# Basin Model

Hydrology Studio v 3.0.0.20

Project Name:

10-22-2021

# Hydrograph by Return Period

Project Name:

10-22-2021

Hydrology Studio v 3.0.0.20

| Hyd. No. | Hydrograph Type | Hydrograph Name | Peak Outflow (cfs) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1-yr | 2-yr | 3-yr | 5-yr | 10-yr | 25-yr | 50-yr | 100-yr |
| 1 | NRCS Runoff | Pre ag row crop | 5.236 | 7.329 | | 9.997 | 12.17 | 15.14 | 17.45 | 19.84 |
| 2 | NRCS Runoff | Post building and parking | 3.455 | 5.320 | | 7.784 | 9.845 | 12.73 | 15.01 | 17.42 |

# IDF Report

IDF filename: PrairieCityIowa.idf

Hydrology Studio v 3.0.0.20

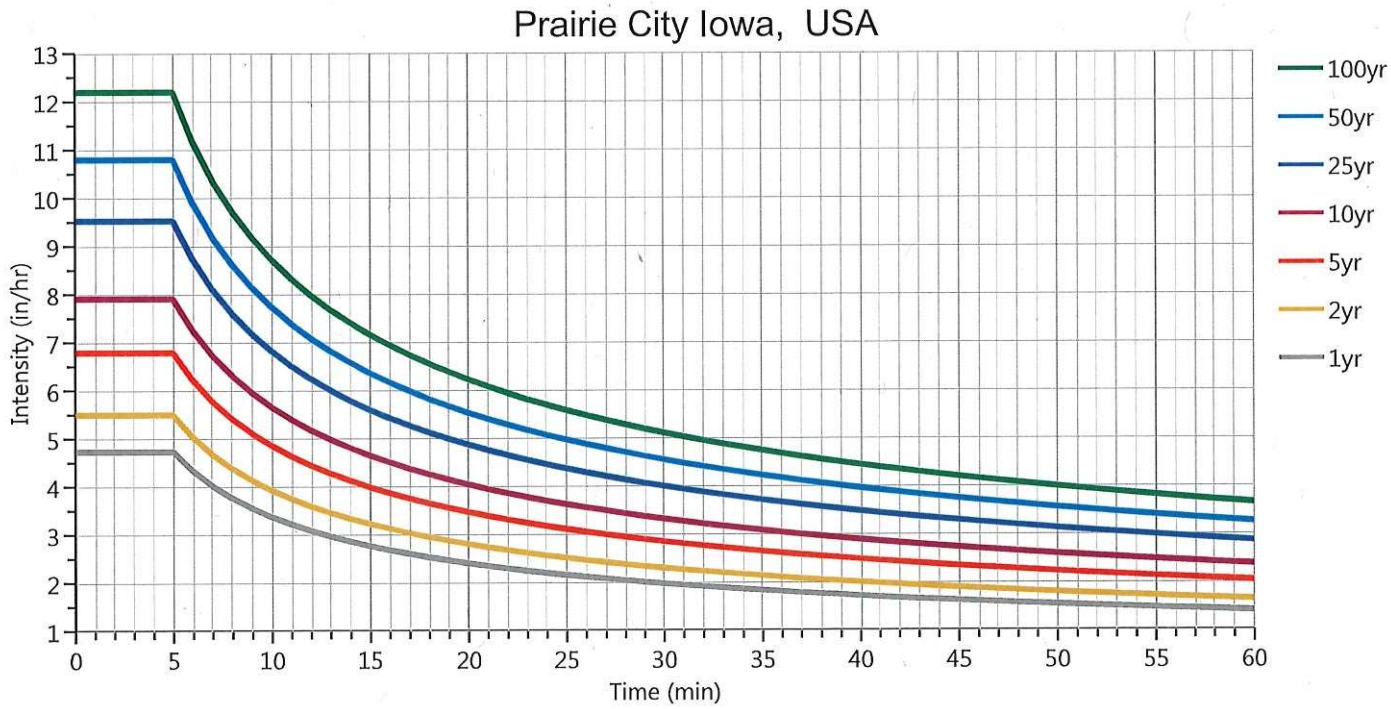
10-22-2021

| Equation Coefficients | Intensity = B / (Tc + D)^E (in/hr) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1-yr | 2-yr | 3-yr | 5-yr | 10-yr | 25-yr | 50-yr | 100-yr | |
| B | 10.3884 | 12.0356 | 0.0000 | 14.8092 | 17.2524 | 20.7855 | 23.4766 | 26.6589 | |
| D | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | |
| E | 0.4888 | 0.4866 | 0.0000 | 0.4845 | 0.4845 | 0.4845 | 0.4824 | 0.4857 | |

*Minimum Tc = 5 minutes*

| Tc (min) | Intensity Values (in/hr) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1-yr | 2-yr | 3-yr | 5-yr | 10-yr | 25-yr | 50-yr | 100-yr | |
| Cf | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| 5 | 4.73 | 5.50 | 0 | 6.79 | 7.91 | 9.53 | 10.80 | 12.20 | |
| 10 | 3.37 | 3.93 | 0 | 4.85 | 5.65 | 6.81 | 7.73 | 8.71 | |
| 15 | 2.76 | 3.22 | 0 | 3.99 | 4.65 | 5.60 | 6.36 | 7.16 | |
| 20 | 2.40 | 2.80 | 0 | 3.47 | 4.04 | 4.87 | 5.53 | 6.22 | |
| 25 | 2.15 | 2.51 | 0 | 3.11 | 3.63 | 4.37 | 4.97 | 5.58 | |
| 30 | 1.97 | 2.30 | 0 | 2.85 | 3.32 | 4.00 | 4.55 | 5.11 | |
| 35 | 1.83 | 2.13 | 0 | 2.64 | 3.08 | 3.71 | 4.22 | 4.74 | |
| 40 | 1.71 | 2.00 | 0 | 2.48 | 2.89 | 3.48 | 3.96 | 4.44 | |
| 45 | 1.62 | 1.89 | 0 | 2.34 | 2.73 | 3.29 | 3.74 | 4.20 | |
| 50 | 1.53 | 1.79 | 0 | 2.23 | 2.59 | 3.12 | 3.56 | 3.99 | |
| 55 | 1.46 | 1.71 | 0 | 2.12 | 2.48 | 2.98 | 3.40 | 3.81 | |
| 60 | 1.40 | 1.64 | 0 | 2.04 | 2.37 | 2.86 | 3.26 | 3.65 | |

*Cf = Correction Factor applied to Rational Method runoff coefficient.*



**NOAA Atlas 14, Volume 8, Version 2**
**Location name: Prairie City, Iowa, USA***
**Latitude: 41.5984°, Longitude: -93.234°**
**Elevation: 925.46 ft****
* source: ESRI Maps
** source: USGS

## POINT PRECIPITATION FREQUENCY ESTIMATES

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NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

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

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | 4.73 (3.89-5.78) | 5.50 (4.51-6.72) | 6.79 (5.56-8.32) | 7.91 (6.44-9.73) | 9.53 (7.54-12.0) | 10.8 (8.36-13.8) | 12.2 (9.08-15.8) | 13.6 (9.74-18.0) | 15.6 (10.7-20.9) | 17.1 (11.5-23.2) |
| 10-min | 3.46 (2.85-4.24) | 4.02 (3.30-4.92) | 4.97 (4.07-6.09) | 5.80 (4.72-7.12) | 6.98 (5.51-8.82) | 7.94 (6.12-10.1) | 8.93 (6.65-11.6) | 9.97 (7.13-13.1) | 11.4 (7.85-15.3) | 12.5 (8.40-17.0) |
| 15-min | 2.82 (2.32-3.44) | 3.27 (2.68-4.00) | 4.04 (3.31-4.95) | 4.71 (3.83-5.79) | 5.68 (4.48-7.17) | 6.45 (4.98-8.22) | 7.26 (5.41-9.40) | 8.10 (5.80-10.7) | 9.27 (6.38-12.5) | 10.2 (6.83-13.8) |
| 30-min | 1.97 (1.62-2.41) | 2.30 (1.89-2.81) | 2.85 (2.33-3.49) | 3.32 (2.70-4.09) | 4.00 (3.16-5.06) | 4.55 (3.51-5.79) | 5.11 (3.81-6.62) | 5.70 (4.08-7.52) | 6.51 (4.48-8.75) | 7.15 (4.79-9.68) |
| 60-min | 1.26 (1.04-1.55) | 1.48 (1.22-1.81) | 1.85 (1.52-2.27) | 2.18 (1.77-2.68) | 2.65 (2.09-3.35) | 3.03 (2.33-3.86) | 3.42 (2.55-4.43) | 3.84 (2.75-5.06) | 4.41 (3.04-5.93) | 4.87 (3.26-6.59) |
| 2-hr | 0.772 (0.640-0.935) | 0.908 (0.751-1.10) | 1.14 (0.942-1.39) | 1.35 (1.10-1.64) | 1.65 (1.31-2.07) | 1.89 (1.47-2.39) | 2.14 (1.61-2.76) | 2.41 (1.74-3.16) | 2.79 (1.94-3.72) | 3.08 (2.08-4.14) |
| 3-hr | 0.568 (0.473-0.685) | 0.670 (0.557-0.809) | 0.847 (0.702-1.02) | 1.00 (0.827-1.22) | 1.23 (0.989-1.54) | 1.42 (1.11-1.79) | 1.62 (1.23-2.07) | 1.83 (1.33-2.39) | 2.12 (1.49-2.82) | 2.36 (1.60-3.15) |
| 6-hr | 0.334 (0.280-0.399) | 0.393 (0.330-0.470) | 0.497 (0.416-0.596) | 0.590 (0.490-0.709) | 0.727 (0.589-0.904) | 0.840 (0.664-1.05) | 0.960 (0.734-1.22) | 1.09 (0.798-1.41) | 1.27 (0.896-1.67) | 1.41 (0.969-1.87) |
| 12-hr | 0.192 (0.163-0.227) | 0.225 (0.190-0.266) | 0.281 (0.237-0.334) | 0.332 (0.278-0.395) | 0.407 (0.333-0.501) | 0.469 (0.374-0.581) | 0.534 (0.412-0.674) | 0.604 (0.448-0.776) | 0.702 (0.501-0.920) | 0.780 (0.541-1.03) |
| 24-hr | 0.111 (0.095-0.130) | 0.128 (0.109-0.150) | 0.158 (0.134-0.186) | 0.185 (0.156-0.218) | 0.224 (0.185-0.274) | 0.257 (0.207-0.316) | 0.291 (0.227-0.364) | 0.328 (0.245-0.418) | 0.380 (0.274-0.493) | 0.421 (0.295-0.550) |
| 2-day | 0.064 (0.055-0.074) | 0.073 (0.063-0.085) | 0.089 (0.076-0.104) | 0.103 (0.088-0.120) | 0.124 (0.103-0.149) | 0.141 (0.114-0.171) | 0.159 (0.125-0.197) | 0.178 (0.134-0.225) | 0.205 (0.149-0.264) | 0.226 (0.160-0.293) |
| 3-day | 0.047 (0.040-0.054) | 0.053 (0.046-0.062) | 0.065 (0.056-0.075) | 0.075 (0.064-0.087) | 0.090 (0.075-0.108) | 0.102 (0.083-0.123) | 0.114 (0.090-0.141) | 0.128 (0.097-0.160) | 0.146 (0.107-0.187) | 0.161 (0.115-0.208) |
| 4-day | 0.038 (0.033-0.043) | 0.043 (0.037-0.050) | 0.052 (0.045-0.060) | 0.060 (0.052-0.070) | 0.072 (0.060-0.086) | 0.082 (0.067-0.098) | 0.092 (0.072-0.112) | 0.102 (0.078-0.127) | 0.116 (0.086-0.149) | 0.128 (0.091-0.165) |
| 7-day | 0.026 (0.022-0.029) | 0.029 (0.025-0.033) | 0.035 (0.030-0.040) | 0.040 (0.035-0.046) | 0.048 (0.040-0.056) | 0.054 (0.044-0.064) | 0.060 (0.048-0.073) | 0.067 (0.051-0.083) | 0.076 (0.056-0.096) | 0.083 (0.060-0.107) |
| 10-day | 0.021 (0.018-0.023) | 0.023 (0.020-0.026) | 0.028 (0.024-0.031) | 0.032 (0.027-0.036) | 0.037 (0.032-0.044) | 0.042 (0.035-0.050) | 0.047 (0.037-0.056) | 0.052 (0.040-0.064) | 0.059 (0.044-0.074) | 0.064 (0.047-0.082) |
| 20-day | 0.014 (0.012-0.016) | 0.016 (0.014-0.018) | 0.019 (0.016-0.021) | 0.021 (0.018-0.024) | 0.024 (0.021-0.028) | 0.027 (0.023-0.032) | 0.030 (0.024-0.036) | 0.033 (0.026-0.040) | 0.037 (0.028-0.046) | 0.040 (0.029-0.050) |
| 30-day | 0.012 (0.010-0.013) | 0.013 (0.011-0.014) | 0.015 (0.013-0.017) | 0.017 (0.015-0.019) | 0.020 (0.017-0.023) | 0.022 (0.018-0.025) | 0.024 (0.019-0.028) | 0.026 (0.020-0.031) | 0.029 (0.022-0.035) | 0.031 (0.023-0.039) |
| 45-day | 0.009 (0.009-0.011) | 0.011 (0.010-0.012) | 0.012 (0.011-0.014) | 0.014 (0.012-0.016) | 0.016 (0.014-0.018) | 0.018 (0.015-0.020) | 0.019 (0.016-0.023) | 0.021 (0.016-0.025) | 0.023 (0.017-0.028) | 0.024 (0.018-0.030) |
| 60-day | 0.008 (0.007-0.009) | 0.009 (0.008-0.010) | 0.011 (0.010-0.012) | 0.012 (0.011-0.014) | 0.014 (0.012-0.016) | 0.015 (0.013-0.018) | 0.017 (0.014-0.019) | 0.018 (0.014-0.021) | 0.019 (0.015-0.024) | 0.020 (0.015-0.025) |

[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 given duration and average 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 maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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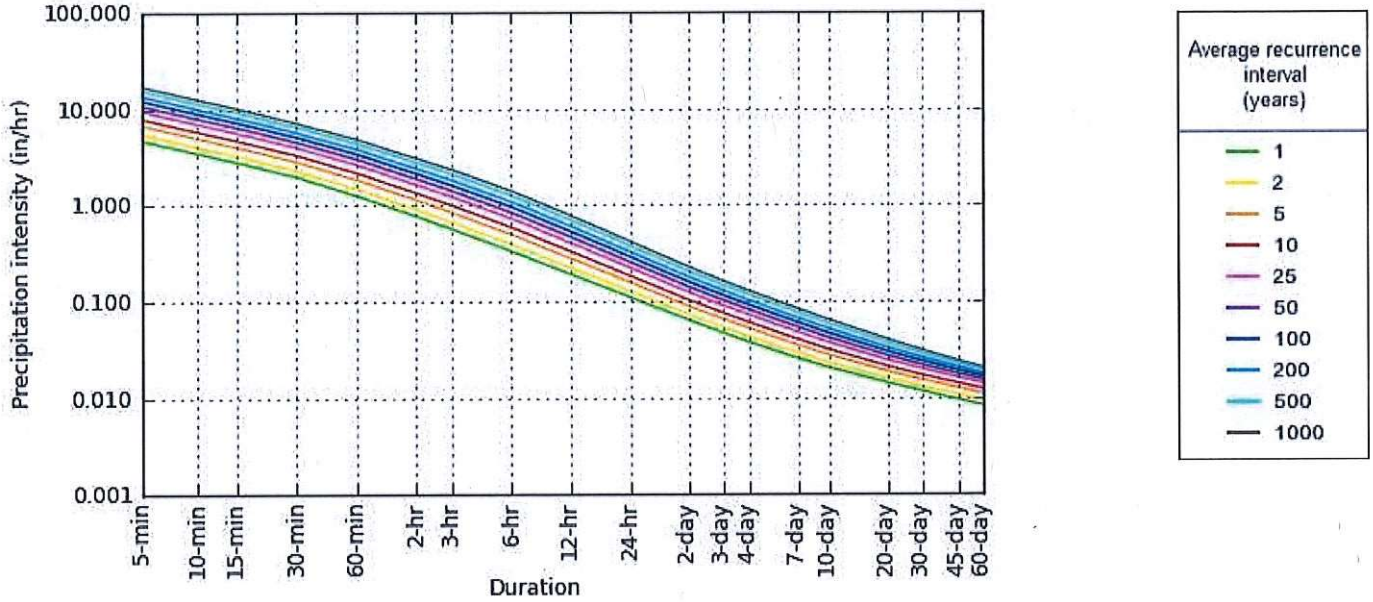
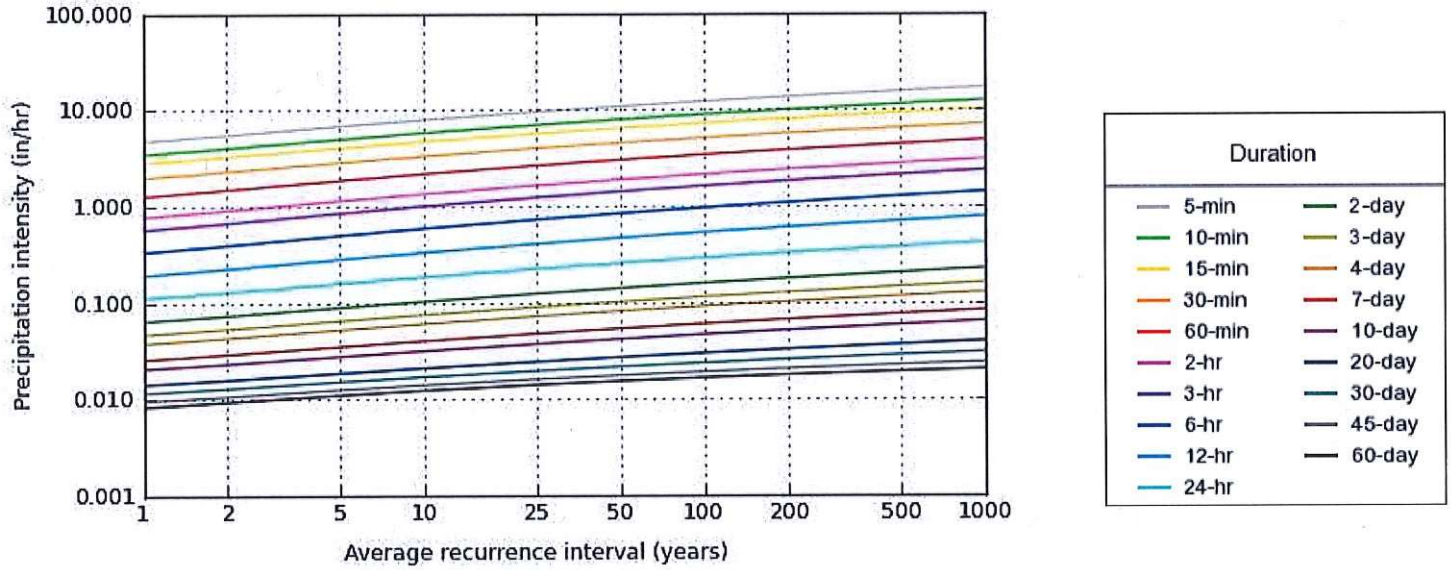
## PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 41.5984°, Longitude: -93.2340°

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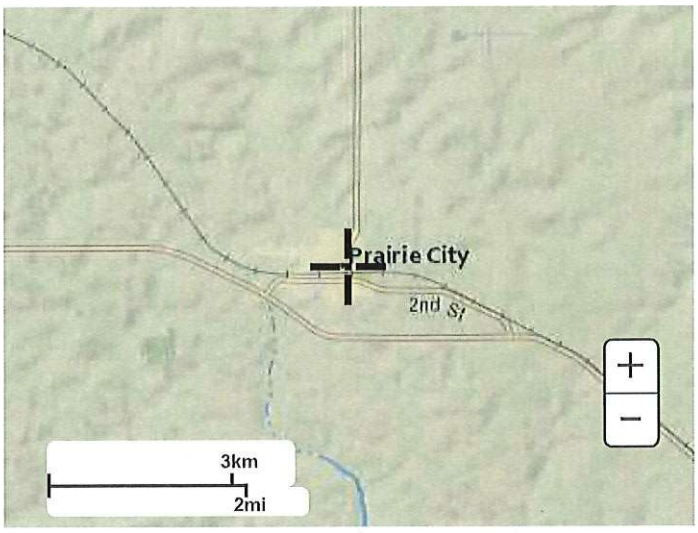
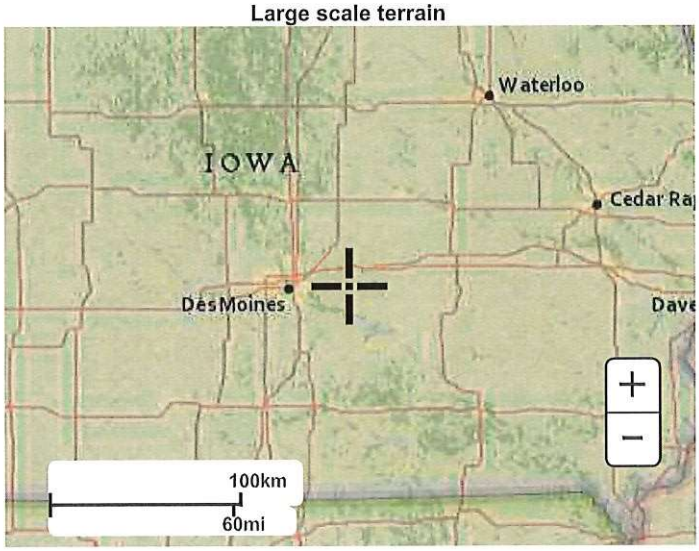
## Maps & aerials

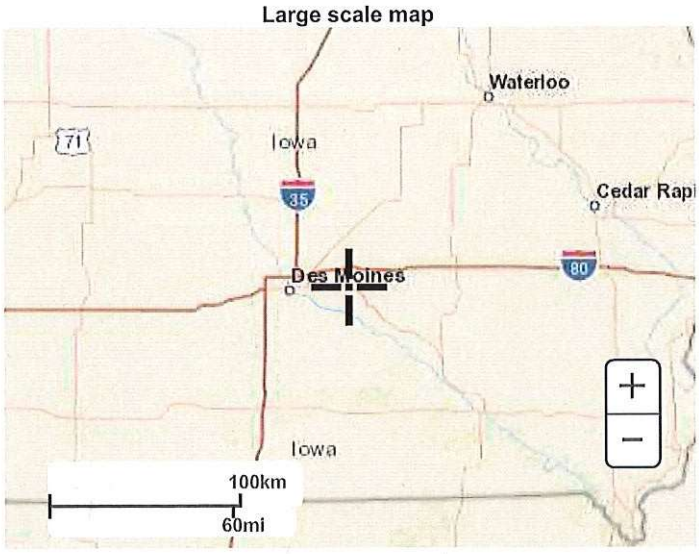
**Small scale terrain**



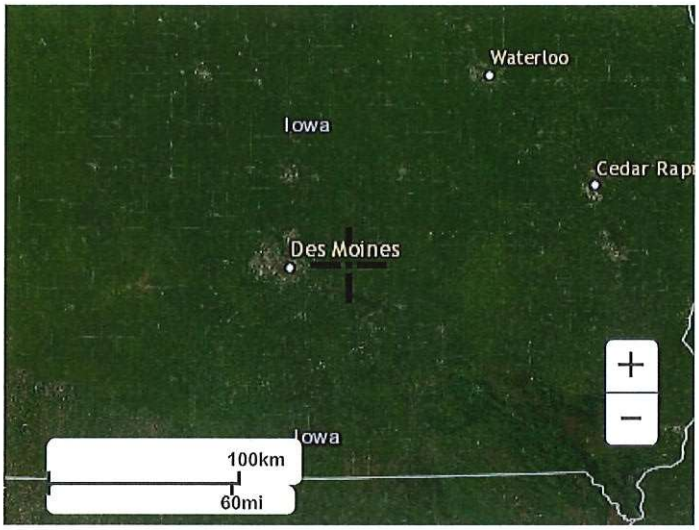

Large scale terrain




Large scale map




Large scale aerial

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