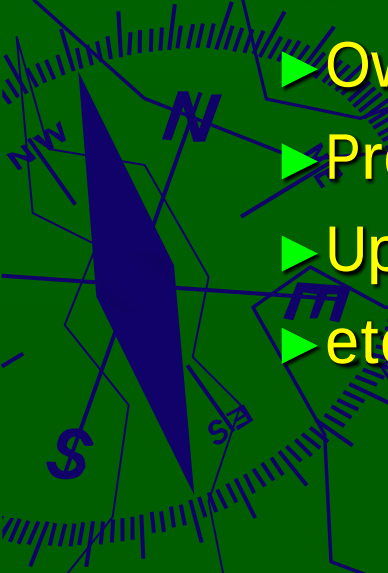

Cave Mapping with
GIS and GPS

What is GIS?

- Geographic Information System
  - Computer maps
  - Aerials / Ortho Photography
  - Attribute information about the mapped features
    - Owner names
    - Property use
    - Update dates
    - etc



What is GIS used for?

- GPS navigation in cars
- Making maps
- Finding and fixing geographic problems
- Locating new stores
- Tracking animal migrations
- Delivery routing (packages, mail, etc)
- Emergency dispatch (fire, police, EMS)
- Much more…

What is GPS?

- Global Positioning System
  - Satellite based tracking system
- Used by:
  - Surveyors
  - In cars, delivery trucks, boats
  - Sports users, hiking, biking
- Often combines GIS data and GPS tracking
- Does not work in caves

Cave Surveying

- GPS the entrance
  - Location for others to find in future
  - Reference for overlays with GIS
- Standard survey instruments “In cave”
  - Tape to measure distance
  - Compass (horizontal angles)
  - Inclinometer (vertical angles)
  - Survey book to record info and sketch
  - Flagging tape to mark survey stations


MB SURVEY
HOUSECREEK CAVE
6-17-02
MB SURVEY 6-17-02
PEEP HOLE INTO MAIN PASSAGE
SUUNTO
SUUNTO

Cave Survey

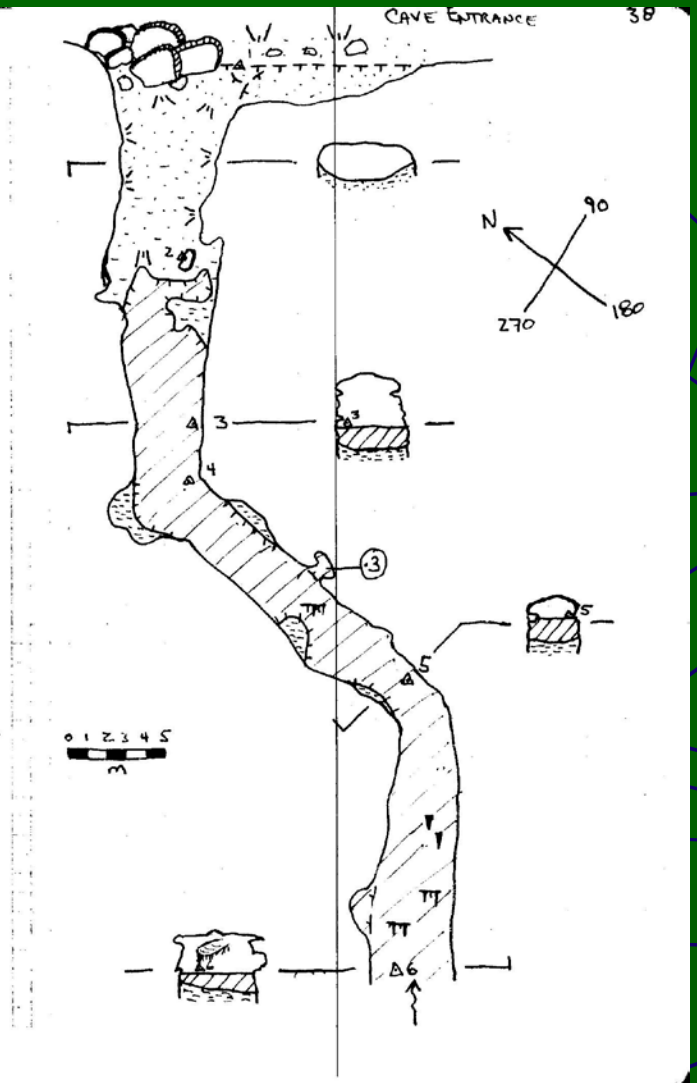
Cave Survey

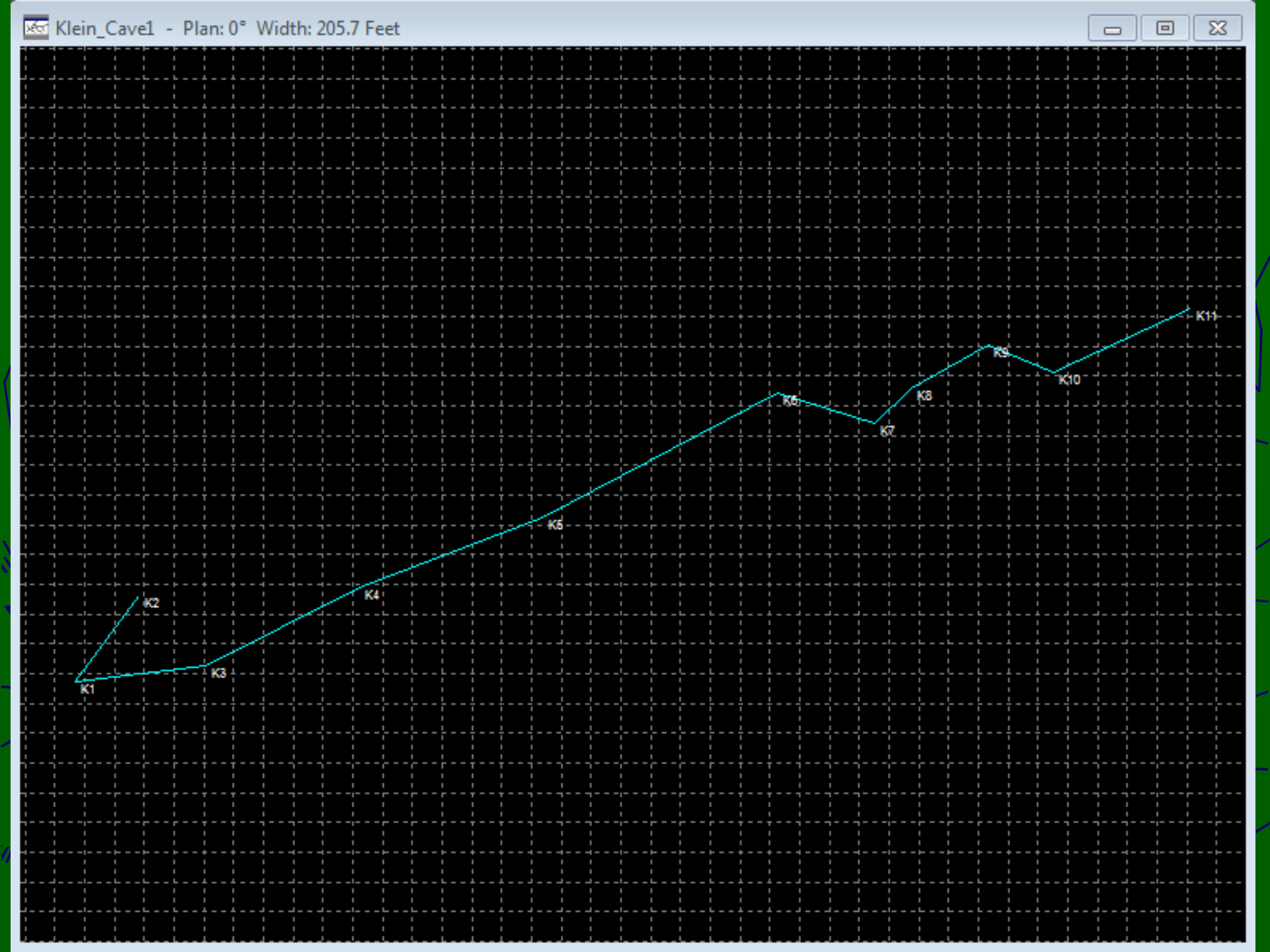
Cave Survey

Cave Survey

STA	AZI (DEG)	DIST (M)	VERT (DEG)	U / D* (M)	⊥ / R (M)
1				1.4 / 1.1	9.5 / 7.0
	220	10.10	-9		
2				1.2 / .45	2 / 4
	196	8.92	-11		
3	WATER LEVEL			1.8 / 1.2	.3 / 2.6
	231	2.95	0		
4				2.0 / 1.2	.4 / 2.4
	213	14.60	0		
5				.9 / 1.2	.7 / 1.8
	260	15.23	0		
6				2.0 / .8	3 / 1.2

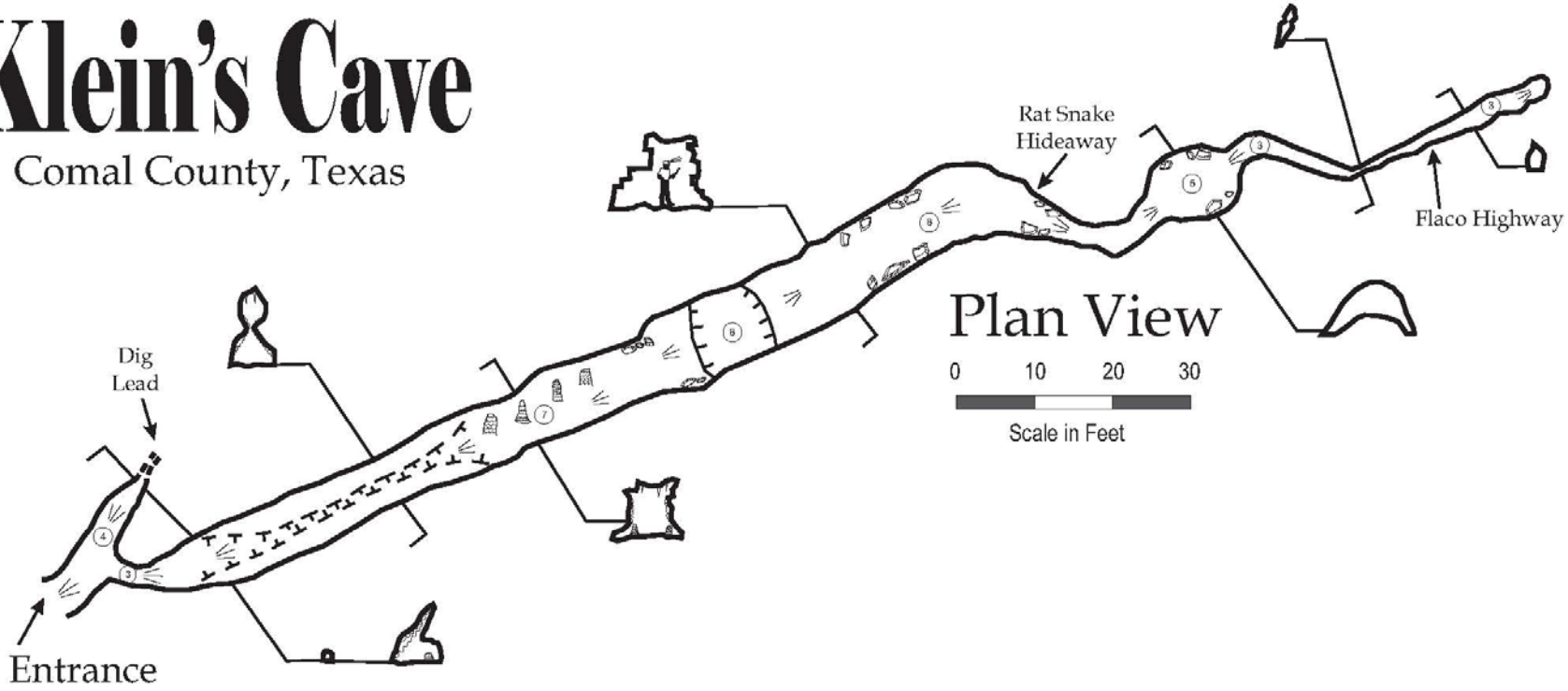
* NUMBERS UNDER BAR = WATER DEPTH
NUMBERS ABOVE BAR = STATION TO WATER

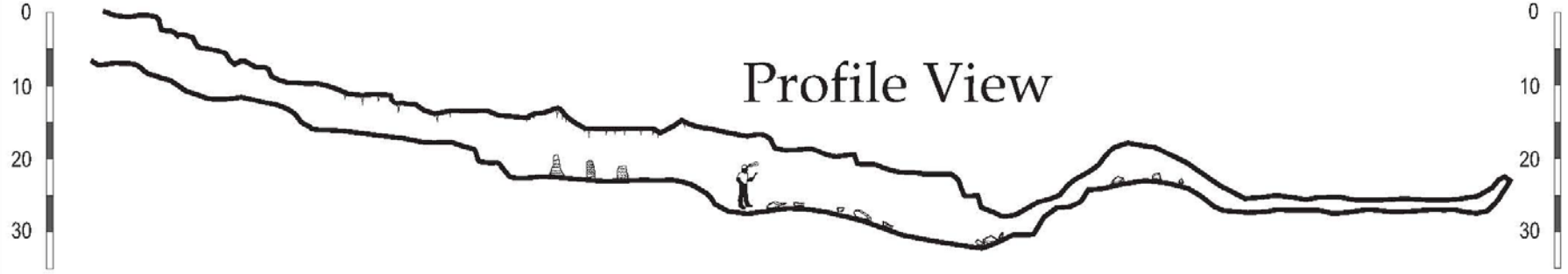



Klein_Cave1 - Plan: 0° Width: 205.7 Feet
K1
K2
K3
K4
K5
K6
K7
K8
K9
K10
K11

Klein's Cave

Comal County, Texas





Suunto & Tape Survey by
Kurt & Justin Menking,
Nov 22, 2009
Drafted by Kurt Menking
Length 224 ft Depth 30 ft

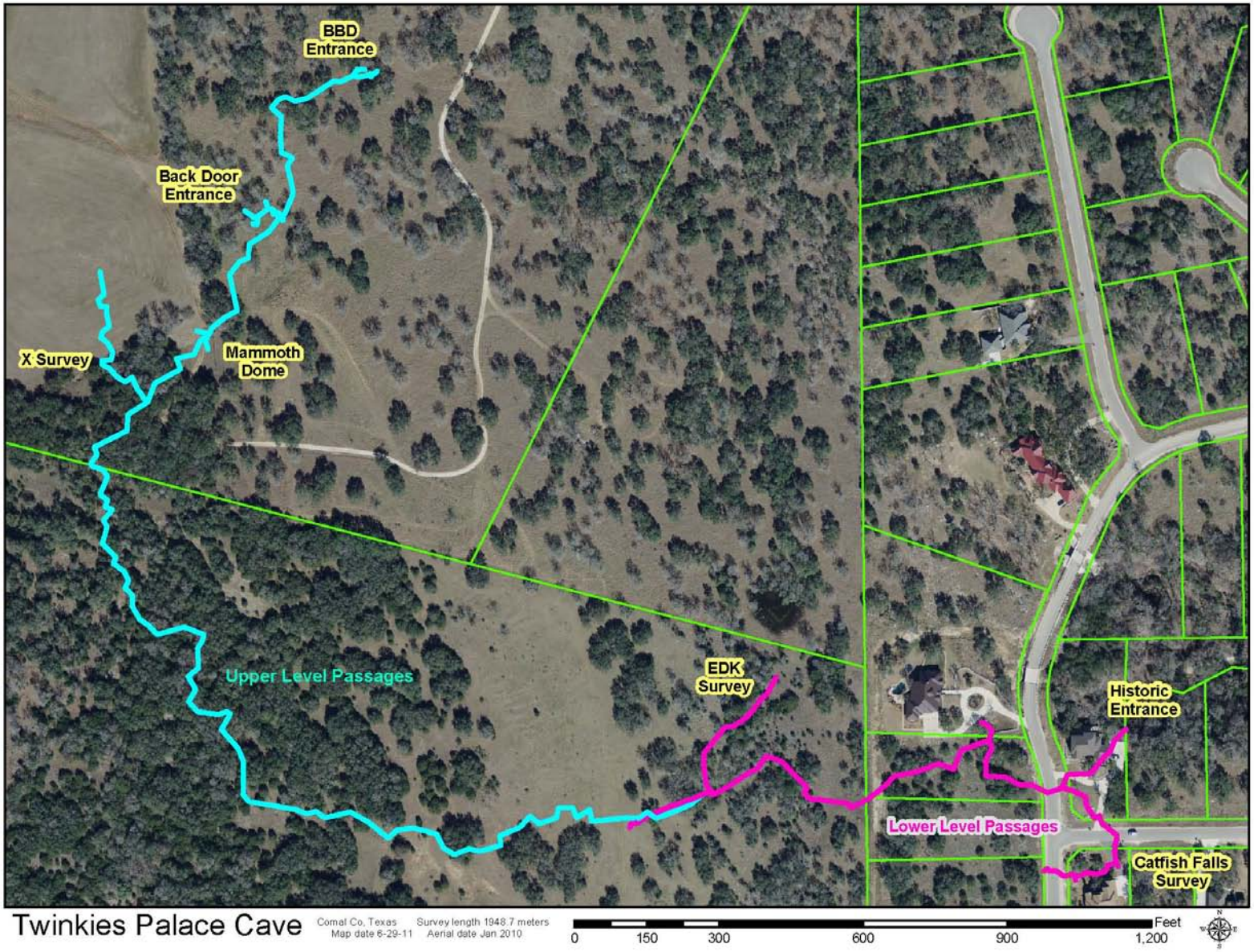
Cave in the Edwards Limestone
Biology observed: Rhadine Beetle,
Cave Crickets, Rat Snake, Spiders

Legend

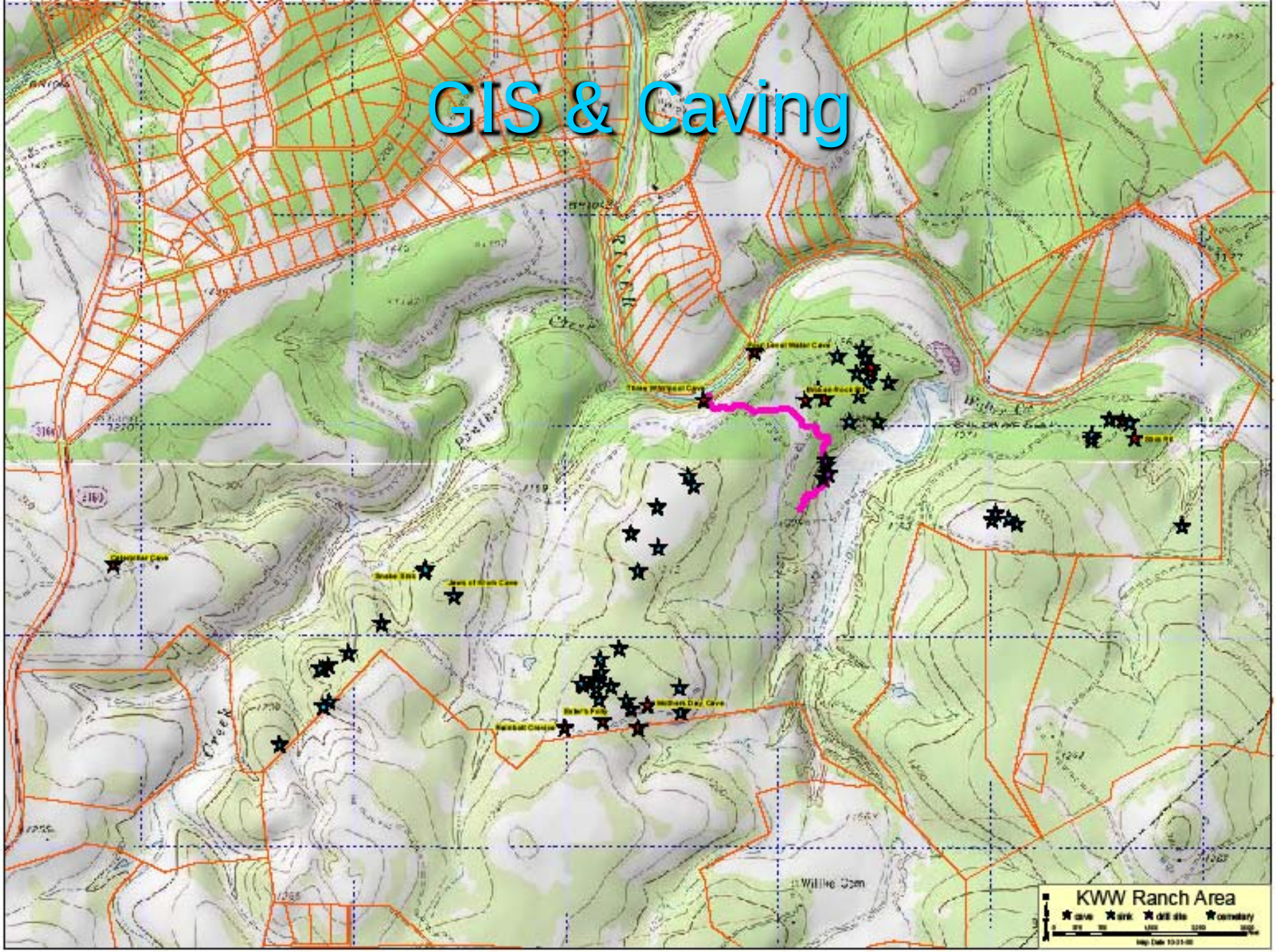
- Drop in ceiling
- Drop in floor
- Slope in floor
- (23) Ceiling heights in feet

North

Cave Survey


BBD Entrance
Back Door Entrance
X Survey
Mammoth Dome
Upper Level Passages
EDK Survey
Historic Entrance
Lower Level Passages
Catfish Falls Survey
Twinkies Palace Cave
Comal Co, Texas
Map date 6-29-11
Survey length 1948.7 meters
Aerial date Jan 2010
0
150
300
600
900
1,200
Feet

GIS & Caving



Resistivity

Electrical resistivity methods involve the measurement of the apparent resistivity of soils and rock as a function of depth and position. Current is injected into the earth through a pair of current electrodes, and the potential difference is measured between a pair of potential electrodes. This yields information of the electrical properties of soils and rock influencing the flow of current.

Resistivity profiling is used to:

Map faults

Map lateral extent of conductive contaminant plumes

Locate voids

Map heavy metals soil contamination

Delineate disposal areas

Map paleochannels

Explore for sand and gravel

Map archaeological sites

Resistivity

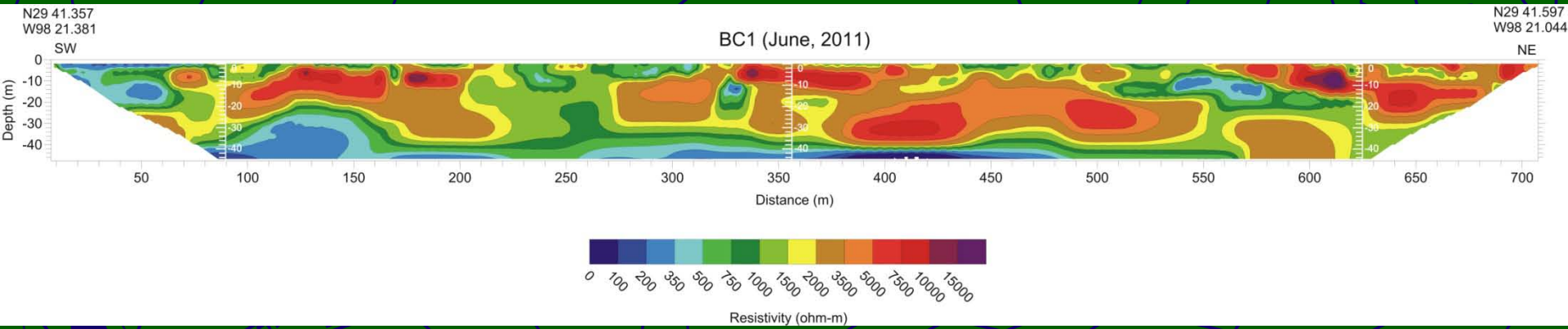
Bracken Bat Cave:

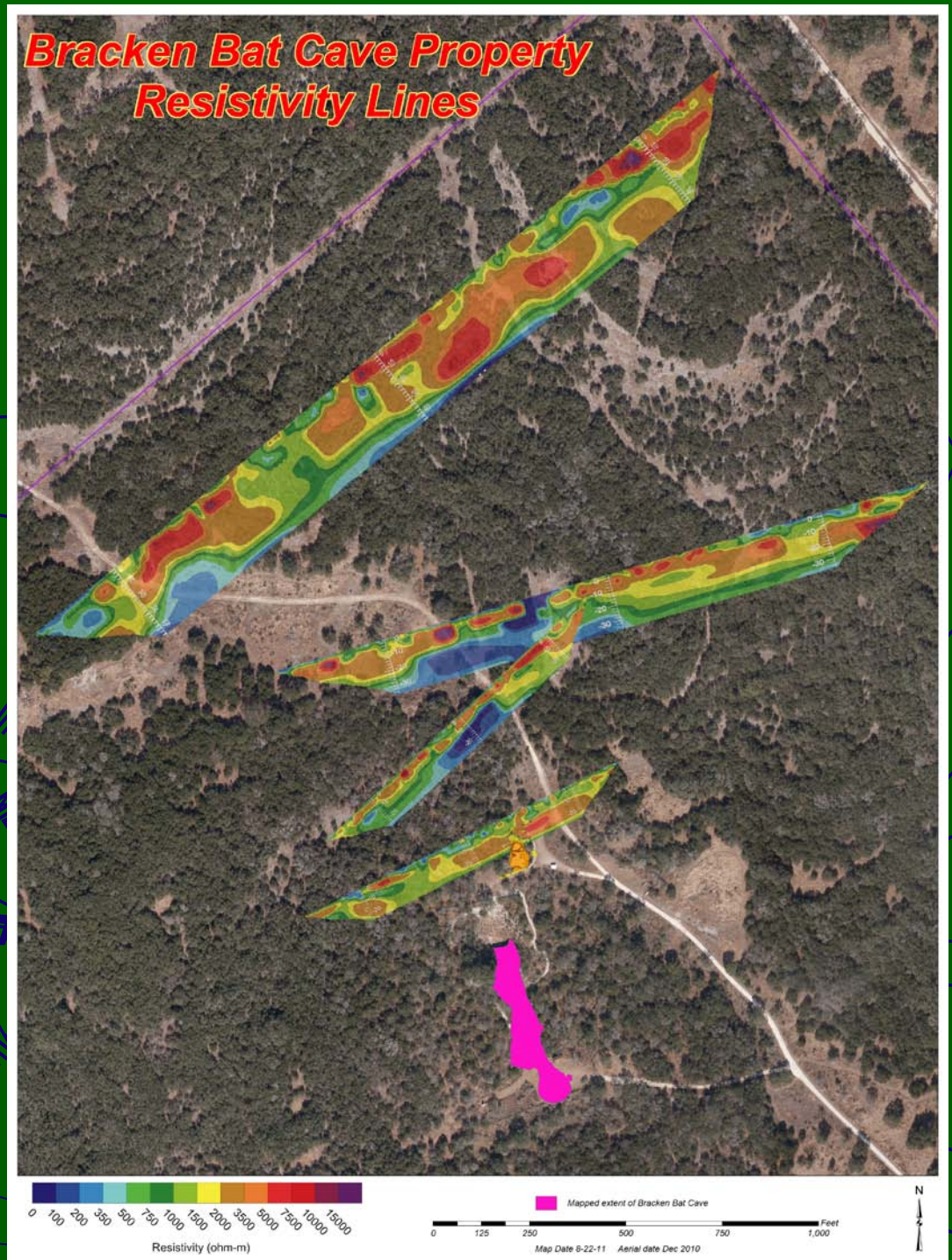
- Worlds largest bat colony
- Very large sized passage
- Entrance sinkhole collapse left one side of the cave passage open the other side closed

Resistivity


EverStart
maxx

Resistivity




Bracken Bat Cave Property
Resistivity Lines
0 100 200 350 500 750 1000 1500 2000 3500 5000 7500 10000 15000
Resistivity (ohm-m)
Mapped extent of Bracken Bat Cave
0 125 250 500 750 1,000
Feet
Map Date 8-22-11 Aerial date Dec 2010
N

Cave Biology

- Salamanders
  - Black Slimy
  - Eurecea
- Frogs
  - Leopard frogs
- Crayfish
- Bats
- Spiders
- Mice

☞ Fish
  - – Sunfish
  - – Catfish
  - – Mosquito Fish
  - – Tetra

Pleistocene bones

- American scimitar *(Homotherium serum)*

Pleistocene bones

- American scimitar *(Homotherium serum)*

Pleistocene bones

- Giant ground sloth *(Megalonyx jeffersonii)*

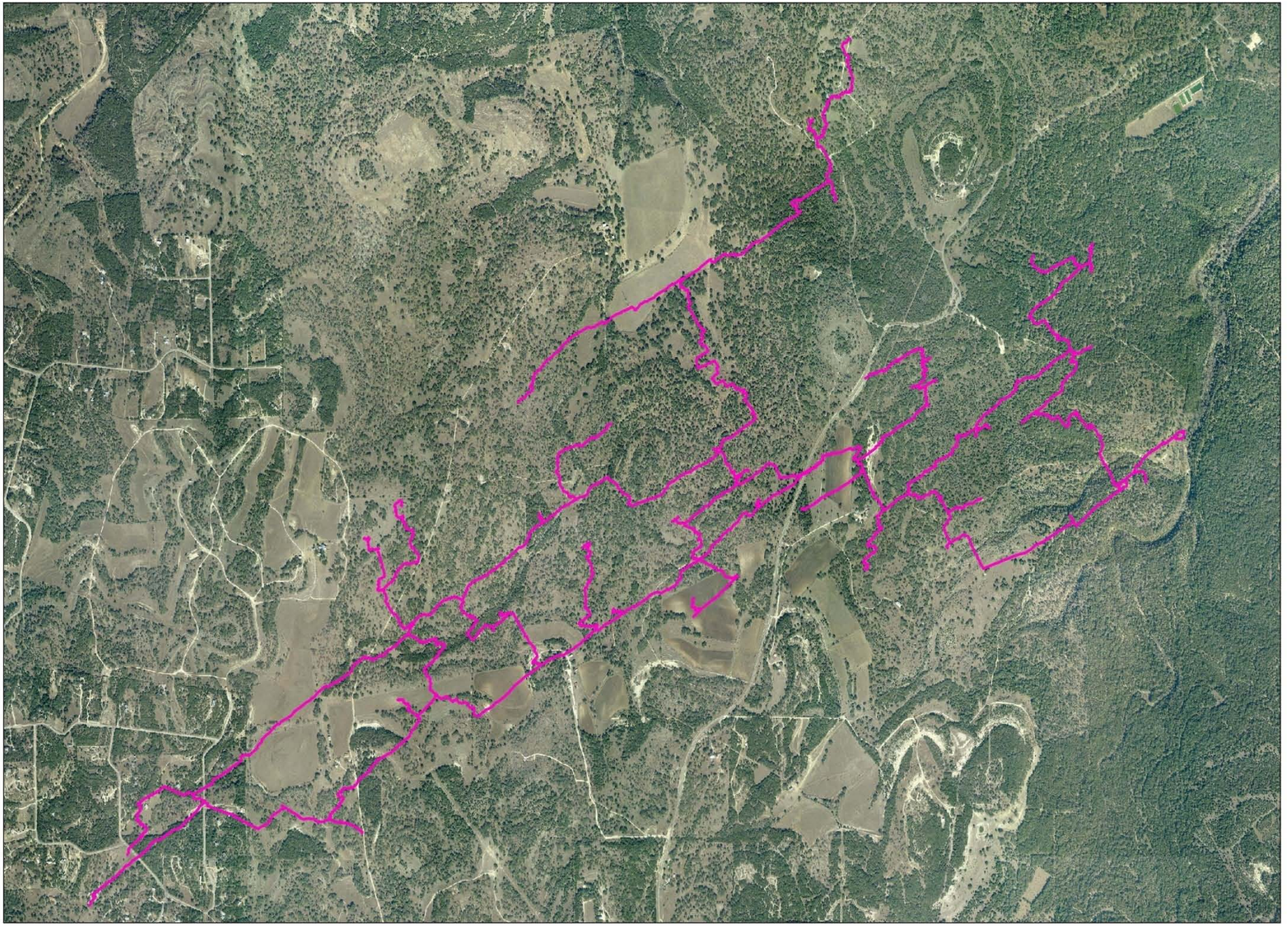
Pleistocene bones

- Giant ground sloth *(Megalonyx jeffersonii)*

Pleistocene bones

- Giant ground sloth *(Megalonyx jeffersonii)*

Pleistocene bones



Honeycreek Cave

Comal & Kendall Co, Texas Map date 11-10-09

0 750 1,500 3,000 4,500 6,000 Feet

Map by Kurt Menking