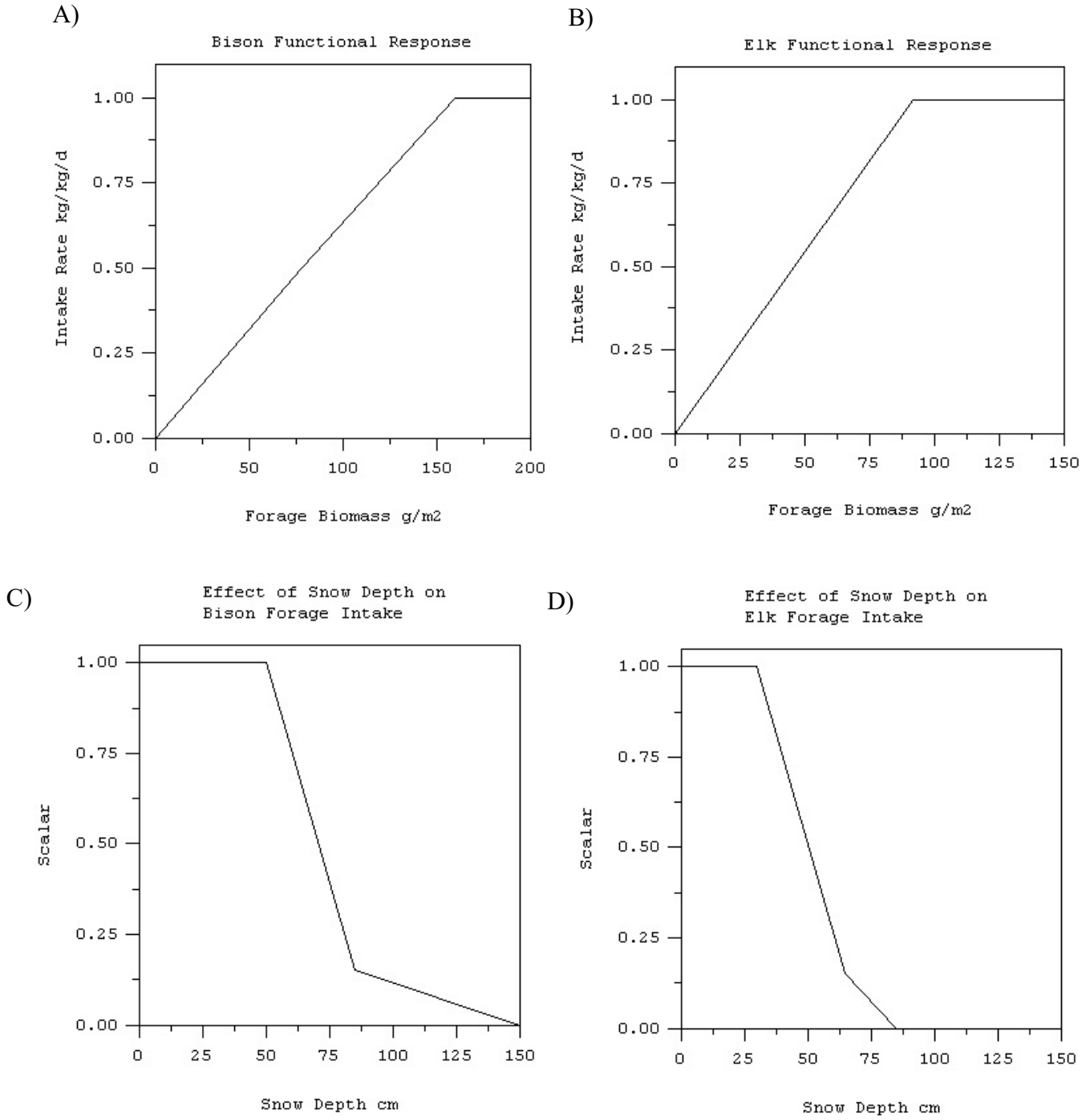


Figure 1. Forage intake rate as a function of forage biomass (the functional response) for A) bison and B) elk. Effect of snow depth on forage intake rate by A) bison and B) elk.

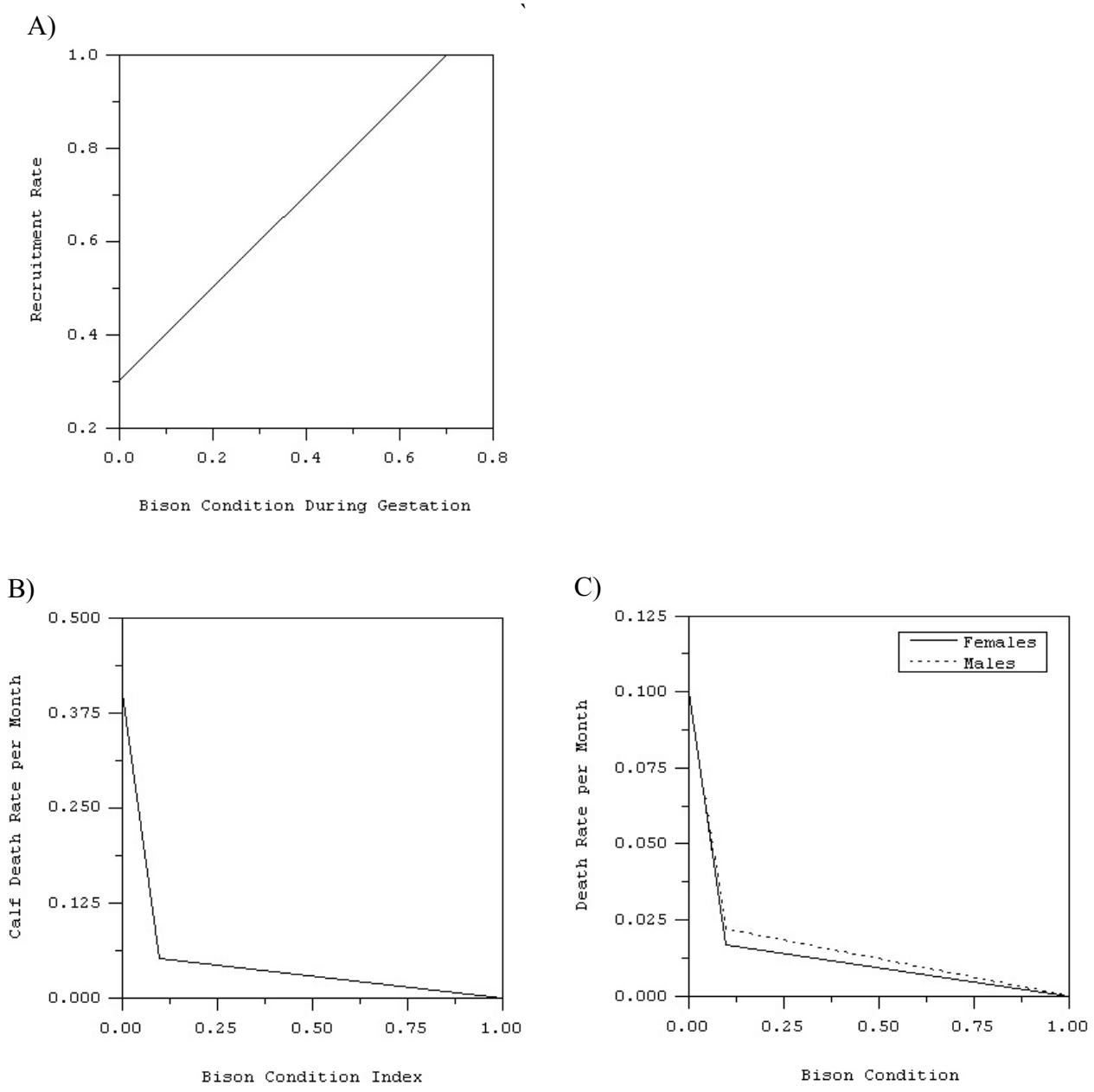


Figure 2. Effects of bison condition indices on A) annual recruitment (births minus neonate and early calf mortality), B) calf mortality rate, C) adult mortality rate.

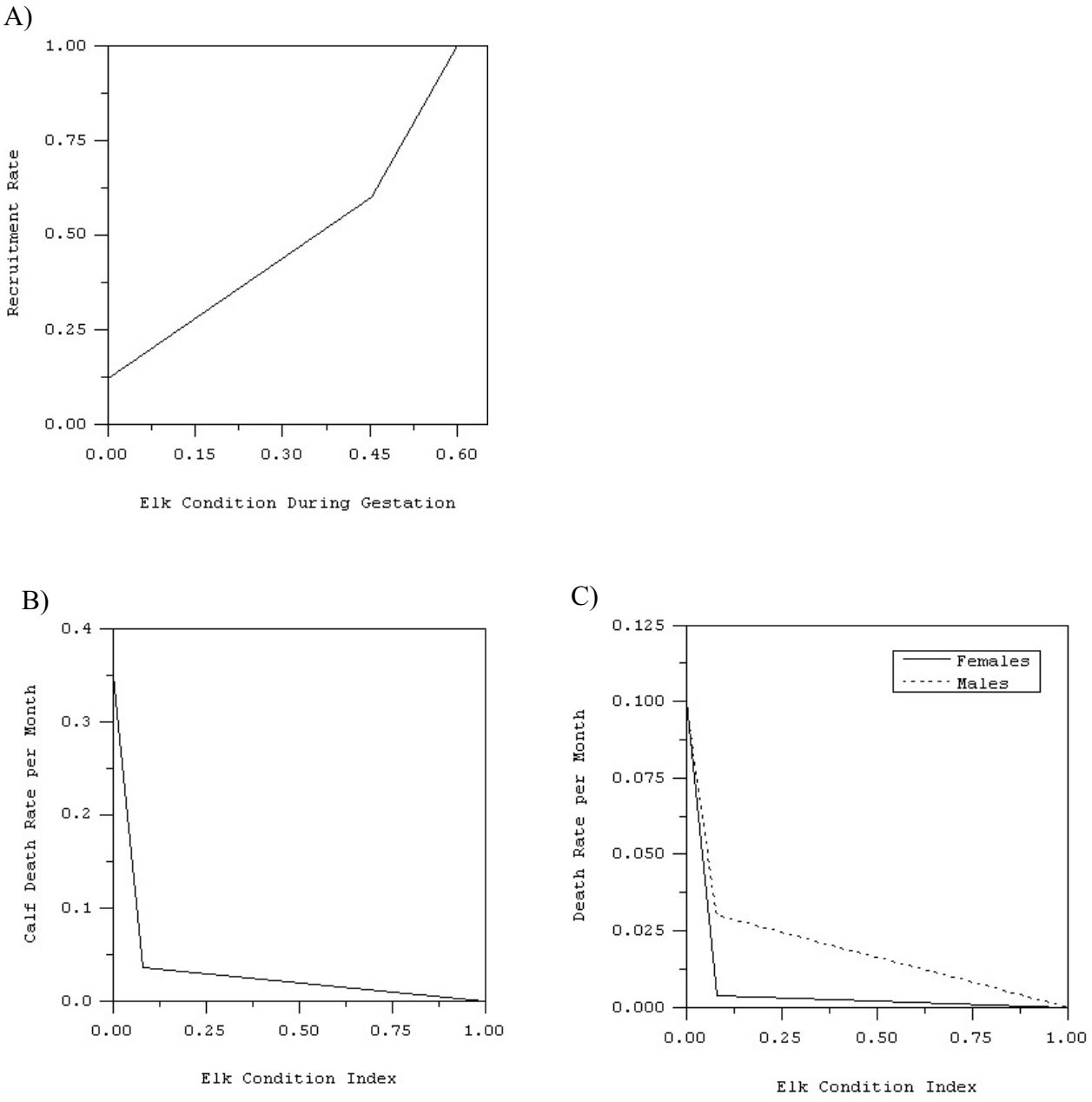
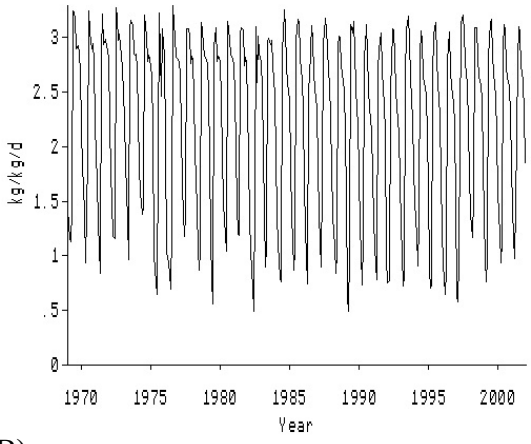
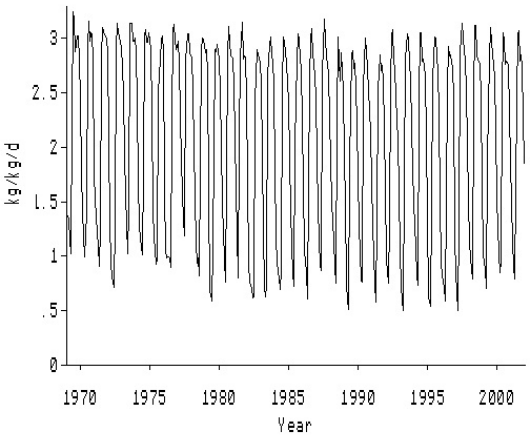


Figure 3. Effects of elk condition indices on A) annual recruitment (births minus neonate and early calf mortality), B) calf mortality rate, C) adult mortality rate.

A)



B)



C)

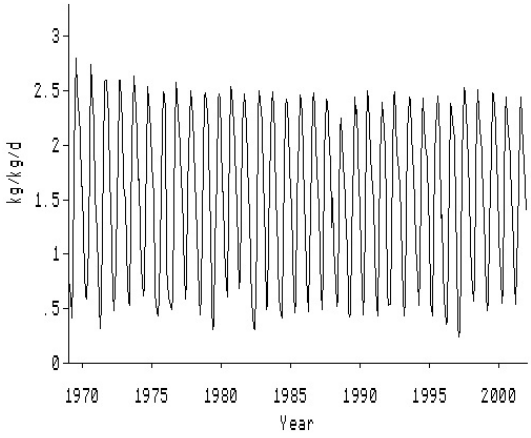


Figure 4. Forage intake rates by A) northern bison, B) central bison, C) northern elk.

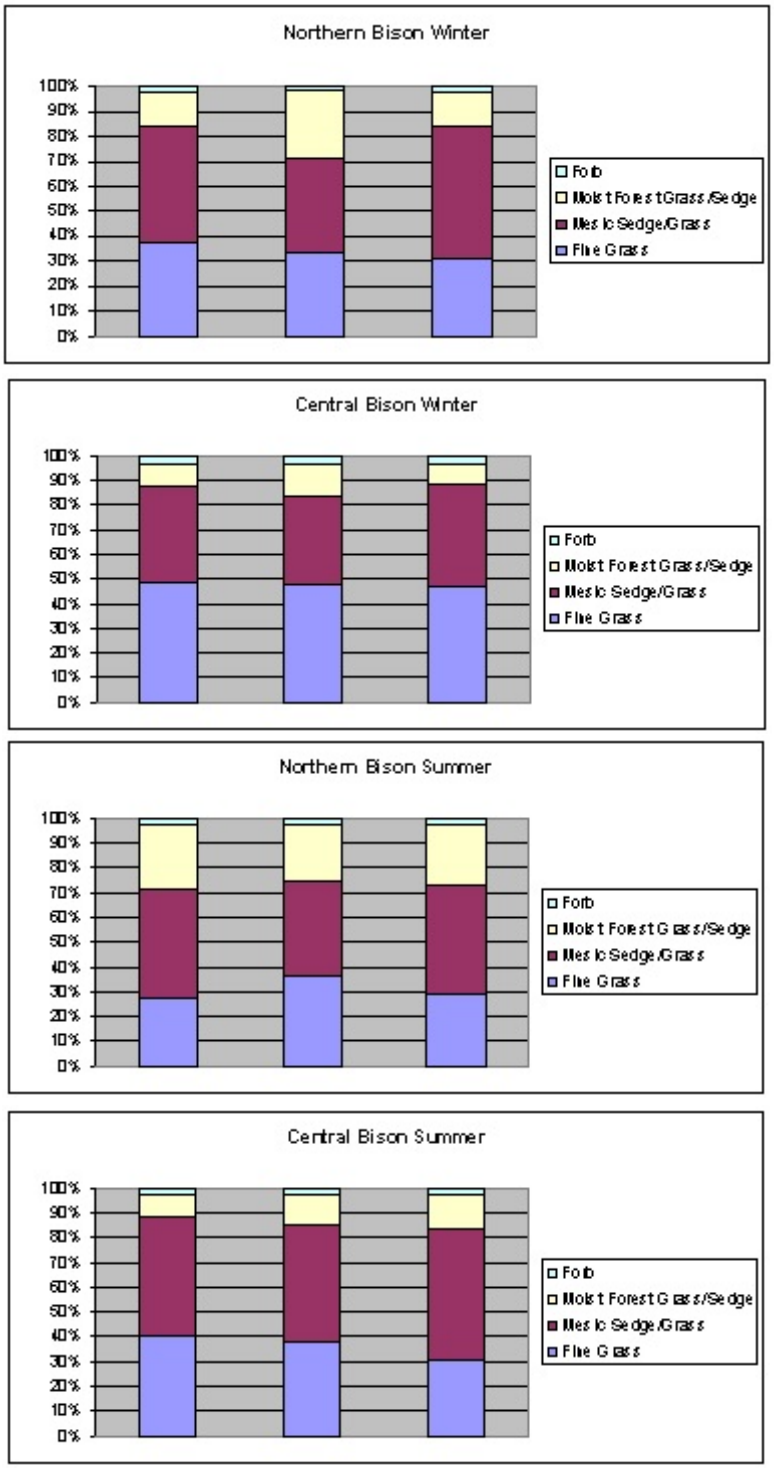


Figure 5. Simulated bison diets in winter and summer. The three bars represent diets in 1969-1981, 1982-1993, and 1994-2001, from left to right.

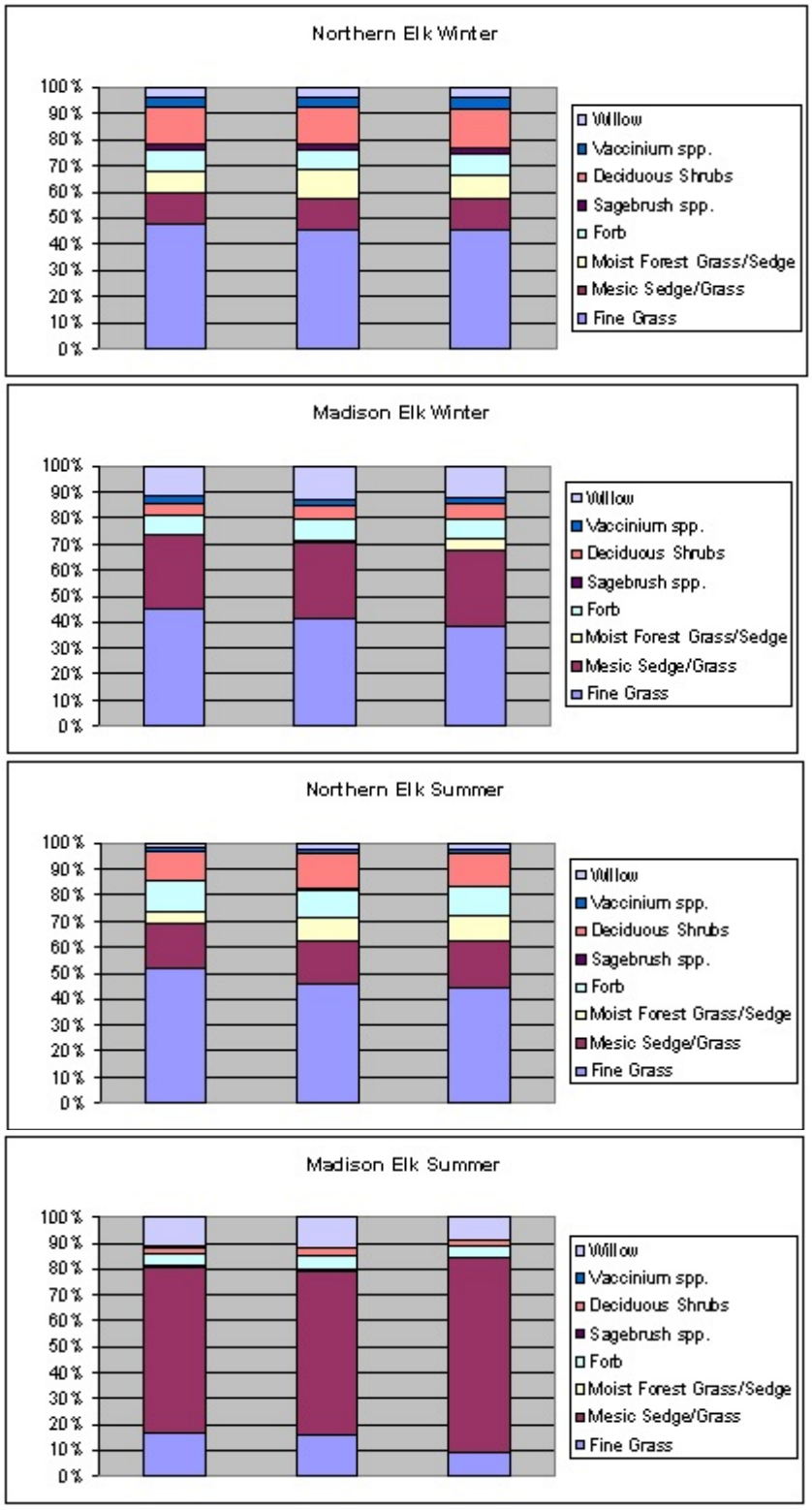
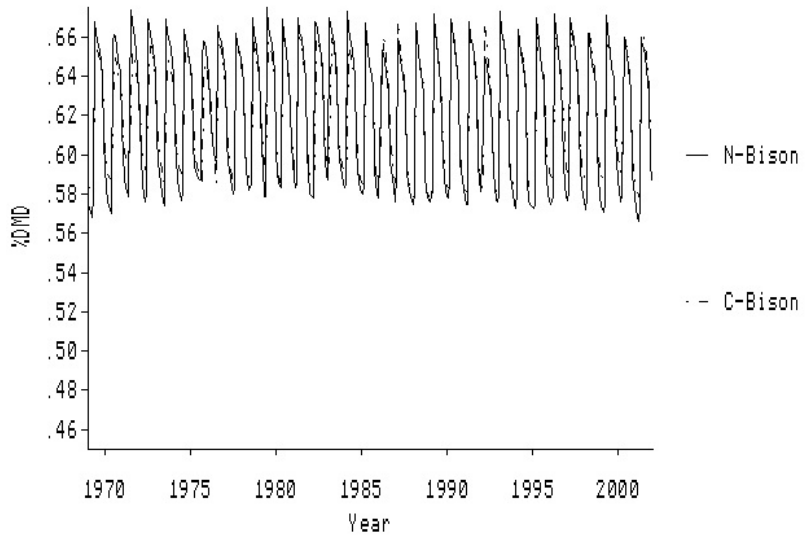


Figure 6. Simulated elk diets in winter and summer. The three bars represent diets in 1969-1981, 1982-1993, and 1994-2001, from left to right.

A)



B)

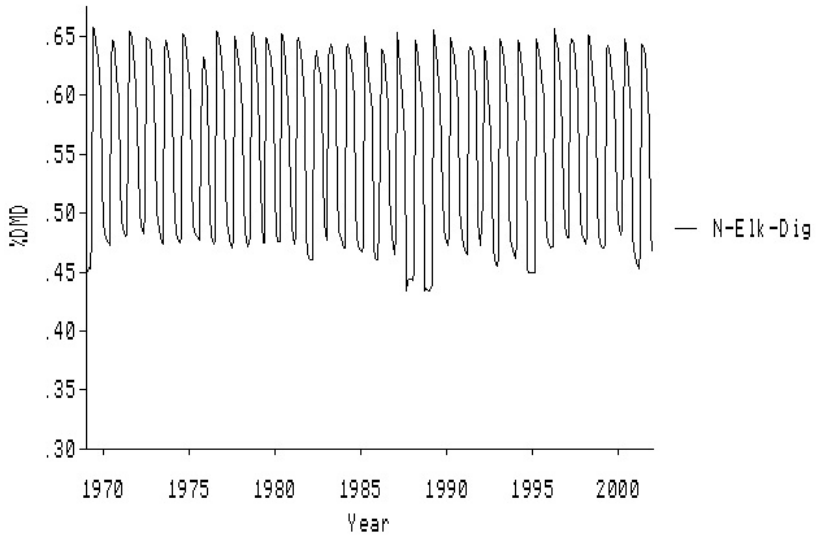
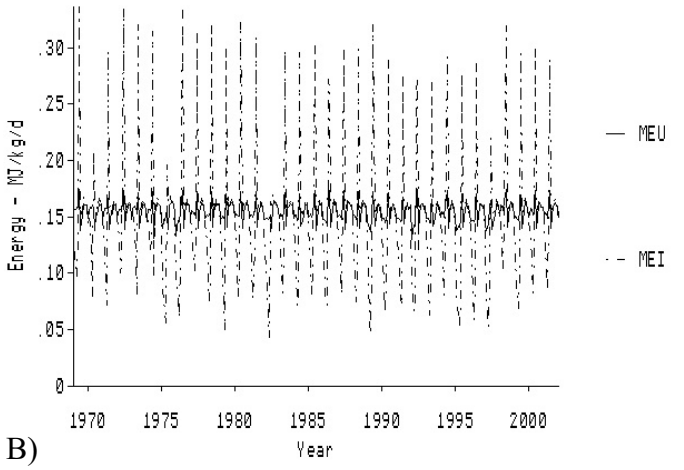
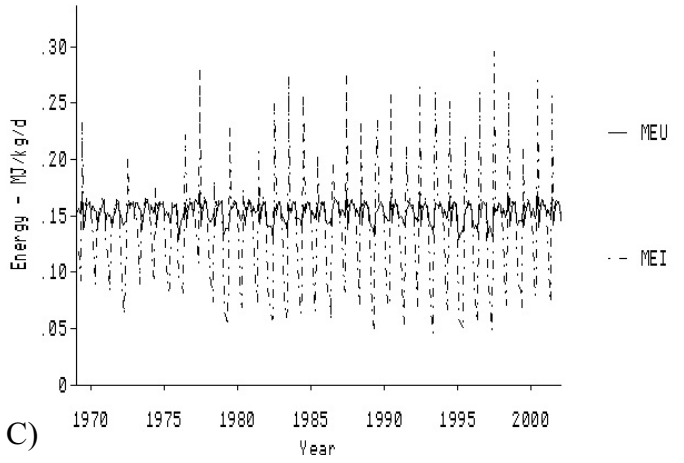


Figure 7. Digestibilities of forage consumed by A) bison, and B) northern elk.

A)



B)



C)

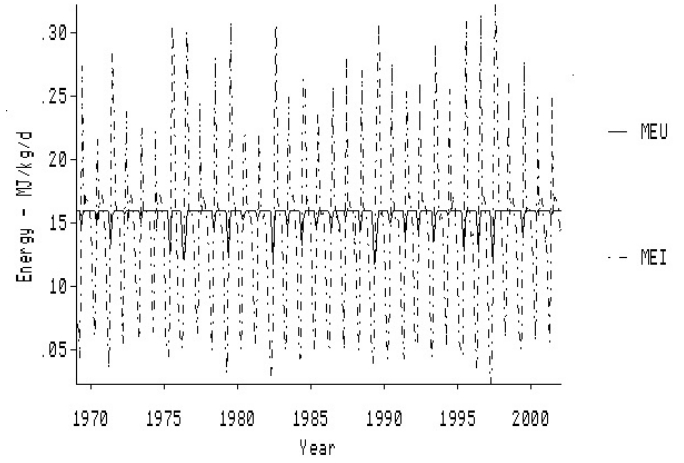
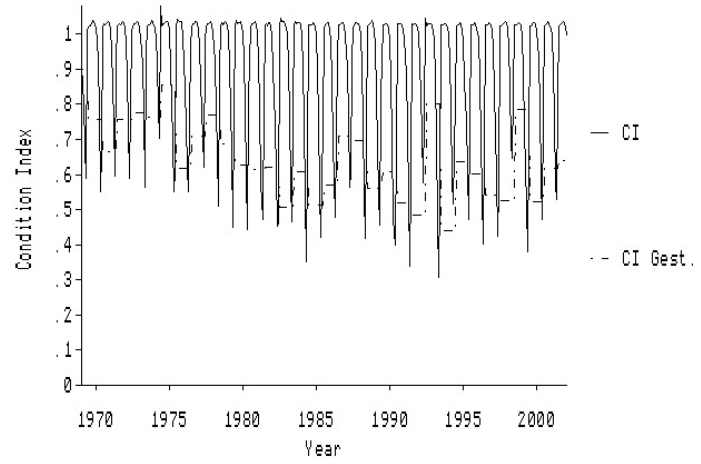
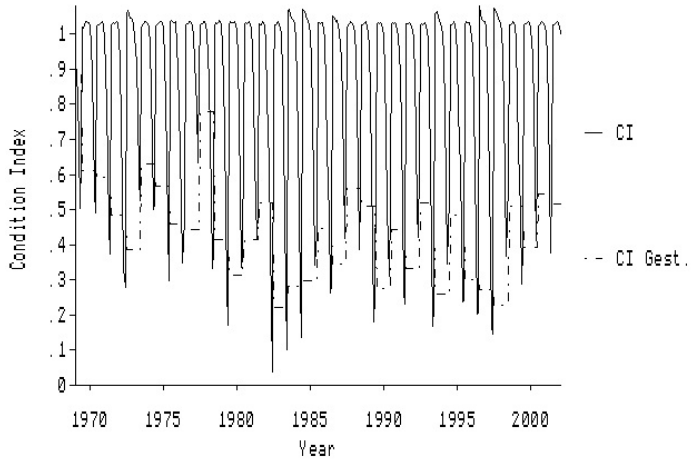


Figure 8. Energy intake (dashed line) relative to energy requirement (solid line) for A) northern bison, B) central bison, and C) northern elk.





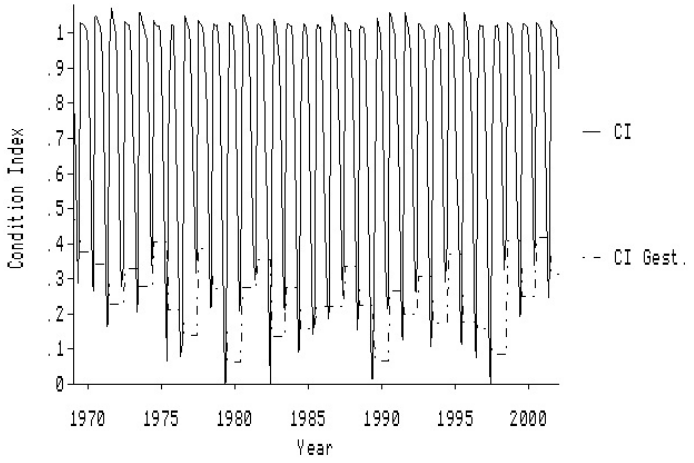


Figure 9 Condition indices of A) northern bison, B) central bison, c) northern elk. Dashed line is condition index during the critical months of gestation, affecting early calf survival

A)

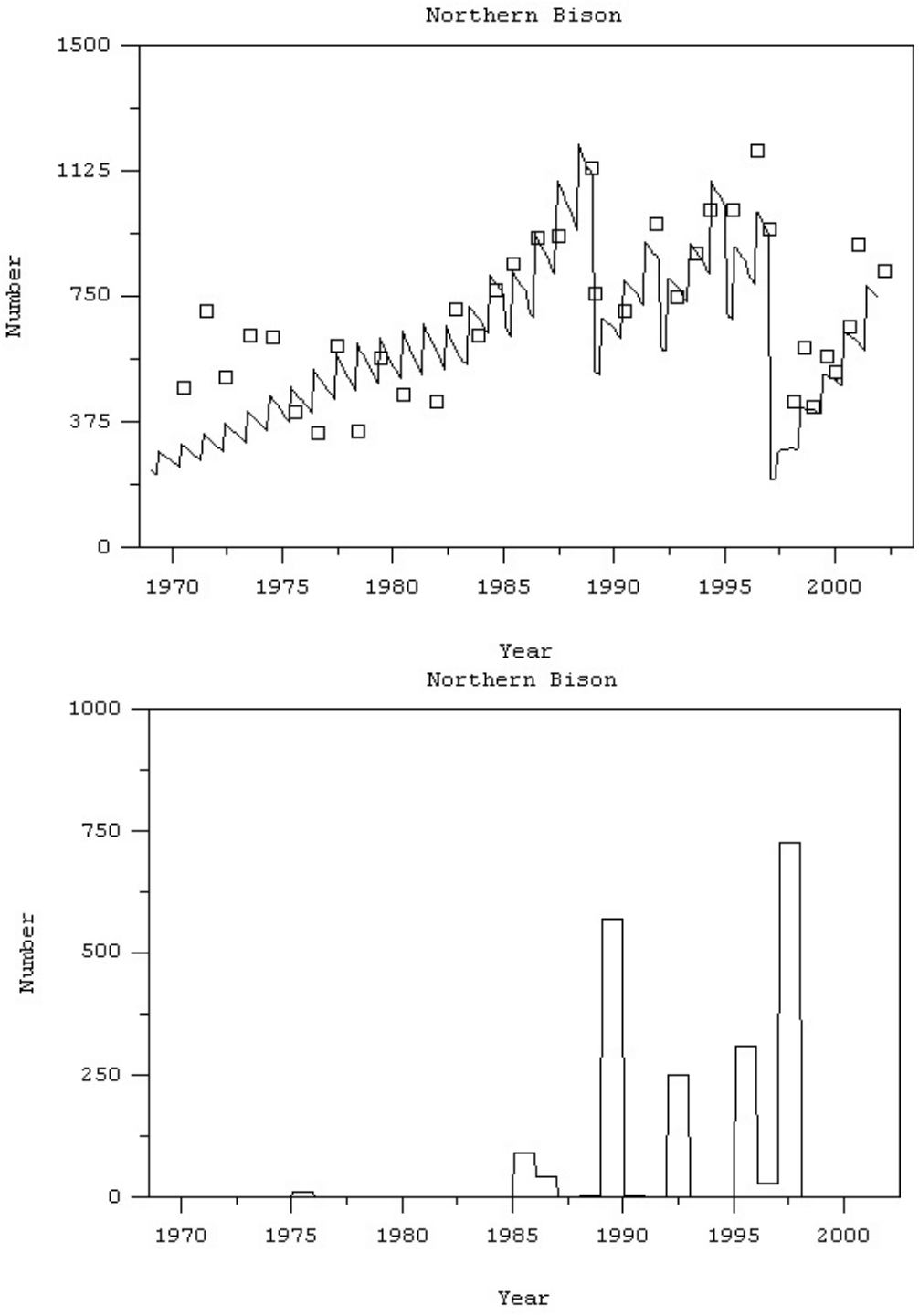
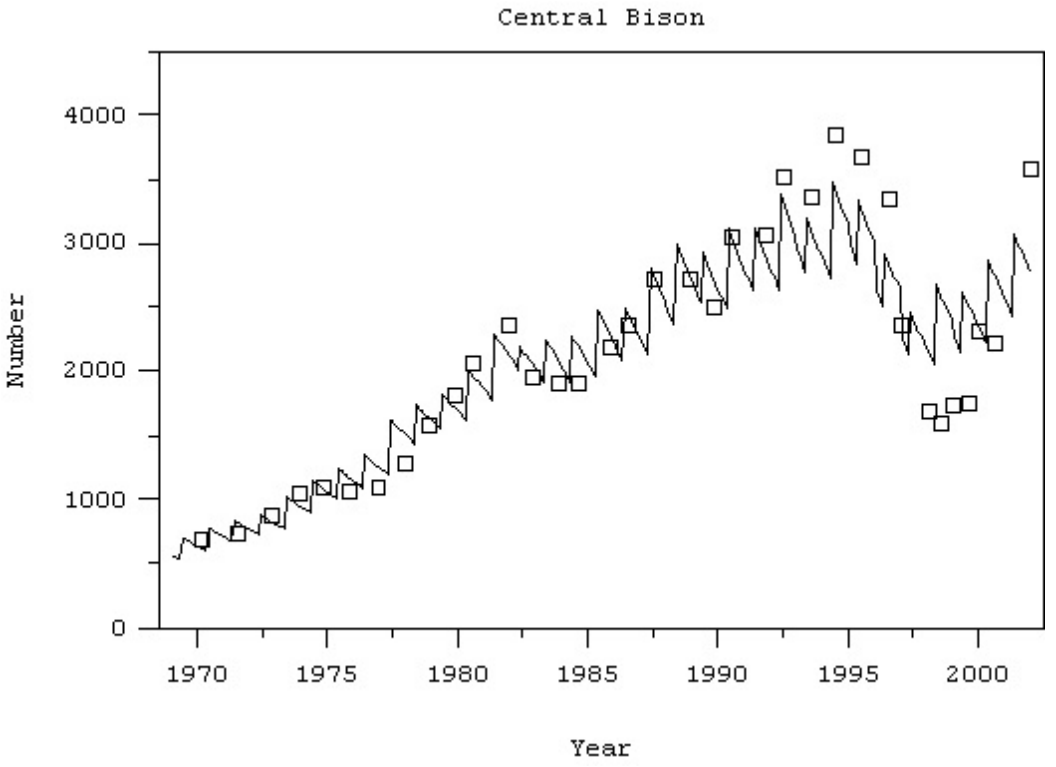


Figure 10. A) Observed (boxes) and predicted (line) population dynamics of northern bison 1969-2001, and B) number removed.



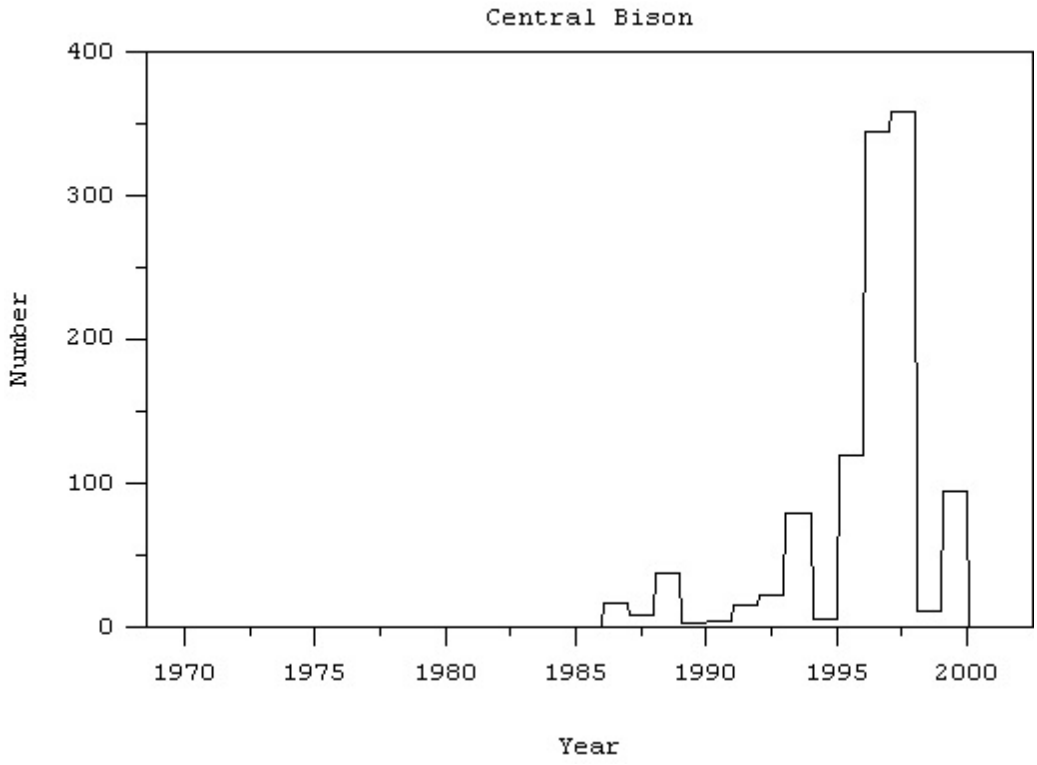


Figure 11. A)Observed (boxes) and predicted (line) population dynamics of central bison 1969-

2001, and B) number removed.

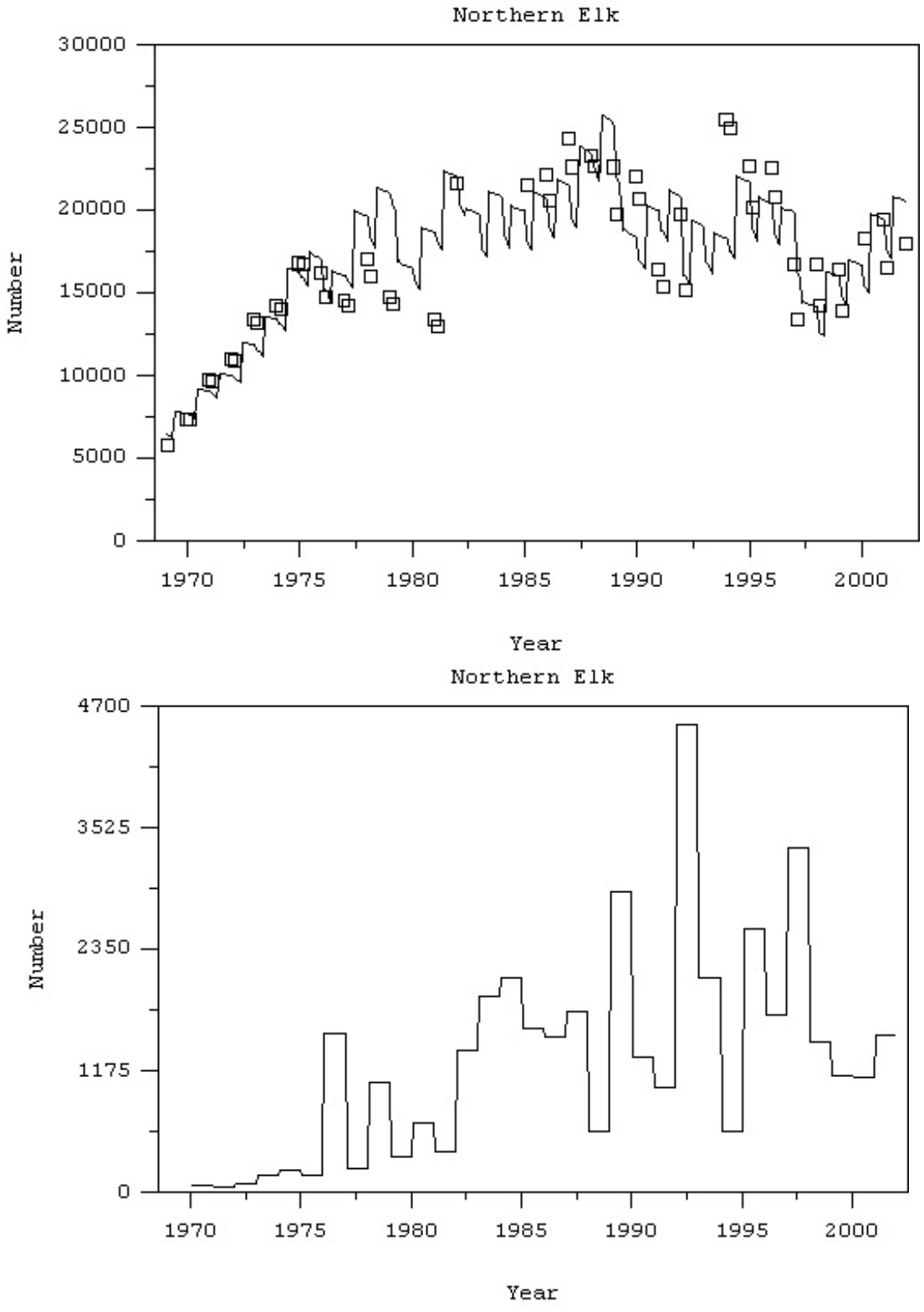


Figure 12. A) Observed (boxes) and predicted (line) population dynamics of northern elk 1969-2001. and B) number hunted.

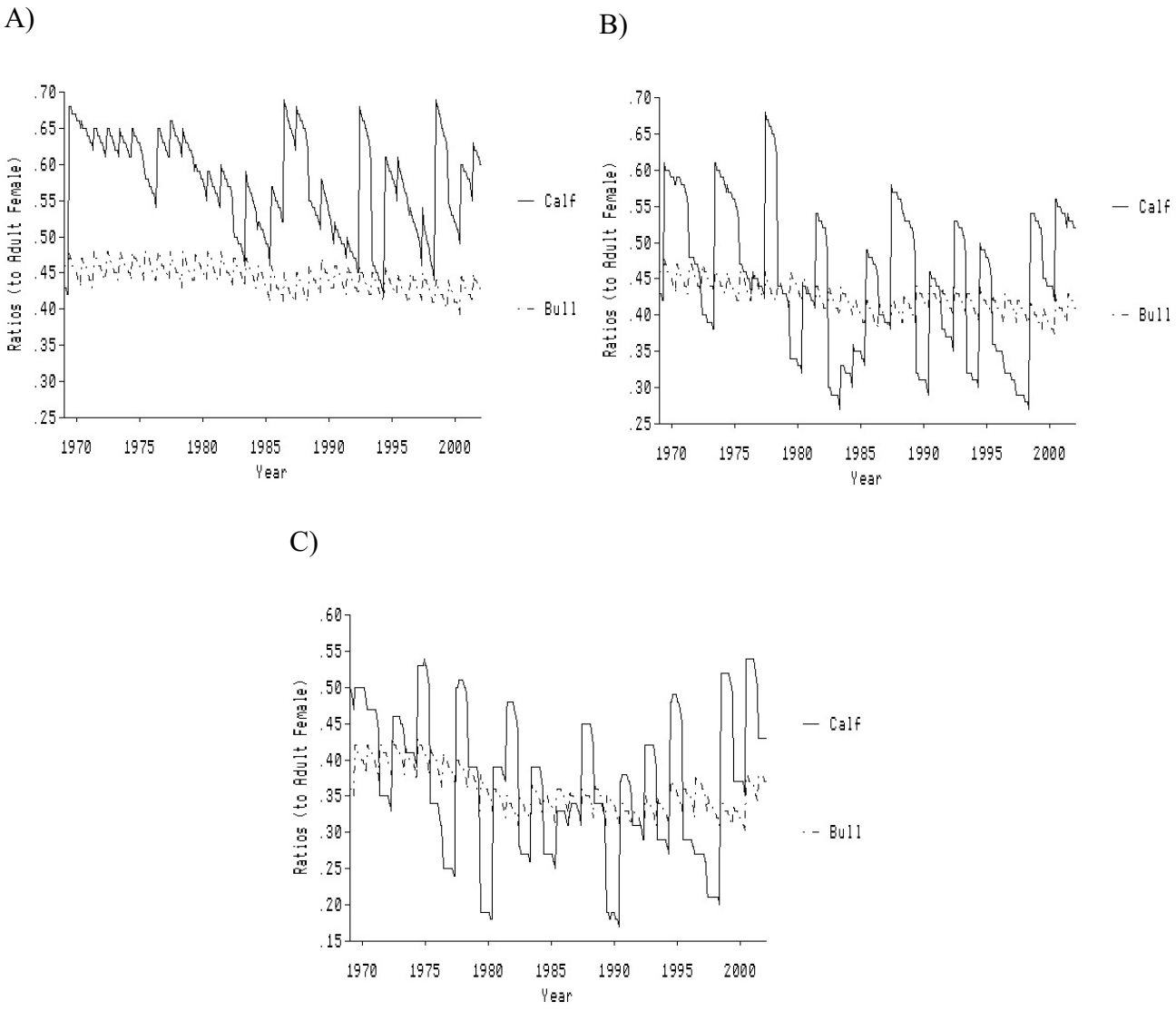


Figure 13. Calf and bull ratios to cows 1969-2001 for A) northern bison, B) central bison, C) northern elk. Bulls are defined here as all males older than yearlings. Cows are all females older than yearlings.

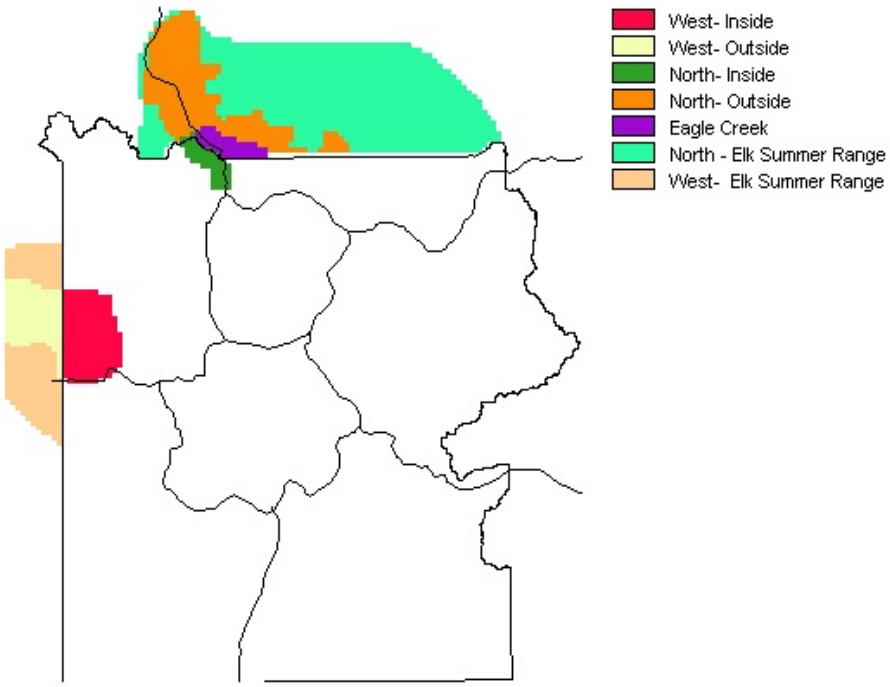
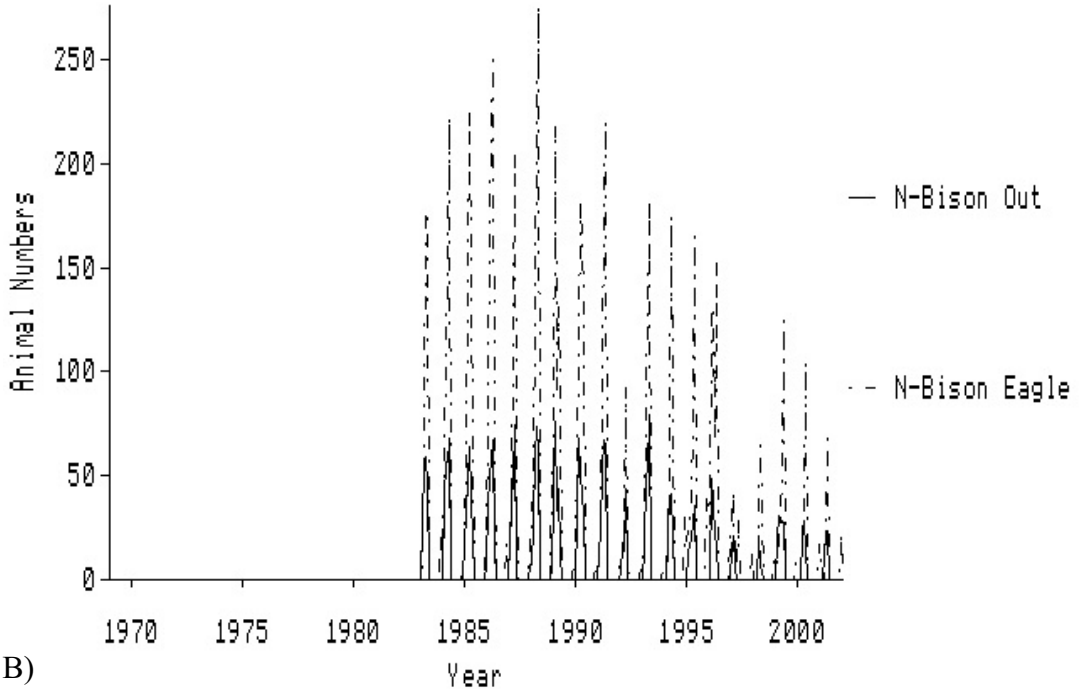


Figure 14. Bison and elk management zones outside of the park.

A)



B)

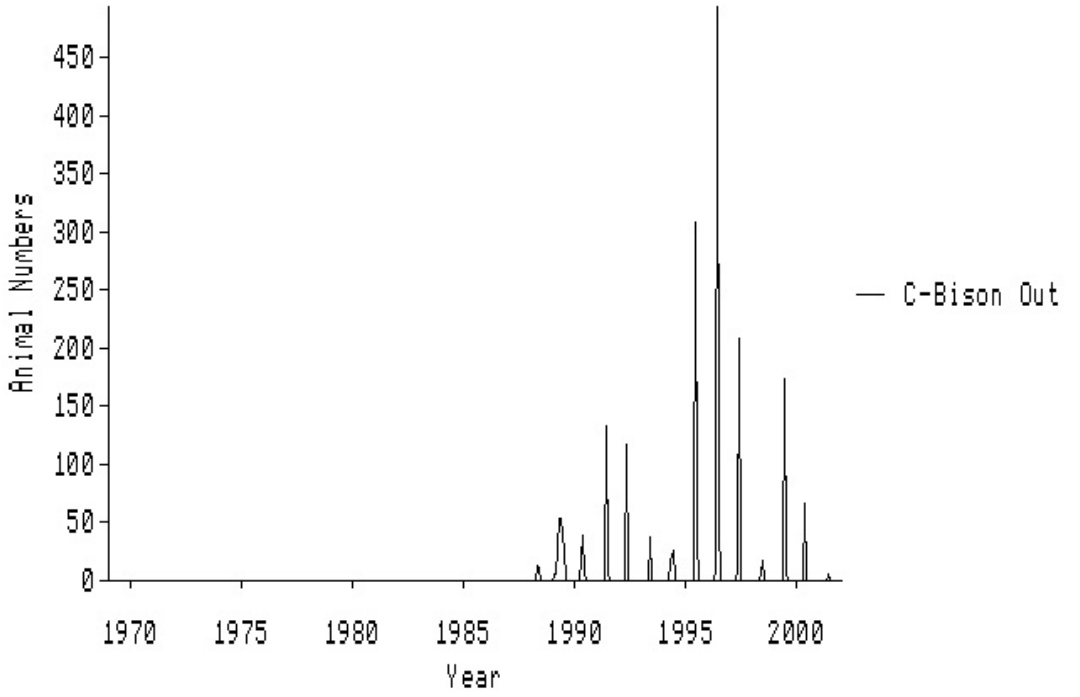


Figure 15. Simulated number of bison outside park 1969-2001 for A) northern herd in , B) central herd.

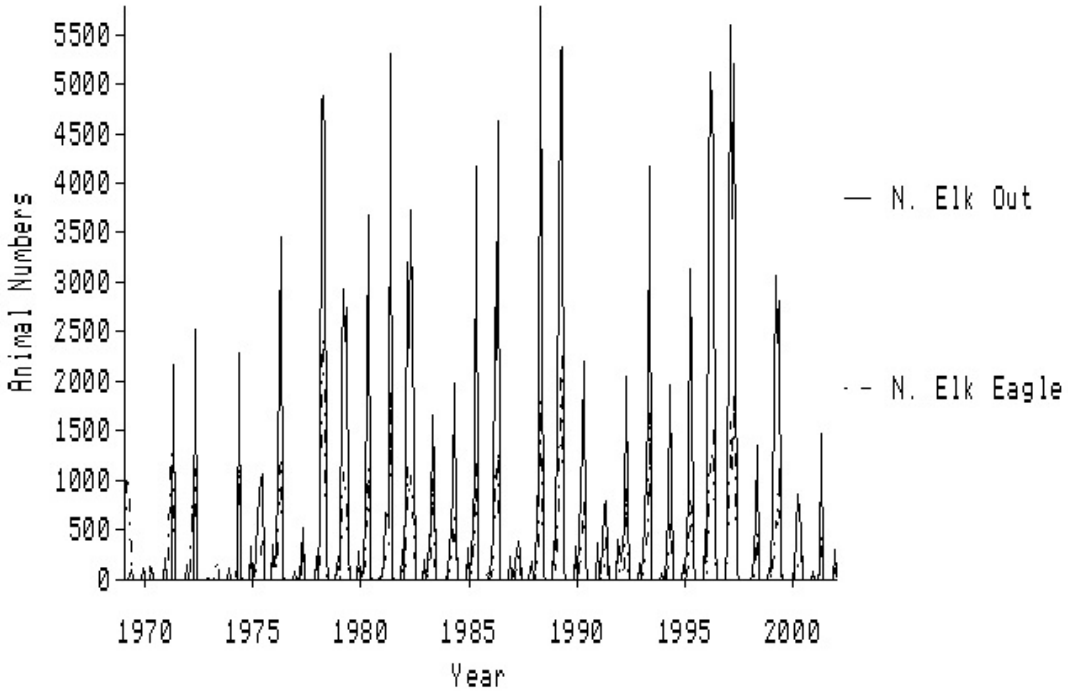


Figure 16. Simulated number of elk outside park 1969-2001.

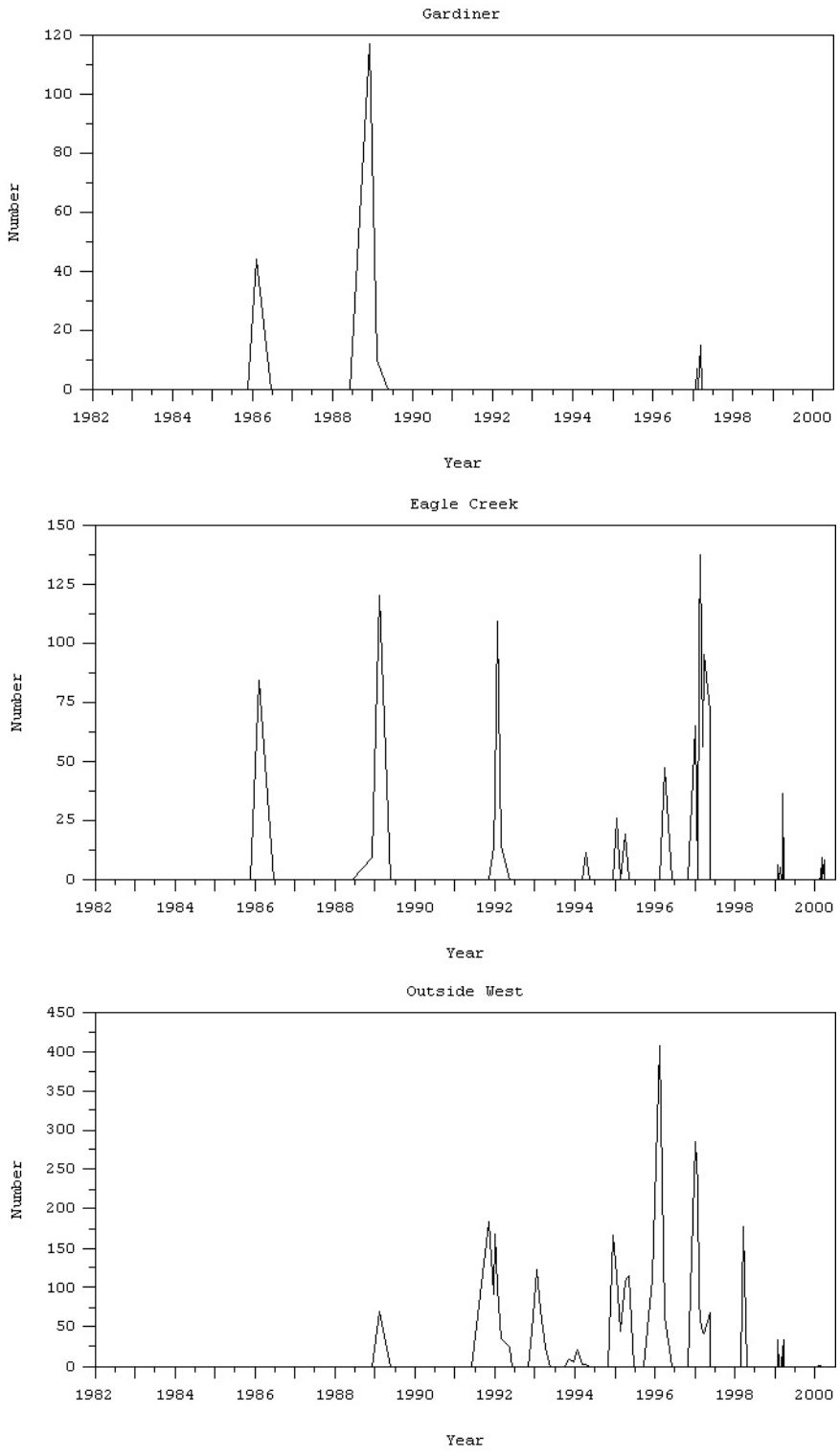


Figure 17. Numbers of bison in three different areas outside of the park boundary based upon a GIS analysis of the 1970-1997 aerial survey data collected by M. Meagher. (Taper et al. 2000), and the aerial survey data of Hess (2001) from 1998-2000.

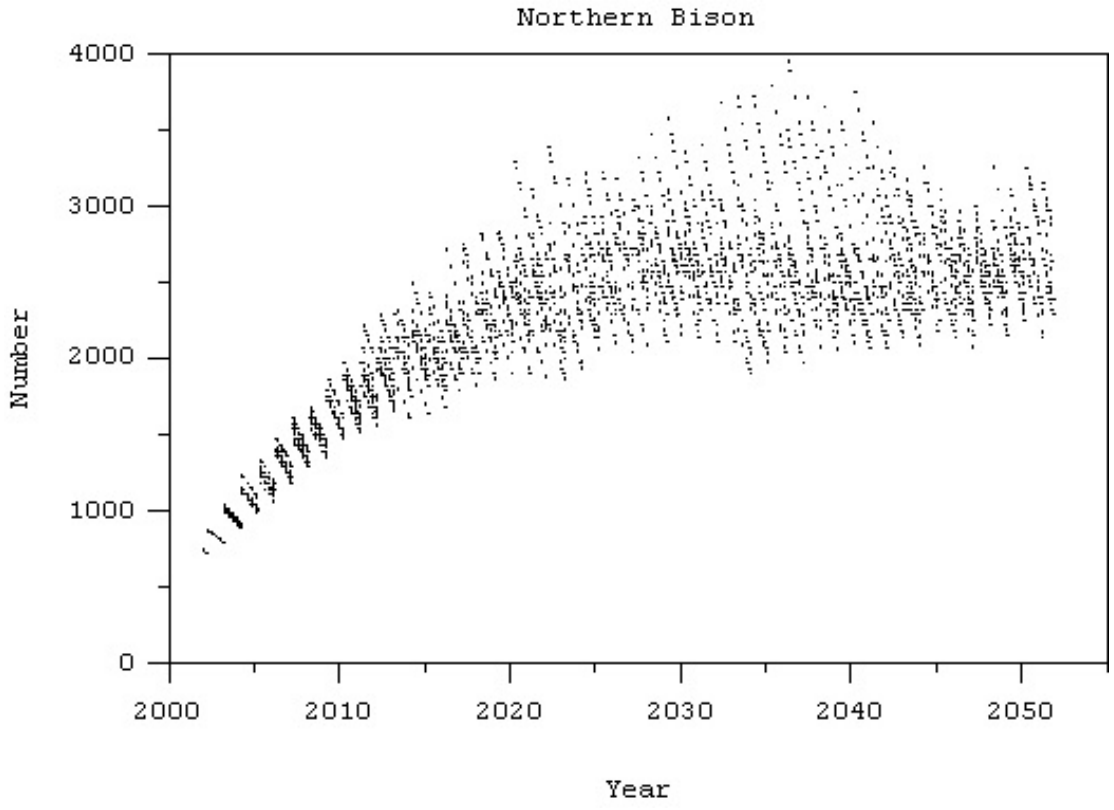


Figure 18. Northern bison numbers in 8 different stochastic simulations with no hunting or culling.

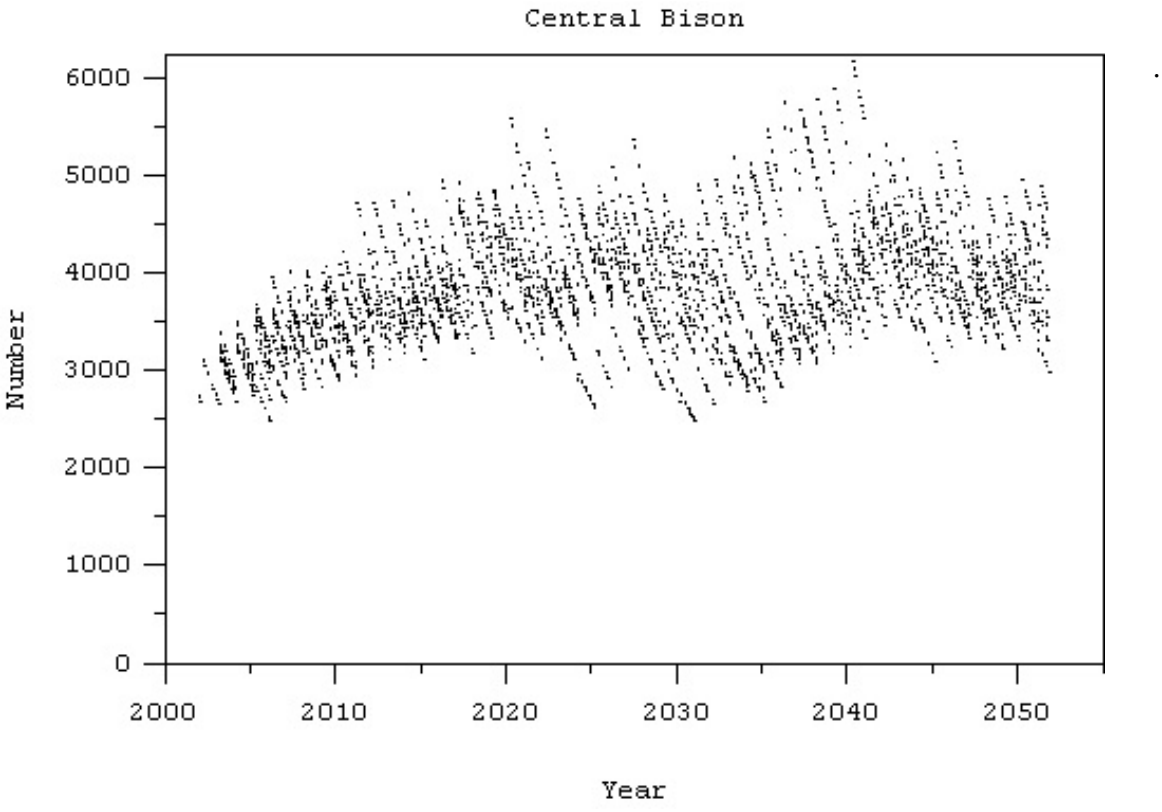


Figure 19. Central bison numbers in 8 different stochastic simulations with no hunting or culling.

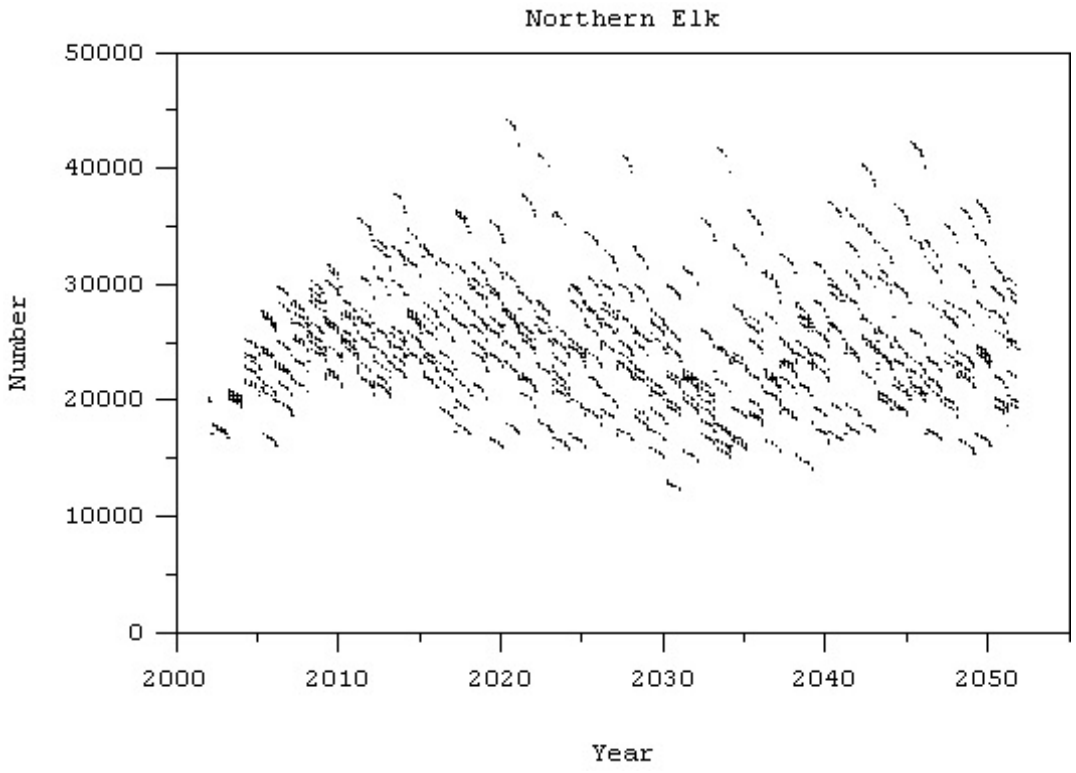


Figure 20. Northern elk numbers in 8 different stochastic simulations with no hunting or culling.

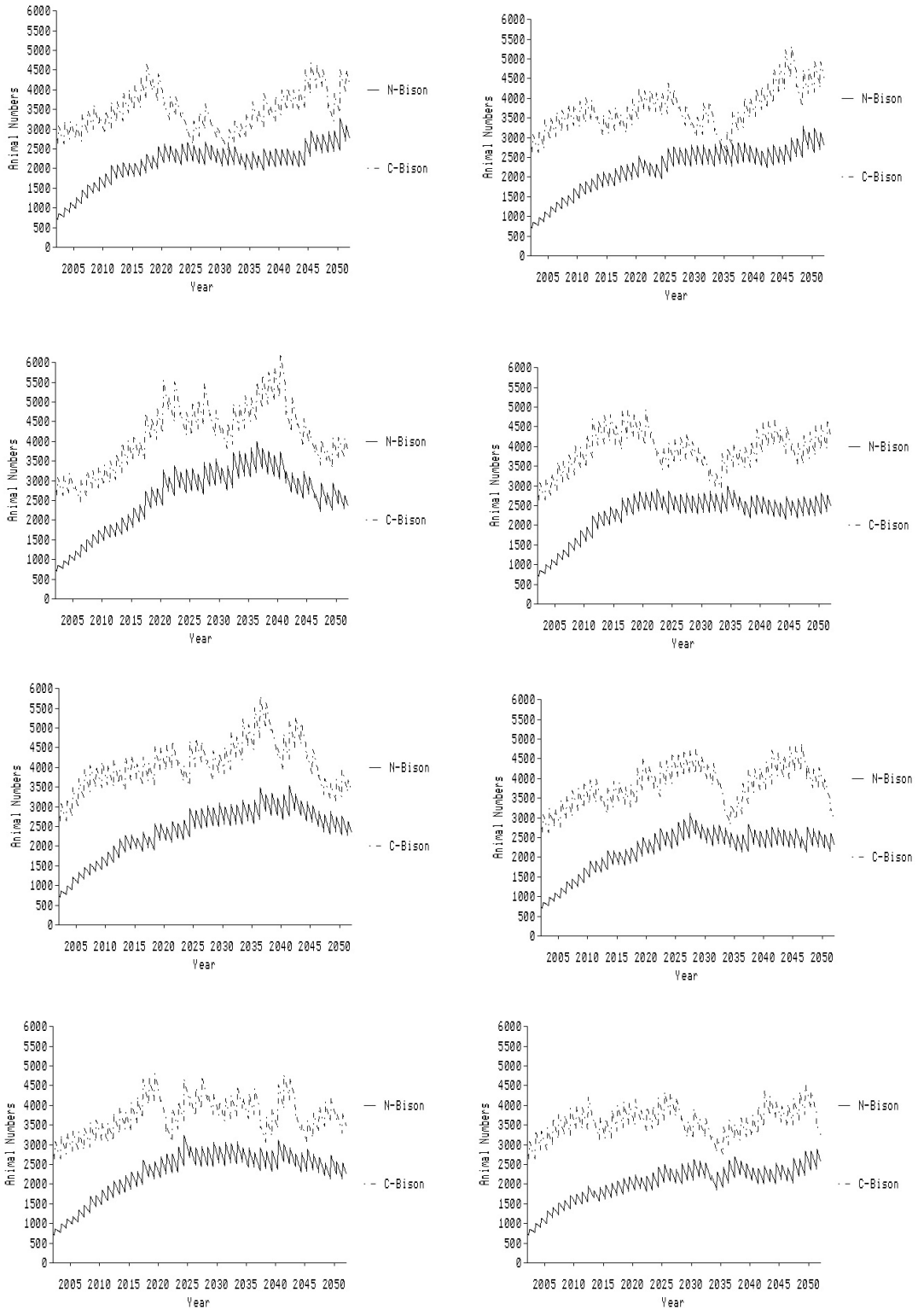


Figure 21. Trajectories of bison populations in 8 runs with different stochastic weather scenarios with no hunting or culling.

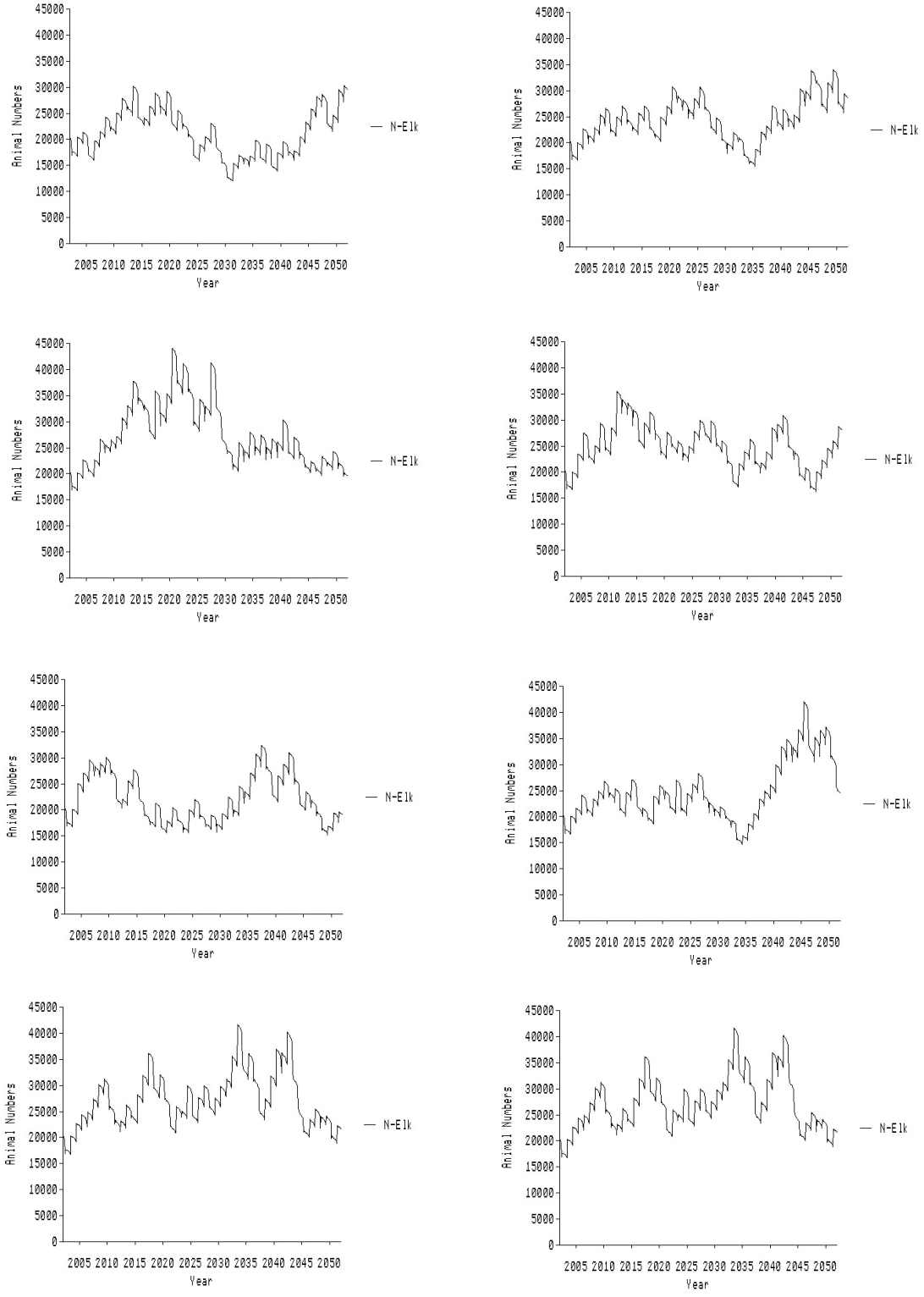


Figure 22. Trajectories of northern elk populations in 8 runs with different stochastic weather scenarios with no hunting or culling.

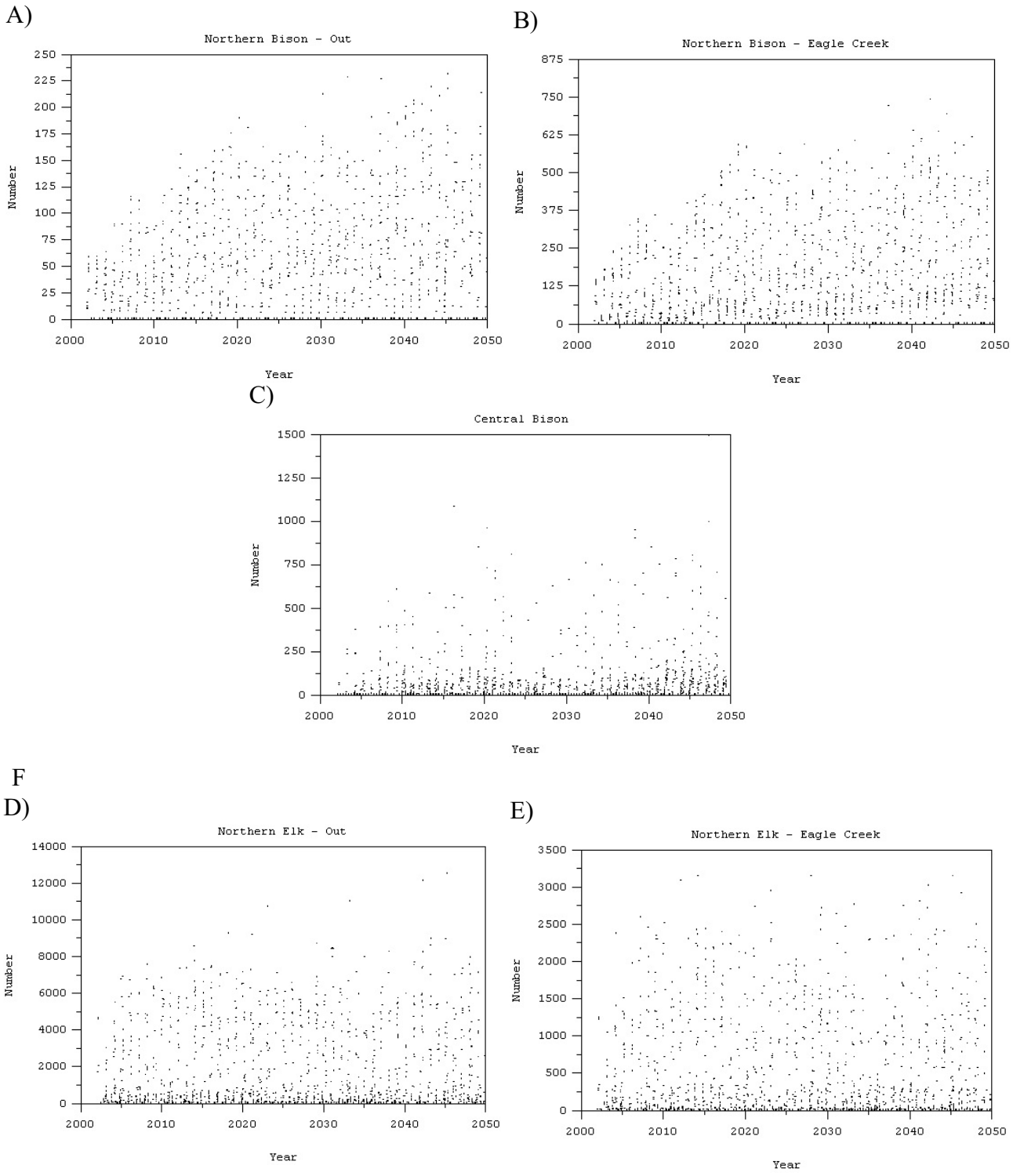


Figure 23. Number of bison found outside the park with no removals. A) bison in the "north out" area, B) bison in the Eagle Creek area, C) bison outside the western boundary, D) elk in the "north out area, E) elk in the Eagle Creek area.

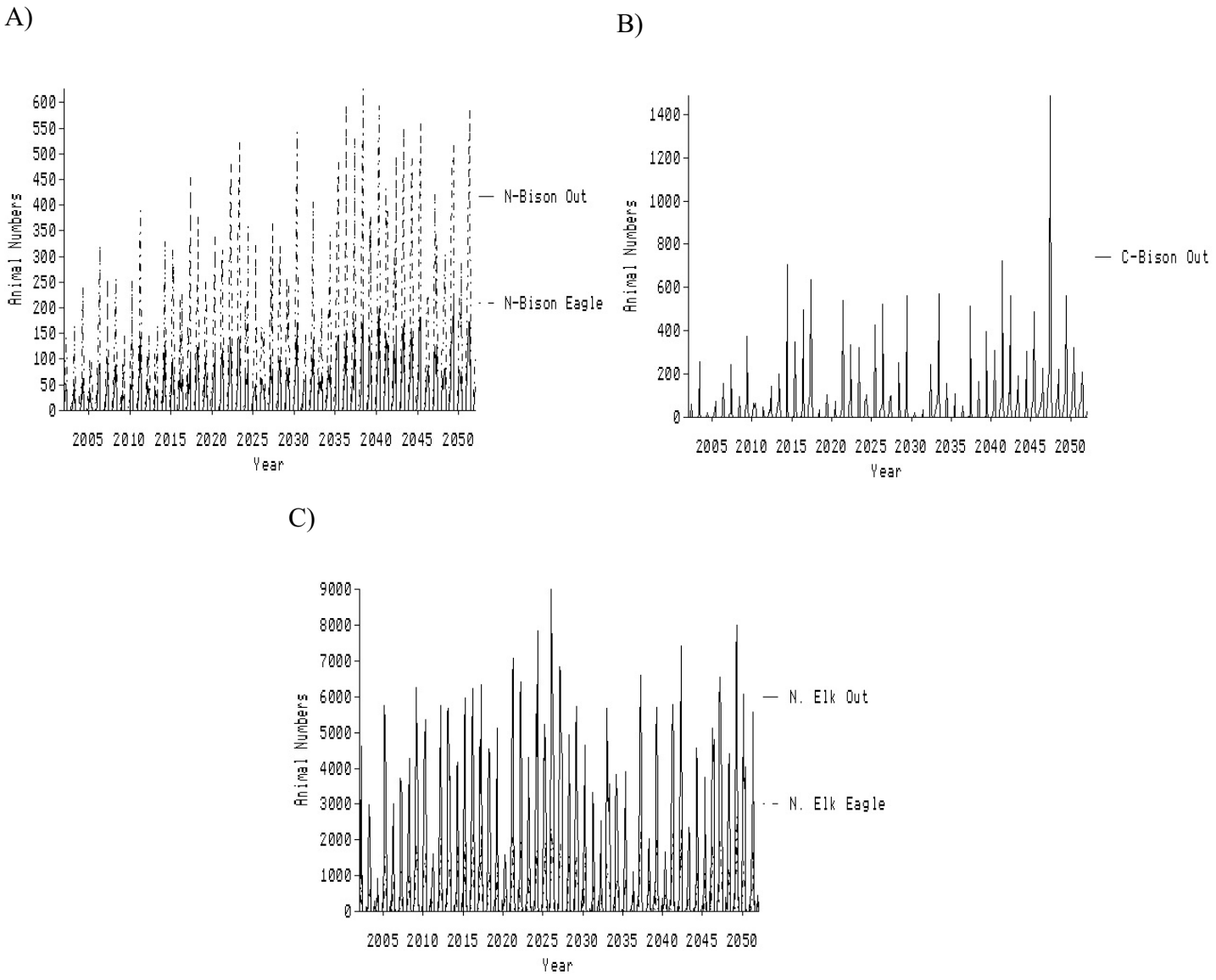


Figure 24. A) Number of northern bison outside park (solid line is number in “north outside”, dashed line is number in Eagle Creek area), B) number of central bison outside park, C) number of elk outside park in one stochastic simulation with no hunting or culling of either bison or elk.

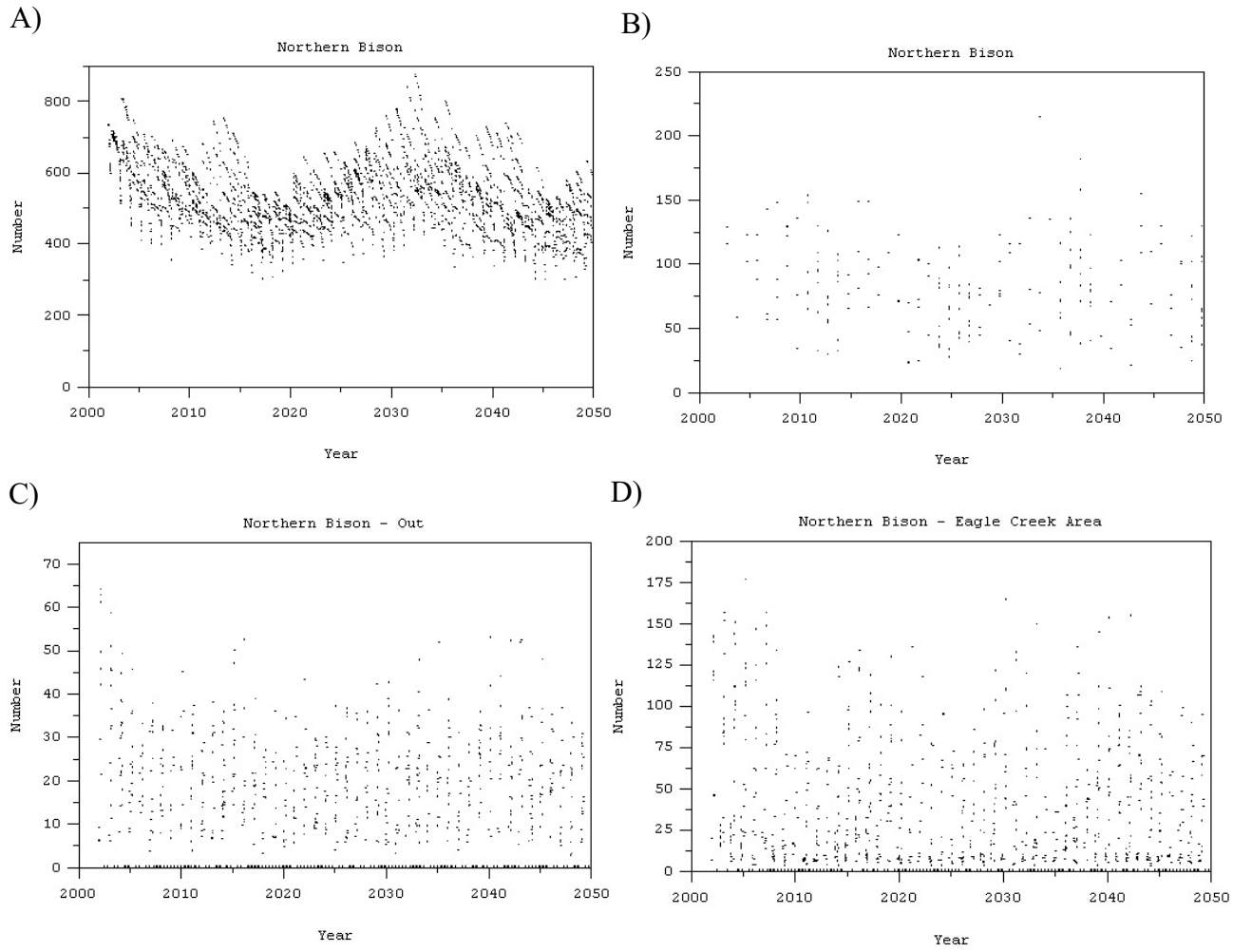


Figure 25. A) Number of northern herd bison, B) number removed per year, C) number found outside the park in any month, D) number found in the Eagle Creek area in 8 stochastic simulation when 45% of animals outside the park were removed.

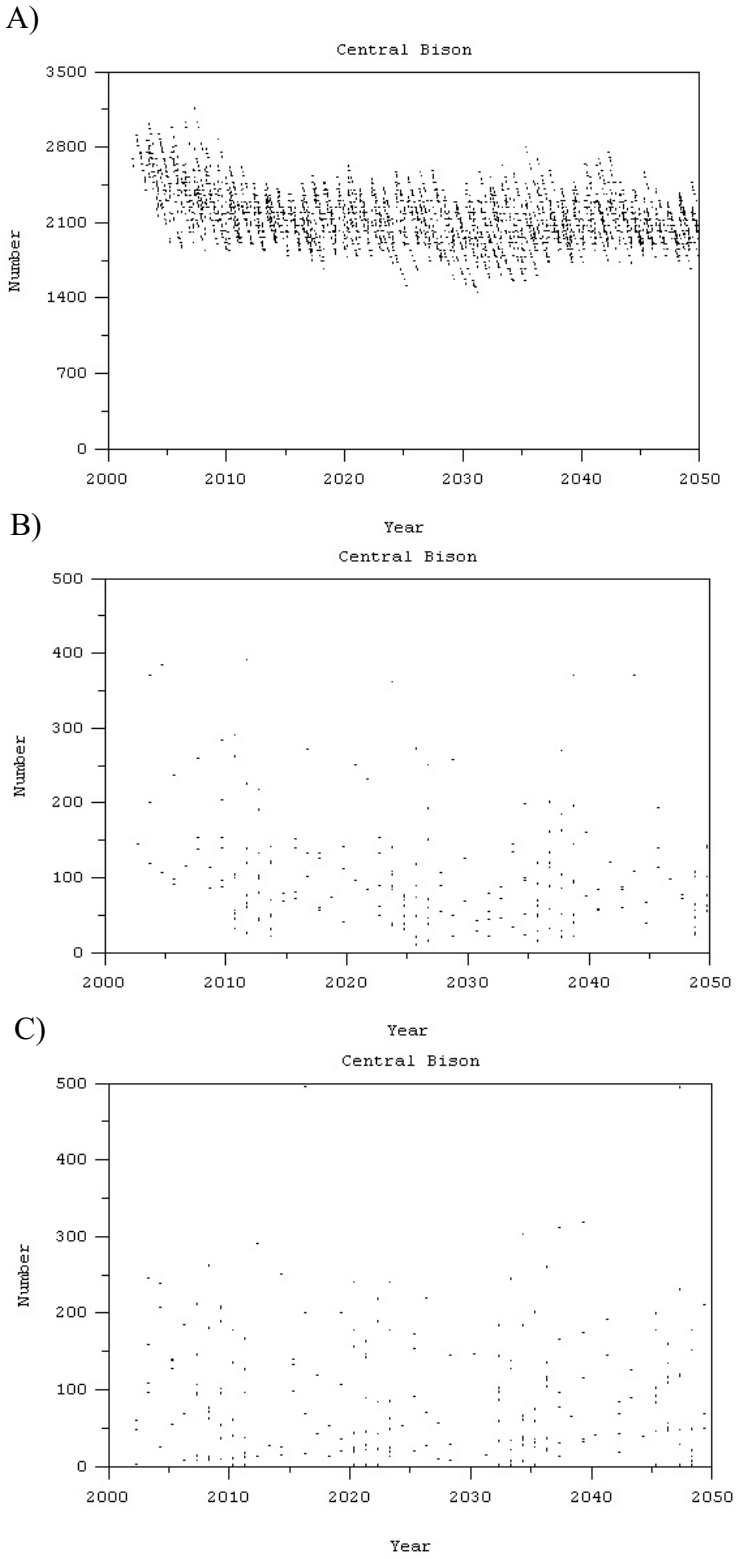


Figure 26. A) Number of central herd bison, B) number removed per year, C) number found outside the park in May in 8 stochastic simulation when 45% of animals outside the park were removed.

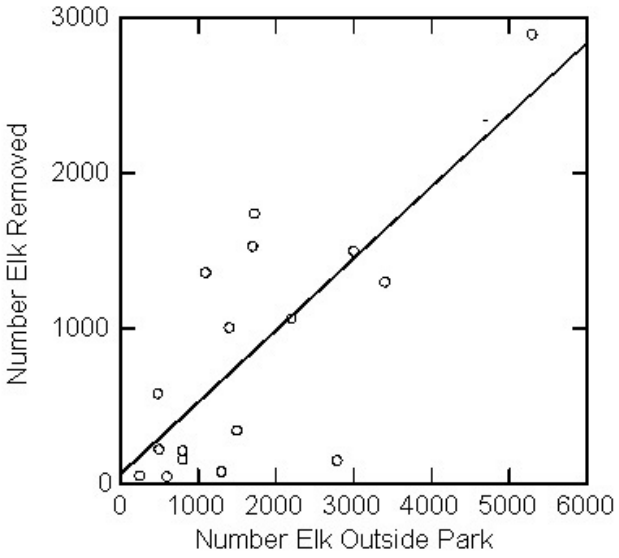


Figure 27. Number of elk removed by hunting vs. number of elk counted outside park in the annual census 1969-1991, y=34+0.47x, r2=0.59, P<0.001. The mean cull rate as a fraction of number outside is 0.48 (s.d. 0.38). If 76% are sighted on average, the actual rate is 0.36.

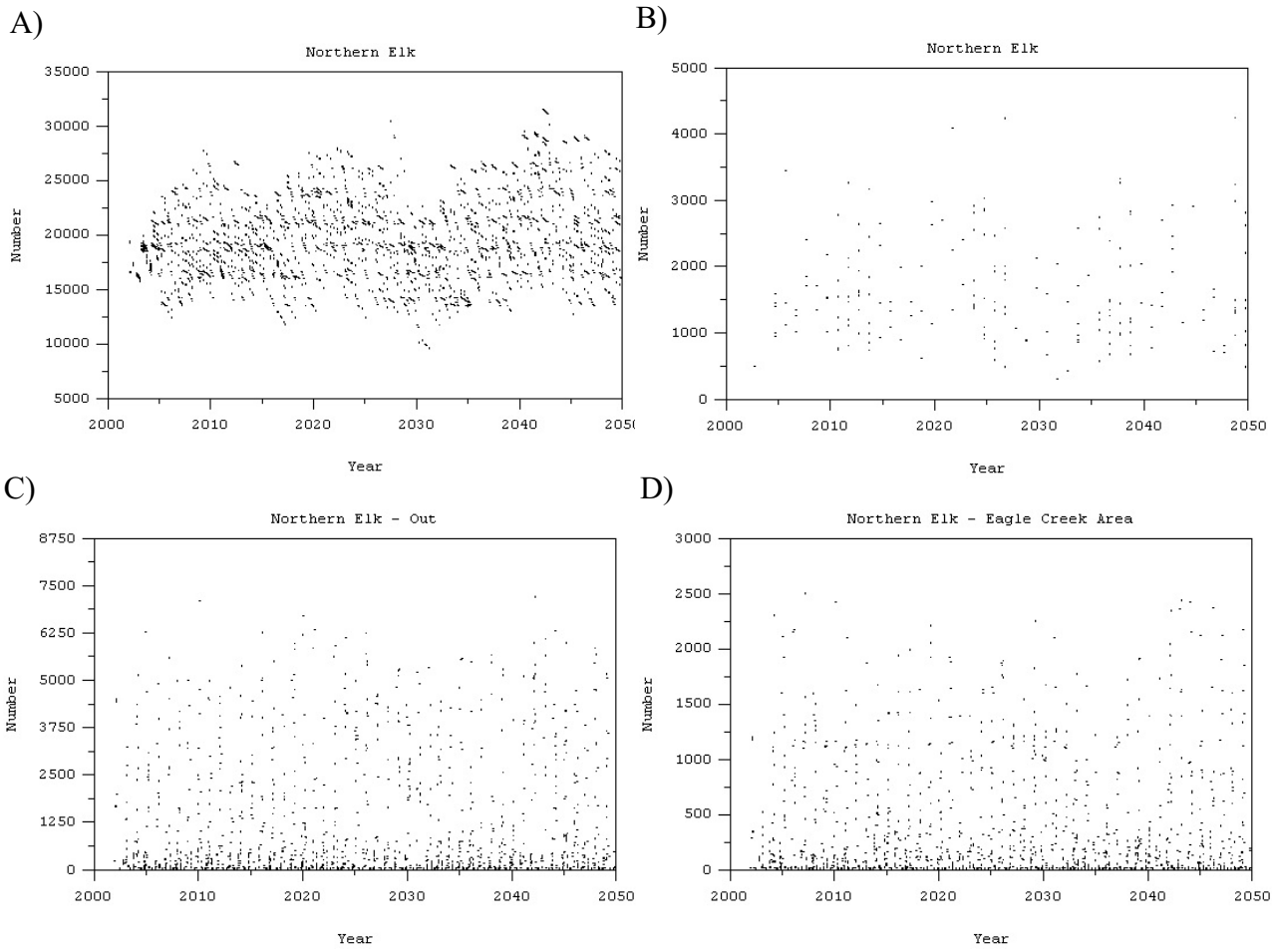


Figure 28. A) Number of northern elk, B) number removed per year, C) number found outside the park in any month, D) number found in the Eagle Creek area in 8 stochastic simulation when 9% of animals outside the park were removed.

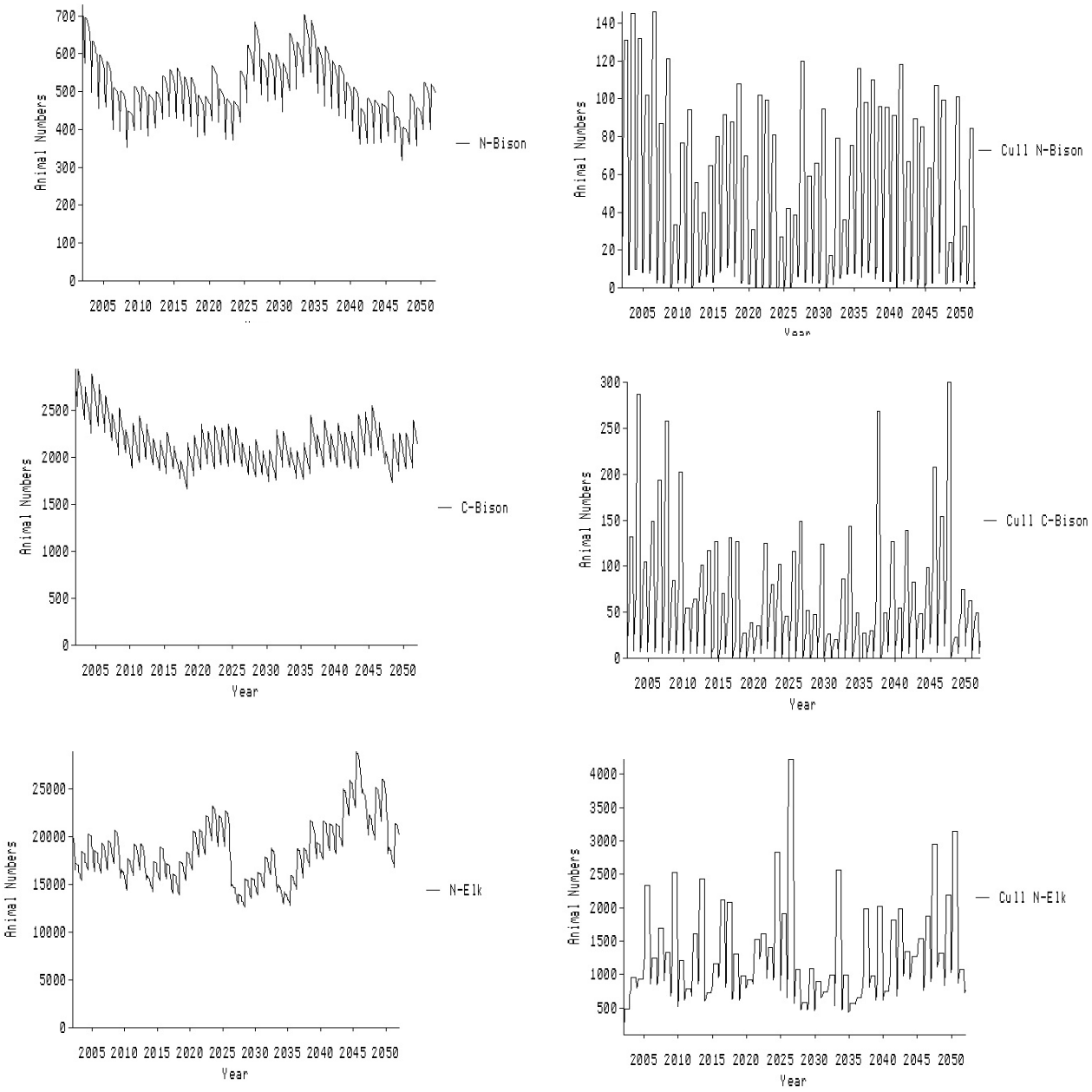


Figure 29. Numbers of northern bison, central bison, and northern elk (left panels), and number culled or hunted (right panels) in one stochastic simulation in which bison found in the removal areas were removed at a rate of 45% per month in November-May, and in which 9% of elk per month were hunted in the northern removal area in December-February.

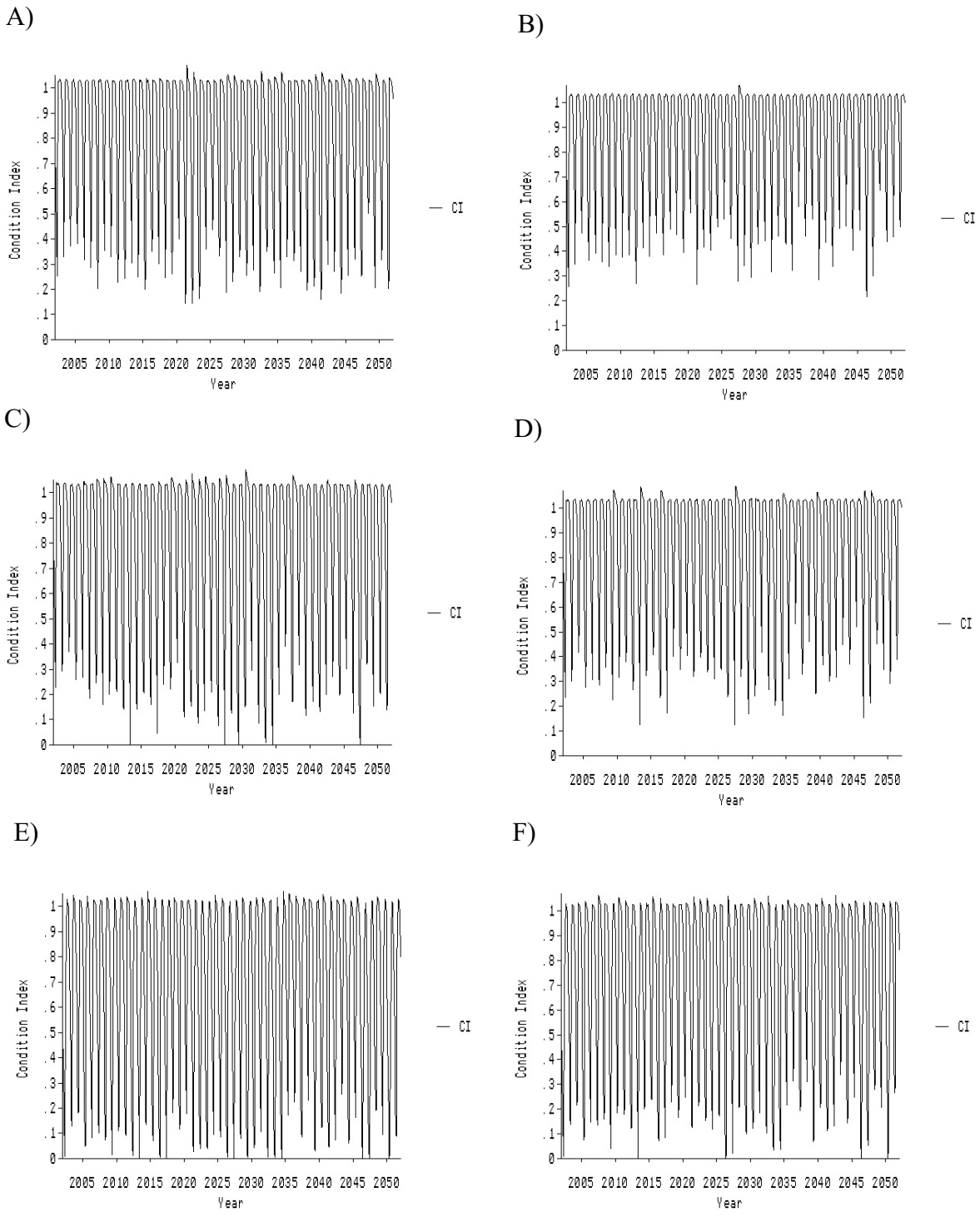


Figure 30. Comparison of condition indices in simulations where animals were neither hunted nor removed (left panels) and where animals were hunted or removed (right panels). A,B) Northern bison, C,D) central bison, E,F) northern elk.

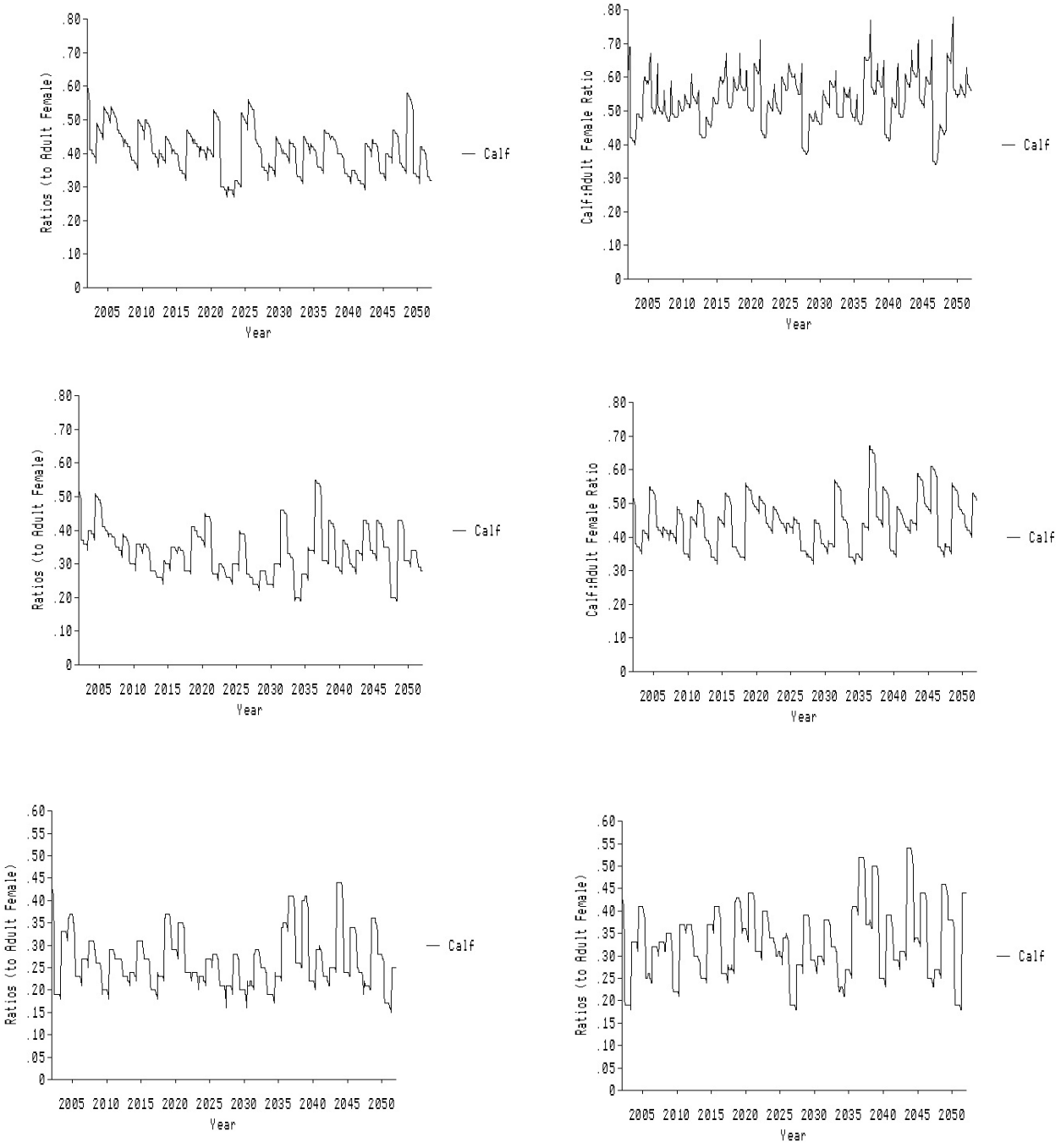


Figure 31. Comparison of calf ratios (calves:cows) in a simulation where animals were neither hunted nor removed (left panels) and a simulation where animals were hunted or removed (right panels). A,B) Northern bison, C,D) central bison, E,F) northern elk.

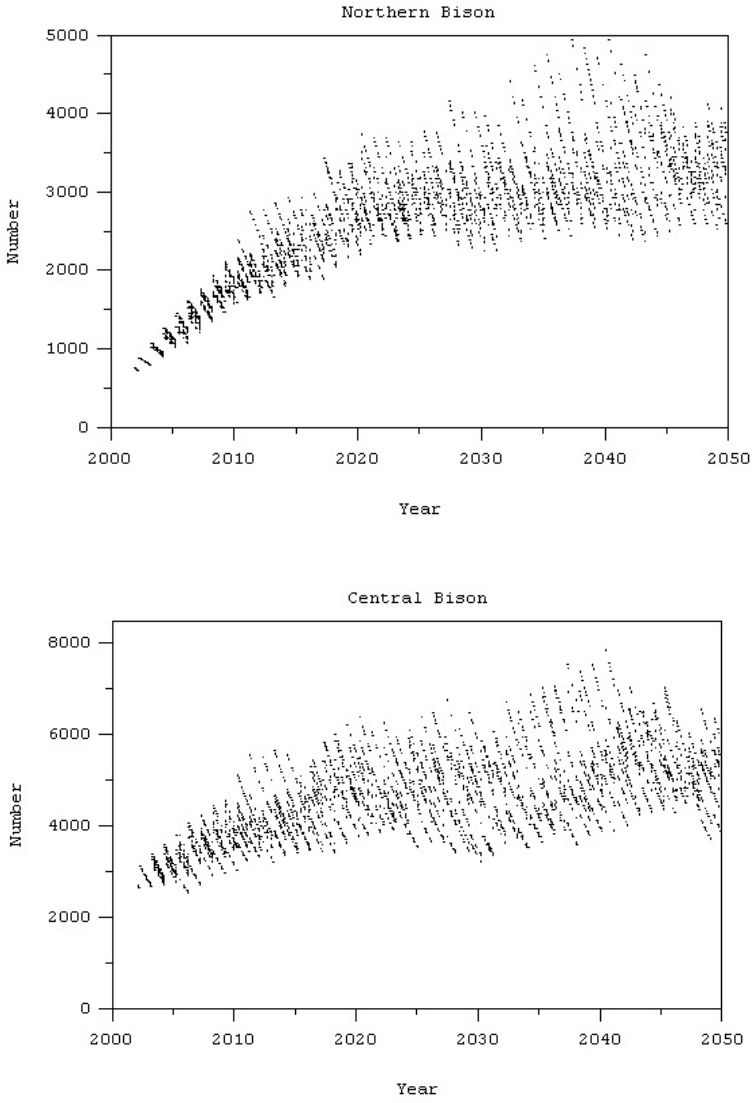


Figure 32. Bison population trajectories in 8 stochastic simulations with no bison removals and northern elk held to approximately 5000.

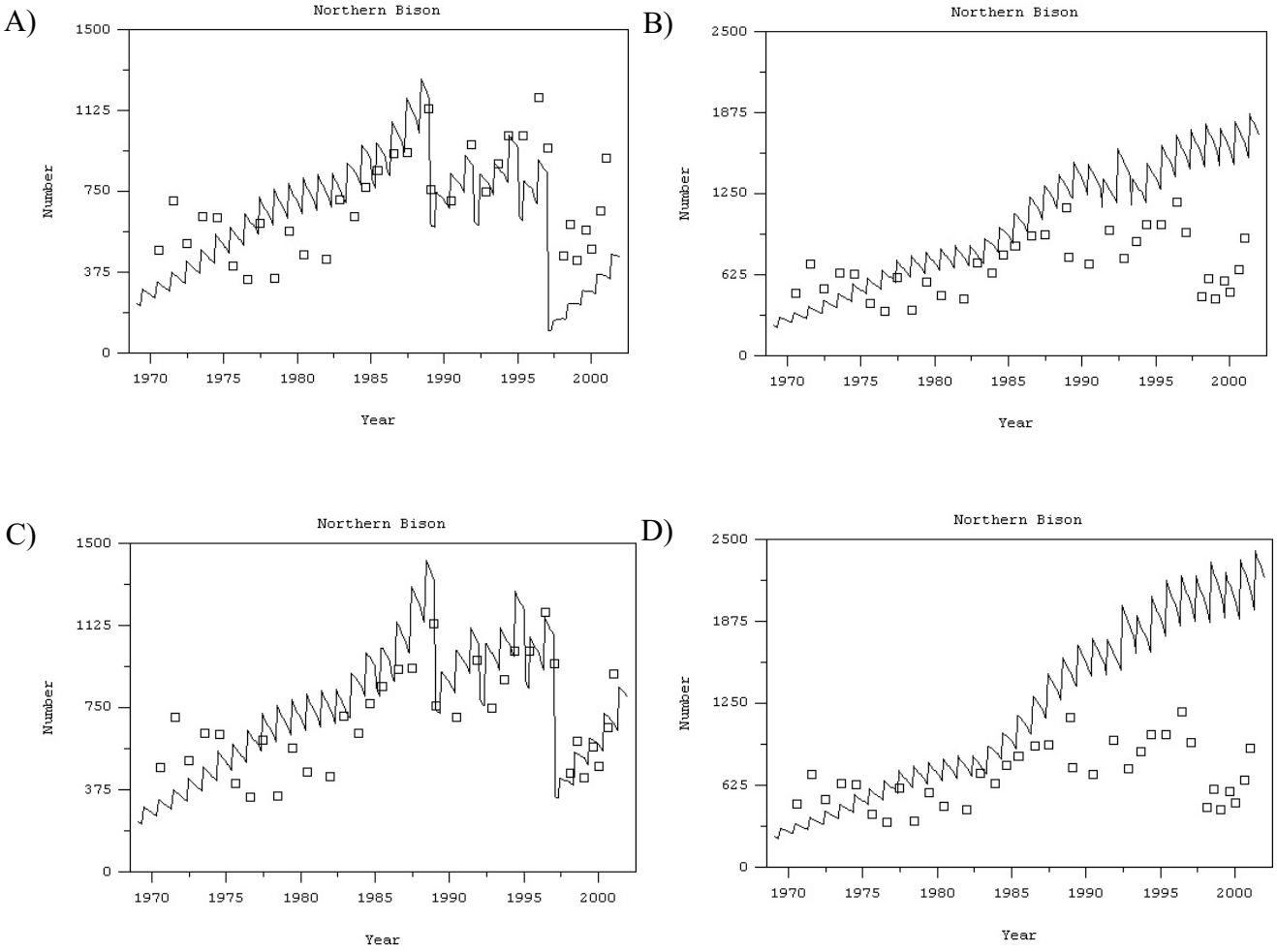


Figure 33. Numbers of northern bison in scenarios where they are restricted to different ranges with or without removals. A) Pre-1983 ranges, with removals. B) Pre-1983 ranges with no removals. C) Mid 1980's ranges, with removals. D) Mid 1980's ranges with no removals. Boxes are observed numbers, sightability corrected.

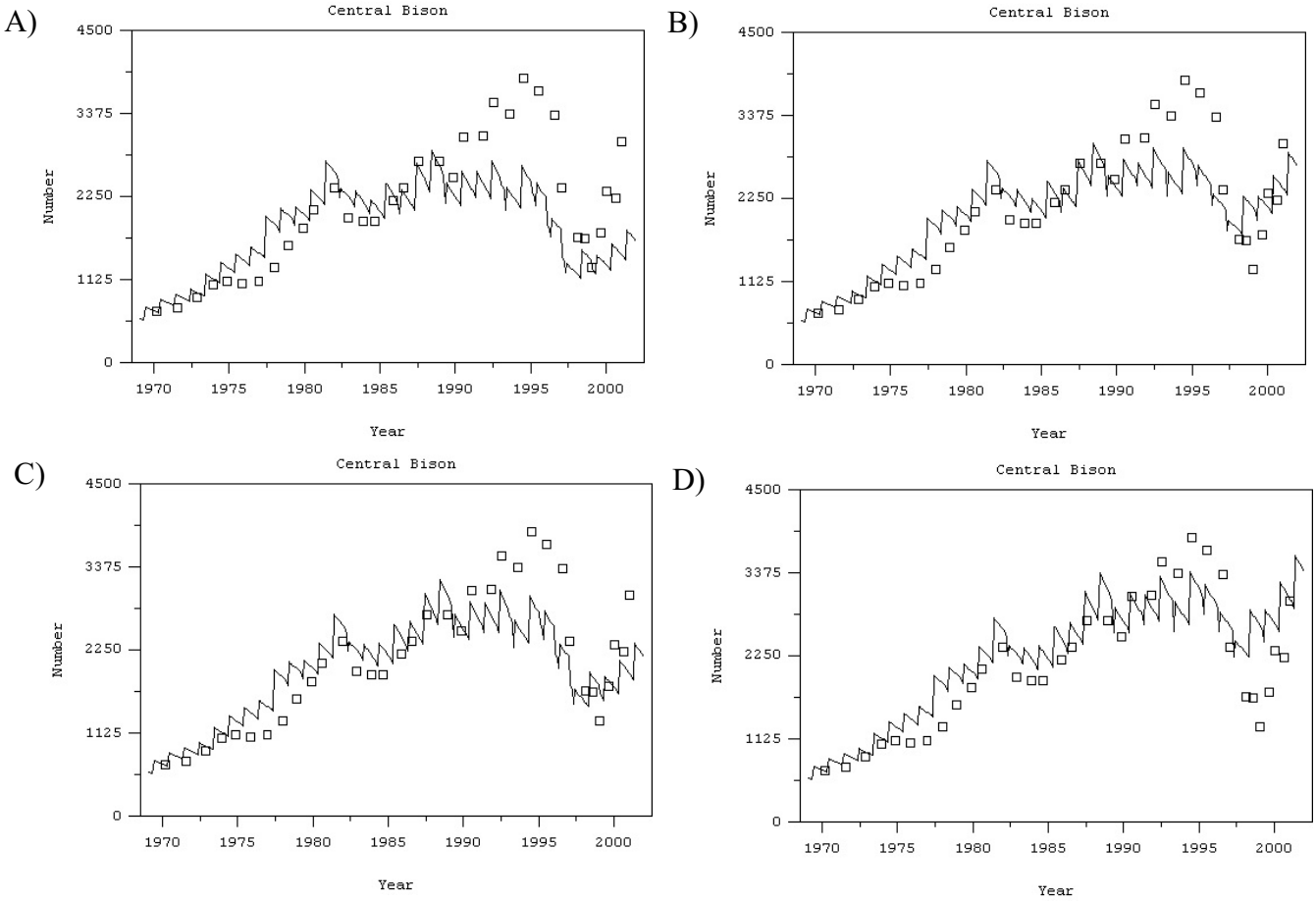


Figure 34. Numbers of central bison in scenarios where they are restricted to different ranges with or without removals. A) Pre-1983 ranges, with removals. B) Pre-1983 ranges with no removals. C) Mid 1980's ranges, with removals. D) Mid 1980's ranges with no removals. Boxes are observed numbers, sightability corrected.

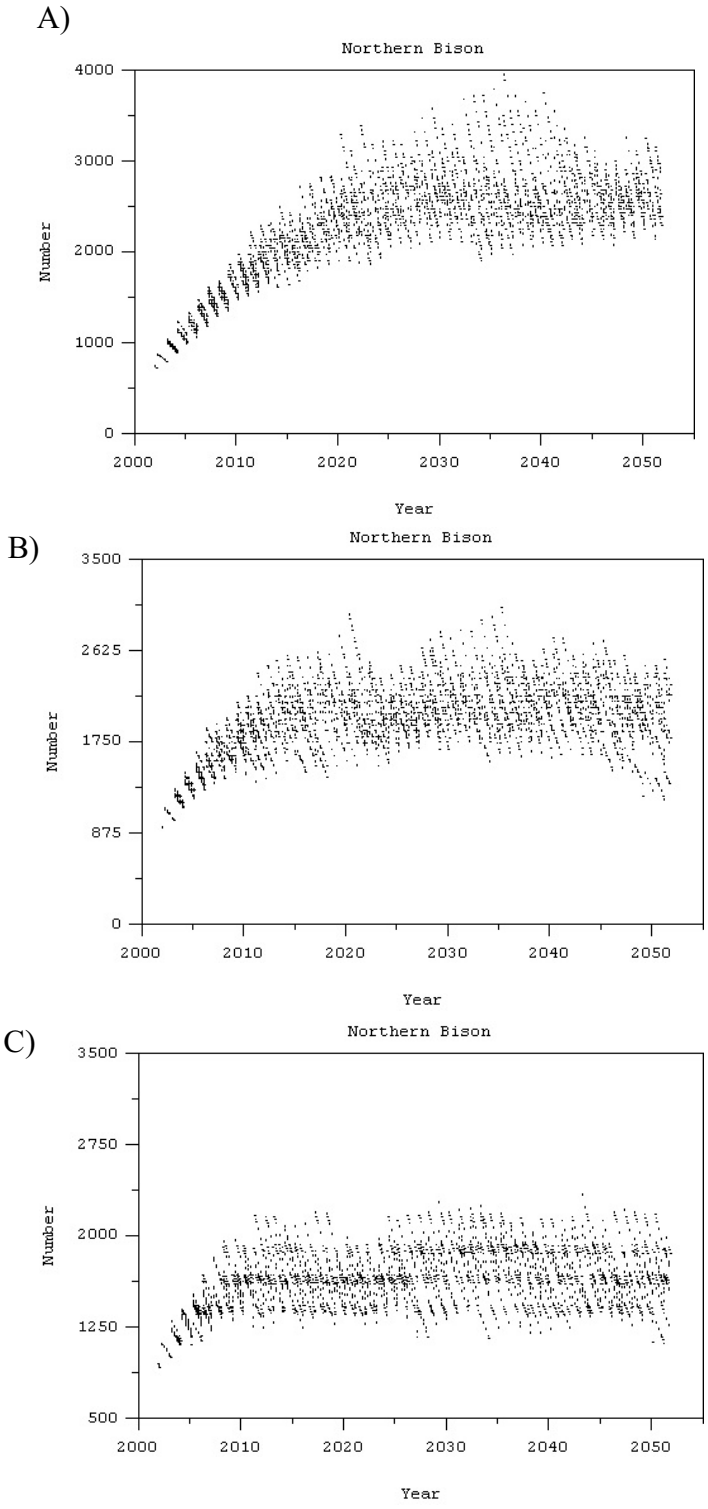


Figure 35. Numbers of northern bison with no removals, in A) animals using current (1993-present) ranges), B) restricted to 1983-mid 1980's ranges, and C) animals restricted to pre 1983 ranges.

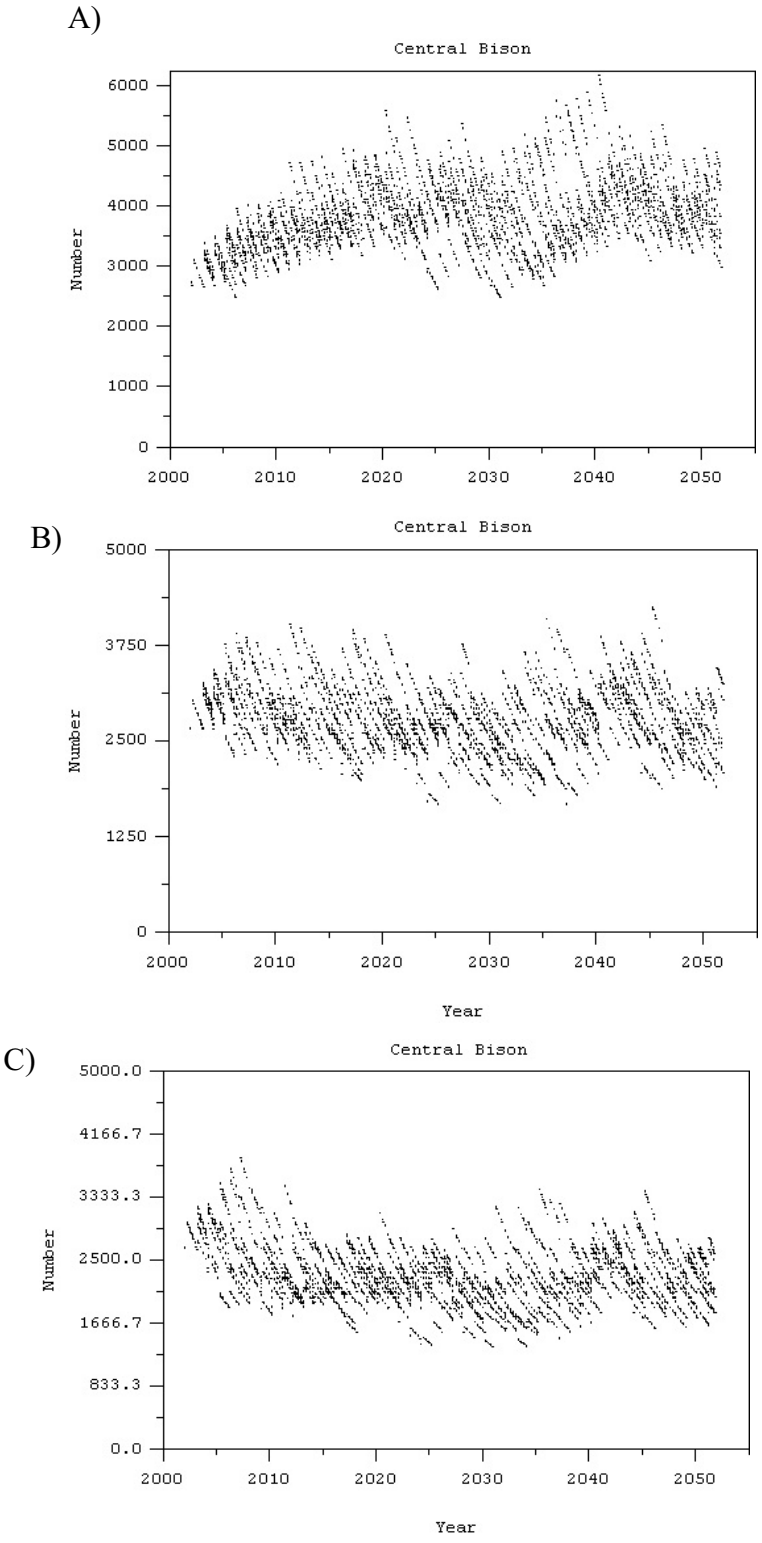


Figure 36. Numbers of central bison with no removals, in A) animals using current (1993-present) ranges), B) restricted to 1983-mid 1980's ranges, and C) animals restricted to pre 1983 ranges.

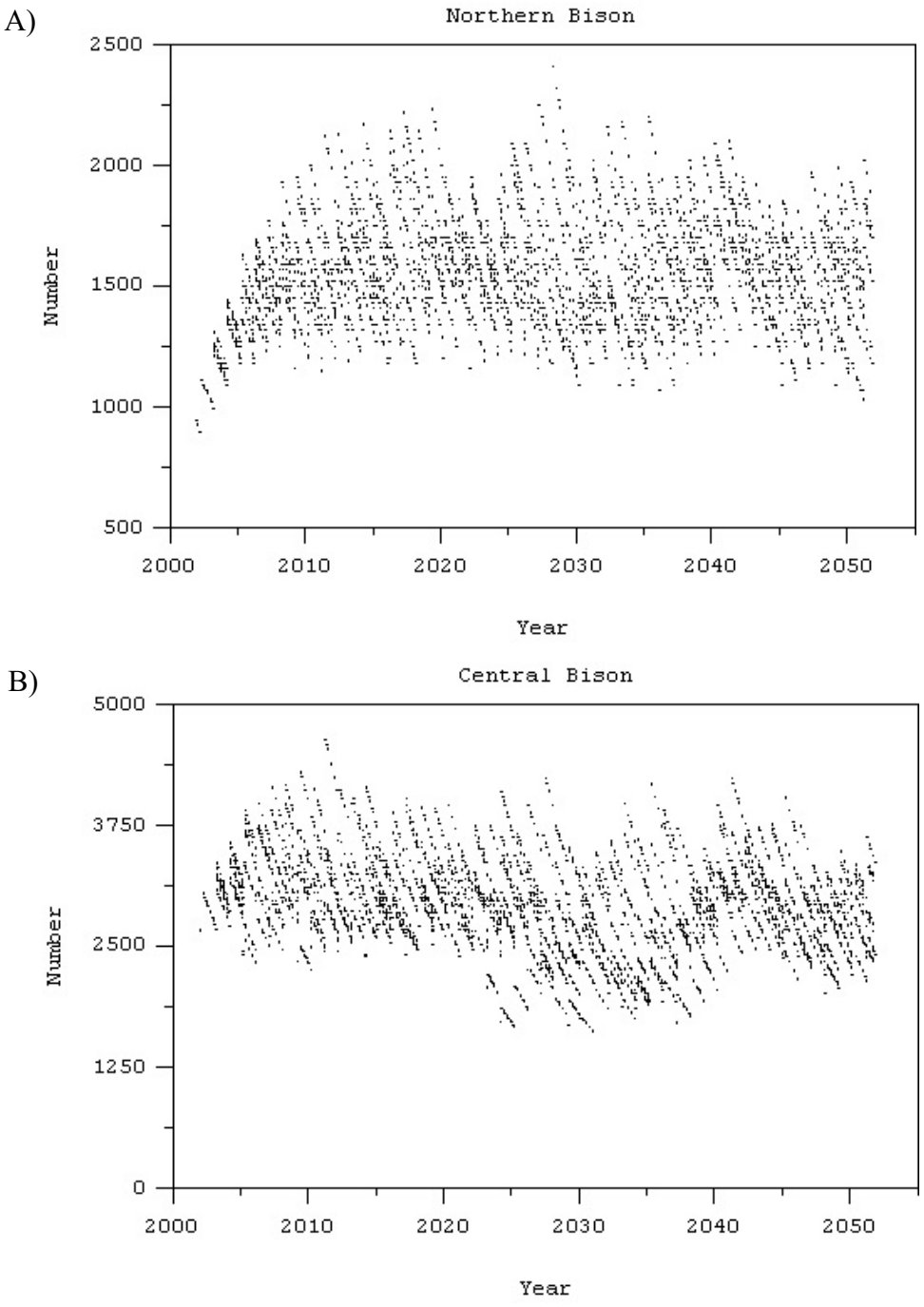


Figure 37. Numbers of A) northern and B) central bison predicted if there are no removals, and if the ranges are as the potential ranges predicted by Olexa (2002).

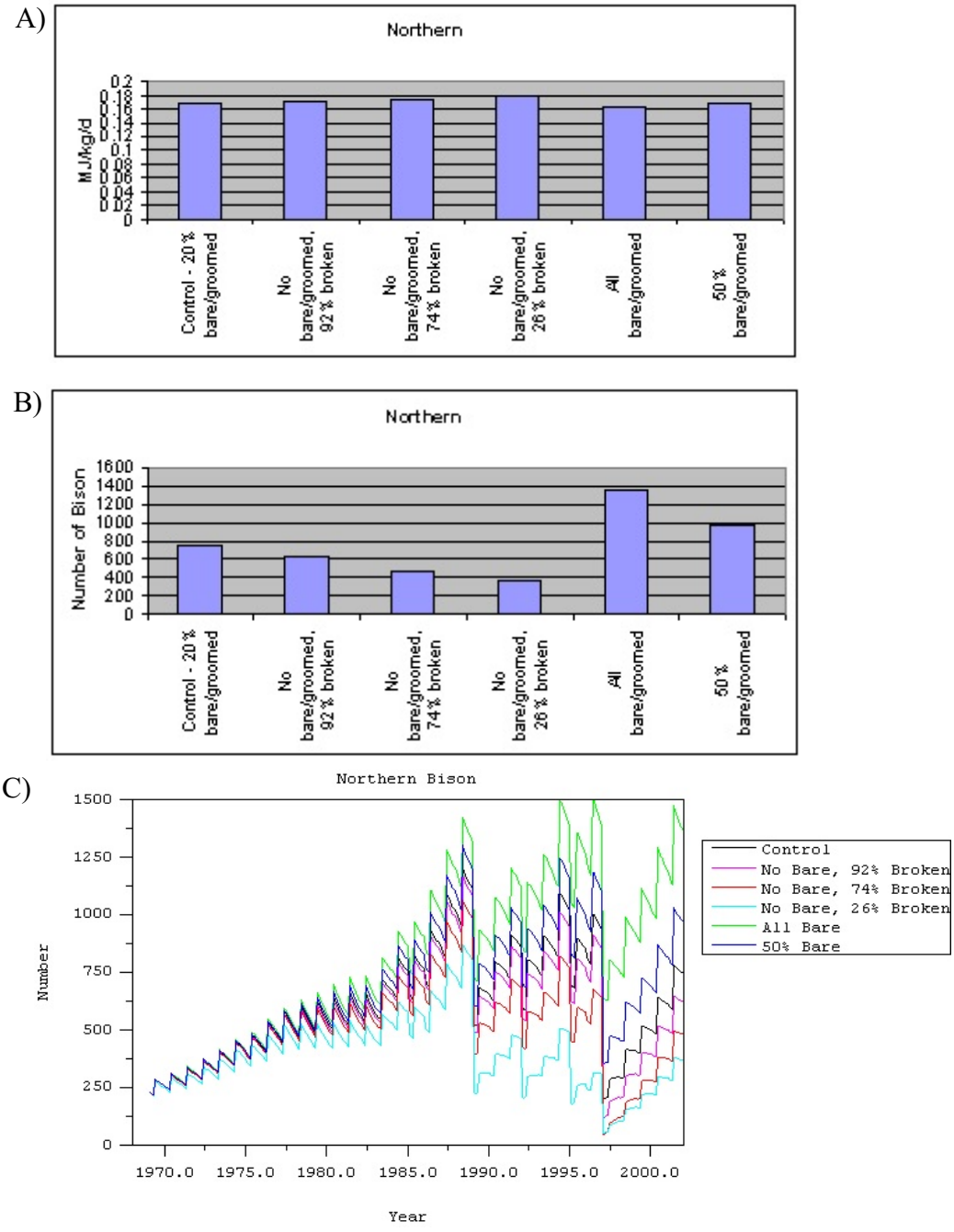


Figure 38. A) Northern bison herd winter energy costs in four different scenarios of travelling in broken, unbroken or no snow in 1969-2001. B) Number of northern bison at the end of 2001, using observed numbers of removals 1969-2001. C) Population trajectories.

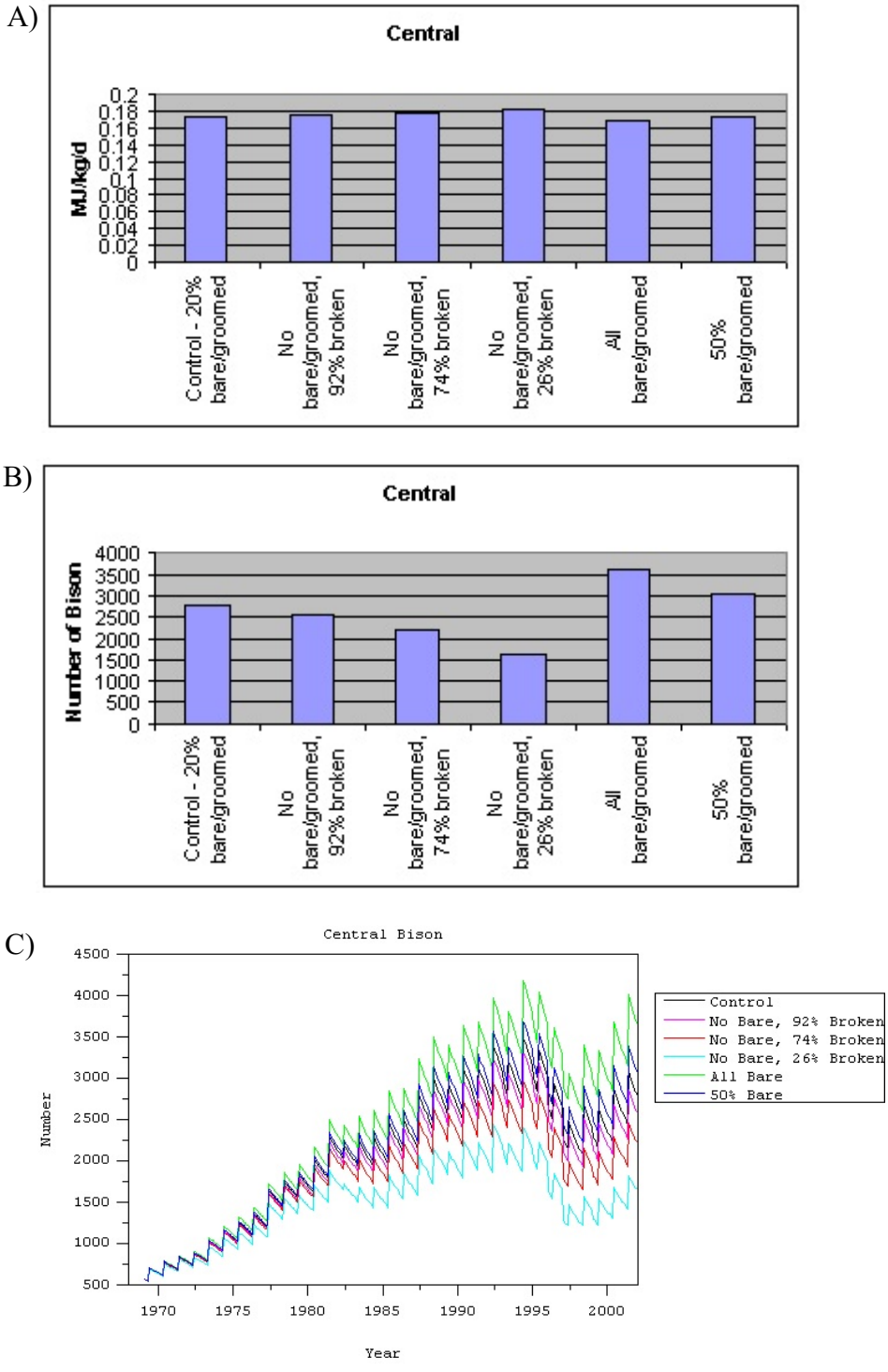


Figure 39. A) Central bison herd winter energy costs in four different scenarios of travelling in broken, unbroken or no snow in 1969-2001. B) Number of central bison at the end of 2001, using observed numbers of removals 1969-2001. C) Population trajectories.