Impacts on mangrove and saltmarsh habitats, and pathways to recovery

DEW
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Outline

• Ecological value of the landscape
• What we know about the ecological impacts
  • aerial imagery
  • ecophysiological inference
• What we need to know
  • Impact assessment – on-ground vegetation assessment, assessment of likely impacts on other values (fish, birds, threatened/iconic species)
  • Pathways to recovery
    • Monitoring network
    • Removing stressor, lag to plant recovery and recruitment
    • Need for active restoration, plants, soil?
• Longer-term and larger scale outlook
  • area of interest is within a broader landscape
  • DEW is currently considering options for the management of this broader landscape (e.g. tidal trial)
Ecological values

• Significant intact area of native vegetation
• Contains nationally listed threatened species and ecological communities
• Provides nursery habitat for ecologically important and commercially important fish species
• Birds
  • combination of tidal mudflats, saltmarsh and functional ponds has driven habitat value for migratory shorebirds for a long time
  • this combination a big driver for these shorebird values that underpin the Adelaide International Bird Sanctuary
Changes to vegetation communities

• Primary tool in measuring impact has been interpretation of aerial and satellite imagery
  • preliminary on-ground vegetation assessment also done

• In our initial assessment we have primarily used high res aerial imagery at different time slices to detect dieback (“death”)
  • easier to detect in mangroves than saltmarsh
  • supported by visual interpretation of other products, eg multispectral satellite imagery

• Longer-term strategy for change detection below
  • including measuring change in different condition classes
  • including measuring change through time (repeat measures)
Satellite Imagery: Sentinel-2 False Colour

October 2019

October 2020

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Ecophysiology

• *Avicennia marina* (Grey mangrove):
  • seedling recruitment optimal at salinities < seawater (35 g/L)
  • adult mortality at salinities 70-100 g/L
  • salinity at sites of high impact (death) > 130 g/L
  • can recruit quickly under favourable conditions (though tree growth can be slow)

• saltmarsh habitats
  • more complex, many species, different tolerances
  • potentially higher salinity tolerances, but typically less tolerant to waterlogging (higher in elevation)
  • already under threat, particularly from sea-level rise
  • recovery can be slow, with the potential for some elements to require active re-establishment
What we need to know – impact assessment

• ongoing vegetation and imagery analysis
  • working with NGOs and others to measure broader impacts (not just ‘dieback’), particularly to identify areas under stress
  • will undertake aerial data capture and analysis regularly (weekly-monthly)
  • coupled with regular and quantitative on-ground vegetation assessment for validation of imagery

• impacts on broader ecosystem and values
  • fauna habitat assessment, including impact on coastal marine fauna
What we need to know – recovery

• once the hydrological conditions are “right”...
• forecast recovery pathways
  • will biological intervention ( revegetation) be required?
  • will other interventions (e.g. soil remediation) be required?
  • how long until we know we need to intervene?
  • are some interventions “no regrets”?
• use monitoring data to determine when interventions should be implemented (and to hopefully demonstrate passive recovery!)