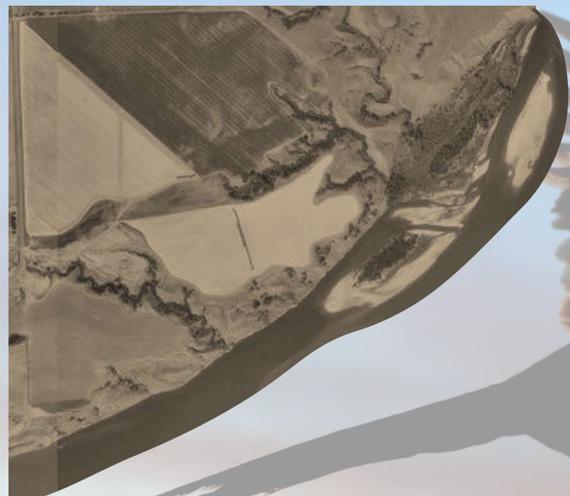


Creating a World Class Pheasant Hunt - Shepherd, Montana

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Purpose of study.

We were interested in understanding what the level of sustainable wild pheasant harvest is on farm ground managed intensively for wild pheasant. We hoped to gain an understanding of which variables were key relative to increasing levels of legal rooster pheasant harvest. Similar measurement has taken place on larger study areas in Europe. For example, the British Game Conservancy Trust tracked annual wild hen and rooster harvest at Seefeld in Lower Austria, and similar measurements have taken place on Pelee Island in the state of Michigan. However, there are a number of key differences between these settings. Our goal was to track levels of sustainable wild bird harvest in a conventional farm ground setting in which certain potential variables could only be influenced within the relatively small study area.

Study area.

Our study area is located in Yellowstone County, twenty miles north-east of Billings, Montana. It is situated between 900 and 960 meters above sea level. The study area consisted of 240 acres. Over the 7 year study period land use transitioned from 175 acres (72.97%) of flood irrigated farm and pasture ground, 18 acres of woodland sub-irrigated grazing ground (7.5%), and 47 acres of mixed-terrain juniper, Russian olive, willows and wild rose, mostly made up of steep, brushy creek bottom (19.9%) - farmed on a rotational basis - to less than 25 acres of flood-irrigated annual crops and currently less than 8 acres of irrigated orchard and perennial crop. Main annual crops are maize, sorghum-sudan grass and barley. Perennials include Maximilian sunflower, asparagus and alfalfa. Orchards are made up of cherry, plum and apple trees. An additional seven acres of irrigated ground has been developed into weakly defined wind breaks and hedgerows during the study period. About 2.5 acres of the farm has also been transitioned into additional waterways that include ponds and ditches that flow consistently through spring and summer months.

Study period.

The seven years from October 1998 to March 2006

Methods.

During all seven years of the study, pheasant hunting methods conventional to North America were utilized. Hunting dogs always accompanied hunters. Most hunts involved groups of hunters, typically two to six, walking through cover with dogs, with some of the hunters strategically positioned in blocking positions that anticipated pheasant escape routes. Particular focus was placed on hit bird identification and recovery.

Montana's hunting season ran for ten weeks during the first five years of the study, then was lengthened to twelve weeks during the last two years. After the first month of hunting, hunters were consistently asked to report on the number of pheasants seen, and the ratio of hens to roosters. To insure sufficient rooster numbers relative to available territories, hunting pressure was reduced once hen to rooster ratio reached or exceeded three to one during the first four years of the study. Once pheasant numbers were estimated to be sufficiently high to insure adequate roosters for available territories the following spring this restriction was lifted, as occurred during the last three study years.

A pheasant census was taken in late winter / early spring of each year of the study. A specific acreage of the study area would be pushed. Counters would tally roosters, hens and total pheasants seen. These results would be extrapolated over the rest of the study area to provide a generalised population count as well as hen to rooster ratios.

Feed production methods.

In each study year but the first, a portion of annual farm crop would be left standing, in some cases for the balance of the study. This took place with corn, sorghum-sudan, annual and perennial sunflower, millet and barley. Up to 25 acres in a year were left unharvested and therefore available to pheasants and other wildlife on the property.

At two points during the study 200 # increments of medicated poultry grit was spread within high pheasant usage zones. Other than this, no other supplementary feeding was carried out in the study area.

The owner integrated a blended strategy to enhance for nest security. This involved coordinating land and water features so that security cover, food, (especially insect habitat associated with broadleaf plants) water and grit were present across the study area. "Edge" habitat was expanded by reduction in field size. Land disturbance was minimized during nesting season.

Except in one instance involving an aphid outbreak within a one-acre orchard, pesticides or herbicides were not used within the study area. Fertilizer was applied sparingly, and at a rate approximately two-thirds lower than levels recommended for optimal agricultural production. Vinegar concentrate was utilized as an organic herbicide during the last two years of the study. Manure from a local feedlot was also spread through approximately twenty acres of the study area twice during the study period.

Alfalfa and grass hay were harvested from the study area intermittently through the study period, but never before a July 15 date. Correspondingly, flood irrigation was also phased back. Currently, flood irrigation is now initiated no earlier than the beginning of July. During nesting season and throughout summer months irrigation ditches provided a low volume source of water that presumably pheasant chicks could access and cross safely. The owner would maintain low water flow through these ditches spread across the farm, providing a widely dispersed source of drinking water.

Crop analysis –

content of bird crops were tracked throughout the study period:

Year 1 Grasshoppers, Russian Olives, Rose Hip
 Year 2 Corn, Russian Olives, Sorghum-Sudan
 Year 3 Russian Olives, Sorghum-Sudan, Corn
 Years 4 - 7 Corn, Russian Olives, Sorghum-Sudan

Predator control methods.

Several strategies were employed to manage small mammalian predators. Box traps armed with conibears were broadcast around the property and pre-baited, typically starting in November - December each year. At first, bait would be positioned in the box without the trap being set to condition predators to focus on the traps as food sources, then at the conclusion of the pheasant hunting season, the traps would be set. This was the primary trapping and predator control method utilized during the first three years of the study, and was effective at harvesting racoon, skunk and feral housecats.

As of year four a snare system was integrated into the predator management protocol, which was significantly effective in the harvesting of red fox, coyote and racoon.

As of year two, bait stations were also introduced into the predator control strategy. Carcasses and other odiferous materials would be deployed in a brushy area, setting the stage for high visit rates by predators. These locations, typically two on opposing sides of the research area, would then be heavily set with snares and box traps. Snares and box traps would otherwise be strategically positioned in funnel areas, and on or adjacent to deer trails within the property.

Predator Harvest.

Racoon	279	Red Fox	78
Coyote	40	Skunk	117
Feral Housecat	111	Mink	4
Weasel	2		

Hunting methods.

During the first four years of the study hunters used shotguns with loads of their choice. During the fifth and sixth years, in most instances hunters were provided with shotgun loads of #4 or 6 hevi-shot. In year seven hunters were allowed again to shoot the load of



their choice. In all instances, the study investigator accompanied hunters, unless it was determined that hunters were appropriately familiar with study protocols.

Crippled birds were verified on the following basis: as soon as possible after a shot sequence, hunters were queried about the disposition of the bird. In cases where the hunters indicated they hit a bird, but it was not recovered, hunters near the scene were asked for verification.

If every hunter witnessing the episode confirmed that the bird had been significantly hit and was either going down or had gone down but had not been recovered, it was classified as a downed bird, in the "not recovered" category. A single hunter disputing this status would negate the entry. In cases without corroborating witnesses, hit birds that were not recovered were not tallied.¹

¹ The only exception to this standard occurred in several instances where the investigator determined, based on the experience of the hunter, that a bird had been downed.

Results.

Year	Birds shot	Lost	Bagged	Lost %	Recovered %	Notes
Year 1	14 birds shot	3 lost	11 bagged	21% lost	79% recovered	Any load
Year 2	24 birds shot	6 lost	18 bagged	25% lost	75% recovered	Any load
Year 3	41 birds shot	11 lost	30 bagged	27% lost	73% recovered	Any load
Year 4	57 birds shot	14 lost	43 bagged	25% lost	75% recovered	Any load
Year 5	92 birds shot	21 lost	71 bagged	23% lost	77% recovered	Hevi-shot
Year 6	121 birds shot	23 lost	98 bagged	19% lost	81% recovered	Hevi-shot
Year 7	207 birds shot	21 lost	186 bagged	10% lost	90% recovered	Predominantly Hevi-shot

Pheasant census data.

Pheasants counted in February of the Second Study year:

49 total birds, comprising 24 Roosters, 25 Hens

During the prior season 24 roosters had been shot. Despite this, hens to roosters were still 1:1, indicating that hens were experiencing similar mortality levels that year.

Pheasant harvest increased 15-fold over the seven year study. A pheasant census taken on March 11, 2006, the winter / spring following the last hunting season of the study, generated a count of 205 hens, 55 roosters. A territory count taken later that spring found 30 territories occurring in the study area, indicating 1.8 roosters available per territory, with 6.8 hens per territory, assuming no dispersal. Since dispersal is likely due to proximity of additional appropriate habitat adjacent to the study area, the hens-per-territory ratio is likely to lower somewhat. With a 205 hen count a further increase in next year's harvest seems probable.

Pheasant Census Data 2006

Pheasants counted in March following the last year of study:

260 total birds, comprising 205 Hens, 55 Roosters

During the prior season 207 roosters had been shot. The predator control program concluded one week before this count, in which 25 racoon, 19 red fox, 10 coyote, 8 skunks and 7 feral housecat had been taken over a 35 day period.

Discussion.

The Shepherd research farm is headquarters for Floating Island International, a company that produces floating wetlands for water quality and wildlife enhancement. The company's production headquarters are located on a property adjacent to the research farm.

Primary goals for the research farm include an exploration of how agriculture can be synchronized with wildlife to achieve an optimal and sustainable balance. The owner has determined that increasing organics in the soil and increasing the ratio of perennial plant life relative to annual crops will contribute to the long-term goal. Because of the well-established research protocols and methods associated with pheasant (plus a life-long love of these birds), the owner chose to use them as one of the "markers" tracking progress towards these goals.

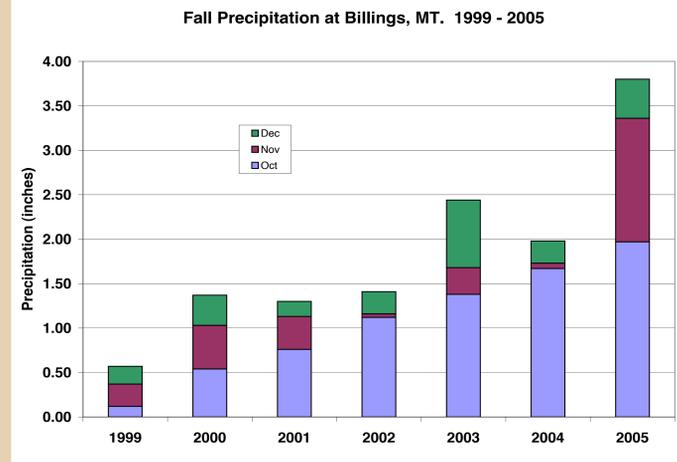
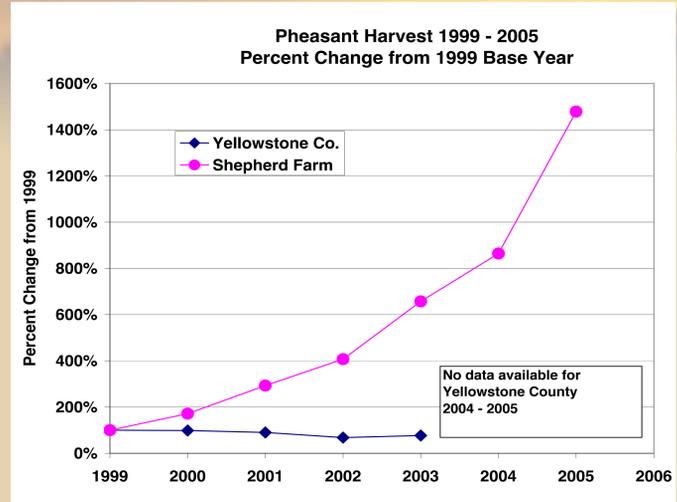
The study modified three major variables, farming methods, habitat, and predator demographics to achieve a fifteen-fold increase in pheasant harvest. Achieving this on a relatively small area was challenging. Pheasants could readily avoid the significant hunting pressure by moving to adjacent properties (the farm was hunted on average twice per week during the last two years of the study). On the other hand the 240-acre size presented a much more focussed opportunity to concentrate predators. The owner estimates predator control activities consumed an average of 100 hours per year. Use of bait stations and funnel zones, quickset snares and pre-baited box traps on a small farm made the predator work significantly more effective, especially in relation to travel time between trap sets.

Increases in habitat dovetailed with the farm's goal of expanded perennial cover. The owner estimates that between six and seven thousand trees and bushes were planted during the study period. It is also noteworthy; however, that these plantings are not likely to have had much bearing on study results for two reasons: drought conditions, and unwillingness on the owner's part to utilize chemicals for weed control. As a result tree and bush survival and growth have been low to moderate. What has contributed to enhanced brood survival, the owner believes, is the strategy of not harvesting up to 25 acres of crop per year, and leaving these crops - primarily sorghum-sudan grass and corn - standing or lodged over for up to five years, with corresponding broad-leaved weeds like koshia, pigweed, sweet blossom clover and mustard filling in and providing dense security cover and thermal mass. Integrating low water volume ditching with these weedy patches, as well as some manure strips, akin to the European beetle bank strategy, provided for added pheasant chick survival enhancement.



The owner has chosen to refrain from burning on the property but has grazed off major areas of the farm twice during the study period, both times during winter months. Some fields have also been mowed in late winter / early spring, and then tilled into the ground. After testing for mycorrhizial presence, selected sites around the farm have been inoculated with a commercial blend of mycorrhizia. The farm has also incorporated approved insect vectors into its weed control strategy in order to meet mandated weed control guidelines.

As explanation for the significant improvement in the recovered birds' ratio in the last year of the study, the owner proposes the following theory. Montana had been in the throes of drought through the study period. Higher than normal precipitation occurred during the last year of the study: fall precipitation was double the previous year. Added moisture seemed to enhance the dogs' ability to find downed birds. In addition, the ample moisture seemed to result in many high quality shot opportunities as birds would hold tighter in the more dense cover. The owner proposes that these two considerations combined to provide a setting that compared to more typical Midwestern cover and moisture conditions, and to recovery ratios that have been reported from that region.



It is also noteworthy that Hevi-shot, while not mandated for the last year of the study, was the predominant load selected by hunters.

Over the next several years the owner intends to expand wetland habitat on the property. Expansion of optimal habitat in concert with conscientious farming methods and predator control could result in further expansion of the pheasant harvest.

Of the three variables - habitat improvement, predator management or adjusted farm practices - the owner would defer from selecting any one as most significant to the study's result. Additional research into various factors would certainly be of value, for example, into the impact on pheasants and other ground nesting birds of pesticide and herbicide use¹; into variations in predator effectiveness relative to predator age and experience²; and into tracking effectiveness of weed-infested standing crops as a pheasant enhancement strategy³.

1 A Montana farmer reported the curious antics of pheasant chicks after exposure to insecticide associated with alfalfa. "They were spinning and flipping...acting like they were drunk!" To what extent is chemical use limiting ground nesting bird populations? Is it humane?

2 Average weight of racoons harvested during the last year of the study was nine pounds. Red fox averaged 9.5 pounds. Local fur buyer reported cross-section average weight on racoons of 14 pounds and 11 pounds on red fox. Are younger, smaller racoon and red fox more or less effective as pheasant predators?

3 Is the term "beneficial weed" an oxymoron?