In September 2018, a formal international conference initiated work on a new international legally binding instrument (ILBI) under the law of the sea, focusing on the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction (the so-called BBNP). Despite a growing recognition of ecosystem services, most ecosystem services were essentially ignored during the BBNP’s preparatory discussions.

Here, we report on approaches to estimating the scales of the economic values of the world’s ecosystem services, and the changes in anthropogenic risks into future services. We conclude that identifying ecosystem services, assigning values to them, and assessing anthropogenic risks is still very much in its early stages. An ultimate objective of our ongoing research will be to strengthen the link between emerging marine science, ecosystem services, and the international discussions over the conservation of the biodiversity of this high seas.

The density of most natural products by depth, showing the potential role of services in the BBNP. Scientific research on marine genetic resources (NGRs), one type of provision good with high value, is growing. It is just not for the first time that the BBNP deliberations in the United Nations, Secretariat (Harmses 2017)

The biological carbon pump (BCP) sequences organic carbon in the deep ocean via routine organisms. Approximately 10% of the total particulate organic carbon (POC) produced at the surface is transferred to the ocean floor where it is believed to be sequestered permanently. Larger amounts are exported to the deep ocean where carbon may be sequestered for millennia (see the figure below right). The total annual carbon flux from ocean to atmosphere could be as much as 200 Gt/m² higher than today, making the ocean’s carbon sequestration a critical issue.

Global estimates of carbon sequestered by the BCP range from 4 to 12 GtC/year because of the wide range of uncertainties associated with the ocean processes that affect this. A consensus appears to be that the reduction this range could be substantial. With a more accurate estimate of ocean carbon sequestered, society could make better-informed decisions regarding the mitigation of CO₂ emissions.

This table lists the overview of ecosystem services. These have been classified into three broad categories: provisioning services, regulating services, and cultural services. Each category is described below.

### Provisioning Services
Provisioning ecosystem services are the products obtained from ecosystems, including food, fresh water, medicines, infrastructure, or materials obtained from biological or physical materials that serve as sources of energy (MA 2005). Benefits: underpinning ecosystem functioning, regulating water, and carbon sources; supporting fish populations.

Commercial fisheries are regulated by coastal nations within their 200NMD exclusive economic zones (EEZ) and to a limited extent on the high seas by regional management organizations (RFMOs), considering competitive management and access issues for intersecting fishing nations. Because of the nation’s lower boundaries, roughly from 200 to 2000NMD, OTZ fisheries are likely to be located mainly on the high seas, except for sectors with narrow continental shelves, implying that their EFLs could encompass depths that lie within the OTZ. Given the difference between perceived international policy and national law, the IUU fishing stocks Agreement, has never been adopted or entered into force. Because the yields of fish from the high seas are not relative to world catches, supporting research with academic value has been called for in MOD high seas. The establishment of such a policy could provide significant benefits to EFL fisheries. If the high seas serve as a refuge for overexploited populations, the exploration of regulation is aimed for the benefit of the populations. The high seas may not be as important as the benefits of marine biodiversity. The management of high seas fisheries, may be more effective because the boundaries and fisheries restrictions would be as respected by nations (see the figure below right).

The area-based management measures on the high seas, such as NPAs, are now a central focus of the BBNP deliberations at the United Nations.

### Regulating Services
Regulating ecosystem services are the benefits obtained from the regulation of ecosystem processes, including, for example, the regulation of climate, water, and human health. Because benefits are not directly used by humans, their intrinsic value to services is not directly used by humans, implying that assigning economic values to these services is not possible. Where economic values are assigned, the value is usually associated with the direct use of the services (e.g., supporting services, such as in the case of predator-prey relationships among commercial fisheries for tuna and squid in the Atlantic). The economic value of the commercial fisheries could be impacted on the tuna fish in their supporting role. In deriving such a value, it would be important to avoid the “double-counting” of economic values.

### Cultural Services
Cultural ecosystem services have been defined as the “non-material benefits people derive from ecosystems through cultural, spiritual, educational, aesthetic, scientific, recreational, and aesthetic experience, including, e.g. knowledge systems, religious and cultural practices, and aesthetic values. Of public knowledge about the BBNP, the functionality of physical and ecological systems, and nature’s intrinsic value, the cultural ecosystem services seem furthered, at present, to expect that the BBNP could be a locus for recreation, a direct, but likely non-invasive use. Social scientists would describe these other non-material benefits of ecosystems provide different values for the BBNP. As the benefits have been described, the “intrinsic” value of positive uses of the BBNP could be exercised in a more inviting and less stressful way. The more recent developments, as described by the United Nations, Cultural Heritage Office (UNESCO), and the National History Office (UNESCO), have been more successful, with new ways of interacting with the natural environment. Tens of millions of people have helped to shape other conservation efforts, including drawing attention to the fate of plastics as a form of ocean pollution. Further, funding has been invested in educational programs designed by the Open University to contribute to open access, free of charge, and a form of “engagement.” The public’s demand for such productions and programs can be viewed as a result of the generation of the view of the BBNP as an important ecosystem service.