



ECOSYSTEMS SERVICES; TOWARDS INTEGRATED MARINE INFRASTRUCTURE PROJECT ASSESSMENTS

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AGENDA

- Introduction
- Why this project?
- The Ecosystem Services concept
- Results Botany Bay port extension, Sydney, Australia

INTRODUCTION

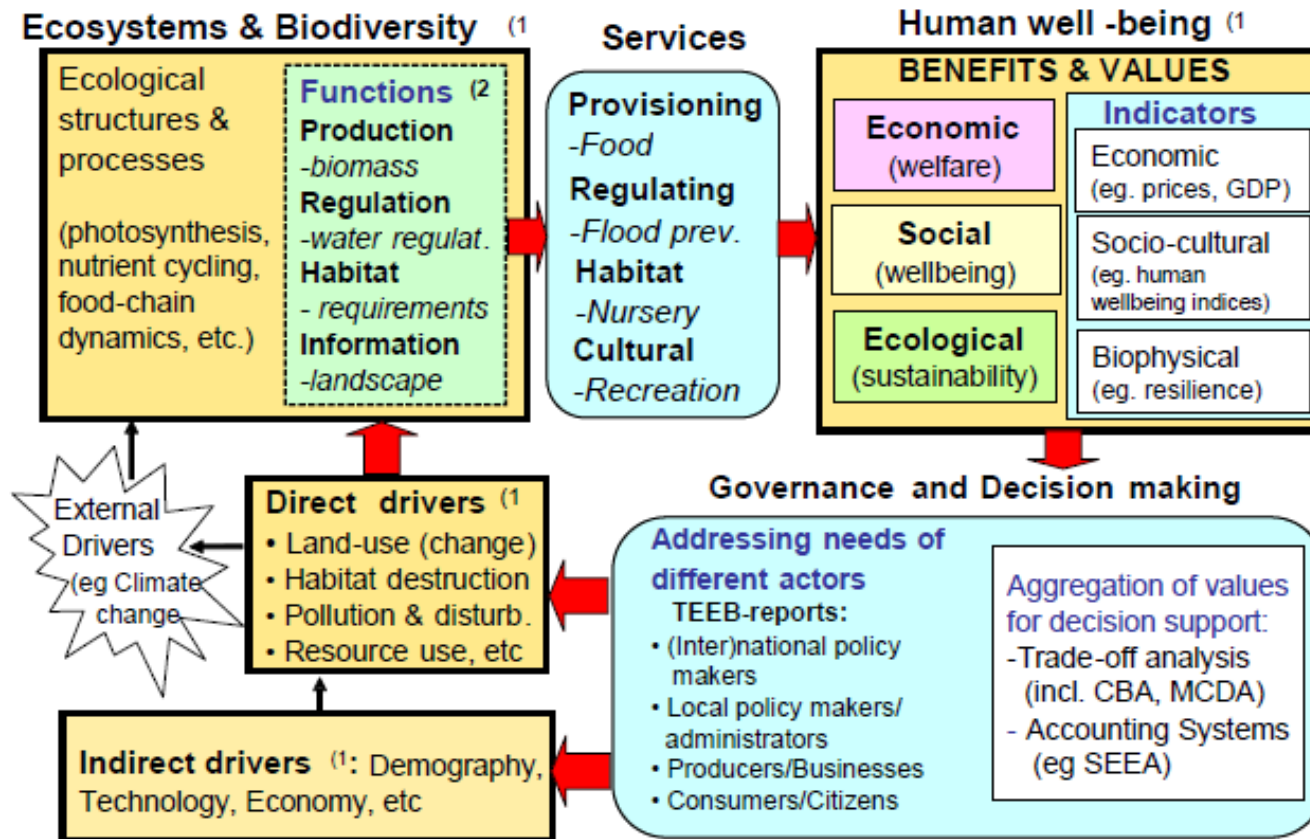


- Educating
- Informing
- Promoting
- Networking
- Connecting

WHY THIS PROJECT?



Ecosystem Services concept



¹⁾ The four bold-lined boxes coincide with the overall MA- Framework

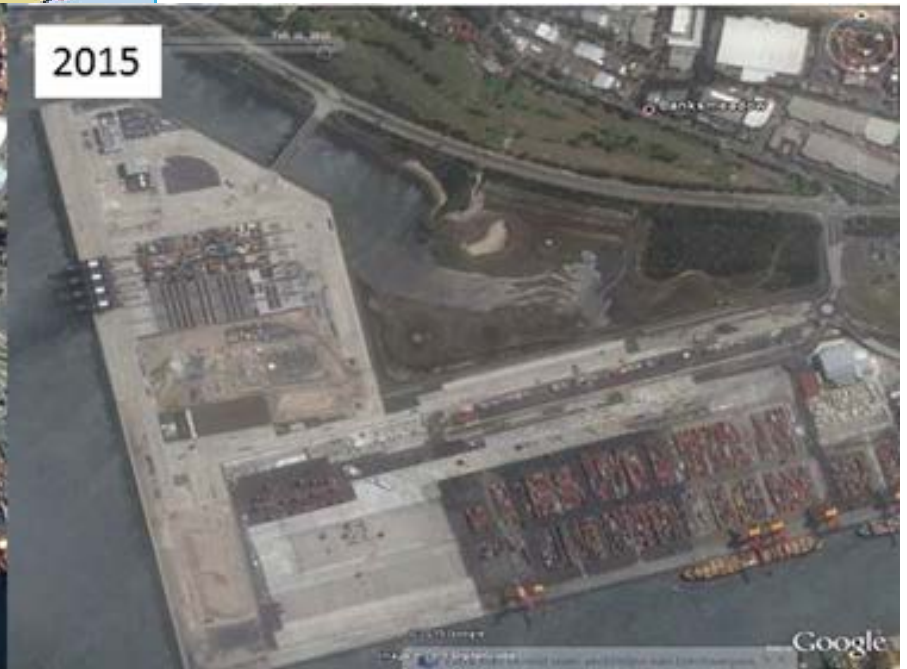
²⁾ subset of ecosystem processes & components that is directly involved in providing the service

Case studies

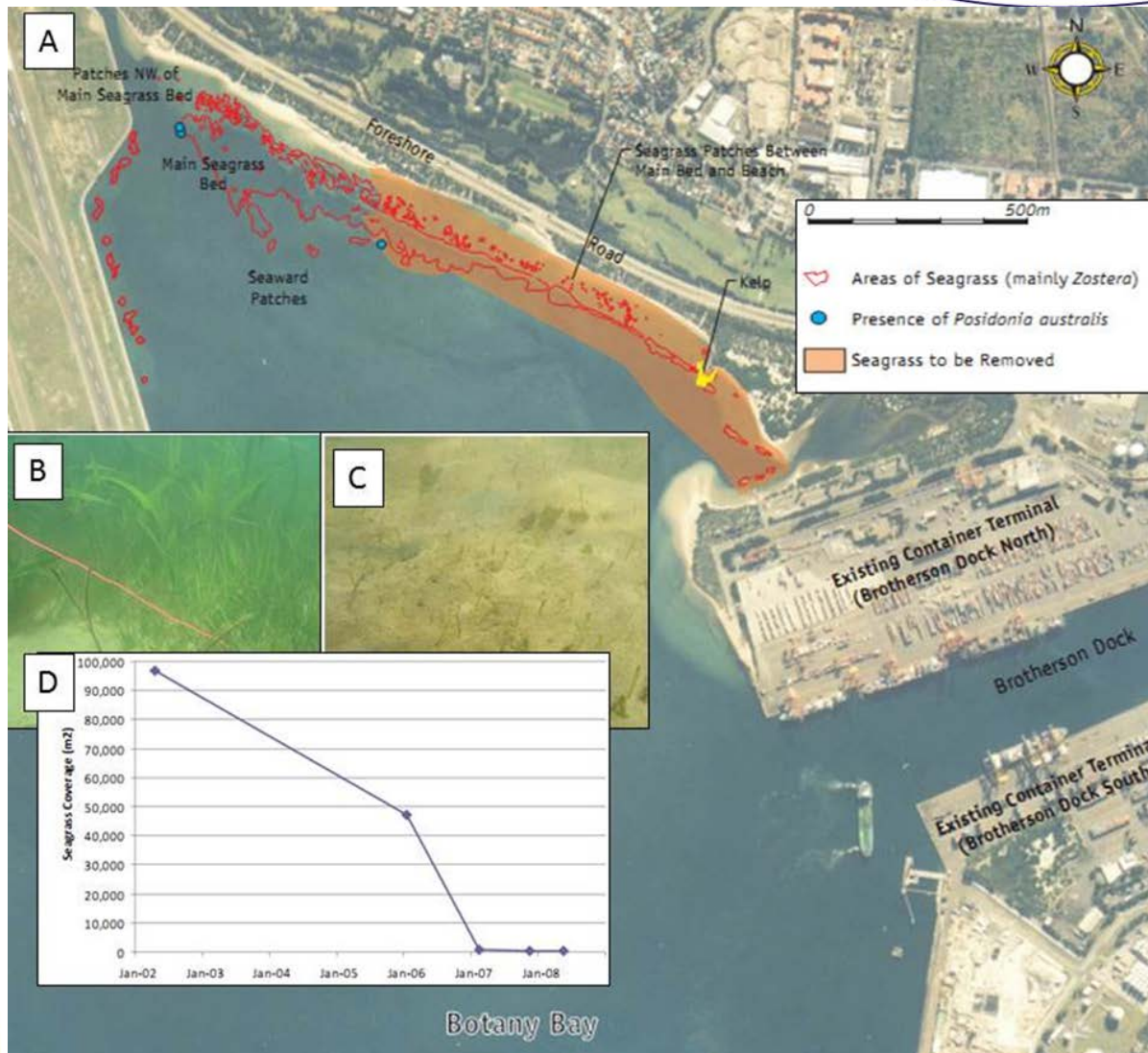
ES in case studies

1. Polders of Kruibeke, Belgium
2. Windfarms at sea (C-Power), Belgium
3. Botany Bay, Sydney, Australia
4. Westerschelde Container Terminal, Netherlands
5. Sand Engine, Netherlands

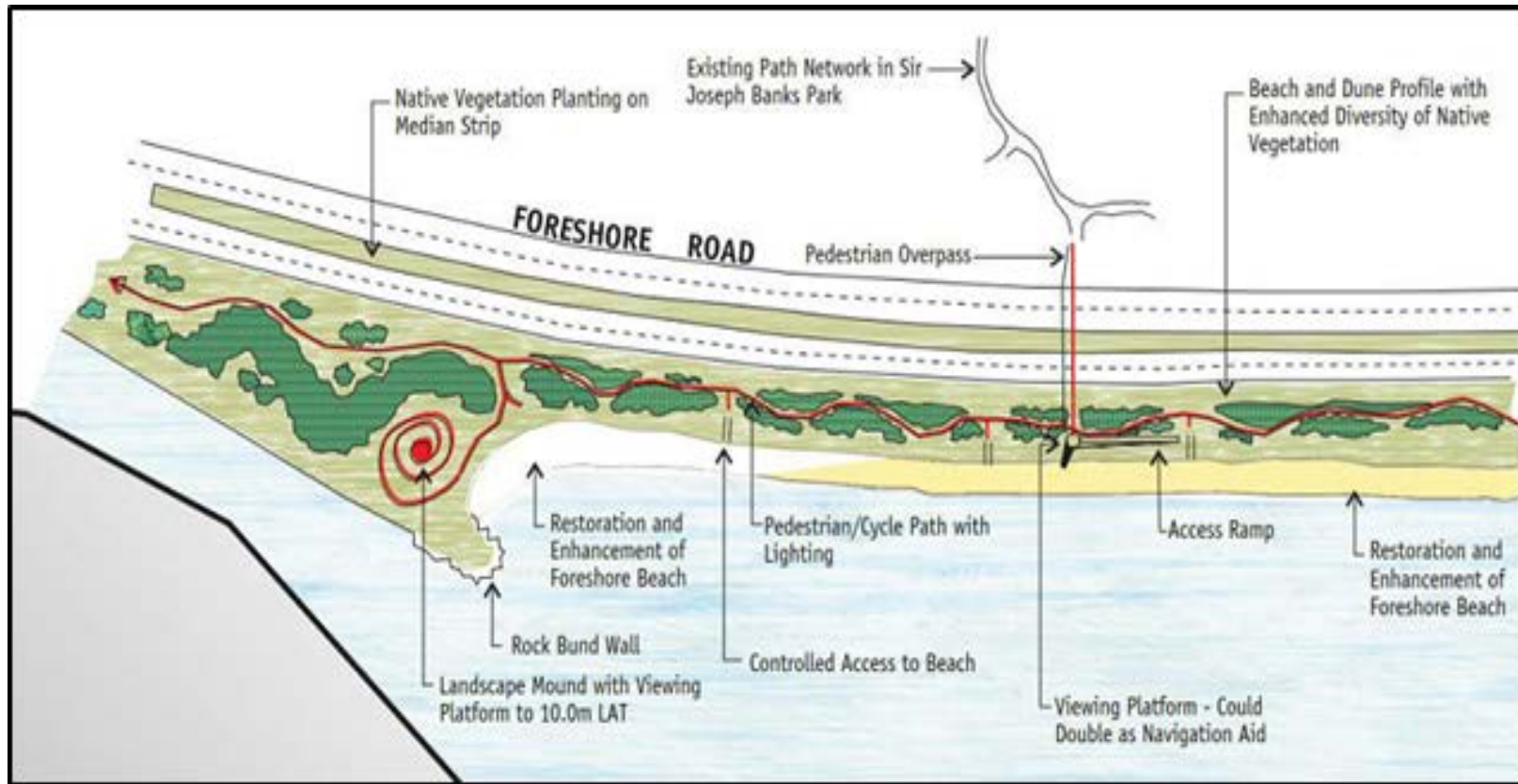
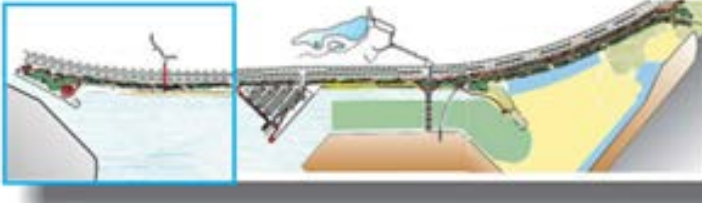
Botany Bay, Sydney, Australia



Botany Bay, Sydney, Australia



Botany Bay, Sydney, Australia



Botany Bay, Sydney, Australia

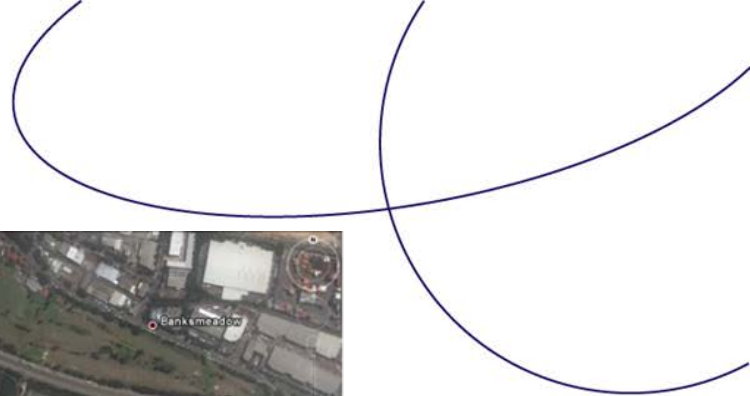
Calculation of the impact on climate regulation (carbon burial)

Habitat		Ha	C burial	TonC/y
Shore	Lagoon, bay	-59	0.068 ton C/ha/y	- 4
	Seagrass	+6	1.38 tonC/ha/y	8-12
	Mangroves	-1	0.83 – 3 tonC/ha/y	- 0.83-3
Inner Estuary	Intertidal flat	+8.3	2 – 9 ton CO ₂ -eq./ha/y (= 0.5-2.5 tonC/ha/y)	4-20
	Marsh	+2	2 – 9 ton CO ₂ -eq./ha/y (= 0.5-2.5 tonC/ha/y)	1-5
Hard substrata	Rock rubble	+1.9		
Terrestrial	Dune, planted shrubland	-11.1	6.8 ton C/ha/y	-75
Total (average)				-56
Monetary value €/y (220 €/tonC)				-12,320

Botany Bay, Sydney, Australia, overall effect

ES	Overall effect
Fish production	+
Agricultural production	
Wood production	
Water production	
Water provision for transportation	
Climate regulation	-
Water quality regulation	-
Air quality regulation	-
Flood protection	
Sedimentation and erosion regulation	+/-
Recreation	+
Heritage	
Biodiversity: shorebirds, marine mammals	+

Botany Bay, summary ES effects



ES	Total effect
Fish production	+
Agricultural production	
Wood production	
Water production for potable water	
Water provision for transportation	+
Climate regulation	-
Water quality regulation	-
Air quality regulation	-
Flood protection	
Sedimentation and erosion regulation	+/-
Recreation	+
Heritage	
Cognitive development	
Biodiversity	+



Bay -59ha

- Fish production
- Climate regulation
- Water quality regulation
- Recreation
- Biodiversity

Mangroves -1ha

- Fish production
- Nursery function
- Water quality regulation
- Climate regulation
- Air quality regulation
- Biodiversity

Marshes +2ha

- Water quality regulation
- Climate regulation
- Air quality regulation
- Biodiversity

Intertidal flats +8ha

- Fish production
- Nursery function
- Water quality regulation
- Climate regulation
- Biodiversity

Shore

- Recreation
- Heritage

Shrubland -11ha

- Climate regulation
- Water quality regulation
- Air quality regulation
- Biodiversity

Seagrass +6ha

- Fish production
- Nursery function
- Water quality regulation
- Climate regulation
- Biodiversity

CONCLUSIONS



Sand engine after construction 2011

Sand engine 2015





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