

3

Affected Environment

How to Read This Chapter: Chapter 3 contains a description of the existing conditions and resources relevant to the ACTS. Existing conditions are described for the roadway or highway transportation, socioeconomic, and physical and biological environment that may be affected by or may affect the nature of transportation improvements within the Study Area.

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

3.1 Introduction

This chapter presents a summary of the existing roadway or highway transportation environment, land use, economic, social and cultural environment, and the existing physical and biological environment. These environmental factors are presented because they provide a baseline for the assessment of potential future transportation and economic benefits and provide a baseline for the assessment of potential environmental, land use, cultural, social, and economic effects of the potential action. Unless otherwise indicated, this chapter describes each resource for the entire Study Area, to provide a context for evaluating the environmental effects of the Proposed Action. Existing conditions described in this chapter include:

- The Transportation Environment
 - The existing highway transportation system;
 - Existing traffic conditions; and
 - Geometric and safety deficiencies.
- Land Use, Economic, Social, and Cultural Environment
 - Land use;
 - Agricultural land;
 - Social and economic conditions;
 - Minority and low income populations;
 - Uncontrolled petroleum and hazardous materials;
 - Cultural resources; and
 - Public parks and recreation land.

- Physical and Biological Environment
 - Forests;
 - Aquatic resources and wetlands;
 - Wildlife habitat, significant wildlife habitat, and essential fish habitat; and
 - Endangered, threatened, and species of special concern.
- Atmospheric Environment
 - Air quality; and
 - Noise environment.

Unless otherwise noted, the information in this chapter is summarized from the DEIS and the technical memoranda prepared for the Study:

- The *SDEIS Corridor Traffic Analysis Technical Memorandum*¹ (*SDEIS TTM*) contains detailed information on the existing traffic, highway, and safety conditions in the Study Area, based on existing information provided by MaineDOT, an origin-destination survey conducted for this study in August 1999, and data on geometric and safety deficiencies collected during the spring and summer of 1999.
- The *SDEIS Economic Technical Report*² (*SDEIS ECTR*) contains an analysis of the population, employment, community, and economic characteristics of the Study Area, based on available secondary sources and supplemented by information provided by knowledgeable local public officials and business representatives.
- The *SDEIS Environmental Technical Report*³ (*SDEIS EVTR*) 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. Resources addressed in this chapter include aquatic resources; vegetation; wildlife; endangered, threatened, and other protected species; land use; and cultural resources. Available existing information was compiled from a variety of sources, including state agencies, local municipalities, and the Northern Maine Development Commission (NMDC).

3.2 Transportation Environment

This section provides a general overview of the existing transportation conditions in the Study Area. It describes the five key facilities that serve the Study Area and quantifies existing traffic demand, speeds, and trip patterns on the key highways. Geometric and safety deficiencies are also quantified and system continuity and mobility are discussed.

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

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

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

Potential impacts on the transportation environment from construction of Segments 2, 4, and 7 are included in Chapter 4 Environmental Consequences (Section 4.2, page 4-2).

3.2.1 The Transportation System

Aroostook County relies heavily on its transportation system, in part due to its agricultural-based economy. The facilities within the Study Area can be characterized as "key" highways and roadways because of their regional significance and because they serve the major activity nodes in Aroostook County that include United States (U.S.) Route 1, U.S. Route 1A, State Route 11, State Route 161 and State Route 163.

Five key transportation facilities in the Study Area were assessed for their geometric condition based on field reconnaissance and review of 1997 Automatic Road Analyzer (ARAN) highway geometric data provided by the MaineDOT. Table 3-1 (page 3-5) provides a summary description of the five key facilities in the Study Area, including a list of the communities through which the highway or roadway passes. Total length, classification, speed limits, horizontal alignment, vertical grades, and lane and shoulder width were collected for each facility and are included as part of this study. Most of these facilities are two-lane undivided highways with the exception of a short section of Route 1 in Caribou that is divided and short urban sections of Route 11 in Houlton and Presque Isle that are four-lane undivided highways. The corridors, which are shown in Figure 3-1, are described below.

- Route 1 within the Study Area extends from Houlton to Fort Kent and is 118 miles long. Route 1 from Houlton to Madawaska is the only non-Interstate highway segment in the Study Area that is part of the National Highway System (NHS) and provides a connection to I-95's interchange in Houlton. Route 1 serves as the primary arterial in the eastern portion of the Study Area, from Houlton, north through small towns and the major developed areas of Mars Hill, Presque Isle, and Caribou to Van Buren. From Van Buren to Fort Kent, Route 1 parallels the St. John River and serves as the key East-West Arterial along the northern boundary of the Study Area and the Canadian border. Within the Study Area, Route 1 generally parallels the TransCanada Highway. The most direct connections between Route 1 and the TransCanada Highway are in Houlton, Fort Kent, Madawaska, and Van Buren.
- Route 1A extends 52 miles from Route 1 in Mars Hill to Van Buren, where it rejoins Route 1. Route 1A provides an alternative to traveling through the segment of Route 1 that serves the urban Presque Isle and Caribou areas, passing instead to the east through the towns of Fort Fairfield, Limestone, and Hamlin. Route 1A traverses generally level or rolling terrain with good horizontal alignment.

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**Table 3-1
 Summary Description of Key Highway Corridors in the Study Area¹**

Highway and Location	Cities and Towns Through Which Highway Passes	Total Length (miles)	Classification(s) ²	Highway Width ft ³	Speed Limits	Alignment/Grades	Highway Segment	Lanes and Shoulders	
								Lanes	Shoulders
Route 1: Houlton to Fort Kent	Houlton, Littleton, Monticello, Bridgewater, Blaine, Mars Hill, Westfield, Presque Isle, Caribou, Connor TWP, Cyr Plantation, Van Buren, Grand Isle, Madawaska, Frenchville, Fort Kent	118	Houlton to Madawaska: Other Principal Arterial Madawaska to Fort Kent: Minor Arterial	36-70 36-48	70% at 40-50 mph; 30% at 25-35 mph in developed areas	Level or rolling, 3-8% grades	Houlton-Caribou (60%) Caribou-Fort Kent (40%)	2 undivided at 12 ft 2 undivided at 10 ft	97% paved at 4 - 10 ft; 3% gravel at 6 - 8 ft 67% paved at 6 - 10 ft; 33% gravel at 6 - 8 ft
Route 1A: Mars Hill to Van Buren	Mars Hill, Easton, Fort Fairfield, Limestone, Caswell, Hamlin, Van Buren	52	Mars Hill to Fort Fairfield: Minor Rural Arterial Fort Fairfield to Van Buren: Major Collector	34-40 34-40	80% at 55 mph; 20% at 25-45 mph in developed areas	Level or rolling, 4-7% grades	All	2 undivided at 11-12 ft	67% gravel at 6 - 8 ft; 33% paved at 6 - 8 ft
Route 11: Sherman to Ashland	Sherman, Stacyville, Patten, Mount Chase, Herey, Moro Plantation, T7R5WELS, T8R5WELS, T9R5WELS, Masardis, Ashland	57	Major Rural Collector	28-42	85% at 50 mph; 15% at 25-45 mph in developed areas	Rolling to mountainous, 4-13+% grades; some restricted sight distances and lower speeds	Sherman - Moro Plantation Moro Plantation-Ashland	2 undivided at 11 ft 2 undivided at 12 ft	62% gravel at 6 - 8 ft; 38% paved at 6 - 8 ft 100% paved at 2 - 6 ft
Ashland to Fort Kent	Nashville Plantation, Portage, T14R6WELS, T16R6WELS, Winterville Plantation, Eagle Lake, Wallagrass Plantation, Fort Kent	49	Major Rural Collector	20-48	84% at 45-50 mph; 16% at 25-35 mph	Generally rolling, 4-12% grades	Ashland-Fort Kent	2 undivided at 11-12 ft	51% paved at 6 - 12 ft; 49% at 4 - 6 ft
Route 161: Caribou to Fort Kent	Caribou, Woodland, New Sweden, Stockholm, T11R4WELS, T17R4WELS, Cross Lake Township, New Canada, Fort Kent	44	Minor Rural Arterial	26-47	88% at 50-55 mph; 12% at 24-45 mph in developed areas	Generally rolling, 3-10% grades; potentially restricted sight distances	All	2 undivided at 11-12 ft	50% paved at 4 - 8 ft; 50% gravel at 2-8 ft
Route 163: Ashland to Presque Isle	Ashland, T11R4WELS, Castle Hill, Mapleton, Presque Isle	20	Minor Rural Arterial	34-46	75% at 50 mph; 25% at 25-45 mph in developed areas	Generally rolling, some steeper, 4-13% grades	All	2 undivided at 11-12 ft	55% gravel at 6 ft; 45% paved at 6 - 10 ft

¹ All surfaces are bituminous concrete in good to excellent condition. The MaineDOT Six-Year Transportation Improvement Plan (TIP) currently includes reconstruction of 48 miles of Route 11 between Ashland and Fort Kent. During the summer of 1999, State Route 11 south of Ashland was improved for approximately 19 miles.

² Highway classifications are as follows:

Other Principal Arterials: highways in rural and urban areas that provide access to other arterials, a major port, an airport, a public transportation facility, or any other intermodal transportation facility.

Minor Rural Arterial: an arterial highway that provides linkage between cities and towns, and between towns and developed areas. Typically minor arterials carry more of a mix of local and through traffic than major arterials. Minor arterials can be located in urban or rural surroundings.

Major Rural Collector: a highway that connects towns and developed areas with highways of higher classifications (arterials and interstates). Collectors tend to serve more local (short distance) travel and operate at lower speeds.

In most cases, full access is provided. These roadways fall within the middle of the functional classification system and provide a combination of access to land and regional mobility. Access points are likely to be more frequent than on major arterials and greater impedance to regional traffic flows is expected on these roadways.

³ Highway width includes travel lanes and shoulders.

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- Route 11 is the western boundary of the Study Area. Route 11 runs north from the southwestern corner of the Study Area in Sherman near Exit 264 of I-95 approximately 106 miles to Fort Kent. It passes through Patten, Ashland, and a number of smaller unorganized townships and plantations. Route 11 traverses generally rolling terrain that can be classified as mountainous in some locations between Sherman and Ashland. In combination with horizontal curvatures, the grades in this area result in restricted sight distances and slower speeds. A majority of the road is through undeveloped wooded areas. Route 11 is characterized by substantial trucking activity. Several sawmills are located near Ashland, including one located just off Route 11 in Ashland, where mill activity on both sides of the road results in reduced speeds.
- A portion of Route 161 that extends 44 miles from Caribou to the northwest through generally rolling terrain and several small towns to Fort Kent. It is the most direct route from Caribou to Fort Kent.
- A portion of Route 163 that extends 20 miles from east of Presque Isle to Ashland. This is the key East-West route through the central part of the Study Area, connecting Route 11 with Route 1 and the Presque Isle area. The Route 163 corridor traverses gently rolling terrain with several locations of steep grades.

The Proposed Action (defined in Section 2.6, page 2-28) includes a bypass of Route 1 in Presque Isle, a new connection between Routes 1 and 161 in Caribou, and improvements to a portion of Route 161 between Caribou and Cross Lake Township. Route 11, which forms the western boundary of the Study Area, is not affected by the Proposed Action and therefore is not discussed in detail in this section of the SDEIS.

3.2.2 Existing Traffic Conditions

The existing traffic conditions within the Study Area are described in this section, and include an overview of existing traffic demand, speeds, and travel patterns.

Existing Daily and Peak Hour Volumes

Traffic volumes presented in this study (Figure 3-2), are based on counts conducted by the MaineDOT in 1994 and 1999 through an ongoing statewide traffic counting program.⁴

Daily Volumes

Route 1 generally carries the heaviest traffic demands in Aroostook County. Highest volumes on Route 1 are in the built-up areas (town centers) and include 15,050 vehicles per day (vpd) in Houlton; 8,765 vpd in Mars Hill; 20,000 vpd in Presque Isle; 11,680 vpd in Caribou; 8,345 vpd in Van Buren; 12,595 vpd in Madawaska; and 12,100 vpd in Fort Kent. These Average Annual Daily Traffic (AADT) volumes are shown on Figure 3-2.

⁴ All traffic counts are from 1994 or 1999. The original analysis was done for the DEIS in 1999 and the traffic model was calibrated to those counts. The existing Statewide Model used for the DEIS was from 1995. While the counts are now somewhat dated, they do not affect the alternatives analysis, because it is based on traffic shifts in the 2030 model.

Traffic volumes on more rural sections of Route 1 (outside town centers) range from 4,000 to 9,000 vpd between Houlton and Presque Isle; 6,000 to 9,000 vpd between Presque Isle and Caribou; approximately 3,500 between Caribou and Van Buren and 1,500 to 2,500 vpd between Van Buren and Madawaska. AADT volumes for key Study Area highways are shown in Figure 3-2.

Route 1A, which provides access to Mars Hill, Fort Fairfield, Limestone, Caswell, Hamlin, and Van Buren, carries lower volumes than Route 1. Daily volumes on Route 1A range from 1,000 vpd to 1,700 vpd.

Route 11 also serves traffic demands in a north-south direction through the Study Area but carries substantially less volume than either Route 1 or Route 1A. The highest volumes on Route 11 are 1,520 vpd south of Fort Kent and 3,340 vpd north of Sherman Mills. Traffic volumes increase to approximately 4,945 vpd in Ashland town center just to the north of Route 163.

Volumes on Route 161 between Caribou and Fort Kent range from a low of 700 vpd in rural areas to a high of 14,000 vpd near Caribou. Volumes on Route 161 approaching Fort Kent range from 2,500 vpd to 3,000 vpd.

Volumes on Route 163, connecting Route 11 in Ashland with Presque Isle, vary from 400 vpd west of Route 11 to 10,000 vpd in Presque Isle.

Peak Hour Volumes

While daily data provide an overview of the traffic conditions in the Study Area, they do not identify the hourly fluctuations in daily traffic volumes or peak periods of usage. The peak hour or Design Hour Volume (DHV) is the hour used for geometric design of highways. The Design Hour Volume is typically the 30th highest hour of the year.

Peak hour volumes in the Study Area generally occur during traditional morning and evening peak travel periods. The DHVs for these highways, expressed as the 30th highest hourly traffic volume of the year, typically range from 8.5 to 10 percent of the AADT for urban areas and between 11 to 12 percent for rural areas.

Origin-destination surveys were conducted in August 1999. During these origin-destination surveys, Automated Traffic Recorders (ATRs) were placed across Route 1 north of I-95 (north of Houlton) and on Route 11 north of Knowles Corner. These locations were chosen because they represent the two major north-south highways of the Study Area. The Route 1 corridor north of I-95 displays well-defined peaks from 8:00 AM to 9:00 AM and from 5:00 PM to 6:00 PM, although these peak hour demands are not dramatically higher than midday demands. Traffic demands are generally higher in the southbound direction during the morning (toward I-95) and in the northbound direction during the evening (from I-95). Route 11, north of Knowles Corner, displayed similar patterns. Demands peaked in the morning from 8:00 AM to 9:00 AM and in the evening from 4:00 PM to 6:00 PM. Midday demands were comparable to morning peak hour demands. Traffic on Route 11 does not

exhibit pronounced directionality – the peak hour traffic is almost even in both directions. Traffic on Route 11 is slightly heavier in the evening peak for both directions.

Truck Volumes

Truck volumes in the Study Area were quantified using 1999 vehicle classification data and 1994 traffic count data from MaineDOT. Figure 3-3 presents a sample of available truck traffic data on Study Area highways.

The number of trucks (light and heavy) in the Route 1 traffic stream in the Study Area varies from 149 to 934 trucks per day. The heaviest volume of truck traffic on Route 1 is experienced between Houlton and Mars Hill. For the Route 1 corridor, Average Annual Daily Truck Volumes at select locations were:

- South of Houlton: approximately 112 trucks;
- Littleton to Mars Hill: approximately 934 trucks;
- Mars Hill to Presque Isle: approximately 671 trucks;
- Presque Isle to Caribou: approximately 491 trucks;
- Caribou to Van Buren: approximately 277 trucks; and
- Van Buren to Madawaska: approximately 263 trucks.

Truck volumes on Route 11, Route 1A, Route 161, and Route 163 are based on 1994 data:

- Route 11 carries 170 trucks per day north of Knowles Corner, 239 trucks per day north of Ashland, and under 193 trucks per day south of Fort Kent.
- Route 1A carries approximately 312 trucks per day south of Easton and 471 trucks per day south of Route 167.
- Route 161 carries approximately 231 trucks per day in New Sweden, 160 trucks per day north of Cross Lake Township, and 224 trucks per day south of Fort Kent.
- Route 163 carries between 219 and 274 trucks per day west of Presque Isle.

Speeds

Speed studies were conducted in September 1999 at five locations in the Study Area. The purpose of these studies was to obtain samples of observed individual vehicle speeds to arrive at representative estimates of low, median, and high vehicle speeds traveling through different segments of study corridors. These speed studies were conducted at the following locations where posted speed limits were either 50 mph or 55 mph:

- Route 1, north of I-95 in Houlton;
- Route 1, south of Caribou;
- Route 1, north of Caribou;
- Route 1A, north of Caswell; and
- Route 161, north of Caribou.

Median speeds on all of these corridors are generally at or in excess of the 50 mph/55 mph posted speed limits. All observed median speeds were within five mph of the posted limit. However, it is the 85th percentile speed, not the median speed that is used to establish the posted speed limit. This is the speed threshold which 85 percent of all observed speeds are at or below.

The 85th percentile speeds on Route 1 ranged from 58 mph to 63 mph. The observed 85th percentile speeds exceeded the posted speed limits by 3 to 13 mph. The highest difference between the posted speeds and the observed 85th percentile speeds on Route 1 were recorded north of Caribou, where the posted speed limit is 50 mph. At this location on Route 1, northbound 85th percentile speeds were 59 mph and southbound speeds were 63 mph.

On Route 1, north of Houlton, the posted speed limit is 55 mph. The observed 85th percentile speed was 58 mph in the northbound direction and 59 mph in the southbound direction. These values exceed the posted limit by between 3 mph and 4 mph. On Route 1, south of Caribou, the posted speed limit is 55 mph. The observed 85th percentile speed was 60 mph in the northbound direction and 59 mph in the southbound direction. These values exceed the posted limit by between 4 mph and 5 mph.

The posted speed limit on Route 1A north of Caswell is 55 mph. The 85th percentile speed measured on this portion of Route 1A was 60 mph in the northbound direction and 66 mph in the southbound direction – exceeding the posted limits by 5 mph northbound and 11 mph southbound.

On Route 161, north of Caribou, the observed 85th percentile speeds exceeded the 55 mph posted speed limit by 7 mph in the northbound direction and 6 mph in the southbound direction.

3.2.2.1 Border Crossings

Monthly incoming vehicle statistics across the Canadian/U.S. border from 1997, as reported by the U.S. Customs Service⁵ are provided in Table 3-2 (page 3-11) for the border crossings within the Study Area (no data were reported for the Hamlin and Easton crossings). Crossing locations within the Study Area include the following:

- Houlton;
- Monticello;
- Bridgewater;
- Easton (no data available);
- Fort Fairfield;
- Limestone;
- Hamlin (no data available);
- Van Buren;
- Madawaska; and
- Fort Kent.

⁵ United States Customs Service. 1997. Bureau of Transportation Statistics Website (<http://www.bts.gov>).

Table 3-2
1997 Canadian Border Crossing Volumes (entering the U.S.)

Border Crossing	Total Yearly Incoming Vehicles	Highest Monthly Incoming Vehicles		Average Monthly Crossings ¹	Distribution (based upon monthly crossings)
		Number	Highest Month		
Passenger Vehicles					
Bridgewater	103,464	13,036	August	10,346	4.9%
Easton ²	N/A	N/A	N/A	N/A	N/A
Fort Fairfield	201,644	22,472	July	18,331	8.7%
Fort Kent	323,937	33,273	July	29,449	14.0%
Hamlin ²	N/A	N/A	N/A	N/A	N/A
Houlton	406,489	58,229	August	36,954	17.5%
Limestone	59,457	9,472	November	5,405	2.6%
Madawaska	897,274	84,840	July	74,773	35.4%
Monticello	1,671	221	January	139	0.1%
Van Buren	<u>427,425</u>	43,837	July	35,619	<u>16.9%</u>
Total (all locations)	2,421,361				100.0%
Trucks					
Bridgewater	7,862	940	May	786	4.7%
Easton ²	N/A	N/A	N/A	N/A	N/A
Fort Fairfield	14,700	1,874	October	1,336	8.0%
Fort Kent	12,847	1,433	January	1,071	6.4%
Hamlin ²	N/A	N/A	N/A	N/A	N/A
Houlton	103,153	12,804	November	9,378	56.2%
Limestone	8,604	1,498	August	782	4.7%
Madawaska	20,707	2,023	August	1,726	10.3%
Monticello	192	38	March	16	0.1%
Van Buren	<u>19,268</u>	2,122	October	1,606	<u>9.6%</u>
Total (all locations)	187,333				100.0%
Total (Passenger Vehicles and Trucks)					
Bridgewater	111,326	13,688	August	11,132	4.9%
Easton ²	N/A	N/A	N/A	N/A	N/A
Fort Fairfield	216,344	23,815	July	19,667	8.6%
Fort Kent	336,784	34,395	July	30,520	13.4%
Hamlin ²	N/A	N/A	N/A	N/A	N/A
Houlton	509,642	66,143	August	46,332	20.3%
Limestone	68,061	10,359	November	6,187	2.7%
Madawaska	917,981	86,674	July	76,499	33.6%
Monticello	1,863	259	March	155	0.1%
Van Buren	<u>446,693</u>	45,622	July	37,225	<u>16.3%</u>
Total (all locations)	2,608,694				100.0%

Source: United States Customs Service, 1997. Data represent volumes entering the U.S.

1 Average monthly crossings is based on months which data has been provided.

2 The United States Customs database did not provide data for the Easton and Hamlin crossings and for some months at other crossings.

N/A not available

The busiest border crossing in the Study Area for all vehicles was at Madawaska, which handled approximately 76,499 incoming vehicles per month in 1997 (passenger vehicles and trucks), or 33.8 percent of all Study Area crossings. The next busiest locations were Houlton with 20.3 percent of all crossings (46,332 incoming vehicles per month), Van Buren with 16.3 percent (37,225 incoming vehicles per month), and Fort Kent with 13.4 percent (30,520 incoming vehicles per month). The majority of these crossings are likely to be for local trips back and forth and not longer regional trips.

August is the peak month for total border crossings (275,723 vehicles) and passenger vehicles (269,106), while truck crossings (19,230) peak in November.

The greatest volume of trucks entering the Study Area at a single port was 9,378 incoming trucks (per month) at Houlton. This crossing accounted for approximately 56 percent of all incoming trucks within the Study Area. The next two busiest locations for trucks were Madawaska (1,726 entering trucks per month) and Van Buren (1,606 entering trucks per month) with about 10 percent of the total truck volume at each.

Houlton is the only full commercial port in the Study Area. A full commercial port can accept commercial shipments without requiring a special permit in advance of the trip. The other border crossings in the Study Area are permit ports where the U.S. Customs Service requires freight carriers to apply for a permit to enter the U.S. Thus, just-in-time or unplanned freight deliveries are forced to enter through Houlton, or outside the Study Area through Calais or Jackman.

3.2.2.2 Trip Patterns

Origin-destination (OD) interview surveys were conducted to gain an understanding of the trip patterns and trip characteristics for north-south travel in Aroostook County. These data supplemented previous travel studies done by MaineDOT. The surveys were conducted concurrently on Routes 1 and 11 in August 1999 during a typical 24-hour weekday period. These surveys were conducted for both directions of travel on Route 11, north of Route 212 at Knowles Corner in Moro Plantation; and on Route 1, north of I-95 in Houlton. Detailed OD trip tables and figures for Route 1 and Route 11 are included in the *SDEIS TTM*.⁶

The OD survey results revealed notable trip characteristics on Route 1. Figures 3-4 and 3-7 depict the surveyed travel patterns by location and vehicle type (passenger vehicles and commercial vehicles). A more detailed discussion of findings for Route 1 is provided in the following sections.

⁶ Vanasse Hangen Brustlin, Inc. August 2005. *Supplemental Draft Environmental Impact Statement, Corridor Traffic Analysis Technical Memorandum*. Prepared for the Maine Department of Transportation.

Route 1 Passenger Vehicles

- Data were collected just to the north of Houlton where a total of 4,520 passenger vehicles were observed traveling this section of Route 1. Figure 3-4 depicts a breakdown of these traffic volumes using the origin-destination survey for passenger vehicles on Route 1. Approximately 41 percent of these passenger vehicles took part in this survey.
- Vehicle occupancies for passenger vehicles traveling along Route 1 averaged 1.7 passengers per vehicle.
- Approximately 60 percent of the 4,520 trips (2,710 trips) are work related, 22 percent (995 trips) are recreational-type trips, and nine percent (405 trips) are shopping trips. Of the total northbound trips, 15 percent (330 trips) are destined for a specific recreational facility within the Study Area.
- As depicted in Figure 3-4, approximately 24 percent of the 2,200 northbound trips (540 trips) were destined for Littleton, 26 percent (580 trips) destined for the Presque Isle/Mapleton region, and 17 percent (370 trips) were destined for Monticello. Approximately 58 percent of the northbound trips (1,275 trips) originated from Houlton. In the southbound direction, 31 percent of the trips (720 trips) originated from Littleton, 21 percent (500 trips) from the Presque Isle/Mapleton region, and 17 percent (395 trips) from Monticello. Approximately 58 percent (1,350 trips) of the southbound trips were destined for Houlton. Frequent OD pairs were Houlton-Littleton, Houlton-Monticello, and Houlton-Presque Isle.
- Approximately two percent of the northbound passenger vehicle trips (40 trips) are destined for Canadian destinations in Quebec and New Brunswick and three percent (60 trips) originated from Canada (New Brunswick, via Houlton). In the southbound direction, approximately three percent of the trips (70 trips) originated from Canada in Quebec and New Brunswick and two percent (50 trips) were destined for Canada (New Brunswick, via Houlton). Through-trips with Canadian origins and destinations comprise less than one percent of the northbound and southbound trips (less than 45 trips) on Route 1.
- Of all (2,320) southbound trips, about 69 percent (1,600 trips) remained within Aroostook County (of which 58 percent, or 1,350 trips were to Houlton). Southbound trips headed outside Aroostook County but within Maine comprised 23 percent of the total southbound trips (535 trips) and those headed outside Maine comprised the remaining eight percent (185 trips).
- Approximately 68 percent of the northbound trips (1,500 trips) originated within Aroostook County (of which 58 percent were from Houlton) and 25 percent (550 trips) from outside Aroostook County but within Maine. The remaining seven percent (150 trips) originated outside Maine.

- Passenger vehicle trip distributions for the Route 1 survey are presented in Table 3-3 (page 3-15). The table presents factored survey results representative of daily traffic volumes. The majority (1,540 trips or 70 percent) of northbound motorists surveyed originated from Route 1 corridor towns and the majority of southbound motorists (1,540 trips or 66 percent) were destined for Route 1 corridor towns. Houlton was an origin or a destination for 58 percent of the Route 1 trips (2,625 trips). I-95 is the origin of 25 percent of the northbound trips (490 trips from points west and 60 trips from Canada) and is the destination for 30 percent of the southbound trips (640 trips to points west and 50 trips to Canada).

Route 1 Commercial Vehicles

- Data were collected just to the north of Houlton where a total of 375 commercial vehicles were observed traveling this section of Route 1. Figure 3-5 depicts a breakdown of these traffic volumes using the origin-destination survey for commercial vehicles on Route 1. Approximately 36 percent of these passenger vehicles took part in this survey.
- Commercial vehicles that were registered in Maine comprised about 85 percent of the total commercial vehicle trips (890 vehicles). Approximately five percent of the commercial vehicles (55 vehicles) were registered in Canada.
- Almost half (49 percent, 515 vehicles) of the vehicles were multi-unit combinations with three or more axles. Single-unit trucks with three or more axles comprised 34 percent of the vehicles (355 vehicles) and the remaining 17 percent (180 vehicles) were two-axle, single-unit trucks.
- Approximately 48 percent of the northbound trips (285 trips) originated from Houlton. Approximately 17 percent of the northbound trips (100 trips) originated in Houlton and were destined for the Presque Isle/Mapleton region. Commercial vehicles destined for the Presque Isle/Mapleton region comprised about 31 percent of all northbound Route 1 trips surveyed (185 trips).
- Approximately 28 percent of the southbound commercial vehicle trips (130 trips) originated from the Presque Isle/Mapleton region. Approximately 14 percent of the southbound trips (65 trips) originated in the Presque Isle/Mapleton region and were destined for Houlton. Houlton was a destination for 35 percent of the southbound trips (160 trips).
- Approximately 55 percent of the northbound trips (325 trips) originated within Aroostook County. Northbound trips originating outside Aroostook County but within the State of Maine comprised 27 percent of the total northbound trips (160 trips). Trips originating outside Maine comprised the remaining 18 percent (105 trips).

**Table 3-3
 Route 1 Passenger Vehicle Trip Distributions**

To/From South of the Survey Station	Northbound (route originating from)		Southbound (route destined to)	
	Percent	Trips	Percent	Trips
Route 1 (Houlton)	58	1,275	58	1,350
Route 1 (south of Houlton)	12	265	8	190
Interstate 95 (to Canada)	3	60	2	50
Interstate 95 (points west)	22	490	28	640
Route 2	4	90	3	70
Route 2A	1	20	1	20
Total	100	2,200	100	2,320

To/From North of the Survey Station	Northbound (route destined to)		Southbound (route originating from)	
	Percent	Trips	Percent	Trips
Route 1 (Presque Isle and points south)	79	1,740	77	1,790
Route 1 (north of Presque Isle)	10	225	11	260
Route 1A (via Route 1)	6	125	7	155
Route 161 (via Route 1)	3	70	3	70
Route 162 (via Route 161)	2	40	2	45
Total	100	2,200	100	2,320

Note: Trip values presented in the table are rounded and therefore may not match the corresponding percentage exactly.

- Of the total southbound trips, about 36 percent (165 trips) remained within Aroostook County. Southbound trips headed outside Aroostook County, but within the State of Maine, comprised 26 percent (120 trips) of the total southbound trips. Trips headed outside Maine composed the remaining 38 percent (175 trips).
- Four percent of the northbound commercial vehicle trips were destined for Canada (20 trips to New Brunswick and five trips to Quebec). In the southbound direction, five percent (20 trips) of the trips originated from Canada (New Brunswick). There were no through-trips with Canadian origins and destinations.
- Commercial vehicle trip distributions for the Route 1 survey are presented in Table 3-4 (page 3-16). The table presents factored survey results representative of daily traffic volumes. The majority of the trips to/from the south of the survey site used Route 1 (59 percent northbound and 46 percent southbound). Similarly, the majority of the trips to/from the north of the survey site remained on Route 1 (67 percent northbound and 62 percent southbound). Houlton was an origin or a destination for 42 percent (445 trips) of the Route 1 trips. I-95 carried 34 percent (200 trips) of the northbound trips and 39 percent (180 trips) of the southbound trips.

**Table 3-4
 Route 1 Commercial Vehicle Trip Distributions**

To/From South of the Survey Station	Northbound (route originating from)		Southbound (route destined to)	
	Percent	Trips	Percent	Trips
Route 1 (Houlton)	48	285	35	160
Route 1 (south of Houlton)	11	65	11	50
Interstate 95	34	200	39	180
Route 2	5	30	11	50
Route 2A	<u>2</u>	<u>10</u>	<u>4</u>	<u>20</u>
Total	100	590	100	460

To/From North of the Survey Station	Northbound (route destined to)		Southbound (route originating from)	
	Percent	Trips	Percent	Trips
Route 1 (Presque Isle and points south)	52	310	40	190
Route 1 (north of Presque Isle)	15	90	22	100
Route 1A (via Route 1)	16	90	18	80
Route 161 (via Route 1)	7	40	6	25
Route 162 (via Route 161)	3	20	12	55
Route 163 (via Route 1)	<u>7</u>	<u>40</u>	<u>2</u>	<u>10</u>
Total	100	590	100	460

Note: Trip values presented in the table are rounded, and therefore may not match the corresponding percentage exactly.

Summary

The OD survey results revealed several notable trip characteristics on Route 1. According to the survey results, the majority of trips (60 percent, 3,340 trips) are work-related. On Route 1, approximately 22 percent of the trips (1,225 trips) are recreational (excluding shopping). Shopping trips on Route 1 consist of nine percent (500 trips).

The percentage of passenger vehicle trips originating from or destined to Canada was five percent. Commercial vehicle trips on Route 1 with Canadian origins or destinations were four percent. Few Canadian through trips were observed.

Route 1 carries a high percentage of northbound and southbound passenger vehicle trips internal to Aroostook County. Approximately 70 percent (3,165 trips) of the northbound and southbound Route 1 passenger vehicle trips were internal to Aroostook County. Commercial traffic along Route 1 exhibited longer distance trip patterns. Approximately 29 percent (305 trips) of the commercial vehicle trips surveyed on Route 1 began or ended outside of Maine.

A substantial portion of commercial vehicle traffic on Route 1 in both northbound and southbound directions uses I-95. Approximately 36 percent (380 trips) of the

commercial vehicles on Route 1 originated from or were destined to I-95. For passenger vehicles, about 27 percent (1,240 trips) of the vehicles surveyed on Route 1 originated from or were destined to the I-95 corridor.

3.2.3 Geometric and Safety Deficiencies

The MaineDOT Highway Design Guide⁷ was used to establish recommended geometric guidelines for the Study Area highways. Existing conditions were established using available information from MaineDOT supplemented with field data.

3.2.3.1 Geometric Deficiencies

The geometric conditions of the Study Area highways are generally dictated by the rolling terrain typical to the Aroostook County area, with the most evident deficiency being vertical geometry. Vertical curvature refers to a highway's up and down grade changes in profile view. Horizontal curvature refers to how a highway bends and curves. Geometric deficiencies occur when the vertical or horizontal curvatures, or the widths of lanes or shoulders, do not meet prevailing design standards.

All of the Study Area highways contain some vertical geometric deficiencies, when compared to MaineDOT design criteria, where the vertical profile contains steep and/or long grades. Horizontal curvature is very important in evaluating safety of the highways. Horizontal deficiencies are most prevalent in the western and northern parts of the Study Area. Other geometric conditions evaluated are travel lane widths and the presence and width of shoulders. A summary of the geometric deficiencies evaluation of the major Study Area highways is provided in Table 3-5 (page 3-18), and depicted on Figure 3-6. The deficiencies along Routes 1 and 161 which are the only existing highways affected by the Tier 1 SDEIS Corridors and Proposed Action are discussed below.

Route 1 - Houlton to Mars Hill

Route 1 between Houlton and Mars Hill has no horizontal deficiencies. There are seven vertical deficiencies along this segment. Four vertical deficiencies are located in Monticello. Three vertical deficiencies are located in Bridgewater. Truck climbing lanes are located at two of these vertical profiles in the north and southbound direction which reduces the potential for travel delay due to slow truck traffic, and improves passing conditions. There were no deficient lane or shoulder widths identified.

⁷ Maine Department of Transportation. February 1994, as amended. *Highway Design Guide*.

**Table 3-5
 Summary of Geometric Deficiencies**

Route/Location	Deficiency Type	Deficiencies	
		Number	Percent ²
US Route 1			
Houlton to Mars Hill	Horizontal	0	-
	Vertical	7	-
	Lane/Widths	-	0 %
	Shoulder Widths	-	0 %
Mars Hill to Caribou	Horizontal	0	-
	Vertical	6	-
	Lane/Widths	-	0 %
	Shoulder Widths	-	0 %
Caribou to Van Buren	Horizontal	0	-
	Vertical	10	-
	Lane/Widths	-	0 %
	Shoulder Widths	-	0 %
Van Buren to Fort Kent	Horizontal	5	-
	Vertical	3	-
	Lane	Widths	0 %
	Shoulder Widths ¹		11 %
State Route 161			
	Horizontal	4	-
	Vertical	18	-
	Lane Width	-	36 %
	Shoulder Width ¹	-	53 %

¹ Shoulder width deficiencies based on MaineDOT Standards

² Percent length of highway segment that is deficient

Route 1 - Mars Hill to Caribou

On Route 1 between Mars Hill and Caribou, no horizontal curves were identified as deficient while six vertical curve deficiencies were identified. Three vertical deficiencies are located in the rural areas of the Town of Westfield in a four-mile stretch of highway and one deficiency in Presque Isle, immediately after the vertical deficiencies in Westfield. Two vertical deficiencies exist in Caribou. Climbing lanes exist for southbound traffic but not for northbound traffic on these two grades. There were no deficient lane or shoulder widths identified.

Route 1 - Caribou to Van Buren

Between Caribou and Van Buren there are no horizontal curvature deficiencies, while ten vertical deficiencies were identified. Two of these vertical deficiencies have existing climbing lanes and are located north (northbound) and south (southbound) of Abel Cyr Road in Cyr Plantation. Most of the deficiencies are due to the long lengths of the grade. Caribou, Connor Township (TWP), and Cyr Plantation each have three vertical deficiencies while the remaining deficient vertical profile is located at the intersection

of Route 1 and Route 1A in Van Buren. There were no deficient lane or shoulder widths identified.

Route 1 - Van Buren to Fort Kent

From Van Buren to Fort Kent, Route 1 generally follows the St. John River, with five deficient horizontal curves between Madawaska and Fort Kent. There are three vertical deficiencies near Frenchville. There were no deficient lane widths. Deficient shoulder widths were identified in Fort Kent, Frenchville, and Van Buren. Approximately 11 percent (five miles) of this segment of Route 1 has deficient shoulder widths.

Route 161

On Route 161, four horizontal curves were identified as deficient. One curve is deficient based on the degree of curvature (11 degrees) in Fort Kent and three are based on short curve lengths in T16R4 and New Sweden. Eighteen vertical geometric deficiencies were identified. Three of the vertical deficiencies are located in Fort Kent and New Canada. Fifteen of the vertical deficiencies are located from Cross Lake Township to Woodland either due to long vertical profiles or a combination of steep grades and long profiles. A vertical deficiency is located approximately every one to three miles over an approximately 20-mile stretch of highway in this area.

Travel lane widths do not meet MaineDOT criteria from Cross Lake Township to Fort Kent which represents approximately 36 percent (16 miles) of Route 161. Shoulder widths do not meet MaineDOT criteria from Caribou to New Sweden and from Cross Lake TWP to Fort Kent, where, in both locations, the shoulders are gravel. Approximately 53 percent (23 miles) of the shoulder widths were determined to be deficient.

3.2.3.2 Safety Analysis

Based on the last three years of available crash data (2002-2004) there are 23 HCLs within the Study Area, as defined by the MaineDOT criteria.⁸ These HCLs are shown on Figure 3-6. Moose crash locations for the same period are shown in Figure 3-7. According to MaineDOT, there were 88 moose crashes on Route 1 (between Littleton and Presque Isle) and 56 crashes on Route 161 (between Woodland and New Canada) during this period. This is a substantial increase over the 1996-1998 period, in which there were 37 moose crashes on Route 1, Route 11, and Route 161.

The ratio of the actual crash rate to the expected crash rate, which is based on highway geometry, speeds and traffic volumes, is referred to as the Critical Rate Factor (CRF). Locations with a CRF of greater than 2.0 that have a correctable crash pattern are considered high priority for further investigation and funding of safety improvement projects.

⁸ HCL are those locations where the Critical Rate Factor is greater than 1 and where there have been greater than eight crashes in three years.

Of the 23 HCLs, four have CRFs greater than 2.0, and of these four, three are along highways affected by the Proposed Action. These are:

Presque Isle

- Route 1 at Maysville Street (Route 163) (CRF = 2.26)

Caribou

- Route 161 (South Main Street) at High Street (Route 89) (CRF =2.69)
- Route 1 at North Main Street (CRF = 4.74)

3.2.4 System Continuity and Mobility

“Transportation system continuity” within Aroostook County can be quantitatively characterized by examining how often the existing highways transition between wide, higher-speed segments to narrow, low-speed segments. Many of these narrower, slower sections of highways are through downtown areas or town centers. These factors contribute to reduced mobility and poor system reliability.

System Continuity

System continuity is based on the physical characteristics of the key highways through Aroostook County. Characteristics such as highway functional classification, highway widths (including shoulders) and speed limits were collected, as shown in Table 3-1 (page 3-5) and Figure 3-6 which only shows geometric deficiencies. System continuity along Routes 1 and 161 is discussed below.

Route 1 is the primary north-south highway through Aroostook County. Route 1 provides several connections to New Brunswick along the northern Maine border and also provides a key connection to I-95 to the south. Route 1 continues outside Aroostook County south of Houlton. From Houlton to Presque Isle, Route 1 is classified as an Other Principal Arterial with posted speed limits varying from 25 to 55 mph. This section of Route 1 is about 70 feet wide near Houlton and narrows to 36 feet through Mars Hill. From Presque Isle to Madawaska, the width of Route 1 varies from 36 to 60 feet and speed limits again vary between 25 and 55 mph. Route 1 transitions from an Other Principal Arterial to a Minor Arterial between Madawaska and Fort Kent. Route 1 between Madawaska and Fort Kent varies in width from 36 to 40 feet with speed limits varying between 25 and 55 mph.

Along Route 1, there are numerous locations where abrupt changes in the posted speed limit occur. These changes are predominantly caused by highway geometry or changing land uses. There are abrupt speed limit changes of 20 miles per hour (mph) or more through Houlton (50 to 25 mph), Monticello (55 to 30 mph), Bridgewater (55 to 30 mph), Blaine/Mars Hill (55 to 25 mph), Presque Isle (45 to 25 mph), Van Buren (50 to 25 mph), Grand Isle (55 to 30 mph), Madawaska (45 to 25 mph), and Frenchville (50 to 30 mph). In all, there are more than 55 speed zone changes along the Route 1 corridor.

Route 161 is classified as a Minor Rural Arterial. The highway width varies from 26 to 47 feet with speeds between 25 and 50 mph. Route 161 is the only direct link between Caribou and Fort Kent. There were 22 vertical or horizontal deficiencies characterized along the Route 161 corridor. About one third of the corridor has lane width deficiencies and half of the corridor has shoulder deficiencies.

None of the five key highways provides consistent speeds and highway geometry throughout its length. In fact, there is very little consistency on these highways for any length of travel. As shown in Table 3-1 (page 3-5) most of the segments between any two major destinations exhibit considerable variation in speed and geometry. On each highway, there are numerous transitions between wider, high speed highway segments through somewhat remote areas and lower speed segments through more densely developed areas.

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). The resulting travel times for major origins and destinations are summarized in Table 3-6 (below).

**Table 3-6
 Summary of Existing Travel Times for Key Origin-Destination Pairs**

Origin-Destination Pair	Travel Route	Existing Travel Time ¹ (minutes)
Houlton to Madawaska	Route 1	130
Houlton to Easton	Route 1/Route 1A/Route 10	45
Houlton to Limestone/Loring Commerce Centre	Route 1/Route 89	75
Houlton to Presque Isle	Route 1	50
Caribou to Madawaska	Route 1	65
Caribou to Fort Kent	Route 161	55
Caribou to Easton	Route 1/Route 10	30
Presque Isle to Caribou	Route 1	20
Sherman to Madawaska	Route 1/I-95	160
Sherman to Van Buren	Route 1/I-95	130
Smyrna to Madawaska	Route 1/I-95	145

¹ Travel times are based on 1999 posted speed limits and represent optimum travel times.

Local Conflicts

Mars Hill, Presque Isle, and Caribou are the primary locations of localized traffic bottlenecks. The bottlenecks are caused by vehicles, including heavy trucks, traveling through the more heavily developed cities and towns where traveling speeds are slower due to the numerous intersecting roadways, driveway, and traffic signals. While these communities represent those locations with the most congestion regional traffic desiring to travel at high speeds conflicts with local traffic in small town centers and residential enclaves that occur along Route 1 and Route 161, as well as the other two-lane highways that serve the Study Area.

Connections between Aroostook County and External Markets

Current highway connections in Aroostook County can result in long travel times and high transportation costs to transport goods from Aroostook County to external points in the United States and Canada. From central and northern Aroostook County, only Route 1 and Route 11, which pass through several dense towns, provide access to nearly all U.S. markets via I-95. Commercial crossings to and from Canada are limited and can result in circuitous travel patterns. Houlton is the only full commercial port in Aroostook County where commercial products can enter from Canada without a special permit that must be applied for in advance of the trip. For example, if a carrier desires to bring goods through Van Buren or any other Aroostook County commercial crossing, they must possess a special permit, obtained in advance. Travel times and costs are increased when trucks have to be diverted from the most direct route through a permit port to a full commercial port. The demand for just-in-time delivery services has not only emphasized travel time minimization, but has also greatly constrained the logistics of goods movement. The time needed to apply for a permit and obtain approval is itself a transportation cost that forces many carriers to choose less direct routes to avoid paperwork processing delays.

3.3 Land Use, Economic, Social, and Cultural Environment

This section identifies elements of the human environment that provide important context to the study and that may be affected by potential actions taken as a result of this study. Information is presented on the existing:

- Land use;
- Agricultural land;
- Economic environment;
- Minority and disadvantaged populations;
- Uncontrolled petroleum and hazardous wastes;
- Cultural resources; and
- Public parks and recreation lands.

Figure 3-8 illustrates the key social and cultural resources within the Study Area that may pose constraints related to potential future transportation improvements.

3.3.1 Land Use

Land use is an important factor to consider in evaluating new and upgraded transportation corridors for several reasons. First, land use helps define the economic and population centers in the Study Area that the proposed transportation corridors are designed to serve. Second, the impacts of new and upgraded corridors on land use are important to consider when making decisions on where transportation improvements should be made, because impacts to land uses could potentially adversely affect the economy and social fabric of the communities within the Study Area. In Aroostook County, there are several major land use categories that greatly influence the social and economic fabric of the community; agriculture, forestry, and recreation (particularly snowmobiling).

This section describes the existing conditions along the SDEIS Corridors for these important land uses as well as for Native American Tribal Lands and for known uncontrolled petroleum and hazardous waste sites that could affect the implementation of transportation improvements. Potential impacts on land use from the Proposed Action and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 4, Environmental Consequences, Section 4.3.1, page 4-10.

3.3.1.1 Land Use Patterns

Forested and agriculture land dominate land use patterns in the Study Area. Together these uses account for 2,693 square miles or 97 percent of the land in the Study Area (the total size of the Study Area is 2,760 square miles). Forested land, including managed forestry, is the largest single land use, covering approximately 73 percent of the Study Area (2,015 square miles) (Figure 3-9). Agriculture is the second largest land use, covering 15 percent of the Study Area (425 square miles) (Figure 3-10). Commercial uses (Figure 3-11) represent only 41 square miles, or 1.5 percent, of land in the Study Area, and residential development comprises less than 23 square miles, or one percent of the total land area. Native American lands comprise 3.4 square miles, or 0.1 percent of the Study Area.

Developed areas are generally limited to the cities and towns and are spread out along the highway corridors within the Study Area. The Town of Houlton, the City of Presque Isle, the City of Caribou, and the Town of Madawaska have the greatest amount of residential, commercial, and industrial development. Other communities, including the Towns of Smyrna, Littleton, Monticello, Bridgewater, Mars Hill, and Westfield have small developed areas. Figure 3-11 shows the predominant land use types along the SDEIS Corridors based upon parcel zoning and qualitative review of aerial photography. Figure 3-12 illustrates the structure density along the SDEIS

Corridors. Figure 3-12 is based upon the number of structures within 300 feet of the centerline of the existing or proposed highway within each corridor.

3.3.1.2 Tribal Lands

The Aroostook Band of Micmac Indians and the Houlton Band of Maliseet Indians are the only federally-recognized sovereign tribal nations located within the Study Area. Both nations own large tracts of land adjacent to the SDEIS Corridor, shown on Figure 3-13.

The Houlton Band of Maliseet Indians owns 855 acres on five parcels of land along the Meduxnekeag River and Route 1 in Houlton and Littleton. Just one parcel held in trust for the Houlton Band abuts the SDEIS Corridors. This 50-acre parcel in Houlton is west of Route 1 approximately 2.5 miles south of the Littleton town line.

The Aroostook Band of Micmac Indians owns 1,343 acres on eight parcels of land in Littleton, Bridgewater, Presque Isle, Limestone, Caribou, and Connor TWP, including land along the SDEIS Corridors in Caribou, approximately halfway between downtown Presque Isle and downtown Caribou.

3.3.1.3 Snowmobile Trails

Aroostook County's 2,000 miles of snowmobile trails make the region a destination for winter tourism. The main trail system, known as the Interconnecting Trail System (ITS), runs throughout Aroostook County, generally near and parallel to existing roads with crossings in undeveloped regions. Connector trails and other maintained club trails are concentrated near Presque Isle, Caribou, Limestone, Fort Kent, and Madawaska. These trails are generally on privately-owned lands and are not subject to Section 4(f). Trails are illustrated on Figure 3-14.

3.3.1.4 Land Use Planning and Zoning

Compatibility of transportation plans with local comprehensive plans and zoning must be considered in an EIS. This section provides information on the relevant plans and zoning for the municipalities within the Proposed Action. 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 Maine Land Use Regulation Commission (LURC). Segment 4 is entirely within Caribou, and Segment 7 is entirely within Presque Isle.

The City of Caribou's Comprehensive Plan (January 2004) lists six transportation policies. Policies that are relevant to the ACTS include:

- 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 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 MaineDOT engineers and Regional Transportation Advisory Council to implement safe and efficient changes needed to Woodland's transportation network.

New Sweden lists the same six transportation policy goals in the Comprehensive Plan as Caribou.

The unorganized territories of T16R4 WELS, T17R4 WELS and Cross Lake Township, are zoned by the Maine 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 current Presque Isle Comprehensive Plan has not been updated since 1975. A new plan has been drafted by the City of Presque Isle but has not been submitted to the Maine State Planning Office for approval. It is expected to be approved, however, in the relatively near future without any major substantive changes. The draft Comprehensive Plan contains several key objectives relevant to the Proposed Action, 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.

3.3.2 Agricultural Land

Agricultural land is defined as land suitable for use in farming. Agriculture is one of the major economic sectors of the Study Area, and cultivated land and farms are the dominant landscape elements along most of the Study Area highways (Figures 3-10 and 3-11). Agricultural land is defined as land suitable for use in farming. It occupies approximately 425 square miles (15 percent) of the 2,760-square mile Study Area.

Farms and farmlands are important factors in evaluating the benefits and impacts of transportation corridors, since these are directly connected to economics, communities, and visual character. This section describes active farms and regulated farmland soils. Potential impacts on agricultural land from construction of Segments 2, 4 and 7 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 4, Environmental Consequences (Section 4.3.1, page 4-10).

3.3.2.1 Regulatory Context

The Farmland Protection Policy Act (FPPA) of 1981⁹ was enacted by the US Department of Agriculture (USDA) to ensure that significant agricultural lands be protected from conversion to non-agricultural uses. For highway projects receiving federal aid, the regulations promulgated under the FPPA require MaineDOT to coordinate with the USDA Natural Resources Conservation Service (NRCS).

3.3.2.2 Active Farms

Aroostook County is one of the largest potato growing regions in the United States. The cool climate and moist soils of this region are also ideal for cultivating broccoli. Other commercially grown crops include seed potatoes, barley, and canola. Crops are rotated making acreages of each crop within the Study Area variable from year to year, but as a whole, active agricultural land comprises approximately 15 percent of the Study Area.

Active farm fields are defined as agricultural land currently in use for farming. Active farm fields along the SDEIS Corridors were identified through meetings with local farmers, site reconnaissance, and review of aerial photography. Active farms generally occupy designated farmland soils, but may also occur in less productive soils. Meetings with the agricultural community helped identify highly productive agricultural land as well as less productive fields. Key field access points and storage facilities were located as well as where large farm equipment crosses highways. Site reconnaissance confirmed the locations of active fields, field access points, and locations where farm equipment crosses highways. Fields were delineated using aerial photography of the Study Area and Geographic Information Systems (GIS) software.

⁹ United States Department of Agriculture. Final rule effective August 6, 1984. *Section 2 [7 United States Code 4201] of the Farmland Protection Policy Act of 1981.*

As shown in Figure 3-10, active farms are concentrated in the south and central portions of the Study Area, between Houlton, Presque Isle, and Caribou. Farm fields are the dominant landscape feature throughout these portions of the Study Area. Farmland is also concentrated in the St. John Valley, between Fort Kent and the Town of Grand Isle. Route 161 from Caribou to New Sweden, Fort Kent to Daigle, and the region from Oakfield to Presque Isle are dominated by forest and contain few farm fields.

3.3.2.3 Prime and Unique Farmland Soils

The FPPA regulates four types of farmland soils: prime farmland, unique farmland, farmland of statewide importance, and farmland of local importance. Farmland subject to FPPA requirements is based on soil type and does not have to be actively used for agriculture. It can be pastureland, forested, or other land types, but not open water or developed urban or transportation areas. FPPA requirements apply if a project completed by a federal agency or with assistance from a federal agency will irreversibly convert farmland to non-agricultural use.

Prime farmland, unique farmland, farmland of state wide importance, and farmland of local importance within the SDEIS Corridors were digitized from USDA soils maps into a GIS compatible format. The large Study Area made mapping the entire Study Area impracticable.

Prime farmland and farmland of statewide importance were the only regulated soil types found in the SDEIS Corridors.

Prime Farmland is defined by the NRCS as *“land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary. Prime farmland includes land that possesses the above characteristics but is being used currently to produce livestock and timber. It does not include land already in or committed to urban development or water storage.”*¹⁰

Prime Farmland Soils are listed in Table 3-7 on page 3-28.

Farmland of Statewide or Local Importance is defined as *“farmland, other than prime or unique farmland, that is of statewide or local importance for the production of food, feed, fiber, forage, or oilseed crops, as determined by the appropriate State or unit of local government agency or agencies, and that the Secretary determines should be considered as farmland for the purposes of this subtitle.”*¹¹

Farmland of Statewide Importance is listed in Table 3-7 on page 3-28.

¹⁰ United States Department of Agriculture. Final rule effective August 6, 1984. *Section 2 [7 United States Code 4201] of the Farmland Protection Policy Act of 1981.*

¹¹ *Ibid.*

**Table 3-7
 Prime Farmland Soils and Farmland of Statewide Importance within the SDEIS Corridors**

Series	Series Symbol	Textures	Slope Class ¹		Parent Material	Drainage Class
			Prime	Statewide Importance		
Allagash	Ag	Fine sandy loam	A, B	C	Outwash	Well drained
Benson ²	Be	Silt loam	A, B	—	Calcareous till	Well drained
Canandaigua	Cd	Silt loam	B	—	Outwash	Poorly drained
Caribou	Cg	Gravelly loam	A, B	C	Calcareous till	Well drained
Colton	Cn	Gravelly sandy loam	A, B	—	Outwash	Somewhat poorly drained
Conant	Co	Silt loam	A, B	—	Calcareous till	Moderately well drained
Daigle ³	Da	Silt loam	A, B	—	Calcareous till	Somewhat poorly drained
Fredon and Halsey ³	Fh	Silt loam	A, B	—	Outwash	Very poorly drained
Hadley	Ha	Silt loam	A, B	—	Recent alluvium	Moderately well drained
Howland	Ho	Gravelly loam	A, B	C	Acid till	Moderately well drained
Linneus	Ln	Silt loam	B	C	Calcareous till	Well drained
Machias	Ma	Gravelly loam	A, B	—	Outwash	Moderately well drained
Madawaska	Mb	Fine sandy loam	A, B	C	Outwash	Moderately well drained
Mapleton	Mh	Shaly silt loam	B	C	Calcareous till	Well drained
Nicholville	Nc	Silt loam, very fine sandy loam	A	B	Outwash	Moderately well drained
Perham	Pe	Gravelly silt loam	A, B	C	Calcareous till	Well drained
Plaisted	Pg	Gravelly loam	A, B	C	Acid till	Well drained
Red Hook and Atherton ³	Ra	Silt loam	A, B	—	Outwash	Poorly/very poorly drained
Salmon	Sa	Silt loam	A	C	Outwash	Well drained
Stetson	Sg	Gravelly loam	A, B	—	Outwash	Well drained
Thorndike ²	Th	Shaly silt loam	B	—	Acid till	Well drained
Winooski	Wn	Silt loam	—	—	Recent alluvium	Moderately well drained

Source: Soil Conservation Service, 1964. *Soil Surveys Aroostook County Northeastern Part and Southern Part*, and correspondence from the USDA field offices in Presque Isle and Houlton, Maine, 2000 and with Wayne Hoar, Maine State Soil Scientist 2001.

- 1 Slope Classes: A = 0-2 percent slope; B = 2-8 percent slope; C = 8-15 percent slope; no slope designation = soil is only found at 0 percent slope
- 2 Prime only if irrigated
- 3 Prime only if drained

Prime farmland and farmland of statewide importance have been mapped by NRCS for the SDEIS Corridors. Overall there is slightly less prime farmland (5,620 acres) than farmland of statewide importance (6,568 acres). The heavily forested area from Smyrna Mills to Westfield contains some farmland of statewide importance and very little prime farmland. Table 3-7 above describes the Prime Farmland Soils and Farmland of Statewide Importance that occur within the SDEIS Corridors.

3.3.3 Social and Economic Environment

This section provides baseline socioeconomic data for the Study Area. Potential impacts on the socioeconomic environment from construction of Segments 2, 4, and 7 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 4, Environmental Consequences (Section 4.3.3, page 4-20).

The Study Area comprises the 55 communities listed in Table 3-8 (below). Although some of the information presented is organized by municipality, the large number of local jurisdictions in the Study Area and the variety of geographies used by different data sources require that certain subjects be discussed at a more regional level. Some information is presented for all of Aroostook County or for the Study Area’s labor market areas (LMAs), which include Patten-Island Falls, Houlton, Presque Isle-Caribou, Van Buren, Madawaska and Fort Kent.¹² The Study Area contains nearly 94 percent of the total Aroostook County population while the population of the LMA’s is slightly larger, since the Patten-Island Falls LMA includes communities located in Penobscot County that are not in the Study Area.

**Table 3-8
 Communities within the Study Area**

Ashland	Fort Kent	Masardis	Sherman
Blaine	Frenchville	Merrill	Smyrna
Bridgewater	Grand Isle	Monticello	St. Agatha
Caribou	Hamlin	Moro Plantation	Stacyville
Castle Hill	Hammond	Mount Chase	Stockholm
Caswell	Hersey	Nashville Plantation	Van Buren
Chapman	Houlton	New Canada	Wade
Conner TWP	Island Falls	New Limerick	Wallagrass Plantation
Crystal	Limestone	New Sweden	Washburn
Cyr Plantation	Littleton	Oakfield	Westfield
Dyer Brook	Ludlow	Patten	Westmanland
Eagle Lake	Madawaska	Perham	Winterville Plantation
Easton	Mapleton	Portage Lake	Woodland
Fort Fairfield	Mars Hill	Presque Isle	

¹² Labor Market Areas, as defined by the Bureau of Labor Statistics, U.S. Department of Labor, “consists of an economically integrated geographical area within which workers can reside and find employment within a reasonable distance or can readily change employment without changing their place of residence.” LMA’s are utilized by the Maine Department of Labor (MeDOL) for statistical reporting purposes. In 2004, subsequent to the analysis undertaken for this report, the MeDOL revised its LMA definitions statewide. This resulted in the combination of the Patten-Island Falls LMA with the Houlton LMA and the Fort Kent LMA into the Presque Isle LMA.

Where specific localized data were available, some information is presented based on selected communities within the Study Area. These data were also used in the DEIS in order to provide a more local context.

The data presented here represent an update of the socioeconomic information contained in the DEIS. The DEIS utilized the best available data at the time, which included 1990 Census population and income estimates, as well as employment and economic estimates and/or forecasts provided by other sources. The updated socioeconomic data includes population and demographic trends as well as economic, municipal tax base, housing, and real estate conditions.

3.3.3.1 Population, Employment and Income

The population, labor force, and income levels in the Study Area have fluctuated modestly since the publication of the DEIS in February 2002, based on information from the U.S. Census, Maine State Planning Office, Maine Department of Labor, and Claritas, Inc.

Population Trends

The dominant characteristic of Aroostook County's population has been its steady decline over the past several decades. Based on the 2000 Census, this trend continued in the 1990s. Aroostook County's 2000 population base of 73,938 was 15 percent less than it was in 1990, having lost almost 13,000 people.

The Study Area mirrored the population decline experienced within Aroostook County with a loss of 11,686 (or 14.2 percent) over the same time period. Individually, all of the LMAs within the Study Area experienced a decline in population. The Presque Isle-Caribou LMA experienced the most rapid decline in population (11,057 or 22 percent) over the time period, due in large part to the closure of Loring Air Force Base in 1994.

With the exception of Woodland, Castle Hill, Mapleton, Blaine, Wade, Hammond, Smyrna, Perham, Chapman, New Canada, Hamlin, Nashville Plantation and Moro Plantation, most communities experienced a decline in population throughout the 1990s, ranging from a loss of over 7,500 residents (76 percent) in Limestone, to the loss of one resident in Littleton, Westmanland, and New Limerick. As shown in Table 3-9 (page 3-31), the general decline in population experienced in Aroostook County and the Study Area is in-line with (or slightly greater than) the population decline (pre-Census 2000) trends reported in the DEIS (page 3-39).

**Table 3-9
 Population Trends: 1990-2000**

	1990	2000	# Change	Percent Change
Study Area	82,262	70,576	-11,686	-14.2
Labor Market Areas				
Fort Kent LMA	7,623	7,274	-349	-4.6%
Houlton LMA	13,739	13,387	-352	-2.6%
Madawaska LMA	8,182	7,694	-488	-6.0%
Patten-Island Falls LMA	4,324	3,904	-420	-9.7%
Presque Isle-Caribou LMA	50,172	39,115	-11,057	-22.0%
Van Buren LMA	3,391	3,005	-386	-11.4%
Total	87,431	74,379	-13,052	-14.9%
Aroostook County	86,936	73,938	-12,998	-15.0%

Source: U.S. Census and Maine State Planning Office

Population Projections

According to population projections provided by the Maine State Planning Office, between 2000 and 2015 Aroostook County's population is expected to essentially remain stable with an increase of less than one percent, representing an increase of about 400 residents over the time period. The projected stable population growth pattern for Aroostook County is similar to the pattern reported in the DEIS (page 3-38). As the population projection within the DEIS was prepared prior to the availability of 2000 Census data, the population base projected in the DEIS (page 3-38) could be over-estimated by approximately 8,000. Table 3-10 (below) presents Aroostook County's population trends and projected population growth to 2015 as forecast by the Maine State Planning Office.

**Table 3-10
 Population Projections: Aroostook County and Maine 1990 – 2015**

	1990	2000	2005	2010	2015
Aroostook County	85,662	72,479	71,009	71,065	72,893
Maine	1,225,259	1,270,299	1,300,000	1,330,117	1,371,022

Source: Maine Office of State Planning (2000)

Population Age Distribution

Between 1990 and 2000, Aroostook County's population experienced a shift of population base from younger age cohorts into older ones. This is shown in Table 3-11 (below) where in 1990, about 13 percent of Aroostook County's population was age 65 and over, compared to 17 percent in 2000. Accordingly, substantial reductions in population were experienced in the under five (pre-school age), five to 19 (school-age), 20 to 24 (college-age), and 25 to 34 (young family-age) age cohorts. The most striking losses in population over the time period were experienced in the 25 to 34 age cohort at about 6,700 residents, representing a loss of about 45 percent. The 35 to 54 age cohort experienced the greatest increase at 881 individuals, a gain of four percent.

Table 3-11
Population Change by Age: 1990-2000

Age Cohort	1990 (%)	2000 (%)	# Change	Percent Change
Under 5	6,055 (7.0)	3,730 (5.0)	-2,325	-38.4%
5 to 19	18,766 (21.6)	15,005 (20.3)	-3,761	-20.0%
20 to 24	6,407 (7.4)	3,803 (5.1)	-2,604	-40.6%
25 to 34	14,769 (17.0)	8,095 (10.9)	-6,674	-45.2%
35 to 54	21,825 (25.1)	22,706 (30.7)	881	4.0%
55 to 64	7,987 (9.2)	8,048 (10.9)	61	0.8%
65 to 74	6,335 (7.3)	6,811 (9.2)	476	7.5%
75 to 84	3,649 (4.2)	4,216 (5.7)	567	15.5%
85 and Over	1,143 (1.3)	1,524 (2.1)	381	33.3%
Total	86,936 (100.0)	73,938 (100.0)	-12,998	-15.0%

Source: United States Census Bureau

Labor Force, Employment and Unemployment Rate Trends

Table 3-12 (page 3-33) shows recent changes in the size of the labor force, the number of persons employed, and the unemployment rates within Aroostook County, the Study Area, and Maine. Table 3-12 (page 3-33) also shows that, between 2000 and 2003, labor market conditions in all three geographies have generally declined. This decline in labor conditions runs opposite to those projected in the DEIS (page 3-40), which were based on data from the late 1990s), indicating that the overall regional economic decline of the early part of the current decade has shown little sign of recovery.

**Table 3-12
 Labor Force, Employment, and Unemployment Rate Trends**

	2000	2003	# Change	Percent Change
Labor Force				
Maine	685,781	693,083	7,302	1.1%
Aroostook County	37,931	37,640	-291	-0.8%
Study Area	38,305	38,063	-242	-0.6%
Employment				
Maine	662,066	658,068	-3,998	-0.6%
Aroostook County	36,291	35,422	-869	-2.4%
Study Area	36,673	35,852	-821	-2.2%
Unemployment Rate				
Maine	3.5%	5.1%	N/A	1.6%
Aroostook County	4.3%	5.9%	N/A	1.6%
Study Area	4.3%	5.8%	N/A	1.5%

Source: Maine Department of Labor
 N/A = Not Applicable

As shown, the size of the labor force statewide has increased marginally by 1.1 percent over the time period (which is a generally positive economic indicator showing a growing supply of labor). The positive growth in labor force over the time period was not experienced in Aroostook County and the Study Area, however. Both geographies experienced a small decline in labor force of less than one percent. This decline in labor force indicates a reduction in the number of employable residents between the ages of 20 and 64.

The number of employed residents declined in the State (by about 4,000 people or less than one percent), Aroostook County (by about 870 people or 2.4 percent), and the Study Area (by about 820 people or 2.2 percent). Over the time period, employment losses within the Study Area were concentrated within the Presque Isle-Caribou LMA (455 jobs or 55 percent of the total) and the Madawaska LMA (194 jobs or 24 percent of the total).

As shown, the 2003 average unemployment rates in Aroostook County (5.9 percent) and the Study Area (5.8 percent) are above the statewide average of 5.1 percent. In terms of unemployment rate trends over the 2000 to 2003 time period, rates generally increased equally within all three areas by between 1.5 and 1.6 percentage points.

At-Place Employment

As opposed to resident employment, which indicates the number of employed residents within a respective community or region, at-place employment (Table 3-13, page 3-34) is a measure of jobs within a respective community or region and is a good indicator of local economic activity.

As shown in Table 3-13 (below), at-place employment growth between 2001 and 2003 was virtually stagnant (less than one-half of one percent growth) within selected communities for which data was available, the LMAs and Aroostook County. In terms of individual communities, Houlton experienced the most significant growth in at-place employment by adding 239 jobs over the time period. The Houlton and Presque Isle-Caribou LMAs accounted for the majority of job growth over the time period, indicating that economic growth is concentrated in the larger more urban centers.

Table 3-13
At-Place Employment Trends: 2001-2003

	2001	2003	# Change	Percent Change
Blaine	133	54	-79	-59.4%
Bridgewater	74	80	6	8.1%
Caribou	4,029	4,031	2	0.0%
Fort Fairfield	830	865	35	4.2%
Fort Kent	2,598	2,470	-128	-4.9%
Houlton	3,651	3,890	239	6.5%
Limestone	1,250	1,294	44	3.5%
Littleton	144	132	-12	-8.3%
Madawaska	2,538	2,356	-182	-7.2%
Mars Hill	547	626	79	14.4%
Monticello	109	117	8	7.3%
New Canada	8	16	8	100.0%
Presque Isle	8,016	8,060	44	0.5%
Van Buren	<u>802</u>	<u>817</u>	<u>15</u>	<u>1.9%</u>
Total	24,729	24,808	79	0.3%
Fort Kent LMA	3,183	3,182	-1	0.0%
Houlton LMA	4,696	4,971	275	5.9%
Madawaska LMA	3,016	2,854	-162	-5.4%
Patten-Island Falls LMA	1,086	986	-100	-9.2%
Presque Isle-Caribou LMA	17,425	17,554	129	0.7%
Van Buren LMA	<u>804</u>	<u>820</u>	<u>16</u>	<u>2.0%</u>
Total	30,210	30,367	157	0.5%
Aroostook County	29,896	30,057	161	0.5%

Source: Maine Department of Labor

Business Establishments

Although at-place job growth in selected communities within the Study Area and Aroostook County was relatively stagnant between 2001 and 2003, both areas experienced a loss of business establishments over the same time period. As shown in Table 3-14 (below), according to the Maine Department of Labor, there were 2,551 business establishments in Aroostook County in 2003, a decrease of 55 firms (2.1 percent) since 2001. On a labor market basis, with the exception of the Fort Kent LMA, which experienced an increase of 15 firms over the time period, every LMA lost business establishments, even though some LMAs, including Houlton, showed modest gains in employment. As shown by Table 3-14 (below), the Presque Isle-Caribou LMA contains about half of the business establishments within the entire Study Area.

Table 3-14
Business Establishment Trends: 2001-2003

	2001	2003	# Change	Percent Change
Blaine	18	14	-4	-22.2%
Bridgewater	18	21	3	16.7%
Caribou	324	314	-10	-3.1%
Fort Fairfield	91	89	-2	-2.2%
Fort Kent	229	229	0	0.0%
Houlton	345	327	-18	-5.2%
Limestone	68	70	2	2.9%
Littleton	26	21	-5	-19.2%
Madawaska	144	139	-5	-3.5%
Mars Hill	69	66	-3	-4.3%
Monticello	16	17	1	6.3%
New Canada	7	10	3	42.9%
Presque Isle	500	486	-14	-2.8%
Van Buren	<u>90</u>	<u>84</u>	<u>-6</u>	<u>-6.7%</u>
Total	1,945	1,887	-58	-3.0%
Fort Kent LMA	343	358	15	4.4%
Houlton LMA	479	461	-18	-3.8%
Madawaska LMA	209	204	-5	-2.4%
Patten Falls LMA	169	161	-8	-4.7%
Presque Isle-Caribou LMA	1,354	1,312	-42	-3.1%
Van Buren LMA	<u>92</u>	<u>86</u>	<u>-6</u>	<u>-6.5%</u>
Total	2,646	2,582	-64	-2.4%
Aroostook County	2,606	2,551	-55	-2.1%

Source: Maine Department of Labor

Median Household Income

The median household income in Maine in 2000 was \$37,240, which represents an increase of \$1,680, or 4.7 percent, since 1998. The 2000 median household income estimate for Aroostook County was \$30,094 (which was \$7,146 below the statewide level) and had increased by \$636 (2.2 percent) since 1998. Median household income estimates for the Study Area communities in 2000 ranged from a low of \$20,038 in Van Buren to a high of \$46,429 in Dyer Brook. Although experiencing substantial gains as compared to both Aroostook County and the State, the estimated median household income for all communities in the Study Area was \$24,343 in 1998 and \$29,395 in 2000 or roughly 79 percent of the statewide median. These figures are essentially unchanged since the household income assessment completed for the DEIS. Table 3-15 (below) provides median household income data for the Study Area, Aroostook County, and Maine.

Table 3-15
Median Household Income Trends: 1998-2000

	1998	2000	Change	Percent Change
Study Area	\$24,343	\$29,395	\$5,052	20.8%
Aroostook County	\$29,458	\$30,094	\$636	2.2%
Maine	\$35,560	\$37,240	\$1,680	4.7%

Source: Claritas, Inc. and Maine State Planning Office. 2000.

Per capita income levels of Aroostook County residents were close to the State of Maine average during the 1970s. Since then, the rate of per capita income growth in Aroostook County has consistently lagged behind the state as a whole. By 2000, per capita personal income in Aroostook County was approximately \$20,800, 19 percent below the statewide average of approximately \$25,700.

3.3.3.2 Community Characteristics and Conditions

This section describes the housing and commuting patterns within the Study Area communities.

Housing Units

According to housing unit estimates provided by the U.S. Census and the NMDC, the Study Area had 38,294 housing units in 2000, an increase of 338 units (0.9 percent) since 1990. Within the Labor Market Areas, Houlton increased by 558 units (an increase of 9.1 percent) and Fort Kent by 503 units (an increase of 13.6 percent). These two towns outperformed all other LMAs in terms of housing unit growth over the time period. The Presque Isle-Caribou LMA experienced the largest decrease in

housing units (1,130 units or 5.6 percent) over the time period. The loss in housing units within the Presque Isle-Caribou LMA is attributed to reductions in the housing stock in Limestone (780 units or 32.0 percent) and Caribou (258 units or 6.3 percent). Table 3-16 (below) shows the change in housing units within selected Study Area communities and LMAs.

Table 3-16
Housing Unit Trends: 1990-2000

Towns	1990	2000	# Change	Percent Change
Blaine	336	339	3	0.9%
Bridgewater	291	311	20	6.9%
Caribou	4,089	3,831	-258	-6.3%
Fort Fairfield	1,648	1,654	6	0.4%
Fort Kent	1,634	1,824	190	11.6%
Houlton	2,774	2,994	220	7.9%
Limestone	2,434	1,654	-780	-32.0%
Littleton	368	447	79	21.5%
Madawaska	2,212	2,362	150	6.8%
Mars Hill	716	706	-10	-1.4%
Monticello	390	416	26	6.7%
New Canada	88	121	33	37.5%
Presque Isle	4,411	4,405	-6	-0.1%
Van Buren	1,247	1,232	-15	-1.2%
Westfield	<u>250</u>	<u>240</u>	<u>-10</u>	<u>-4.0%</u>
Total Housing Units with Study Area selected towns	22,888	22,536	-352	-1.5%
Labor Market Areas				
Fort Kent LMA	3,710	4,213	503	13.6%
Houlton LMA	6,121	6,679	558	9.1%
Madawaska LMA	4,413	4,688	275	6.2%
Patten-Island Falls LMA	2,228	2,360	132	5.9%
Presque Isle-Caribou LMA	20,079	18,949	-1,130	-5.6%
Van Buren LMA	<u>1,405</u>	<u>1,405</u>	<u>0</u>	<u>0.0%</u>
Total Housing Units within LMAs	37,956	38,294	338	0.9%

Source: United States Census Bureau and Northern Maine Development Commission

The increase in the number of housing units contrasts with the loss of population in nearly all communities during the 1990 to 2000 decade. This reflects the shrinking size of the average household due in part to the continued loss of the younger, family-starting age cohorts and the general aging of the population. The decrease in housing units in Caribou and Limestone is likely due to the population loss attributed to the closure of Loring Air Force Base in 1994.

Commuting Patterns

Based on 1990 LMA level commuting pattern data provided by the U.S. Census and the Maine State Planning Office, the research undertaken for the DEIS indicated that there was very little commuting to work across LMA boundaries. The data revealed that the number of persons working in the same LMA as their residence ranged from a low of 78.4 percent in the Van Buren LMA, to a high of 98.2 percent in the Presque Isle-Caribou LMA. Since 2000 commuting pattern data are currently only available at the county level, a comparison of commuting patterns between 1990 and 2000 is not available. However, given the high incidence of individuals working within the same LMA as their residence, it is likely that this pattern has changed very little.

3.3.3.3 Municipal Fiscal Conditions

This section describes the municipal fiscal and tax base characteristics for selected Study Area communities based on information provided by the Maine State Planning Office and the Maine Municipal Association.

Municipal Expenditures

As shown in Table 3-17 (page 3-39), the municipal expenditures for the selected communities within the Study Area for which current data were available totaled approximately \$51.8 million in 2002. On an individual basis, total municipal expenditures ranged from a low of about \$251,000 in New Canada to a high of about \$16.5 million in Presque Isle. The table also shows the distribution of expenditures for each community by spending category and indicates that education (included within the category listed as "other") expenditures range between 29 percent and 58 percent of total municipal spending. Education is typically the largest expenditure item for most communities.

Table 3-17
Total Municipal Expenditures for Selected Study Area Communities: 2002

	General Administration	Public Safety	Public Works	Codes & Health Services	Parks & Recreation	Other (includes Education)	Total	Other as % of Total
Blaine	\$60,000	\$33,500	\$152,700	\$3,100	\$18,500	\$276,000	\$543,800	50.8%
Caribou	\$1,423,803	\$2,294,099	\$1,600,046	\$145,253	\$581,933	\$3,236,291	\$9,281,425	34.9%
Fort Kent	\$624,063	\$469,123	\$670,967	\$12,625	\$131,889	\$1,651,797	\$3,560,464	46.4%
Houlton	\$1,330,325	\$1,725,303	\$790,141	\$115,757	\$417,559	\$2,396,779	\$6,775,864	35.4%
Madawaska	\$952,841	\$1,073,603	\$1,827,838	\$271,056	\$357,116	\$6,152,374	\$10,634,828	57.9%
Mars Hill	\$204,117	\$180,765	\$366,729	\$15,020	\$62,099	\$547,227	\$1,375,957	39.8%
Monticello	\$71,479	\$28,757	\$146,502	\$9,565	\$8,552	\$330,400	\$595,255	55.5%
New Canada	\$14,232	\$9,643	\$84,959	\$498	\$0	\$141,703	\$251,035	56.4%
Presque Isle	\$2,094,896	\$4,140,155	\$4,337,878	\$54,581	\$1,060,202	\$4,783,661	\$16,471,373	29.0%
Van Buren	\$370,397	\$317,635	\$669,141	\$84,020	\$99,010	\$744,205	\$2,284,408	32.6%
Total	\$7,146,153	\$10,272,583	\$10,646,901	\$711,475	\$2,736,860	\$20,260,437	\$51,774,409	39.1%

Source: Maine Municipal Association

Municipal Revenues

Based on municipal revenue estimates provided by the Maine Municipal Association, the selected Study Area communities received approximately \$80.3 million in revenues. These revenues were generated through local real estate or personal property taxes (tax revenue), fees and licenses (non-tax revenue), as well as intergovernmental transfers from the state and federal governments. As shown in Table 3-18 (page 3-40), Caribou, Houlton, Madawaska, and Presque Isle account for almost \$63 million (or 78 percent) of the total revenue base. Locally generated revenues (both property tax and non-tax) account for the largest portion of the revenue base, representing 53 percent of the total.

Table 3-18
Total Municipal Revenues¹ for Selected Study Area Communities: 2002

	Local	State	Federal	Total
Blaine	\$513,134	\$1,012,681	\$0	\$1,525,815
Caribou	\$8,208,242	\$8,115,024	\$23,746	\$16,347,012
Fort Fairfield	N/A	N/A	N/A	N/A
Fort Kent	\$3,130,171	\$3,777,806	\$18,488	\$6,926,465
Houlton	\$5,937,668	\$5,801,010	\$9,417	\$11,748,095
Madawaska	\$9,682,146	\$2,451,890	\$979,185	\$13,113,221
Mars Hill	\$1,309,132	\$1,577,901	\$5,481	\$2,892,514
Monticello	\$493,662	\$756,101	\$2,906	\$1,252,669
New Canada	\$218,491	\$229,023	\$0	\$447,514
Presque Isle	\$11,958,307	\$9,200,611	\$566,460	\$21,725,378
Van Buren	\$1,525,120	\$2,833,756	\$0	\$4,358,876
Total	\$42,976,073	\$35,755,803	\$1,605,683	\$80,337,559

¹ Does not include surplus or reserve funds

Source: Maine Municipal Association

N/A = Not Available

Municipal Property Tax Base

In 2002, the selected Study Area communities had a total tax base of approximately \$1.58 billion of which 63 percent (\$989 million) was from building improvements and the remaining 37 percent was almost equally split between land and personal property. In terms of total tax base (land, buildings, and personal property), Presque Isle (at 22 percent of the total or \$351 million) and Madawaska (at 21 percent of \$337 million) account for 43 percent of the selected Study Area communities' tax base. The size of the tax base in Madawaska (whose population is roughly 20 percent of Presque Isle's) is largely due to the Fraser Paper Mill. Table 3-19 (page 3-41) shows the municipal property tax base of selected Study Area communities in 2002.

**Table 3-19
 Municipal Property Tax Base for Selected Study Area Communities: 2002**

	Land	Buildings	Personal Property	Total	% of Total Value
Blaine	\$6,253,617	\$14,464,632	\$881,095	\$21,599,344	1.4%
Bridgewater	\$7,961,271	\$11,578,730	\$357,675	\$19,897,676	1.3%
Caribou	\$48,533,300	\$174,035,300	\$15,969,800	\$238,538,400	15.1%
Fort Fairfield	\$30,391,500	\$75,792,800	\$23,989,910	\$130,174,210	8.2%
Fort Kent	\$21,049,100	\$83,169,417	\$14,286,389	\$118,504,906	7.5%
Houlton	\$37,208,600	\$109,220,400	\$15,686,400	\$162,115,400	10.3%
Limestone	\$8,771,985	\$25,903,200	\$2,769,490	\$37,444,675	2.4%
Littleton	\$9,005,966	\$11,922,940	\$368,887	\$21,297,793	1.3%
Madawaska	\$21,738,930	\$152,886,430	\$162,686,720	\$337,312,080	21.4%
Mars Hill	\$8,947,433	\$27,419,381	\$5,246,478	\$41,613,292	2.6%
Monticello	\$6,502,850	\$9,308,847	\$200,900	\$16,012,597	1.0%
New Canada	\$4,692,713	\$6,549,600	\$1,011,019	\$12,253,332	0.8%
Presque Isle	\$73,004,300	\$236,614,800	\$41,069,500	\$350,688,600	22.2%
Van Buren	\$10,443,298	\$41,926,119	\$3,743,950	\$56,113,367	3.6%
Westfield	\$6,328,238	\$8,137,150	\$599,780	\$15,065,168	1.0%
Total	\$300,833,101	\$988,929,746	\$288,867,993	\$1,578,630,840	100.0%

Source: Maine State Planning Office

3.3.3.4 Economic Development Initiatives and Outlook

This section describes major employers, economic development resources, higher education, tourism, and some of the economic issues that the regional economy will be facing over the next few years.

Major Employers

As shown in Table 3-20 (page 3-42), based on employer information provided by the NMDC, the largest employer in Aroostook County is Fraser Paper in Madawaska with 1,179 employees. The remaining major employers have much smaller employment bases, ranging from 835 workers (the second largest) through 286 (the smallest of the major employers). All of the major employers listed are within either the manufacturing or service industry sectors. In terms of the geographic locations of the major employers, with the exception of McCain Foods in Easton and firms with multiple locations, all of the major employers are located in the largest urban centers in the Study Area.

**Table 3-20
 Top Ten Major Study Area Employers: 1999**

Company/Organization	SIC¹ Code	Employees	Location
Fraser Paper Company	2621	1,179	Madawaska
Aroostook Medical Center	8062	835	Multiple Locations
Burrelle's Press Clippings	7389	700	Presque Isle
McCain Foods	2037	557	Easton
Cary Medical Center	8062	401	Caribou
MSAD #1	8211	340	Presque Isle
Caribou Nursing Home	8051	314	Caribou
Houlton Regional Hospital	8062	312	Houlton
Northern Maine Medical Center	8062	300	Fort Kent
Caribou School Department	<u>8211</u>	<u>286</u>	Caribou
Total		5,224	
Percent of Study Area Employment Base		17.3%	

Source: Northern Maine Development Commission
 1 Standard Industrial Classification.

Active Industrial Parks

Based on information provided by Maine Public Service and the Maine Department of Economic and Community Development, there are fourteen business and industrial parks in ten communities throughout the Study Area which are actively marketed by both public and private organizations (Figure 3-15). The business and industrial parks contain a total of 10,118 acres of land of which 86 percent is within the Loring Commerce Centre in Limestone – the largest park in the Study Area and a major focus for regional economic development. In 2005, 5,038 acres was available for development with 87 percent of the total available acreage contained within the Loring Commerce Centre. Six of the industrial parks have rail access. All of the industrial parks are located within 35 miles of an airport, with three having air service capabilities on site (Presque Isle, Loring, and Houlton). Table 3-21 (page 3-43) shows the acres of land and principal tenants within industrial parks in the Study Area. Since the publication of the DEIS (page 346 and Figure 3-15), there have been minor changes in the reported amount of available land in some of the industrial parks.

In addition to the formal industrial parks, there are many sites throughout Aroostook County that could potentially be used for industrial and commercial development. Many of these sites are located on or near major roadways, however, few are believed to have water, sewer, or telecommunications infrastructure in place.

In January of 2002, all or parts of 22 Aroostook County communities were designated as the Aroostook County Empowerment Zone (ACEZ), one of only 10 rural

empowerment zones in the United States, and one of only two that are based on population loss. The Aroostook County Empowerment Zone (ACEZ) consists of three separate areas located in the northern part of the Study Area (three communities including Fort Kent), in the central Aroostook region (12 communities centered around Caribou and Presque Isle) and in the south (six communities including Houlton). The empowerment zone program was created in the early 1990s by the federal government (Department of Agriculture/Rural Development) to aid distressed communities by providing opportunities for growth and revitalization through access to capital, training programs, favorable financing mechanisms, tax incentives and other economic development tools in order to attract and retain jobs for local residents. The ACEZ is locally administered by the NMDC.

Table 3-21
Major Industrial Parks and Land Supply: Aroostook County

Community	Total Acres	Available (2005)	Rail	Principal Tenants
Ashland	62	20	No	Kelley Lumber Sales
Caribou	25	13	No	Aroostook Cab, First Technology, SFE Manufacturing, Maine Public Service
Easton	127	0	Yes	J.M. Huber, McCain Foods Ltd., Spruce Enterprises
Fort Fairfield	125	105	Yes	Fairfield Energy Ventures
Fort Kent	100	0	Yes	Coles Express, Daigle Oil, Irving Specialty Products, Kent Inc., Fort Kent Packing Shed
Houlton	100	50	No	Larson FBO, Sabian Cymbal, Smith & Wesson, Ward Log Homes
Limestone	8,700	4,400	Yes	Defense Finance & Accounting Service Center, Hydroblend Inc., International Sourcing, Loring Health Center, MacDonald Enterprises, Maine Winter Sports Center, Maine Army National Guard, Max The Moose Furniture, Maine Street Flour, Inc. National Jobs Corps Center, Pattison Sign Group RS Information Systems, Sitel Corp., Telford Aviation/Volvo
Mars Hill	29	0	No	McCrum Farms, Caron's Property Maintenance, A.E. McQuade & Sons, Boyd Enterprises, Ketchum Farms
Presque Isle	450	150	Yes	Aroostook Trusses, Acme Monaco, CAM Mfg., Coca-Cola, Columbia Forest Products, FedEx, Fiber Materials, Frito-Lay, Industrial Electronics, Linguistics Management Systems, McCain Transport, Michaud Snack Foods, Northeast Packaging, Northeast Publishing, Northern Maine Regional Airport, UPS
Van Buren	400	300	Yes	Aegis Bicycles, Kevlaur Industries, Valley Landscapes
Total	10,118	5,038		

Source: Maine Public Service

Educational Institutions

Recent reports have shown that there is a strong correlation between job generation, out-migration, and educational opportunities, especially higher education. Relative to the size of the population, the region is well-served by educational institutions and training centers. The region has many award winning primary and secondary schools and is home to four post-secondary institutions.

The Northern Maine Community College in Presque Isle was established in 1961 and currently serves approximately 2,000 students in more than thirty programs such as automotive technology, information technology and nursing. The University of Maine at Presque Isle, founded in 1903, is an accredited institution that offers more than thirty four-year baccalaureate and two-year associate degree programs in four divisions. The University of Maine at Fort Kent, founded as the Madawaska Training School in 1878, is an accredited institution offering a wide variety of baccalaureate and two-year associate degree programs. The school is nationally recognized for its forestry program. Husson College, founded in 1898, has a satellite campus in Caribou which is accredited by the New England Association of Schools and Colleges and offers graduate, undergraduate, associates, and bachelor's degrees in business.

One of the most serious challenges to the northern Maine economy is the out-migration of youth from the region. A large majority of high school students leave the region in order to attend colleges and universities in southern Maine or outside of the state. Many do not return to northern Maine due to greater employment opportunities that utilize the skills and knowledge acquired from their post-secondary education and greater cultural and urban amenities located outside of the region. A declining youth population depletes the economic and social fabric of a community or region and can have serious long-term effects. For a regional economy that has relied almost exclusively on its natural assets, attention and resources will have to be directed to addressing the youth out-migration challenge. In addition, the cultural amenities provided by colleges enhance the livability of the communities in which they are located.

A recent study by the University of Southern Maine Center for Business and Economic Research¹³ analyzed out-migration from Aroostook County and found that many of Aroostook County's youth left or intended to leave in order to pursue higher education objectives, and that given the opportunity, many would prefer to stay in Aroostook County.

Tourism

The Aroostook County economy is becoming increasingly dependent on tourism-related activities as a major source of income and employment. As reported in the

¹³ Charles Colgan 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.

DEIS (page 3-50), visitors to the region impact a wide variety of economic sectors including meals and lodging establishments, service businesses, and transportation providers. The region attracts visitors from other parts of Maine, from other states as well as from Canada throughout the year, with a large number of activities and destinations such as hunting, skiing, camping, snowmobiling, hiking, sightseeing and cultural enhancement. A recent report¹⁴ highlighted the importance of tourism and indicated that although it is a growing “industry,” the Aroostook County rate of growth has lagged that of the State of Maine.

Tourism impacts tend to be spread throughout Aroostook County. The Patten area serves as a gateway to Baxter State Park and Fort Kent provides the first or last stop for visitors to the Allagash Wilderness. Snowmobiling, fishing, and hunting take place everywhere, while overnight lodging and restaurants tends to be located in and around the major population centers.

Detailed current statistics on tourism in Aroostook County since the publication of the DEIS are not available. However, one area that has seen substantial growth over the past few years is the Maine Winter Sports Center, described below.

The Maine Winter Sports Center (MWSC) was created in 1998 with a three-part mission: 1) to re-establish skiing as a lifestyle in Maine; 2) leverage that lifestyle to create a new economic model for rural, isolated communities in Maine; and 3) further leverage that lifestyle to create opportunity for the youth of Maine. The MWSC is a group of paid staff and volunteers who utilize the northern Maine’s rich skiing heritage in order to support economic and cultural growth in the region.

The MWSC has built two world class cross country and biathlon facilities in Aroostook County – the 10th Mountain Center in Fort Kent and the Nordic Heritage Center in Presque Isle. Both facilities have acquired both International Ski Federation (FIS) and International Biathlon Union (IBU) licenses. The 10th Mountain Center has hosted two Senior National, two North American and three Junior National Biathlon Championships in the past four seasons. The 2003 World Cup Biathlon competition held at the facility was viewed by over 26 million people throughout the world (via the Outdoor Life Network), making it the most watched sporting event ever from the state of Maine. More recently, the 2006 Biathlon Junior World Championships were held at the 10th Mountain Center. The Nordic Heritage Center in Presque Isle was completed in 2002. The lodge is also a state of the art facility and, like the 10th Mountain Center, is considered to be among the best Nordic facilities in the world.

The MWSC also acquired two existing downhill ski facilities in Aroostook County, Quoggy Jo in Presque Isle and Big Rock in Mars Hill. Substantial improvements and expansion are planned for both areas. The MWSC reports that the World Cup 2003 ski event generated \$1.3 million in direct spending and, when an economic multiplier

¹⁴ Planning Decisions, Inc. September 30, 2003. *Aroostook County Economic Cluster Report – Part 1: Analysis*. Prepared by for Northern Maine Development Commission.

is factored, generated an estimated \$5.2 million in economic impact for the entire region. The world-wide exposure and awareness that comes from the events held at the facilities draw recreational skiers and tourists to the region which, in turn, generates revenue from spending on lodging, meals, goods, and services.

Future Economic Issues

Aroostook County's economic base has historically been rooted in a limited number of industries, including forestry and value-added wood products, agriculture, food processing, and manufacturing. A detailed discussion of these industries was included in the DEIS (beginning on page 3-49). Although northern Maine's economy is dependent on many outside influences, it is likely that these core industries will retain their prominent role in the regional economy of the future.

The NMDC established a regional marketing communications program in the mid-1990s to retain existing businesses as well as attract new investment to northern Maine. The program promotes Aroostook County's regional advantages such as its available labor force and affordable commercial and industrial real estate. Emphasis is placed on marketing to Quebec and the Maritime Provinces of Canada. The NMDC currently targets its marketing efforts to industry sectors which could make the best use of the region's natural, human, and financial resources and include:

- Value-added wood products;
- Specialty agriculture;
- Precision metals manufacturing; and
- Telecommunications-based industries.

Based on the industry sectors outlined above, it is apparent that the economic future of the region has connections to historical industries and new information-based technology industries. Additionally, with the coordinated efforts of groups like the MWSC and others, tourism could become one of the biggest, if not the biggest, contributors to the northern Maine economy in the future. Similarly, because of their employment growth, education and medical care will continue to be major economic contributors in the future.

3.3.4 Minority and Low Income Populations

This section describes the presence of minority or disadvantaged populations within the Study Area, updating the information presented in the DEIS based on 2000 Census data. The analysis utilizes data at the county level rather than for individual communities or the Study Area due to the suppression of data by the Census Bureau for small populations. The findings at the county level are representative of the Study Area (which includes approximately 94 percent of Aroostook County's population).

The following sections analyze the racial composition of the population, as well as indicators of low income and economically disadvantaged groups in Aroostook County.

Potential impacts to minority and low income populations from construction of Segments 2, 4, and 7 are included in Chapter 4, Environmental Consequences (Section 4.3.4, page 4-34).

3.3.4.1 Regulatory Context

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low Income Populations (EO 12898), and DOT Order 5610.2, *Environmental Justice in Minority and Low-Income Populations* require agencies to identify and address potential disproportionate high and adverse impacts on minority,¹⁵ and low-income populations. Minority and low income populations are identified using 2000 U.S. Census data. The following definitions were used in the analyses:

- **Minority Populations** – A Minority person is defined as an individual who is a member of one of the following population groups: Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian, Other Pacific Islander, and some other race alone; and two or more races.¹⁶
- **Low-Income Populations** – The final DOT Order 5610.2 defines Low-Income persons as those whose “median household income is below the United States Department of Health and Human Services poverty guidelines.”¹⁷ CEQ Guidelines state that Low-Income populations should be identified using the annual statistical poverty thresholds developed by the Bureau of the Census. Data for Poverty by Age (P87) at the Block Group Level from the 2000 U.S. Census were used to identify Low-Income populations.

3.3.4.2 Income and Poverty Status

Aroostook County has a relatively higher share of lower income residents than other parts of the state and country. As reported in Section 3.3.3.1 (page 3-30), the estimated median household income in Aroostook County in 2000 was approximately 79 percent of the statewide median. Table 3-22 (page 3-48) indicates the distribution of household income in Aroostook County in 1999, as reported by the U.S. Census.

¹⁵ The United States 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).

¹⁶ United States Census Bureau. 2000. Data (<http://www.census.gov/main/www/cen2000.html>).

¹⁷ United States Department of Transportation. April 1997. *Federal Register 5610.2, Final Order to Address Environmental Justice in Minority Populations and Low-Income Populations*, Volume 62, No. 72.15.

Table 3-22
Household Income Distribution, Aroostook County – 1999

Income Range	Number of Households	Percent
<\$10k	4,751	15.7%
\$10k-\$15k	3,051	10.1%
\$15k-\$25k	5,428	17.9%
\$25k-\$35k	4,677	15.4%
\$35k-\$50k	5,391	17.8%
\$50k-\$75k	4,645	15.3%
\$75k-\$100k	1,442	4.8%
\$100k-\$150k	606	2.0%
\$150k-\$200k	163	0.5%
>\$200k	163	0.5%
Total	30,317	100.0%

Source: U.S. Census

Poverty thresholds in the U.S. in 1999, by size of family, were \$8,501 (one person), \$10,869 (two people), \$13,290 (three people), and \$17,029 (four people). According to the Census, 9.8 percent of families in Aroostook County were living below the official poverty level in 1999, compared to 7.7 percent statewide and 9.2 percent nationwide. Among individuals 65 years and older, 16.0 percent were below the poverty line in Aroostook County, compared to 10.2 percent statewide and 9.9 percent nationwide.

3.3.4.3 Racial Composition

The racial composition of Aroostook County has changed little since the DEIS (page 3-52), which was based on earlier Census data. Estimates provided by the U.S. Census Bureau indicate that Aroostook County had a minority (non-white) population of 2,449 residents in 2000, representing a decline of 735 (or 23 percent of the total minority population) since 1990. Aroostook County's minority population in 2000 represented 3.3 percent of the total population, which is slightly lower than the 1990 minority population level (3.7 percent). In terms of total numbers, the largest racial minority populations living in Aroostook County in 2000 were American Indians (1,345) and Asians (459). Over the time period, the American Indian population experienced the most significant growth of any minority group, increasing by 551 or 69 percent. Table 3-23 (page 3-49) shows the change in minority population in Aroostook County between 1990 and 2000.

Table 3-23
Aroostook County Racial Composition¹ Trends: 1990-2000

	1990	2000	Percent of Total	# Change	Percent Change
White	83,914	72,112	96.7%	-11,802	-14.1%
Black	1,339	362	0.5%	-977	-73.0%
American Indian	794	1,345	1.8%	551	69.4%
Asian	435	459	0.6%	24	5.5%
Other	616	283	0.4%	-333	-54.1%
Non-White Total	<u>3,184</u>	<u>2,449</u>	3.3%	<u>-735</u>	<u>-23.1%</u>
Total	87,098	74,561		-12,537	-14.4%
Non-White % of Population	3.7%	3.3%			

¹ In combination with one or more of the other races listed. Due to individuals reporting more than one race, the total population estimates provided in this table are slightly higher than the population estimates for Aroostook County provided in other tables.

Source: United States Census Bureau

3.3.4.4 Food Stamp and Temporary Assistance to Needy Families (TANF) Recipients

According to information provided by the Maine State Planning Office, in 2001, Aroostook County had 8,927 individuals who received Food Stamps (12 percent of Aroostook County's population), while 1,777 (2.4 percent) received Temporary Assistance to Needy Families (TANF). Participation within these programs in Aroostook County was higher than the statewide average of eight percent and 2.1 percent, respectively. The percentage of individuals receiving food stamps within selected towns within Aroostook County ranged from a low of 0.9 percent in Fort Kent, to a high of 23.8 percent in Van Buren. About one half of the communities selected had residents receiving TANF assistance, ranging from 1.1 percent in Monticello to 4.5 percent in Mars Hill and Houlton. Table 3-24 (page 3-50) shows the number of residents in selected Study Area municipalities receiving Food Stamp or TANF assistance in 2001.

3.3.4.5 Assisted Housing

In addition to individuals receiving Food Stamp or TANF assistance, another indicator of the presence of economically disadvantaged populations is the distribution of federally assisted housing units throughout the region. As there are income eligibility thresholds for occupying federally assisted housing, the presence of subsidized housing units indicates a corresponding presence of low and moderate income households. It should be noted that it is assumed that there are many communities within the region that have no inventories of assisted housing but have income qualified residents, therefore using assisted housing units as a measure of the region's disadvantaged population is of limited utility.

Table 3-24
Participation in TANF¹ and Food Stamp Programs

	2000 Population	Food Stamp Program			TANF Program		
		# Cases	# Persons	Percent of Population	# Cases	# Persons	Percent of Population
Blaine	806	29	66	8.2%			0.0%
Bridgewater	612	29	39	6.4%			0.0%
Caribou	8,312	756	1,379	16.6%	118	294	3.5%
Fort Fairfield	3,579	29	66	1.8%			0.0%
Fort Kent	4,233	29	39	0.9%			0.0%
Houlton	6,476	756	1,379	21.3%	118	294	4.5%
Limestone	2,361	139	271	11.5%	25	72	3.0%
Littleton	955	38	68	7.1%			0.0%
Madawaska	4,534	239	351	7.7%	14	34	0.7%
Mars Hill	1,480	101	174	11.8%	25	67	4.5%
Monticello	790	66	110	13.9%	5	9	1.1%
New Canada	306	5	9	2.9%			0.0%
Presque Isle	9,511	628	1,138	12.0%	106	264	2.8%
Van Buren	2,631	378	626	23.8%	43	116	4.4%
Westfield	559	35	76	13.6%			0.0%
Total for selected communities	47,145	3,257	5,791	12.3%	454	1,150	2.4%
Aroostook County	<u>73,938</u>	<u>4,934</u>	<u>8,927</u>	<u>12.1%</u>	<u>695</u>	<u>1,777</u>	<u>2.4%</u>
Maine	1,266,848	51,707	101,584	8.0%	10,397	26,815	2.1%

¹ TANF - Temporary Assistance to Needy Families
 Source: Maine State Planning Office

As shown in Table 3-24 (above), Aroostook County had 3,174 assisted housing units in 2000 representing 8.2 percent of the county's total housing stock. This represents a decrease of one percentage point since 1990. Over 72 percent (2,297 units) of the assisted housing stock is contained within multi-unit structures with most of those units being designated for elderly residents. The remaining 28 percent (877 units) of Aroostook County's assisted housing stock is provided by scattered units with rental assistance provided through Section 8 certificates.¹⁸

¹⁸ State or Federal rent subsidy vouchers provided to qualified income-eligible individuals.

Table 3-25
Federally Assisted Housing Units and Section 8 Vouchers in Aroostook County: 1999/2000

Total 2000 Housing Units	Multi-Unit Structures			Section 8 Scatter Site Voucher Units			Assisted Units		
	Total	Family	Elderly	Disabled	Total	Elderly	Family	Total # of Units	% of 2000 Units
38,719	2,297	755	1,532	10	877	194	683	3,174	8.2%

Source: U.S. Census and Maine State Planning Office

3.3.5 Uncontrolled Petroleum and Hazardous Materials

This section describes potential and confirmed petroleum and/or hazardous materials sites within the Study Area for Segments 2, 4, and 7 only. Regional context is not relevant for assessing impacts of hazardous materials on the Proposed Action (or vice-versa). It is based on the following investigations by Hiller and Associates:

- Hiller and Associates. September 2005. *Phase I Environmental Assessment, Aroostook County Transportation Study, Segment 4.*
- Hiller and Associates. September 2005. *Phase I Environmental Assessment, Aroostook County Transportation Study, Segment 7 – Presque Isle Bypass.*
- Hiller and Associates. January 2006. *Phase I Environmental Assessment, State Route 161 and Route 1 Connector, Aroostook County Transportation Study, Segment 5.*

Potential impacts that petroleum and/or hazardous materials would have on the construction of Segments 2, 4, and 7 and measures to avoid, minimize, and mitigate the impacts of petroleum and/or hazardous materials are included in Chapter 4, Environmental Consequences (Section 4.3.5, page 4-34).

3.3.5.1 Regulatory Context

Subsurface contamination and hazardous waste materials are regulated under several Federal and state statutes, including EPA regulations under the *Clean Water Act* (administered by Maine DEP); *Resource Conservation and Recovery Act* (RCRA); the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA); and regulations concerning Asbestos Containing Materials (ACM). The Occupational Safety and Health Administration (OSHA) regulates the protection of worker safety and health at the workplace. OSHA regulations, including regulations pertaining to Hazardous Waste Operations and Emergency Response (HAZWOPER), asbestos, and lead based paint, may apply to workers involved in construction. The Maine DEP’s Bureau of Remediation and Waste Management administers a variety of programs that regulate petroleum and hazardous materials.

3.3.5.2 Study Area

Hazardous materials storage areas, underground storage tanks (UST), reported spills and other potential sources of contamination were evaluated for a Study Area that was limited to 0.5 miles on either side of Segments 4 and 7.

The proposed work in Segment 2 would generally be confined to the existing highway ROW, and the proposed improvements are not expected to require substantial excavation. Therefore, a detailed environmental assessment for known or potential uncontrolled petroleum and/or hazardous materials sites in Segment 2 has not yet been undertaken, or considered necessary. The appropriate level of assessment will be done prior to construction.

3.3.5.3 Methodology

Multiple sources of information were collected, reviewed, and evaluated to assess the confirmed and potential presence of subsurface contamination and petroleum or hazardous material use and storage areas.

Environmental Database Search

A database search was undertaken to identify properties within the Study Area that have had a release of, or pose a threat of release of petroleum and/or hazardous wastes, and which may impact the environmental quality of the Study Area. The following databases were reviewed:

Federal Databases

- National Priorities List (NPL);
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS);
- RCRA list;
- Transportation, Storage, and Disposal (TSD);
- RCRA Generators; and
- Emergency Response Notification System (ERNS) list.

State Databases

- Maine state site investigation and remediation list (NPL and CERCLIS equivalent);
- Maine state landfill and/or solid waste disposal sites list;
- Maine state leaking UST list; and
- Maine state registered UST list.

Maine Department of Environmental Protection Records Review

Records maintained by Maine DEP were reviewed for information related to storage and accidental releases of petroleum and hazardous materials. The Maine DEP Master Underground Storage Tanks List was reviewed to identify locations of

current and historical USTs. The Maine DEP Master Spill Report list was reviewed for the towns of Caribou and Presque Isle to identify historical releases of petroleum and hazardous materials. Spill reports reviewed were limited to those located within the Study Area and to those spills that were greater than 20 gallons of gasoline or fuel oil, or one gallon of petroleum distillates or hazardous material.

Site Reconnaissance

In September 2005 and January 2006, site reconnaissance was performed within Segments 4 and 7 for evidence of petroleum and/or hazardous materials.

Interviews

Public officials from Presque Isle and Caribou were interviewed regarding oil and/or hazardous waste issues within, or in the vicinity of, Segments 4 and 7. The results of these interviews are presented in the following sections.

3.3.5.4 Existing Conditions

Potential uncontrolled petroleum and/or hazardous materials sites in the vicinity of the Study Area are described below. Figure 3-16 and Figures 3-17a and 3-17b show the locations of registered USTs in the vicinity of Segments 4 and 7. Figure 3-16 and Figures 3-17a and 3-17b also show known petroleum and/or hazardous waste spills that have occurred in the vicinity of Segments 4 and 7.

Segment 4

Hazardous Materials

No Federal NPL, CERCLIS, RCRA, TSD, RCRA Generators or ERNS sites were identified within one-half mile on either side of Segment 4. Similarly, a review of the Maine state site investigation and remediation list indicates that no generators of hazardous materials are located within 0.5 miles of Segment 4. No sites meeting either the Maine state uncontrolled hazardous waste site or the Maine state landfill and/or solid waste disposal site description are located within 0.5 miles of Segment 4.

Existing and Former Underground Storage Tanks

Thirty-six active or abandoned USTs are known to be present within 0.5 miles of Segment 4, as shown on Figure 3-16. The condition of these USTs is unknown. The locations of 42 removed USTs are also shown on Figure 3-16.

Known Spills

Twenty petroleum and/or hazardous materials spills at 14 locations are known to have occurred within 0.5 miles of Segment 4. The location of these spills is shown in Figure 3-16. The majority of spills in the vicinity of Segment 4 are considered minor (less than 51 gallons of product). Descriptions of these spills are provided in Table 3-26 (page 3-54).

**Table 3-26
 Known Spills within One-Half Mile of Segment 4**

Location	Date	Details
1. Maine Army National Guard, OMS #5	05/12/84	Waste oil overflowed into a ditch and subsequently into the Aroostook River. Approximately 55 gallons of oil were recovered. The UST was slated to be replaced with an above ground storage tank (AST) and education for appropriate personnel was required.
Maine Army National Guard, OMS #5	10/24/90	Overfill of approximately 100 gallons of #4 fuel oil. The fuel was cleaned up with absorbent pads.
Maine Army National Guard, OMS #5	08/09/92	Approximately 40 yards of petroleum-saturated soil was excavated, but saturation ran beneath an adjacent building and some contaminated soil could not be removed. Approximately 20 gallons of product were reported recovered.
Maine Army National Guard, OMS #5	09/21/92	Approximately 30 gallons of #5 oil spilled onto the hot top at the Armory. Approximately one cubic yard of contaminated material was collected.
2. Christopher Boy's Home.	04/18/85	A residential #2 fuel oil tank leaked approximately 25 gallons into a basement.
3. MaineDOT	09/24/86	Approximately 540 yards of fuel-saturated soil was removed to bedrock, approximately 15.5 feet below grade. Some saturated soil was left directly beneath the radio tower, due to the expense of removing the tower.
MaineDOT	08/19/89	Approximately 100 gallons of unspecified fuel oil was reported spilled. No further information is available.
MaineDOT	10/17/91	Approximately 21 gallons of diesel fuel leaked, and about 25 yards of soil were removed.
MaineDOT	10/07/96	Approximately 50 gallons of oil were reported spilled, and approximately 460 cubic yards of contaminated soil were removed.
4. Caribou Recreation Center	11/14/88	A sump pump was reported to have oil flowing into it. Contaminated soil was discovered and subsequently removed. The lines were repaired and the oil tank was filled. On November 21, 1988, the tank was discovered to contain approximately 150 gallons of water displacing approximately 150 gallons of oil. The tank was removed.
5. Irving Mainway	03/24/91	Displacement of approximately 200 gallons of #2 fuel onto a snow bank. The snow was subsequently removed.
6. Edward Trombley, 17 Veronica Street	06/04/91	Approximately 40 gallons of #2 fuel oil leaked into a ditch. Heavy rains washed most of the kerosene away and the resident removed the minor contamination.
7. Daigle Oil Company	12/13/91	Approximately 40 gallons of unleaded gasoline was reported spilled. Approximately one-half yard of material was removed.
8. Grace Plourde residence	10/02/92	A leaky 275-gallon home heating oil tank was discovered in the basement of the Plourde residence. The basement floor was earthen, and the oil had mixed with some water. The oily water was pumped out and some oil soaked wood was removed by Aroostook Environmental Services.
9. Charles Nadeau, 92 Bennett Drive	11/21/95	Approximately 50 gallons are reported to have been spilled and about 170 cubic yards of contaminated soil was removed and replaced.
10. Veterans of Foreign Wars Post #9389	10/08/96	Less than 11 gallons of trichloroethane were thought to have been spilled. No further action was reported.
11. Francis Fuhrman residence	09/25/97	Approximately 40 gallons of fuel oil was spilled onto a concrete floor. The fuel was cleaned up with absorbent pads.
12. Edward Hodgedon, 15 Glendale Road	01/21/97	An outside residential #2 fuel oil tank leaked approximately 50 gallons. Approximately 18 yards of contaminated soil were removed.
13. Caribou Bowladrome	01/21/98	Approximately 30 gallons of kerosene leaked from an AST. A contractor was hired to remove contaminated snow.
14. Rolland Saucier residence	04/19/01	An above ground kerosene tank leaked approximately 20 gallons of kerosene into the ground. The broken line was repaired but no kerosene was recovered.

Several public officials were interviewed regarding petroleum and/or hazardous waste issues within, or in the vicinity of, Segment 4. Interviews were conducted with:

- Police Chief Arnold Gahagen, Town of Caribou Police Department;
- Russel Plourde, Supervisor of Water Crews, Town of Caribou Sewer and Water District;
- Mark Baker, Fire Captain, Town of Caribou Fire Department; and
- Steve Wentworth, Code Enforcement Officer, Town of Caribou Code Enforcement.

The interviewees were unaware of any unreported major spill events along Segment 4. Mr. Wentworth noted that agricultural chemicals are present in the area due to land usage, but was unaware of any large or unreported agricultural chemical spills or abuses.

Segment 7

Hazardous Materials

No Federal NPL, CERCLIS, RCRA, TSD, RCRA Generators or ERNS sites were identified within 0.5 mile on either side of Segment 7. Similarly, a review of the Maine state site investigation and remediation list indicates that no generators of hazardous materials are located within 0.5 miles of Segment 7. In addition, no sites meeting either the Maine state uncontrolled hazardous waste site or the Maine state landfill and/or solid waste disposal site description are located within 0.5 miles of Segment 7.

Within several of the Presque Isle Bypass Alignment Options, adjacent to the Aroostook River in Presque Isle, there is an industrial complex consisting of a former potato processing plant with associated waste piles and lagoons. MaineDOT has been coordinating with the owner and Maine DEP concerning the content of the waste area and lagoons. Based on preliminary information provided by the owner the material is organic waste subject to decomposition.

Existing Underground Storage Tanks

Nine active USTs are known to be present within 0.5 miles of Segment 7, as shown on Figure 3-17a and 3-17b. The condition of these USTs is unknown.

Known Spills

Six spills at five locations are known to have occurred within 0.5 miles of Segment 7. The location of these spills is shown in Figure 3-17a and 3-17b. Details of these spills are provided in Table 3-27 (page 3-56).

Several public officials were interviewed regarding petroleum and/or hazardous waste issues within, or in the vicinity of, Segment 7. Interviews were conducted with:

- Tom King, Dispatcher, Town of Presque Isle, Police Department;
- Steve Freeman, Superintendent, Town of Presque Isle, Sewer and Water District;

- Jim Krysiak, Fire Chief, Town of Presque Isle, Fire Department; and
- Jerry McAvaddey, Code Enforcement Officer, Town of Presque Isle, Code Enforcement.

The interviewees were unaware of any unreported major spill events along Segment 7.

Table 3-27
Known Spills within One-Half Mile of Segment 7

Location	Date	Details
1. Mike Grant Farm	05/15/88	Drums of pesticides were dumped into an open ditch. Soil tests found high concentrations of the pesticide dinoseb.
2. Al Irving	11/18/93	Approximately 500 gallons of propane was released. The propane dispersed rapidly, and tests with an explosimeter found no continuing risk.
3. Parker K. Bailey Facility	03/08/95	Approximately 0.25 gallons of pesticides were spilled. The pesticides was MOCAP 6EC, an organophosphate which was identified as very toxic. The Maine DEP placed the material in an over pack drum.
4. Perry's Mini-Mart	05/17/95	Approximately 128 cubic yards of gasoline-contaminated soils were discovered during removal of two USTs. The soil was subsequently removed. In June 1995, a water test on the Mini-Mart's well water identified gasoline in the well water. The Maine DEP installed a carbon filter on the well plumbing and began water quality monitoring.
Irving Forest Products Truck at Perry's Mini-Mart	09/07/01	Approximately 15 gallons of hydraulic fluid was discharged from a truck. The fluid was recovered and removed from the site.
5. Presque Isle Public Works Department	02/12/03	Approximately 25 gallons of hydraulic fluid was discharged from a snowplow truck. The fluid was recovered and removed from the site.

3.3.6 Cultural Resources

This section describes cultural resources within the Study Area that are listed on or eligible for listing on the National Register. The National Register is the nation's official list of cultural resources worthy of preservation. Districts, sites, buildings, structures, objects, and properties of traditional cultural significance may be listed on the National Register if they are greater than 50 years old, meet one of four evaluation criteria, and possess integrity. The four evaluation criteria are:

- Association with events that have made a significant contribution to the broad patterns of our history.
- Association with the lives of persons significant in our past.
- Embodiment of the distinctive characteristics of a type, period, or method of construction, or representation of the work of a master, or possession of high artistic values, or representation of a significant and distinguishable entity whose components may lack individual distinction.

- Yielding or demonstrating the potential to yield information important in prehistory or history.

State Historic Preservation Officers (SHPOs) advise and assist federal agencies in carrying out their Section 106 responsibilities and ensuring that historic properties are taken into consideration at all levels of planning and development. In Maine, the Director of the Maine Historic Preservation Commission (MHPC) is the SHPO. Federally recognized Native American tribes may assume the responsibilities of the SHPO on tribal lands and appoint a Tribal Historic Preservation Officer (THPO). In the Study Area, there are two federally-recognized tribes: the Aroostook Band of Micmac Indians and the Houlton Band of Maliseet Indians.

Potential impacts on cultural resources from construction of Segments 2, 4, and 7 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 4, Environmental Consequences (Section 4.3.6, page 4-36); and Chapter 5, Draft Section 4(f) Evaluation (Section 5.5, page 5-11).

3.3.6.1 Regulatory Context

NEPA requires federal agencies completing Environmental Impact Statements to address impacts to cultural resources under the requirements of the NHPA. Section 106 of NHPA (Section 106) requires federal agencies to take into account the effect of their undertakings on properties included or eligible for inclusion in the National Register of Historic Places (National Register) and to afford the Advisory Council on Historic Preservation reasonable opportunity to comment on such undertakings.

Section 4(f) of the Department of Transportation Act of 1966 also protects cultural resources. Section 4(f) stipulates that, prior to taking an action that requires the use of land from a significant publicly-owned park, recreation area, wildlife or waterfowl refuge, or from a historic property or archaeological site on or eligible for the National Register of Historic Places, the agency proposing the action must determine that there is no feasible and prudent alternative to the use of the land from that property, and that the Proposed Action includes all possible planning to minimize harm to the property resulting from the use.

3.3.6.2 Historic Overview of the Study Area

The area that now comprises Aroostook County was populated before European settlement by various Native American tribes belonging to the Wabanaki cultural group. The Aroostook Band of Micmac Indians, the Abenaki, and the Houlton Band of Maliseet Indians were the most prevalent Wabanaki tribes in what is now Aroostook County, occupying the lands south and east of the Gulf of Saint Lawrence, the Maritime Provinces of Canada, and other regions along the Atlantic seaboard of the northeastern United States. As in most parts of European-settled North America, the Native American inhabitants of Aroostook County lost significant population to

European diseases and the numerous wars fought between and against French and British colonizers. Small numbers of the Aroostook Band of Micmac and the Houlton Band of the Maliseet remained in Aroostook County throughout the 18th century, and made livings logging, farming, guiding, and producing native crafts such as baskets. The Aroostook Band of Micmacs' ash baskets were widely used by potato farmers to harvest crops in the 19th and early 20th centuries.

Aroostook County was settled by a range of European ethnicities over the course of the late 18th and 19th centuries. The earliest settlers to the region were French Acadian immigrants expelled from the Maritime Provinces of Canada after the British took control of those areas in the mid 1750s. Acadians primarily settled along the St. John River Valley in the Madawaska region. Settlers of English ancestry from further south in Maine, other New England states, and New Brunswick settled in the southern and central portions of Aroostook County primarily after 1830. In the 1870s, the State of Maine recruited an initial group of 51 immigrants from Sweden to settle in north-central Aroostook County in an area known as the Swedish Colony (now portions of the Towns of Woodland, Westmanland, Perham, New Sweden, Stockholm, and part of the unorganized township of T16R4). Settlement patterns in Aroostook County typically moved from the north and south toward the center, but then shifted to the "Houlton Road" (Route 1), the first and primary north-south road in the region, constructed in stages during the early 1840s between Houlton and Caribou.

The economy of Aroostook County has historically been based on timber resources and agriculture. For much of the 19th century, logging and lumber milling along with commercial agriculture centered on potatoes, potato byproducts such as starch, and grains were the chief economic pursuits in Aroostook County. The arrival of the first railroads in the region in the 1890s, particularly the construction of the Bangor and Aroostook Railroad between 1891 and 1894, accelerated the regional economy to a level of prosperity not seen before or since. The ability to transport potatoes outside the region and the coinciding rise in national popularity of the vegetable started a "potato boom" that lasted until the mid 20th century. In the first decades of the 20th century, Aroostook County was the largest concentrated area of potato production in the United States. The timber and papermaking industries also flourished during this period, logging the timber rich regions in the western portion of Aroostook County and hauling logs to pulp plants in Madawaska and Edmundston, New Brunswick, Canada. In the mid 20th century, the invention of techniques for flash freezing fresh produce and pre-made food products resulted in a number of large frozen food plants, including Birdseye Food plants in Houlton and Caribou, and McCain Foods plants in Presque Isle and Easton.

International politics have also had a strong influence on the history and development of Aroostook County. For most of its history, Aroostook County has been a frontier in one manner or another. In the 18th and early 19th centuries, the region was a remote border land between British and French North American colonies. After the Treaty of Paris in 1783, the Madawaska region remained part of the Canadian Province of New Brunswick, while the rest of Aroostook County remained part of the State of Massachusetts. Maine became a state in 1820, but the

Madawaska region did not join the United States until the Webster-Ashburton Treaty of 1842. This treaty ended the bloodless “Aroostook War” between Maine and New Brunswick governments over land claims in the disputed region. The Webster-Ashburton Treaty finally established the St. John River as the regional border between the U.S. and Canada. Aroostook County’s location as the most extreme northeastern point in the U.S. made it strategically important to the U.S. military during the 20th century. The military established air bases at Presque Isle and Limestone (Loring Air Force Base) which were used to supply troops in the European theater during World War II, and as an air and missile base during the Cold War.

3.3.6.3 Historic Buildings, Structures, and Districts

Preparation of the DEIS included consultation with the MHPC regarding known properties within the Study Area included on or eligible for inclusion on the National Register. Section 3.3.6.1 (page 3-57) and Table 3-28 (page 3-61) in the DEIS described 21 properties included on the National Register in the DEIS Study Area. The MHPC reported that the research done to date on properties eligible for inclusion on the National Register in Aroostook County was preliminary in nature, and that additional study would be required during subsequent phases of the Aroostook County Transportation Study to identify such properties.

Subsequent to the DEIS, in June and July 2003, the MaineDOT conducted a reconnaissance-level cultural resource survey according to MHPC and ACHP survey standards to record all buildings and structures over 50 years old within or adjacent to the Area of Potential Effect (APE) for the SDEIS Corridors (refer to Chapter 2, Section 2.2, page 2-3, for a description of the SDEIS Corridors). The APE for cultural resources is defined as those properties and parcels that directly abut the ROW or are within the SDEIS Corridors. In areas where new roadway alignments are proposed, the APE also includes properties adjacent to the SDEIS Corridor ROW.

The survey identified 718 properties containing 1,040 buildings and structures greater than 50 years old within the APE for the SDEIS Corridors. More information on the surveyed properties and their locations is provided in the Cultural Resource Field Survey reports¹⁹ for this study. After the initial survey, intensive-level investigations were conducted for properties that appeared eligible for the National Register of Historic Places. Based on these investigations, the FHWA, MaineDOT, and MHPC identified 99 individual properties (including 133 structures) and two districts within the APE for the SDEIS Corridors eligible for listing on the National Register. Twenty-seven of these properties (containing 54 buildings), and one district are within or adjacent to the APE for the Proposed Action. Brief descriptions of the historic properties within the APE for the Proposed Action are given in the following section and in Table 3-28 (page 3-61).

¹⁹ Vanasse Hangen Brustlin, Inc. (VHB). April – July, 2004. *Cultural Resource Field Survey, Aroostook County Transportation Study, Segments 1-11.*

Properties Included on the National Register of Historic Places

According to the National Register Information System (NRIS), there is one National Register property within or adjacent to the APE for the Proposed Action.

Timmerhuset on New Sweden Road (Route 161) in the Town of New Sweden (National Register Reference # 73000102) is individually listed on the National Register. The circa 1871 log dwelling is architecturally significant for its Swedish log construction method. Timmerhuset is within the APE for the Proposed Action in Segment 2, the Route 161 Upgrade. Timmerhuset is shown on Figure 5-1.

Properties Determined Eligible for Inclusion on the National Register of Historic Places

MaineDOT identified 27 individual properties (including 54 structures) and one district within or adjacent to the APE eligible for inclusion on the National Register based on the cultural resource survey and assigned a reference number to each. Concurrence letters from the MHPC are included in Appendix A of this SDEIS. These properties are listed in Table 3-28 (page 3-61). Table 3-28 (page 3-61) also provides a figure reference for each property (Figures 2-7a to 2-7aa). Properties listed may contain several structures. In this survey, each structure was assigned a unique number. Farmsteads are designated with the letter "F", and individual structures within each farmstead are not described.

Table 3-28
Properties Eligible for Inclusion on the National Register of Historic Places

MHPC No.	Name or Address	Town	Description	Significance	Date ¹	Figure No. (Vol. 2)
Segment 2						
858F-860	8 Colby Siding Road	Woodland	Farmstead	Architecture	Early 20th c.	Figure 2-7z
877	Andrew Jackson Philbrick House, 1303 New Sweden Road	Woodland	English log dwelling	Architecture, Information potential ²	Ca. 1863	Figure 2-7z
884F-887	Hans and Kjersti Wanstrom Farm, Margison Road	Woodland	Farmstead with Swedish log dwelling	Architecture, Information potential	Ca. 1874	Figure 2-7x
893F-896	Albert Johnson Farm, New Sweden Road	Woodland	Farmstead with Swedish log dwelling	Architecture, Information potential	Ca. 1874	Figure 2-7x, and Figure 2-7w
897-898	2 New Sweden Road	New Sweden	Greek Revival and Queen Anne-style dwelling	Architecture	Late 19th or early 20th c.	Figure 2-7w
910	New Sweden Baptist Church, 23 West Road	New Sweden	Queen Anne-style religious building	Architecture	1892	Figure 2-7v
916	53 Jepson Road	New Sweden	Craftsman-style dwelling	Architecture	Early 20th c.	Figure 2-7v
918	Swedish Mansion, 369 New Sweden Road	New Sweden	Queen Anne-style dwelling	Architecture	Late 19th or early 20th c.	Figure 2-7v
921, 922	Jacobsson House and Barn, 452 New Sweden Road	New Sweden	Swedish log dwelling and frame New England barn	Architecture, Information potential	Ca. 1875	Figure 2-7u
924F-926	Jepson Farm, 413 New Sweden Road	New Sweden	Farmstead:	Architecture	1905	Figure 2-7t
943	Mattsen House, West side of New Sweden Rd., app. 500 feet south of West Rd.	Stockholm	Craftsman style prefabricated home	Architecture	Early 20th c.	Figure 2-7o
947	John J. Sodergren House East side of New Sweden Rd., approx. 0.125 miles south of the T16R4 border	Stockholm	Swedish log dwelling	Architecture, Association with John Sodergren, Information potential	Late 19th c.	Figure 2-7n
953, 956-957	Sodergren Store, Boat House, and Ice Barn North side of Lake Shore Dr. at east side of access road to Rte. 161	T16R4	Store, Boat house, Ice barn, and several rental camps	Association with the development of recreation and tourism-related services at Madawaska Lake	Late 19th c.	Figure 2-7m
969-971	Calstrom Landing Log Camps North side of Lake Shore Dr. approx. 500 feet west of access to Rte 161	T16R4	Three seasonal log camps	Association with the development of recreation and tourism-related services at Madawaska Lake, Architecture, Information potential	Ca. 1900	Figure 2-7m

Table 3-28
Properties Eligible for Inclusion on the National Register of Historic Places (continued)

MHPC No.	Name or Address	Town	Description	Significance	Date ¹	Figure No. (Vol. 2)
Segment 4						
847, 849	Van Buren Road	Caribou	Colonial Revival-style house and New England dairy barn	Architecture	Early 20th c.	Figure 2-9e
863 ³	New Sweden Road	Woodland	Banked New England dairy barn	Architecture	Early 20th c.	Figure 2-9a
Segment 7						
554F-557	27 Centerline Road	Presque Isle	Farmstead	Architecture	Late 19th c.	Figure 2-11f
564F	86 Williams Road	Presque Isle	Farmstead	Architecture	Early 20th c.	Figure 2-11f
569F-573	West side of Egypt Rd. approx. 0.5 miles north of Phair Road	Presque Isle	Farmstead	Architecture	Late 19th or early 20th c.	Figure 2-11h
586	West side of Egypt Road, approx. 0.25 miles north of Center Road	Presque Isle	Agricultural outbuilding	Architecture	Early-mid 20th c.	Figure 2-11g
590-593	Hemphill Farms, 204 Egypt Road	Presque Isle	Farmstead	Architecture	Late 19th or early 20th c.	Figure 2-11g
597F-599	175 Egypt Road	Presque Isle	Farmstead	Architecture	Late 19th c.	Figure 2-11g
602F-609	King Farm, 33 Easton Road	Presque Isle	Farmstead	Architecture	Late 19th or early 20th c.	Figure 2-11e
630F-633	138 Reach Road	Presque Isle	Farmstead	Architecture	Late 19th c.	Figure 2-11b
635-644	Northern Maine State Sanitarium, Reach Road District	Presque Isle	Hospital	Association with the history of health care in Aroostook County	Various	Figure 2-11b
667 ⁴	East side of Caribou Rd. approx. 0.25 miles south of Brewer Rd.	Presque Isle	Acadian-influenced English barn	Architecture	19th c.	Figure 2-11a
670 ⁴	East side of Caribou Rd. approx. 0.25 miles south of Brewer Rd.	Presque Isle	T-shaped potato barn	Architecture	Early 20th c.	Figure 2-11a
678 ⁴	Maysville School/Maysville Center Grange Southeast corner of Caribou Rd. and Brewer Rd.	Presque Isle	Colonial Revival-style school building/grange hall	Association with the educational and civic life of the former Town of Maysville and the City of Presque Isle	Early 20th c.	Figure 2-11a

1 c. = century, Ca. = circa

2 National Register Criterion D

3 Property 863 is documented in the Cultural Resource Field Survey Report for Segment 2. The Banked New England dairy barn (Property 863) is on a parcel of land with two non-historic buildings, denoted as Properties 862 and 863 on Figure 2-9a.

4 Properties 667, 670, and 678 are documented in the Cultural Resource Field Survey Report for Segment 6.

Potential Historic Properties and Districts Requiring Further Study

The MHPC requested further evaluation of 10 individual properties and two potential historic districts for eligibility for the National Register in their comments on the Cultural Resource Field Survey Reports.²⁰ None of the individual properties are within the APE for the Proposed Action. One of the potential historic districts is adjacent to the APE for the Proposed Action. The shore of Madawaska Lake in T16R4 (Segment 2) is densely developed with seasonal camps dating from the late 19th century to the present. Because the majority of the area constituting the potential historic district was outside the APE, the district was not comprehensively surveyed. The recommendation for the potential historic districts made to the MHPC in the Cultural Resource Field Survey report for Segment 2 noted that more investigation would be necessary to determine whether the district was eligible for inclusion on the National Register. These investigations will be completed and results provided in the FEIS.

The MHPC also requested further study of cultural aspects of Maine's Swedish Colony, which comprises parts of the towns of New Sweden, Stockholm, Woodland, Perham, Westmanland, and Caribou. In their comment letter on the Cultural Resources Field Survey Report (Appendix B) for Segment 2, the MHPC noted that the Commission has not studied "cultural aspects of the Swedish Colony that may have uniquely influenced building traditions as well as settlement and land use patterns in these communities." The MHPC stated that they believed it was important to understand such patterns in order to identify types of historic properties other than log dwellings, and to evaluate historic themes and areas of significance related to the properties.

At the time of the MHPC's review of the Cultural Resource Field Survey Report for Segment 2, the Proposed Action for Segment 2 consisted of upgrading Route 161 from a two-lane to a four-lane highway. The current Proposed Action in Segment 2 consists of limited highway upgrades to Route 161 such as shoulder paving and constructing climbing lanes in discrete locations. The Proposed Action includes measures to minimize impacts to properties in the Swedish Colony such as reduced ROW widths. Because the level of impact to cultural resources in the Swedish Colony will be substantially less under the Proposed Action, FHWA and the MaineDOT have determined that no further study of cultural resources in the area is warranted. FHWA has requested concurrence from MHPC.

²⁰ Vanasse Hangen Brustlin, Inc. (VHB). April – July, 2004. *Cultural Resource Field Survey, Aroostook County Transportation Study, Segments 1-11.*

3.3.6.4 Archeological Resources

This section describes known prehistoric and historic archeological sites within the Study Area reported by the MHPC as being included in or eligible for inclusion on the National Register. Many archeological sites within the Study Area have not been thoroughly investigated by the MaineDOT for National Register eligibility. The MHPC has designated these sites as having the potential to be eligible for the National Register or as sites where there is insufficient information to determine National Register eligibility at this time.

Known Archeological Sites

Preparation of the DEIS included consultation with the MHPC regarding known archeological sites and areas sensitive for historic and prehistoric archeology within the Study Area. The MHPC reported that there were 42 known prehistoric and historic archeological sites of varying levels of significance in the Study Area for the DEIS.

The archeological sites within the Study Area that may be impacted by the proposed project have not been thoroughly investigated by MaineDOT/FHWA for National Register eligibility. The MHPC has identified these sites as having the potential to be eligible for the National Register or as sites where there is insufficient information to determine National Register eligibility at this time. Investigation of archeological sites potentially affected by construction will be included in the further study proposed for archeologically sensitive areas as described in Chapter 4 (Section 4.3.6.2, page 4-41).

After development of the SDEIS Corridors, the MHPC updated the archeological information reported during the DEIS. MaineDOT reviewed the locations of known archeological sites to determine which sites fell within the APE for the SDEIS Corridors. The APE for archeological resources is defined as those areas directly abutting or within the ROW for the SDEIS Corridors. In areas where new roadway alignments are proposed, the APE also includes areas adjacent to the SDEIS Corridor ROW. The review revealed that there are six known prehistoric and historic archeological sites of varying levels of significance within the SDEIS Corridor APE. Of the six known archeological sites within the APE, the MHPC identified four as being potentially eligible for inclusion on the National Register. Two sites require additional data in order for FHWA/MaineDOT to determine significance.

Two known archaeological sites are within the APE for the Proposed Action. Table 3-29 (page 3-65) lists each site, the public information available about the site, and the National Register eligibility of the site. The approximate locations of the sites shown within a 0.6-mile square grid are shown in Figures 3-18 through 3-23. As indicated in Table 3-29 (page 3-65), Site 167.002 requires additional investigation to determine its significance. Eligibility determinations will be included in the FEIS. No known sites are associated with Segment 2 or Segment 4.

**Table 3-29
 Known Archeological Sites within the Area of Potential Effect (APE) in
 Segment 7**

MHPC Site No.	Name or Description (if assigned)	Town	NR Status	Figure No. (Vol 2)
Segment 7				
167.002	No name or description available	Presque Isle	IN ¹	Figure 3-20
168.001	No name or description available	Presque Isle	PL ²	Figure 3-20

1 IN = Insufficient data for a determination of significance

2 PL = Potentially Eligible

Archeologically Sensitive Areas

During the preparation of the DEIS for this project, the MHPC examined the DEIS Study Area to identify areas that were potentially sensitive for prehistoric and historic archeology. The MHPC determined that the shorelines of all canoe-navigable rivers and streams in the Study Area, as well as all surficial deposits related to alluvium, lake bottom deposits, glacial outwash, glaciofluvial-non eskers, and eskers are sensitive for prehistoric archeology. Areas considered sensitive for historic archeology include most of the navigable waterways and several areas adjacent to larger lakes. Areas of historic and prehistoric archeological sensitivity are shown in Figures 3-24 through 3-29. Further investigation of sensitive areas will be required for Segments 2, 4, and 7, and eligibility determinations made, prior to the issuance of the FEIS.

FHWA, ACHP, MaineDOT and the MHPC have entered into an agreement to conduct a Phase 1 Archaeological Survey for the Preferred Alignment Option (Option 2) for the Presque Isle Bypass (Segment 7), and anticipate entering into similar agreements for Segments 2 and 4. Archaeological resources will be surveyed and evaluated to determine their eligibility for potential Section 4(f), and the findings of this survey will be included in the FEIS.

3.3.6.5 Traditional Cultural Properties

As part of the preparation of the DEIS for this project, the MHPC consulted with the Federally-recognized Houlton Band of the Maliseet Indians and the Aroostook Band of Micmac Indians to determine the existence and approximate locations of Traditional Cultural Properties (TCPs) within the Study Area. A TCP is defined as a property eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that are rooted in that community's history, and are important in maintaining the continuing cultural

identity of the community.²¹ TCPs are eligible for the National Register of Historic Places under Criterion A (association with events that have made a significant contribution to the broad patterns of our history) if they are tangible places; important to the community today; have been important to the community for more than 50 years; possess integrity of location and setting; and have definable boundaries. TCPs that are determined to be eligible for the National Register are also protected under Section 4(f).

Knowledgeable tribal representatives identified 126, 0.6-square mile areas containing a traditional cultural property within the Study Area. The TCP is likely to be smaller than this square. TCPs identified by tribal representatives included ceremonial or religious use areas identified with the tops of some prominent hills, areas for collection of medicinal plants including several species of lily, and harvesting areas for brown ash used in the production of woven baskets.

After development of the SDEIS Corridors, MaineDOT reviewed the locations of identified TCPs to determine which locations fell within the revised Study Area. The review revealed that 17 TCPs are within or adjacent to the APE for this study. The approximate locations of the identified traditional cultural properties are represented with 0.6-mile square grids in Figures 3-30 through 3-35. There are two TCPs within the APE for the Proposed Action. Both TCPs are within the APE for Segment 7, the Presque Isle Bypass (Figure 3-32). Neither area is on the National Register.

3.3.7 Public Parks and Recreation Land

This section identifies the public parks, wildlife refuges, and public recreation land resources that are adjacent to, or crossed by, the SDEIS Corridors. Potential impacts on public parks and recreation land from construction of Segments 2, 4, and 7 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 5, Draft Section 4(f) Evaluation.

3.3.7.1 Regulatory Context

Public parks, wildlife refuges, and public recreation land resources are subject to protection under the Department of Transportation Act of 1966 (Section 4(f)) and may be subject to the Land and Water Conservation Fund Act (Section 6(f)) (16 U.S.C. § 4601-4 *et seq.*). No Section 6(f) resources were identified within the Study Area for the Proposed Action.

²¹ Parker, P.L. and T.F. King. 1990, revised 1998. National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties*.

3.3.7.2 Public Parks and Recreation Lands

Data used to identify public parks and recreation land were obtained from sources including the U.S. Fish and Wildlife Service (USFWS); the Maine State Planning Office (SPO); the Maine State Office of GIS; the Maine Department of Conservation (MDOC); IF&W; the Aroostook County Resource Conservation Service; NMDC; and Town Office and Recreation Departments of towns with mapped resources in the Study Area.

There are three public recreational facilities adjacent to the SDEIS Corridors. The Littleton Community Park, the Bridgewater Center Park, and the Bridgewater Grade School are small municipal facilities that offer picnic and playground facilities and baseball diamonds. None of these resources are within the APE for the Proposed Action.

In addition, the SDEIS Corridors cross several recreation trails that are on public lands and are subject to Section 4(f): the Houlton to Phair Valley Trail (snowmobile trail ITS 83) and the Aroostook Valley Trail/Bangor and Aroostook Trail (snowmobile trails ITS 83 and Connector Trail 205). The Houlton to Phair Valley Trail is a former rail bed converted to an approximately 40-mile recreational trail that runs roughly parallel to the west side of Route 1 from Houlton north to Bridgewater where it crosses Route 1 and continues northward along the east side of Route 1 through Mars Hill to southern Presque Isle. The Aroostook Valley Trail/Bangor and Aroostook Trail are two converging trails which total 53 miles of converted railroad bed between Caribou, Washburn, and Van Buren. The Houlton to Phair Valley Trail and Aroostook Valley Trail/Bangor and Aroostook Trail are owned or leased by the Maine Bureau of Parks and Lands Off-Road Vehicle Division. The Aroostook Valley Trail/Bangor and Aroostook Trail cross Route 161 within Segment 2. The Aroostook Valley Trail in Caribou is within the Study Area for Segment 4.

Segment 2 includes the Maine Bureau of Parks and Lands (BPL) parcel in New Sweden. This 125-acre multiple-use property is managed primarily for timber production, but is sometimes used for hunting, fishing, camping, and ATV riding, although these are not the designated purpose of this property. Based on information from the BPL, the FHWA has determined that this parcel is not subject to Section 4(f) of the DOT Act.²²

3.4 Physical and Biological Environment

The physical geography, geology, and other physical and biological resources of the Study Area may constrain or be affected by transportation improvements. Figures 3-36 through 3-48 provide a composite view of the physical and biological environment that may affect the evaluation of transportation corridors. Physical geography, geology, and soils create the foundation of the natural characteristics of

²² Labbee, Vern, Regional Manager, Maine Bureau of Parks and Lands. Correspondence. August 17, 2005.

the area, and are fundamental to the distribution of vegetation and aquatic habitats in the Study Area. These abiotic factors were described in the DEIS.

Analysis of impacts to certain physical and biological resources are required by FHWA's NEPA regulations, are subject to state or federal regulations, or are of economic importance within the Study Area. This section, and the corresponding sub-sections, examine these critical resources: forests (Section 3.4.1, page 3-68), aquatic resources and wetlands (Section 3.4.2, page 3-68), wildlife and fisheries (Section 3.4.3, page 3-75), and endangered, threatened, and other protected species (Section 3.4.4, page 3-84). The following sections provide a summary of each of these resources.

3.4.1 Forests

This section describes forested areas within the Study Area. Potential impacts on forests from construction of Segments 2, 4, and 7 are included in Chapter 4, Environmental Consequences (Section 4.4.1, page 4-47).

While there are no federal or state regulations that specifically regulate upland natural communities, NEPA guidelines require consideration of environmental impacts on biodiversity. Furthermore, forestry plays a vital role in the economy of Aroostook County by providing a major source of employment.

The majority of the Study Area (73 percent; 2,015 square miles, approximately 1.3 million acres) consists of forest typical of northern New England, which have been altered and fragmented by previous and current human use. Historically, much of the forested land within the region and throughout New England was cleared for agriculture or timber production, and few tracts of land have remained unaffected. The use of rivers for transportation corridors for timber has ceased, and been replaced by a more extensive road system throughout the forest to transport timber. Currently, approximately 50 percent of the forested land in the Study Area (1,000 square miles) is owned by companies associated with the forestry industry. Much of the western portion of the Study Area is actively logged and traversed by logging roads. Figure 3-9 illustrates the distribution of forested land in the Study Area.

Aroostook County lies within the broad transition zone between the boreal forest to the north and the northern hardwoods regions to the south and east. Boreal forest, spruce-northern hardwood forest, and deciduous forest are represented in the Study Area. For more detail on forest types, type coverage, and the primary species associated with forest types, see DEIS Section 3.4.3.2, page 3-76, Natural Upland Communities.

3.4.2 Aquatic Resources and Wetlands

Water is a fundamental component of the natural landscape. Surface water and groundwater are resources that are important to the public drinking water supply, wildlife habitat, agriculture, industry and recreation, and are protected by federal,

state, and local regulatory programs. Sections 3.4.2.1 to 3.4.2.3 describe aquatic resources and wetlands in the Study Area. Potential impacts on aquatic resources and wetlands from construction of Segments 2, 4, and 7 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 4, Environmental Consequences (Section 4.4.2, page 4-49).

3.4.2.1 Water Resources

The water resources mapping presented in the DEIS was refined for the SDEIS Corridors to include surface public drinking water sources, public drinking water wells and wellhead protection areas, and at-risk watersheds within 0.5 miles of the SDEIS Corridors. This section describes the public drinking water sources and at-risk watersheds in the Study Area.

Regulatory Context

Water resource regulations include provisions relating to public drinking water suppliers, public drinking water sources, development, and water quality. Regulations include federal laws, state laws, and local zoning laws.

The federal Safe Drinking Water Act (42 USC 300f) (SDWA) is the primary law regulating drinking water quality in the United States. The Maine Drinking Water Program (DWP) administers the SDWA in the state of Maine under the Maine Drinking Water Rules. The SDWA primarily functions by requiring drinking water providers to test and treat drinking water to ensure that contaminants are below levels determined by the EPA. The SDWA categorizes providers based on the number of users and frequency of their use. User categories help determine the size of source water protection areas.

Surface Public Drinking Water Sources

Within the Study Area, the towns of Mars Hill, Presque Isle, Caribou, and Madawaska use surface water as a public drinking water source. Table 3-30 (page 3-70) lists the sources of surface public drinking water for each community.

Groundwater Wells and Wellhead Protection Areas

Groundwater wells are the source for most municipal public drinking water systems and all public, non-community drinking water systems (such as schools, hospitals, hotels, restaurants) in the Study Area. The communities of Houlton, Littleton, Monticello, Bridgewater, Blaine, Westfield, Woodland, New Sweden, Stockholm, T16R4I, the unorganized townships of T17R3, T17R4, T17R5, the Towns of Saint Agatha, Grand Isle, and Frenchville rely on groundwater wells to provide public drinking water. Mars Hill, Presque Isle, Caribou, and Madawaska utilize both groundwater wells and surface drinking water sources (DWP, 11/1/99). Other communities in the Study Area rely on private groundwater wells and do not have public drinking water supplies.

**Table 3-30
 Towns with Surface Water Drinking Water Sources**

Town/City	Water Body
Mars Hill	Youngs Lake
Presque Isle	Presque Isle Stream
Caribou	Aroostook River
Madawaska	St. John River

Source: Maine Drinking Water Program and Maine Department of Environmental Protection Bureau of Land and Water

The distribution of public drinking wells in the Study Area approximately follows the distribution of population centers. Wells and their Wellhead Protection Areas (WPAs) are shown on Figures 3-36 through 3-41. The WPAs for the majority of wells are based on a fixed radius of between 300 and 2,500 feet.

At-risk Watersheds

Several segments of the SDEIS Corridors are in the proximity of, or cross, lake and stream watersheds that are included on the list of “at-risk” waterbodies under the Maine Stormwater Management Law or the Non-Point Source Pollution priority watershed list (Table 3-31 below). The Non-Point Source Pollution Priority Watersheds List identifies those watersheds where State and Federal agencies will coordinate activities and seek to provide assistance to local groups for the purpose of developing or implementing watershed management plans. There are no waterbodies within the Study Area included on the Unified Watershed Assessment highest priority list. The receiving waters of these watersheds have been determined to be water quality limited or at risk of water quality degradation. No water quality limited water bodies occur within the Study Area.

**Table 3-31
 Watersheds Designated as “At-Risk” by Maine Stormwater Management Law and Non-Point Source Pollution Priorities in Proximity to the SDEIS Corridors**

Segment	Water Body	At-Risk	NPS Priority
2	Cross Lake		X
2	Daigle Brook		X
5	Caribou Stream		X
7	Aroostook River	X	
8	Prestile Stream		X

Source: Maine Watershed Management Committee and Maine DEP Bureau of Land and Water. NPS Pollution Priority Watershed List and UWA. <http://www.state.me.us/dep/blwq/watersh.htm>

Classification as an “at risk” waterbody may not include additional regulation but requires planning and consideration in final design, including measures to reduce the impact of highway stormwater runoff and/or Non-Point Source pollution. The surface waters on the Maine Stormwater Management Law list include the Aroostook River, one of the surface waters used as a source of public drinking water in the Study Area.

3.4.2.2 Aquatic Habitats

There are approximately 3,920 lakes and ponds in the Study Area, covering approximately 90 square miles. The lakes and ponds provide some important waterfowl migratory areas and provide habitat for endangered and threatened plants and wildlife. Some of the lakes and ponds include fringing emergent wetlands.

Major rivers and streams in the Study Area include the north and south branches of the Meduxnekeag River, the Aroostook River, the Little Madawaska River, and the St. John River. The Meduxnekeag River flows west to east in the southeast portion of the Study Area through Houlton and Monticello. The Aroostook River flows from west to east in the central portion of the SDEIS Corridors through Washburn, Presque Isle, Caribou, and Fort Fairfield. The Little Madawaska River flows northeast from its headwaters in Perham through Westmanland and Stockholm, then flows southeast through New Sweden, Connor Township, and Caribou, where it converges with the Aroostook River. The St. John River forms the northern limit of the Study Area and flows east through Fort Kent, Madawaska, and Van Buren. The Proposed Action is primarily within the watershed of the Aroostook River, with parts of Segment 2 and 4 in the watershed of the Little Madawaska River.

3.4.2.3 Wetlands

Wetlands cover about 7,813 square miles of Maine, or approximately one-fourth of the state (Fretwell *et al.*, 1996). Wetlands comprise approximately 523 square miles, 19 percent, of the total Study Area (2,760 square miles). Wetlands are a substantial portion of Maine’s natural resource base and provide a suite of functions and values, including providing essential habitat for a variety of wetland-dependent plants and animals, flood control, sediment retention, water filtration, hunting, fishing, recreational opportunities, and opportunities for timber harvesting and peat mining.

Five principal wetland types have been identified in the Study Area. These include palustrine forested wetlands (PFO), palustrine scrub-shrub wetlands (PSS), palustrine emergent wetlands (PEM), lacustrine wetlands and riverine wetlands. A detailed description of each of these wetland types is provided in Section 3.4.2.4 (page 3-74) of the DEIS.

Regulatory Context

Wetlands in the Study Area are regulated and protected under state and federal regulatory programs because of the important functions they provide to the public. The State of Maine Natural Resources Protection Act (38 M.R.S.A, Protection of Natural Resources., § 480-A to 480-Z) (NRPA) establishes regulations to protect Maine's natural resources, including rivers, streams, great ponds, and freshwater wetlands in organized territories. Chapter 10 (Section 10.16K) of the Rules and Standards promulgated by the LURC protects wetlands in unorganized territories. Section 404 of the federal Clean Water Act regulates discharges of fill to wetlands. Executive Order 11990 also protects wetlands by directing federal agencies to avoid new construction in wetlands where there is a practicable alternative.

Wetland Identification

For the SDEIS, a more detailed analysis of the wetlands in the Study Area was undertaken to facilitate a greater understanding of potential wetland impacts along each of the SDEIS Corridor segments. Wetland boundaries within the SDEIS Corridors were refined from the DEIS by stereoscopic interpretation of aerial photos flown in May 2003. The limits of the SDEIS Corridors within which wetlands were mapped are substantially larger than the impact evaluation corridors and ranged from 600 feet wide along Segment 2 (the Route 161 upgrade alignment) to 5,000 feet along Segment 7 (the Presque Isle Bypass new alignment). Aerial photographs were not available for Segment 3. Average widths used in the wetland mapping were as follows:

- Segment 1: 4000 feet
- Segment 2: 600 feet
- Segment 4: 2,300 feet
- Segment 5: 1,500 feet
- Segment 6: 1,200 feet
- Segment 7: 5,000 feet
- Segment 8: 1,200 feet
- Segment 9: 1,000 feet
- Segment 10: 1,200 feet
- Segment 11: 1,200 feet

Aerial photos were uploaded to a computer application, to which National Wetlands Inventory (NWI)-mapped wetland boundaries were added. NWI polygon data were obtained from the Maine Office of GIS (OGIS) and re-projected onto the project coordinate system. The NWI wetlands were verified and modified as necessary, based on aerial stereoscopic interpretation. For Segment 7, wetland boundaries were ground-truthed and adjusted as necessary. No actual field delineation of wetland boundaries was undertaken during this phase of the study.

Within the Study Area, 1,579 individual wetlands were identified (including wetlands previously identified by NWI mapping). The NWI maps use the Cowardin

Classification System²³ to classify wetlands by “systems” according to plants, soils, and frequency of flooding. The systems are then further subdivided into subsystems, classes, and subclasses based on substrate material, flooding regime, and vegetative life form. The wetlands, water bodies and waterways in the Study Area have been categorized based on the information contained on NWI and USGS maps. These categories include PFO, PSS, PEM, water bodies (ponds, Palustrine Unconsolidated Bottom [PUB] and lakes, L1), and waterways (R2, R3, and R4). These categories were fully described in the *SDEIS EVTR*.

PFO on the NWI maps are grouped into the forested wetland category. These are freshwater wetlands with at least 30 percent aerial coverage of trees. Forested wetlands in the Study Area include forested bogs, forested fens, deciduous forested swamps, and coniferous forested swamps. Approximately 321 square miles of the 2,760-square mile Study Area consists of PFO.

Wetlands in the Study Area identified as PSS on the NWI maps are grouped into the scrub-shrub wetland category. These are freshwater wetlands with less than 30 percent aerial coverage of trees and over 30 percent aerial coverage of shrubs. PSS also include wetlands where trees and shrubs cover less than 30 percent of an area alone but in combination cover 30 percent or more. PSS in the Study Area include shrub bogs and shrub swamps. Approximately 92 square miles of the 2,760-square mile Study Area consists of PSS.

Wetlands in the Study Area identified as PEM on the NWI maps are grouped into the emergent wetland category. These are freshwater wetlands (herbaceous ferns and marshes and wet meadows) with tree and shrub cover less than 30 percent of the area but where the total cover of PEM in the wetland is 30 percent or greater. Freshwater marshes are usually seasonally flooded wetlands that are usually saturated at or near the surface when not flooded, and are dominated by grasses or grass-like plants. Freshwater wet meadows are seldom-flooded wetlands that are saturated throughout the growing season, and are dominated by herbaceous vegetation. Approximately 21 square miles of the 2,760-square mile Study Area are PEM.

Wetland Functions and Values

Wetlands in the Study Area were evaluated in terms of the functions and values they provide. Due to the large number of wetlands, as well as the importance of assessing individual wetlands within the context of the overall landscape that they occur in, wetland functions and values were evaluated for larger wetland systems rather than individual wetlands. These wetland systems include all adjacent wetlands, as well as those wetlands that occur within 100 feet of a waterway. Information collected during stereoscopic photo interpretation, such as type of wetland class present in the wetland, presence or absence of waterways or waterbodies, and adjacency to farm

²³ Cowardin, L.M. et al. 1979. *Classification of Wetlands and Deepwater Habitat of the United States*, FWS/OBS 79/31. Washington DC, United States Government Printing Office.

fields, was used to assess the ability of wetland systems to provide functions and values. Although wetland systems were only photo interpreted within the limits of the SDEIS Corridors, if they were connected to NWI-identified wetlands outside the SDEIS Corridor limits the total wetland size was assessed. This approach was taken to acknowledge the role that size plays in wetland value.

The functions and values assessed for wetlands in Segments 1, 2, and 4 through 11 were:

- Groundwater Recharge/Discharge;
- Floodflow Alteration (Storage/Desynchronization);
- Fish and Shellfish Habitat (Aquatic Diversity/Abundance);
- Sediment/Toxicant Retention;
- Nutrient Removal/Retention/Transformation;
- Production Export (Nutrient);
- Sediment/Shoreline Stabilization;
- Wildlife Habitat;
- Recreation (Consumptive/Non-Consumptive);
- Educational/Scientific Value;
- Uniqueness/Heritage;
- Visual Quality/Aesthetics; and
- Endangered Species.

All of these functions and values occur within the overall Study Area. The specific functions and values that are provided by the wetlands which would be impacted by the Proposed Action are presented in Section 4.4.2.3 on page 4-56.

3.4.2.4 Floodplains

Floodplains are low-lying areas adjacent to streams, rivers, and coastlines that are inundated and that store water during flooding events. Flood storage capacity can reduce flooding impacts on downstream land by reducing peak flows. Executive Order 11988 Floodplain Management recognizes that floodplains provide natural and beneficial values, and that development in floodplains (defined as the area subject to a one percent or greater chance of flooding in any given year, the statistical "100-year floodplain") may have adverse impacts.

Regulatory Context

Floodplains are regulated by the Federal Emergency Management Agency (FEMA) and administered by local floodplain management ordinances within individual communities. Floodplains are also federally regulated by Executive Order 11988, which requires federal agencies to avoid, to the extent possible, impacts to floodplains. Chapter 10 (10.16, B) of the Rules and Standards promulgated by the LURC protects floodplains in unorganized territories.

The majority of the municipalities within the Study Area have adopted a Floodplain Ordinance modeled after the minimal standards issued by FEMA's National Flood Insurance Program (NFIP). The Ordinances regulate activities within the 100-year floodplain, and are intended to ensure that work within the 100-year floodplain will not increase downstream flooding.

Floodplains in the Study Area

The limits of the floodplains in the Study Area were determined through available FEMA NFIP mapping. Floodplains have not been mapped in many portions of the Study Area. The FEMA Flood Insurance Rates Maps (FIRM) focus on developed areas that have flood damage potential; therefore FEMA has not mapped the 100-year floodplain in areas with minimal development.

Mapped 100-year floodplains within the Study Area are generally associated with the larger rivers and streams and their tributaries that flow through larger cities and towns (Figures 3-36 through 3-41). Cities and towns proximate to the SDEIS Corridors that were assessed by FEMA for flood damage potential include the areas surrounding Houlton, Mars Hill and the Caribou/Presque Isle area. Floodplains within these communities are primarily associated with the Meduxnekeag River, Prestile Stream, and the Aroostook River. There is also a 100-year floodplain associated with the St. John River at the northern boundary of the Study Area. Flooding is a major concern for many communities within the Study Area. The U.S. Army Corps of Engineers has invested in major flood control projects in Presque Isle as flooding has historically caused substantial damage to the community.

3.4.2.5 Outstanding River Segments

Because of their "special resource values of the flowing waters and shorelands," some rivers and streams are classified as Outstanding River Segments under the Maine NRPA (12 M.R.S.A. § 403). Portions of several waterways within the overall Study Area have been designated as Outstanding River Segments, including sections of the Aroostook River, Fish River, Fish Stream and St. John River (Figures 3-36 to 3-41). Only the Aroostook River in Presque Isle, however, is in the vicinity of any of the Proposed Action Segments. Segment 7 would cross the Aroostook River (Figure 3-38).

3.4.3 Wildlife Habitat, Significant Wildlife Habitat, and Essential Fish Habitat

Fishery and wildlife resources considered in this study include both regulated and unregulated resources. Unregulated resources such as typical fisheries and wildlife habitat are included because they provide an important component to biodiversity. CEQ Guidance states "To the extent that federal actions affect biodiversity, and to the

extent that it is possible to both anticipate and evaluate those effects, NEPA requires federal agencies to do so.”²⁴

This section presents a description of wildlife habitat, regulated significant wildlife habitat, and essential fish habitat in the Study Area. This section also provides an explanation of the regulatory context for the evaluation of impacts to wildlife habitat. Potential impacts on wildlife habitat, significant wildlife habitat, and essential fish habitat from construction of Segments 2, 4, and 7 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 4, Environmental Consequences (Section 4.4.3, page 4-70).

3.4.3.1 Regulatory Context

There are no regulatory programs for the protection of wildlife habitats other than the specific types described below. However, wildlife are an important component of biological diversity.

Fisheries are primarily protected under the federal Clean Water Act (Section 404), which regulates discharges of fill to wetlands, waterways, and “other waters of the United States.” Discharges that have an “unacceptable adverse effect...on fishery areas (including breeding and spawning areas) or wildlife” may be prohibited. The National Marine Fisheries Service (NMFS) protects essential fish habitat (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 NMFS 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 NMFS must provide conservation recommendations if an adverse effect to EFH is anticipated.

The Maine Atlantic Salmon Commission (MASC) has been charged with protecting Atlantic salmon in the state of Maine in accordance with 12 M.R.S.A. § 9902.

The State of Maine protects “significant wildlife habitat” under its NRPA (38 M.R.S.A. § 480), under authority of the Maine DEP. Significant wildlife habitat includes habitat for species on the state or federal list of endangered species, high- and moderate-value deer wintering yards and travel corridors, high- and moderate-value waterfowl and wading bird habitat, critical spawning and nursery areas for Atlantic salmon, shorebird nesting, feeding, and staging areas, seabird nesting islands, and significant vernal pools.

Significant vernal pools are a Significant Wildlife Habitat designated by NRPA. The scientific criteria for designating “significant” vernal pools include a) presence of a

²⁴ Council on Environmental Quality. January 1993. *Incorporating Biodiversity Considerations into Environmental Impact Analysis under the National Environmental Policy Act.*

state Endangered or Threatened species, or b) evidence of exceptional breeding abundance by one or more pool-breeding amphibians. The definition includes a 250-foot “critical terrestrial habitat” area around the pool. Following public hearings during the fall of 2005, IF&W adopted the definition of a significant vernal pool and the state’s Board of Environmental Protection unanimously adopted the new rules for significant vernal pools. Both agencies will be reporting back to the Legislature in 2006 for the final consideration of proposed changes to NRPA by the Joint Standing Committee on Natural Resources.²⁵

Except for critical spawning areas for Atlantic salmon, which are designated by the MASC, for a habitat to meet the definition of Significant Wildlife Habitat, it must be identified as such by the IF&W.

A permit is required in accordance with the NRPA for projects that involve work within a mapped significant wildlife habitat, or within 100 feet of a mapped significant wildlife habitat. NRPA allows for mitigation to offset impacts when determining if a project will have unreasonable harm to significant wildlife habitat. LURC is responsible for planning and zoning for the unorganized townships in Maine, and regulates wildlife habitat in accordance with the Land Use Regulation Law (12 M.R.S.A. § 681 *et seq.*) as a Fish and Wildlife Protection Subdistrict.

The IF&W and the Maine Natural Areas Program (MNAP) have jointly prepared GIS mapping of several natural resources statewide. The maps outline “consultation areas” which contain information on rare features in the state and key wildlife resources. The consultation areas that contain information on state-regulated rare resources (including state-listed threatened and endangered species) are described in the *SDEIS EVTR* dated August 2005.

3.4.3.2 Wildlife Habitat

Wildlife are identified and discussed in relation to habitat types that occur within the Study Area. Characteristic wildlife species found in the Study Area communities are described in this section.

The Maine Gap Analysis Program (ME-GAP) has determined that the highest diversity of terrestrial vertebrate species occurs in the southern and coastal portion of Maine. These areas are also where the highest number of rare plants and animals occur. The Study Area was not identified by the ME-GAP as an area with under-represented terrestrial wildlife or gaps in wildlife species distribution, land ownership, or management status in terms of biodiversity conservation and, therefore, is not of regional importance for wildlife protection.

²⁵ <http://www.maine.gov/ifw/huntrap/weeklyreport.htm>

Forests dominate the Study Area with shrub and upland herbaceous communities interspersed throughout (Figure 3-9). Much of this forested area is in commercial forestry, harvested for timber on a rotational basis. These large forested areas provide habitat for species that prefer interior forest habitat, while the interspersed forest, shrub, and open habitats provide niches for species that prefer edge and early-successional habitats. Farmlands with pastures, meadows, and hayfields provide habitat for species that inhabit open areas. Numerous, and in some cases extensive, wetland communities within each of the cover types enhances the ecosystem diversity. Wetlands within the forest enhance wildlife habitat and diversity, partly because water provides a required resource for all wildlife, and partly because wetlands provide habitat for wetland-dependent wildlife.

The following paragraphs describe the dominant types of wildlife habitats that occur in the Study Area, and summarize the wildlife communities likely to be associated with these habitats. Wildlife and wildlife habitats (with the exception of Significant Wildlife Habitats and Essential Fish Habitat described in Section 3.4.3.4 and 3.4.3.5 on pages 3-82 and 3-84, respectively), although not specifically regulated under state or federal laws, are important considerations in evaluating potential impacts to biodiversity.

Boreal Forest

Boreal forests, because of the low floristic diversity and low structural complexity, support a characteristic fauna of relatively low diversity in comparison to deciduous or mixed forests. Boreal forest is found in large and small patches throughout the Study Area, particularly in the southern and western portions.

Boreal forests provide habitat for spruce grouse (*Falciennis canadensis*), black-backed woodpecker (*Picoides arcticus*), red squirrel (*Tamiasciurus hudsonicus*), masked shrew (*Sorex cinereus*), redback salamanders (*Plethodon cinereus*), pine grosbeaks (*Pinicola enucleator*), magnolia warbler (*Dendroica magnolia*), Cape May warbler (*Dendroica tigrinas*), Northern parulas (*Parula americana*), palm warblers (*Dendroica palmarum*), and blackpoll warblers (*Dendroica striata*). White-tail deer (*Odocoileus virginianus*) are found in the boreal forest during the winter, particularly on low, south-facing slopes or along watercourses. Moose (*Alces alces*) prefer second-growth boreal forest interspersed with swamps or large ponds, but habitat use by moose varies seasonally.

Spruce-Northern Hardwood Forest

Because of the mixture of evergreen and deciduous trees, this community provides the most diverse cover type in the Study Area in both species diversity and structural complexity. Where spruce-northern hardwood forest occurs near streams, ponds, and other waterways and waterbodies, wildlife habitat values are increased.

Characteristic species of this forest type include common raven (*Corvus corax*), porcupine (*Erethizon dorsatum*), fisher (*Martes pennanti*), marten (*Martes americana*) yellow-bellied sapsucker (*Sphyrapicus varicus*), spotted salamander (*Ambystoma*

maculatum), and short-tailed shrew (*Sorex brevicauda*). Northern goshawks (*Accipiter gentilis*) may hunt in forest interiors, and Cooper's hawk (*Accipiter cooperi*) may hunt in more open woods broken with small openings and edges. Typical migratory songbirds include the black-and-white warbler (*Mniotilta varia*) and Canada warbler (*Wilsonia canadensis*).

Deciduous Forest

Habitats and wildlife species represented in deciduous forest are generally similar to those in the mixed (spruce-northern hardwood) forest type. Typical species include ruffed grouse (*Bonasa umbellus*), pileated woodpeckers (*Dendrocopos pileatus*), American redstarts (*Setophaga ruticilla*), rose-breasted grosbeak (*Pheucticus ludovicianus*), and Northern dusky salamander (*Desmognathus fuscus*). Forests containing stands of American beech and beaked hazelnut, interspersed with wetlands, are important to black bears (*Ursus americanus*) in the fall. Black bear habitat is provided in old forests dominated by hardwoods containing a variety of mast-producing species such as beech, oaks, and beaked hazelnut (mast is the crop of seeds produced by trees and shrubs and consumed by wildlife). Bears typically occupy large tracts of land with dense thickets, swamps, or rock outcrops.

Shrub Communities

Relative to the forested land in the Study Area, shrub communities exhibit less wildlife diversity, except in areas where they form patches within a forest. Although diversity in shrub and herbaceous communities may be lower than in forested habitats, these areas are important to the preservation of some wildlife species that are dependent on open and early successional habitats.

Reptiles such as redbelly snake (*Storeria occipitomaculata*) and garter snake (*Thamnophis sirtalis*) occur in upland meadows and abandoned fields. Characteristic bird species include alder flycatchers (*Empidonax aldrum*), yellow warblers (*Dendroica petechia*), swamp sparrows (*Melospiza georgiana*), chestnut-sided warblers (*Dendroica pensylvanica*), Nashville warblers (*Vermivora ruficapilla*), American goldfinches (*Carduelis tristis*) and cedar waxwings (*Bombycilla cedrorum*). Northern shrike (*Lanius excubitor*) often frequent old fields in the Study Area during the winter, particularly where there are trees or utility poles that can be used as hunting perches. Snowshoe hares inhabit dense second-growth shrub cover types and forest openings. Bobcat (*Lynx rufus*) may also be present in these areas, particularly where snow cover does not accumulate too deeply.

Upland Herbaceous Communities

Upland herbaceous communities support bird species such as Eastern meadowlarks (*Sturnella magna*), bobolinks (*Dolichonyx oryzivorus*), savannah sparrows (*Passerculus sandwichensis*), killdeer (*Charadrius vociferus*) and horned larks (*Eremophila alpestris*). Snow buntings (*Plectrophenax nivalis*) and Lapland longspurs (*Calcaricus lapponicus*) often form gregarious flocks in the winter. Avian predators such as red-tailed hawk (*Buteo*

jamaicensis) and American kestrel (*Falco sparverius*) often hunt over pastures and fields from the air or from vantage points in the tops of nearby trees. Numerous small mammals, particularly meadow voles (*Microtus pennsylvanicus*) and meadow jumping mice (*Napaeozapus insignis*), are common and provide food for mammalian predators such as weasels (*Mustela* spp.), red fox (*Vulpes vulpes*), and coyotes (*Canis latrans*).

Wetland Habitats

Wetland types that occur in the Study Area are described in Section 3.4.2.3 (page 3-71). Forested wetlands generally provide similar habitat values as forested upland areas. Unique wildlife habitats found in wetlands include vernal pools and open water wetlands, as described below. Vernal pools are discussed in Section 3.4.3.4 (page 3-84).

Small ponds created by beaver dams occur throughout the Study Area. These ponds provide habitat for several species in addition to beavers (*Castor canadensis*). Muskrats (*Ondatra zibethicus*), river otters (*Lutra canadensis*), and raccoons (*Procyon lotor*) hunt for fish and aquatic invertebrates in beaver pond wetlands. Big brown bats (*Eptesicus fuscus*) frequently hunt the numerous insects found over these, and other, wetland areas.

Open water habitats provided by the man-made impoundments, reservoirs, beaver ponds, and larger streams throughout the Study Area also provide habitat for a variety of species. Common amphibians associated with open water habitats include spring peepers (*Hyla crucifer*), green frogs (*Rana clamitans*), and bullfrogs (*Rana catesbiana*). Great blue herons (*Ardea herodias*) and belted kingfishers (*Ceryle alcyon*) forage along large wetlands such as Beaver Brook and the Aroostook River. Mallards (*Anas platyrhynchos*), common mergansers (*Mergus merganser*), red-breasted mergansers (*Mergus serrator*), and hooded mergansers (*Lophodytes cucullatus*) occur on Squa Pan Lake, Square Lake, and Cross Lake. These lakes, as well as others within the Study Area, also host a variety of species of transient ducks, grebes, and loons during the spring and fall migratory periods.

Moose Habitat

Moose habitat, although not regulated under state or federal laws, is an important consideration in the evaluation of transportation corridors because of the high incidence of moose-vehicle collisions (Section 3.2.3.2, page 3-19 and see Figure 3-7). The moose population has risen substantially from the turn of the century, to approximately 30,000 in the State of Maine. Approximately 7,000 moose are estimated to inhabit Aroostook County.

Moose habitat is found throughout the Study Area, typically in undeveloped areas interspersed with clear cuts, abandoned farms, wetlands, and stream corridors. Habitat usage varies seasonally. In general, warm season habitat consists of boreal second-growth forests with a matrix of wooded and open water wetlands. In spring, moose use habitat areas with mature aspen, white birch, and balsam fir. As summer approaches, moose move to areas near lentic waters for access to nutritional

requirements, to reduce heat stress, and for relief from biting insects. During the cold seasons, moose commonly seek lower elevations. Yarding behavior is common among males.

Developed Areas

Residential neighborhoods and agricultural areas also provide wildlife habitat. Mammals include raccoon, striped skunk (*Mephites mephites*), house mouse (*Mus musculus*), and Norway rat (*Rattus norvegicus*). Little brown bat (*Myotis lucifagus*) roost during the day in barns, attics, church steeples, and under bridges. Birds such as barn swallow (*Hirundo rustica*) feed on insects during the summer near water, often near human habitation. Birds such as blue jay (*Cyanocitta cristata*), house sparrow (*Passer domesticus*), and downy woodpecker (*Picoides pubescens*) are frequently observed in shade trees and at feeders. White-tailed deer may venture from forest edges to browse on shrubs, grasses, and apple trees in residential neighborhoods in the Study Area. Moose may also be found in neighborhoods and towns, particularly in the winter, when they seek lower elevations.

3.4.3.3 Fisheries

The waterbodies in the Study Area support several coldwater species (salmonids) and several warmwater species (yellow perch, *Perca flavescens*; longnose suckers, *Catostomus catostomus*; and white suckers, *C. commersoni*). However, most warm-water sportfish (white perch, *Morone Americana*; smallmouth bass, *Micropterus dolomieu*; largemouth bass, *M. salmoides*; and pickerel, *Esox niger*) are limited to the South and Main Branches of the Meduxnekeag River in Houlton and Littleton, in part because man-made and natural barriers on major river drainages prevent their movement northward.

St. Croix Stream, the Aroostook River, and the St. John River are the major waterways in the Study Area, and support fish such as brook trout (*Salvelinus fontinalis*), arctic char (*Salvelinus alpinus*), and rainbow smelt (*Osmerus mordax*). Principal lakes include Squa Pan Lake, Eagle Lake, Square Lake, Cross Lake, and Long Lake. Species such as common shiner, (*Notropis cornutus*), lake trout (*Salvelinus namaycush*), and northern redbelly dace (*Rhinichthys cataractae*) are frequently found in large, cool lakes such as these. Numerous smaller ponds and streams are scattered throughout the Study Area. These waterways and waterbodies, and many others in the Study Area, provide suitable habitat for one or more fish species.

Brook trout are the predominant sport fish in Aroostook County and can be found in lakes and streams throughout the entire Study Area. Other popular sport fish include lake trout, which are found primarily in larger lakes such as Eagle Lake in the northwestern portion of the Study Area, and brown trout (*Salmo trutta*), which are found primarily in the Meduxnekeag River drainage in the Houlton area.

The IF&W has been restoring, augmenting, and enhancing native and introduced species of fish populations for several years. Cross Lake, Long Lake, Pleasant Lake, Squa Pan Lake, and Beaver Brook are stocked with brook trout, lake trout, brown trout, landlocked salmon, and splake (hybrid brook/lake trout). Stocked waterbodies are shown on Figures 3-42 through 3-47.

3.4.3.4 Significant Wildlife Habitat

State-regulated wildlife resources under NRPA, defined as “Significant Wildlife Habitat,” includes habitat for state- and federally-listed species, high- and moderate-value deer wintering yards and travel corridors, high- and moderate-value waterfowl and wading bird habitat, critical spawning and nursery areas for Atlantic salmon, shorebird nesting, feeding, and staging areas, seabird nesting islands, and significant vernal pools. Regulated resources known to occur within the Study Area include deer wintering yards and inland waterfowl and wading bird habitat. Descriptions of the resources found in the Study Area are provided below and shown on Figure 3-44. Habitat for state- and federally-listed endangered, threatened and species of special concern are described in Section 3.4.4 (page 3-84).

Deer Wintering Areas

Areas designated by the IF&W as high- and moderate-value deer wintering yards are protected as Significant Wildlife Habitat. The State of Maine supports approximately 300,000 wintering white-tailed deer, nearly a 50 percent increase since 1985. Deer populations have increased at different rates throughout the state, with the highest increases observed in the central and southern parts of the state, which state biologists believe was influenced by generally moderate winters, productive habitat, and management strategies. In the northern and western parts of the state, deer populations have remained relatively constant.

White-tailed deer, which reach the northern extent of their range in Maine, require forested areas that provide areas of protection from deep snow and wind and sufficient forage. These areas also typically green up earlier in the spring, providing an important foraging area when food resources are depleted. Deer Wintering Areas (DWAs) typically occur on south-facing slopes or in low-lying areas along watercourses and are composed of softwood dominated forest.

Mapped DWAs in organized towns are regulated by the IF&W as candidate Significant Wildlife Habitat. The LURC, based on documentation provided by the IF&W, has mapped DWAs in unorganized townships throughout the state. These LURC DWAs are regulated as Protection Districts (PF-W) zones under LURC regulations. Deer wintering yards are defined by IF&W as:

“An area used by deer when snow depth exceeds 12 inches in the open and hardwoods, deer sinking depth exceeds 8 inches in the open and hardwoods, and mean daily temperature is below 32 degrees Fahrenheit, provided that:

- Using Department survey procedure dated 12/22/93, deer use is documented during a minimum of two years in the most recent 10-year period at the time of designation, with one being a ground survey.
- Using Department mapping criteria dated 12/22/93, the area excludes nonforested wetlands, agriculture, development, clearcuts, hardwood forest types, and forest stands dominated by Eastern larch.”

LURC regulations (Chapter 10.16(c)(2)(b)) define deer wintering areas as:

- Areas documented for a minimum of two years to be used by a population of at least 20 deer per one square mile for winter and/or bedding sites.
- Forest stands that are composed of over 50 percent conifer stems and contain a conifer crown closure of over 50 percent with predominant tree heights of over 35 feet.

Inland Wading Bird and Waterfowl Habitat

Mapped inland wading bird and waterfowl habitat is regulated by the IF&W as Significant Wildlife Habitat. Certain ecological systems, particularly palustrine, riverine, and littoral systems, provide valuable conditions for foraging for waterfowl and wading birds. High nutrient availability contributes to production of prey such as fish, tadpoles, amphipods, and crustaceans. Foraging and nesting areas that are relatively undisturbed increase the habitat value for waterfowl and wading birds.

High- and moderate-value waterfowl and wading bird habitat (WWH) (jointly defined) are described by IF&W as:

- An inland wetland complex meeting the Department delineation guidelines, dated December 22, 1993, and 250-foot wide zone surrounding the wetland complex that through a combination of dominant wetland type, wetland diversity, wetland size, wetland type interspersion, and percent open water is rated as high or moderate using the Department’s Rating Procedure dated December 22, 1993 or has documented outstanding use of the wetland by waterfowl and wading birds.

In 2003, the IF&W implemented a process to identify high and moderate value WWHs throughout Maine that incorporated data from National Wetland Inventory mapping. Using this process, IF&W has identified additional WWHs within the Study Area since the publication of the DEIS.

High- and moderate-value WWHs occur in many of the towns within the Study Area. These WWHs are associated primarily with river and stream systems with extensive adjacent wetlands (see Figures 3-42 through 3-47). Examples of larger mapped WWHs include the wetlands associated with the Mattawamkeag River, East Branch (Smyrna); North Brook, Little Smith Brook, and Cut Pond Brook (Dudley Township); Brandy Brook (Webbertown Township); Beaver Brook (T9 R4 WELS), Presque Isle Stream (T9 R3 WELS); Russell Brook South Branch (Bridgewater); the Little Madawaska River (New Sweden, Westmanland, and Stockholm); McLean Brook North Fork (T16 R4 WELS); Dickey Brook West Fork, and McLean Brook, West Fork (T17 R5 WELS); and the Little River (Madawaska).

Significant Vernal Pools

Vernal pools provide critical breeding habitat for ambystomid salamanders (*Ambystoma* spp.), wood frogs (*Rana sylvatica*), and fairy shrimp (*Eubranchipus* spp.). Although vernal pools may occur in any forest type in the Study Area, the large scale of the Study Area precludes vernal pool identification at this stage, and none are mapped by the IF&W.

Significant vernal pools may occur within the Study Area, but have not yet been mapped by the IF&W. Vernal pools are currently being identified and mapped for Segment 2, 4, and 7. The results will be presented in the FEIS.

3.4.3.5 Essential Fish Habitat

The Aroostook River is considered EFH for Atlantic salmon because of its historical importance to Atlantic salmon populations. The MASC also stocks the Aroostook River (as does Canada) with Atlantic salmon.

3.4.4 Endangered, Threatened, and Species of Special Concern

This section describes federal- and state-listed endangered and threatened species, and species of special concern in the Study Area. Potential impacts on endangered, threatened, and species of special concern from construction of Segments 2, 4, and 7 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 4, Environmental Consequences (Section 4.4.4, page 4-79).

3.4.4.1 Regulatory Context

Rare species are protected by both state and federal legislation. The federal Endangered Species Act (16 USC §1531.43) requires federal agencies to conserve listed species of plants and animals. This means that all methods and procedures that would return a species from the possibility of extinction should be implemented,

including habitat conservation, habitat acquisition, and research. Maine's Endangered Species Act (12 M.S.R.A. §7751 *et seq.*) requires state agencies to conserve all endangered or threatened fish and wildlife species, as well as their essential habitat. Rare plants and botanical communities are not protected under state regulations unless they are identified as essential to providing state-listed wildlife species with physical or biological features that are critical to the species' survival, or are within another protected natural resource such as wetlands or Significant Wildlife Habitat. However, the MDOC has developed and maintains an Official List of Endangered and Threatened Plants (E and T List) in Maine, which is used as an informational planning tool.

3.4.4.2 Federal Endangered and Threatened Species

One federally listed species, the Canada lynx (*Lynx canadensis*), potentially occurs in the SDEIS Corridors, and is described in the SDEIS EVTR dated August 2005. Furbish's lousewort (*Pedicularis furbishiae*) is a state- and federally-listed endangered herbaceous plant, and its only habitat worldwide occurs along the calcareous scoured banks of the St. John River, north of the Study Area. The Bald Eagle, *Haliaeetus leucocephalus*, a federally-listed threatened species, also occurs in the Study Area but outside the Corridors (See DEIS Section 3.4.5.1, page 3-87, and Section 4.4.5.1, page 4-100).

The federally threatened Canada lynx is associated with dense boreal and subalpine conifer forests, thickets, and swamps, and occurs in the Study Area at the southern extent of their range. They are nocturnal and usually solitary except during the breeding season. Habitat characteristics include remote forests, rugged terrain, and a dense thicket understory. USFWS states that lynx occur in western Maine, preferring mixed forest-coniferous forest vegetation dominated by red spruce, balsam fir, sugar maple, birch and beech (Federal Register, V. 65 No. 58). The USFWS has proposed critical habitat for the lynx that includes a portion of the Study Area. Route 161 (Segment 2) represents the edge of some proposed critical habitat. The proposed critical habitat is shown on Figure 3-48.

Since the publication of the DEIS, the IF&W, the USFWS, paper companies, and conservation organizations have funded a telemetry study to monitor lynx in northern Maine. Known and historic lynx locations are provided on Figure 3-48. Current industrial forestry practices, such as regeneration of clearcut areas, appear to be beneficial to lynx by providing prime habitat for the snowshoe hare, the chief food source for lynx. Track surveys in sixteen townships in the Northwest Ecoregion (outside of the Study Area, in areas north of Moosehead and west of Ashland) verified lynx presence in 14 of the 16 surveyed townships. The IF&W conducted track surveys in Aroostook County in winter 2004.

On November 17, 2000, Atlantic salmon (*Salmo salar*) was listed as endangered by the NMFS and the USFWS. However, the listing is for a Distinct Population Segment (DPS) in the Gulf of Maine, well outside the SDEIS Corridors. The DPS specifically

identifies naturally reproducing populations in eight rivers (Dennys, Machias, East Machias, Pleasant, Ducktrap, Narraguagus, Sheepscot River, and Cove Brook). The DPS does not occur in the SDEIS Corridors; therefore this species is not considered endangered in Aroostook County. However, three rivers in Aroostook County (the Meduxnekeag River, Prestile Stream, and the Aroostook River), are recognized by the MASC as Atlantic salmon rivers. The Aroostook River is also considered EFH by the USFWS for Atlantic salmon because of its historical importance to Atlantic salmon populations.

3.4.4.3 State Endangered and Threatened Species

Eight state-listed species have been documented in the SDEIS Study Area. Seven of these were described in the *SDEIS EVTR* and DEIS. One dragonfly species, the extra-striped snaketail (*Ophiogomphus anomalus*), has been added to the state list since the publication of the *SDEIS EVTR* and is described below. Of these eight species, five (bald eagle, black tern, Clayton's copper, yellow lampmussel, and Tomah Mayfly) do not occur in the vicinity of the Proposed Action Segments evaluated in this SDEIS and are therefore not discussed in this chapter. Table 3-32 on page 3-87 lists the state-listed wildlife and their regulatory status.

Upland Sandpiper

The upland sandpiper (*Bartramia longicauda*) is state-listed as threatened based on population estimates of less than 200 breeding pairs statewide. The upland sandpiper is not federally-listed. In Aroostook County, upland sandpipers are loosely colonial nesters found in dry, open grassland areas such as airports and grassy pastures during the breeding season. Nests are simple, consisting of little more than a sparsely lined scrape. The upland sandpipers' diet is composed primarily of grain and seeds, though it occasionally eats terrestrial invertebrates.

In the Study Area, the upland sandpiper has been observed during the summer at Loring Commerce Center, the Northern Maine Regional Airport in Presque Isle, the Northern Aroostook Regional Airport in Frenchville, and in the towns of Westfield, Fort Fairfield, and Washburn. This species is not known to occur in the vicinity of the Proposed Action.

Extra-Striped Snaketail

The extra-striped snaketail (*Ophiogomphus anomalus*) is a state-listed dragonfly of Special Concern in Maine. Its preferred habitat is in fast-flowing, medium-sized, warm water streams with abundant gravel in heavily forested watersheds. The species has a limited distribution due to the type of substrate required for the larvae to survive. Riffles with gravel, sand, or cobble within warm water rivers or streams, forested riparian areas, and stream channel integrity are key habitat features for this species.

The Extra-Striped Snaketail has been observed in the Aroostook River in Caribou (Figure 3-44).

Pygmy Snaketail

The pygmy snaketail (*Omphiogomphus howei*) is a dragonfly listed as threatened (no federal listing). In the Study Area, the pygmy snaketail has been observed in the mid-river reaches of the Aroostook River in Washburn, Presque Isle, and Caribou (Figure 3-44). The pygmy snaketail prefers flowing waters of unpolluted, medium to large rivers.

**Table 3-32
 Endangered, Threatened, and Special Concern Wildlife in the SDEIS Corridors**

Common Name	Scientific Name	Legal Status ¹	Distribution	Segment
Birds				
Upland sandpiper	<i>Bartramia longicauda</i>	T	Loring Commerce Center, Northern Maine Regional Airport, Northern Aroostook Regional Airport	1
Mammals				
Canada lynx	<i>Lynx Canadensis</i>	FT	Various locations	9
Invertebrates				
Extra-striped snaketail	<i>Ophiogomphus anomalus</i>	SC	Aroostook River	4, 5
Pygmy snaketail	<i>Ophiogomphus howei</i>	T	Aroostook River	6, 7

¹ T – State Threatened
 SC – (State) Species of Special Concern. Species of Special Concern are listed because they contribute to the FEIS Corridors biodiversity, but are not regulated by the state of Maine.
 FT – Federally Threatened

Source: Maine Department of Inland Fisheries and Wildlife, Wildlife Division, Bangor, Maine.

Essential Habitat

Essential Habitats are areas that currently or historically provide physical or biological features that are critical to conserving an endangered or threatened species, such as nesting or feeding areas. The state designates essential habitat for a rare species only if habitat loss has been determined to be a cause in the species’ decline. Before an area can be designated Essential Habitat, it must be mapped by the IF&W and adopted through formal public procedures.

No Essential Habitats occur in the SDEIS Corridors.

State-listed Plants

Correspondence with the MNAP indicates that 62 rare plant species are known to occur in Aroostook County (as documented in the DEIS, page 3-91), but that no rare plants occur within the SDEIS Corridors.

3.5 Atmospheric Environment

This section describes air quality and the noise environment in the Study Area.

3.5.1 Air Quality

The 1990 Clean Air Act Amendments (CAAA) require that a proposed project not cause any new violation of the National Ambient Air Quality Standards (NAAQS), or increase the frequency or severity of any existing violations, or delay attainment of any NAAQS.

This section describes existing air quality conditions for the ACTS Study Area in terms of their conformance with the NAAQS. This air quality analysis evaluates the pollutants that are relevant to the transportation improvements proposed in the Study Area. This information will be used to assess any regional or local air quality impacts. Potential impacts on air quality from construction of Segments 2, 4, and 7 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 4, Environmental Consequences (Section 4.5.1, page 4-81).

3.5.1.1 Regulatory Context

The EPA has established NAAQS that set limits on air pollutants considered harmful to public health. The State of Maine has adopted the same standards as those set by the EPA. The predominant sources of air pollution from the proposed SDEIS Corridors would be emissions of volatile organic compounds (VOCs), oxides of nitrogen (NO_x), particulate matter (PM₁₀), and carbon monoxide (CO). Ozone is a pollutant of regional concern and is evaluated based upon the change in the precursor emissions of VOC and NO_x. Carbon monoxide and PM₁₀ are of local concern and are evaluated based upon their concentrations at congested intersections.

VOCs and NO_x are important pollutants because of their role in forming ozone, which is also referred to as photochemical smog. Both of these pollutants are emitted from transportation sources. VOCs are a subset of the emissions from unburned fuel. NO_x, a product of high temperature combustion, is a brownish gas with a pungent odor. It is a pulmonary irritant and short exposure may increase susceptibility to acute respiratory disease. NO_x are emitted in the form of nitrogen dioxide (NO₂) and nitrogen monoxide (NO). The amount of NO₂ present in exhaust is dependent on the source type. Typically, NO₂ emissions are not modeled for highway projects but NO_x is and NO_x levels are compared to the NAAQS for NO₂ (Table 3-33, page 3-90). Further conversion of the

emitted NO to NO₂ occurs in the outside air by reacting with ozone in a complex photochemical process. The highest levels of ozone typically occur during the summer months. CO and NO_x are emitted primarily by motor vehicles, and highest concentrations of CO typically occur near congested intersections during the winter, when cold temperatures cause inefficient engine operation.

Particulate matter is a term referring to particles found in the air. Some particles are large enough to be seen as dust, soot, or smoke, while others are too small to be visible. Particulate matter comes from a variety of sources. In general, emissions from highway and non-road vehicles, including railroads, compose approximately one percent of total PM₁₀ emissions. Fuel combustion in power plants and industrial processes accounts for another five percent of PM₁₀. The largest direct source of PM₁₀ is fugitive dust from paved and unpaved roads, agricultural and forestry activities, wind erosion, wildfires, and managed burning. PM₁₀ in Presque Isle is due to dust caused by agricultural operations, winter road sanding, and vehicle emissions. Typically, PM₁₀ concentrations are highest during the winter due to particles from the sanding of roadways. PM₁₀ is also formed indirectly in the atmosphere by the reaction of gaseous pollutants, such as NO_x. Standards for particulate matter are set for particles smaller than a certain size (for PM₁₀, this is 10 microns). Small particles can have adverse health effects because of their ability to reach the lower regions of the respiratory tract. The NAAQS also regulates emissions of smaller (2.5 micron) particles, known as PM_{2.5}.

Carbon monoxide is a product of incomplete combustion. Over 95 percent of CO emissions come from mobile sources. It is a colorless and odorless gas that prevents the lungs from passing oxygen to the blood stream. Brief exposure to high levels of CO can also impair vision, physical coordination, and the perception of time.

The EPA has set the NAAQS to protect the public health and welfare. Table 3-33 (page 3-90) presents the NAAQS for the major pollutants including both primary and secondary pollutants.

The 1990 CAAA divided states into attainment and non-attainment areas with classifications based upon the severity of the air quality problem. The Study Area is currently designated as attainment for ozone, CO, and PM_{2.5}. This means that existing levels of ozone, CO, and PM_{2.5} do not exceed the NAAQS. The City of Presque Isle is designated as a Maintenance area for PM₁₀ and is classified as "Moderate." A Maintenance area is defined as an area that had previously been designated a non-attainment area, but after submitting a maintenance plan now meets applicable air quality standards and is redesignated to attainment.

**Table 3-33
 National Ambient Air Quality Standards**

Pollutant	Averaging Period	Primary
Carbon Monoxide (CO)	8 hours ¹	9 ppm ²
	1 hour ¹	35 ppm
Nitrogen Dioxide (NO ₂)	Annual	0.053 ppm
Ozone	8 hour	0.08 ppm
PM10	Annual Arithmetic Mean	50 µg/m ³
	24 hours	150 µg/m
PM2.5	Annual Arithmetic Mean	15 µg/m
	24 hours	65 µg/m ³

- 1 Not to be exceeded more than once a year.
 2 Parts per million.
 3 Micrograms per cubic meter.

3.5.1.2 Methodology

The air quality study includes a microscale and mesoscale analysis that evaluate the local and regional emissions, respectively. These analyses were conducted following EPA modeling procedures using traffic and emissions data for existing and future (No-Action and Build) conditions. These data were incorporated into EPA air quality models and Maine DEP specific emission programs to generate emissions estimates.

Microscale

The microscale analysis evaluated CO concentrations at one of the most congested intersections in the Study Area during the peak CO season (winter).²⁶ The intersections in the Study Area were ranked based on traffic volumes and level of service. The intersection of Route 1 (Main Street), Route 163 (Maysville Street), and the Parsons Street Connector was selected for analysis as being the most congested.

The microscale analysis calculates maximum one-hour and eight-hour CO concentrations, using the computer model CAL3QHC. The CAL3QHC model calculates the air quality impacts from vehicles in both free-flow and idle operation by creating a three-dimensional model that represents the highway and receptor geometry. Traffic, emission, and meteorological data were entered into the model to predict maximum one-hour and eight-hour CO concentrations.

The vehicle emission factors used in the microscale analysis were obtained using the EPA's MOBILE6.2²⁷ computer model. MOBILE6.2 calculates CO emission factors for motor vehicles in grams per vehicle-mile. The emission factors calculated in this

²⁶ Draft *Environmental Assessment for the Easton Industrial Access Road Study*, 2003.
²⁷ MOBILE6.2 (Mobile Source Emission Factor Model).

study were adjusted to reflect Maine-specific conditions such as temperature representative of the winter CO season and do not include an Inspection and Maintenance program.

The microscale analysis also evaluated PM10 concentrations at the Maine DEP monitoring site in Presque Isle with the highest value.

Mesoscale

The purpose of the mesoscale analysis is to estimate the area-wide emissions of VOC and NOx during a typical day in the peak ozone season (summer) and PM10 during a typical day in the peak PM10 season (winter). PM2.5 was not evaluated as the area is in attainment. The mesoscale analysis evaluates the change in VOC, NOx, and PM10 emissions from the average daily traffic volumes, highway lengths, and vehicle emission rates. Using EPA recommended air quality modeling techniques, total pollutant emissions were calculated for the SDEIS Corridors.

The mesoscale Study Area includes all highways identified in the transportation analysis. The specific highways included in this air quality analysis are Route 1, Route 1A, Route 11, Route 161, Route 163, and Canadian Route 2.

The mesoscale analysis calculated the VOC, NOx, and PM10 emissions for the existing conditions within the Study Area. The vehicle emission factors used in the mesoscale analysis were obtained using the EPA's MOBILE6.2 emissions model. MOBILE6.2 calculates emission factors from motor vehicles in grams per vehicle-mile for existing and future conditions. The emission rates calculated in this air quality study were adjusted to reflect Maine's specific conditions. Emission factors for the mesoscale analysis were determined using the Maine DEP-recommended temperatures for the summer (ozone) season and winter (PM10) season.

3.5.1.3 Results – Existing Conditions

The microscale analysis calculated the 2005 concentrations for CO and PM10. The CO analysis evaluated the most congested intersection based on traffic volumes and level of service. The PM10 concentrations were evaluated based on existing PM10 monitoring data. The results for the microscale analysis are as follows:

- The 2005 Existing CO concentration for the 1-hour analysis was calculated to be 5.1 ppm.
- The corresponding eight-hour analysis was calculated to be 3.57 ppm.
- This CO concentration is substantially below the NAAQS of 35 ppm (one-hour) and 9 ppm (eight-hour).
- The existing PM10 concentrations are 73 $\mu\text{g}/\text{m}^3$ for the 24-hour period and 16 $\mu\text{g}/\text{m}^3$ for the annual. These concentrations are below the NAAQS of 150 (24-hour) and 50 (annual) $\mu\text{g}/\text{m}^3$, respectively.

The mesoscale analysis calculated the 2005 VOC, NO_x, and PM₁₀ emissions from the major highways in the Study Area. These emissions, estimated to be 2,530.6 kilograms per day (kg/day) of VOCs, 5,000.9 kg/day of NO_x, and 127.2 kilograms per day of PM₁₀, establish a baseline to which future emissions can be compared.

3.5.2 Noise Environment

This section describes the existing noise environment of the Study Area. The noise analysis was conducted following MaineDOT's²⁸ and FHWA's²⁹ noise evaluation and abatement procedures for a Type I project. 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 significantly changes either the horizontal or vertical alignment or increases the number of through travel lanes. All of the SDEIS Corridors under consideration conform to this definition.

Potential impacts on the noise environment from Segments 2, 4, and 7 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 4, Environmental Consequences (Section 4.5.2, page 4-89).

3.5.2.1 Noise Terminology

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, work, or recreation. The individual human response to noise is subject to considerable variability, since there are many emotional and physical factors that contribute to the differences in reaction to noise.

Sound (noise) is described in terms of loudness, frequency, and duration. Loudness is the sound pressure level measured on a logarithmic scale in units of decibels (dB). For community noise impact assessment, sound level frequency characteristics are based upon human hearing, using an A-weighted (dBA) frequency filter. The A-weighted filter is used because it approximates the way humans hear sound. Table 3-34 (page 3-93) presents a list of typical sound levels at distances measured in feet from the source. The duration characteristics of sound account for the time-varying nature of sound sources.

The most common way to account for the time-varying nature of sound (duration) is through the equivalent sound level measurement, referred to as Leq. The Leq 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 Leq represents the loudest hour of the day and usually occurs during the peak periods of

²⁸ Maine Department of Transportation. September 1998. *Highway Traffic Noise Policy*.

²⁹ Title 23 Code of Federal Regulations, Part 772. *Procedures for Abatement of Highway Traffic Noise and Construction Noise*.

automobile and truck traffic volumes and when vehicle speeds are high. The FHWA guidelines and criteria require the use of the one-hour Leq for assessing highway noise impacts on different land uses. The one-hour Leq is the Leq noise level for a specific one-hour period. The following general relationships exist between hourly traffic noise levels and human perception:

- A one- or two-dBA increase is not perceptible to the average person.
- A three-dBA increase, although a doubling of acoustic energy, is just barely perceptible to the human ear.
- A 10-dBA increase is a tenfold increase in acoustic energy, but is perceived as a doubling in loudness to the average person.

**Table 3-34
 Typical Sound Levels**

Outdoor Sound Levels	Sound Pressure (μPa) ¹	-	Sound Level (dBA) ²	Indoor Sound Levels
	6,324,555	-	110	Rock Band at 15 feet
Jet Over-Flight at 1000 feet		-	105	
	2,000,000	-	100	Inside New York Subway Train
Gas Lawn Mower at 3 feet		-	95	
	632,456	-	90	Food Blender at 3 feet
Diesel Truck at 50 feet		-	85	
Noisy Urban Area—Daytime	200,000	-	80	Garbage Disposal at 3 feet
		-	75	Shouting at 3 feet
Gas Lawn Mower at 100 feet	63,246	-	70	Vacuum Cleaner at 10 feet
Suburban Commercial Area		-	65	Normal Speech at 3 feet
	20,000	-	60	
Quiet Urban Area—Daytime		-	55	Quiet Conversation at 3 feet
	6,325	-	50	Dishwasher Next Room
Quiet Urban Area—Nighttime		-	45	
	2,000	-	40	Empty Theater or Library
Quiet Suburb—Nighttime		-	35	
	632	-	30	Quiet Bedroom at Night

**Table 3-34 (continued)
 Typical Sound Levels**

Outdoor Sound Levels	Sound Pressure (μPa) ¹	Sound Level (dBA) ²	Indoor Sound Levels
Quiet Rural Area—Nighttime		- 25	Empty Concert Hall
Rustling Leaves	200	- 20	
		- 15	Broadcast and Recording Studios
	63	- 10	
		- 5	
Reference Pressure Level	20	- 0	Threshold of Hearing

¹ μPa MicroPascals describe pressure. The pressure level is what sound level monitors measure.

² dBA A-weighted decibels describe pressure logarithmically with respect to 20 μPa (the reference pressure level).

Source: Highway Noise Fundamentals, Federal Highway Administration, September 1980.

3.5.2.2 Methodology

The noise analysis evaluated the highest noise levels in the Study Area. The highest noise levels were found to occur during the evening peak hour traffic commuting period. The sound levels were calculated using the FHWA's approved noise modeling methodology.³⁰ The current FHWA's noise prediction model is titled *Traffic Noise Model* (TNM) 2.5.³¹ The modeling input data included peak hour traffic volumes, vehicle mix, vehicle speeds, and roadway and receptor geometry. The existing modeled sound levels were based on the evening peak hour traffic commuting period.

3.5.2.3 Existing Noise Levels

The existing sound levels ranged from 39 dBA at locations without existing highways, to 68 dBA at locations with existing highways, as shown in Table 3-35 (page 3-95).

³⁰ US Department of Transportation. December 1978. *FHWA Highway Traffic Noise Prediction Noise Model*. FHWA - RD-77-108.

³¹ Federal Highway Administration's Traffic Noise Model Version 2.5, February 2004

Table 3-35
Existing Sound Levels (dBA)¹

Location	Sound Level (dBA)
Segment 2	63
Segment 4	39
Route 1 – Downtown Presque Isle	68
Segment 7	57

¹ Calculated as the 1-hour Leq.