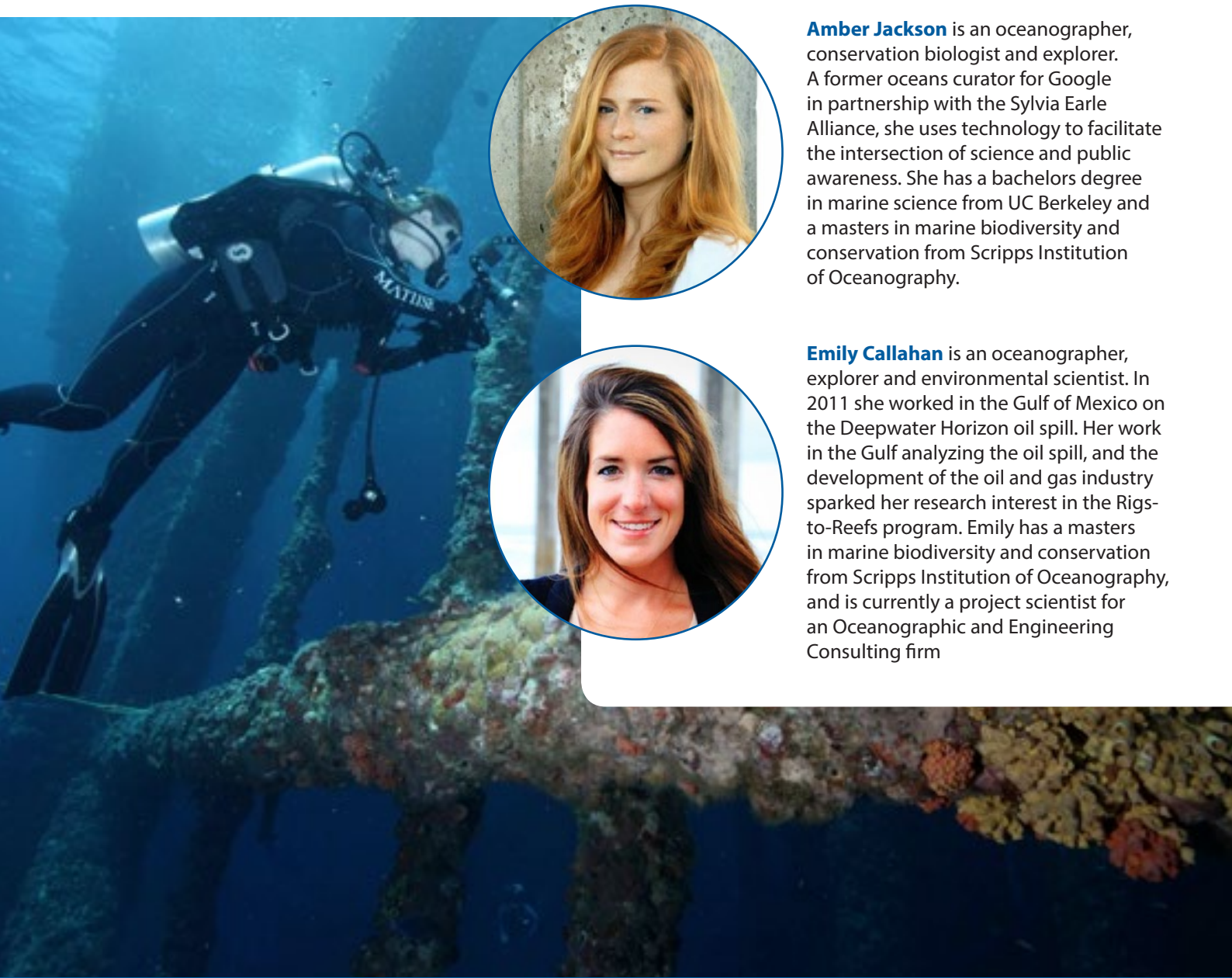


Market Insight for Decommissioning: Rigs to Reef as a Cost-Effective Solution



Amber Jackson is an oceanographer, conservation biologist and explorer. A former oceans curator for Google in partnership with the Sylvia Earle Alliance, she uses technology to facilitate the intersection of science and public awareness. She has a bachelors degree in marine science from UC Berkeley and a masters in marine biodiversity and conservation from Scripps Institution of Oceanography.



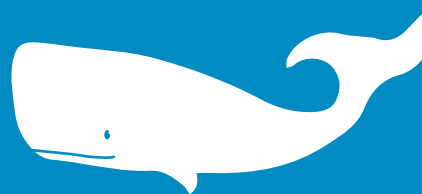
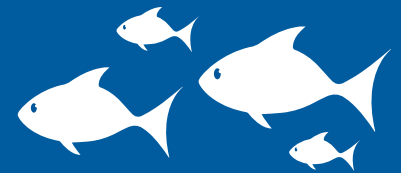
Emily Callahan is an oceanographer, explorer and environmental scientist. In 2011 she worked in the Gulf of Mexico on the Deepwater Horizon oil spill. Her work in the Gulf analyzing the oil spill, and the development of the oil and gas industry sparked her research interest in the Rigs-to-Reefs program. Emily has a masters in marine biodiversity and conservation from Scripps Institution of Oceanography, and is currently a project scientist for an Oceanographic and Engineering Consulting firm

Success story in the GoM



In the **Gulf of Mexico**,
470 platforms
had been converted to
permanent artificial reefs

A typical eight-leg structure
provides a home for
12,000 – 14,000 fish,
according to a study by the
Coastal Marine Institute.



A typical four-leg structure
provides 2-3 acres
of habitat for hundreds of
marine species

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The case for reducing cost: proven in the Gulf of Mexico

Around the world, in every ocean, hundreds of aging offshore oil and gas structures are quickly approaching the end of their economically useful life. The combination of rising operational costs and falling oil prices have caused a global shift towards decommissioning. For most platforms, decommissioning will mean hauling it ashore, breaking it apart and recycling it. This is expensive and potentially dangerous. For a large, deep-water oil or gas platform, total decommissioning costs may reach as much as \$200m, and with the rise in demand, these costs are only expected to continue rising. These increasing costs, have sparked a revival of the Rigs to Reefs (R2R) conversation. Whereby based on a program commonly and successfully practiced in the Gulf of Mexico, platform owners have the option to reuse their platforms as artificial reefs, thus in many cases, cutting the costs of decommissioning by as much as 50% .

Although the Gulf of Mexico has seen much success with its R2R program, it has also struggled with appropriately distributing the windfall of funds back to the respective gulf state. For example, in 2009, the Louisiana legislature began siphoning off money from the states' R2R program to satisfy other non-related budget shortfalls, subsequently draining the fund of about \$46 million dollars. In order to protect the R2R funds from future fiscal drains, Louisiana passed Amendment 8 in 2014 to ensure that all funds be distributed appropriately, and reserve the monies for inshore fish reef enhancement and development. Amendment 8 and the establishment of the Artificial Reef Development Fund was a huge win for the recreational fishing groups and provides a transparency to the distribution of R2R funds to the State, a transparency that should be mimicked by other states and countries looking to develop their own programs.



Louisiana and Texas Offshore Artificial Reefs Key Stats

- Majority of Contributed Material from Removed Platforms
- 150 Offshore Artificial Reefs
- 91 ARs Inside Planning Areas
- 51 SARs Outside Planning Areas
- 8 DWRs > 400 Ft Water Depth

Existing Fixed Platforms vs Water Depth

- 2476 Existing Fixed Platforms
- 516 Idle Platforms (~20%)
- Ave Life = 29 Years vs 20 Years Ave for Removed Platforms
- 57 Fixed Platforms > 400 Ft Water Depth
- Ave Life = 23 Years

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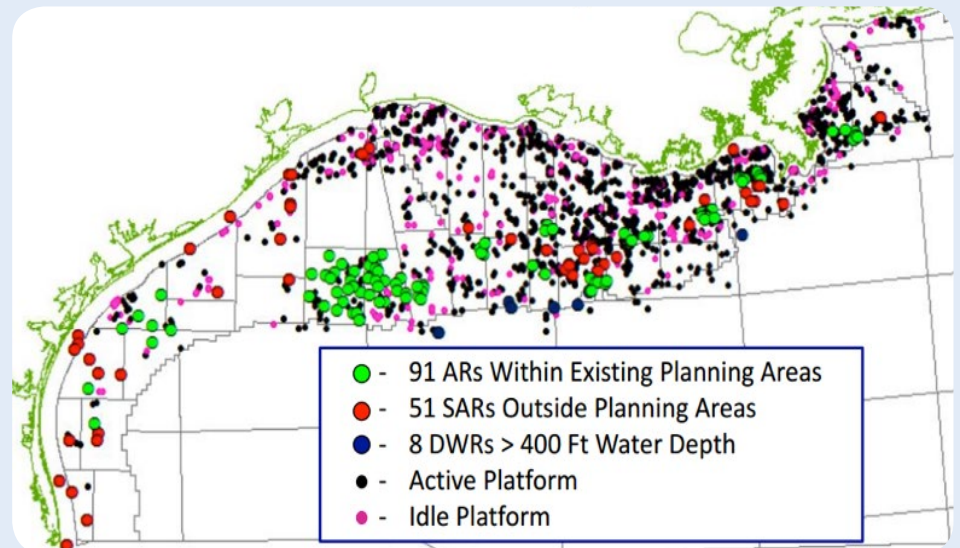
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Spatial Comparison of Existing Fixed Platforms and Offshore Artificial Reefs

- 255 of 2476 Existing Fixed Platforms inside Planning Areas
- 48 of 516 Idle Platforms inside Planning Areas



Source Greg Simmons, D&A Summit 2015

California- Educating the masses

California too faces challenges with its R2R program. In fact, since the R2R law was established in 2010, not a single platform has been implemented into the program and re-purposed as an artificial reef, despite the enormous cost saving benefits. One major challenge is the lack of public knowledge in regards to the goals of the program. With only 27 offshore oil and gas platforms in California waters, there are few jobs tied to the oil industry and therefore the public defaults to the perception that oil platforms equals oil spill. However, with science-based educational initiatives, the public and policymakers have responded positively to the idea of repurposing the offshore oil and gas platforms as reefs through the R2R program, and hope remains that at least a handful of the productive platforms, recently found to be among the most productive marine fish habitats in the world, will remain in place as reefs .

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North Sea- A change is required

In the North Sea, hundreds of platforms face removal, under often dangerous and risky conditions, and coupled with mounting costs of varying uncertainty, means that total compliance under OSPAR may not be the best answer. OSPAR is the primary mechanism governing the North Sea region, by which fifteen Governments of the western coasts of Europe, together with the European Union, cooperate to protect the marine environment of the North-East Atlantic. The decommissioning of oil and gas assets is primarily governed by the Petroleum Act which implemented OSPAR Decision 98/3. The act requires licensees to pay for offshore installations to be properly decommissioned; in most cases it effectively mandates complete removal from the seabed. In other words, the potential to allow platforms to be relocated or left in place to function as artificial reefs is slim, and in light of historical events that lead to public outcry, such as 1995's Brent Spar decommissioning and the BP Oil Spill of 2010, unlikely (Jørgensen, Dolly).

Why not develop a Rig to Reef program in the North Sea? As demonstrated in other areas of the world, R2R offers a viable, and perhaps more environmentally and economically feasible option. The water in the North Sea is cold, murky and incredibly nutrient rich, and home to a wide variety of commercially viable marine life. The bottom is littered with one of the highest concentration of wrecked ships in the world, a grim reminder of the violent power of this icy water body. When paired with the vast array of hard substrate provided by the platforms- these nutrient rich waters have fostered an abundance of marine growth. They may be home to more than over 100 different marine species, including some cold water coral species such as *Lophelia pertusa*, one of six coral species known to form extensive cold-water reefs, and unlike most warm-water corals, it lacks symbiotic algae and thus does not require light.

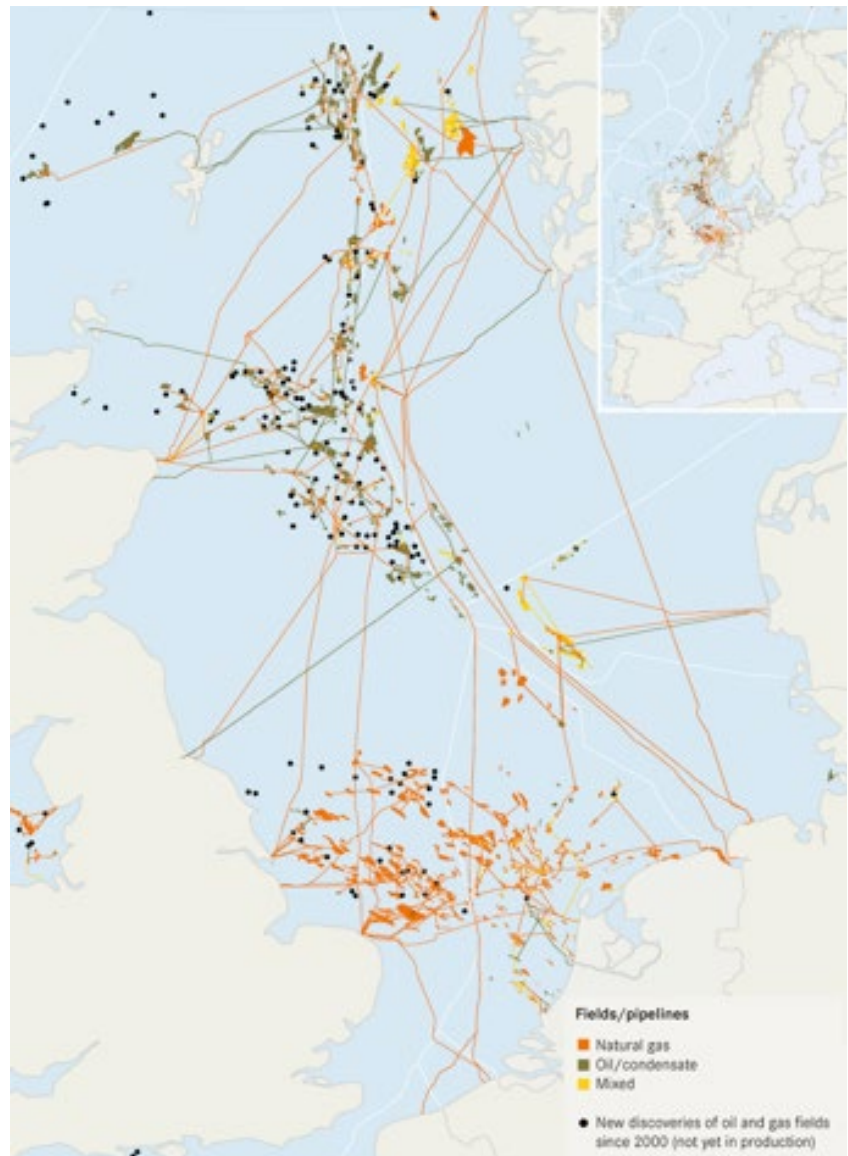
For the North Sea strict compliance, leading to the total removal of the platform, may not be the best answer and for many stakeholders, the debate over decommissioning has come at just the wrong time. The combination of aging assets, high exploration costs, and a significant drop in oil prices is just the troubling dilemma Europeans had hoped to avoid. Currently, there are 1357 offshore installations that are operational in the OSPAR maritime area, most of which are sub-sea steel installations (726) and fixed steel installations (545). These 'fixed steel' installations are the only candidates that may be eligible for 'reefing' as part of a yet to be created "Rigs to Reefs" program. When considering the vast number of these 'fixed steel installations' that remain, reefing is an option that should be seriously considered.

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Offshore Oil and Gas Fields under Exploitation in the North Sea, OSPARs Quality Status Report, 2010 (http://qs2010.ospar.org/en/ch07_01.htm)

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In the North Sea several key complicated barriers remain that make implementing an R2R program challenging. The primary barrier being the OSPAR regulations, to which 17 nations have committed themselves. The rules established at the OSPAR convention in 1998 simply did not foresee the benefits of R2R. And to change OSPAR regulations would take significant time, effort and cooperation among the participants.

Looking to the future of the R2R in areas like the North Sea and California, there is much potential for success. Following in the footsteps of R2R leaders like the Gulf of Mexico, there is potential to set an international standard, allowing other countries like India and Australia to follow suit. The vast number of looming decommissioning projects in the North Sea could pave the way for creating a standard of excellence for decommissioning practices and though the North Sea may be one of the first harsh, cold water marine environments requiring extensive decommissioning, from a global perspective, it certainly won't be the last.

Conclusion

In total, the estimated cost of decommissioning in the North Sea has been determined to be in the order of one-hundred billion dollars, a number not for the feint of heart. Developing and implementing a R2R program could potentially save 10% of these looming costs. Decommissioning will represent huge incremental costs over the lifespan of the production field, and more than half of those costs will be incurred by governments through tax relief schemes, whereby taxpayers become the main shareholders in a business most are hardly aware of. Rigs to Reefs may just be the answer to the mounting costs and risks facing the decommissioning of structures in the North Sea and will likely be the important first step towards a series of Rigs to Reefs programs around the world.

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