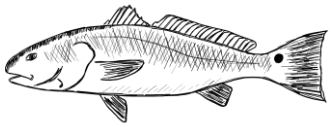


Redfish Revival Learning Guide

Grades 6-12

Contents

This Learning Guide supports the film, *Redfish Revival,* from the H-E-B Presents: Our Texas, Our Future film series. Watch the 16-minute film for free: https://ourtexasourfuture.com/stories/red-fish/

About This Resource

Redfish, also called red drum, rat red, bull red, and sometimes just red, is a popular fish among anglers along the Gulf Coast of Texas. Overfishing in the 1970s caused Texas's redfish population to greatly decline.

The film, *Redfish Revival,* and accompanying learning resources tell the story of how Texas's redfish decline motivated a group of passionate anglers to take action. Their efforts led to state legislation that enforced conservation efforts. As a result of this work and continued efforts, Texas enjoys a thriving redfish population along the coast today.

Learning Objectives

Students will...

1. DESCRIBE characteristics of the Gulf Coast of Texas, including identifying it as part of the Coastal Plains physical region of Texas.
2. IDENTIFY a predatory relationship in Texas's Gulf Coast ecosystem.
3. CREATE a food web and EXPLAIN how overfishing redfish impacted the ecosystem, including energy transfer.
4. DESCRIBE the overfishing of redfish in terms of supply and demand.
5. EXPLAIN how humans responded to the overfishing of redfish.
6. EVALUATE current methods of redfish hatcheries and DESIGN improvements.
7. EXPLORE coastal STEM careers.

Teaching Tips

This Learning Guide is written with grades 6-12 in mind. You can implement the full guide or select the learning objectives, standards, and discussion questions that will work best for your students.

Texas Essential Knowledge & Skills (TEKS) Science

Science TEKS, Adopted 2017	Science TEKS, Adopted 2020/21 *implementation begins fall 2024*
• **7(5)(B)** diagram the flow of energy through living systems, including food chains, food webs, and energy pyramids • **8(11)(C)** recognize human dependence on ocean systems and explain how human activities such as runoff, artificial reefs, or use of resources have modified these systems • **BIO(12)(A)** interpret relationships, including predation, parasitism, commensalism, mutualism, and competition, among organisms • **BIO(12)(C)** analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids • **ENV(3)(E)** describe the connection between environmental science and future careers • **ENV(5)(E)** analyze and evaluate the economic significance and interdependence of resources within the environmental system • **ENV(9)(E)** evaluate the effect of human activities, including habitat restoration projects, species preservation efforts, nature conservancy groups, hunting, fishing, ecotourism, all-terrain vehicles, and small personal watercraft, on the environment	• **6-8(4)(C)** research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field to investigate STEM careers • **6-8(5)(B)** identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems • **6(12)(B)** describe and give examples of predatory, competitive, and symbiotic relationships between organisms, including mutualism, parasitism, and commensalism • **7(11)(B)** describe human dependence and influence on ocean systems and explain how human activities impact these systems • **7(12)(A)** diagram the flow of energy within trophic levels and describe how the available energy decreases in successive trophic levels in energy pyramids • 8(12)(A) explain how disruptions such as population changes, natural disasters, and human intervention impact the transfer of energy in food webs in ecosystems • **BIO&ENV(4)(C)** research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field in order to investigate STEM careers • **BIO(13)(A)** investigate and evaluate how ecological relationships, including predation,

	parasitism, commensalism, mutualism, and competition, influence ecosystem stability • **ENV(6)(E)** analyze and evaluate the economic significance and interdependence of resources within the local environmental system • **ENV(11)(A)** evaluate the negative effects of human activities on the environment, including overhunting, overfishing, ecotourism, all-terrain vehicles, and personal watercraft • **ENV(11)(B)** evaluate the positive effects of human activities on the environment, including habitat restoration projects, species preservation efforts, nature conservancy groups, game and wildlife management, and ecotourism

Texas Essential Knowledge & Skills (TEKS) Social Studies

Social Studies TEKS, Adopted 2018	Social Studies TEKS, Adopted 2022 *implementation begins fall 2024*
• **7(8)(A)** locate and compare the Mountains and Basins, Great Plains, North Central Plains, and Coastal Plains regions • **7(8)(B)** locate and compare places of importance in Texas in terms of physical and human characteristics such as major cities, waterways, natural and historic landmarks, political and cultural regions, and local points of interest • **7(9)(A)** identify ways in which Texans have adapted to and modified the environment and explain the positive and negative consequences of the modifications • **7(9)(B)** explain the impact of economic concepts within the free enterprise system such as supply and demand, profit, and world competition on the economy of Texas • **7(19)(C)** analyze the effects of various scientific discoveries and technological innovations on the development of Texas such as advancements in the agricultural, energy, medical, computer, and aerospace industries • **7(20)(A)** differentiate between, locate, and use valid primary and secondary sources such as media and news services, biographies, interviews, and artifacts to acquire information about Texas	• **7(8)(A)** locate and compare the Mountains and Basins, Great Plains, North Central Plains, and Coastal Plains regions • **7(8)(B)** locate and compare places of importance in Texas in terms of physical and human characteristics such as major cities, waterways, natural and historic landmarks, political and cultural regions, and local points of interest • **7(9)(A)** identify ways in which Texans have adapted to and modified the environment and explain the positive and negative consequences of the modifications • 7(9)(B) explain the impact of economic concepts within the free enterprise system such as supply and demand, profit, and world competition on the economy of Texas • **7(19)(C)** analyze the effects of various scientific discoveries and technological innovations on the development of Texas such as advancements in the agricultural, energy, medical, computer, and aerospace industries • **7(20)(A)** differentiate between, locate, and use valid primary and secondary sources such as media and news services, biographies, interviews, and artifacts to acquire information about Texas

Next Generation Science Standards (NGSS)

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

The performance expectation listed above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science & Engineering Practices

Constructing Explanations and Designing Solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific principles to design an object, tool, process, or system.

Disciplinary Core Ideas

ESS3.C: Human Impacts on Earth Systems

Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.

- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.

Crosscutting Concepts

Cause and Effect

- Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.

HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

The performance expectation listed above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science & Engineering Practices

Constructing Explanations and Designing Solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.

- Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

Disciplinary Core Ideas

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- Moreover, anthropogenic changes (induced by human activity) in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an ecosystem and threaten the survival of some species.

LS4.D: Biodiversity and Humans

- Biodiversity is increased by the formation of new species (speciation) and decreased by the loss of species (extinction). (secondary)
- Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. Thus sustaining biodiversity so that ecosystem functioning and productivity are maintained is essential to supporting and enhancing life on Earth. Sustaining biodiversity also aids humanity by preserving landscapes of recreational or inspirational value. (secondary) (Note: This Disciplinary Core Idea is also addressed by HS-LS4-6.)

ETS1.B: Developing Possible Solutions

- When evaluating solutions it is important to take into account a range of constraints including cost, safety, reliability and aesthetics and to consider social, cultural and environmental impacts. (secondary)

Crosscutting Concepts

Stability and Change

- Much of science deals with constructing explanations of how things change and how they remain stable.

Redfish Revival

English Resources

Academic Vocabulary

From: lead4ward Academic Vocab https://lead4ward.com/resources/

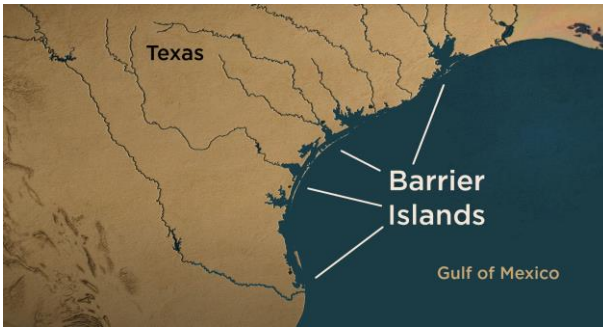
Grade 6 Science	Grade 7 Science	Grade 8 Science
• ecosystem • organism • species • population	• ecosystem • ecoregion • energy pyramid • environment • environmental change • flow of energy • food chain • food web • habitat • offspring • organism • species • trophic levels • sustainability	• ecosystem • environment • environmental change • energy pyramid • flow of energy • food chain • food web • habitat • offspring • organism • population • predator-prey relationship • species • sustainability • trophic level

Biology	Grade 7 Social Studies
• ecosystem • environment • environmental change • ecological pyramid • energy pyramid • flow of energy • food chain • food web • habitat • impact • offspring • organism • population • predator • predation • species	• coast • regions • modify • modifications • modified the environment • negative consequences • positive consequences • environment • economic impact • supply and demand

Background Reading

The Gulf Coast of Texas

Texas's coast spans about 370 miles along the Gulf of Mexico. Here land, streams, and rivers meet the salty waters of the Gulf, creating wetlands, estuaries, and bays. This area of Texas makes up the Gulf Prairies and Marshes ecoregion which is a part of the Coastal Plains physical region of Texas.



Map of Texas's Barrier Islands
Image: Fin & Fur Films Productions

- A **wetland** is an area of land where water covers the ground either all year or seasonally.
- An **estuary** is an area where fresh water from rivers and streams meets the salty waters of an ocean. The mixing of salt water and fresh water creates **brackish water**, water that is less salty than the ocean but more salty than fresh water. In estuaries, the **salinity** (the amount of salt dissolved in a body of water) can change over time as the flow of fresh water from rivers and streams varies and the ocean tides change.
- A **bay** is a body of water partially surrounded by land and connected to the ocean.

A unique feature of Texas's coast is the barrier islands that separate the wetlands, estuaries, and bays from the rest of the Gulf. These long sandy islands protect the coast from strong waves and currents. See the map above of Texas's barrier islands.

Thousands of animals including fish, shellfish, birds, and many others live along the Texas Gulf Coast. This area also includes a great diversity of plant life. Many people live along the coast and visit for recreation. To learn more about coastal habitats and the plants and animals that live there, visit Sea Center Texas's Coastal Habitats Overview webpage.

In the past, this area of Texas was covered by over 9 million acres of native grasslands and wetlands. Some forested areas were found along the many rivers that lead to the Gulf of Mexico. Over time, human development has greatly changed the landscape of this region: land has been cleared for farming, natural wildfires have been prevented, and cities and suburban areas have been developed. About 90% of the natural prairie land has been cleared. All this human activity has changed river flows and impacted the water quality of bays, estuaries, and wetlands (TPWD, 2010).

Since the early 1900s, groups of conservationists have taken an interest in different parts of the Texas Gulf Coast ecosystem and have worked to support and conserve native plant life and wildlife.

One example of this work includes the Migratory Bird Hunting Stamp Act (often called the "Duck Stamp Act"). This federal act was passed by the US Congress in 1934 and signed by President Franklin D. Roosevelt (FDR). It requires waterfowl hunters aged 16 years old and over to annually buy and carry a Migratory Bird Hunting and Conservation Stamp, also called a Federal Duck Stamp. The funds

collected from stamp sales are used to provide a source of funding to buy and preserve the wetlands vital to the survival of migratory waterfowl (U.S. Fish & Wildlife Service, n.d.). "Waterfowl" is another word for water birds, such as ducks, geese, and swans. The wetlands preserved also provide the necessary habitat for many other birds, fish, mammals, and plants.

The film, *Redfish Revival,* tells the story of how a group of passionate South Texas anglers worked together to save the redfish, a popular sport fish, when they saw the redfish population drastically decline in the 1970s due to overfishing.

Redfish (*Sciaenops ocellatus*)

This fish has many names. Redfish are also called red drum, rat red, bull red, and sometimes just red. In Spanish, a redfish is often called corvina roja. Other common Spanish names include corvina, trucha pinta, pez colorado, and sometimes just colorado.

The tail of a redfish
Photo: Fin & Fur Films Productions

Redfish Facts:

- Color - They can range in color from a deep blackish, coppery color to nearly silver, but are most commonly reddish bronze. Redfish are often recognized by the black spot on their tails.
- Size - By the age of 3, a redfish is typically 22-24 inches long and weighs 6-8 pounds.
- Habitat - Young redfish live in bays and estuaries along the Texas Coast. When they mature, most move out to live in the Gulf of Mexico, but some remain in the bays and estuaries.
- Diet - Young redfish feed on small crabs, shrimp, and marine worms. As they grow, they begin to feed on larger crabs, shrimp, and small fish. (TPWD, Red Drum, n.d.)

STEM Careers

MANY paths lead to working in the fields of science, technology, engineering, and mathematics (STEM).

Two STEM professionals highlighted in this video work for the Coastal Conservation Association (CCA). CCA advises and educates the public on the conservation of marine resources. CCA's goal is to conserve, promote, and enhance the present and future availability of coastal resources for the benefit and enjoyment of the general public.

Pat Murray
Photo: Fin & Fur Films Productions

- Pat Murray - National President of the Coastal Conservation Association (CCA)

  In his role as National President, Pat oversees the operations of CCA including participating in advocacy activities, fundraising, public outreach, and communications.

He is also the publisher of TIDE magazine, a coastal outdoors magazine that is read by more than 100,000 subscribers.

Before joining CCA, Pat owned and operated a fishing guide service along the Texas Coast.

Pat studied philosophy as an undergraduate. Since then, he has continued learning by exploring social enterprise development, nonprofit leadership, and executive education. Pat's journey into conservation has been driven by his passion for recreational fishing.

- Shane Bonnot - Advocacy Director at the Coastal Conservation Association (CCA)

  In his role as Advocacy Director, Shane works on interests and policies that are vital to the long-term sustainability of coastal marine resources.

  Shane earned a Bachelor of Science (BS) degree from Texas A&M University in Animal Science and a Master of Science (MS) degree from Texas A&M University–Corpus Christi.

  His past jobs include working as a hatchery biologist for the Texas Parks and Wildlife – Coastal Fisheries Division and as an oyster hatchery manager at the Virginia Institute of Marine Science.

Take Action

The film, *Redfish Revival,* highlights the importance of harvesting seafood responsibly. Taking fish and other marine life out of their environment faster than their population can reproduce negatively impacts that species and the ecosystem as a whole.

The choices we make as consumers impact harvesting practices.

Redfish
Photo: Fin & Fur Films Productions

If we choose to only consume sustainably harvested seafood, the demand for this type of seafood will go up and more companies will harvest products in this way.

Sustainable seafood is wild-caught or farmed seafood harvested/produced in ways that protect the long-term health of fish populations and ecosystems (NOAA, n.d.).

Learn more about sustainable seafood here:

- NOAA FishWatch U.S. Seafood Facts - Sustainable Seafood
- NOAA Fisheries - Sustainable Seafood: Seafood Profiles

Learn more about Texas aquatic ecosystems here:

- Sea Center Texas
- Texas State Aquarium

Discussion Questions

The Gulf Coast of Texas & Redfish

1. What did you notice about the ecosystem where this video was filmed? List at least five characteristics of the ecosystem you observed in the video.
2. In what Texas region does this video take place? (Mountains and Basins, Great Plains, North Central Plains, or Coastal Plains)
3. How is this area of Texas similar to where you live? Or different? Explain.
4. Have you ever been to the Texas Gulf Coast before? If so, share your experience.
5. Do you have any experience fishing for or eating redfish? If so, share your experience.

Ecological Relationships

6. Humans fishing for and eating redfish is an example of what type of ecological relationship? (predatory, competitive, or symbiotic)
7. Sketch a food web to show the relationship between humans, redfish, and other organisms in the ecosystem.
    a. For more information about plant and animal life along the Texas Gulf Coast, visit Sea Center Texas's Coastal Habitats Overview webpage.
    b. For Grade 7: To further investigate the available energy in this ecosystem, also create an energy pyramid with the same organisms used in the food web.
8. How did the relationship between humans and redfish get out of balance? Describe the imbalance in terms of supply and demand.
9. What was the impact of this imbalance? Refer to the food web and/or energy pyramid you sketched to help you create a response to this question.
10. What did people do when they realized the imbalance?
11. What has been the impact of these changes?

Monitoring Human Impacts

12. What are some ways scientists and anglers can make sure redfish are not overharvested again?
13. To run the redfish hatcheries in Texas, fish are collected from the wild and put into large indoor tanks. By adjusting the light and the temperature of the water, the fish spawn for several months. The original organisms and their young offspring are then released into bays and estuaries.
    a. What are some positive impacts of this process of aquaculture?
    b. Do you have any ideas for how to improve this process? Explain.

STEM Careers

14. In the video, Pat Murray explains that as soon as he learned that a person could be a fishing guide for their job, he knew that was what he wanted to do. Have you ever had an experience like that, when you saw or heard something and immediately knew you wanted to do that? You may not have had this experience related to a job, but perhaps you have experienced this feeling in another part of your life. Share your experience.
15. This video highlights a few different ways to work in a STEM career along the coast: as a fishing guide, as a manager of a fish hatchery, and as a conservation advocate. Choose one of these career paths.
    a. What are two things you know you would like about the path?
    b. Are there any things you think you would dislike?
    c. What are two questions you have about the career path?

Name _____

Redfish Revival
Discussion Question Responses

Directions: After watching the film, *Redfish Revival,* answer the discussion questions. For each question, first write the number of the question and then write your answer.

Answer Key - Discussion Questions

The Gulf Coast of Texas & Redfish

1. Answers will include at least five characteristics of Texas's Gulf Coast ecosystem.
2. This video takes place in the Coastal Plains region of Texas.
3. Students will describe how the area where they live is similar or different from the ecosystem shown in the film.
4. Students will describe any prior experiences they've had visiting or living along the Gulf Coast of Texas.
5. Students will describe any prior experiences they've had fishing for or eating redfish.

Ecological Relationships

6. Humans fishing for and eating redfish is an example of a predatory ecological relationship.
7. Students will sketch a food web that shows energy transfer from the Sun → producers → redfish prey (such as shrimp) → redfish → humans and possibly other consumers. For more information about plant and animal life along the Texas Gulf Coast, visit Sea Center Texas's Coastal Habitats Overview webpage. This link is included in the Background Reading and in question #7. Students in Grade 7 will also create an energy pyramid with the same organisms used in the food web.
8. The demand for redfish as a food item increased in the 1970s. It was often on the menu at restaurants. As a result, commercial fishing operations worked to meet that demand by harvesting large quantities of redfish from Texas's coast. Since the source of the supply relied on the natural reproduction process of redfish and redfish were not reproducing fast enough to meet the demand, the supply of redfish along the Texas Coast decreased.
9. As a result of this imbalance, recreational anglers began to notice that there were not as many redfish in the water. This meant there were not as many redfish for people to eat. Although this topic is not addressed in the video, one could infer that the declining redfish population also impacted redfish prey and other predators that eat redfish.
10. When people realized the redfish population was declining, some anglers decided to work with the Texas Legislature to change the laws around harvesting redfish. After a lot of work, the Texas Legislature established bag limits for redfish, meaning there was a limit to how many redfish could be caught. After a couple of years, another measure was passed that made it completely illegal to sell redfish commercially.
11. At first, some commercial fishing operations did not stop harvesting redfish and game wardens had to enforce the new regulations. The redfish population was still small, and a freeze, a year after commercially selling redfish was outlawed, further hurt the population. This caused conservationists to focus on fish hatcheries. In this process, redfish are collected from the Gulf, spawned in indoor tanks, and then released back into the environment with their young. The enhancement program has grown, and redfish populations are thriving today.

Monitoring Human Impacts

12. To ensure redfish are not overharvested, scientists, anglers, and conservationists can monitor the redfish population numbers in the wild, making sure there is a healthy number of redfish in the Gulf. They can also determine a limit on the number of redfish an angler can catch and keep each day. Monitoring how many redfish are being produced in hatcheries and released into the wild is another way to make sure redfish are not overharvested.
13. Some positive impacts of producing and raising redfish in hatcheries are:
    - This process creates a constant supply of new redfish that are released into the wild.
    - This process supports the health of the ecosystem by maintaining the redfish population.
    - It also increases the number of redfish in the Gulf for anglers.

    Student responses on how to improve this process will vary.

STEM Careers

14. Students will provide an example of a time when they saw or heard something and were immediately drawn in.
15. Responses will vary:
    - Students will list two things they would like about a specific STEM career path that involves working along the coast.
    - Students will describe anything they don't think they will like about that STEM career path.
    - Students will create two questions they have about this career path.

Redfish Revival

Spanish Resources

Acerca de este recurso

La corvina roja, también denominada corvina, trucha pinta, pez colorado, y a veces sólo colorado, es un pez popular para los pescadores a lo largo de la costa del Golfo de Texas. La sobrepesca en la década de 1970 causó que disminuyera mucho la población de corvinas rojas en Texas.

El video llamado *El renacimiento de la corvina roja* y los recursos educativos que lo acompañan cuentan la historia de cómo el declive de la población de corvinas rojas en Texas motivaba a un grupo de pescadores apasionados a actuar. Sus esfuerzos condujeron a la legislación estatal que reforzó las medidas de conservación. Como resultado de este trabajo y sus esfuerzos continuos, Texas disfruta una población próspera de corvina roja a lo largo de la costa en la actualidad.

La corvina roja
Foto: "Fin & Fur Films Productions"

Vocabulario académico

De: lead4ward Academic Vocab https://lead4ward.com/resources/

6º Grado Ciencias	7º Grado Ciencias	8º Grado Ciencias
• ecosistema • organismo • especie • población	• ecosistema • ecorregión • pirámide de energía • medio ambiente • cambio medioambiental • flujo de energía • cadena alimenticia • red alimenticia • hábitat • descendientes • organismo • especie • nivel trófico • sostenibilidad	• ecosistema • medio ambiente • cambio medioambiental • pirámide de energía • flujo de energía • cadena alimenticia • red alimenticia • hábitat • descendientes • organismo • población • relación depredador-presa • especie • sostenibilidad • nivel trófico

Biología	7º Grado Estudios Sociales
• ecosistema • medio ambiente • cambio medioambiental • pirámide ecológica • pirámide de energía • flujo de energía • cadena alimenticia • red alimenticia • hábitat • impacto • descendientes • organismo • población • depredador • depredación • especie	• costa • regiones • modificar • modificaciones • modificó el medio ambiente • consecuencias negativas • consecuencias positivas • medio ambiente • impacto económico • oferta y demanda

Lectura de fondo

La costa del Golfo de Texas

La costa de Texas se extiende aproximadamente 370 millas a lo largo del Golfo de México. Aquí se reúnen tierra, arroyos, y ríos con las aguas saladas del Golfo, creando humedales, estuarios, y bahías. Esta área de Texas compone la ecorregión llamada las Marismas y Praderas del Golfo, la cual forma parte de la región física de Texas llamada las Llanuras Costeras.

Mapa de las islas barrera de Texas
Imagen: "Fin & Fur Films Productions"

- Un **humedal** es un área de tierra en dónde el agua cubre la tierra durante todo el año o estacionalmente.
- Un **estuario** es un área en que el agua fresca de los ríos y arroyos se une con las aguas saladas del océano. La mezcla del agua salada y el agua fresca de crea **agua salobre**, agua menos salada que el agua del océano, pero más salada que el agua fresca. En los estuarios, **la salinidad** (la cantidad de sal disuelta en una masa de agua) puede cambiar con el tiempo mientras varie el flujo de agua fresca de los ríos y arroyos y cambian las mareas oceánicas.
- Una **bahía** es una masa de agua parcialmente rodeada de tierra y conectada al océano.

Una característica única de la costa de Texas son las islas barreras que separan los humedales, estuarios, y bahías del resto del Golfo. Estas largas islas arenosas protegen la costa de Texas de fuertes olas y corrientes. Mira el mapa arriba de las islas barreras de Texas.

Miles de animales, incluso peces, mariscos, aves, y muchos otros, viven a lo largo de la costa del Golfo de Texas. Esta área también incluye una gran diversidad de flora. Mucha gente vive a lo largo de la costa y visitan por ocio. Para aprender más sobre los hábitats costeros y las plantas y los animales que viven ahí, visita el sitio web de "Sea Center Texas: Coastal Habits Overview."

Anteriormente, este área de Texas se cubría por más de 9 millones de acres praderas nativas y humedales. Algunas zonas boscosas se encontraron a lo largo de los ríos que conducen al Golfo de México. Con el tiempo, el desarrollo del paisaje de esta región por el hombre lo ha cambiado mucho: la tierra se ha desbrozado para la agricultura, se han evitado incendios naturales, y se han desarrollado las ciudades y zonas urbanas. Aproximadamente 90% de la pradera natural ha sido talada. Toda esta actividad humana ha cambiado el flujo de los ríos y ha impactado la calidad del agua en las bahías, estuarios, y humedales (TPWD, 2010).

Desde principios de la década de 1900, unos grupos de conservacionistas se han interesado por las varias partes del ecosistema de la costa del Golfo de Texas y han trabajado para apoyar y conservar la flora y fauna nativa.

Un ejemplo de este trabajo incluye la Ley de Sellos de Caza de Aves Migratorias (a menudo llamada la "Ley del Sello del Pato"). Se aprobó esta ley por el congreso de

EE.UU. en 1934 y fue firmado por el presidente Franklin D. Roosevelt (FDR). Requiere que cada año los cazadores de aves acuáticas de 16 años o más compren y lleven un Sello de Caza de Aves Migratorias y Conservación, también llamado el Sello Federal del Pato. Los fondos recaudados por la venta de sellos se usan para comprar y preservar los humedales vitales para la supervivencia de las aves acuáticas migratorias (U.S. Fish & Wildlife Service, n.d.). "Ave acuática" es un término que incluye patos, gansos, y cisnes. Los humedales preservados además proveen el hábitat necesario para muchas otras aves, peces, mamíferos, y plantas.

El video llamado *El renacimiento de la corvina roja* cuenta la historia de cómo un grupo de pescadores apasionados del sur de Texas trabajaron juntos para salvar la corvina roja, un pez deportivo popular, después de ver el declive drástico de la población de ella en la década de 1970, debido a la sobrepesca.

Corvina roja (*Sciaenops ocellatus*)
Este pez tiene muchos nombres. La corvina roja también se denomina corvina, trucha pinta, pez colorado, y a veces sólo colorado.

Hechos sobre la corvina roja:


La cola de una corvina roja
Foto: "Fin & Fur Films Productions"

- Color –Pueden variar en color desde un profundo color negruzco cobrizo a un color casi de plata, pero la mayoría son de color bronce rojizo. La corvina roja suele reconocerse por la mancha negra en su cola.
- Tamaño – A los 3 años de edad, una corvina normalmente mide 22-24 pulgadas de largo y pesa 6-8 libras.
- Hábitat – Las corvinas jóvenes viven en bahías y estuarios a lo largo de la costa tejana. Cuando maduren, muchas de ellas se mudan a vivir en el Golfo de México, pero algunas se quedan en las bahías y estuarios.
- Dieta - Las corvinas jóvenes se alimentan de pequeños cangrejos, camarones, y gusanos marinos. Mientras crezcan, empiezan alimentándose de cangrejos y camarones más grandes y de pequeños peces.
  (TPWD, Red Drum, n.d.)

Carreras STEM
MUCHOS caminos conducen a trabajar en los ámbitos de la ciencia, la tecnología, la ingeniería, y las matemáticas (STEM).

Dos profesionales de STEM destacados en este video trabajan con la Asociación para la Conservación de la Costa, Coastal Conservation Association (CCA). La CCA asesora y educa al público acerca de la conservación de recursos marinos. La meta de la CCA es conservar, promover, y mejorar la disponibilidad actual y futura de los recursos costales para el beneficio y diversión del público.

- Pat Murray – Presidente nacional de la Asociación para la Conservación de la Costa (CCA)

Pat Murray
Foto: "Fin & Fur Films Productions"

En su cargo de presidente nacional, Pat supervisa las operaciones de la CCA, incluso participando en actividades de promoción, recaudación de fondos, divulgación pública, y las comunicaciones.

Él también es editor de la revista *TIDE*, una revista sobre las actividades costeras al aire libre que se lee por más de 100,000 suscriptores.

Antes de unirse con la CCA, Pat tenía y dirigía un servicio de guías de pesca a lo largo de la costa de Texas.

Pat estudió Filosofía en la universidad. Desde entonces, él ha continuado aprendiendo a través del estudio del desarrollo de empresas sociales, el liderazgo de organizaciones sin fines de lucro, y la educación ejecutiva. La pasión de Pat por la pesca recreativa ha impulsado su trayectoria en el ámbito de la conservación.

- Shane Bonnot – Director de abogacía de la Asociación para la Conservación de la Costa (CCA)

  En su cargo de director de abogacía, Shane trabaja por los intereses y políticas vitales a la sostenibilidad duradera de los recursos marinos costeros.

  Shane obtuvo una Licenciatura (BS) de la Universidad de Texas A&M en Zootecnia y una Maestría en Ciencias (MS) de la Universidad de Texas A&M–Corpus Christi.

  Sus trabajos anteriores incluyeron ser biólogo de incubadoras para el Departamento de Parques y Fauna Salvaje de Texas– la División de Pesca Costera, y también ser gerente de un criadero de ostras en el Instituto de Ciencias Marinas de Virginia.

Tomar medidas

El video llamado *El renacimiento de la corvina roja* destaca la importancia de pescar marisco de forma responsable. Sacar peces y otra fauna marina de su entorno más rápido de lo que su población pueda reproducirse puede repercutir negativamente a esa especie y al ecosistema entera.

Las decisiones que tomamos como consumidores repercuten en las prácticas de recolección.

Si elegimos consumir sólo marisco capturado de forma sostenible, la demanda para este tipo de marisco aumentará, y más compañías pescarán mariscos de esta forma.

Productos del mar sostenibles incluyen marisco salvaje o de piscifactoría que se recolecte o se produzca de maneras que protegen la salud a largo plaza de las poblaciones de mariscos y de los ecosistemas (NOAA, n.d.).

Aprende más acerca de mariscos sostenibles aquí:

- NOAA FishWatch U.S. Seafood Facts - Sustainable Seafood
- NOAA Fisheries - Sustainable Seafood: Seafood Profiles

Aprende más sobre los ecosistemas acuáticos de Texas aquí:

- Sea Center Texas
- Texas State Aquarium

Preguntas de discusión

La costa del Golfo de Texas & la corvina roja

1. ¿Qué notaste sobre el ecosistema en donde se filmó este video? Enumera al menos cinco características del ecosistema que observaste en el video.
2. ¿En cuál región de Texas tiene lugar este video? (la Cuenca y la Cordillera, las Grandes Llanuras, las Praderas Ondulantes, o las Marismas y Praderas del Golfo)
3. ¿En qué se parece esta zona de Texas a su lugar de residencia? ¿O en qué se diferencia? Explica.
4. ¿Has ido alguna vez a la costa del Golfo de Texas? De ser así, comparte tu experiencia.
5. ¿Tienes experiencia pescando o comiendo corvina roja? De ser así, comparte tu experiencia.

Relaciones ecológicas

6. ¿Los humanos que pescan y comen la corvina roja son un ejemplo de cuál tipo de relación ecológica? (depredadora, competitiva, o simbiótica)
7. Dibuja una red alimenticia para mostrar la relación entre los humanos, las corvinas rojas, y otros organismos en el ecosistema.
    a. Para encontrar más información acerca de la flora y fauna a lo largo de la costa del Golfo de Texas, visita el sitio web "Sea Center Texas: Coastal Habits Overview."
    b. Para el 7º Grado: Para investigar más sobre la energía disponible en este ecosistema, crea una pirámide de energía con los mismos organismos usados en la red alimenticia.
8. ¿Cómo se desequilibró la relación entre los humanos y las corvinas rojas? Describe el desequilibrio en términos de oferta y demanda.
9. ¿Qué fue el impacto de este desequilibrio? Consulta la red alimenticia y/o la pirámide de energía que dibujaste para ayudarte a responder esta pregunta.
10. ¿Qué hizo la gente al darse cuenta del desequilibrio?
11. ¿Qué ha sido el impacto de estos cambios?

Seguimiento del impacto humano

12. ¿Qué pueden hacer los científicos y pescadores para garantizar que nunca más se cosechen en exceso las corvinas rojas?
13. Para operar los criaderos de corvina roja en Texas, recogen los peces de la naturaleza y los colocan en grandes tanques de interior. Regulando la luz y la temperatura del agua, los peces desovan por unos meses. Los organismos originales y sus crías se liberan en bahías y estuarios.
    a. ¿Cuáles son unos efectos positivos de este proceso de acuicultura?
    b. ¿Tienes otras ideas para mejorar este proceso? Explica.

Carreras STEM

14. En el video, Pat Murray dice que tan pronto como se enteró que alguien podía ser guía de pesca por su trabajo, sabía que eso fue lo que quería hacer. ¿Has tenido una experiencia como esa, una en que viste u oíste algo e inmediatamente supiste que querías hacerlo? Tu experiencia probablemente no se relacionó a un trabajo, pero tal vez hayas experimentado este sentimiento en otro aspecto de tu vida. Comparte tu experiencia.

Continúa en la siguiente página.

15. El video destaca algunas carreras STEM a lo largo de la costa: como guía de pesca, gerente de un criadero de peces, o defensor de la conservación. Elige una carrera.
    a. ¿Cuáles dos cosas quieres saber sobre esa carrera?
    b. ¿Hay aspectos de la carrera que no te gustarían?
    c. ¿Qué son dos preguntas que tienes acerca de esa carrera?

Nombre _____

El renacimiento de la corvina roja
Respuestas a las preguntas de discusión

Instrucciones: Después de ver el video, *El renacimiento de la corvina roja*, contesta las preguntas de discusión. Para cada pregunta, primero escribe el número de la pregunta y luego escribe tu respuesta.

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