

## APPENDIX T SUPPORTING INFORMATION FOR THE SHORT-TERM CUMULATIVE IMPACT ANALYSES

This appendix contains the detailed tables that support the short-term cumulative impacts presented in Chapter 6 of this *Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*. The cumulative impact methodologies are described in Appendix R.

This section presents detailed tables for short-term cumulative impacts for the following resource areas: land resources, ecological resources, cultural and paleontological resources, socioeconomics, and transportation (see Tables T-1 through T-4). Other resource areas do not need detailed tables to support their short-term cumulative impact analyses.

The tables in this appendix describe the past, present, and reasonably foreseeable future actions in the regions of influence that were considered in the cumulative impact assessment for these resource areas. Past and present actions that may contribute to cumulative impacts include those conducted by government agencies, businesses, or individuals within the regions of influence considered. As described in Appendix R, Table R-4, 52 projects or sets of projects were evaluated for their contributions to cumulative impacts.

### **Cumulative Impacts**

Effects on the environment that result from the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (40 CFR 1508.7).

The methodology used in this *Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington* to estimate cumulative impacts was divided into four phases: (1) selection of resource areas and appropriate regions of influence, (2) selection of reasonably foreseeable future actions, (3) estimation of cumulative impacts, and (4) identification of monitoring and mitigation. A flow chart showing the four phases of cumulative impacts analysis is presented in Appendix R, Figure R-2. The tables presented in this Appendix T form a portion of Phases 2 and 3 and contain detailed information to support the short-term cumulative impacts analysis presented in Chapter 6.

**Table T-1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources**

<b>Project/Action</b>	<b>Total Land Area/ Terrestrial Habitat Affected<sup>a</sup> (hectares)</b>	<b>Area of Shrub- Steppe Habitat Affected (hectares)</b>	<b>Threatened and Endangered Species</b>	<b>Distance from 200 Areas (kilometers)</b>	<b>Notes</b>	<b>Source</b>
<b>TC &amp; WM EIS Activities</b>						
Alternative Combination 1 <sup>b</sup>	2/2	0	See Chapter 4, Section 4.4.6.3, for a discussion of species potentially impacted by Alternative Combination 1.	Not applicable	Chapter 4, Sections 4.4.1 and 4.4.6, provide information on TC & WM EIS Alternative Combination 1.	Chapter 4, Table 4-153, Table 4-157.
Alternative Combination 2 <sup>b</sup>	307/207	65.5	See Chapter 4, Section 4.4.6.3, for a discussion of species potentially impacted by Alternative Combination 2.	Not applicable	Chapter 4, Sections 4.4.1 and 4.4.6, provide information on TC & WM EIS Alternative Combination 2.	Chapter 4, Table 4-153, Table 4-157.
Alternative Combination 3 <sup>b</sup>	793/749	346	See Chapter 4, Section 4.4.6.3, for a discussion of species potentially impacted by Alternative Combination 3.	Not applicable	Chapter 4, Sections 4.4.1 and 4.4.6, provide information on TC & WM EIS Alternative Combination 3.	Chapter 4, Table 4-153, Table 4-157.
<b>Other DOE Activities at the Hanford Site</b>						
Central Plateau closure <sup>b</sup>	112.1	56.3	Not addressed.	On site	The area would be required as a source for geologic material to be used for covers and to fill voids. Although specific mining plans and precise areas and schedules for material excavation have not been identified, Borrow Area C and/or gravel pit No. 30 are the designated source areas for all geologic materials. It was further assumed that 50 percent of the disturbed area would be shrub-steppe habitat.	Fluor Hanford 2004:2-13, 2-15.

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**Table T-1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources (continued)**

Project/Action	Total Land Area/ Terrestrial Habitat Affected <sup>a</sup> (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
<b>Other DOE Activities at the Hanford Site (continued)</b>						
Decommissioning of eight surplus production reactors and their support facilities in the 100 Areas <sup>b, c</sup>	6.1	6.1	Impacts are not expected because reactor sites are highly disturbed.	On site	The land requirement is related to the disposal of radioactive waste in the 200 Areas. It was conservatively assumed that all of this land is shrub-steppe habitat. Five of the eight reactors have been decommissioned. Habitat loss could be offset by a gain of 5 hectares that would become available for reuse within the 100 Areas once the reactors are removed.	DOE 1992:1-27.
Decommissioning of the N Reactor and its support facilities <sup>b</sup>	0	0	Impacts are not expected because the project area is highly developed.	On site	Undergoing interim safe storage (2006–2009).	DOE 2005:10, 12.
Actions to empty the K Basins in the 100-K Area and implement dry storage of the fuel rods in the Canister Storage Building in the 200-East Area <sup>b</sup>	3.6	0	Impacts are not expected because the new facility was built within a disturbed area.	On site	The facility was built in the vicinity of the Canister Storage Building.	DOE 1995:5.12, 5.38, 5.39.
Excavation and use of geologic materials from existing borrow pits <sup>b</sup>	31.2	8.1	Potential impacts are expected on gray cryptantha, dwarf evening primrose, Piper’s daisy, and loggerhead shrike. Ecological reviews would be necessary prior to excavation.	On site	Land use would be consistent with current designations. Some shrub-steppe habitat could be impacted. Land use was assumed to be 25 percent (8.1 hectares) of total newly disturbed area.	DOE 2001a:3-1, 5-2, Appendix A.

**Table T-1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources (continued)**

Project/Action	Total Land Area/ Terrestrial Habitat Affected <sup>a</sup> (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
<b>Other DOE Activities at the Hanford Site (continued)</b>						
Reactivation and use of three former borrow sites in the 100-F, 100-H, and 100-N Areas <sup>b</sup>	38.9	0	Not present.	On site	Extraction would be authorized as an existing nonconforming use within the "Preservation" land use category. There would be minimal visual impact because existing sites would not be visible to the public from the Hanford Reach National Monument or the Columbia River, and they would be revegetated where possible during and after site usage.	DOE 2003a:5-1-5-3, B-1, B-2.
Construction and operation of the Environmental Restoration Disposal Facility near the 200-West Area <sup>b</sup>	414.4	414.4	Stalked-pod milkvetch and loggerhead shrike were observed on site.	On site	Total land use would be 414 hectares. Phase III (which is complete) occupies 34.4 hectares. The area is low-lying, so there would be minimal visual impact. The facility would detract from the view from Rattlesnake Mountain. Because the disposal area would be capped and revegetated where possible during and after facility usage, long-term impacts would be minimal.	DOE 1999a:9-24; 2001b:6; Sackschewsky 2003:8.
Transport of Navy reactor compartments from the Columbia River and their disposal <sup>b</sup>	4	0	Not present.	On site	Four hectares would be used. (in trench 218-E-12B). The area to be used is classified as a disturbed area.	Navy 1996:2-2, 3-14.

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**Table T-1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources (continued)**

Project/Action	Total Land Area/ Terrestrial Habitat Affected <sup>a</sup> (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
<b>Other DOE Activities at the Hanford Site (continued)</b>						
Construction and operation of a Pacific Northwest National Laboratory Physical Sciences Facility <sup>b</sup>	40.1	25.9	Burrowing owls were observed on site. Potential impacts are expected on sage sparrow and loggerhead shrike.	On site		DOE 2007:26, 38.
<b>Total for Other DOE Activities at the Hanford Site</b>	<b>650.3</b>	<b>510.7</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>
<b>Non-DOE Activities at the Hanford Site</b>						
Management of the Hanford Reach National Monument and Saddle Mountain National Wildlife Refuge <sup>b</sup>	404.7	101.2	Impacts on threatened and endangered species would be generally minor; however, a number of species are present. Those potentially affected by the <i>TC &amp; WM EIS</i> alternatives include the loggerhead shrike, sage sparrow, long-billed curlew, and black-tailed jackrabbit.	On site	Many areas that would be affected have been previously disturbed. It was assumed that 25 percent of the area to be disturbed is shrub-steppe habitat. A total of approximately 32,398 hectares of shrub-steppe habitat are found in the monument. 1,214 hectares of shrub-steppe habitat would be restored each year. 405 hectares of land could be disturbed by recreation facilities and visitor services. Goal 8 of the <i>Hanford Reach National Monument Comprehensive Conservation Plan and Environment Impact Statement</i> is to “Protect the natural visual character and promote the opportunity to experience solitude on the Monument.”	USFWS 2008:2-52, 2-131, 2-132, 4-63, 4-72 to 4-82, 4-109, 4-110.

**Table T-1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources (continued)**

<b>Project/Action</b>	<b>Total Land Area/ Terrestrial Habitat Affected<sup>a</sup> (hectares)</b>	<b>Area of Shrub-Steppe Habitat Affected (hectares)</b>	<b>Threatened and Endangered Species</b>	<b>Distance from 200 Areas (kilometers)</b>	<b>Notes</b>	<b>Source</b>
<b>Non-DOE Activities at the Hanford Site (continued)</b>						
Operation of the US Ecology commercial low-level radioactive waste disposal site near the 200-East Area <sup>b</sup>	40.5	40.5	Listed species were not identified on site.	On site	The cover construction would have minimal impact on ecology; revegetation would encourage shrub-steppe habitat development. An undisturbed 6.1-hectare area of shrub-steppe habitat in the northwest corner may need to be developed for spoils.	Ecology and WSDOH 2004:26-28, 128, 130.
<b>Total for Non-DOE Activities at the Hanford Site</b>	<b>445.2</b>	<b>141.6</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>
<b>Total for Hanford Site</b>	<b>1,095.5</b>	<b>652.4</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>
<b>Other Projects/Activities in the Region of Influence</b>						
Southridge development project, Kennewick, Washington	1,023.9	607	Burrowing owls were observed on site.	50 southeast	Habitat at the site includes 607 hectares of shrub-steppe, 253 hectares of apple orchards, and 152 hectares that are developed. An additional 101 hectares are at the planning/permitting stage.	Kennewick 2005:i, 3-17, 3-28, 3-29; Romine 2007.
Hansen Park development project, Kennewick, Washington	152.6	0	Not addressed.	48 southeast	Primarily agricultural land (based on Google Earth aerial photography).	Kennewick 2006:149.
Clearwater development project, Kennewick, Washington	164.3	40.5	Not addressed.	48 southeast	The site is 164.3 hectares. It is estimated that 40.5 hectares of the site is sagebrush habitat. Other land is agricultural, fallow agricultural, and industrial (based on Google Earth aerial photography).	Kennewick 1999:2.

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**Table T-1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources (continued)**

Project/Action	Total Land Area/ Terrestrial Habitat Affected <sup>a</sup> (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
<b>Other Projects/Activities in the Region of Influence (continued)</b>						
Pasco, Washington (three subdivisions)	115.3	0	Not addressed.	48 south southeast	The subdivisions would be located northwest and southwest of the airport. The land appears to be mostly agricultural (based on Google Earth aerial photography).	Adams 2007.
Red Mountain Center (mixed use development), <sup>b</sup> West Richland, Washington	129.5	129.5	Not addressed.	34 south southeast	The land does not appear to be agricultural and was assumed to be shrub-steppe habitat (based on Google Earth aerial photography).	Gouk 2007.
Red Mountain American Viticulture Area, <sup>b</sup> Benton County, Washington	566.6	509.9	Not addressed.	34 south	The total area is 1,781 hectares. The developed area is currently 283 hectares, but the number of vineyards could double from 10 to 20 in the next 5 years, increasing the developed area to 567 hectares. The area is primarily native habitat with some agricultural land (based on Google Earth aerial photography). It was assumed that 90 percent of past and future development (510 hectares) is shrub-steppe habitat.	Benton County 2006:B-14.
Yakima City, Washington (new subdivisions)	647.5	0	Not addressed.	80 west	Potential for 1,000 new homes to be built. The area is mixed agricultural and rural residential land. The site is to be annexed by the city.	Benson 2007.

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**Table T-1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources (continued)**

Project/Action	Total Land Area/ Terrestrial Habitat Affected <sup>a</sup> (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
<b>Other Projects/Activities in the Region of Influence (continued)</b>						
Gravel mine, Yakima County, Washington	40.5	20.2	Not addressed.	68 west	The site is located east of the city. The project has been permitted; however, work has not yet begun. The current land use is unknown because the location of the site has not been specified. It was assumed that 50 percent of the area is shrub-steppe habitat.	Patterson 2007.
Residential/golf community, Walla Walla County, Washington	202.3	202.3	Not addressed.	90 southeast	The parcel totals 4,856 hectares, with 202 hectares remaining to be developed. The location of the site was not specified. It was conservatively assumed that all 202 hectares to be developed are shrub-steppe habitat.	Prentice 2007.
Boardman Speedway, Morrow County, Oregon	566.6	0	Not addressed.	80 south southeast	The parcel total is 850 hectares, with 567 hectares currently dedicated for use as a race track. The area is agricultural land (based on Google Earth aerial photography).	McClane 2007.
Boardman Resort, Morrow County, Oregon	647.5	0	Not addressed.	80 south southeast	The resort area is 911 hectares in size. A total of 648 hectares is developable. The site does not appear to be shrub-steppe habitat (based on Google Earth aerial photography).	McClane 2007.

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**Table T-1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources (continued)**

Project/Action	Total Land Area/ Terrestrial Habitat Affected <sup>a</sup> (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
<b>Other Projects/Activities in the Region of Influence (continued)</b>						
Boardman Industrial Park, Morrow County, Oregon	161.9	0	Not addressed.	76 south	The area is agricultural land (based on Google Earth aerial photography).	McClane 2007.
Sunnyside Water Conservation Program, Washington	35.2	0	No impacts are expected on bald eagle or Ute ladies' tresses.	24 to 48 west and southwest	The area includes three reservoirs on agricultural and pasture land.	BOR 2004:17, 43, 46.
Big Horn Wind Project, Bickleton, Washington	41.2	21.8	No rare plants or federally threatened or endangered species are present.	80 southwest	The project would temporarily disturb 90.2 hectares and permanently disturb 34 hectares. The switching station and the road contain scrub oak and scattered ponderosa pine. The area includes some shrub-steppe habitat, but it is unknown how much would be affected. It was assumed that 50 percent of disturbed land would be shrub-steppe habitat. The wind turbines would be readily visible from houses and roads. Turbines would be painted a neutral color to minimize visual impacts.	BPA 2005:8-14.

**Table T-1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources (continued)**

Project/Action	Total Land Area/ Terrestrial Habitat Affected <sup>a</sup> (hectares)	Area of Shrub-Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
<b>Other Projects/Activities in the Region of Influence (continued)</b>						
Wild Horse Wind Project, Kittitas County, Washington	66.8	60.3	Potential impacts are expected on 10 percent of the individual hedgehog cactus plants.	90 northwest	The 3,480-hectare site is currently zoned as Forest and Range and Commercial Agriculture. 66.8 hectares would be permanently affected. Approximately 90 percent of impacts would occur in shrub-steppe habitat.	Energy Facility Site Evaluation Council 2005:1-6, 1-11, 1-48, 1-49.
Desert Claim Wind Project, Kittitas County, Washington	31.2	12.1	Potential impacts are expected on bald eagle, golden eagle, northern goshawk, sage thrasher, and loggerhead shrike.	97 northwest	12.1 hectares of shrub-steppe habitat would be permanently disturbed. The project would result in visual impacts ranging from low to high, which would represent a significant unavoidable change in the visual environment.	Kittitas County 2004:1-22, 1-36, 1-39, 1-68; Young, Erickson, and Poulton 2006:3, 12.
Black Rock Reservoir, <sup>b</sup> Yakima County, Washington	3,496.5	1,558.1	Habitat for shrub-steppe species is limited within the site area. Loggerhead shrike, sage thrasher, and sage sparrow are most likely to be present. Moderate impacts are expected on sage sparrow.	23 west southwest	The site is 2,590 hectares. The valley floor is composed of fallow fields, cultivated land, and sparse patches of sagebrush. The largest contiguous patch of sagebrush is 24.3 hectares.	Benton County Sustainable Development 2002:1, 8, 12; BOR and Ecology 2008:2-117.

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**Table T-1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources (continued)**

Project/Action	Total Land Area/ Terrestrial Habitat Affected <sup>a</sup> (hectares)	Area of Shrub-Steppe Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
<b>Other Projects/Activities in the Region of Influence (continued)</b>						
Transportation Project, Roadway from Interstate 82 to Finley, Washington	32.4	25.1	Not addressed.	53 southeast	The roadway is 17.7 kilometers long and 11 meters wide. Assuming 3.7 meters are needed on each side of the road, the total width is 18.3 meters. The road passes through open land, which appears to be primarily shrub-steppe habitat with some agricultural land (based on Google Earth aerial photography). It was assumed that 13.7 kilometers are shrub-steppe habitat.	WSDOT 2007.
Finley Columbia Ethanol Plant, Benton County, Washington	22.3	0	No impact.	62 southeast	16.2 to 22.3 hectares of agricultural land would be disturbed. Plant is adjacent to industrial facility. Area is zoned industrial. Aesthetic impacts would be negligible	Columbia Ethanol Plant Holdings 2006:22, 23, 27, 29.
Operation of the Perma-Fix Northwest (formerly Pacific EcoSolutions) Waste Treatment Facility in Richland, Washington	18.2	0	No impact.	3.2 southeast	The project would impact 18.2 hectares of disturbed grassland. No sensitive habitats would be affected.	DOE 1998:8, 20, 21, 50.

**Table T-1. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Land and Ecological Resources (continued)**

<b>Project/Action</b>	<b>Total Land Area/ Terrestrial Habitat Affected<sup>a</sup> (hectares)</b>	<b>Area of Shrub- Steppe Affected (hectares)</b>	<b>Threatened and Endangered Species</b>	<b>Distance from 200 Areas (kilometers)</b>	<b>Notes</b>	<b>Source</b>
<b>Total for Other Projects/Activities in the Region of Influence</b>	<b>8,162.1</b>	<b>3,186.9</b>	Not applicable	Not applicable	Not applicable	Not applicable
<b>Grand Totals</b>						
Combination 1	<b>9,260/9,260</b>	<b>3,839</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>
Combination 2	<b>9,564/9,465</b>	<b>3,905</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>
Combination 3	<b>10,050/10,006</b>	<b>4,185</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>	<b>Not applicable</b>

<sup>a</sup> For all non-TC & WM EIS projects and activities, it was assumed that the total land area affected and the area of undeveloped land affected would be the same; thus, only one value was provided. It is assumed that undeveloped land equates with terrestrial habitat. For those projects and activities where the land cover was not reported, the entire project area was conservatively assumed to be terrestrial habitat. Terrestrial habitat could include shrub-steppe habitat, other native and non-native habitat, grazing land, and cropland.

<sup>b</sup> All listed projects and activities are within the region of influence for land use and ecological resources. Those within the region of influence for visual resources are indicated with the superscript “b.”

<sup>c</sup> B Reactor was recently designated a National Historic Landmark (DOE and DOI 2008). Therefore, B Reactor will not be decommissioned and moved to the Hanford Central Plateau for disposal as analyzed in the *Environmental Impact Statement, Decommissioning of Eight Surplus Production Reactors at the Hanford Site, Richland, Washington* (DOE 1989, 1992) and assumed in this TC & WM EIS.

**Note:** To convert hectares to acres, multiply by 2.471; kilometers to miles, by 0.6214; meters to feet, by 3.281.

**Key:** DOE=U.S. Department of Energy; TC & WM EIS =Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.

**Table T-2. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Cultural Resources**

Action	Total Area Disturbed (hectares)	Cultural Resources and Visual Impacts	Source
<b>TC &amp; WM EIS Activities</b>			
Alternative Combination 1	2	On site. Specific elements of the <i>TC &amp; WM EIS</i> Alternative Combination 1 are addressed in Chapter 4, Section 4.4.7.	Chapter 4, Section 4.4.7.
Alternative Combination 2	307	On site. Specific elements of the <i>TC &amp; WM EIS</i> Alternative Combination 2 are addressed in Chapter 4, Section 4.4.7.	Chapter 4, Section 4.4.7.
Alternative Combination 3	793	On site. Specific elements of the <i>TC &amp; WM EIS</i> Alternative Combination 3 are addressed in Chapter 4, Section 4.4.7.	Chapter 4, Section 4.4.7.
<b>Other DOE Activities at the Hanford Site</b>			
Central Plateau closure	112.1	On site. Although specific mining plans and precise areas and schedules for material excavation have not been identified, Borrow Area C and/or gravel pit No. 30 are the designated source areas for all geologic materials. Changes to the viewshed would occur. Future uses of the Central Plateau would likely include structures and activities consistent with Industrial-Exclusive use.	Fluor Hanford 2004.
Decommissioning of the eight surplus production reactors and their support facilities in the 100 Areas along the Columbia River <sup>a</sup>	6.1	On site. The location is in a highly developed area. There would be a possible impact on archaeological or cultural properties that could be found within the 100 Areas and/or the 100-B Reactor.	DOE 1989:4.39; 1992.
Decommissioning of the N Reactor and its support facilities	0	On site. 105-N and 109-N Buildings. Impacts are not expected because the project is in a highly developed area.	DOE 2005.

**Table T-2. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Cultural Resources (continued)**

Action	Total Area Disturbed (hectares)	Cultural Resources and Visual Impacts	Source
<b>Other DOE Activities at the Hanford Site (continued)</b>			
Actions to empty the K Basins in the 100-K Area and implement dry storage of the fuel rods in the Canister Storage Building in the 200-East Area	3.6	On site. No known archaeological or historic sites were located during intensive inventories of the reference site. There would be no impact on visual resources. The new facility was built within a disturbed area.	DOE 1995:5.11.
Excavation and use of geologic materials from existing borrow pits <sup>b</sup>	31.2	On site. The area can be seen from the viewshed of American Indian areas of interest. It is expected that excavation activities would be primarily in a previously disturbed area. No cultural resources are known to exist within the currently active borrow areas. Specific cultural resource reviews would be conducted before any expansion activities.	DOE 2001a:5-2, 5-3.
Reactivation and use of three former borrow sites in the 100-F, 100-H, and 100-N Areas	38.9	On site. No cultural resources, historic properties, or American Indian areas of interest are located in the project location area. There would be no visual impacts within the viewshed of American Indian areas of interest, and the sites would be revegetated where possible during and after site usage.	DOE 2003a:5.1.6, 5.1.7, 5.2.
Construction and operation of the Environmental Restoration Disposal Facility near the 200-West Area	414.4	On site. The facility is within the viewshed of American Indian areas of interest. The rail line that traverses the area could adversely affect a portion of the historic White Bluffs Road. No archaeological or historic sites are considered eligible for the National Register of Historic Places. The area would be revegetated where possible during and after facility operation.	DOE 1994:ES-22-27, 12; 2001b.

**Table T-2. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Cultural Resources (continued)**

Action	Total Area Disturbed (hectares)	Cultural Resources and Visual Impacts	Source
<b>Other DOE Activities at the Hanford Site (continued)</b>			
Transport and disposal of Navy reactor compartments from the Columbia River	4	On site. The area to be used is classified as disturbed. There would be no impact on cultural resources or visual impact on American Indian areas of interest.	Navy 1996.
Construction and operation of a Pacific Northwest National Laboratory Physical Sciences Facility	40.1	On site. The fenced area in the eastern portion will protect a site of cultural significance to regional tribes. Two prehistoric sites are located in the eastern buffer area near the Columbia River and are monitored to confirm they remain undisturbed.	DOE 2007:26, 37.
<b>Non-DOE Activities at the Hanford Site</b>			
Management of the Hanford Reach National Monument and Saddle Mountain National Wildlife Refuge	404.7	On site. Many of the areas to be affected have been previously disturbed. Goal 5 of the <i>Hanford Reach National Monument Comprehensive Conservation Plan and Environmental Impact Statement</i> is to “Protect and acknowledge the Native American, settler, atomic and Cold War histories of the Monument to ensure present and future generations recognize the significance of the area’s past, incorporating a balance of views.”	USFWS 2008.
Operation of the US Ecology commercial LLW disposal site near the 200-East Area	40.5	On site. There is a high probability that the proposed actions will not impact any historic buildings, archaeological sites, or specific American Indian areas of interest.	Ecology and WSDOH 2004:134.
<b>Other Activities in the Region of Influence</b>			
Red Mountain American Viticulture Area, Benton County, Washington	566.6	The area is within the viewshed of nearby higher elevations, which are of interest to the American Indians. The developed area could increase from 10 to 20 vineyards in the next 5 years.	Benton County 2006.

**Table T-2. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Cultural Resources (continued)**

Action	Total Area Disturbed (hectares)	Cultural Resources and Visual Impacts	Source
<b>Other Activities in the Region of Influence (continued)</b>			
Black Rock Reservoir, Yakima County, Washington	3,496.5	The area is within the viewshed of nearby higher elevations, which are of interest to the American Indians. The proposed location area has a high potential for both historic and prehistoric resources.	BOR and Ecology 2008:4-255.

<sup>a</sup> B Reactor was recently designated a National Historic Landmark (DOE and DOI 2008). Therefore, B Reactor will not be decommissioned and moved to the Hanford Central Plateau for disposal as analyzed in the *Environmental Impact Statement, Decommissioning of Eight Surplus Production Reactors at the Hanford Site, Richland, Washington* (DOE 1989, 1992) and assumed in this *TC & WM EIS*.

<sup>b</sup> As a result of tribal and public comments on the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (DOE 1999b), DOE designated the McGee Ranch as Preservation as a “tradeoff” for keeping Borrow Area C available as the primary source of geologic materials for site remediation. There are discussions of this decision in the following sections of the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement*: the Summary, the main text, Appendices D and E, and the Comment Response Document.

**Note:** To convert hectares to acres, multiply by 2.471.

**Key:** DOE=U.S. Department of Energy; *TC & WM EIS*=*Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*.

**Table T-3. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Socioeconomics**

Project/Action	Peak Annual Employment (FTEs)	Peak Daily Traffic		Notes	Source
		Commuter <sup>a</sup>	Offsite Truck		
<b>Existing Site Activities</b>					
Baseline	9,760	7,810	Not Applicable	Construction FTEs were not separated from operations FTEs. No data on truck traffic.	Chapter 3, Section 3.2.9.
<b>TC &amp; WM EIS Activities</b>					
Alternative Combination 1 <sup>b</sup>	1,840	1,470	4		Chapter 4, Section 4.4.8, provides information on <i>TC &amp; WM EIS</i> Alternative Combination 1.
Alternative Combination 2 <sup>b</sup>	8,190	6,550	79		Chapter 4, Section 4.4.8, provides information on <i>TC &amp; WM EIS</i> Alternative Combination 2.
Alternative Combination 3 <sup>b</sup>	12,500	10,000	102		Chapter 4, Section 4.4.8, provides information on <i>TC &amp; WM EIS</i> Alternative Combination 3.
<b>Other DOE Activities at the Hanford Site</b>					
Changes in land use at the Hanford Site	1,100	880	Not Applicable	This ongoing activity includes industrial development, research and development initiatives, limited mining, and increased recreational use at the Hanford Site during the next 50 years.	DOE 1999b:5-48.
Actions to empty the K Basins in the 100-K Area and implement dry storage of the fuel rods in the Canister Storage Building in the 200-East Area	140	326	Not Applicable	This is an ongoing activity. Future milestones could require additional FTEs. Employment would be reduced (negative) after spent nuclear fuel is placed in long-term storage. Most truck trips would be on site.	DOE 1995:3.24, 5.1, 5.10, 5.47; 2008a.

**Table T-3. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Socioeconomics (continued)**

Project/Action	Peak Annual Employment (FTEs)	Peak Daily Traffic		Notes	Source
		Commuter <sup>a</sup>	Offsite Truck		
<b>Other DOE Activities at the Hanford Site (continued)</b>					
Final disposition of the canyons, PUREX Plant, PUREX tunnels, and other facilities in the 200 Areas and cleanup to Industrial-Exclusive land use standards	172	138	64	The activity was assumed to have four times the values of the U Plant regional closure. It could possibly use the same workers or could potentially be done consecutively.	Fluor Hanford 2004:ES-7.
Deactivation of the Fast Flux Test Facility in the 400 Area	20	16	Not Applicable	This ongoing activity could require additional FTEs. Most truck trips would be on site.	DOE 2006a:2-8, 4-2, 4-3, 4-4, 4-8, 4-9.
Construction and operation of a Pacific Northwest National Laboratory Physical Sciences Facility	450	450	3	This activity involves construction impacts only. Annual workers were merely relocated, therefore they were already included in the baseline. The commuter numbers are supplied in the source document.	DOE 2007:39-41.
<b>Non-DOE Activities at the Hanford Site</b>					
Operation of the US Ecology commercial LLW disposal site near the 200-East Area	Included in baseline	Included in baseline	4	The facility is currently operating. Workers were already included in the ROI. Offsite truck trips represent potential future construction.	Ecology and WSDOH 2004:25, 35, 94, 141.
Management of the Hanford Reach National Monument and Saddle Mountain National Wildlife Refuge	41	76	Not Applicable	The commuter traffic represents the peak weekend number of national monument visitors.	USFWS 2008:4-202, 4-217.

**Table T-3. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Socioeconomics (continued)**

Project/Action	Peak Annual Employment (FTEs)	Peak Daily Traffic		Notes	Source
		Commuter <sup>a</sup>	Offsite Truck		
<b>Other Projects/Activities in the Region of Influence</b>					
Operation of the Perma-Fix Northwest (formerly Pacific EcoSolutions) Waste Treatment Facility in Richland, Washington	150	129	4	This includes DOE waste generators and other organizations' waste generators.	Richland 1998:14, 24, 25, 39, 40. DOE 1999c:1 of 9, 29 of 33, 32 of 33.
Construction and operation of biofuels facilities	162	96	35		Columbia Ethanol Plant Holdings 2006:13, 21, 43.
<b>Additional Activities Subtotal</b>	<b>2,235<sup>c</sup></b>	<b>2,111<sup>c</sup></b>	<b>110<sup>c</sup></b>		
<b>Grand Totals</b>					
Alternative Combination 1	<b>4,080<sup>c</sup></b>	<b>3,580<sup>c</sup></b>	<b>115<sup>c</sup></b>	Additional activities subtotal added to Alternative Combination 1.	
Alternative Combination 2	<b>10,400<sup>c</sup></b>	<b>8,660<sup>c</sup></b>	<b>189<sup>c</sup></b>	Additional activities subtotal added to Alternative Combination 2.	
Alternative Combination 3	<b>14,700<sup>c</sup></b>	<b>12,100<sup>c</sup></b>	<b>212<sup>c</sup></b>	Additional activities subtotal added to Alternative Combination 3.	

<sup>a</sup> Unless otherwise noted, commuter traffic figures were calculated based on employee numbers.

<sup>b</sup> For each combination, the peaks for each component could potentially occur during different timespans. In order to determine the potential impact from each combination of alternatives, the peak amount for each component was totaled together. The resulting conservative total estimates represent the upper limit of workforce requirements.

<sup>c</sup> Total may not equal the sum of the contributions due to rounding.

**Key:** DOE=U.S. Department of Energy; FTE=full-time equivalent; LLW=low-level radioactive waste; PUREX=Plutonium-Uranium Extraction; ROI=region of influence; TC & WM EIS=Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.

**Table T-4. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Transportation**

Activity	Worker		General Population		Traffic Fatalities
	Collective Dose (person-rem)	LCFs	Collective Dose (person-rem)	LCFs	
<b>Historical Shipments to the Hanford Site (1943–1993)</b>					
SNF shipments <sup>a</sup>	52	0.03	27	0.02	N/L
Radioactive waste <sup>a</sup>	240	0.14	290	0.17	N/L
<b>Subtotal</b>	<b>292</b>	<b>0.18</b>	<b>317</b>	<b>0.19</b>	<b>N/L</b>
<b>General Radioactive Material Transport (includes DOE and non-DOE actions)</b>					
1943–1982a, b	220,000	132	170,000	102	N/L
1983–2073a, c	154,000	92	168,000	101	116
<b>Subtotal</b>	<b>374,000</b>	<b>224</b>	<b>338,000</b>	<b>203</b>	<b>116</b>
<b>Reasonably Foreseeable Actions</b>					
<i>Surplus Plutonium Disposition EIS<sup>a</sup></i>	60	0.04	67	0.04	0.05
<i>Naval Reactor Disposal EIS (Navy 1996)</i>	5.8	0.00	5.80	0.0	0.01
<i>K Basin Fuel Storage EIS (DOE 1995)</i>	0.06	0.00	N/A	N/A	0.00
<i>Treatment of MLLW EA (DOE 1998)</i>	18	0.01	1.34	0.0	1.25
<i>Treatment of MLLW EA FONSI (DOE 1999c)</i>	0.48	0.0	0.19	0.0	N/L
<i>WM PEIS<sup>a, d</sup></i>	15,550	9.3	18,430	11.1	36
<i>WIPP SEIS-II<sup>a</sup></i>	790	0.47	5,900	3.54	5
<i>Idaho HLW and Facilities Disposition EIS<sup>a</sup></i>	520	0.31	2,900	1.74	1.0
<i>SNL Site-Wide EIS<sup>a</sup></i>	94	0.06	590	0.35	1.30
<i>Tritium Production in Commercial Light Water Reactor EIS<sup>a</sup></i>	16	0.01	80	0.05	0.06
<i>LANL Site-Wide EIS (DOE 2008b)</i>	910	0.55	287	0.17	2.96
<i>Plutonium Residue at Rocky Flats EIS<sup>a</sup></i>	2.10	0.00	1.30	0.00	0.01
<i>Surplus disposition of HEU<sup>a</sup></i>	400	0.24	520	0.31	1.10
<i>Molybdenum-99 Production EIS<sup>a</sup></i>	240	0.14	520	0.31	0.10
<i>Import of Russian Plutonium-238 EA<sup>a</sup></i>	1.80	0.00	4.40	0.00	0.00
<i>Pantex Site-Wide EIS<sup>a</sup></i>	250	0.15	490	0.29	0.01
<i>NTS Site-Wide EIS<sup>a</sup></i>	0.0	0.00	155 <sup>e</sup>	0.09	8
<i>Storage and disposition of fissile material<sup>a</sup></i>	0.0	0.00	2,400 <sup>e</sup>	1.44	5.5
<i>Stockpile stewardship<sup>a</sup></i>	0.0	0.0	38 <sup>e</sup>	0.02	0.06
<i>Container system for Naval SNF<sup>a</sup></i>	11	0.010	15	0.01	0.05
<i>DUF<sub>6</sub> Conversion at Paducah EIS (DOE 2004a)</i>	770	0.46	31	0.02	0.42
<i>S3G and DIG Prototype Reactor Plant Disposal EIS<sup>a</sup></i>	2.9	0.00	2.2	0.00	0.01
<i>SIG Prototype Reactor Plant Disposal EIS<sup>a</sup></i>	6.7	0.00	1.9	0.00	0.00
<i>DUF<sub>6</sub> Conversion at Portsmouth EIS (DOE 2004b)</i>	520	0.31	29	0.02	0.45
<i>ETTP DUF<sub>6</sub> Transport to Portsmouth EIS (DOE 2004b)</i>	99	0.06	3.20	0.00	0.33
<i>Spent Nuclear Fuel PEIS<sup>a</sup></i>	360	0.22	810	0.49	0.77
<i>FRR SNF EIS (DOE 1996)</i>	90	0.05	222	0.13	0.07
<i>Private Fuel Storage Facility Final EIS (NRC, BIA, BLM, and STB 2001)</i>	30	0.02	190	0.11	1
<i>West Valley Demonstration Project Waste Management EIS (DOE 2003b)</i>	520	0.31	410	0.25	0.15

**Table T-4. Past, Present, and Reasonably Foreseeable Future Actions Potentially Affecting Transportation (continued)**

Activity	Worker		General Population		Traffic Fatalities
	Collective Dose (person-rem)	LCFs	Collective Dose (person-rem)	LCFs	
<b>Reasonably Foreseeable Actions (continued)</b>					
<i>MOX Fuel Fabrication at SRS EIS (NRC 2005a)</i>	530	0.32	560	0.34	0.20
<i>Enrichment Facility in Lea County EIS (NRC 2005b)<sup>f</sup></i>	1,500	0.90	5,000	3.00	18
<i>Complex Transformation Programmatic EIS (DOE 2008d)</i>	5,500	3	190	0.10	0.02
<i>EA for the Decontamination, Demolition, and Removal of Certain Facilities at the West Valley Demonstration Project (DOE 2006b)</i>	14	0.00	11	0.00	0.01
<i>West Valley Decommissioning and/or Long-Term Stewardship Draft EIS (DOE and NYSERDA 2008)</i>	403	0.24	71	0.043	4
<b>Subtotal</b>	<b>29,214</b>	<b>18</b>	<b>39,936</b>	<b>24</b>	<b>88</b>
<b>Total Transportation Impacts Not Related to This TC &amp; WM EIS</b>					
<b>Total Impacts (Through 2073)</b>	<b>403,500<sup>g</sup></b>	<b>242</b>	<b>378,300<sup>g</sup></b>	<b>227</b>	<b>204</b>

<sup>a</sup> Values are from the *Final Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (Yucca Mountain SEIS)* (DOE 2008c).

<sup>b</sup> These estimates are very conservative because not that many shipments were made in the 1950s and 1960s. Also, the nonexclusive shipment dose estimates are based on a very conservative method.

<sup>c</sup> The annual dose estimates are similar to those generated for the period 1975–1983. The methodology used to estimate traffic fatalities is detailed in Chapter 6, Section 6.3.11.2.

<sup>d</sup> The values are for the low-level and mixed low-level radioactive waste transportation impacts based on the amended Record of Decision, 65 FR 10061, February 25, 2000.

<sup>e</sup> Includes worker and general population doses.

<sup>f</sup> Maximum values from truck transportation were used. For consistency with other data in this table, occupational traffic fatalities were not considered.

<sup>g</sup> The values are rounded to the nearest hundred.

**Key:** DOE=U.S. Department of Energy; DUF<sub>6</sub>=depleted uranium hexafluoride; EA=environmental assessment; EIS=environmental impact statement; ETTP=East Tennessee Technology Park; *FRR SNF EIS*=*Final Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel*; HEU=highly enriched uranium; HLW=high-level radioactive waste; *K Basin Fuel Storage EIS*=*Draft Environmental Impact Statement, Management of Spent Nuclear Fuel from the K Basins at the Hanford Site, Richland, Washington*; *LANL Site-Wide EIS*=*Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico*; LCF=latent cancer fatality; MLLW=mixed low-level radioactive waste; *MOX Fuel Fabrication at SRS EIS*=*Environmental Impact Statement on the Construction and Operation of a Proposed Mixed Oxide Fuel Fabrication Facility at the Savannah River Site, South Carolina*; N/A=not applicable; *Naval Reactor Disposal EIS*=*Final Environmental Impact Statement on the Disposal of Decommissioned, Defueled Cruiser, OHIO Class, and LOS ANGELES Class Naval Reactor Plants*; N/L=not listed; *NTS Site-Wide EIS*=*Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada*; PEIS=programmatic EIS; *Plutonium Residue at Rocky Flats EIS*=*Final Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloy Stored at the Rocky Flats Environmental Technology Site*; *Private Fuel Storage Facility Final EIS*=*Final Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah*; SEIS=supplemental EIS; SNF=spent nuclear fuel; SNL=Sandia National Laboratories; *TC & WM EIS*=*Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*; *Treatment of MLLW EA*=*Environmental Assessment, Non-thermal Treatment of Hanford Site Low-Level Mixed Waste*; *Treatment of MLLW EA FONSI*=*“Environmental Assessment, Offsite Thermal Treatment of Low-Level Mixed Waste,” Finding of No Significant Impact*; *Yucca Mountain SEIS*=*Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*; *WIPP SEIS-II*=*Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement*; *WM PEIS*=*Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste*.

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