

Percent Relative Cover in the Herbert Hoover Prairie: Trends from 1982 to 1992.

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Introduction

Since 1982 Dr. Christianson has recorded percent relative cover and/or other measures of population growth in the restored prairie. This report focuses on the long term trends in cover of alien and native species so that we may better direct management and research on the prairie. This report should be used in conjunction with the report on plant diversity. Percent relative cover values can be found in Inventory Reports 1982-1992 and will not be repeated here. These values can also be found on Figures 79-253. Because of the large volume of figures, they do not accompany this report.

Methods

For each year a maximum of five walking transect and ten permanent plots were measured for percent cover, percent relative cover, and percent frequency were calculated. Percent relative cover was used in this report because it standardizes all measurements to equal 100, thereby making all measurements comparable. The differences between the three measures, why all were calculated, and the process of calculation were not recorded in any of the inventory reports. Not all transect or plots were investigated every year; therefore, I have interpolated points between 1982 and 1992. If the missing value was on the beginning or ending year, interpolation was not possible. It is not known if the plots or transect were randomly chosen. Transect are of differing lengths. Is also not known the exact time and

locations of prescribed burns; only recommendations are given in the Inventory Reports. For each year, a total and transect/plot percent relative cover per species was plotted against time. Each plant species is identified as an alien or native species.

Results

Native species

Aster species cover less than 2% of the transect and plots. Asters increased to approximately 10% on transect in 1989 and the trend continued into 1992. A similar trend is seen at plot 2 in 1990.

Big bluestem generally increased from < 10% to approximately 60% over the time frame. Plot 3 experienced a large increase in 1984 and remained high throughout.

Bigtooth sunflower experienced a slight increase above zero in transect in 1989. It was only found in plot 3 and has been increasing since 1985.

Black-eyed susan cover approximated 0% and was only detected above 0% from 1989 to 1992 primarily on transect. There is insufficient data to predict a future trend.

Generally, the trend for Canada goldenrod is to increase (average ending: 15-20%); however, all declined on walking transect between 1990-1992.

Canada wildrye approximated 0% or a fraction above throughout the time frame. Plot 6 experienced a small increase to 10% in 1990.

Clammy groundcherry was found more often in plots, especially plot 9. However, levels still remain relatively low, less than 3%.

Common horsetail remains relatively low for most of the 10-year period with increases since 1989 only for specific localities (transect 5, plots 4 and 7).

Common milkweed has decreased to 0% from its small peak of 10% in 1985.

Common mallow remains approximately 0% in transect only.

Common ragweed remains stable near 0% except for an increase to 8% in plot 1 in 1989 and again in 1992.

Daisy fleabanes nearly always 0% relative cover except for very small peaks to less than 1%. Since it is so sporadic, no trend can be predicted.

Dogbane never reached levels greater than 1.5%. Again, this species is very sporadic in its appearance.

Field bindweed has decreased to less than 0.5% since 1982 when it averaged 4% relative cover.

Field thistle remains stable at approximately 1% with a few peaks not more than 4% in various localities.

Since fireweed is a pioneer species one would expect its distribution to remain low which it does. Specific localities peak infrequently and never attain values higher than 6%.

Flower-of-an-hour was only detected at 1% relative cover in 1984 and has not been present since.

Goldenrod species have recently experienced an increase (from 0% to 20%) which may continue. For the most part, levels have been low, less than 5%, prior to this increase in 1990.

Horsemint experienced a very small peak in 1987, but otherwise persists at 0%.

Typically, indiagrass levels are stable at 12% or slightly decreasing. Plot 4 experienced a large increase to 30% in 1989 where it stabilized and then declined to 15% in 1992.

Lamb's quarters approximated 0% and were absent in plots 6-10.

Little bluestem was approximately 0% throughout. However, plot 10 remained very stable at 1%.

Mare's tail showed a very small peak of 0.50% in 1990, otherwise it remained approximately 0%.

Muhleygrass remained effectively 0% except for local increases in transect 2 (5%) in 1988 and plot 5 (1%) in 1988.

Nimblewill peaked slightly above 0% in 1988 and was only detected in plot 8 where it peaked at 6% in the same year.

Pellitory has experienced very slight increases over time none extending above 0.5%. Specific localities do extend higher. Transect 3 attained a peak of 5% in 1989.

Plantain experienced very small isolated peaks which never exceeded 0.25% in 1984 and 1988.

Prickly lettuce had a small isolated peak of 0.25% in 1984 and has not been detected since then.

Ragwort has remained stable near 0% for the study period. Various transect and plots have been increasing to approximately 5% since 1987.

Rough cinquefoil is indistinguishable from 0% over time.

Sedge species had two minor peaks above 0% in 1987 (0.5%) and 1989 (0.25%).

Sheep sorrel peaked at 0.5% in 1985 and has been undetected since then.

In general, showy sunflower has remained stable at 1%. However, plot 3 has experienced a moderate increase to 20% and stabilized.

Transect 4 had a moderate increase to 17% in 1984, but the general trend is stable at 0%.

Spiderwort levels are indistinguishable from 0% over time.

Squirrel-tail barley grass levels are indistinguishable from 0% over time.

Generally, switchgrass has been declining since 1982 from a high of 40% to a low of 10% in 1992. Specific localities have experienced much higher peaks and much lower

valleys. Plot 6 declined from 78% in 1984 to 10% in 1992. Other plots have various fluctuations ending in decline. Transect all track each other, indicating that weather might be responsible for the decline.

Tick trefoil peaked slightly above 0% in 1989.

Violet is stable slightly above 0%. Transect 2 has slightly increased to 1% in 1985 and 3% in 1990.

Virginia creeper peaked slightly above 0% in 1984.

Virginia groundcherry is stable slightly above 0% over time.

Virginia wildrye has only been detected since 1990 and a slightly increasing trend is seen.

White avens peaked several times slightly higher than 0%.

White vervain has a very low % relative cover with isolated peaks not exceeding 3%.

Yellow wood-sorrel is stable at 0% over time.

Alien species

Barnyard grass averaged 0% over the ten year period.

Blackberry was found only in plots 1 and 3 and generally stable, but decreasing since 1989 to 0% in 1992.

Black nightshade reached only 2% in 1985 and was absent in all other years. It was found only on plot 9.

Box elder remained at 0% for the ten year period.

There was a very small occurrence of bull thistle from 1982-1984 and has not occurred since.

In transect and plots, buttonweed reached only approximately 1-5% in 1984 and has not spread since that time.

Canada thistle generally decreased from 40% relative cover to approximately 0% in 1992. This decline is very evident from 1985 forward and occurred much more sharply on plots than transect.

Clover species are absent in plots. A small peak at 2% occurred for transect in 1985 and another very small peak of 1% in 1990.

Transect had slightly higher dandelion cover than plots, but all were low, less than 3%. One large increase to 25% did occur in 1988 in plot 4.

Dogwood had approximately 0% except for an increase to 2% in 1990 in plot 7.

Elderberry was absent for most of the 10-year period except for one occurrence in 1989 which was still effectively 0%.

Field pennycress remains stable at approximately 0% except for small peaks to 9% and 3% in transect 1 and plot 8, respectively.

Foxtail species have what looks like a cyclical 3-4 year trend. For the first half of the period cover remained high at 14%. Some localities, such as plot 8 attained cover of 60% in 1985. This site also experienced a population crash in 1988 of 0%. Similar trends are evident in other plots and transect. Generally, 1992 was a decline year which will probably continue until 1993. An increase can be expected in 1994.

Giant ragweed was normally low (approximately 1%). In 1989, a few transect had a slight increase, especially transect 2 which is still on the increase. Plot 5 may also increase in the future; it has primarily remained at 5% or higher throughout the study period.

Hackberry was only detected on transect and remains nearly 0%.

Horse nettle persists at low levels, except for small isolated peaks of not more than 1% relative cover.

Horseweed stays at approximately 0% or is absent for most of the study period except for small increases of 1% in 1985.

Japanese brome grass was absent in 1992; however, it remained steady at 3% or

briefly increased until that point. A moderate increase of 20% in plot 9 occurred in 1987.

Kentucky bluegrass increased to 8% during 1985-1989. It has decreased to 0-3% since then. Plot 9 experienced a huge population explosion to 60% in 1988.

Kochia had one brief increase of 0.5% in 1984 and has persisted at 0% ever since then.

Typically, meadow parsnip remained stable at 1% or slightly decreasing throughout the study period. However, plot 10 experienced a moderate increase at 15% in 1988 and then stabilized at 10% in 1990.

In plots, mulberry stayed stable at 0.5% over time and 0% in transect. Plot 9 increased to 15% in 1989 and this trend will probably continue.

Mustard species were indistinguishable from 0% throughout the study period.

Nightshade bittersweet had one very small peak in 1985 and was not detected for the rest of the period.

Pennsylvania smartweed peaked at 1% in 1985. Other plots and transect also peaked, the largest being 20% in plot 9.

Pigweed peaked at 8% in 1984 and has not been detected since.

Poison ivy had a recent outbreak in 1990 of 0.5%, otherwise it was not detected.

Purslane peaked at 8% in 1984 and was located only in plot 9.

Quackgrass experienced an increase to 10% (plots only) in 1988 and then declined to 0% in 1990. Transect remained stable throughout at a point indistinguishable from 0%. Plot 9 experienced a moderate increase to 20% in 1987 and declined to 4% in 1989.

Raspberry has slightly increased from 0% to 2% in 1992.

In transect, riverbank grape has only been detected since 1990 and is not different from 0%. However, grape has remained stable at 2% on plots with plots 7 and 10 increasing to 9% and stabilizing.

Specific localities of siberian elm have experienced small peaks of approximately 3%.

The general trend is not different from 0%.

Silver maple levels are indistinguishable from 0% over time.

Smooth brome grass is stable at 0.25% or less with some local increases not exceeding 3%.

Stickseed had a incremental increase in 1982, but remains stable at 0% since that time.

Timothy shows a very small isolated peak slightly above 0% in 1987.

Wild lettuce has remained stable at 0.5% over time. Specific localities have increased slightly to 4%. Plot 8 experienced a moderate increase to 25% in 1988 and declined to 1% in 1989.

Yellow nutsedge began at 10% in 1984 and has slowly declined to 5% over time. Plots 8 and 9 began at 30% and experienced a similar decline.

Yellow rocket peaked at 1% in 1985.

Discussion/Recommendations

It is not clear how plots or transect were chosen, and if not randomly, why they were chosen. This could present problem in publication review because of possible bias. For example, rattlesnake master, prairie coneflower, and false indigo were not detected on any plot or transect in any year, yet we know it to be somewhat abundant. There is also a problem of differential measurement; not all plots or transect were measured every year. This could be resolved by measuring all plots/transect every year or using a rotation system where each is measured every other year, etc. Dates of prescribed burns and areas burned should be clearly stated and mapped so that cover trends can be accurately interpreted. Finally, specific indices such as percent cover, percent relative cover, and percent frequency should be outlined. This will provide a guide for new prairie managers to calculate them the

same manner without guesswork.

Native grasses seem to have the most relative cover throughout the time period, but are declining. Big bluestem grass is the only one to increase. Since they do have so much cover, it may be necessary to let them decline 5-15% to allow more prairie forbs to establish themselves further. Individual forb percentages have values approximately less than 10% (3-5%). Some increased (goldenrod, Canada goldenrod). Most remained stable near 0% or increasing slightly from it. It is recommended that more attention be given to increasing the coverage of forbs and only monitor the decline in grasses. A few species did decrease and it is recommended that measures be taken to encourage these plants back to their former abundances or to increase.

Most alien species are decreasing or stable at 0-3% relative cover. A few are increasing, but remain less than 5% relative cover. Foxtail species seem to be the only potential problem because of the observed cyclical trend.

