The Great Lakes/St. Lawrence Seaway Region and Its Possible Impact on the Atlantic Provinces

Lesson Overview:
This lesson is an analysis of the St. Lawrence River drainage system and its terminus, the Gulf of St. Lawrence and then the Atlantic Ocean; and how economic activity and resource utilization in one region may be affected by activities, practices, and policies in another.

Grade Level:
Senior Geography

Time Required:
Two 60-minute periods

Curriculum Connection (Province and course):
Prince Edward Island: GEO 421A and GEO 431A: GEOGRAPHY OF CANADA

Atlantic Provinces Education Foundation curriculum for Social Studies:

INDIVIDUALS, SOCIETIES, AND ECONOMIC DECISIONS
GCO: Students will be expected to demonstrate the ability to make responsible economic decisions as individuals and as members of society.

PEOPLE, PLACE, AND ENVIRONMENT
GCO: Students will be expected to demonstrate an understanding of the interactions among people, places, and the environment.

INTERDEPENDENCE
GCO: Students will be expected to demonstrate an understanding of the interdependent relationship among individuals, societies, and the environment—locally, nationally, and globally—and the implications for a sustainable future.

Link to Canadian National Geography Standards:

Essential Element #1: The World in Spatial Terms
- Map, globe, and atlas use

Oceans Scope & Sequence Standard #1: The World in Spatial Terms
- Location and patterns of ocean characteristics

Essential Element #2: Places and Regions
- Physical and human processes shape places and regions
- Interdependence of places and regions
- Critical issues and problems of places and regions
- Regional analysis of geographic issues and questions
Oceans Scope & Sequence Standard #2: Places and Regions
- Physical and human processes that shape the ocean and coasts
- Interdependence of land areas and the ocean

Essential Element #3: Physical Systems
- Components of Earth’s physical system
- Global ocean and atmospheric systems

Oceans Scope & Sequence Standard #3: Physical Systems
- Processes of ocean physical systems

Essential Element #4: Human Systems
- Population characteristics in world regions, country, and regions within countries
- Demographic transition

Oceans Scope & Sequence Standard #4: Human Systems
- The role of oceans in economic development
- Global economic interdependence (regional ocean resources)

Essential Element #5: Environment and Society
- Global effects of human modification of the physical environment
- Global effects on the human environment by changes in the physical environment
- Use and sustainability of resources
- Environmental issues

Oceans Scope & Sequence Standard #5: Environment and Society
- Human influences on a global scale (tragedy of the commons)
- Ocean policies and regulations
- Changes in world ocean resources and distribution over time

Essential Element #6: Uses of Geography
- Local, regional, and world policies and problems with spatial distribution

Geographic Skill #1: Asking Geographic Questions
- Plan and organize a geographic research project

Geographic Skill #2: Acquiring Geographic Information
- Systematically locate and gather geographic information from a variety of primary and secondary sources

Geographic Skill #3: Organizing Geographic Information
- Select and design appropriate forms of maps to organize geographic information
- Select and design appropriate forms of graphs, diagrams, tables, and charts to organize geographic information
- Use a variety of media to develop and organize integrated summaries of geographic information
Geographic Skill #4: Analyzing Geographic Information
- Make inferences and draw conclusions from maps and other geographic representations

Geographic Skill #5: Answering Geographic Questions
- Formulate valid generalizations from the results of various kinds of geographic inquiries

Additional Resources, Materials and Equipment Required:
Reference maps of Canada, the Great Lakes/St. Lawrence River System, Atlantic Canada

Students and teachers will access the following web sites, therefore, a computer lab or access to the Internet will be required. This lesson can be delivered as an in-class lesson, or as a lesson within the computer lab.
- http://www.great-lakes.net/gis/maps/
- http://www.aquatic.uoguelph.ca/rivers/stlawr.htm

Main Objective:
By working in cooperative groups, students will form an understanding of the complexity of the St. Lawrence river drainage system and the effects that the connections through the Great Lakes to the continent and its population densities and resultant urbanization, industrialization, and agricultural practices has on the Atlantic region which is the recipient of the water and its contents.

Learning Outcomes:
At the end of this lesson, students should be able to:

1. Identify the Great Lakes on a map
2. Identify the St. Lawrence Seaway on a map.
3. Identify the Gulf of St. Lawrence on a map.
4. Identify relevant physical characteristics of the Great Lakes/St. Lawrence regions.
5. Understand the interdependence between these regions.
6. Understand the impact of the total region on the cities, towns, provinces and states that border this region
7. Understand the effect of this region on areas that seem to be removed from the effects of human interaction on this area by distance.
The Lesson:

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<th>Teacher Activity</th>
<th>Student Activity</th>
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<tr>
<td><strong>Introduction</strong></td>
<td><strong>Lesson Development</strong></td>
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<td>The lesson opens with the teacher explaining a drainage basin (what they are, what their purpose is) and introducing a map to illustrate the drainage basins that exist in Canada, illustrating the differences between each and to outline to students the reasons why rivers and lakes in specific areas of the country will only drain to specific larger bodies of water.</td>
<td>Students will be given the map of the drainage basins in Canada and will be asked to illustrate the areas of the country that drain into the major bodies of water. They will also be asked why these areas of the country drain to these areas. The natural geographic borders that cause this will be highlighted on the map by the class.</td>
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<tr>
<td><strong>Lesson Development</strong></td>
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<td>After the introduction to drainage systems, the lesson will focus on the St. Lawrence Seaway and the Great Lakes System. From the establishment of the drainage system for this system in the introduction, students will begin to brainstorm ideas on the effects of drainage from a system that is the transportation system for the Industrial Heartland of Canada and the United States. The trickle down effect from each of the Great Lakes and other major waterways can be seen in the system profile, which is illustrated here.</td>
<td>Students will be given the following maps:</td>
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<td>The lesson will then focus on the St. Lawrence River, specifically the terminus of the river, the Gulf of St. Lawrence. The following maps should be used:</td>
<td>- <a href="http://www.aquatic.uoquelph.ca/rivers/stlawr.htm">http://www.aquatic.uoquelph.ca/rivers/stlawr.htm</a></td>
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<tr>
<td>- Map 3</td>
<td>- <a href="http://www.qc.ec.gc.ca/CSL/inf/nf002_04_e.html">http://www.qc.ec.gc.ca/CSL/inf/nf002_04_e.html</a></td>
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<td>These maps will provide the focus of the lesson. At this stage, students should understand that the Gulf of St. Lawrence and the Atlantic Ocean are the terminus for the water that flows from the Great Lakes and the St. Lawrence. As well, it should be noted that while efforts to limit the harmful materials that enter the water supply are better than in the 80’s and 90’s, not all hazardous materials can be stopped.</td>
<td>- <a href="http://www.qc.ec.gc.ca/CSL/inf/nf044_e.html">http://www.qc.ec.gc.ca/CSL/inf/nf044_e.html</a></td>
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In designated groups, students will be asked to: list major industries that depend on the Great Lakes and the St. Lawrence Seaway for its industrial capacity. As well, students will be asked to identify the major population centers along the seaway.

Factors such as population density, industrial capacity, and pressures on the environment should be discussed at this time. Students should speculate on how unseen factors impact on the environment of the lakes/seaway region.
### Lesson Development

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<th>Students could be asked to assess the impact on one or all of the following:</th>
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<td>• Major cities</td>
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<td>• Types of industries</td>
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<td>• Tributaries of the St. Lawrence</td>
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<td>• Identified pollutants and concentrations</td>
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<td>• Population Densities</td>
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<td>• Statistical data re volume of water</td>
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<td>• Water depths in the two regions</td>
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<td>• Species landings comparisons for specified decades</td>
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Students will then focus on the potential impacts that can occur to the Atlantic provinces. Impacts on economic development in industries such as fishing and aquaculture, environmental impacts and impacts on the animal and human population should be discussed.

Day two should focus on the information found at [http://www.qc.ec.gc.ca/CSL/inf/inf044_e.html](http://www.qc.ec.gc.ca/CSL/inf/inf044_e.html). The potential destruction that can come from the overuse of pesticide and how it impacts the environment should be discussed. At the end of this sheet, students should be asked to speculate how this can be controlled, given the farming and industrial uses for pesticides and herbicides in the region.

### Conclusion

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<th>The lesson will conclude through a presentation of research and a brainstorming session of their findings.</th>
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<td>Groups can present their information in any format/medium. How can Atlantic Canada affect changes in the Industrial Heartland and the policies of the states and provinces involved, especially seeing that Atlantic Canada is on the North American periphery and has a small population base? Brainstorm and share answers with the class. Discussion and debate is encouraged re local, regional, and global stewardship.</td>
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Assessment of Student Learning:
Students will be assessed through the completion of a worksheet, which is attached to the end of this lesson.

Group presentations

Lesson Extension:
Hypothesize whether or not the quality of the fresh water ending up in the marine habitats of the Gulf of St. Lawrence and the Grand Banks may or may not have been one of the contributing factors to species degradation in this region, resulting in reduced landings of salmon and the moratorium on cod. Speculate as to where all these pollutants eventually go. (e.g. into the Atlantic Ocean, into the global ocean systems, into our bodies etc.)

The Five Themes of Geography are:
1. Location
2. Place
3. Human/Environment Interaction
4. Movement
5. Region

1. LOCATION (Absolute and relative): Location answers the basic question; “Where?” Absolute and relative locations are two ways of describing the positions of the Earth’s physical and cultural features. A grid system representing the latitude and longitude is one way of showing absolute locations. Another way of looking at location has to do with the interaction of places. This is a relative location e.g. the way a river connects to other places.

The Greats Lakes/St. Lawrence Seaway can be described in both absolute and relative terms. Provide a description of this area using absolute and relative location.

2. PLACE (Physical and human characteristics): All places on Earth have special features that distinguish them from other places. Geographers usually describe places by their physical and human characteristics.

As a physical and human place on earth, describe the place that the Great Lakes/St. Lawrence Seaway maintains. Be as specific as possible.

3. HUMAN/ENVIRONMENT INTERACTION (Relationships within places): People interact with their environments and change them in different ways, for example, the large-scale agricultural development in Ontario and in the St. Lawrence Lowlands. But such change has a price: the region’s water supply is under pressure from the amounts of pesticides from farm run-off. Geographers
examine how human/environment interactions develop and what their consequences are for people and the landscape.

The Great Lakes/St. Lawrence Seaway also has become the transportation system for the industrial heartland of North America with its huge populations and supporting infrastructure. It accepts travel from trading partner countries, however, this has caused environmental trouble for the water system and for the countries it borders, Canada and the United States. Explore the impact on the following:

1. The Great Lakes
2. The St. Lawrence River
3. The Gulf of St. Lawrence
4. Fishing and aquaculture in the Atlantic Provinces and Quebec.

4. MOVEMENT (Movement of people, goods, and ideas): People everywhere interact. They travel from place to place, they communicate, and they depend upon other people in distant places for products, ideas, and information. A good example of movement exists in the highly urbanized Lake Ontario-St. Lawrence Seaway corridor from Hamilton, Ontario, to Montreal, Quebec. Here people can take a train, drive, or fly from one city to another. Farmers efficiently send their products to restaurants and supermarkets by trucks and trains. Shipping is easy through the St. Lawrence River and its access to the Atlantic Ocean. Geography helps us understand the nature and effects of such movement.

What is the benefit of this corridor to the people of the Atlantic Provinces? Map the major transportation routes and connections.

REGION (How they form and change): Regions are areas on the surface of the Earth that are defined by certain unifying characteristics. These characteristics may be physical, or they may be human. Regions provide an organized way to study Earth’s landscapes and peoples. The St. Lawrence River Drainage System is an example of a physical region.

What other specific unifying characteristics might unite them into a region? How does the Great Lakes/Gulf of St. Lawrence Region unify the people who live it here? Is there a tangible identity formed from those who use and exploit the region? Are the factors that unify them enough to supersede other regional factors? Because of certain defining characteristics might one region feel that its interests may be of more importance than another region that may be affected by its attributes and activities?