

Nutrient Best Management Practice RECOMMENDATIONS

The following recommendations, if implemented, will help Local Government Authorities (LGAs) achieve a high level of nutrient Best Management Practice (BMP).

NUTRIENT MONITORING

1. LGAs should regularly conduct soil tests and leaf tissue analysis before applying fertiliser to determine if nutrients are required, and if required, the application rate and type of nutrients needed. This testing will result in unnecessary fertiliser applications being avoided.
2. LGAs should use ASPAC laboratories for their analyses so that accurate information is received.
3. LGAs should measure the available phosphorus in the soil using a method suited to Perth soils. This will allow levels of phosphorus in the soil to be determined accurately and prevent unnecessary applications. The Colwell method is the standard method for Western Australian conditions.
4. LGAs should measure the Phosphorus Retention Index (PRI) of soil to determine the capacity of the soil to hold on to phosphorus, thus preventing unnecessary applications.
5. LGAs should determine the rates of phosphorus by soil testing and PRI results. Those using the Colwell method can use the following table to determine if applications of phosphorus are necessary. As a minimum, these tests should be conducted every second year.
6. The leaf tissue phosphorus content should be maintained between 0.2%- 0.4% (Ruscoe, Johnston & McKenzie, 2004).
7. The leaf tissue nitrogen content should be maintained between 1.5%- 2% for passive turf and 2%- 3% for sports fields (Ruscoe, Johnston & McKenzie, 2004).
8. LGAs should conduct soil testing and leaf tissue analysis of sports fields, irrigated parks, golf courses under their control, dry grass areas and foreshore reserves before applying fertiliser. This will result in unnecessary fertiliser applications being avoided.
9. LGAs should regularly conduct moisture testing of the abovementioned areas to avoid overwatering and the potential leaching of nutrients from these areas.
10. LGAs should promote testing of all privately owned golf courses, because they can be a significant source of nutrients to waterbodies.

TURF TYPES

11. LGAs should use kikuyu as the first choice for turfed areas as it has low fertiliser requirements, requires a medium water usage and is drought and wear tolerant.
12. LGAs with couch and buffalo in their area should not fertilise this turf in the winter months as it could be in its dormant phase.

PRI (Allen & Jeffery method)	Soil Test P (Colwell test)	Recommendations
0 or negative		Do not apply P
0.1- 0.5	< 5 ppm > 5 ppm	Apply up to 5 kg P/ha Do not apply P
0.5- 2	< 7 ppm > 7 ppm	Apply up to 5 kg P/ha Do not apply P
3- 5	< 10 ppm > 10 ppm	Apply up to 10 kg P/ha Do not apply P
> 5	< 10 ppm	Apply up to 20 kg P/ha



Source: Ruscoe, Johnston & McKenzie 2004, Turf Sustain – A Guide to turf management in Western Australia. Sports Turf Technology, Como, Western Australia.

FERTILISER APPLICATIONS

13. LGAs should use a range of opinions to determine application rates and types of fertiliser used, rather than single sources, to ensure appropriate fertiliser regimes are being implemented.
14. LGAs should use a turf consultant's expertise to determine fertiliser regimes for turfed areas as they are specifically trained in turf management, usually with many years of on ground experience.
15. LGAs should fertilise garden areas according to the species planted, with native gardens generally requiring no, or low levels of, additional nutrients. Fertiliser should not be applied in summer and only in winter when trees are first planted.
16. LGA Parks and Gardens Officers should attend the Fertilise Wise Fertiliser Training course that is hosted by the Phosphorus Awareness Project to learn fertiliser BMPs specific to the Perth Metropolitan Area.

FORESHORE AREAS

17. A buffer zone should be established between fertilised areas and waterbodies. Separation distances (buffers) vary according to their function and factors relating to site conditions (Swan River Trust, 2014), but if possible a width of at least 50 metres should be established between fertilised areas and natural waterbodies (DWER, 2022).
18. If LGAs have foreshore reserves and parks they should not apply fertiliser containing nitrogen or phosphorus within the buffer zone. Areas beyond the buffer zone should be tested before applying fertiliser to avoid unnecessary nutrient applications which could leach into the waterbody via groundwater or runoff.
19. In areas outside the buffer zone, if fertiliser is required according to soil testing and leaf tissue analysis, it should be phosphorus free and a controlled release, low water soluble fertiliser if in solid form or applied to foliage to reduce leaching.
20. Fertiliser should not be applied in the winter months to foreshore areas outside the buffer zone as heavy rainfall can wash nutrients into the waterbody.
21. Irrigation of foreshore areas should be carefully monitored so that overwatering does not wash nutrients into the waterbody.
22. LGAs should refer to 'Fertiliser Application on Pasture or Turf Near Sensitive Water Resources (2010)' available from the Department of Water and Environmental Regulation for more information.

OTHER TURFED AREAS

23. LGAs should use specific fertilisers for each site that are determined by soil testing and leaf tissue analyses rather than using the same fertiliser for all sites to ensure that the nutrients are utilised by the turf and not leached into groundwater.

24. LGAs should only apply phosphorus and nitrogen when testing indicates it is required to avoid leaching of nutrients that are not required by the turf.
25. LGAs should determine the rate of each nutrient of the fertiliser they intend to apply before application to ensure that over application of phosphorus and nitrogen does not occur. The formula to determine the rate of nutrient is to multiply the amount of fertiliser to be applied per hectare by the percentage of that nutrient (either N% or P%) in the fertiliser, divided by 100.
26. The maximum nitrogen rate for a single application is 40 kg nitrogen/hectare (Ruscoe, Johnston & McKenzie, 2004) though 30 kg nitrogen/hectare is usually sufficient.
27. The maximum water-soluble phosphorus single application rate in a low PRI soil is 5 kgs/ha (J. Forrest, pers. comm, 2021). Where testing of turfed areas occurs using the Colwell method and PRI it should be applied according to Table 1.
28. The recommended annual application rate of nitrogen is 100-200 kg/ha/yr for high use active turf, 50 – 100 kg/ha/yr for low use active and premium passive turf, 0-50 kg/ha/yr for minor passive turf and 0 kg/ha/yr for grass buffers (Swan River Trust, 2014). These values should not be exceeded.
29. Keep a logbook to record details of fertiliser and nutrient applications over the year for each application area including details such as weather conditions and monitoring information.
30. If fertiliser is required, apply in spring or early autumn (September, October, November, March and April) when grass grows rapidly. Apply the fertiliser in small amounts and often over these months instead of a single application. This will ensure all nutrients can be utilised by the turf.
31. Do not fertilise in summer or winter. Summer fertilising encourages overuse of water and turf may grow excessively while fertiliser applied during winter may be washed into stormwater drains or leached into groundwater.
32. Do not apply fertiliser too close to hard surfaces such as roads. Fertiliser on hard surfaces may be washed into stormwater drains and end up in waterbodies.
33. Avoid applying fertiliser before heavy rainfall and do not over water turf as both actions could result in leaching of nutrients to groundwater and waterbodies.
34. LGAs should refer to the following publications (see Reference section of the Annual Nutrient Report for full publication details) to obtain more information on fertiliser and irrigation best management practices:
 - *Turf Sustain - A Guide to Turf Management in Western Australia*
 - *Western Australian Environmental Guidelines for the Establishment and Maintenance of Turf Grass Areas*
 - *Stormwater Management Manual for Western Australia.*



NUTRIENT MANAGEMENT STRUCTURAL AND NON-STRUCTURAL MEASURES

35. LGAs should use a combination of structural and non-structural Best Management Practices (BMPs) in their stormwater management programs to reduce the nutrient load to rivers and wetlands from sources such as grass clippings, deciduous leaves and sediment. Structural BMPs are defined as engineered and constructed systems that allow in-situ water quality improvement. Non-structural BMPs comprise institutional and pollution prevention strategies to preclude or minimise the transport of pollutants in stormwater runoff and/or reduce the volume of runoff generated (Water Corporation, 2010)
36. Structural systems should be maintained and cleaned regularly.
37. LGAs should not plant deciduous trees on verges or in foreshore areas. Structural and non-structural measures should be put in place to prevent nutrients from the leaves of historical plantings of deciduous trees ending up in waterbodies.
38. Grass clippings, leaves and sediment should never be blown, hosed or swept onto hard surfaces such as roads or driveways as they can be washed or blown into stormwater drains ending up in waterbodies.
39. Grass clippings, deciduous leaves and sediment that end up on hard surfaces such as roads and driveways should be swept up and removed (either manually or with a street sweeper) or in the case of grass clippings and sediment blown off the hard surface back onto the area from which they originated.
40. When mowing, clippings should be thrown away from hard surfaces and waterbodies.
41. When mowing median strips and small areas near hard surfaces or waterbodies a catcher should be used.
42. Where testing determines that nutrients are lacking, LGAs should leave grass clippings on the mowed turf so that nutrients contained in the clippings are returned back to the soil thus reducing fertiliser requirements. Clippings left in piles should be removed to disperse clippings. If testing reveals that nutrients are required in turf-ed foreshore areas, this practice should be adopted in favour of adding fertiliser or to reduce fertiliser requirements. If nutrients are not required, clippings should be removed from these areas.
43. Clippings and leaves that are removed should be composted and then utilised as a soil amendment.
44. LGAs should ensure that mowing equipment is cleaned before going to the next location. Water used to wash down equipment should not be allowed to enter stormwater drains.
45. LGAs should ensure that sandbagging, hydromulching, covers or sediment control fences are used to prevent erosion from soil or imported sand piles.

NUTRIENT AND IRRIGATION MANAGEMENT PLAN (NIMP)

46. LGAs should implement a NIMP for streetscapes, as combined they are large areas within an LGA where nutrients and water usage should be controlled more appropriately. Environmental and Turf Consultants can assist with preparing NIMPs.

Information about NIMPs is also available from the Department of Water and Environmental Regulation's website (www.water.wa.gov.au) where the following documents can be located:

- 'Water Quality Protection Note 33 (June 2010) Nutrient and Irrigation Management Plans'
- 'Water Quality Information Sheet 04 (August 2010) Nutrient and Irrigation Management Plan Checklist'

LOCAL PLANTS POLICY

47. LGAs should have a local native plant policy and plant local native species in their management areas as they require low levels of water and fertiliser and once established may require no further applications. Information on local native plant policies and using local native species is available from the:
 - Eastern Metropolitan Regional Council's Landscaping with Local Plants Policy and Guidelines section of their 'Local Government Natural Resources Management Policy Manual'
 - Phosphorus Awareness Projects 'Grow Local Plants' leaflets.



WATER QUALITY MONITORING

48. LGAs should regularly monitor wetlands, stormwater drains and compensation basins for nutrient levels to determine if pollution is occurring and potentially pinpoint sources.
49. LGAs should report water quality monitoring results to the local community to reflect their commitment to the environment and provide important information to community catchment and environment groups so they can determine where rehabilitation of waterbodies and education of general community members needs to occur.

DEVELOPMENT CONTROL

50. LGAs should have Town Planning Scheme provisions or Planning Policies to enforce environmental conditions on developments to prevent environmental harm and allow the LGA to prosecute if developers are not adhering to best management practices.
51. LGAs should impose NIMP conditions on developments, monitor these for compliance and prosecute for lack of compliance as new developments are potentially major sources of nutrients to groundwater and waterbodies.
52. LGAs should have mechanisms in place to regulate sediment management. Further information about sediment management for LGAs can be found on SERCULs website (www.sercul.org.au/sediment-resources/).

WASTEWATER SYSTEMS

53. LGAs should encourage householders to connect to the main sewerage line as leaking septic tanks can contribute nutrients to groundwater and waterbodies.

NUTRIENT EDUCATION

54. LGAs should provide compostable dog poo bags and bins in parks and foreshore reserves as dog poo is a major contributor of nutrients to groundwater and waterbodies.
55. LGAs should erect signage in foreshore reserves and parks to educate the public about the effects of bread on waterbodies (eg. increased phosphorus levels and algal blooms) and waterbirds (eg. malnutrition and aggressive behaviour). The Phosphorus Awareness Project has a brochure which outlines this issue that could be used as the basis for signage (see image on previous page).

56. LGAs should distribute information to their ratepayers about the effects of bread on waterbodies and waterbirds through local media, environmental workshops, brochures, LGA newsletters and website, and via Rangers talking to people about the impacts of feeding where and when it occurs.
57. LGAs should introduce Local Laws (and enforce those laws) that prohibit the feeding of birds.
58. LGAs should provide advice to ratepayers on fertiliser practices as ratepayers generally have limited knowledge of fertiliser management and would, when combined, have the largest turfed area in the LGA. 'Fertilise Wise' leaflets are available for free from the Phosphorus Awareness Project to distribute to ratepayers. LGAs could also link the Fertilise Wise section of the SERCUL website (www.sercul.org.au/fertilisewise) to their own website.
59. LGAs should host a 'WaterWise' or 'Our Gardens with Josh Byrne', or similar, workshop to educate their ratepayers on fertiliser and water management and other garden issues. Workshops can be organised by contacting The Forever Project or Josh Byrne & Associates (see Reference section of the Annual Nutrient Report for contact details).
60. LGAs should educate ratepayers on sediment, as it represents a major nutrient source in many areas. They can do so using the infosheets from the Sediment Taskforce available at www.sercul.org.au/sediment-resources/.
61. LGAs should educate ratepayers on all nutrient sources and the manner in which they move through the landscape to reach and impact waterways. LGAs could utilise the Phosphorus Awareness Project education program, including the resources available on its website www.sercul.org.au, or direct school and community groups to it.