

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 on short-term cumulative impacts for the following resource areas: land resources, ecological resources, cultural 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 impacts 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, approximately 60 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 flowchart showing the four phases of cumulative impacts analysis is presented in Appendix R, Figure R-2. The tables presented in this appendix 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

Project/Action	Total Land Area/ Terrestrial Habitat Affected^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
TC & WM EIS Activities						
Alternative Combination 1 ^b	2/2	0	See Chapter 4, Section 4.4.6.3, for a discussion of species potentially impacted under 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 4-157, Table 4-161
Alternative Combination 2 ^b	308/207	65.6	See Chapter 4, Section 4.4.6.3, for a discussion of species potentially impacted under 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 4-157, Table 4-161
Alternative Combination 3 ^b	797/753	348	See Chapter 4, Section 4.4.6.3, for a discussion of species potentially impacted under 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 4-157, Table 4-161
Other DOE Activities at the Hanford Site						
Central Plateau closure ^b	112	56.3	Not addressed	On site	The area would be required as a source of 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 ^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other DOE Activities at the Hanford Site (continued)						
Decommissioning of eight surplus production reactors and their support facilities in the 100 Areas ^{b, c}	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 ^b	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 ^b	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

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 ^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other DOE Activities at the Hanford Site (continued)						
Excavation and use of geologic materials from existing borrow pits ^b	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
Reactivation and use of three former borrow sites in the 100-F, 100-H, and 100-N Areas ^b	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

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 ^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other DOE Activities at the Hanford Site (continued)						
Construction and operation of the Environmental Restoration Disposal Facility near the 200-West Area ^b	414	414	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 1994:9-24; 2001b:6; Sackschewsky 2003:8
Closure of Nonradioactive Dangerous Waste Landfill and 600 Area Central Landfill ^d	61.1	0	Not present	On site	18.2 hectares in Borrow Area C and 42.9 hectares adjacent to the landfill to be closed. Mitigation would alleviate impacts on biological resources of concern.	DOE 2011a:1-1, 4-5, 4-6
Disposal of greater-than-Class C low-level radioactive waste	44.5	44.5	No threatened or endangered species on site. Potential to impact three state candidate species.	On site	Borehole facility would be generally visually unobtrusive, but would add to the generally developed nature of the 200 Areas, especially as seen from Rattlesnake Mountain.	DOE 2011b:2-44, 2-63, 6-92

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^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other DOE Activities at the Hanford Site (continued)						
Construction and operation of a Pacific Northwest National Laboratory Physical Sciences Facility ^b	40.1	25.9	Burrowing owls were observed on site. Potential impacts are expected on the sage sparrow and loggerhead shrike.	On site		DOE 2007a:26, 38
Total for Other DOE Activities at the Hanford Site	752	555	Not applicable	Not applicable	Not applicable	Not applicable

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 ^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Non-DOE Activities at the Hanford Site						
Management of the Hanford Reach National Monument and Saddle Mountain National Wildlife Refuge ^b	405	101	Impacts on threatened and endangered species would be generally minor; however, a number of species are present. Those potentially affected under the <i>TC & 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 34,826 hectares of shrub-steppe habitat are found in the monument; 1,214 hectares of shrub-steppe habitat would be restored each year. Recreation facilities and visitor services could disturb 405 hectares of land. Goal 8 of the <i>Hanford Reach National Monument Final Comprehensive Conservation Plan and Environmental Impact Statement, Adams, Benton, Grant and Franklin Counties, Washington</i> is to “protect the natural visual character and promote the opportunity to experience solitude on the Monument.”	USFWS 2008:2-46, 2-52, 4-72-4-82, 4-110

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^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Non-DOE Activities at the Hanford Site (continued)						
Operation of the US Ecology Commercial Low-Level Radioactive Waste Disposal Site near the 200-East Area ^b	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
Transport of Navy reactor compartments from the Columbia River and their disposal ^b	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
Rattlesnake Mountain cleanup	0	0	Not present	On site	Most facilities would be removed and replaced with two antennas and one building, which would occupy about 0.4 hectares of previously disturbed land.	DOE 2009:SUM-1, SUM-2
Total for Non-DOE Activities at the Hanford Site	449	142	Not applicable	Not applicable	Not applicable	Not applicable
Total for Hanford Site	1,200	697	Not applicable	Not applicable	Not applicable	Not applicable

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^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence						
Southridge development project, Kennewick, Washington	1,020	607	Burrowing owls were observed on site.	50 southeast	Habitat at the site includes 607 hectares of shrub steppe, 256 hectares of apple orchards, and 154 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	153	0	Not addressed	48 southeast	Primarily agricultural land (based on Google Earth aerial photography).	Kennewick 2006: 149
Clearwater development project, Kennewick, Washington	164	40.5	Not addressed	48 southeast	The site is 164 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
Pasco, Washington (three subdivisions)	115	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
Washington State University Tri-Cities Campus expansion	38.9	0	Not addressed	35 southeast	Approximately 26.7 hectares east and 12.1 hectares west of George Washington Way are undeveloped.	TVA 2008

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 ^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence (continued)						
Red Mountain Center (mixed use development), ^b West Richland, Washington	130	130	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 Viticultural Area, ^b Benton County, Washington	567	510	Not addressed	32 south	The total area is 1,781 hectares. The developed area is currently 283 hectares, but the number of vineyards could increase 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 2007:B-18
Yakima City, Washington (new subdivisions)	648	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

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^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence (continued)						
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	202	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 Resort, Morrow County, Oregon	648	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
Boardman Industrial Park, Morrow County, Oregon	162	0	Not addressed	76 south	The area is agricultural land (based on Google Earth aerial photography).	McClane 2007

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 ^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence (continued)						
Operation of the U.S. Army Yakima Training Center	19,700	14,600	No impact on federally listed threatened or endangered species.	26 west	Maneuver activity effects on 19,200 hectares, plus 500 hectares affected by fires. Data not provided on area of sagebrush habitat impacted; therefore, it was assumed that sagebrush habitat would be impacted in the same proportion as it occurs on site (i.e., 74 percent).	Army 2010:2-3, 5-15, 6-25, 6-29
Sunnyside Water Conservation Program, Washington	35.2	0	No impacts are expected on the bald eagle.	24 to 48 west and southwest	The area includes three reservoirs on agricultural and pasture land.	BOR 2004:17, 43, 46

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^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence (continued)						
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
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.	EFSEC 2005:1-6, 1-11, 1-48, 1-49

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 ^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence (continued)						
McNary–John Day transmission line	13	6.5	No federally listed threatened or endangered plant species present along route. “May affect but unlikely to adversely affect” nine federally listed threatened and endangered species. Potential impact on two state-listed plant species.	71 south-southeast (to McNary dam)	The line is 127 kilometers long; 48 kilometers of the line are within 80 kilometers of the 200 Areas. Shrub-steppe habitat includes grazed areas.	BPA and DOE 2002:2-4, 2-31, 3-18
Walla Walla–McNary transmission line	13.8	10.9	No federally listed threatened or endangered plant species present along route. Twelve state special status species are present, including loggerhead shrike, sage sparrow, and long-billed curlew.	71 south-southeast (to McNary dam)	The line is 89 kilometers long; 48 kilometers of the line are within 80 kilometers of the 200 Areas.	Pacific Power 2008:4, 5, 13, 34, 35

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^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence (continued)						
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	72 southeast	A total of 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

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^a (hectares)	Area of Shrub- Steppe Habitat Affected (hectares)	Threatened and Endangered Species	Distance from 200 Areas (kilometers)	Notes	Source
Other Projects/Activities in the Region of Influence (continued)						
Operation of the Perma-Fix Northwest (formerly Pacific EcoSolutions) Waste Treatment Facility in Richland, Washington	18.2	0	No impact	32 southeast	The project would impact 18.2 hectares of disturbed grassland. No sensitive habitats would be affected.	DOE 1998:8, 20, 21, 50
Total for Other Projects/Activities in the Region of Influence	23,800	16,200	Not applicable	Not applicable	Not applicable	Not applicable
Grand Totals						
Alternative Combination 1	25,000/25,000	16,900	Not applicable	Not applicable	Not applicable	Not applicable
Alternative Combination 2	25,300/25,200	17,000	Not applicable	Not applicable	Not applicable	Not applicable
Alternative Combination 3	25,800/25,800	17,200	Not applicable	Not applicable	Not applicable	Not applicable

^a For all non-TC & WM EIS projects and activities, it was conservatively 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 was also 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 nonnative habitat, grazing land, and cropland.

^b 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."

^c 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.

^d The 600 Area Central Landfill is referred to as the "Solid Waste Landfill" (DOE 2011a).

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 Impacts	Source
TC & WM EIS Activities			
Alternative Combination 1	2	On site. Specific elements of <i>TC & WM EIS</i> Alternative Combination 1 are addressed in Chapter 4, Section 4.4.7.	Chapter 4, Section 4.4.7
Alternative Combination 2	207	On site. Specific elements of <i>TC & WM EIS</i> Alternative Combination 2 are addressed in Chapter 4, Section 4.4.7.	Chapter 4, Section 4.4.7
Alternative Combination 3	753	On site. Specific elements of <i>TC & WM EIS</i> Alternative Combination 3 are addressed in Chapter 4, Section 4.4.7.	Chapter 4, Section 4.4.7
Other DOE Activities at the Hanford Site			
Central Plateau closure	112	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 ^a	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. Buildings 105-N and 109-N. 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 Impacts	Source
Other DOE Activities at the Hanford Site (continued)			
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 ^b	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	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 Impacts	Source
Other DOE Activities at the Hanford Site (continued)			
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 2007a:26, 37
Construction and operation of facilities for disposal of greater-than-Class C low-level radioactive waste	44.5	On site. Impacts on cultural resources could occur during the removal and hauling of soil required for the vault alternative.	DOE 2011b:6-102, 6-103
Closure of Nonradioactive Dangerous Waste Landfill and 600 Area Central Landfill	61.1	On site. The area has previously been impacted. Closing these facilities would have no adverse impact on cultural resources.	DOE 2011a:4-3, 4-4, 4-5, Appendix A
Non-DOE Activities at the Hanford Site			
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

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

Action	Total Area Disturbed (hectares)	Cultural Resources Impacts	Source
Non-DOE Activities at the Hanford Site (continued)			
Management of the Hanford Reach National Monument and Saddle Mountain National Wildlife Refuge	405	On site. Many of the areas to be affected have been previously disturbed. Goal 5 of the <i>Hanford Reach National Monument Final Comprehensive Conservation Plan and Environmental Impact Statement, Adams, Benton, Grant and Franklin Counties, Washington</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
Rattlesnake Mountain Cleanup	4.0	On site. Activities would disturb some NRHP-eligible structures, although impacts of these activities would be mitigated. Overall, removal of structures and cleanup of waste will improve visual impacts and therefore lessen impacts on American Indian resources.	DOE 2009:13
Operation of the US Ecology Commercial Low-Level Radioactive Waste Disposal Site near the 200-East Area	40.5	On site. There is a high probability that the proposed actions would not impact any historic buildings, archaeological sites, or specific American Indian areas of interest.	Ecology and WSDOH 2004:134

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

Action	Total Area Disturbed (hectares)	Cultural Resources Impacts	Source
Other Activities in the Region of Influence			
Red Mountain American Viticultural Area, Benton County, Washington	567	The area is within the viewshed of nearby higher elevations, which are of interest to the American Indians. The number of vineyards could increase in the next 5 years.	Benton County 2007

^a 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*.

^b As a result of tribal and public comments on the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (DOE 1999a), 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; NRHP=National Register of Historic Places; *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 ^a	Offsite Truck		
Existing Site Activities					
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
TC & WM EIS Activities					
Alternative Combination 1 ^b	1,840	1,470	4	–	Chapter 4, Section 4.4.8, provides information on TC & WM EIS Alternative Combination 1
Alternative Combination 2 ^b	8,190	6,550	79	–	Chapter 4, Section 4.4.8, provides information on TC & WM EIS Alternative Combination 2
Alternative Combination 3 ^b	12,500	10,000	102	–	Chapter 4, Section 4.4.8, provides information on TC & WM EIS Alternative Combination 3
Other DOE Activities at the Hanford Site					
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 1999a: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	408	326	1	This is an ongoing activity. Future milestones could require additional FTEs. Employment would be reduced 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; 2007b

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 ^a	Offsite Truck		
Other DOE Activities at the Hanford Site (<i>continued</i>)					
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 2007a:39-41
Construction and operation of facilities for disposal of greater-than-Class C LLW	66	53	2	Of Alternatives 3 through 5, the alternative with the largest number of employees who would in-migrate was used; other employees were assumed to relocate from other Hanford Site activities.	DOE 2011b:Section 6.2.6, Appendix D.5.2
Non-DOE Activities at the Hanford Site					
Operation of the US Ecology Commercial Low-Level Radioactive Waste 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 region of influence. 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 ^a	Offsite Truck		
Other Projects/Activities in the Region of Influence					
Future land use in the region	700	700	Not applicable	Potential increases in employees exist with the North Richland Research Park. No data on truck traffic. No carpooling was assumed.	Benton County 2007:2-3
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. Commuter traffic numbers were supplied in the source document.	Richland 1998:14, 24, 25, 39, 40. DOE 1999b:1 of 9, 29 of 33, 32 of 33
Yakima River basin water management	14	14	Not applicable	Total water-related jobs and incomes would likely increase, both statewide and in the two economic regions that incorporate portions of the Yakima River basin, one of which is centered on Kennewick, Pasco, and Richland. No carpooling was assumed.	Ecology 2009:Section 5.13.2
Construction and operation of biofuels facilities	162	72	70	Commuter and truck traffic numbers were supplied in the source document.	Columbia Ethanol Plant Holdings 2006:13, 21, 32
Additional Activities Subtotal	3,280^c	2,850^c	148^c		
Grand Totals					
Alternative Combination 1	5,130^c	4,330^c	152^c	Additional activities subtotal added to Alternative Combination 1.	
Alternative Combination 2	11,500^c	9,410^c	227^c	Additional activities subtotal added to Alternative Combination 2.	
Alternative Combination 3	15,800^c	12,900^c	250^c	Additional activities subtotal added to Alternative Combination 3.	

^a Unless otherwise noted, commuter traffic figures were calculated based on employee numbers by dividing the number of employees by 1.25 to account for carpooling.

^b For each combination, the peaks for each component could potentially occur during different timespans. To determine the potential impact of 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.

^c 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; 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	
	Collective Dose (person-rem)	LCFs	Collective Dose (person-rem)	LCFs
Historical Shipments to the Hanford Site (1943–1993)				
SNF shipments ^a	52	0.03	27	0.02
Radioactive waste ^a	240	0.14	290	0.17
Subtotal	292	0.18	317	0.19
General Radioactive Material Transport (includes DOE and non-DOE actions)				
1943–1982 ^{a, b}	220,000	132	170,000	102
1983–2073 ^{a, c}	154,000	92	168,000	101
Subtotal	374,000	224	338,000	203
Reasonably Foreseeable Actions				
<i>Surplus Plutonium Disposition EIS^a</i>	60	0.04	67	0.04
<i>K Basin Fuel Storage EIS (DOE 1995)</i>	0.06	0.00	N/A	N/A
<i>Treatment of MLLW EA (DOE 1998)</i>	18	0.01	1.34	0.0
<i>Treatment of MLLW EA FONSI (DOE 1999b)</i>	0.48	0.0	0.19	0.0
<i>WM PEIS^{a, d}</i>	15,550	9.3	18,430	11.1
<i>WIPP SEIS-II^a</i>	790	0.47	5,900	3.54
<i>Idaho HLW and Facilities Disposition FEIS^a</i>	520	0.31	2,900	1.74
<i>SNL Site-Wide EIS^a</i>	94	0.06	590	0.35
<i>Tritium Production in Commercial Light Water Reactor EIS^a</i>	16	0.01	80	0.05
<i>LANL Site-Wide EIS (DOE 2008a)</i>	910	0.55	287	0.17
<i>Plutonium Residue at Rocky Flats EIS^a</i>	2.10	0.00	1.30	0.00
<i>Surplus Disposition of HEU EIS^a</i>	400	0.24	520	0.31
<i>Molybdenum-99 Production EIS^a</i>	240	0.14	520	0.31
<i>Import of Russian Plutonium-238 EA^a</i>	1.80	0.00	4.40	0.00
<i>Pantex Site-Wide EIS^a</i>	250	0.15	490	0.29
<i>Draft NNS Site-Wide EIS (DOE 2011c)</i>	5,500	3.33	1,360	0.82
Storage and disposition of fissile material ^a	0.0	0.00	2,400 ^e	1.44
Stockpile stewardship ^a	0.0	0.0	38 ^e	0.02
Container system for Naval SNF ^a	11	0.010	15	0.01
<i>DUF₆ Conversion at Paducah EIS (DOE 2004a)</i>	770	0.46	31	0.02
<i>S3G and DIG Prototype Reactor Plant Disposal EIS^a</i>	2.9	0.00	2.2	0.00
<i>SIC Prototype Reactor Plant Disposal EIS^a</i>	6.7	0.00	1.9	0.00
<i>DUF₆ Conversion at Portsmouth EIS (DOE 2004b)</i>	520	0.31	29	0.02
<i>ETTP DUF₆ Transport to Portsmouth EIS (DOE 2004b)</i>	99	0.06	3.20	0.00
<i>Spent Nuclear Fuel PEIS^a</i>	360	0.22	810	0.49
<i>FRR SNF EIS (DOE 1996)</i>	90	0.05	222	0.13

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

Activity	Worker		General Population	
	Collective Dose (person-rem)	LCFs	Collective Dose (person-rem)	LCFs
Reasonably Foreseeable Actions (continued)				
<i>Private Fuel Storage Facility Final EIS</i> (NRC, BIA, BLM, and STB 2001)	30	0.02	190	0.11
<i>West Valley Demonstration Project Waste Management EIS</i> (DOE 2003b)	520	0.31	410	0.25
<i>MOX Fuel Fabrication at SRS EIS</i> (NRC 2005a)	530	0.32	560	0.34
<i>Enrichment Facility in Lea County EIS</i> (NRC 2005b) ^f	1,500	0.90	450	0.27
<i>Y-12 Site-Wide EIS</i> (DOE 2011d)	0	0	309	0.19
<i>EA for the Decontamination, Demolition, and Removal of Certain Facilities at the West Valley Demonstration Project</i> (DOE 2006b)	14	0.00	11	0.00
<i>West Valley Decommissioning and/or Long-Term Stewardship EIS</i> (DOE and NYSERDA 2010)	400	0.24	72	0.043
<i>Draft GTCC EIS</i> (DOE 2011b)	500	0.30	170	0.1
Subtotal	29,800	18	36,900	22
Total Transportation Impacts Not Related to This TC & WM EIS				
Total Impacts (Through 2073)	404,000g	242	375,000g	225

^a 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* (DOE 2008b).

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

^c 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.

^d 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.

^e Includes worker and general population doses.

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

^g The values are rounded to three significant figures.

Key: DOE=U.S. Department of Energy; DUF₆=depleted uranium hexafluoride; EA=environmental assessment; EIS=environmental impact statement; ETPP=East Tennessee Technology Park; FONSI=Finding of No Significant Impact; FRR=foreign research reactor; GTCC=greater-than-Class C; HEU=highly enriched uranium; HLW=high-level radioactive waste; LANL=Los Alamos National Laboratory; LCF=latent cancer fatality; MLLW=mixed low-level radioactive waste; MOX=mixed oxide; N/A=not applicable; NNSS=Nevada National Security Site; PEIS=programmatic EIS; SEIS=supplemental EIS; SNF=spent nuclear fuel; SNL=Sandia National Laboratories; SRS=Savannah River Site; *TC & WM EIS*=*Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington*; WIPP=Waste Isolation Pilot Plant; WM=waste management. The following are the complete titles of documents cited in this table as sources of data drawn from the *Yucca Mountain Final SEIS* (DOE 2008b) and thus not included among the source materials provided as references for this appendix:

- *Idaho HLW and Facilities Disposition FEIS=Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement*
- *Import of Russian Plutonium-238 EA=Environmental Assessment of the Import of Russian Plutonium-238*
- *Molybdenum-99 Production EIS=Medical Isotopes Production Project: Molybdenum-99 and Related Isotopes, Environmental Impact Statement*
- *Pantex Site-Wide EIS=Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components*

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

- *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*
- *SIC Prototype Reactor Plant Disposal EIS=Final Environmental Impact Statement, SIC Prototype Reactor Plant Disposal*
- *S3G and DIG Prototype Reactor Plant Disposal EIS=Final Environmental Impact Statement, Disposal of S3G and DIG Prototype Reactor Plants*
- *SNL Site-Wide EIS=Site-Wide Environmental Impact Statement for Sandia National Laboratories, New Mexico*
- *Spent Nuclear Fuel PEIS=Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement*
- *Surplus Disposition of HEU EIS=Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement*
- *Surplus Plutonium Disposition EIS=Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement*
- *Tritium Production in Commercial Light Water Reactor EIS=Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor*
- *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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