

Pasture dynamics in western New South Wales saltbush rangelands: Some results from 14 years of monitoring

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Long-term monitoring information is crucial for assessing native pasture responses to management in semi-arid rangelands. The environment is complex, management effects blend with seasonal influences and change is either manifested as dramatic pulses or slow incremental shifts. However, few agency monitoring programs persist long enough to present valid information to either landholders or policymakers (Watson and Novelty 2004). Fortunately, the NSW-based Rangeland Assessment Program (RAP) has persisted through up to 15 monitoring cycles to present a detailed account of pasture dynamics across the state's western rangelands over the period 1989-2003. Annual photo sequences and transect-based assessments have been completed at up to 340 monitoring sites over this 15-year time span. Landholder cooperation in providing seasonal information, rainfall figures and management details has been an integral component of the program.

Selected trends in saltbush-dominated rangelands

Bladder saltbush-dominated rangelands are among the more productive pastures in western NSW. They include Riverine Plain areas as well as the undulating terrain of the Broken Hill district. These pastures have been monitored 14 times since RAP site establishment in 1990.

4. Saltbush and bluebush density (Fig. 2). Significant changes in bladder saltbush density are evident, although 2003 values are similar to those in 1990. Averaging disguises catastrophic dieback in the mid-1990s on parts of the Riverine Plain. Densities increased in most areas during the late 1990s but have declined with the subsequent drought.

Discussion

Fourteen years of monitoring has demonstrated that saltbush rangelands possess a dynamic ecology. This

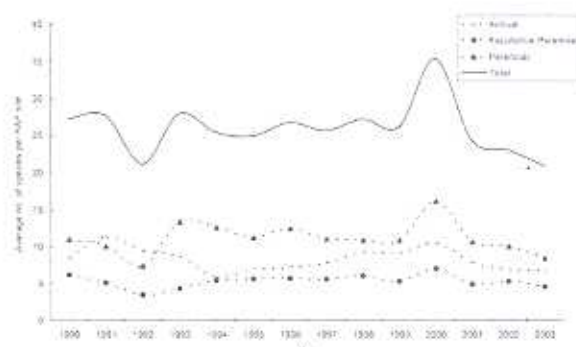


Figure 1. Pasture diversity within the saltbush rangeland type, based on the average number of species recorded at RAP sites.

Trends in RAP data from 50-60 sites on this range type highlight several aspects of the performance of these pastures:

1. Soil surface cover. There was a gradual decline in plant and litter cover over the period and a trend to increasing bare ground. However erosion remained at low levels, peaking with declining cover and rainfall in 1995. Minimal erosion has been recorded during the current drought. Soil cryptogamic cover remained relatively stable over the period.
2. Biomass. High biomass levels existed at the commencement of monitoring in 1990. Pasture biomass failed to respond to good spring and summer rainfalls in 1992-93 and a broader spread of seasonal falls in 1999. In other years, the biomass trend is similar to the annual rainfall pattern.
3. Pasture diversity (Fig. 1). Across all sites and years, 527 pasture species were recorded. The average number of species recorded at each site responded to major seasonal events but otherwise remained relatively constant over the monitoring period. Exotic plants comprised between 15-28% of species present and more perennials than annual species were usually present. The number of perennials was more responsive to seasonal rainfall than the annual component.

is particularly evident through trends in chenopod shrub density. The main implication of this is that perennial component of these pastures is not necessarily stable and requires active management.

References

- Watson I, Novelty P (2004) Making the biodiversity system sustainable: Design issues for large scale monitoring systems. *Australian Ecology* 29, 16-30

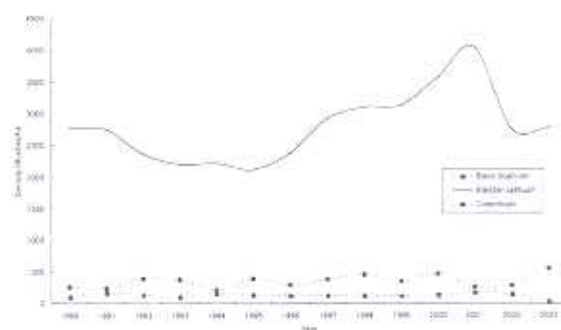


Figure 2. Shrub density of major species within the saltbush rangeland type, based on RAP site data.