Using Atlas 14 – Precipitation Data Frequency Server

April 23, 2013

MnDOT Bridge Hydraulics

Your Destination...Our Priority

NOAA Atlas 14

- Web based tool to access site specific precipitation frequency data
  - Depth – Duration – Frequency
  - Intensity – Duration – Frequency
  - Cartographic Maps
  - GIS Data
- The data supersedes TP-40, Hydro-35, and MnDOT Drainage Manual for design precipitation

http://hdsc.nws.noaa.gov/hdsc/pfds/

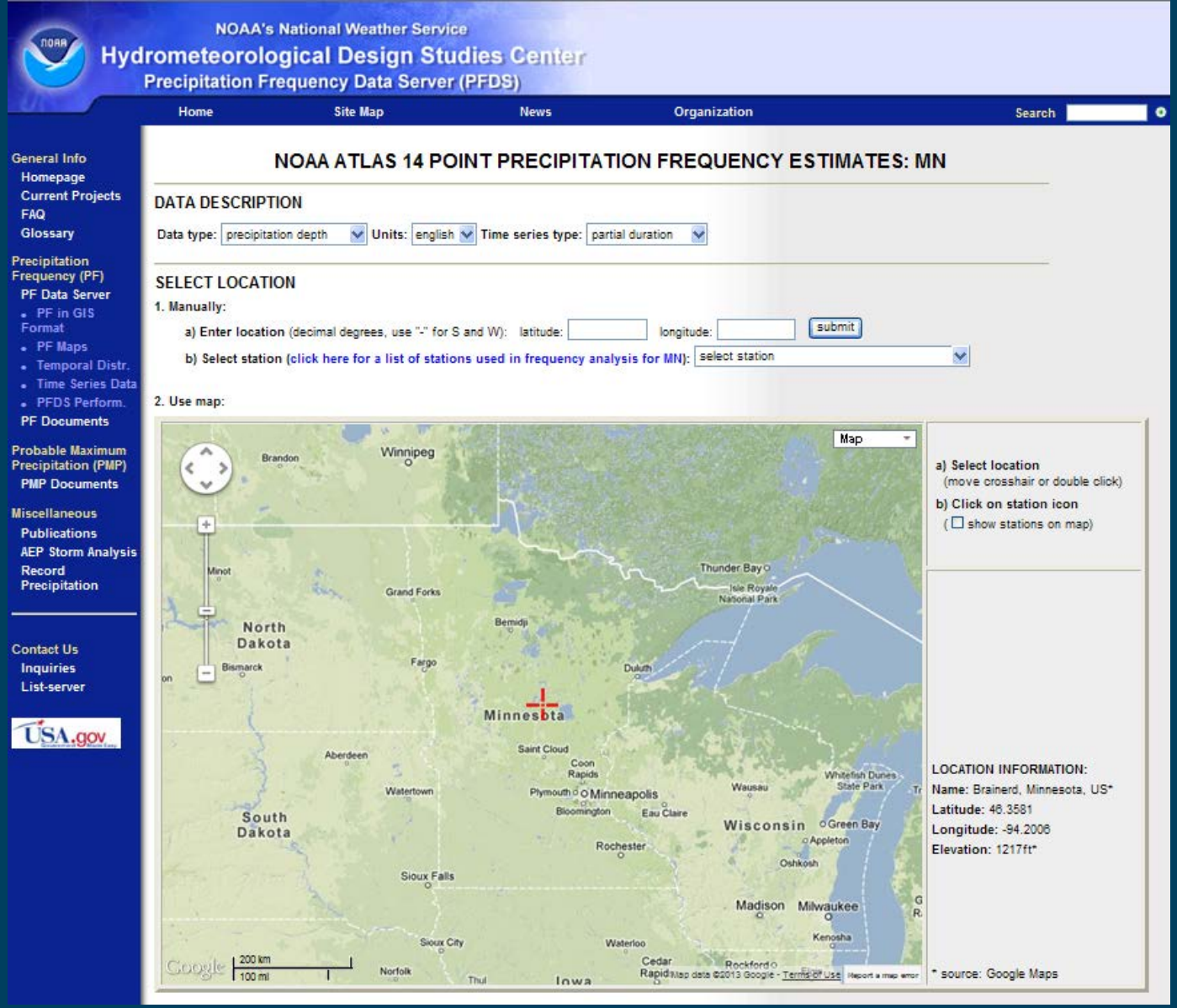
Impacts for Transportation System

Precipitation Frequency data is used with rainfall/runoff methods

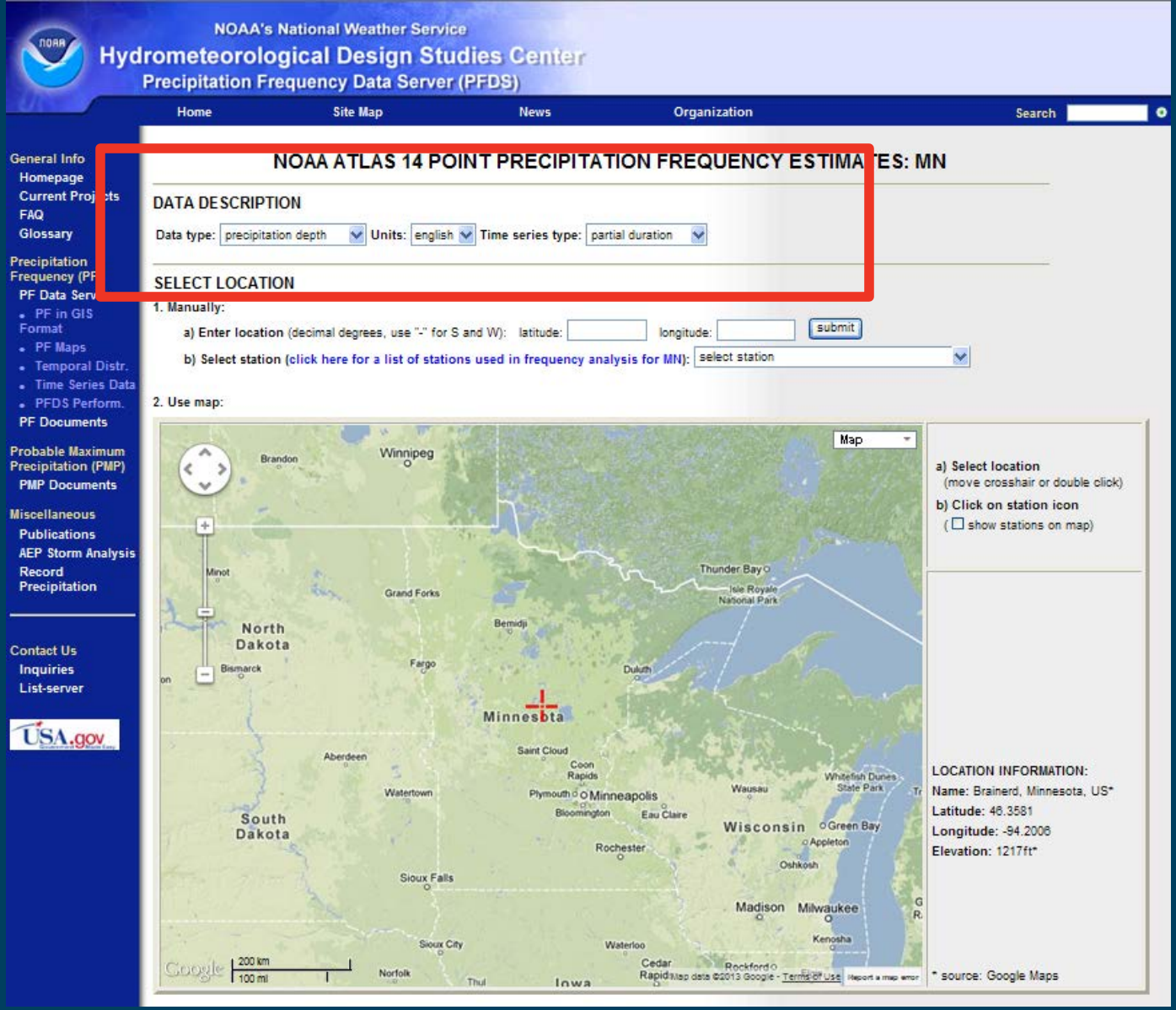
- Ponds, Roadway Culverts, some FIS studies for smaller streams typically use the 24 hour precipitation
- Storm Drains and Catch Basin Spacing use design rainfall Intensity-Duration-Frequency with Rational Method

Does not affect statistical flow models:

- Bridges, stream culverts, FIS studies for larger streams/rivers typically use stream gauge analysis or USGS Regression Equations



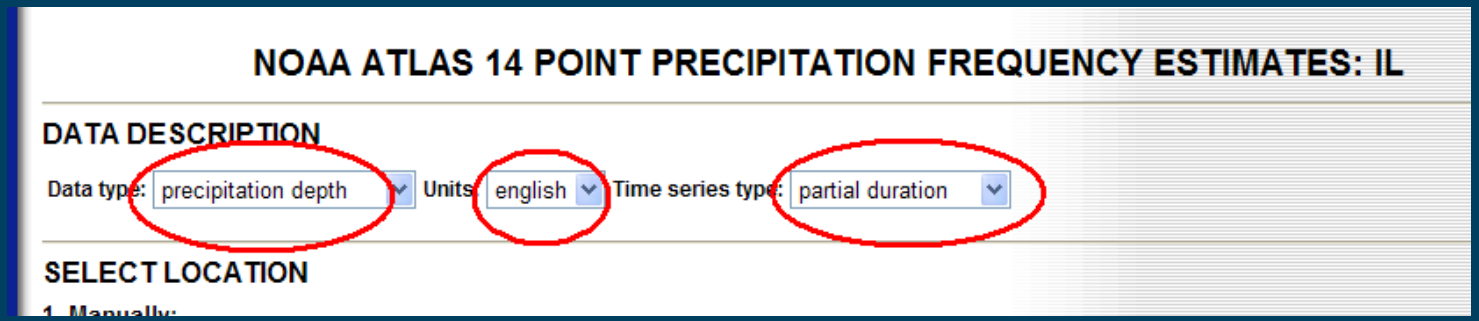
- http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=mn

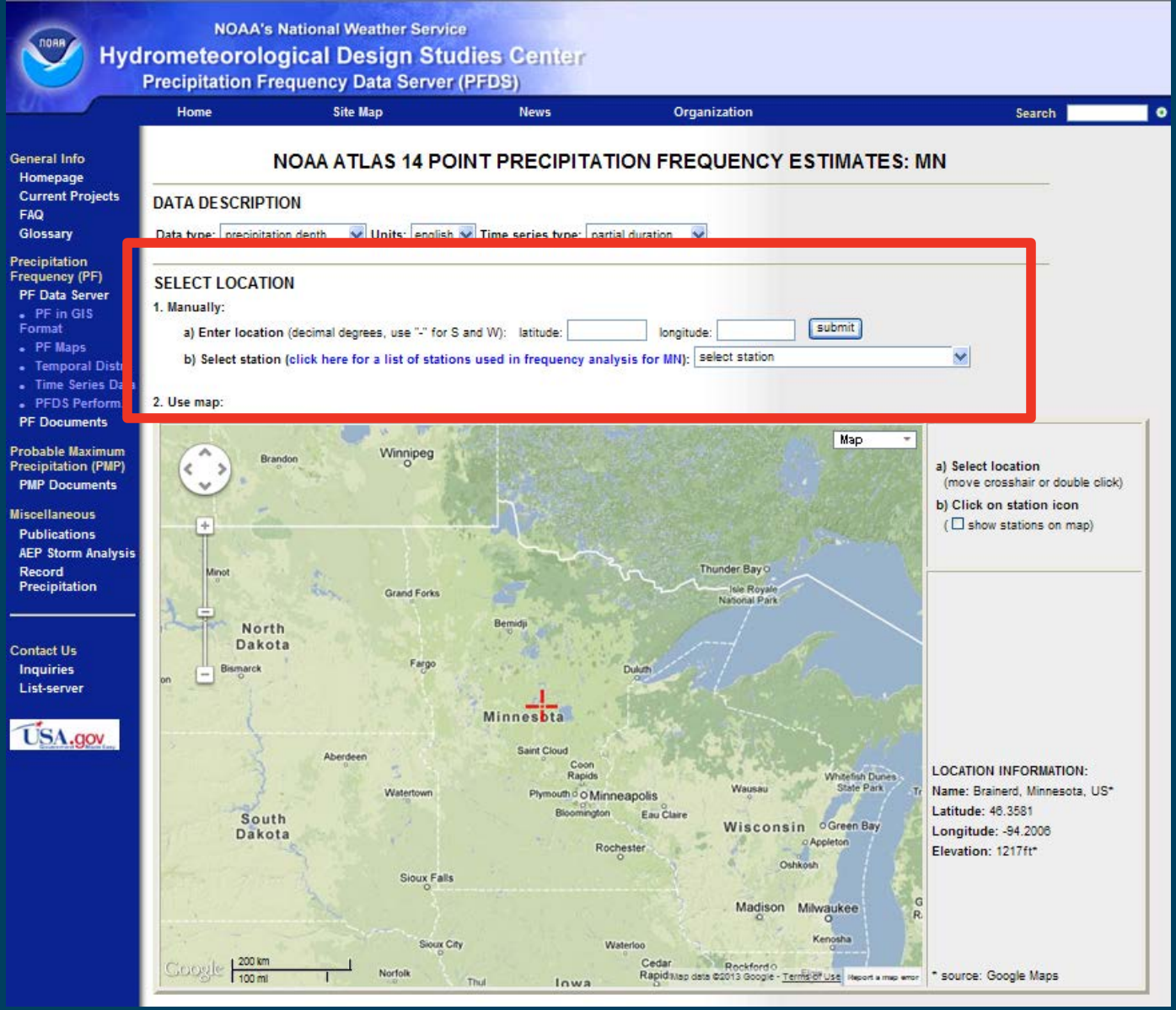


- http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=mn

Data Description:

Select precipitation depth, English and partial duration



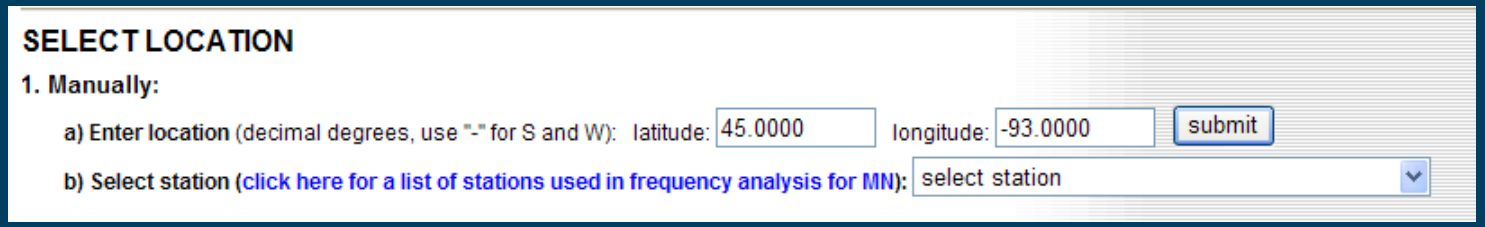


- http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=mn

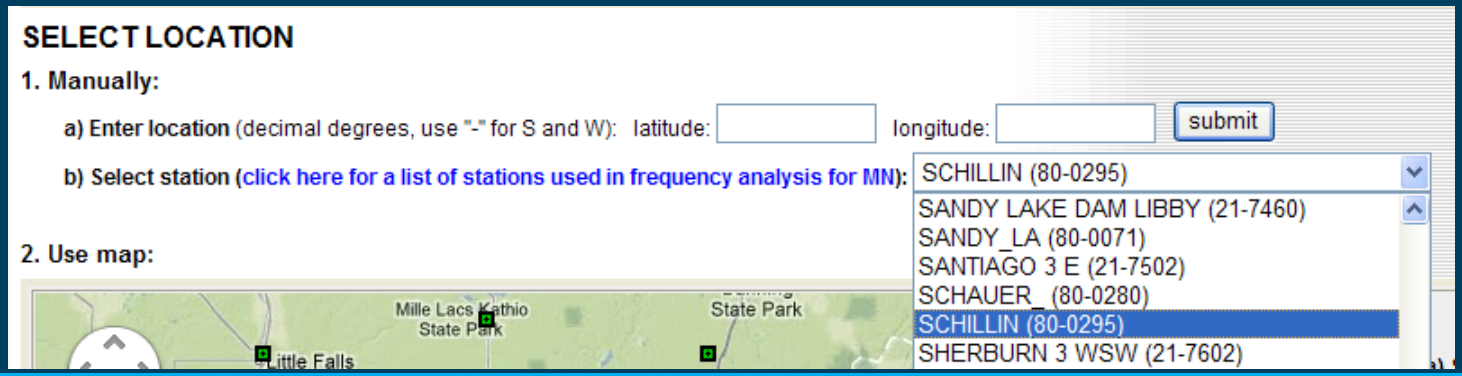
Select Location – Manual and Map Options
Use one of these options to select location

Manual

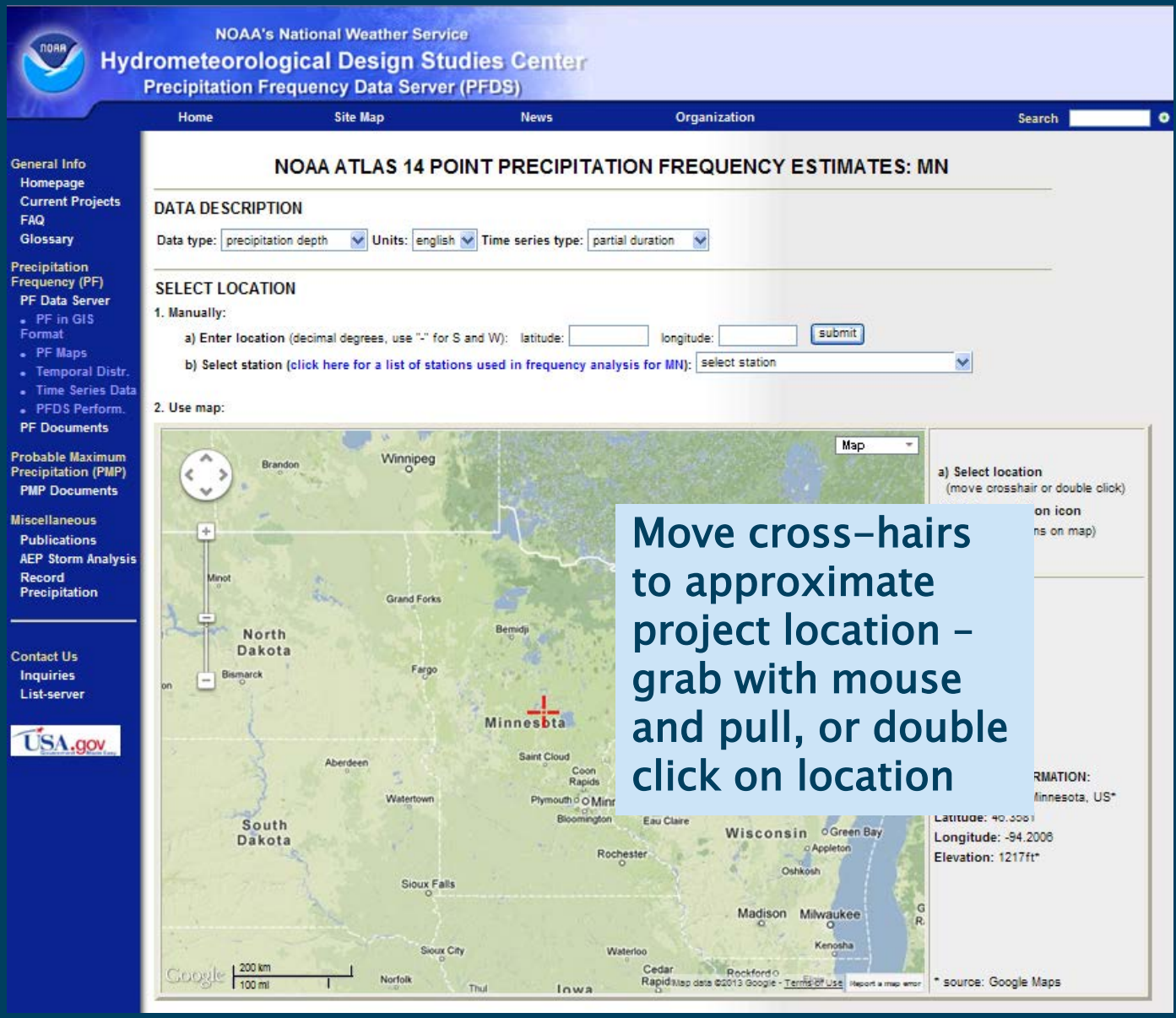
- Enter Location by typing in Latitude or Longitude



- Select nearby station from drop-down list – can turn on station locations on map



Select Location – Map Option



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Hydrometeorological Design Studies Center
Precipitation Frequency Data Server (PFDS)

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NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: MN

DATA DESCRIPTION

Data type: precipitation depth | Units: english | Time series type: partial duration

SELECT LOCATION

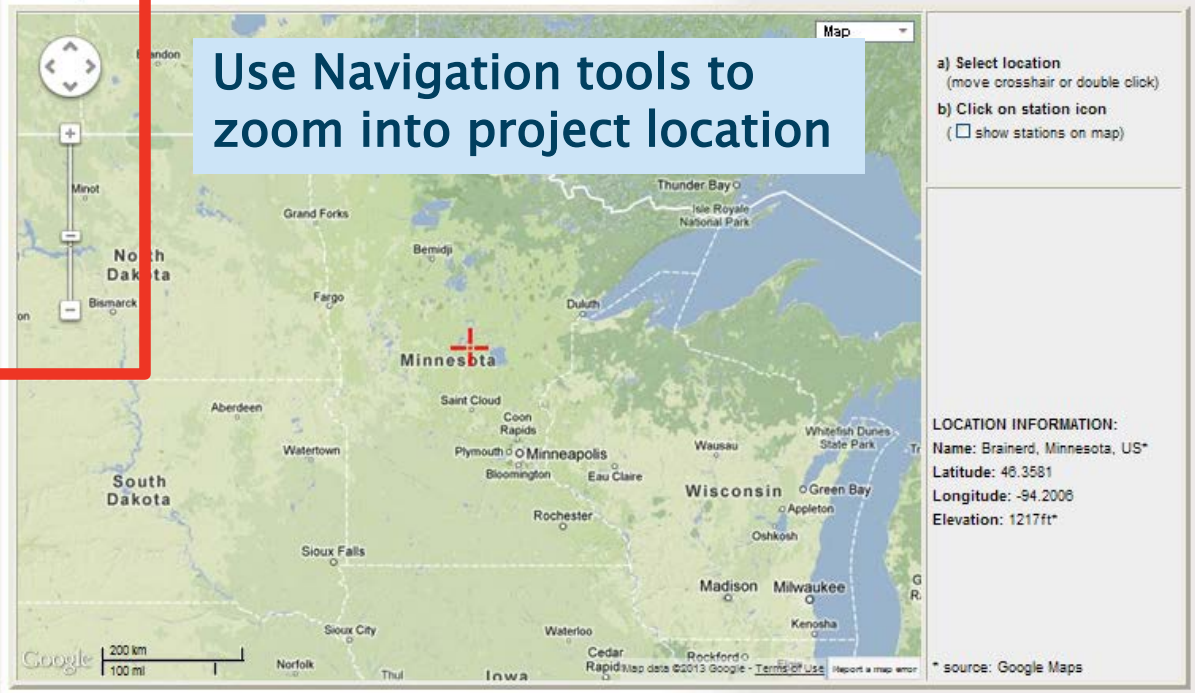
1. Manually:

a) Enter location (decimal degrees, use "-" for S and W): latitude: longitude: submit

b) Select station (click here for a list of stations used in frequency analysis for MN): select station

2. Use map:

Use Navigation tools to zoom into project location



a) Select location
(move crosshair or double click)

b) Click on station icon
(☐ show stations on map)

LOCATION INFORMATION:
Name: Brainerd, Minnesota, US*
Latitude: 46.3581
Longitude: -94.2006
Elevation: 1217ft*

* source: Google Maps

NOAA's National Weather Service

Hydrometeorological Design Studies Center

Precipitation Frequency Data Server (PFDS)

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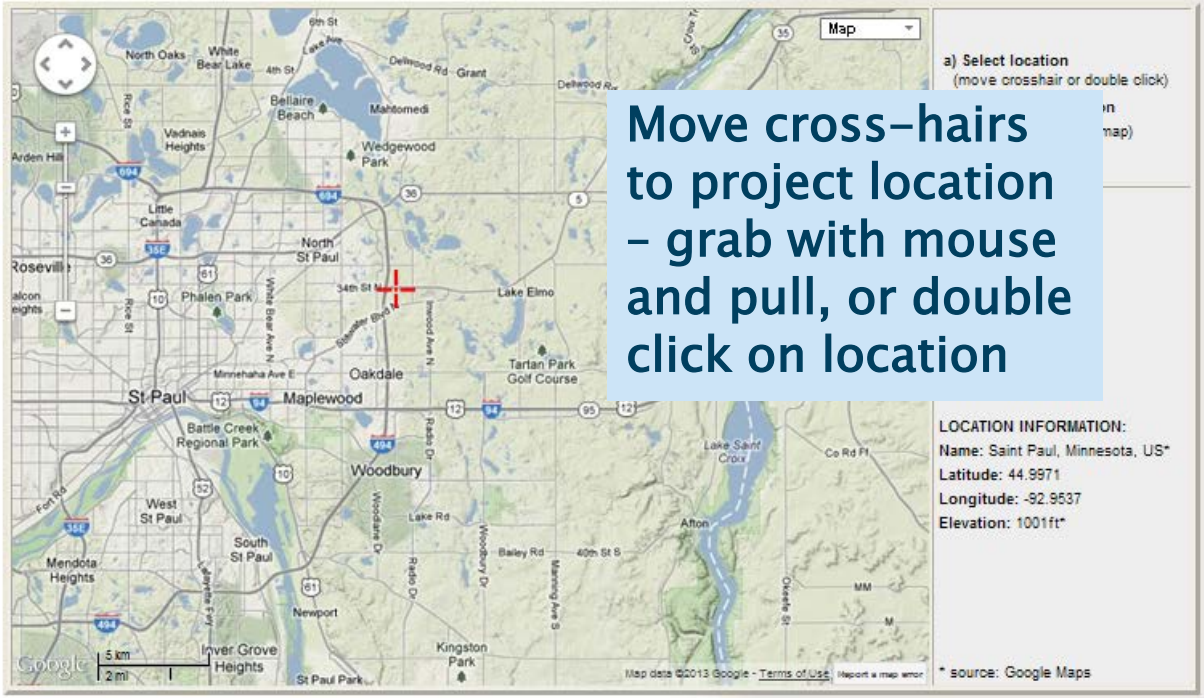


POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION

Depth/Duration/Frequency at bottom of page along with 90% confidence interval

POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION

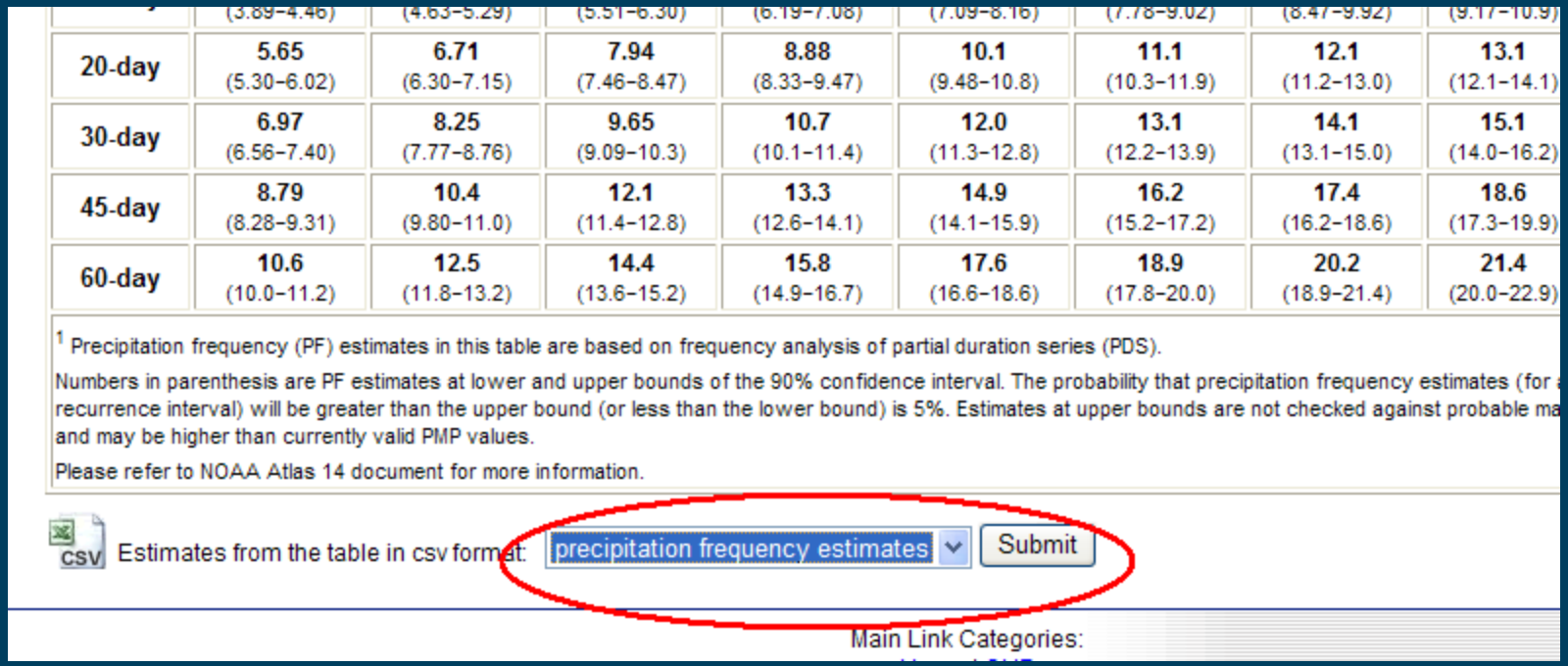
NOAA Atlas 14, Volume 8, Version 2

PF tabular | PF graphical | Supplementary information | Print Page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval(years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.360 (0.279–0.468)	0.425 (0.330–0.554)	0.537 (0.415–0.700)	0.633 (0.487–0.827)	0.771 (0.576–1.04)	0.882 (0.644–1.19)	[illegible]	1.12 (0.759–1.56)	1.28 (0.839–1.83)	1.41 (0.900–2.03)
10-min	0.527 (0.409–0.685)	0.623 (0.483–0.811)	0.786 (0.607–1.02)	0.927 (0.712–1.21)	1.13 (0.844–1.52)	1.29 (0.943–1.75)	[illegible]	1.64 (1.11–2.29)	1.88 (1.23–2.68)	2.07 (1.32–2.97)
15-min	0.643 (0.499–0.836)	0.760 (0.589–0.988)	0.959 (0.741–1.25)	1.13 (0.869–1.48)	1.38 (1.03–1.85)	1.58 (1.15–2.13)	[illegible]	2.00 (1.36–2.79)	2.29 (1.50–3.26)	2.52 (1.61–3.62)
30-min	0.897 (0.696–1.17)	1.07 (0.828–1.39)	1.36 (1.05–1.77)	1.61 (1.24–2.10)	1.96 (1.47–2.64)	2.25 (1.64–3.04)	[illegible]	2.85 (1.94–3.99)	3.28 (2.14–4.66)	3.61 (2.30–5.17)
60-min	1.17 (0.908–1.52)	1.38 (1.07–1.80)	1.76 (1.36–2.29)	2.11 (1.62–2.76)	2.64 (1.99–3.58)	3.09 (2.26–4.21)	[illegible]	4.09 (2.79–5.76)	4.83 (3.17–6.92)	5.44 (3.46–7.80)
2-hr	1.44 (1.13–1.85)	1.69 (1.33–2.18)	2.16 (1.69–2.79)	2.61 (2.03–3.37)	3.31 (2.54–4.48)	3.92 (2.92–5.31)	[illegible]	5.33 (3.68–7.45)	6.39 (4.25–9.10)	7.27 (4.68–10.3)
3-hr	1.61 (1.28–2.06)	1.88 (1.48–2.39)	2.40 (1.89–3.06)	2.92 (2.28–3.74)	3.75 (2.91–5.08)	4.50 (3.38–6.09)	[illegible]	6.27 (4.36–8.75)	7.64 (5.11–10.8)	8.78 (5.68–12.4)
6-hr	1.89 (1.52–2.38)	2.18 (1.75–2.75)	2.79 (2.22–3.51)	3.40 (2.70–4.30)	4.42 (3.48–5.94)	5.34 (4.07–7.17)	[illegible]	7.56 (5.33–10.5)	9.31 (6.30–13.1)	10.8 (7.04–15.1)
12-hr	2.12 (1.72–2.63)	2.48 (2.01–3.08)	3.19 (2.57–3.97)	3.88 (3.11–4.84)	4.97 (3.93–6.54)	5.93 (4.55–7.83)	[illegible]	8.18 (5.81–11.2)	9.91 (6.77–13.8)	11.3 (7.49–15.8)
24-hr	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.37 (5.53–9.79)	8.61 (6.19–11.7)	10.4 (7.20–14.4)	11.9 (7.96–16.5)
2-day	2.85 (2.37–3.44)	3.17 (2.63–3.83)	3.83 (3.17–4.64)	4.50 (3.70–5.47)	5.61 (4.56–7.22)	6.61 (5.21–8.54)	7.74 (5.88–10.2)	9.02 (6.56–12.1)	10.9 (7.62–15.0)	12.5 (8.41–17.1)
3-day	3.14 (2.63–3.76)	3.44 (2.88–4.13)	4.09 (3.41–4.91)	4.75 (3.94–5.73)	5.86 (4.80–7.49)	6.87 (5.45–8.82)	8.02 (6.13–10.5)	9.31 (6.82–12.4)	11.2 (7.90–15.3)	12.9 (8.71–17.5)

Go to Bottom of Table to export Table as a csv file



	(3.89-4.46)	(4.63-5.29)	(5.51-6.30)	(6.19-7.08)	(7.09-8.16)	(7.78-9.02)	(8.47-9.92)	(9.17-10.9)
20-day	5.65 (5.30-6.02)	6.71 (6.30-7.15)	7.94 (7.46-8.47)	8.88 (8.33-9.47)	10.1 (9.48-10.8)	11.1 (10.3-11.9)	12.1 (11.2-13.0)	13.1 (12.1-14.1)
30-day	6.97 (6.56-7.40)	8.25 (7.77-8.76)	9.65 (9.09-10.3)	10.7 (10.1-11.4)	12.0 (11.3-12.8)	13.1 (12.2-13.9)	14.1 (13.1-15.0)	15.1 (14.0-16.2)
45-day	8.79 (8.28-9.31)	10.4 (9.80-11.0)	12.1 (11.4-12.8)	13.3 (12.6-14.1)	14.9 (14.1-15.9)	16.2 (15.2-17.2)	17.4 (16.2-18.6)	18.6 (17.3-19.9)
60-day	10.6 (10.0-11.2)	12.5 (11.8-13.2)	14.4 (13.6-15.2)	15.8 (14.9-16.7)	17.6 (16.6-18.6)	18.9 (17.8-20.0)	20.2 (18.9-21.4)	21.4 (20.0-22.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

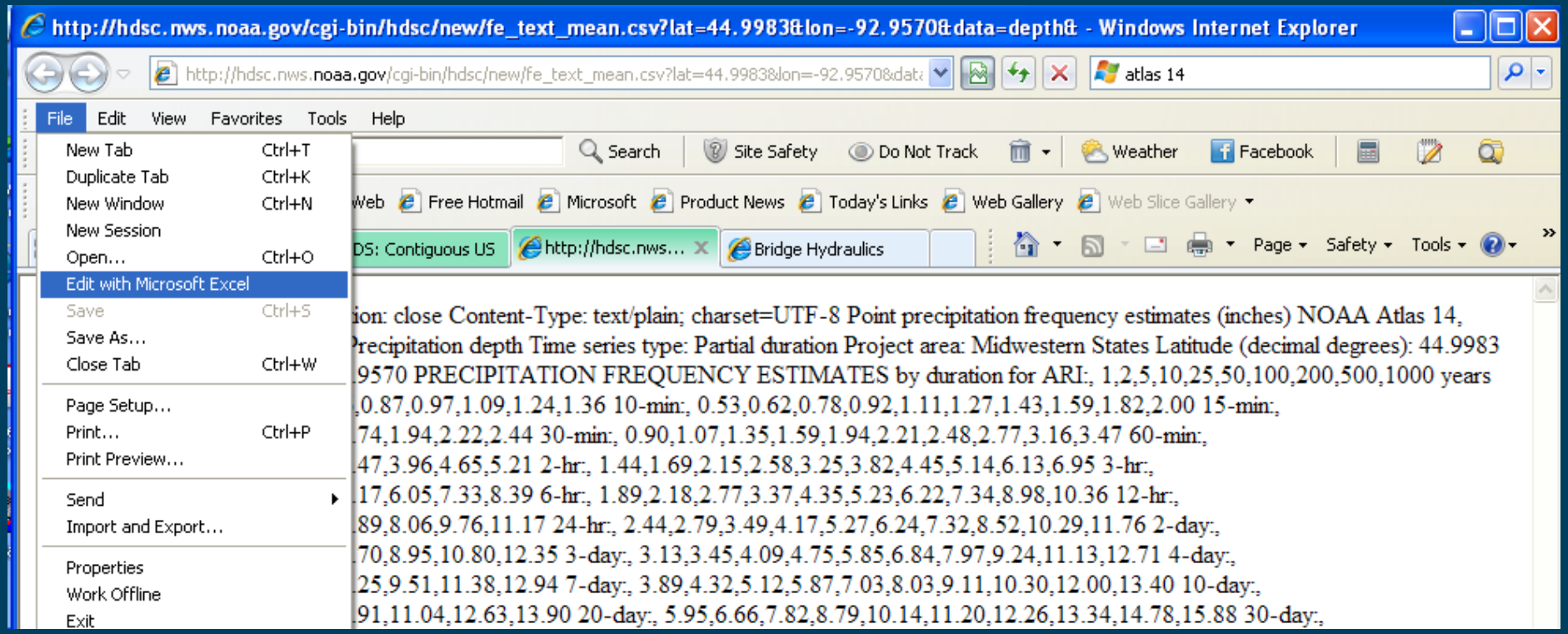
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable ma and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

CSV Estimates from the table in csv format: precipitation frequency estimates Submit

Main Link Categories:

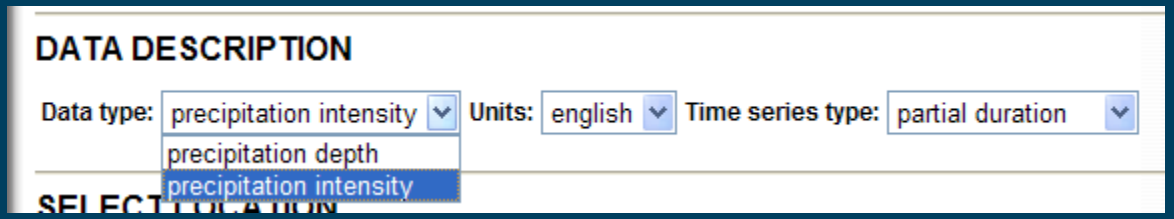
Should get screen with data, select File > Save As (Text or Plain Text) or Edit with Microsoft Excel- output format may vary depending on Browser



Helpsheet for saving data from internet explorer v8 at:
http://www.dot.state.mn.us/bridge/hydraulics/atlas14/pdf/Atlas_14_DownloadingDataUsingInternetExplorer8.pdf

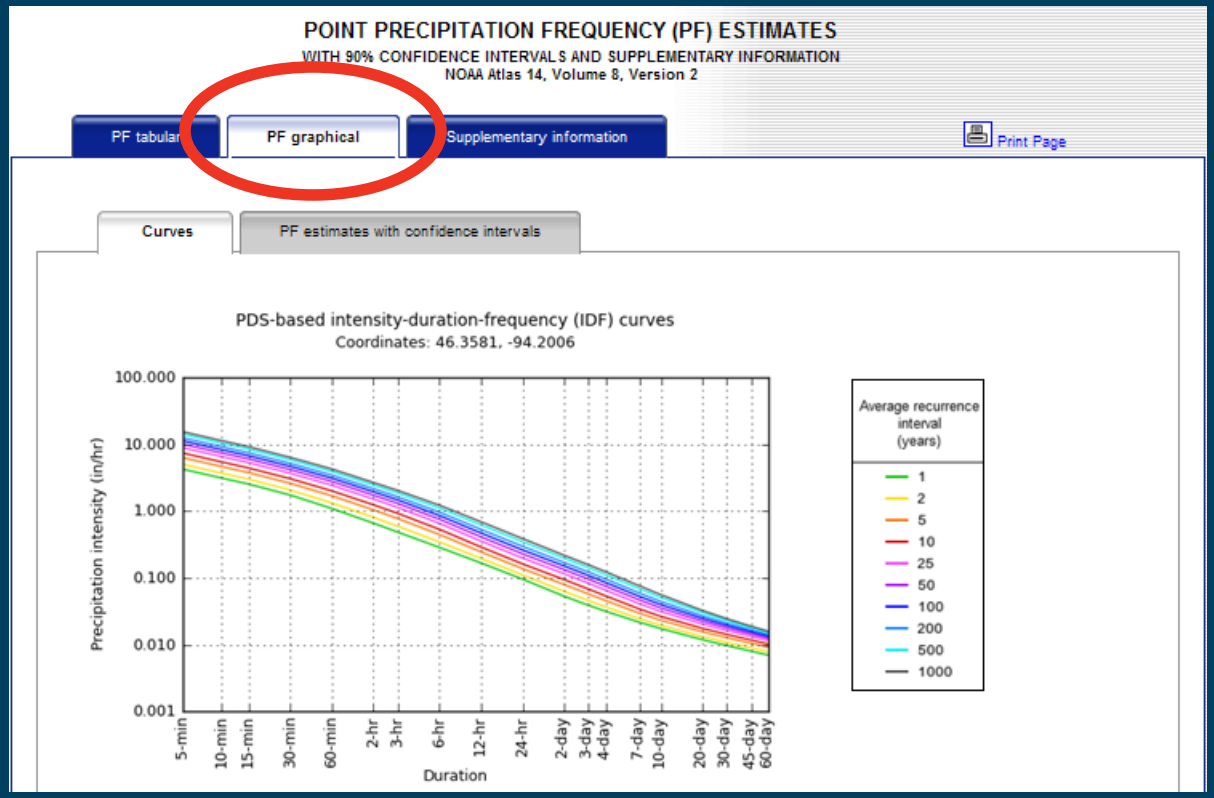
Atlas 14 – Rainfall Intensity

- Rainfall Data can be displayed/exported as intensity (in/hr) for Rational Method Analysis



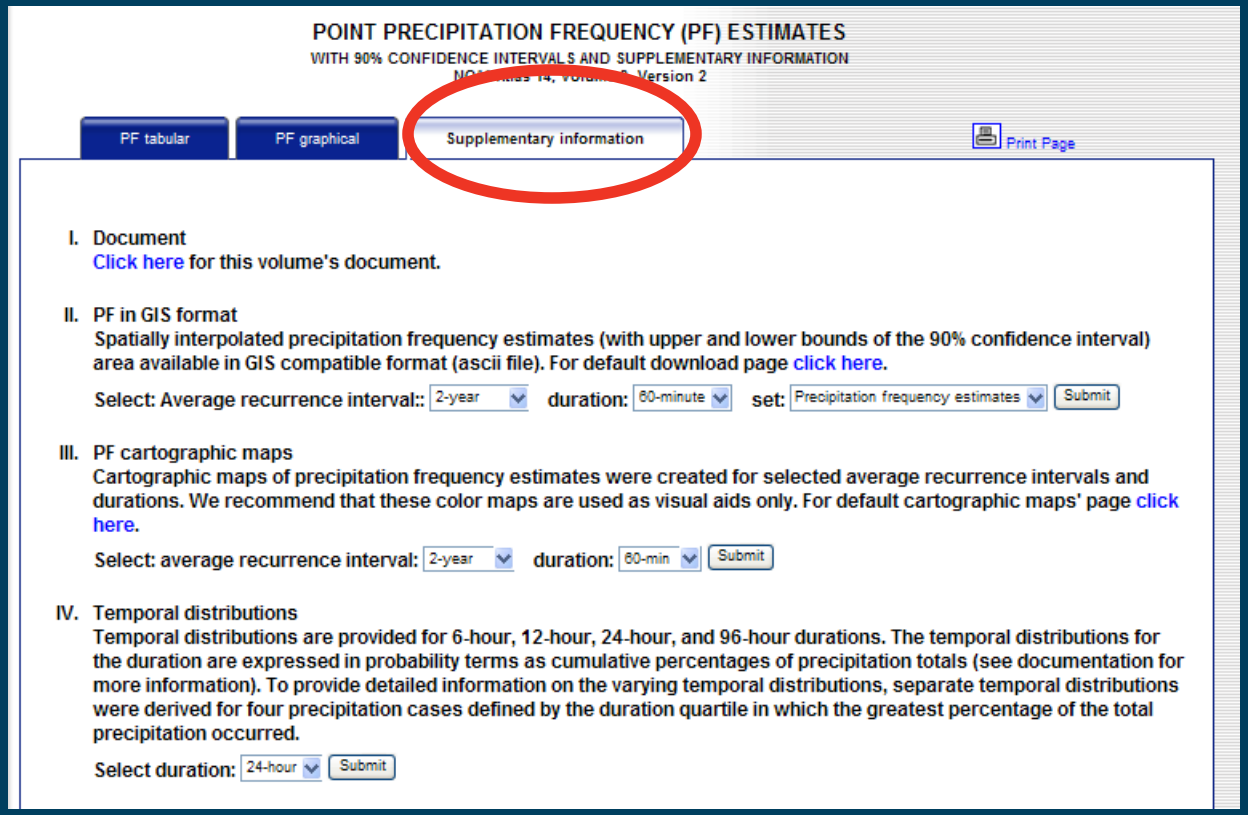
Atlas 14 – Graphical Data

Graphics of Curves for Depth/ Intensity Duration Frequency are available from the PF Graphical tab



Atlas 14 – Supplementary Information

Documentation, Maps, GIS data and other analysis available on the Supplementary information tab.



Resources

- Atlas 14 Resource Website on internal MnDOT Bridge Hydraulics

http://ihub/bridge/hydraulics/atlas14/index.html

- Atlas 14 Resource Website on external MnDOT Bridge Hydraulics

http://www.dot.state.mn.us/bridge/hydraulics/atlas14/index.html