



OIL SPILL SCIENCE

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THE IMPACTS OF DEEPWATER HORIZON ON STRESS, ANXIETY, AND RESILIENCE OF PEOPLE AND COMMUNITIES

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The impacts of the Deepwater Horizon oil spill stretched beyond the Gulf of Mexico's waters, plants, animals, and habitats. The spill affected the mental health of some residents along the Gulf Coast. The impacts varied based on what kind of job a person had, how financially secure they were, how attached they were to the place they lived, and how many disasters they had lived through prior to the spill.



Reporter looks on at oil spill containment boom along the coast of Louisiana. (Reuters/C. Barria)

The Deepwater Horizon (DWH) oil rig exploded on April 20, 2010, killing 11 workers and injuring others. The oil spill affected coastal communities of the Gulf of Mexico in many ways. Some people who relied on the Gulf for work lost income and business as well as outdoor recreational opportunities during the oil spill. Certain coastal residents and cleanup workers were directly exposed to oil and witnessed the impact it caused to the shoreline

and Gulf waters.^{1,2} Others suffered from the spill indirectly, experiencing feelings of unease and confusion as they continuously watched the events unfold on television or social media.^{3,4}

After the oil spill, several studies examined the mental health impacts of the oil spill on people living along the Gulf Coast. Scientists documented short-term, immediate mental health impacts, many of which are believed to be induced by



A shrimping vessel navigates out to fishing waters past beachgoers and oil rigs off the coast of Alabama. (MASGC)

stress. The researchers found that stress following disasters can lead to a wide range of mental health impacts including, in the short-term, increased domestic violence, substance abuse, post-traumatic stress disorders, and suicide.⁵ However, longer-term impacts have been harder to identify.

DEFINING THE IMPACTS

While physical impacts to the environment, animals, and people may be easily observed, assessing impacts to the mental health of people is more difficult. One of the reasons for this difficulty is that people express their mental health symptoms differently, and those differences can be influenced by several factors like age, gender, culture, and previous experiences with trauma.⁶⁻⁸ Some symptoms of poor mental health are mild—like feeling sad or overly tired—while others are more severe and may require medical intervention, such as depression and Post-Traumatic Stress Disorder (PTSD). Doctors and scientists have created several tests to assess mental health impacts, each focused on different symptoms. For example, some tests may ask people about their levels of stress and anxiety or their ability to carry out normal activities.² Other tests might ask about how people see themselves or whether they feel they have people to support them through difficult times.⁹ Doctors and scientists also try to ask about people's coping skills.¹⁰

These tests, put together, tell scientists that the DWH oil spill had extensive, sometimes severe but often subtle, impacts on the mental health of some people across the Gulf of Mexico. However, scientists cannot always explain why certain communities or people reacted differently to the disaster or recovered more slowly than others. Each individual, group, and community can experience various levels of stress, have unique histories with disasters, and have distinct social factors that contribute to their overall mental health.⁵ To understand how all of these factors interact, scientists needed to conduct research in different types of communities with a variety

of groups of people. For example, the Women and Their Children's Health study (WaTCH) focused on the health of women and children in several parishes of southeastern Louisiana¹¹ while the Gulf Long-term Follow-up Study (OSRC) workers.¹ Some studies looked specifically at the impacts on fishing communities,⁸ and others focused on residents of a single state who have experienced multiple disasters.¹²

What does resilience mean?

The term resilience has been used in many ways when describing how individuals, communities, or regions recover from disasters. When talking about mental health, psychological resilience can be described as the way that people negotiate, adapt to, manage, and recover from significant sources of stress and trauma.¹² Though researchers continue to debate the exact meaning of the term and its use,⁵ many agree that psychological resilience is a complex concept, involving both individual traits (such as a person's ability to cope and sense of optimism) and other community-based factors like access to resources and social support networks.¹⁰

Scientists often gauge an individual's resilience when faced with trauma using different terms like hardiness, optimism, and adaptability.¹⁰ Following the DWH oil spill, scientists found a strong relationship between an individual's resilience and **community resilience**.¹² While it appears that much of individual resilience is a matter of perception—whether an individual feels like they are capable of recovering—it can also include a person's ability to effectively find and use available resources after a disaster.¹²

This concept is true at the community level as well—people's perceptions of the community's ability to overcome adversity affects how community members actually handle those adversities. This, in turn, influences community member's mental health.^{9,12} Multiple studies indicate higher rates of mental distress and symptoms

of depression in communities and individuals with lower resilience.^{9,13}

Other factors can influence how well residents recover after a disaster. Feeling a sense of purpose or meaning in life or the belief that they are living their life in a way that stays true to their core values can help people recover after disasters. For example, researchers found that residents who had higher levels of resilience and meaning in life had fewer negative mental health symptoms after the oil spill than residents with lower levels.⁶

TYPE OF DISASTER INFLUENCES FEELINGS

Mistrust leads to negative feelings

The oil spill was not the first disaster to hit residents that lived along the Gulf Coast. These communities were hit hard by natural disasters, such as Hurricane Ivan in 2004 and Katrina and Rita in 2005. The DWH oil spill was different. It was not a natural disaster but a technological disaster.

Technological disasters generally result from malfunctions of technology, human error, regulatory failure, and/or management shortcomings. When a technological disaster occurs, people often experience several stressful life events at the same time, including

economic loss, physical and mental trauma, and loss of **social capital**.¹⁴

Natural disasters are typically considered to be “nobody’s fault” and people often come together to support one another and rebuild. These are referred to as **therapeutic communities**.¹⁵ On the other hand, technological disasters tend to lead to **corrosive communities** as people try to attach blame to people or organization(s). Impacted community members can become suspicious toward those they feel are responsible for the disaster or those they feel are benefiting from it.¹⁵

Following the DWH oil spill, the **responsible party**, BP, implemented a claims process to help offset some of the economic losses.^{3,16} Some residents were frustrated with the claims process and did not trust it. They felt that the amount of compensation people received was determined at random, even with identical claim statements. Regardless of the outcome of their claims, many residents found that the claims process itself was a significant source of stress and anxiety.¹⁷ Other residents complained about people they felt unfairly profited from the spill. These inequalities led to conflict, jealousy, and competitive feelings between members of some communities.^{17,18}

MENTAL HEALTH SYMPTOMS TAKE MANY FORMS

Doctors and scientists classify mental health conditions based on several symptoms, many of which are measured on sliding scales that range from nonexistent to severe. The following table (**Table 1**) lists a few mental health conditions and their acronyms along with the symptoms that were measured during the weeks, months, and years following the DWH oil spill.

TABLE 1. *These examples of mental health conditions and their associated symptoms were reported by scientists studying Deepwater Horizon impacts on multiple community members across the Gulf of Mexico. (Symptoms compiled from the National Institute of Mental Health publications pages <http://www.nimh.nih.gov/health/publications/>)*

Mental Health Conditions	Example Illnesses/Disorders	Potential Symptoms
Stress and Trauma	Post-traumatic Stress (PTS), Post-traumatic Stress Disorder (PTSD)	In relation to the traumatic event: Involuntary thoughts, avoidance of places or people, distorted beliefs, anger, irritability, recklessness
Depression	Major Depression (MD), Clinical Depression (CD), Major Depressive Disorder (MDD)	Sadness, hopelessness, loss of interest or pleasure in daily activities, weight change, fatigue, trouble sleeping
Anxiety	Generalized Anxiety Disorder (GAD)	Excessive worry, difficulty concentrating, restlessness, fatigue, muscle tension, headaches, trouble sleeping, nausea

Workers at an Alabama-based seafood company pick blue crab meat for public sale. Communities that rely heavily on the seafood industry for employment can be particularly vulnerable following disasters.⁸ (MASGC)

BP also created the **Vessels of Opportunity** (VoO) program to hire fishing crews to assist with cleanup efforts. These programs were meant to provide opportunities for members of the fishing communities and others to earn a wage while contributing to the cleanup effort. Yet some residents felt as though the selection for the VoO program was arbitrary and preference should have been given to fishing crews that were out of work.^{16,18}

IMPACTS TO WORKERS

Response and cleanup workers play an essential role following disasters. In the immediate aftermath of DWH, OSRC workers played an important role in minimizing damages to the environment while working to restore community activities (like access to coastal resources or impacted spaces) as quickly as possible.² Considering the important role of workers from affected communities, scientists sought to gain greater understanding of the relationships between disaster recovery work and mental health following the DWH oil spill.^{1,19}

OSRC workers during DWH included a diverse group with very different job tasks. Some came in direct contact with oil and oil spill chemicals, while others worked in supportive roles like information technology, transportation, and security.¹ OSRC workers are considered to be a potentially high-risk group for negative effects on their mental health, such as depression and stress, as they may have repeatedly witnessed the impacts of an oil spill, had direct contact



with the oil, or joined regular conversations about the cleanup efforts.^{2,20}

To determine potential impacts, researchers questioned DWH workers about their experiences with symptoms of depression and screened them for PTSD.¹ Results of these studies found that the prevalence of depression was higher in OSRC workers compared to non-workers, regardless of the amount of time spent working. This impact was particularly true among workers that either contacted or smelled oil as part of their working activities.^{19,20}

However, these and similar studies also found that financial compensation for cleanup work was related to lower rates of stress and anxiety compared to those people from the same community who did not do cleanup work. The advantages of employment appeared even larger for government workers compared to non-government workers, potentially due to the greater long-term stability with government employment.² Taken as a whole, the results suggest that investigating only the direct impacts of disaster recovery work may not tell the whole story of the broader mental health impacts to the worker community.

GETTING INVOLVED CAN HELP WITH RESILIENCE TO SPILL IMPACTS

A few studies have compared the mental health of disaster response workers drawn from affected communities to other members of the same communities who did not participate in cleanup efforts. These studies reported that community-sourced workers experienced a positive effect from their participation, meaning they were somewhat protected from negative mental health impacts.¹⁹ Evidence suggests that community members involved in the cleanup efforts may have a better sense of community belonging, be better informed about cleanup activities, or may be better financially compensated compared to other community members.^{19,21} Previous studies have shown similar, positive effects when individuals volunteer and communities join in disaster responses, including those for hurricanes, tsunamis, and terrorist attacks.^{19,21}

The oil spill hits the fishing industry hard

Following the DWH oil spill, the federal government closed areas of the Gulf of Mexico to fishing and then, using specific criteria, they gradually reopened waters. By April 19, 2011, officials reopened all federal waters.²² However, some heavily oiled areas in Barataria Basin in Louisiana state waters were not reopened to fishing until June 2015 because of oil contamination. Many people who worked in the fishing and seafood industries were out of work when these fishing areas were closed. Members of the fishing industry were nearly three times more likely to report some type of economic loss following DWH as compared to non-fishing households.⁸

Some researchers found that people with ties to fishing were more likely to have higher levels of stress than those in other professions who also relied on the Gulf for a source of income.^{8,23-25} For example, a year after the spill, scientists saw that residents with strong ties to fishing were much more likely to experience symptoms of depression than those with ties to tourism.²⁶

This finding could be because the fishing industry had other concerns in addition to the closure of fishing grounds. People from the fishing industry wondered about the long-term effects on populations of seafood species and whether consumers would believe that seafood was safe to eat.^{23,24} Workers in the fishing industry also tended to be a part of communities dominated by members of ocean-dependent industries. One survey of fishing households in Gulf Coast counties found that 40% also had ties to the oil industry and 51% had ties to tourism-related industries.⁸ This fact means that on top of their own experiences of loss, they saw their families, neighbors, and colleagues struggling as well.

People from fishing communities may feel disconnected from the processes the government uses to control and protect natural resources in the wake of a disaster. This feeling of helplessness can drive feelings of hopelessness, which may contribute to increased stress, anxiety, and multiple physical health impacts.⁵

WOMEN AND CHILDREN EXPERIENCE DISASTERS DIFFERENTLY

Research on disasters has shown that women and children, particularly ethnic minorities and those with significant economic challenges, are often most affected by health impacts, stress, and intimate partner



Fear of the unknown and the future of the seafood industry led many from fishing communities, including children, to experience negative mental health impacts following the DWH oil spill. (Infrogmaton)

violence during and following disasters.⁵ Multiple studies following the DWH oil spill found that women who suffered economic loss were more likely to report an increase in the number and intensity of fights (both verbal and physical) with their domestic partners.^{11,14}

The WaTCH study sought to understand the mental and physical health impacts of DWH oil spill experienced by women and children in the most impacted parishes of southeastern Louisiana. Scientists revealed that study participants had higher rates of anxiety, depression, and PTSD. These results are believed to be tied to the lower socioeconomic status and lack of job security reported by participating women.¹⁴ For example, scientists found that about 60% of study participants (about 1,200 of the women in the study) experienced low or no symptoms of PTSD following the oil spill. Women with low or no symptoms were more likely to be married Caucasians with high school diplomas making more than \$40,000 per year.⁷ Alternatively, participants who reported moderate to severe instances of depression were more likely to have experienced job loss and to have directly smelled the oil from shore.¹⁴

Children can be disproportionately impacted by the disruptions following disasters. Children and adolescents generally do not receive special attention either during

preparations for or recovery from disasters.²⁷ Researchers have also found that the effects of disasters vary based on the age, gender, and socioeconomic status of children. For example, a survey of school-age children who had been exposed to both Hurricane Katrina and DWH found that girls from minority groups had elevated levels of PTSD following the oil spill compared to other children.¹³ Further research indicates that children and adolescents who experienced multiple disasters showed more symptoms of Post-Traumatic Stress (PTS) when they also suffered additional personal loss, displacement, separation from family, and disruption of typical support structures.²⁷

PREPARING FOR THE FUTURE

Disasters, natural and technological, are not new and will continue in the future. Yet long-term studies of individuals and communities before and after disasters, including those that track displaced people, are both necessary and rare.⁵ The need for baseline data from at-risk communities, as well as ongoing surveillance of

community members after disasters through a Health Observing System, has long been cited as critical to increasing our understanding of both short and long-term disaster impacts in the future.³⁰ Understanding the different drivers of mental health impacts from disasters can help policymakers and doctors better serve the most vulnerable individuals and populations.²⁹

Early intervention and hardiness training programs have been developed that promote adaptability, provide methods for putting disasters into perspective, and teach coping skills. Pairing these types of programs with improved access to resources and information can help individuals feel more in control and better able to weather the impacts of disasters.¹⁰ However, training and support programs are not the only way to improve recovery from disasters in the future. Current policies should be reviewed for not only helping communities in the immediately impacted regions, but also for tracking individuals and communities that have been temporarily or permanently displaced following disasters.⁵

WHAT DO WE KNOW ABOUT LONG-TERM IMPACTS?

Research of multiple disasters has shown that while some mental health impacts are resolved relatively quickly after the disaster has passed, others may persist for years or even decades.^{8,12,25,28} There are some discrepancies about which study results should be considered long-term because studies at least a year after an event are all generally considered to be “long-term.” In fact, long-term studies are often more successful the sooner they begin. A simple explanation for this is that as time goes on, scientists find it more and more difficult to get people to respond to their surveys, particularly regarding mental health impacts.⁸

Based on the few studies of DWH that took place more than four years after the spill, scientists have found a combination of results. First, people generally recovered, or stopped reporting symptoms, after the first year. Second, people had lower negative mental health outcomes four and a half years after the spill if they had previously reported higher self-resilience.¹⁰ Finally, when it comes to mental health, a number of underlying conditions need to be considered when assessing the rate of recovery.²⁹



Displacement following disaster can lead people to experience extreme feelings of distress and anxiety that can stem both from leaving their communities and from being forced into uncomfortable circumstances with strangers. Residents of Louisiana and Mississippi were forced to evacuate their communities following Hurricane Katrina, many of them gathered in temporary shelters like the Houston Astrodome, pictured here. (FEMA)

Sea Grant originally released the outreach publication, ***The Deepwater Horizon's impact on people's health: Increases in stress and anxiety***, on this subject in 2017. This publication uses information from its predecessor as well as more recently published research. We would like to acknowledge two former Gulf Sea Grant Oil Spill Science Outreach Team members, Larissa Graham and Chris Hale, whose contributions were integral to the original publication.

MENTAL HEALTH RESOURCES

If you or someone you know needs mental health support or is experiencing a mental health crisis, these resources are available to you:

- **National Alliance on Mental Illness:** <https://www.nami.org/Home>
- **Substance Abuse and Mental Health Services Administration Treatment Services Locator:** <https://findtreatment.samhsa.gov/>
- **The National Suicide Prevention Lifeline:** Call 1-800-273-TALK (8255), Text “HELLO” to 741741, or Chat <https://suicidepreventionlifeline.org/chat/>

GLOSSARY

Community resilience — The sustained ability of a community to respond to, withstand, and recover from disasters.

Corrosive communities — A community in which individuals lack social connectedness due to fears, stress, anxiety, and conflict after a disaster, which impedes the community’s ability to recover.

Responsible party — The person, business, or entity that owns the vessel or facility that caused the spill and, therefore, is liable for the cost of removal and damage. The term does not imply criminal negligence.

Social capital — The networks and relationships that we surround ourselves with that allow us to navigate to resources and find support during times of difficulty.

Therapeutic communities — Communities in which individuals pull together in a coordinated, and connected way, after a disaster, to restore their community to pre-disaster conditions.

Vessels of Opportunity — A program that was implemented by BP after the Deepwater Horizon oil spill to provide limited employment opportunities to those in the Gulf region that had lost income or were out of work due to the oil spill.

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