The datasets referred to in this document are for the paper “Grassland-to-cropland conversion increased soil, nutrient, and carbon losses in the US Midwest between 2008 and 2016” submitted to Environmental Research Letters.

This data package contains two excel documents: (1) “Expansion Impacts\_20210408” and (2) “Abandonment Impacts\_20210408”

The “Expansion Impacts” document includes five scenarios. For this case, the “grassland” scenario represents the baseline scenario assuming no change from grassland to different cropping systems. In addition, there are four cropping scenarios: (1) “notill\_corn”, (2) “notill\_CS”, (3) “till\_corn”, and (4) “till\_CS”. “notill” indicate no tillage is applied, while “till” assumes conventional tillage practices. “corn” denotes continuous corn, while “CS” represents corn-soybean rotation.

The “Abandonment Impacts” document includes two scenarios for the abandoned cropland in the US Midwest between 2008 and 2016. The baseline scenario is “till\_cs” assuming no change from cropland to grassland, while the “grassland” scenario represents a change to grassland.

The variables listed in the tables are explained as follows:

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| Variable name | Definition |
| fips | Federal Information Processing Standards for each county |
| T\_Area | Expanded or abandoned cropland area in ha |
| T\_Erosion | Total soil erosion in Mg/year |
| T\_Nitrogen | Total nitrogen loss in kg N/year |
| T\_Phosphorus | Total phosphorus loss in kg P/year |
| T\_SOC | Total soil organic carbon (SOC) change in kg C/year (note: negative values denote soil C accrual; positive values denote C loss from the soil) |
| Ave\_Erosion | Mean soil erosion for each county in Mg/ha/year |
| Ave\_Nitrogen | Mean nitrogen loss for each county in kg N /ha/year |
| Ave\_Phosphorus | Mean phosphorus loss for each county in kg P/ha/year |
| Ave\_SOC | Mean SOC change for each county in kg C/ha/year |
| Var\_Erosion | Squared difference between county mean and total mean for erosion in Mg/ha/year |
| Ave\_Nitrogen | Squared difference between county mean and total mean for nitrogen in kg N/ha/year |
| Var\_Phosphorus | Squared difference between county mean and total mean for phosphorus in kg P/ha/year |
| Var\_SOC | Squared difference between county mean and total mean for SOC in kg C/ha/year |
|  |  |

Overall totals, per hectare (ha) values, and area-weighted standard deviations (SD) provided at the bottom of columns in **bold**.