
**Pacific Northwest
National Laboratory**

Operated by Battelle for the
U.S. Department of Energy

Hanford Site Environmental Surveillance Master Sampling Schedule for Calendar Year 2007

L. E. Bisping

January 2007



Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

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Pacific Northwest National Laboratory
Richland, Washington

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 environmental surveillance sampling design is described in the Hanford Site *Environmental Monitoring Plan, United States Department of Energy, Richland Operations Office* (DOE/RL-91-50).

This document contains the calendar year 2007 schedule for the routine collection of samples for the Surface Environmental Surveillance Project (SESP) and Drinking Water Monitoring Project (DWMP). Each section includes sampling locations, sampling frequencies, sample types, and analyses to be performed. In some cases, samples are scheduled on a rotating basis and may not be collected in 2007 in which case the anticipated year for collection is provided. Maps showing approximate sampling locations are included for media scheduled for collection in 2007.

SESP Sampling

The SESP is a multimedia environmental surveillance effort to measure the concentrations of radionuclides and chemicals in environmental media for purposes of demonstrating compliance with applicable environmental quality standards and public exposure limits and assess environmental impacts. Project personnel annually collect selected samples of air, surface water, agricultural products, fish, wildlife, and sediments. Soil and natural vegetation samples are collected approximately every 5 years. Particulate matter mass concentrations in air are also routinely measured. Analytical capabilities include the measurement of radionuclides at very low environmental concentrations and, in selected media, nonradiological chemicals including metals, anions, volatile organic compounds, and total organic carbon.

(a) The Pacific Northwest National Laboratory is operated by Battelle Memorial Institute for the U.S. Department of Energy under Contract DE-AC05-76RL01830.

Drinking Water Monitoring Project Sampling

Fluor Hanford, Inc. (FH) is responsible for monitoring the quality of drinking water supplied by the DOE to its onsite facilities in accordance with federal and state regulations. The PNNL conducts radiological monitoring of onsite drinking water for FH concurrent with SESP activities to promote sampling efficiency and consistency, utilize expertise developed over the years, and reduce costs associated with management, sample collection, 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 (HEIS 1989), the majority of the location names in this document are the location names used in the database.

Schedule 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.

Multi-Agency Samples

By joint agreement, some samples are collected by SESP personnel and provided to the Washington State Department of Health (DOH) and the U.S. Food and Drug Administration (FDA). All planned cooperative sampling efforts are indicated in this schedule.

Additional Information

Questions relating to the content of this document can be directed to T. M. (Ted) Poston, Manager, SESP, (509) 376-5678 or R. W. (Bill) Hanf, Manager, DWMP, (509) 376-8264.

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Abbreviations

Frequency Symbols Used

A	annually
BE	biennially (every 2 years)
BW	biweekly (every 2 weeks)
M	monthly
M Comp.	monthly composite
Q	quarterly
Q Comp.	quarterly composite
SA	semiannually (twice each year)
TE	triennially (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
Gamma Scan	analysis of photon energy spectrum for individual photon-emitting radionuclides
HTO	tritiated water ($^3\text{H}^1\text{H}^{16}\text{O}$)
Hg-CVAA	mercury by cold vapor atomic absorbance spectrometry
Hg-CVAF	total mercury in water by cold vapor atomic fluorescence
ICP-MS	major metals by inductively coupled plasma mass spectrometry – samples unfiltered unless otherwise noted
Lo ^3H	analytical procedure includes electrolytic enrichment
PM ₁₀ & PM _{2.5}	particulates having an aerodynamic diameter less than 10 and 2.5 micrometers respectively. Note that a PM ₁₀ sample includes PM _{2.5} particulates
Pu	isotopic plutonium (^{238}Pu , $^{239/240}\text{Pu}$)
TOC	total organic carbon
U	isotopic uranium (^{234}U , ^{235}U , ^{238}U)
VOA	volatile organic compounds

1.0 Air Surveillance

1.1 Particulate Filter

Location	Individual Samples			Composited Samples		
	Location Number ^(a)	Frequency	Analyses	Composite Group	Frequency	Analyses
<u>Onsite</u>						
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			
Gable Mountain	6	BW	Beta, Alpha	Gable Mountain	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	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	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	300 Trench	Q	⁹⁰ Sr, Pu, U, Gamma Scan
300 NE	18	BW	Beta, Alpha	300 NE	Q	⁹⁰ Sr, Pu, U, Gamma Scan
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
<u>Perimeter</u>						
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 Particulate Filter (contd)

Location	Individual Samples			Composited Samples		
	Location Number ^(a)	Frequency	Analyses	Composite Group	Frequency	Analyses
<u>Perimeter</u>						
Dogwood Met Tower	26	BW	Beta, Alpha	Dogwood Met Tower	Q	⁹⁰ Sr, 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 Prosser Barricade ^(b)	29 30	BW BW	Beta, Alpha } Beta, Alpha }	Prosser Barricade	Q	⁹⁰ Sr, Pu, U, Gamma Scan
Yakima Barricade ^(b) Rattlesnake Springs	31 32	BW BW	Beta, Alpha } Beta, Alpha }	Yakima Barricade	Q	⁹⁰ Sr, Pu, Gamma Scan
Wahluke Slope S End Vernita Bridge	33 34	BW BW	Beta, Alpha } Beta, Alpha }	Wahluke Slope	Q	⁹⁰ Sr, Pu, Gamma Scan
<u>Community</u>						
Basin City School	35	BW	Beta, Alpha	Basin City School	Q	⁹⁰ Sr, Pu, U, Gamma Scan
Leslie Groves-Rchlnd	36	BW	Beta, Alpha	Leslie Groves-Rchlnd	Q	⁹⁰ Sr, Pu, U, Gamma Scan
Pasco Kennewick-Ely Street	37 38	BW BW	Beta Beta, Alpha }	Tri Cities	Q	⁹⁰ Sr, Pu, Gamma Scan
Benton City	39	BW	Beta	Benton City	Q	Gamma Scan
Mattawa	40	BW	Beta	Mattawa	Q	Gamma Scan
Othello	41	BW	Beta	Othello	Q	Gamma Scan
<u>Distant</u>						
Yakima	42	BW	Beta, Alpha	Yakima	Q	⁹⁰ Sr, Pu, U, Gamma Scan

(a) Refer to Figure 1.1, 2007 Air Sampling Locations.

(b) DOH air sampler also at this location.

1.2 Tritium and Iodine

<u>Location</u>	<u>Location Number^(a)</u>	<u>Frequency^(b)</u>	<u>Analysis</u>	<u>Frequency</u>	<u>Analysis^(c)</u>
<u>Onsite</u>					
100 K Area	1	Q Comp.	¹²⁹ I	M	³ H
100 N-1325 Crib	2			M	³ H
200 ESE	7			M	³ H
200 Tel. Exchange	11			M	³ H
300 Water Intake ^(d)	14			M	³ H
300 South Gate ^(e)	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
<u>Perimeter</u>					
Ringold Met Tower	24	Q Comp.	¹²⁹ I	M	³ H
W End of Fir Road	25	Q Comp.	¹²⁹ I	M	³ H
Dogwood Met Tower	26			M	³ H
Byers Landing	27			M	³ H
Battelle Complex ^(d)	28			M	³ H
Prosser Barricade ^(d)	30			M	³ H
Wahluke Slope	33			M	³ H
<u>Community</u>					
Basin City School	35			M	³ H
Leslie Groves-Rchlnd	36			M	³ H
<u>Distant</u>					
Yakima	42	Q Comp.	¹²⁹ I	M	³ H

(a) Refer to Figure 1.1, 2007 Air Sampling Locations.

(b) Samples are collected monthly and composited for quarterly analyses.

(c) As HTO.

(d) DOH air sampler also at this location.

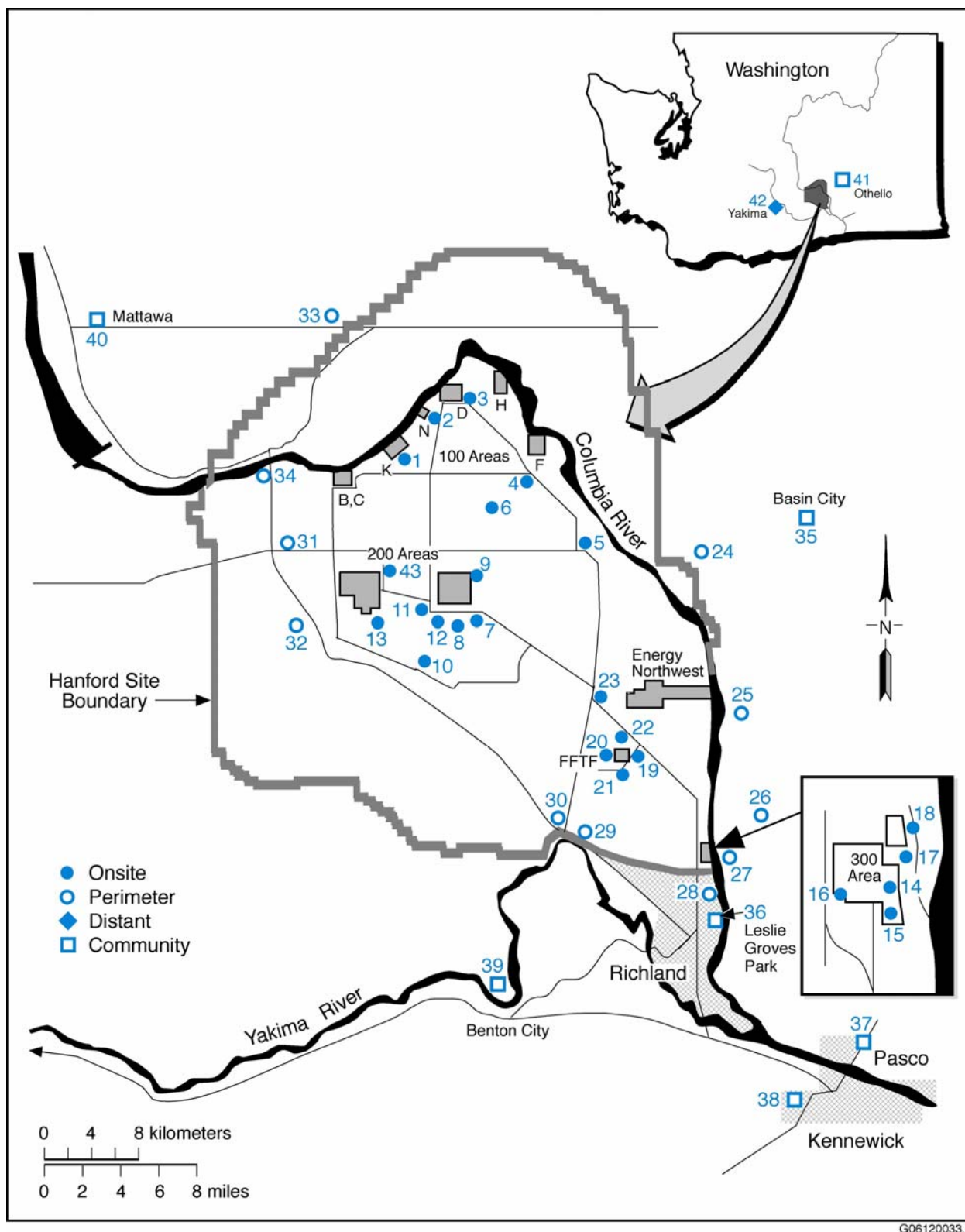
(e) Two tritium samples are collected from this location.

1.3 Particulate Mass

<u>Location</u>	<u>Location Number^(a)</u>	<u>Frequency</u>	<u>Analysis^(b)</u>
Hanford Meteorological Station	43	Hourly	Mass Concentration

(a) Refer to Figure 1.1, 2007 Air Sampling Locations.

(b) Hourly average mass concentration data are collected at the Hanford Meteorological Station for two size fractions, PM₁₀ and PM_{2.5}. These data are not available in the HEIS database but can be obtained from the SESP manager.



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Figure 1.1. 2007 Air Sampling Locations

2.0 Surface Water Surveillance

2.1 Columbia River

Location ^(a)	Sample Type	Frequency	Analyses/Agency
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 ^(f)	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered, VOA
Rich.Pmphs-2 HRM46.4	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered, VOA
Rich.Pmphs-3 HRM46.4	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered, VOA
Rich.Pmphs-5 HRM46.4	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered, VOA
Rich.Pmphs-7 HRM46.4	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered, VOA
Rich.Pmphs-10 HRM46.4	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered, VOA
Rich.Pmphs HRM 43.5	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered/DOH ^(g)
Rich.Pmphs HRM 43.9	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered/DOH ^(g)
Rich.Pmphs HRM 45.0	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered/DOH ^(g)
Rich.Pmphs HRM 45.8	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered/DOH ^(g)
Vernita	Grab	3/Yr	USGS-NASQAN ^(e)
Vernita-1 HRM 0.3	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered, VOA
Vernita-2 HRM 0.3	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered, VOA

2.1 Columbia River (contd)

Location ^(a)	Sample Type	Frequency	Analyses/Agency
Vernita-3 HRM 0.3	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered, VOA
Vernita-4 HRM 0.3	Transect	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, Hg-CVAF, ICP-MS Filtered, VOA
100 N -1 HRM 9.5 ^(h)	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
100 N -2 HRM 9.5	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
100 N -3 HRM 9.5	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
100 N -5 HRM 9.5	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
100 N -7 HRM 9.5	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
100 N -10 HRM 9.5	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
100 N Shore HRM 8.4	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)
100 N Shore HRM 8.9	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)
100 N Shore HRM 9.2	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)
100 N Shore HRM 9.8	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)
Hanfrd TS-1 HRM 28.7	Transect	A	Lo ³ H, ⁹⁰ Sr, ⁹⁹ Tc, U, ICP-MS, ICP-MS Filtered, Anions
Hanfrd TS-2 HRM 28.7	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
Hanfrd TS-3 HRM 28.7	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
Hanfrd TS-5 HRM 28.7	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
Hanfrd TS-7 HRM 28.7	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
Hanfrd TS-10 HRM 28.7	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
Hanfrd Twnsite HRM26	Transect	A	Lo ³ H, ⁹⁰ Sr, ⁹⁹ Tc, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)
Hanfrd Twnsite HRM27	Transect	A	Lo ³ H, ⁹⁰ Sr, ⁹⁹ Tc, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)
Hanfrd Twnsite HRM28	Transect	A	Lo ³ H, ⁹⁰ Sr, ⁹⁹ Tc, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)
Hanfrd Twnsite HRM30	Transect	A	Lo ³ H, ⁹⁰ Sr, ⁹⁹ Tc, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)
300 Area -1 HRM 43.1	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
300 Area -2 HRM 43.1	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
300 Area -3 HRM 43.1	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
300 Area -5 HRM 43.1	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
300 Area -7 HRM 43.1	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
300 Area -10 HRM 43.1	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions
300 Area Shr HRM41.5	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)
300 Area Spring 42-2	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)
300 Area Spr DR 42-2	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)

2.1 Columbia River (contd)

Location ^(a)	Sample Type	Frequency	Analyses/Agency
300 Area Shr HRM42.9	Transect	A	Lo ³ H, ⁹⁰ Sr, U, ICP-MS, ICP-MS Filtered, Anions/DOH ^(g)
300 Area Outfl13	Grab	Q A	Lo ³ H, ⁹⁰ Sr, U, Anions ICP-MS, ICP-MS Filtered

- (a) Refer to Figure 2.1, 2007 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 1.6 kilometer (1 mile) apart. The 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) Additional sample provided to the DOH (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, NH₄-N, NO₃+NO₂, N-Kjeldahl, P, Cr, Fe, and dissolved organic carbon.
- (f) Quality assurance sample submitted for analyses twice per year.
- (g) Additional sample provided to the DOH.
- (h) Quality assurance sample submitted for analyses once per year.

2.2 River Shoreline Springs

Location ^(a)	HRM ^(b)	Sample Type	Frequency	Analyses/Agency
100-B Spring 38-3	3.8	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, ⁹⁹ Tc, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions, VOA
100-B Spring 39-2	3.9	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, ⁹⁹ Tc, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions, VOA
100-K Spring 63-1	6.3	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions, VOA/DOH ^(c)
100-K Spring 77-1	7.6	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions, VOA/DOH ^(c)
100-N Spring 8-13	9.3	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions/DOH ^(c)
100-D Spring 102-1	10.2	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions
100-D Spring 110-1	11.0	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions
100-H Spring 145-1	14.4	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, ⁹⁹ Tc, U, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions
100-H Spring 152-2	15.3	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, ⁹⁹ Tc, U, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions
100-F Spring 207-1	21.3	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, U, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions, VOA

2.2 River Shoreline Springs (contd)

Location ^(a)	HRM ^(b)	Sample Type	Frequency	Analyses/Agency
Hanford Spr UR 28-2 ^(d)	27.8	Grab	A	Alpha, Beta, ³ H, ⁹⁹ Tc, U, ¹²⁹ I, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions
Hanford Spring 28-2	28.1	Grab	A	Alpha, Beta, ³ H, ⁹⁹ Tc, U, ¹²⁹ I, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions
Hanford Spr DR 28-2 ^(e)	28.3	Grab	A	Alpha, Beta, ³ H, ⁹⁹ Tc, U, ¹²⁹ I, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions/DOH ^(c)
300 Area Spring 41-9	41.9	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, U, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions
300 Area Spring 42-2	42.1	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, U, ¹²⁹ I, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions, VOA
300 Area Spr DR 42-2 ^(e)	42.4	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, U, ¹²⁹ I, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions, VOA/DOH ^(c)
300 Area Spring 42-7	42.7	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, U, Gamma Scan, Anions
Richland Spr(SRL 437-1)	43.7	Grab	A	Alpha, Beta, ³ H, ⁹⁰ Sr, U, Gamma Scan, ICP-MS, Hg-CVAF, ICP-MS Filtered, Anions

(a) Refer to Figure 2.1, 2007 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 1.6 kilometer (1 mile) apart. The Vernita Bridge is HRM #0 and Ferry Street in Richland is HRM #46. Samples collected between HRMs are assigned a decimal.

(c) Additional sample provided to the DOH.

(d) UR - Upriver from noted location.

(e) DR - Downriver from noted location.

2.3 Onsite Pond

Location ^(a)	Sample Type	Frequency	Analyses
West Lake	Grab	Q	³ H
FFTF Pond ^(b)	Grab	Q	Alpha, Beta, ³ H, Gamma Scan

(a) Refer to Figure 2.1, 2007 Surface Water and Drinking Water Sampling Locations.

(b) Quality assurance sample submitted for analyses once per year.

2.4 Offsite Irrigation

Location ^(a)	Sample Type	Frequency	Analyses/Agency
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, 2007 Surface Water and Drinking Water Sampling Locations.

(b) Additional sample provided to the DOH.

2.5 Onsite Drinking

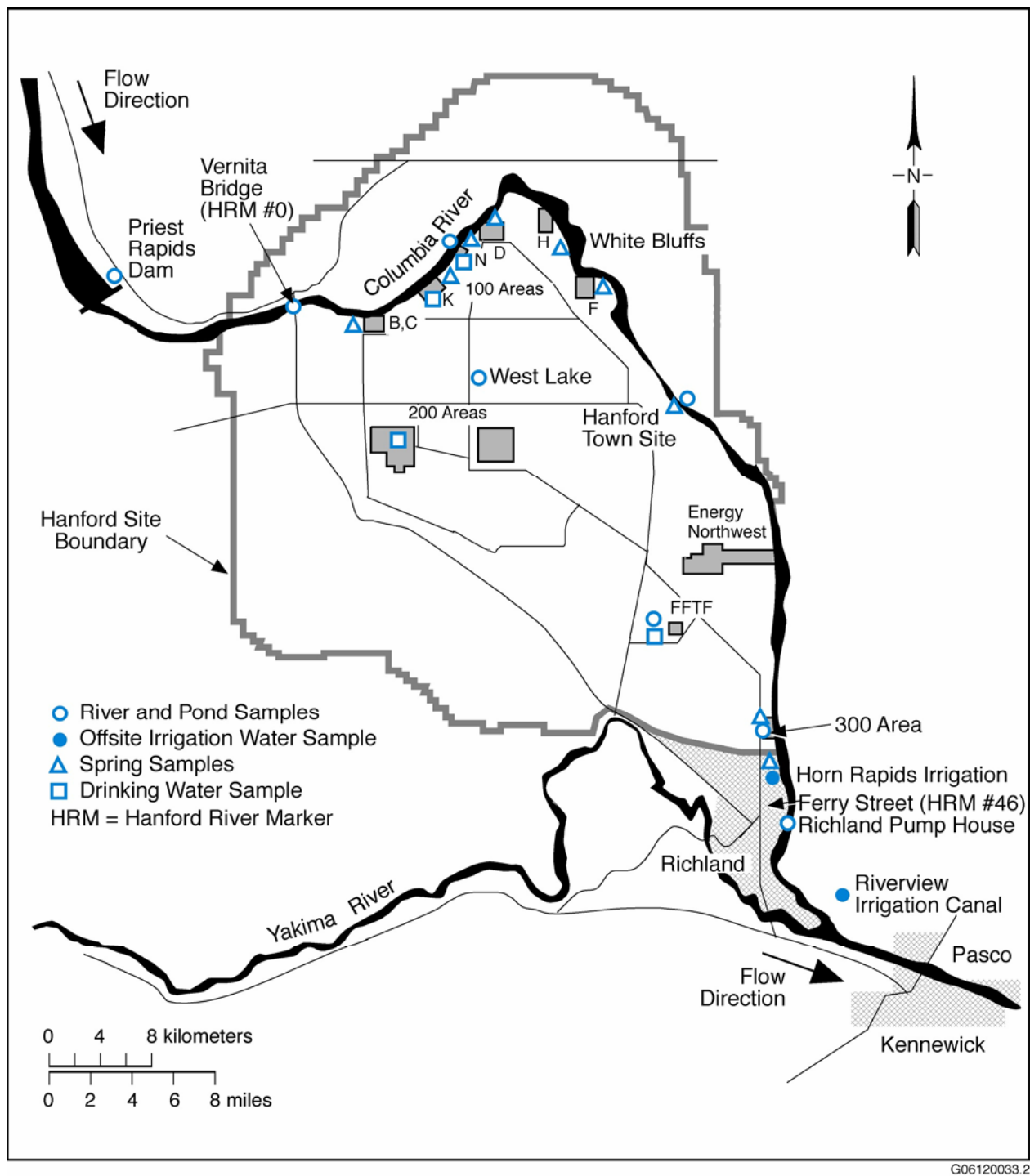
Location ^(a)	Sample Type	Individual Samples		Composited Samples	
		Fre-quency	Analyses/Agency	Composite Group	Fre-quency Analyses
100 N Area	Grab	M ^(b)	}	100 N Area	Q Beta
100 N Area	Grab	Q ^(c)	Alpha }	100 N Area	A ⁹⁰ Sr, ³ H
200 W Area	Grab	M ^(b)	}	200 W Area	Q Beta
200 W Area	Grab	Q ^(c)	Alpha }	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 }	100 K Area	A ⁹⁰ Sr, ³ H
400 Area Well P-14	Grab	M ^(b)	}	400 Area Well P-14	Q Beta
400 Area Well P-14	Grab	Q ^(c)	Alpha }	400 Area Well P-14	A ⁹⁰ Sr, ³ H
400 Area	Grab	M ^(b)	}	400 Area	Q Beta
400 Area	Grab	Q ^(c)	Alpha, ³ H/DOH ^(d) }	400 Area	A ⁹⁰ Sr

(a) Refer to Figure 2.1, 2007 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.

(d) Additional sample provided to the DOH for ³H (January only).



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Figure 2.1. 2007 Surface Water and Drinking Water Sampling Locations

3.0 Biota

3.1 Food and Farm Products

3.1.1 Milk

Location ^(a)	Frequency	Analyses
East Wahluke Area ^(b)	Q SA	Lo ³ H, ⁹⁰ Sr, Gamma Scan ¹²⁹ I
Sage Moor Composite ^(b,c)	Q SA	Lo ³ H, ⁹⁰ Sr, Gamma Scan ¹²⁹ I
Sunnyside Area	Q SA	Lo ³ H, ⁹⁰ Sr, Gamma Scan ¹²⁹ I

(a) Refer to Figure 3.1, 2007 Food and Farm Products Sampling Locations.

(b) Sample composited from multiple dairies in each area.

(c) Quality assurance samples submitted for analyses once per year.

3.1.2 Leafy Vegetables

Location ^(a,b)	Frequency ^(c)	Analyses/Agency
Riverview Area	A	⁹⁰ Sr, Gamma Scan/FDA ^(d)
Sunnyside Area	A	⁹⁰ Sr, Gamma Scan/FDA ^(d)
Sage Moor Area	BE (2007)	⁹⁰ Sr, Gamma Scan/DOH ^(e)
East Wahluke Area	BE (2008)	⁹⁰ Sr, Gamma Scan/DOH ^(e)

(a) Refer to Figure 3.1, 2007 Food and Farm Products Sampling Locations.

(b) Two samples collected for the PNNL within each area, one sample analyzed and one archived.

(c) Samples are collected in 2007 according to their specified frequency unless otherwise noted.

(d) Two additional samples sent to the FDA.

(e) Additional sample provided to the DOH.

3.1.3 Vegetables

Location ^(a,b)	Sample Type	Frequency ^(c)	Analyses/Agency
Riverview Area ^(d)	Potatoes	A	⁹⁰ Sr, Gamma Scan/DOH ^(e)
Sunnyside Area	Potatoes	A	⁹⁰ Sr, Gamma Scan/FDA ^(f)
East Wahluke Area	Potatoes	A	⁹⁰ Sr, Gamma Scan
Horn Rapids Area	Potatoes	BE (2007)	⁹⁰ Sr, Gamma Scan/DOH, ^(e) FDA ^(f)
Sage Moor Area	Potatoes	TE (2009)	⁹⁰ Sr, Gamma Scan/DOH, ^(e) FDA ^(f)

(a) Refer to Figure 3.1, 2007 Food and Farm Products Sampling Locations.

(b) Two samples collected for the PNNL within each area, one sample analyzed and one archived.

(c) Samples are collected in 2007 according to their specified frequency unless otherwise noted.

(d) Other vegetables may be substituted due to availability.

(e) Additional sample provided to the DOH.

(f) Two additional samples sent to the FDA.

3.1.4 Fruits

Location ^(a,b)	Sample Type	Frequency ^(c)	Collection Period	Analyses/Agency
Sage Moor Area	Grapes ^(d)	TE (2007)	September	⁹⁰ Sr, Gamma Scan/DOH ^(e)
	Cherries	TE (2008)	June	⁹⁰ Sr, Gamma Scan/DOH, ^(e) FDA ^(f)
	Apples	TE (2009)	September	⁹⁰ Sr, Gamma Scan/DOH, ^(e) FDA ^(f)
Sunnyside Area	Tomatoes	A	July	⁹⁰ Sr, ³ H, Gamma Scan
	Grapes ^(d)	TE (2007)	September	⁹⁰ Sr, Gamma Scan
	Cherries	TE (2008)	June	⁹⁰ Sr, Gamma Scan
	Apples	TE (2009)	September	⁹⁰ Sr, Gamma Scan/DOH ^(e)
Riverview Area ^(g)	Tomatoes	A	July	⁹⁰ Sr, ³ H, Gamma Scan
	Grapes ^(d)	TE (2007)	September	⁹⁰ Sr, Gamma Scan/DOH, ^(e) FDA ^(f)
	Cherries	TE (2008)	June	⁹⁰ Sr, Gamma Scan
	Apples	TE (2009)	September	⁹⁰ Sr, Gamma Scan/DOH, ^(e) FDA ^(f)
Cold Creek Area	Grapes ^(d)	TE (2007)	September	⁹⁰ Sr, Gamma Scan
Ringold Area	Cherries	TE (2008)	June	⁹⁰ Sr, Gamma Scan/DOH ^(e)
East Waukegan Area	Cherries	TE (2008)	June	⁹⁰ Sr, Gamma Scan
Mattawa Area	Apples	TE (2009)	September	⁹⁰ Sr, Gamma Scan/DOH ^(e)

(a) Refer to Figure 3.1, 2007 Food and Farm Products Sampling Locations.

(b) Two samples collected for the PNNL within each area, one sample analyzed and one archived.

(c) Samples are collected in 2007 according to their specified frequency unless otherwise noted.

(d) Concord grapes preferred; table grapes acceptable if concord grapes are unavailable.

(e) Additional sample provided to the DOH.

(f) Two additional samples sent to the FDA.

(g) Other fruits may be substituted due to availability.

3.1.5 Wines

Location ^(a,b)	Sample Type	Frequency	Collection Period	Analyses/Agency
Columbia Basin	White	BE (2007)	December	Lo ³ H, Gamma Scan/DOH ^(c)
	Red	BE (2007)	December	Lo ³ H, Gamma Scan/DOH ^(c)
Yakima Valley	White	BE (2007)	December	Lo ³ H, Gamma Scan/DOH ^(c)
	Red	BE (2007)	December	Lo ³ H, Gamma Scan/DOH ^(c)
Mattawa Area	White	BE (2007)	December	Lo ³ H, Gamma Scan/DOH ^(c)
	Red	BE (2007)	December	Lo ³ H, Gamma Scan/DOH ^(c)

(a) Refer to Figure 3.1, 2007 Food and Farm Products Sampling Locations.

(b) Two samples of each type collected for the PNNL within each area.

(c) Additional sample provided to the DOH.

3.1.6 Alfalfa

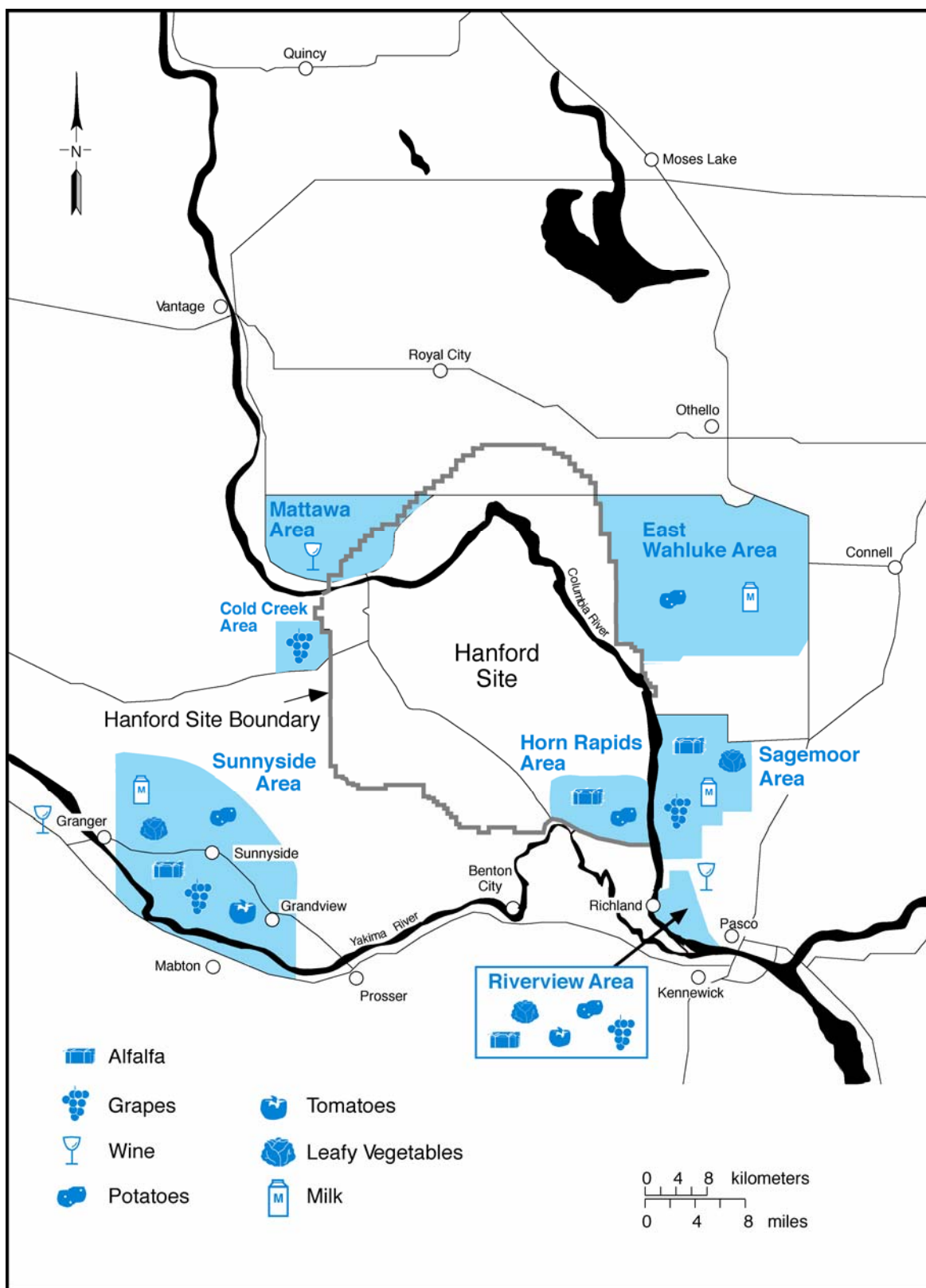
<u>Location^(a,b)</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Collection Period</u>	<u>Analyses/Agency</u>
Sagemoor Area	Alfalfa	BE (2007)	May	⁹⁰ Sr, Gamma Scan
Riverview Area	Alfalfa	BE (2007)	May	⁹⁰ Sr, Gamma Scan/DOH, ^(c) FDA ^(d)
Sunnyside Area	Alfalfa	BE (2007)	May	⁹⁰ Sr, Gamma Scan/FDA ^(d)
Horn Rapids Area	Alfalfa	BE (2007)	May	⁹⁰ Sr, Gamma Scan/DOH ^(c)

(a) Refer to Figure 3.1, 2007 Food and Farm Products Sampling Locations.

(b) Two samples collected for the PNNL within each area, one sample analyzed and one archived.

(c) Additional sample provided to the DOH.

(d) Two additional samples sent to the FDA.



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Figure 3.1. 2007 Food and Farm Products Sampling Locations

3.2 Wildlife

3.2.1 Fish

<u>Location^(a)</u>	<u>Species/Sample</u>	<u>Number of Samples</u>	<u>Frequency^(b)</u>	<u>Collection Period</u>	<u>Analyses/Agency</u>
100-N to 100-D	Whitefish				
	Fillet	5	BE (2007)	November	Gamma Scan/DOH ^(c)
	Carcass	5	BE (2007)	November	⁹⁰ Sr/DOH ^(c)
	Liver ^(d)	5	BE (2007)	November	ICP-MS
	Carp				
	Fillet	5	BE (2008)	April-July	Gamma Scan/DOH ^(c)
	Carcass	5	BE (2008)	April-July	⁹⁰ Sr/DOH ^(c)
	Liver ^(d)	5	BE (2008)	April-July	ICP-MS
Background - Priest Rapids/Wanapum Pools	Whitefish				
	Fillet	5	BE (2007)	November	Gamma Scan
	Carcass	5	BE (2007)	November	⁹⁰ Sr
	Liver ^(d)	5	BE (2007)	November	ICP-MS, Hg-CVAA
300 Area	Carp				
	Fillet	5	BE (2008)	April-July	Gamma Scan, U/DOH ^(c)
	Carcass	5	BE (2008)	April-July	⁹⁰ Sr/DOH ^(c)
	Liver ^(d)	5	BE (2008)	April-July	ICP-MS, Hg-CVAA
	Bass				
	Fillet	5	TE (2008)	April-May	Gamma Scan, U/DOH ^(c)
	Carcass	5	TE (2008)	April-May	⁹⁰ Sr/DOH ^(c)
	Liver ^(d)	5	TE (2008)	April-May	ICP-MS, Hg-CVAA
Background - Desert Aire/Vantage	Carp				
	Fillet	5	BE (2008)	April-July	Gamma Scan, U/DOH ^(c)
	Carcass	5	BE (2008)	April-July	⁹⁰ Sr/DOH ^(c)
	Liver ^(d)	5	BE (2008)	April-July	ICP-MS, Hg-CVAA
	Bass				
	Fillet	5	TE (2008)	April-May	Gamma Scan, U
	Carcass	5	TE (2008)	April-May	⁹⁰ Sr
	Liver ^(d)	5	TE (2008)	April-May	ICP-MS, Hg-CVAA
100 F Slough	Bass				
	Fillet	5	TE (2008)	April-May	Gamma Scan/DOH ^(c)
	Carcass	5	TE (2008)	April-May	⁹⁰ Sr/DOH ^(c)
	Liver ^(d)	5	TE (2008)	April-May	ICP-MS, Hg-CVAA
Hanford Slough	Bass				
	Fillet	5	TE (2008)	April-May	Gamma Scan/DOH ^(c)
	Carcass	5	TE (2008)	April-May	⁹⁰ Sr/DOH ^(c)
	Liver ^(d)	5	TE (2008)	April-May	ICP-MS, Hg-CVAA

(a) Refer to Figure 3.2, 2007 Wildlife Sampling Locations.

(b) Samples are collected in 2007 according to their specified frequency unless otherwise noted.

(c) Additional whole fish sample provided to the DOH.

(d) Ecological assessment sample.

3.2.2 Geese

<u>Location^(a)</u>	<u>Species/Sample</u>	<u>Number of Samples</u>	<u>Frequency</u>	<u>Collection Period</u>	<u>Analyses</u>
100 Areas	Canada Goose				
	Muscle	5	BE (2007)	May-July	Gamma Scan
	Bone	5	BE (2007)	May-July	⁹⁰ Sr
	Liver ^(b)	5	BE (2007)	May-July	ICP-MS, Hg-CVAA
Hanf Townsite to 300 Area	Canada Goose				
	Muscle	5	BE (2007)	May-July	Gamma Scan
	Bone	5	BE (2007)	May-July	⁹⁰ Sr
	Liver ^(b)	5	BE (2007)	May-July	ICP-MS, Hg-CVAA
Background - Vantage	Canada Goose				
	Muscle	5	BE (2007)	May-July	Gamma Scan
	Bone	5	BE (2007)	May-July	⁹⁰ Sr
	Liver ^(b)	5	BE (2007)	May-July	ICP-MS, Hg-CVAA

(a) Refer to Figure 3.2, 2007 Wildlife Sampling Locations.

(b) Ecological assessment sample.

3.2.3 Game Birds

<u>Location</u>	<u>Species/Sample^(a)</u>	<u>Number of Samples</u>	<u>Frequency</u>	<u>Collection Period</u>	<u>Analyses/Agency</u>
100-D to 100-H	Pheasant				
	Muscle	4	BE (2008)	September	Gamma Scan
	Bone	4	BE (2008)	September	⁹⁰ Sr
	Liver ^(b)	4	BE (2008)	September	ICP-MS
100-H to 100-F	Pheasant				
	Muscle	6	BE (2008)	September	Gamma Scan/DOH ^(c)
	Bone	6	BE (2008)	September	⁹⁰ Sr/DOH ^(c)
	Liver ^(b)	6	BE (2008)	September	ICP-MS
Background	Pheasant				
	Muscle	5	BE (2008)	September	Gamma Scan/DOH ^(c)
	Bone	5	BE (2008)	September	⁹⁰ Sr/DOH ^(c)
	Liver ^(b)	5	BE (2008)	September	ICP-MS

(a) Pheasant preferred; chukars or quail acceptable if pheasants are unavailable.

(b) Ecological assessment sample.

(c) Additional whole bird sample provided to the DOH.

3.2.4 Rabbits

<u>Location^(a)</u>	<u>Species/Sample</u>	<u>Number of Samples</u>	<u>Frequency</u>	<u>Collection Period</u>	<u>Analyses/Agency</u>
100 N Area	Cottontail				
	Muscle	4	BE (2007)	Jan-Dec	Gamma Scan/DOH ^(b)
	Bone	4	BE (2007)	Jan-Dec	⁹⁰ Sr/DOH ^(b)
	Liver ^(c)	4	BE (2007)	Jan-Dec	ICP-MS
200 E Area	Cottontail				
	Muscle	4	BE (2007)	Jan-Dec	Gamma Scan/DOH ^(b)
	Bone	4	BE (2007)	Jan-Dec	⁹⁰ Sr/DOH ^(b)
	Liver ^(c)	4	BE (2007)	Jan-Dec	Pu, ICP-MS
200 West	Cottontail				
	Muscle	4	BE (2007)	Jan-Dec	Gamma Scan/DOH ^(b)
	Bone	4	BE (2007)	Jan-Dec	⁹⁰ Sr/DOH ^(b)
	Liver ^(c)	4	BE (2007)	Jan-Dec	Pu, ICP-MS
Background	Cottontail				
	Muscle	5	BE (2007)	Jan-Dec	Gamma Scan
	Bone	5	BE (2007)	Jan-Dec	⁹⁰ Sr
	Liver ^(c)	5	BE (2007)	Jan-Dec	Pu, ICP-MS

(a) Refer to Figure 3.2, 2007 Wildlife Sampling Locations.

(b) Additional whole rabbit sample provided to the DOH.

(c) Ecological assessment sample.

3.2.5 Deer/Elk

<u>Location</u>	<u>Species/Sample</u>	<u>Number of Samples</u>	<u>Frequency</u>	<u>Collection Period</u>	<u>Analyses/Agency</u>
100 N Area	Mule Deer				
	Muscle	2	BE (2008)	Nov-Dec	Gamma Scan/DOH ^(a)
	Bone	2	BE (2008)	Nov-Dec	⁹⁰ Sr/DOH ^(a)
	Liver ^(b)	2	BE (2008)	Nov-Dec	ICP-MS
200 Areas	Mule Deer				
	Muscle	2	BE (2008)	Nov-Dec	Gamma Scan
	Bone	2	BE (2008)	Nov-Dec	⁹⁰ Sr
	Liver ^(b)	2	BE (2008)	Nov-Dec	Pu, ICP-MS
Road Kill at Onsite Locations ^(c)	Mule Deer or Elk				
	Muscle	10	BE (2008)	As Available	Gamma Scan
	Bone	10	BE (2008)	As Available	⁹⁰ Sr
Background ^(d)	Mule Deer				
	Muscle	2	BE (2008)	October	Gamma Scan/DOH ^(a)
	Bone	2	BE (2008)	October	⁹⁰ Sr/DOH ^(a)
	Liver ^(b)	2	BE (2008)	October	Pu, ICP-MS

(a) Additional sample provided to the DOH.

(b) Ecological assessment sample.

(c) As available, according to location.

(d) One background sample obtained from the DOH.

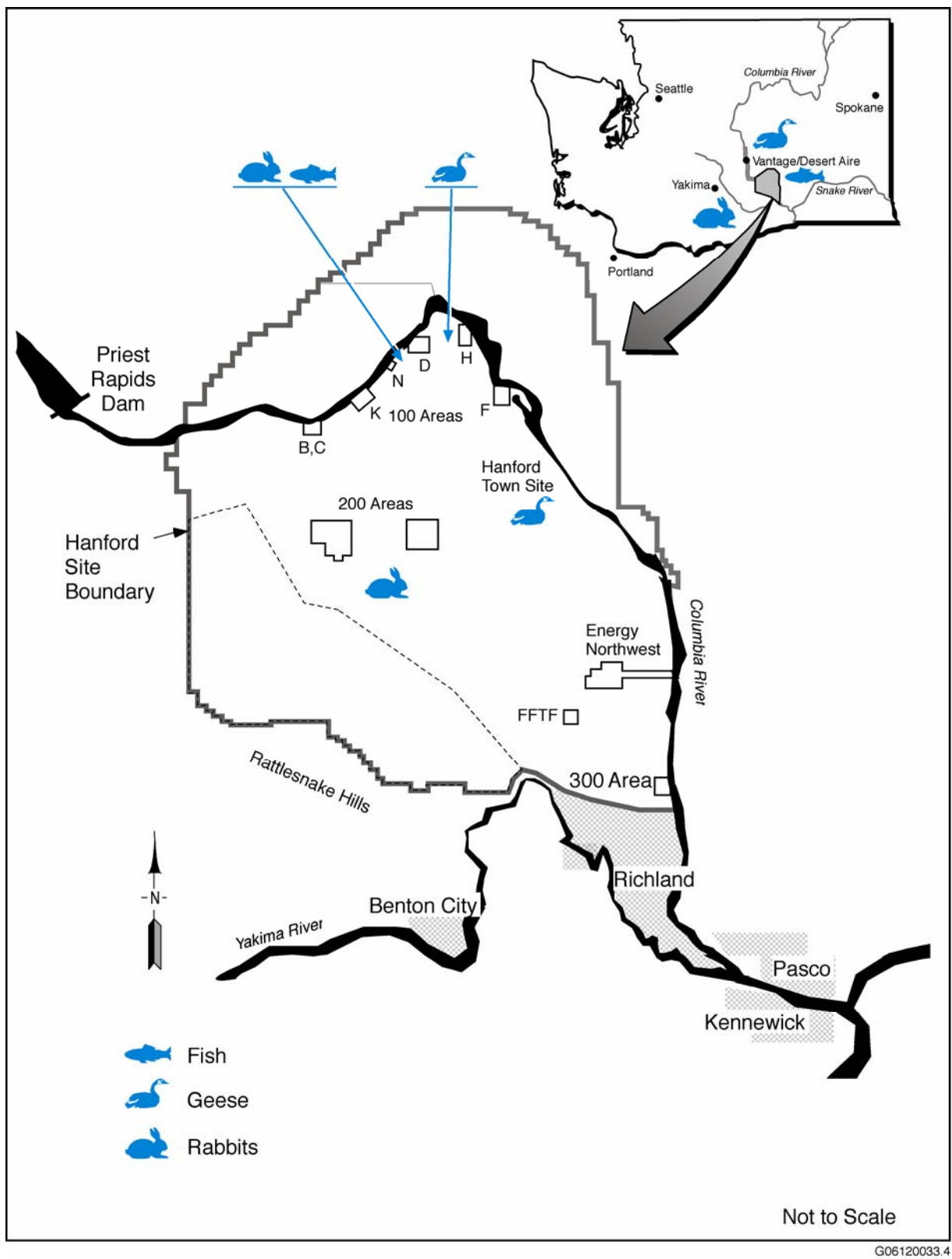


Figure 3.2. 2007 Wildlife Sampling Locations

4.0 Soil and Vegetation

4.1 Soil

Location	Frequency ^(a)	Collection Period	Analyses/Agency
100 K Area	3 to 5 yrs	June-Sept	Gamma Scan, ⁹⁰ Sr, U, Pu/DOH ^(b)
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/DOH ^(b)
200 ESE	3 to 5 yrs	June-Sept	Gamma Scan, ⁹⁰ Sr, U, Pu, ²⁴¹ Am
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 ^(c)	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
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 ^(c)	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
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
George	3 to 5 yrs	June-Sept	Gamma Scan, ⁹⁰ Sr, U, Pu/DOH ^(b)
Othello	3 to 5 yrs	June-Sept	Gamma Scan, ⁹⁰ Sr, U, Pu/DOH ^(b)
Wanapum	3 to 5 yrs	June-Sept	Gamma Scan, ⁹⁰ Sr, U, Pu/DOH ^(b)

(a) Samples are collected once every 3 to 5 years and should be collected in 2009.

(b) Additional sample provided to the DOH.

(c) Quality assurance samples submitted for analyses.

4.2 Vegetation

<u>Location</u>	<u>Frequency^(a)</u>	<u>Collection Period</u>	<u>Analyses/Agency</u>
100 K Area	3 to 5 yrs	June-Sept	Gamma Scan, ⁹⁰ Sr, U, Pu/DOH ^(b)
NE of 100 N Area	3 to 5 yrs	June-Sept	Gamma Scan, ⁹⁰ Sr, U, Pu/DOH ^(b)
E of 100 N Area	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
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
George	3 to 5 yrs	June-Sept	Gamma Scan, ⁹⁰ Sr, U, Pu/DOH ^(b)
Othello	3 to 5 yrs	June-Sept	Gamma Scan, ⁹⁰ Sr, U, Pu/DOH ^(b)
Wanapum	3 to 5 yrs	June-Sept	Gamma Scan, ⁹⁰ Sr, U, Pu/DOH ^(b)

(a) Samples are collected once every 3 to 5 years and should be collected in 2009.

(b) Additional sample provided to the DOH.

5.0 Sediment

5.1 Columbia River

Location ^(a)	Frequency	Analyses/Agency
<u>McNary Dam</u>		
McNary-OR. Side Near Dam	A	Gamma Scan, ⁹⁰ Sr, U, Pu, ICP-MS, Hg-CVAA, TOC/DOH ^(b)
McNary-Wash. Side Near Dam	A	Gamma Scan, ⁹⁰ Sr, U, Pu, ICP-MS, Hg-CVAA, TOC/DOH ^(b)
<u>Priest Rapids Dam (PRD)</u>		
PRD-Grant Side Near Dam	A	Gamma Scan, ⁹⁰ Sr, U, Pu, ICP-MS, Hg-CVAA, TOC/DOH ^(b)
PRD-Yakima Side Near Dam	A	Gamma Scan, ⁹⁰ Sr, U, Pu, ICP-MS, Hg-CVAA, TOC/DOH ^(b)
White Bluffs Slough	A	Gamma Scan, ⁹⁰ Sr, U, Pu, ICP-MS, Hg-CVAA, TOC
100 F Slough	A	Gamma Scan, ⁹⁰ Sr, U, Pu, ICP-MS, Hg-CVAA, TOC/DOH ^(b)
Hanford Slough	A	Gamma Scan, ⁹⁰ Sr, U, Pu, ICP-MS, Hg-CVAA, TOC
Richland	A	Gamma Scan, ⁹⁰ Sr, U, Pu, ICP-MS, Hg-CVAA, TOC

(a) Refer to Figure 5.1, 2007 Sediment Sampling Locations.

(b) Additional sample provided to the DOH.

5.2 River Shoreline Springs

Location ^(a)	HRM ^(b)	Frequency	Analyses/Agency
100-B Spring 38-3	3.8	A	Gamma Scan, ⁹⁰ Sr, U, ICP-MS, Hg-CVAA
100-K Spring 63-1	6.3	A	Gamma Scan, ⁹⁰ Sr, U, ICP-MS, Hg-CVAA/DOH ^(c)
100-H Spring 145-1	14.4	A	Gamma Scan, ⁹⁰ Sr, U, ICP-MS, Hg-CVAA
100-F Spring 207-1	21.3	A	Gamma Scan, ⁹⁰ Sr, U, ICP-MS, Hg-CVAA
Hanford Spr UR 28-2 ^(d)	27.8	A	Gamma Scan, ⁹⁰ Sr, U, ICP-MS, Hg-CVAA
Hanford Spr DR 28-2 ^(e)	28.3	A	Gamma Scan, ⁹⁰ Sr, U, ICP-MS, Hg-CVAA/DOH ^(c)
300 Area Spring 41-9	41.9	A	Gamma Scan, U
300 Area Spring 42-2	42.1	A	Gamma Scan, ⁹⁰ Sr, U, ICP-MS, Hg-CVAA
300 Area Spr DR 42-2 ^(e)	42.4	A	Gamma Scan, ⁹⁰ Sr, U, ICP-MS, Hg-CVAA/DOH ^(c)
300 Area Spring 42-7	42.7	A	Gamma Scan, U
Richland Spr(SRL 437-1)	43.7	A	Gamma Scan, U

(a) Refer to Figure 5.1, 2007 Sediment Sampling Locations.

(b) Hanford River Markers (HRM) are a series of signposts along the Hanford shoreline of the Columbia River that are roughly 1.6 kilometer (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) Additional sample provided to the DOH.

(d) UR - Upriver from noted location.

(e) DR - Downriver from noted location.

5.3 Onsite Pond

<u>Location^(a)</u>	<u>Frequency</u>	<u>Analyses/Agency</u>
West Lake	SA (April & Oct)	Gamma Scan, ⁹⁰ Sr, U, ⁹⁹ Tc, Alpha, Beta/DOH ^(b)

(a) Refer to Figure 5.1, 2007 Sediment Sampling Locations.

(b) Additional sample provided to the DOH (April only).

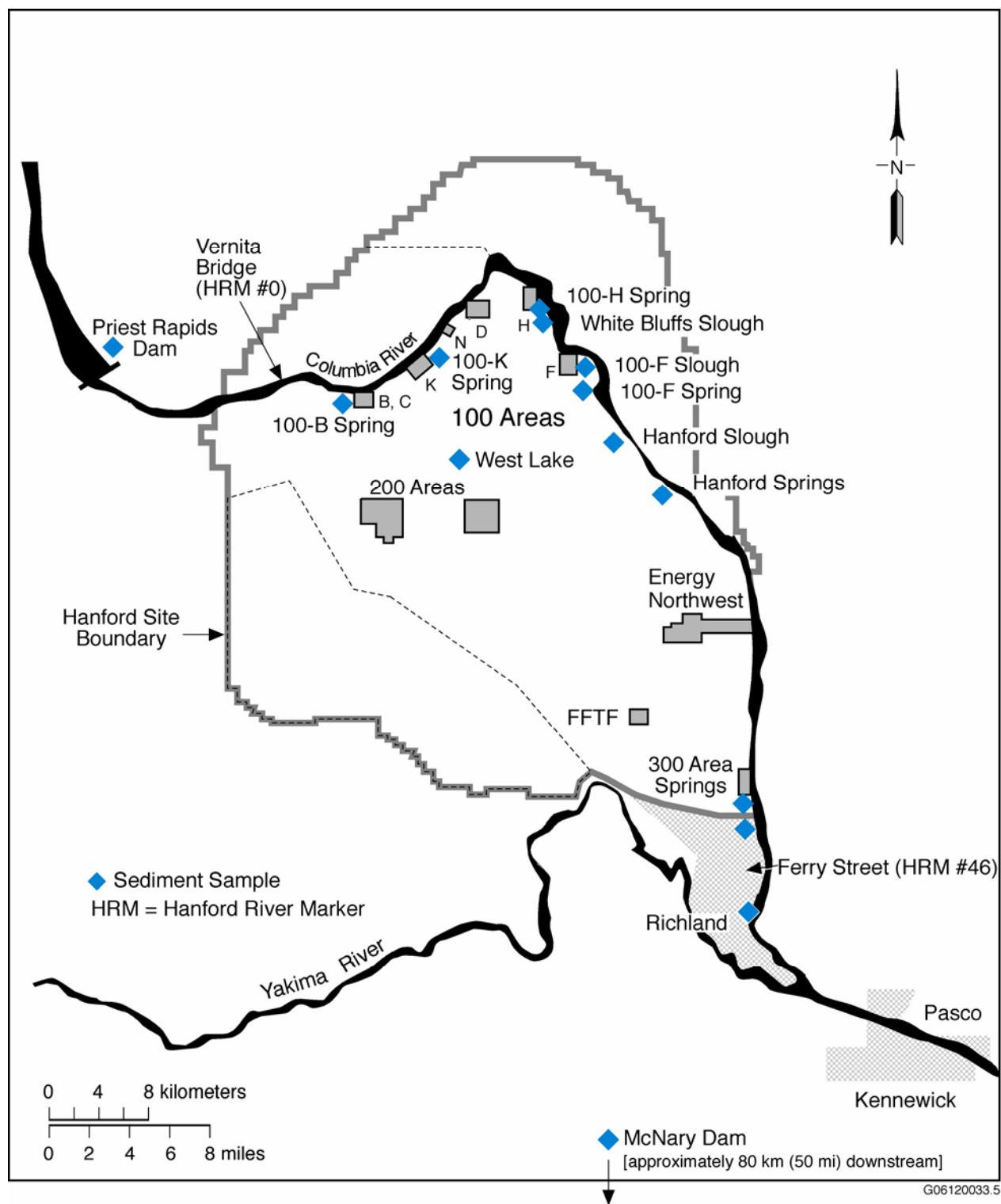


Figure 5.1. 2007 Sediment Sampling Locations

6.0 References

DOE/RL-91-50, Rev. 3. 2000. *Environmental Monitoring Plan, United States Department of Energy, Richland Operations Office*. U.S. Department of Energy, Richland, Washington.

DOE Order 450.1. 2003. "Environmental Protection Program." U.S. Department of Energy, Washington, D.C.

DOE Order 5400.5. 1990. "Radiation Protection of the Public and the Environment." U.S. Department of Energy, Washington, D.C.

HEIS. 1989. *Hanford Environmental Information System*. Environmental Information Systems Department, Fluor Hanford, Inc., Richland, Washington

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