



Valles Caldera National Preserve

Research Program: SAHRA Hydrological Model Study

Stewardship Action Register

Stewardship Action: SAHRA Hydrological Model Study	File Number: PLAN –
Target Start Date: 21 October, 2004	Responsible Official: Preserve Scientist
Target Completion Date: December, 2014	Signature Date: 23 September, 2004
Actual Start Date:	Actual Date of Completion

This Stewardship Action Register is for a sub-project within the VCT “Research Programs on the VCNP” Stewardship Action Register approved by the Board of Trustees in the 2004 Annual Operating Plan.

Introduction

The Valles Caldera Trust (VCT) is proposing to collaborate with the University of Arizona’s Science and Technology Center Program on *Sustainability of semi-arid Hydrology and Riparian Areas (SAHRA)* for the purpose of developing a hydrological model of the VCNP. In view of the critical importance of water in controlling the condition and health of the VCNP ecosystems (forests, grasslands and streams), the VCT’s management programs would benefit from a predictive model of water dynamics on the VCNP. The model would incorporate real-time data from VCT meteorological stations located across the Preserve, and provide predictive insights to the fate of water entering the Preserve as rainfall and snowfall. The potential pathways of the water model would include runoff, infiltration of water into the soil, evaporation, sublimation of snowpack, water uptake and transpiration by plants, and long-term recharge/storage of groundwater. The model also would provide Preserve-specific predictions of springtime snow-melt, discharge amounts and flow rates down the streams leaving the Preserve (i.e., a major portion of the Jemez River watershed). These data, in turn, can then be used in near-term forecasting estimates of ecosystem productivity (e.g., for livestock, elk and other wildlife), erosion potentials, and fire risk assessments.

Proposed Action:

The scientific team will develop the hydrological model using VCNP data on the water cycle. This project will require a comprehensive series of measurements across the VCNP of hydrological variables; included in the instrumentation for these measurements are two instrument “towers” constructed in representative common forest types of the VCNP (Ponderosa pine forest and mixed-conifer spruce-fir forest). These “towers” will support a vertical array of instruments for measuring evapo-transpiration in each forest type. The “towers” themselves will be approximately 1 meter (3 ft) in triangular cross-section approximately 25 meters (80 ft) high; the towers will extend approximately 2

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meters (6 ft) higher than the forest canopy, painted to blend in with the treetops, and located out of sight from frequently traveled roads. Other instruments will be located at ground level, and will measure soil moisture and temperature. Additional instruments will be located in or near streams to measure water quality and quantity of in-stream flows.

Location:

- The two towers will be located in the Redondo Canyon area, with one tower in Ponderosa pine forest in the lower canyon region and a second tower in mixed-conifer forest at the top of the canyon.

Purpose and Need:

- Provide the scientific basis for understanding the water cycle on the VCNP.
- Permit the development and application of hydrological models to assist with management of the Preserve's resources and programs.
- Provide education and interpretation to the public on hydrological, ecological, and climatological dynamics of the Preserve's ecosystems.

Performance Requirements:

Cultural Resources

1. The tower sites have been inspected by the VCT Archaeologist, and have been approved for this project.
2. Access for public vehicles will be prohibited; only workers associated with the project will be allowed access to the site.
3. All vehicles will be restricted to existing roads.
4. No permanent facilities will be constructed in support of these activities, and the towers and instrumentation will be removed when the project is completed.

Soil/Water Quality

1. The area to be disturbed in tower construction will be limited to the tower footings and immediate surroundings, and is estimated to be no larger than approximately 5-7 meters square (15-25 ft square).
2. Disturbed areas in the construction sites will be reclaimed to original grade, and forest litter layers will be replaced to prevent erosion.
3. The sites are not near any surface waters, and being located on flat terrain with little run-off potential, they will not impact any surface water quality parameters.
4. Vehicle access to the work site will be restricted to authorized personnel, and will remain on existing roads. No road construction or off-road travel is required for this project.

Vegetation

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1. Forest floor vegetation is minimal at the tower sites, as the ground is covered with tree litter (pine/spruce/fir needles, branches); as such, impacts to herbaceous vegetation will be minimal.
2. The towers will be raised amidst the existing forest, and no trees will be damaged or removed for this project.

Wildlife

1. Tower construction activities will be restricted to daylight hours, allowing wildlife undisturbed access to the work site at night.
2. No protected species are known to reside or frequent the work area.

Invasive Plants

1. Non-native weed occurrence as a result of the program will be monitored, recorded and eradicated if present.

Site Monitoring, Cleanup and Inspection

1. The study site will be inspected and photographed by VCT personnel prior to the activity to document environmental conditions. During and after site cleanup, inspection by VCT personnel will be conducted to ensure all requisite cleanup activities are completed. The study site will be monitored and photographed to document any project impacts and recovery.

Conflicts between Activities

1. Any visitors to the area will be informed that the VCT encourages the advancement of science and education, and that this project is consistent with those goals.
2. Initial tower and instrument installation, as well as subsequent field sampling, will be conducted during time periods when no elk hunts are planned.
3. The study sites are sufficiently far from publicly traveled roads that people participating in recreation activities (hiking, van tours, etc.) will not see the towers or other instrumentation.

Public Health and Safety

1. Contractors, scientists and employees will attend employee safety and orientation.
2. Any visitors will be provided with safety information.
3. The VCT's policy regarding hazard analysis and mitigation for all activities will be reviewed and adhered to.
4. Leave No Trace ethics are encouraged; littering is prohibited.
5. No pets are allowed on the Preserve with the exception of assistance animals.
6. For this activity, a radio will be provided to site workers.

Laws and Policy

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1. This program has been prepared in compliance with the NEPA (National Environmental Policy Act) procedures adopted by the Valles Caldera Trust (Federal Register/Volume 68, No. 137/July 17th 2003).
2. A Biological Evaluation producing a finding of “No Effect” on threatened and endangered species or migratory birds was prepared for this stewardship action.

Prepared by: Dr. Robert R. Parmenter, Preserve Scientist
September 24, 2004

Implementing Decision

It is my decision to implement the proposed Stewardship Action, with all performance requirements as described, without the preparation of an environmental document. This decision is categorically excluded from such documentation under category 101.6 (9) *“Inventories, research activities and studies, such as resource inventories and routine data collection when such actions are clearly limited in context and intensity.”*

An environmental analysis was conducted by resource specialists in the employ of the Trust to ensure that no extraordinary circumstances are present and are likely to create an outcome of greater significance due to their presence. Extraordinary circumstances include but are not limited to a high level of public interest; extreme weather or climatic conditions; or the potential for effects on critical resources such as cultural resources or threatened or endangered species.

Dennis Trujillo Preserve Manager	Date
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Agencies and Persons Consulted

- Valles Calder Board of Trustees
- Valles Caldera Trust staff.
- Scientists with University of Arizona, NM Tech, University of Colorado, University of California, University of New Mexico, and the National Science Foundation.

Monitored Outcomes

Objectives	Metrics
Provide for public safety	No accidents, injuries, or illnesses to employees, contractors or visitors to the Preserve.
Increase knowledge and appreciation for	Provide a consistent message to all visitors.

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the Preserve and the Trust.	
Acquire new scientific data	Science data sets, publications, and educational opportunities for the public.

If you would like to comment on this proposed stewardship action you may do so by (1) selecting the feedback option from our web site (<http://www.vallescaldera.gov>); (2) by telephoning the VCT staff (505-661-3333); or (3) submitting written comments by mail. Written correspondence should be addressed to the Valles Caldera Trust, 2201 Trinity Drive, Suite C, Los Alamos, NM 87544. Your thoughts regarding any of our stewardship actions are welcome at any time.