Climate Change & Resilience in the Northern Great Plains

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Global Grasslands

Intact habitat in Mississippi river basin
Northern Great Plains

Remaining intact grassland and prairie habitat under threat

Source: Plowprint layer was developed using 2008-2013 CDL data in the US and 2009-2013 AAFC data in Canada. Pixels in agriculture status each year were aggregated to one data layer that shows the maximum footprint of agriculture over that time period. Composition based on land cover in the 2013 CDL.
1.3 million acres of grasslands plowed under in 2014 in the NGP alone

“Comparable to deforestation rates in Brazil, Malaysia, and Indonesia”
Bird Population Declines

C.-collared Longspur
BBS data -4.34%/yr

Sprague's Pipit
BBS data -3.52%/yr
Impacts to Ecological Services
Feeding a growing population
US v. global productivity

US Corn

40% for ethanol
35% for livestock

Calorie Delivery Fraction

calories delivered to the food system per calorie produced

Emily S Cassidy et al 2013 Environ. Res. Lett. 8 034015
Projected Change

Historical temperature on the 7 hottest days of the year

Projected

Lower emissions: 13-19 days
Higher emissions: 19-28+ days

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Winter Storm Atlas, October 4, 2013 takes devastating toll on cattle ranchers

70-80 F days, then rain, wind, heavy snow
$1.7 billion in damage, tens of thousands of livestock lost
Change in Probability of Conversion

[Map showing change in probability of conversion between 2030 and 2060]
Impacts to Forage

• Rangelands=30-40% global land area
• Potential increases in forage production
• Quality of forage may be lower, requiring more land/animal
• Invasive species may also decrease forage quality and may be toxic to livestock
We have a resilient system
that produces food
stores water and carbon
and supports biodiversity.
• Improve sustainability of ranching/livestock production
• Address perverse incentives that result in plow-up of marginal lands
• Restore perennial cover to marginal lands
• Improve soil health/resilience
Questions?