

## **Introduction to Luckiamute Watershed / GIS Exercise.**

Step 1. Insert your Luckiamute Data CD into the D:\ drive

Step 2. Find the saved ArcView project files on the following folder K:\NSSI\GISData\ArcView Projects

Step 3. Open the following projects, perform the following tasks, and answer the questions

### **Precipitation Project**

- Add the "luckquad.shp" theme from your data CD to the view
- Clear the quad polygons, and make the theme active in the contents area

Questions: Identify the following

Lowest rainfall in the watershed:

Highest annual rainfall in the watershed:

Determine the rainfall gradient across the watershed:  $\text{Grad} = (\text{highest} - \text{lowest}) / \text{horizontal distance}$  (answer in mm/km ... you'll have to do some unit conversions)

In which direction is the rainfall gradient oriented?

What quadrangle is associated with the highest rainfall?

What quadrangle is associated with the lowest rainfall?

Add the following shape files: bent\_cont\_100.shp and polk\_cont\_100.shp

What topographic features are associated with the highest rainfall?

What topographic features are associated with the lowest rainfall?

From which direction do weather systems track across the watershed?

Provide an explanation of the meteorological patterns that you observe in the Luckiamute watershed.

## **Surficial Geology Project**

Step 1. Insert your Luckiamute Data CD into the D:\ drive

Step 2. Find the saved ArcView project files on the following folder K:\NSSI\GISData\ArcView Projects

Step 3. Open the following projects, perform the following tasks, and answer the questions

### **Surficial\_geo.apr**

Step 4. Add the luckquad.shp theme from your data CD (in the D:\drive)

Step 5. Find the Monmouth Quad and the Luckiamute River (southeast corner)

Answer the following questions:

Query the surficial geology map and determine the following:

What is the map unit designation and description of the surficial geology associated with the Luckiamute River and immediate surrounding area.

What is the description for surficial unit Qff2?

What is the description for surficial unit Tm?

Add the polk\_cont\_100.shp file to your view.

What types of topographic feature is unit Tm associated with along the Luckiamute drainage.

Would you be able to stick a shovel into unit Tm? or would you have to hit it with a hammer?

Remove the pol\_cont\_100.shp theme, zoom to the full extent of the project.



percent gradient)  $\text{Tan (Elev. / Dist) *100\% = \underline{\hspace{2cm}}$  (this is

Calculate the hillslope gradient, in percent, for any two moderate-hazard debris flow polygons on the Fanno Ridge or Laurel Mountain Quadrangle portions of the upper Little Luckiamute.

Calculation 1 - Moderate Hazard Zone  
measure tool)  $\text{Change in Elevation} \underline{\hspace{1cm}}$  (m) (i.e. rise)  
 $\text{Change in Distance} \underline{\hspace{1cm}}$  (m) (i.e., run use)  
percent gradient)  $\text{Tan (Elev. / Dist) *100\% = \underline{\hspace{2cm}}$  (this is

Calculation 2 - Moderate Hazard Zone  
measure tool)  $\text{Change in Elevation} \underline{\hspace{1cm}}$  (m) (i.e. rise)  
 $\text{Change in Distance} \underline{\hspace{1cm}}$  (m) (i.e., run use)  
percent gradient)  $\text{Tan (Elev. / Dist) *100\% = \underline{\hspace{2cm}}$  (this is

Calculate the hillslope gradient, in percent, for any two unclassified debris flow polygons on the Fanno Ridge or Laurel Mountain Quadrangle portions of the upper Little Luckiamute.

Calculation 1 - Unclassified Hazard Zone  
measure tool)  $\text{Change in Elevation} \underline{\hspace{1cm}}$  (m) (i.e. rise)  
 $\text{Change in Distance} \underline{\hspace{1cm}}$  (m) (i.e., run use)  
percent gradient)  $\text{Tan (Elev. / Dist) *100\% = \underline{\hspace{2cm}}$  (this is

Calculation 2 - Unclassified Hazard Zone  
measure tool)  $\text{Change in Elevation} \underline{\hspace{1cm}}$  (m) (i.e. rise)  
 $\text{Change in Distance} \underline{\hspace{1cm}}$  (m) (i.e., run use)  
percent gradient)  $\text{Tan (Elev. / Dist) *100\% = \underline{\hspace{2cm}}$  (this is

Final Question: Comment on the relationships between hillslope gradient and debris flow hazard in the Coast Range of Oregon. What types of slopes are associated with the highest hazard and the lowest?

## **NSSI Geomorphology Module: Field Trip to Lewisburg Area GIS Background Exercise**

Using your Luckiamute Data CD and the project files on the **K:\NSSI\GISData\ArcView Projects** folder, examine the following GIS themes and answer the related questions.

9. Open the streams.apr and find the Soap Creek and Baker Creek sub-basins of the Luckiamute. Build a mental map of our destinations.
10. Using the location.apr, determine the quadrangle of Soap Creek and Baker Creek.
11. Using the precip.apr, determine the range of precipitation for Soap Ck / Baker Creek.
12. Do the same for bedrock, determine the bedrock units that underlies Baker Ck, and Soap Ck.
13. Open the vegetation.apr, determine the dominant vegetative assemblage for:

Main valley floor of Soap Creek

Baker Ck. Watershed

14. Open the debrisflow hazards \*.apr, determine the relative debris flow hazards for the Baker Creek Watershed. Overlay the bent\_cont\_100.shp file on the project and determine what type of topographic settings are associated with the highest hazard?

Question: what topographic position on the landscape would you likely find landslide / debris flow deposits?