Devils Lake Diversion: A Dilemma

Lesson Overview
In this activity the students will look at the Devils Lake water diversion issue which involves Manitoba and the U.S. state of North Dakota. The students will read an overview of the issue, assess the issue, look at differing perspectives, and evaluate the economic value of the Red River, Lake Winnipeg, and tributaries.

Grade Level
Grade 10

Time Required
One or two 60-minute lessons

Curriculum Connection
Manitoba – Geography 20G (Grade 10), Geographic Issues of the 21st Century

Link to Canadian National Geography Standards
- Essential Element #3 (Grades 9-12) – Physical Systems
- Essential Element #4 (Grades 9-12) - Human Systems
- Essential Element #5 (Grades 9-12) - Environment and Society
- Geographic Skill #4 (Grades 9-12) - Analyzing geographic information
- Geographic Skill #5 (Grades 9-12) - Answering geographic questions

Principal Resource
The following sections of The Canadian Atlas Online are used in this lesson:
- Rivers of Canada: Red River/Central Plain:
  www.canadiangeographic.ca/atlas/themes.aspx?id=rivers&sub=rivers_west_red&lang=En
- This water-rich land (pages 12-13 of The Canadian Atlas)----
  www.canadiangeographic.ca/atlas/themes.aspx?id=waterrich

Additional Resources, Materials and Equipment Required
- Overhead projector or computer projector
- Student Activity Sheet: Devils Lake Diversion: A Dilemma
- Computer lab with access to the Internet and these sites:
  www.gov.mb.ca/waterstewardship/transboundary/maps/map2.html
Main Objective

Students will understand the Devils Lake Diversion issue and assess the economic impact on the Red River, Lake Winnipeg, and tributaries as well as weigh the pros and cons of the issue.

Learning Outcomes

By the end of the lesson, students will be able to:

- Access The Canadian Atlas Online website.
- Identify the Hudson Bay drainage basin, the Red River, and Lake Winnipeg on a map.
- Identify and analyze the issue surrounding the Devils Lake Diversion project.
- Identify differing perspectives concerning the Devils Lake Diversion project.
- Research information using web-based resources.
- Organize information using charts and reports.
- Draw conclusions about the economic value of the Red River and Lake Winnipeg.
- Draw conclusions about the impact of the Devils Lake Diversion on the Red River and Lake Winnipeg.

Lesson

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<th>TEACHER ACTIVITY</th>
<th>STUDENT ACTIVITY</th>
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| **Introduction** | • Ask students to brainstorm and come up with a definition for the term ‘drainage basin’.  
• Read the section that begins “Canada has five ocean drainage basins…..” found on page 12 on The Canadian Atlas. (or found online at [http://www.canadiangeographic.ca/atlas/themes.aspx?id=waterrich&sub=waterrich_basics_drainage](http://www.canadiangeographic.ca/atlas/themes.aspx?id=waterrich&sub=waterrich_basics_drainage)) | • Students participate in brainstorming session.  
• Students listen to reading. |
|                  | • Access the map entitled Hudson Bay Drainage Basin found at [http://www.gov.mb.ca/waterstewardship/transboundary/maps/map2.html](http://www.gov.mb.ca/waterstewardship/transboundary/maps/map2.html).  
• Show the students this map (either on a computer projector or on a ready-made overhead transparency).  
• Point out the Red River, Canada, United States, Manitoba, North Dakota, Winnipeg, Sheyenne River, and Devil’s Lake.  
• Have the students assess the value of the waters found in the Hudson Bay basin (fishing, irrigation, recreation…)  
• Discuss the issues related to flooding in this area. (Refer to The Canadian Atlas---[http://www.canadiangeographic.ca/atlas/themes.aspx?id=rivers&sub=rivers_west_red&lang=En](http://www.canadiangeographic.ca/atlas/themes.aspx?id=rivers&sub=rivers_west_red&lang=En)) | • Students view map of the Hudson Bay Drainage Basin. |
Lesson (cont’d)

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<th>TEACHER ACTIVITY</th>
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<td><strong>Lesson Development (cont’d)</strong></td>
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<tr>
<td>• Read page the section the <em>Red River/Current State</em></td>
<td>• Students assess the economic value of the Hudson Bay drainage basin.</td>
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<td>from The Canadian Atlas Online</td>
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<td><a href="http://www.canadiangeographic.ca/atlas/themes.aspx?id=rivers&amp;sub=rivers_west_red&amp;lang=En">www.canadiangeographic.ca/atlas/themes.aspx?id=rivers&amp;sub=rivers_west_red&amp;lang=En</a></td>
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<td>• Have the students make a list of pros and cons</td>
<td>• Students make a list of pros and cons associated with the Devils Lake</td>
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<td>concerning the diverting of Devils Lake.</td>
<td>Diversion issue.</td>
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<td>• Initiate a class discussion</td>
<td>• Students participate in discussion.</td>
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<td><strong>Conclusion</strong></td>
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<td>• Hand out the Student Activity Sheet entitled ‘Devils Lake Diversion: A Dilemma’</td>
<td>• Students complete the Student Activity Sheet entitled ‘Devils Lake Diversion: A Dilemma’.</td>
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<td>• Read the <em>The Devils Lake Diversion: An Overview</em> section with the students,</td>
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<td>pausing for clarification when required.</td>
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<td>• Have the students complete the Activity Sheet as instructed.</td>
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<td>• Go over Part C as a class and initiate a concluding discussion.</td>
<td>• Students share their responses to Part C and participate in a concluding</td>
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<td>discussion.</td>
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Lesson Extension

There are several ways to extend this lesson:

- Ask students to collect newspaper clippings of the Devils Lake issue and compare differing views.
- Ask the students to access the government of North Dakota’s website and compare their perspectives on the Devils Lake diversion with that of the Manitoba government.
- Have the students map the area of Manitoba and North Dakota affected by the diversion.
- Have the students participate in a role play where different citizens put forth their view on the issue (e.g. – a Manitoba fisherman, a North Dakotan farmer, etc)
- Students could research the International Joint Commission and its potential role in this issue.

Assessment of Student Learning

Students can be assessed in the following ways:

- Teacher can correct and assess the Student Activity Sheet.
- Students can be assessed on their participation in the class discussion.
- A quiz could be given where students must identify an understanding of the Hudson Bay drainage basin, the Devils Lake Diversion, economic value of the Red River and Lake Winnipeg, and the differing views surrounding the issue of diversion.
Student Activity Sheet:
Devils Lake Diversion: A Dilemma

The Devils Lake Diversion: An Overview

Devils Lake, North Dakota is an American town with a population of 7,500. They have an ongoing problem. The nearby lake is on the verge of flooding its namesake town, and the solution to the problem is raising a cross-border water controversy.

Devils Lake sits in a sub-basin of the Hudson Bay drainage basin, but no water flows out of the lake into the Hudson Bay basin. The lake is fed solely by runoff from the surrounding farmland, lacking an outlet, and subject to intense evaporation during the hot prairie summer, the water of Devils Lake is a harmful brew of salt, arsenic, boron, mercury, nitrogen, phosphorous and sulphate.

Since 1993, the waters of Devils Lake have risen by nine metres. The lake has tripled in size, 30,000 hectares of farmland have been flooded and 300 farmsteads lost -- at an estimated cost of $500 million (U.S.). North Dakota has spent an estimated $400 million (U.S.) dealing with the flood situation by building a levee (a dike to prevent flooding), raising roadways, and moving buildings and people.

In an effort to offset the flooding, the state decided to build the "Peterson Coulee temporary emergency outlet" to drain Devils Lake into the nearby Sheyenne River, which joins the Red River near Fargo and flows north into Manitoba's Lake Winnipeg.

The province of Manitoba and several U.S. groups – including the states of Minnesota and Missouri, the Great Lakes Commission, several U.S. Indian reservations, and environmental groups – however, have long opposed any diversion project that results in Devils Lake water entering Manitoba.

Provincial officials say Devils Lake has not joined the Hudson Bay drainage basin for at least 1,800 years, so some organisms -- such as fish diseases -- have become established in Devils Lake but not in the Hudson Bay basin.

The province says Devils Lake's water quality is much worse than the quality of water in the Red River and in Lake Winnipeg, citing concerns about the level of salts, arsenic, boron, mercury and phosphorus.

People who fish on the Lake Winnipeg, the Red River and its tributaries are also concerned. Devils Lake was stocked in the 1970s with striped bass, an aggressively competitive fish that does not live in the Red River basin. While none of the fish has been caught in the lake for several years, opponents to the outlet plan say surviving fish could escape into the Red River system through the outlet, harming the sport and commercial fisheries in Manitoba.

Officials in North Dakota believe that the state has no obligation to carry out an environmental impact assessment on the project because it will affect no "federal property interests." However, Manitoba, Canada and several U.S. groups have called for a full environmental impact assessment of the outlet.

The province also argues that Devils Lake is not likely to continue to rise; they say it reached its highest level in the summer of 2001. Even if the lake continues to grow, provincial officials say the proposed outlet won't remove water fast enough to protect area residents from further flooding. The province also suggests North Dakota could use other methods to protect residents from any further flooding.

Provincial officials in Manitoba say they sympathize with the dilemma of Devils Lake residents, but won't budge on the province's stance. They want the nearly completed floodwater diversion project taken to the International Joint Commission, a U.S.-Canadian organization that resolves boundary water disputes.
PART A – THE RED RIVER

Answer the following by accessing these links to The Canadian Atlas Online:

- This water-rich land: Drainage Basins
  www.canadiangeographic.ca/atlas/themes.aspx?id=waterrich&sub=waterrich_basics_drainage&lang=En
- Rivers of Canada: Red River (Central Plains)
  http://www.canadiangeographic.ca/atlas/themes.aspx?id=rivers&sub=rivers_west_red&lang=En

1. List Canada’s five ocean drainage basins. In which one is the Red River located?

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

2. What is the surface area (square kilometers) of the drainage basin with the Red River that you wrote in #1?

   __________________________________________________________

3. List three other rivers found within this drainage basin.

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   __________________________________________________________
   __________________________________________________________

4. What is the source of the Red River? What direction does it flow? Where is the mouth of the river?

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PART B – DIFFERING VIEWS: CANADIAN AND AMERICAN

**Answer** the following by referring to the extract above entitled *The Devils Lake Diversion: An Overview* and The Canadian Atlas Online: http://www.canadiangeographic.ca/atlas/themes.aspx?id=rivers&sub=rivers_west_red&lang=En

Next to each statement below, write in the space whether the statement represents the Manitoban/Canadian or the American view on the Devils Lake Diversion dilemma.

1. Devils Lake has not joined the Hudson Bay drainage basin for at least 1,800 years, so some organisms – such as fish diseases – have become established in Devils Lake but not in the Hudson Bay basin.

2. Devils Lake is not likely to continue to rise; it has reached its highest level in the summer of 2001.

3. Advanced filtration and disinfection system for the Devils Lake outlet and ongoing monitoring of biota in the lake, the Red River and Lake Winnipeg — will protect the Red River basin while offering flood relief in North Dakota.

4. Water from Devils Lake would pollute the Red and foreign aquatic species and diseases would enter its basin.

5. The state has no obligation to carry out an environmental impact assessment on the project because it will affect no “federal property interests”.

6. Devils Lake's water quality is much worse than the quality of water in the Red River and in Lake Winnipeg; therefore people should be concerned about the level of salts, arsenic, boron, mercury and phosphorus.
Part C – A DILEMMA

A dilemma is a problem offering two solutions or possibilities, or two solutions neither of which is acceptable. Describe the Devil’s Lake dilemma by answering the following:

1. What is the problem with the Devils Lake Diversion?

2. What are two solutions that you learned about?

3. Why are neither solutions acceptable?