

ES492/592 GIS Applications in Earth Sciences
Final Project DUE: Monday of Finals Week

Your job is to compile a complete set of GIS vector map themes, digital elevation models, and DRG's for a select watershed in western Oregon. In addition you will calculate some basic watershed parameters from your GIS compilation and create a poster in powerpoint displaying the fine work you have completed.

Student	Assigned Coast Range Watersheds
Pamela	1. Gales Creek Watershed (Tualatin Basin, Washington County)
Kristin	2. Elk River Watershed (Sixes River Basin, Curry County)
Jan	3. Calapooya Creek Watershed (Umpqua Basin, Douglas County)
Renae	4. Schooner Creek-Drift Creek Watershed (Siletz-Yaquina Basins, Lincoln County)
Ross	5. Big Elk Creek Watershed (Siletz-Yaquina Basins, Lincoln County)
Courtney	6. North Yamhill River Watershed (Yamhill Basin, Yamhill County)
Patrick	7. Mill Creek/Umpqua River Watershed (Umpqua Basin, Douglas County)
Andrew	8. Kilchis River Watershed (Wilson-Trusk-Nestucca Basin, Tillamook County)

Instructions: All final project materials will be submitted as a separate portfolio binders. Make sure you organize your final projects by Task No., and clearly label the sections in order of appearance below.

Task 1. Using the Coast Range Watersheds theme from the class website (under the final project section), find all of the subbasins that are contained within your assigned watershed.

Task 2. Identify the County(ies) in which your watershed (and related subbasins) is (are) contained.

Task 3. Identify all of the USGS 7.5-minute quadrangles that contain portions of your watershed.

Task 4. Using ArcView, select your watershed sub-basins from the Coast Range Watershed theme and convert them to a new, stand-alone shape file.

Task 4A. Create a map layout, with name, title, scale, north arrow, legend, etc. Print your new watershed subbasin theme map.

Task 5. Using ArcView, dissolve your sub-basin polygons into one large watershed polygon for your study site.

Task 5A. Create a map layout, with name, title, scale, north arrow, legend, etc. Print your new consolidated watershed boundary theme map.

Task 6. Using ArcView and the 1:24000 State Quadrangle polygon theme from the class web site (under the final project section), select all of the quads that contain your watershed footprint. Convert the selected quadrangles to a new, stand-alone shape file that can be used as an overlay on your watershed footprint.

Task 6A. Create a map layout, with name, title, scale, north arrow, legend, etc. Print your new quadrangle map with watershed footprint overlay.

Task 7. Using ArcView and the “Coast Range Streams” theme from the class web site (under the final project section), clip the stream coverage so that it forms an overlay within your watershed footprint.

Task 7A. Create a map layout, with name, title, scale, north arrow, legend, etc. Print your new watershed footprint theme map with stream pattern overlay.

Task 8. Use the ArcView table manager and your newly created watershed themes to determine the following watershed parameters:

Total Drainage Area (sq. meters)

Total Drainage Area (sq. km)

Total Length of Watershed (sq. km)

Total Width of Watershed (sq. km)

Watershed Length/Width Ratio

Total No. of Subbasins in Watershed

Average Area of Subbasins in Watershed

Total No. of Stream Segments or Tributaries in Watershed

Total No. of First Order Stream Segments

Total No. of Second Order Stream Segments

First Order Stream Frequency (Total No. / Drainage Area)

Task 9. For your selected watershed, use the GIS web links on the class web site (plus any others that you may find) to download and assemble the following GIS themes:

USGS DRG (raster)

Soils (vector)

USGS DEM (raster)

Vegetation (vector)

Bedrock Geology (vector)

Roads (vector)

Annual Rainfall/Precipitation (raster)

Streams (vector)

Parameters:

- 9-1. convert all map themes to UTM meters, Zone 10 North (NAD_1927)
- 9-2. Clip each vector file so that each theme perfectly overlays the watershed boundary footprint.
- 9-3. Using layout with student names, quadrangle name, map theme title, scale, north arrow, legend, print the following and assemble in a neat looking package to include in each of your portfolios:

Printout for each watershed

A. Quad DRG's

D. Soils on DEM

G. Streams on Precipitation

B. Quad DEM's

E. Bedrock on DRG's

H. Streams on vegetation

C. Vegetation with polygons labeled

F. Roads on bedrock

Task 10. Using the class web site resources and download links, find and assemble all of the Digital Orthophoto Quads for your watershed (Mr. Sid files are the most compact and easiest to use). Using layout with student names, quadrangle name, map theme title, scale, north arrow, legend, print the DOQ's to include in each of your portfolios.

Task 11. Using ArcView Spatial Analyst, your assembled DEM's, and watershed themes, calculate the following watershed parameters:

Minimum Watershed Elevation (feet)	_____
Maximum Watershed Elevation (feet)	_____
Minimum Slope (decimal degrees)	_____
Maximum Slope (decimal degrees)	_____

Task 12. Using powerpoint and the “watershed poster” template available on the final project links of the class web site, create a 36”x 48” (landscape layout) poster of the results of your final project. Posters should include the following text sections:

- I. Title, name, class information following the poster template on the class web site.
- II. Watershed Summary: A text box (or several text boxes) with Section Headings and 1-3 paragraphs summarizing the location, physiographic, geologic, and hydrologic characteristics of your watershed. The watershed summary should include the following items, in well organized paragraphs, under the following section headings:
 - a. Watershed name, general location, county (this should include an figure with the state of Oregon outline as a location map, and your watershed area highlighted)
 - i. Figures:
 1. Map of Oregon with watershed location
 - b. Physiography: general description of landscape, elevation range, significant topographic features, summary of elevation data you collected in Task 11 above, climate/precip, vegetation types
 - i. Figures
 1. Quad DRGs
 2. Quad DEMs
 3. Quad DOQs
 4. Climate map
 5. Vegetation map
 - c. General Geology: summary of the types of bedrock and soils found in your watershed
 - i. Figures
 1. Geologic Map
 2. Soil Map
 - d. Hydrologic Summary: summary of the hydrologic data you collected in Tasks 8 above.
 - i. Figures
 1. Watershed outlines and stream overlays
- III. Figures and Maps: Your posters should include your project output maps, as listed above, pasted into the poster template. The easiest way to do this is to export *.jpg files from the ArcView layout manager, then “insert pictures” into powerpoint and onto the poster template. Each map should be labeled with a figure caption and referred to in the body of your text in section II above.

Task 13. Copy/Save/Compile all of your GIS themes, shapefiles, grids, and raster graphics onto a CD. Organize your data folders according to projection and theme topic. Include an MS-word document that provides a list of the GIS files you have compiled, a brief explanation of what the files are comprised of, and a list of projections. This word document will serve as your metadata.