

WATERSHED STUDY PROPOSAL
FOR THE
TAYLOR RANCH HONORARIUM PROGRAM

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Introduction

In this proposal a watershed study is presented, to be conducted in the Idaho Primitive Area near the University of Idaho's Taylor Ranch facilities. The area of study will consist of from three to four small high-elevation watersheds located either south-west of the Taylor Ranch in the Sheephorn Mountain area or in the Bighorn Crags area east of the Taylor Ranch. The final locations for the study watersheds will depend on the condition of the snowpack in late May and will have to be determined upon or just prior to arrival in the Primitive Area.

The objectives of the study are as follows:

- (1) To record change in areal extent of the snowpack and change in streamflow for each watershed with time.
- (2) To find the relationship between the areal extent of the snowpack and the peak of the streamflow hydrograph for each watershed.
- (3) Through hydrograph separation to find the relationship between generated runoff of the snowpack and observed runoff in the streamflow hydrograph.
- (4) To find the effect of aspect on change of areal extent of the snowpack with time and the timing and shape of the streamflow hydrograph, by locating the watersheds on a range of aspects.

The size of the study watersheds is critical to this project. The size must be small enough for one person to cover well in one day, while the stream coming out of the area must be large enough to not cause any difficulty in measuring streamflow coming out of the watershed. Three hundred acres was picked as a size that would fit both of these conditions.

In addition to size, elevation is also important in determining location of the study watersheds because of the role elevation plays in determining the timing

of snowmelt. This study requires watersheds that have their peak snowmelt runoff in early to late June and not before. This would allow the collection of two weeks' data before peak flows occurred. The watershed elevation that meets this requirement will be selected depending on the condition of the snowpack in late May.

Elevation and vegetation cover will be kept constant throughout the study to determine the effect aspect has on the snowmelt. Watersheds will be chosen so that a range of aspects are represented and the effect of aspect can be noted.

Procedure

Measurements of the areal extent of snowpack and streamflow for the study watersheds will be collected during late May and throughout the month of June. Each watershed will be measured every third day during this period.

Areal extent of the snowpack will be determined according to relative areas recorded through the use of oblique photography and ground observations taken on the same day. Streamflow volumes will be calculated from velocity obtained through the use of a stream velocity probe and the cross-sectional areas of the watershed streams. Standard points will be determined at the beginning of the study and all measurements will be taken from them throughout the study.

The study watersheds, as previously stated, will be picked so that peak streamflow should occur during the middle of June. Therefore, my field work should be completed by the end of that month. The rest of my study will involve separation of the streamflow hydrograph to obtain generated runoff and interpretation of my data to satisfy my objectives. This part of my study will not require my staying at the Taylor Ranch. The University of Idaho facilities would be much more convenient for this portion of my study; therefore I will leave the Primitive Area at the end of June to complete my work in Moscow.

Equipment

The equipment I will need to use during my research includes the following

items:

35 mm camera with haze filter and tripod
Silva Ranger compass
stream velocity probe
50 ft. tape
mirror stereoscope
pocket altimeter
maps of the areas
calculator
planimeter or use of the Numonics Graphic calculator

Cost

The only cost I anticipate beyond the expenses covered by the honorarium is that of film and film processing. It is my hope that the honorarium will extend to this additional expense. If this is not possible I will plan to cover the cost with my \$600 honorarium.

Concluding Remarks

The relationships between areal extent of snowpack and generated and observed runoff can be effective tools in forecasting peak flows and water supply when they are derived from many years of records. The relationships I observe and record will be only initial ones because of the short length of record and therefore will not be applicable for forecasting purposes. However, if this study were continued for a number of years the relationships could prove to be valid in forecasting. Though obtaining the initial relationships is a high priority of this study I believe that the experience I will gain in the process will be of even greater value to the field.