Oil Spills and Corexit:

Has the Deepwater Horizon Oil Spill had an ongoing effect on the cultural and mental health of Louisiana residents?

Michelle Jacobson

A Capstone project submitted in partial fulfillment of the requirements for the degree of

Masters of Arts in Policy Studies

Interdisciplinary Arts and Sciences

Table of Contents

CHAPTER 1

Chapter 1 – Purpose of the Study

Introduction

In July, 2010 the Deepwater Horizon drilling platform exploded killing 11 people and spilling over 4.9 million barrels of crude oil into the Gulf of Mexico. It was the largest offshore oil spill in U.S history. Over 1.8 million gallons of the toxic chemical dispersant Corexit were used as a clean-up solution. The oil and Corexit mixture caused devastating environmental and economic impacts. Those impacts posed serious mental and cultural health issues for the residents of Louisiana. Following the spill, elevated symptoms of anxiety, depression, mental illness, and posttraumatic stress were reported by Gulf residents.

The Environmental Protection Agency (EPA) authorized the use of Corexit to clean-up two of the largest oil spills in U.S. history. In 1989 the Exxon Valdez tanker released approximately 11 million gallons of crude oil into Prince William Sound, Alaska making it the worst oil spill in U.S. history. Over 21 years later the 2010 massive Deepwater Horizon disaster spilled over 130 million gallons into the Gulf of Mexico far surpassing the Exxon Valdez spill (Yarris 2011). Nearly two million gallons of Corexit were used for the BP oil spill alone. The EPA felt Corexit was the best possible solution at the time for the immediate clean-up of both U.S oil spills with the assumption that the oil itself would cause more damage than the oil dispersant combination (EPA, 2010).

Corexit is a toxic chemical dispersant that is commonly used to break up floating oil slicks into small droplets that are heavier than water. The droplets are then submerged underwater and sink to the bottom. This reduces shoreline accumulation, and helps to

protect estuaries, and other coastal waterways. However, it also increases the amount of oil underwater. Wave action and wind helps to degrade the oil further but evaporation concentrates the dangerous toxic compounds that are left behind. Clean-up crews, fisherman, local residents, and tourists came in contact with these toxins through direct physical contact and inhalation.

Testing revealed that individually, oil and Corexit were found to be equally toxic. Studies conducted by Georgia Tech and Universidad Autonoma de Aguascalientes found that individually oil and Corexit are equally toxic but when combined have a synergistic reaction that makes the mixture up to 52 times more toxic (Georgia Institute of Technology 2012).

Over 50,000 people participated in some form of the oil spill clean-up. The exposure to the oil and/or dispersants can cause severe lung damage that is similar to the damage caused by asthma or chronic obstructive pulmonary disease. Cleanup workers and their spouses reported increased domestic dispute and depression (Biedron and Evans, 2017). There were also reports of increased alcohol and drug abuse due to higher levels of anxiety, depression, serious mental illness, and post-traumatic stress. There was increased risk of physical and psychological damage not only the clean-up workers, but to residents in the region as well. Those whose incomes were affected also reported increased levels of psychological distress. The spill resulted in the loss of over 22,000 jobs (Biedron and Evans, 2017).

Oil spills and their cleanup efforts can have long term impacts. Over a decade after the Exxon Valdez disaster, residents were still suffering from increased levels of anxiety,

depression, and post-traumatic stress disorder (Osofsky, Osofsky, and Hansel 2011), which suggests that it could be years before residents of Louisiana recover from the Deepwater Horizon disaster (fide Biedron and Evans 2017). Riki Ott PhD, a marine toxicologist, has been a leading advocate for the banning of toxic chemical dispersants since the Exxon Valdez spill in 1991. Ott's research shows that children across the Gulf States suffered debilitating symptoms that have coincided with the Deepwater Horizon oil spill in what she calls "the secondary disaster", the widespread use of the dispersant Corexit (Ott, 2012).

Given that we are in an era of deep water drilling, with ever deeper wells drilled in the Gulf of Mexico, the risk of massive oil spills has risen. The Deepwater Horizon was close to 5000 feet, and its depth hampered the effort to cap the well. It took 89 days to cap. An updated 2017 map from the National Oceanic and Atmospheric Administration (See Appendix I), shows over 4000 current and active oil and gas drilling platforms in the Gulf of Mexico. The majority are concentrated off the coast of Louisiana with some reaching depths of up to 7000 feet. I believe it is not a question of if, but when another spill will occur. Today the mental and cultural health of Louisiana residents is still recovering from the Deepwater Horizon spill and the use of Corexit. Emergency mental and cultural health response strategies need to be addressed to help prevent future, potential impacts from oil spill disasters and the use of toxic chemical dispersants.

Purpose Statement

The purpose of this research is to determine the current mental and cultural health status of Louisiana residents in 2017, nearly seven years after the Deepwater Horizon oil spill. The massive Deepwater Horizon offshore oil spill and the use of Corexit as a clean-up

solution created serious environmental and economic impacts (GAP 2013). These impacts also threatened public health, both physical and mental. The toxicity of the oil when mixed with the chemical clean-up solution Corexit was magnified therefore magnifying the effect it had on people in the affected and unaffected areas as well. The result was a decline in the mental and cultural health of local residents. Impacts were measured immediately following the DWHS and continued studies have been conducted by researchers almost yearly. Several previous studies have established that the Deepwater Horizon spill is an ongoing public health disaster with psychological effects (Biedron and Evans 2017, Morris, Grattan, Mayer, & Blackburn 2013, Weir 2014). My research is specifically focused on current status today, seven years after the disaster, but also tries to characterize the cultural impacts of contamination of seafood, favorite locales, and critical livelihoods on residents of Louisiana.

Research Question and Hypothesis

My research examined whether there is a continued effect on the cultural and mental health of Louisiana residents seven years following the Deepwater Horizon oil spill and the use of the dispersant Corexit. My hypothesis is that both the spill and its clean-up solution have a continued, devastating impact on the cultural and mental health of the residents of Louisiana. The results of my study may indicate the need for long term mental and cultural health response strategies following such oil spill disasters.

To answer my research question my sample group consisted of clean-up workers, residents, and indigenous tribes living in the affected areas, as well as groups dependent on the fishing industry for sustenance. My survey questions allowed me to explore the

following possible questions regarding on-going impacts. Are there increased levels of anxiety, depression, increased alcohol and substance abuse, chronic physical issues, and post-traumatic stress disorders today following the DWHS? Has the DWHS had a continued effect on the way people traditionally enjoy the Gulf resources? Are economic impacts, such as losses in business revenue or profits and/or personal losses, still having an effect on the mental and cultural health of Louisiana residents today? Does actual or potential contamination of seafood change eating choices of residents, and does this have a larger cultural impact?

CHAPTER 2

Chapter 2 – Review of Literature

Cultural and mental health impacts caused by oil spills and the clean-up process have been revealed in a number of prior studies, particularly those examining two of the largest oil spill disasters in U.S. waters, the Exxon Valdez spill in Alaska and now, the Deepwater Horizon well blowout in the Gulf of Mexico.

The environmental impacts of the DWHS have been profound, and have not yet ended. The Georgia Institute of Technology, a public research university in Atlanta, Georgia and ranked among the world's leading technological research universities, conducted a study to test the effects of combining oil with the toxic chemical dispersant Corexit. This study found that mixing the dispersant with oil increased toxicity of the mixture up to 52-fold over the oil alone. In toxicity tests in the lab, the mixture's effects increased mortality of rotifers, a microscopic grazing animal at the base of the Gulf's food web. Riki Ott is a doctor of marine toxicology and activist in Cordova, Alaska. Ott was frequently introduced as an "oil spill expert" in her many media appearances during the height of the 2010 BP Deepwater Horizon well blow-out news coverage. In her article "Unfinished Business: The Unspoken Link between Dispersants and Sick Children in the Gulf of Mexico.", Ott is informing people of her early warnings about the short and long-term consequences of exposure to oil and dispersants. Now that those consequences have hit home, she is encouraging everyone to stand up and fight against the use of Corexit as an offshore oil spill clean-up solution.

The Government Accountability Project (GAP) is a whistleblower protection and advocacy organization in the United States. A nonprofit public interest group, GAP litigates

whistleblower cases, helps expose wrongdoing to the public, and actively promotes government and corporate accountability. In this article, the GAP released new investigative findings in an addendum to its 2013 report, *Deadly Dispersants in the Gulf: Are Public Health and Environmental Tragedies the New Norm for Oil Spill Cleanups?* The latest evidence further demonstrates devastating long-term effects on human health and the Gulf of Mexico ecosystem stemming from BP and the federal government's unprecedented use of the dispersant Corexit in response to the 2010 Deepwater Horizon oil spill.

We can also see suggestions of impacts on human health from observations of impacts on other species. The National Wildlife Federation's study, "Five Years and Counting: Gulf Wildlife in the Aftermath of the Deepwater Horizon Disaster" summarized impacts on a wide span of species. The new research showed that "Exposure to oil has been shown to cause abnormal development in many species of fish, including mahi-mahi, Gulf killifish, and bluefin and yellowfin tuna", this being only one of twenty new species that were found to be negatively affected. They concluded that there is a significant amount of oil and Corexit mixture remaining on the ocean floor, indicating that it will be potentially decades before the full impact of the disaster will be known.

Studies have shown large impacts stemming from disruption to people's daily lives. In the study "Deepwater Horizon Oil Spill: Mental Health Effects on Residents in Heavily Affected Areas" by Osotsky, Osotsky, and Hansel 2011, telephone and face-to face interviews were conducted with residents to assess their concerns and direct impacts experienced from the spill. They found that communities who were directly affected by oil spills had increased negative mental health issues. The study showed that the greatest effect on mental health was connected to the disruption in the participants' lives, family,

work, and social engagements, resulting in elevated levels of anxiety, depression, and post-traumatic stress. Those dependent on oil work and fishing as a livelihood were most vulnerable. They concluded there was a need for studies exploring the longer-term effects following oil spills and a need for mental health services after oil spill disasters.

These social impacts appeared to be greater for those more reliant on natural resource careers, but also could be mitigated by other factors. In “Public Perceptions of the Response to the Deepwater Horizon Oil Spill: Personal Experiences, Information Sources, and Social Context” by Safford, Ulrich, and Hamilton 2012, random-digit telephone surveys were taken of 2023 residents in coastal parishes and counties of Louisiana and Florida affected by the spill. The study looked at how the actions and involvement of different organizational actors in disaster response might mitigate or exacerbate the social impacts of events like the DWHS. The study showed that social connections to natural resources and vulnerability play central roles in shaping the way both individuals and communities experience disasters.

Local indigenous groups and their way of life were also affected by the Deepwater Horizon spill. In the article "BP Oil Spill Threatens Future of Indigenous Communities in Louisiana", Amy Goodman; an American broadcast journalist, syndicated columnist, investigative reporter, and author and Juan Gonzalez; an American progressive broadcast journalist and investigative reporter, went to Grand Bayou on the same day as a visiting delegation from Alaska who survived the Exxon-Valdez spill and spoke to indigenous leaders from both disaster-affected communities. The article is comprised of interviews with several leaders discussing the impacts on their lives and who hold BP responsible for

a damaged ecosystem, threatened livelihoods, and an end to a way of life. They live mostly off the oysters, shrimp and fish they draw from the marshes and expressed their concern that they and their way of life is on the brink of extinction.

The conceptual models that guide our understanding of oil spill impacts is also of critical importance. Lawrence A. Palinkas PhD, has made this case in "A Conceptual Framework for Understanding the Mental Health Impacts of Oil Spills: Lessons from the Exxon Valdez Oil Spill". The author determined that mental health impacts of oil spills are in many ways similar and different from other types of disasters such as natural disasters, other technological disasters, and acts of terrorism. Disaster mental health builds on the concept of risk and resilience and the loss or threatened loss of resources that occurs during and after a disaster. Palinkas focused on understanding the current social and psychological impacts of the Deepwater Horizon oil spill (DWHS) and lessons learned from the Exxon Valdez oil spill (EVOS). The author believes the knowledge gained from the EVOS should be applied to help identify strategies that will help build community resilience and focus on specific services that will help to mitigate and prevent mental and cultural health impacts.

One of the first efforts to predict long-term impacts of the Deepwater Horizon spill used data on the long term impacts of a prior spill. In "The Exxon Valdez and BP Oil Spills: A Comparison of Initial Social and Psychological Impacts", authors Gill, Picou, and Ritchie 2012 conducted telephone surveys five months after the DWHS spill using a random-digit dialing technique consisting of respondents 18 years or older and residents of the area for more than one year. After comparing the initial social and psychological impacts from both the EVOS and the BP oil spill, they found a parallel in the initial mental health impacts. They

then looked at 20 years of research on the social and psychological impacts of the EVOS. They found that victims in the Gulf Coast areas have a high probability of chronic mental health problems as the residents of the EVOS had significant mental health impacts for more than 11 years with chronic psychological stress focused mostly on commercial fishermen and Alaska Natives. The conclusion was that psychological stress and social disruption will be affect Gulf Coast communities for decades.

Other studies have demonstrated that the Deepwater Horizon well blow-out is an ongoing public health disaster. In 2014 the American Psychological Association released an article by Kristen Weir titled "After the Spill". Weir's article looked at current research on the lingering effects of the BP oil spill, much of which is underway and not yet published. She found that while the focus of most studies has been primarily on physical health, mental health was also at risk. One study by Lynn Grattan, PhD, a psychologist at the University of Maryland, focuses on Gulf Coast residents and their recovery after the spill. Grattan and her team published their findings in the American Clinical and Climatological Association in an article titled *Psychological Responses and Resilience of People and Communities Impacted by The Deepwater Horizon Oil Spill*. Grattan believes "the biggest health impacts of the oil spill have been psychological" (Morris, 2013). Grattan and her group's 2013 published findings showed a sharp increase in the levels of anxiety and depression in two fishing communities, one directly affected by the spill and one indirectly. They found that one-third to one-half of the populations fit the criteria for clinical depression and lingered for up to three years after the spill. Grattan and her team also found loss of income to be the biggest contributor to mental health problems, not just in the fishing and tourism industry but in restaurants, stores, transportation and other industries

as well. Bitterness and anger were said to be associated with the severe mental health outcomes. Grattan's study also showed that man-made disasters had a larger impact than natural disasters on the levels of bitterness and anger, strong drivers of distress (Morris, 2013).

Brian Mayer, PhD, a sociologist at the University of Arizona, is studying the same populations as Grattan, but focuses on community instead of individual resilience. Weir stated that Mayer found "signs of community corrosion" in the aftermath of the spill much like the outcomes after the Exxon Valdez oil spill (Weir, 2014). She reported that epidemiologist Sharon Croisant PhD at the University of Texas Medical Branch is collecting data on the mental and physical health of Louisiana residents who have been affected by the spill. Croisant said her study shows "The residents believe their community has been damaged and the Gulf will never be the same (Weir, 2014)". Croisant also stated that "Our observation is that very few people have adequate access to health care and in most cases virtually no access to mental health care (Weir, 2014)". Weir found a study group at Tulane University, headed by Maureen Lichtveld MD, who is looking at how repeated stressors that include the oil spill are affecting the health and reproductive health of pregnant women. Lichtveld wants to understand the effect of cultural factors on the resilience of individuals and communities after a disaster such as the BP oil spill (Weir, 2014).

A review of follow-up studies was released by the marine conservation organization Oceana, "Time for Action-Six Years after Deepwater Horizon". The report summarized what has been learned about the effects of the DWHS six years later drawing on the latest scientific studies and focusing primarily on the most recent research published in 2015 and

2016. The report showed that after the spill, Gulf residents directly and indirectly affected by the spill reported increased symptoms of depression, anxiety, serious mental illness and post-traumatic stress. Clean-up workers and their spouses reported increased depression and domestic dispute. The study concluded that clean-up workers and local residents have an increased risk of physical and psychological damage from oil spills and dispersants.

The previous studies focused primarily on the economic, mental and cultural health effects that both the EVOS and DWHS had on residents in affected and unaffected areas. They concluded that residents suffered various economic, mental, and cultural health impacts. Only one study concluded that economic impacts were the number 1 cause of mental health impacts (Morris 2013). What wasn't addressed were other factors that may have contributed to mental and cultural health impacts. Why did the oil cause so many mental and cultural health issues? Was it just economic impact and environmental destruction? Were there other social and cultural concerns, such as the role that Gulf seafood plays in not just economic sustainability, but social and cultural sustainability? Questions that look at how the elimination or decrease in consumption of Gulf seafood by residents and local indigenous tribes might affect the increase of mental and cultural health impacts were not addressed. What role does Gulf seafood play in the everyday lives of local residents? Gulf seafood is a huge economic driver for Gulf States providing jobs in the restaurant, fishing, seafood market, and tourism industries. But what impact does it have on local cultures, not just for residents but local indigenous tribes as well? Can a culture survive the loss of its' historical cuisine? Can massive oil spills erase local cultures? These questions are critical to consider when determining the many different impacts of massive oil spills.

CHAPTER 3

Chapter 3 – Methodology

The goal of the research was to determine the current mental and cultural health status of Louisiana residents today, nearly seven years after the Deepwater Horizon oil spill, and to determine if the symptoms of residents who were mentally and culturally affected directly after the spill are still present today. A cross-sectional electronic survey was administered to approximately 200 residents of Louisiana between February 15, 2017 and April 15, 2017. An online survey was chosen for the following four reasons: 1) online surveys are inexpensive and have a small cost to the respondent, 2) surveys have a broad capability which ensures a more accurate sample from which to draw conclusions, 3) surveys allow both closed and open responses, 4) the anonymity of surveys allows the respondent to answer with more candid and valid answers. Respondents were required to be at least 18 years of age and must have resided in Louisiana since the Deepwater Horizon oil spill to be eligible. Groups targeted were indigenous tribes, groups with significant exposure and dependence on fishing and oil work for sustenance, clean-up workers. In addition numerous local non-profit groups such as LEAN (Louisiana Environmental Action Network) and the Gulf Restoration Network were solicited. The study aimed to collect data from approximately 100 people. The study was cross sectional and modeled to a standardized measure of psychological stress and the connection to resources, resource loss, public health, mental health, cultural impact, and economic impact (CDC 2012). The electronic survey was on a strictly voluntary participation only. No tactics were used to entice or coerce the respondents. No offensive, discriminatory, or other unacceptable language was used in the formulation of the questionnaire. The survey was confidential to

assure the respondent's anonymity and no names or labels were used in the results to identify any specific individuals or groups.

This study includes several independent and dependent variables. The first key dependent variable is **Mental Health Impacts** that the spill and clean-up solution has had on the residents of Louisiana. Mental health impacts could range from significant increases in depression, anxiety, alcohol and drug abuse, and posttraumatic stress disorders. The independent variables are mental health stressors such as individual and family health concerns, economic loss, future economic loss, public health, and cultural loss (identity). Individual and family physical health concerns vary from the clean-up workers who were in constant contact with the oil/Corexit mixture; fishermen and oil workers who also aided in the process; local residents in the affected areas who came in contact with the mixture through water, rain (the dispersant evaporated), and ingesting seafood that was tainted with the mixture; and residents not in the immediate affected area who also ingested the tainted seafood. Economic loss and future economic loss were and are still being affected by tainted seafood for commercial and local businesses as well as individual sustenance; environmental and tourism locations that have not yet recovered from the destruction resulting in loss of revenue; and individuals unable to work due to physical and mental health issues caused by the spill.

The second key dependent variable is **Cultural Health Impacts** which are defined as the inability to practice behaviors that have been a way of life for generations of local residents and indigenous tribes. Cultural impact is measured by being able to engage in

previous social activities that revolve around the catching, preparing, and ingesting of local seafood to the harvesting of local seafood for sustainability.

Because of the low response rate, the survey was posted on the social media websites of many of the non-profit and activist groups. Leaders of organizations were directly contacted and asked to post the survey on the organizations' website. Some agreed to participate while others declined stating that "they did not wish to open healing wounds any further". The sample size increased slightly.

Chapter 4

Chapter 4 – Results and Discussion

Survey Results

Approximately 200 surveys were distributed with a total return of 10 surveys, or a response rate of 5%. . The survey respondents consisted of 7 males and 3 females. Of the 10 respondents 8 were White with the remaining 2 categorized as Hispanic, American Indian, or Alaska Native. The ages ranged from 18 to 64 or older. Out of the 10 respondents, 6 participated in clean-up activities; 1 in beaches or marshes, boom deployment and recovery or offshore skimming, decontamination management, and well-head or controlled burning with another 5 saying "other". Approximately 5 of 5 had direct contact with the oil Corexit mixture; 1 skin, 3 inhalation, and another 2 both skin and inhalation.

Overall, of the 10 respondents 7 of them reported some kind of economic, mental health, or cultural health impact following the Deepwater Horizon oil spill (DWHS).

There were a total of 4 reported economic impacts as a result of the DWHS.

- 4 of 4 respondents in the fishing/seafood market/restaurant/tourism industry reported a loss in income following the DWHS due to a shortage of seafood and tainted seafood. Of the 4, 2 have changed professions.

There were a total of 6 reported mental health impacts as a result of the DWHS.

- 5 of 6 respondents reported an increase in levels of anxiety and/or depression, and/or mental health issues, and/or post-traumatic stress following the DWHS, with 4 of 6 reporting continued symptoms today.
- 2 of 6 respondents reported an increase in the use of prescription or nonprescription drugs following the DWHS, and continued today.
- 5 of 6 respondents reported an increase in counseling for problems with emotions, nerves, or mental health following the DWHS, 3 of 6 continue to receive counseling today.

There were a total of 4 reported cultural health impacts as a result of the DWHS.

- 4 of 4 respondents reported a loss of individual and community practices and/or activities due to tainted seafood following the DWHS and today.
- 2 of 4 respondents reported a loss of cultural sustainability practices and/or activities due to tainted seafood and destroyed coastlines following the DWHS and today.

Other reported impacts focused primarily on the effects of tainted seafood as a result of the DWHS and how it impacted their consumption of Gulf seafood, their awareness of environmental issues, and their participation in environmental activism. These all could be classified as cultural impacts.

- 4 of 10 respondents reported the elimination or reduction in the amount of seafood consumed immediately following the DWHS, and today.

- 4 of 10 respondents reported an increase in the levels of anxiety and depression when consuming seafood immediately following the DWHS, and today.
- 2 of 10 respondents reported an increase in the awareness of consequences due to environmental issues immediately following the DWHS, and today.
- 2 of 10 respondents reported an increase in their individual participation in environmental activism immediately following the DWHS, and today.

Discussion

The purpose of the present research was to determine the current mental and cultural health status of Louisiana residents in 2017, following the 2010 Deepwater Horizon oil spill. Other research to date has found various levels of similar and continual mental and cultural health impacts following both the Exxon Valdez Oil Spill (EVOS) and Deepwater Horizon Spill (DWHS). Here I compare my findings to other research that used similar methodologies to see if my results were consistent, or if they reveal additional issues or concerns.

The results of my research show that following the DWHS there were serious economic, mental, and cultural health impacts to the residents of Louisiana that have continued today. Respondents reported that the biggest health impacts were and still are psychological, creating mental health impacts that range from an increase in anxiety, depression, the use of prescription and non-prescription drugs, and counseling for problems with emotions, nerves, of mental health. These same results were found in previous studies conducted by Morris 2012, Palinkas 2012, Osofsky, Osofsky, and Hansel 2012, and Biedron and Evans 2016. Also reported by respondents was economic loss, the

same that was found by Morris in 2012 and Gill, Picou, and Ritchie in 2012. Their results also suggested that economic loss was a contributing factor to mental and cultural health impacts. The results of my research showed cultural health impacts. Respondents reported losses in individual and community practices and/or activities due to tainted seafood and the loss of cultural sustainability practices and/or activities due to tainted seafood. Previous research did not address the impacts that tainted seafood had on individuals and communities. However, research by Goodman and Gonzalez in 2010 also found impacts to cultural sustainability practices and/or activities due to tainted seafood. They reported that local indigenous leaders felt their livelihoods were threatened. They live mostly off the oysters, shrimp and fish they draw from the marshes and expressed their concern that they and their way of life is on the brink of extinction. However, this study was conducted as the spill was just unfolding, and it is significant that similar impacts are reported in my survey seven years later.

Other reported impacts revealed in my study were the elimination or reduction in the amount of Gulf seafood consumed, the increase of anxiety when consuming Gulf seafood, the increase in awareness of environmental issues and their consequences, and the increase in individual participation in environmental activism. No previous studies mentioned in this report addressed any of these issues indicating a need for future research in these areas.

Limitations

Online surveys can be limited and ineffective (Szolnoki and Hoffman 2013). Studies show that online surveys can be cost effective, can be delivered immediately, do not require

interviewers to be present, and can be addressed at the responder's convenience. However, relying on this method can lead to selective samples that do not represent the entire population and concerns about nonresponse bias. Surveys can also be grouped with spam or junk mail and not be addressed leading to a low response rate. Face to face surveys/interviews are proven to produce higher response rates, especially those with sensitive subjects, and can be published as representative of the population (Szolnoki and Hoffman 2013). Because the researcher was not local, face to face interviews were not an option for the research.

A local indigenous group that research shows was greatly affected by the spill, agreed to post the survey on their website. However, there was only 1 participant from that demographic. Other local and engaged non-profits decided not to post or send the survey to their members, stating that they did not wish to reopen old and still painful wounds. Local activists who were asked to distribute the survey stated that many residents were too involved in current, pressing issues and declined to participate stating time constraints.

Suggestions for Future Research

To produce a greater response rate for this research, the researcher needs to be in the location of the subject being researched. Conducting face-to-face interviews with individual and organizations will be more effective in obtaining a greater sample size.

Other reported impacts showed that the tainted Gulf seafood has affected residents as much, if not more than economic or a variety of health issues. Reports show current increased levels of anxiety and depression while consuming or eliminating the consumption of the tainted seafood. An in depth study of how the loss of a community's

cultural cuisine affects their mental and cultural health would be an insightful research topic for the future.

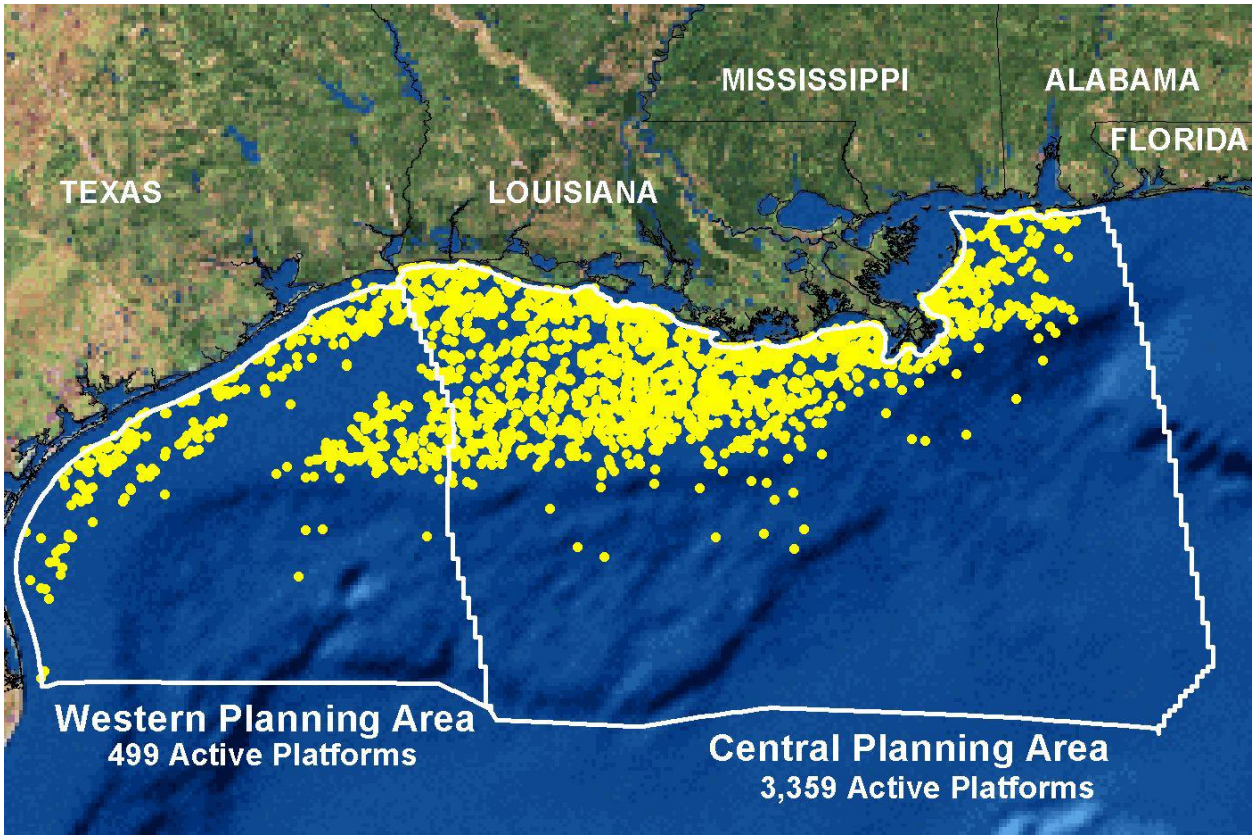
Chapter 5

Chapter 5 – Conclusion

Why study the effects of offshore oil spills and Corexit on the cultural and mental health of Louisiana residents? Studies have shown that Corexit increases the toxicity of the oil thereby increasing the negative impact to the ecosystem, environment, and economy. These negative impacts have had a devastating effect on the culture and mental health of residents in the affected area, clean-up workers, indigenous tribes, and members of the fishing industry. The data collected provided evidence that over six years after the Deepwater Horizon oil spill there are still lingering cultural and mental health effects on the residents of Louisiana. Results show levels of anxiety and depression have increased since the Deepwater Horizon oil spill, citing an increase in the use of prescription and non-prescription drugs, a loss of business/job income, and a loss of cultural practices; social and sustainable. Importantly, several respondents expressed that fear of the potential toxicity of seafood post spill had led to elimination or reduction in their consumption of Gulf seafood, as well as increased levels of anxiety and depression when they did consume these culturally important foods. With over 4,000 active oil and gas deep water drilling platforms in the northern Gulf of Mexico, primarily south of Louisiana (see appendix I), the question is not if but when another massive offshore oil spill disaster will occur. A need for the implementation of efficient mental and cultural health response strategies, locally and nationally, for individuals and communities impacted by oil spill disasters is clear.

Appendix I

Map of the northern Gulf of Mexico showing the nearly 4,000 active oil and gas platforms.



http://oceanexplorer.noaa.gov/explorations/06mexico/background/hires/17_platform_hires.jpg

Appendix II

Mental and Cultural Health of Louisiana Today in the Aftermath of the Gulf Oil Spill

Question 1.

In which of these age categories do you belong?

- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65 or older

Question 2.

What is your gender?

- ☐ Male
- ☐ Female
- ☐
- ☐

Question 3.

What is your zip code?

Question 4.

Which one of these groups would you say best represents your race?

- ☐ White
- ☐ American Indian or Alaska Native
- ☐ Hispanic
- ☐ Asian

- ☐ Black or African American
- ☐ Native Hawaiian or Other pacific Islander
- ☐ Indigenous Tribe

Question 5.

- What is your current marital status?

- ☐ Married
- ☐ Divorced
- ☐ Widowed
- ☐ Separated
- ☐ Never Married
- ☐ Member of an unmarried couple

Question 6.

- What was your employment status before the Gulf oil spill?

- ☐ Employed for wages
- ☐ Self-employed
- ☐ Out of work for more than 1 year
- ☐ Out of work for less than 1 year
- ☐ Student
- ☐ Retired
- ☐ Unable to work
- ☐ Don't know/not sure

Question 7.

What type of industry were you employed in prior to the Gulf oil spill?

- ☐ Fishing
- ☐ Oil and gas extraction/mining

- ☐ Agriculture/hunting/forestry
- ☐ Construction
- ☐ Manufacturing
- ☐ Healthcare/social assistance
- ☐ Wholesale or retail
- ☐ Hotels/restaurants/recreation/arts/entertainment
- ☐ Real-estate, rental, and leasing
- ☐ Other

Question 8.

- Including you, how many people in your household lost their jobs due to the Gulf oil spill?

- ☐ 1-5
- ☐ 6 or more
- ☐ None
- ☐ Don't know/not sure

Question 9.

What is your current employment status?

- ☐ Employed for wages
- ☐ Self-employed
- ☐ Out of work for more than 1 year
- ☐ Out of work for less than 1 year
- ☐ A homemaker
- ☐ Student
- ☐ Retired
- ☐ Unemployed

Question 10.

- If you are out of work or unable to work, is it a result of the Gulf oil spill?

- Yes
- No
-
-

Question 11.

- What type of industry are you currently employed in?

- Fishing
- Agriculture/forestry/hunting
- Oil and gas extraction/mining/
- Construction
- Manufacturing
- Wholesale or retail
- Hotels or restaurants
- Recreation/arts/entertainment
- Healthcare/social assistance
- Real estate/rental/leasing
- Other

Question 12.

- If different from before the Gulf oil spill, was the change due to the spill?

- Yes
- No
-
-

Question 13.

Did you participate in the Gulf Oil Spill cleanup activities?

- Yes
- No

☐

☐

Question 14.

- What type of cleanup activities did you participate in?

☐ Beach or Marshes

☐ Birds or Wildlife

☐ Boom deployment and recovery or off-shore skimming,

☐ Decontamination or Waste stream management

☐ Well-head or controlled burning

☐ Administrative

☐ Logistical

☐ Medical support

☐ Other

Question 15.

- Did you have direct contact with the oil from the Gulf oil spill?

☐ Yes

☐ No

☐ Don't know

☐ Not sure

Question 16.

If so, in what way did you have contact?

☐ Skin

☐ Inhalation

☐ Ingestion

☐ Other

Question 17.

- Since the Gulf oil spill, about how many days did a physical health problem keep you from doing your work or other usual activities?

Question 18.

- Since the Gulf oil spill, have you increased your level of prescription or non-prescription medication use without the advice of a doctor or other health care professional?

- ☐ Yes
- ☐ No
- ☐
- ☐

Question 19.

- Since the Gulf oil spill, have you increased your level of alcohol intake?

- ☐ Yes
- ☐ No
- ☐
- ☐

Question 20.

- Since the Gulf oil spill, has your level of anxiety or depression increased?

- ☐ Yes
- ☐ No
- ☐
- ☐

Question 21.

- Since the Gulf oil spill, about how many days did a mental health condition or emotional problem keep you from doing your work or other usual activities?

Question 22.

- Have you EVER received any sort of counseling for problems with your emotions, nerves, or mental health? [Please include counseling from a family doctor, psychiatrist, psychologist, social worker, therapist, or clergy.]

- [ ] Yes
- [ ] No
- [ ]
- [ ]

Question 23.

- Were you EVER prescribed medication for problems with your emotions, nerves, or mental health?

- [ ] Yes
- [ ] No
- [ ]
- [ ]

Question 24.

- Since the Gulf oil spill, how many times have you received counseling for problems with emotions, nerves, or mental health?

- [ ] 1-30
- [ ] 31-60
- [ ] 61-99
- [ ] 100 or more
- [ ] None

Question 25.

- If so, have you been prescribed medication for problems with your emotions, nerves, or mental health?

- [ ] Yes

☐ No

☐

☐

Question 26.

- How has your life changed since the Gulf Oil Spill?

Question 27.

- Have you changed what you eat? If so, what?

Question 28.

- Have you changed what you do with your free time? If so, please specify.

Question 29.

- Have your community activities changed? If so, please specify.

References

Biedron, I., & Evans, S. (2017, March 22). Time for Action: Six Years After Deepwater Horizon. Retrieved May 21, 2017, from http://usa.oceana.org/publications/reports/time-action-six-years-after-deepwater-horizon

CDC. (2012). Gulf States Population Survey Landline Telephone Questionnaire December 2010 – December 2011. Retrieved February, 2017, from https://www.cdc.gov/mentalhealthsurveillance/documents/GSPSquestionnaire.pdf

EPA. "Dispersant Use in BP Oil Spill." EPA. September, 2010. Accessed November 19, 2016. https://archive.epa.gov/bpspill/web/html/dispersants-testing.html.

Government Accountability Project. "Deadly Dispersants in the Gulf: Are Public Health and Environmental Tragedies the New Norm for Oil Spill Clean-up?" Government Accountability Project. April 19, 2013. Accessed November 1, 2016.

Georgia Institute of Technology. "Gulf of Mexico Clean-up Makes 2010 Spill 52-times More Toxic; Mixing Oil with Dispersant Increased Toxicity to Ecosystems." Science Daily. November 30, 2012. Accessed June 08, 2016. https://www.sciencedaily.com/releases/2012/11/121130110518.htm

Gill, D. A., Picou, J. S., & Ritchie, L. A. (2011). The Exxon Valdez and BP Oil Spills: A Comparison of Initial Social and Psychological Impacts. *American Behavioral Scientist, 56*(1), 3-23. Doi: 10.1177/0002764211408585

Goodman, Amy, and Juan Gonzalez. "BP Oil Spill Threatens Future of Indigenous Communities in Louisiana." Democracy Now! June 7, 2010. Accessed May 21, 2016. http://www.democracynow.org/2010/6/7/bp_oil_thrill_threatens_future_of

Morris, J. G., Grattan, L. M., Mayer, B. M., & Blackburn, J. K. (2013). Psychological Responses and Resilience of People and Communities Impacted by The Deepwater Horizon Oil

Spill. *Transactions of the American Clinical and Climatological Association*, *124*, 191–201.

Osofsky, H. J., Osofsky, J. D., & Hansel, T. C. (2011). Deepwater Horizon Oil Spill: Mental Health Effects on Residents in Heavily Affected Areas. *Disaster Medicine and Public Health Preparedness,5*(04), 280-286. doi:10.1001/dmp.2011.85

Ott, Riki. "Unfinished Business: The Unspoken Link Between Dispersants and Sick Children in the Gulf of Mexico." Common Dreams. December 4, 2012. Accessed May 18, 2016 http://www.commondreams.org/views/2012/12/04/unfinished- ***l***

Palinkas, L. A. (2012). A Conceptual Framework for Understanding the Mental Health Impacts of Oil Spills: Lessons from the Exxon Valdez Oil Spill. *Psychiatry: Interpersonal and Biological Processes,75*(3), 203-222. doi:10.1521/psyc.2012.75.3.203

PTSD: National Center for PTSD. (2007, July 05). Retrieved February 06, 2017, from https://www.ptsd.va.gov/professional/treatment/early/early-intervention-disasters.asp

Safford, T. G., Ulrich, J. D., & Hamilton, L. C. (2012). Public perceptions of the response to the Deepwater Horizon oil spill: Personal experiences, information sources, and social context. *Journal of Environmental Management,113*, 31-39. Doi :10.1016/j.jenvman.2012.08.022

Szolnoki, G., & Hoffmann, D. (2013, October 1). Online, face-to-face and telephone surveys. Retrieved May 21, 2017, from http://www.sciencedirect.com/science/article/pii/S2212977413000331

Weir, K. (2014, July & aug.). After the Spill. Retreived April 22, 2017, from http://www.apa.org/monitor/2014/07-08/spill.aspx

Yarris, Lynn. "Lessons Learned from the Two Worst Oils Spills in U.S. History | Berkeley Lab. News Center. 2011. Accessed November 19, 2016. http://newscenter.lbl.gov/2011/08/18/two-worst-oils-spills/.