Getting Below the Surface

Mapping the Gaps between Expert and Public Understandings of the Ocean and Marine Conservation in the United Kingdom

A FrameWorks Research Report

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I. Introduction

The health of the ocean is critical to the functioning of key planetary systems and life itself. And a range of factors, including climate change, ocean acidification, overfishing and pollution, are threatening the ocean's health. Despite these threats and the severity of their consequences, marine conservation remains low on the national and international agendas. While government, nonprofits and private organisations have taken some steps in the right direction, the wide-scale changes needed to protect the ocean and other marine systems have not been made.

Making change requires cultivating public understanding of the problem and generating support for necessary solutions. The British public currently lacks access to understandings of marine systems and does not recognise the scope of the solutions needed to protect the ocean. This report presents research that is part of a broader project, sponsored by the UK Branch of the Calouste Gulbenkian Foundation, to develop communications strategies to build public understanding of and support for marine conservation.

Communicating about the ocean and marine conservation in ways that increase public knowledge and drive support requires understanding how the public thinks about the ocean. This report analyses public understandings of the ocean and compares these patterns of thinking to the views of those who study and work on these issues. Understanding how experts and the public think about marine issues – and identifying the gaps between them – helps us predict how the public will respond to communications. A detailed view of public understanding also shows how we can begin to reposition – or reframe – messages to move the public conversation forward and create a context of opinion in which meaningful policy change is possible.

In contrast to public opinion work, which documents *what people say* (for example, in response to polls), the analysis presented here goes deeper to document *how people think*. We identify the assumptions and thought processes that inform what people say and structure their judgements and opinions. We look at how shared culture shapes shared patterns of thinking. This cultural-cognitive approach makes it possible to develop communications strategies that alter people's perspectives in fundamental ways.[1] By understanding how people are able to think and reason about an issue, advocates, experts and communications professionals can craft messages that avoid unproductive understandings and elevate new ways of thinking that better align with policy and social change goals.

The report begins by describing how those who study and work on ocean and marine conservation in the United Kingdom think about these issues. This account constitutes experts' shared understanding of what the ocean is; how it matters for human wellbeing; how it is changing, how these changes threaten our wellbeing and what can be done to address these problems. This is what we call an 'untranslated story', and it represents the key ideas that need to be communicated to the public through a reframing strategy.

The core of this report is an analysis of the cultural models[2] – the implicit shared understandings, assumptions and patterns of reasoning – that members of the British public draw upon to think about the ocean. We find that, while the public has well-developed ways of thinking about the ocean (which is

unsurprising, given the importance of and proximity to the ocean for those living in the British Isles), many of these understandings undermine their concern about threats to marine health. For example, the ocean is assumed to be so vast and expansive that it is largely immune to substantial negative change, and the public frequently thinks about the ocean at the surface level only. These ways of thinking lead people to underestimate the kinds of profound and enduring changes that are happening below that surface. Moreover, public knowledge about the role of the ocean within the planet's climate system is thin. This partial understanding keeps people from recognising the seriousness of the changes that are happening to the ocean.

The final part of the report compares, or 'maps the gaps', between expert and public views of the ocean and marine conservation. This analysis identifies places where expert and public understandings overlap and also where they diverge. It identifies the challenges that communicators face in moving the public conversation forward on marine issues.

We conclude with a set of framing recommendations that represents the beginning of a framing strategy. Building a comprehensive framing strategy will require developing additional frames and narratives to address specific framing challenges identified in this report. The report thus ends by outlining a to-do list for possible future framing research.

II. Research Methods

Expert Interviews

To explore and distil expert messages on the ocean and marine conservation, researchers at the FrameWorks Institute conducted 10 one-on-one, one-hour phone interviews with scientists, policy experts and advocates in the United Kingdom. These interviews were conducted in May and June 2016 and, with participants' permission, were recorded and transcribed for analysis. FrameWorks compiled the list of interviewees in consultation with the UK Branch of the Calouste Gulbenkian Foundation. The final list was designed to reflect the diversity of disciplines and perspectives involved in efforts to increase awareness about and improve policy around the ocean.

Expert interviews consisted of a series of probing questions designed to capture expert understandings about the ocean, how and why it is changing and the implications of these changes. In each interview, the interviewer went through a series of prompts and hypothetical scenarios designed to challenge expert participants to explain their research, experience and perspectives, break down complicated relationships and simplify concepts and findings from the field. Interviews were semistructured in the sense that, in addition to preset questions, interviewers repeatedly asked for elaboration and clarification and encouraged experts to expand on concepts they identified as particularly important.

Analysis used a basic grounded theory approach.[3] Common themes were pulled from each interview and categorised, and negative cases were incorporated into the overall findings within each category. This procedure resulted in a refined set of themes that synthesised the substance of the interview data. A penultimate draft of the expert story was revised in response to a feedback session conducted with experts in July 2016. This process resulted in the distilled expert story on the ocean and marine conservation presented below.

Cultural Models Interviews

The cultural models findings presented below are based on 20 in-depth interviews with members of the public in London and Cardiff in June and July 2016. Cultural models interviews are one-on-one, semistructured interviews that last approximately two hours. These interviews allow researchers to capture the broad sets of assumptions, or 'cultural models', that participants use to make sense of an issue or concept. Interviews covered thinking about the ocean and its relationship to other parts of the natural environment, changes to the ocean, the ocean's importance for humans and marine conservation. The goal of these interviews was to examine the cultural models that participants use to make sense of these issues. Researchers approached each interview with a set of topics to cover but gave participants the freedom to follow topics in the directions they deemed relevant. All interviews were recorded and transcribed with participants' consent.

Recruiting a wide range of people, and facilitating talk about concepts introduced by both the interviewer and the interviewee, allowed researchers to identify cultural models that represent shared patterns of thinking within the United Kingdom. Participants were recruited by a professional marketing firm and

were selected to represent variation along the domains of gender; race/ethnicity; age; residential location (inner city, outer city, regional/rural areas up to three hours from a city centre); political views (as self-reported during the screening process); educational background (as a proxy for class), religious involvement and family situation (married, single, with children, without children). The sample included 10 women and 10 men. Seventeen of the 20 participants self-identified as 'white', one as 'Black British', one as 'British Asian' and one as 'Caribbean British/white-mixed'. The mean age of the sample was 46 years old, with an age range from 20 to 69. Eight participants identified their political views as 'middle of the road', six as 'on the Left' and six as 'on the Right'. In terms of education, four participants held a GCSE (or equivalent) or below, seven had completed A levels or the equivalent, seven had attended university or completed university studies and two had attended or completed postgraduate studies. Eleven of the 20 participants reported no attendance at weekly church services, while four reported attending less than once a week and five reported attending weekly. Ten of the 20 participants were married, and 13 had at least one child.

To analyse the interviews, researchers used analytical techniques from cognitive and linguistic anthropology to examine how participants understand issues related to the ocean and marine conservation.[4] Researchers identified common, standardised ways of talking across the sample to reveal assumptions, relationships, logical steps and connections that were commonly made – but taken for granted – throughout an individual's talk and across the set of interviews. In short, the analysis concerns patterns discerned from both what was said (how things were related, explained and understood) and what was not said (assumptions and implied relationships). In many cases, analysis revealed conflicting models that people used to think about the same issue. In such cases, one of the conflicting ways of understanding often (though not always) dominated the other, in the sense that it more consistently and deeply shaped participants' thinking.

Analysis centred on ways of understanding that were shared across participants. Cultural models research is designed to identify common ways of thinking that can be identified across a sample. This research was not designed to identify differences in the understandings of different demographic, ideological or regional groups (this would be an inappropriate use of this method and its sampling frame). We hope, in subsequent research phases, to examine differences in opinion and in the use of cultural models across different groups.

On-the-Street Interviews

Data gathered from cultural models interviews were supplemented with 30 additional 10-to-15 minute 'on-the-street' interviews, conducted on pavements and squares in London in July 2016. All participants in these interviews signed written consent and release forms, and a professional videographer filmed the interviews. Efforts were made to recruit a broad range of participants. Interviews included a short series of open-ended questions designed to gather information about people's top-of-mind thinking about the ocean and dominant patterns of thinking about changes to the ocean, why they are happening and what should be done about them. These interviews were analysed along with the cultural models interview data, using the methods described above, to identify dominant models.

III. Research Findings

The Expert View

Below, we present a distillation of the themes that emerged from the analysis of expert interviews and data from the feedback session. These themes constitute the 'untranslated story' of the ocean and marine conservation in the United Kingdom – the core set of understandings that experts want to be able to communicate to the public about this issue. The untranslated expert story of the ocean and marine conservation is organised around five broad questions:

1. **What is the ocean?**
2. **Why does the ocean matter?**
3. **How is the ocean changing?**
4. **How will these changes affect human wellbeing?**
5. **What should be done to protect the ocean?**

The themes listed below are not ranked in any particular order; they are intended to provide a holistic, cohesive summary of the knowledge that experts deem important for the public to understand.

1. What Is the Ocean?

- **The ocean is a vast, diverse, dynamic space of life.** Our planet is predominantly (71 per cent) ocean, and for this reason some experts noted that we live on a 'blue planet'. This 'world ocean' is vast, not only in its surface but also in its depth. There are different levels of the ocean, from shallow waters to the deep-sea floor, with different temperatures, currents and habitats for life. The ocean is a dynamic space of interacting forces and ecosystems.

- **The ocean is a unified body that is linked to land as part of an interconnected planetary system.** Ocean and land are interconnected through chemical and biological pathways, including the circulation of oxygen and carbon dioxide, the water cycle, climate systems and ecosystems.

- **The ocean is wild and largely unknown.** There is much we still do not know about the ocean. New species and even new ecosystems continue to be discovered. Some experts suggested that we know more about other planets, such as Mars, than we do about our own ocean.

2. Why Does the Ocean Matter?

- **The ocean supports life on Earth.** Humans and the ocean are interconnected parts of a planetwide ecosystem. The ocean is a key contributor of oxygen to Earth's atmosphere, and it absorbs significant amounts of carbon dioxide. The water cycle shapes habitats and migration patterns of terrestrial species. Furthermore, the ocean is a source of protein to many land animals.

- **The ocean shapes human wellbeing by regulating the climate system.** Ocean currents distribute heat and help to regulate climate around the world, ensuring stable conditions for human society.

- **The ocean is important for human physical and mental health.** First and foremost, the ocean is essential to life as it provides the air that we breathe. The ocean also inspires leisure activities with physical health benefits, such as surfing, sailing and diving. The ocean provides people with experiences of freedom, inspiration and renewal, producing a range of positive psychological effects.

- **The ocean has economic value.** Much of the world's trade is conducted via ocean shipping routes, and communication cables run on the sea floor. Around the world, many individuals and communities depend on fishing for their livelihood. New technologies are facilitating underwater mining exploration and extraction. Offshore wind farms, tidal turbines and methods of tapping wave energy are in development. Finally, human emotional interest in the ocean supports a large tourism industry.

3. How Is the Ocean Changing?

- **Ocean species and habitats are being destroyed at alarming rates.** As the ocean is depleted of species and habitats, it is losing its diversity and complexity and becoming increasingly barren.

- **A primary threat to ocean life is overfishing.** The harvesting of the ocean for protein has intensified greatly with advances in technology, which means it has become possible to harvest protein at a faster pace than the ocean habitat can replace it. Many experts expressed specific concerns about bottom-towed fishing, which ploughs the floor of the sea, destroying entire seabed habitats with harmful repercussions through the food chain to species that inhabit other areas of the ocean.

- **Ocean life and ecosystems are also being damaged by pollution.** Experts defined pollution as any human-generated waste that natural systems cannot assimilate. Fish ingest microplastics (small bits of plastic from larger objects like plastic bags or the plastic ingredients in soaps and cosmetics), which then make their way up the food chain, leeching toxic chemicals into the bodies of creatures that ingest them. Human sewage and fertiliser runoff is also harming ecosystems by altering nutrients in the ocean, affecting temperatures and blocking light. Noise and light pollution disrupt some species and interfere with their ability to navigate and communicate.

- **Ocean life is being harmed and destroyed by increases in the temperature and acidity of ocean water.** Rising temperatures associated with climate change result in lower oxygen levels, making it harder for sea creatures to breathe. Acidification that results from increased levels of carbon dioxide threatens the survival of shellfish and crustaceans as it harms their ability to maintain their shells.

- **Warming of the ocean is already disrupting the climate system.** As carbon dioxide levels have risen and the ocean has warmed, it has become less effective in regulating ocean currents and heat flows. This is already leading to sea-level rise, increases in extreme weather and other consequences.

- **Disruptions to ecosystems and climate are mutually exacerbating.** Each form of stress on the ocean worsens the problems caused by the others, as changes to the climate disrupt ecosystems, and damaged ecosystems harm the ocean's ability to protect against the effects of climate change.

4. How Will These Changes Affect Human Wellbeing?

- **Damage to the climate system poses significant threats.** As the ocean warms, it increasingly loses its ability to regulate the flow of heat and precipitation, leading to increases in extreme weather. Sea-level rise is already threatening coastal communities and could have catastrophic consequences for coastal cities around the world. Climate change also poses major threats to human health, as changes in temperature are leading to problems such as the spread of infectious diseases and increased respiratory problems.

- **Destruction of coral reefs, mangroves and seagrass exposes coastal communities to flooding caused by storms and tidal activity.** As these natural formations disappear, they can no longer act as barriers to flooding. This threat is worsened by the increase in extreme weather that accompanies climate change.

- **The loss of ocean life entails the loss of an important food source for humanity.** This will have profound economic, social and health consequences. This is a basic survival issue for many people in poorer countries, where the sea is an essential source of nutrients. The economic impact is also being felt in the United Kingdom, where experts pointed to the collapse of rural fishing communities, due in part to various market forces. Experts also pointed out that diminished access to food and loss of livelihoods will lead to political crises, especially in poorer nations.

- **The loss of ocean life will have a psychological and physical impact on humanity.** Experts noted that human activity is making the ocean, which used to be rich and diverse, into a barren space. As the ocean loses its wildness, beauty and wonder, humanity loses an important source of inspiration. The fact that we are responsible is a source of psychological harm. In addition, humans can be physically harmed by eating plastic-polluted fish, and waterborne pathogens (from pollution) can cause illness to individuals who spend time in the ocean.

- **Impacts of human disruption of the ocean are only beginning to be understood.** Experts emphasised that climate and ecosystems are in delicate balance, and we still do not fully understand the repercussions of disrupting these systems. They stressed that disrupting these systems carries extreme risk and potentially unforeseen consequences.

- **Less prosperous communities and societies are disproportionately vulnerable to harm.** Societies with fewer resources are less able to protect themselves against the consequences of harm to the ocean and will bear the brunt of this harm.

5. What Should Be Done To Protect the Ocean?

- **Increase and expand the number of marine protected areas, expand restrictions on fishing activity in them and enforce existing restrictions.** Marine protected areas are water zones designated by various levels of government as restricted from human activity, for conservation purposes. One of the primary goals of such areas in the ocean is to restore and protect fish populations by providing essential areas for fish to breed. We need more of these areas, we must ensure they are connected to the 'blue belt' to aid species migration and we must define more areas as 'no-take zones', where fishing is prohibited.

- **Reform the fisheries industry.** European governments presently regulate the industry, limiting the numbers of fish that can be caught – but these quotas are too high. The quotas for fishing must be lowered, the size of the fish that are caught must be limited and additional controls must be put in place. These regulations are especially important because evidence suggests that they are effective.

- **Reduce pollution, especially plastic waste.** Microbeads in soaps and cosmetics are banned in the United Kingdom and should be made illegal internationally. Plastic bottle return programmes should be created. The amount of human sewage and agricultural nutrient runoff that enters the ocean must be reduced. Industries must be made responsible for the waste that they produce. The only way to accomplish this on the scale required is through government regulation of industry, including laws that punish violators.

- **Advance climate policy to reduce carbon dioxide emissions.** Governments around the world must work together to reduce carbon dioxide emissions, to limit further warming of the ocean and the atmosphere. Experts noted that the Paris Agreement on climate change will achieve positive results for the ocean by limiting carbon dioxide emissions that are warming the ocean and causing acidification; however, this will only happen if governments fulfil their commitments.

- **Incorporate the ocean and environment into school curricula.** Experts stressed that greater public understanding of how the ocean works and its importance must be fostered through systematic incorporation of marine and environmental issues into school curricula. This is important to generate an understanding of the ocean's importance and what needs to be done to protect it.

- **Improve international governance of the ocean.** The United Kingdom should work with other European governments to control fishing and create more marine protected areas throughout Europe. International cooperation is needed to regulate industry (fishing, oil, mining) in international waters, which comprise the majority of the ocean. The principle of sustainability must be incorporated into international rules, and international bodies charged with protecting the ocean must be strengthened.

- **Reform government decision-making processes to include civil society, foster public–private collaboration and integrate ocean planning across departments.** The marine planning process needs to be more transparent and inclusive so that all community stakeholders have a voice. Better consultation will achieve 'buy in' from local communities, which is important not only in principle but also to ensure cooperation with policy implementation. Government must also work with business to identify ways to limit industries' harm to the ocean. Within government, ocean planning must be 'mainstreamed' so that, rather than a niche concern, it becomes a regular point of consideration across ministries that manage issues such as energy, health and economic development. These activities are important to systematically incorporate marine conservation into all sectors of British society.

- **Government must encourage and fund more ocean and conservation research across academic disciplines.** More ocean research is valuable to better understand the human impact on the ocean and how the ocean can be protected. Experts emphasised that conservation is really about people and changing human behaviour; therefore, marine conservation must draw more heavily on social science.

The Untranslated Expert Story of the Ocean and Marine Conservation

What Is the Ocean?

- A vast, diverse, dynamic space of life that is largely unknown.
- Part of an interconnected planetary system linked to land through chemical and biological pathways (oxygen/carbon dioxide, water cycle, climate and ecosystems).

Why Does the Ocean Matter?

- The ocean supports all life on Earth. Humans and the ocean are interconnected parts of a planet-wide ecosystem.
- The ocean shapes human wellbeing by regulating the climate system, distributing heat and affecting weather through ocean currents.
- The ocean is important for human physical and mental health, providing the air we breathe and experiences of freedom, inspiration and renewal.
- The ocean has economic value (trade and communication, fishing, mineral resources, energy and tourism).

How Is the Ocean Changing?

- Human actions are stressing marine systems in ways that are destroying marine ecosystems and disrupting climate.
- Overfishing, dredging, acidification and pollution (including noise and light pollution) threaten marine life.
- Warming of the ocean is already disrupting the climate system and limiting the capacity of the ocean to effectively regulate climate.

How Will These Changes Affect Human Wellbeing?

- Damage to the climate system poses significant threats, including increases in extreme weather, devastating sea-level rise and major threats to human health.
- Destruction of coral reefs, mangroves and seagrass exposes humans to flooding.
- Loss of fishing stock has profound economic, social and health consequences, threatening nutrition and livelihood in communities across the world.
- The loss of ocean life will have a psychological impact on humanity (loss of wildness, beauty and wonder).
- Impacts of human disruption are only beginning to be understood, but current actions carry extreme risk.
- Less prosperous communities and societies are disproportionately vulnerable to harm.

What Should Be Done To Protect the Ocean?

- Increase and expand marine protected areas, further restrict fishing activity in them and enforce existing restrictions on activity within them.
- Reform the fisheries industry (stricter quotas and limits on size).
- Reduce pollution, especially plastic waste.
- Advance climate policy to reduce carbon dioxide emissions.
- Incorporate the ocean and environment into school curricula to build understanding.
- Improve international governance and embed sustainability with international rules.
- Reform government decision-making to include civil society, foster public–private collaboration and integrate ocean planning across departments.
- Fund research on marine conservation and human impact on the ocean.

The Public View

Below, we present the dominant cultural models – shared assumptions and patterns of thinking – that shape how people think about the ocean and marine conservation in the United Kingdom. These cultural models are ways of thinking that are available to the public, although different models may be activated at different times. It is important to emphasise at the outset that our research finds that **people have multiple ways that they are able to use to think about issues relating to the ocean and marine systems, and that at any given time a particular model will be active in shaping their opinions, beliefs and attitudes about these issues**. Some models are dominant and more consistently and predictably shape public thinking, while others are more recessive and play a less prominent role in public thinking. As discussed below, in some ways these models offer different, sometimes conflicting, ways of thinking about and understanding the ocean and marine conservation.

In everyday life, people toggle between different ways of thinking about social issues. At any given moment, one or more of their mental models may structure how they think, depending on circumstances, context or conversation.[5] Understanding the cultural models that are available to people offers communicators a critical tool. Some models are productive, making it easier for people to take on new perspectives and access information, while others are less productive, making it harder to process and understand certain messages. By communicating in ways that activate productive models and background unproductive ones, communicators can ensure that the content they are trying to communicate is truly accessible to the public. This is the essence of framing as a knowledge translation process.
Our cultural models findings are organised around six questions that people apply different models to think about:

1. **What is the ocean?**
2. **How does the ocean affect humans?**
3. **How do humans affect the ocean?**
4. **What is marine conservation?**
5. **What should be done to protect the ocean?**
6. **Who is responsible for marine conservation?**

1. What Is the Ocean?

Our research revealed four cultural models that members of the British public use to define the ocean. All four of these models have implications for those communicating about ocean change.

The *It's All Connected* model. The British public shares a pervasive, if vague, understanding of the ocean as part of a larger set of interconnected natural systems. There is a sense that 'it's all connected', even as people struggle to name or describe the mechanisms or processes that make up those connections.

> **Participant**: It's all interlinked. It's not just the ocean. There are things that we do on Earth that affect the ocean, that affect our environment. It just goes round and round, and everything's connected.
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> **Participant**: There's got to be an interaction between the oceans and the tides and the planets and the way everything fits together like a jigsaw puzzle. But I wouldn't know the details of that sort of thing.

Underlying this model is a foundational understanding of nature as a system of relationships that, unless disturbed, remain balanced and in harmony.

> **Participant**: There's a cycle of life and things live. You can't have one thing living without another thing in nature. [...] So, there's a balance within nature, and if you start altering the balance of nature, things change radically.

While metaphors of 'cycles' and 'circles' are frequently used, people can only consistently name and explain one of these: the water cycle.

> **Participant**: [The ocean] is the equilibrium. You can't have the rainforest of Brazil without having the ocean, because they need each other. There's precipitation, you know, we need rain. It comes from the ocean; that's where it comes from.

Other than the water cycle, people are mostly at a loss to describe ways the ocean is linked to other large-scale global systems. In particular, the British public lacks an understanding of how the ocean and atmosphere are connected via exchanges of temperature, oxygen and currents. The public also lacks an understanding of how marine ecosystems are connected to ecosystems on land. As we discuss below, when thinking about pollution, people recognise dangers to specific species but lack a general way of thinking about how ecosystems are connected.

The *Vast Other World* model. Participants understood the ocean as both vast and a world apart from our terrestrial environment. According to this model, the ocean is understood as something so large that it transcends human understanding and contains mysteries yet to be understood and depths yet uncharted. It is also seen as 'another world' – something apart and distinct from, rather than connected to, the rest of nature. For many participants, this sense of the ocean's vastness, power and otherworldliness lent a mystical and mysterious quality to their talk about the things that exist and take place within the ocean.

> **Participant**: I've decided that the ocean is another part of the world. And it's obviously under water. The whole thing. But it's another world. [...] It's colossal. [...] It's like another planet from what I've seen.
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> **Participant**: The sea provides a sort of expansive unknown and almost godlike mystery. People have sailed across the sea in boats hoping for new lives since forever.

Aside from these two models of connection and disconnection, the public adopts two distinct mental perspectives to think about the ocean. In the first, people look under the water and see depth and volume in the ocean. In the second, people's focus is trained fairly narrowly on the surface of the ocean, to the exclusion of what lies beneath.

The *Aquarium* model. People often think of the ocean as a vast container for fish and other marine life. This model draws people's thinking *down into* the ocean and its contents, and suggests a perspective on the ocean akin to a side view of an aquarium. People's attention is focused in three dimensions and on what is in the ocean.

> **Researcher**: So what comes to your mind when you think about the ocean?
> **Participant**: Depth. Beautiful lifeforms. Fish that give us food.
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> **Participant**: Probably more things than on land because it's so massive. You'll get plants that live in the sea, like they can on land. And different types and different sizes of fish. You get mammals that actually live in the sea. [...] It's just alive, everywhere you look. All the way around the sea, or around the ocean, there's just … there's life.

The *Surface* model. At other times, members of the public think about the ocean from a surface-only perspective – focusing on the ocean as it is commonly seen from its surface. This model of the ocean takes the shape of mental images of the beach and seaside vistas. Its strength likely arises from the fact that the vast majority of people experience the ocean almost exclusively at this largely surface level. When using this model to think about the ocean, participants had a relatively shallow view of ocean processes; things below the surface were 'out of sight, out of mind'. This model represents a deep, implicit way of thinking about the ocean. It was evident when, for example, questions about the ocean invoked responses that centred on the beach or seaside experience.

> **Researcher**: Is the ocean the same everywhere in the world or is it different in different places?
> **Participant**: I think the colour would probably be different. The texture, the level of pollution – you go to certain British beaches and they're just absolutely disgusting ... grey and murky, and there's rubbish. When you go to Thailand or to India, you've got crystal-clear beaches.
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> **Participant**: As one person on a beach with the sea – just from that point of view [...] It's given me a nice feeling to go there. Here it is again. There it is. It's just the same. And it doesn't matter if you go to this resort or that resort. It's still there. It's all the sea – very nice.

Implications of Models of the Ocean

- **The *It's All Connected* model must be deepened and expanded.** The model provides a useful starting point. It structures a baseline understanding that natural systems are connected and that changes in one area can have ripple effects into other areas. This model represents public knowledge that communicators can seek to activate, elevate and build on as they work to expand public understandings of how climate change, ocean change, ecosystems, species populations, the

food chain and human wellbeing are all interconnected. Yet this model is highly generalised and short on specifics – it is what FrameWorks calls a 'thin' model in that it does not enable robust or detailed thinking or discussion. While the public knows there are connections and cycles, they do not understand what most of those connections and cycles are, what drives them, how they work or why they matter. Without a better understanding of these connections, it is difficult to think through the specific consequences of disrupting these natural systems – and even more difficult to think about how to solve problems. Communicators need to help people understand both *how* systems are connected and *why* those connections matter. These are primary tasks for future frame development and testing.

- **The *Vast Other World* model gets in the way of realising that the ocean can change and is changing in significant ways.** The focus on the vastness of the ocean is likely to lead people to conclude that human activity cannot possibly have lasting impacts on the ocean; the ocean is simply too big for our actions to change it. By shrouding what goes on in the ocean in a sense of mystery, this model also obscures the concrete relationships – biological, chemical, climatic and other – that make the ocean critical to life and health on Earth. While this way of thinking is surely resonant, communicators must be careful not to cue it. Discussions of the ocean as a vast and mysterious place are likely to backfire. Instead, efforts should be taken to demystify ocean processes through engaging and relatable discussions of specific processes and changes within the ocean.

- **The *Aquarium* model is productive in drawing people's attention to the life that exists below the surface.** When this model is active in people's thinking, it brings their attention to the depth and volume of the ocean as a body of water. In the process, it makes them more receptive to communications about the negative implications of changes in ocean temperature and chemistry for animal life, and to thinking about the connections between the range of species that inhabit the ocean. To cue this model, what happens *within* the ocean should be emphasised when the goal is to focus people's attention on marine ecosystems. Visual aids that bring attention to the three-dimensionality of the ocean are also likely to cue this model productively.

- **The *Surface* model obscures biological, chemical and physical processes within the ocean.** In contrast to the more productive *Aquarium* model, this model narrows the scope of people's thinking and mutes attention to marine ecosystems and the mechanisms that determine ocean chemistry, currents and temperature. When discussing surface-level issues (for example, sea-level rise or garbage patches), communicators must connect them to what is happening below the surface to ensure people have the full range of marine processes in view and don't get stuck on the surface in their thinking about the ocean.

2. How Does the Ocean Affect Humans?

Members of the British public use five dominant models for thinking about how the ocean affects humans.

The *Source and Sustainer* model. Most broadly, the public sees the ocean as a central source and sustainer of life on the planet. According to this way of thinking, the ocean is the place where life on Earth began and the source of ongoing life on the planet.

> **Participant**: The first life on Earth was water-dwelling cells. We need water to live and the ocean is made of water. That's probably the most important thing that can be said about it.
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> **Participant**: Everything came from the sea. Life came from the sea. Fish that turned into land-based animals. [...] The sea is there first, and the land is there, after.

The *Source and Sustainer* model involves a vague assumption that the ocean is important in sustaining life – but, like the *It's All Connected* model, it is thin and does not help the public understand *how* the ocean sustains life.

The *Resource* Model. Embedded in this broader way of thinking of the ocean as a sustainer of life is a more specific model of the ocean as a resource for human use and consumption. Viewed in this way, the ocean is seen – through fishing in particular – as a key source of sustenance for many people, especially in less industrialised nations, and as a resource for trade and travel.

> **Participant**: We as humans eat fish, and lots of people all over the world eat fish. So we depend on that for diet and survival. And there might be some places around the world where the only food source that they have is fish. So that's really, really important. If that balance changed in a nation for some reason, because of people, mankind being too greedy and fishing too much of certain types of fish, that could leave the sea empty and no food for people to live.
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> **Participant**: Well … the importance of the ocean for us is … it boils down to food, jobs, work, generating money … that's important to us, as far as the ocean goes. That's pretty much what it boils down to, for me.
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> **Participant**: We depend on it for transportation across continents, countries, etc. [...] For trade and stuff like that – for making your country money, keeping ties with other countries that are in different continents, communications – stuff like that.

The *Mental Respite* model. Participants often responded to open-ended questions about the ocean by talking about its beauty, majesty and calming psychological effects. When viewed from this perspective, the ocean is understood as a source of relief from stress and anxiety and a way to restore a better, healthier state of mind. The most common way in which participants expressed this model was by talking about their own personal coastal or seaside experiences. Notably, the term 'sea' was frequently used when participants were using this model – more so than for most other models discussed in this report. The 'sea' seemed to be a term associated with personal experiences with the ocean.

> **Participant**: Say you're on the beach, and you relax, eyes closed. And you can hear the waters. Picture you're on a ship even, and the same thing. The smell of the air. It actually adds to that relaxation. That feeling of being in a good place.
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> **Participant**: If the waves are making a noise and crashing on the rocks as the water comes in, I feel a calmness. So, perhaps we should all live by the sea, or have the sound of the sea in our houses to calm us.

While the public strongly associates proximity to the ocean with mental wellbeing, participants often struggled when asked specifically about the relationship between the ocean and human health. People tended to invoke a limited set of concerns, such as sea-level rise, commercial fishermen's livelihoods and the ocean's role as a basic source of sustenance – but not to address other health-related topics, such as illness from exposure to microbes or toxins. The absence of discussion of health effects indicates a lack of knowledge about the ways in which the ocean affects people's health at both personal and population levels.

The *Island Nation* model. The sea is also connected to people's idea of nationhood in deep ways. The United Kingdom's history as a dominant seafaring nation is part of people's basic model of the nation and its place in the world.[6] There is also a strong sense of the sea as a shaper of British identity through the widely shared experience of the seaside holiday, and a view of the sea as the prototypical holiday destination for British families. An understanding that the sea is central to UK nationhood unites these patterns in people's talk.

> **Participant**: The history of England is the history of master of the seas. That's what I was born into. That's what I believe. That is our national character. [...] It's in our subconscious.
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> **Participant**: I think we have been seen as a seafaring nation, the fact that we colonised so many parts of the world, we did it via the sea. This tiny little island, we spread out all over the world and it was done by going on the sea. So our relationship to the sea is the fact that we are an island nation, and we stretched out from there.
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> **Participant**: I think the everyday man in the street, I think they go down to the seaside for recreation. They go down there, and they swim in the ocean. And I think that's their physical touch with it. Swimming with the children and their family and having a real good time splashing about. Again, that's their connection.

The *Relative Importance* model. Many participants assumed that the ocean is – and is experienced as – more important to people who live in proximity to it, and correspondingly less important to those who live inland and are more removed from it. Using this model, people assume that changes to the ocean do not have a concrete impact on the lives of people who do not live near the ocean.

> **Participant**: You are shaped by your environment. A Bedouin tribesman isn't going to be that interested in what's going on in the ocean. Someone who lives in the Alps isn't going to be that

interested in what's going on with the ocean. I think if you actually live in or around or near the sea, you have an awareness of the ocean.

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Participant: I think if you're a banker you don't really care about the ocean. If your livelihood is the ocean, it's very important, like if you're a fisherman or a sea captain or something. But for people in their normal everyday nine–to–five jobs, they're not even worried.

When active in people's thinking, this *Relative Importance* model also structures the idea that those who live far away from the ocean can easily take it for granted and can more easily ignore or dismiss information or knowledge about problems facing the ocean.

> **Participant**: If your street is horribly messy, most people will ring the council or talk to the people who are making the street messy because it's in your view and it's affecting you. But I guess that's less so of the sea, because unless you live by it, or are constantly in touch with it in some way, you just know that something bad is happening, but it doesn't affect you, so you don't deal with it.

Implications of Models of Ocean Effects on Humans

- **The *Source and Sustainer* model can be leveraged to expand understanding.** The idea of the ocean as a sustainer of life provides a key starting point for considering the ocean as a fundamental driver of natural systems that affect everything on the planet. Like the *It's All Connected* model, the broad, vague sense that the ocean sustains life must be filled in and expanded through explanations of the specific mechanisms by which the ocean sustains life. Communicators need to focus efforts on cultivating understanding of *how* the ocean sustains life on the planet, and they need new frames to help in this work.

- **The *Resource* model has mixed implications.** In highlighting the importance of the ocean for humans, it might be possible to use the model to elevate the idea that the ocean is valuable and worthy of protection. In this way, this model could potentially be invoked to argue that changes to the ocean threaten the availability of important resources, and could highlight the specific threats faced by coastal countries. However, there is reason for caution with this strategy. The consumptive aspect of the model – the idea that the ocean is there to be used by humans for *our* purposes – organises thinking around the idea of *taking from* the ocean, not protecting or preserving it. Research needs to explore exactly what happens when communicators intentionally activate this way of thinking as a way to increase support for policies designed to protect the ocean and conserve marine systems. Does this way of thinking drive support or backfire by framing the ocean as a resource for human consumption?

- **The *Mental Respite* model can help to make the connection between the ocean and psychological health and wellbeing.** The model aligns with expert thinking and enables people to see the psychological benefits of being near the ocean. This supports the idea that the ocean should be protected and preserved. While care should be taken not to frame the human–ocean relationship in overly mystical or romantic terms (for fear of triggering the *Vast Other World* model), there is likely value in emphasising that the ocean is a unique feature of our biosphere

from which people derive psychological benefits. The *Mental Respite* model does have limitations, however; despite its dominance, it focuses exclusively on psychological benefits to the detriment of other connections between the ocean and human health. Fostering public understanding of how the ocean shapes human health more broadly will require greater effort and specific communications strategies.

- **The *Island Nation* model supports the idea that the ocean is important and represents an easily accessible way of increasing issue salience among the British public.** By linking British identity to the ocean and to the role it has played in creating the modern UK nation, this model elevates the ocean's importance in a deep, emotional and powerful way. The ocean always has and always will remain a defining feature of the British Isles, and communicators can speak to that fact as they assert the need to protect the ocean and not take it for granted.

- **The *Relative Importance* model mutes recognition of the ocean's importance to *all* people.** By tying the importance of the ocean to geographic proximity, the model obscures the importance of the ocean for people who do not live near it. To avoid this implication, communicators must be careful not to focus solely on the *heightened* importance of the ocean to coastal communities. Such assertions will reinforce the assumption that the ocean is unimportant for noncoastal communities. When discussing effects on coastal communities, they should, when possible, tie in effects that extend to inland areas to highlight the importance of the ocean and changes to it for everyone.

3. How Do Humans Affect the Ocean?

Four patterns dominate public thinking about whether and how humans are having an impact on the ocean.

The *Material Pollution* model. Pollution and rubbish come to mind first for many people when asked to think about problems in the ocean. This thinking is particularly focused on material pollutants like oil and plastic containers – substances that are easy to visualise and think about. People immediately recognise that pollutants are bad for marine life. This concern was represented in particularly vivid terms in talk about plastics and how they can get stuck in or on various body parts of animals, inhibiting growth or causing suffering. There was also a pattern of concern about high-profile oil spills of recent decades.

> **Participant**: Pollution can be plastic bottles thrown into the waterways. They all end up in the rivers and oceans. [...] It is a danger for the lifeforms because they might get trapped inside plastic bottles or they might get plastic bottles stuck in their throats.
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> **Participant**: I've seen images of seas, rivers full of plastic bags, strangling birds and wildlife.
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> **Participant**: We've had several horrid disasters where the oil comes out of the ship from crashing or whether it's leaked, and the poor birds get all their feathers cut up, and they can't swim and things.

It is important to highlight that people's understanding of the effects of pollution are limited to the specific animals that come into contact with pollution – the birds strangled by plastic bags or drenched in oil. The model does not include a broader understanding of how pollution disrupts ecosystems; in other words, it doesn't help people think about broader repercussions of pollution.

This is emblematic of broader limitations of the way in which people see the connections between pollution and the ocean. There is a limited understanding of what pollution is, which does not include forms of pollution beyond oil spills and plastics – such as agricultural runoff, industrial dumping or specific problems like plastic microbeads and pharmaceuticals.

The *Overfishing* model. Alongside attention to some forms of pollution, there is a strong, shared familiarity with the problem of overfishing as one of the dominant ways that humans cause problems in the ocean. This talk included attention to the way that current fishing practices unintentionally capture fish not intended for market.

> **Participant**: Fish stocks will be depleted if you overfish them. [...] A good example of that is tuna fishing. Overfishing tuna fish, it depletes the stock.
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> **Participant**: There's a big problem with fish. I think the way that they are caught. [...] The problem, I think, is when they're trying to maybe get a certain type of fish and they're picking up other fish and then that fish is disregarded or killed or not used as food.

Alongside the depletion of stocks, there is also some attention to the problems of species extinction and ecosystem disruption, especially through interruptions in the food chain. In short, people understand that overfishing throws things out of balance.

> **Participant**: The word 'ecosystem' comes to mind. Must disrupt the ecosystem. It's like there's a natural course … if you get rid of one thing in an ecosystem, it has a direct impact on the things around it. And in the same way … if you fish, it must have an impact on the ecosystem. [...] You have to think of what the fish feed on ... it's a chain.
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> **Participant**: It's sort of like the ecosystem's broken down. They all need each other to be there. If one group disappears altogether all of a sudden, their breeding pattern will be affected as well, won't it? And other things in the sea that eat them – the food chain.

It is important to highlight that thinking about overfishing helps people recognise the possibility of ecosystem disruption. As we discussed above, people generally struggle to move from harm to individual species to a recognition of systemic disruption. But the idea of the food chain, triggered by thinking about overfishing, is one example where people can think about how species' fates are connected and how chain reactions can happen.

The *Unchanging Sea* model. As part of the *Vast Other World* model, there is a common assumption that the ocean is so large and powerful that it is largely immune to substantive change. In this way, humans are so small that they *can't* have a significant impact on the ocean.

Participant: From what I've witnessed and what I've studied, I don't think that ocean has changed too much. I do think above the ocean has changed quite a lot for the environment. But the actual oceans … I mean … No, I don't think too much has changed. If you go back … 100 years or so and look at these places, pretty much what was there then is pretty much there now.

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Participant: It's essentially untamable. It's totally wild. It's exactly as it was, I don't know, 1,000 years ago. What's changed? It's still – If you looked out on an ocean then, you'd look out on an ocean now.

The *Sea-Level Rise* model. When asked specifically about ocean change, participants often brought up sea-level rise – a top-of-mind effect of climate change. This talk was grounded in a strong consensus that global warming is happening, that glaciers and ice caps are melting and that ocean surface levels are on the rise as a result.

Participant: The climate is supposed to be getting warmer, and the ice caps are melting and going into the oceans. So, the ocean levels are rising. And a lot of those animals – you think of polar bears and the inhabitants of the ice caps – they're losing their habitat as well, aren't they?

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Participant: Burning fossil fuels basically creates the greenhouse effect and surrounds the planet in a sort of thicker atmosphere that the sun can get through, reflect off of the planet, which heats up the atmosphere, which melts ocean, melts ice caps, and the melting of these ice caps raises the level of the ocean.

Implications of Models of Human Effects on the Ocean

- **The *Material Pollution* model is of limited utility.** The model does, to be sure, support concern about pollution and its negative consequences for ocean life. However, its narrow understanding of types of pollution and its failure to support thinking about the ways that pollution affects ocean and climate systems limits its usefulness. What is missing from the model is a sense of pollution as a pervasive, complex problem that has deeper implications for the overall health of the ocean. Communicators need explanatory strategies that deepen people's understanding of pollution. These tools need to do two things. First, they need to expand the types of pollutants that people recognise as relevant. Second, and more importantly, new communication tools need to help people see how pollution links up with other human activities – such as carbon dioxide emissions – and has effects that reverberate through the ocean to other climate systems.

- **The *Overfishing* model provides a useful entry point for discussing ecosystem disruption.** Communicators can leverage the familiar idea of the food chain to cue thinking about how ecosystems are being disrupted. Once this idea has been introduced, they can pivot from overfishing to other sources of disruption, explaining how, just as overfishing can unbalance ecosystems, so can pollution, acidification or other sources of harm to marine life. However, a note of caution is warranted. When thinking with the model, people may focus on negative *economic* impacts of overfishing, which can serve to divert attention away from broader ocean and ecosystem impacts. Discussions of specific negative impacts to fishing communities should

therefore always include reference to ecosystem impacts as well, to keep the broader picture in view.

- **The *Unchanging Sea* model is perhaps the most problematic model identified in this research.** It assumes that the ocean's vastness protects it from any enduring changes beyond those governed by natural processes. As such, this model represents the central obstacle to helping the public understand that the ocean is undergoing dramatic negative changes and that these changes must be addressed. This model should be a focal point for future prescriptive communications research, which must identify strategies to keep this model from dominating thinking and find other equally thinkable ways of helping people see the changes taking place in ocean and marine systems.

- **The *Sea-Level Rise* model narrows thinking about the effects of climate change.** On the one hand, the model is positive: it draws attention to the problem of excessive reliance on carbon-based energy and its consequence of global warming, thereby structuring support for alternative energy infrastructures; it also draws attention to the heightened vulnerability of coastal nations and communities. On the other hand, though, because the model is not anchored in a holistic understanding of climate and marine systems it does little to help people think about other changes to the ocean. Its narrow focus allows people to think that, at the end of the day, it is really only coastal populations (and polar bears) that are threatened by ocean change. Communicators need strategies for broadening and deepening understanding of climate and marine systems to enable people to see how human activities have a wide array of consequences that threaten people and animals across the globe.

4. What Is Marine Conservation?

Participants had two dominant cultural models for thinking about ocean protection and marine conservation. Both of these ways of thinking have problems similar to those associated with the *Material Pollution* and *Overfishing* models described above. At a basic level, people assume that conservation is about protecting marine life from these threats. Importantly, the problem of sea-level rise and the larger challenge of climate change were not consistently linked to the issues of conservation and protection.

The *Heroic Activism* Model. Marine conservation is regularly links to heroic, brave and extraordinary acts of environmental protection. The organization Greenpeace holds a prominent place in people's thinking about ocean protection. It is *the* exemplar of an organization that works—often in dramatic form—to protect species and prevent pollution in the ocean. More often than not, participants expressed admiration for the heroic lengths to which Greenpeace goes in pursuit of protecting the ocean. According to this model, marine conservation is something done by committed environmental activists.

> **Researcher**: When you think about ocean or marine conservation, what sorts of things come to mind?
> **Participant**: Well, things like Greenpeace, I suppose. Bodies of people like Greenpeace that are raising awareness and actually being proactive about doing things, about protecting some of the dependents on the ocean.

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Participant: Greenpeace. [...] They fight the good fight, don't they? They'll turn up where there's some disaster or if they see something being built on the ocean. I've seen them turn up and jump on top of a whaling ship and things like that just to make their point. They're nonviolent.

The *Spotlight on Species* model. Overall, people clearly and strongly associate ocean protection or marine conservation with the idea of preventing species extinction. In our research, much of this thinking was focused on exemplary species like whales, dolphins and tuna. The infrequency with which a broader ecosystem perspective was present in people's talk about protection and conservation is notable.

Researcher: If somebody were talking about ocean conservation, what would you guess they were talking about?
Participant: Protecting wildlife. I think there are certain species that might be going extinct, so making sure that doesn't happen.
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Participant: Conservation is somebody going out somewhere and looking at what species of fish or mammal should be in this area at this time of year and [asking], 'Why aren't they here? Where are they going? What's doing it? Why are the numbers depleted?'

Participants often visualised marine conservation or protection in terms of creating sanctuaries where species are given the chance to recover and grow their depleted populations.

Researcher: What kinds of things do you think marine conservation involves?
Participant: I would imagine it involves people doing a lot of research to do with the species that are endangered and trying to put them into places where they can protect them, where they can multiply before they're allowed out again.
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Participant: If you're going to do that conservation thing where it's a restriction, it's a no-go zone. You can't go in it, you can't fish in them … It's like saying all the trees that you're cutting down in the forest, 'no, no, no. That's out of bounds, and you can't touch a tree'.

Implications of Models of Marine Conservation

The *Heroic Activism* model undermines the idea that marine conservation is an issue of general concern. In one respect, the model represents an inspirational and exemplary image of people acting on their convictions to fight for something of recognised value. At the same time, the heroic quality of the model makes conservation something that *other* (more heroic) individuals are engaged in. The model also turns attention away from marine conservation as a domain of public policy, and instead makes it an arena for inspired individual or private action by people who push against and work outside of normal systems or boundaries. Communicators must be careful not to depict conservation as an activist-only concern. Research is needed to identify the best ways of building understanding of ocean and marine conversation as a matter of public action and policy change rather than just heroic activism to protect endangered species.

- **The *Spotlight on Species* model makes systemic problems hard to see.** While the model helps people recognise that countering species endangerment and extinction is central to marine conservation, it prevents adoption of a broader perspective. The narrowness of the model – as being about 'saving the whales' or other particular animals – means that people are not thinking about the broader set of interconnected systems that are part of conservation. Making a larger argument for comprehensive and sustained marine conservation and ocean protection policy will require expanding people's understandings beyond protection for a handful of species, to include steps to protect entire ecosystems and address other threats to the ocean, such as those related to climate change.

5. What Should Be Done To Protect the Ocean?

Beyond asking participants what marine conservation *is*, researchers asked them what steps (if any) they thought should be taken to protect the ocean. Participants drew on four models to think about solutions to the threats facing the ocean.

The *Fatalism* model. There is a strong sense of pessimism about the prospects of changing current human behaviour to better protect the ocean. This fatalism has multiple sources. The *Vast Other World* model leads people to conclude that the size and scope of the ocean itself make it virtually impossible to fix problems. People draw on the *Material Pollution* model to reason that the extent of existing damage makes the problem extremely hard to deal with. In addition, when talking about solutions, participants suggested that the nature of human greed and carelessness are basic impediments to responsible action.[7]

> **Participant**: How do you keep your eye on that [pollution]? If everyone says, 'Yeah, okay, we won't put pollution in'. [...] How do you deal with it? It's so vast. It's like a void. It's like a distant star. So how does that work? On land it's a little bit easier, isn't it?
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> **Participant**: A lot of the damage has already happened. I don't know what the government is doing to stop large companies, to stop rubbish being swept into the sea. I don't know what they do, really, about cleaning it up.
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> **Participant**: The thoughtful members of the human race can make efforts, but as soon as there's financial incentive, a lot of the ethics go out of the window.

This fatalism was also evident in people's tendency to talk about interventions in largely reactive terms – as being about clean-up efforts – rather than effective prevention or harm reduction, which are assumed to be impossible.

> **Participant**: People looking after animals that are caught in nets and stuff like that – that is the type of idea that I have in my head when I think conservation. […] You see mass amounts of volunteers and people that clean up beaches and animals that have been affected by oil spills in the ocean. People like that spring to mind.

Part of this fatalism stems from people's tendency to get stuck thinking about solutions at the individual level, where the scope of action is simply incompatible with the scope of the problem. After all, how can an individual address changes to entire marine systems?

> **Participant**: There's only a certain amount of stuff that people can do, other than just picking up rubbish that's been left on the beach, to stop it from going in the sea. And not putting plastics or oils or bad stuff in the sea. I don't really know what else people could do.

The *Elevate Awareness* model. Using this model, the public assumes that if people were more aware, on an individual level, about the important challenges facing the ocean and its conservation, their personal actions would change as a result. Generally, this model is about the individual as the solution agent – the actor who can and should take on the task of protecting the ocean directly through his or her good choices. Elevating awareness would lead those *more enlightened* individuals to recycle plastic bottles rather than throwing them in the bin, or to make better consumer choices about what they buy.

> **Participant**: There needs to be some sort of drive to capture the imagination of the media. There needs to be programmes made about it, there needs to be column inches in newspapers, there needs to be television programmes, there needs to be something that makes people go, 'Oh, all right, is that really what's happening?'
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> **Participant**: A lot more dissemination of knowledge so we're aware of what we're doing. Like if one plastic cup – what does that do, where does it go, is it going to a landfill? Is that biodegradable? I think that would be great.

The *Reduce Fossil Fuels* model. Participants consistently emphasised the importance of reducing fossil fuel use and transforming the planet's energy systems. The strength of this model should *not* be interpreted to mean that the public understands the links between carbon emissions and the full range of negative anthropogenic ocean changes. For example, the participants never introduced the topic of ocean acidification; nor did they talk about the warming of the ocean while discussing climate change. Yet the model indicates a limited but real recognition of the importance of shifting to alternative energy and that this would, in some way, benefit the ocean.

> **Participant**: The pollution is something that really could have more done about it. [...] At the moment, diesel as a fuel has got a big frown over it, hasn't it? [...] The bikes that Boris Johnson introduced in London – there are thousands of them now. They're used all the time. [...] The buses are great. They've got electric buses, haven't they?
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> **Participant**: We are capable of so much better than we are now. It's like, 'Yeah, all right, oil is dying. Let's look toward renewable energy sources.' The ocean is one. Solar power is another. The combination of the two. There is still wind power as well. There are renewable things in nature that we can utilise that don't have an environmental impact other than where these things are stationed.

The *Economy v. Environment* model. Underlying people's thinking about ocean protection is a sense that there is often a tension between the competing interests of protecting nature on one side and maintaining the economic and technological priorities of life in the modern world on the other. At times this model fuelled the fatalism described above, contributing to the idea that the modern economy makes ocean protection a difficult goal to realise.

> **Participant**: I think the crunch point that we are going to have to hit before anybody does anything is to realise that not everything can be measured in pounds, shillings and pence, and that there are some decisions we are going to have to make which are going to necessitate a hit economically, but we are going to have to make those decisions in order to survive literally. So saving ourselves may well mean an impact on GDP growth. But GDP growth is an artificial human construct that has no solid tangible basis.
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> **Participant**: You have to sort out what we're doing as we're advancing, to stop you going backwards. You don't want to go back to the Stone Age. You don't want to be without electricity, do you?

This tension was often evident in participants' talk about people living in areas of the non-Western world where basic sustenance is often a struggle, which constrains people's capacity to care for the ocean and the environment more broadly.

> **Participant**: The overfishing in the [Persian] Gulf – there were boats, thousands, coming all the time laden with fish. And from what I read, that doesn't happen anymore because the fish just aren't there. But those people need to do that to feed their families. […] People are undertaking the kind of work that's hugely damaging to the environment. They're doing it out of a necessity to survive and feed their families.

This tension was also evident in people's talk about overfishing around the United Kingdom. There was a recognition of the priority of protecting endangered species alongside a concern about challenges to people's livelihoods.

> **Participant**: If somebody's relying on a certain type of fishing, and then somebody says, 'Well actually, there's not enough of this. You can't fish them anymore', what does that man do for a living? One would hope that he would get compensated.

Implications of Models of Solutions

- **The *Fatalism* model challenges efforts to boost support for critical policies and interventions.** As long as people believe that much of the damage already done to the ocean is irreversible, and that both human nature and the nature of modern life mean that more damage is inevitable, they are less likely to believe that investments in tackling ocean change are worthwhile and have a chance of being effective. Taking on this fatalism must be a central task for the larger communications project moving forward, and future research should in part be directed towards

testing strategies and tools that can undermine this model and strengthen the idea that there is, in fact, much that can be done.

- **The *Elevate Awareness* model diverts attention from systemic solutions.** While raising awareness around ocean change is itself an important goal – and generating widespread understanding of the problems facing the ocean is critical for making systemic change possible – there are problems with how this model organises people's thinking. Underlying the model is the assumption that the ocean should be protected primarily through individual behaviour change (for example, recycling bottles). The *Elevating Awareness* model focuses thinking entirely on the individual, obstructing thinking about the important policy measures that are necessary for protecting marine systems. Communicators should be careful about stressing awareness because of the tendency of this strategy to focus people's attention at the individual level and distract from systems- and policy-level thinking.

- **The *Reduce Fossil Fuels* model is a useful starting point for communicating about carbon emissions.** Messages about the problems with fossil fuels have clearly got through to the British public, and people understand that changes in energy usage are necessary to combat global warming and climate change. As such, this model is the 'top-of-mind' solution when people are asked to think about ocean and climate change and environmental challenges more broadly. However, this model is *not* grounded in a deeper understanding of the links between excess carbon in the atmosphere and changes to the ocean. As a result, people lack a full understanding of *why* reducing fossil fuels is important, which limits their support for policies to reduce carbon emissions. Without an understanding of process, support for specific programmes will continue to be low. Expanding thinking about ocean warming, acidification and other changes linked to excess reliance on fossil fuels is likely important to boost support for carbon reduction policy. FrameWorks research on ocean and climate change in the United States produced several tools designed to accomplish this task, including the explanatory metaphors *Regular v. Rampant Carbon Dioxide* and *Climate Heart*, as well as explanatory chains that can generate quick understanding of acidification.[8] These tools should be tested in the United Kingdom to see if they enhance understanding of basic processes and build policy support.

- **The *Economy v. Environment* model undermines support for ocean protection.** If ocean protection (and environmental protection more generally) is assumed to come at the expense of necessary features of modern economic life, conservation will seem both impossible and undesirable. As long as people assume a degree of incommensurability between capitalism and caring for the environment, they will assume that some level of environmental degradation is unavoidable – as the price of modernity. This suggests the need to develop strategies that alter the zero–sum equation by explaining how ocean protection can *enhance* human prosperity and wellbeing. This likely requires strategies capable of broadening people's thinking about what prosperity is – beyond a narrow financial sense of this concept – as well as helping people see how policies and interventions could effectively handle both environmental and economic imperatives.

6. Who Is Responsible For Marine Conservation?

As described above, the ocean is in part thought of as a *Vast Other World*, in many ways separate from the terrestrial affairs of humanity; it is not thought of as a social or political space in any sense. In some respects, this pattern of thinking models the ocean as a sort of global commons – though no participants used that specific language – and mutes attention to questions of ownership or responsibility.

> **Researcher**: Do you think people feel ownership of the seas?
> **Participant**: The bit that's near them, perhaps, and the bit you enjoy. [...] I've never thought of the sea as being divided up into this country owns that bit and this country owns that bit.
> **Researcher**: How do you view it?
> **Participant**: Just belonging to everybody, I suppose. Encompassing us all. I never thought about it.

The *lack* of talk across the interviews about who is responsible for the ocean was notable. Issues of responsibility did not typically emerge in interviews until introduced by the interviewer. When asked about responsibility, participants consistently defaulted to a thin model of shared responsibility.

The *Everyone's Responsible/No One's Responsible* model. When asked who is responsible for protecting the ocean, participants consistently said 'everyone' or 'we all are'. This model simultaneously individualises responsibility – individuals should make better choices about those behaviours under their control – and, in broadly dispersing responsibility, ultimately attributes it to no one in particular. While individuals are assumed to be responsible for making better choices, no one is assigned responsibility for fully addressing the problems facing the ocean.

> **Researcher**: If we were thinking about protecting the ocean or resolving whatever the problems are that are affecting the ocean, who's responsible there?
> **Participant**: Everybody. Everybody. That's why I said – to make people knowledgeable about the whole idea. Everyone is responsible for it. It's not just one person. If a child throws plastic into the ocean, he knows no better. But if the mother knows, then the mother will tell the child, 'No, that's not a good thing. Don't do that again'.
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> **Researcher**: Who's responsible for the sea?
> **Participant**: I think we all are. Maybe I'm wrong, I don't know. I suppose if it [the sea] belongs to us as a whole, as a population, then we all need to look after it.

The *Job of Governments* model. When pushed to think specifically about an agent that could accomplish some of the interventions they had already talked about earlier in the interview, most participants did invoke national governments as the most powerful and responsible agents.

> **Participant**: Fundamentally the nation state is responsible ... for safeguarding its coastline and the waters about it.
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> **Researcher**: What makes government a thing that is best at doing the things we're talking about?

> **Participant**: Because they have the money for the resources – all the resources – to get the right scientists involved.

As to whether the United Kingdom has a particular role to play regarding ocean protection, no clear consensus emerged across the data. Many argued that the British role should be consistent with the role of other seafaring nations. Others suggested that the power and influence of the United Kingdom means it should play a heightened role. Still others expressed uncertainty and admitted to not having given the topic much thought. The lack of any clear model of governments' role indicates that this is not something that people think about much, and that it lies at the periphery of public concern.

The *Assumption of International Governance* model. Many participants assumed that multilateral negotiation among governments is necessary when trying to address issues like pollution or overfishing, because no single nation has exclusive claim or control over the ocean. There was also a prevailing assumption that some kind of governing international body 'must' already be in place, though no one could name any international organisation or treaty by name.

> **Participant**: I think world governments need to get onboard. And things like the summits we have regarding environment and pollutants and stuff like that, I think the use of plastics needs to be looked at a little more seriously.
>
> —
>
> **Participant**: I think there's probably something like a global environmental agency that every year or so … there's a lot of people working in there and monitoring the sea, and adjusting or looking at the balance of species in the sea, and making decisions about what is safe to take out of the sea, and what shouldn't be taken out of the sea and what should be left in there to keep the balance flowing, and keep the balance working.
>
> —
>
> **Participant**: I'm sure there is a certain body where various countries get together over this. I'm sure there is.

Implications of Models of Responsibility

- **The *Everyone's Responsible/No One's Responsible* model undermines the idea that ocean protection is a *public* issue.** By individualising responsibility, the model diverts thinking away from public solutions and presents an obstacle to efforts to achieve systemic and policy solutions to ocean challenges. Communicators must emphasise the collective and public nature of these challenges and stress collective responsibility for addressing them. The challenge of fostering a sense of collective responsibility is further complicated by the necessary division of responsibility for ocean protection between local, devolved, national and international governments. While experts stress that each of these levels has a critical role, dividing responsibility between levels is likely to be a barrier to the public adopting a sense of ownership over the issue, since there is no single body for the public to hold responsible. Research is needed to determine how best to frame the issue in ways that acknowledge the different roles of different levels of government while cultivating a sense of collective responsibility among the British public.

- **The *Job of Governments* and *Assumption of International Governance* models must be expanded and filled in.** The central idea that ocean protection is a domain of national and international governmental responsibility is a positive one and provides a useful counter to the individualised model of responsibility. Yet these models provide little sense of (1) what governmental roles are or should entail and (2) how governments are (or should be) acting unilaterally, bilaterally or multilaterally. The public needs help understanding the proper role of governments – acting alone and in concert – in the area of ocean protection. Strategies must be developed to quickly convey governments' role and the proper division of action at different levels (local, devolved, national and international).

IV. Mapping the Gaps in Understanding

The goals of this analysis have been to:

- Document the way experts talk about and explain ocean systems and marine conservation and the implications of these concepts for human wellbeing
- Establish the ways in which the British public understands these issues
- Compare and 'map' these explanations and understandings to reveal the overlaps and gaps between the perspectives of these two groups.

We now turn to this third task.

Overlaps in Understanding

There are important overlaps between expert and public perspectives about the ocean. These overlaps provide solid ground for engaging the public and building greater understanding. That said, and as will become apparent, several of these overlaps are relatively superficial and cover deeper gaps between experts and the public. Communicators will need strategies for leveraging these overlaps while avoiding accidentally triggering less productive ways of thinking.

Experts and the public share the following understandings:

1. **The ocean dominates the planet and its expanse is not fully understood.** Both experts and the public recognise the vastness of the ocean and acknowledge there is much that humans still do not understand about it.
2. **The ocean supports all life on Earth.** Both experts and the public understand that the ocean is the basis of life on the planet, serving as the ultimate reservoir of water and source of food for many lifeforms.
3. **The ocean is embedded within interconnected natural systems.** Both experts and the public understand that the ocean is connected to a range of critical systems that make life on the planet possible, including ecosystems and the water precipitation cycle.
4. **The ocean is economically important.** Both experts and the public recognise that the ocean plays a key role in human economic life, including as a medium of trade and a source of seafood and tourism.
5. **The ocean contributes to positive mental health.** Both experts and the public speak to the ocean's powerful psychological and emotional effects. The ocean is a source of both respite and recreation and contributes to human wellness.

6. **The ocean is important to British identity.** Both experts and the public recognise that the United Kingdom's status as an island nation has shaped the country in powerful ways, from being a prominent seafaring and trading nation to having strong associations with the seaside as a destination for family holidays.

7. **Overfishing is threatening species.** Both experts and the public understand that modern fishing techniques result in substantial overfishing of certain fish populations, depleting their stocks and threatening species. Both also recognise that this overfishing threatens the livelihoods of fishing communities in the United Kingdom and elsewhere.

8. **Too many pollutants enter the ocean.** Both experts and the public understand that too much pollution is entering the ocean, causing damage to animals and compromising both the ocean's beauty and its recreational use.

9. **Sea levels are rising.** Both experts and the public speak to the reality of sea-level rise and recognise that it is caused by global warming. Both also understand that it will be disruptive to humans and many animals.

10. **Less prosperous coastal communities are most vulnerable to ocean change.** Both experts and the public know that coastal people who depend on the ocean for subsistence are most vulnerable to the threats of overfishing and sea-level rise. Economically marginal coastal communities will often be the ones who face the direst consequences from these problems.

Gaps in Understanding

Alongside these overlaps is a series of key gaps between experts and the public. Many of these gaps result from areas where the public is thinking through models that are highly generalised, vague or thin. These are areas where people's thinking is incomplete or inaccurate (or not entirely accurate). As such, they represent opportunities that communicators can use to communicate new knowledge and integrate it into public thinking.

In the conclusion, we offer initial recommendations for addressing these gaps. In later phases of this project, we would develop and test communications strategies to bridge these gaps.

1. **The Ocean Environment: *Diversified v. Uniform*.** Experts understand the ocean as a highly differentiated space, with diverse temperatures, currents, levels and habitats that support a wide variety of different ecosystems. The public defaults to a model of the ocean as a vast, undifferentiated body of water, especially when thinking through the *Vast Other World* and *Surface* models. The variation of systems and processes that exist across the ocean, and the diverse implications of ocean change across that variation, are not on the public's radar when thinking in these ways.

2. **The Ocean's Planetary Role: *Complex v. Simple*.** In addition to the water cycle, experts emphasise the ocean's role in two other critical planetary systems: the oxygen cycle and the global climate. They emphasise how the ocean absorbs carbon dioxide from the atmosphere and releases vast amounts of oxygen, how global warming is disrupting currents and temperatures in both the atmosphere and

ocean and how these disruptions are contributing to extreme weather. While members of the public are familiar with the ocean's role in the water cycle, they do not understand its critical role in either generating atmospheric oxygen or regulating global climate. Underlying this gap is a key absence in public thinking: a lack of understanding of the dynamic interplay between the ocean and atmosphere.

3. **Sources of Pollution: *Diverse Systems v. Careless Episodes*.** Experts identify a broad range of pollution sources derived from our systems of production, consumption, transportation and energy usage that are undermining the health and viability of ocean systems. These include fossil fuel emissions; plastic bottles and packaging; microplastics, noise pollution and chemical and sewage waste from industry, agriculture, municipalities and residences. In contrast, the public focuses on a more limited set of tangible pollutants – mostly plastic bottles and oil spills – and explains both as episodes or acts of carelessness by companies or individuals. The public's lack of understanding of the scope of pollution and how it is embedded within social and economic systems limits understanding of what types of solutions are needed to combat pollution.

4. **Effects of Carbon Emissions: *Multiple v. Sea-Level Rise*.** Experts recognise that excess carbon emissions are resulting not only in atmospheric warming but also in ocean warming and acidification, as the ocean absorbs excess carbon dioxide in the atmosphere, with multiple and manifold results for a broad range of ocean and planetary systems. Meanwhile, the public is attuned only to atmospheric warming and its consequence of sea-level rise, and does not recognise the relationship between carbon emissions and other forms of ocean change. As with Gap #2 above, this gap is partly explained by the public's lack of understanding of the dynamic interplay between the ocean and atmosphere.

5. **Types of Ocean Change: *Many v. Few*.** Experts speak to a range of important changes happening to the ocean, including acidification; warming; reduced oxygen levels; changing currents; endangered species populations, changes to ecosystems and rising sea levels. Experts note that many of these changes are mutually reinforcing and each represents a substantial challenge to the stability of both marine and terrestrial life. The public has a more limited scope of changes on its radar – sea-level rise, overfishing and material pollutants – and is otherwise not attuned to the changes that are happening, nor to their consequences for ecosystems across the planet.

6. **Severity of Ocean Change: *Substantial v. Modest or Unchanging*.** Experts assert that these multiple changes to the ocean collectively represent a crisis that presents severe challenges to our biosphere and its diverse ecosystems. Meanwhile, the public is not attuned to the seriousness of the ocean crisis currently unfolding – even in those areas in which there is some understanding of changes to the ocean. Moreover, the strength of the *Unchanging Sea* model, and people's faith in the ocean's vast capacity to absorb the negative consequences of human activity, mute attention to the reality of these changes.

7. **Species Endangerment and Extinction: *Systemic Crisis v. Isolated Problems***. Experts note how changes to the ocean such as overfishing, acidification and water temperature change are disrupting ecosystems and threatening a broad range of species. They note that species extinction and ecosystem disruption is happening at alarming rates, threatening the overall stability of the life systems of the ocean. The public, meanwhile, recognises some species endangerment through overfishing but vastly underestimates the scope and severity of the problem. Members of the public worry about specific

species but fail to recognise the systemic nature of the problem.

8. **Responsibility: *Collective v. Everyone/No One*.** Experts insist on collective responsibility to address problems through government. They have a robust model of government intervention and speak to a diverse set of actions that governments must take at the local, devolved, national and international levels. This includes the need for governments to hold businesses accountable for their waste disposal. The public, by contrast, typically assigns responsibility to 'everyone' – yet, in practice this apparently universal attribution of responsibility reduces to the extremely limited sense that individuals should make responsible decisions as consumers. While the public does have a vague model of governmental responsibility, people lack a clear understanding of what role national governments can and should take, acting on their own or in concert. Experts' concrete and specific assignment of responsibility to society collectively, acting through specific government bodies, contrasts with the public's highly dispersed and largely empty assignment of responsibility.

9. **Locus for Solutions: *Policy v. Behaviour Change*.** Experts point to a broad range of policy and systems solutions that are necessary for ocean protection, including the need to expand and enforce marine protected areas; reform the global commercial fishing industry; regulate and enforce industry pollution controls, enforce carbon emission limits and embed ocean protection in school curricula and government policymaking. The public, when not fatalistic about what can actually be changed, thinks first about individual behaviour change – such as doing a better job recycling or being more careful about energy usage – and thus emphasises awareness-raising efforts while largely overlooking systemic solutions.

V. Conclusion: Initial Recommendations and Future Research

At a superficial level, experts and advocates committed to marine conservation have the public on their side. Members of the public value the ocean as a source of respite and relaxation, and avow its critical role in sustaining life. People express concern over the threats of pollution and overfishing and recognise that species are being threatened by these activities. Moreover, members of the public view marine conservation as valuable and necessary – heroic, even. Unlike many social and scientific issues, which are sources of controversy, marine conservation is supported by patterns of thinking shared across the British population.

This hospitable environment for marine conservation efforts is undoubtedly good news. Yet if we look below the surface, we see a cultural terrain that is more challenging than it initially appears and begins to explain some of the difficulty experienced by those working on these issues. While people assert the importance of the ocean, public understanding of its role in supporting life and sustaining and regulating planetary systems is extremely thin. In turn, the public lacks a deep understanding of how human activities are changing the ocean, how these activities are disrupting ecosystems and the climate system and the ultimate implications of these disruptions for human health and wellbeing. Commitment to marine conservation is thus neither intense nor prioritised, and the public lacks a concrete sense of the policies needed to protect the ocean and their scope. In short, there are a series of holes in public thinking about ocean and marine conservation that affect people's willingness to engage with the issue and undermine their support for specific solutions. Communicators thus face a series of challenges to boosting the issue's salience and cultivating public support for actions that are urgently needed.

Fortunately, the map of the cultural terrain drawn in this report provides a critical resource that communicators can use to navigate these challenges. Understanding the cultural models that people hold and their implications makes it possible to avoid unproductive ways of communicating, and to use messages to tap into existing ways of thinking that increase understanding and motivate people to engage. As we discuss below, more research must be done to understand which specific reframing strategies can best address the gaps outlined above.

However, the following cultural models findings discussed here point to the following provisional recommendations for the marine conservation sector:

1. **Avoid reliance on *crisis* language.** Messages that evoke strong senses of crisis are likely to strengthen people's sense of fatalism, leading them to think that little can be done to reverse existing damage or prevent further deterioration. Instead, communicators should establish urgency in their messages but emphasise a sense of efficacy – a sense that solutions are possible – and point to examples of success.

2. **Avoid talking about the ocean as an economic resource for human consumption.** While it is tempting to try to increase issue salience by arguing that the ocean is valuable because it provides necessary resources for human use, this approach is likely to sabotage conservation goals in the long

run. Framing the ocean as a resource for human use sets up a short-term economic perspective that can lead people to conclude that conservation efforts do not yield sufficiently clear economic benefits to be worthwhile. When people think in terms of consumption and through economic frames, the immediate benefits of taking from the ocean may seem to outweigh longer-term harm, which can be difficult to grasp. The costs of conservation, when seen through an economic lens, seem burdensome and perhaps not worth the trouble. It is worth exploring whether resource language can be effectively used – but without clear research findings on how this frame can be used effectively, it is safer to avoid it at this point.

3. **Cue and expand the idea of the ocean as a *sustainer* of human wellbeing.** A better strategy to clarify the ocean's importance is to strengthen the idea that the ocean *sustains* human wellbeing. This seemingly subtle reframe allows people to see changes to the ocean as threats to this sustaining function. The idea of sustenance invokes a vision of the ocean in its entirety – rather than differentiating features or parts that are available for use, extraction or consumption – making it clear that the health of the whole ocean is critical, not just the parts that create economic benefits for humans. Furthermore, communicators should provide people with concrete examples of *how* the ocean sustains life and wellness, as the public's understanding of this idea is rather vague. Explaining this is critical to help people understand the full consequences of harming the ocean and to motivate action and engagement.

4. **Build on existing knowledge to expand understanding of marine systems.** The public's existing recognition that natural systems are interconnected must be expanded. For example, communicators can use people's knowledge about the water cycle to explain other exchanges between the atmosphere and ocean (carbon and heat), or build on knowledge about how trees provide oxygen to explain how ocean algae serve that same function. Specific framing tools are needed to explain specific systems (for example, the climate system) – but generally speaking, the more communicators can do to explain the ocean's place within the planet's natural systems, the more the public will recognise the ocean's importance.

5. **Emphasise ecosystem disruptions.** The public is attuned to the issue of endangered specie, but needs help understanding how the endangerment of specific species disrupts entire ecosystems and has broader consequences. Communicators should highlight these systemic consequences of species endangerment to counter the perception that endangerment is an isolated problem that only specific species face.

6. **Make sure to specify what government can and should do.** Communicators must help people understand the roles that different actors, including private and public agents and institutions, should play. In particular, communicators must explain what government can and should do at different levels (local, devolved, national and international). Providing examples of what government can do and showing the effects of these actions is vital to effective communications about the ocean and marine conservation. This helps people understand what government should be responsible for and combats fatalism by showing that outcomes can change as a result of taking action.

7. **Introduce, explain and showcase specific systemic solutions.** In light of people's fatalism, lack of understanding about governmental roles and easy default to heroic individual action, communicators must help people understand what kinds of systemic changes are necessary for marine conservation. Explaining the types of solutions needed and how they work to improve outcomes not only clarifies the ask – what people should support – but also helps people see that there *are* concrete steps that can be taken to protect the ocean and address the threats it faces.

8. **Avoid language that romanticises the vastness or mystery of the ocean.** Talking in this way will cue and strengthen a sense of separation from, rather than connection to, the ocean. Romanticised messaging also has the potential to trigger the idea that the ocean is so large that it is immune to substantive change and cannot be affected by human action. While it is important to invoke the planetary scale of the ocean, attention must simultaneously be paid to specific processes and connections between the ocean and other systems – thus demystifying the ocean, rather than allowing it to be a source of mystical murkiness.

9. **Discuss pollution other than oil spills and plastics.** To expand people's understanding of the sources of pollution, communicators should use examples of pollution that are less familiar to members of the public. Bringing attention to other types of pollution is necessary to broaden people's understanding of the problems that need to be addressed.

10. **Stress negative outcomes for *all* human populations, not only coastal communities.** While extra attention to the vulnerability of coastal communities can at times be appropriate, it must complement a more pervasive strategy of speaking to shared risks and common fates – regardless of one's proximity to the ocean. The public already recognises that coastal populations face risks, yet there is less appreciation for threats to people who live inland. Communicators should emphasise widely applicable effects to counter the perception that changes to the ocean *only* matter for coastal communities.

11. **Highlight compatibility between marine conservation and human prosperity.** To counter the assumption that environmental and economic imperatives conflict with one another in a zero–sum game, communicators should offer examples of how marine conservation can *contribute* to economic advancement. For example, communicators can spotlight the kinds of jobs and scientific and technological advancements that accompany efforts to better preserve and protect ocean systems.

12. **Avoid focusing solely on individual action.** Although marine conservation activists will undoubtedly want to promote individual behaviour that protects the ocean (for example, reducing use of disposable plastic bottles), efforts to build public support for marine conservation policy should avoid appealing *exclusively* to individual action. Focusing too heavily on individual behaviour change is likely to reinforce people's perception of marine conservation as a private issue, rather than a public one. In addition, the difference in scale between the problems that conservationists raise and individual actions means that focusing exclusively on what individuals can do is likely to depress efficacy; any given individual's decision to avoid using disposable plastic bottles will not seem to make a difference. Activists should make sure to pair calls for individual behaviour change with calls for collective action and policy change.

13. **Avoid the generic 'we' when attributing responsibility for ocean protection.** Talking about how 'we all' are, or 'everyone' is, responsible will reinforce people's underlying assumption of dispersed, individual responsibility. Communicators should emphasise the public's collective responsibility in holding accountable governments at all levels as well as corporate and community actors.

These recommendations provide initial strategies that communicators can use to message more effectively about the ocean and marine conservation. Further research is needed to develop frames and strategies capable of overcoming the deepest gaps and challenges identified in the full report.

Moving forward, the following steps should be considered for future research:

- Test existing FrameWorks tools to explore their efficacy in cultivating understanding of marine systems and changes in the United Kingdom. As noted above, FrameWorks has conducted extensive reframing research in the United States on ocean and climate change, leading to the development and testing of a series of frames and strategies (including, but not limited to, values, explanatory metaphors and explanatory chains) to help the American public better understand and engage with these issues.[9] Though British and American cultures differ, there are also areas of overlap, suggesting that some of the frames developed for use in the United States might be useful in the British context.

  The following tools are promising and should be tested:

  - **The Ocean as the Climate's Heart**. This is an explanatory metaphor that improves understanding of the ocean's role within the larger climate system and increases support for a wide range of conservation policies.

  - **Osteoporosis of the Sea**. This is an explanatory metaphor that makes visible the problems that ocean acidification is causing for marine life.

  - **Explanatory Chains about Acidification.** These explanations are designed to cultivate public understanding of the process of ocean acidification by laying out a clear causal sequence about what acidification is, what causes it, how it changes ocean chemistry and how those changes affect marine life and have broader repercussions for ecosystems.

  - **Regular v. Rampant Carbon Dioxide.** This taxonomy illuminates the dangers of *excess* carbon dioxide and can form part of a broader strategy to explain how climate change works.

  - **Heat-Trapping Blanket.** This is an explanatory metaphor that helps people understand the mechanisms of climate change – *how* carbon emissions are warming the planet and its ocean.

  - **Health Effects.** In the United States, talking about the human health effects of climate change proved effective in messages framed with a broader value (specifically, the value of *Protection*). This framing helped increase the salience of climate change. It is worth exploring whether a similar strategy might help people recognise the importance of changes to the ocean, whether related to climate change or not.

- **Develop new explanatory tools to facilitate understanding of marine systems.** In addition to testing the promising tools listed above, new frames are needed to enable the public to easily and accurately understand the relationships between biological, chemical and physical systems – both within the ocean and those linking ocean, atmosphere and land – for example, leveraging the public's understanding of the water cycle to develop tools that will expand upon that knowledge to include other systems of the ocean. The public's existing ways of thinking do not provide adequate resources to understand how these systems work and how they interact. This negatively affects people's perception of the salience of this issue and dampens support for solutions. Explanatory tools, such as explanatory metaphors, must be developed to give the public access to better understanding of how these systems work – so that people can identify the consequences of disrupting these systems and solutions that address the problems caused by these disruptions.

- **Test how best to integrate discussions of the ocean and marine conservation into other issue domains.** Marine issues are closely linked with other critical domains of national and global life, including health, energy, education and economic development. There is the potential to build framing strategies that integrate protection of the ocean with these other policy arenas. This holds promise as a way of illustrating the importance of marine issues, and could offer the strategic benefit of facilitating partnerships with organisations and advocates who work on these other issues. How can educators, economic development experts and broader policy advocates deploy ocean frames?

- **Identify strategies for cultivating a sense of collective efficacy.** Communicators need effective ways of combatting fatalism. Increasing the public's sense of efficacy – the sense that collective actions can make a difference – is vital to building support for key marine conservation policies and programmes. This is one of the most important challenges to address in future work.

- **Develop an integrated story.** Given the range of different types of issues and concerns at stake in communicating about the ocean, it is vital to develop a common narrative to unify the marine sector. Identifying a flexible narrative structure that unifies messaging around marine issues while providing an effective way of communicating about different types of issues is critical if the field is to avoid diffusing the power of its communications. With a shared narrative in hand, advocates and experts can amplify each other's voices while leveraging the power of an effective story to advance their specific concerns.

About the FrameWorks Institute

The FrameWorks Institute is a nonprofit think tank that advances the nonprofit sector's communications capacity by framing the public discourse about social problems. Its work is based on Strategic Frame Analysis®, a multimethod, multidisciplinary approach to empirical research. FrameWorks designs, conducts, publishes, explains, and applies communications research to prepare nonprofit organisations to expand their constituency base, to build public will, and to further public understanding of specific social issues – the environment, government, race, children's issues, and health care, among others. Its work is unique in its breadth – ranging from qualitative, quantitative, and experimental research to applied communications toolkits, eWorkshops, advertising campaigns, FrameChecks®, and in-depth FrameLab study engagements. In 2015, it was named one of nine organizations worldwide to receive the MacArthur Foundation's Award for Creative and Effective Institutions. Learn more at www.frameworksinstitute.org.

Please follow standard APA rules for citation, with FrameWorks Institute as publisher.

Lindland, E. & Volmert, A. (2017). *Getting below the surface: Mapping the gaps between expert and public understandings of ocean change and marine conservation in the UK.* Washington, DC: FrameWorks Institute.

Endnotes

[1] See Tannen, D. (1993). Introduction. In *Framing in discourse*. New York, NY: Oxford University Press, 3–56.

[2] On cultural models, see Quinn, N. & Holland, D. (1987). Culture and cognition. In D. Holland & N. Quinn (Eds.). *Cultural models in language and thought*. Cambridge, England: Cambridge University Press, 3–40.

[3] See Glaser, B. G. & Strauss, A. L. (1967). The discovery of grounded theory: Strategies for qualitative research. Chicago, IL: Aldine Publishing; Strauss, A.L. & Corbin, J. (1990). Basics of qualitative research: Grounded theory procedures and techniques. Newbury Park, CA: Sage Publications.

[4] See Quinn, N. (Ed.). (2005). *Finding culture in talk: A collection of methods*. New York, NY: Palgrave Macmillan.

[5] For more on how people hold multiple cultural models in mind, see Shore, B. (1996). Rethinking culture as models. In *Culture in mind: Cognition, culture, and the problem of meaning*. New York, NY: Oxford University Press.

[6] There was not, however, evidence of a comparably strong model of current economic connection to the ocean, owing perhaps in part to the shift towards banking, finance and services as mainstays of the UK economy.

[7] These comments appear to draw on a model of human nature that we have identified in ongoing (and yet to be published) work on the economy in the United Kingdom.

[8] See Bales, S. N., Sweetland, J. & Volmert, A. (2015). How to talk about oceans and climate change: *A FrameWorks MessageMemo*. Washington, DC: FrameWorks Institute.

[9] See the following FrameWorks reports for the most updated versions of that research: '*Just the Earth doing its thing': Mapping the gaps between expert and public understandings of oceans and climate change* (Volmert et al., 2013), *The Value of Explanation: Using values and causal explanations to reframe climate and ocean change* (Simon et al., 2014) and *Getting to the heart of the matter: Using metaphorical and causal explanation to increase public understanding of climate and ocean change* (Volmert, 2014).