Coastal Change Assessment St Kilda

NTS CVI

Tue 13th Sep to 15th Sept 2022

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Points covered here:

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1. Scope & focus
2. Science update on coastal change
3. Village Bay: Coastal Change Assessment
4. Coastal Risk Map
5. Questions

Scope & focus

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St Kilda WHS is vast, the OUV is rich and varied. It's exposure to climate change is complex.

Interests include

→ 65myo volcano

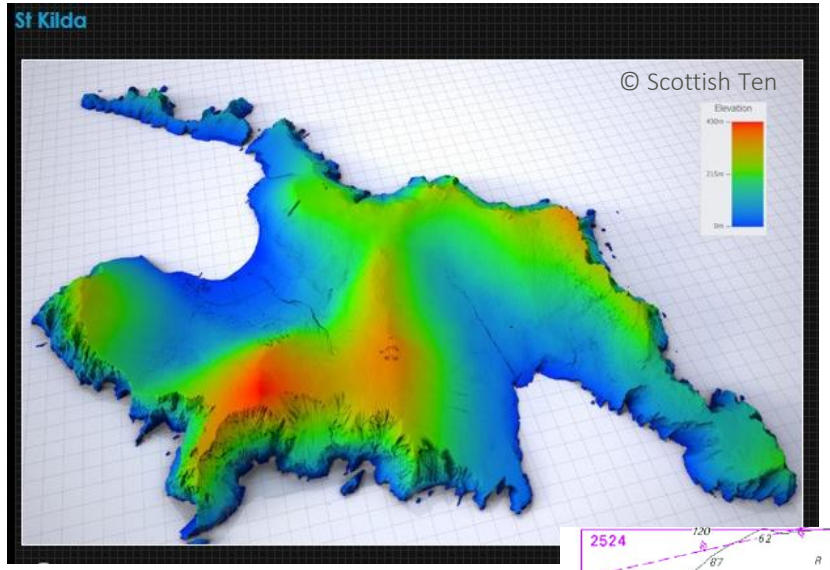
→ 375m tall cliffs

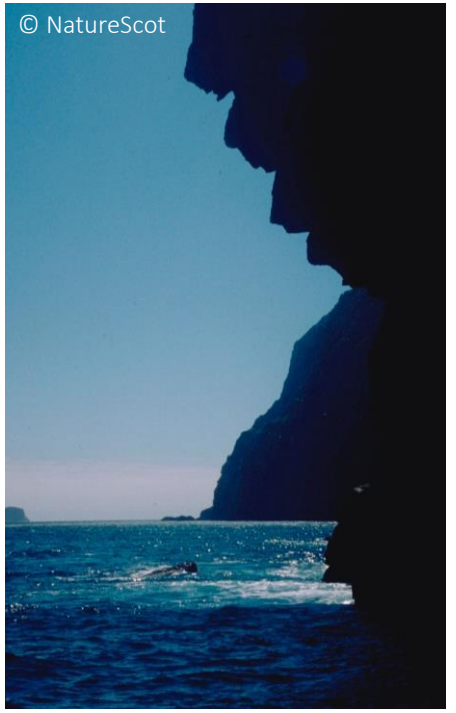
→ Complex submarine geomorphology, geology and marine life.

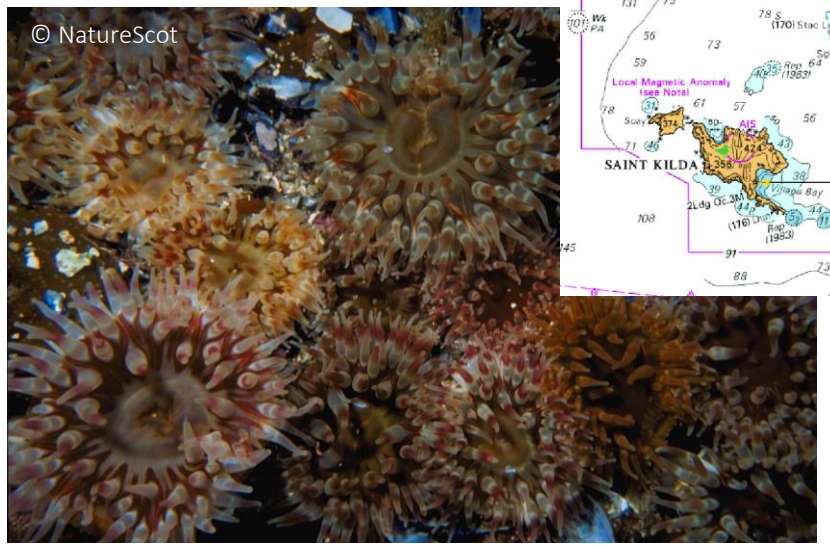
→ Marine/coastal/terrestrial habitats and species

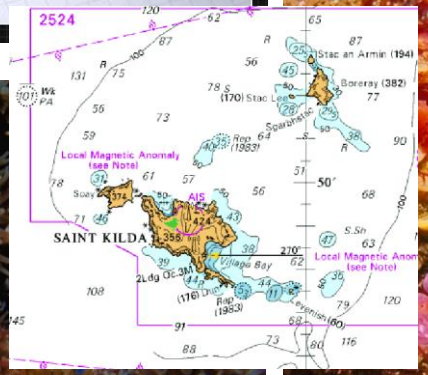
→ Cultural gems scattered across the archipelago

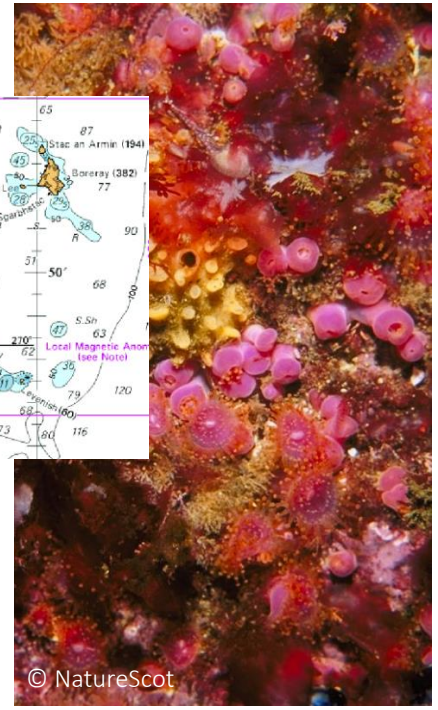
Coastal change risk focussed within Village Bay.











Science update

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Climate change is causing substantial new and growing risks at our coast.

Sea level rise leads

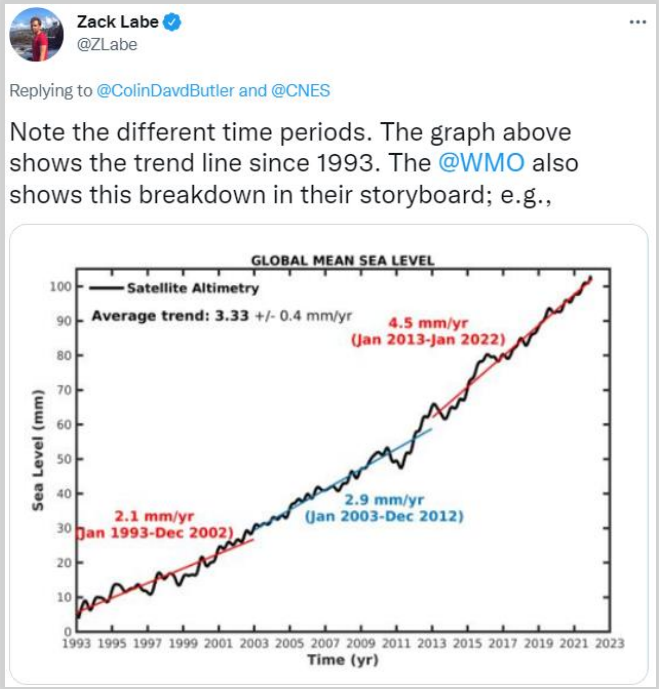
→ More coastal erosion

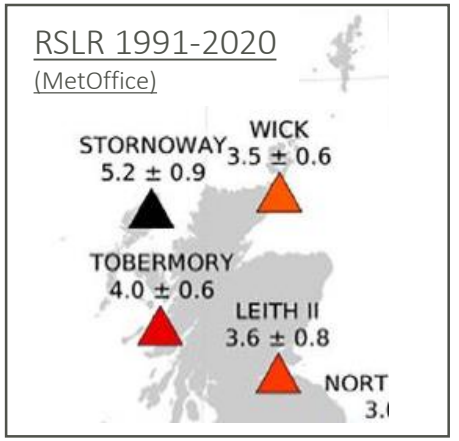
→ More coastal flooding

→ More coastal erosion-enhanced flooding

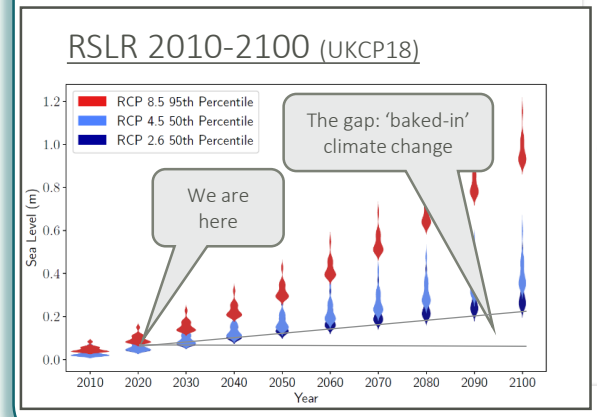
All expected to increasingly affect a wide cross-section of society's assets. (Climate Change Committee)

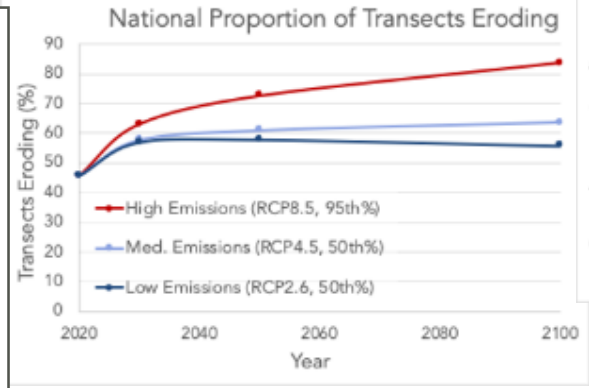
46% of Scotland's open erodible coast is currently eroding. Under all emissions scenarios this rises. Under RCP8.5 we expect erosion to effect 84%.

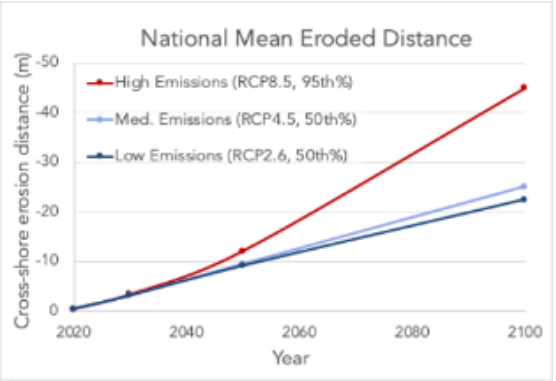




(27-87cm RSLR <200yrs)







(rapid) Coastal Change Assessment

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Readily available data has been compiled and analysed, to complement earlier research, and support CVI discussions.

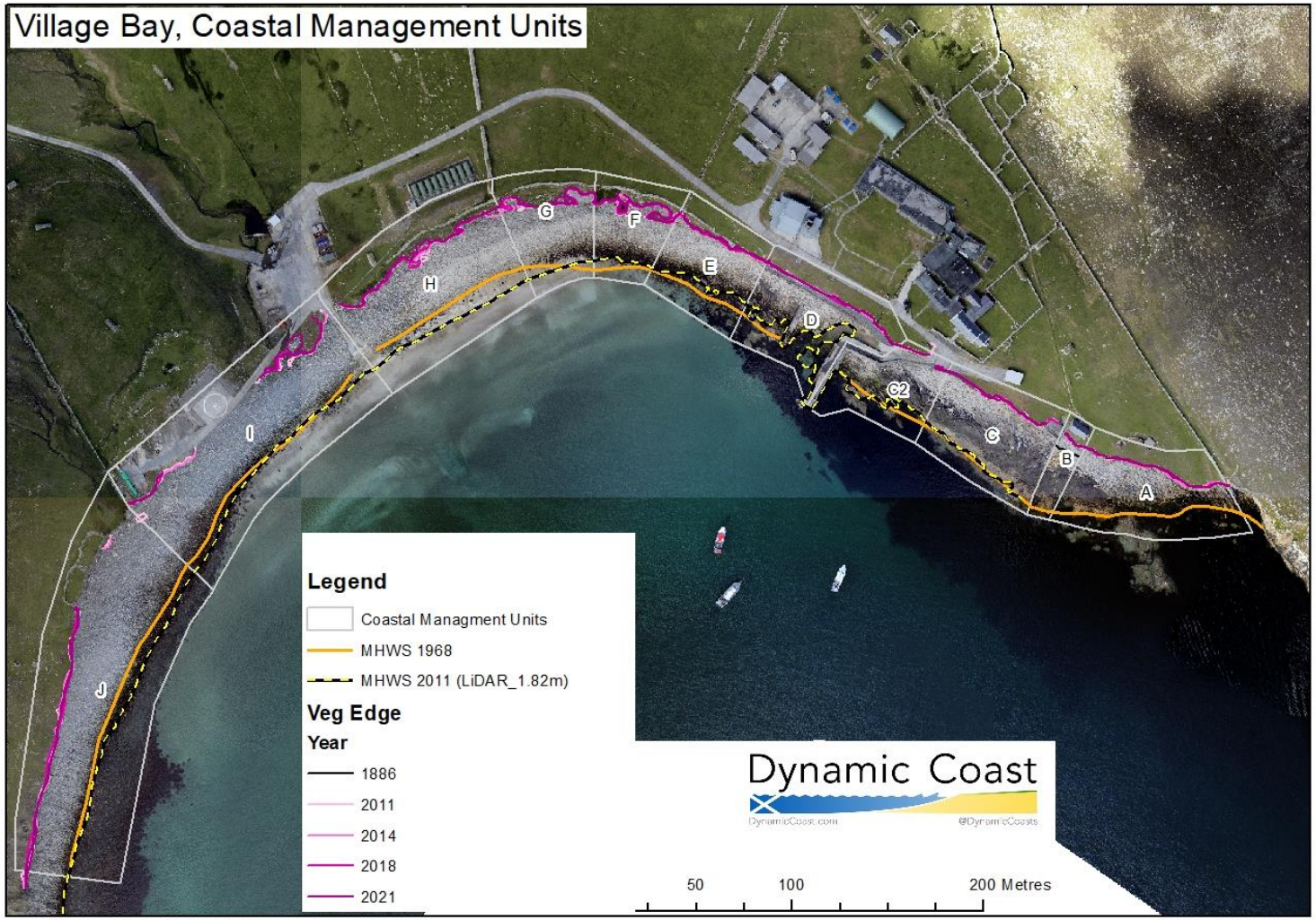
Including:

→ Aerial imagery (2011-2021)

→ LiDAR data (2011)

→ MHWS (1968-2011)

→ Erosion reports & data (1999-2014)



(rapid) Coastal Change Assessment

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Results.

Section		J West	I Heli-pad	H Fuel tanks	G Dyke (west)	F Dyke (cent)	E Dyke (east)	D Gab'n	C2 Pier front	C	B Feat'r Store	A East
MHWS	Max.1968-2021 (m)	+7.1	+5.1	+10.2	+3.8	-2.6	-1.0	-2.2	+4.2	+0.6	-	-
	Ave. 1968-2021 (m)	**+4**	**+2.2**	**+7.9**	**+0.5**	**-4.3**	**-4.0**	**-5.2**	**-0.7**	**-0.6**	**-**	**-**
	Min. 1968-2021 (m)	+0.1	-1.0	+5.8	-3.4	-5.2	-6.3	-9.8	-5.4	-2.5	-	-
Veg edge	Max. 2011-2021 (m)	+1.6	+0.1	+0.1	+0.1	-0.6	+0.1	-	-	+0.2	-0.3	+0.3
	Ave. 2011-2021 (m)	**0.3**	**-1.3**	**-1.4**	**-1.2**	**-1.4**	**-0.5**	**-**	**-**	**-0.3**	**-0.5**	**-0.1**
	Min. 2011-2021 (m)	-0.7	-3.6	-7.1	-4.3	-2.3	-1.3	-	-	-0.7	-0.6	-0.3
Ave altitude of wave thrown sediment (mOD)		7.2	7.6	8.1	8.3	8.2	7.4	5.1	5.9	8.1	7.3	7.4
Min altitude of asset (mOD)		Wall 5.5	Road 6.5	Road 13.0	Wall 10.0	Wall 10.5	Wall 10.5	Gabion 5.0	Seaw'l 3.9	Gabion base 8.0	Gabion base 7.1	Gun 13.4

Detailed data can add further value

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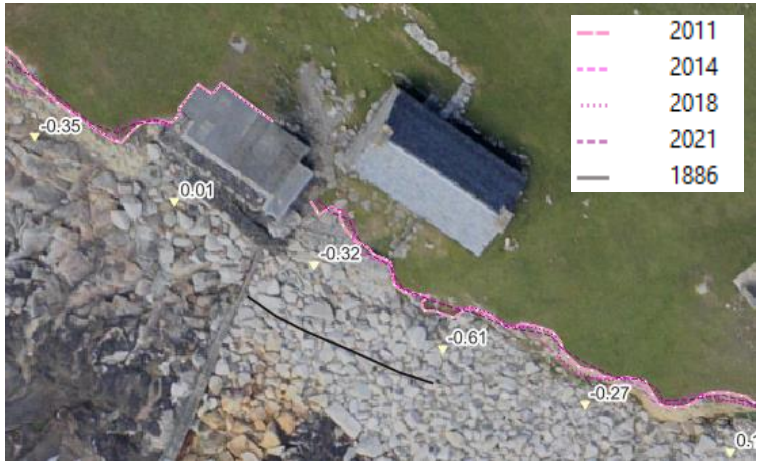
Feather Store

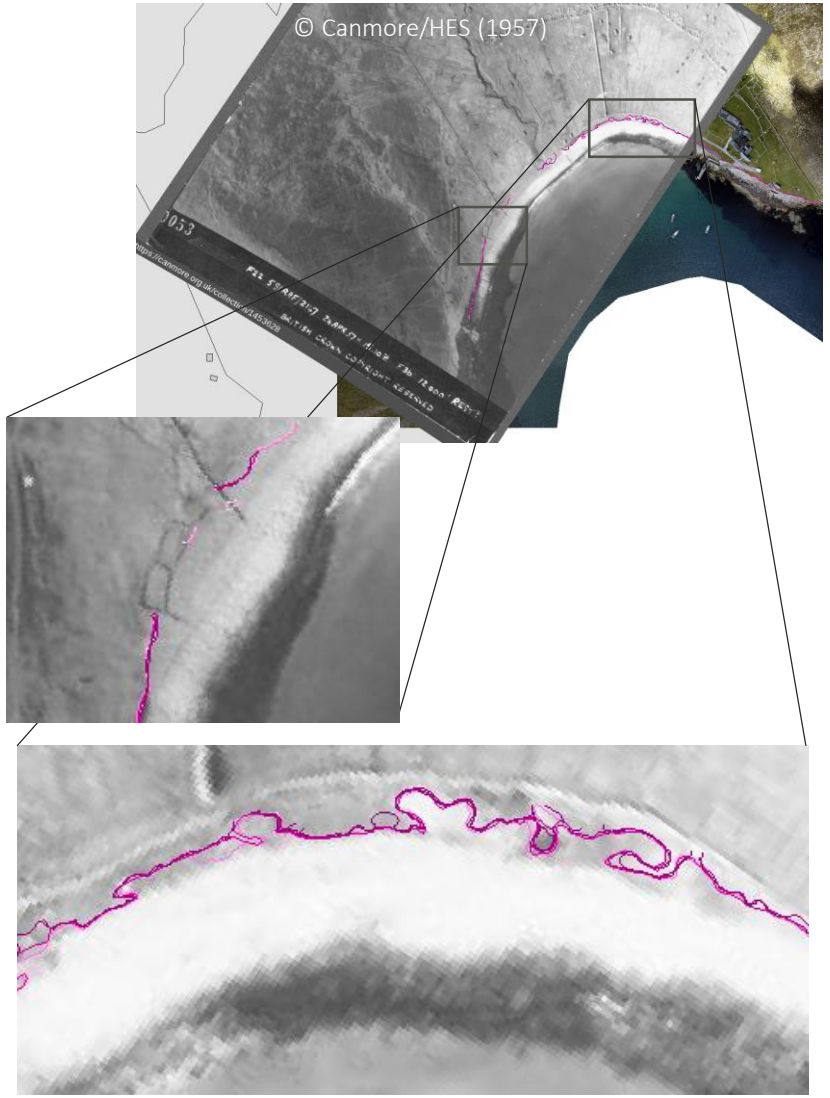
We can (and should) extend the analysis where we can

→ Historic Imagery

→ Modern data

The width of vegetation to the west of the store is 1.24 times the width of the store (ca 5.7m 2011 APs).
Thus in 1886 there was ca 7.2m of vegetated land before the cliff. Dennis' 2006 report depicts the vegetation edge retreating towards the door of the Store (See Dennis 2006, Fig 7, p8).
Gabion baskets were installed (and repaired) in 2006.
Thus, ca 9m land lost in the 120 years (1886 to 2006) = 8cm/yr.





Coastal Risk Map

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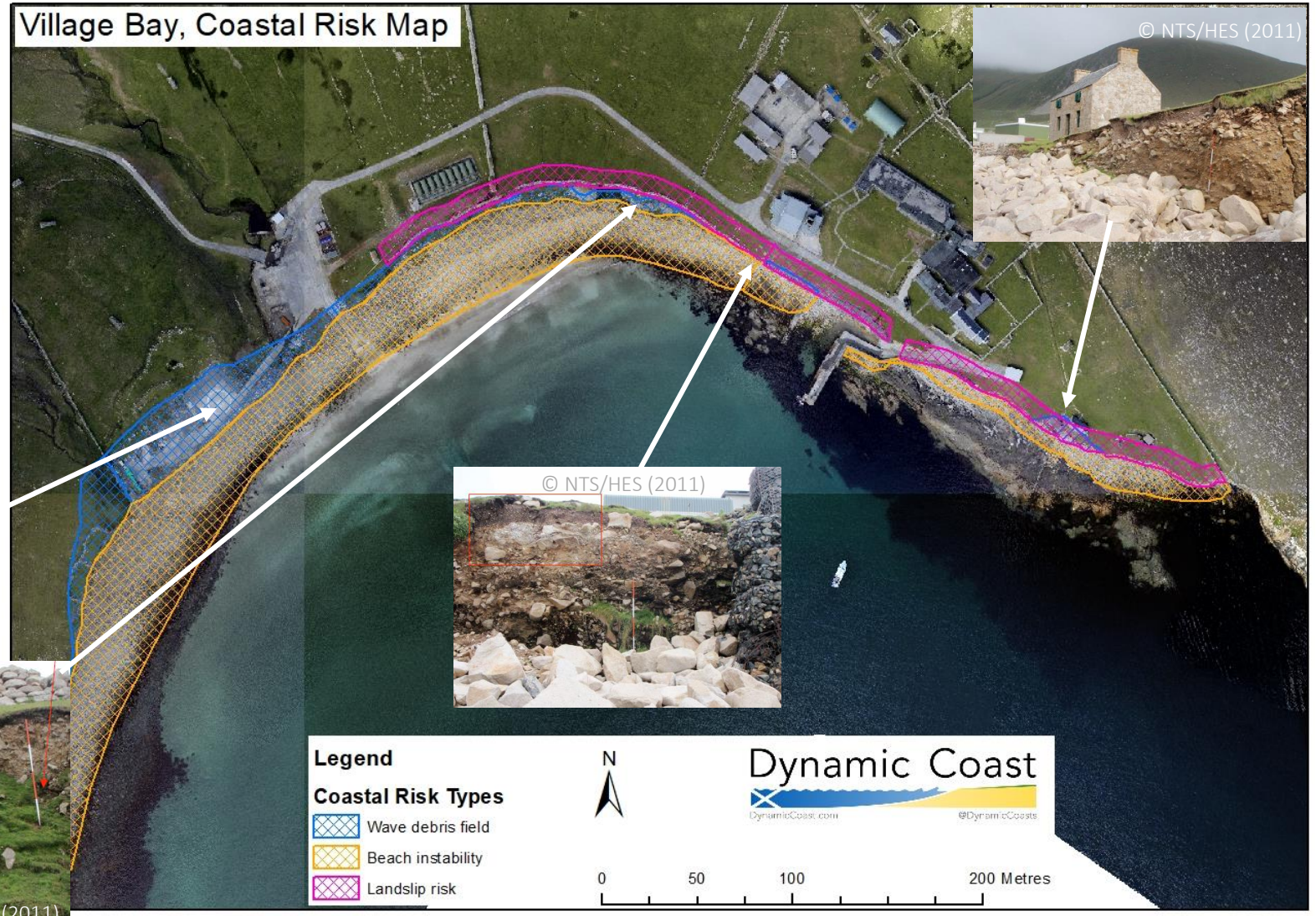
Whilst other climate risks extend over the archipelago and the OUV features, the specific coastal risks are simplified and shown here.

Current and anticipated risks in Village Bay include:

→ Increased beach instability
(level changes and retreat inland)

→ Increased extent of wave thrown debris field (extending further inland)

→ Increased risk of landslips
(extending further inland)



Recommendations

Adaptation planning essential

The management burden and risks to cultural and built assets are set to increase.

As such and in line with (forthcoming) Scottish Government Guidance, a **Coastal Change Adaptation Plan** should be undertaken (together with updated in-field geomorphological assessments) to provide the **monitoring baseline** to track change, to define **trigger points** for **early management action**, and to allow **management strategy to flexibly respond** to the anticipated increases in risk as they occur.

Local authorities have funding to support their duties under Planning and as Coastal Protection Authorities.

But additional funding may be available in FY 2023-24.

3D viewer

Interactive webmap

Available from www.DynamicCoast.com/stkilda

Happy to take questions throughout the discussions