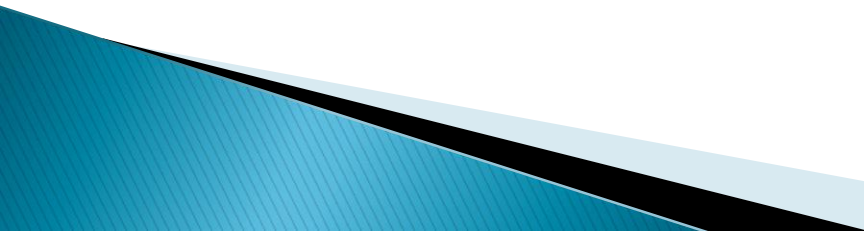


Map and GPS Fundamentals

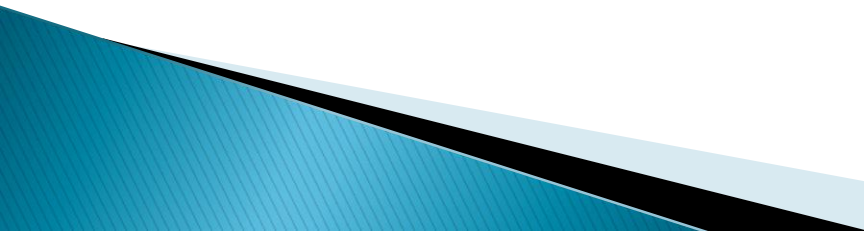
Day 2



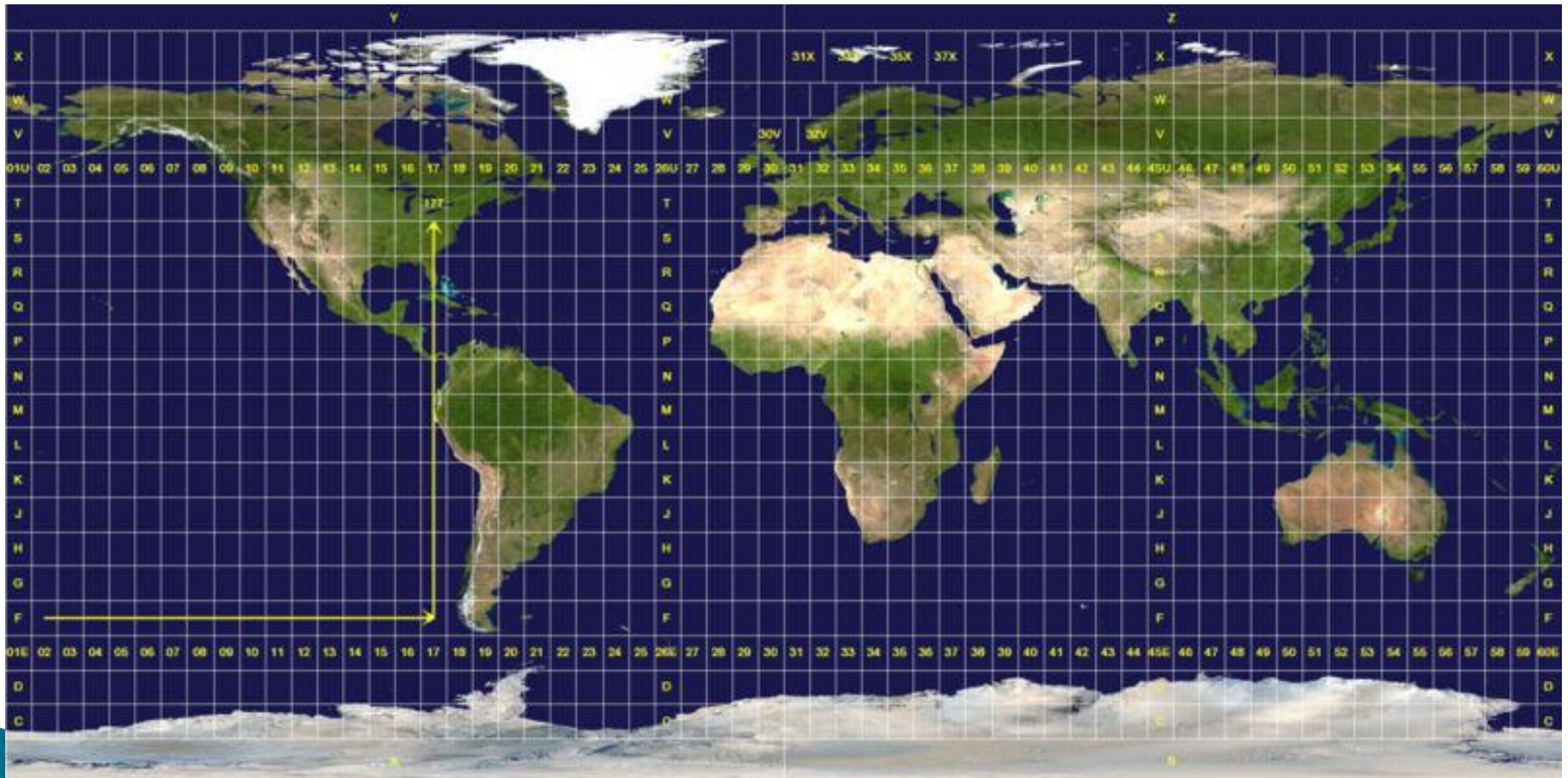
Seminar Objectives – Day 2

- ▶ ~~Read topographic maps~~
 - ▶ ~~Understand geographic coordinate system (Lat, Lon)~~
 - ▶ ~~Plot Lat/Lon coordinates on maps~~
 - ▶ ~~Read Lat/Lon coordinates off maps~~
 - ▶ ~~See demo of Google Earth~~
 - ▶ Understand UTM coordinate system
 - ▶ Plot UTM coordinates maps
 - ▶ Read UTM coordinates off maps
 - ▶ See demo of National Geographic TOPO! Software
 - ▶ Learn how to download tracks to your GPS
 - ▶ Begin geocaching competition
- 

UTM Defined

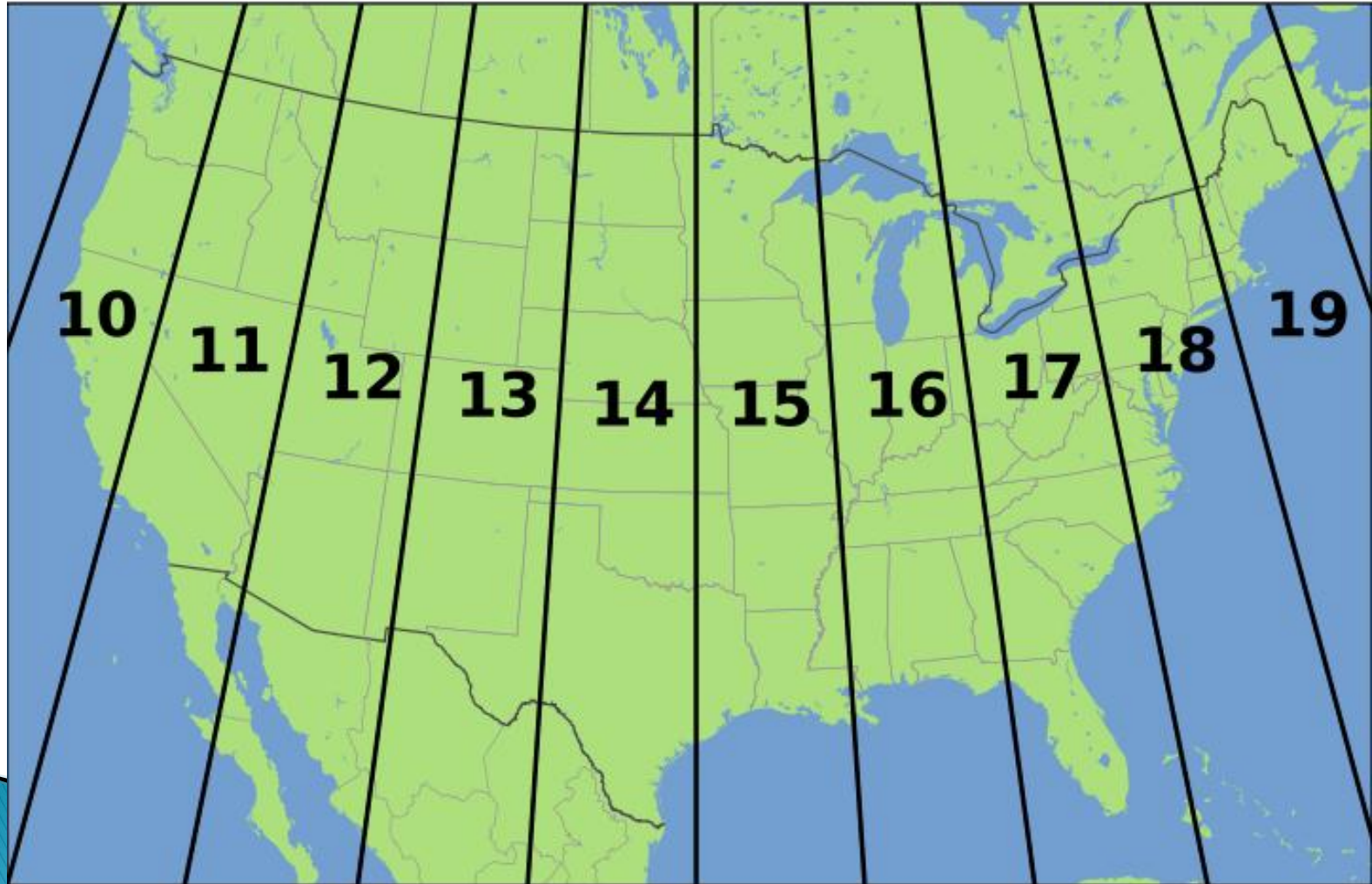
- ▶ Developed by US Army Corps of Engrs in 1940s
 - ▶ Employs a system of 60 zones for the earth
 - ▶ Each Zone is segmented into 20 latitude bands, each band is 8 degrees high
 - ▶ Coordinates consist of a easting and northing pair
 - ▶ Northing is the no. of meters north of the equator
 - ▶ Easting is the no. of meters east of Zone 12 boundary (which passes roughly through Yuma, AZ)
- 

UTM Grid for the World

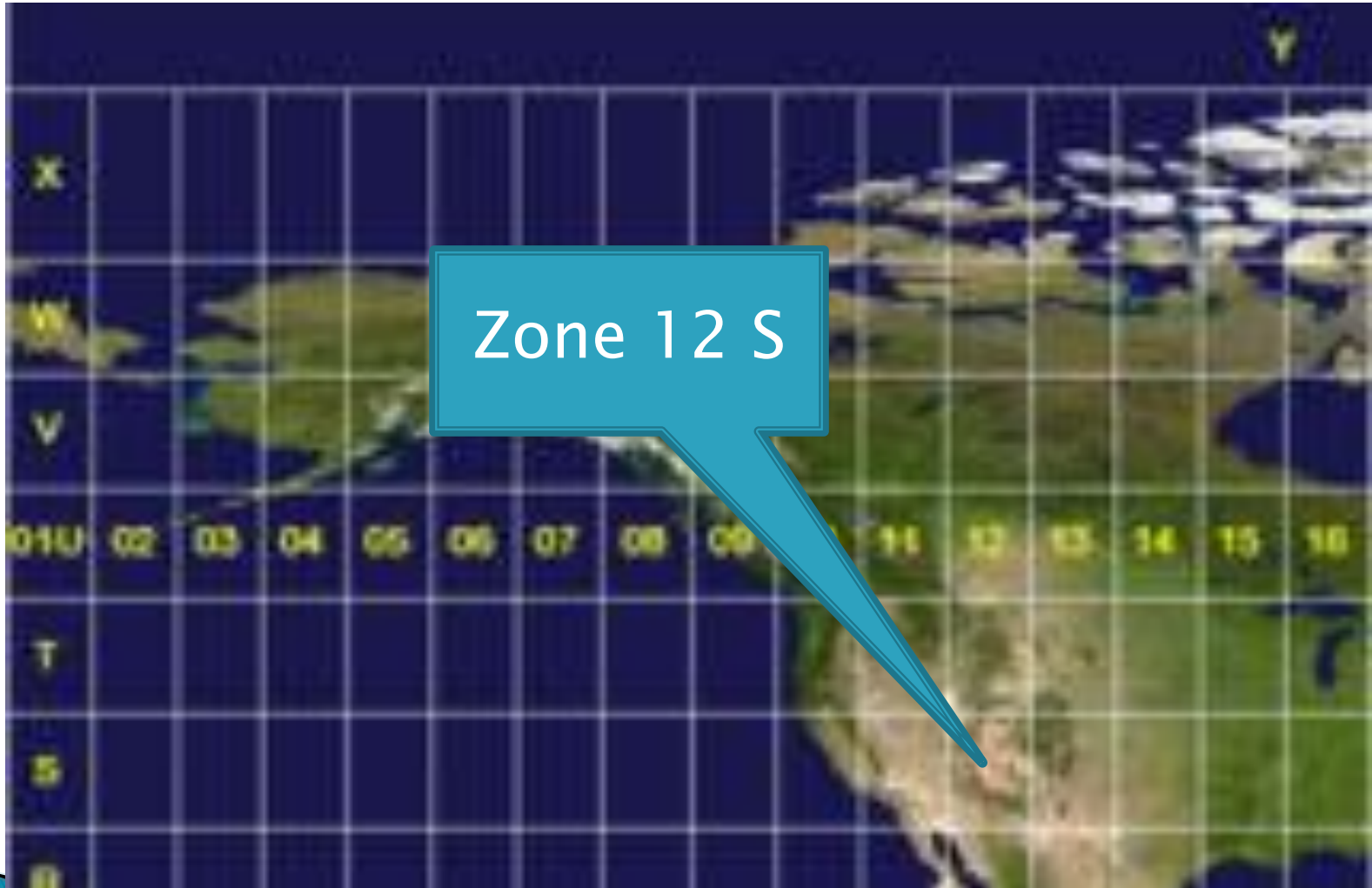


US Zones

126°W 120°W 114°W 108°W 102°W 96°W 90°W 84°W 78°W 72°W 66°W



UTM Zone for most of Arizona



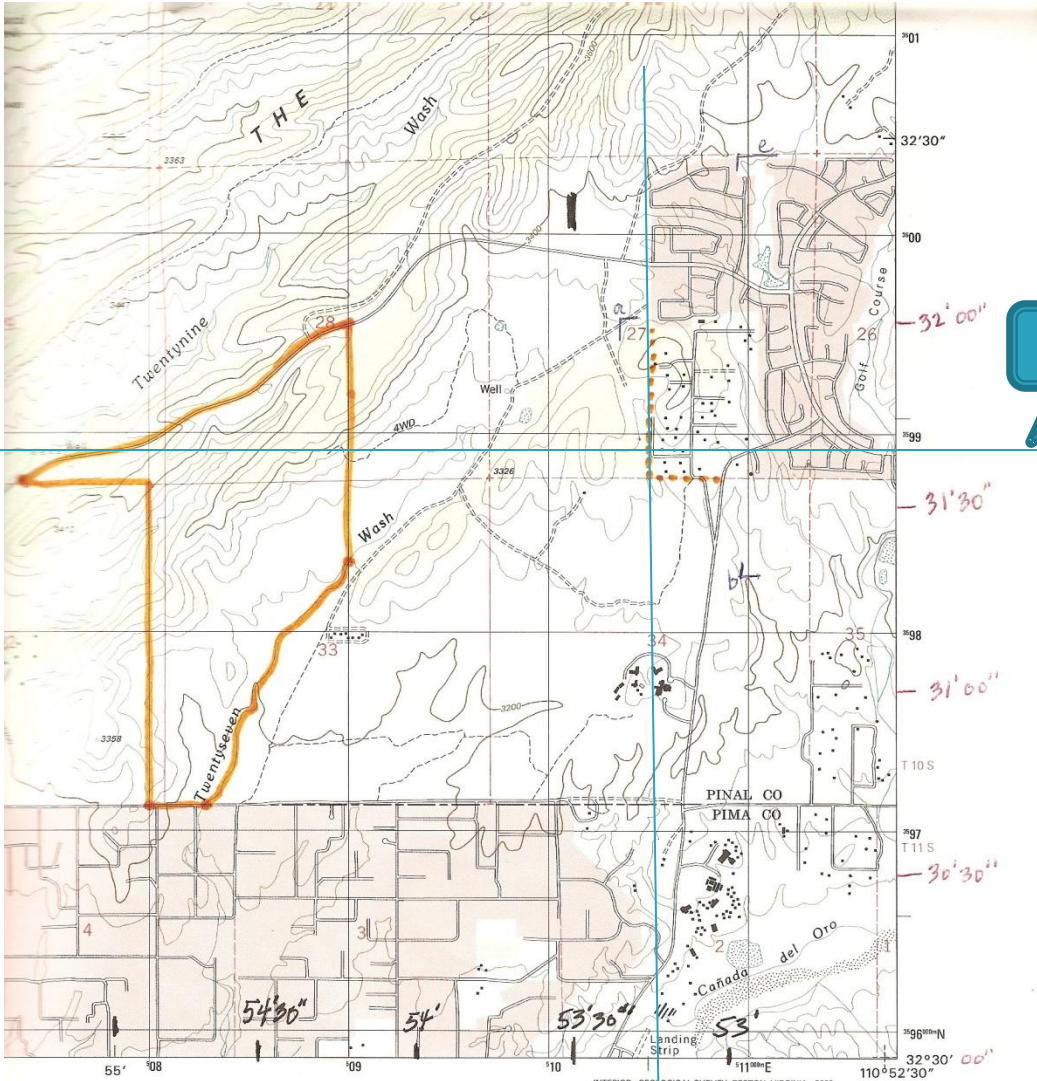
UTM Subzones

- ▶ GPS receivers, when set to show UTM coordinates, will show the Zone and Latitude Band
- ▶ The 11 / 12 Zone line passes north–south through Yuma, AZ
- ▶ The R/S Band line passes east–west about 34.4 miles south of Catalina, AZ (just north of the San Xavier Mission)
- ▶ This means:
 - The Santa Ritas are in Zone 12 R,
 - The Tucsons, Rincons, Santa Catalinas are in 12 S.

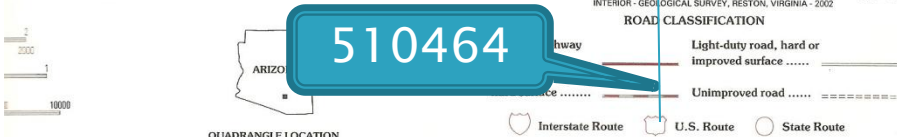
My House

Zone
12 S

3598941



510464



1	2	3	1 Chief Butte
			2 Fortified Peak
			3 North of Oracle
4		5	4 Tortolito Mountains
			5 Oracle
			6 Ruelas Canyon
			7 Oro Valley
6	7	8	8 Mount Lemmon

ADJOINING 7.5' QUADRANGLE NAMES

ORACLE JUNCTION, AZ
1996

NIMA 3849 III SW-SERIES V898



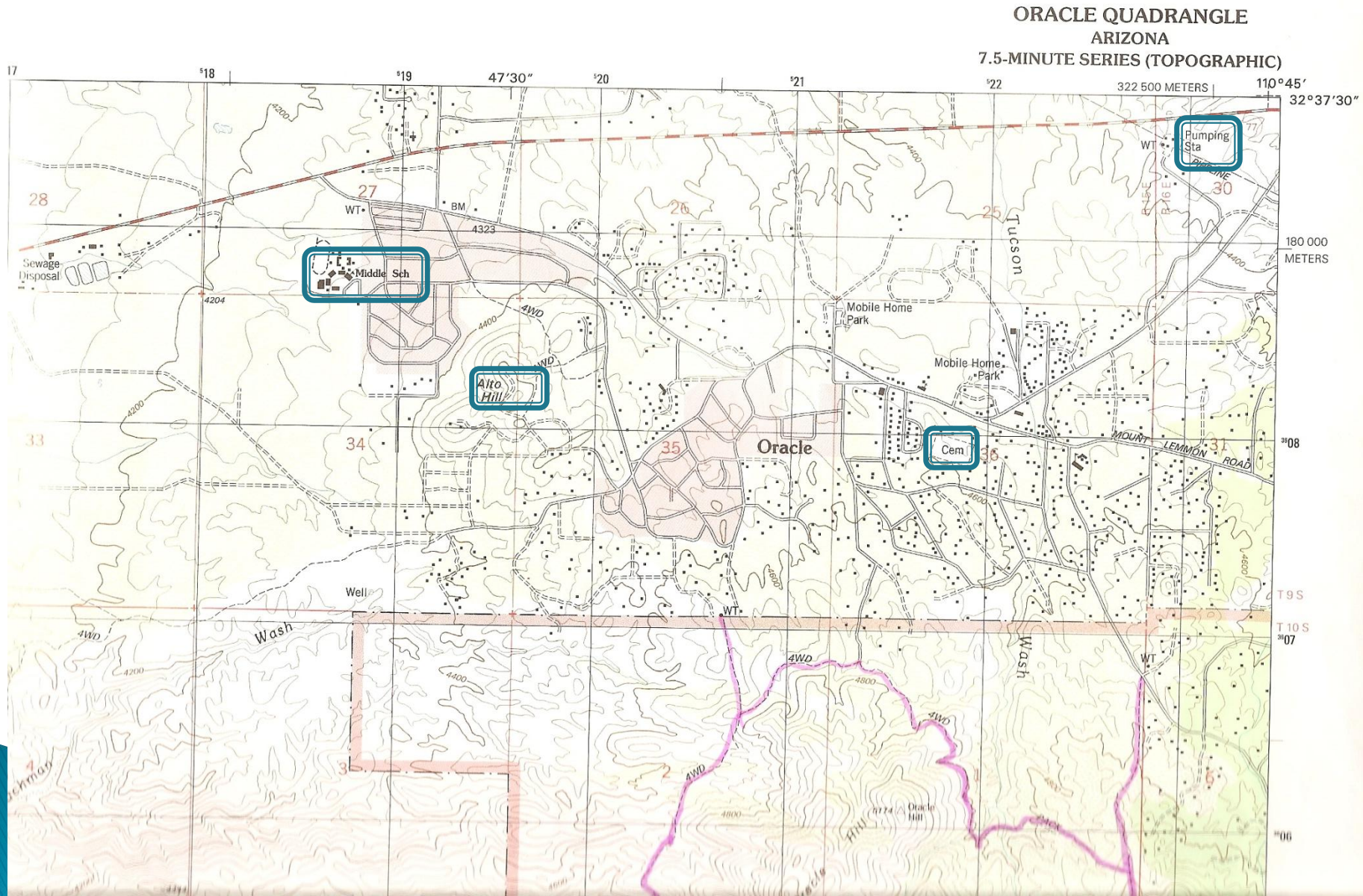
What's so great about UTM?

- ▶ Universal Transverse Mercator
 - World-wide system
 - Easy to interpret
 - 1 digit = 1 meter (about 1 yard)
 - 1000 meters (1 km) = about 0.6 mile
 - Easy to approximate from a known position
 - Easier to plot
- ▶ Common to other GPS users
 - Search-and-rescue
 - Firefighters, police
 - Published topo maps
 - USGS maps show a UTM grid, 1 km x 1 km

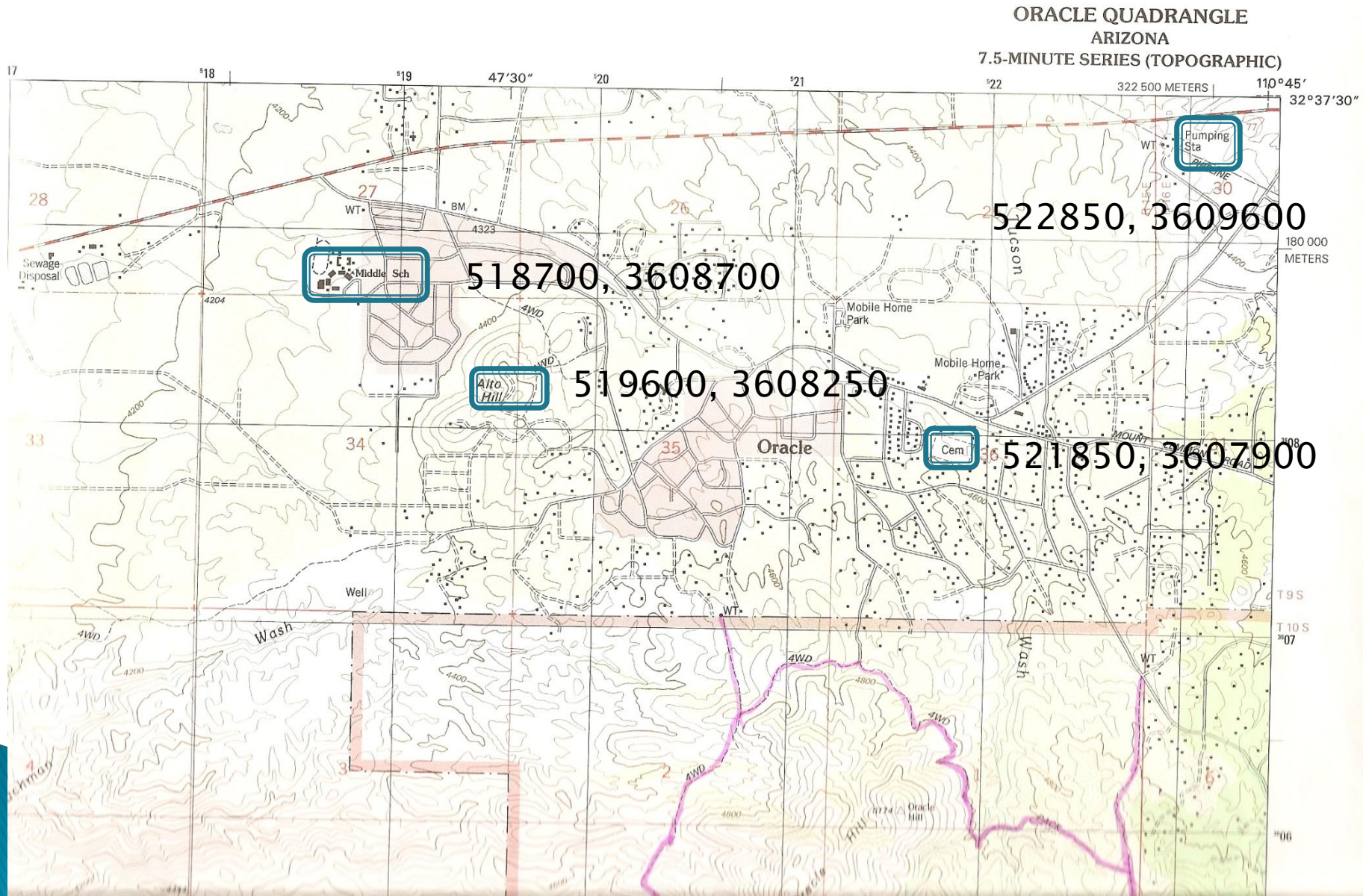
Exercises

- ▶ Determine the location of several points using UTM coordinates
- ▶ Follow up with on-screen location answer, provide “over-the-shoulder” help by guides, who have “Cheat Sheets”
- ▶ Plot the locations of several points using coordinates such as those provided by your GPS

USGS Oracle Quad (NE corner)



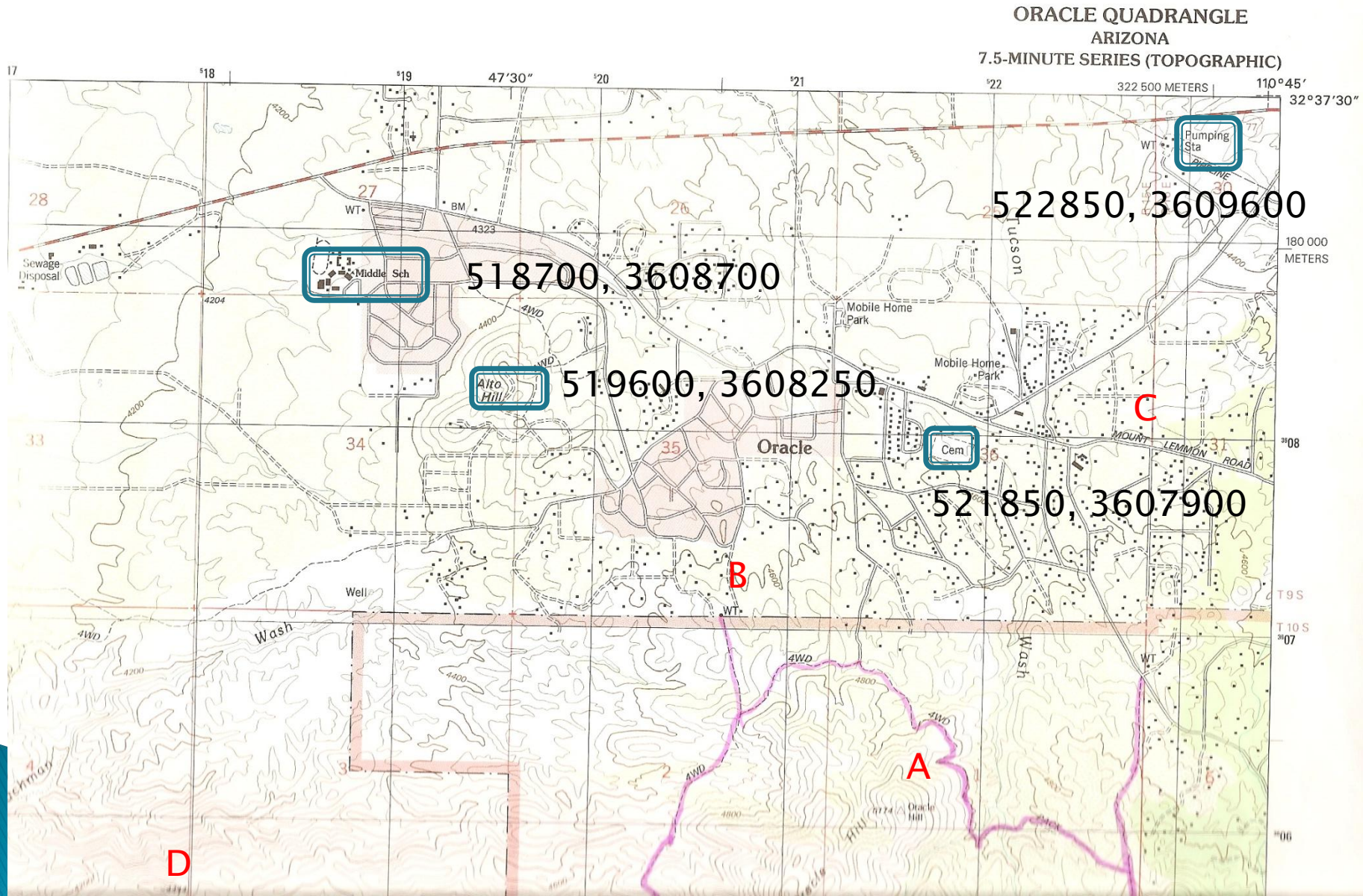
USGS Oracle Quad (NE corner)



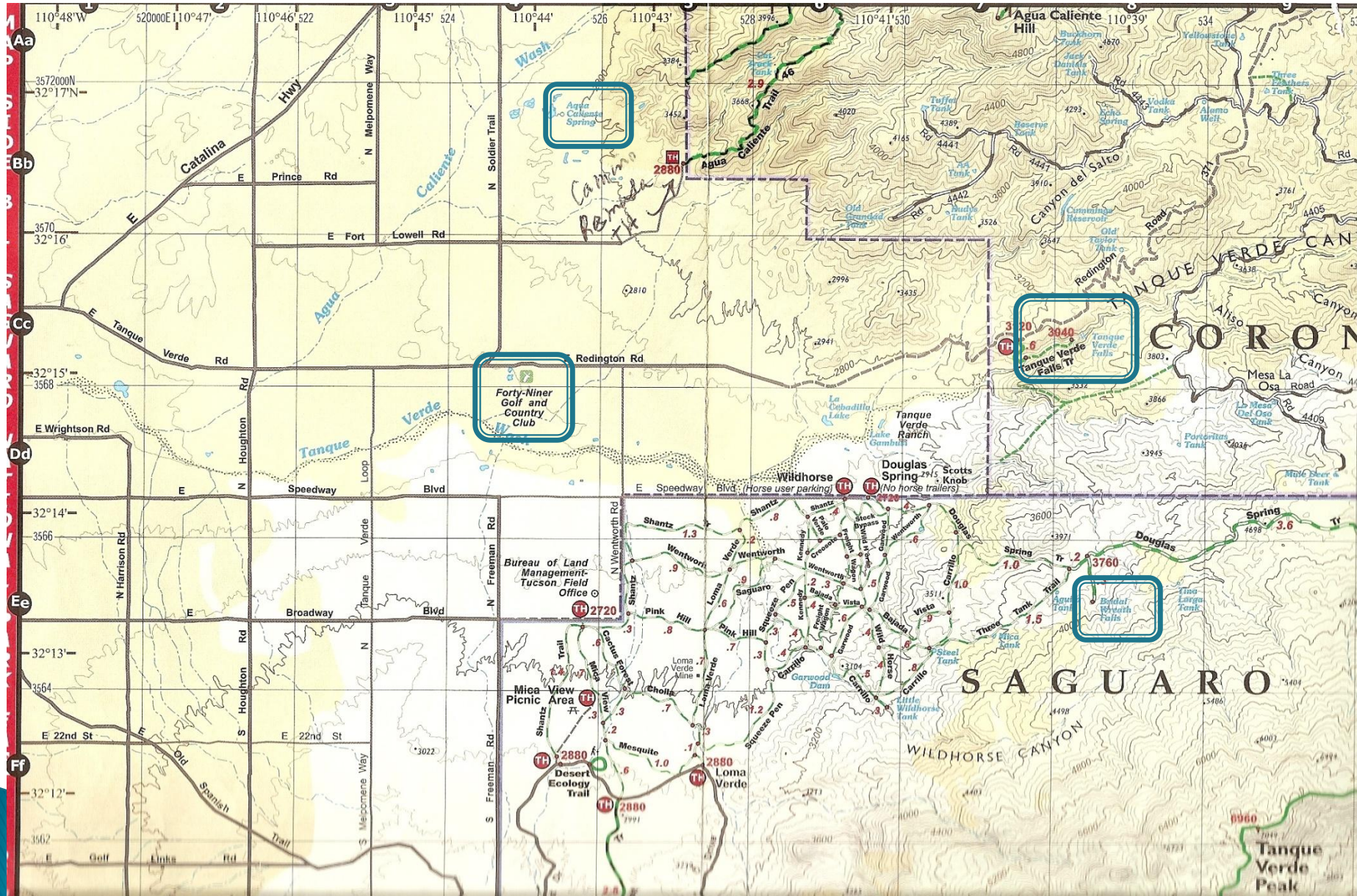
Plot these UTM coordinates on USGS Oracle Quad

- ▶ A – 521650, 3606100
- ▶ B – 520700, 3607100
- ▶ C – 522750, 3608000
- ▶ D – 517085, 3606350

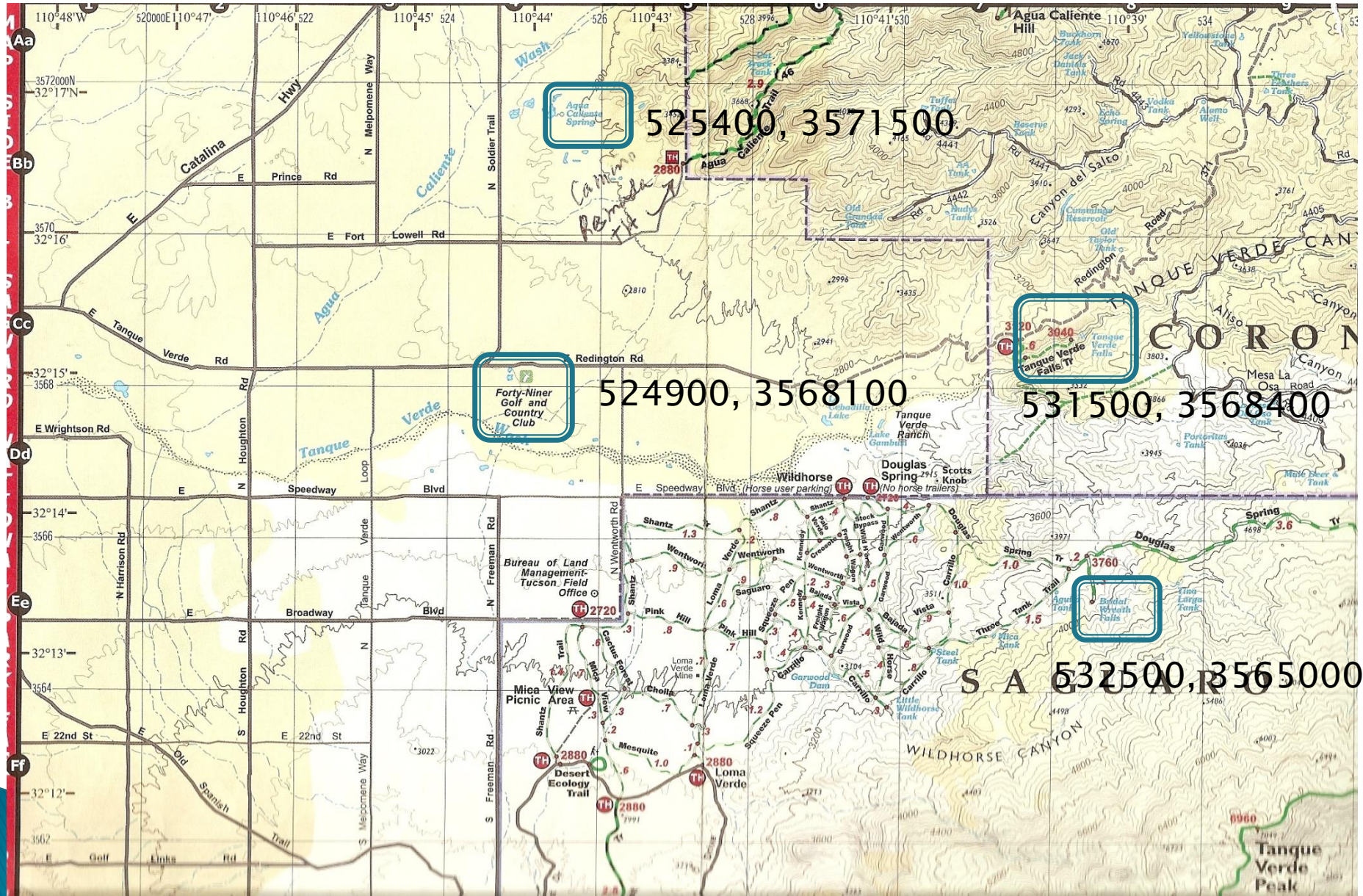
USGS Oracle Quad (NE corner)



Green Trails Map - Saguaro NP



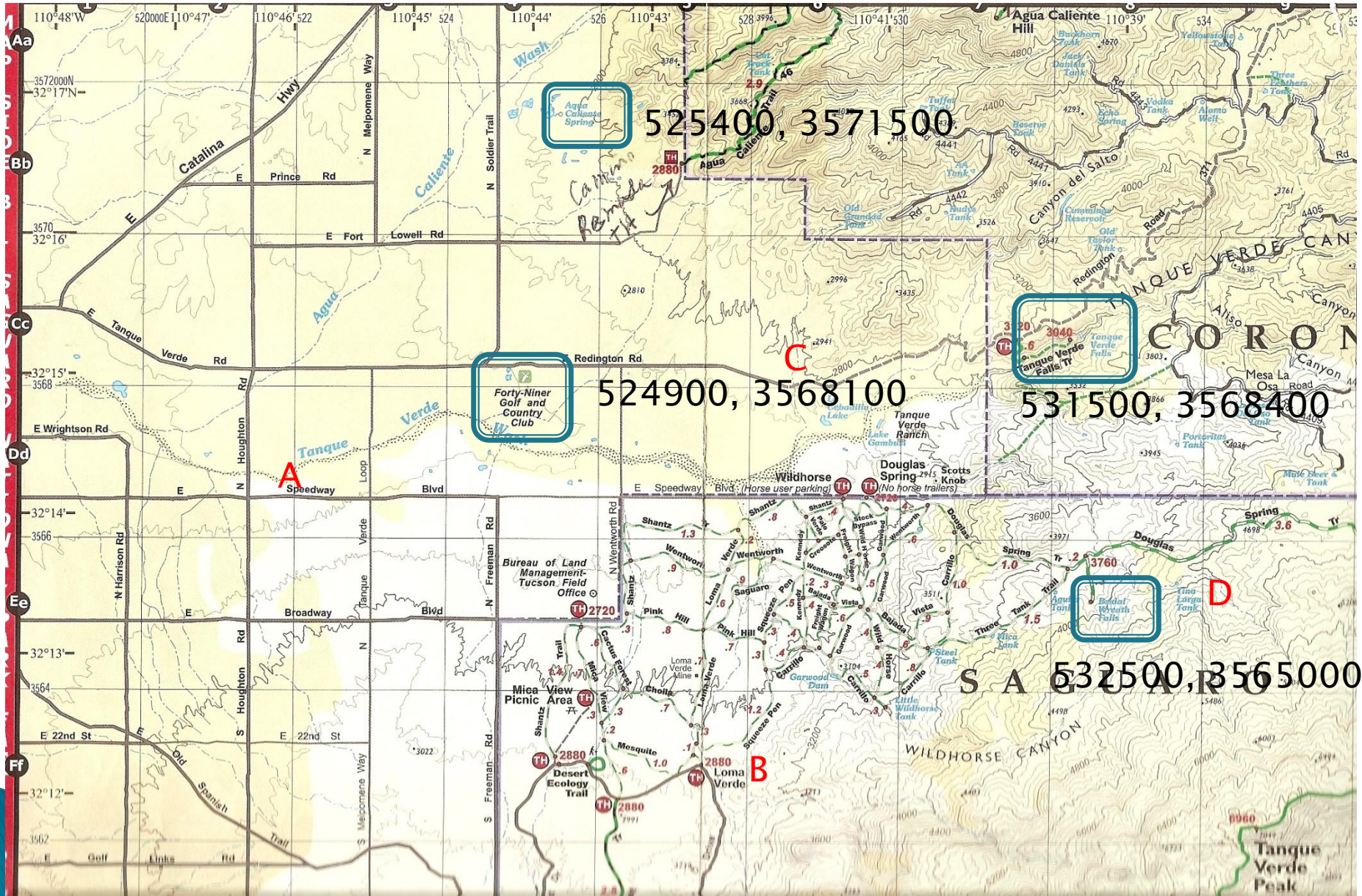
Green Trails Map - Saguaro NP



Plot these UTM coordinates on Green Trails Saguaro NP

- ▶ A - 521400, 3566600
- ▶ B - 527300, 3563000
- ▶ C - 528400, 3568000
- ▶ D - 533600, 3565300

Green Trails Map - Saguaro NP



525400, 3571500

524900, 3568100

531500, 3568400

532500, 3565000

Plot these UTM coordinates on USGS Oracle Quad (Cheat Sheet)

- ▶ A – 521650, 3606100 (Oracle Hill)
- ▶ B – 520700, 3607100 (Water Tower 2)
- ▶ C – 522750, 3608000 (the “U” in Mount Lemmon Road)
- ▶ D – 517085, 3606350 (4444 foot hill in lower left of page)

Plot these UTM coordinates on Green Trails Saguaro NP (Cheat Sheet)

- ▶ A – 521400, 3566600 (Corner of Houghton and Speedway)
- ▶ B – 527300, 3563000 (Loma Verde TH)
- ▶ C – 528400, 3568000 (Point where Redington Rd. turns into dirt)
- ▶ D – 533600, 3565300 (Tina Larga Tank)