

THE NORTHERN ABALONE – SPECIES AT RISK

**Prescribed Learning Outcomes and Curriculum Organizers
(using Fisheries and Oceans recommended activities or learning resources)****SCIENCE 8****Applications of Science**

- critique information presented in a variety of media
- use graphs and simple statistics to analyse data
- identify variables responsible for changes in systems

Life Science (Global Ecosystems)

- evaluate how major natural events and human activity can affect local and global environments and climate change

MATH 8**Problem Solving**

- solve problems that involve mathematics within other disciplines

Statistics and Probability (Data Analysis)

- formulate questions for investigation, using existing data
- display data by hand or by computer in a variety of ways

SOCIAL STUDIES 8**Applications of Social Studies**

- identify and clarify a problem, an issue, or an inquiry
 - gather and organize a body of information from primary and secondary print and non-print sources, including electronic sources
 - interpret and evaluate a variety of primary and secondary sources
 - assess a variety of positions on controversial issues
 - plan, revise, and deliver written and oral presentations
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Overview of Activity***The Northern Abalone – Species at Risk***

In the first lesson students learn about the Northern Abalone. The Northern Abalone is the first marine invertebrate to be designated at risk by COSEWIC (Committee on the Status of Endangered Wildlife in Canada). The Northern Abalone is found further north than any other abalone – living throughout the north-eastern Pacific Ocean, from California all the way up to Alaska. It is the smallest abalone on the Pacific Coast, measuring no longer than 16.5 cm. It is the only abalone commonly found in British Columbia, including the waters of the proposed national marine conservation area adjacent to Gwaii Haana National Park Reserve and Haida

Heritage Site in the Queen Charlottes. Adult abalone are typically found within 10 metres of the water surface. This is where the abalone feed on algae: particularly kelp, their favourite food.

Duration: Two lessons, 45 minutes each, one for preparation and one for student presentation

Materials & Resources to access:

Access to computer lab with internet; library books on marine invertebrates; contact with conservation groups

Evaluation:

Students are able to communicate the threats to the Northern Abalone in presentation format, both verbally and in written format.

Students gather a body of information from text and online about abalone and the issues regarding the harvesting/poaching of abalone.

Natural Area Required: Ocean Stream Estuary Not Required

Recommended Learning Resources

Harbo, R.M. "Whelks to Whales." Coastal Marine Life of the Pacific Northwest. Harbour Publishing, 1999.

Sheldon, I. "Seashore of British Columbia." Lone Pine Field Guide, 1998.

Northern Abalone Worksheet for Students

http://www.racerocks.com/racerock/jason/abal_seastar/na_wksheet.html

Poached Marshmallows Game (see below) courtesy of the Bamfield Community Abalone Project.

Abalone Predator-Prey Game

http://www.racerocks.com/racerock/jason/abal_seastar/game_ss_abal.html

Alternate Learning Outcomes for Grades 4 and 8

http://www.racerocks.com/racerock/jason/abal_seastar/learning_oc.html

Related web links for the Northern Abalone

Video on Abalone

<http://www.racerocks.com/racerock/eco/taxalab/sallav.htm>

<http://www.racerocks.com/racerock/research/abalone/abalonemeas.htm>

What is an abalone?

<http://www.marinematters.org/programs/AbaloneStatusFactsheet.pdf>

http://www.racerocks.com/racerock/jason/abal_seastar/index.html

Northern Abalone Worksheet for Students

http://www.racerocks.com/racerock/jason/abal_seastar/na_wksheet.html

Sea Food Watch Program

http://www.mbayaq.org/cr/cr_seafoodwatch/sfw_factsheet.asp?fid=68

Observe Record, Report for Fisheries & Oceans Canada

http://www.pac.dfo-mpo.gc.ca/comm/pages/release/p-releas/2006/nr004_e.htm

<http://oceanlink.island.net/abaloneproject/protection/protection.htm>

http://www-heb.pac.dfo-mpo.gc.ca/habitat_policy/report_e.htm

http://www-comm.pac.dfo-mpo.gc.ca/pages/NPubCatalogue/details_e.asp?paramKey=272

Abalone Recovery Strategy

http://www.pac.dfo-mpo.gc.ca/comm/pages/consultations/fisheriesmgmt/abalone/default_e.htm

Abalone Information

<http://oceanlink.island.net/abaloneproject/>

Stories about Haida Gwaii

<http://www.spruceroots.org/Feb.2001/abalone%201.html>

COSEWIC Species database

http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm

Educational resources

<http://www.oceanlink.island.net/oinfo/Abalone/abalone.html>

<http://www.marinematters.org/programs/abalone.html#3>

THE NORTHERN ABALONE – SPECIES AT RISK

Activity Description

Presentation:

Students evaluate the various materials they have gathered on Northern Abalone life cycle, threats, and cultural significance to the First Nations. Students assess a variety of positions on the exploitation and poaching of abalone, present their information to the class and create a poster session to post in the school explaining steps that can be taken to protect the Northern Abalone.

THE NORTHERN ABALONE – SPECIES AT RISK

Background - Facts on the Northern Abalone

The Northern Abalone's colourful mottled shell inspired its other name; Pinto Abalone, commonly used in the United States.

But in the 1960s, scuba diving equipment started to be used for harvesting abalone commercially as a gourmet delicacy. This meant abalone could be collected in great numbers, and from considerable depths, throughout the full range of their habitat.

Adult abalone, which group together to spawn, were easy targets. The numbers of breeding abalone declined considerably as a result and not as many offspring were produced. Overall populations began to plunge.

Northern Abalone are slow to grow and reproduce. In fact, less than one percent of abalone offspring survive the many perils they face as they grow into breeding adults. This makes the abalone particularly vulnerable to over-harvesting.

Despite a total harvesting ban in 1990, Northern Abalone populations are still not recovering. One of the reasons behind this lack of success is poaching, motivated by high demand and elevated prices owing to abalone scarcity, as well as the difficulty of patrolling a vast coastline.

Other factors contributing to the Northern Abalone's inability to recover may include pollution, predation, environmental changes, and their slow pace of reproduction.

THE NORTHERN ABALONE – SPECIES AT RISK

Evaluation

In the presentation the students must be able to describe:

- information on the life cycle of the Northern Abalone
- issues of exploitation and poaching
- cultural significance
- impact on recovery of reproductive ability
- enforcement aspect with a study of recent cases of poaching
- details on Species at Risk and the work on COSEWIC

THE NORTHERN ABALONE – SPECIES AT RISK

"Poached Marshmallows" - A Game Approach to Northern Abalone, a B.C. Goldrush Fishery

History

For the past several thousand years, abalone was harvested for food and for their beautiful pearly shells. Abalone was fished traditionally, by hand at extremely low tides and by skin diving. This harvesting method had a negligible impact on the abalone population and deeper water provided a "protected area".

In the 1950's, with the advent of SCUBA diving, divers began to harvest and sell abalone, having a slightly larger impact on the population. Abalone was sold mostly to fish stores and restaurants. The price for abalone in 1954 was \$0.15/kg.

By the 1970's, the amount of abalone being harvested rose dramatically due to limiting access to salmon and herring roe fisheries and the technological advances in diving and on-board freezers. The market for Northern Abalone grew in Japan, increasing the price of abalone from \$0.92/kg in 1970 to \$5.71/kg in 1979. The gold rush had started and abalone populations started to decline.

During the 1980's prices continued to rise and abalone continued to decline in spite of trying to close certain areas (area closures), setting a minimum size and bringing in quota system which restricted the numbers each abalone fishing license could take.

Rising prices and limited access drove abalone into the illegal world of the black market where poachers, greedy for money ignored laws intended to protect abalone. In 1990 abalone was closed to fishing coast-wide. Because of poaching, numbers continued to decline. In April 1999, Northern Abalone was listed by the Canadian government as a "threatened" species heading down the slippery slope towards extinction. Currently black-market prices for abalone range from \$55/kg to \$110/kg.

Vocabulary

Abalone- a marine snail with an ear-shaped, spiral shell, shell shiny and pearly inside, lives on rocky shores at the lowest tides and deeper, large foot used for meat.

Black market- illegal selling and buying

Department of Fisheries and Oceans - the Canadian government's federal department in charge of fisheries and oceans (Laws include Fisheries Act and Oceans Act)

Endangered - a species heading towards extinction

Extinct- a species or population no longer living

Fishery Officer- a fish police officer, enforces the Fisheries Act

Northern Abalone - the species of abalone living in coastal British Columbia, scientific name is *Haliotis kamtschatkana*.

Poaching- the illegal (against the law) harvesting of something such as abalone

Quota- the limit or maximum number of abalone you can harvest

Recovery strategy- a management plan for any species which is listed as threatened, an attempt to help a species get off the list of species in trouble

Recruitment- the number of young animals coming into a population from reproduction

Stock - what fisheries call a population, a population or stock is defined as living in a certain area or being related genetically

Threatened- a species or population heading towards endangered status

The Game

Objective: To explore the history of the abalone fishery in B.C. using marshmallows as abalone and chocolate chips as money.

Time needed: approximately 50 minutes

Materials: It is helpful to have 4 adult volunteers or older students to play the roles of fishery officers, black market buyers, etc.

For each 4 students you need the following:

- 1 tray (like a cafeteria tray or kitchen tray)
- 1 quadrant (~25cm X 25cm square with a grid of strings on it)
- 4 spoons
- 4 forks
- 4 toothpicks
- 100 mini marshmallows (mm)
- ~100 chocolate chips (choc)
- "Poaching tickets" (use stickers, poker chips, paper or surveyor's tape or anything to identify poachers)
- Containers to hold the marshmallows and chocolate chips (bowls)
- Data table below on board or large piece of paper

	1972	1979	1986	1990
Quota	None	12	3	0
Price	1 choc/4 mm	1 choc/1mm	3 choc/1mm	5 choc/1mm
Season length	1 minute	45 sec	30 sec	none
Harvesting method	Toothpick	Fork	Spoon	None (poaching)
Fines	none	3 choc/ticket	3 choc/ticket	5 choc/ticket

Playing the game

Set up harvesting sites. Each harvesting site requires 1 kitchen tray with a quadrant on it and 100 marshmallows under the quadrant. The tray should have 4 forks, 4 spoons, 4 toothpicks, 4 bowls or containers.

Before letting the students go to their trays (4 per tray), explain a brief history of abalone harvesting, **up until 1970**.

Rules: Each student is a harvester. Harvesting methods, prices and quotas change with the year.

	1972	1979	1986	1990
Quota	None	12	3	0
Price	1 choc/4 mm	1 choc/1mm	3 choc/1mm	5 choc/1mm
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1st Round, 1972- there is no quota for abalone harvesters. They can harvest for as long as the weather permits (say, 1 minute). Watch to see how many they are catching- it's best if they are able to catch at least half of the abalone (=marshmallows). The preferred harvesting tool is the toothpick (the most efficient tool). The price, 1 chocolate chip / 4 marshmallows (mm) (each mm is equivalent to 1 tonne of abalone).

After each round get the students to count their mms and pay them with choc chips. Tell the students to keep the choc chips until the end of the game. Collect the mms as you pay for them. Discuss the amount of abalone left, and then give each group some mms back to mimic abalone reproduction in the wild. Groups who have more mms left in their quadrant should have higher reproductive ability.

2nd Round, 1979- DFO (Department of Fisheries and Oceans) is a little concerned with abalone stocks and has set a quota on the harvest. Quota =12 abs. (=mm) They also set a limit on season length (in real life- 7.5 months). (Say....45 seconds). The fishery is also regulated with a licensing system, represented in the game by new fishing technique- forks. The new price is 1 choc chip/1mm. Since the fishery is being regulated by Fishery Officers (FO's) now, this means that there are fisheries officers monitoring the boats, looking for poachers. In the game FO's can slap a ticket on the fisher if they are caught with more than their quota or if they are caught fishing with toothpicks. If a FO catches a student with more than the quota they can confiscate anything over 12 mms.

If you have enough adults or senior student helpers, you can also have a black market buyer(s) who only buys from poachers during the round. Black market price will be the same or a little lower than the going rate, enabling the students to off-load some of their abalone so they don't get caught with more than 12 abalone.

At the end of the round, get the students to count their mms. The FO's become buyers and also collect fines. Fines are 3 choc chips /ticket. Remember to add back some abalone for reproduction.

3rd Round, 1986- Abalone stocks (populations) are dropping. DFO decreases the quota to 3 tonnes of abalone (or 3 mms), the price increases to 3 choc/mm, the fishing season decreases (say...30 seconds) and, in the real world, the number of licenses decrease, which we represent in the game by using spoons to catch abalone.

Of course, it is much easier to catch abalone using a toothpick or a fork, so FO's must be on the lookout for poachers, who presumably are running rampant since the price of abalone has increased so much.

When this round is over, pay the students for their mms (remember, 3choc/mm) and redistribute marshmallows- some groups may have lots of mms left, they should have higher reproductive rates than those who have harvested almost all of their mms. It's up to you to determine if you want to give more mms to the groups who have been continually over-harvesting in the interest of keeping the game fun, or sticking to the laws of nature and giving the low populations extremely low, new recruitment.

4th Round, 1990- Stocks are so low now that DFO has banned all harvesting of abalone. This means that any abalone harvested, are illegally poached. Quota = 0mm The price of abalone (all black market now) has risen accordingly Price = 5choc/mm. There is no official abalone season so harvesters go out whenever the weather permits. Once again, the FO's are out and rather busy ticketing if they can find anyone harvesting. The risks are high but the remuneration is too. If a harvester can sell his/her abalone before the round is up and before the FO catches him, it's an easy profit.

At the end of the round, get kids to count up their abalone and trade them in for choc (5choc/mm) and pay off their tickets/fines.

Summing it up

Students should get a chance to see how many chocolate chips the others have received and how many abalone are left in each ecosystem. Hopefully, it is evident that the low abalone populations that are left behind are a result of a situation of high prices, greed, poaching and limited policing.

Follow-up

The "tragedy of the commons" can be discussed and possible solutions for improved stewardship explored. The federal strategy for the recovery of the Northern Abalone and the objectives of the five pilot projects on the coast of B.C. can be evaluated.

Resources

www.oceanlink.island.net

Bamfield Community Abalone Project

c/o Anne Stewart, Public Education Program Coordinator,
Bamfield Marine Station, Bamfield, B.C. V0R 1B0 fax: 250-728-3452

Powell River Pilot Abalone Project

Kitkatla Pilot Abalone Project

Haida Gwaii Pilot Abalone Project

Fisheries and Oceans Canada