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The Perfect Spill: Solutions for Averting the Next *Deepwater Horizon*

by Robert Costanza, David Batker, John W. Day, Jr., Rusty A. Feagin, M. Luisa Martinez, and Joe Roman

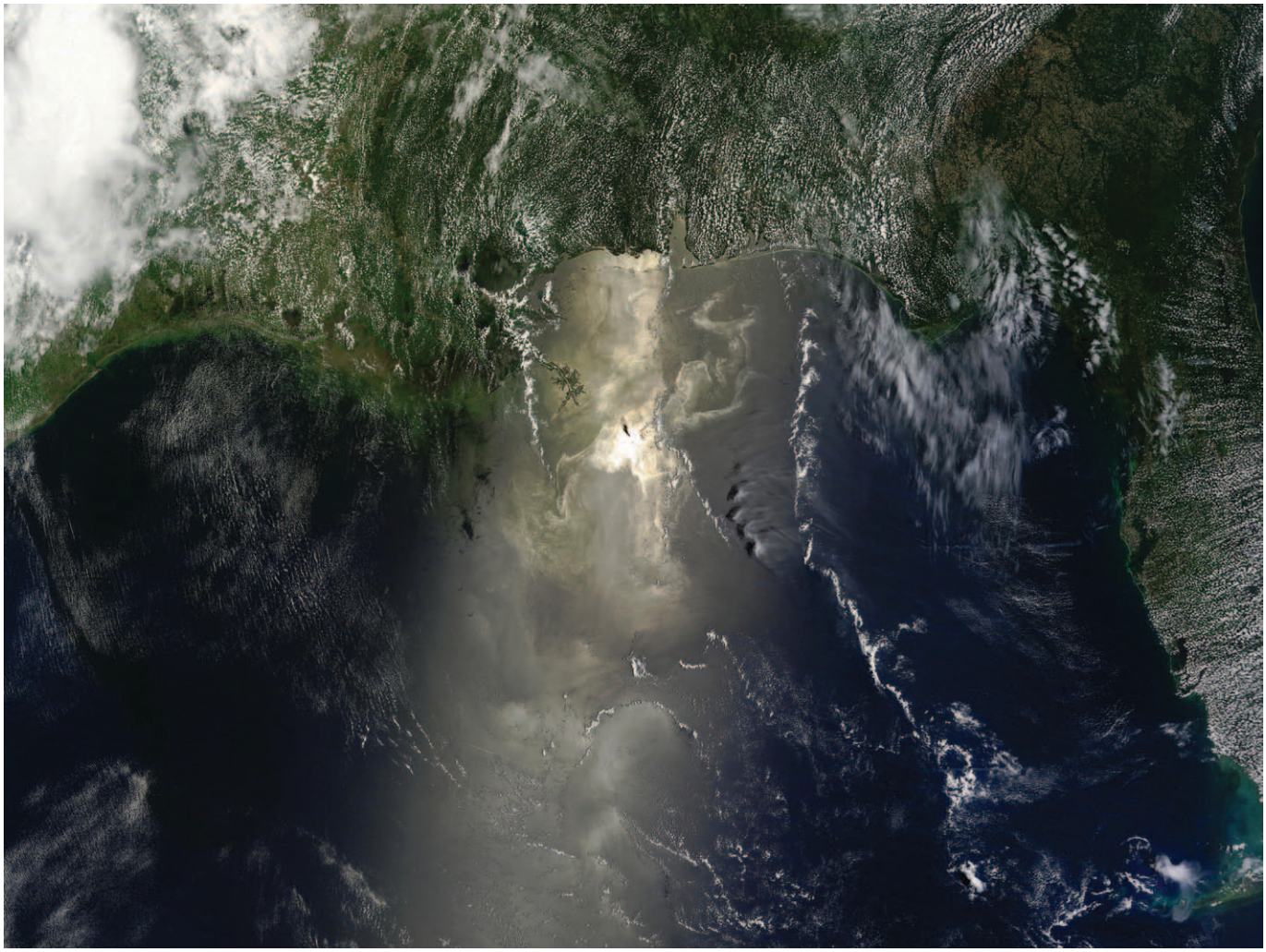
"If we refuse to take into account the full cost of our fossil fuel addiction—if we don't factor in the environmental costs and national security costs and true economic costs—we will have missed our best chance to seize a clean energy future."

—President Barack Obama, Carnegie Mellon University, June 2, 2010

The oil spill from the *Deepwater Horizon* has caused enormous economic and ecological damage. Estimates of its size and impact continue to escalate, but it is now the largest in U.S. history and clearly among the largest oil spills on record.[1]

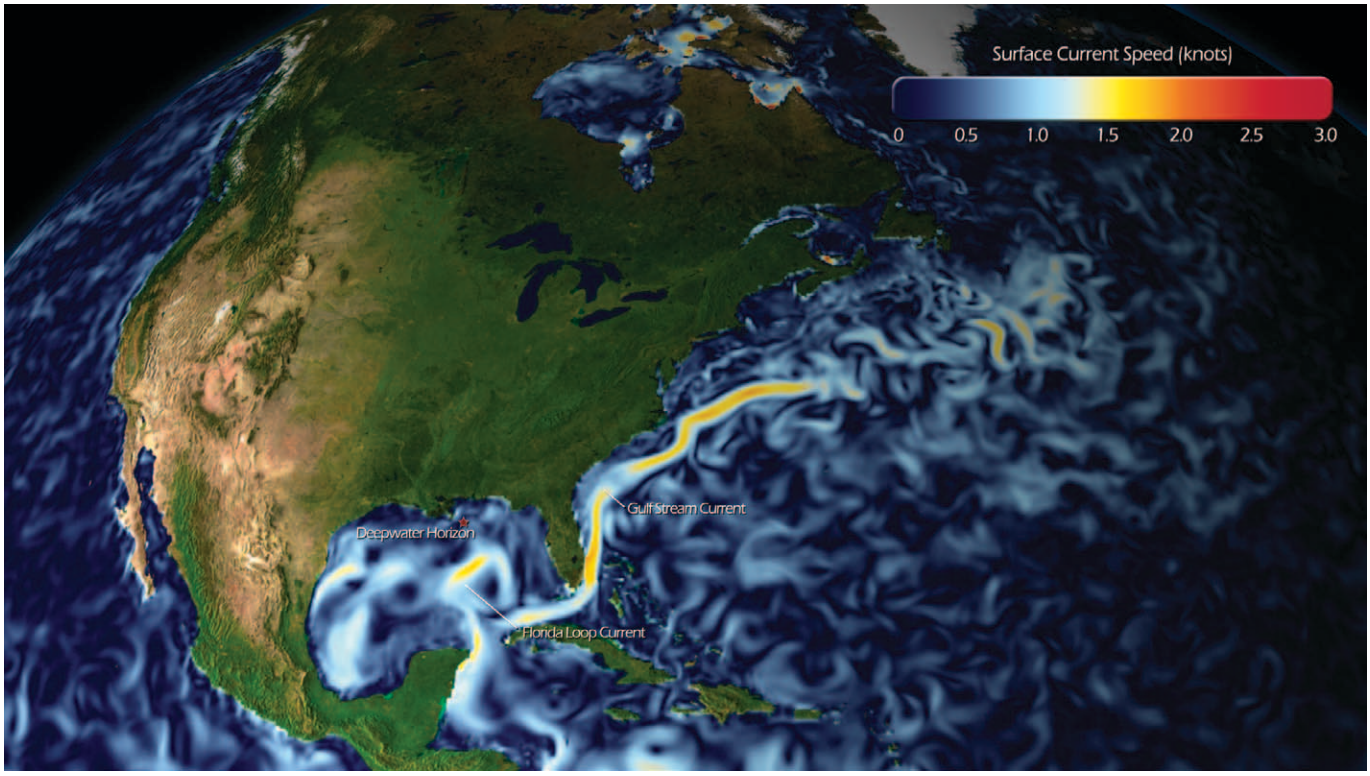
As efforts to clean up the damages and compensate injured parties continue, it is not too soon to begin to draw lessons from this disaster. We need to learn from this experience so we can prevent future oil spills, reevaluate society's current trajectory, and set a better course.

One major lesson is that our natural capital assets and other public goods are far too valuable to continue to put them at such high risk from private interests. We need better (not necessarily more) regulation and strong incentives to protect these assets against actions that put them at risk. While the Obama administration's requirement



NOAA

In this satellite image, oil in the Gulf of Mexico reflects sunlight back into space. (Some of the reflection could be caused by plankton blooms or other features.)



NOAA

Oil from the *Deepwater Horizon* accident has reached the Loop Current in the Gulf of Mexico, which goes through the Florida Straits before feeding into the Gulf Stream current.

that BP contribute to a trust fund to compensate injured parties is appropriate, it arrived only after the fact. Common asset trusts and new financial instruments like assurance bonds would be better able to shift risk incentives and prevent disasters like the *Deepwater Horizon*.

The Costs: Damages to Natural Capital Assets

The spill has directly and indirectly affected at least 20 categories of valuable ecosystem services in and around the Gulf of Mexico. The $2.5 billion per year Louisiana commercial fishery has been almost completely shut down. As the oil extends to popular Gulf Coast beaches, the loss of tourism revenue will also be enormous. In addition, the spill has damaged several important natural capital assets whose value in supporting human well-being is both huge and largely outside the market system. These non-marketed ecosystem services include climate regulation via the sequestration of carbon by coastal marshes and open water systems, hurricane protection by coastal wetlands,[2] and cultural, recreational, and aesthetic values. Since the time of the *Exxon Valdez* spill, we have developed better techniques to estimate the value of the damage to these public assets.

A recently released study estimated the total value of these ecosystem services for the Mississippi River Delta to be in the range of $12–47 billion per year.[3] Based on the flow of these services into the future, the value of the Delta as a natural asset was estimated to be in the range of $330 billion to $1.3 trillion, far more than the total market value of BP ($189 billion) before the spill. Unlike BP, ecosystem service values are outside the market. They continue to produce benefits unless an action like the spill damages them.

The value of the loss of these ecosystem services for the entire Gulf will always be difficult to estimate with any precision. In addition to the Mississippi Delta, the spill will also probably affect a large fraction of the Gulf's open water systems and the coasts of all of the states and nations bordering the Gulf: Florida, Alabama, Mississippi, Louisiana, Texas, and perhaps even Mexico and Cuba. Once the extent of the damages has been assessed, we will have a better idea of these costs. In the meantime, the best we can do is to try to put the expected magnitude of the damages in rough perspective.

If we assume that the Mississippi River Delta will be the most affected region and that there will be a 10 to 50 percent reduction in the ecosystem

services provided by the Delta, this amounts to a loss of $1.2–$23.5 billion per year into the indefinite future until ecological recovery, or $34–$670 billion in present value (at a 3.5 percent discount rate).

Dealing with Risk

Our current approach to dealing with the risk of private interests damaging public environmental assets is to assign liability to the private interests, but with the burden of proof on the public. The public must demonstrate damages after the fact, claim compensation, endure a lengthy judicial process, and finally hope to recover just reparations. In addition, the total liability is often limited. For example, in the U.S., the Oil Pollution Act of 1990 limits the liability for oil spills to $75 million,[4] and the Price-Anderson Act limits the liability for nuclear power plant accidents to $10 billion. The *Exxon Valdez* oil spill resulted in an estimated $3.4 billion in fines, compensation, and cleanup costs, and a court settlement of $2.5 billion in punitive damages that took decades of lawsuits after the incident and was ultimately reduced by the Supreme Court to $500 million in 2008.[5]

In many other parts of society, we require private interests to buy insurance to deal with the risks they impose on the public. For example, purchasing automobile insurance is now mandatory, and assurance bonds are often required from building contractors. Requiring assurance bonds or insurance forces private interests to internalize the risk of their activities before any damages occur. It gives them strong financial incentives to reduce risk, since it is their own money that they stand to lose.

The *Deepwater Horizon* incident, like the banking crisis, resulted from inadequate attention to the risks that the public was left to bear. Precautionary measures were known but not taken. Investments in safety devices (like the acoustic blowout preventer) were not made. Corners were cut. Short-term private profits motivated taking high risks with public assets.

The fundamental problem is that while private interests are ultimately liable for damages to public assets, they are only held accountable long after the fact and only partially. This gives private interests strong incentives to take large risks with public assets—far larger than they should from society's point of view.

If society does not change investment incentives, private interests will continue to devote vast sums of capital to pursue increasingly risky oil reserves (or financial products) that provide less net energy and maintain our oil addiction—an addiction which simply cannot be physically sustained.

The Solutions

The long-term solutions to these problems require fundamental changes to business-as-usual practices, including:

1. Assessment and incorporation of the full value of public natural capital assets into both corporate and public accounting and decision-making, as President Obama recommended.
2. Assessment of the risks and worst-case damages that could result from accidents, based on damages to this more broadly assessed value.
3. Application of the best science available about the complex linkages between human systems and the rest of nature.
4. Reversal of the burden of proof and requirement of corporations and other private interests to internalize and monetize their risks to public goods. One way to monetize these risks would be to require private interests to post an "assurance bond" large enough to cover the worst-case damages.[6-8] Portions of the bond (plus interest) would be returned if and when the private interests could demonstrate that the suspected worst-case damages had not occurred or would be less than was originally assessed. If damages did occur, portions of the bond would be used to rehabilitate or repair the environment and to compensate injured parties. The critical feature is that the risk to the public asset is apparent to the private interests in financial terms *before the fact*, not as a liability that may or may not be enforced after the damage occurs.
5. Finally, it is high time government policy realigned investment incentives for both public and private investment away from greater oil dependency and toward renewable domestic energy sources. Environmental bonding is a good start.

Imagine how this system might have worked had it been in place prior to the *Deepwater Horizon* incident. What actually occurred is pretty close to the "worst-case" scenario that might have been envisioned before the fact. Our best guess of the potential damages would thus be in the range of $34–$670 billion, as discussed above. Let's say that a scientific review panel, after assessing the risk in more detail, settled on an estimate of $50 billion. This immediately makes it very apparent to BP and others drilling in deep water in the Gulf of Mexico that they are engaged in a *very* risky business—several orders of magnitude riskier than the $50 million liability limit previously in force. The size of

this bond, for one deepwater well, would be close to one quarter of the total value of the company! What could they do? Either not drill at all or find ways to reduce the size of the risk and the bond. They might be able to do this very cost-effectively if they spent some money on risk-reduction procedures or technology, such as the acoustic blowout preventer costing a mere $500,000. These measures might convince the scientific review panel to change its assessment of the worst-case scenario and reduce the bond. There would be very strong economic incentives for BP to find creative ways to reduce the risks (just what we want them to do!) rather than ignoring the risks and cutting corners.

How could such a system be implemented? A public agency would need to be appointed as "trustee" for the natural capital assets at risk. This could be a branch of an existing government agency or it could be a new quasi-governmental organization or non-governmental organization set up as an independent "common asset trust." In any case, the mission of the agency would be explicitly to "protect the asset" rather than facilitating its exploitation, and it would have the authority to charge fees for damages to the asset and require posting bonds to cover potential damages.[9-11]

This change in approach to risk should be extended to several other private activities that put the public interest at risk. Nuclear power should be required to be fully insured. Repealing the Price-Anderson Act that currently limits liability and requiring bonds to adequately cover accidents and future waste disposal costs would accomplish this. It would reveal that nuclear power is extremely expensive. The banking crisis would never have occurred if the banks had been required to internalize their risks rather than literally "banking on them." We need to reassert the public-goods nature of money and put control of the money supply back in the hands of the government rather than the private banks, which currently create most of the money supply by issuing loans on fractional reserves.[12] Recapturing "seigniorage," the government's right to control the money supply, could enable a dramatic reduction in taxes.

The *Deepwater Horizon* incident offers a strong lesson in risk management. Our entire society is taking far too many risks with public assets whose real value we are only now beginning to recognize. By shifting the financial burden of those risks onto the private interests who benefit from them, we can establish the right incentives, shift investment to less risky, more productive pursuits, and create a more sustainable and desirable future.

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