



Chapter 3



Urban Stormwater Pollutant Characteristics

Australian Runoff Quality
A guide to Water Sensitive Urban Design



ENGINEERS
AUSTRALIA

Processes

- Traditionally described and modelled in terms of buildup and washoff
- Buildup is usually large compared with washoff in a single event
- Washoff is the critical process
- Rainfall pattern (intensity, energy) is the most important storm factor
- Construction activity with disturbed soil is the most important catchment factor

Stormwater Quality Literature Review



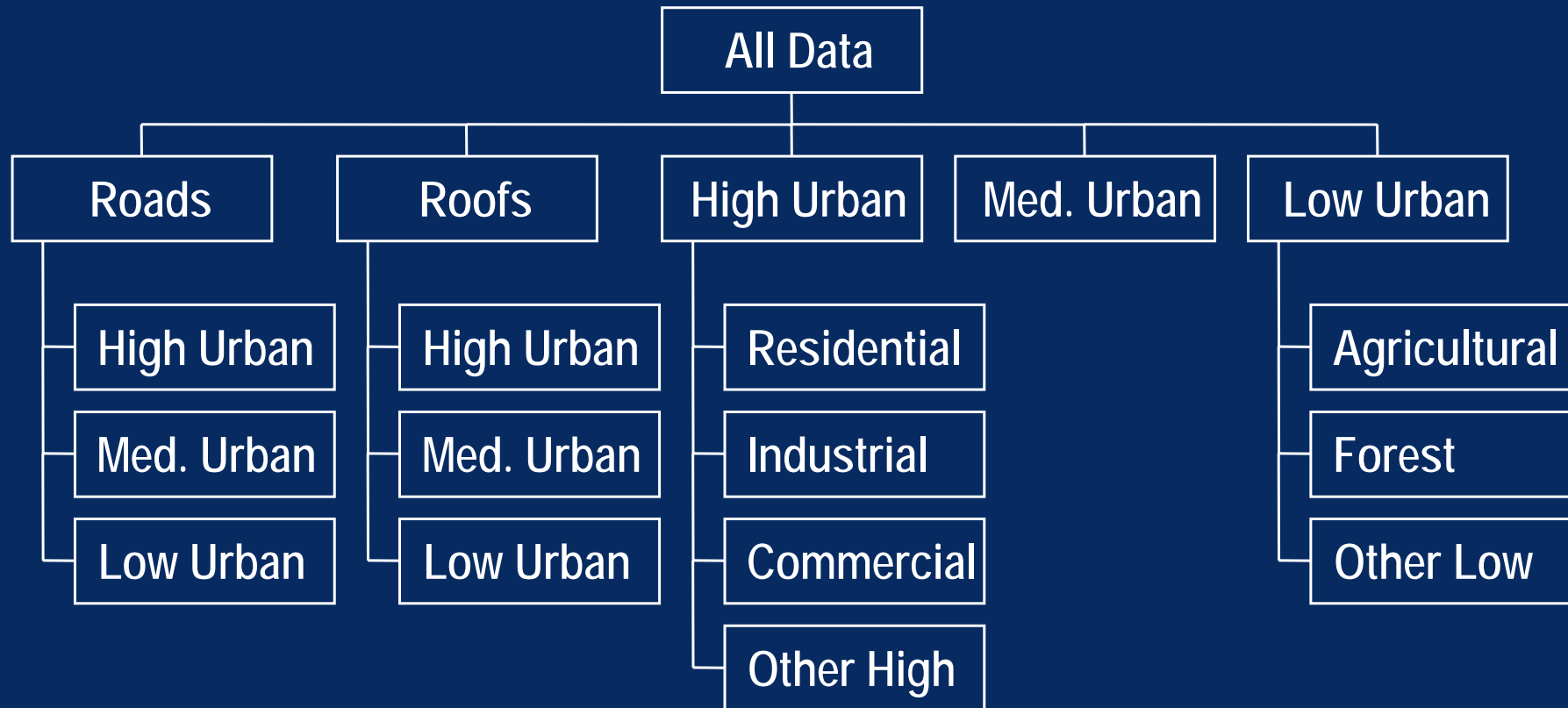
- An analysis of published stormwater quality data
 - 508 data records (site means)
 - 21 quality parameters (3 today)
- Concentration vs land use and catchment characteristics

Types of Land Use



- Three types of land use:
 - Zonings (residential, industrial, commercial, etc.)
 - Surface use (roads, roofs, etc.)
 - Numeric measures (vehicles/day, population/hectare, etc.)
- For zonings and surface use, used percent of area, grouped by thirds

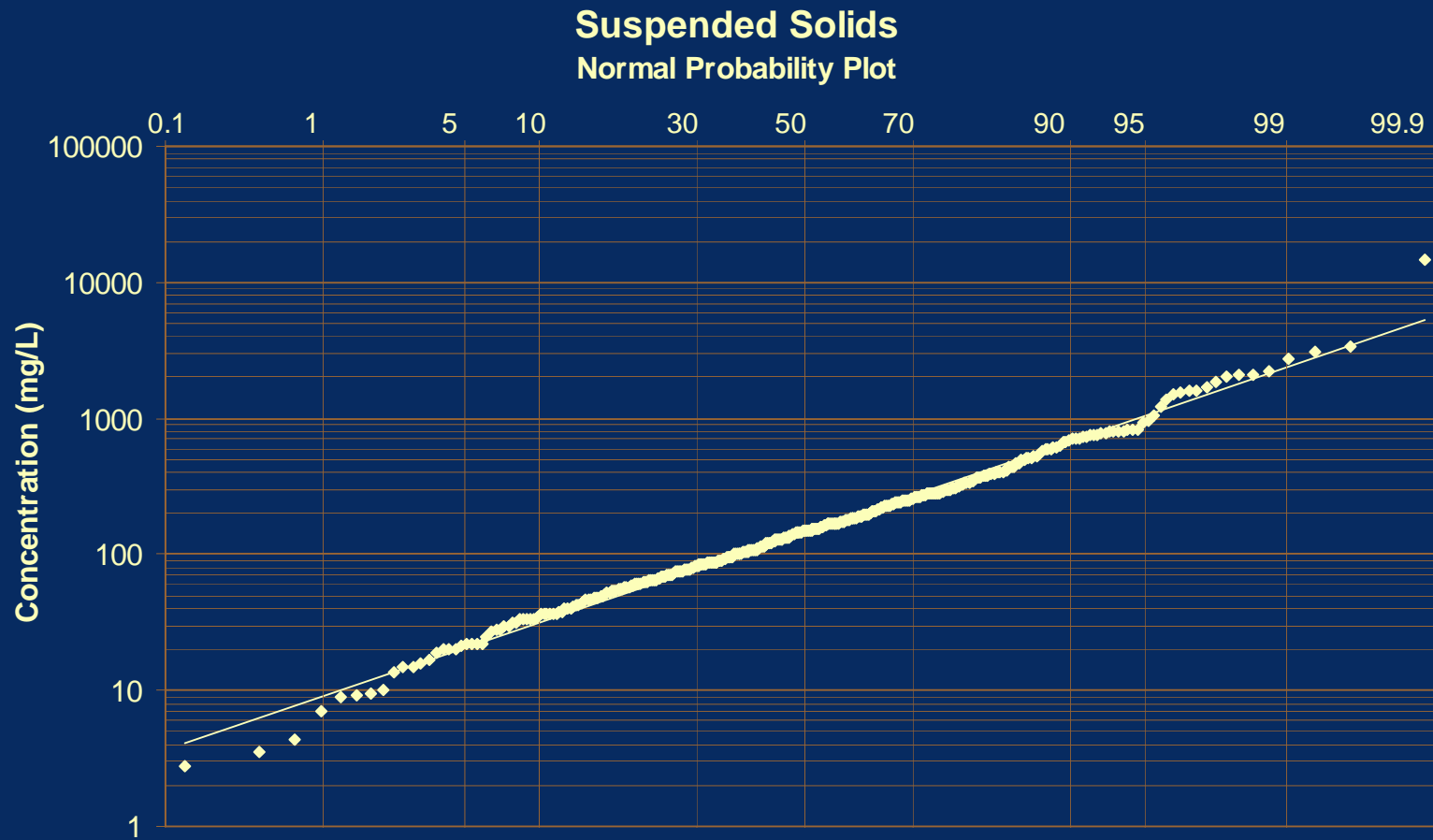
Land Use Categories



Suspended Solids Normal Probability Plot

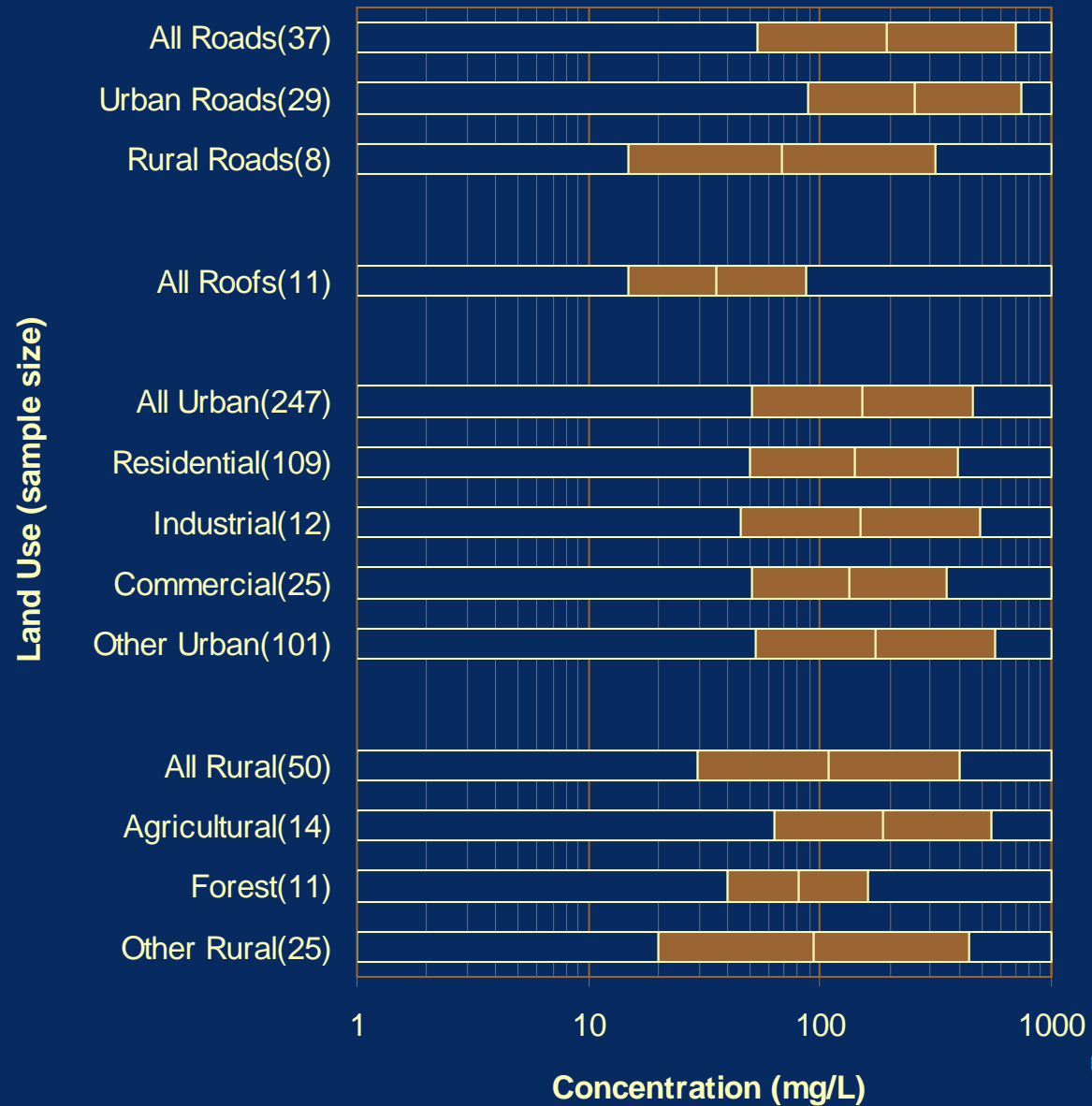


Suspended Solids Log-Normal Probability Plot

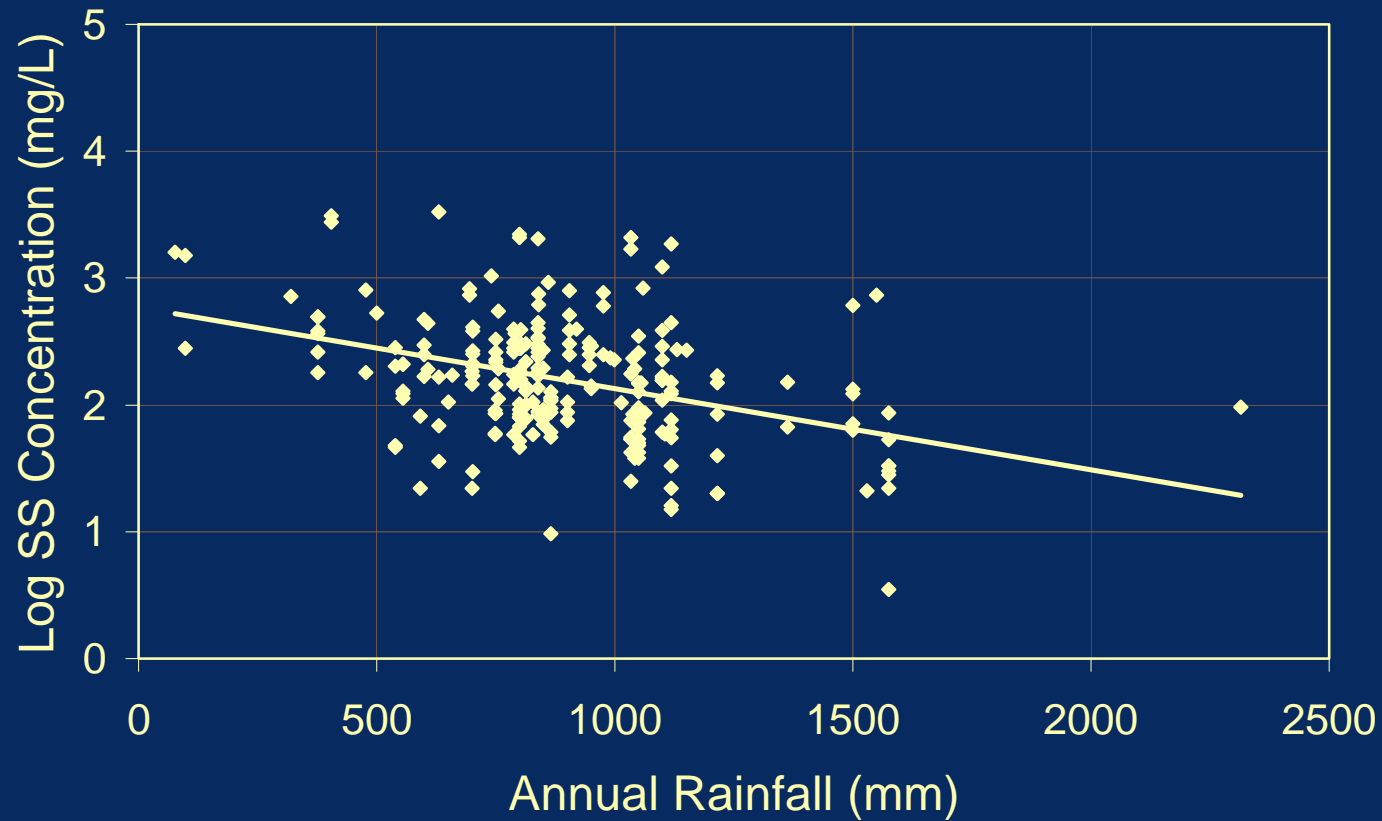


Suspended Solids

Suspended Solids
Mean \pm 1 Standard Deviation

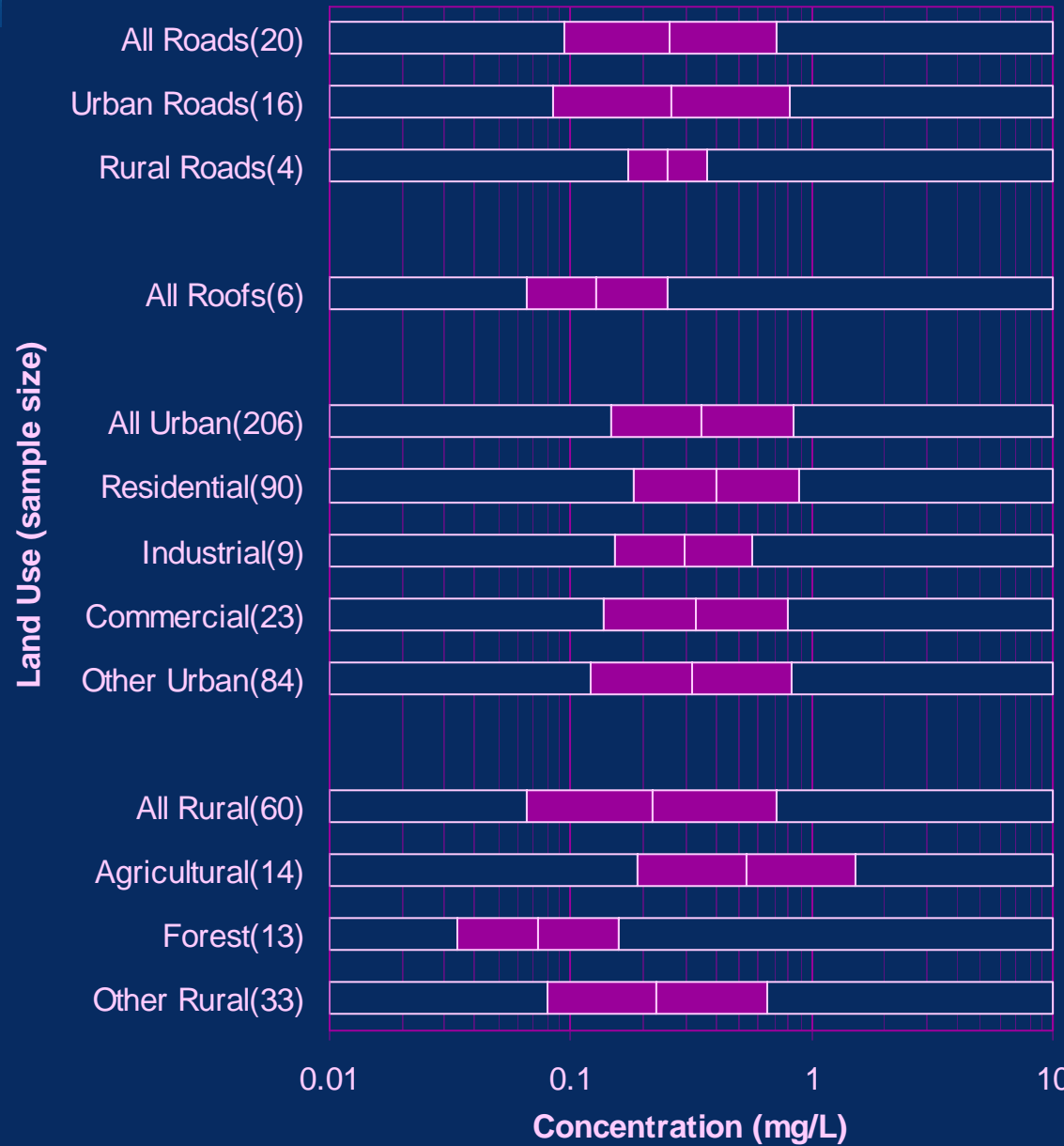


Suspended Solids Urban Land Use

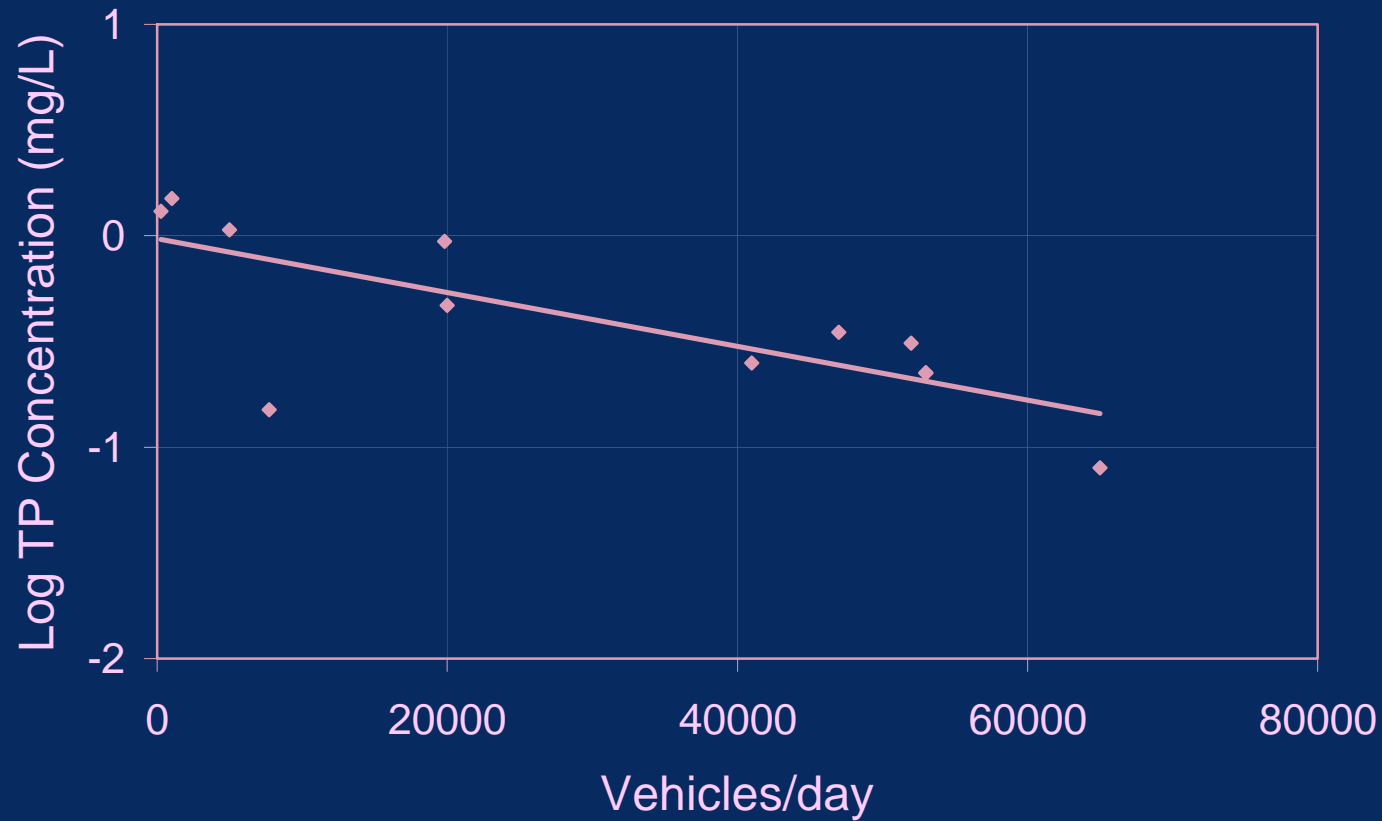


Total Phosphorus

Total Phosphorus
Mean \pm 1 Standard Deviation



Total Phosphorus Roads

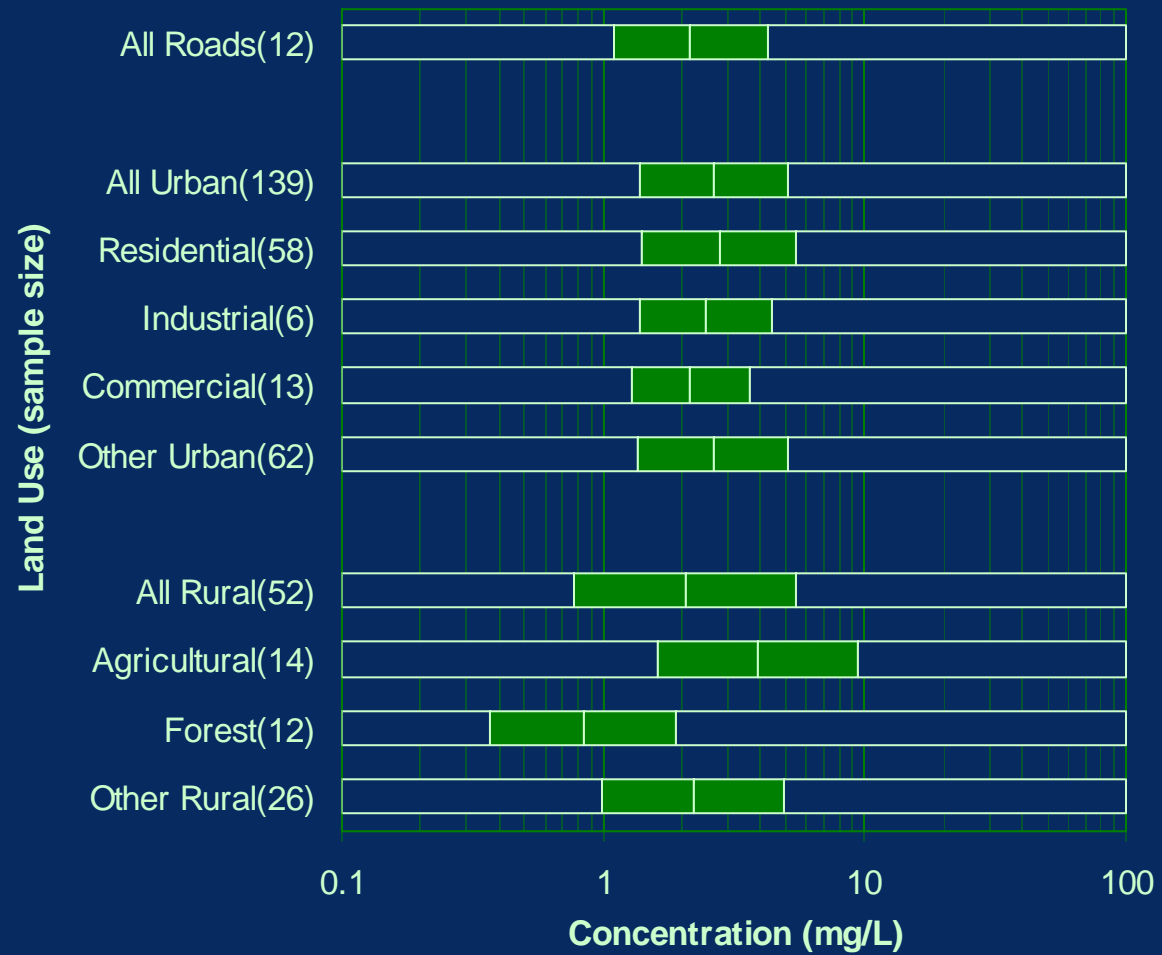


Total Nitrogen

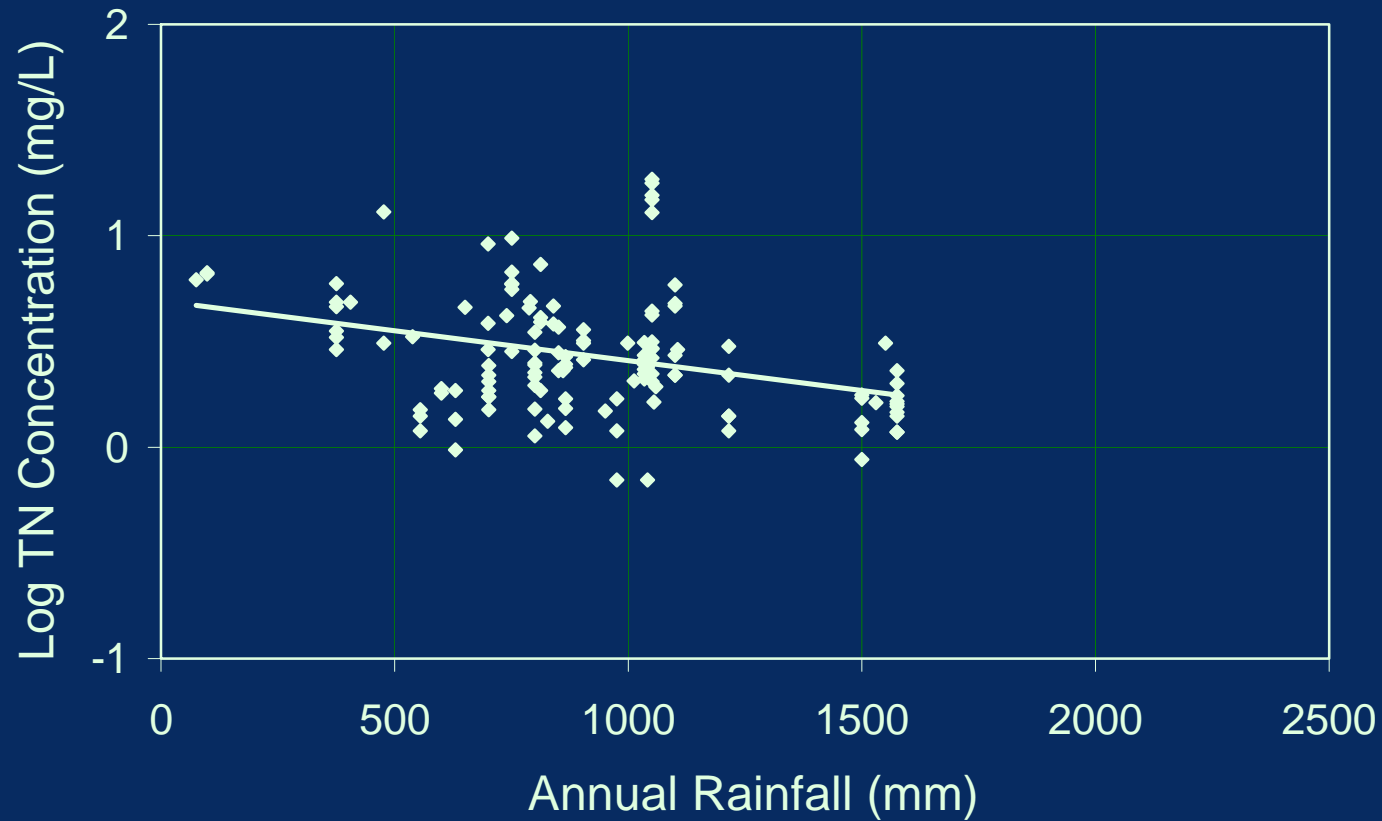


Total Nitrogen

Mean \pm 1 Standard Deviation



Total Nitrogen Urban Land Use



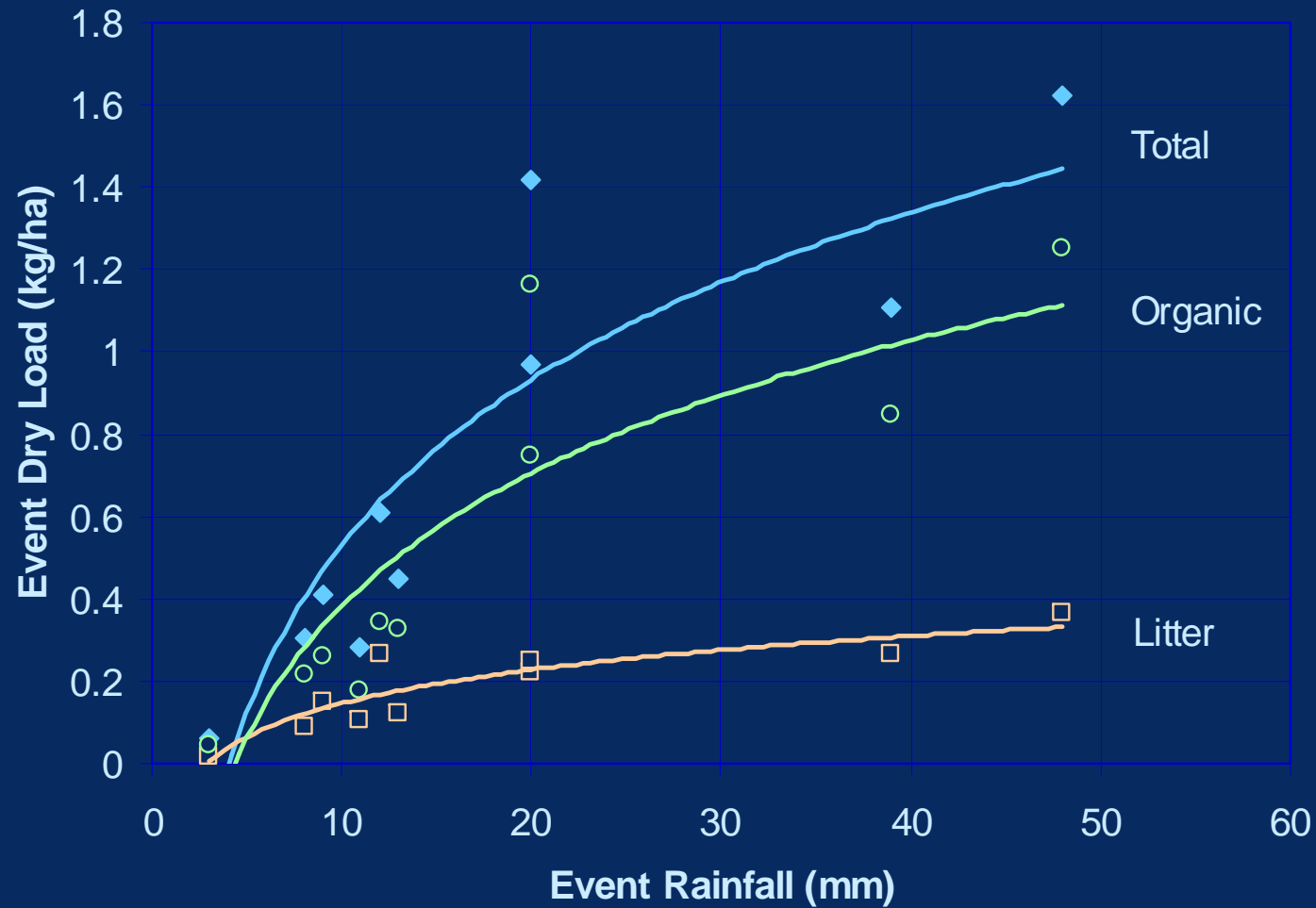
Gross Pollutants

- Larger particles of natural and artificial material
- Distinctive features are larger size and/or lower density
- Very difficult to sample accurately
- Natural organic matter is the larger fraction
- Litter fraction is mostly plastic, then paper, then glass/metal/other
- Wide variation between catchments

Gross Pollutants



Gross Pollutants



Summary

- Concentrations (and loads) from a given land use cover a wide range
- Urban zoning has little effect on runoff quality
- Actual surface use does have an effect
- Local data is very important
 - Transposition from nearby sites may be useful
- Concentrations are log-normally distributed

Transposition

- To transpose runoff and EMC information from a gauged catchment to an ungauged catchment
 - Find mean annual rainfall of both catchments
 - Subdivide both catchments into their component surface types
 - Estimate mean annual runoff fraction for each surface type in the gauged catchment (iteratively)
 - Transpose runoff for each surface type, scaling by area and mean annual rainfall
 - Estimate EMC for each surface type in the gauged catchment to give observed load (iteratively)
 - Transpose EMCs for each surface type, and calculate loads

