**Data for: Crop- and weather-dependent yield and wind erosion benefits from a conservation practices system**

**Mass Flux values 2019\_2022 updated.csv**

This dataset contains sediment mass flux values from the Mandan and Morton sites of the National wind Erosion Research Network. Heading definitions are below.

Site: Mandan or Morton

Treatment: aspirational (cover crops and wheat straw retention) or business-as-usual

Location: Modified Wilson and Cooke sampler ID

Block: Strata of field used for stratified random sampling locations

Year: year sample was collected

Date: date in MDD or MMDD format

Days.After.Planting: days after planting of the cash crop for a given year

total.flux: mass flux from integration of measured at 4 sampling heights (10 cm, 25 cm, 50 cm, and 85 cm); in units of grams per meter per day

R^2: coefficient of determination for exponential decay fit

Rsqr\_cleaned: coefiecints of determination of less than 0.9 were replaced with NA so they could be excluded from analysis (as this might be an indication of no net export of sediment)

ParameterA: first parameter value fit in regression

ParameterB: second parameter value fit in regression

ParameterC: third parameter value fit in regression; when missing, a 2-paremter decay was fit

**h5\_i2\_2019-2022\_hand\_harvest.csv**

This dataset contains cash crop yield and biomass data. Heading definitions are below.

Date: date of sample collection

DoY: day of the year of sample collection

Year: year of ample collection

Crop: crop sampled (corn, soybean, or spring wheat)

Site: site sampled 10 locations in two fields (I2 or H5)

Treatment: aspirational (cover crops and wheat straw retention) or business-as-usual

Rep: replicate number

Sample: sample number (1-4)

Site.Rep: combination of site (same as treatment) and replicate

Percent\_H2O: percentage of water in plant sample

AGB\_g\_m2: aboveground plant biomass excluding grain

Grain\_yield\_g\_m2: grain yield in grams per square meter

Grain\_yield\_kg\_ha: grain yield in kilograms per hectare

Stover\_g\_m2: plant biomass from previous crop

Harvest\_index: unitless ratio of grain yield to aboveground biomass yield

**h5-i2\_2016-2021\_daily-weather.csv**

Dataset contains weather data from the Northern Great Plains site of the Long-Term Agroecosystem Research network. Header definitions are below.

Location: Northern great Plains LTAR site

Year: year of weather data

Field: I2 (aspiration) or H5 (business-as-usual)

Crop: cash crop

Date: date in YYYYMMDD format

DoY: day of year

Sol\_Rad\_MJ\_m2\_d: solar radiation in megajoules per square meter per day

T\_min\_C: maximum temperature in degrees Celsius

T\_max\_C: minimum temperature in degrees Celsius

PCPN\_mm\_d: precipitation received in millimeters per day

RH\_f: relative humidity; percentage of fully saturated air for the temperature

Wind\_spd\_m\_s: wind speed in meters per second

**avg wind speed nwern.xlsx**

This dataset contains daily average wind speeds at 10 meters above the ground from a tower in the center of the Modified Wilson and Cooke samplers at the Mandan and Morton National Wind Erosion Research Network sites. Tab descriptions are below.

Mandan: contains wind speed every minute at Mandan site

MandanDailAvg: wind speeds at Mandan site averaged to the day

Morton: contains wind speed every minute at Morton site

MortonDailAvg: wind speeds at Mandan site averaged to the day

**I2\_CC\_AGB\_2020-2022.csv**

This dataset contains peak cover crop biomass in the Morton site (aspirational treatment) from 2020–2022. This is at the end of the growing season in the corn (2020) and spring wheat (2022) phases and prior to planting of soybean (2021). Header definitions are below. Missing data are identified with NA.

STUDY SITE: All samples taken from the Northern Plains LTAR Cropland Common Experiment aspirational field (Morton National Wind Erosion Research Network) site.

SITEID: Site and rep number

DATE: Date of sampling in MMDDYYYY format

TRT: All samples were from the aspirational treatment

CC\_AGB: Cover crop aboveground biomass in grams per square meter