

Pheasant Brood Survey Report – 2016

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SOUTH DAKOTA PHEASANT BROOD SURVEYS 2016 REPORT

SD Game, Fish and Parks conducts pheasant brood surveys each summer to evaluate the status of pheasant populations and predict pheasant population levels relative to previous years. This information, when combined with other factors such as status of the agricultural harvest and historical hunting pressure, can be used to predict hunter success and satisfaction for geographical areas of the state. Densities of pheasants alone do not infer high or low hunter success and satisfaction. Access to hunting opportunities is equally, if not more important to densities of pheasants in evaluating potential hunter success and ultimately, hunter satisfaction.

In 2016, survey indices were derived from 110, 30-mile pheasant brood routes that are distributed across South Dakota where pheasants are found in sufficient number for surveying. Routes are surveyed from 25 July through 15 August each year using standardized methods on mornings when weather conditions are optimal for observing pheasants. Also, pheasant brood members are opportunistically counted throughout the survey period to estimate an average number of young per brood. Pheasants per mile (PPM) estimates are calculated by summing the product of mean brood sizes and broods observed with numbers of cocks and hens observed on each route. PPM estimates for 2015 and the average of the previous 10 years are compared with the 2016 survey results. Results are compared within local areas with Wilcoxon signed-rank tests which take into account the direction (up or down) and magnitude of change for each route. Since PPM estimates are *relative* density estimates, comparisons are valid only between years within each local area.

County brood survey routes are allocated to local area analyses as follows:

- Chamberlain: Brule, Buffalo, Charles Mix (north route), Gregory (north route), Hyde, Lyman, Tripp (north route), and Aurora.
- Winner: Tripp, Gregory, Lyman (south route), Jones (south route), Mellette, and Todd.
- Pierre: Hughes, Jones, Lyman, Potter (south route), Stanley, Hand (south route only), Hyde, and Sully.
- Mobridge: Campbell, Corson, Dewey, Potter (north and central routes), and Walworth.
- Aberdeen: Brown, Marshall, Day, Edmunds, Faulk, Spink (north and central routes), and McPherson.
- Huron: Hand (north and central routes), Beadle, Jerauld, Kingsbury, Sanborn, Miner, Clark (south route only), and Spink (south and central routes).
- Mitchell: Davison, Hanson, Charles Mix (central route), Douglas, Aurora, Hutchinson (north and west routes), Jerauld, McCook, Miner, and Sanborn.
- Yankton: Yankton, Charles Mix (south route), Bon Homme, Clay, Turner/Hutchinson (west and south routes), and Union.
- Sioux Falls: Minnehaha, Turner/Hutchinson (north route), Lake, Lincoln, McCook, and Moody.
- Brookings: Brookings, Deuel (south route), and Hamlin (south and central routes), Kingsbury, Lake (north route), and Moody.
- Watertown: Codington, Clark, Deuel, Grant, and Hamlin.
- Sisseton: Grant, Day (north route), Marshall, and Roberts.
- Western SD: Bennett, Haakon, Perkins, Butte and Fall River.

SURVEY RESULTS

Overview

The statewide Pheasants Per Mile (PPM) index for the 2016 pheasant brood survey decreased 20% (3.83 to 3.05) compared to the 2015 statewide index (Table 1, Figure 1). In comparison to the 10-year average, this year's index is 41% lower (2016 = 3.05, 10-year average = 5.16). Compared to 2015, fewer roosters, hens and broods were counted throughout the 110 survey routes. Statewide, 38 routes of the 110 surveyed showed an increase in PPM from 2015.

Adult Bird and Brood Data

The number of roosters counted decreased 14% from last year (905 vs. 1051). The number of hens counted decreased 19% from last year (1,502 vs. 1,854). Total broods counted decreased by 18% (1,289 vs. 1,571), while the statewide average brood size decreased by 4.2% (5.91 vs. 6.17). Average brood sizes increased in the southeast, but declined in the northeast, central, and western parts of the state (Figure 2). The statewide average brood size for 2016 (5.91) is slightly below the 10-year average (6.11).

Local Area

2016 vs. 2015 PPM

All local area PPM indices decreased from 2015 (Table 1, Figure 3 and 4). The decrease was significant for the Chamberlain, Winner, Aberdeen, Huron, Mitchell, Yankton, and Sioux Falls local areas (Table 1).

2016 vs. 10-Year Average PPM

All local areas are below the 10-year average (Table 1, Figure 3 and 4). The difference was significant for the Chamberlain, Winner, Pierre, Aberdeen, Huron, Mitchell, Brookings, and Watertown local areas.

Survey Weather Conditions

This survey relies on very specific weather conditions to maximize pheasant observability. Pheasants are most visible during mornings with clear skies, heavy dew, and light winds. Under these "prime" survey conditions, pheasants congregate in open areas such as roadways to dry their feathers in the warm morning sun. It is the goal to conduct all surveys under prime conditions so results are comparable from year to year. This year, 88 of the 110 survey routes were conducted at least 1 time during prime conditions. Many routes were surveyed more than once in an attempt to get at least one survey completed under primary conditions. Final results show 66 of the highest counts for the 110 routes coincided with prime conditions. Cold morning temperatures may also lower pheasant observability during otherwise prime conditions. Morning temperatures were less than or equal to 55° F for 21 high-count surveys. Last year, 96 survey routes were conducted at least one time under primary conditions.

INTERPRETATIONS & DISCUSSION

After two consecutive years of substantial increases in the statewide PPM index, a slight retreat was observed in 2016. This year's index is twice as high as the 2013 index and higher than the 2.7 PPM observed in 2014 when hunters harvested 1.2 million roosters.

Annual changes in pheasant abundance are highly influenced by weather conditions while habitat availability shapes long-term trends. To help understand the causes of annual change in pheasant abundance, a weather model is used to project annual change based on biologically important weather parameters (Figure 5). The decline in PPM was expected in southern South Dakota (Figure 5), especially in the far southeast where above normal winter snowfall (40 – 50 inches) and greater than optimal spring rains occurred (9 – 10 inches). Adult pheasant survival is known to decline with increased winter snowfall. During April and May, ideal conditions include adequate moisture to grow concealment cover for nests and young chicks, but not too much rain which can reduce nest and chick survival. Optimal April – May rainfall is approximately 5 – 6 inches, similar to what was observed in the northeastern part of the state (Figure 5). The decline in pheasant abundance in northeastern South Dakota was contradictory with model predictions of growth based upon favorable environment conditions.

The pheasant index remained nearly unchanged in western South Dakota even though drought conditions were widespread. Drought can result in poor chick survival due to reduced insect availability and reduced vegetative cover. Bennett and Perkins counties will again be the primary destinations in the western portion of the state.

It has been 10 years since expirations of Conservation Reserve Program (CRP) lands began outpacing enrollment (Figure 6 and 7). The 10-year trend in PPM shows a general decline for all city areas and the statewide average. During a decade of declining CRP acreage, it is no surprise that all city area PPM indices are below their 10-year mean. Quantity of this premier pheasant habitat could be half the 2007 acreage by 2020 (Figure 7). There is a clear correlation between the availability of undisturbed grassland nesting habitat and pheasant abundance dating all the way back to 1950. Future pheasant population expectations should be tempered by the reality of declining habitat quantity.

It is possible that poor survey weather conditions influenced the 2016 PPM index. For this reason, it may be particularly important for hunters to visit with those in their traditional hunting areas about local pheasant abundance and habitat conditions. This will be especially important in northeastern South Dakota where survey results were lower, but weather conditions were favorable for pheasant survival and reproduction during the past year.

With 1.1 million acres of public hunting land within the heart of SD's pheasant range, opportunities remain for high quality pheasant hunting. The annual hunting atlas and a web-based interactive map of public lands and private lands leased for public hunting can be found at <http://gfp.sd.gov/hunting/areas>. In addition to printed and interactive maps, hunters can utilize GPS downloads and smartphone applications to locate public hunting lands throughout the state. Hunters are again asked to hunt safely and ethically, respect private landowners and those public hunting areas scattered across the state, and enjoy the South Dakota tradition of hunting pheasants with family and friends this fall.

Table 1. Pheasants Per Mile (PPM) index values comparing 2016 to 2015 and 10-year averages. Note: Comparisons are valid only between years within each local area.

Local Area	Routes	Pheasants Per Mile (PPM)			Difference of 2016 PPM with	
		2016	2015	10-yr ave	2015	10-year ave
Chamberlain	11	7.01	8.58	12.23	-18%*	-43%*
Winner	8	4.88	5.97	7.04	-18%*	-31%*
Pierre	13	6.44	7.26	8.62	-11% ^{ns}	-25%*
Mobridge	8	5.01	5.02	6.63	0% ^{ns}	-25% ^{ns}
Aberdeen	14	1.84	3.22	5.24	-43%*	-65%*
Huron	17	3.10	4.02	6.24	-23%*	-50%*
Mitchell	16	3.78	4.55	5.31	-17%*	-29%*
Yankton	10	1.39	2.06	1.47	-33%*	-5% ^{ns}
Sioux Falls	13	1.51	2.11	1.89	-28%*	-20% ^{ns}
Brookings	11	1.63	1.71	3.03	-4% ^{ns}	-46%*
Watertown	12	1.78	2.01	3.73	-12% ^{ns}	-52%*
Sisseton	5	1.22	1.30	1.71	-7% ^{ns}	-29% ^{ns}
Western SD	5	2.43	2.44	2.57	-1% ^{ns}	-5% ^{ns}
STATEWIDE	110	3.05	3.83	5.16	-20%*	-41%*

^{ns} Results of Wilcoxon signed-rank test not significant ($P > 0.10$)

* Results of Wilcoxon signed-rank test significant ($P < 0.10$)

Figure 1. Statewide Pheasants Per Mile (PPM) index for South Dakota, 2002 – 2016.

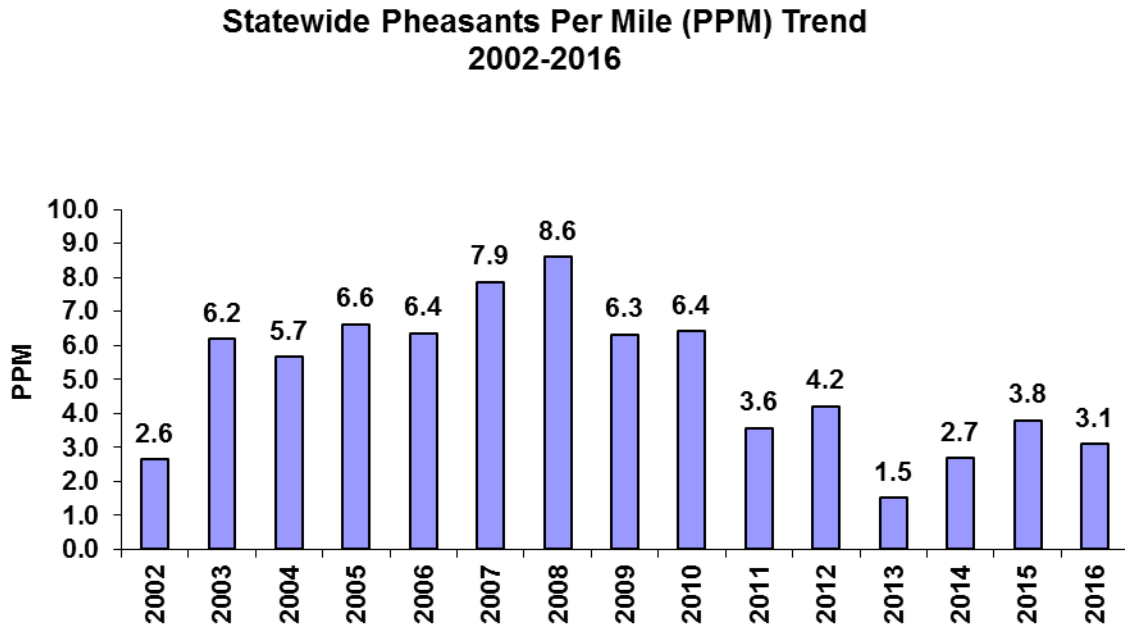


Figure 2. State map with brood size comparisons for 2015 and 2016.

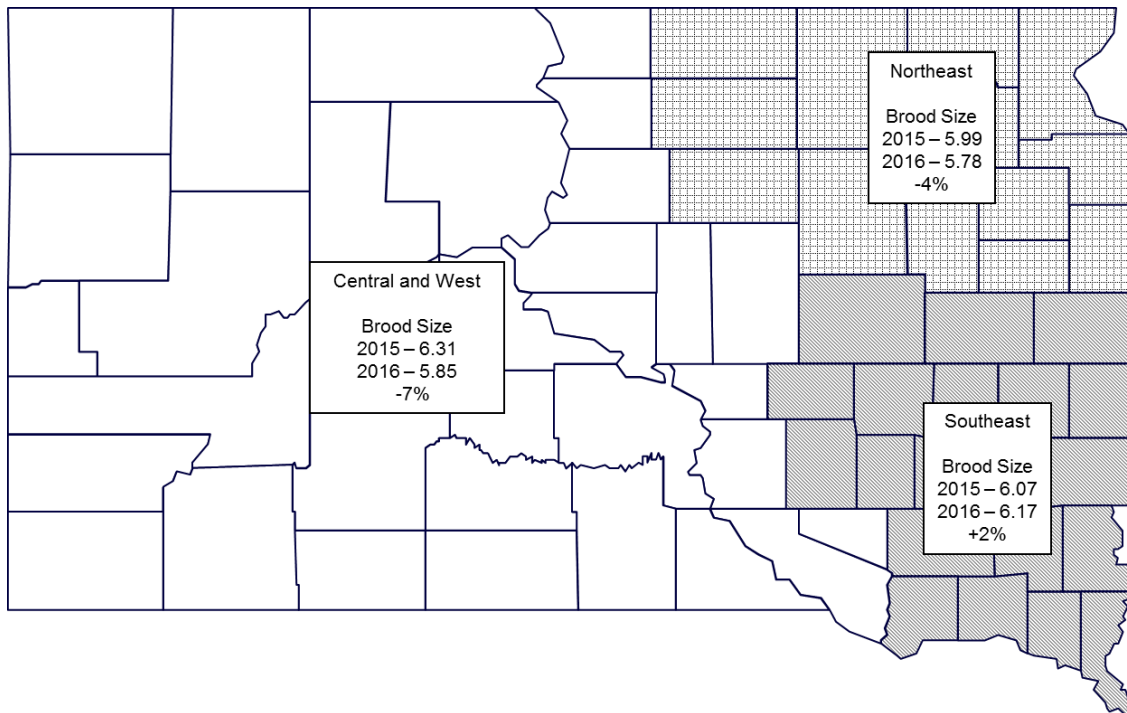


Figure 3. City area Pheasant Per Mile (PPM) indices over the past 10 years.

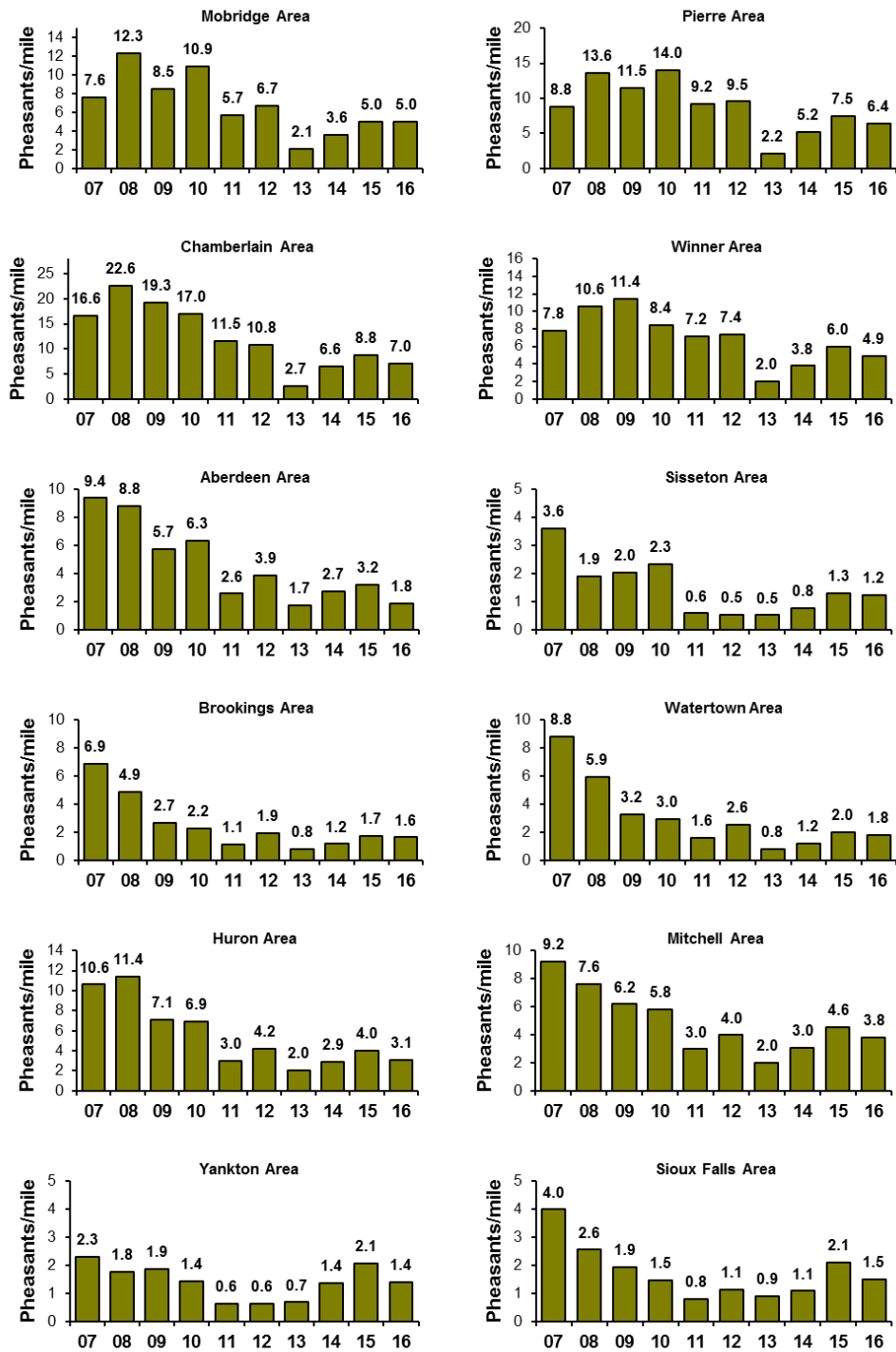


Figure 4. Pheasants Per Mile comparison among local areas for 2016, 2015, and the ten-year average.

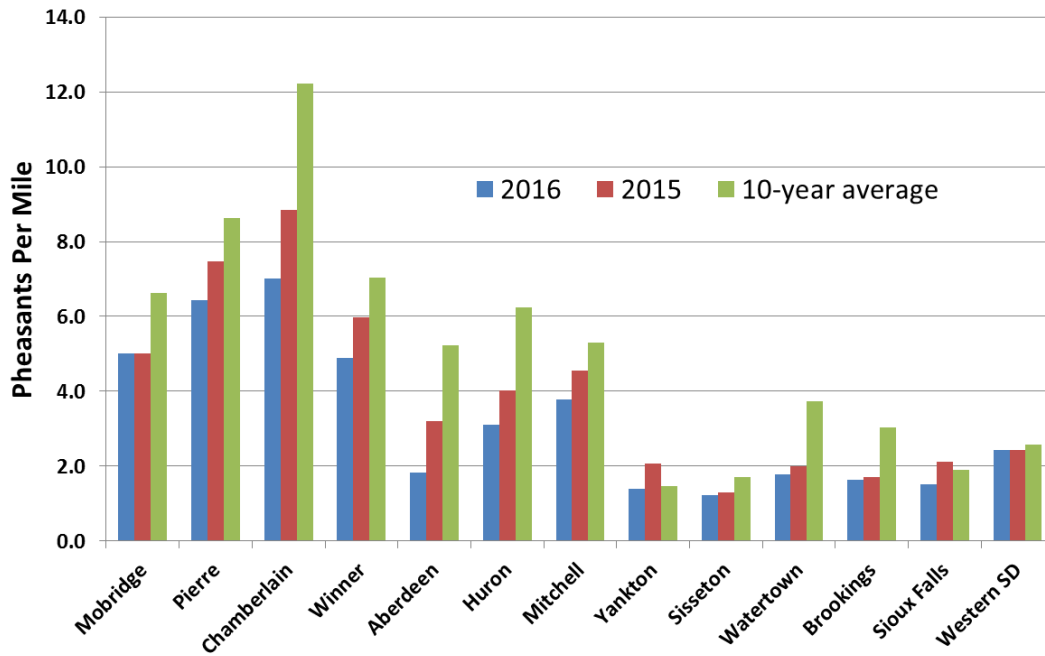
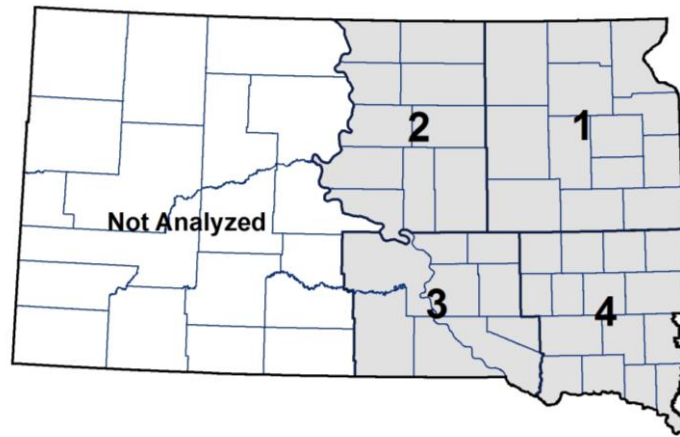


Figure 5. Results of a weather model used to predict annual change in Pheasants Per Mile (PPM) population index based on winter snowfall, April-May precipitation, and April-May temperature compared to the actual change in PPM (weather data source - <http://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/global-historical-climatology-network-ghcn>).

Analysis Region	Nov-Mar Inches Snow	Apr-May Inches Precip.	Apr-May Average Temp.	PPM Predicted % Change from 2015	PPM Actual % Change from 2015
1	29.1	5.4	51.6	27	-24
2	30.3	7.0	51.3	15	-7
3	40.2	9.7	52.9	-22	-20
4	50.0	9.3	53.6	-25	-26

Pheasant Weather Model Analysis Regions



Pheasant Weather Model Predicted Change in PPM

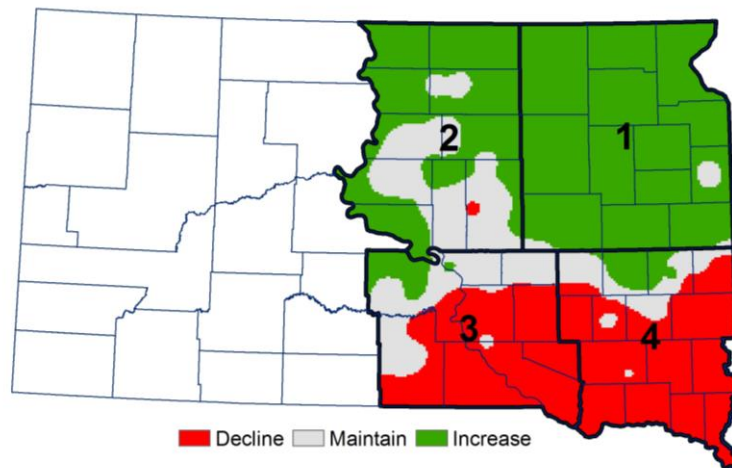


Figure 6. Statewide Pheasants Per Mile index in relation to Conservation Reserve Program and Soil Bank Program enrollment 1949 - 2016.

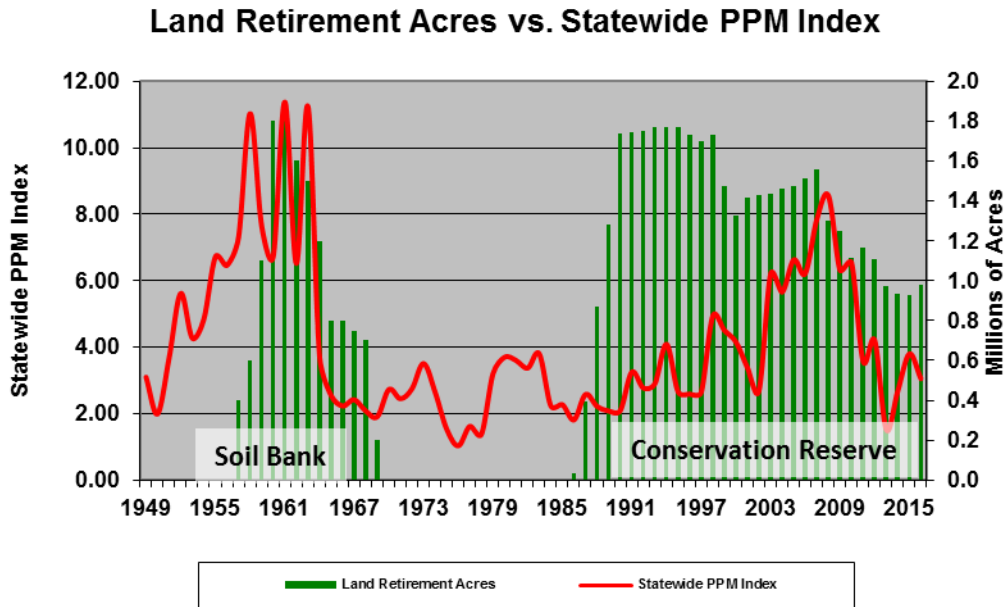


Figure 7. Conservation Reserve Program acreage 2004 - 2016 with maximum projected loss 2017 - 2020 (red bars).

