



# Conserve and sustainably use the oceans, seas and marine resources for sustainable development

## 14 LIFE BELOW WATER

### THE GLOBAL GOALS For Sustainable Development

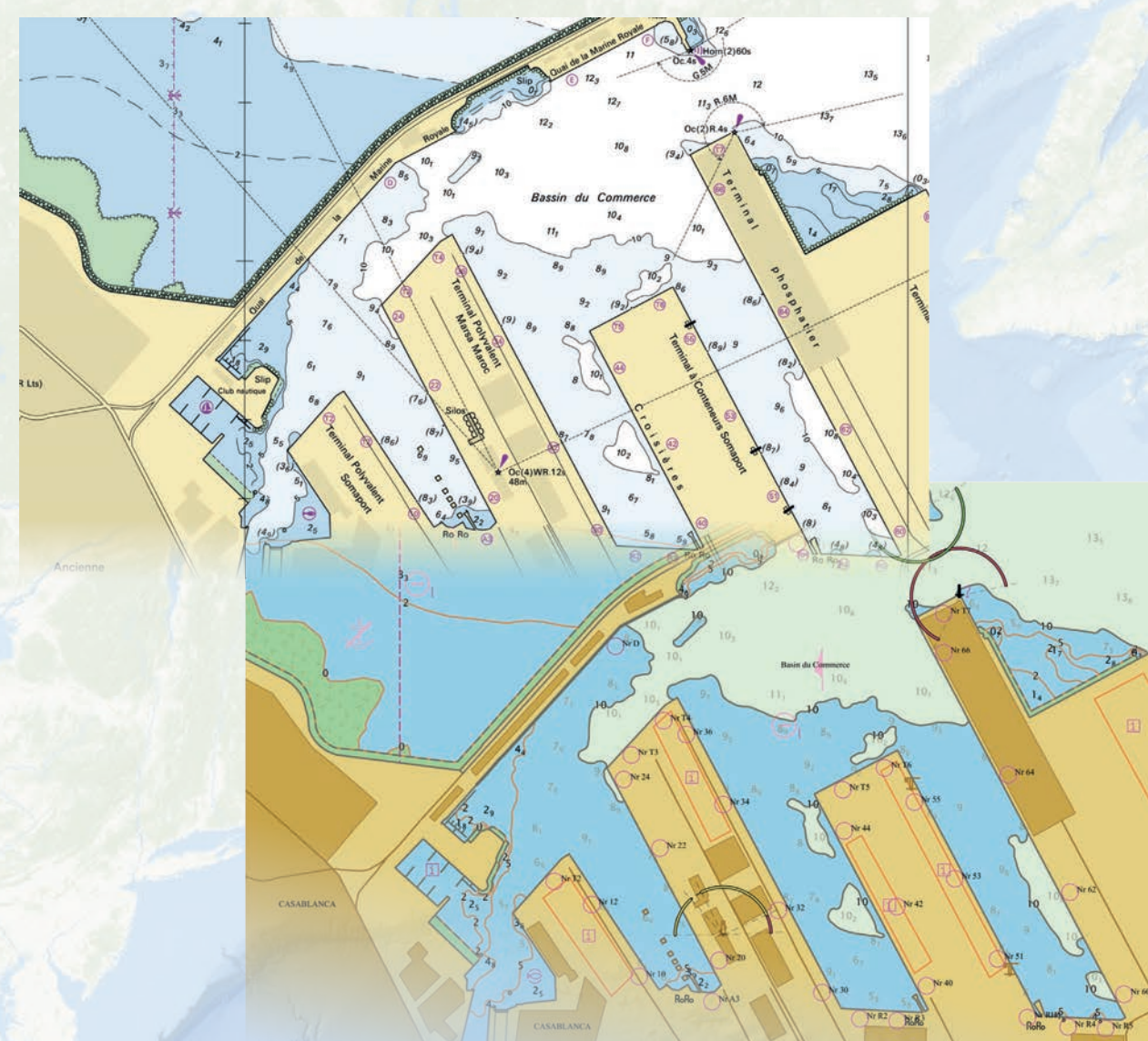
#### Target

Goal 14 targets include reducing marine pollution, strengthening ecosystem resilience, restoring habitats, reducing acidification, ending overfishing, conservation and improving research.

#### Indicator

Numerous indicators provide a way of assessing the extent to which targets are met. This poster illustrates a range of indicators and how different designs can support understanding and the overall goal.

Map design makes a difference because it is key to effective communication



#### Traditional mapping

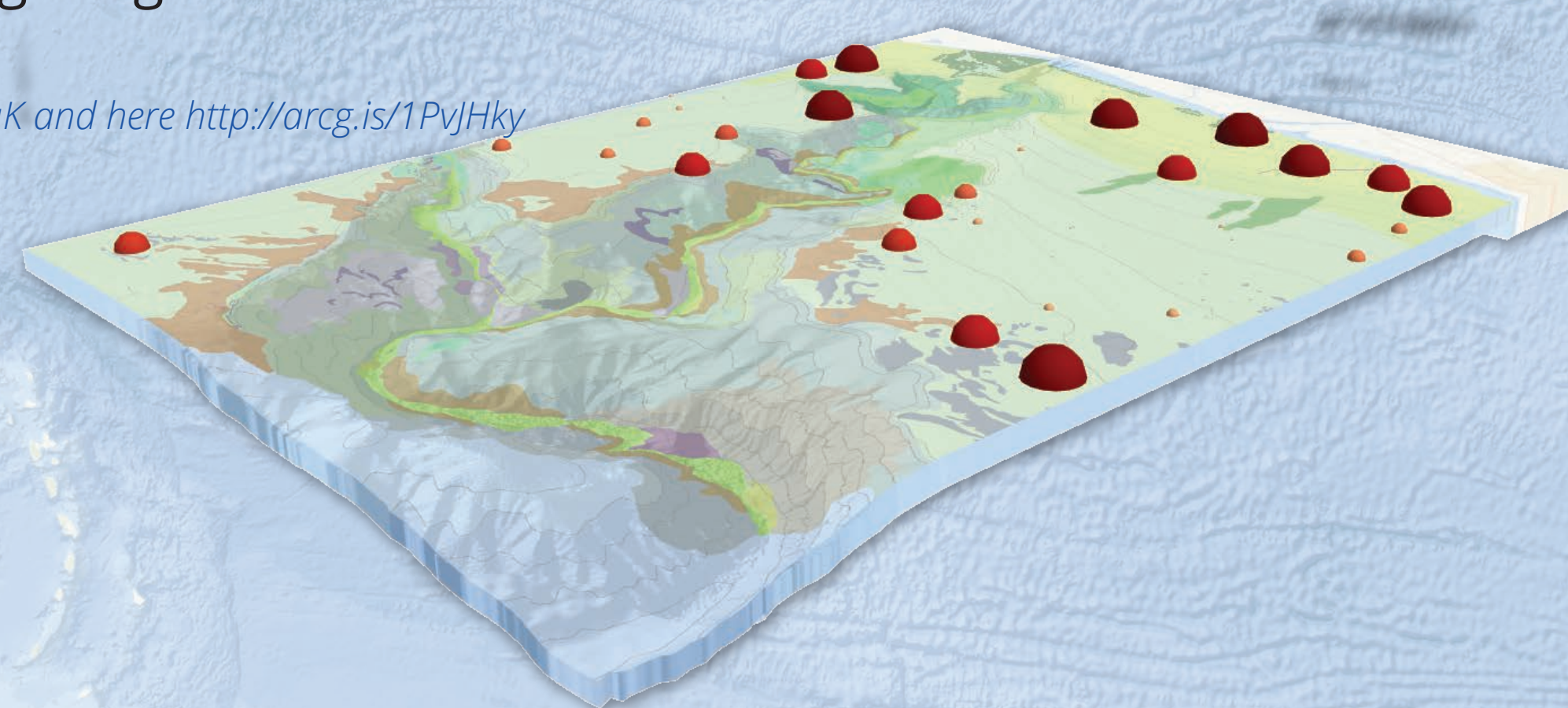
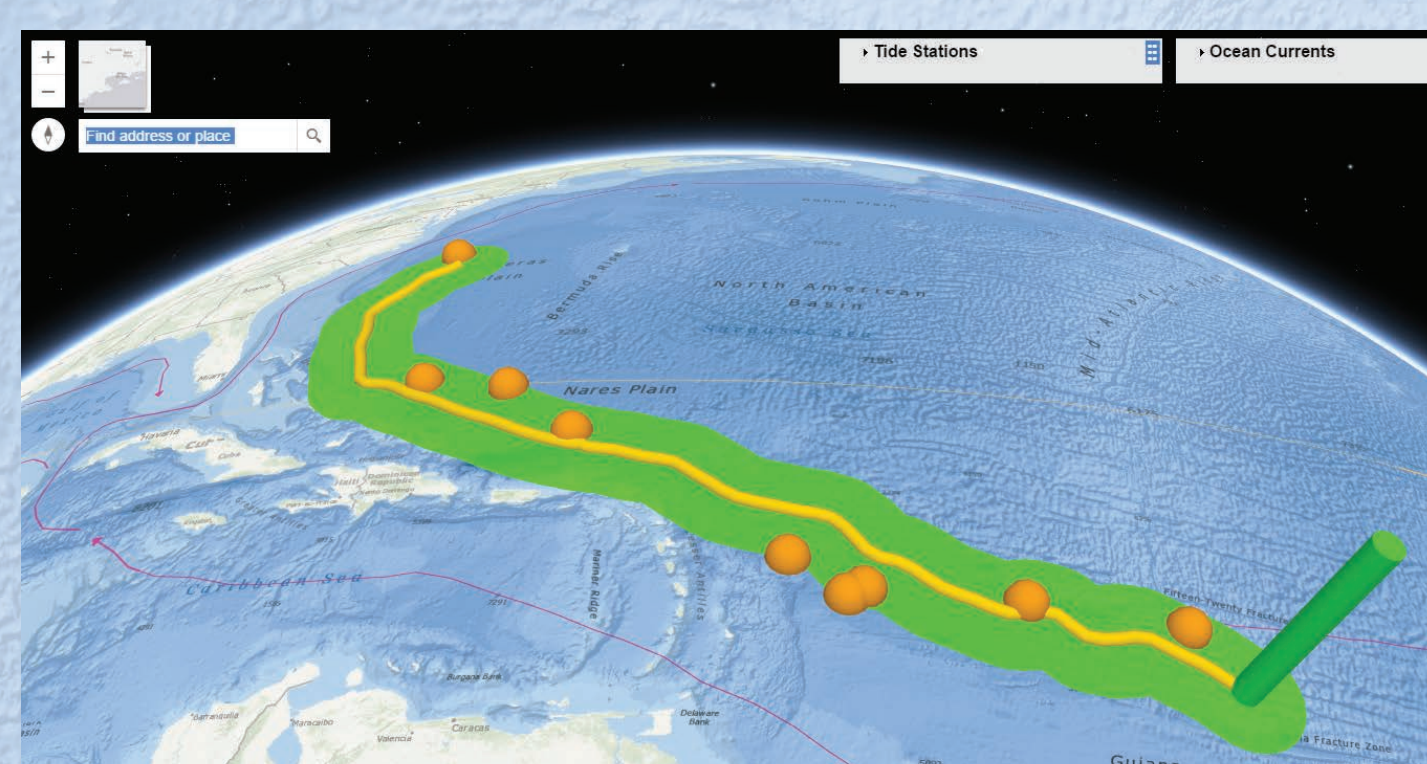
When we think about mapping the oceans we think of nautical charts. They contain a wealth of detail and remain important in both paper and digital form. Mapping the oceans for sustainability requires different products, new products, immersive and interactive products as well as maps of new data and models.

This poster explores some of these cartographies of the oceans and their utility in support of the UN-GGM Sustainability Goal for Life Below Water.

#### Interactive cartography

Oceans are inherently three-dimensional with much of it yet to be fully explored. By creating interactive 3D cartographic representations, such as this model of sediment and geological analysis for Monterey Bay Canyon or the interactive map of ocean currents, we offer a unique, immersive and fascinating insight into the world below water.

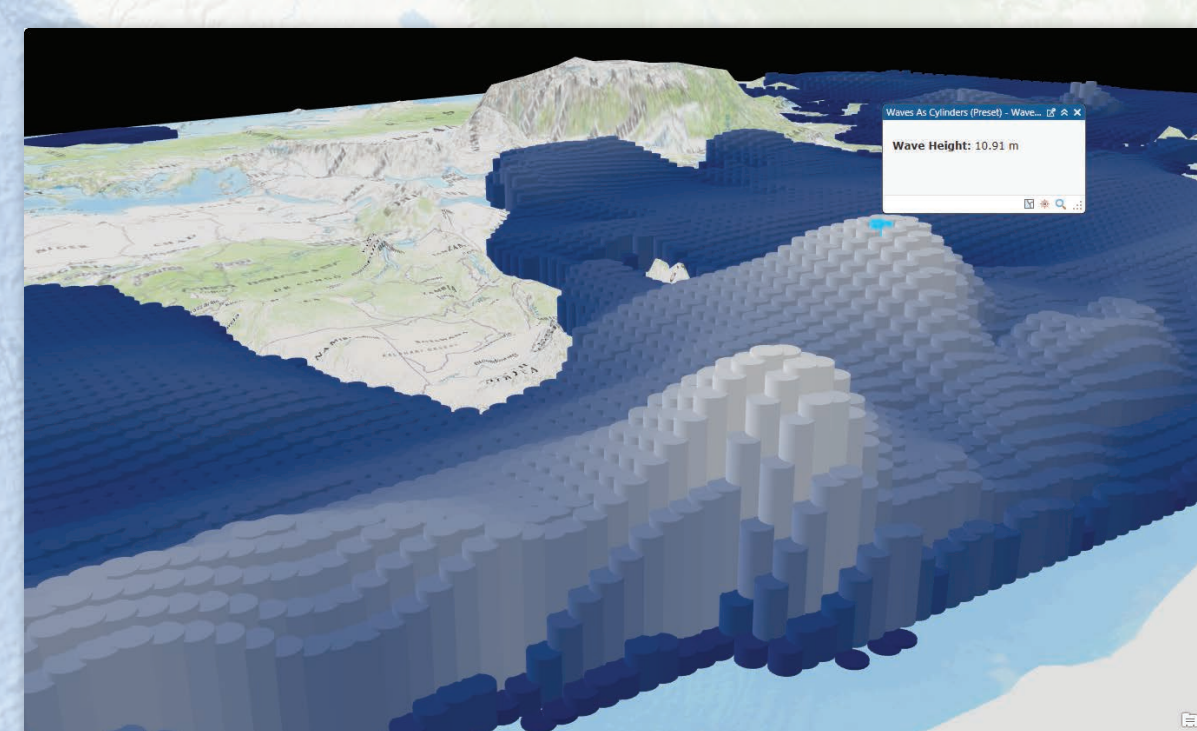
Find out more here: <http://arcg.is/1UQYzQk> and here <http://arcg.is/1PvJHky>



#### Classic cartographic design

Beautiful design marries form and function which draws people's attention. Communicating the urgent objectives of this sustainability goal will need to draw upon a vast wealth of cartographic design experience. We've been mapping the oceans for hundreds of years from Marshall Island Stick charts to Heinrich Berann's beautiful maps of the Atlantic Ocean to Esri's new global ocean basemap (the background image to this poster).

Find out more here: <http://arcg.is/1RBh3jf>

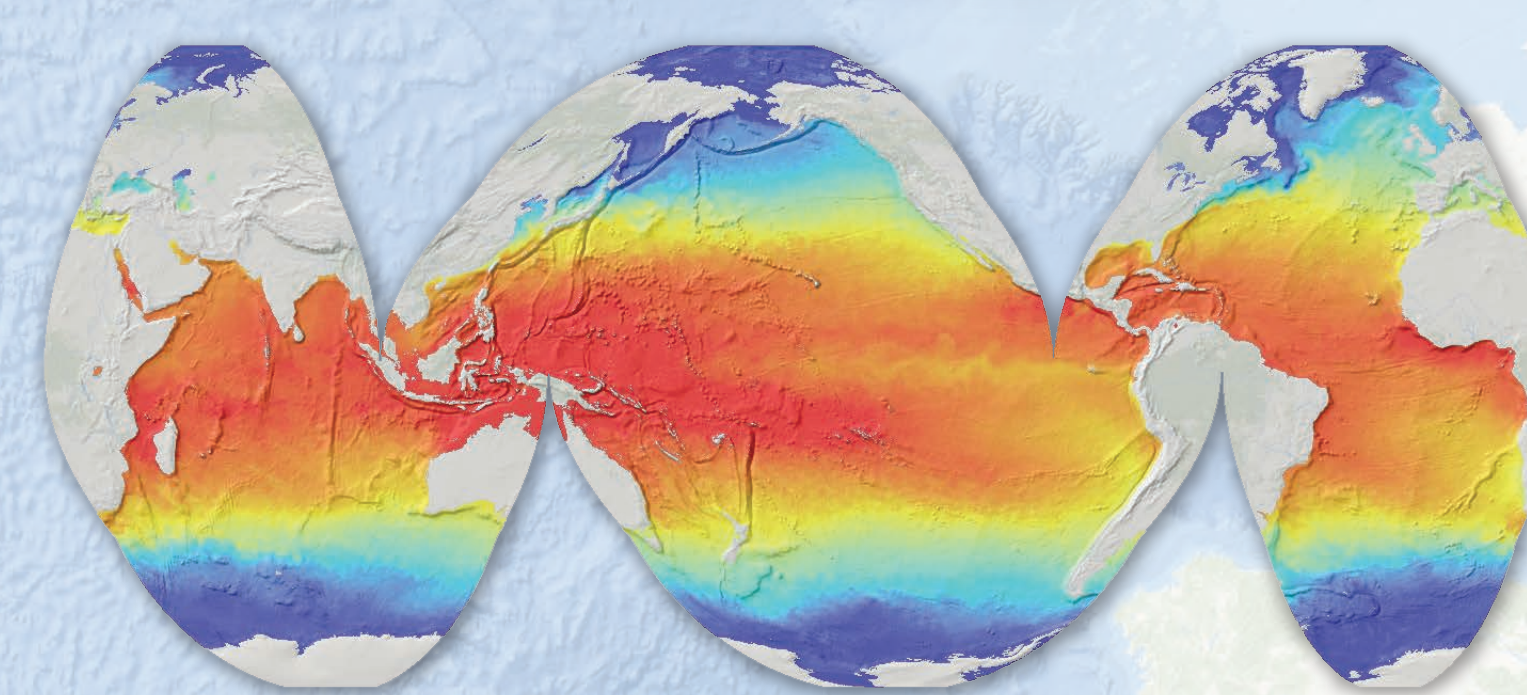
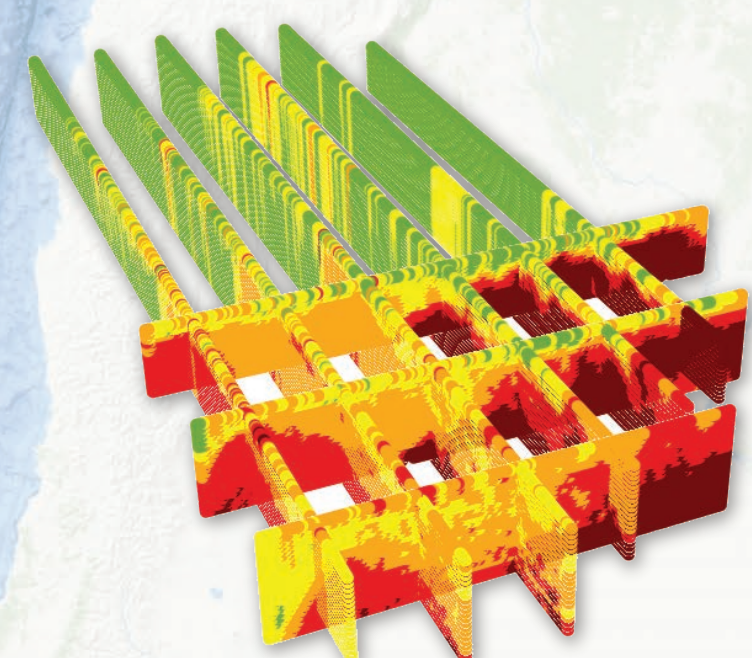


#### Innovative cartography

Mapping the oceans in different ways reveals new ways of seeing. This 3D view of wave height uses extruded columns of water on an isometric map to illustrate amplitude differences.

Alternatively, we can use 3D analysis to create vertical fences as a way of interpolating the water column. Here, exploring the measurement of oil in sea water after an oil spill.

Find out more here: <http://arcg.is/1S1MvFr>



#### Mapping measurements

Sea Surface Temperature is a key climate and weather measurement used for weather prediction, ocean forecasts, tropical cyclone forecasts, and in coastal applications such as fisheries, pollution monitoring and tourism. El Niño and La Niña are two examples of climate events which are forecast through the use of sea surface temperature maps.

Find out more here: <http://arcg.is/1Pvnb1k>

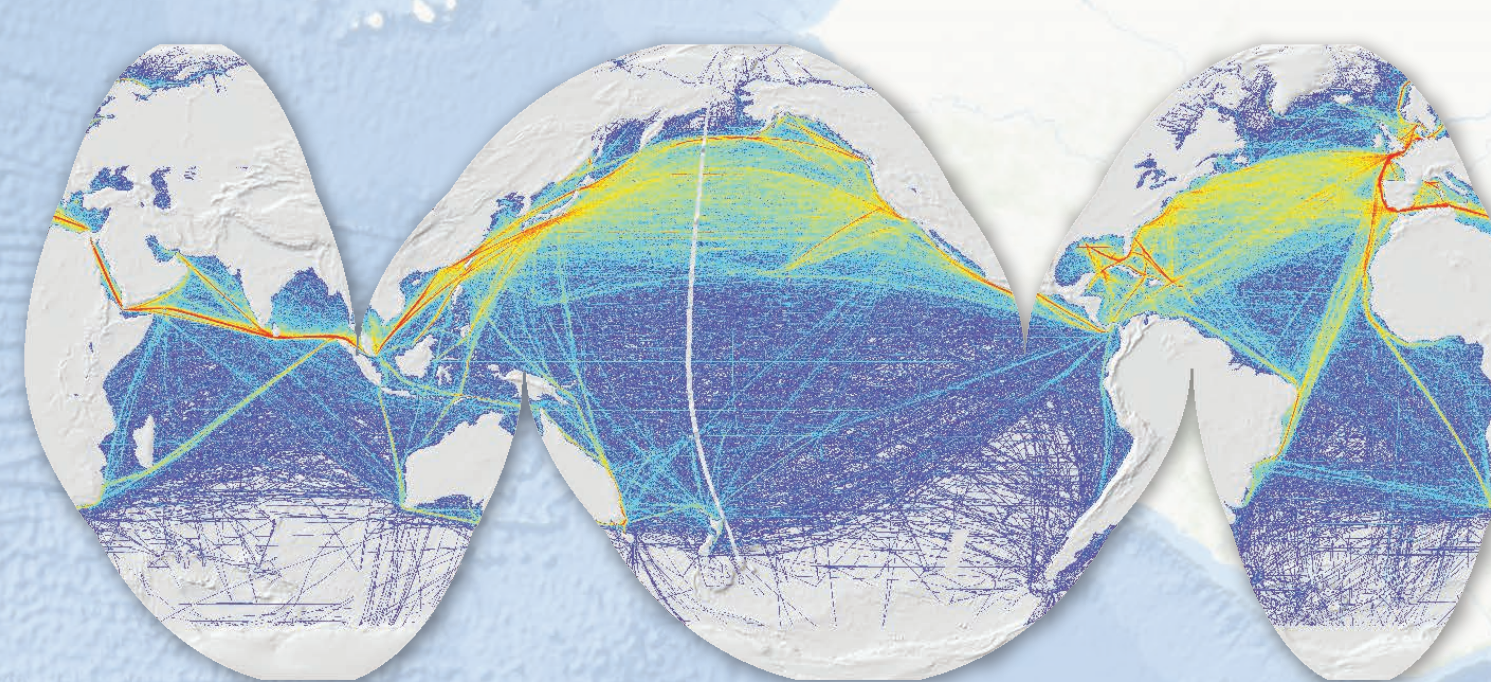
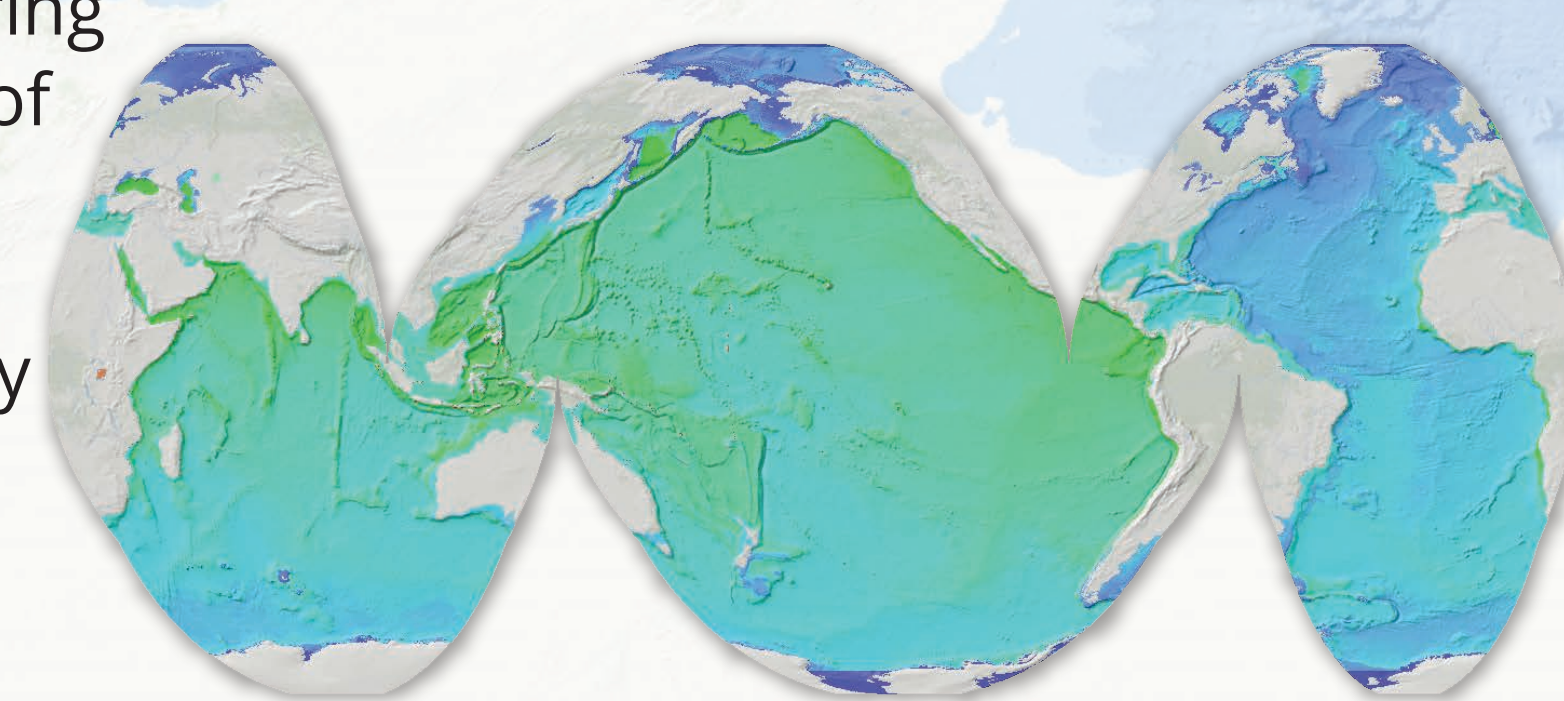
#### Mapping the science

The concentration of dissolved gases in water is of prime importance in considering the quality of water. Sufficient amounts of dissolved oxygen are required for marine-life survival.

Dissolved oxygen levels are influenced by temperature and salinity. The ability for oxygen to dissolve in water (solubility) decreases as temperature and salinity increase.

Poorly oxygenated areas are considered dead zones or hypoxic zones.

Find out more here: <http://arcg.is/1Sbiaqx>



#### Mapping the human impact

Commercial shipping activity can lead to ship strikes of large animals, noise pollution, and a risk of ship groundings or sinkings. Ships from many countries voluntarily participate in collecting meteorological data globally, and therefore also report the location of the ship.

Find out more here: <http://arcg.is/1S1BUdu>

Our impact on the oceans is not restricted to the surface. While Submarine cables criss-cross the depths and there exist many underwater structures.

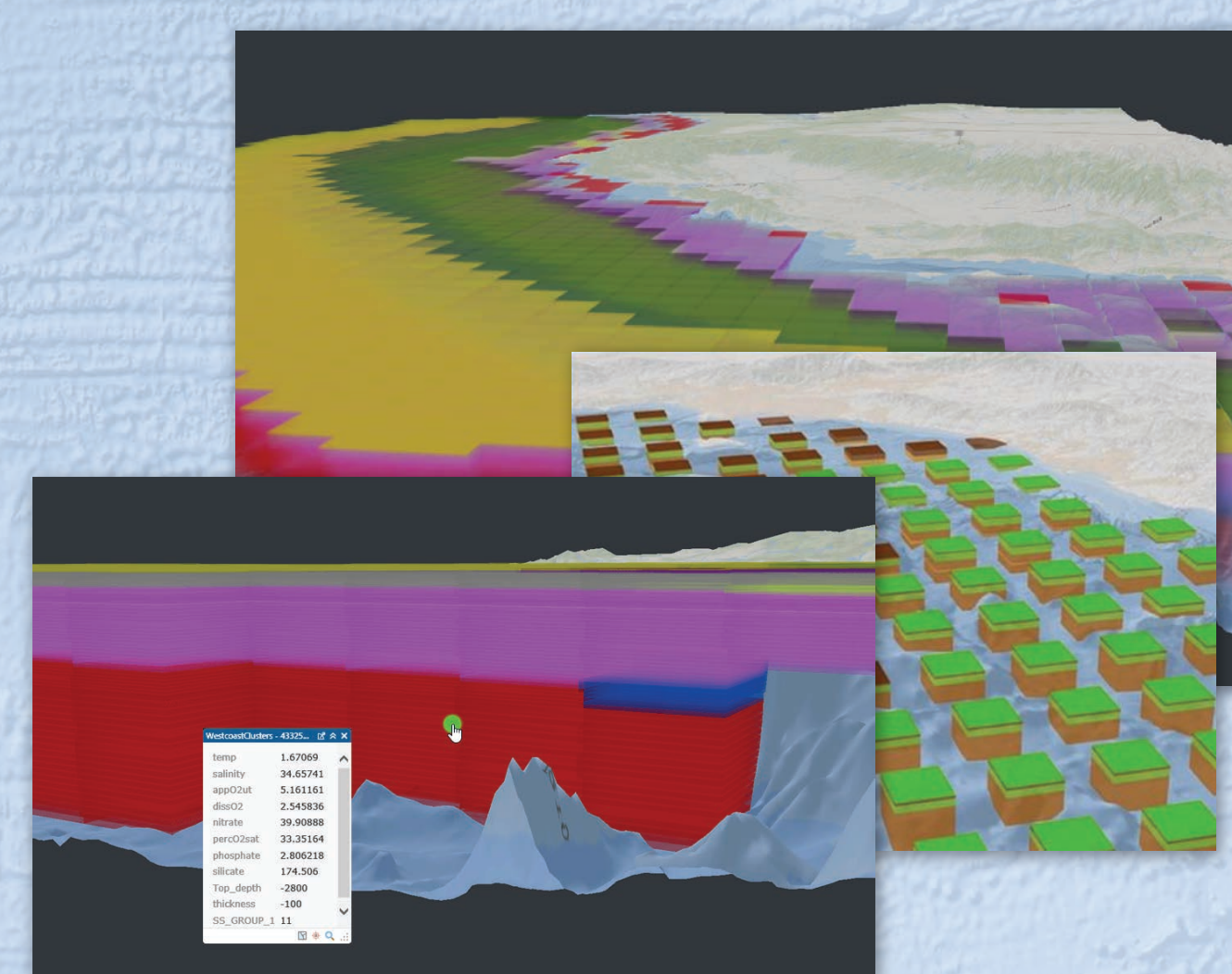
Find out more here: <http://arcg.is/1pC4kqa>



#### Re-freshing cartography

Many maps of how we use the oceans have become regarded as classics such as Charles Minard's map of the export of British coal in 1864 but this doesn't mean we can't bring the cartography up-to-date for modern audiences and technology. Here, the same data Minard used has been woven onto a 3D globe replete with 3D symbology.

Find out more here: <http://arcg.is/1LNvKUe>



#### New mapping

A large collaborative effort is underway to build a new cartography of the oceans and develop a standardised, robust, and practical global ecosystem classification and map for the planet's terrestrial, freshwater and marine ecosystems. The intent is to catalyze science; support planning; and underpin management and provide globally comparable understanding of change, impact and resilience.

Find out more here: <http://arcg.is/21L0Lp>

The ICA **Commission on Map Design** acts as a forum for discussion, exchange of ideas and the development and spread of the principles and practice of high quality, effective cartographic design. Good design and better mapping are core to effective cartography. Information in a well-designed map will be rapidly recovered, unambiguous, easily recalled and ultimately inspire

confidence in both the product and the action that results from the map's use. The examples presented here exhibit high quality design, innovation and expression that support the effective analysis and illustration of data and themes for Life Below Water.

Boundaries on maps may seem definitive, but there are often different perspectives on their status and position. This poster series is compiled from many sources by cartographers from different countries. The ICA tries to be neutral in such matters and boundaries shown reflect those found on the ground, in existing maps, or recognized by the United Nations. The ICA acknowledges that there may be different opinions and interpretations.

ICACI



**Commission on Map design**

Chair: Kenneth Field e-mail: [kfield@esri.com](mailto:kfield@esri.com)  
Vice-chair: Ian Muehlenhaus e-mail: [muehlenhaus@wisc.edu](mailto:muehlenhaus@wisc.edu)

**WE MAPS**  
INTERNATIONAL MAP YEAR 2015–2016

**International Cartographic Association**  
Association Cartographique Internationale

