Title

Projected distribution of mangrove and saltmarsh in NSW estuaries under sea level rise

Abstract

The projected distributions of mangrove and saltmarsh in this dataset were developed using the method described in Hughes et al (2022) which can be downloaded from https://www.frontiersin.org/articles/10.3389/fenvs.2022.749950/full

The method involved the use of machine learning techniques to develop a statistical classification model for predicting the position of mangrove and saltmarsh in the present-day landscape in terms of topographic, hydrological and sedimentological predictor variables. That model was then used to identify and map positions in the future landscape displaying similar attributes. Three future landscapes were modelled based on the three SLR scenarios +0.5 m, +1.0 m and +1.5m. To bracket the potential outcomes three sets of projections were prepared. One where there was no restriction on future wetland locations in the landscape other than exclusion from urban areas, and two where future wetlands were restricted to specific natural and semi-natural land covers.

While the topographic, hydrological and sedimentological factors associated with the present-day distribution of mangrove and saltmarsh can provide a guide to where they might occur in future landscapes associated with SLR, numerous other factors not considered here will also have an influence (e.g. changes in catchment inflows, estuary entrance conditions and sediment supply; climate impacts on species present; existing tidal exclusion infrastructure; present and future management actions etc.).

Resource locator

Data Quality Statement

Name: Data Quality Statement

Protocol: WWW:DOWNLOAD-1.0-http--download

Description:

Data quality statement for Projected distribution of mangrove and saltmarsh in NSW estuaries under sea level rise

Function: download

Hughes_etal_2022

Name: Hughes_etal_2022

Protocol: WWW:DOWNLOAD-1.0-http--download

Description:

Frontiers in Environmental Science paper describing methods used to create map data set.

Function: download

Table 1

Name: Table 1

Protocol: WWW:DOWNLOAD-1.0-http--download

Description:

Table of Matthews Correlation Coefficients used to indicate level of confidence in the mangrove and saltmarsh projections for each estuary

Function: download

Download Package

Name: Download Package

Protocol: WWW:DOWNLOAD-1.0-http--download

Description:

Data (Esri Raster Geodatabase)

Function: download

Download Package

Name: Download Package

Protocol: WWW:DOWNLOAD-1.0-http--download

Description:

Data (Raster - TIFF format)

	Function: download
Unique resource identifier	
Code	266cdf74-2da9-48cb-8ba1-acdce66928b7
Presentation form	Map digital
Edition	1
Dataset language	English
Metadata standard	
Name	ISO 19115
Edition	2016
Dataset URI	https://datasets.seed.nsw.gov.au/dataset/266cdf74-2da9-48cb-8ba1-acdce66928b7
Purpose	This data set is one of the outputs from a state-wide, first-pass vulnerability assessment of mangrove and saltmarsh to SLR prepared under the Marine Estate Management Strategy Initiative 3. The purpose of the assessment was to identify estuaries where mangrove and saltmarsh have an apparently high or low vulnerability to SLR, so that further detailed research could be targeted to fill knowledge gaps. This data set can inform coastal planning at the estuary scale, but it does not replace the need for more detailed local scale assessment of management planning and actions for both existing and potential future wetland areas.
Status	Completed
Spatial representation type	grid
Spatial reference system	
Code identifying the spatial reference system	4283
Spatial resolution	5 m
Additional information source	DATA STRUCTURE The maps of projected mangrove and saltmarsh distribution in 110 estuaries are available in a GeoDatabase titled Wetland_Projections_SLR. The 110 estuaries investigated are listed in table 1. The GeoDatabase contains four sets of maps, one for each sea level scenario: S0 - projections for present-day sea level; S1 - projections for +0.5m sea level rise; S2 - projections for +1.0m sea level rise; S3 - projections for +1.5m sea level rise. Each set S0-S3 contains a spatial layer showing the projected distribution of mangrove and saltmarsh with no land use constraints other than exclusion from urban areas, and two projections constrained to specific land cover types. The naming convention is: SX; SX_nat_re; SX_nat_plus where SX designates the sea level scenario, i.e. present-day sea level (S0) or a projected future sea level (S1, S2, or S3). SX is the projected habitat distribution for the specified sea level scenario with no land use constraints other than exclusion from urban areas. SX_nat_re is the projected habitat distribution for the specified sea level scenario

constrained to (i) natural land cover and (ii) low intensity land use based on NSW Land Use 2017 (https://datasets.seed.nsw.gov.au/dataset/nsw-landuse-2017-v1p2-f0ed).

SX_nat_plus is the projected habitat distribution for the specified sea level scenario constrained to (i) natural land cover, (ii) low intensity land use and (iii) agriculture and horticulture based on NSW Land Use 2017.

For example, the projected mangrove and saltmarsh distribution for the +0.5 m SLR scenario and no restrictions on future wetland location except exclusion from existing urban areas is S1. Similarly, the projected distribution under a +1.5 m SLR scenario with restrictions on location to natural land covers and low intensity land use is S3_nat_re.

In each layer mangrove is designated by the value 2 and saltmarsh by the value 3.

There are a small number of estuaries that include mangrove and/or saltmarsh in the present-day projections (S0), which have a NULL raster in the projections for higher sea level (S1-S3). This indicates that at the higher sea level scenario they are projected to have no mangrove or saltmarsh. This applies to the following estuaries at each sea level scenario: • S1: meringo_creek_S1 • S2: back_lagoon_S2, berrara_creek_S2, elliott_lake_S2, meringo_creek_S2, nadgee_river_S2, woolgoolga_lake_S2 • S3: back_lagoon_S3, berrara_creek_S3, congo_creek_S3, conjola_lake_S3, corunna_lake_S3, curalo_lagoon_S3, elliott_lake_S3, lake_brou_S3, lake_brunderee_S3, little_lake_wallaga_S3, meringo_creek_S3, nadgee_river_S3, station_creek_S3, woolgoolga_lake_S3

MAP ACCURACY

The map accuracy of the predicted present-day distribution of mangrove and saltmarsh can be assessed using the Matthews Correlation Coefficient (MCC), which is provided for each estuary in Table 1. The following qualitative descriptors apply: 0.0-0.19 zero to negligible correlation, 0.2-0.39 weak correlation, 0.4-0.59 moderate correlation, 0.6-0.79 strong correlation, 0.8-1.0 very strong correlation. An MCC value is provided for total wetland area, and mangrove and saltmarsh areas separately in each estuary.

High MCC values indicate high confidence in the predictive model for that estuary when applied to the present-day sea level and suggests a cautious level of confidence in the projections for future sea level scenarios, but there is no means to test the accuracy of future projections. It is recommended that results for estuaries where the MCC is between 0.4 and 0.6 are used with additional caution, and estuaries where MCC<0.4 the projections should not be used (see Hughes et al. 2022).

Topic category

Keyword set

keyword value	WATER-Wetlands MARINE-Estuaries ECOLOGY-Habitat
Originating controlled vocabulary	
Title	ANZLIC Search Words
Reference date	2008-05-16

Geographic location

West bounding longitude	149.9
East bounding longitude	154
North bounding latitude	-37.7
South bounding latitude	-28

Vertical extent information

Minimum value	-100
Maximum value	2228
Coordinate reference system	
Authority code	urn:ogc:def:cs:EPSG::
Code identifying the coordinate reference system	5711

Temporal extent

Begin position	2000-01-01
End position	N/A

Dataset reference date

Resource maintenance

Maintenance and update frequency	Not planned
Contact info	
Contact position	Data Broker
Organisation name	NSW Department of Climate Change, Energy, the Environment and Water
Telephone number	131555
Email address	data.broker@environment.nsw.gov.au
Web address	https://www.nsw.gov.au/departments-and-agencies/dcceew
Responsible party role	pointOfContact

Lineage

The foundational spatial data layers upon which this dataset relies are the: • Estuarine Macrophytes of NSW (2005) • Coastal LiDAR-derived 5 m DEM (2016) • Coastal Quaternary Geology Data Package (2016) • NSW Land Use (2017) • NSW Estuary Tidal Planes These datasets have strong institutional pedigree, and their corresponding data quality statements should be consulted.

Limitations on public access

Responsible party

Contact position	Data Broker
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Telephone number	131555
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Metadata date

2024-02-26T13:50:46.033150

Metadata language