Department of Environment and Primary Industries

State Government Victoria

Statewide wetland geospatial inventory update

Factsheet 5: Method to classify water source

Purpose
This Factsheet describes the method used to classify water source.

Intent of the classification
The new Victorian Wetland Classification Framework adopts five indicative water sources:

Groundwater	Wetlands which coincide with mapped groundwater-dependent ecosystems
River	Wetlands that receive water from in-channel or overbank river flows
Local surface runoff	Wetlands that receive water from local runoff
Tidal	Wetlands which are inundated by regular or spring tides
Artificial	Wetlands which depend on an artificial water source e.g. direct discharges from agriculture or industry, sewage and wastewater discharges, urban run-off that is directed to the wetland, environmental water or consumptive water that is pumped into the wetland or supplied through channels and regulating structures

Because wetlands may have multiple water sources and data are generally not available to identify the relative volumetric contribution of each source, this project describes only the potential for a given wetland to receive water from the different water sources. The likely contribution of local runoff is not included but can be inferred by examination of the other water sources (e.g. if river and groundwater are not identified as water sources then the likelihood of local runoff forming a water source is high). The classification therefore allows a user to understand the likely contribution of each water source, but does not attempt to assign a single water source to an individual wetland.

The approach utilised multiple lines of evidence and classified the likelihood for each water source independently of other water sources. The method is outlined below for each water source.

Groundwater
The groundwater classification was based on the National Atlas of Groundwater Dependent Ecosystems (GDE Atlas), recently released by the Australian Government (http://www.bom.gov.au/water/groundwater/gde). The GDE Atlas is a spatial database that describes the likelihood that a mapped wetland (limited to those mapped previously in Wetlands 1994) will interact with groundwater. The database also provides an estimate of the relative contribution of groundwater vs. surface water at each mapped wetland.

The information in the GDE Atlas was applied to the Wetland 2013 by using spatial overlay analysis to extract the GDE Atlas information for each corresponding Wetland 2013 features. Only the GDE Atlas features described as 'ecosystems that rely upon the surface expression of groundwater' were used in the spatial overlay analysis. The descriptions used in the GDE Atlas were transcribed to be consistent with the terminology for other water source classification in the Wetland 2013 dataset as follows:

Wetland 2013 groundwater classification	GDE Atlas terminology
Very high (probability of groundwater inflows)	Identified in previous study: desktop Identified in previous study: fieldwork
High (probability of groundwater inflows)	High potential for GW interaction
Moderate (probability of groundwater inflows)	Moderate potential for GW interaction
Low (probability of groundwater inflows)	Low potential for GW interaction
Unknown	No data available to infer probability of groundwater inflows (wetland not mapped in the GDE Atlas)

In addition to classifying the likely probability of groundwater inflows, a description of the relative confidence in the classification was provided based on the GDE Atlas description and the spatial proximity of the wetland to those in the GDE Atlas. The confidence was described as either:

Wetland 2013 groundwater confidence	GDE Atlas terminology
High	Wetland mapped in the GDE Atlas and described as 'Identified in previous study: desktop' or 'Identified in previous study: fieldwork'
Moderate	Wetland mapped in the GDE Atlas and described as 'High potential for GW interaction', 'Moderate potential for GW interaction' or 'Low potential for GW interaction'
Low	Wetland is spatially connected to a wetland that was mapped in the GDE Atlas, but this wetland itself not actually included in the GDE Atlas
n/a	No data available to infer probability of groundwater inflows (i.e. wetland not mapped in the GDE Atlas or not spatially connected to a wetland mapped in the GDE Atlas)

In some instances the Wetland 2013 mapping now covered a larger area than the mapping in the GDE Atlas i.e. the Wetland 1994 feature had been enlarged in recent mapping. In these instances, the expanded part of the wetland was assigned the same groundwater classification as the original part, but the confidence associated with the classification was reduced by one level (e.g. from high to moderate, or from moderate to low).

Regardless of the classification arising from the GDE Atlas, all features sourced from the alpine mapping were classified as having a very high probability of receiving groundwater inflows, with a high level of confidence.

River

The river classification was based on spatial overlay analysis with five independent data sources:

Dataset name	Dataset description / link
Floodway	Polygon features representing 'declared' or otherwise delineated floodways. Floodways are typically areas of low lying land close to rivers that are prone to flooding http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803004311.htm
1 in 100 year flood extent	Polygon data delineating modelled statistical flood extent with an Average Recurrence Interval of 100 yrs http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803003630.htm
Watercourse network 1:250,000 to 1 :5 million	Line features delineating hydrological features, for this analysis restricted to features categorised as a 'watercourse_river' or 'watercourse_stream' (as per FEATURE_TYPE_CODE attribute) http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803003512.htm
Watercourse network 1:25,000	Line features delineating hydrological features, for this analysis restricted to features categorised as a 'watercourse_river' or 'watercourse_stream' (as per FEATURE_TYPE_CODE attribute) http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803002490.htm
Floodplain extent	Polygon dataset created by Janet Holmes (DEPI) that maps the extent of floodplain areas in Victoria, focused on those floodplains that would deliver water to wetlands (unpublished)

Spatial overlay analysis was used to estimate what proportion of each wetland intersected each of the five datasets. These datasets provide a relatively independent estimate of the likely distribution of riverine water in the landscape, and therefore wetlands that intersect a higher number of these datasets will have a higher probability of receiving riverine flows. Based on this logic each wetland was classified as follows:

Wetland 2013 river classification	Basis for classification
Very high (probability of river inflows)	▪ Wetland intersects the 'Watercourse network 1:250,000 to 1 :5 million' i.e. a major river runs through the wetland itself ▪ Wetland intersects the 'Floodplain extent', 'Floodway' and '1 in 100 year flood extent' i.e. wetland always mapped as within an inundation area
High (probability of river inflows)	▪ Wetland intersects the 'Floodplain extent', and either 'Floodway' or '1 in 100 year flood extent' i.e. wetland often mapped as within an inundation area ▪ Wetland intersects the 'Floodway' and '1 in 100 year flood extent', but not 'Floodplain extent' i.e. wetland often mapped as within an inundation area
Moderate (probability of river inflows)	▪ Wetland intersects the 'Floodplain extent', but not 'Floodway' or '1 in 100 year flood extent' i.e. predicted floodplain but outside existing inundation mapping
Low (probability of river inflows)	▪ Wetland intersects only one 'Floodway' or '1 in 100 year flood extent', and does not intersect 'Floodplain extent' i.e. wetland rarely mapped as within an inundation area ▪ Wetland intersects only 'Watercourse network 1:25,000' but not any other i.e. wetland is outside of mapped inundation area and only intersects a very minor waterway, which is probably too small to provide significant riverine flows
Very low (probability of river inflows)	▪ Wetland does not intersect any of the riverine inundation datasets i.e. wetland is outside of mapped inundation or riverine area

In addition to classifying the like probability of riverine flows, a description of the relative confidence in the classification was provided based on the alignment or conflicts between the five independent data sources. Wetlands that had a high degree of alignment for this attribute were assign high confidence, while those that had conflicting information from the various data sources were assigned low or moderate confidence, depending on the degree of alignment.

Tidal

The tidal classification was based entirely on work undertaken to classify the wetland system. For details refer to Factsheet 2 which describes the process used to classify wetlands as either tidal or non-tidal.

Artificial

The artificial classification was based on spatial overlay analysis with three independent data sources that provide some level of information on the source of water to wetlands or waterbodies:

Dataset name	Dataset description / link
All Victorian Dam Boundaries	A dataset developed for DSE by SKM that maps dams across Victoria (unpublished)
DRWaterbodies	Melbourne Water's stormwater assets database (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

Spatial overlay analysis was used to estimate what proportion of each wetland intersected each of the three datasets. These datasets each have one attribute that provides some information on whether a given wetland / waterbody is likely to receive artificial water – using this information the features in each dataset can be classified as either receiving artificial water or not. The three datasets provide a relatively independent indication of the water source, and therefore wetlands that intersect a higher number or larger area of artificially-supplied features will have a higher probability of actually receiving artificial deliveries.

Based on this logic each wetland was classified as either receiving water from 'artificial' or 'not artificial' sources as follows:

- Wetlands with 5% or more of the wetland overlapping with 'artificial' water supply features in one or more of the three datasets were classified as 'artificial'
- Wetlands with less than 5% of the wetland overlapping with 'artificial' water supply features in one or more of the three datasets were classified as 'not artificial'

Where no data was available to support this classification, the wetland was classified as 'unknown'. Features sourced from the alpine mapping were an exception, as alpine features formerly classified as 'unknown' were amended to be classified as 'not artificial', with a high level of confidence.

The level of confidence in the artificial classification varied between wetlands and was described as follows:

Wetland 2013 artificial confidence	Basis for classification
High	▪ More than 50% of the wetland overlaps with 'artificial' water supply features in one or more of the three datasets i.e. majority of wetland mapped as a type of feature that receives artificial water supplies
Moderate	▪ Between 20-49% of the wetland overlaps with 'artificial' water supply features in one or more of the three datasets i.e. much of wetland mapped as a type of feature that receives artificial water supplies ▪ Less than 5% of the wetland overlaps with 'artificial' water supply features in one or more of the three datasets i.e. none or insignificant amount of wetland mapped as a type of feature that receives artificial water supplies
Low	▪ Between 5-19% of the wetland overlaps with 'artificial' water supply features in one or more of the three datasets i.e. some of wetland mapped as a type of feature that receives artificial water supplies

The table below identifies the attribute in each of the three datasets that was used to assign a feature as receiving artificial water or not. The table also lists which sort of features were categorised as likely to receive water artificially or not.

Dataset name	Relevant attribute	Feature type		Likely supply of water
All Victorian Dam Boundaries	Feature_type	Aquaculture area	e.g. fish hatcheries	Artificial
		Industrial storage	Dams intersecting industrial or mining land uses	Artificial
		Rural irrigation storage	Dams intersecting irrigated land uses	Artificial
		Settling ponds	Ponds used for water treatment	Artificial
		Town rural storage	Named storages and storages > 250ML	Artificial
		Waste water	Not described	Artificial
		Flood irrigation storage	Dams used to harvest stormwater runoff	Not artificial
		Rural licensed storage	Dams that are likely to be linked to licences	Not artificial
		Rural storage	Likely to be stock and domestic dams	Not artificial
DRWaterbodies	Desc	Bio-retention system	No description	Artificial
		Sediment trap	No description	Artificial
		Natural body of water	No description	Not artificial
		Wetlands	No description	Not artificial
Water area 1:25,000	Wtr_use_fn	1	Water Supply	Unknown
		2	Flood Control	Artificial
		3	Salt Evaporation	Artificial
		4	Sewage	Artificial
		5	Tailing Dam	Artificial
		6	Cooling Ponds	Artificial
		7	Drainage	Unknown
		8	Irrigation	Artificial
		9	Recreation	Artificial

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