

# 4

## Environmental Consequences and Mitigation

**How to Read This Chapter:** This chapter identifies potential impacts to the transportation, social and economic, physical and biological, and atmospheric environment that may result from construction of new or upgraded highway facilities within Segments 2, 4, and 7. This chapter is intended to provide sufficient information on the environmental consequences – both benefits and impacts – associated with each segment to support federal, state, and local decisions.

All accompanying figures are bound separately in Volume 2 of this SDEIS.

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### 4.1 Introduction

This chapter summarizes effects to the highway transportation environment; the land use, economic, social and cultural environment; the physical and biological environment; and the atmospheric environment that are expected to result from the Proposed Action. The Proposed Action consists of the construction of SDEIS Segment 2 (the upgrade of Route 161 from Caribou to Cross Lake Township), Segment 4 (the Route 1-161 Connector in Caribou), and Segment 7 (the Presque Isle Bypass). Some analyses were done on the basis of the four SDEIS Corridors (C1m, C2m, Hm, and C3) in their entirety without breaking out individual segments or alignment options for individual analysis. The transportation and economic analyses were done for the entire corridors, as was the air quality analysis. Wherever possible, details concerning the Proposed Action Segments (Segments 2, 4, and 7) have been highlighted. Other analyses, such as those for land use, cultural, and ecological impacts, have been done for the specific alignment options considered for each of the Proposed Action segments (*i.e.*, Segments 2, 4, and 7). The No-Action Alternative serves as a baseline to which Segments 2, 4, and 7 are compared. The No-Action Alternative is defined as continuing Maine Department of Transportation's (MaineDOT) ongoing construction program with no additional extraordinary projects, as described in Section 2.4.1 (page 2-9).

Unless otherwise noted, the information in this chapter is summarized from the DEIS and the technical memoranda prepared for the ACTS. The *SDEIS TTM*<sup>1</sup> contains detailed information on the existing traffic, highway, and safety conditions in the Study Area. The *SDEIS ECTR*<sup>2</sup> contains an analysis of the population, employment, community, and economic characteristics of the Study Area. The *SDEIS EVTR*<sup>3</sup> provides detailed descriptions of the environmental and cultural resources and constraints, as well as a full description of the federal and state regulations relevant to each resource.

In addition to the direct impacts that would result from the Proposed Action, Chapter 4 also discusses potential secondary and cumulative impacts (Section 4.7, page 4-100). Mitigation measures to lessen unavoidable adverse impacts are also presented and summarized in Section 4.8 (page 4-120).

The impact evaluation presented in this chapter is conservative and is based on the assumption that all resources within the right-of-way (using either a uniform right-of-way width or a variable right-of-way that includes cuts and fills) would be altered by highway construction. This analysis is intended to contrast the direct impacts of the alignment options within each segment based on quantifiable data available at the conceptual design stage.

Impacts are presented based upon the potential full build-out of the Proposed Action, which would include a 4-lane cross section, grade-separated interchanges for Segments 4 and 7, and a 2-lane cross-section for Segment 2. MaineDOT expects, however, that initial construction would be done as 2-lane facilities with at-grade intersections in locations where full interchanges would be located in the full build-out.

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## 4.2 Transportation Environment

The *SDEIS TTM*<sup>4</sup> contains a detailed methodology and analysis for the four SDEIS Corridors (C1m, C2m, Hm, and C3). The potential effects on demand, travel time/distance savings, speed changes, VMT and VHT, geometric deficiencies, safety, system continuity, compatibility, and mobility were documented for each of the corridors. Because the selection of a Preferred Corridor is deferred, this section of the SDEIS focuses on the three segments included in MaineDOT's Proposed Action. Segments 4 and 7 are common to all four SDEIS Corridors; Segment 2 is included in Corridors C1m and C2m, but not in Corridors Hm or C3.

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<sup>1</sup> Vanasse Hangen Brustlin, Inc. August 2005. *Supplemental Draft Environmental Impact Statement, Corridor Traffic Analysis Technical Memorandum*. Prepared for the Maine Department of Transportation.

<sup>2</sup> Vanasse Hangen Brustlin, Inc. August 2005. *Supplemental Draft Environmental Impact Statement, Economic Technical Report*. Prepared for the Maine Department of Transportation.

<sup>3</sup> Vanasse Hangen Brustlin, Inc. August 2005. *Supplemental Draft Environmental Impact Statement, Environmental Technical Report*. Prepared for the Maine Department of Transportation.

<sup>4</sup> Vanasse Hangen Brustlin, Inc. August 2005. *Supplemental Draft Environmental Impact Statement, Corridor Traffic Analysis Technical Memorandum*. Prepared for the Maine Department of Transportation.

## 4.2.1 Evaluation Criteria

The criteria used to assess the three Proposed Action segments were:

- **Demand for the Corridor.** The demand for each Proposed Action segment, in terms of vpd, provides a measure of how well the corridor serves projected travel patterns. Model forecasts are used to estimate the corridor demands. New or upgraded highways create shifts in existing travel patterns. These shifts can be internal to the Study Area (for example, shifts from Route 1 or Route 11); or external, such as shifts from the Trans Canada Highway to the Proposed Action segments. For each Corridor Segment, the analysis estimates the demand and quantifies the demand shifts from other highways.
- **Vehicle-Miles Traveled (VMT).** VMT is a measure of vehicle (automobile and truck) use and trip length. One vehicle traveling one mile constitutes one VMT. Over time, VMT is also affected by factors such as population, employment rates, land development, infrastructure changes, and housing density. The VMT for the Study Area has been quantified using model forecasts for each of the Proposed Action segments as well as the No-Action Alternative. Comparing changes in Study Area VMT provides a direct measure of how the demand shifts caused by each corridor affect transportation efficiency within the Study Area in terms of trip distances. A corridor that provides a shorter route will reduce VMT.
- **Safety and Geometric Deficiencies.** The existing transportation conditions assessment identified geometric- and safety-related deficiencies throughout the Study Area. Proposed Action segments may affect safety by eliminating HCL or geometric deficiencies, or by shifting volumes to or away from HCL or locations with geometric deficiencies.
- **System Continuity and Mobility.** How well a Corridor Segment improves mobility and its compatibility with the existing transportation system are qualitative measures that address how well the corridor fits into the existing transportation network. One measure of system mobility is how each corridor shifts demands from highways with a low functional classification (such as local roads and minor arterials) to roads with a higher functional classification (such as interstate and primary arterials). A highway's effect on mobility is directly related to its functional classification.

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## 4.2.2 Projected Demands

This section compares the future 2030 “build” highway network for each of the Proposed Action segments to the future 2030 No-Action Alternative. This comparison will estimate the potential impact of each segment in terms of demand shifts and VMT. The regional model uses a 1999 base condition and forecasts travel demands to the year 2030.

#### 4.2.2.1 Methodology

The Aroostook County Travel Demand Model, developed for the ACTS, was used to quantify demand shifts, travel time savings, changes in travel distance, VMT, and VHT for all proposed SDEIS corridors. The model consists of a link-based highway network for key regional highways in the Study Area (local roads are not included). The model also includes Route 2 in Canada and US Routes 1, 1A, 2, 2A, 11, and I-95 south of the Study Area.

The model assigns a distance, speed, and highway classification to each highway link. The model software uses the coded information on each link to calculate travel time and distances between defined locations in the model.

The model uses the forecasted population growth and employment growth for the year 2030 to predict the future number of trips traveling within or through the Study Area. The model assigns each trip an origin and a destination through a trip distribution process. These distributed trips are then assigned to the highway network based on the travel times between each area. The result is a “loaded” highway network that contains the forecasted traffic volume on each link and the travel time and distances between each origin/destination pair. The model then calculates VMT and VHT based on the distance, time, and traffic volume on each highway link.

#### 4.2.2.2 Results of Demand Analysis

This section discusses traffic demand shifts and changes for each of the three Proposed Action segments summarized in Table 4-1 and Table 4-2 (page 4-5). Figures 4-1 through 4-4 show the travel demand shifts and travel time savings for each of the four SDEIS corridors.

##### Segment 2

North of Caribou, Route 161 would carry an additional 1,800 to 2,200 vpd (69 percent), 210 to 280 of which are trucks, as a result of this upgrade (for Corridors C1m and C2m). Corridor Hm would decrease traffic on Route 161 by 100 vpd (15 percent) but would increase truck traffic by 70 trucks and Corridor 3 would decrease traffic on Route 161 by 500 vpd but would increase truck traffic by 10 trucks.

##### Segment 4

The proposed Segment 4, the new connection between Routes 1 and 161, is expected to result in a decrease of 1,800 vpd (Corridors Hm and C3 – a 41-percent reduction) to 2,100 vpd (Corridors C1m and C2m – a 48 percent reduction) in downtown Caribou, a decrease of 20 to 35 trucks, respectively.

### Segment 7

Segment 7 bypasses downtown Presque Isle to the east and is expected to reduce the daily volume of traffic on Route 1 in downtown Presque Isle by 7,100 vehicles (52 percent), including 870 trucks. The Presque Isle Bypass is expected to carry approximately 8,500 vpd (1,500 trucks) as part of Corridors Hm or C2m and 7,500 vehicles (1,200 trucks) as part of Corridors C1m or C3. This demand includes traffic diverted from downtown Presque Isle and other highways in the Study Area.

**Table 4-1**  
**2030 Forecasted Annual Average Daily Traffic Demand Shifts<sup>1</sup>**

	No-Action Alternative Volume <sup>2</sup> Total Demand (Trucks)	Change in Demand			
		Corridor Hm Total Demand (Trucks)	Composite Corridor 1m Total Demand (Trucks)	Composite Corridor 2m Total Demand (Trucks)	Corridor 3 Total Demand (Trucks)
<b>Highway Segment Upgrade</b>					
Segment 2 - Route 161 south of Cross Lake Township (T17R5 WELS)	2,600 (50)	-100 (+70)	+1,800 (+210)	+2,200 (+280)	-500 (+10)
<b>New Highway Link</b>					
Segment 4 - Route 1 / Route 161 Connector	n/a <sup>3</sup>	+3,200 (+140)	+4,600 (+270)	+5,000 (+400)	+2,900 (+70)
Segment 7 - Bypass east of Presque Isle	n/a <sup>3</sup>	+8,500 (+1,500)	+7,500 (+1,200)	+8,500 (+1,500)	+7,500 (+1,200)

<sup>1</sup> Volumes shown are AADT for 2030 conditions, expressed in vehicles per day.

<sup>2</sup> The total traffic demand and the truck traffic demand are for the No-Action Alternative. How each corridor changes the No-Action Alternative traffic demands is reflected under each corridor. The truck traffic demand is shown in parenthesis.

<sup>3</sup> Not applicable.

Note: Change in AADT for total vehicles compared to the No-Action Alternative. Positive numbers represent increase in traffic volumes while a negative number would represent a decrease in the number of vehicles.

**Table 4-2**  
**2030 Forecasted Demand Reductions through City/Town Centers**  
**(Total Vehicles/Trucks)**

	Presque Isle	Caribou
No-Action Alternative Volume <sup>1</sup>	13,700/1,000	4,400/80
<b>Volume Reductions<sup>2</sup></b>		
Corridor Hm	7,100/870 (52%)	1,800/20 (41%)
Composite Corridor 1m	7,100/880 (52%)	2,100/35 (48%)
Composite Corridor 2m	7,100/870 (52%)	2,100/35 (48%)
Corridor 3	7,100/880 (52%)	1,800/20 (41%)

<sup>1</sup> Volumes shown are AADT for 2030 conditions (Total Vehicles/Trucks), expressed in vpd.

<sup>2</sup> Percent change (the percent decrease) is shown in parenthesis.

### **4.2.3 Safety and Geometric Deficiencies**

HCLs were identified throughout the Study Area, and geometric deficiencies were identified for the key Study Area highways. This section assesses the Proposed Action's effect on the HCL and deficient segments in terms of:

- Benefits of geometric improvements that eliminate the HCL or geometric deficiency;
- Safety benefits of lower traffic demands to the HCL or geometric deficiency; and
- Safety effects of increasing traffic on corridors with geometric deficiencies or HCL without geometric modifications.

This section also examines the relationship between safety and functional classification. A highway's functional classification is determined by how it is intended to operate and its geometric design. Statewide crash rates for each functional classification have been researched to indicate each corridor's effect on safety based on Study Area traffic volumes diverted to safer highways.

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#### **4.2.3.1 Safety - High Crash Locations and Highway Deficiencies**

This section addresses how the Proposed Action Segments affect HCLs. The primary benefits of each corridor result from the reduction of HCLs through geometric improvements. There will also be secondary benefits from a new corridor or corridor upgrade that diverts traffic away from the HCLs. However, the existing HCLs may not be eliminated because no reconstruction/upgrade of the existing highway would be undertaken. Finally, there are locations that would be affected because traffic is shifted toward the HCLs without geometric improvements. A HCL that is not geometrically improved by the Proposed Action and experiences higher demands because of the corridor may be negatively or adversely impacted. Table 4-3 (page 4-7) summarizes how each segment would affect the HCLs in the Study Area.

##### **No-Action Alternative**

The No-Action Alternative would not impact any HCLs in the Study Area as no construction, and therefore geometric improvements, would occur.

##### **Segment 2**

Segment 2 would result in geometric improvements at one HCL along Route 161 in T16R4 WELS. Between New Sweden and Cross Lake, Route 161 has three deficient horizontal curves, 13 deficient vertical curves, and lacks shoulders. The proposed upgrade of Route 161 would address these deficiencies.

### Segment 4

Segment 4 would improve safety in several ways. First, it would reduce the mix of through traffic, particularly trucks, in downtown Caribou. Second, it would make geometric improvements at the Route 1/Route 89/Bennett Drive HCL location (Table 4-3 below). And finally, it would decrease traffic at the Route 1/North Main Street intersection by 4,600 vpd.

### Segment 7

Segment 7 would decrease traffic volumes at seven HCL locations in Presque Isle, as shown in Table 4-3 below. Traffic will be shifted out of downtown Presque Isle as a result of the bypass and should correct HCLs identified in Table 4-3 through this reduction in traffic.

**Table 4-3  
 Safety Assessment – Effects on High Crash Locations**

Location	City/Town	High Crash Locations (HCL) <sup>1</sup>	Corridor 1m		Composite Corridor 1m		Composite Corridor 2m		Corridor 3	
			Shift <sup>2</sup>	Result <sup>3</sup>	Shift	Result	Shift	Result	Shift	Result
<b>Segment 2</b>										
Route 161	T16 R4WELS	Between Caribou and Fort Kent, south of Rt.162	-100	+	1,800	GI	2,200	GI	-500	+
<b>Segment 4</b>										
Route 1	Caribou	Rt. 1 @ Bennett Dr. / Rt. 89	3,600	GI	3,400	GI	3,700	GI	3,300	GI
Route 1	Caribou	Rt. 1 @ N. Main St.	-4,600	+	-4,600	+	-4,600	+	-4,600	+
<b>Segment 7</b>										
Route 1	Presque Isle	Cedar St. to Pleasant St.	-4,700	+	-4,700	+	-4,700	+	-4,700	+
Route 1	Presque Isle	Main St. @ Blake St.	-3,100	+	-3,100	+	-3,100	+	-3,100	+
Route 1	Presque Isle	from Park/Allen St. to South St.	-3,100	+	-3,100	+	-3,100	+	-3,100	+
Route 1	Presque Isle	from Summer St. to North St.	-3,100	+	-3,100	+	-3,100	+	-3,100	+
Route 1	Presque Isle	Main St. @ Rice St.	-7,100	+	-6,900	+	-7,100	+	-6,900	+
Route 1	Presque Isle	US 1 @ Maysville St.	-7,100	+	-7,100	+	-7,100	+	-7,100	+
Route 1	Presque Isle	Main St. @ Reach/Washburn Rd.	-7,100	+	-7,100	+	-7,100	+	-7,100	+

1 Analysis excludes two HCLs on Bennett Drive and one HCL on Conant Road because these highways are not specifically included in the regional model. Existing HCLs that are addressed through highway reconstruction in the 6-year Transportation Improvement Program (TIP) are also not included in this analysis.

2 Shift denotes the difference between 2030 No-Action and 2030 Build alternatives. Shifts are representative of 2030 AADT, expressed in vehicles per day.

3 Results: "NC" denotes no change in both demands and geometry; "+" denotes a shift in demand away from the HCL; "-" denotes an increase in demand at the HCL; "GI" denotes a geometric improvement at the HCL.

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## **4.2.4 System Continuity, Compatibility, and Mobility**

Continuity can be quantitatively characterized by how often existing highways transition between wide, higher speed segments in rural areas to narrow, lower speed segments through downtown areas or city/town centers. These factors contribute to reduced mobility and poor system reliability. The lack of system continuity contributes to a decrease in mobility for residents and businesses in central and northern Aroostook County. The improvement in mobility provided by each corridor has been qualitatively evaluated by how each corridor would improve local downtown conflicts, connections to external markets, and connections to internal activity centers.

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### **4.2.4.1 Continuity**

Routes 1 and 161 have numerous speed limit changes throughout their length. Most of the segments between towns exhibit considerable variation in speed and geometry. On each highway, there are numerous transitions between high-speed highway segments through somewhat remote areas and lower speed segments through more densely developed areas. The Proposed Action has the potential to improve continuity in two ways: by reducing the number of speed limit transitions and geometry changes; and by shifting traffic volume from highways with high number of speed limit and geometry changes to more consistent highway corridors.

This section discusses each segment of the Proposed Action's effect on continuity, based primarily on speed limits.

#### **Segment 2**

The speed limit on Route 161 between Caribou and Fort Kent (43.6 miles) changes ten times, and varies between 25 and 55 mph. The Proposed Action would improve continuity by upgrading Route 161 between New Sweden and Daigle (26 miles) and would provide more consistent speed limits.

#### **Segment 4**

This connector roadway allows a more direct and efficient route between Route 1 (north of Caribou) and Route 161 (north of Caribou). Currently, vehicles traveling between these two highways must traverse downtown Caribou where traffic congestion, changes in the posted speed limit, and one-way roadway circulation patterns increase travel time. The Proposed Action would provide a more direct connection with less congestion and higher, more constant travel speeds, improve the continuity between highways, and reduce truck traffic in downtown Caribou.

## Segment 7

The speed limit on Route 1 through downtown Presque Isle (4 miles) changes four times and varies between 25 mph and 45 mph. The Proposed Action would reduce the volume of traffic through downtown Presque Isle by approximately 7,100 vpd, and would provide a new 10-mile highway with a consistent 70-mph freeway design speed that could be posted at 55 to 65 MPH. At full build-out, intersections with local roads (Conant Road, and Route 163/167) would be grade-separated, further improving continuity. Initial construction would be two lanes with at-grade intersections at these locations.

### 4.2.4.2 System Mobility

The lack of system continuity, as described above, contributes to a decrease in mobility for residents and businesses in central and northern Aroostook County. These mobility issues can be exacerbated by time of year (due to weather and agricultural activities) and by time of day (due to variations in travel demand). This section discusses each segment's effect on mobility in terms of addressing local conflicts in Presque Isle and Caribou.

Local conflicts occur when regional traffic (motorists that desire the shortest travel time with minimal interruption in traffic flow) passes through local cities/towns on highways that also provide a high degree of local access. Highways through city/town centers have more points of conflict than regional highways outside city/town centers. These conflicts include frequent access and egress points to adjacent land uses, frequent intersections with side streets, pedestrian movements, narrow lane widths, narrow (or lacking) shoulders, on-street parking, and frequent speed limit transitions.

Local conflicts are reduced and mobility increased when regional through traffic is removed. Benefits are improved mobility (travel times); improved access to local businesses, and city/town halls; and improved pedestrian access (reduced congestion in city/town centers). Each of the Proposed Action segments' effect on local downtown conflicts has been summarized in Table 4-4 below. Segment 2 would not improve mobility.

**Table 4-4**  
**Effects on Local Centers**

	Segment 7 – Presque Isle		Segment 4 - Caribou	
	Bypass <sup>1</sup>	Change (vpd) <sup>2</sup>	Bypass <sup>1</sup>	Change (vpd) <sup>2</sup>
No-Action Alternative	No	0	No	0
Corridor Hm	Yes	-52%	Yes	-41%
Composite Corridor 1m	Yes	-52%	Yes	-48%
Composite Corridor 2m	Yes	-52%	Yes	-48%
Corridor 3	Yes	-52%	Yes	-41%

Note: Segment 2 does not include a local bypass of any center and as a result there is no change in volume.

1 If "Yes," the corridor includes a bypass of the local center.

2 Percent of total traffic diverted.

## **Segment 2**

Segment 2 would not cause any traffic to bypass a city or town center and would not improve any functional conflicts.

## **Segment 4**

The northerly bypass of Caribou between Route 161 and Route 1 would directly improve conflicts through Caribou by providing a bypass of the city center. This would reduce downtown Caribou traffic by 1,800 to 2,100 daily vehicles (20 to 35 trucks), a 41 percent reduction for Corridor Hm and C3 and a 48 percent vehicle reduction for Corridor C1m or C2m.

## **Segment 7**

Segment 7 (bypass of city center) would directly improve vehicle conflicts by reducing traffic volumes on Route 1 through downtown Presque Isle. Through Presque Isle, Segment 7 would reduce traffic demand by 7,100 daily vehicles (including 870 to 880 trucks) or 52 percent because of the easterly bypass of Presque Isle.

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## **4.3 Land Use, Economic, Social, and Cultural Environment**

This section describes the potential impacts of the various alignment options for Segments 2, 4, and 7 on land uses including, structures within the potential ROW, tribal lands, snowmobile trails, public parks and recreational land and compatibility with local comprehensive plans and zoning, agricultural land, and cultural resources (historic resources, archaeological resources, and traditional cultural properties). This section also describes potential impacts related to land containing uncontrolled petroleum and hazardous wastes.

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### **4.3.1 Land Use**

Construction of a widened highway or new alignment highway segment will require the acquisition of land, which converts that land from its prior use when purchased for a transportation right-of-way. The total amount of land affected is determined by the amount of new right-of-way acquisition that is required for construction of new highway facilities and upgrades. Loss of forested land and agricultural land could have substantial economic effects, and the loss of developed land could adversely affect communities from both an economic and social perspective.

MaineDOT will determine the specific property needs for each segment of the Proposed Action after the completion of the planning process, funding allocation, and final design for the improvements. Once parcels are identified, property owners will be notified of MaineDOT's interest in acquiring the property as well as the acquisition process. The

acquisition process is guided by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the Uniform Act). The Uniform Act provides for fair and equitable treatment of persons whose property will be acquired or who will be displaced because of programs or projects financed with federal funds. Congress amended and updated the Uniform Act in 1987. The rules for the Uniform Act were first published in the Federal Register of March 2, 1989. The process is described in detail in the *SDEIS ECTR*.

#### 4.3.1.1 Land Use Impacts

Potential land use impacts for Segments 2, 4, and 7 were assessed by overlaying the various alignment options for the segments onto the land use types found within the corridors (as described in Section 3.3, page 3-22). Land use types were determined from parcel data obtained from city and town assessors' offices for Segments 4 and 7 and from 2003 MaineDOT aerial photography for Segment 2. Because the agricultural land discussed in this section is based on town assessor's records rather than aerial photography, the impacts to active farmland discussed in Section 4.3.2 are a more precise estimate of impacts to agriculture. Table 4-5 (below) summarizes these impacts for the purpose of comparing alignment options within the three segments that compose the Proposed Action. Table 4-6 (page 4-12) lists impacts to structures by type for each of the alignment options for Segments 2, 4, and 7.

**Table 4-5  
 Impacts to Land (Acres)**

Segment – Alignment Option	Agricultural (% of total in Study Area)	Commercial (% of total in Study Area)	Community (% of total in Study Area)	Government (% of total in Study Area)	Residential (% of total in Study Area)	Undeveloped Forest (% of total in Study Area)	Total Land (acres)
Segment 2	55 (0.02)	13 (0.05)	0 (0.00)	0 (0.00)	62 (0.42)	258 (0.02)	388
Segment 4 – Option 1	100 (0.04)	16 (0.06)	14 (2.19)	10 (1.56)	7 (0.05)	10 (0.00)	157
Segment 4 – Option 2	174 (0.06)	47 (0.18)	13 (2.03)	22 (3.44)	21 (0.14)	11 (0.00)	288
Segment 4 – Option 3	141 (0.05)	51 (0.19)	14 (2.19)	0 (0.00)	19 (0.13)	31 (0.00)	255
Segment 7 - Option 1	302 (0.11)	49 (0.19)	1 (0.16)	0 (0.00)	84 (0.57)	3 (0.00)	437
Segment 7 - Option 2	342 (0.13)	48 (0.18)	1 (0.16)	0 (0.00)	62 (0.42)	2 (0.00)	455
Segment 7 - Option 3	311 (0.11)	48 (0.18)	1 (0.16)	0 (0.00)	71 (0.48)	8 (0.00)	438
Segment 7 - Option 4	187 (0.07)	na <sup>2</sup>	na	na	na	na	na
Segment 7 - Option 5	289 (0.11)	52 (0.20)	0 (0.00)	0 (0.00)	84 (0.57)	23 (0.00)	448
Segment 7 - Option 6	367 (0.13)	29 (0.11)	0 (0.00)	0 (0.00)	59 (0.40)	16 (0.00)	471
<b>Total Within Study Area</b>	272,000	26,240	<640	< 640	14,720	1,451,520	1,766,400

1 Impacts for Segment 2 were based upon a right-of-way width of 110-120 feet, impacts for Segment 4 were based upon a right-of-way width of 200 feet for the upgrade portion and 300 feet for the new alignment portion; and impacts for Segment 7 are based upon a 300-foot right-of-way for Alignment Options 1, 2, 3, 5, and 6. Alignment Option 4 was based upon a 200-foot right-of-way for the upgrade portion and 300 feet for the new alignment portion.

2 Information not available.

**Table 4-6  
 Impacts to Structures<sup>1</sup>**

Segment - Alignment Option	Agricultural	Commercial	Community	Government	Residential	Total Structures
Segment 2	1	0	0	0	2	3
Segment 4 – Option 1	3	5	0	0	1	9
Segment 4 – Option 2	0	7	1	0	14	22
Segment 4 – Option 3	0	5	0	0	12	17
Segment 7 -Option 1	1	5	0	0	26	32
Segment 7 - Option 2	1	3	0	0	22	26
Segment 7 - Option 3	1	4	0	0	23	28
Segment 7 - Option 4	0	1	1	0	95	97
Segment 7 - Option 5	0	0	0	0	27	27
Segment 7 - Option 6	0	1	0	0	22	23

<sup>1</sup> Impacts for Segment 2 were based upon a right-of-way width of 110-120 feet, impacts for Segment 4 were based upon a right-of-way width of 200 feet for the upgrade portion and 300 feet for the new alignment portion; and impacts for Segment 7 are based upon a 300-foot right-of-way for Alignment Options 1, 2, 3, 5, and 6. Alignment Option 4 was based upon a 200-foot right-of-way for the upgrade portion and 300 feet for the new alignment portion.

### No-Action Alternative

The No-Action Alternative would not affect land use or structures.

### Segment 2

Segment 2 (Figure 2-6) would impact approximately 388 acres of land (Table 4-5, page 4-11). As shown in Table 4-5, the majority of this land (258 acres, or 66 percent of the total impact) is undeveloped forest, which represents approximately 0.02 percent of total forest in the Study Area. Segment 2 would also impact approximately 62 acres of residential land (16 percent of the total impact), which represents approximately 0.42 percent of the total residential land in the Study Area.

Segment 2 would directly impact three structures (two residential and one agricultural) along its entire 26-mile length (Table 4-6, above).

### Segment 4

The three alignment options for Segment 4 (Figure 2-8) would impact between 157 and 288 acres of land. As shown in Table 4-5 (page 4-11), the majority of this land (100 to 174 acres, or 55 to 64 percent of the total) is in agricultural use. Impacts to undeveloped forest land are low (10 to 31 acres). Alignment Option 1 would have less effect on land compared to Alignment Options 2 and 3. Alignment Option 1 would affect less agricultural land (approximately 100 acres or 0.04 percent of the total agricultural land in the Study Area) than Alignment Option 2 (which would affect approximately 174 acres or 0.06 percent of the total agricultural land in the

Study Area) and Alignment Option 3 (which would affect approximately 141 acres or 0.05 percent of the total agricultural land in the Study Area).

Alignment Option 1 would affect nine structures (one residence), Alignment Option 2 would affect 22 structures (14 residences), and Alignment Option 3 would affect 17 structures (12 residences) (Table 4-6, page 4-12). The majority of these structures are residential. Segment 4 would impact 7 to 21 acres of residential land (4 to 7 percent of the total impact), which represents approximately 0.14 percent of residential land in the study area.

### **Segment 7**

The impacts of the Segment 7 alignment options (Figure 2-13a and 13b) are generally similar to one another. Alignment Options 1, 2, 3, 5 and 6 would impact between 437 and 471 acres of land. As shown in Table 4-5 (page 4-11), the majority of this land (ranging between 187 and 367 acres, or 39 to 78 percent of the total impact) is agricultural land, representing between 0.06 and 0.13 percent of the total agricultural land in the Study Area. A full analysis was not completed for Alignment Option 4, the Centerline Road Alignment Option. The majority of land along Centerline Road is in residential and agricultural use.

Among the Segment 7 alignment options, Alignment Option 4 (the upgrade of Centerline Road) would affect the greatest number of structures (97), of which 95 are residences. The next highest is Alignment Option 1 (refinement of the original DEIS alignment) with 32 structures impacted (26 residences). Alignment Option 6 (designed to minimize wetland impacts) would affect the fewest structures (23), of which 22 are residences.

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#### **4.3.1.2 Impact to Tribal Lands**

None of the alignment options for Segments 2, 4, or 7 will affect any lands owned or held in trust by the Houlton Band of Maliseet Indians or the Aroostook Band of Micmac Indians.

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#### **4.3.1.3 Impacts to Snowmobile Trails, Public and Private Recreational Land**

This section describes the effects of each element of the Proposed Action on snowmobile trails and other publicly- and privately-owned recreational properties.

##### **No-Action Alternative**

The No-Action Alternative would not affect any private or public recreational lands.

## Segment 2

Segment 2 parallels one privately-owned snowmobile trail, ITS 83, as it runs alongside Route 161 but will not affect the use of this trail.

Route 161 in Stockholm is crossed by the Maine Bureau of Parks and Lands (BPL) Aroostook Valley Trail/Bangor and Aroostook Trail (snowmobile trails ITS 83 and Connector Trail 205). The minor amount of widening needed to upgrade Route 161 would not require acquisition of land from the BPL. The upgrade of Route 161 is not expected to adversely affect the recreational use of the trail for snowmobile or ATV use. MaineDOT may relocate the crossing to ensure adequate sight distances to cross, or consider other mitigation measures to ensure trail continuity.

## Segment 4

Segment 4 would cross two snowmobile trails: one ITS trail (ITS 83) and one Maintained Club Trail. These are publicly-used snowmobile trails on private lands. If necessary, MaineDOT will relocate the crossings to ensure adequate sight distances and trail continuity.

The Aroostook Valley Trail is a former railroad bed converted to an approximately 53 mile recreational trail. The trail traverses through the towns of Caribou, Washburn, and Van Buren. Segment 4, Alignment Option 3, would require that approximately 1.2 miles of the Aroostook Valley Trail be incorporated into the ROW of the new location highway between Route 89 and Route 1.

## Segment 7

None of the alignment options being evaluated in Segment 7 would affect any public recreation land or snowmobile trail. Segment 7 alignment options cross several publicly-used snowmobile trails on private lands. If necessary, MaineDOT will relocate the crossings to ensure adequate sight distances and trail continuity.

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### 4.3.1.4 Compatibility with Local Comprehensive Plans and Zoning

The three segments that comprise the Proposed Action were reviewed to evaluate their compatibility with the local comprehensive plans of the municipalities in which they are located. Segment 2, the upgrade of Route 161, is within Caribou, Woodland, New Sweden, Stockholm, and the unorganized townships of T16R4 WELS, T17R4 WELS and Cross Lake Township (formerly T17R5 WELS). The unorganized townships are managed by the LURC. Segment 4 is entirely within Caribou, and Segment 7 is entirely within Presque Isle.

## **No-Action Alternative**

The No-Action Alternative would not address any of the transportation policies established in the local comprehensive plans.

## **Segment 2**

The upgrade of Route 161 would affect a narrow strip of land, generally less than ten feet wide, along the existing highway. This land acquisition would be up to 20 feet in areas where a climbing lane is proposed. In Caribou, Segment 2 is within an area that is not zoned by the city. None of the towns along Route 161 north of Caribou have zoning plans. No climbing lanes are proposed in Caribou, so impacts to adjacent land uses would be minimal. The City of Caribou's Comprehensive Plan (January 2004) was reviewed to determine Segment 2's compatibility with the plan. The Caribou Comprehensive Plan lists six transportation policies, three of which are applicable to Segment 2. They are:

- Identify, assess, and preserve the carrying capacity, and promote the construction, reconstruction, and maintenance of roads and bridges.
- Encourage programs that will minimize air and water pollution and promote safety for transportation systems.
- Increase tourism through safe, user-friendly transportation facilities and services.

The upgrade of Route 161 supports these policies. It will improve the existing highway and improve its ability to move vehicles efficiently and safely. Drainage improvements incorporated into the upgrade will help to improve the treatment of stormwater runoff and improve water quality over existing conditions. It will benefit tourism by providing a safer highway to northern Aroostook County and recreational/cultural attractions, such as the Maine Winter Sports Complex in Fort Kent and the Swedish Colony in Stockholm and New Sweden.

In Woodland, Segment 2 is within an area that is not zoned by the town. Two climbing lanes are proposed in Woodland, one northbound and one southbound, which would require only minor additional widening on steep sections of Route 161. The Woodland Comprehensive Plan lists six transportation policies, two of which are applicable to Segment 2. They are:

- Maintain and upgrade the present road system to enhance the opportunities to move goods and services, connect outlying rural areas, and access recreational areas, not only in Woodland but to other areas in the region.
- Explore methods to improve the overall safety of the Town's network of state and local roads. Work with Maine DOT engineers and Regional Transportation Advisory Council to implement safe and efficient changes needed to Woodland's transportation network.

The upgrade of Route 161 supports both these policies because it will improve the existing highway and improve its ability to move vehicles efficiently and safely along the highway.

New Sweden lists the same six transportation policy goals in the CMP as Caribou, and the upgrade of Route 161 would meet them in New Sweden for the same reasons listed above for Caribou. New Sweden does not have any zoning plans.

The unorganized territories of T16R4 WELS, T17R4 WELS, and Cross Lake Township are zoned by the LURC. LURC has zoned the majority of Route 161 as M-GN General subdistrict. The purpose of the M-GN subdistrict is to permit forestry and agricultural management activities to occur with minimal interferences from unrelated development in areas where LURC finds that the resource protection afforded by further protection subdistricts is not required. The Proposed Action is permissible in this sub-district without a permit subject to standards. In other isolated subdistricts, such as those zoned for wetland protection, the Proposed Action is permissible with the appropriate permits. There are no comprehensive plans for these areas.

#### **Segment 4**

All three alignment options for Segment 4 are entirely within Caribou, and all would support the City's transportation and economic goals. As discussed for Segment 2, the Caribou Comprehensive plan outlines six transportation policies. Segment 4 will help to support these policies in several ways. By providing a connection directly from Route 161 to Route 1 for north-south traffic that bypasses the downtown area, it will help to reduce traffic, particularly truck traffic, in the downtown, thereby improving traffic flow on the downtown roads. It will improve safety by reducing the mix of through traffic, particularly trucks, from local traffic, by reducing through traffic on Route 1 at the entrance to the Cary Medical Center and by improving the intersection with Bennett Drive (both Cary Medical Center and Bennett Drive are HCLs). These improvements preserve the carrying capacity of existing roads, promote safety, and minimize air pollution by reducing traffic congestion.

Segment 4 will also help to support Caribou's economic development goals by improving access to its Pine Tree Zone, which includes industrial and commercial districts north of the Cary Medical Center. Segment 4 alignment options pass through portions of urban residential zoned land (R-1) and the airport industrial zone (I-2). Alignment Option 3 passes through zoning district R-4, transitional residential.

#### **Segment 7**

Segment 7, the Presque Isle Bypass, is located entirely within Presque Isle. The current Presque Isle Comprehensive Plan has not been updated since 1975. A new plan has been drafted and submitted to the Maine State Planning Office, but it has

not yet received final approval. It is expected to be approved, however, in the relatively near future without any major substantive changes. The draft Comprehensive Plan was reviewed to determine the proposed Presque Isle Bypass' compatibility with it. The proposed bypass is compatible with, and directly supports, several key objectives within Presque Isle's Comprehensive Plan, specifically:

- ▶ Presque Isle's primary concern is to eliminate traffic-related safety problems within the urban compact area.
- ▶ A long-term goal is the construction of a bypass which would substantially reduce the accident frequency on all major roads within the urban area.
- ▶ A top-priority need for the Route 1 downtown area is a detailed traffic improvement plan to resolve the conflicts of shipping and through traffic.

Presque Isle regulates zoning and land use under Chapter 16, Land Use and Development Code Ordinances.

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#### **4.3.2 Active Farmland and Farmland Soils**

Agriculture is an integral part of the economy of Aroostook County (Section 3.3.2, page 3-26), and influences the land use and transportation needs in the St. John Valley and the eastern portion of the Study Area. Section 4.3.1 (page 4-10) evaluated impacts to mapped agriculture land based on parcel and state GIS data. This section provides a more detailed assessment of impacts based on active farmlands and farmland soils. This section discusses the potential impacts to agricultural lands for the various alignment options for Segments 2, 4, and 7. This SDEIS evaluates each alignment option's impact to active farmland (determined based on a review of aerial photography), Prime Farmland Soils, and Farmland of Statewide Importance. Table 4-7 (page 4-18) summarizes the results.

A discussion of impacts to active farmland is included because of the importance of farming in the Study Area. The potential impacts to active farmland from transportation improvements include both direct and indirect impacts. Direct impacts result from the construction of new roads across existing farms or by expansion of existing roads into adjacent farms. Direct impacts include a loss of active farmland and may also include impacts to buildings and other farm infrastructure. Loss of farmland that shortens a field may also affect the length of rows and affect efficiency and productivity. Impact within new location corridors may result in direct impacts to active farmland by isolating farm fields and facilities and by subdividing fields into land-locked or unusable fragments, while impacts associated with upgrading highways may be limited to the loss of portions of fields close to the existing road.

The direct impacts are presented as the number of active farm fields and the area of active farmland within each corridor. Highways may also indirectly impact agricultural production due to highway-generated stormwater pollutants.

The Prime Farmland Soils and Farmland of Statewide Importance data are based on the available soil survey information in the Study Area and may include unregulated developed areas within areas of farmland soil. The impacts presented, therefore, may be an overestimate, particularly for the upgrade alignments.

NEPA documents prepared for transportation studies are required to discuss the FPPA and farmland soil impacts as directed by the FHWA Technical Advisory (T 6640.8a).

### 4.3.2.1 Impacts

Table 4-7 (below) presents a summary of impacts to active farmland, Prime Farmland Soil and Farmland of Statewide Importance for the Proposed Action segments. As discussed in Section 4.3.1 (page 4-10) and shown in Table 4-5 (page 4-11), approximately 425 square miles (or 272,000 acres) of agricultural land is present within the Study Area based on Maine GIS data. The impacts to agricultural land discussed below are, therefore, considered minor when compared to the available agricultural land in the Study Area.

**Table 4-7**  
**Impacts to Active Farmland and Agricultural Soils (Acres)<sup>1</sup>**

Segment – Alignment Option	Active Farmland	Prime Farmland Soil	Farmland of Statewide Importance
Segment 2	61	141	144
Segment 4 – Option 1	81	71	55
Segment 4 – Option 2	59	107	51
Segment 4 – Option 3	49	119	48
Segment 7 - Option 1	209	55	67
Segment 7 - Option 2	196	80	85
Segment 7 - Option 3	283	29	5
Segment 7 - Option 4	178	na <sup>2</sup>	na
Segment 7 - Option 5	163	na	na
Segment 7 - Option 6	296	na	na

1 Impacts for Segment 2 were based upon a right-of-way width of 110-120 feet, impacts for Segment 4 were based upon a right-of-way width of 200 feet for the upgrade portion and 300 feet for the new alignment portion; and impacts for Segment 7 are based upon a 300-foot right-of-way for Alignment Options 1, 2, 3, 5, and 6. Alignment Option 4 was based upon a 200-foot right-of-way for the upgrade portion and 300 feet for the new alignment portion.

2 Information not available for this Alignment Option.

## **No-Action Alternative**

The No-Action Alternative would not affect active farmland, prime farmland soils, or farmland of state-wide importance.

## **Segment 2**

Impacts along Segment 2 (the upgrade of Route 161) would be confined to a narrow strip, approximately 10 feet wide, along the existing highway. These impacts are expected to be minor and include approximately 61 acres of active farmland, 141 acres of Prime Farmland Soil, and 144 acres of Farmland of Statewide Importance. They would result in very small amounts of lost farm to any given parcel and are not expected to affect access or the ability of farmers to continue using existing fields.

## **Segment 4**

Segment 4 would result in the loss of approximately 49 (Alignment Option 3) to 81 acres (Alignment Option 1) of active farmland, and approximately 71 (Alignment Option 1) to 119 acres (Alignment Option 3) of Prime Farmland Soils. Approximately 48 acres (Alignment Option 3) to 55 acres (Alignment Option 1) of Farmland of Statewide Importance would be lost as a result of Segment 4. This impact is considered relatively minor, given the amount of agricultural land available in the Study Area (272,000 acres)

## **Segment 7**

Among the alignment options for Segment 7, Alignment Option 5 would impact the least amount of active farmland (approximately 163 acres). This is because Alignment Option 5 was designed with the express intent of minimizing impacts to farmland without regard to other resources. Alignment Option 6 would impact the greatest amount of active farmland (approximately 296 acres). It was designed to minimize wetland impacts without regard to farmland impacts. Impacts to Prime Farmland Soils for Alignment Options 1, 2, and 3 range from approximately 29 acres (Alignment Option 3) to 80 acres (Alignment Option 2).

MaineDOT met with a number of landowners and farm operators in the area to develop the least disruptive farmland alignment for the Presque Isle Bypass. Alignment Option 2 represents the results of those efforts. For example, in the area north of the Aroostook River, MaineDOT shifted Alignment Option 2 farther to the west compared to the Alignment Option 3 to avoid more productive farmland located east of Higgins Road. Similarly, in the area of State Street and Routes 163/167, Alignment Option 2 is shifted west of the DEIS Alignment Option to avoid farms and a snowmobile test track facility. Between Conant and Easton Roads, Alignment Option 2 skirts the edge of fields. South of Easton Road, Alignment Option 2 runs north-south, perpendicular to fields, to minimize disruption of

farming operations. South of the MM&A railroad, Alignment Option 2 again skirts the edges of fields and passes through undeveloped forest (some of which is wetland) to minimize agricultural impacts.

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#### **4.3.2.2 Mitigation**

MaineDOT has quantified the regulated farmland that will be converted, identified means to preserve farmland, considered alignment options to minimize impacts, and assured that the preliminary design is compatible with all applicable legislation and programs to protect farmland.

Further mitigation for farmland impacts will be completed during final design of the selected alignments. MaineDOT will work with land owners and farm operators to further refine alignments such that they avoid impacting productive fields to the greatest extent practicable. In general, alignments will attempt to avoid bisecting large fields and instead will follow the edges of fields to minimize the disruption to farming operations. MaineDOT will also work with farmers to ensure that the new highways do not cut off access to their fields. MaineDOT will consider providing underpasses for farm equipment where needed and practicable to do so. MaineDOT shall provide just compensation for any property that is taken according to the procedures discussed in Section 4.3.1 (page 4-10).

Along Segment 4, Alignment Option 1 would have the greatest impact to farmland and would bisect several large fields between Route 1 and the area north of the Caribou Country Club (See Figure 2-9c). Alignment Option 2 and 3 would impact a farm house west of Route 1 (Figure 2-9c) and bisect an approximately 80-acre field just east of Route 161 (Figure 2-9b). During the design stage, MaineDOT will work with the owners of these properties to review possible shifts in the alignment to avoid and minimize these impacts.

The Segment 7 alignment options were refined to minimize impacts to farms. Land owners and farm operators within the Presque Isle Bypass study area were consulted to identify the most productive fields, access, and use of fields. Where field crossings were necessary, alignments were reviewed with the land owners and were designed to run parallel to the edge of fields in order to best accommodate farming equipment used for field maintenance, planting, and harvesting. This technique reduces the amount of field inaccessible to large farm equipment. Field access locations and equipment storage areas were identified and factored into the design of upgrade and new highway alignments. Information on field maintenance, harvesting techniques, and equipment allowed for more sensitive preliminary highway design.

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#### **4.3.3 Social and Economic Impacts**

This section describes the potential economic impacts associated with the proposed SDEIS Corridors and, where the analysis allows for it, the Proposed Action segments

specifically (Segments 2, 4, and 7). Direct impacts include acquiring property required for the construction of the improvements as well as the actual costs to build and maintain the highways. Indirect impacts include the “spin-off” or “multiplier” effects that occur when an economic activity leads to subsequent spending within the regional economy (for example, when wages paid to construction workers are used to purchase goods and services locally, these in turn support the wages of other workers in different industry sectors), or which result in actions by others in response to the initial investment (for example, subsequent new development along or adjacent to the new corridors). In addition, the cost and travel time savings resulting from usage of the highway improvements also result in indirect economic impacts. Cumulative impacts are incremental effects that, when added to other past, present, and reasonably foreseeable future actions, may result in changes to the environment. A more detailed explanation of these impacts was included in the DEIS (page 4-46 through 4-50) and the *SDEIS ECTR*.

This section summarizes the findings of the economic impact forecasts and assessments for the overall SDEIS Corridors. This section builds upon the existing conditions, survey research, screening methodology and analysis conducted previously in the DEIS (Section 4.3.3, page 4-20) as well as on the updated research and analysis conducted for the SDEIS and documented in the *SDEIS ECTR*. It provides insight into the implications of projected corridor traffic conditions on the economy of Aroostook County and the State of Maine, measured in terms of future job creation, output, and income levels.

The economic impact analysis focuses on the broader direct, indirect, and induced impacts of the different SDEIS segment locations. For each corridor, the implications of future transportation cost savings to businesses were addressed using the REMI economic model, which was described in detail in the DEIS (page 4-49). The economic effects associated with the construction of the proposed SDEIS Corridors were examined using a process similar to that undertaken in the DEIS. This process included:

- Quantify measurable economic impacts such as changes in population, employment, income, retail sales, and gross regional product resulting from changes in transportation costs for all industries;
- Quantify the economic value of shortened commuting times for workers traveling between employment and population centers;
- Quantify the economic impacts resulting from estimates of increased tourism in the region; and
- Quantify the economic impacts resulting from construction and maintenance of the highways.

Details on the assumptions and methods used are found in Appendix C of the *SDEIS ECTR*.

### 4.3.3.1 Real Estate Impacts

This section presents the cost of acquiring property along the Proposed Action segments, based on the real estate values of land, residential properties, and commercial/industrial properties within the Study Area. The estimated cost of acquisition is considered a direct impact of the Proposed Action. To determine the values of respective property types, recent (2002-2003) sales records for transactions were analyzed. The specific methodology to collect and analyze property values is presented in Section 1.7 of the *SDEIS ECTR*. This section of the SDEIS provides a general comparative indication of real estate values along the SDEIS Proposed Action segments but does not appraise or value individual properties. The range of values indicated does not include incidental expenses associated with takings, such as relocation costs or other adjustments typically included in the land acquisition process.

To estimate the value of properties that would be acquired to construct the SDEIS Proposed Action segments, the Study Area was divided into four sub-districts - North, South, Caribou, and Presque Isle.<sup>5</sup> The four districts were delineated to better account for local differences that may affect property values. Communities in the North District include those north of Caribou; the South District includes communities south of Presque Isle. Table 4-8 below lists the larger communities within each of the four districts.

**Table 4-8  
Towns within Analysis Real Estate Districts**

Region Name	Selected Towns
North	Woodland, Connor Twp, New Sweden, St. Agatha, Van Buren, Madawaska
Caribou	Caribou
Presque Isle	Presque Isle
South	Smyrna, Houlton, Littleton, Monticello, Bridgewater, Mars Hill, Blaine, Westfield

To determine the types of properties and the amount of land area associated with the respective land use type, aerial photos of each of the segments were analyzed using GIS software, as well as site reconnaissance augmented with property assessment data. The capabilities of the GIS allowed for a relatively accurate delineation of building types and land uses for the following property types:

- Residential: single and multi-family dwellings, which may also include various outbuildings including garages;

<sup>5</sup> It should be noted that the estimated acquisition values developed in this section are used to compare the relative direct economic impacts between corridor choices. They do not represent the actual cost of acquiring all of the properties that will be required to construct a particular roadway segment include condemnation and acquisition according to federal and state guidelines.

- Commercial/Farm: commercial, retail, warehouse, office and industrial buildings as well as farmstead land;
- Agricultural Land: farmland currently in production; and
- Undeveloped Land: vacant or forested land.

Where data were available, structure areas (square feet) were estimated for non-residential structures using the aerial photos within the GIS. Where structure area data were not available, average building area estimates were generated through analysis of property tax records for commercial, industrial, and farm buildings within respective Study Area communities.

To calculate the value for the respective property types, an average value for each land use type was generated based on sales records for each of the segments described in Table 4-9 (page 4-24). Once the average value was generated, it was adjusted (high and low) to account for property variables (such as building size, quality, land area, finish, etc.) which might increase or decrease the value. Both the low and the high value estimates reflect scenarios in which all respective properties along the corridor were either on the low or high side of the average value range and are provided only for comparative purposes.

Based on the 2002-2003 sales data utilized, residential properties within the Study Area had an average value range of \$73,000 to \$109,000, depending on location. The low and high values ranged from \$55,000 to \$120,000. Commercial, industrial, and farm buildings ranged between \$17 and \$40 per square foot on average, with a low of \$1 to a high of \$65 per square foot. In terms of land values, average agricultural land value was about \$500 to \$550 per acre (ranging from a low of \$320 per acre to a high of \$1,000 per acre) with undeveloped or forest land averaging \$300 per acre (with a range of \$200 to \$450 per acre).

Table 4-9 (page 4-24) gives the estimated average total value of the land and buildings located within each of the SDEIS Corridor segments. As indicated in Table 4-9, the overwhelming majority of the contribution to value was through structures, with land accounting for about six percent of the total estimated value for properties within the Proposed Action segments. For each segment, one alignment option was selected to provide a "typical cost" for the segment and allow for an overall cost for each of the SDEIS Corridors to be developed. The alignment options chosen were those listed as the preliminary "Preferred Alignment Option" in Chapter 3 of the *SDEIS EVTR*.

Appendix A of the *SDEIS ECTR* includes details for the estimated acquisition costs within each of the corridor segments considered in the analysis.

Costs are expressed in 2002-2003 dollars and do not include any additional costs for relocation or other potential costs associated with property acquisition under state and federal law.

**Table 4-9  
 Total Estimated Land and Structure Acquisition Values<sup>1</sup>**

Segment	Est. Land Value (\$) <sup>2</sup>			Est. Structures Value (\$) <sup>3</sup>			Est. Total Value (\$)		
	Low	Average	High	Low	Average	High	Low	Average	High
2	\$75,975	\$118,700	\$184,100	\$115,000	\$231,000	\$405,000	\$190,975	\$349,700	\$589,100
4 <sup>4</sup>	\$35,475	\$59,750	\$93,500	\$235,000	\$547,000	\$985,000	\$270,475	\$606,750	\$1,078,500
7 <sup>5</sup>	\$154,400	\$237,700	\$465,400	\$1,955,500	\$2,729,500	\$3,322,500	\$2,109,900	\$2,967,200	\$3,787,900

1 These values represent the calculated total land and structures value for these segments based on the high, average, and low values for land and structures, the acreage of land in each category, and the number and types of structures.  
 2 Land other than residential  
 3 Includes residential land and building value  
 4 Alignment Option 2  
 5 Alignment Option 2  
 Source: Vanasse Hangen Brustlin, Inc. August 2005. *Supplemental Draft Environmental Impact Statement, Economic Technical Report*. Prepared for the Maine Department of Transportation.

**No-Action Alternative**

The No-Action Alternative would not require land or structure acquisition.

**Segment 2**

The cost of land acquisition for Segment 2 is estimated to range from \$190,975 to \$589,100, with the majority (\$115,000 to \$405,000) from the cost of acquiring structures.

**Segment 4**

The cost of land acquisition for Segment 4 (based on Alignment Option 2) is estimated to range from \$270,475 to \$1,078,500, with the majority (\$235,000 to \$985,000) from the cost of acquiring structures.

**Segment 7**

The cost of land acquisition for Segment 7 (based on Alignment Option 2) is estimated to range from \$2,109,900 to \$3,787,900, with the majority resulting from the acquisition of residential property.

**4.3.3.2 Population, Employment and Income Effects**

An analysis was conducted using the REMI Model to analyze the effects of the overall SDEIS Corridors, and for Segment 7 in particular, on the economic conditions in Aroostook County and Maine economies.

The No-Action Alternative would not increase population, employment, or income within the Study Area. In 2030, the Study Area is anticipated to have a population of 79,500, with 46,600 jobs and a total personal income of \$1.9 billion. Gross regional product is anticipated to be \$2.6 billion with \$444 million in retail sales.

The chief factor in economic change resulting from highway construction is the change in time spent traveling by both trucks (commercial transport) and passenger cars. This change (measured as changes in vehicle hours traveled or VHT) has several important economic effects. For commercial transport, it reduces the cost of transportation of goods into and out of Aroostook County. Increasingly, Aroostook County's service-based economy also depends critically on the speed of transportation for contact through courier services, such as Federal Express (FedEx), United Parcel Service (UPS), or DHL International (DHL).

Improved efficiency of highway transportation also increases tourist activity in a region as tourists are able to access a region more quickly. For a region such as Aroostook County, which is remote from major population centers, this can be a particularly critical effect. The result is the potential for faster growth of firms in retail- and tourist-related services. Finally, improved highway efficiency benefits the local labor market by improving links between jobs and people's residences. This improves the attractiveness of a region, increasing population growth as people and employers relocate.

Economic impacts are also derived from the construction and maintenance of the highway. Estimated construction costs and changes in transportation times were used as input to the Regional Economic Models, Inc. of Amherst, MA (REMI) models. Key inputs are shown in Table 4-10 (below). Acquisition of land and buildings through prescribed takings procedures is not entered into the REMI model. The model views these transactions as a substitution of one asset (land or structures) for another (money) which is assumed to be spent within the local economy on replacement assets.

**Table 4-10**  
**Inputs to REMI Model**

Corridor	Construction Cost (Millions) <sup>1</sup>	Construction Period (Years)	Percent Change in Truck VHT <sup>2</sup>	Percent Change in Non-truck VHT
Hm	\$610.02	10	-8.54%	-6.46%
C1m	\$556.28	10	-7.03%	-6.46%
C2m	\$594.93	10	-7.88%	-6.68%
C3	\$571.36	10	-7.75%	-6.99%
Segment 7	\$120.8	6	-1.75%	-1.53%

Source: Cost information and VHT data developed by VHB in 2005.

1 Based on full build-out (4-lane controlled access highway)

2 Vehicle Hours Traveled

Economic effects are examined in terms of five key variables:

- Employment - Employment is measured as total employment, including both wage and salary employment and self employment;
- Personal Income - Personal income in nominal dollars;
- Gross Regional Product (GRP, in constant 1996 dollars) - the total output of goods and services in the regional economy, analogous to the Gross Domestic Product (GDP) at the national level;
- Retail Sales - Output of the retail industry; and
- Population.

The results of the REMI model analysis for Aroostook County are shown in Table 4-11 and Table 4-12 (page 4-27). All of the SDEIS Corridors are expected to have similar impacts. Employment and population effects are shown for selected years from 2008 (the assumed starting date for the project in this analysis) to 2035. Personal income and GRP are shown for 2035. All tables show the change from a baseline forecast of the economy (the “No-Action Alternative”) that is made using the REMI Model.

As shown in the tables, the economic impact analysis indicates that the construction of the new or improved highways under consideration would have a beneficial impact on the Aroostook County economy. Compared with a baseline forecast, employment would expand by over 1,100 after 2030, an increase of approximately 2.2 percent over the baseline forecast. Personal income would increase by about \$80 million and retail sales by over \$17 million by 2035.

**Table 4-11**  
**Effects of SDEIS Corridors on Aroostook County Employment and Population**

Corridor	Employment Change (Relative to No-Action Alternative of 46,600 jobs)				
	Jobs				
	2008	2010	2020	2030	2035
Hm	652	654	982	1,133	1,156
C1m	595	770	960	1,109	1,155
C2m	636	634	961	1,112	1,153
C3	611	782	945	1,091	1,154
Segment 7 <sup>1</sup>	216	216	11	24	27

Corridor	Population Change (Relative to No-Action Alternative of 79,500 people)				
	2008	2010	2020	2030	2035
Hm	112	275	1,179	1,336	1,345
C1m	102	302	1,165	1,287	1,299
C2m	109	268	1,165	1,311	1,319
C3	105	310	1,046	1,311	1,313
Segment 7	37	96	97	75	74

<sup>1</sup> 2008 and 2010 impacts for Segment 7 are largely due to construction spending impacts.

**Table 4-12**  
**Effects of SDEIS Corridors on Aroostook County Economy (2035)**

<b>Corridor</b>	<b>Change in Personal Income (Millions of \$)<sup>1</sup></b>	<b>Change in Gross Regional Product (Millions of 1996 \$)<sup>2</sup></b>	<b>Change in Retail Sales (Millions of \$)<sup>3</sup></b>
Hm	\$80.76	\$45.33	\$17.48
C1m	\$79.87	\$45.13	\$17.44
C2m	\$79.78	\$45.13	\$17.42
C3	\$79.60	\$45.00	\$17.40
Segment 7	\$3.79	\$1.28	\$0.23

1 \$1.9 billion for the No-Action Alternative  
 2 \$2.6 billion for the No-Action Alternative  
 3 \$444 million for the No-Action Alternative  
 Source: REMI model output

Population would increase by approximately 1,300 with construction of any of the corridors. This would return Aroostook County to a population of just over 80,000, the level it last had in 1994, the year Loring Air Force Base was closed. For the No-Action Alternative, this would not occur until after 2040, so these corridors would have the effect of accelerating population recovery by about a decade.

The data in Table 4-11 (page 4-26) indicate the relatively rapid increase in employment resulting from the construction of the corridors and the slower long-term growth that results from the savings of travel time.

While the completion of the corridors would have a positive economic impact on Aroostook County, there are no real differences in the economic effects among the SDEIS Corridors. While Corridor Hm has the largest effect (due primarily to its relatively higher cost and greater time savings), the other corridors are very similar. Neither the alternate routes from I-95 to Presque Isle nor the alternatives from Caribou to Madawaska substantially change the estimates of economic effects. The choice among these corridors should, therefore, be made on other grounds. Because the REMI model looks only at the economy of Aroostook County as a whole, it cannot predict where within the region the impacts would occur. However, it is reasonable to presume that most of the economic effects would be felt in the general vicinity of the SDEIS Corridors.

The Presque Isle Bypass alone has moderate economic effects during the construction phase, but relatively small effects thereafter. The Presque Isle Bypass affects only intra-county movements and thus does not greatly improve Aroostook County connections with the rest of Maine, other states, or Canada. It is expected to result in a number of other transportation benefits, however. It will reduce the amount of truck traffic in the downtown Presque Isle, thereby improving the downtown environment, and it will improve access to the Easton industrial area where the Huber Engineered Woods factory and McCain Foods' potato processing facility are located.

Table 4-13 below shows the changes for Maine (including Aroostook County) relative to the No-Action Alternative. The differences between the SDEIS Corridors are very small, indicating that almost all of the economic and demographic effects would occur in Aroostook County.

**Table 4-13**  
**Effects of the SDEIS Corridors on the Employment and Economy of Maine**

Corridor	Employment Change					Changes in 2035			
	2008	2010	2020	2030	2035	Personal Income (Millions)	Gross Regional Product (Millions of 1996\$)	Retail Sales (Millions)	Population Change
Hm	692	697	1007	1166	1193	\$86.67	\$48.71	\$17.84	1,406
C1	631	812	985	1141	1191	\$85.69	\$48.44	\$17.80	1,360
C2	674	675	986	1144	1189	\$85.59	\$48.45	\$17.77	1,379
C3	648	825	968	1122	1189	\$85.19	\$48.22	\$17.74	1,370
Segment 7	228	230	12	26	29	\$1.74	\$1.43	\$0.25	78

Source: REMI model output

Two qualifications should be made to this analysis. The REMI model does not incorporate effects of improved access from Canada, although an increase in Canadian tourists was built into the tourism part of the analysis. Exclusion of the Canadian tourist effects mean these results slightly underestimate the actual effects. The economic effects also depend on the means of financing the project. The analysis assumes that the project is financed from sources entirely external to Aroostook County. Economic impacts would be smaller depending on the portion of the project financed from within Aroostook County.

The economic impacts associated with the acquisition of land and structures within the corridors are not included in the REMI analysis. The purchase of property by the State for construction of the corridors is considered an exchange of one asset (property) for another (money) that is assumed to be exchanged for replacement property. The analysis assumes that individual property owners will relocate elsewhere in the Study Area and will not be compensated for substantially more than the value of their property and any associated transaction and relocation costs, thus, no new income or wealth is generated as a result of this transfer. If a substantial portion of the property owners decided to build new housing in Aroostook County, rather than purchase existing homes or business/farm facilities, this could result in an additional positive impact to the Aroostook County economy. However, the real estate analysis indicated that there would be a sufficient number of similar properties available during the course of the acquisition and construction period.

### **4.3.3.3 Local and Community Economic Impacts**

The construction of the proposed highway improvements will result in some potential social and economic impacts to local communities that are difficult to quantify. The impacts on housing and relocations, commuting patterns, community tax revenues, and community facilities and services are discussed below for the four north-south corridors.

#### **Relocations**

As discussed in Section 4.3.1 (page 4-10), the acquisition of land and structures for the construction of the highway improvements will result in the loss of homes and businesses. Under state and federal law, owners of property are entitled to fair and just compensation for the value of their property, as well as financial assistance with relocation, including costs associated with purchasing similar replacement property and moving costs. An estimate of these costs was not included in the real estate section due to the average-cost approach that was utilized. The market data that were analyzed indicated that a sufficient inventory of potentially available homes, land, and commercial property exists within the Study Area so that relocation to sites in reasonable proximity to the original property included in the acquisitions was considered reasonably feasible. Appendix B of the *SDEIS ECTR* contains a detailed explanation of the process involved with the acquisition of private property for public uses.

#### **Impacts on Commuting Patterns**

The proposed highway improvements would enhance commuting between communities by reducing travel time and/or costs.

#### **Community Fiscal Impacts**

The increases in population, employment, and economic activity forecast by the application of the REMI model to the proposed highway improvements are relatively small compared to the anticipated background growth, and occur gradually over time as the corridors are built and utilized. Local tax revenues and municipal service costs would be expected to grow proportionately with population. The REMI model calculates, in general terms, the overall increase in local government revenues, as shown in Table 4-14 (page 4-30).

These estimates reflect all government revenues throughout Aroostook County based on state averages and have not been adjusted for any localized differences. The estimates also reflect the entire corridor, and do not distinguish the effects of the three segments identified as the Proposed Action. The impacts shown in Table 4-14 represent a relatively small change over current levels. These municipal revenue increases would be offset by any loss of local property taxes assessed on properties

acquired for the construction of the corridors. These amounts represent a small proportion of total revenues in any of the impacted municipalities.

**Table 4-14**  
**Effect of SDEIS Corridors on Local Revenues at Adjusted State Average Rates**  
**(Millions of 2004 Dollars)**

Corridor	2010	2020	2030	2035
Hm	\$0.8	\$3.6	\$4.5	\$5.1
C1m	\$0.9	\$3.6	\$4.5	\$5.0
C2m	\$0.8	\$3.5	\$4.6	\$5.0
C3	\$0.9	\$3.2	\$4.5	\$4.9
Segment 7 <sup>1</sup>	\$0.3	\$0.2	\$0.2	\$0.2

Source: REMI model output

<sup>1</sup> Note: the revenues shown for the Segment 7 are included in each of the other corridors, and would accrue throughout the Labor Market Area.

### Community Facilities and Services

No major economic impacts to community facilities and services are anticipated as a result of the proposed highway improvements associated with the Proposed Action. The gradual change in population and employment estimated by the REMI model are relatively small compared to existing levels (on the order of 1 to 2 percent) and no sudden or substantial changes in service levels are expected. Because MaineDOT would most likely maintain the roads, no new investment would likely be required locally for this activity.

#### 4.3.3.4 Economic Development and Business Effects

This section examines the potential effects of the Proposed Action and the four SDEIS corridors on local and regional development and businesses. Potential effects due to bypasses are considered, as well as potential adverse and beneficial effects on new commercial development, local economic development, agriculture and forestry, and tourism.

#### Bypass Effects

Segment 4 and Segment 7 are, respectively, bypasses of downtown Caribou and Presque Isle. These bypasses may result in economic and social impacts on the affected communities as a result of the diversion of traffic from the existing street systems. Such impacts could include the loss of business activity/sales revenue for certain businesses and/or possible diminution of property values. On the other hand, the reduction of traffic may enhance the “livability” of the downtown cores, such as Presque Isle and Caribou, in these communities, thereby enhancing the

attractiveness and value of residential units and commercial properties that are not as dependent on through traffic.

Surveys of businesses located along the corridors were conducted as part of the DEIS (page 4-58). Although some businesses were concerned about the impacts of removing through traffic from certain locations, they indicated that the overall impacts would be offset by the improvements to the larger regional economy resulting from the highways. A secondary impact of the construction of bypasses is the resulting development of highway-related commercial uses at interchanges/intersections or at the termini of the bypass segments. This, however, is dependent on local zoning and land use regulations and may or may not occur in the future.

Presque Isle, with the largest commercial activity base in Aroostook County and a variety of auto-related retail outlets along Route 1, has businesses that would be impacted by diverting a portion of the downtown through traffic to a Segment 7 Bypass. These include service stations, convenience stores, and fast food restaurants. Removing traffic from downtown Caribou to a Segment 4 connection could also affect revenues of some businesses that depend on pass-by traffic.

Accurately quantifying the economic impacts of the diversion of traffic from the downtown or village center due to a bypass is difficult without having detailed property-specific data on revenues, customers, and activity levels. These types of data are typically not collected (or shared) by most businesses or local government agencies. In addition, whether or not a through traveler would get off the bypass and come into the downtown/village core, for example to buy fuel or food, is dependent on many other variables and cannot be accurately quantified without additional data.

### **Impact on Houlton**

SDEIS Corridors Hm and C2m would have substantial local economic impacts.<sup>6</sup> Utilizing data presented in the DEIS, the analysis indicated that upgrades to Route 1 (*i.e.*, Corridors C1m and C3) would have “no negative impacts to Houlton other than some temporary construction-related traffic disruption.” The Proposed Action (Segments 2, 4, and 7) would not require any construction in the vicinity of Houlton, would not divert any traffic from Route 1 in Houlton, and therefore would have no economic effect on Houlton.

### **New Commercial Development Locations**

The Proposed Action (improvements to Route 161 and the construction of new highways bypassing Presque Isle and Caribou – Segments 2, 4, and 7) may result in the opening of new land that could potentially be available for commercial development. No new development would result from improvements to Route 161

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<sup>6</sup> Policy One Research, Inc. June 2004. *Assessment of the Impact of a New North/South Aroostook Highway on Houlton and the Southern Aroostook Region.*

in Segment 2. This would be dependent on local zoning and land use regulations or LURC regulations in unorganized townships without local control. Commercial uses typically are developed in or near population centers or along heavily traveled highways. These uses would likely consist of travel-related services, such as gas stations, convenience stores, or fast food outlets. The most likely areas for new commercial development are likely to include:

- The intersection of Segment 4 and Route 1 (Van Buren Road) in Caribou. There is a relatively large amount of commercial development located directly south of this location which is likely to absorb any demand generated by the highway improvements, therefore, no change in use is estimated to occur in the reasonably foreseeable future.
- The intersection of the Presque Isle Bypass (Segment 7) and Fort Fairfield Road (State Routes 163 and 167). This area is zoned for business uses and could support additional commercial development, however, there is also a resource protection zone and other constraints (*e.g.*, railroad tracks) that would limit the extent of development. This intersection is close to the existing commercial area around the Aroostook Mall and existing travel-related service businesses might experience an increase in business due to improved access for through travelers.

The extent of commercial development at any of these locations is difficult to quantify and cannot be reasonably foreseen under current economic conditions. Any new development would represent an incremental change in overall development patterns and economic activity in the Study Area. In some cases, new development might represent a localized shift as existing businesses that are highly dependent on through traffic move to the new location to take advantage of the change in traffic patterns. In other cases, new businesses might be started. In addition to local zoning, commercial development is also dependent on the availability of suitable land free of environmental and other development constraints and that is owned by parties willing to sell or develop their property.

### **Local Economic Development Effects**

Communities and organizations throughout Aroostook County actively promote and encourage economic development, including operating several existing industrial parks. By improving access and reducing travel times, the proposed highway improvements will enhance local economic development efforts to attract and retain businesses, making the region more competitive. The extent of this impact cannot be specifically quantified, other than in a general sense, through the results of the REMI model. Of the new jobs that are created as a result of the proposed highway improvements, some portion of these will likely occur in the existing industrial parks.

## **Agricultural and Forestry Impacts**

The primary impact of the Proposed Action is to reduce truck travel times and costs, thus reducing costs to producers and making the region more economically competitive.

## **Impacts on Tourism**

The REMI model calculated the induced economic impacts on employment, population, and gross regional product derived from savings in time and vehicle miles traveled resulting from each of the SDEIS Corridors. Implicit in the REMI analysis and results are the benefits to commercial sectors including those that support or depend on visitors to Aroostook County. The savings in non-truck vehicle miles and time as a result of the highway improvements means that Aroostook County is likely to attract additional visitors in future years. The DEIS estimated the growth in visitor days to Aroostook County, which was also used for the SDEIS REMI analysis with updated spending estimates derived from more current sources (see Appendix C of the *SDEIS ECTR*). Most of these visitors will come to Aroostook County from other parts of Maine and other New England states. A smaller number will likely come from outside New England or from Canada. Therefore, highway improvements in the southern portion of Aroostook County will benefit the economy sooner than improvements in the north.

The SDEIS corridors would benefit existing tourism venues by improving access to these facilities. The on-going and future activities of the Maine Winter Sports Complex in Fort Kent will benefit from the time savings incurred by visitors and participants. By reducing the overall time it takes to drive to destinations in Aroostook County, snowmobilers, hunters, canoeists, and other recreational participants will benefit, although the degree of benefit will vary with the origination point of these visitors.

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### **4.3.3.5 Other Economic and Social Impacts**

The construction of any of the SDEIS Corridors would have other, less tangible impacts on the economy of the Study Area. These types of impacts would be the result of a combination of the proposed highway project with other reasonably foreseeable actions within Aroostook County that, in combination, would provide additional economic benefits.

A recent study on migration patterns of youth from Aroostook County<sup>7</sup> indicated that the lack of “urban amenities”, such as restaurants, cultural activities, and other features was also a factor, along with limited educational opportunities, in the decision by younger people to leave. The enhancement of Aroostook County’s

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<sup>7</sup> Colgan, Charles and Bruce Andrews. October 2004. *Migration and Youth Migration from Aroostook County: Trends, Factors, and Implications*. Center for Business and Economic Research, University of Southern Maine. Prepared for Northern Maine Development Commission.

downtowns and villages as places to live and work, perhaps resulting from the reduction in heavy truck traffic on the main streets as a result of the proposed highway improvements, along with continued growth of the region's higher education institutions, could make these communities more attractive, thereby helping to stem the outflow of young people as well as attract more permanent residents to Aroostook County.

Segment 4 of the Proposed Action, in combination with revisions to Caribou's zoning ordinance that focus mixed-use growth in the downtown and directs residential growth, could serve as an effective "urban boundary", helping to enhance the image and "livability" of downtown. This, in turn, might affect the out-migration rate of the region's youth and serve to attract additional employers to the community.

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#### **4.3.4 Impacts on Minority and Low Income Populations**

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low Income Populations requires agencies to identify and address potential disproportionate high and adverse impacts on minority<sup>8</sup> and low income populations. The Proposed Action will have a minor positive impact on Aroostook County's disadvantaged populations by providing additional employment opportunities and reducing the costs of commuting. The No-Action Alternative would not provide this benefit. The distribution of low income and minorities in Aroostook County is widespread among the individual communities and rural areas, therefore there will be no neighborhood disruption or other action that will specifically impact these groups. The low income indicators discussed in Chapter 3 (Section 3.3.4, page 3-46) are limited to town-wide or county-wide information only and cannot be used at the neighborhood level. Census data for income and poverty status at the block group level were analyzed for key SDEIS corridor segments and no substantial variation from county-wide or state-wide trends were seen.

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#### **4.3.5 Uncontrolled Petroleum and Hazardous Materials**

This section discusses the potential impacts that previous releases of subsurface petroleum and/or hazardous materials would have on construction of Segments 2, 4, and 7. Measures to mitigate impacts from subsurface contamination are also provided.

The presence of contaminated soils and /or groundwater contamination poses a potential liability for MaineDOT. Purchasing contaminated properties may result in

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<sup>8</sup> The U.S. Census defines a minority as a person who is Black (a person having origins in any of the black racial groups of Africa); Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

clean-up costs as well as other liabilities including compensation to surrounding property owners that were impacted by the hazardous waste.

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#### **4.3.5.1 Impacts**

Construction of the Proposed Action may encounter contaminated soils, and/or groundwater, in some locations.

##### **No-Action Alternative**

The No-Action Alternative would not affect any areas of contaminated soils or groundwater.

##### **Segment 2**

The proposed construction works in Segment 2 would generally be confined to the existing highway right-of-way, and the proposed improvements are not expected to require substantial excavation. Therefore, the likelihood of encountering contaminated soils and/or groundwater in Segment 2 is considered to be very low.

##### **Segment 4**

The majority of Segment 4, Alignment Options 1, 2, and 3, traverse relatively undeveloped woodland and agricultural fields. There is no evidence for the generation of hazardous materials within areas that would be impacted by any of the three alignment options. There is, however, evidence of uncontrolled releases of hazardous materials (petroleum spills), as shown on Figure 3-16. Contamination could be encountered during construction, particularly along Alignment Option 1 and at the southern terminus of Alignment Options 1 and 2. The documented volume of petroleum released in six of these incidents exceeded 100 gallons, however, the majority of the incidents did not exceed 51 gallons. Given that these releases were relatively minor, the likelihood of encountering significant contamination along Alignment Options 1, 2, and 3 in Segment 4 is very low.

##### **Segment 7**

The six alignment options for Segment 7 also traverse mostly undeveloped woodland and agricultural fields. There is no evidence for the generation of hazardous materials within areas that would be impacted by any of the six alignment options. There is, however, evidence of uncontrolled releases of hazardous materials (petroleum spills), as shown in Figures 3-17a and 3-17b. Contamination could be encountered during construction, particularly along Alignment Option 4. As shown in Figures 3-17a and 3-17b, two spills have occurred in close proximity of Alignment Option 4. One of these spills was documented as a release of approximately 1,000 gallons of petroleum, affecting local soils and groundwater. Although substantial remediation was accomplished, uncontrolled petroleum remains in the

subsurface at this location. Four USTs are also located within close proximity of Alignment Option 4 (Figures 3-17a and 3-17b). The condition of these USTs is unknown. Options 1, 2, 3, 5, and 6 would not encounter subsurface contamination.

Preliminary geotechnical field survey conducted during Spring 2006 in and around the industrial complex on the north side of the Aroostook River indicates that the soils may not be suitable material for bridge foundations. Prior to preparation of the FEIS MaineDOT will conduct analysis on the contents of the lagoons and adjacent soils. MaineDOT will continue coordination with Maine DEP and the owner to determine appropriate disposal, if required, by the placement of the Segment 7 proposed Aroostook River crossing. A change in wetland and farmland impacts, as well as potential residential ROW acquisition impacts may occur as the result of the analysis and may affect the location and design options that cross the Aroostook River in the vicinity of these lagoons.

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#### **4.3.5.2 Mitigation**

During the final design phase, MaineDOT will perform Phase II subsurface explorations and testing for the Preferred Alignment Option in each corridor segment to determine if waste or contamination would be encountered during construction. These explorations would be focused on areas where excavation would be necessary to construct the highway and in areas where drainage structures or utilities may be installed below the existing grade. The type of explorations and testing would be determined based on previous findings concerning the various sites of concern. If waste or contaminants are encountered during explorations, MaineDOT will prepare a Contamination Assessment detailing the exploration's findings. MaineDOT would provide Maine DEP with these assessment and draft specifications for the handling, reuse, and/or disposal of any contaminated materials encountered. The handling, use, and disposal would be proposed based on Maine DEP, EPA, and OSHA rules and guidance documents.

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#### **4.3.6 Cultural Environment**

This section discusses impacts to properties along the Proposed Action segments (Segments 2, 4, and 7) that are listed on, or eligible for listing on, the National Register of Historic Places. Section 106 of the NHPA (Section 106) requires Federal agencies to take into account the effect of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) reasonable opportunity to comment on such undertakings. Impacts to historic resources pursuant to Section 4(f) of the U.S. DOT Act are addressed in Chapter 5.

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#### 4.3.6.1 Impacts to Properties Listed on or Eligible for Listing on the National Register of Historic Places

Historic properties were considered impacted if the proposed right-of-way for any of the segments of the Proposed Action intersected the National Register boundary for the property. Evaluation of adverse effects under Section 106 was conducted in accordance with 36 CFR, *Assessment of Adverse Effect*.

Potential adverse effects resulting from the Proposed Action include demolition of all or part of a historic property, land takings from a historic property resulting in a loss of integrity, and the introduction of visible or audible elements that diminish the integrity of historic property. Impacts resulting in no adverse effect could include minor frontage takings along an existing highway segment, or isolated strip takings on an associated parcel far removed from the eligible resources.

Table 4-15 (page 4-38) lists the effects of each segment of the Proposed Action on historic properties within the APE. More detailed descriptions of these properties and the effects of the Proposed Action are presented in Chapter 5 and the *Section 106 Determination of Effect Report* for the Study.<sup>9</sup>

Frontage takings are the most common and variable effect of the Proposed Action on historic properties. For purposes of assessment, frontage takings are characterized in Table 4-15 (pages 4-38 to 4-40) as being minor, moderate, or substantial. A “substantial” frontage taking means that the majority of the land between a historic structure and the highway would be acquired, resulting in demolition or a loss of integrity for the property. Substantial frontage takings typically result in a finding of Adverse Effect under Section 106. A “moderate” frontage taking means that some of the land between a historic structure and the highway would be acquired. Moderate frontage takings can result in a finding of No Adverse Effect or Adverse Effect depending on whether the taking removes character-defining features from a property or diminishes the integrity of the property. A “minor” frontage taking means that a narrow strip of land along the highway edge would be acquired, with negligible or no effect on the property’s integrity. Minor frontage takings typically result in a finding of No Adverse Effect.

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<sup>9</sup> Vanasse Hangen Brustlin, Inc. January 2006. *Section 106 Determination of Effect Report, Aroostook County Transportation Study*.

**Table 4-15**  
**Effects on Properties Eligible for Inclusion on the National Register of Historic Places<sup>1</sup>**

Segment-Alignment Option	MHPC Number	Figure No. (Vol. 2)	Description	Type of Impact	Adverse Effect?
<b>Segment 2</b>	NR	Figure 2-7u	Timmerhuset, New Sweden Rd., New Sweden	Moderate frontage taking for construction of climbing lane resulting in removal of historic apple orchard (5.06 acres from 115-acres)	Yes
	858F	Figure 2-7z	Farmstead, 8 Colby Siding Rd., Woodland	Moderate frontage taking for construction of climbing lane (1 acre from 115 acres)	No
	921, 922	Figure 2-7u	Jacobsson House and Barn, 452 New Sweden Rd., New Sweden	Moderate frontage taking for climbing lane construction resulting in removal of contributing apple orchard (0.67 acres from 3.1 acres)	Yes
<b>Total Impacted Properties: 3</b>				<b>Total Adverse Effects:</b>	<b>2</b>
<b>Segment 4, Option 1</b>					
	863	Figure 2-9a	Banked New England Dairy Barn, New Sweden Rd., Woodland	Minor frontage taking for shoulder construction (5.16 acres from 65-acres)	No
<b>Total Impacted Properties: 1</b>				<b>Total Adverse Effects:</b>	<b>0</b>
<b>Segment 4, Option 2</b>					
	863	Figure 2-9a	Banked New England Dairy Barn, New Sweden Rd., Woodland	Minor frontage taking for shoulder construction	No
<b>Total Impacted Properties: 1</b>				<b>Total Adverse Effects:</b>	<b>0</b>
<b>Segment 4, Option 3</b>					
	863	Figure 2-9a	Banked New England Dairy Barn, New Sweden Rd., Woodland	Minor frontage taking for shoulder construction	No
<b>Total Impacted Properties: 1</b>				<b>Total Adverse Effects:</b>	<b>0</b>
<b>Segment 7, Option 1</b>					
	667	Figure 2-11a	English Barn, Caribou Rd., Presque Isle	Demolition	Yes
	670	Figure 2-11a	Potato Barn, Caribou Rd., Presque Isle	Demolition	Yes
	678	Figure 2-11a	Maysville School/Maysville Center Grange, Caribou Rd., Presque Isle	Demolition	Yes
<b>Total Impacted Properties: 3</b>				<b>Total Adverse Effects:</b>	<b>3</b>
<b>Segment 7, Option 2</b>					
	678	Figure 2-11a	Maysville School/Maysville Center Grange, Caribou Rd., Presque Isle	Minor frontage taking (0.05 acre from 0.47 acres)	No
<b>Total Impacted Properties: 1</b>				<b>Total Adverse Effects:</b>	<b>0</b>

**Table 4-15 (continued)**  
**Effects on Properties Eligible for Inclusion on the National Register of Historic Places<sup>1</sup>**

Segment- Alignment Option	MHPC Number	Figure No. (Vol. 2)	Description	Type of Impact	Adverse Effect?
<b>Segment 7, Option 3</b>					
	602F	Figure 2-11e	King Farm, 33 Easton Rd., Presque Isle	Strip taking of approx. 4 acres from 65-acre parcel; 350 feet west of buildings	No
	630F	Figure 2-11b	Farmstead, 138 Reach Rd., Presque Isle	Taking of 1.6 acres from 7.5-acre property, less than 100 feet west of buildings	Yes
	667	Figure 2-11a	English Barn, Caribou Rd., Presque Isle	Demolition	Yes
	670	Figure 2-11a	Potato Barn, Caribou Rd., Presque Isle	Demolition	Yes
	678	Figure 2-11a	Maysville School/Maysville Center Grange, Caribou Rd., Presque Isle	Demolition	Yes
			<b>Total Impacted Properties: 5</b>	<b>Total Adverse Effects:</b>	<b>4</b>
<b>Segment 7, Option 4</b>					
	554F	Figure 2-11f	Farmstead, 27 Centerline Road, Presque Isle	Demolition	Yes
	602F	Figure 2-11e	King Farm, 33 Easton Rd., Presque Isle	Taking of 1.2 acres at northeast corner of 65-acre property	No
	667	Figure 2-11a	English Barn, Caribou Rd., Presque Isle	Demolition	Yes
	670	Figure 2-11a	Potato Barn, Caribou Rd., Presque Isle	Demolition	Yes
	678	Figure 2-11a	Maysville Center Grange/Maysville School, Caribou Rd., Presque Isle	Demolition	Yes
			<b>Total Impacted Properties: 5</b>	<b>Total Adverse Effects:</b>	<b>4</b>
<b>Segment 7, Option 5</b>					
	630F	Figure 2-11b	Farmstead, 138 Reach Rd., Presque Isle	Taking of 1.7 acres from 7.5-acre parcel along east property boundary, 290 feet east of eligible resources	Yes
	635-644	Figure 2-11b	Northern Maine State Sanitarium, Reach Rd., Presque Isle	Taking of 0.2 acres from 25-acre associated property	Yes
	667	Figure 2-11a	English Barn, Caribou Rd., Presque Isle	Demolition	Yes
	670	Figure 2-11a	Potato Barn, Caribou Rd., Presque Isle	Demolition	Yes
	678	Figure 2-11a	Maysville Center Grange/Maysville School, Caribou Rd., Presque Isle	Demolition	Yes
			<b>Total Impacted Properties: 5</b>	<b>Total Adverse Effects:</b>	<b>5</b>

**Table 4-15 (continued)**  
**Effects on Properties Eligible for Inclusion on the National Register of Historic Places<sup>1</sup>**

Segment- Alignment Option	MHPC Number	Figure No. (Vol. 2)	Description	Type of Impact	Adverse Effect?
<b>Segment 7, Option 6</b>					
	630F	Figure 2-11b	Farmstead, 138 Reach Rd., Presque Isle	Demolition	Yes
	667	Figure 2-11a	English Barn, Caribou Rd., Presque Isle	Taking 0.4 acres from 3.2-acre parcel approximately 300 feet east of eligible resource	No
	670	Figure 2-11a	Potato Barn, Caribou Rd., Presque Isle	Taking totaling 10.2 acres from 13-acre parcel approximately 300 feet east of eligible resource	Yes
	678	Figure 2-11a	Maysville Center Grange/Maysville School, Caribou Rd., Presque Isle	Demolition	Yes
<b>Total Impacted Properties: 4</b>				<b>Total Adverse Effects:</b>	<b>3</b>

<sup>1</sup> For Segment 4 and Alignment Options 1, 2, 3, 5, and 6 in Segment 7, impacts are based on a 300-foot right-of-way width. Impacts for Alignment Option 4 in Segment 7 are based upon 200 feet for the upgrade portion and 300 feet for the new alignment portion. For Segment 2, impacts are based on a 100-foot right-of-way width and a 115-foot right-of-way width in areas where climbing lanes are proposed. Right-of-way widths were reduced in some locations in Segment 2 to avoid cultural resources.

### No-Action Alternative

The No Action alternative would not affect any historic properties.

### Segment 2

As shown in Table 4-15 (pages 4-38 to 4-40), Segment 2 would affect three historic properties, with two adverse effects resulting from frontage takings for climbing lanes. The takings would result in the removal of apple orchards, a contributing factor to the historic integrity at the National Register-listed Timmerhuset and the National Register-eligible Jacobsson House and Barn. The apple orchards are character-defining features of both properties and their removal diminishes the integrity of setting for the properties.

### Segment 4

As shown in Table 4-15 (pages 4-38 to 4-40), Segment 4, Alignment Option 1, 2 and 3 would each affect one historic property, with no adverse effect.

## **Segment 7**

As shown in Table 4-15 (pages 4-38 to 4-40), each of the alignment options evaluated in Segment 7 would affect between one and five historic properties, with adverse effects resulting from building demolition and losses of integrity through substantial land takings or the introduction of incompatible visual or atmospheric elements. The number of adverse effects ranges from zero to five, with the greatest number of adverse effects resulting from Alignment Options 3, 4 and 5. Alignment Option 2 would have no adverse effect to historic properties.

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### **4.3.6.2 Archaeological Resources**

This section describes impacts to known prehistoric and historic archeological sites within the APE for the Proposed Action regulated under Section 106 of the National Historic Preservation Act. This section also describes impacts to land within the Study Area identified by the MHPC as being archeologically sensitive. Additional archaeological work is required in order to confirm the presence of all potentially affected archaeological sites as well as to make determinations of their eligibility. The FHWA will execute a Memorandum of Agreement (MOA), in accordance with 36 CFR 800.4(b)(2), to allow for phased identification and evaluation of these sites. Eligibility determinations and assessment of effect will be made for Segments 2, 4, and 7 prior to the issuance of the FEIS.

#### **Impacts to Known Archeological Sites**

Historic and prehistoric archeological sites were considered impacted if the proposed right-of-way for any of the segments of the Proposed Action intersected any part of the 0.6-mile buffer for the resource as established in consultation with the MHPC. Because the exact locus of archeological materials in each site is unknown, findings of effect under Section 106 must be determined in consultation with the MHPC and could require subsurface investigation. Additional archaeological work will be required for all alternatives. Eligibility determinations and levels of effect will be determined for all relevant sites associated with Segments 2, 4, and 7 prior to the issuance of the FEIS.

#### **No-Action Alternative**

The No-Action Alternative would not affect any recorded archaeological sites.

#### **Segment 2**

Segment 2 would not affect any recorded archaeological sites.

#### **Segment 4**

None of the alignment options in Segment 4 would affect any recorded archaeological sites.

**Segment 7**

Segment 7, the Presque Isle Bypass, is expected to affect recorded archaeological sites. Table 4-16 (below) summarizes these potential impacts. Because the archeological site grid squares are larger than the actual site, the potential impacts presented here are “worst-case”, and actual archaeological sites may not be affected. The FHWA and MaineDOT are consulting with the MHPC to assess effects to these resources.

**Table 4-16  
 Impacts to Archeological Sites<sup>1</sup> in Segment 7**

Alignment Option <sup>2</sup>	Site Number	Town	Site Status <sup>3</sup>	Amount of Potential Impact (acres)
Option 1	167.002	Presque Isle	IN	1.2
	168.001	Presque Isle	PL <sup>4</sup>	1.7
Option 2	167.002	Presque Isle	IN	5.3
	168.001	Presque Isle	PL <sup>4</sup>	1.7
Option 3	168.001	Presque Isle	PL <sup>4</sup>	1.7
Option 5	168.001	Presque Isle	PL <sup>4</sup>	1.7
Option 6	168.001	Presque Isle	PL <sup>4</sup>	1.7

- 1 Impacts are based on a 300-foot right-of-way width for Alignment Options 1, 2, 3, 5, and 6 and mapped locations of 0.6 square mile grids.
- 2 No recorded archaeological sites present along Alignment Option 4
- 3 IN = Insufficient data for a determination of significance
- 4 PL = Potentially eligible for listing

**Archeologically Sensitive Areas**

Archeologically sensitive areas were considered impacted if the proposed right-of-way crossed any part of the sensitive areas established by the MHPC. The total impact area in acres for each Proposed Action segment is summarized in Table 4-17 (page 4-43). These areas may, or may not, contain archeological materials.

Additional archaeological work will be required for all archeologically sensitive areas. Archaeological resources will be surveyed and evaluated to determine their eligibility for protection under Section 4(f), and the findings of this survey will be included in the FEIS. Eligibility determinations and levels of effect will be made for all relevant sites associated with Segments 2, 4, and 7 and included in the FEIS. The impacts are described in acres, for the purpose of comparing corridor segments. Impacts represent the approximate amount of area that would require further investigation in later project stages and that could potentially contain archeological materials.

**No-Action Alternative**

The No-Action Alternative would not impact any archeologically sensitive areas.

### **Segment 2**

Segment 2 would affect a total of approximately 286 acres of archaeologically sensitive areas. Impacts would be along the edges of existing roadway in areas previously disturbed by roadway construction. Constructing climbing lanes may impact previously undisturbed areas along the existing roadway in some locations.

### **Segment 4**

Segment 4 would affect approximately 28 to 128 acres of sensitive areas depending on the alignment option selected. The majority of impacts would be along the edges of existing roadways in areas previously disturbed by roadway construction.

### **Segment 7**

Segment 7 would affect approximately 114 to 129 acres of sensitive areas depending on the alignment option selected. All alignment options in Segment 7 have comparable impacts to archaeologically sensitive areas. The majority of impacts would be along the Aroostook River and the edges of existing roadway in previously disturbed areas.

**Table 4-17**  
**Impacts to Archaeological Sensitive Areas<sup>1</sup>**

<b>Alignment Option</b>	<b>Prehistoric (acres)</b>	<b>Historic (acres)</b>	<b>Total (acres)</b>
Segment 2	10	276	286
Segment 4 - Option 1	0	28	28
Segment 4 - Option 2	0	44	44
Segment 4 – Option 3	26	102	128
Segment 7 - Option 1	48	76	124
Segment 7 - Option 2	53	76	129
Segment 7 - Option 3	45	77	122
Segment 7 - Option 4	42	72	114
Segment 7 - Option 5	47	79	126
Segment 7 - Option 6	54	71	123

<sup>1</sup> Impacts to cultural resources were based upon proposed right-of-way widths, ranging from 100 to 300 feet. Right-of-way widths were reduced in some locations in Segment 2 to avoid cultural resources.

### **4.3.6.3 Traditional Cultural Properties**

Areas of traditional cultural significance were considered impacted if the Proposed Action segments intersected any part of the areas delineated by the MHPC in consultation with the Maliseet and Micmac Tribal Nations. Because the level of

significance of the identified areas has not yet been determined, findings of effect under Section 106 must be made by the FHWA and MaineDOT. Consultation between the FHWA, MaineDOT, MHPC, and the Micmac and Maliseet tribes is ongoing.

### **No-Action Alternative**

The No-Action Alternative would not impact any known TCP.

### **Segment 2**

Segment 2 would not impact any TCPs.

### **Segment 4**

None of the alignment options in Segment 4 could impact known TCPs.

### **Segment 7**

Three alignment options in Segment 7 could impact known TCP grids:

- Alignment Option 1 would impact approximately 12 acres of a delineated TCP;
- Alignment Option 2 would impact approximately 12 acres of a delineated TCP;
- and
- Alignment Option 4 would impact approximately 16 acres of a delineated TCP.

Alignment Options 3, 5, and 6 would avoid impacts to any known TCPs.

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#### **4.3.6.4 Summary of Impacts to Cultural Resources**

Table 4-18 (page 4-45) summarizes the potential impacts to cultural resources for the segments included in the Proposed Action.

**Table 4-18**  
**Summary of Impacts to Cultural Resources (number)<sup>1</sup>**

Segment - Option	Historic Properties <sup>2</sup>	Archeological Sites	Areas of Archaeological Sensitivity (acres)	Section 106 Adverse Effects	Traditional Cultural Property
Segment 2	3 (2)	0	286	2	0
Segment 4 – Option 1	1 (0)	0	23	0	0
Segment 4 – Option 2	1 (0)	0	20	0	0
Segment 4 – Option 3	0(0)	0	128	0	0
Segment 7-Option 1	3 (3)	2	124	3	1 (12 acres)
Segment 7-Option 2	3 (2)	2	129	0	1 (12 acres)
Segment 7-Option 3	5 (3)	1	122	4	0
Segment 7-Option 4	5 (4)	0	114	4	1 (16 acres)
Segment 7-Option 5	5 (5)	1	126	5	0
Segment 7-Option 6	4 (3)	1	123	3	0

1 Impacts to cultural resources were based upon proposed right-of-way widths, ranging from 100 to 300 feet. Right-of-way widths were reduced in some locations in Segment 2 to avoid cultural resources.

2 Number of affected properties (number of adverse effects).

### No-Action Alternative

The No-Action Alternative would not impact any historic properties, archaeological sites, archaeologically sensitive areas, or traditional cultural properties.

### Segment 2

Segment 2 would affect three historic properties, with two adverse effects. Segment 2 would require construction in approximately 286 acres of archaeological sensitivity, requiring further coordination with the MHPC, and potentially further archaeological investigation. No known archaeological sites or traditional cultural properties would be affected.

### Segment 4

Alignment Options 1 and 2 in Segment 4 would affect one historic property, with no adverse effect. Option 3 would not affect any historic properties. Segment 4 would require construction or land acquisition in approximately 20 acres (Alignment Option 2), 23 acres (Alignment Option 1) or 128 acres (Alignment Option 3) of archaeological sensitivity, requiring further coordination with the MHPC, and potentially further archaeological investigation. No known archaeological sites or traditional cultural properties would be affected.

## Segment 7

Segment 7 would affect a range of cultural resources, with the level of impact depending on the selected alignment option. Each alignment option would affect between one and five historic properties, with the majority of the impacts resulting in an adverse effect. Alignment Option 2 would affect the fewest historic properties and have the fewest adverse effects to historic properties. Alignment Options 1, 2, 3, 5, and 6 would require work in proximity to at least one recorded archeological site. Only Alignment Option 4 would not require work in proximity to an archaeological site.

Each alignment option would require construction in approximately 125 acres of archeologically sensitive areas, requiring further investigation and assessment to determine if archeological resources were present. Alignment Option 4 would impact one archeologically sensitive area because it utilizes an existing roadway alignment. Three of the alignment options (Alignment Options 1, 2, and 4) would result in the loss of approximately 12 to 16 acres of traditional cultural property.

Additional archaeological work is required in order to confirm the presence of all potentially affected archaeological sites, as well as to make determinations of their eligibility. The FHWA will execute a MOA, in accordance with 36 CFR 800.4(b)(2), to allow for phased identification and evaluation of these sites. Eligibility determinations and assessment of effect will be made for Segments 2, 4, and 7 prior to and included in the FEIS.

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## 4.4 Physical and Biological Environment

This section examines the potential effects of the Proposed Action on the physical and biological environment within the Study Area, including the following:

- Vegetation (forests);
- Aquatic resources and wetlands;
- Water resources;
- Aquatic habitats;
- Wetlands;
- Floodplains;
- Outstanding River Segments;
- Wildlife and wildlife habitats;
- Fisheries;
- State-regulated wildlife habitats; and
- Endangered, Threatened, and Species of Special Concern.

The construction of a Proposed Action (other than the No-Action Alternative) will require regulatory review under numerous federal and state programs, including but not limited to review by the USACOE under Section 404 of the Clean Water Act and by the Maine DEP under the NRPA. The preliminary impact analyses and proposed mitigation measures presented in this SDEIS will be further developed and refined through final design and permitting.

#### 4.4.1 Forests

Forests and other plant communities are regulated under federal, state, and local regulations if they are located in wetlands (see Section 4.4.2.3, page 4-56) or contain rare plants (see Section 4.4.4, page 4-79). While there are no federal or state regulations that specifically regulate upland natural communities, federal NEPA guidelines require consideration of environmental impacts on biodiversity.

Exemplary natural communities are identified by the Natural Resources Information and Mapping Center (NRIMC) and contain ecologically sensitive communities with uncommon populations of plant species. Although Exemplary Natural Communities are also a non-regulated resource, a database is maintained by the MNAP and used as an informational planning tool during project development and design.

Forested areas were identified from 2003 aerial photography of the Study Area. Direct impacts to forests, shown in Table 4-19 below, were based on the conceptual right-of-way width for each alignment option. The loss of forest land could affect wildlife habitat and could have economic effects on commercial forestry businesses. The loss of forest habitat, particularly the Spruce-Northern Hardwoods forest, may result in the greatest impact to species diversity, since this habitat type supports a wide range of mammals and amphibians, and both year-round resident and neotropical migratory bird species. Section 4.4.3.1 (page 4-70) discusses impacts to wildlife associated with these forested areas.

None of the segments included in the Proposed Action would impact Exemplary Natural Resources.

**Table 4-19  
 Impacts to Forest**

Segment –Alignment Option	Forest Impacted (acres) <sup>1</sup>
Segment 2	182
Segment 4 – Option 1	30
Segment 4 – Option 2	123
Segment 4 – Option 3	110
Segment 7 - Option 1	144
Segment 7 - Option 2	152
Segment 7 - Option 3	90
Segment 7 - Option 4	64
Segment 7 - Option 5	198
Segment 7 - Option 6	119
Total In Study Area	2,015 square miles, 1.3 million acres

<sup>1</sup> Impacts are based on a 300-foot right-of-way width for Alignment Options 1, 2, 3, 5, and 6. Alignment Option 4 was based upon 200 feet for the upgrade portion and 300 feet for the new alignment portion.

To provide some context for these impacts, consider that according to the Maine Forest Service, Maine has the largest contiguous block of undeveloped forestland east of the Mississippi River, approximately 10.5 million acres of which are actively managed for timber production.<sup>10</sup> There are more than one million acres of forested land within the Study Area.

### **No-Action Alternative**

The No-Action Alternative would have no impact on forests or forest habitat.

### **Segment 2**

Segment 2 would have negligible impacts to forested land. Although approximately 182 acres of forest would be lost (a very conservative estimate that assumes the right-of-way would be cleared to its limits), these are narrow slivers of forest along the edge of the existing highway. The loss of these marginal areas would not affect their use for forestry or the ability of the forest to provide wildlife habitat.

### **Segment 4**

Segment 4 would result in the loss of approximately 30 to 123 acres of young second-growth forest north of the Caribou Country Club. Alignment Option 1 would result in the least amount of loss (approximately 30 acres). The loss of this area would not affect forestry uses or mature forest providing important wildlife habitat.

### **Segment 7**

Among the Segment 7 alignment options, Alignment Option 4, the upgrade of Centerline Road, would impact the least forest at approximately 64 acres; Alignment Option 5 would affect the most at approximately 198 acres. The amount of forest impacted by any of the alignment options is relatively small compared to the area of forest cleared on a regular basis throughout northern Maine by the timber and paper industries. Most impacts for all alignment options would be to a large forested wetland/upland complex north of Route 10, as all of the alignment options would bisect this forested area.

<sup>10</sup> Department of Conservation, Maine Forest Service. 2005. *The 2005 Biennial Report on the State of the Forest and Progress Report on Sustainability Standards. Report to the Joint Standing Committee of the 122nd Legislature on Agriculture, Conservation and Forestry.*

## 4.4.2 Aquatic Resources and Wetlands

Impacts to aquatic resources evaluated in this section include potential direct and indirect impacts to:

- Water resources;
- Aquatic habitats;
- Wetlands;
- Floodplains; and
- Wild and Scenic Rivers and Outstanding River Segments.

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### 4.4.2.1 Water Resources

Surface water and groundwater are important natural resources that have many uses in the Study Area, from providing drinking water, to supporting agricultural and recreational uses. Highways and roads may impact surface and groundwater by increasing pollutant loads and by impacting stormwater runoff. Highways generate non-point source pollution when stormwater runoff collects pollutants and flows to wetlands and waterbodies. The construction of new location highway or highway upgrades may also result in short-term impacts to surface waters, such as increases in turbidity due to sedimentation.

Analysis of existing conditions identified potential receptors in the Study Area that are sensitive to highway pollution impact. The receptors identified include: public drinking water wells, public drinking water Wellhead Protection Areas, mapped aquifer areas, public drinking water surface water intakes, surface water intake buffer zones, and surface water supply watershed protection areas. In addition, unmapped private wells within each corridor may be affected by runoff.

Stormwater runoff from highways can contribute metals, hydrocarbons, salts, sediments, and other substances to surface waters and groundwater. The accumulation of pollutants from vehicles on highway surfaces is primarily dependent upon vehicle traffic volumes. During storm events, the substances that have accumulated on the highways are carried in runoff into the drainage system and into receiving waters.

The pollutants carried in highway runoff may have adverse effects on the aquatic ecosystem if they occur within surface waters in sufficient concentrations. According to a report titled *Effects of Highway Runoff on Receiving Waters* (FHWA/RD-84/062-066, June 1987), pollutants generated by traffic volumes under 30,000 vehicles per day exert minimal to no effect on the aquatic components of most surface waters and groundwater, although the size of the watershed relative to the amount of stormwater discharge is also an important factor in assessing impacts. In general, annual pollutant loads from highways are low relative to the entire watershed.

Precipitation cannot infiltrate a paved highway surface and will either evaporate from the surface or drain to the side of the road, where it enters the soil and contributes to groundwater recharge. Net groundwater recharge volumes may be reduced, but are not expected to change substantially. Contaminants discharged with runoff from highways have the potential to infiltrate groundwater and impact groundwater quality.

## Surface Water Supplies

### No-Action Alternative

The No-Action Alternative would have no impact to surface water supplies.

### Segment 2

There are no surface water supplies in the vicinity of Segment 2.

### Segment 4

The surface water intake for the City of Caribou at the Aroostook River is approximately 500 feet east of Route 1 and its watershed includes a small portion of Segment 4. This small increase in impervious surface within the developed landscape of Caribou is not anticipated to adversely affect water quality in the Aroostook River.

### Segment 7

The nearest surface water intake to Segment 7 is in Presque Isle Stream, west of Route 1 in Presque Isle, approximately 2.5 miles west of the Preferred Alignment Option for Segment 7. The increase of impervious surfaces within the developed landscape of Presque Isle is not anticipated to adversely affect water quality in the Presque Isle Stream.

## Public Drinking Water Wells / Wellhead Protection Areas

Wells are listed in Table 4-20 below. Locations are shown on Figures 3-36 and 3-38.

**Table 4-20**  
**Wellhead Protection Areas Intersected by the Proposed Action**

Segment – Alignment Option	Town/City	Number of Wells
Segment 2	T17-R5	1
Segment 2	New Sweden	1
Segment 4 - Option 1	Caribou	2
Segment 4 – Option 2	Caribou	3
Segment 4 – Option 3	Caribou	3

### **No-Action Alternative**

The No-Action Alternative would have no impact to public drinking water wells/wellhead protection areas.

### **Segment 2**

Segment 2 (Figures 3-36 and 3-38) would require work in two wellhead protection areas. Both wells are very near the highway (less than 100 feet), but are in areas that are not proposed for climbing lanes. Therefore, minor widening of shoulders in Segment 2 is not expected to impact these wells.

### **Segment 4**

There are two wells (in one wellhead protection area) near the southern end of Alignment Options 1 and 2 in the vicinity of the Route 1/Route 89/Bennett Drive intersection. Another wellhead protection area is located along Alignment Options 2 and 3, west of Route 1 (Figure 3-38). This well is associated with a farm. This well would be directly impacted by Alignment Options 2 and 3, as would the farm it serves.

### **Segment 7**

Segment 7 would not require work within any wellhead protection area and there are no public groundwater wells within 2,500 feet of any of the proposed Segment 7 alignment options. The closest groundwater well is located just north of the Aroostook River, approximately 3,000 feet west (upstream) of where Alignment Option 4 would cross the Aroostook River. The minor increases in impervious surfaces associated with the Proposed Action would not affect water supply or water quality to these Wellhead Protection Areas.

## **At-Risk Watersheds**

### **No-Action Alternative**

The No-Action Alternative would have no impact to At-Risk watersheds because no construction would occur in these areas.

### **Segment 2**

Segment 2 would require construction within the At-Risk Watersheds of Cross Lake and Daigle Brook. Given the minor amount of highway widening required, and that Best Management Practices (BMPs) would be employed (see below) to treat stormwater runoff during and after construction, the widening is not expected to have any perceptible impact on the water quality of either of these waterbodies.

### **Segment 4**

Segment 4 would not require construction within an At-Risk watershed.

### **Segment 7**

All of the alignment options for Segment 7 are within the watersheds of the Aroostook River and Presque Isle Stream, which have been identified as At-Risk Watersheds sensitive to pollutants, particularly increases in phosphorus from agricultural operations and food processing plants. All of the alignment options identified for Segment 7 would increase impervious surfaces and, therefore, the amount of discharge of highway runoff within these watersheds. In the absence of mitigation, this runoff could further degrade water quality. However, the proposed highway would not be expected to increase non-point source discharges of phosphorus, as phosphorus is not a major constituent of highway runoff. Furthermore, converting farm fields to transportation could result in a minor reduction of phosphorous in runoff.

### **Measures to Reduce the Impacts of Stormwater Runoff**

Specific measures to improve stormwater runoff and to limit stormwater volumes stormwater will be identified during subsequent design of the Preferred Alignment Option within each of the three segments that compose the Proposed Action. MaineDOT has signed a MOA with the Maine DEP to achieve stormwater quantity and quality controls that are reasonably consistent with the Maine DEP's Stormwater Management Rules and the requirements of the Maine Pollutant Discharge Elimination System (MEPDES) General Permit for Construction Activity. Pursuant to the MOA, MaineDOT agreed to adopt the standards set out in the current version of MaineDOT's *Best Management Practices for Erosion and Sedimentation Control Manual* (the BMP Manual), and Maine DEP has determined that application of those standards will result in substantial environmental benefits in the watersheds that are most at risk from development, namely the threatened and sensitive watersheds.

MaineDOT will ensure that the BMP Manual is followed for construction of the Proposed Action including that appropriate erosion and sediment control BMPs are followed and that stormwater pollution prevention plans are implemented. For areas where it is required under the MOA, MaineDOT will also design ditches, culverts, and outlet areas to be stable and to minimize any increase in peak flow from the project.<sup>11</sup> In any instances in which a peak flow increase would result, MaineDOT will implement measures to avoid adverse impacts to off-site property as a result of drainage increases. BMPs may include minimizing impervious surface within recharge areas and avoiding surface water intakes and wellheads.

These BMPs are required for any MaineDOT action, and would be incorporated into the design and specifications for the Proposed Action. Additional (mitigation) measures to protect water quality are not necessary or proposed.

<sup>11</sup> In accordance with the Stormwater MOA, MaineDOT will calculate peak flow from the project site if 1) the project combines two or more subwatershed areas, and 2) includes 20,000 square feet of more of new impervious surface or five acres or more of disturbed area in the direct watershed of a waterbody most at risk from new development, or one acre or more of new impervious area or five acres or more of disturbed area elsewhere.

#### 4.4.2.2 Aquatic Habitats

This section discusses the potential direct and indirect impacts on lakes, ponds, and streams, as well as potential mitigation measures for these impacts.

##### Impacts

Roadway construction, whether construction of new roadways or improvements to existing roads, may affect lentic (open water) and lotic (river and stream) systems. Highway construction or upgrading existing highways in streams and ponds may result in these direct and indirect impacts to aquatic habitats:

- Stream channelization;
- Loss of bank structural complexity;
- Loss of stream flow complexity (riffles/pools);
- Shading from bridges;
- Alteration of water temperature;
- Reduction of water quality from highway runoff impacts; and
- Alteration of stream hydrology.

Direct impacts will result where roadway construction affects the stream channel through the placement of structures (culverts, bridge piers, or riprap) within the channel. Direct impacts may include the loss of fisheries habitat, where natural channel substrates and banks are replaced with artificial substrates that do not provide spawning habitat, cover, or support food resources such as mayflies (Ephemeroptera), stoneflies (Plecoptera), or caddisflies (Trichoptera). Direct impacts may also include alteration of upstream and/or downstream hydrology of the system, if stream crossings are not designed in equilibrium with the existing stream system. MaineDOT policy is to minimize impacts to fish passage by appropriate culvert design.

The design and construction of new roadways in the vicinity of stream crossings may result in decreases in water quality from roadway runoff and increased water temperatures from the loss of streamside vegetation. Where roadway construction encroaches into riverine buffers, the loss of natural vegetation may affect the contribution of non-aquatic insects to lentic systems, may reduce the contribution of vegetation detritus that contributes to the aquatic food chain, and may affect water temperatures by removing overhanging vegetation.

Impacts to aquatic habitats (lakes and ponds) for Segments 2, 4, and 7 are provided in Table 4-21 (page 4-54). Lakes and ponds in the Study Area are shown on Figures 3-36 through 3-41. As described in Section 3.4.2.2 (page 3-71), the Study Area contains approximately 90 square miles of lakes and ponds.

Impacts to intermittent and perennial streams were assessed by overlaying the alignment options onto MaineGIS rivers and streams layers and counting the

number of individual streams that are crossed by each segment. Intermittent and perennial streams in the Study Area are shown on Figures 3-36 through 3-41. Impacts to streams are shown in Table 4-22 (below).

**Table 4-21**  
**Potential Impacts to Ponds and Lakes (Acres)<sup>1</sup>**

Segment - Alignment Option	Ponds <sup>2</sup>	Lakes	Total
Segment 2	0	0	0
Segment 4 - Option 1	0	0	0
Segment 4 - Option 2	0	0	0
Segment 4 - Option 3	0	0	0
Segment 7 - Option 1	0	0	0
Segment 7 - Option 2	0.2	0	0.2
Segment 7 - Option 3	0	0	0
Segment 7 - Option 4	3.5	0	3.5
Segment 7 - Option 5	2.1	0	2.1
Segment 7 - Option 6	0	0	0

- 1 Impacts for Segment 7 Options 1, 2, and 3 are based upon a 300-foot right-of-way width plus areas of cut and fill slopes outside the right-of-way. Impacts for Option 4 are based upon a 200-foot right-of-way plus areas of cut and fill slopes outside the right-of-way for the upgrade portion along Centerline Road; and upon a 300-foot right-of-way plus areas of cut and fill slopes outside the right-of-way for the new alignment portion north of State Road. Impacts for Options 5 and 6 are based upon a 300-foot right-of-way.
- 2 Ponds include areas of open water within wetlands.

**Table 4-22**  
**Potential Impacts to Streams (number of new crossings)**

Segment -Alignment Option	Perennial Streams	Intermittent Streams	Total
Segment 2	0	0	0
Segment 4 - Option 1	2	0	2
Segment 4 - Option 2	2	0	2
Segment 4 - Option 3	2	0	2
Segment 7 -Option 1	5	4	9
Segment 7 - Option 2	5	5	10
Segment 7 - Option 3	4	3	7
Segment 7 - Option 4	3	3	6
Segment 7 - Option 5	4	4	8
Segment 7 - Option 6	5	3	8

### **No-Action Alternative**

The No-Action Alternative would have no impact to ponds, lakes, or streams because no construction would occur.

### **Segment 2**

There are no lakes or ponds within Segment 2. Therefore, Segment 2 would not have any direct impact to lakes or ponds. In addition, Segment 2 would not require new crossings of any streams, however, Segment 2 would require extending existing culverts.

### **Segment 4**

There are no lakes or ponds within Segment 4. Therefore, Alignment Options 1, 2, and 3 would not have any direct impacts to lakes or ponds.

All three alignment options for Segment 4 would require two crossings each of perennial streams. Alignment Option 1 would cross two small tributaries to Hardwood Brook. Alignment Option 2 would cross the same tributary to Hardwood Brook as well as Longfellow Brook near the Route 1/Route 89/Bennett Drive Intersection. Alignment Option 3 would cross the tributary to Hardwood Brook at the same location as Alignment Option 2 and would also cross the small stream that flows from Collins Pond in downtown Caribou directly to the Aroostook River.

### **Segment 7**

There are no lakes within Segment 7. Therefore, Segment 7 would not have any direct impacts to lakes.

Impacts to ponds among the Segment 7 alignment options range between 0 and approximately 3.5 acres of impact. Alignment Options 1, 3, and 6 would have no impact to ponds. Alignment Option 2 would have approximately 0.2 acres of impact and Alignment Option 5 would have approximately 2.1 acres of impact to ponds. Alignment Option 4 (the upgrade of Centerline Road) would have the highest impact at approximately 3.5 acres. This impact is primarily to the lagoons just north of the Aroostook River.

Each of the Segment 7 alignment options would require crossing both intermittent and perennial streams, as well as a new crossing of the Aroostook River. Impacts among the Segment 7 alignment options are very similar with all options having three to five perennial stream crossings and three to five intermittent stream crossings.

### **Mitigation**

Potential mitigation measures for impacts to lakes, ponds, and streams consist primarily of avoidance and minimization. During final design and permitting, every

effort will be made to avoid the need to fill aquatic habitats by shifting the alignment of Segments 4 and 7, and by steepening sideslopes to minimize encroachment along Segment 2 (Route 161).

Mitigation of impact to streams would include avoidance where possible, however, since the streams cross both the existing Route 161 and the new location alignments of Segments 4 and 7, not all streams and rivers can be avoided. Potential mitigation of river and stream impacts will focus on minimizing the impacts of new or widened crossings. These measures may include:

- Crossing streams or rivers at their narrowest points;
- Using bridges rather than culverts to maintain channel substrate, flow, and bank characteristics where possible; and
- Using retaining walls rather than fill slopes to minimize impact areas.

All culverts will be designed in accordance with MaineDOT's 2004 Fish Passage Policy and Design Guide. Additional mitigation measures may also include bank and channel restoration of crossing areas to provide naturally vegetated banks and increase channel habitat. These measures will also provide stabilization to reduce erosion and sedimentation. Crossing structures would be designed to minimize impact to floodplains, as discussed in Section 4.4.2.4 (page 4-66).

Mitigation for stream crossings on Segment 4 would focus on those of the tributary to Hardwood Brook. Mitigation for Segment 7 would focus on the Aroostook River, an unnamed stream which is crossed near the Conant Road, and Williams Brook just north of the railroad near Phair Junction.

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#### **4.4.2.3 Wetlands**

This section discusses the potential direct and indirect impacts on wetlands, as well as potential mitigation measures for these impacts. Wetland impacts will be fully reviewed and evaluated during the final design and permitting process. Therefore, this SDEIS does not review these impacts in further detail.

##### **Impacts**

Direct permanent and temporary wetland impacts include wetland fill, vegetation removal, dredging, and watercourse relocation or alteration. Temporary impacts would involve short-term disturbance to wetlands and waterways during construction that would cease once construction activities are complete.

Indirect impacts to wetlands can occur when wetland hydrology is altered as a result of new impervious surfaces in a watershed, new or modified drainage patterns, or wetland fill. Modifications to wetland hydrology can alter the extent of wetlands and/or performance of functions and values provided by wetlands. Other indirect

effects could include fragmentation; edge effects, such as changes in species composition; and increased disturbance. Where new alignments cross streams and adjacent wetlands, riparian corridors and associated wildlife movements can be disrupted. As discussed in Section 4.4.2.1 on page 4-49, stormwater runoff may also affect water quality in wetlands or may result in the deposition of sediments from de-icing materials, such as sand.

Direct, permanent wetland impacts (loss of wetland) were quantified for each alignment option in Segments 2, 4, and 7, for the purpose of comparing options within each segment. Table 4-23 below shows impacts to wetlands by wetland class. Wetlands in the Study Area are shown on Figures 3-36 through 3-41. This section evaluates impacts to individual wetlands and to the larger wetland systems identified as part of this study (see the *SDEIS EVTR*). A wetland system contains all adjacent wetlands as well as those wetlands that occur within 100 feet of the same waterway. For more details on wetland classes and impacts refer to Section 2.3.2, 3.3.2, and 4.3.2 of the *SDEIS EVTR*. For context when considering wetland impacts, there are approximately 523 square miles (334,720 acres) of wetlands within the Study Area.

**Table 4-23**  
**Wetland Impacts by Segment Option and Wetland Type (Acres)<sup>1</sup>**

Alignment Option	Wetland Type <sup>2</sup>			Total Impact	Percent of Study Area Wetlands
	PEM	PFO	PSS		
Segment 2	2	2	2	6	0.002
Segment 4 - Option 1	11	3	10	24	0.007
Segment 4 - Option 2	11	28	12	51	0.015
Segment 4 – Option 3	12	38	15	65	0.019
Segment 7 - Option 1	3	49	12	64	0.019
Segment 7 - Option 2	7	38	10	55	0.016
Segment 7 - Option 3	<1.0	50	2	53	0.016
Segment 7 - Option 4	2	15	3	20	0.006
Segment 7 - Option 5	5	119	2	126	0.038
Segment 7 - Option 6	1	22	1	24	0.007
Total Within Study Area	13,440 acres	205,440 acres	58,880 acres		

1 Impacts are based upon a 300-foot right-of-way width plus areas of cut and fill slopes outside the right-of-way. Impacts for Segment 2 are based on a reduced ROW width. Impacts for Segment 7, Option 4 are based upon a 200-foot right-of-way plus areas of cut and fill slopes outside the right-of-way for the upgrade portion along Centerline Road; and upon a 300-foot right-of-way plus areas of cut and fill slopes outside the right-of-way for the new alignment portion north of State Road.

2 PEM = palustrine emergent marsh. PFO = palustrine forested wetland. PSS = palustrine scrub-shrub wetland.

**No-Action Alternative**

The No-Action Alternative would not result in direct impacts to wetlands from filling, because no construction would occur.

## **Segment 2**

Segment 2, the upgrade of Route 161, is expected to have minimal wetland impacts, conservatively estimated at six acres (Figures 2-7a to 2-7aa), based upon the maximum amount of widening considered over the full 26-mile upgrade. Given that further avoidance and minimization measures, will be developed during final design, actual impacts will be substantially less. Furthermore, these impacts are expected to be minor because they will occur at the edge of the existing highway and will not affect the ability of the wetlands impacted to continue to provide wetland functions.

## **Segment 4**

Impacts among the three Segment 4 alignment options vary from approximately 24 acres for Alignment Option 1, 51 acres for Alignment Option 2, and 65 acres for Alignment Option 3. These impacts are discussed in more detail in the following paragraphs and are shown in Table 4-24, page 4-59, and shown on Figures 2-9a to 2-9g.

**Alignment Option 1** would impact a total of approximately 24 acres in six wetlands in six systems. The majority of impact would be to PEM (approximately 11 acres) and PSS (approximately 10 acres). The majority of the impacts would occur in wetland system 3751 (8 acres), that provides a range of functions and values, primarily groundwater recharge/discharge and wildlife habitat.

**Alignment Option 2** would impact a total of approximately 51 acres in six wetlands in four systems. The majority of impact would be to PFO (approximately 28 acres). The majority of the impacts would occur in wetland systems 4008 and 9003. These systems provide a variety of functions and values, including Groundwater Recharge/Discharge, Fisheries Habitat, Wildlife Habitat, Floodflow Alteration, Sediment Retention, Sediment/Shoreline Stabilization, and habitat for endangered species.

**Alignment Option 3** would impact a total of approximately 65 acres in seven wetlands in five systems. The majority of impact would be to PFO (approximately 38 acres). The majority of the impacts would occur in wetland system 9003 (approximately 46 acres) which provides a variety of functions and values, including Groundwater Recharge/Discharge, Fisheries Habitat, Wildlife Habitat, Floodflow Alteration, and Sediment Retention.

**Table 4-24**  
**Functions and Values of Affected Wetlands, Segment 4**

System	Functions and Values <sup>1</sup>													# Wetland Classes in System	System Area (acres)	Alignment Option
	GR/D	FF	FH	S/T/ R	NR/ R/T	PE	SS	WH	R	E/SV	UH	VQ/A	ES			
3751	Y	N	N	N	N	N	N	Y	N	N	N	N	N	2	27	1, 2, 3
3874	Y	N	N	N	N	N	N	N	N	N	N	N	N	2	1	1
3955	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	0	1
3962	Y	N	N	N	N	N	N	N	N	N	N	N	N	1	0	1
4008	Y	N	Y	N	N	N	Y	Y	N	N	N	N	Y	10	2182	1, 2, 3
9003	Y	Y	Y	Y	N	N	N	Y	N	N	N	N	N	10	1202	1, 2, 3
3715	Y	Y	N	Y	N	N	N	Y	N	N	N	N	N	4	0	2, 3
3928	Y	Y	N	N	N	N	N	Y	N	N	N	N	N	2	1	3

- 1 GR/D: Groundwater Recharge/Discharge  
 FF: Floodflow Alteration  
 FH: Fisheries Habitat  
 S/TR: Sediment/Toxicant Retention  
 NR/R/T: Nutrient Removal/Retention/Transformation  
 PE: Production Export  
 SS: Sediment/Shoreline Stabilization  
 WH: Wildlife Habitat  
 R: Recreation  
 E/SV: Educational/Scientific Value  
 UH: Uniqueness/Heritage  
 VQ/A: Visual Quality/Aesthetics  
 ES: Endangered Species

**Segment 7**

Impacts among the Segment 7 alignment options vary from approximately 20 acres for Alignment Option 4 to 126 acres for Alignment Option 5. These impacts are discussed in more detail in the following paragraphs and shown in Table 4-23, page 4-57 and on Figures 2-14a to 2-14i. Table 4-25, page 4-62, identifies the functions and values of the impacted wetlands.

**Alignment Option 1** would impact approximately 64 acres in 32 wetlands in 15 systems (totaling approximately 3,000 acres). The majority of the impacts would be to PFO (approximately 49 acres). More than half the wetland impacts (approximately 34 acres) associated with Alignment Option 1 would occur in three wetland systems (6057, (79 acres); 5752 (467 acres), and 5552 (191 acres), that provide a range of functions and values, primarily Groundwater Recharge/ Discharge, Floodflow Alteration, Fisheries Habitat, Sediment/Shoreline Stabilization, Sediment/Toxicant Retention, Nutrient Removal/Retention/Transformation, Wildlife Habitat, and Recreation.

Impacts to System 5752 (17 acres (3.6 percent) of the total 467 acres) bisect a narrow area of a large wetland system. Moderate impacts would be expected to the wetland’s ability to provide functions and values because the primary impact location is at a narrow point in the system. Impacts to System 5552 (10 acres or 5.2 percent of the total 191 acres) are expected to be more severe because the alignment crosses a large portion of the wetland system. Impacts to PSS, would be primarily in wetland system 4008 (10 acres (0.5 percent), of the total of 2,182 acres), a scrub-shrub wetland bounded by Reach Road (Route 210) and Higgins Road.

**Alignment Option 2** would have approximately 55 acres of impact in 36 wetlands in 15 systems (total size 3,019 acres), more than half of which would occur to forested wetlands (approximately 38 acres). More than half the impacts associated with Alignment Option 2 would occur in three wetland systems (Systems 6057 (79 acres); 5407 (121 acres); and 4008 (2,182 acres). These systems provide between three and six wetland functions and values, primarily Groundwater Recharge/Discharge, Floodflow Alteration, and Wildlife Habitat.

Impacts to System 6057, east of Perkins Road, are estimated to be 8 acres (10 percent of the total 79 acres), including PFO, PSS, and PEM. Impacts to this system are expected to be severe because the alignment bisects a large wetland that is not near any roads, and the impact location is in a wide portion of the wetland. Impacts to System 5407, just south of Conant Road, are estimated to be 12.3 acres to PFO and PEM, 10.2 percent of the total size of this wetland. Impacts are expected to be moderate because of the proximity of the wetland to Conant Road. Impacts to System 4008 (approximately 10.3 acres, 0.4 percent, to PFO, PSS, and PEM), at the intersection of Reach Road and Higgins Road, are expected to be moderate because of the wetland's proximity to existing roads. One wetland (5846, total size 23 acres) affected by Option 2 provides visual quality. The impact to this wetland (approximately 0.08 acres, 0.3 percent) is not anticipated to result in the loss of aesthetic values.

**Alignment Option 3** would affect approximately 53 acres in 32 wetlands in 11 systems (totaling 3,026 acres). The majority of losses would be to forested wetlands (approximately 50 acres), with far less impacts to scrub-shrub wetlands (approximately two acres) and emergent marsh (< 1 acre). The majority of impacts (approximately 29 acres) would be to three wetland systems (Systems 90006, 14 acres; 6025, 108 acres; and 5552, 191 acres). Collectively, these systems primarily provide Groundwater Recharge/Discharge, Floodflow Alteration, and Wildlife Habitat.

Impacts to System 90006 (approximately seven acres, 50 percent of the total) would fragment a portion of a large continuous riparian system. Impacts to System 6025 (approximately 14 acres, 13 percent of the total) are expected to be severe because the alignment would bisect a large wetland, and would do so in a location where the wetland is relatively wide. Impacts to System 5552 (approximately eight acres, 4.2 percent of the total size) are expected to be severe because the wetland system would be bisected by this alignment option.

**Alignment Option 4** would result in the loss of approximately 20 acres of vegetated wetlands among 22 wetlands (total size approximately 700 acres), of which most (approximately 15 acres) would be forested wetlands (PFO). Smaller amounts of shrub (approximately three acres) and emergent wetlands (approximately two acres) would be affected. Most of these impacts would occur in two systems, 4008 (total size approximately 2,182 acres) and 90006 (total size approximately 14 acres) which provide a range of functions and values, primarily Groundwater Recharge/ Discharge, Floodflow Alteration, Fisheries Habitat, Sediment/Shoreline Stabilization, Sediment/Toxicant Retention, Nutrient Removal/Retention/Transformation, Wildlife Habitat, and Recreation.

Impacts to System 90006 (approximately four acres, 28.6 percent of its total size) would be moderate because, although the impacts would occur adjacent to Route 1, the alignment would fragment a portion of a large continuous riparian system. Approximately seven acres of impact are anticipated in System 4008 west of Higgins Road (0.3 percent of its total size). These impacts would be moderate as they would cross a relatively wide portion of a riparian forested wetland.

**Alignment Option 5** would result in the loss of approximately 126 acres of wetlands, in 13 wetland systems (total size approximately 3,160 acres). Most of this loss (approximately 119 acres) would be of forested wetlands, with small amounts of emergent marsh (approximately five acres) and scrub-shrub wetland (approximately two acres) filled for road construction. Alignment Option 5 would have the most substantial impact to vegetated wetlands, with nearly twice as much wetland loss as Alignment Option 1 (approximately 64 acres).

The majority of the impacts (approximately 98 acres) would be in four systems (Systems 6025, 108 acres; 5752, 467 acres; 5552, 191 acres; and 5407, 121 acres) which provide a range of functions and values, primarily Groundwater Recharge/ Discharge, Floodflow Alteration, and Wildlife Habitat.

Impacts to System 6025 (approximately 18 acres, 16.7 percent of the total) would be expected to be severe because of the high impact number and the alignment location, which bisects the wetland and is not near any roads. Impacts to System 5752 (approximately 29 acres, 6.2 percent of the total) are expected to be severe for the same reasons. Impacts to System 5552 (approximately 29 acres, 15.2 percent) and System 5407 (approximately 22 acres, 18.2 percent), which are north and south of Conant Road, are expected to be moderate because the majority of the impacts would be at the interchange of Alignment Option 5 with the existing Conant Road.

**Alignment Option 6** would result in the loss of 24 acres of wetlands in 15 wetland systems (totaling approximately 3,035 acres). Most of this loss (approximately 22 acres) would be of forested wetlands, with very small amounts (approximately one acre) each of scrub-shrub wetland and emergent marsh losses. More than half the impacts would be to three systems (Systems 90006, 14 acres; 6057, 79 acres; and 4008, 2,182 acres), that provide a range of functions of values including primarily Groundwater Recharge/Discharge, Floodflow Alteration, Sediment/Toxicant Retention, and Wildlife Habitat. While some portions of these wetland systems also support Endangered Species, no rare species are reported to occur within any of the Segment 7 alignment options.

Impacts to System 90006's (approximately eight acres, 57 percent of its total size) ability to provide functions and values would be moderate because, although the impacts would occur adjacent to Route 1, the alignment would cross a portion of a large continuous riparian system. Impacts to System 6057 (approximately five acres, 6.3 percent) are expected to be minor because would occur in relatively narrow portion of the wetland. Impacts to System 4008 (approximately five acres, 0.2 percent) are also expected to be minor for the same reason. System 5846 (total size 23 acres) affected by Option 2 provides visual quality. The impact to this wetland (approximately 0.08 acres, 0.3 percent of the total) is not anticipated to result in the loss of aesthetic values.

**Table 4-25**  
**Functions and Values of Affected Wetlands, Segment 7**

System	Functions and Values <sup>1</sup>													# Wetland Classes in System	System Area (acres)	Alignment Option
	GR/D	FF	FH	S/T/ R	NR/ R/T	PE	SS	WH	R	E/SV	UH	VQ/A	ES			
4008	Y	N	Y	N	N	N	Y	Y	Y	N	N	N	Y	10	2,182	1, 2, 3, 4, 5, 6
5185	Y	Y	Y	N	N	N	N	Y	N	N	N	N	N	1	17	1,2,4
5330	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	1	1
5379	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	3	1, 2
5383	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	3	1,2
5394	Y	N	N	N	N	N	Y	Y	N	N	N	N	N	1	4	1, 2, 3, 5, 6
5399	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	0.1	5, 6
5401	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	0.1	6
5403	Y	N	N	N	N	N	N	Y	N	N	N	N	N	2	5	1, 3
5407	Y	Y	N	Y	N	N	N	Y	N	N	N	N	N	5	121	2, 5, 6
5419	Y	N	Y	Y	N	N	N	Y	N	N	N	N	N	3	16	1, 2, 3, 4,5, 6
5552	Y	Y	Y	N	N	N	N	Y	N	N	N	N	N	2	191	1, 2, 3, 4,5
5752	Y	Y	Y	Y	Y	N	N	Y	N	N	Y	N	N	5	467	1, 2, 3, 4, 5, 6
5761	Y	N	N	N	N	N	N	Y	N	N	N	N	N	2	5	5
5846	Y	Y	Y	Y	Y	Y	N	Y	N	N	Y	Y	N	5	23	2, 6
5904	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	0.1	3
5912	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	7	3
5917	Y	Y	N	N	N	N	N	Y	N	N	N	N	N	2	15	5
5995	Y	Y	Y	Y	Y	N	N	Y	N	N	N	N	N	4	5	5
5996	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	2	1, 2, 6
6015	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	7	1, 2, 6
6025	Y	Y	N	N	N	N	N	Y	N	N	N	N	N	5	108	3, 5, 6
6057	Y	Y	N	N	N	N	N	Y	N	N	N	N	N	3	79	1, 2, 6
6122	Y	Y	N	Y	N	N	N	Y	N	N	N	N	N	5	32	3, 5
6141	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	0.1	6
6153	Y	N	N	N	N	N	N	Y	N	N	N	N	N	1	1	6
6172	Y	Y	N	Y	N	N	N	Y	N	N	N	N	N	5	11	1, 2, 6
90006	Y	Y	N	Y	N	N	N	Y	N	N	N	N	N	4	14	1, 2, 3, 4, 5, 6

1 GR/D: Groundwater Recharge/Discharge  
 FF: Floodflow Alteration  
 FH: Fisheries Habitat  
 S/TR: Sediment/Toxicant Retention  
 NR/R/T: Nutrient Removal/Retention/Transformation  
 PE: Production Export  
 SS: Sediment/Shoreline Stabilization  
 WH: Wildlife Habitat  
 R: Recreation  
 E/SV: Educational/Scientific Value  
 UH: Uniqueness/Heritage  
 VQ/A: Visual Quality/Aesthetics  
 ES: Endangered Species

## Mitigation

Activities associated with construction will result in direct and indirect impacts to regulated wetland resources. Direct impacts will be mitigated through the establishment of suitable wetland mitigation areas. Indirect impacts will be avoided to the extent feasible and mitigated as necessary.

Direct wetland impacts will require appropriate mitigation. Mitigation will be developed in accordance with the requirements of EO 11990, the NRPA 38 M.R.S.A. Sec. 480 et seq.-D(1) Wetlands and Waterbodies Protection (Chapter 310), and the USACOE Regulatory Guidance Letter (RGL) 02-2. The Executive Order requires that federal agencies “avoid, to the extent possible, the long and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable option.” The requirements of EO 11990 are consistent with the Clean Water Act [(Section 404(b)(1))] and the 1990 MOA between the EPA and the USACOE, which prescribes a sequential approach to wetland mitigation whereby, measures to avoid and minimize wetland impacts are given precedence over compensatory mitigation efforts, such as restoration, creation, or enhancement.

Chapter 310 of the NRPA addresses the permitting of projects that are not eligible for a permit-by-rule from Maine DEP. It contains requirements to avoid impacts, to minimize impacts that are determined to be unavoidable, and to compensate for those impacts, when required. Chapter 310 takes an avoidance, minimization, compensation approach to wetland protection. Compensation for unavoidable impacts may occur in the form of restoration of degraded wetlands, enhancement of existing wetlands, preservation of existing wetlands and adjacent uplands, and creation. Preference is given to restoration projects that will offset lost functions within or near the impacted wetlands. If compensation is done, the following ratios are required:

- 1:1 for restoration, enhancement, or creation for impacts to wetlands that are not of special significance;
- 2:1 for restoration, enhancement, or creation for impacts to wetlands of special significance; and
- 8:1 for preservation, including adjacent upland areas to compensate for impacts in all wetlands.

The USACOE RGL 02-2 states that projects with unavoidable wetland impacts must be mitigated using a holistic, watershed approach that “considers entire systems and their constituent parts”. The purpose of this RGL is to ensure no net loss of wetland functions, and the USACOE recommends that an appropriate functional wetland assessment be used to assist in the wetland mitigation approach. Where practicable, compensatory mitigation should be on-site, but off-site mitigation is allowed where no practicable options exist for on-site wetland mitigation. Upland buffers or riparian corridors may be necessary to ensure compensatory mitigation areas provide the

specified wetland functions and values. Types of mitigation, in order of USACOE preference, are restoration, enhancement, creation, and preservation. Only preservation of highly functioning wetlands under immediate threat from alteration or destruction should be considered for mitigation.

The wetlands and wetland functions impacted by construction could be compensated for by creating wetland mitigation areas where avoidance, minimization, and restoring impacted areas are not possible.

Based on a maximum 2:1 ratio, this section identifies mitigation measures for the preferred option in each segment.

### **Segment 2**

At a 2:1 mitigation ratio, Segment 2 would require a minimum of approximately 12 acres of compensatory wetlands to replace lost wetland area. This would include four acres of emergent wetland, four acres of forested wetland, and four acres of scrub-shrub wetland. No specific mitigation sites have been identified as part of preparing this SDEIS, but would be identified in future design stages.

### **Segment 4**

The Preferred Alignment Option for Segment 4 would impact approximately 51 acres of wetland at full 4-lane build-out and would, therefore, require a minimum of 102 acres of compensatory wetland at a 2:1 ratio, consisting of 56 acres of forested wetland, 24 acres of scrub-shrub wetland, and 22 acres of emergent wetland. No suitably-sized areas for wetland mitigation were identified within Segment 4. A review of available mapping indicated that topography and current land use within the Segment 4 area did not provide suitable mitigation sites. Mitigation for Segment 4 impacts would be provided in preferred mitigation areas identified within Segment 7.

### **Segment 7**

Alignment Option 2, the Preferred Alignment Option for Segment 7, would impact approximately 55 acres of wetland at full 4-lane build-out and would, therefore, require a minimum of 110 acres of compensatory wetland at a 2:1 ratio, consisting of 22 acres of emergent wetland, 56 acres of forested wetland, and 24 acres of scrub-shrub wetland. The majority of affected wetlands near the Segment 7 alignments are forested wetlands along stream systems that provide Groundwater Recharge/ Discharge, Floodflow Alteration, Fisheries Habitat, and Wildlife Habitat functions. Wetland mitigation will be designed to replace these functions and values within the same watershed.

Preliminary contact was made with representatives from USFWS, Maine DEP, NRCS, the Micmac Tribe, the USACOE, IF&W, and private landowners to identify mitigation priorities in the area. Because of the relatively low level of development in the area, few sites were identified in need of restoration or enhancement. One mitigation option identified by the USACOE was to restore wetlands and adjacent

uplands along edges of farm fields that are adjacent to existing wetland systems. Maine DEP recommended that alder wetlands be enhanced to improve habitat for the American woodcock.

A preliminary site selection process was undertaken to identify sites capable of supporting up to 150 acres of wetland mitigation and to accommodate a variety of habitat types and hydrologic regimes in order to replace in-kind wetland impacts associated with the Preferred Alignment Options for Segments 4 and 7.

Four sites have been identified as potential wetland mitigation areas (see Table 4-26 below). Three of the sites identified are in Presque Isle. The fourth site is associated with the Aroostook National Wildlife Refuge (Aroostook NWR) in Limestone outside of the immediate project area. This site may provide mitigation opportunities not found locally. Figure 4-5 shows the locations of the potential mitigation sites in Presque Isle. Two of the sites (the Parsons Road Parcel and Aroostook NWR) have been reviewed in the field and appear to provide highly feasible mitigation options for impacts associated with the Segment 4 and Segment 7 alignments. Two additional sites (Parcel A and Parcel B in Table 4-26) have been identified for further study but have not yet been field investigated. These sites were identified through the review of aerial photographs, available topographic mapping, and hydric soils data.

**Table 4-26**  
**Potential Wetland Mitigation Locations**

<b>Site Name</b>	<b>Potential Mitigation Acreage</b>
Parsons Road Parcel	150
Parcel A	300
Parcel B	30
Aroostook National Wildlife Refuge	50+

The proposed mitigation sites would provide a large mitigation area designed to replace the functions and values that would be primarily affected by construction of the Preferred Alignments Options for Segments 4 and 7. The proposed mitigation sites were chosen due to their direct hydrologic connections to existing streams and wetlands, proximity to the wetland resources proposed to be altered by the Proposed Action, and are within the same watershed wetlands impacted the Proposed Action (Aroostook River). All mitigation areas would be permanently protected from future impact by conservation restriction or by transfer of ownership to an appropriate land conservation agency.

The potential wetland mitigation sites at Parsons Road and the Aroostook National Wildlife Refuge are briefly described below.

### ***Parsons Road Parcel***

This privately-owned parcel in Presque Isle is an abandoned field that would provide up to 150 acres of wetland creation, restoration, or enhancement. It is located off Parsons Road adjacent to the Aroostook River, as shown on Figure 4-6. The site appears to be former river terrace/oxbow and contains stream channels and some isolated wetland areas. The southeast corner of the site is at the confluence of the Aroostook River and Presque Isle Stream. The site is an open, level field with a hydrologic connection to a tributary to the Aroostook River traversing the site. Adjacent land uses include low-density residential, woodland, and the Aroostook River. Upland excavation to achieve wetland hydrology is estimated to be between 1 and 5 feet. The site is within one mile of approximately one-third of the impacts associated with the Presque Isle Bypass.

### ***Aroostook National Wildlife Refuge***

The Aroostook NWR is part of the former Loring Air Force Base in Limestone and consists of approximately 4,700 acres of forested and open uplands and wetlands. The primary emphasis of the refuge is forest and grassland management. Currently, the refuge has an aggressive habitat restoration program involving demolishing buildings, removing railroad track and fencing, as well as removing other remnants of the former base infrastructure. The refuge is actively restoring several wetland types, including a 2.1-mile stream restoration project with the U.S. Air Force. Opportunities also exist for several hundred acres of additional wetland restoration.

One potential mitigation site is adjacent to a “moist soils” area near East Loring Lake that was recently restored to provide approximately 50 acres of wetland and floodplain. This potential restoration site was probably agricultural at one time and could provide up to 20 acres of wetland creation. Up to 30 acres of wetland restoration is also possible in this location. Additional stream and/or wetland restoration can also be investigated at Greenlaw Brook, which has been partially restored within the Aroostook NWR. Greenlaw Brook, a tributary to the Little Madawska River, is a cold water stream that provides high value brook trout habitat.

This area would provide large, connected areas of creation, restoration, and enhancement, the potential to replace similar functions and values, and direct hydrologic connections to existing streams and waterbodies. However, disadvantages include the distance of the mitigation area(s) to affected wetlands and the possibility of encountering contaminated soils at the mitigation site(s). The former base is listed as a CERCLA site due to groundwater contamination and other issues. Further discussion with the USFWS is needed to determine if wetland creation or restoration within the refuge is feasible as a mitigation measure.

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#### **4.4.2.4 Floodplains**

This section describes the potential impacts of the Proposed Action on the 100-year floodplains in the Study Area as well as potential mitigation for these impacts.

## **Impacts**

Direct impacts to floodplains are assessed as the loss of floodplain area. The loss of flood storage or new obstructions within the floodplain or floodway could result in an increase in depth or duration of flooding, or increase the lateral extent of the flooding. These impacts depend on the location of the impact relative to the floodway, and the proximity of sensitive land uses. New location corridors that cross floodplains may potentially have the greatest effect on floodplains. New river crossings downstream of existing residences and neighborhoods may create more property impacts than new crossings in undeveloped areas. Widening existing roads, or constructing new roads parallel to the river, may have the least impacts because these may result in less loss of storage or obstruction within the floodway. Impacts to 100-year floodplains were estimated based on proposed right-of-way widths for each of the Proposed Action segments. Table 4-27 (page 4-68) lists the potential floodplain impacts.

### **No Action Alternative**

The No-Action Alternative would not impact floodplains in the Study Area as no construction would occur.

### **Segment 2**

Segment 2 would affect approximately eight acres of floodplain associated with Bearsley Brook, a tributary to the Little Madawaska River in New Sweden. These impacts would require placing fill adjacent to the existing road and are not anticipated to increase flooding or affect flood flows.

### **Segment 4**

The right-of-way of Alignment Options 2 and 3 would encroach within the floodplain of Hardwood Brook (Figure 3-38). Alignment Option 2 would impact approximately 12 acres, and Alignment Option 3 would affect 25 acres. Alignment Option 1 would not require construction within any floodplain.

### **Segment 7**

All of the Segment 7 alignment options could potentially affect floodplain associated with the Aroostook River. Alignment Options 1, 2, and 6 also cross a mapped floodplain associated with Prestile Stream near Phair Junction, as shown on Figure 3-38. Impacts range from approximately eight to 25 acres. This amount, however, is based on right-of-way width and assumes the worst case scenario where the entire right-of-way width and crossing length would be filled. Because any new bridge will span the Aroostook River and likely most, if not all, of its associated floodplain, actual impacts will very likely be much less.

**Table 4-27**  
**Floodplain Impacts**

<b>Segment - Alignment Option</b>	<b>Floodplain Impacts (acres)<sup>1</sup></b>
Segment 2	8
Segment 4 - Option 1	0
Segment 4 - Option 2	12
Segment 4 - Option 3	25
Segment 7 - Option 1	12
Segment 7 - Option 2	18
Segment 7 - Option 3	8
Segment 7 - Option 4	8
Segment 7 - Option 5	25
Segment 7 - Option 6	16

<sup>1</sup> Impacts for Options 1, 2, 3, 5 and 6 are based upon a 300-foot right-of-way width. Impacts for Option 4 are based on a 200-foot right-of-way for the upgrade portion and on a 300-foot right-of-way for the new alignment portion.

### **Mitigation**

MaineDOT will further avoid floodplains wherever feasible and mitigate for unavoidable impacts as required by EO 11988. Site-specific mitigation measures will be developed during final design and permitting once actual floodplain loss is calculated based upon the selected highway design (e.g., 2-lane versus 4-lane initial build).

Hydraulic studies will be completed for each crossing of 100-year floodplain with bridge and culvert opening sizes and elevations designed to minimize flooding impacts. Filling in floodplains will be reduced to the extent practicable by incorporating special design features such as steepened side slopes, retaining walls, or bridges. Compensatory flood storage may be proposed where floodplain impacts cannot be avoided and loss of flood storage was substantial enough to increase the potential for increased flood damage to property.

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#### **4.4.2.5 Outstanding River Segments**

This section discusses the impacts of the Proposed Action on Outstanding River Segments (ORS) as well as the potential mitigation measures for these impacts.

### **Impacts**

#### **No-Action Alternative**

The No-Action Alternative would not impact ORS in the Study Area.

### **Segment 2**

Segment 2 would not impact any ORS.

### **Segment 4**

None of the alignment options for Segment 4 would impact any ORS.

### **Segment 7**

All of the alignment options considered for Segment 7, the Presque Isle Bypass, will require crossing the Aroostook River, which is an ORS (Figure 3-36 to 3-41). The portion of the Aroostook River in the vicinity of the proposed bridge crossing is in a generally agricultural area northeast of the more developed areas of Presque Isle. The general area of the proposed alignment option crossings also features roadways and rail lines on either side of the river. Development on the south side of the river is sparse, consisting of scattered farms and residences. Notable on the north side of the river is the former McCain potato processing facility, which is currently not being used. At the proposed bridge crossing area, the Aroostook River is approximately 330 feet wide and flows eastward. All of the Presque Isle Bypass alignment options under consideration cross the river within a corridor approximately 0.5 miles wide, located approximately one mile east of the present Route 1 river crossing. Alignment Option 4, the westernmost alignment option, would cross approximately 0.4 miles downriver of the existing Montreal, Maine, and Atlantic Railway bridge and approximately 1.3 miles downriver of the Route 1 Aroostook River crossing in Presque Isle. Alignment Options 5 and 6, the easternmost alignment options, would cross approximately 0.9 miles downriver of the existing Bangor and Aroostook Railroad bridge and approximately 1.8 miles downriver of the Route 1 Aroostook River crossing in Presque Isle. Options 1, 2, and 3 would cross the Aroostook River between these points.

In accordance with Section 480-D.8 of NRPA, Maine DEP may only grant a permit for a new crossing of a designated ORS if the applicant has demonstrated “that no reasonable option exists which would have less adverse effect upon the natural and recreation features of the river segment.” MaineDOT investigated upgrading the existing Route 1 through Presque Isle as an alternative to constructing the Presque Isle Bypass. The upgrade alternative (DEIS Initial Study Corridors 1 and 5, Figure 2-2 of the DEIS) would have included upgrading and widening the existing bridge carrying Route 1 over the Aroostook River. This alternative, however, was found to not satisfy the Purpose and Need for the project. As discussed in Section 2.6.3.1 on page 2-36, upgrading Route 1 through Presque Isle would not result in any substantial transportation or economic benefits, would not reduce functional conflicts, and would not improve movement of goods or access to services. Therefore, a new crossing is required to accommodate the bypass.

## Mitigation

The new bridge crossing the Aroostook River will be designed to meet the NRPA requirements for protection of ORS. MaineDOT will coordinate with Maine DEP during design of the new bridge to ensure that the crossing meets all of the NPRA criteria with regard to natural resources, such as aquatic and wildlife habitat, floodplain, and water quality, as well as recreational features, such as providing adequate access to the river and minimizing visual impacts.

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### 4.4.3 Wildlife Habitat, Significant Wildlife Habitat, and Essential Fish Habitat

This section describes potential impacts to wildlife habitats, fisheries, and state-regulated "Significant Wildlife Habitats," as well as potential mitigation measures for these impacts. Endangered and threatened wildlife species are addressed in Section 4.4.4 (page 4-79).

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#### 4.4.3.1 Wildlife Habitat

Habitat loss is a direct effect of transportation improvements. Habitat is lost when an area previously providing wildlife habitat is converted to an area that does not provide food, cover, water, and/or breeding resources to wildlife. Habitat conversion is another direct effect of transportation projects, where an area providing habitat for one wildlife community may be altered so that it no longer provides resources to the original wildlife community.

#### Impacts

In general, the loss of herbaceous upland vegetation may result in the loss of nesting habitat for grassland birds, the loss of feeding habitat for raptors and mammalian predators, the loss of year-round habitat for small mammals and reptiles, and the loss of wintering habitat for some northern birds.

The loss of shrub habitat may result in the loss of nesting habitat for birds, particularly warblers, and the loss of year-round habitat for small mammals and their predators.

The loss of forest habitat, particularly the Spruce-Northern Hardwoods forest, may result in the greatest impact to species diversity, since this habitat type supports a wide range of mammals and amphibians, and both year-round resident and neotropical migratory bird species.

Indirect effects of new highway construction may include fragmentation and associated 'edge effects', loss of genetic diversity, increased competition for resources, isolating

habitats from each other, and physical or psychological restrictions on movements or migration by some feature within a corridor that wildlife are unwilling or unable to cross.

Fragmentation is defined as the subdivision of once large and continuous tracts of habitat into smaller patches. Fragmentation clearly has consequences on wildlife communities. In general, fragmentation of habitat is viewed as detrimental when considering species composition and abundance and relative ecological stability of animal populations, particularly for wildlife that require large areas of unfragmented forest habitat. Construction of new highways may also interrupt riparian (stream or river) corridors used by wildlife that provide important connections between wildlife populations. There is no unfragmented forest habitat in the vicinity of Segments 4 and 7. While existing Route 161 (Segment 2) passes through extensive areas of forest, the forests have all generally been actively logged and are, thus, fragmented.

New location highways create edges between forest and open land. Edge effects include a range of beneficial and detrimental ecological consequences that are associated with habitat diversity, the most common of which are increased predation and parasitism. Indirect effects, such as increased songbird nest parasitism from brown-headed cowbirds, can be expected where new roads cross through agricultural areas. Predation on small mammals, amphibians, and songbirds may also increase as opportunist predators such as, crows and raccoons, move into the edges adjacent to the new highway. Indirect effects are expected to be higher along new corridors than upgrading local roads because of the relatively undeveloped nature of the new corridor alignments. Even though wildlife tend to avoid roads, mortality is expected to be higher on new location segments than on upgrades, particularly if roads cross through habitats of animals with large home ranges.

Because undeveloped forest makes up the majority of wildlife habitat in the area, the impacts presented in Table 4-5 on page 4-11 for undeveloped forest gives a general sense of the magnitude of impacts to potential wildlife habitat. These numbers do not, however, give an indication of the value of that habitat.

#### **No-Action Alternative**

The No-Action Alternative would not impact wildlife habitat in the Study Area as no construction would occur.

#### **Segment 2**

The minor amount of widening that would occur along Segment 2 is expected to have a negligible effect on wildlife habitat. A review of the aerial photos of Segment 2 (Figures 2-7a through 2-7aa) reveals that the large majority of Route 161 passes through large areas of undeveloped forest. Much of that forest has been heavily logged (Figure 2-7l). Only a very minor amount of clearing along the existing highway at the very edges of these large forest blocks will be necessary. Therefore, it will have negligible impacts to wildlife.

#### **Segment 4**

All three of the alignment options for Segment 4 pass through a mixture of urban, farm, and small patches of forest. The southern terminus of all three alignment options, south of Route 89, is within the developed area of Caribou, where there is little to no wildlife habitat. The northern or western terminus of all three alignment options would have essentially the same impacts, as they are on very nearly the same alignment over their westernmost 7,000 feet. This area is a mix of agricultural and mixed deciduous forest north of the Caribou Country Club (Figure 2-8). In their middle sections from Route 1 to north of the Caribou Country Club, all three alignment options cross through active farm lands. From Route 1 south, Alignment Option 1 remains on Route 1 and would have no impact on wildlife habitat. In the area north of the Cary Medical Center, between Route 1 and Route 89, Alignment Options 2 and 3 pass through a mixture of forest and agricultural land. Each would have some impact to the forest habitat that borders Hardwood Brook. Alignment Option 2 would be somewhat less intrusive to this forest area than would Alignment Option 3. This patch of forest between large agricultural areas is too small to be considered an unfragmented forest block.

#### **Segment 7**

All of the alignment options for Segment 7 would pass through a similar landscape, dominated by cleared agricultural fields and patches of forest and wetland, as shown on Figures 2-10a and 2-10b. North of the Aroostook River, all of the alignment options would be almost entirely within agricultural areas. Only a narrow band of woodland associated with a stream west of and parallel to Higgins Road would be crossed. Alignment Options 3, 5, and 6 would have the greatest impact on this small forest area.

South of the Aroostook River, all six alignment options run essentially north-south between the River and Route 1 near the Westfield town line. This approximately 7-mile long area is predominantly in active agricultural use and contains a patchwork of forest. Farms and residences are located sparsely throughout the area.

There are two large forested areas in the vicinity of the alignments south of the Aroostook River that would provide the greatest amount of wildlife habitat in the area. Both contain large areas of wetland (PFO). The first is located between Conant Road and Easton Road. It is approximately 425 acres in size. Option 5 would pass down the center of it and would impact it the most. Alignment Option 4 would pass to the west of the area and have no impact to it; Alignment Option 2, the Preferred Alignment Option, would make a diagonal crossing of it that would avoid the central portion, but would cross on its east side (Figure 2-13a).

The second forest block is located between Easton Road and Williams Road (Figure 2-13b). All of the alignments with the exception of Alignment Option 5 largely avoid this area. Alignment Options 2 (the Preferred Alignment Option), 1, and 6 cross it near its southeastern limit. Alignment Options 3 and 4 pass to the west of it.

## Mitigation

Mitigation measures for impacts to wildlife habitat may include a variety of structural measures intended to prevent wildlife mortality and to mitigate fragmentation effects of a new highway facility, as well as measures to protect water quality and habitat quality.

Constructing wildlife crossings can mitigate impacts to wildlife from highways. Wildlife crossing structures can be incorporated into the design of new highways as well as retrofitted along upgraded road segments. For upgrades, such as those along Segment 2, often only minor changes may be necessary, such as providing vegetative screens and fencing. Crossing opportunities for both large, high mobility species, and small, low mobility species, may be provided along highways and roads. Several factors are important in designing successful wildlife underpasses. Overall, wildlife crossing structures should maintain landscape connectivity rather than redirect movements, and should be placed in known wildlife migration/travel routes. Determining species distribution and corridors of movement, as well as understanding target species biology, is critical in designing effective wildlife crossing structures. A community/ecosystem approach rather than species-specific has been found to be most effective in maintaining habitat connectivity and ecological functions.

Three types of wildlife crossing structures will be considered as mitigation for impacts to wildlife habitat and may have the potential to reduce conflicts between motorists and moose or deer:

- ▶ Wildlife overpasses are land bridges over a buried highway or road section that can connect suitable habitat for large animals, such as moose and deer, and may provide habitat for small mammals and birds. MaineDOT will coordinate with IF&W to determine if there are any wildlife travel corridors that would conflict with the Proposed Action segments to an extent that would warrant construction of an overpass.
- ▶ Extended bridges can maintain habitat connectivity by providing an unsubmerged area adjacent to the waterway and maintain riparian corridors for wildlife. Extended bridges will be considered at all locations where bridge structures are required.
- ▶ Oversized culverts are effective for both terrestrial and aquatic species, and consist simply of a pipe or culvert designed larger than flow capacity requires.

Seasonal timing of construction to avoid critical breeding or migratory periods for wildlife can also minimize indirect effects on wildlife resources. Other measures, such as habitat preservation and vegetation management, may mitigate for impacts to wildlife habitat.

Prior to the publication of the FEIS, MaineDOT will coordinate further with the IF&W to determine appropriate, feasible locations for wildlife mitigation measures for the Preferred Alignment Options. Design details of these mitigation measures will then be determined during final design and permitting phase for each segment.

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#### **4.4.3.2 Fisheries**

Direct impacts to fisheries resources may result from construction that places fill material in water bodies or waterways and causes the loss of habitat. Fisheries resources may also be indirectly affected by transportation improvements by increased water runoff. Increased runoff may result in higher rates of erosion, in turn, leading to decreased water quality through sedimentation and pollutant loading. Contaminants from highway runoff may also affect water quality, fish reproduction, or fish mortality, particularly in areas of heavy traffic.

Figures 3-42 through 3-47 show the location of the study corridors with respect to important fisheries.

#### **Impacts**

##### **No-Action Alternative**

The No-Action Alternative would not impact fisheries resources in the Study Area as no construction would occur.

##### **Segment 2**

Segment 2 would not create any new crossing of important fisheries waters. It would, however, require existing culverts to be extended in numerous locations.

##### **Segment 4**

None of the alignment options for Segment 4 would require new crossings of important fisheries waters. Segment 4 crosses only small perennial streams tributary to Hardwood Brook.

##### **Segment 7**

The impacts of all of the Segment 7 alignment options to fisheries would be essentially the same. Segment 7 would require a new crossing of the Aroostook River, east of Presque Isle. This element of the Proposed Action may potentially result in a minor loss of habitat if bridge piers are required, and could have temporary impacts to water clarity and quality during construction. In the absence of mitigation, highway runoff from the road could affect habitat quality for Atlantic salmon.

## Mitigation

Impacts to fisheries resources can be mitigated by providing unobstructed passageways between suitable aquatic habitats and by enhancing existing habitat. Oversized stream culverts or fish passage structures can be designed along upgrades and new location segments to improve passage for fish. All new culverts and existing culverts that must be extended or altered will be evaluated to determine requirements for fish passage, and all culverts will be designed in accordance with MaineDOT's 2004 *Fish Passage Policy and Design Guide*.

As discussed in the Design Guide, when considering new stream crossing structures or improvements to existing structures, Maine DOT will strive to:

- Maintain or replicate natural stream channel or flow conditions, as appropriate;
- Pass peak flows in accordance with Maine DOT drainage policy;
- Comply with existing regulations on passing fish;
- Consider potential impacts to rights-of-way, utilities, and traffic;
- Meet appropriate standards and safety requirements;
- Provide reasonable life cycle costs; and
- Consider the least environmentally damaging solutions.

Enhancing stream habitat is another potential mitigation for impacts to fisheries, and can be used along upgrades and new location segments. Planting overhanging trees and shrubs adjacent to streams shades stream waters, thereby enhancing habitat for coldwater fish, such as brook trout. Overhanging shrubs also create a more natural riparian corridor along the stream, and ecological processes, such as cover and food production for fish, are improved.

As with wildlife resources, indirect impacts to fisheries can also be minimized by seasonal timing of construction to avoid critical spawning periods. Construction impacts to aquatic resources can be minimized by the appropriate use of BMPs.

MaineDOT will determine site-specific fisheries mitigation measures during final design and permitting in conjunction with IF&W and the Maine DEP.

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### 4.4.3.3 Significant Wildlife Habitat

As described in Section 3.4.3 (page 3-75), two state-regulated wildlife resource types occur in the Study Area: DWA and WWH. Direct and indirect impacts to these wildlife resources are described below. Figures 3-42 through 3-47 show the location of each segment of the Proposed Action with respect to mapped DWAs and WWHs.

It is likely that vernal pools are also present along Segments 4 and 7; however, no Significant Vernal Pools have been mapped by IF&W. As discussed in Section 3.4.3.4

(page 3-82), vernal pools within the Preferred Alignment Options for Segments 4 and 7 will be investigated and mapped prior to the FEIS.

## **Impacts**

SWH impacts were determined by overlaying the Segment 2, 4, and 7 alignment options onto mapped SWH. If an alignment intercepted any portion of a SWH, this area was counted as an impact. Impacts to DWAs and WWHs along the Proposed Action segments were based on a width of 110 feet along Route 161 (Segment 2) to 300 feet along Segments 4 and 7. Tables 4-28 and 4-29 (page 4-77) presents the findings.

### **No-Action Alternative**

The No-Action Alternative would not impact SWH in the Study Area as no construction would occur.

### **Segment 2**

Segment 2 would impact approximately 1.3 acres of a 116-acre WWH in Stockholm associated with the Little Madawaska River, and would impact approximately 7.5 acres of DWA in two locations, one in Stockholm and one in T16 R4 (Figure 3-42). In each case, the area affected is immediately adjacent to the existing highway, along the edge of the protected habitat area. The minor edge loss would have negligible effect on the overall function of each area.

### **Segment 4**

None of the alignment options in Segment 4 would affect SWH in the Study Area.

### **Segment 7**

One WWH occurs in the vicinity of the Presque Isle Bypass (Figure 3-44). Two of the Segment 7 alignment options would impact this WWH. Alignment Option 2 would alter approximately 1.1 acres of WWH near the intersection of Egypt Road and Easton Road (Route 10). This may overestimate the actual impacts, as the mapped WWH falls outside of field-verified wetland limits in this location. It is possible that the WWH mapping is not as accurate as the field-verified wetland limits. If this is the case, there would be no impacts to WWH in this location. Impacts to this 50-acre WWH would be minimal as they would occur on the fringes of the habitat.

Alignment Option 6 would alter approximately 0.2 acres of the same WWH as Alignment Option 2. Impacts would be less under this alignment option, and would also occur on the fringe of the mapped habitat.

**Table 4-28  
 Potential Impacts to Deer Wintering Areas (DWA)<sup>1</sup>**

Segment - Option	Number Impacted	Town(s)	Impacts (Acres)/Total Area of affected DWA
Segment 2	2	Stockholm, T16 R4 WELS	7.5/182

<sup>1</sup> Impacts to DWAs are based on a 110- to 120-foot impact area width for Segment 2.

**Table 4-29  
 Potential Impacts to Inland Wading Bird and Waterfowl Habitat (WWH)<sup>1</sup>**

Alignment Option	Number impacted	Impacts (Acres)/Total Area of affected WWH
Segment 2	1	1.3/116
Segment 4	0	0
Segment 7 - Option 1	0	0
Segment 7 - Option 2	1	1.1/50
Segment 7 - Option 3	0	0
Segment 7 - Option 4	0	0
Segment 7 - Option 5	0	0
Segment 7 -Option 6	1	0.2/50

<sup>1</sup> Impacts for Segment 7 Alignment Options 1, 2, and 3 are based upon a 300-foot right-of-way width plus areas of cut and fill slopes outside the right-of-way. Impacts for Option 4 are based upon a 200-foot right-of-way plus areas of cut and fill slopes outside the right-of-way for the upgrade portion along Centerline Road; and upon a 300-foot right-of-way plus areas of cut and fill slopes outside the right-of-way for the new alignment portion north of State Road. Impacts for Options 5 and 6 are based upon a 300-foot right-of-way.

### Mitigation

MaineDOT will coordinate with the IF&W to develop appropriate mitigation measures for unavoidable impacts to SWH, if required, for the Preferred Alignment Option. Mitigation for impacts to high-value WWH may include compensatory wetland mitigation adjacent to existing high-value WWHs. Other opportunities may be to enhance moderate-value WWHs to provide higher value habitat through additional wetland plantings within WWHs or upland buffer plantings to screen WWHs from roads. Seasonal timing of construction will also be considered to minimize potential impacts to breeding and migratory birds.

During final design, MaineDOT will attempt to avoid state-regulated wildlife resources, wherever feasible, and to mitigate for unavoidable impacts. Specific mitigation measures will be identified in the FEIS.

Mitigation for state-regulated wildlife resource areas involves the same principles as for wildlife habitat. Mitigating for impacts to DWAs can be accomplished by constructing

wildlife crossing structures such as wildlife overpasses and extended bridges. Other potential mitigation may include replanting suitable areas with coniferous species adjacent to the impacted DWAs and posting signs to warn motorists at known deer crossing locations.

As discussed in Section 4.4.2.3 (page 4-56), the goal for wetland mitigation is to replace the functions and values that would be primarily affected by construction of the Preferred Alignment Options for Segments 4 and 7. This would include constructing suitable habitat for inland waterfowl and wading birds, by creating areas of open water habitat.

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#### **4.4.3.4 Essential Fish Habitat**

The NMFS (National Oceanic and Atmospheric Administration [NOAA] Fisheries Service) protects EFH, as authorized under the 1996 Amendments to the Magnuson-Stevens Fishery Conservation and Management Act (50 CFR Part 600). Section 305(b)(2)-(4) of the Magnuson-Stevens Act outlines a process for NOAA Fisheries Service to provide recommendations on projects during the NEPA review process. State actions that may adversely affect EFH do not require consultation under the Magnuson-Stevens Act, but NOAA Fisheries Service must provide conservation recommendations if an adverse effect to EFH is anticipated. The MASC has been authorized by the Commissioner of the MDOC with protecting Atlantic salmon in the State of Maine in accordance with 12 M.R.S.A. § 9902.

#### **Impacts**

##### **No-Action Alternative**

The No-Action Alternative would not impact EFH in the Study Area as no construction would occur.

##### **Segment 2**

Construction of Segment 2 would not impact areas designated EFH, as no construction would occur in these areas.

##### **Segment 4**

None of the alignment options for Segment 4 would impact areas designated EFH, as no construction would occur in these areas.

##### **Segment 7**

All six alignment options studied in Segment 7, the Presque Isle Bypass, would require construction in the Aroostook River for the proposed bridge, and may affect EFH designated for the Atlantic salmon. Effects to EFH could include the loss of bottom habitat and temporary impacts to water quality as a result of construction-related turbidity. As the lead federal agency, FHWA will consult with the NOAA

Fisheries Service when the bridge is designed to determine if there will be an adverse impact to EFH. NOAA Fisheries Service is required to provide recommendations for avoiding, offsetting, or mitigating any adverse effects.

### **Mitigation**

MaineDOT and FHWA will consult with NOAA Fisheries Service to identify impacts to EFH (Atlantic salmon habitat) resulting from construction of the proposed Aroostook River Bridge. The bridge (for any of the alignment options under consideration) would be a minimum of 300 feet long and could require piers in the river. Mitigation for potential impacts to EFH for Atlantic salmon at the Aroostook River crossing could range from restricting construction in the water to certain time periods; use of cofferdams or other structures to reduce construction impacts; and creating or enhancing suitable habitat. Measures to avoid and minimize sedimentation of the waterway during construction, potentially at a higher level than standard BMPs, will be required. If the proposed bridge structure will require piers or other permanent structures in the Aroostook River, compensatory mitigation may be required.

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#### **4.4.4 Endangered, Threatened, and Species of Special Concern**

Potential impacts to federally and state-listed species are discussed in this section. No federally or state-listed plant species occur in the Study Area. Federally-listed wildlife species that occur in the Study Area include Atlantic salmon (*Salmo salar*) and critical habitat for Canadian lynx (*Lynx canadensis*). State-listed wildlife species that occur in the Study Area include bald eagle (*Haliaeetus leucocephalus*), extra-striped snaketail (*Ophiogomphus anomalus*), and pygmy snaketail (*Ophiogomphus howei*).

Potential impacts to the federally-listed Atlantic salmon were discussed in Section 4.4.3.4, page 4-78. Mitigation measures to ameliorate potential impacts were also discussed in Section 4.4.3.4.

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##### **4.4.4.1 Federal Endangered and Threatened Species**

###### **No-Action Alternative**

The No-Action Alternative would not impact federally-listed species as no construction would occur.

###### **Segment 2**

The FWS has proposed critical habitat for Canadian lynx in the Study Area (Figure 3-48). As shown on Figure 3-48, Route 161 forms the northeastern boundary of the proposed critical habitat. Segment 2, the upgrade of Route 161, would therefore border the critical habitat for approximately 15 miles from just south of Madawaska Lake in Stockholm to

just north of Cross Lake in Cross Lake Township (Figure 3-48). Construction in this area would be limited to minor shoulder widening and the addition of three climbing lanes, one of which would be situated on the southbound side, within critical habitat for the Canadian lynx. Impacts to critical habitat for the Canadian lynx would, therefore, be minor given the vast areas of this habitat within, and in the vicinity of the Study Area. FHWA and MaineDOT will consult with USFWS to confirm that the Proposed Action would not adversely affect critical habitat.

Based on existing mapping and habitat types, Segment 2 would not impact any other federally-listed species, including the bald eagle.

#### **Segment 4**

Based on existing mapping and habitat types, none of the alignment options in Segment 4 would impact federally-listed species, including the bald eagle.

#### **Segment 7**

Based on existing mapping and habitat types, none of the alignment options in Segment 7 would impact federally-listed species, including the bald eagle.

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### **4.4.4.2 State Endangered and Threatened Species**

Impacts to state-listed wildlife habitat (including Essential Habitat for bald eagles) were assessed by overlaying the right-of-way footprint of the alignment options on GIS rare species location and habitat data received from IF&W.

#### **No-Action Alternative**

The No-Action Alternative would not impact state-listed species as no construction would occur.

#### **Segment 2**

Based on existing mapping and habitat types, Segment 2 would not impact state-listed species or designated Essential Habitat.

#### **Segment 4**

Segment 4 has the potential to impact land within the wildlife buffer of the state-listed dragonfly species, the extra-striped snaketail. Segment 4 would result in the loss of approximately five acres (4 percent) of land within the wildlife buffer for extra-striped snaketail for Alignment Option 1, approximately five acres (4 percent) for Alignment Option 2, and approximately 13 acres (10 percent) for Alignment Option 3. If either of the alignment options were carried forward, detailed habitat surveys would be undertaken during the final design process.

Based on existing mapping and habitat types, none of the alignment options in Segment 4 would impact any other state-listed species or designated Essential Habitat.

#### **Segment 7**

Based on existing mapping and habitat types, none of the alignment options in Segment 7 would impact state-listed species or designated Essential Habitat. However, the pygmy snaketail dragonfly may occur in the Aroostook River in the vicinity of the proposed bridge crossing. Determination on proximity will be forthcoming prior to the issuance of the FEIS.

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## **4.5 Atmospheric Environment**

This section discusses impacts to air quality and the noise environment for each of the FEIS Corridors. Unlike other resources, the air and noise analyses were done on a corridor basis as opposed to a per-segment basis. Because they are the only new highways being proposed currently, Segments 4 and 7 were analyzed separately.

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### **4.5.1 Air Quality**

The purpose of the air quality analysis is to assess whether any of the overall SDEIS corridors, and Segments 4 and 7 in particular, could result in adverse regional or local air quality impacts. The Study Area is currently designated as attainment for ozone and CO and maintenance for PM10. Ozone is a pollutant of regional concern and is evaluated based upon the change in the precursor emissions of VOCs and NOx. Carbon monoxide is of localized concern and is evaluated based upon CO concentrations at congested intersections. PM10 refers to particulate matter with an aerodynamic diameter of 10 micrometers or smaller.

The air quality analysis includes a microscale analysis that evaluates CO concentrations at one of the most congested intersections in the Study Area to demonstrate that the proposed corridors do not have the potential to result in adverse local air quality impacts. The air quality analysis did not include a regional analysis of emissions because the change in traffic data can be used as a surrogate to demonstrate that the proposed corridors do not have the potential to result in adverse regional air quality impacts. The proposed corridors will not result in a substantial change in traffic volumes or highway speeds as compared to existing conditions. Therefore, the regional emissions are not expected to result in a substantial change in regional emissions.

In terms of air quality, the differences between the Segment 7 alignment options involve only minor geographic shifts. The differences in the alignments do not affect traffic volume and speed assumptions and, therefore, do not substantially impact the air quality results. As a result, only the preferred Segment 7 alignment option (Option 2) was analyzed and presented in this analysis.

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#### 4.5.1.1 Methodology

Future project-related emission calculations are based upon changes in traffic and emission factor data. The traffic data include traffic volumes, VMT, highway operations, and physical highway improvements. The emission factor data included emission reduction programs, years of analysis, and highway speeds. The following section reports the findings of the microscale and mesoscale analyses for Segments 2, 4, and 7. The *SDEIS EVTR* provides additional information on the analysis methodology.

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#### 4.5.1.2 Local Impacts

The microscale analysis described in Section 3.5.1.2 (page 3-90) was used to calculate 2030 No-Action Alternative and Proposed Action concentrations for CO and PM10, and demonstrated that the future CO and PM10 concentrations were well below the NAAQS.

##### Corridor Analysis

The worst case 2030 No-Action Alternative and Proposed Action CO concentrations were calculated for the intersection of Route 1 (Main Street), Route 163 (Maysville Street), and the Parson Street Connector in Presque Isle for each of the four SDEIS corridors. The highest 2030 No-Action Alternative CO concentration for the 1-hour analysis was calculated to be 5.90 ppm and for the 8-hour analysis was calculated to be 4.13 ppm. The highest 2030 Proposed Action CO concentrations for the 1-hour and 8-hour analyses were 5.80 ppm and 4.06 ppm, respectively. With the Proposed Action, in 2030, the rerouting of traffic from downtown Presque Isle results in lower levels of CO concentrations for both the 1-hour and 8-hour analyses, as compared to the No-Action Alternative in 2030. These results of the microscale analysis (Table 4-30, page 4-83) demonstrate that, under all future conditions, the predicted CO concentrations are substantially below the NAQQS of 35 ppm (1 hour) and 9 ppm (8 hour).

The Proposed Action (Segments 2, 4, and 7) would result in similar changes in CO concentrations at this intersection. The microscale analysis demonstrates that, for Segment 7, the CO and PM10 concentrations are well below the NAAQS. Based on this worst-case analysis, the Presque Isle Bypass is not expected to result in adverse local air quality impacts.

**Table 4-30  
 Carbon Monoxide (CO) Microscale Results<sup>1</sup>**

Carbon Monoxide (CO)	1-hour (ppm) <sup>2</sup>	8-hour (ppm) <sup>3</sup>
2005 Existing Conditions	5.10	3.57
2030 No-Action Alternative	5.90	4.13
2030 Proposed Action	5.80	4.06

1 The concentrations are expressed in parts per million (ppm) and include a background concentration of 1.0 ppm for the 1-hour analysis and 0.7 ppm for the 8-hour analysis.

2 NAAQS = 35 ppm

3 NAAQS = 9 ppm

The 2030 Proposed Action PM10 concentrations for each of the SDEIS corridors, and the 2030 No-Action Alternative, are presented in Table 4-31 below. All of these concentrations are substantially below the NAAQS of 150 µg/m<sup>3</sup> (24 hour) and 50 µg/m<sup>3</sup> (annual). The EPA has not developed procedures for including PM10 in transportation conformity. For purposes of this document, concentrations of PM10 have been estimated from existing monitoring data for use in comparing future conditions.

The Proposed Action (Segments 2, 4, and 7) would result in similar effects to Composite Corridors C1m and C2m (which contain all three segments). The microscale analysis demonstrates that the study corridors would not result in violations of the CO and PM10 standards in the Study Area and that the Proposed Action complies with the CAAA.

**Table 4-31  
 Particulate Matter (PM10) Microscale Results<sup>1</sup>**

Period	NAAQS	2005	2030				
		Existing Conditions	No-Action Alternative	Corridor C1m	Corridor C2m	Corridor C3	Corridor Hm
24 – Hour	150	73	50	53	52	51	50
Annual	50	16	11	12	11	11	11

1 Micrograms per cubic meter

#### 4.5.1.3 Regional Impacts

The Study Area is in attainment for ozone. The mesoscale analysis demonstrates that none of the proposed SDEIS Corridors will result in a substantial increase that could adversely affect this designation. The mesoscale analysis estimates the future Study Area VOCs, NO<sub>x</sub>, and PM10 emissions due to the changes in average daily traffic volume, highway characteristics, and vehicle emission rates for each SDEIS corridor and for Segment 7.

### Corridor Analysis

With the No-Action Alternative, in 2030, VOC emissions were estimated to be 1,201.7 kg/day, NOx emissions were estimated to be 988.3 kg/day, and PM10 emissions were estimated to be 80.3 kg/day. In the future (2030) No-Action Alternative, VOC, NOx, and PM10 emissions are lower than the 2005 Existing Conditions emissions due to the implementation of emission control programs, such as the Federal Motor Vehicle Emission Control Program.

The mesoscale analysis demonstrates that each SDEIS corridor would result in slight increases of regional VOC, NOx, or PM10 emissions, as compared to the 2030 No-Action Alternative. The future build results for each of the SDEIS Corridors are summarized in Table 4-32 below.

**Table 4-32  
 Mesoscale Analysis Results<sup>1</sup>**

Pollutant	2005		2030			
	Existing Conditions	No-Action Alternative	Corridor C1m	Corridor C2m	Corridor C3	Corridor Hm
<b>VOC</b>	2,530.6	1,201.7	1,192.0	1,203.8	1,195.4	1,208.5
<i>Difference from No-Action Alternative</i>	---	---	-9.7	+2.1	-6.4	+6.7
<b>NOx</b>	5,000.9	988.3	997.2	992.2	1,000.2	995.4
<i>Difference from No-Action Alternative</i>	---	---	+8.9	+3.9	+12.0	+7.2
<b>PM10</b>	127.2	80.3	79.8	79.4	79.8	79.3
<i>Difference from No-Action Alternative</i>	---	---	-0.5	-0.9	-0.5	-1.0

<sup>1</sup> Kilograms per Day

#### Corridor C1m

Corridor C1m would decrease regional emissions of VOCs and PM10. Effects of the Proposed Action (Segments 2, 4, and 7) would be similar to Corridor C1m, which includes these segments.

With the Proposed Action, in 2030, VOC emissions were estimated to be 1,192.0 kg/day, NOx emissions were estimated to be 997.2 kg/day, and PM10 emissions were estimated to be 79.8 kg/day. This results in a decrease of 9.7 kg/day in VOC emissions, an increase of 8.9 kg/day in NOx emissions, and a decrease of 0.5 kg/day in PM10 from the 2030 No-Action Alternative.

#### Corridor C2m

Corridor C2m would decrease PM10 emissions, but would result in minor increases in VOCs and NOx.

With the Proposed Action, in 2030, VOC emissions were estimated to be 1,203.8 kg/day, NO<sub>x</sub> emissions were estimated to be 992.2 kg/day, and PM<sub>10</sub> emissions were estimated to be 79.4 kg/day. This results in an increase of 2.1 kg/day in VOC emissions, an increase of 3.9 kg/day in NO<sub>x</sub> emissions, and a decrease of 0.9 kg/day in PM<sub>10</sub> from the 2030 No-Action Alternative.

### **Corridor C3**

Corridor C3 would decrease emissions of VOCs and PM<sub>10</sub>, and would have the largest increase in NO<sub>x</sub>.

With the Proposed Action, in 2030, VOC emissions were estimated to be 1,195.4 kg/day, NO<sub>x</sub> emissions were estimated to be 1,000.2 kg/day, and PM<sub>10</sub> emissions were estimated to be 79.8 kg/day. This results in a decrease of 6.4 kg/day in VOC emissions, an increase of 12.0 kg/day in NO<sub>x</sub> emissions, and a decrease of 0.5 kg/day in PM<sub>10</sub> from the 2030 No-Action Alternative.

### **Corridor Hm**

Corridor Hm would increase regional emission of NO<sub>x</sub> and VOCs, with a minor decrease in PM<sub>10</sub>.

With the Proposed Action, in 2030, VOC emissions were estimated to be 1,208.5 kg/day, NO<sub>x</sub> emissions were estimated to be 995.4 kg/day, and PM<sub>10</sub> emissions were estimated to be 79.3 kg/day. This results in an increase of 6.7 kg/day in VOC emissions, an increase of 7.2 kg/day in NO<sub>x</sub> emissions, and a decrease of 1.0 kg/day in PM<sub>10</sub> from the 2030 No-Action Alternative.

## **Segment 7**

The entire ACTS Study Area is in attainment for ozone. The mesoscale analysis demonstrates that none of the Segment 7 alignment options will result in a substantial increase that could adversely affect this designation. The mesoscale analysis estimates the future VOC, NO<sub>x</sub>, and PM<sub>10</sub> emissions in the entire Study Area due to the changes in average daily traffic volume, highway characteristics, and vehicle emission rates. The following summarizes the mesoscale analysis for the Segment 7 alignment options and the results are presented in Table 4-33 (page 4-86).

With the No-Action Alternative, in 2030, regional VOC emissions were estimated to be 1,201.7 kg/day, NO<sub>x</sub> emissions were estimated to be 988.3 kg/day, and PM<sub>10</sub> emissions were estimated to be 80.3 kg/day. The future No-Action Alternative VOC, NO<sub>x</sub>, and PM<sub>10</sub> emissions are lower than the 2005 Existing Conditions emissions due to the implementation of emission control programs, such as the Federal Motor Vehicle Emission Control Program.

Under the 2030 Proposed Action condition for Segment 7 (assuming no other corridor segments are constructed), VOC emissions were estimated to be

1,192.5 kg/day, NOx emissions were estimated to be 992.6 kg/day, and PM10 emissions were estimated to be 79.9 kg/day. This results in a decrease of 9.2 kg/day in VOC emissions, an increase of 4.4 kg/day in NOx emissions, and a decrease of 0.4 kg/day in PM10 from the 2030 No-Action Alternative.

**Table 4-33  
 Mesoscale Analysis Results, Segment 7<sup>1</sup>**

Pollutant	2005 Existing Conditions	2030	
		No-Action Alternative	Presque Isle Bypass <sup>2</sup>
<b>VOC</b>	2,530.6	1,201.7	1,192.5
<i>Difference from No-Action 2030 Alternative</i>	---	---	-9.2
<b>NOx</b>	5,000.9	988.3	992.6
<i>Difference from No-Action 2030 Alternative</i>	---	---	+4.4
<b>PM10</b>	127.2	80.3	79.9
<i>Difference from No-Action 2030 Alternative</i>	---	---	-0.4

1 Kilograms Per Day

2 Alignment Option 2 was used as a typical representation for all of the Segment 7 alignment options

The air quality study demonstrates that Segment 7 (the Presque Isle Bypass) would comply with the CAAA. The mesoscale analysis demonstrates that the proposed bypass would result in slight increases of regional NOx emissions, as compared to the 2030 No-Action Alternative.

The air quality study demonstrates that the Proposed Action conforms to the CAAA and the State Implementation Plan because:

- No new violation of the NAAQS will be created;
- No increase in the frequency or severity of any existing violations will occur; and
- No delay in attainment of any NAAQS will result.

#### 4.5.1.4 Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. Most air toxics originate from human sources, including on-road mobile sources, non-road mobile sources (*e.g.*, airplanes), area sources (*e.g.*, dry cleaners) and stationary sources (*e.g.*, factories or refineries).

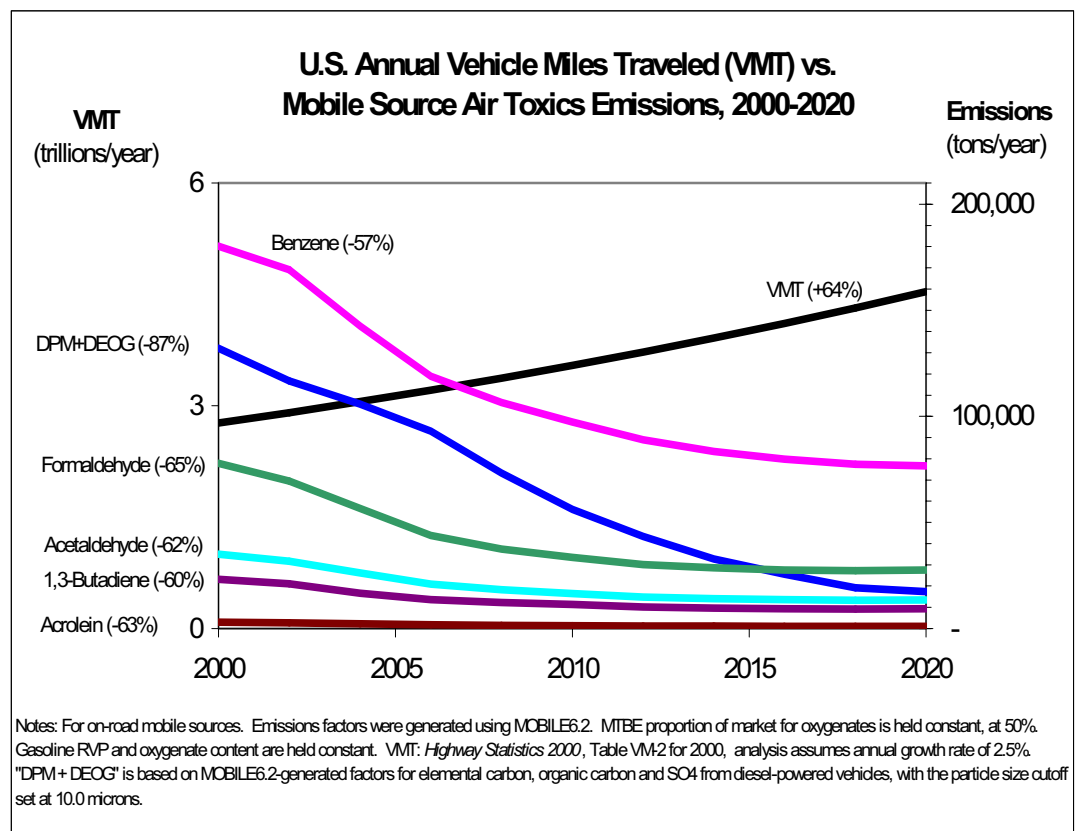
#### Regulatory Background

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The 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.

The EPA is the lead Federal Agency responsible for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources. 66 FR 17229 (March 29, 2001). This rule was issued under the authority in Section 202 of the Clean Air Act. In its rule, EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) 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 estimates that, even with a 64 percent increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel PM emissions by 87 percent, as shown in Figure 4-7 (below).

**Figure 4-7**  
**Mobile Source Air Toxics Emissions**



As a result, EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The agency is preparing another rule under authority of CAA Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary six MSATs.

Technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of transportation projects. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*.<sup>12</sup>

## Impacts

This SDEIS evaluates four transportation corridors including potential upgrades and new location highway segments. The highest AADT for the roadway segments range from 5,000 to 30,000. Using EPA's MOBILE6.2 emissions model, FHWA has estimated that an AADT of 150,000 would be roughly equivalent to the Clean Air Act definition of a major Hazardous Air Pollutant (HAP) source, i.e. 25 tons per year (tpy) for all HAPs or 10 tpy for any single HAP. The AADTs for the ACTS are substantially below these levels.

For each corridor in this SDEIS, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables, such as fleet mix are the same for each alternative. The VMT estimated for each of the corridors is slightly higher than that for the No-Action Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the corridor along with a corresponding decrease in MSAT emissions along the routes where equivalent VMT reductions would occur. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOBILE6.2 emissions model, emissions of all of the priority MSATs, except for diesel particulate matter, decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

Because the estimated VMT for each of the corridors is nearly the same, varying by less than 1.5 percent, there would be no appreciable difference in overall MSAT emissions among the corridors. Regardless of the corridor chosen, emissions will likely be lower

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<sup>12</sup> [www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm](http://www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm)

than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the Study Area are likely to be lower in the future in all cases.

The additional travel lanes included in each corridor would have the effect of moving some traffic closer to nearby homes, schools, and businesses, therefore, there may be localized areas where ambient concentrations of MSATs could be higher for certain corridors than the No-Action Alternative. However, as discussed above, the magnitude and the duration of these potential increases compared to the No-Action Alternative cannot be accurately quantified due to the inherent deficiencies of current air quality models. When a highway is widened and minor new roadway segments are proposed, receptor locations will be closer, the localized level of MSAT emissions for the Build Alternatives could be higher relative to the No-Action Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). MSATs will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today, regardless of which corridor is selected.

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#### **4.5.2 Noise Environment**

The MaineDOT and FHWA noise impact assessment procedures for Type I projects were used to evaluate existing and future highway noise levels and to determine potential noise impacts. A Type I project is a highway project that results in the construction of a new highway or the physical alteration of an existing highway that substantially changes either the horizontal or vertical alignment or increases the number of through travel lanes. All of the corridors under consideration conform to this definition.

The following summarizes the change in future sound levels for each of the Proposed Action corridor segments, for the 2030 analysis year. Sound levels were predicted at a distance of 50 feet from the centerline of the highway, and are compared to the FHWA and MaineDOT noise criteria. MaineDOT considers a receptor location to be impacted by noise when sound levels approach (within 1 dBA), are at, or exceed the Noise Abatement Criteria (NAC) for a particular land use, or when future sound levels exceed existing sound levels by 15 dBA or more. Most of the Study Area would be considered Category B (picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, churches, libraries, and hospitals) for which the NAC is 67 dBA.

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#### 4.5.2.1 Noise Modeling Methodology

The most common way to account for the time-varying nature of sound (duration) is through the equivalent sound level measurement, referred to as  $L_{eq}$ . The  $L_{eq}$  averages the background sound levels with short-term transient sound levels and provides a uniform method for comparing sound levels that vary over time. The time period used for highway noise analysis is typically one hour. The peak hour  $L_{eq}$  represents the noisiest hour of the day/night and usually occurs during peak periods of automobile and truck traffic. FHWA guidelines and criteria require use of the one-hour  $L_{eq}$  for assessing highway noise impacts on different land uses.

The following general relationships exist between hourly traffic noise levels and human perception:

- A 1 or 2 dBA increase/decrease is not perceptible to the average person;
- A 3 dBA increase/decrease is a doubling/halving of acoustic energy but is just barely perceptible to the human ear; and
- A 10 dBA increase/decrease is a tenfold increase/decrease in acoustic energy but is perceived as a doubling/halving in loudness to the average person.

Recognizing that different areas are sensitive to noise in different ways, the FHWA has established Noise Abatement Criteria<sup>13</sup> (NAC) according to land use to help protect the public health and welfare from excessive vehicle traffic noise. The NAC are described in Table 4-34 (page 4-91). MaineDOT follows the FHWA procedures<sup>14</sup> and considers a receptor location to be impacted by noise when sound levels approach (within 1 dBA), are at, or exceed the NAC, or when future sound levels exceed existing sound levels by 15 dBA or more. The NAC for residential areas is 67 dBA. MaineDOT considers a residential receptor location to be impacted by noise when sound levels equal to or exceed 66 dBA.

The noise analysis identified typical worst-case receptor locations along each corridor segment and predicted existing and future sound levels. The existing and future sound levels were calculated using the FHWA's TNM. The modeling input data included peak hour traffic volumes, vehicle mix, free-flow vehicle speeds, and highway and receptor geometry. The sound level predictions were based on evening peak hour traffic, which was assumed to be the loudest hour of the day. The noise analysis calculated the change in sound levels that are anticipated, calculated sound levels for each receptor location, and compared the results to the MaineDOT's noise impact criteria. The noise analysis also calculated the distance from the centerline of each corridor within which sound levels may exceed or equal the impact levels.

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<sup>13</sup> *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, Federal Highway Administration's Title 23 Code of Federal Regulations, Part 772.

<sup>14</sup> *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, Federal Highway Administration, June 1995.

**Table 4-34  
 Noise Abatement Criteria (NAC) One-Hour, A-Weighted Sound Levels in  
 Decibels (dBA)**

Activity Category	$L_{eq}(h)$ <sup>1</sup>	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purposes.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

<sup>1</sup>  $L_{eq}(h)$  is a energy-averaged, one-hour, A-weighted sound level in decibels (dBA).  
 Source: 23 CFR Part 772 - *Procedures for Abatement of Highway Traffic Noise and Construction Noise.*

#### 4.5.2.2 Impacts

Noise impacts are expected to occur when the future sound levels equal to or exceed the residential NAC of 66 dBA or when the future sound levels equal to or exceed the existing sound levels by 15 dBA.

For the 2030 Proposed Action, the highest increases occur where there are new highway segments. The following sections present the distances to impact (Table 4-35, below), number of residences in the impacted areas (Table 4-36 and Table 4-37, page 4-93), and a discussion of noise mitigation measures.

**Table 4-35  
 Distance (ft) from Centerline of Highway to Where Sound Levels Result in Impacts<sup>1</sup>**

Segment <sup>2</sup>	2005		2030			
	Existing Conditions	No-Action Alternative	Corridors			
			C1m	C2m	C3	Hm
Segment 2	50	50	75	75	50	50
Segment 4	NA <sup>3</sup>	NA	175	175	125	150
Route 1 – Downtown Presque Isle	75	75	50	50	50	50
Segment 7	NA	NA	150	175	150	175

<sup>1</sup> An impact is defined as sound levels that approach, are at, or exceed the NAC of 67 dBA (i.e., 66 dBA or greater) or where the Build Corridor noise levels would be more than 15 decibels greater than the future No-Action condition.  
<sup>2</sup> The noise analysis is based on the Preferred Alignment Option for each segment (Segment 4, Option 2 and Segment 7, Option 2).  
<sup>3</sup> NA – new alignment highways – no existing highway centerline.

## **No-Action Alternative**

With the No-Action Alternative, residences within 50 feet of Route 161 would experience noise levels in excess of the NAC (66 dBA), and residents within 75 feet of Route 1 in downtown Presque Isle would experience noise levels in excess of 66 dBA.

## **Segment 2**

Segment 2 would result in minor sound level increases along the existing roadway. The distance to the 66 dBA noise contour, the residential noise impact criteria, was calculated to be 75 feet from the highway centerline. No receptor locations are expected to experience a 15 decibel increase. For this SDEIS, the noise analysis assumes that noise levels at all residences within this distance (75 feet from centerline) would exceed the MaineDOT and FHWA noise criteria. There are currently 12 receptors along existing Route 161 that exceed the MaineDOT and FHWA noise criteria. These receptor locations will continue to exceed the MaineDOT and FHWA noise criteria under Segment 2. No new noise impacts would occur as a result of the Segment 2 improvements.

## **Segment 4**

Segment 4 would result in sound level increases along the new alignments up to a distance of where the NAC of 66 dBA is exceeded or where a 15 dBA increase would occur. The distance to the 66 dBA noise contour, the residential noise impact criteria, was calculated to be 75 feet from the new highway alignment centerline. Noise monitoring was conducted in a rural area of Caribou along Route 205 to establish the existing sound levels for Segment 4. These sound levels were found to be 39 dBA ( $L_{eq}$ ). The noise impact contour line representing a 15 decibel increase (54 dBA) was calculated to be 175 feet from the new highway alignment centerline. Since the 54 dBA contour line is located further from the new highway alignment centerline than the 66 dBA contour line, it was used to determine the number of impacted residences. For this SDEIS, the noise analysis assumes that noise levels at all residences within this distance (175 feet from centerline) would exceed the MaineDOT and FHWA noise criteria.

As shown in Table 4-36 (page 4-93), the number of affected residential receptors ranges from 19 (Alignment Options 1 and 2) to 15 (Alignment Option 3). The range of the impacted noise receptors was relatively small, differing only by four residences among the three alignment options.

**Table 4-36  
 Noise Receptor Impacts, Segment 4 (2030)**

	Alignment Option 1	Alignment Option 2	Alignment Option 3
Number of Residences Exceeding Noise Criteria <sup>1</sup>	19	19	15

<sup>1</sup> Based on a 15 dBA increase relative to existing sound levels.

**Segment 7**

Segment 7 would result in sound level increases along the new alignment up to a distance of where the NAC of 66 dBA is exceeded or a 15 dBA increase would occur. The distance to the 66 dBA noise contour, the residential noise impact criteria, was calculated to be 100 feet from the new highway alignment centerline. Noise monitoring was conducted in Caribou along Route 164 to establish the existing sound levels for the Route 1 corridor, which were found to be 57 dBA (L<sub>eq</sub>) 50 feet from Route 1. Noise monitoring was conducted along Route 1 north of Caribou to establish existing sound levels for rural areas. Rural existing sound levels were found to be 45 dBA. The noise impact contour line representing a 15 decibel increase (60 dBA) was calculated to be 175 feet from the new highway alignment centerline. Since the 60 dBA contour line is located further from the new highway alignment centerline, it was used to determine the number of impacted residences. For this SDEIS, the analysis assumes that noise levels at all residences within this distance (175 feet from centerline) would exceed the MaineDOT and FHWA noise criteria.

As shown in Table 4-37 (below), the number of affected residential receptors ranges from 0 (Alignment Options 1 and 3) to 32 (Alignment Option 4). Alignment Options 2, 5 and 6 are similar, and would affect between 3 and 5 residential receptors. Option 4 will have the highest impact on residences and is estimated to affect 32 residences.

**Table 4-37  
 Noise Receptor Impacts, Segment 7**

	Alignment Option 1	Alignment Option 2	Alignment Option 3	Alignment Option 4	Alignment Option 5	Alignment Option 6
Number of Residences Exceeding Noise Criteria <sup>1</sup>	0	5	0	32	4	3

<sup>1</sup> Based on a 15 dBA increase relative to existing sound levels.

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### 4.5.2.3 Mitigation

The primary noise mitigation measures for highway noise are noise barriers. MaineDOT and FHWA have established guidelines to determine if a noise barrier is feasible and reasonable. The feasibility of noise abatement measures is based upon engineering and acoustic attributes. The engineering considerations include existing geometry, cross streets, driveways, safety issues, and other environmental impacts. While the goal of the noise abatement measures is to provide significant acoustic benefits of 10 dBA (or higher) of noise reduction at the first row of receptors, the measures must be able to provide a minimum of 7 dBA of noise reduction to at least one first row receptor.

The reasonableness of noise abatement measures is based upon its economic and social aspects. The costs of the noise abatement measures must be reasonable for the number of receptors receiving a benefit and the amount of noise reduction being achieved. The local community being affected must also support the implementation of a noise abatement measure.

MaineDOT has developed a Cost Effectiveness Index (CEI) to evaluate the cost effectiveness of a proposed noise barrier. The CEI is an index used to determine barriers' reasonableness based on cost. It is calculated based upon the cost per unit protected. All receivers beyond the right-of-way attaining at least a 5-dBA reduction are considered protected. According to the MaineDOT *Highway Traffic Noise Policy*<sup>15</sup>, the overall cost of abatement shall be equal to or less than \$20,000 per impacted receiver.

The noise analysis evaluated the impacted residential areas for each of the alignment options to determine if noise barriers were feasible and reasonable. The feasibility of a noise barrier was based upon whether or not a noise barrier could achieve a 7-dBA or greater noise reduction for the receptor location. If a noise barrier was found to be feasible, then the cost per benefited receptor was calculated to determine if the noise barrier meets the MaineDOT criteria of \$20,000 per benefited receptor. The costs of potential noise barriers were calculated assuming a 14-foot height, varying lengths, and 16 dollars per square foot. The estimate cost per linear foot is \$224.

The height of the noise barriers can range depending upon specific roadway/receptor location geometry. A 14-foot height was assumed for the noise barriers because truck exhaust stacks are typically 12 feet in height and some additional height is needed to achieve the MaineDOT minimal noise barrier reduction criteria of 7 dBA. The lengths of the noise barriers were estimated based upon FHWA's guidance<sup>16</sup>, which states that noise barriers should be extended beyond the last receptor location to be protected by four times the perpendicular distance from the receptor location to the barrier. For example, an individual receptor location that was approximately 100 feet from the barrier was assumed to have a

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<sup>15</sup> *Highway Traffic Noise Policy*, State of Maine Department of Transportation, September 23, 1998.

<sup>16</sup> *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, Page 25, dated June 1995

minimum barrier length of 900 feet, 100 feet for the property and four times the perpendicular distance to the barrier on each direction, or 800 feet. For areas with multiple receptor locations, the distance between the receptor locations was measured and 800 feet was added to it. The noise barrier lengths are presented in Tables 4-38 and 4-39 (page 4-96).

Although there are no new noise impacts in Segment 2; nevertheless, noise barriers were evaluated for Segment 2. FHWA requires that mitigation be evaluated where existing receptors are above the NAC. This mitigation analysis found that noise barriers were not feasible and could not achieve a significant reduction in sound levels. The construction of noise barriers is not feasible because of the acoustical and engineering restrictions. The driveways and cross streets would result in gaps in potential noise barriers. These driveways and cross streets would prevent the noise barriers from being able to achieve a 7 dBA or greater reduction in sound levels. In most cases, it could make the noise impacts worse by creating an on and off effect as vehicles pass by the openings. Finally, safety considerations would also prohibit the construction of noise barriers at these locations since the noise barriers would limit sight distance for motorists utilizing drives and side roads, creating potentially unsafe traffic conditions.

Segment 4 has three locations where noise impacts were calculated to occur (Table 4-38, page 4-96). The estimated lengths for noise barriers to reduce sound levels ranged from 900 to 2,200 feet. The corresponding number of impacted receptors and costs per receptor ranged from 1 to 12 and \$200,000 to \$40,000 respectively. This exceeds the MaineDOT criteria, so noise barriers are not proposed for Segment 4. Although the construction of noise barriers is feasible, they are not reasonable because they exceed the MaineDOT cost criteria.

Segment 7 has fifteen locations where noise impacts were calculated to occur (Table 4-39, page 4-96). The estimated lengths for noise barriers to reduce sound levels for these receptor locations ranged from 900 to 2,000 feet. The corresponding number of impacted receptors and costs per receptor ranged from 1 to 7 and \$200,000 to \$60,000 respectively. The majority of impacted locations include one residence. The minimum length of an effective barrier was assumed to be 900 feet, which results in a cost per residence of \$200,000. All of these receptor locations substantially exceed the MaineDOT criteria of \$20,000 per benefited receptor, so noise barriers are not proposed as mitigation for Segment 7.

The review of noise impacted areas indicated that the receptor locations are few in number and spread out such that no locations meet the MaineDOT criteria of \$20,000 per benefited receptor. Although the construction of noise barriers is feasible, they are not reasonable because they exceed the MaineDOT cost criteria. Therefore, no noise mitigation measures are recommended for the Proposed Action. Table 4-38 (page 4-96) and Table 4-39 (page 4-96) present the results of the noise barrier evaluation.

**Table 4-38**  
**Noise Receptor Mitigation Analysis, Segment 4**

Alignment Option	Location	Number of Impacted Receptors	Noise Barrier Recommended	Estimated Noise Barrier Length (ft)
Option 1	Route 161 and Thomas	7	N <sup>1</sup>	1,800
	Route 1 and Midland	12	N	2,200
Option 2	Route 161 and Thomas	7	N <sup>1</sup>	1,800
	Route 1 and Midland	12	N	2,200
Option 3	Route 161 and Thomas	7	N	1,800
	Route 1 and Midland	7	N	1,600
	Route 1 at Vickers Drive	1	N	900

<sup>1</sup> Noise Barriers were found to not be Cost Effective.

**Table 4-39**  
**Noise Receptor Mitigation Analysis, Segment 7**

Alignment Option	Location	Number of Impacted Receptors	Noise Barrier Recommended	Estimated Noise Barrier Length (ft)
Option 1	No Adverse Noise Impacts			
Option 2	Route 210 and Brewer Road	3	N <sup>1</sup>	1,200
	Route 210 and Reach Road	1	N	900
	Route 1 and Cambridge Road	1	N	900
Option 3	No Adverse Noise Impacts			
Option 4	Route 210 and Brewer Road	1	N	900
	Route 163 and 167	1	N	900
	Centerline Road (Route 10) and Conant Road	5	N	2,000
	Centerline Road, South of Conant Road	1	N	900
	Centerline Road and Easton Road	1	N	900
	Centerline Road, North of Montreal Maine Atlantic Rail Line	4	N	1,700
	Centerline Road and Henderson Road	7	N	1,000
	Centerline Road and Route 1	4	N	2,000

**Table 4-39 (continued)**  
**Noise Receptor Mitigation Analysis, Segment 7**

Alignment Option	Location	Number of Impacted Receptors	Noise Barrier Recommended	Estimated Noise Barrier Length (ft)
Option 4				
	Route 1 and Tomkins Road	1	N	900
	Route 1 and Clark Brook	2	N	1,800
	Presque Isle and Westfield Boundary Line	2	N	1,100
	Same as Location 3. Route 1 and Cambridge Road	1	N	1,200
	Center Line Road, North of Easton Road	1	N	900
	Center Line Road, South of Easton Road	1	N	900
	Center Line Road, South of Montreal Maine Atlantic Rail Line	1	N	900
Option 5				
	Same as Location 1. Route 210 and Brewer Road	1	N	900
	Higgins Road	1	N	900
	Center Line Road and Easton Road	1	N	900
	Conant Road	1	N	900
Option 6				
	Same as Location 1. Route 210 and Brewer Road	1	N	900
	Same as Location 3. Route 1 and Cambridge Road	1	N	900
	Reach Road and Montreal Maine Atlantic Rail Line	1	N	900

<sup>1</sup> Noise Barriers were found to not be Cost Effective.

## 4.6 Construction Impacts and Mitigation

Construction impacts associated with a transportation project are those impacts which are temporary or short term, and which occur only during construction. This section provides an overview of construction impacts, compares the extent of impacts that potentially may occur with each element of the Proposed Action, and outlines mitigation measures that would be employed to reduce short-term impacts.

### 4.6.1 Water Quality and Wetlands

Activities associated with construction may likely require grading and blasting of bedrock material in some areas. This construction may result in nearly complete reworking and/or removal of both surficial and subsoils along the proposed segments. Exposure of previously vegetated soils could potentially lead to erosion and runoff into adjacent streams or other water bodies if not properly controlled. For Segment 7, construction of new bridge piers could result in the discharge of sediments to the Aroostook River, resulting in increased turbidity downstream of the work zone.

Erosion and sedimentation control plans will be required from the contractor prior to commencement of work that will include ground disturbance. The Stormwater Pollution Prevention Plan (SWPPP) required by NPDES must identify potential source areas and describe what measures will be employed as erosion control, sedimentation control, temporary stormwater management measures, dust control, and winter stabilization measures. In sensitive areas, multiple BMPs must be used. These BMPs must include source erosion control in addition to sedimentation control. Erosion control plans must address in-water work at any stream crossing location.

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#### **4.6.2 Wildlife**

Human presence during construction and the associated construction noise may temporarily displace some species of wildlife from the edge of the right-of-way. The noise associated with construction may also mask territorial vocalizations of bird species near the highway, interfering, at least temporarily, with breeding. Amphibians, which breed more commonly at dusk or at night, are less likely to be indirectly affected. Construction in forested areas may result in the mortality of amphibians, reptiles, and small mammals within the work zone, and the loss of nesting birds (if construction is initiated during nesting season).

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#### **4.6.3 Air Quality**

Air quality in the Study Area would not be affected by construction due to the transitory nature of highway construction and the confined construction area. Emissions produced by the operation of construction machinery (NO<sub>x</sub>, sulfur oxides, CO, and particulate matter) are short term.

Fugitive dust emissions are proportional to the amount of earth moved and the length of travel on unpaved roads. Mitigating fugitive dust emissions involves curbing or eliminating its generation. Mitigation measures that may be used in highway construction include wetting and stabilization to suppress dust generation, cleaning paved highways, and scheduling construction to minimize the amount and duration of exposed earth.

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#### **4.6.4 Noise Impacts**

Noise impacts from construction activities are closely related to the phase of construction and the type and placement of construction equipment. Table 4-40 (page 4-99) shows a variety of construction equipment that may be deployed at various stages of highway construction. Typical noise levels from these equipment are also shown.

Construction activities may result in a substantial, but temporary, noise impact to receptors at various locations adjacent to construction. Noise levels may vary depending on the type and number of pieces of equipment active at any one time. It is expected that noise levels exceeding 67 decibels could occur up to 500 feet away from construction activities. In general, construction noise would be restricted to daylight hours.

**Table 4-40**  
**Typical Construction Equipment Noise Emissions**

<b>Equipment Type</b>	<b>Noise Levels (dBA at 50 ft)</b>
<b>Earthmoving</b>	
Front Loader	84
Backhoe	84
Bulldozer	88
Tractor	84
Scraper	90
Grader	83
Truck	90
Paver	84
Vibrator	76
<b>Materials Handling</b>	
Concrete Mixer	83
Crane	82
Derrick	88
<b>Stationary</b>	
Pump	71
Generator	81
Compressor	89
<b>Impact Devices</b>	
Pile Driver	91
Pavement Breaker	89
Pneumatic Tool	80

Source: *Highway Construction Noise: Environmental Assessment and Abatement, Volume IV: User's Manual*. Vanderbilt University, Nashville, TN. Report No. VTR-81-3, 1981.

#### **4.6.5 Traffic Management and Control**

Construction of any of the corridor segments may create the potential for increased construction truck traffic on secondary roads. Retail establishments may also experience some loss of business due to the difficulty of access. Traffic delays and other types of congestion are also largely unavoidable but would be short term and localized in nature.

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#### 4.6.6 Utilities

Utilities within the Proposed Action segments include overhead electric transmission/distribution lines and substations, underground water lines, natural gas pipelines, and aerial and buried telephone and TV cable lines. Railroads under ownership of the Montreal, Maine and Atlantic Railway also occur within Segment 7. Construction of Segments 2, 4, or 7 may require relocating above-ground or subsurface utility lines within or adjacent to existing highways, and crossing under or over existing utilities along new highway alignment segments. During subsequent phases of the study, MaineDOT will coordinate with utility companies to investigate measures to avoid and minimize impacts to utilities and to utility customers.

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### 4.7 Secondary and Cumulative Impacts

This section examines the potential secondary and cumulative impacts of the ACTS. Secondary impacts are defined as reasonably foreseeable consequences to the environment that are caused by a proposed action, but that would occur either in the future (later in time) or in the vicinity of (not at the same location as) the direct impacts. The baseline for evaluating potential secondary impacts is the existing and reasonably foreseeable expected environment, which is described in the No-Action Alternative (Section 2.4.1, page 2-9). Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions.”<sup>17</sup> The following sections discuss the secondary impacts of the Proposed Action and the cumulative impacts of the Proposed Action, which take into account the likely secondary effects and the consequences of constructing a complete north-south corridor.

Section 4.7.1 below presents a general discussion of secondary impacts and a specific analysis of the potential secondary effects associated with the Proposed Action.

Section 4.7.2 presents a detailed analysis of cumulative effects of the Proposed Action, including the methodology and assumptions used for the analysis. As described in CEQ guidance<sup>18</sup> a three-step process was followed for cumulative impact assessment:

- Scoping
  - Identify significant cumulative effects issues
  - Establish the geographic scope for the analysis
  - Establish the time frame for the analysis

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<sup>17</sup> 40 CFR Section 1508.7

<sup>18</sup> Council on Environmental Quality. January 1997. *Considering Cumulative Effects Under the National Environmental Policy Act*.

- Identify other actions affecting resources, ecosystems, and human communities
- Describing the Affected Environment
- Determining the Environmental Consequences

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#### 4.7.1 Secondary Impacts

Secondary impacts are likely to occur as a result of the circulation of construction spending within the Study Area, improved access to employment opportunities, improved mobility of goods and people, and changes in property values and land uses. Construction spending may result in broad, short-term economic benefits throughout the region. Highway improvements may improve access to employment opportunities, changes in property values and land use along existing highways, and improved access to I-95 and Canadian Route 2. New location corridors may result in secondary impacts to land use, as these may need to have intersections with local roads, which could result in commercial or residential development in lands currently used for forestry or agriculture. New location highway segments would have limited access, except at critical intersections.

Widening existing highways may enhance the value of commercial property along the corridor, while potentially decreasing residential property values. Commercial development (particularly service-related) may increase at intersections, to the extent allowed by local zoning.

The reduction in traffic volumes along existing highways could enhance residential property values, but may decrease commercial property values. New commercial development related to service businesses would not be anticipated. Improved access to major highways (I-95 and Canadian Route 2) may result in shorter travel times within and outside of the region.

The *SDEIS ECTR* presents a detailed analysis of the potential secondary economic effects of the Proposed Action and the four SDEIS corridors resulting from changes in travel times and mobility, as well as short-term economic effects due to construction spending. As this analysis shows, long-term effects of even the complete north-south corridors are expected to result in negligible increases in employment or population. Because of the decreases in population, employment, and economic condition of the Study Area, secondary development which results in new businesses, increased employment, or increased incomes are viewed as beneficial.

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#### **4.7.1.1 Segment 2**

As discussed in Section 4.2 (page 4-2), improving Route 161 between Caribou and Daigle would provide traffic benefits by a minor reduction in travel times between Caribou and the St. John Valley region, and would improve safety along this highway by adding climbing lanes, shoulders, and addressing geometric deficiencies. The economic analysis conducted for this SDEIS (Section 4.3.3.4, page 4-30) indicates that improving Segment 2 is not likely to result in new residential or commercial development along Route 161 or in the adjacent communities of New Sweden, Stockholm, or Daigle, as there is currently no demand for development. The land along Route 161 is not zoned, but any new development is regulated by the municipalities, LURC and MaineDOT through the issuance of curb cut permits for access. No secondary impacts are anticipated to result from improving Route 161 within Segment 2.

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#### **4.7.1.2 Segment 4**

Segment 4 provides a new connection between Route 1 and Route 161 north of Caribou. As described in Section 4.2 (page 4-2), this would reduce travel time between Route 1 and Route 161, allowing traffic between Route 1 and the St. John Valley to bypass downtown Caribou. This segment would divert approximately 41 to 48 percent of traffic from downtown Caribou. The new connector would be a limited-access highway and would not create new road frontage for development.

Removing traffic from downtown Caribou could affect revenues of some businesses that depend on pass-by traffic. Accurately quantifying the economic impacts of the diversion of traffic from the downtown or village center due to a bypass is difficult without having detailed property-specific data on revenues, customers, and activity levels. This type of data is typically not collected (or shared) by most businesses or local government agencies. In addition, whether or not a through traveler would get off the bypass and come into the downtown/village core, for example to buy fuel or food, is dependent on many other variables and cannot be accurately quantified without additional data.

Segment 4 has the potential to induce new commercial development, likely to consist of travel-related services, such as gas stations, convenience stores, or fast food outlets, at the intersections of Segment 4 with Route 1 in Caribou and with Route 161 and Ogren Road at the Caribou-Woodland municipal boundary. The land at the west (Route 161) intersection is zoned Residential-3 and is largely undeveloped agricultural land, with some residences. Adjacent land in Woodland is proposed to be zoned as a Village District, where permitted uses would include residential, hotel, retail, and restaurant. The types of development that could result from secondary development at this location, such as a gas station and/or convenience store, are compatible with local zoning. There is unlikely to be further development because it is remote from a populated area and businesses would depend on pass-by traffic.

The most likely area for new commercial development is the intersection of Segment 4 and Route 1 (Van Buren Road) in Caribou. Land is zoned Residential-3, which allows uses such as hotel, restaurant, grocery store, and shopping center. Undeveloped parcels are present at this location. Adjacent land uses include the Cary Medical Center, businesses, and residences. Secondary development at this location could include a gas station/convenience store and a fast-food outlet. However, there is a relatively large amount of commercial development located directly south of this location which is likely to absorb any demand generated by the highway improvements, therefore, no change in use is estimated to occur in the reasonably foreseeable future.

The extent of commercial development at this location is difficult to quantify and cannot be reasonably foreseen under current economic conditions. New development might represent a localized shift as existing businesses that are highly dependent on through traffic move to the new location to take advantage of the change in traffic patterns, or new businesses might be started. In addition to local zoning, commercial development is also dependent on the availability of suitable land free of environmental and other development constraints and that is owned by parties willing to sell or develop their property.

If the maximum foreseeable secondary development were to occur (two gas stations and one fast-food outlet) the secondary impacts associated with Segment 4 would include:

- Conversion of (at most) three acres of upland used for farming to developed land (parking lots and buildings);
- Loss of (at most) three acres of prime farmland soils; and
- Minor and localized increased runoff during precipitation events.

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#### **4.7.1.3 Segment 7**

Segment 7 would provide a bypass of downtown Presque Isle, extending from Route 1 just north of Cambridge Road in Westfield, to Route 1 near Brewer Road (Route 210) north of Presque Isle. All of the alignment options would have interchanges at Conant Road and Route 163/167. There would be no intersections at other cross-streets (including Henderson Road, Williams Road, Reach Road, and Higgins Road). Alignment Option 4 includes a portion of Centerline Road and would maintain access to properties with frontage along Centerline Road. All of the other alignment options would have limited access and would not provide access to adjacent properties.

As discussed in Section 4.2.2.2 (page 4-4), Segment 7 would divert through traffic from downtown Presque Isle, reducing volumes on Route 1 by 7,100 vehicles per day

(52 percent of the No-Action traffic volumes). Presque Isle, with the largest commercial activity base in Aroostook County and a variety of auto-related retail outlets along Route 1, has businesses that would likely be impacted by diverting a portion of the downtown through traffic. These include service stations, convenience stores, retail outlets, and fast food restaurants.

Accurately quantifying the economic impacts of the diversion of traffic from the downtown or village center due to a bypass is difficult without having detailed property-specific data on revenues, customers, and activity levels. This type of data is typically not collected (or shared) by most businesses or local government agencies. In addition, whether or not a through traveler would get off the bypass and come into the downtown/village core, for example to buy fuel or food, is dependent on many other variables and cannot be accurately quantified without additional data.

Segment 7 could result in secondary (induced) development or relocated businesses from downtown Route 1. As Section 4.3.3 (page 4-20) notes, this would be dependent on local zoning and land use regulations. Commercial uses typically are developed in or near population centers or along heavily traveled highways. These uses would likely consist of travel-related services, such as gas stations, convenience stores, or fast food outlets. Segment 7 is predicted, in 2030, to result in 26 new jobs within the Study Area, and would not cause a substantial increase in area businesses. The most likely areas for new commercial development are similar for each of the alignment options and include:

- The intersection of the Presque Isle Bypass (Segment 7) and Fort Fairfield Road (State Routes 163 and 167). This area is zoned for business uses and could support additional commercial development; however, there is also a resource protection zone and other constraints (*e.g.*, railroad tracks) that would limit the extent of development. This intersection is close to the existing commercial area around the Aroostook Mall and existing travel-related service businesses might experience an increase in business due to improved access for through travelers.
- The southern intersection of the Presque Isle Bypass and Route 1 in Washburn. This area is zoned residential/agricultural. Any business use would require rezoning, as business uses are not currently allowable.
- The northern intersection of the Presque Isle Bypass and Route 1 at Brewer Road (Route 210). This area is zoned Agricultural/Farming. Allowable land uses include agriculture, residential, or home business (such as bed-and-breakfast inns). The types of commercial land use that may be attracted to this location (gas stations and fast food outlets) are not allowed under the current zoning.
- Route 10 near the proposed Conant Road intersection. The area is zoned Agricultural/Farming. Allowable land uses include agriculture, residential, or home business (such as bed-and-breakfast inns). The types of commercial land use

that would be attracted to this location are not allowed under the current zoning. However, the new highway interchange could encourage residential development to take advantage of the improved highway access. Several residential subdivisions, such as the Bishop and Thibodeau developments between State Street and Centerline Road, have been recently permitted or are under construction. This area is targeted by the City of Presque Isle for residential growth. However, Segment 7 is anticipated to result in a population increase of 75 persons (by 2030), and would have negligible residential growth effects.

The extent of commercial development at any of these locations is difficult to quantify and cannot be reasonably foreseen under current economic conditions. Any new development would represent an incremental change in overall development patterns and economic activity in the Study Area. In some cases, new development might represent a localized shift as existing businesses that are highly dependent on through traffic move to the new location to take advantage of the change in traffic patterns. While in other cases, new businesses might be started. In addition to local zoning, commercial development is also dependent on the availability of suitable land free of environmental and other development constraints and that is owned by parties willing to sell or develop their property.

If the maximum foreseeable secondary development were to occur (three gas stations and two fast-food outlets) the secondary impacts associated with Segment 7 would include:

- Conversion of (at most) 10 acres of upland used for farming to developed land (parking lots and buildings);
- Loss of (at most) 10 acres of prime farmland soils; and
- Minor and localized increased runoff during precipitation events.

These potential developments would be required to comply with the Presque Isle zoning standards and NRPA regulations, and to mitigate for impacts to natural resources as required by those standards. It is anticipated that no wetlands would be altered to accommodate secondary developments.

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#### 4.7.2 Cumulative Impacts

Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions”<sup>19</sup>. Cumulative impacts need to be analyzed in terms of the specific resource or ecosystem being impacted. The list of environmental effects

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<sup>19</sup> 40 Code of Federal Regulations Section 1508.7 Cumulative Impact.

focuses on those impacts and affected resources that are meaningful. For this SDEIS, the parameters of the cumulative impact study are:

- Impacts are assessed on a regional level for the Study Area.
- The time frame extends from the recent past (approximately 1950) to the foreseeable future (2030).
- Actions included in the analysis include recent developments:
  - Closing Loring Air Force Base (1994);
  - Redeveloping the Loring Commerce Centre (1990 to 2030); and
  - Improving Route 11 (2002).
- Actions also include planned or likely future developments or actions:
  - Expanding agricultural processing facilities; and
  - Expanding tourist-related activities.
- Resources of concern include:
  - Transportation;
  - Land Use;
  - Agriculture;
  - Cultural Resources;
  - Economic Impacts;
  - Forests;
  - Aquatic Resources;
  - Wetlands;
  - Wildlife (birds, mammals, reptiles and amphibians, and fisheries);
  - Endangered and Threatened Species; and
  - Air Quality and Noise.

The purpose of the analysis of cumulative impacts is to determine whether the Proposed Action, considered with other foreseeable impacts, will result in significant degradation of a resource, loss of biological diversity, or significant social or economic effects that would not result from the Proposed Action considered separately. As the analysis summarized in Table 4-41 (pages 4-110 through 4-111) shows, none of the elements of the Proposed Action being considered in the SDEIS are likely to result in cumulative impacts that would differ substantially from the effects of past actions or other likely future actions and would not result in substantial damage to or loss of an environmental resource. A more detailed analysis will be undertaken for the Proposed Action and presented in the FEIS.

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#### 4.7.2.1 Methodology

EPA Guidance<sup>20</sup> and CEQ guidance<sup>21</sup> establish methods for analyzing cumulative effects of a proposed action. The preparation of this analysis also relied on the FHWA's Interim Guidance memorandum.<sup>22</sup> These documents establish a process which includes identifying a study area, time frame, past actions and their effects, and reasonably foreseeable future actions and their effects.

#### Study Area

The Study Area identified for the analysis of cumulative impacts is defined as the ACTS Area (Figure 1-1). The Study Area for the ACTS comprises the northeast corner of the state and includes the central and northeastern portions of Aroostook County, bounded on the south by I-95, on the west by Route 11, and on the north and east by the Canadian border. I-95 terminates in Houlton in the southeast corner of the Study Area. Therefore, the majority of the Study Area has no freeway access. The Study Area is approximately 100 miles long and 25 to 40 miles wide, encompassing approximately 2,760 square miles.

The Study Area is sparsely populated, with a population of 70,576 people according to the 2000 U.S. Census. The majority of the population (39,115) lives in the Presque Isle-Caribou area in the central portion of the Study Area. The geography, topography, and settlement patterns within the Study Area define four distinct subregions. The southwest corner of the Study Area consists of dispersed residences and farms along Routes 2, 11, 159, and 212. Residents of this rural area rely on the small town centers at Patten, Island Falls, and Sherman Mills for community services and basic retail. Houlton, the County Seat, is south of the intersection of I-95 and Route 1. The principal highway connection to Canada within the Study Area is in Houlton.

The western portion of the Study Area consists primarily of unincorporated towns and forest lands, with dispersed residences and small farms along Route 11. Ashland, the major town in this part of the Study Area, is located at the junction of Routes 11, 163, and 227. Ashland provides the primary source of community services and commodities for the central portion of the Route 11 corridor.

The eastern portion of the Study Area, extending north to Caribou and Limestone, is the most densely developed and includes the primary economic and business centers of the region, within a matrix of dispersed farms and residences. The smaller towns of Monticello, Bridgewater, Mars Hill, Westfield, Easton, Mapleton, Washburn, Fort Fairfield, and Limestone provide community services, libraries, churches, gas stations,

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<sup>20</sup> United States Environmental Protection Agency, Office of Federal Activities. May 1999. *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*. EPA 315-R-99-002.

<sup>21</sup> Council on Environmental Quality. January 1997. *Considering Cumulative Effects Under the National Environmental Policy Act*.

<sup>22</sup> United States Department of Transportation, Federal Highway Administration. January 31, 2003. *Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process*.

small grocery stores, and cafes. Presque Isle and Caribou are small cities that serve as the shopping, business, and employment center for this region. These cities have dense population centers and provide a full range of community resources and services, including educational, medical, civic, recreational, and commercial businesses. Presque Isle, which contains the regional commercial airport, hospital, several hotels, and a regional mall, is the major business and tourist center for the outlying smaller communities and residents. Loring Commerce Centre, at the former Loring Air Force Base in Limestone, is viewed as the region's focus for industrial development.

The St. John Valley, the northernmost region of the Study Area, has a strong Acadian culture, and maintains close cultural and family connections across the Canadian border. This area is separated from the central and southern portions of the Study Area by undeveloped forest land, and is connected to the south by Routes 11, 161, and 1. The population of the St. John Valley area occurs primarily in dispersed residences and farms throughout the area north of Route 161 and Long Lake. More concentrated residences occur in St. Agatha and the summer community along Long Lake, and in the town centers of Fort Kent, Frenchville, Madawaska, Grand Isle, and Van Buren. These town centers provide community services, libraries, cafes, medical services, and shops for the dispersed population.

### **Time Frame**

The time frame for the analysis of past actions was identified by the chronology of events in the historic context of the Study Area that have had a major effect on population growth, land use, and environmental resources. Although there has been continuous development and land use change in the Study Area since the first European settlement, events that have shaped the existing environment and contributed to major changes in land use and the environment began in the early 1950s. The time frame for this analysis extends forward to 2030 which is the end of the planning period for the ACTS.

### **Information Sources**

Information used to evaluate past and future actions, trends, and impacts was obtained from a range of sources. The primary documents consulted for this analysis include:

- United States Geological Survey maps, 1951-1953 (obtained from the University of New Hampshire);
- The Cultural Resources documents prepared as part of this SDEIS and summarized in the *SDEIS EVTR*;
- The economic and environmental impact analyses prepared as part of this SDEIS (*SDEIS ECTR* and *SDEIS EVTR*);

- *City of Caribou Comprehensive Plan*, January 2004;
- *City of Presque Isle Comprehensive Plan*, draft, 2004;
- *Woodland Comprehensive Plan*, March 1997;
- *Comprehensive Land Use Plan for Areas within the Jurisdiction of the LURC*, MDOC, March 1997;
- *A Comprehensive Plan for New Sweden, Maine*, December 2003; and
- Information provided by Town Managers and the NMDC.

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#### **4.7.2.2 Past and Future Actions and Trends**

Past and future actions within the Study Area in this time frame that have affected, or have the potential to affect the transportation environment, land use and economics, the physical and biological environment, and the atmospheric environment are listed in Table 4-41 (pages 4-110 through 4-111). The effects of these past actions are reflected in the existing environmental conditions within the Study Area. Generally, these actions have resulted in increased vehicular traffic, the loss of undeveloped land, changes in farmland, and increased air quality emissions. The effects of future actions are reflected in the No-Action Alternative.

**Table 4-41  
 Past and Foreseeable Future Actions and Trends**

<b>Action</b>	<b>Approximate Date</b>	<b>Location</b>	<b>Environmental Effects</b>
Construct Loring Air Force Base	1950s	Limestone	Loss of undeveloped land, and wetlands Increased stormwater runoff, resulting in surface and groundwater contaminations Increased population both on base and regionally Increased employment resulting in positive economic benefits
Construct I-95 to Houlton	1950s	Houlton	Loss of undeveloped land, farmland, and wetlands Increased stormwater runoff in some watersheds Increased commercial development at I-95/Route 1 interchange in Houlton Decreased traffic, adversely affecting some local businesses on Route 2 south of Houlton
Agricultural Industry – Introduced frozen food processing – increased land in potato production, constructed processing facilities	1950s	Study Area, Caribou, Presque Isle	Positive economic and employment effects Converted fallow land to potato fields. Loss of some wildlife habitat Increased agricultural runoff, adversely affecting water quality
Agricultural Industry Trend: Since 1974, number of farms in Aroostook County has decreased from 1,561 to 889; acres in cultivation has decreased from 448,090 to 324,887; acres planted in potatoes has decreased from 78,000 (1994) to 63,500 (2004).	Ongoing	Study Area	Loss of employment, loss of population, and economic downturn for the region Loss of historic structures due to lack of maintenance
Forestry Industry	Ongoing	Study Area	Construction of forest roads resulting in forest fragmentation, and increased discharge of silt/sediment to waterways Clearcutting resulting in decrease in forest land, forest fragmentation, and increase in early-successional community types
Improve Route 11	2000	I-95 to Ashland	Reduced travel times and VHT Minor impacts to wetlands and historic properties
Commercial Development	Ongoing	Route 1 between Caribou and Presque Isle, south of Presque Isle Route 1 north of I-95 in Houlton Presque Isle Industrial Park Aroostook Valley Mall	Increased traffic congestion and air pollution emissions from vehicles Loss of undeveloped land and agricultural land Increased stormwater runoff
Close Loring AFP	1994	Limestone	Loss of employment, loss of population, and economic downturn for region Environmental benefits: improved air quality (decreased emissions of air pollutants from aircraft), improved surface/groundwater quality through remediation of hazardous material discharge/disposal sites
Maine Winter Sports Center	1998	Fort Kent	Increased employment, tourism revenues

**Table 4-41 (continued)**  
**Past and Foreseeable Future Actions and Trends**

Action	Approximate Date	Location	Environmental Effects
Commercial redevelopment, Loring Commercial Center	Ongoing	Limestone	Improved employment and increased tax revenues
Create Aroostook National Wildlife Refuge at former Loring AFB	2000	Limestone	Improved protection of wildlife habitat and improved protection of rare plant and animal species
Intermodal Transportation Center	2010	Presque Isle	Improved employment and increased tax revenues
Residential Subdivision Development	2005	Presque Isle	Loss of undeveloped (former agricultural) land
Commercial/Retail Development and redevelopment	Ongoing	Presque Isle Caribou Pine Tree District	Improved employment and increased tax revenues. In some locations previously developed areas will be beneficially redeveloped. In other areas, development may result in loss of undeveloped land, and an increase in stormwater runoff.
Highway Projects in MaineDOT's 6-year plan	2010	Various	Minor temporary impacts to wetlands, and water quality during construction. Long-term benefits of maintaining existing infrastructure.
Aroostook County Transportation Study – Complete north-south corridor: Would increase employment by 1,100 jobs, would increase population by 1,300 (2%)	Unknown - based upon funding available	I-95 to Madawaska	<p>Increase in employment, gross regional product (by \$45 million), and population.</p> <p>Loss of undeveloped land, agricultural land, historic resources, wetlands, and residences</p> <p>Increased runoff and contribution of highway runoff to waterways.</p> <p>Noise levels would decrease in some areas, and increase in others.</p> <p>Reduced highway congestion, reduced VHT, reduced VMT, elimination of functional conflicts in village centers, and improved regional mobility</p>

**4.7.2.3 Cumulative Environmental Effects**

The analysis of cumulative effects takes into account, for each resource, the Proposed Action's direct and secondary impacts, and cumulative impacts for that resource. This analysis is intended to determine if the Proposed Action, considered in context, will result in unacceptable significant adverse impacts.

## Transportation

The Proposed Action will have a beneficial effect on the Study Area's highway transportation environment. The Proposed Action will improve mobility to and around Presque Isle and Caribou; provide better access to growth nodes in Easton, Presque Isle, and Caribou; enhance traffic flow by removing trucks from congested downtown areas; improve safety; and save over 1,700 vehicle-hours of travel per day.

## Land Use

The Study Area contains approximately 2,760 square miles of land, of which 82 percent (2,268 square miles, 1,451,520 acres) is undeveloped forest and 15 percent (425 square miles, 272,000 acres) is in agricultural use. Only 2.3 percent of the Study Area (64 square miles, 40,960 acres) is developed for commercial, community, government, and residential use.

As discussed in the *SDEIS ECTR*, land use in the Study Area is not expected to change substantially in the No-Action Alternative, as the population would continue to decline and age, and there would be no increased demand for land. Existing and planned industrial parks, such as Loring Commerce Centre, Pine Tree Area in Caribou, and the Presque Isle Industrial Park, would fill out undeveloped space over the 25-year planning horizon.

The Proposed Action, in combination with potential secondary development, would have a negligible effect on land use, resulting in minor losses of agricultural, commercial, residential, and undeveloped land. Considered with the construction of a complete north-south highway from I-95 to Madawaska, the cumulative changes in land use as a direct effect of these actions would be minor with respect to the total amounts of Study Area lands in each category. The potential maximum loss of undeveloped land (approximately 2,065 acres) would be 0.14 percent of the total undeveloped land within the Study Area, and the potential maximum loss of agricultural land (approximately 929 acres) would be 0.34 percent of the total within the Study Area (Table 4-42, page 4-113).

**Table 4-42**  
**Cumulative Impacts to Land (Acres)**

	Agricultural	Commercial	Community	Government	Residential	Undeveloped	Total Land
Proposed Action <sup>1</sup>	571	95	14	11	145	271	1,118
Complete ACTS Corridor <sup>2</sup>	929	128	14	13	373	2,065	2,903
Total Within Study Area							
Square miles	425	41	< 1	< 1	23	2,268	2,760
acres	272,000	26,240	< 640	< 640	14,720	1,451,520	1,766,400

1 Based on Segment 2; Segment 4 Option 2; and Segment 7 Option 2

2 Based on the maximum impact in each category

The economic analysis predicts that if the complete corridor were constructed, the Study Area population would increase by 1,300 people in 2030, to approximately 80,000. This increased population would be distributed over the Study Area from south of Presque Isle to Van Buren, and across the St. John Valley to Fort Kent. If this is approximately half of the Study Area, the increase in population would be approximately 0.47 persons per square mile. As the *SDEIS ECTR* states, the increase in population would bring the Study Area population back to the level that occurred in the early 1990s, before Loring Air Force Base closed, and would not substantially increase the demand for housing or services. No substantial new demands on land use are expected to result from potential future cumulative effects of transportation improvements.

### Agricultural Land

Estimates of the total amount of agricultural land within the Study Area are based on land use mapping, which indicates that there are currently 425 square miles (272,000 acres) of agricultural land, presumably corresponding to the areas of active farms. Estimates of the amount of prime farmland soils and farmland soils of statewide importance for the Study Area are not available. Active farmland (which includes these regulated farmland soils as well as less valuable soils) varies year-by-year and depends on economic conditions.

Comparison of topographic maps (1951-1953) with 2003 aerial photographs for the Study Area shows that there has been virtually no change in the amount of land in agricultural use, or in the boundaries of forested land patches within or adjacent to farm land. While a given field may not be in production in all years, the overall amount and distribution of farmland has not changed substantially as a result of past actions. According to the USDA Agriculture Census (1994-1997), actively farmed land in Aroostook County decreased from 448,090 to 324,887 acres during this period, a decrease of 27 percent.

The Proposed Action would result in a loss of approximately 316 acres of active farmland, approximately 0.12 percent of the total agricultural land in the Study Area

(Table 4-43 below). Considered with the construction of a complete north-south highway from I-95 to Madawaska, the cumulative changes in land use as a direct effect of these actions would be negligible with respect to the total amounts of Study Area farmland. The potential maximum loss of farmland (756 acres) would be 0.28 percent of the total farmland within the Study Area. This would not affect agriculture within the Study Area, particularly in light of the trend to decreasing amounts of agricultural land actually in production.

**Table 4-43  
 Cumulative Impacts to Agricultural Land (Acres)**

	Active Farmland	Prime Farmland Soils	Farmland of Statewide Importance
Proposed Action <sup>1</sup>	316	328	280
Complete ACTS Corridor <sup>2</sup>	756	576	649

1 Based on Segment 2; Segment 4 Option 2; and Segment 7 Option 2

2 Based on the maximum impact in each category

### Cultural Resources

No quantitative data are available to assess the cumulative effects of past actions on cultural resources (historic properties, archaeological resources, and traditional cultural properties) within the Study Area, as no formal survey of cultural resources was available. Research conducted for this SDEIS to establish the historical context for cultural resources indicates that a substantial number of historic buildings in downtown Caribou, downtown Presque Isle, and in smaller towns and farmsteads dispersed throughout the Study Area have been lost over the past century and continue to be demolished today as a result of lack of maintenance, redevelopment, or changes in the tourist and agricultural industries. It is likely that archaeological and traditional cultural resources have also been altered or lost as a result of agriculture, road construction, or development, because of a lack of knowledge and absence of regulatory protection. A summary of impacts to cultural resources is provided in Table 4-44 below.

**Table 4-44  
 Cumulative Impacts to Cultural Resources (Number)<sup>1</sup>**

	Section 106 Adverse Effects	Traditional Cultural Property
Proposed Action <sup>1</sup>	4	1 site (12 ac)
Corridor	16	8 sites (99 ac)

1 Based on Segment 2; Segment 4 Option 2; and Segment 7 Option 2

2 Based on the greatest impact to this resource among all corridors

The study conducted for this SDEIS focused on the areas proximate to the study corridors, and did not analyze the Study Area as a whole. For this limited area, the study found eight properties listed on the National Register of Historic Places, and identified 99 additional properties and two additional districts that were determined to be eligible for the National Register, for a total of 109 historic properties. The Proposed Action would have an adverse effect on four properties, 4 percent of the total extant resources, and construction of the entire north-south corridor would have an adverse effect on properties, 15 percent of the total extant resources, (Table 4-18, page 4-45).

The Proposed Action could have a minor impact on TCP. The areas mapped by MHPC as TCPs are 0.6-square mile grid squares which contain a TCP – the actual boundaries of the TCP are not available to the public. The Proposed Action would result in the loss of approximately 12 acres from one mapped area (Table 4-18, page 4-45), while the cumulative effects of the entire corridor would require construction within eight mapped areas. Consultation with MHPC and the tribes would be necessary to determine actual impacts. Neither the Proposed Action, nor the total corridor, would result in a substantial loss of areas important to tribal culture.

### **Economic and Social**

The Proposed Action would have a beneficial effect on the economic and social resources of the Study Area, by increasing construction spending, increasing employment, and improving mobility and access to jobs, as documented in Section 4.3 (page 4-10) of this SDEIS and in the SDEIS ECTR. The cumulative effect of the Proposed Action, in combination with the entire north-south transportation corridor, would have a greater beneficial effect more broadly distributed throughout the Study Area.

### **Forests**

Estimates of the total amount of forested land within the Study Area are based on land use mapping, which indicates that there are currently 2,015 square miles (1,289,600 acres) of forest. Comparison of topographic maps (1951-1953) with 2003 aerial photographs for the Study Area shows that there has been virtually no change in the amount of forest land, or in the boundaries of forested land patches within or adjacent to farm land. This land has been actively harvested for timber for two hundred years, with the peak of forest cutting coinciding with the construction of the railroads in the mid- to late-1800s. As a result of this continuous cycle of forest harvest, the interior and western portion of the Study Area are crossed by a large number of logging roads, and forests on both public and private lands are in various stages of succession following cutting. These activities have resulted in a mosaic of habitat types that support a wide range of bird and mammal species.

The Proposed Action would result in the loss of approximately 457 acres of forested land, largely in small strips intertwined with agricultural fields (Table 4-45, page 4-116). This negligible loss (0.04 percent), in combination with potential

secondary development in non-forested areas, will not affect the ability of forests in the Study Area to provide habitat for wildlife, nor would it affect the forest industry. The cumulative effects of the Proposed Action, with the entire potential north-south corridor, could result in the loss of a substantially larger area of forest, approximately 2,284 acres, but which would be only 0.18 percent of the total. This minor area would not affect the ability of forests in the Study Area to provide habitat for wildlife, nor would it affect the forest industry.

**Table 4-45**  
**Cumulative Impacts to Forest (acres)<sup>1</sup>**

	Forest Impacted
Proposed Action <sup>1</sup>	457
Corridor <sup>2</sup>	2,284
Total In Study Area	2,015 square miles, 1.3 million acres

1 Based on Segment 2, Segment 4 Option 2, and Segment 7 Option 2

2 Based on the greatest impact to this resource among all corridors

### **Aquatic Resources**

Aquatic resources within the Study Area include groundwater (which is the source for several public and all private water supplies) and surface water (lakes, ponds, rivers, and streams), some of which provide public water supplies. There are approximately 90 square miles (57,600 acres) of lakes and ponds within the Study Area, including several large lakes (Long Lake, Cross Lake, Square Lake, Eagle Lake, Squa Pan Lake, and Madawaska Lake). Major waterways include the St. John River, the Allagash River, the Little Madawaska River, Prestile Stream, and the Meduxnekeag River. These aquatic resources have been altered in various ways since the time that Europeans settled this region. Rivers and streams have been dammed for power or irrigation; streams have been filled and placed into culverts for road crossings; bridges have been constructed across rivers; wastewater from many cities and towns is discharged to the rivers; and agricultural runoff has discharged silt and nutrients, affecting river and stream channels and water quality in waterbodies and waterways.

The Proposed Action, designed and constructed with appropriate mitigation measures to protect water quality, would have minor effects to aquatic resources. It would avoid direct or indirect adverse impacts to lakes and ponds, except for a small area along Route 161. The Proposed Action would require crossing 12 streams (Table 4-46, page 4-117), and could potentially affect aquatic habitat and water quality within these streams, in the absence of mitigation measures. The Proposed Action would require constructing new highway segments within two “at-risk” watersheds, for the Aroostook River and Prestile Stream. These waterbodies have been determined to be at risk of significant degradation and to be highly sensitive to

the discharge of pollutants. Studies of the Aroostook River<sup>23</sup> have identified the primary pollutant of concern to be phosphorus from agricultural operations. Phosphorus is not a major constituent of highway runoff. With the mitigation measures identified in this SDEIS and future design stages, the Proposed Action is not anticipated to contribute to further degradation of water quality.

The Proposed Action, in combination with the foreseeable future actions including construction of the entire north-south corridor, would require crossing a total of 59 streams and rivers (Table 4-46, below), with construction in six at-risk watersheds. With the appropriate mitigation measures, these actions would not be anticipated to cumulatively result in significant adverse impacts to water resources.

**Table 4-46**  
**Cumulative Impacts to Streams (Number of New Crossings)**

	<b>Perennial Streams</b>	<b>Intermittent Streams</b>
Proposed Action <sup>1</sup>	7	5
Corridor <sup>2</sup>	32	27

1 Based on Segment 2, Segment 4 Option 2, and Segment 7 Option 2

2 Based on the greatest impact to this resource among all corridors

## Wetlands

Wetlands within the Study Area have undoubtedly been lost since European settlement in the region, particularly along the major rivers. Agricultural regions have lost wetlands that were historically drained to create cropland; flooded by dams constructed to power small industry and mills; or filled to construct railroads and roads. Because of the low density of development within the Study Area, it is likely that the loss of wetlands historically has been less than in other portions of Maine. Comparison of the 1951-1953 topographic maps with 2003 aerial photographs and wetland mapping indicates that there has been almost no loss of wetlands over the last 50 years.

The Proposed Action would result in the loss of approximately 112 acres of wetlands (0.04 percent of the Study Area total), as shown in Table 4-47 (page 4-118). This analysis presumes that the very limited potential secondary development that could potentially result from the Proposed Action would be constructed in upland areas and would not create additional wetland loss. This wetland loss (over approximately 15.5 miles of new highway and 26.5 miles of upgraded and widened highway) is minor, and averages approximately 2.7 acres per mile, which is comparable to other New England highway projects. The Proposed Action, in combination with the total north-south corridor (if

<sup>23</sup> Maine Department of Environmental Protection, Bureau of Land and Water Quality. September 2004. *Aroostook River Modeling Report*.

that corridor were constructed within the planning period) would result in a total loss of approximately 278 acres of wetland, 0.1 percent of the total wetland acreage.

**Table 4-47  
 Cumulative Wetland Impacts (Acres)**

	Wetland Type			Total Impact
	Marsh	Forested	Shrub	
Proposed Action <sup>1</sup>	20.0	68.0	24.0	112.0
Corridor <sup>2</sup>	24.9	197.1	56.1	278.1
Total Within Study Area (square miles, acres)	21 square miles 13,440 ac	321 square miles 205,440 ac	92 square miles 58,880 ac	434 square miles 277,760 ac

1 Based on Segment 2, Segment 4 Option 2, and Segment 7 Option 2

2 Based on the greatest impact to this resource among all corridors

### Endangered and Threatened Species

The Proposed Action would not have an adverse effect on any federal or state-listed endangered or threatened species and therefore would not, in combination with past and reasonably foreseeable future actions, have a cumulative adverse effect on these species.

### Air Quality

The Proposed Action would be in compliance with the NAAQS. It would not result in any exceedances of air quality standards and would not affect the attainment status of the Study Area. The Proposed Action, in combination with the entire north-south corridor, would result in slight increases of regional VOCs, NO<sub>x</sub>, and PM<sub>10</sub> emissions as compared to past and future actions. However, these minor increases would not affect the attainment status of the Study Area and would not result in violations of the CO and PM<sub>10</sub> standards.

### Noise

No quantitative data are available to assess the cumulative effects of past actions on the noise environment within the Study Area. Noise generators have existed within the Study Area for over a century and include airports, railroads, trucks and other vehicles on roads, agricultural equipment, forest clearing equipment, mills, sawmills, and other processing plants. Noise experienced by residents in any particular area depends on the type of surrounding development and proximity to a road, railroad, or airport. Noise levels have changed over the study time frame as the type and level of operations at Loring Air Force Base, the Presque Isle Airport, and the Caribou Airport have changed; as railroad operations have ceased in many locations; and as highway truck traffic has increased. The noise levels predicted at any location along the

Proposed Action segment for the future (2030) year reflect this history of noise change, as well as the noise levels anticipated to result from foreseeable future actions.

The Proposed Action would increase noise levels in areas near Segment 4 and Segment 7, but would decrease noise levels on Route 1 south of Presque Isle and in downtown Presque Isle by removing truck traffic. The Proposed Action for Segment 7 would adversely impact five residences for Alignment Option 2, but impacts could be as high as 32 residences if Alignment Option 4 was selected as the Preferred Alignment Option.

The Proposed Action, in combination with the potential construction of the full north-south corridor, would similarly increase noise levels where there are residential areas adjacent to new highway corridor segments, and would decrease noise levels along some existing highway segments where traffic levels would decrease. The precise locations and numbers of residences adversely or beneficially affected varies with each of the four corridor alternatives.

#### 4.7.2.4 Summary of Cumulative Impacts

A summary of cumulative impacts for the Proposed Action is presented in Table 4-48 (below).

**Table 4-48  
 Summary of Cumulative Impacts**

Resource	Effects of Past Actions	Potential Effects of Future Actions	Effects of Current Study
Land Use	Loss of undeveloped land; beneficial re-use of developed properties; relocations of residences and businesses for highway improvements.	Loss of undeveloped land; beneficial re-use of developed properties.	Minor losses of developed and undeveloped land; some relocation of residences and commercial businesses. Corridors Hm and Km, in new location highway segments, could result in changes in land use.
Agriculture	Loss of agricultural land.	Loss of agricultural land.	Loss of land in active agricultural use, with losses of designated agricultural soils.
Social	Unknown.	Unknown.	Some corridors likely to improve neighborhood cohesion through diversion of truck traffic; some corridor aversion.
Economic	Positive economic effects due to increases in employment, tax revenues; minor adverse effects due to loss of land from tax rolls. The loss of Loring AFB resulted in negative economic impacts.	Positive economic effects due to increases in employment, tax revenues and mobility.	All corridors would provide regional economic benefits. Minor economic effects due to reductions in tax revenues. Some corridors likely to affect retail businesses.

**Table 4-48 (continued)  
 Summary of Cumulative Impacts**

Resource	Effects of Past Actions	Potential Effects of Future Actions	Effects of Current Study
Groundwater	Increased demand on groundwater resources.	Increased demand on groundwater resources.	No effect on groundwater resources. Roadway construction will incorporate appropriate mitigation measures to protect groundwater quality.
Wetlands	Losses of wetland resources, generally not mitigated by the construction of compensatory wetlands.	Minor losses of wetland resources, likely to be mitigated with resulting "no net loss" of wetland functions.	Losses of wetland resources. As prudent and feasible, wetland losses will be mitigated to strive for no anticipated loss of wetland functions within the Study Area watersheds.
Wildlife	Losses of wildlife habitat.	Losses of wildlife habitat.	Losses of wildlife habitat.
Rare species	Unknown.	Unlikely to affect rare species. Corridors Hm and C2m could affect critical habitat of the Canada lynx.	Unlikely to affect rare species.
Air quality	Unlikely to affect air quality.	Unlikely to affect air quality.	Unlikely to affect air quality.

## 4.8 Summary of Potential Study Commitments

This section summarizes the Study Commitments for the Proposed Action, particularly as related to mitigation measures that shall be investigated during subsequent phases of the Study. Detailed commitments shall be provided in the FEIS. Following completion of NEPA compliance, and when funding is available, preliminary and final design of the Proposed Action will be undertaken. Design alternatives to avoid and minimize impacts will be developed, and specific mitigation measures developed during final design for unavoidable impacts.

### 4.8.1 Land Use

Preliminary and final design of the Proposed Action will look at avoidance and minimization of losses of cultivated and developed land. When adjacent properties are impacted or additional right-of-way must be acquired to accommodate highway construction, impacts to property would be minimized to the greatest extent practicable. Landowners would be compensated at fair market value for any property and/or structures, and property owners would be assisted with relocation costs for homes and businesses that are displaced in accordance with the Federal Uniform Relocation Act.

## **4.8.2 Farmlands**

During the later design stages, impacts to farmland would be avoided wherever feasible, and unavoidable impacts would be mitigated. Specific mitigation measures will be identified in later stages of the study. Potential mitigation for indirect impacts of highways on active farms may include measures that mitigate for loss of access or reduce highway-related water pollution. Construction of new location highway corridors and upgrades may be designed to provide access to farm fields over or under the highway as part of the mitigation. Improvements to highway stormwater runoff quality may reduce indirect impacts to agricultural production. More specific studies will be completed at a later phase of the study to assess impacts to farms and farm operations and to identify specific mitigation measures that could be implemented.

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## **4.8.3 Cultural Resources (Historical and Archaeological)**

Prior to the FEIS and ROD, further investigation into the loci and significance of known archaeological sites within the APE will be conducted in order to complete the Section 106 process. Among the three Segments included in the Proposed Action, only Segment 7 (Presque Isle Bypass) has the potential to impact any known archaeological sites. Further investigation will also be conducted in areas of archaeological sensitivity where work requiring soil disturbance or compaction will occur. This investigation will be conducted prior to the FEIS and ROD to identify archaeological sites, to determine their extent and significance, and to evaluate effects consistent with the requirements of Section 106 for any corridor segments selected to be advanced.

For above-ground historical resources, MaineDOT will take steps to include replacement of removed features, vegetative screening, and intensive documentation of buildings and properties.

For all impacted historic and archaeological sites, the Section 106 process will be completed and measures to avoid impacts and mitigate potential harm will be identified.

Additional archaeological work is required in order to confirm the presence of all potentially affected archaeological sites as well as to make determinations of their eligibility. The FHWA will execute a Memorandum of Agreement (MOA), in accordance with 36 CFR 800.4(b)(2), to allow for phased identification and evaluation of these sites. Eligibility determinations and assessment of effect will be made for Segments 2, 4, and 7 and results included in the FEIS.

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#### **4.8.4 Public Parks, Recreation Areas, and Wildlife Refuges**

None of the segments included in the Proposed Action based on the Preferred Alignment Options are expected to impact any publicly-owned recreational properties. MaineDOT will work with local snowmobile clubs to relocate trail crossings on private lands, ensuring adequate sight distances and trail continuity.

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#### **4.8.5 Surface and Groundwater Quality**

Potential mitigation measures may include minimizing impervious surfaces within recharge areas and avoiding surface water intakes and wellheads. Short-term mitigation measures may include plans to control erosion and sedimentation during construction. Long-term mitigation measures will address ways to improve the management and quality of highway runoff.

Erosion and sedimentation control plans are required for work that will include ground disturbance. Plans must identify potential source areas and describe what measures will be employed as erosion control, sedimentation control, temporary stormwater management measures, dust control, and winter stabilization measures. In sensitive areas, multiple BMPs must be used and must include source erosion control in addition to sedimentation control. Erosion control plans must address in-water work at any stream crossing location.

Construction of new location highway in Segment 4 and Segment 7 may include measures to collect and store stormwater to minimize changes to the peak runoff rate. Stormwater collection systems will be designed to reduce the potential for erosion, and provide treatment by including BMPs, such as vegetated swales and sedimentation basins. New location highway construction may also be designed to reduce impacts by maintaining existing hydrologic connections with adequately sized culverts or bridges.

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#### **4.8.6 Aquatic Habitats**

Potential mitigation measures include investigating avoidance and minimization of lake, pond, and river crossings. Analysis of the selected corridor or corridors in future stages of this study will include analysis of the highway alignments within the corridors to avoid surface water resources.

Mitigation of impact to streams would include avoidance, where possible, however, since these linear features cross existing highways and new location corridors, many streams and rivers cannot be avoided. Potential mitigation of river and stream impacts would focus on minimizing the impacts of new or widened crossings. These measures may include:

- Crossing streams or rivers at narrow points;
- Using bridges, rather than culverts, to maintain channel substrate, flow, and bank characteristics, where possible; and
- Using retaining walls rather than fill slopes to minimize impact areas.

Additional mitigation measures may also include bank and channel restoration of crossing areas to provide naturally vegetated banks and increase channel habitat. These measures will also provide stabilization to reduce erosion and sedimentation. Crossing structures would be designed to minimize impact to wetlands and floodplains in accordance with MaineDOT's 2004 *Fish Passage Policy and Design Guide*.

The design and construction of new or upgraded highways in the vicinity of stream crossings may include more stringent measures to reduce indirect water quality impacts from highway runoff. Highway design may include measures to reduce alteration to stream hydrology and BMPs to treat stormwater runoff water quality and control flow velocities. Construction may include measures described in the MaineDOT BMP Manual for sensitive waterbodies, which includes the use of source control measures to reduce erosion, in addition to sedimentation control to keep sediment out of waterbodies. Greater levels of protection, and consequently more stringent mitigation measures to reduce direct and indirect impacts on aquatic habitats, water quality, and water temperatures, may be undertaken for corridors that affect sensitive or salmon rivers.

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#### 4.8.7 Wetlands

The 1990 MOA between the EPA and the USACOE prescribes a sequential approach to wetland mitigation. This MOA requires that efforts be made to avoid and minimize wetland impacts before undertaking compensatory mitigation efforts such as restoration, creation, or enhancement.

MaineDOT will compensate for the wetlands and wetland functions impacted by construction by creating wetland mitigation areas. Wetlands would be replaced at a 2:1 mitigation ratio.

Segment 2 would require a minimum of 12 acres of compensatory wetlands, consisting of four acres of emergent wetland, four acres of forested wetland, and four acres of scrub-shrub wetland.

The Preferred Alignment Option for Segment 4 would require a minimum of 110 acres of compensatory wetlands, consisting of 56 acres of forested wetland, 24 acres of scrub-shrub wetland, and 22 acres of emergent wetland. No suitably sized areas for wetland mitigation were identified within Segment 4. Therefore, mitigation for Segment 4 impacts would be provided in preferred mitigation areas identified within Segment 7.

The Preferred Alignment Option for Segment 7 would require a minimum of 102 acres of compensatory wetlands, consisting of 22 acres of emergent wetland, 56 acres of forested wetland, and 24 acres of scrub-shrub wetland. The majority of affected wetlands near the Segment 7 (Presque Isle Bypass) alignments are forested wetlands along stream systems that provide groundwater recharge/discharge, floodflow alteration, fisheries habitat, and wildlife habitat functions. Wetland mitigation would be designed to replace these functions and values within the same watershed.

Four sites have been identified as preliminary wetland mitigation areas. Three of the sites identified are in Presque Isle. The fourth site is associated with the Aroostook NWR in Limestone outside of the immediate project area. The proposed mitigation sites were chosen due to their direct hydrologic connections to existing streams and wetlands and proximity to the wetland resources that would be altered by the Proposed Action. The proposed mitigation sites would provide a large mitigation area designed to replace the functions and values that would be primarily affected by construction of the Preferred Alignment Options for Segments 4 and 7. All mitigation areas would be permanently protected from future impact by conservation restriction or by transfer of ownership to an appropriate land conservation agency.

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#### **4.8.8 Floodplains**

During later design stages, MaineDOT will attempt to avoid floodplains, wherever feasible, and to mitigate for unavoidable impacts. Specific mitigation measures will be identified in the FEIS.

Mitigation measures will be investigated for the alignment alternatives once the preferred corridor is selected. Hydraulic studies will also be completed, and bridge and culvert opening sizes and elevations will be designed to minimize flooding impacts. Filling in floodplains will be reduced to the extent practicable by incorporating special design features, such as steep side slopes, retaining walls, or bridges. Compensatory flood storage may be proposed where floodplain impacts cannot be avoided.

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#### **4.8.9 Wildlife and Fisheries**

Mitigation measures for impacts to wildlife and fisheries may include a variety of structural measures intended to minimize wildlife mortality and mitigate for fragmentation effects of a new highway facility, as well as measures to protect water quality and habitat quality. Alternatives to avoid and minimize impacts to sensitive and regulated habitats will also be investigated during phases of this study.

Constructing wildlife crossings can mitigate impacts to wildlife and fisheries from highways. Wildlife crossing structures can be incorporated into the design of new highways as well as retrofit along upgraded road segments. Seasonal timing of

construction to avoid critical breeding or migratory periods for wildlife can also minimize indirect effects.

Impacts to fisheries resources can be mitigated by providing unobstructed passageways between suitable aquatic habitats and enhancing existing habitat. Oversized stream culverts or fish passage structures can be designed along upgrades and new location segments to improve passage for fish. Culverts or fish passage structures would be designed in accordance with MaineDOT's 2004 *Fish Passage Policy and Design Guide*. Enhancing stream habitat is another potential mitigation for impacts to fisheries, and can be used along upgrades and new location segments. As with wildlife resources, indirect impacts to fisheries can also be minimized by seasonal timing of construction to avoid critical spawning periods. Construction impacts to aquatic resources can be minimized by the appropriate use of BMPs.

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#### **4.8.10 Air Quality and Noise**

Adverse effects to air quality would only occur during construction of the Proposed Action. Air quality may be affected during construction by fugitive dust emissions, which are proportional to the amount of earth moved and the length of travel on unpaved roads. Any impacts from fugitive dust particles would be of short duration and localized. Mitigating fugitive dust emissions involves curbing or eliminating its generation. Mitigation measures that may be used in highway construction include wetting and stabilization to suppress dust generation, cleaning paved highways, and scheduling construction to minimize the amount and duration of exposed earth.

The analysis conducted for this SDEIS demonstrates (Section 4.5.2.3, page 4-94) that noise mitigation measures are not warranted.

Construction activities may result in a substantial, but temporary, noise impact to receptors at various locations adjacent to the proposed construction areas. Noise levels may vary depending on the type and number of pieces of equipment active at any one time. It is expected that noise levels exceeding 67 decibels could occur up to 500 feet away from construction activities. In general, construction noise may be restricted to daylight hours.

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#### **4.8.11 Construction Traffic Impacts**

Construction of any of the Proposed Action segments may create the potential for increased construction truck traffic on secondary roads. Retail establishments may also experience some loss of business due to access difficulties. Traffic delays and other types of congestion are also largely unavoidable, but may be short term and localized in nature. During final design, mitigation measures to reduce potential construction traffic impacts will be investigated and developed.

#### **4.8.12 Utility Impacts**

Construction of any of the Proposed Action segments may require relocating above-ground or subsurface utility lines within or adjacent to existing highways, and crossing under or over existing utilities along new highway alignment segments. During subsequent phases of the study, coordination with the utility companies will be undertaken to investigate measures to avoid and minimize impacts to utilities and to utility customers.