

1.0 Introduction



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This report, published annually since 1958, includes information and summary analytical data that (1) provide an overview of activities at the Hanford Site during calendar year 2003; (2) demonstrate the site's compliance with applicable federal, state, and local environmental laws and regulations, executive orders, and U.S. Department of Energy (DOE) policies and directives; (3) characterize Hanford Site environmental management performance; and (4) highlight significant environmental programs.

Specifically, this report provides a short introduction to the Hanford Site, discusses the site mission, and briefly highlights the site's various environmental-related programs. Included are sections discussing compliance issues, site operations, environmental occurrences, and waste management and chemical inventories. Also included are descriptions of work conducted for the following programs and projects:

- Effluent and Near-Facility Environmental Monitoring Programs.
- Surface Environmental Surveillance Project.
- Groundwater Performance Assessment Project.
- Vadose Zone Monitoring Programs.
- Meteorological and Climatological Services Project.
- Ecosystem Monitoring and Ecological Compliance Project.
- Hanford Cultural Resources Laboratory.
- Other programs and projects.

Readers interested in more detail than that provided in this report should consult the technical documents cited in the text and listed in the reference sections. Descriptions of specific analytical and sampling methods used in the monitoring efforts are contained in the Hanford Site Environmental Monitoring Plan (DOE/RL-91-50).

The appendices of this report contain additional information that is presented to assist the reader in understanding

this report and provide additional details about environmental monitoring. Appendix A contains helpful information about units of measure, scientific notation, unit conversions, and interpreting graphs. Appendix B is a glossary of terms used in this report. Appendix C contains specific monitoring results for calendar year 2003 to supplement the summary information provided in this report. Appendix D contains information about a variety of government standards and permits that are pertinent to Hanford Site operations. Appendix E contains information about radiological dose calculations. Appendix F contains a list of radionuclides detected and measured by gamma spectroscopy. Appendix G contains information about threatened and endangered species, candidate or sensitive animal species, and plant species of concern occurring or potentially occurring on the Hanford Site.

1.0.1 Current Site Mission

For more than 40 years, Hanford Site facilities were dedicated primarily to the production of special nuclear materials for national defense and to the management of the resulting waste. Hanford was the first plutonium production site in the world. In recent years, efforts have focused on the development of new waste treatment and disposal technologies and characterizing and remediating materials and contamination left from historical operations.

Currently, the Hanford Site's primary mission is accelerating the completion of waste cleanup. The report *Performance Management Plan for the Accelerated Cleanup of the Hanford Site* (DOE/RL-2002-47) states that the cleanup mission includes six strategies:

1. Restoring the Columbia River corridor by accelerating cleanup of Hanford Site sources of radiological and chemical contamination that threaten the air, groundwater, or Columbia River. It is expected that most river corridor projects will be completed by 2012.



2. Ending the tank waste program by 2033 by accelerating waste retrieval, increasing the capacity of the Waste Treatment Plant, and starting the process of closing waste tanks.
3. Accelerating the cleanup of Hanford's other urgent risks.
4. Accelerating treatment and disposal of mixed low-level waste, and the retrieval of transuranic waste and its shipment off the site.
5. Accelerating cleanup of excess facilities on the Central Plateau.
6. Accelerating cleanup and protection of groundwater beneath the Hanford Site.

The goal of these strategies is to accelerate the completion of site cleanup, excluding tanks, from 2070 to 2035, and possibly as soon as 2025, and to do so in a cost-effective manner that protects public health and safety and the environment.

1.0.2 Overview of the Hanford Site

The Hanford Site lies within the semi-arid Pasco Basin of the Columbia Plateau in southeastern Washington State (Figure 1.0.1). The site occupies an area of approximately 1,517 square kilometers (586 square miles) located north of the city of Richland (DOE/EIS-0222-F). This area has restricted public access and provides a buffer for areas on the site that were used for production of nuclear materials, waste storage, and waste disposal. The Columbia River flows eastward through the northern part of the site and then turns south, forming part of the eastern site boundary.

The major DOE operational, administrative, and research areas on and around the Hanford Site (Figure 1.0.1) include the following locations:

- **100 Areas** – located along the south and west shores of the Columbia River. These are the sites of nine retired plutonium production reactors. The 100 Areas occupy a total of approximately 11 square kilometers (4 square miles).
- **200-West and 200-East Areas** – centrally located on a plateau. These areas are approximately 8 and 11 kilometers (5 and 7 miles), respectively, south and west of the Columbia River. These areas house

facilities that received and dissolved irradiated fuel and then separated out the plutonium. These facilities were called “separations plants.” The 200-East and 200-West Areas cover a total of approximately 16 square kilometers (6 square miles).

- **300 Area** – located just north of Richland, Washington. From the early 1940s until the advent of the cleanup mission, most research and development activities at the Hanford Site were carried out in the 300 Area. The 300 Area was also the location of nuclear fuel fabrication. This area covers approximately 1.5 square kilometers (0.6 square mile).
- **400 Area** – located northwest of the 300 Area. The 400 Area is the location of the Fast Flux Test Facility, which is scheduled for deactivation and decommissioning during 2004/2005. This nuclear reactor was designed to test various types of nuclear fuel. The 400 Area covers approximately 0.61 square kilometer (0.23 square mile).
- **600 Area** – includes all of the Hanford Site not occupied by the 100, 200, 300, and 400 Areas.
- **Former 1100 Area** – located between the 300 Area and the city of Richland covering an area of 311 hectares (768 acres). On October 1, 1998, this area was transferred to the Port of Benton as a part of DOE's Richland Operations Office economic diversification efforts and is no longer part of the Hanford Site. However, DOE contractors continue to lease facilities in this area.
- **Richland North Area (off the site)** – includes the Environmental Molecular Sciences Laboratory and other DOE and contractor facilities, mostly office buildings, generally located in the northern part of the city of Richland.
- **Volpentest Hazardous Materials Management and Emergency Response Training and Education Center (also called HAMMER)** – a worker safety-training facility located on the site near the city of Richland. It consists of a 32-hectare (80-acre) main site and a 4,000-hectare (10,000-acre) law enforcement and security training site. The facility is owned by the DOE, managed by Fluor Hanford, Inc., and used by site contractors, federal and state agencies, tribal governments, and private industry.

Other site related facilities (office buildings) are located within the Richland, Pasco, and Kennewick (Tri-City) area.



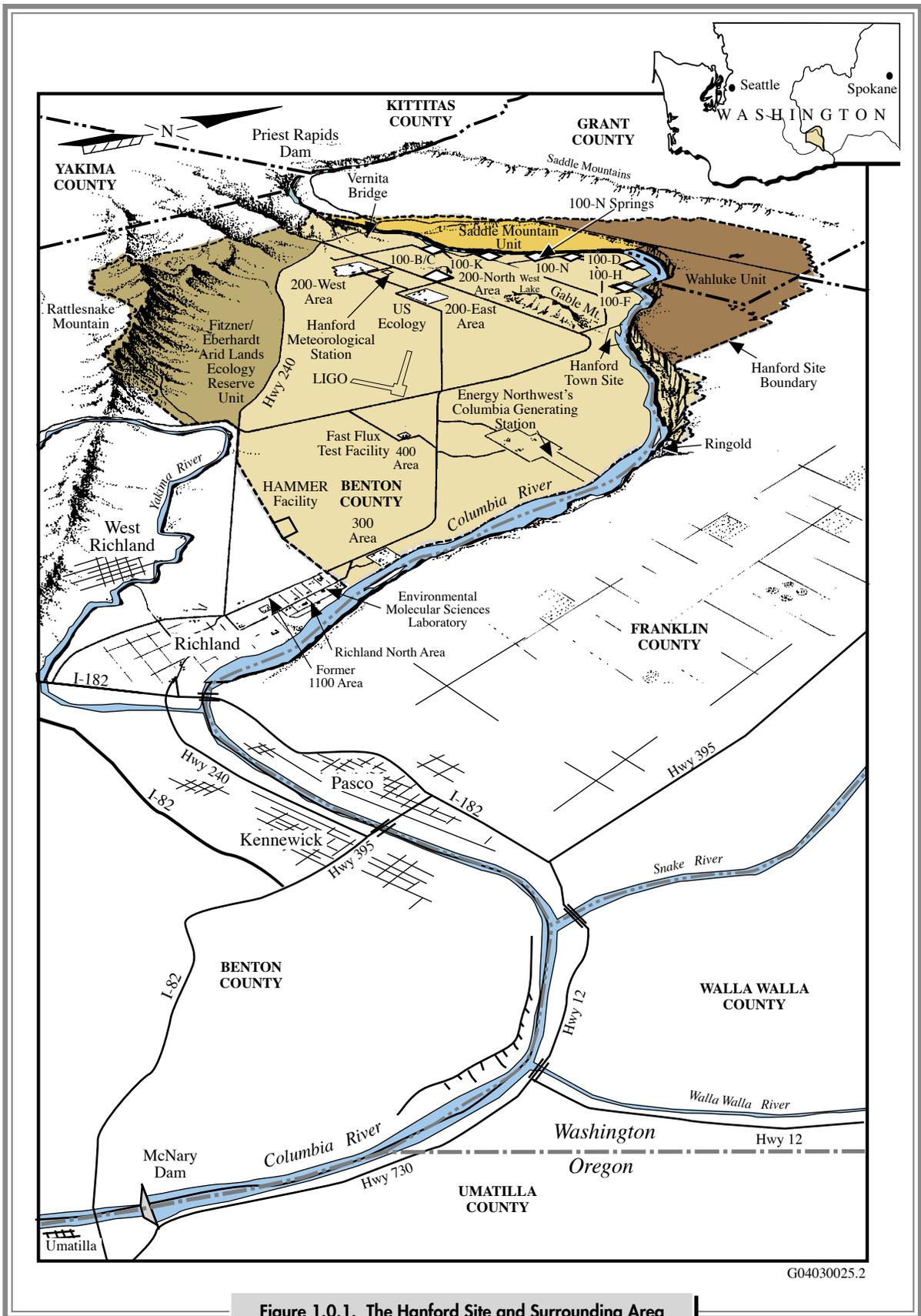


Figure 1.0.1. The Hanford Site and Surrounding Area

The 78,900-hectare (195,000-acre) Hanford Reach National Monument (Figure 1.0.2) was established on the Hanford Site by a Presidential Proclamation in June 2000 (65 FR 114) to protect the nation's only non-impounded stretch of the Columbia River upstream of Bonneville Dam in the United States, and a remnant of a large shrub-steppe ecosystem that once blanketed the Columbia River Basin.

Non-DOE operations and activities on Hanford Site leased land include commercial power production by Energy Northwest at the Columbia Generating Station (4.4 square kilometers [1.6 square miles]) and operation of a commercial low-level radioactive waste burial site by US Ecology, Inc. (0.4 square kilometer [0.2 square mile]). The Laser Interferometer Gravitational Wave Observatory (LIGO) was constructed between 1994 and 1999 and is operated jointly by the California and Massachusetts Institutes of Technology and sponsored by the National Science Foundation. R. H. Smith Distributing operates vehicle-fueling stations in the 200 Areas. Johnson Controls, Inc. operates 42 diesel and natural gas package boilers to produce steam in the 200 and 300 Areas and has compressors supplying compressed air to the site.

Near the city of Richland, immediately adjacent to the southern boundary of the Hanford Site, AREVA (formerly Framatome ANP) operates a commercial nuclear fuel fabrication facility and Pacific EcoSolutions (formerly Allied Technology Group Corporation) operates a low-level radioactive waste decontamination, super compaction, and packaging facility.

1.0.3 Site Management

The DOE Richland Operations Office and DOE Office of River Protection jointly manage the Hanford Site through several contractors and their subcontractors. Each contractor is responsible for safe, environmentally sound, maintenance and management of its activities or facilities; for waste management; and for monitoring any potential effluent to assure environmental compliance. The Pacific Northwest Site Office of the DOE Office of Science oversees Pacific Northwest National Laboratory in support of the DOE's Science and Technology programs, goals, and objectives. Pacific Northwest National Laboratory is a DOE facility operated by Battelle Memorial Institute for the DOE's national security and energy missions. The

core mission is to deliver environmental science and technology in the service of the nation and humanity. The U.S. Fish and Wildlife Service manages portions of the Hanford Reach National Monument.

The DOE Richland Operations Office. The DOE Richland Operations Office serves as landlord of the Hanford Site and manages legacy cleanup, research, and other programs.

During 2003, the principal contractors for the DOE Richland Operations Office, and their respective responsibilities, included the following:

- Bechtel Hanford, Inc. is the environmental restoration contractor for the Hanford Site. Bechtel Hanford, Inc., a subsidiary of Bechtel National, Inc., plans, manages, and executes activities for the cleanup of contaminated soil and inactive nuclear facilities, with a major focus of protecting the Columbia River. Bechtel Hanford, Inc.'s subcontractors in 2003 were CH2M HILL Hanford, Inc. and Eberline Services Hanford, Inc. Washington Closure Company, LLC, was awarded the River Corridor Closure Contract in April 2003. This team of companies consisting of Washington Group International, Inc., Fluor Federal Services, and Earth Tech, LLC, would replace Bechtel Hanford, Inc. and the personnel from Fluor Hanford, Inc. doing 300 Area decontamination and decommissioning work. A protest over the contract award was filed by Bechtel National, Inc. in May 2003 and this halted the transition of work from Bechtel Hanford, Inc. and Fluor Hanford, Inc. to the Washington Closure Company. As of early calendar year 2004, the outcome of the protest remained uncertain and Bechtel Hanford, Inc. and Fluor Hanford Inc. were continuing with the actual cleanup work.
- Fluor Hanford, Inc. is the primary management contractor for Project Hanford. It manages and integrates work to support cleanup of former DOE nuclear production facilities at the site. In 2003, Fluor Hanford, Inc.'s principal subcontractors were Framatome ANP DE&S, Inc.; Duratek Federal Services of Hanford, Inc.; Numatec Hanford Corporation; and Westinghouse Safety Management Solutions. Other subcontractors to Fluor Hanford, Inc. included Day & Zimmerman Protection Technology Hanford, Lockheed Martin Information Technology, and Fluor Government Group.



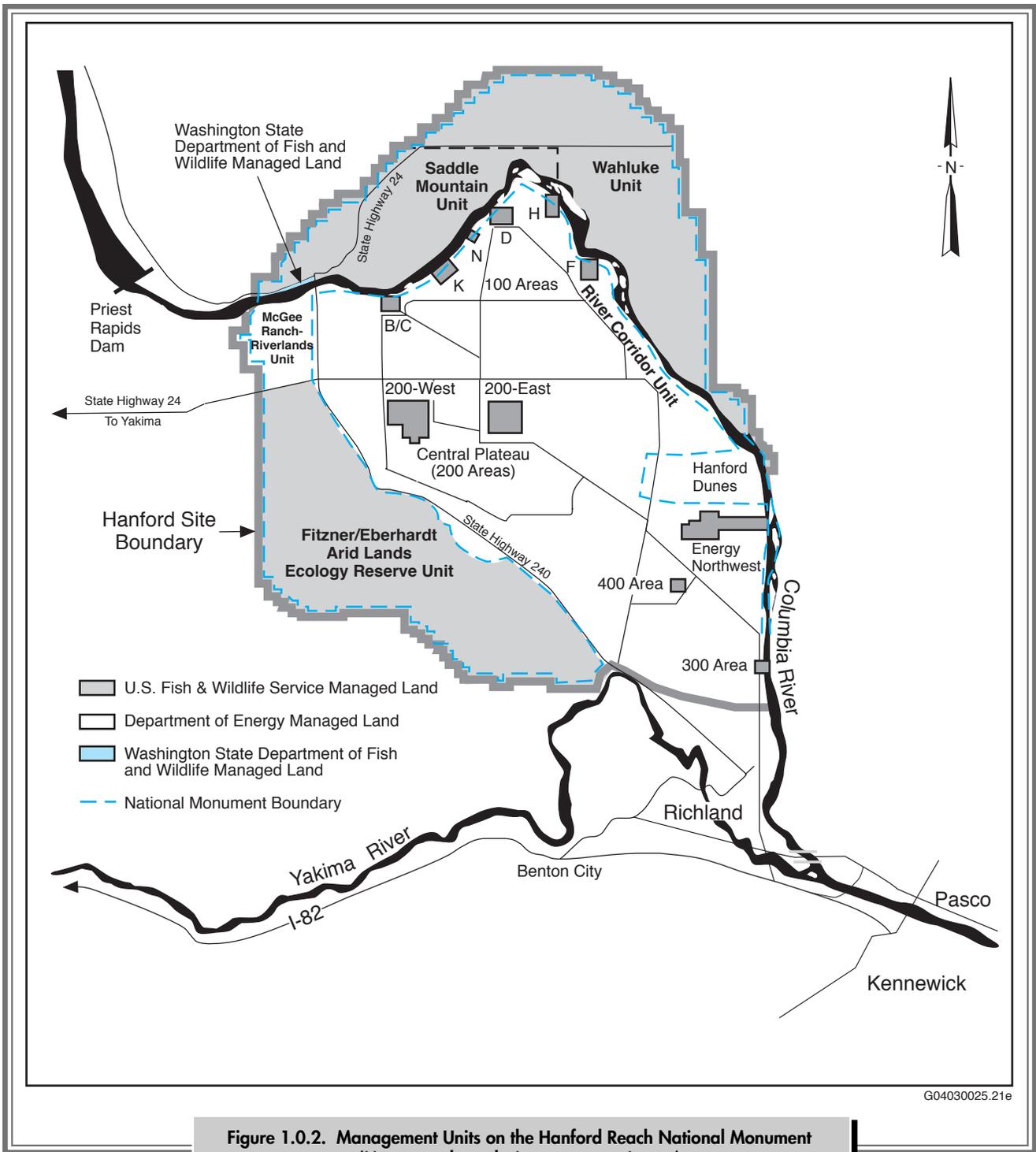


Figure 1.0.2. Management Units on the Hanford Reach National Monument (Monument boundaries are approximate.)



- The Hanford Environmental Health Foundation was the occupational health contractor on the site in 2003. The foundation provided occupational medicine and nursing, medical surveillance, ergonomics assessment, exercise physiology, case management, psychology and counseling, fitness for duty evaluations, health education, infection control, immediate health care, industrial hygiene, and health, safety, and risk assessment. In June 2004, AdvanceMed of Reston, Virginia, took over occupational medical services at the Hanford Site, replacing the Hanford Environmental Health Foundation, which had provided these services at the site for 38 years.
- S.M. Stoller Corporation monitors and characterizes radioactive contamination in the vadose zone for both the DOE Richland Operations Office and DOE Office of River Protection. The primary goal of activities performed for the DOE Richland Operations Office is characterization of liquid waste disposal sites and solid waste burial grounds on the Central Plateau. For the DOE Office of River Protection, the effort involves vadose zone monitoring around the single-shell tanks to detect continuing migration of contamination resulting from tank leaks or other contamination sources.

The DOE Office of River Protection. The DOE Office of River Protection was established by Congress in 1998 as a field office to manage Hanford tank waste retrieval, treatment, and disposal.

The principal contractors for the DOE Office of River Protection in 2003 and their respective responsibilities included the following:

- **Bechtel National, Inc.** – Bechtel National, Inc.'s contract mission is to design and build facilities on a 26.3-hectare (65-acre) site on the Central Plateau of Hanford to convert liquid radioactive waste into a stable glass form (vitrification). The 10-year contract for this work was awarded in December 2000.
- **Washington Group International** – A subcontractor to Bechtel National, Inc., Washington Group International is a participant in the mission to design and construct the Waste Treatment (vitrification) Plant.
- **CH2M HILL Hanford Group, Inc.** – This contractor has the responsibility to retrieve and store for treatment about 201 million liters (53 million gallons) of

radioactive and chemically hazardous waste stored in 177 underground tanks at Hanford. The company's role also includes storing the treated waste until permanent disposal facilities are available. The contract for CH2M HILL Hanford Group, Inc. runs through 2006.

Additional information about Hanford Site management and contractors can be found on the Internet at <http://www.hanford.gov/top/whowho.html> and <http://www.gjo.doe.gov/programs/hanf/HTFVZ.html>.

Hanford Reach National Monument. During 2003, the DOE, U.S. Fish and Wildlife Service, and Washington Department of Fish and Wildlife managed the Hanford Reach National Monument. The U.S. Fish and Wildlife Service administered three major management units of the monument totaling about 668 square kilometers (258 square miles). These included (1) the Fitzner/Eberhardt Arid Lands Ecology Reserve Unit, a 312-square-kilometer (120-square-mile) tract of land with no public access in the southwestern portion of the Hanford Site; (2) the Saddle Mountain Unit, a 130-square-kilometer (50-square-mile) tract of land with no public access located north-northwest of the Columbia River and generally south and east of State Highway 24; and (3) the Wahluke Unit, a 225-square-kilometer (87-square-mile) tract of land located north and east of both the Columbia River and the Saddle Mountain Unit (Figure 1.0.2).

The portion of the monument administered by the DOE included the McGee Ranch/Riverlands Unit (north and west of State Highway 24 and south of the Columbia River), the Columbia River Islands Unit in Benton County, the Columbia River corridor (one-quarter mile [0.4 kilometer] inland from the Hanford Reach shoreline) on the Hanford (Benton County) side of the river, and the Hanford dunes area located along the Hanford side of the Columbia River north of the Columbia Generating Station.

Approximately 162 hectares (400 acres) along the north side of the Columbia River, west of the Vernita Bridge, and south of State Highway 243 were managed by Washington Department of Fish and Wildlife. All of these lands have served as a safety and security buffer zone for Hanford Site operations since 1943, resulting in an ecosystem that has been relatively untouched for nearly 60 years.

1.0.4 References

65 FR 114. June 13, 2000. Presidential Proclamation 7319, "Establishment of the Hanford Reach National Monument." *Federal Register*.

DOE/EIS-0222-F. 1999. *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement*. U.S. Department of Energy, Washington, D.C. Available URL: <http://www.hanford.gov/eis/hraeis/hraeis.htm>

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