

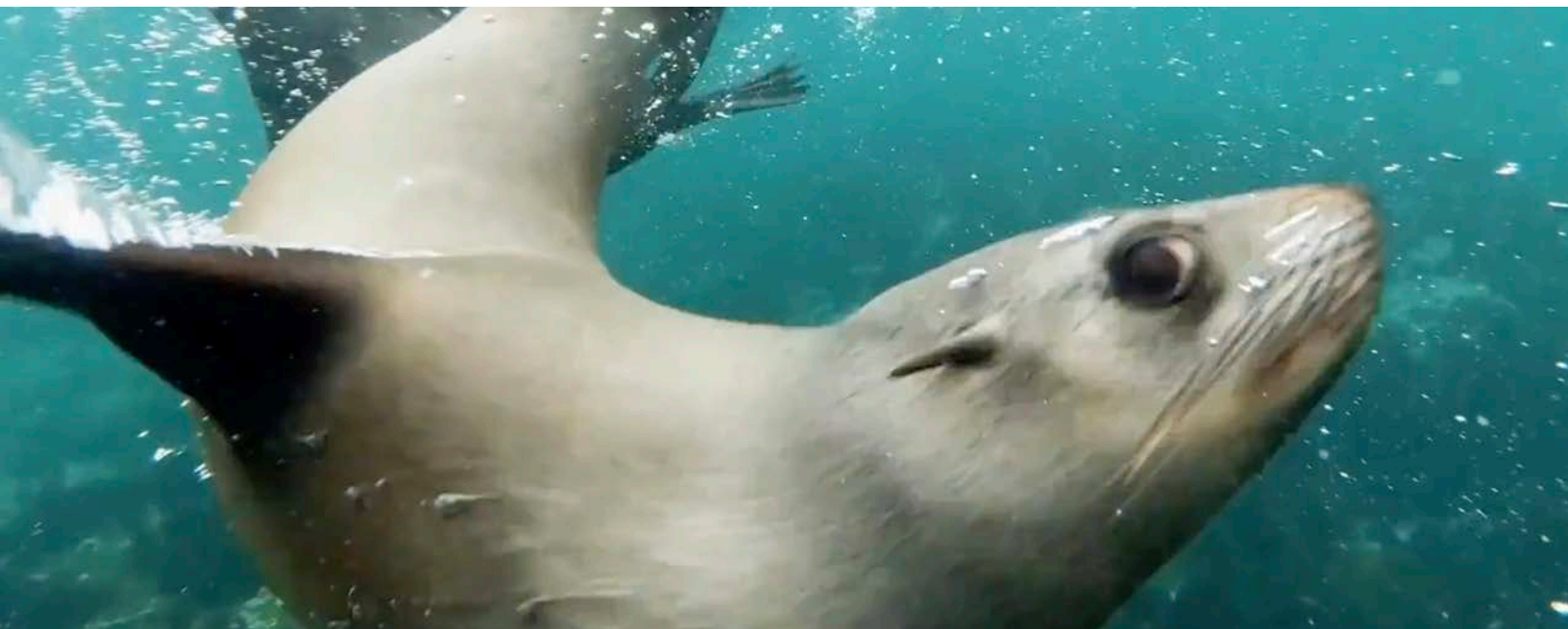
THREE OCEAN ADVOCATES

A Study Guide



“We need to respect the oceans and take care of them as if our lives depended on it. Because they do.”

-Dr. Sylvia Earle



THREE OCEAN ADVOCATES

A Study Guide

TABLE OF CONTENTS

Introduction	<u>3</u>
How to use the guide	<u>3</u>
Map with text boxes about the films	<u>4</u>
Film 1: Tess Felix	
• Background information	<u>5</u>
• Questions for discussion prompts	<u>6</u>
• Supplementary activities	<u>7</u>
• Links to resources about marine debris	<u>8</u>
Film 2: Dick Ogg	
• Background information	<u>9</u>
• Questions for discussion prompts	<u>10</u>
• Supplementary activities	<u>11</u>
• Links to resources about fishing	<u>12</u>
Film 3: Barbara Crites	
• Background information	<u>13</u>
• Questions for discussion prompts	<u>14</u>
• Supplementary activities	<u>15</u>
• Links to resources about coral reefs, climate impacts and restoration	<u>16</u>
About the filmmakers and study guide author	<u>17</u>
Appendixes	
• Appendix A – Questions for all three films	<u>18</u>
• Appendix B – Student handout: reflections on the film	<u>20</u>
• Appendix C – Questions to debrief/discuss the student handout	<u>22</u>
• Appendix D – Concepts and definitions featured in the film	<u>24</u>
• Appendix E – References	<u>25</u>

THREE OCEAN ADVOCATES

A Study Guide

INTRODUCTION

The ocean is the largest habitat on our planet—the very existence of it makes life habitable throughout the entire earth. It absorbs heat, it transports water through weather and currents, it absorbs carbon dioxide, and it is brimming with an amazing array of biodiversity that not only creates food for 3 billion people on the planet, but supports a myriad of recreational activities supporting health. The ocean is in trouble, we know the causes, we have solutions, and we can help.

The ocean advocates featured in these films share their stories and offer a glimpse into the challenges the ocean is facing today. A California artist transforms plastic washed ashore on local beaches into lifelike portraits of ocean heroes that have transformed our understanding and perceptions about our interconnections to the ocean's health. A California fisherman works to protect whales that are negatively impacted by the very fishing he makes his living on by working closely with regulators and other fishermen. A self-taught, curious snorkeler unknowingly creates historic records of what was living on coral reefs in the US Virgin Islands through her underwater photography over a ten-year period. Over that time, she captures astonishing evidence of rapid degradations to these once bountiful coral reef habitats. Follow along with these creative, passionate ocean stewards and consider what actions you can take to support ocean health.

ABOUT THE GUIDE

Film is a powerful medium. It can change our perception of the scale of decline of the ocean as well as offer a new vision of the future—one that is healthy and thriving—for the viewer. “Every Second Breath Project” is a series of short films about individuals who aren't celebrities or renowned scientists, but everyday people who understand the toll human activity has taken on the ocean, and who are committed to making change and inspiring others to do so. Now is the time to tell the stories of our reciprocal relationship to nature and change the messages of despair to ones of inter-connectedness, health and hope. Our goal is to educate and to motivate through stories that encourage action. *Three Ocean Advocates* is part of this series.

In the *Three Ocean Advocates* Study Guide, you'll find short descriptions of the issues portrayed in the films and a handout to reproduce for students to record reflections, questions and activities that explore the topics further. This handout can be used to support class discussion and includes a definition list and resource links to learn more. Some of the questions reflect on feelings, motivations and fear, and address the social-emotional aspect of being a human being in relation to these challenges. The guide is broken out by each film. You can find the film's website here: <https://everysecondbreathproject.org>

HOW TO USE THE GUIDE

This guide offers background information on each of the topics featured in the films, with links to resources and activities to explore deeper. The guide is intended for students to explore the concepts in the film and the social and scientific dilemmas behind each one that need to be confronted—one action at a time. Pick and choose what works for your learning environment. There is a student handout that can be reproduced for each film. The questions and activities are all options for you to consider, depending on how deep you want to go into the content and themes. Read through the guide to learn about each film and to see what activities and discussions are suggested to go with each segment of the film.

THREE OCEAN ADVOCATES

A Study Guide



FILM 1: ARTIST, TESS FELIX

STINSON BEACH, CA

Artist Tess Felix repurposes plastic found on beaches to create colorful, strong portraits, sending a strong message about our collective use of plastics and the damage it is doing to our oceans and environment.

Film segment length: 7 min



FILM 2: FISHERMAN, DICK OGG

BODEGA BAY, CA

- A fisherman who has witnessed drastic changes in the ocean, including the feeding locations of humpback whales that have overlapped with the placement of Dungeness crab fishing gear. He works with fishermen and policy makers to reduce the potential entanglement of whales.

Film segment length: 11 min



FILM 3: PHOTOGRAPHER/ SNORKLER, BARBARA CRITES

US VIRGIN ISLANDS

For over a decade Barbara Crites has documented underwater marine life around St. John, USVI. Her photo collection is testimony to the changing nature of life in our oceans due to acidification and warming temperatures.

Film segment length: 9 min 16 sec



<https://www.freeworldmaps.net/download/northamerica.html>

THREE OCEAN ADVOCATES

A Study Guide

FILM 1: ARTIST TESS FELIX

The ocean is filled with items that do not belong there. Huge amounts of consumer plastics, metals, rubber, paper, textiles, derelict fishing gear, vessels and other lost or discarded items enter the ocean everyday through the waterways around the planet.

This is a relatively modern problem for the ocean. Plastic production escalated after World War II as plastics were pushed to add modern convenience to our society. Today, there isn't a part of the ocean that has not been affected by plastic pollution.

Microplastics are smaller than 5 mm and are suspended in the water column. Big, heavy debris ends up on the seabed where it can impact the seafloor, and buoyant plastics float on the surface and risk being eaten by seabirds, fish and whales. Plastics act as a sponge for persistent organic pollutants (or POPs) which makes the plastic floating around the ocean even more dangerous. All the plastic that has ever been created is still with us on this planet in some form or another. It does not go away or return to a natural element.

While recycling is promoted as a solution, in reality less than 10% is effectively recycled or down-cycled into another material. In the United States, most of it is shipped off to other countries, creating massive environmental hazards in disposal or incineration and causing harm to vulnerable communities. The problem is that there is no place for the massive amounts of plastic to go.

The only way to change this course is to “turn off the tap” of plastic being generated, used and disposed of. Plastic is made by oil, and oil subsidies for extracting and creating plastic products are a central part of this global issue. Cleanups bring attention to the issue, but until the debris flows stop, more will wash up on beaches around the world and sink to the seafloor. The more people become aware of the issue, the more people will demand for change. Tess Felix highlights the issue through her art.



Heavy debris ends up on the seabed where it can impact the seafloor, and buoyant plastics float on the surface and risk being eaten by seabirds, fish and whales.



Tess works on one of her art pieces utilizing plastics recovered from the ocean.

✓ Topics to Explore

What does Tess mean when she says her work represents the “throwaway economy” and our collective “unconscious behavior”? How do you see this in your daily life?



THREE OCEAN ADVOCATES

A Study Guide

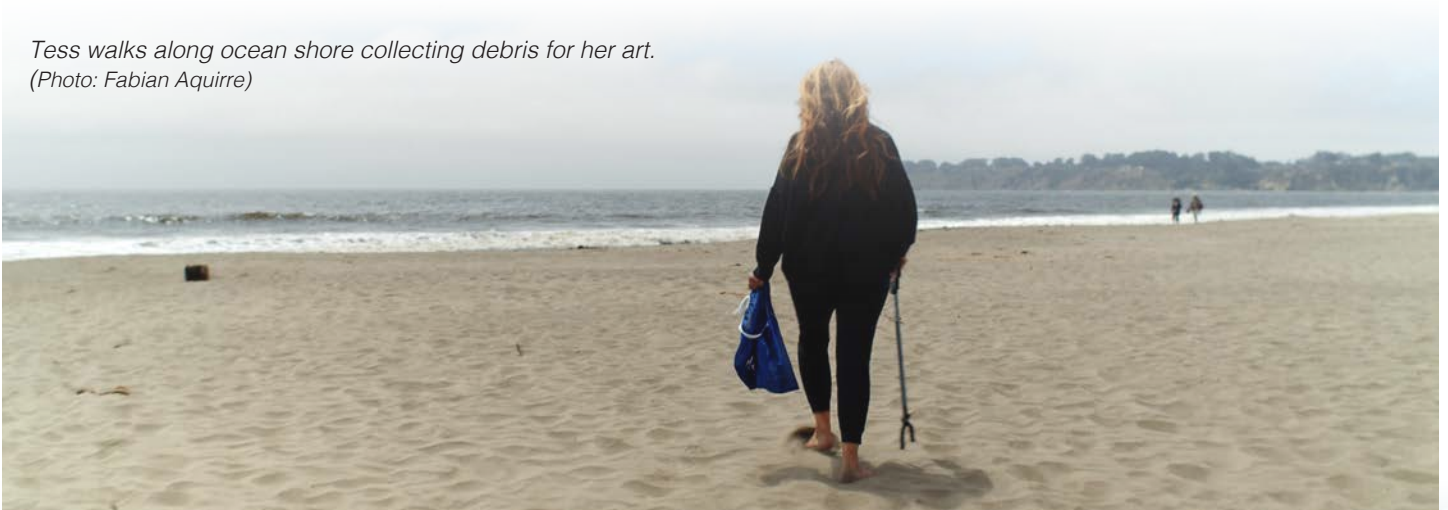
FILM 1: QUESTIONS FOR DISCUSSION

1. **Dr. Sylvia Earle** says, “We need to respect the oceans and take care of them as if our lives depended on it—because they do.” What are the direct connections for which our lives depend on the health of the ocean? What is the most surprising direct connection of ocean health to human health?
2. **Tess mentions** how every single piece of plastic ever made is still on this planet and will stay here. How does this inform your perception of the plastic pollution problem? Knowing that there is no “away,” or decomposition state for plastic, discuss with a group what solutions would need to happen to turn the tide on plastic pollution?
3. **“The ocean is downhill from everywhere in the world.”** Reflect on that statement, and discuss what this means and what activities uphill have a negative impact on the ocean? Which activities uphill have a positive impact on the ocean downhill from everywhere?
4. **How did Tess’ trek on the *Camino de Santiago*** shift her work and efforts with her plastic portraits? Where is a place you go to get a perception shift? Describe a place you go to think deeply about something important to you. Is it a natural setting?
5. **One of the biggest contributors to plastic pollution** is single use plastics, plastic items that are used once and then disposed of. Are there single use items you could see phasing out of your daily life? Which ones are easiest to phase out? Hardest? What are realistic behavior changes that you could make? What other actions could you take to help reduce single use plastics?
6. **What is a plastic pollution problem** you can identify in your community? What do you know about the problem? Not know about the problem? What steps could be taken to address the problem?



Tess sorts through plastic pieces for her art.

*Tess walks along ocean shore collecting debris for her art.
(Photo: Fabian Aquirre)*



THREE OCEAN ADVOCATES

A Study Guide

FILM 1: CLASSROOM ACTIVITIES

1. These young people have taken extraordinary actions to educate others and take action on the issue of marine debris. Use the internet to research one or all of these people, and write about what inspired them and how they took specific actions to mobilize others to help the ocean.

[Kristal Ambrose](#)

[Nalleli Cobo](#)

[Melati and Isabel Wijsen](#)

2. These are a few of the portraits Tess features as ocean advocates. Research each of them, and learn about how they help the ocean:

- What do they do to advocate for the ocean?
- How do they reach people?
- What is the impact of their efforts?
- What is their message?
- If you could ask each of them one question, what would it be?
Write a paragraph or more about each person.

3. Tess mentions how plankton gives us oxygen. It is estimated that phytoplankton produce about 50% of the oxygen in the atmosphere globally. [Click on this link](#), and follow the worksheet to calculate the number of breaths a day you take that are from one species of phytoplankton.

4. To better grasp the problem behind plastic pollution, let's trace a piece of plastic that has washed up on a beach back to its most elemental state—which is crude oil. List out each place this plastic piece has been and what form it was in. Share your work with a small group, and compare notes and observations. What surprised you about these stages?

Go further by estimating the amount of energy needed in various stages of that piece of plastic's "life"—for example, energy to extract the oil, energy needed to transport the oil, etc. By documenting the amount of energy needed throughout each of these stages, research and write about how the plastic pollution issue relates to the climate crisis.



Three of Tess' portraits. (Photo: Cynthia Abbott)



Plastic octopus found on the beach. (Photo: Fabian Aquirre)

THREE OCEAN ADVOCATES

A Study Guide

FILM 1: ACTIVITIES FOR OUTSIDE THE CLASSROOM

1. Dedicate one bag for three days to collect all the plastic you used in three days, dispose of all the plastic into that one bag, and after three days (or another length of time), document the items. What categories can you sort these into? Describe each of the categories you sorted into. How do these findings reflect the society we live in today?
2. Collect plastic off the ground anywhere safely, wash and dry it, and create your own sculpture or portrait from the plastic.
3. Using the [Litterati app](#), create a community challenge to clean up. Using the app, go out in search of debris, snap a closeup photo of the debris, pick up and dispose safely, “tag” the items in *Litterati* and submit. Using the app, you can create challenges and invite others to the challenges. What trends do you see in these pickups? How could you use this app to focus on solving a debris problem in a set/known geographic location?



One of Tess' portraits. (Credit: Cynthia Abbott)

LINKS TO RESOURCES ABOUT MARINE DEBRIS

[NOAA's Marine Debris Program](#) - The NOAA (National Oceanic and Atmospheric Administration) Marine Debris Program is the U.S. Federal government's lead for addressing marine debris. This web link brings facts, figures, education resources, images, research statistics and more into one science vetted website.

[The Story of Plastic](#) - A feature length film part of “The Story of Stuff” project that delves into the truth behind the plastic and fossil fuel industry. This film is 1 hr. and 23 min. and reveals the interconnectedness between the fossil fuel industry, plastics and the harm done to lower income communities in the US and in other countries suffering as a result of this problem. Have you been told that “you can just recycle it” in regards to plastic use? Watch this Emmy Award winning film to understand how deep this problem goes, and find toolkit resources on the site.

[Breakfreefromplastic.org](#) - This organization has created an active movement working together to demand the reduction in production of plastic. The website includes a toolkit for getting involved in plastic pollution prevention and actions people can take to promote this issue.

[Plasticpollutioncoalition.org](#) - A global alliance of more than 1,200 organizations, businesses, and thought leaders in 75 countries working toward a world free of plastic pollution and its toxic impact on humans, animals, waterways, the ocean and the environment.

[Litterati](#) - This company has created a global community of cities, companies, non-governmental organizations and individuals on a mission to create a litter free world. The website includes instructions on how to get involved in a global citizen science effort, how to download and use the free *Litterati* app, and includes K-12 lesson plans.

[Ocean Heroes Bootcamp](#) - This weblink has the tools and training you need to transform your passion for ocean health into tide-turning campaigns. Includes a step-by-step guide for how to create a campaign.

THREE OCEAN ADVOCATES

A Study Guide

FILM 2: FISHERMAN DICK OGG

Fishing communities around the globe either rely on the source of protein found in the sea for their own sustenance or rely on the income generated by selling fishing products to seafood buyers. In essence, fishing sustains lives.

In recent years in the eastern Pacific ocean from California to Alaska, a warming trend due to the excess heat trapping gas carbon dioxide generated by the burning of fossil fuels, has led to cascading effects in the ocean. Warmer waters have changed the amount of and location of prey for whales. Small schooling fish like anchovy have been more numerous and closer to shore, whereas they typically feed a bit further offshore. This abundance of food in coastal waters has drawn humpback whales closer to shore to feed. Humpback whales feed on small shrimp-like animals called krill, or schooling fish like anchovy. With krill abundance not as high in warmer waters and schooling fish being closer to shore it has forced humpback whales to feed closer to shore and to stay in coastal waters off California for longer periods of time instead of migrating south for the winter.

The Dungeness crab season in Washington, Oregon and California starts up in late fall. Dungeness crab fisherman set traps/pots on the seabed during the late fall season for harvest and recently with humpback whales sticking around longer to feed in the same areas as Dungeness crab pots being set, this had led to an escalation in entanglements of whales. Dick Ogg, a Bodega Bay, California fisherman saw the problem unfold and got right to work with agencies and scientists to find solutions to protect whales from getting entangled. Dick's witnessing of changes on the ocean is telling of the rapid changes happening in the ocean during a lifetime.



Dick Ogg surveying the horizon. (Credit: Maya Pisciotto)



Humpback whale off California coast. (Photo: Maya Pisciotto)

THREE OCEAN ADVOCATES

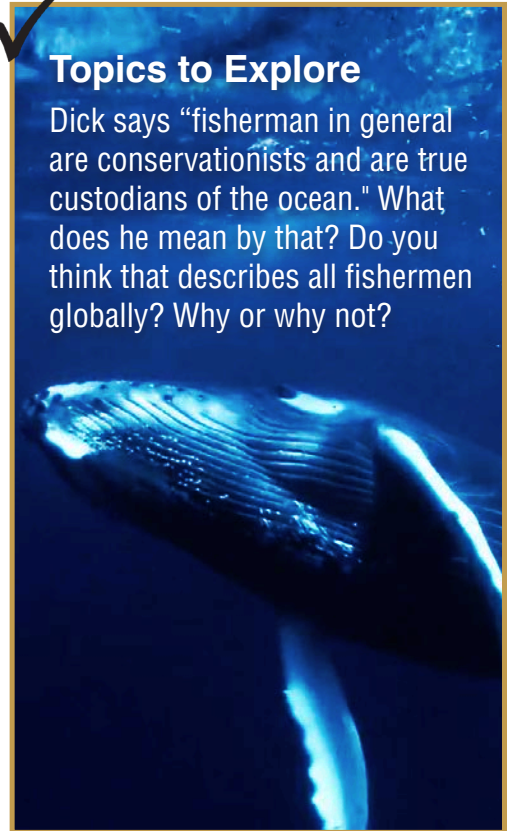
A Study Guide

FILM 2: QUESTIONS FOR DISCUSSION

1. What does sustainability mean as it relates to fishing?
2. [Visit this link](#) to learn about fishing gear types in California where Dick fishes and to learn how each gear type catches fish. Which gear types do you think do the least amount of damage to a habitat on the seafloor? Which do the most damage?
3. In several parts of the film, Dick describes his relationship with the ocean. Describe Dick's relationship to the ocean and what it is built upon. How does his relationship/point of view with the ocean form his actions?
4. Dick is a "small scale fisher," meaning he owns and runs his boat, hires his crew, fishes and markets his catch by himself. A corporate run fishery operates on a much larger scale, where the owner of the corporation may not even know the fishermen themselves and the fishing gear may be destructive and spread out over huge expanses of ocean waters. Which way of fishing do you think is more sustainable for the ocean and why?
5. When Dick says "he takes care of the ocean because it takes care of me," what does that mean?
6. Would a fishing operation that scrapes the bottom of the seafloor for miles (bottom trawling) be considered a conservation-minded fishing practice? Why or why not?
7. Dick talks about how dungeness crab fishing is one of the "cleanest" fisheries. What does that mean?
8. Dick is an example of a "local" fisherman providing a fresh, local catch to local seafood purveyors in the Bay Area. Everything that happens on the ocean and happens in commercial fishing regulations affects him directly. What stake does he have in participating in the regulation processes and in problem solving working groups? What if he didn't participate? What could happen both to fishermen and to whales?
9. What is the *Magnuson-Stevens Fishery Conservation and Management Act*? When was it originally enacted and why?
10. Who creates fishing regulations? How do regulations affect fishermen? How do regulations affect the ecosystem? How could future regulations affect fishermen?
11. What do you think regulators should favor in their decision making? Describe your opinion and provide evidence to support your opinion.

Topics to Explore

Dick says "fisherman in general are conservationists and are true custodians of the ocean." What does he mean by that? Do you think that describes all fishermen globally? Why or why not?



*Dick Ogg explains his philosophy.
(Credit: Fabian Aquirre)*

THREE OCEAN ADVOCATES

A Study Guide



FILM 2: CLASSROOM ACTIVITIES

1. **Balance in the Bay (Grades: 6 - College):** How do population dynamics, environmental variability, and fishing regulations relate? Student groups will take on various roles in a simulated fishing community, making decisions while also facing a range of natural and man-made challenges. These decisions will impact their own well being in addition to the well being of the natural squid population as a shared or "common" resource.
2. **Check out the Monterey Bay Aquarium's Seafood Watch program.** How do they define sustainable? There are several tools available for fish consumers in the Seafood Watch program to take actions to support sustainable fisheries. What can someone who buys fish or seafood do to support sustainable fisheries? Check out the tools on the web link and write about each one.



ACTIVITIES FOR OUTSIDE THE CLASSROOM

1. **Identify five or so grocery stores and restaurants in your community** that sell fish or shellfish for people to cook at home or in a restaurant. Make a list of these places and the products they carry (or dishes they have that have fish products). Go to the grocery store/restaurant and ask to speak with the person who manages the fish department, or person who sources food for the restaurant, and ask about the products they sell. Ask, where do you purchase your seafood from? Get specific—which fisherman, which seafood company or which company? Ask them if the fish is considered sustainably caught? Ask further how they know it is sustainably caught.
2. **Record your findings and compare results** with classmates. How many of them know what sustainable seafood is and sell it? Even if you're hundreds of miles away from the ocean, a restaurant and grocery store can still purchase and sell sustainable seafood. [Visit this seafood watch weblink](#) for more tips on how to help businesses be ocean stewards by sourcing for sustainable fish.



Sonoma coast



THREE OCEAN ADVOCATES

A Study Guide

FILM 2: LINKS TO RESOURCES ABOUT FISHING

[NOAA West Coast Large Whale Entanglement Response Program](#): Website detailing how NOAA responds to entanglements along the west coast of the United States.

[Research Reveals Environmental Effects That Shut Down Fishing and Hiked Whale Entanglements](#): Website page that details how management agencies, regulators and fishermen are working together to create new tools for decision making that reflect the dynamic nature of ocean conditions.

Listen to learn about the unprecedented marine heat wave that affected fishermen and whales and how communication, science and collaboration led to new tools to make timely decisions to protect fishermen and whales. [Go to the Feb 2020 Ocean Currents podcast episode \(Listen to Part 1\)](#).

[The Voices of the Bay curriculum](#) uses engaging, hands-on activities to provide a deeper understanding of the marine ecology, economy and culture that surrounds fisheries. The curriculum meets a range of science, math, social studies and communications educational standards for students in grades six to college. Includes glossary, activities and resources to learn more about fishing

[The Science of Sustainable Seafood and The Magnuson-Stevens Fishery and Management Act](#): 10 page curriculum guide that looks at the types of fishing practices and regulation in the United States. Introduces the United States law about fishing and how it manages fisheries in the United States.

[Fisheries Glossary of Terms](#): Learn the terminology associated with fishing practices.

[What is domoic acid?](#) This animated short helps explain what domoic acid is.

[The Fish on Your Plate May Not Be What You Ordered](#): An article that describes a study by ocean advocacy group Oceana that sampled fish served in restaurants scientifically and found that many products were mislabeled.



THREE OCEAN ADVOCATES

A Study Guide

FILM 3: SNORKLER/PHOTOGRAPHER BARBARA CRITES

Barbara Crites, fascinated by the US Virgin Islands, dove in at first to just take a look, and over time, became an expert snorkeler and citizen scientist by taking over 90,000 pictures of what lives underwater. She observed changes in the islands' coral reef habitats, and before too much damage occurred from extreme weather events, she documented the life on the reefs through photography and created an online platform for people to learn about the species that live there. The platform also serves as a living museum documenting what has lived on the reefs over time. She advocates for helping people connect to and care about the health of the ocean, and she raises awareness about the changes she has witnessed underwater around the US Virgin Islands.



*Coral reefs photographed by Barbara Crites in USVI
(Credit:ESB Films)*

Coral reefs are among the most biodiverse habitats on the planet. Even though they cover less than 1% of the ocean floor, they provide habitat for up to one-quarter of all marine species and provide food, income, coastal infrastructure and cultural value to coastal communities around the globe. They attract visitors from around the globe to spend time exploring and witnessing color beauty and biodiversity. Coral reefs are extremely vulnerable to the impacts from a warming planet.

As we burn fossil fuels for energy, we add more and more carbon dioxide into the atmosphere. This buildup acts like a blanket that traps heat around the planet, preventing the heat from escaping back into space as freely as it used to. The upper layers of the ocean have absorbed this heat, warming up the ocean in recent decades.

Just as the heart circulates blood and regulates the body's temperature, the ocean regulates the circulation of heat and moisture throughout the earth system. This extra heat leads to a series of different changes in the ocean which affect the health of animals and plants that live there. These changes can lead to extreme weather events, such as more intense storms, and extreme heat or cold events due to the disruption of the air and ocean currents.

Corals that live in warm water environments like the US Virgin Islands are experiencing coral bleaching events, where rising ocean temperatures become hot enough to kill the living tissue inside corals, resulting in its death. When coral dies, other animals that make their home in the reef are also affected and either have to move, adapt or die. In addition to being habitats with extreme biodiversity, healthy coral reefs work as natural barriers, buffering shorelines from impacts from big storms, slowing waves and flooding impacts. Corals are also vulnerable to impacts of ocean acidification, where the chemistry of the ocean that has absorbed so much carbon dioxide is making it harder for animals like corals and shellfish to grow and live.



Coral reefs. (Credit:ESB Films)



THREE OCEAN ADVOCATES

A Study Guide

FILM 3: QUESTIONS FOR DISCUSSION

1. Barbara describes how being in the ocean provides everything she needs to feel emotionally healthy. It brings her “peace, solitude, balance, feeling like you are a part of something or connected.” Can you relate to that? Is there a place in nature where you feel “peace, solitude and balance?” What is the value these emotions bring to us as humans? What is the value to you?

2. Universities and conservation organizations are tackling coral reef decline problems head on with community oriented actions and restoration. Read up on the following efforts, and write about or discuss with a group what efforts are underway to help support coral reef restoration. How can people from afar help support coral reef restoration and promote the importance of healthy coral reefs?

- [Coral restoration in St. John Coral World and the University of the Virgin Islands](#) are working together to help restore Staghorn corals on coral reefs around St. Thomas through ocean-based coral nurseries.
- [The Caribbean Oceanic Restoration and Education Fund](#): Citizen science monitoring of corals, applying medicines to corals, and removing invasive species.
- [Virgin Island Reef Response](#): Citizen science effort for coral restoration.
- [The Nature Conservancy](#): With advanced protection, restoration and monitoring techniques, we are tackling coral conservation from all sides to save reefs before it’s too late.

3. Barbara theorizes that most people on the planet have not experienced the ocean directly and fears the “out of sight, out of mind” reality is a detriment to people caring about the ocean. What are ways you think more people can learn about and develop that connection that leads to caring about the ocean?

4. Many species in the ocean are the source for medical treatments and medicines that are saving human lives. Visit these links to learn about species and the connections to human medicine that have been made because of these species.

- [NOAA National Ocean Service](#): *What does coral have to do with medicine?* Corals are the medicine cabinets of the 21st century.
- [Woods Hole Oceanographic Institution](#): *Finding answers in the ocean* - In times of uncertainty, the deep sea provides potential solutions.
- [Medical News Today](#): *Compound isolated from sea sponge fights cancer cells.*
- [Hakai Magazine](#): *A Cancer-Quashing Microbe Emerges from the Deep* - A species of marine bacteria shows promise for curing a nasty brain cancer.
- [AIDA](#): *Did you know coral reefs produce medicine?*

✓ **Topics to Explore**

Barbara describes various effects of global warming on the ocean such as bleaching, cyanobacteria disease and acidification. Describe what each of these impacts do to corals and ultimately what needs to happen to slow down and stop these impacts?




School of fish in coral reefs.
(Credit:ESB Films)

THREE OCEAN ADVOCATES

A Study Guide

FILM 3: QUESTIONS FOR DISCUSSION

1. What are some of the ocean species/medical connections?

How does the fact that the ocean contains so many undiscovered medicines for humans and perhaps other biomimicry solutions to other large scale problems motivate your thinking about protecting the ocean and taking action to slow climate change?

2. Climate Change and global warming can feel so big, and too difficult to do anything about, but the exact opposite is what is needed to slow these impacts down and help create a resilient world for humans and nature.

3. Visit these school programs to see what some school communities are doing to develop climate resilience. Read up on one and describe what actions are being taken, by whom, what is the impact of their actions? Can you see yourself involved in actions like these?



Barbara Crites snorkeling. (Credit:Andrea Leland)

CLASSROOM ACTIVITIES

1. [Visit Barbara's website](#) and the species list, and find five species' common names that are intriguing. Click on the link to the animal, and describe what it looks like and how its name supports what it looks like. What type of animal is it? How does it eat? What habitat does it live in?
2. [Coral Construction Activity](#) for grades 3-12. Students explore the diversity of coral shapes using Lego building bricks. A compiled Lego reef helps them discover the impacts of storm action on different colonies within the reef.
3. Students can create a quick watershed model with a crumpled piece of paper. Take a piece of paper and crumple it. Flatten out the bottom, so it can sit on a table. Label the outskirts of the paper all around as ocean. Take a water-based magic marker, and color the ridges of the folds that are sticking up. While coloring the ridges, discuss land practices that are upstream that may impact the ocean: for example, runoff from agricultural farming, runoff of oil/gas from vehicles, trash on the ground, etc. The colors drawn on the ridges represent the land activities you just discussed. Take a spray bottle with water in it, and gently spray water over the watershed model. Have students describe what they observe. Where does the water go? What travels with the water? What connections do you observe between what happens on land and what happens to the ocean? What are solutions to limiting what travels downhill to the ocean?
4. Student carbon footprint calculators can be a powerful tool in illustrating our reliance and dependence on fossil fuels which contribute to climate change impacts globally. *Equity Alert! Consider the age and diversity of your students to avoid trapping students into a shame cycle, as many students may not have any choices regarding their personal and/or caretaker use and choices related to carbon dioxide/fossil fuel use.* This activity can illustrate how fossil fuels are part of our everyday actions and some actions/decisions are easier to take action on than others.



THREE OCEAN ADVOCATES

A Study Guide

FILM 3: LINKS TO RESOURCES ABOUT CORALS, IMPACTS AND RESTORATION EFFORTS

[Barbara Crites' website Snorkel St. John](#) features species and ways to learn about the coral reef inhabitants around the US Virgin Islands.

[Actions you can take to help coral reefs](#) no matter where you are or live.

[NOAA National Ocean Service - Coral Bleaching](#): What is coral bleaching? Infographic and information.

[Ocean Acidification -What is ocean acidification?](#) Short video and explanation of what ocean acidification is from the National Oceanic and Atmospheric Administration

[Clean Net - Climate Literacy and Energy Awareness Network](#): One stop shop for education resources on climate and energy vetted through scientific review, where you can search for topics based on grade level and topic area.

[Project Drawdown](#): We know the causes of climate change, and we know the solutions to reverse the trends on the planet. Project Drawdown describes the known solutions to reversing the climate crisis. This website highlights the top global solutions for reversing climate change, and you may be surprised by some of these solutions.

[The National Academies of Science, Engineering and Medicine summary report](#) on coral reef resilience strategies offers a look at the known suite of tools and strategies to help coral reefs in the face of climate change.

[TeensCan Make a Difference - online course](#): An online interactive and free course by and for teens to help you find your spark for conservation and take action. #teenscan



*Barbara on the beach in St. John, USVI.
(Credit: Andrea Leland)*

THREE OCEAN ADVOCATES

A Study Guide

ABOUT THE EMMY AWARD-WINNING FILMMAKERS



ANDREA E. LELAND

Producer/director Andrea Leland (MFA, Art Institute of Chicago) has produced and directed award-winning documentaries focusing on Caribbean cultures. She works collaboratively with tradition bearers providing a forum to voice their untold stories, personal challenges and compelling triumphs. Her films have won numerous awards and have screened at museums, conferences, educational institutions, and festivals throughout Europe, Latin America and the United States. Leland is a member of New Day Films, a social issue self-distribution cooperative. Residing on St. John in the USVI for 25+ years, she has seen firsthand the urgency of creating films about the ocean crisis.



CYNTHIA ABBOTT

Cynthia is an independent producer/director of award-winning short environmental films who believes the power of storytelling can change our collective vision of the ocean and create a new vision for the ocean's future—protected and thriving. An experienced cinematographer, editor and producer who has worked in Burma and Thailand, she has spent her adult life living near the ocean in California and Hawaii and is witness to its environmental demise. Compelled to take action, she produces videos on environmental issues to raise awareness and move people to take action.

ABOUT THE STUDY GUIDE AUTHOR

JENNIFER STOCK



Film guide author Jennifer Stock (BA, Biology/MS, Education) has worked in the field of environmental education primarily focused on ocean and climate literacy in the informal setting through non-profit and federal agency settings. She seeks to help people see, understand and experience what they can't from our perspective on land and help connect us to the ocean. As an experienced educator and lifelong learner, Jennifer often uses the phrases "I notice...I wonder." when observing the natural world. Try that at home or when out in nature and see what happens!

STUDY GUIDE DESIGN BY TRACY DEMARCO, ENVIRONMENTAL ADVOCATE
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THREE OCEAN ADVOCATES

A Study Guide

APPENDIX A: QUESTIONS FOR ALL THREE FILMS

1. Who (if any) do you look to for information related to ocean/climate health?
2. Why do you consider them trustworthy, reliable sources of information for the ocean? How can you educate others about seeking out accurate information?
3. Where do these advocates find sustenance or motivation to confront the challenges facing the ocean?
4. What fears or challenges do the advocates featured in the film present or face?

THREE OCEAN ADVOCATES

A Study Guide

APPENDIX B: STUDENT HANDOUT

Take a look at these questions below before each film is shown. During the film or shortly after, write some responses to each prompt.

1. Ocean Advocate featured in this film:

2. Images you saw that you won't forget:

3. Important quotes or statements you heard in the film:

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A Study Guide

APPENDIX B: STUDENT HANDOUT (CONT.)

4. I noticed...

5. I'm wondering...

6. I want to learn more about...

THREE OCEAN ADVOCATES

A Study Guide

APPENDIX C: QUESTIONS FOR REFLECTION

Questions to ask students if using Student Handout

1. What images did you see in the film(s) that you won't forget? Why?
2. What quotes or statements did you write down? Why did they stick out to you?
3. What did you notice throughout the film(s)?
4. What are you wondering about that you learned in the film(s)?

THREE OCEAN ADVOCATES

A Study Guide

APPENDIX C: QUESTIONS FOR REFLECTION (CONT.)

5. What were some similarities between the three people featured in the film(s)?

6. Which film segment was the most interesting to you? Why?

7. Which advocate in the film(s) was the most inspirational to you? Why?



THREE OCEAN ADVOCATES

A Study Guide

APPENDIX D: CONCEPTS/DEFINITIONS FEATURED IN THE FILMS

CLIMATE CHANGE – The burning of fossil fuels to make energy, creates excess carbon dioxide, a greenhouse gas trapping heat around planet earth. This excess carbon dioxide and heat is disrupting earth's systems and changing the typical patterns. Climate is the average weather in a place over many years. Climate change is a shift in the typical conditions that the earth has experienced over time and is causing global changes.

CORAL BLEACHING – When corals are stressed by changes in conditions such as temperature, light, or nutrients, they expel the symbiotic algae living in their tissues, causing them to turn completely white looking “bleached”. This kills the coral.

CYANOBACTERIA – A microbe that photosynthesizes and lives in association with other organisms. They can live in balance with reef habitats and provide food for grazers, but they can also cause disease. They can bore into and live within corals and cause death to coral tissues and coral skeletal structure increasing harm to coral reefs.

DOMOIC ACID – Domoic acid is a naturally occurring toxin produced by certain types of algae, it can be harmful or even fatal to humans if contaminated shellfish is consumed. Domoic acid can be fatal to people if consumed in high doses. West coast states where domoic acid shows up regularly test shellfish and take water samples to understand when it is in high concentrations and a danger for those who consume seafood. Domoic acid is associated with harmful algal blooms (HABs) which are on the rise with a warming ocean.

ENTANGLEMENT – When a wild animal in the ocean becomes wrapped up in plastic, usually fishing gear, but can also be plastic straps or six-pack plastic rings, putting the animal in danger of not being able to carry out its required strategies to live (feed, breathe, swim) which can result in death.

FOSSIL FUEL SUBSIDIES – A subsidy is when the government provides some of the cost for an industry providing a benefit to the industry such as tax breaks or payouts. For fossil fuels, these subsidies allow companies to pay less than their fair share in taxes or other fees and create special rules that reduce the true cost of oil and gas development and energy production, not to mention the cost of the harm to the global environment from producing and burning these products. Fossil fuel subsidies harm the environment and create disproportionate impacts on vulnerable communities.

MARINE DEBRIS – Any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment.

OCEAN ACIDIFICATION – Ocean acidification is the reduction in the pH of the ocean over an extended period of time, caused primarily by uptake of carbon dioxide (CO₂) from the atmosphere. Because of this change in pH, carbonates in the water that are needed by calcifying organisms are less available, causing stress and growth disruptions to many ocean organisms needing carbonates.





THREE OCEAN ADVOCATES

A Study Guide

APPENDIX D: CONCEPTS/DEFINITIONS FEATURED IN THE FILMS

PERSISTENT ORGANIC POLLUTANTS (POPs) – Chemicals known as “POPs” persist in the environment for a long period of time. They include polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs) used as flame retardants, and DDT, and are carried by the wind and rivers into the ocean. Most of the chemicals associated with plastics (plasticizers and other persistent organic pollutants) are “hydrophobic”, meaning they prefer to associate with (stick to) plastic or sediment than remain in the water. Therefore these chemicals become concentrated on plastics and can be slowly broken down once it is ingested. If plastic is handled or ingested by another animal (or human), those POPs can transfer. These chemicals are linked to endocrine disruptors and can lead to cancer.

STAKEHOLDER – A person who has a personal interest or concern about a larger topic or issue because it may affect their livelihood or personal life directly. For example, a fisherman is a stakeholder related to fisheries management decisions.

SUSTAINABLE – Something is sustainable if an activity is able to be maintained for generations to come.

WATERSHED – A region that contains drainage such as streams and rivers that eventually ends up in the ocean. It is estimated by the International Union for the Conservation of Nature (IUCN) that 95% of the plastic in the ocean makes its way to the ocean via watersheds globally.

APPENDIX E: SELECTED REFERENCES

[Reliance on wild caught and farmed seafood](#): 3 billion people on the planet rely on wild caught and farmed seafood.

[Marine Debris information](#): The NOAA Marine Debris Program is the U.S. Federal government's lead for addressing marine debris. Website has facts, figures and the latest research.

[Global Climate Dashboard](#): The National and Oceanic Administration climate portal. Click on several climate indicators to see long term data sets/trends related to climate.

[Coral Reef watershed related impacts.](#)

Climate Policy and Coral Reef and Coastal Wetlands Protections Can Help Communities Withstand Climate Impacts:
[Article by Emily Owen of the Pew Charitable Trust](#) about how coral reefs and coastal wetlands help coastal communities withstand climate impacts

