

## GREEN RIVER VALLEY FIELD TRIP: FLOODPLAIN CHARACTERISTICS

For many purposes in theoretical and applied geomorphology it is necessary to recognize and document evidence of channel migration and the evolution of floodplains and terraces. The work usually involves a combination of aerial-photo interpretation; field mapping of morphology and sedimentology; and the dating of features by radiometric, stratigraphic, dendro-chronological, and historical methods. The purpose of this exercise is to develop these skills in the interpretation of the recent history of the reach of valley floor in the Green River Valley.

### A. Pre-field lab work:

1. Form groups of 4 in lab, with whom you will be working in the field and in making preliminary assessment of aerial photographs and topographic maps. At least one of the team members should have a passing familiarity with ArcView (or a burning desire to learn it quickly).
2. Review the air photos and maps of the reach to determine the general processes, particular styles, and rates of channel changes. Identify sites of past channel locations and plot on your base map(s).
3. Plan a strategy for your day in the field. **THIS IS IMPORTANT!** You will not have air photos in the field, and it is quite easy to spend a lot of time wandering around on the pasture, enjoying the sunshine, and collecting almost no useful data at all. Conversely, it may be raining, and without a plan of action you won't even have fun (never mind data!). Consider what likely field information will be available in the area of our visit to document and to further illuminate those changes you have seen on the air photos.

### B. Field work:

Add to the detail on your base map. You will find locating most effective by use of a GPS receiver set to display UTM coordinates (NAD 1927), whose

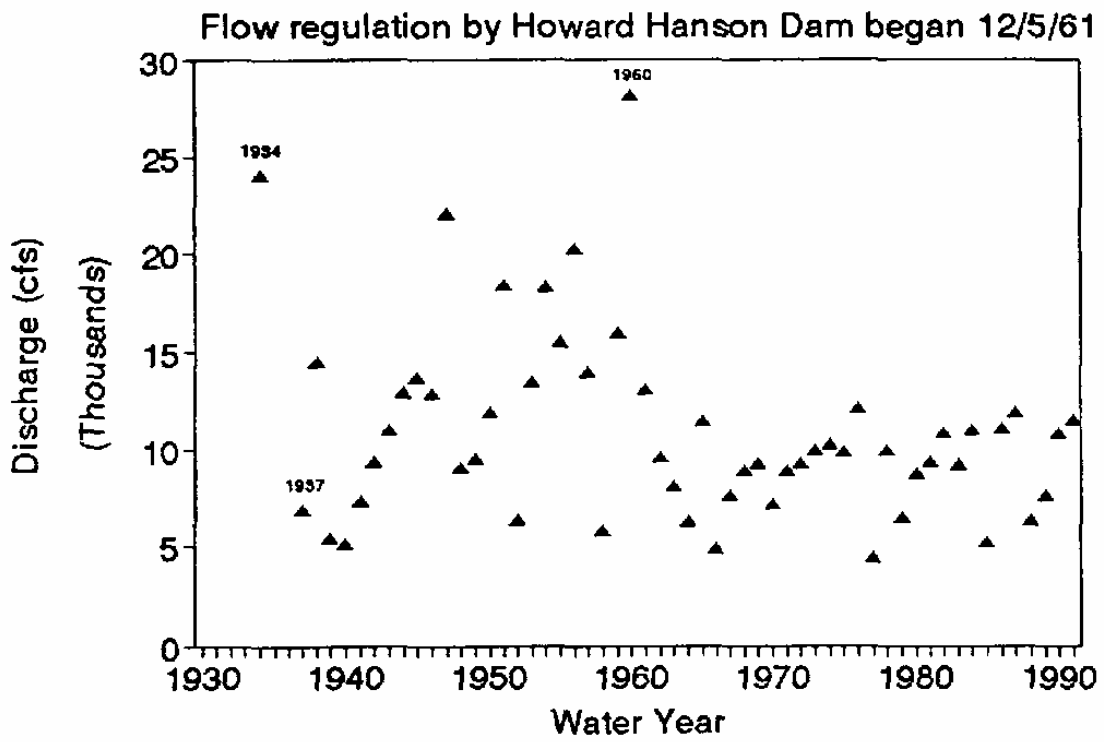
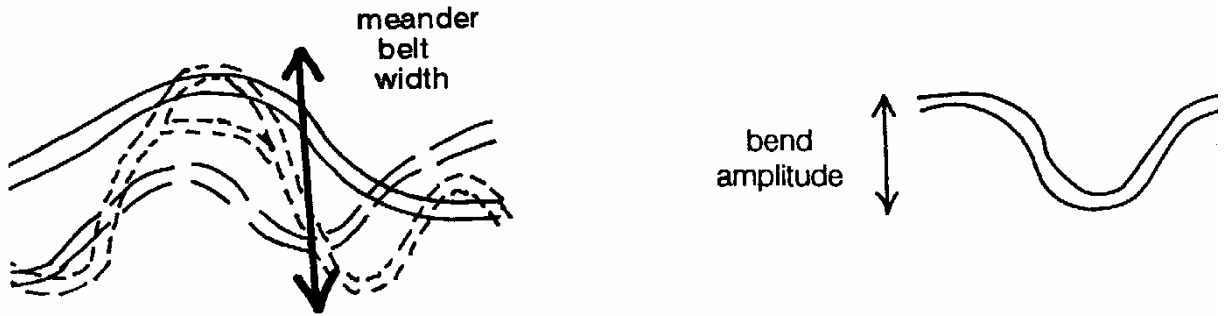
coordinates are shown on your base map. This is the coordinate system used by the USGS in preparing digital topographic maps (Digital Raster Graphics, or DRG's) and our digital orthophotos. As you wander through the area, enjoy at least the following activities:

- a. Look for evidence of channel migration in the form of abandoned channels, overflow channels, and scroll bars. Can you find any evidence of the age of the most recent occupation by the river?
- b. Identify the present floodplain and one or more terraces. It is usually possible to discriminate between these surfaces on the basis of drainage density, vegetation, microtopography, and soil development.
- c. Map the dominant tree species and their maximum circumference (as a surrogate for age).
- d. Using the Swedish borer to date some trees and contribute to the development of a calibration graph relating tree circumference and age. When we have enough data points to define the relationship, you can use it to date the trees on which you have measured the circumference.
- e. Survey the present location of the large meander bend in the northeastern part of the base map using a level or your GPS.
- f. Make some estimates of the bankfull depth of the river and the height of the recently deposited gravel bars in order to calculate minimum rates of sediment flux (which must be greater than or equal to the rate of bar growth) through the reach.
- g. Find the areas of recent beaver activity. Extra credit for the GPS coordinates of the lodge!

### **C. Follow-up lab work:**

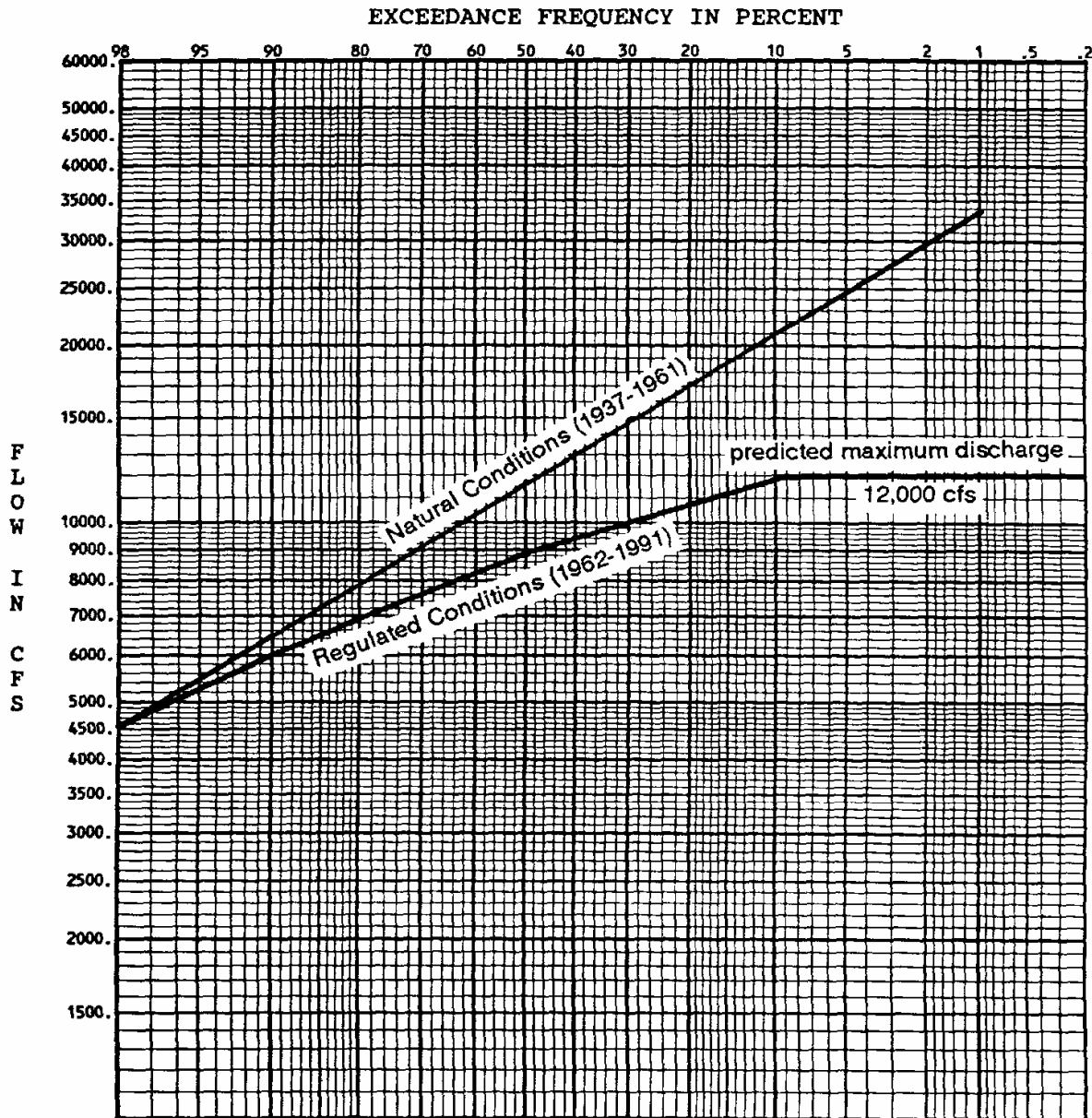
1. Use the historic data to delineate the history of channel changes (including changes in meander wavelength and sinuosity), not only in the immediate field area but also in the adjacent meander zone as well. Produce one or more maps from air photo tracings of this larger area to illustrate your points as needed.
2. Consider the available history of Howard Hanson dam (attached) in reconstructing the past, present, and likely future history of this area.
3. Write a report, following the same general length and format guidelines of the previous ones. Feel free to emphasize one or more particular topics associated with this investigation, but be sure to include data and interpretations relating to at least the following:
  - Floodplain topography, sedimentology, and vegetation;
  - Characterization of the alluvial valley-floor history; and
  - Current and future implications of Howard Hanson Dam on meander rates and sediment flux.

Definitions:



# Flood Frequency Analysis

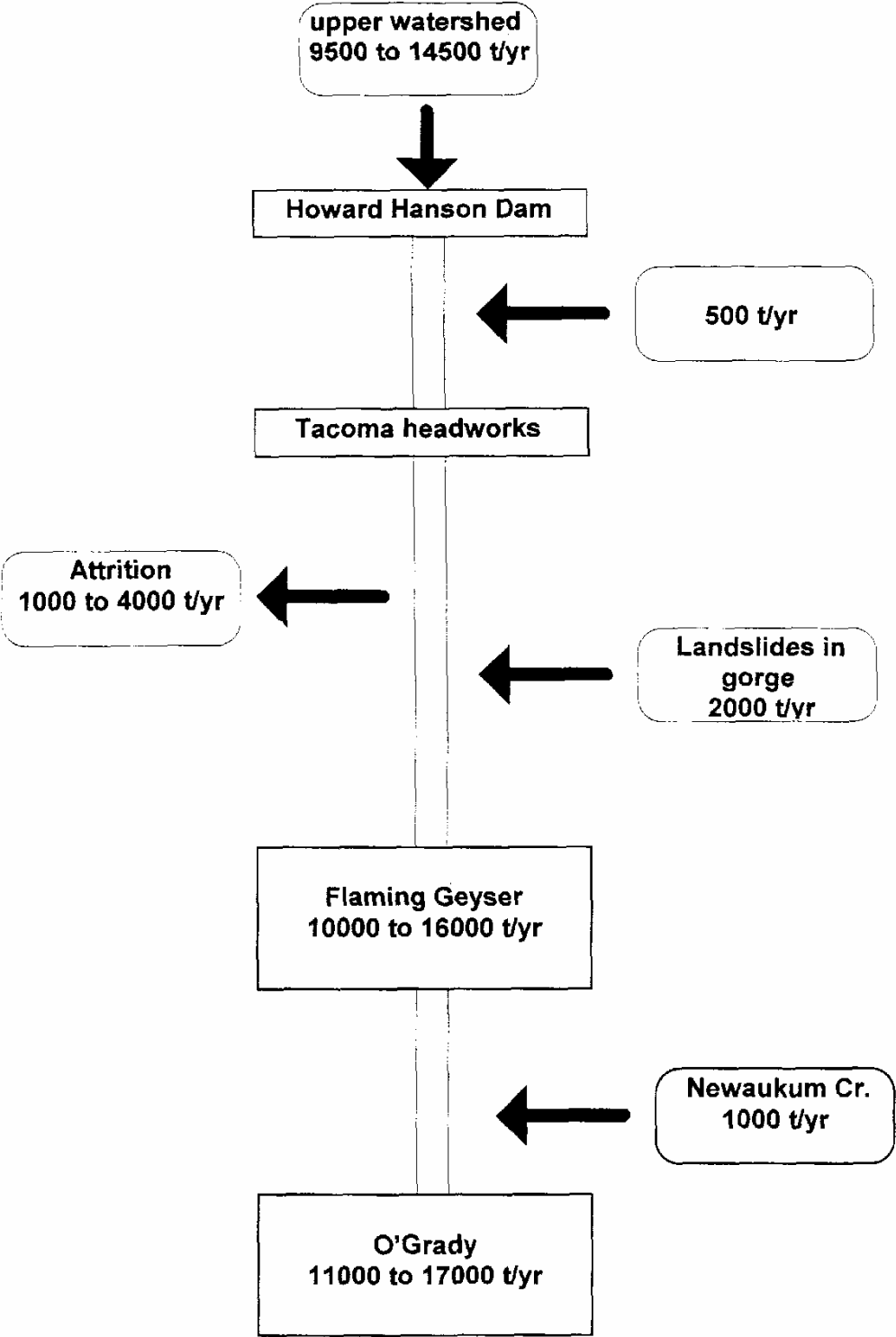
## Pre- and Post Dam



Green River near Auburn gage

Data from USGS. Log-Pearson Type III Analysis.

**Sediment supply before Howard Hanson Dam**



**Eventual post-dam sediment supply after all adjustment is complete**

Note this does *not* say that that this sediment regime has yet been reached at our study site!

