# 1 Abstract

This literature review forms part of the project Formas Agenda 2030, which aims to identify research needs related to the 17 Sustainable Development Goals (SDGs) and to explore options for making structural changes in research policy and funding to foster progress on the SDGs. The project involves literature reviews and exploratory workshops focusing on three SDGs as examples: Goal 12: Responsible Consumption and Production; Goal 14: Life Below Water; and Goal 17: Partnerships for the Goals.

This review presents preliminary findings on research needs for Goal 14: Life Below Water. It focuses on three thematic areas closely linked to all seven targets under SDG 14, namely a) marine pollution, b) ocean and climate and c) sustainable use of marine and ocean resources. The analysis identifies research gaps in the three thematic areas but also cross-cutting issues such as links to other SDG targets and the challenges (and opportunities) of balancing social, economic and environmental dimensions of sustainable development, issues which are all closely interlinked to SDG 14.

In the context of the SDGs, three distinct roles for science, technology and innovation have been defined by Nilsson (Nilsson 2016).

1. characterising the challenges
2. providing the solutions, and
3. strengthening public institutions and society.

In this review, we focus primarily on research needs in relation to the first and second roles, whereas the main report elaborate on the third role as well.

As an extension of this review, analysis could be made of the comparative potential of Swedish research to fill knowledge gaps at regional and global levels. Furthermore, good examples of Swedish research projects and collaborations could be identified. However, this goes beyond the current scope of the review.

## 1.1 Overview of the goals and targets

For this review, our point of departure has been the goal and its seven targets. Table 1 lists the targets and means of implementation under SDG 14. This review does not consider the means of implementation.

*Table 2. Overview of Sustainable Development Goal 14. Targets in focus are in bold.*

**Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and**

are essential for human wellbeing both as a source of food and livelihood. More than three billion people depend on the oceans as their primary source of protein, and marine fisheries directly or indirectly employ over 200 million people (UN 2017a). Furthermore, oceans and coastal areas are estimated to partially support about 75% of the global population, residing in the wider coastal margins. Furthermore, oceans also host the largest connected ecosystem which provides services such as climate stability, oxygen generation, nutrient cycling and food production. Oceans play a vital role in climate change mitigation, absorbing about a third of carbon dioxide produced by humans (ICSU and ISSC 2015).

Pressures such as climate change and other changes brought about by humans, such as pollution, are putting the wellbeing of the oceans and thus the provision of its services at risk. In recent years research has helped to improve awareness of the importance of the ecosystem services and resources of the oceans to all countries worldwide. Yet oceans and seas have for a long time not been prioritised in international forums or on national agendas. A central challenge is the transboundary nature of marine resources and human pressure on oceans. Collective and coordinated action by governments at sub-regional and global level is needed to address issues such as marine pollution (IASS 2017). In the absence of coordinated and enforced regulations, unsustainable use of ocean resources risk resulting in a "tragedy of the commons". The term, first introduced by Garrett Hardin (1968), refers to situations where it is difficult and costly to exclude potential users from common-pool resources. As a consequence the finite resources will be exhausted by rational, utility-maximising individuals rather than conserved for the benefit of all (Ostrom 2008).

Another factor likely to contribute to the lack of prioritisation is that oceans have for a long time been considered an expert area primarily discussed by scientists who are disconnected to the high-level arenas of policy-making. Furthermore, a fragmented institutional system for regulating the management of marine natural resources under the United Nations Convention on the Law of the Sea (UNCLOS) has contributed to a lack of coherent follow-up on national and global ocean commitments (IASS 2017). In recent years an increased focus on oceans has been noted in high-level processes such as Agenda 2030, the development of an oceanspecific SDG, the 2017 UN Ocean Conference on SDG 14, and in the oceans reports of the Intergovernmental Panel on Climate Change (IPCC). This shift was noted by the Swedish minister Isabella Lövin at the opening of the Ocean Conference:

"For the first time, the full range of ocean issues was raised at the UN General Assembly. It has moved from being an area for marine and fisheries experts to one that concerns everyone's survival…. The silo mentality that has been the curse of the oceans is finally beginning to erode."(GOS 2017).

The increased interest in oceans is also reflected in increased investment in ocean research, which has resulted in improved data coverage and in an increase