Watershed Sciences 4930 & 6920
GEOGRAPHIC INFORMATION SYSTEMS

WEEK ELEVEN –
GEOPROCESSING & EFFICIENCY

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THANK YOU TO SOME OF YOU...

- How many of you got my message?
- How many of you actually went?
HOUSEKEEPING

- Late Labs
  - April 8th Cutoff...
- Lab SP2
- Poster Session Preferences...
  - Lab..., Another Room, Atrium
  - Invite Outsiders
- Calendar & Guest Speakers

WHAT’S LEFT

- Sean Maday - Google Earth
- Austin Jenson - Aggie Air
- Emily Holt - USU Ecologist
TODAY’S PLAN...

I. Geoprocessing
   II. ModelBuilder
   III. Batch Processing
      I. A right-click away
      II. Scripting
   IV. Python Scripting
   V. Efficiency

WHAT IS GEOPROCESSING?

An ESRI term...

Introduction to Topic
From ESRI’s Help:

“Geoprocessing is for everyone that uses ArcGIS. Whether you’re a beginning user or a pro, geoprocessing will become an essential part of your day-to-day work with ArcGIS.

The fundamental purposes of geoprocessing are to allow you to automate your GIS tasks and perform spatial analysis and modeling. Almost all uses of GIS involve the repetition of work, and this creates the need for methods to automate, document, and share multiple-step procedures known as workflows.

Geoprocessing supports the automation of workflows by providing a rich set of tools and a mechanism to combine a series of tools in a sequence of operations using models and scripts...” - READ MORE

Why we’re Covering it

Geoprocessing is what helps make you efficient in your spatial analyses. Whether its combining multiple tools into one using model builder, batch processing a large quantity of data, writing some simple Python scripts, or leveraging the functionality of the Results window, geoprocessing is what can help you move from a novice GIS user, to a highly proficient power user.

Learning Outcomes

This topic supports primary learning outcomes 1, 2, 3 and 4 for the course.
TYPES OF GEOPROCESSING IN ARCGIS

- Tools
- Models
- Scripts
- Add-Ins
- Plug-Ins

These differ from some of the Toolbars you’ve used...

PLACES TO GET GEOPROCESSING TOOLS

- Toolbox
- ArcGIS Resource... Gallery
- From Specific Places...
WHERE TO LEARN MORE ABOUT GEOPROCESSING

- Plus,
  - Other Classes
  - ESRI Courses
  - ESRI Tutorials

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THE MODELBUILDER INTERFACE

- ModelBuilder window: where you edit, test and run models

ModelBuilder Canvas

THE MODELBUILDER INTERFACE, CONT.

- Model elements have 3 states
  - Not ready to run (parameters aren’t defined)
    - Usually referred to as Derived Data
  - Ready to run (all elements are colored)
  - Already run (elements are colored and shaded)
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BATCH PROCESSING

• I got to do this same thing 100 times
• AGHHH
• Brut force or Batch Process
• Write a script that loops through same thing (input varies)
• Use right-click in Arc Toolbox and click ‘batch’
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**SCRIPTING**

- Sequences of GIS operations that can be stored and shared
  - Native languages: Arc Macro Language, Avenue
  - Software independent languages such as Visual Basic for Applications, Perl, or Python
  - A model can be written and executed as a script

- Scripts can be manipulated visually
  - E.g., through ESRI’s ModelBuilder

**PROGRAMMING?**

- Lots of languages (syntax is critical to speak)
- Loops (for or do)
- Conditional (if, then, else)
PROGRAMMING - LOOPS

Simple Loops

```
DECLARE
  counter := 0;
BEGIN
  LOOP
    counter := counter + 1;
    DBMS_OUTPUT.PUT_LINE(counter);
  EXIT WHEN counter = 5;
  END LOOP;
END;
```

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BRUTE FORCE...

• If you do something once or twice, brute force may suffice...
• If you start doing it more than that, make yourself a tool
  - Limits opportunity for sloppy mistakes
  - Makes
  - If good enough, share it with others...
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THIS WEEK’S LAB

• Learn how to build a model
• Secondarily, get you might ->
• Do I have to do this lab if it doesn’t apply to my project?