



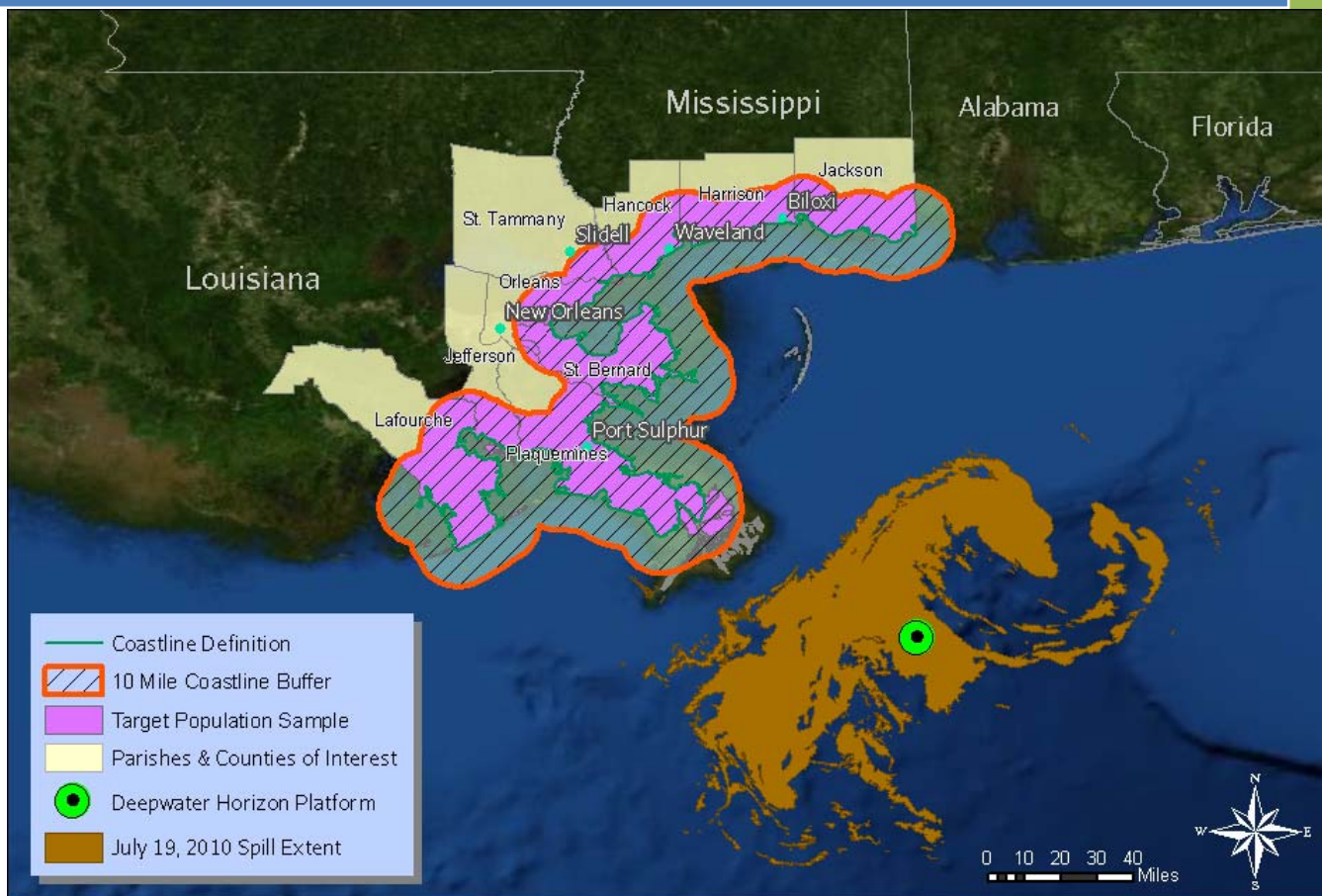
National Center for
Disaster Preparedness

Mailman School of Public Health
Columbia University

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Impact on Children and Families of the Deepwater Horizon Oil Spill

Preliminary Findings of the Coastal Population Impact Study



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On the Cover: The cover map of the Gulf Coast depicts the target population area covered by this study and the extent of the oil spill at the time data collection was begun. The base map was drawn from ESRI ArcMap 9.3.1, and the oil spill extent source from a NOAA/NESDIS satellite-derived surface oil composite.

About the National Center for Disaster Preparedness

Founded in 2003, the National Center for Disaster Preparedness (NCDP) is an academically-based resource center at Columbia University’s Mailman School of Public Health dedicated to the study, analysis and enhancement of the nation's ability to prepare for, respond to, and recover from major disasters, including terrorism. The NCDP has a wide-ranging research, training and education, and advocacy agenda, with a special interest in megadisasters. NCDP staff and faculty have testified at Congressional hearings, conducted briefings for senior government officials, and have presented at numerous scientific conferences and meetings.

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Executive Summary

Although the ruptured Deepwater Horizon oil well was capped on July 15, 2010, an estimated 3 to 5 million barrels of oil spilled in to the Gulf of Mexico over a three-month period.¹ Several surveys prior to the capping of the well documented the concerns and immediate effects of the oil spill on coastal residents. One report by a team of LSU sociologists highlighted the anxiety caused by the oil spill – nearly 60% of the 925 coastal Louisiana residents interviewed said they were almost constantly worried by the oil spill.² As the “acute phase” of the oil spill transitions to a longer-term “chronic phase,” researchers at Columbia University’s National Center for Disaster Preparedness, in collaboration with the Children’s Health Fund and The Marist Poll, interviewed over 1,200 coastal residents in Louisiana and Mississippi, with a particular focus on the short- and potential long-term impact of the disaster on children. This study was informed by work the researchers have done post-Katrina as part of the Gulf Coast Child & Family Health Study, which has documented the enduring effects on impacted populations in the two states, particularly children.³ Among the topics that the research team explored in this initial phase of the Coastal Population Impact Study were the following:

- **Exposure:** What proportion of the population living within a 10-mile radius of the coastline had been directly exposed to the oil spill? Were some groups within that area more likely than others to be exposed?

¹ United States, Department of Energy. "U.S. Scientific Team Draws on New Data, Multiple Scientific Methodologies to Reach Updated Estimate of Oil Flows from Bp's Well". 2010. Press Release. (June 15, 2010). August 2, 2010. <http://www.energy.gov/news/9078.htm>

² *Health Impacts of Deepwater Horizon Oil Disaster on Coastal Louisiana Residents*, MR Lee and TC Blanchard, Louisiana State University Department of Sociology (July 2010)

³ *Prevalence and predictors of mental health distress post-Katrina: findings from the Gulf Coast Child and Family Health Study*. DM Abramson, T Stehling-Ariza, R Garfield, and I Redlener, Disaster Med Public Health Prep, 2008. 2(2): p. 77-86; *The Legacy of Katrina's Children: Children: Estimating the numbers of at-risk children in the Gulf Coast states of Louisiana and Mississippi*, DM Abramson, I Redlener, T Stehling-Ariza, E Fuller, National Center for Disaster Preparedness, Research Brief 2007:12. Columbia University Mailman School of Public Health, New York. (http://www.ncdp.mailman.columbia.edu/files/legacy_katrina_children.pdf); and the forthcoming *Children as Bellwethers of Recovery: Dysfunctional Systems and the Effects of Parents, Households, and Neighborhoods on Serious Emotional Disturbance in Children, Post-Katrina*, DM Abramson, YS Park, T Stehling-Ariza, I Redlener, Disaster Med Public Health Prep (in press).

- ***Effects on Children:*** What were the immediate and perceived long-term physical and mental health effects of the oil spill on children and on adults? What economic effects of the oil spill have been felt by the coastal population?
- ***Decisions:*** How has the oil spill begun to shape decisions faced by coastal residents? This includes such daily decisions as where children can play or whether local seafood is safe to eat, as well as projected decisions about whether or not people think they will have to move.
- ***Trust:*** Which public officials are most trusted to provide accurate and reliable information, and who is perceived to have been most (or least) responsive to the oil spill crisis? Do coastal residents have a trusted source for health information about the effects of the oil spill?

Key Findings:

1. Over 40% of the population living within ten miles of the coast had experienced some direct exposure to the oil spill.
2. Over one-third of parents reported that their children had experienced either physical symptoms or mental health distress as a consequence of the oil spill.
3. One in five households has seen their income decrease as a result of the oil spill, and eight percent have lost jobs. Only five percent of coastal residents reported having received any cash or gift cards from BP, although over fifteen percent believe they may be eligible for compensation from BP for health consequences of the spill.
4. Over one-quarter of coastal residents think they may have to move from the area because of the oil spill.
5. Much the way Hurricane Katrina had its greatest effect on those populations with the fewest economic resources, the Deepwater oil spill has also had its greatest impact among those with the least. Coastal residents earning less than \$25,000 annual household income were more likely to report having lost income than

those earning more, more likely to think they would have to move, more likely to report an effect on children's ability to play on the coast or in the Gulf waters, and more likely to report physical and mental health effects among their children. As environmental scientists have begun to assess the long-term effect of the oil spill on the Gulf's marine ecology, this research marks an equivalent effort to begin exploring the long-term impact of the Deepwater Horizon oil spill on the Gulf's social ecology – the coastal residents, their economy, and their way of life. In an area still recovering from the 2005 Hurricane Katrina, the oil spill represents a significant test of a population's resiliency.

Methodology

The study was designed and led by the National Center for Disaster Preparedness at the Mailman School of Public Health at Columbia University in partnership with the Children's Health Fund, and the survey was conducted by The Marist Poll. 1,203 adult residents (eighteen years of age and older) of Louisiana and Mississippi who live within approximately ten miles of the Gulf Coast were interviewed by telephone.

A random digit dial (RDD) probability design was used to draw the telephone numbers for the survey. US Census tracts, with at least 75% of their geographic area falling within 10 miles of the affected Louisiana and Mississippi Gulf Coast shoreline, were selected for inclusion in the sampling frame. To validate correct inclusion in the survey, respondents were screened by first being asked if they live within 10 miles of the coastline. Those that responded 'no' were then asked if they live within a 30-minute drive from the Gulf of Mexico. Respondents who reported not living within 10 miles of the coast or within a 30-minute drive were not included in the survey.

Telephone numbers were selected based upon a list of telephone exchanges throughout 124 census tracts. The exchanges were selected to ensure that each census tract was represented in proportion to its population. To increase coverage, this landline sample was supplemented by respondents reached through random dialing of cell phone numbers. The two samples were then combined. The telephone numbers were obtained

from Survey Sampling, Inc.

The questionnaire and the telephone sample were programmed for computer assisted telephone interviewing (CATI). Interviewing was conducted from a centralized telephone facility using trained interviewers who were specifically briefed on this study. Interviews were conducted between July 19 and July 25, 2010. Interviewers contacted households between 5:00 p.m. and 9:30 p.m.

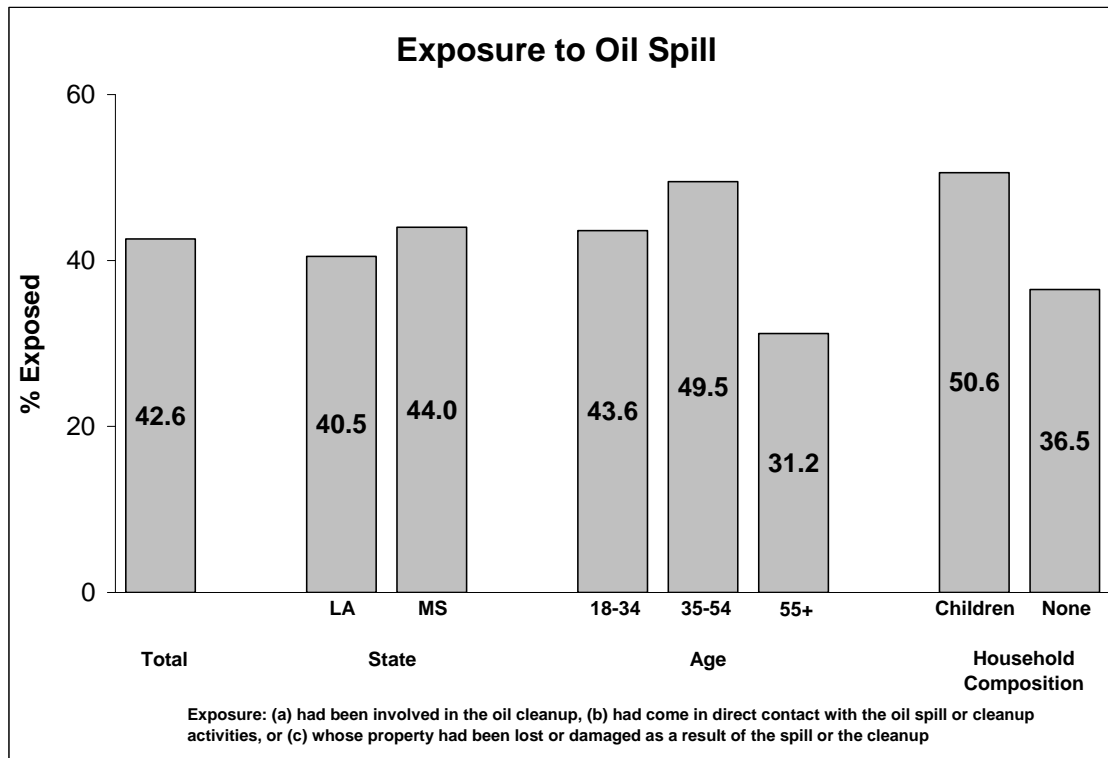
Demographic information on the gender, race, income, and age of adult residents was available for each sampled census tract. Data were combined to yield population estimates for weighting. The resulting dataset was weighted by state of residence, gender, race, income, and age to reflect the demographic distribution of households across the population of the sampled census tracts.

1,203 respondents, including 481 households in Louisiana and 722 households in Mississippi were interviewed (Table 1). Among these, 518 households (43.1%) had children 18 or younger living in them; in households with more than one child, parents were asked about one randomly selected child. This sample is representative of the 398,380 adults and 148,989 children living in the sampled area, within a statistical margin of error. The margin of error for these survey results for all 1,203 residents interviewed is $\pm 2.8\%$ for percentages near 50%, at a confidence level of 95%. For the 481 residents of Louisiana the margin of error is $\pm 4.5\%$ and for the 722 residents of Mississippi it is $\pm 3.7\%$. For the 518 households with children, the error margin is $\pm 4.3\%$. The error margin also increases as the number of interviews for a particular group or sub-group within the sample declines.

Exposure

Direct exposure to the oil spill was defined as those coastal residents who said they, (a) had been involved in the oil cleanup, (b) had come in direct contact with the oil spill or cleanup activities, or (c) whose property had been lost or damaged as a result of the spill

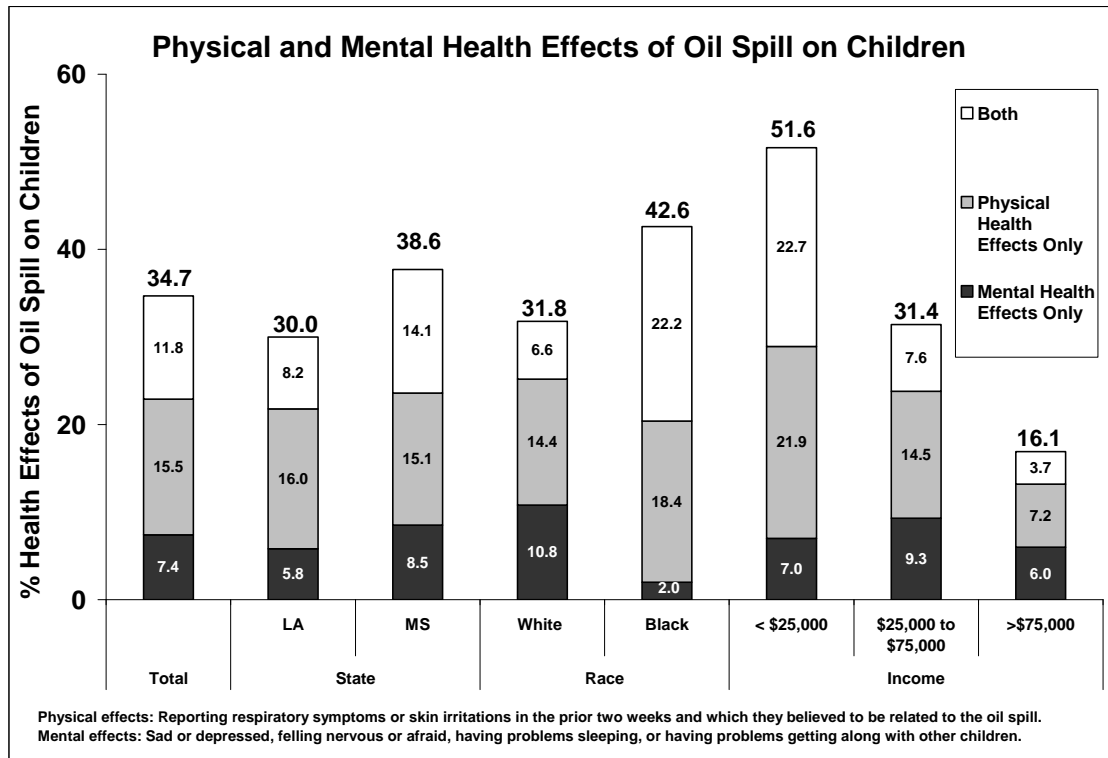
or the cleanup. Overall, as illustrated in the figure below and in Table 2, 42.6% of this coastal population had been exposed to the oil spill. Older residents were less likely to be exposed, and households with children were 1.4 times more likely to report oil spill exposure than households without children.



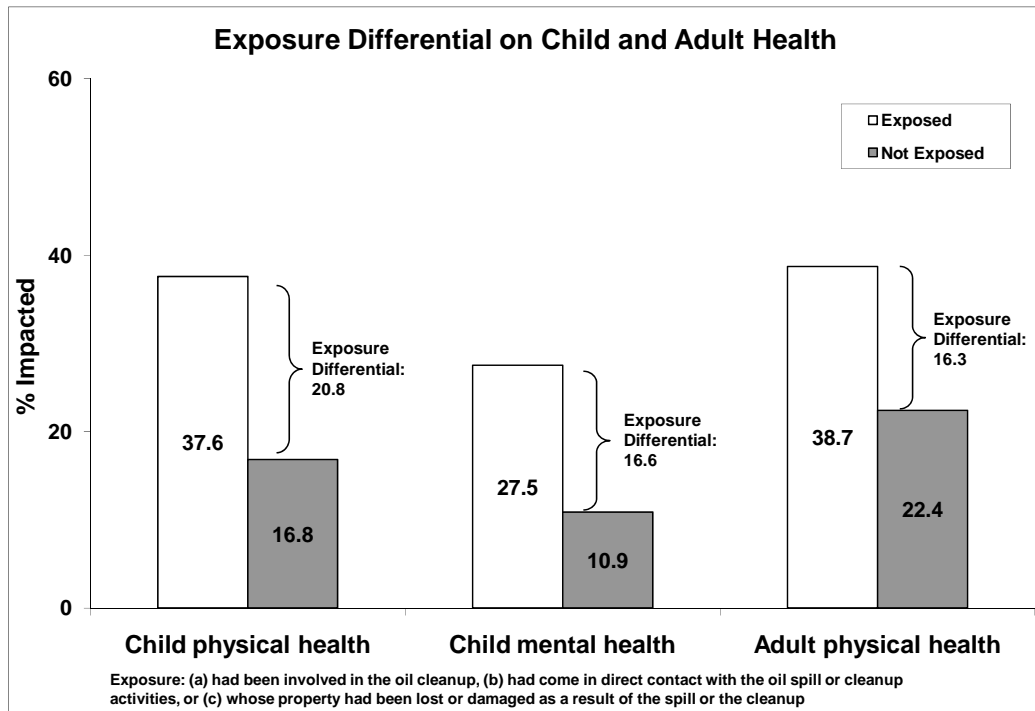
Effects

Coastal residents in the two states were asked about the physical and mental health effects of the oil spill. Physical effects were defined as respondents reporting respiratory symptoms or skin irritations that they or their children had experienced in the prior two weeks and which they believed to be related to the oil spill. Parents were also asked whether their child had experienced any emotional or behavioral problems that they didn't have prior to the oil spill, such as being sad or depressed, feeling nervous or afraid, having problems sleeping, or having problems getting along with other children. Since we were interested in estimating the incidence of emerging mental health issues among

children, we excluded children with prior emotional or behavioral problems from the count of those with oil spill-related emotional or behavioral distress.



Over one-third of all children had either a mental health or physical health effect according to parents, as illustrated in the figure above. In order to estimate the mental health impact of the oil spill on children, one can add the proportion of parents who reported that their children experienced *only* mental health symptoms without physical problems (7.4%) and the proportion who reported that their children exhibited *both* physical and mental health symptoms (11.8%), for a total of 19.2% of the pediatric population experiencing mental health distress. There were statistically significant differences between children based on race and on income (see also Table 3). In an effort to understand how much of these health effects may have been related to direct exposure to the oil spill, we contrasted child and adult health effects between those whose parents reported direct exposure and those who did not.



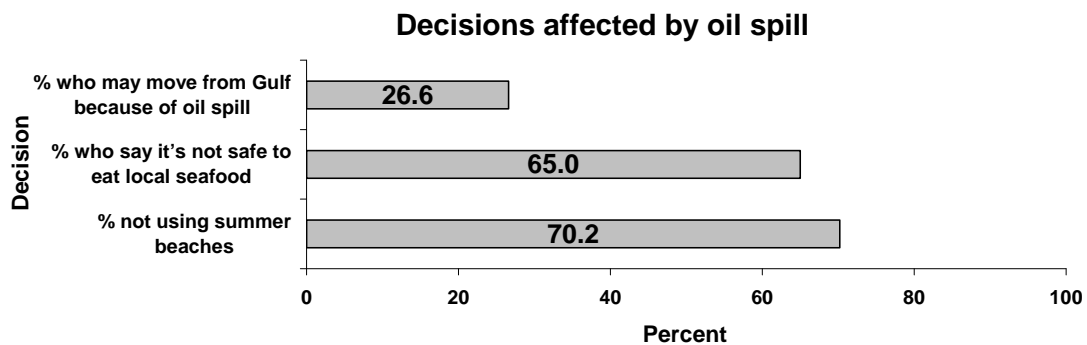
It is difficult to determine with certainty what proportion of clinical symptoms is a direct result of the oil spill. The “exposure differential” illustrated in the figure above provides a conservative attempt to identify the residual effect of direct exposure to the oil spill on individual health, taking into account that other factors or pre-existing conditions might also be related to the physical and mental health symptoms. Across both child and adult health effects, it appears that approximately 16 to 21% may be associated with exposure to the oil spill and to the cleanup. On average, adults and children exposed to the oil spill are twice as likely to report these physical and mental health symptoms, as are those who have not been exposed.

Coastal residents reported notable economic effects of the oil spill, as well. As shown in Table 4, 20.6% reported that their household income had decreased because of the oil spill, a figure higher among those earning less than \$25,000 annually (24.0% reported a decrease) compared to those earning more than \$75,000 annually (of whom 14.2% reported a decrease). Households with children were significantly more likely to report this decreased income (24.4%) than were households without children (17.8%). When

asked if they had received any cash, compensation, or gift cards from BP in relation to the oil spill, 4.5% of coastal residents indicated they had. Among households earning less than \$25,000 annually, less than one percent reported receiving such compensation as compared to 7.0% among those earning between \$25,000 and \$75,000. Notwithstanding what they have already received, 15.5% of the coastal residents expect to receive compensation from BP for health effects or damages.

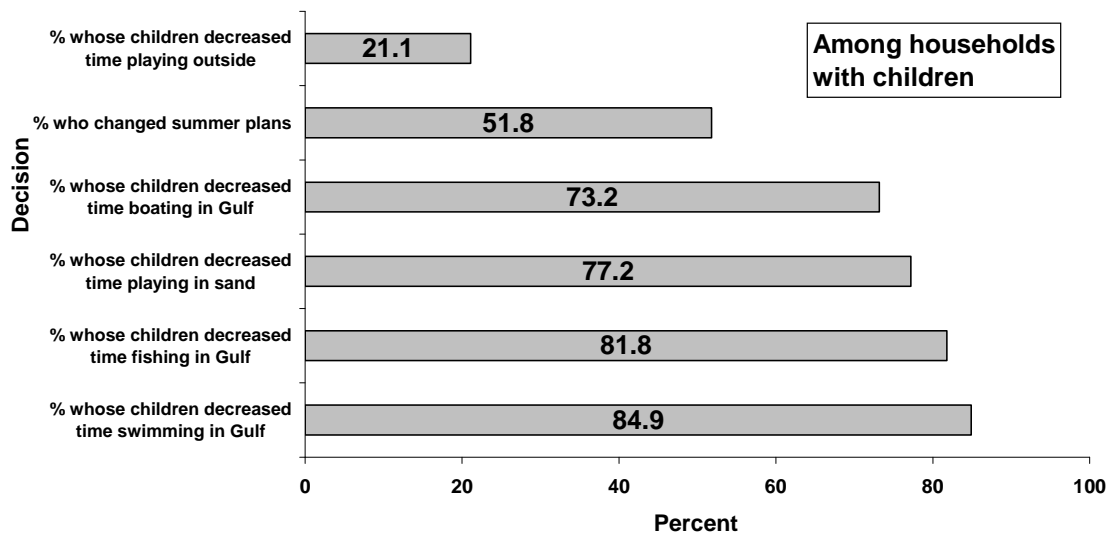
Decisions

This study explored a number of decisions related to the oil spill facing coastal residents on a daily basis – whether it was safe to eat local seafood; whether they have changed their summer plans, or restricted their children’s recreational activities in the Gulf; and their thoughts about having to move from the Gulf Coast. As illustrated in the two figures below and presented in Table 5, a number of coastal residents have either already modified their behaviors or expect to do so. Overall, 26.6% of coastal residents think they may have to move from the area, a number significantly higher among those earning less than \$25,000 annually (36.3% think they may have to move) compared to those earning over \$75,000 (20.0% think they may have to move).



When it comes to eating local seafood, 65.0% of coastal residents believe it may not be safe, although there is a large difference between Louisiana residents (48.6% of whom believe it may not be safe to eat local seafood) and Mississippi residents (of whom 75.7% said it may not be safe). As expected, a significant number of coastal residents have

made changes to summer activities, with 84.9% of parents reporting that they have decreased their children's time swimming in the Gulf, 81.8% reported a decrease in fishing, and 73.2% a decrease in boating. In each of these cases, the proportion of parents in Mississippi reporting decreases in their children's activities is greater than among Louisiana residents, despite differences in the risk communication messages offered by their respective governors. Mississippi Governor Haley Barbour was consistently more positive in asserting the safety of the state's beaches and waterways, whereas Louisiana Governor Bobby Jindal was more cautious in his public statements.



Trust

Generally speaking, coastal residents had more favorable assessments and trust in their local officials and in the US Coast Guard than they did in BP officials or President Obama. When asked to rank the response of various officials (Table 6), coastal residents were most impressed with Governor Jindal: 33.2% of Louisiana residents said his response to the oil spill was excellent, compared to 10.9% of Mississippi residents who ranked Governor Barbour's response as excellent. Slightly over half of all coastal residents felt that BP's response was "poor," and 41.3% said that the president's response to the oil spill was similarly poor. The county executives and parish presidents, local officials such as mayors, Governor Jindal, and the Coast Guard received poor

rankings by 11 to 13% of coastal residents, lower than Governor Barbour's rating (27.9% poor).

When asked who they trusted to provide accurate and reliable information about the oil spill (Table 7), similar trends held: Governor Jindal was the most trusted public figure (78.4% of Louisiana residents said they trusted him "a great deal" or "a good amount"), followed by local officials (75.0%), county executives or parish presidents (73.3%), and the US Coast Guard (73.1%). Less trusted were Governor Barbour (58.5%), President Obama (47.9%), and BP officials (31.0%)

Among parents, 79.9% reported their child had a personal physician or nurse – a "medical home" – and 89.2% reported that they knew a health professional they could turn to if they had questions about the health effects of the oil spill on their children.

The Return of Uncertainty?

In the years since Hurricane Katrina, chaos and uncertainty had generally subsided and the people in the Gulf Coast had returned – or were on their way to returning – to more stable lives. The Deepwater Horizon oil spill has potentially re-introduced an element of uncertainty to people's lives. While some of the economic effects of the oil spill were immediately evident, others were less clear. In town hall meetings and focus groups conducted prior to this survey, the researchers heard coastal residents describe concerns that ranged from worries about declining property values and loss of a way of life, to fears of long-term health carcinogenic health effects. This representative population

Parental Uncertainty About Moving and Children's Mental Health		
	Family may move	Family won't move
Percentage of children with mental health distress	35.0	12.5

study suggests that the economic and health concerns are widespread among coastal residents. As the table above suggests, there may be a substantial relationship between parent's concerns and uncertainty and their children's mental health. Although these percentages of children's mental health distress may reflect parental anxiety rather than clinical symptoms, the potential effects are unmistakable: parental mental health has long been shown to be among the strongest predictors of a child's mental health and development. The human impact of the oil spill in the Gulf Coast's "social ecology," that of its residents, communities, and social networks, may only be accelerated by such uncertainty.

Tables

Table 1. Breakdown of Survey Respondents (adjusted to Census data)

		Number interviewed	% of total
Total		1203	100.0
By State	<i>Louisiana</i>	481	40.0
	<i>Mississippi</i>	722	60.0
By Age	<i>18-34</i>	389	32.4
	<i>35-54</i>	486	40.4
	<i>55+</i>	327	27.2
By Race	<i>White</i>	821	68.8
	<i>Black</i>	298	24.9
	<i>Other</i>	76	6.3
By Income	<i>Less than \$25,000</i>	402	34.8
	<i>\$25,000 – \$75,000</i>	440	38.1
	<i>Greater than \$75,000</i>	314	27.1
By Household Composition	<i>Households with children</i>	518	43.1
	<i>Households without children</i>	684	56.9

Note: Respondents refusing to answer or did not know were excluded for percentage calculations.

Table 2. Proportion Directly Exposed to Oil Spill

		% Directly Exposed
Total		42.6
By State	<i>Louisiana</i>	40.5
	<i>Mississippi</i>	44.0
By Age***	<i>18-34</i>	43.6
	<i>35-54</i>	49.5
	<i>55+</i>	31.2
By Race	<i>White</i>	42.7
	<i>Black</i>	42.6
By Income	<i>Less than \$25,000</i>	44.5
	<i>\$25,000 – \$75,000</i>	40.3
	<i>Greater than \$75,000</i>	44.7
By Household Composition***	<i>Households with children</i>	50.6
	<i>Households without children</i>	36.5

* p<0.05, ** p<0.01, *** p<0.001

Table 3. Physical and mental health effects

		Children (%)				Adult Physical health problems (%)
		Mental health problems	Physical health problems	Both	None	
Total		19.2	27.3	11.8	65.3	29.4
By Parental Exposure***	<i>Exposed</i>	27.5	37.6	18.4	53.3	38.7
	<i>Unexposed</i>	10.9	16.8	5.2	77.5	22.4
By Move***	<i>May have to move</i>	35.3	51.5	29.1	42.3	46.6
	<i>Will not move</i>	13.7	19	5.9	73.2	23.9
By State	<i>Louisiana</i>	14	24.2	8.2	70.0	29.7
	<i>Mississippi</i>	22.6	29.2	14.1	62.4	29.2
By Race***	<i>White</i>	17.4	21	6.6	68.2	24.8
	<i>Black</i>	24.2	40.6	22.2	57.4	40.0
By Income***	<i>Less than \$25,000</i>	29.7	44.6	22.7	48.4	43.3
	<i>\$25,000 – \$75,000</i>	16.9	22.1	7.6	68.6	26.0
	<i>Greater than \$75,000</i>	9.7	10.9	3.7	83.1	16.6
By Household Composition**	<i>With children</i>					35.0
	<i>No children</i>					25.0

* p<0.05, ** p<0.01, *** p<0.001

Table 4. Economic effects of oil spill					
		% Reporting income decreased	% Lost job	% Received money from BP	% Expect compensation from BP for health effects/damages
Total		20.6	8.0	4.5	15.5
By State	<i>Louisiana</i>	25.8**	9.2	6.3	17.7
	<i>Mississippi</i>	17.2	7.2	3.4	14.0
By Race	<i>White</i>	19.1	7.5	4.8	9.5***
	<i>Black</i>	19.1	7.5	1.7	31.0
By Income	<i>Less than \$25,000</i>	24.0	9.2	0.8***	21.8*
	<i>\$25,000 – \$75,000</i>	22.8	8.2	7.0	14.2
	<i>Greater than \$75,000</i>	14.2	6.4	4.4	9.9
By Household Composition***	<i>With children</i>	24.4**	8.4	3.9	19.1*
	<i>Without children</i>	17.8	7.8	5.0	12.8

* p<0.05, ** p<0.01, *** p<0.001

Table 5. Decisions affected by oil spill

	Overall	By state		By race		By household income			By households	
		LA	MS	White	Black	<\$25,000	\$25,000- \$74,000	>\$75,000	with children	without children
% not using summer beaches	70.2	66.4	72.8	73.1	63.1	70.6	69.3	70.1	74.8*	66.1
% who say it's not safe to eat local seafood	65.0	48.6***	75.7	59.0***	79.0	76.5***	63.2	52.7	70.6	60.7
% who may move from Gulf because of oil spill	26.6	29.8	24.5	23.3*	34.4	36.3***	23.4	20.0	28.1	25.5
Among households with children...										
% whose children decreased time playing outside	21.1	14.6	25.3	17.1	30.0	34.9***	17.3	7.8		
% whose children decreased time playing in sand	77.2	76.4	77.6	77.4	75.7	80.0	77.8	73.9		
% whose children decreased time swimming in Gulf	84.9	78.9**	88.9	84.4*	82.3	86.8*	86.6	80.8		
% whose children decreased time boating in Gulf	73.2	68.4	75.9	76.8*	63.0	81.8***	73.3	69.0		
% whose children decreased time fishing in Gulf	81.8	78.9	83.5	81.9	79.6	85.5	82.7	77.8		
% who changed summer plans	51.8	52.3	51.5	51.4	49.2	55.6	57.7	44.2		

* p<0.05, ** p<0.01, *** p<0.001

Table 6. Public perceptions of official response: For each of the following, would you rate their response to the oil spill as...

	Excellent	Good	Fair	Poor
President Obama	11.9	21.3	25.5	41.3
Governor Jindal	33.2	29.9	24.7	12.3
Governor Barbour	10.9	31.7	29.5	27.9
County executive/Parish president	17.6	40.8	28.3	13.3
Local officials	18.4	40.7	28.5	12.5
US Coast Guard	21.4	40.4	27.0	11.2
BP	4.9	17.1	27.1	51.0

* p<0.05, ** p<0.01, *** p<0.001

Table 7. Public trust: How much do you trust each of the following to give accurate and reliable information about the oil spill...

	A great deal	A good amount	Not very much	Not at all
President Obama	20.2	27.7	28.7	23.4
Governor Jindal	35.9	42.5	15.0	6.6
Governor Barbour	20.5	38.0	24.8	16.7
County executive/Parish president	26.4	46.9	19.2	7.5
Local officials	28.5	46.5	18.1	6.9
US Coast Guard	28.3	44.8	19.1	7.9
BP	8.7	22.3	34.3	34.8

* p<0.05, ** p<0.01, *** p<0.001

Note: For Tables 6 and 7 Louisiana residents were asked about Governor Jindal and Mississippi residents about Governor Barbour.