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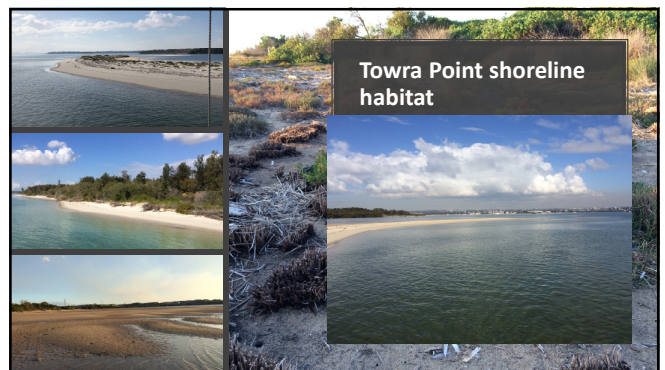
### Key threats to Ramsar wetlands

Threats	Inland, rural	Coastal	Urban coastal
River regulation and water diversion			
Development and catchment disturbance – flows, sediment, nutrients, catchment clearing			
Entrance training, drainage, dredging and floodgates			
Weeds and pest animals			
Climate change			
Rainfall, temperature, evaporation			
Climate change - Groundwater			
Sea level rise, Salinity			
Recreation – boating, fishing			
International management decisions			
Management complexity, knowledge gaps and resourcing limitations			



### Case Study: Towra Point Nature Reserve Ramsar Site

- Formally listed as a Ramsar site in 1984
- Approx. 387 hectares in size and situated on the southern shore of Botany Bay
- Sits entirely within Towra Point Nature Reserve
- Mangrove and saltmarsh communities are the largest in the Greater Sydney Region, providing critical habitat for juvenile fish and crustaceans
- One of NSW most important migratory bird sites and a breeding area for the endangered little tern
- Management is through a plan of management required under the *National Parks and Wildlife Act 1974*



## Slide 5

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**SM1** We need to include a key/legend so this makes sense

Sophia Meehan, 26/10/2019

**Surrounding land use**

- Management of the site's natural and cultural resources is challenged by urban, industrial and development activities taking place outside of the reserve
- These activities include:
  - dredging and major port operations
  - development of Sydney Airport and Kurnell oil refineries
  - residential, commercial and industrial development in Botany Bay and broader Georges River catchment – sediment budget, nutrients, flows, invasive species
  - illegal and/or inappropriate recreational use
  - sand extraction at Kurnell
  - historical loss of oyster reefs
- In 2017, these and other human activities were identified by the Australian Government as contributing to 'significant and adverse' change in the wetland's ecological character
- In accordance with the Article 3.2 Notification issued to NPWS, it was required to develop a Response Strategy to address this change.

**Approach to preparing the strategy**

- Build on existing science, the learnings of site managers and listening to stakeholders
- Promote a more integrated and collaborative approach to management, sharing an understanding of risk, wise use and realistic objectives
- Practically achieved through site inspections, formal and informal stakeholder engagement and a comprehensive literature review
- Advice sought on the following:
  - Geomorphic processes, sediment budget and morphological change
  - Ecological resilience (vegetation communities, habitat)
  - Known and potential risks - sea level rise, infrastructure and urban development impacts
  - Effectiveness of current management and governance structures/actions
  - Key objectives (relevant, realistic and consistent with Ramsar requirements and timelines)
  - Future opportunities and constraints
  - Priority actions, roles and responsibilities, costs and funding options

**Key stakeholders**

Other agencies	Research/Tertiary institutions	Community and industry
Department of Environment and Energy DPIE including Science and Biodiversity and Conservation Divisions Local Land Services Crown Lands Roads and Maritime NSW Port Authority DPI Fisheries CSIRO Sutherland Shire Council	Sydney NSW Wollongong Macquarie ACU Sydney Institute of Marine Science  Note: These research institutions have previously undertaken research at the site	Australian Water Studies Group Landcare Marine Ranger Program Residential land developers Sporting clubs/developers Sydney Airport Port Botany Corporation

**Considerations in the conceptual planning framework**

Drivers of change are offsite and at a scale outside the direct control of the site manager, limited management leverage with nationally significant infrastructure	Limited tailored and integrated baseline data and research; interest but room for improvement on collaboration	Budget and resourcing capacity relative to scale of challenge
Accepting that restoration to former ecological character is not feasible - how to set appropriate objectives and indicators of progress	Dynamic geomorphic environment – some key elements have migrated outside the boundary of TPNRRS	Impact of climate change on resilience of outcomes of actions
Small but complex site with management responsibilities across all levels of government, 20 year old Plan of Management	Low community awareness that there is a wetland of international significance on their doorstep	Uncertainty about future change - gradual or step? What is the threshold for irreversible change?

**Towra Point Nature Reserve Ramsar Site Response Strategy**

- Principle aim is to **halt the decline, and where possible improve, the ecological condition of the Towra Point Nature Reserve Ramsar Site**
- For the purpose of the Towra Point response strategy 'wise use' infers adaptive management of the site to meet the future contextual challenges, climate change and sea level rise
- 21 objectives agreed by stakeholders
- Several objectives to strengthen governance, knowledge and partnerships, for integrated and collaborative management of challenging context and drivers of change
  - targeted and cost-effective science and monitoring
  - updated, whole of Botany Bay approach
- Other objectives focus on improved ecosystem health and resilience, to support key components and values of the site, including:
  - rates of change in coastal processes and morphological response
  - quality and extent of little tern habitat, numbers and breeding success
  - migratory shorebird habitat quality, numbers and species diversity
  - health, viability and ecosystem services provided by mangrove, saltmarsh and seagrass communities
  - Other important terrestrial and aquatic ecological values of the site

**Timeline for implementing strategy**

- Will be implemented over 10 years
- Involves three key stages: halting ecological decline (1-2 years), stabilising and improving ecological condition (2-5 years) and establishing ecological resilience and continual improvement (5-10 years)
- Close and on-going collaboration between NPWS and key stakeholders is required. These will include other state government agencies, tertiary institutions, NGOs, industry and the community
- Adaptive management of ecosystems functions and services is key

**Priorities**

Stage 1	Stage 2	Stage 3
<ul style="list-style-type: none"> <li>More robust baseline data</li> <li>Monitoring protocols</li> <li>Strengthen partnerships and collaboration, for knowledge and resourcing</li> <li>Adjust boundaries</li> <li>Approvals for later major works</li> <li>Link to CMP</li> </ul>	<ul style="list-style-type: none"> <li>Commence major works – governance and on-ground ecological</li> <li>Monitoring and reporting</li> <li>Maintain and enhance awareness, partnerships and collaboration for knowledge and resourcing</li> </ul>	<ul style="list-style-type: none"> <li>Geomorphic works where up-to-date analysis indicates feasible and cost effective</li> <li>Monitoring and reporting</li> <li>Maintain and enhance awareness, partnerships and collaboration for knowledge and resourcing</li> </ul>

**Resources**

- Significant external funding is required.** NPWS has limited resources to address the change in ecological character at the Ramsar site which are caused by human activities taking place outside of the reserve boundaries
- The Australian Government has not committed funding to implement the strategy
- The implementation of Stage I (1-2 years) is conservatively estimated at \$2.5 million, plus in kind salary contributions
- Capital works proposed for Stage 2 and Stage 3 are unfunded. Significant capital works include:
  - construction of artificial islands;
  - extending or improving habitat in existing lagoons;
  - installing fixed or floating pontoons for little tern;
  - shallow dredging and beach scraping to replenish and/or reconstruct beach profiles, and
  - construction of temporary revetment walls.



### Conclusion

- The management of Ramsar wetlands in coastal urban settings presents unique challenges
- Restoring the Towra Point Nature Reserve Ramsar Site to its 'pre-impact condition' is not feasible
- Focus on strengthening the resilience of key ecological processes and services is a more realistic aim
- For the strategy to achieve its objectives the following are required:
  - A formal commitment from relevant local, state and Australian government agencies to work co-operatively on implementing actions outlined in the strategy
  - Development of a new plan of management for the reserve which informs and supports the Georges River and/or Botany Bay coastal management programs
  - Enhanced community awareness and support for the significant natural and cultural values of the reserve
  - Priority investment – including obtaining baseline data to better understand the interactions between coastal geomorphic processes and ecological systems and processes.