**NEAP Freshwater realm. Vector layer.**

Input layers: Geofabric 3.3, Water regions, Rainfall station data.

F1.1 Permanent upland streams, F1.2 Permanent lowland rivers, F1.4 Seasonal upland streams, F1.5 Seasonal lowland rivers

All rivers/creeks from Geofabric 3.3 in the No Water Regions (see attached ‘Rainfall\_sta\_byWaterRegion/xlsx’ file).

In the NO Water Regions, categorize rivers/creeks as permanent or seasonal based on Geofabric 3.3, and then further categorise them as upland or lowland based on the Stein index. This is already done.

F1.3 Freeze-thaw rivers and streams

Australian Alps: Blue lake is frozen 4 months of the year. Probably also Lale Albina, Club Lake and Cootapatamba Lake.

Tasmania: Dove Lake, Lake Selina and Lake Westwood are possible.

TBC with David Keith and Richard Kingsford.

From DK: There are potentially 5 freeze-thaw lakes on Kosc plateau. The upper Snowy River and its tributaries on the Kosc plateau are freeze-thaw streams. It would be informative and practicable to report snow cover duration of these water bodies each year

F1.6 Episodic Arid Rivers

All rivers/creeks from Geofabric 3.3 in the YES Water Regions (see attached ‘Rainfall\_sta\_byWaterRegion/xlsx’ file). Rule based on expert advice (Richard Kingsford) is mean annual rainfall < 450mm and mean annual rainfall variability > 0.75; plus the Avon and Geraldton Water Regions, which don’t quite fit these criteria.

F1.7 Large lowland rivers

Not to be reported. None present in Australia.

F2.8 Artesian springs and oases

All springs in Geofabric 3.3.

F2.9 Geothermal pools and wetlands

Not to be reported. None present in Australia.

**NEAP Freshwater realm. Raster layer.**

Input layers: Geofabric 3.3, Water regions, NVIS 6.0, Rainfall station data, ALUM v8 (Land Cover?).

F2.1 Large permanent freshwater lakes

Possibly Lake Hindmarsh and Lake Wellington from Geofabric 3.3. RK and DK to confirm. Other large ‘lakes’ are saline, tidal, marine, estuarine, ICOL.

F2.2 Small permanent freshwater lakes

All small (not F2.1) permanent lakes from Geofabric 3.3 that are not saline (see F2.7).

F2.3 Seasonal freshwater lakes

Non-permanent lakes from Geofabric 3.3. Requires threshold between seasonal and ephemeral. Use all rivers/creeks from Geofabric 3.3 in the NO Water Regions mask, as for F1.6 Episodic Arid Rivers.

F2.4 Freeze-thaw freshwater lakes

Not to be reported. None present in Australia.

From DK: There are potentially 5 freeze-thaw lakes on Kosc plateau. The upper Snowy River and its tributaries on the Kosc plateau are freeze-thaw streams. It would be informative and practicable to report snow cover duration of these water bodies each year

F2.5 Ephemeral freshwater lakes

Non-permanent lakes from Geofabric 3.3. Requires threshold between seasonal and ephemeral. Suggest using All rivers/creeks from Geofabric 3.3 in the YES Water Regions mask, as for F1.6 Episodic Arid Rivers.

From DK: A lot of hydrological variation within the group. May need an operational threshold (e.g. surface water present in <90% seasonally and interannually sampled records)

Ecosystem Properties: Shallow ephemeral freshwater bodies are also known as depressions, playas, clay pans, or pans. Long periods of low productivity during dry phases are punctuated by episodes of high production after filling.

Ecological Drivers: Arid climates have highly variable hydrology. Episodic inundation after rain is relatively short (days to months) due to high evaporation rates and infiltration.

F2.6 Permanent salt and soda lakes

Salt lakes are represented in NVIS but are also represented in Geofabric without salinity information. Requires a decision as to whether to represent these areas as lakes or as vegetation. Could intersect NVIS with Geofabric to classify Geofabric lakes as saline and put geofabric polygons over NVIS polygons? Note that NVIS will often classify a Geofabric lake as several different types of vegetation – so could impose NVIS polygons over Geofabric polygons and call it vegetation instead of a lake.

From DK: A lot of hydrological variation within the group. May need an operational threshold (e.g. surface water present in <90% seasonally and interannually sampled records)

Permanent salt and soda lakes may not exist in Australia because they all dry out? Requires expert input from RK and DK. Could be separated from F2.7 by size (>10,000km2)?

Ecological Drivers: Permanent salt lakes tend to be large and restricted to semi-arid climates with high evaporation but with reliable inflow sources.

F2.7 Ephemeral salt lakes

Salt lakes are represented in NVIS but are also represented in Geofabric without salinity information. Could intersect NVIS with Geofabric to classify Geofabric lakes as saline and put geofabric polygons over NVIS polygons? Note that NVIS will often classify a Geofabric lake as several different types of vegetation – so could impose NVIS polygons over Geofabric polygons and call it vegetation instead of a lake.

From DK: If there is periodic surface water, they should be classified as lake F2.7, not veg.

Ecosystem Properties: Ephemeral salt lakes or playas have relatively short-lived wet phases and long dry periods of years to decades.

Ecological Drivers: Ephemeral salt lakes are up to 10,000 km2 in area and usually less than a few metres deep.

F2.10 Subglacial lakes

Not to be reported. None present in Australia.

F3.1 Large reservoirs

From ALUM v8 or Land cover, if available. See crosswalk.

F3.2 Constructed lacustrine wetlands

Not to be reported. Currently unrepresented in datasets.

F3.3 Rice paddies

From ALUM v8 or Land cover, if available. See crosswalk.

F3.4 Freshwater aquafarms

From ALUM v8 or Land cover, if available. See crosswalk.

F3.5 Canals, ditches and drains

From ALUM v8 or Land cover, if available. See crosswalk.