2009 EISI DESCHUTES RIVER MODULE:
POST-TRIP APPLICATIONS AND REFLECTIONS

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Eco-informatics Team Members: now that the Deschutes River field module is complete, and we are one week past the geology-based field experience, let's try our hand at applying fundamental field-trip concepts to the watersheds occupied by H.J. Andrews Experimental Forest. This exercise is based on two readings by long-time HJA researchers:

> Swanson, F.J., and James, M.E., 1975, Geology and geomorphology of the H.J. Andrews Experimental Forest, Western Cascades, Oregon: Pacific Northwest Experiment Station, USDA Forest Service Research Paper PNW-188, 14 p.
>
> Swanson. F.J., and Jones, J.A., 2002, Geomorphology and hydrology of the H.J. Andrews Experimental Forest, Blue River, Oregon, *in* Moore, G., ed., Field Guide to Geologic Processes in Cascadia: Oregon Dept. of Geology and Mineral Industries Special Paper 36, p. 289-314.

Before we begin, let's review the stated outcomes and objectives for the Deschutes River module:

(1) To engage team building in the context of outdoor adventure and experiential education
(2) To acquire knowledge of the regional geologic, hydrologic, and geomorphic setting of western Oregon
(3) To apply spatial and temporal scaling concepts to watershed systems
(4) To develop skills in field-based observation, data collection, analysis, and hypothesis testing
(5) To gain experience with techniques of landscape analysis and interpretation of the geologic record

I think we did a fair job of achieving the above objectives, in my humble opinion. The post-trip reflection exercise involves reading the two papers by Swanson and James (1975) and Swanson and Jones (2002), applying Deschutes River field module concepts to the HJA experimental forest, and connecting the resulting knowledge base to your individual EISI 2009 research projects. Guided review questions and directives follow. All work should be neatly compiled, word-processed, and packaged in a professional-looking portfolio along with the other pre-trip reading assignments and field exercises. Sketches and explanatory diagrams are helpful and highly encouraged.

The final checklist of Deschutes River module tasks to include in your final portfolio is as follows:

- ☐ Answers to "Pre-Trip Reading 1" questions (Ritter et al., 2006, Introduction to Drainage Basins)
- ☐ Answers to "Pre-trip Reading 2" questions (O'Connor et al., 2003a, Deschutes Geology, Hydrology, Geomorphology)
- ☐ Camp Exercise 1: "Part 3 – Incision Rate Problem"; p. 219-p. 221 of field guide.
- ☐ Camp Exercise 2: "Part 4 – "Deschutes Basin Water Budget Analysis"; p. 221-p. 222 of field guide.
- ☐ Camp Exercise 3: "Flood Recurrence Intervals" question 1, p. 211 of field guide.
- ☐ Camp Exercise 4: "Deschutes Valley Bottom Analysis" question 4, p. 212 of field guide.
- ☐ Answers to "Post-trip Reading" questions (Swanson and James, 1975, Geology of HJA; Swanson and Jones, 2002, Geomorphology and Hydrology of HJA)
- ☐ "Connections Statement" – Concept application to EISI Research Project

NOTE: *Remember that the post-trip reading questions, (MS word *.doc) and all Deschutes River module materials are available for download from the Western Oregon University EISI web site:*

http://www.wou.edu/las/physci/taylor/eisi/eisi_su09.htm

Go to www.wou.edu/taylor and follow the "Course Web Site" links to "Ecosystem Informatics Summer Institute - Deschutes River Module Homepage" at the bottom of the class list.

I. Post-Trip Reading Questions: Swanson and James (1975) - Geology and Geomorphology of HJA Experimental Forest; Swanson and Jones (2002) – Geomorphology and Hydrology of HJA Experimental Forest
Read the above two HJA-related papers and answer the following questions.

1. Fill in the HJA Watershed Fact Table Below:

Name of Primary Watershed System at HJA _____
Drainage area _____ sq. km
Basin length _____ km
No. of Dams _____
Primary Tributaries: _____ _____
Highest Elevation (ft): _____ (meters)_____
Lowest Elevation (ft): _____ (meters)_____
General Flow Direction:_____
Western Physiographic Boundary: _____
Eastern Physiographic Boundary: _____
Northern Physiographic Boundary: _____
Southern Physiographic Boundary: _____
Oldest Bedrock Underlying Basin: _____
Youngest Bedrock Underlying Basin: _____
Bedrock composition in the eastern portion of the Basin: _____
Bedrock composition in the western portion of the Basin: _____
Average Annual Precipitation: _____ mm
Average Annual Evapotranspiration: _____ mm
Average Annual Runoff: _____ mm _____ cu. M
Average High Flow Months: _____
Average Low Flow Months: _____

Years of Three Largest Floods of Record: _____ _____ _____

Causes of Large Floods at HJA: _____ Time of Year: _____

2. Would you best characterize the Lookout Creek discharge as "seasonally flashy" or "perennially steady"? Explain your answer.

3. List the three types of surface (geomorphic) processes that have played important roles in shaping the valley morphology of Lookout Creek.
_____ _____ _____

4. True or False: glaciers from past climate episodes have influenced landforms and surficial deposits in the Lookout Creek and Blue River basins. Explain your answer and provide reference citations to justify.

5. True or False: similar to reaches in the Deschutes basin, evidence of the cataclysmic eruption of Mt. Mazama (present "Crater Lake) 7000 years ago is preserved on the landscape in the vicinity of HJA. Explain your answer and provide reference citations to justify.

6. What is the landform name applied to level surfaces 15 to 25 feet (5-8 m) above Lookout Creek, with a veneer of rounded gravel deposits? _____

7. True or False: similar types of ancient landforms in question 6 were observed in the Deschutes basin. Draw a sketch and provide a short explanation of how these landforms are created in alluvial environments.

8. True or False: Lookout Creek valley-bottom widths are of uniform dimensions throughout the HJA landscape. Explain your answer and provide reference citations to justify.

9. During the Deschutes River trip, we visited "The Pot" landslide complex near the Whiskey Dick campground. Smaller-scale versions of this type of terrain are evident in the mountainous landscape of HJA. List and describe the three topographic criteria used to distinguish disturbed landslide terrain in the Lookout Creek basin.

10. True or False: The Lookout Creek and Blue River drainage basins exhibit no evidence of ancient geologic damming events like those examined on the Deschutes River field trip. Explain your answer and provide specific reference citations to justify your answer.

11. List and discuss the types of mass wasting processes that influence the landscape at HJA Experimental Forest. In your answer, include a discussion of controlling factors, estimates of erosion rates, and land-management implications.

12. On a geologic time scale (1000's to millions of years), what types of geologic events influence the sediment load and sediment transport capacity in the Lookout Creek basin?

13. Briefly discuss the importance of woody debris with respect to geomorphic process and ecosystems services in the Lookout Creek basin at HJA Experimental Forest.

II. Deschutes River Module - EISI Research Connections Statement

Members of the EISI team have established their research projects for summer 2009. For the most part, projects are located at or near HJA Experimental Forest in the Western Cascades of Oregon. The goal of this final assessment piece for the Deschutes River module is to apply the concepts of regional geology, watershed systems, scaling, field science, and landscape analysis to your study area.

In a 3-to-5-page report format (1 inch margins, double spacing), craft a "connections statement" using the following organizational outline:

I. Overview of 2009 EISI Research Project
   a. Statement of Problem
   b. Location of Field Study (include maps as needed)
   c. Goals-Objectives-Outcomes-Project Deliverables
II. Geologic and Geomorphic Setting of Study Site
   a. Watershed Description
      i. Location + Tributaries
      ii. Hydrology (precipitation, climate)
   b. Bedrock Materials and Ages
   c. Landforms, Materials and Processes
III. Discussion
   a. Hypothesize how the long-term geologic history (1000's to millions of years) of your study site may have had an influence on the potential outcomes of your research project.
   b. Brainstorm strategies that you might use to incorporate geologic history and landscape analysis into your research design.
IV. Concluding Statement
   a. Provide a concluding paragraph that describes your Deschutes River experience and how that has influenced your observations of the landscape around you.