

An aerial photograph of a city street grid with various colored overlays in shades of green, yellow, orange, red, and blue, representing different land use or project areas.

Project Design

GEOG 300, Lecture 15
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A light gray aerial map background showing a street grid.

GEOG 300 Project Assignment

- **GEOG 300 Project Assignment - Fall 2018**
 - The intent of the GEOG 300 project is to initiate and complete a small GIS project related to your program of study or areas of interest. The project fills the last 3 weeks of the term lab periods. It is suggested you divide your time approximately as follows:
 - Nov 12 -16: data assembly and design
 - Nov 19 - 23: data analysis
 - Dec 26- Dec 3: report and final output
 - **Due: Monday, December 3, 2018**
- **Final Exam: Wednesday, November 28, 2018**

Project requirements:

- The project addresses a clear **research question** or **statement of intent** (lame examples here!)
- “Where are the highest suitability sites for mule deer in the Prince George area?”
 - Statement of intent – “This project will identify and map areas suitable for mule deer in the area around Prince George .”
- “Where can I build my dream house?”
 - Statement of intent - “This project will identify / map locations with unobstructed views on west-facing slopes”

Project Scope

- The project is to employ some form of **spatial analysis** (more than just cartography).
 - Typically, these would involve the use of analytical sections of the Arcmap software:
 - 3D Analyst (surface analysis of DEM) and/or
 - Spatial Analyst (feature locations / patterns).
 - These should be justified by a rationale not simply performed to complete the assignment.
- **The first step is decide on a geographic area and application of interest**

Project Marking

- Marks will be based on the clarity and completeness of each section and the logical coherence between the sections (i.e. are the analyses suitable to the question, and does the discussion follow from the statement of intent). Consideration will be given to the complexity of the subject and analysis, meaning that if you attempt something complex and can't fully answer the question, you won't lose marks if you clearly explain the limitations of the work.

Project Deliverables

- 1. A project summary (2-3 pages) that concisely describes:
 - The project research question and study area chosen
 - Data sources and management
 - The criteria and methods used in the analysis
 - The results and conclusions (including any references used)
 - Include map(s), graph(s) and table(s) that summarize the results achieved

Project Deliverables

- 2. Color map / associated graphics
 - These two should be submitted together as **one single PDF document** - both as hardcopy (the colour map can be printed by the help desk on 2nd floor), and also sent to your TA by email as an attachment.
 - Details: A competent analyst should be able to replicate your methodology based on the description provided in your project summary.

Project Evaluation

- The project will be evaluated based on
 - clarity
 - completeness
 - the logical integrity of your analysis
 - and your map output.

Summary Report

- **Cover page**
 - Name, course, lab section
 - A relevant picture if you have one
- **Introduction**
 - Relevant background information
 - Study question
 - Statement of intent
 - Study area description

Summary Report

- **Methods:**
 - **Must provide all information required to replicate the analysis precisely**
 - Describe the process of data acquisition/sourcing
 - Data management steps required (clip, merge, integer, etc.)
 - Analysis tools and settings used

Summary Report

Results :

- What results did your analysis produce?
- Display the results on a map (and in a table)
 - Map has clear purpose (subject stands out)
 - Follow map output principles from lecture: full use of page, clear visual hierarchy, subject obvious, background data relevant to analysis and interpretation.
 - Output table showing complete results of analysis: for example, total area of habitat in each forest cover class.

Summary Report

● Discussion:

- What is the answer to your study question?
- What are the limitations to this answer?
 - e.g. data quality, lack of data, reality involves variables not considered, etc.
- What are the implications of your study?

Exercise

- Using ArcGIS to solve problems
 - An Esri training course
 - <https://www.esri.com/training/catalog/57630433851d31e02a43eea1/using-gis-to-solve-problems/>
- You are encouraged to go through it before you start your project

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SOME DATA SOURCES

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Federal Data for BC and Canada

- Open Data Inventory
 - <https://open.canada.ca/en/search/inventory>
 - This is an assembly of datasets from various Government of Canada departments

BC TRIM Data

- The GIS Lab has downloaded and stored all 7027 TRIM 1:20,000 map sheets at:
- L:/data/trim/trim1
- Note that these TRIM map tiles are downloaded in SAIF format, and need converting using the steps taken in the lab on data formats and conversion with FME software

BC TRIM Data Continued

- The TRIM DEMs are also under: L:/data/trim
- These are in UTM projection in ASCII format
- by 1:250,000 map sheet (25m pixels)
- .. this is converted to raster using the conversion tools -> ASCII to raster

BC Data Catalog

- Spatial data paid for by the Province is being consolidated at DataBC, **this is the best place to start** for data within British Columbia:
- https://catalogue.data.gov.bc.ca/dataset?download_audience=Public
- What it doesn't have: private industries, e.g. ski hill locations

City and District Data

- Other provincial data are available at:
<http://canadiangis.com/data.php> **Prince George City data**
- Data for the city can be downloaded but we already have it in /home/data/gisdata/pgcity
- <http://data.cityofpg.opendata.arcgis.com/>
- PG data corresponds to about 1m resolution, including the high resolution LiDAR DEM
- **Fort Fraser - Prince George Regional District**
 - The website has GIS data download; most of it relates to the rural settlement areas
 - <http://www.rdffg.bc.ca/maps/Data-Catalogue>
- City of Vancouver
- Surrey, BC
- Statistics Canada
- UNBC Library:
 - <http://library.unbc.ca/collections/data-statistics/spatial-data>

An example from an actual student project

PROBLEM STATEMENT

San Francisco is a thriving community at the heart of the technology world. Moving to San Francisco can be extremely beneficial for a computer science student or a young programmer just starting their career in technology. **Unfortunately, housing costs in this tech metropolis has skyrocketed in recent years.** The goal of this project is to determine which residential areas of San Francisco might be most suitable for a student or other financially restricted person to reside in.

Data Description

This project uses data gathered during both the 2000 and 2010 US censuses. Data from multiple census years was used as all of the required data was not available in any single year's census. The primary datasets used during analysis were:

Affordable Housing: This data from the 2010 census gives the percentage of houses in each census tract that are rent-controlled. A house is subject to rent-control if it was built before 1979.

Burdensome Rent: This data from the 2000 census gives the percentage of households being rented in each census tract in which the occupants pay more than 50% of their monthly income in rent.

Zoning Districts: This data, updated in August 2014, provided a map of San Francisco Zoning Districts.

Education: Gathered during the 2010 census, this data depicts the proportion of population living in each census tract that has at least some college education

- Additionally, an orthophoto of San Francisco taken in 2005 was used to make the map resulting from analysis more understandable.
- All data is in NAD83 UTM Zone 10.

Analysis Criteria

Affordable Housing: Generally, having a rent-controlled residence is desirable so I considered a census tract more desirable if more of the housing was rent-controlled as this would mean someone moving into that tract would be more likely to find a rent-controlled residence.

Burdensome Rent: If a census tract has a larger percentage of residents paying more than 50% of their gross income in rent it means the tract's residents are likely either poorer than in other tracts or that the rent of a given residence is likely to be higher than in other tracts. Neither of these qualities are typically associated with an area being considered desirable to live in so I considered census tracts with a lower percentage of burdensome rent as more desirable to live in.

Zoning Districts: Due to the nature of the project I restricted my analysis to residential zones as considering habitation in other zones is likely atypical.

Education: After completing the analysis of which census tracts could be considered most affordable I wished to provide some further analysis to help myself and other students moving to San Francisco decide on the best place to live. I decided that living near to other educated residents would be appreciated so out of the previously selected affordable tracts I highlighted the one with the largest proportion of people with at least some college education.

Analysis Criteria Cont.

More specifically, a census tract was considered *desirable* if more than 90% of the housing was rent-controlled and less than 20% of the households had burdensome rent. Similarly, an *undesirable area* is one in which over 20% of the people with burdensome rent and less than 90% of the houses are rent-controlled.

Results & Conclusions

I found that my analysis criteria resulted in classifying a large proportion of the city as a desirable area to live but did produce many undesirable areas as well. This shows that having a more stringent criteria for desirability could be used and still leave many desirable areas to choose from.

Furthermore, from a more practical view, this project has shown that if one so wishes it is possible to find data and determine for oneself where in a given city might be a good place to live. This can be very useful when moving to a foreign location and might be more reliable than relying on those with a bias such as realtors trying to sell a home.

