

Chapter 15

Recovering from disaster: Holding industry accountable for restoration



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Keywords: Deepwater Horizon, environmental restoration, Gulf Environmental Benefit Fund, Gulf Renewal Project, National Wildlife Federation, Natural Resource Damage Assessment, Oil Pollution Act, RESTORE Act

15.1 INTRODUCTION

As the largest non-profit education and conservation organization in the United States, the mission of the National Wildlife Federation (NWF) is ‘uniting all Americans to ensure wildlife thrive in a rapidly changing world’. To do this, NWF educates and advocates for science-based policy to protect and restore wildlife populations and habitat. In the Gulf of Mexico region, NWF is engaged in several projects to restore the Mississippi River Delta, the Gulf, and the Everglades as well as Texas rivers and streams. That ongoing work took a dramatic turn in 2010 when the largest marine oil spill in history occurred in the Gulf of Mexico. Despite regulations requiring oil companies to operate safely with legal penalties for pollution, federal law and policy alone were ill equipped to mitigate a disaster of this magnitude.

As this chapter relates, in addition to its disastrous impact on the Gulf Coast ecosystem, the Deepwater Horizon oil spill also presented a challenge to national environmental protection and habitat preservation organizations and partners in the Gulf region. Their collective task was to make sure that the federal government vigorously enforced all regulations and applied all available remedies towards significant, permanent restoration of damaged ecosystems. NWF met this crisis with a combination of political advocacy and scientific fieldwork to ensure that those responsible would pay to mitigate the damage, and that funds collected would be allocated where they would do the most good.

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DOI: 10.2166/9781789060676_0165

15.2 SETTING THE STAGE: DEEPWATER HORIZON DISASTER AND ITS ENVIRONMENTAL IMPACTS

On April 20, 2010, an explosion occurred during the drilling of an exploratory oil well 41 miles off the coast of Louisiana. The explosion of the Deepwater Horizon tragically killed 11 people and started spilling oil into the Gulf of Mexico until it was finally capped on July 15, 2010. During those 87 days, an estimated 130 million gallons of oil spilled into the Gulf of Mexico, making the Deepwater Horizon disaster the largest oil spill in recent United States history.

It took years to assess the full environmental impact of the spill and those impacts continue to this day. Because of the biological interconnectedness of the marine ecosystems, the spill impacted the entire food chain throughout the Gulf (Figure 15.1). Five years after the spill, National Wildlife Federation released a report (NWF, 2015) documenting the extent of impacts:

- In 2014, dolphins on the Louisiana coast were found dead in numbers four times greater than historic rates, and there is increasing evidence that these ongoing dolphin deaths are connected to the 2010 oil disaster.
- Between 27,000 and 65,000 Kemp's ridley sea turtles are estimated to have died in 2010, and the annual numbers of Kemp's ridley nests have declined in the years since the spill.
- Twelve percent of the brown pelicans and 32 percent of the laughing gulls in the northern Gulf are estimated to have died as a result of the BP oil spill.
- Oil and dispersant compounds have been found in the eggs of white pelicans nesting in three states – Minnesota, Iowa, and Illinois.
- Exposure to oil has been shown to cause abnormal development in many species of fish, including mahi-mahi, Gulf killifish, and bluefin and yellowfin tuna.
- Spotted seatrout, also known as speckled trout, spawned less frequently in 2011 in both Louisiana and Mississippi than in previous years.



Figure 15.1 Oil from the Deepwater Horizon disaster seeps past barriers into vulnerable coastal Louisiana marshes. (Credit: National Wildlife Federation, Amanda Moore)

- Both 2010 and 2011 had the lowest numbers of juvenile red snapper seen in the eastern Gulf fishery since 1994.
- Coral colonies in five separate locations in the Gulf – three in the deep sea and two in shallower waters – are showing significant oil damage.
- Sperm whales are spending less time foraging in the area around the wellhead.
- Oil has been found in sediments deep in the Gulf of Mexico, in a 1,200-square-mile area surrounding the wellhead.

April 2020 will mark the 10-year Anniversary of the disaster. As detailed in the NWF follow-up report, ‘*10 Species, 10 Years Later: A Look at Gulf Restoration after the Deepwater Horizon Disaster*’ and other studies the oil and its impacts are still being felt throughout the Louisiana marsh and Gulf ecosystem (Fleeger *et al.*, 2018; NWF, 2020). To mitigate those impacts, a massive restoration effort throughout the region is now underway, funded by money from Deepwater Horizon owner BP (formerly British Petroleum) and other parties responsible for the oil spill. But while the money was obtained through enforcement actions related to existing regulations (and associated settlement agreements), fines and penalties alone could not help restore the Gulf coastal environment. What was needed was a plan sweeping enough to mitigate the damage caused by the spill with adequate funding to put it into motion. Thanks to the efforts of its Congressional champions and the broader environmental community (including NWF), just such a plan was supported by ground-breaking legislation, which, was signed into law in 2012.

15.3 FROM REPORTING TO RESTORATION: THE ROLE OF NWF IN DEEPWATER HORIZON RECOVERY

Regulation and enforcement have long been recognized as an integral part of environmental management, especially with respect to industrial water pollution. Hauling companies into court for violating environmental laws, however, will not in itself undo the harm caused by those violations, or even prevent further misconduct in many cases. What is needed is a process that fully accounts for the extent of the environmental damage, assesses proportional penalties, and ensures that the money collected is invested in long-term habitat enhancement. This is illustrated in the response of NWF and other non-governmental organizations (NGOs) in the aftermath of the Deepwater Horizon disaster. The immediate post-spill response followed by the careful creation and implementation of what came to be called the RESTORE Act and the restoration funds provides a lesson in the role played by environmental advocates in holding industry accountable. In the case of the Deepwater Horizon disaster, NWF responded in three phases: emergency assessment, policy advocacy, and penalty allocation.

15.3.1 Environmental response

As oil continued to spill into the Gulf, NWF worked to focus the national spotlight on the on-going devastation. Dozens of NWF staffers travelled to the state during the summer of 2010, taking up residence in Venice, Louisiana, where the press was documenting the ongoing disaster. Local charter boat captains – sitting idle as vacationers cancelled trips and emergency work cut them off from traditional fishing spots – were hired by NWF to take journalists and scientists to areas feeling the worst impacts of the spill. As a result, the press was able to see the damage ‘up close and personal’, preventing those responsible for the disaster from sweeping it ‘under the rug’ (Figure 15.2).



Figure 15.2 NWF staff taking press out to document oil spill impacts. (Credit: National Wildlife Federation, Amanda Moore)

In addition to these on-the-ground efforts, NWF worked with national, state, and local NGOs to press for congressional and agency-level oversight. Most important, the NGOs combined to pressure Congress to ensure that any penalties collected from responsible companies would be used to mitigate the disaster. NWF was in a unique position to mobilize these efforts as it had been working with several other NGOs to address land loss in the Mississippi River Delta (RMRD, 2020). Supported by the Walton Family Foundation, the coalition included NWF, Environmental Defense Fund, Audubon, Coalition to Restore Coastal Louisiana, and the Lake Pontchartrain Basin Foundation. These organizations brought federal and state policy, advocacy, scientific, and outreach expertise to restore the Delta. As the damage continued throughout the summer, the Delta coalition joined forces with other NGOs working throughout the Gulf to support a congressional proposal to direct the money that the corporate responsible parties paid would be directed to restoration, instead of the general treasury funds.

15.3.2 Policy response

Twenty years before Deepwater Horizon, the largest release of crude oil into US waters occurred when the ship *Exxon Valdez* ran aground in Prince William Sound, Alaska, on March 24, 1989. The volume of oil spilled into the Sound – nearly 11 million gallons – was a drop in the bucket compared to the gusher in the Gulf, but in terms of political response, the contrast between the two disasters was striking. Spurred by the *Exxon Valdez* debacle, the US Congress responded with landmark legislation, drafting and passing the Oil Pollution Act (OPA) in less than 18 months. Among other provisions, that transformative law set up the Natural Resource Damage Assessment (NRDA), a mechanism that evaluates and restores wildlife, habitats, and human resources impacted by oil spills and other human-made disasters.

Like most environmental law, OPA was criticized by advocates on both sides as being either too harsh or too lenient. Nevertheless it passed the Senate unanimously and was approved by the House the next day by a bipartisan vote of 360-0, with 70 Democratic and Republican members from energy-producing states abstaining, before being signed into law by Republican President George H. W. Bush. It is worth

noting that even some representatives from energy-producing Gulf States were moved to vote for the bill (e.g. Texas, Louisiana), while not a single member of either chamber was willing to go on record against it.

Twenty years later, following a spill more than ten times larger, it was a different story. Despite the reform recommendations of a bipartisan blue ribbon Oil Spill Commission appointed by President Barack Obama, Congress passed no new law. A reform bill passed in the waning days of the 111th Congress by the Democratic-controlled House with virtually no Republican support died in the Senate just before the historic midterm elections of 2010 (Howell, 2011). With that election, the balance of power in Congress shifted dramatically and became far more partisan on the issue of regulating industry. What had been a matter of division within parties, had become division between parties.

Some policy changes followed the Deepwater Horizon disaster, however. President Obama implemented most of the reforms that did not require Congressional action that were recommended by the bipartisan Oil Spill Commission. Co-chaired by former US Environmental Protection Agency (EPA) Administrator William Reilly (a Republican) and former Florida governor and senator Bob Graham, (a Democrat), the Commission issued broad recommendations for reform of Outer Continental Shelf practices. These included a complete re-organization of the agency within the Department of Interior that managed and regulated oil drilling in offshore waters (National Commission, 2011) including the formation of a new the Bureau of Ocean Energy Management (BOEM) (BOEM, 2020).

Under President Obama, the new BOEM issued a series of new regulations over the objections of many in industry and their supporters in Congress. Most germane to the Deepwater Horizon disaster were new rules to increase the safety and reliability of blow-out preventers, since a failed blow-out preventer was the last line of defense in the cascading series of failures that preceded the disaster. Industry particularly chafed at these stringent new blowout preventer rules which they claimed were expensive and unnecessary, arguing that – notwithstanding the evidence of Deepwater – the industry could be relied upon to police itself. A majority in Congress apparently agreed with industry and refused to ratify any of the Obama reforms (OSCA, 2013). Moreover, the new Republican majority attempted to move legislation intended to expand opportunities for offshore energy development, causing a stalemate between Congress and the President until the end of the Obama Administration.

After the inauguration of Donald Trump in January 2017, BOEM's leadership shifted in a decidedly pro-industry direction, and began dismantling some of the key reforms it had just implemented. Symbolically, on May 2, 2019, the Bureau of Safety and Environmental Enforcement finalized 'improved' blowout preventer and well control regulations that relaxed many of the post-Deepwater Horizon reforms (US DOI, 2019).

15.4 DEEPWATER HORIZON PENALTY RESPONSE

15.4.1 Overview of penalties for environmental disasters

From the outset, NWF was clear about its priorities with respect to the economic impact of the disaster (NWF, 2015):

- The Department of Justice must hold the parties responsible for the Deepwater Horizon spill fully accountable for their violation of federal environmental laws, including the Clean Water Act and the Oil Pollution Act.
- Federal, state, and local officials must direct the fines and penalties paid by the parties responsible for the Deepwater Horizon oil spill to ecological restoration efforts that will make the Gulf healthier and more resilient for people and wildlife.

- Any settlement of claims must include a reopener clause to hold the responsible parties accountable for damages that may be identified in the future.

Following the Deepwater disaster, NWF and its NGO partners were primarily concerned with the magnitude of the penalties assessed and the amount of funds that would ultimately become available for environmental restoration. At the time of the explosion, existing US law provided several different forms of liability for oil spills. Two of the main laws are the Clean Water Act (CWA), the landmark water pollution legislation passed after the first Earth Day, and the above-mentioned Oil Pollution Act (OPA), which followed the Exxon Valdez spill into Prince William Sound. The CWA prohibits releasing oil and hazardous materials into the waters of the United States and doing so can result in both civil and criminal penalties (US Code, 1972). Under OPA, ‘responsible parties’ are liable for the costs of clean up and damages, including for damages to natural resources (US Code, 1990a). All these fines, penalties, and costs are managed under separate rules, by different entities, and are held in separate accounts.

There were good reasons to be concerned. Both civil and criminal penalties under the CWA would be enforced by the federal EPA and assessed by the courts, based in part on the extent to which EPA could prove that the spill resulted from gross negligence or wilful misconduct. Civil penalties assessed under OPA, on the other hand, would be focused on remedying the damages from the oil spill. OPA’s NRDA process requires federal and state trustees to carry out the assessment of damages and create a plan to restore the affected resources (US Code, 1990b). In this case, the Trustee Council included the federal Department of Commerce, Department of Interior, EPA, Department of Agriculture, and representatives from the state of Alabama, Florida, Louisiana, Mississippi, and Texas.

15.4.2 RESTORE Gulf Coast Restoration Trust Fund for civil penalties

While the natural disaster was still unfolding in the Gulf, advocates met with members of Congress to discuss an ambitious plan for long-term restoration funding, over and above what might be assessed through CWA fines and OPA restoration costs. Congressional champions and NGO advocates realized that a change in the law could direct the CWA civil penalties to restoration instead of the general treasury. Gulf ecosystem needs went well beyond the direct damages from the spill, and billions of dollars were at stake. On July 11, 2011, Senators Mary Landrieu (D-LA) and Richard Shelby (R-AL) introduced the RESTORE Act, which dedicated 80% of the penalties to a newly created Gulf Coast Restoration Trust Fund and 20% to the Oil Spill Liability Trust Fund. It also created a process for spending the money that would help ensure the bulk of the money would be dedicated to environmental restoration.

To get the bill passed, NWF and its NGO partners formed a collaboration that came to be informally named the Gulf Renewal Project (GRP). Funding for this effort came from the Walton Family Foundation (WFF) as well as individual donations to organizations helping wildlife recover from the spill. In addition to NWF, the Gulf Renewal Project included the Environmental Defense Fund and Audubon (our national partners in Louisiana) along with The Nature Conservancy and The Ocean Conservancy. The GRP, focused nationally working with WFF-funded OxFam America, also coordinated efforts with WFF supported NWF instate affiliates including the Florida Wildlife Federation, Mississippi Wildlife Federation, and Louisiana Wildlife Federation; Audubon chapters and state offices, as well as environmental and community NGOs in each of the five Gulf states that joined in the effort. President Barack Obama signed the RESTORE Act on July 6, 2012 as an amendment to a broader transportation bill (a generally popular and bipartisan piece of legislation which satisfied a broad array of interests).

15.4.3 NFWF Gulf Environmental Benefit Fund for criminal penalties

The RESTORE Act was drafted to direct the disposition of the civil penalties under CWA. While it worked its way through Congress, the Department of Justice (DOJ) negotiated plea agreements under the criminal provisions of the CWA with BP and Transocean, which, in addition to facing civil penalties, had been charged with crimes. On November 15, 2012, DOJ and BP announced a settlement that would direct \$2.394 billion, to be paid over five years, to a public-private intermediary, the National Fish and Wildlife Foundation (NFWF). On January 4, 2013, DOJ negotiated a similar agreement with Transocean for \$150 million to be paid over a two-year period.

NFWF, chartered by Congress in 1984, had played this role before, serving as a conduit for funnelling settlement dollars from environmental legal settlements to targeted restoration projects through Impact-Directed Environmental Accounts. At \$2.544 billion, this would be, by far, the largest such Account in history. To manage a program of this size, NFWF created the Gulf Environment Benefit Fund (NFWF, 2020). The plea agreement language laid out some specifics for how the money was to be used by state and project type, but NFWF, working with each of the Gulf States has broad latitude in project selection.

15.4.4 Keeping the big picture in focus

With the passage of the RESTORE Act, the pieces were in place to begin the largest restoration undertaking in US history. However, while it was clear that unprecedented funding would eventually be available, no one knew what the final total would be. The court cases for civil charges under CWA and NRDA damages under OPA were still being litigated in the Federal District Court in New Orleans. Restoration work had already begun, however, since BP had agreed to make a \$1 billion ‘down payment’ on its NRDA responsibilities, and NFWF had begun to select projects to fund with criminal penalties paid into the Gulf Environment Benefit Fund. The process of choosing and constructing restoration projects made headway, even as the trial of BP and the other defendants continued.

NFWF and its Gulf Renewal Project work centered on two main efforts: (1) mobilizing public support to see that any trial verdict or settlement would provide meaningful funding; and (2) advocating for a science-based analysis of the problem, a coordinated response by the parties responsible for distributing the funds, and investment in projects of significant scale. This second effort was complicated by the fact that restoring the Gulf’s already stressed ecosystems to ‘pre-spill’ health was not enough. Restoring a seabird nesting beach on an island that could disappear in 20 years would be a waste of money. Aside from this, over the past several decades, the rivers that nourish the Gulf of Mexico have been blocked behind dams, forced into artificial channels, polluted by urban and agricultural uses, and diverted for use in distant cities. Successful restoration projects would need to overcome past degradation and survive climate change; they would need to be largescale and comprehensive, based on cutting-edge scientific analysis (NFWF, 2014).

Fortunately, even before the Deepwater disaster, NFWF and its Gulf Renewal Project partners had been working with the State of Louisiana’s Coastal Protection and Restoration Authority to develop what by 2012 had become Louisiana’s Coastal Master Plan, ‘Comprehensive Master Plan for a Sustainable Coast’ (LCPRA, 2017). Born from the earlier tragedies of 2005’s hurricanes Katrina and Rita which devastated much of the Gulf Coast from northwest Florida to southeast Texas, the Coastal Master Plan utilized science, engineering, socio-economic analysis, and modelling of present and possible future conditions to select the most robust set of projects that could be sustained over the coming decades, even against future climate and sea level predictions. The Coastal Master Plan process thereby served as a model to help guide project selection with Deepwater Horizon generated funds.



Figure 15.3 At the one year anniversary of Deepwater Horizon, NWF staff and volunteers planting grasses in marshes impacted by the oil spill. (Credit: National Wildlife Federation, Amanda Moore)

As a case in point, prior to the Coastal Master Plan, state and federal agencies had spent tens of millions on coastal restoration projects designed to address specific individual problems. It had become apparent, however, that while these projects might be addressing symptoms, they were not addressing the underlying disease (National Research Council, 2006). The Gulf Renewal Project did not want to see potentially transformational funding atomized by individual state and federal agency priorities instead of being effectively applied in a coordinated effort to address big picture challenges. To prevent that, they mounted a grassroots effort to pressure decision-makers through public comments at meetings, letter writing, media stories and interviews, social media, and outreach coordination with everyone from neighborhood organizations and church groups to local elected officials (Figure 15.3). It also meant building scientific, policy, outreach, and communications capability within our organizations in order to make a credible case for our recommended priorities and policies. It meant forging relationships with political leaders and their staffs in the Gulf States and in Washington DC; with agency heads and with agency staff in DC and in five state capitals; and with opinion leaders among scientists, in the news media and in the business community.

15.4.5 Putting the money to work

On April 4, 2016, Federal District Judge Carl Barbier approved the settlement of outstanding civil charges against BP and the other responsible parties under the terms of the CWA and OPA. The settlement required BP to pay in excess of \$13 billion in civil penalties, over and above the \$5 billion in criminal fines it was responsible for. (Transocean, the owner of the drill rig, had settled its civil CWA and OPA claims for \$1.4 billion in January 2013.) The BP settlement included \$5.5 billion in funding from CWA civil penalties to be distributed under the RESTORE Act and up to \$8.8 billion for restoration to address natural resource injuries. The CWA civil settlement of \$5.5 billion, included \$4.4 billion available for restoration (with other eligible uses in some cases). That money was divided as shown in Table 15.1.

The bulk of the restoration funding, however, came from the NRDA settlement of \$8.8 billion, including \$7.1 billion in new restoration funding, the \$1 billion ‘down payment’ BP made towards the NRDA prior to

Table 15.1 Distribution of RESTORE portion of Clean Water Act penalties (\$4.4 billion).

\$B (%)	Distribution	Beneficiaries	Notes
\$1.54 (35%)	Gulf States	5 Gulf States	TX, LA, MS, AL, FL (@7%)
\$1.32 (30%)	RESTORE Council	Restoration	Funding for comprehensive restoration
\$1.32 (30%)	RESTORE Council	Spill Impact	Distributed to states based on impacts (by formula)
\$0.11 (2.5%)	Centers of Excellence	5 Gulf States	Research centers for environmental, health, economic, and energy issues in each Gulf state
\$0.11 (2.5%)	NOAA Science Program	NOAA	Publicly accessible Gulf-wide environmental data management system

judgement, and an additional \$700 million for NRDA damages undetected at the time of the agreement and for adaptive management. Importantly, the settlement allowed for a payout schedule over 15-plus years, which began in April 2017 and will continue until at least 2032. At the same time, BP's criminal penalty payments to Gulf Environmental Benefits Fund stretched from 2013 to 2018. Unlike other restoration projects with long time horizons which depended on uncertain annual federal and state appropriations (e.g., Great Lakes, Chesapeake Bay, the Everglades), these court-ordered payments were secured over 20 years. As a result, trustees could ensure that NGOs would continue to work on gulf restoration for the duration of the 15-year payment schedule.

15.5 CONCLUSION

The Deepwater Horizon disaster polluted miles of sensitive ecosystems with 130 million gallons of crude oil, for which the companies responsible forfeited nearly \$15 billion in civil fines, criminal penalties, and legal settlements. To the extent that these funds are now available to produce significant, long-term improvements in Gulf Coast habitat, the National Wildlife Federation and its partner NGOs can take some measure of satisfaction. To achieve the settlement, NWF and its partners took a variety of actions, including:

- Ensuring that the media covered the ongoing disaster and its impacts on wildlife and the community;
- Launching an advocacy and media campaign to ensure that the Agencies and Courts assessed penalties to cover restoration costs as well as deter future violations;
- Working closely with congressional and state elected officials to direct the penalties to restoration efforts instead of the general treasury.

There is a long road ahead, but given the scale of the project, the investment in time, money and energy will be well worth it. At this point, our remaining task is to guard against allowing states and federal agencies, in pursuit of their worthy but parochial interests, to lose sight of the need and opportunity for truly comprehensive and lasting restoration in the Gulf of Mexico.

REFERENCES

BOEM (Bureau of Ocean Energy Management) (2020). The Reorganization of the Former MMS. Website <https://www.boem.gov/about-boem/reorganization/reorganization-former-mms> (accessed 4 June 2020).

- Fleeger J., Riggio M., Mendelssohn I., Lin Q., Deis D., Johnson D., Carman K., Graham S., Zengel S. and Hou A. (2018). What promotes the recovery of salt marsh infauna after oil spills? *Estuaries and Coasts*. doi: [10.1007/s12237-018-0443-2](https://doi.org/10.1007/s12237-018-0443-2) cited in Malmquist, D. (2019) Study shows continuing impacts of Deepwater Horizon oil spill. Phys.Org, <https://phys.org/news/2019-04-impacts-deepwater-horizon-oil.html> (accessed 5 May 2020).
- Howell K. (2011). A Year After BP's Oil Spill, Congress Sits Idly By. Greenwire in *New York Times*, 4/15/11 <https://archive.nytimes.com/www.nytimes.com/gwire/2011/04/15/15greenwire-a-year-after-bps-oil-spill-congress-sits-idly-29261.html?emc=rss&partner=rss> (accessed 5 April 2020).
- Louisiana Coastal Protection and Restoration Authority (2017). Committed to Our Coast: Louisiana's Comprehensive Master Plan for a Sustainable Coast. <http://coastal.la.gov/our-plan/2017-coastal-master-plan> (accessed 6 April 2020).
- National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling (2011) Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling. Report to the President, January, 2011. <https://www.govinfo.gov/content/pkg/GPO-OILCOMMISSION/pdf/GPO-OILCOMMISSION.pdf> (accessed 5 April 2020).
- National Fish and Wildlife Foundation (2020). Gulf Environmental Benefit Fund (GEBF). <https://www.nfwf.org/gulf/Pages/home.aspx> (accessed 6 April 2020).
- National Research Council (2006) Drawing Louisiana's New Map: A Review of Restoration Plans in Coastal Louisiana. <https://www.nap.edu/download/11476> (accessed 6 April 2020).
- NWF (National Wildlife Federation) (2014) Restoring the Gulf of Mexico for People and Wildlife: Recommended Projects and Priorities.
- NWF (National Wildlife Federation) (2015) Five Years and Counting: Gulf Wildlife in the Aftermath of the Deepwater Horizon. National Wildlife Federation. p. 3. https://www.nwf.org/~media/PDFs/water/2015/Gulf-Wildlife-In-the-Aftermath-of-the-Deepwater-Horizon-Disaster_Five-Years-and-Counting.pdf (accessed 6 April 2020).
- NWF (National Wildlife Federation) (2020) 10 Species, 10 Years Later: A Look at Gulf Restoration after the Deepwater Horizon Disaster. https://restorethegulf.nwf.org/wp-content/uploads/2020/04/nwf_gulfreport2020_web.pdf (accessed 8 April 2020).
- OSCA (Oil Spill Commission Action) (2013). Three years after BP spill, report card notes improvements, but more to do. <http://oscaction.org/press-release-osca-assessment-april-2013> (accessed 6 April 2020).
- Restore the Mississippi River Delta (2020) Land Loss. <http://mississippiriverdelta.org/our-coastal-crisis/land-loss/> (accessed 5 April 2020).
- US Code (1972) Federal Water Pollution Control Act 33 U.S.C. §1251 et seq. Accessed via EPA Website Summary of Clean Water Act. <https://www.epa.gov/laws-regulations/summary-clean-water-act> (accessed 6 April 2020).
- US Code (1990a) Federal Oil Pollution Act 33 U.S.C 2702(a). Accessed via EPA Website 'Summary of Oil Pollution Act'. <https://www.epa.gov/laws-regulations/summary-oil-pollution-act> and Legal Information Institute <https://www.law.cornell.edu/uscode/text/33/2701>
- US Code (1990b) Federal Oil Pollution Act 33 U.S.C 2706(b). Accessed via EPA Website 'Summary of Oil Pollution Act'. <https://www.epa.gov/laws-regulations/summary-oil-pollution-act> and Legal Information Institute <https://www.law.cornell.edu/uscode/text/33/2701>
- US Department of Interior (2019) BSEE Finalizes Improved Blowout Preventer and Well Control Regulations. 5/2/19 <https://www.doi.gov/pressreleases/bsee-finalizes-improved-blowout-preventer-and-well-control-regulations> (accessed 6 April 2020).

Part 2

Incentives and Barriers



The chapters in *Incentives and Barriers* reflect insights on the incentives, supports, barriers, disincentives, and penalties that currently shape water use. The authors also provide recommendations on how individuals and organizations can work together to design and implement incentives and disincentives that will effectively modify the way that water is used by industry.

While some companies have implemented strategies to reduce their long-term exposure to water-related risk, their success should not obscure the difficult path confronting companies still struggling to adopt sustainable water use practices. Early adopters often have sufficient resources to invest in process change, and strong motivation to protect their corporate brand, reducing their 'reputational risk'. Later adopters, on the other hand, are often challenged to take on technical tasks like re-engineering their core processes, and non-technical tasks requiring increased collaboration with suppliers, policy-makers, regulators, water utilities, environmental associations, and others. Their progress, however slow, contrasts markedly with companies unaware of the need to use water more sustainably as well as those content to use and dispose of water as cheaply as possible, regardless of the social or environmental costs.

This section examines the motivations that drive industries towards sustainable water use, and the incentives, penalties, and obstacles that can accelerate or impede their progress.

16. **Davis** *Sustainable water use by industry: What can we do?*

Taking the broadest view, **Davis** suggests that addressing sustainable use of water by industry requires not only an understanding of technical problems but also an understanding of human motivation, and the factors likely to change behavior. She notes that, even as individuals, we don't reliably act in our own best interests, observing that 'we all arrive in the world as narcissists', inclined to choose short-term pleasure over long-term gain and put ourselves ahead of others. She points out a connection between these tendencies and unsustainable use of water that damages communities and the environment. She also suggests that in designing incentives and penalties to influence industrial water use, we should consider how different types of

companies might respond to different strategies. She describes four categories of companies – Early Adopters, Potential Adopters, Profiteers, and the Resource Limited – and suggests incentives and disincentives that may be most effective in changing the behavior of companies in different groups. Drawing on results from the survey circulated among the authors who contributed to this volume, Davis also provides a list of distinct actions that can be taken to promote sustainable water use by individuals regardless of the sector where they work or volunteer their time. This includes our options as consumers who can change our buying behavior—a change that ‘requires no legislation or advanced technology’. Davis also calls for more effective communication on the part of sustainability advocates, which could combine language and symbols that have emotional appeal with sophisticated new communication tools, and discusses possible long-term implications of the coronavirus pandemic on global water issues.

17. **Chesnutt** *The economics of sustainable industrial water use, reuse, and the value of water*

Chesnutt focuses on the economic dimension of human relations – specifically, how the value of water is expressed to industry economically, and how that impacts the decisions businesses make about water use. Industrial water is different from most other goods, he claims, in that it is most often sold by a public monopoly at a price based not on market value of water but on the cost of transporting it to the customer. This sends the wrong signal to industries, as these artificially low prices discourage conservation and mask the true cost of adequately maintaining water systems. The gap between value and price is further widened when utilities base their water rates on their historical costs which don’t take into account either today’s demands or tomorrow’s challenges. Chesnutt warns, ‘There are dangers to driving through life while staring in the rearview mirror’, and he encourages that utilities use instead forward-looking cost accounting methods. Two strategies he recommends to help companies appreciate the value of water conservation and reuse are: (1) calculating the value of avoiding future water shortages; and (2) considering the social and environmental benefits of reuse in terms of increased market share. This latter benefit is the result of preferences expressed by customers for sustainably produced goods, and he notes that the growing desire on the part of retail customers to ‘buy green’ has inspired some companies to use water more sustainably in order to ensure their future profitability. At the same time, awareness of water risks has even encouraged some companies to invest in recycled wastewater to become independent of their local utility, an economic response Chesnutt describes as ‘system bypass’.

18. **Maennicke and Hoenerhoff** *Development finance: Encouraging sustainable water use by industry*

Where wholesale industrial customers make decisions based on price alone, or when a company can’t afford to invest in water improvements, financial institutions can play a key role in incentivizing sustainable water use. This is especially true for small- to medium-sized enterprises (SMEs) in developing countries. These enterprises may have a hard time accessing capital to invest in sustainable practices. In these cases, development finance serves as a catalyst to attract and mobilize other sources of private capital. According to **Maennicke and Hoenerhoff**, Development Finance Institutions (DFIs) such as the German Development Finance Institution DEG can lower the burden and risk associated with businesses and attract private investors. DEG provides tailored solutions to private enterprises operating in developing countries with emerging markets, including long-term financing, promotional programs, and individual advice. One special focus is SMEs, which they support with loans as well as with training in technical and business practices like due diligence assessment. As a further incentive, DEG helps introduce qualifying companies to European markets. For example, companies like EDEKA (Germany’s largest supermarket chain)

require suppliers to certify their sustainable water practices especially in areas designated as ‘high risk’ by the Water Risk Filter Assessment. By financing water management investments through DEG, companies can gain the expertise to certify their sustainable practices and sell products globally.

19. **Crespi Reghizzi** *Reducing pollution from industrial wastewater in developing and emerging countries*

Investment banks can also help by encouraging governments in the countries where they operate to improve water management. The World Water Assessment program estimates that 70% of industrial wastewater is discharged without treatment. According to Crespi Reghizzi, companies pollute because the market allows them to exclude the cost of their impact on the environment from the prices they charge consumers. These externalities can only be addressed by regulation, by creation of economic incentives, or by setting up a system where pollution is recognized as an impairment of property rights. Within France, levies and incentives promote sustainable water management at the river basin scale. This success has encouraged the French Development Agency (AFD) to provide financing for both public and private projects in developing and emerging countries that contribute to achievement of UN Sustainable Development Goals (SDG). Since reducing industrial water pollution furthers UN SDGs related to water, infrastructure, biodiversity, and others, AFD funds upgrades to industrial facilities so that they use fewer chemicals and less water. AFD also invests in appropriate municipal wastewater treatment technologies; for decades, AFD has financed municipal water and wastewater plant upgrades in Morocco. Today AFD also works directly with industries to reduce water consumption and improve treatment prior to discharge. In Senegal, where 80% of industry is located near Dakar and discharges waste into polluted Hann Bay, AFD is funding municipal wastewater treatment plant upgrades and working with the government to set up a structure to bill industry for water and sanitation services and implement a sustainable policy.

20. **Vicencio** *The banking sector as an intermediary in supporting sustainable use of water by industry*

Briefly stated, the banking industry can play a key role in supporting sustainable industrial water use, especially in developing countries. As **Vicencio** explains, banks have extensive knowledge about the behavior of different industries, markets, and business models that they can share with motivated companies. They can do this by providing technical, financial and legal expertise; validation and certification; connections to markets; and favorable terms for investment in sustainable practices. In Ecuador, Podubanco (a subsidiary of Promerica Financial Corporation) has established a successful ‘Green Lines’ program to connect businesses to legal, academic, and other resources to enhance their sustainability. The program helped on one milk processing facility in the Ecuadorian Highlands to reduce water consumption by over 33% through replacement of machinery and automation of a clean-in-place (CIP) process. In another example, Produbanco’s investment allowed an Ecuadorian rose grower to install drip irrigation and other improvements that reduced water use by more than 70%, increasing the company’s profits as well.

21. **Mariluz and Antunez de Mayolo** *The Certificado Azul: Peru’s innovation for encouraging sustainable use of water by industry*

National governments can also implement programs to encourage more sustainable use of water by industry. As explained by **Mariluz and Antunez de Mayolo**, the Peruvian government knows the country is particularly susceptible to the impact of climate change as much of its water supply comes from shrinking glaciers. To stimulate companies to reduce their water use, the National

Water Authority of Peru has implemented the Certificado Azul Program, which supports watershed-level analysis of water use and recognizes documented achievements by companies that implement more sustainable practices. In order to qualify for recognition, companies are required to calculate their water footprint using an approved measurement tool (the Alliance for Water Stewardship, the Water Footprint, or ISO14106) and develop a plan to address water use within at least one of its facilities. Companies must also submit a plan to contribute to improved watershed management in the watershed where the facility is located. As an example, the company may make an audited investment that will reduce water loss in a channel that brings water to farmers who grow produce that is part of the company's supply chain. Although, recognition as a 'Certificado Azul' company does not currently carry a significant financial benefit, the National Water Authority is considering a wide range of economic and non-economic incentives for the future.

22. **Spencer** *The culture of water needs to change*

While incentives can encourage sustainable water use, **Spencer** points out that, too often, progress towards sustainability is hindered by not including industry in developing future water solutions. He argues that the 'culture of water' needs to change, so that utilities bring water customers, industry, government, and other stakeholders into the process. Spencer suggests that the dominance of water professionals in identifying water problems leads to the definition of technical and engineering solutions even in areas where 'communication and collaboration skills would be more relevant.' He concludes that the water industry must shift from its exclusive focus on technical solutions to one that acknowledges the need for behavioral change. This will require financial incentives and strong collaboration among government, customers, civil society, and industries willing to share their practical experience modifying facilities to use water more sustainably.

23. **Caldwell** *Designer water: One utility's unique approach to industrial sustainability*

The potential benefits of utility/industry collaboration are illustrated by West Basin Municipal Water District (WBMWD) in southern California (USA), which is often cited as an example of a successful utility–industry partnership. **Caldwell** traces the history of WBMWD's well-known program, explaining how manufacturing 'designer water' allows a utility to provide water particularly suited to industrial use. WBMWD currently offers no fewer than five types of recycled water tailored to the specific requirements of its large industrial water customers; the types of water produced are: (1) irrigation water; (2) cooling tower water; (3) seawater barrier and groundwater replenishment water; (4) low-pressure boiler feed water; and (5) high-pressure boiler feed water. To be successful in this sort of arrangement, utilities must maintain regular communication with industrial customers.

24. **Rosenblum** *Incentivizing sustainability: How utilities can support industrial water conservation and reuse*

Notwithstanding the positive example set by WBMWD, **Rosenblum** maintains that utilities often drive industry away from the table. He claims that, from the perspective of business, the prospect of collaborating with government can be daunting, and highlights several approaches a utility can take to encourage industries to use municipally treated effluent (i.e., recycled water). He specifically recommends that utilities should strive to understand the concerns of business and adapt their outreach methods to address those concerns. They should acknowledge the risks and challenges associated with the use of recycled water, and candidly discuss the fiscal impact of implementing water reuse, providing financial assistance in the form of grants or loans to help cover the costs. Most important, utilities should take pains to respond promptly to industry

inquiries, and provide support as soon as it is requested. Rosenblum also references a chartering tool used to facilitate joint industry–utility participation in water reuse projects.

25. **Kehoe and Chang** *Onsite water reuse: A collaborative strategy to manage water*

Another example of successful collaboration between utilities and industry is the program launched by the San Francisco Public Utilities Commission (SFPUC), a municipally owned water/wastewater utility, to promote onsite wastewater treatment and reuse. As **Kehoe and Chang** relate, in 2015 SFPUC adopted an ordinance requiring all new commercial, mixed-use and multi-family development projects greater than 250,000 square feet (approximately 23,000 m²) to capture, treat, and reuse wastewater. With the technical assistance and guidance provided by the City, it has proven feasible to apply this approach to multiple sites, ranging from office buildings and transit facilities to breweries.

26. **Groot** *Challenges in regional collaboration*

Just as utilities can provide incentives to promote sustainable water management practices, following Spencer's recommendation, companies themselves can encourage local governments to include them in developing water solutions. **Groot** provides two examples – one from Spain and one from the Netherlands – where Dow Chemical collaborated with local utilities to develop an integrated wastewater treatment and reuse strategy, doing together more than either could accomplish alone. In Catalunya, in Spain, the government headed up a consortium of public and private sector participants to install a 19,000 m³/day (5 mgd) water reclamation plant to treat water from the Tarragona and Vilaseca wastewater treatment plants, blend it with Ebro river water, and supply it as make-up cooling water for the Tarragona Petrochemical Complex plants. The water reclamation plant facility was built by Veolia, owned by ACA (the Catalan Water Agency), and operated by Veolia and AITASA. The process in Catalunya was top-down, driven by clear mandates for individual entities to participate in the collaboration process. As a result, there was a common incentive at a sufficiently high level for all parties to cooperate which ensured there was widespread awareness and support. By contrast, in the Netherlands, Dow Terneuzen funded construction of a membrane bioreactor (MBR) system to purify treated effluent from the local utility so they could reuse the water in their facility. Looking back, Groot observes that it was more difficult for a private sector company to lead the effort, as the utility producing the wastewater and the industry taking the treated water have different motivations and different notions of what is fair. Nevertheless, based on Dow's experience at various water-stressed locations in Europe, he maintains that by cooperating with local utilities, industries can reduce their water footprint more than they can by staying within their own fence line.

CONTRIBUTOR SURVEY RESULTS: INCENTIVES AND BARRIERS

As part of the process of preparing this anthology, the editors asked each author to complete a survey reflecting their views on sustainable use of water by industry. The survey gave authors the opportunity to suggest incentives, supports, barriers, disincentives, and penalties that they believed would encourage more sustainable use of water by industry.

Contributors cited both the low cost of water and the high price of technology as barriers to improved water use, and identified economic incentives and penalties as the most effective stimuli to motivate sustainable use water by industry. Incentives in the form of tax breaks for investments in treatment were mentioned, as were higher fees for water and wastewater discharge and increased fines for permit

violations. Even some industry authors welcomed tougher discharge limits and more aggressive enforcement, because they would help support their business case for investing in advanced wastewater treatment and reuse schemes.

As highlighted by **Chesnutt**, another incentive identified by industry and advocacy groups alike was the importance of customer preference. One industry respondent admitted that progress towards sustainable use of water in the textile industry has been driven primarily by the apparel companies' need to court consumers who buy 'green' products. Competitive companies today cannot afford to associate their brands with water pollution and waste. Environmental advocacy groups reported that companies also respond to their pressure for more transparency in corporate accounting for water use.

While these factors may work for larger companies, they may not be sufficient to motivate small- and medium-sized enterprises in developing countries. According to contributors from the financial sector, these companies (referred to by **Davis** as 'resource limited') first need to find the right solutions, then they need to get the funds to pay for them. Echoing **Vicencio**, they identified favorable loans and technical support from experienced bankers as key to helping companies improve their production processes. Development banks should dispel the notion that investing in water technology is a form of 'philanthropy' by giving sustainable companies access to markets that require environmental certification, while investors can recognize the importance of water by giving them higher valuations.

Not all barriers can be overcome by financial incentives or market inducements, however. Academic, consultant, government, and industry respondents all noted the absence of formal watershed- or catchment-based planning as an obstacle to sustainable use of water by industry. This problem was also noted by **Groot** as he described the relative ease with which industry contributed to a government-sponsored regional solution compared to one in which his company was forced to take the lead. In addition, utility contributors pointed out the need to train operations and maintenance staff in new treatment technologies. To round it out, virtually all survey respondents noted that the public as a whole is too often disengaged, knowing and caring little about their local water supplies until the tap runs dry. As one author put it, 'One key difference between the oil crisis and the current water crisis is that the oil crisis simultaneously affected the entire world, whereas water issues tend to be local and regional. The oil crisis catalyzed a paradigm shift in how the world perceived oil, but this paradigm shift has not yet occurred for water.'

The chapters in this section provide numerous insights on the incentives and barriers that impact current use of water by industry, and recommendations for changing those incentives and barriers in a way that will create a paradigm shift in how water is viewed and used.