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SCIENCE

Improving Coastal Erosion Assessments for Victoria – Embayments and Living Shorelines

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Overview

- Data on erosion risk and hazard in Victorian embayments is often patchy with limited potential for seamless integration
- Quantifying erosion and accretion rates across a number of timescales is necessary for understanding changes in shoreline dynamics
- This project will use 4 themes to address coastal erosion hazard assessment in embayments
 - Integrate the most important drivers of change (wave climate and sea level) with sources and sinks of sediment



Western Port Bay

Slope, orientation, landform shape, position,
lithology, dominant vegetation community

Coastal Compartments

Geomorphic Setting (Wollongong/Macquarie)

- Historic erosion/accretion rates and sea level changes
- Historic sediment characteristics and changes
- Contemporary erosion and accretion rates
- High-resolution analysis of shoreline changes

Coastal Acid Sulfate Soils (Monash)

- Spatial distribution
- Potential formation and oxidation
- Effect of accretion and erosion
- Effect of seawater inundation

Sediment Dynamics (Monash/UniMelb)

- Sediment sources and supply
- Physical and geochemical characteristics

Hydrodynamic Drivers (Monash)

- Wave climate
- Nearshore and onshore sediment movement

Coastal Hazard Framework

Coastal Compartments and Geomorphic Setting

- Wollongong Uni (KR)
 - Coastal Compartments
 - Grouping of shoreline segments of similar geomorphic behavior via statistical analysis using inputs including slope, orientation, landform shape, position, lithology, dominant vegetation community
 - Geomorphic Setting
 - Contemporary erosion and accretion rates
 - SET repairs, maintenance and monitoring; establish new SET sites at Corner Inlet and other Western Port locations
 - Historic erosion/accretion rates and sea level changes
 - ^{210}Pb and ^{137}Cs dating of cores
 - Historic sediment characteristics and changes
 - Grain size analysis and characteristics

- Macquarie Uni (NS)
 - Geomorphic Setting
 - High resolution digital shoreline analysis (erosional and depositional): Rates of change across geomorphic settings
 - Erosional shoreline monitoring

- Monash (RR)

- Sediment sources and supply
 - Use of eDNA to identify sources
 - Use of geochemical indicators to identify sources

- Monash (VW)

- Physical and geochemical characteristics of transported and deposited sediment

- Uni Melb (DK)

- Sediment sources and supply
 - Role of cliffs and cliff erosion as sources of sediment

- Monash (RR)
 - Wave climate
 - Nearshore and onshore sediment movement
 - Determine how sediment (SSC) and waves translate from nearshore onto and along the marsh platform
 - Use remotely sensed proxies for vegetation 'roughness' and density using UAVs (multispectral)
 - Thermal imagery to quantify sheet flow along the marsh platform to establish surface roughness (with a high resolution DEM as reference)
 - Model how the nearshore wave and sediment regime affects the vegetation type forming on the shoreline

- Monash (VW)
 - Spatial distribution
 - Link between sediment and soil characteristics in each geomorphic unit with vegetation type
 - Potential formation and oxidation
 - Variations in inundation on formation and oxidation: permanent inundation, wet/dry cycles
 - Rates of formation and acidification with different organic matter (saltmarsh, mangrove, terrestrial species)
 - Effect of accretion and erosion
 - On rates of formation and oxidation
 - Effect of seawater inundation
 - On rates of formation and oxidation

Study Sites

