



DAILY EROSION PROJECT

Step-by-Step Tutorial for Using the Daily Erosion Project (DEP)

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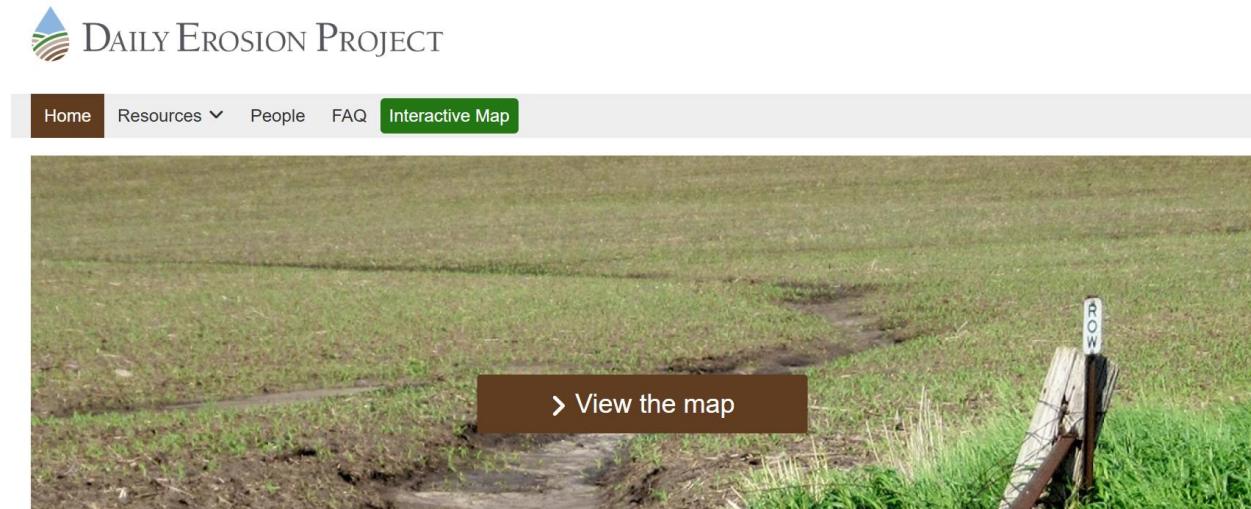


Step 1: Access the Website

Open your web browser and go to Daily Erosion Project (<https://www.dalyerosion.org/>).

Step 2: Understand the Homepage

The homepage provides an overview of the project, including its goals and the importance of monitoring soil erosion. Further information can be found in the Resources, People, and FAQ Tabs.



Step 3: Navigate to the “Interactive Map”

There are three ways to navigate to the interactive map, but all will bring you to the same map page we will be using in this tutorial (1: “Interactive Map”; 2: “>View the map”; and 3: “Visit interactive Map”):



What is DEP?

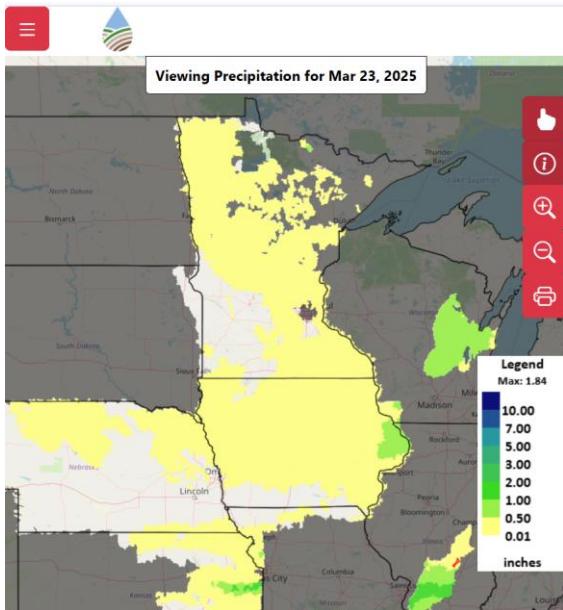
The Daily Erosion Project (DEP) estimates soil erosion and water runoff occurring on hill slopes in Iowa and surrounding states. Estimates are based on hill slope conditions (e.g. topography, crop, precipitation) identified via remote sensing tools like satellites. The DEP team then posts daily estimates of average hill slope soil loss (and water runoff) occurring for each watershed in the DEP coverage area.

Why does erosion matter?

Soil erosion is the movement of soil particles down and from sloping land. These moving soil particles reduce soil productivity and degrade water quality. Soil erosion thins and can completely remove topsoil, the soil layer richest in organic matter and plant nutrient concentration. These lost nutrients must be replaced for crop production purposes, adding extra cost in addition to lost crop yield potential.

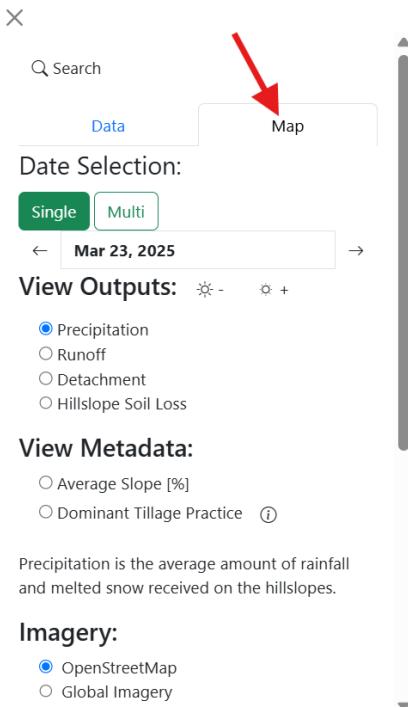


Click on any of the three options, and it will direct you to the map. By default, it deploys the entire DEP domain, see screenshot below:



Step 4: Select Your Variable of Interest in the Map tab

1. Click on the menu button located at the top left corner 
2. Let's explore the Map tab (scroll down to see all the display options):



The screenshot shows the 'Map' tab selected in the top navigation bar. Below it, there is a 'Date Selection' section with 'Single' and 'Multi' buttons, currently set to 'Single' with the date 'Mar 23, 2025'. There is also a 'View Outputs' section with radio buttons for 'Precipitation' (selected), 'Runoff', 'Detachment', and 'Hillslope Soil Loss'. A transparency slider is shown next to the outputs. Below these are sections for 'View Metadata' (Average Slope [%] and Dominant Tillage Practice) and 'Imagery' (OpenStreetMap selected). To the right, a vertical scroll bar is visible, and below the scroll bar, a small map of Minnesota is displayed.

- a. **Date Selection:** select a specific date ("Single") or period ("Multi") to display the outputs.
- b. **View Outputs:** select the output you want to display on the map (precipitation, runoff, detachment, and hillslope soil loss). Option to decrease/increase the transparency of the GIS layer using 
- c. **View Metadata:** display the average slope (%) and the dominant tillage practices of the simulated hill slopes.
- d. **Imagery:** choose two base maps: OpenStreetMap and Global Imagery.
- e. **Layers:** select the overlay layers to display the map (DEP Data Layer, Domain Mask, US Counties, US States, HUC 8)
- f. **View US State:** zooms into your state of interest 

Step 5: View Daily Estimates.

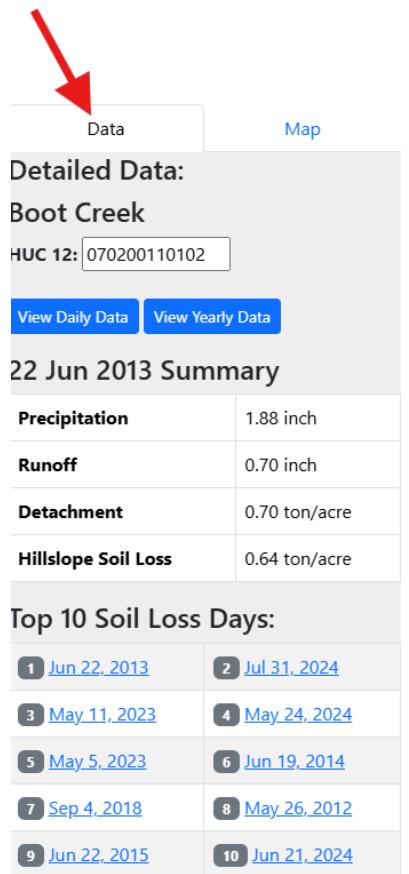
Double-click on a watershed to load detailed data.

Once you select a watershed, the polygon borderline will change to a thicker black. Now we can view detailed estimates for that specific watershed. It automatically switches from the “Map” to the “Data” tab.

- *Pro-tip: you can also search a HUC12 watershed using the “Search”*



Let's explore the “Data” tab (scroll down to see all the display options). You will see something similar to the screenshot below but with the info of your selected watershed:



Precipitation	1.88 inch
Runoff	0.70 inch
Detachment	0.70 ton/acre
Hillslope Soil Loss	0.64 ton/acre

Top 10 Soil Loss Days:	
1 Jun 22, 2013	2 Jul 31, 2024
3 May 11, 2023	4 May 24, 2024
5 May 5, 2023	6 Jun 19, 2014
7 Sep 4, 2018	8 May 26, 2012
9 Jun 22, 2015	10 Jun 21, 2024

1. **Detailed Data:** USGS HUC 12 Name and code. In my example this is Boot Creek (070200110102). Feel free to choose any other watershed of interest.
2. **Date or period Summary:** in this example 22 June 2013. Do you think this date has been randomly selected? Check the next section.
3. **Top 10 Soil Loss Days:** ranked the most severe daily events that produced the top-highest hillslope soil losses in that specific watershed.

- *Pro-tip: click on “one top 10 date” and the date will automatically update to your selection.*
4. **Shapefile Download:** download a shapefile for all the HUC12s in the selected states and for the specified timeframe (single or multi)
 5. **Current DEP Version:** this section is vital for us since it helps us with versioning (Return to the home page and check Resources>CHANGE LOG to details).
 - *Pro-tip: when using data, keep in mind the DEP label, in this workshop we are using DEP version v20250214*

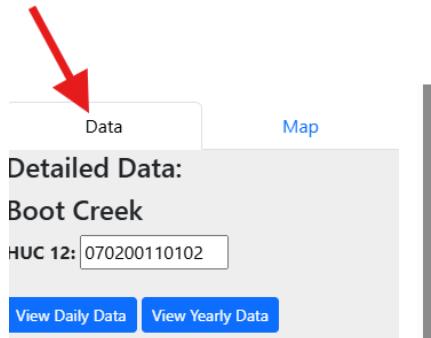
Step 6: Download Data

DEP units in the downloads are **always English units**: precipitation (in), runoff (in), detachment (T/ac), and hillslope soil loss (T/ac). Remember to keep in mind the temporal resolution you are using!

There are different ways and types of data that the user can download. For simplicity, let's divide those into Excel and GIS layers.

1. Estimations for the selected HUC 12 watershed in Excel format.

Here, the user can download the data in two time periods, daily and annually.



Detailed Data:
Boot Creek
HUC 12: 070200110102

[View Daily Data](#) [View Yearly Data](#)

- a. Click “View Daily Data” to view and download daily DEP estimations. A popup window like the example below will appear. Then click on  to download the daily data for your watersheds. It is important to note that only days with precipitation and/or runoff are included.

Yearly summary (# daily events) for
070200110102

[Excel Download](#)

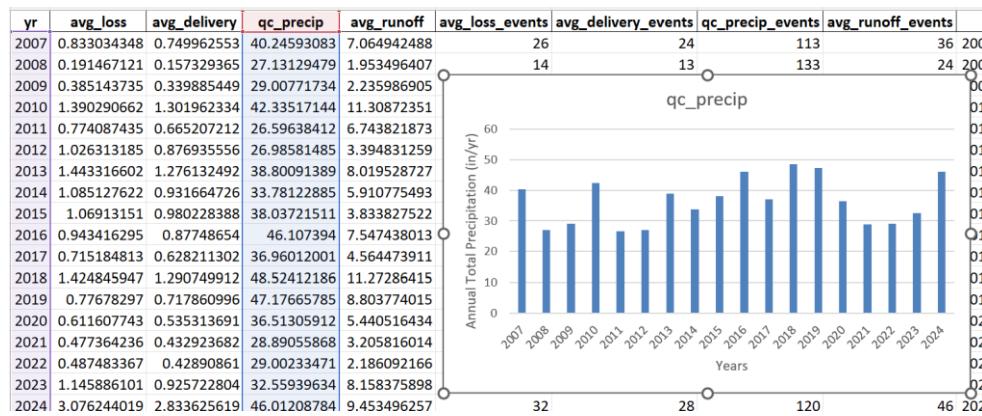
10 entries per page Search:

Year	Precip [inches]	Runoff [inches]	Detach [tons per acre]	Hillslope Soil Loss [tons per acre]
2007	40.25 (113)	7.06 (36)	0.83 (26)	0.75 (24)
2008	27.13 (133)	1.95 (24)	0.19 (14)	0.16 (13)
2009	29.01 (137)	2.24 (30)	0.39 (16)	0.34 (8)
2010	32.23 (133)	4.20 (20)	0.30 (16)	0.30 (8)

[Close](#)

Open downloaded Excel, including DEP estimates. It will look like the following:

- *Pro-tip: Can't wait to see what DEP simulates? Select your columns of interest in Excel Insert>Charts. Here is a bar plot example of precipitation.*



2. Estimates for the entire domain or selected states in shapefile format

This download feature enables users to export DEP simulations for creating custom maps with GIS software. **It is important to note that the results reflect totals for the chosen time period, whether it's a single period or multiple periods.**

Additional calculations are necessary to convert these totals into annual averages, long-term averages, or other statistical measures. The downloaded ZIP folder includes DEP estimates for the specified time frame and contains two files:

- Excel in CSV format
- Shapefile including the HUC12 polygons and the DEP estimations.

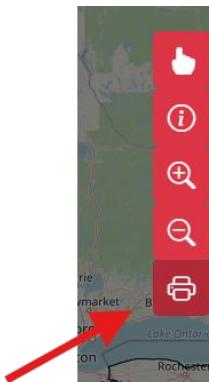
> This PC > Windows (C:) > Users > luqui002 > Downloads > idepv2_20240524.zip

Name	Type	Compressed size	Password ...	Size
idepv2_20240524.csv	Microsoft Excel Comma S...	66 KB	No	
idepv2_20240524.dbf	DBF File	80 KB	No	
idepv2_20240524.prj	PRJ File	1 KB	No	
idepv2_20240524.shp	SHP File	772 KB	No	
idepv2_20240524.shx	SHX File	8 KB	No	

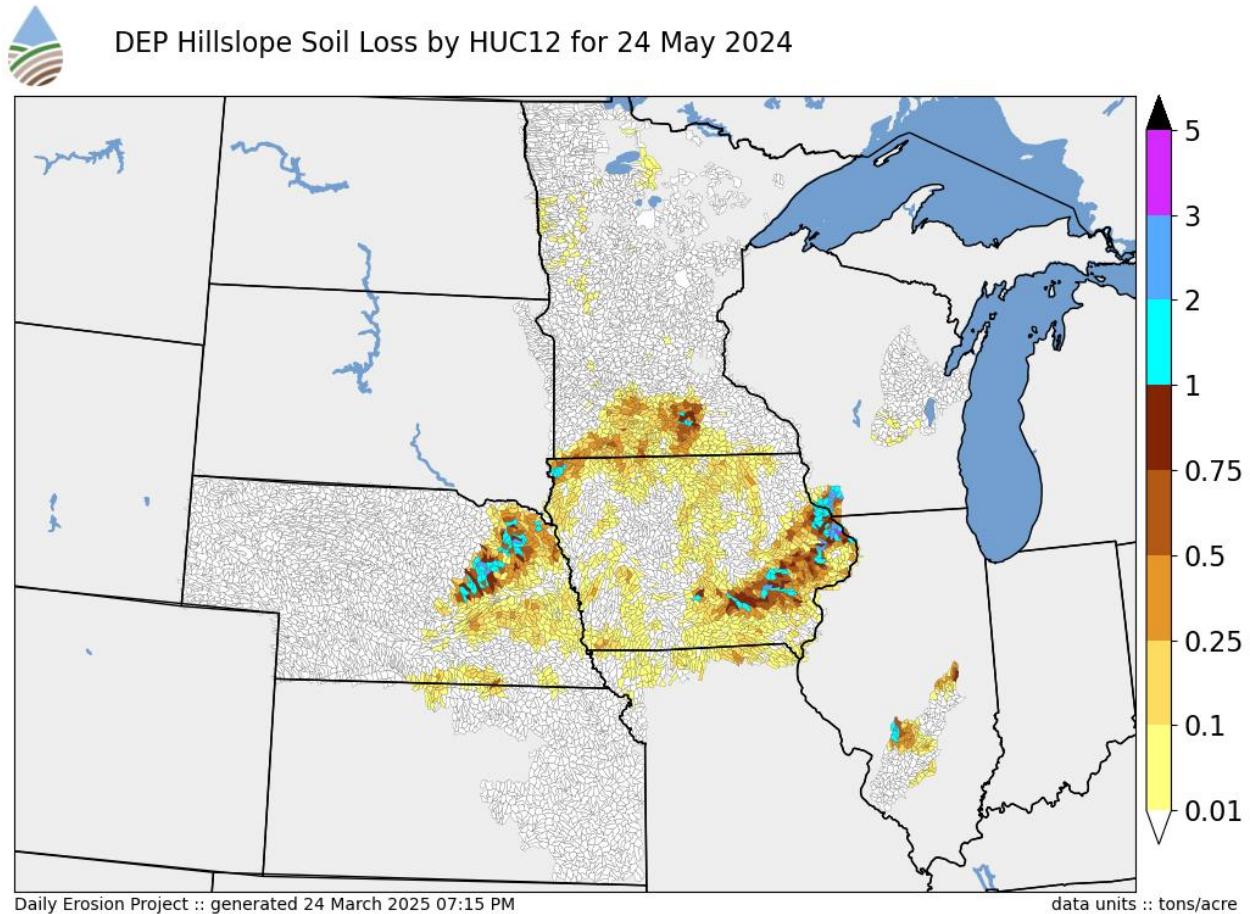
Step 7: Explore Additional Resources, automatic creation of maps

The interactive map also offers the ability to create automatic GIS figures for the entire DEP domain.

1. Select the desired output (precipitation, runoff, detachment, hillslope soil loss, average slope or dominant tillage scenario) and date selection (single or multi)
2. On the right side of the interactive map, click in the printer icon



3. A request is sent to the Iowa Mesonet server where DEP is located, and the automated mapping option is activated. In a few seconds, your map is generated.



This basic tutorial covers the fundamental concept of a DEP interactive map. The possibilities for interactive maps are endless, so it's up to you to experiment and create them. 😊