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Introduction

Natural resources are the raw materials that make up the region. Air, sunlight, water, land, animals, plants, and minerals are examples of these resources. Landforms are features of the landscape such as valleys, plains, hills, ridges, shorelines, and water bodies. Together, natural resources and landforms have a direct impact on community character and how communities develop.

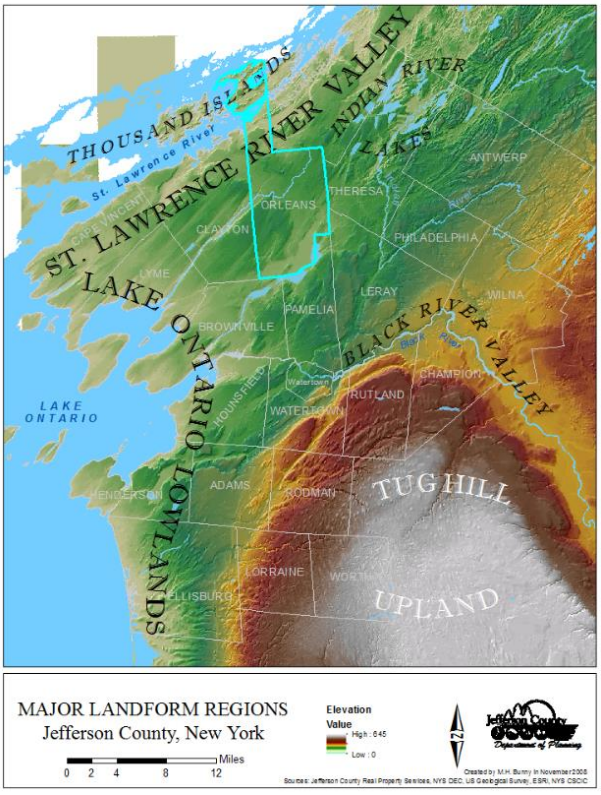
Historically, people settled in areas near water sources with adequate land for farming and trees for construction and a source of heat. Orleans grew around the access and beauty of the St. Lawrence

River, LaFargeville developed due to the power generated by the Chaumont River and abundant farmland throughout the Town. Stone Mills and other now small crossroads hamlets flourished as farming centric communities. This chapter looks at the existing natural resources such as wetlands, major watersheds, soils, topography, and wildlife.

When discussing future development the community should consider the potential physical attributes and impediments to development. A high water table or shallow depth to bedrock can make building in these areas difficult but they would be adequate for agricultural purposes. The topics discussed here are for general planning purposes. Specific development sites should be researched and reviewed for their own natural resource and landform issues.

Regional Setting - Physical Character

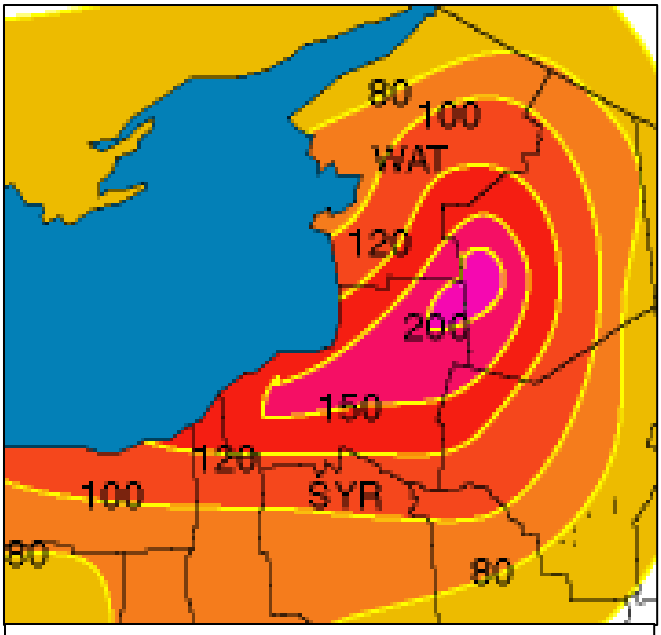
Orleans is located in the North Country region of New York State and the Thousand Islands in Jefferson County. Orleans lies within the St. Lawrence River Valley in close proximity to Lake Ontario, the Tug Hill and the Adirondacks. It is bordered on the north by the St. Lawrence River and Canada, on the east by the Town of Alexandria, on the south by the Towns of Brownville and Pamelia, and the west by the Town Clayton. The Town consists of 77.72 square miles (71.25 land, 6.48 water). The Hamlet of LaFargeville consists of 3.37 square miles within the south central portion of the town.



The main water body is the St. Lawrence River, being a little over five miles wide from the Canadian mainland to the American mainland in the Township. The Chaumont River originates in the Town of Orleans and flows through Clayton to Lake Ontario at the Village of Chaumont.

Seasonal and year-round residential homes predominate the waterfronts on the St. Lawrence and Chaumont Rivers. Beyond the shoreline areas, Orleans consists of agricultural, forested, and former farmfield areas with residential, a few scattered businesses and a manufacturing parcel.

Wellesley Island, the largest in the St. Lawrence River is about 8 miles long, 3 to 4 miles wide and over 8,000 acres. Only about half of the island is within the Town. Thousand Island Park (a census designated place), and the hamlet of Fineview are communities within Orleans on Wellesley Island.



North Country average snowfall within region

Climate

Jefferson County's climate is characterized as humid-continental. The winters are long and relatively cold; the spring is cool and short; summers are warm and moderate; and autumn can be pleasant but usually short. Lake Ontario's close proximity influences the temperature, rainfall and snowfall particularly during the winter. The relatively warm lake water provides moisture for air masses moving across from the west which then often results in "lake effect" snowfalls primarily in the southern portion of the County but also impacts the southern half of Orleans. The average yearly rainfall for Jefferson County is 38.2 inches which is above the national average of 36.5. Also the average yearly snowfall for the County is 93.1 inches which is almost 300% above the national average of 25 inches. The County is below the national average for sunny days, 161 days compared to 205 days. January has an average low temperature of 9 degrees and July has an average high of 80 degrees.

Wetlands

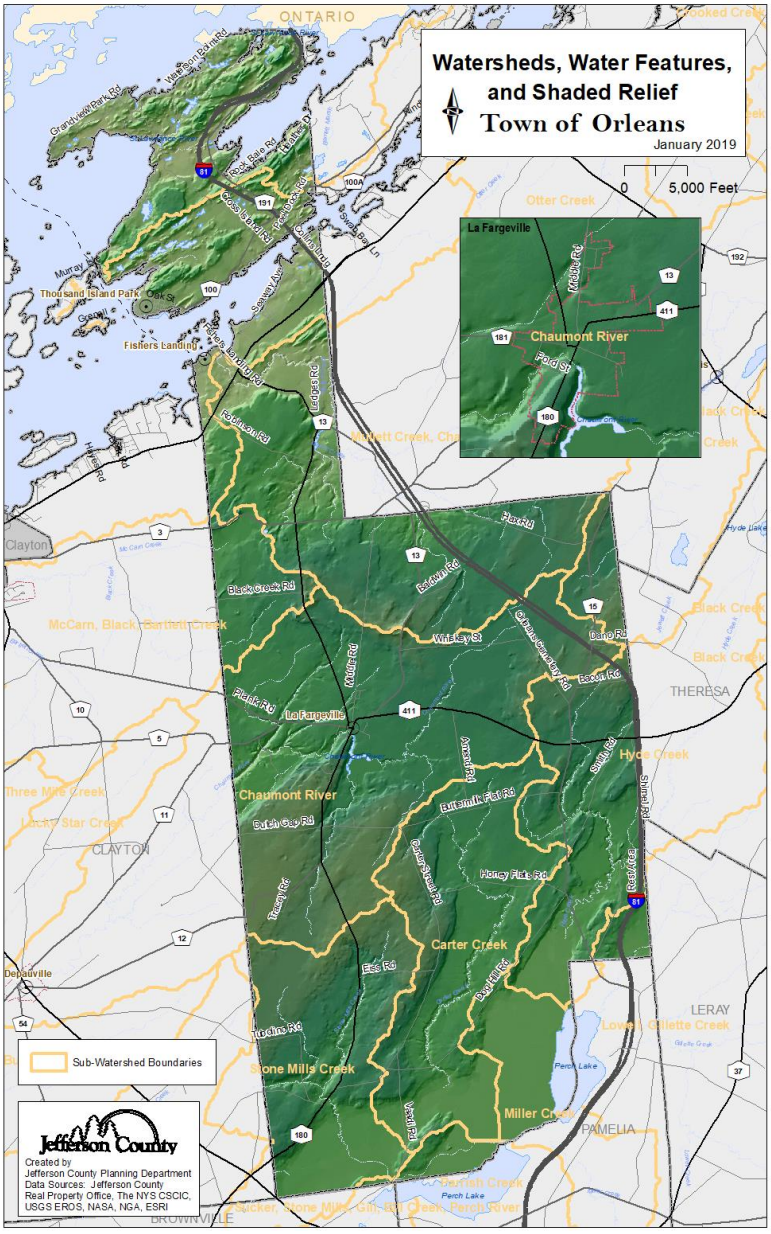
Wetlands are shallow water areas commonly referred to as swamps, marshes, bogs, wet meadows, or potholes. These shallow areas are essential aquatic ecosystems that support many types of vegetation, mammals, reptiles, waterfowl, fish, and rare plants. Typically, wetlands are very productive, contributing greatly to biological diversity. Wetlands are very dynamic in nature and can be vulnerable to human encroachment and damage.

Wetlands also provide flood and storm water control by absorbing and storing rain and snow melt waters, thus minimizing flood damage. They also act as surface and groundwater recharge areas and help maintain important water resources. Wetlands buffer shorelines from erosion and help cleanse waters of pollutants through natural filtration and other processes. The Town of Orleans has approximately 5,389.7 acres of NYS DEC designated wetlands and 5,757.9 acres federally designated.

Wetlands also are valuable as a habitat for fish, waterfowl, and other wildlife. They are among the most productive ecosystems, providing a forage base for all levels of the food chain including spawning fish, nesting birds and many rare and endangered species.

Another value of wetlands is that they provide natural beauty and open space that can often be utilized for education and recreation.

Threats to wetlands include encroachment by residential land use, over utilization and disruption of nursery and fish spawning areas by powerboats, and



possible eutrophication and siltation.

Orleans Watersheds

The northern quarter of Orleans is located within the St. Lawrence River watershed. According to NYS DEC its water quality is affected by atmospheric deposition of pollutants that originate largely outside the basin. Acid rain and mercury deposition are the most widespread issues in the watershed which affect fish consumption. Impacts from agricultural activities and associated runoff are also frequently cited in this very rural and agriculturally intensive area.

Runoff from the southern three quarters of Orleans flows through Clayton and Lyme and then directly into Lake Ontario through the Chaumont River. Water quality concerns in the watershed relate to invasive species and other aquatic plant growth which discourage recreational uses.

Topography and Geology

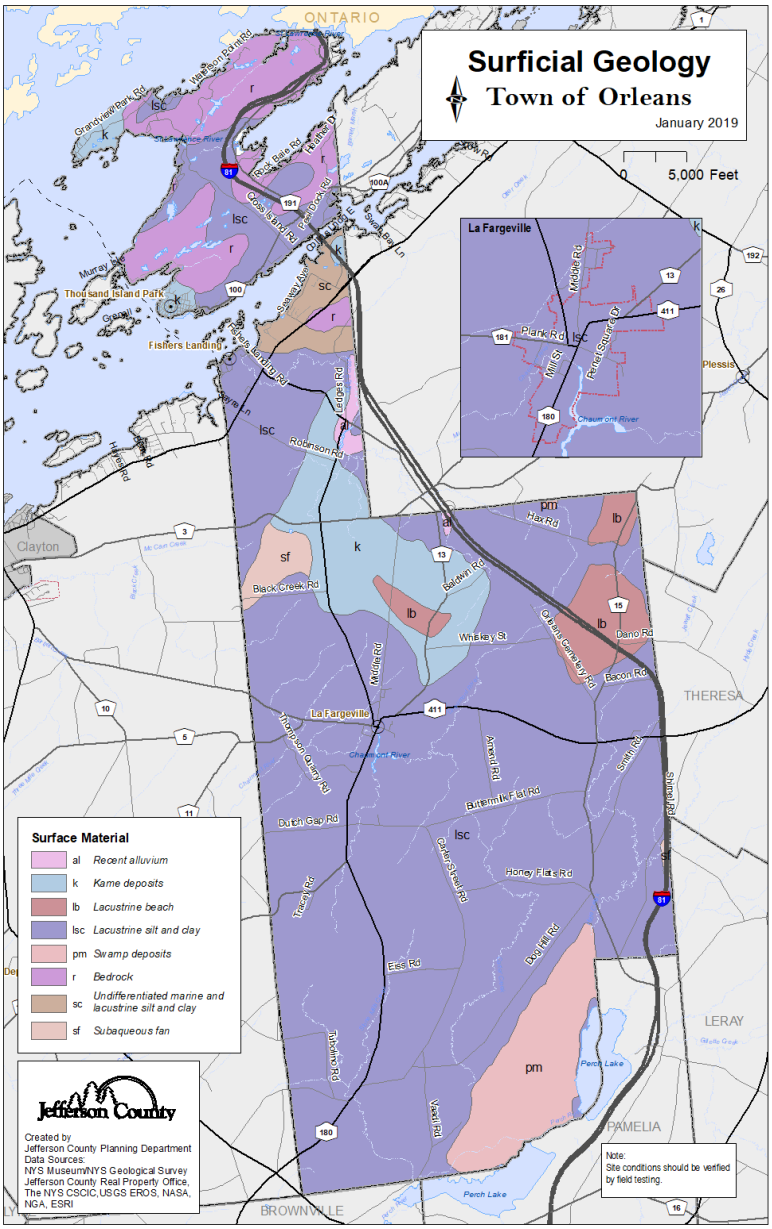
In general, the topography within the Town is fairly level, with some undulation. As evidenced on the Watersheds, Water features, and Shaded Relief map, there are some noticeable ridges that help define the area, including ridgelines on the north and south sides of Wellesley Island, somewhat along the mainland shoreline, and generally along one side of the Chaumont River.

The highest percentage (38.6%) of Orleans is comprised of relatively flat areas having slopes from 0% to 5%. However, the next highest percentage (35.15%) consists of gently rolling hills with 6% to 10% slope. The Town also contains some steeper areas (12.8%) with slopes between 11% and 15%. Similarly, the steepest areas include slopes greater than 15% consisting of 13.4% of the land area.

Surficial Geology

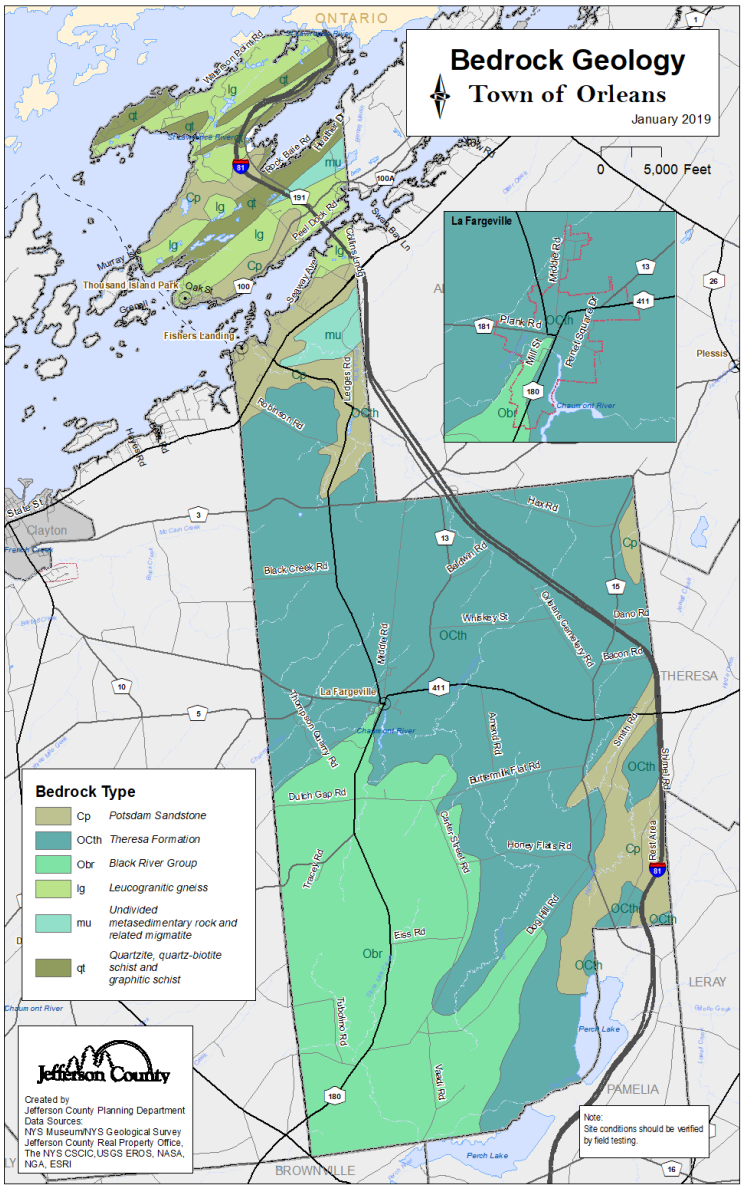
Surficial geology concerns the loose sedimentary materials that overlay bedrock and which are found near the earth's surface. A large portion of the Town consists of lacustrine silt and clay. However, other areas in town consist of kame deposits, swamp deposits, a few areas of lacustrine beach and bedrock.

Wellesley Island largely consists of bedrock with some lacustrine silt and clay deposits. The lacustrine beach areas occur on both sides of I-81 near County Route 15. The kame deposits occur along NYS Route 180 north of LaFargeville.



Bedrock Geology

Bedrock geology refers to the physical rock visible underneath the soil, river systems, till, etc. The geological character along the St. Lawrence River and on Wellesley Island includes Potsdam Sandstone, Leucogranitic gneiss, and quartzite, quartz-biotite schist and graphitic schist. The bulk of the bedrock geology away from the St. Lawrence River consists of the Black River Group, (Chaumont Limestone) and the Theresa Formation, (Dolostone, sandstone). The absence of other sedimentary rock in it reflects a broad transition from the more predominant and recently deposited limestone (Black River Group) from the northwest to the southern portions of the Town, and the older gneisses and granites located in the northern areas within the Town. The Black River Group outcrops periodically and contains mainly limestone rocks separated into two formations, the Lowville and the Chaumont. The Lowville Formation is a medium-light to light gray, generally thinly bedded, micritic limestone. The Chaumont Formation overlies the Lowville Formation and contains more massively bedded limestone and basal chert.



Aquifer recharge/groundwater

Karst is a landscape and aquifer type. Karst areas consist of solid but chemically soluble rock such as limestone (most important) and dolomite, but also gypsum, anhydrite and several other soluble rocks. The Limestone/karst aquifer covers a large portion of the southern portion of Orleans (Black River Group) and is not mapped, therefore the areas of flow, depths to groundwater, and flow rates are not quantified at this time.

This type of aquifer is vulnerable to contamination due to their hydrogeological properties. Contaminants can easily enter karst aquifers through thin soils or via shallow holes (sinks). Once, inside the aquifer, contaminants can quickly spread over large distances, due to rapid flow in the conduit network. Natural attenuation processes such as filtration and retardation are often less effective than in other aquifers.

General Soil Groups

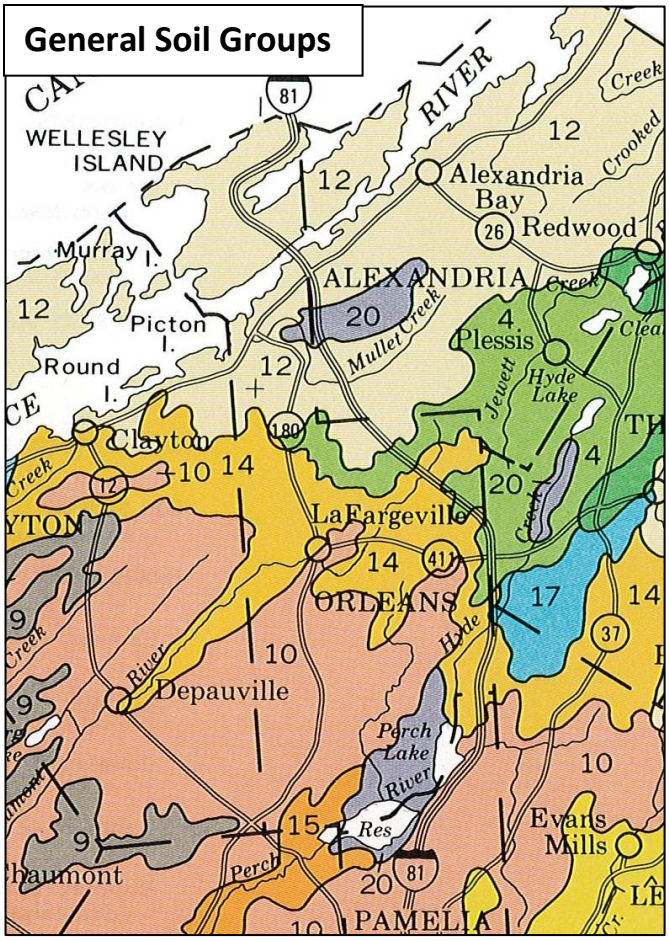
According to the Soil Survey of Jefferson County, NY, Soil Conservation Service and Cornell University, 1988, the Town consists of 6 soil groups.

Soil Groups by Number/Color on the Map

4. (Green on Map) **Rue-Galoo-Insula-Rock Outcrop** – 10% of the Town, shallow and very shallow, excessively drained to very poorly drained, loamy soils and rock outcrop on upland plains.
10. (Salmon on Map) **Chaumont - Galoo - Wilpoint - Guffin**, 40% of the Town, moderately deep to

very shallow, excessively drained to very poorly drained, clay or loamy on lowland plains.

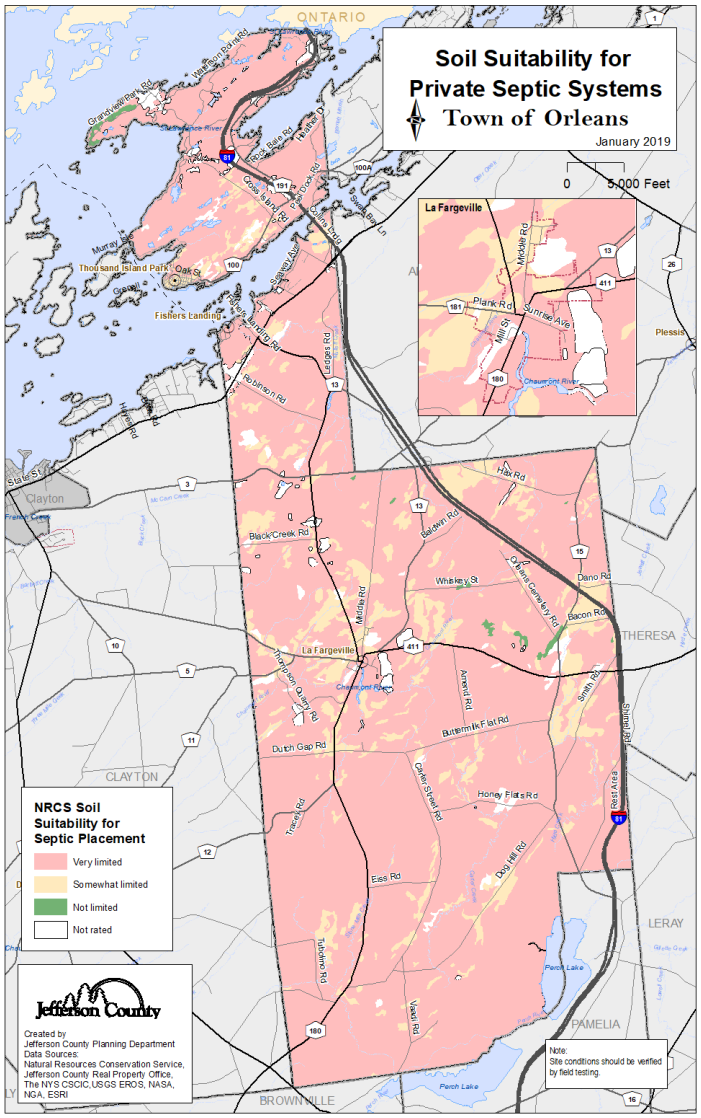
12. (Beige on Map) **Rhinebeck - Hudson - Rock outcrop**, 25% of the Town, very deep, somewhat poorly drained and moderately well drained, clay soils and Rock outcrop, on lowland plains.
14. (Gold on Map) **Vergennes - Kingsbury - Elmridge**, 25% of the Town. Very deep, moderately well drained and somewhat poorly drained, loamy soils over clay sediments, on lowland plains.
15. (Orange on Map) **Kingsbury-Covington-Livingston**: Very deep somewhat poorly drained to very poorly drained, clayey soils, on low-land plains.
20. (Grey on Map) **Carlisle-Palms-Willette**: Very deep, very poorly drained, organic soils, in lowland bogs and depressions.



Septic System Suitability

Soils in Orleans, generally described above, continue to influence development levels throughout the Town. Certain soils or soil conditions present have limitations for buildings and private septic system placement.

Soils in the County have been classified according to their ability to support on-site septic systems by the Soil Survey. Such septic systems consist of septic tank absorption fields in which effluent from a septic tank is distributed into the soil through subsurface tiles or



perforated pipe. The following ratings are based on soil properties, site features, and observed performance of the soils. Permeability, high water table, depth to bedrock or to a hardpan, and flooding affect absorption of the effluent. Large stones and bedrock or a hardpan also interfere with installation of individual septic systems.

Suitability is considered *'not limited'* if soil properties and site features are very favorable for the indicated use. Good performance and very low maintenance can be expected.

Suitability is considered '*somewhat limited*' if soil properties and site features are moderately favorable for the indicated use. The limitations can be overcome by special planning, design or installation. Fair performance and moderate maintenance can be expected.

Suitability is considered "*very limited*' if soil properties or site features have one or more features that are unfavorable for the specific use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent.

On-site tests or investigations must be performed to be certain whether the present soils or soil conditions will support an individual septic system on a given site or project area. Initially refer to the Septic Soils Map as a guide.

Priority Agricultural Soils

Soils with the ability to support farming operations have been identified by the Federal and state governments due to their long term value to agricultural production (food growing potential).

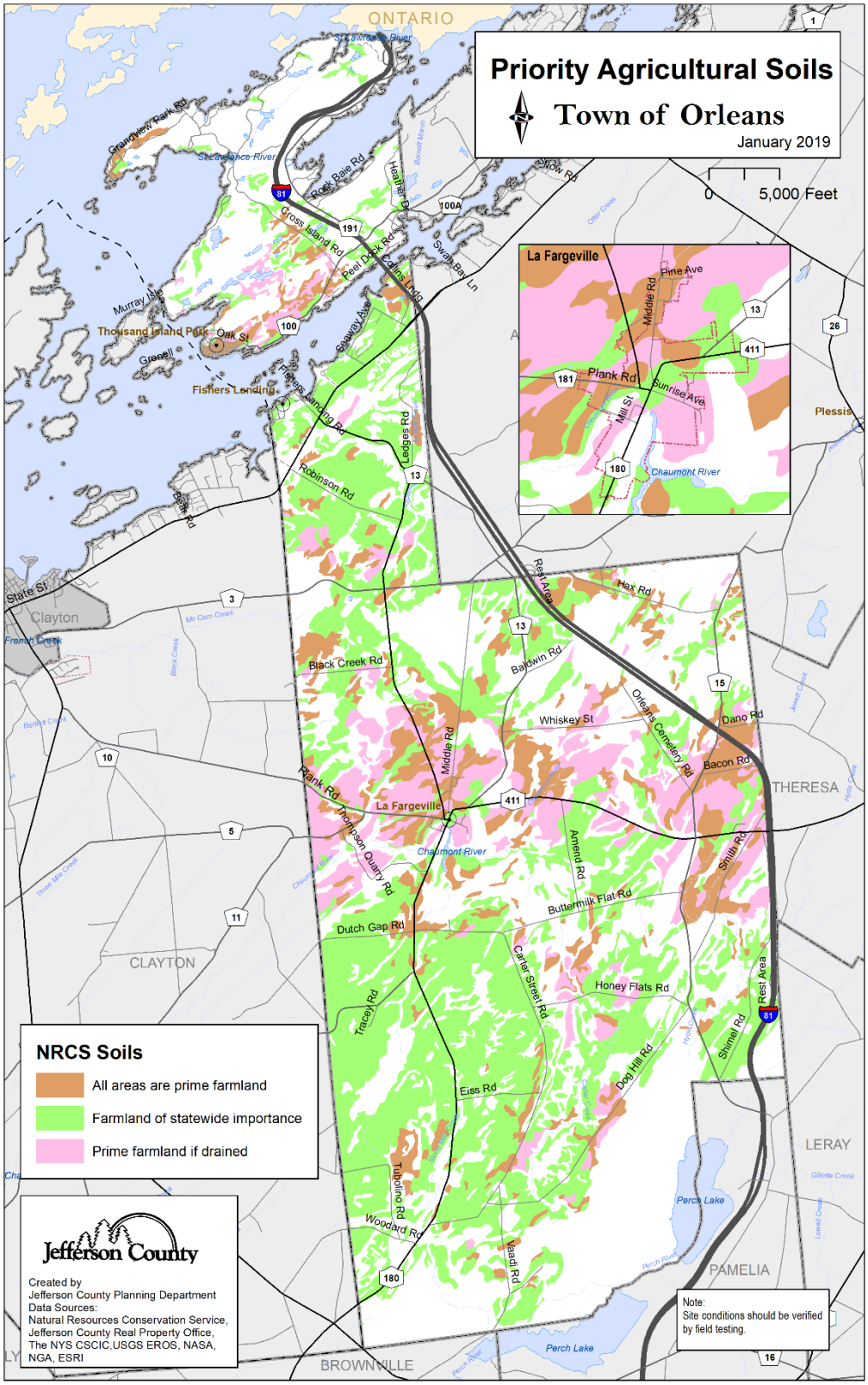
Known as prime farmland, these soils are defined by the US Department of Agriculture as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. The parameters for prime farmland are national and include specific criteria with respect to a number of soil properties: temperature, moisture regime, erodibility, pH, water table, permeability, rock fragment content, and others. Prime farmland could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable

Table 20. Priority Farm Soils, Town of Orleans

	Land Acres (non-water)	Percent Prime Farmland	% Prime Farmland if Drained	% Soils of Statewide Importance	Total % All Farm Soils
Orleans	45,555	10%	12%	39%	61%

Source: Jefferson County Farmland Protection Plan, 2016

acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from zero to six percent. Prime farmland if drained typically meets most criteria for prime farmland except it has a high water table. More detailed information about the prime farmland criteria is available at the local office of the Natural Resources Conservation Service which is the Jefferson County Soil and Water Conservation District.



In some areas, land that does not meet the criteria for prime farmland is considered to be soils of statewide importance for the production of food, feed, fiber, forage and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate state agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. All three categories are considered important to farming in New York State.

St. Lawrence River

The St. Lawrence River is one of the most significant waterways in North America. Extending 760 miles from Lake Ontario to the Gulf of St. Lawrence, the River is the gateway between the Atlantic Ocean and the Great Lakes. At its most downstream point in the US, it drains an area of 300,000 square miles. The upper St. Lawrence can be divided into three sections: the Thousand Islands section, the middle corridor section, and Lake St. Lawrence. T he Thousand Islands section (northwestern Jefferson County and Southwestern St. Lawrence County includes a complex of islands, numerous shoals, and channels.

Despite the uses including international commercial transport, hydroelectric power generation, industrial and residential development, the river continues to support a diverse array of fish and wildlife.

Chaumont River Revitalization Study

The Chaumont River (originates in Orleans and known locally as Catfish Creek) was the subject of a Waterfront Revitalization Strategy study completed in 2015. The Strategy identifies a series of recommended projects to enhance the River, as well as Chaumont Bay to increase public access and use throughout the area. The effort should be considered a precursor to a potential Local Waterfront Revitalization Program but LWRP funding has not yet been secured.

Flood Plains

Most floodplains are found in low areas adjacent to streams, rivers, lakes and ocean and are prone to periodic flooding. In undeveloped areas, this natural interaction restores soil fertility, recharges groundwater supplies creating unique and diverse habitats.

The Federal Emergency Management Agency (FEMA) has designated 100-year flood zones. This designation does not mean that flooding will occur only once a century. Instead, it means that in any given year, there is a one-in-one hundred chance of flooding. Frequency of flooding is dependent on many factors, including weather conditions and upstream development changes to the watershed.

Flooding is not considered a significant problem within Orleans waterfront areas during typical years. In the Town, the 100-year floodplain mostly occurs along creeks, and portions of river shorelines. Specifically, areas within the 100-year floodplain on the mainland include low areas along the St. Lawrence River, Mullet Creek, Chaumont River, Hyde Creek, Stone Mills Creek and Perch River.

The Town of Orleans complies with the terms of the National Flood Insurance program as administered by FEMA. The Town adopted floodplain regulations to control the location and siting of new construction activities within flood zone areas in an effort to minimize damage to property, life, and natural resources.

River Area and Town Species

The 700 + mile long St. Lawrence River is home to many fish species and can be divided into four hydrographic zones. The Town of Orleans is part of the Fluvial Section, which runs from Lake Ontario past Montreal to Trois Rivieres. The river life can be divided into seven categories: plants, plankton, benthic organisms, fish, amphibians, birds and mammals.

Plants **-** Thousands of species of plants inhabit the water and shorelines of the St. Lawrence River system. In the Fluvial Section many are found in wetlands, such as marshes, wet meadows and swamps. Plants provide an important food source for other species and create habitats for many organisms.

Plankton - Plankton are tiny creatures that drift in the water with limited ability to propel themselves. They

form the base of the food chain in the St. Lawrence River and include bacteria, yeast, phytoplankton and zooplankton. Like plants, the phytoplankton has a role of fixing carbon dioxide via photosynthesis. Zooplankton, on the other hand, is the animal-form of plankton, such as the larvae of fishes that drift along the length of the river.

Benthic Organisms - Benthic organisms dwell on the river bottom and are important for recycling organic matter, particularly in deep areas where sunlight does not penetrate. They are also a food source for other species, as well as people. Some bottom dwellers found in the Fluvial Section include mollusks (e.g., clams), crustaceans (e.g., crayfish), oligochaeta worms, diptera larvae, amphipods, gastropods (e.g., snails) and tubificids.

Fish **-** Freshwater fish species found in the Fluvial Section include bullhead, carp, large and smallmouth bass, pumpkinseed, walleye, stickleback, sturgeon, pike, burbot, sucker, perch, shiner, trout, mud-minnow, char, muskellunge, and redhorse.

Amphibians and reptiles **-** Amphibians and reptiles are important secondary consumers in the food chain, eating, for example, insects or plankton. A range of amphibians can be found in and along the river including salamanders, newts, mudpuppies, turtles and frogs.

Mammals **–** Other than bats, most of the area's mammal population can be found in the marshes and wetlands. Examples include mink, muskrats, otters, beavers and raccoons.

Bats – Bats are also mammals, and New York is home to nine bat species. Six of the nine bats are cave bats while the other three are tree bats. Indiana Bat, Little Brown Bat, Northern Bat, Eastern Pipistrelle Bat, Big Brown Bat, and Small-footed Bat use caves during winter hibernation, while the Red Bat, Hoary Bat, and Silver-haired bat live year round in trees.

Birds **-** Most birds along the St. Lawrence inhabit the wetlands in the fluvial section, as well as the estuaries closer to the Gulf of St. Lawrence. Many migrate to the river ecosystem during the spring in search of food and breeding grounds. The main birds in the fluvial section include blue heron, Canada geese, mallard, merganser, goldeneye, snow geese, moorhen, wood duck, green heron, pied billed geese, hawks, cormorant, ospreys, pileated woodpecker, kingfisher, common loon and bald eagle. Less common species include redhead, yellowtail, and golden eagle.

Wildlife Species and Plants at Risk

Species at risk currently occupying waterfront and other area habitat, include, but are not limited to: the **Bald Eagle** (NYS Threatened); **Northern Harrier** and **Common Tern** (NYS Threatened); **Common Loon** (NYS Species of Special Concern); **Lake Sturgeon** (NYS Threatened); and **Muskellunge** (status unrated, but of significant concern at local and state levels). Other species that frequent areas within the Town include the **Short Eared Owl** (NYS Endangered; Osprey (NYS Species of Special Concern); the **Indiana Bat** (Federal and NYS Endangered), and the **Northern long-eared bat** (Federal and NYS Threatened). An at risk plant species is Small **Skullcap** (a flowering plant rated as especially vulnerable, with 5 or fewer recorded occurrences in New York State). The location and presence of these species are described:

Bald Eagles **-** (NYS Threatened**)**

Bald Eagles are present in the waterfront area as spring and fall migrants and winter residents. As winter residents, they occupy open water pools in the ice cover and forested shoreline areas. Seasonally persistent open water pool habitat occurs in the vicinity of islands near sections of unfrozen river. Bald Eagles also frequent the Perch River Wildlife Management Area adjacent to the southern portion of the Town according to NYS DEC.

Northern Harriers - (NYS Threatened)

Northern Harriers are present in migration, as nesting residents and as winter residents. They

occupy wetlands, shorelands, shrublands and fields.

Black Tern **– (NYS Endangered)**

Black Terns migrate back to the area in early May breeding on inland marsh complexes (such as Perch River Wildlife Management Area), ponds, mouths of rivers, and shores of large lakes.

Common Terns - (NYS Threatened)

Common Terns are present as migrants and as colonially nesting residents. They occupy open water, shoreline and wetlands such as French Creek Marsh.

Common Loons (NYS Species of Special Concern)

Common Loons may be present in breeding season, as well as in migration. They occupy open water, shoals, shoreline, and wetland edge habitats.

Lake Sturgeon - (NYS Threatened)

Lake sturgeons are known to inhabit waters of the waterfront area. Critical habitat locations have not been identified – perhaps due to a lack of data.

Muskellunge – (significant concern NYS)

Muskellunge spawning/nursery habitats (occupied) have been identified in several waterfront embayment areas (Steve LaPan to SLEOC: 9/28/89), including Blind Bay and two unnamed bays between McRae and Delaney Bays on Grindstone Island near the Town.

Short Eared Owl – **(NYS Endangered)** Northern populations are believed to be highly migratory, and there is a marked increase in the number of birds in New York in the fall and spring. Short-eared Owls are more common as winter residents in New York State. As breeders they are very rare, being largely limited to the St. Lawrence and Lake Champlain Valleys, the Great Lakes plains and the marshes of Long Island's south shore. Probable locations have been noted in the approximate vicinity of Orleans according to DEC.

Osprey – **(NYS Species of Special Concern)** In New York, there are two main Osprey breeding populations, one on Long Island and the other in and near the Adirondack Mountains. However, nests have been established throughout Jefferson and St. Lawrence County near waterbodies. Within its range, the osprey prefers to make its home along the coastline, and on lakes and rivers. Osprey also frequent the Perch River Wildlife Management Area adjacent to the southern portion of the Town according to NYS DEC.

Upland Sandpiper **(NYS Threatened)** In the northeastern United States populations are declining due to loss of grassland habitat. Historically the upland sandpiper was reported as a locally common breeder in parts of New York. Today the state population is restricted to remaining grassland habitats of the St. Lawrence Valley in Jefferson County, and the Mohawk Valley.

Blandings Turtle **(NYS Threatened)** Jefferson and St. Lawrence counties (between US Route 11 and the St. Lawrence River) are among the few places in New York State home to threatened Blanding's turtles.

Indiana Bat - **(Federal and NYS Endangered)** Indiana Bats have established winter hibernacula and summer ranges within central Jefferson County.

Northern Long-eared Bat **– (Federal and NYS Threatened)** Northern Long-eared Bats are known by NYS DEC to summer in the Town of Clayton/Orleans and winter in Brownville and Watertown.

Small-footed Bat **– (NYS Species of Special Concern)** Small footed Bats are all known to have hibernacula and maternity colonies in Jefferson County according to Integrated Environmental Data, LLC.

Small Skullcap **– (NYS vulnerable)** The Small Skullcap plant has been identified as present on three small islands and one mainland site within the waterfront area.

Invasive Species - Example

According to the society for industrial and applied mathematics, the introduction of nonnative species has detrimental effects on both local and global ecosystems. Invasive species often spread and multiply prolifically, thus can overtake and displace native species,

alter the intended interactions between flora and fauna, and damage the environment and economy. A particularly destructive invasive is the **zebra mussel** (*Dreissena polymorpha*). Given its abundancy and heartiness, zebra mussels frequently outcompete native bivalves. Their dominance interrupts the natural cycle of nutrients and disrupts the structure and function of infested waters. These so-called "ecosystem engineers" generate substantial removal costs for individuals, corporations, and towns; estimates indicate that zebra mussels cause $1 billion in damages and control costs every year.

Since its introduction to North America in 1986, the zebra mussel has spread throughout the Great Lakes and several large rivers, including the Mississippi, Hudson, Ohio, and St. Lawrence. Zebra mussels consume algae that used to provide food for native fish populations, and are considered unsafe for human consumption because they accumulate pollutants and toxins when filtering.

Scenic Resources

The Thousand Islands region is recognized as one of the greatest landscapes and impressive scenic vistas in the United States. Its open skies and protruding islands and mainland outcroppings, abundant natural vegetation and wildlife habitats, and historically and culturally significant boathouses and other structures are all a part of the characteristics associated with the scenic quality of Orleans and surrounding communities and Thousand Islands region.

Impressive scenic views within the Town include views to the St. Lawrence River from roadways and upland areas, views from shoreline locations and from the water, and views from various locations of open space and agricultural resources. The highway gateways and corridors along I-81 to the Canadian Border, NYS Routes 12 and 180 are very important to the visual quality and image of the Town's traditional rural character. Additionally, Route 12 through Orleans is part of the Great Lakes Seaway Trail, a national scenic byway along the St. Lawrence River, Lake Ontario, the Niagara River, and Lake Erie.

Important scenic views from the river to the shoreline are present along the western, northern and southern shores of Wellesley Island and from the channel looking towards the Town in all directions. Smaller islands contribute equally significant vistas and add to the overall aesthetic quality of the Thousand Islands region.

Efforts to protect and maintain some of the most important scenic views should be considered. Positive steps to manage visual impacts of development, protect scenic vistas and wetlands, and maintain forest cover where possible would be additional positive steps.

In Fishers Landing and on Wellesley Island, shoreline properties afford exciting views of an expanse of the St. Lawrence River with islands, seaway traffic, fishing and boating activities characteristic of the Thousand Islands region. Views of the St. Lawrence River from many areas such as Thousand Island Park are also significant. Additionally, the views from most if not all shorelines warrant protection and enhancement.

Save The River

Save The River is a non-profit community-based environmental organization with the mission to restore, preserve and protect the ecological integrity of the Upper St. Lawrence River through advocacy, education and research. Operating in both Canada and the U.S., their office is in Clayton, and serves to further its members' and followers' vision for the St. Lawrence as a healthy river that provides safe drinking water, is home to a thriving range of indigenous species and supports sustainable

economic activity. Their mission and vision is premised on a simple core value that the River is a commons [commonly shared for all] to be nurtured and passed on undiminished for future generations to share.

Since 1978 Save The River has campaigned to stop the introduction of aquatic invasive species through the dumping of ballast water of ocean-going ships, advocated for an environmentally appropriate water levels plan, and organized water quality restoration and monitoring programs to track River health and identify pollution problems. Save The River's educational programs, which provide place-based experiences that connect area kindergarten to 12th grade students to the St. Lawrence, reach over 1,000 students each year. Every summer its Riverkeeper Volunteer training gives adults and children the tools they need to identify and report potential issues on the River. Save The River is a member of the international Waterkeeper Alliance as the Upper St. Lawrence Riverkeeper and champions a swimmable, fishable, drinkable St. Lawrence River.

Save The River hosts events in support of its mission and hosts a Winter Environmental Conference, bringing together researchers, opinion leaders, elected officials and seasonal and year-round residents to hear about issues of concern to the River community.

Significant Fish and Wildlife Habitats

The Town contains some significant coastal habitats. A brief summary of each is included, as well as the inland habitats, to ensure the sites will be incorporated during future priority planning and regulatory processes.

Eel Bay

Eel Bay is located on the upper St. Lawrence River, on the west side of Wellesley Island in the towns of Clayton and Orleans. One of the most extensive shallow bay areas in the St. Lawrence River, this fish and wildlife habitat consists of an approximately 2,100 acre shallow bay, containing extensive beds of submergent marsh vegetation, and several small islands including Big Gull and Little Gull Islands. The habitat extends southwest to the shores of Murray Isle and Picton Island. There are two sizeable emergent wetland areas, totaling about 75 acres, around the bay shoreline. Eel Bay is somewhat sheltered from prevailing winds and wave action, by being situated in the lee of Grindstone Island.

Eel Bay is one of the major waterfowl concentration areas in the St. Lawrence River. The bay provides excellent food resources for a variety of migratory bird species, and especially diving ducks, such as scaup, canvasback, common goldeneye, mallards, redheads and mergansers. Concentrations of several thousand birds are observed in the area during spring (March-April) and fall (September – November, primarily) migrations every year. Considerable numbers of other waterbirds, including loons, grebes, herons, geese and shorebirds also occur in the area during periods of open water (especially during migration). Bald Eagles are observed using perches on various islands in the bay for hunting and roosting during the winter.

Common loons have bred regularly in the bay since at least the 1950's, and active nests are located on islands in the bay. This is one of the only confirmed breeding locations for this species on the St. Lawrence River.

Eel Bay provides suitable habitat for various warmwater resident fish species, including large and smallmouth bass, yellow perch, brown bullhead, and panfish such as rock bass and pumpkinseed. Other fish documented in the area include the rare pugnose shiner, and the

blackchin shiner. Eel Bay is an especially important concentration area for young and adult northern pike, supporting the best year-round recreational fishery for this species in the St. Lawrence River. Anglers from throughout New York State and beyond are attracted to this area.

St. Lawrence River Shoreline Bays on US Mainland

The St. Lawrence River shoreline bays are located on the upper St. Lawrence River, between the Villages of Cape Vincent and Alexandria Bay, in the Towns of Cape Vincent, Clayton, Orleans, and Alexandria, Jefferson County. The fish and wildlife habitat consists of eight shallow bays along the River's mainland shoreline. Four of them form an almost continuous three and a half mile reach of productive littoral zone and wetland habitat.

Much of the land area surrounding the bays has been developed into seasonal camps, permanent residences, and small craft harbor facilities (resulting in some habitat disturbance). Wellesley Island State Park, Dewolf Island Point State Park, Grass Point State Park and Collins Landing Wildlife Management Area owned by the Thousand Islands Bridge Authority (TIBA) are exceptions to the predominance of private land ownership. These four public areas provide direct access for public use of the resources associated with the habitat.

These extensive shallow riverine habitats have been subject to human disturbance, but they continue to be important fish spawning and nursery areas in the St. Lawrence River. All of the bays support productive populations of various warmwater species, including northern pike, brown bullhead, largemouth bass, and various forage fish species.

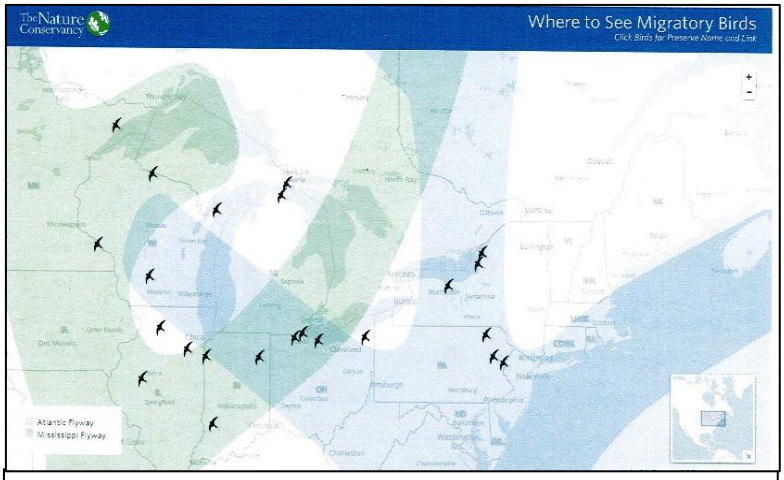
Of special significance however, is the use of these areas by muskellunge. Studies conducted in the past revealed that all eight bays serve as spawning and nursery areas for muskellunge. Muskellunge populations in the St. Lawrence River, which comprise a distinct subspecies from muskellunge populations found elsewhere in New York State, appear to be largely dependent on the habitat found within the St. Lawrence River shoreline bays. This area, in combination with Grindstone Island Bays, comprise the majority of known muskellunge spawning and nursery habitat in the St. Lawrence River. The recreational fishery for this species and others attract anglers from throughout New York State, as well as from adjoining states and provinces.

Common Tern Colonies

The Thousand Islands common tern colonies are located along the St. Lawrence Seaway navigation channel, extending from the Town of Clayton to the Town of Alexandria in Jefferson County. The fish and wildlife habitat consists of one man-made structure supporting navigation lights, located where shoals occur in close proximity to the Seaway channel, and three small rocky islands and one small group of islands. The specific sites include a small group of islands known as the Eagle Wing Group, located approximately one-half mile northwest of the Village of Clayton; Gull Island, located about one mile north of Carrier Bay; Tidd Island, located one mile north of Mason Point; Light Northeast 216, located approximately one-half mile south of Thousand Island Park; and an island known as Southeast Isle of Pines, located just north of Fishers Landing in the Town of Orleans.

A critical feature of the Thousand Island tern colonies is their isolation from mammalian predators and human disturbance. However,

predation by great horned owls appears to be a serious and long standing problem for the island colonies. Ringed-billed gulls also nest on the islands and compete for suitable nesting sites. Thousand Islands Land Trust and Save the River volunteers place grids over the small islands allowing use by nesting common terns, while excluding gulls.



Atlantic Flyway – Northeastern United States and Canada

Perch River Wildlife Management Area

According to the New York State Dept. of Environmental Conservation the Perch River Wildlife Management Area (WMA) is a 7,862 acre parcel dominated by its high quality wetland and open water habitats, but also offers woodland, early succession, and grassland habitats. The area is well known for its waterfowl and furbearer game species. It is a site for waterfowl concentration, diverse species concentration, individual species concentration, species at risk, and bird research. The site supports **American bittern** (Species of Concern), **least bittern** (Threatened), **osprey** (Species of Concern), **bald eagle** (Threatened), 50-60 breeding pairs of **black terns** (Endangered), **sedge wren** (Threatened), and **Henslow's sparrow** (Threatened). Many other characteristic wetland species breed here including **pied-billed grebe** (Threatened), **Virginia rail**, **sora**, **common moorhen**, **American coot**, **marsh wren**, and **swamp sparrow**. Open water serves as foraging area for **Caspian tern**, **common tern**, **black tern**, **pied-billed grebe**, **osprey**, **bald eagle**, and many other species.

The Perch River Wildlife Management Area consists of high quality wetlands and open water bordered by deciduous forest, shrubland, and open agricultural fields. Exemplary ecological communities include: deep emergent marsh, shallow emergent marsh, shrub swamp, and forested wetlands.

St. Lawrence River Valley

The vast "agricultural grassland" of the St. Lawrence Valley supports some of the largest populations of grassland and other early successional bird species in North America (Pashley, et al., 2000). A much higher percentage of bird species that rely on grassland and shrubland/early successional forest are in long-term and widespread decline more so than any other landbird group. Many species that are declining elsewhere are breeding successfully and maintaining stable populations in the St. Lawrence Valley, including the bobolink, eastern meadowlark, short-Avian short-eared owl, upland sandpiper, Henslow's sparrow, savannah sparrow, grasshopper sparrow, sedge wren, and the northern harrier (USFWS, 2000). An estimated 17% of the world's bobolink population breeds in the St. Lawrence Valley. An abundance of savannah sparrows have been recorded here as well (Rosenberg, 2000). These birds, and many other wildlife species, rely upon the extensive grasslands of the St. Lawrence Valley. The most significant concentration of wintering raptors in New York State has been

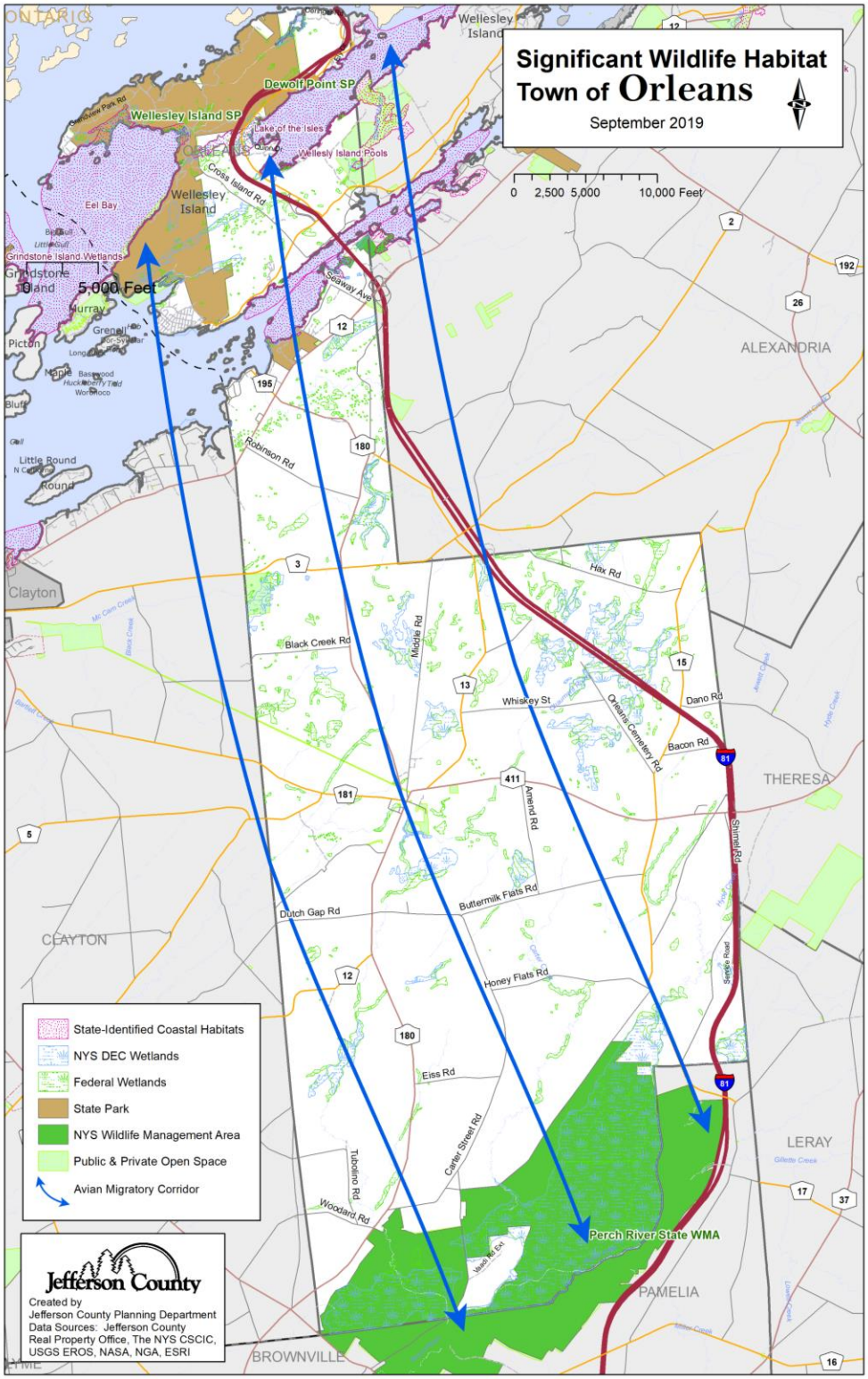
observed in the immediate region, including the northern harrier and the short-eared owl.

According to the 2014 Draft NYS Open Space Conservation Plan, (page 147) the area is a "A major New York State resource consisting of islands, sand dunes, bluffs, embayments, wetlands, major tributaries, lake plains, significant bat and avian migratory flyways, opportunities for shoreline and island access and other significant natural and cultural resources. This system begins at the St. Lawrence River in Jefferson County" "The area also provides nesting, feeding and resting habitat for waterfowl. The lake plain and escarpment, especially where they are located relatively close to the lake, define important avian and bat migratory flyways, providing crucial resting and feeding areas during migratory periods, and critical airspace for migrating birds and bats. They also provide important and unique nesting and wintering habitats for critical avian species, including the American bald eagle, short-eared owl, northern harrier and other species of conservation concern."

Migration and Stopover Areas

It's long been known that the Great Lakes basin, especially the Lake Ontario coastal areas including the St. Lawrence River Valley, support large populations of migrating birds during both spring and fall. Millions of waterfowl, shorebirds, water birds, songbirds, and raptors utilize the region's diverse habitats on their journeys, including open waters, agricultural fields, mudflats, shrub lands, marshes, coastal wetlands, grasslands, and forests. These migration rest stops, also known as "stopover areas", provide shelter and nourishment to hundreds of different bird species, helping to ensure the success of these migrations, which contribute to the region's biodiversity, and support the local economy through recreational opportunities such as bird watching.

These birds rely on local coastal areas. For many if not all of them, it's the unique combination of dependable winds created along the water/land boundary at the regional level, suitable rest stops, and necessary reproductive conditions. Food sources such as aquatic insects, plants, and fish are available at many stopover areas, allowing the hundreds of migratory species to keep coming back and/or through the area annually.



Such areas include French Creek Wildlife Management Area (WMA) (in the Town of Clayton), Perch River WMA (in the Towns of Orleans and Pamelia), Point Peninsula WMA (in the Town of Lyme), Ashland Flats WMA (in the Town of Lyme), Chaumont Barrens (Lyme and Clayton), and the hundreds of other farm fields, wetlands, and grasslands that encompass the area.

Migration Times

Many species of birds migrate during the day. These diurnal migrants include shorebirds, various hawks, gulls, loons, ducks, geese, and songbirds. But the bulk of songbirds migrate at night. Nocturnal migrants such as warblers, vireos, thrushes, and sparrows leave their daytime habitats just after dusk and spend the next eight to ten hours flying. Near dawn they descend to another site along their migratory route, and spend the day or next few days feeding and resting until they can continue the journey. Each species employs its own strategy for migration, but all require two important things during this event – food and rest. Orlean's myriad of habitats provide both of these necessities.

Diurnal migration depends heavily on riding rising air currents called thermals. As these air currents heat up during the day and rise in the atmosphere, birds take advantage of this lift. Many species thermal hop – rising to the top of one thermal, setting their wings for direction, coasting to the next thermal, and then repeat the process. Thermals do not

occur at night in sufficient quantity to allow these birds to utilize them successfully. Other thermal riding or soaring birds include cranes and herons. Some songbird species, such as kingbirds, swallows, and blackbirds will migrate during the day however, the vast majority are nocturnal migrants.

Most birds (excluding owls, night-herons, goatsuckers, and some other species) are typically diurnal during most of the year, but they migrate only at night. Nocturnal migrants tend to be birds that have long distances to fly and do so in powered flight. At night the atmospheric structure is much more stable. It is cooler and smoother than during the day. The coolness helps birds to maintain healthy body temperatures without large water losses, while the smoothness of the air allows for a straight level course without expending energy correcting and maintaining a course in turbulent air. Also, the cover of night is a good way to avoid predation.

Wintering Areas

Migrating birds find their way between their wintering and breeding grounds. However, a number of birds winter within the area: for example, bald eagles winter along the St. Lawrence River. Their wintering area stretches from Kingston, Ontario and Cape Vincent, New York easterly through to Cornwall, Ontario and Massena, New York, depending upon ice cover. Typically, eagles can be seen at Wellesley Island State Park along the edge of the ice or roosting in trees along the shoreline and along the Seaway Shipping Channel. They prefer open (unfrozen) water, their hunting ground for food, so when ice forms over these areas, eagles have been known to move further east to the Brockville narrows or other open water.

Bats

Three species of bats (Indiana Bat (Federal and State Endangered), Northern Long-eared Bat (Federal and NYS Threatened) and the Small-footed Bat (NYS Species of Special Concern) are active in the warm months throughout the area. During the winter several species, including the little brown bat and the federally endangered Indiana bat, hibernate in caves in the region. Several cave wintering bat species populations have been decimated by the introduced "white nose syndrome". It is essential that any human disruptions of population recovery be prevented.

Monarch Butterflies

Monarch butterflies in Eastern North America have a second home in the Sierra Madre Mountains of Mexico where they overwinter from October to late March (USDA – Forest Service). They migrate/travel during the day and need to roost at night. They gather close together during the cool autumn evenings and typically the same roost sites are used year after year. Often pine, fir and cedar trees are chosen for roosting as these trees have thick canopies that moderate the temperature and humidity at the roost site. As warm temperatures and longer days occur, the migratory generation of monarchs finishes the development they halted prior to their migration. This starts the northern journey back to North America. Unlike the generation before them, who made a one-generation journey south, successive generations make the journey north.

They use a combination of air currents and

thermals to travel long distances. Some fly as far as 3,000 miles to reach their winter sites. Migrating monarchs are vulnerable to harsh weather and to human activities that disrupt or destroy their habitat such as reducing milkweed and nectar sources.