

Statewide wetland geospatial inventory update

Factsheet 4: Method to classify water regime

Purpose

This Factsheet describes the method used to classify water regime.

Intent of the classification

The new Victorian Wetland Classification Framework adopts four categories of water regime:

| | |
|------------------------|---|
| Intertidal | Inundated twice daily, with inundation lasting hours between tide cycles |
| Supratidal | Inundated several times per year, with inundation lasting days to months |
| Permanent | Inundated constantly, rarely drying completely |
| Periodically inundated | Inundated annually to infrequently, holding water for 1 month to 1 year before drying |

Within the periodically inundated category, the Framework adopts three subcategories of water regime:

| | |
|--------------|--|
| Seasonal | Inundated annually or near-annually, holding water for 9 or more years in 10; holds water 1-8 months, then dries |
| Intermittent | Inundated infrequently, holding water for 3 to 8 years in 10; holds water > 1 month to > 1 year, then dries |
| Episodic | Inundated infrequently, holding water for less than 3 years in 10; holds water > 1 month to >1 year, then dries |

The water regime classification was undertaken in two parts. The first involved classification of non-tidal regimes (i.e. permanent and periodically inundated wetlands) and the second involved classification of tidal regimes. The methods for these parts are outlined separately below.

Method for non-tidal regimes

The approach utilised multiple lines of evidence to classify the most likely water regime of non-tidal wetlands, based on five relatively independent data sources:

Dataset name Dataset description / link

| | |
|---------------------------|--|
| Cant et al. 2012 database | Report and accompanying database describing the classification of water regime of Victorian wetlands using MODIS satellite data |
| Modelled 2005 EVC | Polygon features delineating native vegetation type across Victoria, modelled in 2005 using Ecological Vegetation Classes (EVCs) http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803003495.htm |
| IWC EVC | Database describing the EVCs at Index of Wetland Condition (IWC) sites in Victoria (unpublished) |
| Flood 2012 database | Report and accompanying database describing the water and salinity regime and depth preferences for Victorian wetland ecological vegetation classes (unpublished) |
| Water area 1:25,000 | Polygon features delineating hydrological features, including lakes, flats (subject to inundation), wetlands, pondages (saltpan and sewage), watercourse areas, rapids and waterfalls http://services.land.vic.gov.au/rhok/Metadata/HY_WATER_AREA_POLYGON.htm |

The first step involved identifying whether/how the Wetland 2013 feature has been classified by Cant et al. 2012, by joining the attributes from the Cant et al. 2012 database to the Wetland 2013 dataset. The Cant et al. 2012 database classified a relatively small selection of the Wetland 1994 derived features as permanent, seasonal, intermittent or episodic. This step also involved

classifying all features from the alpine mapping and all Victoria's named storages¹ as having a permanent water regime, with a high level of confidence. The classification results from the first step took precedence over classification results from the subsequent steps. Approximately 5% of the Wetland 2013 polygons were assigned a water regime class through the first step.

In the second step, the Flood 2012 database was used to identify the preferred inundation frequency for each EVC. The frequency of inundation in the Flood 2012 database is described as either permanent, seasonal, intermittent or episodic. In some cases a single EVC was listed as having more than one preferred water regime, so in these instances the more frequent inundation class was adopted. These descriptors of the preferred water regime for each EVC were then applied to the modelled 2005 EVC dataset and IWC EVC dataset. Spatial overlay analysis identified which EVCs occurred in each wetland. Wetland polygons that had more than > 50% of their area covered by EVCs of a single water regime class were assigned the corresponding class; otherwise the wetland polygons were considered unable to be classified through the second step and so were classified (if possible) using the third step. Approximately 20% of the Wetland 2013 polygons were assigned a water regime class through the second step. The classification results from the second step took precedence over classification results from the third step.

The third step also involved spatial overlay analysis, using water area 1:25,000. The 'wtr_bdy_st' attribute in this dataset identifies if a water body is 'intermittent' or 'perennial', which are analogous to being 'periodically inundated' or 'permanent' respectively. Wetland polygons that had more than > 50% of their area covered by waterbodies described as 'intermittent' or 'perennial' were assigned as either 'intermittent' or 'permanent' respectively; otherwise the wetland polygons were classified as having no dominant water regime class and were labelled as having an 'unknown' water regime. Approximately 20% of the Wetland 2013 polygons were assigned a water regime class through the third step.

Based on steps one to three each wetland was classified into one of the following classes:

- Permanent
- Seasonal (a subcategory of periodically inundated)
- Intermittent (a subcategory of periodically inundated)
- Episodic (a subcategory of periodically inundated)
- Unknown, where steps one to three were unable to provide a classification of water regime

A confidence rating was assigned depending on whether the different datasets (i.e. different steps) provided consistent or conflicting classifications of a single wetland. Where the results of each step provided conflicting classifications, the results from step one were used in preference to other steps, and the results of step two were used in preference to step three. In these instances the confidence rating was adjusted to recognise the lesser certainty in the result.

Method for tidal regimes

The approach for tidal regimes built upon the classification of non-tidal and tidal wetlands undertaken for the wetland system classification (See Factsheet 2). The classification of tidal water regimes involved spatial overlay analysis of Wetland 2013 and the three datasets:

| Dataset name | Dataset description / link |
|-------------------------|--|
| Victorian Saltmarsh EVC | Mapping of saltmarsh vegetation communities across Victoria, completed in March 2010 (unpublished) |
| Estuaries | Mapping of Victoria's estuaries by Deakin University for DEPI (unpublished) |
| Outline of Victoria | Polygon version of outline of Victoria's landmass at 1:25:000 scale http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803002865.htm |

The following process was developed to classify the water regime of tidal wetlands:

1. Assign all marine wetlands as intertidal
2. Assign estuarine wetlands that have less than 70% of their area outside the Victorian landmass, but more than 70% of their area intersecting Victorian Saltmarsh EVC mapping as supratidal
3. Assign estuarine wetlands that have less than 70% of their area outside the Victorian landmass, but more than 70% of their area intersecting estuaries as intertidal
4. Assign remaining tidal wetlands as having an unknown water regime.

¹ The full list of Victoria's named storages was sourced from Attachment B of the *Victorian Water Accounts 2006-07* (DSE 2008). Most, but not all, of these storages occur in the Wetland 2013 dataset.

These rules are outlined in the table below along with the confidence associated with each rule.

| Water regime classification | Confidence of classification | Basis for classification |
|-----------------------------|------------------------------|--|
| Intertidal | Low | <ul style="list-style-type: none"> ▪ Wetland system classified as 'marine', OR ▪ Wetland system classified as 'estuarine', with less than 70% of the wetland area outside the Victorian landmass, but more than 70% of their area intersecting estuaries mapping |
| Supratidal | Moderate | <ul style="list-style-type: none"> ▪ Wetland system classified as 'estuarine', with less than 70% of the wetland area outside the Victorian landmass, but more than 70% of their area intersecting Victorian Saltmarsh EVC mapping |
| Unknown | n/a | <ul style="list-style-type: none"> ▪ Wetland system classified as 'estuarine', but rules for intertidal or supratidal do not provide a water regime classification result |

An exception to the classification method for tidal regimes was made for Lake Wellington (wetland 91188), which is classified as an estuarine wetland system and subsequently also classified as having a 'permanent' water regime, with a high level confidence.

References

Cant, B., Griffioen, P. and Papas, P. 2012. Assessing the hydrology of Victorian wetlands using remotely sensed imagery: a pilot study. Arthur Rylah Institute for Environmental Research Technical Report Series No. 228. Department of Sustainability and Environment, Heidelberg, Victoria

DSE 2008. Victorian Water Accounts 2006-07.

Frood, D. 2012. Water and salinity regime and depth preferences for Victorian wetland ecological vegetation classes: Compiled July 2012 for Department of Sustainability and Environment.

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