

## Tasks

### Task 1- Project Management

#### 1.1 Group Meeting

The NAU watershed modeling team will meet to do the primary forum for researching the project early in the semester. For the rest of spring semester 2013, team meetings will be focused on testing and building models. Meeting hours are set for every Friday afternoon. All team members are required to attend.

**Deliverable:** Meeting Agenda, Minutes.

#### 1.2 Technical Meeting

The NAU watershed modeling team will prepare a schedule for several meetings with technical advisor Dr. Paul Trotta in order to discuss and solve specific project needs and issues. The meeting minutes will be documented.

**Deliverable:** Meeting agenda, professional help on tasks. Document of guidance will be provided.

### Task 2- Project Proposal Development

The NAU watershed modeling team will study the hydrology of the lower Shultz Creek Watershed in Flagstaff, Arizona. The first step is to determine the monthly water budget in the watershed by using a geographic system, ARC GIS, to integrate watershed characteristics and hydrological data. The second one is to determine the magnitude of event-based peak discharges under disturbance scenarios from severe wildfire thinning and under current conditions.

## 2.1 Develop Project Understanding

The team will research the project scope providing all necessary background information. The team will identify all major areas of interest. The team will produce a hard copy of the document. The document will be provided to the client and the technical advisor.

**Deliverable:** Technical Understanding

## 2.2 Develop Scope of Services

The team will provide a list of task that will be completed at the end of the project. Larger tasks will be divided into sub-task. Each task and sub-task will be defined by necessary requirements for completion.

**Deliverable:** Task List

## 2.3 Task Timeline

Team will develop an up to date timeline displaying the proposed project tasks and dates of completion.

**Deliverable:** Timeline of tasks.

## 2.4 Task Staffing

Team will develop a staffing plan describing which team members will be working on which tasks. This staffing plan correlates with the task timeline.

**Deliverable:** Table displaying which team members will be responsible for which tasks.

## 2.5 Budget

Team will develop a budget for the overall proposed project.

**Deliverable:** Budget table displaying all engineering costs for proposed project.

### Task 3- Determination of Watershed Characteristics

Team will be finding all watershed model input data for this task.

#### 3.1 Location

The location of this project is north of Flagstaff at lower Shultz. It is the area of land SW of the past Shultz fire.

**Deliverable:** Topographic map of location of proposed project.

#### 3.2 Annual Precipitation

The discharge from the watershed is based on precipitation, infiltration, evaporation, and transportation.

**Deliverable:** Data tables of precipitation conditions.

#### 3.3 Watershed Conditions

The cover in the watershed canopy has impact on the infiltration in the catchment. Therefore, the cover includes soil and density of the forest, including any forest restoration.

**Deliverable:** Topographic map, soils analysis of infiltration, green and amp method analysis.

### Task 4- Hydrological Response

Forest fires have impact on the hydrological cycle, including reduced infiltration rates, reduced evapotranspiration rates and increased overland flow. Fire impact on hydrological processes is normally apparent for one or two years after the wildfires. However, in dry areas like Flagstaff, much higher runoff and erosion rates are being noticed even five to ten years after the fire.

#### 4.1 Review Existing Literature

Team will look at existing reports and studies, especially the past Shultz fire. We will review the pre and post fire condition at Timberline

**Deliverable:** Design alternatives for best geographic system.

#### 4.2 Determine Current Conditions

Team will research the current conditions of the watershed and define any key characteristics which will benefit the input data for the modeling process.

**Deliverable:** Memo describing conditions.

#### 4.3 Evaluate Current Conditions with respect to Existing Literature

Team will correlate existing conditions of watershed with respect to other previous defined projects.

**Deliverable:** Technical Memorandum.

#### 4.4 Ecological Response to Thinning

Team will evaluate what ecological responses will be when introduced to mechanical thinning of vegetation based on literature reports. This will help to predict responses in Shultz watershed.

**Deliverable:** Memo reporting responses of environment due to thinning.

## Task 5- Post Thinning Evaluation

### 5.1 HEC-HMS Modeling

After obtaining all the information described above, our group will determine and build watershed models. We will test the models and analyze the models based on different scenarios. Team will model current conditions, post-fire with no treatment(s), post-fire with treatment(s), and pre-fire with treatment(s).

**Deliverable:** Provide alternative baseline models for existing conditions.

## Task 6-Project Study Report

### 6.1 Report Preparation

Our group will prepare a draft of the project study report. The draft will document the purpose of the project, describe the model and alternatives, analyze the results, and summarize our findings. The draft will be provided to Mr. Runyon for comments and markups.

**Deliverables:** Draft project study report

### 6.2 Final Project Study Report

Our group will update the project study report and provide a final project study report, based on client's comments.

**Deliverable:** Final Project Study Report

### 6.3 Presentation

Team will prepare presentation for client and NAU faculty.

**Deliverable:** Project Presentation.

## 6.4 Website

Team will develop a webpage that displays the watershed data, analysis results, and model outputs.

**Deliverable:** Website for proposed project.