

# Perspectives from The Gulf of Mexico Shrimp Fishery

**1. Title:** Perspectives from The Gulf of Mexico Shrimp Fishery

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**3. Abstract:** This case study explores the social and environmental ramifications that exist in a dynamic fishery, and provides an opportunity for students to perform a series of exercises involving socio-environmental synthesis. Developed for upper-level undergraduates and graduate courses, students assume and develop the persona of a shrimp fisher in the Gulf of Mexico whose demographics, values, worldview, community, and experiences are markedly different from their own. Students are provided with data on Gulf anthropologies, Environmental Regulations, and Environmental Policy. Throughout the course of the case, students individually present their persona as it develops based on learning about evolving environmental, regulatory, and cultural dynamics. After immersing themselves in their shrimper persona; at the end of the case, students work together as members of the Southern Shrimp Alliance to develop a persuasive testimony prepared for a representative to present at the next hearing on the reauthorization of the Magnuson-Stevens Act.

**4. What course(s) is this case appropriate for?** Environmental Ethics, Environmental Regulations, Environmental Policy

**5. What level is this case appropriate for?** Graduate, May be scaled for use with Upper-level Undergraduates

## **6. SES Learning Goals:**

1. Ability to describe the Gulf of Mexico shrimp fishery as a socio-environmental system, including the environmental and social components and their interactions.
2. Ability to co-develop research questions and conceptual models in inter- or trans-disciplinary teams.
  - Value different ways of knowing and understand the value of different knowledge sources and worldviews.
  - Ability to identify potential users of and applications for research findings.
3. Ability to find, analyze, and synthesize existing data.
  - Ability to integrate different types of data (interdisciplinary integration).
4. Ability to consider the importance of scale and context in addressing socio-environmental problems.
  - Understand that ecological and social processes often vary across differing contexts, including space, time, and conditions (e.g. economic or political).
  - Understand that ecological and social processes interact across different scales.

## **7. Learning Objectives:**

1. Understand the concept of socio-environmental systems generally, but as applied to the context of the Gulf of Mexico shrimp fishery
2. Understand natural resource dependency as part of cultural identity
3. Articulate one's own worldview and relate it to those of the shrimpers

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4. Interpret data to gain knowledge of different cultural and environmental worldviews
5. Practice cross-cultural environmental communication skills
6. Evaluate the applications of selected Environmental Regulations
7. Explain and Evaluate the socio-environmental system of the Gulf of Mexico shrimp fishery using the Cohen framework (described in **Classroom Management**).

### 8. Introduction/Background

Sea turtles are ancient air-breathing reptiles that have inhabited the planet far longer than humans. They live in most of the world's oceans and migrate thousands of miles annually to feeding grounds in temperate regions. There are seven species of sea turtles found around the world. The six sea turtle species that occur in U.S. waters (green *Chelonia mydas*, loggerhead *Caretta caretta*, olive ridley *Lepidochelys olivacea*, Kemp's ridley *Lepidochelys kempii*, leatherback *Dermochelys coriacea*, and hawksbill *Eretmochelys imbricata*) are covered by the Convention of International Trade on Endangered Species (CITES) and five of them are protected under the 1973 U.S. Endangered Species Act (ESA) as either threatened or endangered species.

Trawls are used in most countries of the world to harvest valuable resources of shrimps and prawns. Bycatch is one of the most significant issues affecting fisheries management today. Bycatch is defined as that part of the capture that is discarded at sea, dead (or injured to an extent that death is the result). Capture, in turn, means all that is taken in the gear. The capture can be divided into three components: (a) the portion retained because it has economic value (catch), (b) the portion discarded at sea dead (bycatch), and (c) the portion released alive (release). In this sense, the term bycatch has a clear negative connotation for fishers or environmentalists, and programs and actions to 'reduce bycatch' can be considered as ways to improve the fishery, without being detrimental to the fishers. Bycatches can affect biodiversity through impacts on top predators, the removal of individuals from many species, or by elimination of prey. The bycatch issue is also one of waste; the millions of tons of protein dumped in the ocean, and the waste of animal lives is often condemned on moral grounds. For the economist, it generates additional costs without affecting the revenues, and may hinder profitability. For the fishers, it causes conflicts among fisheries, it gives fishers a bad public image, generates regulations and limitations on the use of resources, and frequently has negative effects on the resources harvested through the mortality of juvenile and undersized individuals of the target species before they reach their optimal size from the point of view of future yield.

Incidental mortality of species which are long-lived and have low reproductive rates is a conservation problem affecting marine mammals, sea birds, sea turtles, sharks, and other groups. Sea turtles are one of the most critically endangered groups of species to be taken incidentally in some of these trawl fisheries. Since sea turtles are air-breathing reptiles, they drown unless the trawl is pulled out of the water frequently. The urgency to reduce the bycatch reflects a clear conservation issue. Sea turtle bycatch falls under the aegis of two pieces of legislation, the ESA and the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The MSA guides management of U.S. fisheries in its exclusive economic zone (EEZ) (3–200 nautical miles from shore). The MSA specifies that bycatch related mortality of non-target fish should be minimized and sea turtles are implicitly included in the definition of "fish" under the MSA. In addition, the MSA authorizes (but does not require) NOAA Fisheries to place scientific observers on vessels for conservation and management of federal fisheries. However, authority

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of NOAA Fisheries under the MSA does not extend to state fisheries, where many incidental takes of sea turtles occur.

Technology has played a role in mitigating the problem. Turtle Excluder Devices (TEDs) were installed in nets to let go sea turtles that entered. A TED is a type of escape hatch in a trawling net that allows large animals like sea turtles and other animals to be filtered out and released back into the ocean, while retaining the shrimp catch. TEDs consist of rigid or soft structures that direct those species larger than the spacing of vertical bars that create a grid out of the net. With regard to mortality rates, in 1981, NOAA Fisheries found that proper use of TEDs resulted in 97% reduction in sea turtle deaths. In addition to TEDs, some area closures reduce captures when high numbers of sea turtles are present, especially during peak nesting periods. In some cases captured turtles can be released alive after a 'resuscitation' procedure.

The original TED arose from a melding of ideas from a fisherman and a government scientist. Despite this, much of the shrimp fishing industry viewed the TED with suspicion, because scientists developed it within a government controlled invention system. The shrimp fishing industry felt that government personnel had developed the TED without industry input and were forcing it on them as the only acceptable solution to the turtle bycatch problem. The industry believed that they had viable alternative ideas to solving the turtle bycatch problem that the federal government ignored. Thus, few shrimp fishers used the early versions of the TED.

In 1987 the TED regulation was passed by the U.S. government to reduce sea turtle bycatch from commercial shrimp harvesting activities, and it has been in effect since then. All U.S. shrimpers are required to use TEDs while fishing in U.S. waters. A series of court cases between the government and the industry delayed the implementation of the regulation until July 1, 1989. The domestic industry claims that the mandatory TED requirement has also contributed to the decline in its market share. Shrimp fishers also claim that using TEDs results in a 15 to 20% harvest loss when the TED is opened to release the turtle. Various experiments, approved by the NOAA Fisheries, have been done over the years to obtain estimates for shrimp escapement when TEDs are used. The figures vary depending on the type of TED, since TEDs differ according to the design and opening size used in the experiment.

The U.S. is the leading consumer of shrimp in the world, and the domestic shrimp industry is the largest seafood industry in the country. More than 80% of the shrimp supplied by the domestic industry is harvested in the Gulf of Mexico region by the southeastern coastal states. Currently, the industry faces very strong competition from a large group of countries exporting shrimp to the U.S. every year. The last two decades have witnessed a surge in U.S. shrimp imports, and the domestic shrimp producers' market share has declined from 43% in 1980 to 12% in 2001. Several factors may have contributed to the shrinking size of the domestic industry. Growing supplies of farm-raised shrimp worldwide, a steady decline in Japanese shrimp imports throughout the 1990s, high tariffs imposed by the European Union on Asian shrimp, and the European Union's strict policy against residues of banned antibiotics in farm-raised shrimp may have all resulted in more foreign shrimp being supplied to the U.S. market.

The U.S. Congress made an attempt to "level the playing field" with international shrimpers who were not subject to such stringent fishery regulations. In 1987, Congress passed Public Law 101-

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162 which required all shrimp-importing nations to register with the Department of State to certify that they participate in sea turtle protection programs compatible with those in the U.S. However, both the Bush and Clinton Administrations adopted rather narrow interpretations of the law, based largely on geography, where the greatest threat were posed to particular sea turtle populations that feed or nest in U.S. waters. As a result, only 14 Atlantic and Caribbean nations fell subject to this law. The major difficulty has been the spread of this technology to all nations that trawl for shrimp in areas with sea turtles present. The U.S. has used its very large market share to threaten embargoes on countries not using TEDs, however there are other threats for the sea turtle (i.e. bycatch in other fisheries, habitat destruction, excessive harvest of individuals or eggs). Bycatch involves an extremely complex set of scientific, economic, political, and moral issues.

### 9. Classroom Management

#### *Summary*

This case can be completed easily in four 50-minute class periods (three with Modification 5). *Perspectives from the Gulf of Mexico Shrimp Fishery* PowerPoint should be viewed on a projector or other in-class technology as a way to guide discussion.

#### *Teaching the Case*

Prior to class, students are assigned these pre-class readings:

- Overview of the Cohen Framework and how it is applied to environmental issues:  
<http://karenlangbehn.wordpress.com/2011/06/01/science-policy-and-outcomes-cohen's-framework-for-environmental-policy/>
- Overview of the Magnuson-Stevens Fishery Conservation and Management Act Reauthorization: <http://www.nmfs.noaa.gov/msa2005/>
- Overview of Sea Turtles: <http://www.nmfs.noaa.gov/pr/species/turtles/>
- Overview of Turtle Excluder Devices:  
<http://www.nmfs.noaa.gov/pr/species/turtles/teds.htm>
- The ‘Moral Economy’ of Resistance: Turtle Excluder Devices and Gulf of Mexico Shrimp Fishermen
- Defining ‘Fishing Communities’: Vulnerability and the Magnuson-Stevens Fishery Conservation and Management Act

At the beginning of class, the instructor leads a brief (2-3 minutes) discussion starting with poll questions (See slides 2 and 3 of *Perspectives from the Gulf of Mexico Shrimp Fishery* PowerPoint):

- How often do you eat local seafood?
  - A) I don't like seafood
  - B) Rarely
  - C) On Occasion
  - D) All the Time (I can't get enough)
  
- For those of you who do eat seafood, do you ever have a preference of where it comes from?
  - A) Yes, I only buy local

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- B) No, just bring on the food
- C) Never considered it

**Part I.** Next, the instructor should take approximately 10 minutes to review the important points from the readings with students. For example,

- What is the basis for the Turtle Excluder Device conflict?
- What are the five major foci of the Cohen framework? What does each foci entail?

(See slide 4 of *Perspectives from the Gulf of Mexico Shrimp Fishery* PowerPoint.)

As a class, or in groups of 2-3, students should spend 10 minutes analyzing the Turtle Excluder Device conflict according to the Cohen framework [Modification 1]. Students should generate an assessment of each component of the Cohen framework and write a brief justification for their inferences. Be sure to encourage groups to assign a note-taker as well as someone to speak on the group's behalf. (See slide 5 of *Perspectives from the Gulf of Mexico Shrimp Fishery* PowerPoint)

Students should assess this environmental problem as:

•**An issue of values**, students should consider questions such as: *What type of ecosystem do we wish to live in, and how does our lifestyle impact that ecosystem? To what extent do environmental problems and the policy approaches we take reflect the way that we value the ecosystems and the worth we place on material consumption?*

•**A political issue**, students should consider questions such as: *Which political processes can best maintain environmental quality, and what are the political dimensions of this environmental problem? How has the political system defined this problem and set the boundaries for its potential solution?*

•**A technology and science issue**, students should consider questions such as: *Can science and technology solve environmental problems as quickly as they create them? Do we have the science in place to truly understand the causes and effects of this environmental problem or mitigate its impacts?*

•**A policy design and economic issue**, students should consider questions such as: *What public policies are needed to reduce environmentally damaging behaviors? How can corporate and private behavior be influenced? What mix of incentives and disincentives seem most effective? What economic factors have caused pollution and stimulated particular forms of environmental policy?*

Here, the instructor should remind students that economic forces are a major influence on environmental problems and the shape of environmental policy. In this framework, students should be encouraged to consider these economic forces as part of the more general issue of policy design; and it should be explained that in some environmental cases the causes and effects of policy may relate to security or political power.

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•**A management issue**, students should consider questions such as: *Which administrative and organizational arrangements have proven to be most effective at protecting the environment? Do we have the organizational capacity in place to solve the environmental problem?*

After the 10 minute analysis period, allow each group 5 minutes to briefly describe how they assessed and justified the Cohen framework in the context of the Turtle Excluder Device conflict. This should take between 15 to 20 minutes, depending on class size and group size (2-3).

**Part II.** The instructor should now prompt students to work in their groups to consider how the different foci interact as this environmental issue is being assessed. In order for students to understand the use of TEDs in the shrimp fishery as a socio-environmental system, students are instructed to spend 5 minutes constructing concept maps using their Cohen assessment.

[Modification 2: This may also be done as a class; where the map foundation is the Gulf of Mexico, and students each draw system arrows and factors until map is deemed “complete” (See slides 6 and 7 of *Perspectives from the Gulf of Mexico Shrimp Fishery PowerPoint*)]

Construction of the concept maps should segue into a brief (5 minute) discussion of how fisheries and endangered species management may be assessed using the Cohen framework, and is also a socio-environmental issue that requires synthesis of various types of data.

**Part III.** Next, the instructor should spend approximately 25 minutes introducing and discussing the concepts of environmental worldviews, attitudes, and values.

\*It is assumed that anyone teaching this case in an Environmental Ethics course would be familiar with these concepts. However, guidance on this subject matter may be found in the references identified in the **Blocks of Analysis**. Suggested texts include Dallmeyer (2003) and Gudorf and Huchingson (2010).

The instructor then introduces the scenario of putting students themselves in the shoes of a Gulf of Mexico shrimper. Students are provided with a “shrimper profile” based on the actual shrimper fisher interviews (See shrimper profile attachment). Profiles include demographic information (i.e. age, gender, race, generation, operation size, level of education, family information, how often you attend meetings) and 3-4 quotes to establish a starting point for persona development. The instructor should emphasize that the objective of this activity is to have students immerse themselves in a persona that is not like them to encourage thinking beyond the scope of their typical worldview. Students should be reminded that as environmental managers, the environment being managed is not just their own. Introduction to the activity and assigning shrimper profiles may take approximately 5 minutes.

After students have had a moment to read their profiles, spend 15 minutes showing short videos that capture the nature of the fishery by highlighting shrimpers with varying ethnicities and backgrounds. Suggested videos are listed below.

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Shrimpers Fight TED proposal: <http://youtu.be/tcMECU9CXqA>

After the Cap video on “Seafood”: <http://www.afterthecap.org/afterthecap/>

The Shrimper Survivor: <http://youtu.be/nju6qvT5QOs>

Gulf Snapshots: <http://youtu.be/1rEVN6uJ9tE>

The Gulf of Shrimp and Oil: [http://youtu.be/Axaqd\\_qMap8](http://youtu.be/Axaqd_qMap8)

Touring the Gulf: <http://youtu.be/qCHfHFIGwZA>

Shrimping Cajuns: <http://youtu.be/uZa6H3TqtpI>

Students should then be instructed to further develop their persona by doing research on how shrimping (or more broadly, the coastal/marine ecosystem) may be relevant to them, their family, and their community. Based on literature that students find independently, have students write an essay comparing their assumed persona’s environmental worldview and values to their own.

Guiding questions/considerations may include:

Differences? Similarities? What social norms exist for your persona? How might the way your persona views fisheries/environmental regulators differ from the way you view regulators? How do you define “environmentalists;” might they define “environmentalist”? What factors/barriers might contribute to your persona’s worldview (language, citizen status, environmental literacy)? Challenge students to think about the reality of coping with shrimping regulatory changes in conjunction with the oil spill impacts/effects. For example: How will your shrimping business fare? How will your family be affected? How will your community be affected? What is your future in the industry? What options do you have given your age, educational background, skill set? What particular regulations have the most significant impact on you as a shrimper? How are you impacted? Do you think these regulations are necessary? Why or why not?

Depending on the level of independent research instructors expect from their students, students may be directed to articles with data on shrimp fishery economics past and future, catch reports/forecasts, fishing area closure announcements, statistics on foreign imports, proposed shrimping regulatory changes, stock assessments, and historical data about physical and mental health effects after oil-spills (see PTSD post-Exxon Valdez) [Modification 4].

In the next class meeting, students should individually give a summary of their persona. This may take an entire class period, depending on the class size. Instructors may also choose to have students submit a well thought out writing assignment (paper) that describes their shrimper persona and considerations [Modification 5].

Prior to the day of Part IV of the case, *the Testimony of Robert P. Gill at the Oversight Hearing on "The reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act"*: <http://naturalresources.house.gov/uploadedfiles/gilltestimony03-13-13.pdf>, should be handed out for reading.

**Part IV.** As an assessment, the instructor should introduce the scenario of students considering themselves active members of the Southern Shrimp Alliance. The Alliance has been called upon by the House Natural Resources Committee to send someone to represent the organization at the next hearing on the reauthorization of the Magnuson-Stevens Act.

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From the vantage point of the shrimper persona they have developed over the course of the case; students should be instructed to work with their fellow shrimpers in groups of 4-5 to develop a persuasive testimony similar to Mr. Gills', using Cohen Framework considerations. The testimony should incorporate socio-environmental, as well as socio-cultural considerations for the collective shrimping community and their specific communities. Allow approximately 20 minutes for groups to work on their testimonies. Again, be sure to encourage groups to assign a note-taker as well as someone to speak on the group's behalf

The in-class presentation portion of Part IV, should begin with the Chairperson of the House Natural Resources Committee (a role that is recommended for the instructor) convening the re-authorization hearing by welcoming students and allowing for between 5 to 8 minutes of testimony, for a total of approximately 25 minutes of testimony.

The last minutes of class should be spent reflecting on the activities of the case using questions 3, 4, and 5 outlined in **Answer Key and Sample Assessment Questions**.

### **10. Blocks of Analysis**

#### ***Environmental Ethics***

According to philosopher Holmes Rolston III, "Environmental ethics stretches classical ethics to the breaking point," in that it is not limited to humans. Environmental ethics attempts to expand the circle of moral concern beyond humans to include other animals, plants, and even entire ecosystems. Before one can address the dilemma of saving an endangered species or saving jobs that may be lost if that species were protected, the environmental ethicist must answer the question of why nonhumans are morally relevant. Traditional anthropocentric moral theories are not designed to address or resolve issues that go beyond the narrow scope of human life, however the challenge of environmental ethics is to build new arguments to justify and explain how conflicts in the environment should be resolved (Gudorf and Huchingson, 2010).

#### ***Worldviews***

The main tenet of Douglas and Wildavsky's (1982; Douglas, 1985) cultural theory is that society uses cultural lenses or worldviews to look at phenomena such as nature and the environment. They posit that there can be no culturally unmediated perception, and that worldviews are a result of peoples' socialization and participation in four main forms of social organization: egalitarianism, individualism, bureaucracy, and fatalism. Each of these rationalities or cultural biases is "a point of view, with its own framing assumptions and readily available solutions for standardized problems" (Douglas, 1997).

#### ***The Cohen Framework***

The Cohen framework is a multidimensional framework for developing effective environmental policy. The framework considers how current environmental policies and problems reflect the value we place in our ecosystems; whether science and technology can solve the environmental problems they create; and what policy is necessary to reduce environmentally damaging behaviors. The intention of the framework is to look at environmental issues from more than one perspective so that practitioners, students, or analysts may be able to observe aspects of the issue that might otherwise be overlooked. Integral to the Cohen framework is the concept of trans-disciplinary cooperation in analyzing, problematizing, and ultimately solving environmental



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crises, thus in order to understand environmental policy, one must learn some science, engineering, economics, political science, organizational management and other branches of learning (Cohen, 2006). The framework concerns: An issue of values, A political issue, A technical and scientific issue, A political design and economic issue, and A management issue.

### ***Resource Dependent Communities***

The legal mandates for social impact assessment have existed since the inception of the National Environmental Policy Act (42 U.S.C. § 4321 et seq.) in 1969 (NEPA) and the Magnuson Act (16 U.S.C. §1801 et seq.) in 1976, which established the eight regional Fishery Management Councils to manage the Nation's fisheries within the 200-mile Exclusive Economic Zone (EEZ). In 1996, with the reauthorization of the Magnuson-Stevens Act additional mandates were added; the most noteworthy of which was National Standard 8 (NS8), which requires the identification of fishing communities and an assessment of their dependence on fishing. These and other regulatory directives have guided the National Marine Fisheries Service (NMFS) and regional Councils in conducting their social impact assessments over the past several decades.

Only recently has the NMFS research agenda focused on fishing communities and the collection of baseline data for comparison over time and across fisheries. Although there have been many social impact assessments written for regional fishery management agencies, (e.g., Impact Assessment, Inc., 1991; McCay et al., 2002; Wilson and McCay, 1998) the focus for many of these efforts is often a specific fishery or management action making it difficult to monitor trends over a wide geographic area or update data to assess impacts in a timely fashion. Funding, strict time tables, and the continuous addition of new regulations may not allow for collection of new data, especially if it requires lengthy fieldwork. These barriers make it difficult for Council or NMFS staffs to assess the impacts of alternatives which can often be numerous, since as many options as possible are included to meet national standards for management of the nation's fisheries.

While NS8 defines a "fishing community" as land based and determined geographically, drawing those boundaries is still a difficult task that has yet to be outlined within the guidelines for analysis of fishery dependent communities. Once those boundaries have been determined then the complicated task of determining fishery dependence must also be accomplished. Furthermore, there is evidence that fishers often consider their community to be virtual and based on their particular gear type or fishery.

There are important implications for the lack of analytical tools in social impact analysis for fisheries management, related to both policy and theory. Social impact predictions are particularly important with respect to fishing communities as much of the evidence suggests that these communities are experiencing rapid change, not only from regulatory agencies, but other factors outside the realm of fishery management. Coastal development and rapid population increases have fueled the process of "coastal gentrification" that is making it difficult for both commercial and charter fishers to remain in their traditional place on land and water.

Collection of relevant data are imperative for quality social impact assessment; the needs for which have become even more evident with dramatic meteorological events such as Hurricanes Katrina and Rita and catastrophic events such as the Deepwater Horizon oil spill. The likelihood

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of persistence of such events demonstrates the need to be able to document how coastal communities adapt and change under such rapid and widespread damage to their infrastructure and the more predictable change that may come from regulatory agencies and the process of fishery management.

### 11. Answer Key and Sample Assessment Questions

1. Please describe the Turtle Excluder Device conflict according to the Cohen framework. Students should generate an assessment of each component of the Cohen framework and write a brief justification for their inferences.
  - This question aims to assess student understanding of the application of the Cohen framework to a socio-environmental system.
2. Using a concept map, diagram the use of TEDs in the shrimp fishery as a socio-environmental system based on your Cohen assessment.
  - This question aims to assess students' ability to illustrate a socio-environmental system.
3. What types of data do you deem necessary to conduct an environmental impact assessment that has both environmental and social considerations?
  - This question aims to assess students' ability to discriminate between different types and sources of relevant data.
4. From this exercise, what challenges do you see with regard to species conservation efforts in the face of protecting vulnerable coastal communities?
  - This question aims to assess students' ability to consider the importance of scale and context in addressing socio-environmental problems.
5. From this exercise, how has knowledge of a person/community with values and worldviews different from your own impacted the way you evaluate environmental problems?
  - This question aims to assess students' ability to interpret data to gain knowledge of different cultural and environmental worldviews in an effort to understand natural resource dependency as part of cultural identity and relate it to their own environmental worldview.

### 12. Suggested Texts

Cohen, S. (2006). *Understanding environmental policy*. Columbia University Press.

Gudorf, C. E., & Huchingson, J. E. (2010). *Boundaries: A casebook in environmental ethics*. Georgetown University Press.

Dallmeyer, D.G. (ed.) (2003). *Values at Sea: Ethics for the Marine Environment*. The University of Georgia Press.

### 13. References

Cohen, S. (2006). *Understanding environmental policy*. Columbia University Press.

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Douglas, M., & Wildavsky, A. (1982). *Risk and culture: An essay on the selection of technological and environmental dangers*. Berkeley: University of California Press.

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Texas Parks and Wildlife (TPW). (2002). *Executive Summary: The Texas Shrimp Fishery, A report to the Governor and the the 77th Legislature of Texas*. Austin, TX.

Wilson, D. & B. McCay (1998). *Social and Cultural Impact Assessment of the Highly Migratory Species Management Plan and the Amendment to the Atlantic Billfish Management Plan*. Prepared for the Highly Migratory Species Office, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, the Ecopolicy Center, Rutgers University, New Brunswick, NJ.

### 14. Case Notes

This case was piloted in a mixed undergraduate/graduate level Environmental Regulations course. Students were instructed to turn in their shrimper profiles assignments as a term paper. By the time students completed this case, they were familiar with how to use the Cohen

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framework in the context of the shrimp fishery, as well as in the broader context of other environmental problems. Since this was a Regulations course, emphasis was placed on the specifics of the Magnuson-Stevens Act, TEDs, and bycatch reduction. Students did however seem to really enjoy the creative freedom they had in developing their personas. In the debriefing portion at the end of the case, students demonstrated an understanding of the impacts of fisheries regulations on coastal communities.

With regard to time management, the following breakdown was successful for the pilot case:

Part I & Part II	Part III	Part IV
3 min- PowerPoint Poll	25 min- Discussion on environmental worldviews, attitudes, and values	3 min- Set up hearing scenario and groups
10 min-discussion	5 min- Profile assignments	20 min- Group work on testimonies
10 min-Cohen analysis	15 min- shrimper videos	25 min- Testimony presentations
20 min- group Cohen presentations	5 min- Persona assignment instructions (Assignments due at beginning of next class period)	Remaining time- Case debrief
5 min- Concept maps		
5 min- map discussion		

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