Virtual Training:

Applying USNG for Decision Support in Search and Rescue

January 21, 2016

NAPSG Foundation in partnership with National Association for Search & Rescue

Instructor Introductions

Paul J. Doherty

Search and Rescue GIS

National Alliance for Public Safety GIS Foundation

Bryan Enberg

Director of Education

National Association for Search And Rescue

NASAR: Who We Are

NAPSG: Who We Are

- **Our Vision** - A Nation of emergency responders and leaders equipped with the knowledge and skills in applying technology and data to change the outcome for survivors.

- **Our Mission** - To equip emergency management & public safety with the knowledge, skills, and resources to apply decision support technology and data in enhancing preparedness and building a more resilient nation.

Background

- 501 (c) (3) Not-for-Profit Organization
- Board of Directors are public safety practitioners
- NAPSG formed in 2005 as informal alliance of national associations
- Evolved to a formal organization to better serve public safety

Training Purpose

Provide awareness level training on how to use the US National Grid (USNG) to support search & rescue missions.

- Hands-on skills for using the USNG as a point and area reference system that provides actionable location information in a uniform format
- Highlight best practices and lessons learned from the field
- Achieve consistent situational awareness across SAR teams and multiple agencies during an incident

Training Objectives

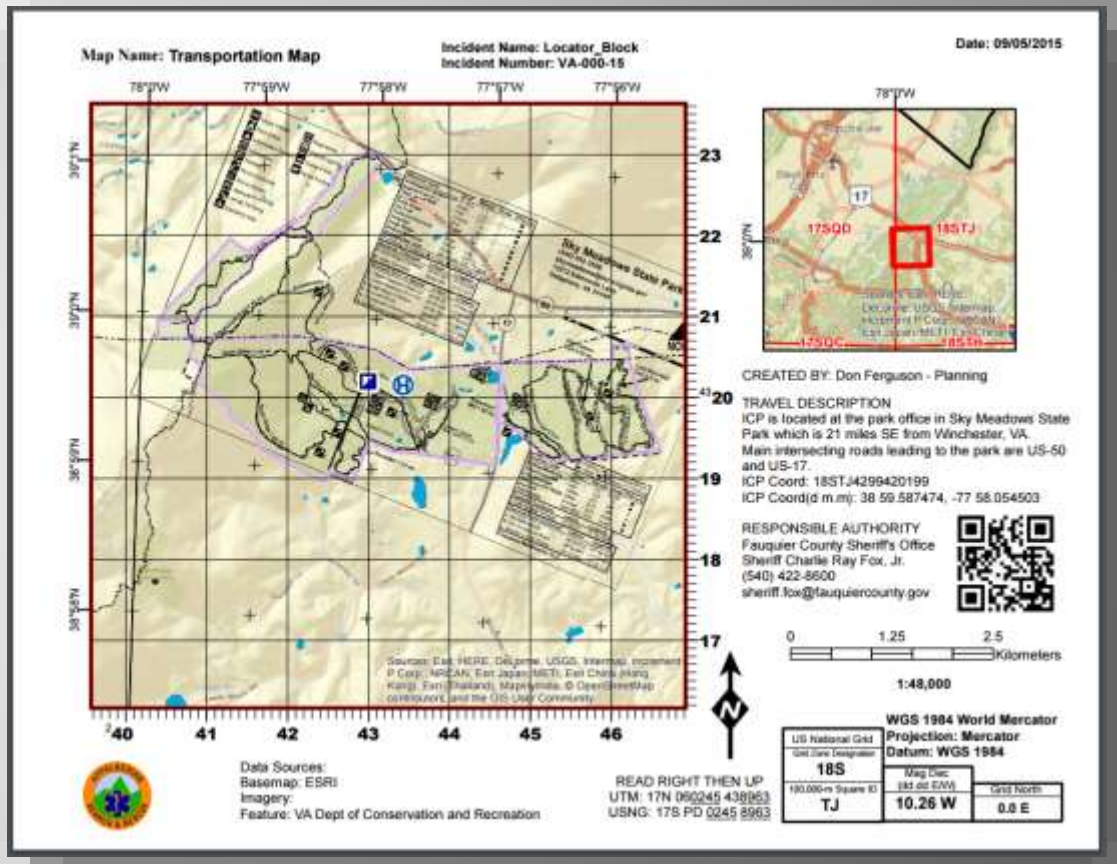
- **Learn how** to apply USNG-enabled decision support tools to enhance coordination during SAR operations
- **Gain insights** from real-world incidents where USNG was successfully used to support SAR operations
- **Explore** the use of USNG and GIS in Search & Rescue operation workflows
- **Learn about** the suite of existing USNG and GIS decision support tools already available

Key Terminology

- **US National Grid (USNG):** A common location area and point reference language for ground and ground/air operations.
- **Geographic Information Systems (GIS):** a system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data.
- **Search & Rescue (SAR):** The search for and provision of aid to people who are in distress or imminent danger.

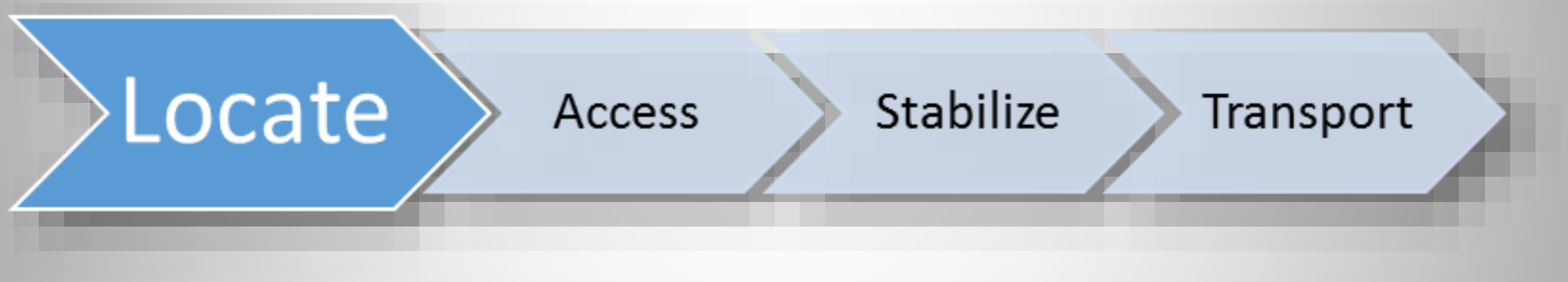
Agenda

- **Why use US National Grid (USNG)?**
- **Learn how to apply USNG**
  - Point Reference
  - Area Reference
  - Decision Support



Search and Rescue

- Search and Rescue (SAR), whether Urban or Wildland, is an inherently spatial problem…



Problem

A story map

Missing Coordinates and Missing People

June 2009 - SPOT Activation Response

In June 2009, Kat, a young woman on a solo hike at 11,000 feet in the Sierra Nevada mountains of California, was rapidly losing strength and coordination as a result of hypothermia. She had a SPOT emergency locator device with her and decided her condition was critical enough that she activated the emergency button. The next day, Kat hiked out of the mountains, wet but alive. An interview determined that the search was carried out 20 miles north of her actual location.

What went wrong?
Decimal degree coordinates may have been entered into a software interface box for degree minute seconds.

For more details read the whole story: Using GIS for Wildland Search and Rescue (Page 27)

What went wrong?

"Decimal degree coordinates may have been entered into a software interface box for degree minute seconds…"

http://arcg.is/1O7clZJ

Solution

- Use the US National Grid for all operations and trainings
- Engage with local GIS Specialists* to help you with day-to-day operations
  - Invite them to a training event or meeting?
  - Build hasty mapping tools and map books responders can use
  - Setup a Memorandum of Understanding (MoU) for disaster response *before* the next local disaster

**NAPSG Foundation Regional Leadership Teams*
http://www.napsgfoundation.org/about/regional-leadership-teams/

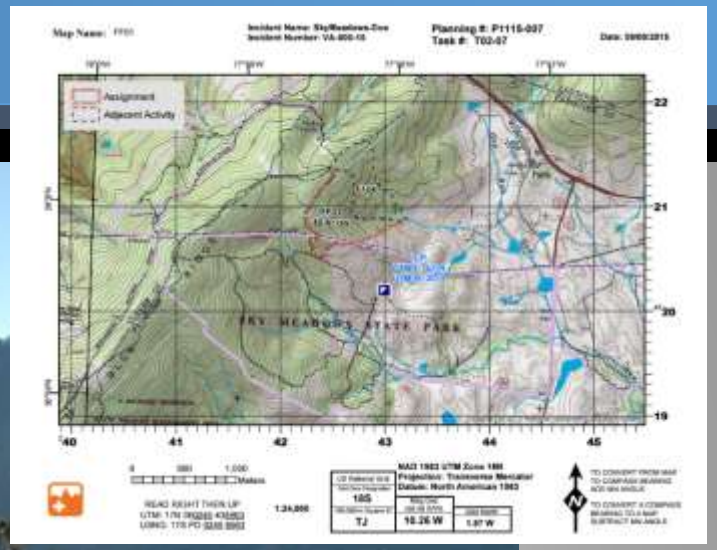
Why Use USNG?

- The USNG:
  - Provides a **UNIFIED** language for defining Areas of Interest, reporting & planning and navigation.
  - Transforms data to **ACTIONABLE** information in a **UNIFORM** format.
  - Provides a **CONSISTENT** situational awareness across jurisdictions, disciplines & all levels of operations.
  - **INTEROPERABILITY** in both connected and disconnected environments

Why Use USNG?

FEMA Urban Search and Rescue (NE TF1) team members search house to house for survivors in tornado devastated neighborhood in Moore, Oklahoma. Andrea Booher/FEMA

Why Use USNG?



Yosemite National Park – A Mountain Rescue Team plans a technical rescue mission on El Capitan. David Pope/NPS

Why Use USNG?

The 2013 Colorado Floods demanded the coordination of diverse Search & Rescue resources. Sgt. Joseph K. VonNida / USDOD

Why Use USNG?

- Haiti
- Japan
- Joplin

Implementing A Common Frame of Spatial Reference For Homeland Security, Emergency/Disaster Response, Recovery, and Mitigation
The U.S. National Grid (USNG)

From the Hurricane Andrew GIS Coordinator's after-action report to the Center for Army Lessons Learned, 10/06/92

"General information type maps with no UTM grid, in an disaster environment without street signs, few recognizable landmarks with no response specific data were very nearly useless… An actual accounting of all the requests for emergency assistance that went without, or the delay encountered by the countless movements of personnel, food, and equipment will likely never accurately be tallied…."

(USNG is based upon UTM.)

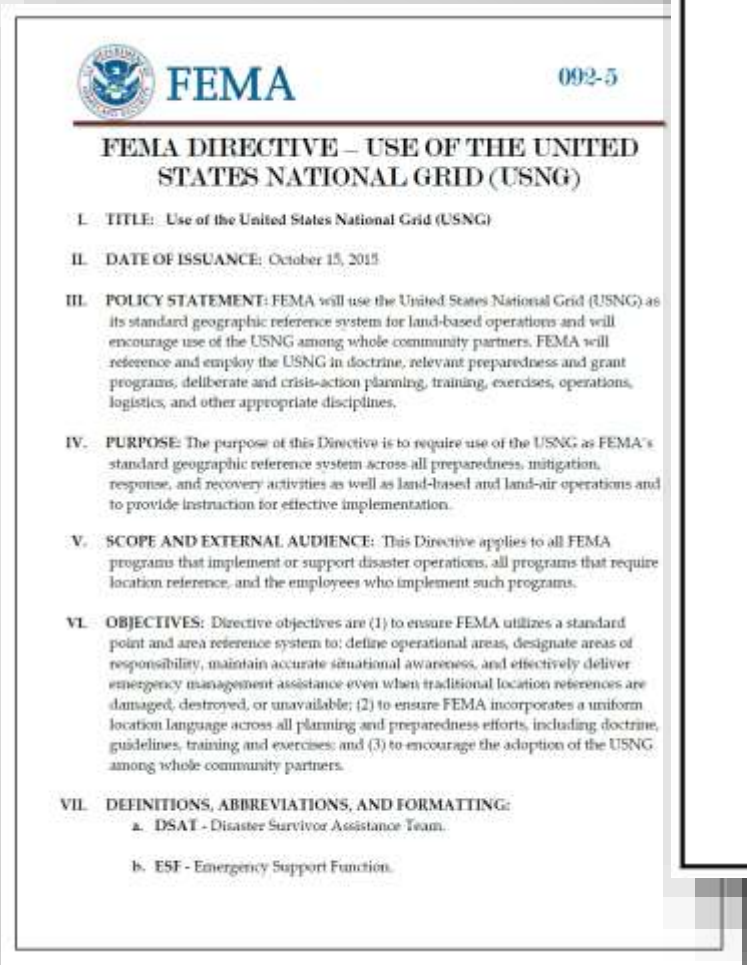
The Same (Map) Sheet of Music: Following the troubled 1992 Hurricane Andrew response, the U.S. Military in its 1993 "capstone doctrine" for domestic support operations (FM 100-19) termed the

- Irene
- Sandy
- Colorado Floods
- Capstone 2014

Nearly every after action report, post any large scale or regional disaster clearly indicates the need for a common grid

Why Use USNG?

- It is a Standard
  - Land SAR Addendum
  - National Search and Rescue Manual-Catastrophic Incident Search and Rescue (CIS) Addendum.
  - FEMA 092-5



FEMA 092-5

FEMA DIRECTIVE – USE OF THE UNITED STATES NATIONAL GRID (USNG)

I. TITLE: Use of the United States National Grid (USNG)

II. DATE OF ISSUANCE: October 15, 2015

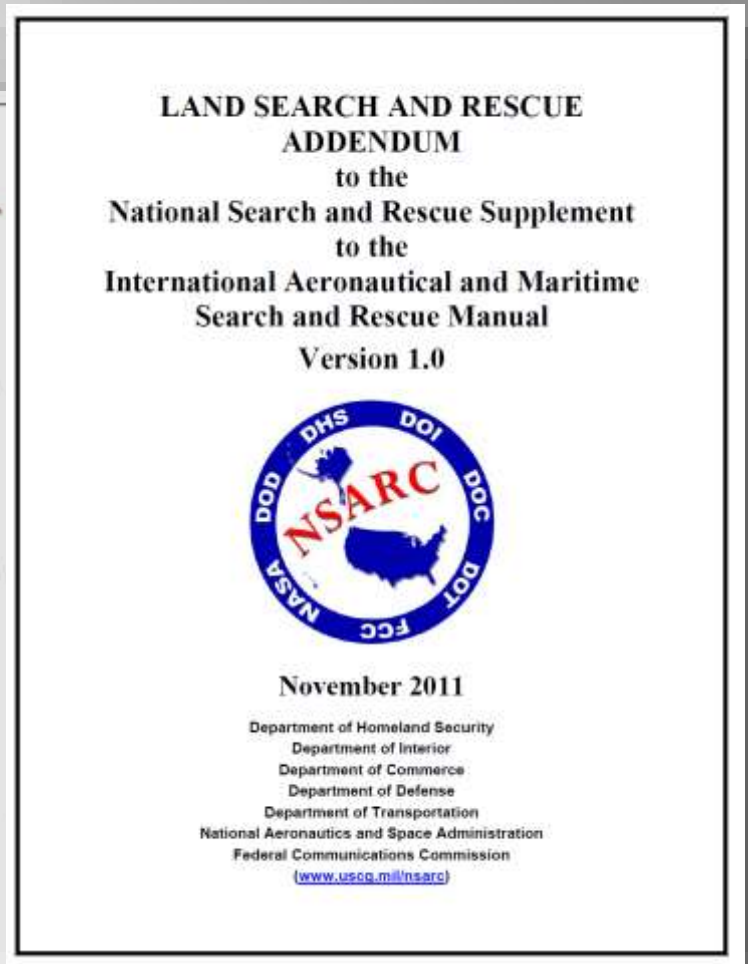
III. POLICY STATEMENT: FEMA will use the United States National Grid (USNG) as its standard geographic reference system for land-based operations and will encourage use of the USNG among whole community partners. FEMA will reference and employ the USNG in doctrine, relevant preparedness and grant programs, deliberate and crisis-action planning, training, exercises, operations, logistics, and other appropriate disciplines.

IV. PURPOSE: The purpose of this Directive is to require use of the USNG as FEMA's standard geographic reference system across all preparedness, mitigation, response, and recovery activities as well as land-based and land-air operations and to provide instruction for effective implementation.

V. SCOPE AND EXTERNAL AUDIENCE: This Directive applies to all FEMA programs that implement or support disaster operations, all programs that require location reference, and the employees who implement such programs.

VI. OBJECTIVES: Directive objectives are (1) to ensure FEMA utilizes a standard point and area reference system to: define operational areas, designate areas of responsibility, maintain accurate situational awareness, and effectively deliver emergency management assistance even when traditional location references are damaged, destroyed, or unavailable; (2) to ensure FEMA incorporates a uniform location language across all planning and preparedness efforts, including doctrine, guidelines, training and exercises; and (3) to encourage the adoption of the USNG among whole community partners.

VII. DEFINITIONS, ABBREVIATIONS, AND FORMATTING:
a. DSAT - Disaster Survivor Assistance Team.
b. ESF - Emergency Support Function.



LAND SEARCH AND RESCUE ADDENDUM
to the
National Search and Rescue Supplement
to the
International Aeronautical and Maritime Search and Rescue Manual
Version 1.0

November 2011

Department of Homeland Security
Department of Interior
Department of Commerce
Department of Defense
Department of Transportation
National Aeronautics and Space Administration
Federal Communications Commission
(www.uscg.mil/nsarc)

How do we communicate and find point coordinates?

USNG for Point Reference

Cole Brown

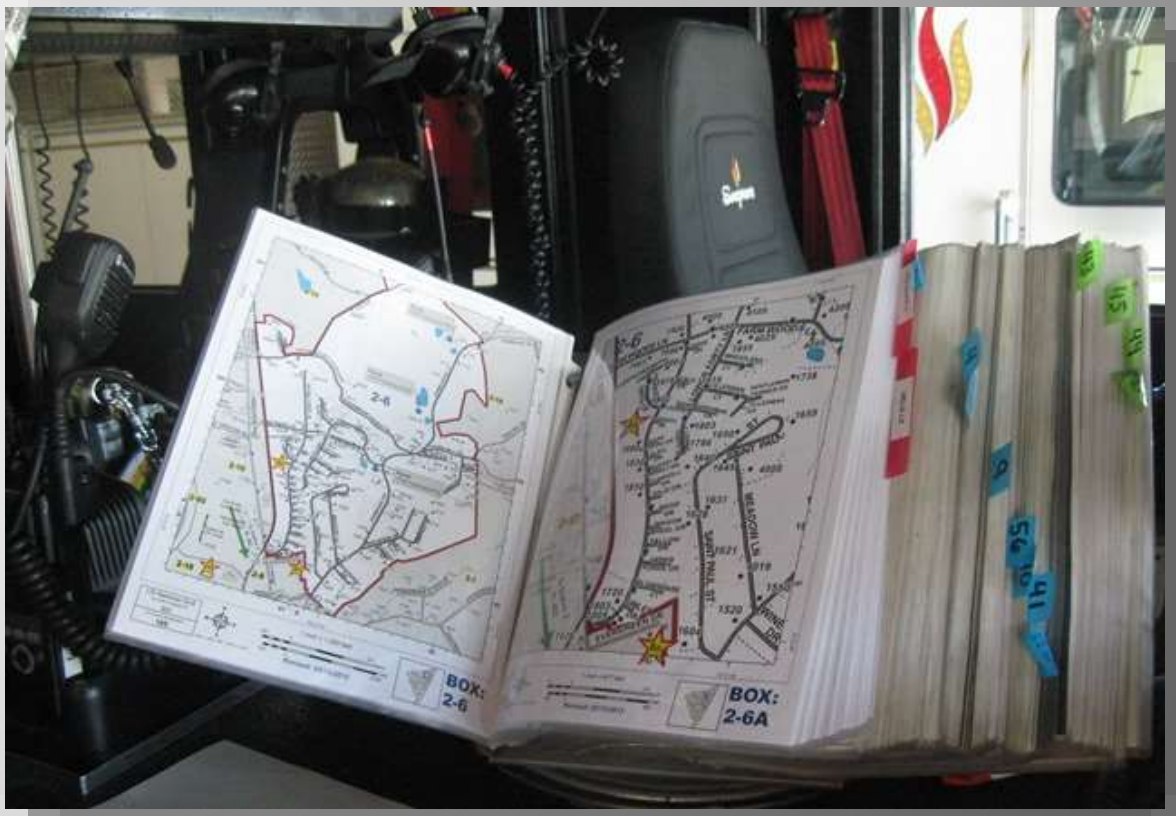
- Maryland State Police Special Operations Division
- Uses US National Grid for Law Enforcement, SAR, and Fire

Why Use USNG?

- A search team that needs to direct a rescue team into an unfamiliar area or an area that has no street signs

USNG as a Point Reference

- Implementing USNG is not hard
  - Especially if you are already using Universal Transverse Mercator
  - IT IS EASY TO USE!! Military has been using it since 1949. +65 yrs of history (Military Grid Reference System).



The Hampstead Volunteer Fire Department Map Book is US National Grid enabled.

USNG as a Point Reference

The Three Components of USNG Coordinates

18S UJ 2337 0651

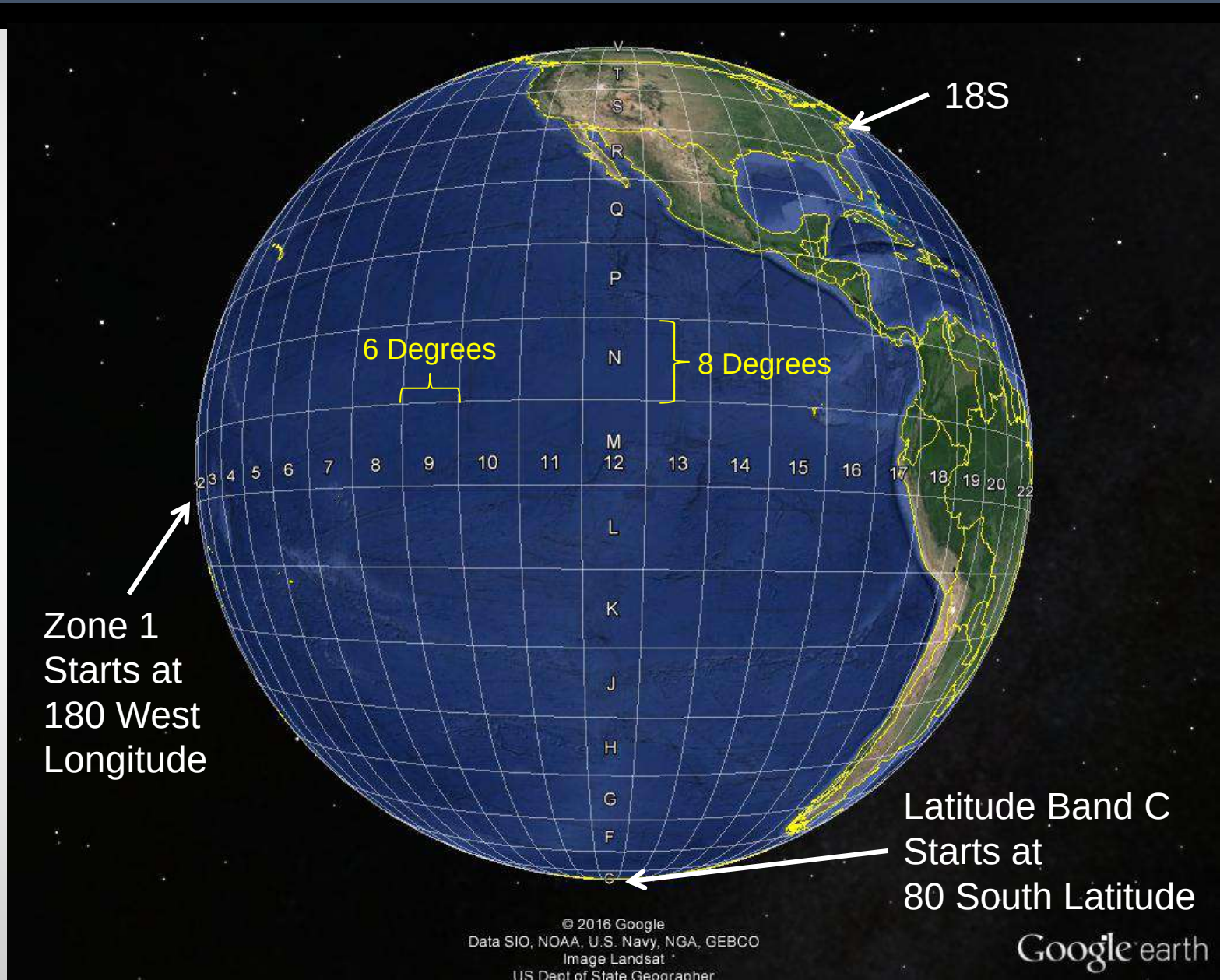
Grid Zone Designation (GZD)
6° x 8° longitude zone / latitude band

100,000-m Square Identification

Grid Coordinates

18 S UJ 2337 0651

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

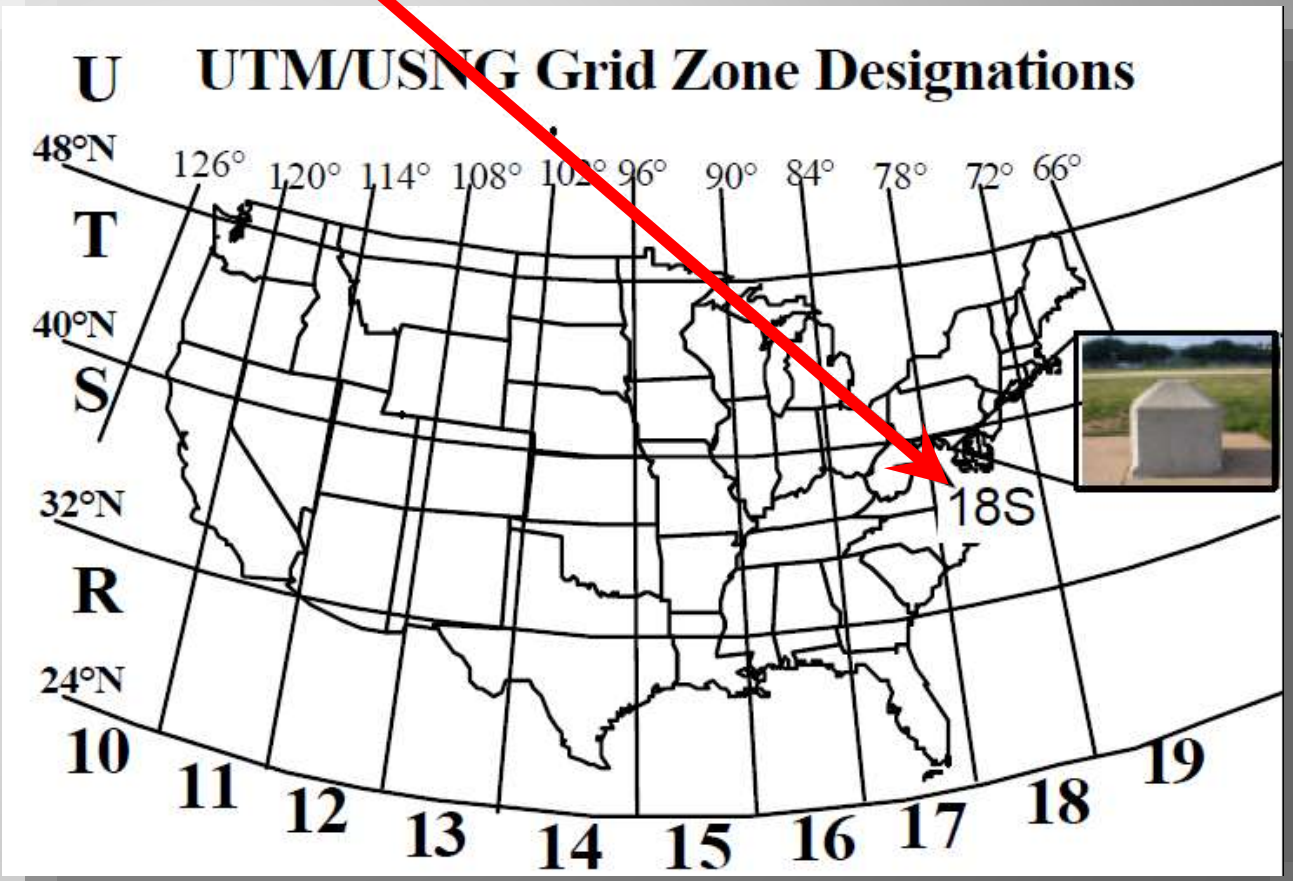


Grid Zone Designation (GZD)

- The World is divided into 6 - degree wide longitudinal zones designated by a number and 8-degree latitudinal bands designated by a letter.

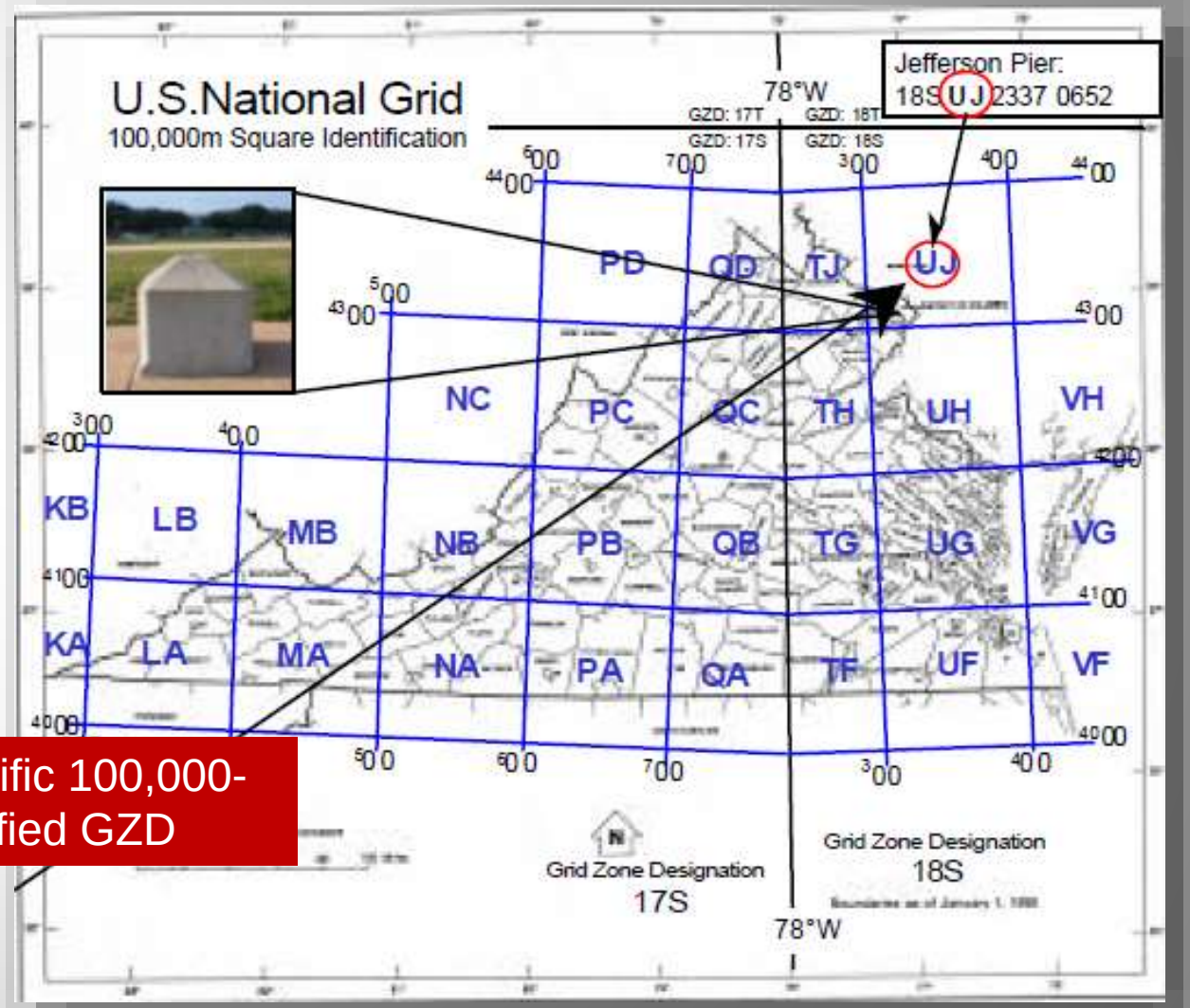
- United States is within Zones 10 thru 19 and Latitude bands of R thru U.

Example: **18S**



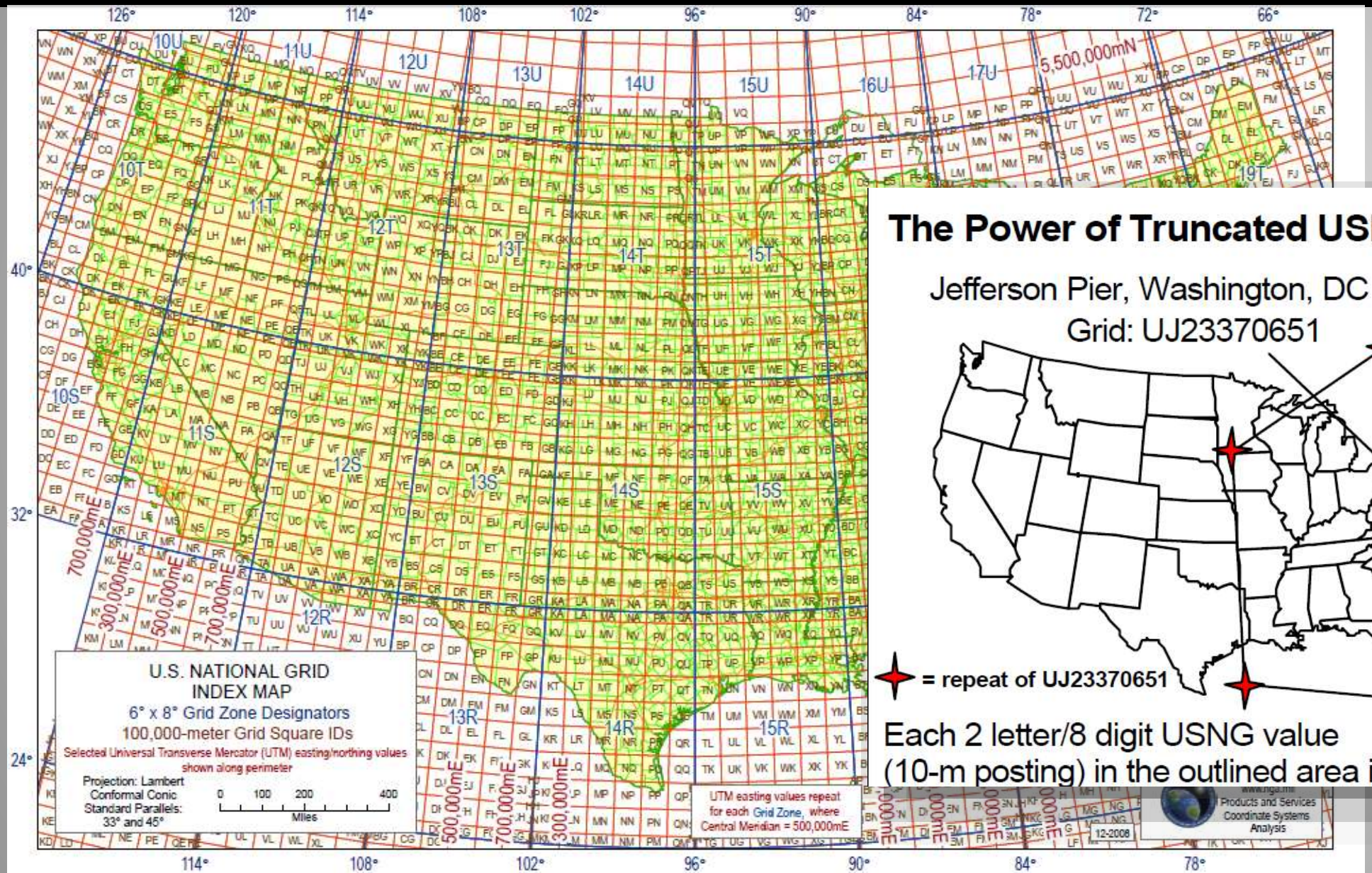
100,000 Meter Square Identification

- Each GZD is further broken into 100,000-meter squares where a two-letter designator that identifies each square.



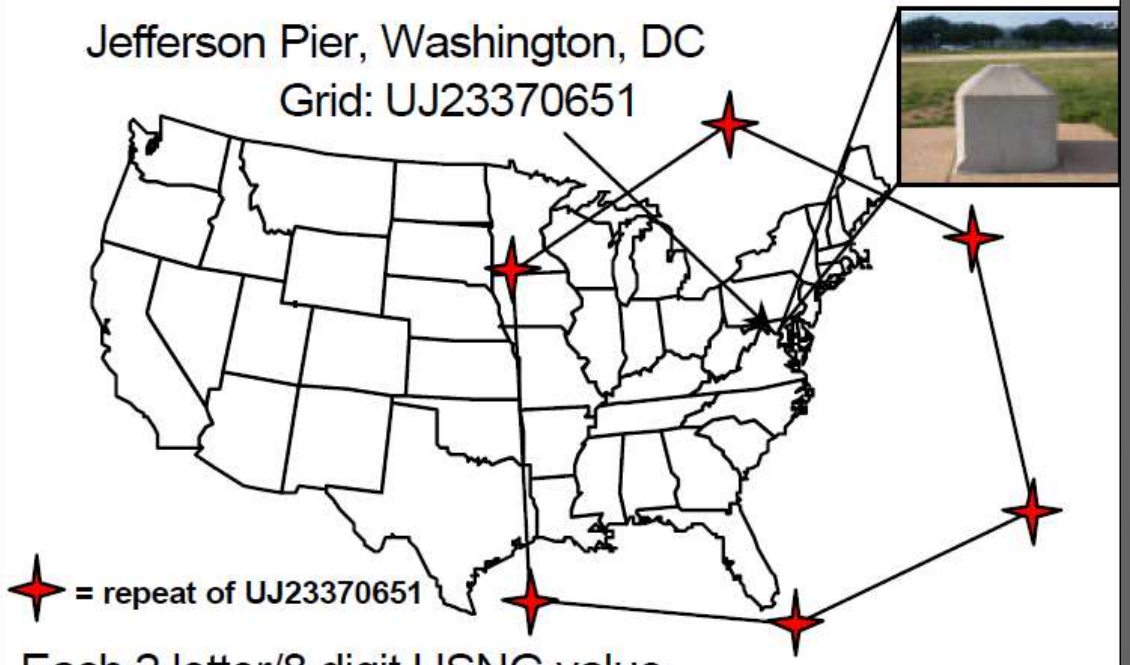
18SUJ – Identifies a specific 100,000-meter square in the specified GZD

100,000 Meter Square Identification



The Power of Truncated USNG Values

Jefferson Pier, Washington, DC
Grid: UJ23370651



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

100,000 Meter Square Identification

Grid Reference Box (Printed On Map)

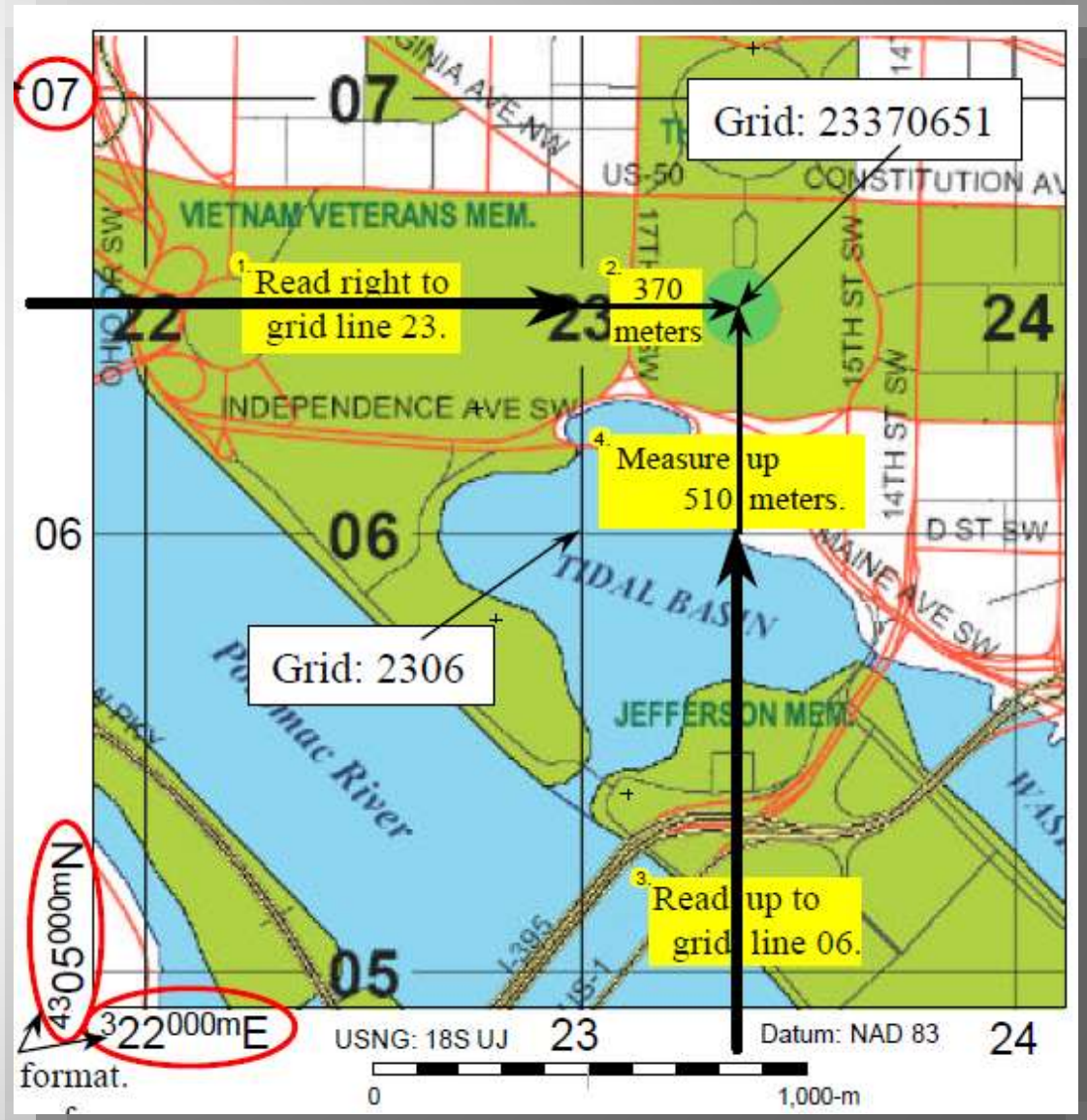
Methods for depicting Grid Zone Designations and USNG 100,000-meter square identifications for a map within a Grid Reference Box.

This map sheet covers two 100,000 meter square designations- TJ & UJ within 18S.

This map sheet coverage is over two Grid Zone Designations (GZD) – 18T & 18S.

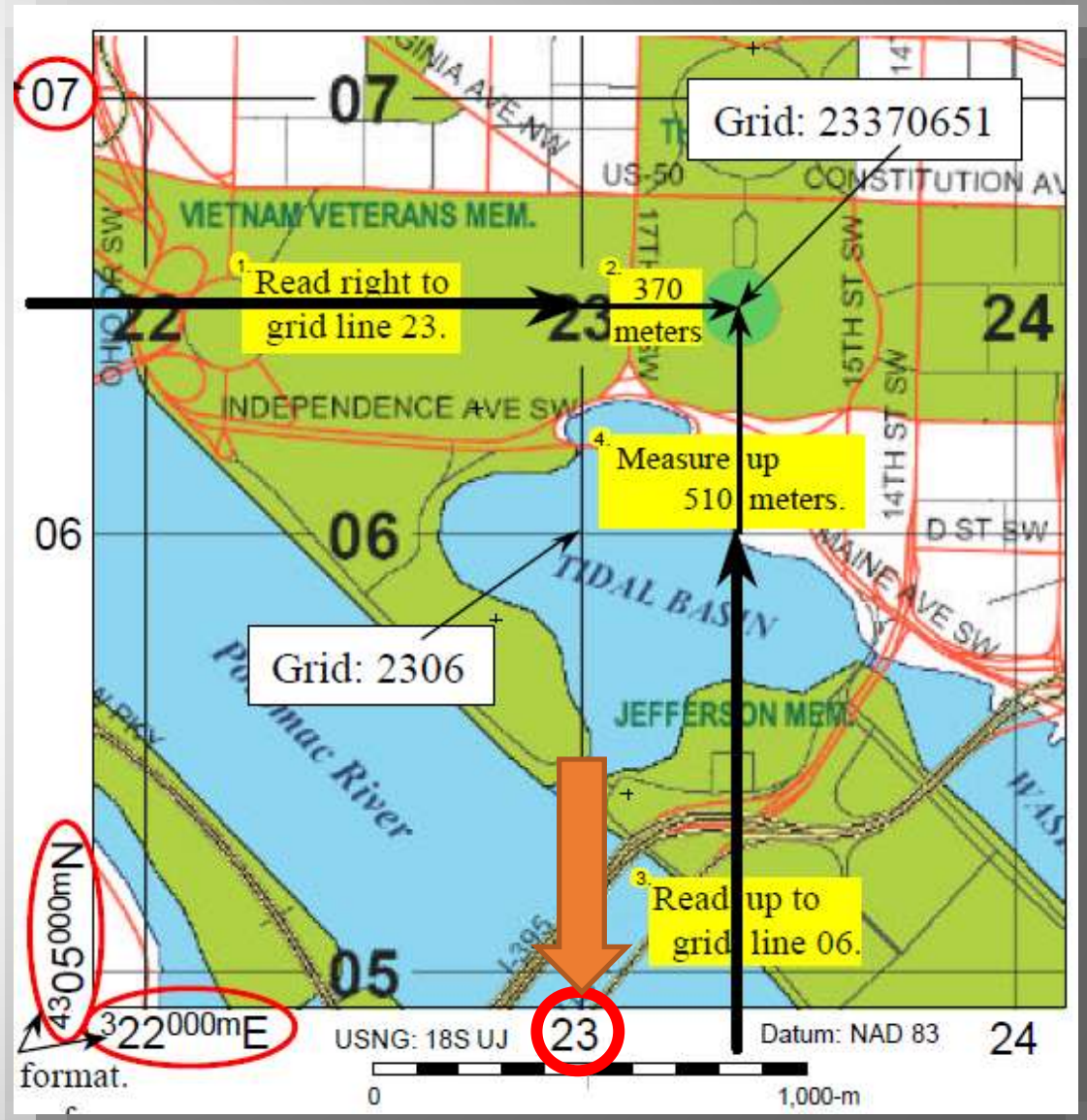
Reading USNG Coordinates

- Coordinates are always given as an even number of digits (e.g. 23370651)
- Separate coordinates in half (2337 0651) into the easting and northing components.
- **Example:** 1,000m grid map



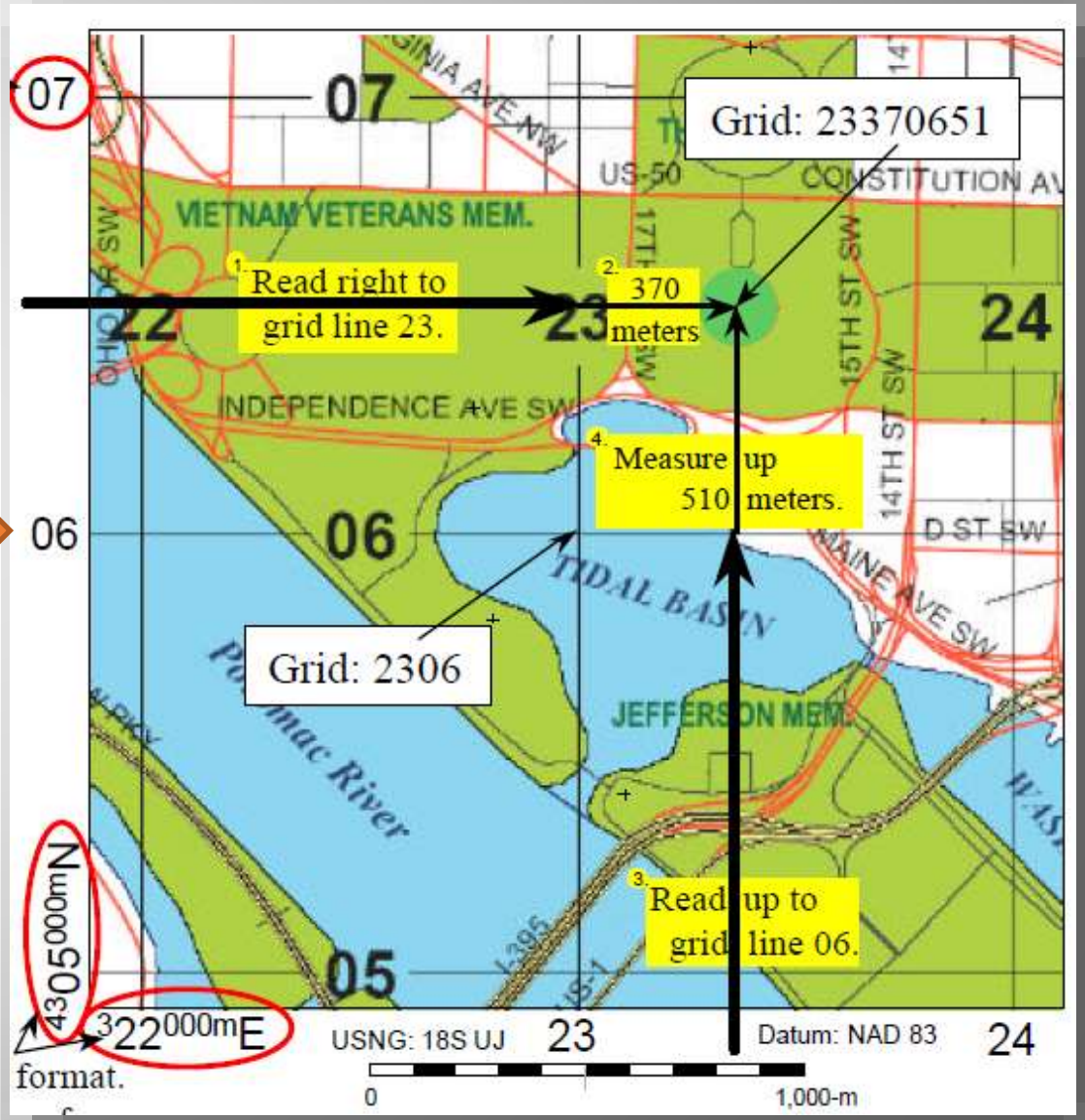
Reading USNG Coordinates

- **2337** 0651
- <u>Read right</u> to grid line 23.
- Then measure right another 370 meters. (Think 23.37)



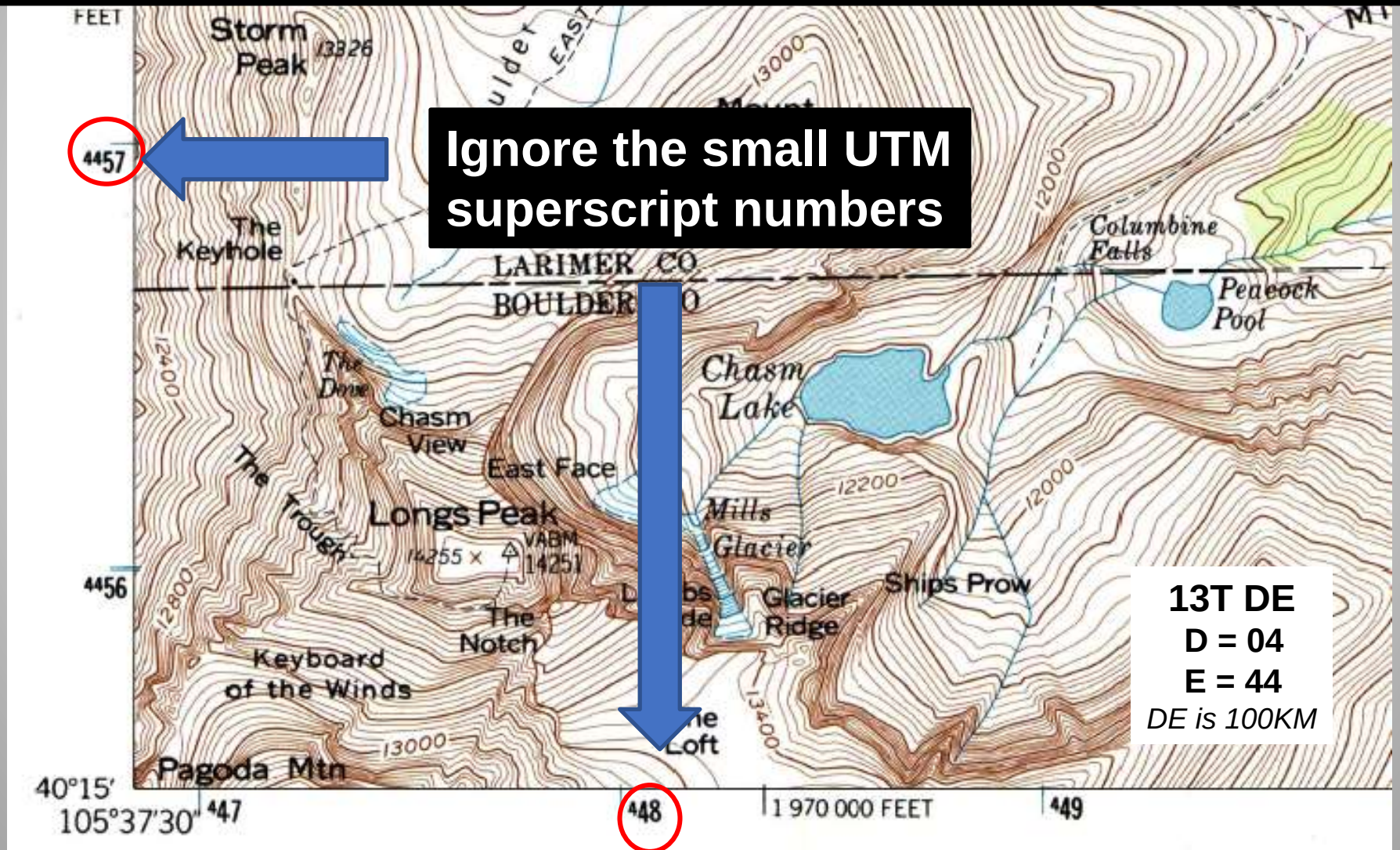
Reading USNG Coordinates

- 2337 **0651**
- <u>Read up</u> to grid line 06.
- Then measure up another 510 meters. (Think 06.51)



Reading USNG Coordinates

The 10,000 and 1,000 meter values in UTM coordinates are known as the **principal digits** in USNG coordinates.



Reading USNG Coordinates

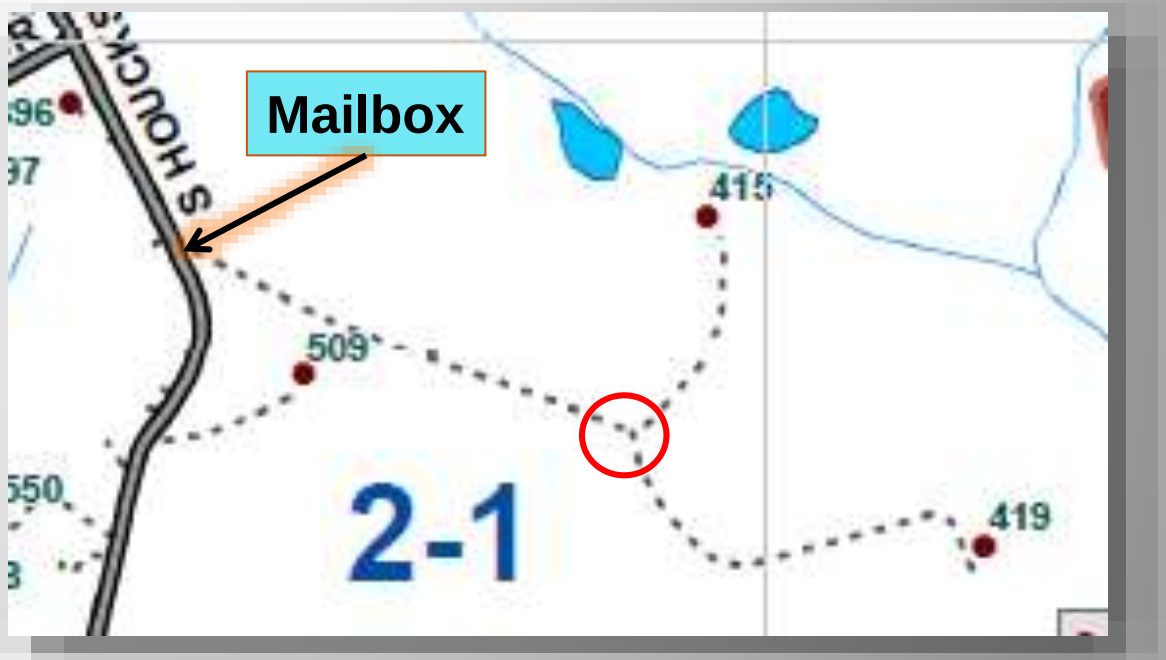
- The standard datum for USNG coordinates is North American Datum 1983 (NAD 83) or its international equivalent, World Geodetic System 1984 (WGS 84)

NAD83

Practice 1

- Missing Person Report
- Dispatcher gives you the address of 419 S. Houcksville Rd.
- But they can also give you –

  18S UJ 39225 80497



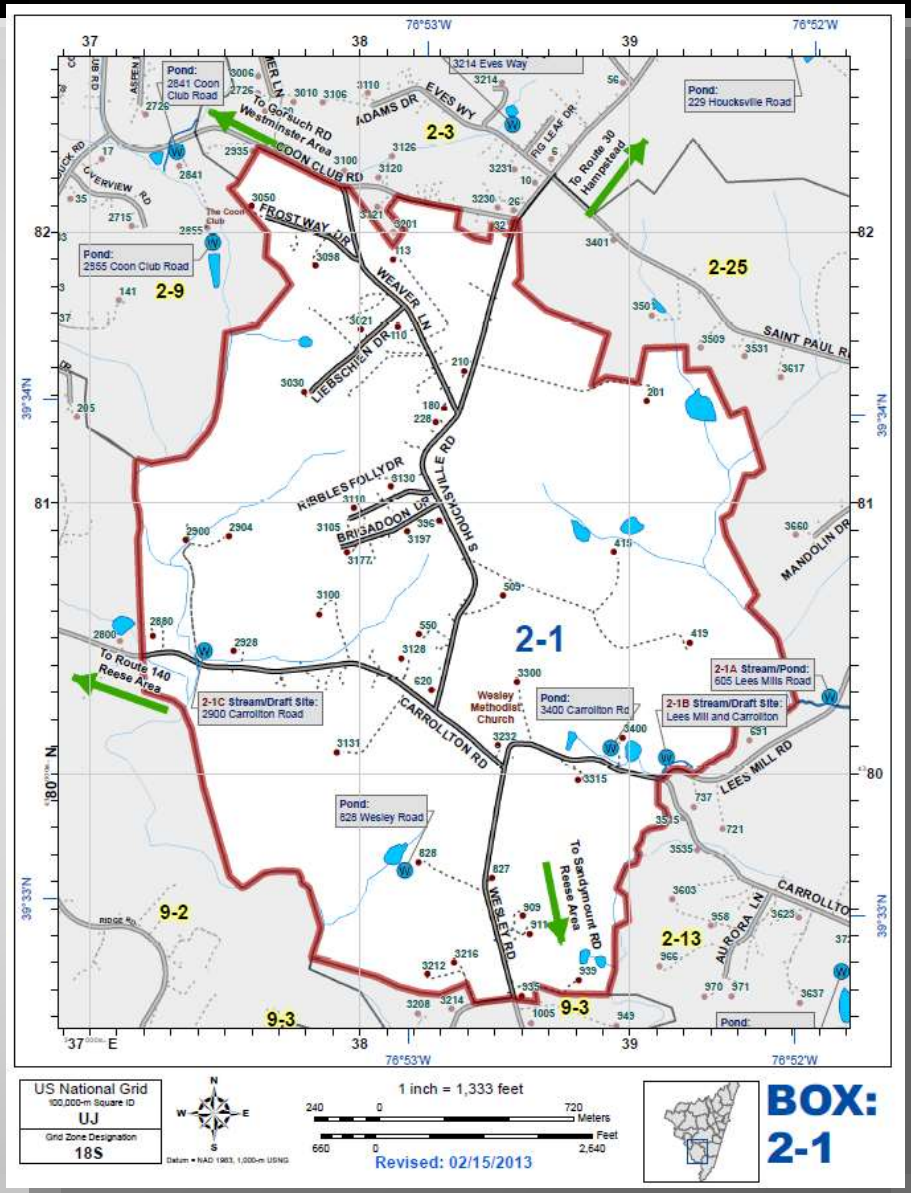
Access the PDF http://bit.ly/HVFC2-1

Practice 1

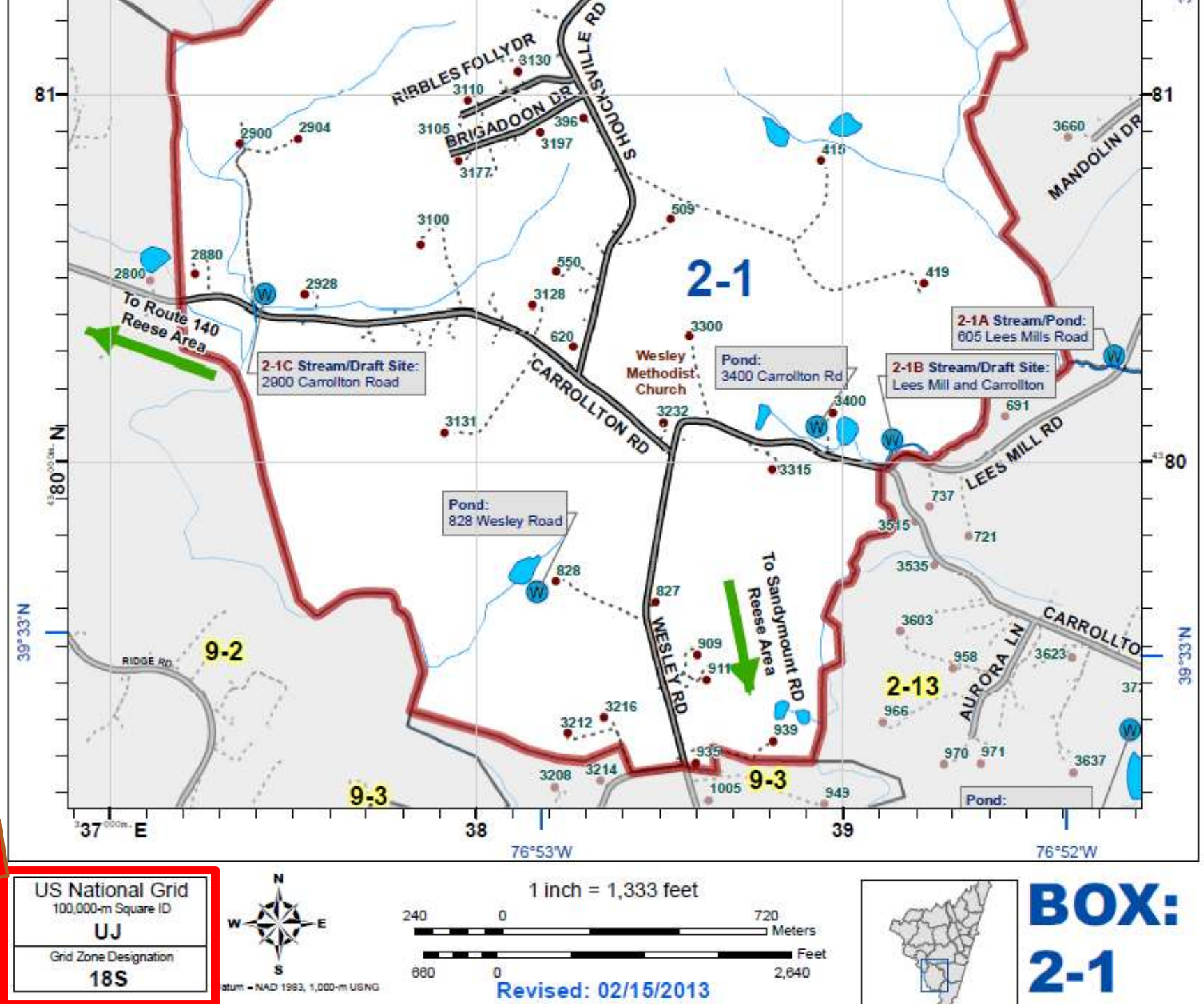
1. What is the Grid Zone Designation and 100,000m square?

Access the PDF

http://bit.ly/HVFC2-1



18SUJ



US National Grid
100,000-m Square ID
UJ
Grid Zone Designation
18S

1 inch = 1,333 feet

240 0 720 Meters

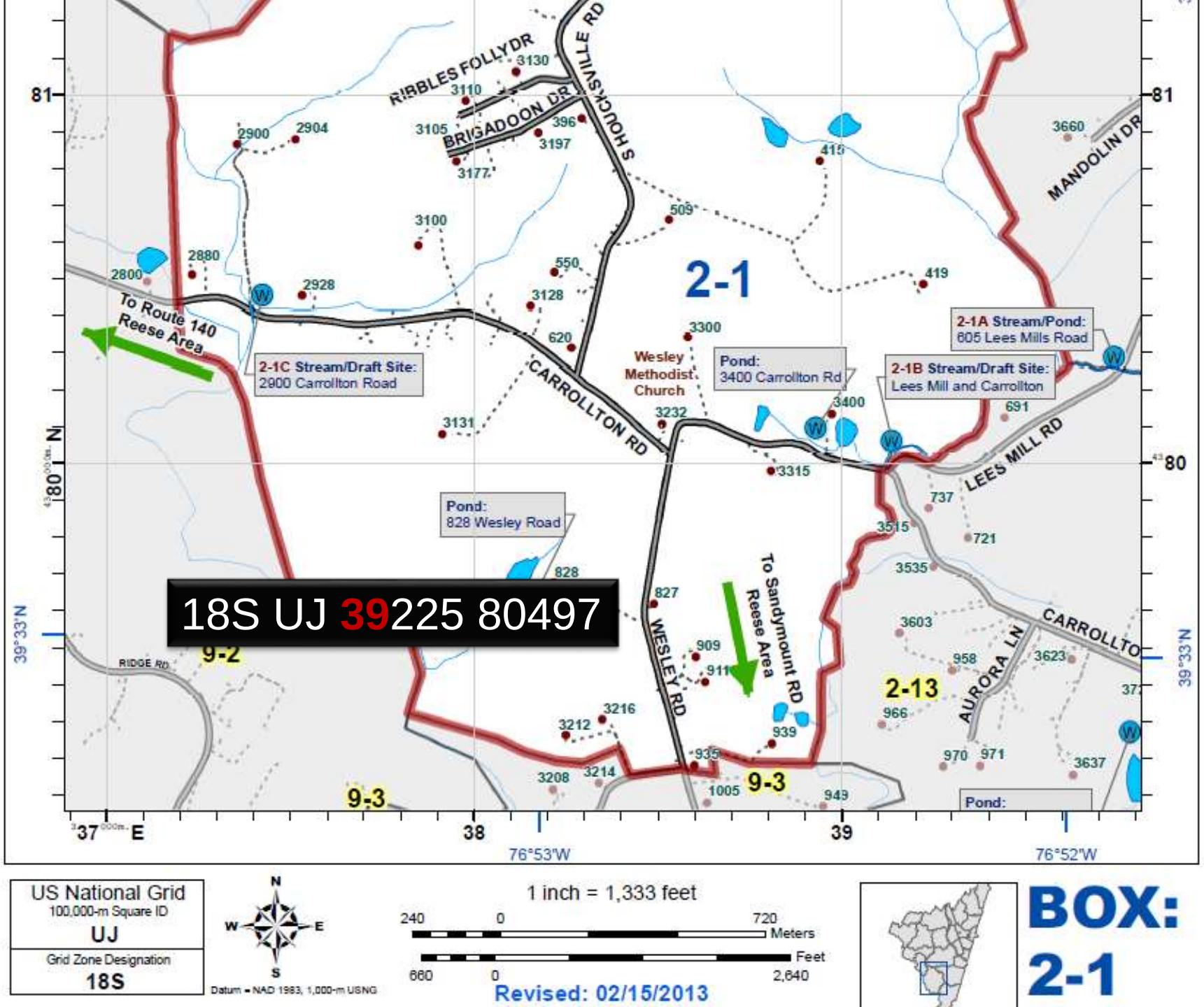
660 0 2,640 Feet

Revised: 02/15/2013

BOX: 2-1

2. Read Right

39225 80497



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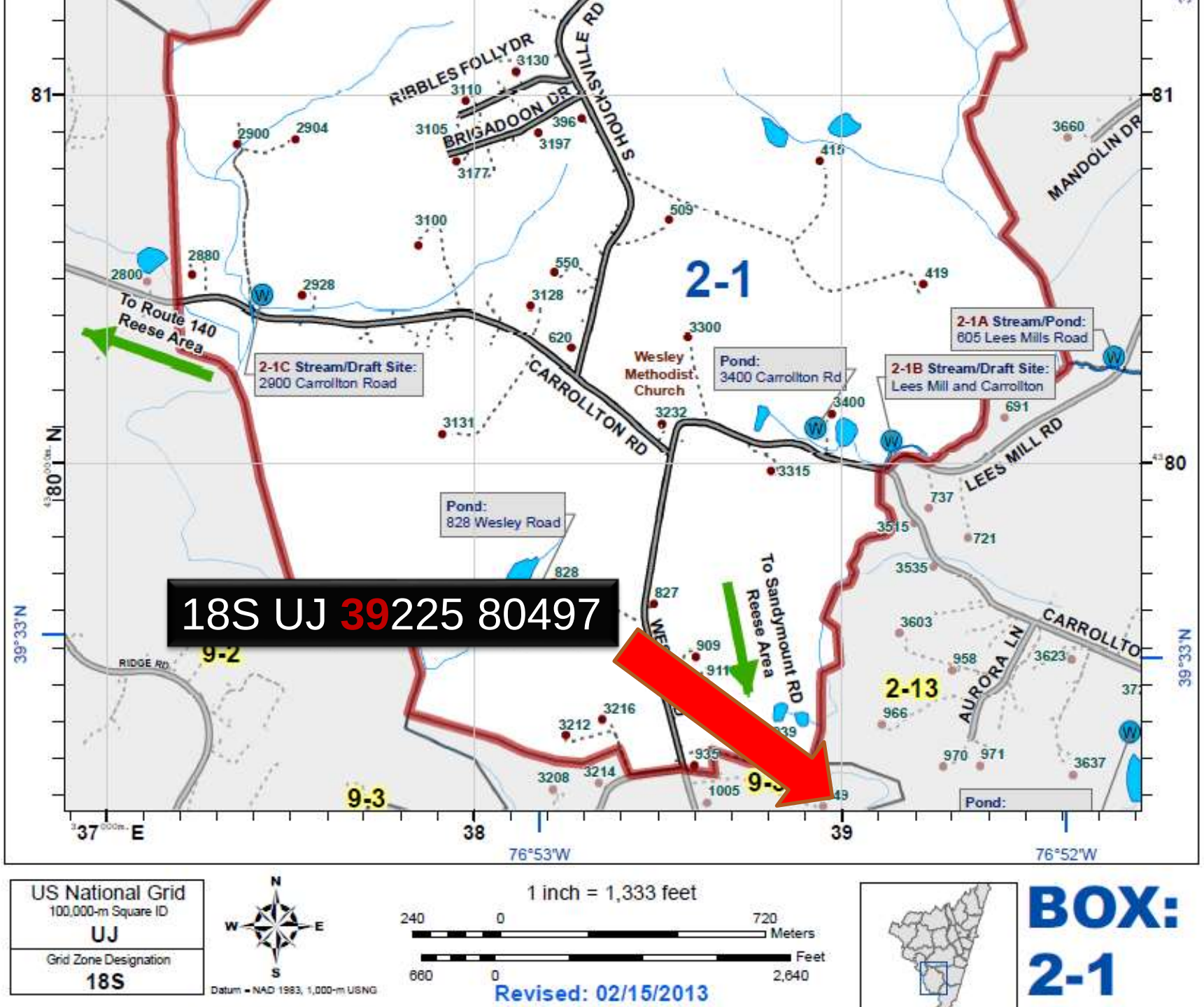
39225 80497



US National Grid
100,000-m Square ID
UJ
Grid Zone Designation
18S

Datum = NAD 1983, 1,000-m USNG

1 inch = 1,333 feet

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Revised: 02/15/2013

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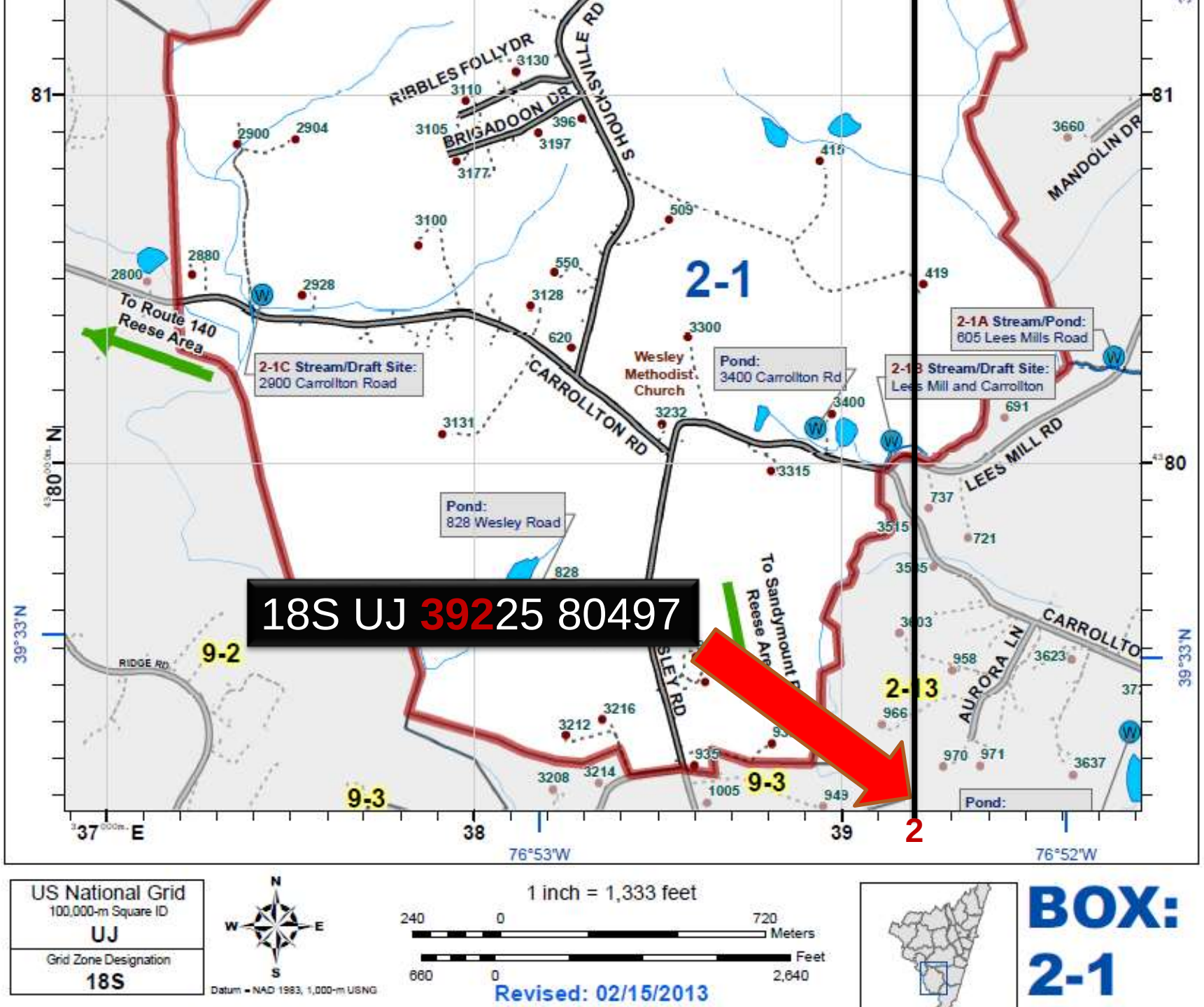

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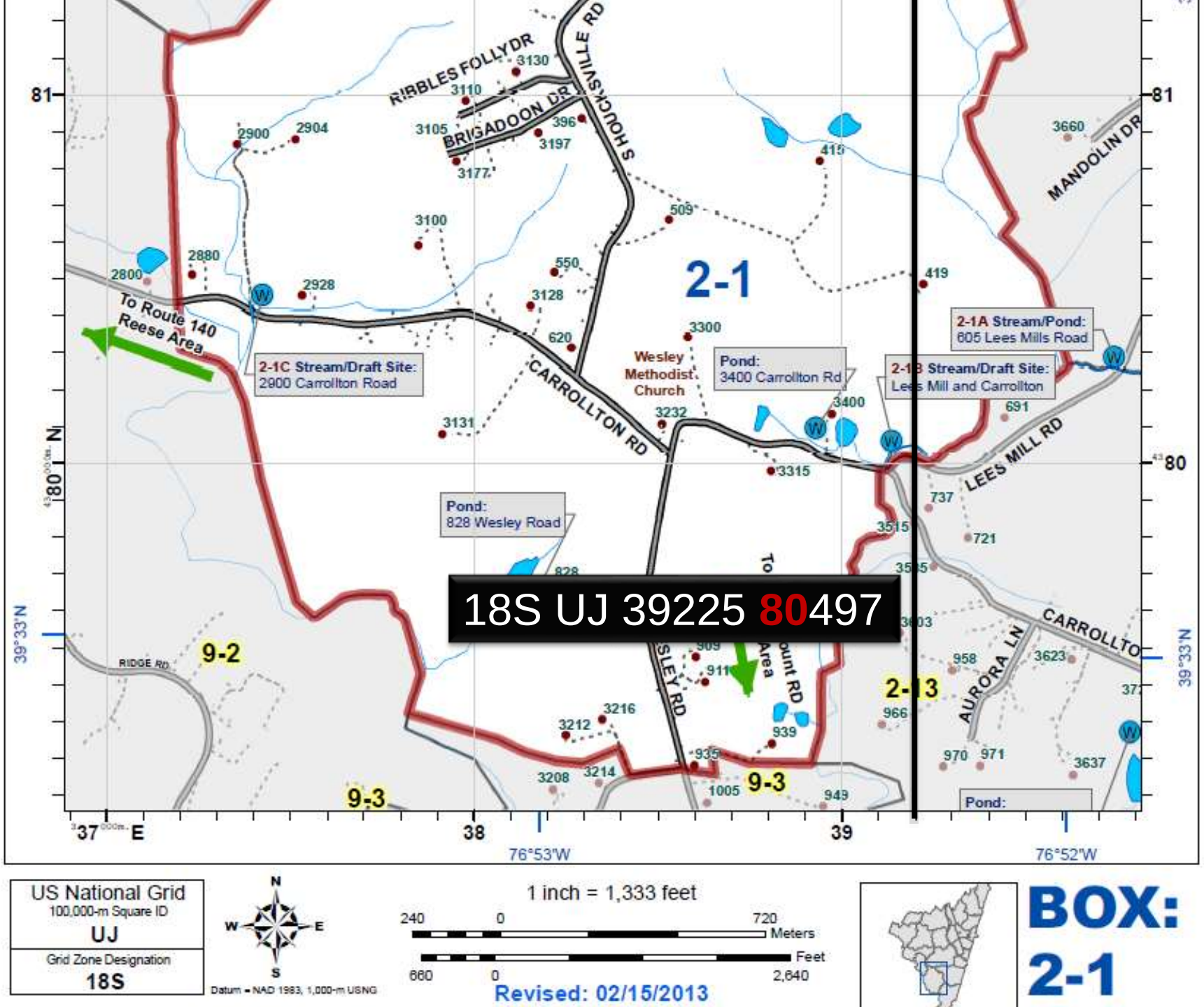
BOX: 2-1

3. Read Up

39225 80497



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3. Read Up

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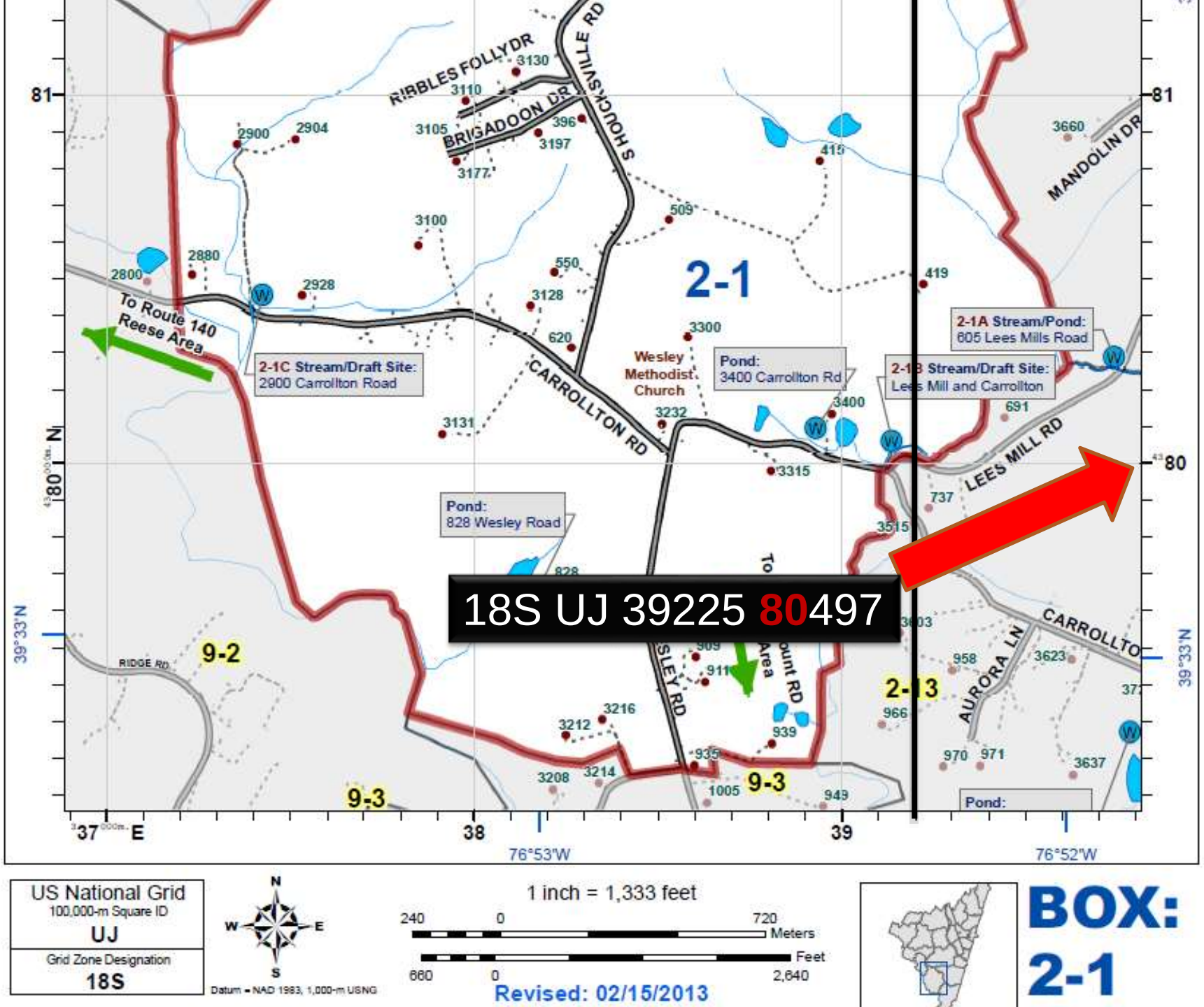

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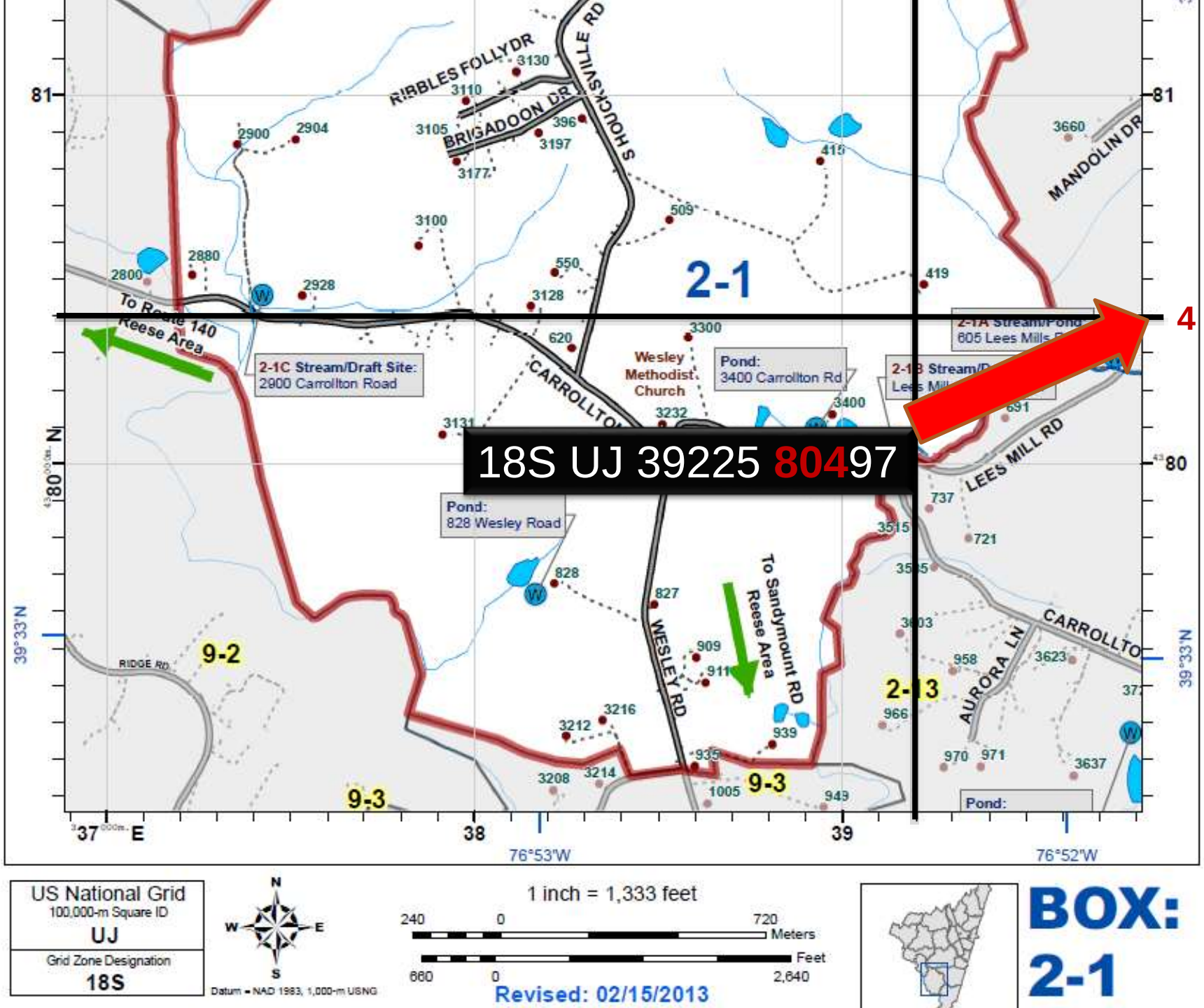

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Revised: 02/15/2013

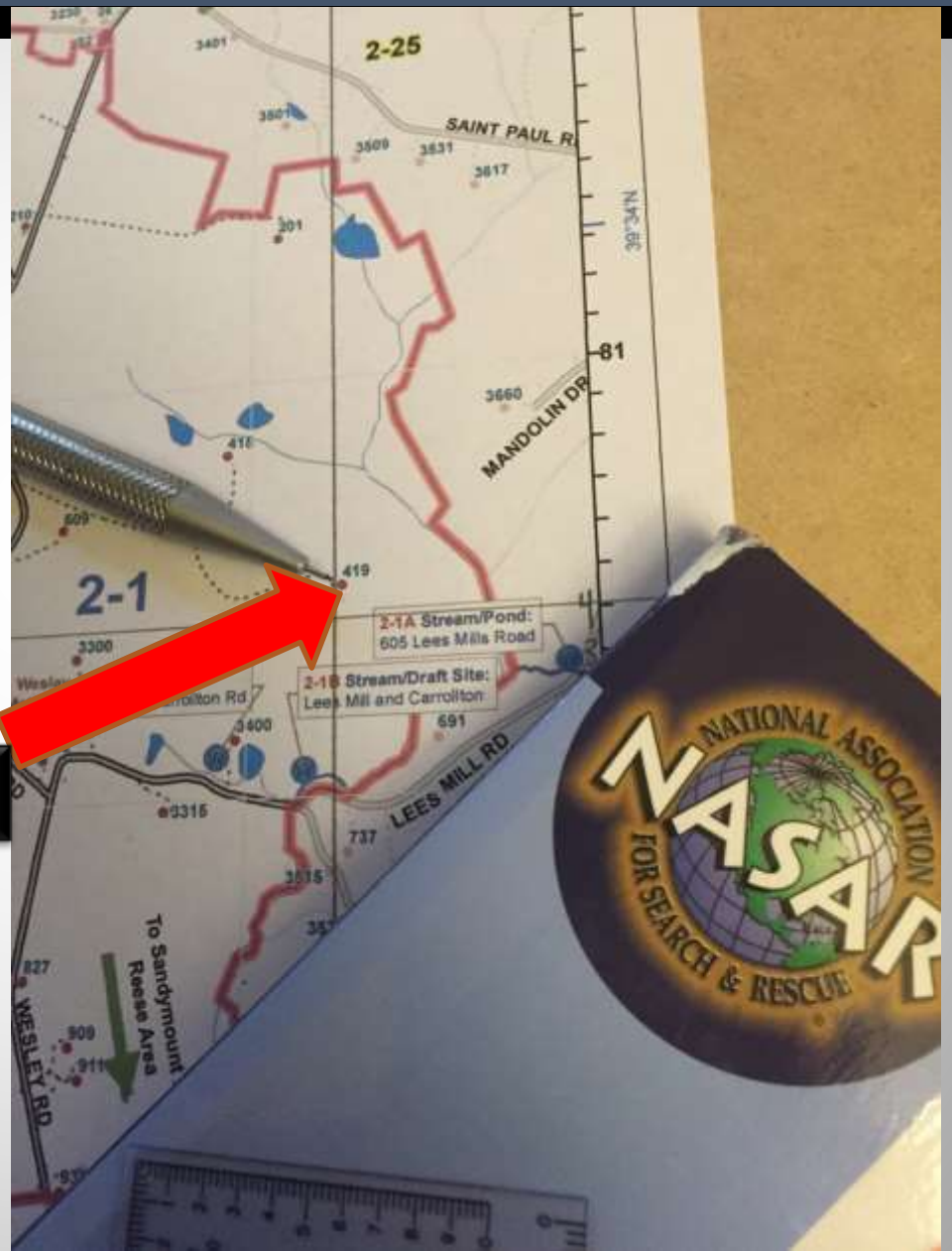
BOX: 2-1

Practice 1

4. Estimate

39225 80497

18S UJ 39225 80497



Practice 1

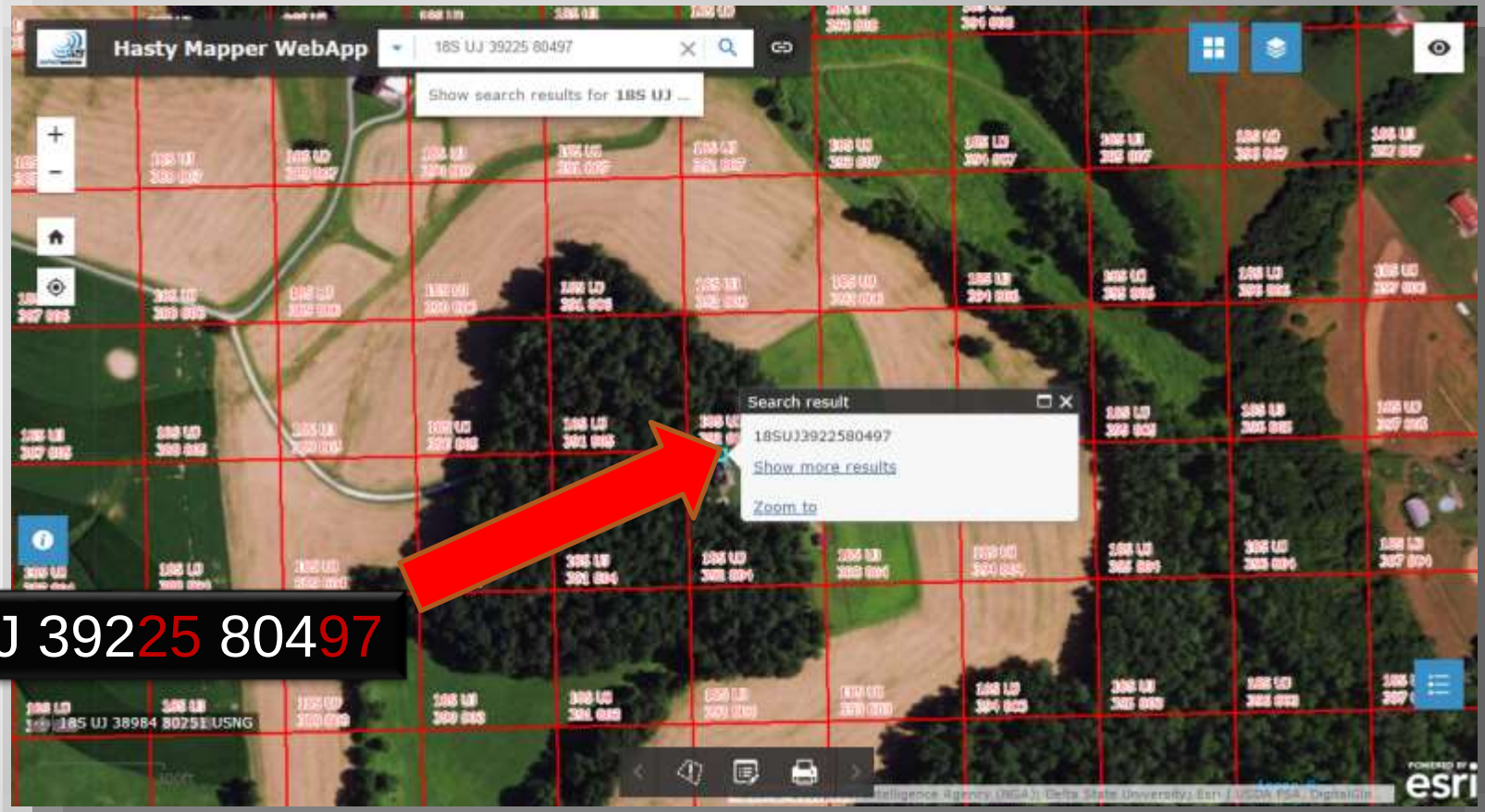
Plot with a GPS or Smartphone

18S UJ 39225 80497

Practice 1

Plot with a Web Mapping Application

http://bit.ly/HastyMapper

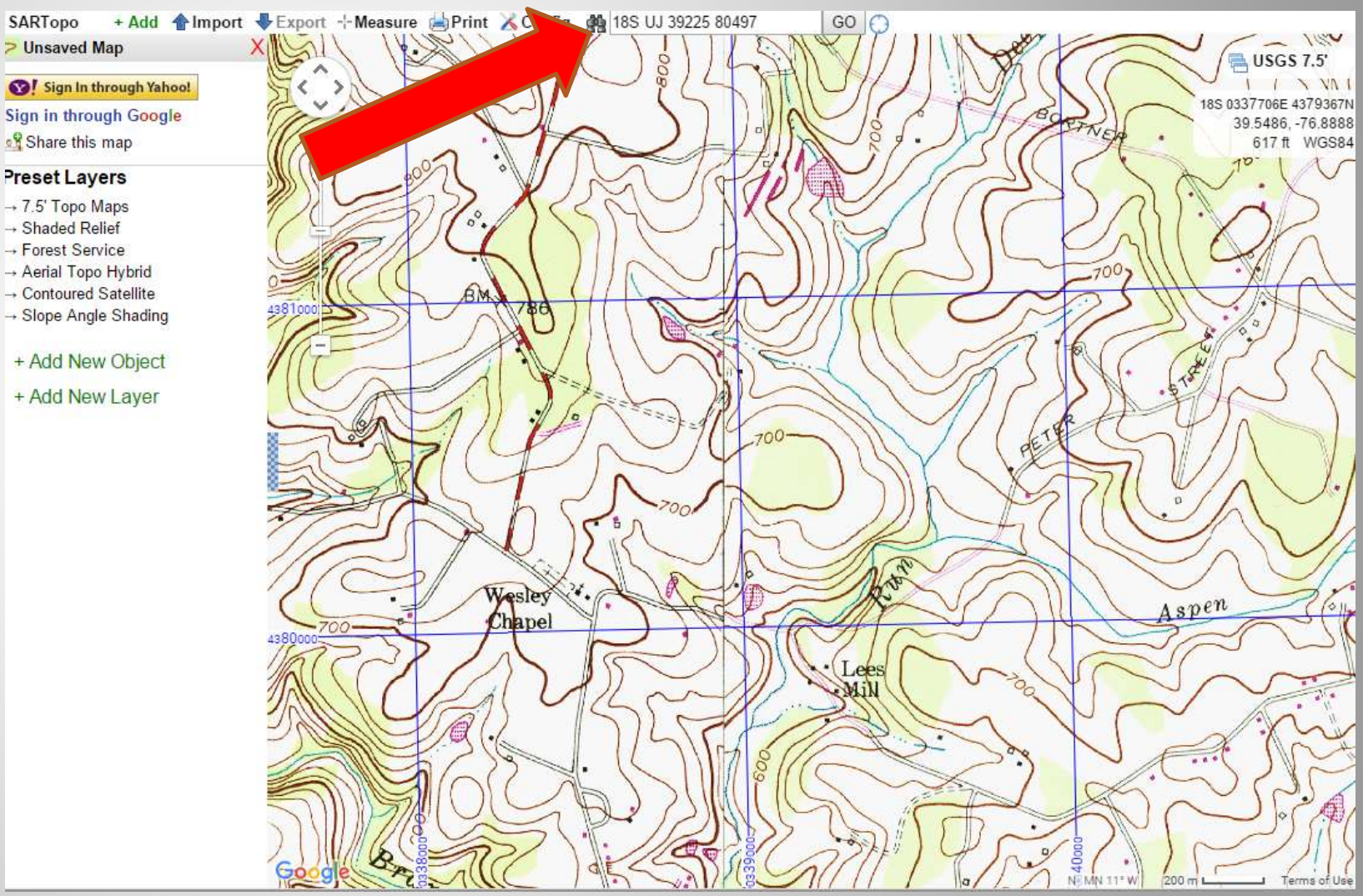


18S UJ 39225 80497

Practice 1

Plot with a Web Mapping Application

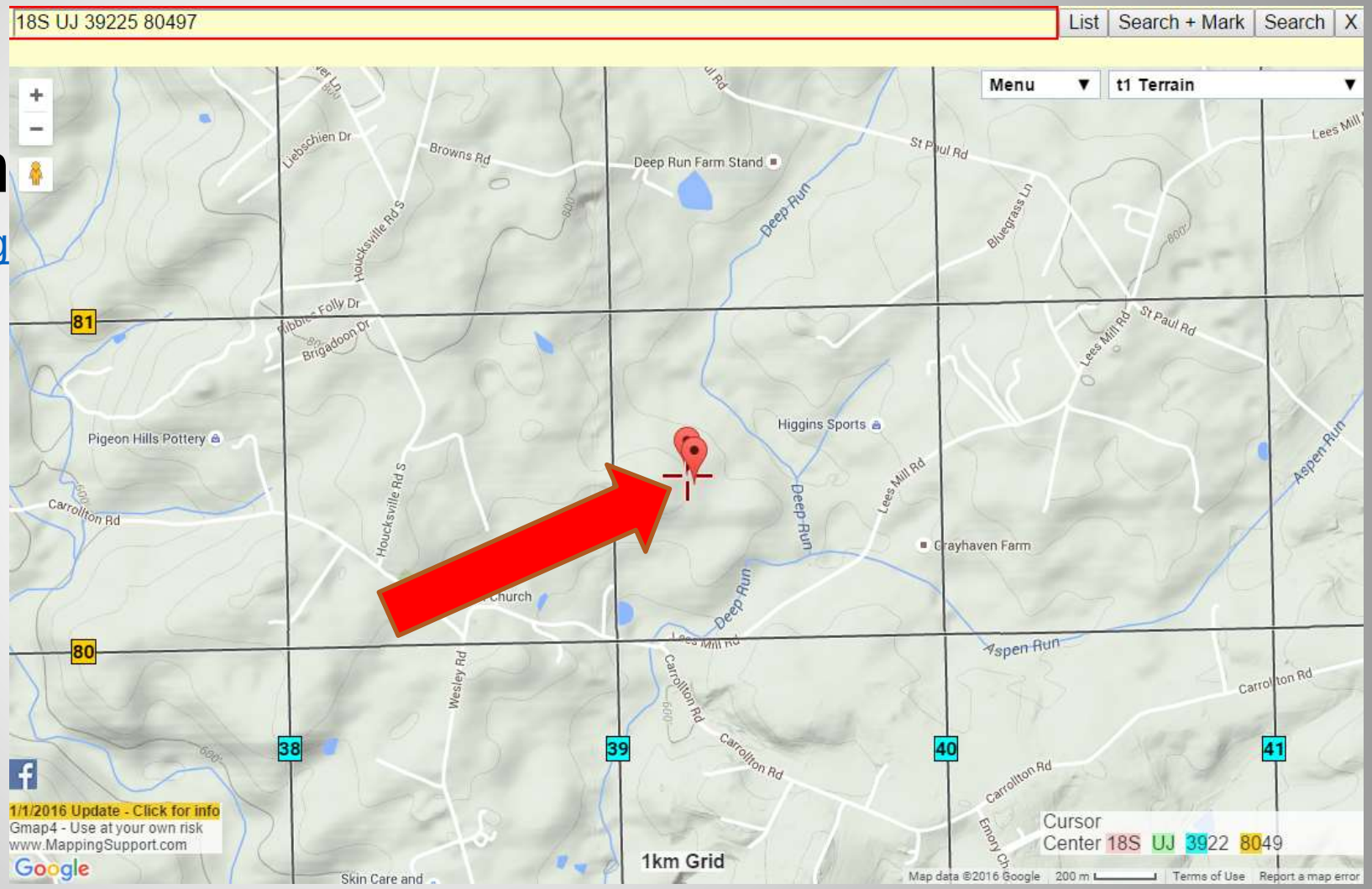
www.sartopo.com



Practice 1

Plot with a Web Mapping Application

http://www.mappingsupport.com/p/gmap4.php?coord=usng



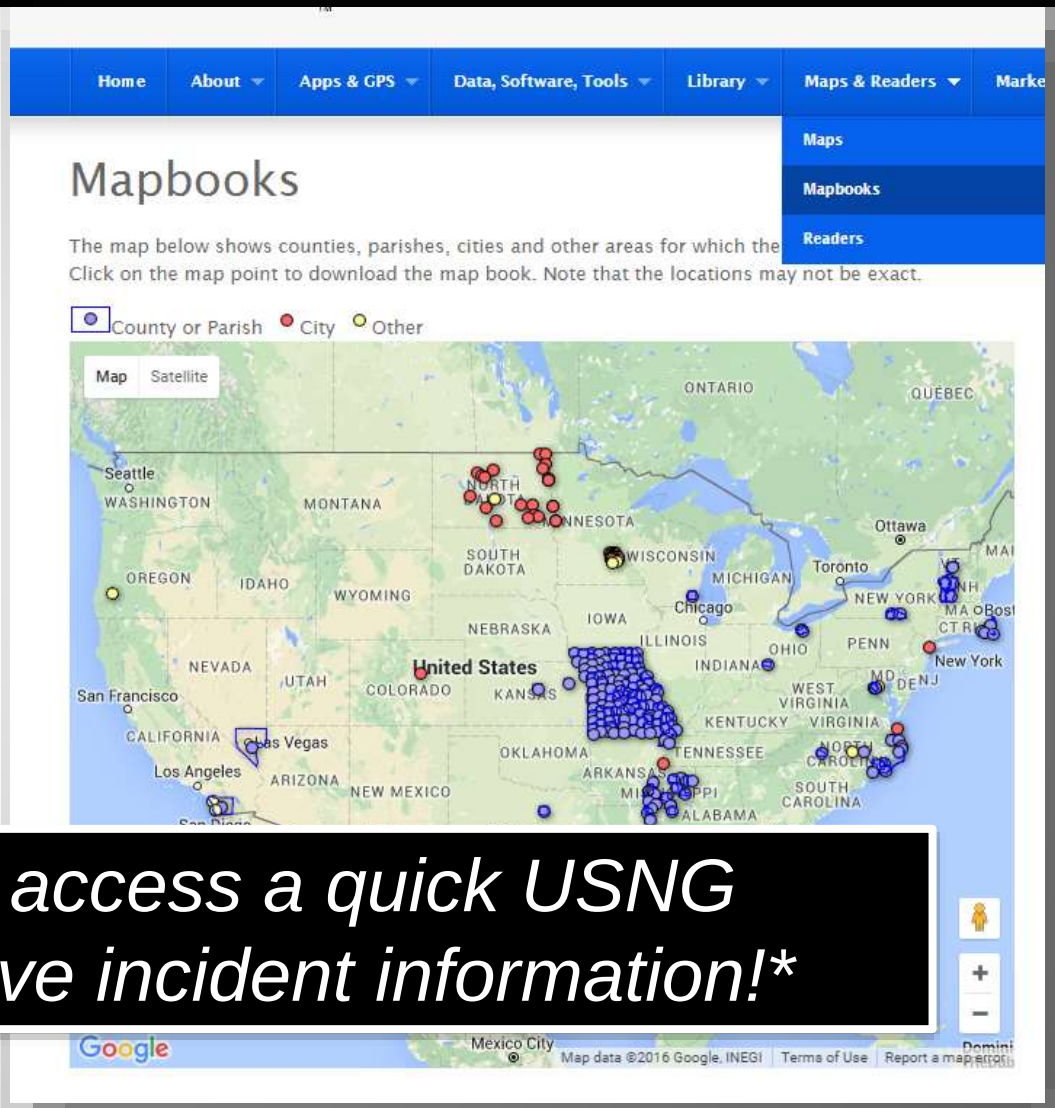
Resources

- Where Are You?

http://usngapp.org/

Resources

- USNG Center http://usngcenter.org/
- USNG Map Books



*Responders should be able to access a quick USNG ready map as soon as they have incident information!**

How do we communicate area?

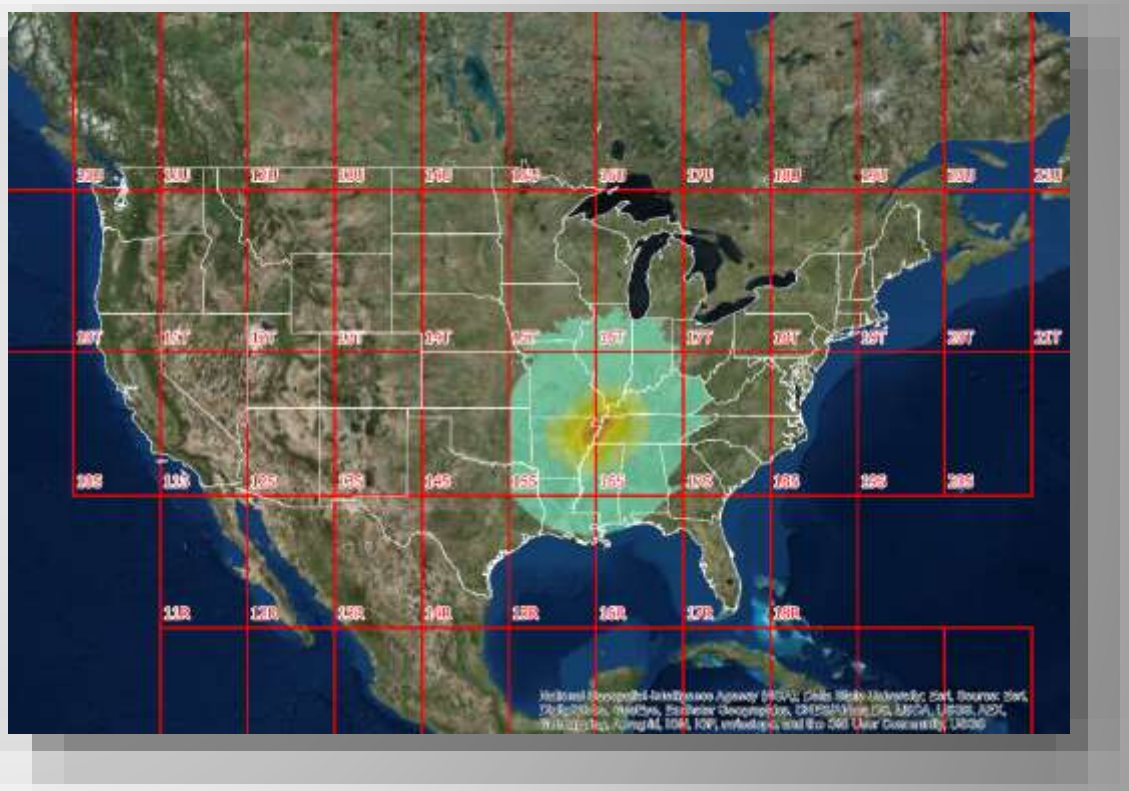
USNG for Area Reference

Jared Doke

- Kansas GIS Response Team
- Structural Firefighter, EMT, Wildland Fire, Urban SAR, WiSAR
- Thesis: Analysis of Search Incidents and Lost Person Behavior in Yosemite National Park

Why Use USNG?

- An Incident Commander needing to break a large incident perimeter into manageable parts so that operational areas can be clearly defined and communicated easily across multiple disciplines and jurisdictions



USNG for Area Reference

A point within the 100,000-meter square is given by the UTM grid coordinates of Easting (E) and Northing (N).

The number of digits used will depend on the precision desired in position referencing. An equal & even number of digits is always be used for E and N.

Examples:

18SUJ20 - Locates a point with a precision of 10 km
18SUJ2306 - Locates a point with a precision of 1 km / 1000m
18SUJ234064 - Locates a point with a precision of 100 meters
18SUJ23480647 - Locates a point with a precision of 10 meters
18SUJ2348306479 - Locates a point with a precision of 1 meter

USNG for Area Reference

Strategic Area

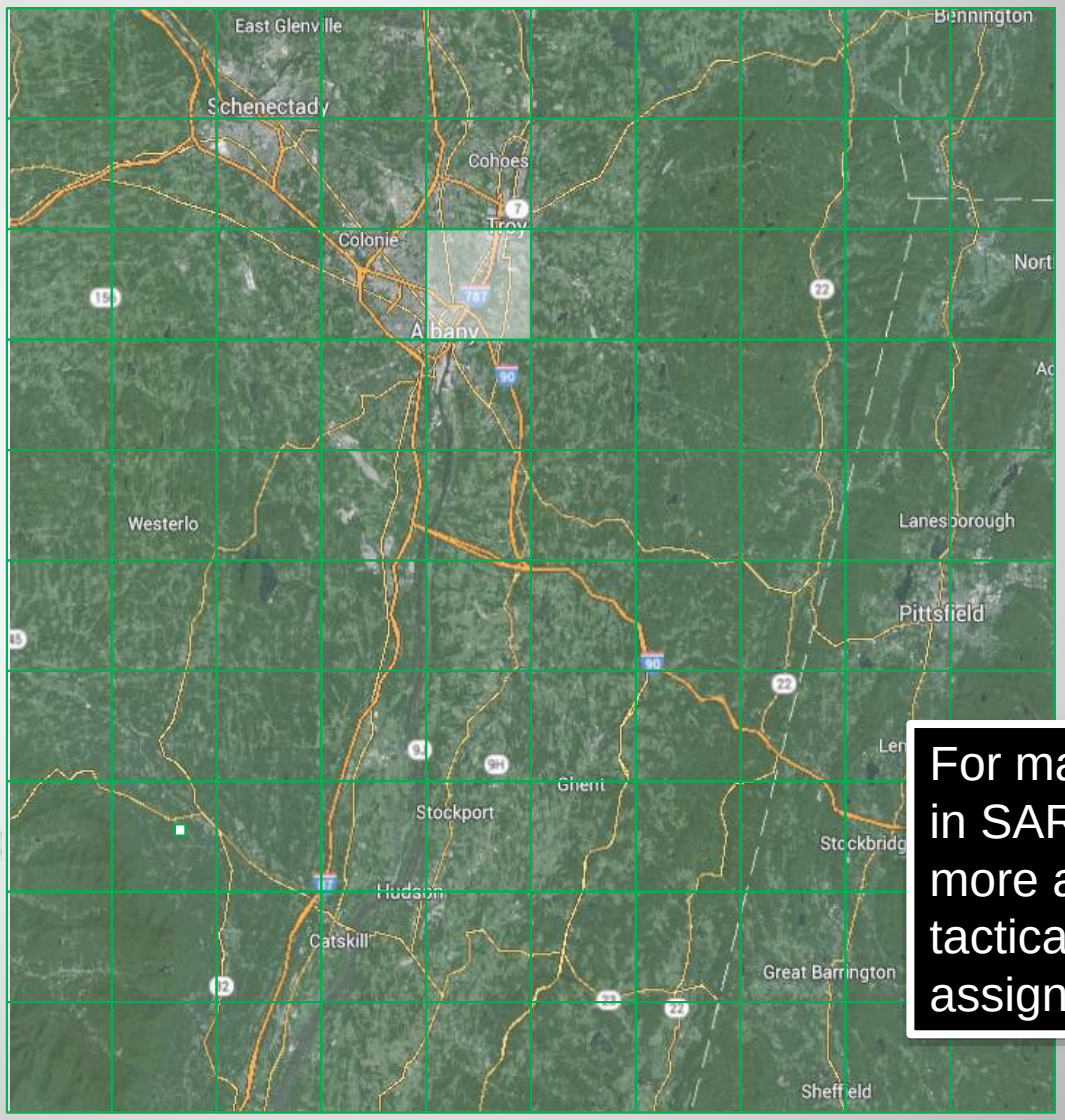
100,000 meters

Regional Area

10,000 meters

Tactical Area

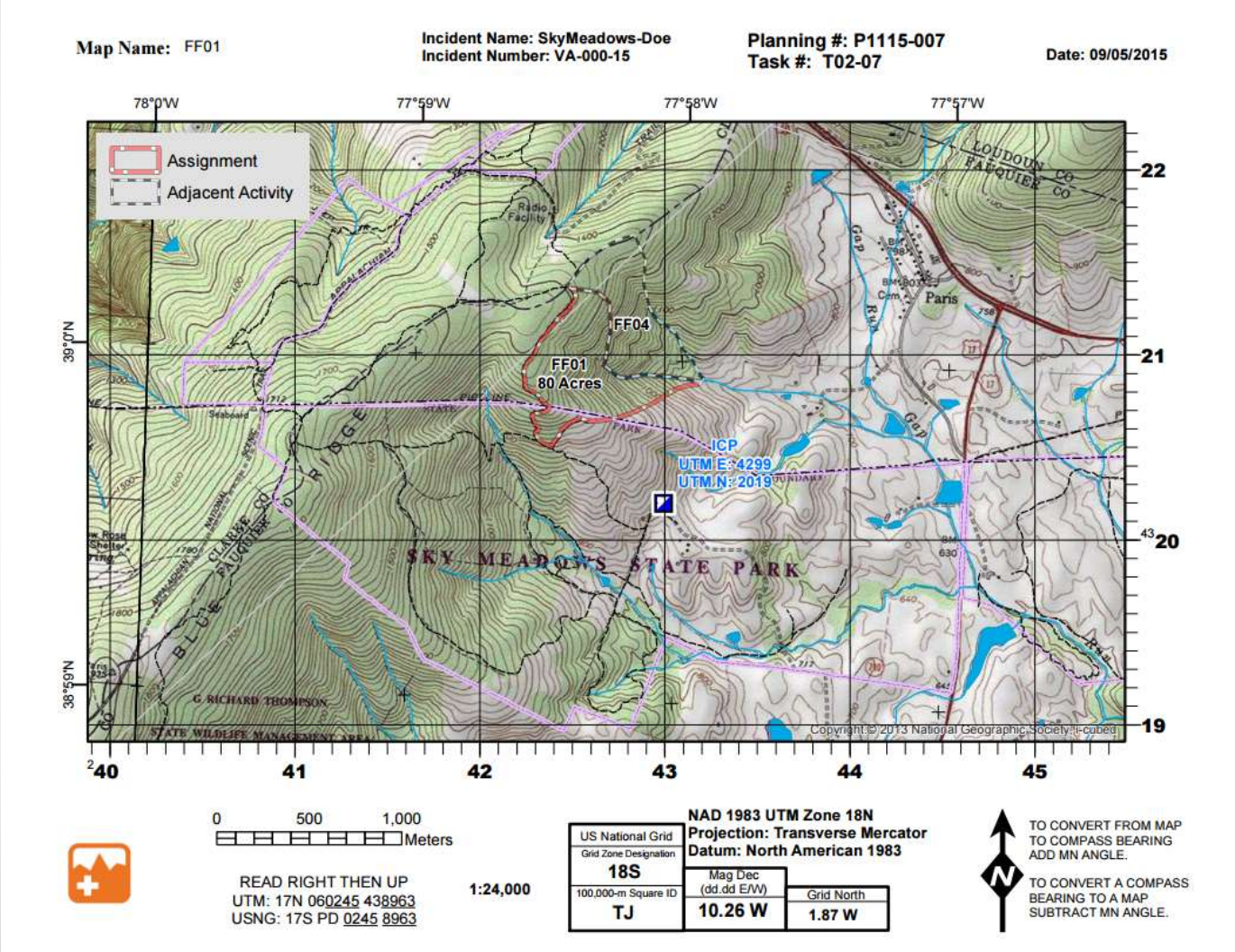
1,000 meters



For many operations in SAR – 100m is a more appropriate tactical area for assigning resources.

USNG for Area Reference

- Assignments are not always a grid
  - Rivers, walls, hazards, etc.
- Adapt accordingly
- Not mutually exclusive
- Ideas?



Map created using IGT4SAR / MapSAR by Don Ferguson.

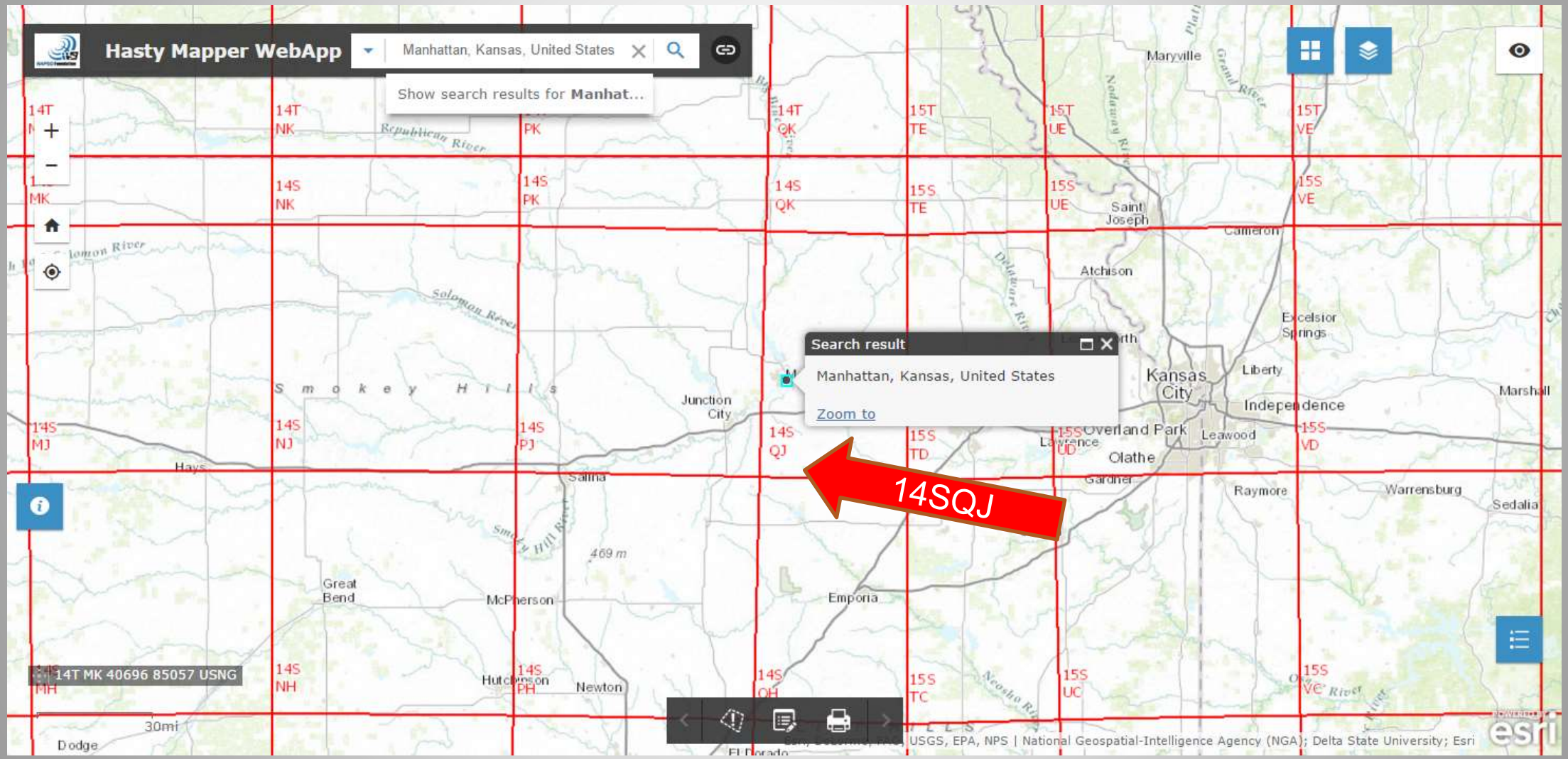
Practice 2

- At 2132 hours on Saturday, May 21st, 2016 Manhattan, KS took a direct hit from an EF5 tornado. Incident resources from the South are meeting near City Park.

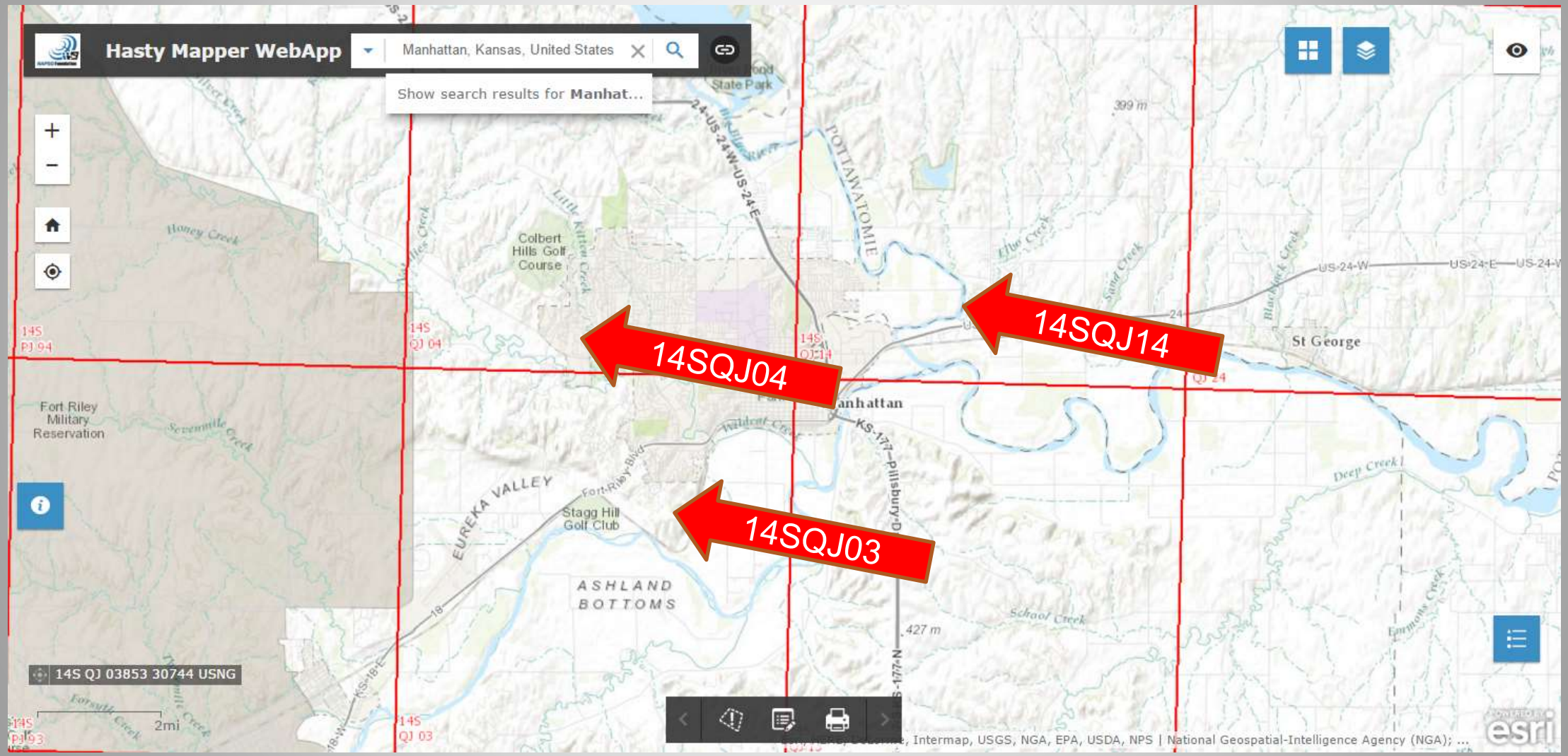
1. What is our 100,000m GZD for this tornado?
2. What are our 10,000m grid areas?
3. What is our 1,000m grid for City Park?

http://bit.ly/HastyMapper

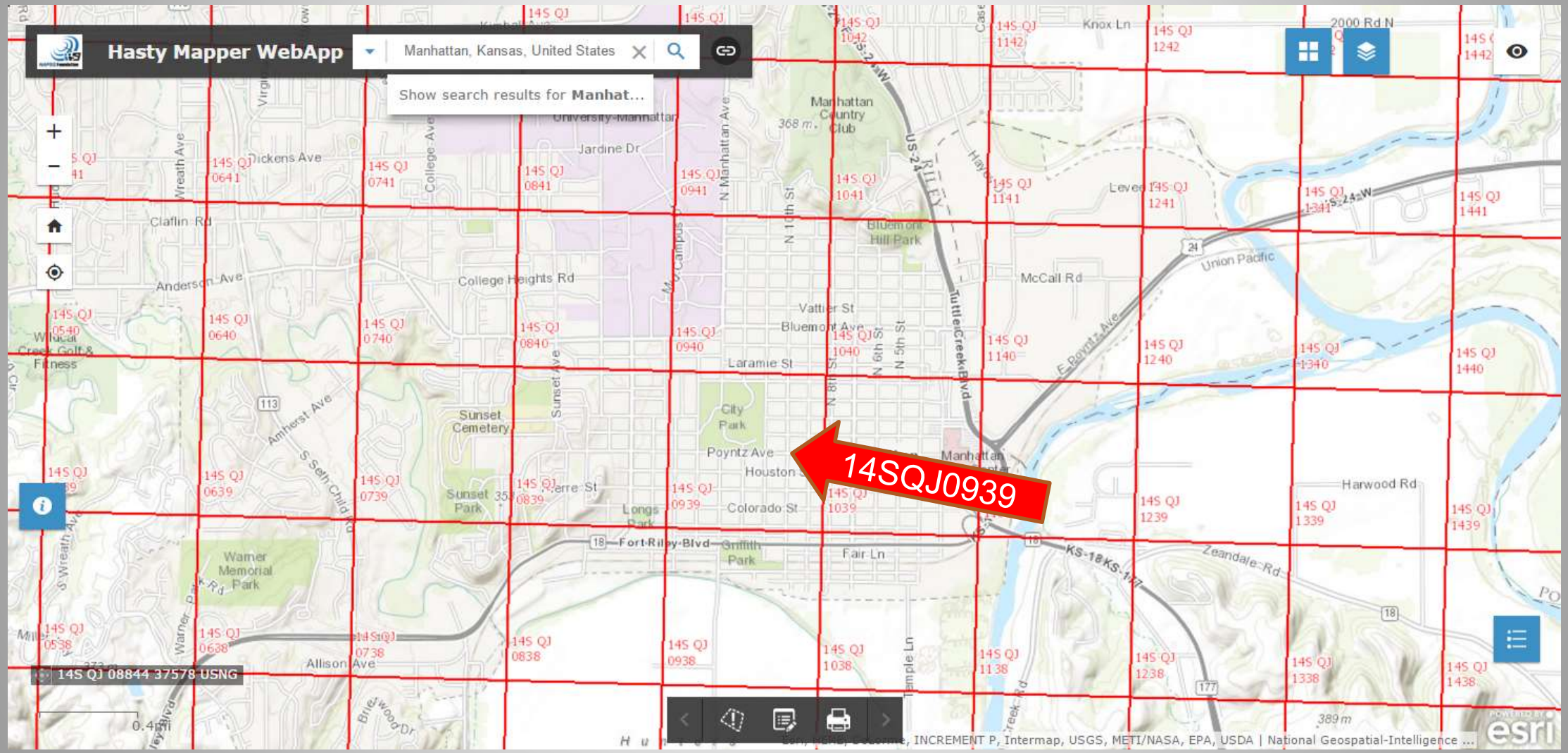
Practice 2


Hasty Mapper WebApp
Manhattan, Kansas, United States
Show search results for Manhat...
Search result
Manhattan, Kansas, United States
Zoom to
14SQJ
14T MK 40696 85057 USNG
Maryville
Saint Joseph
Atchison
Kansas City
Independence
Overland Park
Olathe
Leawood
Liberty
Excelsior Springs
Marshall
Junction City
Salina
Hays
Great Bend
McPherson
Emporia
Hutchinson
Newton
Dodge
Raymore
Warrensburg
Sedalia
Smokey Hills
Republican River
Solomon River
Smoky Hill River
Neosho River
30mi
USGS, EPA, NPS | National Geospatial-Intelligence Agency (NGA); Delta State University; Esri

Practice 2


Hasty Mapper WebApp
Manhattan, Kansas, United States
Show search results for Manhat...
14SQJ14
14SQJ04
14SQJ03
Colbert Hills Golf Course
Fort Riley Military Reservation
Stagg Hill Golf Club
EUREKA VALLEY
ASHLAND BOTTOMS
POTTAWATOMIE
St George
14S QJ 03853 30744 USNG
2mi
Intermap, USGS, NGA, EPA, USDA, NPS | National Geospatial-Intelligence Agency (NGA); ...
esri

Practice 2


Hasty Mapper WebApp
Manhattan, Kansas, United States
Show search results for Manhat...
14SQJ0939
14S QJ 08844 37578 USNG
Claflin Rd
Anderson Ave
College Heights Rd
Jardine Dr
Dickens Ave
Vattier St
Bluemont Ave
Laramie St
Poyntz Ave
Houston
Colorado St
Fort Riley Blvd
McCall Rd
Union Pacific
Harwood Rd
Zeandale Rd
Allison Ave
Sunset Cemetery
Sunset Park
Warner Memorial Park
Longs Park
Griffith Park
City Park
Bluemont Hill Park
Manhattan Country Club
Knox Ln
2000 Rd N
Fair Ln
Temple Ln
Tuttle Creek Blvd
N Manhattan Ave
N 10th St
N 8th St
N 6th St
N 5th St
Sunset Ave
Amherst Ave
S Seth Child Rd
S Wreath Ave
Wreath Ave
College Ave
Wildcat Creek Golf & Fitness
Levee
Brierwood Dr
0.4 mi
389 m
INCREMENT P, Intermap, USGS, METI/NASA, EPA, USDA | National Geospatial-Intelligence ...
esri

Practice 2

- At 2132 hours on Saturday, May 21st, 2016 Manhattan, KS took a direct hit from an EF5 tornado. Incident resources from the South are meeting near City Park.

1. What is our 100,000m GZD for this tornado? 14SQJ
2. What are our 10,000m grid areas? ~14SQJ 04, 03,14
3. What is our 1,000m grid for City Park?

14SQJ 0939

How can it help us make decisions?

USNG for Decision Support

USNG For Decision Support

Determine mission based required resources and pre-script missions based on USNG analysis

- Overlay base and incident data layers with USNG
  - Demographics
  - Community lifelines (transportation, communications, energy)
  - Critical Facilities (Police, Fire, Medical, Schools)

Before the incident or exercise occurs

  - Incident data/forecasts (Hurricane track, path of tornado, tsunami inundation)

USNG For Decision Support

Health Care for USNG 17S NJ 8651

Facility Type	Emer_Funct	Name	Address1	City	County	Zip	USNG
HOSPITAL	ES	SOUTH BEACH COMMUNITY HOSPITAL	630 ALTON ROAD	MIAMI BEACH	86	33139	17R NJ 86141 51183
CLINICAL LABORATORY	ES	MIAMI BEACH COMMUNITY HEALTH CENTER	710 ALTON ROAD	MIAMI BEACH	86	33139	17R NJ 86138 51302
CLINICAL LABORATORY	ES	MIAMI DADE COUNTY HEALTH DEPT / LAB SERV	615 COLLINS AVENUE	MIAMI	86	33139	17R NJ 86966 51150
RESIDENTIAL TREATMENT FACILITY	ES	DOUGLAS GARDENS C.M.H.C./ CRISIS RESIDEN	629 LENOX AVENUE	MIAMI BEACH	86	33139	17R NJ 86284 51191
SKILLED NURSING FACILITY	ES	OCEANSIDE EXTENDED CARE CENTER	550 9TH STREET	MIAMI BEACH	86	33139	17R NJ 86853 51538

Emergency Services for USNG 17S NJ 8651

Facility Type	Emer_Funct	Name	Address1	City	County	Zip	USNG
FIRE STATIONS	ES	MIAMI BEACH FD ST 1	1051 JEFFERSON AVE	MIAMI BEACH	086	33139	17R NJ 86520 51740
LAW ENFORCEMENT	ES	MIAMI BEACH POLICE DEPT	1100 WASHINGTON AVE	MIAMI BEACH	086	33139	17R NJ 86945 51875
CALL CENTER	ES	MIAMI BEACH POLICE DEPT	1100 WASHINGTON AVE	MIAMI BEACH	086	33139	17R NJ 86945 51875

USNG For Decision Support

- For more information – see the handout

http://bit.ly/USNGPreScripted

USNG and Pre-Scripted Missions

Executive Summary

In planning for regional, large-scale, or catastrophic incidents whose impacts cover widespread areas, the ability to script potential missions and determine resource needs/allocations pre-event is critical. This required resource planning process examines a host of available data such as population, demographics, hazards, and infrastructure in the context of potential consequences, and determines likely resource needs for specific operational areas.

The operational area to be pre-scripted should be selected so that it is readily identifiable and known by the local responders, as well as by mutual aid resources that would be asked to respond from other areas of the state, resources requested through EMAC, and federal resources.

In every major event since Hurricane Andrew, after action reports by the military, federal civilian responders as well as local responders have pointed out the need for a uniform geographic point and area reference system. The State of Florida recognized this need during the hurricanes of 2004 and 2005 when local and out-of state mutual aid resources moving from one side of the state to the other had no grid reference system that was common to both the impacted area and the responders. This need was again painfully displayed during response to the catastrophic consequences of Hurricane Katrina, in the urban neighborhoods of New Orleans, and the more rural areas of Mississippi.

The United States National Grid (USNG) is the geographic grid reference system which has been identified by the National SAR Committee as the primary catastrophic incident search and rescue geo-referencing system that ***must*** be used by federal land SAR responders. Other non-federal responders across local and state jurisdictions have been in the process of adopting the Grid as well. Importantly, the US military is our largest force multiplier and also uses a grid which is functionally the same as the USNG, known as the Military Grid Reference System.

Purpose

Develop a uniform procedure that can be used to pre-script missions for specific operational areas across all levels of response (Strategic, Regional, & Tactical) that can be used by leadership of various response disciplines (fire, SAR, Hax-Mat, emergency medical, law enforcement, etc.) to determine resource needs using sound science. Operational areas described utilizing a common grid reference system like the USNG will be readily identifiable to local responders and mutual aid assets not familiar with the local area.

Methodology

Specific and scalable operational areas are identified using the United States National Grid. Operational areas can be classified into three basic categories – tactical, regional & strategic. Tactical areas of operation are typically designated by one or more 1,000 meter (.62 mile) grid squares and provide [detailed/focused] information for direct tactical operations. Regional operational areas generally designated by 10,000 meter (6.2 miles) grid squares and at the more strategic level 100,000 meter (62 miles) grid squares can be utilized to provide a view more typically used by operatives at the state emergency operations center.

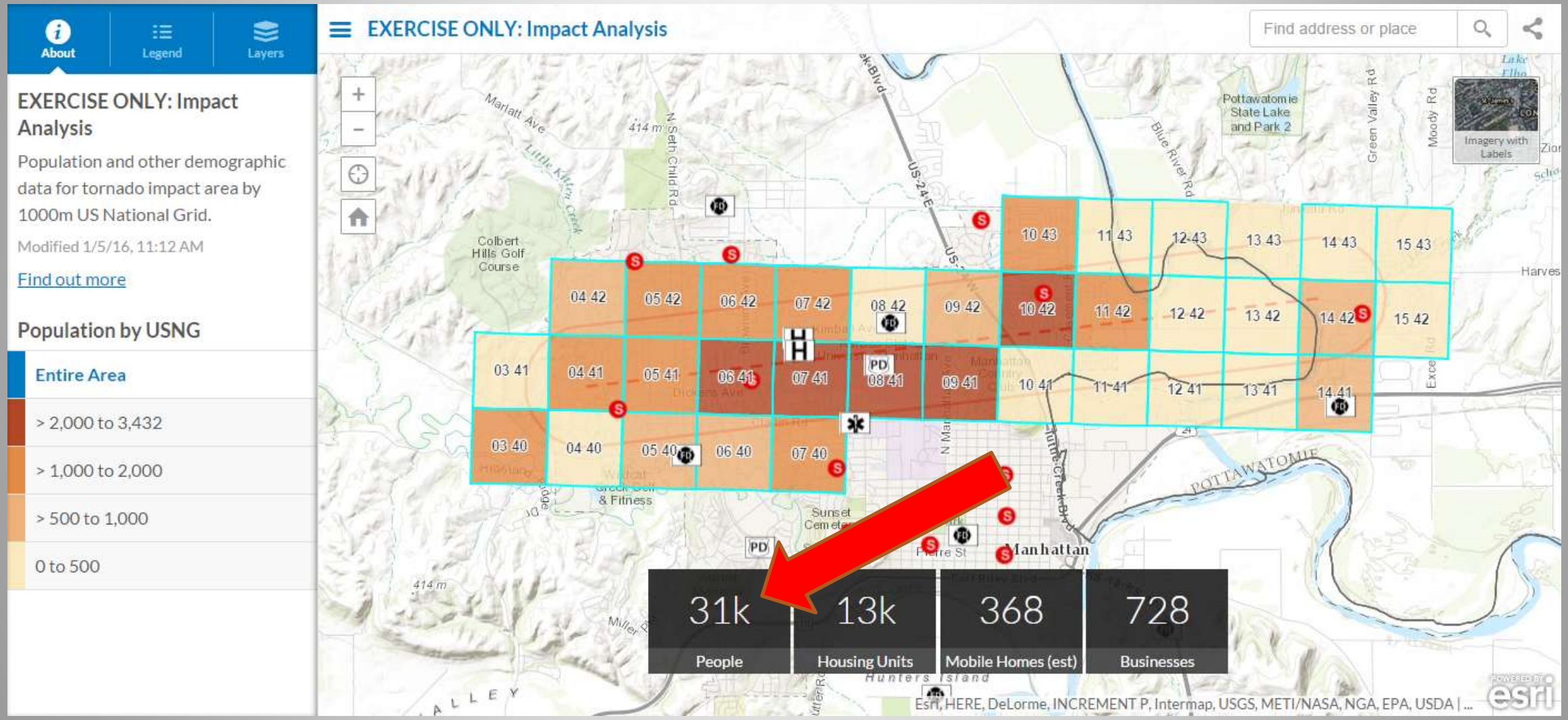
Practice 3

- Structures along the center of the path incurred incredible damage. Facilities impacted include, but not limited to, countless single family residences, multi-unit student housing complexes, Kansas State University, Via Christi Hospital, several public schools, and a Fire Station. Local emergency resources have become overwhelmed and multiple Kansas USAR Task Forces have been deployed to assist in search and rescue operations.

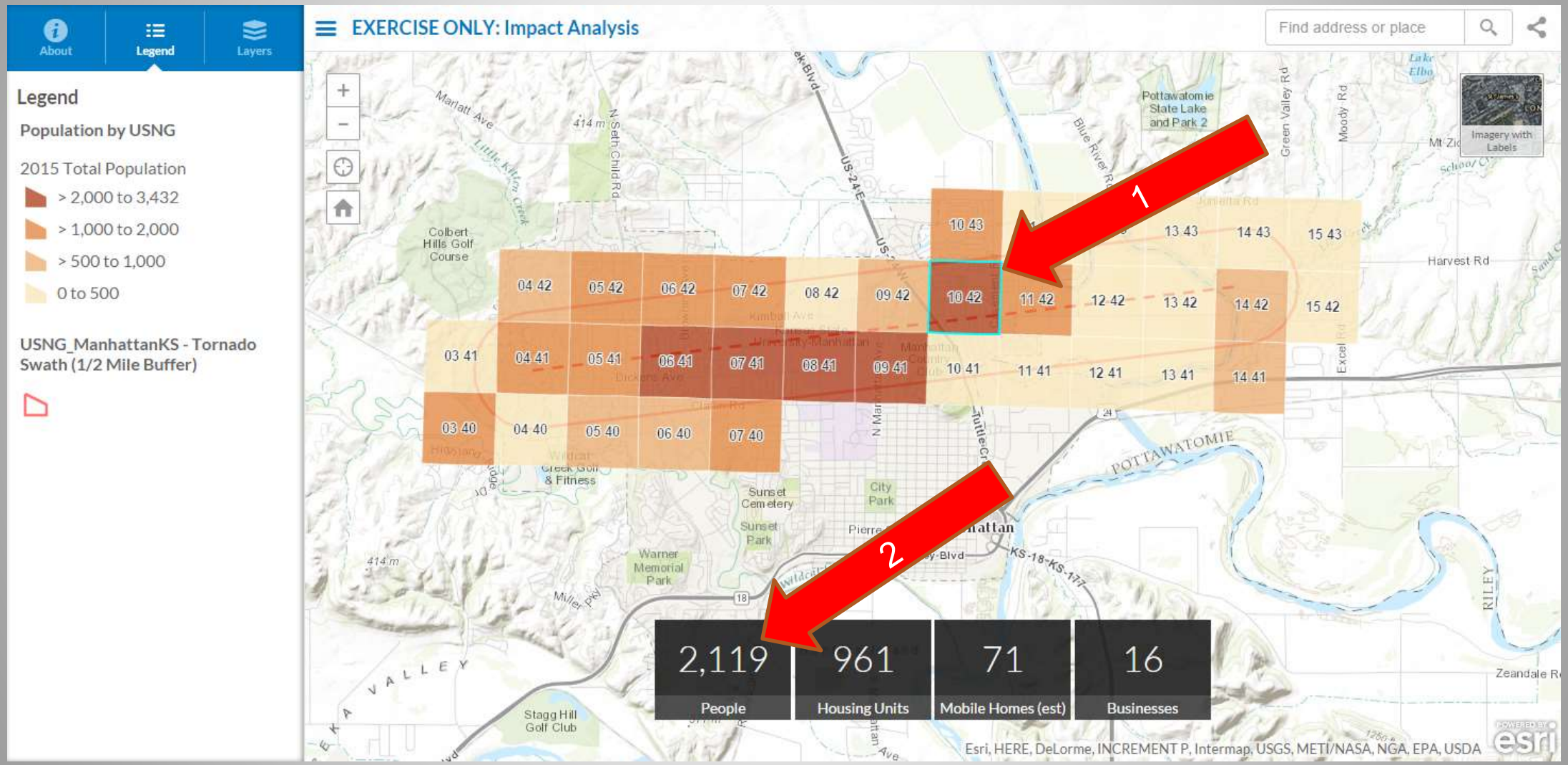
Practice 3

- How many people live in our impact area?
- How do we prioritize tactical areas? Where would you send resources first?

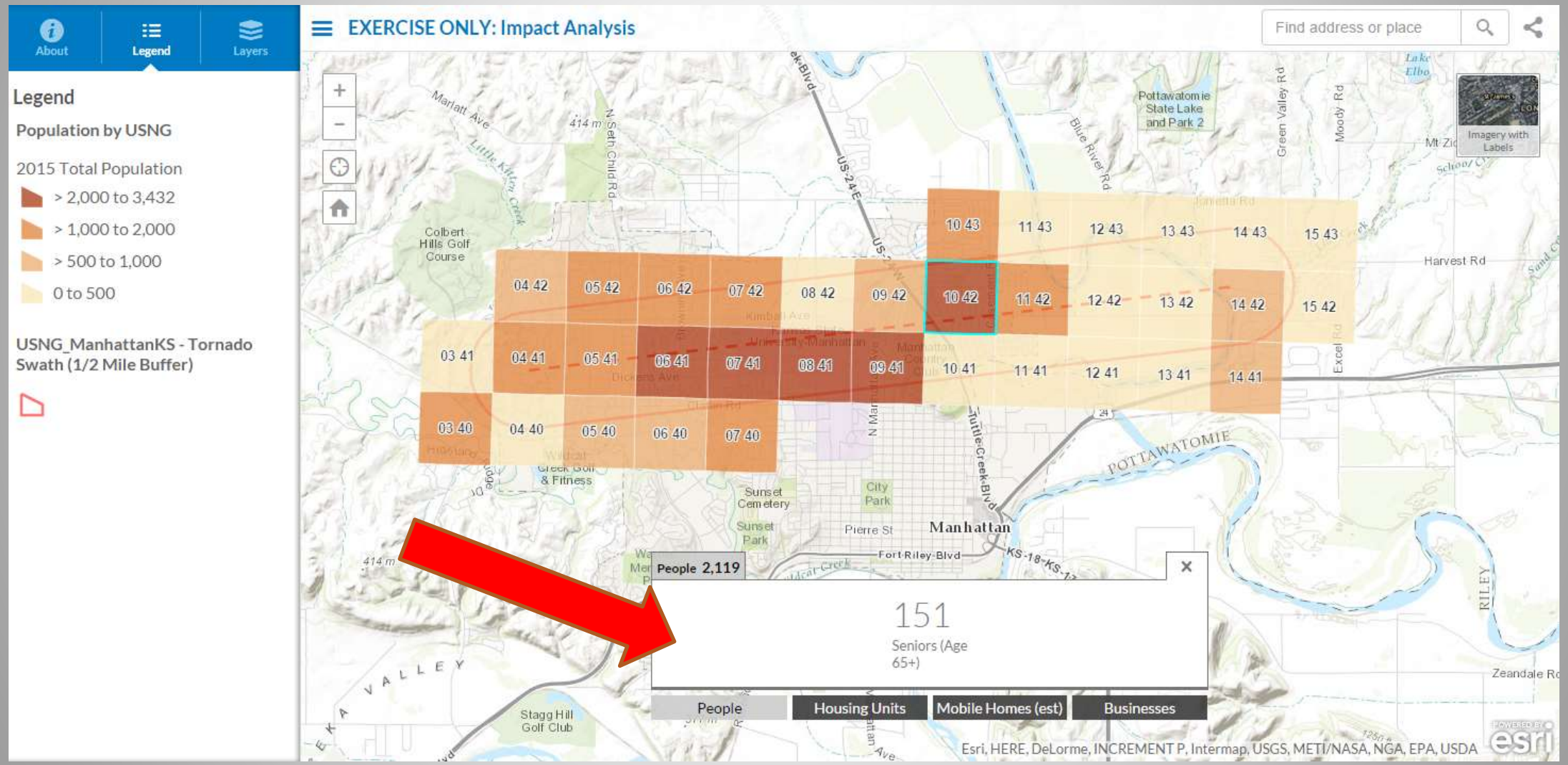
Practice 3


About
Legend
Layers
EXERCISE ONLY: Impact Analysis
Population and other demographic data for tornado impact area by 1000m US National Grid.
Modified 1/5/16, 11:12 AM
Find out more
Population by USNG
Entire Area
> 2,000 to 3,432
> 1,000 to 2,000
> 500 to 1,000
0 to 500
EXERCISE ONLY: Impact Analysis
Find address or place
Imagery with Labels
Pottawatomie State Lake and Park 2
Colbert Hills Golf Course
Manhattan
03 41
04 41
05 41
06 41
07 41
08 41
09 41
10 41
11 41
12 41
13 41
14 41
03 40
04 40
05 40
06 40
07 40
04 42
05 42
06 42
07 42
08 42
09 42
10 42
11 42
12 42
13 42
14 42
15 42
10 43
11 43
12 43
13 43
14 43
15 43
31k
People
13k
Housing Units
368
Mobile Homes (est)
728
Businesses
Esri, HERE, DeLorme, INCREMENT P, Intermap, USGS, METI/NASA, NGA, EPA, USDA | ...
esri

Practice 3


About
Legend
Layers
EXERCISE ONLY: Impact Analysis
Find address or place
Legend
Population by USNG
2015 Total Population
> 2,000 to 3,432
> 1,000 to 2,000
> 500 to 1,000
0 to 500
USNG_ManhattanKS - Tornado Swath (1/2 Mile Buffer)
Imagery with Labels
1
2
10 43
13 43
14 43
15 43
04 42
05 42
06 42
07 42
08 42
09 42
10 42
11 42
12 42
13 42
14 42
15 42
03 41
04 41
05 41
06 41
07 41
08 41
09 41
10 41
11 41
12 41
13 41
14 41
03 40
04 40
05 40
06 40
07 40
2,119
People
961
Housing Units
71
Mobile Homes (est)
16
Businesses
Esri, HERE, DeLorme, INCREMENT P, Intermap, USGS, METI/NASA, NGA, EPA, USDA

Practice 3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Legend
Layers
EXERCISE ONLY: Impact Analysis
Find address or place
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Population by USNG
2015 Total Population
> 2,000 to 3,432
> 1,000 to 2,000
> 500 to 1,000
0 to 500
USNG_ManhattanKS - Tornado Swath (1/2 Mile Buffer)
03 41
04 41
05 41
06 41
07 41
08 41
09 41
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11 41
12 41
13 41
14 41
03 40
04 40
05 40
06 40
07 40
04 42
05 42
06 42
07 42
08 42
09 42
10 42
11 42
12 42
13 42
14 42
15 42
10 43
11 43
12 43
13 43
14 43
15 43
People 2,119
151
Seniors (Age 65+)
People
Housing Units
Mobile Homes (est)
Businesses
Manhattan
Pottawatomie State Lake and Park 2
Colbert Hills Golf Course
Sunset Cemetery
City Park
Stagg Hill Golf Club
Imagery with Labels
Esri, HERE, DeLorme, INCREMENT P, Intermap, USGS, METI/NASA, NGA, EPA, USDA

Practice 3

- How many people live in our strategic planning area? 31,000 people, 13,000 Housing Units, 368 Mobile Homes, 728 Businesses

- How do we prioritize tactical areas? Where would you send resources first? High density, Mobile Homes, Vulnerable Populations

Why Use USNG?

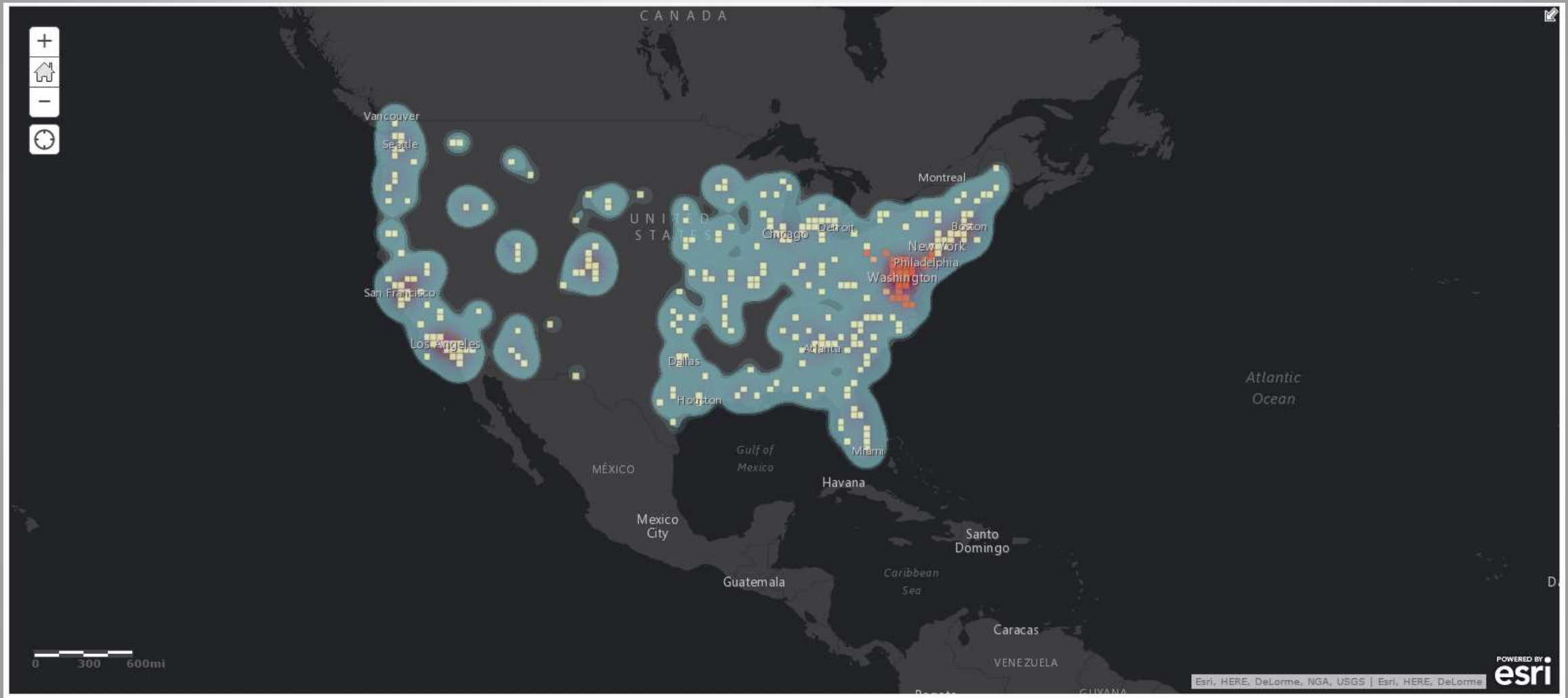
- The USNG:
  - Provides a **UNIFIED** language for defining Areas of Interest, reporting & planning and navigation.
  - Transforms data to **ACTIONABLE** information in a **UNIFORM** format.
  - Provides a **CONSISTENT** situational awareness across jurisdictions, disciplines & all levels of operations.
  - **INTEROPERABILITY** in both connected and disconnected environments

Solution

- Use the US National Grid for all operations and trainings
- Engage with local GIS Specialists* to help you with day-to-day operations
  - Invite them to a training event or meeting?
  - Build hasty mapping tools any responder can use
  - Setup a Memorandum of Understanding (MoU) for disaster response *before* the next local disaster

**NAPSG Foundation Regional Leadership Teams*
http://www.napsgfoundation.org/about/regional-leadership-teams/

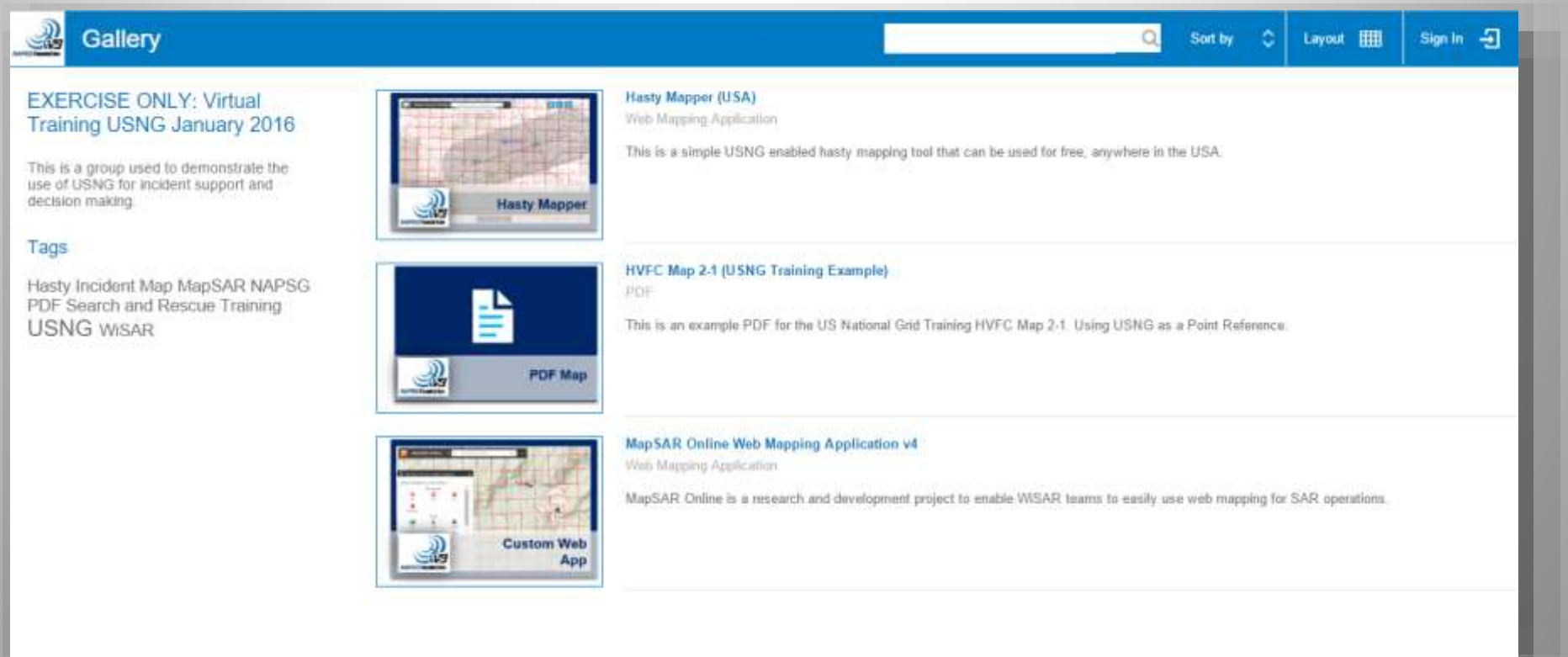
Public Safety GIS Community



http://www.napsgfoundation.org/about/regional-leadership-teams/

Resources

- NPS Training (Unit 12 – Land Nav.) http://bit.ly/J9Tmg0
- Training Materials Gallery http://arcg.is/1O76OlS



Thank You to the SARWG

Name	Agency	State
Cole Brown	Maryland State SAR	MD
Jared Doke	Kansas GIS Response	KS
David Hansen	GISCorps	CA
Don Ferguson	Appalachian Search and Rescue Conference	WV
Vanessa Glynn-Linaris	National Park Service	CA
Richard Laing	Ridge Meadows SAR (Canada)	BC
Eric Menendez	Appalachian Search and Rescue Conference	PA
George Durkee	National Park Service	CA
Lori Peltz-Lewis	US Forest Service	CA
David Kovar	National Association for Search and Rescue	NJ

Thank You for Content & Support

- Rand Napoli
- Carla Boyce
- Ken Phillips
- Cole Brown
- Jared Doke
- National Search and Rescue Committee
- National Association for Search and Rescue
- http://usngcenter.org/

NAPSG Contact - Paul Doherty: pdoherty@publicsafetygis.org

NASAR Contact - Bryan Enberg: bryan.Enberg@gmail.com

USNG Resources - http://bit.ly/NAPSG_USNG

Thank You!