



UNIVERSITY OF
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A Historical Investigation of Solent Saltmarsh as Key Coastal Nursery Habitat Areas

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Aims of the report

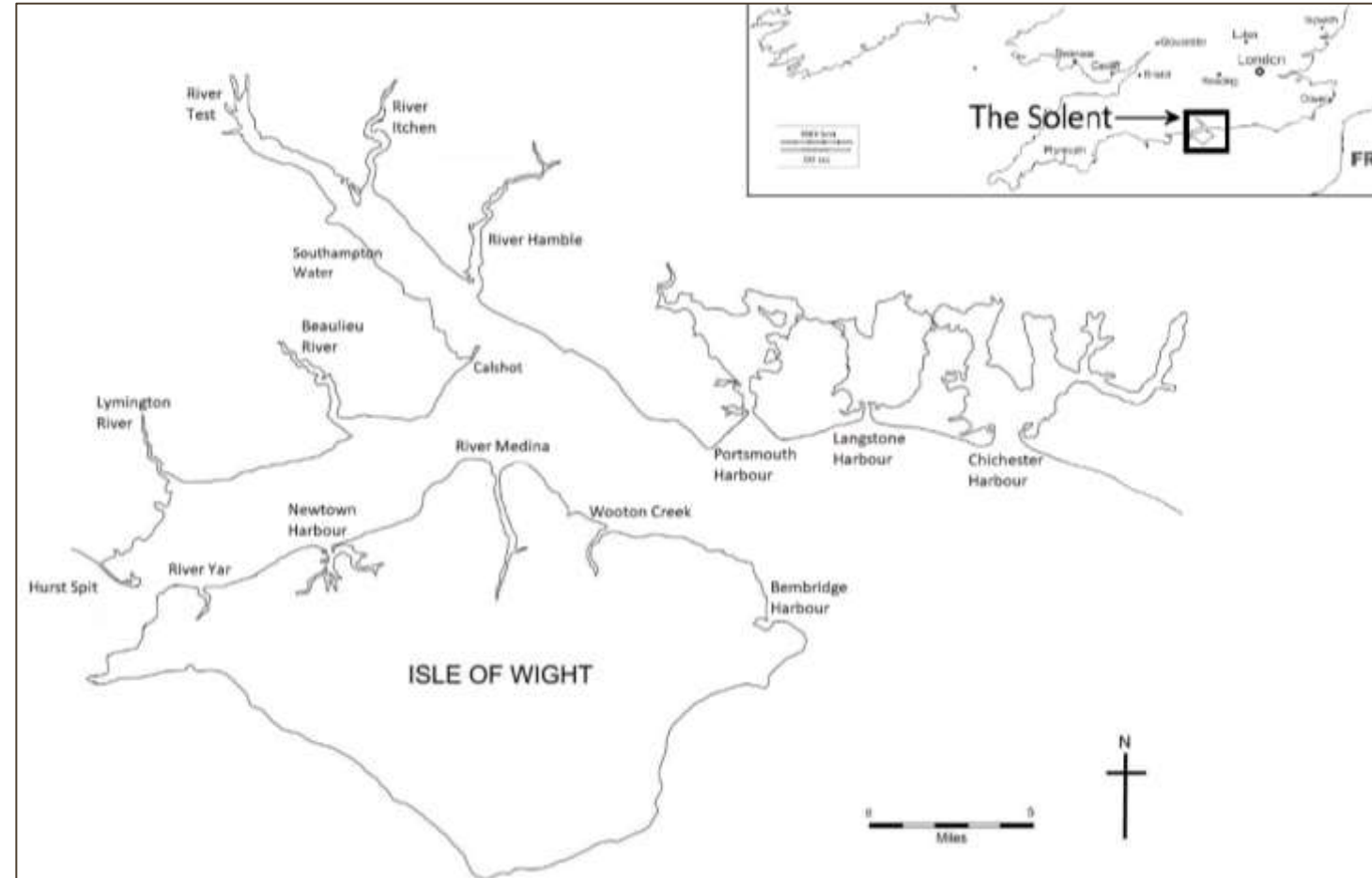
Assess **historical changes** of Solent saltmarsh habitats

Assess **extent** and **distribution** of saltmarsh

Essential Fish Habitat

Blue Carbon 65 – 74 t C ha⁻¹

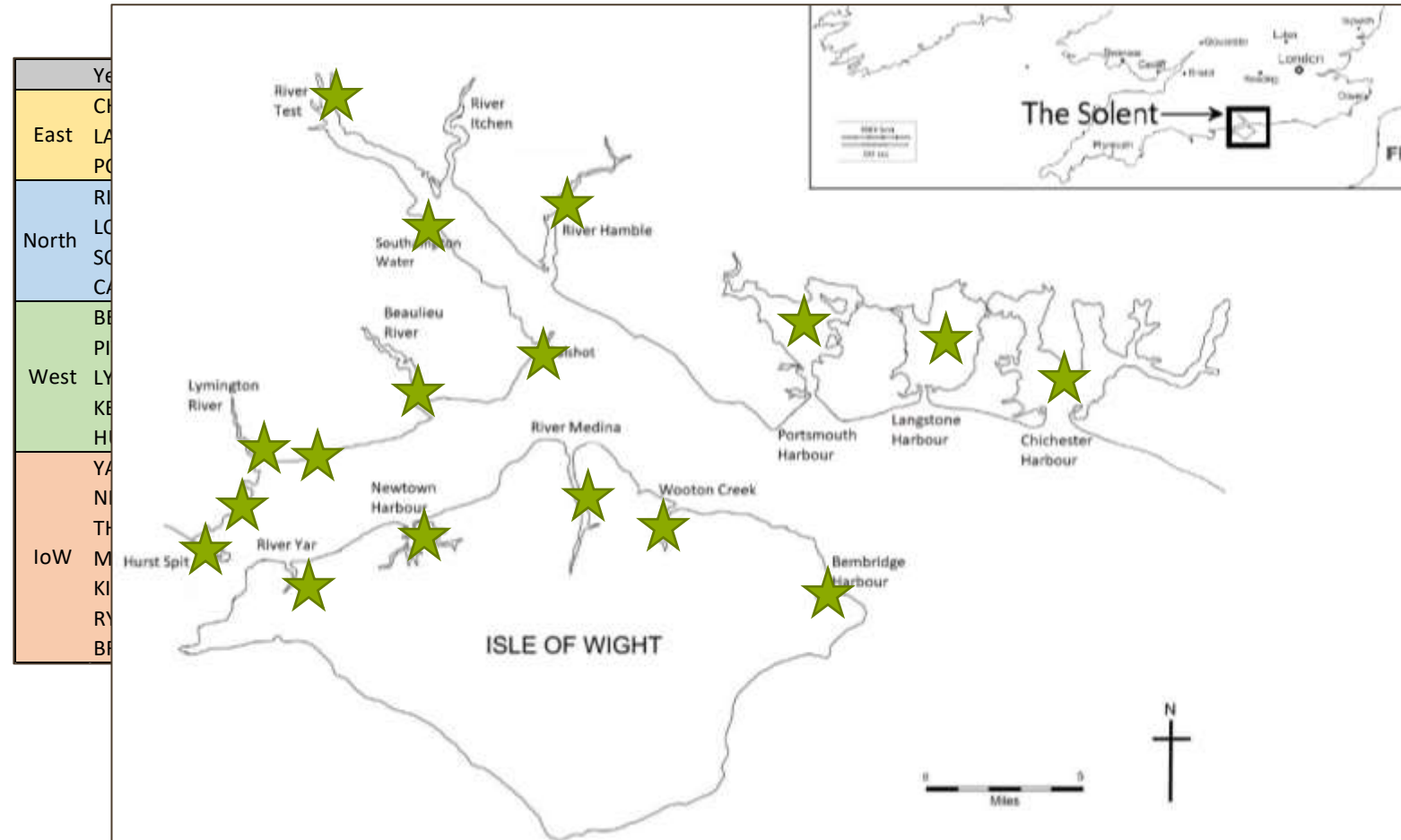
(Burden, Garbutt and Evans, 2019;
BES, 2020)



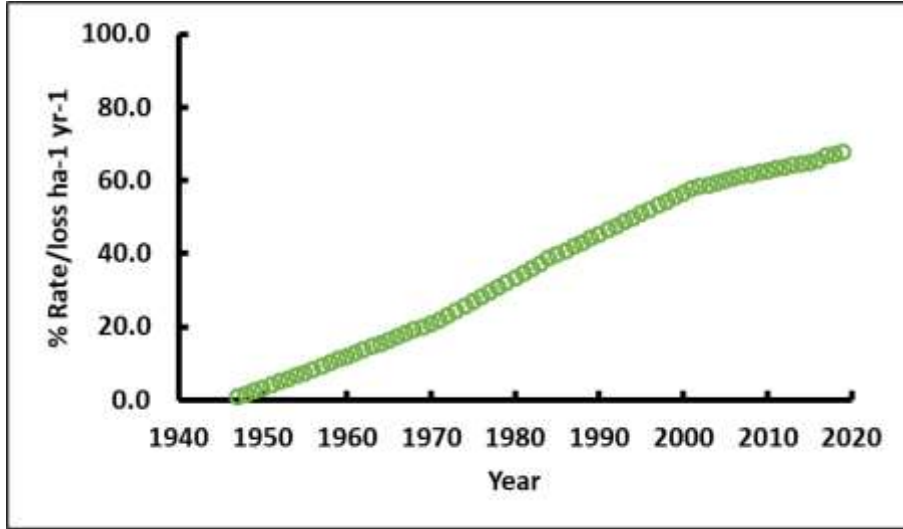
Methodology

Collate all historical saltmarsh data

Identify all areas of saltmarsh within the Solent



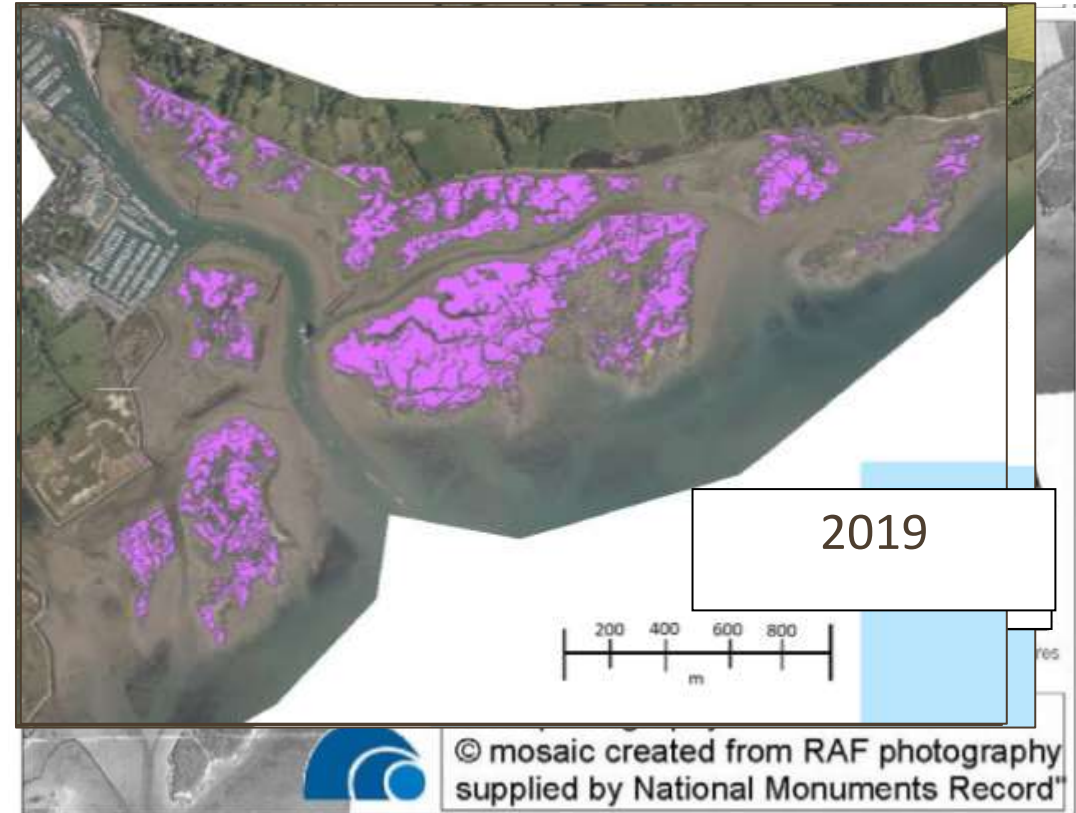
Historical Saltmarsh Loss



The total percentage rate of saltmarsh loss for Lymington River Estuary from 1946 to 2019.

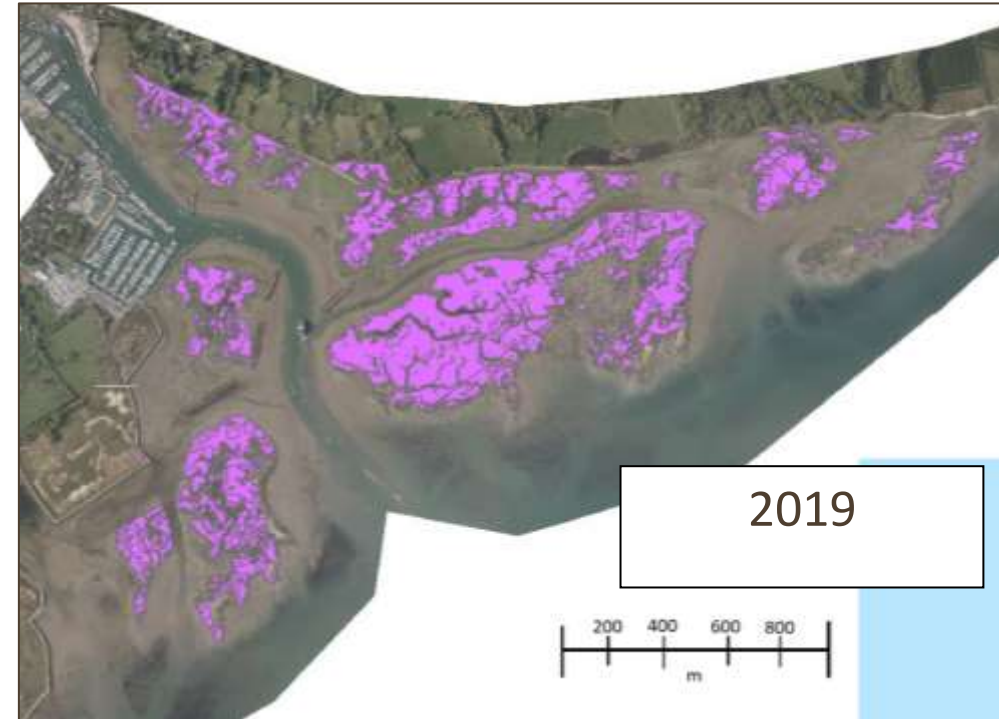
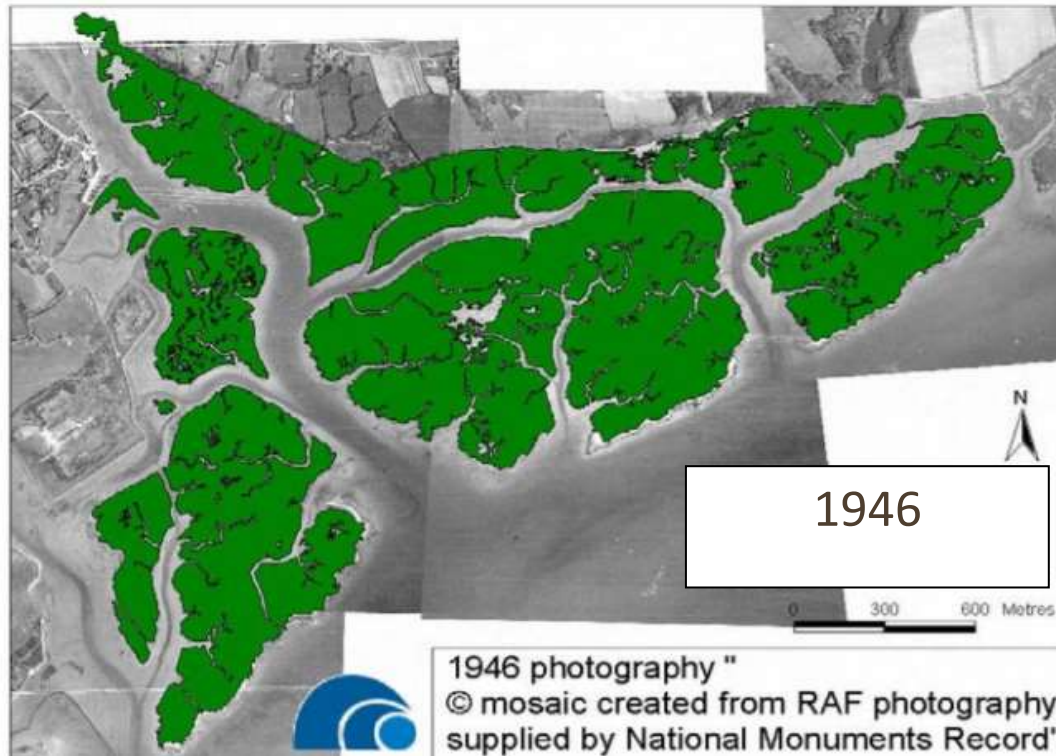
Saltmarsh extent at Lymington River Estuary.

Year	Area (Ha)	Period	Total Saltmarsh Change	
			% Change	% loss yr ⁻¹
1946	266.3			
1954	248.7	1946-1954	-6.61	-0.94
1971	207.7	1954-1971	-16.49	-2.36
1984	162.2	1971-1984	-21.91	-3.13
2001	110.9	1984-2001	-31.63	-4.52
2008	100	2001-2008	-9.83	-1.40
2016	90	2008-2016	-10.00	-1.43
2019	86	2016-2019	-4.44	-0.63
		1956-2019	-67.71	-0.92



Saltmarsh extent at **Lymington River Estuary** (Cope *et al.*, 2008; EA, 2020).

Historical Saltmarsh Extent Data



Total saltmarsh loss at Lymington River Estuary = **67.71%**

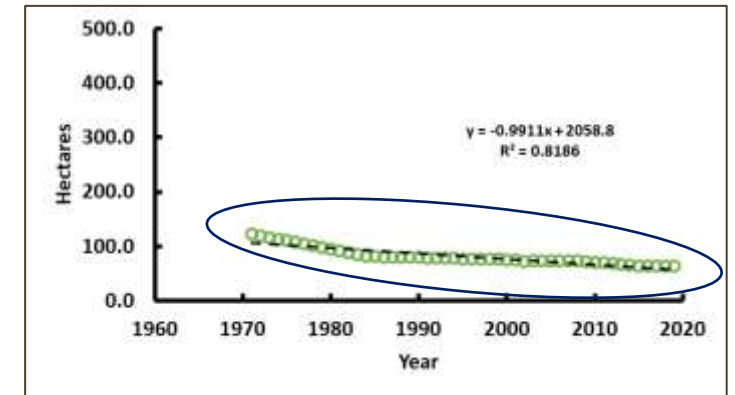
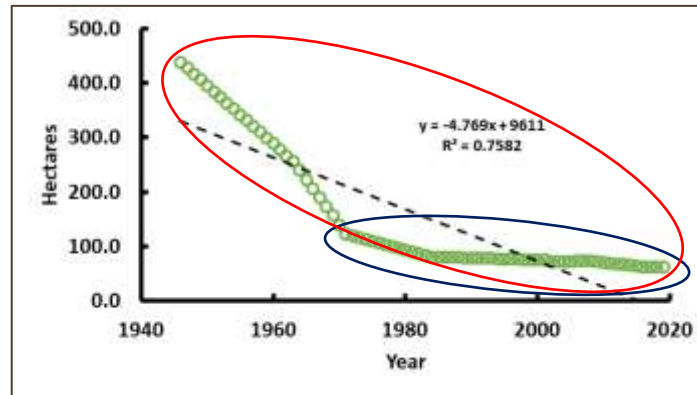
Saltmarsh extent at **Lymington River Estuary**
(Cope *et al.*, 2008; EA, 2020).

Regression Analysis of 100% Saltmarsh Loss

Worst-case Zero Saltmarsh Scenario

Best-case Zero Saltmarsh Scenario

- Regression analysis used to estimate best and worst-case scenarios of 100% saltmarsh loss
- Comparison between the 2008 estimate and a current estimate



Estimate of 100% saltmarsh loss at **Langstone Harbour**
(Cope *et al.*, 2008)

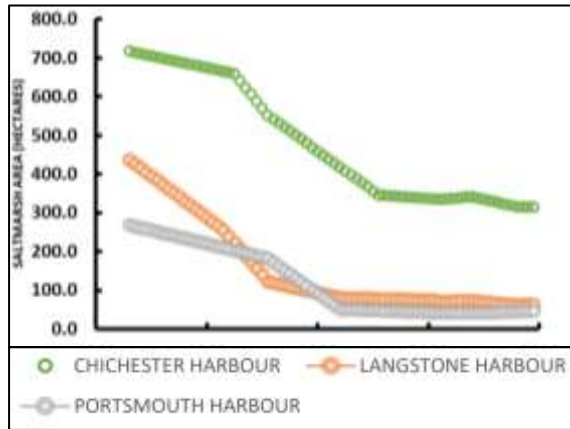
Regression Periods	Expected Zero Marsh
1971 - 2002	2105
1946 - 2002	2009

Updated estimate of 100% saltmarsh loss at **Langstone Harbour**

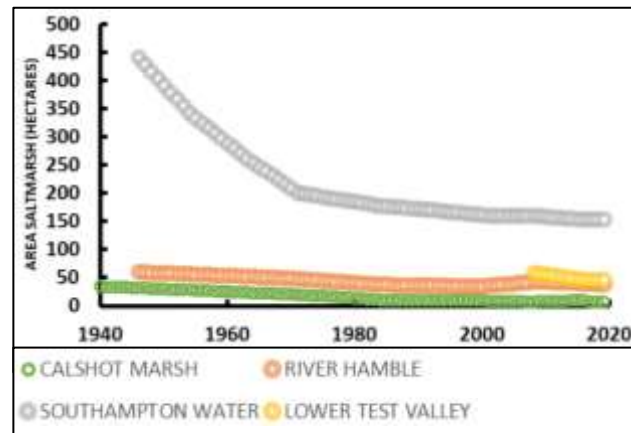
Regression Periods	Expected Zero Marsh
1971 - 2019	March 2077
1946 - 2019	2015

Overall Saltmarsh Loss

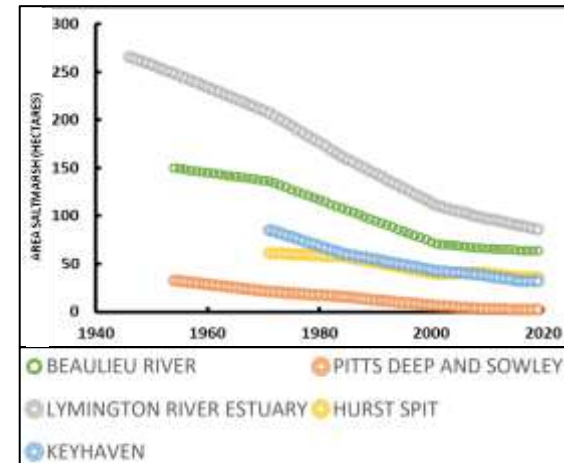
East Solent



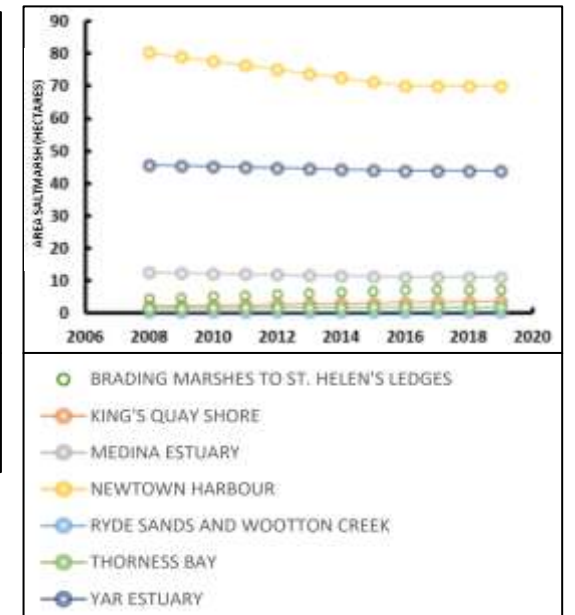
North Solent



West Solent

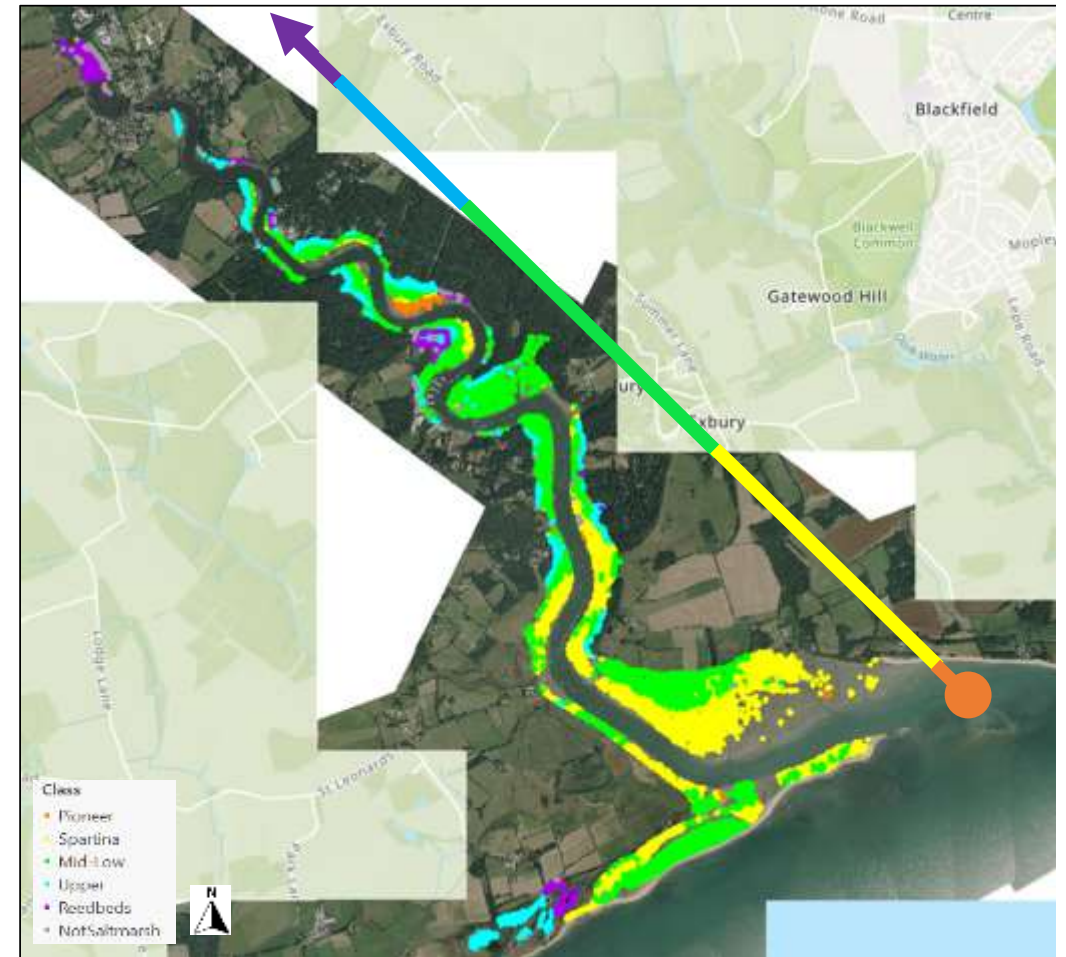


Isle of Wight



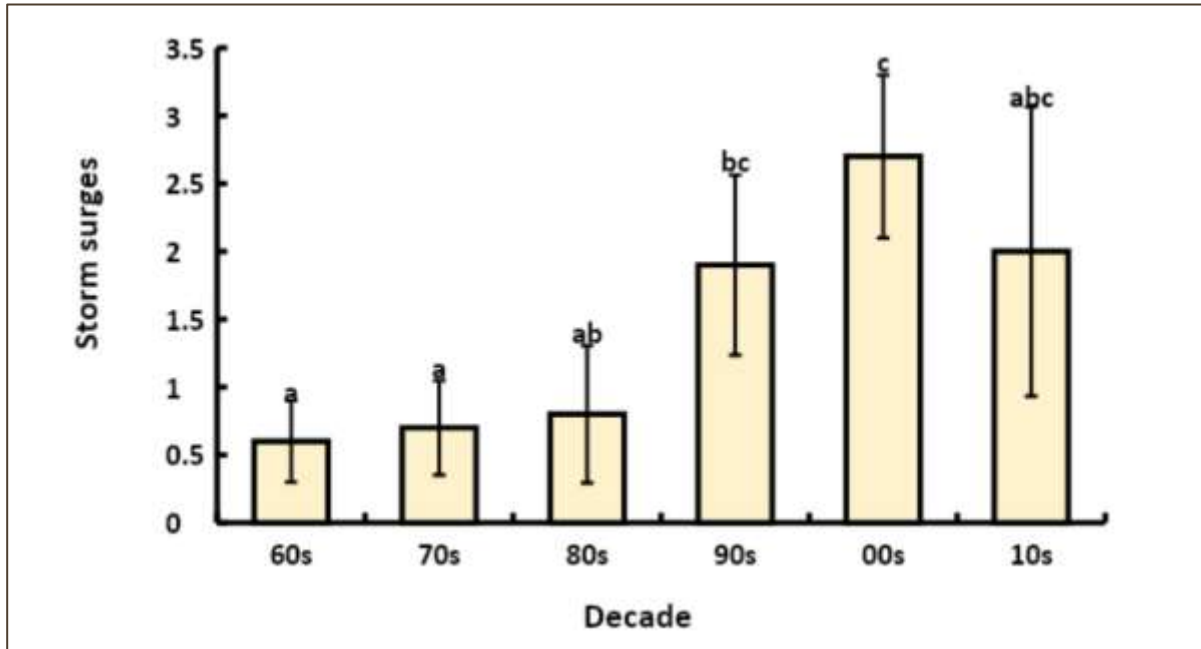
Species Zonation Classification

- Assess saltmarsh species zones
- Data from Environment Agency - 2016
- Zones reflect ecological communities

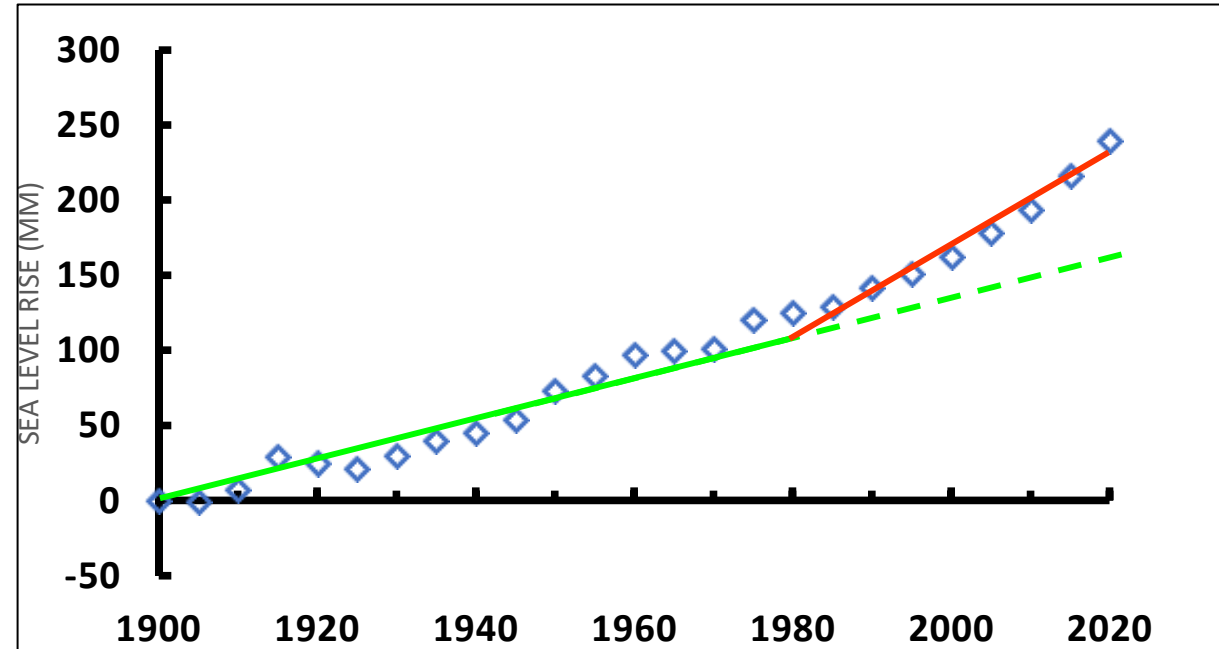


An aerial imagery (Channel Coastal Observatory, 2020) map showing saltmarsh zonation classification of the Beaulieu River in 2016, retrieved from the Environment Agency (EA, 2020). There are 6 classes.

Investigating Reasons for Saltmarsh Loss



Storm surges recorded within the Solent by decade, using data obtained and adapted from SCOPAC (Wadey *et al.*, 2021). Storms have significantly increased since the 1960s to the 2000s (One-Way ANOVA, decade vs. storm surges: $F_{5,52} = 3.3$, $p \leq 0.05$, mean \pm SE). Letters above the bars = Tukey's Pairwise comparisons.



Global average sea level change. Green line shows Linear regression for 1900-1980 ($y = 8.1917x - 17.706$; $R^2 = 0.9666$), while the green dotted line is a continuation of this regression. Red line shows linear regression for 1980-2020 ($y = 14.165x + 100.04$; $R^2 = 0.9635$) (Graph adapted from EPA, 2021).

Future Work and Projects

- Extensive ground truthing
- Higher resolution LIDAR photography (greater than $0.25\pm\text{m}$)
- Identify relationship between saltmarsh and fisheries
- Complete a similar style report on Seagrasses across the Solent

Thanks for listening

Year	1940	1946	1954	1963	1965	1969	1971	1984	1991	2001	2002	2008	2016	2019
East	CHICHESTER HARBOUR	✓			✓		✓		✓		✓	✓	✓	✓
	LANGSTONE HARBOUR	✓		✓			✓	✓		✓	✓	✓	✓	✓
	PORTSMOUTH HARBOUR	✓					✓	✓			✓	✓	✓	✓
North	RIVER HAMBLE		✓				✓	✓		✓		✓	✓	✓
	LOWER TEST VALLEY											✓	✓	✓
	SOUTHAMPTON WATER		✓	✓	✓		✓	✓	✓	✓		✓	✓	✓
	CALSHOT	✓					✓	✓		✓		✓	✓	✓
West	BEAULIEU RIVER			✓			✓	✓		✓		✓	✓	✓
	PITTS DEEP AND SOWLEY					✓	✓	✓		✓		✓	✓	✓
	LYMINGTON RIVER ESTUARY		✓	✓			✓	✓		✓		✓	✓	✓
	KEYHAVEN						✓	✓		✓		✓	✓	✓
	HURST SPIT						✓	✓		✓		✓	✓	✓
IoW	YAR ESTUARY											✓	✓	✓
	NEWTOWN HARBOUR											✓	✓	✓
	THORNESS BAY											✓	✓	✓
	MEDINA ESTUARY											✓	✓	✓
	KING'S QUAY SHORE											✓	✓	✓
	RYDE SANDS AND WOOTTON CREEK											✓	✓	✓
	BRADING MARSHES TO ST. HELEN'S LEDGES											✓	✓	✓