South Gippsland Conservation Society Inc. (SGCS) has undertaken a 12 month investigation of the coastline recession at Inverloch surf beach, culminating in the release of the Inverloch Coastal Resilience Project Report in August 2019 (see www.sgcs.org.au for the Project Report and other project information, including details of our public exhibition, and attached media release).

The project was initiated in response to the 40 metres of dune vegetation that has been eroded at Inverloch since 2013 due to a combination of climate change-related effects, including rising sea levels and more frequent and more intense storm surge events. SGCS arranged its own funding for the project through the Lord Mayors' Charitable Foundation, and the project is being led by a team of SGCS volunteers.

The project aim is to help increase the resilience of the Inverloch coast and its communities to adapt to coastal climate-change impacts through:
* enhancing understanding of the changes that are taking place and the environmental and community values that are under threat
* providing environmental and community input to the development of an adaptation strategy for this section of the coast.

An outline of the full scope of work is provided as Attachment 1. It includes SGCS volunteers undertaking beach profile monitoring under the Victorian Coastal Management Program (on-going activity) and a Sustainability-seeking Inverloch initiative. The latter initiative is aiming to identify a suite of local actions consistent with limiting global temperature increase to less than two degrees in accordance with the 2015 Paris Climate Agreement.

At the time of writing (August 2019), SGCS is looking forward to receiving Victorian Government and Bass Coast Shire Council responses to the Project Report's 24 key findings and 35 recommendations, including funding commitments for urgently-needed scientific investigations (including a Local Coastal Hazard Assessment) and a range of short and longer term actions to build on-ground coastal resilience.

SGCS submitted an application for Phase 2 of the Inverloch Coastal Resilience Project under the Victorian Government's Community Climate Change Adaptation Program 2019 in March 2019. Funding for Phase 2 would enable SGCS to undertake further investigations and community consultation, including further work on the Sustainability-seeking Inverloch initiative, as well as production of a project video.
Inverloch Coastal Resilience Project - Outline

Background
Bass Coast is renowned for its natural, unspoilt coastline, and at Inverloch, features an extensive, vegetated dune system that stretches from the Caves to Point Smythe and Venus Bay. The Inverloch surf beach is highly valued by residents and visitors and is a major attraction for swimmers, surfers, nippers, kite surfers, fishermen and beach walkers. The beach and its vegetated dune system has significant ecological values, providing one of the largest stands of remnant vegetation in Inverloch (comprising a mosaic of coastal dune scrub and coast banksia woodland) and forming an important function as a recognised regional biolink. The vulnerable and EPBC-listed Hooded Plover and other shorebirds nest on the beach and in the dunes directly behind the beach.

This section of naturally dynamic coast has long been recognised as being vulnerable to rising sea levels and storm surges associated with the effects of climate change. Significant recession of the beach has occurred since 2013, with the beach having moved approximately 40 metres landward, resulting in almost half of the dune system and its vegetation already being lost. The recession is currently threatening coastal infrastructure, in particular the Inverloch Surf Life Saving Clubhouse and a section of the Cape Paterson-Inverloch Road.

While coastal recession events have occurred at Inverloch surf beach in the past (notably in the late 1970s), previous events have resulted in the eroded sand being deposited offshore, available for later natural replenishment of the beach under favourable wave and meteorological conditions. However, this is the first time in living memory that significant erosion from the surf beach has coincided with a corresponding build-up of sand in Anderson Inlet, with uncertainty surrounding whether the built-up sand in the Inlet will ever return to the ocean system. If the sand does not return to the ocean system, it will not be available to replenish the surf beach, with the beach dune system being increasingly susceptible to further losses from future winter storm surge events.

If the current rate of recession were to be sustained over the next 5-10 years, without management, the dune system and its ecological, geomorphological, cultural heritage, recreation and tourism values would be lost and community pressure would be demanding infrastructure to protect housing along Surf Parade. This would not only be very expensive, but would also mean a complete loss of dune values and dramatic change to the character of Inverloch surf beach.

In response to this threat, a Government Working Group has been formed to address erosion at Inverloch and to develop short, medium and long-term options for Inverloch surf beach. The Working Group includes representatives from the Department of Environment, Land, Water and Planning, Bass Coast Shire, Regional Roads Victoria and West Gippsland Catchment Management Authority. The Working Group released a short term erosion control plan for threatened infrastructure in late 2018 and it is anticipated that a detailed Local Coastal Hazard Assessment will be commissioned to identify longer term measures during 2019. A number of these assessments have been completed elsewhere along the Victorian coast and the Gippsland Regional Coastal Plan 2015-2020 identified the need for detailed coastal hazard assessment and adaptation planning around Anderson Inlet and Venus Bay.

Objectives
The objective of the Inverloch Coastal Resilience Project is to identify measures that will increase the resilience of the coast and communities between Cape Patterson and Venus Bay to adapt to rising sea levels and increased storm damage resulting from the increased frequency and intensity of storm fronts.
and other climate change effects. The project will review previous studies, undertake scientific investigations, gather local knowledge from residents, consult with sporting and environmental organisations and liaise with the Government Working Group. A preliminary identification of possible management strategies will also be undertaken and a beach/dune monitoring program initiated.

Completion of this study prior to the conduct of the Local Coastal Hazard Assessment is intended to ensure that all ecological, social and economic factors are considered both in the hazard assessment and ultimately, in the development of a coastal adaptation strategy for this section of the Bass Coast.

The study will take account of, and build on, investigations and consultations undertaken for the report ‘What would a Climate-Adapted Settlement look like in 2030? A Case Study of Inverloch and Sandy Point’, prepared by Monash University and the National Climate Change Adaptation Research Facility (NCCARF).

Outline
The study comprises the following main elements, as highlighted in the accompanying chart:

1. Identification of the values of the Inverloch and Point Smythe dune system
   - Ecological – review previous studies of flora and fauna existing within, or utilising, the dune system, supplemented by field reconnaissance; liaise with Birds Australia regarding shorebirds utilising the beach and dune system; analyse the value of vegetation as a regional biolink and role as a flyway for migratory birds; assess the effect of coastal recession and consequent loss of habitat on ecological values and develop revegetation proposals to increase the resilience of the coastal dune system.
   - Geomorphological – analyse the geomorphological values of the Inverloch and Point Smythe dune system and assess its geoscience significance in a local to national context; develop a chronology of shoreline change and identify episodes of shoreline recession and progradation, including the most recent recession since 2013, and identify the range of factors (including metocean conditions) that contribute to these changes; present some possible scenarios for future configuration of Anderson Inlet; make suggestions for the scope of future studies to allow better understanding of the geomorphology and coastal processes of the coastal environment.
   - Cultural Heritage – prepare a cultural heritage inventory and consult with traditional owners to record the values that they ascribe to those cultural sites and the potential impact on those values if the dunes are lost through coastal erosion.
   - Recreation and Tourism – compile visitor numbers and tourism trends and analyse visitor drivers and attractors for Inverloch and the Bass Coast, including liaison with Bass Coast Shire tourism officers; undertake a literature review of beach and surf tourism and recreation in Australia (and specifically Victoria); analyse the influence that natural settings have on the level and type of visits and possible variations due to altered conditions resulting from climate change and rising sea levels.

2. Analysis of Inverloch’s changing coastline and review of previous investigations
   - Analyse how the Inverloch coastline has changed over the past 100 years
     - Liaison with Inverloch Historical Society
     - Review of historical aerial photography
     - Interviews with local residents, including surfers and historians
     - Review of recent studies e.g. Geomorphic and Ecological Investigation between Western Street and Cape Paterson-Inverloch Road, Inverloch, Water Technology, March 2016
Review previous coastal climate change investigations, including:
  o *Climate Change Impacts in Gippsland*, CSIRO, November 2005
  o *Climate Change Sea Level Rise and Coastal Subsidence along the Gippsland Coast*, Gippsland Coastal Board, July 2008
  o *Gippsland State of the Coast Update*, Gippsland Coastal Board, August 2013
  o *Geomorphic and Ecological Investigation between Western Street and Cape Patterson-Inverloch Road, Inverloch*, Water Technology, March 2016

Participate in regular drone monitoring of the coastline under the Victorian Coastal Monitoring program, and implement a complementary laser level monitoring program to enable further changes to the dune system to be tracked. A literature review would be undertaken of approaches to setting up monitoring programs and liaison conducted with the Port Fairy Coastal Group (PFCG), including a site visit. PFCG has been monitoring sand levels and dune movements on East Beach since 2014, following the completion of a Local Coastal Hazard Assessment

3. **Preliminary identification of possible management approaches**
   - Discuss what actions the Inverloch/ Bass Coast community could adopt to serve as a model ‘sustainability-seeking’ community that wishes to play its part in avoiding predicted climate change impacts. This discussion would be in the context of local actions consistent with limiting global temperature increase to less than 2 degrees, in accordance with the 2015 Paris Climate Agreement
   - Literature review of possible approaches to managing climate change impacts in coastal environments. Possible short, medium and long term measures will be identified, including short term, low cost actions such as increasing resilience of the dune system through revegetation and possible ecological engineering solutions (e.g. wet sand fences), medium term measures (e.g. augmentation of existing reef systems) and longer term retreat strategies.
   - Liaise with local residents and interest groups to ascertain community values and priorities, including a survey

4. **Public Exhibition, Questionnaire and Further Actions**
   - Outcomes of the investigations will be compiled into a report for dissemination to the Government Working Group, interested stakeholders and the community, and for consideration in the forthcoming Local Coastal Hazard Assessment
   - Key findings of the investigations will be communicated via a public exhibition to be mounted at the Hub in Inverloch during the first half of 2019. The exhibition will also provide aerial photography and historical photographs of the changing coastline; describe the drone monitoring program that is underway and outline a range of possible short and longer term management approaches for discussion
   - A questionnaire will be administered (at the Hub and on-line) to gain community feedback on the exhibition findings and to enable the coastal issues that are of most importance to residents and special interest groups to be identified
   - It is also proposed to prepare a video during 2019 to communicate key study findings and to present a cross section of community views

The attached flow charts provide a summary outline and potential interactions between the Inverloch Coastal Resilience Project, the Government Working Group and the broader community during 2019.

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Inverloch Coastal Resilience Project Report Released

South Gippsland Conservation Society’s Inverloch Coastal Resilience Project Report was released at an event at Inverloch Surf Life Saving Club on 2 August 2019. The report is the culmination of 12 months’ investigation and community and stakeholder consultation.

The report analyses the coastline erosion at Inverloch since 2013 that far exceeds previous changes recorded and observed. The ecological, Aboriginal cultural heritage, geomorphological and economic values that are being threatened with the loss of the vegetated dunes behind the beach are highlighted in the report, drawing on specialist consultant studies commissioned for the project. The report also documents the outcomes of the survey that was administered by SGCS in conjunction with the public exhibition held in Inverloch and Wonthaggi between March and June this year.

At the Project Report release event, SGCS Project Leader Philip Heath said:
‘The changes that have occurred at Inverloch surf beach represent one of the most rapid changes on the Victorian coast in European historical times, and are rated as ‘severe’ to ‘extreme’ by global comparison. The Inverloch coastline dynamics appear to have changed to the extent that the cyclical changes that have occurred in the past may not repeat in the future.

Scientific investigations, including a Local Coastal Hazard Assessment (LCHA), are urgently required to further analyse the factors that have contributed to the changes, as well as to identify feasible long term strategies to manage the on-going erosion sequence. While we all need to keep pushing for funding of the long-anticipated LCHA, our project has identified a number of relatively low-cost measures that can be implemented over the next 12 months and which will help to build on-ground coastal resilience, as well as providing important input to the LCHA.

Future management actions to protect the surf beach should not only consider coastal infrastructure, but also the environmental, cultural heritage, economic
and community values of the vegetated dunes that are being lost. The Inverloch coastline is rated of State Geoscience significance, comprises vital habitat for threatened flora and fauna and contains at least four sites of Aboriginal cultural significance that are at high risk. In addition, $3-5 million per annum of resident and tourism values are at risk from further sustained coastline impacts.

The survey undertaken for the project revealed that the natural setting provided by the vegetated dunes is rated as extremely important by 81% of respondents, comprising both Inverloch residents and visitors. The recreation and tourism impacts that are already occurring were reflected in the survey results, with 82% of respondents being either significantly (44%) or moderately (38%) affected over the past summer. Respondents also highlighted how important it is that both short and longer term actions are taken to manage the risk of further coastline recession.

South Gippsland Conservation Society urges the Victorian Government and its Agencies, including Bass Coast Shire Council, to consider the content, findings and recommendations of this Project Report and its supporting specialist consultant reports in future planning for the Inverloch coast, including the proposed Bass Coast Local Coastal Hazard Assessment. In particular, the apparent change in Inverloch coastline dynamics since 2013, and the geomorphological, ecological, Aboriginal cultural heritage, economic and community values of the Inverloch dune system, need to be examined carefully in any future assessment of risk associated with coastal recession at Inverloch.’

The Project Report and its supporting consultant studies are on-line at www.sgcs.org.au, together with other information about the Inverloch Coastal Resilience Project. For further information, please contact Philip Heath (M. 0411 430 438) or Dave Sutton (M. 0419 230 110).