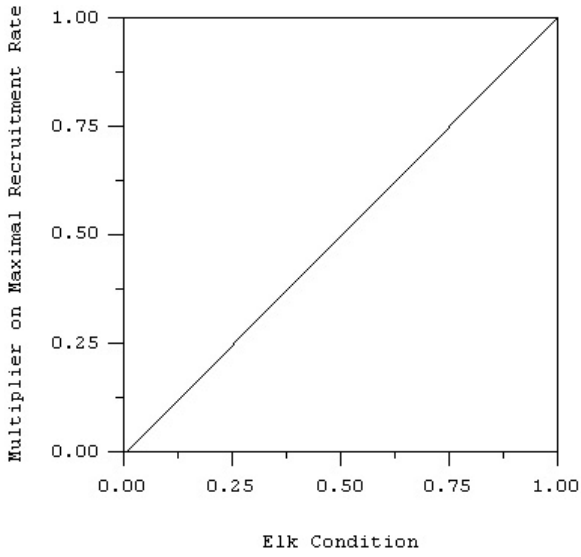
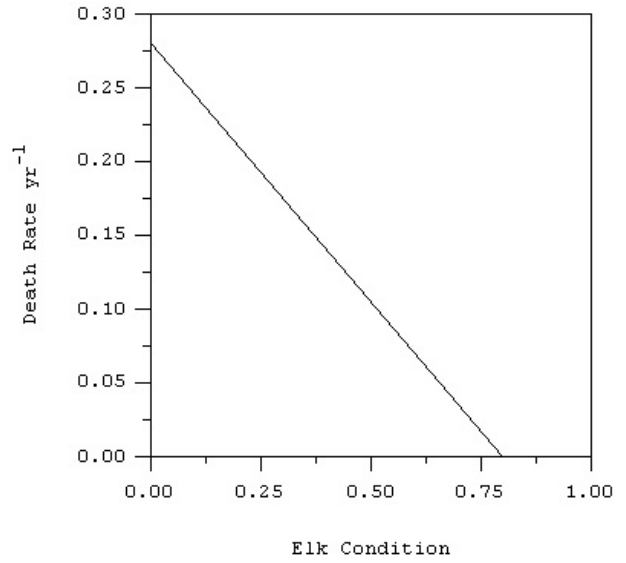


Figure 20. Water table depths as observed (April-October data from Zeigenfuss et al. 2002) and as used in model experiments examining effect of water table depths on willow growth.

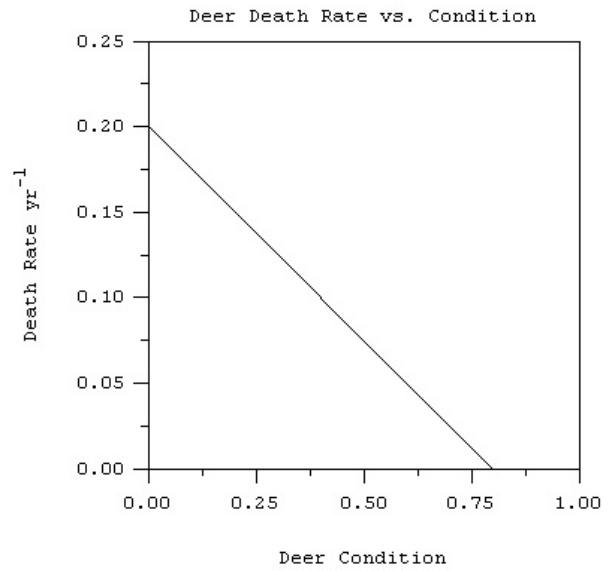
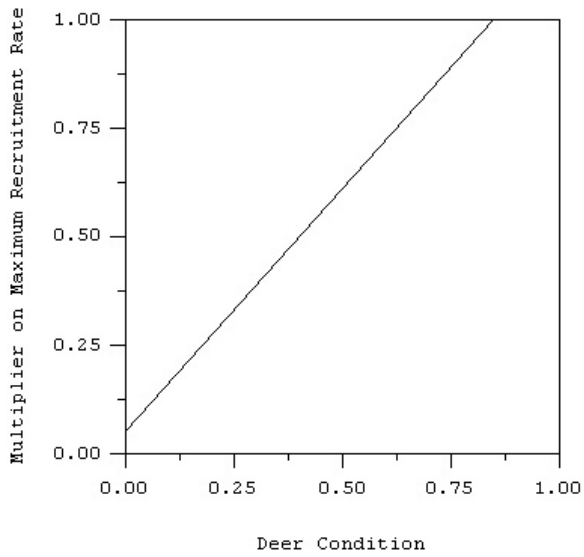
A)



B)



C)



D)

Figure 21. A) Effect of condition index on elk recruitment rate, B) elk mortality rate vs. condition index, B) effect of condition index on deer recruitment rate, and D) deer mortality rate vs. condition index.

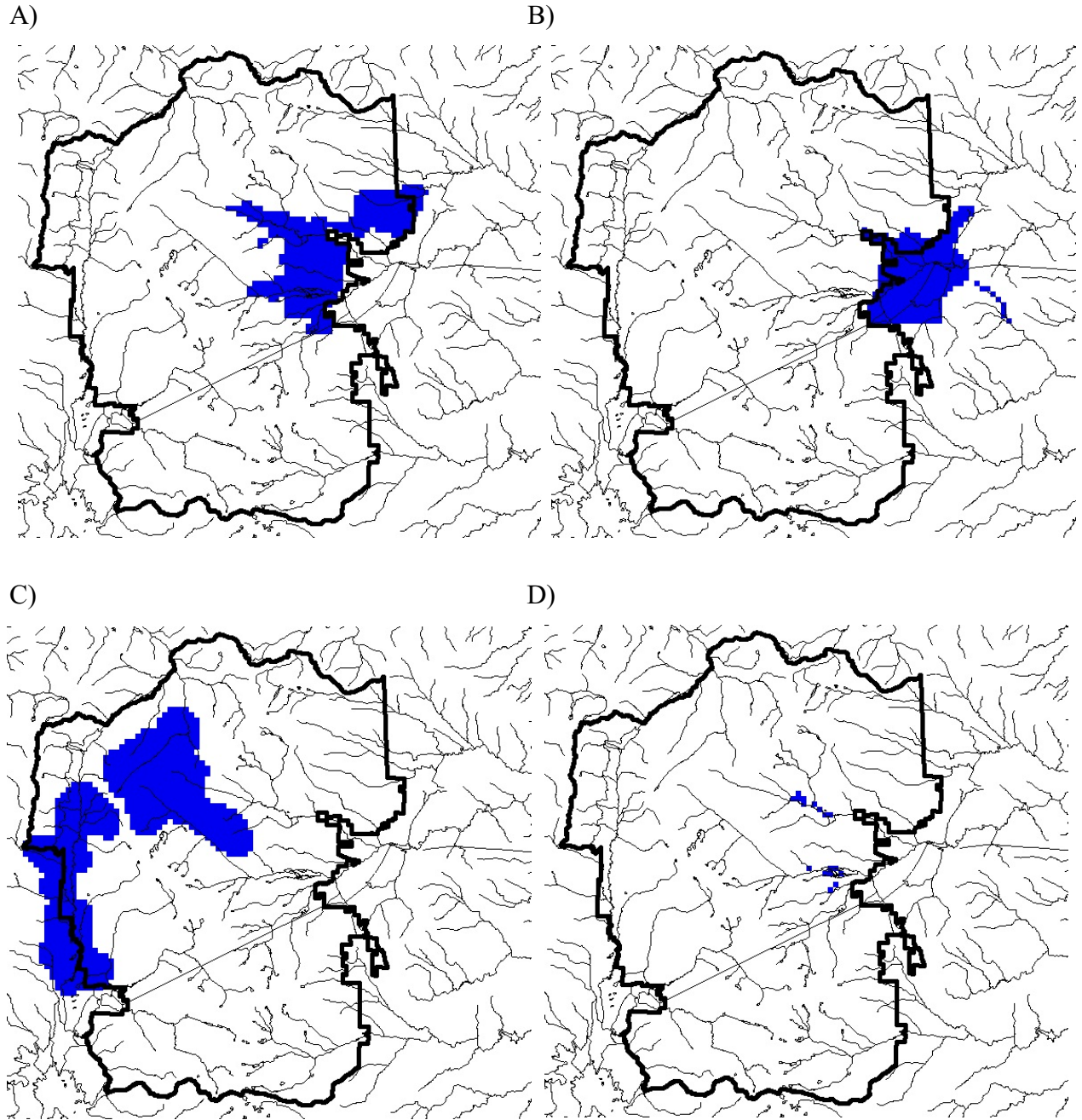


Figure 22. Animal ranges at 500 m grid-cell size used in model. A) Winter range of the park elk herd. B) Winter range of town elk herd. C) Summer range of both herds. D) Beaver habitat.

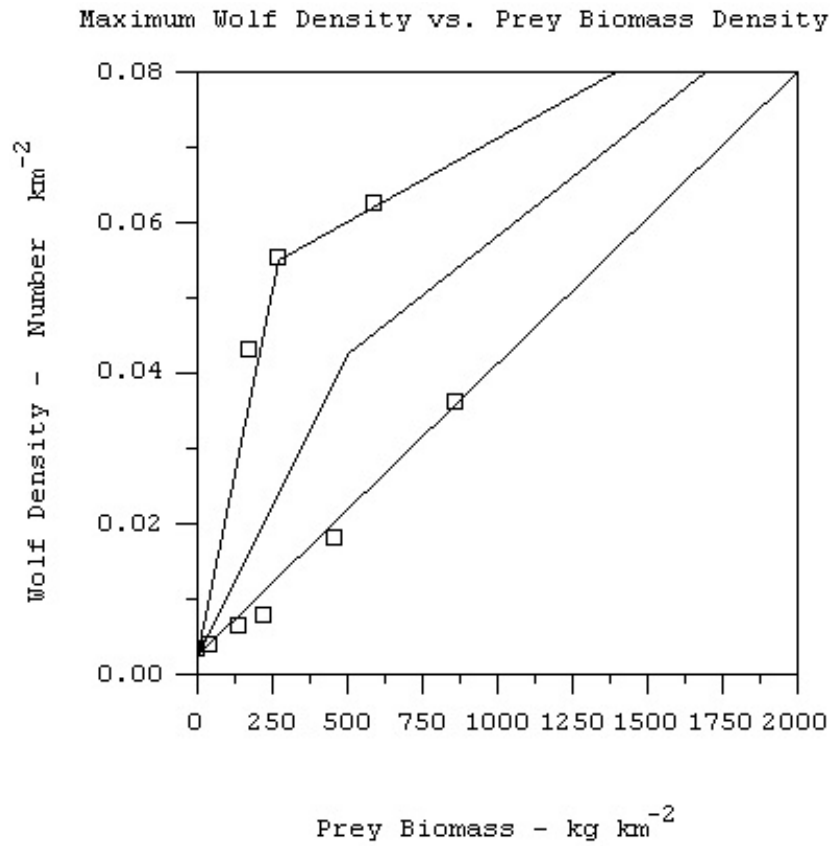
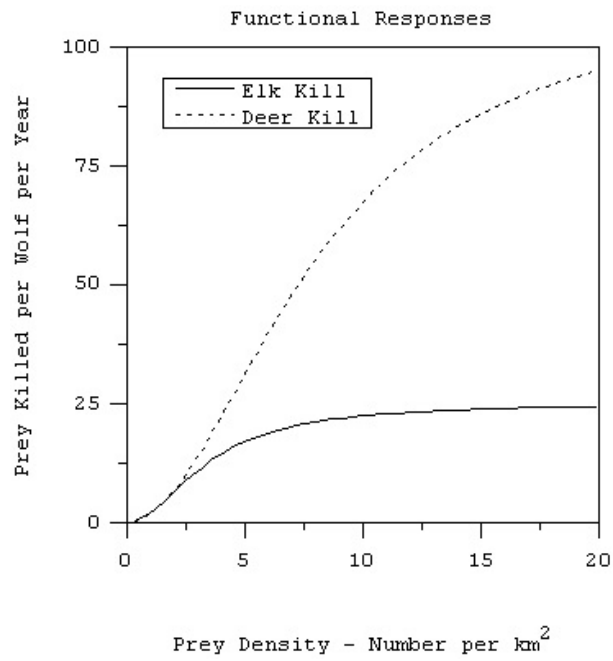
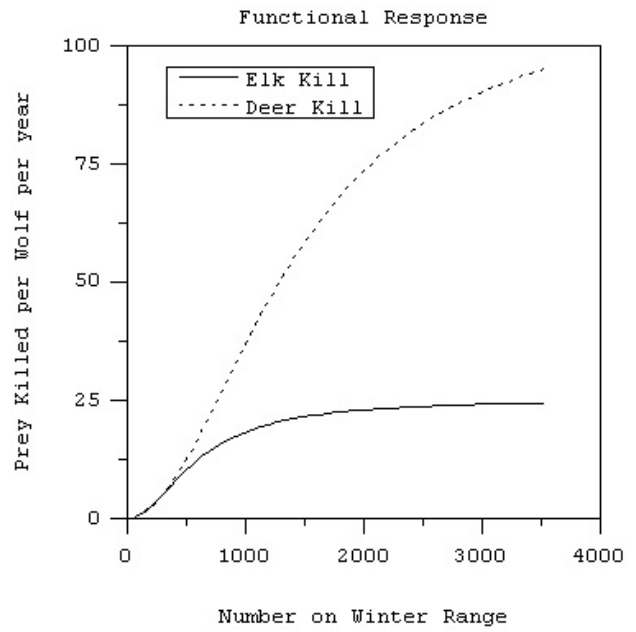


Figure 23. Maximum wolf density versus prey biomass density, based on the data of Walters et al. 1983 (points), and maximum density observed at Isle Royal (Peterson 1976), and an assumption of 10 wolves per pack. Maximum, minimum and median value functions are shown.

1.



B)



C)

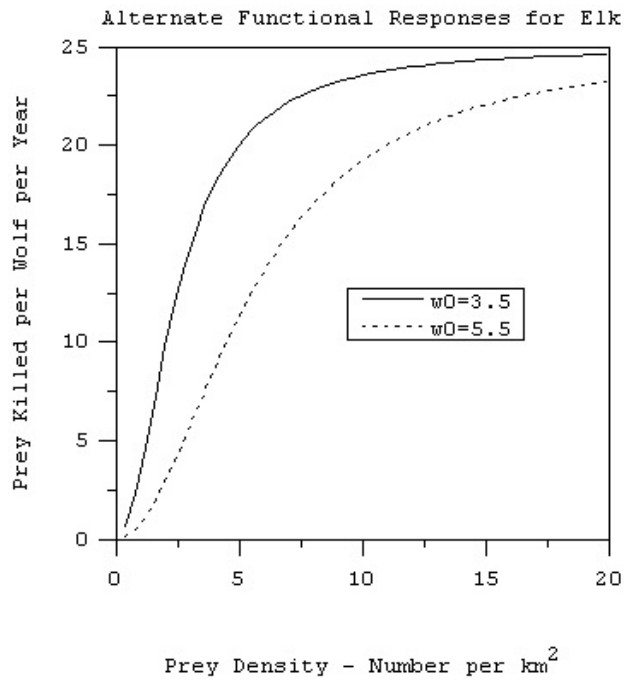
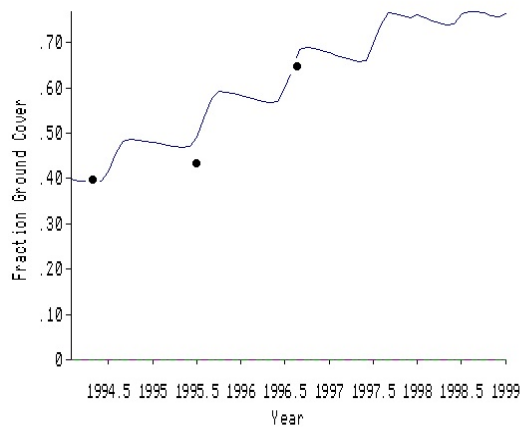
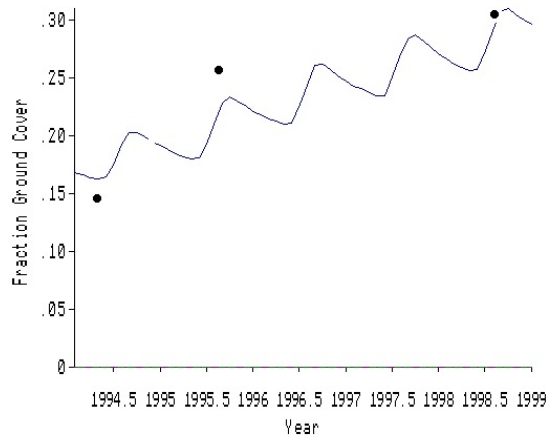


Figure 24. Functional responses for elk and deer versus A) density and B) number of animals on the winter range (277 km²). C) Effect of the parameter w_0 on the form of the functional response.

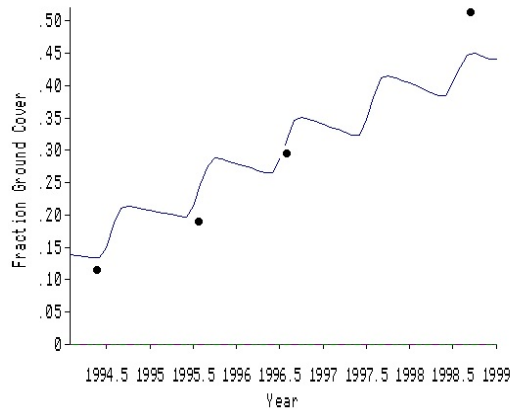
A)



B)



C)



D)

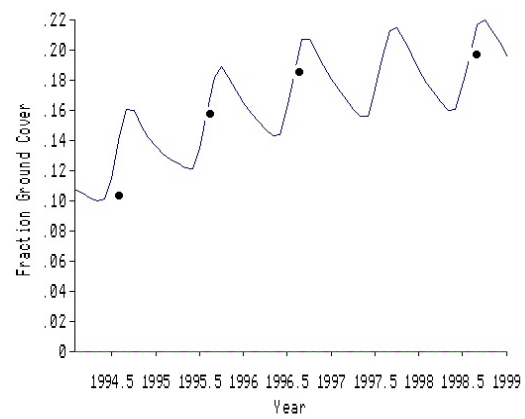


Figure 25. Comparison of simulated (lines) and observed (points) data for willow cover over the course of the experiment conducted in 1994-98. A) Tall willow, unbrowsed. B) Tall willow, browsed with 15 elk km⁻². C) Short willow, unbrowsed. D) Short willow, browsed with 15 elk km⁻²

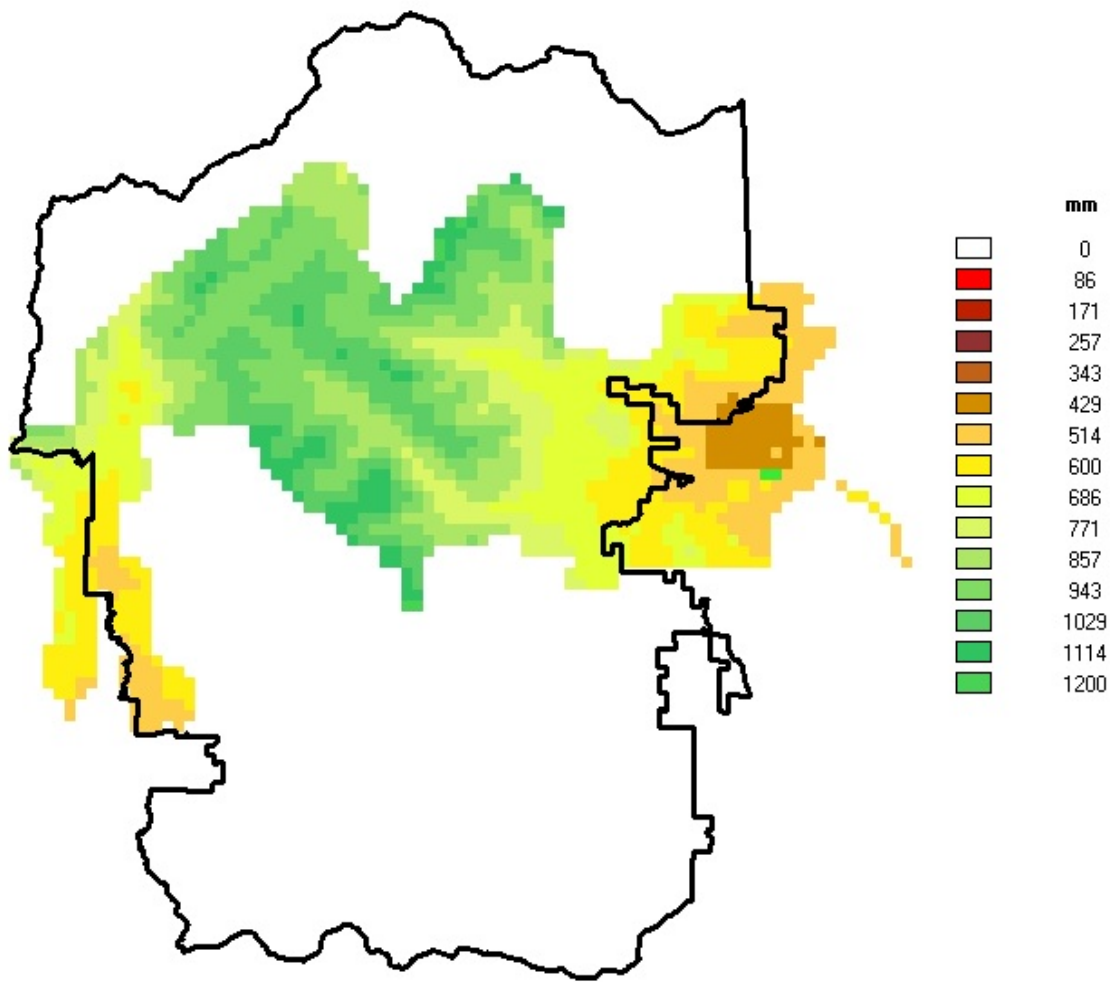
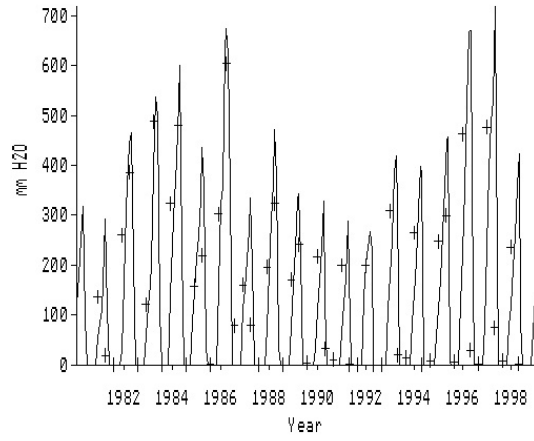
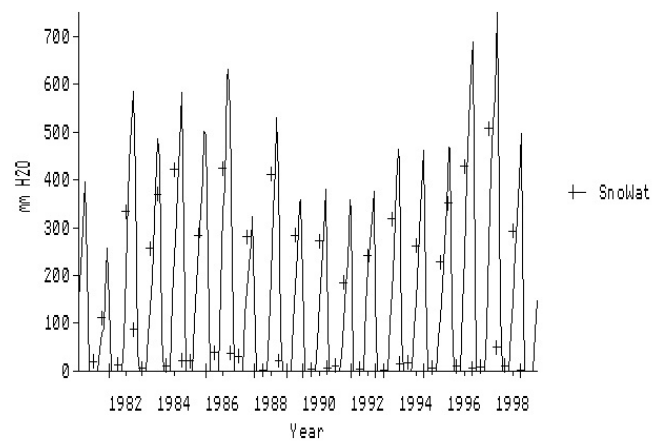


Figure 27. Mean annual precipitation (mm) 1970-1998 on the entire elk range.

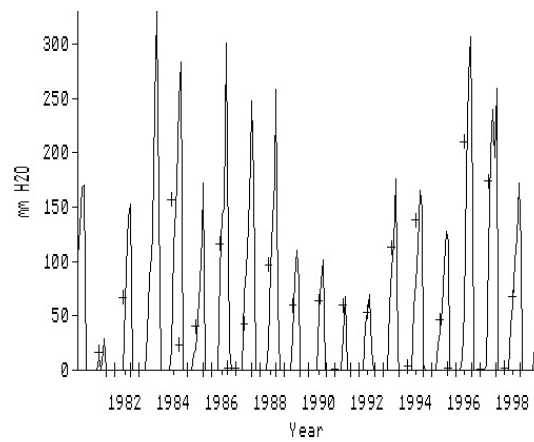
D)



B)



C)



D)

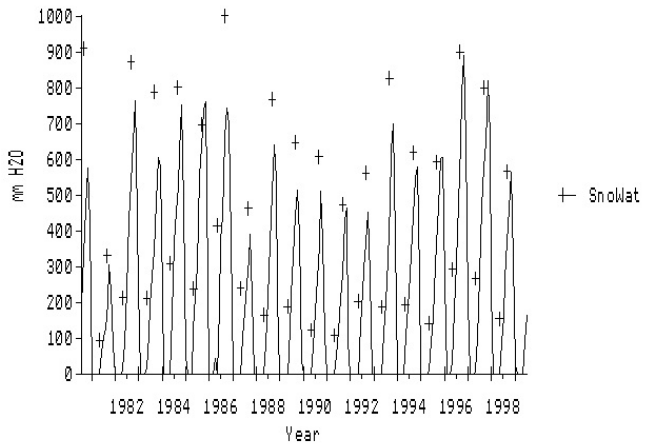
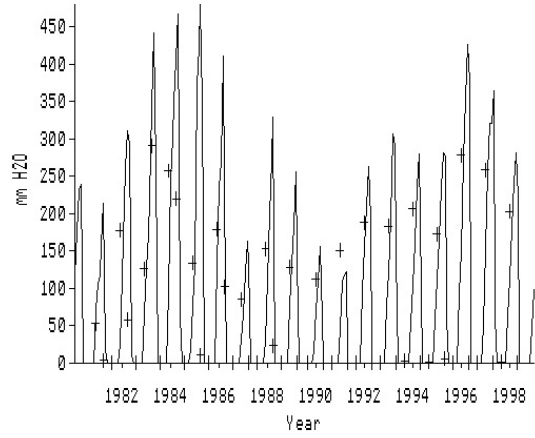
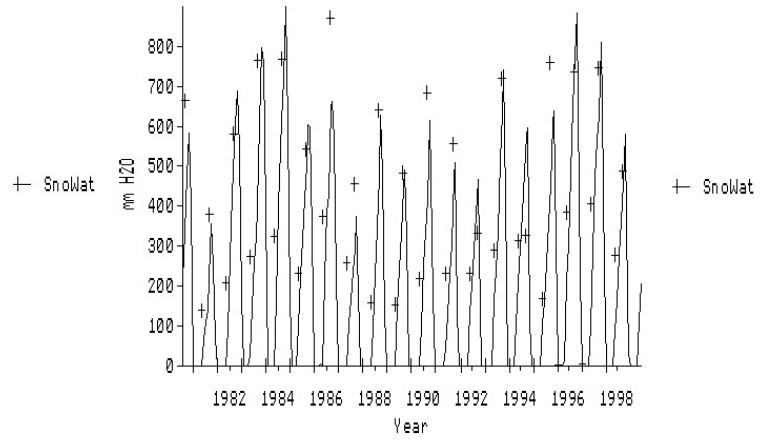


Figure 28. Comparison of observed and predicted snow water contents from A) Bear Lake, B) Willow Park, C) Copeland Lake, D) Lake Irene.

A)



B)



C)

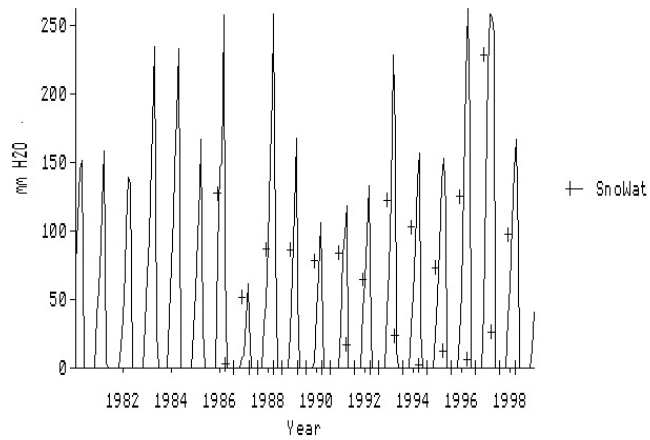


Figure. 29. Comparison of observed and predicted snow water contents for A) Phantom Valley, B) Joe Wright Reservoir, C) Stillwater Creek.

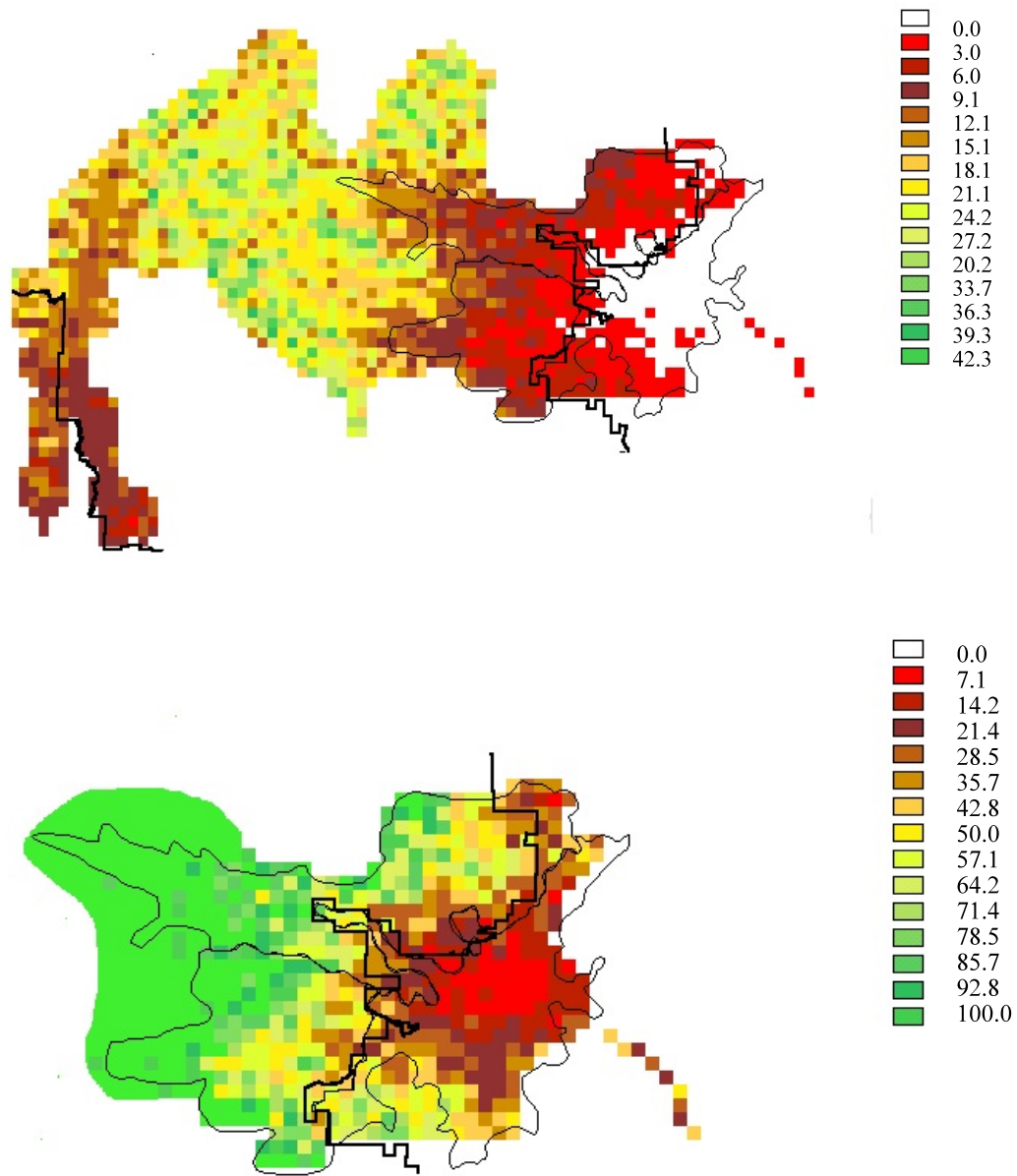


Figure 30. A) Mean snow depth (cm) on the entire elk range December-April, 1970-1998. B) Snow depth map with output rescaled for increased resolution on the elk winter range.

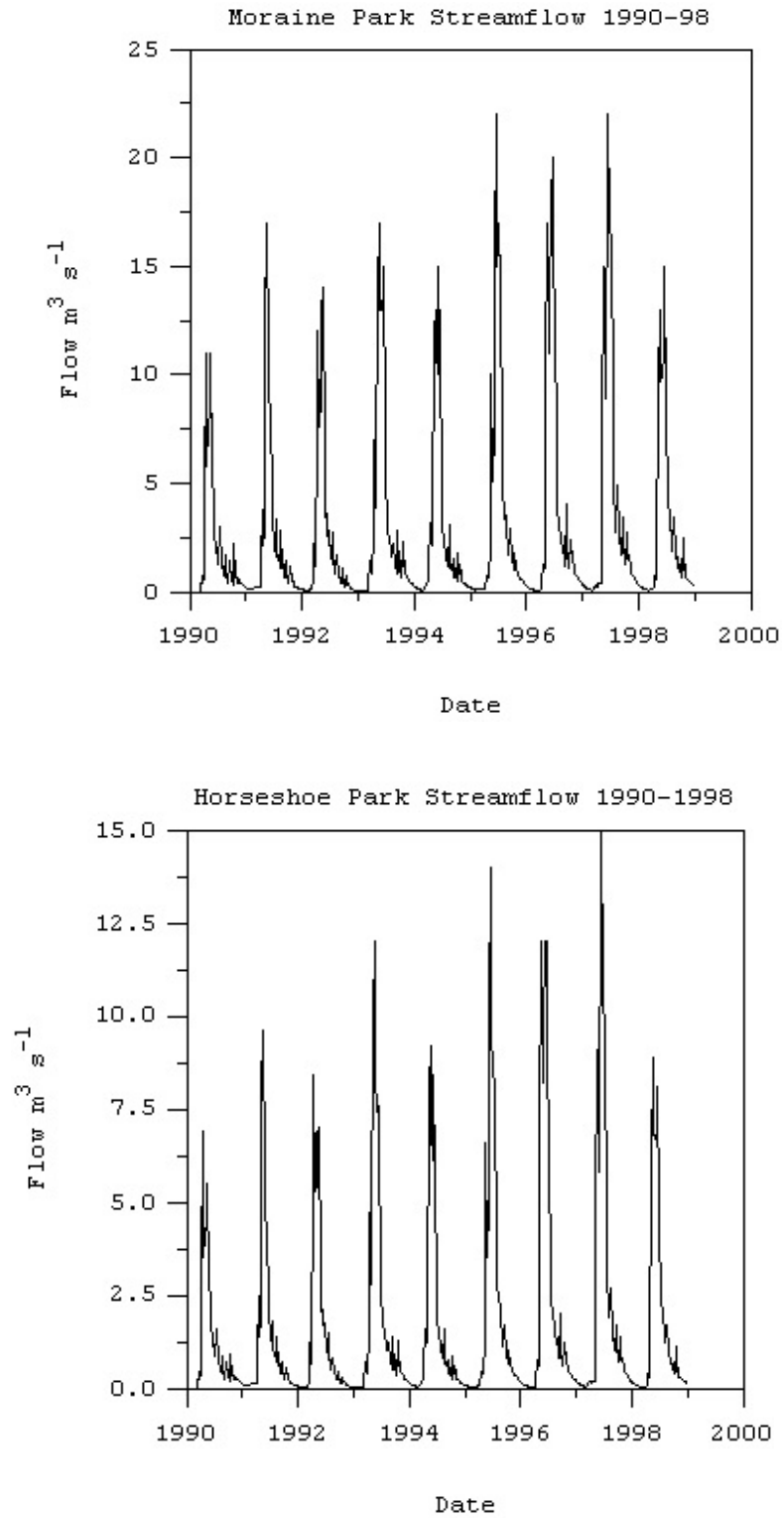


Figure 31. Interannual patterns of simulated streamflow 1990-1998.

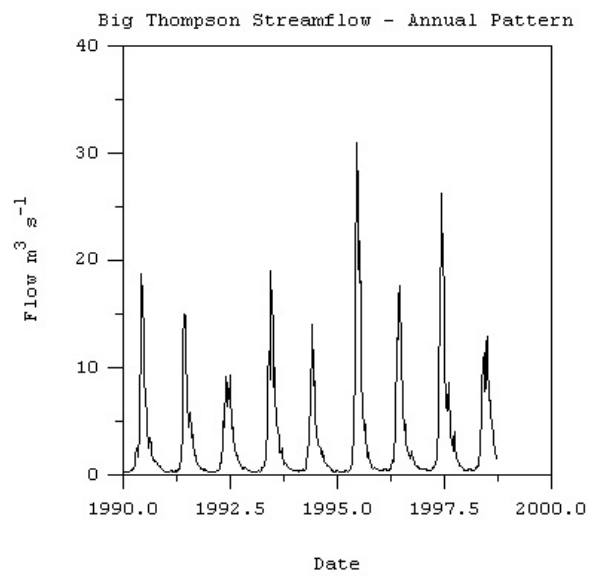
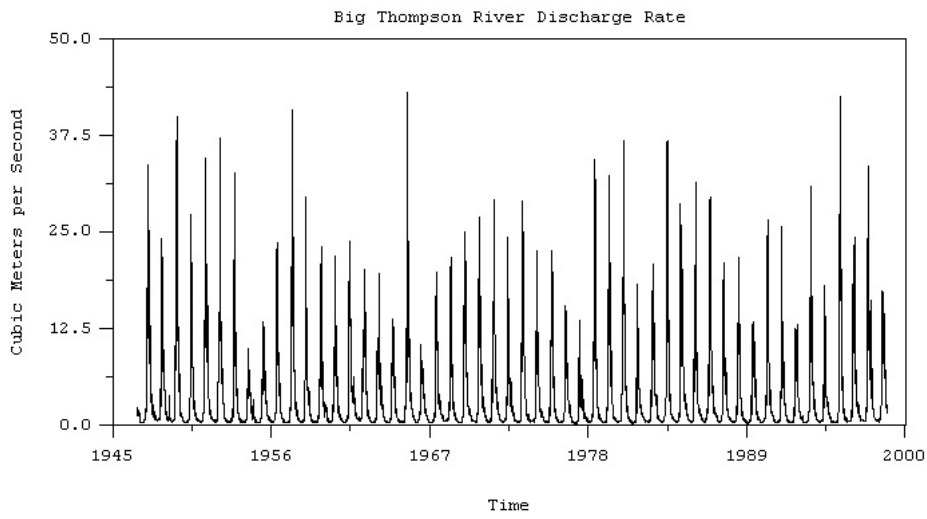


Figure 32. Observed streamflow data for the Big Thompson River, from the gauge above the dam at Lake Estes. A) Long-term daily. B) Weekly means 1990-1998.

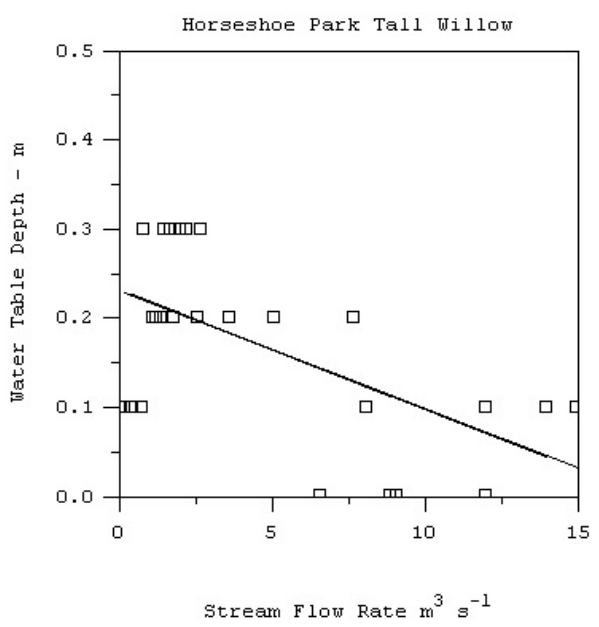
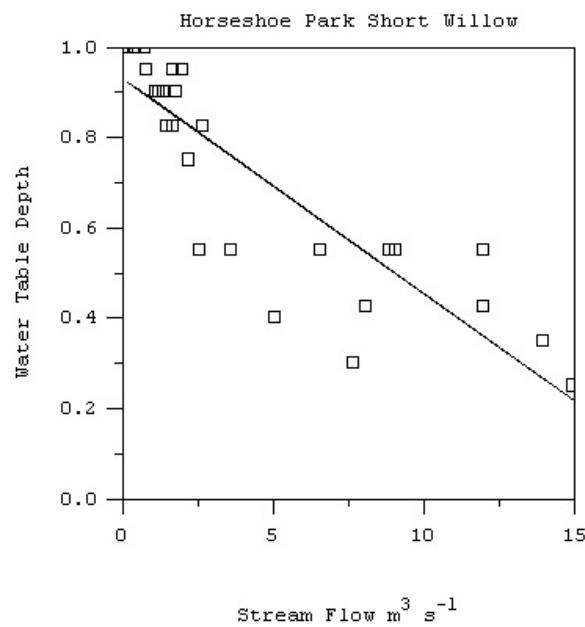
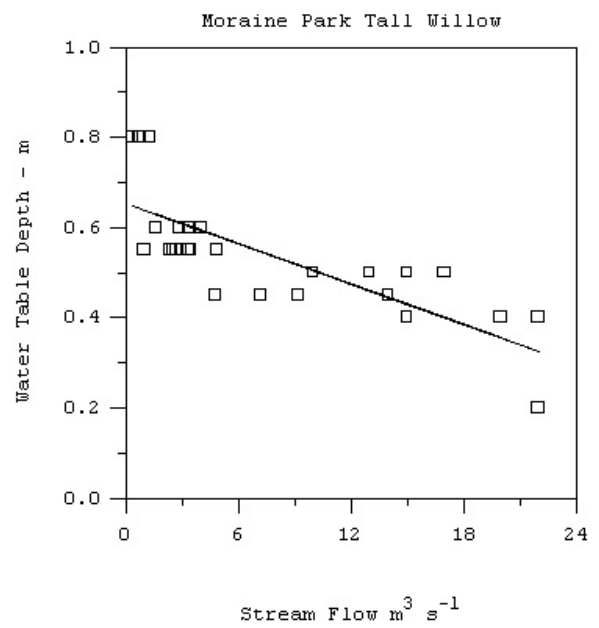
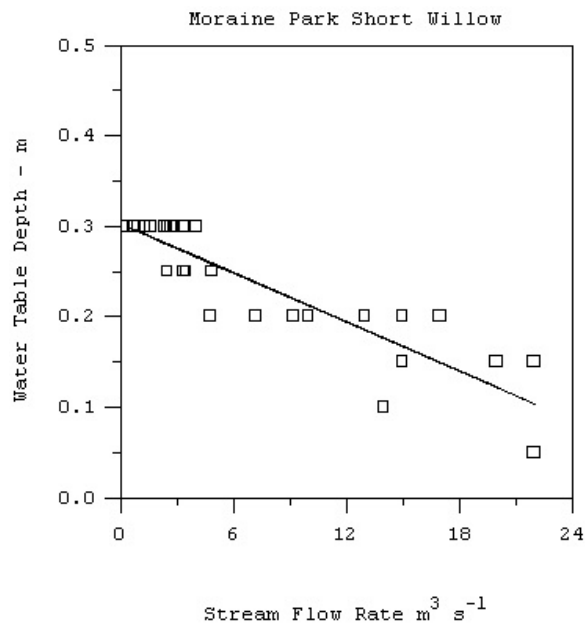
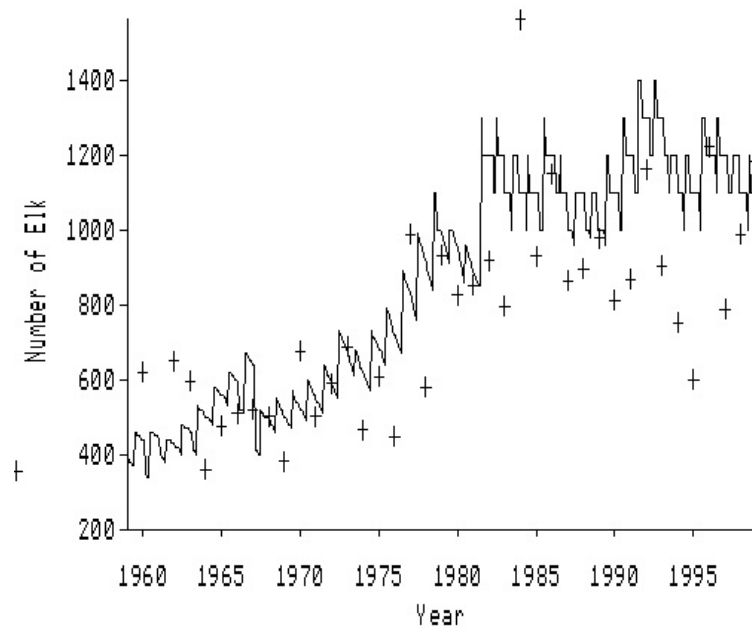


Figure 33. Relationships between simulated streamflow in Moraine and Horseshoe Parks and water table depths observed in short and tall willow by Zeigenfuss et al. (2002) The regression equations were used in the model to link water table depth to simulated streamflow.

A)



B)

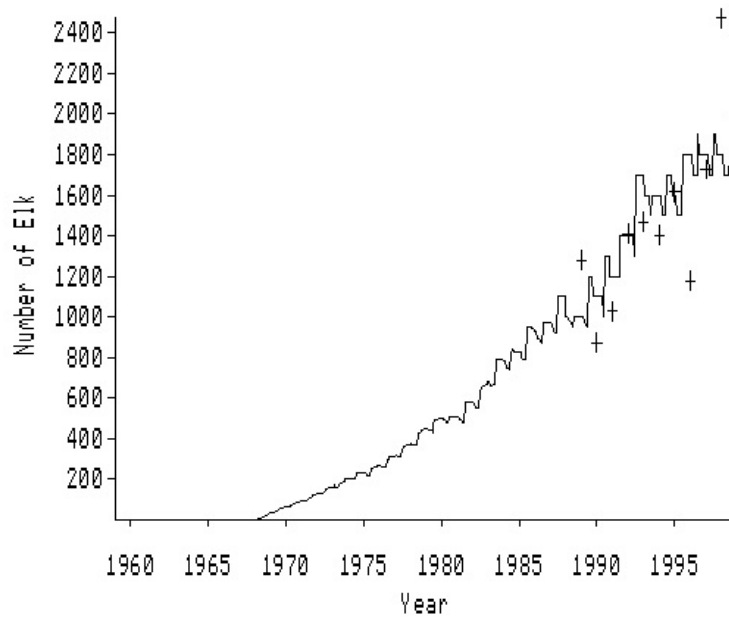
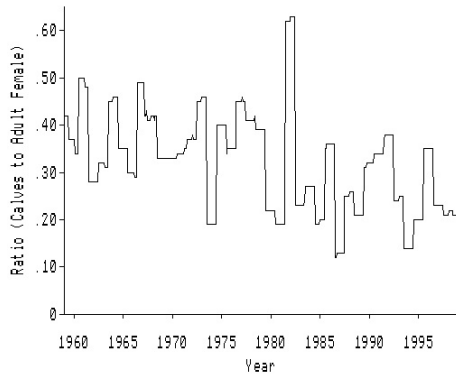


Figure 34. Simulated (lines) and observed (points) population dynamics for A) the park elk herd and B) the town elk herd.

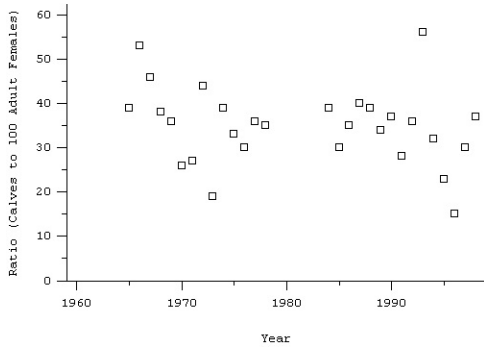
A)



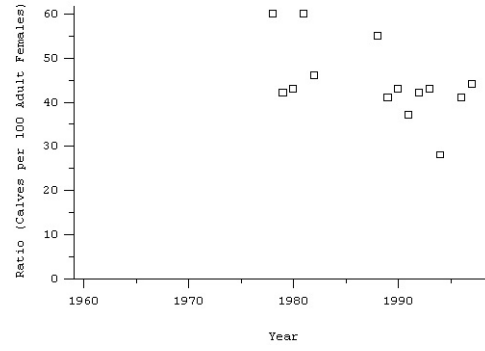
B)



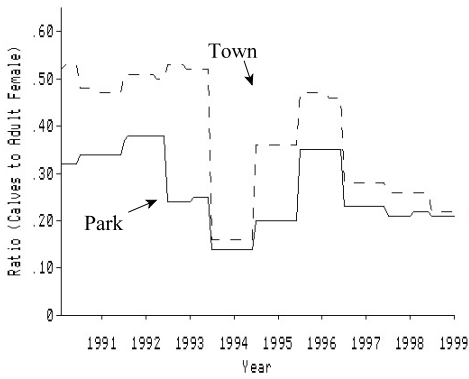
C)



D)



E)



F)

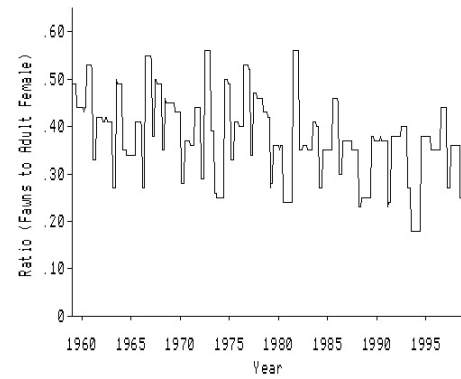
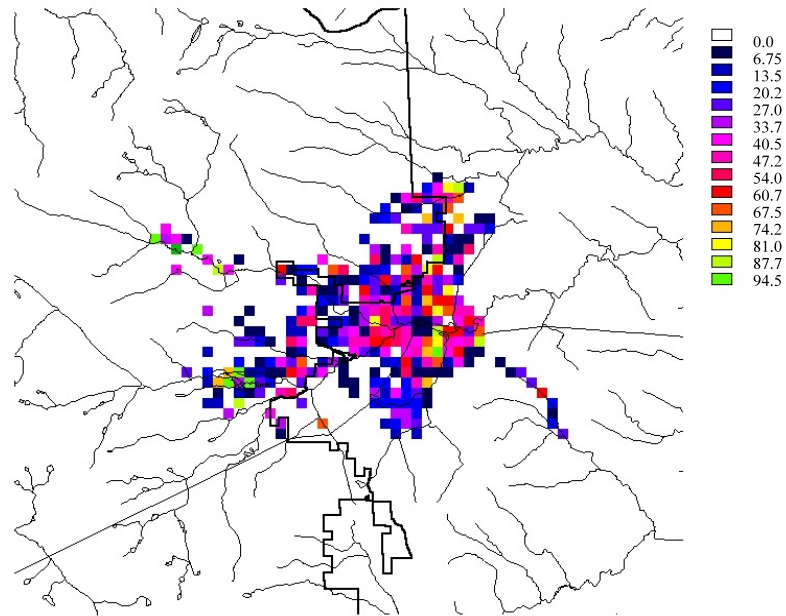


Figure 35. A) Calf:cow ratios for the park elk herd. B) Calf:cow ratios for the town elk herd. C) Observed calf ratios for park herd. D) Observed calf ratios for town herd. E) Detail comparing park and town calf:cow ratios 1990-1998. F) Fawn:doe ratios for the deer herd.

A)



B)

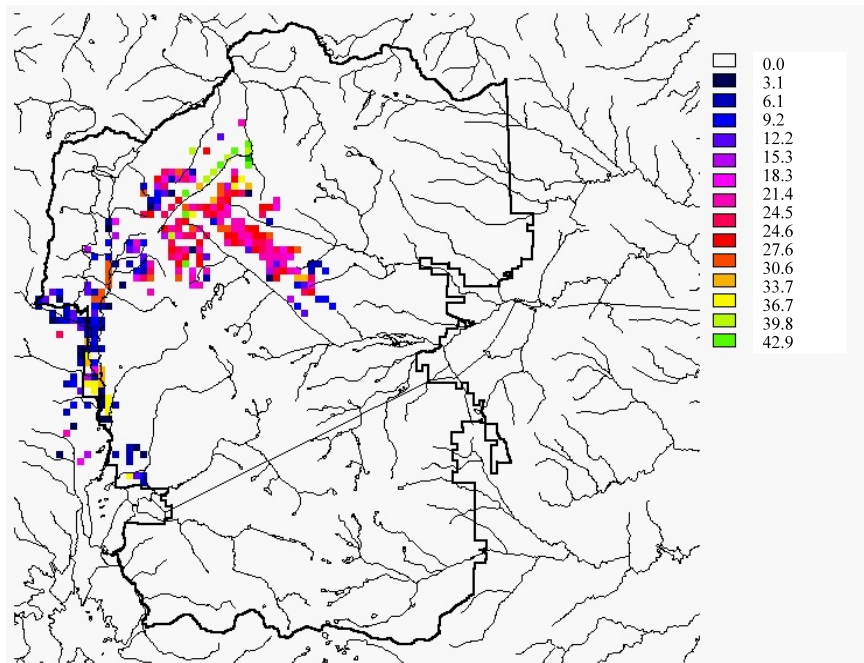


Figure 36. A) Simulated mean elk density distribution (elk km⁻²) on the winter range during January-April 1994-1998. B) Simulated mean elk density distribution on the summer range during June-August 1989-1998.

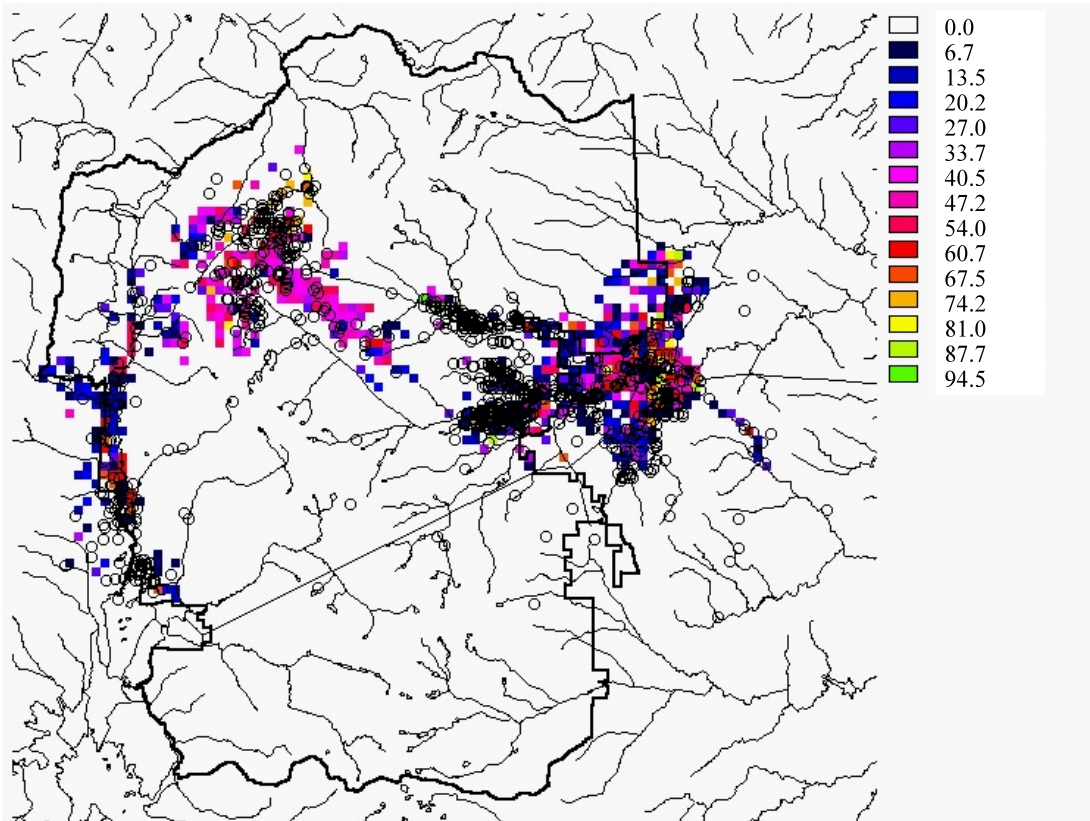
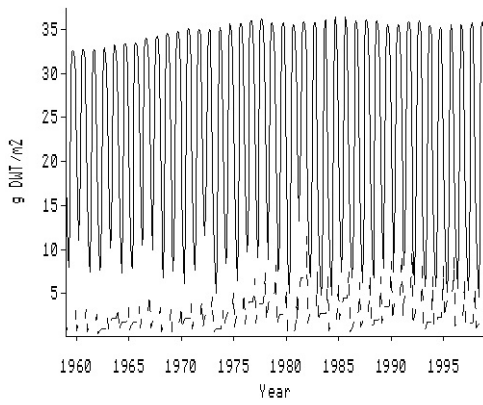
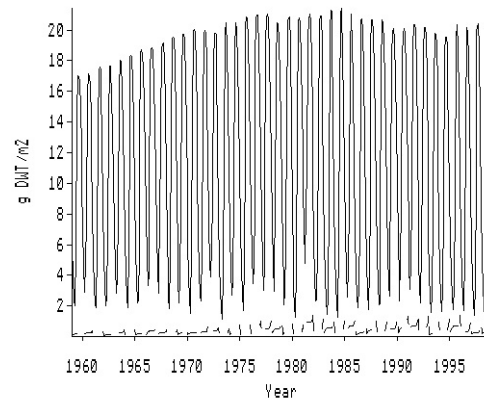


Figure 37. Comparison of simulated elk density distributions (elk km⁻²) in summer and winter with density of elk radio locations as observed by Larkins (1997).

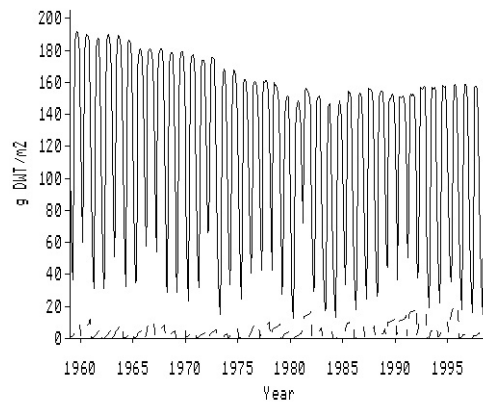
A)



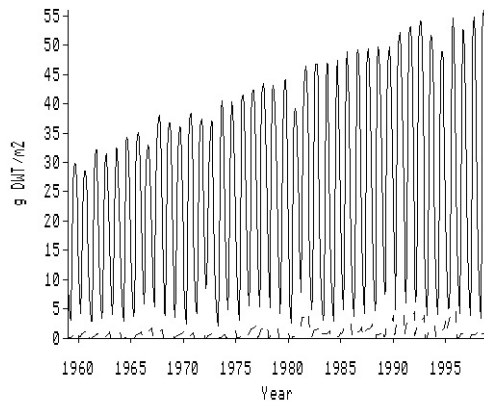
B)



C)



D)



— Biomass
 - - - Offtake

Figure 38. Simulated aboveground biomass and offtake in the control run for A) dryland grasses, B) dryland forb, C) mesic grasses, D) mesic forbs. Biomass is mean grams per square meter in vegetation types where the plant group is found. Dryland grasses are found in dry grasslands, shrublands, and Ponderosa pine woodlands. Mesic species are found in riparian willow communities and subirrigated wet meadows.

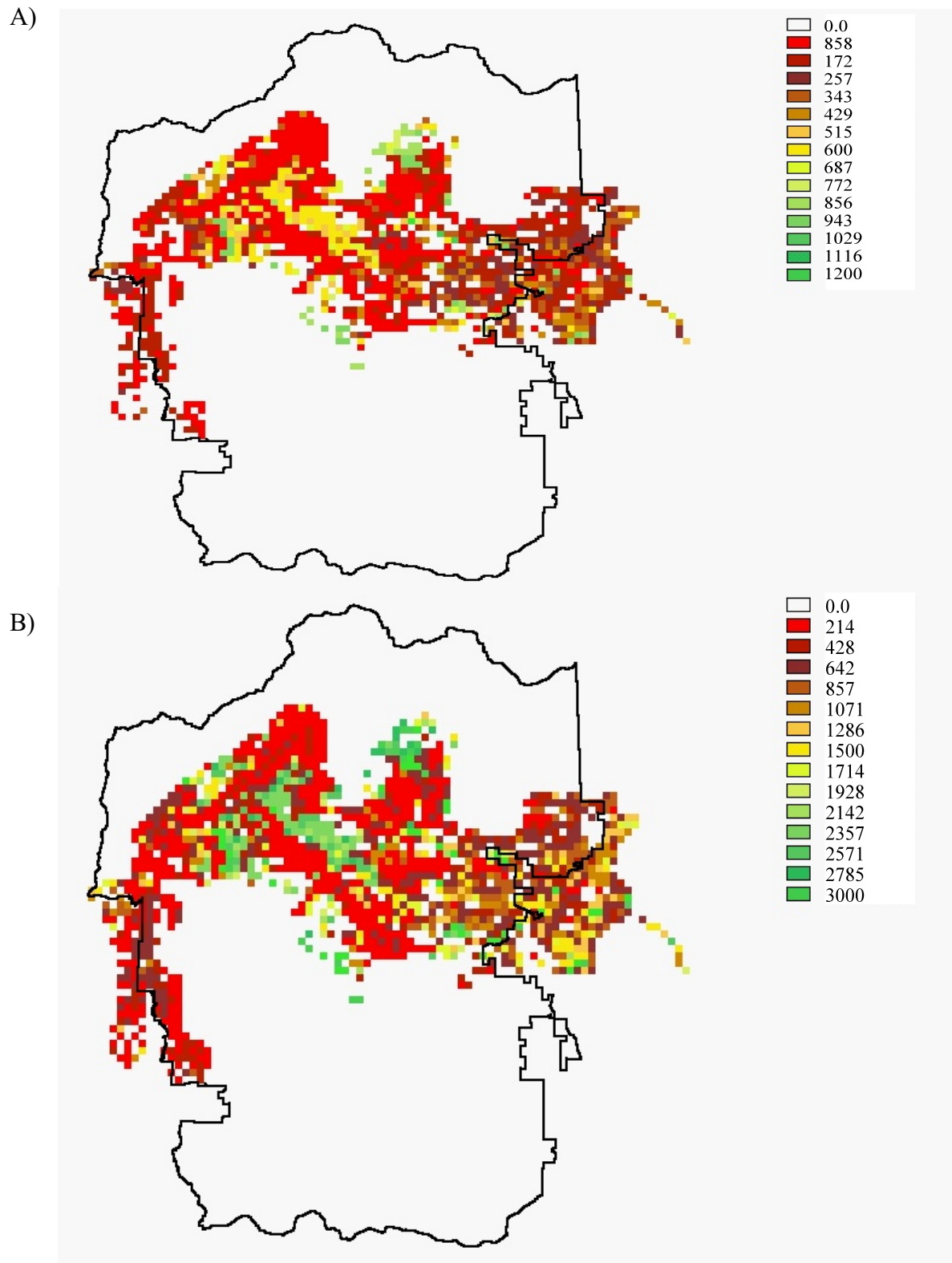


Figure 39. A) Peak aboveground standing crop of herbaceous plants on the elk range (kg/ha) mean 1989-1998. B) Aboveground net primary production of herbaceous plants (kg ha^{-1}).

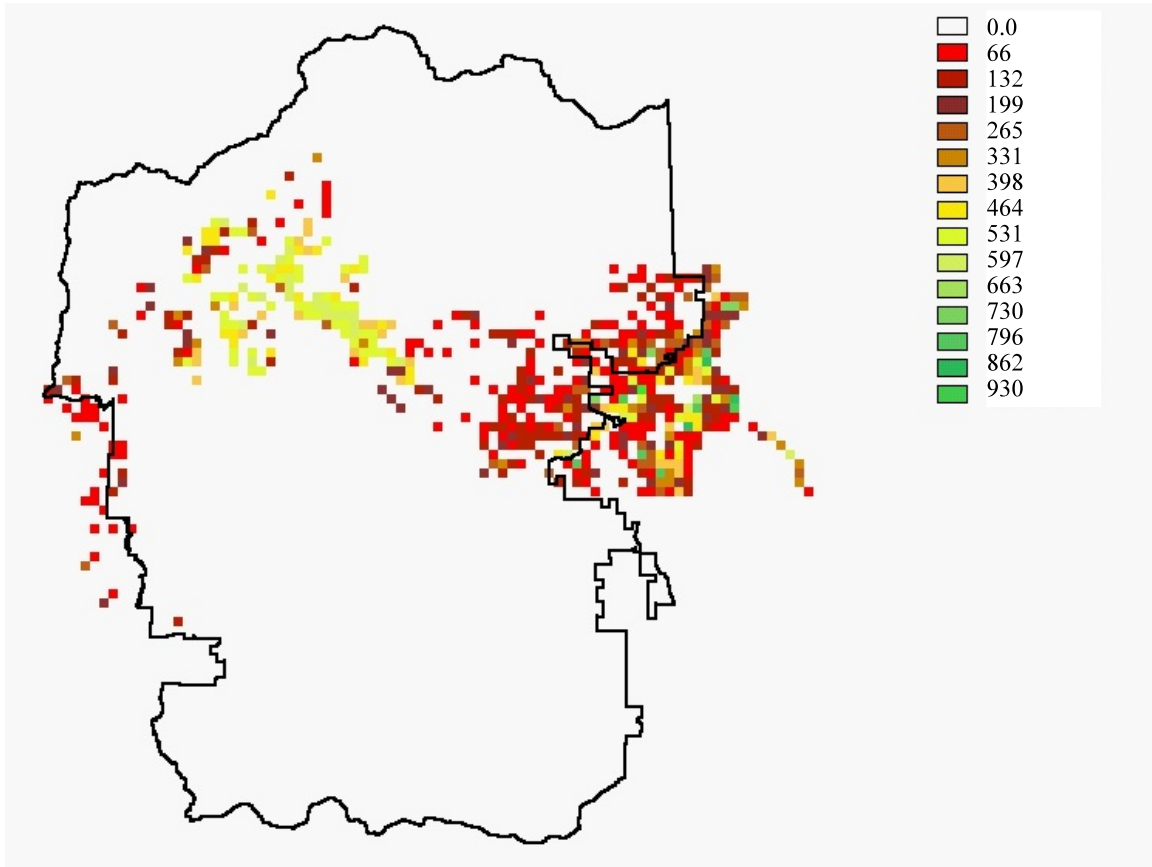


Figure 40. Annual offtake of herbaceous biomass (kg ha⁻¹) by elk 1989-1998.

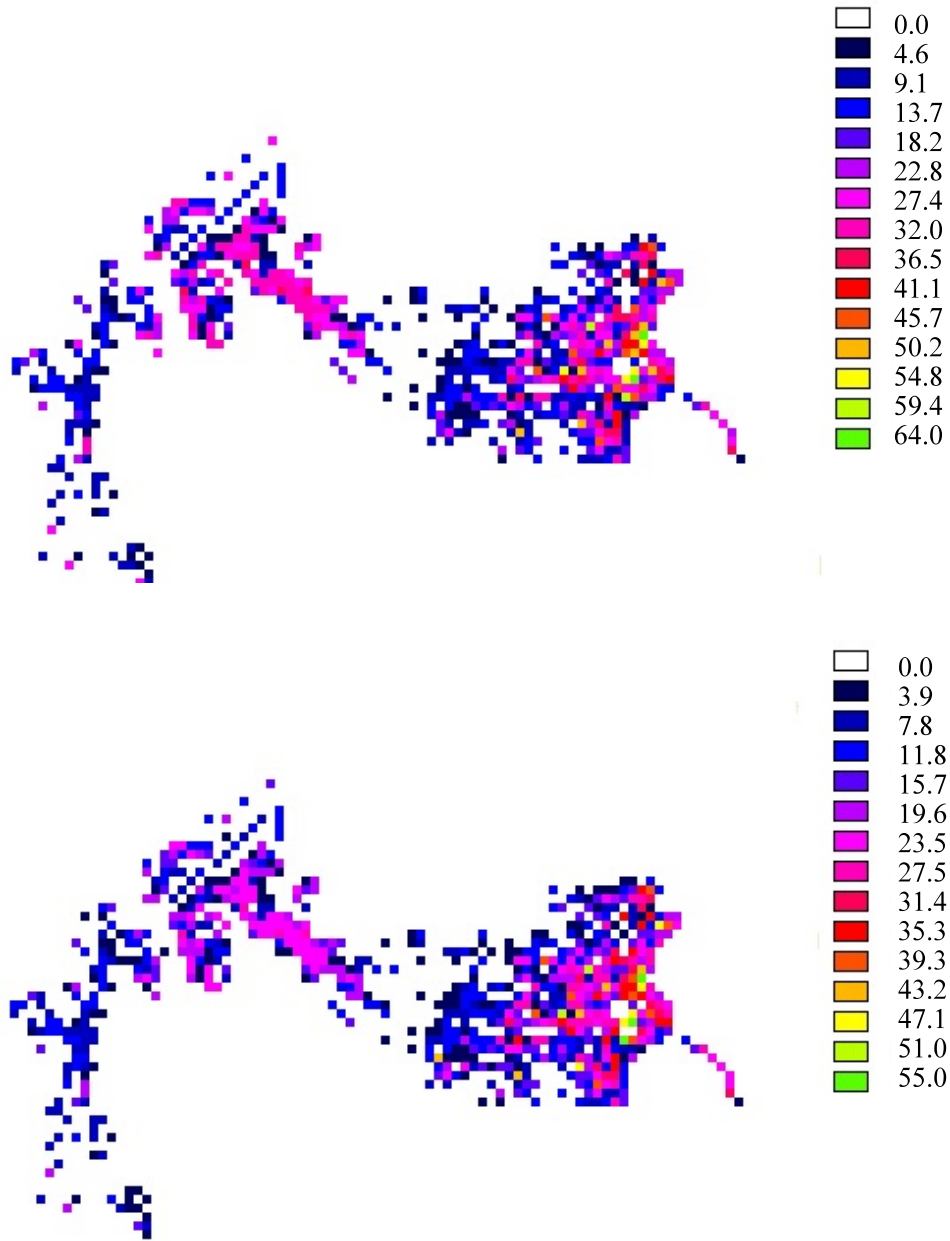
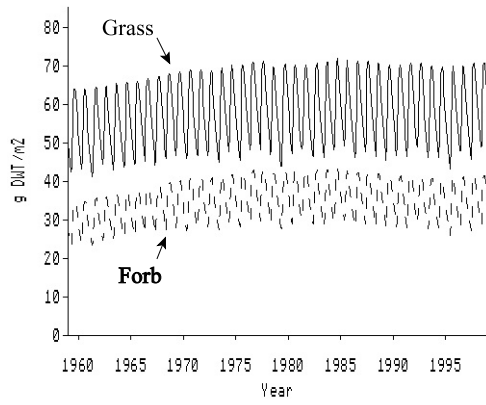
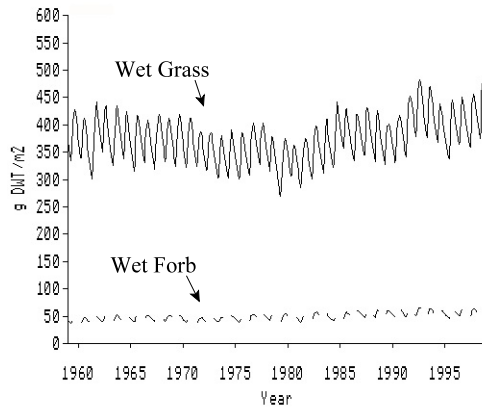


Figure 41. A) Offtake of herbaceous plants by elk as a percentage of peak standing crop. B) Offtake of herbaceous plants by elk as a percentage of aboveground net primary production.

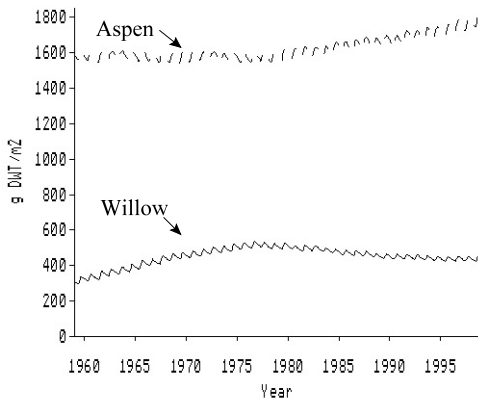
A)



B)



C)



D)

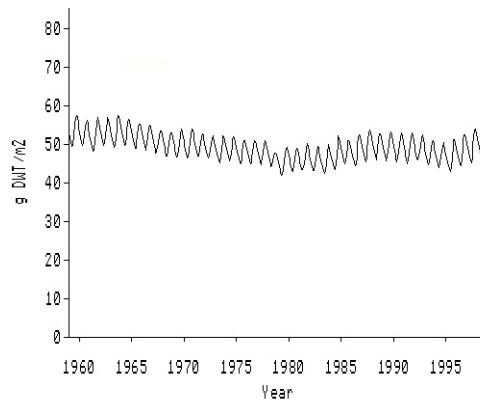


Figure 42. Simulated live root biomass in the control run for A) dry grasslands, B) riparian herbaceous, C) aspen and riparian willow, D) upland shrubs..

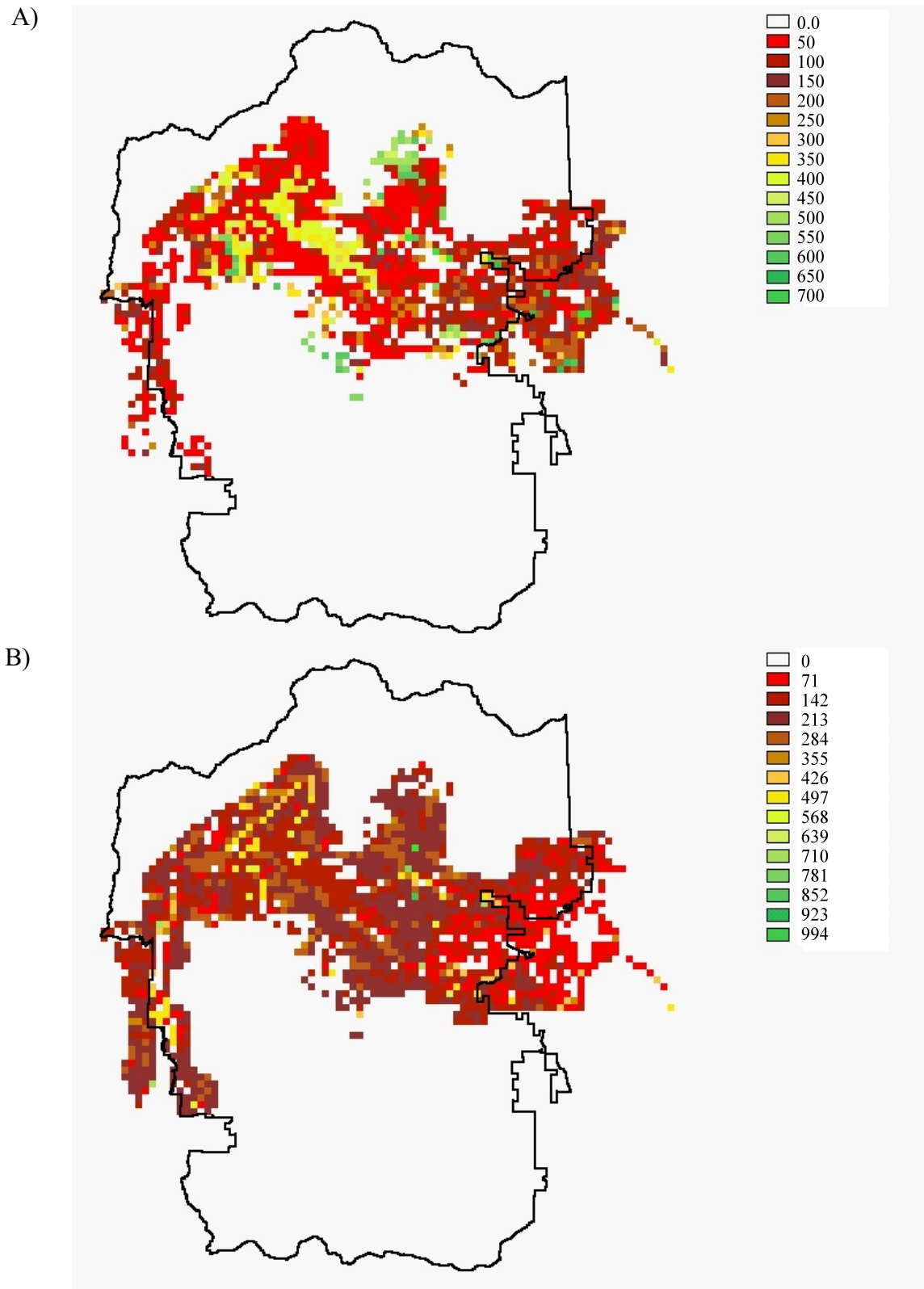
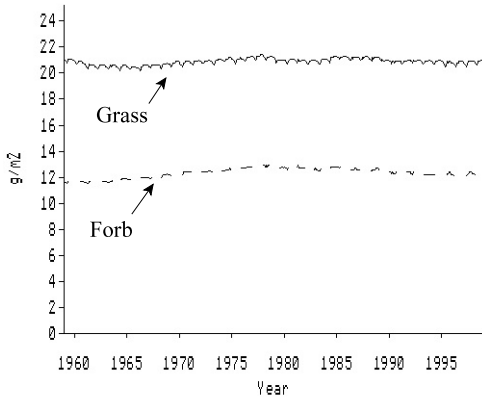
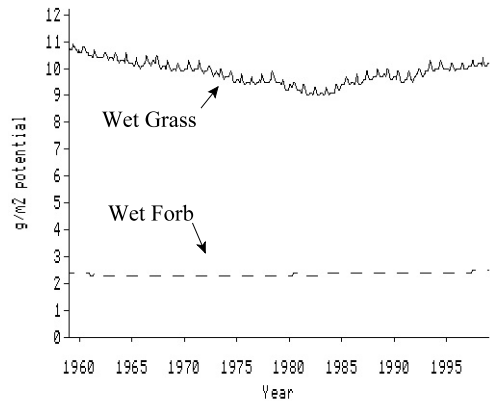


Figure 43. A) Mean root biomass (g m^{-2}) in summer, 1989-1998. B) Mean surface litter carbon (g m^{-2}) in summer 1989-1998.

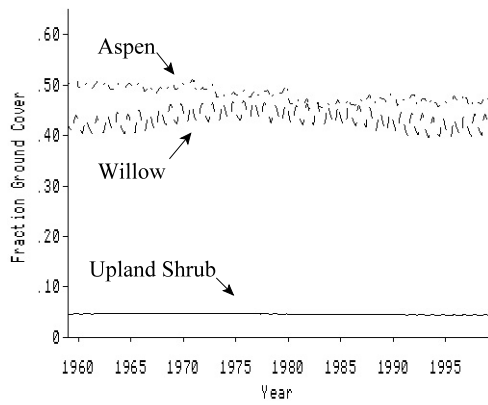
A)



B)



C)



D)

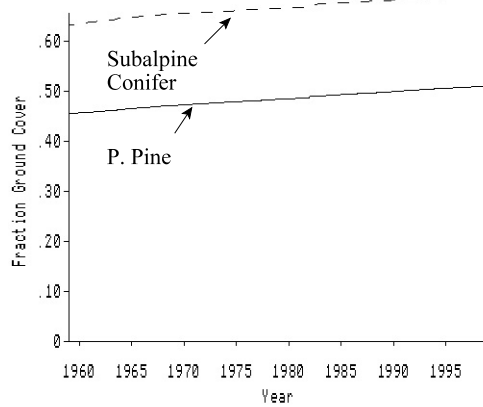
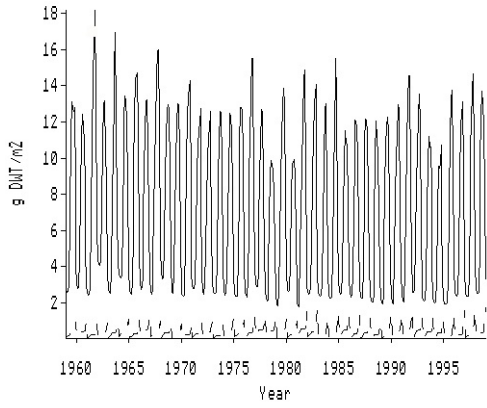
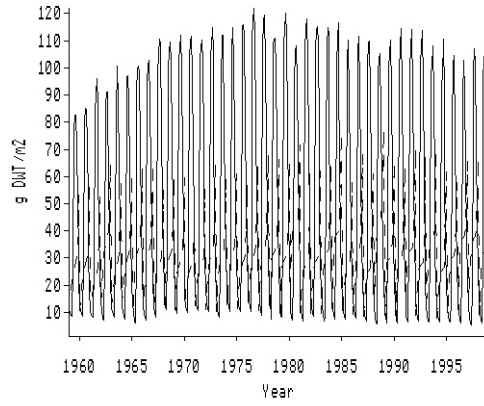


Figure 44. Basal cover of A) dryland grasses and forbs, B) mesic grasses and forbs. Canopy cover of C) willow, upland shrub, and aspen, and D) Ponderosa pine and subalpine conifers.

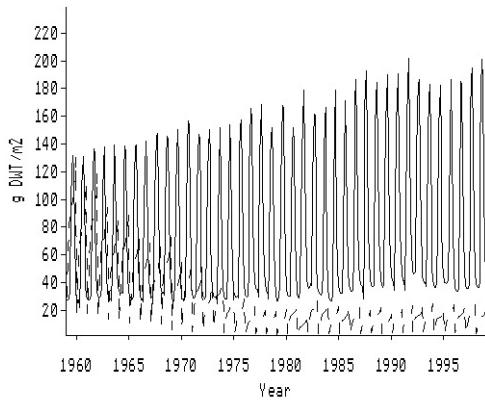
A)



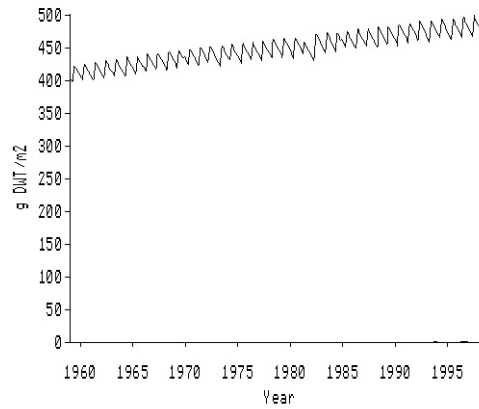
B)



C)



D)



— Biomass
- - - Offtake

Figure 45. Simulated aboveground biomass and offtake in the control run for A) upland shrubs, B) riparian willow, C) aspen, D) Ponderosa pine. Biomass of woody species includes leaves and current annual growth twigs only.

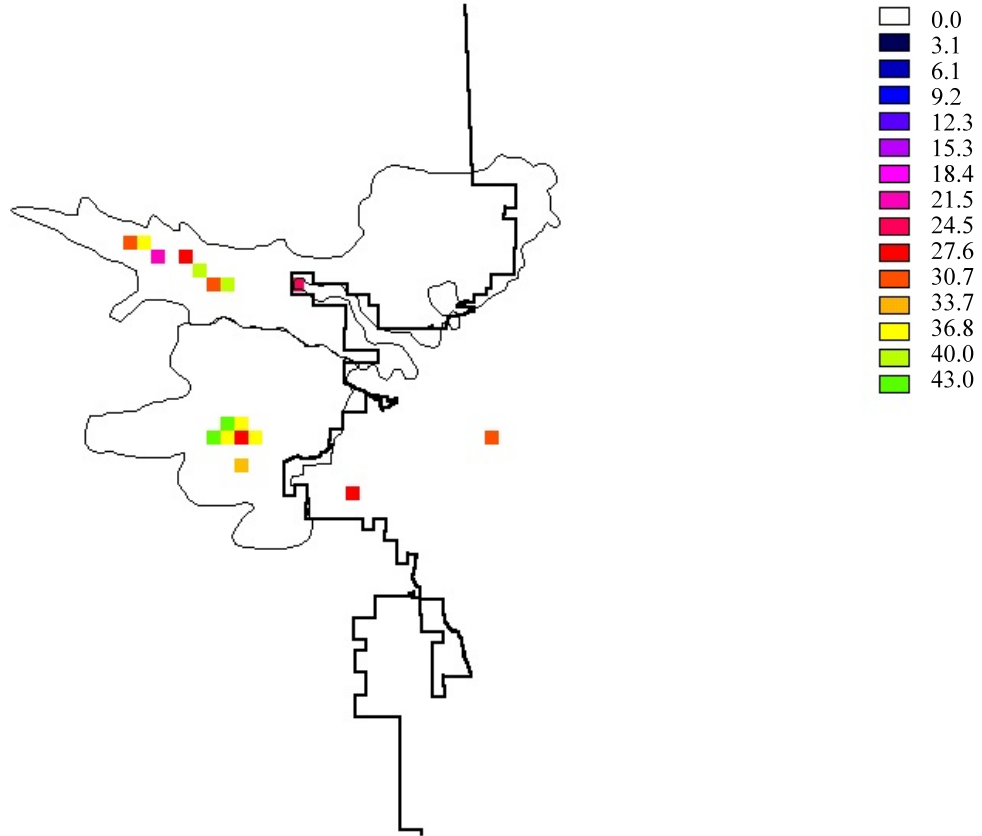
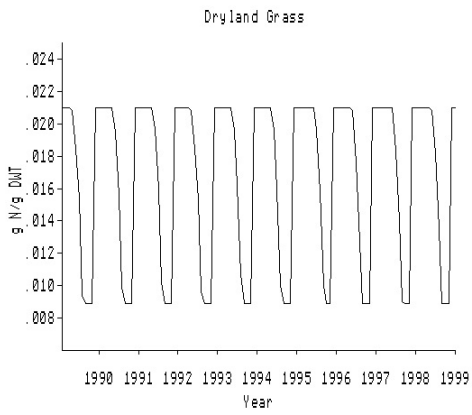
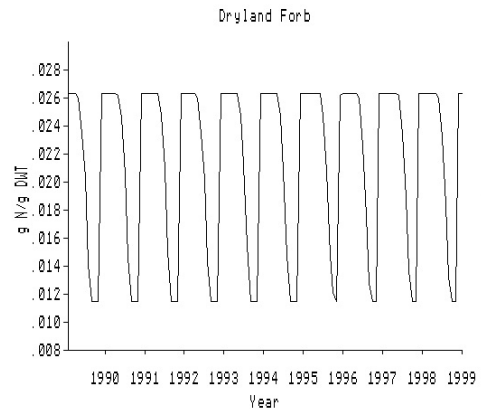


Figure 46. Offtake of willow by elk on the winter range, as a percentage of annual shoot production.

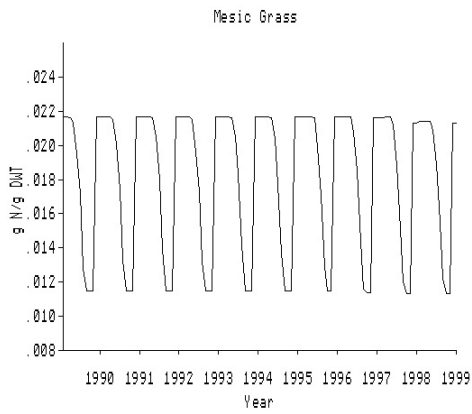
A)



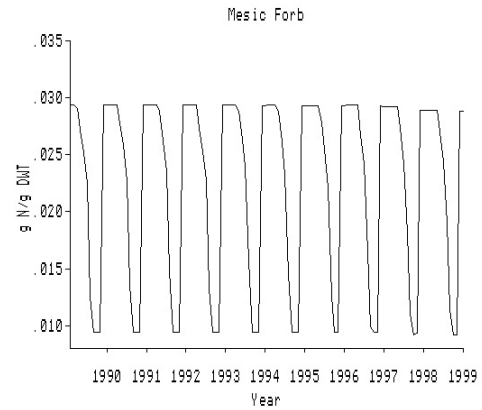
B)



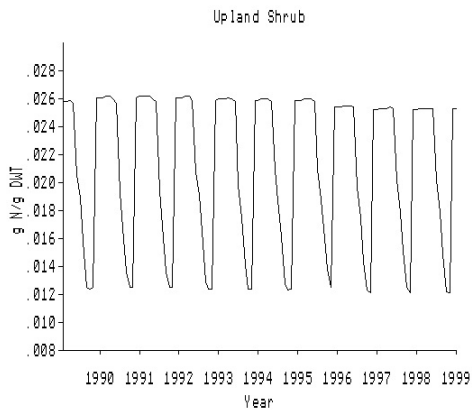
C)



D)



E)



F)

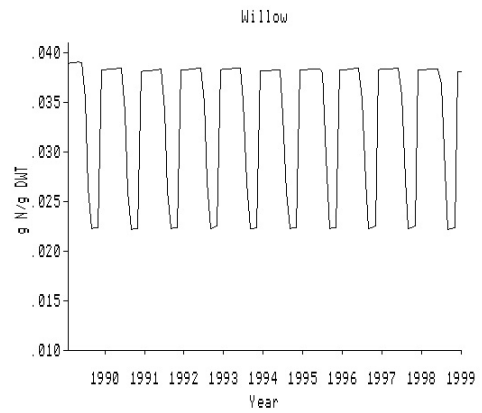
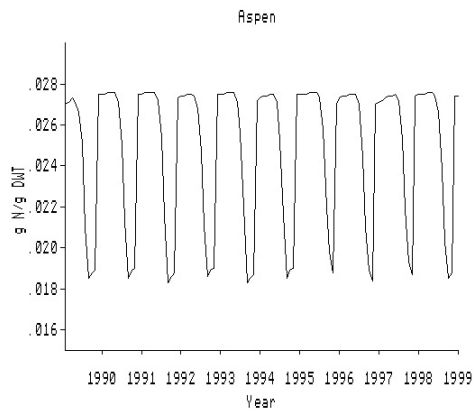
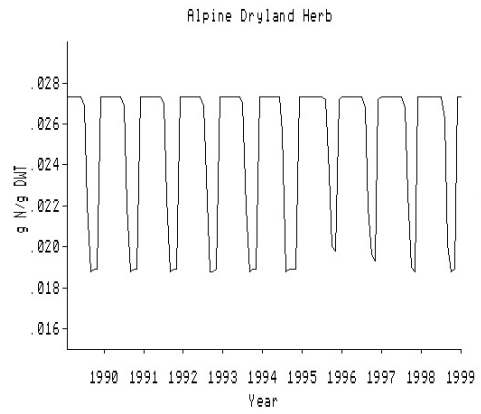


Figure 47. Nitrogen concentrations in green leaves of plants on the winter range expressed as grams N per gram of dry weight (DWT) biomass.

A)



B)



C)

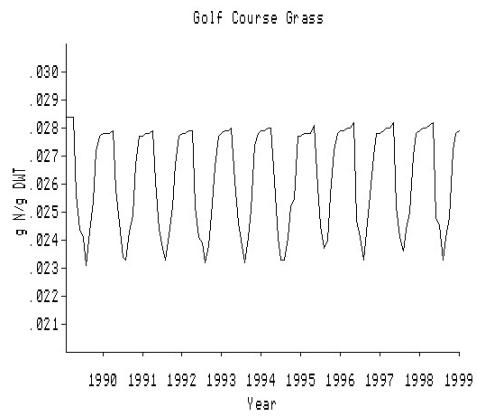
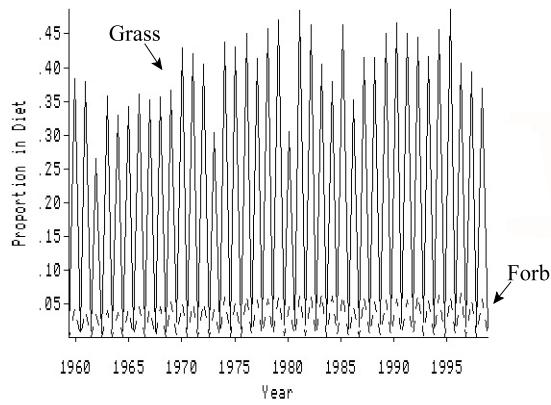
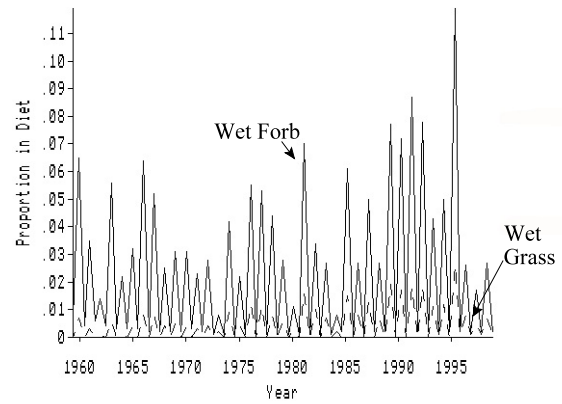


Figure 48. Nitrogen concentrations of plants on the summer and winter range, expressed as grams N per gram of dry weight (DWT) biomass.

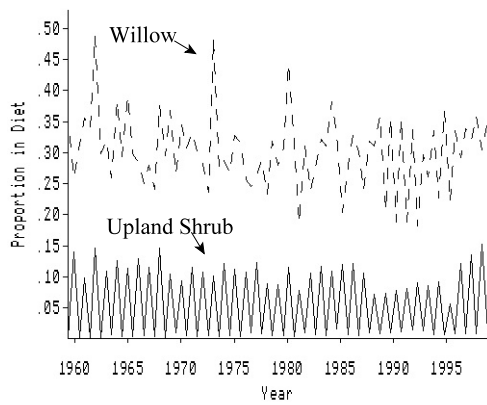
A)



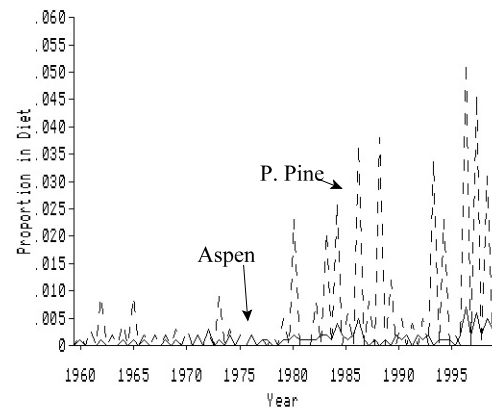
B)



C)



D)



E)

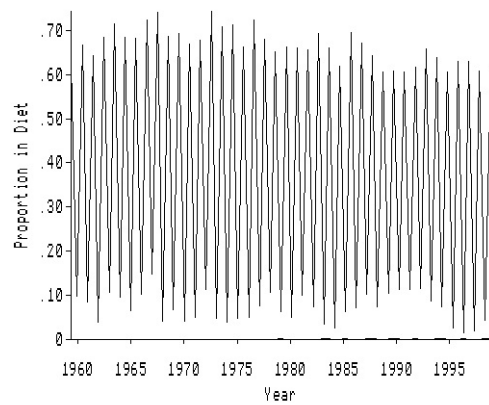
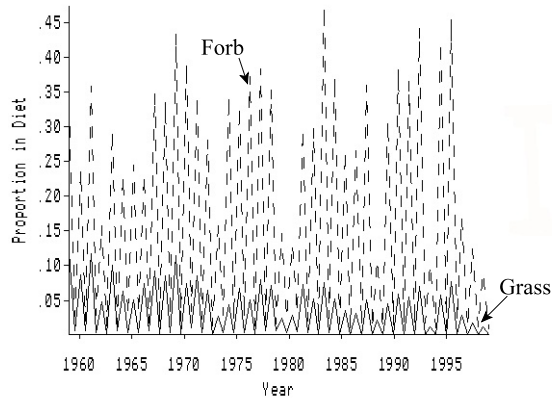
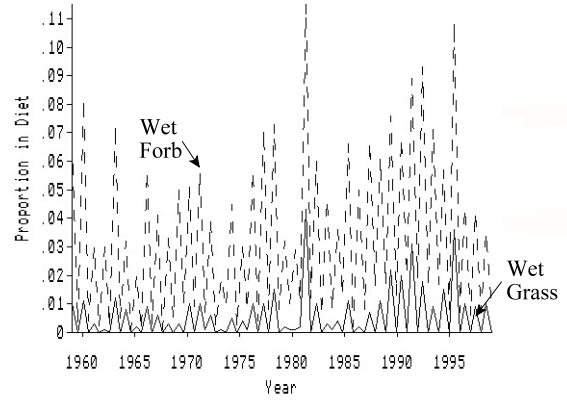


Figure 49. Components of park elk herd diets. A) Dry grasses and forbs, B) mesic grasses and forbs, C) upland shrubs and riparian willow, D) aspen and Ponderosa pine, E) alpine/subalpine herbs. Seasonal variations are due to elk migration among vegetation habitats. In winter elk are in the vegetation types with dryland grasses and pine and in summer they are in alpine tundra and subalpine forests and meadows. Peaks in herb and upland shrub, aspen, and pine proportions are values for winter. Troughs are values for summer. Peaks for grasses and forbs, mesic grasses and forbs, and shrubs are in winter. Alpine herbaceous are in summer. Willow peaks are in summer, but peaks in one year may be less than valleys in another year.

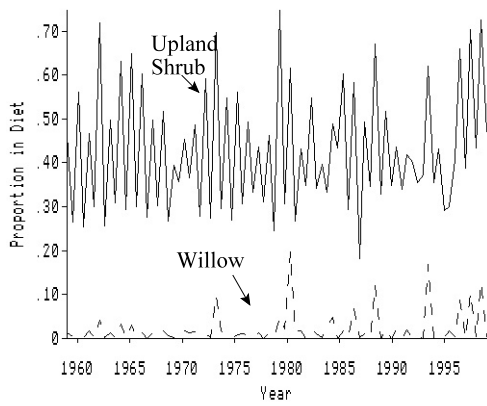
A)



B)



C)



D)

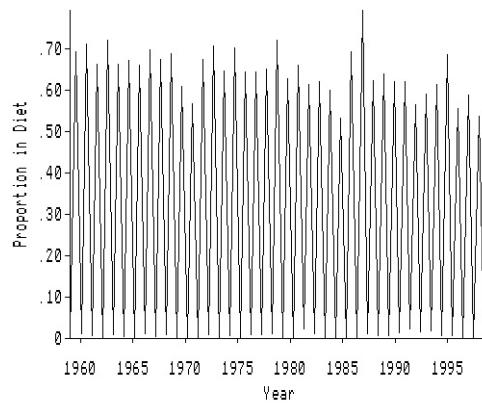
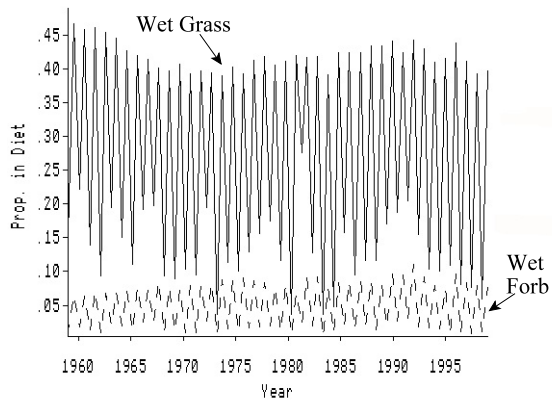
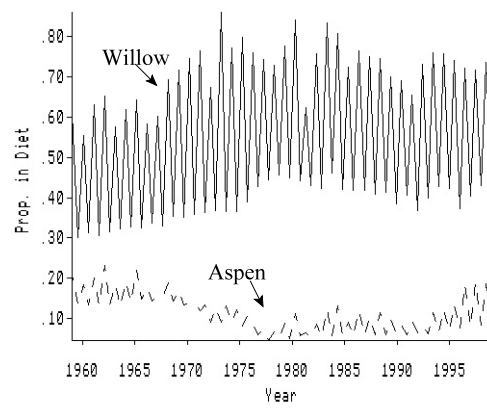


Figure 50. Composition of deer diets. A) dryland herbs, B) mesic herbs, C) upland shrubs and willow, D) alpine and subalpine herbs. Peaks for grasses and forbs, mesic grasses and forbs, and shrubs are in winter. Alpine herbaceous are in summer. Willow peaks are in summer, but peaks in one year may be less than valleys in another year.

A)



B)



C)

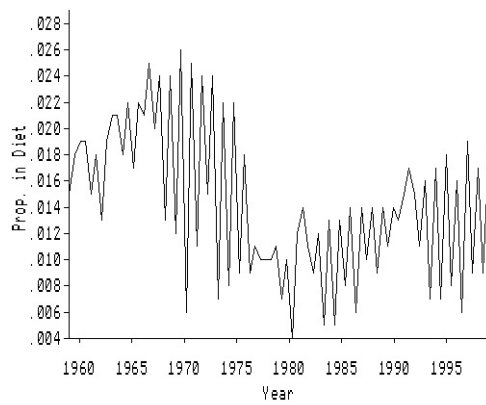
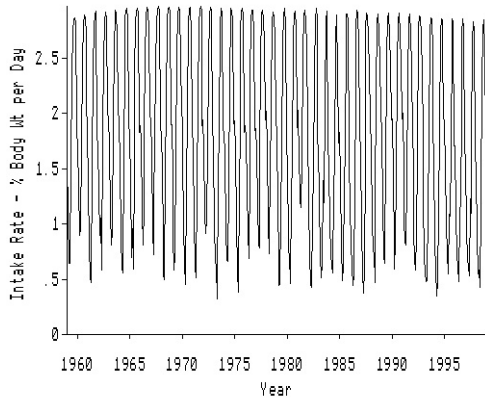
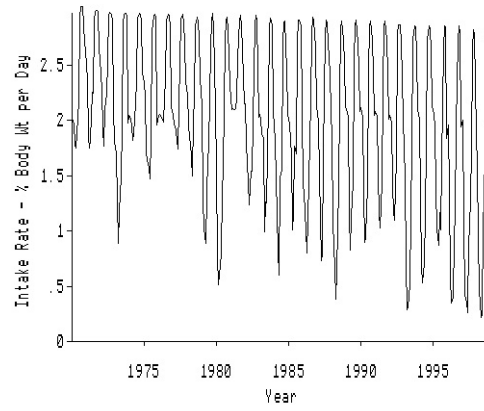


Figure 51. Composition of beaver diets. A) Mesic herbs, B) willow and aspen, and C) upland shrubs. Peaks in herbaceous occur during summer, while peaks in woody intake occur during winter.

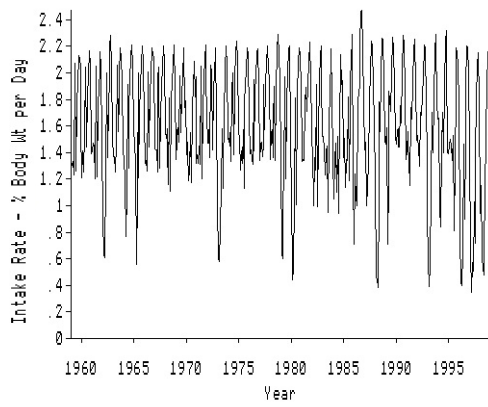
A)



B)



C)



D)

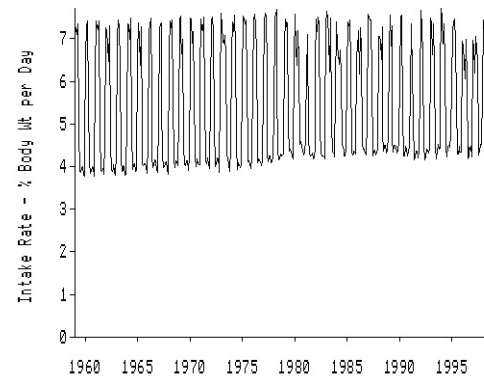
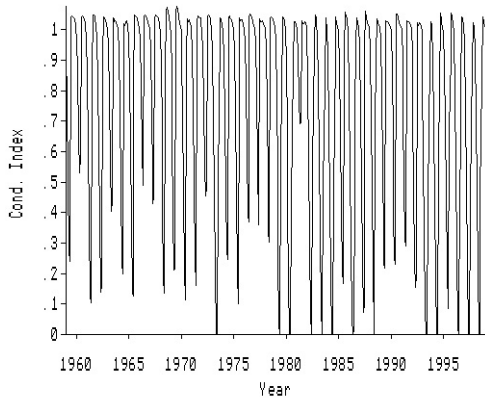
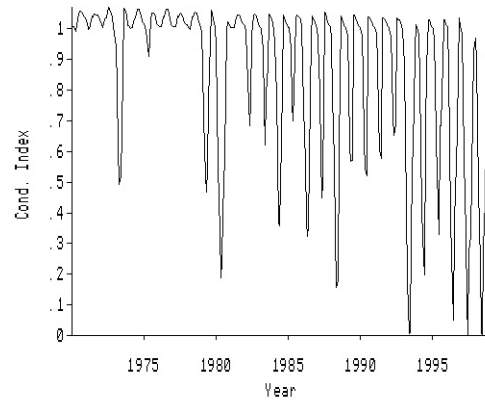


Figure 52. Forage intake rates (forage mass as a percent of body weight per day) for A) park elk herd, B) town elk herd, C) deer, D) beaver.

A)



B)



C)

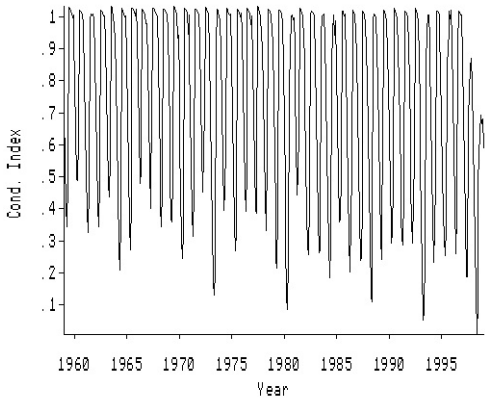
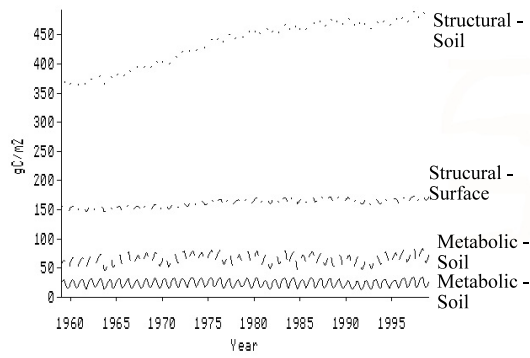


Figure 53. Condition indices of A) the park elk herd, B) the town elk herd, C) deer.

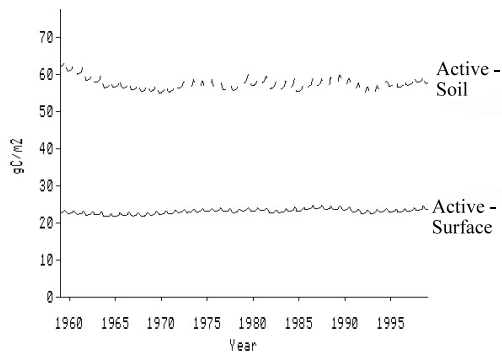
A)



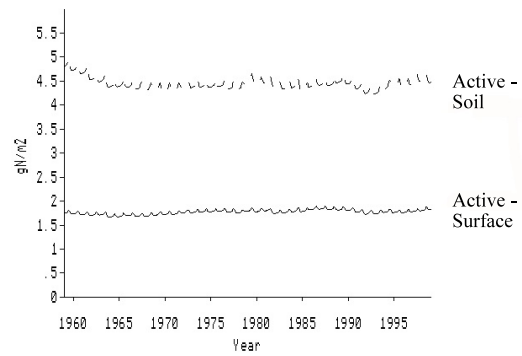
B)



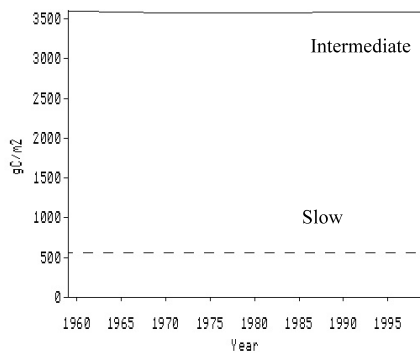
C)



D)



E)



F)

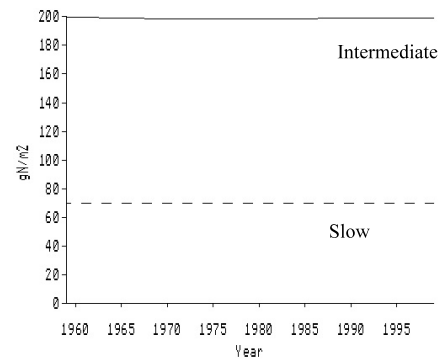


Figure 54. A) Litter carbon in surface metabolic and structural, soil metabolic and structural pools. B) Litter nitrogen in surface structural litter pool. C) Active soil organic matter carbon in surface and soil pools. D) Active soil organic matter nitrogen in surface and soil pools. E) Soil organic matter carbon in intermediate and soil turnover pools. F) Soil organic matter nitrogen in slow and intermediate turnover pools.