



# Where has all the water gone?

Finding solutions to water management in the context of climate change

PILOT

## In a Nutshell

In this lesson, students simulate a water management meeting based on one that actually occurred in the Okanagan. They assume the roles of real stakeholders, and assess the actual water management options reviewed by the community. The role play highlights the environmental, social and economic challenges associated with climate change and freshwater management and encourages students to analyse factors that make proposed resource management solutions challenging to implement.

## Goal

Create a forward-looking water management strategy for a community that will experience reduced fresh water availability as a result of climate change.

## Lesson Objectives

Students will:

- Evaluate possible impacts of climate change on natural systems.
- Analyse factors that make proposed resource management solutions challenging to implement.
- Assess environmental challenges including global warming and fresh water supply.
- Apply the themes of place, human and physical interactions to the subject of climate change and freshwater supply.
- Evaluate how climate affects human activity and human activity affects climate.

## Time

Three 60 minute class periods

## Subject Area/Grade Level

Science 10, Social Studies 11, Science and Technology 11, Civic Studies 11, Geography 12

## Materials

Overhead Projector

## Complementary lessons in this resource

Lesson 1: Impacts of Climate Change on Biotic and Abiotic Factors in a Semi-Arid Ecosystem in B.C., should ideally be done with students prior to this lesson.

## Teacher's Notes:

One consequence of climate change in many regions of British Columbia and the world will be reduced fresh water availability. In this lesson, students assume the roles of various local stakeholders to create a water management strategy for the Okanagan. There are seven roles provided in the lesson. To reduce time, select only the roles of most interest to your class and ask students to read the backgrounder about their role and the water management options as homework.

To add some fun to this activity, ask your students to dress up for their role. You could even consider holding the activity in a town hall or a special meeting room. The way that students dress can open up an interesting discussion around how we stereotype particular groups, and how this can limit or influence negotiations.

As an alternate introduction to the lesson use the Okanagan Basin Waterscape Poster: [http://geoscape.nrcan.gc.ca/h2o/okanagan/poster\\_e.php](http://geoscape.nrcan.gc.ca/h2o/okanagan/poster_e.php)

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## Procedure

### 1 Introduce concepts and activity (Class 1)

- Ask students if they have been to the Okanagan. Can they describe the region?
- Use the map from *Lesson 1: Impacts of Climate Change on Abiotic and Biotic Factors in a Semi-Arid Ecosystem in B.C.* to show students where the Okanagan is located.
- Use *Teacher Resource 4: Climate Change in the Okanagan* to briefly explain anticipated changes to water supply in the Okanagan due to climate change.
- Tell students that they are going to participate in a role play water management meeting in the Okanagan where they must decide what water management options to implement now to avoid potential water shortages in the future.

### 2 Prepare for role play (1st class)

- Divide students into groups. There should be one group assigned to each role.
- Provide each group with the background that describes their role.
- Assign groups a specific amount of time to prepare for the role play, by working through exercises 1, 2 and 3 on *Student Handout 1: Group Tasks*.
- Tell students that you will play the role of chairperson in the water management meeting.

### 3 Start role-play (2nd class)

- Begin the role play by explaining that from this point forward what students say and all decisions that they make on management strategies should be done from the perspective of their assigned role, unless you tell them otherwise.
- Ask a reporter from each group to state to the rest of the class:

- the stakeholder their group represents
- why water is important to them
- how they could be affected by climate change and water shortages
- what their “bottom line” is – or their most important need coming out of the negotiations.

### 4 Present water management options

- Hand out *Student Handout 2: Water Management Options* and place a copy on the overhead. Ask students to read through the hand-out.
- Tell stakeholders to develop a proposal for a water management strategy by selecting and ranking their top three water management options, based on which options most effectively meet their needs while addressing the “bottom-line” of the other stakeholders. (Question 3 on *Student Handout 1: Group Tasks*).
- Ask Negotiator 1 from each stakeholder group to present their groups proposal to the rest of the class.
- Ask stakeholders to consider what options they would be willing to adopt that are not within their top three, and which options they would refuse to consider.
- Use an overhead version of *Teacher Resource 2: Water Management Priorities* to record stakeholder priorities. Alternatively, put up the choices on the board or a flip chart and ask groups to put a star or a number beside their top three choices.

### 5 Analyze the options

- Ask stakeholders to analyze the proposals put forward by each of the groups and consider the similarities and differences.
- Identify the water management options that received the most votes and note them on the board or a piece of flipchart paper, from most to least votes.

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- Ask stakeholders if they would be satisfied with a plan that incorporated only the three strategies that received the most votes.
- If stakeholders are not satisfied with this option, ask them to suggest how the proposal could be modified to include their concerns. Continue this discussion until you run out of time or agree upon a proposal that is satisfactory to all.

## 6 Prepare for action and debrief the role play (3rd class)

- As a class, outside of the role, ask students to consider the steps that would need to be taken to implement the proposal that they developed.
- Ask students to consider the following questions:
  - How did playing another role change how you felt about this issue?
  - How will the role play change the way you approach this issue?
- Discuss the questions in *Teacher Resource 1: Role Play Debriefing*.

## Assessment

- Use the *Teacher Resource 3: Role Play Rubric* to evaluate the role play.
- Use the questions on *Teacher Resource 1: Role Play Debriefing Questions* to assess knowledge attainment related to:
  - Knowledge of fresh water management options
  - Challenges of implementing resource management options
- Ask students to hand in their responses to *Student Handouts 11 & 12: Self Assessment and Group Assessment* to evaluate their group's participation.

## Extensions

- Contact your local/regional water utility to find out where your water comes from. Are there any changes in supply from one season or one year to another? What kind of storage system is used for the water? Is water supply currently an issue in the community? What water conservation programs are in place?
- Invite a water manager from your community to talk to your class about water management. Is your community thinking about climate change impacts?
- Okanagan Basin Waterscape Poster: [http://geoscape.nrcan.gc.ca/h2o/okanagan/poster\\_e.php](http://geoscape.nrcan.gc.ca/h2o/okanagan/poster_e.php). Use this poster to continue to explore water management issues in the Okanagan with students or as an alternate introduction to this lesson.
- Begin a school wide campaign to reduce water use. See Destination Conservation [www.dcplanet.org](http://www.dcplanet.org) and Pembina Institutes Greenlearning Online. [www.greenlearning.ca](http://www.greenlearning.ca)

## Additional Resources

Water Bucket: [www.waterbucket.ca](http://www.waterbucket.ca) provides timely information about sustainable water management in B.C.

## Handouts

### Student Handouts

- 1 Group Tasks
- 2 Water Management Options
- 3 Environmental NGO Role
- 4 Fisheries Role
- 5 First Nations Role
- 6 Municipal Government Role
- 7 Tourist Operator Role
- 8 Farmers' Role
- 9 Water Utility Role
- 10 Group Assessment
- 11 Self-Assessment

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## Teacher Resources

- 1 Role Play Debriefing
- 2 Water Management Priorities
- 3 Role Play Rubric
- 4 Climate Change in the Okanagan