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The Science of Oil Spills

Understanding the Policy Shift During the Deepwater Horizon Oil Spill

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Abstract

In the aftermath of the Deepwater Horizon oil spill of 2010 the spill mitigation response focused heavily on coastal protection, a method recommended by government scientists—despite the fact that the majority of the spill was contained in the water column and never threatened the coast. A few months into the spill, the response policy shifted to include deepwater dimensions, something independent scientists had been advocating from the start. The aim for this thesis is to understand how the shift in response policy occurred. By drawing on Christina Boswell's theory of the political uses of expert knowledge, and John Kingdon's multiple streams framework, I conducted a case study of the knowledge utilization during the Deepwater Horizon response. I found that the policy shift was a shift not in the use of expert knowledge, but a shift in the problem understanding—which provided an opening for subsurface oil to become part of the policy—hence the policy shift. I also found that the decision makers might have been more reluctant to consider suggestions provided by the independent scientists, since only when government scientists conducted their own testing which verified the independent scientists' findings were these considered.

Key words: Deepwater Horizon, oil spill, expert knowledge, knowledge utilization, multiple streams framework
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1 Introduction

In the evening of April 20 2010 an explosion occurred onboard the Deepwater Horizon (DWH) oil rig drilling into the Macondo well at the bottom of the Gulf of Mexico outside the coast of Louisiana. Eleven workers were killed in the explosion and seventeen suffered injuries, and to make matters worse, April 20 was the day representatives from BP and Transocean—the leasers and owners of the rig, respectively—were onboard DWH to celebrate seven years without an accident (Hammer – Schleifstein 2010). When the rig sank on April 22, the largest marine oil spill in U.S. history, nineteen times that of the Exxon Valdez oil spill of 1989, followed in its wake (CNN 2010; Adams – Gabbatt 2010; Bond 2013:696). Five million barrels (equal to approximately 800 million liters; the volume of 320 Olympic size swimming pools) of crude oil leaked into the deep ocean during the three months it took to stop the flow of oil. Another two months would pass before the well could be sealed permanently on September 19 2010, five months after the explosion (Sveriges Radio 2010; DARRP 2018). Dubbed the largest environmental disaster in U.S. history, it is also the incident which has prompted the largest response efforts (Barron 2012:315). Ray Mabus, Secretary of the Navy during the time of the disaster, writes: "At its peak, efforts to stem the spill and combat its effects included more than 47,000 personnel; 7,000 vessels; 120 aircraft; and the participation of scores of federal, state, and local agencies" (2010:2). But in this thesis the focus is narrower, focusing only on the scientists who aided in the oil spill cleanup.

David Bond, whose subject of study is oil spills and their impact on environmental science and governance (Bennington College 2018), describes a shift in response policy during the DWH oil spill, from a tight focus on protection of the coastlines and tried and tested methods for mitigating the oil, to deepwater as an environment of interest. Promoting these policies were government scientists on one side, and independent scientists on the other (Bond 2013:700, 703). The policy shift raised questions about how it can be understood, and how different usages of expert knowledge might come to shed light on the shift in policy.

After the arrival of the new millennium an increase in the demand for evidence-based policy can be detected in countries like the U.K. (Boswell 2009:3; Parsons 2002:43–44), paralleled by a similar development in the U.S. (CEP 2017:1; Mancini – Mears 2013:1117). This trend is consistent with one of the strongest prevailing theories of knowledge utilization: the instrumentalist account—a theory which emphasizes expert knowledge as having a problem-solving function in policymaking (Boswell 2009:4; Weiss 1979:429–430). Scholars like Carol Weiss and Paul Sabatier have critiqued the instrumentalist

account, and explored alternative uses, like the symbolic use of expert knowledge (Boswell 2009:3–5, 35). Upon these theories Christina Boswell, whom I'll return to again in this thesis, built her theory of the political uses of expert knowledge, which develops the ideas about the symbolic use even further (2009:5–6). On another note, Thomas Birkland, political scientist, has studied disasters, sometimes called focusing events—a term borrowed from John Kingdon, whom we'll also return to later. He shows that during oil spills in particular, it's in the interest of the involved parties—whether government, private sector or action groups—to promote their specific narrative of the spill, to push their preferred policy proposals forward. Thus, competition in who gets to control the narrative is to be expected (1997:105), and a possible way to get ahead of the game is to bring in experts to help.

1.1 Objective and research questions

My objective is to create an understanding for how expert knowledge was utilized by the U.S. government in the cleanup after the Deepwater Horizon oil spill, and how this can inform the understanding of the policy shift, from methods for coastal protection to deepwater oil mitigation, that occurred. I hope to shed light on the ways in which expert knowledge can be utilized during a crisis, a very particular time where decisions need to be made quickly. My research questions are the following: *Is the shift a shift in the type of knowledge use? How did this shift occur?*

1.2 Disposition

In the next chapter, chapter two, my theoretical framework consisting of Boswell's theory of knowledge utilization and Kingdon's multiple streams framework will be laid out. My methodological choices and challenges are presented in chapter three, and chapter four contains the analysis and is split into the three streams of Kingdon's multiple streams framework: the problem stream, the policy stream and the political stream. In the fifth and final chapter I'll discuss the findings presented in the analysis, present my conclusions, and propose areas for future research.

2 Theory

2.1 The political uses of expert knowledge

In her book *The Political Uses of Expert Knowledge* (2009) Christina Boswell develops a theory of the different uses of expert knowledge, by delving into the apparent puzzle that exists in the relation between the instrumentalist account of expert knowledge and what role expert knowledge seem to actually play in politics. By challenging the instrumentalist account, she develops her theory which states that expert knowledge isn't predominantly drawn on to improve policy (2009:3–4, 7).

Before delving any deeper into Boswell's theory of knowledge utilization her definitions of expert and expert knowledge need to be made clear, since there is some contestation of who can be deemed an expert. Boswell claims to use a fluid definition of expert knowledge stating that the definition varies with the knowledge politicians, advisors and such, are drawing on. However, she does point out two features usually found in expert knowledge. The first is in reference to the experts themselves. Expert knowledge is held by those classified as experts—persons employed at research institutes or holding specialist posts within organizations. The second refers to how said knowledge is produced. In order to be accepted as expert knowledge, the research needs to have been conducted in accordance with established methodologies, and the arguments need to be logically sound (2009:23–25). It seems as though she equates expert knowledge with research, not only because she uses the terms interchangeably (2009:4n7). With this in mind it's unclear just how fluid her definition is, but it seems unlikely that it would stretch far enough to include *lay-experts*, described by Steven Epstein (1995:409) among others. However, this does not pose much of a challenge for this study in particular since the expert knowledge in question in the DWH case coincides with Boswell's description.

According to the instrumentalist account, expert knowledge is valued and used in politics in order to improve the political output—to generate the best results. Though this both matches the self-perception of policy makers, and the ideal of evidence-based policy, expert knowledge doesn't seem to be used in this way most of the time. On the basis of this apparent gap between research and de facto policy, Boswell challenges the instrumentalist view. She puts forward an alternative theory which suggests that expert knowledge has a symbolic value and use in politics, in contrast to the problem-solving role it's given in the instrumentalist account. She highlights two symbolic functions for expert

knowledge, a legitimizing and substantiating one, which I will present below (2009:3–5), but first, a closer look at the instrumentalist account.

For a long time, the instrumentalist account has reigned sovereign, not just in the realm of literature on knowledge utilization, but also as an ideal among policymakers, evident in the demand for evidence-based policy. Succinctly, it's a way to use the expertise and science available in order to create the best policies and outcomes possible—here lies the need to use available information of what has been proven to work. Policymakers are therefore said to be eager to improve policy when possible, and doing so by drawing on research to fill the gaps in their knowledge of the situation (Boswell 2009:3–5, 30).

To better understand why knowledge has different uses Boswell makes a distinction between two different types of organizations who each use knowledge in a different way from the other. She makes the suggestion that organizations might seek legitimacy through three different means: their talk, decisions, or action. She borrows a distinction made by Nils Brunsson (2002) of two different types of organizations which serve as ideal types in her theory: action organizations and political organizations. What the two types have in common is their desire to secure legitimacy from their environment, the difference is the way they seek to do it. Action organizations derive legitimacy from their output, meaning they're judged on their societal impact—in sum, how well they perform or meet their goals. Therefore, they have an incentive to use the available expert knowledge to improve their output and their results—thus using knowledge in an instrumental way. Political organizations, on the other hand, derive legitimacy through their talk and decisions—in other words, their behavior. When an organization is not primarily judged on its results, but instead its process, there is little incentive to use expert knowledge to improve output. Instead, political organizations are inclined to use expert knowledge symbolically, in a legitimizing or substantiating way. It should be added that action organizations sometimes use knowledge in a substantiating manner too, if the topic is particularly contested (Boswell 2009:13, 47–48), what exactly this entails will be touched on below.

In the words of Boswell, expert knowledge is used symbolically when "/.../ knowledge is not being valued for its content, but rather as a way of signaling the authority, validity and legitimacy of organizational decisions, structures or practices" (2009:61). As mentioned earlier, she describes two different symbolic functions knowledge can serve: a legitimizing function and a substantiating function. The first she argues, is most likely to occur within political organizations as they're the ones striving to prove their legitimacy by meeting the expectations of their environment by tailoring the organization's norms and formal structure to fit those expectations (2009:61–62). Commissioning, performing, collecting, and openly valuing research are ways for organizations to show their rationality, and through these actions they can gain legitimacy. This type of knowledge utilization is symbolic in the sense that the content of the knowledge itself takes a backseat—what is important is that the organization is believed to be valuing and being in possession of expert knowledge (Boswell 2009:87–88).

The second type of symbolic use laid out by Boswell is the substantiating function of expert knowledge. Not reserved for either of the two organizational

types, but rather for any organization operating in a highly contested area. In such a situation it can be useful for an organization to call on expert knowledge in support of their claims or policies to show how they're supported by scientific findings, even if the opposite view has equal, but different, scientific support. This lends authority to the organization's own proposals and can undermine those of their rivals (2009:7–8, 61–62, 87).

In summary, Boswell critiques the instrumentalist function of expert knowledge utilization as the sole function of knowledge in politics, in reference to the observed gap between research findings and policy. She offers up her own theory of knowledge utilization which includes two types of symbolic functions of knowledge use, the legitimizing function, and the substantiating function. Further, she argues that these different uses, or functions, will be employed by different types of organizations. Political organizations, which gain legitimacy from their processes and talk, are likely to use knowledge in the legitimizing way, whereas action organizations, which gain legitimacy from their results are the ones likely to use knowledge instrumentally. In contested policy areas either organizational type might use knowledge to substantiate their proposals or decisions (2009:7).

Boswell's starting point—the gap between outspoken need for science-informed policy and political outcome, or put differently, the lack of instrumental knowledge use—has slight parallels to arguments made by John Kingdon, whose theory of agenda setting will be presented in full below. These theories find common ground in how they understand knowledge utilization in politics. Boswell argues that even though knowledge is valued for its instrumental function, and in high demand among politicians, it most often serves other uses—symbolic ones (2009:7). Expert knowledge not being drawn on to shape the best solutions coincides with Kingdon's understanding of the policy making process, with problems and solutions formed separately, only to be attached later on (2003:19).

2.2 The multiple streams framework

Building on Michael Cohen, James March, and Johan Olsen's *A Garbage Can Model of Organizational Choice* (1972), John Kingdon developed his multiple streams framework (MSF), first laid out in *Agendas, Alternatives, and Public Policies* from 1984 (2003). Over thirty years later it still remains one of the most influential theories in policy literature (Rawat – Morris 2016:605). The multiple streams framework, first developed to describe the process of agenda setting and policy formation (Kingdon 2003:xix), has been proven useful for analysis of a number of different aspects of the policy process (Béland – Howlett 2016:224), such as the framing of issues (Corbett 2011; Maltby 2013), and decision making (Knaggård 2009:99; Wan et al. 2013; Zahariadis 2014:25)—the latter ones being examples of how the MSF is going to be applied in this thesis. I've made the decision to use the MSF in the analysis of the DWH disaster by dividing the surrounding aspects of the case—such as policy proposals and political climate—

into its corresponding stream. In this section an overview of Kingdon's account of the MSF will be presented with a focus on the characteristics of the three streams: the problem stream, the policy stream, and the politics stream.

The MSF was developed to understand, as Kingdon himself puts it, how political issues "got to be issues in the first place" (2003:xvii). It's a theory of agenda setting aiming to understand how certain issues manage to garner the attention of government officials while other issues seem to lack the ability to generate the same engagement. Three separate streams make up Kingdon's version of the policy process, the streams are as aforementioned: the problem stream, the policy stream, and the politics stream—flowing simultaneously, and existing independently from one another (2003:xvii).

The problem stream focuses on how a condition becomes a political problem. Kingdon highlights how a problem is created, or defined, when we identify a condition we deem in need of fixing. Not all conditions are problems, after all, conditions like bad weather aren't usually of political concern (2003:109), unless it's of a very extreme nature. There are indicators—quantifiable characteristics, like a rise in the unemployment rate—that can signal a problem is on the rise. This does not mean that there will be agreement on how the problem should be understood. Some of these indicators, like the unemployment rate, are monitored continuously, but a one-off scientific study showing a trend of a drop in high school graduates could also serve as an indicator (2003:91–93).

However, problems aren't always realized with the help of indicators, sometimes other phenomena bring them into view. One of these phenomena is what Kingdon has termed a focusing event. Common examples of this are attention-grabbing events, like accidents, crises and disasters (2003:94–95). For example, in 2012 a visually impaired 71-year-old in Coventry, England, was hit by a bus in a *shared space* intersection—an intersection purposefully without traffic lights or signage, intended to encourage drivers and pedestrians to cross cautiously. The man later died in hospital from the injuries he sustained during the accident (BBC 2012; Senthilingam 2014). This drew attention to the apparent inaccessibility and danger shared space schemes posed, especially to select members of the public such as the visually impaired, and a ban on all new construction of shared space schemes was called for by a member of the House of Lords (Bawden 2015). A focusing event could also be based on the personal experiences of a policy maker (Kingdon 2003:94–95), which ties in to the shared space example since the member of the House of Lords that brought it to attention was Lord Holmes, the only blind member of the house (Coleman 2015). While the terrible accident was part of the focusing event, it's also likely that Lord Holmes' personal experiences played a part in bringing the issue to attention.

The final way in which a problem can be brought to attention according to Kingdon is through feedback on existing programs. The feedback can be in form of evaluations, complaints, and the like, and shed light on problems such as unforeseen consequences and high costs (2003:100–101). In sum, it's through either indicators, focusing events, or feedback conditions become problems.

Against what might be instinct to many, Kingdon suggests that policy proposals, or solutions, are fashioned independently from the problems they might

become attached to. Put differently, once a problem is realized, the next step is not to build a solution from scratch, but to identify one already out there (2003:143). This stream of ideas is what makes up Kingdon's policy stream.

In communities of specialists, whether scientists or government staffers, ideas float around in what Kingdon likens to an evolutionary process of natural selection, where some ideas succumb, some combine with others, and only some adapt and thrive (2003:116–117). The ideas have to change in order to fit with various criteria posed by those involved in the policymaking process, like scientists and government officials. This group is also known as the policy community, and among the criteria for survival are being technically feasible and in accordance with the values of the community (2003:143). Driving the evolution forward are what he calls policy entrepreneurs, people from both inside, and outside of government, advocating for different policy proposals. They also perform the function of attaching policies to the appropriate problem (2003:122–124, 205). Ideas are rarely accepted at face value and the policy entrepreneurs play an important role in what Kingdon calls the "softening up" process—getting the policy community used to the new ideas. If an idea meets the appropriate criteria and survives long enough for the policy community to see it as a feasible option it ends up on the short list of ideas, ready to be considered by policy makers (2003:139).

When Kingdon speaks of politics he does so with a narrow definition in mind which includes government, elections, pressure groups and so on (2003:145), it's then only natural for his definition of the political stream follows this definition. Changes in the political realm have consequences. It goes without saying that something like a change of administration can affect the makeup of the political agenda. Even more abstract phenomena like a change in the national mood—the public's attitude which directs what it finds acceptable—has the power to shape the agenda according to Kingdon (2003:162–163).

As stated, the problems, policies, and politics stream flow independently from one another. Once in a while however, a *policy window* will open and allow for the joining, or in Kingdon's words *coupling*, of the streams. A policy window is characterized by conditions that are extra beneficial for the pushing forward of certain ideas. They can open when something happens that changes the conditions—like when a change in administration occurs, since a new administration might favor ideas rejected by the former, or when a focusing event gives policy entrepreneurs an issue to attach their policies to. In short, an issue will become joined to a solution, or vice versa, and then on joined to the appropriate forces in the political stream, and it's this that pushes the idea onto the political agenda. It's fully possible for an issue to make its way onto the governmental agenda without having a solution, or policy, attached. Nonetheless, in order for the issue to make it to the decision agenda, it almost always have to come with a policy suggestion (2003:194–195).

To summarize, Kingdon's MSF makes sense of agenda setting by dividing aspects of the policy process into the separate streams of problems, policies, and politics. The problem stream deals with how conditions are framed as political issues by indicators, focusing events, or feedback; in the policy stream proposals

have to survive an evolutionary process in order to be considered, sometimes helped by policy entrepreneurs; the political stream is made up by political institutions and the public and emphasizes how changes in these affect what has the possibility to rise on the agenda. When a policy window opens the streams can couple and propel issues to the governmental agenda, or if attached with the appropriate policy, the decision agenda (2003:18–20, 194–195).

3 Methods and source material

This study is built as a case study of expert knowledge utilization in the oil mitigation efforts carried out by the U.S. government during the Deepwater Horizon oil spill. I believe the case study to be the most fitting research method, given my research objective and question, since one of the major strengths of the case study its ability to generate a good understanding of the case itself (Merriam 1994:184). If I were to attempt a comparative study of say, knowledge utilization during different disasters I might be able to find common characteristics, but without great detail, and detail is of interest to me here since I'm curious as to how the specific policy shift in the DWH case can be understood.

A common challenge to the case study method is its suggested inability to generate broad statements about similar cases, since such generalizations are difficult to make from studying one, or a few, cases alone. While this critique is valid, and should be taken into careful consideration, it poses less of a threat for a study with the ambition to understand, as opposed to an ambition to explain. I believe the case study to be the best choice for my thesis since this method will allow me to make close observations and enable me to see the important details much more clearly. While generalizations made from case studies aren't generally looked upon favorably, it's not impossible for a case study to generate questions in want of testing on other cases in the future.

I've chosen to split the analysis into the three streams of Kingdon's multiple streams framework, a fitting choice given that the theory is developed from studies of the U.S., and should therefore suit the case I've chosen. Kingdon himself does not believe agenda setting to be a straightforward process, instead he paints a picture of an evolutionary process where the strongest ideas survive (2003:2–4). By not too far a stretch of the imagination—and argued by scholars presented in the theory section—one could believe this to be true for the decision making process as well, where multiple understandings of the issue and solutions have to be considered. To make sense of this process—or rather the three parallel processes of problems, policy and politics—I've chosen to structure my thesis after Kingdon's multiple streams framework, and analyze the events in each stream separately. Doing this allows me to get a closer view of each of the streams, and enables a more precise application of Boswell's theory of knowledge utilization in the different realms of the policy process. While the DWH response involved many people and spanned many areas, not all of this will be covered here. I've chosen to limit myself to the clean-up process surrounding the spill, as this is where the policy shift in question occurred. This means that the experts in question are oceanographers, marine scientists and environmental scientists, and therefore this thesis excludes the engineers who advised on source control operations (Lubchenco et al. 2012:20212–20214; McNutt et al. 2012:20222).

The source material for this thesis come in a variety of forms. The material is made up by government sources, such as reports by government agencies or commissions, memorandums or other correspondence between agencies or persons in charge, government websites, press releases or statements; scholarly publications, both from scientists directly involved in the response or as expert advisors, and from scholars studying the events from the outside; and newspaper articles available online. For the sake of the integrity of this thesis I've done my best to ensure the reputability of each source by using information from trusted newspapers, peer reviewed publications and respected government sources. The material I've had access to haven't given me full insight into the process, I do not have knowledge of what has been said during meetings among the scientists and politicians, apart from what has been published in studies by other scholars, and what has been said in interviews with the press. For this reason, interviews with some of the involved scientists would have strengthened the material on which this thesis stands. However, I do still believe the depiction I've produced here to be accurate, given the varied source material. As for if what the scientists are describing in the interviews I've been able to access is an accurate recollection of events, I'm unable to be a true judge of—seeing as I lack the aforementioned insight. However, what can be expected of them is a will to get their story across. The two seemingly warring groups of scientists, which will be laid out in more detail later on, can be expected to want their side of the story heard. Thus, in the instances where they've been subject to interview I expect them to have given their true version of how they experienced the events.

The analysis draws on theories by Kingdon and Boswell and is split three ways, according to the MSF. First, in order to be able to examine the events more closely I divided the source material into its corresponding stream. Material concerning the disaster as an event, professing its status as a disaster, and discussions on the understanding of the problem was sorted into the problem stream. Material concerning proposed solutions, advocates for different solutions, and the like, were sorted into the policy stream. Finally, material concerning the political climate, such as the president's will to run for re-election, and the concern with legitimacy, were sorted into the political stream.

Second, I had to examine each of the streams to understand how, and thirdly by whom, expert knowledge was being used. I was able to do this by using Boswell's theory of knowledge utilization. I chose to recognize an organization as an action organization if it's likely to prioritize results over a legitimate process. Unified Command, of which a description will be given in the next chapter, is the action organization discussed in this thesis. I've classified organizations as political organizations when they can be expected to be mainly concerned with legitimacy, rather than results. This rings true for the president and those closest to him, which will also be touched on in the chapter that follows.

In order to judge which function—instrumental or symbolic—the expert knowledge serves in each case the organizational types can normally serve as a guide, but I didn't want to rely on that since organizations don't always behave in the expected way (Boswell 2009:49). I've identified the knowledge use as instrumental when expert knowledge has been implemented into policy in a fairly

straightforward way. I've chosen to identify the knowledge use as symbolic when drawing on expert knowledge is referenced in the organization's talk, but the actual decisions deviate from expert opinion—when seemingly drawing on expert knowledge is more a way of paying lip service to the organization's environment. Further, I've classified the knowledge utilization as substantiating when the organization makes references to science for policy in their talk and the policy area in question is highly contested among experts. When the policy area lacks this contestation I deem the symbolic use to serve a legitimizing function.

4 Analysis

4.1 The problem stream: A familiar problem in an unfamiliar environment

It could be argued that an oil spill isn't a condition that needs any prior introduction as a problem, we recognize it as a problem *prima facie*, much like a wildfire or a collapsed bridge. Nonetheless, there are still mechanisms at work in making conditions into problems. Here I'll employ Kingdon's MSF to consider how the DWH spill made the transition from condition to problem. Thereafter Boswell's theory of knowledge utilization will be applied to aid the understanding of which problem definition was adopted by the government.

The DWH explosion, and the oil spill that followed, is a textbook example of what Kingdon calls a focusing event—attention-grabbing incidents like an accident or a disaster, of which the DWH could be argued to be both (2003:94-95). It generated immediate media attention, and continued to dominate the news feed for weeks after the disaster struck (Pew Research Center 2010a). The DWH disaster made the front page, engulfed in flames and with pillars of black smoke rising into the sky. In fact, although the threat of an oil spill lingered, there were no indications of an oil spill until four days after the initial explosion, writes Heidi Avery, deputy homeland security advisor to president Barack Obama (2010). Once the news of the spill broke the media attention didn't die down, instead, after the rig had sunk into the ocean, the spill became the leading issue (Pew Research Center 2010b).

Most oil spills never garner much attention (Birkland 1997:74; Birkland – Lawrence 2002:22), which speaks to both the extent and urgency of the DWH spill, and how it came to call attention to the issue as a focusing event. The disaster spanned many areas, from a search and rescue mission for the eleven missing crew members, to issues regarding oversight and rig inspection, to the technical failures of the drilling and safety mechanisms on the rig. In order for the problem to also be specified as an oil spill, additional help was needed. According to Kingdon, such help can come in the form of indicators (2003:98), which is also how it seems to have happened here. The indicators in this case were the oil flow rate estimates. Although oil spills probably didn't need any prior introduction as a problem, with past experiences giving evidence to how devastating they can be, the indicators played an important role in making the oil spill an urgent problem. Once the oil spill became the focal point of the overarching problem, how the spill was to be understood came under contestation.

Initially, the U.S. government's understanding of the spill was shaped largely by past experiences, writes David Bond, an anthropologist who studied the events surrounding the spill. Scientists with the National Oceanic and Atmospheric Administration (NOAA), the main governmental advisory body on this issue, came to understand the DWH oil spill in the terms of the marine spills they'd encountered in the past. In 1989, the Exxon Valdez—an oil tanker—hit a reef in Prince William Sound, Alaska, causing oil to leak from the damaged hull of the ship and creating the second largest marine oil spill in U.S. history, second only to the DWH spill (Bond 2013:698). Stanley Rice, a former scientist with NOAA, provided an accurate statement when he said: "As the most studied oil spill in history, [the Exxon Valdez oil spill] has become a blueprint for how we're going to look at spills in the future" (Rice quoted by Lovgren 2004). The Exxon Valdez oil spill left 2250 kilometers of the Alaskan coastline covered in oil (Lovgren 2004), and when it came to making sense of the DWH spill one problem definition that emerged was oil as a threat to the U.S. coast (Bond 2013:697–698), which could be thought strange. To understand why it is important to note the vastly different natures of the Exxon Valdez spill on one hand, and the Deepwater Horizon spill on the other. From the damaged hull of the Exxon Valdez an estimated 270,000 barrels of oil flowed into the surface layers of the ocean during the twelve hours it took to stop the leak; the Deepwater Horizon spill was nineteen times larger, lasted months, and occurred at an ocean depth of 1500 meters (Sylves – Comfort 2012:84; Bond 2013:699).

Even though the volume or duration of the DWH spill wasn't known at the outset, it was known that it was occurring in deepwater. Jane Lubchenco, together with some of her fellow scientists involved in the response efforts, describe how the DWH spill occurred in "an extreme ocean environment—deep, cold, dark, and high pressure" (Lubchenco et al. 2012:20212), rendering much of what was known about oil spills and the appropriate response useless. Therefore, new science that could make sense of the oil spill was in high demand (Lubchenco et al. 2012:20213). Some of this knowledge was to be produced by government scientists, but independent scientists at universities were brought in to aid in the response as well. Though it was clear that it was an oil spill of proportion, there was a divide in how the problem was to be understood among these two groups.

On one side were the government and their scientists, on the other were independent scientists at universities, writes Bond. As understood by the government scientists, the problem of the DWH spill was not unlike other spills in the past, because of this they considered the oil to be a threat to be to the coast and beaches. Independent scientists however, were deeply concerned of the oil's impact on the environment into which it was leaking—the deep ocean. The problem, according to the independent scientists should be understood as the potential threat of oil in deepwater, not as the surface oil that might make landfall, like the government scientists were proposing (2013:700–702).

During incidents like this, where a large response needs to be coordinated between different government agencies, the U.S. government can set up something called a Unified Command. It could be likened to a government agency, but established for a limited amount of time only, and with fixed goals,

tasked mainly with coordinating a joint effort between different agencies and groups—like between government scientists at NOAA and independent scientists. During the DWH spill the Unified Command coordinated the response efforts and were therefore in charge of the cleanup response. While Unified Command reported to president Obama (Epperson 2011:8), and the president and his cabinet should be classified as a political organization, Unified Command should not. I've chosen to classify it as an action organization because of how it's likely to be judged on its performance in spill mitigation, therefore it can also be expected to use knowledge instrumentally (Boswell 2009:47).

While I can't pinpoint who made the call, president, Unified Command, or other, they chose to go along with the understanding suggested by the government scientists, that of surface oil—and by extension its threat to the coast—as the focal matter of the disaster (Bond 2013:697–698). The scientists, who considered themselves "experts 'in the science of oil spills'" (Bond 2013:699) and federal officials within Unified Command ignored the evidence of oil in deepwater during the first months of the disaster. Simply put, the available scientific expertise pulled two ways: toward oil as a threat to the coast, or toward oil as a threat to the environment of deepwater—and the first is how the government chose to understand the problem (Bond 2013:697–698).

The decision to understand the problem in this way relied on knowledge from experts who had been involved in oil spill response before, even if it wasn't specifically created for the situation in particular. For this reason, I'm reluctant to say that the knowledge utilization had no instrumental qualities, because I believe it did. Nevertheless, the knowledge also played a substantiating role. As stated earlier, expert knowledge can substantiate a position in a contested area by lending authority to the position in showing its scientific backing. Although both are symbolic uses of knowledge, the substantiating function is different from the legitimizing function. Instead of trying to gain legitimacy by showing that the decision making process has access to expert knowledge, it's more closely linked to a specific issue and the expert knowledge is meant to underpin, or validate, one position over another (Boswell 2009:61–62, 87). In press conferences, and other instances where he addressed the public, president Obama stressed the following three points. One, that they had the best experts in the world working on the response efforts. Two, that Steven Chu, a scientist occupying a leading role in the response was a Nobel laureate. And three, that protection of the beaches and coastlines were their highest priority (2010a; 2010b; 2010c; 2010d; 2010e; 2010f). By doing this Obama could show that the way they'd chosen to understand the problem, as a threat to the coast, was a sound decision. What can be said is that there were two opposing understandings of the problem at play, from two groups of experts equally qualified in making such judgements and the government had to make a choice of how to understand the problem. Because the opposing understandings of the problem were played out in media, the government seem to have wanted to substantiate their position.

In August something changed within Unified Command. After much advocacy by the independent scientists trying to shift focus away from the coast and toward deepwater, Unified Command published a report which stated that

going forward, they were also going to assess the subsurface—therefore also the deepwater—dimensions of the spill (OSAT 2010:xxvii). While this is a policy decision, and will be expanded on in the following section, it is also an indicator of how the understanding of the DWH oil spill seem to have changed within government since they went from a problem understanding that excluded subsurface oil, to one which included it. In other words, oil in deepwater became part of the problem understanding within Unified Command.

4.2 The policy stream: From beaches to deepwater

As stated in the previous section, there were multiple suggested problem definitions, and the solutions were no different. Much like within he problem stream, the policy stream held two competing policy proposals. Bond lays them out as follows. The first suggested solution, proposed by the government scientists, were different methods of coastal protection and surface containment. The second, courtesy of the independent scientists, was a two-stage process, the first of which was different methods of monitoring and collecting data on the oil. The quantity, type, and concentration of oil needed to be studied, and efforts in locating the oil, and predicting where it would go, needed to be made. Since the DWH spill was truly unique, knowledge on the topic of oil in deepwater was limited. Therefore, the suggestion from the independent scientists was to build knowledge first, to understand the actual scope of the problem, and form solutions around that knowledge later (2013:697–700).

While it's true that a deepwater spill like this one had never before been seen, it's not the first time subsurface oil mitigation strategies had been up for discussion. Suggestions like those made by the independent scientists during the DWH spill, of more research into better mitigation strategies for subsea leaks, had also been made by the Nixon administration in the late 1960's, in the wake of the Santa Barbara channel spill—currently the third largest marine spill in the U.S., ranking behind the Exxon Valdez and Deepwater Horizon spills—but few such advancements had been made in that area since (NCBP 2011:135). These ideas became relevant again during the response efforts to the DWH disaster, which follows Kingdon's thinking of how ideas float around in scientific communities waiting for an opportunity to be put to action (2003:116–117). The same goes for the ideas proposed by the government science advisors—as discussed, they weren't tailored for the situation either. Rather, the proposals were, as already suggested, the same ones that had been seen and put into action, during oil spills in the past (NCBP 2011:ix), suggesting that both the independent, and the government scientists proposed policy ideas already in the ether.

Government scientists proposed different containment methods for keeping oil off the coast, and they were proposed not individually, but as a complement to each other. They included the use of skimmers, vessels that can remove surface oil; boom, floating barriers that keep surface oil from reaching sensitive areas; in-situ burning, removal of the oil by igniting it and letting it burn off in a controlled

manner; and the use of dispersants, chemicals that dissolve oil (NCBP 2011:ix, 151–153, 160, 167-169; NOAA 2018). Dispersants were one of the most prominent methods and will be discussed further below.

Early on, the use of dispersants—chemicals sprayed on the surface slicks, and later injected underwater at the wellhead—was floated. Dispersants do not remove the oil, but changes its physical form by breaking it down into droplets that disperse in the water column (Ramseur 2010:6). Removing the oil from the surface in this way makes it less of a threat for beaches, coastal areas, and certain animals like birds, which would otherwise be threatened by the slick (NOAA 2018). The National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling (NCBP) explain how the use of dispersants was considered highly controversial from the beginning, partly because of its potential toxicity, and partly because of its unknown effects in the conditions of deepwater (2011:143–144). Dispersants were used to a remarkable extent during the DWH disaster and it was effective in dissolving the oil and therefore preventing it from ever reaching the coast (2011:168). However, once oil is dispersed, it's becomes too diluted to remove with other response methods, and whilst dissolved oil is thought to biodegrade faster than crude oil, it also spreads both vertically and horizontally through the water column much quicker, and dispersed oil is still toxic. Some of the oil had already been dispersed naturally as a result of the immense pressure at the site of the Macondo well, 1500 meters below the ocean surface, where the pressure forced the oil to break down into smaller components—hydrocarbons, the main building blocks of crude oil—and spread throughout the ocean (Bond 2013:696).

During the first weeks of the disaster, independent scientists started noticing changes to the ocean, confirming the fears they had held since the beginning. What they observed were changes in the chemistry of the ocean—later explained to be due to the waste products produced by microorganisms feeding on the dispersed oil (Bond 2013:700–701). What has been described as deepwater plumes of dispersed oil—35 kilometers long—could be detected by the independent scientists, threatening the marine life of the gulf (NCBP 2011:182; Ramseur 2010:14). Scientists working within the Unified command were not interested in monitoring oil in deepwater if nothing could be done about it. Against the suggestions from the independent scientists, which was to locate the oil and research its impacts on the deep ocean—the environment into which the oil was leaking, the government scientists sought only to quantify oil which they knew how to collect and do away with, writes Bond. They described their actions as seeking operational facts to help them problem-solve, which suggests that they had instrumental knowledge utilization in mind during the process (2013:701–702).

As time and response efforts went on, and the flow of oil could finally be stopped, independent scientists continued to investigate and make reports of the oil still remaining in the water column, dispersed or otherwise. With the immediate threat of oil spilling into the gulf at a rate higher than 52,700 barrels—8 million liters—a day no longer present (NCBP 2011:167), what the independent scientists had been saying could gradually come into focus. In August 2010,

roughly a month after the well had been fitted with a temporary seal, NOAA published a report outlining the fate of the oil spilled, and it was made clear that the vast majority of the oil never made it to the surface, threatening the coastline (NOAA 2010). With the immediate threat of an ongoing spill no longer looming, the independent scientists were able to bring attention to their policy proposals.

From having their results ignored, publically discredited and being instructed by the NOAA not to speak to the press about their findings, the independent scientists were able to gain recognition back from those within Unified Command. At this point the peer-reviewed evidence the independent scientists had published started to pile up and became increasingly difficult to ignore, writes Elizabeth Bradshaw, sociologist. Only then, in late August, did the government scientists recognize the existence of the underwater plumes (2012:177–180, 185). Jonathan Ramseur, specialist in environmental policy, speaks of the same dismissal of the independent scientists' findings in his report to the U.S. Congress (2010:14). During the same time, the government scientists were tasked with putting together a plan outlining the subsurface oil monitoring that were going to take place going forward, coupled with a need to find additional methods for addressing the subsurface oil still remaining (OSAT 2010:xxvii; Zukunft 2010). This sudden change indicated a major shift in the government policy toward the DWH oil spill response, from first focusing solely on coastal protection, and not wanting to do any monitoring of subsurface conditions if there wasn't a strategy for immediate mitigation available, to being open to and suggesting monitoring and investigation of new strategies themselves. It seems like these policy proposals were preceded by them also gaining traction in the scientific community, as peer-reviewed findings accumulated (Bradshaw 2012:155). I'll return to this later in the chapter.

Unified Command acts a lot like a government agency. In this case they were the main government organization in charge of the oil spill response. Given that Unified Command takes on many of the characteristics of an action organization, they can be expected to use knowledge instrumentally—to generate good results which help them reach the goal they were established to meet. Therefore, the organization is also expected to draw on expert knowledge in an instrumental fashion (Boswell 2009:13), since this is how they can improve their output, and reach their goal. Behind the first policy they decided to implement—the one considering the surface dimensions of the spill only and therefore focusing on coastal protection as the response—I believe the knowledge utilization to have been both instrumental and substantiating. From Bond's study it was learned that Unified Command had an overriding preference for operational facts at the start, facts which would aid them in the cleanup. With the technologies for deepwater collection not very well developed—in my understanding next to nonexistent—they set a focus on the oil that could be remedied with the knowledge available to them. While the knowledge wasn't the most updated to fit the situation, but rather what had been learned from previous disasters of a similar type—in those cases marine oil spills, which arguably can be considered too vast a category—it was still effective in mitigating what was their initial focus, the surface portion of the spill. In other words, given their goal of coastal protection, they used available

expert knowledge to reach those goals, and therefore the knowledge can be said to have been used instrumentally.

Even if their initial policy was not effective in responding to the subsurface dimensions of the spill, it was never destined to, since it was never part of the problem definition adapted by Unified Command at the start. While some independent scientists voiced concerns about the lack of attention to the subsurface oil, they weren't disputing the effectiveness of the Unified Command methods for their intended purpose—coastal protection—but rather disputing the effectiveness of the response to the oil spill as a whole. Therefore, even though it might seem like the initial strategy was on shaky grounds scientifically, given what it was implemented for it did serve its purpose in improving the output—in this case, cleaning up the surface portion of the spill.

The August news that Unified Command were going to include subsurface oil in the response going forward (Zukunft 2010) might not have entirely relied on the independent scientists' findings however. Independent scientists had been trying to bring attention to the subsurface oil since the first weeks of the spill—their worries backed up by findings from early on (Ramesur 2010:14). Unified Command scientists—government scientists—disputed these findings, and the proposals to monitor and target oil in deepwater continued to be ignored—until the peer-reviewed evidence piled up and could no longer be pushed aside (Bradshaw 2012:155, 179, 183). But it wasn't until government scientists within NOAA conducted their own testing and confirmed the independent scientists' findings that Unified Command really started to pay attention (BBC 2010). Once the severity of the deepwater conditions were brought into focus, the expert knowledge played an instrumental role in shaping the subsea strategy for monitoring and mitigation, released and employed by Unified Command, even though it had been ignored to start with.

4.3 The political stream: Fighting for legitimacy

That political organizations are those who strive to generate legitimacy from their environment by using expert knowledge in symbolic ways, is some of what has been presented from Boswell's theory of knowledge utilization so far (2009:13). Kingdon has brought attention to how conditions within the political stream have the ability to affect what issues rise to the agenda, and by extension, what decisions are made (2003:162–163). Among the political conditions impacting the events surrounding the DWH disaster sits the newly elected president Obama, who was just 15 months into his first term when disaster struck in the Mexican gulf on April 20 2010 (Rodrigues 2017). Presidents can be assumed to want to say in office, and this is an assumption I'm going to make here—maybe strengthened by the fact that Obama did indeed run for re-election after his first term was up. Because of this wish to stay in power, one of their main concerns should be to sustain legitimacy toward the electorate, as to not lose their confidence, and thus also their vote. Out of the two organizational types provided by Boswell, the

president and those closest to him—his cabinet, and further what is often just referred to as "The White House"—can be classified as a political organization, and should therefore take steps to gain legitimacy through symbolic use of expert knowledge (2009:61–62).

While Obama's exact involvement in the decisions made is not entirely clear to me, he did oversee the response at large and was needed to grant permission for certain operations where so required. But maybe most importantly, while the president might not have taken direct part in the cleanup process, he was the one that blame was probably going to be placed on should it not go well. Again, the president is utmost concerned with legitimacy, and part in keeping that legitimacy is keeping the public at ease by demonstrating that the government is well versed and skilled in crisis management. Below I'll present two instances where the concern for legitimacy shaped the events.

The first is the deployment of boom, floating devices used to keep oil off the coast. It proved not to be the most effective strategy for spill containment, but it did make the gulf state residents happy. NCBP wrote the following in their report to president Obama: "Responders knew that in deploying boom they were often responding to the politics of the spill rather than the spill itself. And the miles of boom along the coastline still did not prevent oil from washing up on the shore" (2011:154). At one point Unified Command gave orders to comply with the demands for more boom from the residents, even though boom wasn't the right strategy in those cases (2011:153). Boom was ineffective, but popular, as it was the only containment effort actually visible to the gulf state residents. They couldn't see the efforts carried out far offshore, but vessels laying boom close to their shores gave them a sense of protection (NCBP 2011:151). This here is a clear example of when political conditions, such as a wish to keep the public happy, override what's scientifically motivated. The expert knowledge was in this case not used instrumentally. This combined with the continued emphasis on having employed the absolute best researchers to aid in the response, it seems not all expert knowledge was used to its full potential, and therefore a portion of those statements were, in very broad strokes, just paying lip service to the public. Thus the expert knowledge also served a legitimizing function.

The second relates back to the disagreements between government and independent scientists. Although the independent scientists' ideas were incorporated in the problem understanding the policies in the end, it wasn't until the NOAA confirmed the findings made by these independent scientists that these ideas were brought to consideration. What follows here is speculative, but part of the fight for legitimacy from the president's side surely involves demonstrating that the organizations and institutions within the state apparatus function and are able of protecting their citizens during a time of crisis—a time during which it would certainly look bad for a president to turn against experts and advisors within government. Considering how the disagreements between the two groups of scientists already had played out very publically in the press, it would be to add insult to injury for the president to also start to question and depart from the advice of his own—the government scientists.

5 Discussion and conclusion

In the months during which the spill played out, it seems as though there was a shift not only in policy, but also in the problem understanding. While the streams of problems and policy are separate, they can join together when the time is right—when an arising problem coincides with a policy proposal already out there (Kingdon 2003:194–195). I believe the shift in policy to have occurred in this way. While the understanding of the oil in deepwater as a problem in itself existed within the independent research community from early on, it also needed to be established within the U.S. government and Unified Command, since they were in charge of not only coordinating but also devising the spill response.

At the start, the problem understanding within Unified Command was that of oil as a threat to the coast lines, and the independent scientists' attempts to shift the focus to deepwater were initially futile. But as time went on and the evidence accumulated, Unified Command changed their problem understanding and policy to include the subsurface dimensions of the oil spill. When NOAA realized subsurface dimensions as part of the problem—from conducting their own testing on the matter—this opened a policy window for what the independent scientists had been proposing for a long time. The policy suggestion of subsea assessment found its footing with this policy window, and it could be so that it was propelled to the decision agenda because the findings finally were verified by NOAA and thus fulfilled the government's assumed wish to rely on government scientists for legitimacy reasons.

While not all experts involved were in support of the initial problem understanding and response policy, they were still shaped by the suggestions made by experts in an instrumental fashion. The policy shift was no different, the new policy also relied on expert knowledge, with the hopes of improving the output. This was not unexpected, seeing as the Unified Command is more of an action organization than a political organization. Throughout the process, traces of substantiating knowledge could be found as well, both from government scientists affirming their choices by referencing their past experiences with the Exxon Valdez spill, and from president Obama who often brought up how highly educated the experts were. There were also signs of legitimizing knowledge use, although more indirect. Expert knowledge was, as stated above, referenced throughout the process, but the cleanup response didn't always coincide with what was scientifically motivated. The use of boom is an example of this—not the most effective but liked by the residents and therefore it kept being deployed.

The government seem to have been very concerned about their legitimacy during this time, which can be seen not only in the use of boom, but maybe also in what group of experts they chose to listen to. Although the independent scientists were the ones who pioneered the idea of oil in deepwater as a potential threat, and

suggested strategies for mitigation which were indeed implemented at the end, the ideas didn't really garner attention from the government agencies until they had been tested by NOAA—the government scientists. It seems as though the government had a wish to stick with the knowledge provided by their own experts only, even though the independent scientists were equally qualified.

In sum, the shift was not a shift in knowledge use. Instead the policy shift can be understood as a shift in the problem understanding, which led to the policy shift when there was an opening for different ideas to become attached to this new understanding of the problem. Throughout the process the organizations behaved in expected ways in regard to their use of expert knowledge. Knowledge was used instrumentally throughout the entire process, with instances of legitimizing and substantiating use running parallel. The study also revealed something which I found rather interesting: the government's reluctance to listen to the independent scientists. Though the government invited them to advice on the disaster since they knew they didn't have the resources to produce all the new science needed themselves, it seems as though it wasn't enough for the independent scientists to present their research to gain the attention of policy makers. Even though the scientists within the two groups shared the same education, and thus to some extent the same expertise, something else was needed for their knowledge to be considered viable. If the assigned weight of a scientist's findings is dependent on the scientist's affiliation, and if the sensitive nature of a disaster makes politicians increasingly concerned with legitimacy and therefore more likely to stick to advice coming from government agencies, are areas in need of further exploration.

6 References

Adams, Richard – Adam Gabbatt (2010). “BP oil spill report – as it happened”. *The Guardian*. Newspaper article. 2010-09-08. [Online] https://www.theguardian.com/environment/blog/2010/sep/08/bp-oil-spill-report-live. Last accessed: 2018-04-16.

Avery, Heidi (2010). “The Ongoing Administration-Wide Response to the Deepwater BP Oil Spill”. Blog post. 2010-05-05. [Online] https://obamawhitehouse.archives.gov/blog/2010/05/05/ongoing-administration-wide-response-deepwater-bp-oil-spill. Last accessed: 2018-05-03.

Barron, Mace G. (2012). “Ecological Impacts of the Deepwater Horizon Oil Spill: Implications for Immunotoxicity.” *Toxicologic Pathology*. Vol. 40, No. 2, pp. 315–320.

Bawden, Tom (2015). “Cars and pedestrians don't mix well, concludes study into shared-space schemes”. *The Independent*. Newspaper article. 2015-07-03. [Online] https://www.independent.co.uk/news/uk/home-news/cars-and-pedestrians-dont-mix-well-concludes-study-into-shared-space-schemes-10365202.html. Last accessed: 2018-04-18.

BBC (2010). “Gulf spill: US tests confirm underwater oil plumes”. *BBC*. Newspaper article. 2010-06-08. [Online] http://www.bbc.com/news/10268142. Last accessed: 2018-05-15.

BBC (2012). “Safety call after Coventry pensioner hit by bus in 'shared space' dies”. *BBC*. Newspaper article. 2012-02-15. [Online] http://www.bbc.com/news/uk-england-coventry-warwickshire-17038711. 2018-04-18.

Béland, Daniel – Michael Howlett (2016). “The Role and Impact of the Multiple-Streams Approach in Comparative Policy Analysis.” *Journal of Comparative Policy Analysis: Research and Practice*. Vol. 18, No. 3, pp. 221–227.

Bennington College (2018). “David Bond”. [Online] www.bennington.edu/academics/ faculty/david-bond. Last accessed: 2018-04-16.

Birkland, Thomas A. (1997). *After Disaster: Agenda Setting, Public Policy, and Focusing Events*. Washington, D.C.: Georgetown University Press.

Birkland, Thomas A. – Regina G. Lawrence (2002). “The Social and Political Meaning of the Exxon Valdez Oil Spill”. *Spill Science & Technology Bulletin*. Vol. 7, No. 1–2, pp. 17–22.

Bond, David (2013). “Governing Disaster: The Political Life of the Environment during the BP Oil Spill.” *Cultural Anthropology*. Vol. 28, No. 4, pp. 694–715.

Bradshaw, Elizabeth A. (2012). “Deepwater, Deep Ties, Deep Trouble: A State-Corporate Environmental Crime Analysis of the 2010 Gulf of Mexico Oil Spill”. Diss. Department of Sociology, Western Michigan University.

Brunsson, Nils (2002). *The Organization of Hypocrisy: Talk, Decisions and Actions in Organizations*. Copenhagen: Copenhagen Business School Press.

CEP = The Commission on Evidence-Based Policymaking (2017). *The Promise of Evidence-Based Policymaking: Report of the Commission on Evidence-Based Policymaking*. Washington D.C.: The Commission on Evidence-Based Policymaking.

CNN (2010). “Deepwater Horizon: A chronology”. *CNN*. Newspaper article. 2010-05-27. [Online] http://edition.cnn.com/2010/US/05/26/oil.spill.investigation.timeline/index.html. Last accessed: 2018-04-16.

Cohen, Michael D. – James G. March – Johan P. Olsen (1972). “A Garbage Can Model of Organizational Choice.” *Administrative Science Quarterly*. Vol. 17, No. 1, pp. 1–25.

Coleman, Clive (2015). “Halt city 'shared spaces', says report by Lord Holmes”. *BBC*. Newspaper article. 2015-07-03. [Online] http://www.bbc.com/news/uk-33303031. Last accessed: 2018-04-30.

Corbett, Anne (2011). “Ping Pong: Competing Leadership for Reform in EU Higher Education 1998-2006.” *European Journal of Education*. Vol. 46, No. 1, pp. 36–53.

DARRP = Damage Assessment Remediation and Restoration Program (2018). “Deepwater Horizon”. [Online] http://www.darrp.noaa.gov/oil-spills/deepwater-horizon. Last accessed: 2018-04-16.

Epperson, Charles R. (2011). “A Perspective from Within Deepwater Horizon’s Unified Command Post Houma”. January 2011. Working paper. [Online] https://ccrm.berkeley.edu/pdfs_papers/DHSGWorkingPapersFeb16-2011/PerspectiveFromWithinDeepwaterHorizon_s-UnifiedCommandPost_Houma-RCE_DHSG-Jan2011.pdf. Last accessed: 2018-05-15.

Epstein, Steven (1995). “The Construction of Lay Expertise: AIDS Activism and the Forging of Credibility in the Reform of Clinical Trials”. *Science, Technology, & Human Values*. Vol. 20, No. 4, pp. 408–437.

Hammer, David – Mark Schleifstein (2010). “Gas surge shut well a couple of weeks before Gulf oil spill”. *The Times-Picayune*. Newspaper article. 2010-05-11. [Online] http://www.nola.com/news/gulf-oil-spill/index.ssf/2010/05/gas_surge_shut_well_just_weeks.html. Last accessed: 2018-04-16.

Kingdon, John W. (2003). *Agendas, Alternatives, and Public Policies*. New York: Longman. 2:nd ed.

Knaggård, Åsa (2009). *Vetenskaplig osäkerhet i policyprocessen: En studie av svensk klimatpolitik*. Diss. Statsvetenskapliga institutionen, Lund University.

Lovgren, Stefan (2004). “Exxon Valdez Spill, 15 Years Later: Damage Lingers”. *National Geographic News*. News article. 2004-03-22. [Online]

https://news.nationalgeographic.com/news/2004/03/0318_040318_exxonvaldez.html. Last accessed: 2018-05-03.

Lubchenco, Jane – Marcia K. McNutt – Gabrielle Dreyfus – Steven A. Murawski – David M. Kennedy – Paul T. Anastas – Steven Chu – Tom Hunter (2012). "Science in support of the Deepwater Horizon response." *Proceedings of The National Academy of Sciences of the United States of America*, Vol. 109, No. 50, pp. 20212–20221.

Mabus, Ray (2010). "America's Gulf Coast: A Long Term Recovery Plan after the Deepwater Horizon Oil Spill." Washington DC, EPA.

Maltby, Tomas (2013). "European Union Energy Policy Integration: A case of European Commission Policy Entrepreneurship and Increasing Supra-nationalism." *Energy Policy*. Vol 55, pp. 435–444.

Mancini, Christina – Daniel P. Mears (2013). "U.S. Supreme Court Decisions and Sex Offender Legislation: Evidence of Evidence-Based Policy?" *Journal of Criminal Law and Criminology*. Vol. 103, No. 4, pp. 1115–1153.

McNutt, Marcia K. – Steven Chu – Jane Lubchenco – Tom Hunter – Gabrielle Dreyfus – Steven A. Murawski – David M. Kennedy (2012). "Applications of science and engineering to quantify and control the Deepwater Horizon oil spill" *Proceedings of The National Academy of Sciences of the United States of America*, Vol. 109, No. 50, pp. 20222–20228.

Merriam, Sharan B. (1994). *Fallstudien som forskningsmetod*. Lund: Studentlitteratur.

NCBP = 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*. Washington, D.C.: National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling.

NOAA = National Oceanic and Atmospheric Administration (2010). "BP Deepwater Horizon Oil Budget: What Happened to the Oil?". NOAA Report, August 30 2010. [Online] ftp://ftp.library.noaa.gov/noaa_documents.lib/NOAA_related_docs/oil_spills/oil_budget/Oil_Budget_description_8_3_FINAL.844091.pdf. Last accessed: 2018-04-21.

NOAA = National Oceanic and Atmospheric Administration (2018). "Spill Containment Methods". [Online] https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/spill-containment-methods.html. Last accessed: 2018-05-09.

Obama, Barack (2010a). "President Obama's Oval Office Address on BP Oil Spill & Energy". 2010-06-15. Transcript. [Online] https://obamawhitehouse.archives.gov/realitycheck/photos-and-video/video/president-obama-s-oval-office-address-bp-oil-spill-energy#transcript. Last accessed: 2018-05-07.

Obama, Barack (2010b). "Deepwater BP Oil Spill: Presidential Press Conference". 2010-05-27. [Video]. YouTube. https://www.youtube.com/watch?v=2rT7IANtSjo&ab_channel=TheObamaWhiteHouse. Last accessed: 2018-05-07.

Obama, Barack (2010c). “President Obama Assesses BP Oil Spill Response”. 2010-05-28. [Video]. YouTube. https://www.youtube.com/watch?v=gN4xpBkLB3g&ab_channel=TheObamaWhiteHouse. Last accessed: 2018-05-07.

Obama, Barack (2010d). “Briefing on the BP Oil Spill”. 2010-06-15. [Video]. YouTube. https://www.youtube.com/watch?v=QmbOfkpNRTU&ab_channel=TheObamaWhiteHouse. Last accessed: 2018-05-07.

Obama, Barack (2010e). “President Obama Gives Oil Spill Update from New Orleans”. 2010-06-05. [Video]. YouTube. https://www.youtube.com/watch?v=QmbOfkpNRTU&ab_channel=TheObamaWhiteHouse. Last accessed: 2018-05-07.

Obama, Barack (2010f). “President Obama on the Recovery of the Gulf Coast”. 2010-08-15. [Video]. YouTube. https://www.youtube.com/watch?v=hp9ijnEzPpI&ab_channel=TheObamaWhiteHouse. Last accessed: 2018-05-07.

OSAT = Operational Science Advisory Team (2010). “Summary Report for Sub-Sea and Sub-Surface Oil and Dispersant Detection: Sampling and Monitoring”. December 17, 2010. [Online] https://www.restorethegulf.gov/sites/default/files/documents/pdf/OSAT_Report_FINAL_17DEC.pdf. Last accessed: 2018-05-12.

Pew Research Center (2010a). “A different kind of disaster story”. [Online] http://www.journalism.org/2010/08/25/oil-spill-was-very-different-kind-disaster-story/. Last accessed: 2018-05-03.

Pew Research Center (2010b). “100 Days of Gushing Oil – Media Analysis and Quiz: Eight Things to Know About How the Media Covered the Gulf Disaster”. [Online] http://www.journalism.org/2010/08/25/100-days-gushing-oil/. Last accessed: 2018-05-03.

Ramseur, Jonathan L. (2010). “Deepwater Horizon Oil Spill: The Fate of the Oil”. Congressional Research Service Report No. R41531. December 16, 2010. [Online] https://fas.org/sgp/crs/misc/R41531.pdf. Last accessed: 2018-05-12.

Rawat, Pragati – John Charles Morris (2016). “Kingdon’s ‘Streams’ Model at Thirty: Still Relevant in the 21st Century?” *Politics & Policy*. Vol. 44, No. 4, pp. 608–638.

Rodrigues, Jason (2017). “The Obama years: timeline of a presidency”. *The Guardian*. Newspaper article. 2017-01-03. [Online] https://www.theguardian.com/us-news/2017/jan/03/the-obama-years-timeline-of-a-presidency. Last accessed: 2018-05-15.

Senthilingam, Meera (2014). “Shared space, where the streets have no rules”. *CNN*. Feature. 2014-09-22. [Online] http://edition.cnn.com/2014/09/22/living/shared-spaces/index.html. 2018-04-18.

Sveriges Radio (2010). “BP fyller oljekällan med cement”. *Sveriges Radio*. News article. 2010-11-18. [Online] www.sverigesradio.se/sida/gruppsida.aspx?programid=83&grupp=11432&artikel=4023955. Last accessed: 2018-04-16.

Sylves, Richard T. – Louise K. Comfort (2012). “The Exxon Valdez and BP Deepwater Horizon Oil Spills: Reducing Risk in Socio-Technical Systems”. *American Behavioral Scientist*. Vol. 56, No. 1, pp. 76–103.

Wan, Zheng – Xuefeng Wang – Daniel Sperling (2013). “Policy and Politics Behind the Public Transportation Systems of China’s Medium-Sized Cities: Evidence from the Huizhou Reform.” *Utilities Policy*. Vol. 27, pp. 1–8.

Weiss, Carol H. (1979). “The Many Meanings of Research Utilization”. *Public Administration Review*. Vol. 39, No. 5, pp. 426–31.

Zahariadis, Nikolaos (2014). “Ambiguity, and multiple streams” in Paul A. Sabatier & Christopher M. Weible (ed) *Theories of the policy process*. Boulder: Westview Press. pp. 25–58.

Zukunft, RADM P. F. to VADM R. C. Parker. 17 December 2010. [Online] https://www.restorethegulf.gov/sites/default/files/documents/pdf/OSAT_Report_FINAL_17DEC.pdf. Last accessed: 2018–05–12.