PNNL-14184

Pacific Northwest
National Laboratory
Operated by Battelle for the
U.S. Department of Energy

Hanford Site Environmental Surveillance Master Sampling Schedule for Calendar Year 2003

L. E. Bisping

February 2003

Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RL01830

PACIFIC NORTHWEST NATIONAL LABORATORY
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BATTELLE
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Pacific Northwest National Laboratory
Richland, Washington 99352

SUMMARY

Environmental surveillance of the Hanford Site and surrounding areas is conducted by the Pacific Northwest National Laboratory (PNNL)[(a)] for the U.S. Department of Energy (DOE). Sampling is conducted to evaluate levels of radioactive and nonradioactive pollutants in the Hanford environs, as required in DOE Order 450.1, "Environmental Protection Program," and DOE Order 5400.5, "Radiation Protection of the Public and the Environment." The sampling design is described in the Environmental Monitoring Plan, United States Department of Energy, Richland Operations Office, DOE/RL-91-50, and Rev.3, U.S. Department of Energy, Richland, Washington. The changing mission at Hanford from plutonium production to clean-up has resulted in decreases in radiological sampling scope over the past ten years. This schedule will begin capturing new scope that is more focused on clean-up objectives and non-radiological constituents including ecological assessment monitoring in support of DOE objectives and interests of stakeholder groups. As this scope becomes better defined, the Master Sampling Schedule will expand to address these new surveillance objectives.

This document contains the calendar year 2003 schedules for the routine and non-routine collection of samples for the Surface Environmental Surveillance Project (SESP) and Drinking Water Monitoring Project. Each section includes sampling locations, sample types, and analyses to be performed. In some cases, samples are scheduled on a rotating basis and may not be collected in 2003 in which case the anticipated year for collection is provided. In addition, a map showing approximate sampling locations is included for each media scheduled for collection in 2003.

SESP SAMPLING

The SESP is a multimedia environmental surveillance effort to measure the concentrations of radionuclides and chemicals in environmental media and assess the integrated effects of these materials on the environment and the public. Project staff collect samples of air, surface water, agricultural products, wildlife, and sediments. In addition, soil and natural vegetation samples are collected approximately every 5 years. Analytical capabilities include the measurement of radionuclides at very low environmental concentrations and, in selected media, nonradiological chemicals including metals, anions, and volatile organic compounds. In addition, the project includes the capability to measure ambient external radiation and monitor particulate matter mass concentrations in air.

(a) Pacific Northwest National Laboratory is operated by Battelle Memorial Institute for the U.S. Department of Energy under Contract DE-AC06-76RL01830.

DRINKING WATER MONITORING PROJECT SAMPLING

The responsibility for monitoring onsite drinking water falls outside the scope of the SESP. The Fluor Hanford, Inc. is responsible for monitoring onsite drinking water quality as defined in the National Drinking Water Standards (40 CFR 141) and Washington Administrative Code (WAC) 246-290. PNNL conducts radiological monitoring of onsite drinking water for Fluor Hanford concurrent with SESP activities to promote sampling efficiency and consistency, utilize expertise developed over the years, and reduce costs associated with management, procedure development, analytical contracting, data management, quality control, and reporting.

DATA MANAGEMENT

The Hanford Environmental Information System (HEIS) database is used as a repository for data gathered during environmental surveillance activities at the Hanford Site. For ease in retrieving SESP or Drinking Water data from the HEIS database, the majority of the location names in this document reflect the exact location names used in the database.

SCHEDULED CHANGES

This schedule is subject to modification during the year in response to changes in site operations, program requirements, and the nature of the observed results. Operational limitations such as weather, mechanical failures, sample availability, etc., may also impact scheduled sampling. Therefore, this document may not be an accurate record of samples collected during the year.

COSAMPLES

Samples that are cosampled and analyzed by both PNNL and the Washington State Department of Health (DOH) are indicated in the schedule as are samples that are cosampled and analyzed by both PNNL and the U.S. Food and Drug Administration (FDA).

ADDITIONAL INFORMATION

Questions relating to the content of this document can be directed to T. M. Poston, Manager, Surface Environmental Surveillance Project, (509) 376-5678 or R. W. (Bill) Hanf, Manager, Drinking Water Monitoring Project, (509) 376-8264.

CONTENTS

FIGURES

ABBREVIATIONS

FREQUENCY SYMBOLS USED

A	annually
BE	biennial (every 2 years)
BW	biweekly (every 2 weeks)
M	monthly
M Comp.	monthly composite
Q	quarterly
Q Comp.	quarterly composite
SA	semiannually
TE	triennial (every 3 years)

ANALYTICAL SYMBOLS USED

Generally, standard element, chemical, and isotope designations are used to indicate the analyses performed. Other analytical designations used are:

Alpha	gross alpha activity of sample
Anions	major anions-generally chloride, fluoride, nitrate, nitrite, sulfate
Beta	gross beta activity of sample
DDD	dichlorodiphenyl dichloroethane
DDE	dichlorodiphenyl dichloroethylene
DDT	dichlorodiphenyl trichloroethane
Gamma Scan	analysis of photon energy spectrum for individual photon-emitting radionuclides
HTO	tritiated water ($^{3}H^{1}H^{16}O$)
Hg-CVAA	mercury by cold vapor atomic absorbance spectrometry
Hg-CVAF	total mercury in water by cold vapor atomic fluorescence
ICP-u, ICP-3	major metals by inductively coupled plasma spectrometry – samples unfiltered unless otherwise noted
Lo ^{3}H	analytical procedure includes electrolytic enrichment
PM_{10} & $PM_{2.5}$	particulates having an aerodynamic diameter less than 10 and 2.5 micro meters respectively. Note that a PM_{10} includes $PM_{2.5}$
Pu	isotopic plutonium (^{238}Pu, $^{239/240}Pu$)
SEM/AVS	Simultaneously Extracted Metals/Acid Volatile Sulfide
TOC	Total Organic Carbon
U	isotopic uranium (^{234}U, ^{235}U, ^{238}U)
VOA	Volatile Organic Compounds

INSTRUMENT SYMBOLS USED

BICRON	Microrem meter
GM	Geiger-Müeller counter
PIC	Pressurized ionization chamber

1.0 AIR SURVEILLANCE

1.1 AIR – PARTICULATE FILTER

Location	Individual Samples: Location Number[a]	Individual Samples: Frequency	Individual Samples: Analyses	Composited Samples: Composite Group	Composited Samples: Frequency	Composited Samples: Analyses
Onsite						
100 K Area	1	BW	Beta, Alpha	100 Areas	Q	^{90}Sr, Pu, Gamma Scan
100 N-1325 Crib	2	BW	Beta, Alpha			
100 D Area	3	BW	Beta, Alpha			
100 F Met Tower	4	BW	Beta, Alpha	Hanford Townsite	Q	^{90}Sr, Pu, Gamma Scan
Hanford Townsite	5	BW	Beta, Alpha			
N of 200 E	6	BW	Beta, Alpha	N of 200 E	Q	Gamma Scan
200 ESE[b]	7	BW	Beta, Alpha	200 E Area	Q	^{90}Sr, Pu, U, Gamma Scan
S of 200 E	8	BW	Beta, Alpha			
B Pond	9	BW	Beta, Alpha	B Pond	Q	^{90}Sr, Pu, U, Gamma Scan
Army Loop Camp	10	BW	Beta, Alpha	200 W South East	Q	^{90}Sr, Pu, U, Gamma Scan
200 Tel. Exchange	11	BW	Beta, Alpha			
SW of B/C Cribs	12	BW	Beta, Alpha			
200 W SE	13	BW	Beta, Alpha	200 West Area	Q	^{90}Sr, Pu, U, Gamma Scan
300 Water Intake	14	BW	Beta, Alpha	300 Area	Q	^{90}Sr, Pu, U, Gamma Scan
300 South Gate	15	BW	Beta, Alpha			
300 South West	16	BW	Beta, Alpha			
300 Trench	17	BW	Beta, Alpha	Q U, Gamma (300 NE)	Q	^{90}Sr, Pu
300 NE	18	BW	Beta, Alpha	Q U, Gamma (300 NE)		
400 E	19	BW	Beta, Alpha	400 Area	Q	^{90}Sr, Pu, Gamma Scan
400 W	20	BW	Beta, Alpha			
400 S	21	BW	Beta, Alpha			
400 N	22	BW	Beta, Alpha			
Wye Barricade[b]	23	BW	Beta, Alpha	Wye Barricade	Q	^{90}Sr, Pu, U, Gamma Scan
Perimeter						
Ringold Met Tower	24	BW	Beta, Alpha	Ringold Met Tower	Q	^{90}Sr, Pu, Gamma Scan
W End of Fir Road[b]	25	BW	Beta, Alpha	W End of Fir Road	Q	^{90}Sr, Pu, U, Gamma Scan

1.1 AIR - PARTICULATE FILTER (contd)

Location	Individual Samples: Location Number[a]	Individual Samples: Frequency	Individual Samples: Analyses	Composited Samples: Composite Group	Composited Samples: Frequency	Composited Samples: Analyses
Perimeter						
Dogwood Met Tower	26	BW	Beta, Alpha	Dogwood Met Tower	Q	^{90}Sr, Pu, U, Gamma Scan
Byers Landing	27	BW	Beta, Alpha	Byers Landing	Q	^{90}Sr, Pu, U, Gamma Scan
Battelle Complex[b]	28	BW	Beta, Alpha	Battelle Complex	Q	Gamma Scan
Horn Rapids Substa	29	BW	Beta, Alpha	Prosser Barricade	Q	^{90}Sr, Pu, U, Gamma Scan
Prosser Barricade[b]	30	BW	Beta, Alpha			
Yakima Barricade[b]	31	BW	Beta, Alpha	Yakima Barricade	Q	^{90}Sr, Pu, Gamma Scan
Rattlesnake Springs	32	BW	Beta, Alpha			
Wahluke Slope	33	BW	Beta, Alpha	Wahluke Slope	Q	^{90}Sr, Pu, Gamma Scan
S End Vernita Bridge	34	BW	Beta, Alpha			
Community						
Basin City School[c]	35	BW	Beta, Alpha	Basin City School	Q	^{90}Sr, Pu, U, Gamma Scan
Leslie Groves-Rchlnd[c]	36	BW	Beta, Alpha	Leslie Groves-Rchlnd	Q	^{90}Sr, Pu, U, Gamma Scan
Pasco	37	BW	Beta	Tri Cities	Q	^{90}Sr, Pu, Gamma Scan
Kennewick-Ely Street	38	BW	Beta, Alpha			
Benton City	39	BW	Beta	Benton City	Q	Gamma Scan
Edwin Markham School[c]	40	BW	Beta, Alpha	Edwin Markham School	Q	^{90}Sr, Pu, U, Gamma Scan
Mattawa	41	BW	Beta	Mattawa	Q	Gamma Scan
Othello	42	BW	Beta	Othello	Q	Gamma Scan
Distant						
Yakima	43	BW	Beta, Alpha	Yakima	Q	^{90}Sr, Pu, U, Gamma Scan
Toppenish[c]	44	BW	Beta, Alpha	Toppenish	Q	^{90}Sr, Pu, U, Gamma Scan

(a) Refer to Figure 1.1, 2003 Air Sampling Locations.
(b) Washington State Department of Health air sampler also at this location.
(c) Community-operated environmental surveillance station.

1.2 AIR – TRITIUM AND IODINE

Location	Location Number[a]	Frequency[b]	Analysis	Frequency	Analysis[c]
Onsite					
100 K Area	1			M	^{3}H
100 N-1325 Crib	2			M	^{3}H
200 ESE	7	Q Comp	^{129}I	M	^{3}H
200 Tel. Exchange	11			M	^{3}H
300 Water Intake	14			M	^{3}H
300 South Gate[d]	15			M	^{3}H
300 South West	16			M	^{3}H
300 Trench	17			M	^{3}H
300 NE	18			M	^{3}H
400 E	19			M	^{3}H
Perimeter					
Ringold Met Tower	24	Q Comp	^{129}I	M	^{3}H
Dogwood Met Tower	26			M	^{3}H
Byers Landing	27	Q Comp	^{129}I	M	^{3}H
Battelle Complex[e]	28			M	^{3}H
Prosser Barricade[e]	30			M	^{3}H
Wahluke Slope	33			M	^{3}H
Community[f]					
Basin City School	35			M	^{3}H
Leslie Groves-Rchlnd	36			M	^{3}H
Edwin Markham School	40			M	^{3}H
Distant					
Yakima	43	Q Comp	^{129}I	M	^{3}H
Toppenish[f]	44			M	^{3}H

(a) Refer to Figure 1.1, 2003 Air Sampling Locations.
(b) Samples are collected monthly and composited for quarterly analyses.
(c) As HTO.
(d) Two tritium samples are collected from this location.
(e) Washington State Department of Health air sampler also at this location.
(f) Community-operated environmental surveillance station.

1.3 AIR – PARTICULATE MASS CONCENTRATION

Location	Location Number[a]	Frequency	Analysis[b]
Hanford Meteorological Station	45	Hourly	Mass Concentration

(a) Refer to Figure 1.1, 2003 Air Sampling Locations.
(b) Hourly average mass concentration data are collected at the Hanford Meteorological Station for two size fractions, PM_{10} and $PM_{2.5}$. These data are not available in HEIS but can be obtained from the SESP manager.

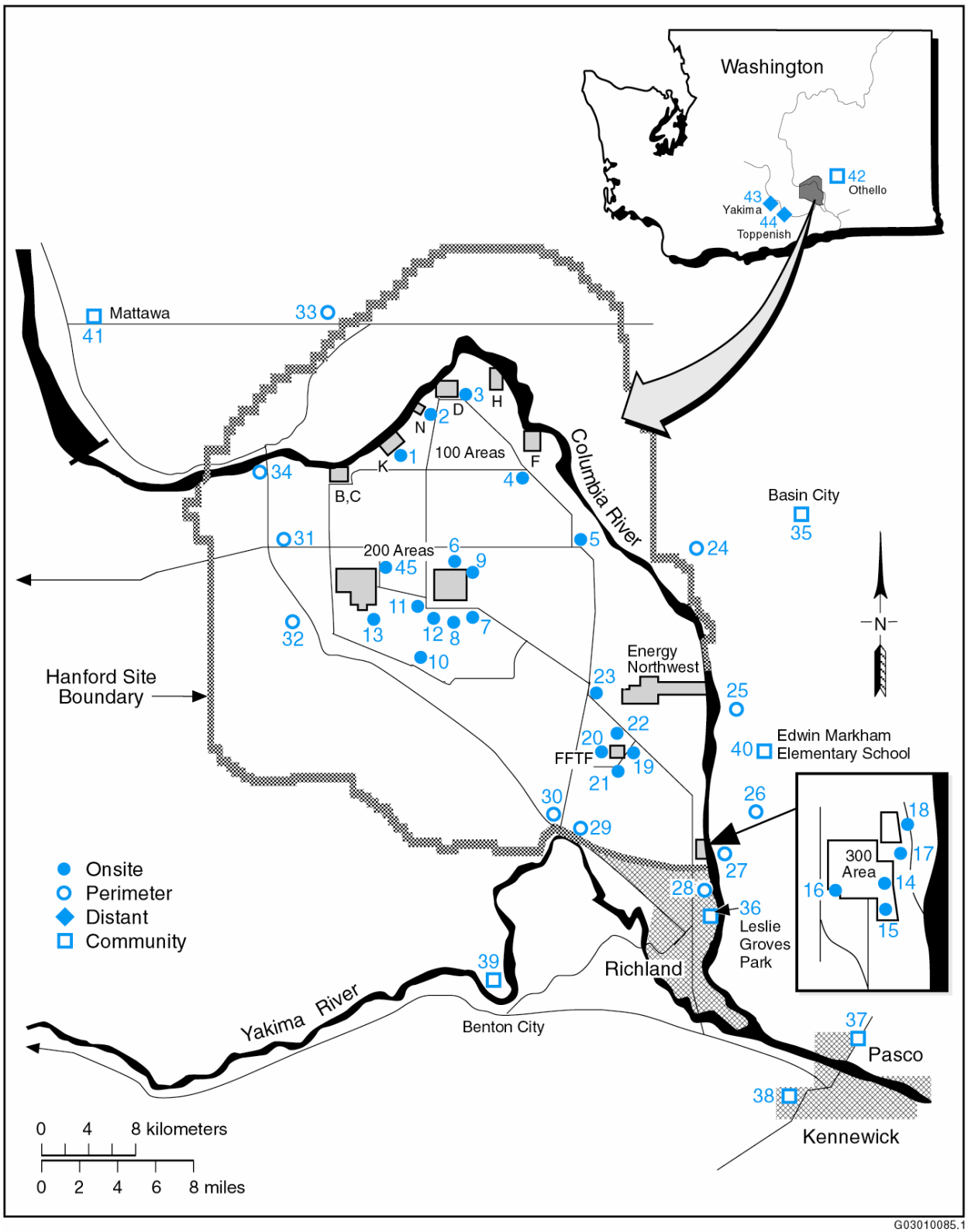

Figure 1.1. 2003 Air Sampling Locations

2.0 SURFACE WATER SURVEILLANCE

2.1 WATER – COLUMBIA RIVER

Location[a]	Sample Type	Frequency	Analyses
Priest Rapids-River	Cumulative	M Comp.[b] Q Comp.[b]	Alpha, Beta, Lo ^{3}H, ^{90}Sr, ^{99}Tc, U, DOH[c] ^{129}I
	Particulate (filter)	M Comp.[d] Q Comp.[d]	Gamma Scan Pu
	Soluble (resin)	M Comp.[d] Q Comp.[d]	Gamma San Pu
Rich.Pmphs HRM 46.4	Cumulative	M Comp.[b] Q Comp.[b]	Alpha, Beta, Lo ^{3}H, ^{90}Sr, ^{99}Tc, U ^{129}I
	Particulate (filter)	M Comp.[d] Q Comp.[d]	Gamma Scan Pu
	Soluble (resin)	M Comp.[d] Q Comp.[d]	Gamma Scan Pu
	Grab	3/Yr	USGS-NASQAN[e]
Rich.Pmphs-1 HRM46.4	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA
Rich.Pmphs-2 HRM46.4	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA
Rich.Pmphs-3 HRM46.4	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA
Rich.Pmphs-5 HRM46.4	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA
Rich.Pmphs-7 HRM 46.4	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA
Rich.Pmphs-10 HRM46.4	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA
Rich.Pmphs HRM 43.5	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA
Rich.Pmphs HRM 43.9	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA
Rich.Pmphs HRM 45.0	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA
Rich.Pmphs HRM 45.8	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA
Vernita	Grab	3/Yr	USGS-NASQAN[e]
Vernita-1 HRM 0.3	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA
Vernita-2 HRM 0.3	Transect	Q A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions VOA

2.1 WATER – COLUMBIA RIVER (contd)

Location[(a)]	Sample Type	Frequency	Analyses
Vernita-3 HRM 0.3	Transect	Q	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
		A	VOA
Vernita-4 HRM 0.3	Transect	Q	Lo ^{3}H, ^{90}Sr, U, ICP-3, ICP-3 Filtered, Anions
		A	VOA
100 N -1 HRM 9.5	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
100 N -2 HRM 9.5	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
100 N -3 HRM 9.5	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
100 N -5 HRM 9.5	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
100 N -7 HRM 9.5	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
100 N -10 HRM 9.5	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
100 N Shore HRM 8.4	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
100 N Shore HRM 8.9	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
100 N Shore HRM 9.2	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
100 N Shore HRM 9.8	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
100 F -1 HRM 19.0	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
100 F -2 HRM 19.0	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
100 F -3 HRM 19.0	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
100 F -5 HRM 19.0	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
100 F -7 HRM 19.0	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
100 F -10 HRM 19.0	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
100 F SHORE HRM 18	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
100 F SHORE HRM 22	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
100 F SHORE HRM 23	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanfrd TS-1 HRM 28.7	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanfrd TS-2 HRM 28.7	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanfrd TS-3 HRM 28.7	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanfrd TS-5 HRM 28.7	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanfrd TS-7 HRM 28.7	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanfrd TS-10 HRM 28.7	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanfrd Twnsite HRM26	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanfrd Twnsite HRM27	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanfrd Twnsite HRM28	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanfrd Twnsite HRM30	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
300 Area-1 HRM 43.1	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
300 Area -2 HRM 43.1	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
300 Area -3 HRM 43.1	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
300 Area -5 HRM 43.1	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
300 Area -7 HRM 43.1	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
300 Area -10 HRM 43.1	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]
300 Area Shr HRM41.5	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[(f)]

2.1 WATER – COLUMBIA RIVER (contd)

Location[a]	Sample Type	Frequency	Analyses
300 Area Shr HRM42.1	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[f]
300 Area Shr HRM42.5	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[f]
300 Area Shr HRM42.9	Transect	A	Lo ^{3}H, ^{90}Sr, U, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[f]

(a) Refer to Figure 2.1, 2003 Surface Water and Drinking Water Sampling Locations. Hanford River Markers (HRM) are a series of signposts along the Hanford shoreline of the Columbia River that are roughly 1 mile apart. Vernita Bridge is HRM #0 and Ferry Street in Richland is HRM #46. Samples collected between HRMs are assigned a decimal.
(b) Cumulative sample is collected weekly and composited for analysis.
(c) Cosample provided to the Washington State Department of Health (January and June only).
(d) Sample is collected biweekly and composited for analysis.
(e) Analyses are performed by the United States Geological Survey (USGS) in conjunction with the National Stream Quality Accounting Network (NASQAN) Program, and include: conductance, pH, temperature, turbidity, dissolved oxygen, hardness, Ca, Mg, alkalinity, carbonates, sulfate, Cl, F, solids, NH_4-N, NO_3+NO_2, N-Kjeldahl, P, Cr, Fe, dissolved organic carbon.
(f) Cosample provided to the Washington State Department of Health (September).

2.2 RIVERBANK SPRINGS

Location[a]	HRM[b]	Sample Type	Frequency	Analyses
100-B Spring 38-3	3.8	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, ^{99}Tc, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, VOA, DOH[c]
100-B Spring 39-2	3.9	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, ^{99}Tc, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, VOA, DOH[c]
100-K Spring 63-1	6.3	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, VOA, DOH[c]
100-K Spring 77-1	7.7	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, VOA, DOH[c]
100-N Spring 8-13	NA	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
100-N Spring Near 199N-46	NA	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, U, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[c]
100-D Spring 110-1	11.0	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
100-D Spring 102-1	10.2	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
100-H Spring 152-2	15.2	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, ^{99}Tc, U, Gamma Scan, Hg-CVAF, ICP-3, ICP-3 Filtered, Anions
100-H Spring 145-1	14.5	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, ^{99}Tc, U, Gamma Scan, Hg-CVAF, ICP-3, ICP-3 Filtered, Anions, DOH[c]
100-F Spring 207-1	20.7	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, U, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, VOA, DOH[c]
Hanford Spring 28-2	28.2	Grab	A	Alpha, Beta, ^{3}H, ^{99}Tc, U, ^{129}I, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanford Spr UR 28-2[d]	UR 28.2	Grab	A	Alpha, Beta, ^{3}H, ^{99}Tc, U, ^{129}I, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions
Hanford Spr DR 28-2[e]	DR 28.2	Grab	A	Alpha, Beta, ^{3}H, ^{99}Tc, U, ^{129}I, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, DOH[c]

2.2 RIVERBANK SPRINGS (contd)

Location[a]	HRM [b]	Sample Type	Frequency	Analyses
300 Area Spring 42-2	42.2	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, U, ^{129}I, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, VOA, DOH[c]
300 Area Spr DR 42-2[e]	DR 42.2	Grab	A	Alpha, Beta, ^{3}H, ^{90}Sr, U, ^{129}I, Gamma Scan, ICP-3, Hg-CVAF, ICP-3 Filtered, Anions, VOA, DOH[c]

(a) Refer to Figure 2.1, 2003 Surface Water and Drinking Water Sampling Locations.
(b) Hanford River Markers (HRM) are a series of signposts along the Hanford shoreline of the Columbia River that are roughly 1 mile apart. Vernita Bridge is HRM #0 and Ferry Street in Richland is HRM #46. Samples collected between HRMs are assigned a decimal.
(c) Cosample provided to the Washington State Department of Health.
(d) UR - Upriver from noted location.
(e) DR - DownRiver from noted location.

2.3 ONSITE PONDS

Location[a]	Sample Type	Frequency	Analyses
West Lake	Grab	Q	^{3}H
FFTF Pond	Grab	Q	Alpha, Beta, ^{3}H, Gamma Scan

(a) Refer to Figure 2.1, 2003 Surface Water and Drinking Water Sampling Locations.

2.4 OFFSITE IRRIGATION WATER

Location[a]	Sample Type	Frequency	Analyses
Riverview Canal	Grab	3 (May-Sept)	Alpha, Beta, Lo ^{3}H, ^{90}Sr, U, Gamma Scan, DOH[b]
Horn Rapids Area	Grab	3 (May-Sept)	Alpha, Beta, Lo ^{3}H, ^{90}Sr, U, Gamma Scan, DOH[b]

(a) Refer to Figure 2.1, 2003 Surface Water and Drinking Water Sampling Locations.
(b) One cosample provided to the Washington State Department of Health.

2.5 ONSITE DRINKING WATER

Location [a]	Sample Type	Individual Samples Frequency	Individual Samples Analyses	Composited Samples Composite Group	Composited Samples Frequency	Composited Samples Analyses
100 N Area	Grab	M[b]		100 N Area	Q	Beta
100 N Area	Grab	Q[c]	Alpha, ^{226}Ra, ^{228}Ra, ^{131}I }	100 N Area	A	^{90}Sr, ^{3}H
200 W Area	Grab	M[b]		200 W Area	Q	Beta
200 W Area	Grab	Q[c]	Alpha, ^{226}Ra, ^{228}Ra, ^{131}I }	200 W Area	A	^{90}Sr, ^{3}H
100 K Area	Grab	M[b]		100 K Area	Q	Beta
100 K Area	Grab	Q[c]	Alpha, ^{226}Ra, ^{228}Ra, ^{131}I }	100 K Area	A	^{90}Sr, ^{3}H
400 Area	Grab	M[b]		400 Area	Q	Beta
400 Area	Grab	Q[c]	Alpha, ^{226}Ra, ^{228}Ra, ^{131}I , ^{3}H }	400 Area	A	^{90}Sr

(a) Refer to Figure 2.1, 2003 Surface Water and Drinking Water Sampling Locations.
(b) Sample is collected monthly and composited for quarterly analysis.
(c) Sample is collected and analyzed quarterly and then composited for annual analysis.

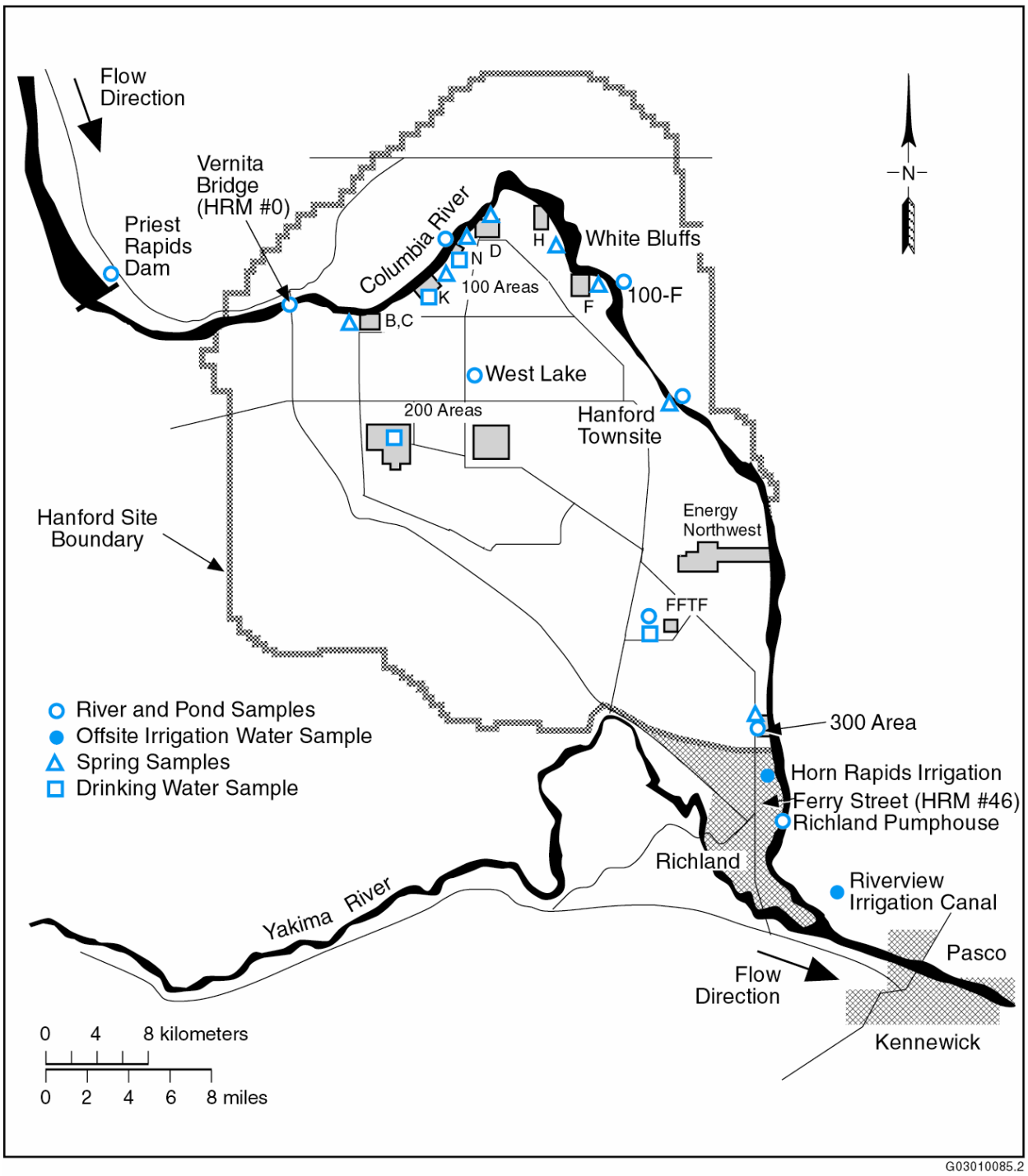

Figure 2.1. 2003 Surface Water and Drinking Water Sampling Locations

3.0 BIOTA

3.1 FOODSTUFFS AND FARM PRODUCTS

3.1.1 Whole Milk

Location[a]	Frequency	Analyses
East Wahluke Area[b]	Q	Lo ^{3}H, ^{90}Sr, Gamma Scan
	SA	^{129}I
Sagemoor Composite[b]	Q	Lo ^{3}H, 90Sr, Gamma Scan
	SA	^{129}I
Sunnyside Area	Q	Lo ^{3}H, 90Sr, Gamma Scan
	SA	^{129}I

(a) Refer to Figure 3.1, 2003 Food and Farm Product Sampling Locations.
(b) Sample composited from multiple dairies in each area.

3.1.2 Leafy Vegetables

Location[a][b]	Frequency[c]	Analyses
Riverview Area	A	^{90}Sr, Gamma Scan, FDA[d]
Sunnyside Area	A	^{90}Sr, Gamma Scan, FDA[d]
Sagemoor Area	BE (2003)	^{90}Sr, Gamma Scan, DOH[e]
East Wahluke Area	BE (2004)	^{90}Sr, Gamma Scan, DOH[e]

(a) Refer to Figure 3.1, 2003 Food and Farm Product Sampling Locations.
(b) Two samples collected within each area, one sample analyzed and one archived.
(c) Samples are collected in 2003 according to their specified frequency unless otherwise noted.
(d) Cosamples sent to U.S. Food and Drug Administration.
(e) Cosample provided to the Washington State Department of Health.

3.1.3 Vegetables

Location[a][b]	Sample Type	Frequency[c]	Analyses
Riverview Area	Potatoes	A	^{90}Sr, Gamma Scan
	Tomatoes	A	^{90}Sr, ^{3}H, Gamma Scan
	Asparagus	A	^{90}Sr, U, Gamma Scan, DOH[d]
Sunnyside Area	Potatoes	A	^{90}Sr, Gamma Scan, FDA[e]
	Asparagus	A	^{90}Sr, U, Gamma Scan, DOH[d]
East Wahluke Area	Potatoes	A	^{90}Sr, Gamma Scan
Harrah/Wapato Area[f]	Tomatoes	A	^{90}Sr, ^{3}H, Gamma Scan, DOH
Sagemoor Area	Potatoes	TE (2003)	^{90}Sr, Gamma Scan, DOH[d], FDA[e]
	Asparagus	A	^{90}Sr, U, Gamma Scan, DOH[d]
Horn Rapids Area	Potatoes	TE (2005)	^{90}Sr, Gamma Scan, DOH[d], FDA[e]

(a) Refer to Figure 3.1, 2003 Food and Farm Product Sampling Locations.
(b) Two samples collected within each area, one sample analyzed and one archived.
(c) Samples are collected in 2003 according to their specified frequency unless otherwise noted.
(d) Cosample provided to the Washington State Department of Health.
(e) Cosamples sent to U.S. Food and Drug Administration.
(f) Samples provided to PNNL by Washington State Department of Health.

3.1.4 Fruit

Location[a][b]	Sample Type	Frequency[c]	Collection Period	Analyses
Sagemoor Area	Apples	TE (2003)	September	^{90}Sr, Gamma Scan, DOH[d], FDA[e]
	Concord Grapes[f]	TE (2004)	September	^{90}Sr, Gamma Scan, DOH[d]
	Cherries	TE (2005)	June	^{90}Sr, Gamma Scan, DOH[d], FDA[e]
Sunnyside Area	Apples	TE (2003)	September	^{90}Sr, Gamma Scan, DOH[d]
	Concord Grapes[f]	TE (2004)	September	^{90}Sr, Gamma Scan, DOH[d]
	Cherries	TE (2005)	June	^{90}Sr, Gamma Scan, DOH[d]
Riverview Area	Apples	TE (2003)	September	^{90}Sr, Gamma Scan, DOH[d], FDA[e]
	Concord Grapes[f]	TE (2004)	September	^{90}Sr, Gamma Scan, DOH[d], FDA[e]
	Cherries	TE (2005)	June	^{90}Sr, Gamma Scan, DOH[d]
Mattawa Area	Apples	TE (2003)	September	^{90}Sr, Gamma Scan, DOH[d]
Cold Creek Area	Concord Grapes[f]	TE (2004)	September	^{90}Sr, Gamma Scan, DOH[d]
Ringold Area	Cherries	TE (2005)	June	^{90}Sr, Gamma Scan, DOH[d]
East Wahluke Area	Cherries	TE (2005)	June	^{90}Sr, Gamma Scan

(a) Refer to Figure 3.1, 2003 Food and Farm Product Sampling Locations.
(b) Two samples collected within each area, one sample analyzed and one archived.
(c) Samples are collected in 2003 according to their specified frequency unless otherwise noted.
(d) Cosample provided to the Washington State Department of Health.
(e) Cosamples sent to U.S. Food and Drug Administration.
(f) Concord grapes preferred; table grapes acceptable if concord grapes are unavailable.

3.1.5 Wine

Location[a][b]	Sample Type	Frequency	Collection Period	Analyses
Columbia Basin	White	A	December	Lo ^{3}H, Gamma Scan, DOH[c]
	Red	A	December	Lo ^{3}H, Gamma Scan, DOH[c]
Yakima Valley	White	A	December	Lo ^{3}H, Gamma Scan, DOH[c]
	Red	A	December	Lo ^{3}H, Gamma Scan, DOH[c]

(a) Refer to Figure 3.1, 2003 Food and Farm Product Sampling Locations.
(b) Two samples of each type collected within each area.
(c) Cosample provided to the Washington State Department of Health.

3.1.6 Alfalfa

Location[a][b]	Sample Type	Frequency	Collection Period	Analyses
Sagemoor Area	Alfalfa	BE (2003)	May	^{90}Sr, Gamma Scan
Riverview Area	Alfalfa	BE (2003)	May	^{90}Sr, Gamma Scan, FDA[c], DOH[d]
Sunnyside Area	Alfalfa	BE (2003)	May	^{90}Sr, Gamma Scan, FDA[c]
Horn Rapids Area	Alfalfa	BE (2003)	May	^{90}Sr, Gamma Scan, DOH[d]

(a) Refer to Figure 3.1, 2003 Food and Farm Product Sampling Locations.
(b) Two samples collected within each area, one sample analyzed and one archived.
(c) Cosamples sent to U.S. Food and Drug Administration.
(d) Cosample provided to the Washington State Department of Health.

3.1.7 Honey

Location[a][b]	Sample Type	Frequency	Collection Period	Analyses
Sagemoor Area	Honey	BE (2003)	Aug-Oct	^{90}Sr, Pu, U, ^{3}H, Gamma Scan, DOH[c]
Cold Creek Area	Honey	BE (2003)	Aug-Oct	^{90}Sr, Pu, U, ^{3}H, Gamma Scan, DOH[c]

(a) Refer to Figure 3.1, 2003 Food and Farm Product Sampling Locations.
(b) One sample collected within each area.
(c) Cosample provided to the Washington State Department of Health.

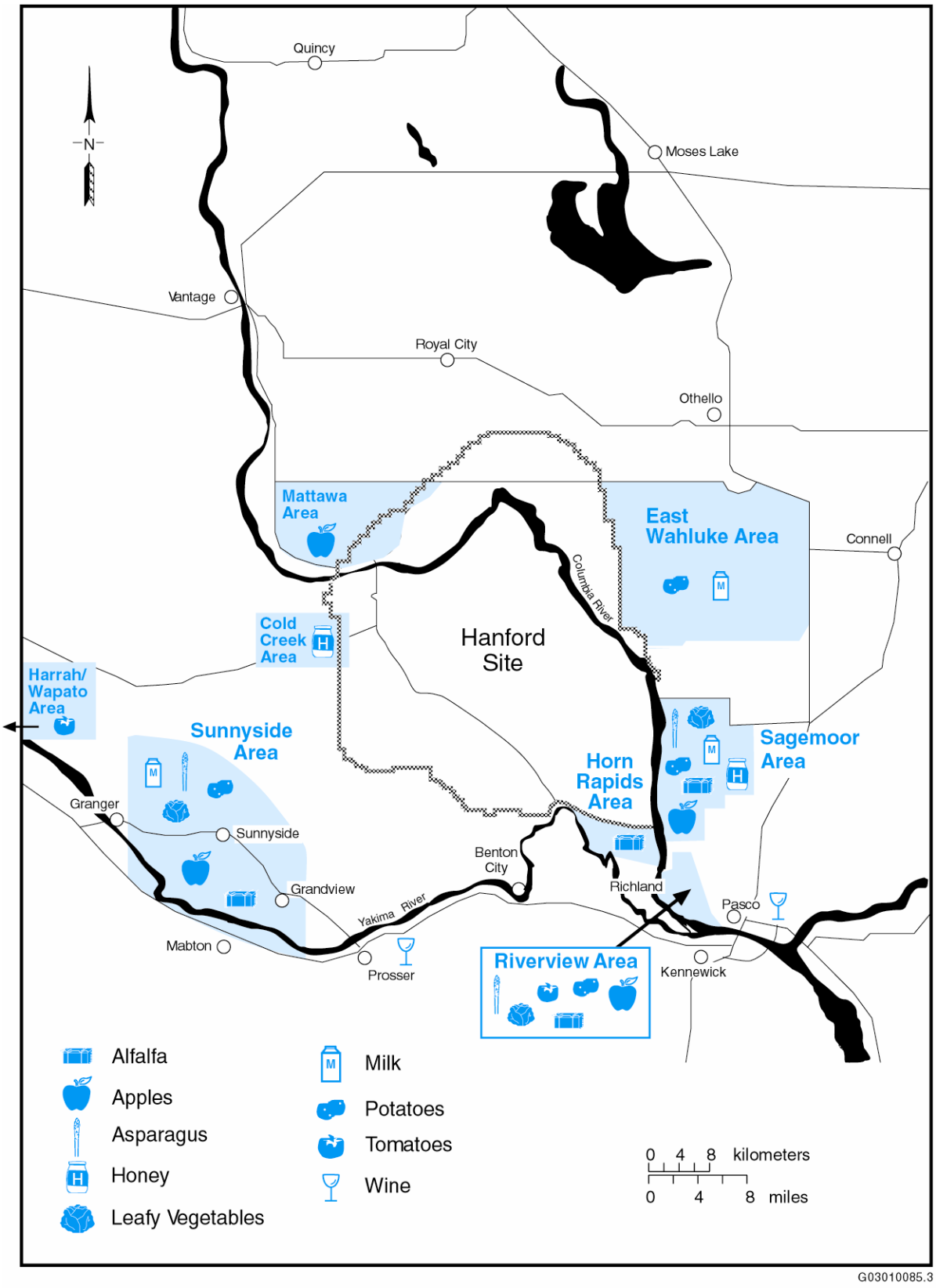

Figure 3.1. 2003 Food and Farm Product Sampling Locations

3.2 WILDLIFE

3.2.1 Aquatic Biota

Location[a]	Species/ Sample	Number of Samples	Frequency[b]	Collection Period	Analyses
100-N Area to 100-D Area[c]	Whitefish				
	Fillet	5	BE (2003)	January	Gamma Scan, DOH[d]
	Carcass	5	BE (2003)	January	^{90}Sr, DOH[d]
	Liver[e]	5	BE (2003)	January	ICP-3
	Carp				
	Fillet	5	BE (2004)	June	Gamma Scan, DOH[d]
	Carcass	5	BE (2004)	June	^{90}Sr, DOH[d]
	Liver[e]	5	BE (2004)	June	ICP-3
Background - Priest Rapids/Wanapum Pools	Whitefish				
	Fillet	5	BE (2003)	Jan & Dec	Gamma Scan, DOH[d]
	Carcass	5	BE (2003)	Jan & Dec	^{90}Sr, DOH[d]
	Liver[e]	5	BE (2003)	Jan & Dec	ICP-3, Hg-CVAA
Background - Vernita	Crayfish[e]				
	Carcass	1	TE (2003)	Jan - Dec	^{90}Sr, ^{99}Tc, Gamma Scan
	Hepatopancreas	10	TE (2003)	Jan - Dec	ICP-3, Hg-CVAA
Background	Crayfish[e][f]				
	Carcass	1	TE (2003)	Jan - Dec	^{90}Sr, ^{99}Tc, Gamma Scan
	Hepatopancreas	1	TE (2003)	Jan - Dec	ICP-3, Hg-CVAA
100 F Slough	Bass				
	Fillet	5	TE (2005)	May-June	Gamma Scan, DOH[d]
	Carcass	5	TE (2005)	May-June	^{90}Sr, DOH[d]
	Liver[e]	5	TE (2005)	May-June	ICP-3, Hg-CVAA
Hanford Slough	Bass				
	Fillet	5	TE (2005)	May-June	Gamma Scan, DOH[d]
	Carcass	5	TE (2005)	May-June	^{90}Sr, DOH[d]
	Liver[e]	5	TE (2005)	May-June	ICP-3, Hg-CVAA
300 Area[c]	Carp				
	Fillet	5	BE (2004)	June	Gamma Scan, U, DOH[d]
	Carcass	5	BE (2004)	June	^{90}Sr, DOH[d]
	Liver[e]	5	BE (2004)	June	ICP-3, Hg-CVAA
	Bass				
	Fillet	5	TE (2005)	May-June	Gamma Scan, U
	Carcass	5	TE (2005)	May-June	^{90}Sr
	Liver[e]	5	TE (2005)	May-June	ICP-3, Hg-CVAA

3.2.1 Aquatic Biota (contd)

Location[a]	Species/ Sample	Number of Samples	Frequency[b]	Collection Period	Analyses
Background - Desert Aire/Vantage	Bass				
	Fillet	5	TE (2005)	June	Gamma Scan, U, DOH[d]
	Carcass	5	TE (2005)	June	^{90}Sr, DOH[d]
	Liver[e]	5	TE (2005)	June	ICP-3, Hg-CVAA
	Carp				
	Fillet	5	BE (2004)	June	Gamma Scan, U
	Carcass	5	BE (2004)	June	^{90}Sr
	Liver[e]	5	BE (2004)	June	ICP-3, Hg-CVAA

(a) Refer to Figure 3.2, 2003 Wildlife Sampling Locations.
(b) Samples are collected in 2003 according to their specified frequency unless otherwise noted.
(c) If available, PNNL will collect one Northern Pike Minnow sample and provide to the Washington State Department of Health.
(d) One cosample provided to the Washington State Department of Health.
(e) Ecological assessment monitoring.
(f) Samples provided to PNNL by Washington State Department of Health.

3.2.2 Geese

Location[a]	Species/Sample	Number of Samples	Frequency	Collection Period	Analyses
100 Areas	Canada Goose				
	Muscle	5	BE (2003)	Jul-Aug	Gamma Scan, DOH[b]
	Bone	5	BE (2003)	Jul-Aug	^{90}Sr, DOH[b]
	Liver[c]	5	BE (2003)	Jul-Aug	ICP-3, Hg-CVAA
Hanford Townsite	Canada Goose				
	Muscle	5	BE (2003)	Jul-Aug	Gamma Scan
	Bone	5	BE (2003)	Jul-Aug	^{90}Sr
	Liver[c]	5	BE (2003)	Jul-Aug	ICP-3, Hg-CVAA
Background -Vantage	Canada Goose				
	Muscle	5	BE (2003)	Jul-Aug	Gamma Scan
	Bone	5	BE (2003)	Jul-Aug	^{90}Sr
	Liver[c]	5	BE (2003)	Jul-Aug	ICP-3, Hg-CVAA

(a) Refer to Figure 3.2, 2003 Wildlife Sampling Locations.
(b) One cosample provided to the Washington State Department of Health.
(c) Ecological assessment monitoring.

3.2.3 Game Birds

Location	Species/Sample[a]	Number of Samples	Frequency	Collection Period	Analyses
100 D Area to	Pheasant				
100 H Area	Muscle	4	BE (2004)	September	Gamma Scan, DOH[b]
	Bone	4	BE (2004)	September	^{90}Sr, DOH[b]
	Liver[c]	4	BE (2004)	September	ICP-3
100 H Area to	Pheasant				
100 F Area	Muscle	6	BE (2004)	September	Gamma Scan, DOH[b]
	Bone	6	BE (2004)	September	^{90}Sr, DOH[b]
	Liver[c]	6	BE (2004)	September	ICP-3
Background	Pheasant				
	Muscle	5	BE (2004)	September	Gamma Scan
	Bone	5	BE (2004)	September	^{90}Sr
	Liver[c]	6	BE (2004)	September	ICP-3

(a) Pheasant preferred; chukar or quail acceptable if pheasant is unavailable.
(b) One cosample provided to the Washington State Department of Health.
(c) Ecological assessment monitoring.

3.2.4 Rabbits

Location[a]	Species/Sample	Number of Samples	Frequency	Collection Period	Analyses
100 N Area	Cottontail				
	Muscle	4	BE (2003)	Jan-Dec	Gamma Scan, DOH[b]
	Bone	4	BE (2003)	Jan-Dec	^{90}Sr, DOH[b]
	Liver[c]	4	BE (2003)	Jan-Dec	ICP-3
200 E Area	Cottontail				
	Muscle	4	BE (2003)	Jan-Dec	Gamma Scan
	Bone	4	BE (2003)	Jan-Dec	^{90}Sr
	Liver[c]	4	BE (2003)	Jan-Dec	Pu, ICP-3
200 West	Cottontail				
	Muscle	4	BE (2003)	Jan-Dec	Gamma Scan
	Bone	4	BE (2003)	Jan-Dec	^{90}Sr
	Liver[c]	4	BE (2003)	Jan-Dec	Pu, ICP-3
Background - Grant/ Douglas Co.	Cottontail				
	Muscle	5	TE (2003)	Jan-Dec	Gamma Scan
	Bone	5	TE (2003)	Jan-Dec	^{90}Sr
	Liver[c]	5	TE (2003)	Jan-Dec	Pu, ICP-3

(a) Refer to Figure 3.2, 2003 Wildlife Sampling Locations.
(b) One cosample provided to the Washington State Department of Health.
(c) Ecological assessment monitoring.

3.2.5 Deer/Elk

Location	Species/ Sample	Number of Samples	Frequency	Collection Period	Analyses
100 N Area	Mule Deer				
	Muscle	2	BE (2004)	Nov-Dec	Gamma Scan, DOH[(a)]
	Bone	2	BE (2004)	Nov-Dec	^{90}Sr, DOH[(a)]
	Liver[(b)]	2	BE (2004)	Nov-Dec	ICP-3
200 Areas	Mule Deer				
	Muscle	2	BE (2004)	December	Gamma Scan, DOH[(a)]
	Bone	2	BE (2004)	December	^{90}Sr, DOH[(a)]
	Liver[(b)]	2	BE (2004)	December	Pu, ICP-3
Road Kill at Onsite Location[(c)]	Mule Deer/Elk				
	Muscle	10	BE (2004)	As Available	Gamma Scan
	Bone	10	BE (2004)	As Available	^{90}Sr
Background	Mule Deer				
	Muscle	2	BE (2004)	October	Gamma Scan, DOH[(a)]
	Bone	2	BE (2004)	October	^{90}Sr, DOH[(a)]
	Liver[(b)]	2	BE (2004)	October	Pu, ICP-3

(a) One cosample provided to the Washington State Department of Health.
(b) Ecological assessment monitoring.
(c) As available, according to location.

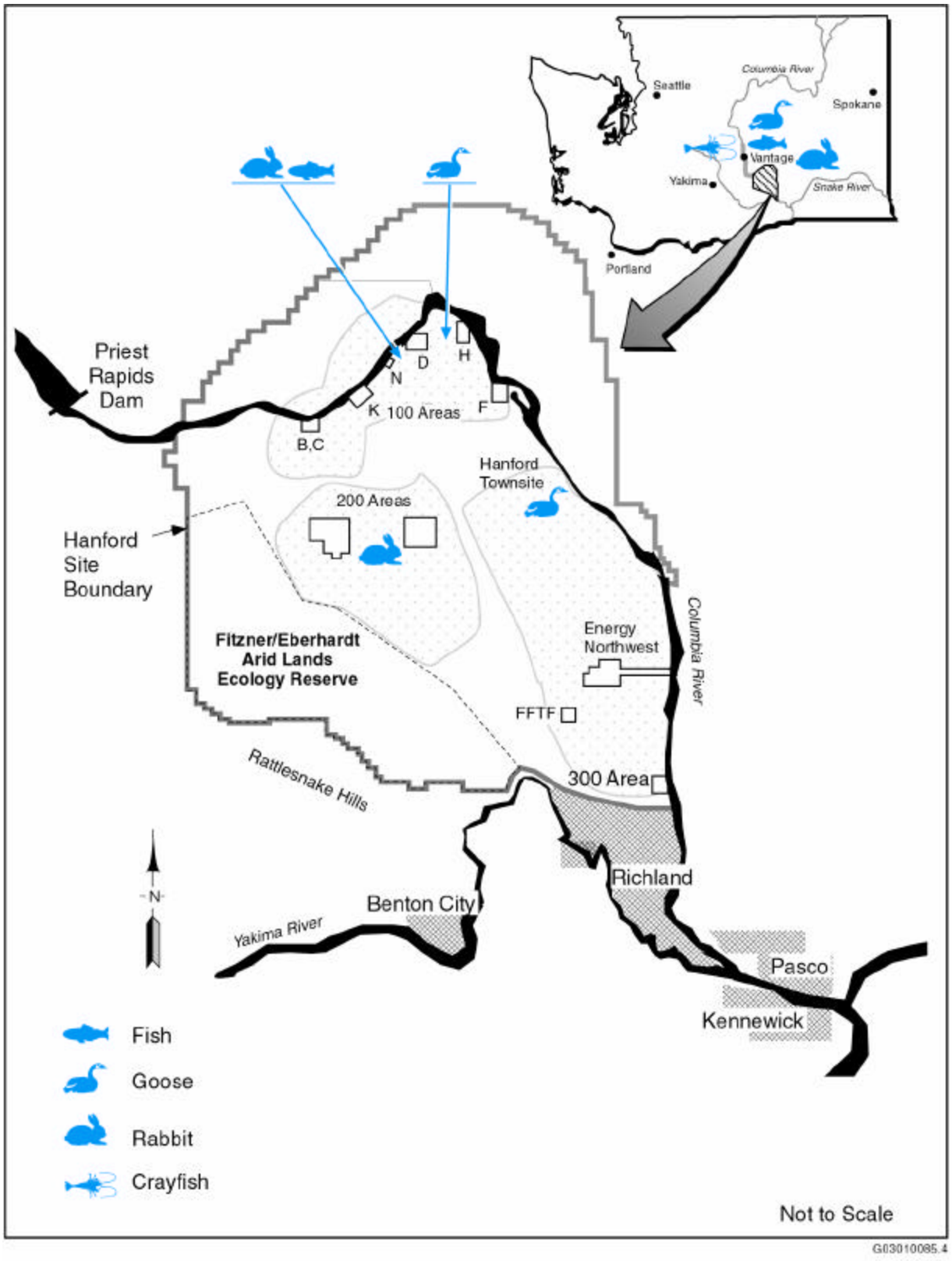

Figure 3.2. 2003 Wildlife Sampling Locations

4.0 SOIL AND VEGETATION

4.1 SOIL

Location	Frequency[a]	Collection Period	Analyses
100 K Area	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
NE of 100 N Area	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
E of 100 N Area	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, DOH[b]
100N Shore Above HGP	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
100N Spring Shoreline	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Above 100D Pumphouse	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
100 Area Fire Stat	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
200 ENC	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
E of 200 E	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
200 ESE	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, ^{241}Am, DOH[b]
S of 200 E	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
SW of B/C Cribs	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, ^{241}Am, DOH[b]
E of 200 W Gate	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu , ^{241}Am, DOH[b]
S of 200 W	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, DOH[b]
Rattlesnake Springs	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, DOH[b]
Yakima Barricade	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
400 E	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
SE Side of FFTF	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, DOH[b]
North of 300 Area	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, DOH[b]
South of 300 Area	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, DOH[b]
Hanford Townsite	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Wye Barricade	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Prosser Barricade	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, DOH[b]
ALE Field Lab	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
N End Vernita Bridge	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Wahluke Slope	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Berg Ranch	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Ringold Area	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
W End of Fir Road	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Taylor Flats No. 2	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Sagemoor Farm	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, ^{241}Am
Byers Landing	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Riverview-Harris	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Benton City	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, DOH[b]
Sunnyside	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, ^{241}Am
McNary Dam	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Walla Walla	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Washtucna	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Toppenish	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu

(a) Samples are collected once every 3 to 5 years and will be collected in 2004.
(b) Cosample provided to the Washington State Department of Health.

4.2 VEGETATION

Location	Frequency[a]	Collection Period	Analyses
100 K Area	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
NE of 100 N Area	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
E of 100 N Area	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, DOH[b]
100N Spring Shoreline	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
E of 200 W Gate	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
300 Area Shoreline	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, DOH[b]
Hanford Townsite	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Hanford Twnsite HRM28	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu, DOH[b]
Ringold Area	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Sagemoor Farm	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Byers Landing	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Riverview-Harris	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Sunnyside	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu
Toppenish	3 to 5 yrs	June-Sept	Gamma Scan, ^{90}Sr, U, Pu

(a) Samples are collected once every 3 to 5 years and will be collected in 2004.
(b) Cosample provided to the Washington State Department of Health.

5.0 SEDIMENT

Location[a]	HRM [b]	Frequency	Analyses
Onsite Pond			
West Lake		Q	Gamma Scan, ^{90}Sr, U, ^{99}Tc, Alpha, Beta
River			
McNary Dam			
McNary-OR. Side Near Dam		A	Gamma Scan, ^{90}Sr, U, Pu, ICP-u, Hg-CVAA, SEM/AVS, Hg-CVAF, TOC, DOH[c]
McNary -Wash. Side Near Dam		A	Gamma Scan, ^{90}Sr, U, Pu, ICP-u, Hg-CVAA, SEM/AVS, Hg-CVAF, TOC, DOH[c]
Priest Rapids Dam (PRD)			
PRD-Grant Side Near Dam		A	Gamma Scan, ^{90}Sr, U, Pu, ICP-u, Hg-CVAA, SEM/AVS, Hg-CVAF, TOC, DOH[c]
PRD-Yakima Side Near Dam		A	Gamma Scan, ^{90}Sr, U, Pu, ICP-u, Hg-CVAA, SEM/AVS, Hg-CVAF, TOC, DOH[c]
White Bluffs Slough		A	Gamma Scan, ^{90}Sr, U, Pu, ICP-u, Hg-CVAA, SEM/AVS, Hg-CVAF, TOC
100 F Slough		A	Gamma Scan, ^{90}Sr, U, Pu, ICP-u, Hg-CVAA, SEM/AVS, Hg-CVAF, TOC, DOH[c]
Hanford Slough		A	Gamma Scan, ^{90}Sr, U, Pu, ICP-u, Hg-CVAA, SEM/AVS, Hg-CVAF, TOC
Richland		A	Gamma Scan, ^{90}Sr, U, Pu, ICP-u, Hg-CVAA, SEM/AVS, Hg-CVAF, TOC
Springs			
100-B Spring 38-3	3.8	A	Gamma Scan, ^{90}Sr, U, ICP-u, Hg-CVAA, DOH[c]
100-K Spring 63-1	6.3	A	Gamma Scan, ^{90}Sr, U, ICP-u, Hg-CVAA, DOH[c]
100-H Spring 145-1	14.5	A	Gamma Scan, ^{90}Sr, U, ICP-u, Hg-CVAA, DOH[c]
100-F Spring 207-1	20.7	A	Gamma Scan, ^{90}Sr, U, ICP-u, Hg-CVAA, DOH[c]
Hanford Spr UR 28-2[d]	UR 28.2	A	Gamma Scan, ^{90}Sr, U, ICP-u, Hg-CVAA
Hanford Spr DR 28-2[e]	DR 28.2	A	Gamma Scan, ^{90}Sr, U, ICP-u, Hg-CVAA, DOH[c]
300 Area Spring 42-2	42.2	A	Gamma Scan, ^{90}Sr, U, ICP-u, Hg-CVAA, DOH[c]
300 Area Spr DR 42-2[e]	DR 42.2	A	Gamma Scan, ^{90}Sr, U, ICP-u, Hg-CVAA, DOH[c]

(a) Refer to Figure 5.1, 2003 Sediment Sampling Locations. UR and DR referenced to upriver and downriver.
(b) Hanford River Markers (HRM) are a series of signposts along the Hanford shoreline of the Columbia River that are roughly 1 mile apart. Vernita Bridge is HRM #0 and Ferry Street in Richland is HRM #46. Samples collected between HRMs are assigned a decimal.
(c) Cosample provided to the Washington State Department of Health.
(d) UR - Upriver from noted location.
(e) DR - Downriver from noted location.

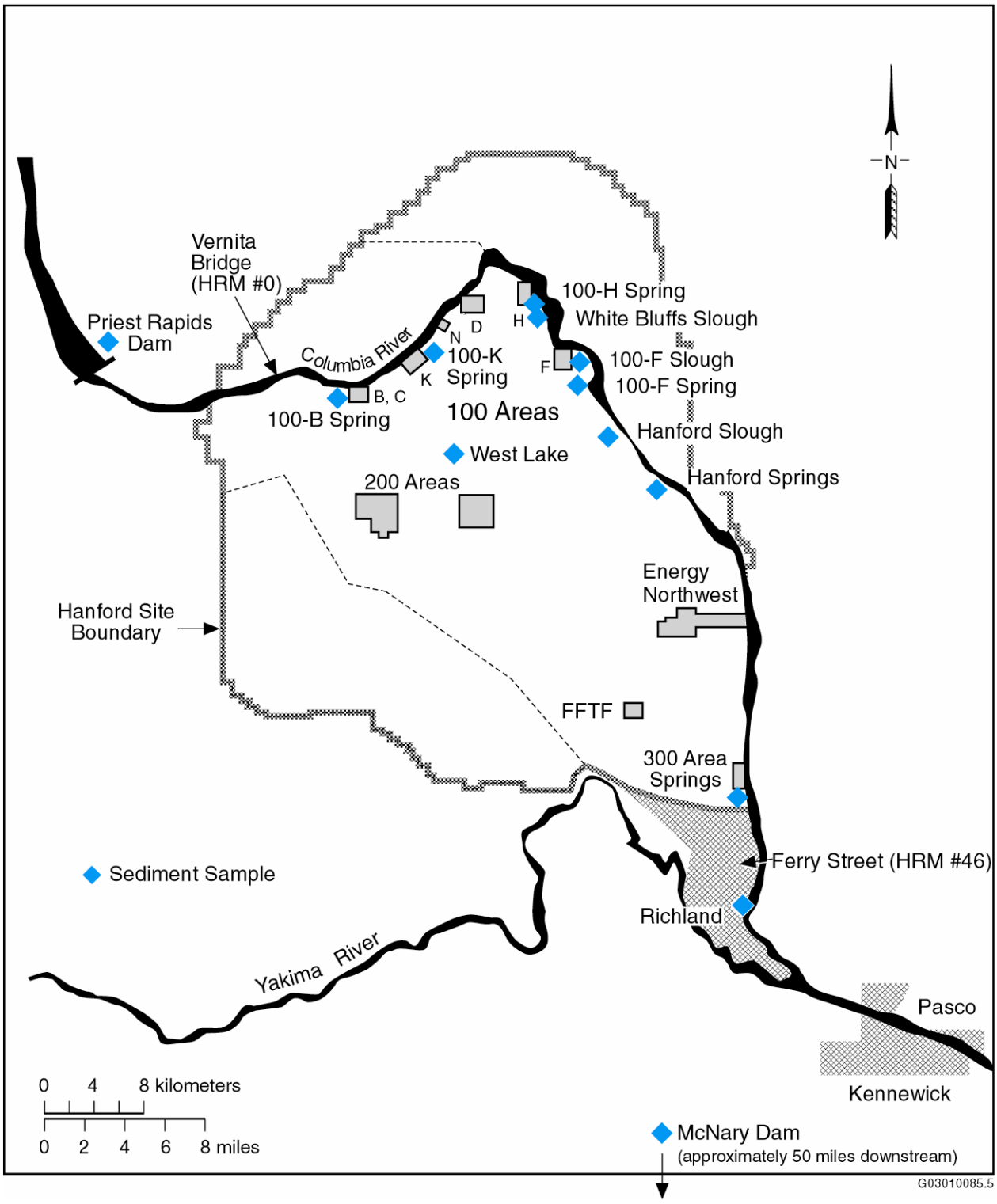

Figure 5.1. Sediment Sampling Locations

6.0 EXTERNAL RADIATION

6.1 THERMOLUMINESCENT DOSIMETERS (TLDS)

6.1.1 Terrestrial Locations

Location	Location Number	Frequency	Measurement	Instrument
Onsite[a]				
100 B Reactor Museum	1	Q	Ambient Dose, DOH[b]	
100 K Area[c]	2	Q	Ambient Dose	
100 D Area[c]	3	Q	Ambient Dose	
100 F Met Tower[c]	4	Q	Ambient Dose	
Hanford Townsite[c]	5	Q	Ambient Dose	
West Lake	6	Q	Ambient Dose	
N of 200 E[c]	7	Q	Ambient Dose, DOH[b]	
B Pond[c]	8	Q	Ambient Dose	
E of 200 E	9	Q	Ambient Dose, DOH[b]	
200 ESE[c]	10	Q	Ambient Dose	
S of 200 E[c]	11	Q	Ambient Dose	
200 Tel. Exchange[c]	12	Q	Ambient Dose	
SW of B/C Cribs[c]	13	Q	Ambient Dose	
200 W SE[c]	14	Q	Ambient Dose	
Army Loop Camp[c]	15	Q	Ambient Dose	
3705 Bldg. 300 Area	16	Q	Ambient Dose	
313 Bldg.	17	Q	Ambient Dose, DOH[b]	
300 Water Intake[c]	18	Q	Ambient Dose	
300 Southwest Gate	19	Q	Ambient Dose	
300 South Gate[c]	20	Q	Ambient Dose	
300 Trench[c]	21	Q	Ambient Dose	
300 NE[c]	22	Q	Ambient Dose	
400 E[c]	23	Q	Ambient Dose	
400 W[c]	24	Q	Ambient Dose	
400 S[c]	25	Q	Ambient Dose	
400 N[c]	26	Q	Ambient Dose	
US Ecology NE Corner	27	Q	Ambient Dose, DOH[b]	
US Ecology SE Corner	28	Q	Ambient Dose, DOH[b]	
US Ecology NW Corner	29	Q	Ambient Dose, DOH[b]	
US Ecology SW Corner	30	Q	Ambient Dose, DOH[b]	
Wye Barricade[c]	31	Q	Ambient Dose, DOH[b]	
WPPSS 1; S of WNP 2	32	Q	Ambient Dose	
LIGO	33	Q	Ambient Dose, DOH[b]	
Perimeter[d]				
Ringold Met Tower[c]	1	Q	Ambient Dose	
W End of Fir Road[c]	2	Q	Ambient Dose, DOH[b]	
Dogwood Met Tower[c]	3	Q	Ambient Dose	
Byers Landing[c]	4	Q	Ambient Dose, DOH[b]	
Battelle Complex[c]	5	Q	Ambient Dose	
WPPSS 4; WPS Warehse	6	Q	Ambient Dose, DOH[b]	
Horn Rapids Substa[c]	7	Q	Ambient Dose, DOH[b]	

6.1.1 Terrestrial Locations (contd)

Location	Location Number	Frequency	Measurement	Instrument
Prosser Barricade[c]	8	Q	Ambient Dose	
Yakima Barricade[c]	9	Q	Ambient Dose, DOH[b]	
Rattlesnake Springs[c]	10	Q	Ambient Dose	
Wahluke Slope[c]	11	Q	Ambient Dose	
Mattawa[c]	12	Q	Ambient Dose	
Community[d]				
Othello[c]	13	Q	Ambient Dose, DOH[b]	
Basin City School[c][e]	14	Q	Ambient Dose	PIC
Edwin Markham School[c][e]	15	Q	Ambient Dose	PIC
Pasco[c]	16	Q	Ambient Dose	
Kennewick-Ely Street[c]	17	Q	Ambient Dose, DOH[b]	
Benton City[c]	18	Q	Ambient Dose	
Distant[d]				
Yakima[c]	19	Q	Ambient Dose, DOH[b]	
Toppenish[c][e]	20	Q	Ambient Dose, DOH[b]	PIC

(a) Refer to Figure 6.1, 2003 Thermoluminescent Dosimeter (TLD) Locations on the Hanford Site.
(b) Washington State Department of Health TLD also at this location.
(c) Collocated with air sampling station.
(d) Refer to Figure 6.2, 2003 Thermoluminescent Dosimeter (TLD) Locations for Perimeter, Community, and Distant Sites.
(e) Community-operated environmental surveillance station.

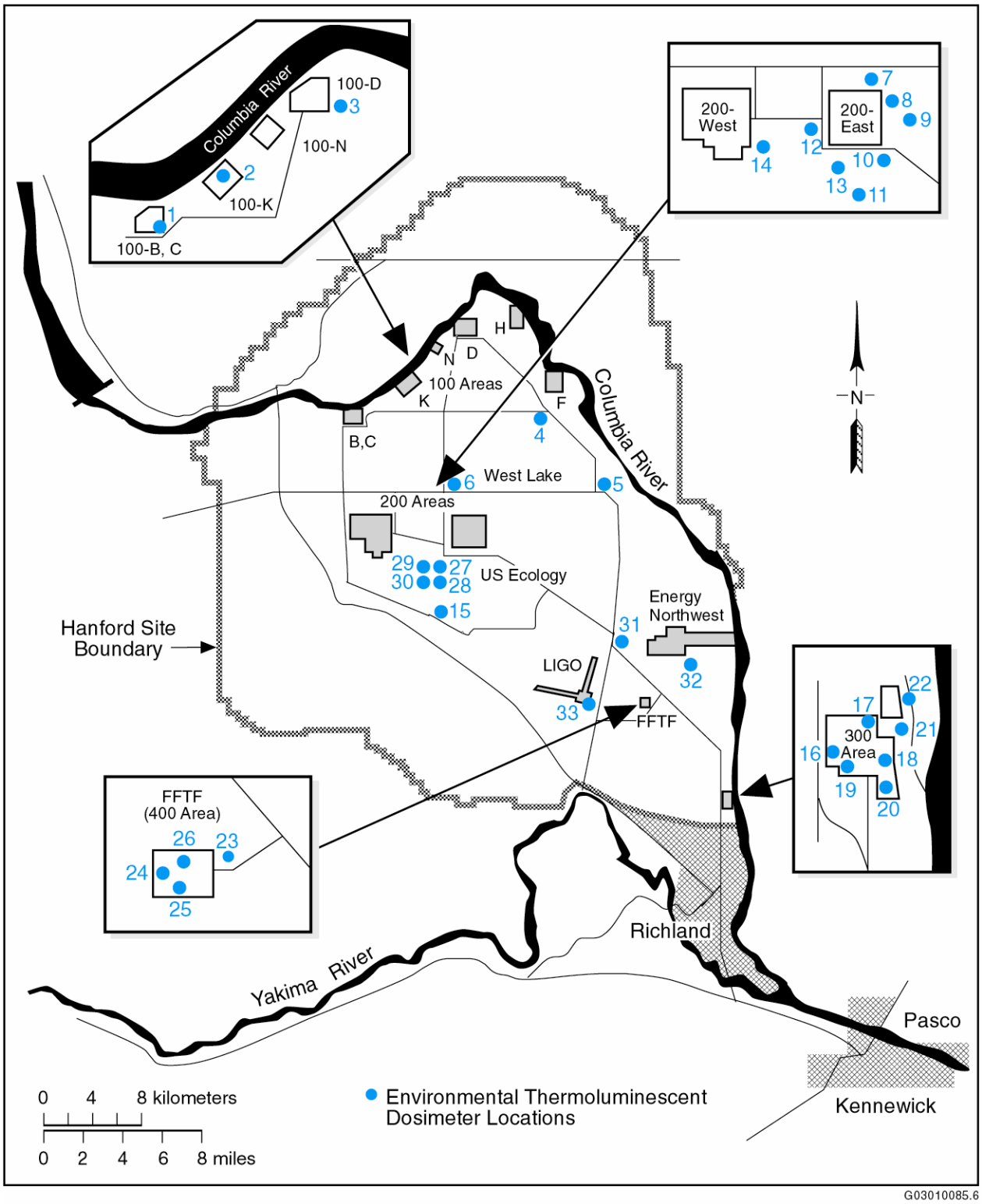

Figure 6.1. 2003 Thermoluminescent Dosimeter (TLD) Locations on the Hanford Site

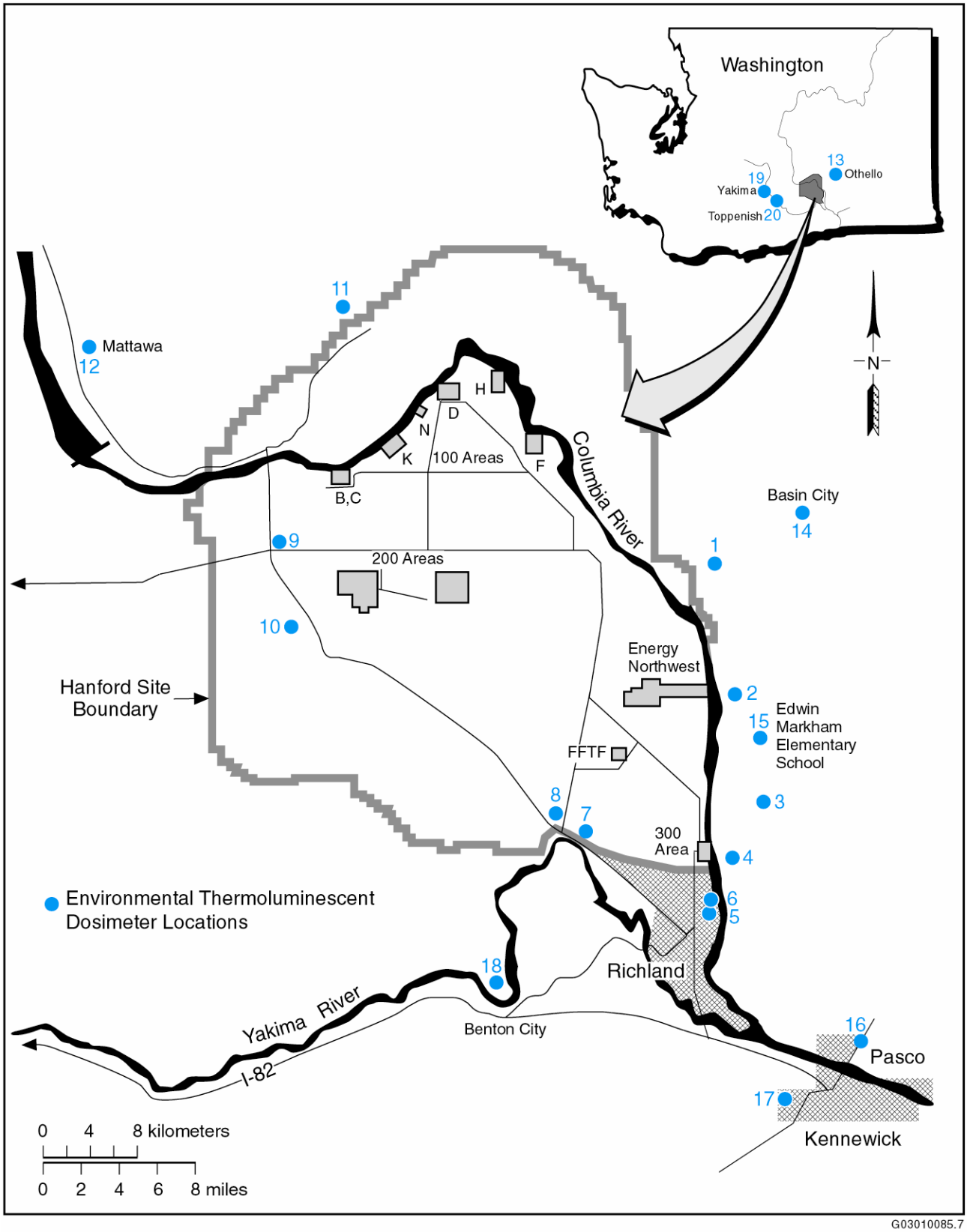

Figure 6.2. 2003 Thermoluminescent Dosimeter (TLD) Locations for Perimeter, Community, and Distant Sites

6.1.2 Columbia River Shoreline Locations

Location[a]	Location Number	Frequency	Measurement	Instrument
S End Vernita Bridge[b]	1	Q	Ambient Dose	
Above 100 B Area	2	Q	Ambient Dose	
Below 100 B Ret Basin	3	Q	Ambient Dose	
Above 1K Boat Ramp	4	Q	Ambient Dose	
Below 100N Outfall	5	Q	Ambient Dose	
Above Tip 100N Berm	6	Q	Ambient Dose	
100 N Trench Spring	7	Q	Ambient Dose	
Below 100 D Area	8	Q	Ambient Dose	
100-D Island	9	Q	Ambient Dose	
100 H Area	10	Q	Ambient Dose	
Lo End Locke Isl	11	Q	Ambient Dose	
White Bluffs Fy Lnd.	12	Q	Ambient Dose	
White Bluffs Slough	13	Q	Ambient Dose	
Below 100 F	14	Q	Ambient Dose	
100 F Floodplain	15	Q	Ambient Dose	
Hanford Slough	16	Q	Ambient Dose	
Hanf Powerline Xing	17	Q	Ambient Dose	
Hanford RR Track	18	Q	Ambient Dose	
Savage Isl Slough	19	Q	Ambient Dose	
Ringold Island	20	Q	Ambient Dose	
Powerline Crossing	21	Q	Ambient Dose	
S End Wooded Island	22	Q	Ambient Dose	
Islnd Above 300 Area	23	Q	Ambient Dose	
Island Near 300 Area	24	Q	Ambient Dose	
Port of Benton-River	25	Q	Ambient Dose	
N. Richland	26	Q	Ambient Dose	PIC[c]
Isl DS Bateman Isl	27	Q	Ambient Dose	

(a) Refer to Figure 6.3, 2003 Thermoluminescent Dosimeter (TLD) Locations on the Hanford Reach of the Columbia River.
(b) Collocated with air sampling station.
(c) PIC located at Leslie Groves-Rchlnd air sampling station.

6.2 COLUMBIA RIVER SHORELINE RADIATION SURVEYS

Location[a]	Location Number	Frequency	Measurement	Instrument
S End Vernita Bridge	1	Q	Exposure, Surface contamination	BICRON, GM
Above 1K Boat Ramp	4	Q	Exposure, Surface contamination	BICRON, GM
Below 100N Outfall	5	Q	Exposure, Surface contamination	BICRON, GM
Above Tip 100N Berm	6	Q	Exposure, Surface contamination	BICRON, GM
100 N Trench Spring	7	Q	Exposure, Surface contamination	BICRON, GM
100-D Island	9	Q	Exposure, Surface contamination	BICRON, GM
Lo End Locke Isl	11	Q	Exposure, Surface contamination	BICRON, GM
White Bluffs Fy Lnd.	12	Q	Exposure, Surface contamination	BICRON, GM
Below 100 F	14	Q	Exposure, Surface contamination	BICRON, GM
Hanf Powerline Xing	17	Q	Exposure, Surface contamination	BICRON, GM
Hanford RR Track	18	Q	Exposure, Surface contamination	BICRON, GM
Ringold Island	20	Q	Exposure, Surface contamination	BICRON, GM
Powerline Crossing	21	Q	Exposure, Surface contamination	BICRON, GM
Islnd Above 300 Area	23	Q	Exposure, Surface contamination	BICRON, GM

(a) Refer to Figure 6.3, 2003 Thermoluminescent Dosimeter (TLD) Locations on the Hanford Reach of the Columbia River.

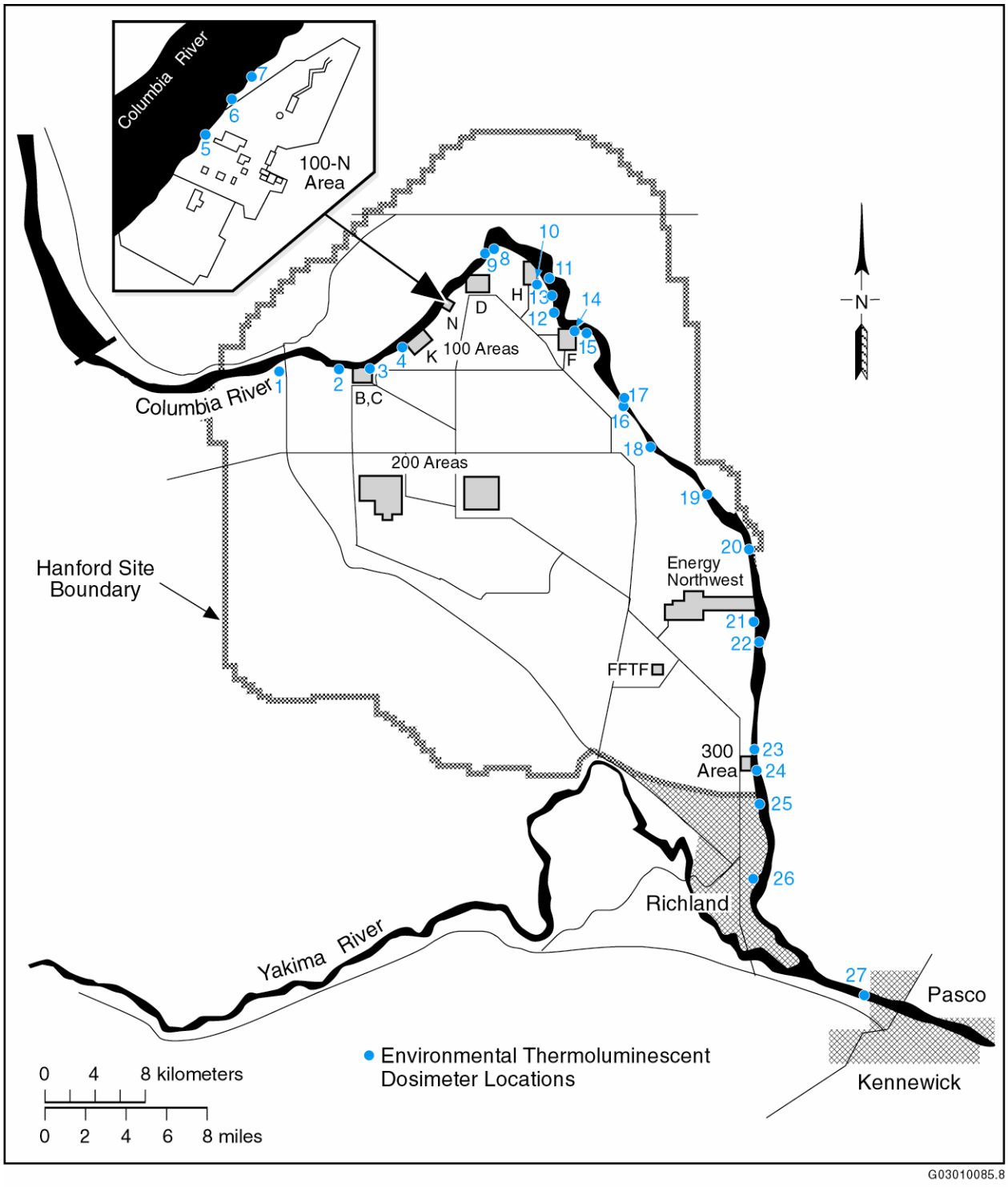

Figure 6.3. 2003 Thermoluminescent Dosimeter (TLD) Locations on the Hanford Reach of the Columbia River

7.0 HORSESHOE LANDFILL SAMPLING

7.1 SOIL

Location[(a)]	Sample Type[(b)]	Number of Samples	Frequency	Collection Period	Analyses
Horseshoe Landfill	Soil	7	A (2003)	May - June	DDT, DDE, DDD
Snively Springs	Soil	1	A (2003)	May - June	DDT, DDE, DDD

(a) Refer to Figure 7.1, 2003 Horseshoe Landfill Sampling Locations.
(b) Ecological assessment monitoring.

7.2 BIOTA

Location[(a)]	Sample Type[(b)]	Number of Samples	Frequency	Collection Period	Analyses
Horseshoe Landfill	Vegetation	6	A (2003)	May - Aug	DDT, DDE, DDD
	Beetle Whole Org	3	A (2003)	May - Aug	DDT, DDE, DDD
	Mouse Brain	3	A (2003)	May - Aug	DDT, DDE, DDD
	Bird Brain	2	A (2003)	May - Aug	DDT, DDE, DDD
Snively Springs	Vegetation	1	A (2003)	May - Aug	DDT, DDE, DDD
	Beetle Whole Org	1	A (2003)	May - Aug	DDT, DDE, DDD
	Mouse Brain	1	A (2003)	May - Aug	DDT, DDE, DDD
	Bird Brain	2	A (2003)	May - Aug	DDT, DDE, DDD

(a) Refer to Figure 7.1, 2003 Horseshoe Landfill Sampling Locations.
(b) Ecological assessment monitoring.

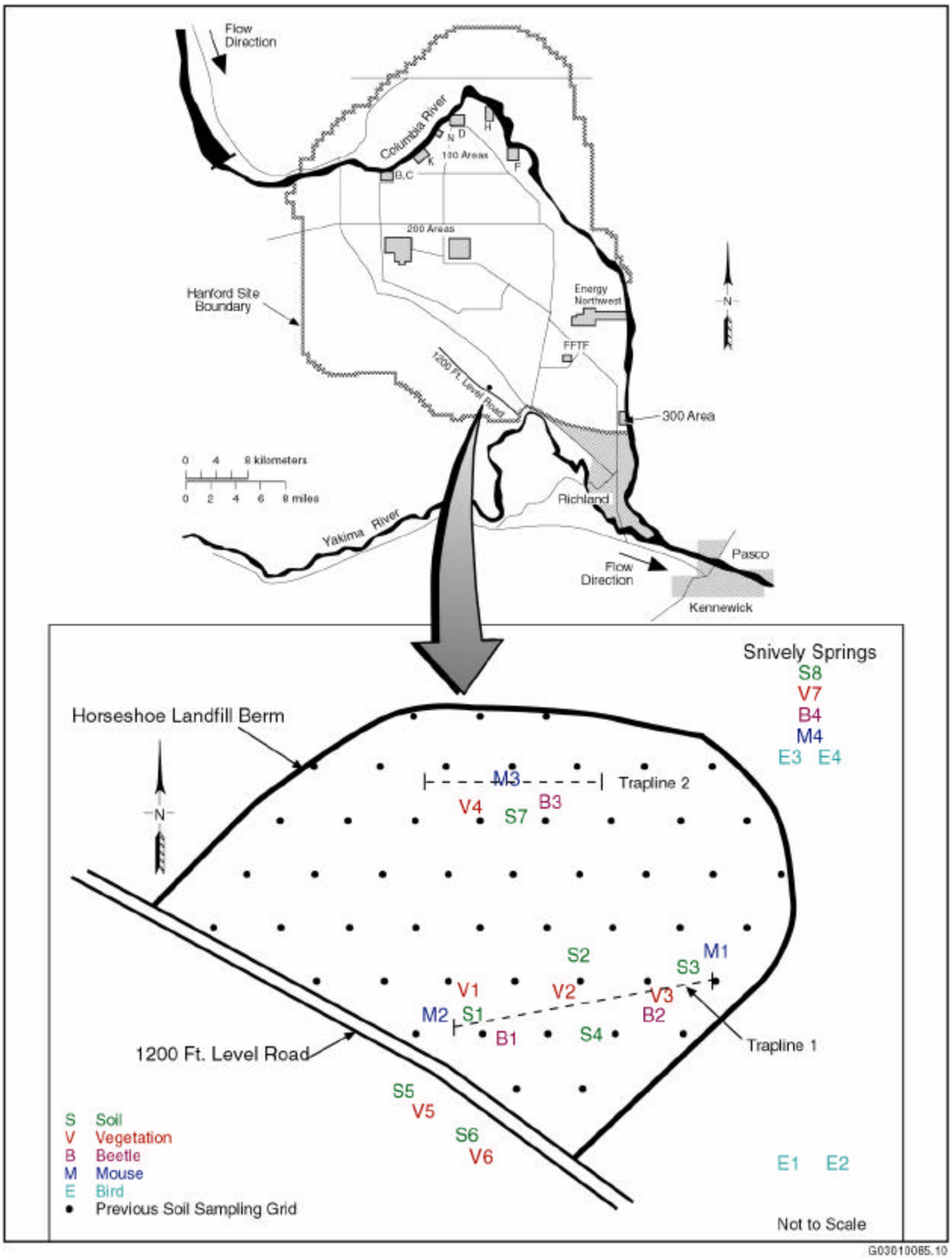

Figure 7.1. 2003 Horseshoe Landfill Sampling Locations

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