REYNOLDS, J. 2022. *Impact assessment of addition, removal and repurposing of subsea storage and infrastructure on biological marine ecosystems*. Presented at the 2022 Structures in the marine environment conferences (SIME 2022), 7 June 2022, Edinburgh, UK.

Impact assessment of addition, removal and repurposing of subsea storage and infrastructure on biological marine ecosystems.

REYNOLDS, J.

2022

Impact assessment of addition, removal and repurposing of subsea storage and infrastructure on biological marine ecosystems

ROBERT GORDON UNIVERSITY ABERDEEN

What is the problem?

Increased need for subsea storage and infrastructure

In response to energy and environmental problems, the proportion of renewable energy production is increasing in the current energy system. However renewable energy such as wind and solar have some local limitations and supply-demand inefficiencies. Therefore, it is necessary to have suitable secondary storage systems in place. Hydrogen is a good source for secondary energy.

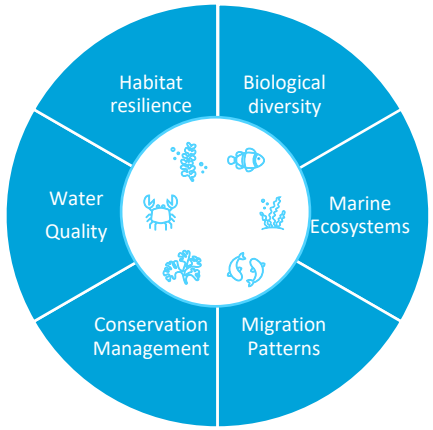
In an industry of increasing demand, it is important to consider a circular approach to the infrastructure already in place and being developed.
The repurposing of traditional oil and gas infrastructure is a key part of the energy transition as in many cases it is more cost effective to adapt infrastructure already in place than remove and install new infrastructure (Sommer et al. 2019). However, in some case the removal of infrastructure is inevitable, such as infrastructure from depleted wells which have to be abandoned. The process of removal has been found to displace many marine ecosystems.

The use of subsea infrastructure for the use of gaseous hydrogen storage poses numerous questions.
Due to the characteristics of hydrogen and its permeability the infrastructure composition is crucial to minimizing the impacts of the storage infrastructure on the marine environment (Burdon et al 2018).
The unknown effects of high compression/pressure vessels subsea need investigating.

Current Areas of Research:
Decommissioning of **hydrocarbon** subsea infrastructure: Structures, Rigid pipelines, Flexible flowlines, Control systems
Influence of **hydrocarbon** structures on ecological connectivity
Value of subsea **hydrocarbon** pipelines to marine biodiversity
UNKNOWN:
Subsea structures suitable for hydrogen and CO2 influence on marine ecosystems
Affects of H2 gas and CO2 leaks on marine ecosystems

What is the proposed solution?

Impact Assessment of addition, removal and repurposing of subsea storage and infrastructure



Areas of Focus for the environmental impact assessment for each Method (Addition, removal and repurposing):

- Biological diversity
- Marine Ecosystems
- Migration Patterns
- Conservation Management
- Water Quality
- Habitat resilience

Expected outcome…

1. Technical and environmental considerations
2. Stakeholder engagement for marine related organisations
3. Impact assessment matrix
4. Guidance on future addition, removal and repurposing of subsea infrastructure

	+		↻	H_2	CO_2	T
	1		6			7
		3				3
					2	2
		5				5
					1	1
	1					1

Impact

Reduction in negative effects for biological marine ecosystems with the use of guidance for operators and energy organisations utilising subsea infrastructure

SIME – June 2022
Jemma Reynolds
j.reynolds5@rgu.ac.uk

National Subsea Centre