



STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

P.O. Box 47600 • Olympia, Washington 98504-7600
(360) 407-6000 • TDD Only (Hearing Impaired) (360) 407-6006

May 4, 1998

TO: See Attached Distribution List

THROUGH: Ken Dzinbal, Manager *K.D.Z.*
Ambient Monitoring Section

FROM: Margaret Dutch *MED*
Marine Sediment Monitoring Team

SUBJECT: Amendments to the *Puget Sound Ambient Monitoring Program Marine Sediment Monitoring Component – Final Quality Assurance Project and Implementation Plan* (Dutch et. al., 1998) for the June 1998 sampling season.

In June 1998, the Washington State Department of Ecology (Ecology) Marine Sediment Monitoring Unit will conduct sampling for the Sediment Monitoring Component of the Puget Sound Ambient Monitoring Program (PSAMP). This sampling will be the second year of the bioeffects monitoring study performed in partnership with the National Oceanic and Atmospheric Administration (NOAA) National Status and Trends (NS&T) Bioeffects Monitoring Program. This document contains information regarding amendments to the *Final Quality Assurance Project and Implementation* (Dutch et al., 1998) which will be implemented during the 1998 sampling season. The headings listed below correspond directly to the sections in the original plan in which changes have been made. Details of these changes are discussed.

SITE DESCRIPTION

The assessment of sediment contamination and associated biological effects in 1998 will be focused in the Puget Sound central basin and adjoining waters (i.e., south of Everett Harbor to north of Commencement Bay, excluding Hood Canal). The strata chosen are outlined in Figure 1. One hundred stations will be distributed among 32 strata (28 strata with three stations each and four strata with four stations each) using a computer program designed to randomly select latitude/longitude coordinates. Detailed area maps and a listing of station coordinates, including a list of alternate locations, will be developed

prior to sampling. A final list of station locations will be published after the field sampling is complete.

PROJECT DESCRIPTION

The list of parameters and chemical compounds to be analyzed for will be amended for 1998 (see revision of Table 2, attached). Analysis for Acid Volatile Sulfides/Simultaneously Extracted Metals will not be conducted, as the 1997 AVS data was all qualified as estimated, due to noisy, unreproducible data caused by the difficulty of the analysis of H₂S, and the non-homogeneity of the sediment matrix. Analysis for the pesticide Diazinon will also be eliminated, as the procedures necessary to for extraction of this organophosphate compound differ from those of the other pesticides, which are organochlorine compounds.

The schedule for performance of this work has also been revised (see revision of Figure 2, attached).

DATA QUALITY OBJECTIVES - Completeness

In addition to the extra volumes of homogenized sediment from each station archived at -18° C for unexpected or necessary retrospective toxicity and chemistry analysis, an additional 8 oz. jar of sediment from each station will also be refrigerated at 4°C for 6 months by Ecology in case additional analysis is required for grain size (see revision of Table 7, attached).

SAMPLE COLLECTION

Grain size samples will be collected in 8-ounce wide-mouth glass jars with Teflon-lined lids, rather than the 200-gram polyethylene whirlpak bags used in 1997 (see revision of Table 7, attached).

LITERATURE CITED

Dutch, M., E. Long, W. Kammin, and S. Redman. 1998. Puget Sound Ambient Monitoring Program Marine Sediment Monitoring Component – Final Quality Assurance Project and Implementation Plan. Measures of bioeffects associated with toxicants in Puget Sound: Survey of sediment contamination, toxicity, and benthic macroinfaunal community structure. Washington State Department of Ecology, Olympia, WA. 37 pp.

MED:mli
Attachments

Figure 1. Central Puget Sound sampling strata for the NOAA/Ecology Cooperative Agreement Bioeffects Survey.

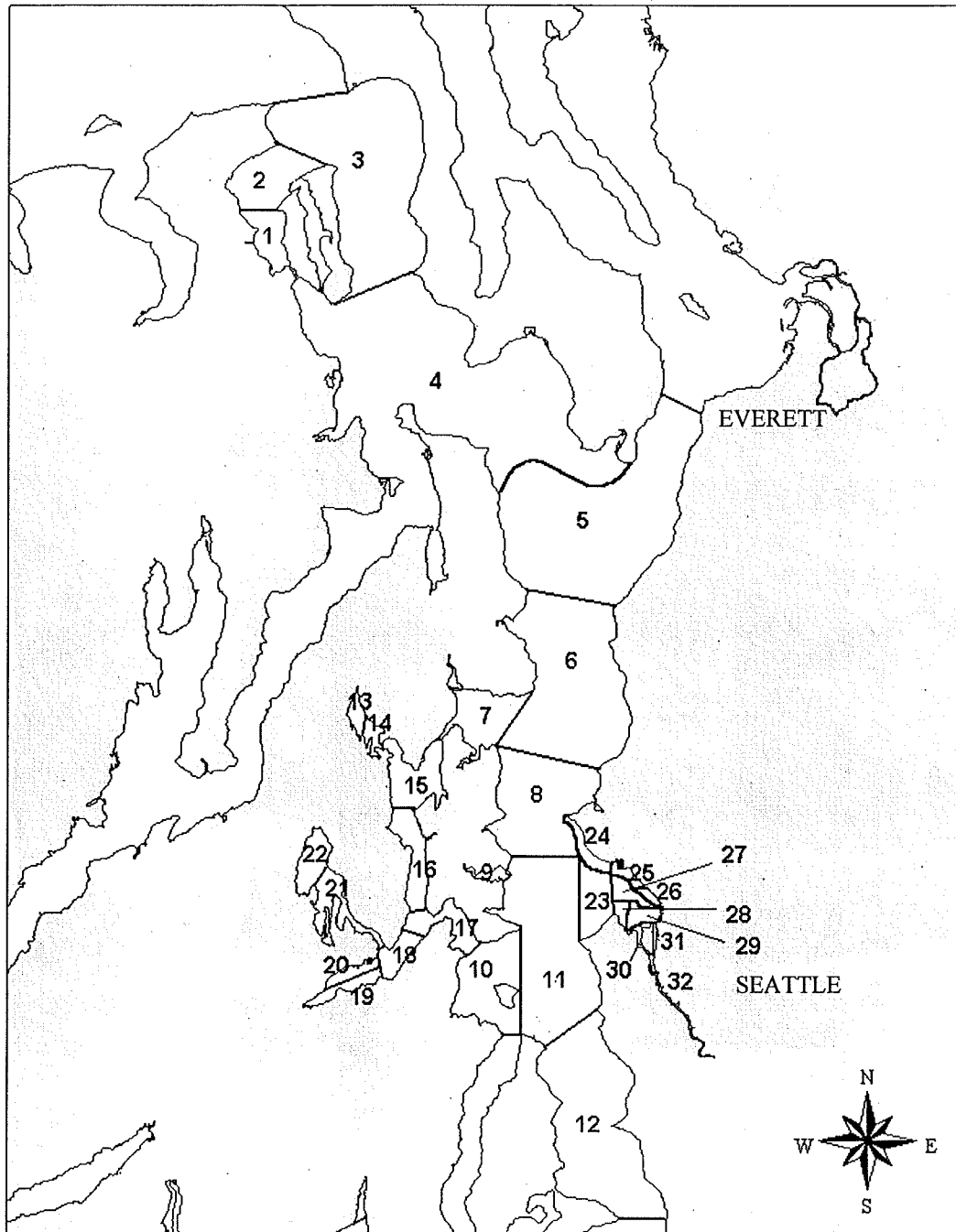


Table 2. Parameters and chemical compounds to be analyzed for in sediments collected from Puget Sound.

Related Parameters	Trace Elements	HPAHs	Miscellaneous
Grain Size	Tin	Benzo(a)anthracene	Extractable Compounds
Total organic carbon		Benzo(a)pyrene	Benzoic acid
	Organotins	Benzo(b)fluoranthene	Benzyl alcohol
Ancillary Metals	Butyl tins: Mono-, Di-, Tri-butyltin	Benzo(g,h,i)perylene	Beta-coprostanol
Aluminum		Benzo(k)fluoranthene	Isophorone
Barium	Chlorinated Aromatic Compounds	Chrysene	Dibenzofuran
Calcium	1,2,4-trichlorobenzene	Dibenzo(a,h)anthracene	
Cobalt	1,2-dichlorobenzene	Fluoranthene	Organonitrogen Compounds
Iron	1,3-dichlorobenzene	Indeno(1,2,3-c,d)pyrene	2,4-dinitrotoluene
Magnesium	1,4-dichlorobenzene	Pyrene	2,6-dinitrotoluene
Manganese	2-chloronaphthalene	C1 - C4 Chrysene	2-nitroaniline
Potassium	Hexachlorobenzene	Benzo(e)pyrene	3,3'-dichlorobenzidine
Sodium		Perylene	3-nitroaniline
Vanadium	Chlorinated Alkanes	calculated values:	4-chloroaniline
	Hexachlorobutadien	total Benzofluoranthenes	4-nitroaniline
	Hexachloroethane	HPAH	9(H)carbazol
	Hexachlorocyclopentadiene		Caffeine
Priority Pollutant Metals		LPAHs	N-nitroso-di-n-propylamine
Antimony		2-methylnaphthalene	Nitrobenzene
Arsenic	Chlorinated and Nitro-Substituted Phenols	Acenaphthene	N-nitrosodiphenylamine
Beryllium	2,4,5-trichlorophenol	Acenaphtylene	
Cadmium	2,4,6-trichlorophenol	Anthracene	Phenols
Chromium	2,4-dichlorophenol	Fluorene	2,4-dimethylphenol
Copper	2,4-dinitrophenol	Napthalene	2-methylphenol
Lead	2-chlorophenol	Phenanthrene	4-methylphenol
Mercury	2-nitrophenol	Retene	Bis(2-chloroethoxy)-methane
Nickel	4,6-dinitro 2-methylphenol	Biphenyl	Phenol
Selenium	(=4,6-dinitro-o-cresol)	1-Methylnaphthalene	P-nonylphenol
Silver	4-chloro 3-methylphenol	2,6-Dimethylnaphthalene	
Thallium	4-nitrophenol	1,6,7-Trimethylnaphthalene	Phthalate Esters
Zinc	Pentachlorophenol	C1 - C4 naphthalenes	Bis(2-ethylhexyl)phthalate
		1-Methylphenanthrene	Butyl benzyl phthalate
Major Elements	Ethers	Dibenzothiophene	Di-n-butyl phthalate
Silicon	4-bromophenyl-phenyl ether	C1 - C2 Fluorenes	Di-n-octyl phthalate
	4-chlorophenyl-phenyl ether	C1 - C4 Phenanthrenes	Diethyl phthalate
	Bis(2-chloroethyl)ether	C1 - C3 Dibenzothiophenes	Dimethyl phthalate
	Bis(2-chloroisopropyl)-ether	calculated value:	
		LPAH	

Table 2. Continued.

Chlorinated Pesticides	Endosulfan I (Alpha-endosulfan)	PCB Congeners:	Miscellaneous Oxygenated Compounds
Aldrin	Endosulfan II (Beta-endosulfan)	8	(may be done at selected stations):
Alpha-chlordane	Chlorpyrifos	18	Polychlorinated dibenzo-p-dioxins:
Alpha-HCH	Toxaphene	28	2,3,7,8-Tetrachlordioxin (TCDD)
Beta-HCH		44	Other tetrachlorinated dioxins
Delta-HCH		52	Pentachlorinated dioxins
Dieldrin	Polycyclic Chlorinated Biphenyls	66	Hexachlorinated dioxins
Endo-sulfansulfate	PCB Arochlors:	77	Heptachlorinated dioxins
Endrin	1016	101	Octachlorinated dioxins
Endrin ketone	1221	105	Polychlorinated dibenzofurans:
Endrin-aldehyde	1232	118	Tetrachlorinated furans
Gamma-chlordane	1242	126	Pentachlorinated furans
Gamma-HCH	1248	128	Hexachlorinated furans
Heptachlor	1254	138	Heptachlorinated furans
Heptachlor epoxide	1260	153	Octachlorinated furans
Methoxychlor		170	
2,4'-DDD		180	
4,4'-DDD		187	
2,4'-DDE		195	
4,4'-DDE		206	
2,4'-DDT		209	
4-4' DDT			
Cis-nonachlor			
Trans-nonachlor			
Oxychlordane			
Mirex			

Table 7. Sample container and collection information

PARAMETER	CONTAINER NO. & TYPE	MINIMUM SAMPLE REQUIRED	PRESERVATION	HOLDING TIME
Grain Size	1 - 8 oz wide mouth glass jar with Teflon-lined lid	8 oz, fill to top	Refrigerate at 4°C	6 months
Grain Size Archive Sample	1 - 8 oz wide mouth glass jar with Teflon-lined lid	8 oz, fill to top	Refrigerate at 4°C	6 months
Total Organic Carbon	1 - 2 oz wide mouth glass jar with Teflon-lined lid	2 oz, fill, but leave head space for expansion during freezing	Refrigerate at 4°C, freeze at -18°C	14 days
Metals (both partial and total digestion)	1 - 4 oz wide mouth glass jar with Teflon-lined lid	4 oz, fill jar to top	Refrigerate at 4°C	6 months, 28 days for mercury
Butyl Tins	1 - 8 oz wide mouth glass jar with Teflon-lined lid	8 oz, fill, but leave head space for expansion during freezing	Refrigerate at 4°C, freeze at -18°C	14 days
Base/Neutral/Acid Organic Compounds, Chlorinated Pesticides and PCB (Arochlors), & PCB Congeners	2 - 16 oz wide mouth glass jar with Teflon-lined lids	16 oz each jar, fill, but leave head space for expansion during freezing	Refrigerate at 4°C, freeze at -18°C	1 year
Chemistry Archive Sample	1 - 16 oz wide mouth glass jar with Teflon-lined lid	16 oz, fill, but leave head space for expansion during freezing	Refrigerate at 4°C, freeze at -18°C	1 year
Amphipod Survival - solid phase	1 gallon HDPE jar	1 gallon, fill to top	Refrigerate at 4°C	10 days
Urchin Fertilization and Embryonic development - pore water	1 gallon HDPE jar	1 gallon, fill to top	Refrigerate at 4°C	---
Urchin Embryo Mortality/Abnormality - solid phase	1 - 8 oz wide mouth glass jar with Teflon-lined lid	8 oz, fill jar to top	Refrigerate at 4°C	14 days
Microtox - organic solvent extract and Cytochrome P450 RGS Toxicity	1 - 16 oz wide mouth glass jar with Teflon-lined lid	16 oz, fill to top	Refrigerate at 4°C	---
Benthic Macro Fauna	1 gallon zip-lock bags	0.1 m ² screened through 0.5 and 1.0mm mesh	10% aqueous solution of borax-buffered formalin	48 hours to 14 days
Foraminiferans*	zip-lock bag	1 pint	Refrigerate at 4°C	unspecified

* collected upon request by Dr. Doris Sloan, U.C. Berkeley

Distribution List:

Sandra Aasen, WA Dept. of Ecology
John Armstrong, U.S. EPA Region 10
Bill Backous, WA Dept. of Ecology
Helen Berry, Dept. of Natural Resources
Dave Bradley, WA Dept of Ecology, Sediment Management Unit
Tim Determan, WA Dept. of Health
Dan Doty, WA Dept. of Fish and Wildlife
Bruce Duncan, U.S. EPA Region 10
Ken Dzinbal, WA Dept of Ecology, EILS Ambient Monitoring Section
Charles Eaton, Bio-marine Enterprises
Bill Ehinger, WA Dept of Ecology
Duane Fagergren, Puget Sound Water Quality Action Team
Rachel Friedman-Thomas, WA Dept of Ecology, Sediment Management Unit
Larry Goldstein, WA Dept of Ecology, EILS Toxic Investigation Section
Greg Hueckel, WA Dept. of Fish and Wildlife
Bill Kammin, WA Dept of Ecology, Manchester Environmental Laboratory
Will Kendra, WA Dept of Ecology
Cliff Kirchmer, WA Dept of Ecology, Quality Assurance Section
Roberto Llansó, WA Dept of Ecology
Ed Long, NOAA
Mary Mahaffy, U.S. Fish and Wildlife Service
Frank Merriweather, WA Dept. of Health
Thomas Mumford, WA Dept. of Natural Resources
Jan Newton, WA Dept. of Ecology
Dale Norton, WA Dept of Ecology
David Nysewander, WA Dept. of Fish and Wildlife
Sandra O'Neill, WA Dept. of Fish and Wildlife
Glen Patrick, WA Dept. of Health
Maria Peeler, WA Dept. of Natural Resources
Alisa Ralph, U.S. Fish and Wildlife Service
Scott Redman, Puget Sound Water Quality Action Team (PSWQAT)
Christina Ricci, WA Dept. of Ecology
Carl Samuelson, WA Dept. of Fish and Wildlife
Randy Shuman, King County Dept. of Natural Resources
Jennifer Tebaldi, WA Dept. of Health
Kathy Welch, WA Dept. of Ecology
Jim West, WA Dept. of Fish and Wildlife