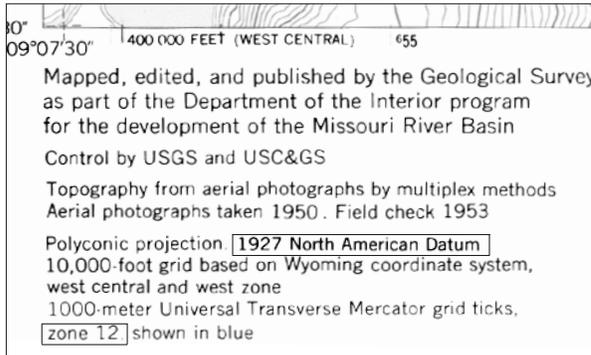


# UTM

## Universal Transverse Mercator (UTM)

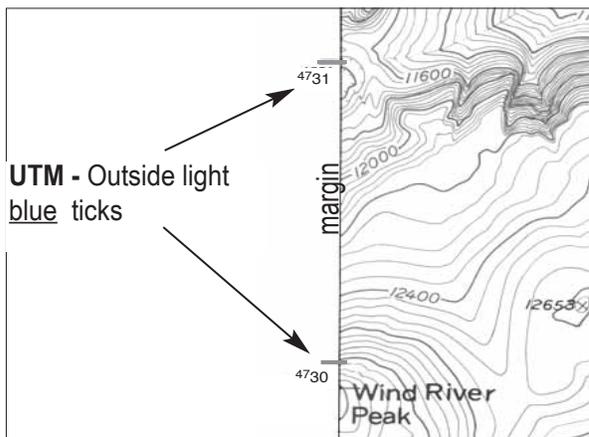
is a 1,000 meter by 1,000 meter square, coordinate system, and is measured from the Equator (0° latitude) and a zone meridian located in the center of each zone. UTM divides the Earth into 60 zones, so it is important to identify and document the zone number and map datum from the map, for GPS receiver use (Figure 5).



Map Datum and UTM Zone (Figure 5)

Map datums were created because the Earth is not a perfect sphere and corrections for mapping are needed. When using a map with no map datum identified use World Geodetic System 1984 (WGS-84).

UTM is marked on a USGS topographic map with blue ticks (Figure 5) and is labeled using an easting (always increases right) and a northing (always increases up). Full UTM labels (4722000mN) are in the lower right-hand and upper left-hand corners of the map, with other UTM labels abbreviated (4731).

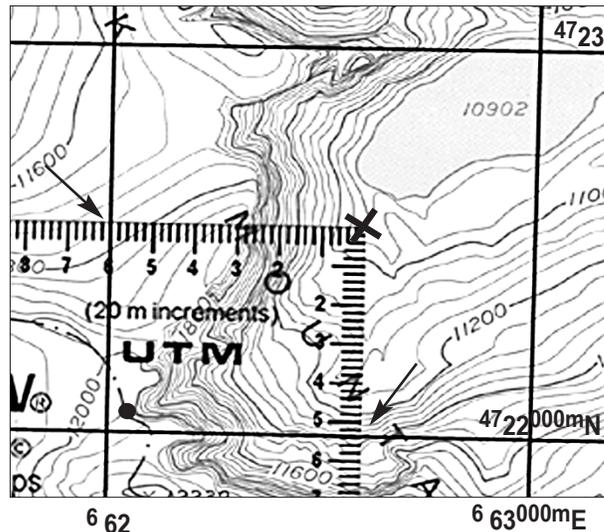


UTM Tick Marks (Figure 6)

## UTM Positioning

1. Document zone number and map datum.
  - zone 12 & 1927 North American Datum (NAD-27us) (Figure 5)

2. Mark position with an "X"
3. Identify blue UTM ticks and labels around map's margin and draw lines connecting equal value UTM ticks to form a 1,000 meter square around the "X" (Figure 7).



UTM Measurement - (Figure 7)

4. Place "0" of the UTM scale at the "X"
  - Keep UTM scale parallel to the grid lines.
5. Identify the value on the scale at the left side of the square, **600 m** (Figure 7).
6. Add 600 meter to the value on the scale at the left side of the square,  $662^{000}m$ .
  - $600\text{ mE} + 662^{000}mE = 662^{600}mE$
7. Identify the value on the scale at the bottom of the square, **540 m** (Figure 7).
8. Add 540 m to the value of the bottom of the square,  $4722^{000}m$ .
  - $540\text{ mN} + 4722^{000}mN = 4722^{540}mN$

Final UTM coordinate is:

**662600mE 4722540mN zone 12 NAD-27us**

Set GPS to **NAD-27us** map datum before entering coordinate. An advantage of using UTM is that it is possible to visually approximate a position with 100 meter accuracy or better.

NAVIGATION CURRICULUM	
	MAP MAKING
NUMBER 1	UTM
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