

ERIC GAY/AP

# Environmental Disaster

## THE GULF OF MEXICO OIL SPILL

### INSIDE

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An Integrated Curriculum For The Washington Post Newspaper In Education Program

## A Word About Environmental Disaster

White House energy and climate adviser Carol M. Browner said the oil spill in the Gulf of Mexico was “probably the biggest environmental disaster we’ve ever faced in this country.” Covering the many dimensions of this news story that began on April 20 is the focus of this guide.

As a foundation for study, use the suggested activities and *The Washington Post* news articles, editorial, editorial cartoons, commentary and informational graphics. The guide is organized in chronological order to emphasize the process of covering an unfolding story. Ads from BP are included for a study of diction, photography and communication of a message.

The continuing story has economic, environmental and marine biology, health and lifestyle, technology, policy and political ramifications. Teachers of many disciplines are urged to supplement these resources with the most current *Post* coverage and commentary to do follow-up to the coverage included in this guide.

A reminder to Post INSIDE program teachers: If you plan to use articles in this guide in the e-Replica format more than three months after their publication date, remember to bookmark them. The e-Replica activities that are suggested in this guide utilize the alert, search and advanced search features.



**Lesson:** Some stories demand follow-up coverage of the initial news report. The oil spill in the Gulf of Mexico has economic, environmental, marine biology, health, lifestyle, technology, policy and political ramifications.

**Level:** Mid to High

**Subjects:** Environmental and Marine Biology, Science, Journalism, Technology

**Related Activity:** Economics, Mathematics, Health, Engineering

### NIE Online Guide

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### Available Online

All Washington Post NIE guides may be downloaded at [www.washpost.com/nie](http://www.washpost.com/nie).

### Send comments about this guide to:

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**Cover Photo:** A shrimp boat is used to collect oil with booms in the waters of Chandeleur Sound, La., on May 5, 2010.

## An Integrated Curriculum For The Washington Post Newspaper In Education Program

## Environmental Disaster

The Gulf of Mexico oil spill that began on April 20, 2010, has been described as America's "biggest environmental disaster." *Post* articles and commentary reprinted in this guide are presented in chronological order in order to reflect the unfolding story and the reporter's job of covering many dimensions of a story.

### Get Acquainted With the Area

Ask students to locate the Gulf of Mexico, Louisiana, Mississippi, Alabama and Florida on a map. If a topographic map is available, use it. Questions for consideration might include:

- Name the countries and states that border the Gulf of Mexico.
- What influence might the Gulf of Mexico and the Mississippi River have on this area?
- In what ways might "hurricane season" affect these states?
- In what ways is the Gulf of Mexico a Mediterranean-type sea?
- The Gulf of Mexico is roughly a circular basin. Where does water enter and exit it?
- What jobs might people in the coastal areas of these states hold?

### Use a Timeline

"A timeline of BP's attempts to stop the flow of oil" is provided in this guide. It gives an overview of the Gulf of Mexico oil spill from the April 20 explosion on Deepwater Horizon to the failed top kill attempt on May 29, 2010.

This informational graphic provides a visual to communicate the depth of the drilling and space in which robotics was used, the progressive attempts to stop the flow and schematic of the technology used.

Discuss the technology that is available for cleanup.

Students may be asked to expand the timeline to the present or to create a new timeline that illustrates

other aspects of the oil spill (economic impact, environmental influence, technology utilization, political response, for example).

### Increase Vocabulary

Terms associated with oil drilling and the attempts to stop the flow of oil are provided in the "In the Know" sidebar (pages 3-4).

Acquaint students with these terms before they read about the oil spill.

### Read for Background

*Post* reprints in this guide are presented in chronological order. Although they are not all of the articles printed about the oil spill, they do reflect the information available by date of publication, the range of subjects associated with the oil spill, cleanup efforts and the responses of stakeholders.

Discuss with students the information provided in each article, the people interviewed and the new dimension added to the public's awareness.

A PowerPoint presentation is provided for use with this guide. It is found at [www.washpost.com/nie](http://www.washpost.com/nie). Select the PowerPoint option. "Not Just Oil" provides an overview of the process from crude oil to market products, pollution sources and cleanup procedures. Teachers should view the notes section for additional information.

## In the Know

**Blowout:** Uncontrolled flow of gas, oil or other well fluids into the atmosphere or into an underground formation

**Blowout preventor (BOP):** One or more valves installed at the wellhead to prevent the escape of pressure; closed if the drilling crew loses control of formation fluids

**Boom:** Floating barrier meant to contain spill in order to protect coastline or contain so the spill can be lit and burned

**Casing:** Steel pipe placed in an oil or gas well to prevent the wall of the hole from caving in, to prevent movement of fluids from one formation to another and to aid in well control

**Cement plug:** Portion of cement placed at some point in the wellbore to seal it

**Containment dome:** Metal "box" or reinforced chamber placed over ruptures to contain the fluid

**Crude oil:** General term for unrefined petroleum or liquid petroleum

**Drill:** Bore a hole in the earth, usually to find and remove subsurface formation fluids such as oil and gas

**Deepwater drilling:** Drilling located in offshore areas where water depths exceed approximately 600 feet (200 m), the approximate water depth at the edge of the continental shelf; the logistics of producing hydrocarbons from reservoirs located below such water depths presents a considerable technical challenge

**Dispersant:** Chemical that aids in breaking up solids or liquids as fine particles or droplets into another medium

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### Create a PowerPoint

Form five to seven groups within your classroom. Assign students a class presentation: Using available data, create a PowerPoint to communicate different aspects of the oil spill. Topics might include:

- The cleanup effort
- Size and movement of the oil spill (including the “Loop Current”)
- Economic impact on BP and its investors
- Economic impact on the businesses in the states bordering the Gulf of Mexico
- Environmental impact on marine life
- Environmental impact on plant and animal life
- Political ramifications and policy changes

Teachers should determine additional details of the assignment by the course of study, age of students and their experience with the technology.

Teachers may also ask students to write a brief or expert's report on their topic. This would include material not included in the group's PowerPoint and emphasize each student's individual research. An annotated bibliography might also be required.

### Write an Editorial

Editorials reflect the perspective of the paper. At *The Post*, these are researched and written by members of the editorial board. Discuss *The Washington Post* editorial from May 28. Points to be considered:

- Is the editorial board's stand clear to readers?
- Is the approach of using questions in the second paragraph of “Mr. Obama steps up on oil spill response” effective?
- Were the quotations from the

president's press conference useful in supporting the thesis of the editorial?

- The strongest point to be made should be placed last in an editorial. What is the editorial's final argument?
- What additional point of view is expressed in the final sentence of the editorial?

Ask students to write an editorial. These may be based on the reading and research they did for the PowerPoint (see above), articles in *The Post* and additional research.

### Draw an Editorial Cartoon

Tom Toles' editorial cartoons from May 18 and June 2 are included in this guide. Discuss “Current Oil Spill Strategies” and “Can the GOP make up its mind?” In his cartoons Toles uses iconic images, order of strategies and allusions. What are the points of view of *The Post*'s editorial cartoonist?

In addition to Toles' cartoon, the animated work of cartoonist Ann Telnaes is found online. Visit <http://voices.washingtonpost.com/anntelnaes/>. View Telnaes's visual commentary for May 26, “BP and Obama respond to the gulf oil spill”; May 24, “BP CEO Tony Hayward thinks environmental impact will be ‘modest’”; and May 12, “BP passes the muck.” Telnaes often uses excerpts from taped interviews so the subjects of her work speak for themselves. What is her point of view?

Have students draw an editorial cartoon to express their points of view on an aspect of the oil spill story.

### Write an Opinion Piece

Opinion may be found in quotations from interviews,

### In the Know | *continued*

**Junk shot:** Under pressure firing tires and other material in an attempt to block passage

**Kill:** To stop a well from flowing or having the ability to flow into the wellbore. Procedures typically involve circulating reservoir fluids or pumping higher density mud into the wellbore.

**Mousse:** Gelatinous layer that is an emulsion of air, oil, and water formed when the oil breaks up in heavy surf

**Offset well:** Existing wellbore close to a proposed well that provides information for planning the proposed well. When lacking offset data, the well planner must be more conservative in designing wells and include more contingencies.

**Rig:** Machine used to drill a wellbore. The rig includes virtually everything except living quarters. The rig is sometimes referred to as the drilling package, particularly offshore.

**Offshore drilling:** Drilling for oil or gas in an ocean, gulf or sea, usually on the Outer Continental Shelf

**Wellbore:** The hole drilled by the bit; also called a “bore hole” or “hole”

SOURCES: OSHA Oil and Gas Well Drilling Glossary of Terms, Schlumberger Oilfield Glossary

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editorials, letters to the editor, guest commentary and columns. Many different points of view have appeared in the op-ed section over the months since the April 20 explosion. On Sunday, May 30, in the Topic A feature four experts focused on the political fallout from the gulf. An e-Replica search can locate many of these expressions.

"In the wake of Deepwater, let's put the environment first" by *Post* columnist Eugene Robinson in an example of commentary that puts the current news in historic perspective. Discuss the situation in Cleveland, the EPA and Clean Water Act. How do these relate to the oil spill? What other references does Robinson make? What is his main thesis?

What kind of column would students write if they had one? Would their focus be general interest, science, environment, politics or technology? Ask students to write a sample column in which an aspect of the oil spill is included.

### Compare and Contrast Advertisements

Advertisements are purchased by businesses to communicate their message or product to readers. Two full-page ads created by BP and published in *The Washington Post* on Tuesday, June 1, 2010, and Sunday, June 6, 2010, are provided.

The layout in both is clean with a dominant photograph, headline, one column of copy, prominent white space, sans serif typeface, Web sites and contact information, and the BP logo.

- View the photographs that illustrate the ads. In the earlier ad: black and white photograph, hard hat-wearing figures and boom silhouetted. In the later ad: full color, marshes, boom in water

and figures on a boat. What do these photographs convey before a word is read?

- Discuss the headlines. Both use "We will make this right." What does the second line in the headline in the later ad communicate and respond to?
- Read the copy. What information remains the same? What different emphasis is expressed in the later ad? What is the tone of both? Is the repetition of the two-sentence headline in the closing of the later ad effective?

Are the BP ads effective? Do they communicate the "right message" to readers of *The Post*? [Who are the readers of *The Post*?] Would this ad work as well in a New Orleans newspaper?

Have students design and write an ad. This could be for BP, for Louisiana and Gulf businesses, for an environmental group or other organization/individual with an interest in the oil spill and its impact.

### Envision the Environmental Future

Ocean and coastal ecosystems have been influenced by the oil spill. These ecosystems are needed for water quality, to protect marine habitat and benefit economics and livelihoods of coastal communities.

In "Scientists envision devastation for gulf" Joel Achenbach asks: "How bad will this get?" He responds: "No one knows, but with each day that the leaking oil well a mile below the surface remains uncapped, scientists and energy industry observers are imagining outcomes that range from bad to worse to worst, with some forecasting a calamity of historic proportions." Read and discuss the May 5 article.

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## More Views

[www.bp.com](http://www.bp.com)

**BP**

Gulf of Mexico response and other information from the perspective of BP, one of the world's largest energy companies

[www.sej.org/](http://www.sej.org/)

**Society of Environmental Journalists**

Source of environment, energy, science, health and climate reporting; select The Daily Glob ([dailyglob.sej.org](http://dailyglob.sej.org)) for Gulf oil spill news.

<http://response.restoration.noaa.gov/>

**NOAA Office of Response and Restoration**

FAQs, assessments and responses, and activities for use in the classroom (Making Mousse, Mearns Rock Time Series, Graphing Changes in Marine Life Abundance and Oil Floats and Spreads). Case studies include the Exxon Valdez oil spill.

<http://ocgweb.marine.usf.edu/>

**Ocean Circulation Group**

Univ. of South Florida College of Marine Science coastal ocean observing and modeling of the West Florida Continental Shelf

<http://rsmas.miami.edu/oil-spill/>

**Oil Spill Response**

Rosenstiel School of Marine & Atmospheric Science, Univ. of Miami, site shares the science and primary research (satellite images, modeling, ocean observations and potential impact) "relevant to the issues emerging from the incident on the Deepwater Horizon oil platform."

<http://globalwarming.house.gov/spillcam>

**Oil Spill in the Gulf — Live Cam**

The Select Committee on Energy Independence and Global Warming video feed from the ocean floor

[photo.newsweek.com/2010/5/oil-spill-timeline.html](http://photo.newsweek.com/2010/5/oil-spill-timeline.html)

**The 2010 Gulf Oil Spill: A Timeline**

Newsweek photographs and informative captions

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On May 6, science reporter Juliet Eilperin reports on the response of environmentalists to the oil spill. Read “Oil disaster could produce a sea change.” What are their main areas of focus? Have they made any progress in getting their point of view noticed?

As a reporter Eilperin makes sure that organizations with different points of view are heard. How do representatives of the oil industry respond?

A month later, on June 6, a clearer picture is emerging, but notice the use of the qualifier “perhaps” in the headline. Read and discuss “An ecosystem that is altered perhaps forever” by Joel Achenbach and David Brown. This article is interesting for the historic perspective that it provides in the first four paragraphs. Ask students to find additional historic references in the article. How do these help to understand the current situation in the Gulf of Mexico?

Teachers may also organize the class into three groups, giving each group a different section of the article. Students are to summarize the information provided, highlight a main point and relate what the reporters communicate that relates to the oil spill of 2010.

From what students have read in these articles and more recent reporting, what is the future of the ecosystem?

### Examine Energy Sources

*The Post’s* May 28 editorial ends with stating that “this disaster should remind Americans of the many costs of the nation’s addiction to fossil fuels.” What are some of the “costs”?

What are some of the viable sources of alternative energy?

America and China are currently the chief producers of wind-powered energy, for example. What figures are needed to put this statement into perspective?

Research the creation of a clean energy economy? Is the U.S. working on this approach? What are the best sources to locate the information needed? Do an e-Replica search or use *The Post’s* online archives to locate articles.

### Follow the Story

The oil spill in the Gulf of Mexico is clearly an example of a major story that will require months, if not years, of follow-up coverage. All aspects of the first news story — the explosion of the Deepwater Horizon oil platform — are not known. The “How” and “Why” of the story are still to be determined.

Philip Graham, once publisher of *The Washington Post*, spoke of the reporter’s “inescapably impossible task of providing every week a first rough draft of history.” Think of this unfolding story as an example of this task of continuous gathering of more information, getting facts and revealing more of the story to readers.

Read “Fishing, tourism industries keep wary eye on oil spill” by Peter Whoriskey. Use it as an example of a follow-up story that reports what is known in the weeks since the April 20 explosion. Eleven employees lost their lives on the oil rig and a way of life is threatened. How many other lives will be affected?

In the second paragraph Whoriskey states that the “economic impact of the nation’s worst ever oil spill may be just beginning.” What are the areas

## Resources

It is important for reporters to interview a wide range of reliable sources. In addition to citizens of the affected area, President Obama, state and local officials, and the White House energy and climate adviser, individuals from the following organizations and government agencies have been quoted in *Washington Post* coverage of the oil spill.

American Petroleum Institute

British Petroleum (BP)

Environmental Protection Agency (EPA)

Federal Emergency Management Agency (FEMA)

Friends of the Earth

Gulf Restoration Network

Halliburton

Louisiana Oyster Task Force

National Academy of Sciences

National Institute of Environmental Health Sciences

National Institute of Occupational Safety and Health

National Oceanic and Atmospheric Admin. (NOAA)

National Resources Defense Fund

National Science Foundation

National Wildlife Federation

Natural Resources Defense Council

Ocean Conservancy

Oil Spill Academic Task Force

Sierra Club

Transocean

U.S. Coast Guard

U.S. Dept. of Energy

U.S. Dept. of the Interior

U.S. Fish and Wildlife Service

U.S. Food and Drug Admin.

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that will need to be followed? Use the graphic, "Paying for it," found with "An ecosystem that is altered perhaps forever." Are the areas that Woriskey presents covered in the graphic?

Students are to read further and chart the unfolding details for one area that interests them. Give students "Charting the Follow-up Story" for the assignment.

### Think Like a ...

Journalists cover many different topics. In larger newspapers, they are able to develop areas of expertise in science, business and health, while they are ready to cover general interest and breaking stories. "Think Like a ..." can be used to illustrate the many ways of looking at a story as large and complex as the Gulf of Mexico oil spill.

The news article "An ecosystem that is altered perhaps forever" and the commentary, "In the wake of Deepwater, let's put the environment first" are examples of how thinking like a historian can strengthen a story.

Discuss the different approaches. Students might work in groups to do the suggested activities.

### Apply Mathematics

Use a real problem to apply mathematics as students estimate the flow rate of oil from the BP Gulf oil leak using recently released BP video images. Visit Space Math @ NASA (<http://spacemath.gsfc.nasa.gov/>) to locate "Problem 342: The Rate of Oil leakage in the Gulf Oil Spill of 2010."

Students will measure the flow rate from a sequence of images of the oil flowing from the well. They get a value of about 4 million

gallons per day which is similar to some of the estimates they recently heard about from the news media but much different than the largely discredited initial estimates of 200,000 gals/day.

Valid questions about assumptions used and whether the oil is pure or mixed with gas will also affect their estimates and may lead to some interesting discussions about mathematical modeling of physical events.

Other problems and reports on the event can be viewed by clicking on the link for Press Releases. Problem 339 uses NASA satellite imagery. Additional problems are posted as discoveries are made.



### Use E-Replica

The e-Replica Post has several features that are helpful in doing a follow-up to the on-going oil spill story. Create ALERTS to receive e-mail notices of Post coverage. The SEARCH and ADVANCED SEARCH allow a number of issues to be reviewed using specific terms.

### Consider the Impact

The human, environmental and economic impact of the oil spill is only beginning to be grasped. Give students "Follow the Oil." This activity may help students to move from the observable to the conceptual.

Students are provided two photographs or maps. They are to complete the category. Teachers may discuss with students the five categories. Students are asked to create a photo essay on the oil spill.

### Who Pays?

Focus on finding ways to evaluate damage, compensation and

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## In The Post

<http://views.washingtonpost.com/climate-change/post-carbon/?hpid=smartliving>

### Oil Spill Crisis Blogs

Updates on the massive oil leak in the Gulf of Mexico

[www.washingtonpost.com/wp-dyn/content/gallery/2010/05/27/GA2010052705419.html?hpid=artslot](http://www.washingtonpost.com/wp-dyn/content/gallery/2010/05/27/GA2010052705419.html?hpid=artslot)

### Gulf Oil Spill

Photo archives and links to articles

[www.washingtonpost.com/wp-srv/nation/green/](http://www.washingtonpost.com/wp-srv/nation/green/)

### Green: Science. Policy. Living.

Washington Post archives and recent articles on environmental issues

### From The Post

Previous Post INSIDE guides related to aspects of this guide. These are found at [www.washpost.com/nie](http://www.washpost.com/nie) under Lesson Plans.

*The Sea — Rich and Strange*  
September 11, 2009

*On the Brink — Threatened and Endangered Species*  
March 12, 2009

*Accelerating Demand for Fuel*  
September 9, 2008

*Plankton — The Drifters*  
October 10, 2007

*The Chesapeake Bay*  
April 18, 2007

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long-term, if not permanent, loss. Read “Oil could spew until August, officials say,” “An ecosystem that is altered perhaps forever,” and other articles that present monetary considerations. Make a list of areas for which claims for compensation and payment are being made.

- Why is it important to get an accurate reading on the volume of the oil leak?
- Is it the responsibility of the federal, state or local government to pay for cleanup and rebuilding of public beaches and facilities?
- How can business loss be determined?
- Does BP have total financial responsibility or are other companies involved?

### **Develop an Experimental Design**

There are three basic classes of absorbents used for oil spill clean ups:

1. Natural organic materials like peat moss, straw, hay and sawdust
2. Mineral-based materials like vermiculite, perlite, and volcanic ash
3. Synthetic organic absorbents like rubber, foam, polystyrene and polyurethane

Have students develop a list of materials they would like to experiment with. They are to develop an experimental design to test their materials.

### **Evaluate Oil Spill Cleanup Procedures**

Check out Ward’s Natural Science Oil Degrading Microbes Lab Activity 85W 3503 ([http://wardsci.com/product.asp?Q\\_pn\\_E\\_IG0013874\\_A\\_name\\_E\\_Oil-Degrading+Microbes+Lab+Activity](http://wardsci.com/product.asp?Q_pn_E_IG0013874_A_name_E_Oil-Degrading+Microbes+Lab+Activity)) or call 1-800-962-2660.

The activity is designed for six groups of students. Cultures of freeze-dried specimens are sent using a coupon to request them when needed. The simulations in the lab were designed to demonstrate the oil degrading effects of two microbes, Penicillium (fungus) and Pseudomonas (bacterium).

### **Illustrate the Technical**

Give students “Cleaning up the BP spill.” It is an example of researchers, journalists and artists working together to create an informational graphic that can stand alone to communicate technical information. Discussion could include:

- Headlines summarize stories. In what way does this one serve the same purpose?
- The introductory/explanatory copy states both what technology is and isn’t. How helpful is this in understanding the technology available to use?
- How many methods are illustrated?
- In what ways do the images enhance understanding of the available technology?
- How is an informational graphic better than words alone? ■

Name \_\_\_\_\_ Date \_\_\_\_\_

## Charting the Follow-Up Story

### 1. What You Know.

On your own paper, write a summary of the information you know about the Gulf of Mexico oil spill.

### 2. New Developments.

In the following chart, record new information that you gain from *The Washington Post's* continuing coverage of the oil spill and its aftermath.

Observation	Data	Interviews	Other
Eyewitness account, photograph, video	Facts, numbers, comparison and contrast of figures	Reliable sources, variety of points of view	Informational graphics, Web resources

### 3. Your Viewpoint.

Pretend you are a columnist for your student newspaper. You determine whether the focus of your column is general interest, environmental, science issues, political or activist. Synthesizing previous information with the new information, write an opinion piece about the oil spill.

Name \_\_\_\_\_ Date \_\_\_\_\_

# Follow the Oil

The human, environmental and economic impact of the Gulf of Mexico oil spill begins with the explosion of an oil rig on April 20, 2010, and the death of eleven individuals who worked there. Below are a series of photographs and maps that present the ongoing story. You are to add the third in the series, providing dates of publication and captions.

**April 22, 2010**



AP PHOTO

**Eleven men perish in an explosion and fire on the Deepwater Horizon platform.**

**May 18, 2010**



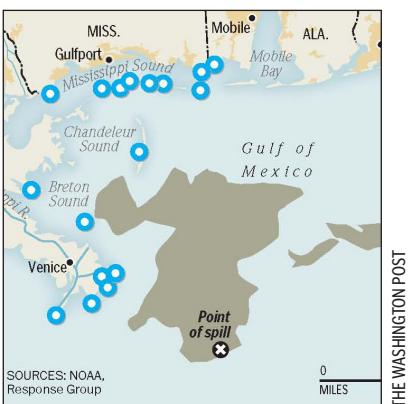
JOHN MOORE/GETTY

Date:

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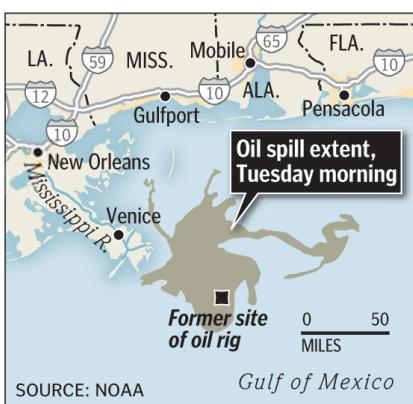
**May 5, 2010**



THE WASHINGTON POST

**Boom locations and forecast for that day's oil spill location.**

**May 6, 2010**



THE WASHINGTON POST

Date:

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**May 5, 2010**



ADRIAN CADIZ/USAF

**A U.S. Air Force C-130 drops an oil dispersant in the cleanup effort.**

**May 14, 2010**



AP PHOTO/CHARLIE REIDEL

**A worker feeds a boom into the Gulf of Mexico at Biloxi, Miss.**

Date:

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Name \_\_\_\_\_ Date \_\_\_\_\_

## Follow the Oil | *continued*

**May 12, 2010**



BP VIA GETTY IMAGES

The underwater camera shows the main oil leak at the riser pipe.

**June 6, 2010**



DERICK E. HINGLE/BLOOMBERG

**May 25, 2010**



A brown pelican sits above marsh grass and branches stained with oil.

**June 6, 2010**



CHARLIE REIDEL/AP

You have images that could begin a short documentary, video or photo essay about the human, environmental and economic impact of the oil spill. Now it is your turn to write the essay that could appear with these images in *WP, The Washington Post's Sunday magazine*.

Read *Post* articles from late April to day's issue for background and facts. Conduct your own interview. Give a sense of the big picture and then focus on one or two areas that interests you most — the human stories, the Louisiana lifestyle, the ecosystem, marine life, animals, larger environmental issues or economic impact on businesses.

Date: \_\_\_\_\_  
\_\_\_\_\_

Date: \_\_\_\_\_  
\_\_\_\_\_

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## Think Like a ...

Articles by *Washington Post* staff writers Joel Achenbach, David Brown, Juliet Eilperin, David A. Fahrenthold, David Hilzenrath, Marc Kaufman, Steven Mufson and Peter Whoriskey have covered the news, business and economics, politics, science and technology, health and other aspects of the Gulf of Mexico oil spill that began in April 2010.

Journalists need to be adept at locating sources, understanding complex issues and ideas, and communicating information in understandable, accurate manners. After reading stories written by the above writers and those of other *Post* writers, see if you can think like a journalist, historian, ecologist and engineer.

### Think Like a Historian

When was the first oil spill in the United States? According to the National Oceanic and Atmospheric Administration's Ocean Service Office of Response and Restoration, oil from natural seeps was collected on the surface of the water by the Chumash Indians in the 1500s in what is now Santa Barbara, California. They used the oil to waterproof their boats. Research and see what you can discover about the following:

- When was the first oil well drilled?
- What caused the hopane peak during WWII in Puget Sound in Washington? Hint: Hopane is a chemical "signal" of spilled oil.
- The *Thomas W. Lawson*, a schooner built in 1902, was bound for London and loaded with oil. She was caught in a storm and may have been the cause of one of the first oil spills as she was stranded on the Scilly Islands in 1907.
- There have been 268 oil spills in the Gulf of Mexico since 1960. Six stand out for the amount of oil spilled, duration of the spill response and the environmental impact. Visit NOAA's Office of Response and Restoration to find out more about:

Alvenus  
Ixtoc

Burmah Agate  
Megaborg

Hurricane Katrina  
Ocean 255

### Think Like Those Who Think Globally and Act Locally

#### One Strand at a Time

Booms are one type of mechanical countermeasure used to clean up oil spills by trapping and containing the oil before it spreads. There is a shortage of booms available to stop the spread of the oil from the current oil spill in the Gulf of Mexico. Scientists fear that the hurricane season combined with several failed attempts to contain the oil will allow the oil to enter the Loop current and be transferred to the Gulf Stream.

There are three main types of booms:

- Hard Boom – a floating piece of plastic with a cylindrical float at the top and a "skirt" under the water.
- Sorbent Boom – made out of a material that absorbs oil, it looks like a long sausage. There is no skirt on the bottom.
- Fire Boom – made to contain oil long enough that it can be lit on fire and burned.

Is there a local answer to the shortage of booms that are used to stop the spread of the spill? One organization, Matter of Trust, is the creator of a program called Hair for Oil Spills that creates booms out of hair and nylon stockings. These booms are incredibly effective at collecting oil, and once retrieved from the water, are fed to worms which convert the booms to fertilizer. One local high school recently invited professionals from Paul Mitchell Beauty School to trim (or cut) the hair of students in an attempt to make a sizable donation to Hair for Oil Spills. Any amount of hair (even half an inch) will make a difference. Can you arrange a similar effort in your community or school?

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## **Think Like a ... | *continued***

### **Don't Dump in the Bay**

For a step-by-step guide as to how you can do a storm drain project in your local area to bring awareness to the problem of non-point source pollution and the proper disposal of substances such as motor oil, visit the Fairfax County Government's Web site at [www.fairfaxcounty.gov/nvswcd/sdeguide.htm](http://www.fairfaxcounty.gov/nvswcd/sdeguide.htm).

## **Think Like an Ecologist**

### Investigate the Effect of Oil Spills on Marine Animals

According to NOAA's Oil Spill Response, the toxicity of oil for different animals depends on:

- The type of chemicals that make up the oil or are used to clean up the oil
- The amount of exposure
- The means of exposure — inhaled, ingested, absorbed, or external
- The biomedical risk factors of the animal — age, sex, reproductive stage and health
- Special aspects — such as certain behaviors

The Gulf of Mexico is home to denizens of wildlife. Mammals, fish, birds, turtles and invertebrates make their home in the mangroves, wetlands, beach sands, shallow and deep waters of the Gulf.

Select an organism to research. Include its scientific name, geographic range, biology, niche (its habitat and how it makes its living), place in the food web, special behaviors, and how and why it may be affected by the oil spill. What are the short and long term effects on its population?

## **Think Like an Engineer**

1. How can society become less dependent on oil? Research other sources of energy that could reduce our demand for oil.
2. How could ships be designed to be safer for the transport of oil?
3. Research the use of remotely operated vehicles (ROVs) in ocean drilling exploration.

## **Think Like a Journalist**

Journalists will evaluate what they know about the situation or topic. They will conduct interviews and do research to get additional information, to be accurate and to more fully understand the topic and to give balance to coverage. They then are ready to inform their readers.

1. What are the safety and health concerns in being eyewitnesses to cleanup efforts? Do journalists need to use the same clothing and masks as those who were trained to do cleanup?
2. Should photojournalists have access to all areas, including aerial overviews?

After doing research on one of the above suggested areas, write an article to inform your readers. Put current events into perspective and context.

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# Scientists envision devastation for gulf

BY JOEL ACHENBACH  
*Washington Post Staff Writer*

• Originally Published May 5, 2010

The urgent question along the polluted Gulf of Mexico: How bad will this get?

No one knows, but with each day that the leaking oil well a mile below the surface remains uncapped, scientists and energy industry observers are imagining outcomes that range from bad to worse to worst, with some forecasting a calamity of historic proportions. Executives from oil giant BP and other energy companies, meanwhile, shared their own worst-case scenario in a Capitol Hill meeting with lawmakers, saying that if they fail to close the well, the spill could increase from an estimated 5,000 barrels a day to 40,000 barrels or possibly even 60,000 barrels.

Three scientists in separate interviews Tuesday said the gulf's "loop current," a powerful conveyor belt that extends about 3,000 feet deep, will almost surely take the oil down through the eastern gulf to the Straits of Florida, a week-long trip, roughly. The oil would then hang a sharp left, riding the Florida Current past the Keys and north again, directly into the Gulf Stream, which could carry it within spitting distance of Palm Beach and up the East Coast to Cape Hatteras, N.C.

For the moment, the oil flowing from the blown-out well in what the industry calls Mississippi Canyon Block 252 is still many miles north of the loop current.

A three-day forecast by the National Oceanographic and Atmospheric Administration does not show the oil and the current crossing paths. But Robert Weisberg, an oceanographer at the University of South Florida who has

## BP seals one leak

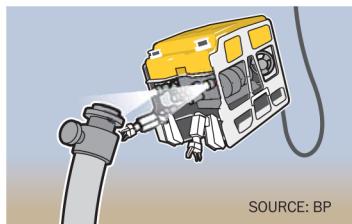
Remotely operated vehicles (ROVs) installed a valve on the end of a broken drill pipe, one of the three points from which oil was leaking.

### How it was done

**1** On Tuesday, the ROVs cut the pipe to create a clean end.



**2** Overnight, the ROVs joined a half-ton valve to the pipe and closed it.



SOURCE: BP

ALBERTO CUADRA / THE WASHINGTON POST

been monitoring the situation, said a new filament of the current is reaching toward the oil slick.

"The loop current is actually going to the oil, versus the oil going to the loop current," Weisberg said.

The crisis in the gulf is shot through with guesses, rough estimates and murky figures. Whether the oil blows onshore depends on fickle winds. This oil slick has been elusive and enigmatic, lurking off the coast of Louisiana for many days as if choosing its moment of attack. It has changed sizes: In rough,

churning seas, the visible slick at the surface has shrunk in recent days.

The oil by its nature is hard to peg. It's not a single, coherent blob but rather an irregular, amoeba-shaped expanse that in some places forms a thin sheen on the water and in other locations is braided and stretched into tendrils of thick, orange-brown gunk. There may be a large plume of oil in the water column, unseen.

A BP executive said the company has had success in treating the oil at the point of the leak with dispersant chemicals sprayed by a robotic submarine. A federal fleet has fought high waves in attempts to skim or burn the oil. Rough weather has actually been a blessing, said Ian MacDonald, an oceanography professor at Florida State University. In heavy surf, the oil has been breaking up, and toxic, volatile substances have been evaporating.

"It chews up the oil; some of it sinks," MacDonald said.

The good news ends there.

"What remains forms what's called mousse, which is like chocolate mousse. It's an emulsion, which is an emulsion of oil, air and water, in a thick, gelatinous layer, and that's nasty stuff," MacDonald said.

No one is sure how much oil is spilling. An early estimate by the Coast Guard of a 1,000-barrel-a-day flow was upped to 5,000 barrels with the discovery of an additional leak, but officials now caution against giving any estimate too much credence.

The oil so far has barely touched coastal islands and hasn't come ashore, but environmentalists are poised for a catastrophic impact that could last decades.

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BY ERIC GAY — ASSOCIATED PRESS

**Before the oil spill, seen May 5 in Louisiana, it appeared that environmentalists would have to accept expanded drilling off U.S. coasts.**

CONTINUED FROM PAGE 14

"It's going to have a ripple effect throughout the entire food chain, from the plankton to the fish that consume them, to the predators, like the pelicans and the dolphins," said Doug Inkley, a senior scientist with the National Wildlife Federation. "It's like a slow-moving train wreck about which you can do nothing, or very little."

At a news conference Tuesday, Louisiana Gov. Bobby Jindal (R) said he had asked federal officials to look for ways to increase the Mississippi River's flow to keep the slick at bay.

"Let's make no mistake about what's at stake here," he said. "This is our very way of life."

The crisis began April 20 with an explosion and fire on the Deepwater Horizon, a huge rig owned by Transocean and leased by BP. The South Korean-built rig, insured for \$560 million, sank two days later; the riser, the pipe leading

to the rig, collapsed. Three leaks have developed, the largest at the end of the drill pipe that extends from the end of the riser.

Robotic submarines have tried to activate a structure called a blowout preventer that sits atop the wellhead and has multiple tools for clamping the flow of oil in an emergency. So far those efforts have failed.

"It's really, really devastating," said Greg McCormack, director of the Petroleum Extension Service at the University of Texas. "On the political front, are we going to be allowed to drill in the deep water again? That's going to be more devastating to society than to the industry. We're going to have much higher oil prices because of that."

Few people have a more apocalyptic view than Matt Simmons, retired chairman of the energy investment banking firm Simmons & Company International and a 41-year veteran of the industry. Simmons, who will speak

at the Offshore Technology Conference in Houston this week, has been famous in recent years for warning that the industry is running out of oil. Now he sees a disaster on an epic scale as the pressurized subterranean reservoir known as the Macondo field, tapped for the first time by Deepwater Horizon, continues to vent into the gulf.

"It really is a catastrophe," Simmons said. "I don't think they're going to be able to put the leak out until the reservoir depletes. It's just too technically challenging."

He said BP's cleanup costs could ruin the company.

"They're going to have to clean up the Gulf of Mexico," he said.

Jindal's news conference Tuesday opened with an invocation from Randy Craighead, the pastor of a New Orleans area church. He asked for divine intervention. "Father, we pray for a prevailing north wind," he said, "to drive that oil slick southward." ■

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# Oil disaster could produce a sea change

BY JULIET EILPERIN  
*Washington Post Staff Writer*

• Originally Published May 6, 2010

The catastrophic oil spill unfolding in the gulf has provided the environmental community with a rare opportunity to shift public opinion on climate and energy issues, an opening on which it has been quick to capitalize.

National environmental groups — including the Sierra Club and the Natural Resources Defense Fund — have rushed volunteers and scientific experts to the Gulf of Mexico to help with the cleanup in the aftermath of the Deepwater Horizon rig's collapse. But they are also holding news conferences, filming TV spots and organizing protest rallies, all aimed at persuading lawmakers to block new offshore oil drilling and pass legislation curbing U.S. greenhouse gas emissions.

"It's very difficult, in our society, to cut through the din and get people to listen and pay attention," said Friends of the Earth Managing Director David Hirsch, whose group is preparing TV ads on the issue. "Unfortunately, these are the times when it happens. These are the moments when you can be heard."

Jack Gerard, president of the American Petroleum Institute, questioned environmentalists' tactics. "It's unfortunate that some would seize on a tragic accident to push a political agenda," Gerard said. "We don't have the facts yet."

Although the exact cause of the blowout remains unclear, activists have used the spill to bolster their argument that the risks of offshore oil exploration outweigh its benefits, and that the United States would be better off focused on promoting alternative energy sources.

"This does serve as a wake-up call, to both the administration and Congress, to focus more effort on reducing the demand for oil," said Sierra Club Executive Director Michael Brune.

Alittle over a month ago, it appeared that environmentalists would have to accept the prospect of expanded oil drilling off the U.S. coasts, as President Obama identified new areas for exploration and the three senators working on a bipartisan climate bill — John F. Kerry (D-Mass.), Lindsey O. Graham (R-S.C.) and Joseph I. Lieberman (I-Conn.) — inserted offshore drilling provisions into their draft. But now the administration has said it will review its proposal, and two GOP governors — California's Arnold Schwarzenegger and Florida's Charlie Crist — have reversed course and said they oppose any drilling off their state's shores.

At least two Democratic senators, Robert Menendez (N.J.) and Bill Nelson (Fla.), have said they won't support a climate proposal that encourages offshore drilling, and even some moderate Republican senators say they want to reexamine the role offshore drilling should play in the nation's energy supply. "Whether it should be there in the future is an open question," said Sen. Richard G. Lugar (R-Ind.).

BP was one of three major oil companies prepared to endorse the compromise Senate climate bill last month — Lieberman described them to reporters in late March as "our new friends" — and Lieberman indicated Tuesday that he did not think the senators would pull offshore oil drilling from the package before they formally introduced it.

But a Democratic Senate aide who spoke on the condition of anonymity said when it comes to the bill's drilling

language, "We will have to change things from where they were before, but we need to figure out what that is." The aide that the bill's sponsors are encouraged by the fact that the spill has "engaged and activated a large part of the environmental community. We feel like this is a really good opportunity for us."

Reaching a drilling compromise that will attract Republican support without alienating Democrats such as Menendez and Nelson remains a challenge. For the moment, however, environmentalists appear to think they have the upper hand. The Sierra Club has not only mobilized 2,000 people to volunteer in the Gulf states, it will hold a "Clean It Up" rally Saturday in New Orleans along with simultaneous "solidarity events" such as demonstrations at BP gas stations around the country and mock oil spills that will involve temporarily laying black trash bags on beaches. Dozens of green groups now participate in a daily "oil disaster war room call" to plot their strategy.

"I'm not crazy about what got it there, but we've got to take advantage of it," Ocean Conservancy President Vicki Spruill said of the spill's moment in the media spotlight. "We've got to turn this crisis into an opportunity."

But Obama and his top deputies have yet to talk about reducing the nation's dependence on fossil fuels in connection with the oil spill, something that worries environmentalists such as Brune.

"There's no mention yet of how to get to the root of this," he said. "If we're not getting to the root problem — our addiction to oil — we're going to see this problem repeated again and again." ■

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# Louisiana's defense plan: Bulked-up islands

BY MARC KAUFMAN  
*Washington Post Staff Writer*

• Originally Published May 10, 2010

**VENICE, LA.** — With the prospects dimming for capping the Deepwater Horizon oil well blowout anytime soon, federal, state and local officials are actively assessing a plan to quickly and massively shore up the battered barrier islands that protect the Louisiana marshlands.

The plan, which local officials hope to present to the White House within days, calls for building up almost 70 miles of barrier islands by dredging sand and mud from a mile out into the Gulf of Mexico and depositing it onto the outer shores of the islands.

Some of the islands included in what local officials call their line of defense are federal bird and wildlife sanctuaries,

including the Breton National Wildlife Refuge.

A project of this scale normally requires years of environmental assessments, but local and state officials say there is no time for those now. The current boom system was of little use even in Sunday's calm waters, and officials say they face an environmental disaster when hurricane season arrives and the oily water is pushed into the marshlands ashore.

Efforts to protect the Louisiana marshlands, some of the most productive in the world, became even more urgent after the failure Saturday to place a



THE WASHINGTON POST

dome on the gushing well, 5,000 feet below the surface. BP officials said Sunday that they had moved the structure 1,600 feet away from the site and were working on making it work and bringing in other technologies, including a smaller dome.

BP Chief Operating Officer Doug Suttles was in Venice, La., on Sunday and met with local officials about the barrier islands plan,

which he described as "not yet complete." He said that the company was interested in further exploring the project after it's more fully developed but that BP hoped to be able to cap the well soon so that a major barrier-building program might not be necessary.

Suttles met with Billy Nungesser, president of Plaquemines Parish, which is especially threatened by the oil. Nungesser said 10 dredges were available to start work, which he hoped could be done night and day.

"We believe this can be done quickly and in a way that doesn't hurt the pelicans and sea turtles and other great wildlife out there," he said.

"But here's the really bad truth: If we don't do it, the chances are good those birds and animals will be destroyed by the oil later this summer, and the marshes will be destroyed, too."

Dredging countless tons of sand is costly, and Nungesser said Sunday that estimates for a full "line of defense" were about \$250 million. He said that estimate



BY GERALD HERBERT — ASSOCIATED PRESS

**Members of the Louisiana National Guard build a levee to protect inland waterways from the Deepwater Horizon oil spill on Elmer's Island in Grand Isle, La., Friday May 14, 2010.**

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is based on building the islands up to a six-foot-high slope, which engineers said was necessary to resist future storms. The plan also calls for creating passages within and between islands so water can move back and forth.

Estimates of how much oil is leaking from the well range from 5,000 to 26,500 barrels per day. Although chemical dispersants have kept any large oil slicks from hitting shore, oil globules and an oil sheen have come up on some of the barrier islands, and Nungesser said some have even moved beyond the barriers and closer to the marshes.

The Associated Press also reported Sunday that thick blobs of tar washed up on Alabama's white sand beaches, yet another sign the spill was spreading.

The barrier island plan was made public on Saturday by Gov. Bobby Jindal, who said his staff was also working hard to make it happen. At a news conference in Venice, near the Gulf tip of Plaquemines Parish, Jindal credited Nungesser with developing the plan and said he supported it fully. A far more limited version of the plan had been in the works for several years, but Nungesser said the oil threat led to the expansion and heightened sense of immediacy. He also said a Dutch dredging firm came to the parish last week and helped officials develop a more expansive plan.

Garret Graves, chairman of the state Coastal Protection and Restoration Authority, said the state had worked on the proposal with the joint oil spill commission led by the Coast Guard and BP but not with the EPA or the White House. He said that numerous state and federal permits would be needed before major dredging could begin but that there wouldn't be any problems obtaining them from the state. Officials might have to apply for the federal permits while the work begins, he said.



BY CHARLIE RIEDEL —ASSOCIATED PRESS

**A rescued Brown Pelican is cleaned Saturday, May 15, 2010, at the Fort Jackson Wildlife Rehabilitation Center, Buras, La.**

Graves said the threat of long-term or permanent damage to the marshes was real and required forceful action. He also said the state had been hampered in its efforts to protect its 77,000 miles of winding coastline because of a significant shortage in booms.

Nungesser, who spent two hours with President Obama when he visited Louisiana and has also met at length with Environmental Protection Agency Administrator Lisa P. Jackson, said he was optimistic the administration would help expedite the approval process. A self-styled "Reagan Republican," he said that he was deeply impressed by Obama's willingness to come to his parish, by his knowledge of the problem and by what he called "his very obvious desire to help."

But it was unclear Sunday how the White House would respond to such a dramatic request involving such a sensitive environment.

Bringing tons of sand, and even Mississippi River sediment, out to fragile barrier islands is sure to be controversial with environmental advocates. It also might not work. The barrier islands, five to 10 miles offshore, are much smaller than they used to be because of hurricanes — but more importantly because of changes in the environment created

by the levees, jetties and canals built to control the Mississippi and to enable oil and gas exploration and drilling.

Aaron Viles, an environmental leader who heads the Louisiana-based Gulf Restoration Network, said that he understands why local leaders are pushing for a large dredging and island-building plan but that he worries about the consequences.

"BP has created a situation where there are no good answers," he said. "Rebuilding the barrier islands slowly and carefully is a very good idea. Doing it quickly could make a bad situation worse." ■

*Staff writer Eli Saslow contributed to this report.*

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# Deep-sea chemical dispersants weighed for cleanup of Gulf of Mexico oil spill

BY JULIET EILPERIN  
*Washington Post Staff Writer*

• Originally Published May 10, 2010

The decision on whether to use chemical dispersants deep below the sea's surface to break up the Gulf of Mexico oil spill boils down to two central questions: Is it worth taking this unprecedented step to protect the region's sensitive and ecologically valuable wetlands, even at the potential expense of its marine life? And because the scientific literature on this question is so sparse, should federal officials conduct extensive new research before making the leap?

"It's sort of the devil you know versus the devil you don't," said Linda Greer, a senior scientist at the Natural Resources Defense Council. "It's really shocking to me how little research has been done into these basic questions."

Responders to the downed Deepwater Horizon rig have spent days applying more than 253,000 gallons of oil dispersant — Nalco's Corexit 9500 — to break up the tens of thousands of gallons of oil that have reached the ocean's surface.

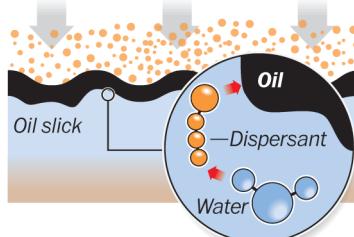
But these compounds have never been used at depth. Federal officials have conducted two rounds of tests to determine dispersants' effects hundreds of feet underwater, and they are consulting with state and federal agencies as well as local community leaders before making a decision to proceed.

On a basic level, dispersants work the same way dishwashing liquid works on grease: They break up the oil into tiny droplets by attaching to the oil, which then becomes diluted in the water. Scientists and policymakers agree that

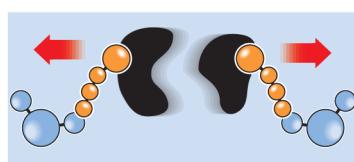
## Dispersing the oil

Waves and water eventually break up oil, but chemical dispersants speed up that natural process.

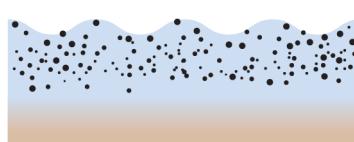
- 1** A molecule of dispersant has two ends. One end is attracted to oil; the other is attracted to water.



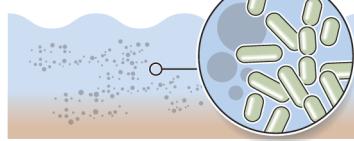
- 2** This nudges the water and oil apart, reducing the surface tension between the two.



- 3** It is now easier for wind and waves to break the oil slick into tiny droplets.



- 4** Microorganisms in the water take over, naturally degrading the oil.



SOURCE: NOAA  
BONNIE BERKOWITZ AND ALBERTO CUADRA/THE WASHINGTON POST

the oil from the spill poses a greater threat to wildlife and vegetation than the chemicals in the dispersants.

"You're putting something into the water, it's less toxic than the oil, so it's a trade-off," said Coast Guard Commandant Thad Allen, national incident commander for the BP spill, in an interview.

But the question of the broader trade-off — whether these compounds will wreak havoc on the marine system over time — remains unanswered. Five years ago, the National Academy of Sciences issued a nearly 400-page study on oil dispersants, which cautioned that "the current understanding of key processes and mechanisms is inadequate to confidently support a decision to apply dispersants."

The NAS panel urged additional scientific inquiry into the matter, but little of that research has taken place. And now, the federal government will have to make a significant decision without it.

The Environmental Protection Agency is analyzing water samples taken from deeper areas in the gulf where responders have applied the dispersants, according to federal officials, and will report back before a broader application takes place.

"It's a hard call," said Carys L. Mitchelmore, one of the authors of the 2005 NAS report and an associate professor at the University of Maryland Center for Environmental Science's Chesapeake Biological Laboratory.

Applying dispersants at depth could kill fish larvae — such as those from the imperiled Atlantic bluefin tuna that use the Gulf of Mexico for spawning grounds — and threaten filter-feeders,

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such as whale sharks, that pass through those waters. It could also harm commercially valuable oysters and mussels, as well as organisms low on the food chain that sustain larger marine creatures. "You would be killing off their food," Mitchelmore said.

There are other unknowns: Almost no research has been done on whether the dispersants will undermine the water repellency of birds, which is essential for

regulating their body temperature. And most of the testing has been conducted in laboratories rather than in the field, which might mean that scientists have underestimated the toxic threat a mixture of oil and chemicals could pose. New research suggests that natural light enhances oil's toxicity, Mitchelmore said, which would threaten translucent organisms such as fish larvae.

In addition, Greer said, scientists do not know whether chemically treated oil degrades as quickly as oil that's dispersed

through wind and wave, and if it's more toxic.

David Horsup, Nalco's division vice president for energy services research, said that dispersed oil at the surface did degrade more quickly and that the initial results of applying it at depth were "very encouraging."

When it comes to treating an oil spill, he added, "it's not a panacea by any means. It's a very good method, not the only one, and it has to be used in conjunction with other tactics." ■



BY DAVID QUINN — ASSOCIATED PRESS

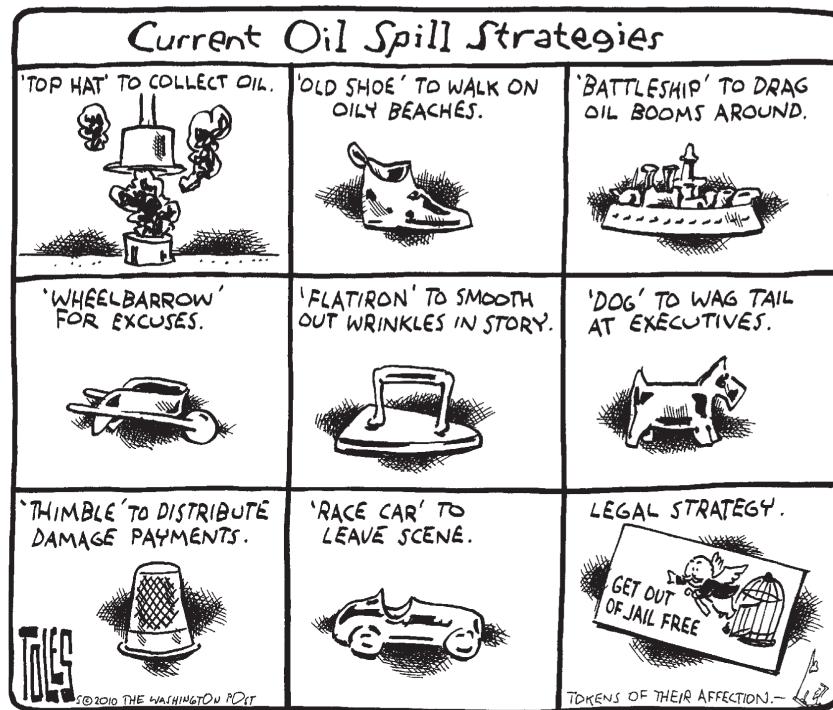
**Massive sheens of oil are seen from an altitude of 3,500 feet over the Gulf of Mexico, off the coast of Louisiana.**



BY LEE CELANO—REUTERS

**A scientist holds a clump of sand and oil, suspected from the oil spill in the Gulf of Mexico, in South Pass, La.**

## An Integrated Curriculum For The Washington Post Newspaper In Education Program

**TOM TOLES**

Tuesday May 18, 2010



Wednesday, June 2, 2010

An Integrated Curriculum For The Washington Post Newspaper In Education Program

# The Washington Post

AN INDEPENDENT NEWSPAPER

## EDITORIALS

# Mr. Obama steps up on oil spill response

PRESIDENT OBAMA put a welcome end Thursday to some of the unattractive finger-pointing and responsibility-dodging of recent weeks with respect to the disastrous BP oil spill. His administration until now had painted a murky picture of lines of authority and responsibility.

Was BP organizing the response to the leak? If the government was already in charge, why did Interior Secretary Ken Salazar insist that the government might yet push BP out of the way? Did the government need the oil company's expertise? Was the whole thing the fault of the previous administration?

Mr. Obama cleared that all away: "From the moment this disaster began," he said, "the federal government has been in charge of the response effort." He noted that federal law prescribes the organization of the response: As the responsible party, BP is conducting operations to cap the well and paying contractors that specialize in oil-spill cleanup, but all at federal direction. "Every key decision and action they take must be approved by us in advance."

The president stepped back from the boot-on-the-neck-of-BP rage. "I take responsibility. It is my job to make sure that everything is done to shut this down." He was honest about the

scope of the challenge the government faces. "There is going to be damage that is heartbreaking to see." And, he acknowledged, "There are going to be places where things fall short." He repeated, accurately, that the problem of regulator-industry coziness predated his tenure and had been somewhat improved by Mr. Salazar, but he also admitted that his administration had not done enough before the spill to cure that problem. As oil continues to lap ashore and cleanup begins in earnest, the president has made clear that Americans can hold him accountable for the effectiveness of that effort, no matter how difficult the task or how fraught the politics.

Perhaps most important: Mr. Obama also argued that this disaster should remind Americans of the many costs of the nation's addiction to fossil fuels, underscoring the need for sensible, comprehensive climate and energy legislation. He pointed out that Sens. John F. Kerry (D-Mass.) and Joseph I. Lieberman (I-Conn.) have assembled a bill that deserves a bipartisan hearing this year. That is the long view America's leaders must see, and soon, if the country is ever to end its dependence on the sticky, black film threatening the Gulf Coast.

*Friday, May 28, 2010*

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EUGENE ROBINSON

# In the wake of Deepwater, let's put the environment first

In June 1969, the stretch of the Cuyahoga River that runs through Cleveland was so polluted that it caught fire. Time magazine described the Cuyahoga this way: "Chocolate-brown, oily, bubbling with subsurface gases, it oozes rather than flows."

The spectacle of a river in flames helped galvanize the environmental movement, and the following year, with Richard Nixon as president, the Environmental Protection Agency was established. In 1972, Congress passed the landmark Clean Water Act. Today, the Cuyahoga is clean enough to support more than 40 species of fish.

We still don't know the full extent of the environmental disaster unfolding in the Gulf of Mexico — the impact on avian and aquatic life, on fisheries, on tourism, on the delicate ecology of coastal marshes and barrier islands. We do know, though, that it is the worst oil spill in our nation's history, far surpassing the Exxon Valdez incident. And maybe the shocking images from the gulf of dead fish, oiled pelicans and shores lapped by viscous "brown mousse" will refocus attention on the need to preserve the environment, not just exploit it.

"Drill, baby, drill" isn't just the bizarrely inappropriate chant that we remember from the Republican National Convention two years ago. It's a pretty good indication of where the national ethos has drifted. Environmental regulation is seen as a bureaucratic imposition — not as an insurance policy against potential

catastrophe, and certainly not as a moral imperative.

Yes, many Americans feel good about going through the motions of environmentalism. We've made a religion of recycling, which is an important change. We turn off the lights when we leave the room — and we're even beginning to use fluorescent bulbs. Some of us, though not enough, understand the long-term threat posed by climate change; a subset of those who see the danger are even willing to make lifestyle changes to try to avert a worst-case outcome.

But where the rubber hits the road — in public policy — we've reverted to our pre-enlightenment ways. When there's a perceived conflict between environmental stewardship and economic growth, the bottom line wins.

Barack Obama is, in many admirable ways, our most progressive president in decades. But as an environmentalist, let's face it, he's no Richard Nixon. Before the Deepwater Horizon rig exploded — allowing, by some estimates, as many as a million gallons of crude oil to gush into the Gulf of Mexico each day for more than a month — Obama had announced plans to permit new offshore drilling. "I don't agree with the notion that we shouldn't do anything," Obama said at the time. "It turns out, by the way, that oil rigs today generally don't cause spills. They are technologically very advanced."

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Obama has wisely backed away from that decision. The technology involved in deep-sea oil drilling turned out to be far more advanced than the technology needed to halt a spill if something goes wrong — essentially, like engineering a car to double its top speed without thinking to upgrade the brakes. This oversight apparently wasn't noticed by anyone who had the power to correct it.

Calls for Obama to somehow "take over" the emergency response ring hollow. Take it over with what? Hands-on intervention has never been government's role in this kind of situation. BP and the other oil companies had the undersea robots and the deep-water experience. Other private companies owned and operated the skimmers that remove the oil from the surface. There is no huge government reserve of the booms that are needed to protect Louisiana's

beaches and marshlands; those are made by private firms and are being deployed by unemployed fishermen.

Obama has rethought his enthusiasm for offshore drilling. Now he, and the rest of us, should rethink the larger issue — the trade-off between economic development and environmental protection. In the long run, our natural resources are all we've got. Defending them must be a higher priority than our recent presidents, including Obama, have made it.

Energy policy is one of Obama's priorities. He talks about "clean coal," which I believe to be an oxymoron, and favors technologies — such as carbon capture and sequestration — that are new and untested. The environmental risks must be a central and paramount concern, not a mere afterthought. Let's preclude the next Deepwater Horizon right now. ■

*Friday, May 28, 2010*

## An Integrated Curriculum For The Washington Post Newspaper In Education Program

TUESDAY, JUNE 1, 2010

The Washington Post

A9



BP has taken full responsibility for cleaning up the spill in the Gulf of Mexico.

### We Will Make This Right.

Stopping the leak will be a major step, but only a start. We know that our responsibility goes much further.

#### **Our commitment to the environment.**

Our job now is to prevent as much environmental damage caused by this spill as we can. Over 1,100 boats, including local fishing fleets, are collecting the oil by skimming and other methods. More than two million feet of boom are in place to protect the shoreline. Where oil has reached the shore, we are cleaning it up.

#### **Our commitment to the people of the Gulf.**

This spill and the hardships endured by Gulf families and businesses never should have happened. The region is home to thousands of BP employees, so we also feel the impact.

We have been paying all legitimate claims for economic loss and will continue to do so. We will not be limited by a spending cap. We have 18 claims offices in operation across the Gulf. More than 9,000 claims have been paid, including millions of dollars to thousands of fishermen.

We've provided \$170 million to support the response and tourism in the region. And our efforts will not come at any cost to taxpayers.

#### **Our commitment to you.**

Whether you've been affected personally or you are following this from a distance, we understand that our responsibility includes keeping you informed. You expect us to make this right. We will.

For the most current information, please visit the following BP and joint U.S. Government/BP websites:

[www.bp.com](http://www.bp.com)  
[www.deepwaterhorizonresponse.com](http://www.deepwaterhorizonresponse.com)

For assistance or information, please call the following 24/7 hotlines:  
 To report oil on the shoreline: (866) 448-5816  
 To report impacted wildlife: (866) 557-1401  
 To make spill-related claims: (800) 440-0858



## An Integrated Curriculum For The Washington Post Newspaper In Education Program

SUNDAY, JUNE 6, 2010

The Washington Post

A5



The Gulf oil spill is a tragedy that never should have happened.

**We will get it done.  
We will make this right.**

And while we were deeply disappointed that the recent "top kill" operation was unsuccessful, we were also prepared. The best engineers in the world are now working around the clock to contain and collect most of the leak.

As they do that, BP will continue to take full responsibility for cleaning up the spill.

We have organized the largest environmental response in this country's history. More than three million feet of boom, 30 planes and over 1,300 boats are working to protect the shoreline. When oil reaches the shore, thousands of people are ready to clean it up.

Thirty teams of specialists are combing the shore along with US Fish and Wildlife, NOAA and Louisiana Wildlife and Fisheries. If wildlife is affected, rescue stations have been set up to take care of them. Experts have been flown in from around the country. And BP has dedicated \$500 million to watch over the long-term impact on marine life and shoreline.

We will honor all legitimate claims. We will continue working for as long as it takes. And our efforts will not come at any cost to taxpayers.

We understand that it is our responsibility to keep you informed. And to do everything we can so this never happens again.

We will get this done. We will make this right.

[www.bp.com](http://www.bp.com)  
[www.deepwaterhorizonresponse.com](http://www.deepwaterhorizonresponse.com)

For assistance or information, please call the following 24/7 hotlines:  
To report oil on the shoreline: (866) 448-5816  
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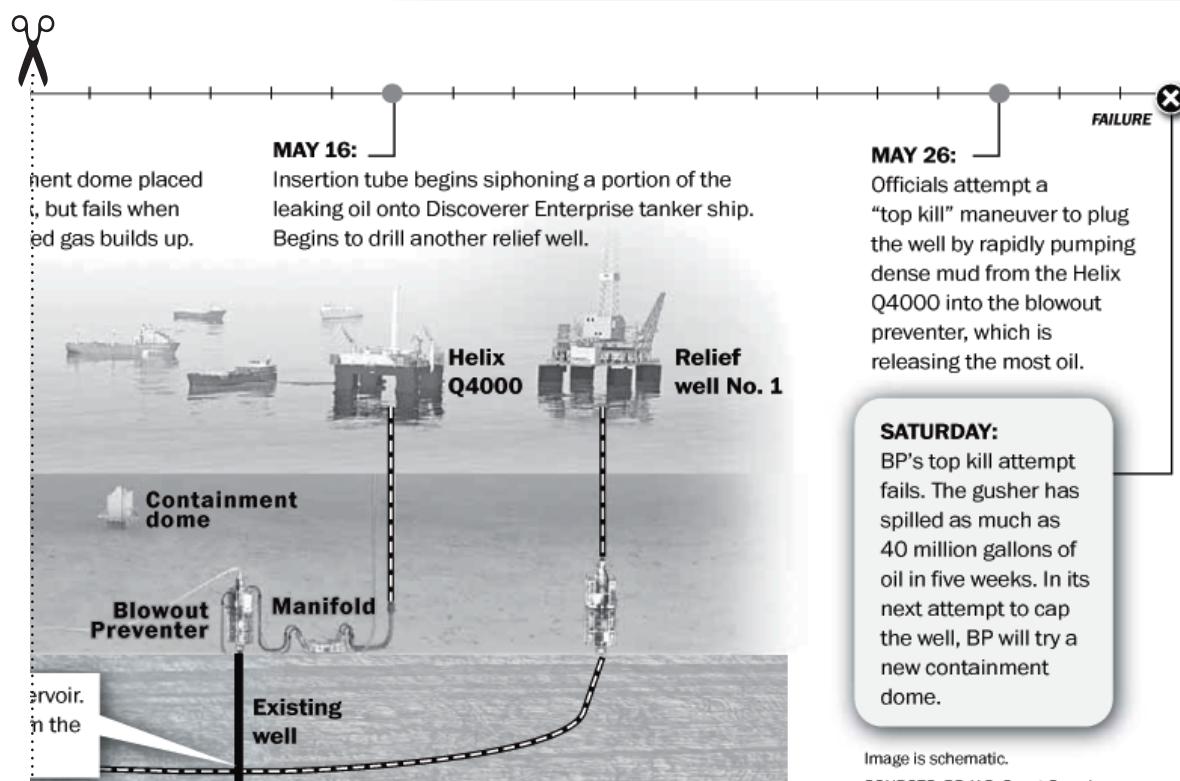
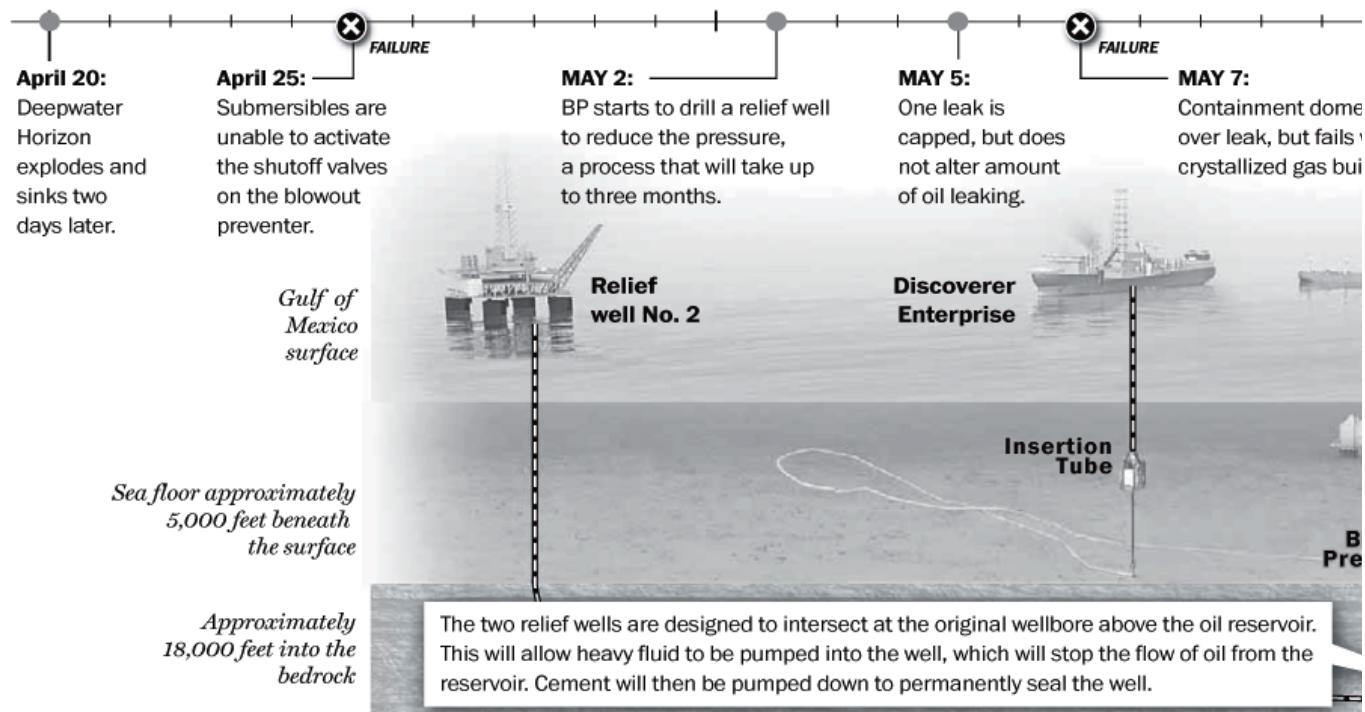


BP Exploration & Production Inc.

An Integrated Curriculum For The Washington Post Newspaper In Education Program

## A timeline of BP's attempts to stop the flow of oil

April 20 — May 29, 2010



An Integrated Curriculum For The Washington Post Newspaper In Education Program

# Oil could spew until August, officials say

BY STEVEN MUFSON AND  
DAVID S. HILZENRATH  
*Washington Post Staff Writers*

• Originally Published May 31, 2010

As BP readied its latest fallback plan to stop oil gushing from one of its wells in the Gulf of Mexico, the Obama administration and the company warned that the crude could continue flowing until August, compounding threats to coastal wetlands, fisheries and beaches.

White House energy and climate adviser Carol M. Browner said Sunday that the oil spill was "probably the biggest environmental disaster we've ever faced in this country" and that "we are prepared for the worst." On the CBS show *Face the Nation*, she said that the "American people need to know that it is possible we will have oil leaking from this well until August when the relief wells will be finished."

Those two wells, which BP began drilling early this month, are expected to intersect the damaged one and seal it near the reservoir far below the seafloor. The first has reached 7,000 feet below the seafloor, and the second has reached 3,500 feet below the floor, but progress gets slower the deeper the wells go. With the arrival of hurricane season Tuesday, the drilling could be slowed if the rigs need to be evacuated during storms.

The grim assessment came in the wake of the failure last week of BP's "top kill" effort to stop the flow of oil from the damaged well by shooting heavy drilling mud into the hole.

BP managing director Bob Dudley, who also made the rounds of Sunday-morning shows, said on ABC's *This Week* that "the next step is to make sure that we minimize the oil and pollution going into

the gulf." He added: "The main thing now is to contain it."

BP plans to saw off a bent and broken pipe attached to the five-story tall blowout preventer that sits over the well. The company will then lower a new apparatus that would funnel oil and gas to vessels on the sea surface. But until the new apparatus is in place, cutting the riser pipe will temporarily increase the flow of oil into the sea by 10 to 20 percent, because the procedure will remove a section of pipe where a kink is limiting the flow, Browner said.

#### 4th fallback plan so far

Dudley expressed optimism about the latest fallback plan — the fourth so far — saying on CBS, "With this, we think we can contain the majority of the oil and gas."

BP and the Obama administration were also trying to contain the rising tide of public frustration as the oil spill comes to the end of its messy sixth week.

Drilling experts said they feared that BP's effort last week to stop the flow of oil and gas with heavy drilling mud might have done further damage to the well and the blowout preventer, possibly complicating the next effort to capture the oil and gas and bring them to surface vessels.

Some drilling experts said that the "top kill" effort failed over the weekend because the force of the oil and gas pushing up from the reservoir 13,000 feet below the seafloor was so great that it had shoved most of the drilling mud through the blowout preventer and into the sea.

Tadeusz W. Patzek, chairman of petroleum and geosystems engineering at the University of Texas at Austin, said it was the "equivalent of six or seven fire

hoses blasting oil and gas up, while two fire hoses were used to blast the drilling mud down. They never stood much of a chance."

Sources at two companies involved with the well said that BP also discovered new damage inside the well below the seafloor and that, as a result, some of the drilling mud that was successfully forced into the well was going off to the side into rock formations.

"We discovered things that were broken in the sub-surface," said a BP official who spoke on the condition of anonymity. He said that mud was making it "out to the side, into the formation." The official said he could not describe what was damaged in the well. Documents released Sunday by the House Committee on Energy and Commerce point to problems BP was having drilling the Macondo well, although some of them date to 2009 when BP was using a different rig with different equipment. Some documents describe previously reported trouble BP was having controlling the well. The company later drilled a new well section, costing it more than \$20 million.

The longer oil seeps out of the ground, the more politics are seeping into the public debate as people question why the oil industry and the government were so ill-prepared.

In an echo of the counting of days during the politically debilitating Iranian hostage crisis during President Jimmy Carter's administration, Jake Tapper on ABC introduced his program as "Day 41 of the Gulf oil spill."

Sen. David Vitter (R-La.) said BP "made enormous mistakes and probably cut corners." Appearing on CNN's *State of the Union*, Vitter also said the federal

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government has failed in its response to the crisis, "particularly with the effort to protect our coast and our marsh."

Last week, Minnesota Gov. Tim Pawlenty (R) questioned the administration's reliance on BP's estimates of the volume of oil, which has been flowing into the gulf since a blowout set fire to the Deepwater Horizon drilling rig, which sank, killing 11 people.

Browner conceded on CBS that "BP has a financial interest in these numbers" on the volume of the leak. "They will pay penalties at the end of the day, a per-barrel, per-day penalty," she said. But she said the latest, increased estimates of oil flowing from the well were produced by an independent government review panel.

"At the end of the day, the government tells BP what to do, and at the end of the day, we will hold BP accountable for all of this," she said.

She also sought to portray the administration as in charge and engaged. She said an administration "brain trust" led by Energy Secretary Steven Chu urged BP to stop adding pressure to the well through the top-kill maneuver

because "things could happen that would make the situation worse."

But she stopped short on CBS of saying that Chu ordered an end to the top-kill maneuver.

Pressed to give an example of administration influence, Browner cited the drilling of two relief wells instead of

one. A BP official said that it was "not unusual" to drill a second relief well and that it "very likely" would have been done anyway.

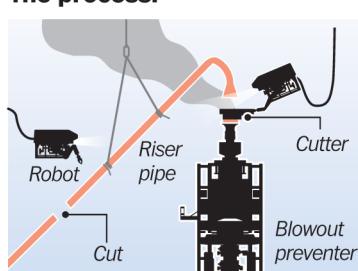
But Browner said that "BP said we're going to drill one relief well. These are expensive wells for them to drill. We said that's not good enough. You're going to drill a second one."

BP has said it would take responsibility for damage from the spill, but BP chief executive Tony Hayward on Sunday disputed claims by scientists that large undersea plumes have been set adrift by the gulf oil spill.

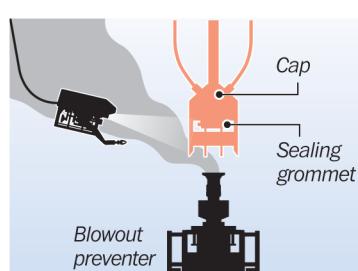
The Associated Press reported that during a tour of a company staging area for cleanup workers, Hayward said BP's samples showed "no evidence" that oil was suspended in large masses beneath the surface.

"The oil is on the surface," Hayward said. "Oil has a specific gravity that's about half that of water. It wants to get to the surface because of the difference in specific gravity."

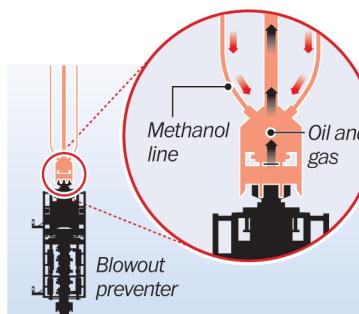
Scientists from several universities have reported plumes of what appears to be oil suspended in clouds stretching for miles and reaching hundreds of feet beneath the gulf's surface. ■

**The process:**

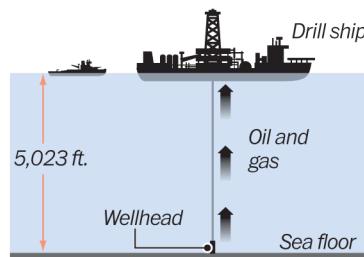
**1** Remote-controlled robots will saw the riser pipe off the top of the dormant blowout preventer. This carries great risk, because the bent riser is pinching off some of the flow.



**2** Robots will attempt to place a snug-fitting round grommet, which is attached to a pipe to the surface, over the sheared riser stump. Ideally, the custom-fit cap would capture most of the oil and would seal out nearly all seawater.



**3** Methanol can be injected into the cap in hopes of preventing the icelike gas-and-water hydrates that clogged the previous containment dome.



**4** Oil and gas would flow up the pipe to the drill ship and be separated. This is happening on a smaller scale with the oil and gas that is being captured by a tube inserted in the broken riser pipe. The next step might be to put a second blowout preventer on top of the failed one.

NOTE: Illustrations not to scale

SOURCE: BP

BONNIE BERKOWITZ AND ALBERTO CUADRA /THE WASHINGTON POST

reaching hundreds of feet beneath the gulf's surface.

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hilzenrath@washpost.com*

Staff writers Mary Pat Flaherty, Juliet Eilperin and Matt DeLong contributed to this report.

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# Fishing, tourism industries keep wary eye on oil spill

*Where crude lands, major parts of coastal economy could be wrecked*

BY PETER WHORISKEY  
*Washington Post Staff Writer*

• Originally Published June 3, 2010

The gargantuan blob of light Louisiana crude floating in the Gulf of Mexico has already closed oyster beds, shut down shrimpers, cancelled fishing tournaments and panicked beach hoteliers from New Orleans to Key West.

But the economic impact of the nation's worst ever oil spill may be just beginning.

With the vast majority of the oil floating offshore, where it will land and whom it will affect have become a guessing game fraught with worry. Wherever the oil goes, it threatens to obliterate billions of dollars for the region's tourism and fishing industries.

"It's like waiting for a hurricane to hit," said Mike Voisin, owner of Motivitat Seafood, which harvests oysters from the gulf. "We don't know where it will go. Every day we look at the forecasting maps."

"We're praying hard," said Ed Schroeder, director of the tourist bureau in Pensacola Bay, Fla., where people are wishing away an oily sheen about 10 miles off the coast.

A report of tarballs on the beach led the news in the local paper last week, though it is uncertain whether the tar came from the spill. "If we were picking a time for something like this to hit, it wouldn't be now," Schroeder said. "Our season just started."

At stake are industries that employ



FRITZ HOFFMAN—NATIONAL GEOGRAPHIC IMAGE COLLECTION

**Workers contracted by BP search for tar balls that have washed up on the beach in Grand Isle, La.**

tens of thousands of people and generate billions of dollars in economic activity for coastal areas stretching hundreds of miles. Beyond fishing and tourism, the offshore oil business is likely to feel the effects soon, too, as some exploration halts under a federal moratorium, analysts said, and new safety measures are required.

"It's clearly going to make deep-water exploration more costly," said Edward Morse, a Credit Suisse oil analyst. "My rough estimate is that it will have at most a 10 to 15 percent increase in costs developing crude from deep water."

For gulf regions from Texas to Key West, commercial fishing contributes \$1 billion to GDP, tourism and recreation contribute \$13 billion, and oil and gas contribute \$11 billion, according to figures from Charles Colgan of the National Ocean Economics Program.

## Shrimp boats idle

As the slick slides toward Mississippi, Alabama and Florida, the damage could spread.

At the Mariah Jade Shrimp Company in Chauvin, La., Kim and David Chauvin have watched as the closing of about a quarter of the gulf to fishing has made the flow of shellfish to their dock just a trickle. The company has three of its own shrimp vessels, which have been enlisted to help contain the spill.

"Our dock is pretty much closed," said Kim Chauvin, 42. "At this point, we are going to be looking for other jobs. . . . What's really scary is wondering how much marine life will be left when this is all over."

The direct impact of the oil on Louisiana's oyster beds has been minimal,

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Voisin said, but the precautionary closures of the beds are taking a big toll on his business, which is down about 50 percent.

Moreover, he said, the news coverage has made diners wary of gulf shrimp and oysters, once prized by connoisseurs.

"We're beginning to have people ask, 'Where is that seafood from?' And if it's from the gulf, they ask for the buffalo wings and the steak."

Though the majority of seafood consumed in the United States is imported, the gulf region accounts for about a fifth of the nation's oyster production and more than 75 percent of the domestic shrimp output, according to Moody's.

The consequences for tourism could be even greater, analysts say, particularly if the oil begins washing up to the east, especially in Florida. The economies of coastal towns and cities from Bay St. Louis, Miss., to the Florida Panhandle

depend on summer beach vacationers and could be devastated.

Rust-colored oil washed ashore on barrier islands off Alabama and Mississippi on Tuesday, and residents and business owners are bracing for more.

The tourism and recreation industries in the gulf could take substantial hits from the oil spill, said Colgan, a professor at the University of Southern Maine and the author of a study on the Gulf Coast economy.

"The headlines alone have scared people off," he said, warning that predicting the spill's impact remains difficult at best. "There's a drive to give this disaster dimensions. But this is uncharted territory. None of us who have studied these things over the years have any experience in deep-water events of this size."

#### **'Can they cut it off?**

Reports of tarballs last week in Key West drew news crews, though the

balls proved unrelated to the Deepwater Horizon gusher. But the attention highlighted the anxiety along the coast.

"My everyday worry is, when are they going to cut off the flow — and can they cut it off?" said Jim Meadlock, owner of the Perdido Beach Resort, a 346-room hotel in Alabama.

For now, public perception of the risk poses as much of a problem as the actual impact.

In Panama City, Fla., the tourist development board is spending \$800,000 on television and billboard advertising to assure the public that the beaches are clean. Each day, officials transmit a date-stamped picture of the beach to electronic billboards in the Southeastern cities from which their visitors tend to come. The county is getting \$1 million in money from BP, and that will be used to pay for the ads, officials said.

"Today's forecast: Clear waters and clean beaches," the billboards say. ■



**A beach at a state park on Grand Isle, La., is empty during the Memorial Day weekend after it was closed because of the spill.**

BY LEE CELANO — REUTERS

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**THE GULF**

# An ecosystem that is altered perhaps forever

BY JOEL ACHENBACH AND DAVID BROWN

*Washington Post Staff Writer**• Originally Published June 6, 2010*

Snorkeling along a coral reef near Veracruz, Mexico, in 2002, Texas biologist Wes Tunnell spotted what looked like a ledge of rock covered in sand, shells, algae and hermit crabs. He knew, from years of research at the reef, that it probably wasn't a rock at all. He stabbed it with his diving knife. His blade pulled up gunk.

"Sure enough, it was tar from the Ixtoc spill," Tunnell said. Twenty-three years earlier, in 1979, an oil well named Ixtoc I had a blowout in 150 feet of water in the southern Gulf of

Mexico. The Mexican national oil company Pemex tried to kill the well with drilling mud, and then with steel and lead balls dropped into the wellbore. It tried to contain the oil with a cap nicknamed The Sombrero. Finally, after 290 days, a relief well plugged the hole with cement and the spill came to an end — but only after polluting the gulf with 138 million gallons of crude.

That remains the worst accidental oil spill in history — but the Deepwater Horizon blowout off the Louisiana coast is rapidly gaining on it.

The spill has now been partially contained with the cap that BP engineers lowered onto the mile-deep geyser Thursday night. That means roughly a quarter to half of the flow is being piped to a surface ship, the national incident commander,

Coast Guard Adm. Thad Allen, said Saturday. BP hopes to improve the rate captured in coming days. If official government estimates are correct, 23 million to 47 million gallons of oil have spewed so far.

Ecosystems can survive and eventually recover from very large oil spills, even ones that are Ixtoc-sized. In most spills, the volatile compounds evaporate. The sun breaks down others. Some compounds are dissolved in water. Microbes consume the simpler, "straight chain" hydrocarbons — and the warmer it is, the more they eat. The gulf spill has climate in its favor. Scientists agree:



**P. J. Hahn lifts an oil-covered pelican that was stuck in oil at Queen Bess Island in Barataria Bay, La., just off the Gulf of Mexico.**

BY GERALD HERBERT—ASSOCIATED PRESS

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Horrible as the spill may be, it's not going to turn the Gulf of Mexico into another Dead Sea.

But neither is this ecological crisis going to be over anytime soon. The spill will have ripple effects far into the future, scientists warn.

"This spill will be lasting for years if not decades," said Doug Inkley, senior scientist at the National Wildlife Federation.

Some of the immediate effects of a spill are obvious — witness the gut-wrenching images of soaked and suffocating seabirds in the gulf. But some types of ecological damage are hard to measure and can take years to document. Many of the creatures that die will sink to the bottom, making mortality estimates difficult. Damage to the reproduction rate of sea turtles may take years to play out.

The Exxon Valdez spill of 11 million gallons killed as many as 700,000 sea birds and 5,000 sea otters initially, but even 21 years later, populations of sea otters in areas of Prince William Sound haven't recovered. The Pacific herring population collapsed after the spill for reasons that remain in dispute among scientists. Two intensely studied pods of killer whales in the sound suffered heavy losses in the spill and have struggled since. One of the two pods has no more reproductive females. It is doomed to extinction.

#### And the oil?

"It's still sitting there," said Stan Rice, program manager for habitat studies at the National Oceanographic and Atmospheric Administration's Auke Bay Fisheries Lab. "It's still liquid, you can still smell it and touch it."

The degradation of oil slows over the years. The microbes move on, as the large and complex compounds that remain, known as the asphaltenes, are

too hard to digest. What's left tends to be dense, tar-like, largely inert and attractive only to people who like to pave roads.

By 2003, there were still 21,000 gallons of oil in Prince William Sound, Rice reports in a recently published study on the lingering effects of the Exxon Valdez spill. The oil can be found by someone scraping three to six inches below the surface of the beach. Rice writes that an oil spill will be "over" when the oil itself is gone, the litigation has been settled and there are no continued negative effects in the environment.

"The Exxon Valdez spill does not meet any of these three criteria," he wrote.

#### Limited research funding

The oil drifting north from the Ixtoc spill not only wiped out hundreds of millions of crabs on Mexican beaches but, also far to the north, managed to kill 80 percent of the segmented worms and shrimp-like crustaceans that live in the sand of Texas beaches, according to Tunnell, a biologist at Texas A&M University at Corpus Christi. But the tiny animals have rapid reproductive cycles, and in about two and a half years they had recovered, he said. Poor government funding limited research on the broader ecological impact of the spill, however: "We don't have any comprehensive, good scientific studies of what happened."

There are on record since 1970 about 1,700 spills from tankers in which at least 2,100 gallons of oil were discharged into water. Scientists have been monitoring the effects of some of them for decades, including a 189,000-gallon spill that occurred off Cape Cod in September 1969.

## Paying for it

The nearly \$1 billion spent so far on oil spill cleanup in the Gulf of Mexico is just the beginning, according to a Credit Suisse analysis. Total costs could run in the tens of billions of dollars, with cleanup accounting for only half the bill. Economic damage to the fishing and tourism industries is projected to be steep. Under U.S. law, the costs of cleanup and damages are shared by the leaseholders:

- BP (65%), Anadarko Petroleum (25%) and Mitsui (10%).

By Karen Yourish  
and Laura Stanton

ESTIMATED  
EVENTUAL  
COST:  
UP TO  
**\$31  
billion**

Potential  
liabilities for  
economic  
damages to  
**fishing  
and  
tourism  
industries**

**\$14  
billion**

**\$17  
billion**  
↑ Range of  
total cleanup  
costs  
↓  
**\$11  
billion**

#### CLEANUP COSTS:

(Through June 1)

**\$990 million**

That includes:



#### CLEANUP COSTS PER DAY:

**\$14 million  
to \$30 million**

SOURCE:  
Credit Suisse analysis

SO FAR:  
**\$990  
million**

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Five years after that spill, fiddler crabs in the oiled marsh were sluggish and reproduced poorly. In many cases they dug burrows too shallow to protect themselves over the winter.

Astonishingly, many of those problems remained 35 years later, when a graduate student, Jennifer Culbertson, surveyed the marsh. She found that the fiddler crabs reacted slowly to startling motions, apparently the result of a narcotic effect of oil that still formed a visible layer four inches below the marsh surface. (A similar clumsiness has been seen in juvenile spot fish when they chew on sediments contaminated with compounds from oil.) When the crabs burrowed down and hit the layer of 40-year-old oil, they veered horizontally.

"The marsh is still waging chemical warfare several inches below the surface," said Christopher M. Reddy, a chemist at the Woods Hole Oceanographic Institute in Massachusetts who helped supervise Culbertson's research.

### Making it worse

Beaches get scrubbed by waves and storms, but marshes can develop tar

mats lasting decades, Tunnell said. He said the beaches are a 3 on a scale of 1 to 10 in terms of sensitivity to oil spills, but the marshes are a 10. Attempts to clean a marsh will backfire. After the huge Amoco Cadiz spill of 68 million gallons off Brittany in 1978, French authorities scraped the top off the oiled marshes. It was a mistake: Most never came back.

Although many scientists and officials have warned that the marshes are in danger, one scientist who has studied oil spills in Louisiana marshes said that these wetlands are generally able to recover if human intervention doesn't make the situation worse.

"The vegetation itself generally recovers in a year, although sometimes it may take three or four," said Irving A. Mendelssohn, a biologist at Louisiana State University. Only if oil sinks in deep, or if repeated oilings kill off new shoots, does the marsh die, he added.

That's not just a biological change but a geological one, points out LSU professor Edward Overton. "Biological stocks can be replenished a lot easier than land loss," he said.

Every oil spill has unique features, from the geography to the chemical makeup of the oil, which can vary dramatically in

toxicity. The Deepwater Horizon spill has the distinction of being the deepest blowout in history. Also unique has been the huge quantity of chemical dispersants sprayed on the surface and at the leak on the seafloor. There's little scientific understanding of how the dispersants might affect the deep-water ecosystem.

Coral reefs, only recently studied, can take centuries to develop in the cold, oxygen-poor depths; there are several such reefs directly beneath the oil slick. Deep plumes of oil have been reported in preliminary research by scientists on research vessels. As bacteria feast on the oil they could deplete the oxygen levels further, creating unusually deep "dead zones."

"If you're a creature that can't move, it's not good," Overton said.

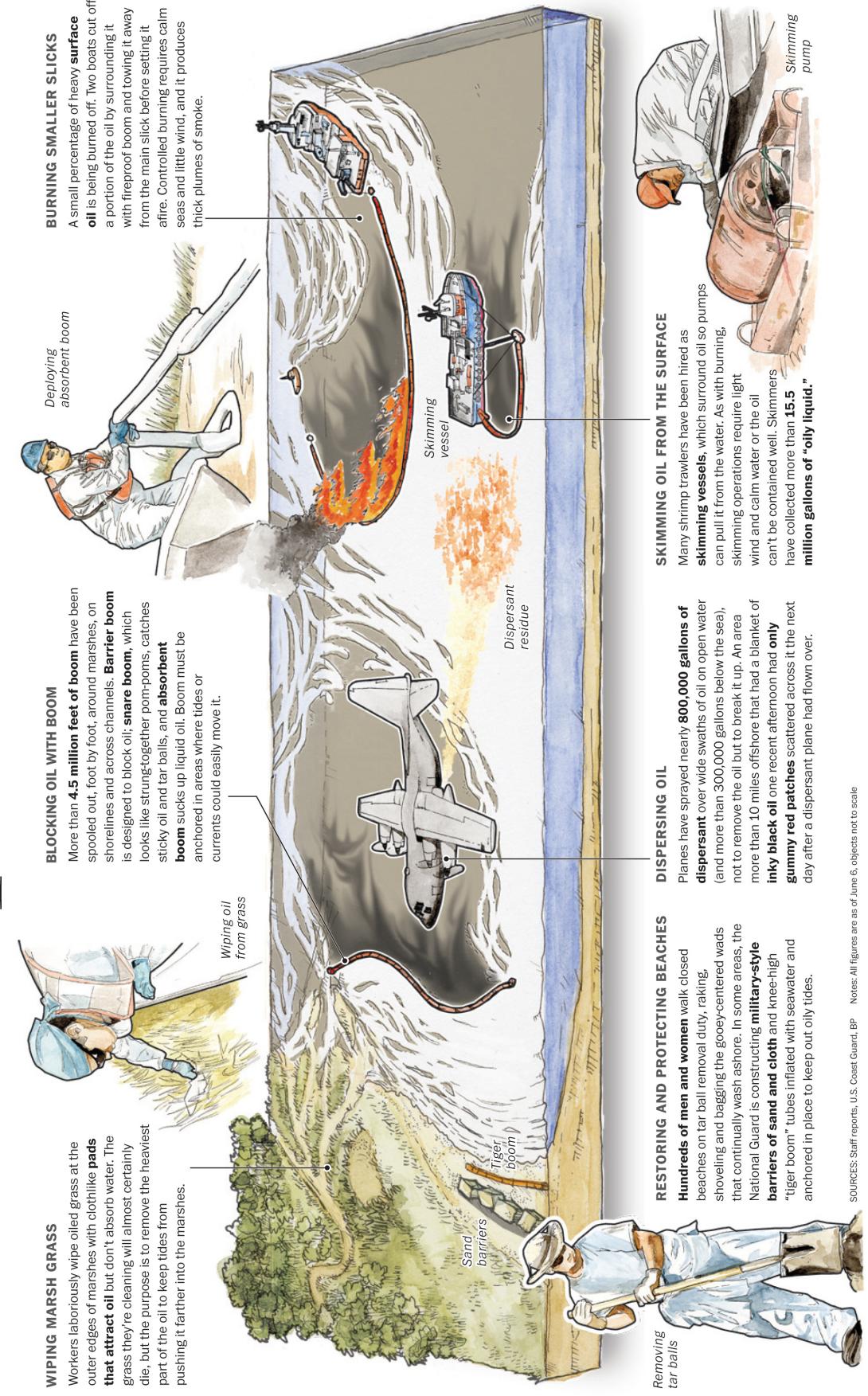
In the years to come, scientists will study this spill in the same way they have studied the Exxon Valdez disaster. The gulf ecosystems may survive, but they'll likely have changed in certain details, according to LSU biologist Kevin R. Carman.

"Undoubtedly, life will get a foothold," he said. "The question is how different it will be." ■

# Cleaning Up the BP Spill

By BONNIE BERKOWITZ AND ALBERTO CUADRA

While the technology required to drill an oil well in deep water can be mind-boggling, cleaning up spilled oil requires mostly tedious manual labor. No grand vacuum for tar balls has been created; workers in disposable coveralls pick them up by hand. BP has no marsh hoses; men in waders wipe sticky oil off dying grass one handful at a time. With fishing curtailed, BP offers cleanup jobs at \$12 an hour. **Some of the methods being used:**



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## Academic Content Standards

*This lesson addresses academic content standards of Maryland, Virginia and the District of Columbia.*

### Maryland

**Science, Ecology:** The student will investigate the interdependence of diverse living organisms and their interactions with components of the biosphere (Expectation 3.5)

**Science, Biology:** Recognize and explain how human activities can accelerate or magnify many naturally occurring changes.

**Reading:** Read, use and identify the characteristics of functional documents such as sets of directions, science investigations, atlases, posters, flyers, forms, instructional manuals menus, pamphlets, advertisements, other functional documents (2.0 Comprehension of Informational Text, A. b, grade 6)

**Writing:** Compose oral, written and visual presentations that express personal ideas, inform and persuade (4.0, indicator 2, grade 8)

### Virginia

**Science, Biology:** The student will investigate and understand dynamic equilibria within populations, communities and ecosystems (BIO.9)

**Science, Life Science:** The student will investigate and understand the relationship between ecosystem dynamics and human activity. Key concepts include:  
 b. change in habitat size, quality, or structure;  
 d. population disturbances and factors that threaten or enhance species survival; and  
 e. environmental issues (water supply, air quality, energy production, and waste management.) (LS.12)

**English:** The student will read and analyze a variety of informational materials.

c) Apply concepts and use vocabulary in informational and technical materials to complete a task.  
 e) Analyze information from a text to draw conclusions. (11.4, Reading Analysis)

**English:** The student will develop expository and informational writings.  
 b) Consider audience and purpose when planning for writing. (12.7, Writing)

The Maryland Voluntary State Curriculum Content Standards can be found online at <http://mdk12.org/assessments/vsc/index.html>.

Standards of Learning currently in effect for Virginia Public Schools can be found online at [www.pen.k12.va.us/VDOE/Superintendent/Sols/home.shtml](http://www.pen.k12.va.us/VDOE/Superintendent/Sols/home.shtml).

### Washington, D.C.

**Biology:** Explain how a large diversity of species increases the chance that at least some living things will survive in the face of large or even catastrophic changes in the environment (2). (B.5)

**Biology:** Evolution and biodiversity are the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept, (7) Research and explain that Darwin argued that only biologically inherited characteristics could be passed to offspring, and that some of these characteristics would be different from the average and advantageous in surviving and reproducing (B.5)

#### Reading/English Language Arts:

Produce functional texts that

- address audience needs;
- state purpose and context; and
- adopt a customary format (Expository Writing, 9.W-E.2)

#### Reading/English Language Arts:

Write persuasive [pro/con] essays that

- include a well-defined thesis that sets forth a clear and knowledgeable position, theory or generalization;
- arrange details, reasons, and examples effectively, anticipating and answering reader concerns and counterarguments (Expository Writing, 8.W-E.5)

Learning Standards for DCPS are found online at [www.k12.dc.us/dcps/Standards/StandardsHome.htm](http://www.k12.dc.us/dcps/Standards/StandardsHome.htm).