



# 1.0 INTRODUCTION

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This report, published annually since 1958, includes information and summary data that (1) provide an overview of activities at the Hanford Site during 2002; (2) demonstrate the status of the site's compliance with applicable federal, state, and local environmental laws and regulations, executive orders, and U.S. Department of Energy (DOE) polices; (3) summarize environmental data that 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 defined by the Effluent and Near-Facility Environmental Monitoring Programs, the Surface Environmental Surveillance Project, the Hanford Groundwater Monitoring Project, Vadose Zone Monitoring, the Meteorological and Climatological Services Project, Ecosystem Monitoring and Ecological Compliance, the Hanford Cultural Resources Laboratory, and information about 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 will assist the reader in understanding this report and provide additional details about monitoring. Appendix A contains helpful information about units of measure, scientific notation, and other nomenclature. Appendix B contains additional monitoring results for 2002 to supplement the information provided in the body

of the report. Appendix C is a glossary of terms used in this report. Appendix D contains information about a variety of government standards and permits governing Hanford Site operations. Appendix E contains information about dose calculations. Appendix F contains information about radionuclides detected by gamma spectroscopy. Appendix G contains information about threatened and endangered species, candidate or sensitive animal species, and plant species of concern potentially found on the Hanford Site. Appendix H identifies errata that were found in last year's annual environmental report (PNNL-13910).

## 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 shifted from production to the development of new waste treatment and disposal technologies and characterizing and cleaning up materials and contamination left from historical operations.

Currently, the Hanford Site's primary mission includes cleaning up and shrinking the size of the site from ~1,517 square kilometers (~586 square miles) to ~194 square kilometers (~75 square miles) by the target date of 2012. The on-line report *Hanford 2012: Accelerating Cleanup and Shrinking the Site* (DOE/RL-2000-62) states that the cleanup mission includes three strategies:

1. Restore the Columbia River corridor by continuing to clean up 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. Transition the Central Plateau (200-East and 200-West Areas) from primarily waste storage to waste characterization, treatment, storage, and disposal operations, which are expected to last for another 40 years.
3. Prepare the site for future activities such as long-term stewardship, other DOE and non-DOE federal missions, and other public and private sector uses.

The goal of these strategies is to complete major portions of the site cleanup by 2012 and to do so in a manner that protects the environment and uses taxpayers' dollars wisely and efficiently.

## 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 ~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

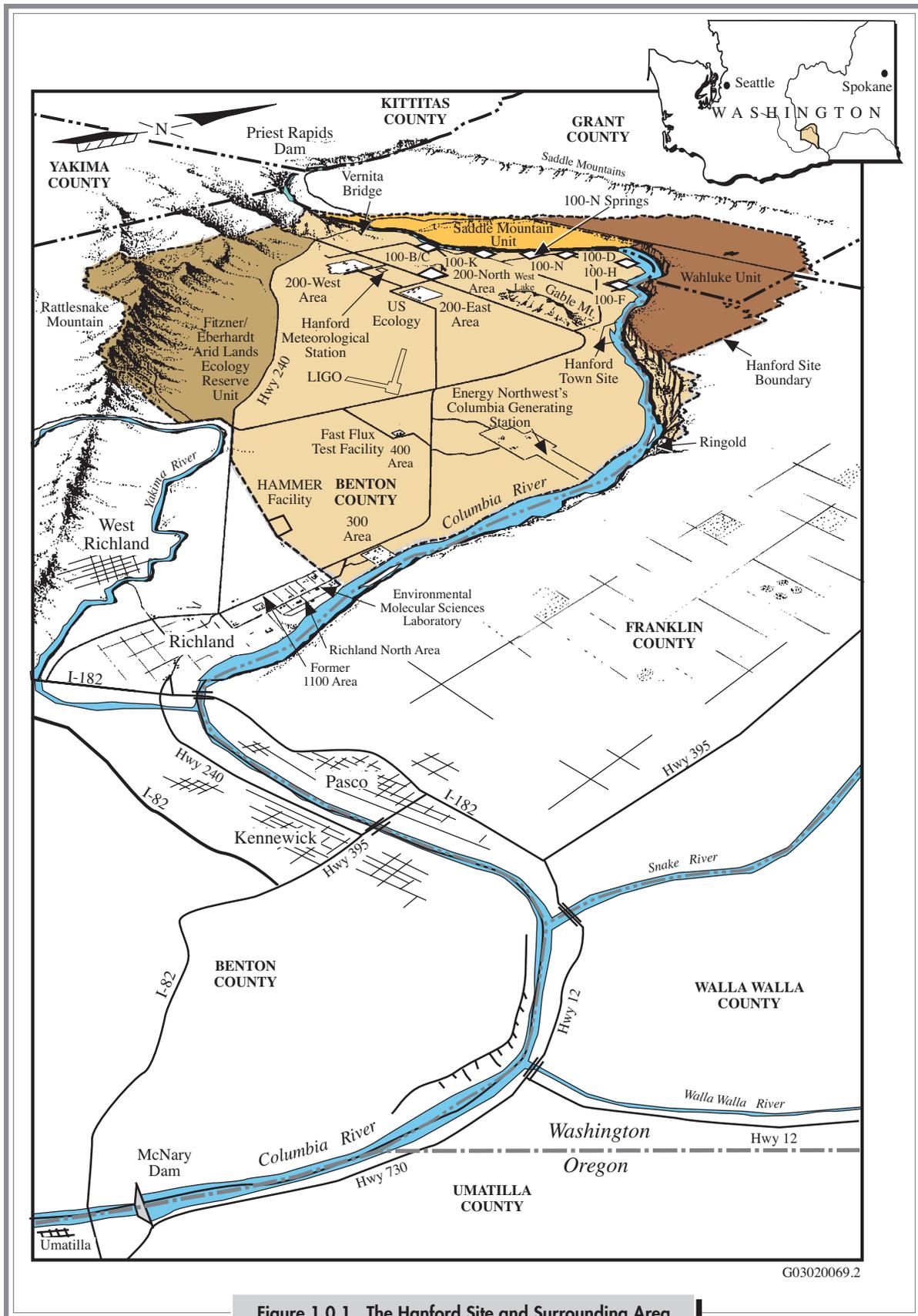
- **100 Areas** – located along the south and west shores of the Columbia River. These are the sites of nine retired plutonium production reactors. The 100 Areas occupy a total of ~11 square kilometers (~4 square miles).
- **200-West and 200-East Areas** – centrally located on a plateau. These areas are ~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 Areas cover a total of ~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 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 ~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 during 2003. This nuclear reactor was designed to test various types of nuclear fuel. The 400 Area covers ~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 generally 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 leased 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 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.

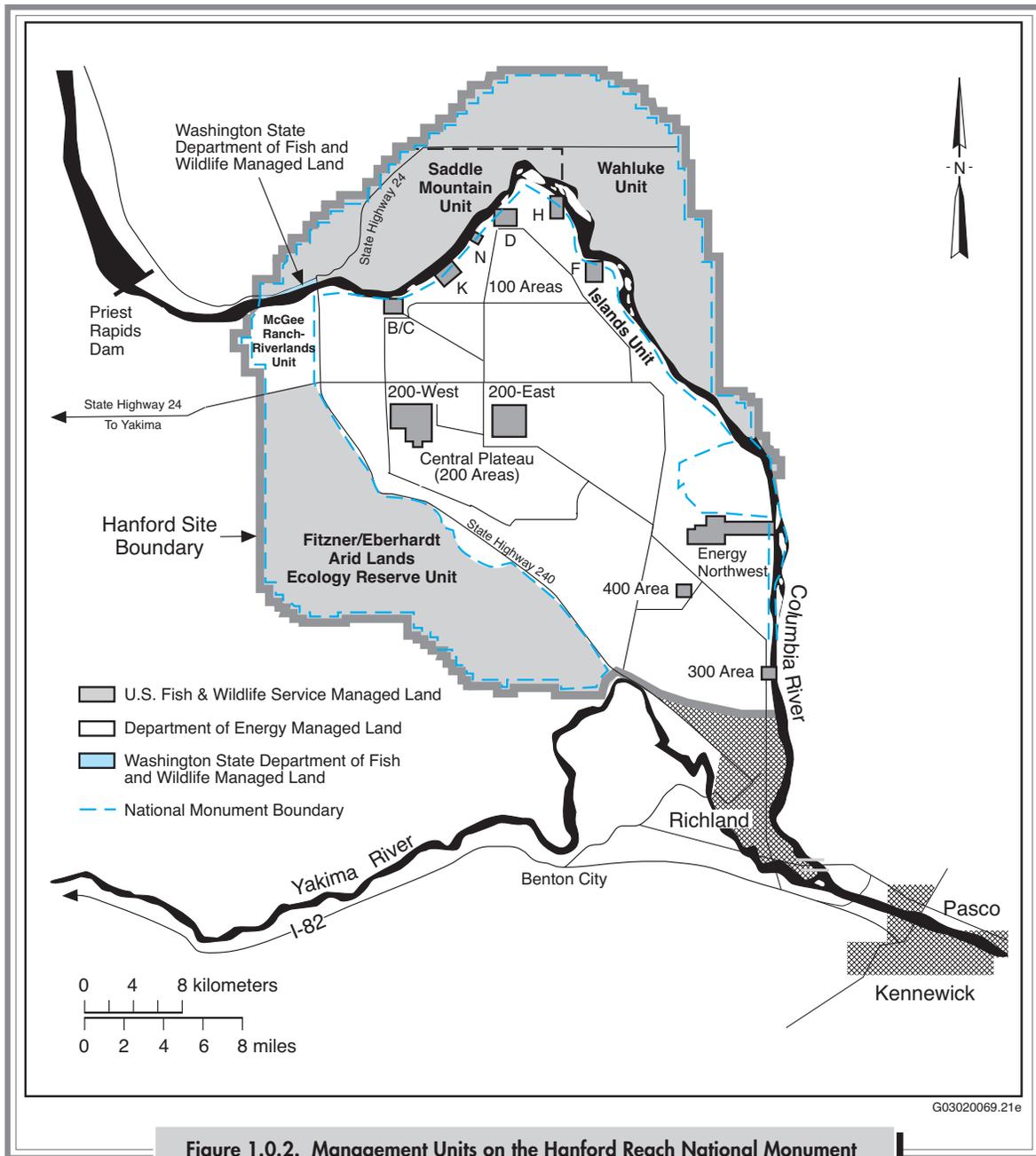
The 78,900-hectare (195,000-acre) Hanford Reach National Monument (Figure 1.0.2) was established on the Hanford Site by a Presidential Proclamation in June 2000 (65 FR 114) to protect the nation's only non-impounded stretch of the Columbia River upstream of Bonneville Dam in the United States and a remnant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

Non-DOE operations and activities on Hanford Site leased land or in leased facilities 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



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Figure 1.0.1. The Hanford Site and Surrounding Area



[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. R. H. Smith Distributing operates vehicle-fueling stations in the 200 Areas. Washington State University at Tri-Cities operated several laboratories in the 300 Area until March 2002. 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. Kaiser Aluminum and Chemical Corporation leased the 313 Building in the 300 Area from 1994 until January 2002 to use an extrusion press that was formerly DOE owned.

Near the city of Richland, immediately adjacent to the southern boundary of the Hanford Site, Framatome ANP, Inc. operates a commercial nuclear fuel fabrication facility

and 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 the 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 U.S. Fish and Wildlife Service was a joint steward of portions of the Hanford Reach National Monument with DOE.

**DOE Richland Operations Office.** The DOE Richland Operations Office manages legacy cleanup, research, and other programs at the Hanford Site.

During 2002, 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 were **CH2M HILL Hanford, Inc.** and **Eberline Services Hanford, Inc.**
- **Fluor Hanford, Inc.** is the prime contractor for the Project Hanford Management Contract. It manages and integrates work to support cleanup of former DOE nuclear production facilities at the site. 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 Federal Services**.
- **Hanford Environmental Health Foundation** works to identify and analyze the hazards that Hanford personnel face in the work environment. During 2002, the foundation's occupational health services 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.

- **S. M. Stoller Corporation** performs geophysical logging for both the DOE Richland Operations Office and DOE Office of River Protection as of July 21, 2002. Until then, this work was performed by MACTEC-ERS. In addition, responsibility for day-to-day program management was transferred from the DOE Grand Junction Office to the DOE Richland Operations Office. The primary goal of logging activities performed for the DOE Richland Operations Office is characterization of waste sites on the Central Plateau. For the DOE Office of River Protection, the logging effort involves vadose zone monitoring around the single-shell tanks.
- **Pacific Northwest National Laboratory** is a DOE facility operated by Battelle Memorial Institute for 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. On July 23, 2002, DOE announced a two-year restructuring project that will re-engineer management processes to comply with the President's Management Agenda to improve efficiency and reduce the cost of operations. The effort is aimed at reducing layers of management, streamlining decision-making processes, clarifying lines of authority, making more efficient use of resources, and reshaping and rebuilding the DOE Office of Science work force. A Pacific Northwest Site Office will be established to provide oversight of Pacific Northwest National Laboratory. When the office is established, Pacific Northwest National Laboratory will report directly to the Office of Science in DOE Headquarters rather than the DOE Richland Operations Office.

**DOE Office of River Protection.** The DOE Office of River Protection was established by Congress in 1998 as a field office to manage DOE's largest, most complex environmental cleanup project—Hanford tank waste retrieval, treatment, and disposal. Sixty percent of the nation's high-level radioactive waste is stored at Hanford in tanks.

The principal contractors for the DOE Office of River Protection in 2002 and their respective responsibilities included the following:

- **Bechtel National, Inc.** – Bechtel National, Inc.'s contract mission is to design, build, and start up 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 prime sub-contractor to Bechtel National, Inc. Washington Group International is a participant in the mission to design, construct, and start up the Waste Treatment (vitrification) Plant.
- **CH2M HILL Hanford Group, Inc.** – The DOE Office of River Protection's prime contractor has the responsibility to store and retrieve for treatment ~201 million liters (~53 million gallons) of radioactive and 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>.

During 2002, DOE, the U.S. Fish and Wildlife Service, and the Washington State Department of Fish and Wildlife were joint stewards of the Hanford Reach National Monument. The U.S. Fish and Wildlife Service administered three major management units of the monument totaling ~66,775 hectares (~165,000 acres). These included (1) the Fitzner/Eberhardt Arid Lands Ecology Reserve Unit, a 312-square-kilometer (120-square-mile) tract of land in the southwestern portion of the Hanford Site; (2) the Saddle Mountain Unit, a 130-square-kilometer (50-square-mile) tract of land 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 1.0.1).

The portion of the monument administered by DOE included the McGee Ranch/Riverlands Unit (north and west of State Highway 24 and south of the Columbia River), the Columbia River islands in Benton County, the Columbia River corridor (one-quarter mile inland from

the Hanford Reach shoreline) on the Hanford (Benton County) side of the river, and the sand 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 was managed by the Washington State 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.
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