

We make the following recommendations:

CLASSIFICATION AND INVENTORY

Recommendation 1: Adopt the proposed new typology for Victorian coastal saltmarsh, i.e. the current Ecological Vegetation Class 9, Coastal Saltmarsh Aggregate, should be divided into seven distinct EVCs as outlined in Chapter 4.

Recommendation 2: Update the spatial data layers held by the Department of Sustainability and Environment to include the maps of current extent of mangroves and coastal saltmarsh produced in this project.

Recommendation 3: Make publicly available the maps and associated metadata by way of the existing 'Biodiversity Interactive Map' platform or similar. The maps should form a stand-alone layer, otherwise they would require careful edge-matching with existing data and clear communication of the fact that their resolution and method of production differ from vegetation maps for other parts of Victoria.

CONDITION ASSESSMENT

Recommendation 4: Publish a definition or explanation of 'ecological condition', endorsed by the Department of Sustainability and Environment.

Recommendation 5: Trial, with an eye to future adoption, the condition-assessment method outlined for coastal saltmarsh. If trials show them to be appropriate, adopt the EVC benchmarks proposed in Appendix J.

Recommendation 6: Support the statewide use of the condition-assessment method through further on-ground testing and refinement, publication of a methods manual, training of staff to implement the method, and communication of the method and results to interested parties.

PRE-EUROPEAN DISTRIBUTION

Recommendation 7: Update the 'pre-1750' EVC data layer held by the Department of Sustainability and Environment and integrate the mapping presented in this report.

Recommendation 8: Make the updated maps publicly available by way of the existing 'Biodiversity Interactive Map' platform or similar.

CONSERVATION STATUS

Recommendation 9: Recognise that mangroves and coastal saltmarsh are not referred to specifically in Victoria under any legislation for protection. Although there is some indirect protection offered by the *Flora and Fauna Guarantee Act 1988* and statutory planning schemes through regulations for the retention of native vegetation, there is a need for stronger and clearer legislation, policy and guidelines to specifically protect and direct proactive management of mangroves and coastal saltmarsh. The shortcoming is aggravated by the bioregional planning framework for native vegetation protection and management in Victoria which focusses on EVCs and Bioregional Conservation Status ratings. The framework disregards the fact that some vegetation communities, including mangroves and coastal saltmarsh, are geographically rare because of natural limits on their distribution and extent.

Recommendation 10: Accept the recommended Bioregional Conservation Status ratings for all saltmarsh EVCs.

Recommendation 11: Support the nomination for listing of southern Australian temperate coastal saltmarsh (which occurs in Victoria, New South Wales, Tasmania, South Australia and Western Australia) as a threatened ecological community under the *Environment Protection and Biodiversity Conservation Act 1999*.

Recommendation 12: Renominate Victorian coastal saltmarsh for listing under the Victorian *Flora and Fauna Guarantee Act 1988* and/or the Biodiversity Conservation Bill proposed in *Securing Our Future – A White Paper for Land and Biodiversity at a Time of Climate Change*. Our study provides a larger amount of information for listing than was available when the community was unsuccessfully nominated in the past. The Act lists two processes that pose threats to coastal saltmarsh: i) ‘loss of terrestrial climatic habitat caused by anthropogenic emissions of greenhouse gases’ (presumably including sea-level rise); and ii) ‘wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing.’

Recommendation 13: Provide legislative protection for mangroves and coastal saltmarsh under the *Fisheries Act 1995*, the *Planning and Environment Act 1987* and/or Natural Resource and Catchment Management Bill or Biodiversity Conservation Bill proposed under the *Securing Our Future – A White Paper at a Time of Climate Change*.

Recommendation 14: Undertake a comprehensive assessment of changes in mangroves and coastal saltmarsh and investigate their causes so that decisions over what action, if any, can be determined.

RESERVATION

Recommendation 15: Upgrade the reservation status of Victorian coastal saltmarsh and protective buffer areas in the public estate to a reserve category managed primarily for nature conservation. This would include reservation purposes (l), (m), (n), (o), and (ze) under Part 2, Section 4 the *Crown Land Reserves Act 1978*.

Recommendation 16: Increase the security and conservation management of mangroves and coastal saltmarsh and protective buffer areas on private property through the following means:

- Purchase program to identify and transfer high-conservation value mangroves, coastal saltmarsh and protective buffer areas to the public estate.
- Application of planning zones and overlays adequate to protect ecological and other values of mangroves, coastal saltmarsh and protective buffers (see below).
- Land-use agreements, for example, under Section 69 of the *Conservation Forests and Lands Act 1987*, or Section 173 of the *Planning and Environment Act 1987*.
- Provision of incentives to facilitate conservation management and permanent protection, through new and existing schemes such as Bush Tender, Bush Broker, Habitat Tender and Ecotender, as administered through organisations such as the Department of Sustainability and Environment, Catchment Management Authorities, Coastal Boards, Landcare, Coastcare and local government.
- Incentives to covenant coastal saltmarsh through the Trust for Nature Victoria.
- Preparation and distribution of a ‘toolkit’ of options for the protection of saltmarsh on private land, for use by organisations promoting saltmarsh conservation. The toolkit should include *inter alia* advice on Trust for Nature covenants, incentive schemes, management guidelines, weed control and other information.

SEA-LEVEL RISE

Recommendation 17: Refine and repeat the approach used for the Western Port case study (Chapter 6.2), making use of LIDAR-derived elevation data covering all of Victoria, to produce a map showing the extent of ‘possible future mangrove and saltmarsh’ under likely climate change scenarios.

Recommendation 18: Explore the possibility of incorporating dynamic temporal processes, including multiple hydrological and geomorphological scenarios (e.g. formation of tidal channels, and rates of coastal erosion), into the statewide analysis.

Recommendation 19: Align the ‘possible future mangrove and saltmarsh’ map with information on land tenure, to identify public land that may be able to accommodate landward migration of intertidal vegetation and private land that could be purchased to that end.

Recommendation 20: Align the ‘possible future mangrove and saltmarsh’ map with current coastal engineering works to identify sea walls and other structures that may prevent natural migration of intertidal vegetation consequent to rising sea levels.

PROVISION OF BUFFER ZONES

Recommendation 21: Provide adequate buffers adjoining high-significance mangroves and coastal saltmarsh (and Ramsar sites supporting these vegetation types) through development or land-use setbacks. The mechanisms referred to in the above paragraphs (Reservation) should be used to secure and adequately manage protective buffers.

Recommendation 22: Provide adequate buffers to protect mangroves and coastal saltmarsh against projected sea-level rise, including impacts arising from storm tide surge, through mechanisms such as land acquisition, restrictive zoning, or planned retreat.

PLANNING

Recommendation 23: Use a strategic planning process to develop clear policy directions for mangroves and coastal saltmarsh and which includes the estuary and catchment as a combined ecological unit.

Recommendation 24: Prepare and/or update coastal or estuary policies and strategies to specifically refer to protection of mangroves and coastal saltmarsh and which include the following future vision or similar:

Mangroves and coastal saltmarsh will be healthy, productive ecosystems providing continuing benefits to Victorians through protection of shorelines, sustained productivity associated with estuarine life, and fisheries from our estuaries, bays and inlets.

Recommendation 25: Maintain the conservation values of mangroves and coastal saltmarsh, including the provision of adequate protective buffer zones as described above. Planning needs to acknowledge the precedent set by recent VCAT decisions that recognise the threat posed by sea-level rise and application of the precautionary principle (e.g. VCAT no.1545, 2008).

Recommendation 26: Apply mechanisms currently available under the Victorian Planning Provisions to protect and adequately manage mangroves and coastal saltmarsh and their protective buffers, and to create opportunities for landward migration under future sea-level rise. The mechanisms must apply to the control of developments, uses and activities, including those that have an indirect effect on mangroves and coastal saltmarsh. Mechanisms include but are not limited to:

- Environmental Significance Overlays
- Vegetation Protection Overlay
- Significant Landscape Overlay
- Land Subject to Inundation Overlay
- Section 173 agreements under the *Planning and Environment Act 1987*
- Section 69 of the *Conservation Forests and Land Act 1987*.

Recommendation 27: Investigate the introduction of appropriate clauses or mechanisms allowing for the introduction of such clauses in those cases where existing zone or overlays do not adequately specify controls on developments, uses and activities that may adversely affect mangroves, coastal saltmarsh and their protective buffers.

Recommendation 28: Introduce a new zone or overlay into the Victorian Planning Provisions, to reserve and protect buffers and provide opportunities for landward migration for threatened biological communities including mangroves and coastal saltmarsh, as well as protection of coastal economic assets.

Recommendation 29: Apply a strict ‘no-development’ policy to all mangroves, coastal saltmarsh and their protective buffers.

Recommendation 30: Ensure that any developments that take place near mangroves or coastal saltmarsh contribute positively to the rehabilitation and improvement of the adjoining estuarine environment and provide for retreat areas.

STRONGER ACTION ON THE PART OF RESPONSIBLE AUTHORITIES

Recommendation 31: Ensure stronger, more proactive action to protect the natural and conservation values of mangroves and coastal saltmarsh by state, regional and local authorities, consistent with the institutional remits of each.

Recommendation 32: Audit organisational performance in regard to conservation management of mangroves and coastal saltmarsh against each organisation’s institutional remit.

ACTION ON INVASIVE PLANTS

Recommendation 33: Extend and adequately resource current programs to locate and eliminate **Spartina* from Victorian mangroves, coastal saltmarsh and estuaries. In particular, search for **Spartina* in the area around the Nooramunga Islands and maintain an appropriate level of surveillance indefinitely.

Recommendation 34: Prepare and implement a statewide weed-management strategy for mangroves and coastal saltmarsh which identifies and ranks all weed species that pose a threat to these vegetation types and which assesses the feasibility of their elimination and/or containment.

Recommendation 35: Survey the geographic distribution and local extent of populations of the following weed species, which pose a very high current or potential threat to coastal saltmarsh, and develop and implement appropriate eradication or control strategies:

- **Lophopyrum ponticum* Tall Wheat Grass
- **Limonium hyblaicum* Sea Lavender
- **Gladiolus undulatus* Wild Gladiolus
- **Puccinellia ciliata* Puccinellia.

Recommendation 36: Investigate risks to coastal saltmarsh posed by deliberate introductions of salt-tolerant species for agriculture and salt-land remediation (e.g. Puccinellia) and take appropriate action to minimise such risks.

ACTION TO REDUCE IMPACTS OF EXOTIC VERTEBRATE FAUNA

Recommendation 37: Revoke or do not renew grazing licences that grant stock access to coastal saltmarsh on public land.

Recommendation 38: Provide incentives to discontinue grazing on private property, through offering stewardship payments in return for conservation management.

Recommendation 39: Control feral mammals and game species (particularly deer and pigs), including control of indirect impacts created by hunters gaining access to coastal saltmarsh.

MAINTAIN AND RESTORE NATURAL HYDROLOGICAL CONDITIONS

Recommendation 40: Maintain natural hydrological conditions in mangroves and coastal saltmarsh.

Recommendation 41: Restore natural hydrological, salinity and inundation conditions where they have been altered by infrastructure or development, including by urban stormwater outfalls. A wide-ranging survey, inventory and ranking of ameliorative works is required to avoid *ad hoc* responses.

Recommendation 42: Prevent further draining of land supporting coastal saltmarsh.

SEA WALLS

Recommendation 43: Research appropriate management of existing sea walls to achieve optimum conservation outcomes for mangroves and coastal saltmarsh.

Recommendation 44: Decide whether to retain or remove sea walls or open hinterland to tidal influences on a case-by-case basis, by referral to a specialist group which includes at least the following disciplines: saltmarsh ecologists (e.g. botanist, zoologist), hydrologists, geomorphologists, marine engineers and coastal planners, as appropriate.

PROVISION OF INFORMATION ON CONSERVATION MANAGEMENT

Recommendation 45: Provide information to all tenure holders on appropriate conservation management of mangroves and coastal saltmarsh, consistent with the information and management template provided in the present document.

Recommendation 46: Undertaken the family of communication strategies outlined in Chapter 3.3 to raise awareness and improve understanding of mangroves and coastal saltmarsh by the general public.

ESTABLISH A BODY CHARGED WITH COORDINATING PROTECTION, PRESERVATION, AND CONSERVATION MANAGEMENT OF MANGROVES AND COASTAL SALTMARSH

Recommendation 47: Charge a single body with responsibility for coordinating the management of mangroves and coastal saltmarsh across tenures. Tasks of the body would include: i) setting benchmarks and targets; ii) monitoring and auditing of organisational performances against remits; iii) facilitating and coordinating research; iv) producing management guidelines; v) collating, managing and disseminating information and research results; vi) promoting the values of mangroves and saltmarsh; vii) ensuring consistent application of management objectives and practice; and viii) facilitating community involvement.

Recommendation 48: Establish within the body an expert technical group to provide advice on the relevance and conduct of research and management of mangroves and coastal saltmarsh.

FURTHER RESEARCH

Recommendation 49: Initiate a forum for the scientific community which focusses on research and management of mangroves, coastal saltmarsh and other estuarine systems.

Recommendation 50: Support research into the following broad topics:

- Best-practice conservation management of mangroves and coastal saltmarsh, including methods and assessment of rehabilitation techniques.
- Changes in extent or condition of intertidal or estuarine wetlands, including analysis of the factors responsible for change.
- Determination of the width and nature of buffer areas required for landward migration of mangroves and coastal saltmarsh consequent to sea-level rise, and how best to provide such buffers.
- Ecological processes within mangroves and coastal saltmarsh relevant to conservation management.
- Fauna of mangroves and coastal saltmarsh and their conservation management.
- Distribution, control and eradication of the high- and medium-threat weeds.
- Management of existing sea walls and other structures (e.g. levees) to achieve the best conservation management outcomes for mangroves and coastal saltmarsh.
- Affinities and contrasts between coastal saltmarsh and inland saltmarsh, and their implications for biodiversity conservation.

Recommendation 51: Effectively disseminate the outcomes of research into mangroves, coastal saltmarsh and other estuarine systems to policymakers, planners, engineers and community groups.