



FRESHWATER
SUMMIT 2010

**2010 FRESHWATER YOUTH SUMMIT
PARTICIPANT WORKBOOK**

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1. Introduction

Welcome to the 2010 Freshwater Youth Summit! The organizing committee is excited to have you as a participant at the summit.

This Workbook contains a variety of information about fresh water. As a participant in Muskoka's 2010 Freshwater Youth Summit, it will provide you the knowledge you need to contribute to Summit discussions. Become an expert on one or more of its topic areas: Canada's Freshwater Resources, Water Justice and Jurisdiction, Water Knowledge, Water Management Issues Part 1, or Water Management Issues Part II. Doing so will help you to clarify your own position on water issues.

At the Summit you will have to opportunity to share your viewpoints with other students. The product of the Youth Summit will be a communiqué, which will be sent to Canada's delegates to the 2010 G8 summit. Educate yourself, and then argue your positions so that political leaders are informed about the ways *you* think water should be managed.

After reading this Workbook, you should be able to do the following things:

- a. List several issues related to freshwater policies or management
- b. Rank these issues in their order of importance to you and to society
- c. List the prevailing viewpoints or positions regarding these issues
- d. Clearly articulate your own position on these issues
- e. Based on your own point-of-view recommend at least one water-management activity or freshwater policy

The workbook is divided into several sections as you can see by glancing at the Table of Contents.

Sections 1 - 4 are required reading for every student.

Sections 5 - 9 are the five Freshwater Youth Summit Main Topics. You have been assigned to become an expert in one of these topics. The format for this Workbook is interactive:

- Each of these sections begins with a '**Topic Overview**' and some links that give general information about each topic.
- Next, is a list of '**Questions to Consider**'. These questions are important to think about and answer as you read through the materials in your topic section.
- Following the list of questions are tables of recommended **readings** for each sub-topic. These are provided as a series of hyperlinks. Clicking on these links will direct you to websites and writings from a variety of authoritative sources.

**Note:* If a link is broken, try using the root of the link or searching for the Title/Website using Google.

The authors have made an attempt to provide a balanced viewpoint in each section. You will need to work from a computer with internet access to read through the resources for this workbook. There are plenty more resources available on the web. The authors encourage you to look up resources on your own and explore additional resources that are on the web. These could be from organizations, governments, or online journals.

The authors also encourage you to share valuable resources with team members from your school and your counterparts from other schools. This can be done by sending a request to join the Facebook Group called "2010 Freshwater Youth Summit". There are discussion threads started there for various topics. We encourage you to start other threads as you see fit. Also check out the video and photos sections of the group- and add your own! The site will be monitored for appropriate material and only participants

of the Youth Summit will be approved to join. Your teacher will provide the organizing committee with your names so that you may be approved to join the group.

Be sure to check the summit website for information and additional resources

<http://www.2010freshwatersummit.org/youth.htm>

The 'General Resources' section that appears at the end of this introduction provides general knowledge for all participants. It may be useful to keep these in mind and refer back to as you learn more about your topic area.

If you have any questions or comments, ask your teacher or post it on the wall of the Facebook group. See you on May 8th for the introduction day and on June 1st & 2nd at the 2010 Freshwater Youth Summit!

General Resources

Date	Title/Website	Link
2009	Environment Canada: Water Quick Facts	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=11A8CA33-1
2009	Blue Planet Project	http://www.blueplanetproject.net/
2009	Ministry of the Environment: A Fresh Outlook on Water	http://www.ene.gov.on.ca/en/water/index.php
2010	Conference Board of Canada - Environment	http://www.conferenceboard.ca/HCP/Details/Environment/water-consumption.aspx
2010	Water Chronicles	www.water.ca

2. 2010 G8 Meeting and the 2010 Freshwater Summit

Fresh water is important locally, provincially, nationally and globally. Past and current stresses on our freshwater resources are having a significant impact. These stresses threaten our ability to use, enjoy and rely on this vital resource. There have always been stresses on our freshwater resources but current trends indicate a potential acceleration in the deterioration of water quality and quantity.

Those critical of this position point out that nature has always demonstrated the ability to withstand, to respond to, and to adjust to the damage humans have caused. There is a measure of truth in that. The Muskoka forests that were clear-cut at the end of the 19th, and beginning of the 20th century are today healthy and thriving. The rivers that once were the receptacles for human waste from our early communities, and were further polluted by the old tanbark mills, are cleaner today than they were many decades ago.

Nature does have a remarkable resilience and ability to adapt. So what has changed?

Two things have changed: the first is the pace at which the natural environment is bombarded by the stresses from human behaviours. The current rate of resource depletion and environmental degradation viewed from the global perspective is unprecedented in human history. Reversing environmental damage requires decades and centuries; the second is the scope of the stresses, which has increased dramatically since the industrial revolution, as a result of our demands on the goods and services provided to us by the environment.

Our impacts on water are determined by our population (i.e., the number of people using water) and our level of consumption. Larger populations and higher standards of living increase the drain on natural resources. As the world's population increases and standards of living escalate dramatically in the developing world, so too does the demand for more of earth's resources to feed, shelter, entertain and nourish our bodies, minds and souls.

With both population and per capita consumption increasing, we are compromising our environment's ability to meet human needs. How can this trend be reversed? There are many perspectives on this, and these perspectives warrant debate and testing. As global environmental degradation continues, acting locally and providing global leadership to manage our freshwater resources is vital.

In June of this year we have the opportunity to voice our collective concern about the future health of our freshwater to the leaders of the G8 countries as they gather in Huntsville to discuss global issues. The objective of the 2010 Youth Freshwater Summit is to learn about, debate, and develop a consensus on the management of freshwater that can be presented to world leaders.

About the G8

The Group of Eight (G8) is a forum for the leaders of eight of the world's most industrialized nations, aimed at finding common ground on key topics and solutions to global issues. The G8 includes Canada, France, Germany, Italy, Japan, Russia, the United Kingdom and the United States. While the leaders of these countries are in regular contact, they meet in summit format as the G8 once a year, usually in mid-year, to discuss world economics and politics.

The G8's origin stems from meetings held in the 1970s between France's Valéry Giscard D'Estaing and Germany's Helmut Schmidt when they were finance ministers. Each subsequently assumed the leadership of their respective countries, just as the mid-1970s oil crisis was buffeting the world's largest economies. French President Giscard D'Estaing urged the leaders of Germany, Italy, Japan, the United Kingdom and the United States to meet in 1975 to discuss how to respond to the oil crisis.

Canada joined the group in 1976 at the Puerto Rico Summit hosted by the United States. The European Community, now the European Union, was given observer status the following year at the London Summit. Russia became a full-fledged member of the G8 in 1998.

Canada has hosted four summits since 1976: Ottawa-Montebello 1981, Toronto 1988, Halifax 1995 and Kananaskis 2002. Canada is host of the Muskoka 2010 G8 Summit in Huntsville on June 25 and 26.

3. Deriving a Position Statement by Consensus

In many issues, especially scientific issues, there are often differences in opinion. It is completely normal for individuals to disagree about an issue. For example, consider the debate about genetically modified food (GMO). Many individuals think that GMOs are a great option, especially in countries where there is a much higher demand for food. On the other hand, many other individuals think that GMOs are bad news – not a healthy alternative – and something that science should not worry about.

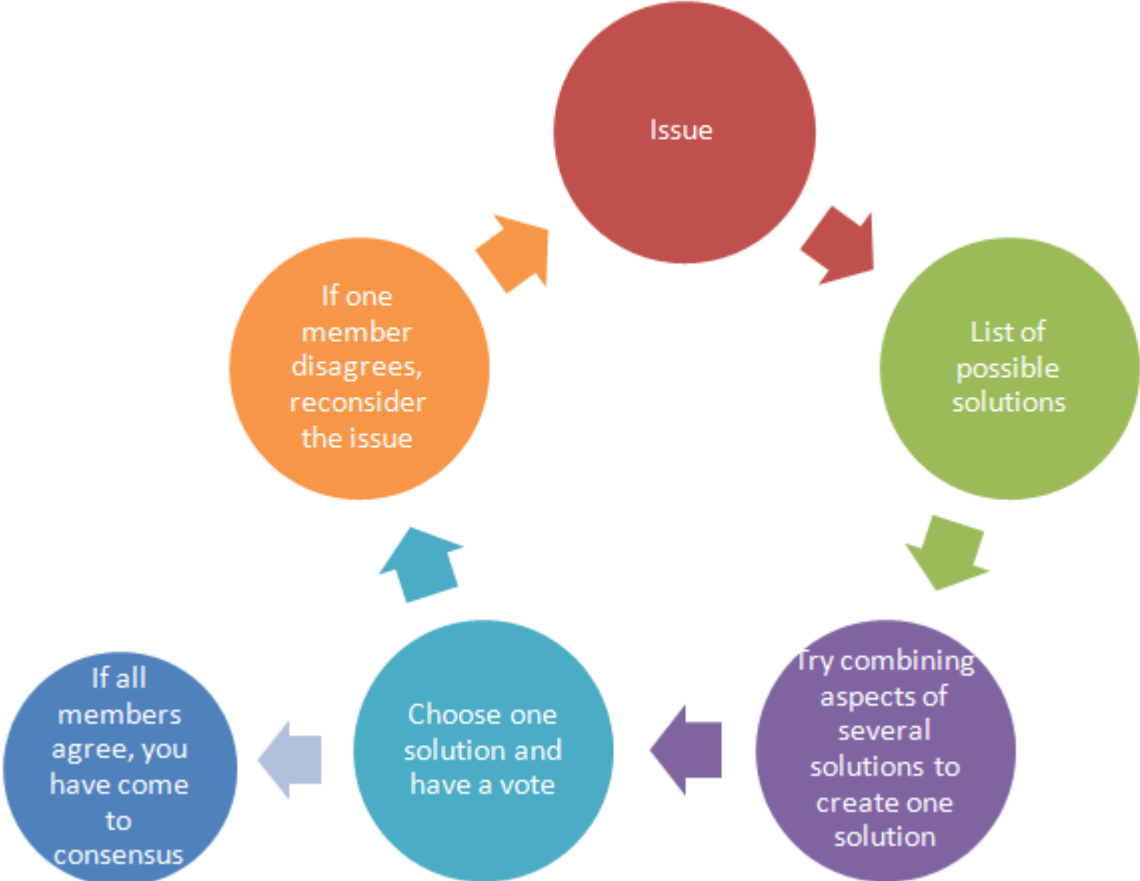
Often, when individuals have differing opinions on a topic, there are many issues to consider. So what do we do when there are different opinions about an issue? Sometimes, we must work together and come to a **consensus**. Consensus attempts to reach an agreement between all participants and is an active process between all of these participants. This means that everyone has the opportunity to have a say in coming to an overall decision or conclusion about an issue.

Coming to Consensus

Following these steps will help a group of individuals come to a consensus about a topic. In some cases, these steps may need to be repeated several times before everyone agrees on a solution.

1. Select a convenor or mediator. This person will ensure that the discussion stays on topic, will encourage all individuals to share their opinions, and will ensure that everyone's ideas are considered, incorporated, or discussed.
2. Create a list of all issues that need to be discussed. This will be your agenda for group discussion. It may be helpful to also choose an individual to keep track of time during this process.
3. Begin with one issue and allow each individual the chance to discuss their definition of the issue.
4. Consider many possible solutions or suggestions for the issue at hand. It can be helpful to write down these solutions in a brainstorming session – This can even be done in a few smaller groups first. Write down the ideas before you consider whether any of them are “right” or “wrong,” or whether they are suitable for everyone. By suggesting many solutions, different groups are able to reconsider their initial ideas and trade for other similar ideas.
5. Consider eliminating some of the solutions or suggestions that the group has come up with – You may notice that when there are many options available, all members can come to the conclusion that some of the solutions are not as ideal as others.
6. Look at some of the remaining solutions and consider blending them together so that you can come to a solution that considers the values and interests of many individuals.
7. Once the group thinks that they have come to a final solution, a final discussion must confirm that everyone agrees with the final decision. Since we are trying to come to consensus, everyone must agree with the final decision. This is not a “voting” process.
8. If everyone agrees, then congratulations – consensus has been reached! If not, back to the drawing board! Re-consider the parts of the solution that some parties do not agree with. There may be other “trade-offs” which can be considered.

Consensus Flow-Chart



Some pointers to keep in mind when having your group discussion:

- Participation: The consensus process values the input and participation of all individuals involved in the decision-making process.
- Alternative Viewpoints: It is important to listen to the ideas and concerns of other participants since they may have thought of a point of view that you haven't thought about yet. Be sure to weigh all of these opinions before coming to a conclusion.
- Remember the topic: The participants of a consensus process should try to come to a decision that is best for the topic at hand. This may mean that you will have to voice an opinion that is different from the majority.
- Be democratic: All of the participants should be given equal input into the process and have the opportunity to present, amend and disagree with proposals.
- Start on common ground: To begin to reach a consensus it is important to focus on common agreement and less on the differences. This will give you a jumping off point.
- Dealing with disagreements: When opposing ideas bring the process to a standstill the use of reasonable compromise may allow for a solution to be reached. Else a careful and considerate debate may have to occur with both sides logically laying out the reasoning behind their viewpoints.
- It may be helpful to create a short agenda of what issues need to be discussed.
- Consensus decision-making is different from the standard democratic model of voting yes or no for an idea. The idea behind reaching a consensus is to take into account the ideas of all participants and use them to shape a new idea. This uses the best points from all the participants to make a decision based on logical research and multiple viewpoints.

References:

Bingham, G. & Stedman, B. *Fostering Collaborative Problem Solving Processes for Controversial Water Resources Issues*. Retrieved from http://www.ucowr.siu.edu/updates/pdf/V115_A7.pdf

Burgess, H. & Spangler, B. (September 2003). *Consensus Building*. Retrieved from http://www.beyondintractability.org/essay/consensus_building/

4. How to Write a Communiqué

In June, you will be hearing speakers discuss various issues related to water. Writing a communiqué is one way that your thoughts and ideas can be communicated.

What is a communiqué?

Communiqués are official statements or reports recommending actions related to a specific issue.

A communiqué does not simply include a list of the scientific facts about an issue. It also includes opinions and recommendations for a specific topic.

During the Youth Summit, you will hear speakers present their views on water-related topics. In many ways, these speakers are presenting an oral version of their own communiqués. While they are educating the public about water, they will also argue for their position and make recommendations about how they think water should be managed.

You may agree or disagree with these speakers' arguments. In your communiqué, it's especially important to discuss perspectives about the issues that you disagree with.

What does a communiqué look like?

Communiqués posted on the internet may be difficult to understand without having all of the background information about the issues that are presented. They may also include more information than you will be expected to provide at the Youth Summit. However, it's still useful to look at some real communiqués that will help give you an idea about how to form your own communiqué. The following two communiqué examples are about water-related topics:

- G20 Communiqué on water
http://www.l20.org/publications/8_04_water_mehta.pdf
- World Conference on Science: Water and Climate Change
http://www.unesco.org/science/wcs/meetings/eur_espoo_98.htm

Preparing to write your communiqué:

1. Coming to the Youth Summit in June, you should understand the issues related to your water topic. As you work through the Youth Summit Workbook, identify water issues that you think are important and try to rank them in order of their importance. You may also want to consider how you feel about the issues.
2. Listen to the issues and suggestions mentioned by keynote speakers during the Youth Summit. They will likely bring up some things that you hadn't thought about.
3. Meet with your group after listening to the keynote speakers and brainstorm a list of water issues. You might find that many of these issues are related and can't be considered alone. Try to organize these issues into larger categories.
4. Decide as a group on the 4 or 5 most important issues, keeping in mind that you will have a limited amount of time to come to consensus and write your communiqué. Since your communiqué will not be written in "essay form," the categories that your group decide are the most important to discuss can be used as headings in the final document.
5. Once you have a list of the most important issues begin discussing as a group where you stand on each of the issues. At this point, group members should also be making some recommendations of changes that could be made to improve the situations. Don't forget that someone should be writing down the points that are brought up by each group member.
6. Now that you have determined the issues and the various opinions within your group, it's time to attempt to come to consensus about each issue. If you are having difficulty agreeing on a solution, it may be helpful to go back to the document about coming to consensus.
7. Once you have determined where the group stands on each issue and the recommendations that you would like to make, you can begin to write your communiqué.

Writing the Communiqué

Two or three pages should be enough space to communicate your positions and recommendations regarding your water issues.

1. Begin with a short introduction to your water topic. This section may include information that you have read before coming to the Summit and information that you learned during the Summit.
2. As mentioned, each issue that you have discussed as a group can be used as main points in the body of your communiqué. Use your highest-priority issues as headings in your communiqué.

Under each heading, include a short summary of your position. Recommendations arising from this position can be listed as bullets underneath this summary.

3. Finally, state a final conclusion about the direction you think we are going in. Think about the most important points that you brought up in your communiqué or perhaps whether you think any final issues should be looked at or considered before any final decisions are made. This section doesn't need to be long and detailed – it may only be a few sentences.

Remember that...

- It is hard to envision what your communiqué will look like before you have had a chance to listen to what the keynote speakers have to say and before you have had a chance to meet with your group members.
- You don't have very long to work on your communiqué at the Youth Summit! Don't worry as much about the language that you are using or whether all of your sentences make perfect sense. You should focus more on making sure that the important ideas are written down.
- Someone will be reading over and editing your communiqué after the conference. Once your communiqué is edited, you will have the chance to make sure that the final copy is saying what you want it to say.

References

Mehta, L. *G20 Communiqué on Water: An Independent Arbitrator's Position*. Retrieved from http://www.l20.org/publications/8_04_water_mehta.pdf.

UNESCO. (1998). *Climate and Water: A 1998 Perspective*. Retrieved from http://www.unesco.org/science/wcs/meetings/eur_espoo_98.htm.

5. Canada's Freshwater Resources

Topic Overview

Did you know that Canada is one of the highest water users per capita in the world? It's no wonder that easy access to safe, clean water is considered to be an important issue. Managing Canada's water resources, which represents about seven per cent of the world's renewable freshwater, is everyone's responsibility.

Water covers nearly three-quarters of the earth's surface. There is also water in the atmosphere and underground. It is mainly in oceans but is also found as rivers, lakes, snow and glaciers. In fact, over 99% of all fresh water is found in glaciers, icefields, or underground.

This section covers the various types of water that make up the world's -- and Canada's -- supply, where it is and how much we have.

Date	Title/Website	Link
2009	Environment Canada: Introduction to Water Use	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=2AE761EC-1
2008	Ontario Ministry of Natural Resources: Water Resources in Ontario	http://www.mnr.gov.on.ca/en/Business/Water/index.html
2009	Environment Canada: Water Quick Facts	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=11A8CA33-1
2004	Muskoka Water Web	http://www.muskokawaterweb.ca/
2009	Atlas of Canada – Freshwater site	http://atlas.nrcan.gc.ca/site/english/maps/freshwater
2006	Environment Canada: Freshwater Primer	http://www.ec.gc.ca/eau-water/25F6C7A2-91FC-4B2D-ADE3-EDFFB7933F7D/e_primer.pdf
-	Conservation Ontario: Diagram of Water Cycle	http://www.ltc.on.ca/images/watercycle.jpg

Questions to Consider

- List several issues in this section
- Rank these issues in order of importance
- What are the opposing views of these issues?
- What is your opinion?

5.5 Canada's Lakes

Date	Title/Website	Link
2010	Environment Canada: Lakes	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=448F99F0-1
2008	Environment Canada: Great Lakes	http://www.on.ec.gc.ca/greatlakes/Home-WS7E5E6AF1-1_En.htm
2010	Ontario Ministry of Natural Resources Great Lakes:	http://www.mnr.gov.on.ca/en/Business/GreatLakes/index.html
2004	Muskoka Water Web	http://www.muskokawaterweb.ca/6/6.1/lakeecology.htm

5.6 Canada's Rivers

Date	Title/Website	Link
2009	Environment Canada: Rivers	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=45BBB7B8-1
2010	Environment Canada: St. Lawrence River	http://www.ec.gc.ca/stl/default.asp?Lang=En&n=F46CF5F8-1
2004	Muskoka WaterWeb	http://www.muskokawaterweb.ca/5/5.1/ws_muskoka.htm#land
2004	Credit River Management	http://www.creditvalleycons.com/makingitwork/downloads/CRWMSUbrochure.pdf
2009	Natural Resources Canada: Atlas of Canada	http://atlas.nrcan.gc.ca/site/english/learningresources/facts/rivers.html

5.7 Canada's Wetlands

Date	Title/Website	Link
2010	Environment Canada: Wetlands	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=27147C37-1
2008	Ontario Ministry of Natural Resources Wetlands	http://www.mnr.gov.on.ca/en/Business/Biodiversity/2ColumnSubPage/STEL02_167268.html
1998	Wetlands and Agriculture – Private Interests and Public Benefits	http://www.ers.usda.gov/Publications/aer765/
2002	Canada's wetlands	http://www.aquatic.uoguelph.ca/wetlands/wetlandframes.htm
2007	Ducks Unlimited Canada: Wetland Lesson Plans for Teachers	http://www.ducks.ca/resource/teachers/lesson_plans/index.html

5.8 Canada's Groundwater

Date	Title/Website	Link
2009	Environment Canada: Groundwater Contamination	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=6A7FB7B2-1
2009	Envirothon Materials	See your Envirothon Coordinator for this information
-	Canadian Groundwater Association	http://www.cgwa.org/education.htm
2009	Atlas of Canada: Groundwater	http://atlas.nrcan.gc.ca/site/english/maps/freshwater/distribution/groundwater/1
2009	Aquifer Systems in Canada	http://ess.nrcan.gc.ca/gm-ces/proj1_e.php
2007	Excel Water	http://www.excelwater.com/eng/b2c/about_10.php
2008	Ground water video	http://www.youtube.com/watch?v=lht9WBBXepA

6. Water Justice and Jurisdiction

Topic Overview

Canada is a federation. As in many areas of Canadian life, this means that different levels of government have different jurisdictional roles related to water management, while there are also many areas of shared commitment. This section covers these roles and responsibilities, as well as the governance approaches that Canada's federal, provincial and territorial governments have developed to protect and conserve our freshwater resources.

This section also considers the different interest groups, such as First Nations people, that must be a part of the discussion about water issues. Water as a human right is considered in the Canadian and global contexts. Nationally and internationally there are many agreements about trade, agriculture & industrial uses, and international diplomacy that must also be considered in our shared commitment to water justice and jurisdiction.

Questions to Consider

- a. List several issues in this section
- b. Rank these issues in order of importance
- c. What are the opposing views of these issues?
- d. What is your opinion?

6.1 Canadian Laws and Regulations Regarding Freshwater

Date	Title/Website	Link
2008	Ontario Ministry of Natural Resources: Ontario Legislation, Regulation and Provincial Policies	http://www.mnr.gov.on.ca/en/Business/Water/2ColumnSubPage/STEL02_163602.html
2010	Environment Canada: Federal Policy & Regulation	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=E05A7F81-1
2007	Canada's Water Law	http://www.ncwc.ca/pdf/waterlaw.pdf
2004	Resources for the Environment and Law Catalogue: Canada water legislation FAQ	http://www.ecolawinfo.org/WaterFAQ-CanWatLeg.aspx

6.2 Water Management Jurisdictions in Canada

Date	Title/Website	Link
2009	Environment Canada: Provincial Territorial	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=24C5BD18-1
2010	Environment Canada: Shared Responsibility	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=035F6173-1
2004	Freshwater Management in Canada: 1. Jurisdiction	http://dsp-psd.pwgsc.gc.ca/Collection-R/LoPBdP/PRB-e/PRB0448-e.pdf
1999	Canada tries to Block WTO Jurisdiction Over Water	http://www.albionmonitor.com/9911a/copyright/canadawaterban.html

6.3 Water as a Human Right

Date	Title/Website	Link
2010	The World Health Organization: Right to Water	http://www.who.int/water_sanitation_health/rightwater/en/
2010	Water Aid: The Right to Water	http://www.righttowater.info/
2009	CBC News: Water not recognized as human right	http://www.cbc.ca/world/story/2009/03/22/water-forum.html
2008	UN rejects water as basic human right	http://www.canada.com/topics/news/world/story.html?id=b65b35fd-477f-4956-98f4-c17a46fe3e26
-	Blue Planet Project: Right to Water	http://www.blueplanetproject.net/RightToWater/index.html
2005	Payments for watershed services and water as a human right: is there a conflict?	http://www.flowsonline.net/data/Flows10.pdf

6.4 Water as a Public Trust

Date	Title/Website	Link
2009	Water Sustainability Project	http://www.waterdsm.org/publication/261
2009	The Council of Canadians: Why Canada Needs a National Water Policy	http://www.canadians.org/water/issues/policy/index.html
2009	Canadian Centre for Policy Alternatives: National Water Policy	http://www.canadians.org/water/documents/AFB2009NationalWaterPolicy.pdf

6.5 First Nations' Rights

Date	Title/Website	Link
2010	Environment Canada: First nations Water Management Strategy	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=E05A7F81-1#management
2009	Environment Canada: Water and Canada's Aboriginal Peoples	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=BA5125BF-1
2008	Canadian Centre for Policy Alternatives: Safe Water for First Nations	http://www.canadians.org/water/issues/First_Nations/index.html
–	Customary water laws and practices in Canada	http://www.fao.org/legal/advserv/FAOIUCNcs/Canada.pdf
2008	Water Declaration of the First Nations in Ontario	http://chiefs-of-ontario.org/Assets/COO%20long%20form%20declaration.pdf
2009	United Nations: Traditional Water Knowledge	http://www.unutki.org/news.php?news_id=59&doc_id=6

6.6 Use in Manufacturing and Agri-business Sectors

Date	Title/Website	Link
2009	Council of Canadians: National Water Policy	http://www.canadians.org/water/issues/policy/index.html
2009	Riparian Grazing and off-stream livestock grazing	http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1233961471390&lang=eng
2007	Agriculture and Agri-Food Canada: Agriculture in a water-scarce World	http://www4.agr.gc.ca/resources/prod/doc/pol/pub/water-eau/pdf/water-eau_e.pdf
2005	Environment Canada: Industrial Water Use	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=EC333114-1
2009	Alliance for Water Efficiency: Manufacturing	http://www.allianceforwaterefficiency.org/Manufacturing_Introduction.aspx

6.7 International Diplomacy

Date	Title/Website	Link
2009	Environment Canada: International	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=B947BAA8-1
2008	Milk River Management	http://www.milkriverwatershedcouncil.ca/key_issues.html
2010	International Joint Commission	http://www.ijc.org/en/home/main_accueil.htm
2009	Lake of the Woods	http://www.ene.gov.on.ca/publications/7158e.pdf

6.7.1 International Joint Commission

Date	Title/Website	Link
2010	International Joint Commission	http://www.ijc.org/en/home/main_accueil.htm
2006	Pollution Probe: Lessons for Canada-US Regulatory Cooperation	http://www.pollutionprobe.org/Reports/greatlakesagreement.pdf
2002	Institute for Water & Watersheds	http://www.transboundarywaters.orst.edu/research/case_studies/Documents/ijc.html

6.7.2 Great Lakes Charter

Date	Title/Website	Link
2006	Environment Canada: Backgrounder on Great Lakes Charter	http://www.on.ec.gc.ca/greatlakes/default.asp?lang=En&n=BA0D657B-1
1985	Great Lakes Charter	http://www.cglg.org/projects/water/docs/GreatLakesCharter.pdf
2006	About the Charter and Charter Annex:	http://www.on.ec.gc.ca/greatlakes/default.asp?lang=En&n=BA0D657B-1
2008	Council of Canadians: Great Lakes-St. Lawrence River Basin Compact	http://www.canadians.org/water/issues/Great_Lakes/index.html
–	Canada, U.S. will renegotiate Great Lakes water treaty	http://cosmos.bcst.yahoo.com/up/player/popup/?rn=3906861&cl=13966049&ch=4226714&src=news

6.7.3 European Union Water Framework Directive

Date	Title/Website	Link
2009	About the EU Water Framework Directive	http://ec.europa.eu/environment/water/water-framework/index_en.html
2008	Summaries of EU Legislation	http://europa.eu/legislation_summaries/agriculture/environment/l28002b_en.htm
–	WFDIC	http://www.euwfd.com/html/what_is_the_information_centre.html

6.8 Water as a Commodity

Date	Title/Website	Link
2009	Environment Canada: Bulk Water Removal and Water Export	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=1356EC91-1
2009	World Water Forum: A Commodity more Precious than Oil	http://www.cbc.ca/technology/quirks-blog/2009/03/world_water_forum.html
2001	Water: Right or Commodity	http://www.mindfully.org/Water/Right-Or-Commodity.htm

6.8.1 North America Free Trade Agreement

Date	Title/Website	Link
2002	Government of Canada: Water Exports and the NAFTA	http://dsp-psd.pwgsc.gc.ca/Collection-R/LoPBdP/EB/prb995-e.htm
2001	Sierra Club of Canada: NAFTA effects on water	http://earthembassy.com/national/programs/sustainable-economy/trade-environment/nafta-great-lakes.html
2000	Control of Canada's Water Yielded to US by NAFTA	http://nesara.insights2.org/NAFTA1.html
2010	Water Chronicles	www.water.ca/nafta.asp

7. Water Knowledge

Topic Overview

An aquatic ecosystem is a group of interacting organisms dependent on one another and their water environment for nutrients (e.g., nitrogen and phosphorus) and shelter. Familiar examples are ponds, lakes and rivers, but aquatic ecosystems also include areas such as floodplains and wetlands, which are flooded with water for all or only parts of the year. Seemingly inhospitable aquatic ecosystems can sustain life. Thermal springs, for instance, support algae and some insect species at water temperatures near the boiling point; tiny worms live year-round on the Yukon ice fields; and some highly polluted waters can support large populations of bacteria.

Even a drop of water is an aquatic ecosystem, since it contains or can support living organisms. In fact, ecologists often study drops of water -- taken from lakes and rivers -- in the lab to understand how these larger aquatic ecosystems work.

This section explores the science of limnology, water as habitat, and aquatic ecology as ways of coming to a more comprehensive understanding of water and its' systems, communities, and characteristics. Traditional water knowledge and the stories of First Nations' people help us to have a holistic view of water knowledge. Finally, water quality and quantity monitoring is explored as a way of understanding water's features through the scientific methods and data.

Questions to Consider

- a. List several issues in this section
- b. Rank these issues in order of importance
- c. What are the opposing views of these issues?
- d. What is your opinion?

7.1 The Science of Limnology

Date	Title/Website	Link
2003	ASLO: Advancing the Science of Limnology and Oceanography	http://www.aslo.org/limnology.html
-	Limnology's Second Century: New Challenges and Opportunities	http://www.ucowr.siu.edu/updates/pdf/V98_F1.pdf
2004	Muskoka Water Web	http://www.muskokawaterweb.ca/6/6.1/lakeecology.htm

7.2 Water as Habitat: Aquatic Ecology

Date	Title/Website	Link
2009	Environment Canada: Aquatic Ecology	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=6CA710A4-1
2009	Water Treatment Solutions	http://www.lenntech.com/water-ecology-faq.htm
2007	Earth Trends: Farming Fish	http://earthtrends.wri.org/features/view_feature.php?theme=2&fid=20
2000	Earth Trends: Freshwater Biodiversity in Crisis	http://earthtrends.wri.org/features/view_feature.php?theme=2&fid=9
2003	Giving Nature its Share	http://earthtrends.wri.org/features/view_feature.php?theme=2&fid=38
2000	Ecological Society of America	http://www.esa.org/education_diversity/pdfDocs/ecosystemservices.pdf

7.3 Traditional Water Knowledge

Date	Title/Website	Link
2010	Environment Canada: First nations Water Management Strategy	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=E05A7F81-1#management
2009	Environment Canada: Water and Canada's Aboriginal Peoples	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=BA5125BF-1
2008	Canadian Centre for Policy Alternatives: Safe Water for First Nations	http://www.canadians.org/water/issues/First_Nations/index.html
-	Customary water laws and practices in Canada	http://www.fao.org/legal/advserv/FAOIUCNcs/Canada.pdf
2008	Water Declaration of the First Nations in Ontario	http://chiefs-of-ontario.org/Assets/COO%20long%20form%20declaration.pdf
2009	United Nations: Traditional Water Knowledge	http://www.unutki.org/news.php?news_id=59&doc_id=6

7.4 Water Quality and Quantity Monitoring

Date	Title/Website	Link
2008	Ontario Ministry of Natural Resources: Water Levels and Flows	http://www.mnr.gov.on.ca/en/Business/Water/2ColumnSubPage/STEL02_163598.html
2009	Ontario Ministry of Natural Resources Water Monitoring, Science & Information	http://www.mnr.gov.on.ca/en/Business/Water/2ColumnSubPage/STEL02_163613.html
2010	Environment Canada: Water Quality	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=F2F43FC7-1
2009	Environment Canada: Water Quantity	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=2DE7B40F-1
2004	Muskoka Water Web	www.muskokawaterweb.ca
2003	Conservation Ontario Position Paper on Water Quality Monitoring	http://www.conservation-ontario.on.ca/projects/pdf/CO_Water_Quality.pdf
2009	Ontario Ministry of the Environment- Water Quality in Ontario Report Part I: Section 2.0 Water Quality Monitoring	http://www.ene.gov.on.ca/publications/6926e.pdf

8. Water Management Issues Part 1

Topic Overview

Topics relating to the human management of fresh water are featured in this section. Why do we need to manage our water resources? The simple answer is that we manage the resource because various users are competing for the available supply of fresh water to satisfy basic needs, to enable economic development, to sustain the natural environment and to support recreational activities. It is necessary to reconcile these needs and promote the use of fresh water in a way that recognizes its social, economic, and environmental benefits.

This section examines water management for drinking water quality by way of ground and surface water sources, protecting source water to ensure water is usable and the standard and regulations that dictate how we go about these activities.

This section also investigates the sources and effects of several different types of water pollutants and how these affect the ways in which we manage water.

Date	Title/Website	Link
2010	World Bank: Water Management	http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTWAT/0,,contentMDK:21630583~menuPK:4602445~pagePK:148956~piPK:216618~theSitePK:4602123,00.html
-	Simon Fraser University: Toward a National Strategy	http://www.sfu.ca/cstudies/science/resources/water/pdf/Appendix_3.pdf
2009	Environment Canada: Water Management	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=DF9EE875-1
2009	Environment Canada: Clean Water- Life depends on it!	http://www.ec.gc.ca/eau-water/default.asp?lang=en&n=06F1403C-1
-	Diagram: sources of contamination	http://www.specialdistricts.org/2/update/water/services/ccr/waterquality.gif
-	Diagram: Modern strains on an ancient system	http://home.comcast.net/~fssr/images/Drinking_water_sources.gif

Questions to Consider

- List several issues in this section
- Rank these issues in order of importance
- What are the opposing views of these issues?
- What is your opinion?

8.1 Drinking Water Quality

Date	Title/Website	Link
2009	Environment Canada Introduction to Water Quality	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=2C3144F5-1
2009	Environment Canada: Drinking Water	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=AAD01CB4-1
2010	District of Muskoka	http://www.muskoka.on.ca/siteengine/activepage.asp?PageID=317
2010	Ministry of the Environment	http://www.ontario.ca/ONT/portal61/drinkingwater!/ut/p/c5/04_SB8K8xLLM9MSSzPy8xBz9CP0os3hvi2A3F0dzE0N3b3dXA09vX0dT9yA_Q_9AU_1wkA48Kkwg8gY4gKOBvp9Hfm6qkfF2dpqjo6liAMMr8bw!/dl3/d3/L2dJQSEvUUt3QS9ZQnZ3LzZfSzhTRkRBNzQxR0tHRTBJS01BNUdSTjFPNjY!/?lang=en
2009	Health Canada: Drinking Water	http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/index-eng.php

8.1.1 Ground-and-Surface-Water Sources

Date	Title/Website	Link
2010	Ministry of the Environment - Wells	http://www.ontario.ca/ONT/portal61/drinkingwater/Combo?dclid=STEL01_049359&breadcrumbLevel=1&lang=en&comboTarget=
2010	Ministry of the Environment- Groundwater	http://www.ontario.ca/ONT/portal61/drinkingwater/General?dclid=STEL01_049372&breadcrumbLevel=1&lang=en
2010	Well Aware	http://www.wellaware.ca/default/index.php?section=BeWellAware&page=GroundWater&vrs=
2009	Simcoe Muskoka Health Unit	http://www.simcoemuskokahealth.org/Topics/SafeWater.aspx

8.1.2 Source Water Protection

Date	Title/Website	Link
2009	Environment Canada: Integrated Water management	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=13D23813-1
2010	South Georgian Bay-Lake Simcoe Source Water Protection	http://www.ourwatershed.ca/
-	The Source Water Protection Primer	http://www.pollutionprobe.org/Reports/swpprimer.pdf

8.1.3 Standards and Regulations

Date	Title/Website	Link
2009	Clean Water Act	http://www.ene.gov.on.ca/en/water/cleanwater/index.php
2004	Technical Brief – Ontario Wastewater Systems	http://www.ene.gov.on.ca/programs/4429e.pdf
2009	Ministry of the Environment – Drinking Water site	http://www.ontario.ca/ONT/portal61/drinkingwater/!ut/p/c5/04_SB8K8xLLM9MSSzPy8xBz9CP0os3hvi2A3F0dzE0N3b3dXA09vX0dT9yA_Q_9AU_1wkA48Kkwwg8gY4gKOBvp9Hfm6qkfF2dpqjo6liAMMr8bw!/dl3/d3/L2dJQSEvUUt3QS9ZQnZ3LzZfSzhTRkRBNzQxR0tHRTBJS01BNUdSTjFPNjY!/?lang=en

8.2 Water Pollution: Sources and Effects

Date	Title/Website	Link
2009	Environment Canada: Water Pollution Control	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=083B1647-1
2006	Water Pollution	http://www.mbgnet.net/fresh/pollute.htm
2009	Water Pollution FAQ	http://www.lenntech.com/water-pollutants-faq.htm
2007	Earth Trends: Dirty Water	http://earthtrends.wri.org/features/view_feature.php?theme=2&fid=16

8.2.1 Toxic Contaminants

Date	Title/Website	Link
2009	Environment Canada: Wastewater	http://www.ec.gc.ca/eu-ww/default.asp?lang=En&n=BC799641-1
2009	Great Lakes Water Quality Agreement	http://meeting.ijc.org/
2010	Canadian Council of Environment Ministers	http://www.ccme.ca/publications/
2009	Environment Canada: The Pollution Problem	http://www.ec.gc.ca/eau-water/default.asp?lang=en&n=06F1403C-1#pollution

8.2.2 Acid Rain

Date	Title/Website	Link
2006	CBC- acid rain video	http://archives.cbc.ca/environment/pollution/topics/584/
2009	Environment Canada: Acid Rain	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=FD30C16-1
2009	Environment Canada: Acid Rain and the Facts: The Green Lane	http://www.ec.gc.ca/AcidRain/acidfact.html
2009	Ontario Ministry of the Environment- Water Quality in Ontario Report Section 4.0: Acid Rain	http://www.ene.gov.on.ca/publications/6926e.pdf
2007	US Environmental Protection Agency: What is Acid Rain?	http://www.epa.gov/acidrain/what/index.html

8.2.3 Macro-nutrients (Phosphorus, Nitrogen, Carbon)

Date	Title/Website	Link
2007	Earth Trends: Nutrient Overload	http://earthtrends.wri.org/features/view_feature.php?theme=2&fid=1
2009	Ontario Ministry of the Environment- Water Quality in Ontario Report Section 3.0: Phosphorus Management	http://www.ene.gov.on.ca/publications/6926e.pdf
2008	The Globe and Mail: Phenomenon of Calcium Decline	http://www.theglobeandmail.com/news/technology/science/article725310.ece
2009	Water Pollution FAQ	http://www.lenntech.com/water-pollution-faq.htm
2009	US Environmental Protection Agency: Nitrogen and Phosphorus pollution	http://www.epa.gov/waterscience/criteria/nutrient/basic.htm

8.2.4 Sediment

Date	Title/Website	Link
2009	Environment Canada: Erosion and Sedimentation	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=32121A74-1
2009	Environment Canada: Water the Transporter	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=ADB791B6-1
-	US Environmental Protection Agency: What is Sediment Pollution?	http://www.epa.gov/nps/toolbox/other/KSMO_Sediment.pdf
2006	Sediment Pollution	http://www3.abe.iastate.edu/tsm424/TSM424TermProj2006/HanglebenSuhFinalPaper.pdf

9. Water Management Issues Part 2

Topic Overview

Overall, Canada is blessed with freshwater resources. But their availability varies considerably from season to season and year to year, and from one region to another. This section will explore the positive and negative consequences of two energy production issues that have an effect on water: hydro-electric power generation and fossil fuel extraction.

Increasingly, climate also dictates where and when water is available- for human use and management but also for the inherent services it provides for other beings and the natural world as an interconnected system. Climate seems to be changing beyond previously monitored natural variability, and this is likely to impact on the availability and distribution of water.

At the same time, other stresses on water are increasing. The amount of fresh water is limited, and the easily accessible sources have been developed. Not only do more people than ever before have to share this resource, but the world population is expected to double by 2050, if it continues to grow at the present rate. A larger population will not only use more water but will discharge more wastewater. Water quality programs are not fully developed even in the industrialized countries and are nonexistent in most developing countries, where they are most needed. Furthermore, the costs for managing water supplies are increasing, as are the demands on limited financial resources.

We may now have to consider the effects on water of not only the natural variability of climate and more population pressure but also what appears to be a change in climate that is brought about by human activity. All of these factors are already resulting in situations of water scarcity and conflict of water resources. This section aims to develop an understanding of these issues and how they are connected.

Questions to Consider

- a. List several issues in this section
- b. Rank these issues in order of importance
- c. What are the opposing views of these issues?
- d. What is your opinion?

9.1 Energy Production: Hydro Electric Power

Date	Title/Website	Link
2009	Ontario Ministry of Natural Resources Water Power	http://www.mnr.gov.on.ca/en/Business/Renewable/2ColumnSubPage/STEL02_167251.html
2009	Environment Canada: Dams and Diversions	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=9D404A01-1
2009	Pros & Cons of Hydro Power	http://www.bionomicfuel.com/pros-and-cons-of-hydropower/
2009	Ontario Power Generation	http://www.opg.com/power/hydro/
-	Alternative Energy	http://www.altenergy.org/renewables/hydroelectric.html

9.2 Energy Production: Fossil Fuel Extraction (E.g. Tar Sands)

Date	Title/Website	Link
2009	Greenpeace Canada: Tar Sands and Water Pollution	http://www.greenpeace.org/canada/en/campaigns/tarsands/threats/water-pollution
2007	Edmonton Journal: "Halt oilsands: water expert (David Schindler)"	http://www.canada.com/edmontonjournal/news/story.html?id=733f4e03-543d-43be-a3a2-deceb621d4fe
2006	CBC News: Oil sands activity threatens water supply in Sask., NWT: study	http://www.cbc.ca/canada/edmonton/story/2006/11/13/oilsands-water.html
2009	Canada's Oil Sands	http://www.canadasoilsands.ca/en/index.aspx

9.3 Water & Climate Change

Date	Title/Website	Link
2009	Environment Canada: Water and Climate Change	http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=3E75BC40-1
2006	Freshwater Biodiversity threatened by climate change	http://ec.europa.eu/environment/integration/research/newsalert/pdf/7na4.pdf
2009	Climate Change (Water stress) video	http://www.youtube.com/watch?v=UwSrOBecDMw
2010	Ducks Unlimited: Wetlands and climate change	http://www.ducks.ca/conserve/research/projects/climate/index.html
2009	Ontario Ministry of the Environment- Water Quality in Ontario Report Part 6: Climate Change	http://www.ene.gov.on.ca/publications/6926e.pdf

9.4 Water Scarcity and Conflict

Date	Title/Website	Link
2000	Earth Trends: Will there be enough water?	http://earthtrends.wri.org/features/view_feature.php?theme=2&fid=17
2008	World Without Water: video	http://video.google.com/videoplay?docid=3930199780455728313#
2009	Map: Freshwater Resources per capita of the World	http://www.mapsofworld.com/images/world-fresh-water-resources-map.jpg
2008	United nation Environment Programme	http://maps.grida.no/go/graphic/freshwater_resources

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Thank you -the students- for participating in the 2010 Freshwater Youth Summit!