



2016

# PLOWPRINT REPORT

## FREQUENTLY ASKED QUESTIONS

### What is the purpose of the report?

WWF is committed to conserving the grasslands of the Northern Great Plains, one of the last large expanses of temperate grasslands on the planet. The purpose of the Plowprint is to identify remaining intact habitat across the Great Plains region of the US and Canada. We are concerned that agriculture is expanding into marginal and poor-quality soils in areas that have remained largely in grassland since European settlement in North America, providing ecosystem services and wildlife habitat. The analysis provides a standardized method to tracking the loss of intact grassland that can enable multiple stakeholders to communicate and collaborate using a common framework. While grassland loss is a concern, WWF recognizes that farmers are critical for global food, fuel, and fiber production, and U.S. and Canadian producers are no exception. Efficiency gains as a result of better management practices, improved technology, and farmer innovation have made it possible to produce more food on fewer acres, and WWF supports farmers' efforts to integrate conservation into their operations.

### What is included in the Plowprint?

The Plowprint tracks land that has been converted from intact grassland to cropland since 2008 (US) and 2009 (Canada) (Please see below for information about datasets used in the Plowprint analysis). If a parcel of land is planted back to grass, it still remains part of the Plowprint. Initial plow-up has significant, long-term environmental impacts, particularly when diverse and/or native stands of grassland are lost. The ability of grasslands to store and filter water, sequester carbon, and sustain biodiversity above and below ground is compromised when that land is cultivated. Acres converted to cropland may be sourced from native grasses, shrubland, wetlands, alfalfa, lands enrolled in the USDA's Conservation Reserve Program (CRP), or any other vegetative cover that was not planted in annual cropland or fallow at any point since 2009. WWF is also tracking how much land, once converted, is planted back to grass or other forms of perennial cover each year.

### How does WWF define intact grasslands?

Intact grasslands, as defined by the Plowprint analysis, are those lands that have not been converted to annual crops between 2008 (in the US) or 2009 (Canada) and 2015 (or the most recent year of data), and are also not classified as developed, barren or open water as of 2011 (the most recent data available for these categories). Intact grasslands may include:

- Lands that were tilled and planted back to grass prior to 2008/9 (through conservation programs such as CRP or other private land management decisions);
- Lands that have not been tilled since 2008/9 but are not in native cover;
- Lands that have a mix of native and non-native cover and are managed to a variety of standards;
- Lands that have pristine, native cover.

### What sources of data does the Plowprint use?

The data we use to develop the Plowprint analysis is from federal government sources.

#### For plowed lands:

- In the US, we use the USDA National Agricultural Statistics Service Cropland Data Layer from 2008-2015.
- In Canada, we use the Agriculture and Agri-Food Canada Annual Crop Inventory from 2009-2015.

#### For noncropland cover types:

- In the US, we use the National Land Cover Dataset from 2011.
- In Canada, we use the Land Cover Data from 2000.

All datasets are derived from satellite imagery that is interpreted by government analysts.

## How is WWF's methodology different than other reports on grasslands loss?

The Plowprint tracks cumulative or gross—as opposed to net—conversion of intact grasslands to cropland between 2008/9 and the most recent year of data. (See Gage et al., 2016 for a complete summary of the methodology.) In other words, if an acre of intact grass was converted for crop production but reverted back to grass during this period, it is still counted in the Plowprint. Other studies look at net conversion (Wright and Wimberley, 2013; Lark et al., 2015); in those studies, land is not counted as converted if it was planted back into grass or if it reverted naturally. WWF monitors gross conversion because the first conversion of intact grasslands represents a significant ecological loss that can't be easily recouped. Native, intact grasslands hold hundreds, if not thousands, of years' worth of organic matter that gives the land an exceptional ability to store and filter water, sequester carbon, and support diverse life above and below ground. The first time it's plowed, the land loses much of its capacity to provide these valuable ecosystem services. Farmers and ranchers can use crops and livestock as tools to rebuild that soil and restore diverse plant life, but it can take a long period of time to do so—longer than the period covered by the Plowprint.

In order to improve our ability to distinguish between cropland and non-cropland, we aggregated CDL/AAFC data for land planted in annual crops, making it easier to detect different land-cover types accurately. We also performed the analysis at a broad scale (the Mississippi River Basin and Great Plains) in order to account for error that occurs at a local scale in the CDL. We cross-validated the Plowprint results with a dataset from eastern South Dakota that primarily uses USDA Farm Service Agency data to identify lands that have never been plowed (Bauman et al., 2014). Comparing these two datasets, we found that approximately 5% of the cells that our analysis identified as plowed, Bauman et al. identified as intact. This suggests that the Plowprint compares well in certain geographies with other credible analyses of undisturbed grassland and, therefore, provides a useful picture of cumulative grassland conversion at the scale of the Mississippi River Basin and Great Plains.

## Are there other forms of conversion that contribute to grassland loss?

Yes, energy development, roads, and urban development contribute to grassland loss, but these types of developments likely have more significant impacts by fragmenting habitat than by converting large-scale acreage. In 2015, developed areas comprised, in total, only about 4% of the Great Plains geography (Homer et al., 2015), whereas the total area devoted to cropland was tenfold greater. Thus, we expect the volume of area impacted annually by conversion to cropland to greatly exceed that by other development. The Plowprint Report tracks conversion to cropland on an annual basis and is cumulative, but developed lands are updated every five years.

## Why is alfalfa included as part of intact grasslands?

Alfalfa is a perennial crop that is periodically planted in rotation with annual crops. It is also planted as part of a grass mix for hay and pastures and is sustained as perennial cover for long time periods. Finally, it sequesters soil carbon and provides added habitat for some pollinators, some species of birds, and other prairie wildlife. Including alfalfa as part of intact grasslands ensures that our estimates of conversion are conservative.

## What is WWF's definition of perennial cover within the Plowprint?

Perennial cover is defined as areas that have been identified as converted since 2008/9 (thus, they are part of the Plowprint), and have since been planted back (i.e., restored) or reverted naturally to some type of perennial cover, which includes grassland, wetland, shrubland, alfalfa and hay.

## Is some cropland going back into grassland?

Yes (see question about perennial cover above). In 2015, almost half of the Plowprint was planted in, or had naturally reverted to, perennial cover. About 10% was planted to alfalfa and 40% was comprised of other types of perennial vegetation (grassland, wetland, shrubland, other hay crops). It is difficult to say how the quality of these grasslands differ. Our primary concern about quality is that these areas have been tilled in the recent past, impacting their ability to sequester carbon, prevent erosion, and facilitate the infiltration of water until newly reestablished vegetation has developed mature root systems. Some of these lands may be diverse grasslands, whereas others may be temporarily abandoned fields of low-quality habitat.

Conversion of grassland and other natural vegetation to cropland is not necessarily permanent and cropland can rotate back to grasslands and wetlands. However, initial plow-up has significant, long-term environmental impacts, particularly when diverse and/or native stands of grassland are lost. Restoration and rotations into perennial cover, while important, are not always sufficient in addressing these losses, particularly with regard to conserving biological diversity. These grasslands can provide conservation value in a broader, land use management context.

## How does WWF determine which areas will be depicted (mapped) as conversion hotspots?

There are a variety of ways to show “hotspots” of conversion based on the data we have gathered. In the Plowprint Report, we used a simple method of looking at the average conversion rate per county (which is equal to the number of converted acres divided by the number of total acres in the county). We then compared the average conversion rate across all counties to the conversion rate for each individual county to highlight those that had conversion rates that were higher or lower than average.

## What influences producer decision making? What are the drivers of conversion?

Profitability, cost, changing weather patterns and growing conditions, the availability of funds for conservation programs, technology choices, and policies at the local, state and federal level all affect how producers choose to manage their land. As stewards of the land, producers can and do play an important role in protecting grasslands while staying profitable. Ranchers and farmers need the support and engagement of policymakers, companies in the supply chain (e.g., traders, processors, manufacturers, retailers), the conservation sector, and consumers. All of us have a responsibility to support environmentally, economically, and socially sustainable food production on North America's farms and ranches.

## Besides tracking the Plowprint, what is WWF doing to slow grassland loss and deforestation around the world?

In the US, WWF is pushing for government policies that expand conservation-smart programs like Sodsaver and CRP. We're working with ranchers and other stakeholders in the Northern Great Plains to develop programs that maximize the economic value of intact grasslands. We're also engaging with farmers and critical supply chain stakeholders to improve environmental outcomes and increase efficiencies on existing row crop acres to reduce the need for cropland expansion.

Globally, WWF is part of several new initiatives to eliminate the conversion of grasslands and forests for soy and beef production in two of Latin America's landscapes: the Amazon and Cerrado of Brazil, and the Chaco of Paraguay and Argentina. We're engaging producers, traders, processors, manufacturers, brands, retailers and food service providers to eliminate conversion in these ecosystems by 2021. We're also working with major actors across the palm oil supply chain to eliminate deforestation in Indonesia and Malaysia, where rainforests are being slashed and burned to make the world's most popular vegetable oil. To push these industries as far and as fast as they can go, we're also working with financial institutions to shift their practices so that they no longer lend to or invest in companies that convert forests and grasslands.

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