

Appendix I

Ecological Resources

Appendix I provides additional information regarding potential impacts to terrestrial and aquatic ecological resources that may result from implementation of Alternative Groups A, B, C, D₁, D₂, D₃, E₁, E₂, and E₃, or the No Action Alternative. Potential impacts to terrestrial resources would occur in the near term, i.e., during waste management operations and under current conditions. These relate primarily to surface disturbance associated with disposal in the Low Level Burial Grounds (LLBGs), the Environmental Restoration and Disposal Facility (ERDF), and in the proposed disposal facility near the PUREX Plant; Area C from which capping materials would be obtained and the associated stockpile area and conveyance road; and construction sites for the additional Central Waste Complex (CWC) facilities and New Waste Processing Facility. Potential impacts to Columbia River riparian and aquatic resources could occur in the long term, i.e., up to 10,000 years following the conclusion of waste management operations. These relate primarily to the eventual migration of radionuclides and other hazardous chemicals through the vadose zone to groundwater and on to the Columbia River.

I.1 Background

The 24 Command Fire, a range fire that occurred in late June–early July 2000 (DOE-RL 2000), burned 163,884 acres on the central part of the Hanford Site and the Fitzner/Eberhardt Arid Lands Ecology (ALE) Reserve (Baker 2000). The 24 Command Fire covered the 200 West Expansion Area, some of which has been identified for construction of the additional CWC facilities and the New Waste Processing Facility; a large area west and south of that location, including Area C; and the southern portion of the corridor between the 200 West Area and 200 East Area, including the ERDF. The 24 Command Fire did not affect the LLBGs in the 200 West Area (although some of these border the 200 West Expansion Area), nor did it reach the 200 East Area.

In general, approximately 85 percent of the burned area experienced severe fire intensity, resulting in complete destruction of all vegetation and organic litter on the soil surface (Baker 2000). In moderately burned areas, there was partial removal of the shrub layer and understory. Many of the severely and moderately burned areas have since been colonized by alien annual weeds, such as Russian thistle (*Salsola kali*) and cheatgrass (*Bromus tectorum*).

The most severely burned areas, particularly west and southwest of the 200 West Area (including the area identified for construction of the additional CWC facilities and the New Waste Processing Facility), were, and continue to be severely eroded by wind (Becker and Sackschewsky 2001a, 2001b; Sackschewsky and Becker 2001). Much of the topsoil and likely much of the buried seed (Baker 2000) have been removed. Plant communities in these areas, particularly the shrub components, may not

1 recover before project-related surface disturbance because of a lack of buried seed (Baker 2000),
2 relatively long distances to upwind seed sources, continued wind erosion, and competition by weedy
3 species.

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5 In contrast, some of the pre-fire shrub and understory vegetation in the moderately burned areas
6 (including most of Area C and the ERDF) was not removed or is recovering, and these areas have not
7 been affected as severely by wind erosion. These plant communities thus have likely retained more of
8 their buried seed than those that were severely burned; this seed may germinate when conditions are
9 suitable. Consequently, some of these communities are expected to partially or fully recover before
10 project-related disturbance, notwithstanding competition by weedy species.

11 12 **I.2 Impacts to Terrestrial Resources Resulting from** 13 **Surface Disturbance**

14 15 **I.2.1 Alternative Group A**

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17 **LLBGs in the 200 East Area – Impacts to Habitats and Plant Species of Concern.** The LLBGs in
18 the 200 East Area are surveyed annually, consistent with the DOE *Ecological Compliance Assessment*
19 *Management Plan* (ECAMP) (DOE-RL 1995a). The 218-E-10 and 218-E-12B LLBGs have been cleared
20 of most of their original vegetation, greatly increasing their susceptibility to noxious weed invasion.

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22 Noxious weeds on the Hanford Site are managed under the Integrated Pest Management (IPM)
23 program (WHC 1995), and the primary means of control is herbicides. IPM personnel are required to
24 obtain training, licenses, and certifications (WHC 1995) in order to ensure compliance with Washington
25 State Department of Agriculture rules relating to the use of restricted herbicides in ground and aerial
26 applications. Compliance with these rules facilitates effective control of target populations with minimal
27 accidental overspray of and herbicide drift into non-target areas. Herbicide drift is minimized primarily
28 by deploying herbicides under optimal weather conditions (Renne and Wolf 1976) and using drift
29 retardants. Drift retardants increase droplet size, increasing settling rate and thus rendering herbicides
30 less susceptible to drift.

31
32 Cheatgrass and Sandberg's bluegrass (*Poa sandbergii*), a native perennial, dominate approximately
33 two-thirds of the 218-E-10 and 218-E-12B LLBGs. Crested wheatgrass (*Agropyron cristatum*), a non-
34 native perennial planted for a variety of purposes including dust suppression and reduction of water
35 infiltration into the vadose zone, dominates the other third (Brandt 1998, 1999; Sackschewsky 2000,
36 2001, 2002a). The 218-E-10 and 218-E-12B LLBGs receive regular herbicide applications and thus have
37 essentially no habitat value for native broad-leaved species such as big sagebrush (*Artemisia tridentata*).
38 Consequently, continued use of these LLBGs, or new disturbance of the extant plant communities within
39 them, would not result in the loss of any habitats designated by Washington State as priority habitats
40 (DOE-RL 2003). However, native habitats could develop if herbicide spraying ceases.

41
42 Two plant species of concern have been observed within the 218-E-10 and 218-E-12B LLBGs. The
43 most notable is Piper's daisy (*Erigeron piperianus*). The State of Washington Natural Heritage Program