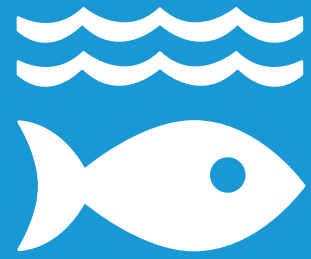


14 LIFE BELOW WATER



CONSERVE AND SUSTAINABLY USE OUR OCEANS, SEAS AND MARINE RESOURCES

Oceans, coastal zones and marine resources are essential to human well-being, as well as social and economic prosperity worldwide. Beyond humankind, oceans support over 200,000 identified species and countless other species that have yet to be discovered. Keeping our oceans clean and healthy is in our best interests because they help protect our drinking water, weather, climate, food and oxygen. Managing the impact of trade and transportation means increasing international cooperation to protect vulnerable habitats, invest in sustainable industry practices, and address wasteful habits.

TARGETS

- Reduce marine pollution by 2025 by reducing sources of pollution from human sources on land.
- Enact laws that protect our oceans from destructive fishing practices such as illegal fishing and overfishing.
- Minimize the impacts of ocean acidification through enhanced scientific cooperation and action at all levels.

“We know that when we protect our oceans we’re protecting our future.”

Bill Clinton
Former US President



LEARNING OBJECTIVES

- 1** Learners will understand the basics of our marine ecosystem, threats to its well-being and our connection to the sea and the life it holds.
- 2** Learners will understand the role of climate change on our oceans, and the role oceans play in moderating the effects of climate change.
- 3** Learners will be able to identify the need for sustainable fishing practices and the impact humankind is having on the health of our oceans.
- 4** Learners will be able to research their country's relationship to the sea and debate improvements to sustainable methods of collecting natural resources.
- 5** Learners will be able to identify and advocate for improved access to sustainably harvested marine life, marine conservation and the development of scientific marine research.

CURRICULUM CONNECTIONS

Media

What are some important considerations for reporting on stories of marine sustainability?

Environment

How does marine conservation differ from other environmental issues?

Poverty, wealth and power

How are different populations affected when environmental protection is not a priority?

Indigenous Peoples

How are Indigenous communities protecting and advocating for our ocean environments? How are they uniquely affected by its degradation?

Oppression and genocide

What happens to environmental protection during times of genocide and conflict?

Health and biotechnology

How does the health of our ocean environments affect the health of all global citizens?

Gender politics

How is the health of our oceans related to gender issues?

Social justice and human rights

How are people advocating for the protection and conservation of our oceans, seas and marine resources?

Peace and conflict

What conflicts have occurred, or are ongoing, regarding the protection of our oceans and their resources?



THE BIG QUESTIONS

1 Where did it begin?

- The protection of our marine environments is integral to the species that live in them and the communities that rely on them. From absorbing carbon dioxide (CO₂) and managing the temperature of our atmosphere, oceans help balance our climate system. The health of our oceans impacts the realities of **climate change** in a big way. Over time, human activity has contributed to the negative impacts of climate change on our planet and our own oceanic well-being.
- From food and medicine to fuel and fun, oceans provide a wealth of resources to humanity. Over three billion people depend on marine and coastal **biodiversity** for their livelihoods, with fisheries alone directly or indirectly employing over 200 million people.¹
- **Marine ecosystems** represent the largest aquatic ecosystems on our planet. From salt marshes to coral reefs and estuaries to the sea floor, marine waters cover two-thirds of the surface of the Earth. Marine ecosystems have extensive biodiversity and support a large amount of **biomass**, or the mass of all species in an ecosystem. Did you know our oceans contain 36 million tonnes of blue whales and 379 million tonnes of Antarctic krill?²
- Oceans, seas and **marine resources** (such as fish, gas, minerals, renewable energy and tourism) are increasingly being threatened, degraded or destroyed by human activity. Pollution from chemicals like phosphates, lead, oil, nitrates, mercury, land run-off, overfishing and the destruction of coastal habitats for human expansion are all negatively impacting the well-being of the species who live in our marine ecosystems.
- **Acidification**, caused from increased absorption of CO₂ in our oceans, is making our waters more acidic, with harmful consequences on marine organisms, such as decreasing species immune responses and **coral bleaching**.
- **Marine conservation** involves protecting and preserving our ocean's ecosystems by limiting human-caused damage, restoring damaged ecosystems and establishing protective policies and projects to ensure humanity understands and respects the fine balance of life under water.



2 Why does this issue matter?

- **Oceans are important to our economy**

Did you know that our coastal and marine resources contribute an estimated \$28 trillion to the global economy each year?³ Despite how much we rely on these resources, they are extremely vulnerable to environmental degradation, overfishing, climate change and pollution. Protecting our oceans means stopping overfishing to improve our ecosystems and biodiversity. In order to find a healthy balance, our planet's fish stocks need to be kept within sustainable limits, at or above the abundance level that can produce maximum sustainable yields.⁴

- **Our ecosystems need to be protected**

River basins, marine ecosystems, coral reefs, the sea floor and the atmosphere are all part of the **hydrological system**. The extent and connectivity of this system means the impacts of pollution are often felt far from their source. The hydrological system is important for climate change regulation because of the role it plays in absorbing heat and CO2 from the atmosphere and protecting coastal areas from flooding and erosion.⁵

Since the beginning of the industrial revolution, the ocean has absorbed about one third of the CO2 released by human activities, reducing the full impact of climate change.⁶ Protecting our hydrological system means developing policies and programs that ensure ecosystems upstream and downstream are preserved.

- **We need more scientific cooperation and international laws**

In order to conserve our oceans and reduce our impact, we need to develop strong platforms and policies that support and protect our water ecosystems. Investing in knowledge, improved technologies and ways to minimize acidification through scientific research and development are essential to achieving this goal. Ensuring that our governments, businesses and decision-makers protect our coastlines and oceans from overfishing and illegal fishing can help our coastal communities develop more sustainable practices.

“ Why is it that scuba divers and surfers are some of the strongest advocates of ocean conservation? Because they've spent time in and around the ocean, and they've personally seen the beauty, the fragility and even the degradation of our planet's blue heart. ”

Sylvia Earle

American marine biologist and author



3 Who and what are affected?

- **Our ocean species and ecosystems**

Sewage, industrial chemicals, land runoff, oil spills, mining and litter make up the largest sources of pollution in our oceans. The diversity of pollution sources increases the diversity of consequences to our ecosystems as well—from depleted oxygen levels and disruption of photosynthesis for coral and seaweed to accumulated waste in the food chain, our oceans are taking a beating from our business activities and behaviour. Runoff from fertilizers can cause **hypoxic zones**, or areas of the ocean with insufficient amounts of oxygen, light and nutrients to support other species caused by increases in algae.

- **Our population**

When our oceans are polluted, it's not just our ecosystems that pay the price. In an ecosystem of fish eating other organisms polluted with chemicals, levels of toxicity will rise over time. When we eat contaminated fish, we are digesting mercury, nitrates and micro-plastics. When consumed, it can increase our likelihood of diseases such as Parkinson's disease, Alzheimer's and heart disease.⁷ The oceans provide us so much and it's our responsibility to respect our ecosystems and our health by keeping it clean for generations with come.

4 What needs to be done?

- To repair our oceans and allow them to flourish in the future we need to increase international cooperation to protect vulnerable habitats, invest in research and sustainably harvest our natural marine resources. No act is too small—making changes to our daily lives to stop contamination in our marine ecosystems is an essential part of the process.
- To manage our impact on marine resources, we need to improve the uptake of sustainable social, political and economic practices through good governance and public accountability. Illegal fishing, and overfishing in particular, are being targeted as detrimental industries to the health of our oceans. Through the choices we make, we can put pressure on decision-makers to choose the sustainable path.
- Healthy oceans make for healthy humans, and they sustain life on Earth. When we protect key ecosystems, habitats, and species in **marine protected areas** (MPAs), we can restore and replenish biodiversity, along with social, cultural, and economic resources. With only 3.4 per cent of our oceans under protection, we need to encourage representatives and decision-makers to develop policies that encourage the designation of MPAs and partnerships that increase investment in these protected areas.⁸
- As the cause of, and solution to, pollution on Earth, we have to start with ourselves if we want to improve our oceans. If researchers can develop sustainable **renewable resources**, we can also learn to recycle and pick up after ourselves. Social actions to reduce **fossil fuel** usage like taking public transit, or reducing pollution by eliminating plastic bags and cleaning our beaches, can have a great impact on the health of our oceans.



CONNECTION TO THE OTHER GOALS



Initiatives to protect our oceans should identify ways to reduce the amount of pollutants entering our water systems through human activity. Addressing populations' sustainable access to fresh water and **sanitation** will help in reducing pollutants entering our water ecosystems. Collaborative programs that address human activity while protecting life on land and life below water can help keep our oceans healthy and clean.



Ensuring we buy only what we need is a huge part of responsible consumption. Making sure products are recyclable and safe for our waters will help reduce the threat to our oceans, seas and marine resources.



Clean and biodiverse oceans have a direct relationship to our health and well-being. In achieving good health and **food security** for all, we need food that is healthy and free of bio-accumulated chemicals like mercury. We can improve the health of our food by reducing pollution, paying attention to fishing habits and techniques, and investing in research to address pollutants already in our oceans.

“ I had fought on behalf of man against the sea, but I realized that it had become more urgent to fight on behalf of the sea against men. ”

Alain Bombard
French biologist and physician



Consequences of inaction

- An inability to control climate change impacts will result in the rise of our oceans and severe effects on our coastal regions, especially in low-lying areas and increasingly vulnerable island nations. Without investment in climate change action, it is estimated that the cost of damage to the ocean will be US \$322 billion per year by 2050.⁹
- By failing to take control of marine pollution, we will have negatively impacted the health and biodiversity of our oceans species and ecosystems. The spread of hypoxic dead zones will increase, ultimately impacting key marine industries like tourism and fishing, and the livelihoods of many.

REFLECTION AND ACTION QUESTIONS

- 1 How do you feel about the issue now that you know more about it?
- 2 How might this issue have been prevented? What could have been done differently?
- 3 How has this problem changed over time? Where do you see it going in the future?
- 4 What questions do you still have?

“ It is a curious situation that the sea, from which life first arose, should now be threatened by the activities of one form of that life. But the sea, though changed in a sinister way, will continue to exist; the threat is rather to life itself. ”

Rachel Carson
American marine biologist and author



RESOURCES

How to take action

- **Reduce, reuse, recycle.** We need to manage our plastic waste, along with other pollutants, that end up in our oceanic ecosystems. Our plastic production needs reassessment, but in the meantime we need to clean up the mess we've made by making sure we properly dispose of our waste. Cut up the plastic rings that hold cans together, so that if they find their way into our watery ecosystems we can prevent marine life from becoming stuck or injured.
- **Use fewer plastic products.** Try to bring your own reusable bottles, cutlery, and bags to reduce the amount of plastic waste thrown away. Limit micro-plastics commonly found in clothes, and only buy clothes when you need them. Refuse to buy products with microbeads, such as some toothpastes and facewashes, as these beads can end up in water systems.¹⁰
- **Volunteer clean up.** Keeping your local waterways clear of trash is a great way to stop pollution in our oceans downstream. Work with your local government, community leaders and businesses to avoid plastic that is detrimental to our oceans and waterways.
- **Get creative.** Innovation can fuel a conservation and recycling revolution. Put your thinking cap on and bounce around a couple of ideas for compostable product wrappers, or maybe an ingenious ocean cleaning mobile.
- **Join a movement.** Write your local government representatives and tell them why marine conservation and protection is so important to your future and the future of our planet. It doesn't matter where you are, the health of our oceans affects each and every one of us.
- **Buy seafood sustainably.** As a consumer, you influence the seafood industry with your money so make sure your money is representing your values in protecting our waters. [Download the SeaChoice App](#) and learn how to make the best choices at your grocery store and restaurants.
- **Bring the Yellow Fish Road campaign to your community.** Simple tasks that use water such as bathing your dog, changing your oil and making a garden can all create **water pollution** through the build-up of grease, oil, soaps and fertilizers. The [Yellow Fish Road](#) campaign encourages people to pause and think about what we are putting into our water supply by painting yellow fish on storm drains.
- **Participate in a campaign.** Take part in the [Give Water a Hand](#) campaign and help solve real water problems in your own community. Download their guides and get started by completing a checklist. Map a watershed, connect with a local expert, find a local service project and take action.
- **Host a documentary screening.** Show your class or community why protecting our life under water is crucial for our planet's survival. Watch films such as *Mission Blue* or *Oceans* and let the imagery speak for itself.



Educational resources

- The World's Largest Lesson plan for Goal 14 has downloadable comics, posters and lesson plans [here](#). Included is the lesson plan [Protect Life Below Water](#) (ages 11 to 14). This lesson focuses on exposing students to the dangers of damaging Earth's seas and oceans. Students will explore ideas of how to use the ocean sustainably and view imagery that exposes ocean pollution such as acidification, overfishing and waste. [Wild For Life](#) (ages 8 to 12) is a lesson focused on understanding the plight of endangered species, how individual actions contribute to improving the environment and understanding the interconnectedness of humans with the living and non-living environment.
- From ocean acidification to tsunamis, the National Oceanic and Atmospheric Association has a wealth of information about the and what we can do to help. Find a variety of educational resources [here](#).
- Bring the ocean to your classroom. Learn about our oceans biggest and smallest creatures and our history and relationship to the big blue ocean from [National Geographic's Ocean Education](#) collection. With activities for K to 12, you're sure to find something your students will love.
- Have you ever heard of the [Trash Vortex](#)? Encourage your students to learn more about where our waste goes by exploring videos and articles about the country-sized floating island of trash in the North Pacific. Follow up with these [ocean toolkits](#) available through Greenpeace.
- The Vancouver Aquarium has a wealth of [educational resources](#) and archived [live streams](#) about marine life including topics like saving endangered species and protecting our wildlife who call the ocean their home.
- Learn about the Stow it-Don't Throw it Campaign to prevent marine debris and fuel ocean conservation, with these helpful [student resources](#).
- [Fishing for the Future](#) (Grades 6 to 12) is a simulation game where students experience the "Tragedy of the Commons". Through a hands-on game of depletion of fishing resources, their actions reflect real-life consequences of overfishing and failing to protect ecosystems. Using candy and a variety of props, students will explore population growth and sustainable fishing practices, followed by a discussion, writing connections and action project ideas.



CASE STUDIES

1 Tanzanian Society of Agricultural Education and Extension



Interlake youth in Manitoba are passionate about environmental issues and concerned about the future sustainability of the fishery on Lake Winnipeg. Many similar issues of ecological damage also affect the long-term livelihoods for young adults living along Lake Victoria in Tanzania. In this partnership, youth in the Rural Municipality of Gimli connected with the [Tanzanian Society of Agricultural Education and Extension](#) (TSAEE) to work to address water and environmental issues. TSAEE supports ongoing initiatives to protect the Lake Victoria environment by providing extension education to mobilized youth groups participating in agricultural activities adjacent to the lake.

2 The Story of Stuff

[The Story of Stuff](#) is a movie turned global movement that draws attention to our society's relationship with "stuff": how we have too much, how too much of it is toxic and how we don't share it very well. Beginning with a 20-minute online movie, the project has now expanding to include millions of change makers worldwide. With different initiatives such as the "Plastic Free Challenge" and "Stop Microfiber Plastic Pollution", The Story of Stuff continues to challenge the way in which our consumer society functions while aiming to protect life on land and life below water.

3 Papahānaumokuākea Marine Protection Area

In 2016, UNESCO and former US President Barack Obama established the largest marine protection area in the world in the state of Hawaii. The reserve, called [Papahānaumokuākea Marine Protection Area](#), lies 250 kilometres northwest of the main Hawaiian Islands and is home to a fifth of the ocean's known fish species.¹¹ Protecting this area will help protect the fragile biodiversity and ecosystems that exist in our oceans and will serve as an example for marine areas around the world.

4 The Ocean Cleanup

More than five trillion pieces of plastic currently litter the ocean, threatening ecosystems and their biodiversity. In attempt to combat this plastic impact, [The Ocean Cleanup](#), founded in 2013, is committed to collecting ocean garbage using innovative technology. Using a system and model that works with the ocean's currents rather than against them, a continuous hard-walled pipe attached to a screen will collect and keep trash until it is able to be extracted. Flexible enough to move with waves yet rigid enough to do its job, The Ocean Cleanup system could clean up 50 per cent of the Great Pacific Garbage Patch in five years.



5 Winnipeg Rotary Club Community Service Fund

The [Winnipeg Rotary Club Community Service Fund](#) is working in South Sudan to promote sustainable aquatic harvesting through their Ziam-Ziam/Panpoil Community Fishing Project. The project aims to provide food aid and a long-term economic development opportunity to a conflict ravaged community of 3,000 people (637 households) in South Sudan. Hooks and nets will be provided to increase fishing for consumption and barter trade.

6 Narayana Peesapaty

Aware of the impact and damage plastic cutlery poses to our environment and oceans, [Narayana Peesapaty](#) founded Bakey's Food Private Limited and developed edible cutlery. Made from flours of jowar, blended with rice and wheat, the cutlery is 100 per cent natural, biodegradable and edible. Available in a variety of tastes, Bakey's Edible Cutlery is another innovative approach to reducing the amount of plastic that ends up in our water systems, ultimately helping the health of marine life, our oceans and us.

End notes

¹http://www.un.org/sustainabledevelopment/wp-content/uploads/2016/08/14_Why-it-Matters_Goal-14_Life-Below-Water_3p.pdf

²<http://www.coolantarctica.com/Antarctica%20fact%20file/wildlife/krill.php>

³<https://sustainabledevelopment.un.org/sdg14>

⁴<https://sustainabledevelopment.un.org/sdg14>

⁵<https://sustainabledevelopment.un.org/sdg14>

⁶<https://sustainabledevelopment.un.org/sdg14>

⁷<https://www.divein.com/articles/ocean-pollution/>

⁸http://www.un.org/sustainabledevelopment/wp-content/uploads/2016/07/16-00055_Why_it_Matters_Climate_Action_Business_letter_size_1p.pdf

⁹http://www.un.org/sustainabledevelopment/wp-content/uploads/2016/08/14_Why-it-Matters_Goal-14_Life-Below-Water_3p.pdf

¹⁰<https://www.youtube.com/watch?v=BqkekY5t7KY>

¹¹<http://www.un.org/sustainabledevelopment/blog/2016/08/unesco-hails-creation-of-worlds-largest-marine-protected-area/>