



Working to Protect and Preserve the Gulf of Mexico

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*Testimony of Cynthia Sarthou
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My name is Cynthia Sarthou and I am the Executive Director of the Gulf Restoration Network (GRN), a diverse coalition of forty-five local, regional and national environmental and citizen groups committed to uniting and empowering people to protect and restore the resources of the Gulf Region, forever protecting it for future generations. On behalf of the GRN, I wish to express our appreciation to the Commission for inviting us to testify today.

This commission has a unique opportunity to help shape our national ocean policy to move away from the current crisis-oriented management approach toward decision-making that is coordinated, adaptive, and comprehensive—an approach that promotes protection of the marine environment and prevention of marine pollution. Such an approach is clearly needed if we are to address the years of neglect and abuse of our oceans. I urge you to produce recommendations for innovative approaches to better manage and conserve our oceans for present and future generations.

I. THE VALUABLE RESOURCES OF THE GULF OF MEXICO

The Gulf of Mexico is the ninth largest body of water in the world, with a coastline that extends more than 1,600 miles. The Gulf contains over five million acres of wetlands and thirty-one major estuaries, which include fifty-five percent of the coastal marshes in the lower forty-eight states. The coastal wetlands of Louisiana alone comprise forty-one percent of the total coastal wetlands of the United States.ⁱ The Gulf is comprised of diverse coastal habitats, including, barrier islands, mangrove forests, river deltas, coral reefs and seagrass beds.

These habitats provide shelter and feed thousands of species of coastal and marine wildlife. The marshes and estuaries along the Gulf coast serve as vital nurseries or spawning grounds for ninety-five percent of the fish caught in the Gulf of Mexico, supporting vibrant commercial and recreational fisheries. In fact, the entire U.S. Gulf of Mexico commercial fishery yields more finfish, shrimp, and shellfish annually than the South and Mid-Atlantic, Chesapeake, and the Great Lakes regions combined. In 2000, commercial landings in the Gulf totaled 1.76 billion pounds valued at over \$910 million.ⁱⁱ Commercial shrimp landings in that year totaled 116 million pounds valued at \$582 million. In 2000, three of the top five commercial fishing ports in terms of landings, and two of the top five ports in terms of value were located in the Gulf of Mexico. In 2000, it was also estimated that over 2.6 million

recreational fishermen took 20.4 million fishing trips and harvested over 149 million pounds of fish (excluding Texas).ⁱⁱⁱ Texas and Florida are two of the top recreational fishing states in the nation.

Each winter, these coastal wetlands also provide critical habitat for seventy-five percent (five to seven million birds) of the United States migratory waterfowl. The Gulf region is home to three of the four migration flyways in North America including the Atlantic, Mississippi, and Central flyways.^{iv} Other birds found in abundance along the Gulf coast year round include gulls, terns, herons, egrets, and other shorebirds.

The Gulf supports many endangered species. Endangered birds found in the region are the North American population of the endangered whooping crane, the Arctic peregrine falcon, the bald eagle, the piping plover and the Eskimo curlew (one of the rarest native North American birds). Additionally, many other endangered species call the Gulf home, including five species of endangered or threatened sea turtles, seven species of endangered whales, including Northern Right, Blue, Fin, Sei, Minke, Humpback and Sperm whales, and the endangered West Indian (or Florida) manatee.

In short, the aquatic ecosystems of Alabama, Florida, Louisiana, Mississippi, and Texas -- teeming coastal marshes, vast expanses of bottomland hardwood wetlands, and numerous riverine systems -- are unique ecological, economic, cultural, and recreational treasures. Tragically, these irreplaceable resources are in peril. The cumulative effect of years of neglect and unsustainable use have led to a decline in the quality and productivity of the Gulf's aquatic resources, and ultimately of the entire Gulf ecosystem, placing citizens and wildlife at risk.

The GRN has identified the following living marine resource issues as priority in the Gulf of Mexico region. The following sections describe the problems facing our living marine resources and offer solutions for consideration by the Commission.

II. SEA TURTLES

There are five species of sea turtles found in the Gulf of Mexico -- Kemp's ridley, Hawksbill, Loggerhead, Green and Leatherback. All nesting of the Kemp's ridley occurs on Gulf beaches, and the species is largely confined to the Gulf.^v These sea turtles were once abundant in some areas of the Gulf. Sadly, all of these species are now listed as either endangered or threatened. In 1989, the Kemp's ridley sea turtle was selected as one of the twelve most endangered animals in the world by the International Union of Conservation of Nature and Natural Resources' Species Survival Commission.^{vi}

Natural obstacles faced by young and adult sea turtles are staggering, but it is the increasing threats caused by humans that are driving these species to extinction. The complex life cycle of sea turtles involves diverse and distant habitats. The reliance on a variety of habitats increases the vulnerability of sea turtles to human activities, since all habitats are necessary to support the survival of sea turtles.^{vii} For example, Stranding Reports for the Texas Gulf Coast for 2000 noted that eighty-five Kemp's ridley turtles and three hundred and eighty-five sea turtles of all species were stranded; in 1999, ninety-five Kemp's ridley turtles and four hundred and fifty sea turtles of all species were stranded, and in 1998, one hundred thirty-two Kemp's ridley Turtles and three hundred and ninety-six sea turtles of all species were stranded.^{viii} The endangered status of these turtles makes the loss of even small numbers of these animals risky.

There are many human-caused threats to the Gulf's sea turtles that must be addressed if these species are to survive. Those of greatest importance for your consideration are:

A. *Commercial Fishing*

As early as 1973, scientists identified shrimp trawling in the Gulf as a major cause of the continuing decline in sea turtle populations. Historically, shrimp trawling accounted for the incidental catch (entanglement and drowning in shrimp nets) of thousands of juvenile and adult turtles.^{ix} In 1990, nearly all shrimp trawl nets in the Gulf were required to use Turtle Excluder Devices (TEDs), a device designed to help turtles escape from the nets. Most shrimpers have complied with this requirement and shrimp trawl related sea turtle mortalities have been reduced. However, sea turtle stranding records between 1986 and 1997 show that between thirty-three and forty-seven percent of loggerhead turtles found washed ashore in the Gulf and Atlantic were larger than the current minimum TED escape opening size. In the same area, one hundred and seventy leatherback turtles – which are too large to fit through currently approved TEDs – were stranded between 1986 and 1999. As a result, the National Marine Fisheries Service (NMFS) is now considering new regulations that would require each approved TED be capable of releasing all sizes of turtles.

B. *Coastal Development*

Most observers believe that the gravest long-term threat to sea turtle populations is the degradation and destruction of their habitat. Turtles must now compete with tourists, businesses and coastal residents for use of the Gulf's beaches and dunes. Human occupancy and residential use of these areas can adversely affect turtles due to lights that both attract sea turtle predators and disorient nesting and hatchling turtles. By far the most serious threat caused by the increased human presence on beaches is the disturbance of nesting females, causing them to shift nesting beaches, delay egg-laying, and select poor nesting sites. Recreational use of dune areas also causes dune erosion and the loss of turtle habitat required for nesting. Additionally, human occupancy and use of beaches can create the likelihood of injury or death to sea turtle hatchlings through collapse of nests by foot traffic, crushing of developing embryos, or entombing emerging hatchlings.^x Coastal armoring, including the construction of sea walls, rock revetments, and sandbags, installed to protect beachfront property from erosion also blocks turtles from reaching suitable nesting habitat.^{xi} Beach nourishment, often used as an alternative to armoring, can also negatively impact sea turtles. For example, if the sand is too compacted or if the sand imported to the beach is drastically different than native sediments, nest-site selection, digging behavior, incubation temperature, and moisture content of nests can be affected.^{xii}

C. *Pollution*

Pollution of coastal waters also has serious impacts on both sea turtles and their prey species. New research suggests that a disease now killing many sea turtles (fibropapillomas) may be linked to pollution in coastal waters. Oil spills, urban runoff of chemicals, fertilizers, and petroleum all contribute to pollution of the Gulf's waters.^{xiii} For example, releases of oil into coastal waters can result in the formation of tar balls. Sea turtles may attempt to ingest these tar balls, which then cling to their mouths, preventing them from eating, and if ingested, the toxic components can have fatal consequences. Similarly, sea turtles have no ability to avoid oil slicks and suffer adverse reactions to oil. Oil spills of any magnitude thus present a clear threat, and could have catastrophic consequences in areas where sea turtles aggregate for breeding and nesting.^{xiv}

Recommendations:

The Commission should call upon Congress to:

- (1) develop a multi-agency ecosystem based approach to turtle conservation, that focuses on the development of a comprehensive conservation program to address all threats to endangered and threatened sea turtles. The program must include proactive strategies for preserving important coastal habitats, such as the establishment of additional coastal refuges, and addressing open water threats to these species, including threats posed by fishing, oil and gas development, shipping, and the like.
- (2) revisit present policy under the Federal Flood Insurance Program that fosters unwise coastal development by removing market forces from development decisions, and drives much of the current coastal habitat destruction in the Gulf of Mexico states.

III. MARINE MAMMALS

The Gulf is home to at least twenty-eight species of marine mammals, including nine species of dolphins, nineteen species of whales (seven of which are endangered), and the endangered West Indian Manatee.^{xv} Sadly, many human activities that occur in the Gulf of Mexico have adverse impacts on marine mammals and their habitat. Coastal development (particularly marine dumping and dredging), offshore oil and gas exploration and development, vessel traffic, and military activities may interfere with cetacean communication. These activities may also stress marine mammals, causing them to abandon traditional breeding areas, migratory routes or feeding areas. Changes in the availability of essential prey species may also occur.

Although consideration of marine mammal protection is required under the Marine Mammal Protection Act, impact analyses and mitigation activities have mostly been tailored to address dolphin populations.^{xvi} Largely unaddressed are the threats to the many whale species that call the Gulf home. For example, although whales were known to populate the deeper waters of the Gulf, it was not until 2000 that scientists discovered that five hundred endangered sperm whales, along with killer whales and rare pilot whales congregate year-round near the mouth of the busy Mississippi River.^{xvii} This knowledge brings with it serious conservation challenges.

The northern Gulf of Mexico is one of the world's busiest shipping channels and one of the United States' most developed energy zones. Although much of the oil gas development of the past was limited to the outer continental shelf, oil and gas development is now moving into the deeper waters of the Gulf. This raises questions as to the possible collision course between these endangered whales and oil and gas development.

Currently, we lack sufficient information to say with certainty that these activities do not have a significant adverse impact on the whales of the Gulf, including adverse impacts to feeding or breeding behavior. It is generally known that noise pollution can silence whales, drive them away, and in extreme cases cause hemorrhaging and fatally damage their echolocation systems. In 2000, eight whales died after the Navy deployed powerful mid-range sonar during a submarine detection exercise in the Bahamas.^{xviii} Nonetheless, the effect of underwater noise from oil drilling and naval low-level

sonar activities on whales is unknown. The noise generated by oil and gas development has been likened to a steady hum at a low frequency. Although this could disrupt the whales' ability to navigate and communicate through echolocation, the actual impact is unknown as is the tolerance levels of marine mammals to noises associated with seismic exploration activities of oil and gas development, which can reach 230 decibels, and low-range sonar.

Moreover, the impacts of activities on these species cannot be determined through short-term scientific studies. The difficulty lies in measuring the potential threats, for they may trigger behavioral, migratory, or physiological changes that may affect efficient group sizes, mating and feeding patterns, reproduction, or longevity.^{xix} Comprehensive long-term research must be initiated with the intent of determining and minimizing the impacts of shipping and oil and gas development on whale species in the Gulf.

Recommendation:

The Commission should call for a comprehensive multi-agency research program led by the NMFS to determine the impacts of shipping, pollution, and oil and gas activities on marine mammals, particularly whales, in the Gulf of Mexico and methods for minimizing those impacts.

IV. Fisheries

Of the fifty seven species managed by the Gulf of Mexico Fishery Management Council (Gulf Council), six are considered by the NMFS to be “overfished”, one is “approaching an overfished condition”, four are candidate species for listing under the Endangered Species Act^{xx}, and four are undergoing overfishing, a fishing rate inconsistent with maintenance of healthy population levels. Over one-half (six out of ten) of the species under management of the Gulf Council for which we have the information necessary to estimate population size are considered “overfished” or nearing such a condition, and of the twenty nine fish species under direct management of the NMFS, twenty-two of these are considered overfished.^{xxi} Thus, of the thirty-nine species under management in the Gulf region for which we have information, twenty-eight species (seventy-two percent) are overfished in the Gulf of Mexico.^{xxii} These statistics do not include the majority (forty-six) of Gulf species whose status is considered unknown.

Even more alarming, in November of 2000, the American Fisheries Society, the nations oldest and largest professional society representing fisheries scientists, produced an article on marine fish species at risk of extinction in North America.^{xxiii} Thirty-six of the identified species occur in the Gulf region, with fourteen of these species under the management of the federal government. Furthermore, the article identified extinction “hot spots” in North America where several species are at risk. Three of the five identified hot spots are in the Gulf of Mexico -- Florida Bay, the Florida Keys, and the northern Gulf of Mexico.

The causes of the current fisheries crisis are numerous and often interrelated. They include overfishing by directed fisheries, mortality associated with incidental catch related to directed fisheries (bycatch), degradation of water quality, and loss or degradation of habitat. For purposes of this testimony, the GRN has chosen to focus on four primary issues of concern.

A. *Serial Overfishing Leads to Crisis Management*

As commercially or recreationally desirable species such as red snapper become the focus of regulations aimed at rectifying past overfishing, other fish species become targeted -- a process that often referred to as fishing down the food chain. For example, management measures required to help rebuild red snapper populations in the Gulf of Mexico have had profound impacts on many other fish species targeted by fishermen to offset lower red snapper catches. Unfortunately, little information is known by NMFS about the population health of many of these newly targeted species. Moreover, management measures, if any, implemented to protect these species are quickly overwhelmed by increased fishing pressure. As new target species become depleted, fishermen move to yet another fishery in a continuing process of overfishing. Serial overfishing is difficult for both the fish and the fishermen. When fish for which little information is known are chosen as targets, managers and scientists must scramble to assess the health of the species. Once an assessment of the health of the fishery is completed, often years after a problem is initially identified, managers must administer draconian management measures to help rebuild the now depleted population, causing fishermen to both resist the regulations and shift their focus to other previously less desirable species starting the process all over again.

B. Lack of Information

One of the greatest impediments to sustainable fisheries and ecosystem management in the Gulf of Mexico region is the uncertainty in the management process. We know very little about the status of those fish species under the direct management of the federal government and, as noted above, know even less about those that are not. Additionally, despite existing law, no standardized system exists in the Gulf of Mexico for the collection of information on the type and amount of incidental take (bycatch) in Gulf fisheries. Yet, many "bycatch" species are the subject of formal rebuilding plans.^{xxiv} Furthermore, too little is known about the impact of anthropogenic changes in marine habitats and ecosystems on fish populations.

In light of the multi-species nature of many Gulf fisheries, the problem of serial overfishing, bycatch levels in the majority of Gulf fisheries, and sparse information on predator prey relationships and habitat requirements, we must be able to effectively manage marine fishery resources in the absence of hard scientific data. Fortunately, tools are available to deal with these uncertainties that ultimately protect the fish and the fishermen.

C. Sustainable Fisheries Management Requires Ecosystem Management

In addition to the creation of serial overfishing, conventional fisheries management also fails to consider the importance of habitat, prey species and the targeted species role in the greater marine ecosystem. As the number of overexploited fish populations continues to rise in this country, we must look to a more comprehensive form of management as the solution. This new form of management must recognize that removal of a percentage of fish species from the marine environment can affect the predators and prey of the removed species, their habitats, and change growth and mortality rates of target and non-target species alike.

Fortunately, Congress recognized these shortcomings in the passage of the Sustainable Fisheries Act of 1996 (SFA) by recognizing the role of habitat in healthy fisheries, requiring fisheries managers to assess and address bycatch, and directing the NMFS to convene a panel of experts to review and recommend application of ecosystem principles to marine fisheries management.^{xxv} However, many problems remain. The following discussion highlights key areas in need of attention.

Coastal wetlands and estuaries rank among the most productive of ecosystems. Estuarine wetlands are essential fish habitat, providing valuable spawning and nursery grounds for fish and shellfish.^{xxvi} Nowhere in the nation is the link between estuarine habitat and fish production more obvious than in the Gulf of Mexico. Ninety-five percent of the commercially and recreationally important species in the Gulf of Mexico utilize the bays and estuaries of this system at some point in their life cycle, typically as nursery grounds.^{xxvii} Historically the estuarine dependent nature of these fish posed no problem for the region. Sadly, this is changing.

These critical fisheries habitats are rapidly disappearing or becoming degraded. The Gulf of Mexico region has lost approximately fifty percent of its historical wetlands. The river systems that provide the freshwater and nutrient needed to support Gulf fisheries have been significantly altered by structural flood control projects, navigation, and urban development. In addition, scientists estimate that Florida could lose the majority of its coral reefs within the next twenty years if no action is taken now. Clearly, there are significant non-fishing impacts to fisheries habitat that must be addressed if we are to sustain the Gulf's fisheries.^{xxviii}

Yet, neither the NMFS nor the Gulf Council possesses the authority needed to protect coastal fisheries habitat from non-fishing impacts. Under the SFA, federal agencies are required to consult with the NMFS with regard to actions that will adversely affect fisheries habitat. However, if the NMFS should disagree with a sister agency's findings, its only recourse is to raise the issue to the Secretaries of both agencies. The sister agency has no obligation under the law to alter a proposed project to ensure that impacts to fishery habitat are minimized. As a result, federal agency actions are rarely affected by NMFS' expression that fisheries habitats continue to be destroyed and degraded. If this continues there soon may be insufficient habitat remaining to fully support the vibrant fisheries of the Gulf.

The impacts of fishing gears on essential fish habitat can be equally destructive.^{xxix} To help reverse the decline of marine habitats of the Gulf and restore those ecosystems for fish and marine mammals, the United States must take action to protect those habitats from the threats posed by man. Despite legal requirements to address the adverse impacts of fishing gears on fisheries habitat, little work has been completed in the Gulf, primarily due to the lack of concrete data on impacts of fishing gear.

Finally, in the process of catching target species, Gulf fishermen produce significant amounts of bycatch, the incidental take of marine life in the process of catching a target species. For example, in 1997 the Gulf of Mexico shrimp fishery produced 766 million pounds of bycatch alone. Major species impacted include 8.2 billion croaker, 7.2 billion long spine porgy, and 42 million red snapper.^{xxx} Fortunately, the Gulf Council and the NMFS took action to help address this problem by requiring bycatch reduction methods in the fishery. However, over twenty years of these levels of bycatch and continuing bycatch in the shrimp and other fisheries in the Gulf of Mexico have had, and continue to have an impact on the Gulf ecosystem.

D. The Need for Reform of the Fishery Management Council System

The initial passage of the Magnuson-Stevens Fishery Conservation and Management Act of 1976 (FCMA) established a two-tiered system for federal fisheries governance. The FCMA created regional fishery management councils to develop fishery management plans and regulations for consideration of the NMFS. Although these management councils are charged with managing marine fisheries for all Americans, representatives of fishing interests dominate the councils nationwide in what is cited as a

classic example of the fox guarding the henhouse. Considering that federal marine fish species are a public resource, management decisions must be made accordingly, not in the economic interest of a particular group or individual.

Recommendations:

- (1) Ensure that reauthorization of the FCMA contains provisions for broadening representation of the public interest on the councils;
- (2) Convene a review panel to assess twenty five years of the council system to identify strengths, weaknesses and recommendations for improvement;
- (3) Call on Congress to amend the FCMA to set firm deadlines for the establishment of a standardized reporting methodology to collect and assess bycatch data in all fisheries and require annual reports to Congress updating the status of these efforts;
- (4) Call on Congress to provide funding for fisheries research and data collection in the Gulf region commensurate to its contribution to the nation;
- (5) Call on the administration to utilize effective strategies such as fishery observers and vessel monitoring systems to collect needed fishery management and marine ecosystem health data and ensure better fishery management regulation compliance to level the playing field for all fishermen;
- (6) Call on Congress to amend the FCMA to require application of the precautionary approach to fisheries management to require the use of margins of safety against scientific uncertainty in all fishery management decisions;
- (7) Call upon Congress to require that federal agencies bear the burden of proving that activities that affect the coastal environment will not have an adverse impact on fisheries habitat and increase NMFS', as well as the Gulf Councils', ability to veto federal non-fishing related activities that are found to cause unacceptable adverse impacts to fisheries habitat.
- (8) Consistent with the advice of the Ocean Conservancy, the Commission should make a commitment to the use of Marine Protected Areas (MPAs) as a marine management tool and establish an adequate national system of MPAs, including no-take reserves and ocean wilderness areas. These areas are critical tools in moving towards ecosystem based management strategies.
- (9) Call on Congress to amend the FCMA to develop Fishery Ecosystem Plans for major ecosystems and ensure that management action is consistent with these plans.

V. THE DEAD ZONE: NUTRIENT POLLUTION AND ITS THREAT TO THE GULF'S MARINE RESOURCES

Nitrogen pollution is a growing threat to the Gulf's resources. Nowhere is this more evident than in the Northern Gulf of Mexico where nitrogen polluted runoff gives rise to an area of hypoxia, commonly known as the "Dead Zone". In 2001 this massive Dead Zone measured 8,000 square miles, an area larger than the state of New Jersey.

The Dead Zone is caused by excessive nutrients – particularly nitrogen – that pollute the waters of the Gulf of Mexico downstream from the Mississippi River, triggering excess growth of algae. When the algae die and decompose, dissolved oxygen levels plunge. The resulting condition known as "hypoxia" creates an area in which few organisms can survive.^{xxx1} The long-term environmental and economic

impacts of the Dead Zone are not fully known. However, its current size is indicative of a "severely stressed environment," which may include: 1) altered coastal phytoplankton based food webs; 2) increased occurrence of noxious algal blooms; 3) loss of seagrass beds and kelp forests; and 4) direct and indirect impacts on fisheries (including direct mortality and altered migration which may lead to declines in fish populations). In other areas of the world, similar Dead Zones have led to the economic collapse of fisheries – something we hope can be avoided in the Gulf.^{xxxii}

Overwhelming evidence shows that the main cause of the Gulf Dead Zone is agricultural practices that contribute to the excessive flow of nutrients down the Mississippi. An Integrated Assessment of Hypoxia completed by the Committee on the Environment and Natural Resources found that about 90% of the nitrogen load causing the Dead Zone is from nonpoint polluted runoff and that over half of the load is from the upper Midwest.^{xxxiii}

On January 18, 2001, the EPA and the National Oceanic and Atmospheric Administration (NOAA) officially presented to Congress the Gulf of Mexico/Mississippi River Watershed Nutrient Task Force's Action Plan to Reduce Gulf Hypoxia. The Plan sets out a national strategy to reduce the duration, size, and degree of oxygen depletion in the Dead Zone, setting goals for much needed reductions in nitrogen levels entering the Gulf and methods for achieving those reductions. Broad implementation of the nutrient reduction strategies called for in the Action Plan, combined with a commitment to a more sustainable approach to agriculture is the solution to the "Dead Zone" problem.

Recommendation:

The Commission should call upon the federal government to make a long-term commitment of federal agency resources to address nitrogen pollution in the Mississippi River Basin. Aggressive implementation of the Action Plan recommendations and the availability of adequate resources in the next federal budget cycle are critical to addressing this threat to the resources of the Gulf of Mexico.

VII. CONCLUSION

The Gulf of Mexico, like far too many of our ocean areas, is in serious trouble. Fortunately, this Commission has the distinct opportunity to address the problems facing the Gulf, and to fundamentally redefine how we manage, conserve, and relate to marine resources. The GRN believes that the current approach, which vests authority over these issues in numerous federal agencies, often with conflicting mandates, and focuses on individual species, activities, and areas, is simply inadequate to address the problems that we face. Only a comprehensive overhaul of the federal ocean governance structure will reverse current trends and help us to achieve sustainable ecosystem-based management.

ⁱWeber, M. J. 1995. "Gulf of Mexico States", in *State of the Coasts: a State-by-State Analysis of the Vital Link Between Healthy Coasts and a Healthy Economy*. Coast Alliance, Washington, D.C. Pp. 35-59; Turner, R. E. 1990. *Landscape Development and Coastal Wetland Losses in the Northern Gulf of Mexico*. American Zoology 30:89-205

ⁱⁱ National Marine Fisheries Service. August 2001. *Fisheries of the United States 2000*. Pp. 1-46.

ⁱⁱⁱ *Id.*

^{iv} www.birdnature.com/flyways.html

^v Bjorndal, K.A. and A.B. Bolten. 1989. *Goals for Sea Turtle Research in the Gulf of Mexico with Respect to the Oil and Gas Industry*, in *Proceeding of Sea Turtles and Marine Mammals of the Gulf of Mexico*. New Orleans, LA. Pp. 47-58.

- ^{vi} Weber, M.J. 1989, *Human Activities and Sea Turtle Conservation in the Gulf of Mexico in Proceeding of Sea Turtles and Marine Mammals of the Gulf of Mexico*. New Orleans, LA. Pp. 23.
- ^{vii} Bjorndal, K.A. and A.B. Bolten. 1989. *Goals for Sea Turtle Research*.
- ^{viii} Help Endangered Animals: Ridley Turtles. *Stranding Report for the Gulf Coast 2002*. <http://www.ridleyturtles.org/strandings.html>. (Note: The H.E.A.R.T. Stranding Report is based on data obtained from the National Marine Fisheries Service.)
- ^{ix} Center for Marine Conservation. 1995 *Delay and Denial: A Political History of Sea Turtles and Shrimp Fishing*. Washington, D.C. Pp. 7-8, 12.
- ^x U.S. Fish and Wildlife Service. 2001. *Gulf Highlands Area Conservation Plan*. Daphne, AL. Pp. 27.
- ^{xi} Caribbean Conservation Corporation. 2002. *Coastal Habitats: Threats and Protection*. <http://www.ccturtle.org/threats2.htm>
- ^{xii} *Id.*
- ^{xiii} *Id.*
- ^{xiv} Weber, M.J. 1989. *Human Activities and Sea Turtle Conservation in the Gulf of Mexico*.
- ^{xv} Schmidly, D.J. and D.L. Scarborough. 1989. *Marine Mammals of the Gulf of Mexico: Past, Present, and Future in Proceedings of Turtles and Marine Mammals of the Gulf of Mexico*. New Orleans, LA. Pp. 59-76.
- ^{xvi} Of course the first study to focus on any cetaceans (dolphins and whales) in the oceanic Gulf of Mexico was not completed until 1994. Mullin, K.D. et al. 1994. *Cetaceans on the Upper Continental Slope in the North-Central Gulf of Mexico*. Fishery Bulletin 92: Pp. 773-786.
- ^{xvii} Verrengia, J.B. December 14, 2001. *In Gulf, Underwater Tag Game Scientists Use Devices To Improve Tracking of Whales -- and Their Preservation*. Washington Post.
- ^{xviii} *Id.*
- ^{xix} Gordon, J. January 2002. *Sperm Whales - Potential Concerns for Seismic Operations, a presentation at the Mineral Management Information Transfer Meeting*. Kenner, LA.; Wursig, B. 1989. *Human Impacts on Cetaceans in Proceedings of Sea Turtles and Marine Mammals in the Gulf of Mexico*. New Orleans, LA. Pp. 39-46.
- ^{xx} www.nmfs.gov/prot_res/candidate.html
- ^{xxi} *Id.*
- ^{xxii} National Marine Fisheries Service. 2001. *Report to Congress, Status of Fisheries of the United States*.
- ^{xxiii} The authors of the article conducted a comprehensive review of marine fish species to determine which species may be at risk of extinction based on a number of criteria. Criteria included the rarity of a species, its range, specialized habitat requirements, and known declines in population size.
- ^{xxiv} For example, in 1997 the NMFS estimated that 42 million red snapper were killed in the shrimp trawl fishery in the Gulf of Mexico. Recent bycatch reduction measures implemented for this fishery are estimated to have reduced this number by thirty to forty percent.
- ^{xxv} For a full discussion of the need to incorporate ecosystem principles into fisheries management and recommendations for doing so, see *Ecosystem Based Fishery Management, A Report to Congress by the Ecosystem Advisory Panel*. 1998.
- ^{xxvi} Kiraly, S.J. et al. 1998. *Ensuring the sustainability of ocean living resources quality*. Pp. C1-C34 in *Year of the Ocean: Discussion Papers*. National Oceanic and Atmospheric Administration.
- ^{xxvii} Chambers, J.R. 1992. *Coastal Degradation and Fishery Declines in the U.S.* Pp. 45-51 in R.H Stroud, *Stemming the Tide of Coastal Fish Habitat Loss*. National Coalition for Marine Conservation, Savannah, GA.
- ^{xxviii} Sarthou, C.M. 1999. *An Environmentalists' Perspective on Essential Fish Habitat*. Pp. 11-22 in *Essential Fish Habitat and Rehabilitation*. American Fisheries Society Symposium 22.
- ^{xxix} For a full discussion of the real and potential impacts of fishing gear utilized in the Gulf of Mexico, see Barnette, M.C. 2001. *A review of the fishing gear utilized within the Southeast region and their potential impacts on essential fish habitat*. NOAA Technical memorandum. NMFS-SEFSC-449. National Marine Fisheries Service, St. Petersburg, FL. 62p.
- ^{xxx} National Marine Fisheries Service (NMFS). 1998. *Report to Congress: Southeastern United States Shrimp Trawl Bycatch Program*. Washington, D.C. National Oceanic and Atmospheric Administration, U.S Department of Commerce.
- ^{xxxi} National Science and Technology Council, Committee on Environment and Natural Resources. 2000. *An Integrated Assessment: Hypoxia in the Northern Gulf of Mexico*. Washington, DC. Pp. 11-12.
- ^{xxxii} *Id.* at Pp. 25-27.
- ^{xxxiii} *Id.* at Pp.13-23.