Chapter 24: Cumulative Impacts

24.1 Introduction

The regulations of the Council on Environmental Quality (CEQ) require an assessment of cumulative impacts. These regulations ensure that the proposed West Davis Corridor (WDC) and other federal, state, and private actions will be evaluated with regard to cumulative impacts.

What are cumulative impacts?

Cumulative impacts are the resulting impacts from the proposed action combined with impacts from other past, present, and reasonably foreseeable future actions.

Cumulative impacts are defined by the CEQ regulations in 40 Code of Federal Regulations (CFR) 1508.7. The CEQ regulations define cumulative impacts as:

> … the impact on the environment which results from the incremental impact of the [proposed] action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Cumulative impacts include the direct and indirect impacts of a proposed project together with the reasonably foreseeable future actions of other projects.

- *Direct impacts* are defined by the CEQ regulations as "effects which are caused by the [proposed] action and occur at the same time and place." For the WDC Project, an example of a direct impact would be taking a wetland for right-of-way for an interchange.
- *Indirect impacts* are defined by the CEQ regulations as "effects which are caused by the [proposed] action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate …" For the WDC Project, an example of an indirect impact could be urban development on farmland or wetlands as a result of new access provided by the WDC.

Cumulative impacts also include the impacts of "other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions." For this project, an example of a past action in the WDC study area is historic farming operations.

What is the WDC study area?

The WDC study area is the area described in Section 1.2, Description of the Needs Assessment Study Area.

Examples of reasonably foreseeable future actions include the planned residential developments in Kaysville and the planned roadway-widening transportation projects, such as 4000 South and State Route (SR) 108, listed in the Regional Transportation Plan developed by the Wasatch Front Regional Council (WFRC).

What is the Wasatch Front Regional Council (WFRC)?

The Wasatch Front Regional Council is the designated metropolitan planning organization that works in partnership with the Utah Department of Transportation (UDOT), city and county governments, and other stakeholders to develop the Regional Transportation Plan for the Wasatch Front Urban Area. This plan is the region's plan for highway, transit, and other transportation-related improvements to meet the area's growing transportation needs over the next 30 years.

These reasonably foreseeable future actions are independent of the WDC Project but must be considered in this Environmental Impact Statement (EIS) as part of the cumulative impacts analysis. The future actions considered in this EIS are listed in Table 24-1, Present and Reasonably Foreseeable Transit and Roadway Actions, on page 24-10 and in Table 24-2, Present and Reasonably Foreseeable Development Actions, on page 24-13.

24.2 Methodology for Determining Cumulative Impacts

The methodology for determining the cumulative impacts of the proposed WDC is based on the CEQ guidance *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997) and the Federal Highway Administration (FHWA) position paper *Secondary and Cumulative Impact Assessment in the Highway Development Process* (FHWA 1992).

This chapter provides a general overview of the methodology used to conduct the cumulative impacts analysis. The specific analyses of direct impacts are discussed in the appropriate resource chapters in this EIS.

24.3 Cumulative Impacts Analysis

24.3.1 Important Cumulative Impact Issues Associated with the WDC

The WDC could affect resources either directly or indirectly. Resources can be elements of the physical environment, species, habitats, ecosystem parameters and functions, cultural resources, recreation opportunities, the structure of human communities, traffic patterns, or other economic and social conditions.

However, according to CEQ's cumulative impacts guidance, the cumulative impacts analysis should be narrowed to focus on important issues at a national, regional, or local level. The analysis should look at other actions that could have similar effects and whether a particular resource has been historically affected by cumulative actions. The cumulative impacts analysis should "count what counts," not provide a superficial list of issues that have little relevance to the effects of the proposed action or the eventual decision.

24.3.1.1 Cumulative Impact Concerns Identified during Scoping

As part of the WDC EIS process, the WDC team held scoping meetings with the public and resource agencies to help identify issues to be analyzed in the EIS. The comments received during the public and agency scoping period were reviewed to determine whether any important issues were identified.

What is scoping?

Scoping is an early and open process for determining the scope of issues to be addressed and for identifying the important issues related to a proposed action.

Public Concerns. The public identified the following main concerns regarding cumulative impacts:

- Loss of farmland
- Loss of wetlands, wildlife areas, and water bodies
- Continued degradation of air and water quality
- Value of home prices due to the combined effects of the WDC and the economic recession

Concerns of Local Municipalities. Meetings were held with local municipalities in the WDC study area. The main issues identified by community officials included preserving farmland and the rural character of the area, including open space.

Concerns of Resource Agencies. Several methods were used to solicit potential issues from the resource agencies. First, during the WDC scoping period, letters were sent to the agencies asking them to identify issues to be studied in the EIS. Second, a resource agency scoping meeting was held on January 19, 2010, to identify potential issues and develop initial methodologies for conducting the cumulative impacts analysis. Third, after the scoping meeting, the WDC team continued to coordinate with the resource agencies to refine issues and EIS methodologies for analyzing cumulative impacts.

Which resource agencies were consulted?

The resource agencies consulted for the cumulative impacts analysis were the U.S. Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (USACE), and the Utah Division of Wildlife Resources.

Over the course of the scoping period, the resource agencies identified the following initial issues:

- Loss of wetlands and wildlife habitat along the Great Salt Lake in Davis and Weber Counties
- Indirect impacts to regional air and water quality
- Loss of floodplains along the Great Salt Lake
- Degradation of water quality, increase in stormwater flow, and loss of stream ecology

Finally, in April 2011, the WDC team shared with the resource agencies the WDC cumulative impacts approach so that the agencies could review and comment on it and determine whether the proposed list of resources to be analyzed for cumulative impacts was acceptable. The agencies concurred with the cumulative impacts methodology and resources to be analyzed (farmland, economics, air quality, water quality, ecosystems, and floodplains). However, both USACE and EPA asked the WDC team to also analyze cumulative impacts to the community (Coursen 2011; Hermann 2011; Kramer 2011; Urbanic 2011).

What is the West Davis Corridor team?

The West Davis Corridor team consists of the lead agencies for the WDC Project (FHWA and UDOT).

24.3.1.2 Important Cumulative Impacts Issues

Based on the results of the scoping process and the potential for direct impacts from the WDC, the WDC team identified the following seven important cumulative impacts issues, which are the focus of the cumulative impacts analysis in this chapter:

- Ecosystems (wetlands and wildlife habitat)
- Air quality
- Water quality
- Floodplains
- Farmland
- Economics
- Community impacts

No threatened or endangered species were identified in the WDC study area; therefore, cumulative impacts to threatened or endangered species were not analyzed.

24.3.1.3 Urban Growth and Land Use

The potential cumulative impacts on the resources under study depend on future changes in land use in the WDC study area and the direct impacts from the WDC. The cumulative impacts analysis considered the anticipated changes in land use from regional growth and from direct and secondary (induced) development caused by the WDC. The past and present changes in land use in the WDC study area and along the Wasatch Front are one of the main factors causing the loss of wetlands, wildlife habitat, and farmland and the historic degradation of water and air quality.

What is induced development?

Induced development is development that occurs because a roadway project makes it easier for residents to live farther from destinations such as employment and shopping. Induced development can change the pattern of land uses, population density, or growth rates in the project's study area.

The potential indirect impacts on land use caused by the WDC are analyzed in Chapter 23, Indirect Effects. In addition, the impacts of other reasonably foreseeable actions are being considered for the resources being studied (see Table 24-1, Present and Reasonably Foreseeable Transit and Roadway Actions, on page 24-10).

24.3.2 Geographic Scope for the Analysis

The geographic scope for the cumulative impacts analysis was determined by establishing the area of project impacts and determining the geographic areas occupied by each affected resource.

24.3.3 Timeframe for the Analysis

The timeframe for the cumulative impacts analysis includes past and future time periods. The time period for the past impact analysis varies by resource depending on the timeframe for which historical data were available. The time period for the future impact analysis extends from the present day to the reasonably foreseeable year of 2040 based on the current WFRC Regional Transportation Plan which extends to the forecast year 2040. In addition, a baseline year is provided for each resource to provide the context for evaluating the cumulative environmental consequences and includes historical cumulative effects to the extent feasible.

The time period for the past analysis was determined by the information available for each resource. For some resources, data were available for only the past 10 to 20 years, while for other resources data were available back to early Euro-American settlement of the Wasatch Front. In addition, for some resources such as air quality, it was more appropriate to begin the analysis when data were available from monitoring sites rather than at the onset of modern settlement when air quality records were not available. The specific past-year timeframe for each resource analysis is described in each specific resource chapter and is listed below:

- Ecosystems (wetlands and wildlife habitat): 1850–2040
- Air quality: 1990–2040
- Water quality: 1975–2040
- Floodplains: 1980–2040
- Farmland: 1900–2040
- Economics: 2005–2040
- Community impacts: 1950–2040

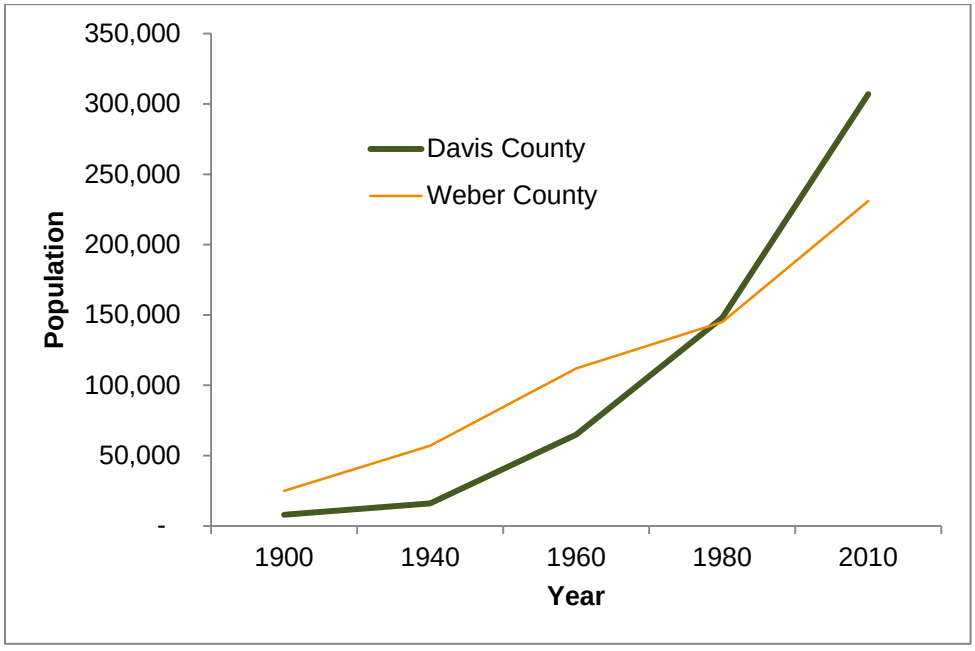
24.3.4 Other Actions Affecting the Resources, Ecosystems, and Human Communities of Concern

This section provides a brief overview of the past actions and the present and reasonably foreseeable actions that contributed or could contribute to cumulative impacts. Many of the baseline conditions relevant to cumulative impacts are described in detail in various chapters in this EIS.

24.3.4.1 Past Actions

Weber and Davis Counties have experienced major urban expansion resulting in large residential, commercial, and industrial centers along with associated infrastructure such as freeways and surface streets. The 1900 U.S. Census found that Davis County had a population of about 8,000 people and Weber County had a population of about 25,000 people. As shown in Chart 24-1 below, the population in these counties has increased dramatically since 1900, and this steady increase has led to continuing urban expansion (GOMB 2012).

Chart 24-1. Population Growth in Davis and Weber Counties, 1900 to 2010



From 1900 to the 1950s, the populations of Davis and Weber Counties grew slowly. The economy of the counties primarily supported people engaged in irrigation agriculture and livestock raising. The Utah Central Railroad (now the Union Pacific Railroad) was built in 1870, crossing Davis and Weber Counties from Ogden on the north to Salt Lake City on the south and providing transportation links to bring in manufactured products. This was the beginning of a transition that led to mechanized agriculture and a surge of commerce,

banking, and local business along with improved roads, new water systems, and the electrification of homes and businesses.

As the age of the automobile and interurban railways created greater mobility, many Davis and Weber County citizens looked to Ogden and Salt Lake City for employment. Small farms, dairy farms, beef cattle, orchards, and fields of grain and sugar beets continued to sustain local farmers.

World War II then introduced a new way of life in Davis and Weber Counties. The establishment of Hill Air Force Base in northern Davis County and the Defense Depot Ogden created a surge of civilian employment. Hill Air Force Base quickly became and remains the state's largest employer. Diversification brought rapid post-war growth. This period also saw the construction of the large industrial Freeport Center facility.

After World War II, suburban development occurred mostly in the eastern part of the counties along the Wasatch Mountains. Interstate 15 (I-15) was constructed in the 1960s, providing convenient access to Salt Lake City. Urban development started spreading west of I-15 in the agricultural land starting in the 1960s and continuing to today.

Within the WDC study area, the growth in population has led to about 31,800 acres being developed for urban uses out of the total 64,300 acres (both developable and undevelopable land). The remaining 32,500 acres in the study area consist of agricultural land (20,200 acres), open space (7,500 acres), and conservation areas (4,800 acres). For comparison, in 2005, all of Davis County had about 58,000 acres developed for urban uses out of 407,000 acres in the county, and all of Weber County had about 61,000 acres developed out of 422,000 acres in the county (GOMB 2008). Many of the undeveloped areas consist of undevelopable land such as the Wasatch Mountains and the Great Salt Lake. In addition, Davis County has about 24,000 acres associated with agricultural uses, and Weber County has about 49,000 acres (GOMB 2008).

Within the study area, about 20,000 acres are dedicated to agricultural uses. The urban development has caused the loss of farmland, wetlands, and wildlife habitat. The amount of land available for growth in Davis and Weber Counties is limited by the surrounding mountains and the Great Salt Lake. Figure 24-1, Wasatch Front North Developed Land 2005, in Volume IV provides an overview of developed areas along the Wasatch Front in 2005.

Past actions have also substantially altered the Great Salt Lake. Roads and rail lines that cross the lake have altered its water quality and wildlife habitat. The lake has also been used for mineral extraction (salt, magnesium, and potassium), aquaculture (brine shrimp), and recreational activities (waterfowl hunting, bird watching, and boating) (Bioeconomics 2012). Farming on the east side of the lake has led to a substantial loss of wetlands when natural watercourses were placed in drains to dry the land for agriculture. To preserve parts of the Great Salt Lake ecosystem, nongovernmental organizations such as The Nature Conservancy have worked in conjunction with government organizations to protect many of the wetland and associated upland areas along the lake's east shore.

24.3.4.2 Present and Reasonably Foreseeable Actions

The WDC team took several steps to determine the potential present and future actions to consider in the cumulative impacts analysis. The first step involved coordinating with UDOT, the Utah Transit Authority, and WFRC to help identify other transit and roadway projects that could result in cumulative impacts when combined with the WDC. This step included reviewing environmental documents that were recently completed or are in progress and WFRC's 2015–2040 Regional Transportation Plan. In addition, UDOT held multiple meetings with project managers to identify current and upcoming projects and the scope of the potential impacts. The intent of these meetings was to address region-wide issues related to cumulative impacts.

Next, the team contacted municipalities in the WDC study area to help identify major local projects including private developments (West Davis Corridor Team 2012a, 2012b). Finally, the team used the *2008 Utah Baseline Report: Current Conditions, Trends, and Projections* from the Utah Governor's Office of Management and Budget (GOMB 2008) to help determine potential long-term (2030 and 2040) development trends anticipated for the Wasatch Front, including the anticipated number of acres that will be developed. This report was prepared with input from Envision Utah, the Utah Quality Growth Commission, the Utah Divisions of Air Quality and Water Resources, and UDOT.

Table 24-1 and Table 24-2 below show the major projects identified as other actions to be considered that could have a cumulative effect on area resources. Projects were determined to be reasonably foreseeable if they were in a transportation plan, were platted by a city or county, or were likely to occur based on city and county input.

What is a plat?

A plat is a map showing the divisions of a piece of land. Further refinement often splits these pieces into individual lots, known collectively as a subdivision.

According to the Governor's Office of Planning and Budget, about 47,000 additional acres are expected to be developed between 2005 and 2030 in Davis and Weber Counties (which include areas outside the WDC study area). This projection is based on a current urbanized area of about 119,000 acres (58,000 acres in Davis County and 61,000 acres in Weber County) and a future urbanized area of about 166,000 acres in both counties in 2030 if current trends continue (GOMB 2008).

Assuming that the same pace of development continues to 2040, about 66,000 acres would be developed between 2005 and 2040 with or without the WDC. This developed land would include proposed future residential and commercial developments and the approximately 50 roadway and transit projects identified in WFRC's 2015–2040 Regional Transportation Plan in Davis and Weber Counties (WFRC 2015) that would be implemented with or without the WDC.

Many future development or infrastructure projects are not listed in Table 24-1 and Table 24-2 because they are not yet included in adopted plans. However, these projects are included in the expected 66,000 acres of overall urban-related development by 2040 and are considered reasonably foreseeable. Because most of the projects in the long-range transportation plans are in the planning stages, specific details about the impacts of these planned developments were not available.

In 2008, the Governor's Office of Management and Budget determined the projected development growth that is expected along the greater Wasatch Front, which includes the area proposed for the WDC in Davis and Weber Counties. As shown in Figure 24-2, Wasatch Front North Developed Land 2030, in Volume IV, much of the area that was undeveloped or agricultural in 2005 (see Figure 24-1, Wasatch Front North Developed Land 2005, in Volume IV) is expected to be developed by 2030 based on current population growth rates with or without the WDC. As shown in Figure 24-2, most of the agricultural land in the WDC study area is expected to be converted to urban development.

The projections from the Governor's Office of Management and Budget do not include specific projects such as the WDC but are based on overall population growth, which the Office distributes down to the county level. WFRC in cooperation with the Cities then divides this growth among the cities. This growth is used to develop future road projects.

Table 24-1. Present and Reasonably Foreseeable Transit and Roadway Actions

Project or Activity	Description	Impacts	Project Status
Davis County Projects – Roadway			
1800 North Widening (UDOT 2015)[a]	Widening from two to four lanes from I-15 to 2000 West.	Analysis is in process; the impacts below are estimates. • Farmland – None • Air quality – Project conforms to State Implementation Plan • Water quality – Increase in impervious surface could reduce water quality • Wetlands – None • Wildlife habitat – None • Community impacts – Up to 51 relocations • Floodplains – None	Planning
SR 193 Extension (UDOT 2011)[a]	Construction of a new four-lane arterial from State Street to 2000 West.	• Farmland – 22 acres converted to transportation use • Air quality – Project conforms to State Implementation Plan • Water quality – Increase in impervious surface could reduce water quality • Wetlands – None • Wildlife habitat – None • Community impacts – 22 relocations • Floodplains – None	Completed – 2015
SR 108 (FHWA 2008)[a]	Widening from two to four lanes from Antelope Drive to 1900 West.	• Farmland – 26 acres converted to transportation use • Air quality – Project conforms to State Implementation Plan • Water quality – None • Wetlands – 1 acre converted to transportation use • Wildlife habitat – Minor impact to agricultural land • Community impacts – 61 relocations • Floodplains – None	Construction

(*continued on next page)*

Table 24-1. Present and Reasonably Foreseeable Transit and Roadway Actions

Project or Activity	Description	Impacts	Project Status
I-15	Widening to add a high-occupancy vehicle (HOV) lane or high-occupancy/toll (HOT) lane from Interstate 84 (I-84) (Weber County) to Hill Field Road. Widening to add an HOV/HOT lane from U.S. Highway 89 (US 89) to Interstate 215 (I-215).	• Farmland – None • Air quality – Project conforms to State Implementation Plan • Floodplains – None • Water quality – Increase in impervious surface could reduce water quality • Wetlands – Minor • Wildlife habitat – None • Community impacts – None	Completed – 2016
Legacy Parkway	New construction of a four-lane, 14-mile highway.	• Farmland – 23 acres converted to transportation use • Air quality – Project conforms to State Implementation Plan • Floodplains – 138 acres converted to transportation use • Water quality – Increase in impervious surface could reduce water quality • Wetlands – 100 acres converted to transportation use • Wildlife habitat – 483 acres converted to transportation use • Community impacts – 28 relocations	Completed – 2008
Shepard Lane Interchange	New interchange on I-15 at Shepard Lane with possible road alignment on the Kaysville–Farmington boundary.	Project has not been developed in enough detail to determine level of impacts. Below are estimates based on a new interchange and three-lane road to the west. • Farmland – Less than 2 acres converted to transportation use • Air quality – Project is in WFRC's 2015–2040 Regional Transportation Plan, thus conforms to State Implementation Plan • Floodplains – None (would likely avoid Haight Creek) • Water quality – Increase in impervious surface could reduce water quality • Wetlands – Either avoided or up to 0.5 acre affected • Wildlife habitat – No high-quality habitat affected • Community impacts – No residential acquisitions are expected	In Phase 1 of WFRC's 2015–2040 Regional Transportation Plan

(*continued on next page)*

Table 24-1. Present and Reasonably Foreseeable Transit and Roadway Actions

Project or Activity	Description	Impacts	Project Status
Weber County Projects – Transit			
Commuter Rail, Ogden to Pleasant View	Phase 2 extension of commuter rail from Ogden Intermodal Center to Pleasant View.	Analysis has not started; the impacts below are estimates. • Farmland – None • Air quality – Project conforms to State Implementation Plan • Floodplains – None • Water quality – Minor increase in pollutants • Wetlands – Minor • Wildlife habitat – Minor changes to habitat • Community impacts – Minor • Threatened and endangered species – None	Planning
Ogden – Weber State University Streetcar	Phase 1 Enhanced Bus (BRT 1) and Bus Rapid Transit (BRT 3) between Ogden Intermodal Center and McKay-Dee Hospital.	None expected.	Planning
Weber County Projects – Roadway			
4000 South	Widen from two lanes to four lanes from 5500 West to I-15.	Analysis has not started; the impacts below are estimates. • Farmland – Minor • Air quality – Project conforms to State Implementation Plan • Floodplains – None • Water quality – Increase in impervious surface could reduce water quality • Wetlands – Minor • Wildlife habitat – Minor • Community impacts – High • Threatened and endangered species – None	Planning

[a] Data from most recent environmental document; see reference.

Table 24-2. Present and Reasonably Foreseeable Development Actions

Project or Activity	Description	Impacts	Project Status
Development in Weber and Davis Counties (See below for some of the specific developments.)	The area is developing quickly with traditional urban land uses (housing, commercial, retail, infrastructure, and institutional uses) through the 2040 planning period. The urbanized area is expected to increase from 119,000 acres in 2005 to about 185,000 acres in 2040. Development includes land developed as part of future roadway (such as the Shepard Lane interchange) and transit projects identified in WFRC's 2015–2040 Regional Transportation Plan. Large developments are listed below (GOMB 2008).	Loss of open space, farmland, wildlife habitat, and wetlands. Increase in air pollutant emissions, stormwater runoff, and noise.	Current and future land-development projects are expected to the year 2040. Some projects are currently being developed, and others are in the preliminary planning stages. Some of the 66,000 acres of development include anticipated urban growth based on population projections. By 2040, Davis County will add 41,000 new homes and Weber County 43,000 new homes (Economic & Planning Systems 2005).

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Table 24-2. Present and Reasonably Foreseeable Development Actions

Davis County

1. Farmington – 500-acre, mixed-use Station Park development; between Shepard Lane and 100 North (parts completed; others under construction)
2. Farmington – 80-acre industrial development; Glovers Lane adjacent to I-15 (parts completed; others under construction)
3. Farmington – Additional phase of Farmington Ranches and Hunter Creek subdivisions; Buffalo Ranches connector road; West Farmington (parts completed; others under construction)
4. Farmington – New subdivisions; West Farmington including 83-unit Farmington Conservation Park subdivision (parts completed; others under construction)
5. Farmington – New high school and elementary school; Glovers Lane near I-15 (under construction)
6. Kaysville – 120-unit, 60-acre subdivision; 200 North near the WDC (parts completed; others under construction)
7. Kaysville – 42-unit, 18-acre subdivision; 200 North near the WDC (parts completed; others under construction)
8. Kaysville – 33-unit, 20-acre subdivision; Bonneville Lane near Wellington Drive (parts completed; others under construction)
9. Kaysville – 120-unit, 78-acre subdivision; east side of Angel Street (planning)
10. Kaysville – 10-acre commercial development; east side of Angel Street (planning)
11. Kaysville – 10-unit, 6.4-acre subdivision; north side of Western Drive (parts completed; others under construction)
12. Kaysville – 150-unit, 51-acre subdivision; south side of Western Drive (completed)
13. Kaysville – 41-unit, 25-acre subdivision; north of Shepard Lane (parts completed; others under construction)
14. Layton – Mixed-use village center; 2700 West and Hill Field Road (planning)
15. Layton – 30-acre, mixed-use development; Layton Parkway near Flint Street. Other developments include Foothills at Cherry Lane; Kays Crossing; Mutton Hollow; Oakridge Estates; Villas on Main; Roberts Farm; Kennington Parkway; Daniel 23; and Jacobs Hollow. Eleven other subdivision were pending action as of May 2015 (parts completed; others under construction)

Davis County (continued)

16. Syracuse – 175-acre industrial and commercial development; near Freeport Center (planning)
17. Syracuse – 80-acre, 275-unit subdivision with jet ski park; north of Gentile Street (parts completed; others under construction)
18. Syracuse – 66-unit subdivision; 1900 South and 1000 West (planning)
19. Syracuse – 50-unit subdivision; 2000 West near Bluff Road (parts completed; others under construction)
20. West Point – High school; 1800 North and 5000 West (planning)
21. West Point – Junior high school; 700 South and 4000 West (planning)
22. West Point – Elementary school; 300 South and 4400 West (planning)
23. West Point – 30-unit subdivision; 600 North and 3000 West (completed)

Weber County

24. Clinton – Completion of Crane Field Golf Course subdivision; Crane Field Golf Course (parts completed; others under construction)
25. Weber County – High school; 4000 South and 1500 West (planning)
26. Great Salt Lake Minerals Company Expansion Project – 52,000 acres (planning)

Salt Lake County

27. Northwest Quadrant Master Plan – 10,300-acre development with an additional 8,700 acres of protected sensitive lands, conservation easements, and open space (planning)

24.4 Cumulative Impacts Analysis by Resource

As discussed in Section 24.2, Methodology for Determining Cumulative Impacts, the WDC team used CEQ guidance (CEQ 1997) to evaluate cumulative impacts. This section provides the foundation for determining the important issues to be evaluated as well as the past, present, and reasonably foreseeable projects to be considered in the analysis. Detailed information about the affected environment and impacts from the WDC is provided in the following chapters:

- Chapter 14, Ecosystem Resources
- Chapter 11, Air Quality
- Chapter 13, Water Quality
- Chapter 15, Floodplains
- Chapter 4, Farmland
- Chapter 8, Economics
- Chapter 5, Community Impacts

The following sections summarize the cumulative impacts identified from the WDC Project and other projects.

24.4.1 Ecosystem Resources

This section describes the cumulative impacts to ecosystem resources (wetlands and wildlife habitat) from the WDC and other actions. Because the WDC would have no effect on any threatened or endangered species, the WDC would not contribute to any cumulative impacts to threatened or endangered species, and therefore this resource is not addressed in this chapter.

The geographic scope of this analysis includes the area around the Great Salt Lake and the Ogden, Salt Lake, Utah, and Tooele Valleys (Ogden hydrologic unit, Jordan River hydrologic unit, Utah Lake hydrologic unit, and Tooele Valley hydrologic unit, respectively). These hydrologic units make up the impact analysis area referred to in Section 24.4.1.

What is the geographic scope of the analysis of cumulative impacts to ecosystem resources?

The geographic scope includes the Ogden, Jordan River, Utah Lake, and Tooele Valley hydrologic units. These hydrologic units make up the impact analysis area referred to in Section 24.4.1.

These areas were selected for two reasons. First, these areas are used by migratory birds that use the wetlands as feeding and resting areas during migration. Second, a decrease in wildlife habitat and wetlands adjacent to the Great Salt Lake could affect bird and other local wildlife populations in the Ogden, Salt Lake, Utah, and Tooele Valleys. Birds could use other adjacent habitats, which would change the carrying capacity of those habitats.

The timeframe of this analysis is from the mid-1800s (pre-Euro-American settlement) through 2040. The change from historic to current wetlands and habitat availability was estimated using regional-scale land cover data (Jones & Stokes 2005). The baseline year for the analysis (2003) was selected based on the availability of land cover data from 2003.

What is the timeframe of the analysis of cumulative impacts to ecosystem resources?

The timeframe is from the mid-1800s (pre-Euro-American settlement) through 2040.

24.4.1.1 Past Conditions

Wildlife habitat, wetlands, rivers, and lakes in the impact analysis area have been extensively altered as a result of urban and agricultural development during the past century. The wetlands adjacent to Utah Lake and the Great Salt Lake have been extensively altered or lost, and many of the streams that flowed into Utah Lake, the Jordan River, and the Great Salt Lake have been altered for water supplies, control of stormwater, agricultural uses, and urban development.

Human development has degraded the quality of some of the wetland and wildlife habitat adjacent to the Great Salt Lake as a result of changes in water flow and quality, noise, and other human disturbances. In the impact analysis area, there has been about a 58% reduction in wetlands and wildlife habitat from past development. The extent of estimated historic wetlands and wildlife habitats and the current conditions are listed below. Overall, the past trend for wetlands has been a decrease in their acreage and quality.

To help protect the natural habitat around the Great Salt Lake, state and federal agencies and private groups have preserved important habitat near the proposed WDC alternatives. Between the Great Salt Lake Shorelands Preserve and the Farmington Bay, Howard Slough, and Ogden Bay Waterfowl Management Areas, about 45,000 acres of wetland and wildlife habitat have been preserved.

About 42% of the estimated historic wetlands and wildlife habitats are still available in the impact analysis area. The remaining habitat available varies by hydrologic unit.

- Ogden hydrologic unit – 30% available (35,043 acres)
- Jordan River hydrologic unit – 38% available (37,333 acres)
- Utah Lake hydrologic unit – 17% available (11,018 acres)
- Tooele Valley hydrologic unit – 80% available (56,370 acres)

24.4.1.2 Future Trends

The U.S. Army Corps of Engineers (USACE) is the federal agency tasked with protecting the nation's waters. The USACE regulatory wetland program was put in place to mitigate the loss of wetlands and other waters of the U.S. through avoidance, minimization, and creation or restoration of these resources. The resulting federal policy is "no net loss of wetland acres and/or function."

Although the amount of future wetlands and the associated aquatic habitat conditions in the impact analysis area are difficult to predict, these resources could be degraded by encroachment, fragmentation, and/or hydrologic modification. For example, a new road might be adjacent to an emergent marsh or might bisect the marsh. Even if the impacts from the road are mitigated, the result might be wetlands that provide diminished wildlife habitat function for some species. Similarly, such a project could alter the movement of surface water or groundwater, resulting in the direct loss of wetlands.

Since no regulatory program protects uplands, the associated upland wildlife habitat (such as winter foraging areas) will likely continue to be developed in the future as the population in the impact analysis area grows. The expected 66,000 acres of new development in Weber and Davis Counties (which include the WDC study area) and potential developments along the Great Salt Lake in Salt Lake County will affect upland habitat and some wetland habitat. The expected development growth could result in more than 50% of the current agricultural and open land being lost to development.

To determine the amount of wetlands that could be lost with the No-Action Alternative in the impact analysis area, the WDC team used data from the National Wetlands Inventory, data on water-related land use from the Utah Division of Water Quality (2005), the 2030 development conditions predicted by the Governor's Office of Management and Budget (GOMB 2008), and other site-specific information about proposed projects. According to these data, up to 7,000 acres, or about 5%, of the wetlands in the impact analysis area could be lost between now and 2040 without the WDC (that is, with the No-Action Alternative). The WDC would be located in the Ogden hydrologic unit, and up to 4,200 acres (about 12%) of the wetlands in this unit, most of which would be in Weber County, could be developed.

With the USACE regulatory program in place, the loss of these wetlands should be mitigated. Overall, based on the projected estimates of population growth and population densities, there will continue to be a trend of converting wetlands and wildlife habitat to increasingly dense levels of development.

24.4.1.3 Contribution of the WDC to Cumulative Impacts

Wildlife Habitat. All of the proposed WDC alternatives would result in a loss of wildlife habitat, and up to 446 acres of low-, medium-, and high-quality habitat that could be used by wildlife would be converted to a transportation use (for more details regarding the types of habitat and wildlife, see Chapter 14, Ecosystem Resources). Of these 446 acres, up to 50 acres would be high-quality wildlife habitat. It is important to note that, of these 446 acres of habitat, about 427 acres are pasture land that has been disturbed by grazing activities, and the remainder is riparian or marsh habitat. Of the 427 acres of pasture land, 380 acres provide low- to medium-quality habitat. Additionally, most of this land is privately owned parcels that are not managed for wildlife habitat. Most of the privately owned parcels are less than 10 acres.

The wildlife habitat affected by the WDC would be in Davis and Weber Counties, which include more than 45,000 acres of land set aside for wildlife management. In addition, about 260,000 acres of wetlands or wildlife habitat around the Great Salt Lake are under some form of management or protection by federal, state, municipal, or private landowners. Most of these acres are managed specifically for waterfowl or shorebird habitat, and a few function as mitigation to offset the discharge of fill to wetlands.

The land that would be affected by the WDC alternatives and future development would be mostly agricultural and pasture lands that have been previously disturbed. Therefore, this development would not substantially change the current natural and high-quality wildlife habitat or protected lands. However, future development and the WDC alternatives would contribute to a continued change of agricultural land to developed land.

Overall, the WDC would contribute to a small percentage of the total cumulative impact to wildlife habitat in the impact analysis area for cumulative impacts to ecosystem resources and would not cause this resource to lose its current sustainability. The continued loss of wildlife habitat and disturbance to wildlife from future development and the WDC could push wildlife onto conservation areas around the Great Salt Lake, which could reduce overall wildlife populations because of the reduction in carrying capacity. Additionally, indirect impacts in the form of increased noise levels could reduce the quality of habitat on conservations land, causing additional cumulative impacts.

Wetlands. All of the proposed alternatives would affect some wetlands. The WDC alternative with the greatest wetland impacts could convert up to 48 acres of wetlands (all quality types) to a transportation use (these would be direct impacts). The WDC could also cause indirect water quality or hydrology effects on 64 to 100 acres of wetlands within 300 feet of the right-of-way. However, stormwater runoff to adjacent wetlands from the WDC would be contained within the right-of-way, thereby minimizing indirect water quality impacts. The actual indirect effects on wetlands from the WDC would be determined during the Clean Water Act Section 404 permitting process.

Indirect effects from development around proposed interchanges in Syracuse and West Point could result in an additional loss of up to 20 acres of wetlands (see Chapter 23, Indirect Effects). Because future development around the interchanges has not been planned, the exact amount of wetlands lost due to indirect effects is not known. The total direct and indirect loss

of wetlands from the WDC would be less than 1% of the remaining wetlands in either the impact analysis area or the Ogden hydrologic unit, which is the unit that includes the WDC (see Table 24-3).

Table 24-3. WDC-Related Losses of Wetlands and Wildlife Habitat

	Percentage Loss of Wetlands and Wildlife Habitat (%)	
Alternative	Ogden Hydrologic Unit[a]	Impact Analysis Area[b]
A1	0.14	0.03
A2	0.12	0.03
B1	0.21	0.05
B2	0.19	0.05

[a] Total acreage is 35,043.

[b] Includes the Ogden, Jordan River, Utah Lake, and Tooele Valley hydrologic units.

Although other planned transportation projects such as the Shepard Lane interchange could also affect wetlands (see Table 24-2, Present and Reasonably Foreseeable Development Actions), urban growth, regardless of the construction of roads and rails, will likely cause the greatest impact to wetlands between 2005 and 2040. This urban growth, which is expected to be about 66,000 acres (GOMB 2008) and which would occur with or without the WDC, would result in a loss of about 4% of the wetlands in the impact analysis area and about 12% of the wetlands in the Ogden hydrologic unit (see Table 24-4).

Table 24-4. Cumulative Wetland Impacts

in acres

Area	Historic Wetlands	Past Impacts	Future Impacts[a]	WDC[a]	Remaining Wetlands
Ogden hydrologic unit	115,196	80,153	4,208	68	30,767
Impact analysis area[b]	349,415	209,651	7,000	68	132,696

Source: Jones & Stokes 2005

[a] Assumes that direct and indirect impacts and wetlands are not mitigated; however, the Clean Water Act requires mitigation that would result in no net loss of wetlands. Depending on the alternative, 65.7 to 134.7 acres of wetlands are within 300 feet of the WDC right-of-way and could have some hydrologic or water quality impacts that will be determined during the Section 404 permitting process.

[b] Includes the Ogden, Jordan River, Utah Lake, and Tooele Valley hydrologic units.

However, all projects that would require a Section 404 individual permit must identify the least environmentally damaging practicable alternative, which is the goal of the wetland assessment component of this EIS process. In addition, all projects are required to complete a wetland delineation, from which mitigation measures are determined. Mitigation measures can include avoiding wetland impacts, minimizing wetland impacts, and/or some form of creating, restoring, or enhancing wetlands. Because each project is treated independently by USACE, no data are available on the exact amount of wetlands to be converted to urban uses.

What is a Section 404 individual permit?

Section 404 of the Clean Water Act regulates the discharge of dredged, excavated, or fill material in waters of the U.S. USACE is the federal agency authorized to issue Section 404 permits for certain activities conducted in wetlands or waters of the U.S. An individual permit is required for activities that would have potentially significant impacts.

The WDC team expects that wetland impacts from the WDC will have to be mitigated (through creating, restoring, or enhancing wetlands) within the general vicinity of the WDC to satisfy the federal policy of no net loss of wetland acres and/or function (Executive Order 11990, Protection of Wetlands).

What is a wetland delineation?

A wetland delineation is a survey to determine the extent and types of wetlands that would be affected by a project.

In summary, the impact analysis area has lost much of its estimated historic wetland and wildlife habitat areas. Future development projections suggest that this trend will continue. The WDC would contribute (less than 1%) to this overall decrease in wetlands and wildlife habitat in the impact analysis area and in the Ogden hydrologic unit. The location of the WDC in the Ogden hydrologic unit would continue this trend of substantial loss of wetlands and wildlife habitat. The cumulative impact would be greater during high Great Salt Lake water levels when available habitat would decrease, making areas such as the uplands of the Great Salt Lake Shorelands Preserve critical areas for birds and other wildlife. The location of the WDC and the related potential indirect impacts along with past projects that have reduced available habitat would increase the overall cumulative impact to available wildlife and wetland habitat.

24.4.1.4 Mitigation Measures for WDC Impacts to Wetlands and Wildlife Habitat

Chapter 14, Ecosystem Resources, provides a detailed discussion of mitigation measures for impacts to wetlands, wildlife and wildlife habitat, vegetation, and threatened and endangered species. These mitigation measures include following:

- Develop and implement wetland mitigation sites that result in an overall no net loss of wetland functions affected by the WDC in accordance with Section 404 permit guidelines.
- Provide additional wildlife habitat as described in Chapter 14.

24.4.2 Air Quality

This section describes the cumulative impacts to air quality from the WDC and other actions. The geographic scope of this analysis is the air basins of Salt Lake, Davis, and Weber Counties. This area was selected because it is part of the greater airshed around the location of the proposed WDC. This geographic scope is the impact analysis area referred to in Section 24.4.2.

The timeframe of this analysis is from about 1990 through 2040. The baseline year for the analysis (2015) was selected based on the availability of data in the Utah Division of Air Quality's *Annual Report for 2015* (Utah Division of Air Quality 2016).

What are the geographic scope and timeframe of the analysis of cumulative impacts to air quality?

The geographic scope is the air basins of Salt Lake, Davis, and Weber Counties. This geographic scope is the impact analysis area referred to in Section 24.4.2. The timeframe is from about 1990 through 2040.

24.4.2.1 Past Trends

Overall, the air quality in Salt Lake, Davis, and Weber Counties has been improving. In the early 1980s, the health standards for four of the six criteria pollutants identified by EPA (carbon monoxide, ozone, sulfur dioxide, and particulate matter) were violated in one or more Utah counties.

Currently, three of the six criteria pollutants—ozone (which is formed in part by nitrogen dioxide), sulfur dioxide, and particulate matter ($PM_{2.5}$ and PM_{10})—occasionally reach levels that can affect the health and well-being of Utah's urban residents who are more sensitive to pollution, residents such as children, the elderly, and those with chronic health problems. These pollutants can aggravate respiratory disorders during periods of high pollution and can lead to chronic illness (Utah Division of Air Quality 2016).

Historically, Utah had problems meeting the National Ambient Air Quality Standard for carbon monoxide (CO); however, it has been many years since a violation of the CO standard occurred. All areas with historic CO problems are now designated as attainment areas for CO.

EPA revised the standard for $PM_{2.5}$ in 2006. Salt Lake, Davis, and Weber Counties are non-attainment areas according to the revised standard. Salt Lake County is a non-attainment area for PM_{10} and for sulfur dioxide.

What is an airshed?

An airshed is a part of the atmosphere that behaves in a coherent way with respect to the dispersion of emissions.

What are criteria pollutants?

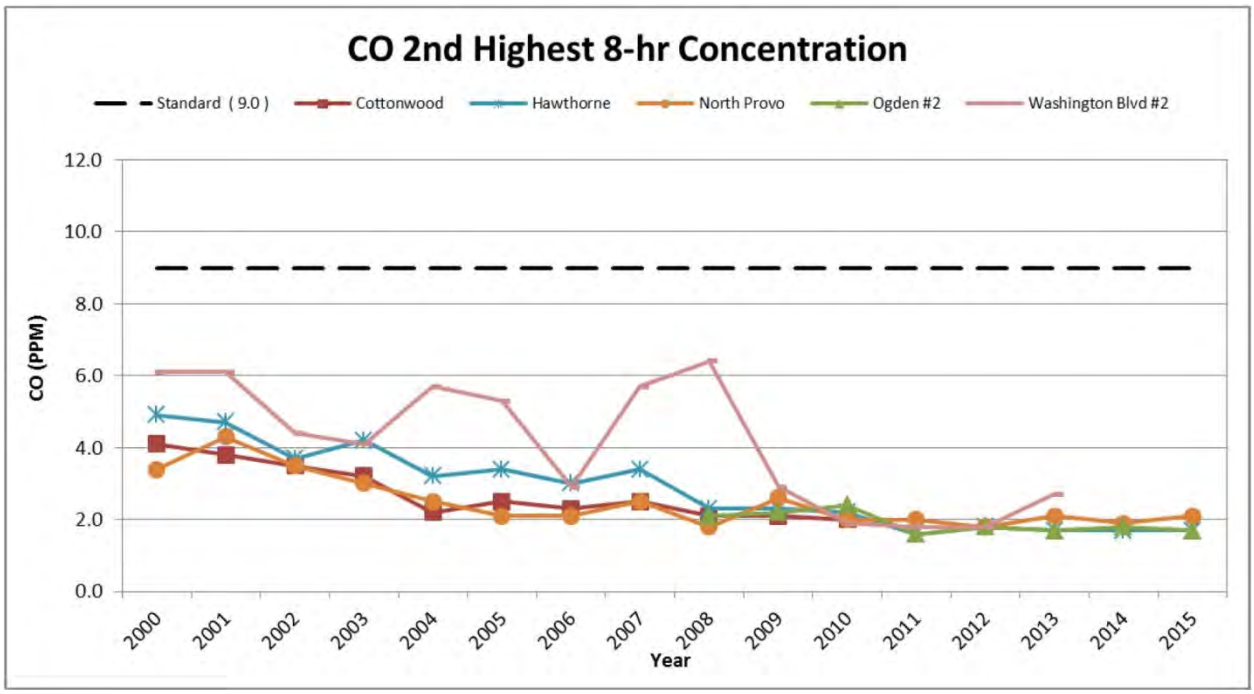
Criteria pollutants are the six pollutants for which EPA has established air quality standards (criteria): carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter. Particulate matter is classified as $PM_{2.5}$ (2.5 microns in diameter or less) or PM_{10} (10 microns in diameter or less).

What are attainment and non-attainment areas?

An attainment area is an area that meets (or "attains") the National Ambient Air Quality Standard for a given air pollutant. A non-attainment area is an area that does not meet the standard for a given air pollutant.

Chart 24-2 through Chart 24-8 below show the historic air quality trends for the criteria pollutants along the Wasatch Front (Utah Division of Air Quality 2016). Figure 24-3, Air Monitoring Locations, in Volume IV shows the locations of the monitoring stations in Davis and Weber Counties that are referenced in the charts.

Chart 24-2. CO Second-Highest 8-Hour Concentration



A violation of the standard occurs with the 2nd-highest concentration; therefore, the data are reported for the 2nd-highest concentration.

Chart 24-3. Nitrogen Dioxide Annual Averages

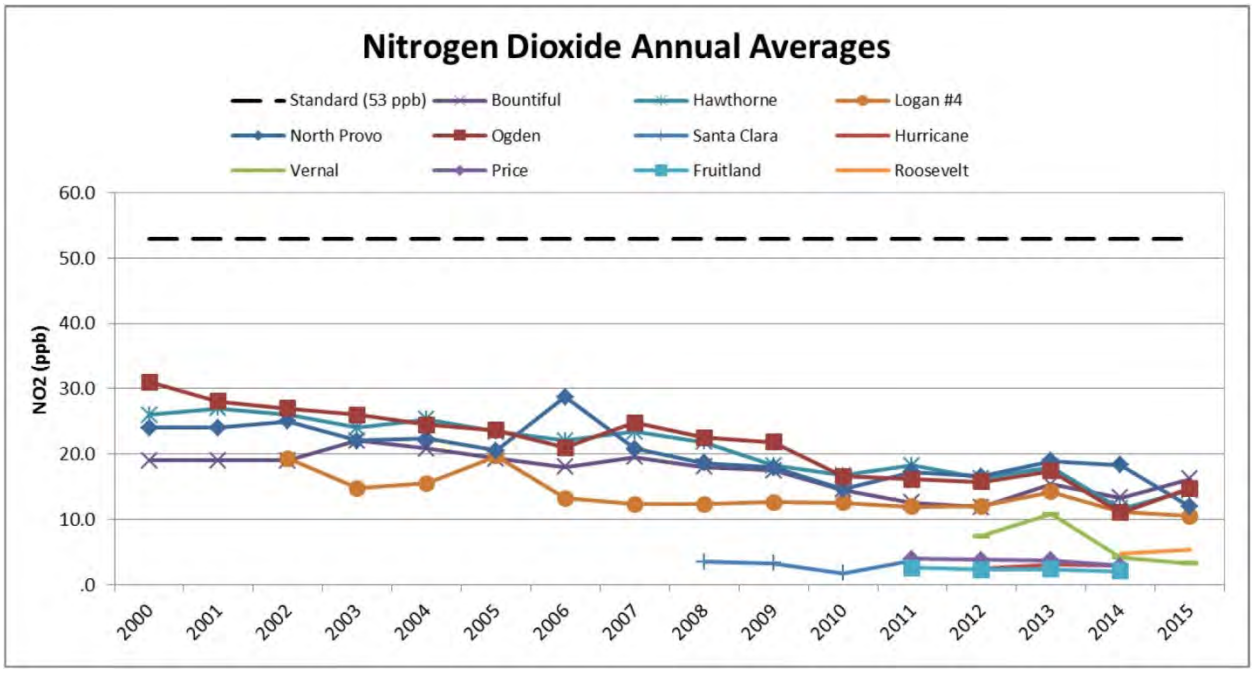
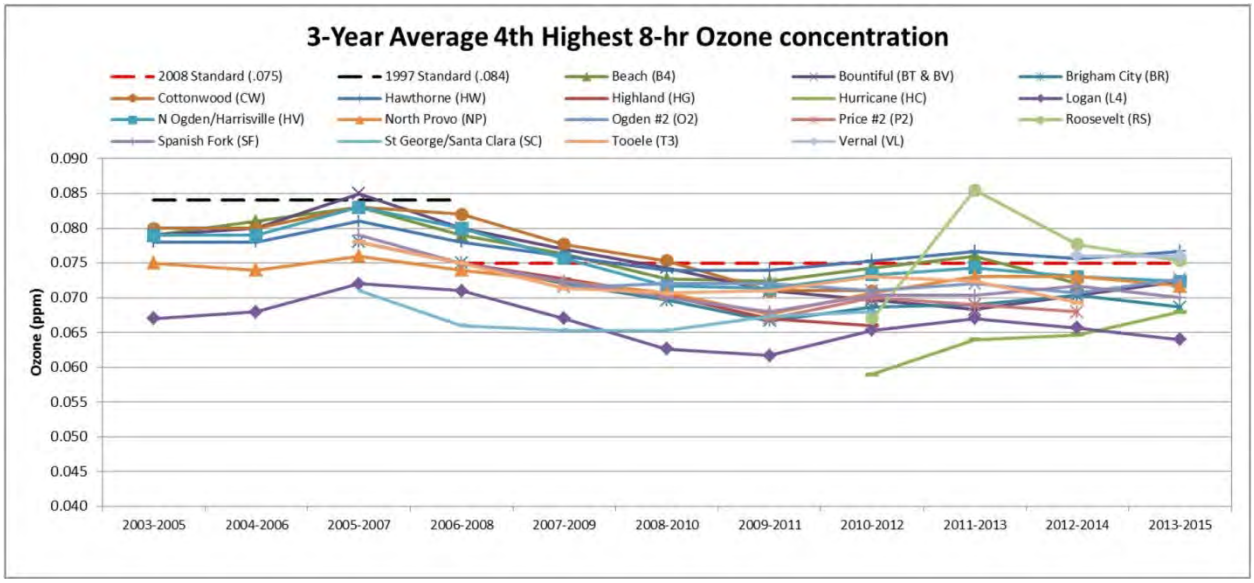


Chart 24-4. Ozone 4-Year Average Fourth-Highest 8-Hour Concentration



The standard is based on a 3-year average of the annual 4th-highest daily 8-hour concentration.

Chart 24-5. PM_{10} Highest 24-Hour Concentration Excluding Exceptional Events Data

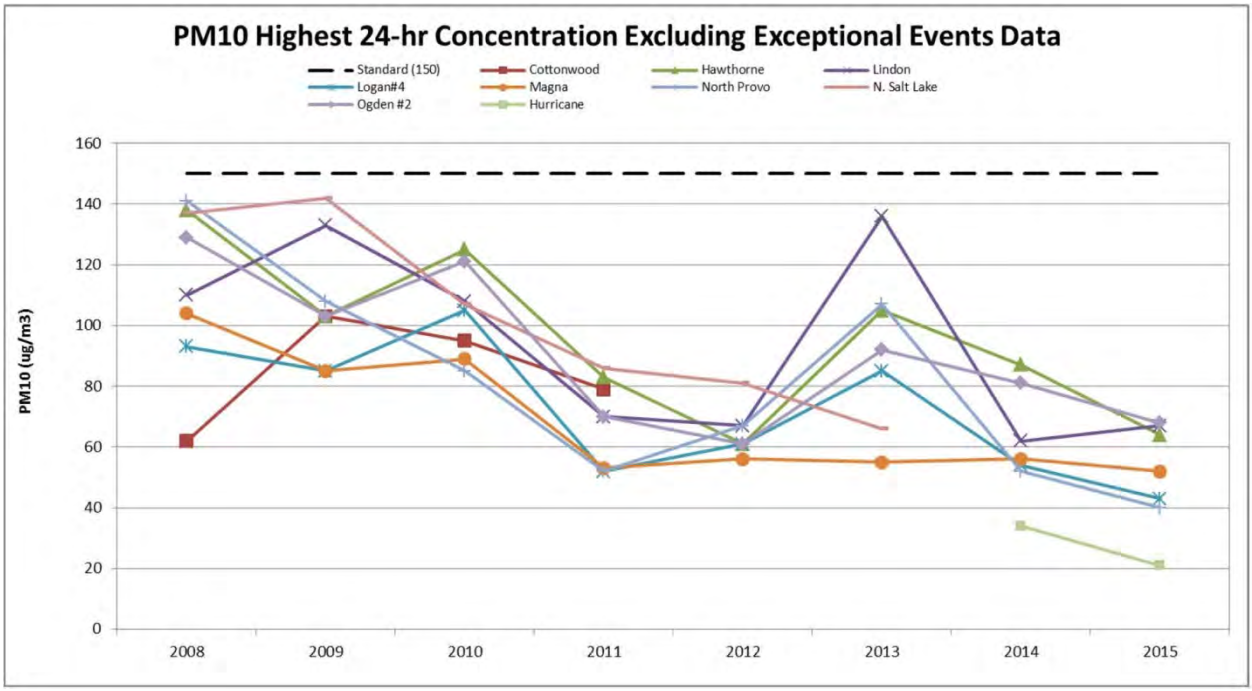


Chart 24-6. $PM_{2.5}$ 3-Year Average 98th-Percentile 24-Hour Concentration

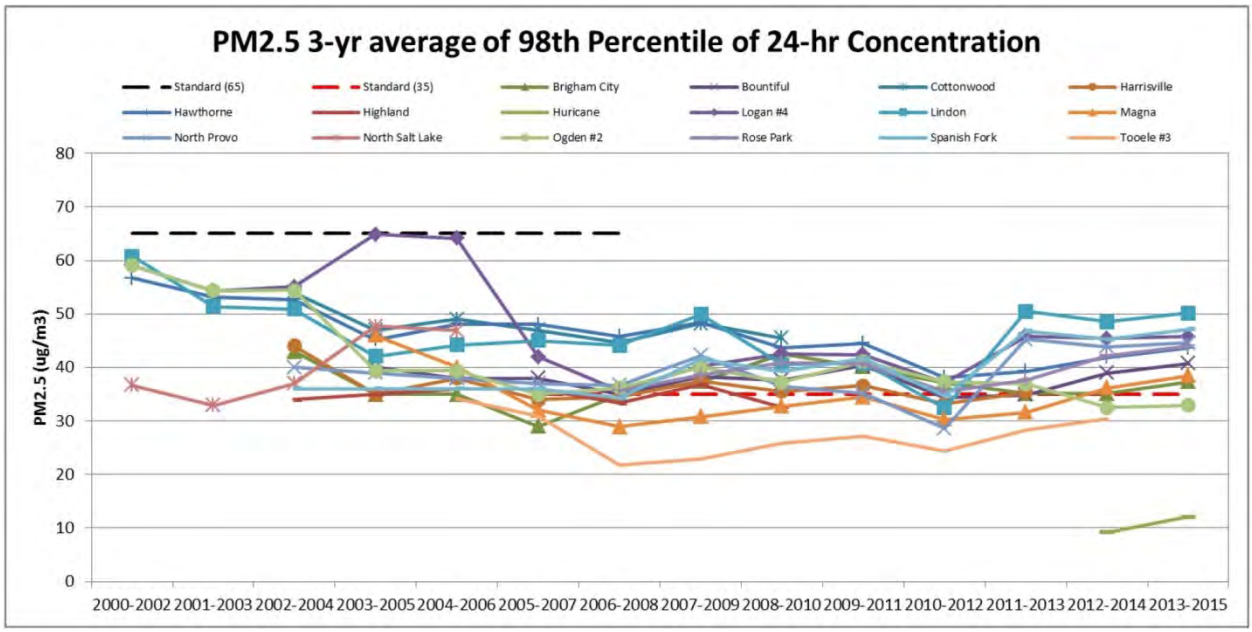


Chart 24-7. $PM_{2.5}$ Annual Mean Concentration

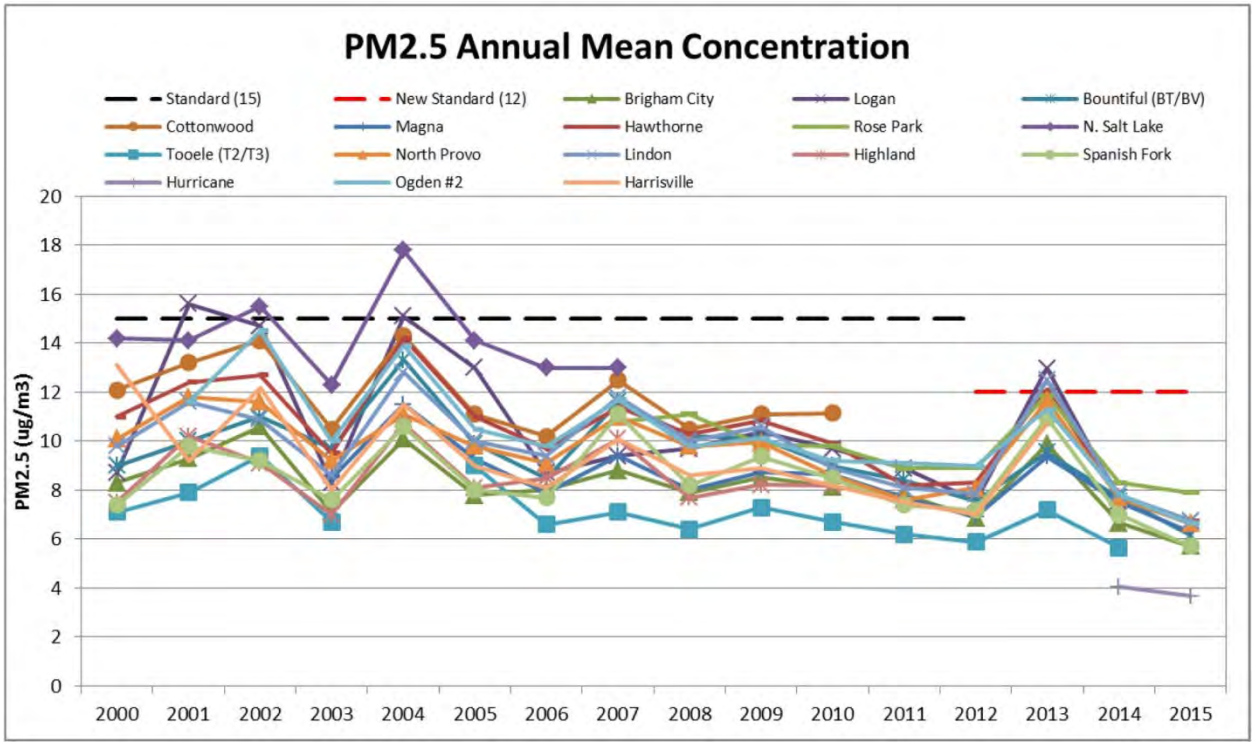
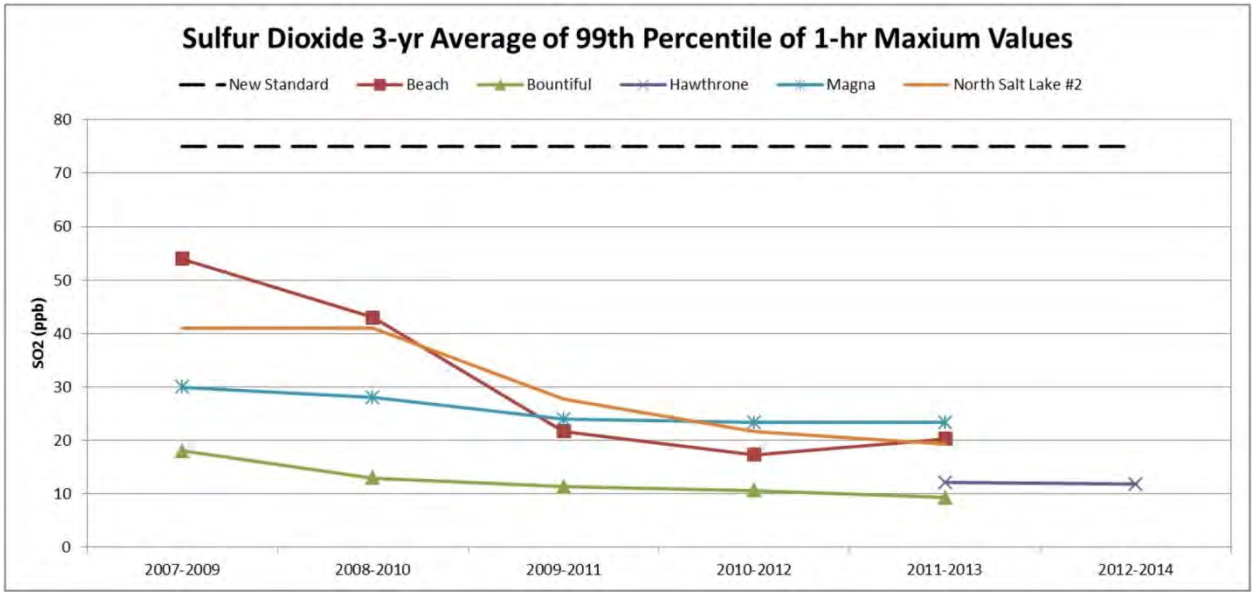


Chart 24-8. Sulfur Dioxide 3-Year Average of 99th-Percentile of 1-Hour Maximum Values



Data provided by the Utah Division of Air Quality for the 2nd-highest 24-hour values.

24.4.2.2 Future Trends

With improvements to vehicle emissions and more-stringent air quality controls, the WDC team expects that air quality will continue to improve along the Wasatch Front through the 2040 planning period with the No-Action Alternative. Regional air quality modeling conducted by WFRC for the 2040 transportation conformity determination demonstrated that the 2015–2040 Regional Transportation Plan conforms to the State Implementation Plan in applicable non-attainment or maintenance areas. Therefore, all the transportation projects in Weber, Davis, and Salt Lake Counties in the 2015–2040 Regional Transportation Plan are found to conform. Although the population has increased in Davis and Weber Counties, overall, air quality has improved throughout the region.

24.4.2.3 Contribution of the WDC to Cumulative Impacts

Regional air quality modeling conducted by WFRC for the 2040 transportation conformity determination demonstrated that all regionally significant transportation projects would be in compliance with the National Ambient Air Quality Standards. Population growth in Davis and Weber Counties has had little effect on overall air quality as demonstrated by the continuing improvement in air quality throughout the region.

What is a transportation conformity determination?

A transportation conformity determination is made to determine whether a proposed transportation project will conform to the purpose of the State Implementation Plan. For more information, see Section 11.2.3, Transportation Conformity Requirements.

Alternatives A1 and B1 were selected for the analysis because they would have the highest emissions of all the A and B Alternatives (see Table 24-5 below). Because the 2040 transportation conformity determination (which includes the WDC) is in compliance with standards and because the WDC would only slightly increase emissions compared to the No-Action Alternative, the WDC would not substantially increase regional air quality emissions.

Overall, the population growth in Davis and Weber Counties by 2040 would likely be the same with or without the WDC. However, the WDC would help reduce regional traffic congestion, which would reduce idling emissions of CO and volatile organic compounds.

Table 24-5. Emissions of Criteria Pollutants with Alternatives A1 and B1 in the WDC Study Area

	2015	2040					
		No-Action Alternative		Alternative A1		Alternative B1	
Parameter	Emissions under Existing Conditions	Emissions with No-Action Alternative	Percent Change from Existing Conditions	Emissions with Alternative A1	Percent Change from No-Action	Emissions with Alternative B1	Percent Change from No-Action
VMT (million miles/day)	4.17	6.09	46.0%	6.24	2.5%	6.27	3.0%
CO (tons/day)	22.51	12.77	–43.2%	13.18	3.21%	13.28	3.99%
Particulate matter							
NO_x (tons/day)	4.023	1.061	–73.6%	1.095	3.20%	1.102	3.86%
PM_{10} (tons/day)[a]	1.391	1.628	17.04%	1.656	1.72%	1.664	2.21%
$PM_{2.5}$ (tons/day)[b]	0.118	0.075	–36.44%	0.076	1.33%	0.076	1.33%

VMT = vehicle-miles traveled; NO_x = nitrogen oxides

[a] PM_{10} emissions include vehicle exhaust emissions, tire wear, brake wear, and road dust.

[b] $PM_{2.5}$ emissions include vehicle exhaust emissions, tire wear, and brake wear.

Fugitive Dust. During construction of the WDC and other developments in the WDC study area, fugitive-dust-control measures would be needed in certain areas to protect disturbed soils from wind erosion until permanent, stabilized cover is established. After the construction phase is completed, the soil would have a lower potential for wind erosion compared to its undeveloped state.

Vehicle Emissions. Vehicle emissions have continued to decrease substantially over time as EPA has imposed a series of tighter emission-control requirements on engine emissions. As the region's vehicle fleet becomes newer and the older, high-emitting vehicles are replaced, the WDC team expects that the tighter emission standards will substantially offset the regional growth in VMT. Although it is difficult to predict fleet-average emissions 20 to 30 years in the future, the WDC team expects that the more stringent federal regulation of motor vehicle emissions will continue to drive vehicle emissions even lower, thus helping to offset the growth in VMT.

Mobile-Source Air Toxics (MSATs). See Chapter 11, Air Quality, for detailed information on MSATs. Most air toxics originate from human-made sources including on-road mobile sources, non-road mobile sources (such as airplanes), and stationary sources (such as factories or refineries). MSATs are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

EPA is the lead federal agency for administering the Clean Air Act and has specific responsibilities for determining the health effects of MSATs. On March 29, 2001, EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 Federal Register 17229). In its rule, EPA examined the impacts of existing and newly promulgated mobile-source control programs including its reformulated gasoline program, its national low-emission vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur-control requirements, and its proposed heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur-control requirements. Between 2000 and 2020, FHWA projects that, even with an increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and polycyclic organic matter and will reduce on-highway diesel particulate emissions.

The cumulative impact of annual MSAT emissions in 2040 (that is, MSAT emissions from the WDC and regionally significant projects in the air quality impact analysis area) are shown in Table 24-6 below. With the No-Action Alternative, the level of each individual MSAT in 2040 is expected to decrease relative to existing conditions (2015) due to EPA's ongoing programs to control hazardous air pollutants from mobile sources. Despite an expected increase of 46% in VMT between existing conditions in 2015 and the No-Action Alternative in 2040, MSAT emissions would decrease by about 50% to more than 90%, depending on the individual pollutant.

Table 24-6. Emissions of Mobile-Source Air Toxics with Alternatives A1 and B1 in the WDC Study Area

Scenario	Daily VMT (millions)	Tons per Year						
		Acrolein	Benzene	1,3-Butadiene	Naph-thalene	Form-aldehyde	Diesel Particulate Matter	Polycyclic Organic Matter
Existing Conditions in 2015								
Existing	4.17	0.179	5.058	0.373	0.372	3.028	6.275	0.203
With WDC Alternatives in 2040								
No-Action	6.09	0.0560	2.177	0.0020	0.1375	1.243	1.238	0.0589
A1	6.24	0.0633	2.445	0.0022	0.1413	1.394	1.249	0.0612
B1	6.27	0.0636	2.458	0.0022	0.1400	1.400	1.257	0.0605

With the WDC, the annual amount of MSATs emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for each alternative is no more than 3.0% greater than the VMT with the No-Action Alternative in 2040. This slight increase in VMT would lead to slightly higher MSAT emissions along the WDC for the action alternatives. The increase in emissions would be offset somewhat by lower MSAT emission rates due to the increased speeds of vehicles as a result of the WDC.

MSAT emissions on some streets would decrease with the WDC action alternatives as vehicles use the WDC instead, while MSAT emissions on other roads would increase slightly. For example, MSAT emissions on Bluff Road, which is adjacent to existing residential developments, would decrease, while MSAT emissions on Antelope Drive would increase slightly as the result of a WDC interchange on Antelope Drive.

Overall, because MSAT emissions would decrease between 2015 and 2040 with the WDC action alternatives and because emissions are estimated to increase up to 3.0% over the emissions with the No-Action Alternative, the WDC would not substantially contribute to cumulative air quality impacts.

24.4.2.4 Mitigation Measures for WDC Impacts to Air Quality

As described in Chapter 11, Air Quality, FHWA and UDOT conclude that the proposed WDC would not have a substantial impact on regional air quality, so no mitigation measures are proposed for direct impacts from the use of the WDC. Potential construction-related air quality mitigation measures are described in Section 20.3.3, Air Quality Construction Impacts, and include development of a Fugitive Dust Emission-Control Plan, street sweeping, and maintaining equipment to reduce emissions.

24.4.3 Water Quality

This section describes the cumulative impacts to water quality from the WDC and other actions. The main water body that would receive stormwater from the WDC would be the Great Salt Lake. Therefore, streams that drain into the Great Salt Lake are part of this cumulative impact analysis.

The geographic scope of this analysis is the Weber River, Bear River, and Utah Lake/Jordan River Watershed Management Units, which are in north-central Utah, and the streams that drain into the Great Salt Lake. This geographic scope is the impact analysis area referred to in Section 24.4.3.

What are the geographic scope and timeframe of the analysis of cumulative impacts to water quality?

The geographic scope is the Weber River, Bear River, and Utah Lake/ Jordan River Watershed Management Units and the streams that drain into the Great Salt Lake. This geographic scope is the impact analysis area referred to in Section 24.4.3. The timeframe is from the mid-1970s through 2040.

The timeframe of this analysis is from the mid-1970s through 2040. The mid-1970s were selected as the early date for the analysis based on the availability of data. The baseline year for the analysis (2012) was selected based on the availability of water quality data from 2012.

24.4.3.1 Past Conditions

Watersheds

The rivers and lakes in the Weber River, Bear River, and Utah Lake/Jordan River Watershed Management Units have been extensively altered as a result of urban and agricultural development during the past century. Many of the streams that flowed into the Great Salt Lake have been altered for water supplies, control of stormwater, agricultural uses, and urban development. For example, the Weber River has been altered to reduce its potential for flooding and to allow urban and agricultural development. As development occurred in the area, the amount of impervious surfaces, sewage-treatment plants, and agricultural areas increased, all of which reduced water quality through the early 1970s.

What is a stream?

In this chapter, the term *stream* is used as a general term to refer to linear waterways such as rivers, creeks, washes, and canals.

The Utah Division of Water Quality has performed a water quality assessment for each of the three watershed management units in the impact analysis area (Utah Division of Water Quality 2000a, 2000b, 2002). In each unit, numerous streams and other water bodies were determined to be impaired waters. The major causes of impairment were metals, sediments, habitat alterations, flow alterations, and nutrients. In all three watershed management units, nutrients were the greatest cause of impairment and accounted for about 43% to 80% of the impairment in each unit (UGS 2002).

What are impaired waters?

Impaired waters are those that do not meet the water quality standards for their designated beneficial uses. Beneficial uses are the uses that lakes, rivers, and other water bodies have to humans and other life.

The major sources of impairment were resource extraction, habitat modification, hydromodification, and agricultural activities. Table 24-7 lists the sources of water quality impairment for the streams in each watershed management unit.

What is hydromodification?

Hydromodification is human alteration of the hydrologic characteristics of water bodies.

Table 24-7. Sources of Water Quality Impairment in the Utah Lake/Jordan River, Weber River, and Bear River Watershed Management Units

	Contribution to Impairment (%)		
Source	**Utah Lake/ Jordan River**	**Weber River**	**Bear River**
Resource extraction	19.4	15.9	—
Unknown	18.1	10.0	16.6
Habitat modification	16.7	13.5	2.4
Agricultural	14.7	21.8	38.2
Hydromodification	14.7	18.4	4.6
Urban runoff	6.2	3.5	2.5
Industrial point sources	4.0	—	13.3
Municipal point sources	4.0	3.5	12.5
Natural sources	2.1	13.5	4.0
Aquaculture	—	—	1.2
Reservoir releases	—	—	4.8

Sources: Utah Division of Water Quality 2000a, 2000b, 2002

Within the past several decades, a number of regulatory programs have evolved that control stormwater and restrict direct disturbances of water bodies. The 1987 revisions to the Clean Water Act placed a new emphasis on the requirement for Cities and Counties to obtain permits for stormwater discharges and to mitigate impacts. In addition, the State of Utah requires approval for any project that proposes to disturb any area within the ordinary high-water mark of a stream or lake; this controls the amount of disturbance to the water body and requires restoration for any impacts. USACE also regulates impacts to wetlands and navigable waters of the U.S.

What are point and nonpoint sources?

A point source is any single, identifiable location, such as a pipe or ditch, from which pollutants are discharged. A nonpoint source is a source such as a highway or farm that does not discharge pollutants from a single, identifiable location.

These regulatory controls have resulted in improved water quality in some of the streams that enter the Great Salt Lake. The quality of water has improved since the Clean Water Act was passed in 1972. Regulations on municipal waste from wastewater treatment plants, stormwater runoff, and industrial discharges have reduced the concentrations of pollutants discharged into water bodies (Hooton 1999).

What is a discharge?

A discharge is a release of waste-water, stormwater, or pollutants into a water body.

In addition, numerous Total Maximum Daily Load analyses have been performed on water bodies in each watershed management unit, and the recommendations from these analyses should improve overall water quality. Finally, the conversion of farmland to nonagricultural uses (see Chapter 4, Farmland) should also improve water quality, since agriculture is one of the main sources of impairment. Three water bodies (Farmington Creek, Kays Creek, and Holmes Creek) in the impact analysis area have information and data that at least one designated use is not being supported for copper. All three impaired water bodies are ranked as a low priority to develop a TMDL

What is a Total Maximum Daily Load analysis?

A Total Maximum Daily Load analysis is an evaluation of the pollutants in a water body and the source of the pollutants.

Great Salt Lake

The Great Salt Lake is located at the lowest point of its watershed, which is about 21,000 square miles. Because of its location near urban areas, the lake receives stormwater runoff and other municipal and industrial wastes from sources in Davis and Weber Counties as well as in Salt Lake, Box Elder, and Tooele Counties (UGS 2010).

What is a watershed?

Watershed is another term for a drainage basin. All of the precipitation within a watershed drains into the same water body.

Permitted municipal wastewater treatment plants, urban stormwater runoff, and nonpoint sources discharge sediment, nutrients, and metals to the Great Salt Lake through pipes, canals, and drainage systems. In addition, pesticides and fertilizers that are used on landscaped areas and contaminated runoff from impervious surfaces make their way into the lake via stormwater drainage systems.

These past and ongoing actions have reduced the water quality of the Great Salt Lake. The Utah Division of Water Quality and the Utah Division of Forestry, Fire and State Lands are jointly working on conducting studies and preparing management plans for the Great Salt Lake. The 2012 *Draft Final Great Salt Lake Management Plan* acknowledges that increasing population growth will shift future land uses from the existing agricultural uses to urban uses, thereby introducing different pollutants, and acknowledges that future management actions should consider water quality impacts (SWCA 2012).

What are narrative standards?

Narrative standards are general statements that prohibit the discharge of waste or other substances that result in unacceptable water quality conditions such as visible pollution or undesirable aquatic life.

What are transitional waters?

Transitional waters are all waters below approximately 4,208 feet elevation down to the current lake elevation of the open water of the Great Salt Lake that receive their source water from naturally occurring springs and streams, impounded wetlands, or facilities requiring a certain permit.

The Great Salt Lake has unique hydrology and biogeochemistry. In the past, the State has regulated these lake characteristics through narrative standards, not numeric standards. However, in 2008, the State established a numeric selenium standard for open water in Gilbert Bay of the Great Salt Lake. The State will

continue to develop additional numeric criteria to protect the water quality in each of the major bays and transitional waters of the Great Salt Lake.

24.4.3.2 Future Trends

The regulatory programs briefly summarized in Section 24.4.3.1, Past Conditions, ensure that the rate of hydrologic and water quality degradation in developing areas will be much lower than the historic rate. However, the future water resource conditions in the impact analysis area are difficult to predict accurately.

For example, as urban development in the area continues with the No-Action Alternative, the amount of impervious surface will increase, but other pollutant sources from agriculture and resource extraction will decrease (since these land uses will be converted to urban uses), thus making an overall assessment of future water quality conditions difficult. Stormwater regulations could continue to evolve, resulting in new rules such as stricter controls from construction sites and new urban development.

24.4.3.3 Contribution of the WDC to Cumulative Impacts

The other transportation-related projects listed above in Table 24-1, Present and Reasonably Foreseeable Transit and Roadway Actions, would increase the amount of impervious area in the project areas, but they are not expected to contribute to major stormwater runoff or reduce water quality because of the controls that are placed on projects to manage runoff and minimize water quality impacts. In addition, many of these projects are improving existing roads that have no stormwater controls by adding control measures that could reduce water quality impacts. It is likely that one of the greatest contributors to future water quality impacts will be the urban development that is converting existing undeveloped land into residential, industrial, and commercial uses.

Urban runoff is the cause of about 2.5% to 6.2% of the water quality impairment for streams in the impact analysis area (see Table 24-7 above, Sources of Water Quality Impairment in the Utah Lake/Jordan River, Weber River, and Bear River Watershed Management Units). However, as development increases, this contribution will likely increase. Although development in the impact analysis area will occur with or without the WDC, roadway improvements in general could contribute to some development growth. It is expected that, with the WDC or without the WDC (that is, with the No-Action Alternative), the amount of urbanized development in Davis and Weber Counties will increase from about 119,000 acres currently to about 185,000 acres in 2040, an increase of 66,000 acres (GOMB 2008). This urbanization would include all residential and commercial areas and the necessary infrastructure such as roads (including roads like the WDC).

Not all of the 66,000 acres would be impervious surfaces, since the typical amount of impervious land cover in residential areas can vary from 12% to 40% and for commercial areas from 60% to 95% (Canter 1996). The future development would be subject to water quality regulations that should help improve the water quality of stormwater runoff.

As regulatory requirements for treating discharges to surface waters continue to become more stringent and as numeric standards become established for the Great Salt Lake, the long-term future trend would be an improvement in the quality of water that is discharged to the Great Salt Lake. As urban development and redevelopment occur adjacent to the Great Salt Lake, requirements would be triggered, and updated methods of treating and managing point and nonpoint discharges would be implemented.

Even with the water quality regulations placed on future development, the continued urbanization of Davis and Weber Counties could further contribute to cumulative impacts to and some degradation of water quality as more stormwater runoff enters the Great Salt Lake. However, this increase in urbanization would also decrease the amount of agriculture and resource extraction, which are two of the larger factors that impair water quality. It is also likely that, in the future, regulatory controls would be increased to reduce water quality impacts from all sources.

Any of the WDC action alternatives would increase the amount of impervious surface by about 242 acres to 262 acres, which would increase the potential for stormwater runoff. The WDC would include measures to control stormwater runoff and would use detention basins and vegetated filter strips to minimize the amounts of pollutants that are discharged into adjacent surface waters.

What is a detention basin?

A detention basin is a pond that holds stormwater runoff temporarily before releasing it.

Overall, there would be a substantial increase in impervious surfaces in the future which could contribute further impairment to area waters (copper currently exceeds standards in Farmington Creek, Kays Creek, and Holmes Creek). However, there would be water quality controls and reduction in agricultural uses, which should benefit future runoff. With the water quality controls that would be used for the WDC, its contribution to water quality impacts would be minor but it would further exacerbate the impairment for copper. Given the current condition of water resources, the WDC team does not expect the WDC to substantially change the overall water quality in the impact analysis area.

24.4.3.4 Mitigation Measures for WDC Impacts to Water Quality

Chapter 13, Water Quality, provides a detailed discussion of water quality mitigation measures.

The following standard design practices will be incorporated into the selected alternative:

- Develop and implement an erosion-control plan during construction in accordance with Utah Construction Stormwater Permit conditions.
- Use detention basins or vegetated filter strips for the WDC to detain runoff, reduce the peak flow rate, and reduce pollutants in accordance with UDOT's Municipal Separate Storm Sewer System (MS4) permit conditions.

24.4.4 Floodplains

What are the geographic scope and timeframe of the analysis of cumulative impacts to floodplains?

The geographic scope is the Great Salt Lake's 100-year floodplain. This geographic scope is the impact analysis area referred to in Section 24.4.4. The timeframe is from about 1980 through 2040.

This section describes the cumulative impacts to floodplains from the WDC and other actions. The ecosystem value of wetlands and habitat within the floodplain is addressed in Section 24.4.1, Ecosystem Resources. The analysis in Section 24.4.4 addresses cumulative impacts based on the possibility of the WDC increasing the flooding hazard risk to surrounding properties.

The geographic scope of this analysis is the Great Salt Lake's 100-year floodplain. This area was selected because this floodplain would be affected by the WDC. This geographic scope is the impact analysis area referred to in Section 24.4.4.

The timeframe of this analysis is from about 1980 (the last major flood) through 2040. The baseline year for the analysis (2012) was selected based on the availability of data from the Great Salt Lake Comprehensive Management Plan (SWCA 2012).

Closed-basin lakes such as the Great Salt Lake fluctuate in level and area in response to variations in the climate over their drainage basins. When the lake level rises, developments in the lake's floodplain are at a severe risk of flooding. A potential cumulative impact to the Great Salt Lake floodplain would occur if the WDC raises the lake's base flood elevation; this higher flood elevation could then threaten developments around the lake (see Figure 15-1, FEMA Floodplain Schematic, in Volume IV).

A *floodplain* is a normally dry area that is occasionally inundated by stormwater runoff or high lake water. A *100-year flood* is a level of flood water that has a 1% chance of occurring in a given location in any given year. A *100-year floodplain* is the area that would be flooded by a water body during a 100-year flood. The *base flood elevation* is the elevation of the water during a 100-year flood.

For the Great Salt Lake, the 100-year floodplain is the area at or below 4,217 feet in elevation around the lake. This area is about 2,300,000 acres (3,700 square miles). Developments in this area are at risk of flooding when the lake has a 100-year flood. Development in a floodplain, including roads, can reduce its flood-carrying capacity and increase the area of the 100-year floodplain.

24.4.4.1 Past Trends

The Great Salt Lake is the largest closed-basin lake in the Great Basin, and some development has occurred within its floodplain. The naturally occurring fluctuations in the lake's water level are termed *flooding* when the level of the lake begins to harm structures and developments in the lake's floodplain. However, flooding is a natural process and is mostly beneficial to the species that are adapted to this dynamic environment.

In the 1980s, the level of the Great Salt Lake rose substantially during a period of above-average precipitation. The resulting flooding caused extensive damage to developments in the floodplain.

Many residential subdivisions have been constructed in the last decade in areas adjacent to the lake. Residential developments east of the Great Salt Lake have been built up to, and in some cases within, the Great Salt Lake's 100-year floodplain (with mitigation such as placing fill material to raise the elevation of the homes above the floodplain). Development in the lake's 100-year floodplain is discouraged due to flooding risks to properties.

To accommodate the increasing northern Wasatch Front population growth and to decrease traffic congestion for commuters in Weber and Davis Counties, UDOT built the 14-mile Legacy Parkway, which opened in 2008, near the eastern edge of the Great Salt Lake. Because it was built at elevations ranging from 4,215 feet to 4,282 feet (that is, partially within the lake's 100-year floodplain), the Legacy Parkway could be affected by, and could affect, the Great Salt Lake. To minimize these impacts, equalization culverts were built into the highway to allow flood water to pass under the highway (SWCA 2012).

24.4.4.2 Future Trends

The Cities of Farmington and Kaysville have allowed developments to be built in their cities down to an elevation of 4,217 feet. Cities and Counties in the impact analysis area have ordinances in place to limit development in the floodplain. The WDC team expects that, with the No-Action Alternative, no or little development would occur in this area.

24.4.4.3 Contribution of the WDC to Cumulative Impacts

The proposed WDC alternatives would traverse the eastern edge of the Great Salt Lake's 100-year floodplain. Alternatives A1, A2, B1, and B2 would affect up to 187.7 acres within the 100-year floodplain. Most of this floodplain impact would occur within the 2,300,000-acre Great Salt Lake floodplain. UDOT would follow appropriate design standards, including allowing water to pass under the WDC using equalization culverts, which would reduce floodplain impacts. Therefore, the WDC would have a negligible impact on the 100-year floodplain.

For those parts of the WDC in the Great Salt Lake's 100-year floodplain, the highway would be designed to allow flood waters to pass under the highway to minimize the impacts to the floodplain and not cause a rise in the lake's base flood elevation. To satisfy the requirements of the Federal Emergency Management Agency (FEMA) and local jurisdictions, culverts and bridges in regulatory floodplains would be designed to accommodate a 100-year flood.

What is a regulatory floodplain?

A water body has a regulatory floodplain if the floodplain is identified and mapped by FEMA.

In addition, floodplain development permits would be obtained for all locations where the highway would encroach on a regulatory floodplain, and structures would be designed to meet the more stringent of FEMA requirements or local floodplain ordinances. FEMA requires that construction within a floodway must not increase the base (100-year) flood elevation.

What is a floodway?

The floodway is the defined stream channel and the adjacent areas that must be kept free of encroachment to pass the 100-year flood without increasing the water surface elevation more than a designated height.

Bridges and culverts would provide floodplain connectivity and would reduce impacts to natural and beneficial floodplain values, specifically flood conveyance (for flood waters moving toward the Great Salt Lake) and flood storage (for flood waters extending to the northeast in Farmington Bay as the Great Salt Lake level rises). The hydraulic conveyance provided by bridges and culverts would also reduce impacts to groundwater recharge, since surface water from the northeast would be able to flow to the southwest to existing recharge areas.

With current ordinances and regulations in place, no future urban developments are expected to occur within the floodplain. Within the context of the larger Great Salt Lake floodplain, the up to 187.7 acres of floodplain impact would result in negligible cumulative impacts. In addition, with the mitigation measures presented in Section 15.4.6, Mitigation Measures, in Chapter 15, Floodplains, the WDC action alternatives would not result in a significant adverse impact to natural and beneficial floodplain values and therefore would not contribute to a cumulative floodplain impact.

24.4.4.4 Mitigation Measures for WDC Impacts to Floodplains

As described in Section 15.4.6, Mitigation Measures, in Chapter 15, Floodplains, measures will be taken to reduce floodplain impacts and to ensure that constructing the WDC complies with all applicable regulations. For all locations where the highway would encroach on a regulatory floodplain, structures will be designed to meet the more stringent of the FEMA or local floodplain ordinance requirements. FEMA requires that construction within a floodway must not increase the base (100-year) flood elevation.

24.4.5 Farmland

This section describes the cumulative impacts to farmland from the WDC and other actions. The potential cumulative impacts to farmland depend on future changes in land use. The geographic scope of this analysis is Davis and Weber Counties. This area was selected because it is the likely area of development surrounding the WDC.

What are the geographic scope and timeframe of the analysis of cumulative impacts to farmland?

The geographic scope is Davis and Weber Counties. The timeframe is from about 1900 through 2040.

The timeframe of this analysis is from about 1900 through 2040. The baseline year for the analysis (2005) is the year for which the most recent data were available from the Governor's Office of Management and Budget (GOMB 2008).

24.4.5.1 Past Trends

Although consistent data regarding the amount of farmland available in the period between 1900 and the 1960s were not available for Davis and Weber Counties, vast areas of each county were farmed during this period to supply the local population. In 1974, Davis County had 120,000 acres of farmland, and Weber County had 215,421 acres of farmland. By 2012, the amount of farmland in Davis County had decreased by 54% to 55,017 acres, and the amount in Weber County had decreased by 46% to 117,415 acres (Downen 2009). Much of the decrease in farmland in Davis and Weber Counties has been the result of converting farmland to urban uses to support population growth.

24.4.5.2 Future Trends

In 2008, the Governor's Office of Management and Budget determined the projected development growth that is expected along the greater Wasatch Front. As shown in Figure 24-2, Wasatch Front North Developed Land 2030, in Volume IV, much of the area that was undeveloped or agricultural in 2005 (see Figure 24-1, Wasatch Front North Developed Land 2005, in Volume IV) is expected to be developed by 2030 based on current population growth rates. The WDC team expects that the rate of farmland lost to development will continue through 2040.

No data are available regarding the exact amount of agricultural land that will be converted to urban uses in the two counties by 2040 with the No-Action Alternative. However, when one compares Figure 24-1, Wasatch Front North Developed Land 2005, to Figure 24-2, Wasatch Front North Developed Land 2030, it is evident that regional development without the WDC (that is, with the No-Action Alternative) would result in the loss of agricultural land. As shown in Table 24-2 above, Present and Reasonably Foreseeable Development Actions, by 2040, an additional 66,000 acres of land could be converted to urban uses, most of which would be agricultural land (GOMB 2008).

24.4.5.3 Contribution of the WDC to Cumulative Impacts

The proposed WDC alternatives would convert between 608 acres of agricultural land (up to 636 acres if severed parcels are included) with Alternative B1 (the alternative with the least impact to farmland) and 690 acres of agricultural land (up to 740 acres if severed parcels are included) with Alternative A2 (the alternative with the most impact to farmland), or less than 1% of the total agricultural land currently in Davis and Weber Counties. Other planned transportation projects listed above in Table 24-1, Present and Reasonably Foreseeable Transit and Roadway Actions, would result in less than 100 acres of additional impacts to agricultural land; the main contributor will continue to be the urban growth that will occur through 2040 in the two counties.

No data are available on the exact amount of agricultural land that will be converted to urban uses in the two counties, but, as described in Section 24.4.5.2, Future Trends, the WDC team expects that, by 2040, up to 66,000 acres of agricultural land could be converted to urban uses (GOMB 2008). Using available data starting with the 1974 farmland census, past and future actions, including any direct and indirect agricultural impacts from the WDC, could result in a total loss of 69% of the total farmland in Weber and Davis Counties (about 230,000 acres). With the direct impacts from the WDC, the total loss would still be about 69%.

The loss of farmland from the expected urban growth could affect the sustainability of farming in Davis County because farmers rely on sharing resources to stay competitive. The loss of numerous farming operations could make farming not viable for smaller farming operations. It should be noted that converting farmland to development is an economic decision made by the private landowner. Although the WDC would affect some farming operations, it would not contribute enough to cumulative impacts to be the final cause of the loss of farming operations in Davis County. If farmers sell their land for development, this would ultimately cause the loss of sustainable farming in the area. Overall, the WDC would contribute less than 1% of the total loss in farmland and would not substantially add to the cumulative impacts.

24.4.5.4 Mitigation Measures for WDC Impacts to Farmland

Section 4.4.6, Mitigation Measures, in Chapter 4, Farmland, provides a detailed discussion of measures for mitigating impacts to farmland. The mitigation measures include maintaining farm access and irrigation systems. As part of its standard procedures, UDOT would compensate owners of farmland and farm-related businesses within the WDC right-of-way according to the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and other state and federal guidelines if the owners' properties are affected by project construction.

24.4.6 Economics

This section describes the cumulative impacts to housing values from the WDC and the economic recession that started in late 2007. During the EIS scoping period, some residents commented that their property values had decreased substantially since 2007 and that having a new highway adjacent to or near their home would further reduce the property value.

What are the geographic scope and timeframe of the analysis of cumulative impacts to property values?

The geographic scope is Davis and Weber Counties. This geographic scope is the impact analysis area referred to in Section 24.4.6. The timeframe is from about 2005 through 2040.

The WDC would be located in both Davis and Weber Counties. Potential impacts to residential properties would occur in both counties, so the geographic scope of this analysis includes these two counties. This geographic scope is the impact analysis area referred to in Section 24.4.6.

The timeframe of the analysis is from about 2005 through 2040. The baseline year selected for the analysis is 2007 when property values began to decline.

24.4.6.1 Past Trends

Historically in Utah, residential property values have increased almost every year. Over a 16-year period beginning in 1980, residential property values increased every year except in 1984, 1987, and 1988, when they decreased by 0.1%, 2.1%, and 3%, respectively. During the 2 years before the recent downturn in the housing market, property values in Utah increased substantially (15.9% in 2006 and 12.4% in 2007). As in the rest of the U.S., residential property values in Utah declined between 2007 to about 2012 or 2013, depending on the city. The median home price in Utah declined from a peak of $220,000 in May 2007 to just above $170,000 in August 2011, or more than 20% on a seasonally adjusted basis (GOMB 2011). By 2016, housing prices had rebounded to levels at or higher than those in 2007 prior to the recession.

In Davis County, residential property values decreased from an average high of $254,530 in 2007 to $194,700 in 2011, a decrease of about 30%. In Weber County, residential property values decreased from an average high of $225,531 in 2007 to $166,996 in 2011, a decrease of about 35%. By 2016, housing prices had rebounded to levels at or higher than those in 2007 prior to the recession.

24.4.6.2 Future Trends

Between the release of the Draft EIS and the Final EIS, property values had rebounded to be at or above those prior to the start of the economic recession, which started in late 2007. No reliable data are available that predict future property values.

24.4.6.3 Contribution of the WDC to Cumulative Impacts

Because it is difficult to predict future property values, the following analysis is based on how the WDC could cause cumulative impacts to property values in the year when the WDC is constructed versus the planning year of 2040. Between 2007 and 2011, property values in Davis and Weber Counties fell between 30% and 35% from their all-time highs in 2007 (Great Salt Lake City Real Estate 2012; The Salt Lake Tribune 2012). By 2016, property values had rebounded and were at or above those in 2007 before the recession. Prior to the release of the Draft EIS, many residents whose homes would be adjacent to the WDC believed that the WDC would further reduce their property values in combination with the last recession, which they believed would result in cumulative economic impacts to individuals. For the Final EIS, since home values are now at or higher than their levels at the start of the 2007 recession, the best available information indicates that the WDC would not contribute to a cumulative reduction in home values.

As stated in Section 8.4.2.5, General Impacts to Property Values, for the WDC study area, a new highway is expected to cause a net increase in property values. The net increase in property values in the WDC study area would be a positive regional cumulative impact. However, previous studies have suggested that, in some situations, single-family residential areas adjacent or close to a new road could have lower property values and could have a lower rate of appreciation than similar properties located farther from the new road (Carey 2003). No other reasonably foreseeable projects or actions other than the WDC are expected by the WDC team to affect property values in the future.

Most researchers hypothesize that any adverse effects on property values from a new highway are predominantly related to higher traffic volumes and higher levels of noise, visual impacts, and other nuisance effects attributable to the highway. Since property values in any area depend on many different variables, it is difficult to isolate and identify the effect of one transportation facility on property values.

Any decrease in property values from the WDC would not contribute to a cumulative impact with a loss in home values that occurred during the economic recession that started in late 2007, since home prices had rebounded to prerecession levels or higher by 2016. However, property values could decrease for some single-family residential properties immediately adjacent to the WDC.

24.4.6.4 Mitigation Measures for WDC Economic Impacts

No mitigation is proposed for the cumulative economic effects on residential property values.

24.4.7 Community Impacts

This section describes the cumulative impacts to communities from the WDC and other actions. During the EIS scoping period, EPA and USACE commented that cumulative impacts to communities should be considered. In their comments, the agencies did not provide specific details about what aspects of the communities should be considered in the analysis.

What are the geographic scope and timeframe of the analysis of cumulative impacts to communities?

The geographic scope is the cities in Davis and Weber Counties that could be directly affected by a project alternative. The timeframe is from the 1950s through 2040.

In this EIS, community impacts are considered for changes to community cohesion, quality of life, recreation resources, community facilities, public health and safety, and public services and utilities. Of these resources, the WDC action alternatives would not have any substantial adverse effects on recreation resources, community facilities, public safety, or public services and utilities. In addition, public comments received during the scoping period and the alternatives-development process focused on how the WDC would affect residents' quality of life and the cohesive nature of their neighborhoods. Therefore, the cumulative impacts analysis for community impacts focuses on community cohesion and quality of life. The air quality cumulative impacts analysis in Section 24.4.2, Air Quality, evaluates the cumulative impacts of air quality in terms of the national standards that have been established to protect public health.

The geographic scope of this analysis is the cities in Davis and Weber Counties that could be directly affected by a project alternative.

The timeframe of this analysis is from the 1950s through 2040. The baseline year selected for the analysis is 2012 based on the available information from public comments and the communities.

24.4.7.1 Past Trends

During the 1900s, the communities in Weber and Davis Counties have experienced major urban expansion resulting in large residential, commercial, and industrial centers along with associated infrastructure such as freeways and surface streets. The 1900 U.S. Census found that Davis County had a population of about 8,000 people and Weber County had a population of about 25,000 people. As shown above in Chart 24-1, Population Growth in Davis and Weber Counties, 1900 to 2010, the population in these counties has increased dramatically since 1900, and this steady increase has led to continuing urban expansion (GOMB 2012).

What is community cohesion?

Community cohesion is the degree to which residents have a sense of belonging to their neighborhood or community.

Community Cohesion. From 1900 to 1950, the populations of Davis and Weber Counties grew slowly. Residents were predominantly engaged in irrigation agriculture and livestock raising. The first main feature to divide the rural communities was the Utah Central Railroad (now the Union Pacific Railroad), which was built in 1870.

With the introduction of the automobile, the cohesive agricultural communities began to be divided by roads, and the community character was changing from rural to more urban. When I-15 was built in the 1960s, most of the population in Davis and Weber Counties was concentrated on the east, along the Wasatch Mountains. Starting in the 1960s, urban development started spreading west of I-15 in the available agricultural land, and this expansion continues today. As the cities in theses counties began to expand west of I-15, cities such as Farmington, Kaysville, and Layton became divided by the freeway, with most of the town centers east of the freeway and suburban areas on the west side.

Although many of the cities in the WDC study area do not have a historic downtown district or community center, the cities are individually as well as regionally cohesive. Residents identify with their individual neighborhoods and communities but are also involved in regional events, such as holiday celebrations and festivals, outside their neighborhoods. Residents also participate in their neighborhoods and communities by volunteering in various social endeavors.

Edges and paths caused by roads and major utility corridors can generally diminish community cohesion by separating neighborhoods; the extent of the reduction depends on the type of path or edge. For some residents, I-15 and the Rocky Mountain Power utility corridor might diminish community cohesion more than smaller roads do.

Quality of Life. Residents of Utah and the WDC study area generally consider their quality of life to be high. Contributing factors include a varied four-season climate, a moderate cost of living, diverse natural resources, a low rate of violent crime, high-quality education and health care, and varied cultural and recreation opportunities.

What is quality of life?

Quality of life can be characterized as a person's well-being and happiness.

The nonprofit organization Utah Foundation recently released a new study of Utah's priorities taken from citizen surveys (Dan Jones & Associates 2009, 2010). The 2010 Utah Priorities Project report summarizes the issues that were most important that year and how residents felt about Utah's economy, society, and politics. Respondents were also asked to rate the overall quality of life in Utah compared to 5 years ago. Not surprisingly, the percentage of respondents who felt that Utah's quality of life was "somewhat worse" was noticeably higher in 2010 than it was in 2008. A minority of voters (16%) felt that the quality of life in Utah was somewhat or much better, and slightly more than a third (37%) felt that it was about the same. The largest bloc of respondents (45%) felt that Utah's quality of life was somewhat or much worse. These sentiments likely reflect the strains placed on individuals and the state by the economic recession.

In an open-ended question on the surveys, participants were asked, "What do you like most about the community where you live?" Twenty-five percent of respondents cited the rural atmosphere, while another 20% cited people and neighbors (Dan Jones & Associates 2010).

Many residents moved to cities in the WDC study area because of the rural atmosphere. UDOT continues to receive letters from residents in the study area, and newspaper articles periodically appear in local papers, regarding the WDC and the effect it might have on

people's neighborhoods and quality of life. Many people feel that the WDC will ruin their communities and lower their quality of life.

24.4.7.2 Future Trends

Within the WDC study area, population is expected to increase from 182,000 in 2015 to 256,000 in 2040 (an increase of 41%). According to the Governor's Office of Management and Budget (GOMB 2008), this population increase will result in about 66,000 additional acres being developed within the study area with both the No-Action and action alternatives. As the smaller cities grow, they will become less cohesive and divided by additional infrastructure (roads and utilities) and shopping areas. The more cohesive areas will be associated with smaller neighborhoods where people share a common connection such as a local church or school.

With the predicted future growth, the rural atmosphere that brought many current residents to the area will change with the No-Action Alternative. Many of the cities in the WDC study area have predicted full build-out by 2040, when most of the agricultural land will have been converted to urban uses. The sense of open land and the related rural feel will be replaced with that of a typical suburban environment.

What is build-out?

Build-out means that there is no more land available for new development because any undeveloped land is already being used for its intended use of open space, agriculture, or other defined uses.

24.4.7.3 Contribution of the WDC to Cumulative Impacts

For some communities, the initial construction of the WDC would reduce the cohesive nature of their city and reduce the quality of life for those residents adjacent to the highway. The WDC would add to the cumulative effect of the area's changing from rural to urban and would continue the trend of roads dividing communities as they grow. However, this cumulative effect of the area's changing from a rural to a more urban setting would occur either with or without the WDC. The pace of growth and development in the study area communities has been occurring rapidly, and this is evident in the Wasatch Front's loss of 434,000 acres of farmland between 1974 and 2007 (Downen 2009).

Moreover, this incremental contribution by the WDC to the change in the rural nature of the communities is consistent with the communities' plans for overall growth and would occur with either the No-Action or action alternatives. The WDC would require acquiring between 26 and 39 homes (both relocations and potential relocations) and would thereby reduce the cohesive nature of specific neighborhoods. Although the WDC might locally reduce the cohesive nature of specific neighborhoods, no other projects are planned that would add to a cumulative loss of community cohesion in these areas.

What are relocations and potential relocations?

A relocation occurs when constructing an alternative would require purchasing an occupied structure, such as a home or business. The residents or business would need to relocate.

A potential relocation to a residence or business occurs when an existing structure (excluding porches and garages) is within 15 feet of the proposed right-of-way.

The WDC could have additional cumulative impacts on the cohesive nature of Farmington and Kaysville, which are divided by I-15. However, these cities were mostly on the east side of I-15 when that highway was constructed and have since expanded to the west side as population has continued to grow.

The WDC is being considered to address the expected substantial population growth in the WDC study area through 2040. This growth will change the area from more rural to typically suburban. This change in the rural quality of life will occur with or without the WDC, and therefore the WDC would not substantially add to the change in the quality of life or the cohesive nature of communities through 2040. (Local, direct impacts to communities are addressed in Chapter 5, Community Impacts.)

24.4.7.4 Mitigation Measures for WDC Community Impacts

No mitigation is proposed for cumulative community impacts.

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