

# 4

## Affected Environment

**How to Read This Chapter:** Chapter 4 describes the existing conditions and resources relevant to the Segment 4 Route 1-161 Connector in Caribou, Maine. 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 FEIS Study Area. Existing conditions for the entire ACTS Study Area were described in Chapter 3 of the SDEIS.

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

---

### 4.1 Introduction

This chapter summarizes 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 Proposed Action. This chapter describes each resource within the Segment 4 Study Area only.

The Segment 4 Study Area is approximately 10,000 acres, consisting of the eastern portion of downtown Caribou and northern Caribou. The Study area also contains a portion of the western side of the Towns of Woodland and New Sweden. The aerial extent shown on Figure 3-2 depicts the Segment 4 Study Area.

Downtown Caribou serves as the shopping, business, and employment center for this area. It is a dense population center and provides a full range of community resources and services, including educational, medical, civic, recreational, and commercial facilities. The Aroostook River passes through the southeast portion of the Study Area, serving as the eastern boundary of downtown Caribou.

In contrast, northern Caribou and the portions of Woodland and New Sweden included in the Segment 4 Study Area consist predominately of farmland (approximately 4,900 acres) and undeveloped forest (approximately 3,900 acres).

Existing conditions described in this chapter include:

- 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 SDEIS and the technical memoranda prepared for the Study:

- The SDEIS *Corridor Traffic Analysis Technical Memorandum*<sup>1</sup> (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*<sup>2</sup> (SDEIS ECTR) contains an analysis of the population, employment, community, and economic characteristics of the Study

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

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

Area, based on available secondary sources and supplemented by information provided by knowledgeable local public officials and business representatives.

- The SDEIS *Environmental Technical Report*<sup>3</sup> (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).
- The *Aroostook County Transportation Study USACE Highway Methodology Phase I Avoidance and Phase II Permit Application – Caribou Route 1 – 161 Connector* contain detailed comparative analysis of the alternatives and alignment options considered for the Route 1- 161 Connector in Caribou. This included a transportation benefit analysis and a comparison of impacts to social and natural environmental resources including wetlands, farmland, structures, historic properties, Section 4(f) resources.

---

## 4.2 Transportation Environment

This section provides a general overview of the existing transportation conditions in the Study Area for Segment 4. It describes the key highways that serve the Study Area and quantifies existing traffic demands, and geometric/safety deficiencies on the key highways. Potential impacts on the transportation environment from construction of Segment 4 are discussed in Chapter 5 (Section 5.2, page 5-2).

---

### 4.2.1 The Transportation System

Caribou is the second largest city in Aroostook County and one of the major economic activity centers in Aroostook County. Route 1 is the major north-south route through Caribou and is part of the National Highway System, as shown on Figure 1-1. The Caribou Municipal Airport, a general aviation airport, is within the study area and accessed from Main Street.

Caribou has approximately 29 miles of arterial highways, 32 miles of collector roads, and 90 miles of local roads. Arterial highways include Route 1, Route 89, Bennett Drive, and portions of Route 161, Route 164, and Route 228. Collector roads include Route 205, Route 223, and portions of Route 161, Route 164, and Route 228.

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

Route 1, with controlled access between Route 164 (south of downtown) and Route 89 (north of downtown), provides an eastern bypass of Caribou. Route 164 provides direct access into the downtown from Route 1 south of Caribou and connects Route 1 with Route 161 west of Caribou (see Figure 3-1). Route 164 is heavily developed with commercial uses along much of its length.

Route 161 is the principal connection between the Saint John Valley (Fort Kent, Frenchville, Madawaska) and areas south and east of Caribou. For most of its length, Route 161 is a 2-lane rural arterial with maximum posted speeds of 55 miles per hour. Vehicles traveling north on Route 1 to the Saint John Valley either exit Route 1 at Route 164 and travel through the one-way downtown loop to reach Route 161 or exit Route 1 further north at Fort Street (Route 161) and then pass through the downtown business district one-way loop. These connections have a 25 mile-per-hour speed limit, stop signs, and congested residential and commercial streets, which increase travel times and result in conflicts between through traffic (particularly trucks) and local destination traffic, as well as with the pedestrian use of downtown Caribou.

## 4.2.2 Existing Traffic Conditions

Traffic volumes presented in this section are based on counts conducted by MaineDOT through an ongoing statewide traffic counting program. Average annual daily traffic (AADT) volumes for key study area highways are shown in Table 4-1 (page 4-4).

**Table 4-1  
 AADT Summary**

Highway	Location	2004 AADT <sup>1</sup>
Route 1 (Van Buren Road)	North of Old Van Buren Road	3,900
North Main St. (North of downtown Caribou)	North of Herschel St (Route 161)	6,100
Route 228 (Woodland Road)	Northwest of Route 161	2,300
Route 161 (Sweden Street)	North of Route 228	4,700
Route 161/164 (South Main Street)	South of Water Street	10,700
Route 89 (High Street)	West of Bennett Drive	10,800
Route 89 (Access Highway)	Northeast of Otter Street	7,700

Source: 2007 Maine Transportation Count Book- Traffic counts for Caribou are from 2004  
 1 AADT – Average annual daily traffic

The higher traffic volumes in the Study Area (over 10,000 vehicles per day) occur on highway segments closer to the Caribou city center and in the vicinity of Bennett

Drive. The regional highways in the Study Area including Route 1, Route 161, and Route 228, carry notably lower traffic volumes (below 5,000 vehicles per day) when compared to the Caribou city center and in the vicinity of Bennett Drive.

---

### 4.2.3 Geometric and Safety Deficiencies

A safety review was conducted within the Study Area limits to determine if the traffic demands being placed on the highways combined with the geometric conditions of the highways have resulted in unsafe operating conditions. High Crash Locations (HCLs) and geometric deficiencies were identified for the key Study Area highways.

#### High Crash Locations

HCLs identified using MaineDOT data from 2005 to 2007 are shown on Figure 4-1. HCLs occur at the following four locations on Route 1, Route 89, Route 161, and Bennett Drive:

1. Route 1 at Belanger Rd
2. Route 89 at Bennett Drive/Pleasant Street
3. Route 161 at Route 89 (High Street at Main Street)
4. Bennett Drive at Laurette Circle

#### Geometric Deficiencies

Geometric deficiencies exist when the criteria contained within the MaineDOT Highway Design Guide are not met for the design speed of the facility. Reviews of vertical geometry, horizontal geometry, and highway lane and shoulder widths were completed. Deficiencies included narrow lane and shoulder widths, and vertical and horizontal curves that exceeded current MaineDOT's design standards.

Figure 4-1 highlights the geometric deficiencies in the Study Area. As indicated, there are shoulder width deficiencies on Route 161 and vertical curve deficiencies on Route 1 north of Caribou. Shoulders are multi-functional and provide structural support, increased capacity, emergency parking, and recovery area for vehicles. Desirable shoulder widths vary according to functional classification, traffic volumes, rural/urban setting, and curbed/uncurbed facilities. Vertical grades (steepness) are an issue for the safety of both large trucks and passenger vehicles. The MaineDOT criteria for maximum grades are based on functional classification, urban/rural location, type of terrain, design speed, and scope of the project.

#### 4.2.4 System Continuity and Mobility

One of the overarching goals of this study is to identify a faster, safer, and more reliable route for motorists and trucks within and through the Caribou area. This can be accomplished by shifting regional traffic demand to highways with less interruptions and higher classifications to maximize mobility and travel speeds. For example, regional north-south traffic demands are not efficiently handled through the one-way street network in Caribou that is primarily designed for local access and not for regional through traffic.

Continuity and mobility varies with a highway's functional classification. Roads with a low classification, such as local and collector roads, primarily provide local access rather than regional continuity and mobility. Highways with higher classifications, such as Interstate Highways and Principal Arterials, tend to provide a safer, faster, and more reliable route because of limited access points, higher speed design standards, and more passing opportunities. This trade off between mobility and access is directly related to reliability. For regional travel, a shift from lower classification roadways (local/collector) to higher classification (arterial) reflects an improvement in the study area mobility.

Sixty-one percent of the travel demands are carried on roadways that have a lower functional classification and more points of access and egress. Approximately 39 percent of the vehicle trips through the Study Area occur on highways with a higher functional classification such as freeways and principal arterials that historically have a lower crash occurrence. Existing traffic volumes are shown in Table 4-1 (page 4-4).

---

### 4.3 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 resources:

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

Figure 4-2 illustrates the key social and cultural resources within the Study Area that may pose constraints related to potential future transportation improvements.

---

### 4.3.1 Land Use

Land use is an important factor to consider in evaluating new and upgraded transportation corridors for several reasons. 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 the Caribou area, there are several major land use categories that greatly influence the social and economic fabric of the community, including agriculture, forestry, and recreation (particularly snowmobiling).

This section describes the existing conditions in the FEIS Segment 4 Study Area for these important land uses and provides information on 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 5, (Section 5.3.1, page 5-9).

---

#### 4.3.1.1 Land Use Patterns

Forested and agricultural lands dominate land use patterns in the Segment 4 Study Area. Together these uses account for 8,800 acres of land in the Study Area (the total size of the Study Area is approximately 10,000 acres). Forested land, including managed forestry covers 3,900 acres of the Study Area (Figure 4-3). Agriculture is the largest single land use, covering approximately 4,900 acres in the Study Area (Figure 4-4).

Developed areas are generally limited to central Caribou and land adjacent to highway corridors in the Caribou area such as Route 1, Route 89, Route 161, and Route 164.

---

#### 4.3.1.2 Tribal Lands

The Aroostook Band of Micmac Indians is the only federally-recognized sovereign tribal nation who own land in the vicinity of the Segment 4 Study Area. 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 184 acres of land adjacent to Route 1, approximately halfway between

downtown Presque Isle and downtown Caribou, outside of the Segment 4 Study Area (see Figure 4-5).

---

#### 4.3.1.3 Snowmobile Trails

Aroostook County's 2,000 miles of snowmobile trails makes the region a destination for winter tourism. The main trail system, known as the Interconnecting Trail System (ITS), runs throughout Aroostook County, including Caribou. The Bangor-Aroostook Trail in Caribou, part of the ITS, is a publicly-owned trail owned by the Maine Bureau of Parks and Lands, Off-Road Vehicle Division. The Bangor-Aroostook Trail runs from Otter Street in Caribou northwest towards New Sweden. There are several other regional connector trails (RT) and maintained club trails on the Interconnected Trail System (ITS) in the Caribou area. These include ITS 83, RT 89, and ITS 90. These trails are on both publicly- and privately-owned lands. These trails are illustrated on Figure 4-6.

---

#### 4.3.1.4 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 Segment 4.

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.

---

#### 4.3.2 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 (Figure 4-4). Agricultural land occupies approximately 4,900 acres of the 10,000-acre 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 Segment 4 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 5, (Section 5.3.2, page 5-12).

---

#### 4.3.2.1 Regulatory Context

The Farmland Protection Policy Act (FPPA) of 1981<sup>4</sup> was enacted by the U.S. 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).

---

#### 4.3.2.2 Active Farms

Aroostook County is one of the largest potato growing regions in the United States. As shown in Figure 4-4, active farms are abundant within Caribou. Farm fields are the dominant landscape feature throughout the Study Area. 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.

Active farm fields are defined as agricultural land currently in use for farming. Active farm fields along the FEIS Corridor 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. Site reconnaissance confirmed the locations of active fields, key field access points, storage facilities, and locations where farm equipment crosses highways.

---

#### 4.3.2.3 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.

---

<sup>4</sup> 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.*

Prime farmland, unique farmland, farmland of state wide importance, and farmland of local importance within the FEIS Corridors were digitized from USDA soils maps into a GIS compatible format. Prime farmland and farmland of statewide importance were the only regulated soil types found in the Segment 4 Study Area.

Prime farmland and farmland of statewide importance have been mapped by NRCS for the Study Area. Overall there is slightly more prime farmland (4,002 acres) than farmland of statewide importance (2,636 acres) within the Segment 4 Study Area. Table 4-2 (page 4-10) describes the Prime Farmland Soils and Farmland of Statewide Importance that occur within the Segment 4 Study Area.

**Table 4-2**  
**Prime Farmland Soils and Farmland of Statewide Importance within the Study Area**

Series	Series Symbol	Textures	Slope Class <sup>1</sup>		Parent Material	Drainage Class
			Prime	Statewide Importance		
Allagash	Ag	Fine sandy loam	A, B	C	Outwash	Well drained
Benson <sup>2</sup>	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 <sup>3</sup>	Da	Silt loam	A, B	—	Calcareous till	Somewhat poorly drained
Fredon and Halsey <sup>3</sup>	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 <sup>3</sup>	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 <sup>2</sup>	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

### 4.3.3 Social and Economic Environment

This section provides baseline socioeconomic data for the Segment 4 Study Area. Potential impacts on the socioeconomic environment from construction of Segment 4 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 5, (Section 5.3.3, page 5-14).

The Study Area is comprised of the community of Caribou. Although some of the information is presented for Caribou, 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 area (LMA), Presque Isle-Caribou.<sup>5</sup> The Study Area contains approximately 11 percent of the total Aroostook County population, based on 2000 U.S. Census Bureau data.

The data presented here represent an update of the socioeconomic information contained in the SDEIS. The SDEIS 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 from the most recent year the data was available.

---

#### 4.3.3.1 Population, Employment and Income

The population, labor force, and income levels in the Study Area have fluctuated modestly since the publication of the SDEIS in June 2006, based on information from the U.S. Census, Maine State Planning Office, Maine Department of Labor, Claritas, Inc., and RKG Associates, Inc.

##### Population Trends

The dominant characteristic of Caribou's population has been its steady decline over the past several decades. Between 1990 and 2000, the population in Caribou declined from 9,415 to 8,312 persons. This decline continued through 2008, with Caribou losing an additional 451 persons. This trend in population decline has been experienced in all of Aroostook County. The population in Caribou is projected to continue to decline through 2013 (see Table 4-3, page 4-12).

---

<sup>5</sup> 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.

**Table 4-3  
 Population Trends and Projections: 1990-2013**

	1990	2000	2008	2013
Caribou Population	9,415	8,312	7,861	7,682
% Change over Prior		-11.7%	-5.4%	-2.3%

Source: *DemographicsNOW* and RKG Associates, Inc.

### Population Age Distribution

Between 1990 and 2000, Caribou’s population experienced a shift of population base from younger age cohorts into older ones. This trend has continued from 2000 to 2008. This is shown in Table 4-4 (page 4-12). In 1990, 13.8 percent of Caribou’s population was age 65 and over, compared to 17.5 percent in 2000. In 2008, 18.7 percent of Caribou’s population was age 65 and over, showing a continuation of this trend. 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 from 1990 to 2000 were experienced in the 20 to 24 age cohort, at about 377 residents, representing a loss of 41.6 percent. However, this population group increased by 29.9 percent from 2000 to 2008.

**Table 4-4  
 Population Change by Age: 1990-2008**

Age Cohort	1990 (%)	2000 (%)	2008 (%)	% Change (1990-2000)	% Change (2000-2008)
Under 5	625 (6.6)	475 (5.7)	440(5.6)	-24.0%	-7.4%
5 to 19	1,961 (20.8)	1,560 (18.8)	1,256 (16.6)	-20.0%	-19.5%
20 to 24	646 (6.9)	377 (4.5)	438 (5.6)	-41.6%	29.9%
25 to 34	1,513 (16.1)	987 (11.9)	922 (11.7)	-34.8%	-6.6
35 to 54	2,424 (25.7)	2,511 (30.7)	2,215 (28.2)	5.2%	-11.8%
55 to 64	946 (10.0)	903 (10.9)	1,121 (14.3)	-4.5%	24.1%
65 to 74	736 (7.8)	806 (9.7)	768 (9.8)	9.5%	-4.7%
75 to 84	426 (4.5)	486 (5.8)	518 (6.6)	14.1%	6.6%
85 and Over	<u>138 (1.5)</u>	<u>167 (2.0)</u>	<u>183 (2.3)</u>	<u>21.0%</u>	<u>9.5%</u>
<b>Total</b>	<b>9,415 (100.0)</b>	<b>8,312 (100.0)</b>	<b>7,861 (100.0)</b>	<b>-11.7%</b>	<b>-5.4%</b>

Source: RKG Associates, Inc.

### Labor Force, Employment, and Unemployment Rate Trends

Table 4-5 (page 4-13) shows recent changes in the size of the labor force, the number of persons employed, and the unemployment rates within Aroostook County, the Presque Isle-Caribou LMA, and Maine in general. Table 4-5 (page 4-13) also shows that, between 2000 and 2008, labor market conditions in Maine have generally improved. This improvement in labor conditions runs opposite to those projected in the SDEIS (SDEIS page 3-33, which were based on data from 2000-2003), indicating that the overall regional economic decline of the early part of the current decade has shown some sign of recovery. However, the economic changes experienced since mid-2008 may have affected this recovery.

**Table 4-5  
 Labor Force, Employment, and Unemployment Rate Trends**

	2000	2008	# Change	Percent Change
<b>Labor Force</b>				
Maine	685,781	706,800	21,019	3.1%
Aroostook County	37,931	35,350	-2,581	-6.8%
LMA	24,050	24,760	710	2.9%
<b>Employment</b>				
Maine	662,066	668,700	26,634	4.0%
Aroostook County	36,291	32,790	-3,501	-9.6%
LMA	23,050	23,000	-50	-0.22%
<b>Unemployment Rate</b>				
Maine	3.5%	5.4%	N/A	1.9%
Aroostook County	4.3%	7.3%	N/A	3.0%
LMA	4.2%	7.1%	N/A	2.9%

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

As shown, the size of the labor force statewide has increased marginally by 3.1 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 also occurred in the Study Area, but was not experienced in Aroostook County. Aroostook County experienced a decline in labor force. 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 increased in the State by about 26,634 people (4 percent), decreased in Aroostook County by about 3,500 people (9.6 percent), and decreased in the Presque-Isle-Caribou LMA by about 50 people (0.22 percent).

As shown, the 2008 average unemployment rates in Aroostook County (7.3 percent) and the Presque Isle-Caribou LMA (7.1 percent) are above the statewide average of 5.4 percent. In terms of unemployment rate trends over the 2000 to 2008 time period, rates generally increased within all three areas by between 1.9 and 3.0 percentage points.

### Business Establishments

Although at-place job growth in selected communities within the Study Area was relatively stagnant between 2001 and 2007, the area experienced a loss of business establishments over the same time period. As shown in Table 4-6 (page 4-14), according to the Maine Center for Workforce and Research Information, there were 269 business establishments in Caribou in 2007, a decrease of 30 firms (10.0 percent) since 2000. On a labor market basis, the Presque-Isle-Caribou LMA also experienced a 3.1-percent decrease in business establishments.

**Table 4-6**  
**Business Establishment Trends: 2000-2007**

Segment 4	2000	2007	Percent Change
Agriculture, Forestry, Fishing, Mining	11	12	9.1%
Construction	33	21	-36.45
Manufacturing- Durable	11	5	-54.5%
Manufacturing- Nondurable	5	2	-0.6%
Utilities	1	2	100.0%
Wholesale Trade	11	9	-18.2%
Retail Trade	61	52	-14.8%
Transportation and Warehousing	9	10	11.1%
Information Services	7	8	14.3%
Finance and Insurance	13	11	-15.4%
Real Estate	10	9	-10.0%
Professional/Technical Services	17	18	5.9%
Management	NA	NA	NA
Administration and Waste	15	16	6.7%
Educational Services	2	3	50.0%
Health Care	32	40	25.0%
Arts, Entertainment, Recreation	2	4	100.0%
Accommodations and Food	20	19	-5.0%
All Other except Government	39	28	-28.2%
<b>Total</b>	<b>299</b>	<b>269</b>	<b>-10.0%</b>
<b>Presque Isle-Caribou LMA</b>	<b>1,354</b>	<b>1,312</b>	<b>-3.1%</b>

Source: Maine Center for Workforce and Research Information

### Median Household Income

The median household income in Caribou in 2008 was \$48,976, which represents an increase of \$11,557, or 30.9 percent, since 2000 as shown in Table 4-7 (page 4-15).

**Table 4-7**  
**Median Household Income Trends: 2000-2008**

	2000	2008	Change	Percent Change
Caribou	\$37,419	\$48,976	\$11,557	30.9%

Source: DemographicsNow and RKG Associates, Inc.

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. In 2006, the State of Maine per capita income as \$32,287 while the per capita income in Aroostook County was \$26,633.<sup>6</sup> The increase in median household income in Caribou from 2000 to 2008 can be attributed to an increase in the number of households earning greater than \$100,000 per year.

#### 4.3.3.2 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, Caribou had 3,744 housing units in 2008, a decrease of 345 units (8.4 percent) since 1990. Within the Presque-Isle-Caribou LMA, the housing unit estimates in 1990 were higher than in 2000 by 1,130 units or 5.6 percent. Table 4-8 (page 4-16) shows the change in housing units within Caribou and the Presque Isle-Caribou LMA.

The decrease in the number of housing units is consistent with the loss of population in nearly all communities during the 1990 to 2008 period.

<sup>6</sup> Maine Department of Labor Employment Info Guide. Accessed 4/14/2009.

**Table 4-8  
 Housing Unit Trends: 1990-2008**

	1990	2000	2008	%Change 1990-2000	% Change 2000-2008
Caribou	4,089	3,831	3,744	-6.3%	-0.3%
Presque Isle-Caribou LMA	20,079	18,949	NA	-5.6%	NA

Source: United States Census Bureau, Northern Maine Development Commission, and RKG Associates, Inc.

### 4.3.3.3 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 4-9 (page 4-16), the municipal expenditures for Caribou totaled approximately \$10.9 million in 2007. The table also shows the distribution of expenditures by spending category and indicates that education (included within the category listed as “other”) expenditures accounted for 32 percent of total municipal spending. Education is typically the largest expenditure item for most communities.

**Table 4-9  
 Total Municipal Expenditures: 2007**

	General Administration	Public Safety	Public Works	Codes & Health Services	Parks & Recreation	Other (includes Education)	Total	Other as % of Total
Caribou	\$1,772,728	\$3,090,253	\$1,819,112	\$143,107	\$596,387	\$3,516,207	\$10,937,794	32.1%

Source: Maine Municipal Association

#### Municipal Revenues

Based on municipal revenue estimates provided by the Maine Municipal Association, Caribou received approximately \$21 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 4-10 (page 4-17), local and state generated revenues (both property tax and non-tax) account approximately equal portions of the revenue base, with federal revenue only accounting for 1.9 percent of the total.

**Table 4-10**  
**Total Municipal Revenues<sup>1</sup>: 2007**

	Local	State	Federal	Total
Caribou	\$9,578,221	\$11,050,521	\$405,285	\$21,034,027

<sup>1</sup> Does not include surplus or reserve funds  
 Source: Maine Municipal Association

### Municipal Property Tax Base

In 2008, the Study Area had a total tax base of approximately \$290 million, of which 78 percent (\$225 million) was from building improvements, 17 percent was from land, and the remaining 5 percent was from personal property. Table 4-11 (page 4-17) shows the municipal property tax base of Caribou in 2002.

**Table 4-11**  
**Municipal Property Tax Base: 2008**

	Land	Buildings	Personal Property	Total
Caribou	\$50,879,800	\$225,834,300	\$13,731,800	\$290,445,900

Source: Maine State Planning Office

#### 4.3.3.4 Economic Development Initiatives and Outlook

This section describes major employers in the area surrounding the Segment 4 Study Area, 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 4-12 (page 4-18), based on employer information provided by the Aroostook Partnership for Progress, the largest employer in Caribou is the Cary Medical Center followed by the Caribou School Department. The remaining major employers have much smaller employment bases.

**Table 4-12  
 Top Ten Major Employers- Aroostook County: 2008**

Company/Organization	Industry	Employees	Location
Aroostook Medical Center	Health Care	1,000-1,500	Presque Isle
Northern Maine Medical Center	Health Care	500-1,000	Fort Kent
Fraser Paper Company	Paper Manufacturing	500-1,000	Madawaska
Burrelle's Information Services	Information	500-1,000	Presque Isle, Houlton
McCain Foods	Food Processing	500-1,000	Easton
Cary Medical Center	Health Care	500-1,000	Caribou
Houlton Regional Hospital	Health Care	500-1,000	Houlton
WalMart Associates	Retail Sales	500-1,000	Presque Isle, Houlton
Sitel Corp.	Call Center	250-500	Limestone
Maine Military Authority	Vehicle Refurbishment	250-500	Limestone

Source: Aroostook Partnership for Progress

### Active Industrial Parks

Based on information provided by the Aroostook Partnership for Progress and RKG Associates, Inc., there are 11 business and industrial parks in 9 communities throughout the Aroostook County Study Area that are actively marketed by both public and private organizations. The business and industrial parks contain a total of 10,215 acres of land. In 2005, 5,106 acres were available for development, with 87 percent of the total available acreage contained within the Loring Commerce Centre in Limestone. Table 4-13 (page 4-19) shows the acres of land and principal tenants within industrial parks in the Aroostook County Study Area. There are two industrial parks in Caribou, one small (32-acre) industrial park with all 32 acres of land available for development and one larger (229 acre) industrial park with 6 acres available for development.

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 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 1 of only 2 that are based on population loss. The ACEZ consists of 3 separate areas: the northern part of the ACTS Study Area (3 communities including Fort Kent); the central Aroostook region (12 communities centered around Caribou and Presque Isle); and the south (6 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 4-13**  
**Available Land in Industrial Parks in 2008: Aroostook County**

Community	Total Acres	Available Acres	Percent Available	Principal Tenants
Ashland	62	20	32%	Kelley Lumber Sales
Caribou	229	6	3%	Maine Public service, SFE Inc., Maine Military Authority, Levesque Office Supply, McNeal's Trucking
Caribou	32	32	100%	None
Fort Fairfield	273	208	76%	Durepo & Durepo, Boralex, Atlantic Custom Processors, Graphic Utilities, Barnes Farms, HAPCO Farms
Fort Kent	40	40	100%	None
Houlton	100	50	50%	Larson FBO, Sabian Cymbal, Smith & Wesson, Ward Log Homes
Limestone	8,700	4,400	51%	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, Pattinson Sign Group RS Information System, Sitel Corp., Telford Aviation/Volvo
Mars Hill	29	0	0%	McCrum Farms, Caron's Property Maintenance, A.E. McQuade & Sons, Boyd Enterprises, Ketchum Farms
Presque Isle	450	150	33%	Acme Monaco, Aroostook Trusses, CAM Mfg., Coca-Cola, Columbia Forest Products, FedEx, Fiber Materials, Logistics Management Systems, Northeast Packaging, Northeast Publishing, Northern Maine Regional Airport, Overhead Door Company, PNM Construction, Sure Winner Foods, UPS
Van Buren	100	0	0%	Aegis Bicycles, Kevlaur Industries, Valley Landscapes
Van Buren	200	200	100%	None
<b>Total</b>	<b>10,215</b>	<b>5,106</b>	<b>50%</b>	

Source: Aroostook Partnership for Progress and RKG Associates, Inc.

## 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 Caribou-Presque Isle region has many award winning primary and secondary schools and is home to 3 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 30 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 30 4-year baccalaureate and 2-year associate degree programs in 4 divisions. Husson College, founded in 1898, has a satellite campus in Caribou that 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 2004 study by the University of Southern Maine Center for Business and Economic Research<sup>7</sup> 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 DEIS (page 3-50), visitors to the region impact a wide variety of economic

---

<sup>7</sup> 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.

sectors including food 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 2003 report<sup>8</sup> 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. Snowmobiling, fishing, and hunting take place everywhere, while overnight lodging and restaurants tends to be located in and around the major population centers.

### 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 Maine Winter Sports Center (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.

---

<sup>8</sup> Planning Decisions, Inc. September 30, 2003. *Aroostook County Economic Cluster Report – Part 1: Analysis*. Prepared by for Northern Maine Development Commission.

#### 4.3.4 Minority and Low Income Populations

This section describes the presence of minority or disadvantaged populations within the Segment 4 Study Area, updating the information presented in the SDEIS where updated data was available. The analysis utilizes data at the municipal level when possible; otherwise data at the county level is used due to the suppression of data by the Census Bureau for small populations. The findings at the county level are assumed to be representative of the Study Area.

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

Potential impacts to minority and low income populations from construction of Segment 4 are included in Chapter 5 (Section 5.3.4, page 5-20).

---

##### 4.3.4.1 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,<sup>9</sup> 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 2 or more races.<sup>10</sup>
- **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.”<sup>11</sup> 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.

---

<sup>9</sup> 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).

<sup>10</sup> United States Census Bureau. 2000. Data (<http://www.census.gov/main/www/cen2000.html>).

<sup>11</sup> 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.

#### 4.3.4.2 Income and Poverty Status

Caribou has a relatively higher share of lower income residents than other parts of the state and country. Table 4-14 (page 4-23) indicates the distribution of household income in Caribou in 2008.

**Table 4-14**  
**Household Income Distribution, Caribou - 2008**

Income Range	Number of Households	Percent
<\$25k	1,260	35.5%
\$25k-\$35k	461	13.0%
\$35k-\$50k	587	16.6%
\$50k-\$75k	663	18.7%
\$75k-\$100k	292	8.2%
>\$100k	<u>282</u>	<u>8.0%</u>
<b>Total</b>	<b>3,545</b>	<b>100.0%</b>

Source: Demographics*Now* and RKG Associates, Inc.

Poverty thresholds in the U.S. in 2007, by size of family, were \$10,590 (one person), \$13,540 (2 people), \$16,530 (3 people), and \$21,203 (4 people). According to the Census, 17.4 percent of residents in Aroostook County were living below the official poverty level in 2007, compared to 12.2 percent statewide and 13.0 percent nationwide. As shown on Figure 4-2, none of the 2000 census block groups in the Segment 4 Study Area contain median household incomes below the U.S. poverty thresholds.

#### 4.3.4.3 Racial Composition

The racial composition of Aroostook County has changed little since the SDEIS (page 3-48), which was based on 1990 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 4-15 (page 4-24) shows the change in minority population in Aroostook County between 1990 and 2000.

**Table 4-15  
 Aroostook County Racial Composition<sup>1</sup> 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%			

<sup>1</sup> 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

As shown in Figure 4-2, many 2000 census block groups in the Segment 4 Study Area have minority populations above the Maine State Average (3.5 percent). The entire portion of the Town of Woodland in the Segment 4 Study Area has a minority population above the state average. The census block group east of the Woodland Caribou town line, from Washburn Street to Route 228 has a minority population above the state average. The majority of Downtown Caribou and the census block group directly to the east of Downtown Caribou, across the Aroostook River, contain minority populations above the state average.

#### 4.3.4.4 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 8 percent and 2.1 percent, respectively. The percentage of individuals receiving food stamps and participating in the TANF Program within Caribou is 16.6 percent and 3.5 percent, respectively. Table 4-16 (page 4-25) shows the number of residents in selected Study Areas receiving Food Stamp or TANF assistance in 2001.

**Table 4-16**  
**Participation in TANF<sup>1</sup> and Food Stamp Programs**

	2000 Population	Food Stamp Program			TANF Program		
		# Cases	# Persons	Percent of Population	# Cases	# Persons	Percent of Population
Caribou	8,312	756	1,379	16.6%	118	294	3.5%
Aroostook County	73,938	4,934	8,927	12.1%	695	1,777	2.4%
Maine	1,266,848	51,707	101,584	8.0%	10,397	26,815	2.1%

<sup>1</sup> TANF - Temporary Assistance to Needy Families  
 Source: Maine State Planning Office

#### 4.3.4.5 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.

As shown in Table 4-17 (page 4-26), Caribou had 537 assisted housing units in 2000, representing 13.9 percent of the city's total housing stock. The percent of assisted housing units in Aroostook County in 2000 was 8.2 percent of the county's total housing stock. Approximately 60 percent (318 units) of the assisted housing stock is contained within multi-unit structures with most of those units being designated for elderly residents. The remaining 40 percent (219 units) of Caribou's assisted housing stock is provided by scattered units with rental assistance provided through Section 8 certificates.<sup>12</sup>

<sup>12</sup> State or federal rent subsidy vouchers provided to qualified income-eligible individuals.

**Table 4-17**  
**Federally Assisted Housing Units and Section 8 Vouchers in Caribou and Aroostook County: 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
Caribou	3,858	318	14	197	10	219	35	184	537	13.9%
Aroostook	38,719	2,297	755	1,532	10	877	194	683	3,174	8.2%

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

#### 4.3.5 Uncontrolled Petroleum and Hazardous Materials

This section describes potential and confirmed petroleum and/or hazardous materials sites within the Study Area for Segment 4. Regional context is not relevant for assessing impacts of hazardous materials on the Proposed Action (or vice-versa). It is based on the Phase I Environmental Assessment, Aroostook County Transportation Study for Segment 4 conducted by Hiller and Associates in 2005.

Potential impacts that petroleum and/or hazardous materials would have on the construction of the Route 1-161 Connector in Caribou and measures to avoid, minimize, and mitigate the impacts of petroleum and/or hazardous materials are included in Chapter 5 (Section 5.3.5, page 5-21).

##### 4.3.5.1 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.

##### 4.3.5.2 Study Area

Hazardous materials storage areas, underground storage tanks (UST), reported spills, and other potential sources of contamination were evaluated for the Segment 4

Study Area, which was limited to 0.5 miles on either side of the alignment options considered for Segment 4.

---

### 4.3.5.3 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 City of Caribou 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 Segment 4 for evidence of petroleum and/or hazardous materials.

### Interviews

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

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

---

#### 4.3.5.4 Existing Conditions

Potential uncontrolled petroleum and/or hazardous materials sites in the vicinity of the Study Area are described below. Figure 4-7 show the locations of registered USTs in the vicinity of the Segment 4 Alignment Options. Figure 4-7 also shows known petroleum and/or hazardous waste spills that have occurred in the vicinity of the Alignment Options considered for 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 the Segment 4 Study Area. 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 the Segment 4 Study Area. 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 Alignment Options.

#### Existing and Former Underground Storage Tanks

Thirty-six active or abandoned USTs are known to be present within 0.5 miles of the Segment 4 Study Area, as shown on Figure 4-7. The condition of these USTs is unknown. The locations of 42 removed USTs are also shown on Figure 4-7.

### Known Spills

Twenty petroleum and/or hazardous materials spills at 14 locations are known to have occurred within 0.5 miles of the Segment 4 Study Area. The location of these spills is shown in Figure 4-7. The majority of spills in the vicinity of the Segment 4 Study Area are considered minor (less than 51 gallons of product). Descriptions of these spills are provided in Table 4-18 (page 4-30).

Several public officials were interviewed regarding petroleum and/or hazardous waste issues within, or in the vicinity of, Segment 4. The interviewees were unaware of any unreported major spill events along Segment 4. Mr. Wentworth, Code Enforcement Officer, City of Caribou 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.

**Table 4-18**  
**Known Spills within One-Half Mile of Segment 4**

Location	Date	Details
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	Overflow 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.
Christopher Boy's Home	04/18/85	A residential #2 fuel oil tank leaked approximately 25 gallons into a basement.
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 was 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.
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.
Irving Mainway	03/24/91	Displacement of approximately 200 gallons of #2 fuel onto a snow bank. The snow was subsequently removed.
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.
Daigle Oil Company	12/13/91	Approximately 40 gallons of unleaded gasoline was reported spilled. Approximately one-half yard of material was removed.
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.
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.
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.
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.
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.
Caribou Bowladrome	01/21/98	Approximately 30 gallons of kerosene leaked from an AST. A contractor was hired to remove contaminated snow.
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.

### 4.3.6 Cultural Resources

This section describes cultural resources within the Segment 4 Study Area that are listed on or eligible for listing on the National Register of Historic Places. 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 or eligible for listing 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 ACTS 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 Segment 4 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 5 (Section 5.3.6, page 5-22).

---

#### 4.3.6.1 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.

---

#### 4.3.6.2 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.

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.

---

#### 4.3.6.3 Historic Buildings, Structures, and Districts

Preparation of the DEIS included consultation with the MHPC regarding known properties within the ACT Study Area included on or eligible for inclusion on the National Register. Section 3.3.6.1 (page 3-59) and Table 3-29 (page 3-60) 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 of the SDEIS, 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 reports<sup>13</sup> 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. 27 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 4-19 (page 4-35).

An additional survey was conducted in 2007 for properties, parcels, and structures that directly abut or are included within Alignment Option 4B and Route 161 north of the proposed T-intersection where Alignment 4B would meet Route 161. 5 properties over 45 years old were identified. Reconnaissance-level fieldwork was conducted to record all of the buildings and structures that appeared to be over 45 years old, and a search for National Register listed properties in the area was also conducted. According to the National Register Information System, there are no listed properties or districts within the area. Of the surveyed 5 properties over 45 years old, 3 properties appeared to meet the Criteria of Eligibility (36 CFR Part 60) for listing in the National Register of Historic Places.

### **Properties Included on the National Register of Historic Places**

According to the National Register Information System (NRIS), there are no National Register listed properties within or adjacent to the APE for the Proposed Action.

<sup>13</sup> Vanasse Hangen Brustlin, Inc. (VHB). April – July, 2004. *Cultural Resource Field Survey, Aroostook County Transportation Study, Segments 1-11.*

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

MaineDOT identified 2 individual properties 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 B and C of the SDEIS. These properties are listed in Table 4-19 (page 4-35) and shown on Figure 4-9. Properties listed may contain several structures. In this survey, each structure was assigned a unique number.

An additional survey, conducted in 2007, identified three properties that are potentially eligible for listing on the National Register. MaineDOT has consulted with MHPC to determine the eligibility of these properties. The MHPC, in a letter dated October 22, 2007 (Appendix A-3), determined that the Mooers Farmstead and the Holmes Farmstead are eligible for listing on the National Register of Historic Places. The MHPC determined that the McElawain Farmstead is not eligible for listing on the National Register of Historic Places.

**Table 4-19**  
**Properties Eligible for Inclusion on the National Register of Historic Places**

MHPC No.	Name or Address	Town	Description	Significance	Date <sup>1</sup>
847, 849	Van Buren Road	Caribou	Colonial Revival-style house and New England dairy barn	Architecture	Early 20th c.
863 <sup>2</sup>	New Sweden Road	Woodland	Banked New England dairy barn	Architecture	Early 20th c.
	742 New Sweden Road	Caribou	Mooers Farmstead	Agriculture	Early 20th c.
	790 New Sweden Road	Caribou	Holmes Farmstead	Agriculture	Early 20 <sup>th</sup> c.

<sup>1</sup> c. = century

<sup>2</sup> 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

### 4.3.6.4 Archaeological Resources

This section describes known prehistoric and historic archaeological sites within the Segment 4 Study Area reported by the MHPC as being included in or eligible for inclusion on the National Register. Many archaeological sites within the Segment 4 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.

Subsequent to the SDEIS, FHWA, ACHP, MaineDOT, and the MHPC entered into an agreement to conduct a Phase 1 Archaeological Survey for the Preferred Alternative

in Segment 4. Archaeological resources have been surveyed and evaluated to determine their eligibility for potential Section 4(f) impacts.

Preparation of the FEIS included consultation with the MHPC regarding known archaeological sites and areas sensitive for historic and prehistoric archaeology within the Study Area (Figure 4-9). The MHPC reported that there were 2 potential prehistoric and historic archaeological sites of varying levels of significance in the Study Area for the FEIS. The MHPC conducted historic archaeological field work, including a walkover and subsurface testing for prehistoric sites, along the margins of the Hardwood Brook Valley and an associated wetland. In a letter dated June 5, 2007, the MHPC stated that no prehistoric sites were found within Segment 4 (see Appendix A-4).

---

#### 4.3.6.5 Traditional Cultural Properties

As part of the preparation of the FEIS 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.<sup>14</sup> 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).

No TCPs have been identified in the Segment 4 Study Area.

---

#### 4.3.7 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, Segment 4. Potential impacts on public parks and recreation land from construction of Segment 4 and measures to avoid, minimize, or mitigate these potential impacts are included in Section 5.3.7 (page 5-25).

---

<sup>14</sup> Parker, P.L. and T.F. King. 1990, revised 1998. National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties*.

#### 4.3.7.1 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.*).

---

#### 4.3.7.2 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), the Maine Department of Inland Fisheries and Wildlife (IF&W), the Aroostook County Resource Conservation Service, the Maine Bureau of Parks and Lands, NMDC, and City Office and Recreation Departments of Caribou. Public parks and recreational facilities within the Project Area are listed on Table 4-20 (page 4-38) and are identified on Figure 4-2 as “Potential Section 4(f)/6(f) parcels”.

The Bangor-Aroostook Trail (BAT) in Caribou (designated in the Interconnected Trail System as ITS 90) is a multi-use recreation trail owned by the Maine Bureau of Parks and Lands. The BAT is a Section 4(f) property. The BAT is a designated snowmobile trail, which extends from Route 89 (Access Highway) northwest to the Town of Woodland, south of Hardwood Brook. The Bangor-Aroostook Trail converges with the Aroostook Valley Trail to create a total of 53-miles of converted railroad bed between Caribou, Washburn, and Van Buren. The Bangor-Aroostook Trail, and other snowmobile trails in the Caribou area (some of which are privately owned) are depicted on Figure 4-6.

**Table 4-20  
 Public Recreational Facilities in the Segment 4 Study Area**

Name of Facility	Address	Town	Features	Size (acres)
Bangor-Aroostook Trail	Entrance at Otter Street, Caribou	Caribou/Woodland	Recreational Trail (ATV, Snowmobiles, hiking, cycling)	300
Interconnected Trail System (ITS)	Throughout Maine	Locally in Caribou/Woodland	Recreational Trail (ATV, Snowmobiles, hiking, cycling)	>500
Caribou Recreation Center	55 Bennett Drive	Caribou	Indoor Weight Room, Showers	2
Caribou Community Pool	89 Glenn Street	Caribou	Swimming Pool, Picnic Area	2
Caribou Ski Trails	728 Sweden Street	Caribou	Groomed Ski Trails	22
North Caribou Park	Van Buren Road	Caribou	Softball/Baseball Fields, Basketball Courts, Nature Trails	54
Teague Park	50 Glenn Street	Caribou	Playground, Tennis Courts, Skating Rink, Nordic Ski Trails	5
Collins Pond Park	Roberts Street/Caribou Street	Caribou	Walking Trails, Picnic Sites	14
Paul Soucie Sports Complex	Sincook Street	Caribou	Baseball, Soccer Fields	1
Hardison Playground	Hardison Avenue	Caribou	Playground Equipment, Picnic Tables	1
Aroostook River Boat Launch	Lower Lydon Street	Caribou	Boat Launch	1

Source – City of Caribou Recreation Department web site [www.caribourec.org](http://www.caribourec.org)

## 4.4 Physical and Biological Environment

The physical geography, geology, and other physical and biological resources of the Segment 4 Study Area may constrain or be affected by transportation improvements. Figures 4-10 through 4-14 provide a composite view of the physical and biological environment that may affect the evaluation of the Proposed Action. Physical geography, geology, and soils create the foundation of the natural characteristics of the area, and are fundamental to the distribution of vegetation and aquatic habitats in the Study Area.

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 4.4.1, page 4-39), aquatic resources and wetlands (Section 4.4.2, page 4-39), wildlife and fisheries (Section 4.4.3, page 4-46), and endangered, threatened, and other protected species (Section 4.4.4, page 4-54). The following sections provide a summary of each of these resources. These resources are described in the SDEIS for the entire ACTS Study Area.

#### 4.4.1 Forests

This section describes forested areas within the Study Area. Potential impacts on forests from construction of Segment 4 are included in Chapter 5 (Section 5.4.1, page 5-29).

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 Caribou by providing a major source of employment.

A large portion of the Segment 4 Study Area (3,900 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. Figure 4-3 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 3-77), Natural Upland Communities.

---

#### 4.4.2 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 4.4.2.1 to 4.4.2.3 describe aquatic resources and wetlands in the Study Area. Potential impacts on aquatic resources and wetlands from construction of Segment 4 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 5 (Section 5.4.2, page 5-30).

Major rivers and streams in the Segment 4 Study Area include the Aroostook River, Caribou Stream, Hardwood Brook, Caribou Stream, Longfellow Brook, and Mile Brook. Caribou Mill Pond, which is fed by the Caribou Stream and Mile Brook, is also located in the Segment 4 Study Area. The Aroostook River is considered Essential Fish Habitat (EFH) for Atlantic salmon because of its historical importance to Atlantic salmon populations. According to MaineGIS data, no Atlantic salmon spawning or rearing locations occur in the Segment 4 project area. However, an

active Atlantic salmon restoration program is currently underway by the NOAA's National Marine Fisheries Service, the FWS, and the Maine Atlantic Salmon Commission. Recent restoration projects have included the 2005 Aroostook Broodstock Program and the 2006 Aroostook River Atlantic Salmon Enhancement Project. The Canadian province of New Brunswick has also contributed to the restoration of Atlantic salmon in the Aroostook River by constructing a fish ladder at the Tinker Dam Generating Station.

---

#### 4.4.2.1 Water Resources

The water resources mapping for the Segment 4 Study Area included surface public drinking water sources, public drinking water wells and wellhead protection areas, and at-risk watersheds within 0.5 mile of the Segment 4 Alignment Options. This section describes the public drinking water sources and at-risk watersheds in the Segment 4 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.

##### Public Drinking Water Sources

The City of Caribou uses surface water from the Aroostook River as a public drinking water source. The Aroostook River is classified as a Category 2 Class B river according to the 2008 Integrated Water Quality Monitoring and Assessment Report. Caribou also uses groundwater wells as a public drinking water source. Wells and Wellhead Protection Areas (WPAs) are shown on Figure 4-10. The WPAs for the majority of wells are based on a fixed radius of between 300 and 2,500 feet.

##### At-risk Watersheds

The Segment 4 Alignment Options are in the proximity of 2 watersheds that are included on the list of "at-risk" waterbodies under the Maine Stormwater Management Law or the Non-Point Source Pollution Priority Watersheds List

(Table 4-21, page 4-41). 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. 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 4-21**  
**Watersheds Designated as “At-Risk” by Maine Stormwater Management Law and Non-Point Source Pollution Priorities in Proximity to the FEIS Corridors**

Water Body	At-Risk	NPS Priority
Caribou Stream		X
Aroostook River	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/blwg/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, a source of public drinking water in the Study Area.

According to the 2008 Integrated Water Quality Monitoring and Assessment Report, there are no water bodies within the Segment 4 Study Area included on the 303d List of Impaired Waters.<sup>15</sup> The Caribou Stream was listed as a Category 5a stream in 2002 and 2004, but has since been delisted and classified as a Category 3 stream.

The 2008 Integrated Water Quality Monitoring and Assessment Report states that in September 2006, fish (brook trout) in Longfellow Brook were killed due to contaminated runoff from a fertilizer blending and distribution facility.

#### 4.4.2.2 Aquatic Habitats

There is one pond in the Segment 4 Study Area, Caribou Mill Pond in downtown Caribou. The pond provides important waterfowl migratory areas and habitat for endangered and threatened plants and wildlife. It also includes fringing emergent wetlands.

<sup>15</sup> Maine Department of Environmental Protection 2008 Integrated Water Quality Monitoring and Assessment Report. <http://www.maine.gov/dep/blwg/docmonitoring/305b/index.htm>

Major rivers and streams in the Segment 4 Study Area include the Aroostook River, Caribou Stream, Longfellow Brook, and Mile Brook. The Aroostook River forms the southeastern limit of the Segment 4 Study Area and flows from west to east in the central portion of the ACTS Study Area through Washburn, Presque Isle, Caribou, and Fort Fairfield. Within the Segment 4 Study Area, Hardwood Brook begins north of Route 161 at Thomas Road and flows to the southeast before converging with Otter Brook, east of Route 1, and flowing south to the Aroostook River. Caribou Stream and Mile Brook flow southeast, south of Route 161. The two streams flow into Caribou Mill Pond and one stream flows from Caribou Mill Pond to the Aroostook River. Longfellow Brook flows parallel to Route 1 southeast from the Route 1/Main Street Rotary, crosses Route 89, and meets the Aroostook River.

#### 4.4.2.3 Wetlands

Wetlands cover about 7,813 square miles of Maine, or approximately one-fourth of the state.<sup>16</sup> Wetlands comprise approximately 1,280 acres of the total Segment 4 Study Area (Figure 4-11). Wetlands are a substantial portion of Maine’s natural resource base and provide a wide-range 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 3-72) 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 Land Use Regulation Commission (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.

<sup>16</sup> Fretwell, JD, JS Williams, and PJ Redman. 1996. National Water Summary on Wetland Resources. Water- Supply Paper 2425. US Geological Survey, Reston, VA.

## Wetland Identification

The National Wetland Inventory (NWI) maps use the Cowardin Classification System<sup>17</sup> 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.

Wetlands in the Segment 4 Study Area have been classified based on the information contained on the NWI and United States Geological Survey (USGS) maps and field verification. A more detailed analysis of the wetlands in the Study Area was undertaken during the preparation of the SDEIS in 2006 to better understand potential wetland impacts within the Segment 4 Study Area.

Wetlands in the Segment 4 Study Area south of Hardwood Brook were found to be pocketed between a highly developed agricultural landscape and the roadway network of Caribou. Wetlands north of Hardwood Brook, north of the proposed alignment options, were found to be in undeveloped forests. Wetlands in undeveloped forest are likely more pristine and undisturbed than wetlands surrounded by active agricultural lands and urban centers.

Aerial photos were uploaded to a computer application, to which National Wetlands Inventory (NWI)-mapped wetland boundaries were added. The NWI wetlands were verified and modified based on aerial stereoscopic interpretation. Wetland boundaries were ground-truthed and adjusted as necessary. Wetland plant communities were classified according to the wetland classification scheme developed by the U.S. Fish and Wildlife Service (USFWS).<sup>18</sup>

For analysis purposes, individual wetlands within the Segment 4 Study Area were grouped and numbered into wetland systems based on proximity and connectivity. These numbered wetland systems are not “systems” in the sense of the Cowardin Classification.

As described below, the three principal wetland types identified in the Segment 4 Study Area include forested wetlands, shrub wetlands, and emergent wetlands. Figure 4-10 shows the distribution of these wetland types within the study area.

### Forested Wetlands

Wetlands identified as palustrine forested wetlands (PFO) on the NWI maps are grouped into the forested wetland category. Forested wetlands in the Study Area include forested bogs, forested fens, deciduous forested swamps, and coniferous

<sup>17</sup> 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.

<sup>18</sup> Ibid.

forested swamps. This wetland type is the most abundant wetland type within the Segment 4 Study Area.

#### Shrub Wetlands

Wetlands identified as palustrine scrub-shrub wetlands (PSS) on the NWI maps are grouped into the shrub wetland category. Shrub wetlands include shrub bogs and shrub swamps.

#### Emergent Wetlands

Wetlands identified as palustrine emergent wetlands (PEM) on the NWI maps are grouped into the emergent wetland category. Freshwater marshes are usually seasonally-flooded wetlands that are frequently 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 that is adapted to these saturated conditions.

### **Wetland Functions and Values**

Wetland functions and values include wildlife habitat, fisheries habitat, educational potential, visual/aesthetic quality, water-based recreation, flood flow desynchronization, groundwater and surface water use potential, nutrient retention, sediment trapping, shoreline stabilization and dissipation of erosive forces, forestry potential, and archaeological potential. Most of the wetlands in the Segment 4 Study Area provide many of these functions. Some of these wetlands also provide important waterfowl migratory areas and are important water supplies to the surrounding communities. The forested wetlands may also provide fuelwood and timber.

Wetlands in the Segment 4 Study Area were evaluated in terms of the functions and values they provide. The functions and values of the wetlands within the Segment 4 Study Area were determined using the methodology outlined in the USACE Highway Methodology Workbook Supplement (November 1995). For example, 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 fields, was used to assess the ability of wetland systems to provide functions and values.

The functions and values assessed for wetlands in Segment 4 were:

- Groundwater Recharge/Discharge;
- Floodflow Alteration (Storage/Desynchronization);
- Fish and Shellfish Habitat (Aquatic Diversity/Abundance);

- Sediment/Toxicant/Pollutant 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 Habitat.

---

#### 4.4.2.4 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 (Section 10.16B) of the Rules and Standards promulgated by the LURC protects floodplains in unorganized territories. MaineDEP also regulates floodplains as they are considered Wetlands of Special Significance.

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. The FEMA Flood Insurance Rate Maps (FIRM) focus on developed areas that have flood damage potential.

Mapped 100-year floodplains are generally associated with larger rivers and streams and their tributaries that flow through larger cities and towns. The Segment 4 Study Area was assessed by FEMA for flood damage potential. Floodplains within the Segment 4 Study Area are associated with the Aroostook River, Hardwood Brook, Otter Brook, Mile Brook, Caribou Stream, and the Caribou Mill Pond (Figure 4-10).

---

#### 4.4.2.5 Outstanding River Segments

Because of “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). Segments of the Aroostook River have been designated as an Outstanding River Segment; however, the section of the Aroostook River that passes through the Segment 4 Study Area has not been classified as an Outstanding River Segment.

---

#### 4.4.3 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.”<sup>19</sup>

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. A discussion of the endangered, threatened, and species of special concern within the Segment 4 Study Area is provided in Section 4.4.4 (page 4-54). Potential impacts on wildlife habitat, significant wildlife habitat, and essential fish habitat from construction of Segment 4 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 5 (Section 5.4.3, page 5-52).

---

##### 4.4.3.1 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.

---

<sup>19</sup> Council on Environmental Quality. January 1993. *Incorporating Biodiversity Considerations into Environmental Impact Analysis under the National Environmental Policy Act.*

## Essential Fish Habitat

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 2006 Reauthorization of 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 Atlantic Salmon Group, part of the Maine Department of Marine Resources (MDMR), has been authorized with protecting Atlantic salmon in the state of Maine.

## Significant Wildlife Habitat

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 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.

Except for critical spawning areas for Atlantic salmon, which are designated by the MDMR, 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.

---

#### 4.4.3.2 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 Segment 4 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. The Segment 4 Study Area is not mapped in the Maine Wildlife Action Plan.

Forests are common in the Segment 4 Study Area, with shrub and upland herbaceous communities interspersed throughout (Figure 4-3). Much of this forested area is in commercial forestry and is harvested for timber on a rotational basis. These large forested areas provide habitat for species that prefer interior forest habitat, while the interspersion of forest, shrub, and open habitats provides 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 4.4.3.4 and 4.4.3.5 on pages 4-52 and 4-53, 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 northern and eastern portions (see Figure 4-3).

Boreal forests provide habitat for spruce grouse (*Falcapennis 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 palmorum*), 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 (*Desmognanthus 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 vociferous*), 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 4.4.2.3 (page 4-42). 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 4.4.3.4 (page 4-52).

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, beaver ponds, and larger streams occur within the Segment 4 Study Area and 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 the Aroostook River.

### 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. 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.

#### 4.4.3.3 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 southern portions of Aroostook County, outside the Segment 4 Study Area, in part because man-made and natural barriers on major river drainages prevent their movement northward.

The Aroostook River is the major waterway in the Study Area, and supports fish such as brook trout (*Salvelinus fontinalis*), arctic char (*Salvelinus alpinus*), and rainbow smelt (*Osmerus mordax*). Brook trout are the predominant sport fish in Aroostook County and may be found in Hardwood Brook, Longfellow Brook, the Aroostook River, and other streams throughout the Segment 4 Study Area.

---

#### 4.4.3.4 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 areas 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. One regulated resources is known to occur within the Study Area; inland waterfowl and wading bird habitat. Descriptions of the resources found in the Study Area are provided below and shown on Figure 4-12. Habitat for state- and federally-listed endangered, threatened and species of special concern are described in Section 4.4.4 (page 4-54).

##### Deer Wintering Areas

Areas designated by the IF&W as high- and moderate-value deer wintering yards are protected as Significant Wildlife Habitat. 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. State biologists believe this increase 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. As shown in Figure 4-12, no Deer Wintering Areas occur in the Segment 4 Study Area.

## 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 a 250-foot wide zone surrounding the wetland complex that through a combination of dominant wetland type, wetland diversity, wetland size, wetland type interspersions, 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 (see Figure 4-12). Using this process, IF&W has identified 2 WWHs within the Study Area.

One WWH occurs in wetlands associated with Hardwood Brook, just east of the Woodland-Caribou town line. Another WWH occurs in wetlands associated with Otter Brook, south of Belanger Road (see Figure 4-12).

## 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 Segment 4 Study Area, none are mapped by the IF&W. No significant vernal pools were identified by MaineDOT in the Segment 4 Study Area.

---

### 4.4.3.5 Essential Fish Habitat

The Aroostook River is considered Essential Fish Habitat (EFH) for Atlantic salmon because of its historical importance to historic salmon populations. According to MaineGIS data, no Atlantic salmon spawning or rearing locations occur in the Segment 4 project area. The MASC stocks the Aroostook River (as does Canada) with Atlantic salmon.

#### 4.4.4 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 Segment 4 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 5 (Section 5.4.4, page 5-55).

---

##### 4.4.4.1 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.

---

##### 4.4.4.2 Federal Endangered and Threatened Species

Although federally listed species occur in Aroostook County, none are known to occur within the Segment 4 Study Area. 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, well north of the Segment 4 Study Area.

The federally threatened Canada lynx (*Lynx canadensis*) is associated with dense boreal and subalpine conifer forests, thickets, and swamps. Canada Lynx occur outside the Study Area at the southern extent of its range in the eastern United States and Canada (see Figure 4-13). Lynx are nocturnal and usually solitary except during the breeding season. Habitat characteristics include remote forests, rugged terrain, and a dense thicket understory, 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 stated that in the eastern United States, lynx occur in

northwestern Maine and northern New Hampshire, Vermont, and New York State. Critical habitat for Canada lynx does not occur in the Segment 4 Study Area.

On November 17, 2000, Atlantic salmon (*Salmo salar*) was jointly listed as endangered by the NMFS and the USFWS. However, the listing is for a Distinct Population Segment (DPS) in the Gulf of Maine. The DPS specifically identified naturally reproducing populations in 8 rivers (Dennys, Machias, East Machias, Pleasant, Ducktrap, Narraguagus, Sheepscot River, and Cove Brook). In June 2009, NOAA and the USFWS extended the DPS for Atlantic salmon to include 3 additional rivers in Maine: the Penobscot; the Kennebec; and the Androscoggin. The rivers containing the DPS for Atlantic salmon, including the 3 rivers added in 2009, do not occur in the Segment 4 Study Area (see Figure 4-14).

---

#### 4.4.4.3 State Endangered and Threatened Species

No state-listed species occur in the Segment 4 Study Area. The extra-striped snaketail (*Ophiogomphus anomalus*) is no longer listed as a Species of Special Concern, as previously identified in the 2006 ACTS SDEIS.

##### 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 Segment 4 Study Area.

##### 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 Segment 4 Study Area.

---

## 4.5 Atmospheric Environment

This section describes air quality and the noise environment in the Segment 4 Study Area.

## 4.5.1 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 Segment 4 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 Segment 4 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 5, Environmental Consequences (Section 5.5.1, page 5-56).

---

### 4.5.1.1 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<sub>x</sub>), particulate matter (PM<sub>10</sub>), 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<sub>x</sub>. CO and PM<sub>10</sub> are of local concern and are evaluated based upon their concentrations at congested intersections.

VOCs and NO<sub>x</sub> 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<sub>x</sub>, 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<sub>x</sub> are emitted in the form of nitrogen dioxide (NO<sub>2</sub>) and nitrogen monoxide (NO). The amount of NO<sub>2</sub> present in exhaust is dependent on the source type. Typically, NO<sub>2</sub> emissions are not modeled for highway projects but NO<sub>x</sub> is and NO<sub>x</sub> levels are compared to the NAAQS for NO<sub>2</sub> on Table 4-22 (page 4-58). Further conversion of the emitted NO to NO<sub>2</sub> 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<sub>x</sub> 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 5 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 the study area 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 NOx. 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 PM2.5.

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 4-22 (page 4-58) 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 PM2.5. This means that existing levels of ozone, CO, and PM2.5 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 4-22  
 National Ambient Air Quality Standards**

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

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

#### 4.5.1.2 Methodology

The air quality study includes microscale and mesoscale analyses 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 SDEIS Study Area during the peak CO season (winter).<sup>20</sup> The intersections in the SDEIS 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 data from the SDEIS microscale analysis were assumed to be representative of intersections in the entire SDEIS Study Area, which includes the Segment 4 Study Area and will therefore be used for this FEIS.

The microscale analysis calculates maximum 1-hour and 8-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 3-dimensional model that represents the highway and receptor geometry. Traffic,

<sup>20</sup> Draft Environmental Assessment for the Easton Industrial Access Road Study, 2003.

emission, and meteorological data were entered into the model to predict maximum 1-hour and 8-hour CO concentrations.

The vehicle emission factors used in the microscale analysis were obtained using the EPA's MOBILE6.2<sup>21</sup> computer model. MOBILE6.2 calculates CO emission factors for motor vehicles in grams per vehicle-mile. The emission factors calculated in this 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 NO<sub>x</sub> 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, NO<sub>x</sub>, 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, including the Segment 4 Study Area.

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, NO<sub>x</sub>, 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.

---

#### 4.5.1.2 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:

---

<sup>21</sup> MOBILE6.2 (Mobile Source Emission Factor Model).

- The maximum 2005 Existing CO concentration for the 1-hour analysis was calculated to be 5.1 ppm.
- The corresponding maximum 8-hour concentration was calculated to be 3.57 ppm.
- This CO concentration is substantially below the NAAQS of 35 ppm (1-hour) and 9 ppm (8-hour).
- The maximum 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<sub>x</sub>, and PM10 emissions from the major highways in the ACTS Study Area. These emissions, estimated to be 2,530.6 kilograms per day (kg/day) of VOCs, 5,000.9 kg/day of NO<sub>x</sub>, and 127.2 kilograms per day of PM10, establish a baseline to which future emissions can be compared.

---

## 4.5.2 Noise Environment

This section describes the existing noise environment of the Study Area. The noise analysis was conducted following MaineDOT's<sup>22</sup> and FHWA's<sup>23</sup> 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 FEIS alignments under consideration conform to this definition.

Potential impacts on the noise environment from Segment 4 and measures to avoid, minimize, or mitigate these potential impacts are included in Chapter 5 (Section 5.5.2, page 5-62).

---

### 4.5.2.1 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.

---

<sup>22</sup> Maine Department of Transportation. May 2008. *Highway Traffic Noise Policy*.

<sup>23</sup> Title 23 Code of Federal Regulations, Part 772. *Procedures for Abatement of Highway Traffic Noise and Construction 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 4-23 (page 4-62) presents a list of typical sound levels at distances measured in feet from the source.

This noise analysis uses a common sound measurement, known 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 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 following general relationships exist between hourly traffic noise levels and human perception:

- A 1- or 2-dBA increase is not perceptible to the average person.
- A 3-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 4-23  
 Typical Sound Levels**

Outdoor Sound Levels	Sound Pressure ( $\mu\text{Pa}$ ) <sup>1</sup>	Sound Level (dBA) <sup>2</sup>	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
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  $\mu\text{Pa}$  MicroPascals describe pressure. The pressure level is what sound level monitors measure.

2 dBA A-weighted decibels describe pressure logarithmically with respect to 20  $\mu\text{Pa}$  (the reference pressure level).

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

#### 4.5.2.2 Methodology

The noise analysis evaluated noise levels along Route 205 in Caribou because this location is representative of Caribou's rural, underdeveloped character. 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.<sup>24</sup> The current FHWA's noise prediction model is titled *Traffic Noise Model* (TNM) 2.5.<sup>25</sup> 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.

#### 4.5.2.3 Existing Noise Levels

The existing sound levels along Route 205 were found to be 39 dBA. The existing sound levels are considered representative of Segment 4 Study Area sound levels as Route 205 is very rural and many locations within the Segment 4 Study Area do not have existing highways.

---

<sup>24</sup> US Department of Transportation. December 1978. *FHWA Highway Traffic Noise Prediction Noise Model*. FHWA - RD-77-108.

<sup>25</sup> Federal Highway Administration's Traffic Noise Model Version 2.5, February 2004