

## UTM Coordinates, how they are found, and how they relate to NatureMapping

The NatureMapping Program is interested in knowing where wildlife is found. All wildlife uses certain habitats for their needs. NatureMapping is interested in habitats that are the size of football fields (approximately a 100 meter x 100 meter area) or larger.

It is important that you know exactly where you found the different species you are looking for. For each football field sized (1-hectare) or larger area you observe wildlife in, you will need to know exactly where that area is. For your monitoring project, Iowa NatureMapping is requesting that you use the Universal Transverse Mercator (UTM) system to locate your study area(s).

The UTM system is a way of pinpointing a location with a set of coordinates. Below is a description of how to use the UTM system

For additional help, use the graphic at the end of these instructions to help visualize the process.

### Understanding the UTM System

1. UTM stands for Universal Transverse Mercator. It is one way to pinpoint a location on a map.
2. UTM numbers are in Kilometers. Add three zeros and you have converted them to Meters.

Example 1: 400 kilometers is equal in distance to 400,000 meters.

Example 2: 200,000 meters is equal in distance to 200 kilometers.

3. The UTM numbers coincide with a light blue tick mark along the edges of the 7.5' USGS Quadrangle. Some 7.5' Quadrangles don't have the blue ticks, but instead have a fine black UTM grid laid out over the entire map, similar to the grid shown in the graphic.
4. What about UTM numbers? Why do they look funny? UTM numbers are numbers that are printed along the left, right, top, and bottom of the 7.5' Quadrangle Map. The individual digits are printed in two different sizes. This DOES NOT indicate where a comma or decimal goes. Apparently, the different sized digits help the reader distinguish the UTM numbers from the myriad of other numbers printed along the sides. Some of the other numbers represent Latitude and Longitude coordinates and Township and Range numbers.
5. The UTM system is laid out in a grid pattern. Think of finding a UTM coordinate like finding an (x) and (y) point in Algebra. In Algebra, it is called the Cartesian coordinate system.
6. There are two numbers to be found in a UTM coordinate. The first number coincides with an East direction (or "Easting"). This is (x). These numbers can be found along the top and bottom of the Quadrangle. The second number coincides with a North direction (or "Northing"). This is (y). These numbers can be found along the left and right sides of the Quadrangle.
7. Always "read RIGHT, UP" - find the distance to the EAST, then the distance to the NORTH.

8. 1 Kilometer = 1000 Meters. Each UTM grid square is 1-kilometer in length on each side, or 1000 meters on each side.
9. UTM coordinates can be found accurately to the nearest 25 meters using a 7.5' Quadrangle Map and an appropriate scale bar. For NatureMapping, finding the UTM coordinates to the nearest 100 meters is accurate enough.
10. Each set of UTM coordinates correspond to a given zone. Remember, most of Iowa is in Zone 15. Part of the state is in Zone 14, which includes parts of Lyon, Sioux, Plymouth, Woodbury, Monona, Harrison, and Pottawattamie Counties in western Iowa.
11. To find out which Zone you are in, look in the lower left corner of a 7.5' Quadrangle map.
12. An example of a UTM coordinate: UTM coordinates are written 454,250m E. x 4,661,500m N., Zone 15. (Read four hundred fifty-four thousand two-hundred fifty meters East by four million six-hundred sixty-one thousand five hundred meters North, Zone Fifteen). Remember to always include the Zone in your UTM reading. The UTM numbers are exclusive to just one spot in each zone, however, the same set of coordinates are used over again in every other zone.
13. This UTM coordinate will coincide with one 100-meter x 100-meter area, or plot (usually the coordinate represents a point in the center of the area). This 1-hectare area is large enough for you to determine the dominant habitat type for the area you are monitoring. You may have a monitoring site larger than 1 hectare. In that case, you have two options: (1) locate and use different sets of UTM coordinates for any additional 100m x 100m areas, or plots, or (2) determine a unique area larger than 1-hectare for each UTM coordinate. In the first option, you may want to do this if you are monitoring consecutive 1-hectare areas, along a hiking trail for example. This would be considered a type of point count, where you monitor at regular time intervals at each site, and perhaps return regularly to those points. In the case of the second option, the UTM coordinate may coincide with an area larger than 1-hectare, such as a large forest or other contiguous habitat that varies little in vegetation cover. This is considered a more casual observation technique, such as when we go on a bird hike and record every bird species we see, without placing each individual species at a particular coordinate. When recording what you see using the second option, it is important for the UTM coordinate be in the dominant habitat type you describe for the larger area. Remember, you do not need to create more 1-hectare sized areas than you are willing to monitor. Monitor as many sites as is practical for you.

Example of option 2:

Remember, for the purposes of NatureMapping, recording species according to the 1-hectare plot is the most accurate method, and gives the best information about the habitat a species is using. However, let's say you are at Ledges State Park near Boone, Iowa. Ledges SP is around 1500 hectares in size. It is dominated by these habitat types: Upland Deciduous Forest (UPDF), Lowland Deciduous Shrubland (LOSH), Rural Maintained Parkland (RPRK), and several large patches of Tallgrass Prairie (TALP). Each of these dominant habitat types occupies distinct contiguous areas each larger than 1-hectare (100m x 100m). If you were to bird watch at Ledges SP, you may spend much of your time walking around a given habitat observing and recording

what you see. Rather than keep track of many 1-hectare sized plots within each large habitat type, you would keep track of all birds within that larger habitat area, Upland Deciduous Forest, for example. You would then submit those bird species for one site, a site with one UTM coordinate representing roughly the center of the larger dominant habitat where you spent time bird watching. If you went to a different habitat type, you would find the UTM coordinates for it and report only the species you saw within that area. This type of sampling works well with species that are highly mobile, such as birds. Of course, bird watchers are a highly mobile species as well!

Exceptions to option 2:

Let's say you are at Ledges State Park and you find a seasonally flooded depression (wetland) within the Upland Deciduous Forest (UPDF) habitat area. This area may or may not be larger than 1-hectare, but for this example, let's say it is still considered Upland Deciduous Forest habitat. Within this wetland, you see tiger salamanders and hear chorus frogs. Do you report these species using the UTM coordinate that represent the entire Upland Deciduous Forest habitat described in the previous example, or do you find new coordinates for just this smaller seasonally flooded wetland? Certainly, you could just report these species to the larger area, but it may be very important to know that these species are using this temporary wet area. There may only be several of these wetland areas in the Upland Deciduous Forest habitat, and therefore, that is why they are found in this spot at all. A more accurate coordinate can be very informative, especially for less mobile species, such as frogs, toads, salamanders, turtles, snakes, and some mammals. Greater coordinate accuracy can tell you a lot more about habitat variations.

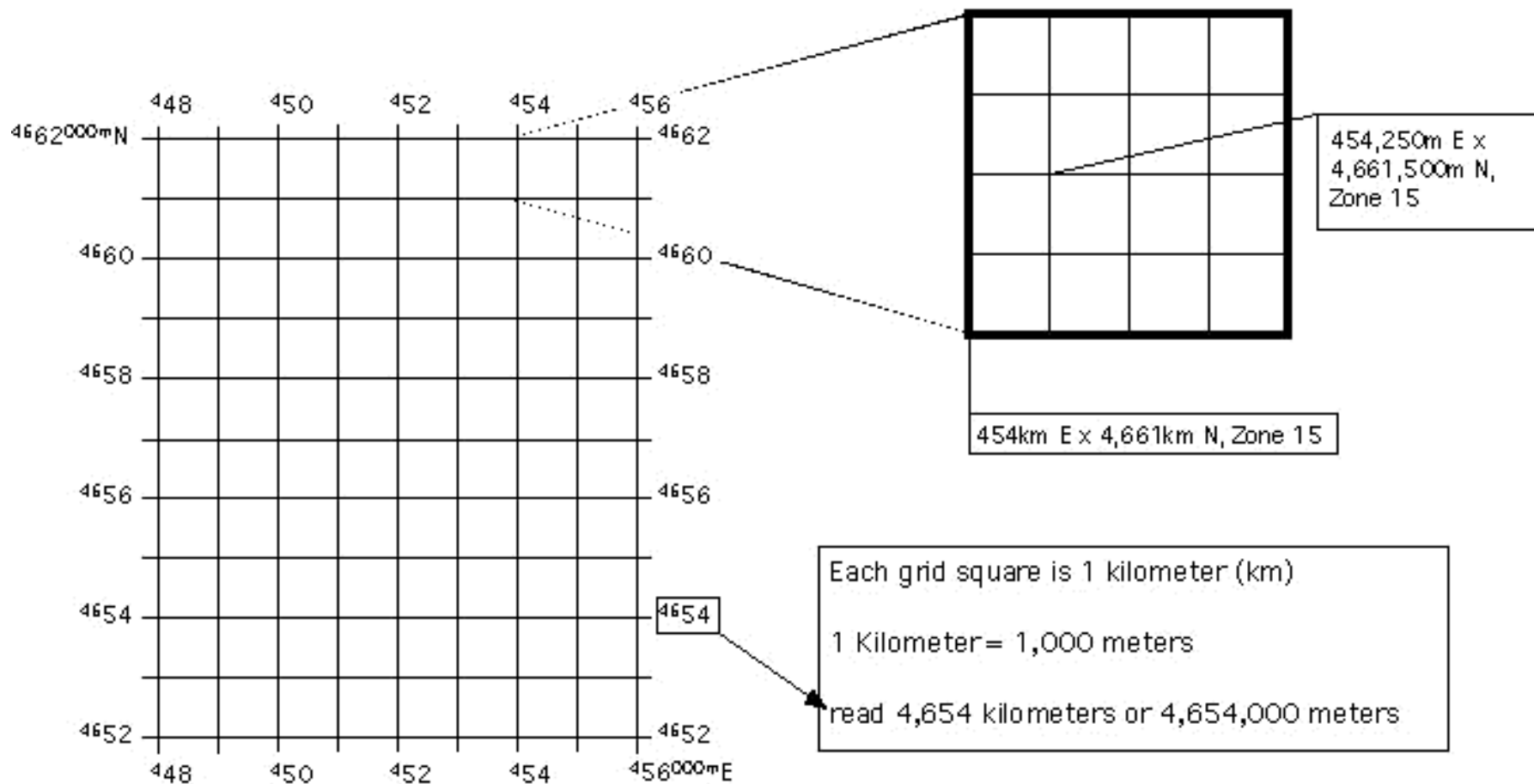
14. Why not use Latitude and Longitude or the Tier, Range, and Section (TRS - often called the Township, Section, and Range) to describe a location?

The advantage of using UTM's is that they are precise points based entirely on actual distance. On a map, distance and area are important. When laying out your monitoring site for NatureMapping, you can use the UTM grid scale on a 7.5' Quadrangle to measure out the area. Latitude and Longitude (or Lat/Long) coordinates are precise points as well, yet the information is not distance-based. You've probably noticed how the longitude lines (those running vertically on a globe) converge at the poles. This convergence makes it difficult to convert "degrees" traveled West to East into "distance" traveled West to East. In other words, a degree traveled West to East near the poles is not equal in distance to a degree traveled West to East at the Equator.

Tier, Range, and Section tend to be cumbersome when describing a 100-meter x 100-meter sized area. Of course, technology is constantly changing, and now there is a web-based TRS to UTM coordinate converter. You can find this converter at [www.igsb.uiowa.edu/database/gsbdata.htm](http://www.igsb.uiowa.edu/database/gsbdata.htm). The UTM coordinate is found by entering a Tier, Range, and Section for a given area. The computer sends back a UTM coordinate for the center of the area you described using TRS.

15. Another advantage to using UTM coordinates is that they are increasingly becoming the convention in other monitoring programs. The UTM is also one of many coordinate systems included on hand GPS (Global Positioning Satellite) units.

## 1 000-meter Universal Transverse Mercator grid, Zone 15



Always "read RIGHT, UP"