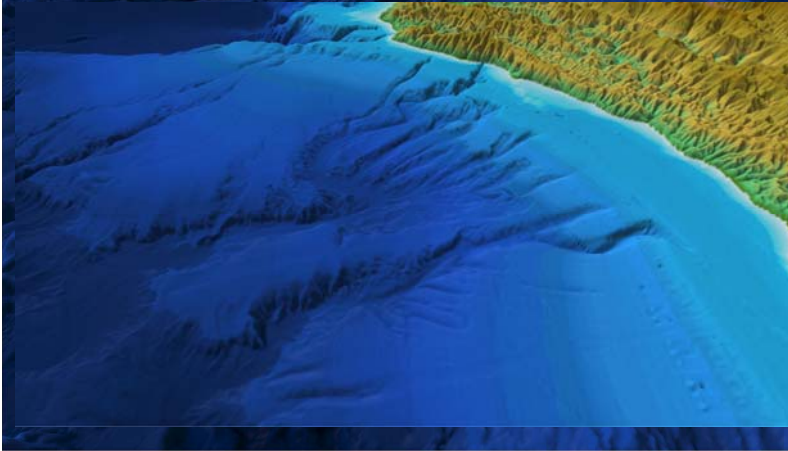


BATHYMETRY



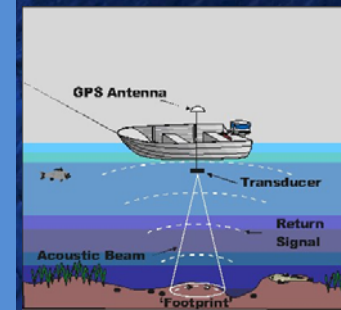
Today:

- Bathymetry
- Charts
- Spatial Dimension
- Scale (Vertical and Horizontal)
- Sonar and other Geophysical Methods

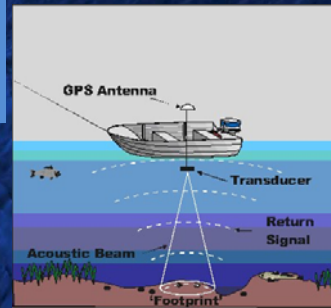
TOPOGRAPHY (place + drawing)
BATHYMETRY (depth + measure)

- Earliest depth measurements employed a weighted rope – soundings
- Piano Wire replaced ropes in the 1870's

- US Navy developed an electronic sounding device in 1922
- a.k.a. Echo-sounder, sonic depth finder, fathometer
- Measures time required for a sound pulse to travel from the boat/ship, to the bottom, and back to the surface.

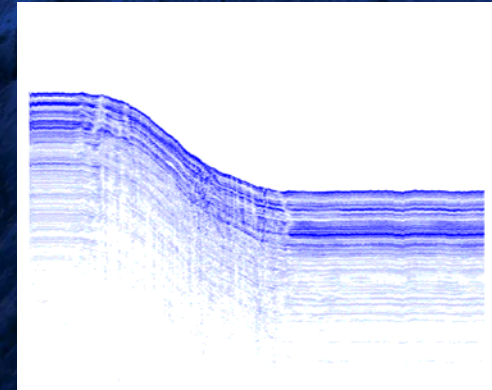


- Velocity of Sound in water $\approx 1,500$ m/sec
- Depth = Velocity/two way travel time
- $D = 1,500 \text{ m/sec} \times 5 \text{ sec} / 2$
- $D = 7,500 \text{ m} / 2$
- $D = 3,750 \text{ m}$



"ECHOGRAM"

- Looks into the subsurface



BATHYMETRY

1894 navigation chart for Humboldt Bay



BATHYMETRY

DATUM: Charts
Mean Low Tide

- Mean Low, Low Tide = mean lower low water
- Depths = distance below datum

BATHYMETRY

TOPOGRAPHIC MAPS

- Mean Sea Level
- Elevations = height above the datum

BATHYMETRY

CONTOUR

- a line that connects points of equal elevation or depth

ISOBATH

- Contour line on a marine chart

BATHYMETRY

Contour Lines are spaced at some regular vertical interval:

- Contour Interval
- Isobath Interval
- The shape and spacing of the contours reveal what the topographic/bathymetric features look like.

BATHYMETRY

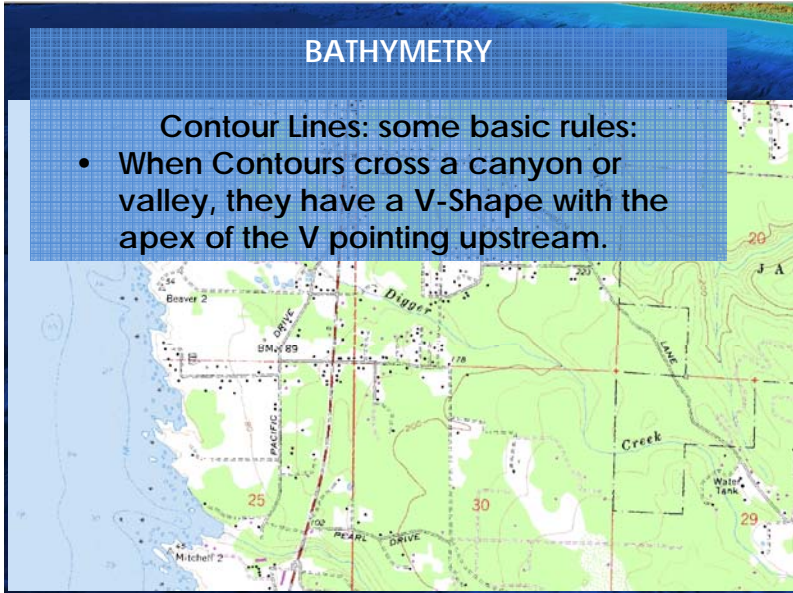
Contour Lines: some basic rules:

- Contours never cross each other.

BATHYMETRY

Contour Lines: some basic rules:

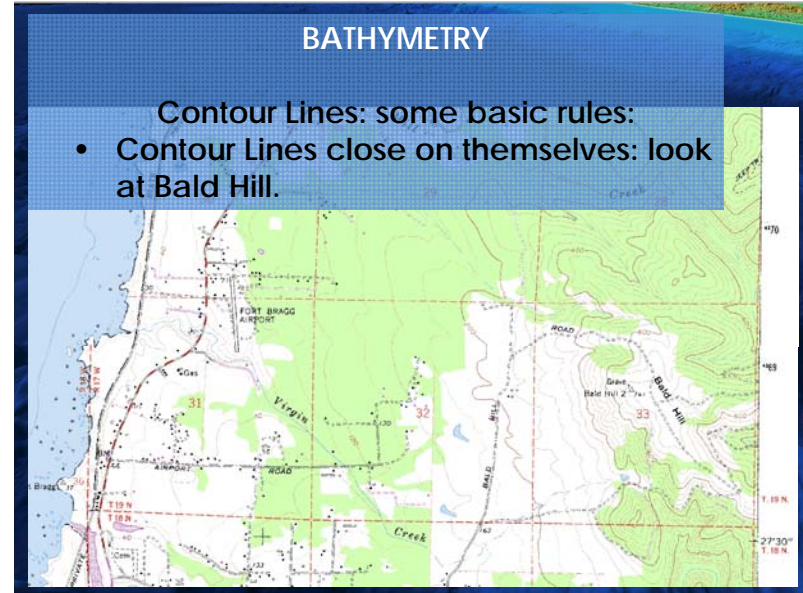
- When Contours cross a canyon or valley, they have a V-Shape with the apex of the V pointing upstream.



BATHYMETRY

Contour Lines: some basic rules:

- Contour Lines close on themselves: look at Bald Hill.

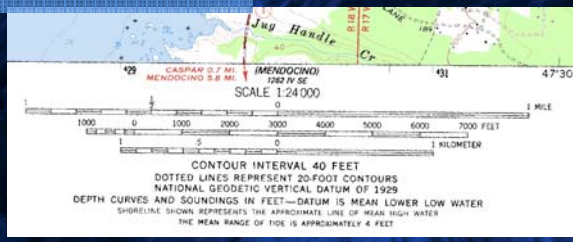
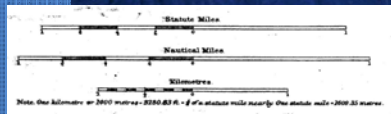


BATHYMETRY

SCALES

- Calibrated Line or Bar
- Fractional

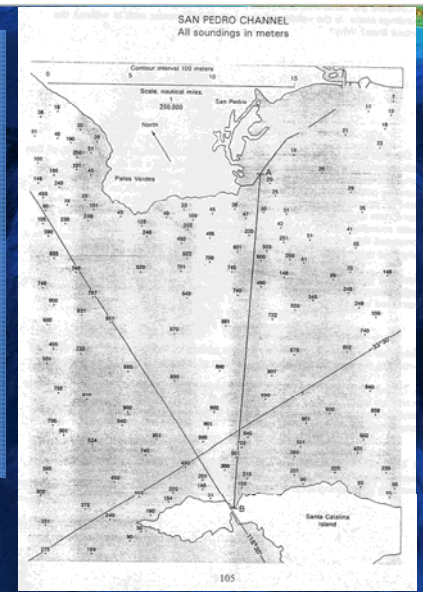
1:250,000
 1 cm = 250,000 cm
 1 cm = 2,500 m
 1 cm = 2.5 km



LAB EXERCISE

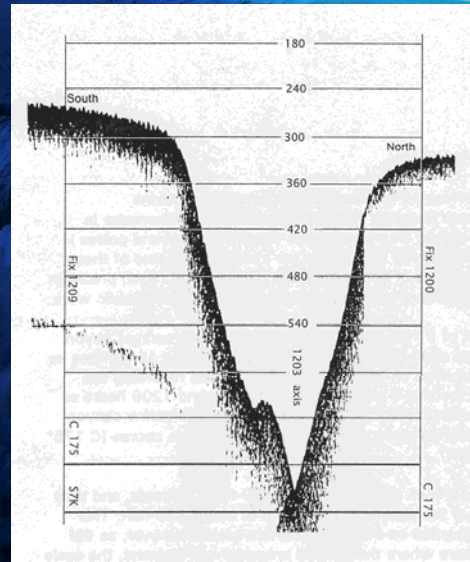
Describe Chart

- General Appearance
 - Use Cardinal Directions
- #### Contour Chart
- All Soundings are in meters
 - 100m isobath interval
 - Label all isobaths
 - Compare contoured chart with your original answer.



LAB EXERCIZE

- Determine Depth
- Determine Width
 - Use Known times and velocity
- Determine Vertical Exaggeration
- Determine Sound Travel Time
 - $D = V \times T/2$



LAB EXERCIZE

- Construct Profile
- Determine Vertical Exaggeration
 - Vertical Scale / Horizontal Scale
- Construct Profile without vertical exaggeration
- Compare and Contrast both profiles

