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July 9, 2001

Don Harris, Park Supervisor
McDowell Mountain Regional Park
P.O. Box 18415
Fountain Hills, AZ 85269

Dear Don Harris,

Introduction

Thank you for sharing your knowledge with Dr. Michael Ramsay (University of Pittsburgh) and I on June 14, 2001 when we stopped by your offices at the Park. As you may recall, we are working on a NASA-funded project entitled "Multi-Spectral Remote Sensing of Brush Fire Scars in Arid Urban Regions: Analysis of Future Fire and Flooding Hazards." This project applies remote sensing analysis, review of fire fighting history, and field investigations to the study of brush fire occurence, recovery, and mitigation. In particular, we are interested in the vegetative recovery as well as the response of the landscape to the change in landcover. In otherwords, if you burn much of the vegetation, what does that do to the generation of runoff and the potential for increased local erosion or sedimentation?

Request for Research permit

We have chosen the area of northeast Scottsdale and the northern McDowell Mountains as a natural laboratory for our studies (see figure 1 for a LANDSAT view of the region with the very evident fire scars). The McDowell Mountain Regional Park is an excellent area for our studies because of the preservation of the effects of the Rio Fire and unburnt areas, the lack of disturbance due to ongoing development, and the opportunity to partner with Maricopa County.

We understand the importance of regulation of research activities at the Park. We request a research permit to perform the following tasks at McDowell Mountain Regional Park. The research team includes Dr. Ramónn Arrowsmith from Arizona State University, Dr. Michael Ramsay (University of Pittsburgh), and a few of our students. Arrowsmith is the contact and supervisor of field operations and will be the responsible party for the research agreement.

1. Hiking and walking inspection of burnt and unburnt areas. We take notes, photographs, and occasionally spectra (non-invasive–like a photograph) to compare with the satellite image spectra.
2. Topographic mapping using GPS or optical Total station (electronic transit) of selected areas. This method is not invasive and we hike to the study sites.

3. Balloon aerial photography of burn and unburnt areas. We have considerable experience flying tethered helium balloons with a maximum altitude of 1000' on which we lift radio-triggered cameras to take low-altitude photography. These data are valuable for documentation of the effects of the fires. See Figure 2 from the Cave Creek area for an example. Because of the relatively remote area away from airfield approach, these tethered balloons do not require speciall FAA clearance.

4. Installation and inspection of 10-20 sediment traps (see figure 3 for a schematic). We would like to compare the sediment removal rates from burned and unburnt areas, so we propose to install prefabricated sheetmetal boxes in small washes and to monitor their collection of sediment for several years. The installation will be done by hand with shovels. No cement or other artificial fill will be used. We will hike to the locations for installation. The traps will be inspected monthly to measure the amount of material that has been collected. This inspection will also be done on foot and not require any additional investigation. Because we need to map the area before installation, we have not selected the specific sites, but we expect to install between 10 and 20 traps focusing largely in the northeast portion of the Park, near the Ironwood Picnic area and further west along the burn edge.

Master agreement between ASU and Maricopa County

Arizona State University's Risk Management Department has negotiated a master agreement for research with Maricopa County and our work will be covered by this agreement. Robert Gomez, Director of Risk Management (480) 965-6927, may provide contact information within the County Administration.

Enclosures

I have enclosed a printout of our web site for our project (http://ivis.eps.pitt.edu/projects/fire-flood/). I have also typed up the Research Agreement. I will contact you in a week or so, or give me a call.

Sincerely,

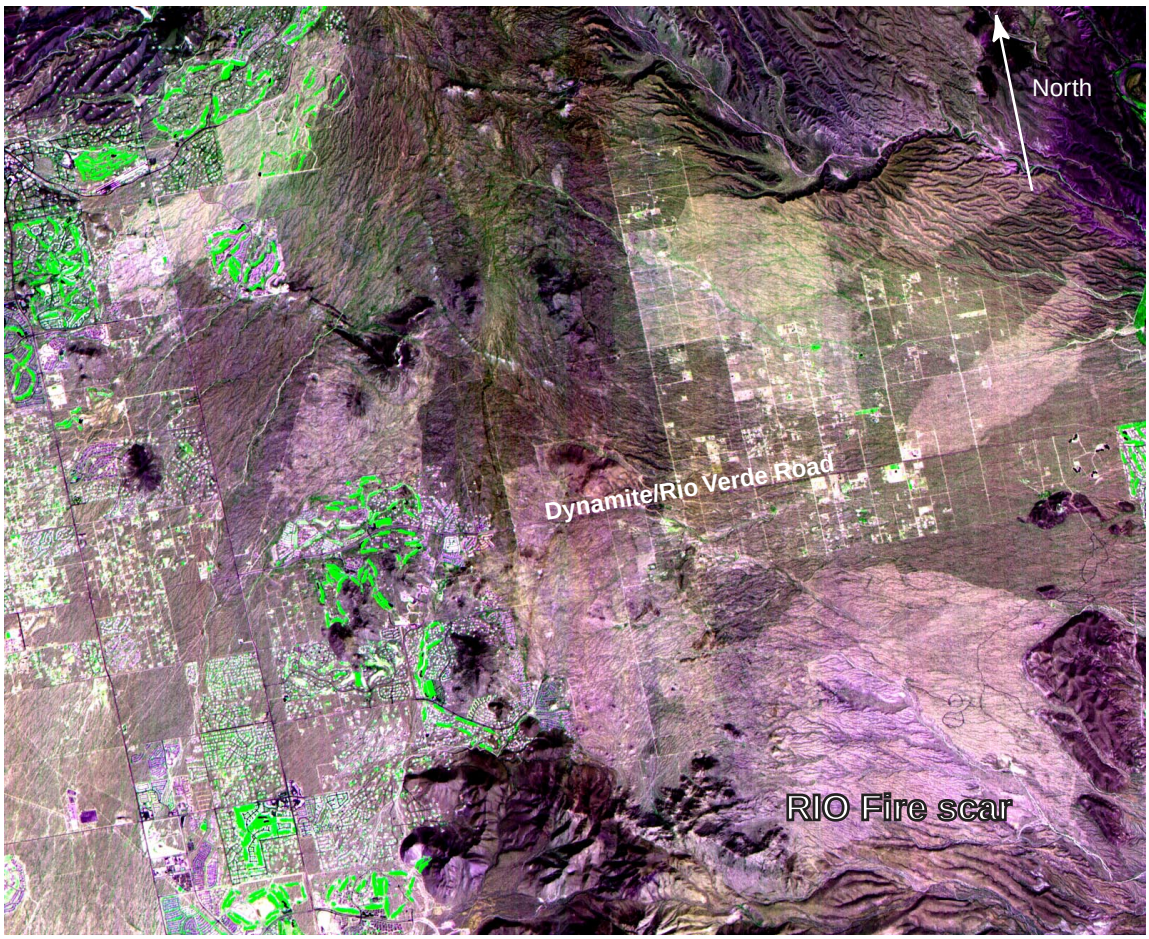

Figure 1: LANDSAT image of the northeast Scottsdale-northern McDowell Mountains area. Urban encroachment is ongoing in this area. Golf courses are clear as the light green areas. The light splotchy areas are the brush fire scars that we study, including the largest: that caused by the Rio Fire of 1995 that burned largely within the McDowell Mountain Regional Park.

Figure 2: Low altitude tethered balloon aerial photograph of a fire scar in the Cave Creek area. Note how clearly the landscape and the vegetation can be documented with this method. The central wash area was not burned in this early 1990s fire, but the hills on either side were.

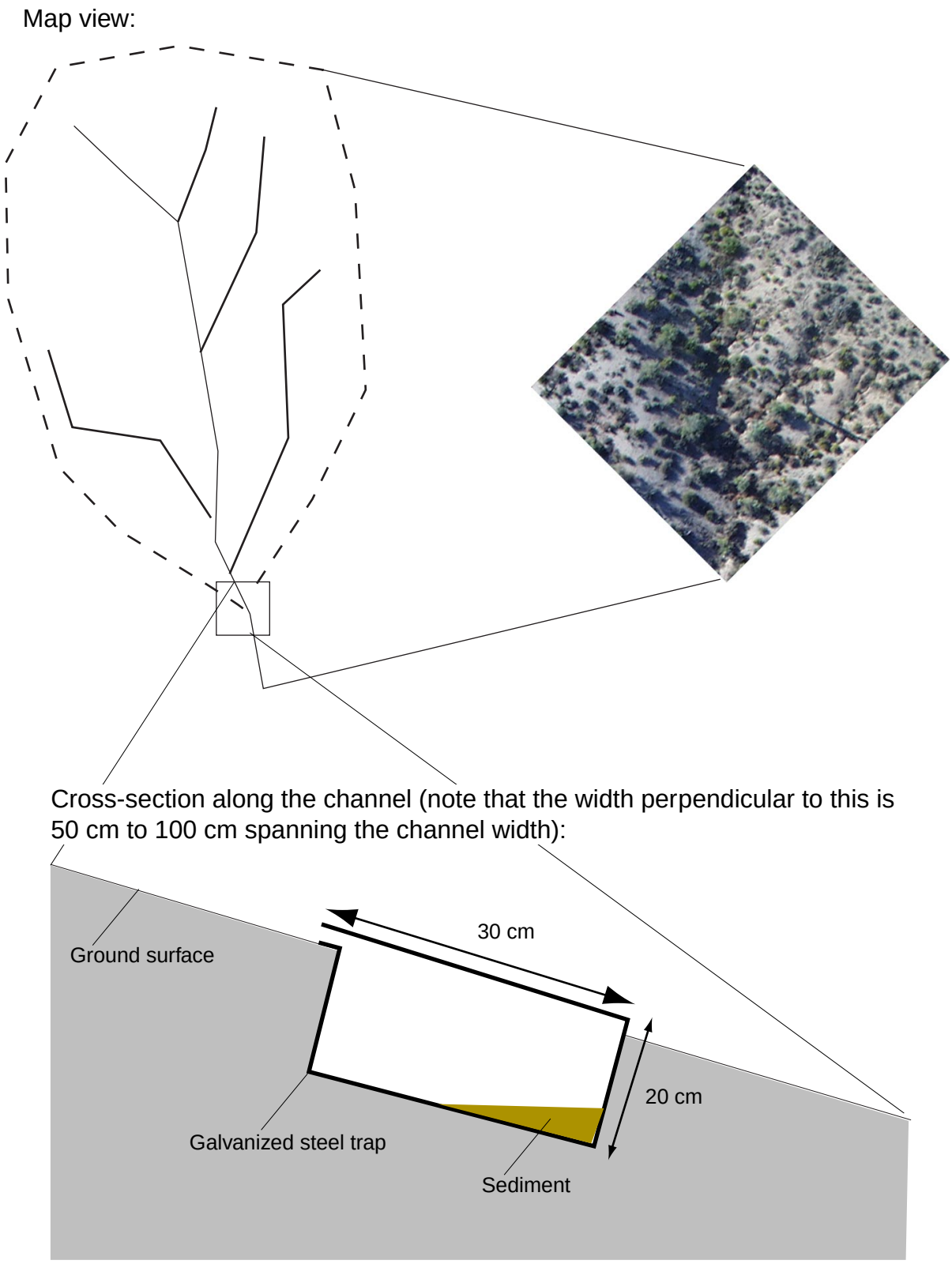

Figure 3: Sediment trap design. We will install these small traps in channels with small drainage basins above to measure the amount of sediment delivered from the burnt and unburnt portions of the landscape.