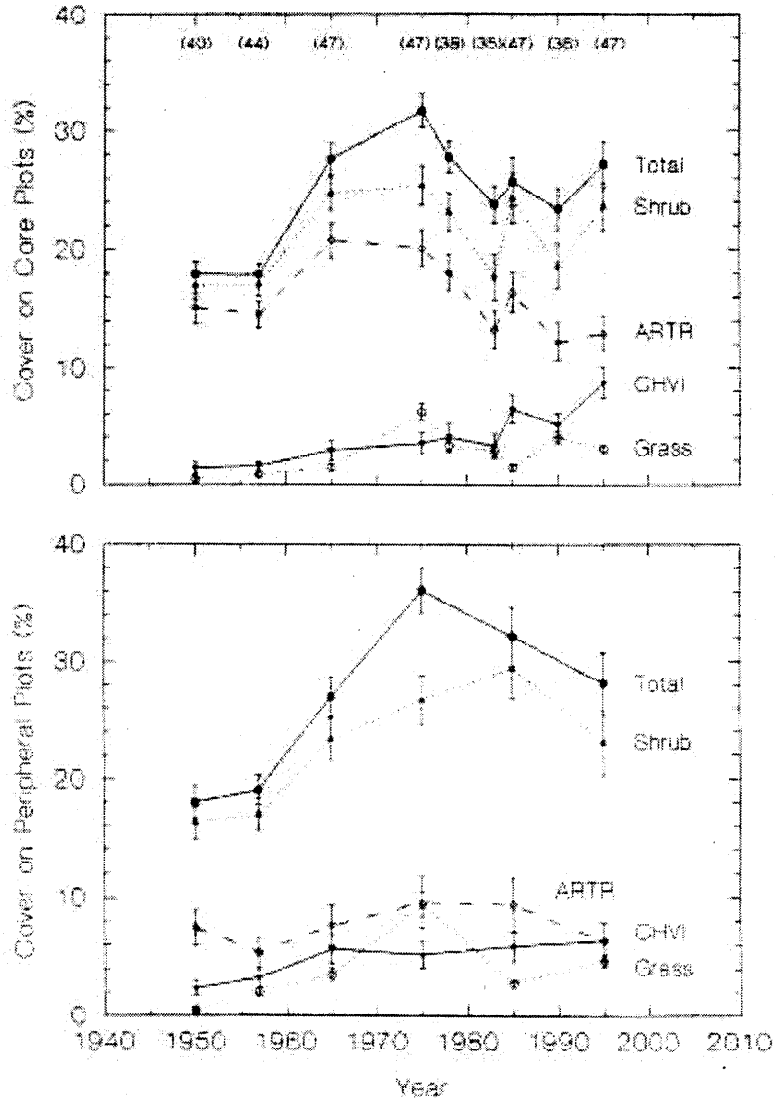
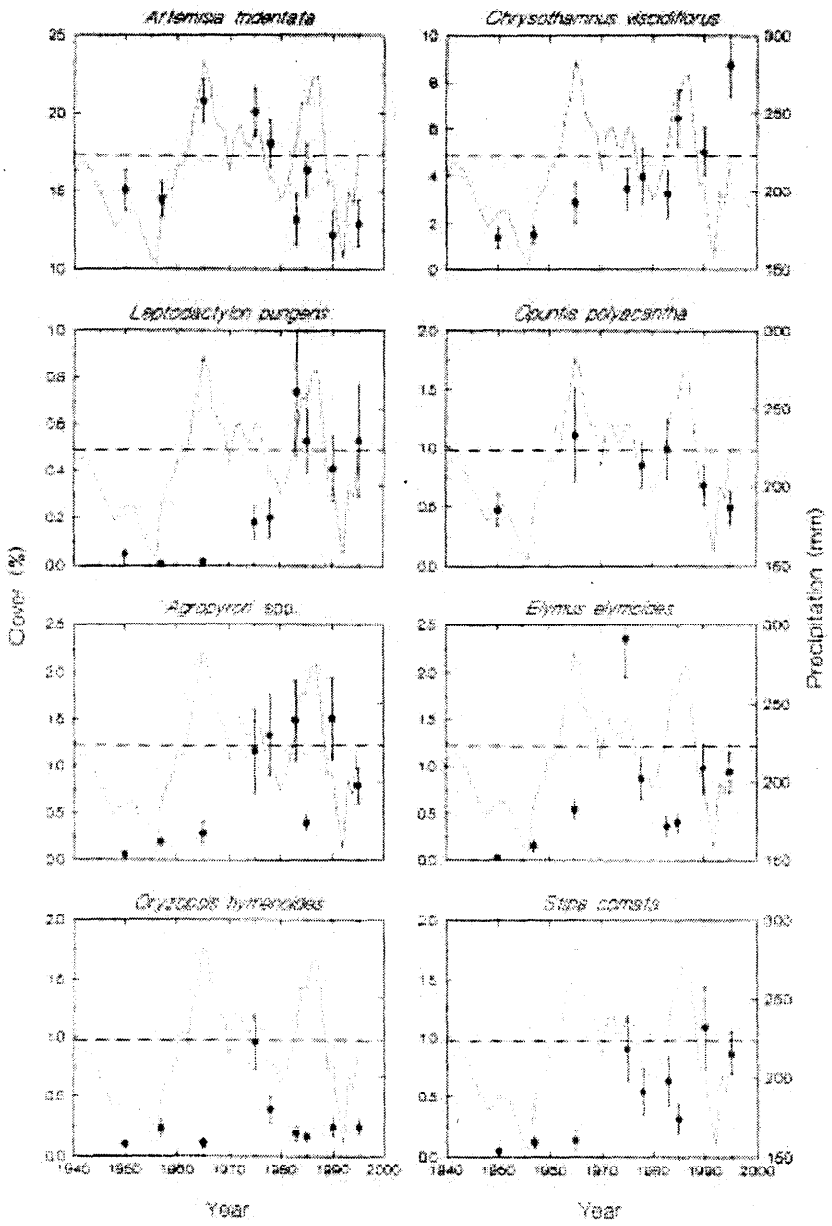


Fig. 4. Trends in total cover, shrub and perennial grass cover, and the cover of the two dominant shrubs, *Artemisia tridentata* (ARTR) and *Chrysothamnus viscidiflorus* (CHVI) from 1950 to 1995 for 47 core and 32 peripheral permanent plots (see Methods) at the Idaho National Engineering and Environmental Laboratory. Numbers in parentheses at top of upper frame show number of plots for which data are available in each census year. Means in lower frame are for 32 plots except for 1950 when n = 31.

Fig. 5. Mean cover of the some common perennial species on the core plots (see Methods) at the Idaho National Engineering and Environmental Laboratory. Error bars represent standard errors. The dotted line represents the 5-year sliding average of annual (September - August) precipitation, the dashed line shows the long-term mean annual precipitation.


Artemisia tridentata
Chrysothamnus viscidiflorus
Leptodactylon pungens
Opuntia polyacantha
Agropyron spp.
Elymus elymoides
Oryzopsis hymenoides
Stipa comata
Cover (%)
Precipitation (mm)
Year
Year

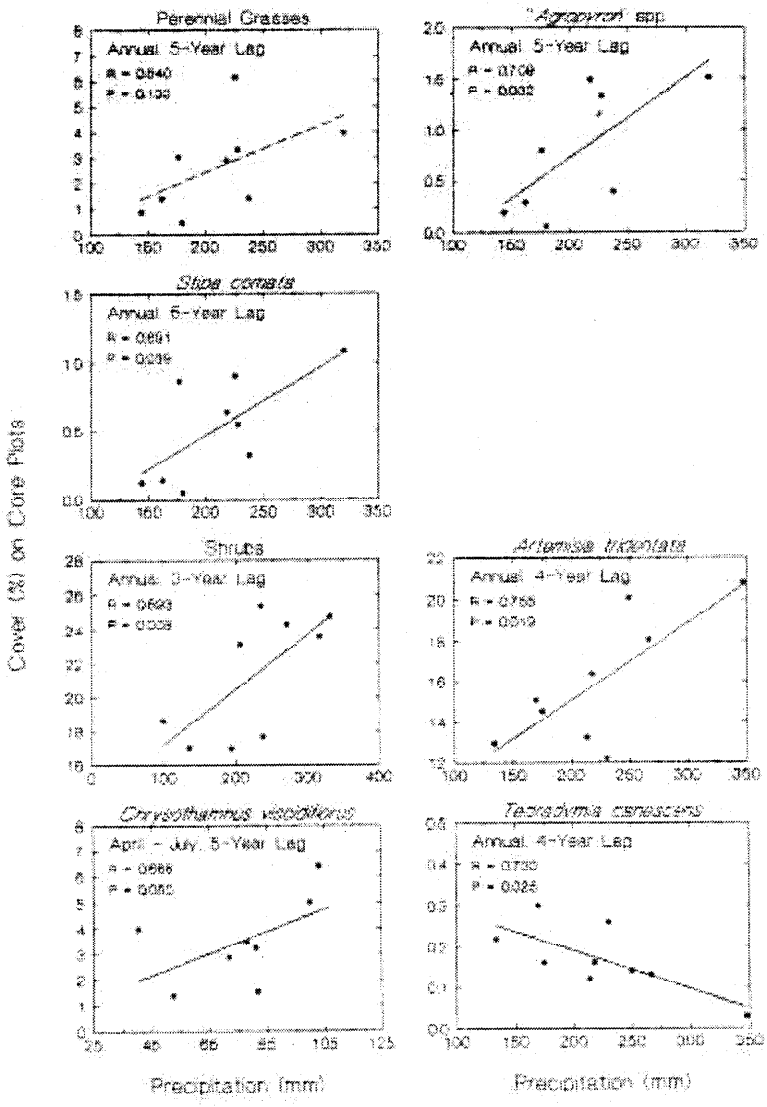


Fig. 6. Relationships between mean cover and precipitation on core plots. For each species or group of species, this is the most significant relationship between mean cover on the core plots and annual or growing season (April - July) precipitation in the current year or any of the preceding five years.

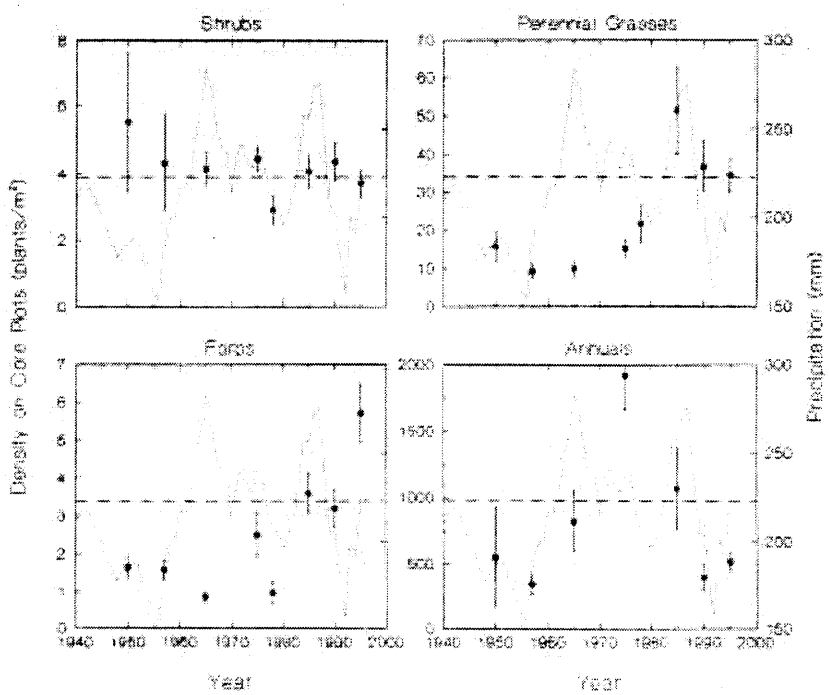


Fig. 7. Mean density of four plant groups on the core plots. Error bars represent standard errors. The dotted line represents the 5-year sliding average of annual (September - August) precipitation; the dashed line shows the long-term mean annual precipitation.

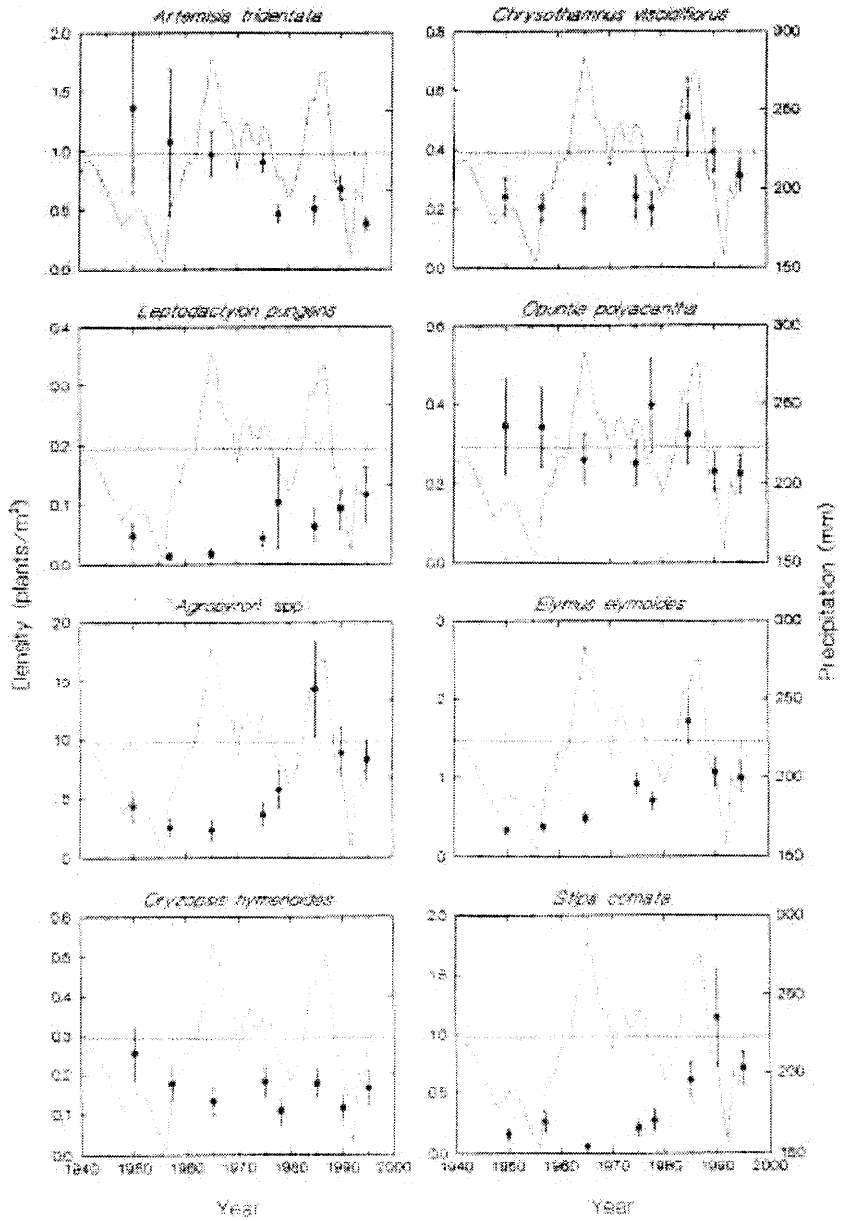


Fig. 8. Mean density of common perennial species on the core plots. Error bars represent standard errors. The dotted line represents the 5-year sliding average of annual (September - August) precipitation, the dashed line shows the long-term mean annual precipitation. See Methods for species included in "*Agropyron*."

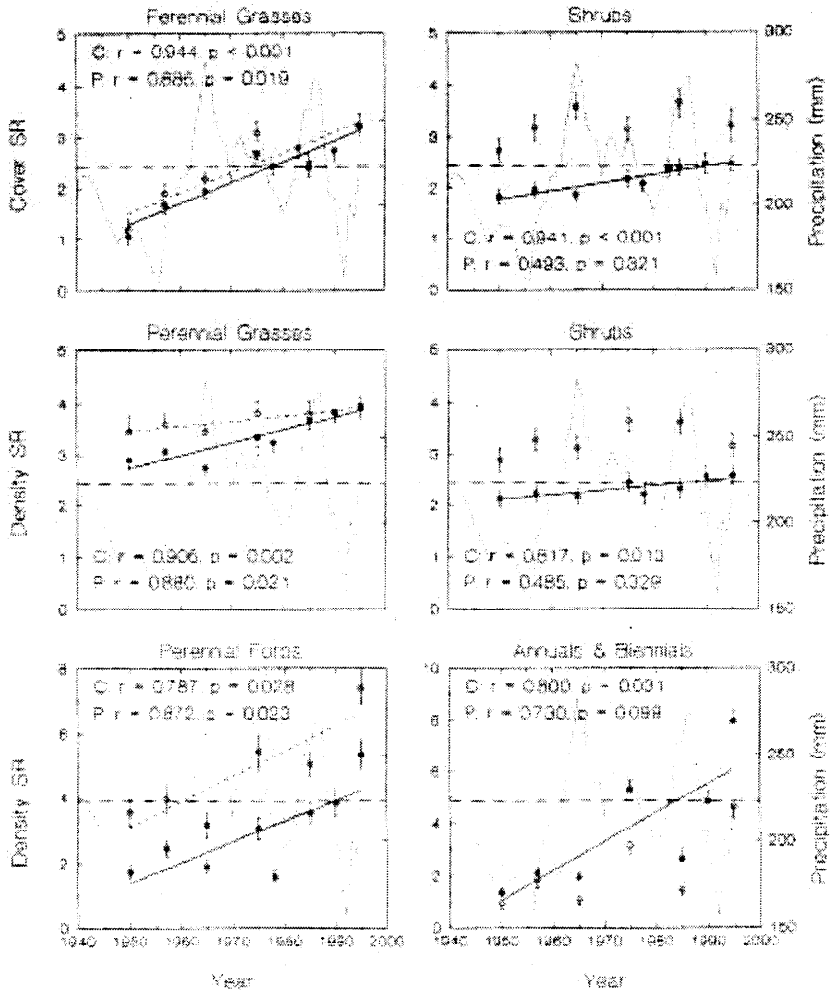


Fig. 9. Species richness of perennial grasses and shrubs from line interception (cover) samples (top two graphs) and of perennial grasses, shrubs, perennial forbs, and annuals + biennials from density samples (bottom four graphs). Closed circles show means for the core (C) plots; open circles show means for the peripheral (P) plots. Error bars represent standard errors. Regression lines are shown for relationships that are significant at $P < 0.05$. The dotted line represents the 5-year sliding average of annual (September - August) precipitation, the dashed line shows the long-term mean annual precipitation.

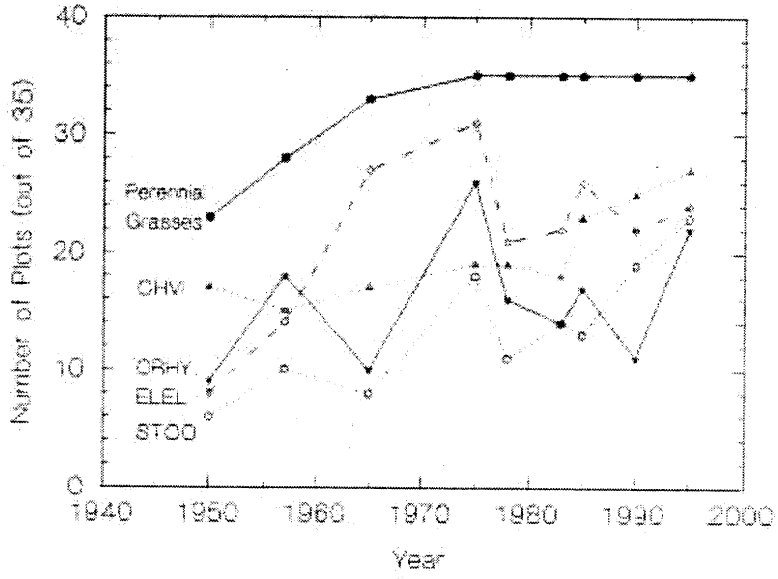


Fig. 10. Number of 35 core plots upon which a perennial grass or various species were recorded in the nine census years (35 plots used in this analysis because data are available for them for all nine census years). CHVI = *Chrysothamnus viscidiflorus*; ORHY = *Oryzopsis hymenoides*; ELEL = *Elymus elymoides* (= *Sitanion hystrix*); STCO = *Stipa comata*.

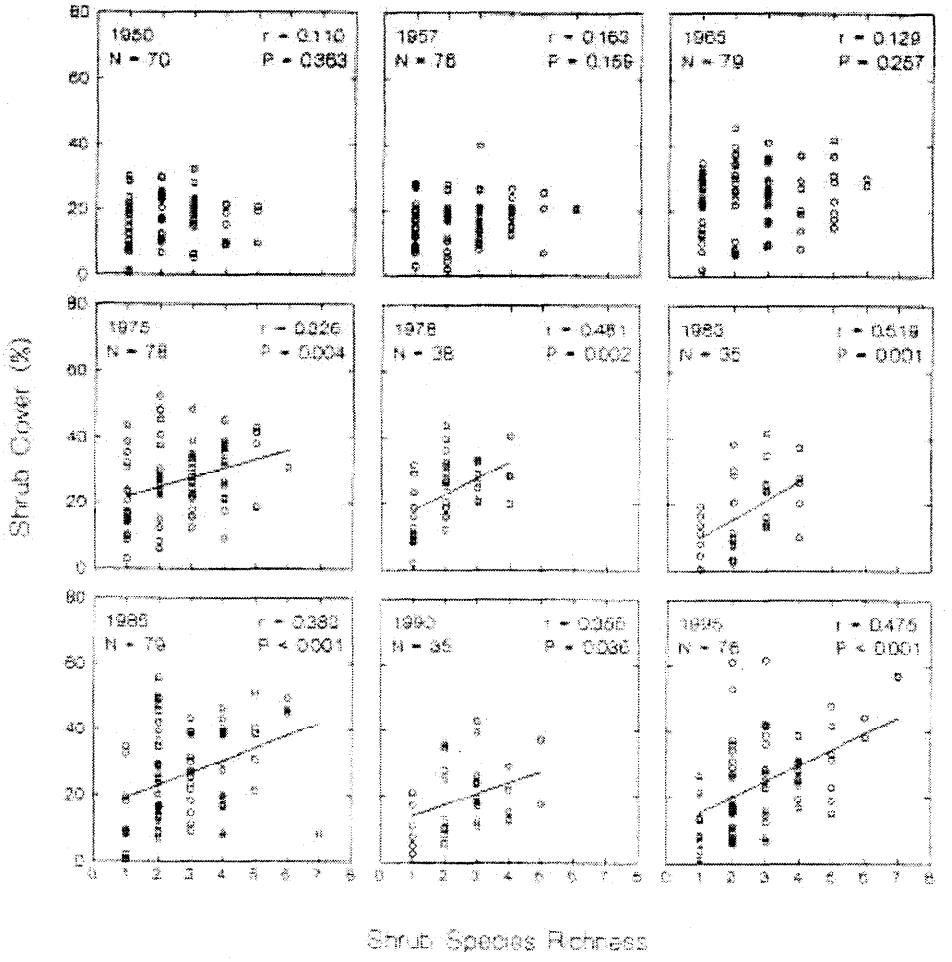


Fig. 11. Relationships between shrub cover and species richness for all core + peripheral plots sampled in each of nine census years. Each point represents one plot. N is the number of plots sampled in each census year.

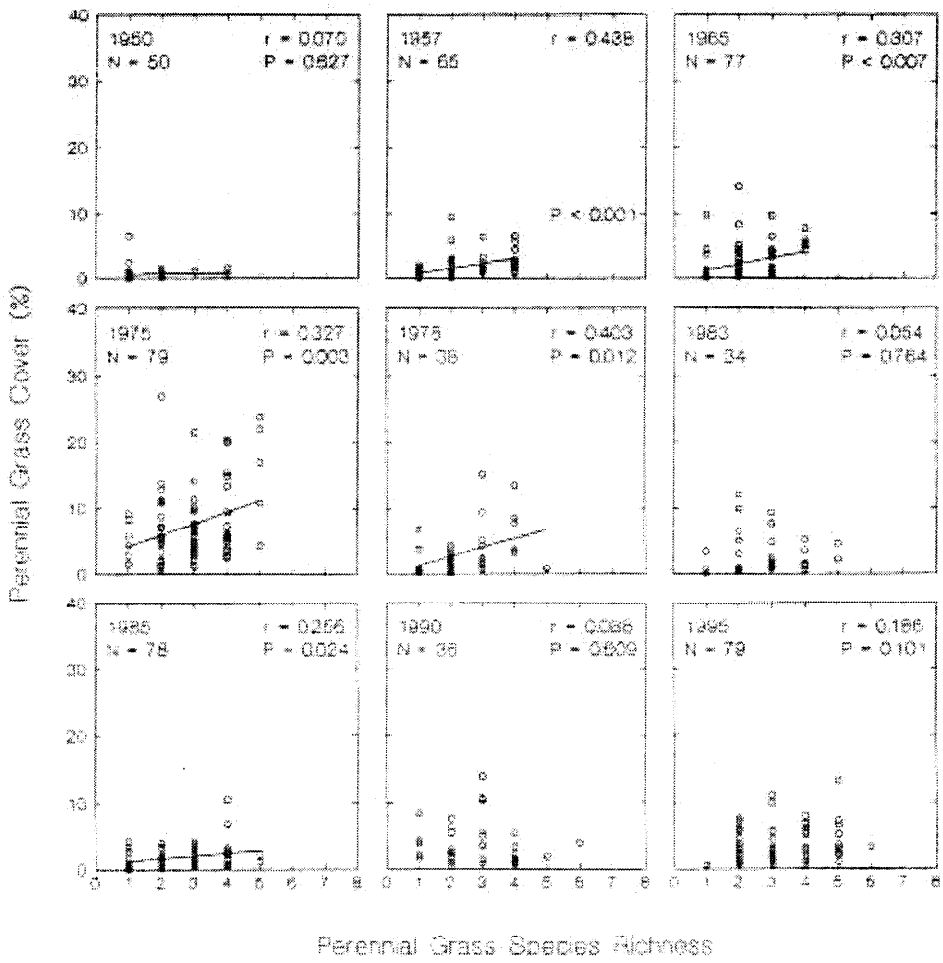


Fig. 12. Relationships between cover and species richness of perennial grasses for all core + peripheral plots sampled in each of nine census years. Each point represents one plot. N is the number of plots sampled in each census year.

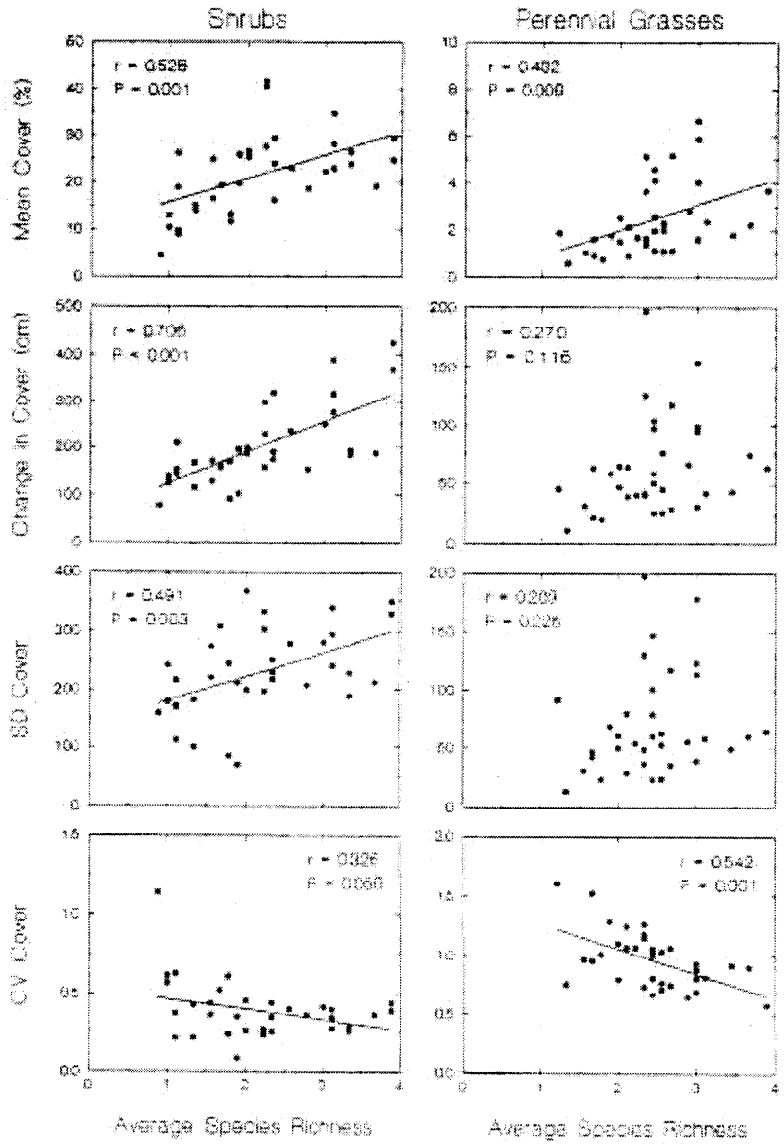


Fig. 13. Relationships between cover and average species richness on 35 core plots that were sampled in all 9 census years. Mean cover is the mean from all 9 census years. Change in cover is the mean of the absolute values of change in cover between subsequent censuses. Standard deviation (SD) and coefficient of variation (CV) of cover were calculated based on all 9 census years.

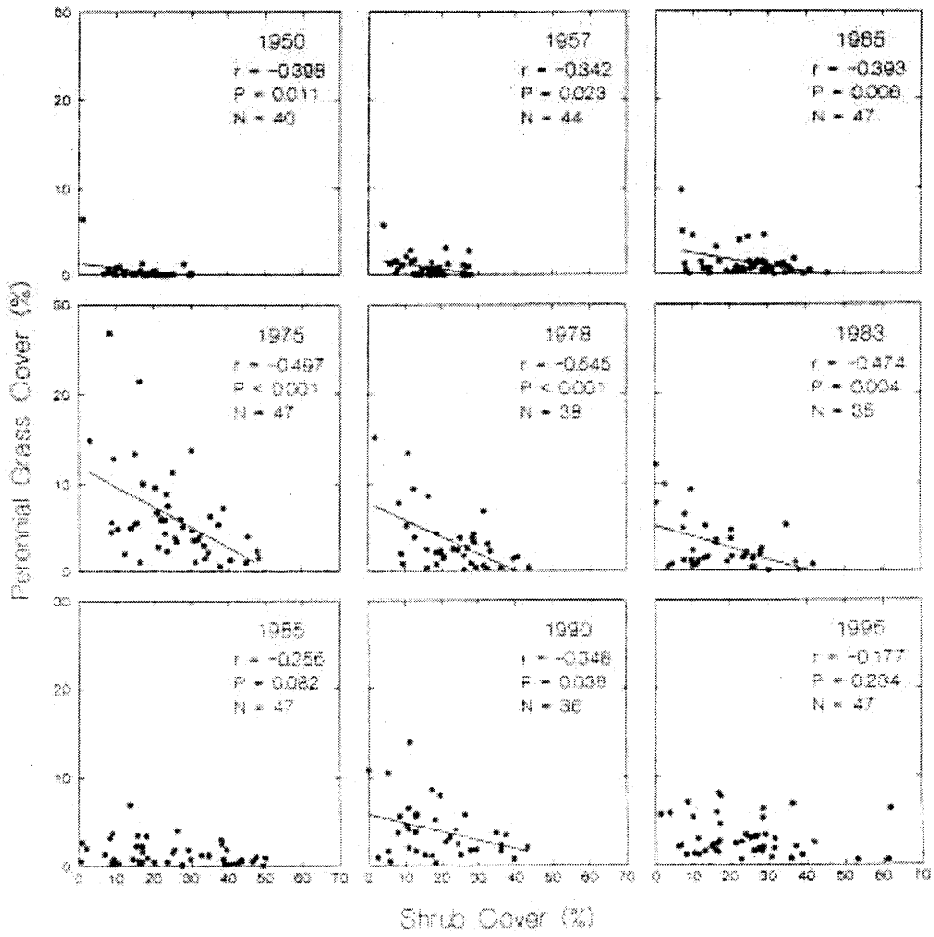


Fig. 14. Mean cover of perennial grasses plotted against mean cover of shrubs on the core plots. Each graph represents one year, and each point represents one plot. Regression lines are shown for those years in which there was a significant correlation between perennial grass and shrub cover. N is the number of core plots sampled in that year.

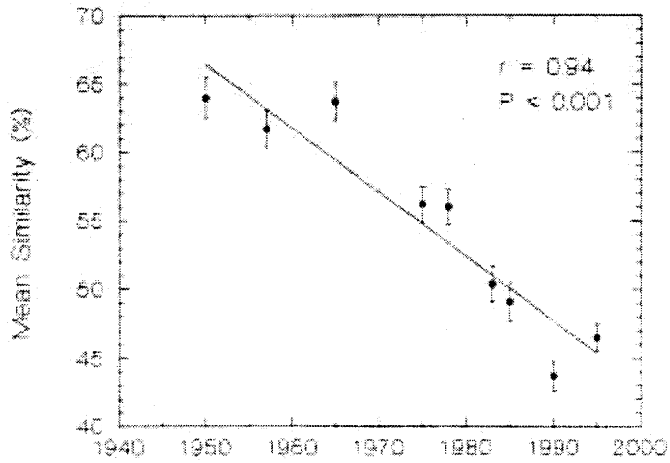
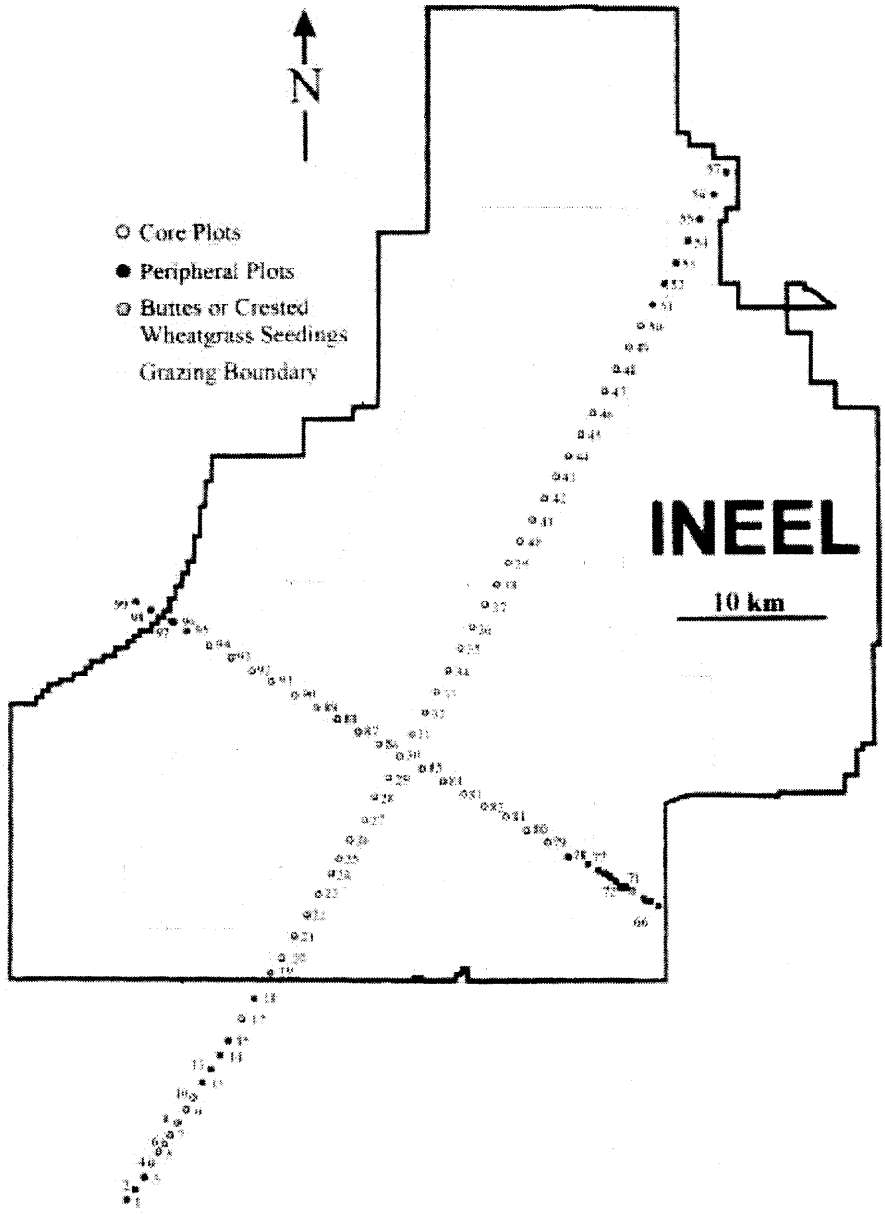


Fig. 15 Mean percent similarity, based on perennial grass and shrub cover, for the core plots for each of the 9 census years

Appendix

Appendix Fig. 1 shows the location of the permanent vegetation plots at the Idaho National Engineering and Environmental Laboratory (INEEL) with respect to the livestock grazing boundary (dotted line). Plots included in the core (ungrazed) group in this report are shown in yellow; peripheral plots are shown in red (see Methods for plot definitions). Our field notes indicated that plots 51 and 52 have been grazed, so they were included in the peripheral plots. Plots 93 and 94 both lie east of the grazing boundary signs and have no evidence of grazing, so they were included in the core group. Plots 20 through 23 lie north of the railroad in an area that is not readily accessible to livestock. We have never seen evidence of livestock grazing on those plots, and they were included in the core group. Plots 17 and 19 (shown in blue) are within crested wheatgrass seedings and were not included in the present analyses. Plots 1- 15 lie south of the INEEL boundary. Plots 4 – 10 are on steep, rocky portions of Big Southern Butte and were therefore not included in the peripheral group. Plot 70 (shown in blue), on East Butte, was excluded for the same reason. The remaining plots constituted the peripheral group, including plots 98 and 99, which lie just west of Highway 33.


N
Core Plots
Peripheral Plots
Buttes or Crested Wheatgrass Seedings
Grazing Boundary
INEEL
10 km