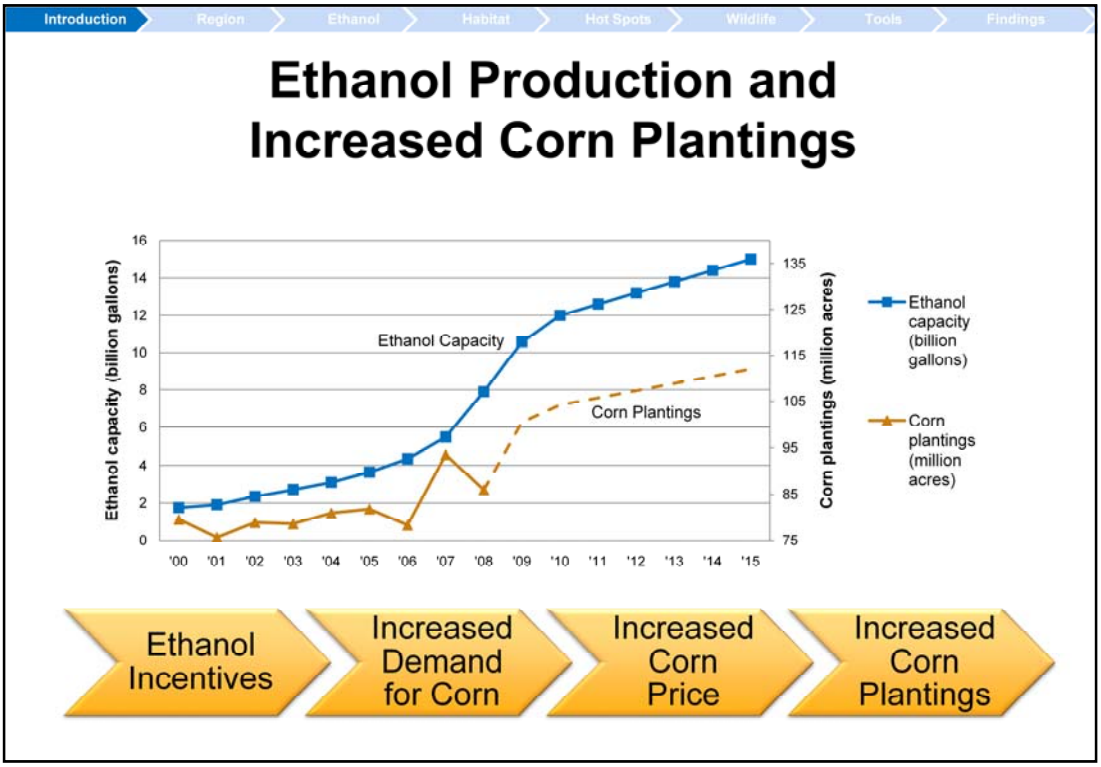
Today, we're presenting our Masters Project, "Corn Ethanol and Wildlife: How are policy- and market-driven increases in corn plantings affecting habitat and wildlife?"

When we were beginning our project in the winter of 2008, corn ethanol was being hailed as a national solution to energy security, rising fuel costs, and climate change. In December 2007 Congress had passed the Energy Independence and Security Act, mandating a dramatic increase in corn ethanol production.

Conservationists were just beginning to wonder what the potential effects this mandated increase in corn ethanol production would have on habitat and wildlife.

It was with this question in mind that we were approached by the National Wildlife Federation to research and analyze the current and potential impacts of increased ethanol production on wildlife and habitat. The first step in the link between corn ethanol and habitat is the fact that ethanol production causes increased corn plantings and land-use changes



Ethanol incentives increase demand for corn, which in turn increases corn prices. Finally, increased corn prices lead to land being converted from other uses to corn agriculture

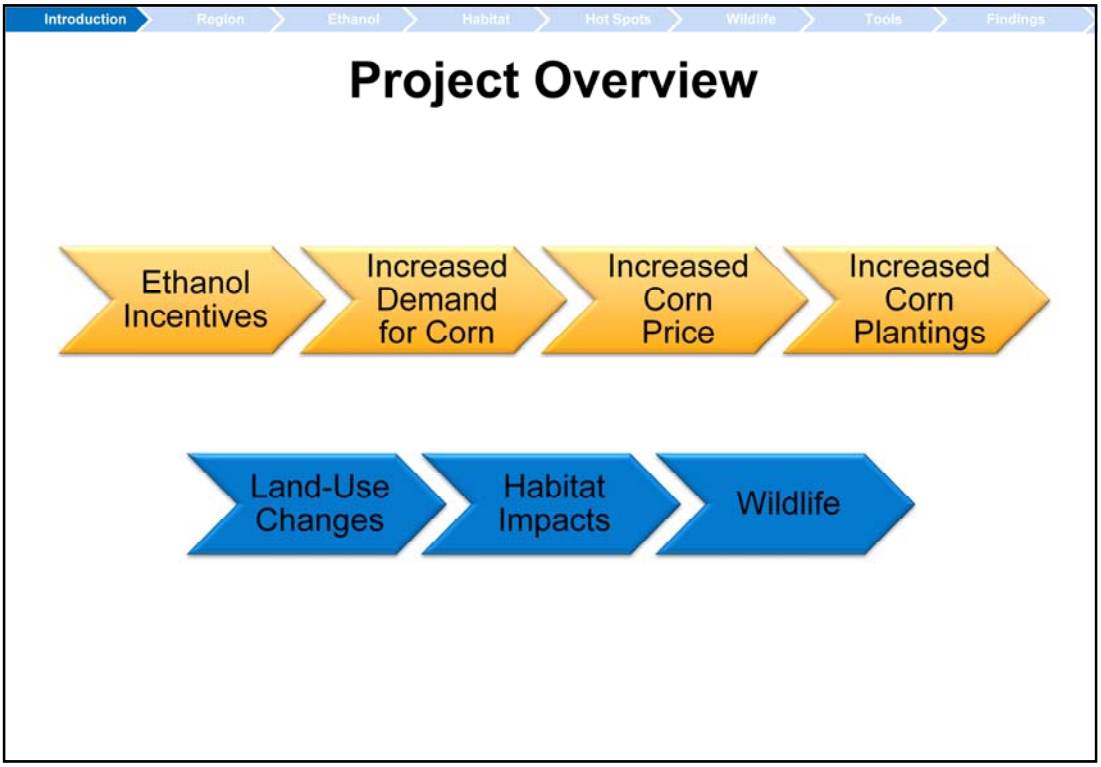
This graph shows U.S. ethanol capacity, which is the blue line and acres of corn planted, which is the brown line, since 2000

As you can see, ethanol capacity was increasing at a steady but moderate rate during the early 2000s. The 2005 Energy Bill mandated a large increase in domestic ethanol production. After its passage, the growth of U.S. corn ethanol capacity began to increase. Given current legislation, ethanol capacity will continue to increase until 2015, when it will level off at 15 billion gallons.

This means that, despite current contraction within the industry, corn ethanol production will continue to increase.

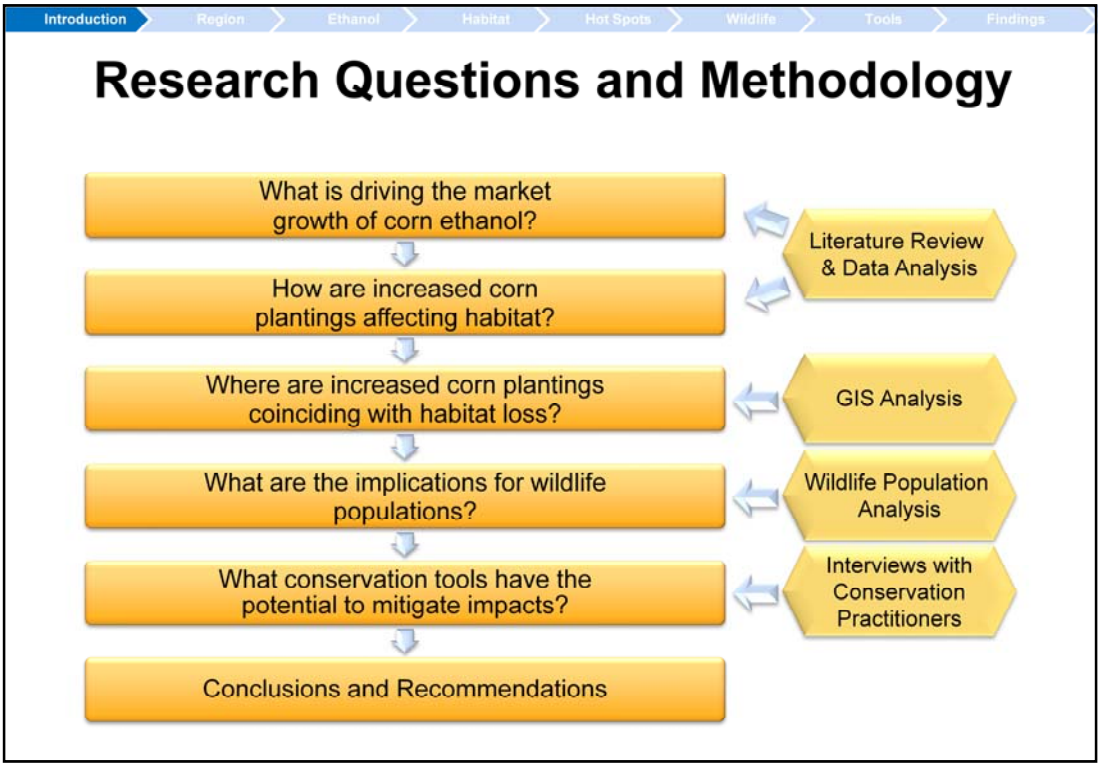
The brown line on the graph shows the total acres of corn planted over the same time period. Total corn acreage shot up 19% between 2006 and 2007. Though plantings decreased slightly in 2008, they are still higher than at any point in the past half-century. The dotted part of the brown line shows estimated corn plantings through 2015, with the increased plantings necessary to meet increased ethanol capacity are taken into account.

In addition to examining this link between ethanol incentives and increased corn plantings, we also looked at the impacts that increased corn plantings are having on habitat and wildlife.



Increased corn plantings lead to land-use changes – land that was previously being used for something else is now used for corn agriculture. We examined the link between these land-use changes, habitat changes, and wildlife populations.

Our research and analysis revealed that government incentives drive corn ethanol growth. The land-use changes related to increased corn plantings are already occurring, and wildlife have already been affected by these changes. Given current federal and state policy, these impacts will only increase.



These are the research questions we used to guide our analysis.

started with a literature review and data analysis investigating what is driving the expansion of the corn ethanol industry and how increased corn plantings affect habitat.

We then conducted a GIS analysis to determine where increased corn plantings are coinciding with habitat loss.

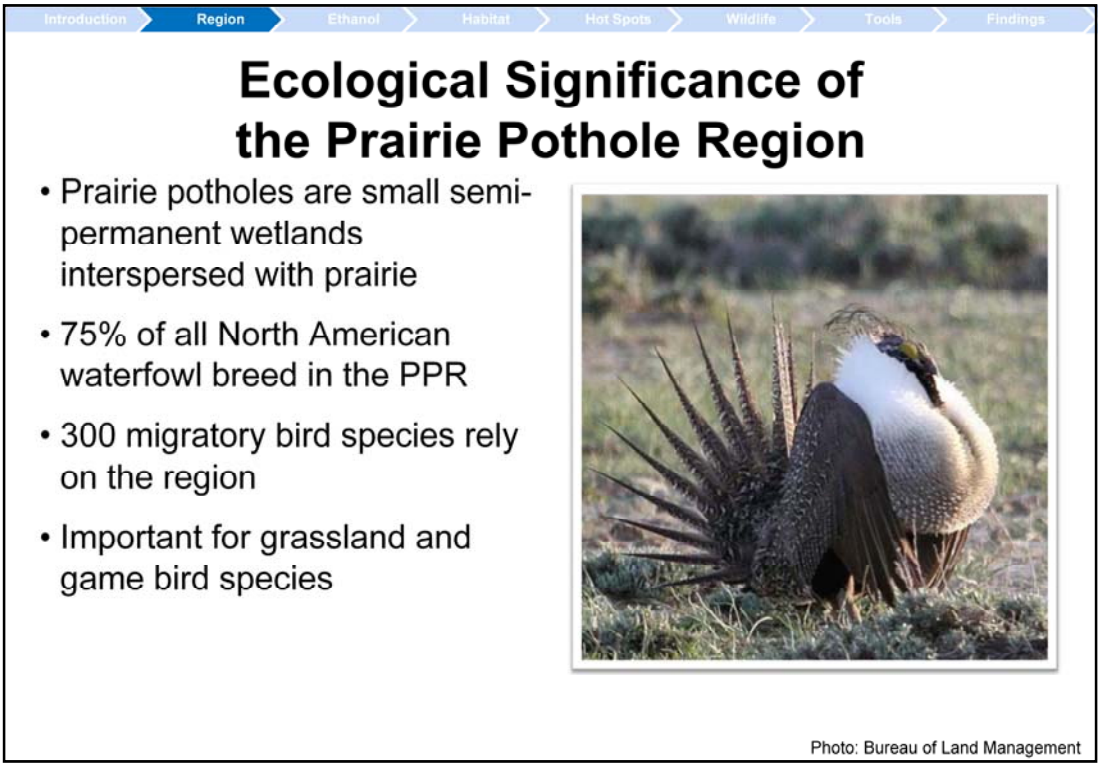
We used this GIS analysis to inform our wildlife analysis, in which we looked at how ethanol-driven habitat change is affecting bird populations

We also used our GIS analysis to inform our interviews with conservation practitioners. We spoke with over 30 practitioners in our study region about where habitat loss is occurring and what conservation tools have the potential to mitigate its impacts.

In order to better focus our analysis, we centered our investigation on the Prairie Pothole Region, or PPR, of the United States

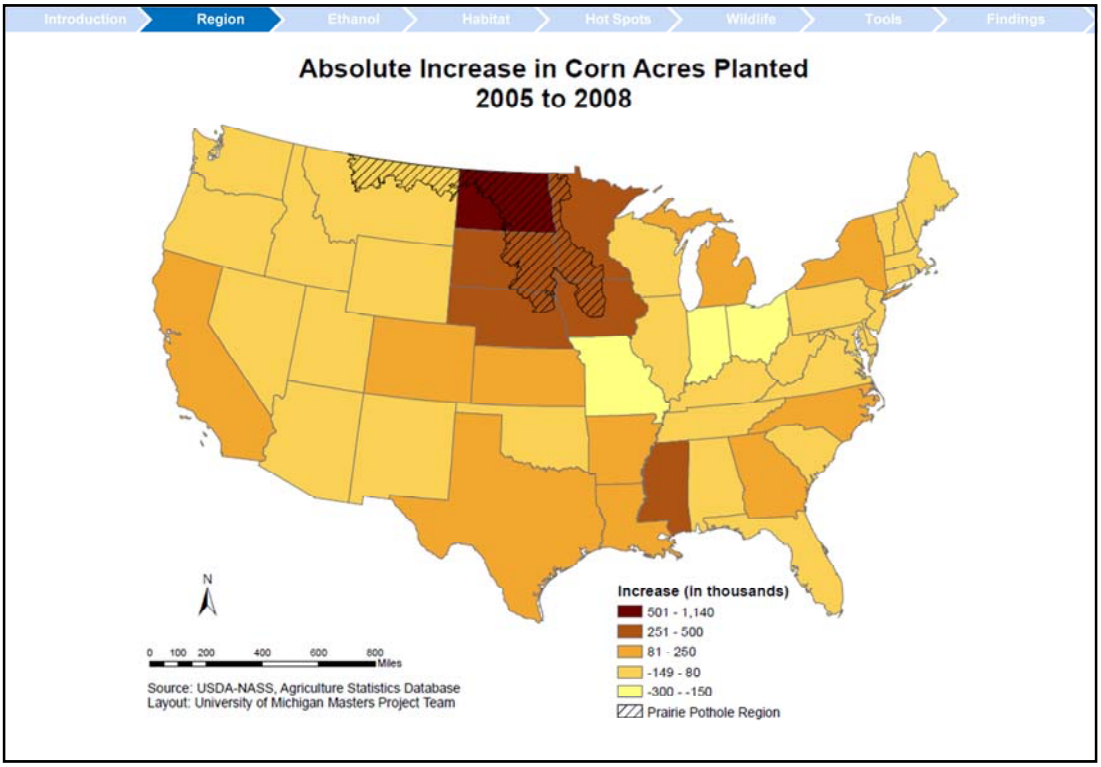
We focused specifically on the Prairie Pothole states of Iowa, Minnesota, North Dakota and South Dakota

The Prairie Pothole Region is an ecologically unique region with a landscape of native prairie interspersed with small depressional wetlands, as shown in the picture



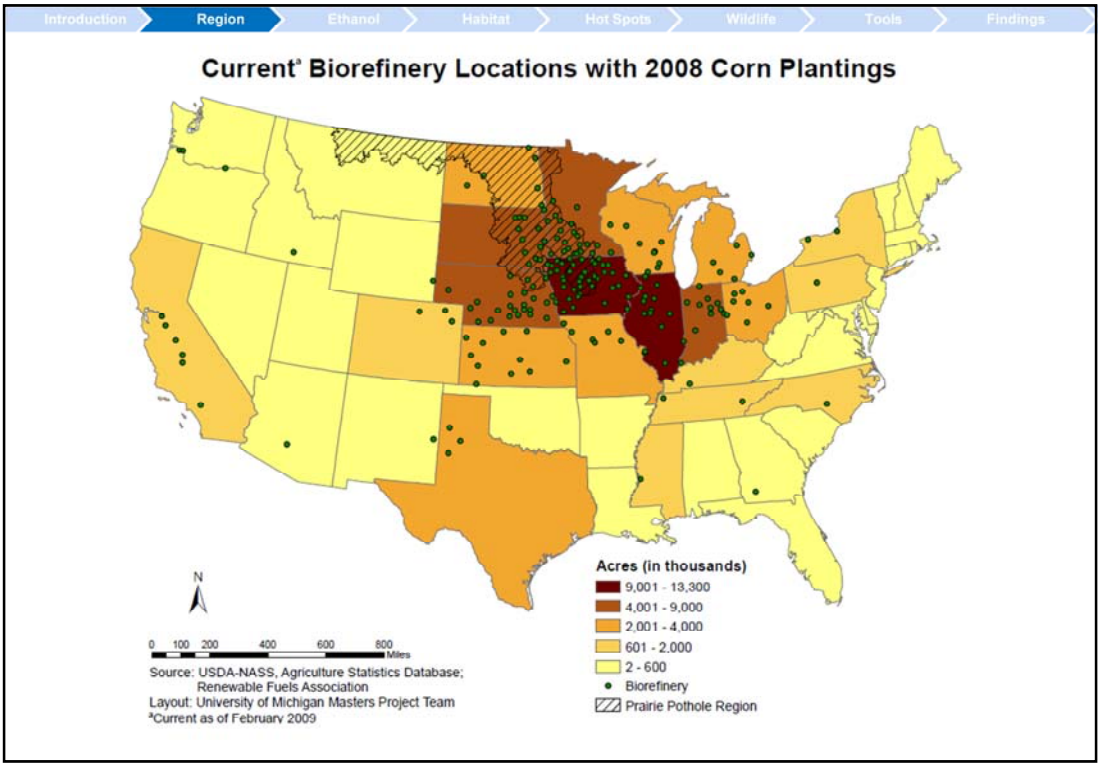
The Prairie Pothole Region is particularly important as habitat for migratory birds, waterfowl, and grassland and game bird species.

This region is also home to a plurality of the U.S. corn ethanol industry



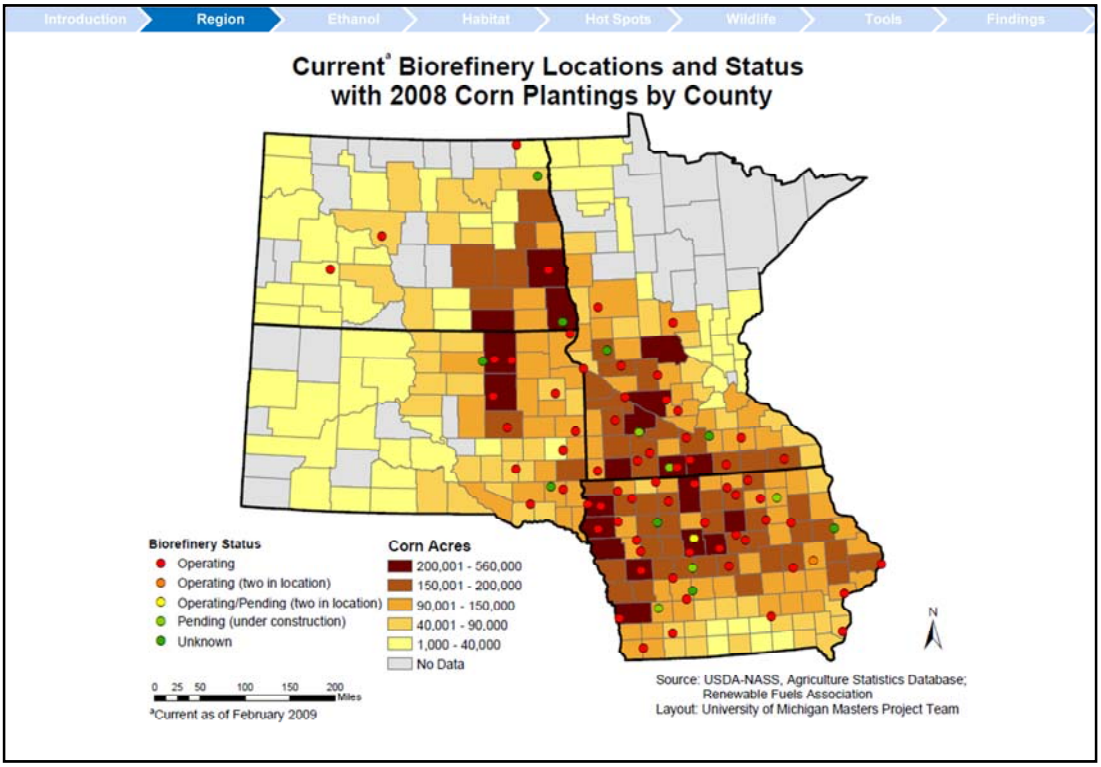
Nationally, total corn plantings have increased significantly since 2005

Much of this increase has been concentrated in the states which we chose to focus on, with increases of over a quarter million acres in each of our four study states – and increases of over half a million acres in North Dakota



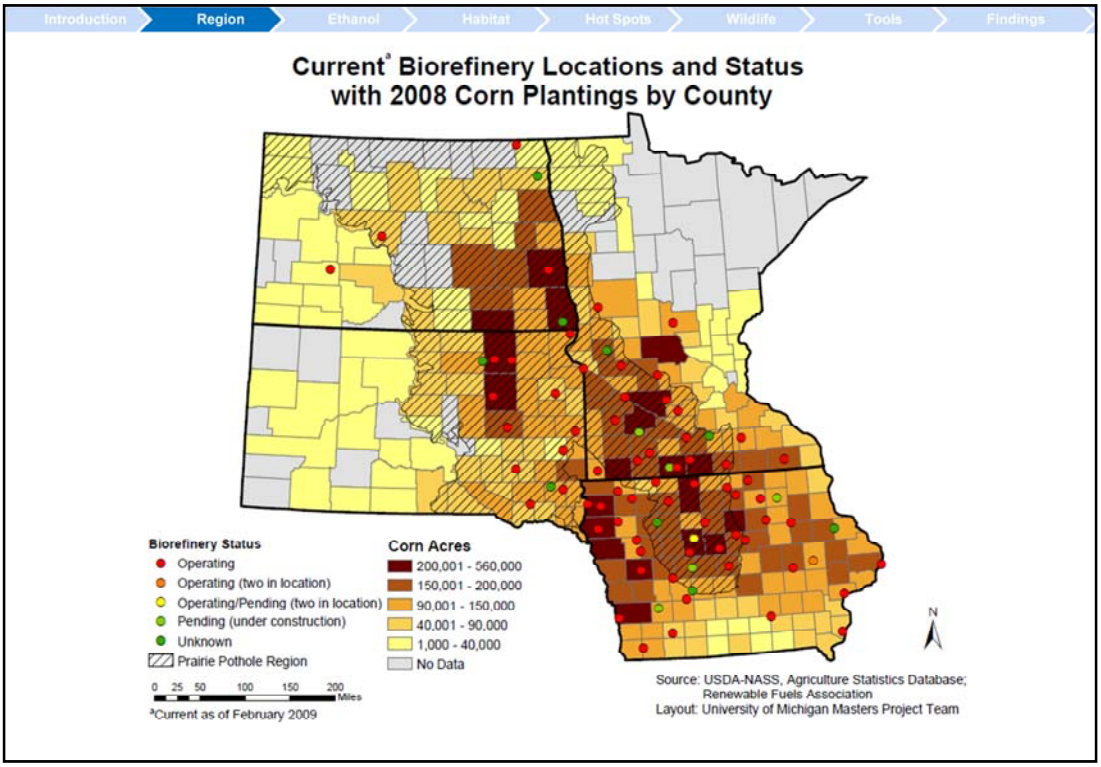
Here we show the location of all U.S. biorefineries

Not surprisingly, biorefineries are generally located in regions with high corn plantings



When we zoom in on our region, you can see that there is a large concentration of biorefineries in our study states

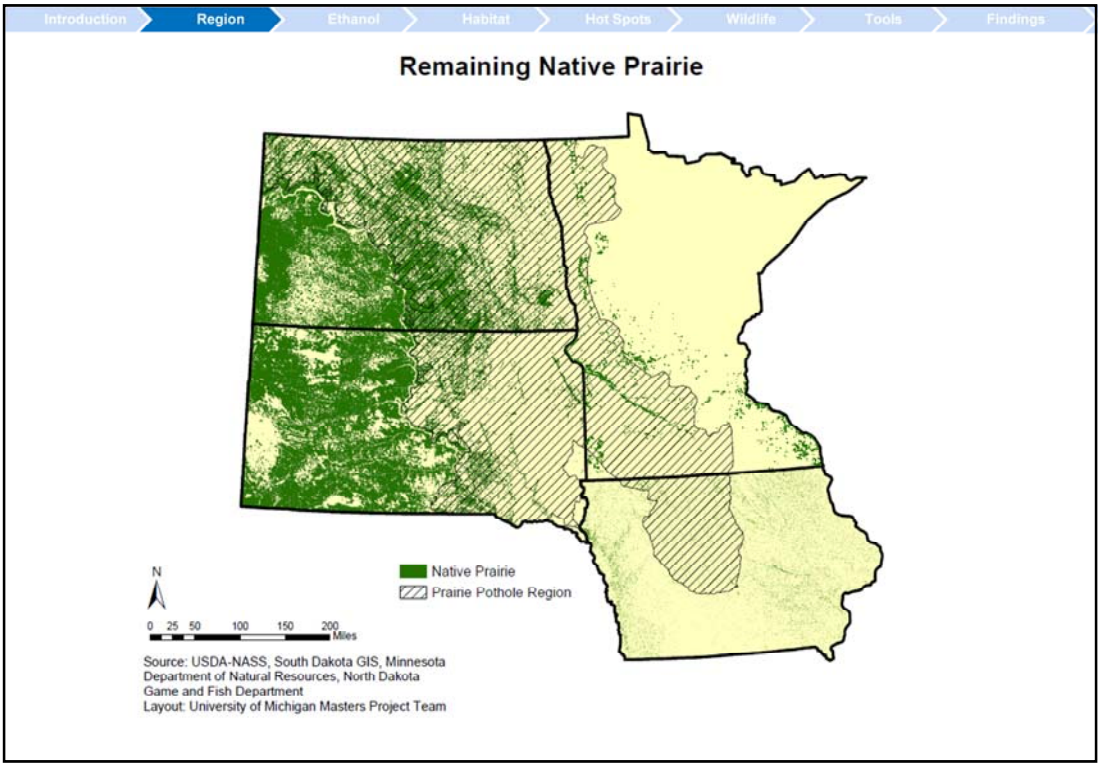
Our four-state focal area is home to 85 of the nation's 204 corn ethanol refineries



When we add the Prairie Pothole layer to the map, you can see that almost all refineries in the four-state area are located within the PPR portion of these states

There are 61 biorefineries – that's 30% of all national biorefineries – within 20 miles of the PPR

Clearly, the corn ethanol industry has the potential to cause significant impacts throughout this region



Along with wetlands, native prairie is the most important habitat in the Prairie Pothole region, and it is a good indicator of total native habitat available

Here we compiled native prairie data from all four states. The data used are from different sources, despite these data limitations, however, the trends are very clear

Both Minnesota and Iowa only have small fragments of native prairie remaining. Iowa has gone from 23 million acres of native prairie in 1780 to only 30,000 today. Similarly, Minnesota has gone from over 18 million acres of native prairie in 1850 to only 170,000 today

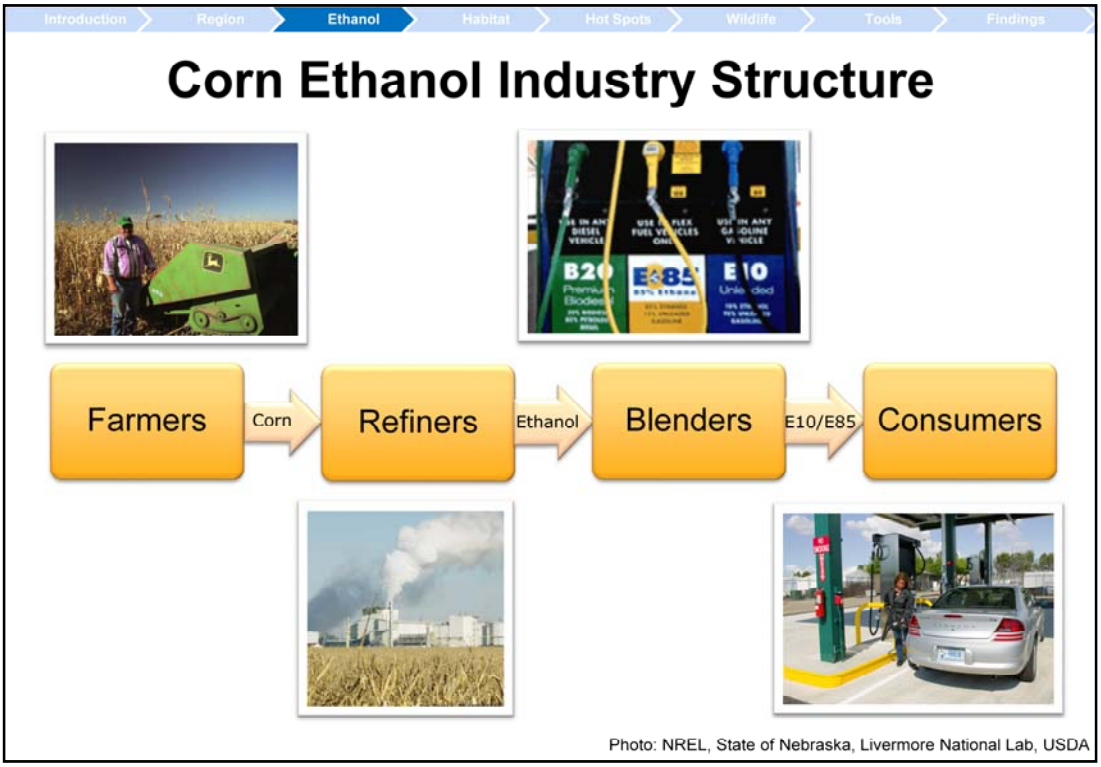
North and South Dakota still have significant amounts of native prairie remaining. Prairie losses in the state are estimated to be about 50%. Most of the remaining native prairie in the states is located to the west of the Prairie Pothole region and is currently used as rangeland for grazing

As corn prices increase, it becomes more and more profitable for ranchers to convert their rangeland into corn production

And Both North and South Dakota are already transitioning towards more intensive agriculture, with North Dakota having the greatest increase in corn acres planted between 2005 and 2008

As one practitioner we spoke with said, “North Dakota wants to be like Iowa when it grows up”

To begin our research we wanted to understand what is driving the recent increases in corn ethanol production



But in order to understand market drivers, it's important to first take a step back and understand the industry structure.

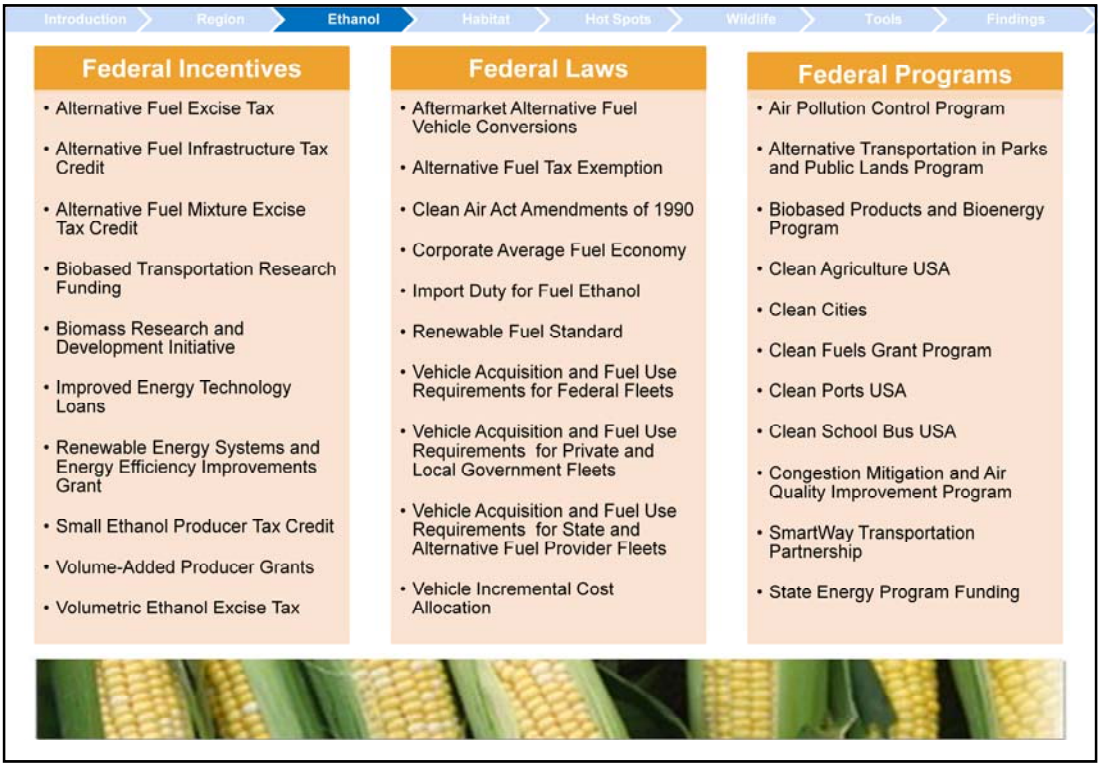
The corn ethanol value chain starts with **farmers**, who are responsible for corn production. Refiners often contract with farmers for future crops of corn, up to 2 to 3 years in advance. This has provided a new level of financial stability for farmers.

Refiners undertake the physical production of corn ethanol. Corn ethanol for fuel is made through a fermentation process where yeast is used to metabolize the sugar in corn to produce ethanol. In addition to corn, the production of ethanol requires significant amounts of energy and water.

In 2005, nearly half of all corn ethanol refineries were owned by farmer co-operatives. With the passage of the 2005 Energy Bill and the creation of the first Renewable Fuel Standard, this ownership demographic began to change and centralized agribusiness corporations invested heavily in refining. At the beginning of 2009, local ownership has dropped to 23% of ethanol production capacity.

When the refining process is complete, ethanol is purchased by **blenders**. Blenders are typically oil companies and fuel retailers who blend corn ethanol into gasoline to achieve either E10 (10% ethanol 90% gasoline) or E85 (85% ethanol, 15% gasoline).*indicate in photo*

Blenders are required by the government to blend a certain amount of ethanol into the gasoline they sell each year. Such government requirements and incentives play a major role, if not the key role, in driving market demand for corn ethanol.



This slide lists these federal incentives, laws, and programs. The point here is not to get into the details of each but to simply underscore how many exist.

Federal **Incentives** are payments by the federal government for ethanol production. These incentives include:

•tax credits for both ethanol infrastructure and the blending ethanol into gasoline

•loans or grants for the construction of refineries

•R&D funding for improving production efficiencies.

Federal **laws** actually set requirements and mandates that help the industry, for example:

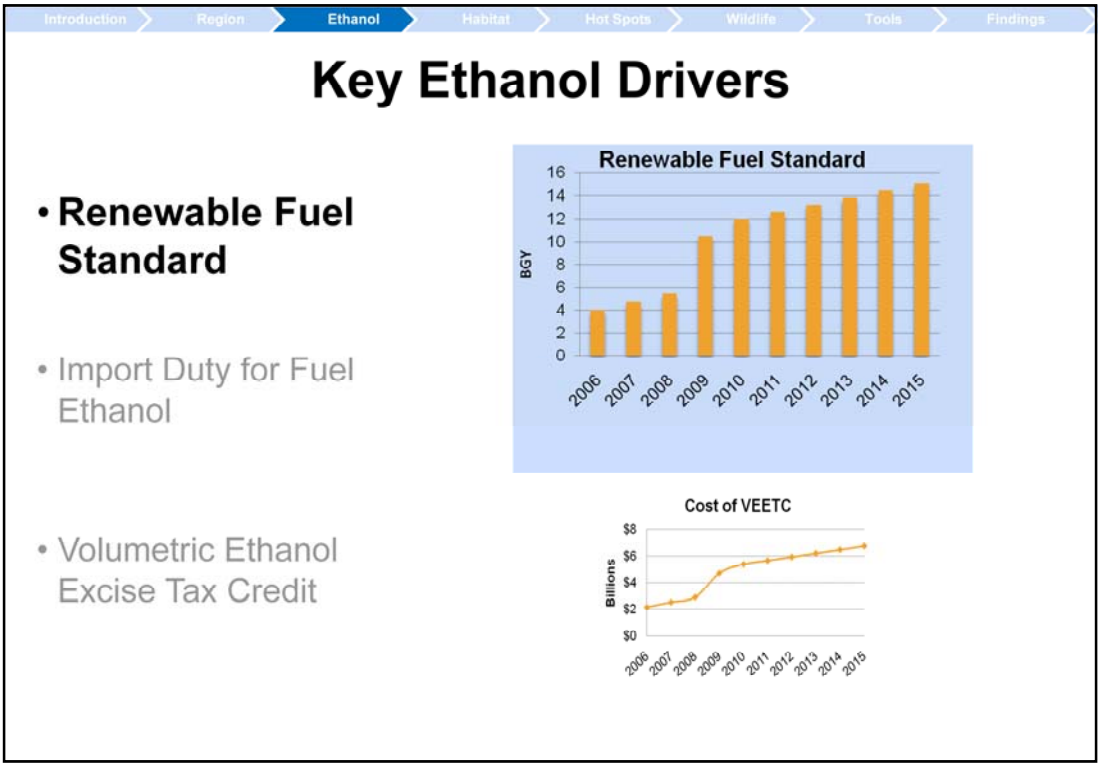
•Requiring the use of E10 or E85 by federal agencies

•Creating trade barriers for foreign ethanol

•Mandating that certain levels of ethanol be blended into gasoline

Federal **programs** dedicate staff and agency capacity to certain goals. Most of the programs listed here, have goals such as “encouraging cleaner fuels” to reduce air pollution. The U.S. government has historically considered corn ethanol to be one such “clean fuel”.

Next I am going to discuss the three most important of these in terms of increasing market demand for corn ethanol.

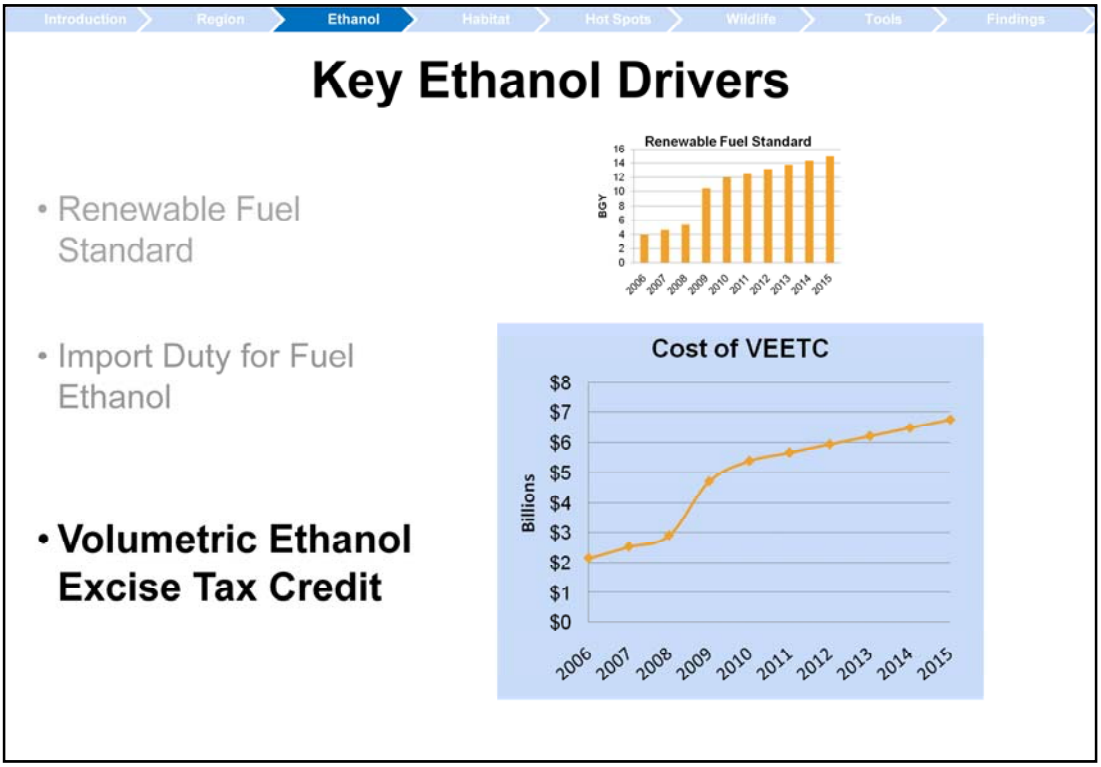


<u>Renewable Fuel Standard – LAW</u>

The Renewable Fuels Standard, commonly referred to as the RFS, is a <u>law</u> which specifies how much biofuel must be used by blenders each year. This essentially sets a floor for corn ethanol demand, and is a major driver for growth. The graph here shows the increasing levels of blending required under the RFS.

When Congress first enacted the RFS through the 2005 Energy Bill, they set initial blending requirements at 4 billion gallons per year, increasing at about half a billion gallons each year. In 2007, this standard was increased – and you can see the jump that is reflected in the graph.

As of this spring the industry has 10.57 billion gallons of ethanol capacity in operation, just above the RFS requirement, and they have addition capacity that is offline but available should demand increase – which is will next year when these blending requirements increase. In fact, the RFS ensures that ethanol demand (and subsequently corn demand) will grow each year until 2016 when it levels of at 15 billion gallons per year.

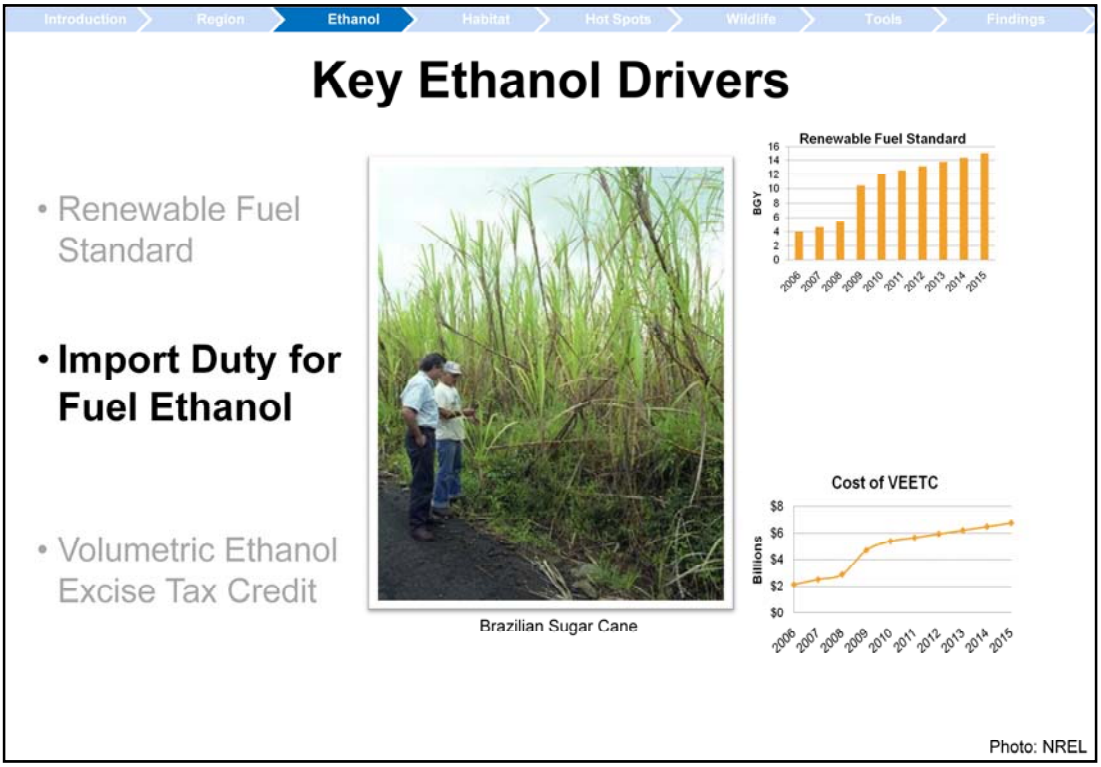


<u>Volumetric Ethanol Excise Tax Credit – INCENTIVE</u>

A second important driver for corn ethanol growth is the Volumetric Ethanol Excise Tax Credit, an incentive that pays blenders 45 cents-per-gallon of ethanol they blend into gasoline. This is essentially paying blenders to meet the requirements of the RFS, and continues to reward those who blend additional ethanol beyond the requirements of the RFS

This graph shows payments to blenders through VEETC, based on the blending requirements of the Renewable Fuel Standard. You can see that in 2009 this incentive will pay oil companies close to $5 billion dollars, which is more than is spent on all U.S. Department of Agriculture conservation programs.

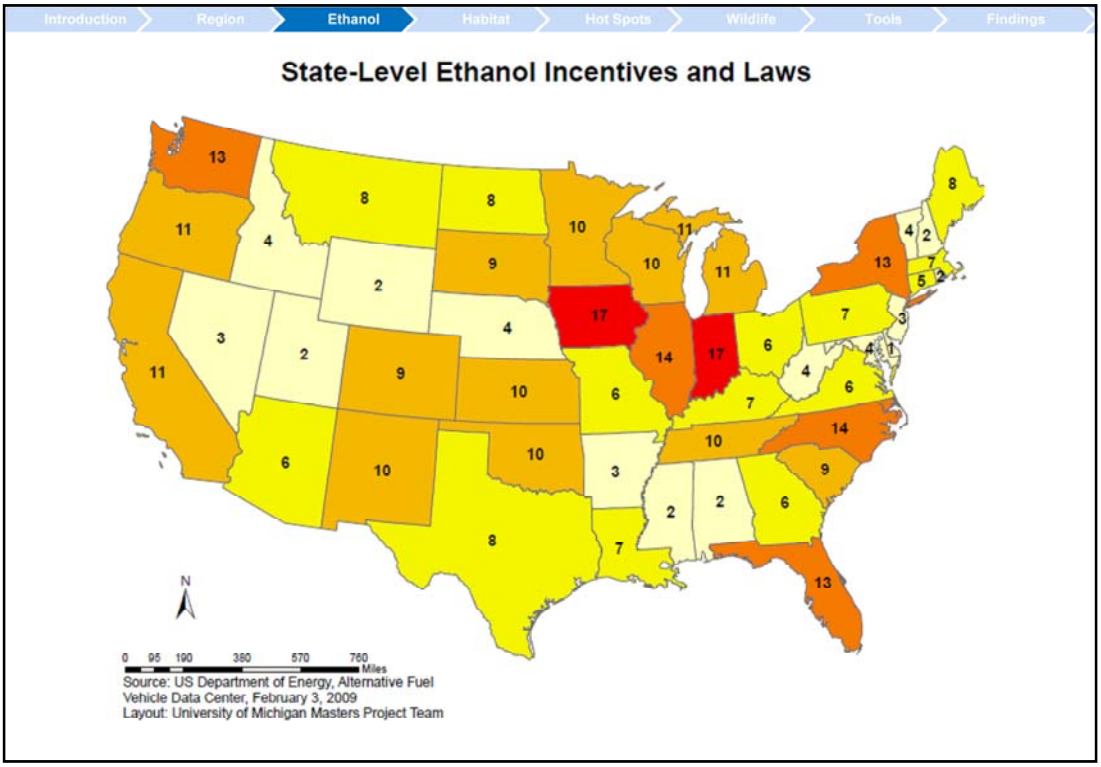
It is important to remember that this is just one of a number of government incentives. This graph does not capture cost of the many *other* federal programs that support corn ethanol.



<u>Import Duty for Fuel Ethanol - LAW</u>

Finally, the Import Duty for Fuel Ethanol is a law that protects the domestic ethanol industry from foreign competition by placing high tariffs on imported ethanol. This is essentially a trade barrier that makes in unprofitable to import fuel ethanol.

Should the tariff be lifted, the main source of competition with corn ethanol would be Brazilian sugar cane ethanol, which has a production cost of about half due to greater production efficiencies. This would be very tough competition for corn ethanol.



State-Level Laws and Incentives

In addition to federal laws and incentives, every state in the country has some way in which is supports ethanol.

This map illustrates the number of state ethanol incentives and laws across the country.

- 9 states have enacted their own Renewable Fuel Standard (which mandate higher blending levels that the federal RFS)
- 14 states have some sort of incentive for the retail sale of E10 and/or E85
- 23 states have incentives for ethanol refiners

Industry Outlook: Continued Growth

- Present state of market:
  - Lower profit margins
  - Lack of liquidity
  - Excess capacity
- Government laws and incentives will drive future growth

Photo: U.S. Department of Energy

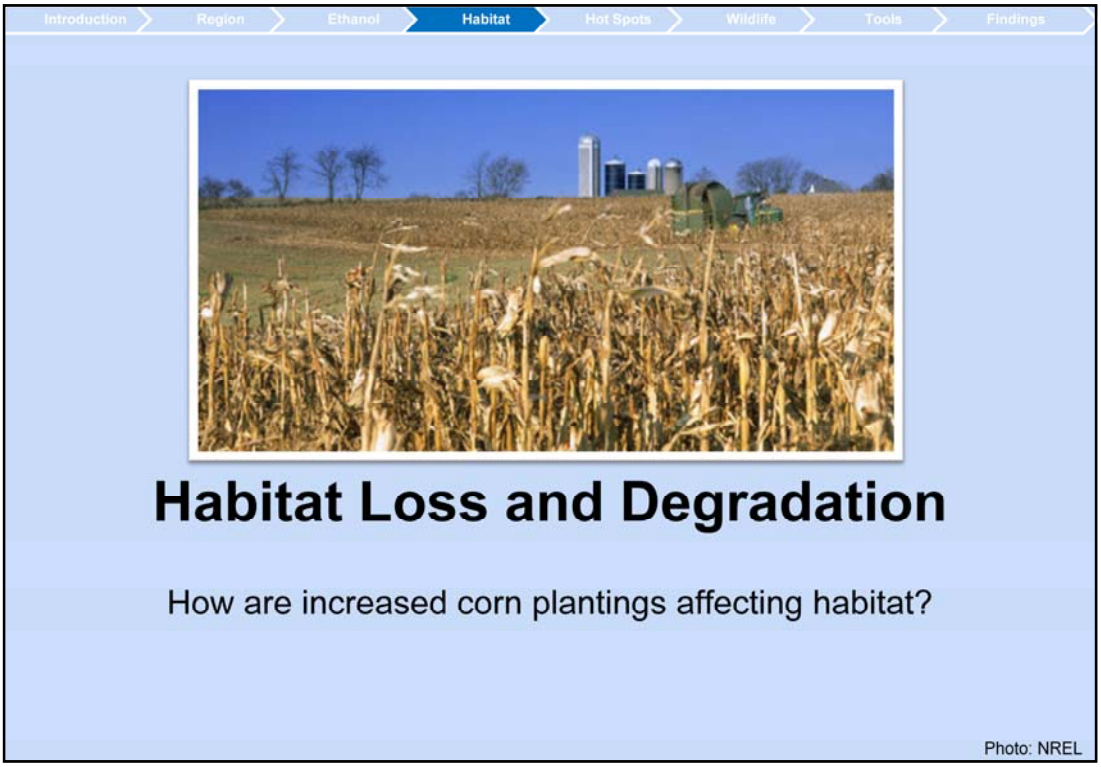
In projecting future trends in market growth, it is important to recognize the affect that the present recession is having on the corn ethanol industry. Refiners are facing lower profit margins due to the combination of recent high corn price and lower ethanol prices due to lower gas prices. Lack of liquidity in the market has had serious cash-flow implications for refiners, many of whom carry large amounts of debt.

Finally, as I mentioned earlier, there is some excess capacity in the industry, meaning that there is more ethanol being produced that there is demand. This has further driven down ethanol price and has also resulted in the halt of construction on many new refineries and the temporary shut-down previously operating refineries.

These forces have combined to result in a string of bankruptcies over the past 3-4 months. However, while there is general consolidation going on in this highly fragmented industry, the longer outlook remains strong. Remember, the Renewable Fuel Standard increases annually until 2015, essentially mandating an increase in demand for corn ethanol.

There is also an ongoing lobbying effort to increase federal blending requirements beyond the RFS, which has gained the support of many key players in DC, including Secretary of Agriculture Tom Vilsack and speaker of the House Nancy Pelosi. What the industry is proposing would increase ethanol demand to 15 billion gallons per year immediately, essentially jumping to levels not presently required by the RFS until 2015. This would be a catalyst for market growth.

Thus one of our key findings is that the market drivers for corn ethanol are federal laws and incentives, which will continue to drive up demand for corn ethanol at least through 2015. This demand will result in increased production of corn, which has serious environmental implications.



And now we will explain *some* of those environmental impacts in greater detail, focusing specifically on the land use changes associated with increased corn production.

Research Question--Habitat Loss and Degradation

Between 2004 and 2007, corn plantings in our study area increased by more than 3 million acres. We were interested in determining how this increase has altered the landscape and what implication this has for both habitat quality and quantity.

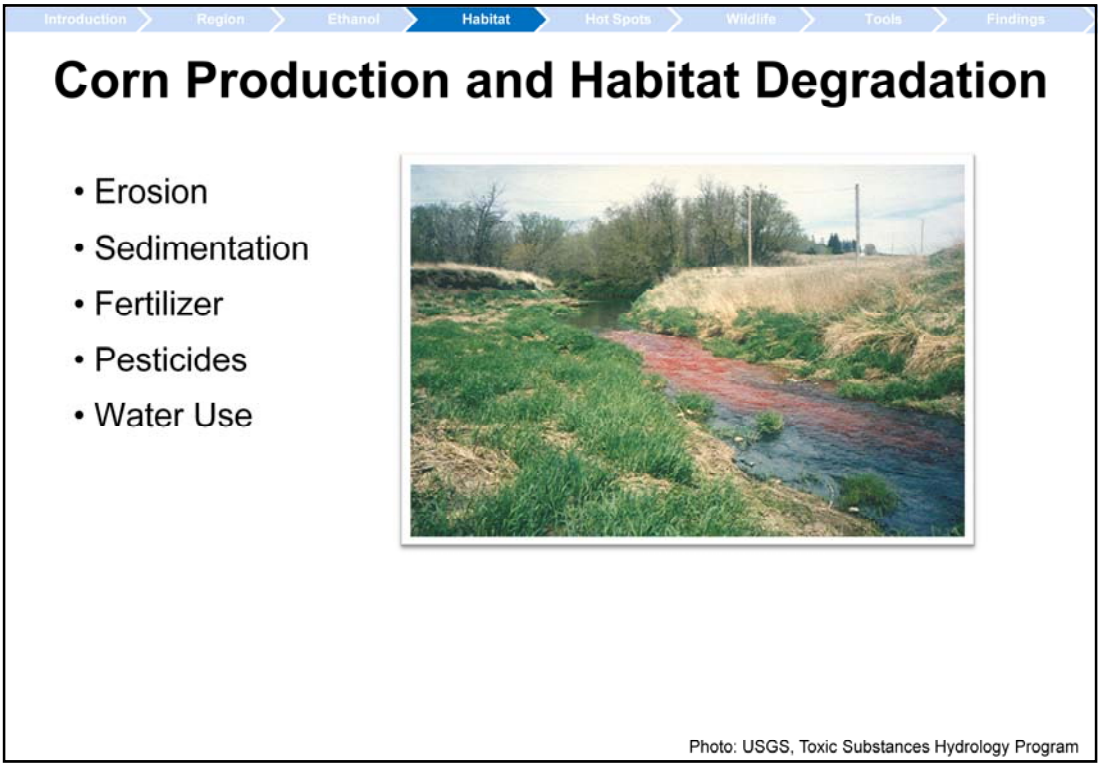
Where is land coming from?

To understand how these increased corn plantings are affecting the landscape, we had to first answer the question, where is the land to grow this corn coming from? Through a literature review and numerous conversations with practitioners, we determined that there are three main sources of land.

The majority of increased corn plantings have occurred on land formerly used to grow other crops, a practice known as cropswitching. Farmers often implement crop rotations on their land to improve soil quality, and the most common crop rotation in our study area is alternating between corn and soy. In recent years, many farmers have changed to corn-corn rotations, sometimes with several years in continuous corn.

Another source of land for corn production is retired agricultural land. This is primarily land enrolled in Farm Bill conservation programs. Landowners have the option to bring this land back into production at the end of their contract, and many farmers have chosen to do, particularly since 2007.

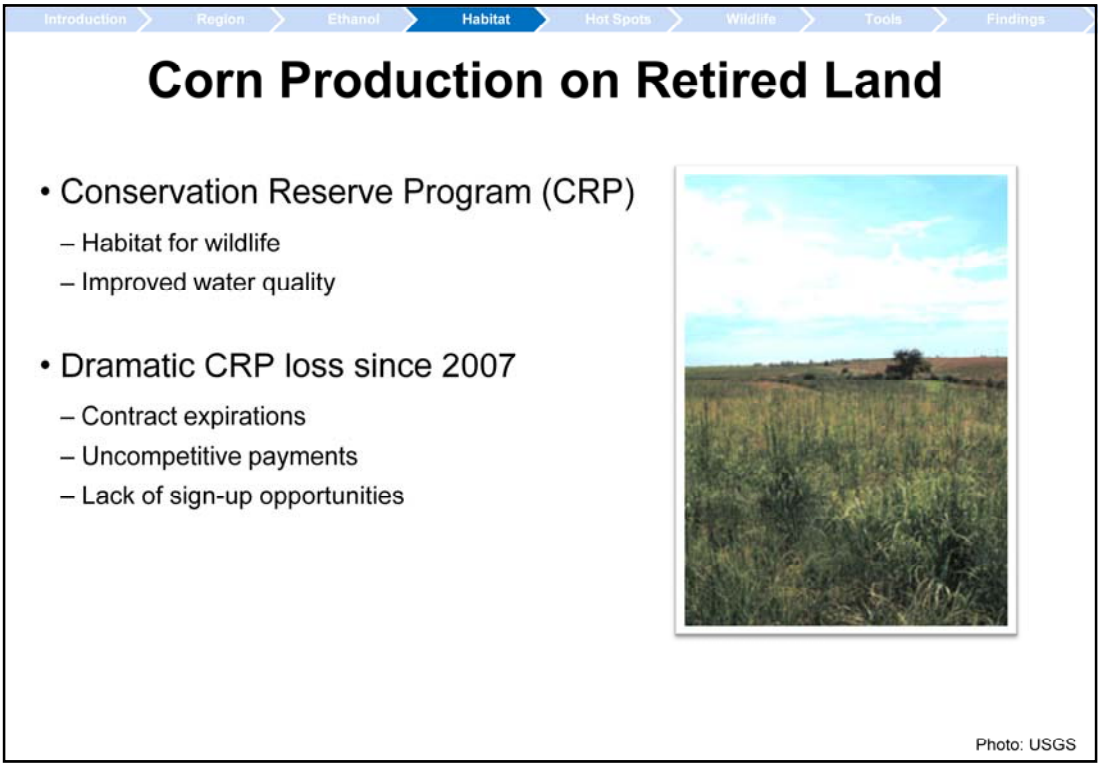
The third source of land for corn production is native grassland. The practice of converting this land to crop production is often referred to as sodbusting.



Habitat Degradation

There are several ways in which switching to corn from other crops can impact habitat quality.

Our report includes a thorough literature review on the various ways in which growing corn differs from growing other crops. This research revealed that because of how corn is grown, it is generally more damaging than other crops. In our study area, corn generally leads to more soil erosion and sedimentation, which degrades aquatic ecosystems. Corn also requires on average more fertilizer, pesticides, and water than other crops. So even if corn acreage expands onto existing agricultural land, the fact that corn is generally more input-intensive than other crops means that switching from wheat or soy to corn production will have a negative impact on habitat quality.



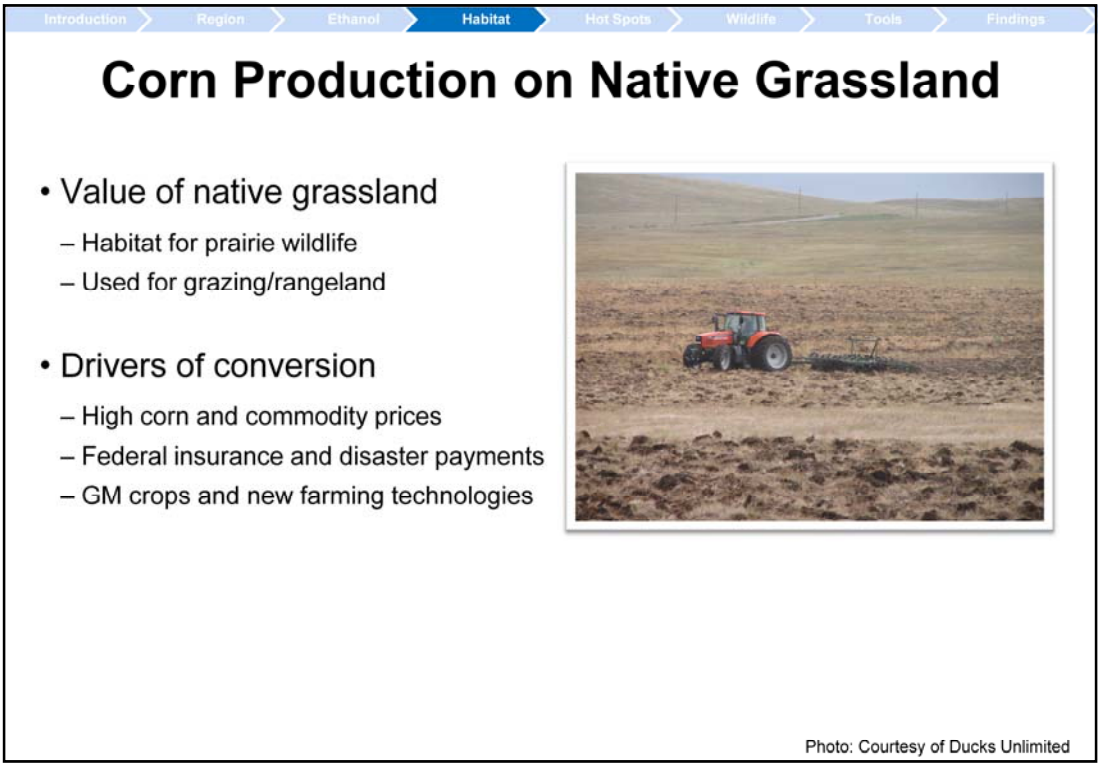
Converting Retired Agricultural Land

In addition to habitat degradation, increased corn plantings are also associated with habitat loss.

I mentioned the two types of land conversion associated with increased corn plantings, one of which is conversion of retired agricultural land.

The largest land retirement program in the United States is the Conservation Reserve Program. In our four states alone, more than 8 million acres of sensitive, erosion-prone land is currently enrolled. Land owners receive payments for keeping this land out of production for the specified length of the contract. Because this land is planted with grassy vegetation, CRP land provides habitat for diverse wildlife and also protects water quality by reducing soil erosion and sedimentation. Numerous studies have shown that CRP has helped populations of grassland birds, game species, and waterfowl, in particular.

Unfortunately, CRP has experienced dramatic declines in enrollment since 2007. In our study states, about 1.25 million acres of CRP land has been brought back into production. There are three main reasons for this. Contracts have been expiring, and CRP payments have not been competitive enough with crop prices to incentivize people to re-enroll in the program. Furthermore, the Farm Service Agency, the agency responsible for administering CRP, hasn't opened up a general sign-up for new landowners to enroll. Interviews with state practitioners have confirmed that CRP land is being converted to crop production, including corn, at alarming rates.

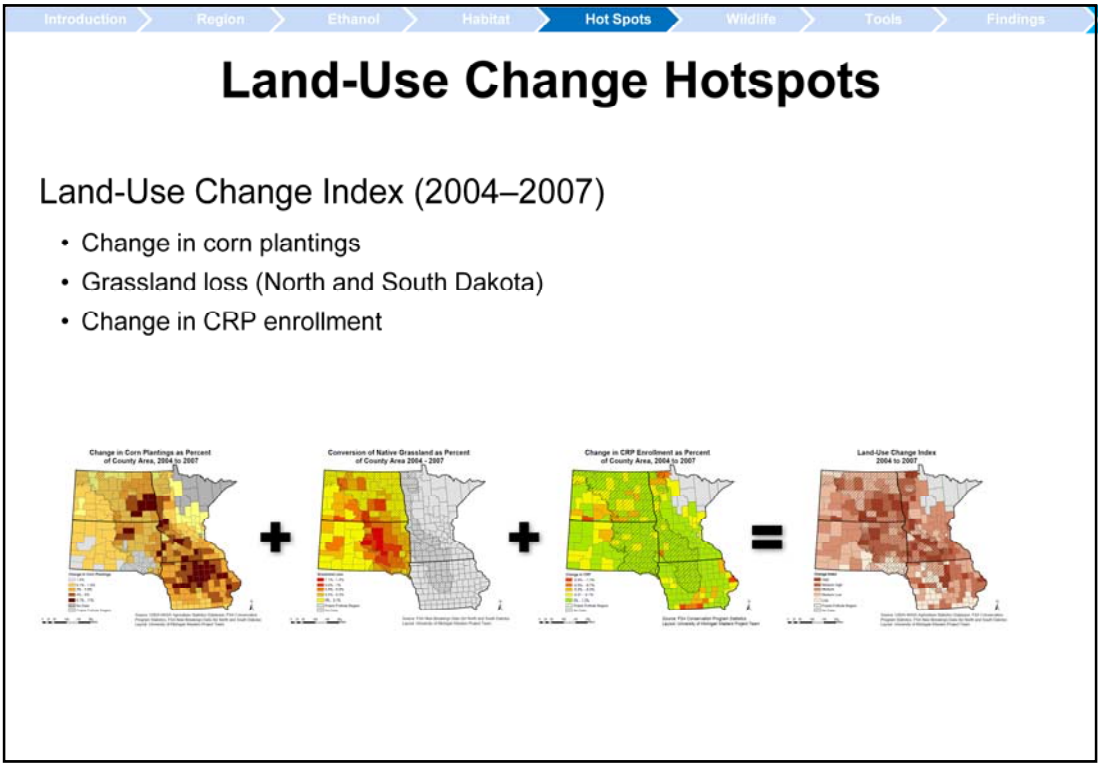


Converting Native Grassland

The other type of land conversion associated with increased crop production is sodbusting, the conversion of native grassland. Wildlife practitioners consider this type of conversion to be the most detrimental, because it is an irreversible loss of true native habitat—both prairie and the associated wetlands. There are various drivers of this conversion.

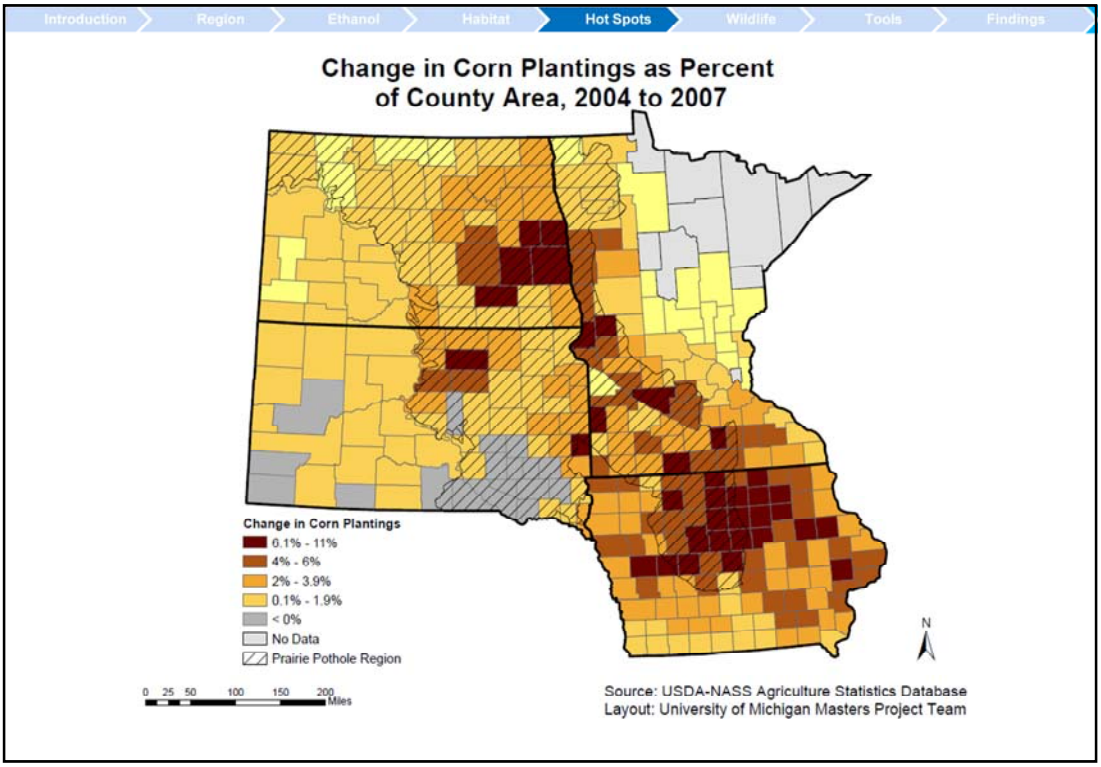
Research Question---Land-Use Change Hotspots

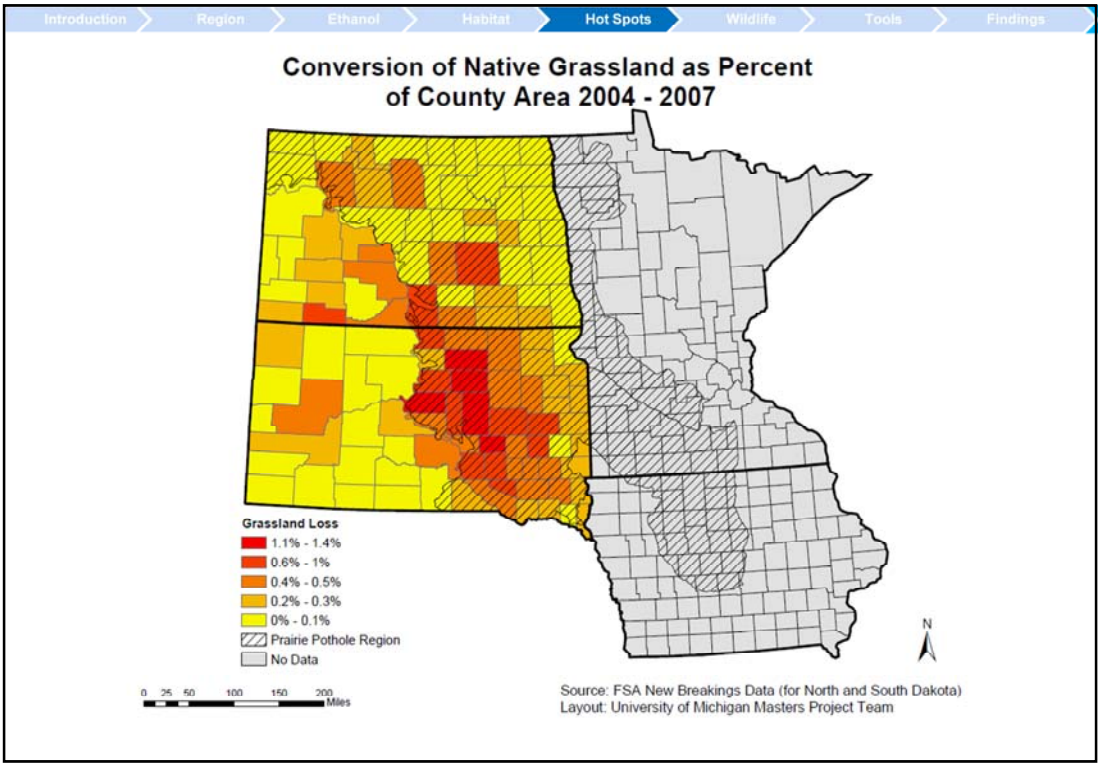
Given these impacts of increased corn production, we wanted to determine where these land-use changes are occurring –where there are hotspots of increased corn plantings and habitat loss.

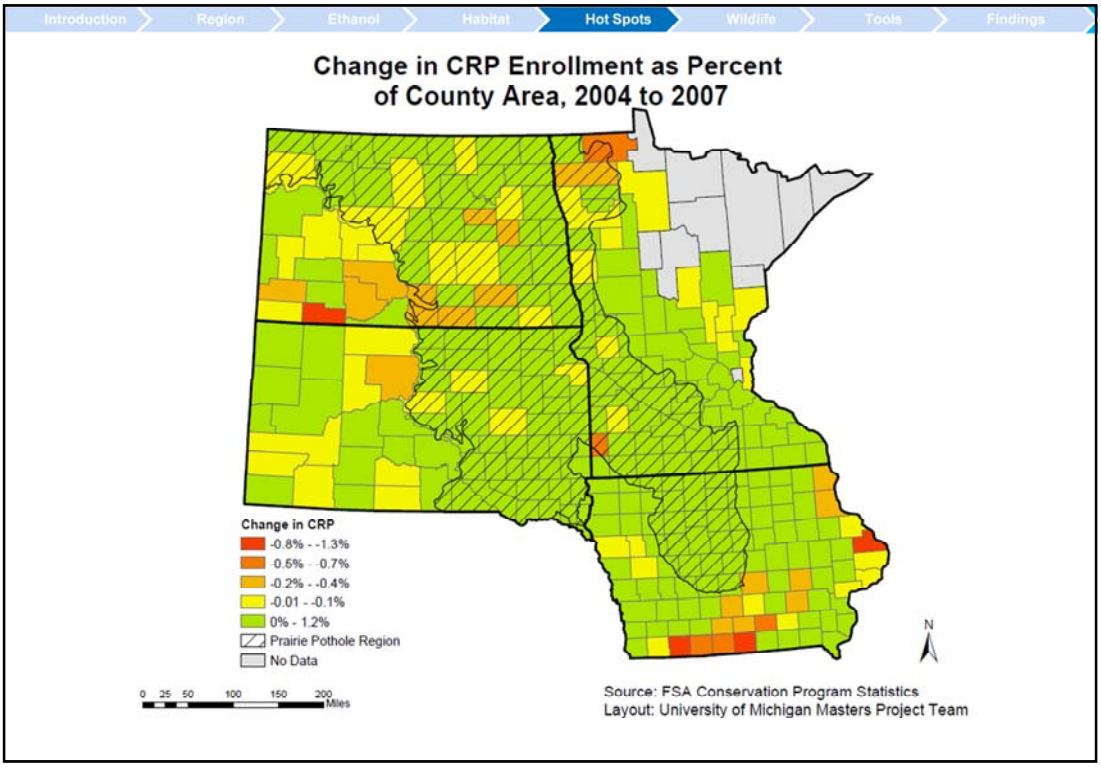


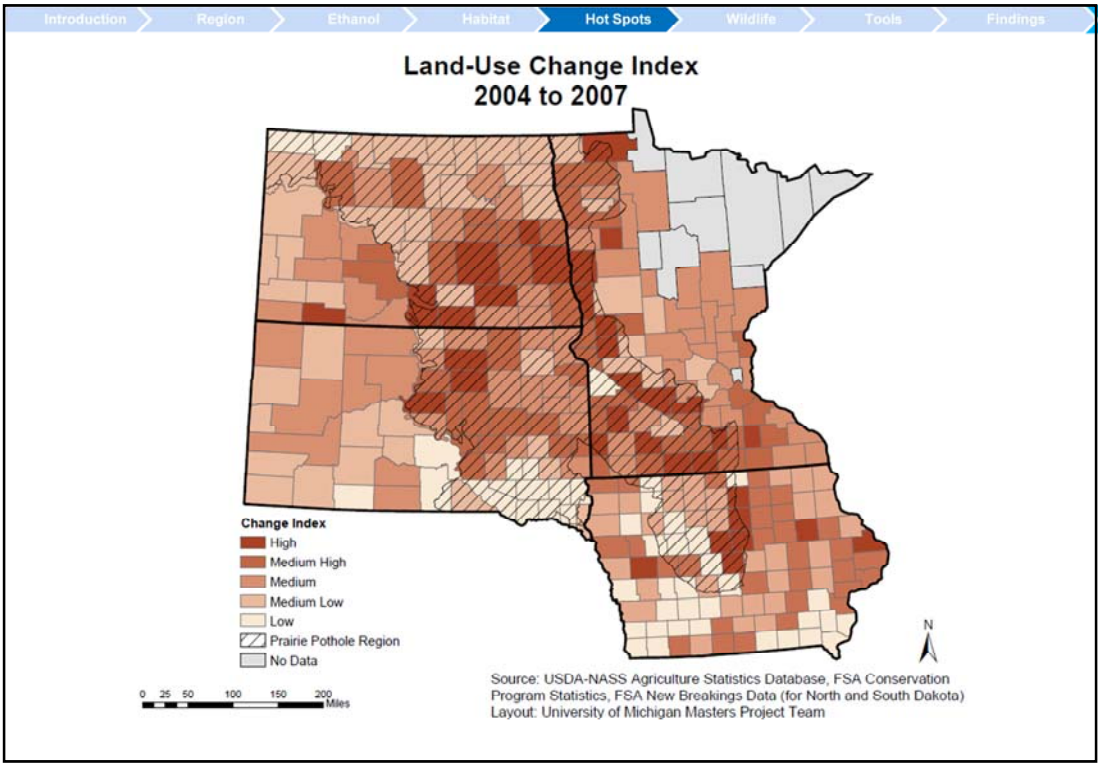
To do this, we created a Land-Use change index that assigns a “Change Value” to each county in the four states. The index is composed of three types of land-use measurements: change in corn plantings, loss of native grassland, and change in CRP.

Higher change index scores are associated with negative impacts. I should note that for the time period we considered, 2004 – 2007, CRP enrollment was generally increasing. Therefore, in counties where CRP enrollment increased, this had the effect of lowering the change index score to reflect a beneficial impact on habitat.


Introduction
Region
Ethanol
Habitat
Hot Spots
Wildlife
Tools
Findings
Change in Corn Plantings as Percent of County Area, 2004 to 2007
Change in Corn Plantings
0.1% - 11%
4% - 6%
2% - 3.9%
0.1% - 1.9%
< 0%
No Data
Prairie Pothole Region
0 25 50 100 150 200 Miles
N
Source: USDA-NASS Agriculture Statistics Database
Layout: University of Michigan Masters Project Team


Introduction
Region
Ethanol
Habitat
Hot Spots
Wildlife
Tools
Findings
Conversion of Native Grassland as Percent of County Area 2004 - 2007
Grassland Loss
1.1% - 1.4%
0.6% - 1%
0.4% - 0.5%
0.2% - 0.3%
0% - 0.1%
Prairie Pothole Region
No Data
0 25 50 100 150 200 Miles
N
Source: FSA New Breakings Data (for North and South Dakota)
Layout: University of Michigan Masters Project Team

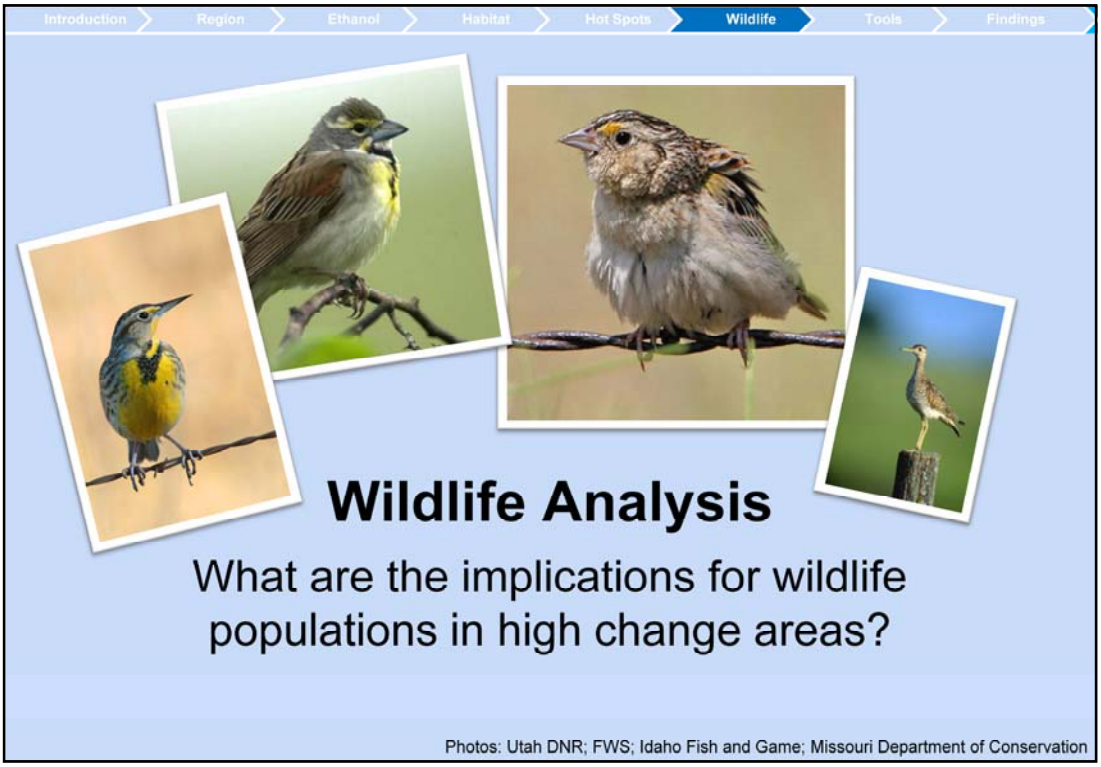

Introduction
Region
Ethanol
Habitat
Hot Spots
Wildlife
Tools
Findings
Change in CRP Enrollment as Percent of County Area, 2004 to 2007
Change in CRP
-0.8% - -1.3%
-0.5% - -0.7%
-0.2% - -0.4%
-0.01 - -0.1%
0% - 1.2%
Prairie Pothole Region
No Data
0 25 50 100 150 200 Miles
N
Source: FSA Conservation Program Statistics
Layout: University of Michigan Masters Project Team



Final Change Index Map

We showed the individual state maps from this analysis to state practitioners during our interviews. We asked them if these maps reflected the changes on the ground, and generally they validated these land-use trends.

Change index scores from this analysis also informed our analysis of grassland bird populations, which we will discuss next.



After doing the land use change hotspot analysis and identifying areas where high corn increases coincide with habitat losses, we wanted to analyze what the implications for wildlife are in these high change areas.

Specifically, we focused on bird populations in the four state study area.

We found that hotspots of change and high corn increases have had significant declines in populations of some sensitive grassland bird species.

Methods

- Used corn increases and Change Index to quantify land use changes between 2004 and 2007
  - High corn increase vs. low corn increase
  - High Change Index value vs. low Change Index value
- Used Breeding Bird Survey Data
- Quantified population changes in 2 groups of species between 2005 and 2008
  - 5 sensitive "indicator" species: Dickcissels, Grasshopper Sparrow, Sedge Wrens, Upland Sandpipers, Western Meadowlarks
  - 5 generalist "insensitive" species: American Crows, American Robins, Bank Swallows, Brown-headed Cowbirds, Mourning Doves
- Conducted 2-sided paired t-tests on population change

To look at land use changes, we used two different metrics of change: corn increases as percent of county area, and Land Use Change Index Values. Using these two metrics, we quantified land use changes between 2004 and 2007. We chose these two years because 2004 was a baseline year, before the 2005 Renewable Fuel Standard, which led to caused increase corn prices and plantings. 2007 was a peak year for increased corn plants.

To assess how these 2004-2007 land use changes affect wildlife, we compared areas with high corn increases to areas with low corn increases. Similarly, we compared areas with High Change Index values to areas with Low Change Index values.
We chose to focus on birds for our analysis: Short generation times, Respond to changes in habitat, There is good, consistent, regional level data on birds

The Breeding Bird Survey is a yearly, national level survey that tracks populations of breeding birds at the same time in the same locations every year. Data from the survey is publicly available and is commonly used to analyze population trends.

We matched up land use changes between 2004 and 2007 with bird population changes between 2005 and 2008. This is because bird populations do not respond to changes in habitat immediately; rather, habitat losses may affect breeding and reproductive success, and thus habitat losses in one year can be felt in the subsequent year.

To conduct our analysis, we chose to focus on five indicator species. These are species that depend on grasslands for successful breeding, and are typically sensitive to population changes. The majority of these species are also listed as species of conservation concern by state wildlife agencies, meaning that there is significant concern that these birds may be threatened or in declined. The five indicator species we chose were: Dickcissels, Grasshopper Sparrows, Sedge Wrens, Upland Sandpipers, and Western Meadowlarks.

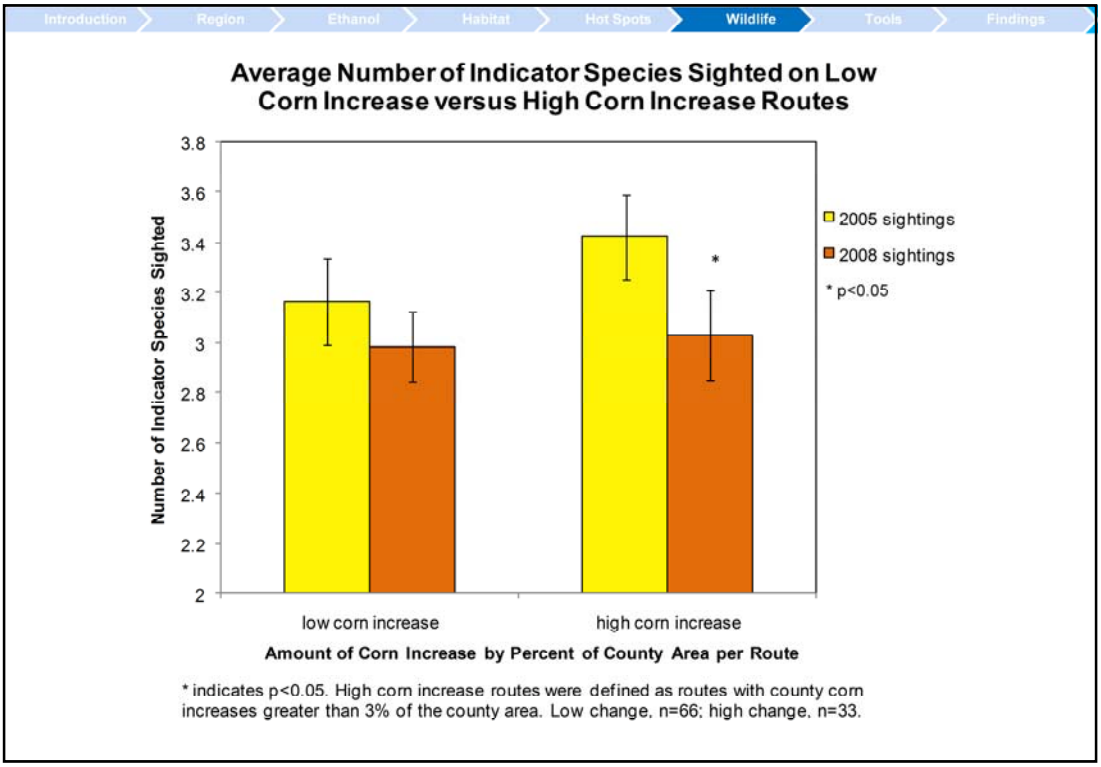
We also chose five "insensitive species," defined here as habitat-insensitive, generalist species that do not depend on grassland. We did not expect population trends to be associated with grassland loss and degradation. The five insensitive species used are: American Crows, American Robins, Bank Swallows, Brown-headed Cowbirds, and Mourning Doves. These are extremely common species, and there is little concern about their population levels.

Finally, to conduct statistical analyses on population changes, we ran 2-sided paired t-tests

Hypothesis

- Indicator species will show greater declines between 2005 and 2008 in areas with high corn increase and high Change Index values
  - Number of species
  - Number of individual birds
- Insensitive control species will remain unchanged or increase in areas with high corn increase and high Change Index values
  - Number of species
  - Number of individuals birds

I will show the results of the indicator species analysis. The next slide shows the change in number of species between 2005 and 2008 in areas with low corn increase versus areas experiencing high corn increases



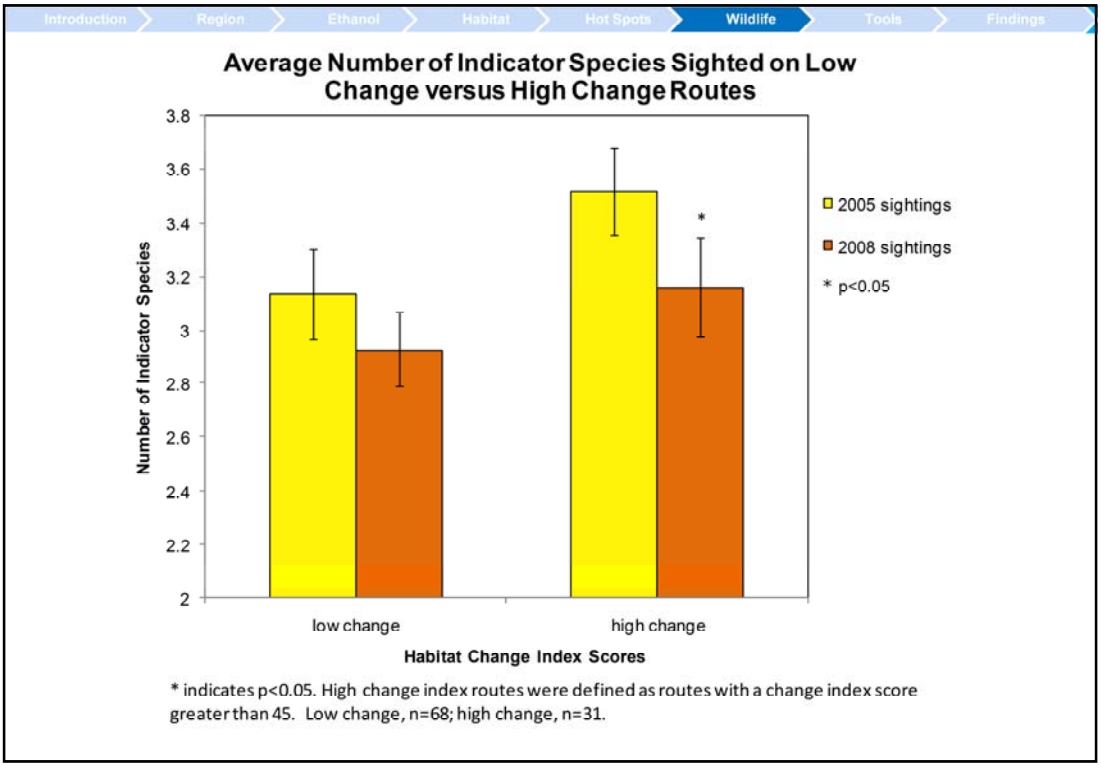
On the left of this graph is areas of low corn increase, while the right side of the graph represents areas of high corn increases.

The yellow bars show the number of indicator species in 2005, while the orange bars show the number of indicator species in 2005.

As you can see, between 2005 and 2008, there were declines in the number of species on both low corn increase and high corn increase areas. However, the decline in number of species on low corn increases areas was not significant.

The asterisk represents a significance level of $p<0.05$. We found that in areas of high corn increase, there was a significant decrease in the number of indicator species between 2005 and 2008.

We ran the same analysis of change in number of indicator species, but this time we used the Land Use change index instead of corn increases as our indicator of habitat change

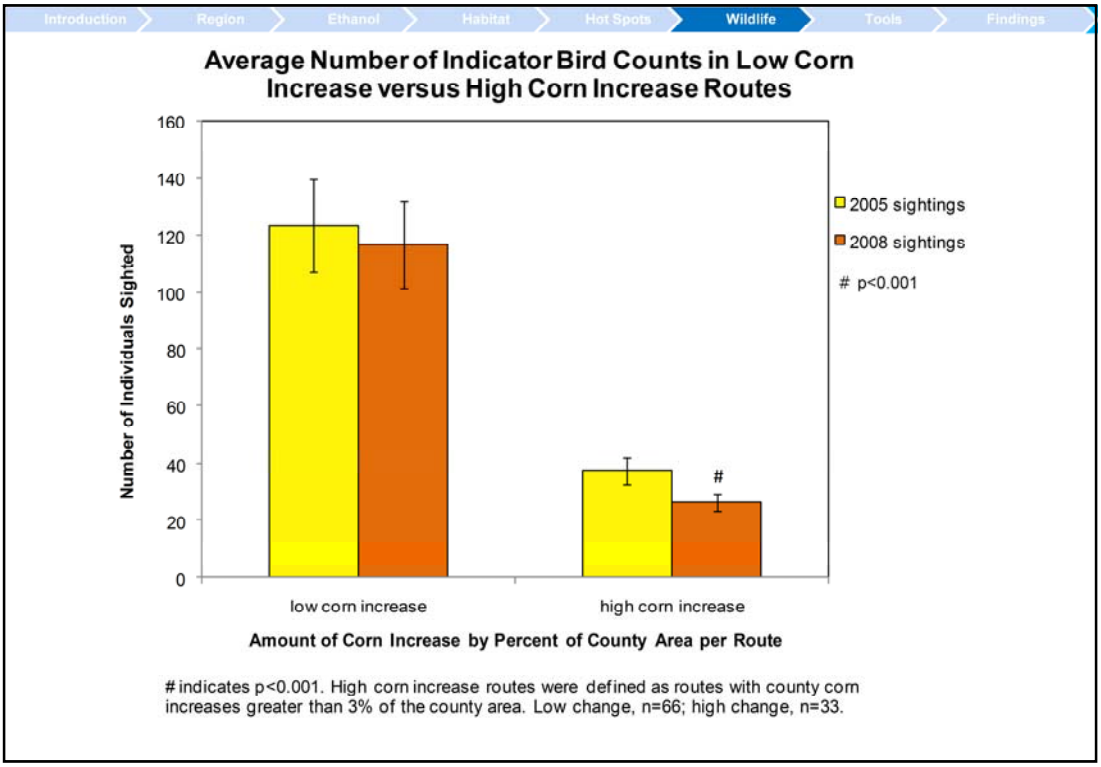


Again, we find a similar trend, with decreases in number of indicator species between 2005 and 2008 in areas with both low Change Index values and areas with high change index values.

Again, the population change in areas with Low Change index values was not significant, but we did find a significant decrease in number of sensitive indicator species in areas of high change.

So, using the Change Index Value instead of the Corn increase metric yields similar results.

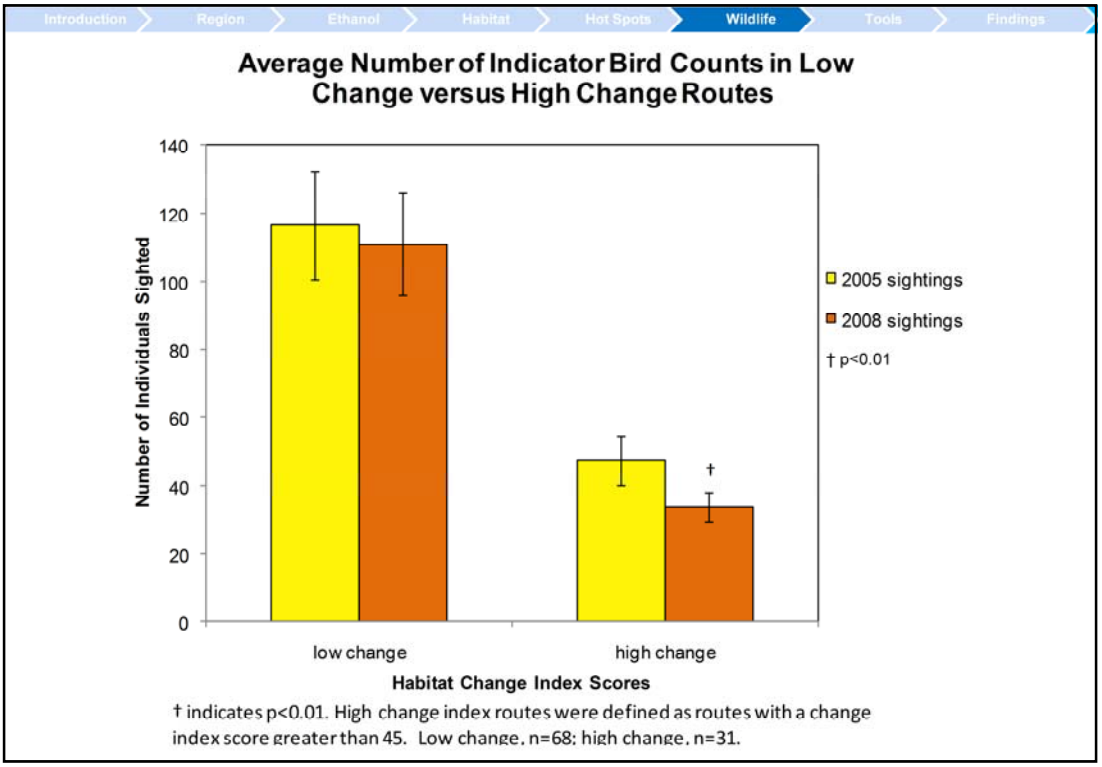
In addition to looking at the change in the number of indicator species, we also looked at the change in number of individual birds



This graph shows the change in the number of individuals of all 5 indicator species between 2005 and 2008.

While there were no significant differences in number of birds in low corn increase areas, we did find a significant decline in indicator birds in areas with high corn increase.

This was a statistically significant decrease of 29.4% in areas with high corn increases, compared to a non-significant decrease of 5.3% in areas with low corn increases.

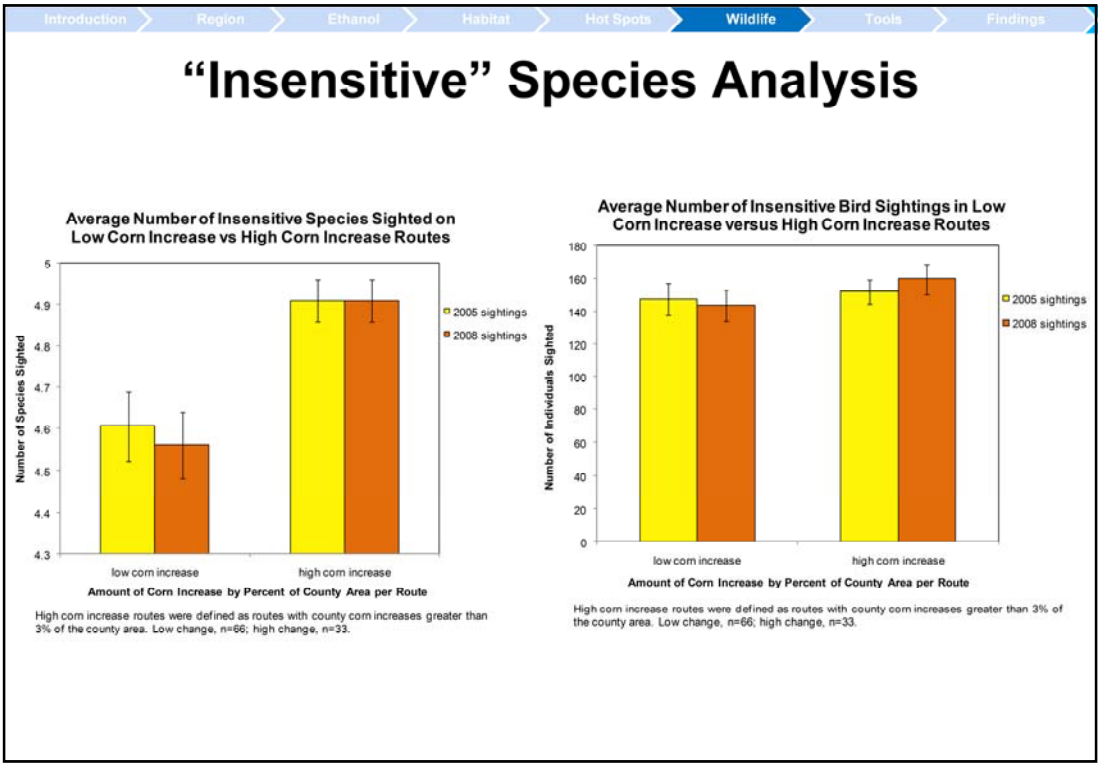


This graph again shows the change in total number of birds of all 5 indicator species, but this time using the Change Index as our indication of land use change.

Again, we found no significant difference in population change in the low change area. In high change areas, we found a significant decline in sensitive indicator birds.

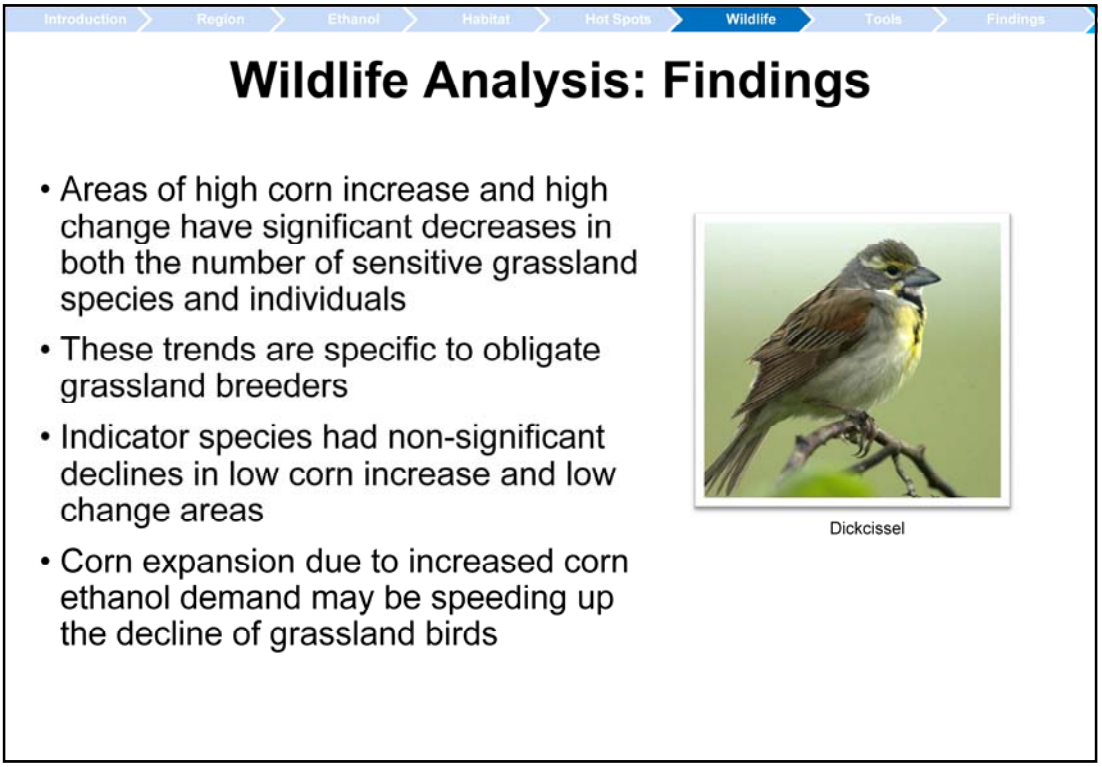
Specifically, we found a statistically significant 28.7% decline in sensitive bird populations in high change areas compared to a non-significant decline of 4.7% in low change areas.

After analyzing the population changes of indicator species, we then ran the same analysis on our control, or “insensitive” species. The next slide shows the results of this analysis using corn increases as our indicator of land use change.



The graph on the left shows the change in number of control species between 2005 and 2008 in areas of low corn increase versus areas of high corn increase. The graph on the right shows the change in number of individuals of all 5 control species. Unlike the indicator species analysis, we did not find any significant differences in our control species for in areas of low corn increase or areas of high corn increase.

We found similarly non-significant results when looking at control species population changes using the Change index values instead of corn increase.



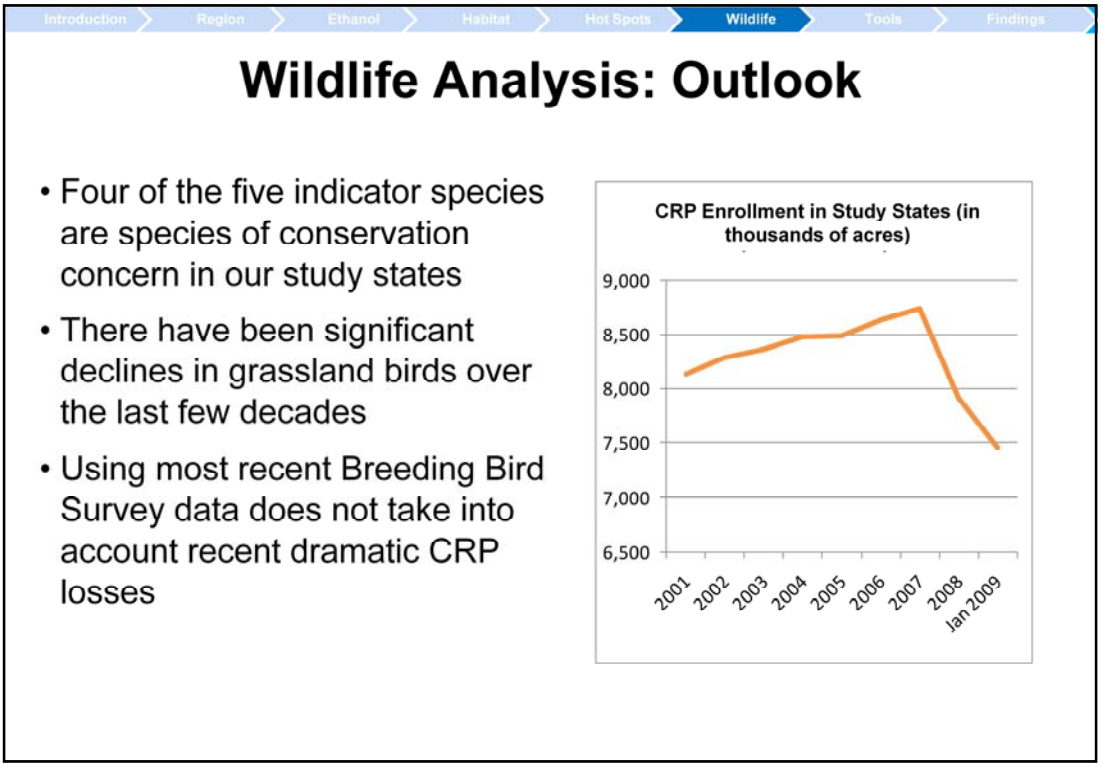
Areas of high corn increase and high change have significant decreases in both the number of sensitive grassland species and the number of sensitive grassland individuals

We found that these areas of high agricultural change have shown as great as 30% losses of indicator bird populations.

These trends were specific to the sensitive indicator species, and did not hold true for the more common, generalist “insensitive” species that we used as a control.

We also found that indicator species had non-significant, smaller declines in low corn increase and low change areas.

These findings suggest that corn expansion due to increased corn ethanol demand may be speeding up the decline of grassland birds



These are species that are listed by state wildlife agencies that are declining or in danger of declining.

According to a 2009 “state of the birds report”, grassland birds are among the fastest and most consistently declining birds in North America;

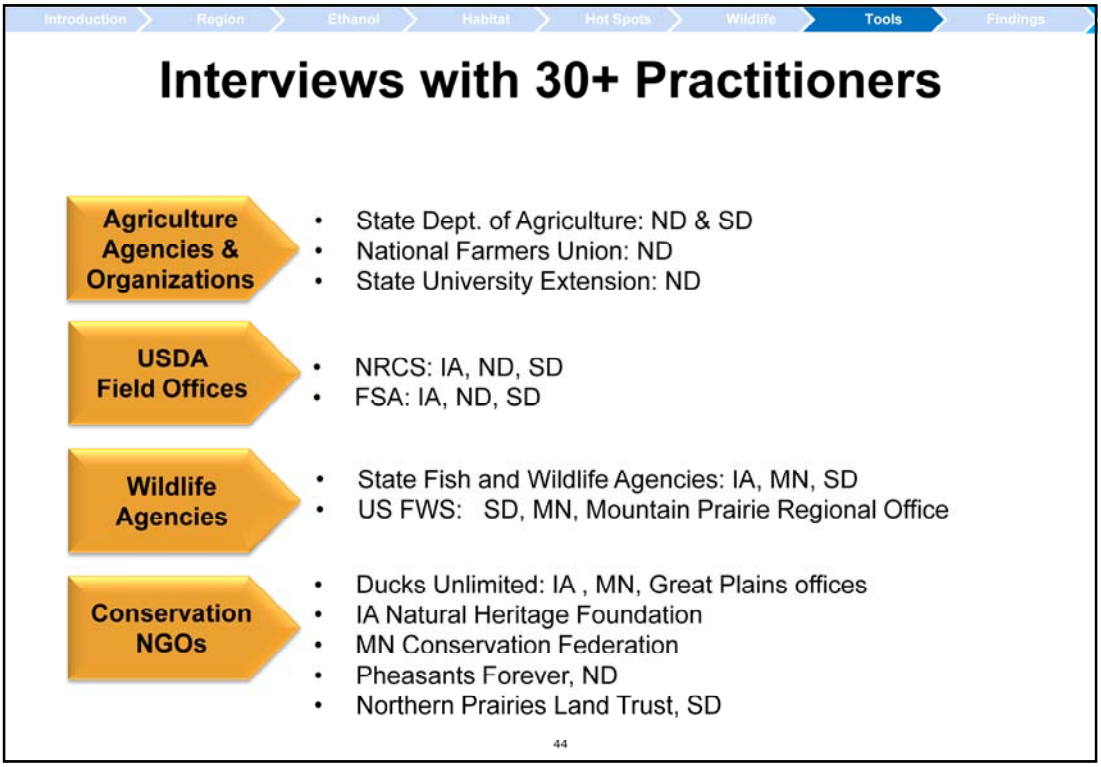
55% are showing significant declines.

In light of the severity of the situation for grassland birds , the finding that corn expansion may be further contributing tothe decline of grassland birds is especially relevant and concerning.

Additionally, our analysis used 2008 BBS data. 2008 was the first year that dramatic losses in CRP occurred. The effects of these losses are only beginning to be felt in bird populations. Therefore, the actual declines may be even greater than we found.

This leads us to the question: How can we respond to these threats, and in what ways can these wildlife impacts be mitigated? Greg will now speak about Conservation Tools.

Conservation programs are already conserving land. However, rapidly expanding ethanol is a new threat. There is host of programs that can be changed to address new concerns and changing land use.



In order to better UNDERSTAND ON-THE-GROUND CHANGES IN LAND USE, and also to assess both the REGULATORY AND INSTITUTIONAL CAPACITY that exist to deal with the impact of land-use change, we conducted over 30 phone interviews with state-level practitioners.

Our team chose interviewees that would represent FOUR BASIC CATEGORIES OF EXPERTISE:

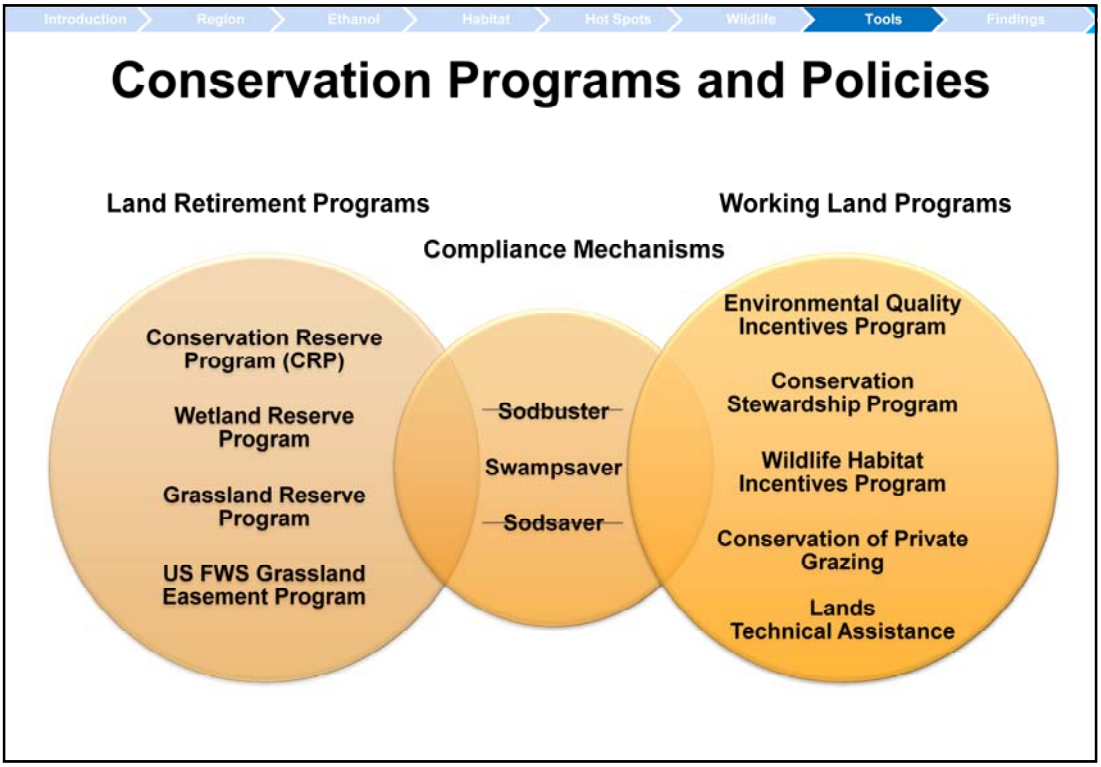
1) Agricultural Agencies and Organizations

2) USDA State Offices (FSA or NRCS)

3) Wildlife Agencies

4) Conservation NGOs

From these discussions, we drew conclusion about WHAT IS WORKING WELL and leading to successful conservation efforts, and also the CHALLENGES that practitioners face and ADJUSTMENTS THAT COULD BE MADE to better cope with biofuel-related land-use changes.



INTERVIEWEES TALKED ABOUT MOST OF THE MAJOR PROGRAMS aimed at conserving habitat on agricultural land.

Land Retirement:

LARGEST PART of Farm Bill, farmers are PAID TO REMOVE LAND from production for a SPECIDIFIED NUMBER OF YEARS.

DECREASED EMPHASIS ON LAND RETIREMENT in the 2008 Farm Bill

Working land

Implement CONSERVATION PRACTICES on WORKING FARMLAND AND RANCHLAND.

MAJORITY OF NEW CONSERVATION SPENDING in the 2008 Farm Bill.

Incentives include payment programs, cost-share agreements, and technical assistance.

Compliance Mechanisms:

Laws that DISINCENTIVIZE CONVERSION OF HABITAT TO PRODUCTION

For example, in order to be eligible for most federal commodity payments, SWAMPSAVER requires that producers to certify that they have not produced crops on converted wetlands and have not converted a wetland to make agricultural production possible. Both SODBUSTER (soil conservation plan in order to be eligible for certain government payments) and SODSAVER are LARGELY CONSIDERED FAILURES.

Successes Highlighted By Practitioners

- Conservation of millions of acres through federal and state programs
- Measurable wildlife population benefits
- Diverse conservation toolbox
- Effective state-federal conservation partnerships
- High demand for many conservation programs

Photo: USGS

A number of success were mentioned by multiple interviewees:

Significant habitat conservation: EXTENT of CRP alone (9 million acres in 2007)

Measurable population benefits: PHEASANT POPULATION RECOVERY in SD

Diverse toolbox: Retirement, Working lands, Practice specific

Partnerships: RIM/CREP, RIM/WRP, P.L.O.T.S

High Demand: GEP, WRP, SAFE

Challenges Highlighted By Practitioners

- Lack of resources and short timetables for obligating funds
- Landowner demand for enrollment outstrips supply of contracts
- No disincentive for cropping on native prairie
- CRP rental rates cannot compete with high commodity prices
- No CRP general signup
- Lack of programs aimed at conserving habitat in perpetuity

Photo: USGS

WHILE THERE ARE CLEAR SUCCESSES, practitioners also identified significant challenges to conserving in the face of corn expansion.

Some agencies are bound by lack of resources and short timetables for allocating funds

Landowner demand for program enrollment outstrips supply of contracts, due to lack of funding

There is no dis-incentive for cropping on native prairie

CRP rental rates cannot compete when crop prices are very high

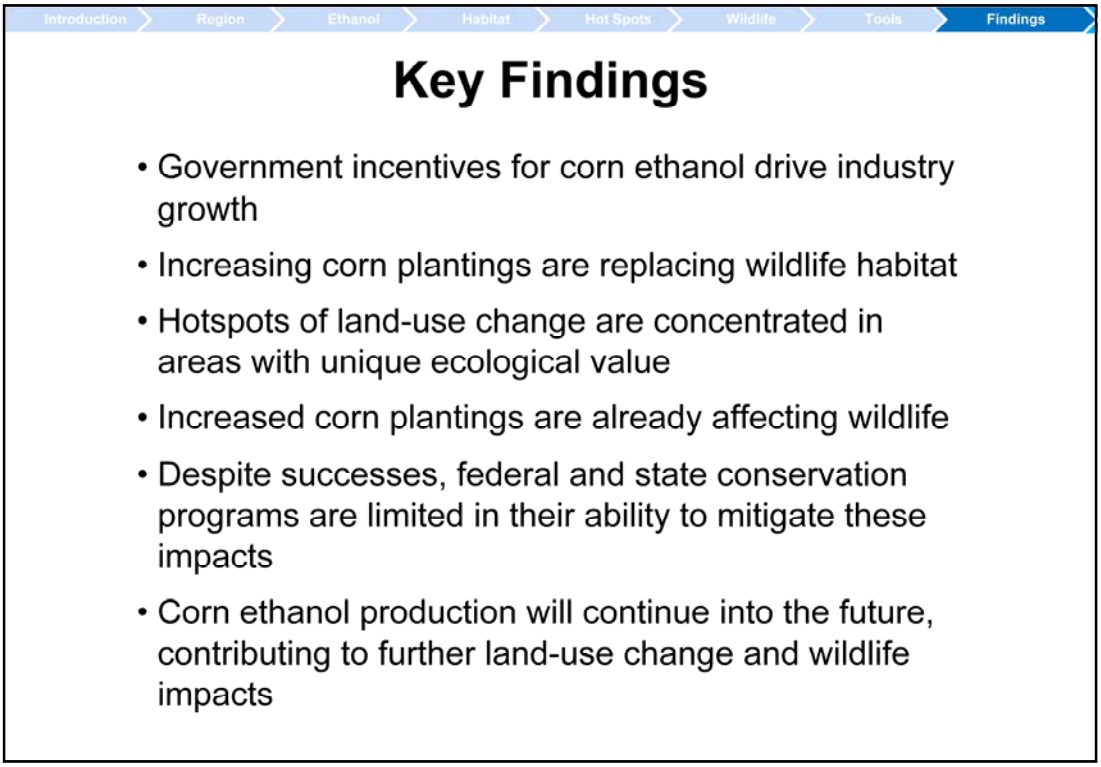
Without a CRP general sign-up, far fewer acres and no large, contiguous blocks are enrolled in the program

The reduced CRP enrollment cap limits the reach of the program

There is a general lack of federal programs aimed at conserving grassland, wetland, and other habitat in perpetuity

Conclusions and Recommendations

Photo: NRCS



1) Government Incentives are what is driving growth of corn ethanol

2) Corn Plantings Increasing: While the total number of corn plantings fluctuates from year to year, INCREASES SINCE 2005 HAVE BEEN PARTICULARLY ACCUTE. Corn plantings have increased most dramatically in the DAKOTAS.

3) Hotspots of land-use change are concentrated in areas with unique ecological value:

a. OUR CHANGE ANALYSIS shows that land-use change is CONCENTRATED in the PPR

b. And WITHIN THE PPR, the AREAS WITH THE MOST REMAINING NATIVE PRAIRIE ARE THOSE THAT ARE EXPERIENCE THE MOST LANDUSE CHANGE.

4) Already affecting wildlife: As our sensitive grassland bird species analysis shows—

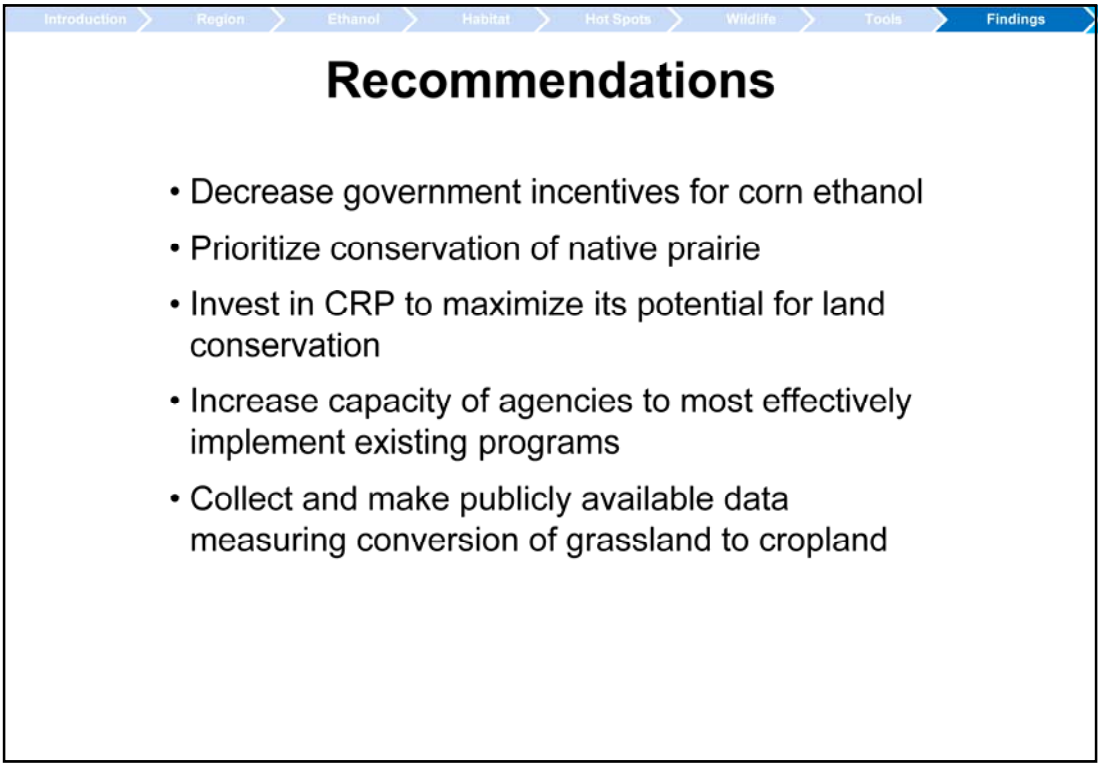
a. SENSITIVE BIRD SPECIES ARE EXPERIENCE SIGNIFICANT DECLINES IN HIGH CHANGE AREAS, but NOT in low corn increase areas

5) and 6) Despite successes, federal and state conservation programs are limited in their ability to mitigate these impacts:

Despite current challenges, the FUTURE EXPANSION OF THE INDUSTRY IS GUARENTEED without changes to RFS, VEET, ETC.

COMMON MISCONCEPTION that cellulosic will replace corn.

Without current changes to legislation, CELLULOSIC WILL NOT REPLACE CORN.



There are 20+ recommendations in our report based around:

Legislation, Program Implementation, NGO participation, Data needs, Future Research

The ones here are generalized from those, more specific recommendations:

1) Decrease incentives for corn ethanol: RFS and VEET

2) Prioritize conservation of native prairie:

a. SODSAVER -- MANDATED NATIONALLY and governors should not have the option to opt-out

b. GRASSLAND EASEMENTS -- GRP, Grassland Easement Program, and state programs

3) Invest in CRP:

a. INCREASE CAP or at least restore to previous cap

b. UPDATE RENTAL RATES REGULARLY so that they are competitive with current commodity prices.

c. GENERAL SIGN-UP

4) Increase capacity of agencies to most effectively implement existing programs:

a. better staffing

b. more realistic timelines for allocating funds

5) Collect and make publicly available data measuring conversion of grassland to cropland

Acknowledgements

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