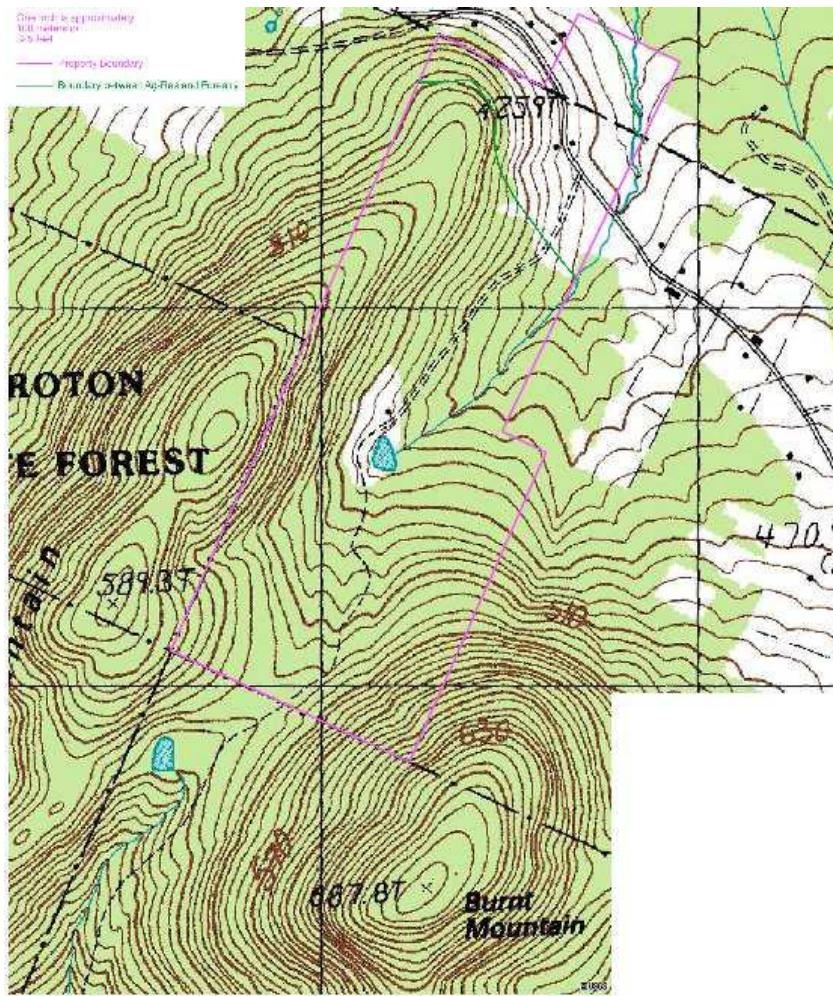


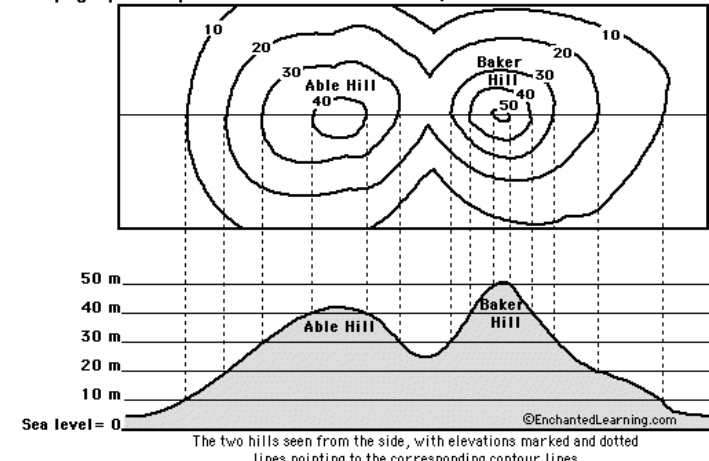
Topographic Map Interpretation

For more practice-See Sovio pp. 246-257
Provincial Exams online
Mleziva has unbelievable exercises

Acquiring map-reading skills allows geographers to interpret landscapes and use maps as research documents. The ability to scan maps well is analogous to being able to read music while playing an instrument. Most topographic maps use the same symbols for representing information. Topo maps take the real world and provide us with a flat representation



Topographic Map (with contour lines that show points that are on the same level)

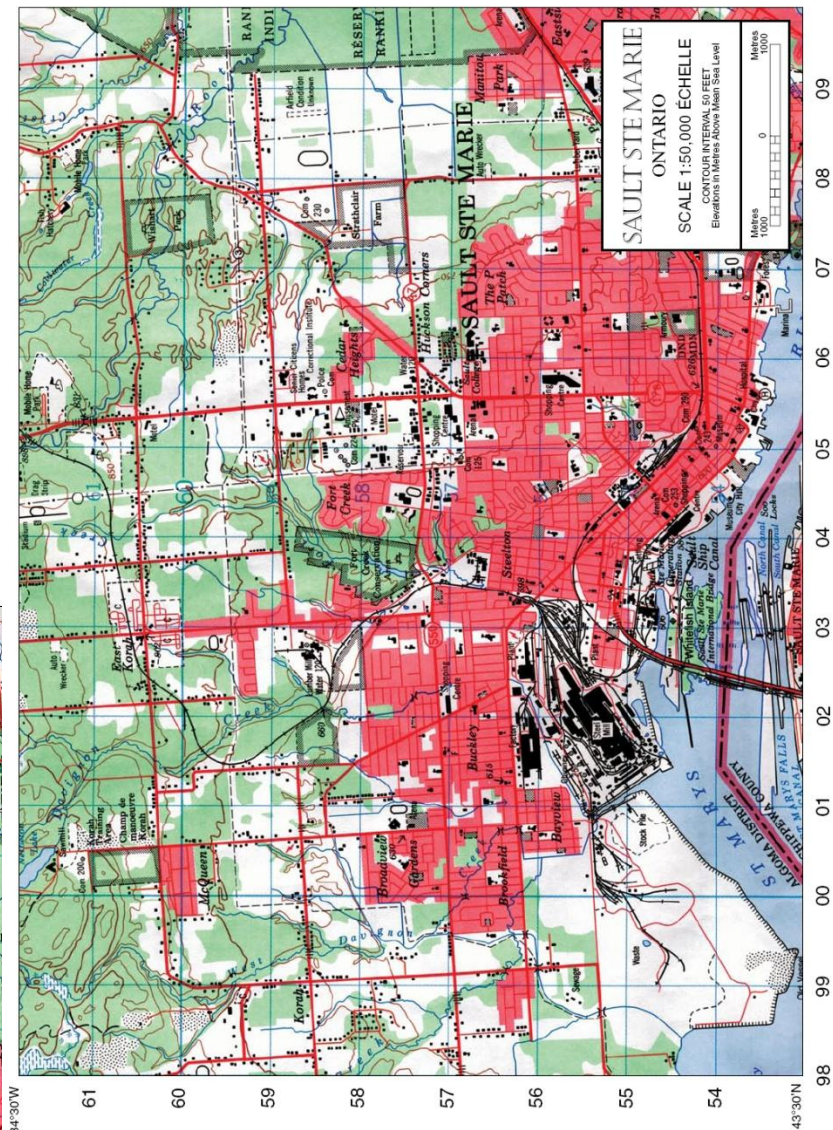
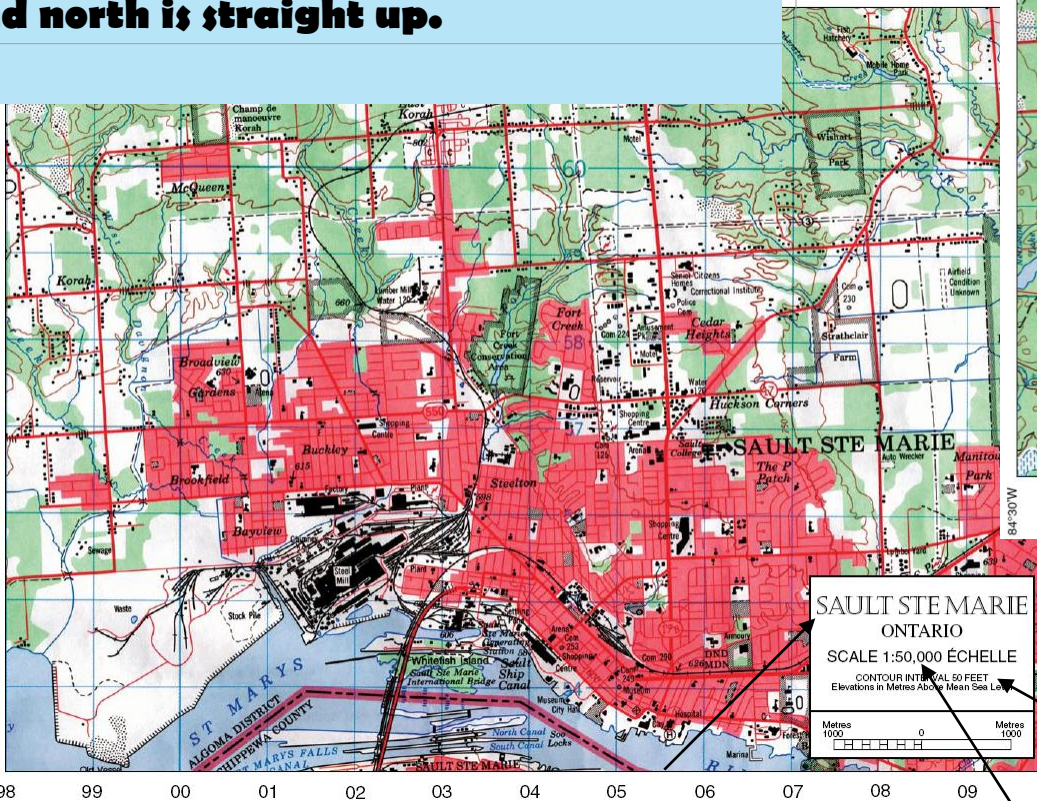


Basic Guidelines

A) Marginal Information

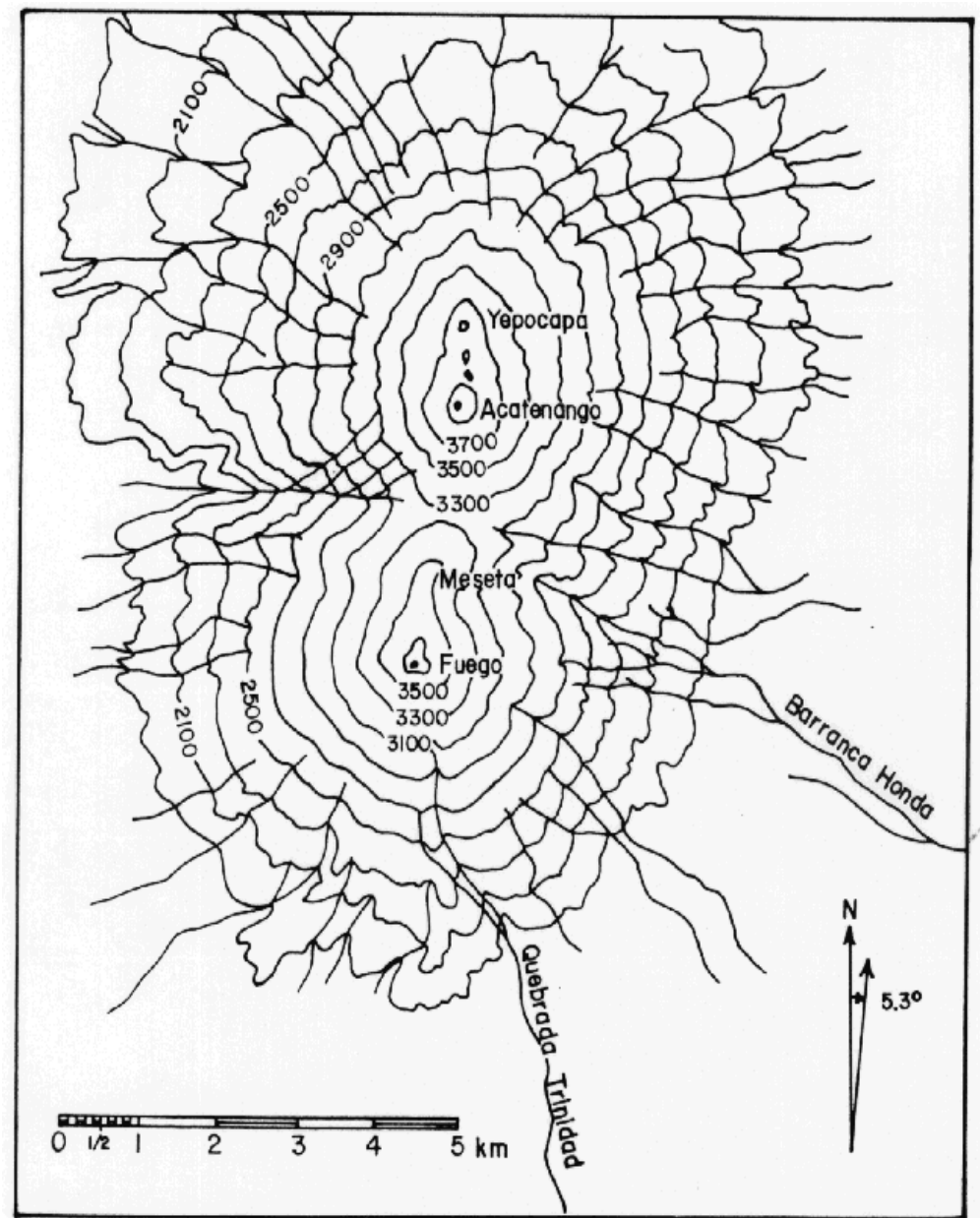
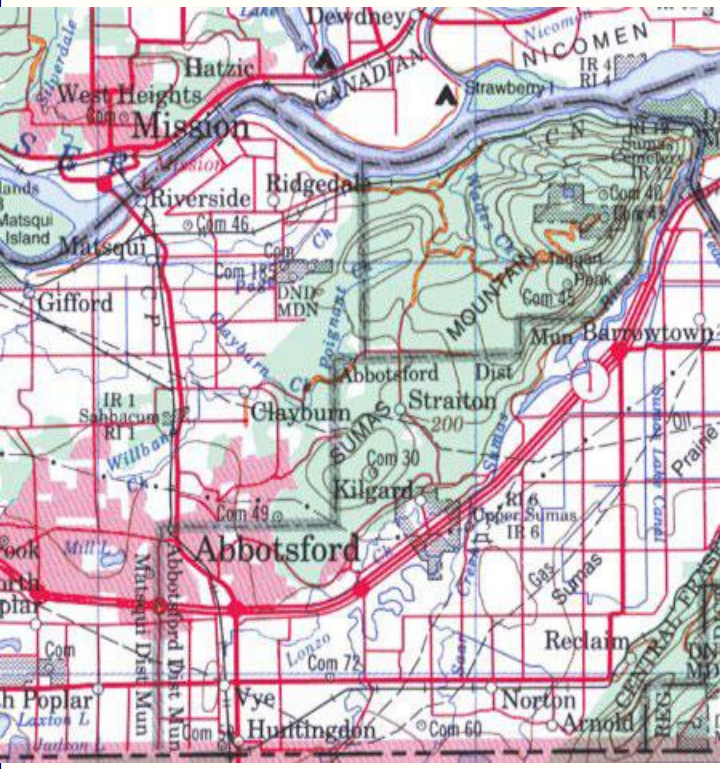
- map title
- map scale
- military grid
- contour interval (change in)

Determine what direction is *north* on the map. If it is not clearly shown, the rule of the thumb is to get the printing right side up so that you can read the majority of information on the map and north is straight up.



B) Broad Patterns

Look at the whole map to get a general picture of the area. Watch for broad patterns of land and water, settlements, vegetation, and physical features.



Contour lines show:

Show elevation

Steepness of slopes, valleys
mountains




Direction of water flow

Spot height: exact elevation

Bench mark: Show exact elevation with concrete brass pillar

Depressions: exactly that a depression or dip in the landscape-
remember Crater Lake?

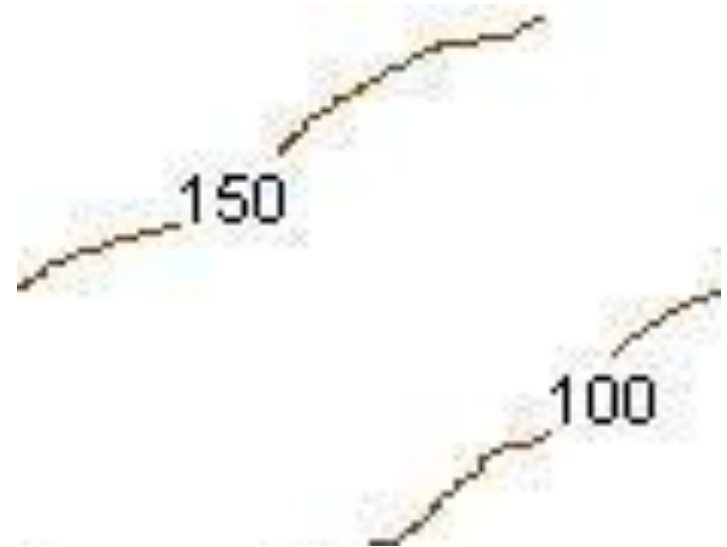
Topographic map Symbols - Elevation

Feature Name	Symbol
Horizontal control point; Bench mark with elevation	 187.8 ↑
Precise elevation	•224
Contours; index, intermediate	
Depression contours	

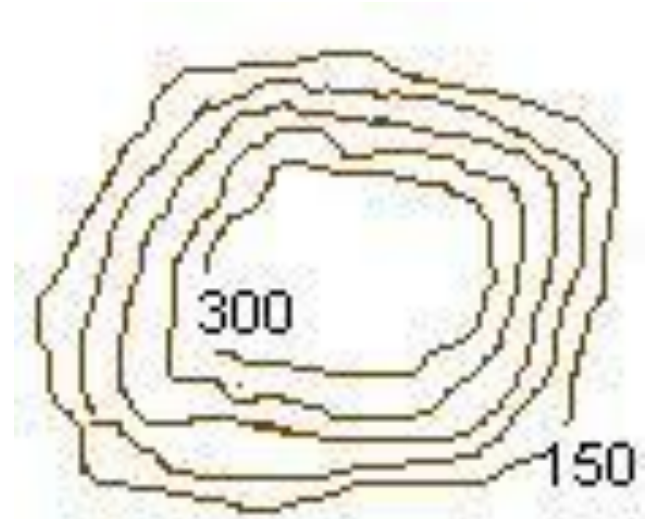


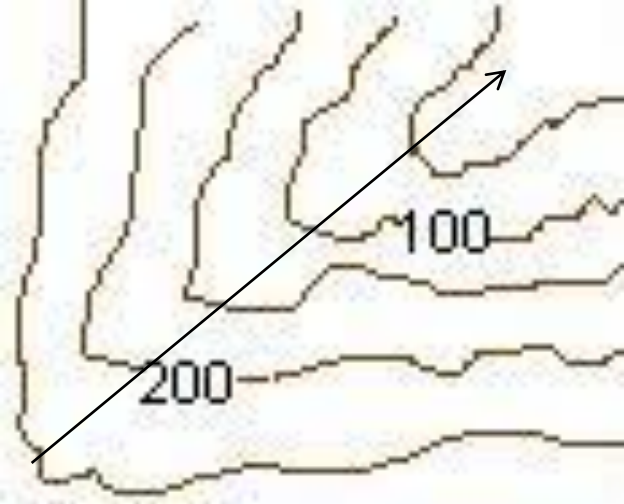
Steep slope = contour lines close together
Gentle slope = contour lines spread out

Flat or gently sloping land



A steep-sided flat-topped hill





Contour lines are always shown pointing upstream where they cross a stream or river.

A river flowing from south-west towards the north-east (line should be blue)



A river flowing towards the south-west from the north-east

D) Drainage

(The ability of an area to shed water)

To help in your understanding of the drainage of an area, ask yourself the following questions:

Pattern

In which direction do most rivers flow?

Where are the main watersheds?

Rivers and Streams

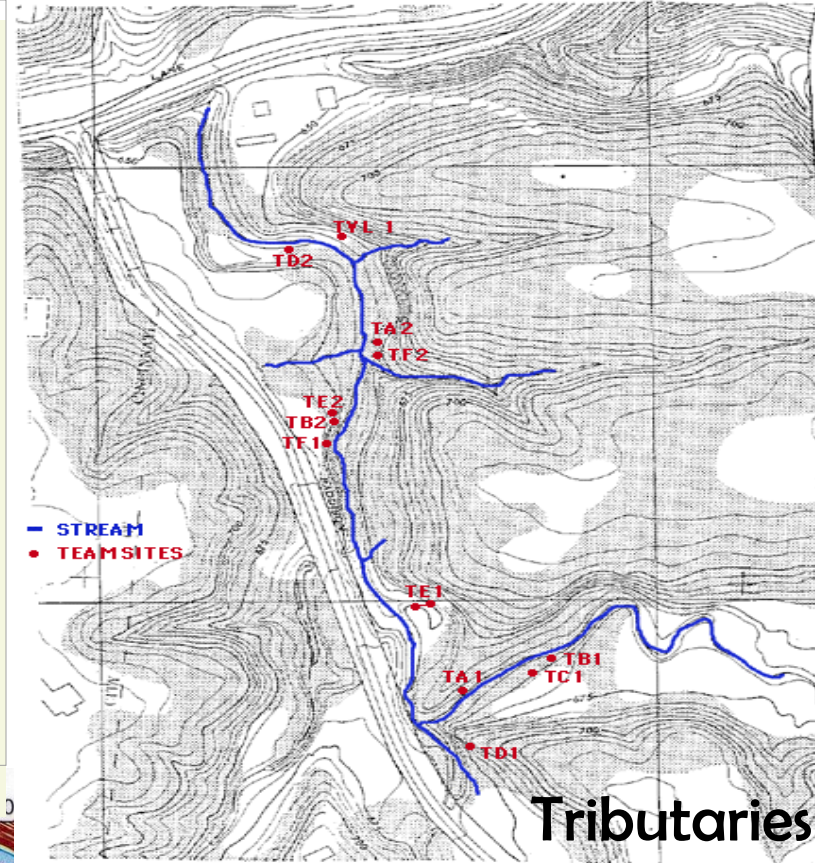
What is the gradient? Do waterfalls or rapids indicate an uneven gradient (steeper (slope))?

How many tributaries (A stream that flows into a larger stream or other body of water) does it have?

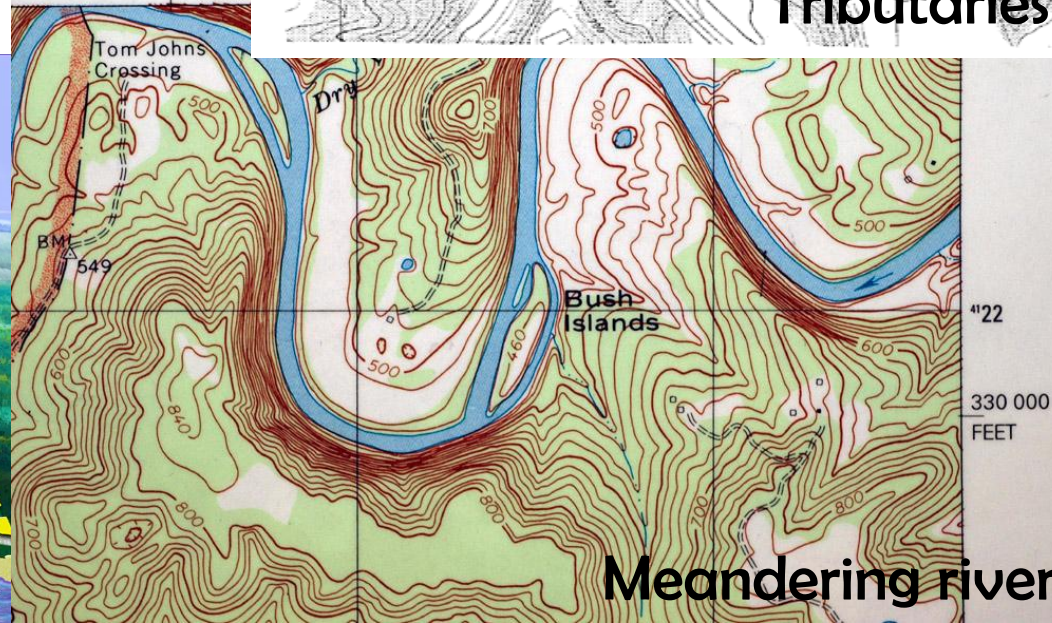
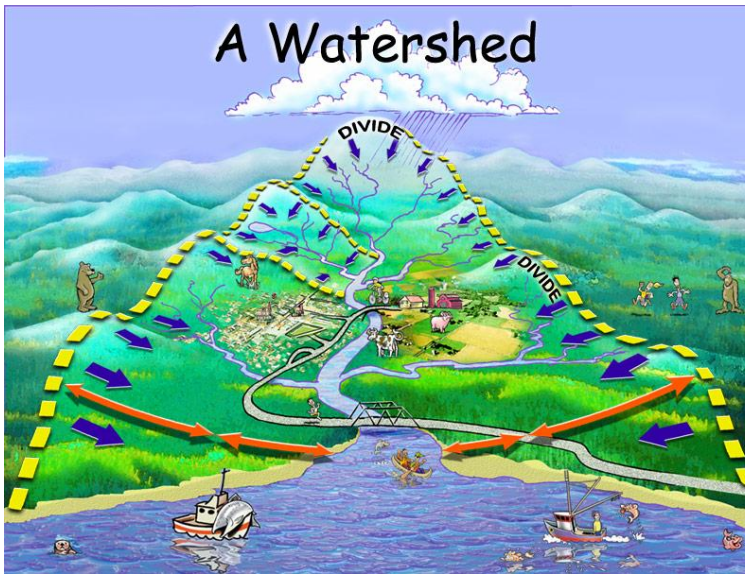
Does the river flow relatively straight or does it meander? (will determine age of river (Is there evidence that the drainage has been altered (i.e. dams))?

Surface Water

Is there standing water (lakes, marshes, swamps)? If there is a large amount of surface water, does the area have impermeable bedrock? Is the lack of surface water a sign of permeable bedrock? (evidence of aquifers)



Tributaries



***E) Basic Landforms—* Glaciers (depositional features)**
The shape of contour lines can indicate landforms as shown below.

Small hill-like deposits of debris
Left behind by continental
glaciers



Wisconsin (Green Bay Lobe) Drumlin



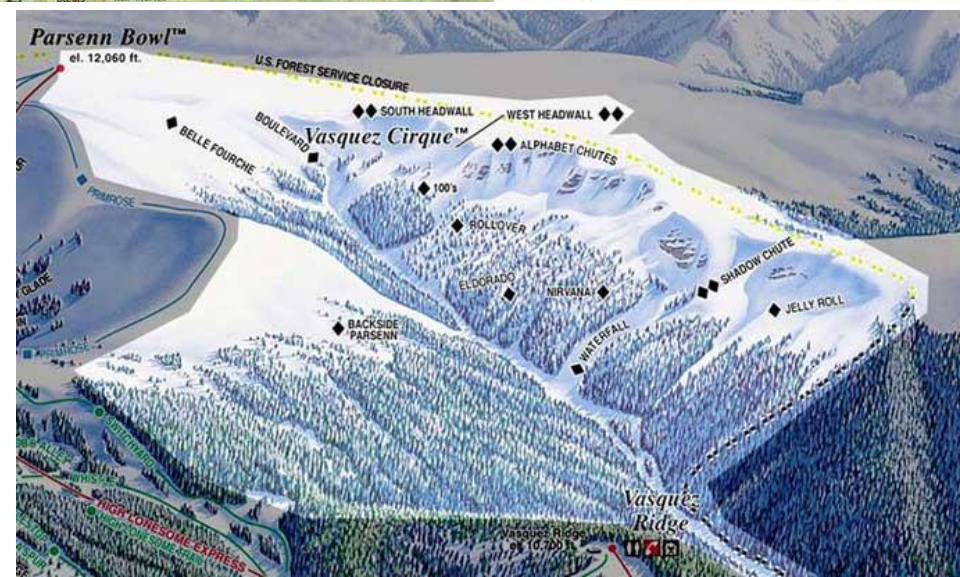
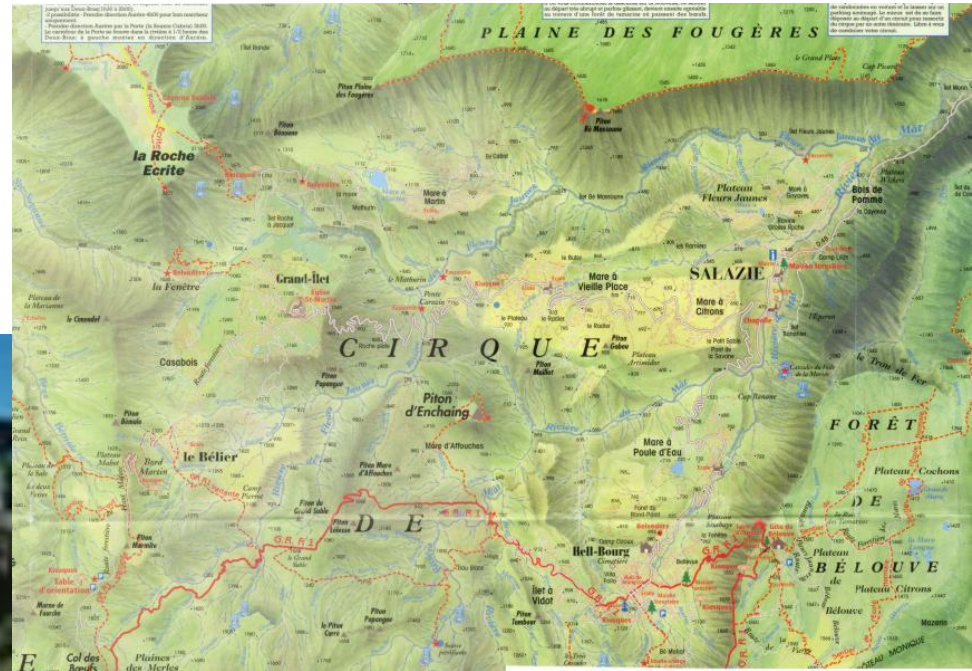
Drumlin

An esker is a ridge made up of sand and gravel, formed in a meltwater tunnel under a glacier.





A hillside hollow created
By glacial plucking and
abrasion



Arete-a sharp ridge created by the action of 2 cirques eroding the mountain between them

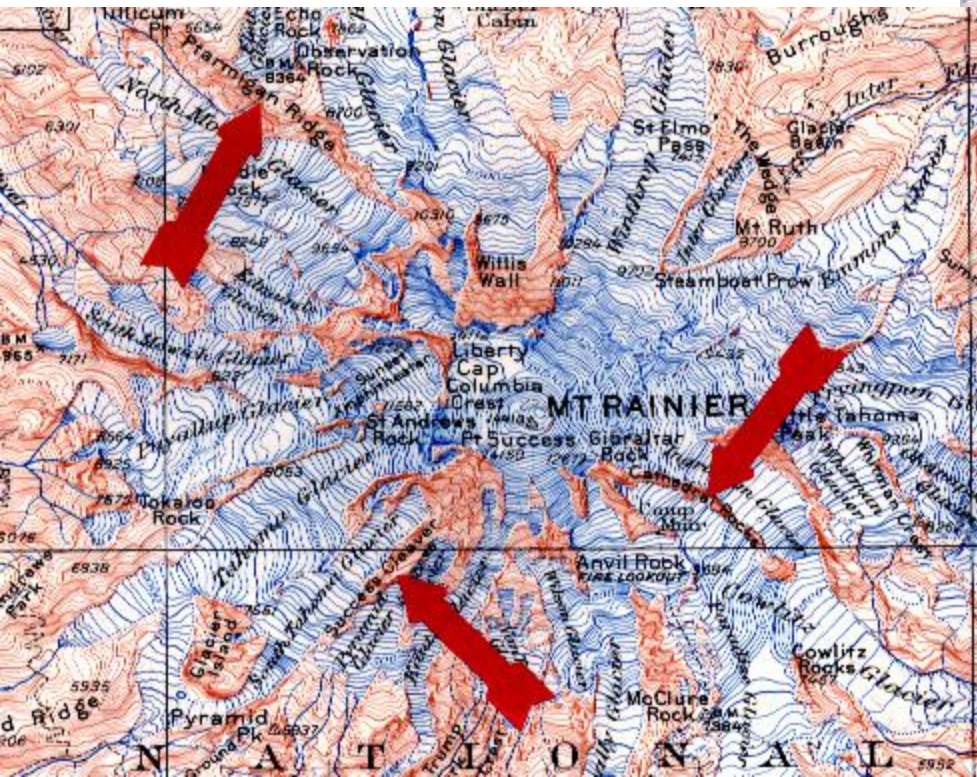
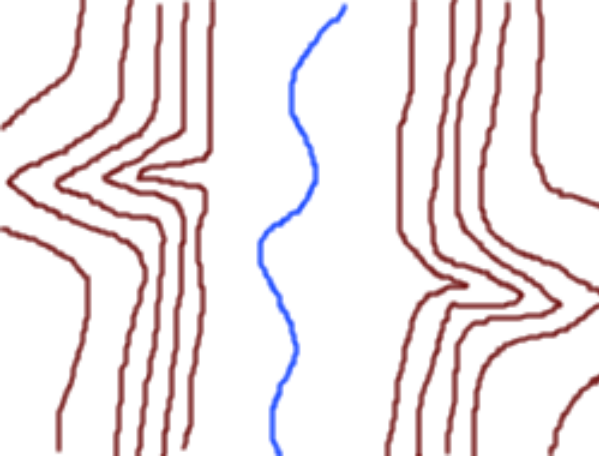
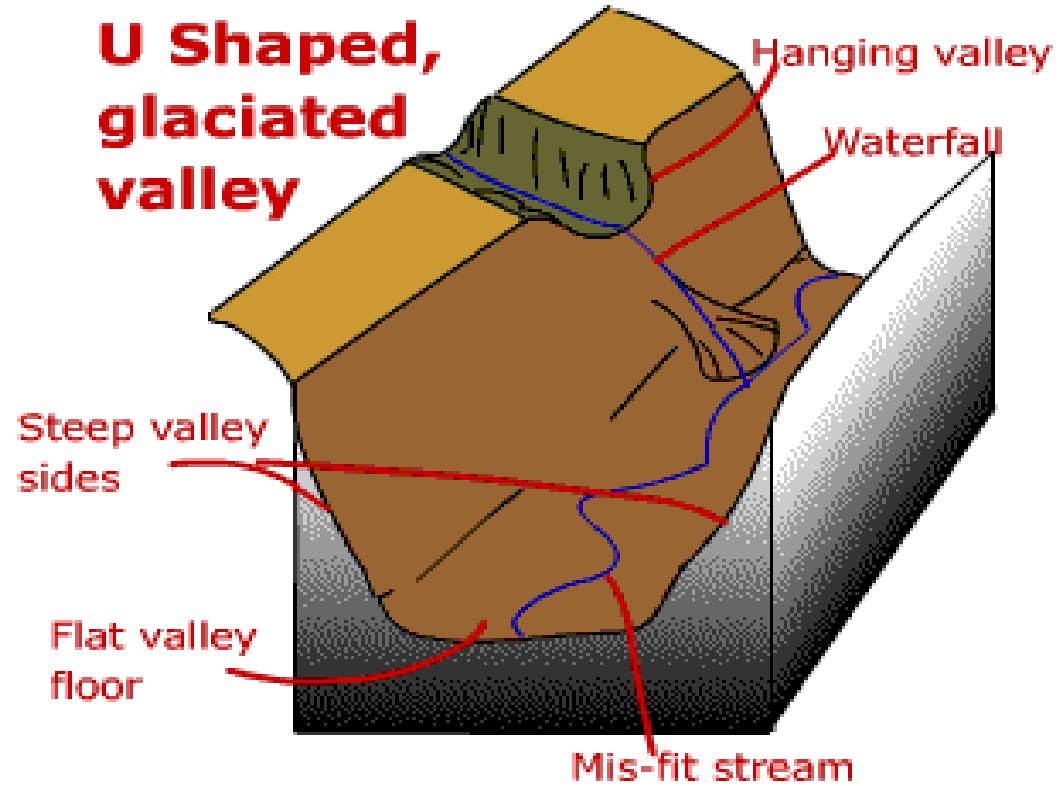


Photo by K. A. Lemke.



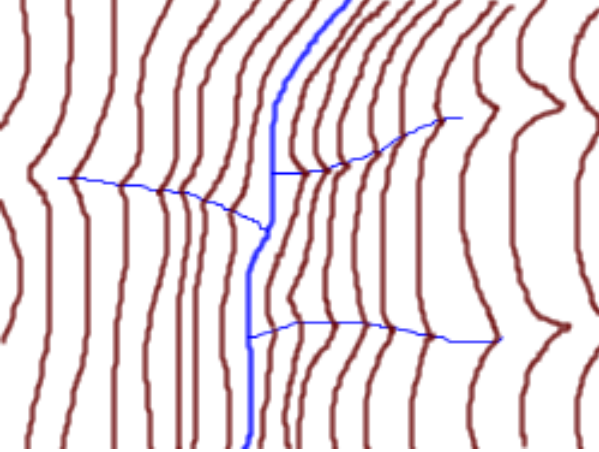
U Shaped, glaciated valley



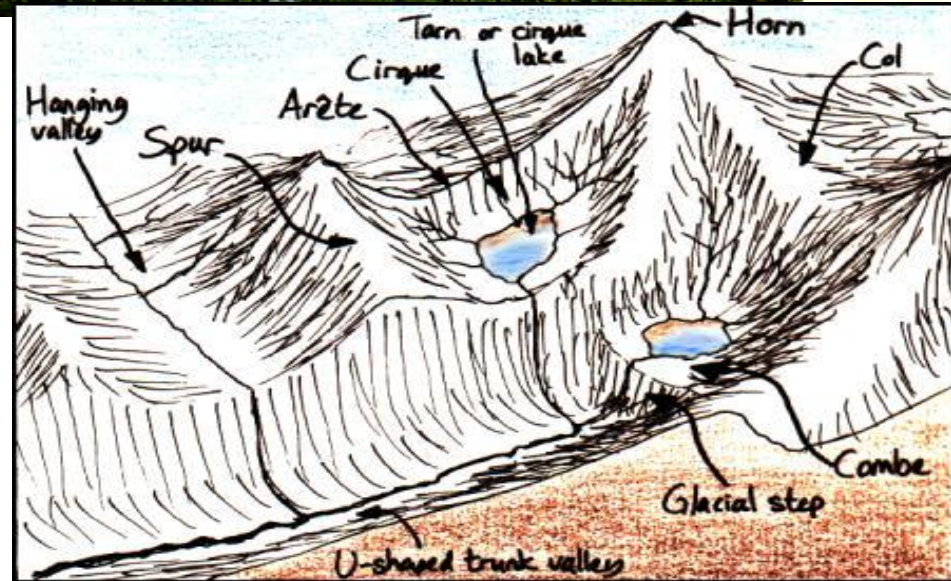
Defined as being the shape of glacial valleys

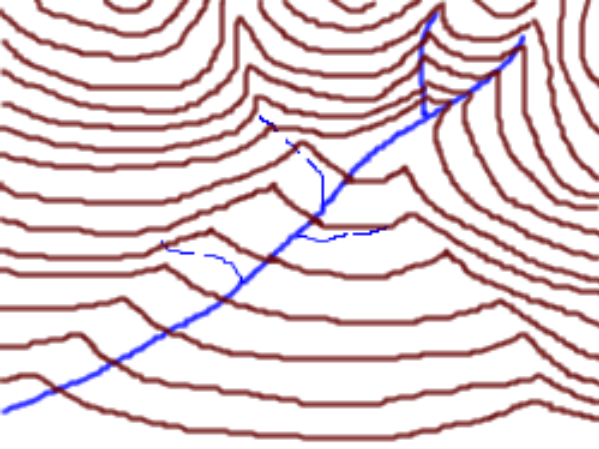


The shape of valleys created by river action in moist climates

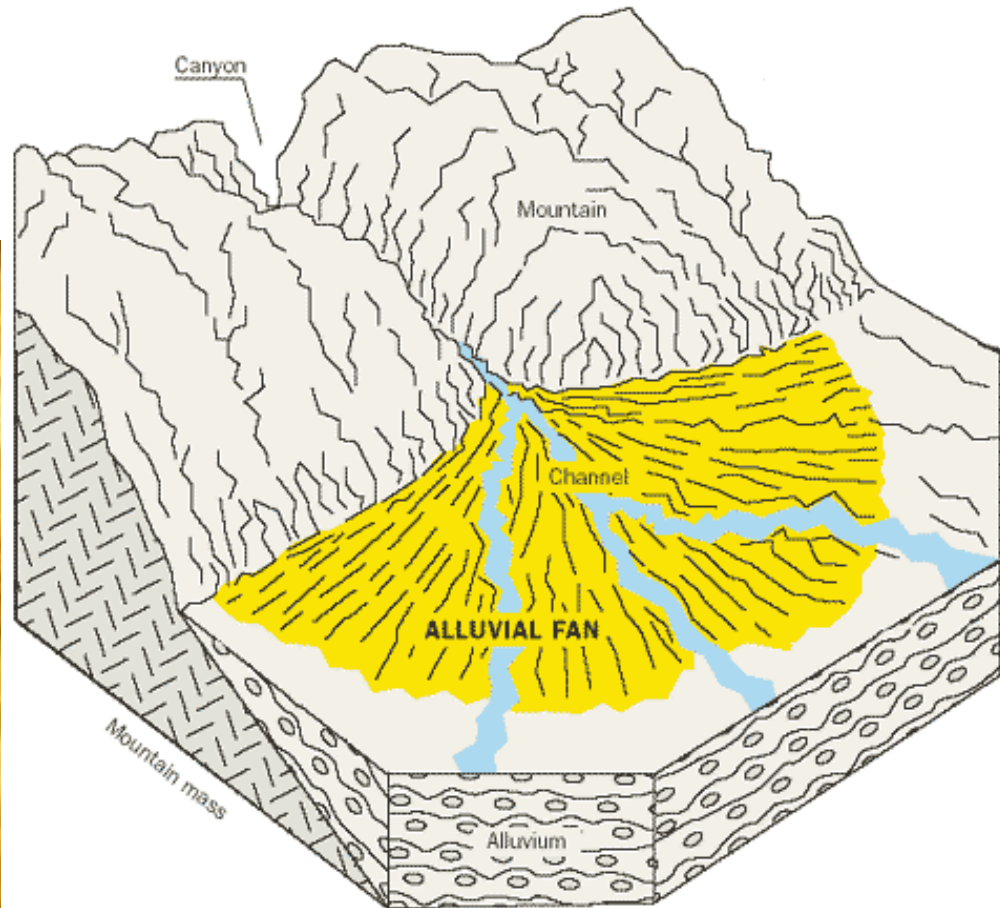


V Shaped Valley





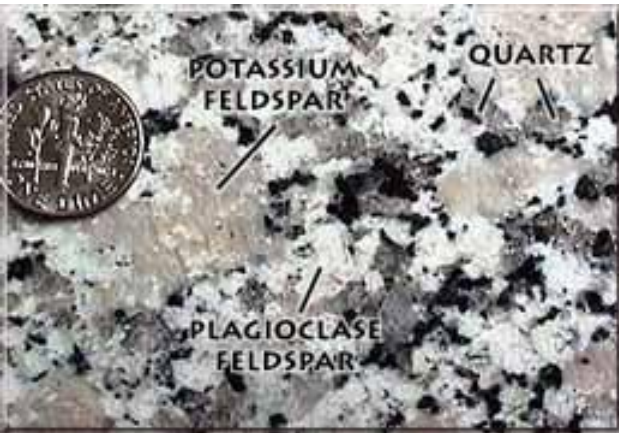
Fan-shaped deposits left behind by a mountain stream when it reaches flat ground.



F) Nature of Rock

Hard (i.e. igneous and metamorphic) rock and resistant rock generally produce rugged features.

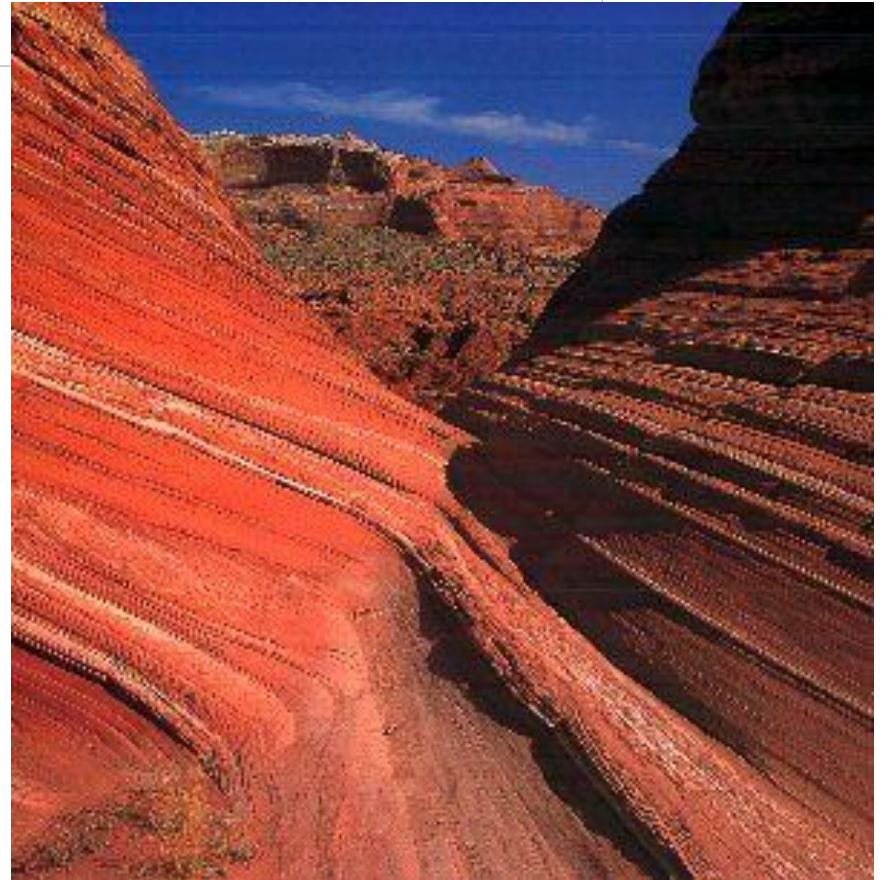
Soft rock (i.e. sedimentary) generally produces a more gentle relief.



Intrusive



Igneous rocks



Sedimentary rocks-sandstone

It's not hard to see that this metamorphic rock, called gneiss, has been intensely folded! This rock had to have been under very high pressure and temperature to allow it to fold like this without breaking.

G) Climate

Use information from previous items to make deductions about the climate. The number and size of streams, the vegetation or lack of it, the existence of wells, irrigation ditches or windmills, knowledge of elevation, latitude, etc. should all help.

Remember the Biomes, Climates, Soil Unit?

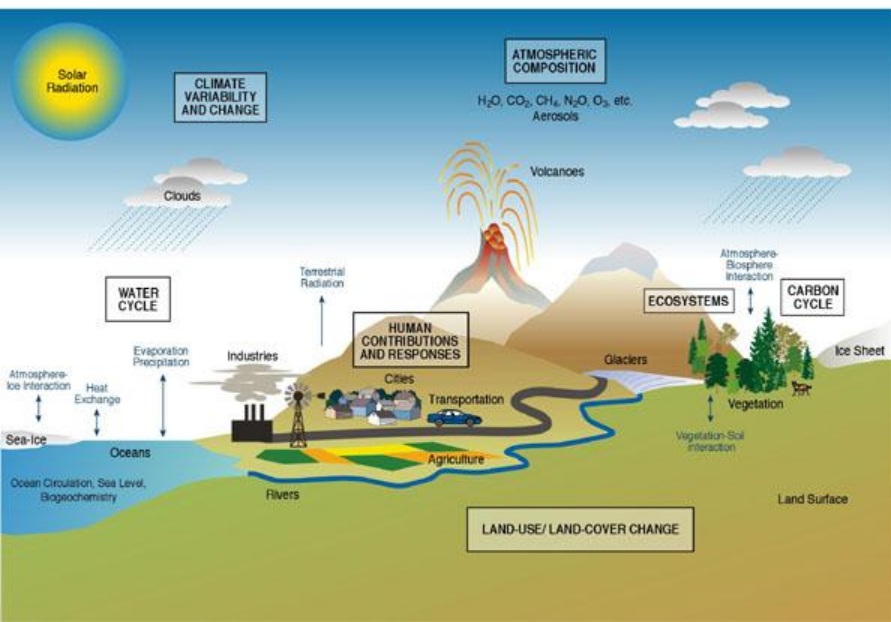
You should know the major biomes within Canada-including flora and fauna, adaptations, climates, soil type, major economic activity. There aren't that many.

BC-Dependent upon location is Temperate Rainforest

Southern Prairies-Temperate Grassland

Rest with the exception of up North (Tundra) are coniferous forests.

Try to study the place and topography...If it is mountain we are probably dealing with Coniferous forest. If flat and lots of agriculture then grassland.



H) Land Use

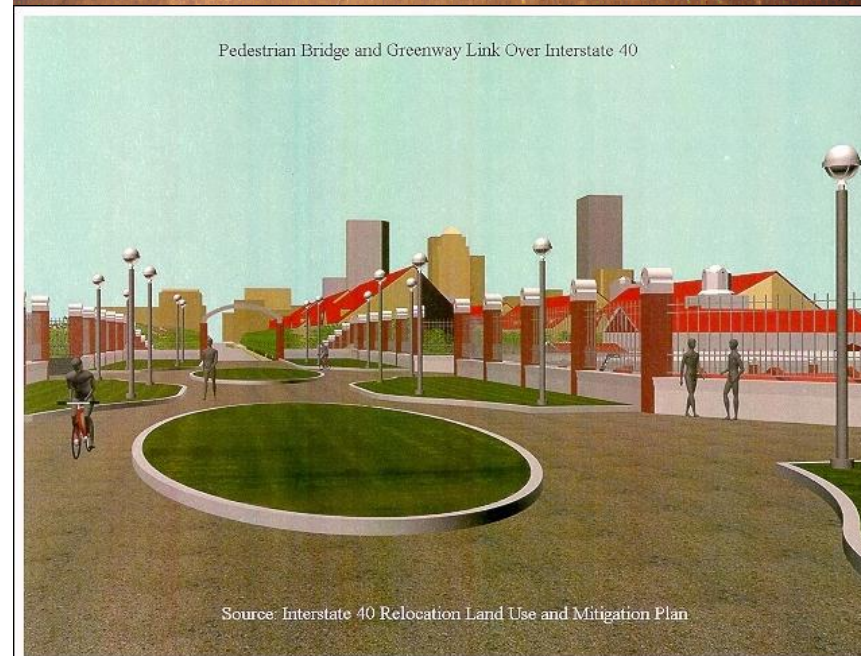
Utilize your knowledge of topographic map symbols to determine activities such as mining, forestry, farming, energy production, urban infrastructure, etc. Study the map very closely to see what type of activity:

Resource management unit knowledge to remind yourselves of environmental impacts associated with

- A) Forestry
- B) Mining
- C) Fishing
- D) Agriculture
- E) Oil extraction etc.



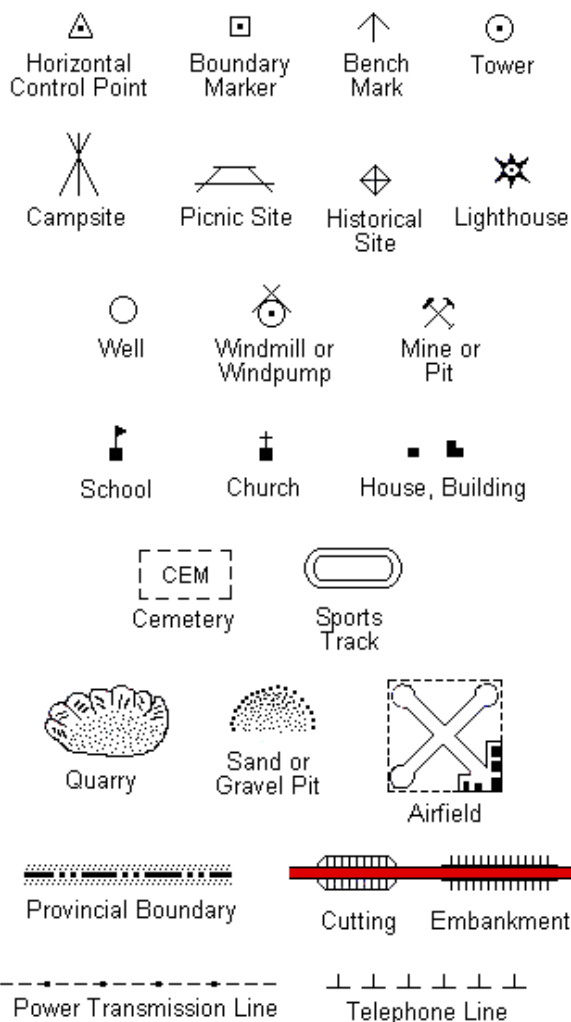
Legend	
 Estate Residential (0.51-4.0 du/acre)	 Planning Areas
 Low Density Residential (4.1-8.0 du/acre)	 Sunrise Boulevard North
 Medium Density Residential (8.1-18.0 du/acre)	 Sunrise Boulevard South
 High Density Residential (18.1-40.0 du/acre)	 Folsom Boulevard
 Commercial	 Easton
 Commercial Mixed Use	 Westborough
 Village Center Mixed Use	 Aerojet
 Transit-Oriented/Town Center Mixed Use	 Rio Del Oro
 Office	 Grant Line West
 Office Mixed Use	 North Douglas 1
 Light Industry	 North Douglas 2
 Heavy Industry	 East
 Mining	 Mather
 Public/Quasi-Public	 Jackson
 Parks and Open Space	 Sunrise Douglas
 Natural Resources	 Grant Line North
 Private Streets	 Grant Line South
 Town Center	



Topo Map Symbols

See:

<http://www.markville.ss.yrdsb.edu.on.ca/teacher/geography/9/Academic/Topographic%20Symbols%20Nat%20Resources%20Canada.pdf>



Topographic Map Symbols - Recreation

(Feature Name)	Symbol
Sports track	
Swimming pool	
Stadium	
Golf course	
Golf driving range	
Campground; Picnic site	
Ski area, ski jump	
Rifle range with butts	
Historic site or point of interest; Navigation light	
Aerial cableway, ski lift	

Lands with environmental constraints:

- Lands of high resource value—not to be developed:
floodplains; wetlands; stream headwaters, courses, & buffers; and steep slopes
- Lands of moderate resource value—may be developed
only after stringent review and mitigation:
agricultural soils, aquifers, hilltops & ridgelines, moderate slopes,
biodiversity areas, and wildlife habitats & corridors

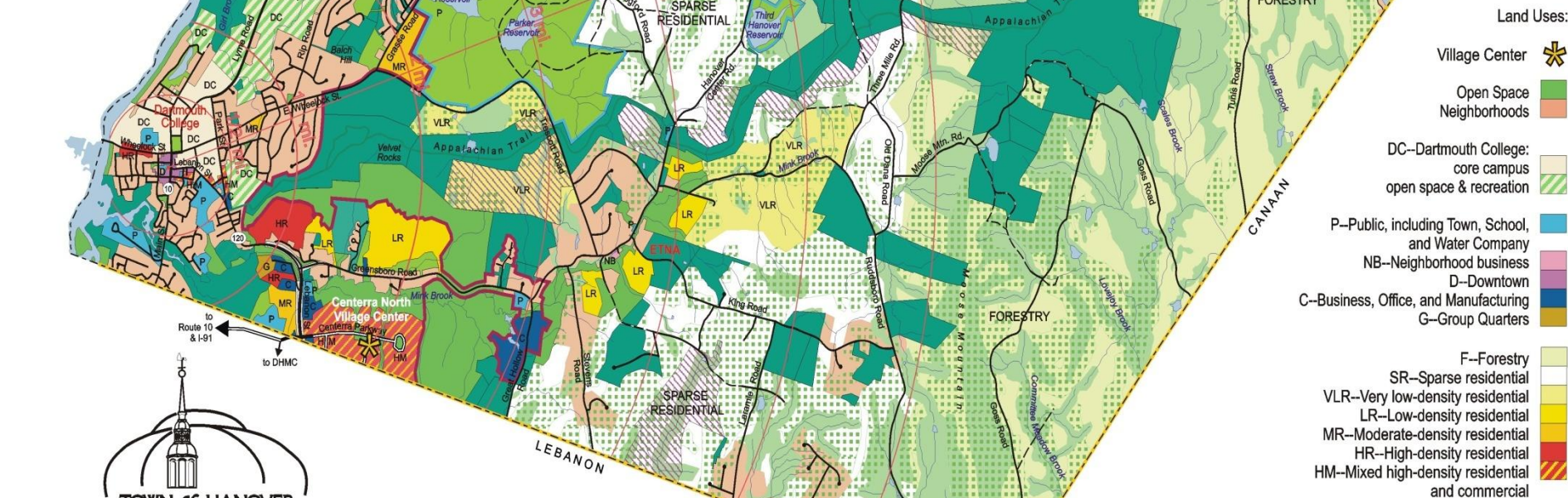
Other lands, especially those significant to open space protection,
which may be developed only after stringent review and mitigation

Protected open space lands

Area served by public water & sewer

new roadway
Class VI road

5 acres
10 acres
20 acres
50 acres



scale = 1 : 50,000
1 inch = 4,167 feet = 0.80 miles
0 1 2 3 miles
Town of Hanover, New Hampshire
Jonathan Edwards
Department of Planning & Zoning
July 2003

MASTER PLAN 2003

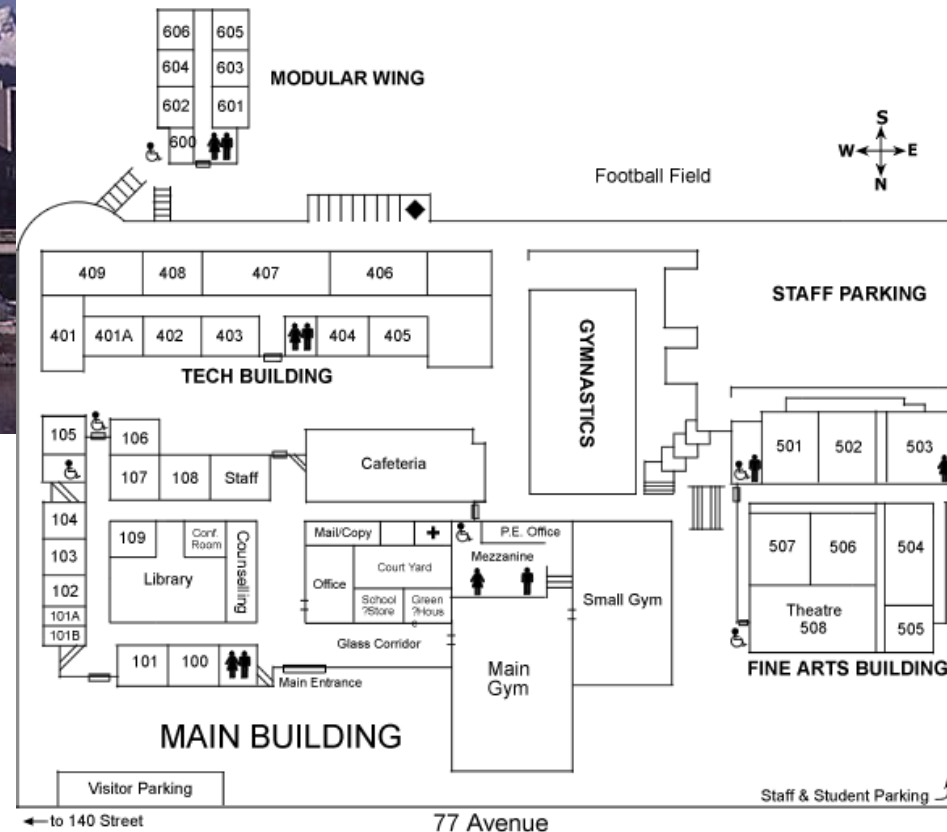
Land Use Concept Map

Map 3-4

This concept map and guide show the Planning Board's vision of what land uses ought to be. Exact uses and boundaries will be determined during the implementation of the Master Plan.

1) Cultural Features

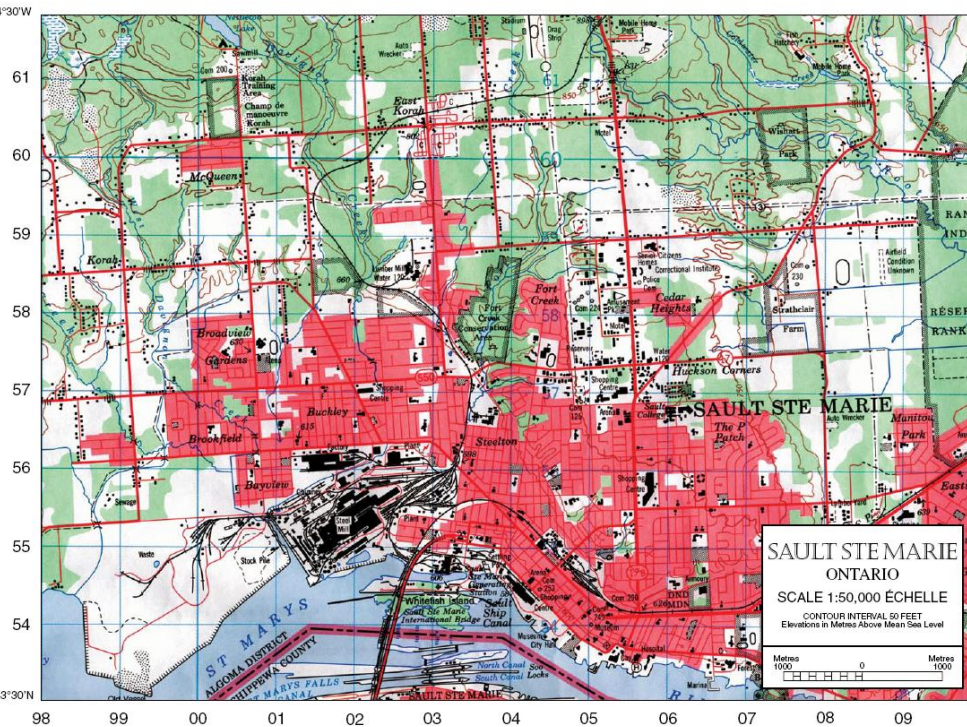
Place names can often give a clue as to the ethnic groups that have settled an area.



1) Types of Settlement:

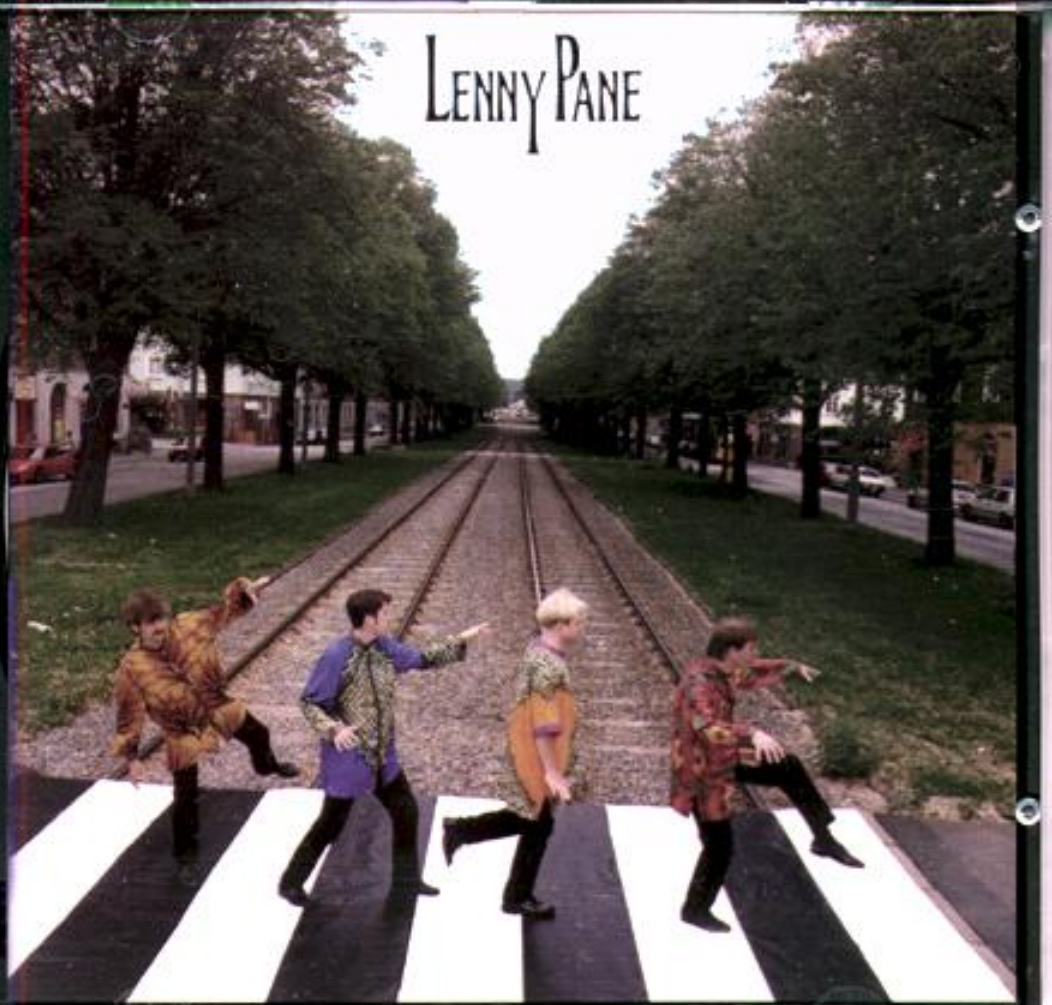
- a) dispersed: houses and other buildings spread out
- b) nucleated: much development in a small area
- c) ribbon or strip development: much commercial development (i.e. retail stores) down a particular road/street.

Cities are usually delineated with red/pink colour!



K) Transportation and Communication

Look for roads, the density and pattern of the roads, railways, airports, tv towers, radio towers, etc



L) Forested/Wooded Areas

Any area shaded green, unless stated otherwise, is forested/wooded area.

White areas are either logged or have no or little vegetation or are used for farming. Highland (mountain) areas that are white delineate snow



Economic Activities

- **note any evidence of fishing, forestry, mining or quarrying, manufacturing, recreation or tourism, or agriculture and its distribution**
 - **establish any relationships between economic activity and the physical and cultural features of the area**

For example an area rich with minerals is likely to be mined

An area with good agricultural land will be farmed



Some BASICS

Chapter 76 Map scale and six-digit grid reference

Map Scale

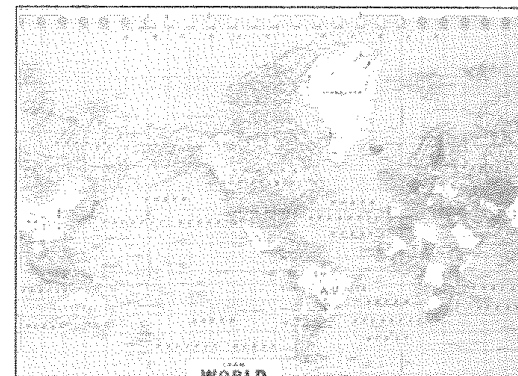
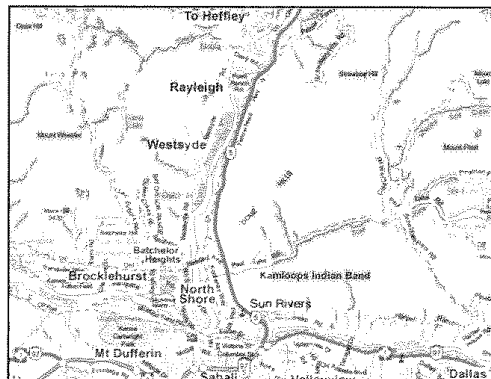
All topographic maps display a scale and it is the most important feature on the map. The scale allows you to use the map to accurately determine distances between two points and the areas of a lake or city for instance. The two most common ways to show scale are

- a) representative fraction 1:50000
- b) graphic or linear scale which appears as a short ruler usually directly below the fractional scale on the map.

A scale of 1:50000 means that 1 centimeter on the map represents 50,000 centimeters or .5 kilometers in real distance. On a map with a scale of 1:100000, 1 centimeter on the map would represent 100,000 centimeters or 1 kilometer in real distance.

Large-scale maps show much detail. City maps, for instance, are thought of as large-scale maps. Roads, parks, important buildings such as schools and hospitals, along with much other information can be seen on large-scale maps. Contractors using house blueprints work with very large-scale maps. The blueprint shows the entire house in great detail.

Small-scale maps, such as maps of countries and world maps, have little detail. On world maps very little detail is shown. Only major rivers and mountain ranges, the largest lakes, and the location of major cities are shown but fine detail is lacking on all small-scale maps. The smaller the scale, the less detail is shown. A globe may have a scale of 1:86,000,000 meaning that 1 centimeter on the map is 860 kilometers in real distance.



Six-Grid Reference System We Enjoy Saturday Nights

336

Six digit grid reference

Unit 7: Topographic mapping

All large-scale topographic maps with scales of 1:250000 and larger (showing more detail) contain grid lines to allow exact point location. Topographic maps seen on the old Geography 12 Provincial exams have a scale of 1:50,000 and grid squares represent 1 square kilometer. Each line of the grid is numbered along the edge of the map. Vertical grid lines, running north to south, are called **eastings** with numbers increasing as you move east on the map. Lines running west to east are called **northings** with numbers increasing as you move north. When giving the exact location of something on the map, such as a bridge, pulp mill, or radio tower, record the easting number first followed by the northing.

Example: to give the grid reference of the water tower on the map, follow the steps below

1. Locate the number of the grid line to the west of the water tower (line 26)
2. Determine the number of tenths that the water tower is east of line 26.
3. 264 will be the first three numbers of the six digit grid reference.
4. Now locate the number of the grid line south of the water tower (line 43)
5. Determine the number of tenths the water tower is north of line 43.
6. 435 will be the last three numbers of the six digit reference.
7. The exact location of the water tower on the map will be **264435**

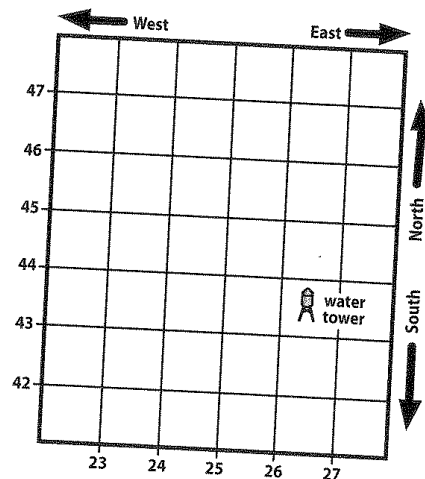
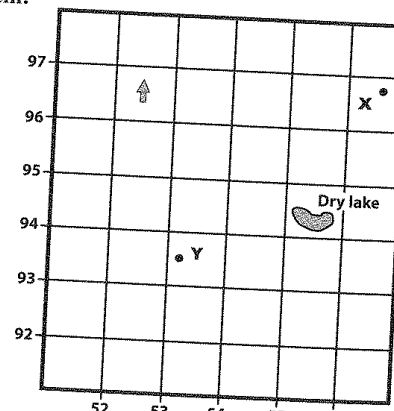


Figure 76.3 Grid reference

Use the map on the right to practice using the grid reference system.

Give the six-digit grid reference for the following

- a) point X _____
- b) point Y _____
- c) tree in northwest quadrant _____
- d) middle of dry lake _____



Measuring Area

Thumb rule-1 squared kilometer

Each box on these maps is 2 cm by 2 cm-meaning 1 by 1 km in the real world

Unit 7: Topographic mapping

Measurement of Area

• Regular Area

When calculating the area of something that has straight sides, use the regular area formula.

$$\text{Area} = \text{length} \times \text{width}$$

Measure the length and width in centimeters on the map, then use the map scale to convert to true distance. Now multiply length x width to get area. Example below

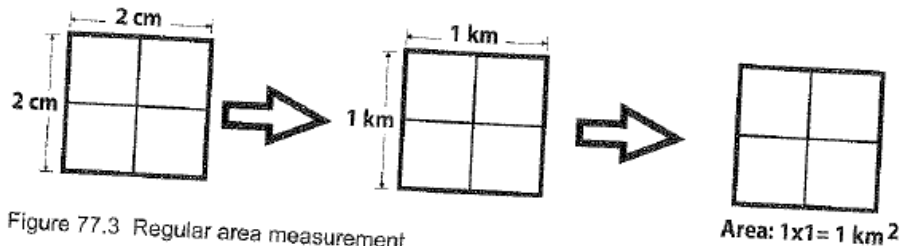


Figure 77.3 Regular area measurement

Answers:

A. _____

B. _____

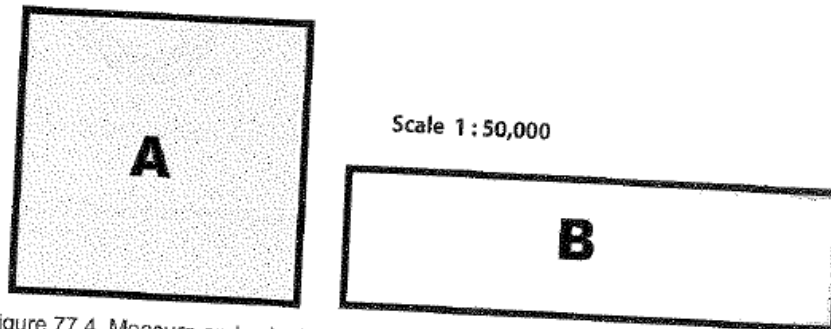


Figure 77.4 Measure and calculate the area of A and B

**Let's look at some sample m/c and
how we would approach them!**

45. What is the road distance between the bridge at 053611 and the intersection at 056574?

- A. 4 km
- B. 8 km
- C. 10 km
- D. 14 km

Remember that this is a small scale map.

All of these maps are 1:50,000

Meaning that 1 cm on the map

Represents 50,000 cm in the real world

Now when you talk to your friends, you don't tell

Them I walked 30,000 cm today, so we convert that to

Km...Math 9 rules tell me that I need to divide by 100,000

Therefore 50,000 cm are equal to 0.5 km

Any distance on the map will be multiplied by 0.5 km,

Which is the same thing as dividing by 2...(simple stuff ha?)

Let's look at the steps we need to take in order to answer this question

45. What is the road distance between the bridge at 053611 and the intersection at 056574?

- A. 4 km
- B. 8 km
- C. 10 km
- D. 14 km

**Look at the symbology for a bridge on p. 245
(trust me there is that same symbol
at this location**

Greate Mnemonic:

**We
Enjoy
Saturday
Night;**

1. I start here (W)

2. I move (E) .3

When you practice these exams:

You will notice that the distance is 20 mm

2 mm = 1 slot over

6 mm = 3 slots over

3. My next number is 61 (S)

4. I move (N) .1

2 mm on my ruler

**5. Green circle indicates the approximate
place where the bridge is found**

**I will not go through the steps to find the
intersection but the other**

Green circle signifies that location

**So now you take your ruler and
measure the distance between the
two – The actual distance is 8 cm on the map,
but what is it in the**

**real world? Remember our
conversion...that's right you divide
by two or multiply by .5**

Answer is drum roll please

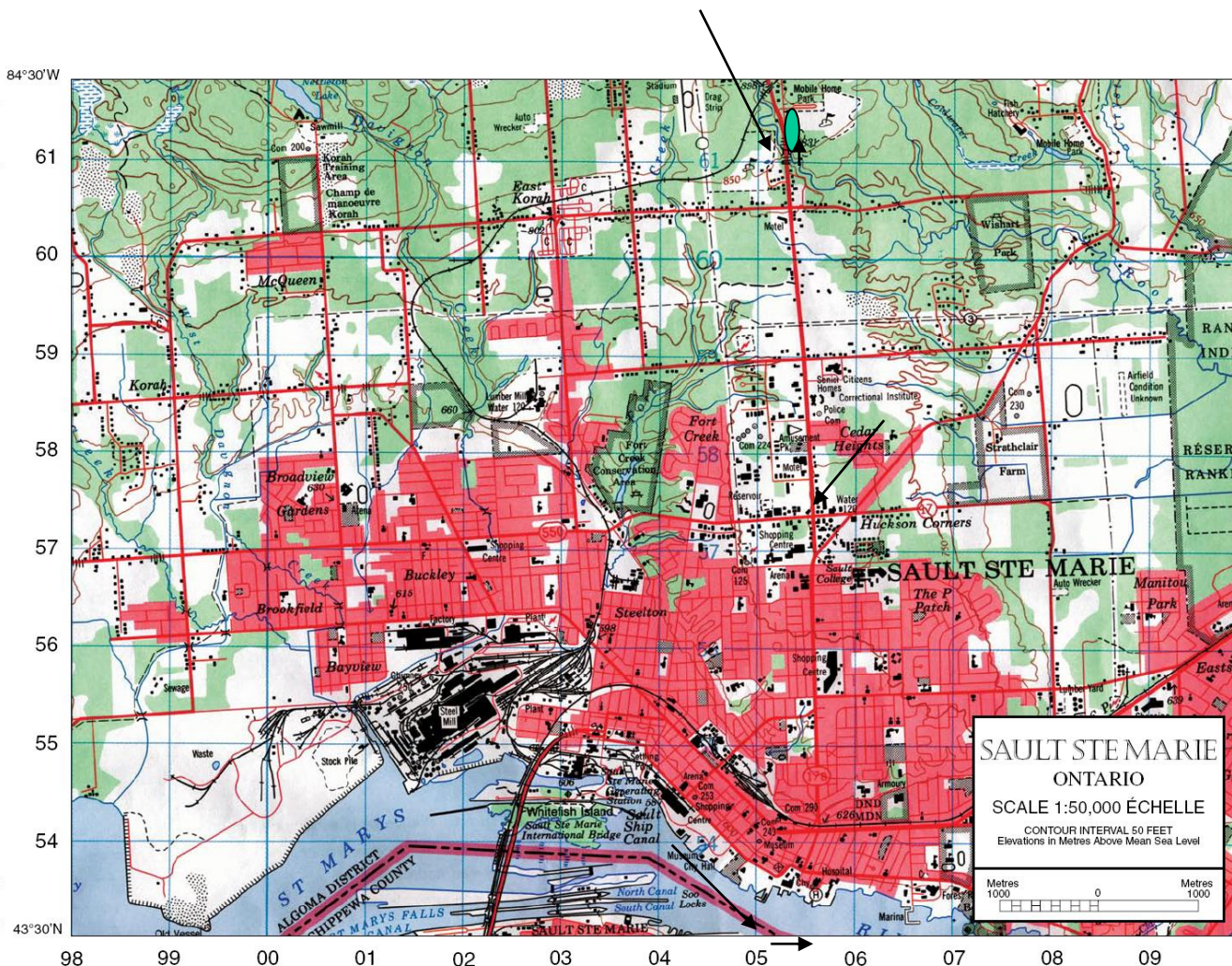
4 km!

**This is easy! What if the line was not
straight?**

**Let's turn to Sovio pp. 240-you need a piece
of string for this, or paper!**

0708 Geography 12

Data Page 1



46. What direction is it from Fort Creek Conservation Area (0357) to the Korah Training area at 0060?

- A. northeast
B. southeast
C. southwest
D. northwest

The key word here is from
So I find Fort Creek Conservation
Area
It is somewhere in the grid 0357

Then I find the Korah Training
It is somewhere in the grid 0060

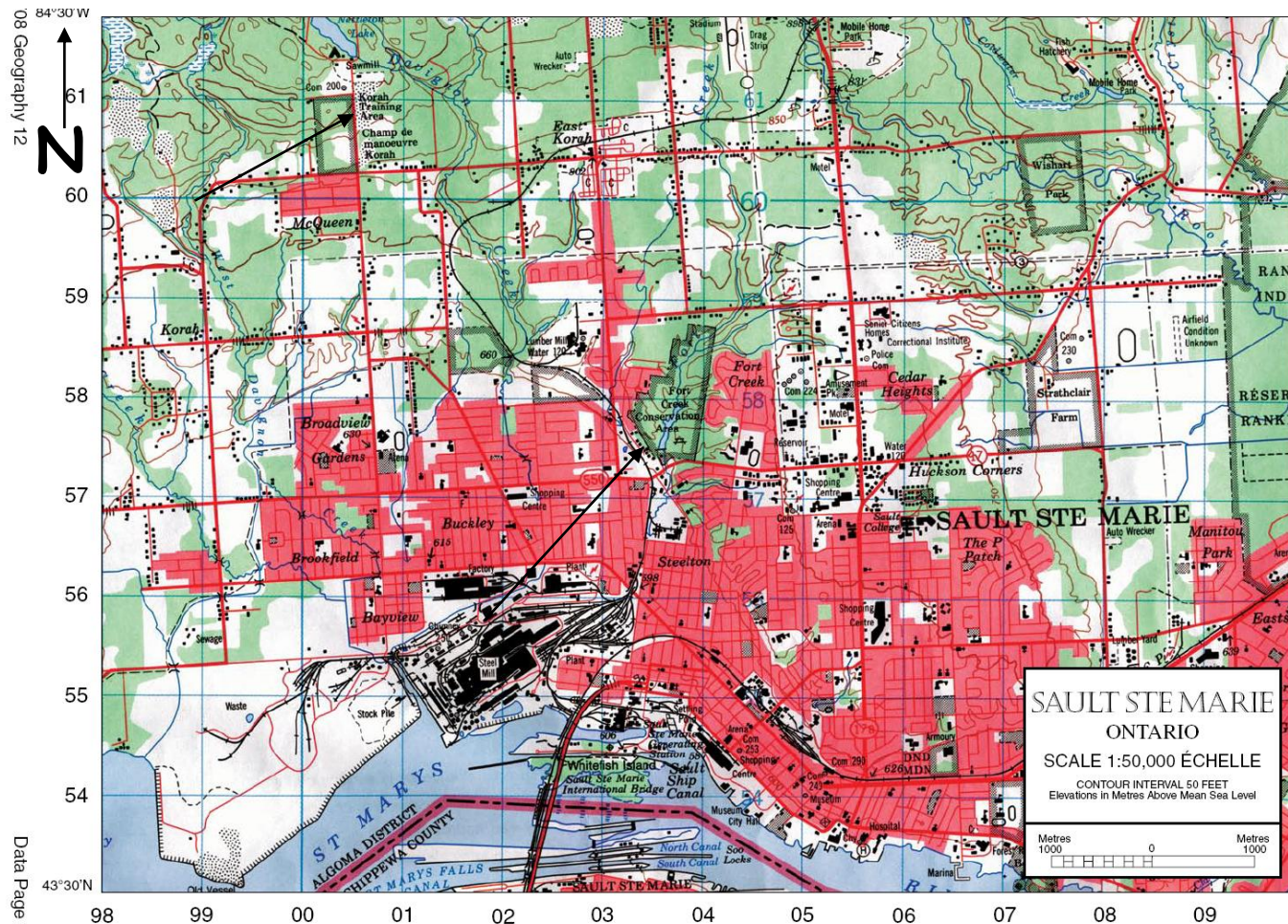
Now it is asking me for direction
From Fort Creek to Korah - This is
Social Studies 9 stuff!

Remember that north is always right side up!

The correct answer is

You guessed it Northwest

**Wow Mr. K this is fun and easy!
Be careful sometimes on the
provincial they will word it in a
manner to mix you up...
What is the direction to Korah
Training from Fort Creek →the
from is always your starting point!**



47. What is the area of the Fort Creek Conservation Area (0357)?

- A. 0.5 km²
- B. 1.0 km²
- C. 2.0 km²
- D. 4.0 km²

Area is a little tricky, especially for an irregular area like Fort Creek

What do you think the actual area of one square is on this map?

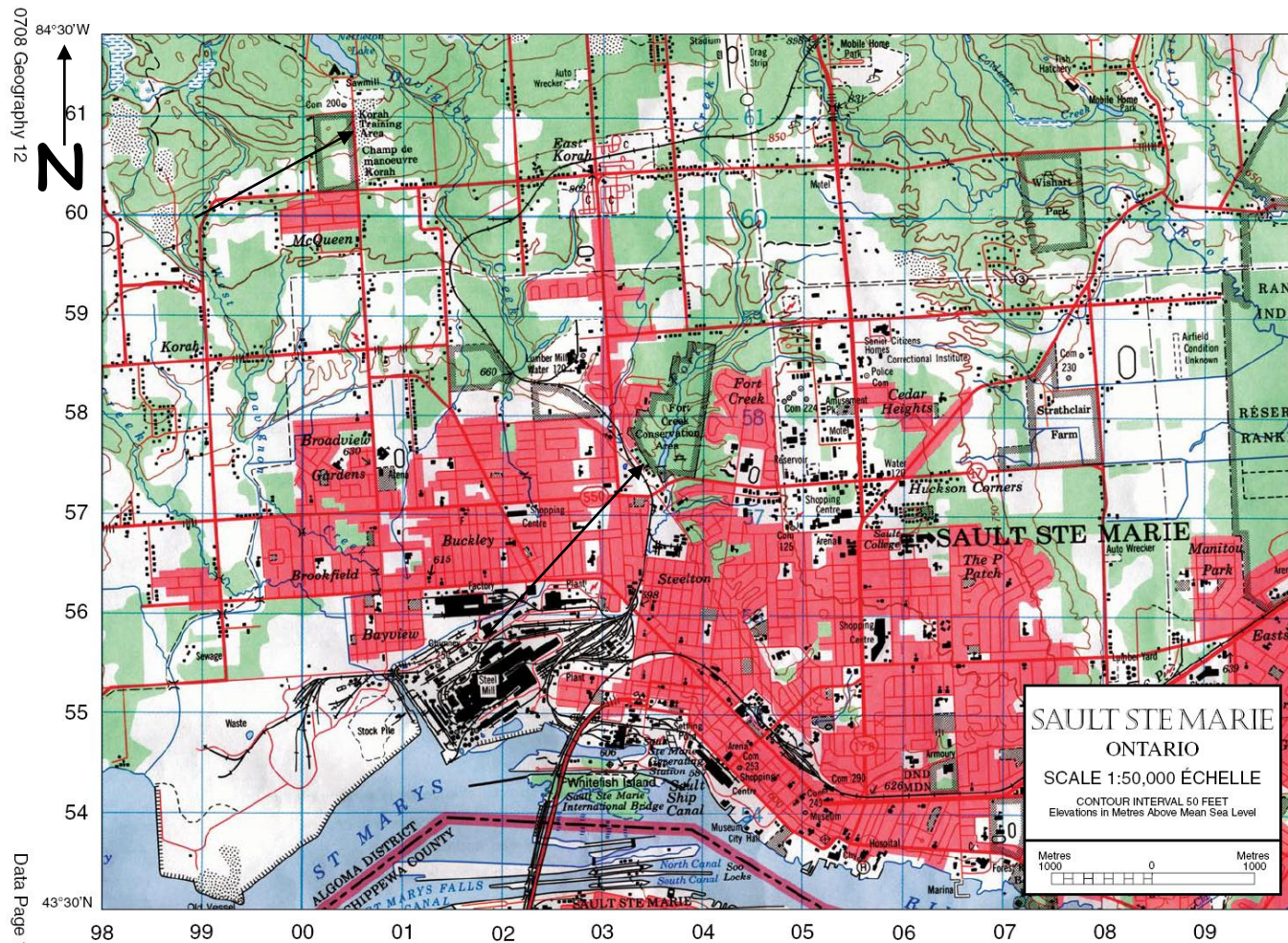
Remember that 2 cm = 1 km

1 km by 1 km is?

1 km squared - That is the area for each grid on this map (take that into the provincial)

Know you have to ask yourself how much of an area (square does it cover)?

You guessed it...it is very close to covering 1 full square
So the correct answer is 1 km squared
Also see Sovio pp.241, 242



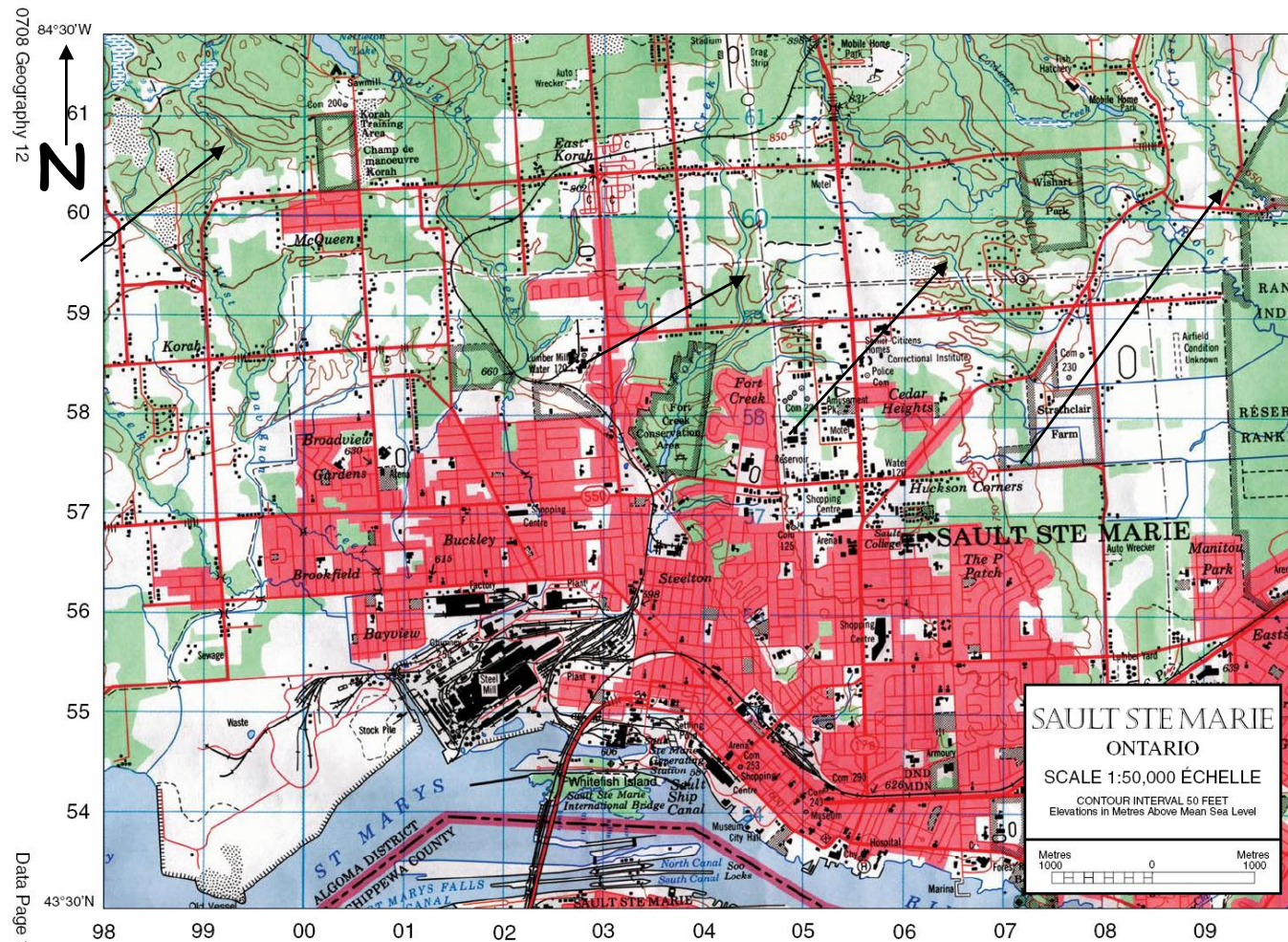
48. In which grid square does the stream flow fastest?

- A. 9960
- B. 0459
- C. 0659
- D. 0960

Remember earlier in this powerpoint we talked about contour lines!
The closer the contour lines the steeper the gradient!

The stream will be fastest where the contour lines are closest

Let's Zoom in...





48. In which grid square does the stream flow fastest?

- A. 9960
- B. 0459
- C. 0659
- D. 0960

What do you think?

The stream is represented by the blue line...

Where are the contour lines the closest together?

You guessed it!

a)

49. What river feature will form as erosion continues at 079603?

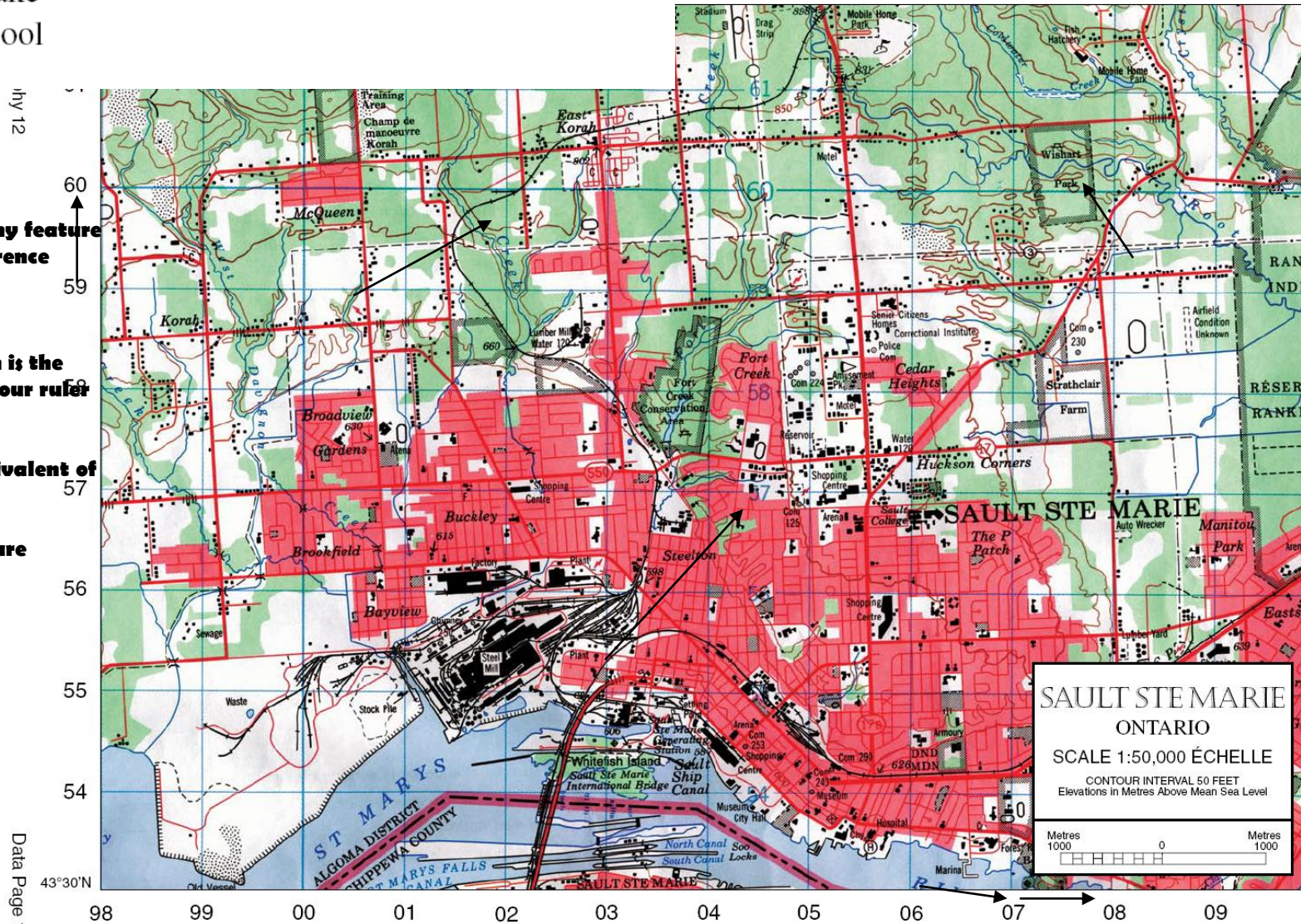
- A. rapids
B. pot hole
C. oxbow lake
D. plunge pool

Again I need to located my feature first using my 6 grid reference system

Start at 07 (W)
Move to the right 9 which is the
Equivalent of 18 mm on your ruler

Then I go to 60 (\$)
I move 3 which is the equivalent of
6 mm (N) 57

Let's zoom and try to figure out what is there





Do you notice this is a meandering river?

What will form as erosion continues

→ from our river unit we know it will be an oxbow lake

Measuring elevation (contour lines)

What is the elevation at a particular location?

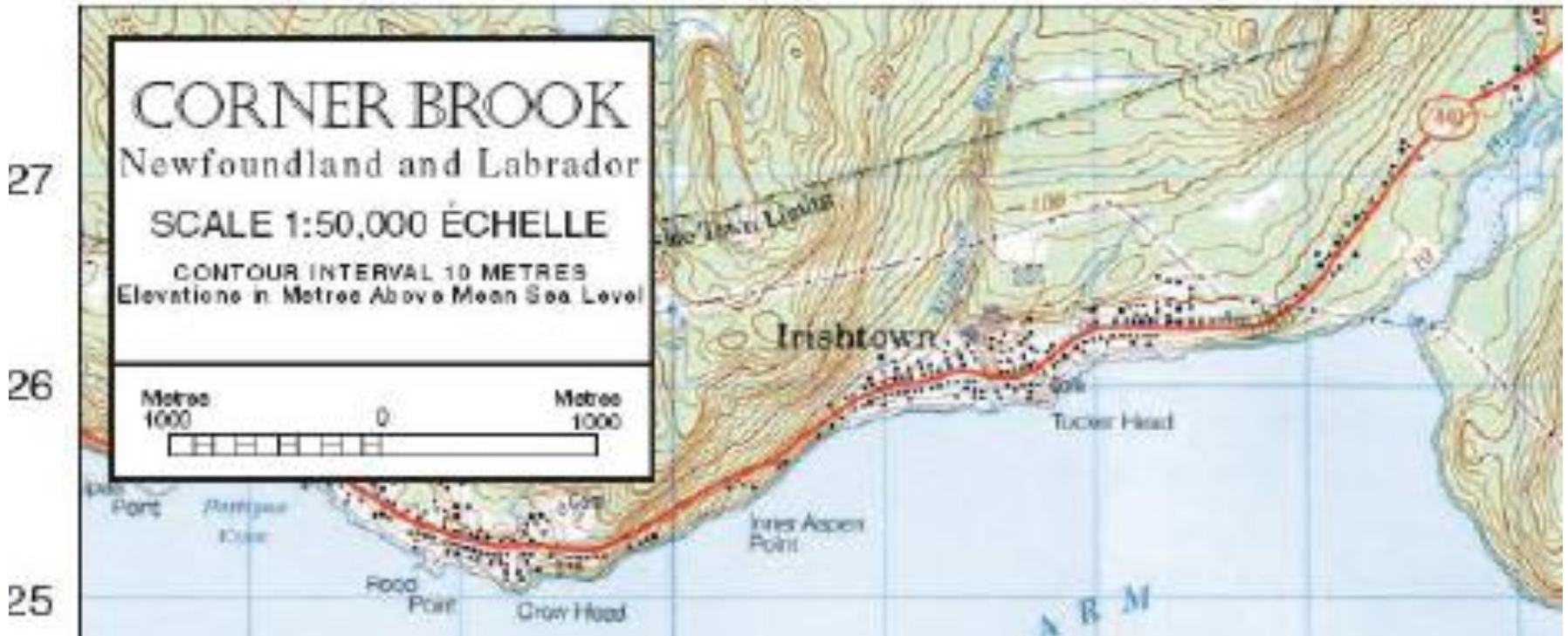
Remember to look at contour interval. For this map it is

50 feet. That means that for every contour line (if you are going up in elevation) you are climbing by 50 feet. Look for thick black contours

that give you an elevation for example in 0460 there is a line showing

850 feet. The next contour line will be 900, 950, 1000, 1050. The next thick line on the map

Will be 1100. That is right there are five contour lines between the thicker index contour lines!

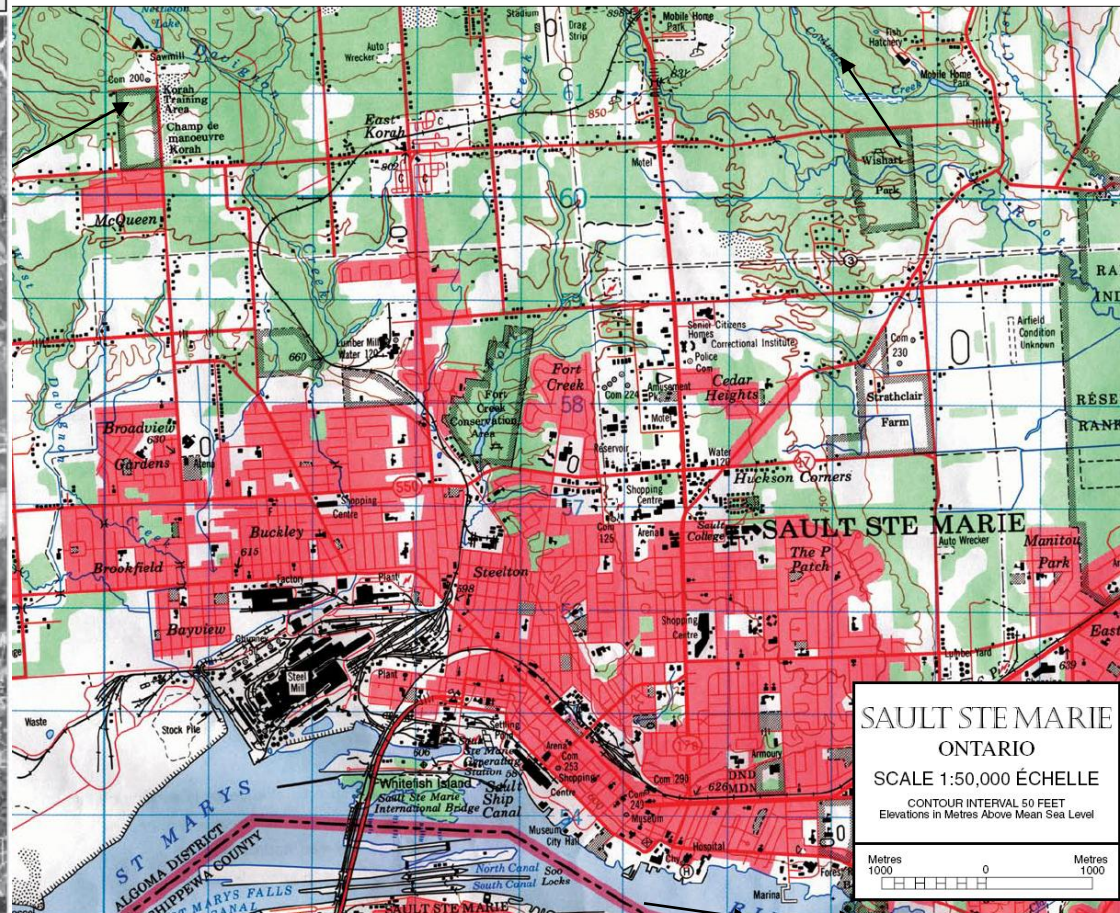


51. What is the scale of the air photograph?

- A. 1 : 30 000
- B. 1 : 60 000
- C. 1 : 80 000
- D. 1 : 100 000

**This is little harder-
An aerial photo is a real world
picture taken from above
What you need to is find two point
on the map and measure them
and two similar points on the
Aerial photo and measure them-
Let's look at another map example
and come back to this one!**

AIR PHOTOGRAPH OF SAULT STE MARIE, ONTARIO



Step 2: Pick two common points that you can easily recognize and measure between on both the topographic map and the air photo.

St. John's Topographic Map:

The Distance Between South Head (636689) and Spriggs Point (639668) is 4.4cm.

St. John's Air Photo:

The Distance Between South Head and Spriggs Point is 8.5 cm.

Step 3: Approximate the factor difference between the two distances by dividing the larger distance by the smaller one.

$8.5\text{cm} / 4.4\text{ cm} = \text{Approximately } 2.$

Step 4: If you have zoomed in on the air photo, divide the topographic map scale by the factor difference.

If you have zoomed out on the air photo, then multiply the topographic map scale by the factor difference.

(Note: If you have a factor difference very close to one, then the air photo has the same scale as the topographic map.)

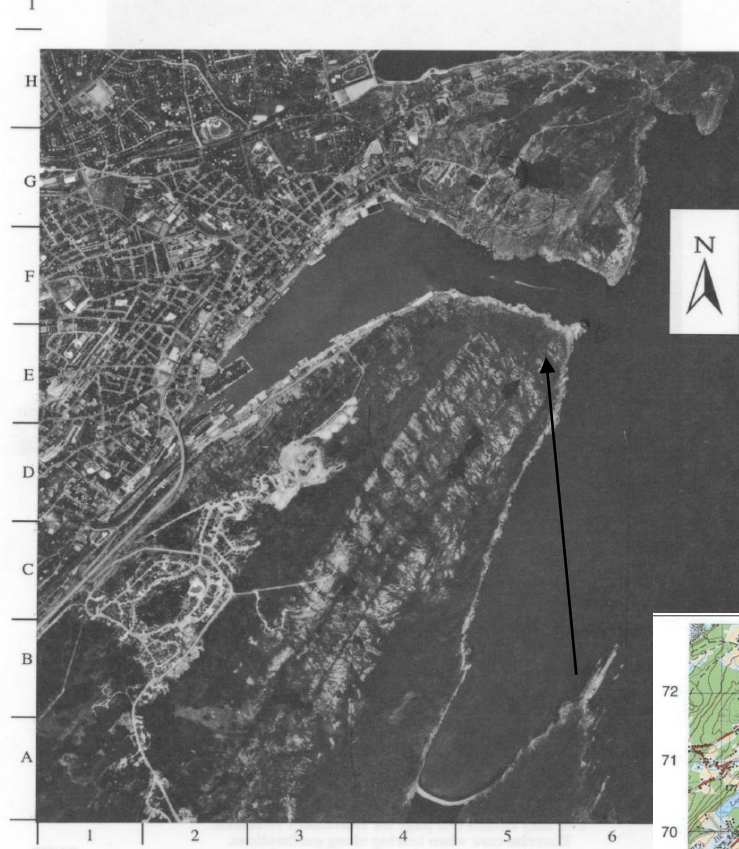
St. John's Topographic Map = 1:50 000

Zoomed In on Air Photo so divide by the factor difference of 2.

Therefore, $50\ 000 / 2 = 25\ 000.$

The scale of the St. John's air photo is 1:25 000 (b).

Going back to our original question – The factor difference was indeed very close to one–so the actual scale of the air photo is 1:60, 000 (we have zoomed out)



52. What is the cultural feature at X on the air photograph?

- A. college
- B. shopping centre
- C. secondary school
- D. Huckson Corners

53. What is the main economic activity of the region?

- A. mining
- B. logging
- C. farming
- D. manufacturing

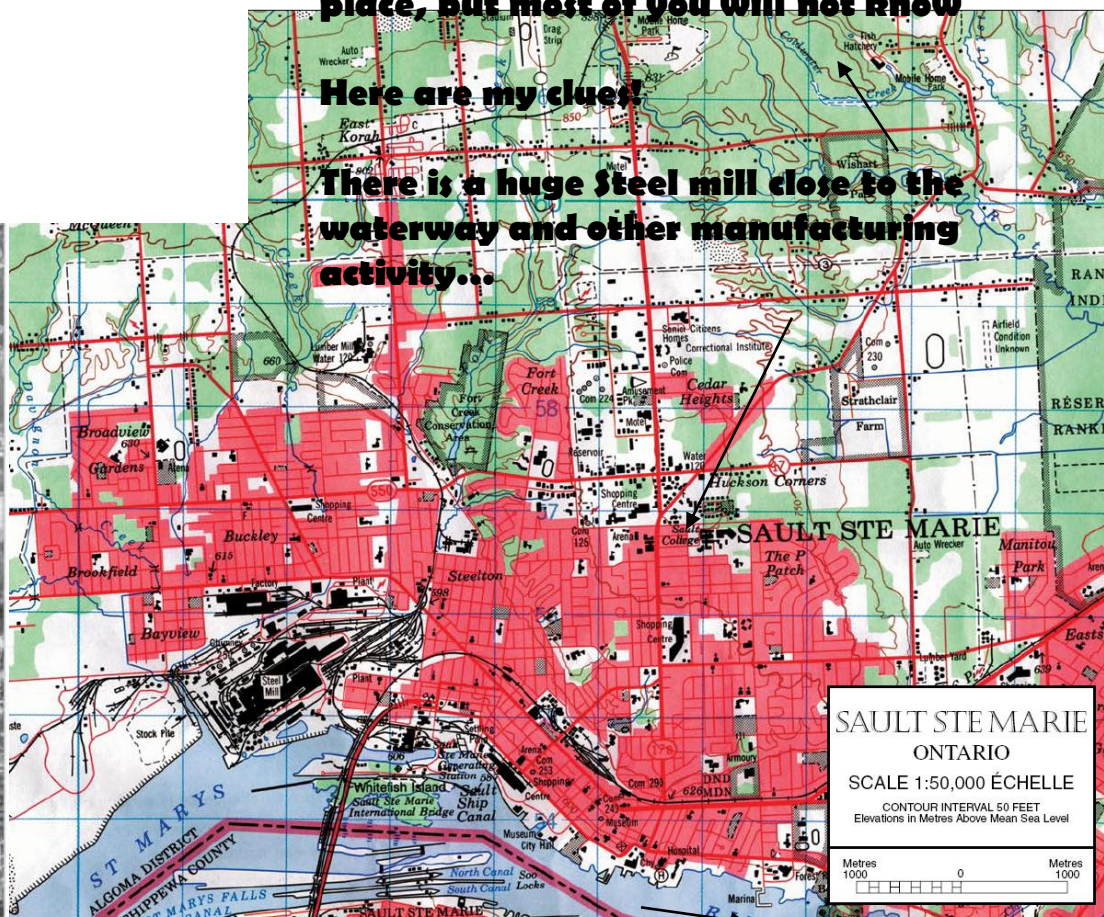
**Your task here is to identify where X is on the topographic map
Do you see the pattern of the city?**

**If I put the air photo over the topo map
they match!
It is the college!**

**Last question – you need to look for clues
I answer this question just by knowing the
place, but most of you will not know**

Here are my clues!

**There is a huge steel mill close to the
waterway and other manufacturing
activity...**



O
N
M
L
K
J
I
H
G
F
E
D
C
B
A

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

00 01 02 03 04 05 06 07 08 09

Written Portion

it is really the human-physical interaction-Look for the data on the map

1. **Explain** four different ways the geography of the Sault Ste Marie region has contributed to the economic success of the community.
Use **page 1** in the Response Booklet. (4 marks)
2. What impact have the industrial activities had upon the Sault Ste Marie environment?
Answer in **paragraph** form.
Use **page 2** in the Response Booklet. (6 marks)

1. **Explain** four different ways the geography of the Sault Ste Marie region has contributed to the economic success of the community. (4 marks)

Response:

- | | |
|--|---|
| | <ul style="list-style-type: none">• Cheap water transportation• Hydro-electricity from the St. Mary's River• River used as a waste disposal system• River used for cooling in the steel-making process• Located near natural resources, such as iron ore, coal, limestone and softwood lumber• Nearness to the markets of the heartland of North America• Access to skilled labour from the heartland of North America• Good natural drainage reduces threat of flooding• Flat land for development, infrastructure and expansion• Gravel for construction and transportation routes |
|--|---|

2. What impact have the industrial activities had upon the Sault Ste Marie environment?

Answer in paragraph form.

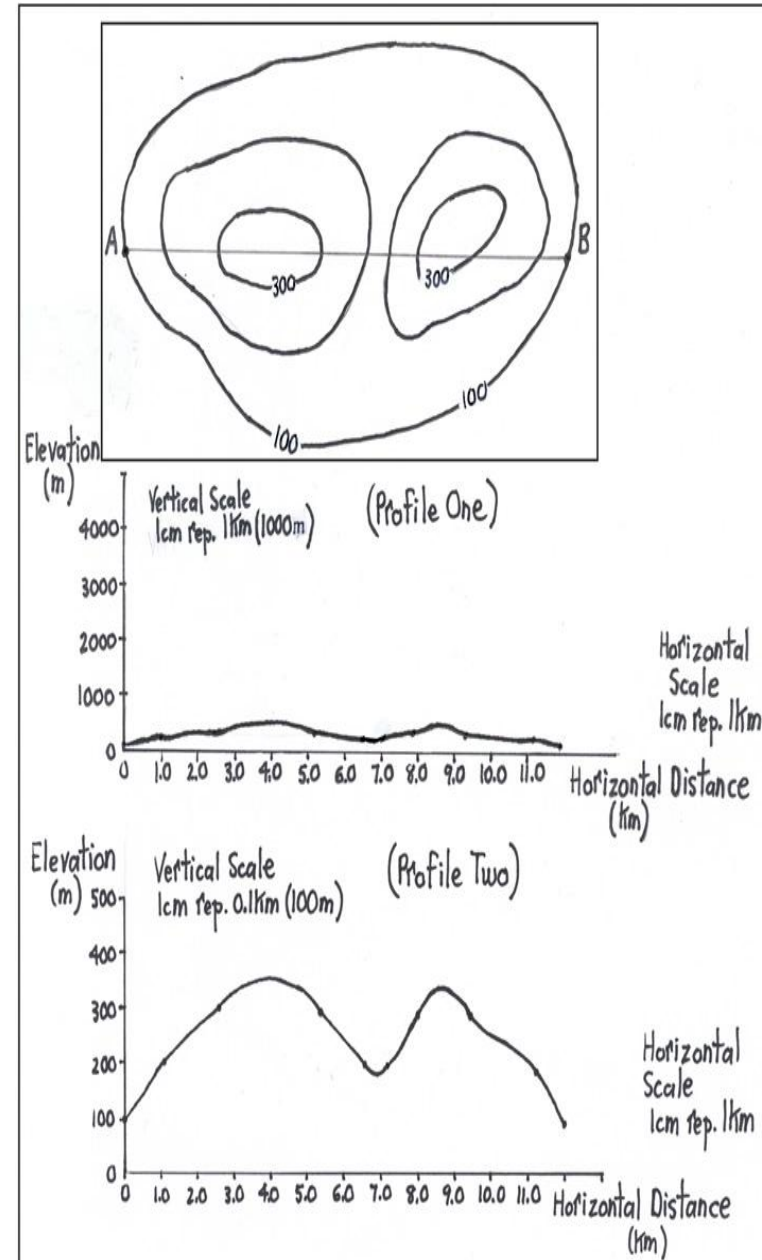
(6 marks)

- • Thermal pollution of the river when water is used for cooling, then returned to the river.
- Effluent from the steel mill is dumped into the river and can severely affect the river ecology with heavy metals.
- Acid rain from the chemicals and mill emissions.
- Sewage and septic effluent is dumped into the river with serious threats to the river ecology.
- Effluent from the St. Mary's Pulp Mill may include organo chlorines, dioxins and furans.
- • Oil spills and leakage associated with transportation of steel and raw materials.
- • Iron ore and gravel mining may be open pit, thus habitat loss and potential acid rock drainage concerns.
- • Chemical contamination from the lumber mill and agricultural activities.
- • Restrictions on fish and wildlife consumption.
- – Bioaccumulation of heavy metals.
- • Threats to organisms in the food chain, thus degraded fish and wildlife population.
- • Industrial activities threaten river:
 - – Eutrophication or undesirable algae.
 - – Restrictions on water consumption.
 - – Beach closures.
- • Aesthetically unpleasant.
- • Hydro-electric power generation has altered the St. Mary's River ecology.
- – Potential for leaching into the river.
- Domestic run-off.

Other tasks you might have to perform on the exam...identifying a cross profile

We will see some examples in the booklet I created!

Let's practice that is the best way to learn!

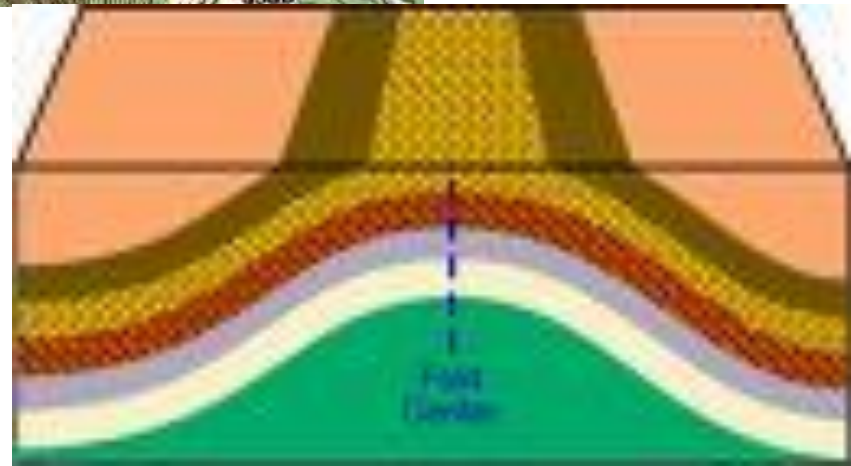


POP Quiz...See if you can figure out what the following features are from your study in Geography so far...

Geologic Structures

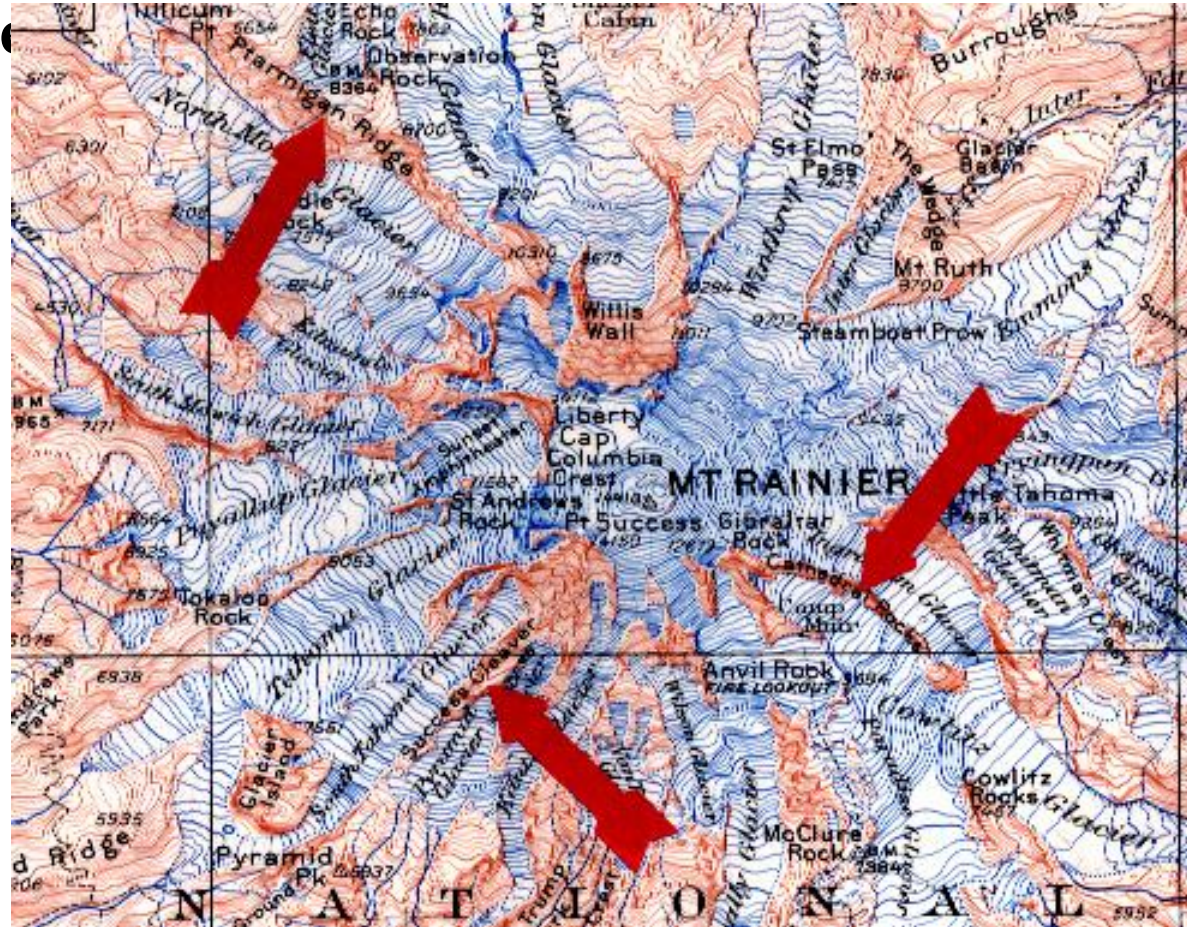


Anticline—folded strata



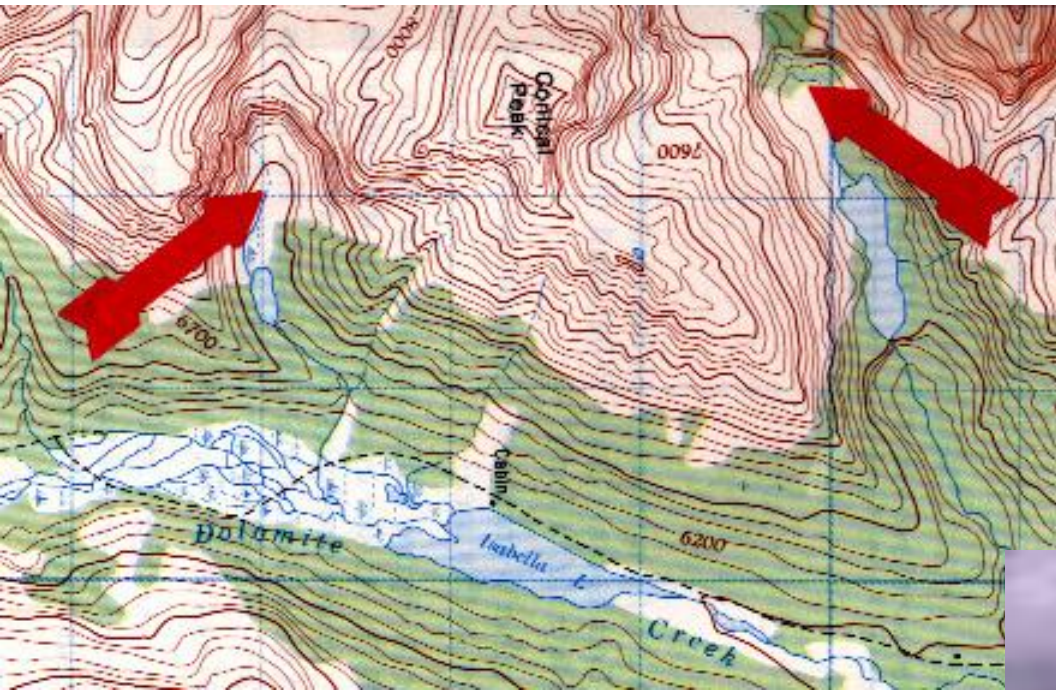
POP Quiz...See if you can figure out what the following features are from your study in Geography so far...

Glacier

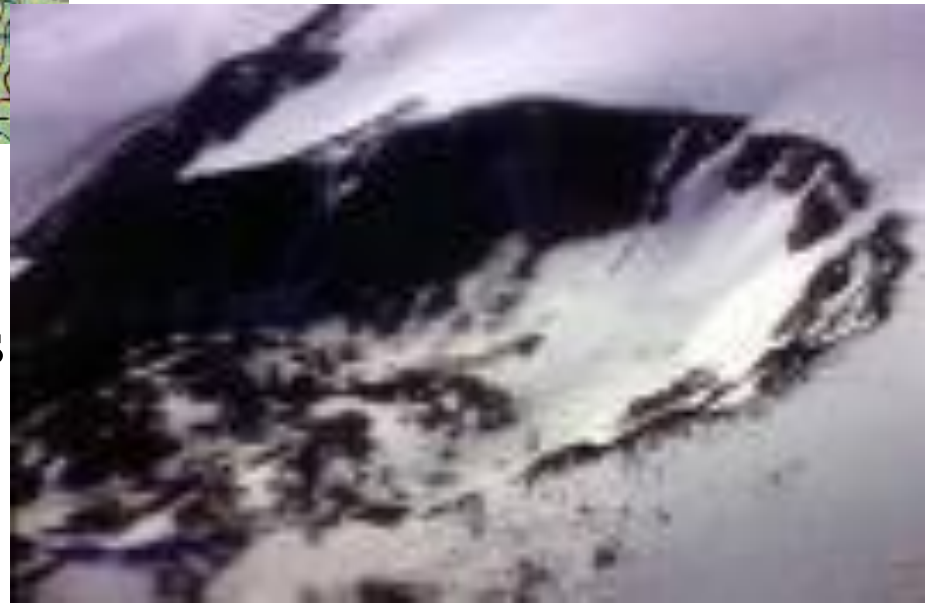


Arête—divisions between cirques

POP Quiz...See if you can figure out what the following features are from your study in Geography so far...



Cirque—bowl like depressions

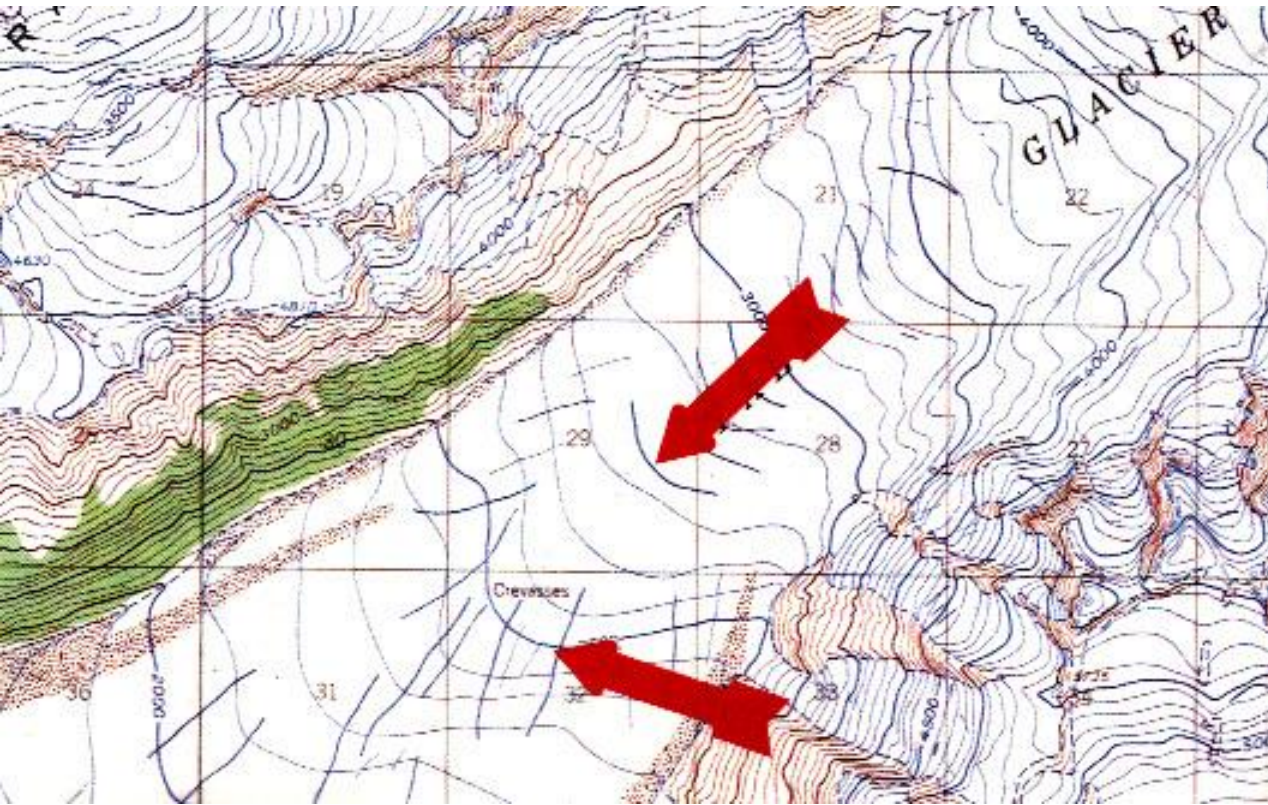


POP Quiz...See if you can figure out what the following features are from your study in Geography so far...



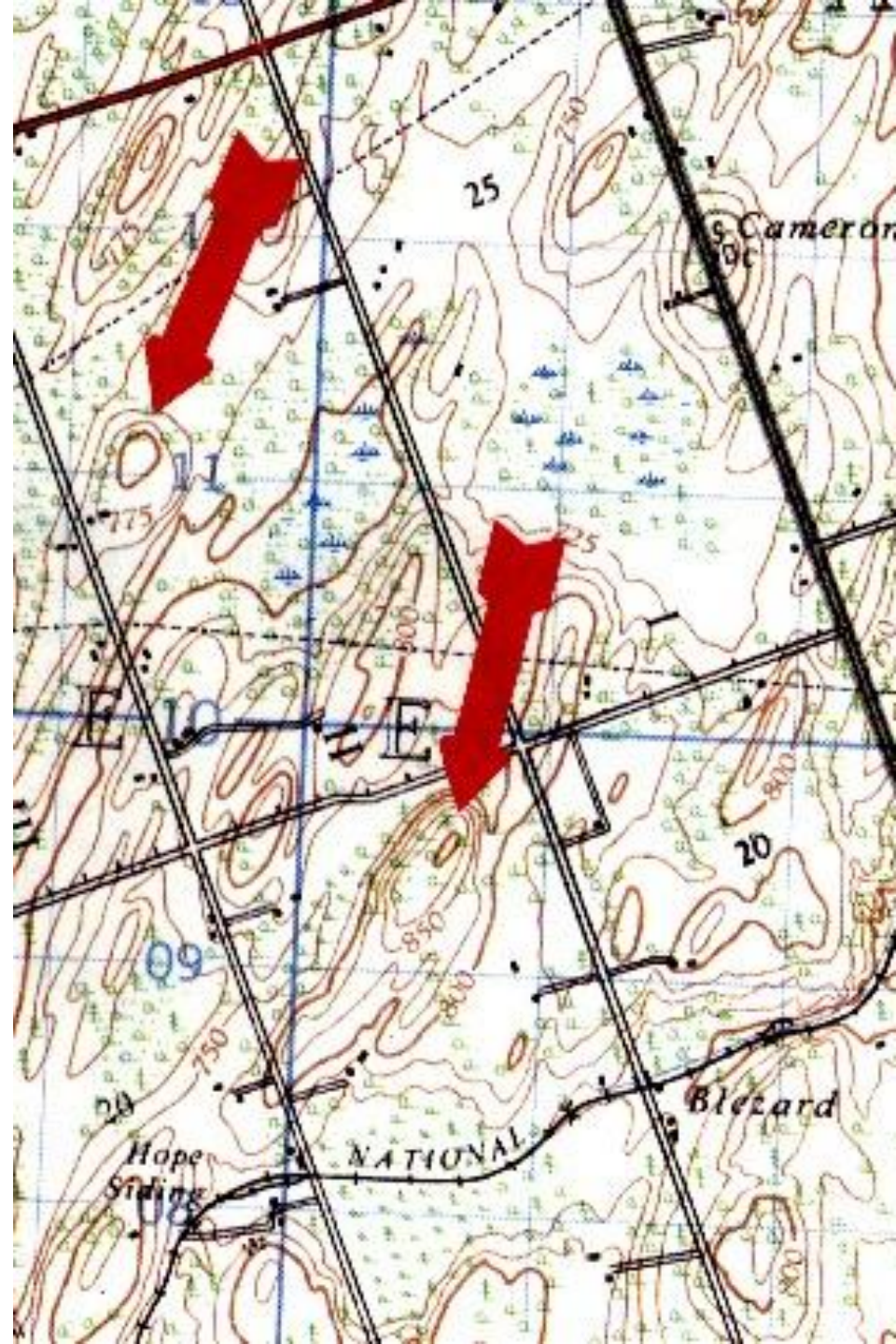
Col—mountain pass

POP Quiz...See if you can figure out what the following features are from your study in Geography so far...



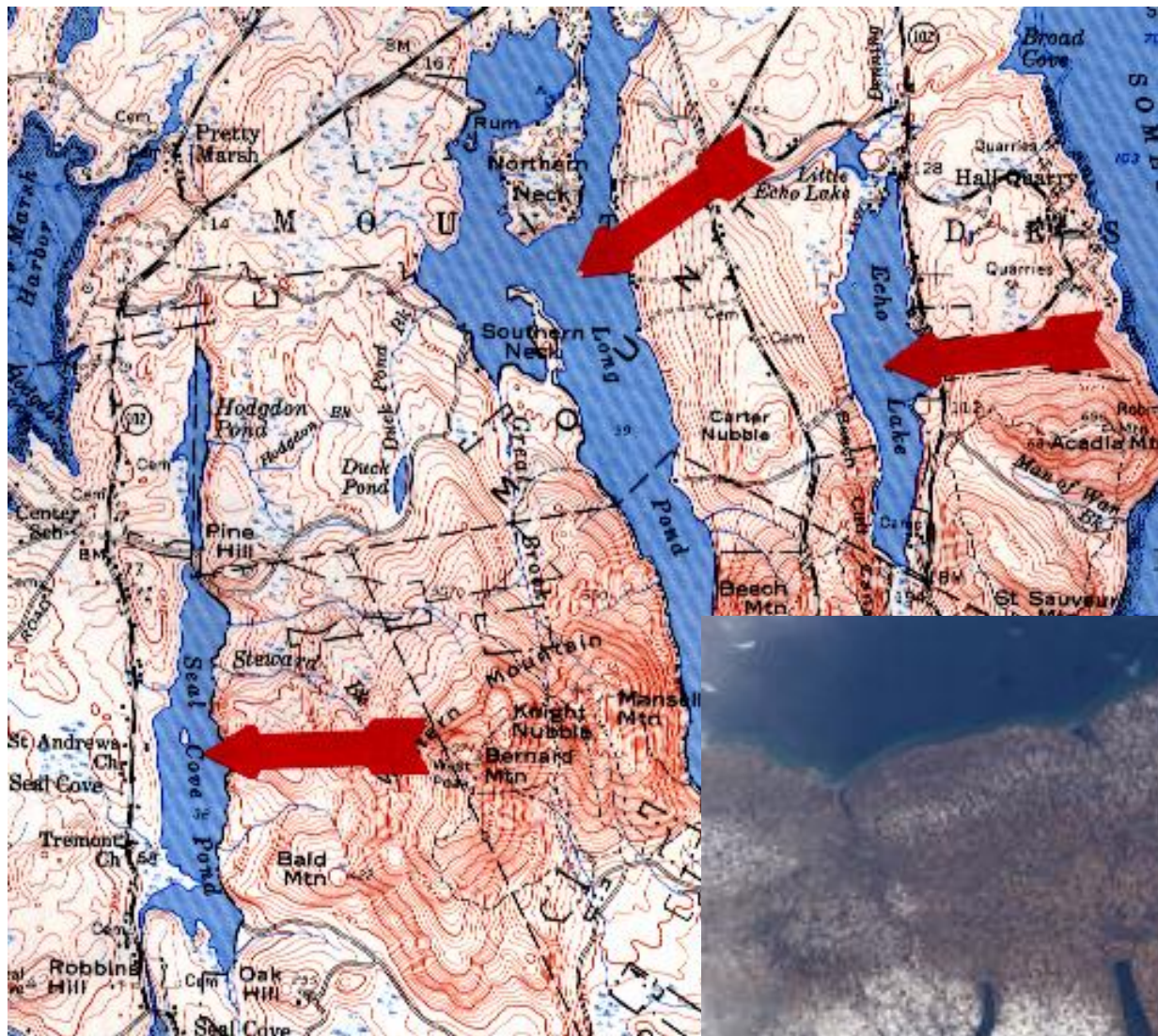
Crevasse: A **crevasse** is a crack or fissure in a glacier or snowfield

Drumlin: A **drumlin** (is an elongated whale-shaped hill formed by glacial action--depositional





An **Esker** is a long, winding ridge of stratified sand and gravel which occur in glaciated and formerly glaciated regions of Europe and North America. (depositional)



Hanging Valleys: We are looking towards the south in this photo. On the map, north is towards the top. The photo was taken from the camera location on the map. The floor of the hanging valley is relatively flat, and thus the contour lines on the topographic map are more widely spaced than those contours representing the sides of the valley. The close spacing of the contour lines at the edge of the hanging valley indicates a steep drop-off, which is where the waterfall is located.

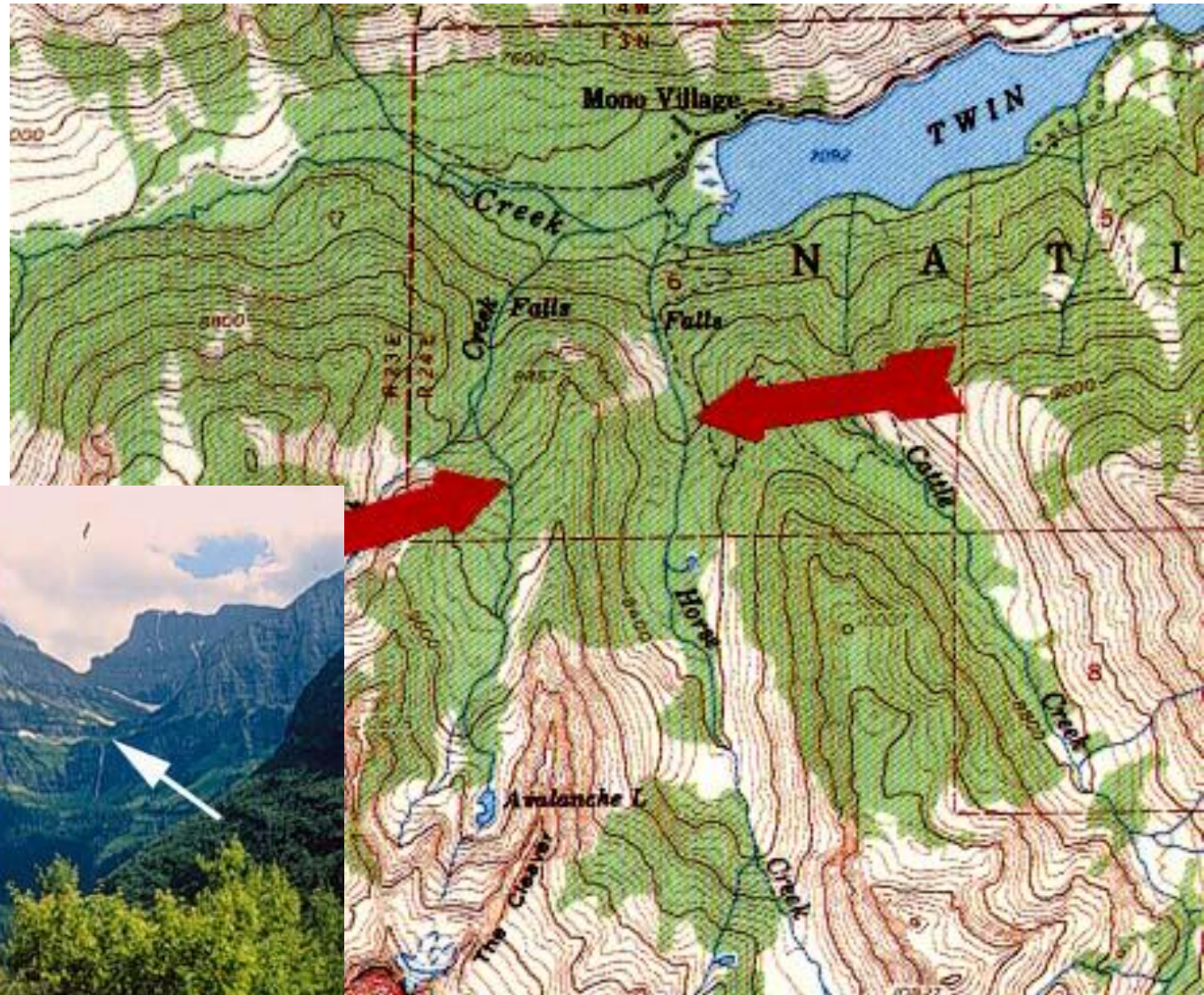
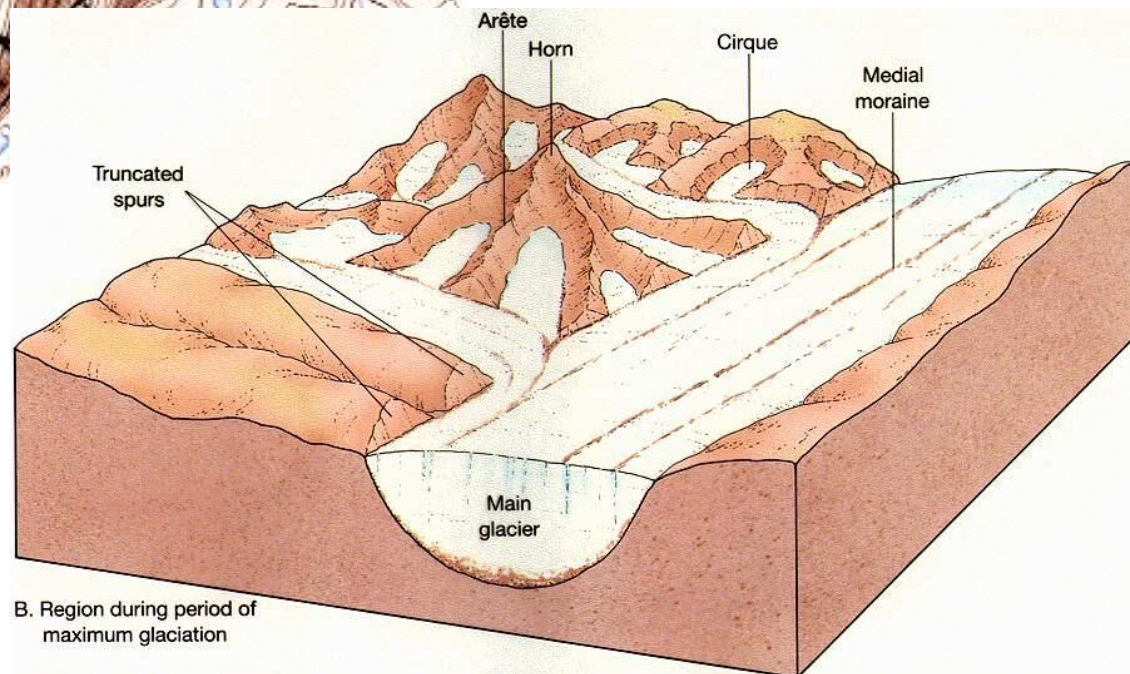
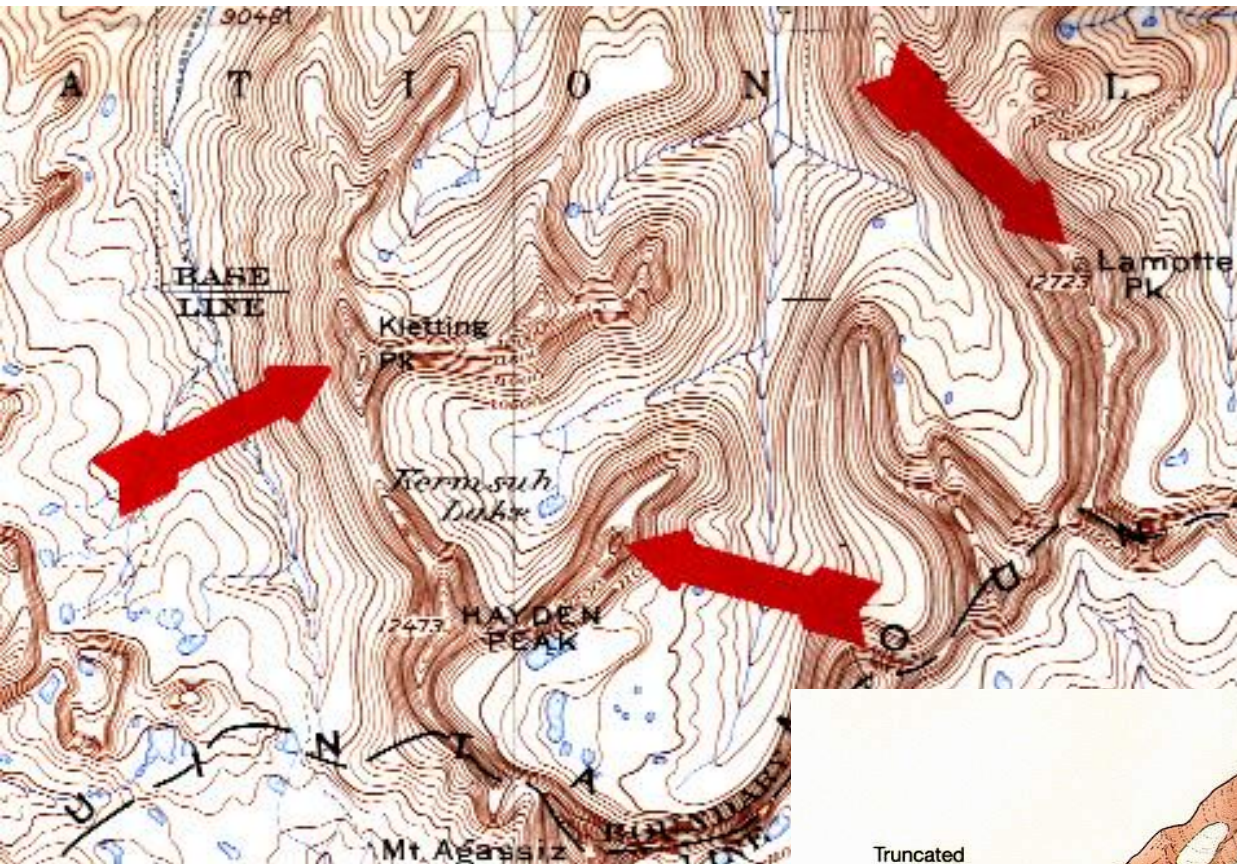


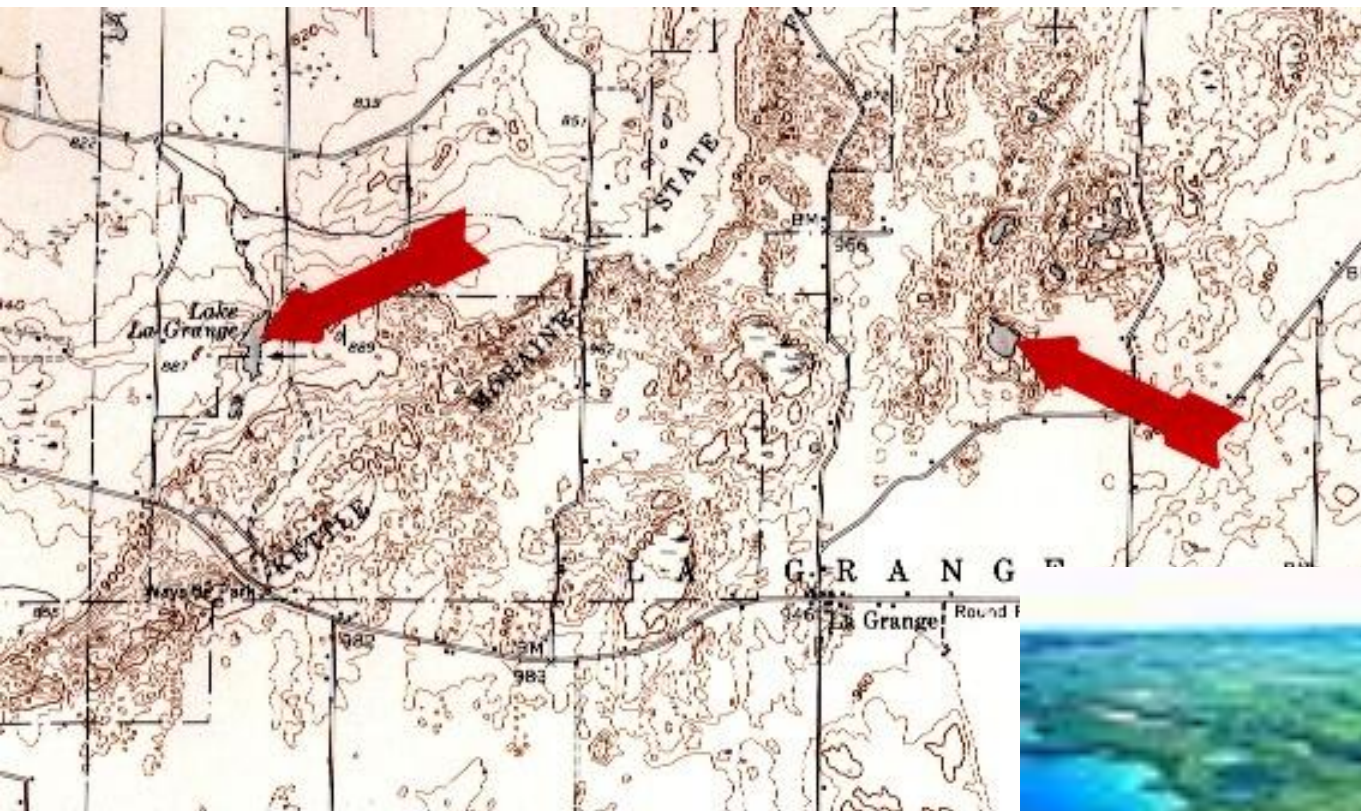
Photo by K.A. Lemke.

Horns

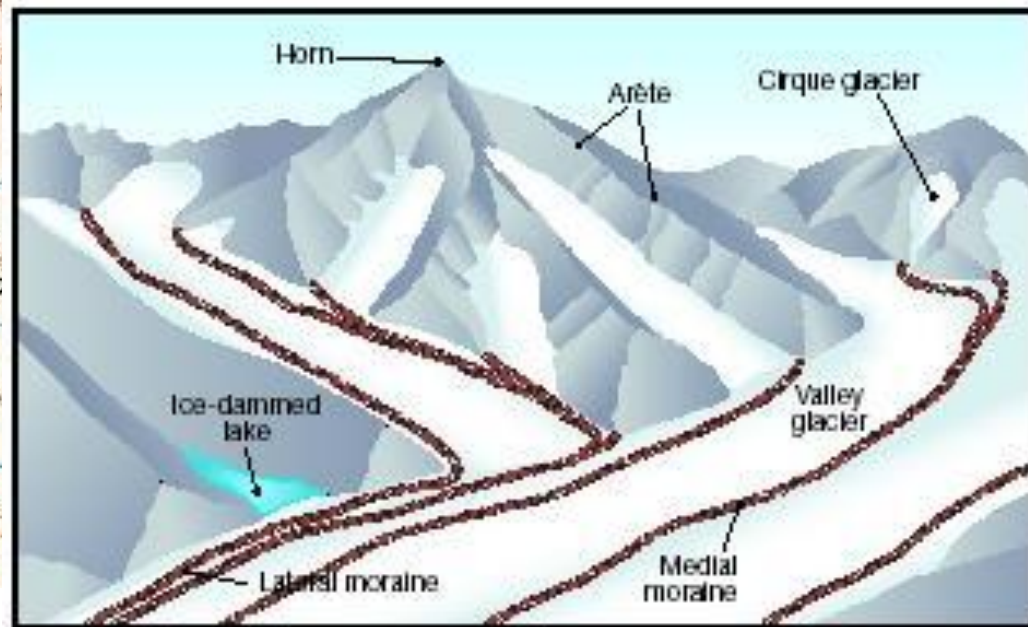
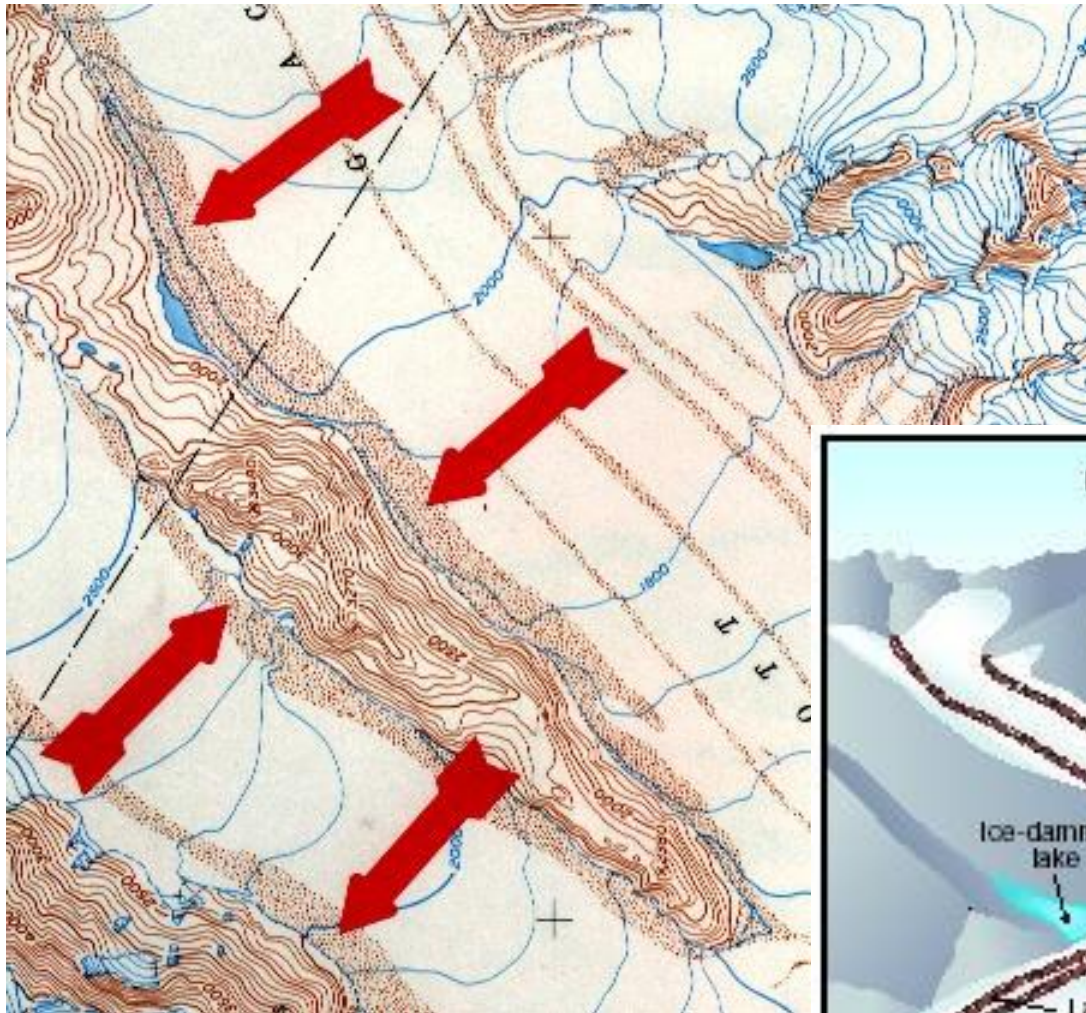


B. Region during period of maximum glaciation

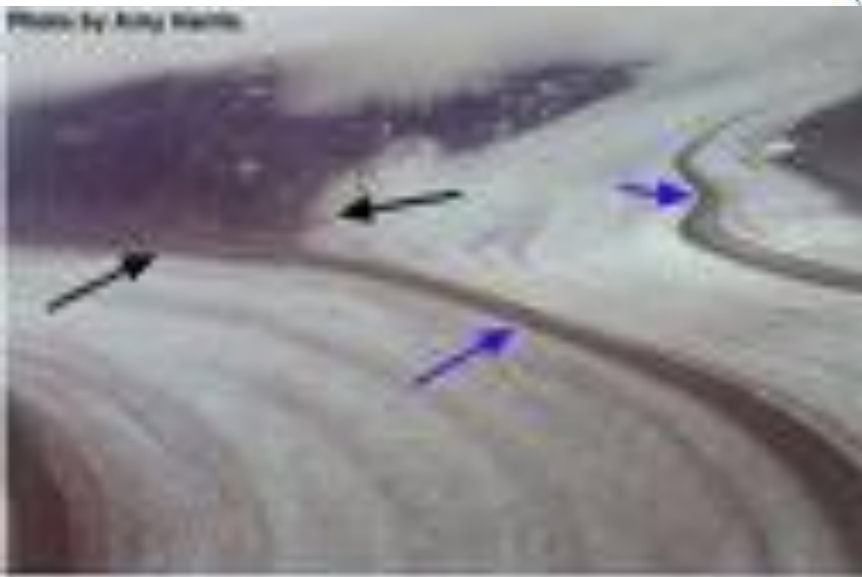
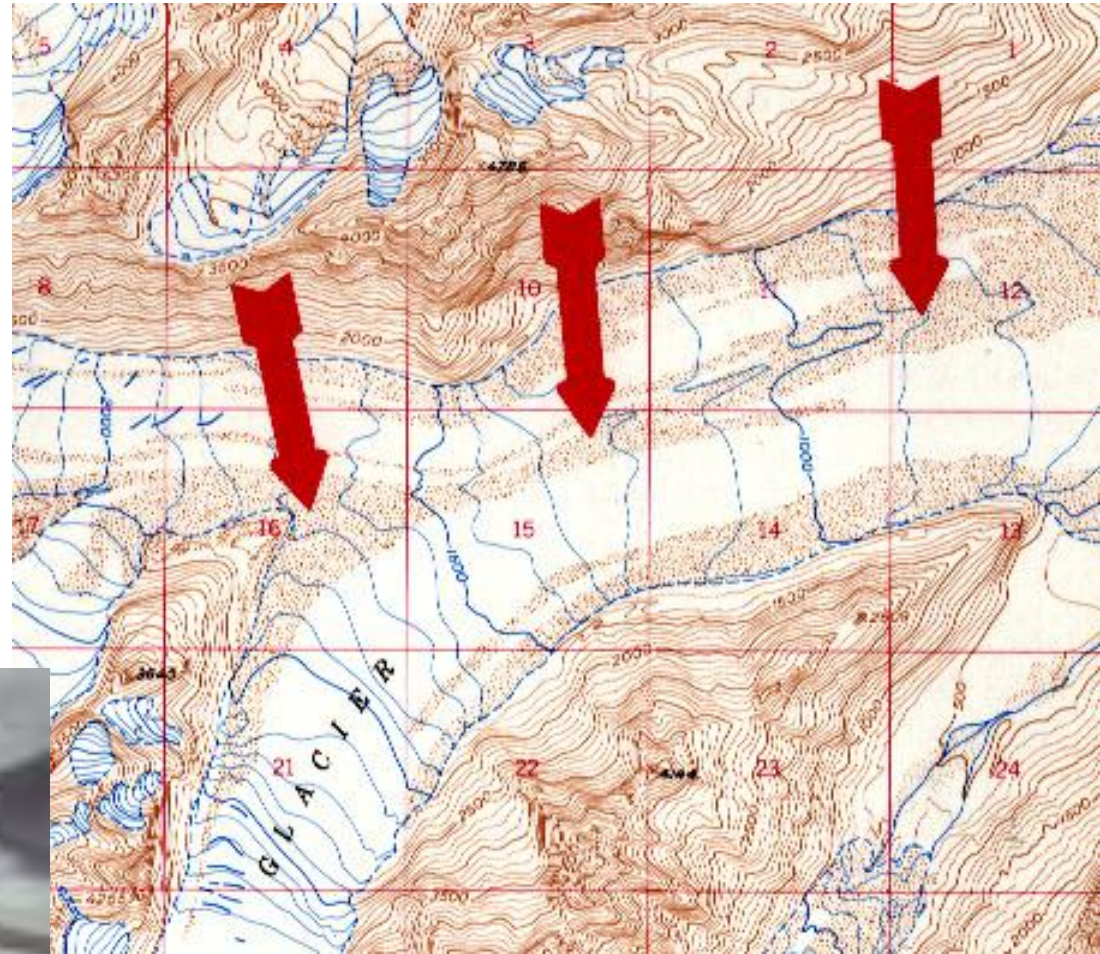
Kettle Lakes



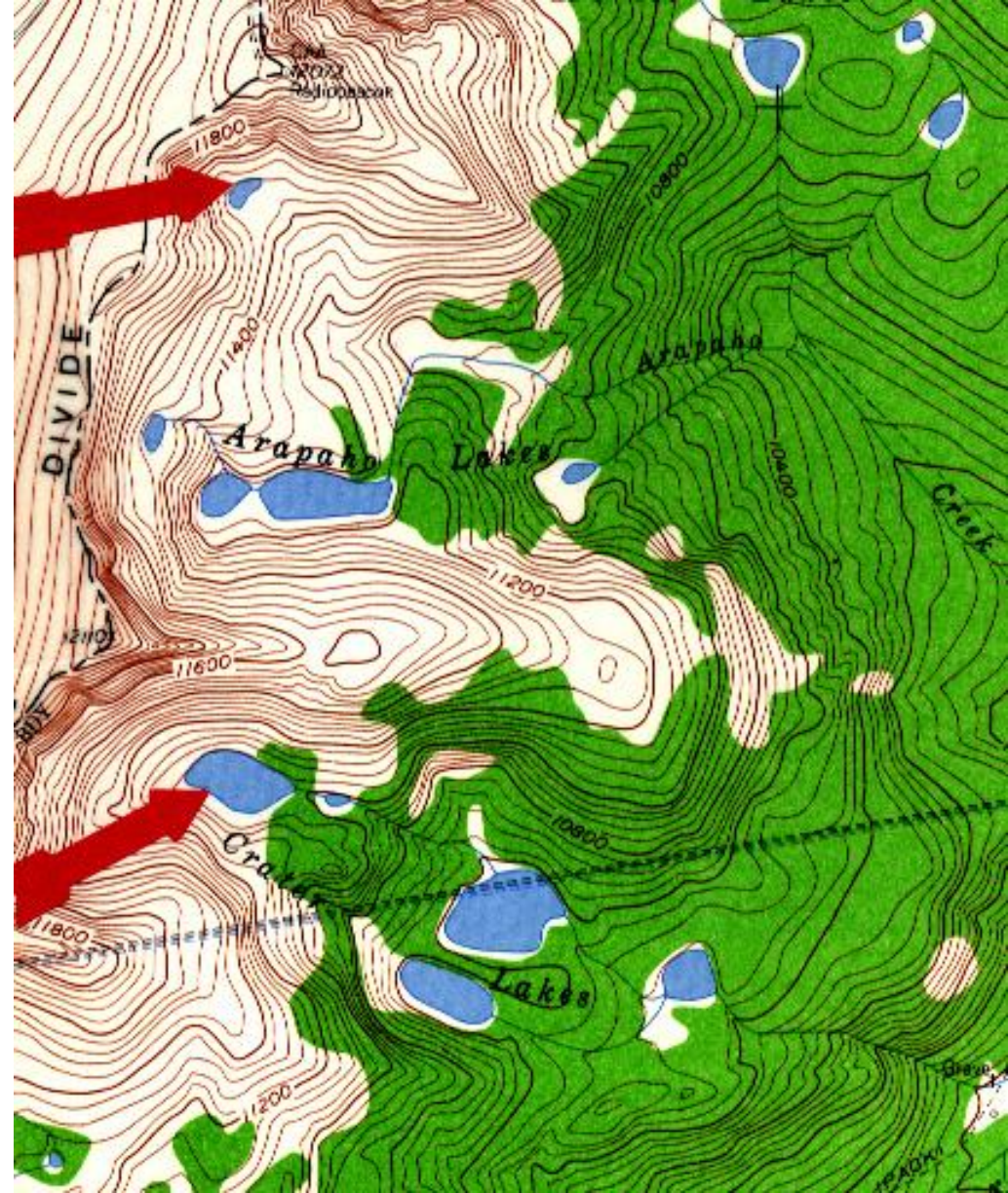
Lateral Moraines



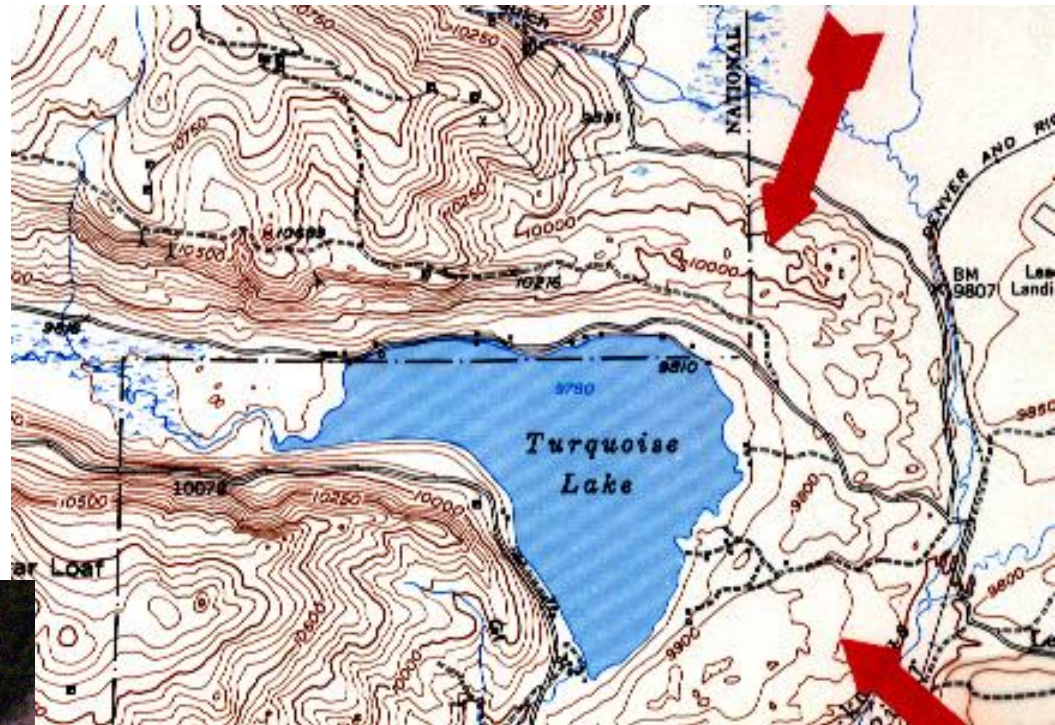
Medial Moraine



Tarns- Found in Cirques



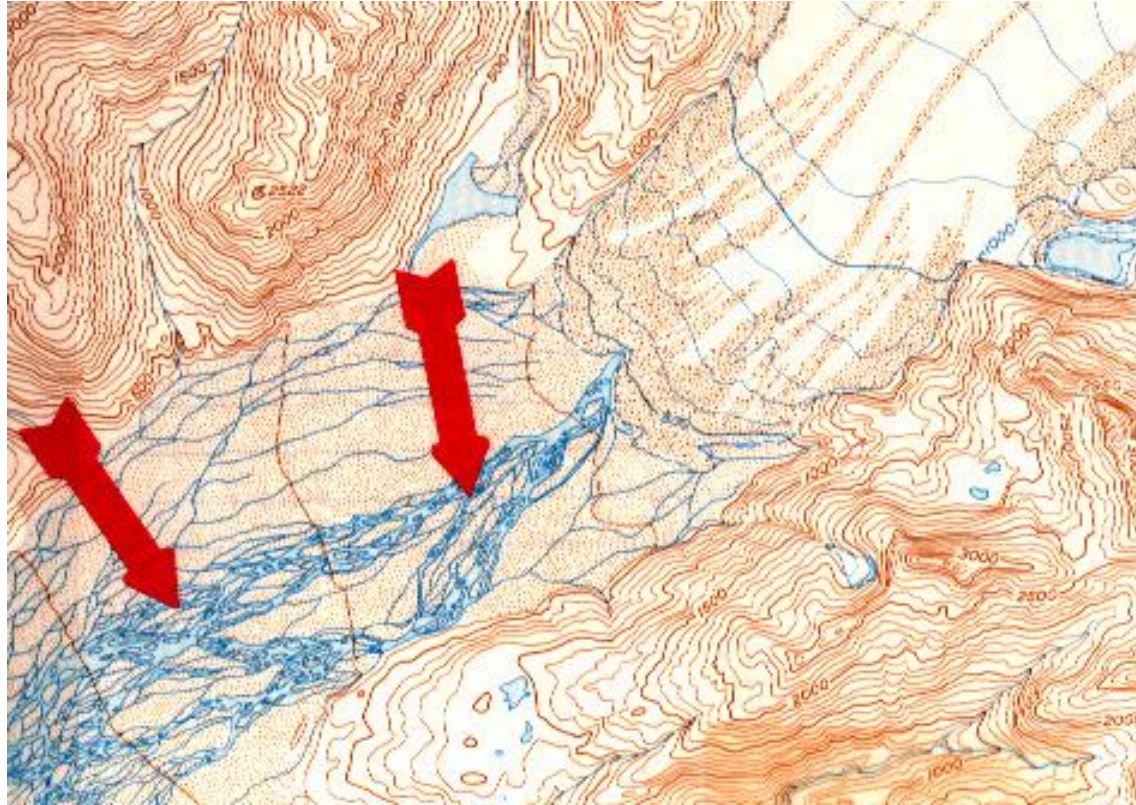
Terminal Moraine



Alluvial fan



River Related/Glacier: Braided Stream—usually found at the end of a terminal moraine—outwash plain

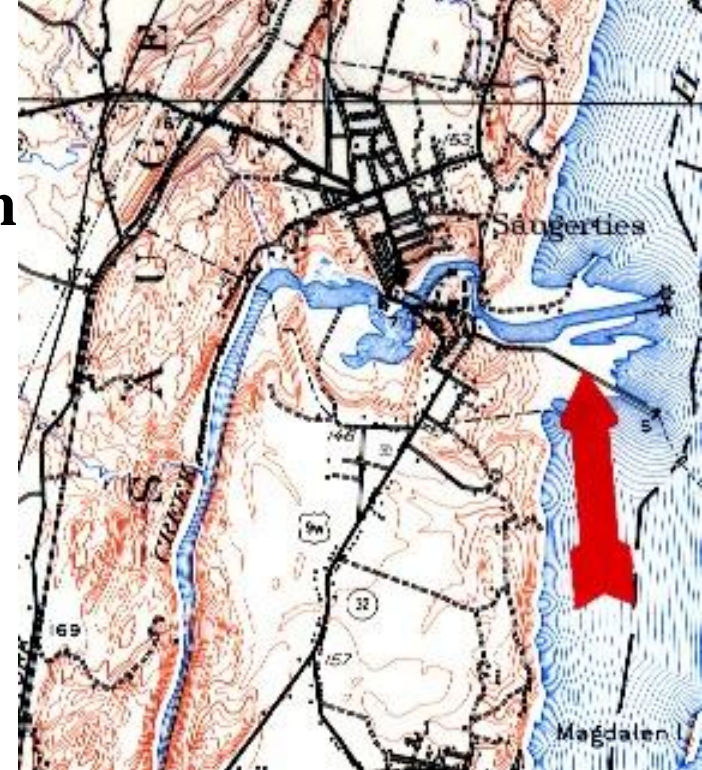


Cut-off Bank

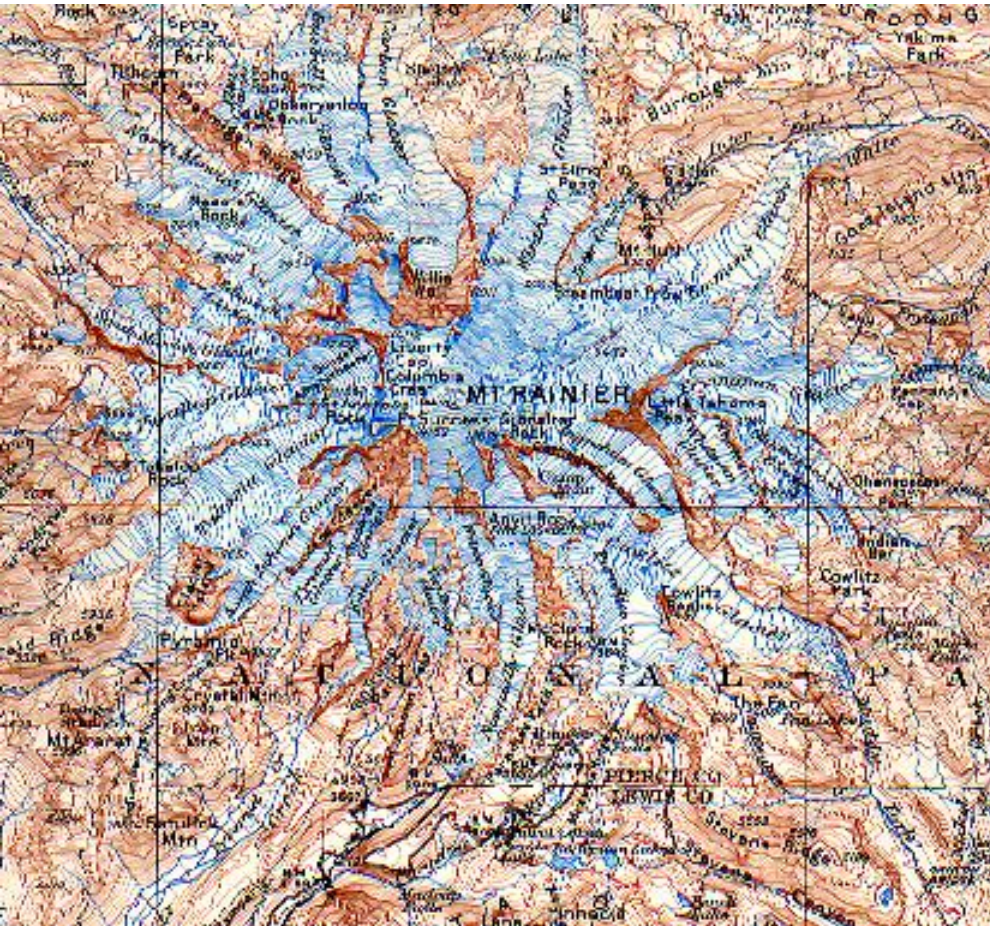


Delta: Estuarine

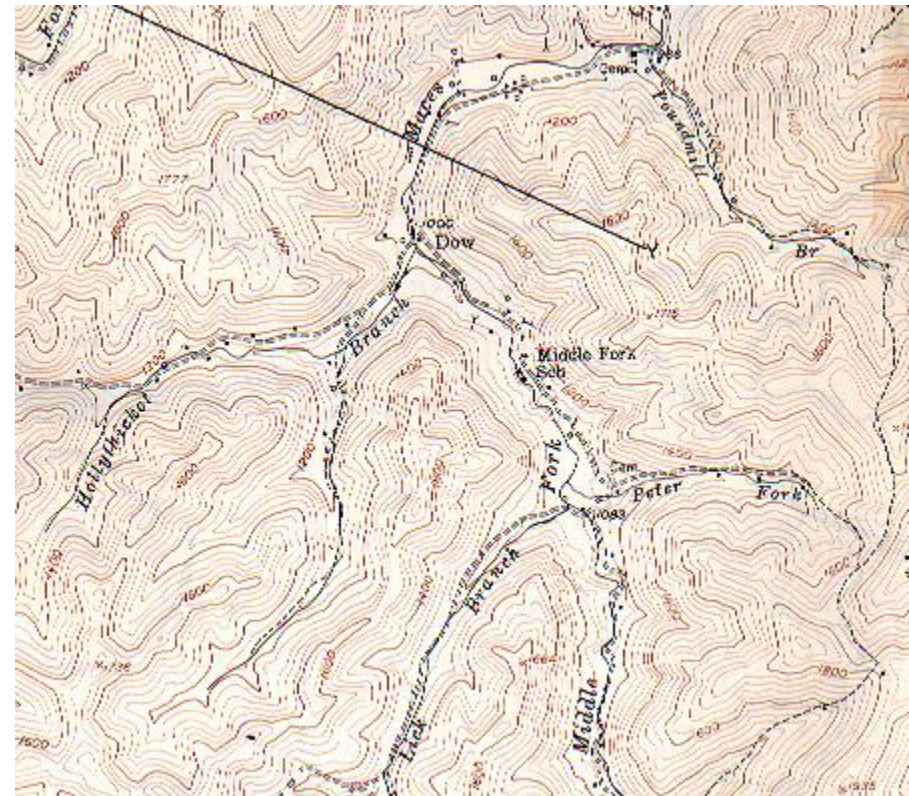
Delta-When the mouth of a river enters the sea and is inundated by the sea in a mix with freshwater and very little delta, it is called an estuary.



Radial drainage pattern



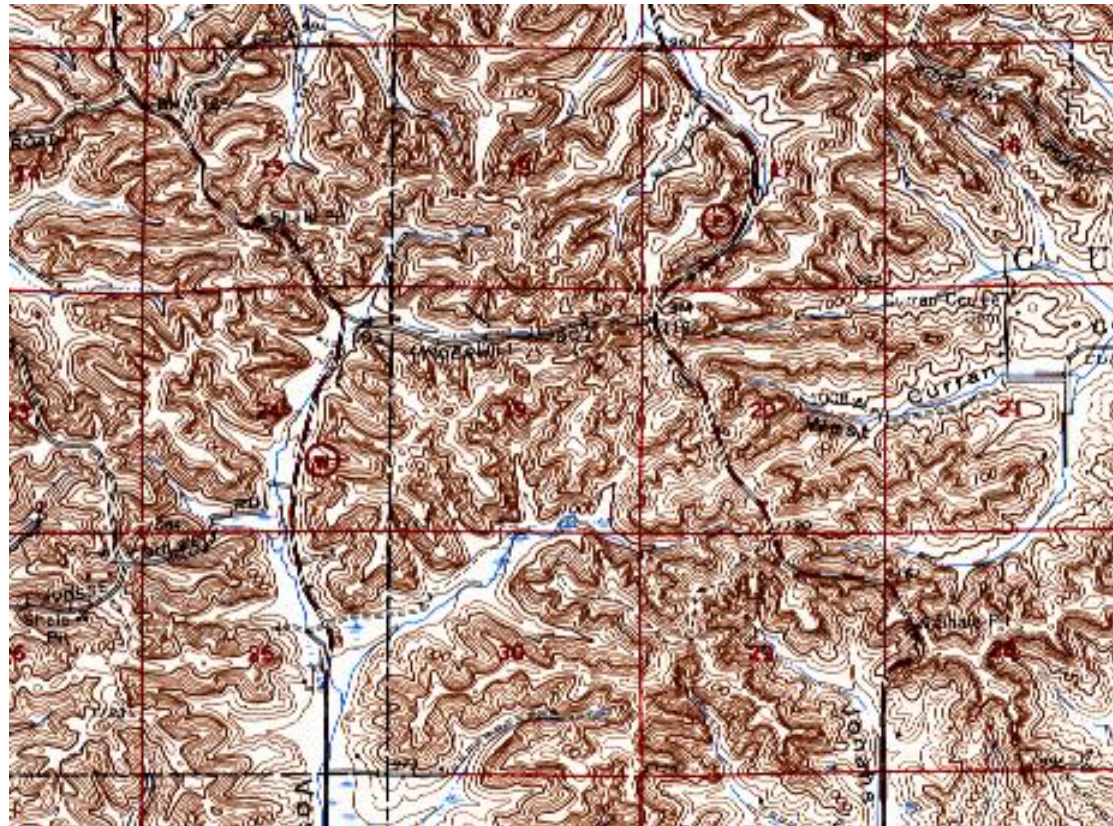
Dendritic Drainage Pattern



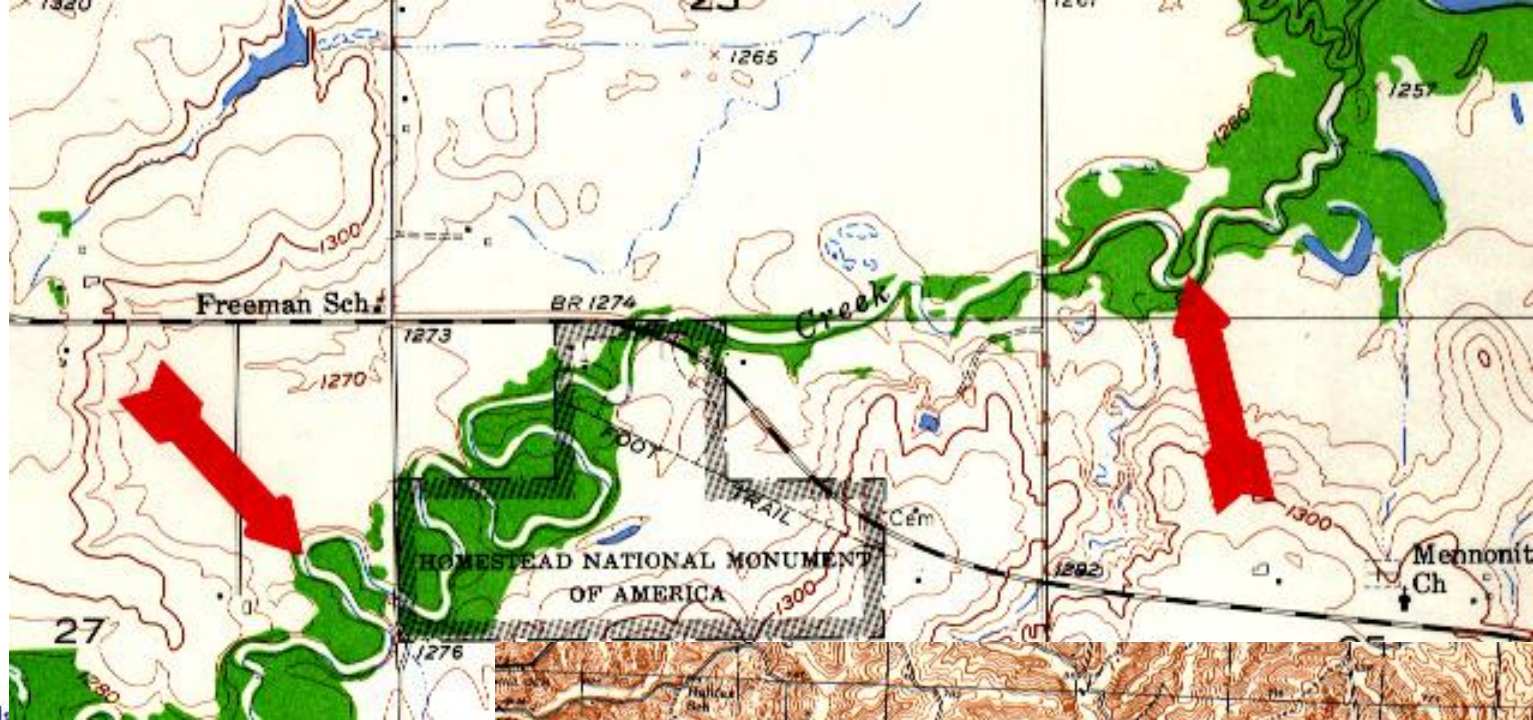
Trellis



Dendritic



Meanders



The River Tay and its Floodplain

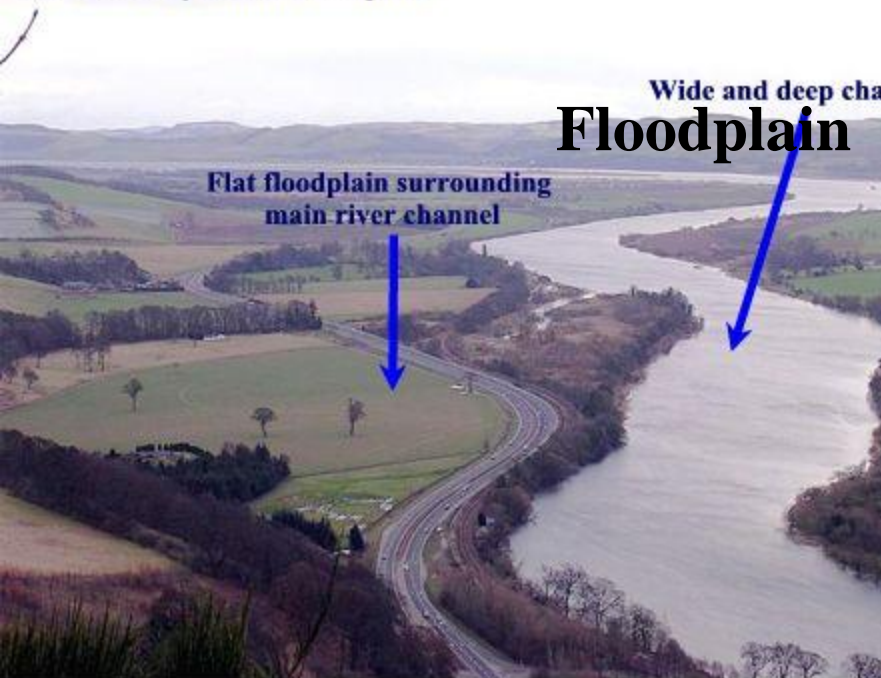
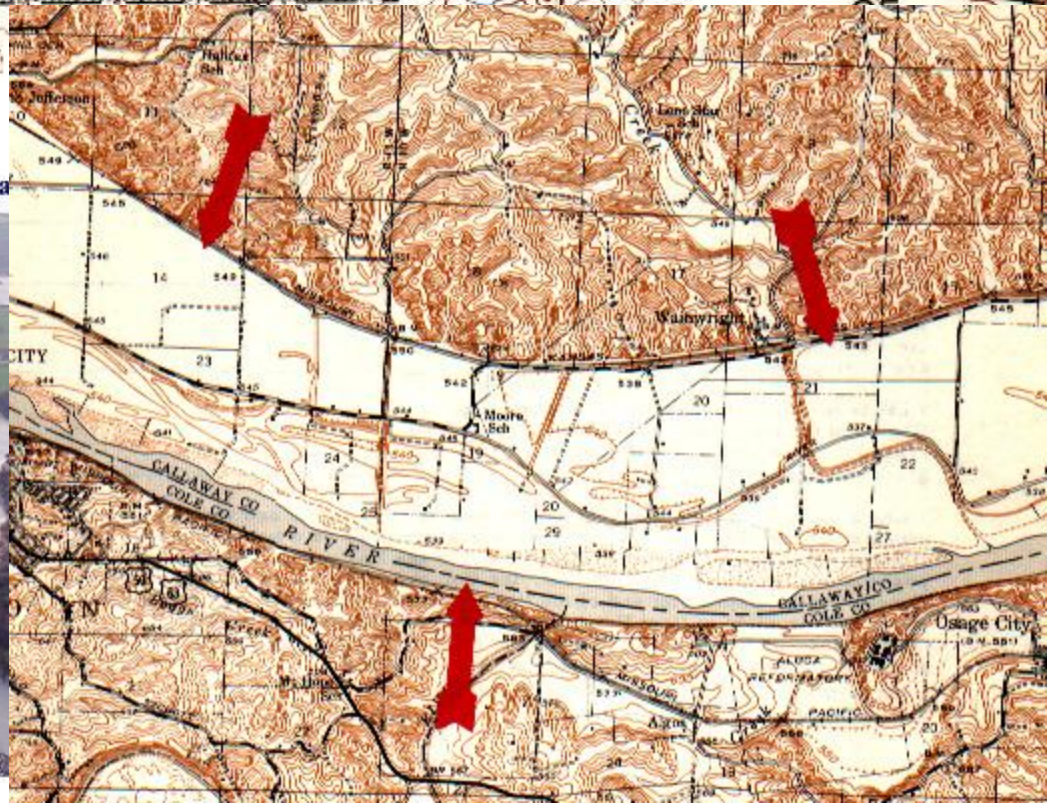
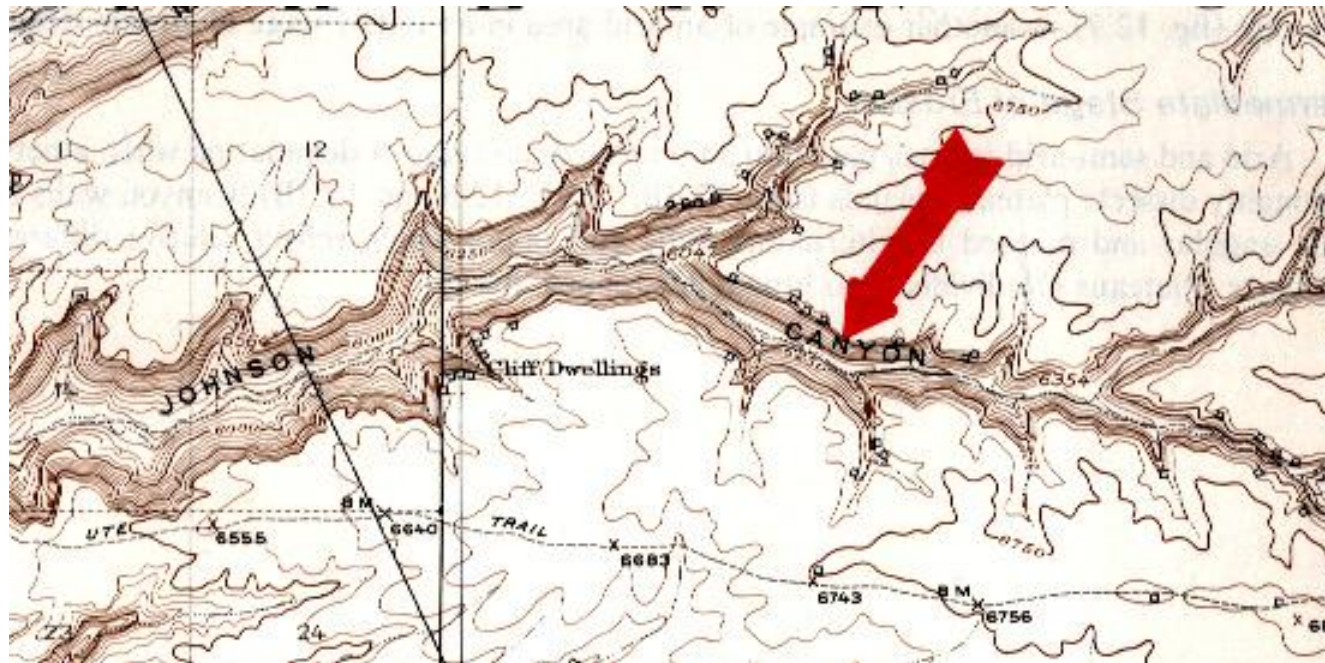


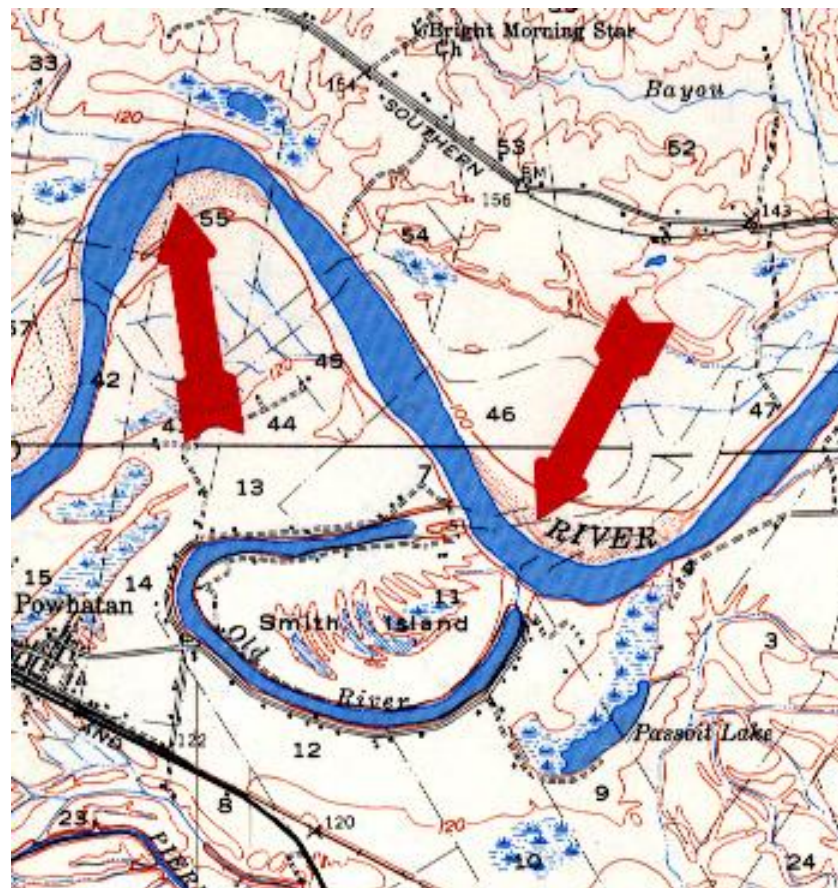
Photo Source: V Vannet - on www.geographyphotos.com



V-shaped Valley

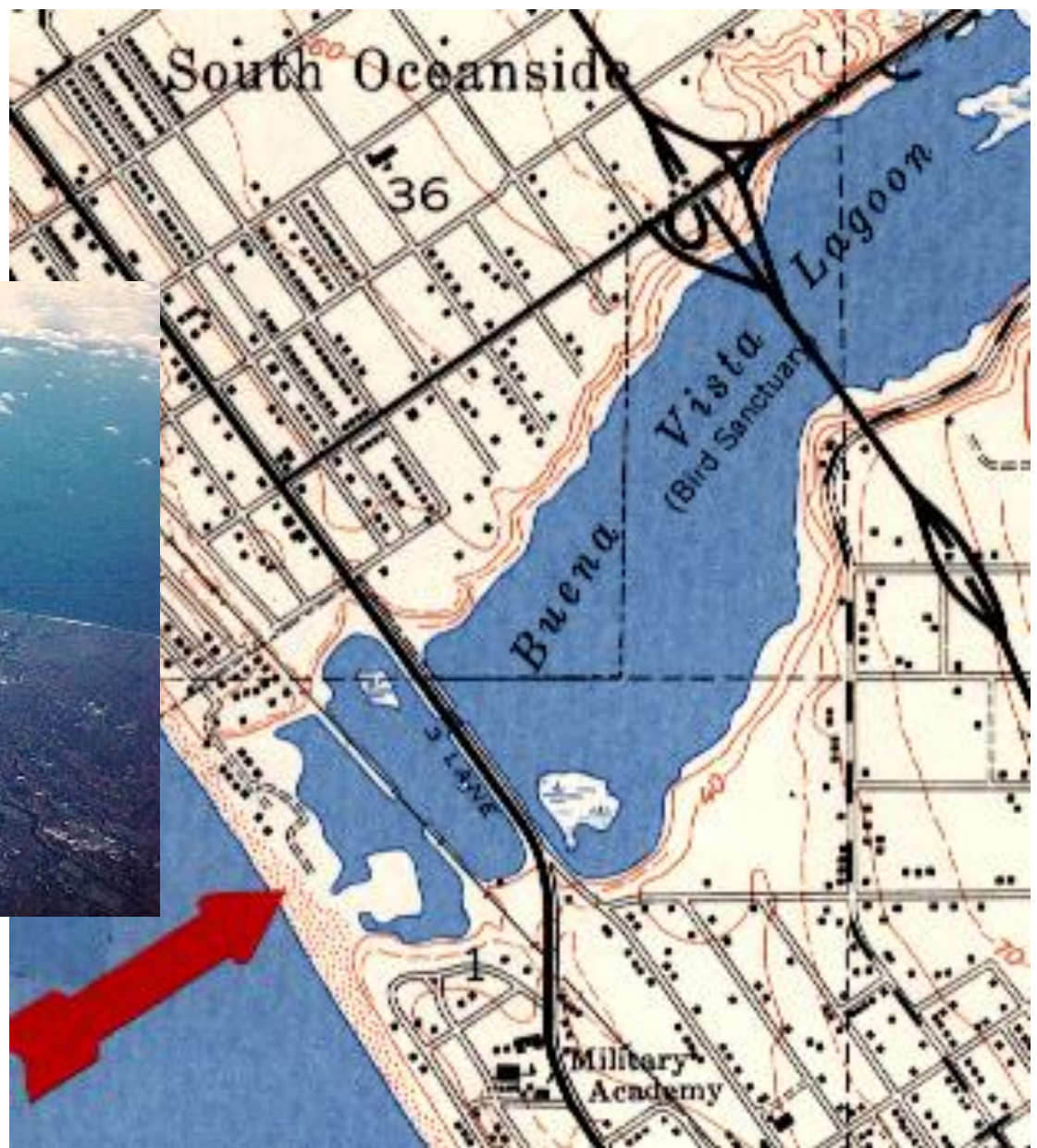


Point Bar



Coastal Landscapes:

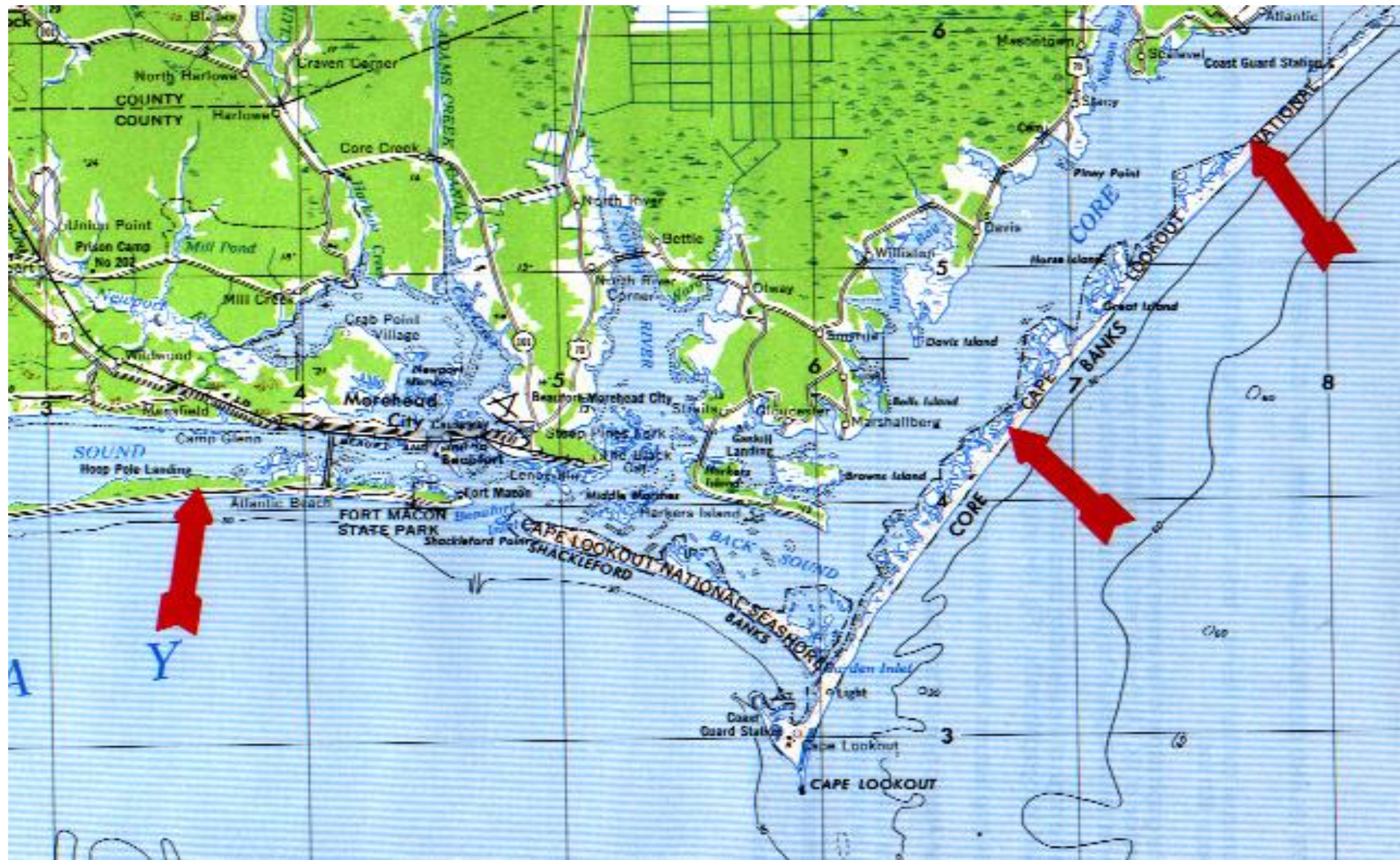
Baymouth Bar (deposition by longshore drift)





Headland (erosion)

Offshore Bar



Sea Stacks



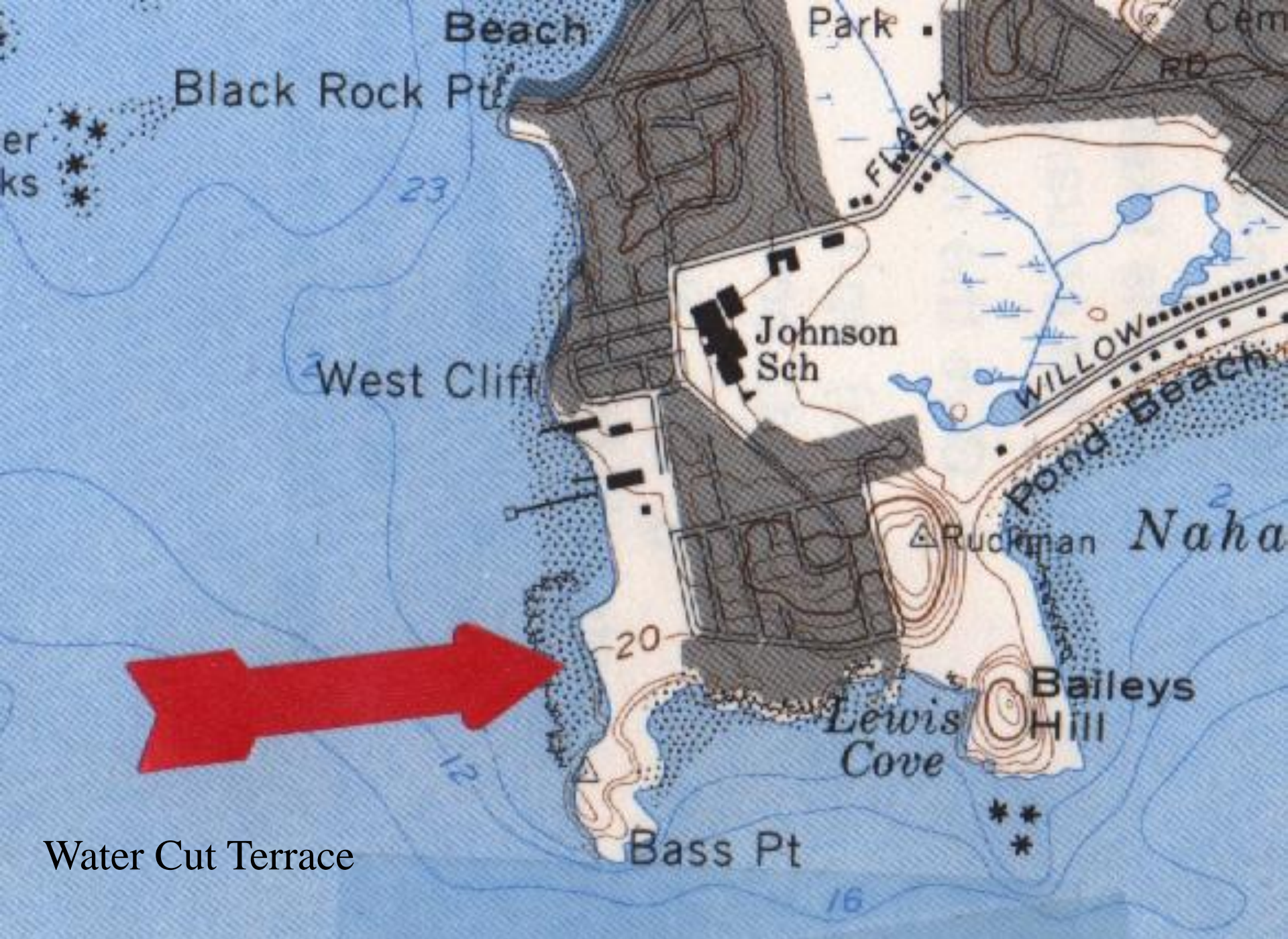


Spit (depositional)





Tombolo (deposition)



Water Cut Terrace