Current as of 18 September 2023

Factsheet

Evaporation Pond Design

Summary

Designing an evaporation pond depends heavily on the nature of the Controlled Drainage Area (CDA) and the local weather pattern. This factsheet outlines the DPIRD recommended approach to designing evaporation ponds for impermeable catchments such as cattle feedlots or composting pads.

Department Position

Depending on the location of the facility, the pond design should be based on the weather patterns outlined in Figure 1.

- Method A (storm based) – a 1:20 Average Recurrence Interval (ARI) 48-hour storm event is the sole design basis. The sum of annual evaporation and storm rainfall determines the pond depth. Evaporation area is calculated based on the total inflow volume from the catchment (at a runoff coefficient of 1) divided by the pond depth.
- Method B (yearly water balance + summer storm) – a month-by-month water balance over an average year determines the evaporation pond area, and a 1:20 ARI 48-hour storm event is added to January for additional pond depth. The water balance is done over 2 years.
- Method C (wet season water balance) - a month-by-month water balance over 2 years, with the first year having an 85th percentile wet month determines the size of evaporation pond.

Other considerations:

- Runoff coefficient for catchment runoff should be calculated for each month if using Method B or Method C pond sizing – refer to 'Factsheet: Cattle Feedlot Runoff' for runoff numbers appropriate for cattle feedlots.
- 48hr rainfall events over 250mm are not considered to be part of the design criteria. These events are generally cyclones, and an overflow during such high rainfall events would have significant dilution in the environment. Therefore, they are not considered to have significant environmental impact (for animal and agricultural wastes only).
- An overflow event is considered to be 3-7 days long.
- A 10% safety factor is recommended for both the area and depth of the pond as an additional safety factor allowing for environmental factors impacting evaporation (debris, shade from vegetation or structures) and solids build up in the pond.
- Structural design should include an overflow point at the top of the freeboard.

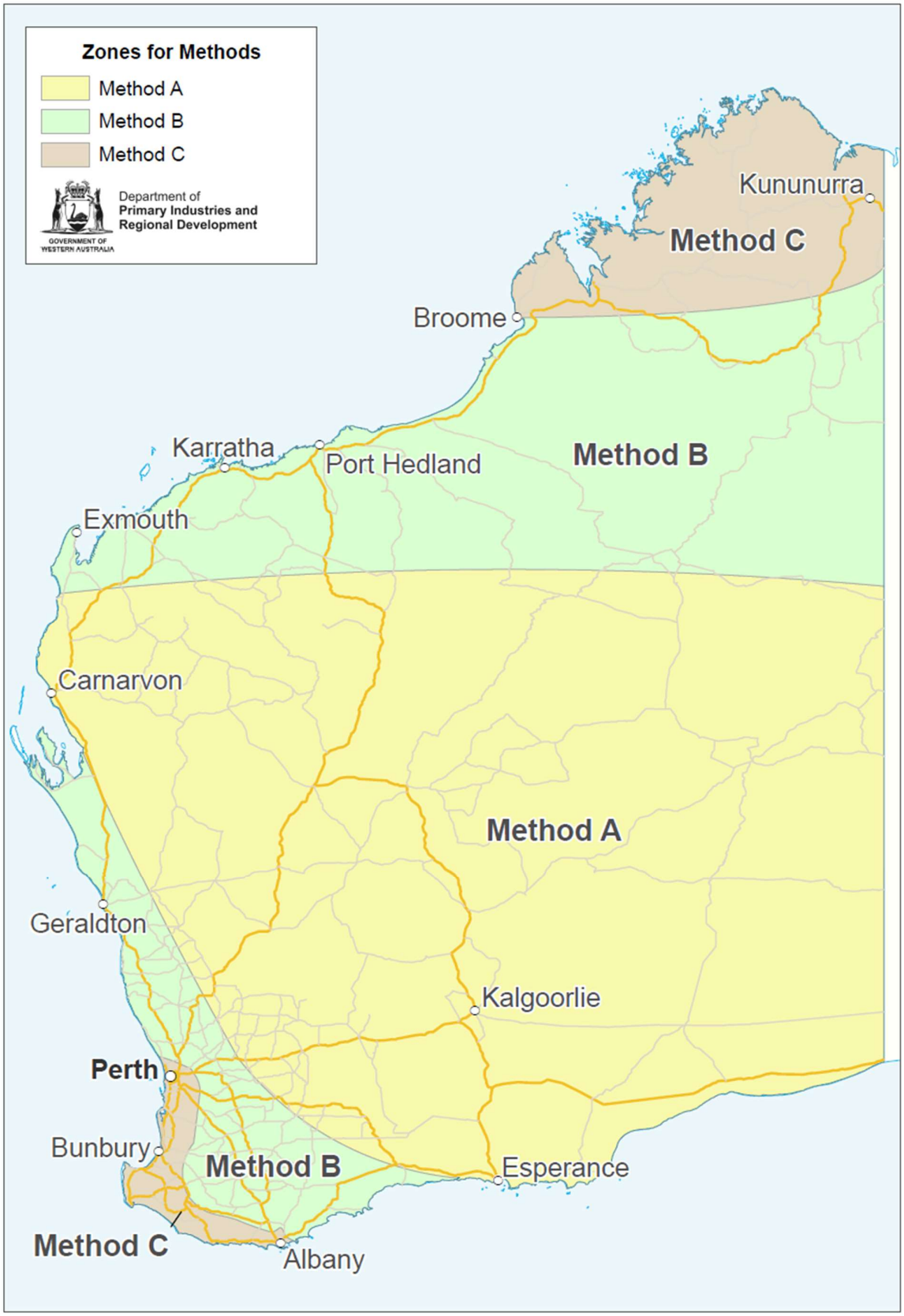

Figure 1 – Weather patterns map.

Associated Documents

Factsheet: Cattle Feedlot Runoff

Factsheet: Cattle Feedlot Evaporation Rates

Factsheet: Pond Freeboard

Contact

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