Cartography and Geomatics

GEOMATICS

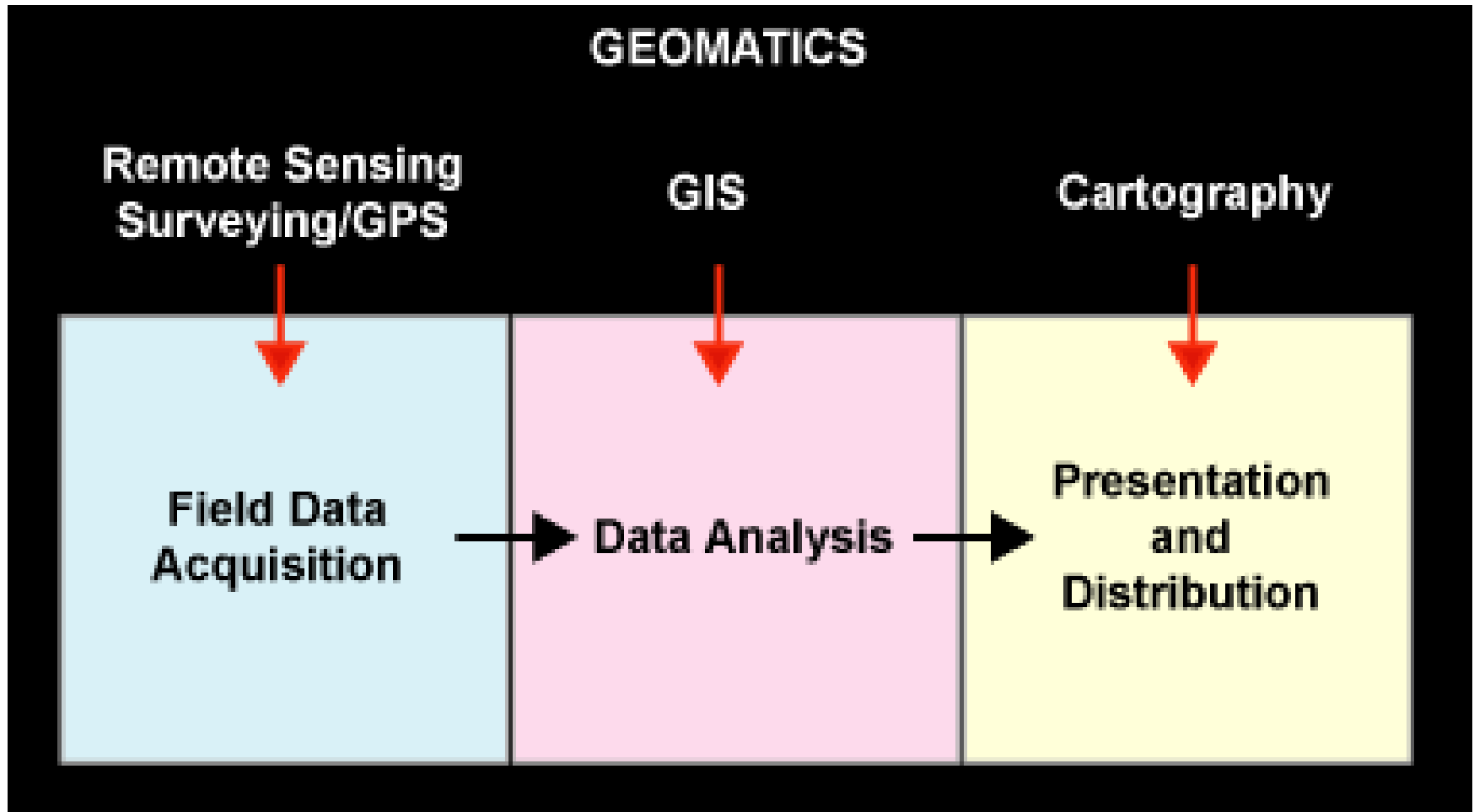| Remote Sensing Surveying/GPS	GIS	Cartography
Field Data Acquisition	Data Analysis	Presentation and Distribution

Canadian Institute of Geomatics 1993
CI surveying and mapping 1957
CI Surveying and Photogrammetry 1934
CI surveying 1882

"Cartography and Geovisualization"
Effective output, not just 'pretty maps'

Canadian Cartographic Assoc., 1975

In this course, you should have learned:

- General overview of mapping technologies (geomatics)

- Use of (complex) GIS software for map output

- How maps and images are used in projects and the media

- How to generate a map for future projects and courses

- Appreciation of what makes a good display …. and bad !

Map critique

How many 'errors' can you spot ?

Tetsa River Park, near Fort Nelson, BC
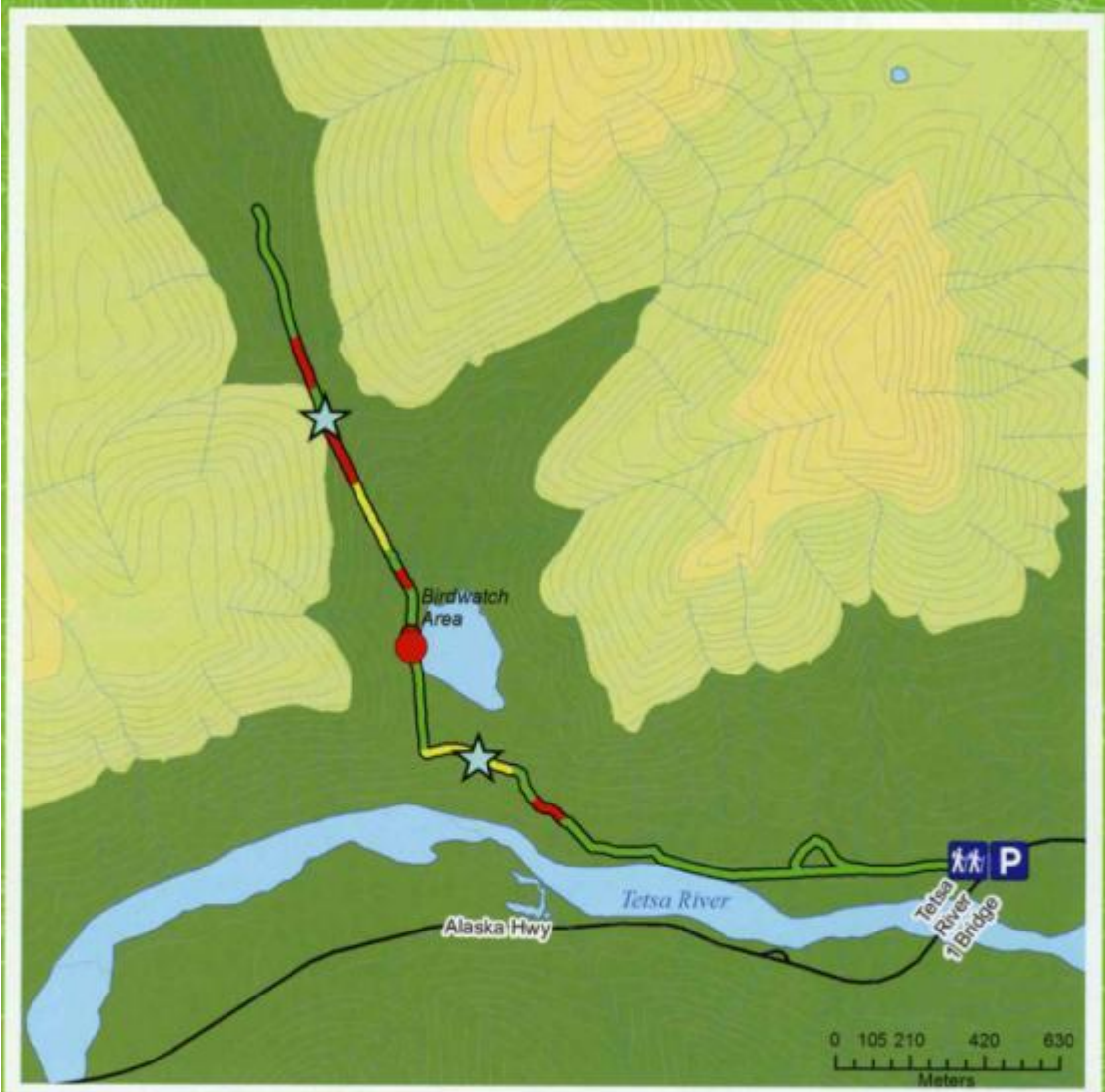
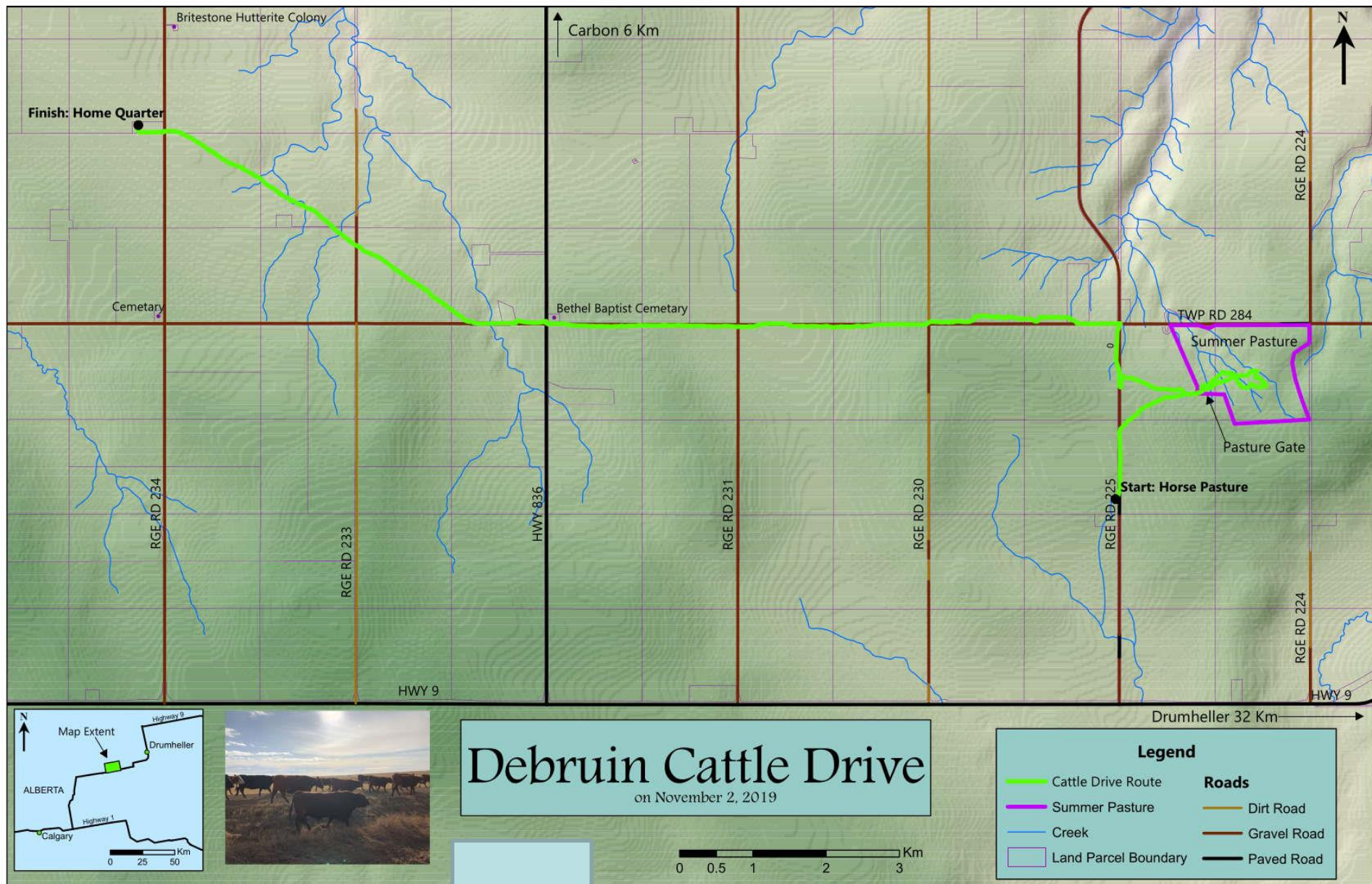| Longname	Lat	Long
Parking	58° 40' 2.731" N	124° 26' 31.727" W
Trail Head	58° 40' 2.622" N	124° 26' 36.432" W
Viewpoint	58° 40' 11.309" N	124° 28' 3.184" W
Birdwatch Area	58° 40' 22.115" N	124° 28' 15.957" W
Viewpoint	58° 40' 41.356" N	124° 28' 31.718" W

Mountain cartography – Morgan Hite, Smithers

Mt. Edziza Provincial Park
Topographic Hiking Maps

Index to topographic maps of

Mt. Edziza Provincial Park

1:35,000 scale

Edziza Full Atlas edition: Arctic Lake to Buckley Lake

This package contains 28 maps on waterproof, tearproof paper

Contour interval 20 metres

- Standard Route (not precise) Wetlands
- Glaciers (2020) Forested

Based on data available from DataBC as of February 2021.
*All trails shown are historical and may be overgrown, impassable, or completely gone. They
have not been ground-checked.*

Be advised that the geological composition of this area may interfere with magnetic
field direction and alter compass readings.

This area is culturally significant to the Tahltan Nation. Please leave artifacts intact on site
and report finds to the Tahltan Central Government. Removal of such items is illegal.

Please follow Leave No Trace principles, as this area is ecologically sensitive and unique.

Before planning backcountry travel in this area ALWAYS consult the BC Parks
webpage for Mount Edziza Provincial Park.

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GEOG205 Project map, 2020

Britestone Hutterite Colony

Carbon 6 Km

N

Finish: Home Quarter

RGE RD 224

Cemetary

Bethel Baptist Cemetary

TWP RD 284

Summer Pasture

Pasture Gate

Start: Horse Pasture

RGE RD 234

RGE RD 233

HWY 836

RGE RD 231

RGE RD 230

RGE RD 225

RGE RD 224

HWY 9

HWY 9

Drumheller 32 Km

N

Map Extent

Highway 9

Drumheller

ALBERTA

Highway 1

Calgary

Km
0   25   50

Debruin Cattle Drive
on November 2, 2019

Legend

Cattle Drive Route   **Roads**

Summer Pasture   Dirt Road

Creek   Gravel Road

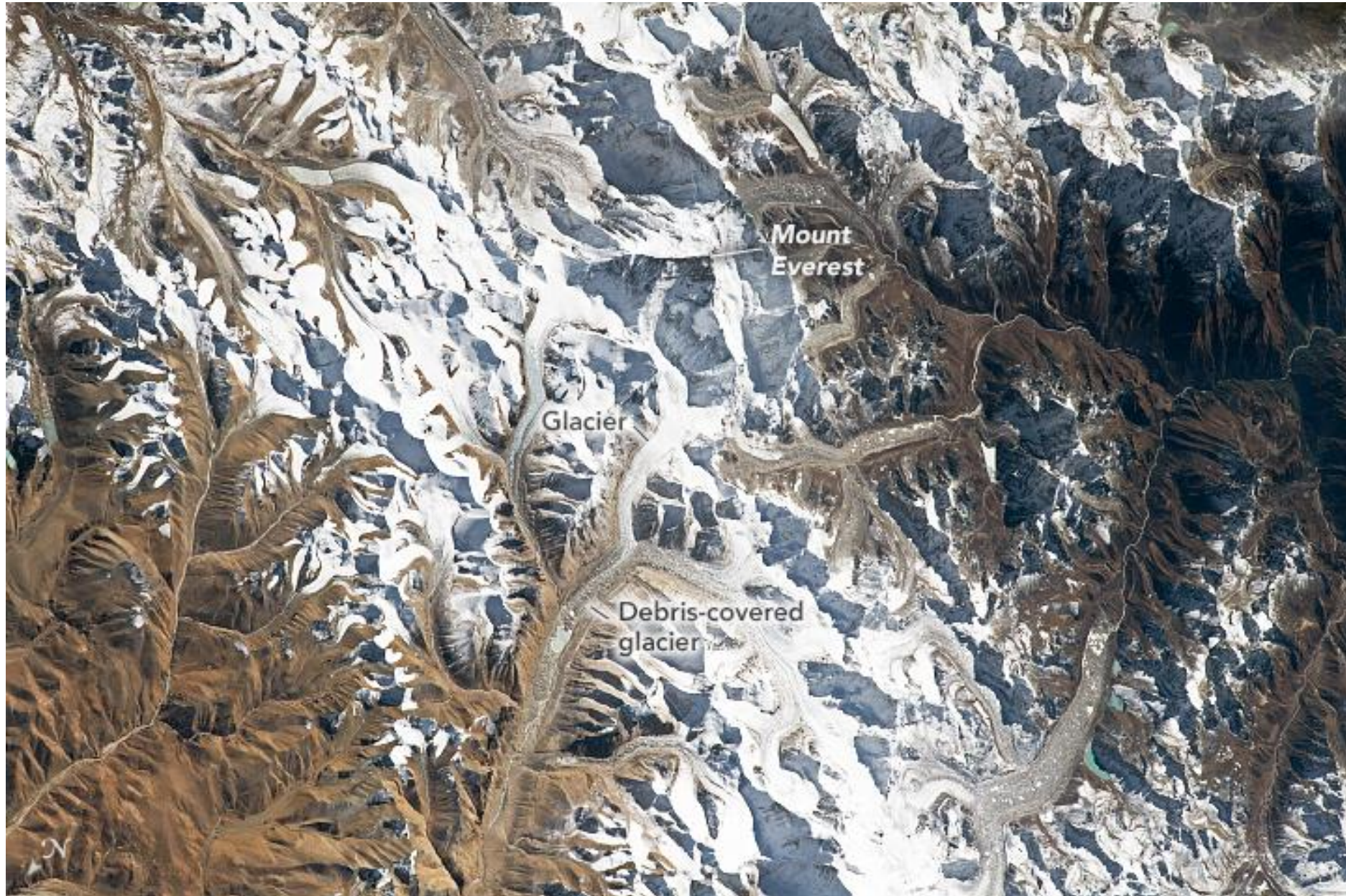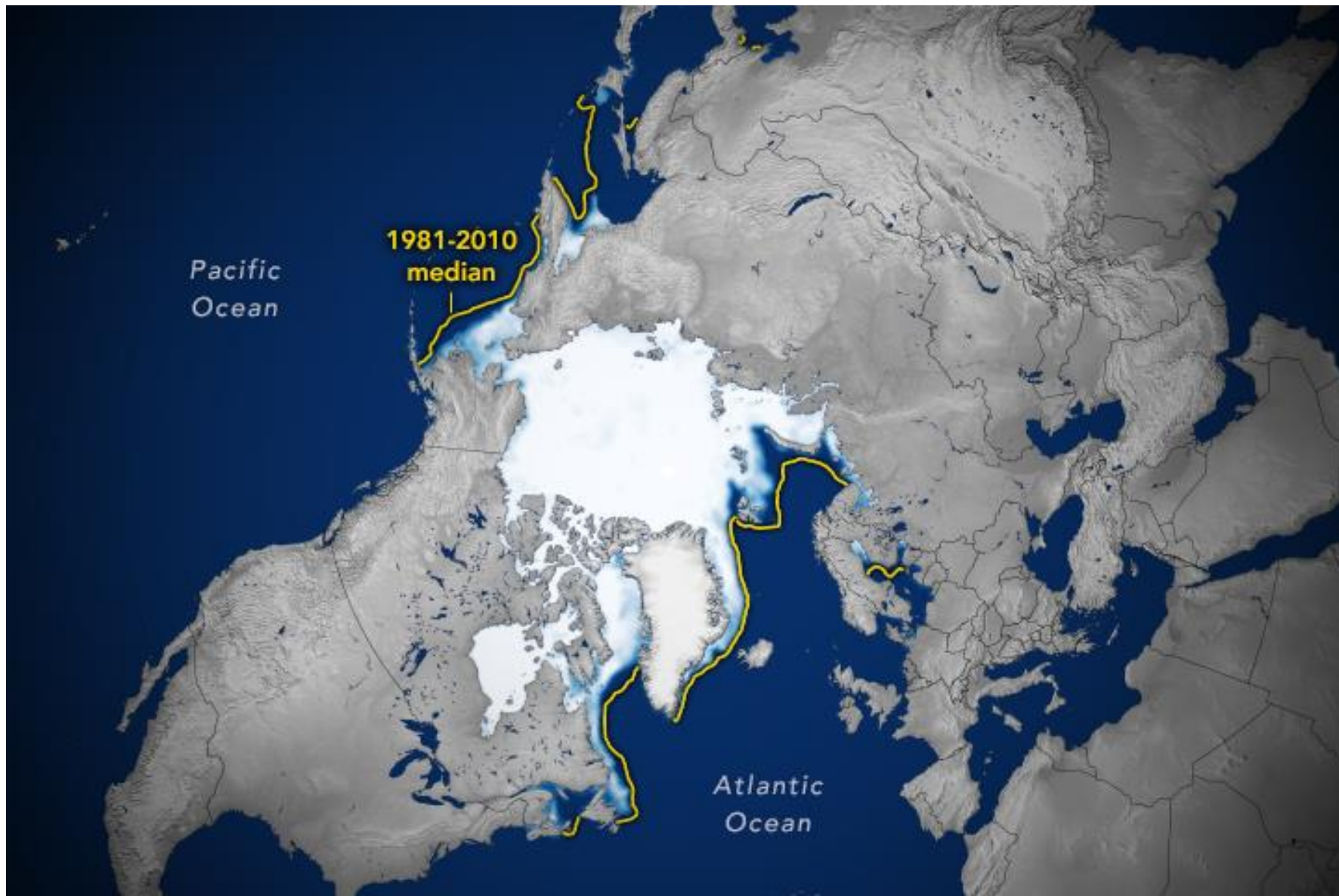Land Parcel Boundary   Paved Road

Km
0   0.5   1   2   3

Remote sensing
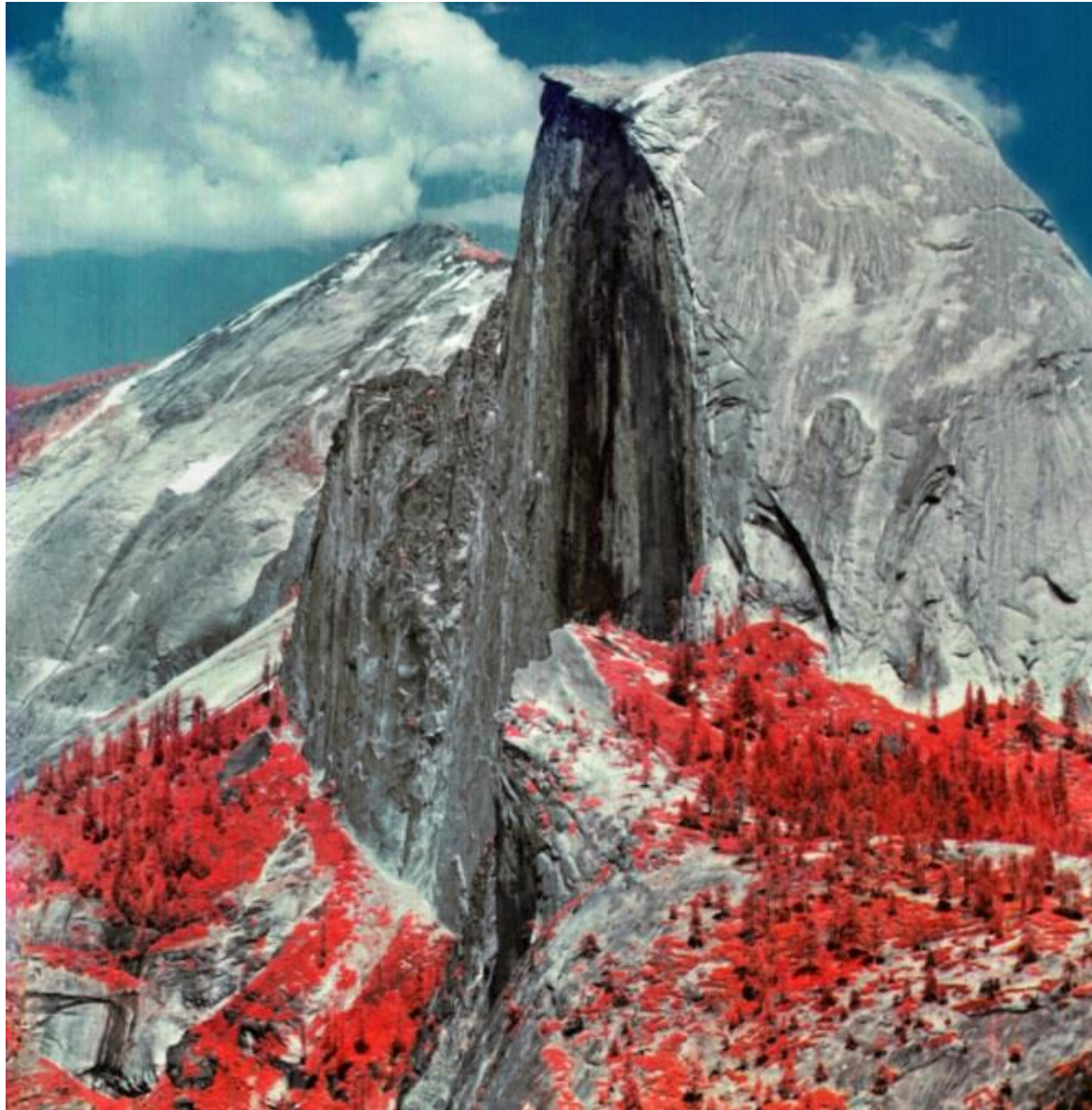
Yosemite (Infra-Red)

Satellite **photo** 2021: Everest (International Space Station)

Satellite **image** (microwave)

Sea Ice Concentration (%)

0   25   50   75   100
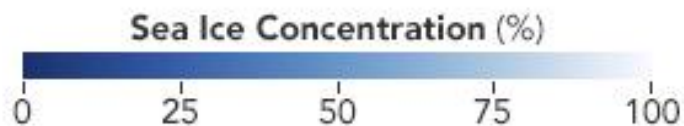
Arctic sea ice – March 6, 2023 (maximum extent)

(Map projections) - quiz 3

Present and fossil teeth suggest migration waves in the past, when reduced sea levels created bridges between now isolated Japanese and Aleutian islands.
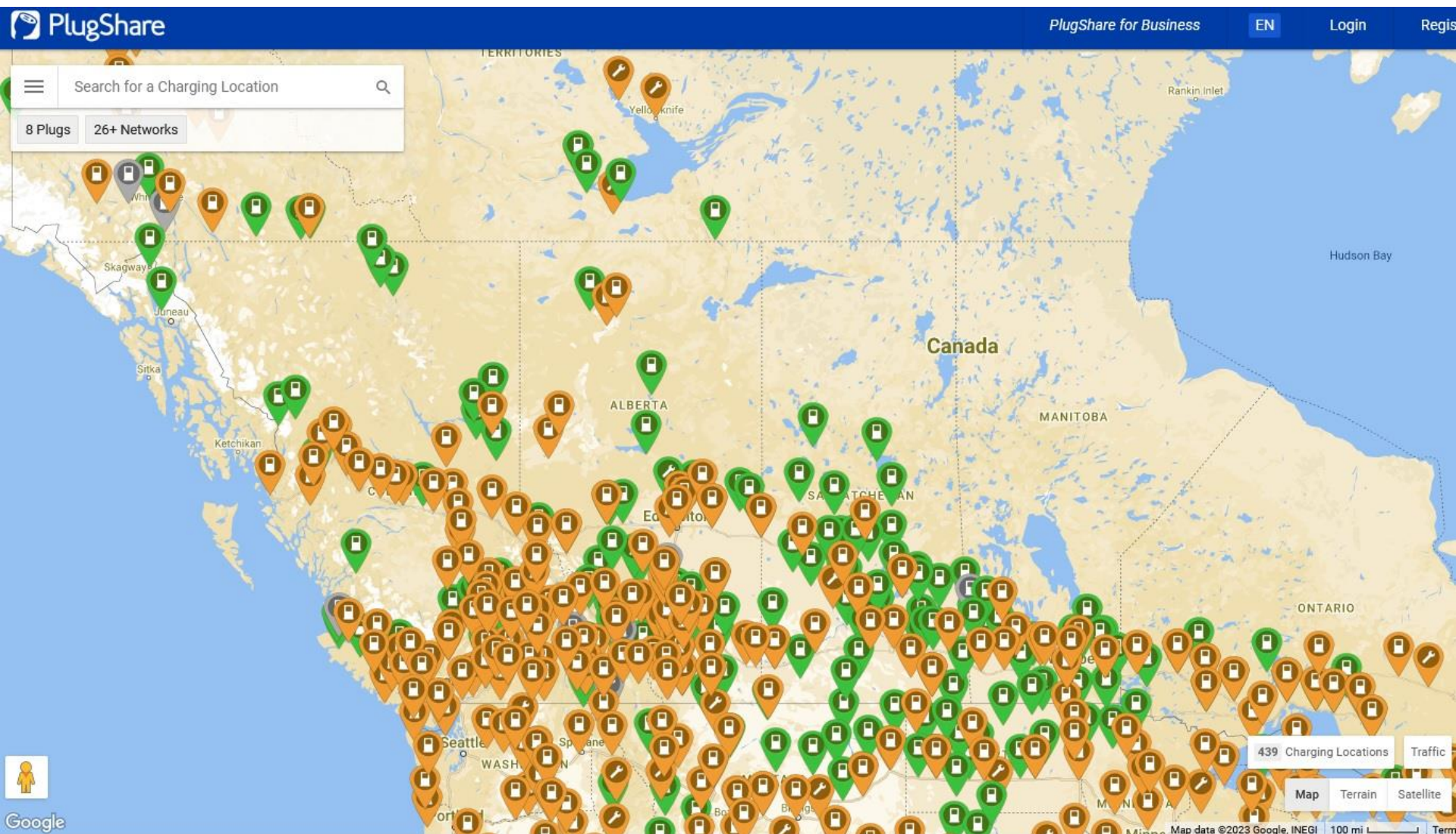
Cassini (transverse cylindrical)

World Religions

	Roman Catholic		Buddhism
R	Significant Roman Catholic population		Japanese religions (Shintoism, Buddhism)
	Protestant		Chinese religions (Buddhism, Taoism, Confucianism)
	Eastern Orthodox	✡	Judaism
	Islam		
☪	Significant Muslim population		Local religions
	Hinduism		Uninhabited

Matouowesarini

PART OF

PART OF NEW

Charioquet

SCOTLAND.

The Grand River of Canada

Mont Royal

Great Fall

Lock of Peers

Tadoussac

Ammughsaugen

Quebeeq

Kennebeka

N   O   R   T   H

Horikans

Lake of Irocoisis

Izoisoisen

A   M   E   R   I   C   A

Canomackers

Armeomeeks

RENSE   BERWICK

New R

Nawaas

Massachu

The Land of Katz Kill

Sennecaas

Minnessinck or
Land of Bachain

The High Land of Esopus

Sequins

Matanae-
kouses

Gacheos

Conekock

YORK

Makimanea

Waoraneeks

Konekotay

Wappinges

Tappianna

North
Sea

Minquaas

Southcans

Long Iland

Wayanes

Sasquahana

Sauwanoos

Elizabeth Iland

Natick I

NEW

JARSEY

PART   OF

THE   NORTH   SEA.

MARYLAND

A Map of
NEW ENGLAND
AND
NEW YORK

Sold by Tho. Basset in Fleetstreet, and Richard
Chiswell in St Pauls Church Yard.

A Scale of English Miles

F. Lamb Scip.

Web maps – 'pan-scale' display and seamless database with fast updates

https://www.plugshare.com

https://www.bcafn.ca/first-nations-bc/interactive-map   https://maps.fpcc.ca
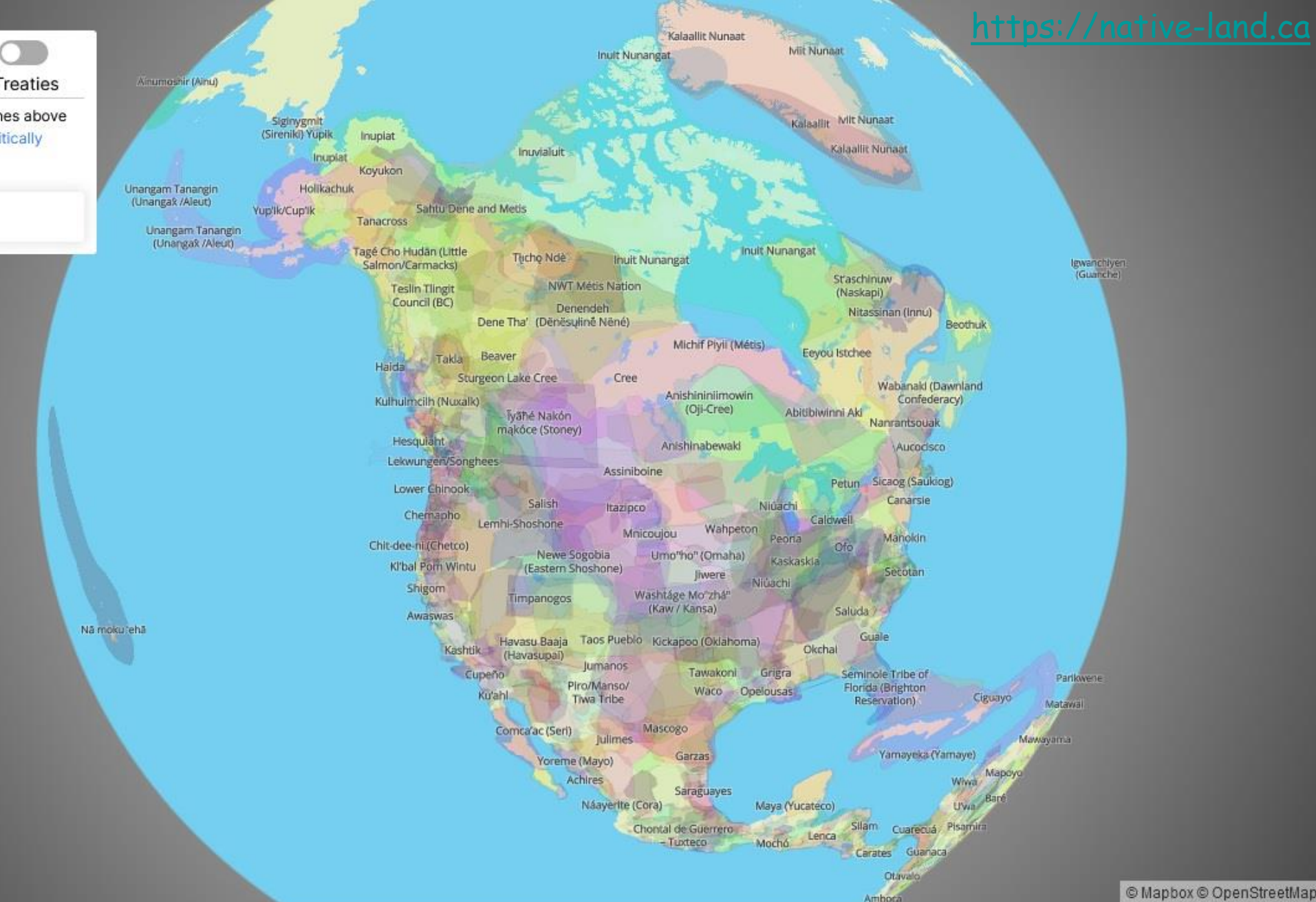
Ukrainians attempting to push back Russians

BELARUS

Chernihiv

RUSSIA

Makariv

Kyiv

Lviv

UKRAINE

Kharkiv

Luhansk

Donetsk

Mykolaiv — Kherson

Mariupol

200km

200 miles

Odesa

Crimea

Black Sea

Legend:
- ⊚ Ukrainian counter-attacks
- ▪ Russian military control
- ◪ Russian advances
- ☐ Russia annexed Crimea in 2014

Google

BBC

Cranbrook Hill Greenway

Map Author: Nancy D Alexander
ndigart@gmail.com

Otway Ski Centre

Legend
- Distance Markers: Every Kilometre
- Greenway
- Map Panel
- Parking
- Greenway Trail
- Trail
- Barrier
- Trail (Service Road)

Otway Road

Nechako R.

Cranbrook Hill Rd

Foothills Blvd

Swanson Rd

Westridge Dr

5th Ave

rough route, not maintained

Takla Rd

Westcrest Rd

Willmann Rd

Roughton Rd

Cranbrook Hill Rd
Not a through road

Kueng Road

University Way

Winter by-pass

Forests for the World

UNBC

Sport Centre

Access to Greenway:
1. Otway Ski Centre
2. Forests for the World
3. UNBC Greenway Trailhead
4. Kimball Road
5. Westcrest - Willmann Rd

0   500 Metres

UNBC Land

Kueng Rd

To UNBC

To Greenway

0   1000
1 Km

UNBC 6 km
Otway 22 km

Kimb

Art Knapp's

HWY

UNBC Trails Cranbrook Hill

Current trends in mapping

➢ Apps for mobile devices = 'Ubiquitous cartography'

➢ Increasing use of google maps / online tools

➢ Animations –maps showing change and movement

➢ '3D' perspectives and software applications

➢ More and more data e.g. LiDAR, UAVs, satellites

➢ Increased use of scripting/coding

➢ Mapping and GPS for everyone

Remains of the course

- Friday : last Friday lab with Emily 8.00-10.50

- Monday: last lab with Emily 11.30-14.20

- Tuesday: exam 10% (any time) ; Matt in the lab 13.00-15.00

- Thursday: no class, but I will be in the Lab 10.30-11.20

- Projects due – extensions may be possible, but not if other courses are affected … get it done !

- Final DEADline – April 19

  (with some penalty – 1% from 25 / day unless approved)

Second exam (10%) – April 4th: 12.01am – 11.59pm (50 minute time limit)
Moodle: multiple choice – 20 questions
non-*cumulative:*   **Covering lectures since the last midterm**

➢Mountain cartography; Projects

➢Remote sensing /Satellite images

➢Map Projections: history and digital – part covered in quiz 3

➢History of Cartography; digital mapping

➢Global Positioning Systems;   Summary – this lecture

Sample question: The minimum number of satellites required to give a reliable position location from GPS is:

a. 2   b. 4   c. 6   d. 8   e. 24

Further courses in Geomatics, 2023->

GEOG204: Introduction to GIS (fall)

GEOG250: Geospatial analysis (fall) (Python programming)

GEOG300: Intermediate GIS (winter)

GEOG357: Remote Sensing (fall)

GEOG413: Advanced GIS (fall 2024)

GEOG450: Advanced Geospatial Analysis (winter 2024)

GEOG457: Advanced RS (winter 2024)

GEOG499/440: Independent Study/Internship –anytime

Mapping/GIS skills generally in high demand

Most desirable by employers: ability to code / script

UNBC GIS Minor:

5 geomatics courses + two CPSC = 21 credits

= GEOG 204, 205, 300, 357

    + CPSC 110 or 101 or GEOG250

    + two of 250, 413, 457, ENPL303

Emily project tips - Base Maps: - Removing reference layers:

No background layers with lettering (and better without vectors e.g. 'Topographic')

- The following are base maps without text or with separate reference layers that can be turned off:
- "Imagery"
- "Topographic"
- "Light Gray Canvas" (turn off reference)
- "Dark Gray Canvas" (turn off reference)
- "Oceans" (turn off reference)
- "National Geographic Style" (turn off "National Geographic Style" layer)
- "Human Geography Map" (turn off "Human Geography Label")
- "Human Geography Dark Map" (turn off "Human Geography Label")
- "Firefly Imagery Hybrid" (turn off "Hybrid Reference Layer")

Emily tips: Saving/Exporting:

Share > Print Layout > Microsoft

Print to PDF *Ensure the correct page orientation is selected (portrait or landscape) - it must match the orientation of the layout they chose to build their map on. I encountered this quite a bit in assignments…

*If the Print Layout method doesn't work for any reason, they can try Share > Export Layout - choose "Flattened PDF"*
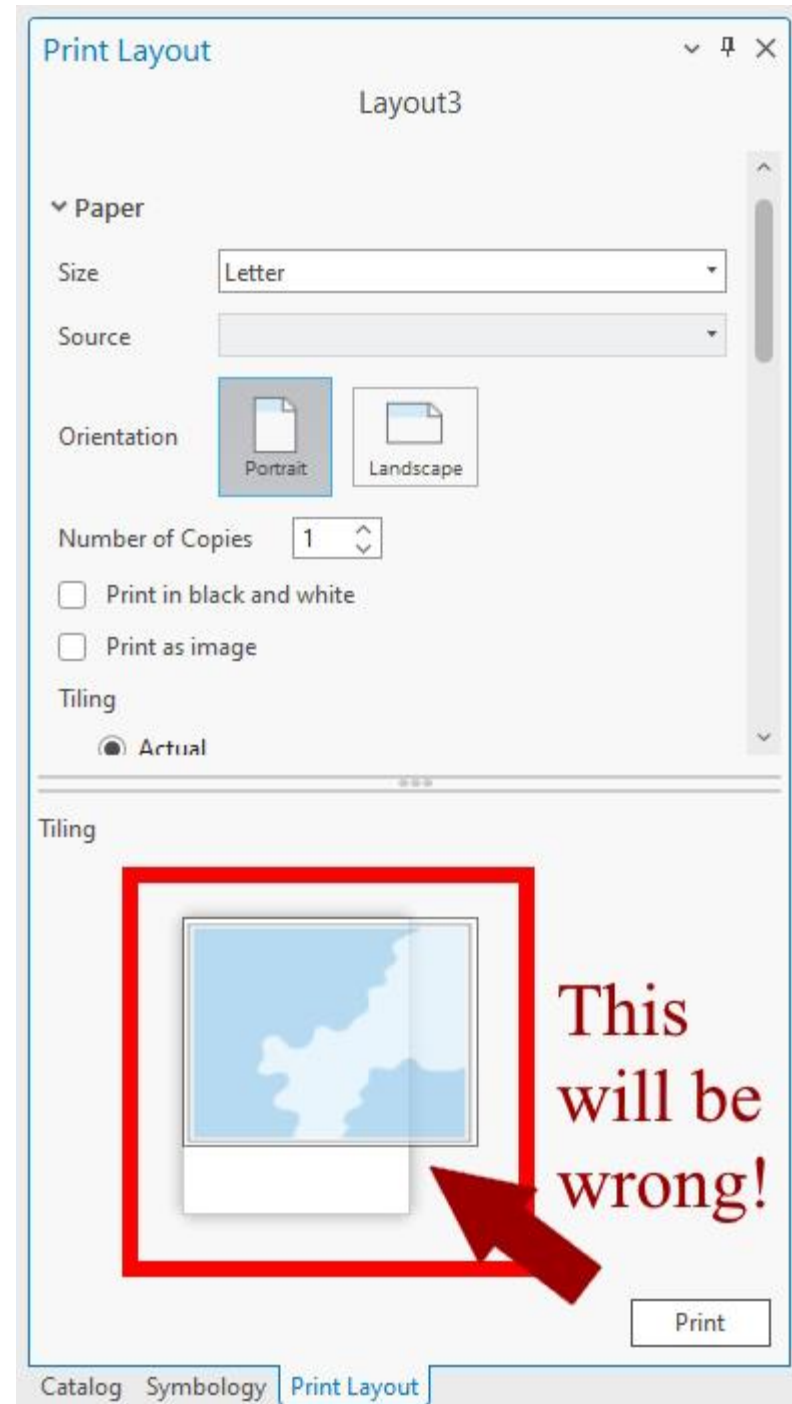
Emily tips: DPI / file size

Their PDFs need to be georeferenced. The Export Layout has many more settings to choose from - do not export at a vector resolution higher than 300 DPI - anything over that tends to be too large to upload to Moodle.

If 300 DPI is still too large, they can try decreasing that value to 150 (I did not notice a difference)

Beware: a satellite image background can boost file size (e.g. lab 8)
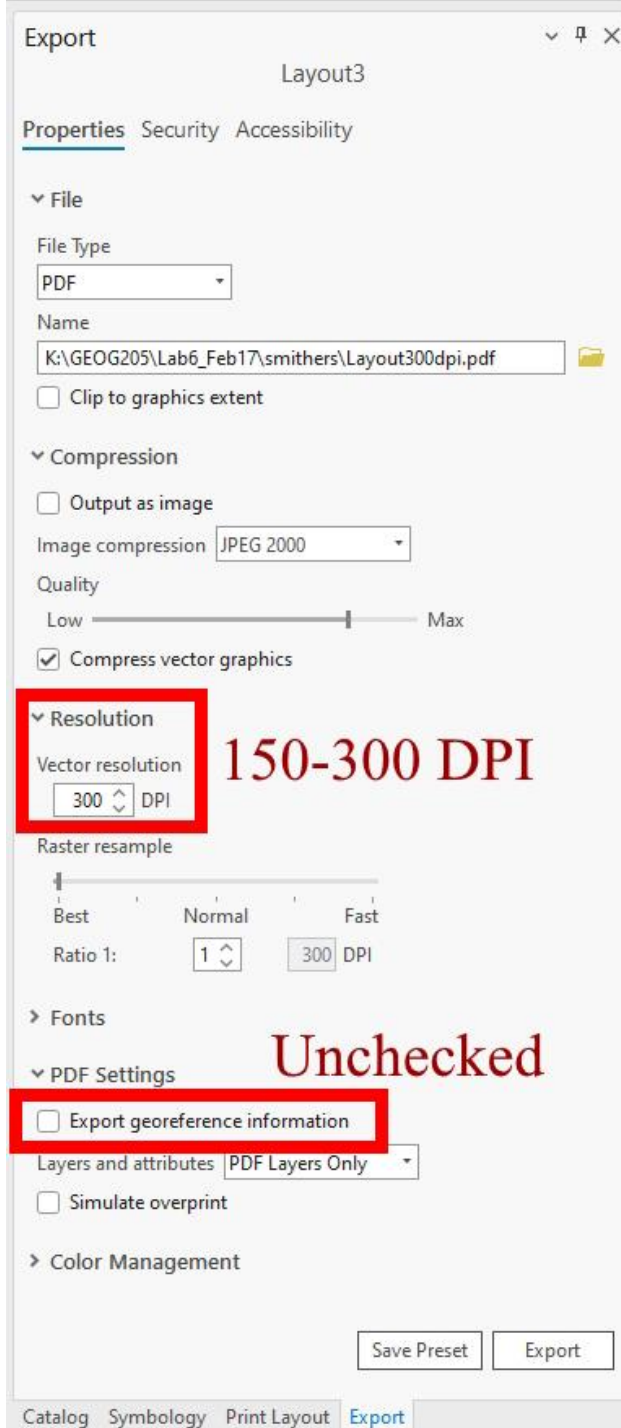
Emily tips : lab 5-8 feedback

I highly recommend students go review the feedback on their assignments, particularly from assignments 5 through 8 - they could even use the feedback as a checklist while reviewing their final project map to check for common errors.

Every student that submitted an assignment for any of labs 5-8 received feedback specific to their submission. Common advice included maximizing use of the page (i.e., size of map frame vs size of page layout), choosing appropriate contrast, colour schemes, and map extents, when to use or not use a north arrow, updating legend entries appropriate to the map.

Making a meaningful map

1. Do I know what my map's story is ?

2. Am I using the right map projection ?

3. Am I using data at the right level of generalization ?

4. Is my symbology clear ?

5. Do my symbols match my data ?

6. Have I used the right text symbols (lettering) ?

7. Does my map have 'figure-ground organization' ? -> contrast and clarity

8. Does my map have good visual hierarchy ?

9. Do I need to add anything else to my map ?

10. Have I asked for a critique ? (e.g. Thursday in the lab)

http://www.esri.com/news/arcuser/0911/files/mapchecklist.pdf

last slide of the year

Project: upload the map and report, to Moodle

Use this format: **surname-map.pdf** and **surname-report.pdf**
Note: pdf is better than .doc for the report as it can be directly opened in moodle

Course reviews – posted on Moodle (and an email)

•**Student survey of learning** – see Moodle

your input /feedback is much appreciated.
Happy to take constructive feedback – good or otherwise