2011 Flood Event Long Range Projection June 2011

PURPOSE AND USE

This mapping is provided by the U.S. Army Corps of Engineers Kansas City District to assist communities within the Missouri River floodplain to plan and prepare for flooding that may be experienced from Rulo, Neb., to St. Louis, Mo., for an extended period of time. These maps are based on releases of 160,000 cubic feet per second from Gavins Point Dam (South Dakota) with a likely range of flows on the Missouri River that can be expected from normal precipitation patterns. An expected range of river stages were generated for each gage location along the Missouri River. A hydraulic model was used to generate water surface profiles from Rulo, Neb., to St. Charles, Mo., for the expected range of flows. The resulting water surface profiles are mapped to show an anticipated range of inundated areas based on this likely range of flows. Areas behind levees are shown as being inundated based solely on estimated overtopping elevations. Levees may fail before overtopping in some cases, resulting in more extensive flooding than shown. Areas shown as flooded between the levee and bluff line, and between the tie-back levees, are difficult to predict and will be highly dependent on local rainfall.

DISCLAIMER

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READING USNG LOCATIONS

The primary coordinate system displayed in these maps is the U.S. National Grid (USNG). A USNG location is composed of the world Grid Zone Designation (GZD), the two letter 100,000m grid ID, and the grid coordinate. To read USNG locations from these maps, locate the GZD and grid ID values at the bottom of each sheet. Then use the two-digit UTM principal digits displayed on the map. Ignore the small UTM superscript numbers that are provided for reference purposes. USNG coordinate strings can be 4, 6, 8, or 10 digits long; having coordinate precision of 1,000m, 100m, 10m or 1m. The left half of the coordinate string is the easting value and the right half is the northing value. The first two easting and northing digits should be the principal UTM digits as displayed on the map. Additional digits refine the accuracy of the coordinate pair. Additional resources pertaining to the USNG can be found at
http://www.fgdc.gov/usng/index.html

KEY SOURCES

Key sources compiled to produce these maps include:
•National Weather Service (NWS) http://www.nws.noaa.gov/oh/ahps/.
Current gate readings and gage forecasts are updated daily at this site
•United States Geological Survey (USGS) National Elevation Dataset (NED)
•USACE Modeling, Mapping, and Consequences Production Center (MMC), initial hydraulic model used by Omaha and Kansas City Districts to develop flood mapping
•USACE National Levee Safety Program National Levee Database (NLD), Federal and non-Federal levee locations and elevations

MAPPING NOTES

The coordinate system used in the preparation of this map is Universal Transverse Mercator (UTM), horizontal datum is NAD 83, GRS80 spheroid. Differences in datum, spheroid or projection used in the production of map sheets for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of these maps. Accuracy of the map scales for varying paper sizes is valid only if printed according to specification guidelines.

ADDITIONAL SOURCES

BACKGROUND DATA is provided via an online GIS Image server made available from ESRI. The data used in the street map series was developed by ESRI using ESRI basemap data, DeLorme basemap layers, Automotive Navigation Data (AND) road data, U.S. Geological Survey (USGS) elevation data, UNEP-WCMC parks and protected areas for the world, Tele Atlas Dynamap® and Multinet® street data for North America and Europe, and First American (CoreLogic) parcel data for the United States.

The World Imagery service used in the aerial photography map series is a compilation of imagery sources from around the world for use at various resolutions. United States imagery is was provided by NASA, i-cubed, U.S. Geological Survey (USGS), U.S. Department of Agriculture Farm Services Agency (USDA FSA), GeoEye, and Aerials Express.

INUNDATION ELEMENTS were created from the modeling effort for this event. Inundation boundaries were computed using one dimensional HEC-RAS software from the USACE Hydrologic Engineering Center.

The source of most BASEMAP ELEMENTS is USACE CorpsMap data, which is a compilation of prominent nationwide datasets. Below are the nationwide datasets used for the source of base map data and the layers extracted from each:

-Homeland Security Infrastructure Program (HSIP): Airports, Heliports, Bridges, Bulk Petroleum Storage, Communication Facilities, Chemical Use Sites, Electric SubStations, Electric Generating Plants, EMS, Fire Stations, Health Care Facilities, Intermodal Shipping Facility, Police Stations, Schools, Railways, Waste Water Treatment and Municipality Boundaries.
-Environmental Systems Research Institute (ESRI): County, State, and International boundaries.
-FEMA Hazus data 2009 release: Emergency operations centers and potable water facilities.
-USACE AGC National Inventory of Dams (NID): USACE Dams, and Non-USACE Dams
-National Geospatial-Intellegence Agency (NGA): MGRS/USNG Grid
SHEET INDEX map sheets are derived from the USGS 7.5' Quadrangle Index.

INUNDATION ELEMENTS

*See Purpose and Use and Disclaimer

Lower Flow Scenario - Flow estimates are based on 160,000 cfs release from Gavins Point Dam, and assuming typical seasonal runoff

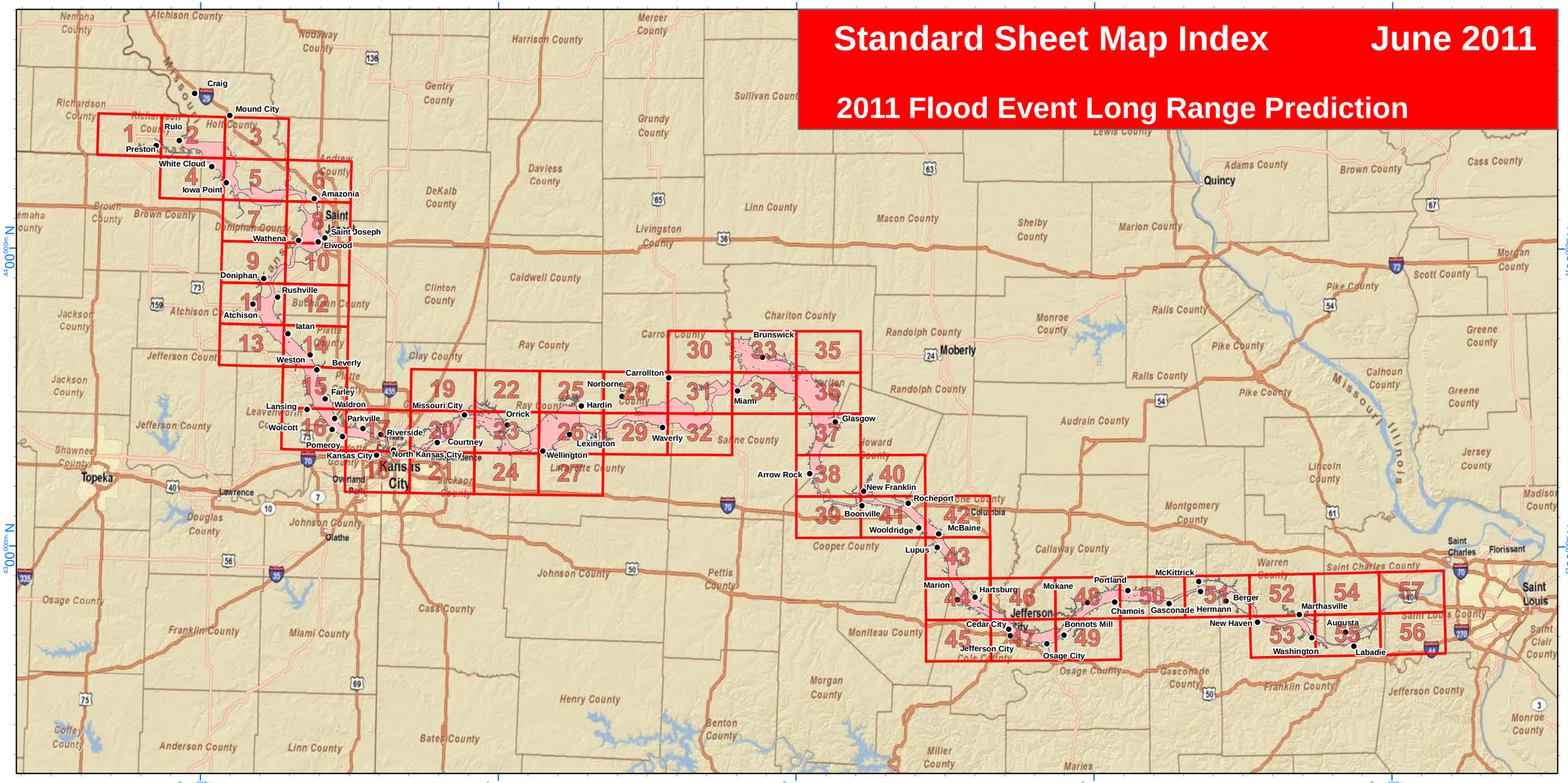
Higher Flow Scenario - Flow estimates are based on 160,000 cfs release from Gavins Point Dam, and assuming runoff experienced during June and July from 2007 - 2010

BASE MAP ELEMENTS

- Federal Levee
- Non-Federal Levee
- County Boundary
- State Boundary
- International Boundary
- Minor Roads
- State Highway or Major Road
- Interstate or US Highway
- Railway Lines
- Pipelines
- Bridges
- Gages
- Chemical Use Sites
- EMS
- Schools
- Communication Facilities
- Airports
- Heliports
- Emergency Operations Centers
- Police Stations
- Fire Stations
- Health Care Facilities
- Potable Water Facilities
- Electric Substations
- Electric Generating Plants
- Intermodal Shipping Facility
- Bulk Petroleum Storage
- Wastewater Treatment

Standard Sheet Map Index June 2011

2011 Flood Event Long Range Prediction



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0 5 10 20 30 40 Miles

Click on the sheet number to open individual maps

Interactive maps available at http://www.nwk.usace.army.mil

Inundation Area

Higher Flow Scenario

Note: Flow estimates are based on 160,000 cfs release from Gavins Point Dam, and assuming runoff experienced during June and July from 2007 - 2010

Base Map Elements

Sheet Extents

Minor Roads

Interstate or US Highway

State Highway or Major Road

N

FIM

2011 Flood Event

FLOOD INUNDATION MAP

Estimated Range of Inundation Scenarios Begining June

US Army Corps of Engineers ®
Kansas City District

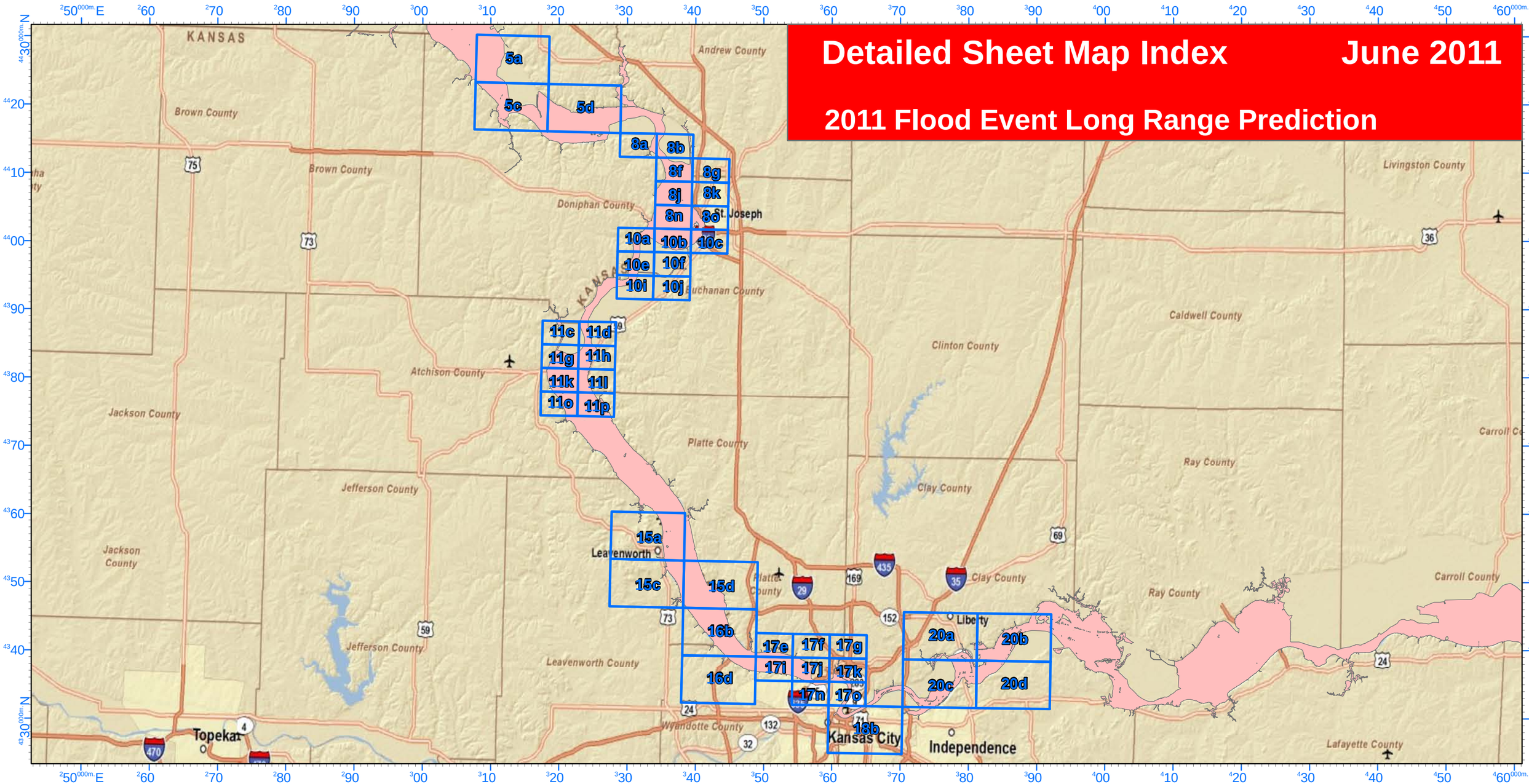
US Army Corps of Engineers ®
Kansas City District

MMC PRODUCTION CENTER
Modeling | Mapping | Consequences

Detailed Sheet Map Index

June 2011

2011 Flood Event Long Range Prediction



0 5 10 20 30 40 Miles

8 Click on the sheet number to open individual maps

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Inundation Area

Higher Flow Scenario

Note: Flow estimates are based on 160,000 cfs release from Gavins Point Dam, and assuming runoff experienced during June and July from 2007 - 2010

Base Map Elements

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N

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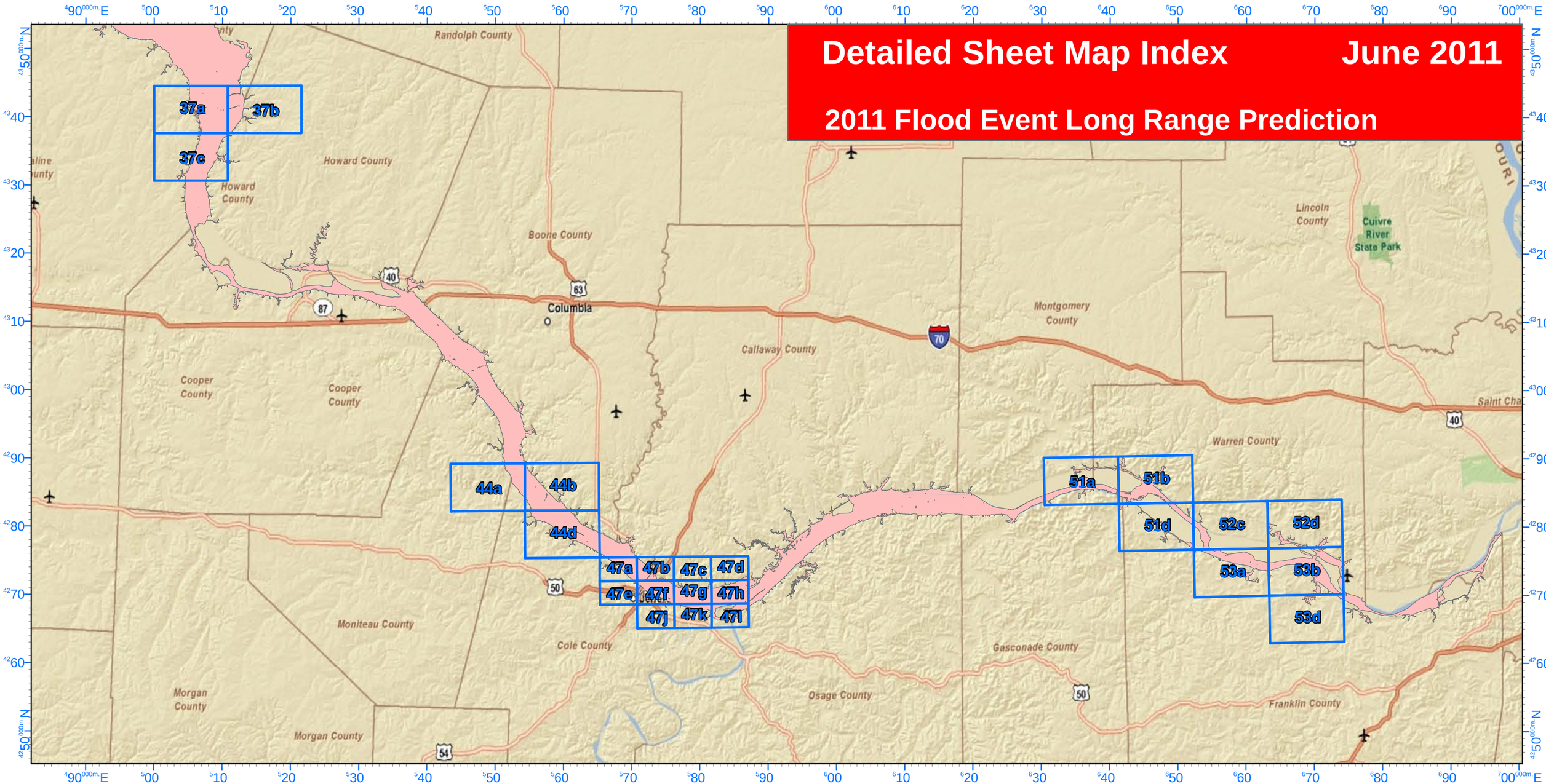
FIM	2011 Flood Event
FLOOD INUNDATION MAP	Estimated Range of Inundation Scenarios Begining June US Army Corps of Engineers ® Kansas City District

Detailed Sheet Map Index June 2011

2011 Flood Event Long Range Prediction



US Army Corps of Engineers ®
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0 5 10 20 30 40 Miles

8 Click on the sheet number to open individual maps

Interactive maps available at http://www.nwk.usace.army.mil

Inundation Area

Higher Flow Scenario

Note: Flow estimates are based on 160,000 cfs release from Gavins Point Dam, and assuming runoff experienced during June and July from 2007 - 2010

Base Map Elements

12 Sheet Extents

Minor Roads

Interstate or US Highway

State Highway or Major Road

N

FIM | 2011 Flood Event

FLOOD INUNDATION MAP

Estimated Range of Inundation Scenarios Begining June

US Army Corps of Engineers ®
Kansas City District

Reading US National Grid (USNG) Coordinates: *"Read right, then up."*

Information Sheet 1 in this series. FGDC-STD-011-2001 From www.fgdc.gov/usng

The example below locates the Jefferson Pier at USNG: 18S UJ 23371 06519.

U.S. National Grid
100,000-m Square ID
UJ
43 00
UH
Grid Zone Designation 18S

A USNG value has three components.

Some maps may give this leading information in a grid reference box.

Grid Zone Designation (GZD): 6° x 8° longitude zone / latitude band.

100,000-m Square Identification:

18S UJ 2337 0651

Grid Coordinates: Read *right*, then *up*.

"Read right, then up."

- Grid lines are identified by Principal Digits. Ignore the small superscript numbers like those in the lower left corner of this map.

07

Reading USNG Grid Coordinates.

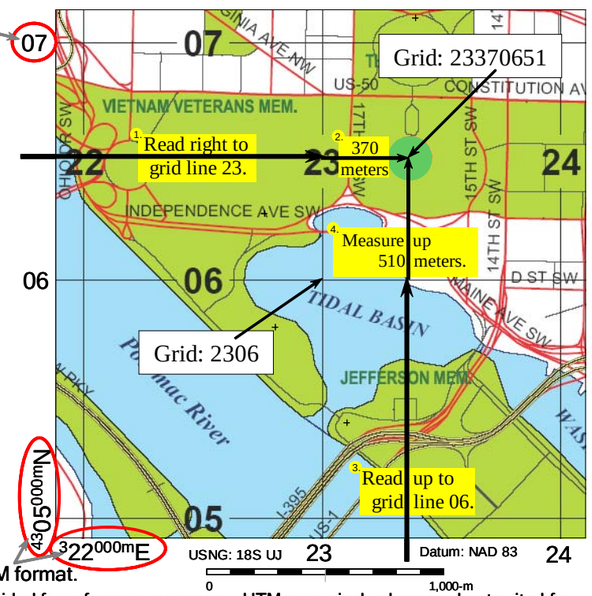
- Coordinates are always given as an even number of digits (i.e. 23370651).

- Separate coordinates in half (2337 0651) into the easting and northing components.

- [1] Read right to grid line 23. [2] Then measure right another 370 meters. (Think 23.37)

- [3] Read up to grid line 06. [4] Then measure up another 510 meters. (Think 06.51)

Grid:	Examples:
228058	FDR Memorial:
231054	George Mason Memorial:
2338 0710	Zero Milestone:
2275 0628	DC War Memorial:
213017	Ft. Scott Park:



N 43 05 000m

E 3 22 000m

UTM format.

Ignore the small UTM superscript numbers that are provided for reference purposes. UTM numerical values are best suited for determining direction and distance as in surveying. USNG alpha-numeric values are best suited for describing particular locations because they can be given as only grid coordinates and with only the precision required for a particular task.

Users determine the required precision. These values represent a point position (southwest corner) for an area of refinement.

Four digits:	23 06	Locating a point within a 1,000-m square.
Six digits:	233 065	Locating a point within a 100-m square (football field size).
Eight digits:	2337 0651	Locating a point within a 10-m square (modest size home).
Ten digits:	23371 06519	Locating a point within a 1-m square (parking space size).

A modest size home can be found or identified in a local area with only an 8-digit grid.

Full USNG: 18S UJ 2337 0651 - World wide unique.

Without Grid Zone Designation (GZD): UJ 2337 0651 - Regional areas.

Without GZD and 100,000-m Square ID: 2337 0651 - Local areas.

This illustrates how USNG coordinates can be used in a phone directory or advertisement like a universal map index value. Unlike classic atlas grids (i.e. B3), these can be used with any paper map using the national grid and in web map portals such as the Washington, DC GIS (http://dcgis.dc.gov) or The National Map. (http://nmviewogc.cr.usgs.gov/viewer.htm)

They can also be used in consumer GPS receivers to directly guide you to the location. This is especially beneficial at night, in heavy traffic, or after major disasters when street signs are missing.

Point of Interest	Street Address	USNG Grid: 18S UJ	Telephone: (202)
Subway Sandwich & Salads	2030 M St., NW	2256 0826	223-2587
Subway Sandwich & Salads	430 8th St., SE	2698 0567	547-8200
Subway Sandwich & Salads	3504 12th St., NE	2740 1120	526-5999
Subway Sandwich & Salads	1500 Benning Rd, NE	2815 0757	388-0421

US National Grid (USNG) Coordinates: *World wide context.*

Information Sheet 2 in this series. FGDC-STD-011-2001 From www.fgdc.gov/usng

The example below locates the Jefferson Pier at USNG: 18S UJ 23371 06519.

U.S. National Grid
100,000-m Square ID
UJ
43 00
UH
Grid Zone Designation 18S

A USNG value has three components.

Some maps may give this leading information in a grid reference box.

Grid Zone Designation (GZD): 6° x 8° longitude zone / latitude band.

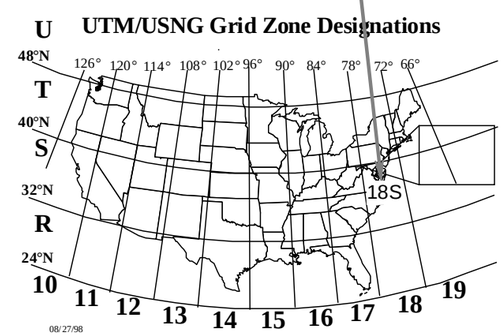
100,000-m Square Identification:

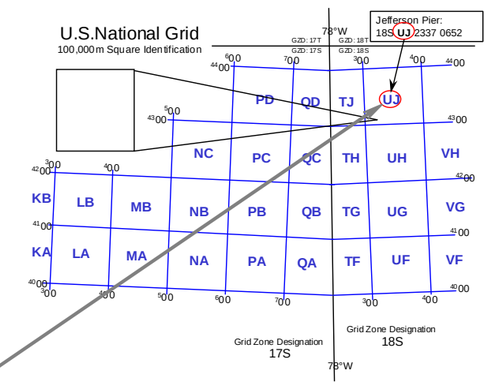
18S UJ 2337 0651

Grid Coordinates: Read *right*, then *up*.

"Read right, then up."

USNG values have three components as seen above. The Grid Zone Designation gives a USNG value world-wide context with 60 longitudinal zones each 6° wide. Zones 10 - 19 cover the conterminous US as seen below left. Zones are divided into 8° latitudinal bands. Together these zones and bands compose Grid Zone Designations. Example: 18S

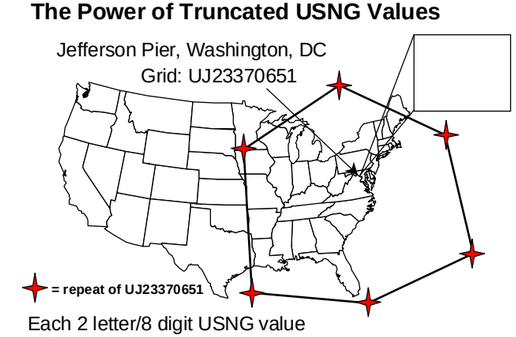




100,000-m Square Identifications
Example: UJ

GZDs are further subdivided into 100km x 100km squares with 100,000-m Square Identifications. In this example, the Jefferson Pier is located in UJ. These squares are organized and lettered so they do not repeat themselves but every 18°, which is approximately 1,000 miles in the mid-latitudes. The illustration at right depicts how far one must go before the letters UJ repeat. This ensures a given value such as UJ 2337 0651 is unique out of the entire state it is located in - as well as all surrounding states - with the exception of Alaska.

The Power of Truncated USNG Values



Each 2 letter/8 digit USNG value (10-m posting) in the outlined area is unique.

In general, people in a local community use the grid coordinates alone--for example: 233 065. The same numbers recurs about every 60 miles, normally that will cause no problem when the general location is understood. This is similar to the way you tell someone only the last digits of a phone number when the area code is obvious. If there is a possibility of confusion include the letter pair too - for example: UJ 233 065. A letter pair recurs about every 1000 miles, so even in a disaster relief project there will be no other point with those coordinates nearby. Full USNG coordinates such as 18S UJ 233 065 are worldwide unique. Typically a GPS or other electronic device requires coordinates in that form since unlike a human it doesn't intuitively understand the general location from context. You should always give full coordinates whenever abbreviated coordinates might not be clear or when listing them on letterhead, a business card or advertisement.