AN ABSTRACT OF THE THESIS OF

Jill E. Schrlau for the degree of Master of Science in Chemistry presented on December 11, 2007.

Title: Comparison between Lichen, Conifer Needles, Resin-Based Passive Air Sampling Devices (PASDs), and Snow to Monitor Semi-Volatile Organic Compounds (SOCs) in the Atmosphere

Abstract approved:

Staci L. Simonich

The purpose of this research was to compare four different media that were used to monitor SOC atmospheric concentrations in remote ecosystems. The accumulation of semi-volatile organic compounds, including pesticides, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs), was investigated in lichen, 2-year old conifer needles, resin-based passive air sampling devices (PASDs), and snow. In addition, an analytical method for the trace analysis of these SOCs in lichen, conifer needles, and SOCs in PASDs, was developed and validated. To evaluate the preferential accumulation of SOCs in these media, lichen and conifer needles were collected in 2004, PASDs were collected in 2006 after a 1-year exposure period, and snowpack was collected in spring 2003 and 2004 from the same sites in 5 Western U.S. national parks (NPs), including Sequoia NP, Rocky Mtn. NP, Olympic NP, Glacier NP, and Denali NP. Endosulfan sulfate, a degradation product of the pesticide endosulfan, preferentially accumulated in lichen. Hexachlorobenzene (HCB) and fluorene preferentially accumulated in PASDs, and dacthal, chlorpyrifos, dieldrin, acenapthene, and benzo[ghi]perylene preferentially accumulated in snow. Hexachlorocyclohexanes (HCHs) and PCBs did not preferentially accumulate in any one medium. The influence of SOC physical-chemical properties, including air-water partition coefficient (K_{AW}), octanol-air partition coefficient (Log K_{OA}) and the estimated SOC fraction in the particle phase in the atmosphere (Φ), on accumulation in each medium was also investigated. The effect of SOC physical-chemical properties on medium accumulation was evaluated at all sites from which lichen, conifer needles, PASDs, and snow were collected (82, 85, 33, and 30 sites, respectively). These SOC physical-chemical properties significantly influenced the accumulation of dacthal, endosulfans, trans-chlordane, nonachlors, and several PAHs in several of the media. The results from this research indicate that pesticides and PAHs preferentially accumulate in snow. Therefore, snow should be used, if possible, in short-term studies (months) of SOC concentrations in the atmosphere of remote ecosystems during the winter months. However, lichen may be used instead of snow in warmer regions or for studies that require longer exposure periods and/or summer months. If lichen is not present in the ecosystem, conifer needles may be used; however the measurement of particle-phase SOCs may be limited by needle structure and estimated method detection limits (EDLs). Finally, PASDs may be used for studies interested in the concentration of specific gas-phase SOCs with residence times in the atmosphere over 1 year and for a more quantitative estimate of atmospheric concentrations.

Comparison between Lichen, Conifer Needles, Resin-Based Passive Air Sampling Devices (PASDs), and Snow to Monitor Semi-Volatile Organic Compounds (SOCs) in the Atmosphere

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Jill E. Schrlau, Author

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CONTRIBUTION OF AUTHORS

Dr. Staci Simonich provided experimental design and edits (all Chapters).

Chapter 2: Eli Moore and Lisa Deskin performed most of the initial method development under the advice of Dr. Staci Simonich before I was assigned to the project. Dr. Linda Geiser set up the experimental design and organized field collection of samples.

Chapter 3: Dr. Linda Geiser set up the experimental design and organized field collection of samples. Dr. Kimberly Hageman provided the snow data.

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

Page

CHAPTER 1: Introduction

The primary objective of this research was to develop an analytical method and measure semi-volatile organic compounds (SOCs) in lichen, conifer needles, and resin-based passive air sampling devices (PASDs) from high elevation sites in western U.S national parks. The secondary goal was to compare SOC concentrations in these matrices, with the addition of snow, to determine which media accumulated which SOCs preferentially. The final goal was to determine which SOC physical-chemical properties explained SOC accumulation in lichen, conifer needles, PASDs, and snow.

SOC Transport and Deposition

SOCs are organic compounds with vapor pressures ranging from 10^{-4} to 10^{-11} atm (*1*). Based on the physical-chemical properties of these compounds, SOCs can persist in the environment, bioaccumulate in food webs, have toxic effects, and transfer between different environmental compartments (*2*). SOCs encompass a wide range of chemicals, including current and historic use pesticides, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). The sources of SOCs in the environment are agricultural practices, fossil fuel combustion, and industrial activities.

The transport, deposition, and fate of SOCs are dependent on the physical chemical properties of the compounds. SOCs are transported from a source to other locations through the atmosphere and the distance that a compound is able to travel is dependent on its atmospheric lifetime, phase (gas or particle) in which it exists in the atmosphere, and regional and global wind patterns. SOC deposition from the atmosphere depends on the affinity for that compound to partition from the atmosphere to other environmental compartments. Once deposited, SOC fate is again dependent on the compartment in which the compound resides and physical-chemical properties.

SOCs can undergo regional and long-range transport based on lifetimes and vapor pressures of the compounds. The atmospheric lifetime of SOCs range from hours to months (*3*), therefore SOCs with a shorter lifetime are not transported as far as those with longer lifetimes. SOCs with lower vapor pressures condense from the gas-phase to the particle phase at relatively warm temperatures. Typically, transport of particle phase SOCs will be limited to the regional scale. However, SOCs with higher vapor pressure will exist in the atmosphere in the gas phase and have the potential to be transported long distances, such as remote locations (*1*) on the global scale (*4*). A model has been developed to calculate the characteristic travel distance (CTD) for several organochlorine pesticides (*5*). The type of winds that carry SOCs will also affect the range of transport (*6*).

The mechanisms by which SOCs undergo deposition are dependent on the phase of the compound in the atmosphere and the physical-chemical properties that describe the affinity for the compound to partition from the atmosphere to a different environmental compartment. SOCs with low vapor pressures condense out of the gas-phase onto atmospheric particles (*7*) or terrestrial surfaces in locations with relatively low temperatures in a process known as "cold condensation" (*4, 6, 8*). These SOCs can undergo deposition through wet and/or dry processes and through air-surface exchange (*9-11*). Wet deposition is the washout of gas and particle phase SOCs in the atmosphere via precipitation events, while dry deposition is the gravitational fall out of higher mass particles. The exchange of gas-phase SOCs between terrestrial surfaces and the atmosphere is dependent on the affinity of the SOC for the atmosphere compared to lipid-based matrixes, such as vegetation. This affinity is quantified using the octanol-air partition coefficient, K_{OA}, and has been used to explain the accumulation of SOCs in lipophilic compartments within an ecosystem. K_{OA} has also been used to explain SOC gas-particle partitioning in the atmosphere (*7, 12*).

The preferential accumulation of SOCs in an environmental compartment is also dependent on the properties of an environmental compartment compared to another. The air-water partition coefficient, K_{AW}, describes the potential for an SOC to be present in the atmosphere compared to water. The air-surface exchange of SOCs, based on K_{OA}, can be used to understand preferential accumulation of SOCs in one terrestrial compartment relative to another. For example, SOCs with high K_{OA} values have been found to preferentially accumulate in the humic layer of soil compared to conifer needles (*13*). The octanol-water partition coefficient, K_{OW}, has been used to describe the accumulation potential of SOCs in aquatic ecosystems (*14*). Some SOCs have a high affinity for lipophilic matrices relative to water; therefore there is strong evidence of bioaccumulation of some SOCs in aquatic organisms (*15*). Using these concepts, a model has been developed to asses the fraction of a globally-emitted SOC that will exist in different Arctic surface compartments after a certain period of time (*16*).

The importance of studying the transport, accumulation, and fate of SOCs in terrestrial ecosystems, especially those in remote, high elevations, is the imposed risk imposed on biota and humans. Bioaccumulation of SOCs, based on K_{OW} and K_{OA} values, has been found to occur, and differs between aquatic, terrestrial, and marine food webs (*15*). An Arctic food web study has shown that, despite regulatory efforts to define the potential for a SOC to bioaccumulate using K_{OW}, the ability for a compound to biomagnify is better explained using K_{OA} (*17*).

Some SOCs are carcinogenic and/or estrogenic, and may pose risks to the health of organisms in remote ecosystems, and to humans that rely on this biota for consumption (*18*).

Sampling SOCs from Air

To determine SOC concentrations in air, several sampling devices have been used. Active high volume air samplers (HiVols), powered by electricity, are most frequently used because samples are obtained over short periods of time (~24 hours), collect large volumes of air (600-800m^3), and allow for the collection of SOCs during episodic transport events (*19-21*). However, at more remote sites, passive air samplers (PASs), such as those based on semipermeable membrane devices (SPMDs) (*22, 23*), polyurethane foam (PUF) disks (*24, 25*), and Amberlite styrene divinylbenzene copolymer resin (XAD) (*26, 27*) are more feasible to use. The XAD-based passive air sampling device (PASD) and is a linear uptake sampler, which has a large uptake capacity for SOCs and fast uptake rate (*26*). Because XAD is used as the sampling media, these PASDs can be deployed for up to one year without reaching equilibrium. The average concentration of gas phase SOCs in the atmosphere may be calculated over the exposure time period using the uptake rate for each SOC (*26*).

The measurement of SOCs in snow provides information on inputs to terrestrial ecosystems from the atmosphere through annual snowpack. Snow flakes are ice crystals with large surface areas and are efficient scavengers of both gas and particle phase SOCs (*28*). Gas phase SOCs sorb to the ice crystal at the air-ice interface and particle phase SOCs are trapped within the ice crystal structure (*29, 30*). Dry deposition and/or volatilization can occur at the snow-air boundary layer of a snow pack (*31, 32*). As a snow packs ages, SOC concentrations fluctuate due to changes in the snow surface area (*32-36*). During snowpack melt, model results have shown that relatively water soluble compounds are transported with melt water to lakes (*31, 33, 36, 37*), while less soluble compounds sorb to lipid compartments in the terrestrial ecosystem (*38*).

Forest canopies and plant biomass play a significant role in the global cycling of SOCs. Models have been developed (*39, 40*) and tested (*41*) to demonstrate the role of forest canopies as a filter in the removal of SOCs from the atmosphere. Deciduous forest canopies are a temporary reservoir for SOCs prior to litter fall, are replenished, and therefore, have a strong influence on SOC fate (*40*), particularly SOCs with Log K_{OA} values > 9 (*39*). SOC concentrations in the atmosphere are dependent on forest type (*42, 43*), and atmospheric concentrations are reduced in the spring by the "bud bursting effect" (*44, 45*).

Vegetation, particularly lichen and conifer needles, have been used as passive air samplers and to assess SOC inputs into terrestrial ecosystems. SOC accumulation in vegetation is related to the rate of uptake, which is dependent on the SOC physical-chemical properties, vegetation type, and exposed surface area (*46*). In conifer needles, absorption of SOCs occurs in the waxy surface at a fast rate (*47*). Pesticides, PAHs, and PCBs have been measured in lichen (*17, 48-51*) and conifer needles (*42, 52-56*) in an effort to understand distribution patterns. Vegetation does not only accumulate SOCs, but is also an important intermediate step between the transfer of SOCs from the atmosphere to other environmental compartments such as soil (*45*).

Several studies have compared the accumulation of SOCs in different environmental matrices relative to air. Studies investigating the relationship between SOC concentrations in air and lichen and/or conifer needles have validated the use of vegetation as SOC biomonitors (*51, 55, 57*), or to understand concentrations within distance gradients from sources (*58*). Other studies have compared concentrations in vegetation and soil to investigate preferential accumulation between the two compartments (*13, 59*). PCB concentration profiles in PUF disks and SPMDs passive air sampling devices have been compared (*60*). However, studies that compare a passive air sampler to an environmental matrix at the same site has been limited to soil and SPMDs, PUF disks, or XAD-based PASDs (*25, 61-63*). Comparisons of SOC accumulation in lichen, conifer needles, a passive air sampling device, and snow from the same sites have not been made.

In Chapter 2, the development and validation of an analytical method for the trace measurement of 56 SOCs in lichen and conifer needles is described. The method involves the use of pressurized liquid extraction (PLE), which has only been investigated by one other group in the extraction of SOCs from conifer needles (*54*). Several extract purification steps, including silica solid phase extraction (SPE) and gel-permeation chromatography (GPC), were implemented. There were two major objectives for the development of this method: 1) to maximize the number of measurable SOCs, with physical chemical properties that range in several orders of magnitude, in both lichen and conifer needles and 2) to develop a method that is applicable to different species of lichen and conifer needles.

Chapter 3 describes the results from the measurement of SOCs in conifer needles, lichen, and XAD-based PASDs from 19 sites in the Western U.S. national parks. The primary objectives of this research were to: 1) determine which SOCs preferentially accumulate in each matrix, and 2) determine which physical chemical properties explained the accumulation. The hypotheses were: 1) at sites were all four media were located, preferential accumulation of SOCs occurred among the media could be determined, and 2) there are significant relationships between SOC concentrations and physical-chemical properties (K_{AW}, Log $K_{OA,}$ and Φ) in each media.

This research increases our understanding of SOC accumulation in lichen, conifer needles, PASDs, and snow in high elevation ecosystems and may be used in future SOC inventory and monitoring efforts. In addition, it will compare the strengths and weaknesses of each matrix to provide information on SOC concentrations in the atmosphere.

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CHAPTER 2

Trace Analysis of Pesticides, PAHs, and PCBs in Lichen and Conifer Needles in the Western U.S.

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Abstract

An analytical method for the measurement of 56 semi-volatile organic compounds (SOCs), including pesticides, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs), in lichen and conifer needles was developed and validated. Pressurized liquid extraction (PLE), using dichloromethane (DCM) and ethyl acetate (EA), was used to extract SOCs from vegetation. The percent recoveries over the analytical method were higher for DCM compared to EA. Following PLE, the extract contained matrix interferrants that inhibited the quantification of SOCs. Therefore, several extract purification steps were used, including several subsequent water extractions and silica gel solid phase extraction. Elution solvent ratios for the silica gel fractions were determined based on the amount of interferrants in the fractions and the presence of SOCs in the fractions, and were 100% hexane, 1:1 hexane:DCM, and 100% DCM. These fractions were combined and further cleaned using gel permeation chromatography (GPC). GPC significantly purified conifer needle extracts, however did not improve lichen extracts. The average percent SOC recoveries from lichen and conifer needles were 75.9 ± 13.7 (RSD) % and 74.8 ± 3.8 (RSD) %, respectively. Sample-specific estimated detection limits (EDLs) for lichen and conifer needles ranged from 0.01 to 23.0 ng/g lipid and 0.01 to 58.5 ng/g lipid, respectively.

Introduction

Semi-volatile organic compounds (SOCs) encompass a wide-range of substances including persistent, bioaccumulative, and toxic pesticides (*2*), carcinogenic polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). Deposition of SOCs from the atmosphere to the terrestrial ecosystem can occur through air surface exchange as well as wet and dry deposition (*9-11*). SOCs accumulate in many environmental compartments including sediment, soil, fish, snow, and vegetation. Vegetation is of particular interest because it covers 80% the earth's terrestrial surface, and most leaf surfaces have wax cuticles that promote accumulation of lipophilic SOCs (*64, 65*). Vegetation is considered to be an important source for SOCs to other terrestrial compartments through decomposition of leaf litter (*65, 66*) and plays and important role in the global cycling of SOCs (*64, 67, 68*). Research conducted on a wide-range of vegetation types, including tree bark (*4, 64, 69, 70*), cork (*69*), leaves (*17, 45, 64, 71*), grass (*71, 72*), needles (*13, 53, 55, 56, 64*), moss (*54, 73*), and lichen (*17, 54*), have resulted in a wide array of analytical methods involving extraction, cleanup and analysis of SOCs. Each vegetation type has its own complex matrix interferrants, including lipids and other biological compounds, that result in high variability in SOC concentrations among similar (20-60 % RSD) and different species (*74*).

These SOC extraction methods and cleanup steps for measuring SOCs in vegetation vary and include ultrasonic extraction (*53-55, 64*), supercritical fluid extraction (*64*), Soxhlet (*13, 45, 56, 69-71, 73, 75, 76*), and pressurized liquid extraction (PLE) (*54*). Soxhlet is the most commonly used technique, but has long extraction times (~12-24 hours) and high solvent consumption. PLE is a faster (~ 30-60 mins), more aggressive extraction method with lower solvent consumption compared to soxhlet extraction. Cleanup methods commonly used to remove matrix interferrants that may hinder instrumental analysis and compound quantification include adsorption chromatography using florisil (*13, 17, 50, 53-55, 75*), alumina (*72, 73*), and/or silica columns (*56, 69-71*), with a variety of solvent combinations to elute SOCs while retaining interferrants. To a lesser extent, size-exclusion gel-permeation chromatography (GPC) has also been used to remove high molecular weight matrix interferrants from lower molecular weight SOCs (*17, 71*).

The purpose of this study was to develop and validate a sensitive, precise, and accurate analytical method to measure a wide range of current and historic use pesticides, PAHs, and PCBs in lichen and conifer needles in to samples collected from 19 western U.S. national parks as part of U.S National Park Services' Western Airborne Contaminants Assessment Project (WACAP) (*77*). Due to spatial and meteorological differences between the WACAP sites, the analytical method was required to be applicable to measure SOCs in 15 lichen and 19 conifer species. The detection and quantification of 56 SOCs, with vapor pressures ranging 10^{-7} to 10^{-13}, was accomplished by using PLE, followed by several cleanup steps that included water extraction, silica adsorption chromatography, and GPC and isotope dilution mass spectrometry using both electron impact (EI) and chemical ionization (CI).

Materials and Methods

Sampling

Lichen (*Hypogymnia inactiva*) and conifer needles (*Abies procera*) were sampled from Mary's Peak Observatory, Oregon (44°30'24"N, 123°33'21"W, 1248 masl) in fall 2003. The lichen samples were collected by hand using nitrile gloves while conifer twigs were cut using solvent-rinsed pruning shears. Both samples were stored in Kapak 8"x12" Heat Sealable Metalized Polyester Barrier Film Bags (Kapak

Corp, Minneapolis, MN). The samples were transported to the lab on ice and stored at -20^{o}C until analysis.

Chemicals

The analytical method was developed for 56 SOCs listed in Tables 2.1 and 2.2. The supplier information for the isotopically-labeled SOCs and target standards have been previously reported (*78*). SOCs were quantified using 17 isotopically-labeled surrogates (d_{10}-fluorene, d_{10}-phenanthrene, d_{10}-pyrene, d_{12}-triphenylene, d_{12}-benzo(a)pyrene, d_{12}-benzo(ghi)perylene, d_8-p,p'-DDE, d_8-p,p'-DDT, d_6-methyl parathion, ^{13}C-PCB 101, ^{13}C-PCB 180, d_{10}-chlorpyrifos, ^{13}C-HCB, d_6-g-HCH, d_{14}-trifluralin, d_4-endosulfan I, and d_4-endosulfan II). Internal standards included four isotopically-labeled SOCs (d_{10}-acenaphthene, d_{10}-fluoranthene, d_{12}-benzo[k]fluoranthene, and ^{13}C-PCB 138). Optima Grade solvents were purchased from Fisher Scientific (Fairlawn, NJ).

Extraction

Prior to extraction, unwanted debris, such as tree bark and leaves, were removed from the frozen lichen samples. Conifer needles were aged by year using terminal bud scars and separated from the twig. The frozen lichen and conifer needles were ground using a Büchi Mixer B-400 (Flawil, Switzerland). The porcelain blades were rinsed with Millipore deionized water until clear and the grinding beakers were solvent rinsed between each sample. A sub-sample of the ground, wet tissue was used to measure percent moisture by drying ~3 g at 108^{o}C for 24 hours. Approximately 20 g (ww) of lichen and 10 g (ww) two-year old conifer needles were loaded into a 100 mL ASE cell and the remaining cell volume filled with baked Na_2SO_4. The vegetation at the top of the cell was spiked with target SOCs and labeled surrogates. The vegetation samples were extracted twice with dichloromethane (DCM) using the following PLE parameters: cell temperature 100^{o}C, static time 5 min, solvent flush 75% of cell volume, 1 static cycle, and a N_2 purge time of 240 sec. Ethyl acetate (EA) was also tested as PLE extraction solvent using the same conditions but did not result in significantly higher SOC recoveries. To remove water from the extract, baked Na_2SO_4 was added to the extracts, shaken, and allowed to stand for 10 minutes. This process was repeated until the Na_2SO_4 was free-flowing. The percent lipid in the vegetation was determined gravimetrically by obtaining the dry weight of a 2% v/v aliquot of extract.

Cleanup

The DCM extracts were solvent exchanged to hexane and concentrated with a stream of nitrogen to 25 mL using a Turbovap II at 37^{o}C. To remove polar matrix interferrants, a simple water extraction was performed twice using 25 mL of Millipore deionized water. After the water was added to the extract, the mixture was shaken for 30 seconds and stored at -20^{o}C overnight or until the water was frozen. The extract was transferred into a clean, baked glass bottle and the ice was gently rinsed with hexane, taking care not to dislodge any precipitated plant matter. The extract and hexane rinses were combined and dried again with baked Na_2SO_4. The extracts were then reduced to 3-4 mL using nitrogen.

Additional matrix interferences were removed using 20 g silica solid phase extraction (SPE) columns (Varian, Inc). The column was activated by eluting it with 50 mL of hexane, DCM, and EA at a fast rate. To determine which SOCs eluted from the column using different solvents, SOCs were spiked directly onto the SPE column and eluted using the following 50 mL fractions: hexane:DCM (4:1), hexane:DCM (1:1), DCM, DCM: EA (1:1), and EA. Sample extracts were loaded at the top of the column and eluted with 50 mL fractions of hexane, hexane: DCM (1:1), DCM, and EA, at a flow rate of 0.5 mL/sec. The fractions were then solvent exchanged to DCM, concentrated to 0.2 mL under nitrogen, and analyzed on a Hewlett Packard 5890 Series II gas chromatograph (GC) with a flame ionization detector (FID) to estimate matrix interferences using total ion abundance. The fractions were diluted to 1 mL and filtered using a 25 mm GD/X Disposable PTFE Filter (VWR) with a polypropylene housing and rinsed three times with DCM. The filter rinses were combined with the extract.

The extracts were further cleaned using GPC (Waters) to remove high molecular weight interferrants that were not retained by the silica column (*78*). The GPC columns included a guard column and two methylene chloride Envirogel columns (Waters). Target SOCs were collected after the lipid fraction eluted at approximately 12 min with a flow rate of 5 mL/min. The lipid and analyte fractions were reduced to 0.2 mL with nitrogen. The analyte fraction was analyzed with GC/FID and the lipid fraction was archived.

Instrumental Analysis

The extracts were spiked with internal standards to obtain target SOC and surrogate recoveries over the analytical method. SOC identification and quantitation was achieved using a 30 m x 0.25 mm x 0.25 µm DB-5 column (J&W Scientific, Palo Alto, CA) and an Agilent 6890 GC coupled to a 5793N mass spectrometer (MS) in electron impact ionization (EI) and electron capture negative ionization (ECNI) modes. The ionization mode for each SOC was chosen based on the lowest instrumental detection limits (IDLs). GC/MS parameters and temperature programs have been described elsewhere (*78*).

Results and Discussion

Extraction

The average method recovery of SOCs from lichen (Table 2.1) and conifer needles (Table 2.2) extracted with DCM was 75.9 ± 13.7 (RSD) and 74.8 ± 3.8 (RSD) %, respectively. The extraction efficiency of EA was tested on lichen and proved to be less efficient with percent recoveries ranging from 10 to 50% (data not shown). Therefore, DCM was the preferred solvent for this method.

Solid-Phase Extraction

Preliminary investigations of compound elution in different solvent fractions from the silica column yielded the following results: hexane:DCM contained pesticides (Trifluralin, Hexachlorobenzene, beta HCH, Triallate, Chlorpyrifos, oxy Chlordane, Endosulfans (I, II, and sulfate)), PAHs (Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Retene, Benz[a]anthracene, Chrysene, Triphenylene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[e]pyrene, Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene, Dibenz[a,h]anthracene, and Benzo[ghi]perylene), DDTs (o,p'-DDE, p,p'-DDE, o,p'-DDD, p,p'-DDD, o,p'-DDT, and p,p'-DDT), and some PCBs (PCB 74, 101, 187, and 183), DCM contained most of the chlorinated compounds (Disulfoton, Ethion, Parathion, Phorate, Methoxychlor, Triallate, HCHs (α-, γ-, and δ-), Chlordanes (cis and trans) Nonachlors (cis and trans), Heptachlor, Heptachlor epoxide, Dieldrin, Aldrin, Endrin, Endrin aldehyde, Dacthal, Chlorothalonil, Metribuzin, Mirex)) and more PCBs (PCB 118, 138, and 153), and DCM:EA contained organophosphates and chloroamides (Diazinon, Chlorpyrifos oxon, Malathion, Metalochlor, Acetochlor, Alachlor, Pebulate, EPTC, Propachlor, Atrazine).

The eluted silica fractions were analyzed by GC/FID to estimate matrix interferences and determine which fractions should be combined for SOC quantification. The more non-polar solvent fractions, hexane:DCM and DCM, remained colorless or became slightly pigmented with yellow as the elution proceeded. However, the DCM:EA and EA fractions eluted green (lichen) or brown (conifer needles) matrix bands from the column, which indicated that the solvent mixture was too polar. The GC/FID chromatograms for the DCM and EA fractions from the lichen extracts are shown in Figure 2.1A and B. The ion abundance for EA was two-fold greater than that of DCM, however a higher baseline and the lack of Gaussian-shaped chromatographic peaks indicated that this fraction contained more matrix interferences that could potentially interfere with analyte detection (Figure 2.1B). This result was also observed in the DCM and EA silica fractions of the conifer needles. Because of this co-elution of matrix interferrants, the DCM:EA and EA silica fractions were excluded from further cleanup and analysis and, therefore, some polar analytes were not measured. This was not desirable; however, a method that maximized the number of measurable SOCs by removing matrix interferences was preferred. In addition, these polar SOCs are less likely to partition to vegetation because of low octanol-air partition coefficients (*79, 80*).

GPC

Application of GPC to the combined lichen silica fractions (hexane, hexane:DCM, and DCM) did not substantially improve matrix interferences. Some high molecular weight interferences were removed, however this did not increase the number of SOCs detected. Thus, GPC was not required to measure SOCs in lichen.

Unlike lichen, GPC significantly decreased interferences in conifer needle extracts. Without GPC, only the hexane and hexane:DCM silica fractions had low enough levels of interferences to be analyzed directly by GC/MS, limiting the number of measurable SOCs to 38. By using GPC, the third silica fraction (DCM) was combined with the hexane and hexane:DCM fractions, making it possible to measure 56 SOCs with vapor pressures and Log Koa ranging over 10^{-7} to 10^{-13} and 6 to13, respectively.

Recovery of SOCs and Estimated Detection Limits

The triplicate method for target SOCs from lichen and conifer needles the method were 75.9 ± 13.7 (RSD) % and 74.8 ± 3.8 (RSD) %, respectively. The average surrogate recoveries were 107.1 ± 19.8 (RSD) % for lichen, and 73.1 ± 22.0 (RSD) % for conifer needles. The surrogate recoveries for lichen and conifer were comparable to other methods (*17, 53, 55, 56*).

The sample-specific EDLs for each SOC were calculated following EPA-method 8280A (*81*), using a representative lichen and conifer needle samples from Mount Rainer National Park. The EDLs for lichen and conifer needles are listed in Tables 2.1 and 2.2 and ranged from 0.01 to 23.0 ng/g lipid and 0.01 to 58.5 ng/g lipid, respectively. The EDLs for conifer needles were generally higher than lichen because of higher amounts matrix interferrants in the final extract that decreased the signal-to-noise ratios.

Application of Analytical Method

The analytical method was applied to field triplicate lichen (*Bryoria*) and conifer needle (*Abies lasiocarpa*) samples collected from Olympic National Park in 2003. U.S. current-use (dacthal, g-HCH, and endosulfans) and historic-use pesticides (HCB, a-HCH, *cis*- chlordane, and *cis*- and *trans*-nonachlor) were measured in both lichen and conifer needles (Figure 2.2A). PAHs (fluorene, phenanthrene, fluoranthene, pyrene, retene, chrysene/triphenylene, benzo[a]anthracene, benzo[b]fluoranthene, indeno[1,2,3-cd]pyrene, and benzo[ghi]perylene) were measured in lichen but only retene was also measured in conifer needles (Figure 2.2B). Similarly, PCB 118, 138, 153, and 187 were measured in lichen but only PCB 138 and 153 were measured in conifer needles (Figure 2.2C) (*77*).

The highest concentrations of pesticides, PAHs and PCBs were measured in lichen and ranged from 3.1 to 260 ng/g lipid, 37 to 1226 ng/g lipid, and 1.9 to 6.8 ng/g lipid, respectively (Figures 2.2A, B, C) (*82*). The SOC concentrations in conifer needles were 2 to 50 times lower than lichen collected from the same site. The concentrations for pesticides and PCBs in lichen and conifer needles ranged from 0.2 to 18 ng/g lipid and 0.2 to 0.9 ng/g lipid, respectively. The only PAH measured in conifer needles was retene at 34 ng/g lipid. Based on these results, lichen appears to be a better accumulator of current and historic-use pesticides, PAHs and PCBs compared to conifer needles. This may be a function of longer exposure times for lichen.

To test the applicability of the method to measurement in SOCs in other lichen species, *Alectoria sarmentosa*, was collected at the same site in Olympic NP. Most of the same pesticides measured in *Bryoria* were also measured in *Alectoria*, except for trans-nonachlor (Figure 2.3). The concentrations of dacthal, endosulfans (I, II, and sulfate) and HCHs measured in *Bryoria* were 2-5 times higher than those in *Alectoria*, however HCB was measured at similar concentrations in both species. This difference is most likely attributed to differences in SOC accumulation between species (*9, 71*) Additionally, differences in exposure time may also contribute to the differences in SOC accumulation between species (*83*).

Conclusions

An analytical method that allowed the measurement of 56 SOCs in lichen and conifer needles was developed and validated. The method involved the use of PLE and several cleanup steps, including water extraction, silica solid phase extraction, and GPC (for conifer needles only), to remove as many matrix interferences as possible and allow for the accurate measurement of SOCs. The method was applied to lichen and conifer needles collected from Olympic NP to demonstrate that it is applicable to more than one species. Lichen had higher SOC concentrations compared to two-year old conifer needles, indicating that it may preferentially accumulate SOCs. The pesticide concentrations of two lichen species were compared and variations in the results were attributed to difference in SOC accumulation between the species collected.

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Table 2.1. Recovery of SOCs from lichen over the analytical method. [1]Samples collected at Mary's Peak Observatory (Philomath, Oregon) in 2003. Recoveries were corrected for background concentrations of SOCs in lichen. [2]Sample-specific estimated method detection limits calculated from a sample taken from Mount Rainier National Park. [3]Hexachlorocyclohexane. [4]Dichlorodiphenyldichloroethylene. [5]Dichlorodiphenyldichloroethane. [6]Dichlorodiphenyltrichloroethane.

	Mary's Peak Observatory[1]		EDL[2]		Mary's Peak Observatory[1]		EDL[2]
	Avg. % Rec	% RSD	ng/g lipid		Avg. %Rec	%RSD	ng/g lipid
			Organochlorine Pesticides and Metabolites				
HCH, gamma[3]	73.8	5.6	1.0	dieldrin	120.4	10.0	8.0
HCH, alpha[3]	81.6	4.8	0.9	chlordane, cis	62.4	13.2	2.7
HCH, beta[3]	80.9	0.6	1.9	p,p'-DDD[5]	83.3	9.1	5.3
HCH, delta[3]	88.9	6.5	1.0	nonachlor, trans	56.9	16.8	0.4
methoxychlor	72.6	21.8	7.3	o,p'-DDD[5]	79.2	0.9	7.3
heptachlor epoxide	58.7	13.2	4.6	chlordane, trans	59.0	15.9	0.21
endrin aldehyde	52.0	9.7	0.5	nonachlor, cis	31.3	6.8	0.2
endrin	93.8	13.6	6.9	aldrin	76.0	4.0	2.6
heptachlor	81.8	3.3	1.5	o,p'-DDT[6]	56.8	26.8	13.5
hexachlorobenzene	72.8	1.7	0.01	p,p'-DDE[4]	77.4	1.5	6.4
o,p'-DDE[4]	74.7	3.9	7.1	mirex	139.5	7.6	1.0
chlordane, oxy	57.5	12.0	1.7	p,p'-DDT[6]	94.8	40.6	6.3
			Organochlorine Sulfide Pesticides and Metabolites				
endosulfan sulfate	38.4	22.6	0.4	endosulfan II	64.8	5.9	0.2
endosulfan I	62.0	10.9	1.1				
			Phosphorothioate Pesticides				
methyl parathion	85.7	9.6	54.3	chlorpyrifos	92.7	1.6	0.2
			Miscellaneous Pesticides				
dacthal	68.6	20.0	0.2	trifluralin	94.1	2.0	0.1
triallate	99.8	37.2	0.9				
			Polycyclic Aromatic Hydrocarbons				
acenaphthylene	51.5	10.8	13.7	retene	61.0	93.9	16.0
acenaphthene	68.3	19.6	6.3	benzo[k]fluoranthene (BkF)	68.5	89.1	9.2
fluorene	74.7	6.0	2.7	benzo[a]pyrene (BaP)	87.6	10.6	5.3
anthracene	82.2	1.6	4.9	benzo[b]fluoranthene (BbF)	61.4	87.1	9.1
phenanthrene	68.0	16.4	2.3	indeno[1,2,3-cd]pyrene (Ind)	81.1	2.6	5.9
pyrene (Pyr)	76.7	0.6	1.7	dibenz[a,h]anthracene	79.8	6.4	23.0
fluoranthene (Fla)	75.5	7.9	1.7	benzo[e]pyrene (BeP)	60.7	16.2	7.0
chrysene+triphenylene	87.6	1.2	1.8	benzo[ghi]perylene (BghiP)	88.4	6.5	2.4
benzo[a]anthracene	87.7	1.8	2.4				
			Polychlorinated Biphenyls				
PCB 74	89.0	2.3	9.1	PCB 118	89.9	0.8	0.3
PCB 101	77.3	2.0	3.7	PCB 187	75.7	4.5	0.11
PCB 138	76.2	5.6	0.2	PCB 183	75.9	10.7	0.09
PCB 153	75.5	3.3	0.12				
			Average Recovery, % RSD, and EDL				
average	75.9	13.7	4.6	max	139.5	90.5	54.3
				min	31.3	0.4	0.01

Table 2.2. Recovery of SOCs in conifer needles over the analytical method. [1]Samples collected at Mary's Peak Observatory (Philomath, Oregon) in 2003. Recoveries were corrected for background concentrations of SOCs in needles. [2]Sample-specific estimated method detection limits calculated from a sample taken from Mount Rainier National Park. [3]Hexachlorocyclohexane. [4]Dichlorodiphenyldichloroethylene. [5]Dichlorodiphenyldichloroethane. [6]Dichlorodiphenyltrichloroethane.

	Mary's Peak Observatory Needles[1]		EDL[2]		Mary's Peak Observatory Needles[1]		EDL[2]
	Avg. % Rec	% RSD	ng/g dw		Avg. %Rec	%RSD	ng/g dw
			Organochlorine Pesticides and Metabolites				
HCH, gamma[3]	79.1	1.7	1.9	dieldrin	75.1	9.5	5.8
HCH, alpha[3]	80.2	2.1	1.5	chlordane, cis	57.6	0.9	0.6
HCH, beta[3]	74.8	1.3	1.7	p,p'-DDD[5]	71.7	4.8	6.0
HCH, delta[3]	91.5	2.1	3.1	nonachlor, trans	58.9	3.1	0.2
methoxychlor	84.9	2.4	5.3	o,p'-DDD[5]	71.8	0.5	5.4
heptachlor epoxide	75.4	6.7	1.2	chlordane, trans	82.8	4.6	0.05
endrin aldehyde	24.6	3.7	0.9	nonachlor, cis	30.5	1.8	0.1
endrin	79.5	5.4	14.6	aldrin	72.6	3.8	2.2
heptachlor	85.6	3.2	3.3	o,p'-DDT[6]	57.7	1.8	1.7
hexachlorobenzene	71.0	1.5	0.01	p,p'-DDE[4]	81.1	1.2	1.8
o,p'-DDE[4]	67.0	1.0	3.6	mirex	87.9	0.9	0.4
chlordane, oxy	78.8	7.1	1.6	p,p'-DDT[6]	66.8	0.9	2.5
			Organochlorine Sulfide Pesticides and Metabolites				
endosulfan sulfate	80.6	4.6	0.6	endosulfan II	63.8	1.0	0.7
endosulfan I	62.4	2.6	0.2				
			Phosphorothioate Pesticides				
methyl parathion	51.1	44.4	72.3	chlorpyrifos	68.8	0.6	0.4
			Miscellaneous Pesticides				
dacthal	83.2	3.9	0.1	trifluralin	77.2	0.3	0.1
triallate	92.8	11.2	1.7				
			Polycyclic Aromatic Hydrocarbons				
acenaphthylene	53.2	2.5	2.3	retene	89.0	5.6	16.4
acenaphthene	80.4	9.5	7.1	benzo[k]fluoranthene (BkF)	71.9	2.7	6.5
fluorene	66.3	10.7	3.2	benzo[a]pyrene (BaP)	92.6	0.8	8.4
anthracene	79.1	1.2	10.4	benzo[b]fluoranthene (BbF)	76.3	2.9	7.9
phenanthrene	51.2	5.8	4.8	indeno[1,2,3-cd]pyrene (Ind)	84.3	1.0	16.4
pyrene (Pyr)	79.7	3.1	0.6	dibenz[a,h]anthracene	62.5	3.0	58.5
fluoranthene (Fla)	85.6	5.3	3.7	benzo[e]pyrene (BeP)	81.7	2.7	9.4
chrysene+triphenylene	86.6	2.3	4.3	benzo[ghi]perylene (BghiP)	87.7	1.8	3.0
benzo[a]anthracene	78.2	2.7	13.0				
			Polychlorinated Biphenyls				
PCB 74	97.3	2.3	16.7	PCB 118	89.2	0.8	0.2
PCB 101	81.3	2.4	2.2	PCB 187	85.7	0.9	0.04
PCB 138	78.8	1.9	0.2	PCB 183	79.8	1.1	0.04
PCB 153	81.2	1.7	0.05				
			Average Recovery, % RSD, and EDL				
average	74.8	3.8	5.7	max	97.3	44.4	72.3
				min	24.6	0.3	0.01

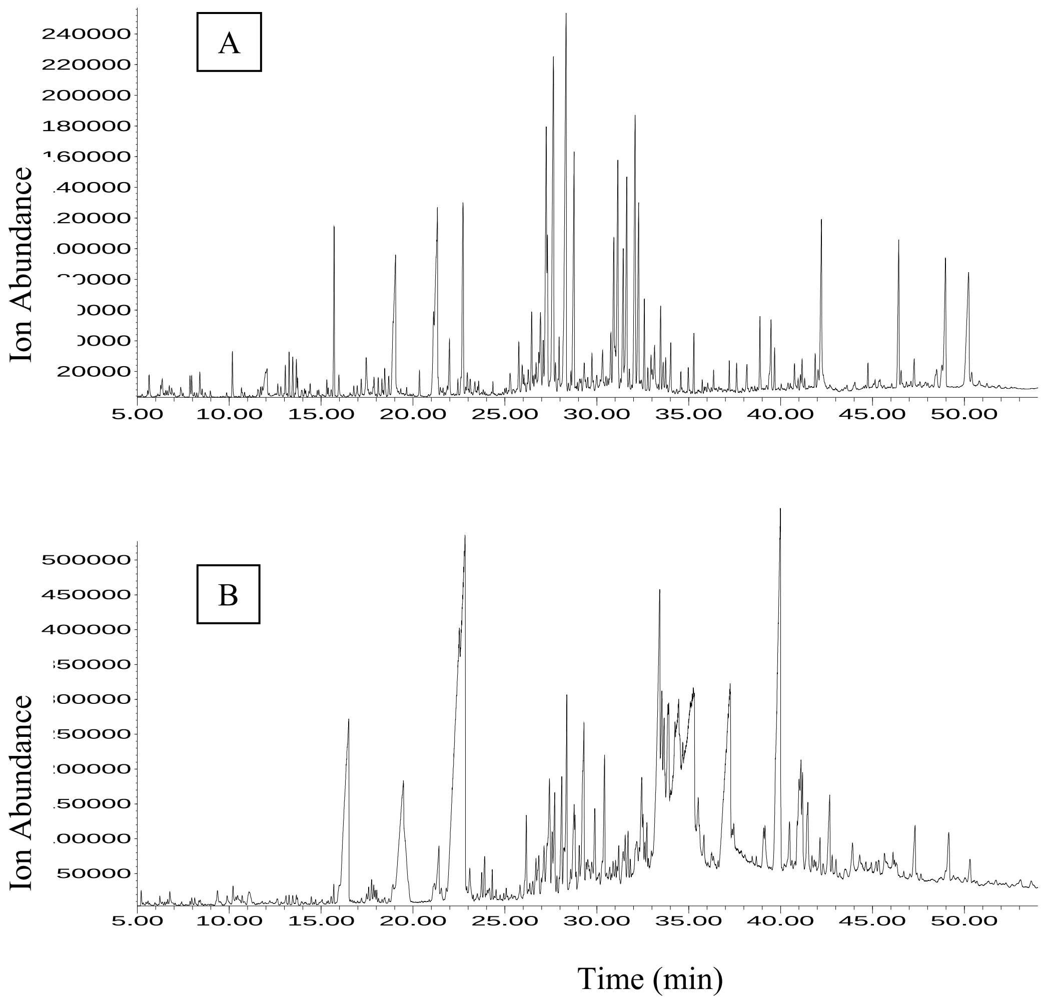

Figure 2.1. Lichen GC/FID chromatograms for DCM (A) and EA (B) fractions from silica solid-phase extraction

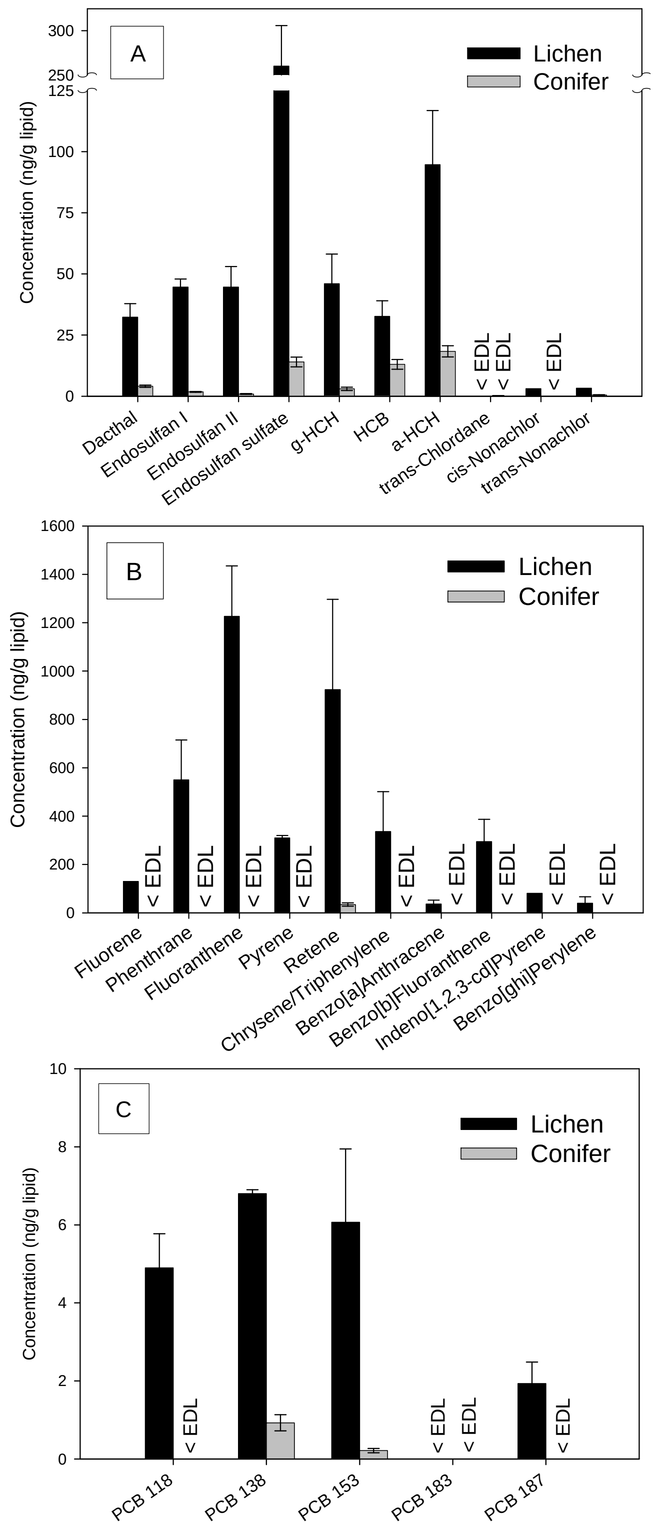

Figure 2.2: Pesticides (A), PAHs (B), and PCBs (C) measured in lichen and conifer needles collected from Olympic NP. SOCs measured in lichen (*Bryoria*, n = 3) and Conifer Needles (*Abies lasiocarpa*, n = 3). Error bars represent the standard deviation of the mean. < EDL = Concentration below the estimated detection limit.

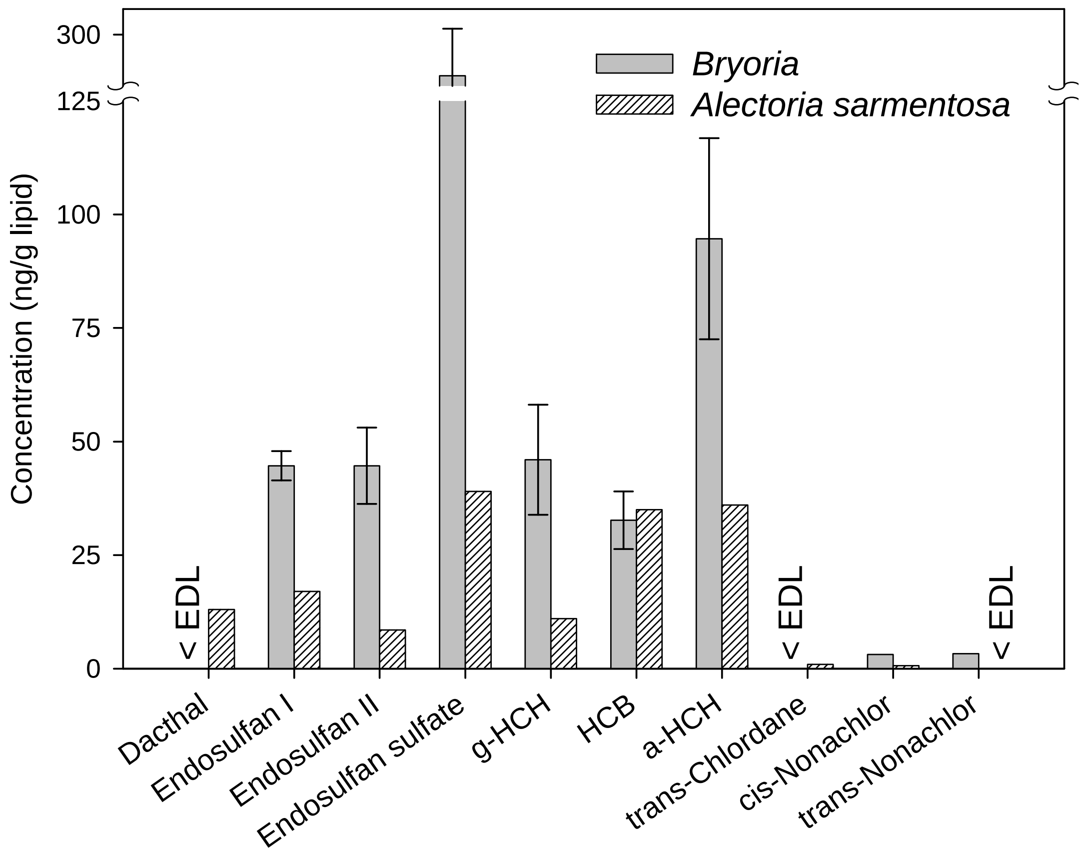

Figure 2.3. Pesticide concentrations in two lichen species collected from Olympic NP Pesticides measured in two lichen species: *Bryoria*, n = 3 and *Alectoria samentosa*, n = 1. Error bars represent the standard deviation of the mean. < EDL = Concentration below the estimated detection limit.

CHAPTER 3

Comparison between Lichen, Conifer Needles, Resin-Based Passive Air Sampling Devices (PASDs), and Snow to Monitor Semi-Volatile Organic Compounds (SOCs) in the Atmosphere

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Abstract

The preferential accumulation of pesticides, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) was evaluated in lichen, two-year old conifer needles, resin-based PASDs, and snow collected from the same sites in 5 Western U.S. national parks, including Sequoia NP, Rocky Mtn. NP, Olympic NP, Glacier NP, and Denali NP. Lichen and conifer needles were collected in 2004, PASDs were collected in 2006 after a 1-year exposure period, and annual snowpack was collected in spring 2003 and 2004. The influence of SOC physical-chemical properties, including air-water partition coefficient (K_{AW}), octanol-air partition coefficient (Log K_{OA}) and the estimated SOC fraction in the particle phase in the atmosphere (Φ), on accumulation in lichen, two-year old conifer needles, resin-based PASDs, and snow was also investigated at all sites from which samples were collected (82, 85, 33, and 30 sites, respectively). The highest total pesticide, PAH, and PCB concentrations (ng/g lipid) were measured in lichen and conifer needles. SOC concentrations were converted to percent of the total SOC concentration to account for concentration differences between the media. The SOCs that preferentially accumulated (p-value ≤ 0.05) in each medium were as follows: lichen preferentially accumulated endosulfan sulfate and cis-chlordane, conifer needles preferentially accumulated cis-chlordane, PASDs preferentially accumulated HCB and fluorene, and snow preferentially accumulated dacthal, chlorpyrifos, dieldrin, acenapthene, and benzo[ghi]perylene. Cis-nonachlor preferentially accumulated in lichen, conifer needles, and snow compared to PASDs. The accumulation of other SOCs, including hexachlorocyclohexanes (HCHs), endosulfan I and II, trans-chlordane, trans-

nonachlor, trifluralin, most PAHs, and PCBs, was not statistically different among the media. The accumulation of dacthal, endosulfans, trans-chlordane, nonachlors, and selected PAHs were significantly influenced by K_{AW}, Log K_{OA}, and Φ in several of the media. In general, a significant positive correlation was observed between K_{AW} and a significant negative correlation was observed for Log Koa and Φ in lichen, conifer needles, and PASDs. In contrast, a significant negative correlation was observed between K_{AW} and a significant positive correlation was observed for Log Koa and Φ in snow. The results from this research indicate that pesticides and PAHs preferentially accumulate in snow. Therefore, snow should be used, if possible, in short-term studies (months) of SOC concentrations in the atmosphere of remote ecosystems during the winter months. However, lichen may be used instead of snow in warmer regions or for studies that require longer exposure periods and/or summer months. If lichen is not present in the ecosystem, conifer needles may be used; however the measurement of particle-phase SOCs may be limited. Finally, PASDs may be used for studies interested in the concentration of gas phase SOCs in the atmosphere over 1 year and for a more quantitative estimate of atmospheric concentrations.

Introduction

Semi-volatile organic compounds (SOCs) are deposited from the atmosphere to the terrestrial ecosystem and their route of deposition is dependent on the phase in which the SOCs exist in the air (*1-3*). Several factors influence gas-to-particle partitioning in the atmosphere, including SOC vapor pressure, Henry's Law Constant (H), temperature and total suspended particle concentration (TSP) (*4*). SOCs with higher vapor pressures (~10^{-7} to 10^{-9} atm) tend to reside in the gas phase while those with lower vapor pressures (~10^{-9} to 10^{-13} atm) exist in the particulate phase (*4*). An estimate of which SOCs are present in the particle phase, and in what proportion, can be calculated using the octanol-air partition coefficient, (K_{OA}), TSP, the organic content of the particles that is available for absorption, f_{oc}, and ambient temperature (*5-8*).

SOCs have been sampled from the atmosphere using a variety of environmental matrices, including vegetation (*9*), passive air sampling devices (PASDs) (*10*), and precipitation (*11*). SOCs are sampled from the atmosphere through different mechanisms that are media dependent. In this study, lichen, conifer needles, PASDs, and snow are the media of interest.

Vegetation is a passive air sampler that naturally exists in the terrestrial ecosystem. Many studies have used terrestrial vegetation, including lichen and conifer needles, to monitor SOCs in air because of their large surface area and waxy cuticles that accumulate lipophilic SOCs (*12, 13*). SOCs are accumulated in lichen and conifer needles through wet and dry deposition and through the interaction between the waxy exterior of the foliage and SOCs in the gas phase (*1-3*).

PASDs can be deployed in remote ecosystems where electrically-powered high volume air samplers cannot be operated. PASDs, based on semi-permeable membranes (SPMDs) (*14, 15*), polyurethane foam (PUF) disks (*16, 17*), and Amberlite styrene divinylbenzene copolymer resin (XAD-2) (*10, 18*), have been used to sample SOCs from the atmosphere. The XAD-based PASD has a high uptake capacity compared to the other PASDs and is preferred for long sampling periods (~1 year). Results from studies conducted on the PASD housing design have shown that the effect of wind on SOC accumulation is minimal and that SOC partitioning from the atmosphere to the XAD resin is controlled by molecular diffusion (*10*). Therefore, only gas phase SOCs are accumulated in this PASD design (*10*).

Precipitation, including snow, effectively scavenge SOCs from the atmosphere and this scavenging has been explained using models (*19, 20*) and investigated through field studies (*11, 21-23*). Falling snow is an efficient scavenger of both gas and particle-bound SOCs in the atmosphere due to the large surface area of the ice crystals (*24*). During a snow event, gaseous SOCs undergo sorption at the air-ice interface of the snow crystal, while particle phase SOCs are trapped within the structure (*21, 22*). Gas exchange at the snowpack boundary layer can increase or decrease SOC concentrations through dry gaseous deposition and/or volatilization, respectively (*20*). Volatilization of more volatile SOCs, such as hexachlorocyclohexanes (HCHs), from the snow pack occurs rapidly after deposition due to changes in the specific snow surface area (*19, 23, 25, 26*).

The purpose of this study was to compare and contrast the accumulation of SOCs in lichen, conifer needles, XAD-based PASDs, and snow from the same remote sites and to provide information on which media should be used to monitor SOCs based on the SOC physical chemical properties and media characteristics. There were two hypotheses for this study: 1) preferential accumulation of SOCs occurred in all four media collected from the same site, and 2) the SOC accumulation in each of the media was significantly correlated with SOC physical-chemical properties (K_{AW} and Log K_{OA}) and Φ.

Materials and Methods

Sampling Sites

Lichen was collected from Sequoia NP, Rocky Mountain NP, Mount Rainier NP, Olympic NP, Denali NP, Noatak National Preserve, and Gates of the Arctic NP and Preserve in summer 2004 and from Grand Teton NP, Great Sand Dunes NP and Preserve, Big Bend NP, Bandelier National Monument, Crater Lake NP, Katmia NP and Preserve, Lassen Volcanic NP, North Cascades NP, Stikine LeConte Wilderness, Wrangell-St.Elias NP and Preserve, and Yosemite NP in summer 2005 (Figure 3.1 and Table 3.1). Two-year old conifer needles were collected from the same national parks and at the same time as lichen (Table 3.2). However, conifer needles were not collected from Noatak National Preserve and Gates of the Arctic NP and Preserve because these sites were located above the tree line. PASDs were deployed in summer 2005 at these same national parks for a period of 1 year and retrieved from the field in summer 2006 (Table 3.3). Annual snowpack samples were collected from Sequoia NP, Rocky Mountain NP, Mount Rainier NP, Denali NP, Noatak National Preserve, and Gates of the Arctic NP and Preserve in March or April 2003, 2004, and 2005

(Table 3.4) (*11, 27*). Annual snowpack samples were collected from Olympic NP in 2004 and from North Cascades NP in March or April 2005.

Vegetation Method

Sampling Method

Lichens were collected by hand using nitrile gloves and conifer twigs with needles were cut from the tree with solvent-rinsed pruning shears. Lichen and conifer needles were stored in Kapak 8”x12” Heat Sealable Metalized Polyester Barrier Film Bags (Kapak Corp, Minneapolis, MN) on ice and shipped to the lab. The samples were stored at -20^{0}C until analysis.

Analytical Method

The vegetation analytical method has been described in detail in Chapter 2. In brief, lichen and two-year old conifer needles were ground and packed into 66 mL ASE cells. The top of the vegetation was spiked with isotopically-labeled surrogates (d_{10}-fluorene, d_{10}-phenanthrene, d_{10}-pyrene, d_{12}-triphenylene, d_{12}-benzo(a)pyrene, d_{12}-benzo(ghi)perylene, d_8-p,p’-DDE, d_8-p,p’-DDT, d_6-methyl parathion, ^{13}C-PCB 101, ^{13}C-PCB 180, d_{10}-chlorpyrifos, ^{13}C-HCB, d_6-g-HCH, d_{14}-trifluralin, d_4-endosulfan I, and d_4-endosulfan II), and extracted with dichloromethane (DCM) using Pressurized Liquid Extraction (PLE). The extract was purified using water extraction and 20 g silica solid-phase extraction columns (Varian, Inc). Selected silica fractions were combined based on the amount of matrix interferrants in the extract. The conifer needle extract required further cleanup, therefore gel permeation chromatography (GPC) was used to separate high molecular weight biomolecules from lower molecular weight target SOCs. The combined lichen silica fractions and the conifer target fraction from the GPC were concentrated to 0.2mL using a fine stream of nitrogen. The extracts were spiked with internal standards and diluted 8 times. Laboratory blanks, consisting of baked Na_2SO_4, were included with every set of 6 samples.

PASD Method

Deployment and Sampling

Stainless steel wire mesh sampling tubes, travel tubes, and sampler housing were constructed based on a previous design (*10*). Amberlite XAD-2 resin (Supelco) was cleaned with ethyl acetate (EA) and DCM and using PLE prior to use. The XAD-2 resin was packed into a 66 mL Accelerate Solvent Extraction (ASE) cell (Dionex) with a quartz fiber filter at both ends, and extracted 3 times with EA with the following PLE method: Heat for 5 mins, static for 5 mins, 50% flush, purge for 240 sec, 1 cycle. The XAD-2 was then extracted twice with DCM using the same PLE method, except for the use of 2 cycles. Baked, solvent-rinsed stainless steel wire mesh sampling tubes were fit with a baked glass wool plug and 20 mm crimp cap (Wheaton Science Products, Millville, NJ) on the bottom (*10*). The XAD-2 was transferred from the ASE cell to the sampling tubes. The top of the sampling tube was sealed with glass wool and a crimp cap and placed into an air-tight, baked aluminum travel tube (*10*). The travel tube design deviated slightly from previous designs (*10*) because the bottom was permanently sealed with a press-to-fit aluminum plug and the top was a push cap with a radial-seal o-ring instead of a screw cap. A small diameter machine screw was used to ensure the security of the cap. The samplers were stored at 0^0C until shipped to the national parks for deployment.

The housing was designed to protect the PASD from precipitation, animal life, and strong winds (*10*). Validation of this PASD design for SOC accumulation using this housing was previously conducted (*10*). The sampling tube was hung in the center of the housing by a hook and stabilized with a wire grid that was fit inside of the housing. The PASD housing was hung from a tree with a rope attached to the top of the housing at a height of ~5 m or above an estimated height of snow accumulation, whichever was greater. The bottom of the sampler was anchored to the tree by a second rope to ensure the position of the housing remained vertical for the duration of the sampling. The PASDs were deployed during the summer (June through September) in 2005 at sites from which lichen and conifer needle samples were collected in 2005. Therefore, PASD and lichen exposure did not overlap.

The PASDs were harvested approximately 1 year ± 1 month from the deployment date. The sample tube was gently removed from the housing, placed into the sealed travel tube and wrapped in a Ziploc bag in the field. The travel tubes were stored at ~20^{0}C until being shipped to the lab. The sample tubes were stored at 0^{0}C until analysis.

Field blanks and travel blanks were used to assess SOC contamination. Both blanks consisted of a sample tube sealed inside of a travel tube and the sampling tube did not have direct contact with the air except if there was a leak in the travel tube. The field blank was attached to the top of the sampler housing for the duration of the sampling time (1 year) at 28% of the sites. Travel blanks were used to assess contamination during transport to and from the sites. Travel blanks were sent to 54% of the parks with PASDs that were to be deployed, carried to the site, and sent back to the lab for analysis. A second set of travel blanks were sent to 10% of the parks when the PASDs were retrieved from the field. The field and travel blanks were treated the same as samples in the analytical method.

Analytical Method

Following PASD deployment and retrieval, the XAD-2 and glass wool were transferred from the sampling tube to a 66 mL ASE cell with a quartz fiber filter on both ends. Excess space in the cell was filled with a known amount of clean, baked Na_2SO_4. Samples were spiked with isotopically-labeled surrogates and extracted with the same PLE method that was used to clean the XAD-2. The dry weight for the XAD-2 was obtained for each PASD after the extraction, averaged, and used to convert SOC concentration units from pg/PASD to pg/g XAD. The extracts were concentrated with nitrogen to 0.2 mL and spiked with internal standards.

To obtain SOC recoveries for the analytical method, clean XAD-2 was spiked with target SOCs and labeled surrogates and were extracted with PLE in triplicate. The extracts were concentrated under a fine stream on nitrogen and spiked with internal standards prior to analysis by GC/MS. The average SOC recoveries from XAD-2 was 93.7 ± 5.6 (RSD) % (Table 3.5).

Snow Method

Snow Sampling

The snow sampling method has been described previously (*11*). Briefly, snow was collected in March or April of 2003, 2004, and 2005. Snowpits were dug to the ground and ~50 kg of snow was scraped in a vertical direction along the length of the pit using solvent-rinsed polycarbonate resin shovels. The snow sample was divided between 6 solvent-rinsed 60 x 60-cm polytetrafluoroethylene (PTFE) bags and then wrapped in black polyethylene bags to minimize light exposure. The samples were shipped to the lab on dry ice and stored at -20°C until analysis. Field blanks were collected by pouring pesticide-grade water (EMD Chemicals, Gibbstown, NJ) over the shovels into PTFE bags.

Analytical Method

The analytical method for snow has been described elsewhere (*28*). In brief, the samples were melted without heat for ~36 hours within the tightly sealed collection bags. Once melted, 1 mL methanol-labeled surrogate slurry was divided between the 6 bags. Extractions were performed using two modified Speedisks that contained hydrophobic and hydrophilic resins, a vacuum manifold, and a remote sample adapter at a flow rate of ~200 mL/min. The collection bags were rinsed with 40 mL each of EA, EA:DCM, and DCM and used to clean the extraction apparatus in series. The SOCs in the particulate phase and dissolved phase were not separated; therefore extracts represented the total SOC concentration in the snow sample.

Snow extracts required further cleanup to remove polar interferences (*28*). This was achieved using a 20-g silica SPE cartridge (Varian) with 50 mL fractions of DCM and DCM:EA. The silica fractions were combined and solvent exchanged to DCM. The extract was reduced, filtered with a 0.45-µm PTFE syringe filter, and run on GPC to remove high molecular weight compounds. The target fraction from the GPC was concentrated to 0.2 mL using nitrogen and spiked with internal standards prior to analysis by GC/MS.

Instrumental Analysis

All lichen, conifer needles, PASDs, and snow extracts were analyzed for SOCs using an Agilent 6890 GC with a 30 m x 0.25 mm x 0.25 µm DB-5 column (J&W Scientific, Palo Alto, CA) coupled to a 5793N mass spectrometer in electron impact ionization (EI) and electron capture negative ionization (ECNI) modes. The GC temperature programs and ions monitored have been described elsewhere (*28*).

Estimated Method Detection Limits

The sample-specific estimated detection limits (EDLs) for all target SOCs in lichen, conifer needles, PASDs, and snow were determined following EPA-method 8280A (*29*). EDLs were calculated for lichen, conifer needles, and PASDs using a representative sample from Mount Rainer NP and for snow using a representative sample from Sequoia NP. EDLs for lichen, conifer needles, PASDs and snow ranged from 0.01 to 54.3 ng/g lipid (Table 2.1), 0.01 to 72.3 ng/g lipid (Table 2.2), 0.0002 to 0.2 ng/g XAD (Table 3.5), and 0.2 to 124.8 pg/L (*28*), respectively.

Statistical Analysis

SOC Accumulation in Media

To evaluate the accumulation of SOCs among lichen, conifer needles, PASDs, and snow with statistical analysis, the data required some manipulation. The SOC concentrations in vegetation, PASDs and snow were converted to units of pg/g lipid (from pg/g ww using g ww/g lipid), pg/g XAD (from pg/PASDs using the average dry weight of XAD in the PASDs), and pg/g (from pg/L in melted snow using the density of water), respectively. The units for vegetation, pg/g lipid, were chosen because SOCs accumulate in the lipid portion of plant tissue (*12*, *13*) and normalizing SOC concentrations by the lipid content of vegetation accounts for concentration differences between samples and species (*30*). For PASDs, the average dry weight for XAD-2 was 32.3 ± 4.17 (%RSD) g. The average weight of XAD in the PASDs was used to convert from pg/g PASD to pg/g XAD because the variability in the XAD mass in the PASDs was low. To avoid bias based on differences of SOC concentrations, the SOCs were grouped by ΣPesticides, ΣPAHs, and ΣPCBs for interpretation. The total concentration for each group was calculated and the average percent of each SOC within the group and media was determined. For statistical analysis, one-half EDLs were used in place of non-detected SOC concentrations (*31*), and were included in the dataset for each medium if one other concentration was an actual measurement. If all the concentrations for a particular SOC were composed of ½ EDLs, then the SOC was considered to be not detected (ND) and the EDLs for that SOC were excluded from the analysis.

In general, statistical analyses of proportions such as this may require the use of a transformation known as the acrsine square root transformation (*32*). To determined if this transformation was necessary, residual plots of the percent SOC concentration (original data) and the acrsine square root percent SOC concentration (transformed data) were compared (*33*). The residual plots for the transformed data showed a more random distribution compared to the residual plots for the original data (*32*). Therefore, the arcsine square root transformed data was used in the statistical analyses.

To examine the preferential accumulation of each SOC among the four media, Tukey-Kramer honestly significant difference (HSD) tests were performed (*34*). For each SOC, Tukey-Kramer HSD compared the transformed average percent concentration within one medium to the transformed average percent concentration in the other three media. The test determined if the transformed average percent concentration in one medium was significantly different from the other media, where alpha ≤ 0.05.

The preferential accumulation of each SOC among the four media was investigated at sites where all four media were located (n = 5). These sites included Sequoia NP (Emerald Lake), Rocky Mountain NP (Mills Lake), Glacier NP (Snyder Lake), Olympic NP (Hoh Lake), and Denali NP (Wonder Lake), as indicated on Tables 3.1 through 3.4. A previous study on SOC concentrations in snow has shown that local and regional transport of SOCs influence SOC concentration in the national parks to varying degrees (*11*). Therefore, park was included as a factor in the Tukey-Kramer HSD test to account for spatial influences on SOC concentrations.

The exposure period for each medium is listed in Table 3.6. The age of lichen cannot be determined; therefore, the exposure period was unknown. However, two-year conifer needles, collected in summer 2004, accumulated SOCs from 2002 to 2004. PASDs were deployed for 1 year from summer 2005 to summer 2006 and did not overlap in time with the lichen or conifer needle exposure period. Snow samples were collected in winter 2003, 2004, and 2005 and accounted for SOC accumulation during November through March. Only SOC concentrations in snowpack collected in March 2003 and 2004 were included in the evaluation of SOC preferential accumulation in the media because the exposure period of the 2005 snow samples did not overlap with the exposure periods of the other media.

Factors Governing Accumulation

The influence of SOC physical-chemical properties on SOC accumulation in all four media was investigated using multiple linear regression (MLR) models. For each SOC and media, MLRs were used to evaluate the significance of the physical-chemical properties on accumulation in each medium, while accounting for the spatial differences between sites using environmental parameters.

The environmental parameters included in the MLR models were temperature (K) (*35*), precipitation (cm) (*35*), ammonia nitrate and ammonia sulfate concentration (µg/m^3) (*36*), elevation (m), latitude (degrees), longitude (degrees), population within a 150 km radius from the site, distance to the western coastline of the U.S. (km), and agriculture intensity within a 150 km radius from the site (% cropland) (*11*). The values for all of the environmental parameters at each, and for all four media, are listed in Appendix A.

Site-specific average maximum temperatures (K) and precipitation (cm) were obtained from the Parameters-elevation Regressions on Independent Slopes Model (PRISM) (*35*). PRISM used precipitation, temperature, and other climate-related measurements from meteorological stations to estimate monthly and yearly continuous climatic parameters that were extrapolated to a digital grid. Individual year data for mean monthly maximum temperature and mean precipitation were averaged over the exposure period for each medium listed in Table 3.6 for sites in the lower 48 states. Individual year data was not available for Alaskan sites, therefore 30-year mean monthly maximum temperature and mean precipitation for each month during the exposure period was used. The average monthly maximum temperatures and average monthly precipitation at all sites are listed in Appendix A.

Ammonium nitrate and ammonium sulfate concentrations in the atmosphere were obtained from Interagency Monitoring of Protected Visual Environments (IMPROVE) (*36*). Ammonium nitrate and ammonium sulfate concentrations (µg/m^3) was measured in fine particulates (<2.5 µm), in 24 hour samples, taken three times a week from the IMPROVE Aerosol module located in the national parks and wilderness areas. Concentrations between 1998 and 2004 were averaged to minimize year-to-year variability. These measurements were used as an alternative estimate of agricultural intensity by assuming ammonium sources originated from agricultural fertilizers. Preliminary analysis of correlations between vegetation SOC concentrations and average ammonium nitrate and ammonium sulfate concentration showed a stronger correlation between ammonium nitrate concentration and SOC concentrations. Therefore, ammonium nitrate concentration in the park was included in the multiple linear regression models and not ammonium sulfate concentration (Appendix A).

Temperature-corrected K_{AW} and K_{OA} values for all the sites in which the media were collected was determined. K_{AW} values were calculated using temperature variation equations for H provided by HenryWin 3.10 (EPI Suite 3.20) (Appendix B) and the average monthly maximum temperature during the accumulation time period from the PRISM model. Log K_{OA} was calculated using the site temperature-corrected specific K_{AW} values divided by K_{OW} (estimated using KOWIN 1.67) (Appendix C). K_{OW} was not corrected for site temperatures because of its limited temperature dependence (*37*).

Another property of interest was the estimated fraction of each SOC on the atmospheric particles (Φ) (*5-8*). At colder temperatures, gas-phase SOCs may partition onto atmospheric particles that influence their mode of deposition. The potential for each medium to accumulate SOCs based on the fraction in the particle phase may be an important predictor of preferential accumulation. The percent particle fraction was calculated using the K_{OA} absorption model that is described with the following equations (*7, 8*):

$$LogK_P = LogK_{OA} + Logf_{oc} - 11.91 \quad \text{Eqn. 1}$$

$$\Phi = \frac{K_P TSP}{(K_P TSP + 1)} \times 100 \quad \text{Eqn. 2}$$

where K_P is the particle-gas partition coefficient and Φ is the percent particle fraction of a specific SOC in the atmosphere. The value of K_P, which describes the phase distribution of the SOCs in the particle phase, C_p, to those in the gas phase, C_g, was estimated using K_{OA} and f_{oc} (*6, 7*). Temperature-specific Log K_{OA} values and assumed values for TSP and f_{oc} (0.25 µg/m^3 and 0.2, respectively) (*8*) at remote sites (*38*) were used to calculate K_P and Φ. A linear relationship between Log K_P and Log K_{OA} has been observed for PAHs and indicates that temperature-corrected K_{OA} effectively accounts for the temperature dependence of K_P (*6, 8*). Temperature-specific Φ values for pesticides, PAHs, and PCBs at each site are listed in Appendix D.

Co-linearity between the environmental parameters and SOC physical-chemical properties used in the MLR models was evaluated using Pearson's Correlation coefficient, which measures the linear relationship between two variables (*32*). If two variables resulted in a Pearson's Correlation of ≥ 0.7, one of the two variables was removed from the MLR full model (*39*). Temperature, latitude, and longitude had a Pearson's correlation coefficient of 0.7 or greater with each other and the SOC physical-chemical properties of interest (K_{AW}, Log K_{OA}, and Φ). The physical-chemical properties also showed significant co-linearity with each other. Log K_{OA} was used to construct the reduced MLR models because all four media were associated with octanol-based properties. Log K_{OA} and Φ were substituted into the final MLR model, one at a time, to determine the significance of the physical-chemical properties. Performing the MLR analyses in this manner prevented bias in the results by testing the relationship between SOC percent concentration and the SOC physical-chemical properties in each medium, while accounting for different environmental parameters among the sites, and not the affect of environmental parameters on the properties.

A full MLR model, containing the environmental parameters without co-linearity, temperature (K) (*35*), precipitation (cm) (*35*), ammonia nitrate ($\mu g/m^3$) (*36*), elevation (m), population within a 150 km radius around the site, distance to the coast of the western U.S. (km), and agriculture intensity within 150 km radius around site (*11*), was reduced step-wise using backward elimination based on the significance of each parameter (p-value ≤ 0.05) (*32*). The affect of species differences on SOC concentration was considered for lichen and two-year conifer needles by building a model that included species and a second model that did not include species. A measurement of how well both MLR models fit the data was determined using Akaike's Information Criterion (AIC) (*40-42*). The AIC was calculated for each model and the one with a smaller value was chosen. The statistical analyses were performed using S Plus 7.0.

The MLR models included log SOC concentrations from all the sites for each medium. Statistics were not performed on SOC concentrations that were composed of more than 50% EDLs. The number of sites for lichen, conifer needles, PASDs, and snow were 82, 85, 33, and 30, respectively (Tables 3.1 to 3.4). The lichen and two-year conifer needles were collected in summer 2004 and 2005, the PASDs were collected in summer 2006 after an exposure time of 1 year, and SOC concentrations in the snowpack collected in 2003, 2004, and 2005 were averaged.

Results and Discussion

Although the four media were located at the same five sites, other factors may contribute to differences in SOC concentrations among the media, including structural differences that affect the media's affinity for SOCs, the lack of temporal overlap in the exposure period, and the length of exposure. However, the preferential accumulation of SOCs in each media can be accounted for by comparing the percent of each SOC out of the total pesticide, PAH or PCB concentration. The lack of overlap in the exposure period for the media at the sites may not significantly influence the accumulation of SOCs. Although the SOC concentrations in snow collected in 2003, 2004, and 2005 were significantly different, the profile of the percent concentrations were not significantly different (*27*). Therefore, the percent SOC concentration in the media may not vary significantly between the sampling years at these sites. The length of exposure time may affect the SOC concentrations in the media but not the preferential accumulation. Despite these factors, the evaluation of the preferential accumulation of SOCs in the media located at the same sites was possible.

SOC Concentration in Samples

Total concentrations for 8 of the most frequently measured pesticides in the media are shown in Figure 3.2. The total pesticide concentration for each park in each medium is shown in parentheses in the key for Figure 3.2. The highest total pesticide concentrations were measured in lichen or conifer. At Glacier NP, Sequoia NP, and Olympic NP, total pesticide concentrations were highest in lichen and ranged from 131 ng/g lipid in Olympic NP to 1.53 µg/g lipid in Glacier NP. Rocky Mtn. NP and Denali NP, the highest concentrations were measured in conifer needles (46.8 ng/g lipid and 6.90 ng/g lipid, respectively). The lowest total pesticide concentrations measured in PASDs and ranged from 1.22 ng/g XAD to 2.00 ng/g XAD at Sequoia NP, Rocky Mtn. NP, and Glacier NP, and in snow from 0.192 ng/g to 0.309 ng/g at Olympic NP and Denali NP, respectively. The concentration of total chlordanes in lichen and PASDs from this study were within the range measured in lichen from Ontario (*43*) and PASDs from Costa Rica (*44*); however, the concentration of a-HCH in the current study were 4 times greater than lichen from Ontario (*43*) and 4 to 10 times greater than PASDs from Costa Rica (*44*). In conifer needles, the concentration of endosulfan II was within the range of concentration measured in needles collected from the Canadian Rocky Mtns. in 1999 and 2000 (*45*). The concentrations of HCB and a-HCH were also similar in conifer needles from the Canadian Rocky Mtns., however concentrations at Glacier NP were 2 fold higher than the other study (*45*). Pesticide concentrations, including a- and g-HCH and endosulfan I, in snow were in the same range as snowpack collected in the mountains of British Columbia in 1996 (*46*). In a different study conducted east of Lake Superior in 1999 to 2000, the pesticide concentrations in snowpack were up to 3 orders of magnitude higher than reported here (*23*).

The total concentrations for 14 PAHs measured in the media are shown in Figure 3.3. The highest concentration of total PAHs were consistently measured in lichen at all the parks and ranged from 24.7 ng/g lipid in Denali NP to 97.6 µg/g lipid in Glacier NP while the lowest concentrations were measured in snow (0.637 pg/g in Denali NP to 556 pg/g in Glacier NP). Concentrations of total PAHs in lichen from this study were higher compared to concentrations in lichen collected near a Pyrenees tunnel by two orders of magnitude (*47*). Although most PAHs were not detected in conifer needles in this study, other studies have measured PAHs (*12, 13, 48*). PAH concentrations in snow measured in this study were similar to PAH concentrations measured in Minneapolis/St. Paul Minnesota snowfall in March 1992 that followed a rain event (*49*).

The concentration of 5 PCBs are shown in Figure 3.4. The highest total PCB concentrations were measured in lichen at Sequoia NP, Olympic NP, and Glacier NP, ranging from 4.30 ng/g lipid in Olympic NP to 10.1 ng/g lipid in Glacier NP. The highest total PCB concentration was measured in conifer needles at Rocky Mtn. NP (2.20 ng/g lipid). PCBs were measured in PASDs only at Sequoia NP (508 pg/g XAD) and the concentration in snow (0.0470 pg/g) was lower than in PASDs. At the four other sites, the total PCB concentrations measured in snow ranged from 0.0120 pg/g in Olympic NP to 0.110 pg/g in Glacier NP. PCB concentrations in lichen in this study were similar to concentrations measured in lichen from Ontario (*43*). In conifer needles from Russia (*48*) and the Central Pyrenean Mountains (*50*), PCB concentrations were 10 to 32 times higher than the current study. PCB concentrations in snow from the Sierra Nevada Mountains in California in 1995 were generally one order of magnitude higher than this study (*51*).

SOC Concentrations in National Parks

The percent pesticide concentrations in the four media have different park profiles. In general, current-use pesticides, including dacthal, chlorpyrifos, total endosulfans, and g-HCH, had higher percent concentrations at Sequoia NP, Rocky Mtn. NP, and Glacier NP in all the media (Figure 3.2). High percent concentrations of chlorpyrifos and total endosulfans were also measured in snow at Denali NP (Figure 3.2E). Historic-use pesticides, including dieldrin, a-HCH, total chlordanes, and HCB, had higher percent concentrations at Olympic NP and Denali NP (Figure 3.2).

The percent PAH concentrations among the parks were variable. In lichen, gas phase PAHs, including fluorene, phenanthrene, fluoranthene, pyrene, benz[a]anthracene, and chrysene/triphenylene, were measured in most parks. However, the particle phase PAHs, including benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[e]pyrene, benzo[a]pyrene, indeno[1,2,3-cd]perylene, dibenzo[ah]anthrancene, and benzo[ghi]perylene, were measured in lichen at Rocky Mtn. NP and Glacier NP (Figure 3.6A). In conifer needles, only gas phase PAHs were measured and were primarily found at Sequoia NP (Figure 3.6B). In PASDs, gas phase PAHs, primarily fluorene, was measured at Rocky Mtn. NP, Olympic NP, Glacier NP, and Denali NP (Figure 3.6C). Gas and particle phase PAHs were measured in snow at all parks; however, a trend between the parks was not obvious (Figure 3.6D). In general, the percent PAH concentrations were the highest for gas phase PAHs and lower for particle phase PAHs in all media.

The percent PCB concentrations at each park had different profiles among the media. The percent PCB concentrations in lichen were similar at all the parks (Figure 3.7A). PCB 183 and 187 were only measured at Sequoia NP and Rocky Mtn. NP. In conifer needles, all PCBs were measured at Sequoia NP (Figure 3.7B). In addition, PCB 138 was measured at Rocky Mtn. NP and Glacier NP and PCB 153 was measured at Olympic NP. PCBs were only measured in PASDs at Sequoia NP (Figure 3.7C). In snow, all PCBs were measured in Sequoia NP, Glacier NP, and Denali NP. PCB 118 was only measured at Olympic NP and PCB 153, 183, and 187 were also measured at Rocky Mtn. NP (Figure 3.7D). In general, the percent concentrations for PCB 118, 138, and 153 were higher for lichen, conifer needles, and snow.

SOC Accumulation in Media

The percent of total pesticide, PAH and PCB concentration for each media at the five sites where all four media were located are shown in Figures 3.2 and 3.5, 3.3 to 3.6, and 3.4 to 3.7, respectively. The Tukey-Kramer HSD results are shown in Table 3.7 and include p-values for each media and park and the average percent concentration. The p-values for media and park indicate the significance (p-value $\leq$ 0.05) of these explanatory variables in the model. A statistical difference between percent of the total SOC concentration is indicated with superscript letters in Table 3.7. A different letter indicates that the mean arcsine square root concentration for one media is significantly different (alpha $\leq$0.05) from another media, with the largest mean value assigned “A.” A shared letter indicates that the mean arcsine square root concentration for one media was not significantly different from another media. Based on the Tukey-Kramer HSD results, there was evidence that differences between media exist for 6 pesticides (dacthal, chlorpyrifos, endosulfan sulfate, HCB, dieldrin, and cis-nonachlor) and 2 PAH (fluorene and benzo[ghi]perylene), however, differences between media were not observed for PCBs.

Pesticides

<u>Dacthal</u>

The average percent concentration of dacthal was different among media (p-value = 0.0019) and parks (p-value = <0.0001) (Table 3.7). The highest average percent dacthal concentrations were measured in snow at Sequoia NP, Rocky Mtn. NP, and Glacier NP (Figure 3.2). At Olympic NP, lichen and snow had similar average percent dacthal concentrations, however at Denali NP, percent dacthal concentrations was higher than lichen than in snow (Figure 3.2). At parks where dacthal was measured in conifer needles (Sequoia NP, Rocky Mtn. NP, and Glacier NP), the percent dacthal concentrations in conifer needles were similar to those in lichen (Figure 3.5). In all parks, except Sequoia NP, the smallest average percent dacthal concentrations were measured in PASDs (Figure 3.5). The average percent dacthal concentration in snow was significantly different from conifer needles and PASDs, but was not different from lichen (Table 3.7). Therefore, snow preferentially accumulated dacthal compared to conifer needles and PASDs. Also, snow had the highest percent dacthal concentration compared to the other media. The percent dacthal concentration in lichen was not different compared to the percent dacthal concentration in PASDs, conifer needles, or snow.

Chlorpyrifos

Average percent concentration of chlorpyrifos were different between media (p-value = 0.0109) but not parks (p-value = 0.1920) (Table 3.7). Of the various media, the highest average percent chlorpyrifos concentration was measured in snow at all sites except for Rocky Mtn NP, which had a higher percent concentration in conifer needles (Figure 3.2). Sequoia NP was the only park in which chlorpyrifos was detected in all media. Chlorpyrifos was also measured in lichen at Olympic NP. The average percent concentration of chlorpyrifos in snow was significantly different from conifer needles and PASDs, but not lichen (Table 3.7). Therefore, snow preferentially accumulated chlorpyrifos compared to conifer needles and PASDs. The percent chlorpyrifos concentration in lichen was not different compared to the percent concentration in conifer needles, PASDs, or snow.

Endosulfans

Average percent concentrations of total endosulfans were variable between media and parks (Figure 3.2). The highest concentrations of total endosulfans were measured in lichen at all sites; however, similar concentrations of total endosulfans were measured in conifer needles at Sequoia NP and Olympic NP (Figure 3.2). At Rocky Mtn. NP, Glacier NP, and Denali NP, the percent endosulfan concentration in conifer needles was much lower than in lichen and snow. The average percent total endosulfan concentrations was the highest in lichen and was significantly different from PASDs but not conifer needles or snow. Total endosulfans in lichen and conifer needles were primarily composed of endosulfan I and endosulfan sulfate; however, in snow and PASDs, endosulfan I had the highest concentrations (Figure 3.2 and Figure 3.5). Endosulfan I and II are degraded to endosulfan sulfate through biological mechanisms, which might occur on the surface of vegetation (*30*). Statistical analysis showed that all four media accumulated endosulfan I and II in similar concentrations (Table 3.7). Endosulfan sulfate concentrations were different between the media (p-value = 0.0003), with the highest concentration measured in lichen. Although the endosulfan sulfate concentrations in lichen were significantly different from snow and PASDs, the concentrations in lichen were not significantly different from conifer needles (Table 3.7). Therefore, lichen preferentially accumulated endosulfan sulfate compared to PASDs and snow. The percent endosulfan sulfate concentration in conifer needles was different from the percent endosulfan sulfate concentration in PASDs, but not lichen or snow.

<u>HCHs:</u>

Percent concentrations for a-HCH were not variable among media (p-value = 0.1821) but varied between parks (p-value = 0.0008), and g-HCH profiles were not variable among media (p-value = 0.0938) or parks (p-value = 0.4164) (Table 3.7). The concentration profiles of a-HCH were similar for all four media at all parks except for higher concentrations measured in conifer needles at Olympic NP and Denali NP (Figure 3.2). In Sequoia NP and Olympic NP, lichen, conifer needles, and snow had similar average percent g-HCH concentrations, however the concentration profile in the PASDs were higher (in Sequoia NP) or lower (in Olympic NP). The percent concentrations of g-HCH were the highest in conifer needles at Glacier NP (Figure

3.2D). Due to the variation in concentration, a relationship between a- and g-HCH concentrations and media was not found and the media that preferentially accumulated HCHs could not be determined.

Chlordanes:

The average percent concentrations for total chlordanes were low (~ 10 % or less) for all parks. Total chlordanes predominantly accumulated in lichen, conifer needles, and/or snow at all parks, except Sequoia NP where the percent total chlordane concentration in PASDs was greater than the other media (Figure 3.2); however the average total chlordane concentrations were not different among the media (p-value = 0.2453) (Table 3.7). The accumulation of trans-chlordane and trans-nonachlor was not statistically different among the media (Table 3.7). Cis-chlordane was only measured in lichen and conifer needles and the percent concentrations were not significantly different; however, since cis-chlordane was not measured in the other media, preferential accumulation occurred in lichen and conifer needles. Percent cis-nonachlor concentrations were significantly higher in lichen, conifer needles, and snow compared to PASD (p-value = 0.0138). Therefore, cis-chlordane preferentially accumulated in lichen and conifer needles compared to snow and PASDs, and cis-nonachlor preferentially accumulated in lichen, conifer needles, and snow compared to PASDs.

HCB

The percent concentration for HCB varied between media (p-value = <0.0001) and parks (p-value = 0.0452) (Table 3.7). PASDs accumulated the highest average percent concentrations of HCB compared to the other media (Figure 3.2). The percent

HCB concentration in PASDs was significantly different from lichen, conifer needles, and snow (Table 3.7). In addition, the percent HCB concentrations in the other media were not significantly different from each other. These results clearly suggest that PASDs preferentially accumulated HCB relative to other media.

Dieldrin

The average percent concentration for dieldrin varied between media (p-value = 0.0065) but not park (p-value = 0.3819) (Table 3.7). Dieldrin was measured in snow at all parks; however dieldrin was only measured in the conifer needles and PASDs at Sequoia NP (Figure 3.2). Dieldrin was not measured in lichen at any parks. The average percent dieldrin concentration in snow was significantly different from PASDs, but not from conifer needles. Therefore, snow preferentially accumulated dieldrin compared to PASDs.

PAHs

PAHs partition between the gas and particulate phases in the atmosphere based on their vapor pressures (*4*). Gas phase PAHs include acenapthene, acenpthylene, fluorene, phenanthrene, anthracene, fluoranthene, and pyrene, whereas particle phase PAHs include benzo[b]fluoranthene, benzo[k] fluoranthene, benzo[a]pyrene, benzo[e]pyrene, benzo[ghi]perylene, dibenzo[ah]anthracene, and indeno[1,2,3-cd]perylene (*4*). Some PAHs, including chrysene/triphenylene and benz[a]anthracene, exist in both the gas and particle phases.

The gas phase PAHs, including fluorene and phenanthrene, had the highest percent concentration profile at all parks (Figure 3.3). The highest percent fluorene concentrations were measured in PASDs at all the parks except Sequoia NP. The highest percent phenanthrene concentration was measured in lichen at Denali NP, in conifer needles at Sequoia NP, in PASDs at Glacier NP, and in snow at Rocky Mtn. NP and Olympic NP. In addition to phenanthrene, fluoranthene and pyrene were also measured in conifer needles at Sequoia NP (Figure 3.6). Fluoranthene was measured in similar percent concentrations in conifer needles and PASDs at Glacier NP; however, the percent concentration was lower than lichen and snow. The highest percent fluorene concentration was significantly different in PASDs compared to the other media (p-value = 0.0082). Therefore, fluorene preferentially accumulated in PASDs.

The remaining gas and particle phase PAHs were only measured in lichen and/or snow and not conifer needles or PASDs. PAHs were measured in both lichen and snow at Glacier NP and Rocky Mtn. NP, with higher percent PAH concentrations measured in snow compared to lichen. Particle phase PAHs were only measured in snow at Olympic NP and Denali NP. Despite differences in measurements, the percent concentrations were not significantly different for the PAHs, except for benzo[ghi]perylene, which had a higher percent concentration in snow than in lichen (p-value = 0.0355) (Table 3.7). In addition, acenapthene was only measured in snow. Although differences in the percent composition of lichen and snow were not significant for most PAHs, snow generally had higher concentrations compared to lichen. Therefore, snow and lichen preferentially accumulated particle phase PAHs relative to conifer needles and PASDs, and snow preferentially accumulated acenapthene and benzo[ghi]perylene.

The frequency of detection for 14 PAHs is shown in Figure 3.8. Gas phase PAHs (fluorene, phenanthrene, anthracene, fluoranthene, and pyrene) were measured in lichen, conifer needles, and PASDs in a higher frequency than the particle phase PAHs (benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[e]pyrene, benzo[a]pyrene, indeno[1,2,3-cd]perylene, debenzo[ah]anthracene, and benzo[ghi]perylene). Particle phase PAHs were measured more frequently in lichen compared to conifer needles and were not measured in PASDs except for benzo[ghi]perylene. In snow, both gas and particle phase PAHs had a similar measurement frequency. This indicates that gas phase PAHs accumulated in all four media; however, more particle phase PAHs accumulated in lichen and snow compared to conifer needles and PASDs.

The difference between percent PAH concentrations in snow, lichen, conifer needles, and PASDs is related to the different accumulation mechanism for each medium (Figure 3.3). Falling snow has a high scavenging efficiency for both gas and particle-phase SOCs (*22*). Gas phase PAHs undergo deposition to snow at the snow-air interface, while those in the particle-phase will be transported by dry deposition.

Lichen has many different thallus structures that influence the accumulation potential of PAHs. *Alectoria sarmentosa* (Olympic NP) and *Letharia vulpina* (Sequoia NP) have a hair-like thallus structure that provides a large surface area for air-surface exchange and trapping of particle bound PAHs. *Masonhalea richardsonii* (Denali NP) and *Platismatia glauca* (Glacier NP) have a wide, flat thallus that may provide a surface onto which particle-phase PAHs can accumulate.

Conifer needles may have reduced potential for accumulation of particle phase PAHs due to their smooth wax outer layer. However, other studies have measured particle phase PAHs in conifer needles (*12, 13, 48*). One explanation for a lower frequency of PAH detection in conifer needles in this study compared to other studies may be that the extracts had a lower signal to noise ratio, and higher EDLs. Therefore, matrix interferences may limit the detection of PAHs in conifer needles.

PASDs sample gas phase PAHs only, which are generally those with three rings such as fluorene, phenanthrene, and fluoranthene. Because of the high vapor pressure of these compounds (10^{-6} to 10^{-9} atm), the linear uptake region for these PAHs may be surpassed during a year-long sampling time. Therefore, equilibrium between SOCs in the air and the XAD may have been reached. Higher molecular weight PAHs, such as benzo[a]anthracene and benzo[ghi]perylene, were not accumulated by PASDs because XAD primarily samples gas phase SOCs (*10*).

PCBs

Similar to PAHs, PCBs (PCB 118, 138, 153, 183, and 187) were measured primarily in lichen and snow (Figure 3.4). However, the PCBs were measured in all four media at Sequoia NP. Lower molecular weight PCBs were measured in conifer needles from Rocky Mtn. NP, Olympic NP, and Glacier NP. In contrast, lichen and snow accumulated both low and high molecular weight PCBs. PCBs were only measured in snow at Denali NP and at similar percent composition. PCBs did not accumulate more in one media than the others (Table 3.7) (p-value range: 0.1590 to 0.7371), however the largest number of PCBs were measured in lichen and snow. Therefore, PCBs did not preferentially accumulate in any media.

Factors Governing Accumulation

The reduced MLR models and p-values for the SOC physical-chemical properties, K_{AW}, Log K_{OA}, and Φ for each SOC are shown in Tables 3.8 to 3.11. The direction of the correlations are indicated with "+", for positive, and "-", for negative correlations next to the p-value. The reduced model consisted of significant environmental parameters that corrected for spatial differences among the parks, but these did not describe the influence of environmental parameters on SOC concentrations. The reduced models for all four media included agricultural intensity (Ag Intensity) or ammonium nitrate concentration ($AmmNO_3$) for almost all SOCs, which indicated that the differences between the parks were most frequently explained by agricultural intensity, even for PAHs and PCBs. The reduced models for lichen and conifer needles also included Species, which accounted for variations in SOC concentrations due to different species (Tables 3.8 and 3.9). The other environmental parameters, including elevation (Elev), population within a 150 km radius from the park (Pop), distance to the coast (Coast Distance), and precipitation (Precip), were also significant in accounting for differences between parks for many of the SOCs.

Lichen and Conifer Needles

Although SOCs may be deposited to lichen and conifer needles through similar mechanisms, the factors that govern SOC accumulation may be different for these two media. The reduced MLR models and p-values for the SOC physical-chemical properties of interest are shown in Tables 3.8 and 3.9 for lichen and conifer, respectively.

Most lichen and conifer needle pesticide concentrations did not have a significant correlation with SOC physical-chemical properties. However, dacthal, endosulfan I and II concentrations in lichen and conifer needles had a significant positive correlation with K_{AW} and a significant negative correlation with Log K_{OA} and Φ. Endosulfan sulfate concentrations in lichen were also positively correlated with K_{AW} and negatively correlated with Log K_{OA}.

For dacthal, endosulfan I and II, and endosulfan sulfate in lichen and conifer needles, the values for average Log K_{OA} (8.73, 8.62, and 9.00, respectively) and average Φ ranged from 8.62 to 9.00 and 0.269% to 0.669%. Log K_{OA} and Φ values for these pesticides were also similar to chlorpyrifos and a- and g-HCH; however, a significant relationship between chlorpyrifos and a- and g-HCH concentrations in lichen and the physical-chemical properties was not observed. For chlorpyrifos, the lack of a relationship may be an effect of the limited number of sites from which measurements were obtained. Chlorpyrifos was primarily measured at parks in the northwest, including Crater Lake NP, Glacier NP, Mount Rainier NP, North Cascades NP, and Olympic NP. A significant correlation between the concentrations of HCHs and HCB and the physical-chemical properties may not have been observed because these SOCs are globally distributed (*9*). The accumulation of HCHs and HCB in lichen and conifer needles may be heavily influenced by similar atmospheric concentrations at all the parks and a relationship with the physical-chemical properties cannot be observed. The values for K_{AW}, Log K_{OA}, and Φ for trans-chlordane and trans- and cis-nonachlor outside of the range for dacthal, endosulfan I and II, and endosulfan sulfate; however, the concentration of trans-chlordane and nonachlors were not correlated with these physical-chemical properties. These SOCs had low concentrations compared to the other measured pesticides and this may have limited the observation of a relationship.

The relationship between many PAHs and K_{AW}, Log K_{OA}, and Φ in lichen and conifer needles was not evaluated because many of these SOCs were not detected and ½ EDLs were substituted for more than 50% of the concentrations. For lichen, the accumulation of fluorene, phenanthrene, fluoranthene, pyrene, and chrysene/triphenylene were evaluated. Based on Φ values, fluorene, phenanthrene, fluoranthene, and pyrene were not present in the particle phase (0.00016% to 0.48%) and chrysene/triphenylene were present in both the gas and particle phase (0.88% to 42%) compared to the higher molecular weight PAHs (22% to 87%) (Appendix D). The only PAHs that were significantly correlated with the physical-chemical properties were fluorene and fluoranthene. The accumulation of fluorene in lichen was positively correlated with K_{AW} and negatively correlated with Log K_{OA}, and Φ, and fluoranthene was negatively correlated with Log K_{OA} and Φ.

In lichen, the average K_{AW}, Log K_{OA}, and Φ values for fluorene were 0.00149, 6.87, and 0.00504 %, respectively and the average Log K_{OA} and Φ values for fluoranthene were 8.89 and 0.521%, respectively, which were similar to phenanthrene and pyrene. In lichen, fluorene, fluoranthene, and chrysene/triphenylene were measured at all the parks but phenanthrene and pyrene were not frequently measured at the Alaskan parks (Denali NP and Preserve and Noatak National Preserve) and phenanthrene was not measured from Bandelier National Monument (New Mexico). In addition, the data set for pyrene and chrysene/triphenylene included 40% and 46% ½ EDLs as concentrations, respectively. Therefore, a significant relationship between phenanthrene, pyrene, and chrysene/triphenylene concentrations and the physical-chemical properties may not have been observed because of a limited distribution of measurements among the parks and the frequency of ½ EDLs that were substituted for concentration values.

In conifer needles, only phenanthrene was detected in more than 50% of the samples; however, the accumulation of phenanthrene was not explained by K_{AW}, Log K_{OA}, and Φ. A relationship between phenanthrene concentrations and the physical-chemical properties may not have been observed because phenanthrene was only measured in conifer needles from Crater Lake NP, Glacier NP, Mount Rainier NP, and Rocky Mtn. NP.

Accumulation of PCBs in lichen and conifer needles were not correlated with the physical-chemical properties. In lichen, the range of average K_{AW}, Log K_{OA}, and Φ values for PCB 118, 138, 153, 183, and 187 were from 4.39×10^{-3} to 3.16×10^{-4}, 9.37 to 11.4, and 1.58 % to 58.2 %, respectively. In conifer needles, the ranges of values for the physical-chemical properties were from 4.66×10^{-3} to 9.17×10^{-4}, 9.33 to 11.3, and 1.36 % to 56.4 %, respectively.

In lichen and conifer needles, pesticides and PAHs concentrations that were significantly correlated with the physical-chemical properties had positive correlations with K_{AW} and negative correlations with Log K_{OA} and Φ. A positive correlation between SOC concentration and K_{AW} indicated that higher concentrations were measured in lichen and conifer needles when the SOCs were more likely to be in the atmosphere compared to water. A negative correlation between SOC concentrations and Log K_{OA} and Φ indicated that higher concentrations were observed when SOCs preferred to be in the gas phase compared to the particle phase. Therefore, the accumulation of most pesticides in lichen and conifer needles was influenced by the SOC in the gas phase compared to the particle phase in the atmosphere.

PASD

Accumulation of SOCs in the PASDs occurred through molecular diffusion of gas phase compounds from the atmosphere to the surface of the XAD resin (*10*). The majority of the SOCs measured in PASDs were pesticides. The estimated fraction of the pesticide concentrations in the particle phase ranged from 0.010 to 7.5%. The accumulation of dacthal, endosulfan I and II, endosulfan sulfate, trans-chlordane and trans-nonachlor in PASDs had a significant positive correlation with K_{AW} and a significant negative correlation with Log K_{OA}, and Φ. Trifluralin concentrations had a significant negative correlation with Log K_{OA} and Φ. The average values of K_{AW} and Log K_{OA} for all the pesticides ranged from 1.30×10^{-6} to 2.81×10^{-2} and 7.30 to 10.1, respectively. The concentrations of HCB and HCHs were not correlated with the physical-chemical properties likely due to the ubiquitous distribution of these SOCs.

The accumulation of PAHs in PASDs was limited to fluorene and phenanthrene and neither were correlated with K_{AW}, Log K_{OA}, and Φ. The average values of K_{AW}, Log K_{OA}, and Φ for fluorene and phenanthrene were 1.75×10^{-3} and 7.82×10^{-4}, 6.85 and 7.52, and 0.0049% and 0.0233%, respectively.

PCBs were only measured in PASDs at Sequoia NP (Figure 3.7). Therefore, the relationship between PCB concentrations and the physical-chemical properties was not evaluated.

Similar to lichen and conifer needles, significant correlations between pesticide concentrations and the physical-chemical properties in PASDs were positively correlated with K_{AW} and negatively correlated with Log Koa and Φ. This indicated that higher concentrations of pesticides were accumulated when the SOC was in the gas phase compared to the particle phase.

Snow

In snow, the accumulation of endosulfan I, trans-chlordane, trans-nonachlor, and trifluralin was negatively correlated with K_{AW} and positively correlated with Log K_{OA} and Φ, dieldrin was positively correlated with Log K_{OA} and Φ, endosulfan II and endosulfan sulfate was positively correlated with Log K_{OA}. The average K_{AW} values for endosulfan I, trans-chlordane, trans-nonachlor, and trifluralin ranged from 4.28×10^{-6} to 3.94×10^{-3} and the average Log K_{OA} and Φ values for endosulfan I and sulfate, trans-chlordane, trans-nonachlor, trifluralin, and dieldrin ranged from 8.54 to 10.04 and 0.32% to 6.98%, respectively. Although dacthal and chlorpyrifos had values for the physical-chemical properties within these ranges, and middle to high concentrations, the concentrations of these pesticides were not significantly correlated with $K_{AW,}$ Log $K_{OA,}$ and Φ. The lack of a correlation may be an effect of the environmental parameters that were included in the MLR models. If the environmental parameters in the MLR models did not efficiently account for spatial differences, then a significant correlation may not be observed. The relationship between the concentration of HCB and HCHs and the physical-chemical properties was not significantly correlated most likely because these SOCs were ubiquitous in the environment.

Most of the PAHs measured in snow were significantly correlated with the physical-chemical properties. Phenanthrene, fluoranthene, pyrene, benzo[a]pyrene, benzo[e]pyrene, indeno[1,2,3-cd]perylene, and benzo[ghi]perylene were negatively correlated with K_{AW} and positively correlated with Log K_{OA} and Φ and chrysene/triphenylene was positively correlated with Log K_{OA} and Φ. The average values for $K_{AW,}$ Log $K_{OA,}$ and Φ for these PAHs ranged from 3.10×10^{-6} to 2.99×10^{-4}, 7.93 to 12.0, and 0.0668 to 77.9, respectively. The PAHs that were not significantly correlated with the physical-chemical properties were benzo[b]fluoranthene and benzo[k]fluoranthene; however, the values for the physical chemical values and the concentrations were within the range of the other PAHs. Therefore, similar to several pesticides in snow, the environmental parameters may not have been effectively adjusted for park differences.

In contrast to lichen, conifer needles, and PASDs, significant correlations between pesticide and PAHs concentrations in snow and the physical-chemical properties were negatively correlated with K_{AW} and positively correlated with Log K_{OA} and Φ. A negative correlation with K_{AW} indicated that SOCs preferentially partitioned to the snow compared to the air. A positive correlation with Log K_{OA} and Φ indicated that a higher concentration of particle phase SOCs were most likely accumulated by snow.

Conclusion

Lichen, conifer needles, PASDs, and snow located at the same remote sites were compared to understand the accumulation of pesticides, PAHs, and PCBs. For SOCs that were detected in more than 50% of the four media, the media type that preferentially accumulated each SOC was determined based on the higher percent of the total concentration. Accumulation of specific pesticides was enhanced in the different media as follows: endosulfan sulfate and cis-chlordane in lichen; cis-chlordane in conifer needles; HCB and fluorene in PASDs; and dacthal, chlorpyrifos, dieldrin, acenapthene, and benzo[ghi]perylene in snow. Cis-nonachlor preferentially accumulated in lichen, conifer needles, and snow compared to PASDs. Finally, the accumulation of HCHs, endosulfan I and II, trans- chlordane, trans-nonachlor, trifluralin, most PAHs, and PCBs, was not statistically different.

Most PAHs were only detected in lichen and snow, however higher percent PAH concentrations were measured in snow. Gas phase PAHs were measured in all media, however particle phase PAHs were measured in lichen and snow. Fluorene was the only gas phase PAH to preferentially accumulate within a medium, which was PASDs. The only particle phase SOC that preferentially accumulated in snow was benzo[ghi]perylene. The PCBs did not preferentially accumulate in any of the media.

The influence of K_{AW}, Log K_{OA}, and Φ on SOC concentrations was significant for different SOC in each media. In general, most pesticides had a significant relationship with the physical-chemical properties except for HCB and a- and g-HCH. These SOCs are globally ubiquitous in the atmosphere which may affect the ability to observe a significant relationship with the physical-chemical properties. In addition, pesticides that were measured in low concentrations were not significantly influenced. In lichen, only fluorene and fluoranthene were significantly influenced by K_{AW}, Log K_{OA}, and Φ, however in snow, most of the PAHs were influenced. For the other PAHs in lichen and snow, a non-significant relationship may be attributed to measurements in a limited number of parks or by the frequency of ½ EDLs that were substituted for non-detects. Evaluating the influence of the physical-chemical properties may only be applicable to SOCs that are measured in mid to high concentrations, a low frequency of ½ EDLs (less than ~30%), and a large spatial distribution of the sites.

The direction of the significant correlations between SOC concentrations and the physical-chemical properties were different among the media. In general, lichen, conifer needles, and PASD had positive correlations with K_{AW} and negative correlations with Log K_{OA} and Φ, indicating that higher concentrations of SOCs were accumulated in the media when the SOCs were in the gas phase. Snow, however, had had negative correlations with K_{AW} and positive correlations with Log K_{OA} and Φ, indicating that high concentrations of SOCs were accumulated when the SOC was in the particle phase.

Based on these results, recommendations for the type of medium that should be used to measure SOCs in the atmosphere can be made. For pesticide, PAH, and PCB accumulation at cold, high elevation remote sites during the winter, snow is the preferred media. In general, both gas and particle phase SOCs preferentially accumulated in snow over a shorter time periods (months) compared to the other media. However, snow is more difficult to collect and transport and only represents SOC concentrations in air during winter and spring. At sites where snowfall is limited, or where collection and transport is too difficult, lichen may be used instead. Lichen accumulated gas and particle phase SOCs. In contrast to snow, lichen may be used in studies interested in long-term temporal variations in SOC concentrations in warmer regions. However, the exposure period of lichen cannot be determined. If lichen is not present in the ecosystem, conifer needles may be used. Because the age of the conifer needles can be determined, conifer needles are a suitable media for short-term temporal studies. However, the sampling of particle phase PAHs by conifer needles may be limited. Finally, PASDs are recommended for year-long studies specifically interested in gas phase pesticides, especially HCB and HCHs, and gas phase PAHs at sites where snow, lichen, and conifer needles are limited.

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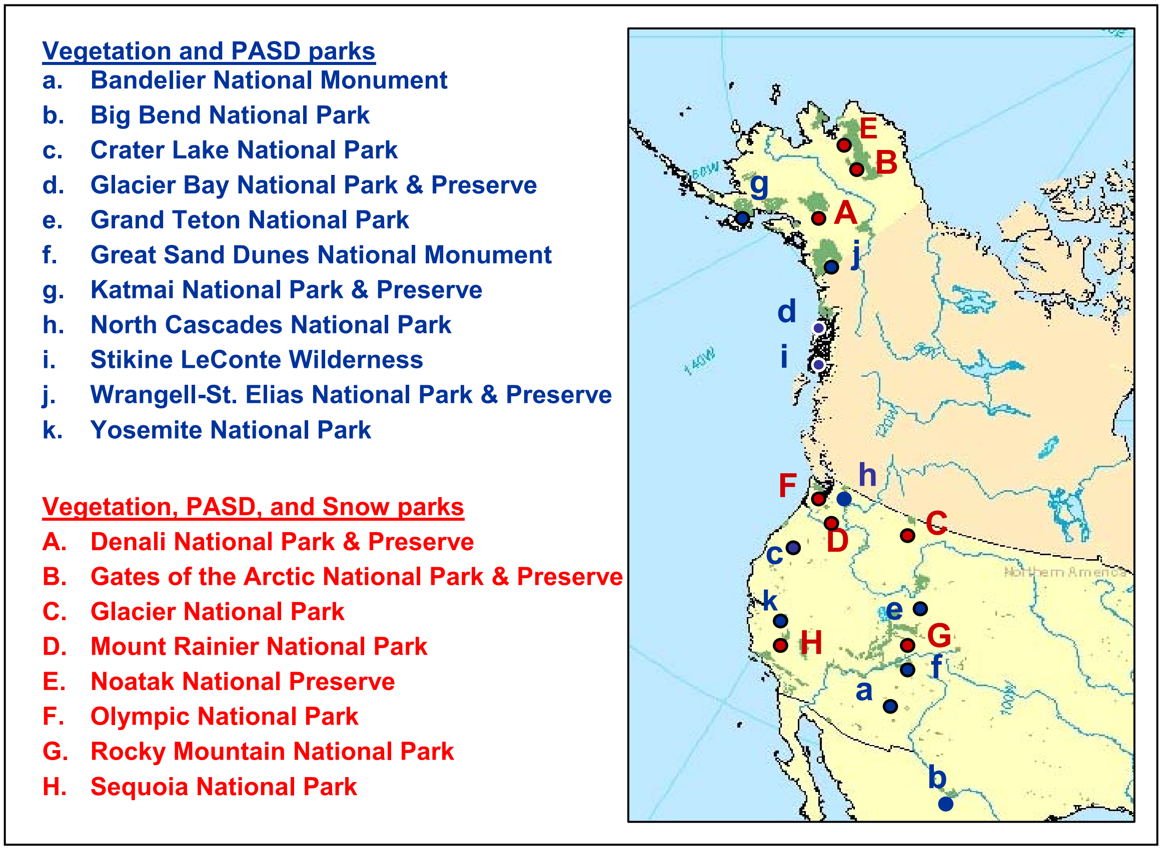

Figure 3.1. Map of U.S. national parks from which lichen, 2-year conifer needles, PASDs, and snow were collected. Blue lower-case letters indicate parks were lichen and 2-year conifer needles were collected in 2005 and PASDs were collected in 2006. Red upper-case letters indicate parks where lichen and conifer needles were collected in 2004, PASDs were collected in 2006, and snow was collected in 2003, 2004, and 2005.

Table 3.1. Site information for lichen samples. [1]Samples were located at the same sites as conifer needles, PASDs, and snow. [2]Monthly maximum temperature data from PRISM was averaged from March 2002 through June 2004 unless noted otherwise. [3]30-year monthly maximum temperature data from PRISM was averaged.

Park	Site	Lake Catchment	Latitude	Longitude	Elevation (m)	Average Monthly Maximum Temperature (C)[2]	Species	Number of Samples
Bandelier NM	1		35.7279	-106.2745	1854	21.04	*Xanthoparmelia*	1
Bandelier NM	2		35.7989	-106.2846	2076	20.08	*Usnea*	2
Bandelier NM	3		35.8241	-106.3611	2348	16.35	*Xanthoparmelia*	1
Bandelier NM	4		35.8262	-106.3893	2576	14.94	*Usnea*	1
Bandelier NM	5		35.8642	-106.4178	2926	13.88	*Usnea*	1
Big Bend NP	4		29.2534	-103.2979	1920	23.93	*Usnea*	1
Big Bend NP	5		29.2465	-103.3049	2316	23.64	*Usnea*	1
Crater Lake NP	1		42.8364	-122.1459	1798	11.41	*Letharia vulpina*	1
Crater Lake NP	2		42.8821	-122.1914	1859	10.71	*Letharia vulpina*	1
Crater Lake NP	3		42.9346	-122.1776	2043	10.64	*Letharia vulpina*	2
Crater Lake NP	4		42.9194	-122.0289	2423	11.01	*Letharia vulpina*	1
Denali NP & Preserve	1		63.7740	-151.0194	221	4.37[3]	*Flavocetraria cucullata*	3
Denali NP & Preserve[1]	2	Wonder Lake	63.4538	-150.8720	655	4.32[3]	*Masonhalea richardsonii*	3
Denali NP & Preserve	3	McLeod Lake	63.3696	-151.1003	579	4.41[3]	*Masonhalea richardsonii*	3
Denali NP & Preserve	4		63.5520	-150.9670	975	5.01[3]	*Masonhalea richardsonii*	3
Denali NP & Preserve	5		63.1648	-151.3599	1296	2.39[3]	*Flavocetraria cucullata*	1
							Masonhalea richardsonii	3
Denali NP & Preserve	6		63.1386	-151.3221	1753	0.39[3]	*Thamnolia*	3
Gates of the Arctic NP & Preserve	1	Matcharak Lake	67.7529	-156.2323	505	-2.22[3]	*Masonhalea richardsonii*	2
Glacier NP	1		48.6208	-113.9058	961	11.71	*Platismatia glauca*	3
Glacier NP	2		48.6757	-113.8096	1089	9.76	*Platismatia glauca*	3
Glacier NP	3		48.6261	-113.8031	1609	9.46	*Platismatia glauca*	3
Glacier NP	4		48.5104	-113.4552	2024	9.76	*Letharia vulpina*	3
Glacier NP	5		48.6924	-113.5170	1372	9.78	*Hypogymnia physodes*	3
							Letharia vulpina	1
Glacier Bay NP & Preserve	1		58.6022	-135.8831	8	8.14[3]	*Platismatia glauca*	1
Glacier Bay NP & Preserve	2		58.6061	-135.8801	168	8.14[3]	*Sphaerophorus globosus*	1
Glacier Bay NP & Preserve[1]	3	Snyder Lake	58.6093	-135.8724	457	8.14[3]	*Sphaerophorus globosus*	1
Glacier Bay NP & Preserve	4	Oldman Lake	58.6121	-135.8714	625	8.14[3]	*Alectoria sarmentosa*	1
Great Sane Dunes NM	2		37.7308	-105.4874	2774	13.38	*Xanthoparmelia*	1
Great Sane Dunes NM	4		37.7223	-105.4699	3109	13.38	*Xanthoparmelia*	1
Grand Tetons NP	1		43.7307	-110.7389	2073	11.27	*Usnea*	2
Grand Tetons NP	2		43.7256	-110.7601	2362	10.66	*Letharia vulpina*	1
Katmai NP & Preserve	1		58.5459	-155.7836	36	7.89[3]	*Hypogymnia physodes*	1
Katmai NP & Preserve	2		58.5686	-155.7937	213	7.64[3]	*Hypogymnia physodes*	1
Katmai NP & Preserve	3		58.5711	-155.8036	370	7.64[3]	*Hypogymnia physodes*	1
Katmai NP & Preserve	4		58.5718	-155.8421	563	7.16[3]	*Flavocetraria cucullata*	1
Katmai NP & Preserve	5		58.5793	-155.8558	724	7.16[3]	*Flavocetraria cucullata*	1
Katmai NP & Preserve	6		58.4715	-155.4901	1112	5.96[3]	*Flavocetraria cucullata*	1
Lassen Volcanic NP	1		40.5568	-121.5315	1829	14.93	*Letharia vulpina*	1
Lassen Volcanic NP	2		40.5314	-121.5342	2012	14	*Letharia vulpina*	1
Lassen Volcanic NP	3		40.4550	-121.5399	2271	12.35	*Letharia columbiana*	1
Lassen Volcanic NP	4		40.4392	-121.5576	2499	13.19	*Letharia vulpina*	1
Lassen Volcanic NP	5		40.4476	-121.5662	2713	13.19	*Letharia vulpina*	1
Mount Rainier NP	1		46.7433	-121.8915	654	12.79	*Alectoria sarmentosa*	3
Mount Rainier NP	2		46.7697	-121.7893	985	10.32	*Alectoria sarmentosa*	3
Mount Rainier NP	3	LP 19	46.8239	-121.8953	1372	10.25	*Alectoria sarmentosa*	3
Mount Rainier NP	4	Golden Lake	46.8878	-121.8987	1369	10.49	*Alectoria sarmentosa*	3
Noatak NP	1		68.2847	-161.4657	227	-1.36[3]	*Masonhalea richardsonii*	3
Noatak NP	3	Burial Lake	68.4063	-159.2223	388	-3.33[3]	*Masonhalea richardsonii*	3
Noatak NP	5		68.4625	-161.4612	675	-2.89[3]	*Masonhalea richardsonii*	3
North Cascades NP	1		48.6493	-121.3070	198	14.38	*Alectoria sarmentosa*	1
North Cascades NP	2		48.6420	-121.3370	614	14.38	*Platismatia glauca*	1
North Cascades NP	3		48.6641	-121.3266	945	14.1	*Alectoria sarmentosa*	1
North Cascades NP	4		48.6716	-121.3187	1228	14.19	*Alectoria sarmentosa*	1
North Cascades NP	5		48.6824	-121.3217	1600	13.66	*Alectoria sarmentosa*	1

Table 3.1. Site information for lichen samples (continued).

Park	Site	Lake Catchment	Latitude	Longitude	Elevation (m)	Average Maximum Temperature (C) [2]	Species	Number of Samples
Olympic NP	2		47.9535	-123.8381	518	12.01	*Lobaria oregana*	3
Olympic NP[1]	3	Hoh Lake	47.8973	-123.7831	1448	12.01	*Alectoria sarmentosa*	3
Olympic NP	4	PJ Lake	47.9463	-123.4136	1392	10.74	*Bryoria fuscescens*	3
Olympic NP	5		47.9307	-123.4105	1850	10.74	*Alectoria sarmentosa*	1
Rocky Mnt. NP[1]	6	Mills Lake	40.2916	-105.6438	3042	9.06	*Xanthoparmelia*	3
Sequoia NP	2		35.5761	-118.7862	1573	25.68	*Letharia vulpina*	3
Sequoia NP	3		36.5536	-118.7492	2071	17.43	*Letharia vulpina*	3
Sequoia NP	4		36.5985	-118.7212	2332	13.69	*Letharia vulpina*	3
Sequoia NP[1]	5	Emerald Lake	36.6005	-118.6789	2816	12.25	*Letharia vulpina*	3
Stikine LeConte Wilderness	1		56.7910	-132.5110	1	8.56 [3]	*Alectoria sarmentosa*	1
							Platismatia glauca	1
Stikine LeConte Wilderness	2		56.8047	-132.5317	254	7.83 [3]	*Platismatia glauca*	1
							Lobaria oregana	1
Stikine LeConte Wilderness	3		56.8095	-132.5407	567	7.83 [3]	*Alectoria sarmentosa*	1
Stikine LeConte Wilderness	4		56.8250	-132.5715	815	6.96 [3]	*Alectoria sarmentosa*	1
							Platismatia glauca	1
Stikine LeConte Wilderness	5		56.8180	-132.6090	1064	7.84 [3]	*Cladina arbuscula*	1
							Platismatia glauca	1
Wrangell St. Elias NP & Preserve	1		60.0476	-141.3066	7	7.38 [3]	*Hypogymnia apinnata*	1
							Platismatia glauca	1
Wrangell St. Elias NP & Preserve	3		61.3856	-143.6014	648	5.72 [3]	*Hypogymnia physodes*	1
Wrangell St. Elias NP & Preserve	5		61.5014	-142.8381	1421	3.62 [3]	*Cladina (arbuscula?)*	1
							Flavocetraria cucullata	1
Yosemite NP	1		37.6783	-119.7541	661	17.9	*Xanthoparmelia*	1
Yosemite NP	2		37.7150	-119.6801	1433	16.19	*Letharia vulpina*	2
Yosemite NP	3		37.7237	-119.5336	1829	16.39	*Letharia vulpina*	1

Table 3.2. Site Information for 2-year conifer needle samples. [1]Samples were located at the same sites as lichen, PASDs, and snow. [2]Monthly maximum temperature data from PRISM was averaged from March 2002 through June 2004 unless noted otherwise. [3]30-year monthly maximum temperature data from PRISM was averaged.

Park	Site	Lake Catchment	Latitude	Longitude	Elevation (m)	Average Monthly Maximum Temperature (C)[2]	Species	Number of Samples
Bandelier NM	1		35.7279	-106.2745	1854	21.04	*Pinus edulis*	1
Bandelier NM	2		35.7989	-106.2846	2076	20.08	*Pinus edulis*	2
Bandelier NM	3		35.8241	-106.3611	2348	16.35	*Pinus ponderosa*	1
Bandelier NM	4		35.8262	-106.3893	2576	14.94	*Pinus ponderosa*	1
Bandelier NM	5		35.8642	-106.4178	2926	13.88	*Pinus ponderosa*	1
Big Bend NP	3		29.2850	-103.2799	1067	24.23	*Pinus cembroides*	1
Big Bend NP	4		29.2534	-103.2979	1920	23.93	*Pinus cembroides*	1
Big Bend NP	5		29.2465	-103.3049	2316	23.64	*Pinus cembroides*	1
Crater Lake NP	1		42.8364	-122.1459	1798	11.41	*Abies magnifica*	1
Crater Lake NP	2		42.8821	-122.1914	1859	10.71	*Abies concolor*	1
Crater Lake NP	3		42.9346	-122.1776	2043	10.64	*Abies magnifica*	1
Crater Lake NP	4		42.9194	-122.0289	2423	11.01	*Pinus albicaulis*	1
Crater Lake NP	5		42.9233	-122.0162	2713	11.01	*Pinus albicaulis*	1
Denali NP & Preserve	1		63.7740	-151.0194	221	4.37 [3]	*Picea mariana*	3
Denali NP & Preserve	2	Wonder Lake	63.4538	-150.8720	655	4.32 [3]	*Picea mariana*	3
Denali NP & Preserve	3	McLeod Lake	63.3696	-151.1003	579	4.41 [3]	*Picea mariana*	3
Denali NP & Preserve	4		63.5520	-150.9670	975	5.01 [3]	*Picea mariana*	3
Glacier NP	1		48.6208	-113.9058	961	11.71	*Tsuga heterophylla*	3
Glacier NP	2		48.6757	-113.8096	1089	9.76	*Tsuga heterophylla*	3
Glacier NP	3	Snyder Lake	48.6261	-113.8031	1609	9.46	*Picea engelmanii*	3
Glacier NP	4	Oldman Lake	48.5104	-113.4552	2024	9.76	*Abies lasiocarpa*	3
Glacier NP	5		48.6924	-113.5170	1372	9.78	*Pseudotsuga menziesii*	3
Glacier Bay NP & Preserve	1		58.6022	-135.8831	8	8.14 [3]	*Picea sitchensis*	1
Glacier Bay NP & Preserve	2		58.6061	-135.8801	168	8.14 [3]	*Picea sitchensis*	1
Glacier Bay NP & Preserve	3		58.6093	-135.8724	457	8.14 [3]	*Picea sitchensis*	1
Glacier Bay NP & Preserve	4		58.6121	-135.8714	625	8.14 [3]	*Picea sitchensis*	1
Great Sane Dunes NM	1		37.7258	-105.5323	2469	15.3	*Pinus edulis*	1
Great Sane Dunes NM	2		37.7308	-105.4874	2774	13.38	*Pinus edulis*	1
Great Sane Dunes NM	3		37.7338	-105.4602	2941	12.94	*Pinus flexilis*	1
Great Sane Dunes NM	4		37.7223	-105.4699	3109	13.38	*Pinus flexilis*	1
Great Sane Dunes NM	5		37.7149	-105.4704	3338	13.19	*Pinus flexilis*	1
Grand Tetons NP	1		43.7307	-110.7389	2073	11.27	*Pinus contorta*	2
Grand Tetons NP	2		43.7256	-110.7601	2362	10.66	*Abies lasiocarpa*	1
Grand Tetons NP	3		43.7264	-110.7657	2591	9.76	*Pinus flexilis*	1
Grand Tetons NP	4		43.7276	-110.7713	2804	9.76	*Pinus flexilis*	1
Katmai NP & Preserve	1		58.5459	-155.7836	36	7.89 [3]	*Picea glauca*	1
Katmai NP & Preserve	2		58.5686	-155.7937	213	7.64 [3]	*Picea glauca*	1
Katmai NP & Preserve	3		58.5711	-155.8036	370	7.64 [3]	*Picea glauca*	1
Katmai NP & Preserve	4		58.5718	-155.8421	563	7.16 [3]	*Picea glauca*	1
Katmai NP & Preserve	5		58.5793	-155.8558	724	7.16 [3]	*Picea glauca*	1
Lassen Volcanic NP	1		40.5568	-121.5315	1829	14.93	*Abies concolor*	1
Lassen Volcanic NP	2		40.5314	-121.5342	2012	14	*Abies concolor*	1
Lassen Volcanic NP	3		40.4550	-121.5399	2271	12.35	*Abies magnifica*	1
Lassen Volcanic NP	4		40.4392	-121.5576	2499	13.19	*Abies magnifica*	1
Lassen Volcanic NP	5		40.4476	-121.5662	2713	13.19	*Abies magnifica*	1
Mount Rainier NP	1		46.7433	-121.8915	654	12.79	*Tsuga heterophylla*	3
Mount Rainier NP	2		46.7697	-121.7893	985	10.32	*Tsuga heterophylla*	3
Mount Rainier NP	3	LP 19	46.8239	-121.8953	1372	10.25	*Abies amabilis*	3
Mount Rainier NP	4	Golden Lake	46.8878	-121.8987	1369	10.49	*Abies amabilis*	3
Mount Rainier NP	5		46.8006	-121.7831	1809	8.64	*Abies procera*	3
North Cascades NP	1		48.6493	-121.3070	198	14.38	*Pseudotsuga menziesii*	3
North Cascades NP	2		48.6420	-121.3370	614	14.38	*Tsuga heterophylla*	3
North Cascades NP	3		48.6641	-121.3266	945	14.1	*Abies amabilis*	3
North Cascades NP	4		48.6716	-121.3187	1228	14.19	*Abies amabilis*	3
North Cascades NP	5		48.6824	-121.3217	1600	13.66	*Abies amabilis*	3

Table 3.2. Site Information for 2-year conifer needle samples (continued).

Park	Site	Lake Catchment	Latitude	Longitude	Elevation (m)	Average Maximum Temperature (C)[2]	Species	Number of Samples
Olympic NP	1		48.0926	-123.4338	137	14.37	*Tsuga heterophylla*	3
Olympic NP	2		48.0926	-123.4338	137	12.01	*Tsuga heterophylla*	3
Olympic NP	3	Hoh Lake	47.8973	-123.7831	1448	12.01	*Abies lasiocarpa*	3
Olympic NP	4	PJ Lake	47.9463	-123.4136	1392	10.74	*Abies amabilis*	3
Olympic NP	5		47.9307	-123.4105	1850	10.74	*Abies lasiocarpa*	3
Rocky Mtn. NP	1		40.2380	-105.8000	2560	11.84	*Picea engelmanii*	3
Rocky Mtn. NP	2		40.2380	-105.8000	2560	11.15	*Abies*	3
Rocky Mtn. NP	3	Lonepine Lake	40.2310	-105.7310	3018	9.68	*Abies lasiocarpa*	3
Rocky Mtn. NP	5		40.3916	-105.6867	3451	9.59	*Abies lasiocarpa*	3
Rocky Mtn. NP	6	Mills Lake	40.2916	-105.6438	3042	9.06	*Picea engelmanii*	3
Sequoia NP	3		36.5536	-118.7492	2071	17.43	*Abies concolor*	3
Sequoia NP	4		36.5985	-118.7212	2332	13.69	*Abies magnifica*	3
Sequoia NP	5	Emerald Lake	36.6005	-118.6789	2816	12.25	*Abies magnifica*	3
Sequoia NP	6	Pear Lake	36.6040	-118.6690	2911	11.94	*Pinus contorta*	3
Stikine LeConte Wilderness	1		56.7910	-132.5110	1	8.56 [3]	*Picea sitchensis*	2
Stikine LeConte Wilderness	2		56.8047	-132.5317	254	7.83 [3]	*Picea sitchensis*	1
Stikine LeConte Wilderness	3		56.8095	-132.5407	567	7.83 [3]	*Picea sitchensis*	1
Stikine LeConte Wilderness	4		56.8250	-132.5715	815	6.96 [3]	*Picea sitchensis*	1
Stikine LeConte Wilderness	5		56.8180	-132.6090	1064	7.84 [3]	*Picea sitchensis*	1
Wrangell St. Elias NP & Preserve	1		60.0476	-141.3066	7	7.38 [3]	*Picea sitchensis*	2
Wrangell St. Elias NP & Preserve	2		61.5219	-144.4002	219	5.23 [3]	*Picea glauca*	2
Wrangell St. Elias NP & Preserve	3		61.3856	-143.6014	648	5.72 [3]	*Picea glauca*	1
Wrangell St. Elias NP & Preserve	4		61.4964	-142.8684	607	4.63 [3]	*Picea glauca*	1
Wrangell St. Elias NP & Preserve	5		61.5014	-142.8381	1421	3.62 [3]	*Picea glauca*	1
Yosemite NP	1		37.6783	-119.7541	661	17.9	*Pinus sabiniana*	1
Yosemite NP	2		37.7150	-119.6801	1433	16.19	*Pinus ponderosa*	2
Yosemite NP	3		37.7237	-119.5336	1829	16.39	*Pinus lambertiana*	1
Yosemite NP	4		37.7506	-119.3631	2713	10.91	*Pinus contorta*	1
Yosemite NP	5		37.7744	-119.3371	3048	11.43	*Pinus contorta*	1

Table 3.3. Site information for PASDs. [1]Samples were located at the same sites as lichen, conifer needles, and snow. [2]Monthly maximum temperature data from PRISM was averaged from June 2004 through June 2005 unless noted otherwise. Temperature data was not available for 2006. [3]30-year monthly maximum temperature data from PRISM was averaged from June 2004 through June 2005.

Park	Site	Catchment Lake	Latitude	Longitude	Elevation (m)	Average Monthly Maximum Temperature (C)[2]	Number of Samples
Bandelier NM	5		35.8642	-106.4178	2926	13.00	1
Bandelier NM	1		29.187	-102.9718	560	30.97	1
Bandelier NM	2		29.3079	-103.1828	1067	27.17	1
Bandelier NM	3		29.2850	-103.2799	1067	24.77	1
Bandelier NM	4		29.2534	-103.2979	1920	23.93	1
Crater Lake NP	5		42.9233	-122.0162	2713	9.22	1
Denali NP & Preserve	3	Wonder Lake	63.45383	-150.87202	655	3.10 [3]	1
Denali NP & Preserve	Friday Creek		63.54210	-150.97810	561	2.80 [3]	1
Gates of the Arctic NP & Preserve	1	Matcherak Lake	67.75291	-156.23230	505	-3.60 [3]	1
Glacier NP	3	Snyder Lake	48.62605	-113.80308	1609	9.36	1
Glacier NP	4	Oldman Lake	48.51040	-113.45520	2024	9.42	1
Glacier Bay NP & Preserve	1		58.6022	-135.8831	8	7.6 [3]	1
Great Sane Dunes NM	5		37.7149	-105.4704	3338	11.98	1
Grand Tetons NP	5		43.4300	-110.7800	3048	10.55	1
Katmai NP & Preserve	3		58.5711	-155.8036	370	7.1 [3]	1
Lassen Volcanic NP	5		40.4476	-121.5662	2713	12.38	1
Mount Rainier NP	3	LP 19 Lake	46.82392	-121.89525	1372	9.51	1
Mount Rainier NP	4	Golden Lake	46.88782	-121.89867	1369	10.24	1
Noatak NP	3	Burial Lake	68.40630	-159.22226	388	-4.70 [3]	1
North Cascades NP	5		48.6824	-121.3217	1600	12.80	1
Olympic NP	3	Hoh Lake	47.89730	-123.78310	1448	11.37	1
Olympic NP	4	PJ Lake	47.94630	-123.41360	1392	9.73	1
Rocky Mnt. NP	1		40.2380	-105.8000	2560	10.92	1
Rocky Mnt. NP	2		40.2380	-105.8000	2560	10.27	1
Rocky Mnt. NP	3	Lonepine Lake	40.2310	-105.7310	3018	9.01	1
Rocky Mnt. NP	5		40.3916	-105.6867	3451	9.01	1
Rocky Mnt. NP	6	Mills Lake	40.2916	-105.6438	3042	8.77	1
Sequoia NP	5	Emerald Lake	36.6005	-118.6789	2816	11.45	1
Sequoia NP	Wolverton Creek		36.5985	-118.7212	2332	12.88	1
Sequoia NP	POTW		36.5165	-118.8017	658	19.73	1
Sequoia NP	CRYS		35.5767	-118.7860	1573	22.77	1
Stikine LeConte Wilderness	1		56.7910	-132.5110	1	7.90 [3]	1
Stikine LeConte Wilderness	2		56.8047	-132.5317	254	7.20 [3]	1
Stikine LeConte Wilderness	4		56.8250	-132.5715	815	6.20 [3]	1
Wrangell St. Elias NP & Preserve	3		60.0476	-141.3066	7	4.30 [3]	1
Yosemite NP	5		37.7744	-119.3371	3048	11.01	1

Table 3.4. Site information for snow. [1]Samples were located at the same sites as lichen, conifer needles, and PASDs. [2]Monthly maximum temperature data from PRISM was averaged from November through March for 2003, 2004, and 2005 unless noted otherwise. [3]30-year monthly maximum temperature data from PRISM was averaged from November through.

Park	Site	Latitude	Longitude	Elevation (m)	Average Monthly Maximum Temperature (C)[2]	Number of Samples	Sampling Year
Denali NP & Preserve	Kahiltna	62.9692	-151.1733	2153	-16.88[3]	1	2003
Denali NP & Preserve	McLeod	63.3711	-151.0931	609	-8.82[3]	3	2003, 2004, 2005
Denali NP & Preserve	Wonder	63.4800	-150.8797	610	-8.66[3]	3	2003, 2004, 2005
Gates of the Arctic NP & Preserve	Matcharak	67.7500	-156.2100	502	-18.94[3]	3	2003, 2004, 2005
Glacier NP	Aster	48.4583	-113.3781	1922	-0.85	2	2003, 2004
Glacier NP	Granite Park	48.7711	-113.7703	2006	0.33	1	2005
Glacier NP	Preston	48.7111	-113.6511	2163	0.02	1	2005
Glacier NP	Snyder	48.6250	-113.8044	1600	0.28	2	2003, 2004
Mount Rainier NP	AltaVista	46.7944	-121.7364	1798	2.65	1	2003
Mount Rainier NP	Edith Cornice	46.7986	-121.7322	1896	2.65	1	2005
Mount Rainier NP	Fell Fields	46.8242	-121.7253	2670	0.83	1	2005
Mount Rainier NP	Mowich	46.9342	-121.8622	1506	4.13	1	2004
Mount Rainier NP	Paradise	46.7867	-121.7419	1676	2.34	1	2004
Mount Rainier NP	Protection	46.8339	-121.7294	3011	0.83	1	2005
Mount Rainier NP	Sugarloaf	46.8144	-121.7214	2380	1.64	1	2005
Noatak NP	Burial	68.4300	-159.1800	427	-20.12[3]	2	2003, 2004
Noatak NP	Kangilipak	68.0000	-159.1208	305	-19.44[3]	1	2005
North Cascades NP	Noisy Creek Glacier	48.6714	-121.5278	550	3.61	1	2005
North Cascades NP	Sandalee Glacier	48.4072	-120.7889	687	2.66	1	2005
North Cascades NP	Silver Glacier	48.9775	-121.2433	656	0.84	1	2005
North Cascades NP	Stout	48.5794	-121.1867	616	3.29	1	2005
Olympic NP	Hoh	47.8978	-123.7878	1387	6.42	1	2004
Olympic NP	Hurricane Ridge	47.9719	-123.5019	1554	5.77	1	2004
Olympic NP	Steeple Rock	47.9525	-123.4408	1539	5.13	1	2004
Rocky Mnt. NP	Irene Forest	40.4128	-105.8197	3243	-0.2	2	2004, 2005
Rocky Mnt. NP	IreneMeadow	40.4119	-105.8217	3237	-0.2	2	2003, 2005
Rocky Mnt. NP	Lonepine	40.2306	-105.7361	2975	0.47	1	2003
Rocky Mnt. NP	Mills	40.2897	-105.6431	3056	0.13	3	2003, 2004, 2005
Sequoia NP	Emerald	36.5964	-118.6750	2908	3.56	3	2003, 2004, 2005
Sequoia NP	Pear	36.5986	-118.6656	2950	3.56	3	2003, 2004, 2005

Table 3.5. Recovery of SOCs from PASDs over the analytical method. The average percent recovery was calculated from triplicates. [1]Recoveries were corrected for background concentrations of SOCs in needles. [2]Sample-specific estimated method detection limits were calculated from a sample taken from Hoh Lake in Olympic National Park. [3]Hexachlorocyclohexane. [4]Dichlorodiphenyldichloroethylene. [5]Dichlorodiphenyldichloroethane. [6]Dichlorodiphenyltrichloroethane.

	XAD[1]		EDL[2]		XAD[1]		EDL[2]
	Avg. % Rec	% RSD	ng/g dw		Avg. %Rec	%RSD	ng/g dw
			Amide Pesticides				
Propachlor	100.7	3.8	0.05	Acetochlor	87.9	3.1	0.1
Alachlor	97.0	2.1	0.1	Metolachlor	102.6	1.9	0.02
			Organochlorine Pesticides and Metabolites				
HCH, gamma[3]	92.2	0.4	0.01	Chlordane, cis	82.6	3.7	0.02
HCH, alpha[3]	89.9	1.0	0.01	p,p'-DDD[5]	106.3	3.2	0.05
HCH, beta[3]	94.5	1.1	0.00	Nonachlor, trans	99.3	1.6	0.00
HCH, delta[3]	102.9	0.8	0.02	o,p'-DDD[5]	94.9	1.7	0.02
Methoxychlor	110.0	1.4	0.01	Chlordane, trans	104.1	1.1	0.001
Heptachlor epoxide	122.4	1.3	0.03	Nonachlor, cis	93.9	2.5	0.001
Endrin aldehyde	92.9	1.4	0.003	Aldrin	99.2	1.3	0.01
Endrin	107.3	2.2	0.03	o,p'-DDT[6]	67.5	8.8	0.04
Heptachlor	111.6	2.6	0.01	p,p'-DDE[4]	91.0	1.8	0.01
o,p'-DDE[4]	104.2	7.7	0.02	Mirex	86.5	2.5	0.004
Chlordane, oxy	118.2	1.4	0.03	p,p'-DDT[6]	94.4	1.5	0.01
Dieldrin	95.2	1.8	0.02				
			Organochlorine Sulfide Pesticides and Metabolites				
Endosulfan sulfate	94.7	3.6	0.0002	Endosulfan II	97.8	2.3	0.003
Endosulfan I	102.0	1.1	0.003				
			Phosphorothioate Pesticides				
Methyl parathion	80.7	1.4	0.1	Ethion	100.4	8.5	0.1
Malathion	74.0	5.8	0.1	Chlorpyrifos	81.8	2.6	0.003
Diazinon	81.2	2.2	0.04	Chlorpyrifos oxon	150.6	9.9	0.2
Parathion	77.1	3.4	0.1				
			Triazine Herbicides and Metabolites				
Simazine	102.7	1.3	0.1	Atrazine desethyl	107.7	3.4	0.1
Cyanazine	210.0	2.0	0.1	Atrazine desisoproply	102.7	1.4	0.02
Atrazine	90.2	1.0	0.04				
			Miscellaneous Pesticides				
Metribuzin	90.8	7.0	0.02	Trifluralin	82.6	4.5	0.001
Etridiazole	116.5	0.7	0.1	Hexachlorobenzene	93.3	1.0	0.0002
Triallate	91.9	2.2	0.01	EPTC	83.8	1.4	0.2
Dacthal	95.4	3.7	0.002	Pebulate	88.8	1.3	0.1
			Polycyclic Aromatic Hydrocarbons				
Acenaphthylene	48.4	25.6	0.03	Benzo[a]anthracene	63.8	44.8	0.01
Acenaphthene	81.2	4.4	0.04	Benzo[k]fluoranthene	79.6	2.4	0.01
Fluorene	92.1	2.2	0.04	Benzo[a]pyrene	88.2	0.0	0.02
Anthracene	20.9	154.8	0.1	Benzo[b]fluoranthene	99.2	0.7	0.007
Phenanthrene	99.4	2.2	0.1	Indeno[1,2,3-cd]pyrene	93.7	1.4	0.01
Pyrene	89.4	2.7	0.01	Dibenz[a,h]anthracene	89.9	2.4	0.02
Fluoranthene	92.2	3.0	0.01	Benzo[e]pyrene	101.8	3.6	0.009
Chrysene/Triphenylene	87.5	1.9	0.005	Benzo[ghi]perylene	88.9	2.5	0.01
			Polychlorinated Biphenyls				
PCB 74	93.5	0.6	0.1	PCB 118	70.9	4.6	0.001
PCB 101	88.7	3.1	0.003	PCB 187	91.0	1.5	0.001
PCB 138	111.8	1.7	0.001	PCB 183	91.9	1.6	0.0002
PCB 153	103.9	1.6	0.001				
			Averages and % RSD				
average	94.7	5.5	0.03	max	210.0	154.8	0.2
				min	20.9	0.0	0.0002

Table 3.6. Exposure period for lichen, conifer needles, PASDs, and snow from Sequoia NP (Emerald Lake), Rocky Mountain NP (Mills Lake), Glacier NP (Snyder Lake), Olympic NP (Hoh Lake) and Denali NP (Wonder Lake) where they were all located.

	Start Exposure	**Stop Exposure**	**Exposure Period (± 2 months)**
Lichen	unknown	Summer 2004	years
Conifer needles	Spring 2002	Summer 2004	2 years
PASDs	Summer 2005	Summer 2006	1 year
Snow	November 2003 and 2004	March 2003 and 2004	5 months

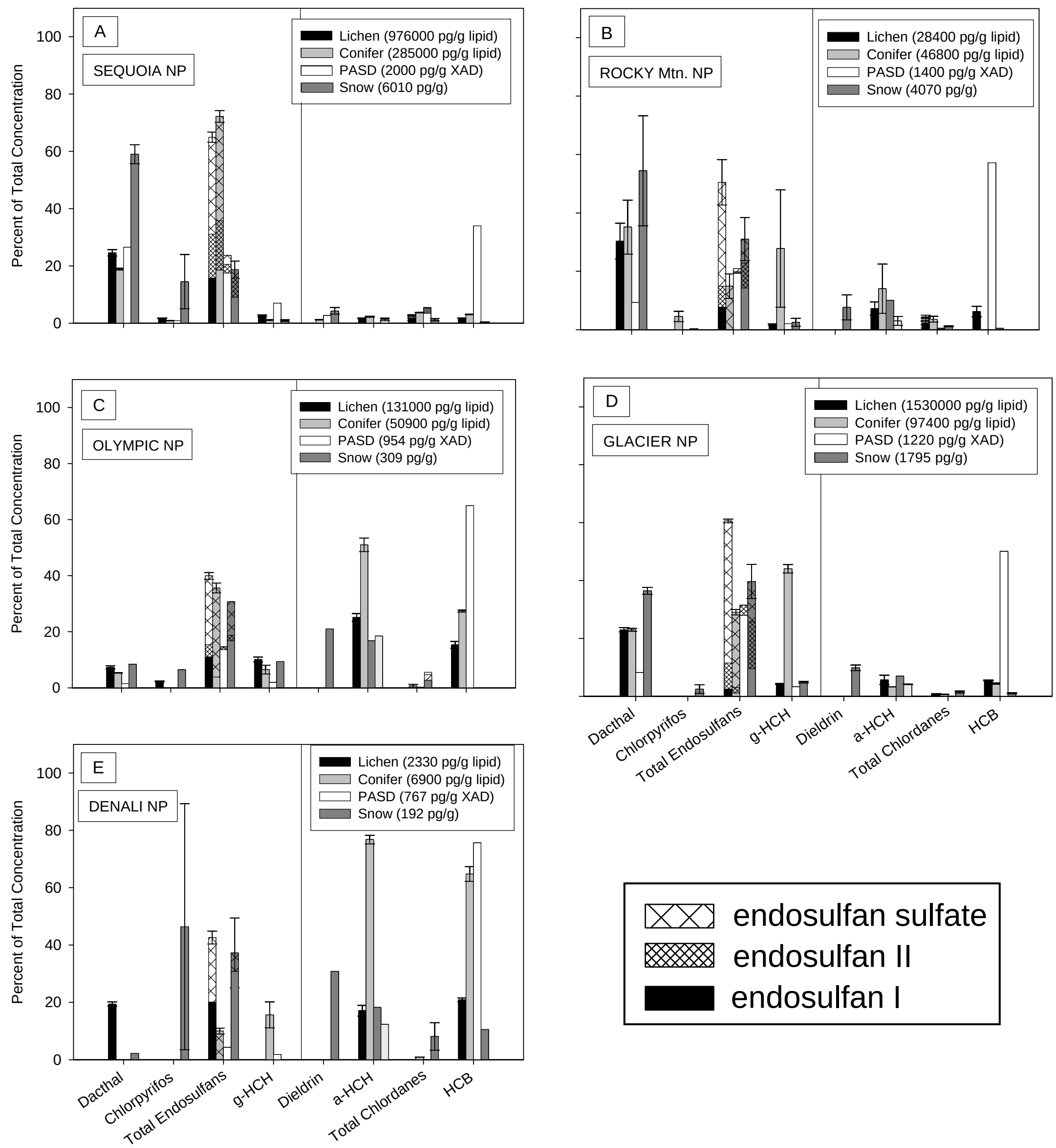

Figure 3.2. Average percent of the total concentration for 8 most frequently measured pesticides in lichen, conifer needles, PASDs, and snow by park (n = 5). The error bars represent the standard error. Stacked bars for Total Endosulfans show concentrations for endosulfan I, II, and sulfate. Total pesticide concentrations are shown for each medium in parentheses. Snow data includes 2003 and 2004 snow accumulation periods.

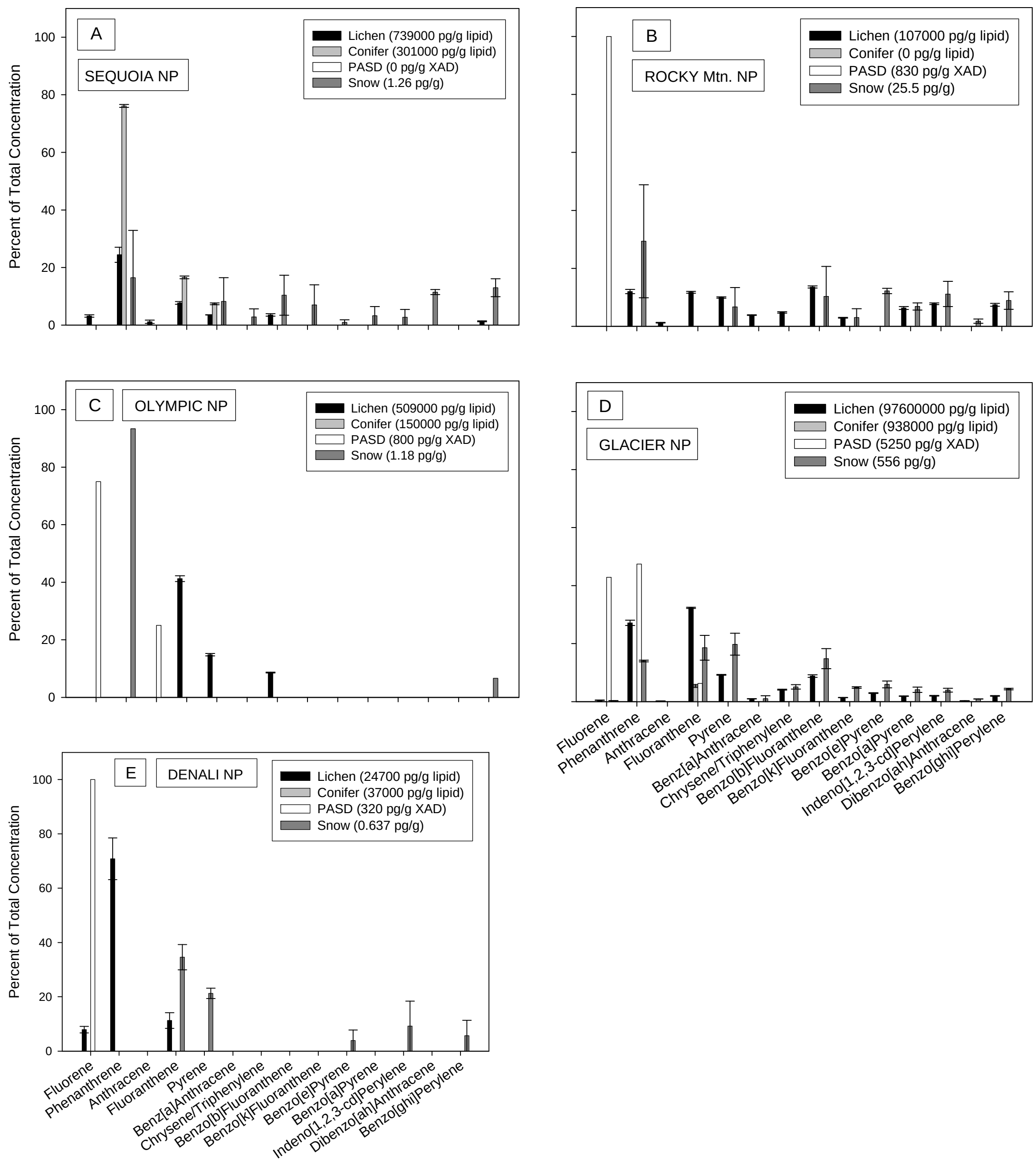

Figure 3.3. Average percent of the total concentration for 14 measured PAHs in lichen, conifer needles, PASDs, and snow by park (n = 5). The error bars represent the standard error. Total PAH concentrations are shown for each medium in parentheses. Snow data includes 2003 and 2004 snow accumulation periods.

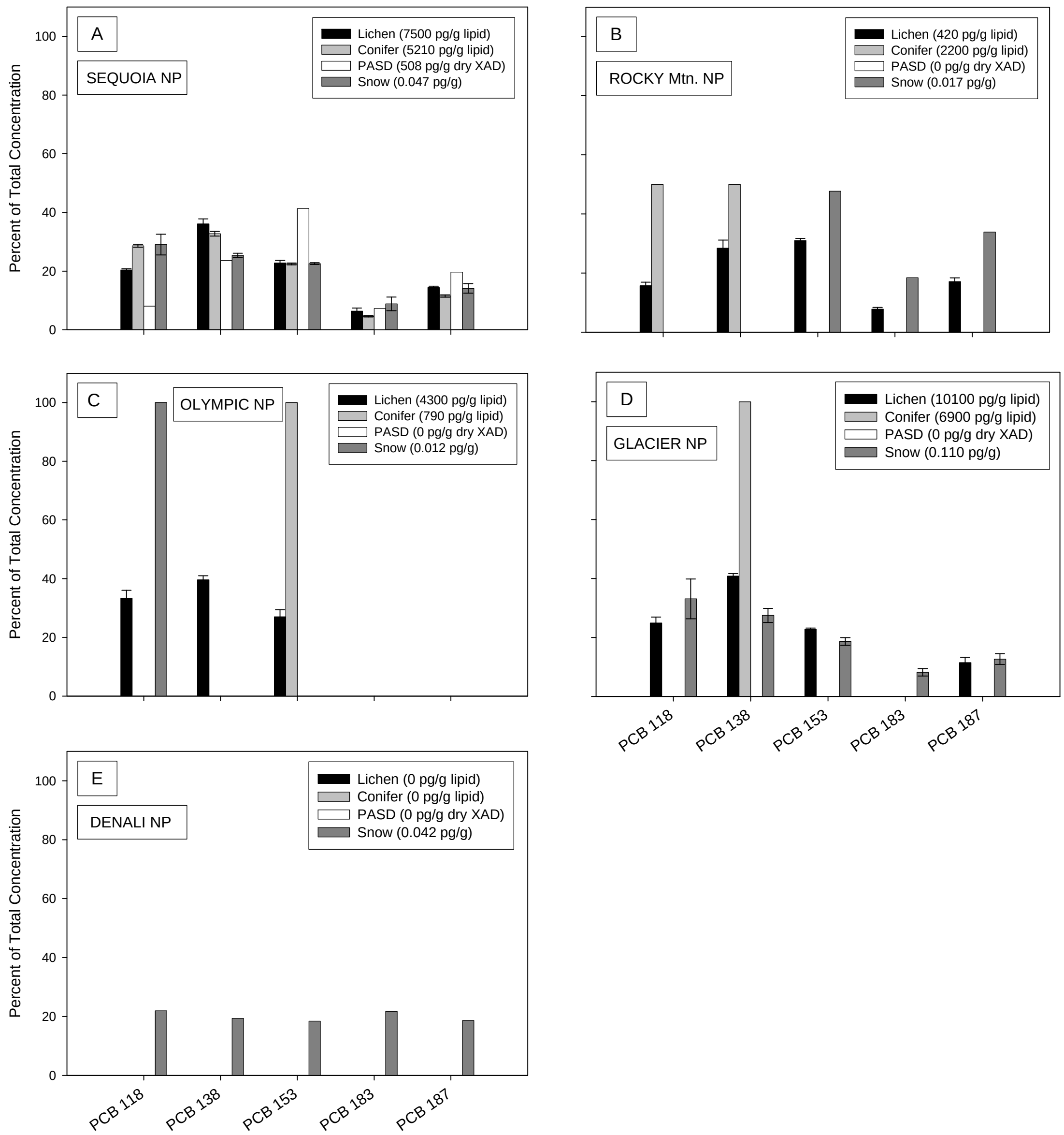

Figure 3.4. Average percent of the total concentration for 5 measured PCBs in lichen, conifer needles, PASDs, and snow by park. The error bars represent the standard error. Total PCB concentrations are shown for each medium in parentheses. Snow data includes 2003 and 2004 snow accumulation periods.

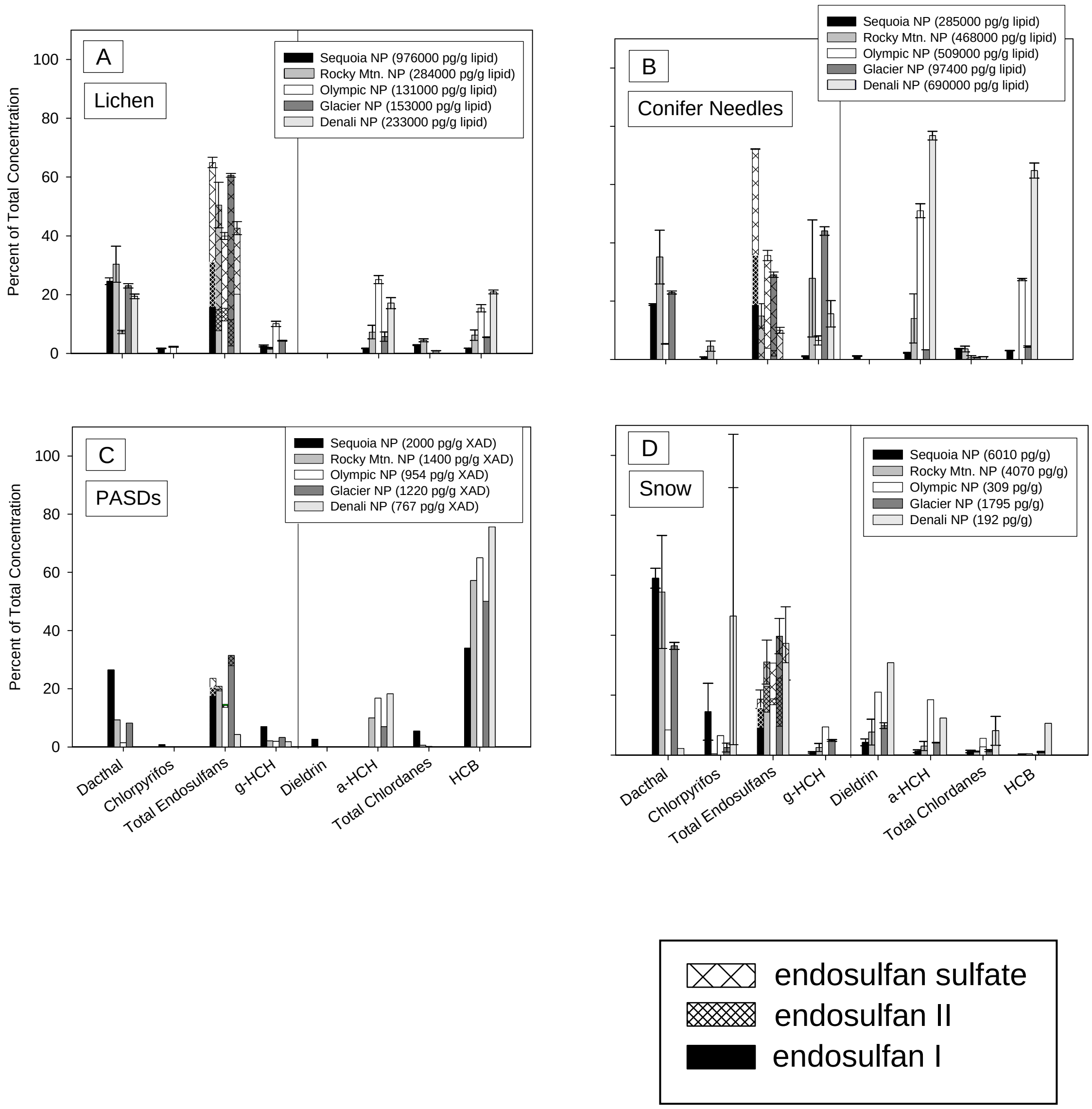

Figure 3.5. Average percent of the total concentration for 8 of the most frequently measured pesticides in lichen, conifer needles, PASDs, and snow by media. The error bars represent the standard error. Total pesticide concentrations are shown for each medium in parentheses. Snow data includes 2003 and 2004 snow accumulation periods

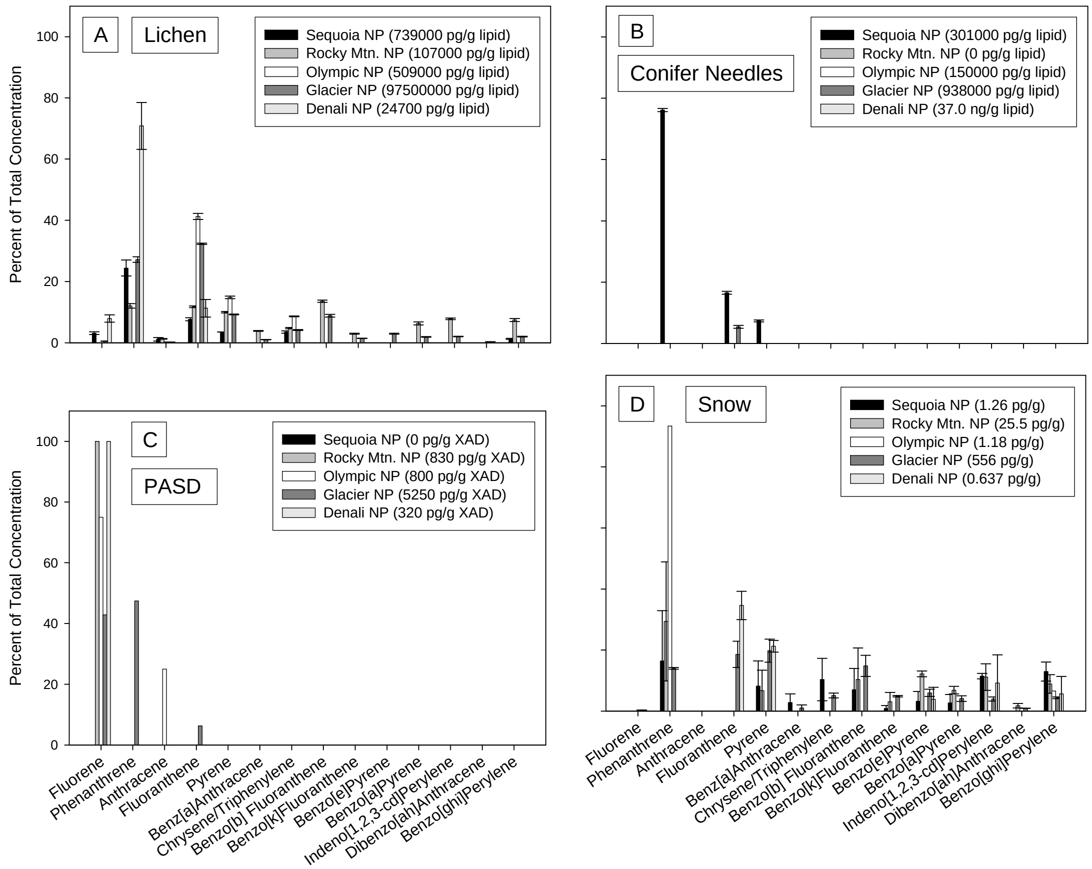

Figure 3.6. Average percent of the total concentration for 14 measured PAHs in lichen, conifer needles, PASDs, and snow by media. The error bars represent the standard error. Total PAH concentrations are shown for each medium in parentheses. Snow data includes 2003 and 2004 snow accumulation periods.

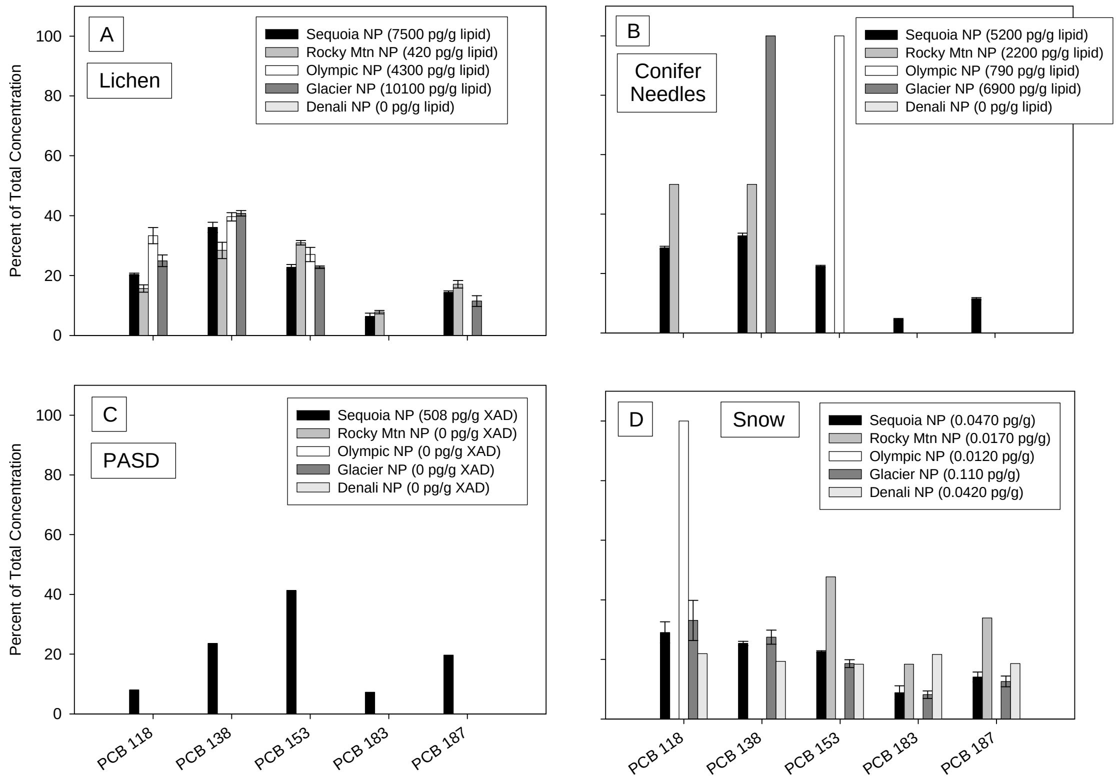

Figure 3.7. Average percent of the total concentration for 5 measured PCBs in lichen, conifer needles, PASDs, and snow by media. The error bars represent the standard error. Total PCBs concentrations are shown for each medium in parentheses. Snow data includes 2003 and 2004 snow accumulation periods.

Table 3.7. Results for Tukey-Kramer Kramer honestly significant difference (HSD) tests. Analysis was performed on transformed percent of total SOC concentrations for each media from 5 sites. ND = SOC was not detected in the media. NA = The p-value for significance of media type and park was not available due to a limited number of detections for the SOC. [1]Significant differences (alpha ≤ 0.05) between average arcsine square root percent concentrations of the media are shown with subscript letters and the largest average transformed percent SOC concentration assigned “A”. If no letter is present, there is not a significant difference.

Compound	p-value		Tukey-Kramer HSD Results[1] and Average Percent SOC Concentration			
	Media	Park	Lichen	Conifer Needles	PASD	Snow
dacthal	0.0019	<0.0001	18.54^{A,B}	13.81^{B}	9.004^{B}	31.28^{A}
chlorpyrifos	0.0109	0.192	1.552^{A,B}	0.8984^{B}	0.2569^{B}	6.868^{A}
endosulfan I	0.1483	0.7437	8.827	5.695	16.45	13.89
endosulfan II	0.1131	0.0106	7.224	4.271	1.586	6.159
endosulfan sulfate	0.0003	0.0733	29.70^{A}	19.61^{A,B}	0.8912^{C}	7.620^{B,C}
total endosulfans	0.0716	0.0986	45.75^{A}	29.58^{A,B}	18.93^{B}	27.67^{A,B}
HCB	<0.0001	0.0452	7.077^{B}	10.99^{B}	56.12^{A}	3.796^{B}
a-HCH	0.1821	0.0008	9.025	16.65	10.37	7.106
g-HCH	0.0938	0.4164	4.027	19.04	3.187	3.396
dieldrin	0.0065	0.3819	ND	5.583^{A,B}	0.5214^{B}	13.15^{A}
trans-chlordane	0.8652	0.4216	0.9188	0.5826	0.7657	0.7796
cis-chlordane	0.3781	0.2802	11.05	1.612	ND	ND
trans-nonachlor	0.2560	0.4951	1.266	0.7779	0.4542	1.034
cis-nonachlor	0.0138	0.1696	0.7561^{A}	0.4714^{A}	0.06567^{B}	0.5288^{A}
total chlordanes	0.2453	0.3944	13.99	3.453	2.343	1.286
trifluralin	0.0995	0.2587	0.0283	ND	0.3264	0.5302
triallate	NA	NA	ND	ND	ND	0.3862
acenapthene	NA	NA	ND	ND	ND	3.862
acenapthylene	NA	NA	ND	ND	ND	ND
fluorene	0.2914	0.3072	1.34^{B}	ND	79.06^{A}	0.3053^{B}
phenanthrene	0.5839	0.5975	18.25	2.398	11.86	28.42
anthracene	NA	NA	ND	26.68	6.652	ND
fluoranthene	0.0863	0.2690	18.54	4.485	1.571	10.79
pyrene	0.6170	0.8918	7.094	ND	ND	11.14
chrysene/ triphenylene	0.5063	0.5425	3.998	ND	ND	2.907
benzo[a]anthracene	0.8386	0.9291	1.467	ND	ND	1.189
benzo[b]fluoranthene	0.8600	0.1668	6.311	ND	ND	8.111
benzo[k]fluoranthene	0.6933	0.6391	3.002	ND	ND	2.296
benzo[a]pyrene	0.8983	0.2696	2.744	ND	ND	2.559
benzo[e]pyrene	0.1413	0.2150	2.437	ND	ND	4.942
benzo[ghi]perylene	0.0355	0.5101	2.531^{B}	ND	ND	7.366^{A}
dibenzo[ah]anthracene	0.1823	0.3392	6.051	ND	ND	1.26
indeno[1,2,3-cd]perylene	0.0813	0.1285	3.189	ND	ND	7.394
PCB 118	0.3626	0.3024	20.22	23.31	2.018	36.23
PCB 138	0.3304	0.0184	30.24	50.86	52.07	15.93
PCB 153	0.7371	0.2738	21.47	19.86	30.61	20.83
PCB 183	0.2298	0.5632	12.91	2.111	6.141	11.4
PCB 187	0.1590	0.6134	15.16	3.869	9.161	15.61

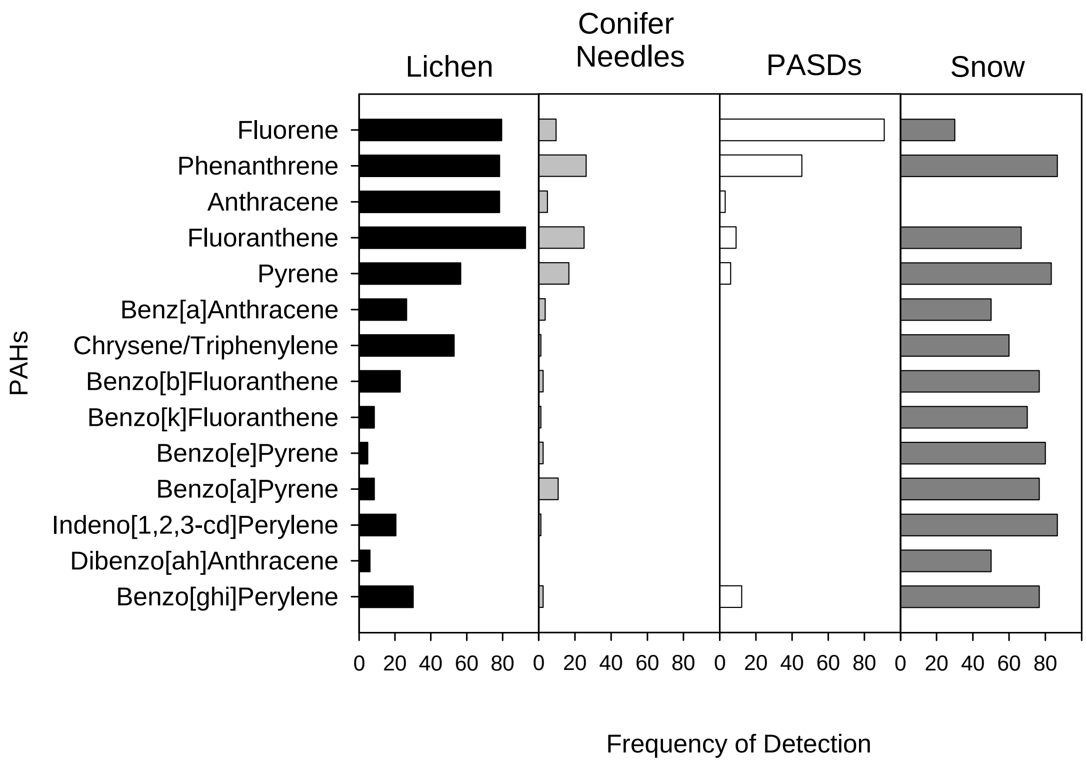

Figure 3.8. Frequency of Detection for 14 frequently measured PAHs in lichen, conifer needles, PASDs, and snow without EDLs. Snow data includes 2003 and 2004 snow accumulation periods.

Table 3.8 Multiple Linear Regression Model Results for Lichen. ND = Not Detected. NA = Not Available: More than 50% of the data were composed of ½ EDLs. Significant Environmental Parameters were obtained from stepwise elimination of a full multiple linear regression model based on the significance of the parameter (p-value ≤ 0.05). A positive correlation is indicated by "+" and a negative correlation is indicated by "-".

Compound	Significant Environmental Parameters	p-values Kaw	p-values Log Koa	p-values % Particle Fraction	Number of Sites
dacthal	Species + Elev + Coast Distance + Ag Intensity + AmmNO3	+ 0.0068	- 0.0024	- 0.0365	82
chlorpyrifos	Species + Coast Distance + Ag Intensity + AmmNO3	+ 0.1461	- 0.1189	- 0.2339	46
endosulfan I	Species + Elev + Ag Intensity	+ 0.0084	- 0.0079	- 0.0269	82
endosulfan II	Species + Elev + Coast Distance + Ag Intensity + AmmNO3 + Precip	+ 0.0016	- 0.0012	- 0.0077	82
endosulfan sulfate	Species + Elev + Ag Intensity	+ 0.0286	- 0.0148	- 0.0652	82
HCB	Species + Elev	- 0.5108	+ 0.8579	+ 0.7254	81
a-HCH	Species + Elev	- 0.0800	+ 0.1939	+ 0.5513	82
g-HCH	Species + Elev + Ag Intensity	- 0.3632	+ 0.5239	+ 0.8349	82
dieldrin	NA	NA	NA	NA	82
trans-chlordane	Species + Elev + Coast Distance + Ag Intensity	+ 0.1853	- 0.0671	- 0.0582	82
cis-chlordane	NA	NA	NA	NA	82
trans-nonachlor	Species + Ag Intensity	+ 0.7791	- 0.4192	- 0.2293	82
cis-nonachlor	Species + Elev + Coast Distance + Ag Intensity	+ 0.7371	- 0.5994	- 0.5127	82
trifluralin	NA	NA	NA	NA	14
triallate	NA	NA	NA	NA	82
acenapthene	ND	ND	ND	ND	83
acenapthylene	NA	NA	NA	NA	83
fluorene	Species + Ag Intensity	+ 0.0326	- 0.0049	- 0.0012	75
phenanthrene	Species + Coast Distance + Ag Intensity + AmmNO3 + Precip	+ 0.6314	- 0.5970	- 0.5761	66
anthracene	NA	NA	NA	NA	83
fluoranthene	Species + Ag Intensity + AmmNO3	+ 0.0710	- 0.0298	- 0.0338	79
pyrene	Species + Ag Intensity	+ 0.1593	- 0.2292	- 0.3637	79
chrysene/triphenylene	Species + Ag Intensity + AmmNO3 + Precip	+ 0.1659	- 0.0408	- 0.0967	83
benzo[a]anthracene	NA	NA	NA	NA	83
benzo[b]fluoranthene	NA	NA	NA	NA	83
benzo[k]fluoranthene	NA	NA	NA	NA	83
benzo[a]pyrene	NA	NA	NA	NA	81
benzo[e]pyrene	NA	NA	NA	NA	83
dibenzo[ah]anthracene	NA	NA	NA	NA	83
indeno[1,2,3-cd]perylene	NA	NA	NA	NA	83
benzo[ghi]perylene	NA	NA	NA	NA	81
PCB 118	Species	+ 0.3510	- 0.1914	- 0.2423	63
PCB 138	Species + Elev + Coast Distance + Ag Intensity + Precip	- 0.5443	+ 0.9780	+ 0.9255	82
PCB 153	Species	- 0.9071	+ 0.7096	+ 0.6191	82
PCB 183	Species + Elev + Precip	+ 0.8619	- 0.5341	- 0.5452	81
PCB 187	Species + Elev + Coast Distance + Ag Intensity + Precip	- 0.5397	+ 0.9013	+ 0.8638	82

Table 3.9. Multiple Linear Regression Model Results for Conifer Needles. ND = Not Detected. NA = Not Available: More than 50% of the data were composed of ½ EDLs. Significant Environmental Parameters were obtained from stepwise elimination of a full multiple linear regression model based on the significance of the parameter (p-value ≤ 0.05). A positive correlation is indicated by "+" and a negative correlation is indicated by "-".

Compound	Significant Environmental Parameters	p-values			Number of Sites
		Kaw	Log Koa	% Particle Fraction	
dacthal	Species + Elev + Ag Intensity + AmmNO3	+ 0.0406	- 0.0352	- 0.0341	79
chlorpyrifos	Species + Precip	+ 0.7918	- 0.7168	- 0.6791	52
endosulfan I	Species + Elev + Coast Distance + Ag Intensity	+ 0.0431	- 0.0218	- 0.0141	85
endosulfan II	Species + Elev + Coast Distance + Ag Intensity	+ 0.0073	- 0.0064	- 0.0080	85
endosulfan sulfate	Species + Coast Distance + Ag Intensity	+ 0.3285	- 0.3013	- 0.3095	85
HCB	Species + Elev	- 0.3422	+ 0.3595	+ 0.4206	84
a-HCH	Species	+ 0.3248	- 0.3651	- 0.3865	85
g-HCH	Species + Elev + Ag Intensity	0.4093	+ 0.4683	+ 0.5343	85
dieldrin	NA	NA	NA	NA	28
trans-chlordane	Species + Pop + Ag Intensity	+ 0.4656	- 0.4469	- 0.4836	85
cis-chlordane	NA	NA	NA	NA	84
trans-nonachlor	Species + Coast Distance + Pop + Ag Intensity	+ 0.2332	- 0.1275	- 0.0706	85
cis-nonachlor	NA	NA	NA	NA	85
trifluralin	NA	NA	NA	NA	14
triallate	NA	NA	NA	NA	85
acenapthene	ND	ND	ND	ND	84
acenapthylene	NA	NA	NA	NA	84
fluorene	NA	NA	NA	NA	39
phenanthrene	Species + Pop	+ 0.4692	- 0.5759	- 0.6849	22
anthracene	NA	NA	NA	NA	84
fluoranthene	NA	NA	NA	NA	74
pyrene	NA	NA	NA	NA	84
chrysene/triphenylene	NA	NA	NA	NA	84
benzo[a]anthracene	NA	NA	NA	NA	83
benzo[b]fluoranthene	NA	NA	NA	NA	84
benzo[k]fluoranthene	NA	NA	NA	NA	84
benzo[a]pyrene	NA	NA	NA	NA	57
benzo[e]pyrene	NA	NA	NA	NA	79
dibenzo[ah]anthracene	NA	NA	NA	NA	84
indeno[1,2,3-cd]perylene	NA	NA	NA	NA	84
benzo[ghi]perylene	NA	NA	NA	NA	79
PCB 118	NA	NA	NA	NA	49
PCB 138	Species + Coast Distance + Ag Intensity	- 0.1647	+ 0.1292	+ 0.1248	55
PCB 153	Species	+ 0.7951	- 0.6657	- 0.6582	49
PCB 183	Species + Ag Intensity	+ 0.3584	- 0.2850	- 0.3010	56
PCB 187	Species + Ag Intensity	+ 0.1578	- 0.1881	- 0.1883	56

Table 3.10. Multiple Linear Regression Model Results for PASDs. ND = Not Detected. NA = Not Available: More than 50% of the data were composed of ½ EDLs. NSM = No Significant Model: All explanatory variables were not significant. Significant Environmental Parameters were obtained from stepwise elimination of a full multiple linear regression model based on the significance of the parameter (p-value ≤ 0.05). A positive correlation is indicated by "+" and a negative correlation is indicated by "-".

Compound	Significant Environmental Parameters	p-values			Number of Sites
		Kaw	Log Koa	% Particle Fraction	
dacthal	Elev + Ag Intensity	+ <0.0001	- <0.0001	- <0.0001	33
chlorpyrifos	NA	NA	NA	NA	35
endosulfan I	Elev + Ag Intensity	+ <0.0001	- <0.0001	- <0.0001	35
endosulfan II	Elev + Coast Distance + Ag Intensity + Precip	+ <0.0001	- <0.0001	- <0.0001	36
endosulfan sulfate	Elev	+ <0.0001	- 0.0001	- 0.0164	32
HCB	NSM	+ 0.7042	- 0.9653	- 0.7752	35
a-HCH	AmmNO3	0.2906	+ 0.2872	+ 0.316	35
g-HCH	Elev	+ 0.2596	- 0.3839	- 0.6458	36
dieldrin	NA	NA	NA	NA	36
trans-chlordane	Elev + AmmNO3	+ 0.0046	- 0.0043	- 0.0157	33
cis-chlordane	NA	NA	NA	NA	34
trans-nonachlor	AmmNO3	+ 0.0235	- 0.0223	- 0.0441	32
cis-nonachlor	NA	NA	NA	NA	32
trifluralin	Ag Intensity	+ 0.0926	- 0.0439	- 0.0223	20
triallate	ND	ND	ND	ND	35
acenapthene	ND	ND	ND	ND	33
acenapthylene	ND	ND	ND	ND	33
fluorene	NSM	0.6605	+ 0.7983	+ 0.9711	32
phenanthrene	NSM	0.6006	+ 0.4667	+ 0.3757	15
anthracene	NA	NA	NA	NA	1
fluoranthene	NA	NA	NA	NA	3
pyrene	NA	NA	NA	NA	2
chrysene/triphenylene	ND	ND	ND	ND	34
benzo[a]anthracene	ND	ND	ND	ND	34
benzo[b]fluoranthene	ND	ND	ND	ND	33
benzo[k]fluoranthene	ND	ND	ND	ND	34
benzo[a]pyrene	ND	ND	ND	ND	29
benzo[e]pyrene	ND	ND	ND	ND	25
dibenzo[ah]anthracene	ND	ND	ND	ND	19
indeno[1,2,3-cd]perylene	ND	ND	ND	ND	34
benzo[ghi]perylene	NA	NA	NA	NA	9
PCB 118	NA	NA	NA	NA	2
PCB 138	NA	NA	NA	NA	34
PCB 153	NA	NA	NA	NA	31
PCB 183	NA	NA	NA	NA	31
PCB 187	NA	NA	NA	NA	30

Table 3.11. Multiple Linear Regression Model Results for Snow. ND = Not Detected. NA = Not Available: More than 50% of the data were composed of ½ EDLs. NSM = No Significant Model: All explanatory variables were not significant. Significant Environmental Parameters were obtained from stepwise elimination of a full multiple linear regression model based on the significance of the parameter (p-value ≤ 0.05). A positive correlation is indicated by "+" and a negative correlation is indicated by "-".

Compound	Significant Environmental Parameters	p-values Kaw	p-values Log Koa	p-values % Particle Fraction	Number of Sites
dacthal	Elev + Ag Intensity + Coast Distance + Pop + AmmNO3	- 0.0520	+ 0.3527	+ 0.8486	30
chlorpyrifos	AmmNO3	+ 0.7225	- 0.4853	- 0.4024	28
endosulfan I	Elev + Ag Intensity + Pop + AmmNO3	- 0.0003	+ <0.0001	+ 0.0121	30
endosulfan II	Elev + Ag Intensity + Pop	- 0.1150	+ 0.0251	+ 0.3769	30
endosulfan sulfate	Ag Intensity + Precip	- 0.0675	+ 0.0051	+ 0.2923	30
HCB	Elev	+ 0.5534	- 0.6456	- 0.8712	30
a-HCH	Precip	0.9919	+ 0.7274	+ 0.485	30
g-HCH	Elev + Ag Intensity	+ 0.9672	- 0.8323	- 0.6176	30
dieldrin	Elev	- 0.0814	+ 0.0263	+ 0.0117	30
trans-chlordane	Elev + Pop + AmmNO3 + Ag Intensity	- 0.0099	+ 0.0022	+ 0.0019	30
cis-chlordane	ND	ND	ND	ND	30
trans-nonachlor	Elev + Ag Intensity + Coast Distance + Pop + AmmNO3	- 0.0027	+ 0.0008	+ 0.001	29
cis-nonachlor	Coast Distance + AmmNO3	- 0.0012	+ 0.0005	+ 0.0004	30
trifluralin	NSM	- 0.0116	+ 0.0068	+ 0.0176	24
triallate	NA	NA	NA	NA	30
acenapthene	NA	NA	NA	NA	30
acenapthylene	ND	ND	ND	ND	30
fluorene	NA	NA	NA	NA	26
phenanthrene	Elev + Coast Distance + Ag Intensity + Precip	- 0.0445	+ 0.0110	+ 0.0032	22
anthracene	ND	ND	ND	ND	30
fluoranthene	Ag Intensity + AmmNO3	- 0.0226	+ 0.0261	+ 0.0348	30
pyrene	Ag Intensity	- 0.0037	+ 0.0068	+ 0.0130	30
chrysene/triphenylene	Elev + Coast Distance + Pop + Ag Intensity	- 0.0664	+ 0.0062	+ 0.0068	30
benzo[a]anthracene	NA	NA	NA	NA	22
benzo[b]fluoranthene	Ag Intensity	- 0.0640	+ 0.0770	+ 0.0803	30
benzo[k]fluoranthene	Ag Intensity	- 0.0873	+ 0.0872	+ 0.0939	30
benzo[a]pyrene	Elev + Pop + Ag Intensity	- 0.0010	+ 0.0051	+ 0.0016	30
benzo[e]pyrene	Elev + Pop + Ag Intensity + AmmNO3	- 0.0042	+ 0.003	+ 0.0031	30
dibenzo[ah]anthracene	NA	NA	NA	NA	30
indeno[1,2,3-cd]perylene	Ag Intensity + AmmNO3	- 0.0005	+ 0.0005	+ 0.0005	30
benzo[ghi]perylene	Elev + Coast Distance + Precip + Ag Intensity	- 0.0364	+ 0.0286	+ 0.035	30
PCB 118	NSM	- 0.7205	+ 0.6844	+ 0.6489	26
PCB 138	NSM	- 0.8030	+ 0.7240	+ 0.7687	25
PCB 153	AmmnNO3	- 0.4835	+ 0.5566	+ 0.5295	24
PCB 183	NSM	+ 0.8383	- 0.6384	- 0.7754	24
PCB 187	AmmNO3	- 0.8182	+ 0.9942	+ 0.8853	24

APPENDICES

Appendix A: Environmental parameters for lichen, conifer needles, PASDs, and snow

Table A.1. Environmental parameters for lichen.

Park	Site	Maximum Average Monthly Temperature (K)	Average Monthly Precipitation (cm)	Ammonium nitrate ($\mu g\ m^{-3}$)	Population within 150 km radius	Coast Distance (km)	Agriculture Intensity (% Cropland)
Bandelier National Monument	1	294.04	2.86	0.25	1028371	806	2.5
Bandelier National Monument	2	293.08	3.09	0.25	1028371	811	2.5
Bandelier National Monument	3	289.35	3.68	0.25	1028371	807	2.5
Bandelier National Monument	4	287.94	4.10	0.25	1028371	806	2.5
Bandelier National Monument	5	286.88	4.65	0.25	1028371	805	2.5
Big Bend National Park	4	296.93	5.80	0.26	87203	580	0.5
Big Bend National Park	5	296.64	5.37	0.26	87203	580	0.5
Crater Lake National Park	1	284.41	11.93	0.11	518477	186	4.2
Crater Lake National Park	2	283.71	12.33	0.11	518477	181	4.2
Crater Lake National Park	3	283.64	12.09	0.11	518477	180	4.2
Crater Lake National Park	4	284.01	8.00	0.11	518477	192	4.2
Denali National Park and Preserve	1	277.37	3.35	0.05	2026	264	0
Denali National Park and Preserve	2	277.32	5.38	0.05	2026	229	0
Denali National Park and Preserve	3	277.41	5.67	0.05	2026	224	0
Denali National Park and Preserve	4	278.01	5.88	0.05	2026	242	0
Denali National Park and Preserve	5	275.39	9.94	0.05	2026	207	0
Denali National Park and Preserve	6	273.39	14.61	0.05	2026	204	0
Gates of the Arctic National Park and Preserve	1	270.78	3.48	0.05	677	242	0
Glacier National Park	1	284.71	5.57	0.29	208476	619	21.6
Glacier National Park	2	282.76	6.43	0.29	208476	627	21.6
Glacier National Park	3	282.46	12.15	0.29	208476	627	21.6
Glacier National Park	4	282.76	6.43	0.29	208476	627	21.6
Glacier National Park	5	282.78	9.42	0.29	208476	650	21.6
Glacier Bay National Park	1	281.14	20.24	0.10	24703	0	0
Glacier Bay National Park	2	281.14	20.24	0.10	24703	0	0
Glacier Bay National Park	3	281.14	20.24	0.10	24703	1	0
Glacier Bay National Park	4	281.14	20.24	0.10	24703	1	0
Great Sand Dunes National Park and Preserve	2	286.38	4.20	0.20	691947	1002	7.1
Great Sand Dunes National Park and Preserve	4	286.38	4.20	0.20	691947	1001	7.1
Grand Teton National Park	1	284.27	5.33	0.22	209693	1065	10.2
Grand Teton National Park	2	283.66	5.87	0.22	209693	1065	10.2
Katmai National Park and Preserve	1	280.89	3.99	0.10	1655	72	0
Katmai National Park and Preserve	2	280.64	4.26	0.10	1655	71	0
Katmai National Park and Preserve	3	280.64	4.26	0.10	1655	70	0
Katmai National Park and Preserve	4	280.16	5.42	0.10	1655	69	0
Katmai National Park and Preserve	5	280.16	5.42	0.10	1655	67	0
Katmai National Park and Preserve	6	278.96	6.58	0.10	1655	57	0
Lassen Volcanic National Park	1	287.93	8.43	0.20	554988	209	7.4
Lassen Volcanic National Park	2	287	9.04	0.20	554988	211	7.4
Lassen Volcanic National Park	3	285.35	22.71	0.20	554988	208	7.4
Lassen Volcanic National Park	4	286.19	19.03	0.20	554988	205	7.4
Lassen Volcanic National Park	5	286.19	19.03	0.20	554988	206	7.4
Mt. Rainier National Park	1	285.79	13.42	0.20	3673153	70	6
Mt. Rainier National Park	2	283.32	17.70	0.20	3673153	73	6
Mt. Rainier National Park	3	283.25	14.68	0.20	3673153	63	6
Mt. Rainier National Park	4	283.49	13.50	0.20	3673153	57	6
Noatak National Preserve	1	271.64	3.20	0.05	677	127	0
Noatak National Preserve	3	269.67	3.06	0.05	677	192	0
Noatak National Preserve	5	270.11	3.97	0.05	677	114	0
North Cascades National Park	1	287.38	16.33	0.13	3994448	83	3.7
North Cascades National Park	2	287.38	16.53	0.13	3994448	80	3.7
North Cascades National Park	3	287.1	18.92	0.13	3994448	81	3.7
North Cascades National Park	4	287.19	16.48	0.13	3994448	82	3.7
North Cascades National Park	5	286.66	16.20	0.13	3994448	82	3.7

Table A.1. Environmental parameters for lichen (continued).

Park	Site	Maximum Average Monthly Temperature (K)	Average Monthly Precipitation (cm)	Ammonium nitrate (μg m^{-3})	Population within 150 km radius	Coast Distance (km)	Agriculture Intensity (% Cropland)
Olympic National Park	2	285.01	24.63	0.39	3990429	21	2.2
Olympic National Park	3	285.01	30.06	0.39	3990429	27	2.2
Olympic National Park	4	283.74	12.83	0.39	3990429	19	2.2
Olympic National Park	5	283.74	12.83	0.39	3990429	20	2.2
Rocky Mountain National Park	6	282.06	7.93	0.35	3051678	1216	14.4
Sequoia and Kings Canyon National Park	2	298.68	3.24	2.19	1873042	240	16.6
Sequoia and Kings Canyon National Park	3	290.43	8.34	2.19	1873042	229	16.6
Sequoia and Kings Canyon National Park	4	286.69	8.66	2.19	1873042	233	16.6
Sequoia and Kings Canyon National Park	5	285.25	7.55	2.19	1873042	237	16.6
Stikine-LeConte Wlderness, Tongass National Forest	1	281.56	24.86	0.10	8460	0	0.1
Stikine-LeConte Wlderness, Tongass National Forest	2	280.83	29.47	0.10	8460	2	0.1
Stikine-LeConte Wlderness, Tongass National Forest	3	280.83	29.47	0.10	8460	3	0.1
Stikine-LeConte Wlderness, Tongass National Forest	4	279.96	37.89	0.10	8460	5	0.1
Stikine-LeConte Wlderness, Tongass National Forest	5	280.84	33.57	0.10	8460	4	0.1
Wrangell-St. Elias National Park and Preserve	1	280.38	24.47	0.10	1556	0	0
Wrangell-St. Elias National Park and Preserve	3	278.72	4.90	0.10	1556	121	0
Wrangell-St. Elias National Park and Preserve	5	276.62	10.11	0.10	1556	156	0
Yosemite National Park	1	290.9	9.02	0.46	2089441	202	13.8
Yosemite National Park	2	289.19	9.45	0.46	2089441	211	13.8
Yosemite National Park	3	289.39	8.86	0.46	2089441	222	13.8

Table A.2. Environmental parameters for 2-year old conifer needles.

Park	Site	Maximum Average Monthly Temperature (K)	Average Monthly Precipitation (cm)	Ammonium nitrate ($\mu g\ m^{-3}$)	Population within 150 km radius	Coast Distance (km)	Agriculture Intensity (% Cropland)
Bandelier National Monument	1	294.04	2.86	0.25	1028371	806	2.5
Bandelier National Monument	2	293.08	3.09	0.25	1028371	811	2.5
Bandelier National Monument	3	289.35	3.68	0.25	1028371	807	2.5
Bandelier National Monument	4	287.94	4.10	0.25	1028371	806	2.5
Bandelier National Monument	5	286.88	4.65	0.25	1028371	805	2.5
Big Bend National Park	3	297.23	4.86	0.26	87203	581	0.5
Big Bend National Park	4	296.93	5.80	0.26	87203	580	0.5
Big Bend National Park	5	296.64	5.37	0.26	87203	580	0.5
Crater Lake National Park	1	284.41	11.93	0.11	518477	186	4.2
Crater Lake National Park	2	283.71	12.33	0.11	518477	181	4.2
Crater Lake National Park	3	283.64	12.09	0.11	518477	180	4.2
Crater Lake National Park	4	284.01	8.00	0.11	518477	192	4.2
Crater Lake National Park	5	284.01	8.00	0.11	518477	193	4.2
Denali National Park and Preserve	1	277.37	3.35	0.05	2026	264	0
Denali National Park and Preserve	2	277.32	5.38	0.05	2026	229	0
Denali National Park and Preserve	3	277.41	5.67	0.05	2026	224	0
Denali National Park and Preserve	4	278.01	5.88	0.05	2026	242	0
Glacier National Park	1	284.71	5.57	0.29	208476	619	21.6
Glacier National Park	2	282.76	6.43	0.29	208476	627	21.6
Glacier National Park	3	282.46	12.15	0.29	208476	627	21.6
Glacier National Park	4	282.76	6.43	0.29	208476	627	21.6
Glacier National Park	5	282.78	9.42	0.29	208476	650	21.6
Glacier Bay National Park	1	281.14	20.24	0.10	24703	0	0
Glacier Bay National Park	2	281.14	20.24	0.10	24703	0	0
Glacier Bay National Park	3	281.14	20.24	0.10	24703	1	0
Glacier Bay National Park	4	281.14	20.24	0.10	24703	1	0
Great Sand Dunes National Park and Preserve	1	288.3	2.25	0.20	691947	999	7.1
Great Sand Dunes National Park and Preserve	2	286.38	4.20	0.20	691947	1002	7.1
Great Sand Dunes National Park and Preserve	3	285.94	5.28	0.20	691947	1004	7.1
Great Sand Dunes National Park and Preserve	4	286.38	4.20	0.20	691947	1001	7.1
Great Sand Dunes National Park and Preserve	5	286.19	4.55	0.20	691947	1001	7.1
Grand Teton National Park	1	284.27	5.33	0.22	209693	1065	10.2
Grand Teton National Park	2	283.66	5.87	0.22	209693	1065	10.2
Grand Teton National Park	3	282.76	7.39	0.22	209693	1065	10.2
Grand Teton National Park	4	282.76	7.39	0.22	209693	1065	10.2
Katmai National Park and Preserve	1	280.89	3.99	0.10	1655	72	0
Katmai National Park and Preserve	2	280.64	4.26	0.10	1655	71	0
Katmai National Park and Preserve	3	280.64	4.26	0.10	1655	70	0
Katmai National Park and Preserve	4	280.16	5.42	0.10	1655	69	0
Katmai National Park and Preserve	5	280.16	5.42	0.10	1655	67	0
Lassen Volcanic National Park	1	287.93	8.43	0.20	554988	209	7.4
Lassen Volcanic National Park	2	287	9.04	0.20	554988	211	7.4
Lassen Volcanic National Park	3	285.35	22.71	0.20	554988	208	7.4
Lassen Volcanic National Park	4	286.19	19.03	0.20	554988	205	7.4
Lassen Volcanic National Park	5	286.19	19.03	0.20	554988	206	7.4
Mt. Rainier National Park	1	285.79	13.42	0.20	3673153	70	6
Mt. Rainier National Park	2	283.32	17.70	0.20	3673153	73	6
Mt. Rainier National Park	3	283.25	14.68	0.20	3673153	63	6
Mt. Rainier National Park	4	283.49	13.50	0.20	3673153	57	6
Mt. Rainier National Park	5	281.64	19.29	0.20	3673153	70	6
North Cascades National Park	1	287.38	16.33	0.13	3994448	83	3.7
North Cascades National Park	2	287.38	16.53	0.13	3994448	80	3.7
North Cascades National Park	3	287.1	18.92	0.13	3994448	81	3.7
North Cascades National Park	4	287.19	16.48	0.13	3994448	82	3.7
North Cascades National Park	5	286.66	16.20	0.13	3994448	82	3.7

Table A.2. Environmental parameters for 2-year old conifer needles (continued).

Park	Site	Maximum Average Monthly Temperature (K)	Average Monthly Precipitation (cm)	Ammonium nitrate ($\mu g\ m^{-3}$)	Population within 150 km radius	Coast Distance (km)	Agriculture Intensity (% Cropland)
Olympic National Park	1	287.37	6.70	0.39	3990429	2	2.2
Olympic National Park	2	285.01	24.63	0.39	3990429	2	2.2
Olympic National Park	3	285.01	30.06	0.39	3990429	27	2.2
Olympic National Park	4	283.74	12.83	0.39	3990429	19	2.2
Olympic National Park	5	283.74	12.83	0.39	3990429	20	2.2
Rocky Mountain National Park	1	284.84	4.99	0.35	3051678	1196	14.4
Rocky Mountain National Park	2	284.15	5.89	0.35	3051678	1196	14.4
Rocky Mountain National Park	3	282.68	7.53	0.35	3051678	1200	14.4
Rocky Mountain National Park	5	282.59	6.94	0.35	3051678	1212	14.4
Rocky Mountain National Park	6	282.06	7.93	0.35	3051678	1216	14.4
Sequoia and Kings Canyon National Park	3	290.43	8.34	2.19	1873042	229	16.6
Sequoia and Kings Canyon National Park	4	286.69	8.66	2.19	1873042	233	16.6
Sequoia and Kings Canyon National Park	5	285.25	7.55	2.19	1873042	237	16.6
Sequoia and Kings Canyon National Park	6	284.94	6.10	2.19	1873042	238	16.6
Stikine-LeConte Wlderness, Tongass National Forest	1	281.56	24.86	0.10	8460	0	0.1
Stikine-LeConte Wlderness, Tongass National Forest	2	280.83	29.47	0.10	8460	2	0.1
Stikine-LeConte Wlderness, Tongass National Forest	3	280.83	29.47	0.10	8460	3	0.1
Stikine-LeConte Wlderness, Tongass National Forest	4	279.96	37.89	0.10	8460	5	0.1
Stikine-LeConte Wlderness, Tongass National Forest	5	280.84	33.57	0.10	8460	4	0.1
Wrangell-St. Elias National Park and Preserve	1	280.38	24.47	0.10	1556	0	0
Wrangell-St. Elias National Park and Preserve	2	278.23	2.38	0.10	1556	110	0
Wrangell-St. Elias National Park and Preserve	3	278.72	4.90	0.10	1556	121	0
Wrangell-St. Elias National Park and Preserve	4	277.63	6.74	0.10	1556	154	0
Wrangell-St. Elias National Park and Preserve	5	276.62	10.11	0.10	1556	156	0
Yosemite National Park	1	290.9	9.02	0.46	2089441	202	13.8
Yosemite National Park	2	289.19	9.45	0.46	2089441	211	13.8
Yosemite National Park	3	289.39	8.86	0.46	2089441	222	13.8
Yosemite National Park	4	283.91	10.82	0.46	2089441	236	13.8
Yosemite National Park	5	284.43	9.12	0.46	2089441	240	13.8

Table A.3. Environmental parameters for PASDs.

Park	Site	Maximum Average Monthly Temperature (K)	Average Monthly Precipitation (cm)	Ammonium nitrate (μg m^{-3})	Population within 150 km radius	Coast Distance (km)	Agriculture Intensity (% Cropland)
Bandelier NM	5	273	5	0.25	1028371	805	2.5
Bandelier NM	1	273	2.01	0.25	1028371	770	2.5
Bandelier NM	2	273	2.85	0.25	1028371	760	2.5
Bandelier NM	3	273	3.21	0.26	87203	581	0.5
Bandelier NM	4	273	3.46	0.26	87203	580	0.5
Crater Lake NP	5	273	10.37	0.11	518477	193	4.2
Denali NP & Preserve	3	273	5.5	0.05	2026	229	0
Denali NP & Preserve	Friday Creek	273	5.6	0.05	2026	255	0
Gates of the Arctic NP & Preserve	1	273	3.6	0.05	677	242	0
Glacier NP	3	273	7.7	0.29	208476	627	21.6
Glacier NP	4	273	12.13	0.29	208476	627	21.6
Glacier Bay NP & Preserve	1	273	21.7	0.10	24703	0	0
Great Sane Dunes NM	5	273	4.28	0.20	691947	1001	7.1
Grand Tetons NP	5	273	6.27	0.20	691947	1254	7.1
Katmai NP & Preserve	3	273	4.4	0.10	1655	70	0
Lassen Volcanic NP	5	273	22.82	0.20	554988	206	7.4
Mount Rainier NP	3	273	14.96	0.20	3673153	63	6
Mount Rainier NP	4	273	14.18	0.20	3673153	57	6
Noatak NP	3	273	3.2	0.05	677	192	0
North Cascades NP	5	273	13.36	0.13	3994448	82	3.7
Olympic NP	3	273	29.02	0.39	3990429	27	2.2
Olympic NP	4	273	13.86	0.39	3990429	19	2.2
Rocky Mnt. NP	1	273	9.23	0.35	3051678	1216	14.4
Rocky Mnt. NP	2	273	5.49	0.35	3051678	1196	14.4
Rocky Mnt. NP	3	273	6.55	0.35	3051678	1196	14.4
Rocky Mnt. NP	5	273	8.29	0.35	3051678	1200	14.4
Rocky Mnt. NP	6	273	7.73	0.35	3051678	1212	14.4
Sequoia NP	5	273	8.84	2.19	1873042	237	16.6
Sequoia NP	Wolverton Creek	273	10.19	2.19	1873042	265	16.6
Sequoia NP	POTW	273	8.12	2.19	1873042	252	16.6
Sequoia NP	CRYS	273	4.52	2.19	1873042	201	16.6
Stikine LeConte Wilderness	1	273	26.5	0.10	8460	0	0.1
Stikine LeConte Wilderness	2	273	31.5	0.10	8460	2	0.1
Stikine LeConte Wilderness	4	273	40.6	0.10	8460	5	0.1
Wrangell St. Elias NP & Preserve	3	273	5.1	0.10	1556	0	0
Yosemite NP	5	273	12.36	0.46	2089441	240	13.8

Table A.4. Environmental parameters for snow.

Park	Site	Maximum Average Monthly Temperature (K)	Average Monthly Precipitation (cm)	Ammonium nitrate (μg m^{-3})	Population within 150 km radius	Coast Distance (km)	Agriculture Intensity (% Cropland)
Denali NP & Preserve	Kahiltna	256.12	NA	0.05	2026	191	0
Denali NP & Preserve	McLeod	264.18	35.2	0.05	2026	235	0
Denali NP & Preserve	Wonder	264.34	33.4	0.05	2026	246	0
Gates of the Arctic NP & Preserve	Matcharak	254.06	22.6	0.05	667	216	0
Glacier NP	Aster	272.15	11.99	0.29	208476	725	21.6
Glacier NP	Granite Park	273.33	14.39	0.29	208476	699	21.6
Glacier NP	Preston	273.02	23.15	0.29	208476	708	21.6
Glacier NP	Snyder	273.28	16.44	0.29	208476	692	21.6
Mount Rainier NP	AltaVista	275.65	35.64	0.2	3673153	80	6
Mount Rainier NP	Edith Cornice	275.65	35.64	0.2	3673153	80	6
Mount Rainier NP	Fell Fields	273.83	57.27	0.2	3673153	78	6
Mount Rainier NP	Mowich	277.13	21.83	0.2	3673153	62	6
Mount Rainier NP	Paradise	275.34	33.94	0.2	3673153	81	6
Mount Rainier NP	Protection	273.83	57.27	0.2	3673153	77	6
Mount Rainier NP	Sugarloaf	274.64	46.58	0.2	3673153	79	6
Noatak NP	Burial	252.88	18.2	0.05	667	192	0
Noatak NP	Kangilipak	253.56	NA	0.05	667	155	0
North Cascades NP	Noisy Creek Glacier	276.61	38.1	0.13	3994448	74	3.7
North Cascades NP	Sandalee Glacier	275.66	23.45	0.13	3994448	130	3.7
North Cascades NP	Silver Glacier	273.84	30.23	0.13	3994448	104	3.7
North Cascades NP	Stout	276.29	24.09	0.13	3994448	101	3.7
Olympic NP	Hoh	279.42	51.87	0.39	3990429	56	2.2
Olympic NP	Hurricane Ridge	278.77	21.8	0.39	3990429	19	2.2
Olympic NP	Steeple Rock	278.13	22.65	0.39	3990429	20	2.2
Rocky Mnt. NP	Irene Forest	272.8	8.55	0.35	3051678	1737	14.4
Rocky Mnt. NP	IreneMeadow	272.8	8.55	0.35	3051678	1737	14.4
Rocky Mnt. NP	Lonepine	273.47	8.59	0.35	3051678	1746	14.4
Rocky Mnt. NP	Mills	273.13	9.69	0.35	3051678	1762	14.4
Sequoia NP	Emerald	276.56	10.89	2.19	1873042	268	16.6
Sequoia NP	Pear	276.56	10.89	2.19	1873042	270	16.6

Appendix B: Temperature-corrected K_{AW} values for lichen, conifer needles, PASDs, and snow

Table B.1. Equations used to obtain temperature-corrected Henry's Law Constant (K_H)

SOC	K_H Eqn (Pa-m^3/mole)	K_H Eqn (atm-m^3/mole)
Dacthal		exp(7.0872-(6000/T))
Chlorpyrifos		exp(8.6471-(6270/T))
Endosulfan I,II		exp(0.3380-(4500/T)
Endosulfan sulfate		exp(6.8609-(6500/T)
g-HCH		exp(0.4308-(4500/T))
Dieldrin		exp(5.3071-(5150/T))
a-HCH		exp(0.4308-(4500/T))
Chlordane		exp(10.8130-(5500/T))
Nonachlor		exp(4.4863-(4500/T))
HCB	10^(10.05-(2492/T))	
Trifluralin		exp(16.4025-(7500/T))
Triallate		exp(10.945-(6500/T))
ACY		exp(13.1021-(6563/T))
ACE		exp(13.4054-(6563/T))
FLO		exp(11.5302-(6193/T))
PHE		exp(10.0143-(5988/T))
ANT	10^(5.8820-(1530/T))	
FLA	10^(9.9510-(2981/T))	
PYR		exp(7.3263-(5461/T))
CHR/TRI		exp(29.5228-(12430/T))
B[a]A		exp(16.3936-(8265/T))
B[b]F	10^(6.7620-(2367/T))	
B[k]F	10^(7.298-(2542/T))	
B[a]P	10^(5.5450-(2051/T))	
B[e]P		exp(0.7439-(4700/T))
B[ghi]P	10^(3.1670-(1384/T))	
D[ah]A		exp(1.2331-(4700/T))
I[1,2,3-cd]P	10^(3.8500-(1581/T))	
PCB 118		exp(12.8093-(6250/T))
PCB 138	10^(9.5510-(2750/T))	
PCB 153	10^(9.5900-(2750/T))	
PCB 183		exp(8.5576-(5500/T))
PCB 187		exp(8.5576-(5500/T))

Table B.2. Unitless air-water partition coefficients (K_{AW}) for pesticides in lichen.

Park/Site	Dacthal K_{AW}	Chlorpyrifos K_{AW}	Endosulfan I,II K_{AW}	Endosulfan sulfate K_{AW}	g-HCH K_{AW}	Trifluralin K_{AW}	Triallate K_{AW}	Dieldrin K_{AW}	a-HCH K_{AW}	Chlordane K_{AW}	Nonachlor K_{AW}	HCB K_{AW}
Bandelier National Monument 1	6.81E-05	1.29E-04	1.31E-05	9.92E-06	1.44E-05	4.61E-03	5.89E-04	2.07E-04	1.44E-05	1.55E-02	8.31E-04	1.54E-02
Bandelier National Monument 2	6.40E-05	1.21E-04	1.25E-05	9.26E-06	1.37E-05	4.25E-03	5.50E-04	1.96E-04	1.37E-05	1.46E-02	7.93E-04	1.45E-02
Bandelier National Monument 3	4.98E-05	9.31E-05	1.04E-05	7.05E-06	1.14E-05	3.10E-03	4.19E-04	1.58E-04	1.14E-05	1.16E-02	6.59E-04	1.14E-02
Bandelier National Monument 4	4.52E-05	8.41E-05	9.69E-06	6.34E-06	1.06E-05	2.74E-03	3.77E-04	1.46E-04	1.06E-05	1.06E-02	6.13E-04	1.04E-02
Bandelier National Monument 5	4.20E-05	7.79E-05	9.18E-06	5.86E-06	1.01E-05	2.50E-03	3.48E-04	1.37E-04	1.01E-05	9.95E-03	5.81E-04	9.68E-03
Big Bend National Park 4	8.23E-05	1.58E-04	1.51E-05	1.22E-05	1.65E-05	5.85E-03	7.24E-04	2.43E-04	1.65E-05	1.84E-02	9.55E-04	1.84E-02
Big Bend National Park 5	8.08E-05	1.55E-04	1.49E-05	1.19E-05	1.63E-05	5.71E-03	7.09E-04	2.39E-04	1.63E-05	1.81E-02	9.42E-04	1.81E-02
Crater Lake National Park 1	3.53E-05	6.50E-05	8.08E-06	4.85E-06	8.86E-06	2.01E-03	2.88E-04	1.18E-04	8.86E-06	8.50E-03	5.11E-04	8.21E-03
Crater Lake National Park 2	3.36E-05	6.17E-05	7.79E-06	4.60E-06	8.54E-06	1.89E-03	2.73E-04	1.13E-04	8.54E-06	8.12E-03	4.93E-04	7.83E-03
Crater Lake National Park 3	3.34E-05	6.14E-05	7.76E-06	4.57E-06	8.51E-06	1.88E-03	2.72E-04	1.13E-04	8.51E-06	8.09E-03	4.91E-04	7.79E-03
Crater Lake National Park 4	3.43E-05	6.31E-05	7.91E-06	4.71E-06	8.68E-06	1.94E-03	2.80E-04	1.15E-04	8.68E-06	8.28E-03	5.01E-04	7.99E-03
Denali National Park and Preserve 1	2.12E-05	3.81E-05	5.54E-06	2.79E-06	6.08E-06	1.05E-03	1.65E-04	7.66E-05	6.08E-06	5.34E-03	3.51E-04	5.04E-03
Denali National Park and Preserve 2	2.11E-05	3.80E-05	5.53E-06	2.78E-06	6.06E-06	1.05E-03	1.65E-04	7.63E-05	6.06E-06	5.32E-03	3.50E-04	5.03E-03
Denali National Park and Preserve 3	2.13E-05	3.82E-05	5.55E-06	2.80E-06	6.09E-06	1.06E-03	1.66E-04	7.68E-05	6.09E-06	5.35E-03	3.52E-04	5.06E-03
Denali National Park and Preserve 4	2.22E-05	4.00E-05	5.74E-06	2.93E-06	6.30E-06	1.12E-03	1.74E-04	7.97E-05	6.30E-06	5.57E-03	3.64E-04	5.28E-03
Denali National Park and Preserve 5	1.83E-05	3.26E-05	4.97E-06	2.37E-06	5.45E-06	8.75E-04	1.41E-04	6.75E-05	5.45E-06	4.66E-03	3.15E-04	4.38E-03
Denali National Park and Preserve 6	1.57E-05	2.78E-05	4.44E-06	2.01E-06	4.87E-06	7.22E-04	1.19E-04	5.93E-05	4.87E-06	4.06E-03	2.81E-04	3.79E-03
Gates of the Arctic National Park and Preserve 1	1.28E-05	2.25E-05	3.83E-06	1.61E-06	4.20E-06	5.59E-04	9.58E-05	4.99E-05	4.20E-06	3.37E-03	2.42E-04	3.12E-03
Glacier National Park 1	3.61E-05	6.65E-05	8.20E-06	4.97E-06	9.00E-06	2.06E-03	2.95E-04	1.20E-04	9.00E-06	8.67E-03	5.20E-04	8.38E-03
Glacier National Park 2	3.14E-05	5.75E-05	7.41E-06	4.27E-06	8.13E-06	1.73E-03	2.54E-04	1.07E-04	8.13E-06	7.64E-03	4.69E-04	7.34E-03
Glacier National Park 3	3.07E-05	5.62E-05	7.29E-06	4.17E-06	8.00E-06	1.69E-03	2.48E-04	1.05E-04	8.00E-06	7.49E-03	4.62E-04	7.19E-03
Glacier National Park 4	3.14E-05	5.75E-05	7.41E-06	4.27E-06	8.13E-06	1.73E-03	2.54E-04	1.07E-04	8.13E-06	7.64E-03	4.69E-04	7.34E-03
Glacier National Park 5	3.14E-05	5.76E-05	7.42E-06	4.28E-06	8.14E-06	1.74E-03	2.54E-04	1.07E-04	8.14E-06	7.65E-03	4.70E-04	7.35E-03
Glacier Bay National Park 1	2.79E-05	5.09E-05	6.80E-06	3.76E-06	7.46E-06	1.50E-03	2.24E-04	9.69E-05	7.46E-06	6.87E-03	4.30E-04	6.57E-03
Glacier Bay National Park 2	2.79E-05	5.09E-05	6.80E-06	3.76E-06	7.46E-06	1.50E-03	2.24E-04	9.69E-05	7.46E-06	6.87E-03	4.30E-04	6.57E-03
Glacier Bay National Park 3	2.79E-05	5.09E-05	6.80E-06	3.76E-06	7.46E-06	1.50E-03	2.24E-04	9.69E-05	7.46E-06	6.87E-03	4.30E-04	6.57E-03
Glacier Bay National Park 4	2.79E-05	5.09E-05	6.80E-06	3.76E-06	7.46E-06	1.50E-03	2.24E-04	9.69E-05	7.46E-06	6.87E-03	4.30E-04	6.57E-03
Great Sand Dunes National Park and Preserve 2	4.05E-05	7.51E-05	8.94E-06	5.64E-06	9.81E-06	2.39E-03	3.35E-04	1.33E-04	9.81E-06	9.64E-03	5.66E-04	9.36E-03
Great Sand Dunes National Park and Preserve 4	4.05E-05	7.51E-05	8.94E-06	5.64E-06	9.81E-06	2.39E-03	3.35E-04	1.33E-04	9.81E-06	9.64E-03	5.66E-04	9.36E-03
Grand Teton National Park 1	3.50E-05	6.43E-05	8.02E-06	4.80E-06	8.80E-06	1.98E-03	2.85E-04	1.17E-04	8.80E-06	8.42E-03	5.08E-04	8.13E-03
Grand Teton National Park 2	3.35E-05	6.15E-05	7.77E-06	4.58E-06	8.52E-06	1.88E-03	2.72E-04	1.13E-04	8.52E-06	8.10E-03	4.92E-04	7.80E-03
Katmai National Park and Preserve 1	2.74E-05	4.99E-05	6.71E-06	3.69E-06	7.36E-06	1.46E-03	2.19E-04	9.54E-05	7.36E-06	6.75E-03	4.25E-04	6.45E-03
Katmai National Park and Preserve 2	2.70E-05	4.90E-05	6.62E-06	3.62E-06	7.26E-06	1.43E-03	2.15E-04	9.39E-05	7.26E-06	6.64E-03	4.19E-04	6.34E-03
Katmai National Park and Preserve 3	2.70E-05	4.90E-05	6.62E-06	3.62E-06	7.26E-06	1.43E-03	2.15E-04	9.39E-05	7.26E-06	6.64E-03	4.19E-04	6.34E-03
Katmai National Park and Preserve 4	2.60E-05	4.72E-05	6.45E-06	3.48E-06	7.08E-06	1.37E-03	2.07E-04	9.12E-05	7.08E-06	6.44E-03	4.08E-04	6.14E-03
Katmai National Park and Preserve 5	2.60E-05	4.72E-05	6.45E-06	3.48E-06	7.08E-06	1.37E-03	2.07E-04	9.12E-05	7.08E-06	6.44E-03	4.08E-04	6.14E-03
Katmai National Park and Preserve 6	2.38E-05	4.31E-05	6.04E-06	3.17E-06	6.63E-06	1.22E-03	1.88E-04	8.46E-05	6.63E-06	5.94E-03	3.83E-04	5.64E-03
Lassen Volcanic National Park 1	4.51E-05	8.41E-05	9.68E-06	6.34E-06	1.06E-05	2.74E-03	3.77E-04	1.46E-04	1.06E-05	1.06E-02	6.13E-04	1.04E-02
Lassen Volcanic National Park 2	4.23E-05	7.86E-05	9.23E-06	5.91E-06	1.01E-05	2.53E-03	3.51E-04	1.38E-04	1.01E-05	1.00E-02	5.85E-04	9.76E-03
Lassen Volcanic National Park 3	3.77E-05	6.97E-05	8.48E-06	5.22E-06	9.31E-06	2.18E-03	3.10E-04	1.25E-04	9.31E-06	9.03E-03	5.37E-04	8.74E-03
Lassen Volcanic National Park 4	4.00E-05	7.41E-05	8.86E-06	5.56E-06	9.72E-06	2.35E-03	3.30E-04	1.32E-04	9.72E-06	9.53E-03	5.61E-04	9.25E-03
Lassen Volcanic National Park 5	4.00E-05	7.41E-05	8.86E-06	5.56E-06	9.72E-06	2.35E-03	3.30E-04	1.32E-04	9.72E-06	9.53E-03	5.61E-04	9.25E-03
Mt. Rainier National Park 1	3.89E-05	7.20E-05	8.68E-06	5.39E-06	9.52E-06	2.27E-03	3.20E-04	1.28E-04	9.52E-06	9.29E-03	5.49E-04	9.00E-03
Mt. Rainier National Park 2	3.27E-05	6.00E-05	7.63E-06	4.46E-06	8.37E-06	1.82E-03	2.65E-04	1.11E-04	8.37E-06	7.92E-03	4.83E-04	7.62E-03
Mt. Rainier National Park 3	3.25E-05	5.96E-05	7.60E-06	4.44E-06	8.34E-06	1.81E-03	2.64E-04	1.10E-04	8.34E-06	7.89E-03	4.81E-04	7.59E-03
Mt. Rainier National Park 4	3.31E-05	6.07E-05	7.70E-06	4.52E-06	8.45E-06	1.85E-03	2.69E-04	1.12E-04	8.45E-06	8.01E-03	4.87E-04	7.71E-03
Noatak National Preserve 1	1.37E-05	2.41E-05	4.02E-06	1.74E-06	4.41E-06	6.09E-04	1.03E-04	5.28E-05	4.41E-06	3.59E-03	2.55E-04	3.33E-03
Noatak National Preserve 3	1.18E-05	2.06E-05	3.59E-06	1.47E-06	3.94E-06	5.01E-04	8.72E-05	4.63E-05	3.94E-06	3.12E-03	2.27E-04	2.87E-03
Noatak National Preserve 5	1.22E-05	2.13E-05	3.68E-06	1.52E-06	4.04E-06	5.24E-04	9.05E-05	4.77E-05	4.04E-06	3.22E-03	2.33E-04	2.97E-03
North Cascades National Park 1	4.35E-05	8.08E-05	9.41E-06	6.08E-06	1.03E-05	2.61E-03	3.61E-04	1.41E-04	1.03E-05	1.03E-02	5.96E-04	1.00E-02
North Cascades National Park 2	4.35E-05	8.08E-05	9.41E-06	6.08E-06	1.03E-05	2.61E-03	3.61E-04	1.41E-04	1.03E-05	1.03E-02	5.96E-04	1.00E-02
North Cascades National Park 3	4.26E-05	7.92E-05	9.28E-06	5.96E-06	1.02E-05	2.55E-03	3.54E-04	1.39E-04	1.02E-05	1.01E-02	5.88E-04	9.82E-03
North Cascades National Park 4	4.29E-05	7.97E-05	9.32E-06	6.00E-06	1.02E-05	2.57E-03	3.56E-04	1.40E-04	1.02E-05	1.02E-02	5.90E-04	9.88E-03
North Cascades National Park 5	4.13E-05	7.67E-05	9.07E-06	5.76E-06	9.95E-06	2.45E-03	3.42E-04	1.35E-04	9.95E-06	9.82E-03	5.75E-04	9.54E-03
Olympic National Park 2	3.68E-05	6.80E-05	8.33E-06	5.08E-06	9.14E-06	2.12E-03	3.02E-04	1.23E-04	9.14E-06	8.84E-03	5.28E-04	8.55E-03
Olympic National Park 3	3.68E-05	6.80E-05	8.33E-06	5.08E-06	9.14E-06	2.12E-03	3.02E-04	1.23E-04	9.14E-06	8.84E-03	5.28E-04	8.55E-03
Olympic National Park 4	3.37E-05	6.19E-05	7.80E-06	4.61E-06	8.56E-06	1.89E-03	2.74E-04	1.14E-04	8.56E-06	8.14E-03	4.94E-04	7.84E-03
Olympic National Park 5	3.37E-05	6.19E-05	7.80E-06	4.61E-06	8.56E-06	1.89E-03	2.74E-04	1.14E-04	8.56E-06	8.14E-03	4.94E-04	7.84E-03
Rocky Mountain National Park 6	2.99E-05	5.46E-05	7.14E-06	4.05E-06	7.83E-06	1.63E-03	2.40E-04	1.03E-04	7.83E-06	7.30E-03	4.52E-04	7.00E-03
Sequoia and Kings Canyon National Park 2	9.21E-05	1.77E-04	1.64E-05	1.38E-05	1.80E-05	6.74E-03	8.18E-04	2.67E-04	1.80E-05	2.04E-02	1.04E-03	2.05E-02
Sequoia and Kings Canyon National Park 3	5.35E-05	1.01E-04	1.10E-05	7.63E-06	1.20E-05	3.40E-03	4.53E-04	1.69E-04	1.20E-05	1.24E-02	6.95E-04	1.22E-02
Sequoia and Kings Canyon National Park 4	4.14E-05	7.69E-05	9.09E-06	5.77E-06	9.97E-06	2.46E-03	3.43E-04	1.35E-04	9.97E-06	9.84E-03	5.75E-04	9.56E-03
Sequoia and Kings Canyon National Park 5	3.75E-05	6.92E-05	8.44E-06	5.18E-06	9.26E-06	2.16E-03	3.07E-04	1.24E-04	9.26E-06	8.97E-03	5.34E-04	8.68E-03
Stikine-LeConte Wlderness, Tongass National Forest 1	2.88E-05	5.25E-05	6.95E-06	3.89E-06	7.63E-06	1.55E-03	2.31E-04	9.94E-05	7.63E-06	7.06E-03	4.40E-04	6.76E-03
Stikine-LeConte Wlderness, Tongass National Forest 2	2.73E-05	4.97E-05	6.69E-06	3.67E-06	7.34E-06	1.45E-03	2.18E-04	9.51E-05	7.34E-06	6.73E-03	4.23E-04	6.43E-03
Stikine-LeConte Wlderness, Tongass National Forest 3	2.73E-05	4.97E-05	6.69E-06	3.67E-06	7.34E-06	1.45E-03	2.18E-04	9.51E-05	7.34E-06	6.73E-03	4.23E-04	6.43E-03
Stikine-LeConte Wlderness, Tongass National Forest 4	2.56E-05	4.65E-05	6.38E-06	3.43E-06	7.00E-06	1.34E-03	2.04E-04	9.01E-05	7.00E-06	6.35E-03	4.04E-04	6.05E-03
Stikine-LeConte Wlderness, Tongass National Forest 5	2.73E-05	4.98E-05	6.69E-06	3.68E-06	7.34E-06	1.45E-03	2.18E-04	9.51E-05	7.34E-06	6.73E-03	4.24E-04	6.43E-03
Wrangell-St. Elias National Park and Preserve 1	2.64E-05	4.80E-05	6.53E-06	3.54E-06	7.16E-06	1.39E-03	2.11E-04	9.24E-05	7.16E-06	6.53E-03	4.13E-04	6.23E-03
Wrangell-St. Elias National Park and Preserve 3	2.34E-05	4.23E-05	5.97E-06	3.11E-06	6.55E-06	1.20E-03	1.84E-04	8.34E-05	6.55E-06	5.84E-03	3.78E-04	5.55E-03
Wrangell-St. Elias National Park and Preserve 5	2.00E-05	3.59E-05	5.32E-06	2.62E-06	5.84E-06	9.83E-04	1.56E-04	7.30E-05	5.84E-06	5.07E-03	3.37E-04	4.78E-03
Yosemite National Park 1	5.53E-05	1.04E-04	1.12E-05	7.90E-06	1.23E-05	3.54E-03	4.69E-04	1.73E-04	1.23E-05	1.28E-02	7.12E-04	1.26E-02
Yosemite National Park 2	4.92E-05	9.21E-05	1.03E-05	6.96E-06	1.13E-05	3.05E-03	4.14E-04	1.57E-04	1.13E-05	1.15E-02	6.53E-04	1.13E-02
Yosemite National Park 3	4.99E-05	9.34E-05	1.04E-05	7.07E-06	1.14E-05	3.11E-03	4.20E-04	1.59E-04	1.14E-05	1.17E-02	6.60E-04	1.14E-02

Table B.3. Unitless air-water partition coefficients (K_{AW}) for PAHs in lichen.

Park/Site	ACY K_{AW}	ACE K_{AW}	FLO K_{AW}	PHE K_{AW}	ANT K_{AW}	FLA K_{AW}	PYR K_{AW}	CHR/TRI K_{AW}	B[a]A K_{AW}	B[b]F K_{AW}	B[k]F K_{AW}	B[a]P K_{AW}	B[e]P K_{AW}	B[ghi]P K_{AW}	D[ah]A K_{AW}	I[1,2,3-cd]P K_{AW}
Bandelier National Monument 1	3.80E-03	5.57E-03	3.01E-03	1.33E-03	1.95E-03	2.66E-04	5.41E-04	1.20E-04	3.39E-04	2.11E-05	1.84E-05	1.52E-05	9.97E-06	1.18E-05	1.63E-05	1.22E-05
Bandelier National Monument 2	3.55E-03	5.19E-03	2.81E-03	1.24E-03	1.88E-03	2.47E-04	5.11E-04	1.05E-04	3.10E-04	1.99E-05	1.73E-05	1.45E-05	9.49E-06	1.14E-05	1.55E-05	1.17E-05
Bandelier National Monument 3	2.69E-03	3.94E-03	2.17E-03	9.68E-04	1.63E-03	1.85E-04	4.07E-04	6.16E-05	2.18E-04	1.59E-05	1.35E-05	1.19E-05	7.82E-06	1.01E-05	1.28E-05	1.01E-05
Bandelier National Monument 4	2.42E-03	3.55E-03	1.96E-03	8.79E-04	1.55E-03	1.66E-04	3.73E-04	5.01E-05	1.91E-04	1.45E-05	1.23E-05	1.10E-05	7.26E-06	9.58E-06	1.18E-05	9.55E-06
Bandelier National Monument 5	2.23E-03	3.27E-03	1.82E-03	8.17E-04	1.48E-03	1.52E-04	3.49E-04	4.29E-05	1.72E-04	1.36E-05	1.15E-05	1.04E-05	6.86E-06	9.23E-06	1.12E-05	9.15E-06
Big Bend National Park 4	4.68E-03	6.85E-03	3.65E-03	1.60E-03	2.17E-03	3.30E-04	6.42E-04	1.80E-04	4.41E-04	2.50E-05	2.21E-05	1.76E-05	1.15E-05	1.30E-05	1.88E-05	1.36E-05
Big Bend National Park 5	4.59E-03	6.71E-03	3.58E-03	1.57E-03	2.15E-03	3.23E-04	6.31E-04	1.73E-04	4.30E-04	2.46E-05	2.17E-05	1.73E-05	1.14E-05	1.29E-05	1.85E-05	1.34E-05
Crater Lake National Park 1	1.84E-03	2.70E-03	1.52E-03	6.88E-04	1.34E-03	1.25E-04	2.98E-04	2.97E-05	1.35E-04	1.16E-05	9.69E-06	9.12E-06	6.00E-06	8.45E-06	9.79E-06	8.27E-06
Crater Lake National Park 2	1.74E-03	2.56E-03	1.45E-03	6.55E-04	1.31E-03	1.18E-04	2.85E-04	2.67E-05	1.26E-04	1.11E-05	9.24E-06	8.77E-06	5.77E-06	8.24E-06	9.42E-06	8.03E-06
Crater Lake National Park 3	1.73E-03	2.55E-03	1.44E-03	6.51E-04	1.30E-03	1.17E-04	2.84E-04	2.65E-05	1.25E-04	1.11E-05	9.19E-06	8.74E-06	5.75E-06	8.22E-06	9.38E-06	8.01E-06
Crater Lake National Park 4	1.05E-03	1.54E-03	8.99E-04	4.13E-04	1.01E-03	6.93E-05	1.88E-04	1.00E-05	6.63E-05	7.33E-06	5.89E-06	6.13E-06	4.04E-06	6.52E-06	6.60E-06	6.13E-06
Denali National Park and Preserve 1	1.05E-03	1.54E-03	8.95E-04	4.12E-04	1.00E-03	6.90E-05	1.87E-04	9.97E-06	6.60E-05	7.31E-06	5.87E-06	6.11E-06	4.03E-06	6.51E-06	6.58E-06	6.11E-06
Denali National Park and Preserve 2	1.05E-03	1.55E-03	9.01E-04	4.14E-04	1.01E-03	6.95E-05	1.88E-04	1.01E-05	6.66E-05	7.35E-06	5.91E-06	6.15E-06	4.05E-06	6.53E-06	6.61E-06	6.14E-06
Denali National Park and Preserve 3	1.11E-03	1.63E-03	9.44E-04	4.33E-04	1.03E-03	7.32E-05	1.96E-04	1.11E-05	7.08E-05	7.66E-06	6.17E-06	6.36E-06	4.20E-06	6.68E-06	6.84E-06	6.30E-06
Denali National Park and Preserve 4	8.91E-04	1.31E-03	7.71E-04	3.56E-04	9.26E-04	5.84E-05	1.64E-04	7.33E-06	5.39E-05	6.41E-06	5.10E-06	5.47E-06	3.61E-06	6.05E-06	5.88E-06	5.61E-06
Denali National Park and Preserve 5	8.91E-04	1.31E-03	7.71E-04	3.56E-04	9.26E-04	5.84E-05	1.64E-04	7.33E-06	5.39E-05	6.41E-06	5.10E-06	5.47E-06	3.61E-06	6.05E-06	5.88E-06	5.61E-06
Denali National Park and Preserve 6	6.03E-04	8.89E-04	5.35E-04	2.50E-04	7.57E-04	3.89E-05	1.19E-04	3.46E-06	3.29E-05	4.66E-06	3.61E-06	4.15E-06	2.74E-06	5.05E-06	4.47E-06	4.56E-06
Gates of the Arctic National Park and Preserve 1	1.89E-03	2.77E-03	1.56E-03	7.02E-04	1.36E-03	1.28E-04	3.04E-04	3.11E-05	1.39E-04	1.19E-05	9.89E-06	9.27E-06	6.10E-06	8.54E-06	9.95E-06	8.37E-06
Glacier National Park 1	1.62E-03	2.38E-03	1.35E-03	6.12E-04	1.26E-03	1.09E-04	2.68E-04	2.32E-05	1.15E-04	1.05E-05	8.65E-06	8.32E-06	5.48E-06	7.96E-06	8.94E-06	7.72E-06
Glacier National Park 2	1.58E-03	2.32E-03	1.32E-03	5.99E-04	1.24E-03	1.06E-04	2.63E-04	2.21E-05	1.11E-04	1.03E-05	8.47E-06	8.18E-06	5.39E-06	7.88E-06	8.79E-06	7.62E-06
Glacier National Park 3	1.62E-03	2.38E-03	1.35E-03	6.12E-04	1.26E-03	1.09E-04	2.68E-04	2.32E-05	1.15E-04	1.05E-05	8.65E-06	8.32E-06	5.48E-06	7.96E-06	8.94E-06	7.72E-06
Glacier National Park 4	1.62E-03	2.38E-03	1.35E-03	6.13E-04	1.26E-03	1.09E-04	2.69E-04	2.32E-05	1.15E-04	1.05E-05	8.66E-06	8.33E-06	5.49E-06	7.97E-06	8.95E-06	7.72E-06
Glacier National Park 5	1.62E-03	2.38E-03	1.35E-03	6.13E-04	1.26E-03	1.09E-04	2.69E-04	2.32E-05	1.15E-04	1.05E-05	8.66E-06	8.33E-06	5.49E-06	7.97E-06	8.95E-06	7.72E-06
Glacier Bay National Park 1	1.42E-03	2.09E-03	1.20E-03	5.45E-04	1.18E-03	9.53E-05	2.41E-04	1.81E-05	9.75E-05	9.42E-06	7.72E-06	7.60E-06	5.01E-06	7.51E-06	8.17E-06	7.21E-06
Glacier Bay National Park 2	1.42E-03	2.09E-03	1.20E-03	5.45E-04	1.18E-03	9.53E-05	2.41E-04	1.81E-05	9.75E-05	9.42E-06	7.72E-06	7.60E-06	5.01E-06	7.51E-06	8.17E-06	7.21E-06
Glacier Bay National Park 3	1.42E-03	2.09E-03	1.20E-03	5.45E-04	1.18E-03	9.53E-05	2.41E-04	1.81E-05	9.75E-05	9.42E-06	7.72E-06	7.60E-06	5.01E-06	7.51E-06	8.17E-06	7.21E-06
Glacier Bay National Park 4	2.15E-03	3.15E-03	1.76E-03	7.89E-04	1.45E-03	1.46E-04	3.38E-04	3.99E-05	1.64E-04	1.32E-05	1.11E-05	1.01E-05	6.68E-06	9.07E-06	1.09E-05	8.97E-06
Great Sand Dunes National Park and Preserve 2	2.15E-03	3.15E-03	1.76E-03	7.89E-04	1.45E-03	1.46E-04	3.38E-04	3.99E-05	1.64E-04	1.32E-05	1.11E-05	1.01E-05	6.68E-06	9.07E-06	1.09E-05	8.97E-06
Great Sand Dunes National Park and Preserve 4	1.82E-03	2.68E-03	1.51E-03	6.81E-04	1.34E-03	1.23E-04	2.96E-04	2.91E-05	1.33E-04	1.15E-05	9.60E-06	9.05E-06	5.95E-06	8.41E-06	9.71E-06	8.22E-06
Grand Teton National Park 1	1.74E-03	2.55E-03	1.44E-03	6.52E-04	1.30E-03	1.17E-04	2.84E-04	2.65E-05	1.26E-04	1.11E-05	9.20E-06	8.75E-06	5.76E-06	8.23E-06	9.39E-06	8.01E-06
Grand Teton National Park 2	1.40E-03	2.05E-03	1.17E-03	5.35E-04	1.17E-03	9.33E-05	2.38E-04	1.74E-05	9.51E-05	9.26E-06	7.58E-06	7.50E-06	4.94E-06	7.44E-06	8.05E-06	7.13E-06
Katmai National Park and Preserve 1	1.37E-03	2.01E-03	1.15E-03	5.25E-04	1.15E-03	9.14E-05	2.34E-04	1.67E-05	9.27E-05	9.11E-06	7.45E-06	7.39E-06	4.87E-06	7.37E-06	7.94E-06	7.05E-06
Katmai National Park and Preserve 2	1.37E-03	2.01E-03	1.15E-03	5.25E-04	1.15E-03	9.14E-05	2.34E-04	1.67E-05	9.27E-05	9.11E-06	7.45E-06	7.39E-06	4.87E-06	7.37E-06	7.94E-06	7.05E-06
Katmai National Park and Preserve 3	1.32E-03	1.93E-03	1.11E-03	5.07E-04	1.13E-03	8.78E-05	2.26E-04	1.55E-05	8.83E-05	8.83E-06	7.20E-06	7.19E-06	4.74E-06	7.24E-06	7.73E-06	6.91E-06
Katmai National Park and Preserve 4	1.32E-03	1.93E-03	1.11E-03	5.07E-04	1.13E-03	8.78E-05	2.26E-04	1.55E-05	8.83E-05	8.83E-06	7.20E-06	7.19E-06	4.74E-06	7.24E-06	7.73E-06	6.91E-06
Katmai National Park and Preserve 5	1.19E-03	1.76E-03	1.01E-03	4.65E-04	1.08E-03	7.93E-05	2.09E-04	1.29E-05	7.81E-05	8.16E-06	6.61E-06	6.72E-06	4.43E-06	6.92E-06	7.22E-06	6.56E-06
Katmai National Park and Preserve 6	2.41E-03	3.54E-03	1.96E-03	8.79E-04	1.55E-03	1.65E-04	3.73E-04	5.01E-05	1.90E-04	1.45E-05	1.23E-05	1.10E-05	7.25E-06	9.58E-06	1.18E-05	9.55E-06
Lassen Volcanic National Park 1	2.25E-03	3.30E-03	1.84E-03	8.24E-04	1.49E-03	1.54E-04	3.52E-04	4.37E-05	1.74E-04	1.37E-05	1.16E-05	1.05E-05	6.90E-06	9.27E-06	1.13E-05	9.20E-06
Lassen Volcanic National Park 2	1.98E-03	2.91E-03	1.63E-03	7.35E-04	1.40E-03	1.35E-04	3.17E-04	3.42E-05	1.48E-04	1.24E-05	1.03E-05	9.60E-06	6.31E-06	8.74E-06	1.03E-05	8.59E-06
Lassen Volcanic National Park 3	2.11E-03	3.10E-03	1.73E-03	7.79E-04	1.44E-03	1.44E-04	3.34E-04	3.87E-05	1.61E-04	1.30E-05	1.09E-05	1.00E-05	6.61E-06	9.01E-06	1.08E-05	8.90E-06
Lassen Volcanic National Park 4	2.11E-03	3.10E-03	1.73E-03	7.79E-04	1.44E-03	1.44E-04	3.34E-04	3.87E-05	1.61E-04	1.30E-05	1.09E-05	1.00E-05	6.61E-06	9.01E-06	1.08E-05	8.90E-06
Mt. Rainier National Park 1	2.05E-03	3.01E-03	1.68E-03	7.58E-04	1.42E-03	1.39E-04	3.26E-04	3.65E-05	1.55E-04	1.27E-05	1.07E-05	9.83E-06	6.47E-06	8.88E-06	1.05E-05	8.75E-06
Mt. Rainier National Park 2	1.69E-03	2.48E-03	1.41E-03	6.37E-04	1.29E-03	1.14E-04	2.78E-04	2.52E-05	1.21E-04	1.08E-05	8.99E-06	8.58E-06	5.65E-06	8.13E-06	9.22E-06	7.90E-06
Mt. Rainier National Park 3	1.68E-03	2.47E-03	1.40E-03	6.33E-04	1.28E-03	1.13E-04	2.77E-04	2.49E-05	1.21E-04	1.08E-05	8.95E-06	8.55E-06	5.63E-06	8.11E-06	9.18E-06	7.88E-06
Mt. Rainier National Park 4	1.71E-03	2.52E-03	1.42E-03	6.44E-04	1.30E-03	1.16E-04	2.81E-04	2.59E-05	1.23E-04	1.10E-05	9.10E-06	8.67E-06	5.70E-06	8.18E-06	9.30E-06	7.96E-06
Noatak National Preserve 1	6.49E-04	9.57E-04	5.73E-04	2.68E-04	7.87E-04	4.20E-05	1.27E-04	3.99E-06	3.61E-05	4.95E-06	3.86E-06	4.37E-06	2.89E-06	5.23E-06	4.71E-06	4.74E-06
Noatak National Preserve 3	5.48E-04	8.08E-04	4.89E-04	2.29E-04	7.21E-04	3.52E-05	1.10E-04	2.87E-06	2.91E-05	4.30E-06	3.32E-06	3.88E-06	2.56E-06	4.83E-06	4.18E-06	4.33E-06
Noatak National Preserve 5	5.69E-04	8.39E-04	5.06E-04	2.38E-04	7.35E-04	3.66E-05	1.14E-04	3.09E-06	3.06E-05	4.44E-06	3.43E-06	3.98E-06	2.63E-06	4.92E-06	4.30E-06	4.42E-06
North Cascades National Park 1	2.32E-03	3.40E-03	1.89E-03	8.46E-04	1.51E-03	1.58E-04	3.60E-04	4.62E-05	1.81E-04	1.40E-05	1.19E-05	1.07E-05	7.04E-06	9.39E-06	1.15E-05	9.34E-06
North Cascades National Park 2	2.32E-03	3.40E-03	1.89E-03	8.46E-04	1.51E-03	1.58E-04	3.60E-04	4.62E-05	1.81E-04	1.40E-05	1.19E-05	1.07E-05	7.04E-06	9.39E-06	1.15E-05	9.34E-06
North Cascades National Park 3	2.27E-03	3.33E-03	1.85E-03	8.30E-04	1.50E-03	1.55E-04	3.54E-04	4.43E-05	1.76E-04	1.38E-05	1.16E-05	1.06E-05	6.94E-06	9.30E-06	1.13E-05	9.23E-06
North Cascades National Park 4	2.28E-03	3.35E-03	1.86E-03	8.35E-04	1.50E-03	1.56E-04	3.56E-04	4.49E-05	1.77E-04	1.39E-05	1.17E-05	1.06E-05	6.97E-06	9.33E-06	1.14E-05	9.27E-06
North Cascades National Park 5	2.19E-03	3.22E-03	1.79E-03	8.05E-04	1.47E-03	1.50E-04	3.44E-04	4.15E-05	1.68E-04	1.34E-05	1.13E-05	1.03E-05	6.78E-06	9.16E-06	1.11E-05	9.07E-06
Olympic National Park 2	1.93E-03	2.83E-03	1.59E-03	7.17E-04	1.38E-03	1.31E-04	3.10E-04	3.25E-05	1.43E-04	1.21E-05	1.01E-05	9.42E-06	6.20E-06	8.64E-06	1.01E-05	8.47E-06
Olympic National Park 3	1.93E-03	2.83E-03	1.59E-03	7.17E-04	1.38E-03	1.31E-04	3.10E-04	3.25E-05	1.43E-04	1.21E-05	1.01E-05	9.42E-06	6.20E-06	8.64E-06	1.01E-05	8.47E-06
Olympic National Park 4	1.75E-03	2.57E-03	1.45E-03	6.56E-04	1.31E-03	1.18E-04	2.86E-04	2.69E-05	1.27E-04	1.11E-05	9.25E-06	8.79E-06	5.78E-06	8.25E-06	9.43E-06	8.04E-06
Olympic National Park 5	1.75E-03	2.57E-03	1.45E-03	6.56E-04	1.31E-03	1.18E-04	2.86E-04	2.69E-05	1.27E-04	1.11E-05	9.25E-06	8.79E-06	5.78E-06	8.25E-06	9.43E-06	8.04E-06
Rocky Mountain National Park 6	1.53E-03	2.25E-03	1.28E-03	5.82E-04	1.22E-03	1.03E-04	2.56E-04	2.08E-05	1.07E-04	1.00E-05	8.23E-06	8.00E-06	5.27E-06	7.76E-06	8.60E-06	7.49E-06
Sequoia and Kings Canyon National Park 2	5.30E-03	7.76E-03	4.10E-03	1.79E-03	2.31E-03	3.76E-04	7.11E-04	2.28E-04	5.16E-04	2.77E-05	2.47E-05	1.92E-05	1.26E-05	1.37E-05	2.05E-05	1.45E-05
Sequoia and Kings Canyon National Park 3	2.91E-03	4.27E-03	2.34E-03	1.04E-03	1.70E-03	2.01E-04	4.35E-04	7.20E-05	2.42E-04	1.69E-05	1.45E-05	1.26E-05	8.28E-06	1.04E-05	1.35E-05	1.06E-05
Sequoia and Kings Canyon National Park 4	2.20E-03	3.22E-03	1.80E-03	8.07E-04	1.47E-03	1.50E-04	3.45E-04	4.17E-05	1.69E-04	1.34E-05	1.13E-05	1.03E-05	6.79E-06	9.17E-06	1.11E-05	9.08E-06
Sequoia and Kings Canyon National Park 5	1.97E-03	2.89E-03	1.62E-03	7.30E-04	1.39E-03	1.33E-04	3.15E-04	3.37E-05	1.47E-04	1.23E-05	1.03E-05	9.54E-06	6.28E-06	8.71E-06	1.02E-05	8.56E-06
Stikine-LeConte Wlderness, Tongass National Forest 1	1.47E-03	2.16E-03	1.23E-03	5.61E-04	1.20E-03	9.87E-05	2.48E-04	1.93E-05	1.02E-04	9.68E-06	7.95E-06	7.78E-06	5.13E-06	7.62E-06	8.36E-06	7.34E-06
Stikine-LeConte Wlderness, Tongass National Forest 2	1.39E-03	2.04E-03	1.17E-03	5.33E-04	1.16E-03	9.28E-05	2.37E-04	1.72E-05	9.45E-05	9.23E-06	7.55E-06	7.47E-06	4.92E-06	7.42E-06	8.03E-06	7.11E-06
Stikine-LeConte Wlderness, Tongass National Forest 3	1.39E-03	2.04E-03	1.17E-03	5.33E-04	1.16E-03	9.28E-05	2.37E-04	1.72E-05	9.45E-05	9.23E-06	7.55E-06	7.47E-06	4.92E-06	7.42E-06	8.03E-06	7.11E-06
Stikine-LeConte Wlderness, Tongass National Forest 4	1.30E-03	1.90E-03	1.09E-03	5.00E-04	1.12E-03	8.63E-05	2.23E-04	1.51E-05	8.65E-05	8.72E-06	7.10E-06	7.11E-06	4.69E-06	7.19E-06	7.64E-06	6.85E-06
Stikine-LeConte Wlderness, Tongass National Forest 5	1.39E-03	2.04E-03	1.17E-03	5.33E-04	1.16E-03	9.29E-05	2.37E-04	1.73E-05	9.46E-05	9.23E-06	7.56E-06	7.48E-06	4.92E-06	7.42E-06	8.03E-06	7.11E-06
Wrangell-St. Elias National Park and Preserve 1	1.34E-03	1.97E-03	1.13E-03	5.15E-04	1.14E-03	8.94E-05	2.30E-04	1.61E-05	9.03E-05	8.96E-06	7.31E-06	7.28E-06	4.80E-06	7.30E-06	7.83E-06	6.98E-06
Wrangell-St. Elias National Park and Preserve 3	1.17E-03	1.72E-03	9.96E-04	4.57E-04	1.07E-03	7.77E-05	2.06E-04	1.24E-05	7.62E-05	8.03E-06	6.50E-06	6.63E-06	4.37E-06	6.86E-06	7.13E-06	6.50E-06
Wrangell-St. Elias National Park and Preserve 5	9.87E-04	1.45E-03	8.48E-04	3.91E-04	9.76E-04	6.50E-05	1.79E-04	8.92E-06	6.13E-05	6.97E-06	5.58E-06	5.87E-06	3.87E-06	6.34E-06	6.32E-06	5.93E-06
Yosemite National Park 1	3.02E-03	4.42E-03	2.42E-03	1.08E-03	1.73E-03	2.09E-04	4.48E-04	7.70E-05	2.53E-04	1.74E-05	1.50E-05	1.29E-05	8.48E-06	1.06E-05	1.38E-05	1.08E-05
Yosemite National Park 2	2.66E-03	3.90E-03	2.15E-03	9.58E-04	1.62E-03	1.83E-04	4.03E-04	6.02E-05	2.15E-04	1.57E-05	1.34E-05	1.18E-05	7.75E-06	1.00E-05	1.26E-05	1.00E-05
Yosemite National Park 3	2.70E-03	3.95E-03	2.18E-03	9.71E-04	1.64E-03	1.86E-04	4.08E-04	6.19E-05	2.19E-04	1.59E-05	1.36E-05	1.19E-05	7.84E-06	1.01E-05	1.28E-05	1.01E-05

Table B.4. Unitless air-water partition coefficients (K_{AW}) for PCBs in lichen.

Park/Site	PCB 118 K_{AW}	PCB 138 K_{AW}	PCB 153 K_{AW}	PCB 183 K_{AW}	PCB 187 K_{AW}
Bandelier National Monument 1	8.90E-03	6.46E-04	7.07E-04	1.62E-03	1.62E-03
Bandelier National Monument 2	8.33E-03	6.04E-04	6.61E-04	1.53E-03	1.53E-03
Bandelier National Monument 3	6.41E-03	4.63E-04	5.07E-04	1.22E-03	1.22E-03
Bandelier National Monument 4	5.79E-03	4.18E-04	4.57E-04	1.12E-03	1.12E-03
Bandelier National Monument 5	5.37E-03	3.87E-04	4.23E-04	1.04E-03	1.04E-03
Big Bend National Park 4	1.08E-02	7.89E-04	8.63E-04	1.93E-03	1.93E-03
Big Bend National Park 5	1.06E-02	7.73E-04	8.46E-04	1.90E-03	1.90E-03
Crater Lake National Park 1	4.48E-03	3.22E-04	3.52E-04	8.91E-04	8.91E-04
Crater Lake National Park 2	4.25E-03	3.06E-04	3.34E-04	8.52E-04	8.52E-04
Crater Lake National Park 3	4.23E-03	3.04E-04	3.33E-04	8.48E-04	8.48E-04
Crater Lake National Park 4	4.35E-03	3.13E-04	3.42E-04	8.68E-04	8.68E-04
Denali National Park and Preserve 1	2.63E-03	1.88E-04	2.05E-04	5.59E-04	5.59E-04
Denali National Park and Preserve 2	2.62E-03	1.87E-04	2.05E-04	5.57E-04	5.57E-04
Denali National Park and Preserve 3	2.64E-03	1.88E-04	2.06E-04	5.61E-04	5.61E-04
Denali National Park and Preserve 4	2.76E-03	1.97E-04	2.16E-04	5.84E-04	5.84E-04
Denali National Park and Preserve 5	2.25E-03	1.60E-04	1.76E-04	4.89E-04	4.89E-04
Denali National Park and Preserve 6	1.92E-03	1.37E-04	1.49E-04	4.25E-04	4.25E-04
Gates of the Arctic National Park and Preserve 1	1.56E-03	1.10E-04	1.21E-04	3.54E-04	3.54E-04
Glacier National Park 1	4.58E-03	3.29E-04	3.60E-04	9.09E-04	9.09E-04
Glacier National Park 2	3.96E-03	2.85E-04	3.11E-04	8.01E-04	8.01E-04
Glacier National Park 3	3.88E-03	2.78E-04	3.04E-04	7.85E-04	7.85E-04
Glacier National Park 4	3.96E-03	2.85E-04	3.11E-04	8.01E-04	8.01E-04
Glacier National Park 5	3.97E-03	2.85E-04	3.12E-04	8.02E-04	8.02E-04
Glacier Bay National Park 1	3.51E-03	2.52E-04	2.75E-04	7.20E-04	7.20E-04
Glacier Bay National Park 2	3.51E-03	2.52E-04	2.75E-04	7.20E-04	7.20E-04
Glacier Bay National Park 3	3.51E-03	2.52E-04	2.75E-04	7.20E-04	7.20E-04
Glacier Bay National Park 4	3.51E-03	2.52E-04	2.75E-04	7.20E-04	7.20E-04
Great Sand Dunes National Park and Preserve 2	5.17E-03	3.73E-04	4.08E-04	1.01E-03	1.01E-03
Great Sand Dunes National Park and Preserve 4	5.17E-03	3.73E-04	4.08E-04	1.01E-03	1.01E-03
Grand Teton National Park 1	4.43E-03	3.19E-04	3.49E-04	8.83E-04	8.83E-04
Grand Teton National Park 2	4.24E-03	3.05E-04	3.33E-04	8.49E-04	8.49E-04
Katmai National Park and Preserve 1	3.44E-03	2.47E-04	2.70E-04	7.08E-04	7.08E-04
Katmai National Park and Preserve 2	3.38E-03	2.42E-04	2.65E-04	6.97E-04	6.97E-04
Katmai National Park and Preserve 3	3.38E-03	2.42E-04	2.65E-04	6.97E-04	6.97E-04
Katmai National Park and Preserve 4	3.26E-03	2.33E-04	2.55E-04	6.75E-04	6.75E-04
Katmai National Park and Preserve 5	3.26E-03	2.33E-04	2.55E-04	6.75E-04	6.75E-04
Katmai National Park and Preserve 6	2.97E-03	2.13E-04	2.33E-04	6.23E-04	6.23E-04
Lassen Volcanic National Park 1	5.79E-03	4.18E-04	4.57E-04	1.12E-03	1.12E-03
Lassen Volcanic National Park 2	5.41E-03	3.90E-04	4.27E-04	1.05E-03	1.05E-03
Lassen Volcanic National Park 3	4.80E-03	3.46E-04	3.78E-04	9.47E-04	9.47E-04
Lassen Volcanic National Park 4	5.10E-03	3.68E-04	4.02E-04	9.99E-04	9.99E-04
Mt. Rainier National Park 1	4.96E-03	3.57E-04	3.91E-04	9.74E-04	9.74E-04
Mt. Rainier National Park 2	4.13E-03	2.97E-04	3.25E-04	8.30E-04	8.30E-04
Mt. Rainier National Park 3	4.11E-03	2.95E-04	3.23E-04	8.27E-04	8.27E-04
Mt. Rainier National Park 4	4.18E-03	3.01E-04	3.29E-04	8.40E-04	8.40E-04
Noatak National Preserve 1	1.67E-03	1.18E-04	1.30E-04	3.76E-04	3.76E-04
Noatak National Preserve 3	1.42E-03	1.01E-04	1.10E-04	3.27E-04	3.27E-04
Noatak National Preserve 5	1.47E-03	1.04E-04	1.14E-04	3.37E-04	3.37E-04
North Cascades National Park 1	5.56E-03	4.01E-04	4.39E-04	1.08E-03	1.08E-03
North Cascades National Park 2	5.56E-03	4.01E-04	4.39E-04	1.08E-03	1.08E-03
North Cascades National Park 3	5.45E-03	3.93E-04	4.30E-04	1.06E-03	1.06E-03
North Cascades National Park 4	5.49E-03	3.96E-04	4.33E-04	1.06E-03	1.06E-03
North Cascades National Park 5	5.28E-03	3.81E-04	4.16E-04	1.03E-03	1.03E-03
Olympic National Park 2	4.68E-03	3.37E-04	3.69E-04	9.26E-04	9.26E-04
Olympic National Park 3	4.68E-03	3.37E-04	3.69E-04	9.26E-04	9.26E-04
Olympic National Park 4	4.26E-03	3.06E-04	3.35E-04	8.53E-04	8.53E-04
Olympic National Park 5	4.26E-03	3.06E-04	3.35E-04	8.53E-04	8.53E-04
Rocky Mountain National Park 6	3.76E-03	2.70E-04	2.95E-04	7.65E-04	7.65E-04
Sequoia and Kings Canyon National Park 2	1.22E-02	8.89E-04	9.72E-04	2.14E-03	2.14E-03
Sequoia and Kings Canyon National Park 3	6.92E-03	5.01E-04	5.48E-04	1.30E-03	1.30E-03
Sequoia and Kings Canyon National Park 4	5.29E-03	3.82E-04	4.17E-04	1.03E-03	1.03E-03
Sequoia and Kings Canyon National Park 5	4.76E-03	3.43E-04	3.75E-04	9.41E-04	9.41E-04
Stikine-LeConte Wlderness, Tongass National Forest 1	3.62E-03	2.60E-04	2.84E-04	7.40E-04	7.40E-04
Stikine-LeConte Wlderness, Tongass National Forest 2	3.43E-03	2.46E-04	2.69E-04	7.05E-04	7.05E-04
Stikine-LeConte Wlderness, Tongass National Forest 3	3.43E-03	2.46E-04	2.69E-04	7.05E-04	7.05E-04
Stikine-LeConte Wlderness, Tongass National Forest 4	3.21E-03	2.30E-04	2.51E-04	6.66E-04	6.66E-04
Stikine-LeConte Wlderness, Tongass National Forest 5	3.43E-03	2.46E-04	2.69E-04	7.06E-04	7.06E-04
Wrangell-St. Elias National Park and Preserve 1	3.31E-03	2.37E-04	2.60E-04	6.85E-04	6.85E-04
Wrangell-St. Elias National Park and Preserve 3	2.92E-03	2.09E-04	2.28E-04	6.13E-04	6.13E-04
Wrangell-St. Elias National Park and Preserve 5	2.48E-03	1.77E-04	1.94E-04	5.31E-04	5.31E-04
Yosemite National Park 1	7.15E-03	5.18E-04	5.66E-04	1.34E-03	1.34E-03
Yosemite National Park 2	6.33E-03	4.58E-04	5.01E-04	1.21E-03	1.21E-03
Yosemite National Park 3	6.43E-03	4.64E-04	5.08E-04	1.22E-03	1.22E-03

Table B.5. Unitless air-water partition coefficients (K_{AW}) for pesticides in conifer needles.

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Park/Site	Dacthal K_{AW}	Chlorpyrifos K_{AW}	Endosulfan I,II K_{AW}	Endosulfan sulfate K_{AW}	g-HCH K_{AW}	Trifluralin K_{AW}	Triallate K_{AW}	Dieldrin K_{AW}	a-HCH K_{AW}	Chlordane K_{AW}	Nonachlor K_{AW}	HCB K_{AW}
Bandelier National Monument 1	6.81E-05	1.29E-04	1.31E-05	9.92E-06	1.44E-05	4.61E-03	5.89E-04	2.07E-04	1.44E-05	1.55E-02	8.31E-04	1.54E-02
Bandelier National Monument 2	6.40E-05	1.21E-04	1.25E-05	9.26E-06	1.37E-05	4.25E-03	5.50E-04	1.96E-04	1.37E-05	1.46E-02	7.93E-04	1.45E-02
Bandelier National Monument 3	4.98E-05	9.31E-05	1.04E-05	7.05E-06	1.14E-05	3.10E-03	4.19E-04	1.58E-04	1.14E-05	1.16E-02	6.59E-04	1.14E-02
Bandelier National Monument 4	4.52E-05	8.41E-05	9.69E-06	6.34E-06	1.06E-05	2.74E-03	3.77E-04	1.46E-04	1.06E-05	1.06E-02	6.13E-04	1.04E-02
Bandelier National Monument 5	4.20E-05	7.79E-05	9.18E-06	5.86E-06	1.01E-05	2.50E-03	3.48E-04	1.37E-04	1.01E-05	9.95E-03	5.81E-04	9.68E-03
Big Bend National Park 3	8.39E-05	1.61E-04	1.53E-05	1.24E-05	1.68E-05	5.99E-03	7.39E-04	2.47E-04	1.68E-05	1.87E-02	9.68E-04	1.87E-02
Big Bend National Park 4	8.23E-05	1.58E-04	1.51E-05	1.22E-05	1.65E-05	5.85E-03	7.24E-04	2.43E-04	1.65E-05	1.84E-02	9.55E-04	1.84E-02
Big Bend National Park 5	8.08E-05	1.55E-04	1.49E-05	1.19E-05	1.63E-05	5.71E-03	7.09E-04	2.39E-04	1.63E-05	1.81E-02	9.42E-04	1.81E-02
Crater Lake National Park 1	3.53E-05	6.50E-05	8.08E-06	4.85E-06	8.86E-06	2.01E-03	2.88E-04	1.18E-04	8.86E-06	8.50E-03	5.11E-04	8.21E-03
Crater Lake National Park 2	3.36E-05	6.17E-05	7.79E-06	4.60E-06	8.54E-06	1.89E-03	2.73E-04	1.13E-04	8.54E-06	8.12E-03	4.93E-04	7.83E-03
Crater Lake National Park 3	3.34E-05	6.14E-05	7.76E-06	4.57E-06	8.51E-06	1.88E-03	2.72E-04	1.13E-04	8.51E-06	8.09E-03	4.91E-04	7.79E-03
Crater Lake National Park 4	3.43E-05	6.31E-05	7.91E-06	4.71E-06	8.68E-06	1.94E-03	2.80E-04	1.15E-04	8.68E-06	8.28E-03	5.01E-04	7.99E-03
Crater Lake National Park 5	3.43E-05	6.31E-05	7.91E-06	4.71E-06	8.68E-06	1.94E-03	2.80E-04	1.15E-04	8.68E-06	8.28E-03	5.01E-04	7.99E-03
Denali National Park and Preserve 1	2.12E-05	3.81E-05	5.54E-06	2.79E-06	6.08E-06	1.05E-03	1.65E-04	7.66E-05	6.08E-06	5.34E-03	3.51E-04	5.04E-03
Denali National Park and Preserve 2	2.11E-05	3.80E-05	5.53E-06	2.78E-06	6.06E-06	1.05E-03	1.65E-04	7.63E-05	6.06E-06	5.32E-03	3.50E-04	5.03E-03
Denali National Park and Preserve 3	2.13E-05	3.82E-05	5.55E-06	2.80E-06	6.09E-06	1.06E-03	1.66E-04	7.68E-05	6.09E-06	5.35E-03	3.52E-04	5.06E-03
Denali National Park and Preserve 4	2.22E-05	4.00E-05	5.74E-06	2.93E-06	6.30E-06	1.12E-03	1.74E-04	7.97E-05	6.30E-06	5.57E-03	3.64E-04	5.28E-03
Glacier National Park 1	3.61E-05	6.65E-05	8.20E-06	4.97E-06	9.00E-06	2.06E-03	2.95E-04	1.20E-04	9.00E-06	8.67E-03	5.20E-04	8.38E-03
Glacier National Park 2	3.14E-05	5.75E-05	7.41E-06	4.27E-06	8.13E-06	1.73E-03	2.54E-04	1.07E-04	8.13E-06	7.64E-03	4.69E-04	7.34E-03
Glacier National Park 3	3.07E-05	5.62E-05	7.29E-06	4.17E-06	8.00E-06	1.69E-03	2.48E-04	1.05E-04	8.00E-06	7.49E-03	4.62E-04	7.19E-03
Glacier National Park 4	3.14E-05	5.75E-05	7.41E-06	4.27E-06	8.13E-06	1.73E-03	2.54E-04	1.07E-04	8.13E-06	7.64E-03	4.69E-04	7.34E-03
Glacier National Park 5	3.14E-05	5.76E-05	7.42E-06	4.28E-06	8.14E-06	1.74E-03	2.54E-04	1.07E-04	8.14E-06	7.65E-03	4.70E-04	7.35E-03
Glacier Bay National Park 1	2.79E-05	5.09E-05	6.80E-06	3.76E-06	7.46E-06	1.50E-03	2.24E-04	9.69E-05	7.46E-06	6.87E-03	4.30E-04	6.57E-03
Glacier Bay National Park 2	2.79E-05	5.09E-05	6.80E-06	3.76E-06	7.46E-06	1.50E-03	2.24E-04	9.69E-05	7.46E-06	6.87E-03	4.30E-04	6.57E-03
Glacier Bay National Park 3	2.79E-05	5.09E-05	6.80E-06	3.76E-06	7.46E-06	1.50E-03	2.24E-04	9.69E-05	7.46E-06	6.87E-03	4.30E-04	6.57E-03
Glacier Bay National Park 4	2.79E-05	5.09E-05	6.80E-06	3.76E-06	7.46E-06	1.50E-03	2.24E-04	9.69E-05	7.46E-06	6.87E-03	4.30E-04	6.57E-03
Great Sand Dunes National Park and Preserve 1	4.63E-05	8.64E-05	9.86E-06	6.52E-06	1.08E-05	2.83E-03	3.87E-04	1.49E-04	1.08E-05	1.09E-02	6.25E-04	1.06E-02
Great Sand Dunes National Park and Preserve 2	4.05E-05	7.51E-05	8.94E-06	5.64E-06	9.81E-06	2.39E-03	3.35E-04	1.33E-04	9.81E-06	9.64E-03	5.66E-04	9.36E-03
Great Sand Dunes National Park and Preserve 3	3.93E-05	7.28E-05	8.74E-06	5.46E-06	9.59E-06	2.30E-03	3.24E-04	1.30E-04	9.59E-06	9.38E-03	5.54E-04	9.09E-03
Great Sand Dunes National Park and Preserve 4	4.05E-05	7.51E-05	8.94E-06	5.64E-06	9.81E-06	2.39E-03	3.35E-04	1.33E-04	9.81E-06	9.64E-03	5.66E-04	9.36E-03
Great Sand Dunes National Park and Preserve 5	4.00E-05	7.41E-05	8.86E-06	5.56E-06	9.72E-06	2.35E-03	3.30E-04	1.32E-04	9.72E-06	9.53E-03	5.61E-04	9.25E-03
Grand Teton National Park 1	3.50E-05	6.43E-05	8.02E-06	4.80E-06	8.80E-06	1.98E-03	2.85E-04	1.17E-04	8.80E-06	8.42E-03	5.08E-04	8.13E-03
Grand Teton National Park 2	3.35E-05	6.15E-05	7.77E-06	4.58E-06	8.52E-06	1.88E-03	2.72E-04	1.13E-04	8.52E-06	8.10E-03	4.92E-04	7.80E-03
Grand Teton National Park 3	3.14E-05	5.75E-05	7.41E-06	4.27E-06	8.13E-06	1.73E-03	2.54E-04	1.07E-04	8.13E-06	7.64E-03	4.69E-04	7.34E-03
Grand Teton National Park 4	3.14E-05	5.75E-05	7.41E-06	4.27E-06	8.13E-06	1.73E-03	2.54E-04	1.07E-04	8.13E-06	7.64E-03	4.69E-04	7.34E-03
Katmai National Park and Preserve 1	2.74E-05	4.99E-05	6.71E-06	3.69E-06	7.36E-06	1.46E-03	2.19E-04	9.54E-05	7.36E-06	6.75E-03	4.25E-04	6.45E-03
Katmai National Park and Preserve 2	2.70E-05	4.90E-05	6.62E-06	3.62E-06	7.26E-06	1.43E-03	2.15E-04	9.39E-05	7.26E-06	6.64E-03	4.19E-04	6.34E-03
Katmai National Park and Preserve 3	2.70E-05	4.90E-05	6.62E-06	3.62E-06	7.26E-06	1.43E-03	2.15E-04	9.39E-05	7.26E-06	6.64E-03	4.19E-04	6.34E-03
Katmai National Park and Preserve 4	2.60E-05	4.72E-05	6.45E-06	3.48E-06	7.08E-06	1.37E-03	2.07E-04	9.12E-05	7.08E-06	6.44E-03	4.08E-04	6.14E-03
Katmai National Park and Preserve 5	2.60E-05	4.72E-05	6.45E-06	3.48E-06	7.08E-06	1.37E-03	2.07E-04	9.12E-05	7.08E-06	6.44E-03	4.08E-04	6.14E-03
Lassen Volcanic National Park 1	4.51E-05	8.41E-05	9.68E-06	6.34E-06	1.06E-05	2.74E-03	3.77E-04	1.46E-04	1.06E-05	1.06E-02	6.13E-04	1.04E-02
Lassen Volcanic National Park 2	4.23E-05	7.86E-05	9.23E-06	5.91E-06	1.01E-05	2.53E-03	3.51E-04	1.38E-04	1.01E-05	1.00E-02	5.85E-04	9.76E-03
Lassen Volcanic National Park 3	3.77E-05	6.97E-05	8.48E-06	5.22E-06	9.31E-06	2.18E-03	3.10E-04	1.25E-04	9.31E-06	9.03E-03	5.37E-04	8.74E-03
Lassen Volcanic National Park 4	4.00E-05	7.41E-05	8.86E-06	5.56E-06	9.72E-06	2.35E-03	3.30E-04	1.32E-04	9.72E-06	9.53E-03	5.61E-04	9.25E-03
Lassen Volcanic National Park 5	4.00E-05	7.41E-05	8.86E-06	5.56E-06	9.72E-06	2.35E-03	3.30E-04	1.32E-04	9.72E-06	9.53E-03	5.61E-04	9.25E-03
Mt. Rainier National Park 1	3.89E-05	7.20E-05	8.68E-06	5.39E-06	9.52E-06	2.27E-03	3.20E-04	1.28E-04	9.52E-06	9.29E-03	5.49E-04	9.00E-03
Mt. Rainier National Park 2	3.27E-05	6.00E-05	7.63E-06	4.46E-06	8.37E-06	1.82E-03	2.65E-04	1.11E-04	8.37E-06	7.92E-03	4.83E-04	7.62E-03
Mt. Rainier National Park 3	3.25E-05	5.96E-05	7.60E-06	4.44E-06	8.34E-06	1.81E-03	2.64E-04	1.10E-04	8.34E-06	7.89E-03	4.81E-04	7.59E-03
Mt. Rainier National Park 4	3.31E-05	6.07E-05	7.70E-06	4.52E-06	8.45E-06	1.85E-03	2.69E-04	1.12E-04	8.45E-06	8.01E-03	4.87E-04	7.71E-03
Mt. Rainier National Park 5	2.90E-05	5.29E-05	6.98E-06	3.91E-06	7.66E-06	1.57E-03	2.32E-04	9.99E-05	7.66E-06	7.10E-03	4.42E-04	6.80E-03
North Cascades National Park 1	4.35E-05	8.08E-05	9.41E-06	6.08E-06	1.03E-05	2.61E-03	3.61E-04	1.41E-04	1.03E-05	1.03E-02	5.96E-04	1.00E-02
North Cascades National Park 2	4.35E-05	8.08E-05	9.41E-06	6.08E-06	1.03E-05	2.61E-03	3.61E-04	1.41E-04	1.03E-05	1.03E-02	5.96E-04	1.00E-02
North Cascades National Park 3	4.26E-05	7.92E-05	9.28E-06	5.96E-06	1.02E-05	2.55E-03	3.54E-04	1.39E-04	1.02E-05	1.01E-02	5.88E-04	9.82E-03
North Cascades National Park 4	4.29E-05	7.97E-05	9.32E-06	6.00E-06	1.02E-05	2.57E-03	3.56E-04	1.40E-04	1.02E-05	1.02E-02	5.90E-04	9.88E-03
North Cascades National Park 5	4.13E-05	7.67E-05	9.07E-06	5.76E-06	9.95E-06	2.45E-03	3.42E-04	1.35E-04	9.95E-06	9.82E-03	5.75E-04	9.54E-03
Olympic National Park 1	4.34E-05	8.08E-05	9.41E-06	6.08E-06	1.03E-05	2.61E-03	3.61E-04	1.41E-04	1.03E-05	1.03E-02	5.96E-04	1.00E-02
Olympic National Park 2	3.68E-05	6.80E-05	8.33E-06	5.08E-06	9.14E-06	2.12E-03	3.02E-04	1.23E-04	9.14E-06	8.84E-03	5.28E-04	8.55E-03
Olympic National Park 3	3.68E-05	6.80E-05	8.33E-06	5.08E-06	9.14E-06	2.12E-03	3.02E-04	1.23E-04	9.14E-06	8.84E-03	5.28E-04	8.55E-03
Olympic National Park 4	3.37E-05	6.19E-05	7.80E-06	4.61E-06	8.56E-06	1.89E-03	2.74E-04	1.14E-04	8.56E-06	8.14E-03	4.94E-04	7.84E-03
Olympic National Park 5	3.37E-05	6.19E-05	7.80E-06	4.61E-06	8.56E-06	1.89E-03	2.74E-04	1.14E-04	8.56E-06	8.14E-03	4.94E-04	7.84E-03
Rocky Mountain National Park 1	3.64E-05	6.71E-05	8.26E-06	5.02E-06	9.06E-06	2.09E-03	2.98E-04	1.21E-04	9.06E-06	8.74E-03	5.23E-04	8.45E-03
Rocky Mountain National Park 2	3.47E-05	6.38E-05	7.97E-06	4.76E-06	8.74E-06	1.96E-03	2.83E-04	1.16E-04	8.74E-06	8.36E-03	5.05E-04	8.06E-03
Rocky Mountain National Park 3	3.12E-05	5.72E-05	7.38E-06	4.25E-06	8.09E-06	1.72E-03	2.52E-04	1.06E-04	8.09E-06	7.60E-03	4.67E-04	7.30E-03
Rocky Mountain National Park 5	3.10E-05	5.68E-05	7.34E-06	4.22E-06	8.05E-06	1.71E-03	2.50E-04	1.06E-04	8.05E-06	7.55E-03	4.65E-04	7.25E-03
Rocky Mountain National Park 6	2.99E-05	5.46E-05	7.14E-06	4.05E-06	7.83E-06	1.63E-03	2.40E-04	1.03E-04	7.83E-06	7.30E-03	4.52E-04	7.00E-03
Sequoia and Kings Canyon National Park 3	5.35E-05	1.01E-04	1.10E-05	7.63E-06	1.20E-05	3.40E-03	4.53E-04	1.69E-04	1.20E-05	1.24E-02	6.95E-04	1.22E-02
Sequoia and Kings Canyon National Park 4	4.14E-05	7.69E-05	9.09E-06	5.77E-06	9.97E-06	2.46E-03	3.43E-04	1.35E-04	9.97E-06	9.84E-03	5.75E-04	9.56E-03
Sequoia and Kings Canyon National Park 5	3.75E-05	6.92E-05	8.44E-06	5.18E-06	9.26E-06	2.16E-03	3.07E-04	1.24E-04	9.26E-06	8.97E-03	5.34E-04	8.68E-03
Sequoia and Kings Canyon National Park 6	3.67E-05	6.76E-05	8.30E-06	5.06E-06	9.11E-06	2.11E-03	3.00E-04	1.22E-04	9.11E-06	8.80E-03	5.26E-04	8.51E-03
Stikine-LeConte Wlderness, Tongass National Forest 1	2.88E-05	5.25E-05	6.95E-06	3.89E-06	7.63E-06	1.55E-03	2.31E-04	9.94E-05	7.63E-06	7.06E-03	4.40E-04	6.76E-03
Stikine-LeConte Wlderness, Tongass National Forest 2	2.73E-05	4.97E-05	6.69E-06	3.67E-06	7.34E-06	1.45E-03	2.18E-04	9.51E-05	7.34E-06	6.73E-03	4.23E-04	6.43E-03
Stikine-LeConte Wlderness, Tongass National Forest 3	2.73E-05	4.97E-05	6.69E-06	3.67E-06	7.34E-06	1.45E-03	2.18E-04	9.51E-05	7.34E-06	6.73E-03	4.23E-04	6.43E-03
Stikine-LeConte Wlderness, Tongass National Forest 4	2.56E-05	4.65E-05	6.38E-06	3.43E-06	7.00E-06	1.34E-03	2.04E-04	9.01E-05	7.00E-06	6.35E-03	4.04E-04	6.05E-03
Stikine-LeConte Wlderness, Tongass National Forest 5	2.73E-05	4.98E-05	6.69E-06	3.68E-06	7.34E-06	1.45E-03	2.18E-04	9.51E-05	7.34E-06	6.73E-03	4.24E-04	6.43E-03
Wrangell-St. Elias National Park and Preserve 1	2.64E-05	4.80E-05	6.53E-06	3.54E-06	7.16E-06	1.39E-03	2.11E-04	9.24E-05	7.16E-06	6.53E-03	4.13E-04	6.23E-03
Wrangell-St. Elias National Park and Preserve 2	2.26E-05	4.07E-05	5.81E-06	2.99E-06	6.37E-06	1.14E-03	1.77E-04	8.08E-05	6.37E-06	5.66E-03	3.68E-04	5.36E-03
Wrangell-St. Elias National Park and Preserve 3	2.34E-05	4.23E-05	5.97E-06	3.11E-06	6.55E-06	1.20E-03	1.84E-04	8.34E-05	6.55E-06	5.84E-03	3.78E-04	5.55E-03
Wrangell-St. Elias National Park and Preserve 4	2.16E-05	3.89E-05	5.62E-06	2.85E-06	6.17E-06	1.08E-03	1.69E-04	7.78E-05	6.17E-06	5.43E-03	3.56E-04	5.14E-03
Wrangell-St. Elias National Park and Preserve 5	2.00E-05	3.59E-05	5.32E-06	2.62E-06	5.84E-06	9.83E-04	1.56E-04	7.30E-05	5.84E-06	5.07E-03	3.37E-04	4.78E-03
Yosemite National Park 1	5.53E-05	1.04E-04	1.12E-05	7.90E-06	1.23E-05	3.54E-03	4.69E-04	1.73E-04	1.23E-05	1.28E-02	7.12E-04	1.26E-02
Yosemite National Park 2	4.92E-05	9.21E-05	1.03E-05	6.96E-06	1.13E-05	3.05E-03	4.14E-04	1.57E-04	1.13E-05	1.15E-02	6.53E-04	1.13E-02
Yosemite National Park 3	4.99E-05	9.34E-05	1.04E-05	7.07E-06	1.14E-05	3.11E-03	4.20E-04	1.59E-04	1.14E-05	1.17E-02	6.60E-04	1.14E-02
Yosemite National Park 4	3.41E-05	6.27E-05	7.87E-06	4.67E-06	8.63E-06	1.92E-03	2.77E-04	1.15E-04	8.63E-06	8.23E-03	4.98E-04	7.94E-03
Yosemite National Park 5	3.54E-05	6.51E-05	8.08E-06	4.86E-06	8.87E-06	2.01E-03	2.89E-04	1.18E-04	8.87E-06	8.51E-03	5.12E-04	8.22E-03

Table B.6. Unitless air-water partition coefficients (K_{AW}) for PAHs in conifer needles.

Park/Site	ACY K_{AW}	ACE K_{AW}	FLO K_{AW}	PHE K_{AW}	ANT K_{AW}	FLA K_{AW}	PYR K_{AW}	CHR/TRI K_{AW}	B[a]A K_{AW}	B[b]F K_{AW}	B[k]F K_{AW}	B[a]P K_{AW}	B[e]P K_{AW}	B[ghi]P K_{AW}	D[ah]A K_{AW}	I[1,2,3-cd]P K_{AW}
Bandelier National Monument 1	3.80E-03	5.57E-03	3.01E-03	1.33E-03	1.95E-03	2.66E-04	5.41E-04	1.20E-04	3.39E-04	2.11E-05	1.84E-05	1.52E-05	9.97E-06	1.18E-05	1.63E-05	1.22E-05
Bandelier National Monument 2	3.55E-03	5.19E-03	2.81E-03	1.24E-03	1.88E-03	2.47E-04	5.11E-04	1.05E-04	3.10E-04	1.99E-05	1.73E-05	1.45E-05	9.49E-06	1.14E-05	1.55E-05	1.17E-05
Bandelier National Monument 3	2.69E-03	3.94E-03	2.17E-03	9.68E-04	1.63E-03	1.85E-04	4.07E-04	6.16E-05	2.18E-04	1.59E-05	1.35E-05	1.19E-05	7.82E-06	1.01E-05	1.28E-05	1.01E-05
Bandelier National Monument 4	2.42E-03	3.55E-03	1.96E-03	8.79E-04	1.55E-03	1.66E-04	3.73E-04	5.01E-05	1.91E-04	1.45E-05	1.23E-05	1.10E-05	7.26E-06	9.58E-06	1.18E-05	9.55E-06
Bandelier National Monument 5	2.23E-03	3.27E-03	1.82E-03	8.17E-04	1.48E-03	1.52E-04	3.49E-04	4.29E-05	1.72E-04	1.36E-05	1.15E-05	1.04E-05	6.86E-06	9.23E-06	1.12E-05	9.15E-06
Big Bend National Park 3	4.79E-03	7.00E-03	3.73E-03	1.63E-03	2.20E-03	3.38E-04	6.54E-04	1.87E-04	4.53E-04	2.54E-05	2.25E-05	1.79E-05	1.17E-05	1.31E-05	1.91E-05	1.37E-05
Big Bend National Park 4	4.68E-03	6.85E-03	3.65E-03	1.60E-03	2.17E-03	3.30E-04	6.42E-04	1.80E-04	4.41E-04	2.50E-05	2.21E-05	1.76E-05	1.15E-05	1.30E-05	1.88E-05	1.36E-05
Big Bend National Park 5	4.59E-03	6.71E-03	3.58E-03	1.57E-03	2.15E-03	3.23E-04	6.31E-04	1.73E-04	4.30E-04	2.46E-05	2.17E-05	1.73E-05	1.14E-05	1.29E-05	1.85E-05	1.34E-05
Crater Lake National Park 1	1.84E-03	2.70E-03	1.52E-03	6.88E-04	1.34E-03	1.25E-04	2.98E-04	2.97E-05	1.35E-04	1.16E-05	9.69E-06	9.12E-06	6.00E-06	8.45E-06	9.79E-06	8.27E-06
Crater Lake National Park 2	1.74E-03	2.56E-03	1.45E-03	6.55E-04	1.31E-03	1.18E-04	2.85E-04	2.67E-05	1.26E-04	1.11E-05	9.24E-06	8.77E-06	5.77E-06	8.24E-06	9.42E-06	8.03E-06
Crater Lake National Park 3	1.73E-03	2.55E-03	1.44E-03	6.51E-04	1.30E-03	1.17E-04	2.84E-04	2.65E-05	1.25E-04	1.11E-05	9.19E-06	8.74E-06	5.75E-06	8.22E-06	9.38E-06	8.01E-06
Crater Lake National Park 4	1.79E-03	2.62E-03	1.48E-03	6.69E-04	1.32E-03	1.21E-04	2.91E-04	2.80E-05	1.30E-04	1.13E-05	9.43E-06	8.92E-06	5.87E-06	8.33E-06	9.57E-06	8.13E-06
Crater Lake National Park 5	1.79E-03	2.62E-03	1.48E-03	6.69E-04	1.32E-03	1.21E-04	2.91E-04	2.80E-05	1.30E-04	1.13E-05	9.43E-06	8.92E-06	5.87E-06	8.33E-06	9.57E-06	8.13E-06
Denali National Park and Preserve 1	1.05E-03	1.54E-03	8.99E-04	4.13E-04	1.01E-03	6.93E-05	1.88E-04	1.00E-05	6.63E-05	7.33E-06	5.89E-06	6.13E-06	4.04E-06	6.52E-06	6.60E-06	6.13E-06
Denali National Park and Preserve 2	1.05E-03	1.54E-03	8.95E-04	4.12E-04	1.00E-03	6.90E-05	1.87E-04	9.97E-06	6.60E-05	7.31E-06	5.87E-06	6.11E-06	4.03E-06	6.51E-06	6.58E-06	6.11E-06
Denali National Park and Preserve 3	1.05E-03	1.55E-03	9.01E-04	4.14E-04	1.01E-03	6.95E-05	1.88E-04	1.01E-05	6.66E-05	7.35E-06	5.91E-06	6.15E-06	4.05E-06	6.53E-06	6.61E-06	6.14E-06
Denali National Park and Preserve 4	1.11E-03	1.63E-03	9.44E-04	4.33E-04	1.03E-03	7.32E-05	1.96E-04	1.11E-05	7.08E-05	7.66E-06	6.17E-06	6.36E-06	4.20E-06	6.68E-06	6.84E-06	6.30E-06
Glacier National Park 1	1.89E-03	2.77E-03	1.56E-03	7.02E-04	1.36E-03	1.28E-04	3.04E-04	3.11E-05	1.39E-04	1.19E-05	9.89E-06	9.27E-06	6.10E-06	8.54E-06	9.95E-06	8.37E-06
Glacier National Park 2	1.62E-03	2.38E-03	1.35E-03	6.12E-04	1.26E-03	1.09E-04	2.68E-04	2.32E-05	1.15E-04	1.05E-05	8.65E-06	8.32E-06	5.48E-06	7.96E-06	8.94E-06	7.72E-06
Glacier National Park 3	1.58E-03	2.32E-03	1.32E-03	5.99E-04	1.24E-03	1.06E-04	2.63E-04	2.21E-05	1.11E-04	1.03E-05	8.47E-06	8.18E-06	5.39E-06	7.88E-06	8.79E-06	7.62E-06
Glacier National Park 4	1.62E-03	2.38E-03	1.35E-03	6.12E-04	1.26E-03	1.09E-04	2.68E-04	2.32E-05	1.15E-04	1.05E-05	8.65E-06	8.32E-06	5.48E-06	7.96E-06	8.94E-06	7.72E-06
Glacier National Park 5	1.62E-03	2.38E-03	1.35E-03	6.13E-04	1.26E-03	1.09E-04	2.69E-04	2.32E-05	1.15E-04	1.05E-05	8.66E-06	8.33E-06	5.49E-06	7.97E-06	8.95E-06	7.72E-06
Glacier Bay National Park 1	1.42E-03	2.09E-03	1.20E-03	5.45E-04	1.18E-03	9.53E-05	2.41E-04	1.81E-05	9.75E-05	9.42E-06	7.72E-06	7.60E-06	5.01E-06	7.51E-06	8.17E-06	7.21E-06
Glacier Bay National Park 2	1.42E-03	2.09E-03	1.20E-03	5.45E-04	1.18E-03	9.53E-05	2.41E-04	1.81E-05	9.75E-05	9.42E-06	7.72E-06	7.60E-06	5.01E-06	7.51E-06	8.17E-06	7.21E-06
Glacier Bay National Park 3	1.42E-03	2.09E-03	1.20E-03	5.45E-04	1.18E-03	9.53E-05	2.41E-04	1.81E-05	9.75E-05	9.42E-06	7.72E-06	7.60E-06	5.01E-06	7.51E-06	8.17E-06	7.21E-06
Glacier Bay National Park 4	1.42E-03	2.09E-03	1.20E-03	5.45E-04	1.18E-03	9.53E-05	2.41E-04	1.81E-05	9.75E-05	9.42E-06	7.72E-06	7.60E-06	5.01E-06	7.51E-06	8.17E-06	7.21E-06
Great Sand Dunes National Park and Preserve 1	2.48E-03	3.64E-03	2.02E-03	9.01E-04	1.57E-03	1.70E-04	3.81E-04	5.29E-05	1.97E-04	1.49E-05	1.26E-05	1.13E-05	7.40E-06	9.70E-06	1.21E-05	9.69E-06
Great Sand Dunes National Park and Preserve 2	2.15E-03	3.15E-03	1.76E-03	7.89E-04	1.45E-03	1.46E-04	3.38E-04	3.99E-05	1.64E-04	1.32E-05	1.11E-05	1.01E-05	6.68E-06	9.07E-06	1.09E-05	8.97E-06
Great Sand Dunes National Park and Preserve 3	2.07E-03	3.04E-03	1.70E-03	7.66E-04	1.43E-03	1.41E-04	3.29E-04	3.73E-05	1.57E-04	1.28E-05	1.08E-05	9.91E-06	6.52E-06	8.93E-06	1.06E-05	8.81E-06
Great Sand Dunes National Park and Preserve 4	2.15E-03	3.15E-03	1.76E-03	7.89E-04	1.45E-03	1.46E-04	3.38E-04	3.99E-05	1.64E-04	1.32E-05	1.11E-05	1.01E-05	6.68E-06	9.07E-06	1.09E-05	8.97E-06
Great Sand Dunes National Park and Preserve 5	2.11E-03	3.10E-03	1.73E-03	7.79E-04	1.44E-03	1.44E-04	3.34E-04	3.87E-05	1.61E-04	1.30E-05	1.09E-05	1.00E-05	6.61E-06	9.01E-06	1.08E-05	8.90E-06
Grand Teton National Park 1	1.82E-03	2.68E-03	1.51E-03	6.81E-04	1.34E-03	1.23E-04	2.96E-04	2.91E-05	1.33E-04	1.15E-05	9.60E-06	9.05E-06	5.95E-06	8.41E-06	9.71E-06	8.22E-06
Grand Teton National Park 2	1.74E-03	2.55E-03	1.44E-03	6.52E-04	1.30E-03	1.17E-04	2.84E-04	2.65E-05	1.26E-04	1.11E-05	9.20E-06	8.75E-06	5.76E-06	8.23E-06	9.39E-06	8.01E-06
Grand Teton National Park 3	1.62E-03	2.38E-03	1.35E-03	6.12E-04	1.26E-03	1.09E-04	2.68E-04	2.32E-05	1.15E-04	1.05E-05	8.65E-06	8.32E-06	5.48E-06	7.96E-06	8.94E-06	7.72E-06
Grand Teton National Park 4	1.62E-03	2.38E-03	1.35E-03	6.12E-04	1.26E-03	1.09E-04	2.68E-04	2.32E-05	1.15E-04	1.05E-05	8.65E-06	8.32E-06	5.48E-06	7.96E-06	8.94E-06	7.72E-06
Katmai National Park and Preserve 1	1.40E-03	2.05E-03	1.17E-03	5.35E-04	1.17E-03	9.33E-05	2.38E-04	1.74E-05	9.51E-05	9.26E-06	7.58E-06	7.50E-06	4.94E-06	7.44E-06	8.05E-06	7.13E-06
Katmai National Park and Preserve 2	1.37E-03	2.01E-03	1.15E-03	5.25E-04	1.15E-03	9.14E-05	2.34E-04	1.67E-05	9.27E-05	9.11E-06	7.45E-06	7.39E-06	4.87E-06	7.37E-06	7.94E-06	7.05E-06
Katmai National Park and Preserve 3	1.37E-03	2.01E-03	1.15E-03	5.25E-04	1.15E-03	9.14E-05	2.34E-04	1.67E-05	9.27E-05	9.11E-06	7.45E-06	7.39E-06	4.87E-06	7.37E-06	7.94E-06	7.05E-06
Katmai National Park and Preserve 4	1.32E-03	1.93E-03	1.11E-03	5.07E-04	1.13E-03	8.78E-05	2.26E-04	1.55E-05	8.83E-05	8.83E-06	7.20E-06	7.19E-06	4.74E-06	7.24E-06	7.73E-06	6.91E-06
Katmai National Park and Preserve 5	1.32E-03	1.93E-03	1.11E-03	5.07E-04	1.13E-03	8.78E-05	2.26E-04	1.55E-05	8.83E-05	8.83E-06	7.20E-06	7.19E-06	4.74E-06	7.24E-06	7.73E-06	6.91E-06
Lassen Volcanic National Park 1	2.41E-03	3.54E-03	1.96E-03	8.79E-04	1.55E-03	1.65E-04	3.73E-04	5.01E-05	1.90E-04	1.45E-05	1.23E-05	1.10E-05	7.25E-06	9.58E-06	1.18E-05	9.55E-06
Lassen Volcanic National Park 2	2.25E-03	3.30E-03	1.84E-03	8.24E-04	1.49E-03	1.54E-04	3.52E-04	4.37E-05	1.74E-04	1.37E-05	1.16E-05	1.05E-05	6.90E-06	9.27E-06	1.13E-05	9.20E-06
Lassen Volcanic National Park 3	1.98E-03	2.91E-03	1.63E-03	7.35E-04	1.40E-03	1.35E-04	3.17E-04	3.42E-05	1.48E-04	1.24E-05	1.03E-05	9.60E-06	6.31E-06	8.74E-06	1.03E-05	8.59E-06
Lassen Volcanic National Park 4	2.11E-03	3.10E-03	1.73E-03	7.79E-04	1.44E-03	1.44E-04	3.34E-04	3.87E-05	1.61E-04	1.30E-05	1.09E-05	1.00E-05	6.61E-06	9.01E-06	1.08E-05	8.90E-06
Lassen Volcanic National Park 5	2.11E-03	3.10E-03	1.73E-03	7.79E-04	1.44E-03	1.44E-04	3.34E-04	3.87E-05	1.61E-04	1.30E-05	1.09E-05	1.00E-05	6.61E-06	9.01E-06	1.08E-05	8.90E-06
Mt. Rainier National Park 1	2.05E-03	3.01E-03	1.68E-03	7.58E-04	1.42E-03	1.39E-04	3.26E-04	3.65E-05	1.55E-04	1.27E-05	1.07E-05	9.83E-06	6.47E-06	8.88E-06	1.05E-05	8.75E-06
Mt. Rainier National Park 2	1.69E-03	2.48E-03	1.41E-03	6.37E-04	1.29E-03	1.14E-04	2.78E-04	2.52E-05	1.21E-04	1.08E-05	8.99E-06	8.58E-06	5.65E-06	8.13E-06	9.22E-06	7.90E-06
Mt. Rainier National Park 3	1.68E-03	2.47E-03	1.40E-03	6.33E-04	1.28E-03	1.13E-04	2.77E-04	2.49E-05	1.21E-04	1.08E-05	8.95E-06	8.55E-06	5.63E-06	8.11E-06	9.18E-06	7.88E-06
Mt. Rainier National Park 4	1.71E-03	2.52E-03	1.42E-03	6.44E-04	1.30E-03	1.16E-04	2.81E-04	2.59E-05	1.23E-04	1.10E-05	9.10E-06	8.67E-06	5.70E-06	8.18E-06	9.30E-06	7.96E-06
Mt. Rainier National Park 5	1.48E-03	2.18E-03	1.24E-03	5.65E-04	1.20E-03	9.93E-05	2.49E-04	1.95E-05	1.03E-04	9.73E-06	7.99E-06	7.82E-06	5.15E-06	7.65E-06	8.40E-06	7.36E-06
North Cascades National Park 1	2.32E-03	3.40E-03	1.89E-03	8.46E-04	1.51E-03	1.58E-04	3.60E-04	4.62E-05	1.81E-04	1.40E-05	1.19E-05	1.07E-05	7.04E-06	9.39E-06	1.15E-05	9.34E-06
North Cascades National Park 2	2.32E-03	3.40E-03	1.89E-03	8.46E-04	1.51E-03	1.58E-04	3.60E-04	4.62E-05	1.81E-04	1.40E-05	1.19E-05	1.07E-05	7.04E-06	9.39E-06	1.15E-05	9.34E-06
North Cascades National Park 3	2.27E-03	3.33E-03	1.85E-03	8.30E-04	1.50E-03	1.55E-04	3.54E-04	4.43E-05	1.76E-04	1.38E-05	1.16E-05	1.06E-05	6.94E-06	9.30E-06	1.13E-05	9.23E-06
North Cascades National Park 4	2.28E-03	3.35E-03	1.86E-03	8.35E-04	1.50E-03	1.56E-04	3.56E-04	4.49E-05	1.77E-04	1.39E-05	1.17E-05	1.06E-05	6.97E-06	9.33E-06	1.14E-05	9.27E-06
North Cascades National Park 5	2.19E-03	3.22E-03	1.79E-03	8.05E-04	1.47E-03	1.50E-04	3.44E-04	4.15E-05	1.68E-04	1.34E-05	1.13E-05	1.03E-05	6.78E-06	9.16E-06	1.11E-05	9.07E-06
Olympic National Park 1	2.31E-03	3.40E-03	1.89E-03	8.45E-04	1.51E-03	1.58E-04	3.60E-04	4.61E-05	1.80E-04	1.40E-05	1.19E-05	1.07E-05	7.04E-06	9.39E-06	1.15E-05	9.33E-06
Olympic National Park 2	1.93E-03	2.83E-03	1.59E-03	7.17E-04	1.38E-03	1.31E-04	3.10E-04	3.25E-05	1.43E-04	1.21E-05	1.01E-05	9.42E-06	6.20E-06	8.64E-06	1.01E-05	8.47E-06
Olympic National Park 3	1.93E-03	2.83E-03	1.59E-03	7.17E-04	1.38E-03	1.31E-04	3.10E-04	3.25E-05	1.43E-04	1.21E-05	1.01E-05	9.42E-06	6.20E-06	8.64E-06	1.01E-05	8.47E-06
Olympic National Park 4	1.75E-03	2.57E-03	1.45E-03	6.56E-04	1.31E-03	1.18E-04	2.86E-04	2.69E-05	1.27E-04	1.11E-05	9.25E-06	8.79E-06	5.78E-06	8.25E-06	9.43E-06	8.04E-06
Olympic National Park 5	1.75E-03	2.57E-03	1.45E-03	6.56E-04	1.31E-03	1.18E-04	2.86E-04	2.69E-05	1.27E-04	1.11E-05	9.25E-06	8.79E-06	5.78E-06	8.25E-06	9.43E-06	8.04E-06
Rocky Mountain National Park 1	1.90E-03	2.80E-03	1.57E-03	7.09E-04	1.37E-03	1.29E-04	3.07E-04	3.17E-05	1.41E-04	1.20E-05	9.98E-06	9.33E-06	6.14E-06	8.58E-06	1.00E-05	8.42E-06
Rocky Mountain National Park 2	1.80E-03	2.65E-03	1.49E-03	6.75E-04	1.33E-03	1.22E-04	2.93E-04	2.86E-05	1.32E-04	1.14E-05	9.52E-06	8.99E-06	5.91E-06	8.37E-06	9.65E-06	8.18E-06
Rocky Mountain National Park 3	1.61E-03	2.36E-03	1.34E-03	6.08E-04	1.25E-03	1.08E-04	2.67E-04	2.29E-05	1.14E-04	1.04E-05	8.60E-06	8.29E-06	5.46E-06	7.94E-06	8.90E-06	7.69E-06
Rocky Mountain National Park 5	1.60E-03	2.35E-03	1.33E-03	6.04E-04	1.25E-03	1.07E-04	2.65E-04	2.26E-05	1.13E-04	1.03E-05	8.54E-06	8.24E-06	5.43E-06	7.92E-06	8.85E-06	7.66E-06
Rocky Mountain National Park 6	1.53E-03	2.25E-03	1.28E-03	5.82E-04	1.22E-03	1.03E-04	2.56E-04	2.08E-05	1.07E-04	1.00E-05	8.23E-06	8.00E-06	5.27E-06	7.76E-06	8.60E-06	7.49E-06
Sequoia and Kings Canyon National Park 3	2.91E-03	4.27E-03	2.34E-03	1.04E-03	1.70E-03	2.01E-04	4.35E-04	7.20E-05	2.42E-04	1.69E-05	1.45E-05	1.26E-05	8.28E-06	1.04E-05	1.35E-05	1.06E-05
Sequoia and Kings Canyon National Park 4	2.20E-03	3.22E-03	1.80E-03	8.07E-04	1.47E-03	1.50E-04	3.45E-04	4.17E-05	1.69E-04	1.34E-05	1.13E-05	1.03E-05	6.79E-06	9.17E-06	1.11E-05	9.08E-06
Sequoia and Kings Canyon National Park 5	1.97E-03	2.89E-03	1.62E-03	7.30E-04	1.39E-03	1.33E-04	3.15E-04	3.37E-05	1.47E-04	1.23E-05	1.03E-05	9.54E-06	6.28E-06	8.71E-06	1.02E-05	8.56E-06
Sequoia and Kings Canyon National Park 6	1.92E-03	2.82E-03	1.58E-03	7.14E-04	1.37E-03	1.30E-04	3.09E-04	3.22E-05	1.42E-04	1.20E-05	1.01E-05	9.38E-06	6.18E-06	8.61E-06	1.01E-05	8.45E-06
Stikine-LeConte Wlderness, Tongass National Forest 1	1.47E-03	2.16E-03	1.23E-03	5.61E-04	1.20E-03	9.87E-05	2.48E-04	1.93E-05	1.02E-04	9.68E-06	7.95E-06	7.78E-06	5.13E-06	7.62E-06	8.36E-06	7.34E-06
Stikine-LeConte Wlderness, Tongass National Forest 2	1.39E-03	2.04E-03	1.17E-03	5.33E-04	1.16E-03	9.28E-05	2.37E-04	1.72E-05	9.45E-05	9.23E-06	7.55E-06	7.47E-06	4.92E-06	7.42E-06	8.03E-06	7.11E-06
Stikine-LeConte Wlderness, Tongass National Forest 3	1.39E-03	2.04E-03	1.17E-03	5.33E-04	1.16E-03	9.28E-05	2.37E-04	1.72E-05	9.45E-05	9.23E-06	7.55E-06	7.47E-06	4.92E-06	7.42E-06	8.03E-06	7.11E-06
Stikine-LeConte Wlderness, Tongass National Forest 4	1.30E-03	1.90E-03	1.09E-03	5.00E-04	1.12E-03	8.63E-05	2.23E-04	1.51E-05	8.65E-05	8.72E-06	7.10E-06	7.11E-06	4.69E-06	7.19E-06	7.64E-06	6.85E-06
Stikine-LeConte Wlderness, Tongass National Forest 5	1.39E-03	2.04E-03	1.17E-03	5.33E-04	1.16E-03	9.29E-05	2.37E-04	1.73E-05	9.46E-05	9.23E-06	7.56E-06	7.48E-06	4.92E-06	7.42E-06	8.03E-06	7.11E-06
Wrangell-St. Elias National Park and Preserve 1	1.34E-03	1.97E-03	1.13E-03	5.15E-04	1.14E-03	8.94E-05	2.30E-04	1.61E-05	9.03E-05	8.96E-06	7.31E-06	7.28E-06	4.80E-06	7.30E-06	7.83E-06	6.98E-06
Wrangell-St. Elias National Park and Preserve 2	1.13E-03	1.66E-03	9.60E-04	4.40E-04	1.04E-03	7.46E-05	1.99E-04	1.15E-05	7.25E-05	7.77E-06	6.27E-06	6.44E-06	4.25E-06	6.74E-06	6.93E-06	6.36E-06
Wrangell-St. Elias National Park and Preserve 3	1.17E-03	1.72E-03	9.96E-04	4.57E-04	1.07E-03	7.77E-05	2.06E-04	1.24E-05	7.62E-05	8.03E-06	6.50E-06	6.63E-06	4.37E-06	6.86E-06	7.13E-06	6.50E-06
Wrangell-St. Elias National Park and Preserve 4	1.07E-03	1.58E-03	9.17E-04	4.21E-04	1.02E-03	7.09E-05	1.91E-04	1.05E-05	6.81E-05	7.46E-06	6.01E-06	6.23E-06	4.11E-06	6.59E-06	6.70E-06	6.20E-06
Wrangell-St. Elias National Park and Preserve 5	9.87E-04	1.45E-03	8.48E-04	3.91E-04	9.76E-04	6.50E-05	1.79E-04	8.92E-06	6.13E-05	6.97E-06	5.58E-06	5.87E-06	3.87E-06	6.34E-06	6.32E-06	5.93E-06
Yosemite National Park 1	3.02E-03	4.42E-03	2.42E-03	1.08E-03	1.73E-03	2.09E-04	4.48E-04	7.70E-05	2.53E-04	1.74E-05	1.50E-05	1.29E-05	8.48E-06	1.06E-05	1.38E-05	1.08E-05
Yosemite National Park 2	2.66E-03	3.90E-03	2.15E-03	9.58E-04	1.62E-03	1.83E-04	4.03E-04	6.02E-05	2.15E-04	1.57E-05	1.34E-05	1.18E-05	7.75E-06	1.00E-05	1.26E-05	1.00E-05
Yosemite National Park 3	2.70E-03	3.95E-03	2.18E-03	9.71E-04	1.64E-03	1.86E-04	4.08E-04	6.19E-05	2.19E-04	1.59E-05	1.36E-05	1.19E-05	7.84E-06	1.01E-05	1.28E-05	1.01E-05
Yosemite National Park 4	1.77E-03	2.60E-03	1.47E-03	6.64E-04	1.32E-03	1.20E-04	2.89E-04	2.76E-05	1.29E-04	1.13E-05	9.36E-06	8.87E-06	5.84E-06	8.30E-06	9.52E-06	8.10E-06
Yosemite National Park 5	1.84E-03	2.71E-03	1.53E-03	6.89E-04	1.35E-03	1.25E-04	2.99E-04	2.98E-05	1.35E-04	1.16E-05	9.71E-06	9.13E-06	6.01E-06	8.46E-06	9.80E-06	8.27E-06

Table B.7. Unitless air-water partition coefficients (K_{AW}) for PCBs in conifer needles.

Park/Site	PCB 118 K_{AW}	PCB 138 K_{AW}	PCB 153 K_{AW}	PCB 183 K_{AW}	PCB 187 K_{AW}
Bandelier National Monument 1	8.90E-03	6.46E-04	7.07E-04	1.62E-03	1.62E-03
Bandelier National Monument 2	8.33E-03	6.04E-04	6.61E-04	1.53E-03	1.53E-03
Bandelier National Monument 3	6.41E-03	4.63E-04	5.07E-04	1.22E-03	1.22E-03
Bandelier National Monument 4	5.79E-03	4.18E-04	4.57E-04	1.12E-03	1.12E-03
Bandelier National Monument 5	5.37E-03	3.87E-04	4.23E-04	1.04E-03	1.04E-03
Big Bend National Park 3	1.11E-02	8.05E-04	8.81E-04	1.96E-03	1.96E-03
Big Bend National Park 4	1.08E-02	7.89E-04	8.63E-04	1.93E-03	1.93E-03
Big Bend National Park 5	1.06E-02	7.73E-04	8.46E-04	1.90E-03	1.90E-03
Crater Lake National Park 1	4.48E-03	3.22E-04	3.52E-04	8.91E-04	8.91E-04
Crater Lake National Park 2	4.25E-03	3.06E-04	3.34E-04	8.52E-04	8.52E-04
Crater Lake National Park 3	4.23E-03	3.04E-04	3.33E-04	8.48E-04	8.48E-04
Crater Lake National Park 4	4.35E-03	3.13E-04	3.42E-04	8.68E-04	8.68E-04
Crater Lake National Park 5	4.35E-03	3.13E-04	3.42E-04	8.68E-04	8.68E-04
Denali National Park and Preserve 1	2.63E-03	1.88E-04	2.05E-04	5.59E-04	5.59E-04
Denali National Park and Preserve 2	2.64E-03	1.88E-04	2.06E-04	5.61E-04	5.61E-04
Denali National Park and Preserve 3	2.62E-03	1.87E-04	2.05E-04	5.57E-04	5.57E-04
Denali National Park and Preserve 4	2.76E-03	1.97E-04	2.16E-04	5.84E-04	5.84E-04
Glacier National Park 1	4.58E-03	3.29E-04	3.60E-04	9.09E-04	9.09E-04
Glacier National Park 2	3.96E-03	2.85E-04	3.11E-04	8.01E-04	8.01E-04
Glacier National Park 3	3.88E-03	2.78E-04	3.04E-04	7.85E-04	7.85E-04
Glacier National Park 4	3.96E-03	2.85E-04	3.11E-04	8.01E-04	8.01E-04
Glacier National Park 5	3.97E-03	2.85E-04	3.12E-04	8.02E-04	8.02E-04
Glacier Bay National Park 1	3.51E-03	2.52E-04	2.75E-04	7.20E-04	7.20E-04
Glacier Bay National Park 2	3.51E-03	2.52E-04	2.75E-04	7.20E-04	7.20E-04
Glacier Bay National Park 3	3.51E-03	2.52E-04	2.75E-04	7.20E-04	7.20E-04
Glacier Bay National Park 4	3.51E-03	2.52E-04	2.75E-04	7.20E-04	7.20E-04
Great Sand Dunes National Park and Preserve 1	5.94E-03	4.29E-04	4.70E-04	1.14E-03	1.14E-03
Great Sand Dunes National Park and Preserve 2	5.17E-03	3.73E-04	4.08E-04	1.01E-03	1.01E-03
Great Sand Dunes National Park and Preserve 3	5.01E-03	3.61E-04	3.95E-04	9.83E-04	9.83E-04
Great Sand Dunes National Park and Preserve 4	5.17E-03	3.73E-04	4.08E-04	1.01E-03	1.01E-03
Great Sand Dunes National Park and Preserve 5	5.10E-03	3.68E-04	4.02E-04	9.99E-04	9.99E-04
Grand Teton National Park 1	4.43E-03	3.19E-04	3.49E-04	8.83E-04	8.83E-04
Grand Teton National Park 2	4.24E-03	3.05E-04	3.33E-04	8.49E-04	8.49E-04
Grand Teton National Park 3	3.96E-03	2.85E-04	3.11E-04	8.01E-04	8.01E-04
Grand Teton National Park 4	3.96E-03	2.85E-04	3.11E-04	8.01E-04	8.01E-04
Katmai National Park and Preserve 1	3.44E-03	2.47E-04	2.70E-04	7.08E-04	7.08E-04
Katmai National Park and Preserve 2	3.38E-03	2.42E-04	2.65E-04	6.97E-04	6.97E-04
Katmai National Park and Preserve 3	3.38E-03	2.42E-04	2.65E-04	6.97E-04	6.97E-04
Katmai National Park and Preserve 4	3.26E-03	2.33E-04	2.55E-04	6.75E-04	6.75E-04
Katmai National Park and Preserve 5	3.26E-03	2.33E-04	2.55E-04	6.75E-04	6.75E-04
Lassen Volcanic National Park 1	5.79E-03	4.18E-04	4.57E-04	1.12E-03	1.12E-03
Lassen Volcanic National Park 2	5.41E-03	3.90E-04	4.27E-04	1.05E-03	1.05E-03
Lassen Volcanic National Park 3	4.80E-03	3.46E-04	3.78E-04	9.47E-04	9.47E-04
Lassen Volcanic National Park 4	5.10E-03	3.68E-04	4.02E-04	9.99E-04	9.99E-04
Lassen Volcanic National Park 5	5.10E-03	3.68E-04	4.02E-04	9.99E-04	9.99E-04
Mt. Rainier National Park 1	4.96E-03	3.57E-04	3.91E-04	9.74E-04	9.74E-04
Mt. Rainier National Park 2	4.13E-03	2.97E-04	3.25E-04	8.30E-04	8.30E-04
Mt. Rainier National Park 3	4.11E-03	2.95E-04	3.23E-04	8.27E-04	8.27E-04
Mt. Rainier National Park 4	4.18E-03	3.01E-04	3.29E-04	8.40E-04	8.40E-04
Mt. Rainier National Park 5	3.64E-03	2.61E-04	2.86E-04	7.44E-04	7.44E-04
North Cascades National Park 1	5.56E-03	4.01E-04	4.39E-04	1.08E-03	1.08E-03
North Cascades National Park 2	5.56E-03	4.01E-04	4.39E-04	1.08E-03	1.08E-03
North Cascades National Park 3	5.45E-03	3.93E-04	4.30E-04	1.06E-03	1.06E-03
North Cascades National Park 4	5.49E-03	3.96E-04	4.33E-04	1.06E-03	1.06E-03
North Cascades National Park 5	5.28E-03	3.81E-04	4.16E-04	1.03E-03	1.03E-03
Olympic National Park 1	5.56E-03	4.01E-04	4.39E-04	1.08E-03	1.08E-03
Olympic National Park 2	4.68E-03	3.37E-04	3.69E-04	9.26E-04	9.26E-04
Olympic National Park 3	4.68E-03	3.37E-04	3.69E-04	9.26E-04	9.26E-04
Olympic National Park 4	4.26E-03	3.06E-04	3.35E-04	8.53E-04	8.53E-04
Olympic National Park 5	4.26E-03	3.06E-04	3.35E-04	8.53E-04	8.53E-04
Rocky Mountain National Park 1	4.62E-03	3.33E-04	3.64E-04	9.16E-04	9.16E-04
Rocky Mountain National Park 2	4.39E-03	3.16E-04	3.46E-04	8.76E-04	8.76E-04
Rocky Mountain National Park 3	3.94E-03	2.83E-04	3.09E-04	7.97E-04	7.97E-04
Rocky Mountain National Park 5	3.91E-03	2.81E-04	3.07E-04	7.92E-04	7.92E-04
Rocky Mountain National Park 6	3.76E-03	2.70E-04	2.95E-04	7.65E-04	7.65E-04
Sequoia and Kings Canyon National Park 3	6.92E-03	5.01E-04	5.48E-04	1.30E-03	1.30E-03
Sequoia and Kings Canyon National Park 4	5.29E-03	3.82E-04	4.17E-04	1.03E-03	1.03E-03
Sequoia and Kings Canyon National Park 5	4.76E-03	3.43E-04	3.75E-04	9.41E-04	9.41E-04
Sequoia and Kings Canyon National Park 6	4.66E-03	3.35E-04	3.67E-04	9.22E-04	9.22E-04
Stikine-LeConte Wlderness, Tongass National Forest 1	3.62E-03	2.60E-04	2.84E-04	7.40E-04	7.40E-04
Stikine-LeConte Wlderness, Tongass National Forest 2	3.43E-03	2.46E-04	2.69E-04	7.05E-04	7.05E-04
Stikine-LeConte Wlderness, Tongass National Forest 3	3.43E-03	2.46E-04	2.69E-04	7.05E-04	7.05E-04
Stikine-LeConte Wlderness, Tongass National Forest 4	3.21E-03	2.30E-04	2.51E-04	6.66E-04	6.66E-04
Stikine-LeConte Wlderness, Tongass National Forest 5	3.43E-03	2.46E-04	2.69E-04	7.06E-04	7.06E-04
Wrangell-St. Elias National Park and Preserve 1	3.31E-03	2.37E-04	2.60E-04	6.85E-04	6.85E-04
Wrangell-St. Elias National Park and Preserve 2	2.81E-03	2.01E-04	2.20E-04	5.93E-04	5.93E-04
Wrangell-St. Elias National Park and Preserve 3	2.92E-03	2.09E-04	2.28E-04	6.13E-04	6.13E-04
Wrangell-St. Elias National Park and Preserve 4	2.68E-03	1.92E-04	2.10E-04	5.69E-04	5.69E-04
Wrangell-St. Elias National Park and Preserve 5	2.48E-03	1.77E-04	1.94E-04	5.31E-04	5.31E-04
Yosemite National Park 2	6.33E-03	4.58E-04	5.01E-04	1.21E-03	1.21E-03
Yosemite National Park 3	6.43E-03	4.64E-04	5.08E-04	1.22E-03	1.22E-03
Yosemite National Park 4	4.32E-03	3.10E-04	3.39E-04	8.63E-04	8.63E-04
Yosemite National Park 5	4.49E-03	3.23E-04	3.53E-04	8.92E-04	8.92E-04

Table B.8. Unitless air-water partition coefficients (K_{AW}) for pesticides in PASDs.

Park/Site	Dacthal K_{AW}	Chlorpyrifos K_{AW}	Endosulfan I,II K_{AW}	Endosulfan sulfate K_{AW}	g-HCH K_{AW}	Trifluralin K_{AW}	Triallate K_{AW}	Dieldrin K_{AW}	a-HCH K_{AW}	Chlordane K_{AW}	Nonachlor K_{AW}	HCB K_{AW}
Bandelier NM 5	3.948E-05	7.309E-05	8.770E-06	5.481E-06	9.623E-06	2.313E-03	3.255E-04	1.300E-04	9.131E-03	9.413E-03	5.554E-04	9.623E-06
Big Bend NP 1	1.284E-04	2.513E-04	2.092E-05	1.976E-05	2.295E-05	1.026E-02	1.174E-03	3.547E-04	2.813E-02	2.761E-02	1.325E-03	2.295E-05
Big Bend NP 2	1.013E-04	1.960E-04	1.756E-05	1.527E-05	1.927E-05	7.600E-03	9.067E-04	2.899E-04	2.243E-02	2.223E-02	1.112E-03	1.927E-05
Big Bend NP 3	8.690E-05	1.670E-04	1.569E-05	1.293E-05	1.721E-05	6.264E-03	7.677E-04	2.545E-04	1.938E-02	1.933E-02	9.935E-04	1.721E-05
Big Bend NP 4	8.231E-05	1.578E-04	1.507E-05	1.219E-05	1.654E-05	5.850E-03	7.237E-04	2.430E-04	1.841E-02	1.840E-02	9.546E-04	1.654E-05
Crater Lake NP 5	3.021E-05	5.522E-05	7.199E-06	4.097E-06	7.899E-06	1.650E-03	2.433E-04	1.035E-04	7.073E-03	7.373E-03	4.559E-04	7.899E-06
Denali NP & Preserve 3	1.927E-05	3.449E-05	5.168E-06	2.513E-06	5.670E-06	9.357E-04	1.493E-04	7.062E-05	4.607E-03	4.893E-03	3.272E-04	5.670E-06
Denali NP & Preserve/Friday Creek	1.884E-05	3.369E-05	5.082E-06	2.452E-06	5.576E-06	9.094E-04	1.456E-04	6.927E-05	4.509E-03	4.793E-03	3.218E-04	5.576E-06
Gates of the Arctic NP & Preserve 1	1.151E-05	2.010E-05	3.531E-06	1.434E-06	3.875E-06	4.880E-04	8.518E-05	4.551E-05	2.816E-03	3.055E-03	2.236E-04	3.875E-06
Glacier NP 3	3.064E-05	5.606E-05	7.275E-06	4.161E-06	7.983E-06	1.680E-03	2.471E-04	1.048E-04	7.170E-03	7.470E-03	4.607E-04	7.983E-06
Glacier NP 4	3.051E-05	5.580E-05	7.252E-06	4.142E-06	7.958E-06	1.671E-03	2.460E-04	1.044E-04	7.141E-03	7.441E-03	4.593E-04	7.958E-06
Glacier Bay NP & Preserve 1	2.687E-05	4.885E-05	6.604E-06	3.607E-06	7.246E-06	1.423E-03	2.142E-04	9.371E-05	6.326E-03	6.626E-03	4.182E-04	7.246E-06
Great Sane Dunes NM 5	3.676E-05	6.781E-05	8.320E-06	5.071E-06	9.129E-06	2.113E-03	3.011E-04	1.223E-04	8.529E-03	8.818E-03	5.268E-04	9.129E-06
Grand Tetons NP 5	3.322E-05	6.100E-05	7.721E-06	4.542E-06	8.472E-06	1.860E-03	2.698E-04	1.123E-04	7.744E-03	8.041E-03	4.890E-04	8.472E-06
Katmai NP & Preserve 3	2.591E-05	4.703E-05	6.429E-06	3.467E-06	7.054E-06	1.359E-03	2.059E-04	9.086E-05	6.110E-03	6.410E-03	4.071E-04	7.054E-06
Lassen Volcanic NP 5	3.780E-05	6.984E-05	8.494E-06	5.228E-06	9.320E-06	2.190E-03	3.105E-04	1.253E-04	8.760E-03	9.047E-03	5.379E-04	9.320E-06
Mount Rainier NP 3	3.084E-05	5.643E-05	7.310E-06	4.190E-06	8.021E-06	1.694E-03	2.489E-04	1.054E-04	7.214E-03	7.514E-03	4.629E-04	8.021E-06
Mount Rainier NP 4	3.249E-05	5.960E-05	7.597E-06	4.435E-06	8.336E-06	1.809E-03	2.634E-04	1.102E-04	7.583E-03	7.881E-03	4.811E-04	8.336E-06
Noatak NP 3	1.055E-05	1.834E-05	3.311E-06	1.304E-06	3.633E-06	4.371E-04	7.747E-05	4.225E-05	2.591E-03	2.822E-03	2.097E-04	3.633E-06
North Cascades NP 5	3.893E-05	7.202E-05	8.680E-06	5.398E-06	9.524E-06	2.273E-03	3.206E-04	1.285E-04	9.010E-03	9.294E-03	5.497E-04	9.524E-06
Olympic NP 3	3.521E-05	6.483E-05	8.060E-06	4.839E-06	8.843E-06	2.002E-03	2.874E-04	1.179E-04	8.186E-03	8.479E-03	5.104E-04	8.843E-06
Olympic NP 4	3.133E-05	5.737E-05	7.395E-06	4.263E-06	8.115E-06	1.728E-03	2.532E-04	1.068E-04	7.324E-03	7.623E-03	4.683E-04	8.115E-06
Rocky Mtn. NP 1	2.925E-05	5.338E-05	7.029E-06	3.955E-06	7.713E-06	1.584E-03	2.349E-04	1.007E-04	6.858E-03	7.158E-03	4.451E-04	7.713E-06
Rocky Mtn. NP 2	3.410E-05	6.270E-05	7.873E-06	4.674E-06	8.638E-06	1.923E-03	2.776E-04	1.148E-04	7.941E-03	8.236E-03	4.985E-04	8.638E-06
Rocky Mtn. NP 3	3.256E-05	5.974E-05	7.609E-06	4.445E-06	8.349E-06	1.814E-03	2.640E-04	1.104E-04	7.598E-03	7.896E-03	4.818E-04	8.349E-06
Rocky Mtn. NP 5	2.976E-05	5.435E-05	7.119E-06	4.030E-06	7.811E-06	1.619E-03	2.393E-04	1.022E-04	6.972E-03	7.272E-03	4.508E-04	7.811E-06
Rocky Mtn. NP 6	2.976E-05	5.435E-05	7.119E-06	4.030E-06	7.811E-06	1.619E-03	2.393E-04	1.022E-04	6.972E-03	7.272E-03	4.508E-04	7.811E-06
Sequoia NP 5	3.541E-05	6.521E-05	8.093E-06	4.869E-06	8.880E-06	2.016E-03	2.891E-04	1.185E-04	8.230E-03	8.523E-03	5.125E-04	8.880E-06
Sequoia NP/Wolverton Creek	3.915E-05	7.245E-05	8.716E-06	5.431E-06	9.564E-06	2.289E-03	3.225E-04	1.291E-04	9.058E-03	9.341E-03	5.520E-04	9.564E-06
Sequoia NP/POTW	6.248E-05	1.182E-04	1.230E-05	9.029E-06	1.350E-05	4.130E-03	5.362E-04	1.922E-04	1.415E-02	1.431E-02	7.791E-04	1.350E-05
Sequoia NP/CRYS	7.634E-05	1.458E-04	1.426E-05	1.123E-05	1.565E-05	5.319E-03	6.668E-04	2.279E-04	1.713E-02	1.718E-02	9.031E-04	1.565E-05
Stikine LeConte Wilderness 1	2.746E-05	4.998E-05	6.710E-06	3.694E-06	7.363E-06	1.463E-03	2.194E-04	9.547E-05	6.458E-03	6.759E-03	4.250E-04	7.363E-06
Stikine LeConte Wilderness 2	2.610E-05	4.739E-05	6.463E-06	3.495E-06	7.092E-06	1.372E-03	2.076E-04	9.142E-05	6.152E-03	6.453E-03	4.093E-04	7.092E-06
Stikine LeConte Wilderness 4	2.426E-05	4.389E-05	6.124E-06	3.228E-06	6.719E-06	1.251E-03	1.917E-04	8.590E-05	5.738E-03	6.036E-03	3.878E-04	6.719E-06
Wrangell St. Elias NP & Preserve 3	2.108E-05	3.789E-05	5.521E-06	2.771E-06	6.058E-06	1.048E-03	1.645E-04	7.622E-05	5.018E-03	5.310E-03	3.496E-04	6.058E-06
Yosemite NP 5	3.432E-05	6.312E-05	7.910E-06	4.707E-06	8.679E-06	1.938E-03	2.795E-04	1.154E-04	7.989E-03	8.284E-03	5.009E-04	8.679E-06

Table B.9. Unitless air-water partition coefficients (K_{AW}) for PAHs in PASDs.

Park/Site	**FLO K_{AW}**	**PHE K_{AW}**	**FLA K_{AW}**
Bandelier NM 5	1.71E-03	7.69E-04	1.42E-04
Big Bend NP 1	5.79E-03	2.49E-03	5.51E-04
Big Bend NP 2	4.53E-03	1.97E-03	4.20E-04
Big Bend NP 3	3.86E-03	1.69E-03	3.52E-04
Big Bend NP 4	3.65E-03	1.60E-03	3.30E-04
Crater Lake NP 5	1.30E-03	5.89E-04	1.04E-04
Denali NP & Preserve 3	8.15E-04	3.76E-04	6.21E-05
Denali NP & Preserve/Friday Creek	7.96E-04	3.68E-04	6.05E-05
Gates of the Arctic NP & Preserve 1	4.78E-04	2.25E-04	3.43E-05
Glacier NP 3	1.32E-03	5.97E-04	1.06E-04
Glacier NP 4	1.31E-03	5.95E-04	1.05E-04
Great Sane Dunes NM 5	1.59E-03	7.16E-04	1.31E-04
Katmai NP & Preserve 3	1.11E-03	5.05E-04	8.73E-05
Lassen Volcanic NP 5	1.63E-03	7.36E-04	1.35E-04
Mount Rainier NP 3	1.32E-03	6.01E-04	1.07E-04
Mount Rainier NP 4	1.40E-03	6.33E-04	1.13E-04
Noatak NP 3	4.37E-04	2.06E-04	3.10E-05
North Cascades NP 5	1.68E-03	7.58E-04	1.40E-04
Olympic NP 3	1.52E-03	6.86E-04	1.24E-04
Olympic NP 4	1.35E-03	6.10E-04	1.09E-04
Rocky Mtn. NP 1	1.47E-03	6.64E-04	1.20E-04
Rocky Mtn. NP 2	1.40E-03	6.34E-04	1.14E-04
Rocky Mtn. NP 3	1.28E-03	5.80E-04	1.02E-04
Rocky Mtn. NP 5	1.28E-03	5.80E-04	1.02E-04
Rocky Mtn. NP 6	1.25E-03	5.70E-04	1.00E-04
Sequoia NP/Wolverton Creek	1.69E-03	7.62E-04	1.40E-04
Sequoia NP/POTW	2.75E-03	1.22E-03	2.41E-04
Sequoia NP/CRYS	3.38E-03	1.48E-03	3.03E-04
Stikine LeConte Wilderness 1	1.17E-03	5.35E-04	9.34E-05
Stikine LeConte Wilderness 2	1.11E-03	5.09E-04	8.81E-05
Stikine LeConte Wilderness 4	1.03E-03	4.73E-04	8.10E-05
Wrangell St. Elias NP & Preserve 3	8.94E-04	4.11E-04	6.89E-05
Yosemite NP 5	1.48E-03	6.69E-04	1.21E-04

Table B.10. Unitless air-water partition coefficients (K_{AW}) for pesticides in snow.

Park/Site	Dacthal K_{AW}	Chlorpyrifos K_{AW}	Endosulfan I,II K_{AW}	Endosulfan sulfate K_{AW}	g-HCH K_{AW}	Trifluralin K_{AW}	Triallate K_{AW}	Dieldrin K_{AW}	a-HCH K_{AW}	Chlordane K_{AW}	Nonachlor K_{AW}	HCB K_{AW}
Denali National Park/Kahiltna	3.81E-06	6.32E-06	1.56E-06	4.32E-07	1.71E-06	1.21E-04	2.56E-05	1.78E-05	1.71E-06	1.12E-03	9.89E-05	0.001
Denali National Park/McLeod	7.56E-06	1.29E-05	2.59E-06	9.08E-07	2.84E-06	2.87E-04	5.39E-05	3.18E-05	2.84E-06	2.08E-03	1.64E-04	0.002
Denali National Park/Wonder	7.66E-06	1.31E-05	2.61E-06	9.21E-07	2.87E-06	2.92E-04	5.47E-05	3.22E-05	2.87E-06	2.11E-03	1.66E-04	0.002
Glacier National Park/Matcharak	3.18E-06	5.23E-06	1.37E-06	3.54E-07	1.50E-06	9.63E-05	2.10E-05	1.52E-05	1.50E-06	9.44E-04	8.65E-05	0.001
Glacier National Park/Aster	1.43E-05	2.52E-05	4.14E-06	1.81E-06	4.54E-06	6.40E-04	1.08E-04	5.47E-05	4.54E-06	3.72E-03	2.62E-04	0.003
Glacier National Park/Granite Park	1.56E-05	2.77E-05	4.43E-06	2.00E-06	4.86E-06	7.18E-04	1.19E-04	5.90E-05	4.86E-06	4.04E-03	2.80E-04	0.004
Glacier National Park/Preston	1.53E-05	2.70E-05	4.35E-06	1.95E-06	4.77E-06	6.96E-04	1.16E-04	5.79E-05	4.77E-06	3.95E-03	2.75E-04	0.004
Glacier National Park/Snyder	1.56E-05	2.76E-05	4.41E-06	1.99E-06	4.84E-06	7.14E-04	1.18E-04	5.89E-05	4.84E-06	4.02E-03	2.79E-04	0.004
Mt. Rainier National Park/Alta Vista	1.86E-05	3.33E-05	5.04E-06	2.42E-06	5.53E-06	8.97E-04	1.44E-04	6.86E-05	5.53E-06	4.74E-03	3.19E-04	0.004
Mt. Rainier National Park/Edith Cornice	1.86E-05	3.33E-05	5.04E-06	2.42E-06	5.53E-06	8.97E-04	1.44E-04	6.86E-05	5.53E-06	4.74E-03	3.19E-04	0.004
Mt. Rainier National Park/Fell Fields	1.62E-05	2.88E-05	4.55E-06	2.08E-06	4.99E-06	7.53E-04	1.24E-04	6.10E-05	4.99E-06	4.18E-03	2.88E-04	0.004
Mt. Rainier National Park/Mowich	2.08E-05	3.74E-05	5.47E-06	2.73E-06	6.00E-06	1.03E-03	1.62E-04	7.54E-05	6.00E-06	5.25E-03	3.46E-04	0.005
Mt. Rainier National Park/Paradise	1.82E-05	3.25E-05	4.95E-06	2.36E-06	5.44E-06	8.70E-04	1.40E-04	6.73E-05	5.44E-06	4.64E-03	3.14E-04	0.004
Mt. Rainier National Park/Protection	1.62E-05	2.88E-05	4.55E-06	2.08E-06	4.99E-06	7.53E-04	1.24E-04	6.10E-05	4.99E-06	4.18E-03	2.88E-04	0.004
Mt. Rainier National Park/Sugarloaf	1.73E-05	3.07E-05	4.76E-06	2.23E-06	5.23E-06	8.14E-04	1.32E-04	6.43E-05	5.23E-06	4.42E-03	3.02E-04	0.004
Noatak National Preserve/Burial	2.86E-06	4.68E-06	1.26E-06	3.16E-07	1.39E-06	8.43E-05	1.88E-05	1.39E-05	1.39E-06	8.58E-04	8.00E-05	0.001
Noatak National Preserve/Kangilipak	3.04E-06	4.99E-06	1.32E-06	3.38E-07	1.45E-06	9.11E-05	2.00E-05	1.46E-05	1.45E-06	9.07E-04	8.37E-05	0.001
North Cascades National Park/Noisy Creek Glacier	2.00E-05	3.59E-05	5.32E-06	2.62E-06	5.83E-06	9.82E-04	1.56E-04	7.30E-05	5.83E-06	5.07E-03	3.37E-04	0.005
North Cascades National Park/Sandalee Glacier	1.86E-05	3.33E-05	5.04E-06	2.42E-06	5.53E-06	8.97E-04	1.44E-04	6.87E-05	5.53E-06	4.75E-03	3.19E-04	0.004
North Cascades National Park/Silver Glacier	1.62E-05	2.88E-05	4.55E-06	2.09E-06	5.00E-06	7.54E-04	1.24E-04	6.10E-05	5.00E-06	4.19E-03	2.88E-04	0.004
North Cascades National Park/Stout	1.96E-05	3.50E-05	5.22E-06	2.55E-06	5.73E-06	9.53E-04	1.52E-04	7.15E-05	5.73E-06	4.96E-03	3.31E-04	0.005
Olympic National Park/Hoh	2.47E-05	4.46E-05	6.20E-06	3.28E-06	6.80E-06	1.28E-03	1.95E-04	8.71E-05	6.80E-06	6.13E-03	3.92E-04	0.006
Olympic National Park/Hurricane Ridge	2.35E-05	4.25E-05	5.98E-06	3.12E-06	6.56E-06	1.20E-03	1.85E-04	8.36E-05	6.56E-06	5.86E-03	3.79E-04	0.006
Olympic National Park/Steeple Rock	2.24E-05	4.04E-05	5.78E-06	2.96E-06	6.34E-06	1.13E-03	1.76E-04	8.03E-05	6.34E-06	5.62E-03	3.66E-04	0.005
Rocky Mountain National Park/Irene Forest	1.50E-05	2.65E-05	4.29E-06	1.91E-06	4.71E-06	6.82E-04	1.14E-04	5.70E-05	4.71E-06	3.89E-03	2.72E-04	0.004
Rocky Mountain National Park/Irene Meados	1.50E-05	2.65E-05	4.29E-06	1.91E-06	4.71E-06	6.82E-04	1.14E-04	5.70E-05	4.71E-06	3.89E-03	2.72E-04	0.004
Rocky Mountain National Park/Lonepine	1.58E-05	2.80E-05	4.46E-06	2.02E-06	4.89E-06	7.27E-04	1.20E-04	5.96E-05	4.89E-06	4.08E-03	2.82E-04	0.004
Rocky Mountain National Park/Mills	1.54E-05	2.72E-05	4.38E-06	1.97E-06	4.80E-06	7.04E-04	1.17E-04	5.83E-05	4.80E-06	3.98E-03	2.77E-04	0.004
Sequoia and Kings Canyon National Park/Emerald	2.00E-05	3.58E-05	5.30E-06	2.61E-06	5.82E-06	9.77E-04	1.55E-04	7.27E-05	5.82E-06	5.05E-03	3.36E-04	0.005
Sequoia and Kings Canyon National Park/Pear	2.00E-05	3.58E-05	5.30E-06	2.61E-06	5.82E-06	9.77E-04	1.55E-04	7.27E-05	5.82E-06	5.05E-03	3.36E-04	0.005

Table B.11. Unitless air-water partition coefficients (K_{AW}) for PAHs in snow.

Park/Site	PHE K_{AW}	FLA K_{AW}	PYR K_{AW}	CHR/TRI K_{AW}	B[a]A K_{AW}	B[b]F K_{AW}	B[k]F K_{AW}	B[a]P K_{AW}	B[e]P K_{AW}	B[ghi]P K_{AW}	D[ah]A K_{AW}	I[1,2,3-cd]P K_{AW}
Denali National Park/Kahiltna	7.46E-05	9.63E-06	3.97E-05	2.64E-07	6.06E-06	1.56E-06	1.11E-06	1.62E-06	1.07E-06	2.72E-06	1.75E-06	2.23E-06
Denali National Park/McLeod	1.48E-04	2.11E-05	7.38E-05	1.13E-06	1.57E-05	2.89E-06	2.16E-06	2.75E-06	1.82E-06	3.86E-06	2.97E-06	3.34E-06
Denali National Park/Wonder	1.50E-04	2.15E-05	7.47E-05	1.16E-06	1.60E-05	2.92E-06	2.19E-06	2.78E-06	1.84E-06	3.88E-06	3.00E-06	3.37E-06
Glacier National Park/Matcharak	6.22E-05	7.81E-06	3.37E-05	1.80E-07	4.70E-06	1.32E-06	9.28E-07	1.40E-06	9.33E-07	2.48E-06	1.52E-06	2.01E-06
Glacier National Park/Aster	2.78E-04	4.39E-05	1.31E-04	4.33E-06	3.82E-05	5.13E-06	4.01E-06	4.51E-06	2.98E-06	5.33E-06	4.86E-06	4.85E-06
Glacier National Park/Granite Park	3.05E-04	4.88E-05	1.43E-04	5.26E-06	4.33E-05	5.57E-06	4.38E-06	4.84E-06	3.19E-06	5.58E-06	5.21E-06	5.12E-06
Glacier National Park/Preston	2.98E-04	4.75E-05	1.40E-04	5.00E-06	4.19E-05	5.45E-06	4.28E-06	4.75E-06	3.14E-06	5.52E-06	5.12E-06	5.05E-06
Glacier National Park/Snyder	3.04E-04	4.86E-05	1.42E-04	5.21E-06	4.31E-05	5.55E-06	4.36E-06	4.82E-06	3.19E-06	5.57E-06	5.20E-06	5.11E-06
Mt. Rainier National Park/Alta Vista	3.63E-04	5.98E-05	1.67E-04	7.64E-06	5.54E-05	6.53E-06	5.20E-06	5.55E-06	3.66E-06	6.11E-06	5.97E-06	5.68E-06
Mt. Rainier National Park/Edith Cornice	3.63E-04	5.98E-05	1.67E-04	7.64E-06	5.54E-05	6.53E-06	5.20E-06	5.55E-06	3.66E-06	6.11E-06	5.97E-06	5.68E-06
Mt. Rainier National Park/Fell Fields	3.17E-04	5.10E-05	1.48E-04	5.70E-06	4.57E-05	5.76E-06	4.55E-06	4.98E-06	3.29E-06	5.69E-06	5.37E-06	5.24E-06
Mt. Rainier National Park/Mowich	4.06E-04	6.79E-05	1.85E-04	9.67E-06	6.47E-05	7.22E-06	5.79E-06	6.05E-06	3.99E-06	6.46E-06	6.51E-06	6.06E-06
Mt. Rainier National Park/Paradise	3.55E-04	5.82E-05	1.64E-04	7.27E-06	5.36E-05	6.39E-06	5.08E-06	5.45E-06	3.60E-06	6.04E-06	5.86E-06	5.60E-06
Mt. Rainier National Park/Protection	3.17E-04	5.10E-05	1.48E-04	5.70E-06	4.57E-05	5.76E-06	4.55E-06	4.98E-06	3.29E-06	5.69E-06	5.37E-06	5.24E-06
Mt. Rainier National Park/Sugarloaf	3.37E-04	5.47E-05	1.56E-04	6.50E-06	4.98E-05	6.09E-06	4.83E-06	5.23E-06	3.45E-06	5.88E-06	5.63E-06	5.43E-06
Noatak National Preserve/Burial	5.60E-05	6.92E-06	3.06E-05	1.44E-07	4.06E-06	1.20E-06	8.38E-07	1.29E-06	8.60E-07	2.35E-06	1.40E-06	1.88E-06
Noatak National Preserve/Kangilipak	5.95E-05	7.42E-06	3.24E-05	1.63E-07	4.42E-06	1.27E-06	8.89E-07	1.36E-06	9.01E-07	2.43E-06	1.47E-06	1.95E-06
North Cascades National Park/Noisy Creek Glacier	3.91E-04	6.49E-05	1.79E-04	8.91E-06	6.13E-05	6.97E-06	5.58E-06	5.87E-06	3.87E-06	6.34E-06	6.31E-06	5.92E-06
North Cascades National Park/Sandalee Glacier	3.64E-04	5.98E-05	1.67E-04	7.66E-06	5.54E-05	6.53E-06	5.20E-06	5.55E-06	3.66E-06	6.11E-06	5.97E-06	5.68E-06
North Cascades National Park/Silver Glacier	3.17E-04	5.10E-05	1.48E-04	5.71E-06	4.57E-05	5.77E-06	4.55E-06	4.99E-06	3.29E-06	5.70E-06	5.37E-06	5.24E-06
North Cascades National Park/Stout	3.81E-04	6.32E-05	1.75E-04	8.47E-06	5.92E-05	6.82E-06	5.45E-06	5.76E-06	3.80E-06	6.26E-06	6.20E-06	5.84E-06
Olympic National Park/Hoh	4.81E-04	8.25E-05	2.16E-04	1.39E-05	8.19E-05	8.41E-06	6.83E-06	6.90E-06	4.55E-06	7.04E-06	7.41E-06	6.70E-06
Olympic National Park/Hurricane Ridge	4.58E-04	7.81E-05	2.06E-04	1.25E-05	7.66E-05	8.05E-06	6.52E-06	6.65E-06	4.38E-06	6.87E-06	7.15E-06	6.51E-06
Olympic National Park/Steeple Rock	4.37E-04	7.39E-05	1.98E-04	1.13E-05	7.17E-05	7.72E-06	6.23E-06	6.41E-06	4.22E-06	6.71E-06	6.89E-06	6.33E-06
Rocky Mountain National Park/Irene Forest	2.93E-04	4.65E-05	1.37E-04	4.82E-06	4.09E-05	5.37E-06	4.21E-06	4.69E-06	3.10E-06	5.47E-06	5.05E-06	5.00E-06
Rocky Mountain National Park/Irene Meadows	2.93E-04	4.65E-05	1.37E-04	4.82E-06	4.09E-05	5.37E-06	4.21E-06	4.69E-06	3.10E-06	5.47E-06	5.05E-06	5.00E-06
Rocky Mountain National Park/Lonepine	3.08E-04	4.94E-05	1.44E-04	5.38E-06	4.40E-05	5.62E-06	4.42E-06	4.88E-06	3.22E-06	5.62E-06	5.25E-06	5.15E-06
Rocky Mountain National Park/Mills	3.00E-04	4.79E-05	1.41E-04	5.09E-06	4.24E-05	5.49E-06	4.31E-06	4.78E-06	3.16E-06	5.54E-06	5.15E-06	5.07E-06
Sequoia and Kings Canyon National Park/Emerald	3.89E-04	6.46E-05	1.78E-04	8.84E-06	6.09E-05	6.94E-06	5.56E-06	5.85E-06	3.86E-06	6.32E-06	6.30E-06	5.91E-06
Sequoia and Kings Canyon National Park/Pear	3.89E-04	6.46E-05	1.78E-04	8.84E-06	6.09E-05	6.94E-06	5.56E-06	5.85E-06	3.86E-06	6.32E-06	6.30E-06	5.91E-06

Table B.12. Unitless air-water partition coefficients (K_{AW}) for PCBs in snow.

Park/Site	PCB 118 K_{AW}	PCB 138 K_{AW}	PCB 153 K_{AW}	PCB 183 K_{AW}	PCB 187 K_{AW}
Denali National Park/Kahiltna	4.39E-04	3.06E-05	3.35E-05	1.17E-04	1.17E-04
Denali National Park/McLeod	8.96E-04	6.31E-05	6.90E-05	2.18E-04	2.18E-04
Denali National Park/Wonder	9.09E-04	6.39E-05	6.99E-05	2.21E-04	2.21E-04
Glacier National Park/Matcharak	3.63E-04	2.52E-05	2.76E-05	9.90E-05	9.90E-05
Glacier National Park/Aster	1.74E-03	1.23E-04	1.35E-04	3.90E-04	3.90E-04
Glacier National Park/Granite Park	1.91E-03	1.36E-04	1.49E-04	4.23E-04	4.23E-04
Glacier National Park/Preston	1.87E-03	1.33E-04	1.45E-04	4.14E-04	4.14E-04
Glacier National Park/Snyder	1.90E-03	1.35E-04	1.48E-04	4.22E-04	4.22E-04
Mt. Rainier National Park/Alta Vista	2.30E-03	1.64E-04	1.79E-04	4.97E-04	4.97E-04
Mt. Rainier National Park/Edith Cornice	2.30E-03	1.64E-04	1.79E-04	4.97E-04	4.97E-04
Mt. Rainier National Park/Fell Fields	1.99E-03	1.42E-04	1.55E-04	4.38E-04	4.38E-04
Mt. Rainier National Park/Mowich	2.58E-03	1.84E-04	2.02E-04	5.50E-04	5.50E-04
Mt. Rainier National Park/Paradise	2.24E-03	1.60E-04	1.75E-04	4.87E-04	4.87E-04
Mt. Rainier National Park/Protection	1.99E-03	1.42E-04	1.55E-04	4.38E-04	4.38E-04
Mt. Rainier National Park/Sugarloaf	2.12E-03	1.51E-04	1.65E-04	4.64E-04	4.64E-04
Noatak National Preserve/Burial	3.25E-04	2.26E-05	2.47E-05	8.99E-05	8.99E-05
Noatak National Preserve/Kangilipak	3.47E-04	2.41E-05	2.63E-05	9.51E-05	9.51E-05
North Cascades National Park/Noisy Creek Glacier	2.48E-03	1.77E-04	1.93E-04	5.31E-04	5.31E-04
North Cascades National Park/Sandalee Glacier	2.30E-03	1.64E-04	1.79E-04	4.98E-04	4.98E-04
North Cascades National Park/Silver Glacier	1.99E-03	1.42E-04	1.55E-04	4.39E-04	4.39E-04
North Cascades National Park/Stout	2.42E-03	1.72E-04	1.89E-04	5.20E-04	5.20E-04
Olympic National Park/Hoh	3.08E-03	2.20E-04	2.41E-04	6.42E-04	6.42E-04
Olympic National Park/Hurricane Ridge	2.93E-03	2.09E-04	2.29E-04	6.15E-04	6.15E-04
Olympic National Park/Steeple Rock	2.79E-03	1.99E-04	2.18E-04	5.89E-04	5.89E-04
Rocky Mountain National Park/Irene Forest	1.83E-03	1.30E-04	1.42E-04	4.08E-04	4.08E-04
Rocky Mountain National Park/Irene Meadows	1.83E-03	1.30E-04	1.42E-04	4.08E-04	4.08E-04
Rocky Mountain National Park/Lonepine	1.93E-03	1.38E-04	1.50E-04	4.28E-04	4.28E-04
Rocky Mountain National Park/Mills	1.88E-03	1.34E-04	1.46E-04	4.18E-04	4.18E-04
Sequoia and Kings Canyon National Park/Emerald	2.47E-03	1.76E-04	1.93E-04	5.29E-04	5.29E-04
Sequoia and Kings Canyon National Park/Pear	2.47E-03	1.76E-04	1.93E-04	5.29E-04	5.29E-04

Appendix C: Temperature-corrected K_{OA} values for lichen, conifer needles, PASDs, and snow.

Table C.1. Octanol-air partition coefficients (Log K_{OA}) for pesticides in lichen

Park/Site	Dacthal Log K_{OA}	Chlorpyrifos Log K_{OA}	Endosulfan I,II Log K_{OA}	Endosulfan sulfate Log K_{OA}	g-HCH Log K_{OA}	Trifluralin Log K_{OA}	Triallate Log K_{OA}	Dieldrin Log K_{OA}	a-HCH Log K_{OA}	Chlordane Log K_{OA}	Nonachlor Log K_{OA}	HCB Log K_{OA}
Bandelier National Monument 1	8.41	8.55	8.38	8.64	9.10	7.65	7.80	9.13	9.10	8.07	9.52	7.67
Bandelier National Monument 2	8.43	8.58	8.40	8.67	9.12	7.68	7.83	9.16	9.12	8.10	9.54	7.70
Bandelier National Monument 3	8.54	8.69	8.48	8.79	9.20	7.82	7.95	9.25	9.20	8.19	9.62	7.80
Bandelier National Monument 4	8.59	8.73	8.51	8.84	9.23	7.87	7.99	9.28	9.23	8.23	9.65	7.84
Bandelier National Monument 5	8.62	8.77	8.54	8.87	9.26	7.91	8.03	9.31	9.26	8.26	9.68	7.87
Big Bend National Park 4	8.32	8.46	8.32	8.55	9.04	7.54	7.71	9.06	9.04	8.00	9.46	7.60
Big Bend National Park 5	8.33	8.47	8.33	8.56	9.05	7.55	7.72	9.07	9.05	8.00	9.47	7.60
Crater Lake National Park 1	8.69	8.85	8.59	8.95	9.31	8.01	8.11	9.38	9.31	8.33	9.73	7.95
Crater Lake National Park 2	8.71	8.87	8.61	8.98	9.33	8.03	8.13	9.39	9.33	8.35	9.75	7.97
Crater Lake National Park 3	8.72	8.87	8.61	8.98	9.33	8.04	8.14	9.40	9.33	8.35	9.75	7.97
Crater Lake National Park 4	8.70	8.86	8.60	8.97	9.32	8.02	8.12	9.39	9.32	8.34	9.74	7.96
Denali National Park and Preserve 1	8.91	9.08	8.76	9.19	9.48	8.29	8.35	9.56	9.48	8.53	9.89	8.16
Denali National Park and Preserve 2	8.92	9.08	8.76	9.20	9.48	8.29	8.35	9.57	9.48	8.53	9.90	8.16
Denali National Park and Preserve 3	8.91	9.08	8.76	9.19	9.48	8.29	8.35	9.56	9.48	8.53	9.89	8.16
Denali National Park and Preserve 4	8.89	9.06	8.74	9.17	9.46	8.26	8.33	9.55	9.46	8.51	9.88	8.14
Denali National Park and Preserve 5	8.98	9.15	8.80	9.27	9.52	8.37	8.42	9.62	9.52	8.59	9.94	8.22
Denali National Park and Preserve 6	9.04	9.22	8.85	9.34	9.57	8.45	8.49	9.67	9.57	8.65	9.99	8.28
Gates of the Arctic National Park and Preserve 1	9.13	9.31	8.92	9.43	9.64	8.56	8.59	9.75	9.64	8.73	10.06	8.37
Glacier National Park 1	8.68	8.84	8.59	8.94	9.31	8.00	8.10	9.37	9.31	8.32	9.72	7.94
Glacier National Park 2	8.74	8.90	8.63	9.01	9.35	8.07	8.17	9.42	9.35	8.38	9.77	7.99
Glacier National Park 3	8.75	8.91	8.64	9.02	9.36	8.08	8.18	9.43	9.36	8.39	9.78	8.00
Glacier National Park 4	8.74	8.90	8.63	9.01	9.35	8.07	8.17	9.42	9.35	8.38	9.77	7.99
Glacier National Park 5	8.74	8.90	8.63	9.01	9.35	8.07	8.16	9.42	9.35	8.38	9.77	7.99
Glacier Bay National Park 1	8.79	8.95	8.67	9.06	9.39	8.14	8.22	9.46	9.39	8.42	9.81	8.04
Glacier Bay National Park 2	8.79	8.95	8.67	9.06	9.39	8.14	8.22	9.46	9.39	8.42	9.81	8.04
Glacier Bay National Park 3	8.79	8.95	8.67	9.06	9.39	8.14	8.22	9.46	9.39	8.42	9.81	8.04
Glacier Bay National Park 4	8.79	8.95	8.67	9.06	9.39	8.14	8.22	9.46	9.39	8.42	9.81	8.04
Great Sand Dunes National Park and Preserve 2	8.63	8.78	8.55	8.89	9.27	7.93	8.04	9.32	9.27	8.28	9.69	7.89
Great Sand Dunes National Park and Preserve 4	8.63	8.78	8.55	8.89	9.27	7.93	8.04	9.32	9.27	8.28	9.69	7.89
Grand Teton National Park 1	8.70	8.85	8.60	8.96	9.32	8.01	8.11	9.38	9.32	8.33	9.73	7.95
Grand Teton National Park 2	8.72	8.87	8.61	8.98	9.33	8.04	8.14	9.39	9.33	8.35	9.75	7.97
Katmai National Park and Preserve 1	8.80	8.96	8.67	9.07	9.39	8.15	8.23	9.47	9.39	8.43	9.81	8.05
Katmai National Park and Preserve 2	8.81	8.97	8.68	9.08	9.40	8.16	8.24	9.47	9.40	8.44	9.82	8.06
Katmai National Park and Preserve 3	8.81	8.97	8.68	9.08	9.40	8.16	8.24	9.47	9.40	8.44	9.82	8.06
Katmai National Park and Preserve 4	8.82	8.99	8.69	9.10	9.41	8.17	8.25	9.49	9.41	8.45	9.83	8.07
Katmai National Park and Preserve 5	8.82	8.99	8.69	9.10	9.41	8.17	8.25	9.49	9.41	8.45	9.83	8.07
Katmai National Park and Preserve 6	8.86	9.03	8.72	9.14	9.44	8.22	8.30	9.52	9.44	8.49	9.86	8.11
Lassen Volcanic National Park 1	8.59	8.74	8.51	8.84	9.23	7.87	7.99	9.28	9.23	8.23	9.65	7.84
Lassen Volcanic National Park 2	8.61	8.76	8.53	8.87	9.25	7.91	8.02	9.31	9.25	8.26	9.67	7.87
Lassen Volcanic National Park 3	8.66	8.82	8.57	8.92	9.29	7.97	8.08	9.35	9.29	8.30	9.71	7.92
Lassen Volcanic National Park 4	8.64	8.79	8.55	8.89	9.27	7.94	8.05	9.33	9.27	8.28	9.69	7.89
Lassen Volcanic National Park 5	8.64	8.79	8.55	8.89	9.27	7.94	8.05	9.33	9.27	8.28	9.69	7.89
Mt. Rainier National Park 1	8.65	8.80	8.56	8.91	9.28	7.95	8.06	9.34	9.28	8.29	9.70	7.91
Mt. Rainier National Park 2	8.73	8.88	8.62	8.99	9.34	8.05	8.15	9.40	9.34	8.36	9.76	7.98
Mt. Rainier National Park 3	8.73	8.88	8.62	8.99	9.34	8.05	8.15	9.41	9.34	8.36	9.76	7.98
Mt. Rainier National Park 4	8.72	8.88	8.61	8.98	9.33	8.04	8.14	9.40	9.33	8.36	9.75	7.97
Noatak National Preserve 1	9.10	9.28	8.90	9.40	9.62	8.53	8.56	9.72	9.62	8.71	10.03	8.34
Noatak National Preserve 3	9.17	9.35	8.95	9.47	9.66	8.61	8.63	9.78	9.66	8.77	10.08	8.40
Noatak National Preserve 5	9.15	9.33	8.93	9.46	9.65	8.59	8.61	9.77	9.65	8.75	10.07	8.39
North Cascades National Park 1	8.60	8.75	8.53	8.86	9.25	7.89	8.01	9.30	9.25	8.25	9.66	7.86
North Cascades National Park 2	8.60	8.75	8.53	8.86	9.25	7.89	8.01	9.30	9.25	8.25	9.66	7.86
North Cascades National Park 3	8.61	8.76	8.53	8.87	9.25	7.90	8.02	9.31	9.25	8.26	9.67	7.87
North Cascades National Park 4	8.61	8.76	8.53	8.86	9.25	7.90	8.02	9.30	9.25	8.25	9.67	7.87
North Cascades National Park 5	8.62	8.78	8.54	8.88	9.26	7.92	8.04	9.32	9.26	8.27	9.68	7.88
Olympic National Park 2	8.67	8.83	8.58	8.93	9.30	7.98	8.09	9.36	9.30	8.31	9.72	7.93
Olympic National Park 3	8.67	8.83	8.58	8.93	9.30	7.98	8.09	9.36	9.30	8.31	9.72	7.93
Olympic National Park 4	8.71	8.87	8.61	8.98	9.33	8.03	8.13	9.39	9.33	8.35	9.75	7.97
Olympic National Park 5	8.71	8.87	8.61	8.98	9.33	8.03	8.13	9.39	9.33	8.35	9.75	7.97
Rocky Mountain National Park 6	8.76	8.92	8.65	9.03	9.37	8.10	8.19	9.44	9.37	8.40	9.78	8.02
Sequoia and Kings Canyon National Park 2	8.28	8.41	8.29	8.50	9.01	7.48	7.66	9.02	9.01	7.95	9.42	7.55
Sequoia and Kings Canyon National Park 3	8.51	8.66	8.46	8.76	9.18	7.78	7.91	9.22	9.18	8.17	9.60	7.77
Sequoia and Kings Canyon National Park 4	8.62	8.77	8.54	8.88	9.26	7.92	8.03	9.32	9.26	8.27	9.68	7.88
Sequoia and Kings Canyon National Park 5	8.67	8.82	8.57	8.93	9.29	7.97	8.08	9.35	9.29	8.31	9.71	7.92
Stikine-LeConte Wlderness, Tongass National Forest 1	8.78	8.94	8.66	9.05	9.38	8.12	8.21	9.45	9.38	8.41	9.80	8.03
Stikine-LeConte Wlderness, Tongass National Forest 2	8.80	8.96	8.67	9.07	9.39	8.15	8.23	9.47	9.39	8.43	9.81	8.05
Stikine-LeConte Wlderness, Tongass National Forest 3	8.80	8.96	8.67	9.07	9.39	8.15	8.23	9.47	9.39	8.43	9.81	8.05
Stikine-LeConte Wlderness, Tongass National Forest 4	8.83	8.99	8.70	9.10	9.41	8.18	8.26	9.49	9.41	8.46	9.83	8.08
Stikine-LeConte Wlderness, Tongass National Forest 5	8.80	8.96	8.67	9.07	9.39	8.15	8.23	9.47	9.39	8.43	9.81	8.05
Wrangell-St. Elias National Park and Preserve 1	8.82	8.98	8.69	9.09	9.41	8.17	8.25	9.48	9.41	8.45	9.82	8.07
Wrangell-St. Elias National Park and Preserve 3	8.87	9.03	8.72	9.15	9.44	8.23	8.30	9.53	9.44	8.49	9.86	8.12
Wrangell-St. Elias National Park and Preserve 5	8.94	9.10	8.77	9.22	9.49	8.32	8.38	9.58	9.49	8.55	9.91	8.18
Yosemite National Park 1	8.50	8.64	8.45	8.74	9.17	7.76	7.90	9.21	9.17	8.15	9.59	7.76
Yosemite National Park 2	8.55	8.70	8.49	8.80	9.21	7.82	7.95	9.25	9.21	8.20	9.62	7.81
Yosemite National Park 3	8.54	8.69	8.48	8.79	9.20	7.82	7.95	9.25	9.20	8.19	9.62	7.80

Table C.2. Octanol-air partition coefficients (Log K_{OA}) for PAHs in lichen

Park/Site	ACY Log K_{OA}	ACE Log K_{OA}	FLO Log K_{OA}	PHE Log K_{OA}	ANT Log K_{OA}	FLA Log K_{OA}	PYR Log K_{OA}	CHR/TRI Log K_{OA}	B[a]A Log K_{OA}	B[b]F Log K_{OA}	B[k]F Log K_{OA}	B[a]P Log K_{OA}	B[e]P Log K_{OA}	B[ghi]P Log K_{OA}	D[ah]A Log K_{OA}	I[1,2,3-cd]P Log K_{OA}
Bandelier National Monument 1	6.36	6.41	6.54	7.22	7.05	8.51	8.20	9.44	8.99	10.79	10.84	11.24	11.11	11.63	11.49	11.61
Bandelier National Monument 2	6.39	6.44	6.57	7.25	7.07	8.54	8.22	9.50	9.03	10.81	10.87	11.26	11.13	11.64	11.51	11.63
Bandelier National Monument 3	6.51	6.56	6.68	7.36	7.13	8.67	8.32	9.73	9.18	10.91	10.98	11.34	11.22	11.69	11.59	11.69
Bandelier National Monument 4	6.55	6.60	6.72	7.40	7.16	8.71	8.36	9.82	9.24	10.95	11.02	11.38	11.25	11.72	11.62	11.72
Bandelier National Monument 5	6.59	6.64	6.76	7.43	7.17	8.75	8.39	9.89	9.28	10.98	11.05	11.40	11.27	11.73	11.65	11.74
Big Bend National Park 4	6.27	6.32	6.45	7.14	7.01	8.41	8.13	9.27	8.88	10.71	10.76	11.17	11.05	11.58	11.42	11.56
Big Bend National Park 5	6.27	6.32	6.46	7.15	7.01	8.42	8.13	9.28	8.89	10.72	10.77	11.18	11.05	11.59	11.43	11.57
Crater Lake National Park 1	6.67	6.72	6.83	7.51	7.22	8.84	8.46	10.05	9.39	11.04	11.12	11.46	11.33	11.77	11.71	11.78
Crater Lake National Park 2	6.69	6.74	6.86	7.53	7.23	8.86	8.48	10.09	9.42	11.06	11.14	11.48	11.35	11.78	11.72	11.79
Crater Lake National Park 3	6.70	6.74	6.86	7.53	7.23	8.86	8.48	10.10	9.42	11.06	11.15	11.48	11.35	11.78	11.72	11.79
Crater Lake National Park 4	6.92	6.96	7.06	7.73	7.34	9.09	8.66	10.52	9.70	11.24	11.34	11.63	11.50	11.88	11.88	11.91
Denali National Park and Preserve 1	6.92	6.96	7.06	7.73	7.34	9.09	8.66	10.52	9.70	11.25	11.34	11.63	11.50	11.88	11.88	11.91
Denali National Park and Preserve 2	6.91	6.96	7.06	7.73	7.34	9.09	8.66	10.52	9.70	11.24	11.34	11.63	11.50	11.88	11.88	11.91
Denali National Park and Preserve 3	6.89	6.94	7.04	7.71	7.33	9.07	8.64	10.47	9.67	11.22	11.32	11.62	11.49	11.87	11.86	11.90
Denali National Park and Preserve 4	6.99	7.03	7.13	7.79	7.38	9.17	8.72	10.65	9.79	11.30	11.40	11.68	11.55	11.92	11.93	11.95
Denali National Park and Preserve 5	6.99	7.03	7.13	7.79	7.38	9.17	8.72	10.65	9.79	11.30	11.40	11.68	11.55	11.92	11.93	11.95
Denali National Park and Preserve 6	7.16	7.20	7.29	7.95	7.47	9.34	8.86	10.98	10.00	11.44	11.55	11.80	11.67	11.99	12.05	12.04
Gates of the Arctic National Park and Preserve 1	6.66	6.71	6.82	7.50	7.21	8.83	8.45	10.03	9.38	11.03	11.11	11.45	11.32	11.77	11.70	11.77
Glacier National Park 1	6.73	6.77	6.89	7.56	7.25	8.90	8.50	10.16	9.46	11.09	11.17	11.50	11.37	11.80	11.75	11.81
Glacier National Park 2	6.74	6.79	6.90	7.57	7.25	8.91	8.51	10.18	9.47	11.10	11.18	11.51	11.38	11.80	11.75	11.82
Glacier National Park 3	6.73	6.77	6.89	7.56	7.25	8.90	8.50	10.16	9.46	11.09	11.17	11.50	11.37	11.80	11.75	11.81
Glacier National Park 4	6.73	6.77	6.89	7.56	7.24	8.90	8.50	10.15	9.46	11.09	11.17	11.50	11.37	11.80	11.75	11.81
Glacier National Park 5	6.73	6.77	6.89	7.56	7.24	8.90	8.50	10.15	9.46	11.09	11.17	11.50	11.37	11.80	11.75	11.81
Glacier Bay National Park 1	6.78	6.83	6.94	7.61	7.27	8.95	8.55	10.26	9.53	11.14	11.22	11.54	11.41	11.82	11.78	11.84
Glacier Bay National Park 2	6.78	6.83	6.94	7.61	7.27	8.95	8.55	10.26	9.53	11.14	11.22	11.54	11.41	11.82	11.78	11.84
Glacier Bay National Park 3	6.78	6.83	6.94	7.61	7.27	8.95	8.55	10.26	9.53	11.14	11.22	11.54	11.41	11.82	11.78	11.84
Glacier Bay National Park 4	6.60	6.65	6.77	7.45	7.18	8.77	8.40	9.92	9.31	10.99	11.06	11.41	11.28	11.74	11.66	11.74
Great Sand Dunes National Park and Preserve 2	6.60	6.65	6.77	7.45	7.18	8.77	8.40	9.92	9.31	10.99	11.06	11.41	11.28	11.74	11.66	11.74
Great Sand Dunes National Park and Preserve 4	6.68	6.72	6.84	7.51	7.22	8.84	8.46	10.06	9.40	11.05	11.13	11.46	11.33	11.77	11.71	11.78
Grand Teton National Park 1	6.70	6.74	6.86	7.53	7.23	8.86	8.48	10.10	9.42	11.06	11.15	11.48	11.35	11.78	11.72	11.79
Grand Teton National Park 2	6.79	6.84	6.95	7.62	7.28	8.96	8.56	10.28	9.54	11.14	11.23	11.54	11.42	11.83	11.79	11.84
Katmai National Park and Preserve 1	6.80	6.85	6.95	7.62	7.28	8.97	8.56	10.30	9.55	11.15	11.24	11.55	11.42	11.83	11.80	11.85
Katmai National Park and Preserve 2	6.80	6.85	6.95	7.62	7.28	8.97	8.56	10.30	9.55	11.15	11.24	11.55	11.42	11.83	11.80	11.85
Katmai National Park and Preserve 3	6.82	6.86	6.97	7.64	7.29	8.99	8.58	10.33	9.57	11.16	11.25	11.56	11.43	11.84	11.81	11.86
Katmai National Park and Preserve 4	6.82	6.86	6.97	7.64	7.29	8.99	8.58	10.33	9.57	11.16	11.25	11.56	11.43	11.84	11.81	11.86
Katmai National Park and Preserve 5	6.86	6.91	7.01	7.68	7.31	9.03	8.61	10.41	9.63	11.20	11.29	11.59	11.46	11.86	11.84	11.88
Katmai National Park and Preserve 6	6.55	6.60	6.72	7.40	7.16	8.71	8.36	9.82	9.24	10.95	11.02	11.38	11.25	11.72	11.62	11.72
Lassen Volcanic National Park 1	6.58	6.63	6.75	7.43	7.17	8.75	8.39	9.88	9.28	10.97	11.05	11.40	11.27	11.73	11.65	11.73
Lassen Volcanic National Park 2	6.64	6.69	6.80	7.48	7.20	8.80	8.43	9.99	9.35	11.02	11.09	11.44	11.31	11.76	11.68	11.76
Lassen Volcanic National Park 3	6.61	6.66	6.78	7.45	7.19	8.77	8.41	9.93	9.31	10.99	11.07	11.42	11.29	11.74	11.66	11.75
Lassen Volcanic National Park 4	6.61	6.66	6.78	7.45	7.19	8.77	8.41	9.93	9.31	10.99	11.07	11.42	11.29	11.74	11.66	11.75
Mt. Rainier National Park 1	6.62	6.67	6.79	7.47	7.19	8.79	8.42	9.96	9.33	11.01	11.08	11.43	11.30	11.75	11.67	11.75
Mt. Rainier National Park 2	6.71	6.76	6.87	7.54	7.24	8.88	8.49	10.12	9.44	11.07	11.16	11.49	11.36	11.79	11.73	11.80
Mt. Rainier National Park 3	6.71	6.76	6.87	7.54	7.24	8.88	8.49	10.12	9.44	11.08	11.16	11.49	11.36	11.79	11.73	11.80
Mt. Rainier National Park 4	6.70	6.75	6.86	7.54	7.23	8.87	8.48	10.11	9.43	11.07	11.15	11.48	11.35	11.78	11.73	11.80
Noatak National Preserve 1	7.12	7.17	7.26	7.92	7.45	9.31	8.83	10.92	9.96	11.41	11.52	11.78	11.65	11.98	12.02	12.02
Noatak National Preserve 3	7.20	7.24	7.33	7.98	7.49	9.39	8.89	11.06	10.06	11.48	11.59	11.83	11.70	12.01	12.08	12.06
Noatak National Preserve 5	7.18	7.23	7.31	7.97	7.48	9.37	8.88	11.03	10.03	11.46	11.57	11.82	11.69	12.01	12.06	12.05
North Cascades National Park 1	6.57	6.62	6.74	7.42	7.17	8.73	8.38	9.86	9.26	10.96	11.03	11.39	11.26	11.72	11.64	11.73
North Cascades National Park 2	6.57	6.62	6.74	7.42	7.17	8.73	8.38	9.86	9.26	10.96	11.03	11.39	11.26	11.72	11.64	11.73
North Cascades National Park 3	6.58	6.63	6.75	7.43	7.17	8.74	8.38	9.87	9.27	10.97	11.04	11.40	11.27	11.73	11.64	11.73
North Cascades National Park 4	6.58	6.63	6.75	7.42	7.17	8.74	8.38	9.87	9.27	10.97	11.04	11.39	11.27	11.73	11.64	11.73
North Cascades National Park 5	6.60	6.64	6.76	7.44	7.18	8.76	8.40	9.90	9.29	10.98	11.06	11.41	11.28	11.74	11.65	11.74
Olympic National Park 2	6.65	6.70	6.81	7.49	7.21	8.82	8.44	10.01	9.36	11.03	11.10	11.44	11.32	11.76	11.69	11.77
Olympic National Park 3	6.65	6.70	6.81	7.49	7.21	8.82	8.44	10.01	9.36	11.03	11.10	11.44	11.32	11.76	11.69	11.77
Olympic National Park 4	6.69	6.74	6.85	7.53	7.23	8.86	8.48	10.09	9.42	11.06	11.14	11.48	11.35	11.78	11.72	11.79
Olympic National Park 5	6.69	6.74	6.85	7.53	7.23	8.86	8.48	10.09	9.42	11.06	11.14	11.48	11.35	11.78	11.72	11.79
Rocky Mountain National Park 6	6.75	6.80	6.91	7.58	7.26	8.92	8.52	10.20	9.49	11.11	11.19	11.52	11.39	11.81	11.76	11.82
Sequoia and Kings Canyon National Park 2	6.21	6.26	6.40	7.09	6.98	8.36	8.08	9.16	8.81	10.67	10.72	11.14	11.01	11.56	11.38	11.54
Sequoia and Kings Canyon National Park 3	6.47	6.52	6.65	7.33	7.11	8.63	8.29	9.66	9.14	10.88	10.95	11.32	11.19	11.68	11.57	11.67
Sequoia and Kings Canyon National Park 4	6.59	6.64	6.76	7.44	7.18	8.76	8.40	9.90	9.29	10.98	11.05	11.41	11.28	11.73	11.65	11.74
Sequoia and Kings Canyon National Park 5	6.64	6.69	6.81	7.48	7.20	8.81	8.43	9.99	9.35	11.02	11.10	11.44	11.31	11.76	11.69	11.76
Stikine-LeConte Wlderness, Tongass National Forest 1	6.77	6.82	6.92	7.60	7.27	8.94	8.54	10.23	9.51	11.12	11.21	11.53	11.40	11.81	11.77	11.83
Stikine-LeConte Wlderness, Tongass National Forest 2	6.79	6.84	6.95	7.62	7.28	8.97	8.56	10.28	9.54	11.14	11.23	11.55	11.42	11.83	11.79	11.85
Stikine-LeConte Wlderness, Tongass National Forest 3	6.79	6.84	6.95	7.62	7.28	8.97	8.56	10.28	9.54	11.14	11.23	11.55	11.42	11.83	11.79	11.85
Stikine-LeConte Wlderness, Tongass National Forest 4	6.82	6.87	6.98	7.65	7.29	9.00	8.58	10.34	9.58	11.17	11.26	11.57	11.44	11.84	11.81	11.86
Stikine-LeConte Wlderness, Tongass National Forest 5	6.79	6.84	6.95	7.62	7.28	8.96	8.56	10.28	9.54	11.14	11.23	11.55	11.42	11.83	11.79	11.84
Wrangell-St. Elias National Park and Preserve 1	6.81	6.86	6.96	7.63	7.29	8.98	8.57	10.31	9.56	11.16	11.24	11.56	11.43	11.83	11.80	11.85
Wrangell-St. Elias National Park and Preserve 3	6.87	6.91	7.02	7.69	7.32	9.04	8.62	10.43	9.64	11.20	11.30	11.60	11.47	11.86	11.84	11.88
Wrangell-St. Elias National Park and Preserve 5	6.94	6.99	7.09	7.75	7.36	9.12	8.68	10.57	9.73	11.27	11.36	11.65	11.52	11.89	11.90	11.92
Yosemite National Park 1	6.46	6.51	6.63	7.31	7.11	8.61	8.28	9.63	9.12	10.87	10.93	11.31	11.18	11.67	11.56	11.67
Yosemite National Park 2	6.51	6.56	6.68	7.36	7.13	8.67	8.33	9.74	9.19	10.91	10.98	11.35	11.22	11.70	11.60	11.70
Yosemite National Park 3	6.51	6.55	6.68	7.36	7.13	8.66	8.32	9.73	9.18	10.91	10.98	11.34	11.21	11.69	11.59	11.69

Table C.3. Octanol-air partition coefficients (Log K_{OA}) for PCBs in lichen.

Park/Site	PCB 118 Log K_{OA}	PCB 138 Log K_{OA}	PCB 153 Log K_{OA}	PCB 183 Log K_{OA}	PCB 187 Log K_{OA}
Bandelier National Monument 1	9.03	10.81	10.77	11.06	11.06
Bandelier National Monument 2	9.06	10.84	10.80	11.08	11.08
Bandelier National Monument 3	9.17	10.95	10.92	11.18	11.18
Bandelier National Monument 4	9.22	11.00	10.96	11.22	11.22
Bandelier National Monument 5	9.25	11.03	10.99	11.25	11.25
Big Bend National Park 4	8.95	10.72	10.68	10.98	10.98
Big Bend National Park 5	8.95	10.73	10.69	10.99	10.99
Crater Lake National Park 1	9.33	11.11	11.07	11.32	11.32
Crater Lake National Park 2	9.35	11.13	11.10	11.34	11.34
Crater Lake National Park 3	9.35	11.14	11.10	11.34	11.34
Crater Lake National Park 4	9.34	11.12	11.09	11.33	11.33
Denali National Park and Preserve 1	9.56	11.35	11.31	11.52	11.52
Denali National Park and Preserve 2	9.56	11.35	11.31	11.52	11.52
Denali National Park and Preserve 3	9.56	11.35	11.31	11.52	11.52
Denali National Park and Preserve 4	9.54	11.32	11.29	11.50	11.50
Denali National Park and Preserve 5	9.63	11.41	11.38	11.58	11.58
Denali National Park and Preserve 6	9.70	11.48	11.45	11.64	11.64
Gates of the Arctic National Park and Preserve 1	9.79	11.58	11.54	11.72	11.72
Glacier National Park 1	9.32	11.10	11.06	11.31	11.31
Glacier National Park 2	9.38	11.17	11.13	11.37	11.37
Glacier National Park 3	9.39	11.18	11.14	11.38	11.38
Glacier National Park 4	9.38	11.17	11.13	11.37	11.37
Glacier National Park 5	9.38	11.17	11.13	11.37	11.37
Glacier Bay National Park 1	9.43	11.22	11.18	11.41	11.41
Glacier Bay National Park 2	9.43	11.22	11.18	11.41	11.41
Glacier Bay National Park 3	9.43	11.22	11.18	11.41	11.41
Glacier Bay National Park 4	9.43	11.22	11.18	11.41	11.41
Great Sand Dunes National Park and Preserve 2	9.27	11.05	11.01	11.27	11.27
Great Sand Dunes National Park and Preserve 4	9.27	11.05	11.01	11.27	11.27
Grand Teton National Park 1	9.33	11.12	11.08	11.32	11.32
Grand Teton National Park 2	9.35	11.14	11.10	11.34	11.34
Katmai National Park and Preserve 1	9.44	11.23	11.19	11.42	11.42
Katmai National Park and Preserve 2	9.45	11.24	11.20	11.43	11.43
Katmai National Park and Preserve 3	9.45	11.24	11.20	11.43	11.43
Katmai National Park and Preserve 4	9.47	11.25	11.21	11.44	11.44
Katmai National Park and Preserve 5	9.47	11.25	11.21	11.44	11.44
Katmai National Park and Preserve 6	9.51	11.29	11.25	11.48	11.48
Lassen Volcanic National Park 1	9.22	11.00	10.96	11.22	11.22
Lassen Volcanic National Park 2	9.25	11.03	10.99	11.25	11.25
Lassen Volcanic National Park 3	9.30	11.08	11.04	11.29	11.29
Lassen Volcanic National Park 4	9.27	11.05	11.02	11.27	11.27
Mt. Rainier National Park 1	9.28	11.07	11.03	11.28	11.28
Mt. Rainier National Park 2	9.36	11.15	11.11	11.35	11.35
Mt. Rainier National Park 3	9.37	11.15	11.11	11.35	11.35
Mt. Rainier National Park 4	9.36	11.14	11.10	11.35	11.35
Noatak National Preserve 1	9.76	11.55	11.51	11.69	11.69
Noatak National Preserve 3	9.83	11.62	11.58	11.76	11.76
Noatak National Preserve 5	9.81	11.60	11.56	11.74	11.74
North Cascades National Park 1	9.23	11.02	10.98	11.24	11.24
North Cascades National Park 2	9.23	11.02	10.98	11.24	11.24
North Cascades National Park 3	9.24	11.03	10.99	11.25	11.25
North Cascades National Park 4	9.24	11.02	10.98	11.24	11.24
North Cascades National Park 5	9.26	11.04	11.00	11.26	11.26
Olympic National Park 2	9.31	11.09	11.05	11.30	11.30
Olympic National Park 3	9.31	11.09	11.05	11.30	11.30
Olympic National Park 4	9.35	11.13	11.09	11.34	11.34
Olympic National Park 5	9.35	11.13	11.09	11.34	11.34
Rocky Mountain National Park 6	9.40	11.19	11.15	11.39	11.39
Sequoia and Kings Canyon National Park 2	8.89	10.67	10.63	10.94	10.94
Sequoia and Kings Canyon National Park 3	9.14	10.92	10.88	11.16	11.16
Sequoia and Kings Canyon National Park 4	9.26	11.04	11.00	11.26	11.26
Sequoia and Kings Canyon National Park 5	9.30	11.08	11.05	11.30	11.30
Stikine-LeConte Wlderness, Tongass National Forest 1	9.42	11.21	11.17	11.40	11.40
Stikine-LeConte Wlderness, Tongass National Forest 2	9.44	11.23	11.19	11.42	11.42
Stikine-LeConte Wlderness, Tongass National Forest 3	9.44	11.23	11.19	11.42	11.42
Stikine-LeConte Wlderness, Tongass National Forest 4	9.47	11.26	11.22	11.45	11.45
Stikine-LeConte Wlderness, Tongass National Forest 5	9.44	11.23	11.19	11.42	11.42
Wrangell-St. Elias National Park and Preserve 1	9.46	11.24	11.21	11.43	11.43
Wrangell-St. Elias National Park and Preserve 3	9.51	11.30	11.26	11.48	11.48
Wrangell-St. Elias National Park and Preserve 5	9.59	11.37	11.33	11.54	11.54
Yosemite National Park 1	9.13	10.91	10.87	11.14	11.14
Yosemite National Park 2	9.18	10.96	10.92	11.19	11.19
Yosemite National Park 3	9.17	10.95	10.91	11.18	11.18

Table C.4. Octanol-air partition coefficients (Log K_{OA}) for pesticides in conifer needles.

Park/Site	Dacthal Log K_{OA}	Chlorpyrifos Log K_{OA}	Endosulfan I,II Log K_{OA}	Endosulfan sulfate Log K_{OA}	g-HCH Log K_{OA}	Trifluralin Log K_{OA}	Triallate Log K_{OA}	Dieldrin Log K_{OA}	a-HCH Log K_{OA}	Chlordane Log K_{OA}	Nonachlor Log K_{OA}	HCB Log K_{OA}
Bandelier National Monument 1	8.41	8.55	8.38	8.64	9.10	7.65	7.80	9.13	9.10	8.07	9.52	7.67
Bandelier National Monument 2	8.43	8.58	8.40	8.67	9.12	7.68	7.83	9.16	9.12	8.10	9.54	7.70
Bandelier National Monument 3	8.54	8.69	8.48	8.79	9.20	7.82	7.95	9.25	9.20	8.19	9.62	7.80
Bandelier National Monument 4	8.59	8.73	8.51	8.84	9.23	7.87	7.99	9.28	9.23	8.23	9.65	7.84
Bandelier National Monument 5	8.62	8.77	8.54	8.87	9.26	7.91	8.03	9.31	9.26	8.26	9.68	7.87
Big Bend National Park 3	8.32	8.45	8.32	8.54	9.04	7.53	7.70	9.06	9.04	7.99	9.45	7.59
Big Bend National Park 4	8.32	8.46	8.32	8.55	9.04	7.54	7.71	9.06	9.04	8.00	9.46	7.60
Big Bend National Park 5	8.33	8.47	8.33	8.56	9.05	7.55	7.72	9.07	9.05	8.00	9.47	7.60
Crater Lake National Park 1	8.69	8.85	8.59	8.95	9.31	8.01	8.11	9.38	9.31	8.33	9.73	7.95
Crater Lake National Park 2	8.71	8.87	8.61	8.98	9.33	8.03	8.13	9.39	9.33	8.35	9.75	7.97
Crater Lake National Park 3	8.72	8.87	8.61	8.98	9.33	8.04	8.14	9.40	9.33	8.35	9.75	7.97
Crater Lake National Park 4	8.70	8.86	8.60	8.97	9.32	8.02	8.12	9.39	9.32	8.34	9.74	7.96
Crater Lake National Park 5	8.70	8.86	8.60	8.97	9.32	8.02	8.12	9.39	9.32	8.34	9.74	7.96
Denali National Park and Preserve 1	8.91	9.08	8.76	9.19	9.48	8.29	8.35	9.56	9.48	8.53	9.89	8.16
Denali National Park and Preserve 2	8.92	9.08	8.76	9.20	9.48	8.29	8.35	9.57	9.48	8.53	9.90	8.16
Denali National Park and Preserve 3	8.91	9.08	8.76	9.19	9.48	8.29	8.35	9.56	9.48	8.53	9.89	8.16
Denali National Park and Preserve 4	8.89	9.06	8.74	9.17	9.46	8.26	8.33	9.55	9.46	8.51	9.88	8.14
Glacier National Park 1	8.68	8.84	8.59	8.94	9.31	8.00	8.10	9.37	9.31	8.32	9.72	7.94
Glacier National Park 2	8.74	8.90	8.63	9.01	9.35	8.07	8.17	9.42	9.35	8.38	9.77	7.99
Glacier National Park 3	8.75	8.91	8.64	9.02	9.36	8.08	8.18	9.43	9.36	8.39	9.78	8.00
Glacier National Park 4	8.74	8.90	8.63	9.01	9.35	8.07	8.17	9.42	9.35	8.38	9.77	7.99
Glacier National Park 5	8.74	8.90	8.63	9.01	9.35	8.07	8.16	9.42	9.35	8.38	9.77	7.99
Glacier Bay National Park 1	8.79	8.95	8.67	9.06	9.39	8.14	8.22	9.46	9.39	8.42	9.81	8.04
Glacier Bay National Park 2	8.79	8.95	8.67	9.06	9.39	8.14	8.22	9.46	9.39	8.42	9.81	8.04
Glacier Bay National Park 3	8.79	8.95	8.67	9.06	9.39	8.14	8.22	9.46	9.39	8.42	9.81	8.04
Glacier Bay National Park 4	8.79	8.95	8.67	9.06	9.39	8.14	8.22	9.46	9.39	8.42	9.81	8.04
Great Sand Dunes National Park and Preserve 1	8.57	8.72	8.51	8.83	9.23	7.86	7.98	9.27	9.23	8.22	9.64	7.83
Great Sand Dunes National Park and Preserve 2	8.63	8.78	8.55	8.89	9.27	7.93	8.04	9.32	9.27	8.28	9.69	7.89
Great Sand Dunes National Park and Preserve 3	8.65	8.80	8.56	8.90	9.28	7.95	8.06	9.34	9.28	8.29	9.70	7.90
Great Sand Dunes National Park and Preserve 4	8.63	8.78	8.55	8.89	9.27	7.93	8.04	9.32	9.27	8.28	9.69	7.89
Great Sand Dunes National Park and Preserve 5	8.64	8.79	8.55	8.89	9.27	7.94	8.05	9.33	9.27	8.28	9.69	7.89
Grand Teton National Park 1	8.70	8.85	8.60	8.96	9.32	8.01	8.11	9.38	9.32	8.33	9.73	7.95
Grand Teton National Park 2	8.72	8.87	8.61	8.98	9.33	8.04	8.14	9.39	9.33	8.35	9.75	7.97
Grand Teton National Park 3	8.74	8.90	8.63	9.01	9.35	8.07	8.17	9.42	9.35	8.38	9.77	7.99
Grand Teton National Park 4	8.74	8.90	8.63	9.01	9.35	8.07	8.17	9.42	9.35	8.38	9.77	7.99
Katmai National Park and Preserve 1	8.80	8.96	8.67	9.07	9.39	8.15	8.23	9.47	9.39	8.43	9.81	8.05
Katmai National Park and Preserve 2	8.81	8.97	8.68	9.08	9.40	8.16	8.24	9.47	9.40	8.44	9.82	8.06
Katmai National Park and Preserve 3	8.81	8.97	8.68	9.08	9.40	8.16	8.24	9.47	9.40	8.44	9.82	8.06
Katmai National Park and Preserve 4	8.82	8.99	8.69	9.10	9.41	8.17	8.25	9.49	9.41	8.45	9.83	8.07
Katmai National Park and Preserve 5	8.82	8.99	8.69	9.10	9.41	8.17	8.25	9.49	9.41	8.45	9.83	8.07
Lassen Volcanic National Park 1	8.59	8.74	8.51	8.84	9.23	7.87	7.99	9.28	9.23	8.23	9.65	7.84
Lassen Volcanic National Park 2	8.61	8.76	8.53	8.87	9.25	7.91	8.02	9.31	9.25	8.26	9.67	7.87
Lassen Volcanic National Park 3	8.66	8.82	8.57	8.92	9.29	7.97	8.08	9.35	9.29	8.30	9.71	7.92
Lassen Volcanic National Park 4	8.64	8.79	8.55	8.89	9.27	7.94	8.05	9.33	9.27	8.28	9.69	7.89
Lassen Volcanic National Park 5	8.64	8.79	8.55	8.89	9.27	7.94	8.05	9.33	9.27	8.28	9.69	7.89
Mt. Rainier National Park 1	8.65	8.80	8.56	8.91	9.28	7.95	8.06	9.34	9.28	8.29	9.70	7.91
Mt. Rainier National Park 2	8.73	8.88	8.62	8.99	9.34	8.05	8.15	9.40	9.34	8.36	9.76	7.98
Mt. Rainier National Park 3	8.73	8.88	8.62	8.99	9.34	8.05	8.15	9.41	9.34	8.36	9.76	7.98
Mt. Rainier National Park 4	8.72	8.88	8.61	8.98	9.33	8.04	8.14	9.40	9.33	8.36	9.75	7.97
Mt. Rainier National Park 5	8.78	8.94	8.66	9.05	9.38	8.12	8.20	9.45	9.38	8.41	9.79	8.03
North Cascades National Park 1	8.60	8.75	8.53	8.86	9.25	7.89	8.01	9.30	9.25	8.25	9.66	7.86
North Cascades National Park 2	8.60	8.75	8.53	8.86	9.25	7.89	8.01	9.30	9.25	8.25	9.66	7.86
North Cascades National Park 3	8.61	8.76	8.53	8.87	9.25	7.90	8.02	9.31	9.25	8.26	9.67	7.87
North Cascades National Park 4	8.61	8.76	8.53	8.86	9.25	7.90	8.02	9.30	9.25	8.25	9.67	7.87
North Cascades National Park 5	8.62	8.78	8.54	8.88	9.26	7.92	8.04	9.32	9.26	8.27	9.68	7.88
Olympic National Park 1	8.60	8.75	8.53	8.86	9.25	7.89	8.01	9.30	9.25	8.25	9.66	7.86
Olympic National Park 2	8.67	8.83	8.58	8.93	9.30	7.98	8.09	9.36	9.30	8.31	9.72	7.93
Olympic National Park 3	8.67	8.83	8.58	8.93	9.30	7.98	8.09	9.36	9.30	8.31	9.72	7.93
Olympic National Park 4	8.71	8.87	8.61	8.98	9.33	8.03	8.13	9.39	9.33	8.35	9.75	7.97
Olympic National Park 5	8.71	8.87	8.61	8.98	9.33	8.03	8.13	9.39	9.33	8.35	9.75	7.97
Rocky Mountain National Park 1	8.68	8.83	8.58	8.94	9.30	7.99	8.10	9.36	9.30	8.32	9.72	7.93
Rocky Mountain National Park 2	8.70	8.86	8.60	8.96	9.32	8.02	8.12	9.38	9.32	8.34	9.74	7.95
Rocky Mountain National Park 3	8.75	8.90	8.63	9.01	9.35	8.07	8.17	9.42	9.35	8.38	9.77	8.00
Rocky Mountain National Park 5	8.75	8.91	8.63	9.02	9.35	8.08	8.17	9.42	9.35	8.38	9.77	8.00
Rocky Mountain National Park 6	8.76	8.92	8.65	9.03	9.37	8.10	8.19	9.44	9.37	8.40	9.78	8.02
Sequoia and Kings Canyon National Park 3	8.51	8.66	8.46	8.76	9.18	7.78	7.91	9.22	9.18	8.17	9.60	7.77
Sequoia and Kings Canyon National Park 4	8.62	8.77	8.54	8.88	9.26	7.92	8.03	9.32	9.26	8.27	9.68	7.88
Sequoia and Kings Canyon National Park 5	8.67	8.82	8.57	8.93	9.29	7.97	8.08	9.35	9.29	8.31	9.71	7.92
Sequoia and Kings Canyon National Park 6	8.68	8.83	8.58	8.94	9.30	7.99	8.09	9.36	9.30	8.32	9.72	7.93
Stikine-LeConte Wlderness, Tongass National Forest 1	8.78	8.94	8.66	9.05	9.38	8.12	8.21	9.45	9.38	8.41	9.80	8.03
Stikine-LeConte Wlderness, Tongass National Forest 2	8.80	8.96	8.67	9.07	9.39	8.15	8.23	9.47	9.39	8.43	9.81	8.05
Stikine-LeConte Wlderness, Tongass National Forest 3	8.80	8.96	8.67	9.07	9.39	8.15	8.23	9.47	9.39	8.43	9.81	8.05
Stikine-LeConte Wlderness, Tongass National Forest 4	8.83	8.99	8.70	9.10	9.41	8.18	8.26	9.49	9.41	8.46	9.83	8.08
Stikine-LeConte Wlderness, Tongass National Forest 5	8.80	8.96	8.67	9.07	9.39	8.15	8.23	9.47	9.39	8.43	9.81	8.05
Wrangell-St. Elias National Park and Preserve 1	8.82	8.98	8.69	9.09	9.41	8.17	8.25	9.48	9.41	8.45	9.82	8.07
Wrangell-St. Elias National Park and Preserve 2	8.89	9.05	8.74	9.16	9.46	8.25	8.32	9.54	9.46	8.51	9.87	8.13
Wrangell-St. Elias National Park and Preserve 3	8.87	9.03	8.72	9.15	9.44	8.23	8.30	9.53	9.44	8.49	9.86	8.12
Wrangell-St. Elias National Park and Preserve 4	8.91	9.07	8.75	9.19	9.47	8.28	8.34	9.56	9.47	8.53	9.89	8.15
Wrangell-St. Elias National Park and Preserve 5	8.94	9.10	8.77	9.22	9.49	8.32	8.38	9.58	9.49	8.55	9.91	8.18
Yosemite National Park 1	8.50	8.64	8.45	8.74	9.17	7.76	7.90	9.21	9.17	8.15	9.59	7.76
Yosemite National Park 2	8.55	8.70	8.49	8.80	9.21	7.82	7.95	9.25	9.21	8.20	9.62	7.81
Yosemite National Park 3	8.54	8.69	8.48	8.79	9.20	7.82	7.95	9.25	9.20	8.19	9.62	7.80
Yosemite National Park 4	8.71	8.86	8.60	8.97	9.32	8.03	8.13	9.39	9.32	8.34	9.74	7.96
Yosemite National Park 5	8.69	8.85	8.59	8.95	9.31	8.01	8.11	9.37	9.31	8.33	9.73	7.95

Table C.5. Octanol-air partition coefficients (Log K_{OA}) for PAHs in conifer needles.

Park/Site	ACY Log K_{OA}	ACE Log K_{OA}	FLO Log K_{OA}	PHE Log K_{OA}	ANT Log K_{OA}	FLA Log K_{OA}	PYR Log K_{OA}	CHR/TRI Log K_{OA}	B[a]A Log K_{OA}	B[b]F Log K_{OA}	B[k]F Log K_{OA}	B[a]P Log K_{OA}	B[e]P Log K_{OA}	B[ghi]P Log K_{OA}	D[ah]A Log K_{OA}	I[1,2,3-cd]P Log K_{OA}
Bandelier National Monument 1	6.36	6.41	6.54	7.22	7.05	8.51	8.20	9.44	8.99	10.79	10.84	11.24	11.11	11.63	11.49	11.61
Bandelier National Monument 2	6.39	6.44	6.57	7.25	7.07	8.54	8.22	9.50	9.03	10.81	10.87	11.26	11.13	11.64	11.51	11.63
Bandelier National Monument 3	6.51	6.56	6.68	7.36	7.13	8.67	8.32	9.73	9.18	10.91	10.98	11.34	11.22	11.69	11.59	11.69
Bandelier National Monument 4	6.55	6.60	6.72	7.40	7.16	8.71	8.36	9.82	9.24	10.95	11.02	11.38	11.25	11.72	11.62	11.72
Bandelier National Monument 5	6.59	6.64	6.76	7.43	7.17	8.75	8.39	9.89	9.28	10.98	11.05	11.40	11.27	11.73	11.65	11.74
Big Bend National Park 3	6.26	6.31	6.44	7.13	7.00	8.40	8.12	9.25	8.86	10.70	10.76	11.17	11.04	11.58	11.42	11.56
Big Bend National Park 4	6.27	6.32	6.45	7.14	7.01	8.41	8.13	9.27	8.88	10.71	10.76	11.17	11.05	11.58	11.42	11.56
Big Bend National Park 5	6.27	6.32	6.46	7.15	7.01	8.42	8.13	9.28	8.89	10.72	10.77	11.18	11.05	11.59	11.43	11.57
Crater Lake National Park 1	6.67	6.72	6.83	7.51	7.22	8.84	8.46	10.05	9.39	11.04	11.12	11.46	11.33	11.77	11.71	11.78
Crater Lake National Park 2	6.69	6.74	6.86	7.53	7.23	8.86	8.48	10.09	9.42	11.06	11.14	11.48	11.35	11.78	11.72	11.79
Crater Lake National Park 3	6.70	6.74	6.86	7.53	7.23	8.86	8.48	10.10	9.42	11.06	11.15	11.48	11.35	11.78	11.72	11.79
Crater Lake National Park 4	6.68	6.73	6.85	7.52	7.22	8.85	8.47	10.07	9.41	11.05	11.13	11.47	11.34	11.78	11.72	11.79
Crater Lake National Park 5	6.68	6.73	6.85	7.52	7.22	8.85	8.47	10.07	9.41	11.05	11.13	11.47	11.34	11.78	11.72	11.79
Denali National Park and Preserve 1	6.92	6.96	7.06	7.73	7.34	9.09	8.66	10.52	9.70	11.24	11.34	11.63	11.50	11.88	11.88	11.91
Denali National Park and Preserve 2	6.92	6.96	7.06	7.73	7.34	9.09	8.66	10.52	9.70	11.25	11.34	11.63	11.50	11.88	11.88	11.91
Denali National Park and Preserve 3	6.91	6.96	7.06	7.73	7.34	9.09	8.66	10.52	9.70	11.24	11.34	11.63	11.50	11.88	11.88	11.91
Denali National Park and Preserve 4	6.89	6.94	7.04	7.71	7.33	9.07	8.64	10.47	9.67	11.22	11.32	11.62	11.49	11.87	11.86	11.90
Glacier National Park 1	6.66	6.71	6.82	7.50	7.21	8.83	8.45	10.03	9.38	11.03	11.11	11.45	11.32	11.77	11.70	11.77
Glacier National Park 2	6.73	6.77	6.89	7.56	7.25	8.90	8.50	10.16	9.46	11.09	11.17	11.50	11.37	11.80	11.75	11.81
Glacier National Park 3	6.74	6.79	6.90	7.57	7.25	8.91	8.51	10.18	9.47	11.10	11.18	11.51	11.38	11.80	11.75	11.82
Glacier National Park 4	6.73	6.77	6.89	7.56	7.25	8.90	8.50	10.16	9.46	11.09	11.17	11.50	11.37	11.80	11.75	11.81
Glacier National Park 5	6.73	6.77	6.89	7.56	7.24	8.90	8.50	10.15	9.46	11.09	11.17	11.50	11.37	11.80	11.75	11.81
Glacier Bay National Park 1	6.78	6.83	6.94	7.61	7.27	8.95	8.55	10.26	9.53	11.14	11.22	11.54	11.41	11.82	11.78	11.84
Glacier Bay National Park 2	6.78	6.83	6.94	7.61	7.27	8.95	8.55	10.26	9.53	11.14	11.22	11.54	11.41	11.82	11.78	11.84
Glacier Bay National Park 3	6.78	6.83	6.94	7.61	7.27	8.95	8.55	10.26	9.53	11.14	11.22	11.54	11.41	11.82	11.78	11.84
Glacier Bay National Park 4	6.78	6.83	6.94	7.61	7.27	8.95	8.55	10.26	9.53	11.14	11.22	11.54	11.41	11.82	11.78	11.84
Great Sand Dunes National Park and Preserve 1	6.54	6.59	6.71	7.39	7.15	8.70	8.35	9.80	9.22	10.94	11.01	11.37	11.24	11.71	11.62	11.71
Great Sand Dunes National Park and Preserve 2	6.60	6.65	6.77	7.45	7.18	8.77	8.40	9.92	9.31	10.99	11.06	11.41	11.28	11.74	11.66	11.74
Great Sand Dunes National Park and Preserve 3	6.62	6.67	6.79	7.46	7.19	8.78	8.42	9.95	9.32	11.00	11.08	11.42	11.29	11.75	11.67	11.75
Great Sand Dunes National Park and Preserve 4	6.60	6.65	6.77	7.45	7.18	8.77	8.40	9.92	9.31	10.99	11.06	11.41	11.28	11.74	11.66	11.74
Great Sand Dunes National Park and Preserve 5	6.61	6.66	6.78	7.45	7.19	8.77	8.41	9.93	9.31	10.99	11.07	11.42	11.29	11.74	11.66	11.75
Grand Teton National Park 1	6.68	6.72	6.84	7.51	7.22	8.84	8.46	10.06	9.40	11.05	11.13	11.46	11.33	11.77	11.71	11.78
Grand Teton National Park 2	6.70	6.74	6.86	7.53	7.23	8.86	8.48	10.10	9.42	11.06	11.15	11.48	11.35	11.78	11.72	11.79
Grand Teton National Park 3	6.73	6.77	6.89	7.56	7.25	8.90	8.50	10.16	9.46	11.09	11.17	11.50	11.37	11.80	11.75	11.81
Grand Teton National Park 4	6.73	6.77	6.89	7.56	7.25	8.90	8.50	10.16	9.46	11.09	11.17	11.50	11.37	11.80	11.75	11.81
Katmai National Park and Preserve 1	6.79	6.84	6.95	7.62	7.28	8.96	8.56	10.28	9.54	11.14	11.23	11.54	11.42	11.83	11.79	11.84
Katmai National Park and Preserve 2	6.80	6.85	6.95	7.62	7.28	8.97	8.56	10.30	9.55	11.15	11.24	11.55	11.42	11.83	11.80	11.85
Katmai National Park and Preserve 3	6.80	6.85	6.95	7.62	7.28	8.97	8.56	10.30	9.55	11.15	11.24	11.55	11.42	11.83	11.80	11.85
Katmai National Park and Preserve 4	6.82	6.86	6.97	7.64	7.29	8.99	8.58	10.33	9.57	11.16	11.25	11.56	11.43	11.84	11.81	11.86
Katmai National Park and Preserve 5	6.82	6.86	6.97	7.64	7.29	8.99	8.58	10.33	9.57	11.16	11.25	11.56	11.43	11.84	11.81	11.86
Lassen Volcanic National Park 1	6.55	6.60	6.72	7.40	7.16	8.71	8.36	9.82	9.24	10.95	11.02	11.38	11.25	11.72	11.62	11.72
Lassen Volcanic National Park 2	6.58	6.63	6.75	7.43	7.17	8.75	8.39	9.88	9.28	10.97	11.05	11.40	11.27	11.73	11.65	11.73
Lassen Volcanic National Park 3	6.64	6.69	6.80	7.48	7.20	8.80	8.43	9.99	9.35	11.02	11.09	11.44	11.31	11.76	11.68	11.76
Lassen Volcanic National Park 4	6.61	6.66	6.78	7.45	7.19	8.77	8.41	9.93	9.31	10.99	11.07	11.42	11.29	11.74	11.66	11.75
Lassen Volcanic National Park 5	6.61	6.66	6.78	7.45	7.19	8.77	8.41	9.93	9.31	10.99	11.07	11.42	11.29	11.74	11.66	11.75
Mt. Rainier National Park 1	6.62	6.67	6.79	7.47	7.19	8.79	8.42	9.96	9.33	11.01	11.08	11.43	11.30	11.75	11.67	11.75
Mt. Rainier National Park 2	6.71	6.76	6.87	7.54	7.24	8.88	8.49	10.12	9.44	11.07	11.16	11.49	11.36	11.79	11.73	11.80
Mt. Rainier National Park 3	6.71	6.76	6.87	7.54	7.24	8.88	8.49	10.12	9.44	11.08	11.16	11.49	11.36	11.79	11.73	11.80
Mt. Rainier National Park 4	6.70	6.75	6.86	7.54	7.23	8.87	8.48	10.11	9.43	11.07	11.15	11.48	11.35	11.78	11.73	11.80
Mt. Rainier National Park 5	6.77	6.81	6.92	7.59	7.26	8.94	8.54	10.23	9.51	11.12	11.21	11.53	11.40	11.81	11.77	11.83
North Cascades National Park 1	6.57	6.62	6.74	7.42	7.17	8.73	8.38	9.86	9.26	10.96	11.03	11.39	11.26	11.72	11.64	11.73
North Cascades National Park 2	6.57	6.62	6.74	7.42	7.17	8.73	8.38	9.86	9.26	10.96	11.03	11.39	11.26	11.72	11.64	11.73
North Cascades National Park 3	6.58	6.63	6.75	7.43	7.17	8.74	8.38	9.87	9.27	10.97	11.04	11.40	11.27	11.73	11.64	11.73
North Cascades National Park 4	6.58	6.63	6.75	7.42	7.17	8.74	8.38	9.87	9.27	10.97	11.04	11.39	11.27	11.73	11.64	11.73
North Cascades National Park 5	6.60	6.64	6.76	7.44	7.18	8.76	8.40	9.90	9.29	10.98	11.06	11.41	11.28	11.74	11.65	11.74
Olympic National Park 1	6.57	6.62	6.74	7.42	7.17	8.73	8.38	9.86	9.26	10.96	11.04	11.39	11.26	11.72	11.64	11.73
Olympic National Park 2	6.65	6.70	6.81	7.49	7.21	8.82	8.44	10.01	9.36	11.03	11.10	11.44	11.32	11.76	11.69	11.77
Olympic National Park 3	6.65	6.70	6.81	7.49	7.21	8.82	8.44	10.01	9.36	11.03	11.10	11.44	11.32	11.76	11.69	11.77
Olympic National Park 4	6.69	6.74	6.85	7.53	7.23	8.86	8.48	10.09	9.42	11.06	11.14	11.48	11.35	11.78	11.72	11.79
Olympic National Park 5	6.69	6.74	6.85	7.53	7.23	8.86	8.48	10.09	9.42	11.06	11.14	11.48	11.35	11.78	11.72	11.79
Rocky Mountain National Park 1	6.66	6.70	6.82	7.49	7.21	8.82	8.45	10.02	9.37	11.03	11.11	11.45	11.32	11.76	11.70	11.77
Rocky Mountain National Park 2	6.68	6.73	6.84	7.52	7.22	8.85	8.47	10.06	9.40	11.05	11.13	11.47	11.34	11.77	11.71	11.78
Rocky Mountain National Park 3	6.73	6.78	6.89	7.56	7.25	8.90	8.51	10.16	9.46	11.09	11.17	11.50	11.37	11.80	11.75	11.81
Rocky Mountain National Park 5	6.73	6.78	6.89	7.56	7.25	8.90	8.51	10.17	9.47	11.09	11.18	11.50	11.37	11.80	11.75	11.81
Rocky Mountain National Park 6	6.75	6.80	6.91	7.58	7.26	8.92	8.52	10.20	9.49	11.11	11.19	11.52	11.39	11.81	11.76	11.82
Sequoia and Kings Canyon National Park 3	6.47	6.52	6.65	7.33	7.11	8.63	8.29	9.66	9.14	10.88	10.95	11.32	11.19	11.68	11.57	11.67
Sequoia and Kings Canyon National Park 4	6.59	6.64	6.76	7.44	7.18	8.76	8.40	9.90	9.29	10.98	11.05	11.41	11.28	11.73	11.65	11.74
Sequoia and Kings Canyon National Park 5	6.64	6.69	6.81	7.48	7.20	8.81	8.43	9.99	9.35	11.02	11.10	11.44	11.31	11.76	11.69	11.76
Sequoia and Kings Canyon National Park 6	6.65	6.70	6.82	7.49	7.21	8.82	8.44	10.01	9.37	11.03	11.11	11.45	11.32	11.76	11.69	11.77
Stikine-LeConte Wlderness, Tongass National Forest 1	6.77	6.82	6.92	7.60	7.27	8.94	8.54	10.23	9.51	11.12	11.21	11.53	11.40	11.81	11.77	11.83
Stikine-LeConte Wlderness, Tongass National Forest 2	6.79	6.84	6.95	7.62	7.28	8.97	8.56	10.28	9.54	11.14	11.23	11.55	11.42	11.83	11.79	11.85
Stikine-LeConte Wlderness, Tongass National Forest 3	6.79	6.84	6.95	7.62	7.28	8.97	8.56	10.28	9.54	11.14	11.23	11.55	11.42	11.83	11.79	11.85
Stikine-LeConte Wlderness, Tongass National Forest 4	6.82	6.87	6.98	7.65	7.29	9.00	8.58	10.34	9.58	11.17	11.26	11.57	11.44	11.84	11.81	11.86
Stikine-LeConte Wlderness, Tongass National Forest 5	6.79	6.84	6.95	7.62	7.28	8.96	8.56	10.28	9.54	11.14	11.23	11.55	11.42	11.83	11.79	11.84
Wrangell-St. Elias National Park and Preserve 1	6.81	6.86	6.96	7.63	7.29	8.98	8.57	10.31	9.56	11.16	11.24	11.56	11.43	11.83	11.80	11.85
Wrangell-St. Elias National Park and Preserve 2	6.88	6.93	7.03	7.70	7.33	9.06	8.63	10.46	9.66	11.22	11.31	11.61	11.48	11.87	11.86	11.89
Wrangell-St. Elias National Park and Preserve 3	6.87	6.91	7.02	7.69	7.32	9.04	8.62	10.43	9.64	11.20	11.30	11.60	11.47	11.86	11.84	11.88
Wrangell-St. Elias National Park and Preserve 4	6.91	6.95	7.05	7.72	7.34	9.08	8.65	10.50	9.69	11.24	11.33	11.62	11.50	11.88	11.87	11.90
Wrangell-St. Elias National Park and Preserve 5	6.94	6.99	7.09	7.75	7.36	9.12	8.68	10.57	9.73	11.27	11.36	11.65	11.52	11.89	11.90	11.92
Yosemite National Park 1	6.46	6.51	6.63	7.31	7.11	8.61	8.28	9.63	9.12	10.87	10.93	11.31	11.18	11.67	11.56	11.67
Yosemite National Park 2	6.51	6.56	6.68	7.36	7.13	8.67	8.33	9.74	9.19	10.91	10.98	11.35	11.22	11.70	11.60	11.70
Yosemite National Park 3	6.51	6.55	6.68	7.36	7.13	8.66	8.32	9.73	9.18	10.91	10.98	11.34	11.21	11.69	11.59	11.69
Yosemite National Park 4	6.69	6.74	6.85	7.52	7.23	8.85	8.47	10.08	9.41	11.06	11.14	11.47	11.34	11.78	11.72	11.79
Yosemite National Park 5	6.67	6.72	6.83	7.51	7.22	8.84	8.46	10.05	9.39	11.04	11.12	11.46	11.33	11.77	11.71	11.78

Table C.6. Octanol-air partition coefficients (Log K_{OA}) for PCBs in conifer needles

Park/Site	PCB 118 Log K_{OA}	PCB 138 Log K_{OA}	PCB 153 Log K_{OA}	PCB 183 Log K_{OA}	PCB 187 Log K_{OA}
Bandelier National Monument 1	9.03	10.81	10.77	11.06	11.06
Bandelier National Monument 2	9.06	10.84	10.80	11.08	11.08
Bandelier National Monument 3	9.17	10.95	10.92	11.18	11.18
Bandelier National Monument 4	9.22	11.00	10.96	11.22	11.22
Bandelier National Monument 5	9.25	11.03	10.99	11.25	11.25
Big Bend National Park 3	8.94	10.71	10.68	10.98	10.98
Big Bend National Park 4	8.95	10.72	10.68	10.98	10.98
Big Bend National Park 5	8.95	10.73	10.69	10.99	10.99
Crater Lake National Park 1	9.33	11.11	11.07	11.32	11.32
Crater Lake National Park 2	9.35	11.13	11.10	11.34	11.34
Crater Lake National Park 3	9.35	11.14	11.10	11.34	11.34
Crater Lake National Park 4	9.34	11.12	11.09	11.33	11.33
Crater Lake National Park 5	9.34	11.12	11.09	11.33	11.33
Denali National Park and Preserve 1	9.56	11.35	11.31	11.52	11.52
Denali National Park and Preserve 2	9.56	11.35	11.31	11.52	11.52
Denali National Park and Preserve 3	9.56	11.35	11.31	11.52	11.52
Denali National Park and Preserve 4	9.54	11.32	11.29	11.50	11.50
Glacier National Park 1	9.32	11.10	11.06	11.31	11.31
Glacier National Park 2	9.38	11.17	11.13	11.37	11.37
Glacier National Park 3	9.39	11.18	11.14	11.38	11.38
Glacier National Park 4	9.38	11.17	11.13	11.37	11.37
Glacier National Park 5	9.38	11.17	11.13	11.37	11.37
Glacier Bay National Park 1	9.43	11.22	11.18	11.41	11.41
Glacier Bay National Park 2	9.43	11.22	11.18	11.41	11.41
Glacier Bay National Park 3	9.43	11.22	11.18	11.41	11.41
Glacier Bay National Park 4	9.43	11.22	11.18	11.41	11.41
Great Sand Dunes National Park and Preserve 1	9.21	10.99	10.95	11.21	11.21
Great Sand Dunes National Park and Preserve 2	9.27	11.05	11.01	11.27	11.27
Great Sand Dunes National Park and Preserve 3	9.28	11.06	11.02	11.28	11.28
Great Sand Dunes National Park and Preserve 4	9.27	11.05	11.01	11.27	11.27
Great Sand Dunes National Park and Preserve 5	9.27	11.05	11.02	11.27	11.27
Grand Teton National Park 1	9.33	11.12	11.08	11.32	11.32
Grand Teton National Park 2	9.35	11.14	11.10	11.34	11.34
Grand Teton National Park 3	9.38	11.17	11.13	11.37	11.37
Grand Teton National Park 4	9.38	11.17	11.13	11.37	11.37
Katmai National Park and Preserve 1	9.44	11.23	11.19	11.42	11.42
Katmai National Park and Preserve 2	9.45	11.24	11.20	11.43	11.43
Katmai National Park and Preserve 3	9.45	11.24	11.20	11.43	11.43
Katmai National Park and Preserve 4	9.47	11.25	11.21	11.44	11.44
Katmai National Park and Preserve 5	9.47	11.25	11.21	11.44	11.44
Lassen Volcanic National Park 1	9.22	11.00	10.96	11.22	11.22
Lassen Volcanic National Park 2	9.25	11.03	10.99	11.25	11.25
Lassen Volcanic National Park 3	9.30	11.08	11.04	11.29	11.29
Lassen Volcanic National Park 4	9.27	11.05	11.02	11.27	11.27
Lassen Volcanic National Park 5	9.27	11.05	11.02	11.27	11.27
Mt. Rainier National Park 1	9.28	11.07	11.03	11.28	11.28
Mt. Rainier National Park 2	9.36	11.15	11.11	11.35	11.35
Mt. Rainier National Park 3	9.37	11.15	11.11	11.35	11.35
Mt. Rainier National Park 4	9.36	11.14	11.10	11.35	11.35
Mt. Rainier National Park 5	9.42	11.20	11.16	11.40	11.40
North Cascades National Park 1	9.23	11.02	10.98	11.24	11.24
North Cascades National Park 2	9.23	11.02	10.98	11.24	11.24
North Cascades National Park 3	9.24	11.03	10.99	11.25	11.25
North Cascades National Park 4	9.24	11.02	10.98	11.24	11.24
North Cascades National Park 5	9.26	11.04	11.00	11.26	11.26
Olympic National Park 1	9.24	11.02	10.98	11.24	11.24
Olympic National Park 2	9.31	11.09	11.05	11.30	11.30
Olympic National Park 3	9.31	11.09	11.05	11.30	11.30
Olympic National Park 4	9.35	11.13	11.09	11.34	11.34
Olympic National Park 5	9.35	11.13	11.09	11.34	11.34
Rocky Mountain National Park 1	9.32	11.10	11.06	11.31	11.31
Rocky Mountain National Park 2	9.34	11.12	11.08	11.33	11.33
Rocky Mountain National Park 3	9.38	11.17	11.13	11.37	11.37
Rocky Mountain National Park 5	9.39	11.17	11.13	11.37	11.37
Rocky Mountain National Park 6	9.40	11.19	11.15	11.39	11.39
Sequoia and Kings Canyon National Park 3	9.14	10.92	10.88	11.16	11.16
Sequoia and Kings Canyon National Park 4	9.26	11.04	11.00	11.26	11.26
Sequoia and Kings Canyon National Park 5	9.30	11.08	11.05	11.30	11.30
Sequoia and Kings Canyon National Park 6	9.31	11.09	11.06	11.31	11.31
Stikine-LeConte Wlderness, Tongass National Forest 1	9.42	11.21	11.17	11.40	11.40
Stikine-LeConte Wlderness, Tongass National Forest 2	9.44	11.23	11.19	11.42	11.42
Stikine-LeConte Wlderness, Tongass National Forest 3	9.44	11.23	11.19	11.42	11.42
Stikine-LeConte Wlderness, Tongass National Forest 4	9.47	11.26	11.22	11.45	11.45
Stikine-LeConte Wlderness, Tongass National Forest 5	9.44	11.23	11.19	11.42	11.42
Wrangell-St. Elias National Park and Preserve 1	9.46	11.24	11.21	11.43	11.43
Wrangell-St. Elias National Park and Preserve 2	9.53	11.32	11.28	11.50	11.50
Wrangell-St. Elias National Park and Preserve 3	9.51	11.30	11.26	11.48	11.48
Wrangell-St. Elias National Park and Preserve 4	9.55	11.34	11.30	11.51	11.51
Wrangell-St. Elias National Park and Preserve 5	9.59	11.37	11.33	11.54	11.54
Yosemite National Park 2	9.18	10.96	10.92	11.19	11.19
Yosemite National Park 3	9.17	10.95	10.91	11.18	11.18
Yosemite National Park 4	9.34	11.13	11.09	11.33	11.33
Yosemite National Park 5	9.33	11.11	11.07	11.32	11.32

Table C.7. Octanol-air partition coefficients (Log K_{OA}) for pesticides in PASDs.

Park/Site	Dacthal Log K_{OA}	Chlorpyrifos Log K_{OA}	Endosulfan I,II Log K_{OA}	Endosulfan sulfate Log K_{OA}	g-HCH Log K_{OA}	Trifluralin Log K_{OA}	Triallate Log K_{OA}	Dieldrin Log K_{OA}	a-HCH Log K_{OA}	Chlordane Log K_{OA}	Nonachlor Log K_{OA}	HCB Log K_{OA}
Bandelier NM 5	8.64	8.80	8.56	8.90	9.28	7.95	8.06	9.33	9.28	8.29	9.70	7.90
Big Bend NP 1	8.13	8.26	8.18	8.34	8.90	7.30	7.50	8.90	8.90	7.82	9.32	7.41
Big Bend NP 2	8.23	8.37	8.26	8.46	8.98	7.43	7.61	8.99	8.98	7.91	9.39	7.51
Big Bend NP 3	8.30	8.44	8.30	8.53	9.02	7.51	7.68	9.04	9.02	7.97	9.44	7.57
Big Bend NP 4	8.32	8.46	8.32	8.55	9.04	7.54	7.71	9.06	9.04	8.00	9.46	7.60
Crater Lake NP 5	8.76	8.92	8.64	9.03	9.36	8.09	8.18	9.43	9.36	8.39	9.78	8.01
Denali NP & Preserve 3	8.96	9.12	8.79	9.24	9.51	8.34	8.40	9.60	9.51	8.57	9.93	8.20
Denali NP & Preserve/Friday Creek	8.96	9.13	8.79	9.25	9.51	8.35	8.41	9.61	9.51	8.58	9.93	8.21
Gates of the Arctic NP & Preserve 1	9.18	9.36	8.95	9.48	9.67	8.62	8.64	9.79	9.67	8.77	10.09	8.41
Glacier NP 3	8.75	8.91	8.64	9.02	9.36	8.08	8.18	9.43	9.36	8.39	9.78	8.00
Glacier NP 4	8.76	8.91	8.64	9.02	9.36	8.09	8.18	9.43	9.36	8.39	9.78	8.01
Glacier Bay NP & Preserve 1	8.81	8.97	8.68	9.08	9.40	8.16	8.24	9.48	9.40	8.44	9.82	8.06
Great Sane Dunes NM 5	8.67	8.83	8.58	8.93	9.30	7.99	8.09	9.36	9.30	8.31	9.72	7.93
Grand Tetons NP 5	8.72	8.87	8.61	8.98	9.33	8.04	8.14	9.40	9.33	8.35	9.75	7.97
Katmai NP & Preserve 3	8.83	8.99	8.69	9.10	9.41	8.18	8.26	9.49	9.41	8.45	9.83	8.07
Lassen Volcanic NP 5	8.66	8.82	8.57	8.92	9.29	7.97	8.08	9.35	9.29	8.30	9.71	7.92
Mount Rainier NP 3	8.75	8.91	8.64	9.02	9.36	8.08	8.17	9.43	9.36	8.38	9.77	8.00
Mount Rainier NP 4	8.73	8.88	8.62	8.99	9.34	8.05	8.15	9.41	9.34	8.36	9.76	7.98
Noatak NP 3	9.22	9.40	8.98	9.52	9.70	8.67	8.68	9.82	9.70	8.81	10.12	8.45
North Cascades NP 5	8.65	8.80	8.56	8.91	9.28	7.95	8.06	9.34	9.28	8.29	9.70	7.91
Olympic NP 3	8.69	8.85	8.59	8.96	9.31	8.01	8.11	9.38	9.31	8.33	9.73	7.95
Olympic NP 4	8.74	8.90	8.63	9.01	9.35	8.07	8.17	9.42	9.35	8.38	9.77	8.00
Rocky Mtn. NP 1	8.77	8.93	8.65	9.04	9.37	8.11	8.20	9.44	9.37	8.41	9.79	8.02
Rocky Mtn. NP 2	8.71	8.86	8.60	8.97	9.32	8.03	8.13	9.39	9.32	8.34	9.74	7.96
Rocky Mtn. NP 3	8.73	8.88	8.62	8.99	9.34	8.05	8.15	9.40	9.34	8.36	9.76	7.98
Rocky Mtn. NP 5	8.77	8.92	8.65	9.03	9.37	8.10	8.19	9.44	9.37	8.40	9.79	8.02
Rocky Mtn. NP 6	8.77	8.92	8.65	9.03	9.37	8.10	8.19	9.44	9.37	8.40	9.79	8.02
Sequoia NP 5	8.69	8.85	8.59	8.95	9.31	8.01	8.11	9.37	9.31	8.33	9.73	7.94
Sequoia NP/Wolverton Creek	8.65	8.80	8.56	8.91	9.28	7.95	8.06	9.34	9.28	8.29	9.70	7.90
Sequoia NP/POTW	8.44	8.59	8.41	8.68	9.13	7.69	7.84	9.16	9.13	8.10	9.55	7.71
Sequoia NP/CRYS	8.36	8.50	8.35	8.59	9.07	7.58	7.75	9.09	9.07	8.02	9.48	7.63
Stikine LeConte Wilderness 1	8.80	8.96	8.67	9.07	9.39	8.14	8.23	9.47	9.39	8.43	9.81	8.05
Stikine LeConte Wilderness 2	8.82	8.98	8.69	9.10	9.41	8.17	8.25	9.49	9.41	8.45	9.83	8.07
Stikine LeConte Wilderness 4	8.86	9.02	8.71	9.13	9.43	8.21	8.29	9.51	9.43	8.48	9.85	8.10
Wrangell St. Elias NP & Preserve 3	8.92	9.08	8.76	9.20	9.48	8.29	8.35	9.57	9.48	8.53	9.90	8.16
Yosemite NP 5	8.70	8.86	8.60	8.97	9.32	8.02	8.12	9.39	9.32	8.34	9.74	7.96

Table C.8. Octanol-air partition coefficients (Log K_{OA}) for PAHs in PASDs.

Park/Site	FLO Log K_{OA}	PHE Log K_{OA}	FLA Log K_{OA}
Bandelier NM 5	6.78	7.46	8.78
Big Bend NP 1	6.25	6.95	8.19
Big Bend NP 2	6.36	7.05	8.31
Big Bend NP 3	6.43	7.12	8.39
Big Bend NP 4	6.45	7.14	8.41
Crater Lake NP 5	6.90	7.58	8.92
Denali NP & Preserve 3	7.11	7.77	9.14
Denali NP & Preserve/Friday Creek	7.12	7.78	9.15
Gates of the Arctic NP & Preserve 1	7.34	7.99	9.40
Glacier NP 3	6.90	7.57	8.91
Glacier NP 4	6.90	7.57	8.91
Great Sane Dunes NM 5	6.82	7.49	8.82
Katmai NP & Preserve 3	6.97	7.64	8.99
Lassen Volcanic NP 5	6.80	7.48	8.80
Mount Rainier NP 3	6.89	7.57	8.90
Mount Rainier NP 4	6.87	7.54	8.88
Noatak NP 3	7.38	8.03	9.44
North Cascades NP 5	6.79	7.47	8.79
Olympic NP 3	6.83	7.51	8.84
Olympic NP 4	6.89	7.56	8.90
Rocky Mtn. NP 1	6.85	7.52	8.85
Rocky Mtn. NP 2	6.87	7.54	8.88
Rocky Mtn. NP 3	6.91	7.58	8.92
Rocky Mtn. NP 5	6.91	7.58	8.92
Rocky Mtn. NP 6	6.92	7.59	8.93
Sequoia NP/Wolverton Creek	6.79	7.46	8.79
Sequoia NP/POTW	6.58	7.26	8.55
Sequoia NP/CRYS	6.49	7.17	8.45
Stikine LeConte Wilderness 1	6.95	7.62	8.96
Stikine LeConte Wilderness 2	6.97	7.64	8.99
Stikine LeConte Wilderness 4	7.00	7.67	9.02
Wrangell St. Elias NP & Preserve 3	7.06	7.73	9.09
Yosemite NP 5	6.85	7.52	8.85

Table C.9. Octanol-air partition coefficients (Log K_{OA}) for pesticides in snow.

Park/Site	Dacthal Log K_{OA}	Chlorpyrifos Log K_{OA}	Endosulfan I,II Log K_{OA}	Endosulfan sulfate Log K_{OA}	g-HCH Log K_{OA}	Trifluralin Log K_{OA}	Triallate Log K_{OA}	Dieldrin Log K_{OA}	a-HCH Log K_{OA}	Chlordane Log K_{OA}	Nonachlor Log K_{OA}	HCB Log K_{OA}
Denali National Park/Kahiltna	9.66	9.86	10.03	9.31	10.00	9.23	9.16	10.20	10.03	9.21	10.44	8.87
Denali National Park/McLeod	9.36	9.55	9.81	9.09	9.68	8.85	8.84	9.95	9.81	8.94	10.23	8.58
Denali National Park/Wonder	9.36	9.54	9.80	9.08	9.68	8.84	8.83	9.94	9.80	8.94	10.22	8.58
Glacier National Park/Matcharak	9.74	9.94	10.08	9.36	10.09	9.33	9.25	10.27	10.08	9.28	10.50	8.94
Glacier National Park/Aster	9.09	9.26	9.60	8.88	9.38	8.50	8.54	9.71	9.60	8.69	10.02	8.32
Glacier National Park/Granite Park	9.05	9.22	9.57	8.85	9.34	8.45	8.50	9.68	9.57	8.65	9.99	8.28
Glacier National Park/Preston	9.06	9.23	9.58	8.86	9.35	8.47	8.51	9.69	9.58	8.66	10.00	8.29
Glacier National Park/Snyder	9.05	9.22	9.57	8.86	9.34	8.46	8.50	9.68	9.57	8.66	9.99	8.29
Mt. Rainier National Park/Alta Vista	8.97	9.14	9.52	8.80	9.26	8.36	8.41	9.61	9.52	8.58	9.94	8.21
Mt. Rainier National Park/Edith Cornice	8.97	9.14	9.52	8.80	9.26	8.36	8.41	9.61	9.52	8.58	9.94	8.21
Mt. Rainier National Park/Fell Fields	9.03	9.20	9.56	8.84	9.32	8.43	8.48	9.66	9.56	8.64	9.98	8.27
Mt. Rainier National Park/Mowich	8.92	9.09	9.48	8.76	9.20	8.30	8.36	9.57	9.48	8.54	9.90	8.16
Mt. Rainier National Park/Paradise	8.98	9.15	9.52	8.81	9.27	8.37	8.42	9.62	9.52	8.59	9.94	8.22
Mt. Rainier National Park/Protection	9.03	9.20	9.56	8.84	9.32	8.43	8.48	9.66	9.56	8.64	9.98	8.27
Mt. Rainier National Park/Sugarloaf	9.00	9.17	9.54	8.82	9.29	8.40	8.45	9.64	9.54	8.61	9.96	8.24
Noatak National Preserve/Burial	9.78	9.99	10.12	9.40	10.14	9.38	9.30	10.30	10.12	9.33	10.54	8.99
Noatak National Preserve/Kangilipak	9.76	9.96	10.10	9.38	10.11	9.35	9.27	10.28	10.10	9.30	10.52	8.96
North Cascades National Park/Noisy Creek Glacier	8.94	9.10	9.49	8.77	9.22	8.32	8.38	9.58	9.49	8.56	9.91	8.18
North Cascades National Park/Sandalee Glacier	8.97	9.14	9.52	8.80	9.26	8.36	8.41	9.61	9.52	8.58	9.94	8.21
North Cascades National Park/Silver Glacier	9.03	9.20	9.56	8.84	9.32	8.43	8.48	9.66	9.56	8.64	9.98	8.27
North Cascades National Park/Stout	8.95	9.12	9.50	8.78	9.23	8.33	8.39	9.59	9.50	8.56	9.92	8.19
Olympic National Park/Hoh	8.85	9.01	9.43	8.71	9.12	8.20	8.28	9.51	9.43	8.47	9.85	8.09
Olympic National Park/Hurricane Ridge	8.87	9.03	9.44	8.72	9.15	8.23	8.30	9.53	9.44	8.49	9.86	8.11
Olympic National Park/Steeple Rock	8.89	9.05	9.46	8.74	9.17	8.26	8.32	9.54	9.46	8.51	9.88	8.13
Rocky Mountain National Park/Irene Forest	9.06	9.24	9.59	8.87	9.36	8.48	8.51	9.69	9.59	8.67	10.01	8.30
Rocky Mountain National Park/Irene Meados	9.06	9.24	9.59	8.87	9.36	8.48	8.51	9.69	9.59	8.67	10.01	8.30
Rocky Mountain National Park/Lonepine	9.04	9.21	9.57	8.85	9.33	8.45	8.49	9.67	9.57	8.65	9.99	8.28
Rocky Mountain National Park/Mills	9.05	9.22	9.58	8.86	9.35	8.46	8.50	9.68	9.58	8.66	10.00	8.29
Sequoia and Kings Canyon National Park/Emerald	8.94	9.11	9.50	8.78	9.22	8.32	8.38	9.59	9.50	8.56	9.91	8.18
Sequoia and Kings Canyon National Park/Pear	8.94	9.11	9.50	8.78	9.22	8.32	8.38	9.59	9.50	8.56	9.91	8.18

Table C.10. Octanol-air partition coefficients (Log K_{OA}) for PAHs in snow.

Park/Site	PHE Log K_{OA}	FLA Log K_{OA}	PYR Log K_{OA}	CHR/TRI Log K_{OA}	B[a]A Log K_{OA}	B[b]F Log K_{OA}	B[k]F Log K_{OA}	B[a]P Log K_{OA}	B[e]P Log K_{OA}	B[ghi]P Log K_{OA}	D[ah]A Log K_{OA}	I[1,2,3-cd]P Log K_{OA}
Denali National Park/Kahiltna	8.47	9.95	9.33	12.10	10.74	11.92	12.06	12.21	12.08	12.26	12.45	12.35
Denali National Park/McLeod	8.18	9.61	9.06	11.47	10.32	11.65	11.77	11.98	11.85	12.11	12.22	12.17
Denali National Park/Wonder	8.17	9.60	9.06	11.46	10.32	11.64	11.77	11.97	11.84	12.11	12.22	12.17
Glacier National Park/Matcharak	8.55	10.04	9.41	12.27	10.85	11.99	12.14	12.27	12.14	12.30	12.51	12.39
Glacier National Park/Aster	7.90	9.29	8.81	10.88	9.94	11.40	11.51	11.76	11.64	11.97	12.01	12.01
Glacier National Park/Granite Park	7.86	9.24	8.78	10.80	9.88	11.36	11.47	11.73	11.60	11.95	11.98	11.99
Glacier National Park/Preston	7.87	9.26	8.79	10.82	9.90	11.37	11.48	11.74	11.61	11.96	11.99	11.99
Glacier National Park/Snyder	7.86	9.25	8.78	10.80	9.89	11.36	11.47	11.74	11.61	11.95	11.98	11.99
Mt. Rainier National Park/Alta Vista	7.78	9.16	8.71	10.64	9.78	11.29	11.39	11.67	11.55	11.91	11.92	11.94
Mt. Rainier National Park/Edith Cornice	7.78	9.16	8.71	10.64	9.78	11.29	11.39	11.67	11.55	11.91	11.92	11.94
Mt. Rainier National Park/Fell Fields	7.84	9.23	8.76	10.76	9.86	11.35	11.45	11.72	11.59	11.94	11.97	11.98
Mt. Rainier National Park/Mowich	7.74	9.10	8.67	10.53	9.71	11.25	11.35	11.64	11.51	11.89	11.88	11.91
Mt. Rainier National Park/Paradise	7.79	9.17	8.72	10.66	9.79	11.30	11.40	11.68	11.55	11.92	11.93	11.95
Mt. Rainier National Park/Protection	7.84	9.23	8.76	10.76	9.86	11.35	11.45	11.72	11.59	11.94	11.97	11.98
Mt. Rainier National Park/Sugarloaf	7.82	9.19	8.74	10.71	9.82	11.32	11.43	11.70	11.57	11.93	11.95	11.96
Noatak National Preserve/Burial	8.60	10.09	9.45	12.36	10.91	12.03	12.19	12.31	12.17	12.33	12.55	12.42
Noatak National Preserve/Kangilipak	8.57	10.06	9.42	12.31	10.87	12.01	12.16	12.29	12.15	12.31	12.53	12.41
North Cascades National Park/Noisy Creek Glacier	7.75	9.12	8.68	10.57	9.73	11.27	11.36	11.65	11.52	11.90	11.90	11.92
North Cascades National Park/Sandalee Glacier	7.78	9.16	8.71	10.64	9.78	11.29	11.39	11.67	11.55	11.91	11.92	11.94
North Cascades National Park/Silver Glacier	7.84	9.23	8.76	10.76	9.86	11.35	11.45	11.72	11.59	11.94	11.97	11.98
North Cascades National Park/Stout	7.76	9.13	8.69	10.59	9.75	11.28	11.37	11.66	11.53	11.90	11.90	11.93
Olympic National Park/Hoh	7.66	9.02	8.60	10.38	9.61	11.18	11.27	11.58	11.45	11.85	11.83	11.87
Olympic National Park/Hurricane Ridge	7.68	9.04	8.62	10.42	9.64	11.20	11.29	11.60	11.47	11.86	11.84	11.88
Olympic National Park/Steeple Rock	7.70	9.06	8.64	10.47	9.66	11.22	11.31	11.61	11.48	11.87	11.86	11.90
Rocky Mountain National Park/Irene Forest	7.88	9.27	8.80	10.84	9.91	11.38	11.48	11.75	11.62	11.96	11.99	12.00
Rocky Mountain National Park/Irene Meadows	7.88	9.27	8.80	10.84	9.91	11.38	11.48	11.75	11.62	11.96	11.99	12.00
Rocky Mountain National Park/Lonepine	7.86	9.24	8.77	10.79	9.88	11.36	11.46	11.73	11.60	11.95	11.98	11.99
Rocky Mountain National Park/Mills	7.87	9.25	8.79	10.81	9.89	11.37	11.47	11.74	11.61	11.95	11.99	11.99
Sequoia and Kings Canyon National Park/Emerald	7.75	9.12	8.68	10.57	9.74	11.27	11.36	11.65	11.52	11.90	11.90	11.93
Sequoia and Kings Canyon National Park/Pear	7.75	9.12	8.68	10.57	9.74	11.27	11.36	11.65	11.52	11.90	11.90	11.93

Table C.11. Octanol-air partition coefficients (Log K_{OA}) for PCBs in snow.

Park/Site	PCB 118 Log K_{OA}	PCB 138 Log K_{OA}	PCB 153 Log K_{OA}	PCB 183 Log K_{OA}	PCB 187 Log K_{OA}
Denali National Park/Kahiltna	10.34	12.13	12.10	12.20	12.20
Denali National Park/McLeod	10.03	11.82	11.78	11.93	11.93
Denali National Park/Wonder	10.02	11.81	11.78	11.93	11.93
Glacier National Park/Matcharak	10.42	12.22	12.18	12.27	12.27
Glacier National Park/Aster	9.74	11.53	11.49	11.68	11.68
Glacier National Park/Granite Park	9.70	11.49	11.45	11.64	11.64
Glacier National Park/Preston	9.71	11.50	11.46	11.65	11.65
Glacier National Park/Snyder	9.70	11.49	11.45	11.64	11.64
Mt. Rainier National Park/Alta Vista	9.62	11.41	11.37	11.57	11.57
Mt. Rainier National Park/Edith Cornice	9.62	11.41	11.37	11.57	11.57
Mt. Rainier National Park/Fell Fields	9.68	11.47	11.43	11.63	11.63
Mt. Rainier National Park/Mowich	9.57	11.35	11.32	11.53	11.53
Mt. Rainier National Park/Paradise	9.63	11.42	11.38	11.58	11.58
Mt. Rainier National Park/Protection	9.68	11.47	11.43	11.63	11.63
Mt. Rainier National Park/Sugarloaf	9.65	11.44	11.40	11.60	11.60
Noatak National Preserve/Burial	10.47	12.27	12.23	12.32	12.32
Noatak National Preserve/Kangilipak	10.44	12.24	12.20	12.29	12.29
North Cascades National Park/Noisy Creek Glacier	9.59	11.37	11.33	11.54	11.54
North Cascades National Park/Sandalee Glacier	9.62	11.41	11.37	11.57	11.57
North Cascades National Park/Silver Glacier	9.68	11.47	11.43	11.63	11.63
North Cascades National Park/Stout	9.60	11.38	11.34	11.55	11.55
Olympic National Park/Hoh	9.49	11.28	11.24	11.46	11.46
Olympic National Park/Hurricane Ridge	9.51	11.30	11.26	11.48	11.48
Olympic National Park/Steeple Rock	9.53	11.32	11.28	11.50	11.50
Rocky Mountain National Park/Irene Forest	9.72	11.51	11.47	11.66	11.66
Rocky Mountain National Park/Irene Meadows	9.72	11.51	11.47	11.66	11.66
Rocky Mountain National Park/Lonepine	9.69	11.48	11.44	11.64	11.64
Rocky Mountain National Park/Mills	9.71	11.49	11.45	11.65	11.65
Sequoia and Kings Canyon National Park/Emerald	9.59	11.37	11.34	11.55	11.55
Sequoia and Kings Canyon National Park/Pear	9.59	11.37	11.34	11.55	11.55

Appendix D: Estimated particle fraction (Φ) for lichen, conifer needles, PASDs, and snow

Table D.1. Estimated particle fraction (Φ) for pesticides in lichen.

Park/Site	Dacthal % Φ	Chlorpyrifos % Φ	Endosulfan I,II % Φ	Endosulfan sulfate % Φ	g-HCH % Φ	Trifluralin % Φ	Triallate % Φ	Dieldrin % Φ	a-HCH % Φ	Chlordane % Φ	Nonachlor % Φ	HCB % Φ
Bandelier National Monument 1	0.157	0.217	0.148	0.270	0.772	0.027	0.039	0.827	0.772	0.072	1.999	0.029
Bandelier National Monument 2	0.167	0.232	0.155	0.289	0.809	0.030	0.042	0.872	0.809	0.077	2.093	0.031
Bandelier National Monument 3	0.214	0.301	0.187	0.380	0.971	0.041	0.055	1.078	0.971	0.096	2.508	0.039
Bandelier National Monument 4	0.236	0.333	0.200	0.421	1.042	0.046	0.061	1.169	1.042	0.105	2.688	0.043
Bandelier National Monument 5	0.254	0.360	0.212	0.456	1.100	0.050	0.066	1.244	1.100	0.112	2.833	0.046
Big Bend National Park 4	0.130	0.178	0.129	0.220	0.672	0.021	0.032	0.705	0.672	0.061	1.744	0.024
Big Bend National Park 5	0.132	0.181	0.131	0.224	0.681	0.022	0.032	0.716	0.681	0.062	1.768	0.025
Crater Lake National Park 1	0.302	0.431	0.240	0.550	1.247	0.062	0.079	1.438	1.247	0.132	3.206	0.054
Crater Lake National Park 2	0.317	0.453	0.249	0.580	1.293	0.067	0.084	1.499	1.293	0.138	3.322	0.057
Crater Lake National Park 3	0.319	0.456	0.250	0.584	1.298	0.067	0.084	1.505	1.298	0.138	3.334	0.057
Crater Lake National Park 4	0.310	0.443	0.245	0.567	1.273	0.065	0.082	1.473	1.273	0.135	3.272	0.056
Denali National Park and Preserve 1	0.502	0.733	0.350	0.954	1.807	0.119	0.138	2.203	1.807	0.209	4.605	0.088
Denali National Park and Preserve 2	0.504	0.735	0.351	0.958	1.812	0.119	0.138	2.210	1.812	0.210	4.617	0.089
Denali National Park and Preserve 3	0.500	0.730	0.349	0.951	1.803	0.118	0.137	2.198	1.803	0.209	4.595	0.088
Denali National Park and Preserve 4	0.479	0.697	0.338	0.907	1.746	0.112	0.131	2.118	1.746	0.200	4.453	0.084
Denali National Park and Preserve 5	0.582	0.855	0.390	1.120	2.012	0.143	0.162	2.493	2.012	0.240	5.110	0.102
Denali National Park and Preserve 6	0.677	1.001	0.436	1.318	2.246	0.174	0.191	2.828	2.246	0.275	5.683	0.118
Gates of the Arctic National Park and Preserve 1	0.827	1.234	0.506	1.637	2.598	0.224	0.238	3.340	2.598	0.331	6.537	0.143
Glacier National Park 1	0.296	0.421	0.237	0.538	1.228	0.061	0.077	1.413	1.228	0.129	3.158	0.053
Glacier National Park 2	0.339	0.487	0.262	0.625	1.359	0.072	0.090	1.587	1.359	0.146	3.486	0.061
Glacier National Park 3	0.347	0.498	0.266	0.639	1.380	0.074	0.092	1.615	1.380	0.149	3.540	0.062
Glacier National Park 4	0.339	0.487	0.262	0.625	1.359	0.072	0.090	1.587	1.359	0.146	3.486	0.061
Glacier National Park 5	0.339	0.486	0.262	0.624	1.357	0.072	0.090	1.585	1.357	0.146	3.482	0.061
Glacier Bay National Park 1	0.381	0.549	0.285	0.708	1.479	0.084	0.102	1.749	1.479	0.163	3.787	0.068
Glacier Bay National Park 2	0.381	0.549	0.285	0.708	1.479	0.084	0.102	1.749	1.479	0.163	3.787	0.068
Glacier Bay National Park 3	0.381	0.549	0.285	0.708	1.479	0.084	0.102	1.749	1.479	0.163	3.787	0.068
Glacier Bay National Park 4	0.381	0.549	0.285	0.708	1.479	0.084	0.102	1.749	1.479	0.163	3.787	0.068
Great Sand Dunes National Park and Preserve 2	0.263	0.373	0.217	0.474	1.128	0.052	0.068	1.280	1.128	0.116	2.905	0.048
Great Sand Dunes National Park and Preserve 4	0.263	0.373	0.217	0.474	1.128	0.052	0.068	1.280	1.128	0.116	2.905	0.048
Grand Teton National Park 1	0.305	0.435	0.242	0.556	1.256	0.063	0.080	1.450	1.256	0.133	3.229	0.055
Grand Teton National Park 2	0.318	0.455	0.250	0.583	1.297	0.067	0.084	1.504	1.297	0.138	3.330	0.057
Katmai National Park and Preserve 1	0.388	0.560	0.289	0.722	1.498	0.086	0.104	1.776	1.498	0.165	3.836	0.069
Katmai National Park and Preserve 2	0.395	0.571	0.293	0.737	1.518	0.088	0.106	1.803	1.518	0.168	3.886	0.070
Katmai National Park and Preserve 3	0.395	0.571	0.293	0.737	1.518	0.088	0.106	1.803	1.518	0.168	3.886	0.070
Katmai National Park and Preserve 4	0.409	0.592	0.301	0.765	1.557	0.092	0.110	1.856	1.557	0.174	3.983	0.073
Katmai National Park and Preserve 5	0.409	0.592	0.301	0.765	1.557	0.092	0.110	1.856	1.557	0.174	3.983	0.073
Katmai National Park and Preserve 6	0.446	0.648	0.321	0.841	1.660	0.103	0.121	1.998	1.660	0.188	4.238	0.079
Lassen Volcanic National Park 1	0.236	0.333	0.201	0.422	1.043	0.046	0.061	1.170	1.043	0.105	2.689	0.043
Lassen Volcanic National Park 2	0.252	0.356	0.210	0.452	1.093	0.050	0.065	1.235	1.093	0.111	2.816	0.046
Lassen Volcanic National Park 3	0.283	0.402	0.229	0.512	1.189	0.057	0.074	1.360	1.189	0.124	3.058	0.051
Lassen Volcanic National Park 4	0.266	0.378	0.219	0.481	1.139	0.053	0.069	1.295	1.139	0.117	2.932	0.048
Lassen Volcanic National Park 5	0.266	0.378	0.219	0.481	1.139	0.053	0.069	1.295	1.139	0.117	2.932	0.048
Mt. Rainier National Park 1	0.274	0.389	0.224	0.495	1.162	0.055	0.071	1.325	1.162	0.120	2.992	0.049
Mt. Rainier National Park 2	0.326	0.467	0.254	0.598	1.320	0.069	0.086	1.534	1.320	0.141	3.388	0.058
Mt. Rainier National Park 3	0.328	0.469	0.255	0.601	1.324	0.069	0.087	1.541	1.324	0.142	3.400	0.059
Mt. Rainier National Park 4	0.322	0.461	0.252	0.590	1.308	0.068	0.085	1.519	1.308	0.140	3.359	0.058
Noatak National Preserve 1	0.774	1.151	0.482	1.524	2.475	0.206	0.221	3.161	2.475	0.311	6.241	0.134
Noatak National Preserve 3	0.901	1.350	0.539	1.796	2.765	0.250	0.261	3.588	2.765	0.358	6.941	0.155
Noatak National Preserve 5	0.871	1.302	0.526	1.731	2.697	0.239	0.252	3.488	2.697	0.347	6.777	0.150
North Cascades National Park 1	0.245	0.347	0.206	0.439	1.072	0.048	0.063	1.208	1.072	0.109	2.764	0.045
North Cascades National Park 2	0.245	0.347	0.206	0.439	1.072	0.048	0.063	1.208	1.072	0.109	2.764	0.045
North Cascades National Park 3	0.250	0.354	0.209	0.449	1.087	0.049	0.065	1.228	1.087	0.111	2.802	0.045
North Cascades National Park 4	0.249	0.352	0.208	0.446	1.082	0.049	0.064	1.221	1.082	0.110	2.790	0.045
North Cascades National Park 5	0.258	0.365	0.214	0.464	1.112	0.051	0.067	1.260	1.112	0.114	2.864	0.047
Olympic National Park 2	0.289	0.412	0.233	0.526	1.210	0.059	0.076	1.388	1.210	0.127	3.111	0.052
Olympic National Park 3	0.289	0.412	0.233	0.526	1.210	0.059	0.076	1.388	1.210	0.127	3.111	0.052
Olympic National Park 4	0.316	0.452	0.249	0.579	1.291	0.066	0.083	1.496	1.291	0.137	3.317	0.057
Olympic National Park 5	0.316	0.452	0.249	0.579	1.291	0.066	0.083	1.496	1.291	0.137	3.317	0.057
Rocky Mountain National Park 6	0.357	0.513	0.272	0.659	1.409	0.077	0.095	1.655	1.409	0.153	3.613	0.064
Sequoia and Kings Canyon National Park 2	0.116	0.158	0.119	0.195	0.619	0.019	0.028	0.641	0.619	0.055	1.607	0.022
Sequoia and Kings Canyon National Park 3	0.199	0.279	0.177	0.351	0.921	0.037	0.050	1.013	0.921	0.090	2.379	0.036
Sequoia and Kings Canyon National Park 4	0.257	0.364	0.214	0.463	1.110	0.051	0.067	1.257	1.110	0.114	2.860	0.047
Sequoia and Kings Canyon National Park 5	0.285	0.405	0.230	0.516	1.195	0.058	0.074	1.368	1.195	0.125	3.074	0.051
Stikine-LeConte Wlderness, Tongass National Forest 1	0.370	0.532	0.279	0.685	1.446	0.081	0.099	1.705	1.446	0.158	3.706	0.066
Stikine-LeConte Wlderness, Tongass National Forest 2	0.390	0.562	0.290	0.726	1.503	0.086	0.105	1.782	1.503	0.166	3.848	0.069
Stikine-LeConte Wlderness, Tongass National Forest 3	0.390	0.562	0.290	0.726	1.503	0.086	0.105	1.782	1.503	0.166	3.848	0.069
Stikine-LeConte Wlderness, Tongass National Forest 4	0.415	0.601	0.304	0.777	1.574	0.093	0.112	1.879	1.574	0.176	4.024	0.074
Stikine-LeConte Wlderness, Tongass National Forest 5	0.389	0.562	0.290	0.725	1.502	0.086	0.105	1.781	1.502	0.166	3.846	0.069
Wrangell-St. Elias National Park and Preserve 1	0.403	0.582	0.297	0.752	1.539	0.090	0.108	1.832	1.539	0.171	3.938	0.071
Wrangell-St. Elias National Park and Preserve 3	0.454	0.660	0.325	0.857	1.681	0.105	0.124	2.027	1.681	0.191	4.292	0.080
Wrangell-St. Elias National Park and Preserve 5	0.531	0.776	0.364	1.014	1.882	0.128	0.147	2.308	1.882	0.220	4.790	0.093
Yosemite National Park 1	0.193	0.270	0.173	0.339	0.900	0.035	0.049	0.986	0.900	0.087	2.325	0.035
Yosemite National Park 2	0.217	0.305	0.188	0.384	0.979	0.041	0.055	1.088	0.979	0.097	2.528	0.040
Yosemite National Park 3	0.214	0.300	0.186	0.378	0.969	0.040	0.054	1.075	0.969	0.096	2.503	0.039

Table D.2. Estimated particle fraction (Φ) for PAHs in lichen.

Park/Site	ACY % Φ	ACY % Φ	FLO % Φ	PHEN % Φ	ANT % Φ	FLA % Φ	PYR % Φ	CHR/TRI % Φ	B[a]A % Φ	B[b]F % Φ	B[k]F % Φ	B[a]P % Φ	B[e]P % Φ	B[ghi]P % Φ	D[ah]A % Φ	I[cd]P % Φ
Bandelier National Monument 1	0.001	0.002	0.002	0.010	0.007	0.198	0.097	1.67	0.60	27.28	30.06	51.52	44.23	72.18	65.31	71.57
Bandelier National Monument 2	0.001	0.002	0.002	0.011	0.007	0.213	0.103	1.90	0.65	28.43	31.38	52.75	45.44	72.82	66.42	72.33
Bandelier National Monument 3	0.002	0.002	0.003	0.014	0.008	0.284	0.129	3.20	0.92	33.26	36.87	57.57	50.28	75.27	70.60	75.18
Bandelier National Monument 4	0.002	0.002	0.003	0.015	0.009	0.317	0.141	3.90	1.06	35.23	39.09	59.39	52.14	76.17	72.12	76.22
Bandelier National Monument 5	0.002	0.003	0.004	0.017	0.009	0.345	0.151	4.53	1.17	36.76	40.80	60.76	53.55	76.84	73.24	76.99
Big Bend National Park 4	0.001	0.001	0.002	0.009	0.006	0.159	0.082	1.12	0.46	24.03	26.34	47.86	40.67	70.22	61.94	69.27
Big Bend National Park 5	0.001	0.001	0.002	0.009	0.006	0.163	0.083	1.17	0.47	24.34	26.70	48.22	41.02	70.42	62.28	69.50
Crater Lake National Park 1	0.003	0.003	0.004	0.020	0.010	0.421	0.176	6.42	1.48	40.46	44.93	63.91	56.86	78.36	75.78	78.74
Crater Lake National Park 2	0.003	0.003	0.004	0.021	0.010	0.446	0.184	7.08	1.59	41.55	46.12	64.79	57.79	78.79	76.48	79.22
Crater Lake National Park 3	0.003	0.003	0.004	0.021	0.010	0.448	0.185	7.15	1.60	41.65	46.24	64.88	57.89	78.83	76.55	79.27
Crater Lake National Park 4	0.005	0.006	0.007	0.033	0.014	0.755	0.280	16.86	2.98	51.88	57.29	72.47	66.16	82.44	82.28	83.33
Denali National Park and Preserve 1	0.005	0.006	0.007	0.033	0.014	0.758	0.281	16.97	3.00	51.96	57.38	72.53	66.22	82.47	82.32	83.36
Denali National Park and Preserve 2	0.005	0.006	0.007	0.033	0.013	0.752	0.279	16.77	2.97	51.81	57.22	72.42	66.11	82.42	82.24	83.30
Denali National Park and Preserve 3	0.005	0.005	0.007	0.031	0.013	0.715	0.268	15.49	2.80	50.80	56.15	71.73	65.33	82.09	81.73	82.94
Denali National Park and Preserve 4	0.006	0.007	0.008	0.038	0.015	0.894	0.320	21.74	3.64	55.21	60.78	74.71	68.68	83.50	83.89	84.51
Denali National Park and Preserve 5	0.006	0.007	0.008	0.038	0.015	0.894	0.320	21.74	3.64	55.21	60.78	74.71	68.68	83.50	83.89	84.51
Denali National Park and Preserve 6	0.009	0.010	0.012	0.054	0.018	1.338	0.440	37.07	5.83	62.93	68.64	79.55	74.24	85.84	87.25	87.04
Gates of the Arctic National Park and Preserve 1	0.003	0.003	0.004	0.019	0.010	0.411	0.173	6.15	1.44	40.00	44.42	63.53	56.45	78.18	75.48	78.53
Glacier National Park 1	0.003	0.004	0.005	0.022	0.011	0.482	0.196	8.09	1.74	43.04	47.77	65.98	59.06	79.36	77.41	79.87
Glacier National Park 2	0.003	0.004	0.005	0.023	0.011	0.494	0.200	8.43	1.80	43.52	48.29	66.36	59.46	79.54	77.69	80.07
Glacier National Park 3	0.003	0.004	0.005	0.022	0.011	0.482	0.196	8.09	1.74	43.04	47.77	65.98	59.06	79.36	77.41	79.87
Glacier National Park 4	0.003	0.004	0.005	0.022	0.011	0.481	0.196	8.06	1.74	43.01	47.73	65.96	59.04	79.35	77.39	79.86
Glacier National Park 5	0.003	0.004	0.005	0.022	0.011	0.481	0.196	8.06	1.74	43.01	47.73	65.96	59.04	79.35	77.39	79.86
Glacier Bay National Park 1	0.004	0.004	0.005	0.025	0.012	0.550	0.218	10.13	2.05	45.64	50.60	67.98	61.22	80.31	78.94	80.95
Glacier Bay National Park 2	0.004	0.004	0.005	0.025	0.012	0.550	0.218	10.13	2.05	45.64	50.60	67.98	61.22	80.31	78.94	80.95
Glacier Bay National Park 3	0.004	0.004	0.005	0.025	0.012	0.550	0.218	10.13	2.05	45.64	50.60	67.98	61.22	80.31	78.94	80.95
Glacier Bay National Park 4	0.002	0.003	0.004	0.017	0.009	0.359	0.156	4.86	1.23	37.49	41.62	61.40	54.22	77.15	73.77	77.35
Great Sand Dunes National Park and Preserve 2	0.002	0.003	0.004	0.017	0.009	0.359	0.156	4.86	1.23	37.49	41.62	61.40	54.22	77.15	73.77	77.35
Great Sand Dunes National Park and Preserve 4	0.003	0.003	0.004	0.020	0.010	0.426	0.178	6.54	1.50	40.68	45.16	64.09	57.04	78.45	75.92	78.84
Grand Teton National Park 1	0.003	0.003	0.004	0.021	0.010	0.447	0.185	7.13	1.60	41.62	46.21	64.86	57.86	78.82	76.53	79.26
Grand Teton National Park 2	0.004	0.004	0.005	0.025	0.012	0.562	0.221	10.48	2.10	46.04	51.04	68.29	61.55	80.46	79.17	81.11
Katmai National Park and Preserve 1	0.004	0.004	0.006	0.026	0.012	0.574	0.225	10.85	2.15	46.45	51.49	68.59	61.88	80.60	79.40	81.27
Katmai National Park and Preserve 2	0.004	0.004	0.006	0.026	0.012	0.574	0.225	10.85	2.15	46.45	51.49	68.59	61.88	80.60	79.40	81.27
Katmai National Park and Preserve 3	0.004	0.005	0.006	0.027	0.012	0.597	0.232	11.59	2.25	47.24	52.34	69.17	62.52	80.88	79.84	81.58
Katmai National Park and Preserve 4	0.004	0.005	0.006	0.027	0.012	0.597	0.232	11.59	2.25	47.24	52.34	69.17	62.52	80.88	79.84	81.58
Katmai National Park and Preserve 5	0.004	0.005	0.006	0.029	0.013	0.660	0.252	13.64	2.54	49.22	54.46	70.61	64.10	81.56	80.91	82.35
Katmai National Park and Preserve 6	0.002	0.002	0.003	0.015	0.009	0.318	0.141	3.91	1.06	35.25	39.10	59.41	52.16	76.18	72.13	76.23
Lassen Volcanic National Park 1	0.002	0.003	0.003	0.017	0.009	0.342	0.150	4.46	1.16	36.58	40.60	60.60	53.39	76.76	73.12	76.90
Lassen Volcanic National Park 2	0.003	0.003	0.004	0.019	0.010	0.390	0.166	5.62	1.36	39.03	43.34	62.72	55.60	77.79	74.83	78.08
Lassen Volcanic National Park 3	0.003	0.003	0.004	0.017	0.009	0.365	0.158	4.99	1.25	37.77	41.94	61.64	54.47	77.27	73.97	77.49
Lassen Volcanic National Park 4	0.003	0.003	0.004	0.017	0.009	0.365	0.158	4.99	1.25	37.77	41.94	61.64	54.47	77.27	73.97	77.49
Mt. Rainier National Park 1	0.003	0.003	0.004	0.018	0.010	0.377	0.162	5.28	1.30	38.37	42.60	62.15	55.01	77.52	74.38	77.77
Mt. Rainier National Park 2	0.003	0.004	0.005	0.021	0.011	0.460	0.189	7.48	1.65	42.16	46.80	65.28	58.32	79.02	76.86	79.49
Mt. Rainier National Park 3	0.003	0.004	0.005	0.021	0.011	0.463	0.190	7.55	1.66	42.27	46.92	65.37	58.41	79.07	76.93	79.54
Mt. Rainier National Park 4	0.003	0.003	0.004	0.021	0.011	0.454	0.187	7.30	1.62	41.89	46.50	65.07	58.09	78.92	76.69	79.37
Noatak National Preserve 1	0.008	0.009	0.011	0.051	0.017	1.240	0.414	33.82	5.34	61.51	67.21	78.69	73.24	85.42	86.66	86.59
Noatak National Preserve 3	0.010	0.011	0.013	0.059	0.019	1.477	0.476	41.47	6.54	64.75	70.43	80.63	75.51	86.37	87.98	87.61
Noatak National Preserve 5	0.009	0.010	0.013	0.057	0.019	1.420	0.462	39.70	6.25	64.03	69.73	80.20	75.01	86.16	87.70	87.38
North Cascades National Park 1	0.002	0.003	0.003	0.016	0.009	0.332	0.146	4.22	1.11	36.03	39.99	60.11	52.89	76.52	72.72	76.63
North Cascades National Park 2	0.002	0.003	0.003	0.016	0.009	0.332	0.146	4.22	1.11	36.03	39.99	60.11	52.89	76.52	72.72	76.63
North Cascades National Park 3	0.002	0.003	0.003	0.016	0.009	0.339	0.149	4.39	1.15	36.44	40.44	60.47	53.26	76.70	73.01	76.83
North Cascades National Park 4	0.002	0.003	0.003	0.016	0.009	0.337	0.148	4.34	1.14	36.31	40.30	60.36	53.14	76.64	72.92	76.77
North Cascades National Park 5	0.002	0.003	0.004	0.017	0.009	0.351	0.153	4.67	1.19	37.08	41.16	61.04	53.85	76.98	73.48	77.15
Olympic National Park 2	0.003	0.003	0.004	0.019	0.010	0.401	0.170	5.90	1.40	39.54	43.91	63.15	56.05	78.00	75.18	78.32
Olympic National Park 3	0.003	0.003	0.004	0.019	0.010	0.401	0.170	5.90	1.40	39.54	43.91	63.15	56.05	78.00	75.18	78.32
Olympic National Park 4	0.003	0.003	0.004	0.021	0.010	0.445	0.184	7.05	1.58	41.50	46.07	64.75	57.75	78.77	76.45	79.20
Olympic National Park 5	0.003	0.003	0.004	0.021	0.010	0.445	0.184	7.05	1.58	41.50	46.07	64.75	57.75	78.77	76.45	79.20
Rocky Mountain National Park 6	0.003	0.004	0.005	0.023	0.011	0.510	0.205	8.91	1.87	44.15	48.99	66.85	60.00	79.77	78.08	80.34
Sequoia and Kings Canyon National Park 2	0.001	0.001	0.002	0.008	0.006	0.140	0.074	0.88	0.39	22.22	24.27	45.69	38.59	69.01	59.87	67.85
Sequoia and Kings Canyon National Park 3	0.002	0.002	0.003	0.013	0.008	0.261	0.121	2.75	0.84	31.81	35.22	56.17	48.86	74.57	69.41	74.36
Sequoia and Kings Canyon National Park 4	0.002	0.003	0.004	0.017	0.009	0.350	0.153	4.65	1.19	37.04	41.11	61.00	53.81	76.96	73.44	77.13
Sequoia and Kings Canyon National Park 5	0.003	0.003	0.004	0.019	0.010	0.393	0.167	5.70	1.37	39.18	43.50	62.84	55.73	77.85	74.93	78.15
Stikine-LeConte Wlderness, Tongass National Forest 1	0.004	0.004	0.005	0.024	0.011	0.531	0.212	9.55	1.96	44.96	49.86	67.47	60.66	80.07	78.55	80.67
Stikine-LeConte Wlderness, Tongass National Forest 2	0.004	0.004	0.005	0.026	0.012	0.565	0.222	10.57	2.11	46.14	51.15	68.36	61.63	80.49	79.23	81.15
Stikine-LeConte Wlderness, Tongass National Forest 3	0.004	0.004	0.005	0.026	0.012	0.565	0.222	10.57	2.11	46.14	51.15	68.36	61.63	80.49	79.23	81.15
Stikine-LeConte Wlderness, Tongass National Forest 4	0.004	0.005	0.006	0.027	0.012	0.607	0.235	11.91	2.30	47.57	52.69	69.42	62.78	80.99	80.02	81.71
Stikine-LeConte Wlderness, Tongass National Forest 5	0.004	0.004	0.005	0.026	0.012	0.564	0.222	10.55	2.11	46.13	51.13	68.35	61.62	80.48	79.22	81.14
Wrangell-St. Elias National Park and Preserve 1	0.004	0.004	0.006	0.026	0.012	0.586	0.229	11.24	2.21	46.88	51.95	68.91	62.23	80.75	79.64	81.44
Wrangell-St. Elias National Park and Preserve 3	0.005	0.005	0.006	0.030	0.013	0.674	0.256	14.09	2.60	49.62	54.89	70.89	64.41	81.69	81.12	82.50
Wrangell-St. Elias National Park and Preserve 5	0.005	0.006	0.008	0.035	0.014	0.805	0.294	18.59	3.22	53.14	58.62	73.33	67.12	82.85	82.90	83.78
Yosemite National Park 1	0.002	0.002	0.003	0.013	0.008	0.252	0.118	2.58	0.80	31.19	34.52	55.57	48.25	74.26	68.88	74.01
Yosemite National Park 2	0.002	0.002	0.003	0.014	0.008	0.288	0.131	3.27	0.94	33.48	37.12	57.78	50.49	75.37	70.77	75.30
Yosemite National Park 3	0.002	0.002	0.003	0.014	0.008	0.283	0.129	3.18	0.92	33.21	36.81	57.52	50.22	75.24	70.55	75.15

Table D.3. Estimated particle fraction (Φ) for PCBs in lichen.

Park/Site	PCB 118 % Φ	PCB 138 % Φ	PCB 153 % Φ	PCB 183 % Φ	PCB 187 % Φ
Bandelier National Monument 1	0.656	28.413	26.622	41.362	41.362
Bandelier National Monument 2	0.701	29.801	27.957	42.776	42.776
Bandelier National Monument 3	0.909	35.638	33.606	48.453	48.453
Bandelier National Monument 4	1.004	38.017	35.925	50.657	50.657
Bandelier National Monument 5	1.083	39.861	37.729	52.328	52.328
Big Bend National Park 4	0.539	24.529	22.905	37.255	37.255
Big Bend National Park 5	0.550	24.899	23.258	37.656	37.656
Crater Lake National Park 1	1.295	44.319	42.116	56.243	56.243
Crater Lake National Park 2	1.362	45.618	43.400	57.353	57.353
Crater Lake National Park 3	1.369	45.748	43.529	57.464	57.464
Crater Lake National Park 4	1.333	45.060	42.848	56.878	56.878
Denali National Park and Preserve 1	2.185	57.733	55.528	67.190	67.190
Denali National Park and Preserve 2	2.194	57.829	55.625	67.265	67.265
Denali National Park and Preserve 3	2.179	57.656	55.450	67.130	67.130
Denali National Park and Preserve 4	2.082	56.502	54.284	66.228	66.228
Denali National Park and Preserve 5	2.542	61.510	59.363	70.103	70.103
Denali National Park and Preserve 6	2.966	65.242	63.179	72.929	72.929
Gates of the Arctic National Park and Preserve 1	3.637	69.917	67.995	76.411	76.411
Glacier National Park 1	1.267	43.767	41.571	55.767	55.767
Glacier National Park 2	1.461	47.400	45.167	58.857	58.857
Glacier National Park 3	1.493	47.966	45.731	59.331	59.331
Glacier National Park 4	1.461	47.400	45.167	58.857	58.857
Glacier National Park 5	1.459	47.362	45.130	58.825	58.825
Glacier Bay National Park 1	1.646	50.480	48.235	61.406	61.406
Glacier Bay National Park 2	1.646	50.480	48.235	61.406	61.406
Glacier Bay National Park 3	1.646	50.480	48.235	61.406	61.406
Glacier Bay National Park 4	1.646	50.480	48.235	61.406	61.406
Great Sand Dunes National Park and Preserve 2	1.123	40.746	38.598	53.119	53.119
Great Sand Dunes National Park and Preserve 4	1.123	40.746	38.598	53.119	53.119
Grand Teton National Park 1	1.308	44.578	42.372	56.465	56.465
Grand Teton National Park 2	1.367	45.711	43.492	57.432	57.432
Katmai National Park and Preserve 1	1.677	50.958	48.714	61.796	61.796
Katmai National Park and Preserve 2	1.709	51.438	49.193	62.186	62.186
Katmai National Park and Preserve 3	1.709	51.438	49.193	62.186	62.186
Katmai National Park and Preserve 4	1.771	52.360	50.117	62.933	62.933
Katmai National Park and Preserve 5	1.771	52.360	50.117	62.933	62.933
Katmai National Park and Preserve 6	1.938	54.672	52.438	64.782	64.782
Lassen Volcanic National Park 1	1.005	38.034	35.942	50.673	50.673
Lassen Volcanic National Park 2	1.074	39.650	37.522	52.138	52.138
Lassen Volcanic National Park 3	1.209	42.598	40.419	54.751	54.751
Lassen Volcanic National Park 4	1.138	41.085	38.930	53.419	53.419
Mt. Rainier National Park 1	1.171	41.803	39.635	54.053	54.053
Mt. Rainier National Park 2	1.402	46.347	44.122	57.971	57.971
Mt. Rainier National Park 3	1.409	46.478	44.253	58.082	58.082
Mt. Rainier National Park 4	1.384	46.028	43.807	57.702	57.702
Noatak National Preserve 1	3.400	68.406	66.434	75.291	75.291
Noatak National Preserve 3	3.969	71.819	69.967	77.813	77.813
Noatak National Preserve 5	3.834	71.072	69.192	77.263	77.263
North Cascades National Park 1	1.045	38.986	36.872	51.539	51.539
North Cascades National Park 2	1.045	38.986	36.872	51.539	51.539
North Cascades National Park 3	1.066	39.475	37.351	51.980	51.980
North Cascades National Park 4	1.059	39.317	37.196	51.838	51.838
North Cascades National Park 5	1.100	40.249	38.110	52.675	52.675
Olympic National Park 2	1.239	43.218	41.029	55.291	55.291
Olympic National Park 3	1.239	43.218	41.029	55.291	55.291
Olympic National Park 4	1.359	45.562	43.345	57.306	57.306
Olympic National Park 5	1.359	45.562	43.345	57.306	57.306
Rocky Mountain National Park 6	1.538	48.725	46.485	59.961	59.961
Sequoia and Kings Canyon National Park 2	0.480	22.392	20.870	34.889	34.889
Sequoia and Kings Canyon National Park 3	0.842	33.878	31.896	46.783	46.783
Sequoia and Kings Canyon National Park 4	1.098	40.196	38.058	52.628	52.628
Sequoia and Kings Canyon National Park 5	1.218	42.780	40.598	54.910	54.910
Stikine-LeConte Wlderness, Tongass National Forest 1	1.596	49.677	47.434	60.747	60.747
Stikine-LeConte Wlderness, Tongass National Forest 2	1.685	51.073	48.829	61.890	61.890
Stikine-LeConte Wlderness, Tongass National Forest 3	1.685	51.073	48.829	61.890	61.890
Stikine-LeConte Wlderness, Tongass National Forest 4	1.798	52.745	50.503	63.243	63.243
Stikine-LeConte Wlderness, Tongass National Forest 5	1.684	51.054	48.810	61.874	61.874
Wrangell-St. Elias National Park and Preserve 1	1.742	51.937	49.693	62.591	62.591
Wrangell-St. Elias National Park and Preserve 3	1.973	55.134	52.904	65.149	65.149
Wrangell-St. Elias National Park and Preserve 5	2.314	59.170	56.984	68.306	68.306
Yosemite National Park 1	0.815	33.129	31.170	46.062	46.062
Yosemite National Park 2	0.919	35.904	33.864	48.702	48.702
Yosemite National Park 3	0.906	35.572	33.542	48.391	48.391

Table D.4. Estimated particle fraction (Φ) for pesticides in conifer needles.

Park/Site	Dacthal % Φ	Chlorpyrifos % Φ	Endosulfan I,II % Φ	Endosulfan sulfate % Φ	g-HCH % Φ	Trifluralin % Φ	Triallate % Φ	Dieldrin % Φ	a-HCH % Φ	Chlordane % Φ	Nonachlor % Φ	HCB % Φ
Bandelier National Monument 1	0.16	0.22	0.15	0.27	0.77	0.03	0.04	0.83	0.77	0.07	2.00	0.03
Bandelier National Monument 2	0.17	0.23	0.16	0.29	0.81	0.03	0.04	0.87	0.81	0.08	2.09	0.03
Bandelier National Monument 3	0.21	0.30	0.19	0.38	0.97	0.04	0.05	1.08	0.97	0.10	2.51	0.04
Bandelier National Monument 4	0.24	0.33	0.20	0.42	1.04	0.05	0.06	1.17	1.04	0.11	2.69	0.04
Bandelier National Monument 5	0.25	0.36	0.21	0.46	1.10	0.05	0.07	1.24	1.10	0.11	2.83	0.05
Big Bend National Park 3	0.13	0.17	0.13	0.22	0.66	0.02	0.03	0.69	0.66	0.06	1.72	0.02
Big Bend National Park 4	0.13	0.18	0.13	0.22	0.67	0.02	0.03	0.70	0.67	0.06	1.74	0.02
Big Bend National Park 5	0.13	0.18	0.13	0.22	0.68	0.02	0.03	0.72	0.68	0.06	1.77	0.02
Crater Lake National Park 1	0.30	0.43	0.24	0.55	1.25	0.06	0.08	1.44	1.25	0.13	3.21	0.05
Crater Lake National Park 2	0.32	0.45	0.25	0.58	1.29	0.07	0.08	1.50	1.29	0.14	3.32	0.06
Crater Lake National Park 3	0.32	0.46	0.25	0.58	1.30	0.07	0.08	1.51	1.30	0.14	3.33	0.06
Crater Lake National Park 4	0.31	0.44	0.25	0.57	1.27	0.06	0.08	1.47	1.27	0.13	3.27	0.06
Crater Lake National Park 5	0.31	0.44	0.25	0.57	1.27	0.06	0.08	1.47	1.27	0.13	3.27	0.06
Denali National Park and Preserve 1	0.50	0.73	0.35	0.95	1.81	0.12	0.14	2.20	1.81	0.21	4.60	0.09
Denali National Park and Preserve 2	0.50	0.74	0.35	0.96	1.81	0.12	0.14	2.21	1.81	0.21	4.62	0.09
Denali National Park and Preserve 3	0.50	0.73	0.35	0.95	1.80	0.12	0.14	2.20	1.80	0.21	4.60	0.09
Denali National Park and Preserve 4	0.48	0.70	0.34	0.91	1.75	0.11	0.13	2.12	1.75	0.20	4.45	0.08
Glacier National Park 1	0.30	0.42	0.24	0.54	1.23	0.06	0.08	1.41	1.23	0.13	3.16	0.05
Glacier National Park 2	0.34	0.49	0.26	0.62	1.36	0.07	0.09	1.59	1.36	0.15	3.49	0.06
Glacier National Park 3	0.35	0.50	0.27	0.64	1.38	0.07	0.09	1.62	1.38	0.15	3.54	0.06
Glacier National Park 4	0.34	0.49	0.26	0.62	1.36	0.07	0.09	1.59	1.36	0.15	3.49	0.06
Glacier National Park 5	0.34	0.49	0.26	0.62	1.36	0.07	0.09	1.58	1.36	0.15	3.48	0.06
Glacier Bay National Park 1	0.38	0.55	0.29	0.71	1.48	0.08	0.10	1.75	1.48	0.16	3.79	0.07
Glacier Bay National Park 2	0.38	0.55	0.29	0.71	1.48	0.08	0.10	1.75	1.48	0.16	3.79	0.07
Glacier Bay National Park 3	0.38	0.55	0.29	0.71	1.48	0.08	0.10	1.75	1.48	0.16	3.79	0.07
Glacier Bay National Park 4	0.38	0.55	0.29	0.71	1.48	0.08	0.10	1.75	1.48	0.16	3.79	0.07
Great Sand Dunes National Park and Preserve 1	0.23	0.32	0.20	0.41	1.02	0.04	0.06	1.15	1.02	0.10	2.64	0.04
Great Sand Dunes National Park and Preserve 2	0.26	0.37	0.22	0.47	1.13	0.05	0.07	1.28	1.13	0.12	2.90	0.05
Great Sand Dunes National Park and Preserve 3	0.27	0.38	0.22	0.49	1.15	0.05	0.07	1.31	1.15	0.12	2.97	0.05
Great Sand Dunes National Park and Preserve 4	0.26	0.37	0.22	0.47	1.13	0.05	0.07	1.28	1.13	0.12	2.90	0.05
Great Sand Dunes National Park and Preserve 5	0.27	0.38	0.22	0.48	1.14	0.05	0.07	1.29	1.14	0.12	2.93	0.05
Grand Teton National Park 1	0.30	0.44	0.24	0.56	1.26	0.06	0.08	1.45	1.26	0.13	3.23	0.05
Grand Teton National Park 2	0.32	0.46	0.25	0.58	1.30	0.07	0.08	1.50	1.30	0.14	3.33	0.06
Grand Teton National Park 3	0.34	0.49	0.26	0.62	1.36	0.07	0.09	1.59	1.36	0.15	3.49	0.06
Grand Teton National Park 4	0.34	0.49	0.26	0.62	1.36	0.07	0.09	1.59	1.36	0.15	3.49	0.06
Katmai National Park and Preserve 1	0.39	0.56	0.29	0.72	1.50	0.09	0.10	1.78	1.50	0.17	3.84	0.07
Katmai National Park and Preserve 2	0.40	0.57	0.29	0.74	1.52	0.09	0.11	1.80	1.52	0.17	3.89	0.07
Katmai National Park and Preserve 3	0.40	0.57	0.29	0.74	1.52	0.09	0.11	1.80	1.52	0.17	3.89	0.07
Katmai National Park and Preserve 4	0.41	0.59	0.30	0.76	1.56	0.09	0.11	1.86	1.56	0.17	3.98	0.07
Katmai National Park and Preserve 5	0.41	0.59	0.30	0.76	1.56	0.09	0.11	1.86	1.56	0.17	3.98	0.07
Lassen Volcanic National Park 1	0.24	0.33	0.20	0.42	1.04	0.05	0.06	1.17	1.04	0.11	2.69	0.04
Lassen Volcanic National Park 2	0.25	0.36	0.21	0.45	1.09	0.05	0.07	1.23	1.09	0.11	2.82	0.05
Lassen Volcanic National Park 3	0.28	0.40	0.23	0.51	1.19	0.06	0.07	1.36	1.19	0.12	3.06	0.05
Lassen Volcanic National Park 4	0.27	0.38	0.22	0.48	1.14	0.05	0.07	1.29	1.14	0.12	2.93	0.05
Lassen Volcanic National Park 5	0.27	0.38	0.22	0.48	1.14	0.05	0.07	1.29	1.14	0.12	2.93	0.05
Mt. Rainier National Park 1	0.27	0.39	0.22	0.50	1.16	0.06	0.07	1.33	1.16	0.12	2.99	0.05
Mt. Rainier National Park 2	0.33	0.47	0.25	0.60	1.32	0.07	0.09	1.53	1.32	0.14	3.39	0.06
Mt. Rainier National Park 3	0.33	0.47	0.26	0.60	1.32	0.07	0.09	1.54	1.32	0.14	3.40	0.06
Mt. Rainier National Park 4	0.32	0.46	0.25	0.59	1.31	0.07	0.09	1.52	1.31	0.14	3.36	0.06
Mt. Rainier National Park 5	0.37	0.53	0.28	0.68	1.44	0.08	0.10	1.70	1.44	0.16	3.69	0.07
North Cascades National Park 1	0.25	0.35	0.21	0.44	1.07	0.05	0.06	1.21	1.07	0.11	2.76	0.04
North Cascades National Park 2	0.25	0.35	0.21	0.44	1.07	0.05	0.06	1.21	1.07	0.11	2.76	0.04
North Cascades National Park 3	0.25	0.35	0.21	0.45	1.09	0.05	0.06	1.23	1.09	0.11	2.80	0.05
North Cascades National Park 4	0.25	0.35	0.21	0.45	1.08	0.05	0.06	1.22	1.08	0.11	2.79	0.05
North Cascades National Park 5	0.26	0.37	0.21	0.46	1.11	0.05	0.07	1.26	1.11	0.11	2.86	0.05
Olympic National Park 1	0.25	0.35	0.21	0.44	1.07	0.05	0.06	1.21	1.07	0.11	2.77	0.04
Olympic National Park 2	0.29	0.41	0.23	0.53	1.21	0.06	0.08	1.39	1.21	0.13	3.11	0.05
Olympic National Park 3	0.29	0.41	0.23	0.53	1.21	0.06	0.08	1.39	1.21	0.13	3.11	0.05
Olympic National Park 4	0.32	0.45	0.25	0.58	1.29	0.07	0.08	1.50	1.29	0.14	3.32	0.06
Olympic National Park 5	0.32	0.45	0.25	0.58	1.29	0.07	0.08	1.50	1.29	0.14	3.32	0.06
Rocky Mountain National Park 1	0.29	0.42	0.23	0.53	1.22	0.06	0.08	1.40	1.22	0.13	3.14	0.05
Rocky Mountain National Park 2	0.31	0.44	0.24	0.56	1.26	0.06	0.08	1.46	1.26	0.13	3.25	0.06
Rocky Mountain National Park 3	0.34	0.49	0.26	0.63	1.36	0.07	0.09	1.59	1.36	0.15	3.50	0.06
Rocky Mountain National Park 5	0.34	0.49	0.26	0.63	1.37	0.07	0.09	1.60	1.37	0.15	3.52	0.06
Rocky Mountain National Park 6	0.36	0.51	0.27	0.66	1.41	0.08	0.10	1.65	1.41	0.15	3.61	0.06
Sequoia and Kings Canyon National Park 3	0.20	0.28	0.18	0.35	0.92	0.04	0.05	1.01	0.92	0.09	2.38	0.04
Sequoia and Kings Canyon National Park 4	0.26	0.36	0.21	0.46	1.11	0.05	0.07	1.26	1.11	0.11	2.86	0.05
Sequoia and Kings Canyon National Park 5	0.28	0.40	0.23	0.52	1.19	0.06	0.07	1.37	1.19	0.12	3.07	0.05
Sequoia and Kings Canyon National Park 6	0.29	0.41	0.23	0.53	1.21	0.06	0.08	1.39	1.21	0.13	3.12	0.05
Stikine-LeConte Wlderness, Tongass National Forest 1	0.37	0.53	0.28	0.69	1.45	0.08	0.10	1.71	1.45	0.16	3.71	0.07
Stikine-LeConte Wlderness, Tongass National Forest 2	0.39	0.56	0.29	0.73	1.50	0.09	0.10	1.78	1.50	0.17	3.85	0.07
Stikine-LeConte Wlderness, Tongass National Forest 3	0.39	0.56	0.29	0.73	1.50	0.09	0.10	1.78	1.50	0.17	3.85	0.07
Stikine-LeConte Wlderness, Tongass National Forest 4	0.42	0.60	0.30	0.78	1.57	0.09	0.11	1.88	1.57	0.18	4.02	0.07
Stikine-LeConte Wlderness, Tongass National Forest 5	0.39	0.56	0.29	0.73	1.50	0.09	0.10	1.78	1.50	0.17	3.85	0.07
Wrangell-St. Elias National Park and Preserve 1	0.40	0.58	0.30	0.75	1.54	0.09	0.11	1.83	1.54	0.17	3.94	0.07
Wrangell-St. Elias National Park and Preserve 2	0.47	0.69	0.33	0.89	1.73	0.11	0.13	2.09	1.73	0.20	4.40	0.08
Wrangell-St. Elias National Park and Preserve 3	0.45	0.66	0.32	0.86	1.68	0.10	0.12	2.03	1.68	0.19	4.29	0.08
Wrangell-St. Elias National Park and Preserve 4	0.49	0.72	0.34	0.93	1.78	0.12	0.14	2.17	1.78	0.21	4.54	0.09
Wrangell-St. Elias National Park and Preserve 5	0.53	0.78	0.36	1.01	1.88	0.13	0.15	2.31	1.88	0.22	4.79	0.09
Yosemite National Park 1	0.19	0.27	0.17	0.34	0.90	0.04	0.05	0.99	0.90	0.09	2.33	0.04
Yosemite National Park 2	0.22	0.30	0.19	0.38	0.98	0.04	0.06	1.09	0.98	0.10	2.53	0.04
Yosemite National Park 3	0.21	0.30	0.19	0.38	0.97	0.04	0.05	1.08	0.97	0.10	2.50	0.04
Yosemite National Park 4	0.31	0.45	0.25	0.57	1.28	0.07	0.08	1.48	1.28	0.14	3.29	0.06
Yosemite National Park 5	0.30	0.43	0.24	0.55	1.25	0.06	0.08	1.44	1.25	0.13	3.20	0.05

Table D.5. Estimated particle fraction (Φ) for PAHs in conifer needles.

Park/Site	ACY % Φ	ACY % Φ	FLO % Φ	PHEN % Φ	ANT % Φ	FLA % Φ	PYR % Φ	CHR/TRI % Φ	B[a]A % Φ	B[b]F % Φ	B[k]F % Φ	B[a]P % Φ	B[e]P % Φ	B[ghi]P % Φ	D[ah]A % Φ	I[cd]P % Φ
Bandelier National Monument 1	1.40E-03	1.56E-03	2.12E-03	1.03E-02	6.98E-03	1.98E-01	9.73E-02	1.67E+00	5.98E-01	2.73E+01	3.01E+01	5.15E+01	4.42E+01	7.22E+01	6.53E+01	7.16E+01
Bandelier National Monument 2	1.50E-03	1.68E-03	2.27E-03	1.09E-02	7.23E-03	2.13E-01	1.03E-01	1.90E+00	6.53E-01	2.84E+01	3.14E+01	5.28E+01	4.54E+01	7.28E+01	6.64E+01	7.23E+01
Bandelier National Monument 3	1.97E-03	2.21E-03	2.94E-03	1.41E-02	8.34E-03	2.84E-01	1.29E-01	3.20E+00	9.25E-01	3.33E+01	3.69E+01	5.76E+01	5.03E+01	7.53E+01	7.06E+01	7.52E+01
Bandelier National Monument 4	2.20E-03	2.46E-03	3.25E-03	1.55E-02	8.80E-03	3.17E-01	1.41E-01	3.90E+00	1.06E+00	3.52E+01	3.91E+01	5.94E+01	5.21E+01	7.62E+01	7.21E+01	7.62E+01
Bandelier National Monument 5	2.38E-03	2.66E-03	3.50E-03	1.67E-02	9.18E-03	3.45E-01	1.51E-01	4.53E+00	1.17E+00	3.68E+01	4.08E+01	6.08E+01	5.36E+01	7.68E+01	7.32E+01	7.70E+01
Big Bend National Park 3	1.11E-03	1.24E-03	1.71E-03	8.34E-03	6.20E-03	1.56E-01	8.06E-02	1.08E+00	4.48E-01	2.37E+01	2.60E+01	4.75E+01	4.03E+01	7.00E+01	6.16E+01	6.90E+01
Big Bend National Park 4	1.13E-03	1.27E-03	1.75E-03	8.51E-03	6.27E-03	1.59E-01	8.20E-02	1.12E+00	4.60E-01	2.40E+01	2.63E+01	4.79E+01	4.07E+01	7.02E+01	6.19E+01	6.93E+01
Big Bend National Park 5	1.16E-03	1.30E-03	1.78E-03	8.67E-03	6.34E-03	1.63E-01	8.34E-02	1.17E+00	4.72E-01	2.43E+01	2.67E+01	4.82E+01	4.10E+01	7.04E+01	6.23E+01	6.95E+01
Crater Lake National Park 1	2.88E-03	3.22E-03	4.19E-03	1.98E-02	1.01E-02	4.21E-01	1.76E-01	6.42E+00	1.48E+00	4.05E+01	4.49E+01	6.39E+01	5.69E+01	7.84E+01	7.58E+01	7.87E+01
Crater Lake National Park 2	3.04E-03	3.40E-03	4.41E-03	2.08E-02	1.04E-02	4.46E-01	1.84E-01	7.08E+00	1.59E+00	4.15E+01	4.61E+01	6.48E+01	5.78E+01	7.88E+01	7.65E+01	7.92E+01
Crater Lake National Park 3	3.06E-03	3.42E-03	4.43E-03	2.09E-02	1.04E-02	4.48E-01	1.85E-01	7.15E+00	1.60E+00	4.17E+01	4.62E+01	6.49E+01	5.79E+01	7.88E+01	7.65E+01	7.93E+01
Crater Lake National Park 4	2.97E-03	3.32E-03	4.31E-03	2.04E-02	1.03E-02	4.35E-01	1.81E-01	6.79E+00	1.54E+00	4.11E+01	4.56E+01	6.44E+01	5.74E+01	7.86E+01	7.62E+01	7.90E+01
Crater Lake National Park 5	2.97E-03	3.32E-03	4.31E-03	2.04E-02	1.03E-02	4.35E-01	1.81E-01	6.79E+00	1.54E+00	4.11E+01	4.56E+01	6.44E+01	5.74E+01	7.86E+01	7.62E+01	7.90E+01
Denali National Park and Preserve 1	5.06E-03	5.64E-03	7.10E-03	3.29E-02	1.35E-02	7.55E-01	2.80E-01	1.69E+01	2.98E+00	5.19E+01	5.73E+01	7.25E+01	6.62E+01	8.24E+01	8.23E+01	8.33E+01
Denali National Park and Preserve 2	5.08E-03	5.66E-03	7.13E-03	3.31E-02	1.35E-02	7.58E-01	2.81E-01	1.70E+01	3.00E+00	5.20E+01	5.74E+01	7.25E+01	6.62E+01	8.25E+01	8.23E+01	8.34E+01
Denali National Park and Preserve 3	5.04E-03	5.62E-03	7.08E-03	3.28E-02	1.35E-02	7.52E-01	2.79E-01	1.68E+01	2.97E+00	5.18E+01	5.72E+01	7.24E+01	6.61E+01	8.24E+01	8.22E+01	8.33E+01
Denali National Park and Preserve 4	4.80E-03	5.35E-03	6.76E-03	3.14E-02	1.32E-02	7.15E-01	2.68E-01	1.55E+01	2.80E+00	5.08E+01	5.62E+01	7.17E+01	6.53E+01	8.21E+01	8.17E+01	8.29E+01
Glacier National Park 1	2.82E-03	3.15E-03	4.10E-03	1.94E-02	1.00E-02	4.11E-01	1.73E-01	6.15E+00	1.44E+00	4.00E+01	4.44E+01	6.35E+01	5.65E+01	7.82E+01	7.55E+01	7.85E+01
Glacier National Park 2	3.28E-03	3.66E-03	4.73E-03	2.22E-02	1.08E-02	4.82E-01	1.96E-01	8.09E+00	1.74E+00	4.30E+01	4.78E+01	6.60E+01	5.91E+01	7.94E+01	7.74E+01	7.99E+01
Glacier National Park 3	3.36E-03	3.75E-03	4.84E-03	2.27E-02	1.09E-02	4.94E-01	2.00E-01	8.43E+00	1.80E+00	4.35E+01	4.83E+01	6.64E+01	5.95E+01	7.95E+01	7.77E+01	8.01E+01
Glacier National Park 4	3.28E-03	3.66E-03	4.73E-03	2.22E-02	1.08E-02	4.82E-01	1.96E-01	8.09E+00	1.74E+00	4.30E+01	4.78E+01	6.60E+01	5.91E+01	7.94E+01	7.74E+01	7.99E+01
Glacier National Park 5	3.27E-03	3.66E-03	4.72E-03	2.22E-02	1.08E-02	4.81E-01	1.96E-01	8.06E+00	1.74E+00	4.30E+01	4.77E+01	6.60E+01	5.90E+01	7.93E+01	7.74E+01	7.99E+01
Glacier Bay National Park 1	3.73E-03	4.16E-03	5.34E-03	2.50E-02	1.16E-02	5.50E-01	2.18E-01	1.01E+01	2.05E+00	4.56E+01	5.06E+01	6.80E+01	6.12E+01	8.03E+01	7.89E+01	8.09E+01
Glacier Bay National Park 2	3.73E-03	4.16E-03	5.34E-03	2.50E-02	1.16E-02	5.50E-01	2.18E-01	1.01E+01	2.05E+00	4.56E+01	5.06E+01	6.80E+01	6.12E+01	8.03E+01	7.89E+01	8.09E+01
Glacier Bay National Park 3	3.73E-03	4.16E-03	5.34E-03	2.50E-02	1.16E-02	5.50E-01	2.18E-01	1.01E+01	2.05E+00	4.56E+01	5.06E+01	6.80E+01	6.12E+01	8.03E+01	7.89E+01	8.09E+01
Glacier Bay National Park 4	3.73E-03	4.16E-03	5.34E-03	2.50E-02	1.16E-02	5.50E-01	2.18E-01	1.01E+01	2.05E+00	4.56E+01	5.06E+01	6.80E+01	6.12E+01	8.03E+01	7.89E+01	8.09E+01
Great Sand Dunes National Park and Preserve 1	2.14E-03	2.39E-03	3.17E-03	1.51E-02	8.68E-03	3.08E-01	1.38E-01	3.71E+00	1.02E+00	3.47E+01	3.85E+01	5.89E+01	5.17E+01	7.59E+01	7.17E+01	7.60E+01
Great Sand Dunes National Park and Preserve 2	2.47E-03	2.77E-03	3.63E-03	1.72E-02	9.36E-03	3.59E-01	1.56E-01	4.86E+00	1.23E+00	3.75E+01	4.16E+01	6.14E+01	5.42E+01	7.72E+01	7.38E+01	7.73E+01
Great Sand Dunes National Park and Preserve 3	2.56E-03	2.86E-03	3.75E-03	1.78E-02	9.52E-03	3.72E-01	1.60E-01	5.17E+00	1.28E+00	3.81E+01	4.24E+01	6.20E+01	5.48E+01	7.74E+01	7.42E+01	7.77E+01
Great Sand Dunes National Park and Preserve 4	2.47E-03	2.77E-03	3.63E-03	1.72E-02	9.36E-03	3.59E-01	1.56E-01	4.86E+00	1.23E+00	3.75E+01	4.16E+01	6.14E+01	5.42E+01	7.72E+01	7.38E+01	7.73E+01
Great Sand Dunes National Park and Preserve 5	2.51E-03	2.81E-03	3.68E-03	1.75E-02	9.43E-03	3.65E-01	1.58E-01	4.99E+00	1.25E+00	3.78E+01	4.19E+01	6.16E+01	5.45E+01	7.73E+01	7.40E+01	7.75E+01
Grand Teton National Park 1	2.91E-03	3.26E-03	4.23E-03	2.00E-02	1.02E-02	4.26E-01	1.78E-01	6.54E+00	1.50E+00	4.07E+01	4.52E+01	6.41E+01	5.70E+01	7.85E+01	7.59E+01	7.88E+01
Grand Teton National Park 2	3.06E-03	3.41E-03	4.43E-03	2.09E-02	1.04E-02	4.47E-01	1.85E-01	7.13E+00	1.60E+00	4.16E+01	4.62E+01	6.49E+01	5.79E+01	7.88E+01	7.65E+01	7.93E+01
Grand Teton National Park 3	3.28E-03	3.66E-03	4.73E-03	2.22E-02	1.08E-02	4.82E-01	1.96E-01	8.09E+00	1.74E+00	4.30E+01	4.78E+01	6.60E+01	5.91E+01	7.94E+01	7.74E+01	7.99E+01
Grand Teton National Park 4	3.28E-03	3.66E-03	4.73E-03	2.22E-02	1.08E-02	4.82E-01	1.96E-01	8.09E+00	1.74E+00	4.30E+01	4.78E+01	6.60E+01	5.91E+01	7.94E+01	7.74E+01	7.99E+01
Katmai National Park and Preserve 1	3.80E-03	4.25E-03	5.44E-03	2.54E-02	1.17E-02	5.62E-01	2.21E-01	1.05E+01	2.10E+00	4.60E+01	5.10E+01	6.83E+01	6.16E+01	8.05E+01	7.92E+01	8.11E+01
Katmai National Park and Preserve 2	3.88E-03	4.33E-03	5.54E-03	2.59E-02	1.18E-02	5.74E-01	2.25E-01	1.08E+01	2.15E+00	4.65E+01	5.15E+01	6.86E+01	6.19E+01	8.06E+01	7.94E+01	8.13E+01
Katmai National Park and Preserve 3	3.88E-03	4.33E-03	5.54E-03	2.59E-02	1.18E-02	5.74E-01	2.25E-01	1.08E+01	2.15E+00	4.65E+01	5.15E+01	6.86E+01	6.19E+01	8.06E+01	7.94E+01	8.13E+01
Katmai National Park and Preserve 4	4.03E-03	4.50E-03	5.74E-03	2.68E-02	1.20E-02	5.97E-01	2.32E-01	1.16E+01	2.25E+00	4.72E+01	5.23E+01	6.92E+01	6.25E+01	8.09E+01	7.98E+01	8.16E+01
Katmai National Park and Preserve 5	4.03E-03	4.50E-03	5.74E-03	2.68E-02	1.20E-02	5.97E-01	2.32E-01	1.16E+01	2.25E+00	4.72E+01	5.23E+01	6.92E+01	6.25E+01	8.09E+01	7.98E+01	8.16E+01
Lassen Volcanic National Park 1	2.20E-03	2.46E-03	3.25E-03	1.55E-02	8.81E-03	3.18E-01	1.41E-01	3.91E+00	1.06E+00	3.52E+01	3.91E+01	5.94E+01	5.22E+01	7.62E+01	7.21E+01	7.62E+01
Lassen Volcanic National Park 2	2.36E-03	2.64E-03	3.47E-03	1.65E-02	9.13E-03	3.42E-01	1.50E-01	4.46E+00	1.16E+00	3.66E+01	4.06E+01	6.06E+01	5.34E+01	7.68E+01	7.31E+01	7.69E+01
Lassen Volcanic National Park 3	2.68E-03	2.99E-03	3.91E-03	1.85E-02	9.75E-03	3.90E-01	1.66E-01	5.62E+00	1.36E+00	3.90E+01	4.33E+01	6.27E+01	5.56E+01	7.78E+01	7.48E+01	7.81E+01
Lassen Volcanic National Park 4	2.51E-03	2.81E-03	3.68E-03	1.75E-02	9.43E-03	3.65E-01	1.58E-01	4.99E+00	1.25E+00	3.78E+01	4.19E+01	6.16E+01	5.45E+01	7.73E+01	7.40E+01	7.75E+01
Lassen Volcanic National Park 5	2.51E-03	2.81E-03	3.68E-03	1.75E-02	9.43E-03	3.65E-01	1.58E-01	4.99E+00	1.25E+00	3.78E+01	4.19E+01	6.16E+01	5.45E+01	7.73E+01	7.40E+01	7.75E+01
Mt. Rainier National Park 1	2.59E-03	2.89E-03	3.79E-03	1.80E-02	9.58E-03	3.77E-01	1.62E-01	5.28E+00	1.30E+00	3.84E+01	4.26E+01	6.22E+01	5.50E+01	7.75E+01	7.44E+01	7.78E+01
Mt. Rainier National Park 2	3.14E-03	3.51E-03	4.54E-03	2.14E-02	1.06E-02	4.60E-01	1.89E-01	7.48E+00	1.65E+00	4.22E+01	4.68E+01	6.53E+01	5.83E+01	7.90E+01	7.69E+01	7.95E+01
Mt. Rainier National Park 3	3.16E-03	3.52E-03	4.56E-03	2.15E-02	1.06E-02	4.63E-01	1.90E-01	7.55E+00	1.66E+00	4.23E+01	4.69E+01	6.54E+01	5.84E+01	7.91E+01	7.69E+01	7.95E+01
Mt. Rainier National Park 4	3.10E-03	3.46E-03	4.48E-03	2.11E-02	1.05E-02	4.54E-01	1.87E-01	7.30E+00	1.62E+00	4.19E+01	4.65E+01	6.51E+01	5.81E+01	7.89E+01	7.67E+01	7.94E+01
Mt. Rainier National Park 5	3.58E-03	4.00E-03	5.14E-03	2.41E-02	1.13E-02	5.28E-01	2.11E-01	9.45E+00	1.95E+00	4.48E+01	4.97E+01	6.74E+01	6.06E+01	8.00E+01	7.85E+01	8.06E+01
North Cascades National Park 1	2.29E-03	2.56E-03	3.38E-03	1.61E-02	9.00E-03	3.32E-01	1.46E-01	4.22E+00	1.11E+00	3.60E+01	4.00E+01	6.01E+01	5.29E+01	7.65E+01	7.27E+01	7.66E+01
North Cascades National Park 2	2.29E-03	2.56E-03	3.38E-03	1.61E-02	9.00E-03	3.32E-01	1.46E-01	4.22E+00	1.11E+00	3.60E+01	4.00E+01	6.01E+01	5.29E+01	7.65E+01	7.27E+01	7.66E+01
North Cascades National Park 3	2.34E-03	2.62E-03	3.45E-03	1.64E-02	9.10E-03	3.39E-01	1.49E-01	4.39E+00	1.15E+00	3.64E+01	4.04E+01	6.05E+01	5.33E+01	7.67E+01	7.30E+01	7.68E+01
North Cascades National Park 4	2.33E-03	2.60E-03	3.43E-03	1.63E-02	9.07E-03	3.37E-01	1.48E-01	4.34E+00	1.14E+00	3.63E+01	4.03E+01	6.04E+01	5.31E+01	7.66E+01	7.29E+01	7.68E+01
North Cascades National Park 5	2.42E-03	2.71E-03	3.56E-03	1.69E-02	9.26E-03	3.51E-01	1.53E-01	4.67E+00	1.19E+00	3.71E+01	4.12E+01	6.10E+01	5.38E+01	7.70E+01	7.35E+01	7.71E+01
Olympic National Park 1	2.29E-03	2.57E-03	3.38E-03	1.61E-02	9.00E-03	3.32E-01	1.46E-01	4.23E+00	1.12E+00	3.60E+01	4.00E+01	6.01E+01	5.29E+01	7.65E+01	7.27E+01	7.66E+01
Olympic National Park 2	2.75E-03	3.07E-03	4.01E-03	1.90E-02	9.88E-03	4.01E-01	1.70E-01	5.90E+00	1.40E+00	3.95E+01	4.39E+01	6.31E+01	5.61E+01	7.80E+01	7.52E+01	7.83E+01
Olympic National Park 3	2.75E-03	3.07E-03	4.01E-03	1.90E-02	9.88E-03	4.01E-01	1.70E-01	5.90E+00	1.40E+00	3.95E+01	4.39E+01	6.31E+01	5.61E+01	7.80E+01	7.52E+01	7.83E+01
Olympic National Park 4	3.04E-03	3.39E-03	4.40E-03	2.08E-02	1.04E-02	4.45E-01	1.84E-01	7.05E+00	1.58E+00	4.15E+01	4.61E+01	6.48E+01	5.78E+01	7.88E+01	7.64E+01	7.92E+01
Olympic National Park 5	3.04E-03	3.39E-03	4.40E-03	2.08E-02	1.04E-02	4.45E-01	1.84E-01	7.05E+00	1.58E+00	4.15E+01	4.61E+01	6.48E+01	5.78E+01	7.88E+01	7.64E+01	7.92E+01
Rocky Mountain National Park 1	2.79E-03	3.11E-03	4.06E-03	1.92E-02	9.95E-03	4.07E-01	1.72E-01	6.04E+00	1.42E+00	3.98E+01	4.42E+01	6.34E+01	5.63E+01	7.81E+01	7.53E+01	7.84E+01
Rocky Mountain National Park 2	2.94E-03	3.29E-03	4.27E-03	2.02E-02	1.02E-02	4.30E-01	1.79E-01	6.65E+00	1.52E+00	4.09E+01	4.54E+01	6.42E+01	5.72E+01	7.85E+01	7.60E+01	7.89E+01
Rocky Mountain National Park 3	3.30E-03	3.69E-03	4.76E-03	2.24E-02	1.09E-02	4.85E-01	1.97E-01	8.18E+00	1.76E+00	4.32E+01	4.79E+01	6.61E+01	5.92E+01	7.94E+01	7.75E+01	7.99E+01
Rocky Mountain National Park 5	3.32E-03	3.71E-03	4.79E-03	2.25E-02	1.09E-02	4.88E-01	1.98E-01	8.28E+00	1.77E+00	4.33E+01	4.81E+01	6.62E+01	5.93E+01	7.95E+01	7.76E+01	8.00E+01
Rocky Mountain National Park 6	3.47E-03	3.87E-03	4.98E-03	2.34E-02	1.11E-02	5.10E-01	2.05E-01	8.91E+00	1.87E+00	4.42E+01	4.90E+01	6.69E+01	6.00E+01	7.98E+01	7.81E+01	8.03E+01
Sequoia and Kings Canyon National Park 3	1.82E-03	2.04E-03	2.72E-03	1.31E-02	8.00E-03	2.61E-01	1.21E-01	2.75E+00	8.35E-01	3.18E+01	3.52E+01	5.62E+01	4.89E+01	7.46E+01	6.94E+01	7.44E+01
Sequoia and Kings Canyon National Park 4	2.42E-03	2.70E-03	3.55E-03	1.69E-02	9.25E-03	3.50E-01	1.53E-01	4.65E+00	1.19E+00	3.70E+01	4.11E+01	6.10E+01	5.38E+01	7.70E+01	7.34E+01	7.71E+01
Sequoia and Kings Canyon National Park 5	2.70E-03	3.02E-03	3.94E-03	1.87E-02	9.79E-03	3.93E-01	1.67E-01	5.70E+00	1.37E+00	3.92E+01	4.35E+01	6.28E+01	5.57E+01	7.79E+01	7.49E+01	7.82E+01
Sequoia and Kings Canyon National Park 6	2.77E-03	3.09E-03	4.03E-03	1.91E-02	9.91E-03	4.03E-01	1.71E-01	5.96E+00	1.41E+00	3.97E+01	4.40E+01	6.32E+01	5.61E+01	7.80E+01	7.52E+01	7.84E+01
Stikine-LeConte Wlderness, Tongass National Forest 1	3.61E-03	4.03E-03	5.17E-03	2.42E-02	1.14E-02	5.31E-01	2.12E-01	9.55E+00	1.96E+00	4.50E+01	4.99E+01	6.75E+01	6.07E+01	8.01E+01	7.85E+01	8.07E+01
Stikine-LeConte Wlderness, Tongass National Forest 2	3.82E-03	4.27E-03	5.46E-03	2.56E-02	1.17E-02	5.65E-01	2.22E-01	1.06E+01	2.11E+00	4.61E+01	5.12E+01	6.84E+01	6.16E+01	8.05E+01	7.92E+01	8.12E+01
Stikine-LeConte Wlderness, Tongass National Forest 3	3.82E-03	4.27E-03	5.46E-03	2.56E-02	1.17E-02	5.65E-01	2.22E-01	1.06E+01	2.11E+00	4.61E+01	5.12E+01	6.84E+01	6.16E+01	8.05E+01	7.92E+01	8.12E+01
Stikine-LeConte Wlderness, Tongass National Forest 4	4.10E-03	4.57E-03	5.83E-03	2.72E-02	1.21E-02	6.07E-01	2.35E-01	1.19E+01	2.30E+00	4.76E+01	5.27E+01	6.94E+01	6.28E+01	8.10E+01	8.00E+01	8.17E+01
Stikine-LeConte Wlderness, Tongass National Forest 5	3.82E-03	4.26E-03	5.46E-03	2.55E-02	1.17E-02	5.64E-01	2.22E-01	1.06E+01	2.11E+00	4.61E+01	5.11E+01	6.83E+01	6.16E+01	8.05E+01	7.92E+01	8.11E+01
Wrangell-St. Elias National Park and Preserve 1	3.96E-03	4.42E-03	5.65E-03	2.64E-02	1.19E-02	5.86E-01	2.29E-01	1.12E+01	2.21E+00	4.69E+01	5.19E+01	6.89E+01	6.22E+01	8.07E+01	7.96E+01	8.14E+01
Wrangell-St. Elias National Park and Preserve 2	4.72E-03	5.26E-03	6.65E-03	3.09E-02	1.30E-02	7.02E-01	2.64E-01	1.50E+01	2.73E+00	5.04E+01	5.58E+01	7.15E+01	6.50E+01	8.20E+01	8.15E+01	8.28E+01
Wrangell-St. Elias National Park and Preserve 3	4.53E-03	5.05E-03	6.40E-03	2.98E-02	1.28E-02	6.74E-01	2.56E-01	1.41E+01	2.60E+00	4.96E+01	5.49E+01	7.09E+01	6.44E+01	8.17E+01	8.11E+01	8.25E+01
Wrangell-St. Elias National Park and Preserve 4	4.95E-03	5.52E-03	6.96E-03	3.23E-02	1.34E-02	7.39E-01	2.75E-01	1.63E+01	2.90E+00	5.14E+01	5.68E+01	7.22E+01	6.58E+01	8.23E+01	8.21E+01	8.32E+01
Wrangell-St. Elias National Park and Preserve 5	5.38E-03	6.00E-03	7.52E-03	3.48E-02	1.40E-02	8.05E-01	2.94E-01	1.86E+01	3.22E+00	5.31E+01	5.86E+01	7.33E+01	6.71E+01	8.28E+01	8.29E+01	8.38E+01
Yosemite National Park 1	1.76E-03	1.97E-03	2.64E-03	1.27E-02	7.85E-03	2.52E-01	1.18E-01	2.58E+00	7.99E-01	3.12E+01	3.45E+01	5.56E+01	4.82E+01	7.43E+01	6.89E+01	7.40E+01
Yosemite National Park 2	2.00E-03	2.24E-03	2.97E-03	1.42E-02	8.39E-03	2.88E-01	1.31E-01	3.27E+00	9.39E-01	3.35E+01	3.71E+01	5.78E+01	5.05E+01	7.54E+01	7.08E+01	7.53E+01
Yosemite National Park 3	1.97E-03	2.20E-03	2.93E-03	1.40E-02	8.32E-03	2.83E-01	1.29E-01	3.18E+00	9.21E-01	3.32E+01	3.68E+01	5.75E+01	5.02E+01	7.52E+01	7.06E+01	7.51E+01
Yosemite National Park 4	3.00E-03	3.35E-03	4.35E-03	2.05E-02	1.03E-02	4.38E-01	1.82E-01	6.88E+00	1.56E+00	4.12E+01	4.58E+01	6.45E+01	5.75E+01	7.87E+01	7.63E+01	7.91E+01
Yosemite National Park 5	2.88E-03	3.21E-03	4.18E-03	1.98E-02	1.01E-02	4.20E-01	1.76E-01	6.40E+00	1.48E+00	4.04E+01	4.49E+01	6.39E+01	5.68E+01	7.84E+01	7.58E+01	7.87E+01

Table D.6. Estimated particle fraction (Φ) for PCBs in conifer needles.

Park/Site	PCB 118 % Φ	PCB 138 % Φ	PCB 153 % Φ	PCB 183 % Φ	PCB 187 % Φ
Bandelier National Monument 1	0.66	28.41	26.62	41.36	41.36
Bandelier National Monument 2	0.70	29.80	27.96	42.78	42.78
Bandelier National Monument 3	0.91	35.64	33.61	48.45	48.45
Bandelier National Monument 4	1.00	38.02	35.92	50.66	50.66
Bandelier National Monument 5	1.08	39.86	37.73	52.33	52.33
Big Bend National Park 3	0.53	24.15	22.54	36.84	36.84
Big Bend National Park 4	0.54	24.53	22.90	37.26	37.26
Big Bend National Park 5	0.55	24.90	23.26	37.66	37.66
Crater Lake National Park 1	1.29	44.32	42.12	56.24	56.24
Crater Lake National Park 2	1.36	45.62	43.40	57.35	57.35
Crater Lake National Park 3	1.37	45.75	43.53	57.46	57.46
Crater Lake National Park 4	1.33	45.06	42.85	56.88	56.88
Crater Lake National Park 5	1.33	45.06	42.85	56.88	56.88
Denali National Park and Preserve 1	2.19	57.73	55.53	67.19	67.19
Denali National Park and Preserve 2	2.18	57.66	55.45	67.13	67.13
Denali National Park and Preserve 3	2.19	57.83	55.62	67.26	67.26
Denali National Park and Preserve 4	2.08	56.50	54.28	66.23	66.23
Glacier National Park 1	1.27	43.77	41.57	55.77	55.77
Glacier National Park 2	1.46	47.40	45.17	58.86	58.86
Glacier National Park 3	1.49	47.97	45.73	59.33	59.33
Glacier National Park 4	1.46	47.40	45.17	58.86	58.86
Glacier National Park 5	1.46	47.36	45.13	58.83	58.83
Glacier Bay National Park 1	1.65	50.48	48.24	61.41	61.41
Glacier Bay National Park 2	1.65	50.48	48.24	61.41	61.41
Glacier Bay National Park 3	1.65	50.48	48.24	61.41	61.41
Glacier Bay National Park 4	1.65	50.48	48.24	61.41	61.41
Great Sand Dunes National Park and Preserve 1	0.98	37.40	35.32	50.09	50.09
Great Sand Dunes National Park and Preserve 2	1.12	40.75	38.60	53.12	53.12
Great Sand Dunes National Park and Preserve 3	1.16	41.53	39.37	53.82	53.82
Great Sand Dunes National Park and Preserve 4	1.12	40.75	38.60	53.12	53.12
Great Sand Dunes National Park and Preserve 5	1.14	41.09	38.93	53.42	53.42
Grand Teton National Park 1	1.31	44.58	42.37	56.47	56.47
Grand Teton National Park 2	1.37	45.71	43.49	57.43	57.43
Grand Teton National Park 3	1.46	47.40	45.17	58.86	58.86
Grand Teton National Park 4	1.46	47.40	45.17	58.86	58.86
Katmai National Park and Preserve 1	1.68	50.96	48.71	61.80	61.80
Katmai National Park and Preserve 2	1.71	51.44	49.19	62.19	62.19
Katmai National Park and Preserve 3	1.71	51.44	49.19	62.19	62.19
Katmai National Park and Preserve 4	1.77	52.36	50.12	62.93	62.93
Katmai National Park and Preserve 5	1.77	52.36	50.12	62.93	62.93
Lassen Volcanic National Park 1	1.00	38.03	35.94	50.67	50.67
Lassen Volcanic National Park 2	1.07	39.65	37.52	52.14	52.14
Lassen Volcanic National Park 3	1.21	42.60	40.42	54.75	54.75
Lassen Volcanic National Park 4	1.14	41.09	38.93	53.42	53.42
Lassen Volcanic National Park 5	1.14	41.09	38.93	53.42	53.42
Mt. Rainier National Park 1	1.17	41.80	39.64	54.05	54.05
Mt. Rainier National Park 2	1.40	46.35	44.12	57.97	57.97
Mt. Rainier National Park 3	1.41	46.48	44.25	58.08	58.08
Mt. Rainier National Park 4	1.38	46.03	43.81	57.70	57.70
Mt. Rainier National Park 5	1.59	49.52	47.28	60.62	60.62
North Cascades National Park 1	1.04	38.99	36.87	51.54	51.54
North Cascades National Park 2	1.04	38.99	36.87	51.54	51.54
North Cascades National Park 3	1.07	39.47	37.35	51.98	51.98
North Cascades National Park 4	1.06	39.32	37.20	51.84	51.84
North Cascades National Park 5	1.10	40.25	38.11	52.68	52.68
Olympic National Park 1	1.05	39.00	36.89	51.55	51.55
Olympic National Park 2	1.24	43.22	41.03	55.29	55.29
Olympic National Park 3	1.24	43.22	41.03	55.29	55.29
Olympic National Park 4	1.36	45.56	43.34	57.31	57.31
Olympic National Park 5	1.36	45.56	43.34	57.31	57.31
Rocky Mountain National Park 1	1.25	43.53	41.34	55.56	55.56
Rocky Mountain National Park 2	1.32	44.80	42.59	56.66	56.66
Rocky Mountain National Park 3	1.47	47.55	45.32	58.98	58.98
Rocky Mountain National Park 5	1.48	47.72	45.49	59.13	59.13
Rocky Mountain National Park 6	1.54	48.72	46.49	59.96	59.96
Sequoia and Kings Canyon National Park 3	0.84	33.88	31.90	46.78	46.78
Sequoia and Kings Canyon National Park 4	1.10	40.20	38.06	52.63	52.63
Sequoia and Kings Canyon National Park 5	1.22	42.78	40.60	54.91	54.91
Sequoia and Kings Canyon National Park 6	1.25	43.35	41.15	55.40	55.40
Stikine-LeConte Wlderness, Tongass National Forest 1	1.60	49.68	47.43	60.75	60.75
Stikine-LeConte Wlderness, Tongass National Forest 2	1.68	51.07	48.83	61.89	61.89
Stikine-LeConte Wlderness, Tongass National Forest 3	1.68	51.07	48.83	61.89	61.89
Stikine-LeConte Wlderness, Tongass National Forest 4	1.80	52.74	50.50	63.24	63.24
Stikine-LeConte Wlderness, Tongass National Forest 5	1.68	51.05	48.81	61.87	61.87
Wrangell-St. Elias National Park and Preserve 1	1.74	51.94	49.69	62.59	62.59
Wrangell-St. Elias National Park and Preserve 2	2.05	56.08	53.86	65.89	65.89
Wrangell-St. Elias National Park and Preserve 3	1.97	55.13	52.90	65.15	65.15
Wrangell-St. Elias National Park and Preserve 4	2.14	57.23	55.02	66.80	66.80
Wrangell-St. Elias National Park and Preserve 5	2.31	59.17	56.98	68.31	68.31
Yosemite National Park 2	0.92	35.90	33.86	48.70	48.70
Yosemite National Park 3	0.91	35.57	33.54	48.39	48.39
Yosemite National Park 4	1.34	45.25	43.03	57.04	57.04
Yosemite National Park 5	1.29	44.28	42.08	56.21	56.21

Table D.7. Estimated particle fraction (Φ) for pesticides in PASDs.

Park/Site	Dacthal % Φ	Chlorpyrifos % Φ	Endosulfan I,II % Φ	Endosulfan sulfate % Φ	g-HCH % Φ	Trifluralin % Φ	Triallate % Φ	Dieldrin % Φ	a-HCH % Φ	Chlordane % Φ	Nonachlor % Φ	HCB % Φ
Bandelier NM 5	0.27	0.38	0.22	0.49	1.15	0.05	0.07	1.31	1.15	0.12	2.96	0.05
Big Bend NP 1	0.08	0.11	0.09	0.14	0.49	0.01	0.02	0.48	0.49	0.04	1.26	0.02
Big Bend NP 2	0.11	0.14	0.11	0.18	0.58	0.02	0.03	0.59	0.58	0.05	1.50	0.02
Big Bend NP 3	0.12	0.17	0.12	0.21	0.65	0.02	0.03	0.67	0.65	0.06	1.68	0.02
Big Bend NP 4	0.13	0.18	0.13	0.22	0.67	0.02	0.03	0.70	0.67	0.06	1.74	0.02
Crater Lake NP 5	0.35	0.51	0.27	0.65	1.40	0.08	0.09	1.64	1.40	0.15	3.58	0.06
Denali NP & Preserve 3	0.55	0.81	0.38	1.06	1.94	0.13	0.15	2.38	1.94	0.23	4.92	0.10
Denali NP & Preserve/Friday Creek	0.56	0.83	0.38	1.08	1.97	0.14	0.16	2.43	1.97	0.23	5.00	0.10
Gates of the Arctic NP & Preserve 1	0.92	1.38	0.55	1.84	2.81	0.26	0.27	3.65	2.81	0.37	7.04	0.16
Glacier NP 3	0.35	0.50	0.27	0.64	1.38	0.07	0.09	1.62	1.38	0.15	3.55	0.06
Glacier NP 4	0.35	0.50	0.27	0.64	1.39	0.08	0.09	1.63	1.39	0.15	3.56	0.06
Glacier Bay NP & Preserve 1	0.40	0.57	0.29	0.74	1.52	0.09	0.11	1.81	1.52	0.17	3.89	0.07
Great Sane Dunes NM 5	0.29	0.41	0.23	0.53	1.21	0.06	0.08	1.39	1.21	0.13	3.12	0.05
Grand Tetons NP 5	0.32	0.46	0.25	0.59	1.30	0.07	0.08	1.51	1.30	0.14	3.35	0.06
Katmai NP & Preserve 3	0.41	0.59	0.30	0.77	1.56	0.09	0.11	1.86	1.56	0.17	4.00	0.07
Lassen Volcanic NP 5	0.28	0.40	0.23	0.51	1.19	0.06	0.07	1.36	1.19	0.12	3.05	0.05
Mount Rainier NP 3	0.35	0.50	0.27	0.64	1.38	0.07	0.09	1.61	1.38	0.15	3.53	0.06
Mount Rainier NP 4	0.33	0.47	0.26	0.60	1.33	0.07	0.09	1.54	1.33	0.14	3.40	0.06
Noatak NP 3	1.00	1.51	0.58	2.02	2.99	0.29	0.29	3.92	2.99	0.40	7.48	0.17
North Cascades NP 5	0.27	0.39	0.22	0.49	1.16	0.06	0.07	1.32	1.16	0.12	2.99	0.05
Olympic NP 3	0.30	0.43	0.24	0.55	1.25	0.06	0.08	1.44	1.25	0.13	3.21	0.05
Olympic NP 4	0.34	0.49	0.26	0.63	1.36	0.07	0.09	1.59	1.36	0.15	3.49	0.06
Rocky Mtn. NP 1	0.36	0.52	0.28	0.67	1.43	0.08	0.10	1.68	1.43	0.16	3.67	0.06
Rocky Mtn. NP 2	0.31	0.45	0.25	0.57	1.28	0.07	0.08	1.48	1.28	0.14	3.29	0.06
Rocky Mtn. NP 3	0.33	0.47	0.26	0.60	1.32	0.07	0.09	1.54	1.32	0.14	3.40	0.06
Rocky Mtn. NP 5	0.36	0.51	0.27	0.66	1.41	0.08	0.10	1.66	1.41	0.15	3.62	0.06
Rocky Mtn. NP 6	0.36	0.51	0.27	0.66	1.41	0.08	0.10	1.66	1.41	0.15	3.62	0.06
Sequoia NP 5	0.30	0.43	0.24	0.55	1.24	0.06	0.08	1.43	1.24	0.13	3.20	0.05
Sequoia NP/Wolverton Creek	0.27	0.39	0.22	0.49	1.16	0.05	0.07	1.32	1.16	0.12	2.98	0.05
Sequoia NP/POTW	0.17	0.24	0.16	0.30	0.82	0.03	0.04	0.89	0.82	0.08	2.13	0.03
Sequoia NP/CRYS	0.14	0.19	0.14	0.24	0.71	0.02	0.03	0.75	0.71	0.07	1.84	0.03
Stikine LeConte Wilderness 1	0.39	0.56	0.29	0.72	1.50	0.09	0.10	1.77	1.50	0.17	3.83	0.07
Stikine LeConte Wilderness 2	0.41	0.59	0.30	0.76	1.55	0.09	0.11	1.85	1.55	0.17	3.97	0.07
Stikine LeConte Wilderness 4	0.44	0.64	0.32	0.83	1.64	0.10	0.12	1.97	1.64	0.19	4.19	0.08
Wrangell St. Elias NP & Preserve 3	0.50	0.74	0.35	0.96	1.81	0.12	0.14	2.21	1.81	0.21	4.62	0.09
Yosemite NP 5	0.31	0.44	0.25	0.57	1.27	0.06	0.08	1.47	1.27	0.13	3.27	0.06

Table D.8. Estimated particle fraction (Φ) for PAHs in PASDs.

Park/Site	**FLO % Φ**	**PHEN % Φ**	**FLA % Φ**
Bandelier NM 5	3.73E-03	1.77E-02	3.70E-01
Big Bend NP 1	1.10E-03	5.46E-03	9.55E-02
Big Bend NP 2	1.41E-03	6.92E-03	1.26E-01
Big Bend NP 3	1.65E-03	8.06E-03	1.50E-01
Big Bend NP 4	1.75E-03	8.51E-03	1.59E-01
Crater Lake NP 5	4.92E-03	2.31E-02	5.03E-01
Denali NP & Preserve 3	7.83E-03	3.62E-02	8.41E-01
Denali NP & Preserve/Friday Creek	8.02E-03	3.70E-02	8.63E-01
Gates of the Arctic NP & Preserve 1	1.34E-02	6.06E-02	1.51E+00
Glacier NP 3	4.85E-03	2.28E-02	4.95E-01
Glacier NP 4	4.87E-03	2.29E-02	4.98E-01
Great Sane Dunes NM 5	4.02E-03	1.90E-02	4.02E-01
Katmai NP & Preserve 3	5.77E-03	2.69E-02	6.00E-01
Lassen Volcanic NP 5	3.90E-03	1.85E-02	3.89E-01
Mount Rainier NP 3	4.82E-03	2.26E-02	4.92E-01
Mount Rainier NP 4	4.57E-03	2.15E-02	4.63E-01
Noatak NP 3	1.46E-02	6.61E-02	1.67E+00
North Cascades NP 5	3.79E-03	1.80E-02	3.76E-01
Olympic NP 3	4.20E-03	1.98E-02	4.22E-01
Olympic NP 4	4.74E-03	2.23E-02	4.83E-01
Rocky Mtn. NP 1	4.34E-03	2.05E-02	4.38E-01
Rocky Mtn. NP 2	4.56E-03	2.15E-02	4.62E-01
Rocky Mtn. NP 3	5.00E-03	2.35E-02	5.12E-01
Rocky Mtn. NP 5	5.00E-03	2.35E-02	5.12E-01
Rocky Mtn. NP 6	5.09E-03	2.39E-02	5.22E-01
Sequoia NP/Wolverton Creek	3.77E-03	1.79E-02	3.74E-01
Sequoia NP/POTW	2.32E-03	1.12E-02	2.19E-01
Sequoia NP/CRYS	1.89E-03	9.17E-03	1.74E-01
Stikine LeConte Wilderness 1	5.43E-03	2.54E-02	5.61E-01
Stikine LeConte Wilderness 2	5.73E-03	2.68E-02	5.95E-01
Stikine LeConte Wilderness 4	6.18E-03	2.88E-02	6.47E-01
Wrangell St. Elias NP & Preserve 3	7.14E-03	3.31E-02	7.60E-01
Yosemite NP 5	4.31E-03	2.04E-02	4.35E-01

Table D.9. Estimated particle fraction (Φ) for pesticides in snow.

Park/Site	Dacthal % Φ	Chlorpyrifos % Φ	Endosulfan I,II % Φ	Endosulfan sulfate % Φ	g-HCH % Φ	Trifluralin % Φ	Triallate % Φ	Dieldrin % Φ	a-HCH % Φ	Chlordane % Φ	Nonachlor % Φ	HCB % Φ
Denali National Park/Kahiltna	2.73	4.26	1.23	5.85	6.13	1.03	0.88	8.85	6.13	0.99	14.62	0.45
Denali National Park/McLeod	1.39	2.13	0.75	2.87	3.79	0.44	0.42	5.14	3.79	0.53	9.37	0.24
Denali National Park/Wonder	1.38	2.10	0.74	2.83	3.76	0.43	0.42	5.09	3.76	0.53	9.28	0.23
Glacier National Park/Matcharak	3.25	5.10	1.40	7.04	6.95	1.29	1.07	10.18	6.95	1.17	16.38	0.54
Glacier National Park/Aster	0.74	1.10	0.47	1.46	2.41	0.20	0.21	3.06	2.41	0.30	6.07	0.13
Glacier National Park/Granite Park	0.68	1.01	0.44	1.32	2.25	0.17	0.19	2.84	2.25	0.28	5.70	0.12
Glacier National Park/Preston	0.70	1.03	0.45	1.36	2.29	0.18	0.20	2.89	2.29	0.28	5.80	0.12
Glacier National Park/Snyder	0.68	1.01	0.44	1.33	2.26	0.18	0.19	2.85	2.26	0.28	5.72	0.12
Mt. Rainier National Park/Alta Vista	0.57	0.84	0.38	1.10	1.98	0.14	0.16	2.45	1.98	0.24	5.04	0.10
Mt. Rainier National Park/Edith Cornice	0.57	0.84	0.38	1.10	1.98	0.14	0.16	2.45	1.98	0.24	5.04	0.10
Mt. Rainier National Park/Fell Fields	0.65	0.97	0.43	1.27	2.19	0.17	0.18	2.75	2.19	0.27	5.55	0.11
Mt. Rainier National Park/Mowich	0.51	0.75	0.35	0.97	1.83	0.12	0.14	2.24	1.83	0.21	4.66	0.09
Mt. Rainier National Park/Paradise	0.58	0.86	0.39	1.12	2.02	0.14	0.16	2.50	2.02	0.24	5.12	0.10
Mt. Rainier National Park/Protection	0.65	0.97	0.43	1.27	2.19	0.17	0.18	2.75	2.19	0.27	5.55	0.11
Mt. Rainier National Park/Sugarloaf	0.62	0.91	0.41	1.19	2.10	0.15	0.17	2.61	2.10	0.25	5.32	0.11
Noatak National Preserve/Burial	3.60	5.67	1.52	7.83	7.47	1.47	1.20	11.03	7.47	1.29	17.48	0.59
Noatak National Preserve/Kangilipak	3.40	5.34	1.45	7.37	7.17	1.36	1.13	10.53	7.17	1.22	16.84	0.56
North Cascades National Park/Noisy Creek Glacier	0.53	0.78	0.36	1.01	1.88	0.13	0.15	2.31	1.88	0.22	4.79	0.09
North Cascades National Park/Sandalee Glacier	0.57	0.84	0.38	1.10	1.98	0.14	0.16	2.45	1.98	0.24	5.04	0.10
North Cascades National Park/Silver Glacier	0.65	0.97	0.43	1.27	2.19	0.17	0.18	2.75	2.19	0.27	5.55	0.11
North Cascades National Park/Stout	0.54	0.80	0.37	1.04	1.92	0.13	0.15	2.36	1.92	0.23	4.87	0.10
Olympic National Park/Hoh	0.43	0.63	0.31	0.81	1.62	0.10	0.12	1.94	1.62	0.18	4.14	0.08
Olympic National Park/Hurricane Ridge	0.45	0.66	0.32	0.85	1.68	0.10	0.12	2.02	1.68	0.19	4.28	0.08
Olympic National Park/Steeple Rock	0.47	0.69	0.34	0.90	1.73	0.11	0.13	2.10	1.73	0.20	4.43	0.08
Rocky Mountain National Park/Irene Forest	0.71	1.05	0.45	1.38	2.32	0.18	0.20	2.94	2.32	0.29	5.86	0.12
Rocky Mountain National Park/Irene Meados	0.71	1.05	0.45	1.38	2.32	0.18	0.20	2.94	2.32	0.29	5.86	0.12
Rocky Mountain National Park/Lonepine	0.67	0.99	0.43	1.31	2.24	0.17	0.19	2.81	2.24	0.27	5.66	0.12
Rocky Mountain National Park/Mills	0.69	1.02	0.44	1.35	2.28	0.18	0.20	2.87	2.28	0.28	5.76	0.12
Sequoia and Kings Canyon National Park/Emerald	0.53	0.78	0.37	1.02	1.89	0.13	0.15	2.32	1.89	0.22	4.80	0.09
Sequoia and Kings Canyon National Park/Pear	0.53	0.78	0.37	1.02	1.89	0.13	0.15	2.32	1.89	0.22	4.80	0.09

Table D.10. Estimated particle fraction (Φ) for PAHs in snow.

Park/Site	PHEN % Φ	FLA % Φ	PYR % Φ	CHR/TRI % Φ	B[a]A % Φ	B[b]F % Φ	B[k]F % Φ	B[a]P % Φ	B[e]P % Φ	B[ghi]P % Φ	D[ah]A % Φ	I[cd]P % Φ
Denali National Park/Kahiltna	0.18	5.19	1.31	88.52	25.16	83.56	87.70	90.89	88.04	91.83	94.59	93.20
Denali National Park/McLeod	0.09	2.43	0.71	64.40	11.47	73.25	78.56	85.44	81.27	88.81	91.15	90.16
Denali National Park/Wonder	0.09	2.40	0.70	63.76	11.28	73.02	78.34	85.31	81.12	88.74	91.07	90.10
Glacier National Park/Matcharak	0.22	6.32	1.54	91.89	30.23	85.69	89.49	92.00	89.45	92.50	95.27	93.85
Glacier National Park/Aster	0.05	1.19	0.40	31.97	5.07	60.66	66.36	78.17	72.64	85.17	86.31	86.32
Glacier National Park/Granite Park	0.04	1.07	0.37	27.93	4.49	58.68	64.36	76.94	71.22	84.57	85.46	85.67
Glacier National Park/Preston	0.05	1.10	0.38	28.95	4.64	59.20	64.89	77.26	71.60	84.73	85.68	85.84
Glacier National Park/Snyder	0.04	1.07	0.37	28.09	4.51	58.77	64.44	76.99	71.28	84.60	85.49	85.70
Mt. Rainier National Park/Alta Vista	0.04	0.87	0.31	21.04	3.55	54.77	60.33	74.42	68.35	83.37	83.68	84.35
Mt. Rainier National Park/Edith Cornice	0.04	0.87	0.31	21.04	3.55	54.77	60.33	74.42	68.35	83.37	83.68	84.35
Mt. Rainier National Park/Fell Fields	0.04	1.02	0.36	26.32	4.27	57.84	63.50	76.41	70.61	84.32	85.09	85.40
Mt. Rainier National Park/Mowich	0.03	0.77	0.28	17.39	3.05	52.28	57.71	72.74	66.47	82.57	82.48	83.47
Mt. Rainier National Park/Paradise	0.04	0.90	0.32	21.88	3.66	55.29	60.87	74.76	68.74	83.53	83.93	84.53
Mt. Rainier National Park/Protection	0.04	1.02	0.36	26.32	4.27	57.84	63.50	76.41	70.61	84.32	85.09	85.40
Mt. Rainier National Park/Sugarloaf	0.04	0.95	0.34	23.86	3.93	56.48	62.09	75.53	69.61	83.90	84.47	84.94
Noatak National Preserve/Burial	0.24	7.08	1.69	93.41	33.42	86.82	90.42	92.58	90.19	92.87	95.62	94.20
Noatak National Preserve/Kangilipak	0.23	6.63	1.60	92.57	31.55	86.18	89.89	92.25	89.77	92.66	95.42	94.00
North Cascades National Park/Noisy Creek Glacier	0.03	0.81	0.29	18.61	3.22	53.15	58.63	73.34	67.13	82.85	82.90	83.79
North Cascades National Park/Sandalee Glacier	0.04	0.87	0.31	21.01	3.54	54.75	60.31	74.41	68.34	83.36	83.67	84.35
North Cascades National Park/Silver Glacier	0.04	1.02	0.36	26.29	4.26	57.82	63.48	76.40	70.60	84.31	85.08	85.39
North Cascades National Park/Stout	0.04	0.83	0.30	19.39	3.32	53.69	59.20	73.70	67.54	83.03	83.17	83.98
Olympic National Park/Hoh	0.03	0.64	0.24	12.82	2.43	48.46	53.65	70.06	63.49	81.30	80.50	82.06
Olympic National Park/Hurricane Ridge	0.03	0.67	0.25	13.99	2.59	49.53	54.80	70.83	64.34	81.66	81.08	82.47
Olympic National Park/Steeple Rock	0.03	0.71	0.27	15.24	2.76	50.60	55.94	71.59	65.18	82.02	81.63	82.86
Rocky Mountain National Park/Irene Forest	0.05	1.12	0.38	29.70	4.74	59.57	65.26	77.49	71.86	84.84	85.84	85.96
Rocky Mountain National Park/Irene Meadows	0.05	1.12	0.38	29.70	4.74	59.57	65.26	77.49	71.86	84.84	85.84	85.96
Rocky Mountain National Park/Lonepine	0.04	1.06	0.36	27.47	4.43	58.45	64.12	76.79	71.05	84.50	85.35	85.60
Rocky Mountain National Park/Mills	0.05	1.09	0.37	28.59	4.58	59.02	64.70	77.15	71.46	84.68	85.60	85.78
Sequoia and Kings Canyon National Park/Emerald	0.03	0.81	0.30	18.73	3.23	53.24	58.72	73.40	67.20	82.88	82.95	83.82
Sequoia and Kings Canyon National Park/Pear	0.03	0.81	0.30	18.73	3.23	53.24	58.72	73.40	67.20	82.88	82.95	83.82

Table D.11. Estimated particle fraction (Φ) for PCBs in snow.

Park/Site	PCB 118 % Φ	PCB 138 % Φ	PCB 153 % Φ	PCB 183 % Φ	PCB 187 % Φ
Denali National Park/Kahiltna	11.80	89.34	88.46	90.74	90.74
Denali National Park/McLeod	6.15	80.26	78.80	84.00	84.00
Denali National Park/Wonder	6.07	80.04	78.57	83.84	83.84
Glacier National Park/Matcharak	13.92	91.04	90.28	92.04	92.04
Glacier National Park/Aster	3.27	67.50	65.50	74.61	74.61
Glacier National Park/Granite Park	2.98	65.35	63.29	73.01	73.01
Glacier National Park/Preston	3.05	65.92	63.87	73.44	73.44
Glacier National Park/Snyder	2.99	65.44	63.39	73.08	73.08
Mt. Rainier National Park/Alta Vista	2.49	61.02	58.86	69.73	69.73
Mt. Rainier National Park/Edith Cornice	2.49	61.02	58.86	69.73	69.73
Mt. Rainier National Park/Fell Fields	2.87	64.43	62.35	72.32	72.32
Mt. Rainier National Park/Mowich	2.23	58.19	55.99	67.55	67.55
Mt. Rainier National Park/Paradise	2.55	61.60	59.46	70.17	70.17
Mt. Rainier National Park/Protection	2.87	64.43	62.35	72.32	72.32
Mt. Rainier National Park/Sugarloaf	2.69	62.92	60.80	71.18	71.18
Noatak National Preserve/Burial	15.30	91.91	91.22	92.72	92.72
Noatak National Preserve/Kangilipak	14.49	91.42	90.69	92.34	92.34
North Cascades National Park/Noisy Creek Glacier	2.32	59.19	57.00	68.32	68.32
North Cascades National Park/Sandalee Glacier	2.49	61.00	58.84	69.71	69.71
North Cascades National Park/Silver Glacier	2.86	64.41	62.33	72.30	72.30
North Cascades National Park/Stout	2.37	59.80	57.62	68.79	68.79
Olympic National Park/Hoh	1.87	53.78	51.55	64.08	64.08
Olympic National Park/Hurricane Ridge	1.97	55.04	52.81	65.07	65.07
Olympic National Park/Steeple Rock	2.06	56.27	54.05	66.05	66.05
Rocky Mountain National Park/Irene Forest	3.11	66.32	64.29	73.74	73.74
Rocky Mountain National Park/Irene Meadows	3.11	66.32	64.29	73.74	73.74
Rocky Mountain National Park/Lonepine	2.95	65.10	63.03	72.82	72.82
Rocky Mountain National Park/Mills	3.03	65.72	63.67	73.29	73.29
Sequoia and Kings Canyon National Park/Emerald	2.32	59.28	57.10	68.39	68.39
Sequoia and Kings Canyon National Park/Pear	2.32	59.28	57.10	68.39	68.39

Chapter 4: Conclusions

The accumulation of SOCs in lichen, 2-year old conifer needles, XAD-based passive air sampling devices (PASDs), and snow was investigated. An analytical method for the measurement of 56 SOCs in lichen and conifer needles, and 73 SOCs PASDs was developed and validated. The analytical method for lichen and conifer needles was used to measure SOCs in samples collected in summer of 2004 and 2005 from national parks in the western U.S. The analytical method for PASDs was used to measure SOCs in PASDs deployed from summer 2005 to summer 2006 at the same sites from which lichen was collected. SOC concentrations in the annual snowpack samples collected the in winter of 2003, 2004, and 2005 were also included in the media comparison.

The trace analysis of SOCs in vegetation required that matrix interference be minimized. Lichen and conifer needle samples contained lipid compounds that were co-extracted with SOCs. Therefore, the analytical method was optimized for the extraction of SOCs from lichen and conifer needles while efficiently removing matrix interferences to maximize the number of detectable SOCs.

The lichen and conifer needle analytical method developed included the use of pressurized liquid extraction (PLE) and several extract purification steps. Dichloromethane (DCM) was used as the PLE extraction solvent and the subsequent purification steps included two water extractions and silica solid phase extraction (SPE) using 100% hexane, 1:1 hexane:DCM, and 100% DCM as the elution solvents. These steps efficiently removed interferences in lichen; however, conifer needles also required gel-permeation chromatography (GPC) to further purify the extract. The average method percent recoveries for lichen and conifer needles for 53 SOCs, including pesticides, polycyclic aromatic hydrocarbons

(PAHs), and polychlorinated biphenyls (PCBs), were 75.9 ± 13.7 (RSD) % and 74.8 ± 3.8 (RSD) %, respectively. The analytical method for the measurement of SOCs in PASDs only required the use of PLE to extract the XAD, with ethyl ether (EA) and DCM as the solvents. The average method percent recovery of pesticides, PAHs, and PCBs from PASDs was 93.7 ± 5.6 (RSD) %.

To examine the potential preferential accumulation of SOCs in lichen, conifer needles, PASDs, and snow, SOC concentrations in these media collected from the same sites in Sequoia NP, Rocky Mtn. NP, Olympic NP, Glacier NP, and Denali NP were compared. Lichen and 2-year old conifer needles were collected in 2004, PASDs were deployed for 1 year from summer 2005 to summer 2006, and snow was collected in 2003 and 2004. Although the exposure period of the four media did not overlap, the percent of the total concentrations were expected to remain the same from year to year. Statistical analysis of the percent SOC concentrations in the media from the 5 sites were performed using the Tukey-Kramer honestly significant difference (HSD) tests.

In Sequoia NP, Olympic NP, and Glacier NP, the highest pesticide, PAH, and PCB concentrations were measured in lichen. In Rocky Mtn NP, the highest total pesticide and PCB concentrations were measured in conifer needles and the highest PAH concentration was measured in lichen. In Denali NP, the highest total pesticide and PAH concentrations were also measured in conifer needles. In Denali NP, the highest total PCB concentrations were measured in snow. To account for the spatial differences between the parks, the percent of the total pesticide, PAH, and PCB concentration was used in the statistical analyses and park was included in the Tukey-Kramer HSD test as a factor.

Lichen preferentially accumulated endosulfan sulfate and cis-chlordane while conifer needles also preferentially accumulated cis-chlordane. PASDs preferentially accumulated HCB. Most of the current-use pesticides, including dacthal, chlorpyrifos and dieldrin, had enhanced accumulation in snow. The accumulation of HCHs was not statistically different among the four media.

Gas and particle phase PAHs were measured most frequently in lichen and snow while PCBs were measured in all four media. One gas phase PAH, fluorene preferentially accumulated in PASDs. Differences between the percent PAH concentrations in lichen and snow were not significant for most PAHs, except for acenaphthene, which was only measured in snow, and particle phase benzo[ghi]perylene. In general, higher percent gas and particle phase PAH concentrations were measured in snow compared to lichen, which may indicated that snow preferentially accumulated gas and particle phase PAHs. The percent PCB concentrations were not significantly different among the four media; therefore, PCBs did not preferentially accumulate in any one medium.

The SOC physical-chemical properties were evaluated to determine which properties govern the accumulation mechanisms for each medium. Reduced multiple linear regression (MLR) models were constructed from a full model through step-wise backward elimination of the non-significant variables. The reduced model only contained significant explanatory variables with p-values ≤ 0.05. The environmental parameters that were included in the full model to account for park differences were temperature (K), precipitation (cm), ammonia nitrate concentration ($\mu g/m^3$), elevation (m), population within a 150 km radius around the site, distance to the western coastline of the U.S. (km), and agriculture intensity within 150 km radius around site. The maximum average temperatures over the exposure period for each medium were use to calculate temperature-corrected air-water partition coefficient (K_{AW}), octanol-air partition coefficient (Log K_{OA}), and the estimated fraction of SOCs that exist in the particle phase (Φ). The physical-chemical properties were evaluated to determine if the accumulation of each SOC in the media was significantly correlated with these properties. MLR models were constructed for lichen, conifer needles, PASDs, and snow and encompassed all the sites from which each medium was collected (82, 85, 33, and 30 sites, respectively).

For lichen, most SOCs were not significantly correlated with SOC physical-chemical properties. However, dacthal, endosulfan I, II, endosulfan sulfate, fluorene, and fluoranthene accumulation had a significant positive correlation with K_{AW} and a significant negative correlation with Log $K_{OA,}$ and/or Φ. In conifers, accumulation of dacthal, endosulfan I and II had a significant positive correlation with K_{AW} and a significant negative correlation with Log Koa and Φ. A positive correlation between SOC concentration and K_{AW} and a negative correlation with Log K_{OA} and Φ indicated that higher concentrations of SOCs were accumulated in lichen and conifer needles when the SOCs were in the gas phase compared to the particle phase.

In PASDs, the accumulation of dacthal, endosulfan I and II, endosulfan sulfate, trans-chlordane, trans-nonachlor, and trifluralin had a significant positive correlation with K_{AW} and a significant negative correlation with Log K_{OA} and Φ, and endosulfan sulfate accumulation had a significant negative correlation with Log K_{OA} and Φ. The direction of these correlations were similar to lichen and conifer needles and indicated that the accumulation of SOCs increased when the SOCs were in the gas phase compared to the particle phase.

In snow, the concentration of most SOCs had a significant relationship with the physical-chemical properties. In general, the concentrations of endosulfan I, II, dieldrin, trans-chlordane, trans-nonachlor, trifluralin, phenanthrene, fluoranthene, pyrene, chrysene/triphenylene, benzo[a]pyrene, benzo[e]pyrene, indeno[1,2,3-cd]perylene and benzo[ghi]perylene had a negative correlation with K_{AW} and a significant positive correlation with Log K_{OA} and Φ. The accumulation of PCBs in snow was not significantly correlated with any of the physical-chemical properties. The direction of the correlation indicated that higher SOC concentrations were accumulated in snow when the SOCs were in the particle phase compared to the gas phase.

Several SOCs were not significantly correlated with the physical-chemical properties in each medium, particularly HCB and HCHs. These compound are ubiquitous on the global scale and this may affect the ability to observe a significant relationship with the physical-chemical properties. Significant correlations were not observed for trans-chlordane, nonachlors phenanthrene, pyrene, chrysene/triphenylene in lichen, trans-chlordane, trans-nonachlor, phenanthrene in conifer needles, fluorene and phenanthrene in PASDs, and benzo[b]fluoranthene and benzo[k]fluoranthene in snow. This may be attributed to low measured SOC concentrations, SOC measurements in a small number of parks, high frequency of ½ EDLs that were substituted for non-detected SOC concentrations, and the inefficient adjustment of park differences by the environmental parameters that were included in the MLR models.

Recommendations for the type of medium that may be used to measure SOCs in the atmosphere can be made based on the results from this research. Snow is the preferred medium for pesticide, PAH, and PCB accumulation at cold, high elevation remote sites during the winter. Both gas and particle phase SOCs preferentially accumulated in snow compared to the other media. There are some limitations to snow, however, including a higher difficulty to collect and transport samples compared to the other media and snow SOC concentrations only represents air concentrations during winter and spring. Lichen may be used in place of snow at sites where snowfall is limited, or where collection and transport is too difficult. Lichen accumulated gas and particle phase SOCs at concentrations lower than snow but not significantly different. Also, lichen is preferred for studies interested in long-term atmospheric SOC concentrations the ecological inputs of SOCs through vegetation in warmer regions. However, the exposure period of lichen cannot be determined. If lichen is not present in the ecosystem, or temporal studies, conifer needles may be used. Because the age of the conifer needles can be determined, conifer needles with a specific exposure period can be selected. However, conifer needles may be limited to the accumulation of gas phase SOCs. Finally, PASDs are recommended for year-long studies specifically interested in gas phase pesticides, especially HCB and HCHs, and gas phase PAHs at sites where snow, lichen, and conifer needles are limited.

Appendix E

Appendix E: Lichen, conifer needles, PASDs, and snow databases

Table E.1 Lichen Database.

Abbreviation	NAME	Units	Description
TFNL	Trifluralin	ng/g lipid	Normalized to lipid content
HCB	Hexachlorobenzene	ng/g lipid	Normalized to lipid content
aHCH	Hexachlorcyclohexane	ng/g lipid	Normalized to lipid content
bHCH	Hexachlorcyclohexane	ng/g lipid	Normalized to lipid content
gHCH	Hexachlorcyclohexane	ng/g lipid	Normalized to lipid content
dHCH	Hexachlorcyclohexane	ng/g lipid	Normalized to lipid content
TRLTE	Triallate	ng/g lipid	Normalized to lipid content
MBZN	Metribuzin	ng/g lipid	Normalized to lipid content
HCLR	Heptachlor	ng/g lipid	Normalized to lipid content
DCPA	Dacthal	ng/g lipid	Normalized to lipid content
Aldrin	Aldrin	ng/g lipid	Normalized to lipid content
CLPYR	Chlorpyrifos	ng/g lipid	Normalized to lipid content
o-CLDN	Chlordane, oxy	ng/g lipid	Normalized to lipid content
t-CLDN	Chlordane, trans	ng/g lipid	Normalized to lipid content
ENDO I	Endosulfan I	ng/g lipid	Normalized to lipid content
c-CLDN	Chlordane, cis	ng/g lipid	Normalized to lipid content
t-NCLR	Nonachlor, trans	ng/g lipid	Normalized to lipid content
Dieldrin	Dieldrin	ng/g lipid	Normalized to lipid content
PCB	Polychlorinated biphenyl	ng/g lipid	Normalized to lipid content
PCB	Polychlorinated biphenyl	ng/g lipid	Normalized to lipid content
PCB	Polychlorinated biphenyl	ng/g lipid	Normalized to lipid content
Endrin	Endrin	ng/g lipid	Normalized to lipid content
ENDO II	Endosulfan II	ng/g lipid	Normalized to lipid content
c-NCLR	Nonachlor, cis	ng/g lipid	Normalized to lipid content
Endrin A	Endrin aldehyde	ng/g lipid	Normalized to lipid content
ENDO S	Endosulfan Sulfate	ng/g lipid	Normalized to lipid content
PCB	Polychlorinated biphenyl	ng/g lipid	Normalized to lipid content
PCB	Polychlorinated biphenyl	ng/g lipid	Normalized to lipid content
PCB	Polychlorinated biphenyl	ng/g lipid	Normalized to lipid content
PCB	Polychlorinated biphenyl	ng/g lipid	Normalized to lipid content
Mirex	Mirex	ng/g lipid	Normalized to lipid content
EPTC	Ethyldipropylthiocarbamate	ng/g lipid	Normalized to lipid content
ETDZL	Etridiazole	ng/g lipid	Normalized to lipid content
PBLT	Pebulate	ng/g lipid	Normalized to lipid content
ACY	Acenaphthylene	ng/g lipid	Normalized to lipid content
ACE	Acenaphthene	ng/g lipid	Normalized to lipid content
FLO	Fluorene	ng/g lipid	Normalized to lipid content
PHE	Phenanthrene	ng/g lipid	Normalized to lipid content
ANT	Anthracene	ng/g lipid	Normalized to lipid content
M-PTHN	Methyl parathion	ng/g lipid	Normalized to lipid content
FLA	Fluoranthene	ng/g lipid	Normalized to lipid content
PYR	Pyrene	ng/g lipid	Normalized to lipid content
MXCLR	Methoxychlor	ng/g lipid	Normalized to lipid content
B[a]A	Benzo(a)anthracene	ng/g lipid	Normalized to lipid content
CHR/TRI	Chrysene + Triphene	ng/g lipid	Normalized to lipid content

B[b]F	Benzo(b)fluoranthene	ng/g lipid	Normalized to lipid content
B[k]F	Benzo(k)fluoranthene	ng/g lipid	Normalized to lipid content
B[e]P	Benzo(e)pyrene	ng/g lipid	Normalized to lipid content
B[a]P	Benzo(a)pyrene	ng/g lipid	Normalized to lipid content
I[1,2,3-cd]p	Indeno(1,2,3-cd)pyrene	ng/g lipid	Normalized to lipid content
D[ah]A	Dibenz(a,h)anthracene	ng/g lipid	Normalized to lipid content
B[ghi]P	Benzo(ghi)perylene	ng/g lipid	Normalized to lipid content

Site	Wet Weight g	% moisture	% lipid	g lipid	TFLN ng/g lipid	HCB ng/g lipid	a-HCH ng/g lipid	b-HCH ng/g lipid	g-HCH ng/g lipid	d-HCH ng/g lipid
DENA1	10	15.87	5.59	0.47		5.1	3.2	-1.3	-0.72	-0.72
DENA1	10.2	16.41	8.43	0.719		3.4	2	-0.87	-0.47	-0.47
DENA1	10.1	15.41	-6.32	0.594		4	2.4	-1	-0.57	-0.57
DENA2	10	15.34	22.6	1.92		0.48	0.33	-0.33	-0.18	-0.18
DENA2	10.1	15.97	22.3	1.89		0.52	0.43	-0.33	-0.18	-0.18
DENA2	10.1	16.62	21.4	1.8		0.46	0.43	-0.35	-0.19	-0.19
DENA3	10.1	12.92	25.9	2.28		0.41	0.43	-0.27	-0.15	-0.15
DENA3	10	13.14	26.1	2.27		0.44	0.4	-0.28	-0.15	-0.15
DENA3	10.1	12.31	25.8	2.29		0.44	0.35	-0.27	-0.15	-0.15
DENA4	10.2	11.16	20	1.81			0.49	-0.34	-0.19	-0.19
DENA4	10.5	10.39	20	1.88		0.35	0.54	-0.33	-0.18	-0.18
DENA4	10.2	10.77	22.9	2.08		0.79	0.55	-0.3	-0.16	-0.16
DENA5	10.1	16.1	20.3	1.72		21	15	-1.9	5.7	-1.1
DENA5	10.1	16.1	20.3	1.72			0.67	-0.36	-0.2	-0.2
DENA5	9.9	14.7	19.1	1.61		0.77	0.8	-0.39	-0.21	-0.21
DENA5	10.2	17.39	20.9	1.76		0.91	0.99	-0.36	-0.19	-0.19
DENA6	10.2	20.21	3.98	0.32		7.5	2.6	-1.9	-1.1	-1.1
GAAR1	10.3	14.98	15.6	1.63			-0.4	-0.46	-0.39	-0.75
GAAR1	10.1	16.5	19.3	1.63			-0.4	-0.46	-0.39	-0.75
GLAC1	10.2	38.78	2.76	0.173	1	96	36	-3.6	61	-2
GLAC1	10.3	36.2	3.27	0.215	1	74	95	-2.9	15	-1.6
GLAC1	10.2	37.12	2.52	0.162	1	87	30	-3.9	52	-2.1
GLAC2	11.3	78.85	1.8	0.043		70	37	-15	52	-7.9
GLAC2	10.9	77.13	1.96	0.049		62	38	-13	54	-7
GLAC2	11.1	74.4	1.98	0.056		81	30	-11	58	-6.1
GLAC3	10.3	72.63	2.77	0.078		75	58	-8	59	-4.4
GLAC3	10.4	71.61	2.39	0.071		95	66	-8.9	68	-4.8
GLAC3	10.4	71.62	2.54	0.075		82	140	-8.3	70	-4.5
GLAC4	10.7	62.52	3.24	0.13		13	24	-4.8	59	-2.6
GLAC4	10.4	61.51	3.6	0.144		12	26	-4.3	44	-2.4
GLAC4	10.5	65.71	2.98	0.107		17	31	-5.8	60	-3.2
GLAC5	10.6	55.95	4.06	0.19		50	40	-3.3	56	-1.8
GLAC5	10.8	60.51	2.78	0.119		59	53	-5.3	63	-2.9
GLAC5	10.8	61.76	2.41	0.1		52	52	-6.3	70	-3.4
GLAC5	10.1	42.67	3.69	0.214		22	18	-3.5	110	-5.7
MORA1	10.9	58.16	7.29	0.333		6	5.9	-1.9	5	-1
MORA1	10.6	55.81	9.55	0.448		4.9	4.5	-1.4	3.1	-0.76
MORA1	10.8	58.01	9.62	0.436		8.4	12	-1.4	6.7	-0.78
MORA2	10.9	33.76	4.67	0.67		5.3	8.7	-0.93	4.1	-0.51
MORA2	10.8	53.44	4.39	0.586		5.5	9	-1.1	4.1	-0.58
MORA2	10.7	41.29	5.05	0.581		6.1	12	-1.1	5	-0.59
MORA3	10.4	14.41	4.2	0.745		15	47	-1.4	20	-0.76
MORA3	10.3	13.3	4.97	0.566		13	41	-1.3	16	-0.72
MORA3	10.6	13.82	5.52	0.503		13	42	-1.4	14	-0.76
MORA4	10.4	60.58	5.78	0.446		10	20	-1.4	12	-0.76
MORA4	10.1	59.23	5.2	0.475		12	19	-1.3	12	-0.72
MORA4	10.3	60.95	4.61	0.448		12	29	-1.4	14	-0.76
NOAT1	10.3	13.36	20.6	1.83		0.84	0.93	-0.34	-0.19	-0.19
NOAT1	10.1	12.62	20.1	1.77		0.85	0.62	-0.35	-0.19	-0.19
NOAT1	10.2	27	21.2	1.58		0.95	0.63	-0.4	-0.22	-0.22
NOAT3	10.1	12.51	23.1	2.04		0.64	0.61	-0.31	-0.17	-0.17
NOAT3	10.1	12.23	20.4	1.81		0.48	0.45	-0.35	-0.19	-0.19
NOAT3	10.4	11.17	22	2.03		0.42	0.58	-0.31	-0.17	-0.17
NOAT5	10.2	10.42	22.3	2.04		1.1	0.59	-0.31	-0.17	-0.17
NOAT5	10.1	11.43	20.2	1.81		1.3	0.66	-0.35	-0.19	-0.19
NOAT5	10.6	10.68	21.8	2.07		0.94	0.71	-0.3	-0.16	-0.16
OLYM2	10.1	61.25	2.69	0.105		8.4	12	-5.9	-3.2	-3.2
OLYM2	10.3	67.99	3.31	0.109		10	19	-5.7	-3.1	-3.1
OLYM2	10.8	69.77	3.91	0.128		8.2	15	-4.9	-2.7	-2.7
OLYM3	10.3	66.58	2.35	0.081	-0.61	28	47	-7.7	21	-4.2
OLYM3	10.4	59.98	7.93	0.33	-0.15	9.9	13	-1.9	4.6	-1
OLYM3	10.2	61.27	3.2	0.126	-0.39	20	40	-4.9	16	-2.7
OLYM4	10.3	17.2	0.871	0.074	-0.66	14	56	-8.4	53	-4.6
OLYM4	10.2	18.65	3.92	0.326	-0.15	5.1	17	-1.9	11	-1
OLYM4	10.3	17.87	0.893	0.076	-0.65	13	39	-8.3	71	-4.5
OLYM5	10.2	58.95	1.01	0.042	1.9	35	120	-15	39	-8.1
OLYM5	10.3	58.98	0.722	0.031	-1.6	40	85	-20	60	-11
OLYM5	10.3	59.73	1.07	0.045	4	29	79	-14	39	-7.6
OLYM5	10.2	55.56	5.74	0.26		16	36	-2.4	11	-1.3
ROMO6	10.2	22.51	3.42	3.42		1.2	0.82	-0.18	0.37	-0.1
ROMO6	10	12.8	4.29	4.29		3.2	3	-0.15	0.69	-0.079
ROMO6	10.1	24.64	4.75	4.75		1.1	2.2	-0.13	0.42	-0.072
SEKI2	10.7	16.12	6.06	0.544		9.3	4	-1.1	5.2	-0.63
SEKI2	10.4	15.04	3.88	0.343		12	4.9	-1.8	8.2	-0.99
SEKI2	10	14.61	4.12	0.352		12	4.5	-1.8	8.7	-0.97
SEKI3	10	9.378	5.4	0.489	0.83	10	4.2	-1.3	4.1	-0.7
SEKI3	10	10.19	5.49	0.494	1	9.6	3.4	-1.3	4.1	-0.69
SEKI3	10	10.18	5.52	0.496	1	10	3.9	-1.3	3.6	-0.69
SEKI4	10.1	14.99	5.47	0.469		15	10	-1.3	12	-0.73
SEKI4	10.3	13.34	5.6	0.5		14	13	-1.2	14	-0.68
SEKI4	10	13.43	4.07	0.353		16	14	-1.8	13	-0.96
SEKI5	10.1	17.48	4.41	0.368		17	17	-1.7	26	-0.93
SEKI5	10	14.89	4.80	0.418		19	15	-1.5	19	-0.82
SEKI5	10.1	18.32	3.95	0.325		16	17	-1.9	28	-1

Site	Wet Weight g	% moisture	% lipid	g lipid	TFLN ng/g lipid	HCB ng/g lipid	a-HCH ng/g lipid	b-HCH ng/g lipid	g-HCH ng/g lipid	d-HCH ng/g lipid
BAND 1	10.4	6.436	4.06	0.3950		12	9.8	-1.9	-1.6	-3.1
BAND 2-1	10.3	7.734	17	1.6148		2.7	2.7	-0.46	1.8	-0.76
BAND 2-2	10.3	8.836	3.49	0.3280		11	13	-2.3	9	-3.7
BAND 3	10.1	8.119	3.25	0.3020		9.1	5.2	-2.5	2.2	-4.1
BAND 4	10.4	8.389	5.2	0.4955		10	12	1.8	7.5	-2.5
BAND 5	10.2	11.98	3.18	0.2858	0.51	17	17	-2.6	13	-4.3
BIBE 4	12.0	7.737	2.68	0.2972		1.9	-2.2	-2.5	-2.1	-4.1
BIBE 5	9.8	8.083	3.72	0.3362		5	3.9	-2.2	4.3	-3.6
CRLA 1	9.0	14.69	5.33	0.4090		7	8.3	-1.8	2	-3
CRLA 2	10.4	11.8	4.28	0.3923		9.4	4.6	-1.9	1.6	-3.1
CRLA 3-1	10.0	12.1	3.68	0.3235		14	15	-2.3	5	-3.8
CRLA 3-2	10.8	11.5	4.21	0.4023		10	11	-1.9	3.3	-3
CRLA 4	10.1	12.01	1.43	0.1272		45	34	-5.9	11	-9.6
GLBA 1	10.7	62.66	2.78	0.1112		84	41	-6.7	9.7	-11
GLBA 2	10.1	57.87	2.51	0.1070		50	25	-7	7.8	-11
GLBA 3	10.4	73.63	3.75	0.1028		44	20	-7.3	-6.1	-12
GLBA 4	11.3	63.91	6.03	0.2458		17	26	-3	7.3	-5
GRSA 2	10.1	4.309	0.535	0.0518		67	38	-14	17	-24
GRSA 4	10.3	7.92	2.02	0.1915	0.63	64	26	-3.9	5	-6.4
GRTE 1-1	10	11.59	11.4	1.0080		12	10	-0.74	6	-1.2
GRTE 1-2	10.3	13.07	6.63	0.5937	0.12	17	15	-1.3	8.6	-2.1
GRTE 2	10.7	9.284	4.45	0.4320	0.14	9.2	5.5	-1.7	3.3	-2.8
KATM 1	10.2	14.22	6.25	0.5468		31	13	-1.4	2.9	-2.2
KATM 2	10.2	17.15	5.08	0.4293		34	12	-1.7	4.2	-2.9
KATM 3	10.2	15.56	5.29	0.4557		26	12	-1.6	3.4	-2.7
KATM 4	10.2	16.53	6.46	0.5497		17	4.9	-1.4	1.2	-2.2
KATM 5	10.3	17.27	7.14	0.6085		19	7.2	-1.2	2.1	-2
KATM 6	10.8	63.34	4.33	0.1715		24	8.8	-4.4	-3.7	-7.1
LAVO 1	10	8.817	5.83	0.5318		7.6	4.9	-1.4	1.9	-2.3
LAVO 2	10.5	10.24	3.96	0.3735		11	11	-2	4.1	-3.3
LAVO 3	10.1	10.84	4.14	0.3730		15	17	-2	4.7	-3.3
LAVO 4	10.3	10.87	5.61	0.5155		10	10	-1.4	3.6	-2.4
LAVO 5	10.1	10.87	9.49	0.8545						
NOCA 1	10.3	16.14	5.23	0.4520		8.2	5.6	-1.7	2.6	-2.7
NOCA 2	10.6	40.34	2.77	0.1752		60	20	-4.3	8.1	-7
NOCA 3	10.1	17.29	6.98	0.5835		8.2	13	-1.3	5.6	-2.1
NOCA 4	10.5	20.69	6.83	0.5685		8	14	-1.3	5.6	-2.2
NOCA 5	10.2	18.37	7.37	0.6135	0.17	9.3	12	-1.2	5.6	-2
STLE 1-1	11.8	30.7	9.34	0.7640		6.1	4.2	-0.98	1.4	-1.6
STLE 1-2	10.2	20.04	11.2	0.9140		4.5	2.8	-0.82	0.74	-1.3
STLE 1-3	10.4	44.49	3.12	0.1803		56	30	-4.1	6.3	-6.8
STLE 2-1	10.7	69.08	1.88	0.0623		86	110	-12	23	-20
STLE 2-2	10.4	71.09	3.58	0.1075		5.7	7.9	-6.9	-5.9	-11
STLE 3	10	20.72	10.9	0.8660		8	15	-0.86	3.6	-1.4
STLE 4-1	10.5	33.14	11.2	0.7870		6.7	6.8	-0.95	2.3	-1.6
STLE 4-2	10.2	29.4	2.43	0.1752		100	42	-4.3	12	-7
STLE 5-1	9.9	37.27	2.29	0.1420	-0.2	16	7.8	-5.3	-4.4	-8.6
STLE 5-2	10	49.82	3.15	0.1580		84	53	-4.7	15	-7.8
WRST 1-1	10.3	18.05	3.12	0.2633		58	17	-2.8	6.6	-4.7
WRST 1-2	10.1	18.39	3.27	0.2695		64	27	-2.8	8.8	-4.5
WRST 1-3	10.2	19.92	0.857	0.0700		150	54	-11	14	-17
WRST 3	10.4	13.61	5.74	0.5155		18	8.3	-1.4	1.9	-2.4
WRST 5-1	10.7	11.76	2.41	0.2280		12	10	-3.3	-2.8	-5.4
WRST 5-2	10.5	11.1	5.69	0.5310		9.3	7.1	-1.4	1.6	-2.3
YOSE 1	10.2	6.635	5.14	0.4893	0.59	3.4	2	-1.5	-1.3	-2.5
YOSE 2-1	10	9.609	3.54	0.3200	1.1	22	3.3	-2.3	3.6	-3.8
YOSE 2-2	10.1	10.59	7.46	0.6735	1	8	2.3	-1.1	1.9	-1.8
YOSE 3	10.1	9.799	1.25	0.1142	4	32	16	-6.5	8.6	-11

Site	TRLTE ng/g lipid	HCLR ng/g lipid	DCPA ng/g lipid	Aldrin ng/g lipid	CLPYR ng/g lipid	o-CLDN ng/g lipid	t-CLDN ng/g lipid	ENDO I ng/g lipid	c-CLDN ng/g lipid	t-NCLR ng/g lipid	Dieldrin ng/g lipid	PCB 74 ng/g lipid	PCB 101 ng/g lipid
DENA1	-0.62	-1.1	-0.15	-1.8	-0.18	-1.2	-0.15	-0.74	-1.9	-0.25	-5.6	-6.5	-2.6
DENA1	-0.41	-0.71	0.12	-1.2	-0.11	-0.77	-0.098	-0.49	-1.3	-0.16	-3.7	-4.2	-1.7
DENA1	-0.49	-0.86	0.13	-1.4	-0.14	-0.93	-0.12	-0.59	-1.5	-0.2	-4.5	-5.1	-2
DENA2	-0.15	-0.27	0.51	-0.45	-0.043	-0.29	-0.037	0.57	-0.47	-0.061	-1.4	-1.6	-0.63
DENA2	-0.15	-0.27	0.43	-0.45	-0.044	-0.29	-0.037	0.5	-0.48	-0.062	-1.4	-1.6	-0.64
DENA2	-0.16	-0.28	0.42	-0.48	-0.046	-0.31	-0.039	0.35	-0.5	-0.065	-1.5	-1.7	-0.67
DENA3	-0.13	-0.22	0.67	-0.38	-0.036	-0.24	-0.031	0.54	-0.4	-0.052	-1.2	-1.3	-0.53
DENA3	-0.13	-0.23	0.7	-0.38	-0.036	-0.24	-0.031	0.34	-0.4	-0.052	-1.2	-1.3	-0.54
DENA3	-0.13	-0.22	0.57	-0.38	-0.036	-0.24	-0.031	0.47	-0.4	-0.051	-1.2	-1.3	-0.53
DENA4	-0.16	-0.28	0.53	-0.48	-0.046	-0.31	-0.039	0.57	-0.5	-0.065	-1.5	-1.7	-0.67
DENA4	-0.16	-0.27	0.49	-0.46	-0.044	-0.29	-0.038	0.67	-0.48	-0.063	-1.4	-1.6	-0.65
DENA4	-0.14	-0.25	0.81	-0.41	-0.04	-0.27	-0.034	0.82	-0.43	-0.057	-1.3	-1.5	-0.58
DENA5	-0.9	-1.6	0.88	-2.7	-0.25	-1.7	-0.22	5.7	-2.8	-0.36	-8.2	-9.4	-3.8
DENA5	-0.17	-0.3	0.48	-0.5	-0.048	-0.32	-0.041	0.66	-0.52	-0.068	-1.5	-1.8	-0.7
DENA5	-0.18	-0.32	1.2	-0.53	-0.051	-0.34	-0.044	0.75	-0.56	-0.073	-1.6	-1.9	-0.75
DENA5	-0.17	-0.29	0.98	-0.49	-0.047	-0.31	-0.04	1.1	-0.51	-0.067	-1.5	-1.7	-0.69
DENA6	-0.9	-1.6	-0.23	-2.7	-0.25	-1.7	-0.22	3.6	-2.8	-0.36	-8.2	-9.4	-3.8
GAAR1	-0.35	-0.96	0.5	-1.1	-0.13	-0.6	-0.031	0.62	-0.21	-0.017	-0.79	-3.6	-1
GAAR1	-0.35	-0.96	0.4	-1.1	-0.13	-0.6	-0.031	0.44	-0.21	-0.017	-0.79	-3.6	-1
GLAC1	11	-3	440	-5	2.2	-3.2	2.2	29	-5.2	2.7	-15	-18	-7
GLAC1	-1.4	-2.4	17	-4	-0.38	-2.6	1.3	6.2	-4.2	1.8	-12	-14	-5.7
GLAC1	8.6	-3.2	330	-5.3	-0.51	-3.4	1.9	27	-5.6	1.5	-16	-19	-7.5
GLAC2	-6.8	-12	320	-20	5	-13	3.6	31	-21	-2.7	-62	-71	-28
GLAC2	-6	-10	290	-18	5.2	-11	2.7	34	-19	-2.4	-54	-62	-25
GLAC2	12	-9.1	390	-15	3.4	-9.8	3.9	36	-16	4.3	-47	-54	-22
GLAC3	-3.7	-6.5	310	-11	-1.1	-7.1	4.8	32	-12	6.3	-34	-39	-16
GLAC3	-4.1	-7.2	410	-12	-1.2	-7.8	6.1	51	-13	6	-38	-43	-17
GLAC3	-3.9	-6.8	340	-11	-1.1	-7.4	5.9	35	-12	5	-35	-41	-16
GLAC4	6.6	-3.9	100	-6.6	7.9	-4.2	2.4	56	-6.9	3.2	-20	-23	-9.3
GLAC4	7.1	-3.5	110	-6	7.3	-3.8	2.8	54	-6.3	3.3	-18	-21	-8.4
GLAC4	13	-4.8	170	-8	16	-5.2	2.7	80	-8.4	3.2	-25	-28	-11
GLAC5	15	-2.7	190	-4.5	-0.43	-2.9	5.5	31	-4.8	6.2	-14	-16	-6.4
GLAC5	14	-4.3	230	-7.3	-0.7	-4.7	5.9	38	-7.6	6.1	-22	-26	-10
GLAC5	9.3	-5.1	240	-8.6	-0.83	-5.6	7.1	35	-9.1	5.8	-27	-31	-12
GLAC5	12	-7.3	160	-8.7	15	-4.6	2.9	70	-1.6	2.7	-6.1	-28	-7.6
MORA1	-0.88	-1.5	11	-2.6	4.1	-1.7	0.92	12	-2.7	0.53	-8	-9.1	-3.7
MORA1	-0.65	-1.1	7	-1.9	3.4	-1.2	0.93	13	-2	0.72	-5.9	-6.8	-2.7
MORA1	-0.67	-1.2	14	-2	5	-1.3	1.2	19	-2.1	0.88	-6.1	-7	-2.8
MORA2	-0.43	-0.76	8.8	-1.3	3.6	-0.83	0.75	12	-1.4	0.78	-3.9	-4.5	-1.8
MORA2	-0.5	-0.87	7.7	-1.5	2.9	-0.94	0.78	11	-1.5	0.53	-4.5	-5.2	-2.1
MORA2	-0.5	-0.88	11	-1.5	4.4	-0.95	0.85	12	-1.6	0.93	-4.6	-5.2	-2.1
MORA3	-0.65	-1.1	19	-1.9	9	-1.2	2.8	34	3.6	2.2	-5.9	-6.8	-2.7
MORA3	-0.61	-1.1	14	-1.8	7	-1.2	1.5	20	-1.9	1.2	-5.6	-6.4	-2.6
MORA3	-0.65	-1.1	19	-1.9	8.3	-1.2	2.6	27	3	2.1	-5.9	-6.8	-2.7
MORA4	-0.65	-1.1	16	-1.9	7.4	-1.2	1.9	17	-2	1.1	-5.9	-6.8	-2.7
MORA4	-0.61	-1.1	18	-1.8	8.7	-1.2	2.2	30	2.3	1.9	-5.6	-6.4	-2.6
MORA4	-0.65	-1.1	13	-1.9	8.2	-1.2	3.2	23	4.2	2.1	-5.9	-6.8	-2.7
NOAT1	-0.16	-0.28	0.82	-0.47	-0.045	-0.3	-0.039	0.82	-0.49	-0.064	-1.4	-1.7	-0.66
NOAT1	-0.16	-0.29	0.58	-0.49	-0.047	-0.31	-0.04	0.77	-0.51	-0.066	-1.5	-1.7	-0.69
NOAT1	-0.18	-0.32	0.61	-0.55	-0.052	-0.35	-0.045	0.75	-0.57	-0.075	-1.7	-1.9	-0.77
NOAT3	-0.14	-0.25	0.62	-0.42	-0.04	-0.27	-0.035	0.84	-0.44	-0.058	-1.3	-1.5	-0.59
NOAT3	-0.16	-0.28	0.65	-0.48	-0.046	-0.31	-0.039	0.73	-0.5	-0.065	-1.5	-1.7	-0.67
NOAT3	-0.14	-0.25	0.46	-0.42	-0.041	-0.27	-0.035	0.59	-0.45	-0.058	-1.3	-1.5	-0.6
NOAT5	-0.14	-0.25	0.78	-0.42	-0.04	-0.27	-0.035	0.82	-0.44	0.081	-1.3	-1.5	-0.6
NOAT5	-0.16	-0.28	0.73	-0.48	-0.046	-0.31	-0.039	0.92	-0.5	-0.065	-1.5	-1.7	-0.67
NOAT5	-0.14	-0.25	0.58	-0.42	-0.04	-0.27	-0.034	0.79	-0.44	-0.057	-1.3	-1.5	-0.59
OLYM2	-2.8	-4.9	1.4	-8.2	-0.78	-5.3	-0.67	-3.3	-8.6	-1.1	-25	-29	-12
OLYM2	-2.7	-4.7	1.4	-7.9	-0.76	-5.1	-0.65	-3.2	-8.3	-1.1	-24	-28	-11
OLYM2	-2.3	-4	0.99	-6.7	-0.65	-4.3	-0.55	-2.7	-7.1	-0.92	-21	-24	-9.5
OLYM3	-3.6	-6.3	12	-11	4.7	-6.8	-0.87	22	-11	-1.5	-33	-38	-15
OLYM3	-0.88	-1.5	4.5	-2.6	1.1	-1.7	-0.21	6.3	-2.7	-0.36	-8	-9.2	-3.7
OLYM3	-2.3	-4	11	-6.8	3.4	-4.4	-0.56	15	-7.2	-0.93	-21	-24	-9.6
OLYM4	-3.9	-6.9	9.3	-12	-1.1	-7.4	5.9	35	-12	4.4	-36	-41	-16
OLYM4	-0.9	-1.6	5.1	-2.6	-0.25	-1.7	-0.22	4.8	-2.8	-0.36	-8.1		
OLYM4	-3.9	-6.8	12	-11	-1.1	-7.3	3.7	31	-12	3.9	-35	-40	-16
OLYM5	-6.9	-12	36	-20	6.1	-13	-1.7	47	-21	3.3	-63	-72	-29
OLYM5	-9.6	-17	35	-28	3	-18	-2.3	46	-30	-3.9	-87	-100	-40
OLYM5	-6.5	-11	26	-19	2.4	-12	-1.6	41	-20	-2.6	-59	-68	-27
OLYM5	-1.1	-2	13	-3.3	-0.32	-2.1	0.93	17	-3.5	-0.45	-10	-12	
ROMO6	-0.085	-0.15	11	-0.25	-0.024	-0.16	0.23	3.7	-0.26	0.26	-0.77	-0.89	-0.36
ROMO6	-0.068	-0.12	12	-0.2	-0.019	-0.13	0.31	2.1	0.33	0.34	-0.62	-0.71	-0.28
ROMO6	-0.061	-0.11	4	-0.18	-0.017	-0.12	0.34	1	0.36	0.42	-0.56	-0.64	-0.26
SEKI2	-0.54	-0.94	87	-1.6	24	-1	5.7	61	4.5	4.9	9	-5.6	-2.2
SEKI2	-0.85	-1.5	140	-2.5	31	-1.6	6.9	78	6.1	5.7	13	-8.9	-3.5
SEKI2	-0.83	-1.5	170	-2.4	28	-1.6	5.5	61	4.3	4.7	8.7	-8.6	-3.5
SEKI3	-0.6	-1	140	-1.8	18	-1.1	5.7	69	3.7	4.1	6	-6.2	
SEKI3	-0.59	-1	110	-1.7	21	-1.1	4.8	63	2.9	3.7	6	-6.2	
SEKI3	-0.59	-1	120	-1.7	15	-1.1	5.5	57	3.6	4.4	8	-6.1	
SEKI4	-0.62	-1.1	180	-1.8	15	-1.2	5.6	85	5.1	4.9	6.6	-6.5	-2.6
SEKI4	-0.58	-1	180	-1.7	16	-1.1	4.5	72	3.8	4	14	-6.1	-2.4
SEKI4	-0.83	-1.4	190	-2.4	14	-1.6	6.9	97	8.6	5.7	14	-8.6	-3.4
SEKI5	-0.79	-1.4	240	-2.3	17	-1.5	9.1	150	10	8.3	-7.2	-8.3	-3.3
SEKI5	-0.7	-1.2	270	-2.1	18	-1.3	8.3	170	9.1	7.7	-6.3	-7.3	-2.9
SEKI5	-0.9	-1.6	210	-2.6	15	-1.7	7.4	140	5.8	6.3	-8.1	-9.3	-3.7

Site	TRLTE ng/g lipid	HCLR ng/g lipid	DCPA ng/g lipid	Aldrin ng/g lipid	CLPYR ng/g lipid	o-CLDN ng/g lipid	t-CLDN ng/g lipid	ENDO I ng/g lipid	c-CLDN ng/g lipid	t-NCLR ng/g lipid	Dieldrin ng/g lipid	PCB 74 ng/g lipid	PCB 101 ng/g lipid
BAND 1	-1.4	-3.9	30	-4.7		-2.5	3.3	19	4.2	3.6	-3.3	-15	
BAND 2-1	-0.35	-0.97	13	-1.2		-0.6	0.71	10	0.9	0.65	-0.8	-3.7	
BAND 2-2	-1.7	-4.8	53	-5.7		-3	3.1	43	3.1	2.4	-3.9	-18	
BAND 3	-1.9	-5.2	33	-6.2		-3.2	2	22	2	2.3	-4.3	-20	
BAND 4	-1.2	-3.1	47	-3.8		-2	1.3	27	1.7	1.2	-2.6	-12	
BAND 5	-2	-5.5	56	-6.5	5.1	-3.4	2.3	58	-1.2	2.3	-4.5	-21	
BIBE 4	-1.9	-5.2	5.6	-6.3		-3.3	0.52	23	-1.2	-0.091	-4.3	-20	
BIBE 5	-1.7	-4.6	14	-5.5		-2.9	1.4	75	-1	1.1	-3.8	-18	
CRLA 1	-1.4	-3.8	17	-4.6		-2.4	1.2	13	1.8	1.2	-3.2	-14	
CRLA 2	-1.5	-4	24	-4.8	2	-2.5	1.3	22	2	1.6	-3.3	-15	
CRLA 3-1	-1.8	-4.8	46	-5.8		-3	1.1	18	-1.1	1	-4	-18	
CRLA 3-2	-1.4	-3.9	33	-4.6	1.6	-2.4	2.1	28	-0.85	2.1	-3.2	-15	
CRLA 4	-4.5	-12	150	-15	9.5	-7.7	8.9	120	13	8.2	-10	-46	
GLBA 1	-5.1	-14	2.4	-17		-8.8	1.9	5.2	-3.1	3.3	-12	-53	
GLBA 2	-5.3	-15	0.95	-17		-9.1	1.1	3.8	-3.2	1.2	-12	-55	
GLBA 3	-5.6	-15	1.5	-18		-9.5	1.9	3.8	-3.3	3.4	-13	-57	
GLBA 4	-2.3	-6.3	1.2	-7.6		-4	0.78	6	-1.4	1.1	-5.3	-24	
GRSA 2	-11	-30	240	-36		-19	11	210	-6.6	14	-25	-110	
GRSA 4	-3	-8.1	110	-9.7		-5.1	5.2	30	7.4	7	-6.7	-31	
GRTE 1-1	-0.57	-1.5	28	-1.9	3	-0.97	0.55	17	-0.34	0.6	1.7	-5.9	
GRTE 1-2	3.8	-2.6	33	-3.1	5.2	-1.6	1.4	37	2.1	1.5	-2.2	-9.9	
GRTE 2	5.5	-3.6	49	-4.3		-2.3	1.3	33	1.8	1.5	-3	-14	
KATM 1	-1	-2.9	0.61	-3.4		-1.8	0.4	2.1	-0.63	0.7	-2.4	-11	
KATM 2	-1.3	-3.6	0.92	-4.3		-2.3	0.87	3.2	1.8	1.4	-3	-14	
KATM 3	-1.3	-3.4	0.63	-4.1		-2.1	0.87	3.7	1.8	1.5	-2.8	-13	
KATM 4	-1	-2.8	0.18	-3.4		-1.8	0.17	2.3	-0.62	0.31	-2.4	-11	
KATM 5	-0.94	-2.6	0.4	-3.1		-1.6	0.15	2.5	-0.56	0.22	-2.1	-9.7	
KATM 6	-3.3	-9.1	0.73	-11		-5.7	-0.3	3.4	-2	-0.16	-7.5	-34	
LAVO 1	-1.1	-2.9	40	-3.5		-1.8	1.8	15	2	1.7	-2.4	-11	
LAVO 2	-1.5	-4.2	71	-5		-2.6	3.4	24	4.1	3.1	-3.5	-16	
LAVO 3	-1.5	-4.2	100	-5		-2.6	3.8	24	3.9	3.2	3.8	-16	
LAVO 4	-1.1	-3	89	-3.6		-1.9	4.1	36	5	3.6	5.8	-11	
LAVO 5													
NOCA 1	-1.3	-3.4	3.5	-4.1	3.5	-2.2	0.48	7	-0.76	0.58	-2.9	-13	
NOCA 2	-3.3	-8.9	34	-11	3.2	-5.6	1.8	12	-2	1.9	-7.4	-34	
NOCA 3	-0.98	-2.7	14	-3.2	5.9	-1.7	0.96	14	-0.59	0.64	-2.2	-10	
NOCA 4	-1	-2.7	9.7	-3.3	5.7	-1.7	0.89	12	-0.6	0.65	-2.3	-10	
NOCA 5	-0.93	-2.5	16	-3	7.7	-1.6	0.46	12	-0.56	0.46	-2.1	-9.6	
STLE 1-1	-0.75	-2	0.46	-2.4		-1.3	0.19	1.3	-0.45	0.26	-1.7	-7.7	
STLE 1-2	-0.63	-1.7	0.29	-2		-1.1	0.11	1	-0.38	0.23	-1.4	-6.5	
STLE 1-3	-3.2	-8.6	3.7	-10		-5.4	0.8	4.4	-1.9	1.1	-7.2	-33	
STLE 2-1	-9.2	-25	13	-30		-16	3.5	11	-5.5	4.6	-21	-95	
STLE 2-2	-5.3	-15	0.78	-17		-9.1	-0.47	-3.1	-3.2	-0.25	-12	-55	
STLE 3	-0.66	-1.8	1.2	-2.2		-1.1	0.33	3	-0.4	0.45	-1.5	-6.8	
STLE 4-1	-0.73	-2	0.84	-2.4		-1.2	0.26	2.9	-0.44	0.36	-1.6	-7.5	
STLE 4-2	-3.3	-8.9	14	-11	-1.2	-5.6	1.1	8.8	-2	1.3	-7.4	-34	
STLE 5-1	-4	-11	0.95	-13	-1.5	-6.9	-0.36	3.3	-2.4	0.38	-9.1	-42	
STLE 5-2	-3.6	-9.9	20	-12		-6.2	0.72	9.3	-2.2	0.85	-8.2	-37	
WRST 1-1	-2.2	-5.9	2	-7.1		-3.7	0.65	4.1	-1.3	0.9	-4.9	-22	
WRST 1-2	-2.1	-5.8	1.6	-6.9		-3.6	1.2	5.5	-1.3	2	-4.8	-22	
WRST 1-3	-8.2	-22	3.4	-27		-14	1.1	-4.8	-4.9	2.3	-18	-84	
WRST 3	-1.1	-3	0.41	-3.6		-1.9	0.14	-0.65	-0.67	0.42	-2.5	-11	
WRST 5-1	-2.5	-6.8	0.63	-8.2		-4.3	-0.22	4.4	-1.5	0.46	-5.7	-26	
WRST 5-2	-1.1	-2.9	0.46	-3.5		-1.8	0.12	2.9	-0.65	0.23	-2.4	-11	
YOSE 1	-1.2	-3.2	39	-3.8	22	-2	5.2	9.2	4.5	5	-2.6	-12	
YOSE 2-1	-1.8	-4.9	310	-5.8	31	-3	2.7	28	-1.1	2.6	-4	-18	
YOSE 2-2	-0.85	-2.3	140	-2.8	14	-1.4	1.9	16	2	1.6	-1.9	-8.8	
YOSE 3	-5	-14	350	-16	15	-8.5	7.1	65	-3	5.9	-11	-52	

Site	PCB 118 ng/g lipid	Endrin ng/g lipid	ENDO II ng/g lipid	c-NCLR ng/g lipid	Endrin A ng/g lipid	ENDO S ng/g lipid	PCB 153 ng/g lipid	PCB 138 ng/g lipid	PCB 187 ng/g lipid	PCB 183 ng/g lipid	Mirex ng/g lipid
DENA1	-0.18	-4.9	-0.15	-0.16	-0.38	1.5	-0.088	-0.16	-0.076	-0.065	-0.73
DENA1	-0.12	-3.2	-0.097	-0.1	-0.25	1.1	-0.058	-0.1	-0.05	-0.043	-0.48
DENA1	-0.14	-3.9	-0.12	-0.13	-0.3	1.3	-0.07	-0.12	-0.06	-0.052	-0.58
DENA2	-0.044	-1.2	-0.036	-0.039	-0.093	0.56	-0.022	-0.038	-0.019	-0.016	-0.18
DENA2	-0.044	-1.2	-0.037	-0.039	-0.094	0.5	-0.022	-0.038	-0.019	-0.016	-0.18
DENA2	-0.046	-1.3	-0.039	-0.041	-0.099	0.51	-0.023	-0.04	-0.02	-0.017	-0.19
DENA3	-0.037	-1	-0.031	-0.033	-0.078	0.7	-0.018	-0.032	-0.016	-0.013	-0.15
DENA3	-0.037	-1	-0.031	-0.033	-0.079	0.58	-0.018	-0.032	-0.016	-0.014	-0.15
DENA3	-0.036	-1	-0.03	-0.033	-0.078	0.56	-0.018	-0.032	-0.016	-0.013	-0.15
DENA4	-0.046	-1.3	-0.039	-0.041	-0.098	0.98	-0.023	-0.04	-0.02	-0.017	-0.19
DENA4	-0.044	-1.2	-0.037	-0.04	-0.095	0.9	0.053	-0.039	-0.019	-0.016	-0.18
DENA4	-0.04	-1.1	-0.034	-0.036	-0.086	0.75	-0.02	-0.035	-0.017	-0.015	-0.16
DENA5	0.32	-7.1	-0.22	-0.23	-0.55	7					-1.1
DENA5	-0.048	-1.3	-0.04	-0.043	-0.1	0.95	-0.024	-0.042	-0.021	-0.018	-0.2
DENA5	-0.052	-1.4	-0.043	-0.046	-0.11	0.83	-0.026	-0.045	-0.022	-0.019	-0.21
DENA5	-0.047	-1.3	-0.04	-0.042	-0.1	1	-0.024	-0.041	-0.02	-0.017	-0.2
DENA6	-0.26	-7.1	-0.22	-0.23	-0.55	3.6	-0.13	-0.23	-0.11	-0.095	-1.1
GAAR1	-0.059	-2.1	-0.084	-0.058	-0.2	0.81	-0.029	-0.07	-0.015	-0.014	-0.091
GAAR1	-0.058	-2.1	-0.084	-0.058	-0.2	0.74	-0.029	-0.07	-0.015	-0.014	-0.091
GLAC1	3.8	-13	130	0.9	-1	620	3.3	4.4	0.85	0.33	-2
GLAC1	-0.39	-11	2.9	-0.35	-0.83	60	1	4.1	0.29	-0.14	-1.6
GLAC1	5	-14	110	1	-1.1	550	2.8	4.8	0.8	0.24	-2.1
GLAC2	3.7	-53	140	-1.7	-4.1	940	2.3	4	1.2	-0.71	-8
GLAC2	2.6	-47	120	-1.5	-3.7	800	2.3	2.8	1.2	-0.63	-7
GLAC2	3.8	-41	160	1.5	-3.2	1010	2.3	4	0.91	-0.54	-6.1
GLAC3	2	-29	130	2.5	-2.3	660	2.2	3.7	1.4	-0.39	-4.4
GLAC3	2.9	-33	150	2.6	-2.5	840	2.3	4.1	0.94	-0.43	-4.9
GLAC3	2.7	-31	130	2.7	-2.4	760	2.4	4.6	1.1	-0.41	-4.6
GLAC4	0.71	-18	69	1.5	-1.4	330	0.92	2.3	0.35	0.44	-2.6
GLAC4	1.1	-16	80	1.4	-1.2	430	1.1	1.5	0.4	-0.21	-2.4
GLAC4	1.5	-21	120	1.3	-1.7	450	1.3	2	0.84	0.34	-3.2
GLAC5	3.4	-12	85	3	-0.94	740	2.5	5	1.6	0.71	-1.8
GLAC5	3.3	-19	78	3	-1.5	650	2.1	4.2	1.8	0.53	-2.9
GLAC5	2.6	-23	86	3.1	-1.8	700	2.8	5.6	1.7	0.42	-3.4
GLAC5	1.6	-16	100	1.6	-1.5	580	1.5	2.9	0.65	0.31	-0.7
MORA1	0.8	-6.9	10	0.31	-0.54	28	0.62	1.1	0.26	0.14	-1
MORA1	0.67	-5.1	8.8	0.19	-0.4	29	0.74	0.76	0.25	0.11	-0.77
MORA1	0.99	-5.3	17	0.38	-0.41	49	1.2	1.2	0.38	0.17	-0.79
MORA2	0.69	-3.4	11	0.3	-0.27	33	0.73	0.81	0.21	0.099	-0.51
MORA2	0.62	-3.9	8.9	0.24	-0.3	29	0.72	0.71	0.24	0.14	-0.58
MORA2	0.97	-4	12	0.37	-0.31	43	0.9	1.1	0.39	0.14	-0.59
MORA3	2.8	-5.2	23	0.89	-0.4	140	2.7	3.7	1.1	0.59	-0.77
MORA3	3.4	-4.8	19	0.74	-0.38	96	2.7	3.5	0.98	0.45	-0.72
MORA3	2.1	-5.1	20	0.87	-0.4	63	2.7	3.3	1	0.47	-0.76
MORA4	2.3	-5.2	16	0.56	-0.4	84	1.9	2.4	0.8	0.5	-0.77
MORA4	2.2	-4.8	22	0.72	-0.38	110	1.9	2.5	0.72	0.59	-0.72
MORA4	2.4	-5.1	18	0.8	-0.4	94	2.3	2.9	0.93	0.5	-0.76
NOAT1	-0.045	-1.3	-0.038	-0.041	-0.097	0.95	0.065	-0.04	-0.02	-0.017	-0.19
NOAT1	-0.047	-1.3	-0.039	-0.042	-0.1	0.97	0.037	-0.041	-0.02	-0.017	-0.19
NOAT1	-0.053	-1.5	-0.044	-0.047	-0.11	0.94	0.036	-0.046	-0.023	-0.019	-0.22
NOAT3	-0.041	-1.1	-0.034	-0.037	-0.087	0.97	-0.02	-0.036	-0.018	-0.015	-0.17
NOAT3	-0.046	-1.3	-0.039	-0.041	-0.099	1.1	-0.023	-0.04	-0.02	-0.017	-0.19
NOAT3	-0.041	-1.1	-0.034	-0.037	-0.088	0.82	-0.02	-0.036	-0.018	-0.015	-0.17
NOAT5	-0.041	-1.1	-0.034	-0.037	-0.087	0.9	0.026	-0.036	-0.018	-0.015	-0.17
NOAT5	-0.046	-1.3	-0.039	-0.041	-0.099	0.9	0.053	-0.04	-0.02	-0.017	-0.19
NOAT5	-0.04	-1.1	-0.034	-0.036	-0.086	0.88	-0.02	-0.035	-0.017	-0.015	-0.17
OLYM2	-0.79	-22	-0.66	-0.71	-1.7	26	-0.39	-0.69	-0.34	-0.29	-3.3
OLYM2	-0.76	-21	-0.64	-0.68	-1.6	32	-0.38	-0.67	-0.33	-0.28	-3.1
OLYM2	-0.65	-18	-0.55	-0.58	-1.4	26	-0.32	-0.57	-0.28	-0.24	-2.7
OLYM3	1.9	-28	9.2	-0.92	-2.2	51	2.1	2.8	-0.44	-0.38	-4.2
OLYM3	0.61	-7	2.3	-0.23	-0.54	14	0.47	0.63	-0.11	-0.093	-1
OLYM3	1.6	-18	6.2	-0.59	-1.4	32	1	1.8	-0.28	-0.24	-2.7
OLYM4	3.4	-31	11	-1	-2.4	83	3.7	5.3	2.3	0.48	-4.6
OLYM4							-0.13	-0.22	-0.11	-0.094	-1.1
OLYM4	2.7	-30	15	-0.99	-2.4	100	4.1	4.2	1.7	-0.41	-4.5
OLYM5	5.5	-54	50	3.1	-4.2	310	5.7	6.7	1.9	-0.72	-8.1
OLYM5	5.3	-75	49	-2.4	-5.8	220	8.1	6.9	2.5	-1	-11
OLYM5	3.9	-51	35	-1.7	-4	250	4.4	6.8	1.4	-0.68	-7.7
OLYM5	0.81	-8.8	8.5	0.61	-0.69	39	1.2	1.4	0.37	0.16	-1.3
ROMO6	0.043	-0.67	3.6	0.18	-0.052	8.8	0.1	0.11	0.05	0.022	-0.1
ROMO6	0.078	-0.54	1.5	0.21	-0.042	9.2	0.14	0.12	0.092	0.041	-0.08
ROMO6	0.08	-0.48	1.1	0.25	-0.038	11	0.15	0.12	0.076	0.037	-0.072
SEKI2	1.4	-4.2	110	2.3	-0.33	300	1.1	1.8	0.58	0.23	-0.63
SEKI2	1.8	-6.7	140	2.5	-0.52	290	1.6	2.5	0.71	0.24	-1
SEKI2	1.8	-6.5	110	2.2	-0.51	290	1.5	2.4	0.69	0.26	-0.97
SEKI3	1.2	-4.7	96	2	-0.36	190	1.5	2.6	0.66	0.67	-0.7
SEKI3	1.1	-4.7	88	1.8	-0.36	170	1.2	1.9	0.64	0.84	-0.69
SEKI3	0.99	-4.6	79	1.9	-0.36	210	1.4	2.8	0.67	0.53	-0.69
SEKI4	1.2	-4.9	97	1.9	-0.38	250	1.2	2.1	0.66	0.24	-0.73
SEKI4	1.4	-4.6	120	2.1	-0.36	290	1.4	2.3	0.8	0.27	-0.69
SEKI4	1.3	-6.5	130	2.9	-0.51	350	1.5	2.4	0.89	0.26	-0.97
SEKI5	1.4	-6.3	150	3.9	-0.49	310	1.6	2.8	0.99	0.3	-0.93
SEKI5	1.8	-5.5	160	3.6	-0.43	330	1.8	2.9	1.3	0.67	-0.82
SEKI5	1.4	-7.1	140	3.2	-0.55	350	1.7	2.4	0.97	0.48	-1.1

Site	PCB 118 ng/g lipid	Endrin ng/g lipid	ENDO II ng/g lipid	c-NCLR ng/g lipid	Endrin A ng/g lipid	ENDO S ng/g lipid	PCB 153 ng/g lipid	PCB 138 ng/g lipid	PCB 187 ng/g lipid	Mirex ng/g lipid
BAND 1		-8.5	11	1.3	-0.82	59	0.81	0.84	0.36	-0.38
BAND 2-1	0.59	-2.1	4.5	0.33	-0.2	24	0.59	0.81	0.27	-0.092
BAND 2-2	2	-10	18	1	-0.98	100	2	3	0.77	-0.45
BAND 3		-11	12	0.78	-1.1	50	1.2	1.1	0.45	-0.49
BAND 4	1.4	-6.8	16	0.79	-0.65	120	1.3	2	0.53	-0.3
BAND 5	1.7	-12	28	1.4	-1.1	170	1.8	2.6	1.1	-0.52
BIBE 4		-11	19	0.36	-1.1	83	0.26	-0.38	0.13	-0.5
BIBE 5	0.67	-10	50	0.7	-0.96	130	0.79	1.2	0.39	-0.44
CRLA 1		-8.2	10	0.52	-0.79	67	0.61	0.85	0.24	-0.36
CRLA 2		-8.6	15	0.54	-0.82	69	0.67	0.89	0.32	-0.38
CRLA 3-1		-10	25	0.64	-1	100	0.74	2.1	0.59	-0.46
CRLA 3-2	0.87	-8.3	22	1.1	-0.8	86	1.3	1.7	0.73	-0.37
CRLA 4	3.3	-26	66	3.4	-2.5	300	3.8	6.2	1.8	-1.2
GLBA 1	2.8	-30	-1.2	1.3	-2.9	110	1.3	2.2	0.59	-1.3
GLBA 2		-31	-1.3	-0.88	-3	52	1.1	1.4	0.56	-1.4
GLBA 3	2.4	-33	-1.3	2.6	-3.1	47	2.7	3	2.5	-1.4
GLBA 4	1.3	-14	-0.56	0.6	-1.3	15	1.3	1.7	0.43	-0.61
GRSA 2		-65	150	4.1	-6.2	350	3.5	4.1	1.6	-2.9
GRSA 4	2.1	-18	42	4.5	-1.7	290	3.2	3.1	2.9	2.2
GRTE 1-1	0.74	-3.3	15	0.38	-0.32	55	0.61	0.85	0.27	-0.15
GRTE 1-2	0.82	-5.7	24	0.72	-0.54	99	0.96	1.2	0.4	-0.25
GRTE 2	0.51	-7.8	22	0.7	-0.75	110	0.69	0.76	0.38	-0.34
KATM 1	0.48	-6.1	-0.25	0.26	-0.59	13	0.48	0.66	0.24	-0.27
KATM 2	0.76	-7.8	-0.32	0.68	-0.75	32	0.83	1.1	0.48	-0.35
KATM 3	0.76	-7.4	-0.3	0.66	-0.71	43	0.86	1	0.45	-0.33
KATM 4		-6.1	-0.25	0.22	-0.59	2.9	0.2	0.21	0.06	-0.27
KATM 5		-5.5	-0.22	-0.15	-0.53	3.2	0.25	0.26	0.064	-0.24
KATM 6		-20	-0.8	-0.55	-1.9	7	0.42	-0.66	-0.14	-0.87
LAVO 1		-6.3	7.9	0.74	-0.61	60	0.61	0.8	0.3	-0.28
LAVO 2		-9	16	1.2	-0.86	73	1.2	1.9	0.67	-0.4
LAVO 3	1.7	-9	14	1.4	-0.87	99	1.4	2	0.67	-0.4
LAVO 4		-6.5	21	1.5	-0.63	120	1.3	2	0.74	-0.29
LAVO 5										
NOCA 1	0.63	-7.4	6.6	-0.21	-0.71	20	0.52	0.66	0.16	-0.33
NOCA 2	2.2	-19	33	1.1	-1.8	310	1.2	2	0.43	-0.85
NOCA 3	1.5	-5.8	11	0.33	-0.55	39	0.91	1.3	0.29	-0.25
NOCA 4	1.2	-5.9	9.9	0.28	-0.57	45	0.97	1.3	0.31	-0.26
NOCA 5	1.6	-5.5	15	0.32	-0.53	50	-0.076	1.8	0.49	-0.24
STLE 1-1		-4.4	-0.18	0.13	-0.42	3.7	0.24	0.27	0.059	-0.19
STLE 1-2		-3.7	-0.15	-0.1	-0.35	3.4	0.19	0.2	0.062	-0.16
STLE 1-3	1.2	-19	-0.76	0.55	-1.8	77	0.75	0.83	0.18	-0.83
STLE 2-1		-54	-2.2	2.1	-5.2	260	2.2	2.7	0.87	-2.4
STLE 2-2		-31	-1.3	-0.87	-3	26	-0.44	-1.1	-0.22	-1.4
STLE 3	0.6	-3.9	-0.16	0.24	-0.37	6.8	0.45	0.63	0.13	-0.17
STLE 4-1	0.47	-4.3	-0.17	0.21	-0.41	5.7	0.45	0.52	0.11	-0.19
STLE 4-2	1.9	-19	0.96	0.77	-1.8	140	1.2	2	0.51	-0.85
STLE 5-1	-0.67	-24	-0.96	-0.66	-2.3	10	-0.33	-0.8	-0.17	-1
STLE 5-2		-21	1.7	1.1	-2	110	0.91	1.3	0.34	-0.94
WRST 1-1	0.75	-13	-0.52	-0.36	-1.2	42	0.71	0.79	0.22	-0.56
WRST 1-2	2.4	-12	-0.51	0.69	-1.2	50	0.7	0.87	0.27	-0.55
WRST 1-3		-48	-2	-1.3	-4.6	50	1.8	1.9	0.64	-2.1
WRST 3		-6.5	-0.27	0.2	-0.63	3.4	0.27	0.4	0.16	-0.29
WRST 5-1		-15	-0.6	-0.41	-1.4	7.8	0.3	-0.5	-0.11	-0.65
WRST 5-2		-6.3	-0.26	-0.18	-0.61	4	0.15	-0.21	-0.045	-0.28
YOSE 1	0.57	-6.9	21	2.6	-0.66	48	0.9	1.2	0.52	-0.3
YOSE 2-1	1.7	-10	25	1.2	-1	100	0.97	2.1	0.56	-0.46
YOSE 2-2	0.57	-5	15	0.76	-0.48	77	0.5	0.75	0.3	-0.22
YOSE 3	2	-29	59	3.1	-2.8	350	2.1	3.2	1.5	-1.3

Site	Wet Weight g	% moisture	% lipid	g lipid	ACY ng/g lipid	ACE ng/g lipid	FLO ng/g lipid	PHE ng/g lipid	ANT ng/g lipid	M-PTHN ng/g lipid
DENA1	10	15.87	5.59	0.47	-9.7	-4.5		110	-3.5	-38
DENA1	10.2	16.41	8.43	0.719	-6.3	-2.9			-2.3	-25
DENA1	10.1	15.41	7.01	0.594	-7.7	-3.5			-2.7	-30
DENA2	10	15.34	22.6	1.92	-2.4	-1.1	1.7	10	-0.85	-9.4
DENA2	10.1	15.97	22.3	1.89	-2.4	-1.1	1.9	17	-0.86	-9.5
DENA2	10.1	16.62	21.4	1.8	-2.5	-1.2	1.9	27	-0.91	-10
DENA3	10.1	12.92	25.9	2.28	-2	-0.92		9.4	-0.72	-7.9
DENA3	10	13.14	26.1	2.27	-2	-0.92			-0.72	-8
DENA3	10.1	12.31	25.8	2.29	-2	-0.92		9.7	-0.71	-7.9
DENA4	10.2	11.16	20	1.81	-2.5	-1.2			-0.9	-10
DENA4	10.5	10.39	20	1.88	-2.4	-1.1			-0.87	-9.6
DENA4	10.5	10.39	20	1.88	-2.4	-1.1			-0.87	-9.6
DENA4	10.2	10.77	22.9	2.08	-2.2	-1			-0.78	-8.7
DENA5	10.1	16.1	20.3	1.72	-2.6	-1.2			-0.95	-10
DENA5	10.1	16.1	20.3	1.72	-2.6	-1.2			-0.95	-10
DENA5	10.1	16.1	20.3	1.72	-2.6	-1.2			-0.93	-10
DENA5	9.9	14.7	19.1	1.61	-2.8	-1.3			-1	-11
DENA5	10.2	17.39	20.9	1.76	-2.6	-1.2			-0.93	-10
DENA6	10.2	20.21	3.98	0.32	-14	-6.5	-2.7		-5	-56
GAAR1	10.3	14.98	15.6	1.63	-2.8	-1.3			-1	-11
GAAR1	10.1	16.5	19.3	1.63	-2.8	-1.3			-1	-11
GLAC1	10.2	38.78	2.76	0.173	98	-12	1260	55830	1120	-100
GLAC1	10.3	36.2	3.27	0.215	-21	-9.7	-4.1	92	-7.6	-84
GLAC1	10.2	37.12	2.52	0.162	93	-13	1080	47090	1000	-110
GLAC2	11.3	78.85	1.8	0.043	-110	-49	710	35330	470	-420
GLAC2	10.9	77.13	1.96	0.049	-93	-43	620	29090	340	-370
GLAC2	11.1	74.4	1.98	0.056	-81	-37	750	41070	450	-320
GLAC3	10.3	72.63	2.77	0.078	-58	-27	460	23260	200	-230
GLAC3	10.4	71.61	2.39	0.071	-65	-30	600	30250	240	-260
GLAC3	10.4	71.62	2.54	0.075	-61	-28	480	26230	250	-240
GLAC4	10.7	62.52	3.24	0.13	-35	-16	49	520	-13	-140
GLAC4	10.4	61.51	3.6	0.144	-32	-15	46	550	-11	-130
GLAC4	10.5	65.71	2.98	0.107	-42	-20	72	790	-15	-170
GLAC5	10.6	55.95	4.06	0.19	35	-11	140	4310	71	-95
GLAC5	10.8	60.51	2.78	0.119	43	-18	210	5880	86	-150
GLAC5	10.8	61.76	2.41	0.1	48	-21	190	5480	75	-180
GLAC5	10.1	42.67	3.69	0.214	-21	-9.8	95	1700	28	-85
MORA1	10.9	58.16	7.29	0.333	-14	-6.3	26	200	-4.9	-54
MORA1	10.6	55.81	9.55	0.448	-10	-4.7	20	150	-3.6	-40
MORA1	10.8	58.01	9.62	0.436	-10	-4.8	25	240	-3.7	-41
MORA2	10.9	33.76	4.67	0.67	-6.8	-3.1	17	160	-2.4	-27
MORA2	10.8	53.44	4.39	0.586	-7.8	-3.6	17	190	-2.8	-31
MORA2	10.7	41.29	5.05	0.581	-7.8	-3.6	20	180	-2.8	-31
MORA3	10.4	14.41	4.2	0.745	-6.1	-2.8	20	160	-2.2	-24
MORA3	10.3	13.3	4.97	0.566	-8	-3.7	25	180	-2.9	-32
MORA3	10.6	13.82	5.52	0.503	-9.1	-4.2	28	190	-3.2	-36
MORA4	10.4	60.58	5.78	0.446	-10	-4.7	30	180	-3.7	-40
MORA4	10.1	59.23	5.2	0.475	-9.6	-4.4	31	200	-3.4	-38
MORA4	10.3	60.95	4.61	0.448	-10	-4.7	38	220	-3.6	-40
NOAT1	10.3	13.36	20.6	1.83	-2.5	-1.1	-0.5		-0.89	-9.8
NOAT1	10.1	12.62	20.1	1.77	-2.6	-1.2	-0.5		-0.92	-10
NOAT1	10.2	27	21.2	1.58	-2.9	-1.3	-0.56		-1	-11
NOAT3	10.1	12.51	23.1	2.04	-2.2	-1	-0.43		-0.8	-8.8
NOAT3	10.1	12.23	20.4	1.81	-2.5	-1.2	-0.49		-0.9	-10
NOAT3	10.4	11.17	22	2.03	-2.2	-1	-0.44		-0.8	-8.9
NOAT5	10.2	10.42	22.3	2.04	-2.2	-1	-0.43		-0.8	-8.8
NOAT5	10.1	11.43	20.2	1.81	-2.5	-1.2	-0.49		-0.9	-10
NOAT5	10.6	10.68	21.8	2.07	-2.2	-1	-0.43		-0.79	-8.7
OLYM2	10.1	61.25	2.69	0.105	-43	-20	-8.4		-15	-170
OLYM2	10.3	67.99	3.31	0.109	-42	-19	-8.1		-15	-170
OLYM2	10.8	69.77	3.91	0.128	-36	-16	-6.9		-13	-140
OLYM3	10.3	66.58	2.35	0.081	-56	-26			-20	-220
OLYM3	10.4	59.98	7.93	0.33	-14	-6.3			-4.9	-55
OLYM3	10.2	61.27	3.2	0.126	-36	-17			-13	-140
OLYM4	10.3	17.2	0.871	0.074	-61	-28			-22	-240
OLYM4	10.2	18.65	3.92	0.326						
OLYM4	10.3	17.87	0.893	0.076	-60	-28		290	-22	-240
OLYM5	10.2	58.95	1.01	0.042	-110	-50	140	540	-39	-430
OLYM5	10.3	58.98	0.722	0.031	-150	-69	190	470	-53	-590
OLYM5	10.3	59.73	1.07	0.045	-100	-47	110	440	-36	-400
OLYM5	10.2	55.56	5.74	0.26	-100	-47	190	740	-36	-400
ROMO6	10.2	22.51	3.42	3.42	-1.3	-0.61	-0.26	14	1.4	-5.3
ROMO6	10	12.8	4.29	4.29	-1.1	-0.49	-0.21	8.2	0.99	-4.2
ROMO6	10.1	24.64	4.75	4.75	-0.96	-0.44	-0.19	16	1.6	-3.8
SEKI2	10.7	16.12	6.06	0.544	-8.4	-3.9	24	270	-3	-33
SEKI2	10.4	15.04	3.88	0.343	-13	-6.1	36	320	-4.8	-53
SEKI2	10	14.61	4.12	0.352	-13	-6	29	310	-4.6	-51
SEKI3	10	9.378	5.4	0.489	-9.3	-4.3	43	420	-3.3	-37
SEKI3	10	10.19	5.49	0.494	-9.2	-4.2	36	350	-3.3	-37
SEKI3	10	10.18	5.52	0.496	-9.2	-4.2	42	390	-3.3	-36
SEKI4	10.1	14.99	5.47	0.469	-9.7	-4.5	20	180	-3.5	-38
SEKI4	10.3	13.34	5.6	0.5	-9.1	-4.2	21	160	-3.3	-36
SEKI4	10	13.43	4.07	0.353	-13	-5.9	24	190	-4.6	-51
SEKI5	10.1	17.48	2.04	0.368	-12	-5.7	27	200	13	-49
SEKI5	10	14.89	2.28	0.418	-11	-5	14	120	-3.9	-43
SEKI5	10.1	18.32	2.19	0.325	-14	-6.4	30	230	14	-56

Site	Wet Weight g	% moisture	% lipid	g lipid	ACY ng/g lipid	ACE ng/g lipid	FLO ng/g lipid	PHE ng/g lipid	ANT ng/g lipid	M-PTHN ng/g lipid
BAND 1	10.4	6.436	4.06	0.3950	-4.9	-17	32		-7.6	-10
BAND 2-1	10.3	7.734	17	1.6148	-1.2	-4.1	10		-1.9	-2.5
BAND 2-2	10.3	8.836	3.49	0.3280	-5.9	-20	44		-9.2	-12
BAND 3	10.1	8.119	3.25	0.3020	-2.148	-7.24	9.3		-3.3	-4.4
BAND 4	10.4	8.389	5.2	0.4955	-1.309	-4.413	7.9		-2	-2.7
BAND 5	10.2	11.98	3.18	0.2858	-2.27	-7.652	11		-3.5	-4.6
BIBE 4	12.0	7.737	2.68	0.2972	-6.5	-22	22		-10	-13
BIBE 5	9.8	8.083	3.72	0.3362	-5.8	-20	21	140	-9	-12
CRLA 1	9.0	14.69	5.33	0.4090	-4.8	-16	30	250	-7.4	-9.7
CRLA 2	10.4	11.8	4.28	0.3923	-5	-17	39	410	-7.7	-10
CRLA 3-1	10.0	12.1	3.68	0.3235	-6	-20	31	200	-9.3	-12
CRLA 3-2	10.8	11.5	4.21	0.4023	-1.613	-5.436	8.7	70	-2.5	-3.3
CRLA 4	10.1	12.01	1.43	0.1272	-5.098	-17	29	230	-7.9	-10
GLBA 1	10.7	62.66	2.78	0.1112	-18	-59	100	1400	-27	-36
GLBA 2	10.1	57.87	2.51	0.1070	-18	-61	46	230	-28	-37
GLBA 3	10.4	73.63	3.75	0.1028	-19	-64	52	220	-29	-39
GLBA 4	11.3	63.91	6.03	0.2458	-2.639	-8.895	8.5	33	-4.1	-5.4
GRSA 2	10.1	4.309	0.535	0.0518	-38	-130	140		-58	-77
GRSA 4	10.3	7.92	2.02	0.1915	-3.388	-11	11	39	-5.3	-6.9
GRTE 1-1	10	11.59	11.4	1.0080	-1.9	-6.5	18	160	-3	-3.9
GRTE 1-2	10.3	13.07	6.63	0.5937	-3.3	-11	27	220	-5.1	-6.7
GRTE 2	10.7	9.284	4.45	0.4320	-4.5	-15	20	100	-7	-9.2
KATM 1	10.2	14.22	6.25	0.5468	-3.6	-12	38	200	-5.5	-7.3
KATM 2	10.2	17.15	5.08	0.4293	-4.5	-15	49	390	-7	-9.3
KATM 3	10.2	15.56	5.29	0.4557	-1.424	-4.798	12	180	-2.2	-2.9
KATM 4	10.2	16.53	6.46	0.5497	-1.18	-3.978	4.4	27	-1.8	-2.4
KATM 5	10.3	17.27	7.14	0.6085	-1.066	-3.593	5.1	27	-1.7	-2.8
KATM 6	10.8	63.34	4.33	0.1715	-11	-38	33	86	-18	-23
LAVO 1	10	8.817	5.83	0.5318	-3.7	-12	16	110	-5.7	-7.5
LAVO 2	10.5	10.24	3.96	0.3735	-5.2	-18	34	96	-8.1	-11
LAVO 3	10.1	10.84	4.14	0.3730	-1.739	-5.862	6.1	32	-2.7	-3.6
LAVO 4	10.3	10.87	5.61	0.5155	-1.258	-4.241	5.3	27	-2	-2.6
LAVO 5	10.1	10.87	9.49	0.8545						
NOCA 1	10.3	16.14	5.23	0.4520	-4.3	-15	46	340	-6.7	-8.8
NOCA 2	10.6	40.34	2.77	0.1752	-11	-37	290	4060	-17	-23
NOCA 3	10.1	17.29	6.98	0.5835	-1.112	-3.747	8.9	84	-1.7	-2.3
NOCA 4	10.5	20.69	6.83	0.5685	-1.141	-3.846	8.1	74	-1.8	-2.3
NOCA 5	10.2	18.37	7.37	0.6135	-1.057	-3.564	7.76	76	-1.6	-2.2
STLE 1-1	11.8	30.7	9.34	0.7640	-2.5	-8.6	11	53	-4	-5.2
STLE 1-2	10.2	20.04	11.2	0.9140	-2.1	-7.2	9.7	45	-3.3	-4.4
STLE 1-3	10.4	44.49	3.12	0.1803	-11	-36	92	910	-17	-22
STLE 2-1	10.7	69.08	1.88	0.0623	-10	-35	73	1000	-16	-21
STLE 2-2	10.4	71.09	3.58	0.1075	-6.035	-20	-8.5	22	-9.4	-12
STLE 3	10	20.72	10.9	0.8660	-0.75	-2.525	2.7	18	-1.2	-1.5
STLE 4-1	10.5	33.14	11.2	0.7870	-0.82	-2.778	3.3	17	-1.3	-1.7
STLE 4-2	10.2	29.4	2.43	0.1752	-3.703	-12	58	1000	-5.7	-7.6
STLE 5-1	9.9	37.27	2.29	0.1420	-4.569	-15	8.4	26	-7.1	-9.3
STLE 5-2	10	49.82	3.15	0.1580	-4.106	-14	46	1000	-6.4	-8.4
WRST 1-1	10.3	18.05	3.12	0.2633	-7.4	-25	78	1380	-11	-15
WRST 1-2	10.1	18.39	3.27	0.2695	-7.2	-24	13	1460	-11	-15
WRST 1-3	10.2	19.92	0.857	0.0700	-28	-94	190	3090	-43	-57
WRST 3	10.4	13.61	5.74	0.5155	-1.258	-4.241	6	35	-2	-2.6
WRST 5-1	10.7	11.76	2.41	0.2280	-2.845	-9.59	-4	29	-4.4	-5.8
WRST 5-2	10.5	11.1	5.69	0.5310	-1.222	-4.118	-1.7	12	-1.9	-2.5
YOSE 1	10.2	6.635	5.14	0.4893	-4	-13	34	210	13	-8.1
YOSE 2-1	10	9.609	3.54	0.3200	-6.1	-20	34	320	-9.4	-12
YOSE 2-2	10.1	10.59	7.46	0.6735	-2.9	-9.7	16	140	-4.5	-5.9
YOSE 3	10.1	9.799	1.25	0.1142	-17	-57	79	510	-26	-35

Site	FLA ng/g lipid	PYR ng/g lipid	B[a]A ng/g lipid	CHR/TRI ng/g lipid	B[b]F ng/g lipid	B[k]F ng/g lipid	B[e]P ng/g lipid	B[a]P ng/g lipid	I[1,2,3-cd]p ng/g lipid	D[ah]A ng/g lipid	B[ghi]P ng/g lipid
DENA1	14	-1.2	-1.7	-1.2	-6.4	-6.5	-5	-3.7	-4.2	-16	-1.7
DENA1	12	-0.77	-1.1	-0.81	-4.2	-4.3	-3.3	-2.4	-2.7	-11	-1.1
DENA1	18	-0.93	-1.4	-0.98	-5.1	-5.2	-3.9	-2.9	-3.3	-13	-1.3
DENA2	2.8	-0.29	-0.42	-0.31	-1.6	-1.6	-1.2	-0.91	-1	-4	-0.42
DENA2	2.7	-0.29	-0.43	-0.31	-1.6	-1.6	-1.2	-0.93	-1	-4	-0.42
DENA2	2	-0.31	-0.45	-0.32	-1.7	-1.7	-1.3	-0.97	-1.1	-4.2	-0.44
DENA3	2.2	-0.24	-0.36	-0.26	-1.3	-1.3	-1	-0.77	-0.87	-3.4	-0.35
DENA3	2.2	-0.24	-0.36	-0.26	-1.3	-1.4	-1	-0.77	-0.87	-3.4	-0.35
DENA3	2.2	-0.24	-0.35	-0.32	-1.3	-1.3	-1	-0.77	-0.86	-3.3	-0.35
DENA4		-0.31	-0.45	-0.32	-1.7	-1.7	-1.3	-0.97	-1.1	-4.2	-0.44
DENA4		-0.3	-0.43	-0.31	-1.6	-1.6	-1.2	-0.93	-1.1	-4.1	-0.43
DENA4	2.2	-0.3	-0.43	-0.31	-1.6	-1.6	-1.2	-0.93	-1.1	-4.1	-0.43
DENA4	3.7	-0.27	-0.39	-0.28	-1.4	-1.5	-1.1	-0.84	-0.95	-3.7	-0.38
DENA5		-0.32	-0.46	-0.33	-1.7	-1.8	-1.4	-1	-1.1	-4.4	-0.46
DENA5		-0.32	-0.47	-0.34	-1.7	-1.8	-1.4	-1	-1.1	-4.4	-0.46
DENA5	5.1	1.3	-0.46	-0.33	-1.7	-1.7	-1.3	-1	-1.1	-4.4	-0.45
DENA5		-0.34	-0.5	-0.36	-1.9	-1.9	-1.5	-1.1	-1.2	-4.7	-0.49
DENA5	4.5	-1.5	-0.46	-1.6	-1.7	-1.7	-1.3	-1	-1.1	-4.4	-0.45
DENA6	13	-1.7	-2.5	-1.8	-9.3	-9.5	-7.2	-5.4	-6.1	-24	-2.5
GAAR1		-0.34	-0.5	0.75	-1.8	-1.9	-1.4	-1.1	-1.2	-4.7	-0.49
GAAR1		-0.34	-0.5	0.59	-1.8	-1.9	-1.4	-1.1	-1.2	-4.7	-0.49
GLAC1	58500	14050	1720	7850	11050	2190	4360	2550	2320	430	2810
GLAC1	-2.6	-2.6	34	380	-14	-14	-11	-8.1	-9.2	-36	-3.7
GLAC1	49020	12600	1410	6490	8970	1800	3680	2250	2180	400	2560
GLAC2	52740	17890	2410	7410	16220	2990	5740	4530	4240	690	4740
GLAC2	42730	14800	2080	6490	14350	2490	5020	4000	3820	610	4250
GLAC2	60400	20380	2550	8600	18990	3380	6270	5190	4480	780	5580
GLAC3	28510	8310	980	3890	8450	1330	2870	1860	1910	290	1920
GLAC3	33980	9360	990	4000	8290	1360	2880	1830	1930	280	1880
GLAC3	32190	9340	990	4270	9000	1450	2880	1820	2050	310	2010
GLAC4	560	250	28	180	320	49	-18	39	95	-59	68
GLAC4	720	330	41	240	450	66	-16	76	130	-53	100
GLAC4	980	420	47	330	600	110	-22	57	170	-71	130
GLAC5	6610	3420	470	2110	6460	1010	1980	1310	1370	210	1610
GLAC5	8220	3590	560	2240	5960	1040	2020	1290	1520	210	1570
GLAC5	7180	3110	510	1900	5180	870	1880	1120	1390	190	1370
GLAC5	2330	1210	130	750	1810	300	-11	320	480	64	450
MORA1	200	94	13	72	98	-9.2	-7	-5.3	-5.9	-23	5.1
MORA1	170	78	11	60	87	-6.9	-5.2	-3.9	-4.4	-17	4
MORA1	210	110	18	60	91	-7	-5.4	-4	-4.5	-18	5.1
MORA2	140	73	12	39	54	-4.6	-3.5	-2.6	-2.9	-11	3.1
MORA2	200	97	22	74	86	-5.2	-4	-3	-3.4	-13	3.5
MORA2	170	83	15	50	84	-5.3	-4	-3	-3.4	-13	5.4
MORA3	150	41	-1.1	30	28	-4.1	-3.1	-2.4	-2.6	-10	-1.1
MORA3	170	48	-1.4	33	31	-5.4	-4.1	-3.1	-3.5	-14	-1.4
MORA3	170	49	-1.6	33	32	-6.1	-4.7	-3.5	-3.9	-15	-1.6
MORA4	190	53	-1.8	-1.3	-6.7	-6.9	-5.3	-3.9	-4.4	-17	-1.8
MORA4	200	63	-1.7	45	43	-6.5	-4.9	-3.7	-4.1	-16	-1.7
MORA4	210	57	-1.8	48	60	-6.8	-5.2	-3.9	-4.4	-17	-1.8
NOAT1			-0.44	-0.32	-1.6	-1.7	-1.3	-0.96	-1.1	-4.2	-0.44
NOAT1			-0.46	-0.33	-1.7	-1.7	-1.3	-0.99	-1.1	-4.3	-0.45
NOAT1			-0.51	-0.37	-1.9	-1.9	-1.5	-1.1	-1.2	-4.8	-0.51
NOAT3			-0.4	-0.29	-1.5	-1.5	-1.1	-0.86	-0.97	-3.7	-0.39
NOAT3			-0.45	-0.32	-1.7	-1.7	-1.3	-0.97	-1.1	-4.2	-0.44
NOAT3			-0.4	-0.29	-1.5	-1.5	-1.2	-0.86	-0.97	-3.8	-0.39
NOAT5	1	-0.27	-0.4	-0.29	-1.5	-1.5	-1.1	-0.86	-0.97	-3.7	-0.39
NOAT5	1.3	-0.31	-0.45	-0.32	-1.7	-1.7	-1.3	-0.97	-1.1	-4.2	-0.44
NOAT5	1	-0.27	-0.39	-0.28	-1.5	-1.5	-1.1	-0.85	-0.95	-3.7	-0.39
OLYM2	14	-5.3	-7.7	-5.6	-29	-29	-22	-17	-19	-73	-7.6
OLYM2	17	-5.1	-7.4	-5.4	-28	-28	-21	-16	-18	-70	-7.3
OLYM2	12	-4.3	-6.3	-4.6	-24	-24	-18	-14	-15	-60	-6.2
OLYM3	310	110	-10	66	-37	-38	-29	-22	-24	-94	-9.9
OLYM3	95	35	-2.5	20	-9.1	-9.3	-7.1	-5.3	-6	-23	-2.4
OLYM3	220	78	-6.4	45	-24	-24	-19	-14	-16	-61	-6.3
OLYM4	870	290	-11	430	280	-41	-32	-24	-27	-100	-11
OLYM4											
OLYM4	800	230	-11	410	270	-41	-31	-23	-26	-100	-11
OLYM5	1540	370	-19	390	250	-73	-55	-41	-47	-180	-19
OLYM5	1430	360	-27	500	360	-100	-77	-57	-65	-250	-26
OLYM5	1290	340	-18	340	230	-69	-52	-39	-44	-170	-18
OLYM5	1020	360	-18	170	-67	-69	-52	-39	-44	-170	-18
ROMO6	12	9.9	4	5.4	14	3.3	-0.69	5.9	7.8	-2.2	7.3
ROMO6	8	7.1	2.9	3.3	10	1.9	-0.55	5.1	5.9	-1.8	5.9
ROMO6	18	15	5.4	6.5	19	4.4	-0.49	8.8	11	-1.6	10
SEKI2	37		7.5	33	-5.5	-5.6	-4.3	-3.2	-3.6	-14	
SEKI2			13	42	-8.8	-8.9	-6.8	-5.1	-5.7	-22	
SEKI2			11	34	-8.6	-8.7	-6.7	-5	-5.6	-22	
SEKI3	110	54	-1.7	55	-6.2	-6.3	-4.8	-3.6	-4	-16	8.1
SEKI3	130	54	-1.6	47	-6.1	-6.2	-4.7	-3.6	-4	-15	8.4
SEKI3	110	53	-1.6	57	-6.1	-6.2	-4.7	-3.5	-4	-15	7
SEKI4	48		-1.7	24	-6.4	-6.5	-5	-3.7	-4.2	-16	
SEKI4	66		-1.6	26	-6	-6.1	-4.7	-3.5	-3.9	-15	
SEKI4			-2.3	31	-8.5	-8.7	-6.6	-5	-5.6	-22	
SEKI5	57	29	-2.2	26	-8.2	-8.3	-6.4	-4.8	-5.4	-21	8.9
SEKI5	52	21	-1.9	26	-7.2	-7.3	-5.6	-4.2	-4.7	-18	9.6
SEKI5	59	28	-2.5	24	-9.3	-9.4	-7.2	-5.4	-6.1	-24	8.9

Site	FLA ng/g lipid	PYR ng/g lipid	MXCLR ng/g lipid	B[a]A ng/g lipid	CHR/TRI ng/g lipid	B[b]F ng/g lipid	B[k]F ng/g lipid	B[e]P ng/g lipid	B[a]P ng/g lipid	I[1,2,3-cd]p ng/g lipid	D[ah]A ng/g lipid	B[ghi]P ng/g lipid
BAND 1	88	65	-10	24	35	62	-6.5	-9.9	-11	44	-34	48
BAND 2-1	53	22	-2.6	2.6	10	-1.3	-1.6	-2.4	-2.8	4.9	-8.3	5.3
BAND 2-2	180	84	-13	9.2	35	-6.5	-7.8	-12	-14	15	-41	16
BAND 3	33	24	-4.6	7.371	10	-2.3	-2.815	-4.331	-5.002	16	-15	16
BAND 4	30	14	-2.8	1.921	6.838	-1.4	-1.716	-2.639	-3.049	3.889	-8.97	3.984
BAND 5	42	17	-4.8	-2.236	9.351	-2.47	-2.976	-4.577	-5.287	-4.653	-16	3.801
BIBE 4	40	27	-14	-6.4	-4.4	-7.1	-8.6	-13	-15	21	-45	18
BIBE 5	150	97	14	18	53	-6.3	-7.6	-12	-13	73	-40	64
CRLA 1	130	68	-10	8.2	44	-5.2	-6.2	-9.6	-11	-9.8	-33	12
CRLA 2	210	110	-11	9.6	59	-5.4	-6.5	-10	-12	-10	-34	7.5
CRLA 3-1	69	-1.3	-13	-5.9	390	-6.5	-7.9	-12	-14	-12	-41	8.2
CRLA 3-2	40	17	-3.4	1.633	14	-1.754	-2.114	-3.251	-3.756	-3.306	-11	2.367
CRLA 4	150	55	-11	-5.02	43	-5.6	-6.682	-10	-12	-10	-35	10
GLBA 1	400	-3.8	-37	-17	-12	-19	-23	-35	-41	-36	-120	-18
GLBA 2	220	-3.9	-39	-18	-12	-20	-24	-37	-42	-37	-120	-18
GLBA 3	120	-4.1	-40	-19	-13	-21	-25	-38	-44	-39	-130	-19
GLBA 4	24	-0.57	-5.6	-2.599	7.059	-2.9	-3.459	-5.321	-6.146	-5.41	-18	-2.642
GRSA 2	270	200	-80	49	-26	-41	-49	-76	-87	150	-260	140
GRSA 4	39	34	-7.2	9.875	-2.3	-3.7	-4.44	-6.83	-7.889	23	-23	24
GRTE 1-1	120	54	-4.1	-1.9	39	-2.1	-2.5	-3.9	-4.5	-4	-13	-1.9
GRTE 1-2	140	69	-7	-3.2	35	-3.6	-4.3	-6.6	-7.6	-6.7	-22	-3.3
GRTE 2	55	22	-9.6	-4.4	16	-4.9	-5.9	-9.1	-10	-9.2	-31	-4.5
KATM 1	55	-0.76	-7.5	-3.5	-2.4	-3.9	-4.7	-7.2	-8.3	-7.3	-24	-3.6
KATM 2	56	-0.97	-9.6	-4.5	-3.1	-4.9	-5.9	-9.1	-11	-9.3	-31	-4.5
KATM 3	15	-0.31	-3	-1.4	-0.97	-1.5	-1.866	-2.9	-3.315	-2.918	-9.7	-1.425
KATM 4	5.98	-0.25	-2.5	-1.2	-0.8	-1.3	-1.547	-2.4	-2.748	-2.419	-8.085	-1.181
KATM 5	5.85	-0.23	-2.3	-1.1	-0.72	-1.2	-1.397	-2.1	-2.483	-2.185	-7.304	-1.067
KATM 6	13	-2.4	-24	-11	-7.7	-12	-15	-23	-26	-23	-78	-11
LAVO 1	46	-0.78	-7.8	-3.6	-2.5	-4	-4.8	-7.4	-8.5	-7.5	-25	-3.7
LAVO 2	59	-1.1	-11	-5.1	-3.5	-5.7	-6.8	-11	-12	-11	-36	-5.2
LAVO 3	17	6.5	-3.7	-1.713	-1.18	-1.9	-2.279	-3.5	-4.05	-3.565	-12	-1.741
LAVO 4	15	5.6	-2.7	-1.239	-0.85	-1.7	-1.649	-2.5	-2.931	-2.579	-8.622	-1.26
LAVO 5												
NOCA 1	190	110	-9.1	-4.2	75	54	-5.6	-8.7	-10	-8.8	-29	-4.3
NOCA 2	1870	530	-24	-11	150	170	-15	-22	-26	53	-76	-11
NOCA 3	91	29	-2.4	-1.095	15	-1.2	-1.457	-2.241	-2.589	-2.279	-7.617	-1.113
NOCA 4	68	21	-2.4	-1.124	10	-1.2	-1.496	-2.301	-2.657	-2.339	-7.818	-1.142
NOCA 5	55	-0.23	-2.2	-1.041	76	-1.2	-1.386	-2.132	-2.462	-2.167	-7.245	-1.058
STLE 1-1	62	43	-5.4	14	22	-2.8	-3.3	-5.1	-5.9	-5.2	-17	-2.5
STLE 1-2	62	46	-4.5	12	20	-2.3	-2.8	-4.3	-5	-4.4	-15	-2.1
STLE 1-3	370	180	-23	-11	-7.3	-12	-14	-22	-25	-22	-74	-11
STLE 2-1	250	60	-22	-10	-7.1	-11	-14	-21	-24	-21	-71	-10
STLE 2-2	-4.1	-1.3	-13	-5.943	-4.1	-6.6	-7.909	-12	-14	-12	-41	-6.04
STLE 3	14	3	-1.6	-0.74	2.6	-0.81	-0.98	-1.51	-1.745	-1.535	-5.132	-0.75
STLE 4-1	14	-0.18	-1.7	-0.81	-0.56	-0.9	-1.08	-1.662	-1.92	-1.69	-5.647	-0.83
STLE 4-2	170	35	-7.8	-3.646	-2.5	-4	-4.853	-7.465	-8.623	-7.59	-25	-3.706
STLE 5-1	12	-0.98	-9.7	-4.499	-3.1	-5	-5.988	-9.21	-11	-9.364	-31	-4.573
STLE 5-2	210	50	-8.7	-4.043	-2.8	-4.5	-5.381	-8.278	-9.562	-8.416	-28	-4.11
WRST 1-1	78	-1.6	-16	-7.3	-5	-8	-9.7	-15	-17	-15	-51	-7.4
WRST 1-2	110	-1.5	-15	-7.1	-4.9	-7.9	-9.5	-15	-17	-15	-49	-7.2
WRST 1-3	170	-6	-59	-27	-19	-30	-36	-56	-65	-57	-190	-28
WRST 3	6.4	-0.27	-2.7	-1.239	-0.85	-1.4	-1.649	-2.537	-2.931	-2.579	-8.622	-1.26
WRST 5-1	7.1	-0.61	-6	-2.802	-1.9	-3.1	-3.729	-5.736	-6.626	-5.832	-19	-2.848
WRST 5-2	2.1	-0.26	-2.6	-1.203	-0.83	-1.3	-1.601	-2.463	-2.845	-2.504	-8.37	-1.223
YOSE 1	170	150	-8.4	45	72	160	-5.2	-8		96	-27	160
YOSE 2-1	150	86	-13	-6	49	-6.6	-8	-12	-14	-12	-42	-6.1
YOSE 2-2	66	35	-6.1	-2.8	24	-3.1	-3.8	-5.8	-6.7	-5.9	-20	-2.9
YOSE 3	230	110	-36	-17	120	-19	-22	-34		-35	-120	-17

Table E.2 Conifer Database

Site	Wet weight g	% moisture	% lipid	g lipid	TFLN ng/g lipid	HCB ng/g lipid	a-HCH ng/g lipid	b-HCH ng/g lipid	g-HCH ng/g lipid	d-HCH ng/g lipid
DENA1	19.9	55.85	7.75	0.681		3.6	4.8	-1.1	1.1	-1.8
DENA1	20.1	55.77	8.17	0.726		3.4	4	-1	1	-1.7
DENA1	19.9	56.44	6.4	0.555		4.7	5.6	-1.3	1.3	-2.2
DENA2	20.1	56.33	6.76	0.593		5	5.8	-1.3	1.2	-2.1
DENA2	20.1	57.03	6.2	0.536		5.3	5.8	-1.4	1.8	-2.3
DENA2	20.1	57.52	8.24	0.697		3.5	4.6	-1.1	-0.91	-1.8
DENA3	20	52.15	8.98	0.859		3.5	4.6	-0.87	-0.74	-1.4
DENA3	20	50.9	8.67	0.851		3.2	3.9	-0.88	-0.74	-1.4
DENA3	20.1	51.68	6.7	0.651		4.6	5	-1.1	-0.97	-1.9
DENA4	19.9	53.3	6.61	0.615		6	4.3	-1.2	-1	-2
DENA4	20.2	53.62	5.54	0.519		6.8	5.3	-1.4	-1.2	-2.4
DENA4	20.1	53.26	7.86	0.738		4.8	4.1	-1	-0.86	-1.7
GLAC1	9.9	57.99	5.44	0.226		18	28	-3.3	15	-5.4
GLAC1	10.1	55.76	5.58	0.249		19	30	-3	16	-4.9
GLAC1	10	58.81	4.82	0.199		21	31	-3.8	17	-6.2
GLAC2	14.7	61.85	2.17	0.122		66	86	-6.1	51	-10
GLAC2	15	60.34	1.64	0.098		69	91	-7.7	57	-13
GLAC2	15.4	57.16	1.11	0.074		110	140	-10	91	-17
GLAC3	19.9	55.35	4.56	0.405		3.9	3.3	-1.8	47	-3
GLAC3	20	55.21	4.23	0.379		4.7	3.2	-2	43	-3.2
GLAC3	20.2	56.51	5.28	0.464		4.2	3.1	-1.6	39	-2.6
GLAC4	13	58.98	7.95	0.424		6.8	11	-1.8	5.7	-2.9
GLAC4	17.8	60.52	7.08	0.498		7.2	12	-1.5	6.4	-2.5
GLAC4	17.7	58.36	7.31	0.539		7.3	12	-1.4	6	-2.3
GLAC5	20	55.38	5.21	0.465		9.2	11	-1.6	6.8	-2.6
GLAC5	19.9	54.02	5.5	0.504		6.9	7	-1.5	5.3	-2.4
GLAC5	20.1	55.84	5.25	0.466		8.5	8.1	-1.6	5.6	-2.6
MORA1	19.9	47.92	4.68	0.486		26	38	-1.5	7.6	-2.5
MORA1	19.9	59.2	4.82	0.391		25	44	-1.9	9.7	-3.1
MORA1	19.9	57.78	5.37	0.452		25	39	-1.7	8.3	-2.7
MORA2	13.1	50.36	4.67	0.304		20	38	-2.5	7.4	-4
MORA2	20	56.73	4.39	0.38		26	49	-2	8.8	-3.2
MORA2	20.1	54.69	5.05	0.46		18	30	-1.6	6.4	-2.7
MORA3	20.3	56.93	4.2	0.367		39	53	-2	10	-3.3
MORA3	19.9	55.6	4.97	0.439		32	44	-1.7	8.7	-2.8
MORA3	19.9	55.79	5.52	0.488		31	36	-1.5	6.6	-2.5
MORA4	20.1	60.58	5.78	0.458		24	36	-1.6	5.8	-2.7
MORA4	20	59.23	5.2	0.424		29	36	-1.8	6	-2.9
MORA4	19.9	60.95	4.61	0.356		30	44	-2.1	7.8	-3.4
MORA5	19.9	57.8	10	0.841		9.6	11	-0.89	2.2	-1.5
MORA5	20.4	57.46	10.6	0.917		8.8	11	-0.81	2.5	-1.3
MORA5	20.1	57.22	8	0.688		14	14	-1.1	2.9	-1.8
OLYM1	5.3	49.16	10.4	0.279	3.8	14	23	-2.7	6.2	-4.4
OLYM1	5.4	54.38	9.46	0.233	5.8	20	28	-3.2	6.2	-5.3
OLYM1	5.3	56.77	11.2	0.257	2.9	16	20	-2.9	4.8	-4.8
OLYM2	15	60.08	3.64	0.218		42	72	-3.4	11	-5.6
OLYM2	14.9	57.16	3.39	0.216		48	81	-3.5	12	-5.7
OLYM2	14.8	57.65	3.17	0.199		34	61	-3.8	9.8	-6.2
OLYM3	5.8	55.46	6.55	0.169	0.53	14	29	-4.4	-3.7	-7.2
OLYM3	7.6	55.17	7.23	0.247	0.41	15	26	-3	4.9	-5
OLYM3	8.1	54.5	6.7	0.247	0.39	14	25	-3	3.5	-5
OLYM4	20	52.89	5.23	0.487		18	42	-1.5	5.3	-2.5
OLYM4	19.8	56.17	9.27	0.805		20	26	-0.93	3.2	-1.5
OLYM4	19.9	54.28	8.76	0.798		18	25	-0.94	3	-1.5
OLYM5	20	58.9	8.07	0.663		13	17	-1.1	2.5	-1.8
OLYM5	19.9	56.91	6.73	0.578		11	17	-1.3	2.7	-2.1
OLYM5	20	59.41	6.65	0.54		15	21	-1.4	3.8	-2.3
ROMO1	19.9	54.62	13.3	1.2		1.2	0.98	-0.62	6.3	-1
ROMO1	20	52.24	8.84	0.844		1.7	1.2	-0.88	5.7	-1.5
ROMO1	20	54.98	4.86	0.438		3.4	2.5	-1.7	19	-2.8
ROMO2	19.9	56.48	10	0.866						
ROMO2	19.6	55.79	33.3	2.89		1.7	1.1	-0.26	0.54	-0.42
ROMO2	19.9	56.32	11.9	1.03		4.2	3	-0.72	1.3	-1.2
ROMO3	20	51.76	2.11	0.203		23	29	-3.7	8	-6
ROMO3	20.1	57.86	8.28	0.701		6.3	7.8	-1.1	2.2	-1.7
ROMO3	20.1	55.39	8.71	0.781		8.6	9.7	-0.96	3.5	-1.6
ROMO4										
ROMO4										
ROMO4										
ROMO5	20.2	50.13	5.13	0.517		8	8.4	-1.4	3.5	-2.4
ROMO5	20.2	51.27	6.61	0.65		5.8	6.6	-1.1	3.9	-1.9
ROMO5	20.2	49.13	5.98	0.615		8	8	-1.2	4.4	-2
ROMO6	5	48.94	4.33	0.111			-5.9	-6.8	62	-11
ROMO6	5	51.66	8.06	0.195			6.7	-3.8	-3.2	-6.3
ROMO6	5	53.67	5.36	0.124			-5.2	-6	-5.1	-9.9
SEKI2										
SEKI2										
SEKI2										
SEKI3	20.1	59.02	7.7	0.634		9.6	15	-1.2	14	-1.9
SEKI3	20	59.79	8.01	0.645		7.3	11	-1.2	8	-1.9
SEKI3	20	59.78	7.98	0.642			8.8	-1.2	8.4	-1.9
SEKI4	19.8	58.2	5.31	0.44		40	47	-1.7	17	-2.8
SEKI4	19.8	58.27	5.83	0.482		28	33	-1.5	13	-2.5
SEKI4	20	58.71	11.2	0.923		15	16	-0.81	6	-1.3
SEKI5	20	59.52	10.1	0.817		5.7	4.3	-0.91	2.3	-1.5
SEKI5	19.9	59.44	6.51	0.526		10	7.7	-1.4	3.5	-2.3
SEKI5	20.3	58.98	5.6	0.467		10	6.9	-1.6	3	-2.6
SEKI6	19.8	53.79	6.13	0.561		6.1	6.6	-1.3	4	-2.2
SEKI6	20	54.26	5.39	0.493		7.1	5.9	-1.5	2.7	-2.5
SEKI6	20.1	53.66	6.49	0.599		4.1	3.3	-1.2	2	-2

Site	% moisture	% lipid	g lipid	TFLN ng/g lipid	HCB ng/g lipid	a-HCH ng/g lipid	b-HCH ng/g lipid	g-HCH ng/g lipid	d-HCH ng/g lipid
BAND1	39.91	6.77	0.8500		1.4	2	-1.6	-1	-1
BAND2	41.96	5.44	0.6317		1.8	1.5	-2.1	-1.4	-1.3
BAND2	44.5	6.39	0.7133		1.8	1.9	-1.9	-1.2	-1.2
BAND3	48.82	6.48	0.6662		4.5	2.9	-2	-1.3	-1.3
BAND4	51.59	7.34	0.6997		5	2.6	-1.9	-1.2	-1.2
BAND5	45.46	8.25	0.8912		3.6	1.9	-1.5	-0.98	-0.96
BIBE3	46.39	4.94	0.5402		4.5	2.3	-2.5	-1.6	-1.6
BIBE4	36.32	4.34	0.5395		7.5	2.8	-2.5	-1.6	-1.6
BIBE5	44.22	4.8	0.5305		3.8	2.3	-2.6	-1.6	-1.6
CRLA1	59.24	3.68	0.3045	0.39	39	28	-4.5	7.2	-2.8
CRLA2	55.41	6.85	0.6320	0.22	14	16	-2.1	4.2	-1.3
CRLA3	55.73	3.4	0.2983	0.41	44	34	-4.5	6.5	-2.9
CRLA3	56.06	3.56	0.3127	0.35	38	27	-4.3	5.3	-2.7
CRLA4	54.3	7.02	0.6350	0.19	5.4	3.7	-2.1	-1.4	-1.3
CRLA5	56.86	8.85	0.7710	0.17	7.4	4.7	-1.8	-1.1	-1.1
GLBA1	51.86	5.45	0.5197		7	4.9	-2.6	28	-1.6
GLBA2	42.67	3.15	0.3538		6.6	3.7	-3.8	53	-2.4
GLBA3	56.26	4.09	0.3508		8.6	5.2	-3.9	49	-2.4
GLBA4	49.46	4.15	0.4197		7.4	7.7	-3.2	-2.1	-2
GRSA1	51.4	4.83	0.4768		2.4	-1.5	-2.8	-1.8	-1.8
GRSA2	45.08	4.15	0.4670		1.2	-1.5	-2.9	-1.9	-1.8
GRSA3	55.49	4.27	0.3955		4.4	2.1	-3.4	-2.2	-2.2
GRSA4	54.91	3.99	0.3707		5.6	2.7	-3.7	-2.4	-2.3
GRSA5	52.98	3.89	0.3730	-0.12	3.5	-1.9	-3.6	-2.3	-2.3
GRTE1	50.84	5.08	0.5298		5.7	4.6	-2.6	-1.6	-1.6
GRTE1	52.16	5.48	0.5350		6.2	5	-2.5	-1.6	-1.6
GRTE2	45.08	3.96	0.4370		14	14	-3.1	-2	-1.9
GRTE3	50.55	6.69	0.6618		3.7	2.4	-2.1	-1.3	-1.3
GRTE4	50.46	6.41	0.6505		4	2	-2.1	-1.3	-1.3
GRTE5	53.12	5.37	0.5115	-0.088	5	-1.4	-2.7	-1.7	-1.7
KATM1	43.02	3.21	0.3770		8.9	4.3	-3.6	-2.3	-2.3
KATM2	47.26	4.05	0.4398		5	3	-3.1	-2	-1.9
KATM3	49.99	4.12	0.4200		5.5	4.5	-3.2	-2.1	-2
KATM4	45.76	3.46	0.3778		9.4	4.8	-3.6	-2.3	-2.3
KATM5	44.4	3.99	0.4462		10	5.6	-3	-2	-1.9
LAVO1	58.3	4.07	0.3465		11	19	-3.9	5.9	-2.5
LAVO2	57.62	3.72	0.3293		11	24	-4.1	8	-2.6
LAVO3	59.49	4.9	0.4013		19	20	-3.4	4.4	-2.1
LAVO4	55.47	4.58	0.4368		16	11	-3.1	2.1	-2
LAVO5	53.91	4.5	0.4290		16	10	-3.2	-2	-2
NOCA1	58.3	4.07	0.4925		19	17	-2.8	2	-1.7
NOCA2	57.62	3.72	0.3615		35	49	-3.8	11	-2.4
NOCA3	59.49	4.9	0.4363		30	35	-3.1	6.1	-2
NOCA4	55.47	4.58	0.4317		29	28	-3.1	4.6	-2
NOCA5	53.91	4.5	0.6310		17	30	-2.2	5	-1.4
STLE1	48.69	3.77	0.4058		5.7	-1.7	-3.3	42	-2.1
STLE1	46.78	3.82	0.4122		7.2	-1.7	-3.3	34	-2.1
STLE2	54.64	4.33	0.3988		9.7	3.5	-3.4	42	-2.1
STLE3	47.86	3.74	0.3880		8.7	8.5	-3.5	-2.2	-2.2
STLE4	51.04	4.59	0.4700		8.6	6.2	-2.9	-1.9	-1.8
STLE5	50.39	4.06	0.4005		12	4.4	-3.4	-2.2	-2.1
WRST1	54.32	5.87	0.5528		6.4	-1.3	-2.5	31	-1.5
WRST1	56.28	5.11	0.4490		6.2	-1.6	-3	36	-1.9
WRST2	45.19	3.56	0.3980		5.1	-1.8	-3.4	-2.2	-2.1
WRST2	43.73	5.86	0.6755		3.4	-1	-2	-1.3	-1.3
WRST3	44.56	5.32	0.6080	-0.074	4.5	1.8	-2.2	-1.4	-1.4
WRST4	51.24	3.82	0.3833		11	3.7	-3.5	-2.3	-2.2
WRST5	46.79	4.85	0.5235		4.7	2.7	-2.6	-1.7	-1.6
YOSE1	52.55	4.13	0.3935		25	7.6	-3.4	-2.2	-2.2
YOSE2	56.68	1.47	0.1288		32	22	-11	-6.8	-6.6
YOSE2	55.49	4.47	0.4103		9.1	7.1	-3.3	-2.1	-2.1
YOSE3	59.69	4.02	0.3367		17	4.6	-4	-2.6	-2.5
YOSE4	65.04	4.4	0.3125		4.9	-2.3	-4.3	-2.8	-2.7
YOSE5	58.32	4.74	0.4147		5.7	3.6	-3.3	-2.1	-2.1

Site	TRLTE ng/g lipid	HCLR ng/g lipid	DCPA ng/g lipid	Aldrin ng/g lipid	CLPYR ng/g lipid	HCLR E ng/g lipid	o-CLDN ng/g lipid	t-CLDN ng/g lipid	ENDO I ng/g lipid	c-CLDN ng/g lipid	t-NCLR ng/g lipid	Dieldrin ng/g lipid	PCB 74 ng/g lipid	PCB 101 ng/g lipid
DENA1	-0.84	-2.3		-2.7		-3.2	-1.4	0.079	-0.49	-0.5	0.097	-1.9	-8.7	-2.4
DENA1	-0.79	-2.1		-2.6		-3	-1.3	0.091	-0.46	-0.47	0.11	-1.8	-8.1	-2.2
DENA1	-1	-2.8		-3.4		-3.9	-1.8	0.1	-0.6	-0.62	0.12	-2.3	-11	-2.9
DENA2	-0.96	-2.6		-3.1		-3.6	-1.6	-0.086	-0.56	-0.58	0.1	-2.2	-10	-2.7
DENA2	-1.1	-2.9		-3.5		-4	-1.8	-0.095	-0.62	-0.64	-0.05	-2.4	-11	-3
DENA2	-0.82	-2.2		-2.7		-3.1	-1.4	-0.073	-0.48	-0.49	0.069	-1.9	-8.5	-2.3
DENA3	-0.67	-1.8	-0.055	-2.2	0.85	-2.5	-1.1	-0.059	-0.39	-0.4	-0.031	-1.5	-6.9	-1.9
DENA3	-0.67	-1.8	0.078	-2.2		-2.5	-1.1	0.078	-0.39	-0.4	0.12	-1.5	-6.9	-1.9
DENA3	-0.88	-2.4	0.12	-2.9	0.87	-3.3	-1.5	-0.078	-0.51	-0.53	0.1	-2	-9.1	-2.5
DENA4	-0.93	-2.5	0.12	-3		-3.5	-1.6	-0.083	-0.54	-0.56	0.14	-2.1	-9.6	-2.6
DENA4	-1.1	-3	0.14	-3.6		-4.1	-1.9	-0.098	-0.64	-0.66	0.16	-2.5	-11	-3.1
DENA4	-0.77	-2.1	0.077	-2.5		-2.9	-1.3	-0.069	-0.45	-0.46	0.15	-1.8	-8	-2.2
GLAC1	5.5	-6.9	41	-8.2	3.3	-9.5	-4.3	1.4	6.5	-1.5	0.93	-5.7	-26	-7.2
GLAC1	10	-6.3	44	-7.5	1.9	-8.6	-3.9	1.2	6.8	-1.4	0.96	-5.2	-24	-6.5
GLAC1	11	-7.8	49	-9.4	2.8	-11	-4.9	1	7.3	-1.7	1	-6.5	-30	-8.2
GLAC2	24	-13	130	-15	3.9	-18	-8	-0.42	18	-2.8	2.3	-11	-48	-13
GLAC2	35	-16	160	-19	5.2	-22	-10	-0.52	20	-3.5	3	-13	-61	-17
GLAC2	51	-21	250	-25	5.1	-29	-13	3.8	37	-4.7	4.2	-18	-80	-22
GLAC3	-1.4	-3.9	22	-4.6		-5.3	-2.4	0.29	1	-0.85	0.27	-3.2	-15	-4
GLAC3	-1.5	-4.1	23	-4.9	-0.57	-5.7	-2.6	0.31	1.3	-0.91	0.36	-3.4	-16	-4.3
GLAC3	-1.2	-3.4	22	-4		-4.6	-2.1	0.29	0.93	-0.74	0.39	-2.8	-13	-3.5
GLAC4	4.8	-3.7	16	-4.4	0.73	-5.1	-2.3	0.37	6.1	-0.81	0.5	-3.1	-14	-3.8
GLAC4	6.4	-3.1	21	-3.7	0.85	-4.3	-2	0.47	9.4	-0.69	0.61	-2.6	-12	-3.3
GLAC4	4.2	-2.9	19	-3.5	0.74	-4	-1.8	0.41	7.3	-0.64	0.58	-2.4	-11	-3
GLAC5	19	-3.4	27	-4	3.7	-4.6	-2.1	0.83	10	-0.74	0.84	-2.8	-13	-3.5
GLAC5	17	-3.1	24	-3.7	3.5	-4.3	-1.9	0.59	8.3	-0.68	0.48	-2.6	-12	-3.2
GLAC5	16	-3.3	25	-4	3.3	-4.6	-2.1	0.92	9.9	-0.74	0.97	-2.8	-13	-3.5
MORA1	-1.2	-3.2	12	-3.8	2.2	-4.4	-2	2.2	10	-0.71	1.8	6.4	-12	-3.3
MORA1	-1.5	-4	12	-4.8	1.8	-5.5	-2.5	2.2	11	-0.88	1.9	4.9	-15	-4.2
MORA1	-1.3	-3.5	12	-4.1	1.6	-4.8	-2.2	2.3	13	-0.76	2	-2.9	-13	-3.6
MORA2	-1.9	-5.1	12	-6.1	1.7	-7.1	-3.2	1.8	13	-1.1	1.9	6.3	-19	-5.3
MORA2	-1.5	-4.1	16	-4.9	1.5	-5.7	-2.6	1.9	12	-0.9	1.7	6.3	-16	-4.3
MORA2	-1.2	-3.4	12	-4.1	1.3	-4.7	-2.1	1.4	8.2	-0.75	1.4	3.2	-13	-3.5
MORA3	-1.6	-4.2	1.6	-5.1		-5.9	-2.7	2.8	23	-0.93	2.9	7.4	-16	-4.4
MORA3	-1.3	-3.6	10	-4.3		-4.9	-2.2	2.3	19	-0.78	2.5	7.4	-13	-3.7
MORA3	-1.2	-3.2	11	-3.8		-4.4	-2	2	16	-0.7	2.2	5.9	-12	-3.3
MORA4	-1.2	-3.4	6.9	-4.1		-4.7	-2.1	3	16	1.4	2.4	7	-13	-3.5
MORA4	-1.3	-3.7	6.6	-4.4		-5.1	-2.3	3.1	17	1.9	2.5	8.8	-14	-3.8
MORA4	-1.6	-4.3	9.2	-5.2		-6	-2.7	3.8	21	2.7	3.2	8.6	-16	-4.5
MORA5	-0.68	-1.9	4.9	-2.2		-2.6	-1.2	0.43	2.1	-0.41	0.5	2.9	-7	-1.9
MORA5	-0.62	-1.7	4.6	-2		-2.3	-1.1	0.48	2.1	-0.37	0.55	2.6	-6.4	-1.8
MORA5	-0.83	-2.3	5.8	-2.7		-3.1	-1.4	0.58	2.4	-0.5	0.72	4.2	-8.6	-2.4
OLYM1	-2	-5.6	1.6	-6.7	5.7	-7.7	-3.5	5	3.4	-1.2	4.2	-4.6	-21	
OLYM1	-2.5	-6.7	1.8	-8	6	-9.2	-4.2	5.1	2.4	-1.5	4.5	-5.5	-25	
OLYM1	-2.2	-6.1	1.4	-7.3	4.3	-8.4	-3.8	3.2	-1.3	-1.3	2.8	-5	-23	
OLYM2	-2.6	-7.1	3.7	-8.5		-9.9	-4.5	-0.23	3.9		1.3	-5.9	-27	-7.4
OLYM2	-2.6	-7.2	4.5	-8.6		-10	-4.5	-0.24	2.3		0.69	-6	-27	-7.5
OLYM2	-2.9	-7.8	4.4	-9.4		-11	-4.9	-0.26	2		0.75	-6.5	-30	-8.2
OLYM3	-3.4	-9.2	2.8	-11	-1.3	-13	-5.8	-0.3	-2	-2	-0.16	-7.6	-35	-9.6
OLYM3	-2.3	-6.3	2.8	-7.6	-0.88	-8.7	-4	-0.21	1.8	-1.4	1	-5.2	-24	-6.6
OLYM3	-2.3	-6.3	2.7	-7.6	-0.88	-8.7	-3.9	-0.21	3.1	-1.4	-0.11	-5.2	-24	-6.6
OLYM4	-1.2	-3.2	4.9	-3.8	0.61	-4.4	-2	0.73	6.1	-0.7	0.81	-2.7	-12	-3.3
OLYM4	-0.71	-1.9	3.9	-2.3	-0.27	-2.7	-1.2	0.29	1.7	-0.43	0.54	-1.6	-7.3	-2
OLYM4	-0.72	-2	3.6	-2.3	0.64	-2.7	-1.2	0.35	1.9	-0.43	0.62	-1.6	-7.4	-2
OLYM5	-0.86	-2.4	3.6	-2.8	-0.33	-3.2	-1.5	0.19	1.9	-0.52	0.47	-1.9	-8.9	-2.4
OLYM5	-0.99	-2.7	4.3	-3.2	-0.38	-3.7	-1.7	0.22	1.6	-0.59	0.61	-2.2	-10	-2.8
OLYM5	-1.1	-2.9	4.4	-3.5	-0.4	-4	-1.8	0.21	1.8	-0.63	0.33	-2.4	-11	-3
ROMO1	-0.48	-1.3	6.4	-1.6	0.3	-1.8	-0.81	0.085	0.33	-0.29	0.17	-1.1	-4.9	-1.4
ROMO1	-0.68	-1.8	10	-2.2	0.82	-2.6	-1.2	0.15	0.61	-0.41	0.26	-1.5	-7	-1.9
ROMO1	-1.3	-3.6	19	-4.3	0.88	-4.9	-2.2	0.25	1	-0.78	0.47	-3	-13	-3.7
ROMO2														
ROMO2	-0.2	-0.54	3.1	-0.65	0.16	-0.75	-0.34	0.076	1.3	-0.12	0.095	-0.45	-2	-0.56
ROMO2	-0.55	-1.5	8.6	-1.8	0.45	-2.1	-0.94	0.18	3.4	-0.33	0.19	-1.3	-5.7	-1.6
ROMO3	-2.8	-7.7	49	-9.2		-11	-4.8	1.2	11	-1.7	1.5	-6.4	-29	-8
ROMO3	-0.82	-2.2	16	-2.7		-3.1	-1.4	0.32	3.5	-0.49	0.56	-1.8	-8.4	-2.3
ROMO3	-0.73	-2	17	-2.4		-2.8	-1.2	0.46	4.2	-0.44	0.51	-1.7	-7.6	-2.1
ROMO4														
ROMO4														
ROMO4														
ROMO5	-1.1	-3	26	-3.6		-4.2	-1.9	0.46	5.6	-0.66	0.84	-2.5	-11	-3.1
ROMO5	-0.88	-2.4	19	-2.9		-3.3	-1.5	0.32	3.8	-0.53	0.54	-2	-9.1	-2.5
ROMO5	-0.93	-2.5	25	-3		-3.5	-1.6	0.41	4.7	-0.56	0.71	-2.1	-9.6	-2.6
ROMO6	-5.2	-14	17	-17	-2	-19	-8.8	0.62	-3	-3.1	0.92	-12	-53	-15
ROMO6	-2.9	-8	7.9	-9.6	1.5	-11	-5	0.32	-1.7	-1.8	0.43	-6.6	-30	-8.3
ROMO6	-4.6	-13	16	-15	1.8	-17	-7.8	0.58	-2.7	-2.8	1.2	-10	-48	-13
SEKI2														
SEKI2														
SEKI2														
SEKI3	-0.9	-2.5	67	-2.9	1.5	-3.4	-1.5	6.4	28	4	5.6	-2	-9.3	
SEKI3	-0.89	-2.4	41	-2.9	1.9	-3.3	-1.5	5.5	25	3.1	5.6	-2	-9.2	
SEKI3	-0.89	-2.4	43	-2.9	1.5	-3.4	-1.5	5	23	3	4.1	-2	-9.2	
SEKI4	-1.3	-3.5	160	-4.2	4.9	-4.9	-2.2	10	150	9.7	10	9.4	-13	-3.7
SEKI4	-1.2	-3.2	140	-3.9	4.7	-4.5	-2	9.4	140	8.5	9.3	9.1	-12	-3.4
SEKI4	-0.62	-1.7	71	-2	1.8	-2.3	-1.1	4.8	74	4.8	4.7	4.3	-6.4	-1.8
SEKI5	-0.7	-1.9	36	-2.3	1.5	-2.6	-1.2	2.3	36	2	2.2	1.9	-7.2	-2
SEKI5	-1.1	-3	60	-3.5	2.7	-4.1	-1.9	3.4	54	3	3.3	4.1	-11	-3.1
SEKI5	-1.2	-3.3	64	-4	3.2	-4.6	-2.1	3.8	67	3.4	3.6	4.2	-13	-3.5
SEKI6	-1	-2.8	43	-3.3	1.3	-3.8	-1.7	1.1	4.8	-0.61	2.1	3	-11	-2.9
SEKI6	-1.2	-3.2	38	-3.8	3.3	-4.4	-2	0.93	4	-0.7	1.9	-2.6	-12	-3.3
SEKI6	-0.96	-2.6	34	-3.1	1.4	-3.6	-1.6	0.71	3.8	-0.57	1.3	-2.2	-9.9	-2.7

Site	PCB 118 ng/g lipid	Endrin ng/g lipid	ENDO II ng/g lipid	c-NCLR ng/g lipid	Endrin A ng/g lipid	ENDO S ng/g lipid	PCB 153 ng/g lipid	PCB 138 ng/g lipid	PCB 187 ng/g lipid	PCB 183 ng/g lipid	Mirex ng/g lipid
DENA1	-0.14	-4.9	-0.2	-0.14	-0.47	0.78					-0.22
DENA1	-0.13	-4.6	-0.19	-0.13	-0.44	0.69					-0.2
DENA1	-0.17	-6	-0.25	-0.17	-0.58	1					-0.27
DENA2		-5.7	-0.23	-0.16	-0.54	0.68					-0.25
DENA2											-0.28
DENA2		-4.8	-0.2	-0.13	-0.46	0.65					-0.21
DENA3	-0.11	-3.9	-0.16	-0.11	-0.38	0.68	0.44	0.34	0.084	0.052	-0.17
DENA3	-0.11	-3.9	-0.16	-0.11	-0.38	0.7	0.29		0.067	0.042	-0.17
DENA3	-0.15	-5.2	-0.21	-0.14	-0.5	1.5	0.51	0.81	0.097	0.069	-0.23
DENA4	-0.16	-5.5	-0.22	-0.15	-0.53	0.49	0.17				-0.24
DENA4	-0.18	-6.5	-0.26	-0.18	-0.62	0.62					-0.29
DENA4	-0.13	-4.5	-0.19	-0.13	-0.44	0.5	0.17			-0.031	-0.2
GLAC1		-15	5.5	0.49	-1.4	120	0.66	0.98			-0.66
GLAC1		-13	5.9	0.54	-1.3	120	0.78	1	0.4		-0.6
GLAC1		-17	6.6	-0.47	-1.6	140	0.88	1.2			-0.75
GLAC2	1.5	-28	17	-0.77	-2.6	210	1.3	2.5	0.39	-0.19	-1.2
GLAC2	2.2	-34	21	-0.96	-3.3	260	1.3	3	0.55	-0.23	-1.5
GLAC2	3.1	-46	29	-1.3	-4.4	360	2.4	-1.5	0.94	-0.31	-2
GLAC3		-8.3	1.6	-0.23	-0.8	25		5.7			-0.37
GLAC3		-8.9	2.3	-0.25	-0.85	25		6.8			-0.39
GLAC3		-7.2	1.7	-0.2	-0.7	26		8.2			-0.32
GLAC4		-7.9	2.6	-0.22	-0.76	67	0.28	0.52	0.13		-0.35
GLAC4		-6.7	3.9	0.26	-0.65	85	0.27	0.31	0.13		-0.3
GLAC4		-6.2	3	0.21	-0.6	70	0.23	0.61	0.14		-0.28
GLAC5		-7.2	9.3	0.3	-0.69	74	0.33	0.54	0.13		-0.32
GLAC5		-6.7	7.7	-0.19	-0.64	61	0.22	0.32	0.095		-0.3
GLAC5		-7.2	8.4	0.43	-0.69	63	0.3	0.29	0.13		-0.32
MORA1	1.2	-6.9	7.8	0.39	-0.66	79	1.1	1.4			-0.31
MORA1	1.1	-8.6	7.9	0.46	-0.82	88	0.93	1.6			-0.38
MORA1	0.89	-7.4	7	0.47	-0.71	74	0.82	1.3			-0.33
MORA2	0.69	-11	7.5	-0.31	-1.1	76	1.1	1.1	0.37	0.22	-0.49
MORA2	0.73	-8.8	7.8	0.41	-0.85	90	0.99	1.7	0.34	0.17	-0.39
MORA2	0.59	-7.3	4.9	0.33	-0.7	60	0.78	0.92	0.29	0.13	-0.32
MORA3	1.3						1.4	1.7	0.6	0.22	-0.41
MORA3	1.2	-7.6	10	0.62	-0.74	67	1.2	1.6	0.55	0.21	-0.34
MORA3	0.85	-6.9	8.6	0.42	-0.66	65	1.1	1.2	0.44	0.15	-0.3
MORA4	0.94	-7.3	8.2	0.43	-0.7	110	1.6	1.7	0.68	0.22	-0.32
MORA4	1	-7.9	9.2	0.61	-0.76	120	1.6	1.9	0.67	0.23	-0.35
MORA4	1.3	-9.4	12	0.55	-0.9	160	2.2	2.2	0.85	0.27	-0.41
MORA5		-4	1.9	-0.11	-0.38	39	0.34	1.3	0.12	0.057	-0.18
MORA5		-3.7	1.9	0.14	-0.35	38	0.35	1.5	0.14	0.059	-0.16
MORA5	0.28	-4.9	2	0.21	-0.47	55	0.56	1.8	0.19	0.07	-0.22
OLYM1	2.3	-12	0.77	0.84	-1.2	14	1.9	2.6	0.76	0.31	-0.53
OLYM1	2	-14	1.1	0.72	-1.4	18	1.8	2.6	0.82	0.36	-0.64
OLYM1	1.6	-13	-0.53	0.41	-1.3	11	1.2	2.1	0.49	0.13	-0.58
OLYM2	-0.44	-15	1.2	-0.43	-1.5	23	-0.21	-0.52	-0.11	-0.1	-0.68
OLYM2	-0.44	-16	0.85	-0.43	-1.5	19	-0.22	-0.53	-0.11	-0.11	-0.69
OLYM2	-0.48	-17	0.86	-0.47	-1.6	25	-0.24	-0.57	-0.12	-0.11	-0.75
OLYM3	-0.56	-20	-0.81	-0.55	-1.9	17		-0.67	-0.14	-0.13	-0.88
OLYM3	-0.39	-14	-0.55	-0.38	-1.3	18	0.79	-0.46	-0.097	-0.092	-0.6
OLYM3	-0.39	-14	-0.55	-0.38	-1.3	15		-0.46	-0.097	-0.092	-0.6
OLYM4	0.42	-6.9	2.2	-0.19	-0.66	20	0.39	1	0.14	-0.047	-0.31
OLYM4	0.27	-4.2	0.74	-0.12	-0.4	15	0.33	1.3	0.071	-0.028	-0.18
OLYM4	0.23	-4.2	0.69	-0.12	-0.4	15	0.26	1	0.06	-0.029	-0.19
OLYM5	-0.14	-5.1	0.79	-0.14	-0.49	12	0.15	1.1	-0.036	-0.034	-0.22
OLYM5	-0.16	-5.8	0.82	-0.16	-0.56	14	0.26	0.7	-0.041	-0.039	-0.26
OLYM5	-0.18	-6.2	1.1	-0.17	-0.6	16	0.23	0.98	-0.044	-0.042	-0.28
ROMO1	-0.079	-2.8	0.22	-0.078	-0.27	1.5	0.12	-0.095	0.072		-0.12
ROMO1	-0.11	-4	0.43	-0.11	-0.38	2.3	0.18	-0.13	0.11		-0.18
ROMO1	-0.22	-7.7	0.73	-0.21	-0.74	4.3	0.19	-0.26	0.19		-0.34
ROMO2											
ROMO2	0.037	-1.2	0.47	0.041	-0.11	2.3	0.051	0.073	0.02		-0.052
ROMO2	0.099	-3.3	1.2	-0.091	-0.31	6.2	0.12	0.21			-0.14
ROMO3	0.66	-16	3	0.47	-1.6	59	0.97	1.7	0.35		-0.73
ROMO3	0.16	-4.8	1	-0.13	-0.46	16	0.28	0.26	0.086		-0.21
ROMO3	0.25	-4.3	1.2	0.22	-0.41	20	0.3	0.77	0.13	0.081	-0.19
ROMO4											
ROMO4											
ROMO4											
ROMO5	-0.18	-6.5	2.1	0.23	-0.62	33	0.37	0.76	0.12		-0.29
ROMO5	0.16	-5.2	1.6	-0.14	-0.5	23	0.25	0.46	0.088		-0.23
ROMO5	0.22	-5.5	1.9	0.21	-0.52	29	0.31	0.83	0.11		-0.24
ROMO6	1.1	-30	-1.2	-0.85	-2.9	6.7		1.1			-1.3
ROMO6	-0.49	-17	-0.7	-0.48	-1.7	3.4		-0.58			-0.73
ROMO6	-0.77	-27	-1.1	-0.75	-2.6	6.9		-0.92			-1.2
SEKI2											
SEKI2											
SEKI2											
SEKI3	0.61	-5.3	31	1.9	-0.51	220	1.5	2.1	0.7	0.32	-0.23
SEKI3	0.54	-5.2	24	1.3	-0.5	170	0.94	1.7	0.54	0.2	-0.23
SEKI3	0.38	-5.2	23	1.2	-0.5	150	1.1	1.7	0.61	0.23	-0.23
SEKI4	-0.22	-7.6	62	3.2	-0.73	430	2.6	3.8	1.4	0.55	-0.34
SEKI4	-0.2	-7	63	2.7	-0.67	350	2.3	3.2	1.2	0.42	-0.31
SEKI4	-0.1	-3.6	35	1.4	-0.35	170	1.2	1.6	0.66	0.25	-0.16
SEKI5	1	-4.1	32	0.87	-0.4	64	0.81	1.2	0.43	0.15	-0.18
SEKI5	1.7	-6.4	53	1.3	-0.61	130	1.3	2	0.64	0.3	-0.28
SEKI5	1.8	-7.2	62	1.6	-0.69	120	1.4	1.9	0.72	0.28	-0.32
SEKI6	0.28	-6	4.6	0.37	-0.57	22		0.4			-0.27
SEKI6	0.37	-6.8	4.5	0.21	-0.65	19		0.38			-0.3
SEKI6	0.27	-5.6	4.1	0.19	-0.54	23		0.37			-0.25

Site	PCB 118 ng/g lipid	Endrin ng/g lipid	ENDO II ng/g lipid	c-NCLR ng/g lipid	Endrin A ng/g lipid	ENDO S ng/g lipid	PCB 153 ng/g lipid	PCB 138 ng/g lipid	PCB 187 ng/g lipid	PCB 183 ng/g lipid	Mirex ng/g lipid
BAND1	0.23	-4	0.26	-0.037	-0.32	1.3					-0.13
BAND2		-5.4	-0.23	-0.05	-0.43	5.5					-0.18
BAND2		-4.8	-0.2	-0.044	-0.38	1.8	0.58	1.2	0.088	0.063	-0.16
BAND3		-5.1	-0.22	-0.047	-0.41	2					-0.17
BAND4		-4.9	-0.21	-0.045	-0.39	1.6					-0.16
BAND5		-3.8	0.26	-0.035	-0.3	2.1					-0.13
BIBE3	-0.2	-6.3	0.35	-0.058	-0.5	7.4				-0.04	-0.21
BIBE4		-6.3	0.78	-0.058	-0.5	13					-0.21
BIBE5		-6.4	0.73	-0.059	-0.51	9.5					-0.22
CRLA1		-11	5.2	-0.1	-0.89	53		0.77	0.23	0.13	-0.37
CRLA2		-5.4	0.95	0.16	-0.43	23		1.3	0.095	0.043	-0.18
CRLA3		-11	17	0.5	-0.91	70		1.1	0.33	0.15	-0.38
CRLA3		-11	15	0.49	-0.87	60		1	0.27	0.14	-0.36
CRLA4		-5.4	0.33	-0.05	-0.43	2.6			0.052	-0.034	-0.18
CRLA5		-4.4	0.46	-0.041	-0.35	4.3			0.035	-0.028	-0.15
GLBA1		-6.6	-0.28	-0.06	-0.52	1.1					-0.22
GLBA2		-9.6	-0.41	-0.089	-0.77	2.1					-0.32
GLBA3		-9.7	-0.41	-0.09	-0.77	1.8					-0.33
GLBA4		-8.1	-0.34	-0.075	-0.65	1.5					-0.27
GRSA1		-7.2	-0.3	-0.066	-0.57	2.3					-0.24
GRSA2		-7.3	-0.31	-0.067	-0.58	2.3					-0.24
GRSA3		-8.6	0.55	-0.079	-0.69	5.7					-0.29
GRSA4		-9.2	0.46	-0.085	-0.73	7.8					-0.31
GRSA5	-0.29	-9.1	-0.39	-0.084	-0.73	5.1	0.35	0.63	0.064	-0.057	-0.31
GRTE1		-6.4	-0.27	-0.059	-0.51	3.6	-0.13	-0.14	-0.044	-0.04	-0.22
GRTE1		-6.4	-0.27	-0.059	-0.51	3	0.19	-0.14	-0.044	-0.04	-0.21
GRTE2		-7.8	1.7	-0.072	-0.62	22	0.37	-0.17	0.076	-0.049	-0.26
GRTE3	-0.17	-5.2	-0.22	-0.048	-0.41	2.4	0.34	0.31	0.059	0.036	-0.17
GRTE4	-0.17	-5.2	-0.22	-0.048	-0.42	2.8	0.38	0.7	0.074	0.037	-0.18
GRTE5	-0.21	-6.7	-0.28	-0.061	-0.53	4.6	-0.14	-0.14	-0.046	-0.042	-0.22
KATM1		-9.1	-0.38	-0.083	-0.72	1.5	0.36			0.088	-0.3
KATM2		-7.8	-0.33	-0.071	-0.62	1.2				-0.049	-0.26
KATM3		-8.1	-0.34	-0.075	-0.65	1.9				-0.051	-0.27
KATM4		-9	-0.38	-0.083	-0.72	1.6				0.079	-0.3
KATM5		-7.6	-0.32	-0.07	-0.61	2.2				0.061	-0.26
LAVO1	0.47	-9.8	5.5	0.62	-0.78	78			0.29		-0.33
LAVO2	0.56	-10	12	1.1	-0.83	110			0.38	0.15	-0.35
LAVO3		-8.5	19	0.96	-0.68	94		1.4	0.54	0.23	-0.28
LAVO4		-7.8	23	0.76	-0.62	75			0.42	0.14	-0.26
LAVO5		-8	15	0.78	-0.63	87		1.4	0.39	0.17	-0.27
NOCA1	0.32	-6.9	2.8	0.12	-0.55	17	0.31	-0.15	0.097	-0.043	-0.23
NOCA2	-0.3	-9.4	5.2	0.25	-0.75	50	0.81	1.1	0.33	-0.059	-0.32
NOCA3	0.43	-7.8	3.8	0.22	-0.62	27	0.65	0.63	0.18	0.062	-0.26
NOCA4	0.43	-7.9	4.7	0.22	-0.63	30	0.58	0.6	0.18	0.056	-0.26
NOCA5	0.31	-5.4	5.8	0.17	-0.43	26	0.37	0.43	0.12	0.043	-0.18
STLE1	-0.27	-8.4	-0.36	-0.077	-0.67	0.87	-0.17	-0.18	-0.058	-0.053	-0.28
STLE1	-0.27	-8.3	-0.35	-0.076	-0.66	1.1	0.26	-0.18	-0.057	-0.052	-0.28
STLE2	-0.28	-8.6	-0.36	-0.079	-0.68	1.6	0.21	-0.18	-0.059	-0.054	-0.29
STLE3	-0.28	-8.8	-0.37	-0.081	-0.7	1.6	-0.18	-0.19	-0.061	-0.055	-0.29
STLE4	-0.23	-7.3	-0.31	-0.067	-0.58	2.1	0.23	-0.16	-0.05	-0.045	-0.24
STLE5	-0.27	-8.5	-0.36	-0.079	-0.68	2	0.22	-0.18	-0.059	-0.053	-0.28
WRST1	-0.2	-6.2	-0.26	0.1	-0.49	0.61	-0.13	-0.13	-0.043	-0.039	-0.21
WRST1	-0.24	-7.6	-0.32	-0.07	-0.61	0.55	-0.15	-0.16	-0.052	-0.048	-0.25
WRST2	-0.28	-8.6	-0.36	-0.079	-0.68	0.88	-0.17	-0.18	-0.059	-0.054	-0.29
WRST2	-0.16	-5.1	-0.21	-0.047	-0.4	0.57	-0.1	-0.11	-0.035	-0.032	-0.17
WRST3	-0.18	-5.6	-0.24	-0.052	-0.45	1.4	-0.11	-0.12	-0.039	-0.035	-0.19
WRST4	-0.29	-8.9	-0.38	-0.082	-0.71	2.2	-0.18	-0.19	-0.061	-0.056	-0.3
WRST5	-0.21	-6.5	-0.28	-0.06	-0.52	0.91	-0.13	-0.14	-0.045	-0.041	-0.22
YOSE1	0.39	-8.7	0.78	0.73	-0.69	17	0.82	1	0.43	0.32	0.57
YOSE2	-0.85	-26	2.4	0.49	-2.1	38	0.75	-0.57	0.42	-0.17	-0.89
YOSE2	-0.27	-8.3	-0.35	0.12	-0.66	15	0.31	-0.18	0.14	-0.052	-0.28
YOSE3	-0.33	-10	-0.43	-0.093	-0.81	21	-0.21	-0.22	0.098	-0.063	-0.34
YOSE4	0.51	-11	-0.46	0.11	-0.87	7.1	-0.22	-0.24	0.16	-0.068	-0.37
YOSE5	-0.26	-8.2	-0.35	-0.076	-0.66	9.2	-0.17	-0.18	0.065	-0.051	-0.28

Site	Wet weight g	% moisture	% lipid	g lipid	ACY ng/g lipid	ACE ng/g lipid	FLO ng/g lipid	PHE ng/g lipid	ANT ng/g lipid	M-PTHN ng/g lipid
DENA1	19.9	55.85	7.75	0.681	-1.6	-5			-7.3	-51
DENA1	20.1	55.77	8.17	0.726	-1.5	-4.7			-6.9	-48
DENA1	19.9	56.44	6.4	0.555	-2	-6.1			-9	-63
DENA2	20.1	56.33	6.76	0.593	-1.8	-5.7			28	-59
DENA2	20.1	57.03	6.2	0.536	-2	-6.3			-9.3	-65
DENA2	20.1	57.52	8.24	0.697	-1.6	-4.9			-7.1	-50
DENA3	20	52.15	8.98	0.859	-1.3	-3.9			-5.8	-40
DENA3	20	50.9	8.67	0.851	-1.3	-4			-5.8	-41
DENA3	20.1	51.68	6.7	0.651	-1.7	-5.2			-7.7	-53
DENA4	19.9	53.3	6.61	0.615	-1.8	-5.5			-8.1	-56
DENA4	20.2	53.62	5.54	0.519	-2.1	-6.5			-9.6	-67
DENA4	20.1	53.26	7.86	0.738	-1.5	-4.6			-6.7	-47
GLAC1	9.9	57.99	5.44	0.226	-4.8	-15	2030	11080	230	-150
GLAC1	10.1	55.76	5.58	0.249	-4.4	-14	2410	12520	280	-140
GLAC1	10	58.81	4.82	0.199	-5.5	-17	2610	13390	310	-170
GLAC2	14.7	61.85	2.17	0.122	-8.9	-28	-13	7270	-41	-280
GLAC2	14.7	61.85	2.17	0.122	-8.9	-28	-13	6400	-41	-280
GLAC2	15	60.34	1.64	0.098	-11	-35	-16	7670	-51	-360
GLAC2	15.4	57.16	1.11	0.074	-15	-46	-21	12180	-68	-470
GLAC3	19.9	55.35	4.56	0.405	-2.7	-8.4	-3.8		-12	-86
GLAC3	20	55.21	4.23	0.379	-2.9	-9	-4		-13	-92
GLAC3	20.2	56.51	5.28	0.464	-2.3	-7.3	-3.3		-11	-75
GLAC4	13	58.98	7.95	0.424	-2.6	-8	56	160	-12	-82
GLAC4	17.8	60.52	7.08	0.498	-2.2	-6.8	50	120	-10	-70
GLAC4	17.7	58.36	7.31	0.539	-2	-6.3	55	140	-9.2	-64
GLAC5	20	55.38	5.21	0.465	-2.3	-7.3		250	-11	-75
GLAC5	19.9	54.02	5.5	0.504	-2.2	-6.7		200	-9.9	-69
GLAC5	20.1	55.84	5.25	0.466	-2.3	-7.3		220	-11	-74
MORA1	19.9	47.92	4.68	0.486	-2.2	-7	-3.2	470	-10	-71
MORA1	19.9	59.2	4.82	0.391	-2.8	-8.7	-3.9	320	-13	-89
MORA1	19.9	57.78	5.37	0.452	-2.4	-7.5	-3.4	520	-11	-77
MORA2	13.1	50.36	4.67	0.304	-3.6	-11		1370	-16	-110
MORA2	20	56.73	4.39	0.38	-2.9	-8.9		1210	-13	-91
MORA2	20.1	54.69	5.05	0.46	-2.4	-7.4		1420	-11	-76
MORA3	20.3	56.93	4.2	0.367	-3	-9.2		72	-14	-95
MORA3	19.9	55.6	4.97	0.439	-2.5	-7.7		76	-11	-79
MORA3	19.9	55.79	5.52	0.488	-2.2	-7		65	-10	-71
MORA4	20.1	60.58	5.78	0.458	-2.4	-7.4	-3.3	72	-11	-76
MORA4	20	59.23	5.2	0.424	-2.6	-8	-3.6	59	-12	-82
MORA4	19.9	60.95	4.61	0.356	-3	-9.5	-4.3	72	-14	-97
MORA5	19.9	57.8	10	0.841	-1.3	-4	-1.8		-5.9	-41
MORA5	20.4	57.46	10.6	0.917	-1.2	-3.7	-1.7		-5.4	-38
MORA5	20.1	57.22	8	0.688	-1.6	-4.9	-2.2		-7.2	-50
OLYM1	5.3	49.16	10.4	0.279	420	-12	-5.5	3960	41	-120
OLYM1	5.4	54.38	9.46	0.233	700	-15	-6.6	5560	65	-150
OLYM1	5.3	56.77	11.2	0.257	510	-13	-6	2870	44	-140
OLYM2	15	60.08	3.64	0.218	-5	-16			-23	-160
OLYM2	14.9	57.16	3.39	0.216	-5	-16			-23	-160
OLYM2	14.8	57.65	3.17	0.199	-5.5	-17			-25	-170
OLYM3	5.8	55.46	6.55	0.169	-6.4	-20			-29	-210
OLYM3	7.6	55.17	7.23	0.247	-4.4	-14			-20	-140
OLYM3	8.1	54.5	6.7	0.247	-4.4	-14			-20	-140
OLYM4	20	52.89	5.23	0.487	-2.2	-7	-3.1		-10	-71
OLYM4	19.8	56.17	9.27	0.805	-1.4	-4.2	-1.9		-6.2	-43
OLYM4	19.9	54.28	8.76	0.798	-1.4	-4.3	-1.9		-6.2	-44
OLYM5	20	58.9	8.07	0.663	-1.6	-5.1	-2.3		-7.5	-52
OLYM5	19.9	56.91	6.73	0.578	-1.9	-5.9	-2.7		-8.6	-60
OLYM5	20	59.41	6.65	0.54	-2	-6.3	-2.8		-9.2	-64
ROMO1	19.9	54.62	13.3	1.2	-0.9	-2.8			-4.1	-29
ROMO1	20	52.24	8.84	0.844	-1.3	-4			-5.9	-41
ROMO1	20	54.98	4.86	0.438	-2.5	-7.8			-11	-79
ROMO2	19.9	56.48	10	0.866						
ROMO2	19.6	55.79	33.3	2.89	-0.38	-1.2		18	-1.7	-12
ROMO2	19.9	56.32	11.9	1.03	-1.1	-3.3		48	-4.8	-34
ROMO3	20	51.76	2.11	0.203	-5.3	-17	-7.5	120	110	-170
ROMO3	20.1	57.86	8.28	0.701	-1.5	-4.8	-2.2	38	37	-49
ROMO3	20.1	55.39	8.71	0.781	-1.4	-4.3	-2	130	48	-44
ROMO4										
ROMO4										
ROMO4										
ROMO5	20.2	50.13	5.13	0.517	-2.1	-6.6	-3	63	-9.6	-67
ROMO5	20.2	51.27	6.61	0.65	-1.7	-5.2	-2.4	52	-7.7	-53
ROMO5	20.2	49.13	5.98	0.615	-1.8	-5.5	-2.5	59	-8.1	-56
ROMO6	5	48.94	4.33	0.111	-9.8	-31	-14		-45	-310
ROMO6	5	51.66	8.06	0.195	-5.6	-17	-7.9		-26	-180
ROMO6	5	53.67	5.36	0.124	-8.7	-27	-12		-40	-280
SEKI2										
SEKI2										
SEKI2										
SEKI3	20.1	59.02	7.7	0.634	120	-5.3	880	470	-7.9	-55
SEKI3	20	59.79	8.01	0.645	120	-5.3	870		-7.7	-54
SEKI3	20	59.78	7.98	0.642	70	-5.3	1370		-7.8	-54
SEKI4	19.8	58.2	5.31	0.44	-2.5	-7.7	310	940	-11	-79
SEKI4	19.8	58.27	5.83	0.482	-2.3	-7	280	860	-10	-72
SEKI4	20	58.71	11.2	0.923	-1.2	-3.7	120	380	-5.4	-38
SEKI5	20	59.52	10.1	0.817	-1.3	-4.2	-1.9	160	-6.1	-43
SEKI5	19.9	59.44	6.51	0.526	-2.1	-6.5	-2.9	210	-9.5	-66
SEKI5	20.3	58.98	5.6	0.467	-2.3	-7.3	-3.3	320	-11	-74
SEKI6	19.8	53.79	6.13	0.561	-1.9	-6	-2.7		-8.9	-62
SEKI6	20	54.26	5.39	0.493	-2.2	-6.9	-3.1		-10	-70
SEKI6	20.1	53.66	6.49	0.599	-1.8	-5.7	-2.6		-8.3	-58

Site	% moisture	% lipid	g lipid	ACY ng/g lipid	ACE ng/g lipid	FLO ng/g lipid	PHE ng/g lipid	ANT ng/g lipid	M-PTHN ng/g lipid
BAND1	39.91	6.77	0.8500	-2.2	-2.9			-2.1	-8.7
BAND2	41.96	5.44	0.6317	-3	-3.9			-2.8	-12
BAND2	44.5	6.39	0.7133	-2.6	-3.5			-2.5	-10
BAND3	48.82	6.48	0.6662	-2.8	-3.7			-2.6	-11
BAND4	51.59	7.34	0.6997	-2.7	-3.5			-2.5	-11
BAND5	45.46	8.25	0.8912	-2.1	-2.8			-2	-8.3
BIBE3	46.39	4.94	0.5402	-3.5	-4.6	-2		-3.3	-14
BIBE4	36.32	4.34	0.5395	-3.5	-4.6	-2		-3.3	-14
BIBE5	44.22	4.8	0.5305	-3.6	-4.7	-2.1	13	-3.3	-14
CRLA1	59.24	3.68	0.3045	-6.2	-8.1	-2	460	-5.8	-24
CRLA2	55.41	6.85	0.6320	-3	-3.9	-1.7	54	-2.8	-12
CRLA3	55.73	3.4	0.2983	-6.3	-8.3		960	-5.9	-25
CRLA3	56.06	3.56	0.3127	-6	-7.9		690	-5.6	-24
CRLA4	54.3	7.02	0.6350	-3	-3.9			-2.8	-12
CRLA5	56.86	8.85	0.7710	-2.4	-3.2			-2.3	-9.5
GLBA1	51.86	5.45	0.5197	-3.6	-4.8	-2.1		-3.4	-14
GLBA2	42.67	3.15	0.3538	-5.3	-7	-3.1		-5	-21
GLBA3	56.26	4.09	0.3508	-5.4	-7.1	-3.2		-5	-21
GLBA4	49.46	4.15	0.4197	-4.5	-5.9	-2.6		-4.2	-18
GRSA1	51.4	4.83	0.4768	-4	-5.2			-3.7	-15
GRSA2	45.08	4.15	0.4670	-4	-5.3			-3.8	-16
GRSA3	55.49	4.27	0.3955	-4.8	-6.3			-4.5	-19
GRSA4	54.91	3.99	0.3707	-5.1	-6.7			-4.8	-20
GRSA5	52.98	3.89	0.3730	-5.1	-6.7			-4.7	-20
GRTE1	50.84	5.08	0.5298	-3.6	-4.7	-2.1		-3.3	-14
GRTE1	52.16	5.48	0.5350	-3.5	-4.6	-2.1		-3.3	-14
GRTE2	45.08	3.96	0.4370	-4.3	-5.7	-2.5		-4	-17
GRTE3	50.55	6.69	0.6618	-2.8	-3.7	-1.7		-2.7	-11
GRTE4	50.46	6.41	0.6505	-2.9	-3.8	-1.7		-2.7	-11
GRTE5	53.12	5.37	0.5115						
KATM1	43.02	3.21	0.3770	-5	-6.6	-2.9		-4.7	-20
KATM2	47.26	4.05	0.4398	-4.3	-5.6	-2.5		-4	-17
KATM3	49.99	4.12	0.4200	-4.5	-5.9	-2.6		-4.2	-18
KATM4	45.76	3.46	0.3778	-5	-6.6	-2.9		-4.7	-19
KATM5	44.4	3.99	0.4462	-4.2	-5.6	-2.5		-4	-16
LAVO1	58.3	4.07	0.3465	-5.4	-7.2			-5.1	-21
LAVO2	57.62	3.72	0.3293	-5.7	-7.5			-5.4	-22
LAVO3	59.49	4.9	0.4013	-4.7	-6.2			-4.4	-18
LAVO4	55.47	4.58	0.4368	-4.3	-5.7			-4	-17
LAVO5	53.91	4.5	0.4290	-4.4	-5.8			-4.1	-17
NOCA1	58.3	4.07	0.4925	-3.8	-5			-3.6	-15
NOCA2	57.62	3.72	0.3615	-5.2	-6.9		280	-4.9	-20
NOCA3	59.49	4.9	0.4363	-4.3	-5.7			-4	-17
NOCA4	55.47	4.58	0.4317	-4.4	-5.7			-4.1	-17
NOCA5	53.91	4.5	0.6310	-3	-3.9			-2.8	-12
STLE1	48.69	3.77	0.4058	-4.6	-6.1			-4.3	-18
STLE1	46.78	3.82	0.4122	-4.6	-6	88		-4.3	-18
STLE2	54.64	4.33	0.3988	-4.7	-6.2			-4.4	-18
STLE3	47.86	3.74	0.3880	-4.9	-6.4			-4.5	-19
STLE4	51.04	4.59	0.4700	-4	-5.3			-3.8	-16
STLE5	50.39	4.06	0.4005	-4.7	-6.2			-4.4	-18
WRST1	54.32	5.87	0.5528	-3.4	-4.5			-3.2	-13
WRST1	56.28	5.11	0.4490	-4.2	-5.5			-3.9	-16
WRST2	45.19	3.56	0.3980	-4.7	-6.2			-4.4	-18
WRST2	43.73	5.86	0.6755	-2.8	-3.7			-2.6	-11
WRST3	44.56	5.32	0.6080	-3.1	-4.1			-2.9	-12
WRST4	51.24	3.82	0.3833	-4.9	-6.5			-4.6	-19
WRST5	46.79	4.85	0.5235	-3.6	-4.7			-3.4	-14
YOSE1	52.55	4.13	0.3935	58	-6.3	58		-4.5	-19
YOSE2	56.68	1.47	0.1288	-15	-19	700	2420	-14	-57
YOSE2	55.49	4.47	0.4103	-4.6	-6	210	770	-4.3	-18
YOSE3	59.69	4.02	0.3367	-5.6	-7.4	130	510	-5.2	-22
YOSE4	65.04	4.4	0.3125	-6	-7.9			-5.6	-24
YOSE5	58.32	4.74	0.4147	-4.5	-6			-4.3	-18

Site	FLA ng/g lipid	PYR ng/g lipid	MXCLR ng/g lipid	B[a]A ng/g lipid	CHR/TRI ng/g lipid	B[b]F ng/g lipid	B[k]F ng/g lipid	B[e]P ng/g lipid	B[a]P ng/g lipid	I[1,2,3-cd]p ng/g lipid	D[ah]A ng/g lipid	B[ghi]P ng/g lipid
DENA1		-0.45		-9.2	-3	-5.6	-4.6	-6.6	-5.9	-12	-41	-2.1
DENA1		-0.42		-8.6	-2.8	-5.2	-4.3	-6.2	-5.5	-11	-39	-2
DENA1		-0.56		-11	-3.7	-6.9	-5.7	-8.1	-7.2	-14	-51	-2.6
DENA2		-0.52		-11	-3.5	-6.4	-5.3	-7.6	-6.8	-13	-47	-2.4
DENA2		-0.58		-12	-3.9	-7.1	-5.9	-8.4	-7.5	-15	-52	-2.7
DENA2		-0.44		-9	-3	-5.5	-4.5	-6.5	-5.8	-11	-40	-2
DENA3		-0.36	-2.9	-7.3	-2.4	-4.4	-3.7	-5.2	-4.7	-9.1	-33	-1.7
DENA3		-0.36	-3	-7.3	-2.4	-4.5	-3.7	-5.3	-4.7	-9.2	-33	-1.7
DENA3		-0.47	-3.9	-9.6	-3.2	-5.9	-4.8	-6.9	-6.2	-12	-43	-2.2
DENA4		-0.5	-4.1	-10	-3.4	-6.2	-5.1	-7.3	-6.5	-13	-46	-2.3
DENA4		-0.59	-4.9	-12	-4	-7.3	-6.1	-8.7	-7.7	-15	-54	-2.7
DENA4		-0.42	-3.4	-8.5	-2.8	-5.2	-4.3	-6.1	-5.4	-11	-38	-1.9
GLAC1	2130	1140		-18	-9.1	240	-14	81	19	-35	-120	27
GLAC1	2480	1300		-16	-8.3	270	-13	90	26	-32	-110	38
GLAC1	2740	1410		-20	-10	280	-16	84	39	-40	-140	28
GLAC2	2060	520	-21	-51	13830	-31	-26	-37	-33	-64	-230	-12
GLAC2	1930	460	-21	-51	14520	-31	-26	-37	-33	-64	-230	-12
GLAC2	1760	570	-26	-64	29890	-39	-32	-46	-41	-81	-290	-15
GLAC2	3720	990	-34	-85	27350	-52	-43	-61	-55	-110	-380	-19
GLAC3	42	-0.76		-15	-5.1	-9.4	-7.8	-11	-9.9	-19	-69	-3.5
GLAC3	59	-0.81		-17	-5.4	-10	-8.3	-12	-11	-21	-74	-3.8
GLAC3	52	-0.66		-13	-4.4	-8.2	-6.8	-9.7	-8.7	-17	-61	-3.1
GLAC4	38	29	-6	-15	-4.9	-9	-7.4	-11	-9.5	-19	-66	-3.4
GLAC4	31	20	-5.1	-13	-4.1	-7.7	-6.3	-9	-8.1	-16	-56	-2.9
GLAC4	35	27	-4.7	-12	-3.8	-7.1	-5.8	-8.3	-7.5	-15	-52	-2.6
GLAC5	120	61	-5.4	14	-4.4	-8.2	-6.8	-9.7	-8.6	-17	-60	-3.1
GLAC5	100	46	-5	-12	-4.1	-7.6	-6.2	-8.9	-8	-16	-56	-2.8
GLAC5	120	55	-5.4	-13	-4.4	-8.2	-6.7	-9.6	-8.6	-17	-60	-3
MORA1		140	-5.2	-13	-4.3	-7.8	-6.5	-9.3	-8.3	-16	-58	-2.9
MORA1		47	-6.5	-16	-5.3	-9.7	-8	-11	-10	-20	-72	-3.6
MORA1	120	120	-5.6	-14	-4.6	-8.4	-7	-10	-8.9	-17	-62	-3.1
MORA2	480	180	-8.3	-21	-6.8	-13	-10	-15	-13	-26	-92	-4.7
MORA2	370	140	-6.6	-16	-5.4	-10	-8.3	-12	-11	-21	-74	-3.7
MORA2	440	140	-5.5	-14	-5.4	-8.3	-6.8	-9.8	-8.7	-17	-61	-3.1
MORA3		-0.84	-6.9	-17	-5.6	-10	-8.6	-12	-11	-21	-76	-3.9
MORA3		-0.7	-5.8	-14	-4.7	-8.7	-7.2	-10	-9.2	-18	-64	-3.2
MORA3		-0.63	-5.2	-13	-4.2	-7.8	-6.4	-9.2	-8.2	-16	-58	-2.9
MORA4		-0.67	-5.5	-14	-4.5	-8.3	-6.9	-9.8	-8.8	-17	-61	-3.1
MORA4		-0.73	-6	-15	-4.9	-9	-7.4	-11	-9.5	-19	-66	-3.4
MORA4		-0.86	-7	-17	-5.8	-11	-8.8	-13	-11	-22	-78	-4
MORA5		-0.37	-3	-7.4	-2.5	-4.5	-3.7	-5.3	-4.8	-9.3	-33	-1.7
MORA5		-0.34	-2.8	-6.8	-2.3	-4.2	-3.4	-4.9	-4.4	-8.6	-31	-1.5
MORA5		-0.45	-3.7	-9.1	-3	-5.5	-4.6	-6.5	-5.8	-11	-41	-2.1
OLYM1	1780	850	-9	120	-7.4	420	110	180	73	85	-100	94
OLYM1	2120	1000	-11	120	-8.9	390	97	180	80	89	-120	110
OLYM1	1080	480	-9.8	67	-8	190	54	87	120	49	-110	55
OLYM2	-8.1	-1.4	-12	-29	-9.5	-17	-14	-21	-18	-36	-130	-6.5
OLYM2	-8.1	-1.4	-12	-29	-9.5	-18	-15	-21	-19	-36	-130	-6.6
OLYM2	-8.8	-1.6	-13	-31	-10	-19	-16	-23	-20	-40	-140	-7.1
OLYM3		-1.8	37	-37	-12	-22	-19	-27	-24	-46	-170	-8.4
OLYM3		-1.2	41	-25	-8.4	-15	-13	-18	-16	-32	-110	-5.8
OLYM3		-1.2	43	-25	-8.4	-15	-13	-18	-16	-32	-110	-5.8
OLYM4	-3.6	-0.63	23	-13	-4.2	-7.8	-6.4	-9.2	-8.2	-16	-58	-2.9
OLYM4	-2.2	-0.38	37	-7.8	-2.6	-4.7	-3.9	-5.6	-5	-9.8	-35	-1.8
OLYM4	-2.2	-0.39	35	-7.8	-2.6	-4.8	-3.9	-5.6	-5	-9.9	-35	-1.8
OLYM5	-2.7	-0.46	-3.8	-9.4	-3.1	-5.7	-4.7	-6.8	-6.1	-12	-42	-2.1
OLYM5	-3	-0.53	-4.4	-11	-3.6	-6.6	-5.4	-7.8	-7	-14	-49	-2.5
OLYM5	-3.3	-0.57	54	-12	-3.8	-7	-5.8	-8.3	-7.4	-15	-52	-2.6
ROMO1	5.2	-0.26	67	-5.2	-1.7	-3.2	-2.6	-3.7	-3.3	-6.5	-23	-1.2
ROMO1	7	-0.37	60	-7.4	-2.4	-4.5	-3.7	-5.3	-4.8	-9.3	-33	-1.7
ROMO1	16	-0.7	200	-14	-4.7	-8.7	-7.2	-10	-9.2	-18	-64	-3.2
ROMO2												
ROMO2	4.1	-0.11	-0.87	-2.2	-0.71	-1.3	-1.1	-1.6	-1.4	-2.7	-9.7	-0.49
ROMO2	11	-0.3	-2.4	-6.1	-2	-3.7	-3	-4.4	-3.9	-7.6	-27	-1.4
ROMO3	24	-1.5	-12	-31	-10	-19	-15	-22	-20	-39	-140	-7
ROMO3	9.7	-0.44	-3.6	-8.9	-2.9	-5.4	-4.5	-6.4	-5.7	-11	-40	-2
ROMO3	9.5	-0.39	-3.2	-8	-2.6	-4.9	-4	-5.8	-5.1	-10	-36	-1.8
ROMO4												
ROMO4												
ROMO4												
ROMO5	8.9	-0.6	-4.9	-12	-4	-7.4	-6.1	-8.7	-7.8	-15	-54	-2.7
ROMO5	6.2	-0.47	-3.9	-9.6	-3.2	-5.9	-4.8	-6.9	-6.2	-12	-43	-2.2
ROMO5	7	-0.5	-4.1	-10	-3.4	-6.2	-5.1	-7.3	-6.5	-13	-46	-2.3
ROMO6		-2.8	-23	-57	-19	-34	-28	-41	-36	-71	-250	-13
ROMO6		-1.6	-13	-32	-11	-20	-16	-23	-21	-40	-140	-7.3
ROMO6		-2.5	-20	-50	-17	-31	-25	-36	-32	-63	-230	-11
SEKI2												
SEKI2												
SEKI2												
SEKI3	34	35	-4	-9.9	-3.3	-6	-5	-7.1	-6.3	-12	-44	-2.2
SEKI3	34	34	-3.9	-9.7	-3.2	-5.9	-4.9	-7	-6.2	-12	-44	-2.2
SEKI3	310		-3.9	-9.7	-3.2	-5.9	-4.9	-7	-6.3	-12	-44	-2.2
SEKI4	170	83		-14	-4.7	-8.7	-7.1	-10	-9.1	-18	-64	-3.2
SEKI4	160	76		-13	-4.3	-7.9	-6.5	-9.3	-8.3	-16	-58	-2.9
SEKI4	76	32		-6.8	-2.2	-4.1	-3.4	-4.9	-4.4	-8.5	-30	-1.5
SEKI5	37	15		-7.7	-2.5	-4.7	-3.9	-5.5	-4.9	-9.6	-34	-1.7
SEKI5	45	22		-12	-3.9	-7.2	-6	-8.6	-7.6	-15	-53	-2.7
SEKI5	66	29		-13	-4.4	-8.2	-6.7	-9.6	-8.6	-17	-60	-3
SEKI6		-0.55	-4.5	-11	-3.7	-6.8	-5.6	-8	-7.2	-14	-50	-2.5
SEKI6		-0.63	-5.1	-13	-4.2	-7.7	-6.4	-9.1	-8.2	-16	-57	-2.9
SEKI6		-0.51	-4.2	-10	-3.4	-6.4	-5.3	-7.5	-6.7	-13	-47	-2.4

Site	FLA ng/g lipid	PYR ng/g lipid	MXCLR ng/g lipid	B[a]A ng/g lipid	CHR/TRI ng/g lipid	B[b]F ng/g lipid	B[k]F ng/g lipid	B[e]P ng/g lipid	B[a]P ng/g lipid	I[1,2,3-cd]p ng/g lipid	D[ah]A ng/g lipid	B[ghi]P ng/g lipid
BAND1	-0.7	-0.17	-2	-0.51	-0.77	-0.73	-0.99		-1.6	-1.5	-12	
BAND2	-0.95	-0.23	-2.7	-0.68	-1	-0.98	-1.3		-2.2	-2	-17	
BAND2	-0.84	-0.2	-2.4	-0.6	-0.92	-0.87	-1.2		-2	-1.8	-15	
BAND3	-0.9	-0.22	-2.6	-0.65	-0.98	-0.93	-1.3		-2.1	-1.9	-16	
BAND4	-0.86	-0.21	-2.5	-0.62	-0.93	-0.89	-1.2		-2	-1.8	-15	
BAND5	-0.67	-0.16	-1.9	-0.48	-0.73	-0.7	-0.94		-1.6	-1.4	-12	
BIBE3	-1.1	-0.27	-3.2	-0.8	-1.2	-1.2	-1.6	-2.1		-2.3	-19	-1.8
BIBE4	-1.1	-0.27	-3.2	-0.8	-1.2	-1.2	-1.6	-2.1		-2.3	-19	-1.8
BIBE5	-1.1	-0.27	-3.3	-0.81	-1.2	-1.2	-1.6	-2.2		-2.4	-20	-1.8
CRLA1	58	-0.47	-5.7	-1.4	-2.1	-2	-2.8	-3.8	-4.6	-4.1	-35	-3.2
CRLA2	-0.95	-0.23	120	-0.68	-1	-0.98	-1.3	-1.8	-2.2	-2	-17	-1.5
CRLA3	130	65	-5.8	-1.4	-2.2	-2.1	-2.8	-3.9	-4.7	-4.2	-35	-3.3
CRLA3	140	49	-5.5	-1.4	-2.1	-2	-2.7	-3.7	-4.5	-4	-34	-3.1
CRLA4	-0.94	-0.23	-2.7	-0.68	-1	-0.98	-1.3	-1.8	-2.2	-2	-17	-1.5
CRLA5	-0.78	-0.19	-2.2	-0.56	-0.85	-0.81	-1.1	-1.5	-1.8	-1.6	-14	-1.3
GLBA1	-1.2	-0.28	210	-0.83	-1.3	-1.2	-1.6	-2.2		-2.4	-20	-1.9
GLBA2	-1.7	-0.41	300	-1.2	-1.8	-1.8	-2.4	-3.3		-3.6	-30	-2.8
GLBA3	-1.7	-0.41	490	-1.2	-1.9	-1.8	-2.4	-3.3		-3.6	-30	-2.8
GLBA4	-1.4	-0.34	600	-1	-1.6	-1.5	-2	-2.8		-3	-25	-2.3
GRSA1	-1.3	-0.3	-3.6	-0.9	-1.4	-1.3	-1.8	-2.4		-2.6	-22	-2
GRSA2	-1.3	-0.31	-3.7	-0.92	-1.4	-1.3	-1.8	-2.5		-2.7	-23	-2.1
GRSA3	-1.5	-0.37	-4.4	-1.1	-1.7	-1.6	-2.1	-2.9		-3.2	-27	-2.5
GRSA4	-1.6	-0.39	-4.7	-1.2	-1.8	-1.7	-2.3	-3.1		-3.4	-28	-2.6
GRSA5	-1.6	-0.39	-4.6	-1.2	-1.8	-1.7	-2.2	-3.1		-3.4	-28	-2.6
GRTE1	-1.1	-0.27	-3.3	-0.81	-1.2	-1.2	-1.6	-2.2		-2.4	-20	-1.8
GRTE1	-1.1	-0.27	-3.2	-0.8	-1.2	-1.2	-1.6	-2.2	21	-2.4	-20	-1.8
GRTE2	-1.4	-0.33	260	-0.99	-1.5	-1.4	-1.9	-2.7		-2.9	-24	-2.2
GRTE3	-0.9	-0.22	-2.6	-0.65	-0.99	-0.94	-1.3	-1.8		-1.9	-16	-1.5
GRTE4	-0.92	-0.22	-2.7	-0.66	-1	-0.96	-1.3	-1.8	15	-1.9	-16	-1.5
GRTE5												
KATM1	-1.6	-0.38	-4.6	-1.1	-1.7	-1.6	-2.2	-3.1		-3.3	-28	-2.6
KATM2	-1.4	-0.33	-3.9	-0.98	-1.5	-1.4	-1.9	-2.6		-2.9	-24	-2.2
KATM3	-1.4	-0.34	-4.1	-1	-1.6	-1.5	-2	-2.8		-3	-25	-2.3
KATM4	-1.6	-0.38	-4.6	-1.1	-1.7	-1.6	-2.2	-3.1		-3.3	-28	-2.6
KATM5	-1.3	-0.32	-3.9	-0.96	-1.5	-1.4	-1.9	-2.6		-2.8	-24	-2.2
LAVO1	-1.7	-0.42	13	-1.2	-1.9	-1.8	-2.4	-3.3	19	-3.6	-30	-2.8
LAVO2	-1.8	-0.44	140	-1.3	-2	-1.9	-2.5	-3.5	23	-3.8	-32	-3
LAVO3	-1.5	-0.36	27	-1.1	-1.6	-1.5	-2.1	-2.9	16	-3.1	-26	-2.4
LAVO4	-1.4	-0.33	44	-0.99	-1.5	-1.4	-1.9	-2.7	12	-2.9	-24	-2.2
LAVO5	-1.4	-0.34	-4	-1	-1.5	-1.4	-2	-2.7	-3.3	-2.9	-25	-2.3
NOCA1	22	30	-3.5	-0.87	-1.3	-1.3	-1.7	-2.4	-2.8	-2.6	-21	-2
NOCA2	-1.7	-0.4	-4.8	-1.2	-1.8	-1.7	-2.3	-3.2	-3.9	-3.5	-29	-2.7
NOCA3	-1.4	-0.33	-4	-0.99	-1.5	-1.4	-1.9	-2.7	-3.2	-2.9	-24	-2.2
NOCA4	-1.4	-0.33	-4	-1	-1.5	-1.4	-1.9	-2.7	-3.2	-2.9	-24	-2.3
NOCA5	-0.95	-0.23	-2.7	-0.68	-1	-0.99	-1.3	-1.8	-2.2	-2	-17	-1.5
STLE1	-1.5	-0.36	260	-1.1	-1.6	-1.5	-2.1	-2.9	16	-3.1	-26	-2.4
STLE1	-1.5	-0.35	240	-1	-1.6	-1.5	-2	-2.8		-3.1	-26	-2.4
STLE2	-1.5	-0.36	540	-1.1	-1.6	-1.6	-2.1	-2.9		-3.2	-26	-2.4
STLE3	-1.5	-0.37	1910	-1.1	-1.7	-1.6	-2.2	-3		-3.2	-27	-2.5
STLE4	-1.3	-0.31	1130	-0.92	-1.4	-1.3	-1.8	-2.5		-2.7	-22	-2.1
STLE5	-1.5	-0.36	680	-1.1	-1.6	-1.6	-2.1	-2.9		-3.1	-26	-2.4
WRST1	-1.1	-0.26	240	-0.78	-1.2	-1.1	-1.5	-2.1	-2.5	-2.3	-19	-1.8
WRST1	-1.3	-0.32	190	-0.96	-1.5	-1.4	-1.9	-2.6	-3.1	-2.8	-23	-2.2
WRST2	-1.5	-0.36	-4.3	-1.1	-1.6	-1.6	-2.1	-2.9	-3.5	-3.2	-26	-2.4
WRST2	-0.89	-0.21	54	-0.64	-0.97	-0.92	-1.2	-1.7	-2.1	-1.9	-16	-1.4
WRST3	-0.98	-0.24	-2.8	-0.71	-1.1	-1	-1.4	-1.9	-2.3	-2.1	-17	-1.6
WRST4	-1.6	-0.38	110	-1.1	-1.7	-1.6	-2.2	-3	-3.6	-3.3	-27	-2.5
WRST5	-1.1	-0.28	-3.3	-0.82	-1.2	-1.2	-1.6	-2.2	-2.7	-2.4	-20	-1.9
YOSE1	-1.5	-0.37	-4.4	-1.1	-1.7	-1.6	-2.1	-2.9		-3.2	-27	-2.5
YOSE2	400	200	-13	50	-5.1	-4.8	-6.5	-9		-9.8	-82	-7.6
YOSE2	91	65	-4.2	15	-1.6	-1.5	-2	-2.8		-3.1	-26	-2.4
YOSE3	69	55	-5.1	7.8	-1.9	-1.8	-2.5	-3.4	-4.1	-3.7	-31	-2.9
YOSE4	21	-0.46	-5.5	-1.4	-2.1	-2	-2.7	-3.7		-4	-34	-3.1
YOSE5	11	-0.35	-4.2	-1	-1.6	-1.5	-2	-2.8		-3	-25	-2.3

Table E.3. PASD Database.

Park	Site	g dry XAD	TFLN pg/PASD	TFLN pg/g dry XAD	HCB pg/PASD	HCB pg/g dry XAD	a-HCH pg/PASD	a-HCH pg/g dry XAD	g-HCH pg/PASD	g-HCH pg/g dry XAD	TRLTE pg/PASD	TRLTE pg/g dry XAD
BAND	BAND 5	31.4	280	8.8	23930	750	3510	110	1180	37	-380	-12
BIBE	BIBE 1	31.2	150	4.8	26490	830	3000	94	1240	39	-380	-12
BIBE	BIBE 2	30.2	130	4	40210	1260	4790	150	1240	39	-410	-13
BIBE	BIBE 3	30.6	99	3.1	14680	460	1790	56	410	13	-410	-13
BIBE	BIBE 4	32.4	120	3.7	24250	760	2780	87	1120	35	-380	-12
CRLA	CRLA 5	31.7			29360	920	7340	230	1150	36	-380	-12
DENA	Wonder Lake	33.8			18510	580	4470	140	450	14	-350	-11
DENA	Friday Creek	32.5			13400	420	3130	98	310	9.7	-380	-12
GAAR	Matcherak Lake	32.1			21060	660	4790	150	700	22	-380	-12
GLAC	Oldman Lake	31.5			35740	1120	7340	230	2620	82	-380	-12
GLAC	Snyder Lake	32.1			19470	610	2710	85	1280	40	-380	-12
GLBA	GLBA 1	33.6	45	1.4	21060	660	6700	210	540	17	-380	-12
GRSA	GRSA 5	31.1			18510	580	3830	120	2330	73	-380	-12
GRTE	GRTE 5	32			26800	840	4470	140	1400	44	-380	-12
KATM	KATM 3	33.2	41	1.3	40210	1260	10850	340	1820	57	-380	-12
LAVO	LAVO 5	32.6	180	5.5	26800	840	4790	150	960	30	-380	-12
MORA	LP 19	32			15960	500	3510	110	640	20	-380	-12
MORA	Golden Lake	32.3	73	2.3	13080	410	3510	110	320	10	-380	-12
NOAT	Burial Lake	32.3			30630	960	8620	270	1080	34	-380	-12
NOCA	NOCA 5	30.5	410	13	29040	910	6380	200	1020	32	-410	-13
OLYM	Hoh Lake	32.3	48	1.5	19780	620	5110	160	570	18	-380	-12
OLYM	PJ Lake	31.9	73	2.3	20740	650	5420	170	670	21	-380	-12
ROMO	Mills	30.5			25530	800	4470	140	930	29	-410	-13
ROMO	ROMO 1	32.8			12760	400	2430	76	570	18	-380	-12
ROMO	ROMO 2	29.5	150	4.6	34460	1080	5740	180	2040	64	-410	-13
ROMO	ROMO 3	32			19150	600	3830	120	830	26	-380	-12
ROMO	ROMO 4	32.6			21060	660	4790	150	860	27	-380	-12
SEKI	Emerald Lake	32.1	960	30	21700	680	-450	-14	4470	140	-380	-12
SEKI	Wolverton Creek	32.6	190	6.1	11490	360	2460	77	860	27	-380	-12
SEKI	POTW	31.7	1470	46	20740	650	2580	81	1500	47	-380	-12
SEKI	CRYS	31.3	510	16	14040	440	1980	62	1120	35	-380	-12
STLE	STLE 1	33.1	-19	-0.59	15640	490	3190	100	-250	-7.9	-380	-12
STLE	STLE 2	30.4	67	2.1	15000	470	4470	140	410	13	-410	-13
STLE	STLE 4	31.5	48	1.5	36700	1150	12440	390	1210	38	-380	-12
STLE	STLE 3	31.4										
WRST	WRST 3	33.4							570	18	-380	-12
YOSE	YOSE 5	32.5			24570	770	3830	120	1050	33	-380	-12

Site	MTBZ pg/PASD	MTBZ pg/g dry XAD	HCLR pg/PASD	HCLR pg/g dry XAD	DCPA pg/PASD	DCPA pg/g dry XAD	Aldrin pg/PASD	Aldrin pg/g dry XAD	CLPYR-O pg/PASD	CLPYR-O pg/g dry XAD	CLPYR pg/PASD	CLPYR pg/g dry XAD	HCLR E pg/PASD	HCLR E pg/g dry XAD
BAND 5	-570	-18	-410	-13	4790	150	-280	-8.8	-6700	-210	-96	-3	-930	-29
BIBE 1	-610	-19	-410	-13	6060	190	-280	-8.9	-6700	-210	-96	-3	-930	-29
BIBE 2	-610	-19	-450	-14	12440	390	-290	-9.1	-7020	-220	-99	-3.1	-960	-30
BIBE 3	-610	-19	-450	-14	2140	67	-290	-9	-7020	-220	-96	-3	-960	-30
BIBE 4	-570	-18	-410	-13	4790	150	-270	-8.5	-6380	-200	-93	-2.9	-890	-28
CRLA 5	-570	-18	-410	-13	5110	160	-280	-8.7	-6700	-210	-93	-2.9	-930	-29
Wonder Lake	-540	-17	-380	-12			-260	-8.2	-6380	-200	-89	-2.8	-860	-27
Friday Creek	-570	-18	-410	-13			-270	-8.5	-6380	-200	-93	-2.9	-890	-28
Matcherak Lake	-570	-18	-410	-13	-57	-1.8	-270	-8.6	-6700	-210	-93	-2.9	-890	-28
Oldman Lake	-570	-18	-410	-13	14040	440	-280	-8.8	-6700	-210	-96	-3	-930	-29
Snyder Lake	-570	-18	-410	-13	3190	100	-270	-8.6	-6700	-210			-890	-28
GLBA 1	-540	-17	-380	-12	-54	-1.7	-260	-8.2	-6380	-200	-89	-2.8	-860	-27
GRSA 5	-610	-19	-450	-14	9570	300	-280	-8.9	-6700	-210	-96	-3	-930	-29
GRTE 5	-570	-18	-410	-13	12440	390	-270	-8.6	-6700	-210	-93	-2.9	-890	-28
KATM 3	-540	-17	-410	-13	-54	-1.7	-260	-8.3	-6380	-200	-89	-2.8	-860	-27
LAVO 5	-570	-18	-410	-13	12130	380	-270	-8.5	-6380	-200	-93	-2.9	-890	-28
LP 19	-570	-18	-410	-13	1120	35	-270	-8.6	-6700	-210	-93	-2.9	-890	-28
Golden Lake	-570	-18	-410	-13	450	14	-270	-8.6	-6700	-210	-93	-2.9	-890	-28
Burial Lake	-570	-18	-410	-13	-57	-1.8	-270	-8.6	-6700	-210	-93	-2.9	-890	-28
NOCA 5	-610	-19	4790	150	2900	91	-290	-9.1	-7020	-220	3510	110	-960	-30
Hoh Lake	-570	-18	-410	-13	450	14	-270	-8.6	-6700	-210	-93	-2.9	-890	-28
PJ Lake	-570	-18	-410	-13	480	15	-280	-8.7	-6700	-210	-93	-2.9	-890	-28
Mills	-610	-19	-450	-14	4150	130	-290	-9.1	-7020	-220	-99	-3.1	-960	-30
ROMO 1	-570	-18	-410	-13	2840	89	-270	-8.4			-89	-2.8	-890	-28
ROMO 2	-640	-20	-450	-14	8300	260	-300	-9.4			-100	-3.2	-990	-31
ROMO 3	-570	-18	-410	-13	3190	100	-270	-8.6			-93	-2.9	-890	-28
ROMO 4	-570	-18	-410	-13	6700	210	-270	-8.5			-93	-2.9	-890	-28
Emerald Lake	-570	-18	-410	-13	16910	530	-270	-8.6	10530	330	540	17	-890	-28
Wolverton Creek	-570	-18	-410	-13	9250	290	-270	-8.5	-6380	-200	140	4.5	-890	-28
POTW	-570	-18	-410	-13	27440	860	-280	-8.7	-6700	-210	-93	-2.9	-930	-29
CRYS	-570	-18	-410	-13	17870	560	-280	-8.8	-6700	-210	-96	-3	-930	-29
STLE 1	-540	-17	-410	-13	-54	-1.7	-260	-8.3	-6380	-200	-89	-2.8	-860	-27
STLE 2	-610	-19	-450	-14	-61	-1.9	-290	-9.1	-7020	-220	-99	-3.1	-960	-30
STLE 4	-570	-18	-410	-13	61	1.9	-280	-8.8	-6700	-210	-96	-3	-930	-29
STLE 3			#VALUE!											
WRST 3	-540	-17	-410	-13			-260	-8.3	-6380	-200	-89	-2.8	-860	-27
YOSE 5	-570	-18	-410	-13	11490	360	-270	-8.5	-6380	-200	-93	-2.9	-890	-28

Site	o-CLDN pg/PASD	o-CLDN pg/g dry XAD	t-CLDN pg/PASD	t-CLDN pg/g dry XAD	ENDO I pg/PASD	ENDO I pg/g dry XAD	c-CLDN pg/PASD	c-CLDN pg/g dry XAD	t-NCLR pg/PASD	t-NCLR pg/g dry XAD	Dieldrin pg/PASD	Dieldrin pg/g dry XAD	PCB 74 pg/PASD	PCB 74 pg/g dry XAD	PCB 101 pg/PASD
BAND 5	-860	-27	220	6.9	14360	450	-510	-16	100	3.2	-800	-25	-2620	-82	-89
BIBE 1	-860	-27	350	11	20740	650	-510	-16	310	9.6	-800	-25	-2620	-82	-89
BIBE 2	-890	-28	450	14	29040	910	-540	-17	410	13	-830	-26	-2710	-85	-93
BIBE 3	-890	-28	110	3.4	13720	430	-510	-16	120	3.8	-830	-26	-2680	-84	-93
BIBE 4	-830	-26	190	5.9	26170	820	-480	-15	210	6.7	-800	-25	-2520	-79	-86
CRLA 5	-860	-27	300	9.4	13400	420			240	7.5	-800	-25	-2580	-81	
Wonder Lake	-800	-25			1050	33	-480	-15			-730	-23	-2430	-76	
Friday Creek	-830	-26			540	17	-480	-15			-770	-24	-2520	-79	
Matcherak Lake	-830	-26	-38	-1.2	1020	32	-510	-16	-93	-2.9	-800	-25	-2550	-80	
Oldman Lake	-860	-27	180	5.7	26170	820	-510	-16			-800	-25	-2580	-81	300
Snyder Lake	-830	-26			10850	340	-510	-16			-800	-25	-2550	-80	
GLBA 1	-800	-25	-38	-1.2	670	21	-480	-15	-89	-2.8	-770	-24	-2430	-76	-83
GRSA 5	-860	-27	96	3	8620	270	-510	-16	120	3.7	-830	-26	-2620	-82	-89
GRTE 5	-830	-26	160	4.9	10210	320	-510	-16	180	5.7	-800	-25	-2550	-80	-89
KATM 3	-800	-25	160	5	1910	60	-480	-15	-89	-2.8	-770	-24	-2460	-77	-86
LAVO 5	-830	-26	410	13	10530	330	-480	-15	410	13	-770	-24	-2520	-79	
LP 19	-830	-26	240	7.5	8300	260			190	5.9	-800	-25	-2550	-80	-89
Golden Lake	-830	-26	170	5.4	5740	180	-480	-15	-93	-2.9	-800	-25	-2520	-79	-86
Burial Lake	-830	-26	61	1.9	2230	70	-480	-15	110	3.3	-800	-25	-2520	-79	
NOCA 5	-890	-28	830	26	13720	430	730	23	410	13	-830	-26	-2680	-84	510
Hoh Lake	-830	-26	61	1.9	4150	130	-480	-15	-93	-2.9	-800	-25	-2520	-79	
PJ Lake	-830	-26	110	3.4	4470	140	-510	-16	110	3.6	-800	-25	-2550	-80	-89
Mills	-890	-28	130	4	8620	270	-510	-16	130	4.2	-830	-26	-2680	-84	-93
ROMO 1	-830	-26	93	2.9	5740	180	-480	-15	-93	-2.9	-770	-24	-2490	-78	190
ROMO 2	-930	-29	380	12	15000	470	-540	-17	570	18	-860	-27	-2780	-87	-96
ROMO 3	-830	-26	120	3.8	8620	270	-510	-16	100	3.2	-800	-25	-2550	-80	-89
ROMO 4	-830	-26	120	3.7	8300	260	-480	-15	110	3.6	-770	-24	-2520	-79	-86
Emerald Lake	-830	-26	2170	68	11170	350	-510	-16	1180	37	1690	53	71480	2240	5740
Wolverton Creek	-830	-26	670	21	19780	620	510	16	480	15	-770	-24	-2520	-79	
POTW	-860	-27	1850	58	63500	1990	1820	57	1630	51	1020	32	-2580	-81	
CRYS	-860	-27	1310	41	42120	1320	1370	43	1080	34	-800	-25	-2620	-82	
STLE 1	-830	-26	-38	-1.2	510	16	-480	-15	-89	-2.8	-770	-24	-2490	-78	-86
STLE 2	-890	-28	-41	-1.3	730	23	-510	-16	-99	-3.1	-830	-26	-2680	-84	-93
STLE 4	-860	-27	130	4	2900	91	-510	-16	280	8.7	-800	-25	-2580	-81	-89
STLE 3															
WRST 3	-800	-25	-38	-1.2			-480	-15	-89	-2.8	-770	-24	-2460	-77	99
YOSE 5	-830	-26	380	12	12130	380	-480	-15	310	9.7	-770	-24	-2520	-79	-86

Site	PCB 101 pg/g dry XAD	PCB 118 pg/PASD	PCB 118 pg/g dry XAD	Endrin pg/PASD	Endrin pg/g dry XAD	ENDO II pg/PASD	ENDO II pg/g dry XAD	c-NCLR pg/PASD	c-NCLR pg/g dry XAD	Endrin A pg/PASD	Endrin A pg/g dry XAD	ENDO S pg/PASD	ENDO S pg/g dry XAD	PCB 153 pg/PASD
BAND 5	-2.8			-860	-27	670	21	-32	-1	-110	-3.4	730	23	-35
BIBE 1	-2.8			-860	-27	1530	48	-35	-1.1	-110	-3.5	1240	39	-35
BIBE 2	-2.9			-890	-28	3100	97	54	1.7	-110	-3.6	2840	89	41
BIBE 3	-2.9			-890	-28	730	23	-35	-1.1	-110	-3.5	610	19	-38
BIBE 4	-2.7			-830	-26	1690	53	-32	-1	-110	-3.3	1240	39	-35
CRLA 5				-860	-27	990	31	-32	-1	-110	-3.4	510	16	-35
Wonder Lake				-800	-25	-89	-2.8			-100	-3.2			
Friday Creek				-830	-26	-93	-2.9	-32	-1	-110	-3.3			
Matcherak Lake				-830	-26	-93	-2.9	-32	-1	-110	-3.4	48	1.5	-35
Oldman Lake	9.5			-860	-27	3510	110			-110	-3.4	1050	33	
Snyder Lake				-830	-26	1370	43			-110	-3.4			
GLBA 1	-2.6	110	3.3	-800	-25	-89	-2.8	-31	-0.98	-100	-3.2	64	2	-35
GRSA 5	-2.8			-860	-27	1630	51	-35	-1.1	-110	-3.5	1020	32	-35
GRTE 5	-2.8			-860	-27	770	24	-32	-1	-110	-3.4	480	15	-35
KATM 3	-2.7			-830	-26	-89	-2.8	-32	-0.99	-110	-3.3	-7.7	-0.24	-35
LAVO 5				-830	-26	640	20	-32	-1	-110	-3.3	410	13	45
LP 19	-2.8			-860	-27	610	19	-32	-1	-110	-3.4	290	9.2	-35
Golden Lake	-2.7			-830	-26	410	13			-110	-3.3	170	5.2	-35
Burial Lake				-830	-26	-93	-2.9	-32	-1	-110	-3.3	89	2.8	-35
NOCA 5	16			-890	-28	1440	45	-35	-1.1	-110	-3.5	540	17	230
Hoh Lake				-830	-26	200	6.2	-32	-1	-110	-3.3	120	3.9	-35
PJ Lake	-2.8			-860	-27	140	4.3	-32	-1	-110	-3.4	220	6.8	35
Mills	-2.9			-890	-28	260	8	-35	-1.1	-110	-3.5	450	14	-38
ROMO 1	6.1			-830	-26	180	5.6	-32	-1	-110	-3.3	280	8.9	-35
ROMO 2	-3			-930	-29	830	26	320	10	-120	-3.7	1120	35	350
ROMO 3	-2.8			-860	-27	300	9.5	-32	-1	-110	-3.4	410	13	-35
ROMO 4	-2.7			-830	-26	380	12	-32	-1	-110	-3.3	410	13	-35
Emerald Lake	180	1310	41	-830	-26	1950	61	150	4.8	-110	-3.4	1980	62	6700
Wolverton Creek				-830	-26	1820	57	32	1	-110	-3.3	450	14	120
POTW				-860	-27	7980	250	140	4.5	-110	-3.4	1240	39	160
CRYS				-860	-27	5110	160	96	3	-110	-3.4	1050	33	51
STLE 1	-2.7			-830	-26	-89	-2.8	-32	-0.99	-110	-3.3	-7.7	-0.24	-35
STLE 2	-2.9			-890	-28	-99	-3.1	-35	-1.1	-110	-3.6	-8.3	-0.26	-38
STLE 4	-2.8			-860	-27	-96	-3	-32	-1	-110	-3.4	110	3.4	-35
STLE 3														
WRST 3	3.1			-800	-25	-89	-2.8	-31	-0.98	-100	-3.2			
YOSE 5	-2.7			-830	-26	540	17	-32	-1	-110	-3.3	510	16	-35

Site	PCB 153 pg/g dry XAD	PCB 138 pg/PASD	PCB 138 pg/g dry XAD	PCB 187 pg/PASD	PCB 187 pg/g dry XAD	PCB 183 pg/PASD	PCB 183 pg/g dry XAD	Mirex pg/PASD	Mirex pg/g dry XAD
BAND 5	-1.1	-38	-1.2	-18	-0.55	-7.7	-0.24	-120	-3.9
BIBE 1	-1.1	-38	-1.2	-18	-0.55	-8	-0.25	-120	-3.9
BIBE 2	1.3	-38	-1.2	-18	-0.57	-8.3	-0.26	-130	-4
BIBE 3	-1.2	-38	-1.2	-18	-0.56	-8	-0.25	-130	-4
BIBE 4	-1.1	-38	-1.2	-17	-0.53	-7.7	-0.24	-120	-3.7
CRLA 5	-1.1	-38	-1.2	-17	-0.54	-8	-0.25	-120	-3.8
Wonder Lake								-110	-3.6
Friday Creek								-120	-3.7
Matcherak Lake	-1.1	-38	-1.2	-17	-0.54	-7.7	-0.24	-120	-3.8
Oldman Lake		-38	-1.2					-120	-3.8
Snyder Lake		-38	-1.2						
GLBA 1	-1.1	-35	-1.1	-16	-0.51	-7.3	-0.23	-110	-3.6
GRSA 5	-1.1	-38	-1.2	-18	-0.55	-8	-0.25	-120	-3.9
GRTE 5	-1.1	-38	-1.2	-17	-0.54	-7.7	-0.24	-120	-3.8
KATM 3	-1.1	-35	-1.1	-17	-0.52	-7.3	-0.23	-110	-3.6
LAVO 5	1.4	-35	-1.1	-17	-0.53	-7.7	-0.24	-120	-3.7
LP 19	-1.1	-38	-1.2	-17	-0.54	-7.7	-0.24	-120	-3.8
Golden Lake	-1.1	-38	-1.2					-120	-3.7
Burial Lake	-1.1	-38	-1.2	-17	-0.53	-7.7	-0.24	-120	-3.7
NOCA 5	7.3	-38	-1.2	54	1.7	22	0.69	-130	-4
Hoh Lake	-1.1	-38	-1.2	-17	-0.53	-7.7	-0.24	-120	-3.7
PJ Lake	1.1	-38	-1.2	-17	-0.54	-7.7	-0.24	-120	-3.8
Mills	-1.2	-38	-1.2			-8	-0.25	-130	-4
ROMO 1	-1.1	-35	-1.1	-17	-0.53	-7.7	-0.24	-120	-3.7
ROMO 2	11	-41	-1.3	320	9.9	250	7.9	-130	-4.1
ROMO 3	-1.1	-38	-1.2	-17	-0.54	-7.7	-0.24	-120	-3.8
ROMO 4	-1.1	-35	-1.1	-17	-0.53	-7.7	-0.24	-120	-3.7
Emerald Lake	210	3830	120	3190	100	1180	37	-120	-3.8
Wolverton Creek	3.7	-35	-1.1	83	2.6	26	0.83	-120	-3.7
POTW	5	-38	-1.2	93	2.9	61	1.9	-120	-3.8
CRYS	1.6	-38	-1.2	19	0.58	-8	-0.25	-120	-3.9
STLE 1	-1.1	-35	-1.1	-17	-0.52	-7.3	-0.23	-120	-3.7
STLE 2	-1.2	-38	-1.2	-18	-0.57	-8.3	-0.26	-130	-4
STLE 4	-1.1	-38	-1.2	-18	-0.55	-8	-0.25	-120	-3.8
STLE 3									
WRST 3		-35	-1.1	-17	-0.52	-7.3	-0.23	-110	-3.6
YOSE 5	-1.1	-38	-1.2	-17	-0.53	-7.7	-0.24	-120	-3.7

Park	Site	g dry XAD	EPTC pg/PASD	EPTC pg/g dry XAD	ETDZL pg/PASD	ETDZL pg/g dry XAD	PBLT pg/PASD	PBLT pg/g dry XAD	ACY pg/PASD	ACY pg/g dry XAD	ACE pg/PASD	ACE pg/g dry XAD	PCLR pg/PASD
BAND	BAND 5	31.4	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
BIBE	BIBE 1	31.2	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
BIBE	BIBE 2	30.2	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
BIBE	BIBE 3	30.6	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
BIBE	BIBE 4	32.4	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
CRLA	CRLA 5	31.7	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
DENA	Wonder Lake	33.8	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
DENA	Friday Creek	32.5	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
GAAR	Matcherak Lake	32.1	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
GLAC	Oldman Lake	31.5	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
GLAC	Snyder Lake	32.1	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
GLBA	GLBA 1	33.6											
GRSD	GRSD 5	31.1	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
GRTE	GRTE 5	32	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
KATM	KATM 3	33.2	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
LAVO	LAVO 5	32.6	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
MORA	LP 19	32	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
MORA	Golden Lake	32.3	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
NOAT	Burial Lake	32.3	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
NOCA	NOCA 5	30.5	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
OLYM	Hoh Lake	32.3	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
OLYM	FB Hoh Lake												
OLYM	PJ Lake	31.9	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
ROMO	Mills	30.5	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
ROMO	ROMO 1	32.8	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
ROMO	ROMO 2	29.5	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
ROMO	ROMO 3	32	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
ROMO	ROMO 4	32.6	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
SEKI	Emerald Lake	32.1											
SEKI	Wolverton Creek	32.6	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
SEKI	POTW	31.7	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
SEKI	CRYS	31.3	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
STLE	STLE 1	33.1	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
STLE	STLE 2	30.4	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
STLE	STLE 4	31.5	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
STLE	STLE 3	31.4											
WRST	WRST 3	33.4	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170
YOSE	YOSE 5	32.5	-610	-19	-480	-15	-350	-11	-99	-3.1	-140	-4.4	-170

Site	PCLR pg/g dry XAD	ATRZ DSPL pg/PASD	ATRZ DSPL pg/g dry XAD	ATRZ DSTHL pg/PASD	ATRZ DSTHL pg/g dry XAD	SIMZ pg/PASD	SIMZ pg/g dry XAD	PMTN pg/PASD	PMTN pg/g dry XAD	ATRZ pg/PASD	ATRZ pg/g dry XAD
BAND 5	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
BIBE 1	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
BIBE 2	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
BIBE 3	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
BIBE 4	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
CRLA 5	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
Wonder Lake	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
Friday Creek	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
Matcherak Lake	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
Oldman Lake	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
Snyder Lake	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
GLBA 1											
GRSD 5	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
GRTE 5	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
KATM 3	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
LAVO 5	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
LP 19	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
Golden Lake	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
Burial Lake	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
NOCA 5	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
Hoh Lake	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
FB Hoh Lake											
PJ Lake	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
Mills	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
ROMO 1	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
ROMO 2	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
ROMO 3	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
ROMO 4	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
Emerald Lake											
Wolverton Creek	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
POTW	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
CRYS	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
STLE 1	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
STLE 2	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
STLE 4	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
STLE 3											
WRST 3	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9
YOSE 5	-5.2	-510	-16	-80	-2.5	-250	-7.9	-510	-16	-120	-3.9

Site	CYAZ pg/PASD	CYAZ pg/g dry XAD	DIAZ pg/PASD	DIAZ pg/g dry XAD	ACLR pg/PASD	ACLR pg/g dry XAD	ALCLR pg/PASD	ALCLR pg/g dry XAD	MCLR pg/PASD	MCLR pg/g dry XAD	MTHN pg/PASD	MTHN pg/g dry XAD
BAND 5	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
BIBE 1	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
BIBE 2	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
BIBE 3	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
BIBE 4	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
CRLA 5	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
Wonder Lake	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
Friday Creek	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
Matcherak Lake	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
Oldman Lake	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
Snyder Lake	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
GLBA 1												
GRSD 5	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
GRTE 5	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
KATM 3	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
LAVO 5	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
LP 19	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
Golden Lake	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
Burial Lake	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
NOCA 5	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
Hoh Lake	-510	-16	260	8	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
FB Hoh Lake												
PJ Lake	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
Mills	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
ROMO 1	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
ROMO 2	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
ROMO 3	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
ROMO 4	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
Emerald Lake												
Wolverton Creek	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
POTW	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
CRYS	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
STLE 1	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
STLE 2	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
STLE 4	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
STLE 3												
WRST 3	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9
YOSE 5	-510	-16	-120	-3.9	-450	-14	-310	-9.8	-61	-1.9	-220	-6.9

Site	M-PTHN pg/PASD	M-PTHN pg/g dry XAD	PTHN pg/PASD	PTHN pg/g dry XAD	ETHN pg/PASD	ETHN pg/g dry XAD	FLA pg/PASD	FLA pg/g dry XAD	PYR pg/PASD	PYR pg/g dry XAD	MXCLR pg/PASD	MXCLR pg/g dry XAD
BAND 5	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
BIBE 1	-240	-7.4	-230	-7.2	-210	-6.7	7340	230	19150	600	-38	-1.2
BIBE 2	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
BIBE 3	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
BIBE 4	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
CRLA 5	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
Wonder Lake	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
Friday Creek	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
Matcherak Lake	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
Oldman Lake	-240	-7.4	-230	-7.2	-210	-6.7	6380	200			-38	-1.2
Snyder Lake	-240	-7.4	-230	-7.2	-210	-6.7	10530	330			-38	-1.2
GLBA 1												
GRSD 5	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
GRTE 5	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
KATM 3	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
LAVO 5	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
LP 19	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
Golden Lake	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
Burial Lake	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
NOCA 5	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
Hoh Lake	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
FB Hoh Lake												
PJ Lake	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
Mills	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
ROMO 1	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
ROMO 2	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
ROMO 3	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
ROMO 4	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
Emerald Lake												
Wolverton Creek	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
POTW	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
CRYS	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
STLE 1	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
STLE 2	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
STLE 4	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2
STLE 3												
WRST 3	-240	-7.4	-230	-7.2	-210	-6.7			2870	90	-38	-1.2
YOSE 5	-240	-7.4	-230	-7.2	-210	-6.7					-38	-1.2

Site	B[a]A pg/PASD	B[a]A pg/g dry XAD	CHR/TRI pg/PASD	CHR/TRI pg/g dry XAD	B[b]F pg/PASD	B[b]F pg/g dry XAD	B[k]F pg/PASD	B[k]F pg/g dry XAD	B[e]P pg/PASD	B[e]P pg/g dry XAD	B[a]P pg/PASD	B[a]P pg/g dry XAD
BAND 5	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
BIBE 1	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
BIBE 2	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
BIBE 3	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
BIBE 4	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
CRLA 5	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
Wonder Lake	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
Friday Creek	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
Matcherak Lake	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
Oldman Lake	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-31	-0.98	-55	-1.7
Snyder Lake	-22	-0.67	-17	-0.54			-37	-1.2	-31	-0.98	-55	-1.7
GLBA 1												
GRSD 5	-22	-0.67	-17	-0.54	-24	-0.74	-38	-1.2	-31	-0.98	-55	-1.7
GRTE 5	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-31	-0.98	-55	-1.7
KATM 3	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2			-55	-1.7
LAVO 5	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-31	-0.98	-55	-1.7
LP 19	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-31	-0.98	-55	-1.7
Golden Lake	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-31	-0.98	-55	-1.7
Burial Lake	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2			-55	-1.7
NOCA 5	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-31	-0.98	-55	-1.7
Hoh Lake	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-31	-0.98	-55	-1.7
FB Hoh Lake												
PJ Lake	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-31	-0.98	-55	-1.7
Mills	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98		
ROMO 1	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2				
ROMO 2	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2				
ROMO 3	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2				
ROMO 4	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2				
Emerald Lake												
Wolverton Creek	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
POTW	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
CRYS	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
STLE 1	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2			-55	-1.7
STLE 2	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2			-55	-1.7
STLE 4	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2			-55	-1.7
STLE 3												
WRST 3	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7
YOSE 5	-22	-0.67	-17	-0.54	-24	-0.74	-37	-1.2	-32	-0.98	-55	-1.7

Site	I[1,2,3-cd] p pg/PASD	I[1,2,3-cd] p pg/g dry XAD	D[ah]A pg/PASD	D[ah]A pg/g dry XAD	B[ghi]P pg/PASD	B[ghi]P pg/g dry XAD
BAND 5	-41	-1.3	-71	-2.2		
BIBE 1	-41	-1.3	-71	-2.2	15990	500
BIBE 2	-41	-1.3	-71	-2.2	-34	-1
BIBE 3	-41	-1.3	-71	-2.2	-34	-1
BIBE 4	-41	-1.3	-71	-2.2	-34	-1
CRLA 5	-41	-1.3	-71	-2.2		
Wonder Lake	-41	-1.3	-71	-2.2		
Friday Creek	-41	-1.3	-71	-2.2		
Matcherak Lake	-41	-1.3	-71	-2.2		
Oldman Lake	-41	-1.3	-71	-2.2	3970	120
Snyder Lake	-41	-1.3	-71	-2.2		
GLBA 1						
GRSD 5	-41	-1.3	-71	-2.2	-34	-1
GRTE 5	-41	-1.3	-71	-2.2	-34	-1
KATM 3			-71	-2.2		
LAVO 5	-41	-1.3	-71	-2.2		
LP 19			-71	-2.2		
Golden Lake			-71	-2.2		
Burial Lake			-71	-2.2		
NOCA 5	-41	-1.3	-71	-2.2		
Hoh Lake	-41	-1.3	-71	-2.2		
FB Hoh Lake						
PJ Lake	-41	-1.3	-71	-2.2		
Mills			-71	-2.2		
ROMO 1			-71	-2.2		
ROMO 2			-71	-2.2		
ROMO 3			-71	-2.2		
ROMO 4			-71	-2.2		
Emerald Lake						
Wolverton Creek			-71	-2.2		
POTW			-71	-2.2		
CRYS			-71	-2.2		
STLE 1			-71	-2.2		
STLE 2			-71	-2.2		
STLE 4			-71	-2.2		
STLE 3						
WRST 3	-41	-1.3	-71	-2.2	3840	120
YOSE 5	-41	-1.3	-71	-2.2	1230	38

Table E.4. Average SOC concentrations in snow from 2003, 2004, and 2005 accumulation period.

Park	Site	Trifluralin ng/L	Hexachlorobenzene ng/L	HCH alpha ng/L	HCH gamma ng/L	Triallate ng/L	Dacthal ng/L	Chlorpyrifos ng/L	Chlordane cis ng/L	Chlordane trans ng/L	Nonachlor trans ng/L	Nonachlor cis ng/L	Dieldrin ng/L	Endosulfan I ng/L	Endosulfan II ng/L	Endosulfan sulfate ng/L
DENA	Kahiltna	0.00003	0.0032	0.00205	0.0018	0.0034	0.022	0.026	0.0025	0.00016	0.0031	0.0065	0.056	0.11	0.01	0.02
DENA	McLeod	0.0036	0.017	0.00935	0.0116	0.0034	0.0104333	0.0353333	0.0025	0.0033333	0.0044667	0.0047333	0.0286667	0.0573333	0.0023167	0.0273333
DENA	Wonder		0.0395	0.0321833	0.0132	0.0034	0.006575	0.0115	0.0025	0.00198	0.0040567	0.0025333	0.0528333	0.0681667	0.0021333	0.0200667
GAAR	Match	0.00351	0.0321	0.0634167	0.0370167	0.0034	0.0054333	0.021	0.0025	0.01052	0.0167333	0.0066667	0.0723333	0.126	0.0022667	0.0753333
GLAC	Aster	0.017	0.016	0.17	0.19	0.73	0.54	0.042	0.0025	0.0159	0.01685	0.0095	0.305	0.33	0.26	0.235
GLAC	Granite Park	0.0045		0.065	0.1	0.29	0.65	0.067	0.0025	0.012	0.012	0.0042	0.12	0.35	0.67	0.11
GLAC	Preston	0.0093		0.2	0.16	0.33	0.77	0.2	0.0025	0.017	0.019	0.00055	0.17	0.66	1.3	0.53
GLAC	Snyder	0.0074	0.018	0.074	0.0885	0.292	0.65	0.05	0.0025	0.0105	0.0086	0.0054	0.18	0.165	0.305	0.24
MORA	AltaVista			0.079	0.0256	0.0034	0.03	0.052	0.0025	0.0068	0.00545	0.0026	0.007	0.0715	0.029	0.052
MORA	Edith Cornice			0.043	0.016	0.0034	0.048	0.018	0.0025	0.0022	0.00145	0.00055	0.007	0.052	0.0165	0.022
MORA	Fell Fields			0.016	0.0099	0.0034	0.024		0.0025	0.0042	0.0022	0.0012	0.007	0.075	0.052	0.014
MORA	Mowich		0.014	0.11	0.044	0.0034	0.054	0.027	0.0025	0.0055	0.0054	0.0021	0.061	0.09	0.026	0.068
MORA	Paradise	0.011	0.033	0.13	0.053	0.0034	0.092	0.038	0.0025	0.01	0.0079	0.004	0.055	0.13	0.038	0.093
MORA	Protection	0.0051	0.012	0.015	0.0076	0.0034	0.049	0.0092	0.0025	0.0031	0.0019	0.0014	0.007	0.064	0.021	0.011
MORA	Sugarloaf	0.0066	0.0067	0.026	0.016	0.0034	0.078	0.032	0.0025	0.004	0.0046	0.0016	0.007	0.1	0.029	0.023
NOAT	Burial	0.00394	0.1219	0.295	0.037025	0.0034	0.00875	0.027	0.0025	0.07145	0.10965	0.0235	0.407	0.635	0.003375	0.1135
NOAT	Kangilipak	0.0052		0.13	0.071	0.0034	0.0063	0.0099	0.0025	0.014	0.019	0.0045	0.096	0.27	0.0056	0.03
NOCA	Noisy Creek Glacier	0.0081		0.055	0.027	0.0034	0.23	0.059	0.0025	0.0077	0.0072	0.0024	0.035	0.54	0.3	0.037
NOCA	Sandalee Glacier	0.01		0.046	0.044	0.051	0.79	1.1	0.0025	0.012	0.012	0.0033	0.058	1.9	1.5	0.08
NOCA	Silver Glacier	0.0083	0.048	0.0255	0.017	0.0034	0.285	0.019	0.0025	0.00425	0.013	0.00185	0.032	0.285	0.17	0.0255
NOCA	Stout	0.0065		0.063	0.037	0.0034	0.31	0.029	0.0025	0.0052	0.0043	0.0023	0.03	0.42	0.21	0.029
OLYM	Hoh	0.0063		0.057	0.029	0.0034	0.026	0.02	0.0025	0.0084	0.0061	0.0028	0.065	0.052	0.006	0.037
OLYM	Hurricane Ridge	0.00895		0.012	0.00435	0.0034	0.00825	0.024	0.0025	0.00098	0.00046	0.00055	0.033	0.012	0.0025	0.015
OLYM	Steeple Rock	0.007	0.019	0.15	0.039	0.0034	0.072	0.02	0.0025	0.0059	0.0067	0.0034	0.063	0.077	0.026	0.19
ROMO	Irene Forest	0.007625	0.021	0.082	0.0535	0.0068	2.35	0.066625	0.0025	0.02025	0.02625	0.013725	0.0685	0.595	0.2775	0.295175
ROMO	IreneMeadow	0.00385	0.0065	0.05525	0.051125	0.0217	1.245	0.04275	0.0025	0.00875	0.0125	0.009525	0.1755	0.5525	0.1877375	0.1325
ROMO	LonePine			0.079	0.066	0.051	1.1		0.0025	0.0059		0.011	0.23	0.47	0.23	0.26
ROMO	Mills	0.0084	0.023	0.112	0.079	0.0788	2.2666667	0.066	0.0025	0.0166	0.0295	0.0124667	0.23	0.5266667	0.3333333	0.3433333
SEKI	Emerald	0.0071	0.0108667	0.069	0.0493333	0.0034	3.4833333	1.4733333	0.0025	0.0198333	0.0151667	0.0075667	0.172	0.5266667	0.4333333	0.1326667
SEKI	Pear	0.0112333	0.0402	0.0936667	0.067	0.0034	3.1666667	0.89	0.0025	0.0346667	0.0208667	0.0097333	1.6626667	0.5866667	0.3633333	0.112

Park	Site	ACY ng/L	ACE ng/L	FLO ng/L	PHE ng/L	ANT ng/L	FLA ng/L	PYR ng/L	B[a]A ng/L	CHR/TRI ng/L	B[b]F ng/L	B[k]F ng/L	B[e]P ng/L	B[a]P ng/L	I[123-cd]p ng/L	D[ah]A ng/L	B[ghi]P ng/L
DENA	Kahiltna	0.01	5.7	0.00415		0.01	0.21	0.17	0.0075	0.0065	0.00345	0.0025	0.00445	0.00395	0.14	0.0145	0.13
DENA	McLoed	0.01	0.0055	0.00415		0.01	0.1346667	0.0883	0.0075	0.0065	0.00345	0.0025	0.0629667	0.00395	0.2266667	0.053	0.1406667
DENA	Wonder	0.01	0.0055	0.00415	0.4872	0.01	0.3483333	0.1906667	0.0075	0.0065	0.1406333	0.0326667	0.092225	0.0459667	0.187	0.0145	0.1128333
GAAR	Matcharak	0.01	0.0055	0.1061	1.285	0.01	0.6133333	0.39	0.1125	0.1555	0.52115	0.1051667	0.22815	0.1313167	0.3533333	0.0316667	0.2333333
GLAC	Aster	0.01	2.25275	0.00415	7.45	0.01	46.001	6.2	0.89	3.7	7.9	2.3	4.4	2.1	3.8	0.485	3.2
GLAC	Granite Park	0.01	0.0055	0.00415	13	0.01	25	17	2.1	6.3	14	4	8.2	5.8	8.1	1.3	7.9
GLAC	Preston	0.01	0.0055	0.00415	14	0.01	0.002	0.00245	0.0075	0.0065	0.00345	0.0025	0.00445	6.9	8.1	1.5	7.7
GLAC	Snyder	0.01	2.10275	1.935	77	0.01	117	98	9.00375	26	93.5	28	29.5	20	20	5.25	23.5
MORA	AltaVista	0.01	0.0055	0.27		0.01	0.405	0.18	0.0075	0.13	0.37	0.09	0.21	0.00395	0.24	0.0145	0.175
MORA	Edith Cornice	0.01	0.0055		0.56	0.01	0.071	0.062	0.0075	0.01525	0.049725	0.01175	0.027225	0.016475	0.086	0.0145	0.057
MORA	Fell Fields	0.01	0.0055			0.01	0.13	0.1	0.0075	0.029	0.14	0.0025	0.00445	0.00395	0.13	0.068	0.11
MORA	Mowich	0.01	0.0055	0.00415		0.01	0.002	0.36	0.49	0.0065	1.9	0.51	0.84	0.28	1	0.0145	0.77
MORA	Paradise	0.01	0.0055			0.01	0.002	0.00245	0.0075	0.0065	0.4	0.1	0.22	0.11	0.016	0.0145	0.18
MORA	Protection	0.01	0.0055	0.2	0.6	0.01	0.1	0.11	0.096	0.039	0.26	0.082	0.16	0.31	0.23	0.1	0.19
MORA	Sugarloaf	0.01	0.0055	0.18	0.47	0.01	0.11	0.079		0.046	0.16	0.035	0.074	0.05	0.14	0.0145	0.086
NOAT	Burial	0.01	0.0055	0.84	3.2	0.01	2.4	1.215	0.325	0.74	2.35	0.58	1.11	0.4	0.875	0.1135	0.61
NOAT	Kangilipak	0.01	0.0055	0.16	0.95	0.01	0.77	0.39	0.12	0.26	0.7	0.15	0.28	0.11	0.37	0.062	0.23
NOCA	Noisy Creek Glacier	0.01	0.0055		0.5	0.01	0.35	0.23	0.08	0.13	0.00345	0.0025	0.22	0.16	0.38	0.081	0.27
NOCA	Sandalee Glacier	0.01	0.0055	0.29	1.2	0.01	0.7	0.44	0.12	0.19	0.66	0.18	0.35	0.22	0.42	0.0145	0.38
NOCA	Silver Glacier	0.01	0.0055	0.195	0.455	0.01	0.235	0.135	0.0435	0.076	0.19	0.0485	0.115	0.0615	0.165	0.049	0.12
NOCA	Stout	0.01	0.0055	0.27	0.79	0.01	0.32	0.23	0.078	0.096	0.32	0.08	0.17	0.15	0.27	0.072	0.21
OLYM	Hoh	0.01	0.0055	0.00415	1.1	0.01	0.002	0.00245	0.0075	0.0065	0.00345	0.0025	0.00445	0.00395	0.016	0.0145	0.078
OLYM	Hurricane Ridge	0.01	0.0055	0.00415		0.01	0.002	0.00245	0.0075	0.0065	0.00345	0.0025	0.00445	0.00395	0.016	0.0145	0.0085
OLYM	Steeple Rock	0.01	0.0055	0.00415		0.01	0.002	0.00245	0.0075	0.0065	0.00345	0.0025	0.00445	0.00395	0.016	0.0145	0.0085
ROMO	Irene Forest	0.01	0.0055	0.00415	1.6	0.01	0.002	0.926225	0.0075	0.0065	1.8025875	0.651875	1.0033375	0.975	1.6	0.0145	1.525
ROMO	Irene Meadow	0.01	0.0055	0.0506125	0.83	0.01	0.506	0.6706125	0.063125	0.23075	0.491725	0.12875	0.52	0.345	0.6225	0.06975	0.5225
ROMO	LonePine	0.01	0.0055	0.00415	1.9	0.01	1.3	0.9	0.0075	0.0065	1.4	0.0025	0.95	0.49	0.94	0.16	0.83
ROMO	Mills	0.01	0.0055	0.00415	3.7333333	0.01	0.002	1.9016333	0.0075	0.0065	2.9356333	0.8683333	1.96815	1.5933333	2.2666667	0.2248333	1.1695
SEKI	Emerald	0.01	0.0055	0.00415	0.4	0.01	0.002	0.0733	0.0295833	0.0870833	0.0589667	0.009	0.0289667	0.0246333	0.1013333	0.0145	0.1263333
SEKI	Pear	0.01	0.0055	0.00415	0.495	0.01	0.002	0.2975	0.0075	0.036	0.0798167	0.0178333	0.0408167	0.0293167	0.075	0.0145	0.0943333

Park	Site	PCB 101 (penta) ng/L	PCB 118 (penta) ng/L	PCB 153 (hexa) ng/L	PCB 138 (hexa) ng/L	PCB 187 (hepta) ng/L	PCB 183 (hepta) ng/L
DENA	Kahiltna	0.006	0.0053	0.0052	0.0064	0.0035	0.0034
DENA	McLoed	0.006	0.017	0.0181	0.02195	0.0147	0.0143
DENA	Wonder	0.006	0.01265	0.0078	0.00775	0.0079	0.0092
GAAR	Matcharak	0.006	0.00946667	0.00865	0.01023333	0.00366667	0.0023
GLAC	Aster	0.006	0.01155	0.00965	0.016	0.00495	0.003
GLAC	Granite Park	0.006	0.013	0.011	0.017	0.0056	0.0035
GLAC	Preston	0.006	0.0006	0.0095	0.0011	0.0061	0.0035
GLAC	Snyder	0.006	0.0311	0.022	0.0329	0.01575	0.0103
MORA	AltaVista	0.006	0.027	0.0156	0.0235	0.0116	0.00785
MORA	Edith Cornice	0.006			0.0064		
MORA	Fell Fields	0.006		0.0092	0.0092	0.0065	0.0042
MORA	Mowich	0.006					
MORA	Paradise	0.006	0.016	0.013	0.015	0.0071	0.003
MORA	Protection	0.006	0.012	0.0071	0.0078	0.0056	0.0048
MORA	Sugarloaf	0.006	0.011	0.0065	0.007	0.0038	0.0028
NOAT	Burial	0.006	0.02685	0.02	0.02375	0.0104	0.00555
NOAT	Kangilipak	0.006	0.014	0.0084	0.011	0.0046	0.0032
NOCA	Noisy Creek Glacier	0.006	0.014	0.0072	0.0091	0.0052	0.0042
NOCA	Sandalee Glacier	0.006	0.011	0.0063	0.0071	0.0046	0.0035
NOCA	Silver Glacier	0.006	0.0165	0.0097	0.01245	0.00565	0.0046
NOCA	Stout	0.006	0.013	0.0085	0.011	0.0053	0.0041
OLYM	Hoh	0.006	0.012				
OLYM	Hurricane Ridge	0.006	0.0006	0.00885	0.0038	0.00575	0.00365
OLYM	Steeple Rock	0.006	0.014				
ROMO	Irene Forest	0.006	0.0062	0.009575	0.006325	0.00585	0.00465
ROMO	Irene Meadow	0.006	0.01365	0.012275	0.013725	0.0079	0.0092
ROMO	LonePine	0.006					
ROMO	Mills	0.006	0.0006	0.00865	0.0011	0.00535	0.00295
SEKI	Emerald	0.006	0.01325	0.0106	0.0118	0.006775	0.004375
SEKI	Pear	0.044	0.0785	0.0565	0.067	0.03075	0.0179