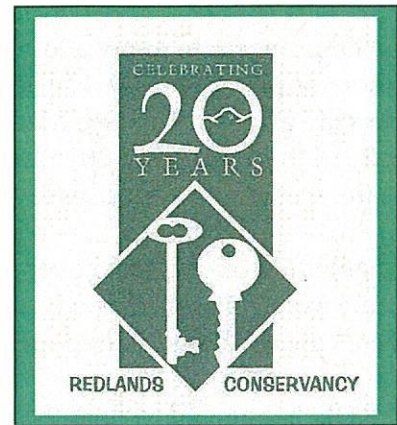


Redlands Conservancy ~

PO Box 855, Redlands, CA 92373; (909) 389-7810

www.redlandsconservancy.org; www.facebook.com/redlandsconservancy

2014: *THE Voice for Redlands' Heritage since 1994*



April 2, 2015

To: The City of Redlands,

From: Redlands Conservancy

Re: Purple Needle Grass Restoration Experiment: Native Vegetation restoration research project at San Timoteo Nature Sanctuary

To Whom It May Concern,

Redlands Conservancy is a non-profit land trust and preservation organization, located in and serving the City of Redlands and the immediate areas. The Conservancy manages the City of Redlands' properties in San Timoteo Canyon between Alessandro Road and San Timoteo Canyon Road with the charge, among others, to restore, preserve and protect the site's native vegetation, much of which has been seriously degraded by grazing, dry-land farming, and the introduction of invasive plant species, particularly invasive annual grasses. The most degraded sites are on the grasslands and hillsides.

To meet this charge, the Conservancy works with the Inland Empire Resource Conservation District to arrange and conduct restoration activities.

In September 2014, Christopher McDonald PhD, Natural Resources Advisor with University of California Cooperative Extension, contacted the IERCD and Redlands Conservancy and proposed a Purple Needle Grass Restoration Experiment for the San Timoteo properties in an effort to determine best practices for restoring native vegetation. Such results will benefit the Conservancy's efforts to restore, preserve and protect the native vegetation by informing us about the efficacy of the proposed strategy and likely costs.

According to McDonald, Purple needle grass (*Stipa Pulchra*) is a native perennial bunchgrass that was an abundant constituent in grassland communities in Southern California. Its current population is significantly reduced from historical times. Previous research demonstrates chemical control methods provide consistent weed control while allowing purple needlegrass to thrive. These methods need to be tested on a large scale (~4 ac.) to examine: (1) which non-target species are affected, (2) whether these non-target species will thrive once treatments are complete and weeds are reduced, (3) if large scale applications can provide sufficient weed control, and (4) to measure the costs of large scale applications.

Perennial bunchgrasses are an important component of many landscapes across California and can be found across the state in a variety of habitats. Land managers across Southern California are interested in restoring degraded native grasslands. Previously used chemical methods for native grassland restoration have been tested on small scales in relatively few locations. To determine the efficacy of chemical methods on a variety of plant species across Southern California, McDonald will investigate the use of a combination of two herbicides to provide selective control of invasive annual grasses and forbs while previous research indicates perennial grasses tolerate these herbicides.

The complete description of this experiment is attached as Exhibit A.

McDonald proposes to apply a low rate of glyphosate (trade name Roundup Pro® Concentrate) and a high rate of aminopyralid (trade name Milestone®) to an area with the presence of *S. pulchra* with adjacent untreated plots serving as controls. (See Methods in Exhibit A for complete description.) Treatments will be applied in winter 2014 to early spring 2015, with follow-up treatments in spring 2016 and potentially in spring 2017 to reduce the seed bank of weedy exotics.

McDonald will collect plant cover data randomly throughout the treated and control plots. He intends to determine exact location of study site in consultation with IERCD and Redlands Conservancy staff to keep treatments away from sensitive sites and away from high visitation areas.

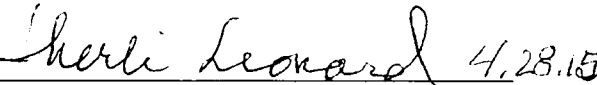
The IERCD has agreed to fund the entire project which will have no fiscal impact on the City of Redlands.

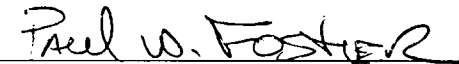
The Conservancy is asking for your permission for McDonald to enter the City's property for the sole purpose of conducting this experiment (Work). By signing this Letter of Agreement, you will be agreeing to the terms for a right of entry and granting McDonald permission to enter the Property and perform the Work. Except as to the sole negligence, or willful misconduct of the Landowner, the Conservancy shall defend, indemnify and hold the Landowner harmless from any and all loss, damage, claim for damage, liability, expense or cost, including attorney fees, which arise out of or is in any way connected with the performance of Work under this right of entry letter by the Conservancy or any of the Conservancy's employees, agents, volunteers, or subcontractors. This indemnification provision shall apply to any acts or omissions, willful misconduct or negligent conduct, whether active or passive, on the part of the Conservancy's employees, volunteers, subcontractors or agents.

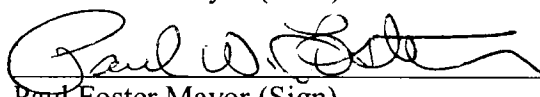
A separate permit or written permission to operate a motor vehicle in conjunction with this project must be approved by the City Manager. Attached is a signed hold harmless agreement from McDonald.

Please indicate your consent by signing and dating both copies enclosed and returning to the Conservancy in the envelope provided. We have enclosed a separate signed copy of this letter of agreement for your records. If you have any questions, please contact Sherli Leonard, Executive Director, Redlands Conservancy at (909) 389-7810.

Your cooperation in signing and returning this Letter Agreement is greatly appreciated. Thank you.


Sherli Leonard, Executive Director DATE


Paul Foster Mayor (Print)

 4/13/2015
Paul Foster Mayor (Sign) /DATE

ATTEST:

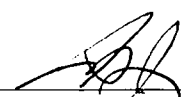

Sam Irwin, City Clerk

EXHIBIT A

Christopher McDonald PhD
University of California
Cooperative Extension
Natural Resources Advisor
909-387-2242
cjmcDonald@ucanr.edu

Purple Needle Grass (*Stipa pulchra*) Restoration Experiment

Summary: Purple needlegrass (*Stipa pulchra*) is a native perennial bunchgrass that was an abundant constituent in grassland communities in Southern California. Its current population is significantly reduced from historical times. Previous research demonstrates chemical control methods provide consistent weed control while allowing purple needlegrass to thrive. These methods need to be tested on a large scale (~4 ac.) to examine: (1) which non-target species are affected, (2) whether these non-target species will thrive once treatments are complete and weeds are reduced, (3) if large scale applications can provide sufficient weed control, and (4) to measure the costs of large scale applications.

Introduction:

Perennial bunchgrasses are an important component of many landscapes across California and can be found across the state in a variety of habitats. Land managers across Southern California are interested in restoring degraded native grasslands. Purple needlegrass (*Stipa pulchra*, formerly *Nassella pulchra*) is a native perennial bunchgrass and has been significantly reduced from its historic abundance due to high intensity livestock grazing and the introduction of invasive plant species, particularly invasive annual grasses. While scientists have developed several chemical methods for native grassland restoration these methods have been tested on small scales in relatively few locations. Other methods like livestock grazing, or prescribed fire have had mixed results, do not provide long lasting benefits, are difficult to implement, and often post-treatment chemical applications significantly improve effectiveness. To determine the efficacy of chemical methods on a variety of plant species across Southern California I will investigate the use of a combination of two herbicides to provide selective control of invasive annual grasses and forbs while previous research indicates perennial grasses tolerate these herbicides.

My previous research and other studies have found chemical methods provide excellent weed control, and after repeated annual applications native perennial grasses can increase in abundance. In just one year of treatment, a greater than 95% reduction in weed populations has been observed, while purple needle grass populations did not significantly differ from pre-treatment levels and produced seed at the end of the season. The herbicide treatment combines a low rate of glyphosate (0.8 qt/ac rate, trade name Roundup Pro® Concentrate) and a high rate of aminopyralid (7 ozs./ac., trade name Milestone®), the latter also exhibits post-emergent control of annual grasses, which should reduce re-treatment costs. According to the herbicide labels these herbicides have a low toxicity profile (Signal word: Caution), can be grazed by (non-organic certified) livestock, and have a short restricted entry interval (re-entry allowed when spray has dried). In addition, this combination will allow for tolerance of perennial grasses, while selecting annual grasses and forbs for treatment. Because of the short access restrictions, selectivity, and reduced toxicity other land managers could use these herbicides in a variety of settings to restore native grasslands.

While previous studies have focused on the efficacy of treatments on small plots, large plots are needed to evaluate these results at a scale appropriate to land managers and to the species that use those landscapes. Large

plots are also useful for determining a more accurate cost of treating an area than small plots. In addition, large plots will enable the measurement of treatment longevity; weed seeds often invade small patches because there is a more pronounced edge effect. Large plots have a large interior space that is free of the adjacent weed pressure where re-invasion rates can be measured once treatments are complete.

Methods:

Application will be made to an area with the presence of *S. pulchra* with adjacent untreated plots serving as controls, this plot may be split into several plots. Application will be made using a specialized off-road utility vehicle (UTV, Kawasaki mule) designed to broadcast apply herbicides. Treatments will be applied in winter 2014 to early spring 2015 when most invasive annuals have germinated; exact timing will depend on adequate precipitation. Follow up treatments will be applied later in the spring to correct inconsistent control problems. Treatments will be applied again in Spring 2016 and potentially in Spring 2017 to reduce the seed bank of weedy exotics. Monitoring will occur before and after treatments each year until Spring 2018. Plot locations will be marked with temporary wooden stakes and can be removed when complete. Data collected can include plant cover and species richness, if species of importance or species that occur in low frequencies (i.e. geophytes) occur on the plots they can be monitored as needed.

Plant cover data will be collected randomly throughout the treated and control plots with transects and/or quadrats in early spring before treatments have been applied and in the end of the season. Biomass and/or basal diameter of 40 *Stipa pulchra* plants may be collected in treated and untreated areas.

Location: Exact location of study site on the preserve will be made in consultation with reserve staff to ensure treatments are located away from sensitive sties, and away from high visitation areas.

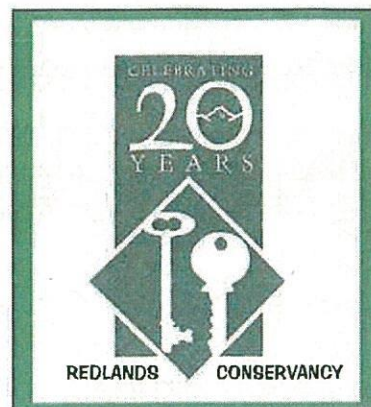
Extension: This study will be used to inform land managers across Southern California on the effectiveness of a large-scale grassland restoration treatment hat is low cost and has the potential to last for multiple years. A low cost and highly effective treatment that is both relatively safe and effective is desired among practitioners in the region. Data from this project can be used to develop a publication in the scientific literature. Outreach methods can include talks at scientific meetings, one-on-one meetings with land managers, newsletter articles, blog articles or demonstration meetings.

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RELEASE AND HOLD HARMLESS AGREEMENT FOR THE REDLANDS CONSERVANCY AND THE CITY OF REDLANDS For Research Work

The Regents of the University of California fully understand that the participation of its officers, employees, or agents in Work on any site owned by the City of Redlands and managed by the Redlands Conservancy exposes such officers, employees, or agents to the risk of personal injury, death or property damage. The Regents of the University hereby acknowledge that any participation in events on such sites by its officers, employees, or agents is voluntary, and expressly agrees to assume any such risks. Further, the Regents of the University of California hereby release and forever discharge the City of Redlands (Landowner), all officials, agents, and employees, and the Redlands Conservancy (easement holder/property manager/trail manager), all directors, officers, employees, agents and volunteers from any and all liability for any injury or death to its officers, employees, or agents, or damage to or loss of personal property arising out of or in connection with their participation in these events from whatever cause, including the active or passive negligence of the City of Redlands, the Redlands Conservancy, or the participants in this project.

In further consideration for being allowed to conduct the Work on City properties, the Regents of the University of California hereby agree to indemnify and hold harmless the Redlands Conservancy and the City of Redlands, their employees, agents and volunteers from any and all claims, including claims for Worker's Compensation benefits, damages, demands, actions or suits arising out of or in connection with my participation in these events brought by any third party, but only in proportion to and to the extent that such claims arise from the negligent or intentional acts of the Regents of the University, its officers, employees, or agents.

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA HAS CAREFULLY REVIEWED THIS RELEASE AND HOLD HARMLESS AGREEMENT AND FULLY UNDERSTANDS ITS CONTENTS. THE REGENTS OF THE UNIVERSITY OF CALIFORNIA IS AWARE THAT IT IS A FULL RELEASE OF ALL LIABILITY AND ITS AUTHORIZED REPRESENTATIVE SIGNS IT OF THEIR OWN FREE WILL.

Name of Research Party (print): THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

Research Party's Authorized Representative (signature): William E. Froust

Date: 3/19/15

Address of Research Party: UCCE San Bernardino, 777 East Rialto Ave., San Bernardino, CA 92415-0730

Contact information of Research Party: Dr. Chris McDonald, (909) 387-2242, cjmcDonald@ucanr.edu