

**Performance Report
For the Period (7/01/02) through (12/31/03)**

Agreement Number: JSA990018

Title: Inventory of Past Pinyon-Juniper Management Treatments on BLM Lands on the Colorado Plateau.

Recipient Organization: Merriam-Powell Center for Environmental Research, Northern Arizona University, P.O. Box 5765, Flagstaff, AZ 86011-5765

Recipient Principal Investigator/Project Manager: Neil S. Cobb

Date of this Report: January 7, 2004

Submitted by: Neil S. Cobb, Jill M. Rundall and Mead Z. Mier

A. Goals and Accomplishments

Project goals and objectives for this project period have been accomplished. There was a cost overrun of \$7221.94 in salary which was off set through travel, supplies and equipment funds. Existing MPCER equipment was used on the project. Our results to date are summarized in the following report "Documenting past Pinyon-juniper woodland treatments on the Colorado Plateau Bureau of Land Management lands" and detailed on the website http://www.mpcer.nau.edu/pj/blm_project_new/pji_main_tmpl.htm.

B. Work Schedule

There are no changes to the work schedule.

C. Budget Information

Total costs to date are \$58,680.21. These are detailed below.

EXPENSES 07/01/02 - 12/31/03						
	CSE 35FU			MPC35HS		
	Budget	Spent	Remaining	Budget	Spent	Remaining
SALARY	\$19,866.00	\$27,087.94	-\$7,221.94	\$41,853.00	\$16,221.17	\$25,631.83
ERE	\$4,711.00	\$3,898.22	\$812.78	\$12,978.00	\$1,113.66	\$11,864.34
TRAVEL	\$11,375.00	\$8,139.34	\$3,235.66	\$11,508.00	\$2,103.54	\$9,404.46
SUPPLIES	\$678.00	\$4.50	\$673.50	\$1,255.00	\$111.84	\$1,143.16
EQUIP	\$2,500.00		\$2,500.00	\$15,015.00		\$15,015.00
TOTALS	\$39,130.00	\$39,130.00	\$0.00	\$82,609.00	\$19,550.21	\$63,058.79

D. Planned Activity for Next Reporting Period

This Assistance Agreement required site visits by NAU to the BLM Field Offices on the Colorado Plateau where pinyon-juniper treatment information may be located in project files. One field office is remaining to visit, Albuquerque, New Mexico.

In addition to finishing the office visits and data collection for the treatment projects, funding is provided under this Task Order to complete the process of data integration and project data serving from a website to be hosted by NAU.

DOCUMENTING PAST PINYON-JUNIPER WOODLAND TREATMENTS ON THE
COLORADO PLATEAU
BUREAU OF LAND MANAGEMENT LANDS

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Introduction

Pinyon-Juniper (PJ) woodland is the 3rd largest vegetation type in the US. Covering 35.5% of the Colorado Plateau, it is the largest vegetation type administered by the Bureau of Land Management (BLM) on the Colorado Plateau. These woodlands have been increasing dramatically in density and extent over the last 100 years. In response to this increase and a concomitant loss of grasslands, the BLM has been actively removing pinyon and juniper and reseeding since the 1950's.

Recognizing the value of historical data as a reference for future land management decisions, in 2000, the BLM Colorado Plateau Managers Coalition adopted a regional Pinyon-Juniper Management Strategy document outlining the need for collecting and synthesizing current regional information. Our project addresses one key need by providing data needed to assess the effectiveness of past PJ removal and re-vegetation treatments across the entire Colorado Plateau.

Inventory: Process

In Phase I we compiled regional data from all Colorado Plateau BLM field offices. The study area (Figure 1) was defined by PJ distribution, topography and watershed boundaries. We are initiating Phase II, which includes database design for both non-spatial (Oracle) and spatial data (ArcGIS) with data access and analysis via the internet by 2005. The combined database will provide managers and researchers with the ability to perform online queries and data analyses and thus promote a greater understanding of the long-term efficacy of the treatments and their ecological implications.

We have collected and synthesized PJ treatment data from over 725 pinyon-juniper removal and re-vegetation treatments in 20 of the 22 field offices. Treatments included any mechanical, chemical, prescribed fire, wood cutting/hand thinning, or seeding applications in PJ woodlands. A large proportion of these treatments and BLM land are located in the northern part of the study area (Fig. 1). For the last fifty-seven years BLM has conducted PJ treatments encompassing 700,000 acres constituting 7% of all pinyon-juniper on BLM lands. The numbers of treatments applied within a field office varied from 2 to 124 and treatment sizes varied from 1 to 14,417 acres.

We identified over 100 database variables, including photos, maps and various ecological, geographic, political, and economic attributes, as well as the full suite of treatment applications (e.g. such as of vegetation removal and reseeding). The relational database management system (RDMS) design will provide non-spatial information in a client / server architecture using Oracle and SQL. These data will be used in combination with spatial data that is incorporated into an ArcGIS coverage. The combination of an Oracle RDMS, ArcGIS and our website

(http://www.mpcer.nau.edu/pj/blm_project_new/pji_main_tmpl.htm) will provide an integrated regional database to be accessed by anyone (Figure 2). The web site will include the interface with the Oracle and spatial databases allowing for online data queries that can be downloaded to the local desktop for spatial and statistical analysis.

We are using a variety of existing GIS coverages to obtain core data for the project. For example, digital orthophoto quadrangles (DOQ) and digital raster graphics (DRG) topographic maps depicting forested and non-forested areas are important sources of data for defining areas of PJ treatments (Figure 3A and 3B). Where available GIS photo point locations were collected, existing photos relating to treatments were obtained from range improvement project files providing key information for assessing long-term ecological change (Figure 4).

Inventory: Regional Patterns

During the last 57 years, multiple treatment methods have been applied across the Colorado Plateau BLM lands, with six major treatment methods represented: chaining, hydroaxe, rollerchop, prescribed burn, select hand thinning and chemical (Figure 5). We specifically looked at three trends in the treatments across the Colorado Plateau, the total area treated, the number of treatments and the average size of a treatment (Figs. 5A-5C). Based on both total area affected and number of treatments, there were two well-defined periods we refer to as the “Chaining Era” from 1950 to 1979, characterized by chaining and/or bull dozing, and a “Diversified Methods Era” from 1980 to the present where prescribed burning was the most common but the hydroaxe, rollerchop, select hand thinning, and chemical treatments were also applied. The number of treatments and the size of areas treated in the “Chaining Era” is much greater than that applied in the “Diversified Methods Era”, however, since 2000 both the numbers of treatments and size of treatments have increased dramatically. The average size of treatments did not change during the last 50 years, except for prescribed burning, where the average size of a treatment was four-fold greater than any of the other treatments.

We also examined the variation in treatment methods applied over time by each of the Field Offices (Figure 6A, 6B). Across Field Offices treatment methods varied greatly in acres covered and use. Recent trends in PJ treatment methods show that greater areas are being treated in N-NE area of the Colorado Plateau with a tendency towards rollerchopping and prescribed burning methods. The western Colorado Plateau shows more use of chemical treatments in recent years.

Conclusions

Increasing pressure to manage pinyon-juniper woodlands at the wilderness-urban interface by thinning and removal of the woodlands is a driving force in management decisions. To date over 700 treatments across ~700,000 acres of PJ woodland on BLM lands have been treated in the last fifty-seven years. Trends show larger areas of land are being impacted by a variety of methods such as prescribed fire and rollerchopping. It remains to be seen as to whether these treatments in pinyon-juniper woodlands will lead to the “restoration” of pinyon-juniper woodlands. The BLM Pinyon-Juniper Treatment Inventory will provide baseline information of past and present impacts on pinyon-juniper woodlands that can be integrated into a regional perspective of impacts and pressures on pinyon-juniper woodlands.

FIGURES:

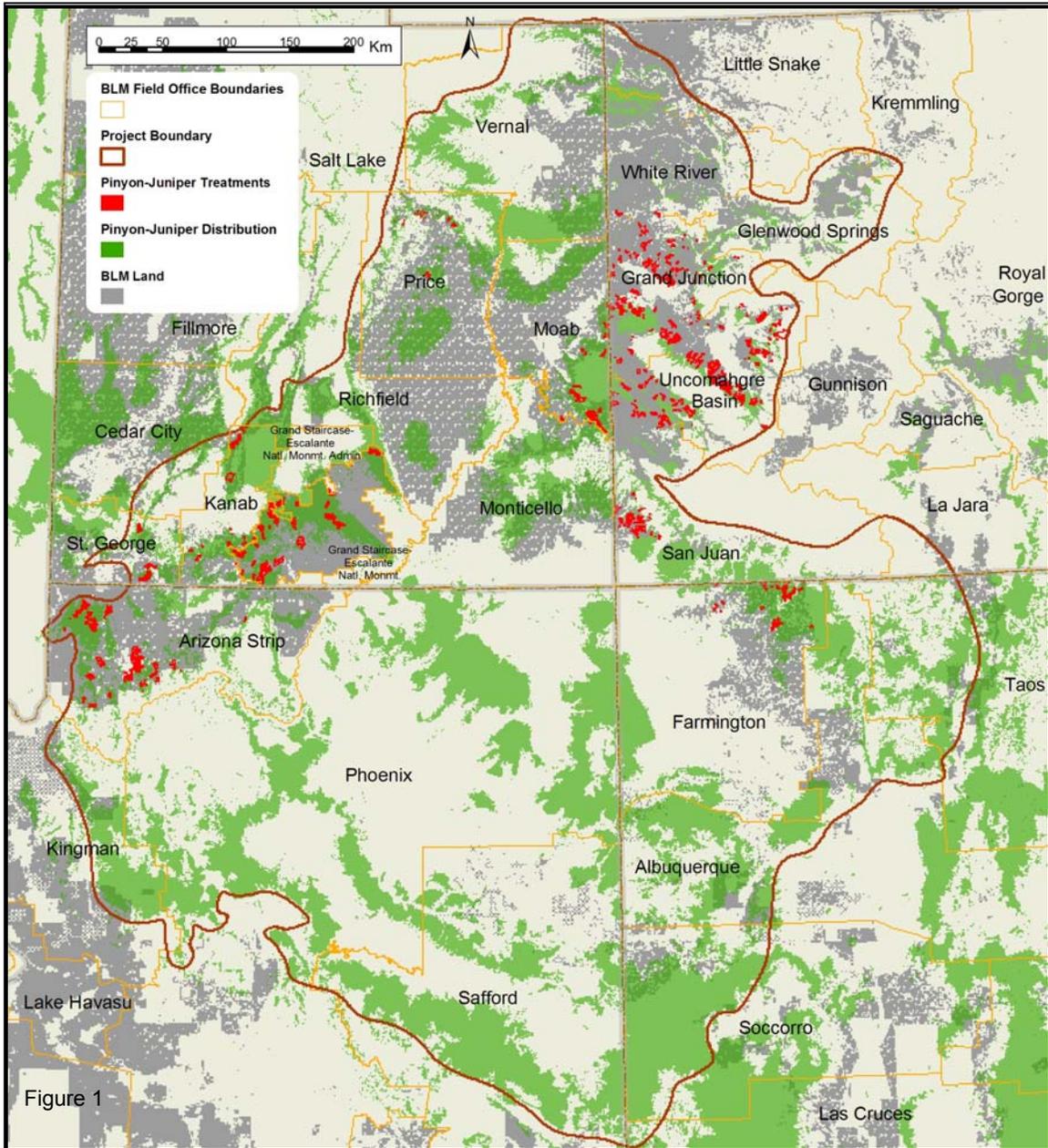
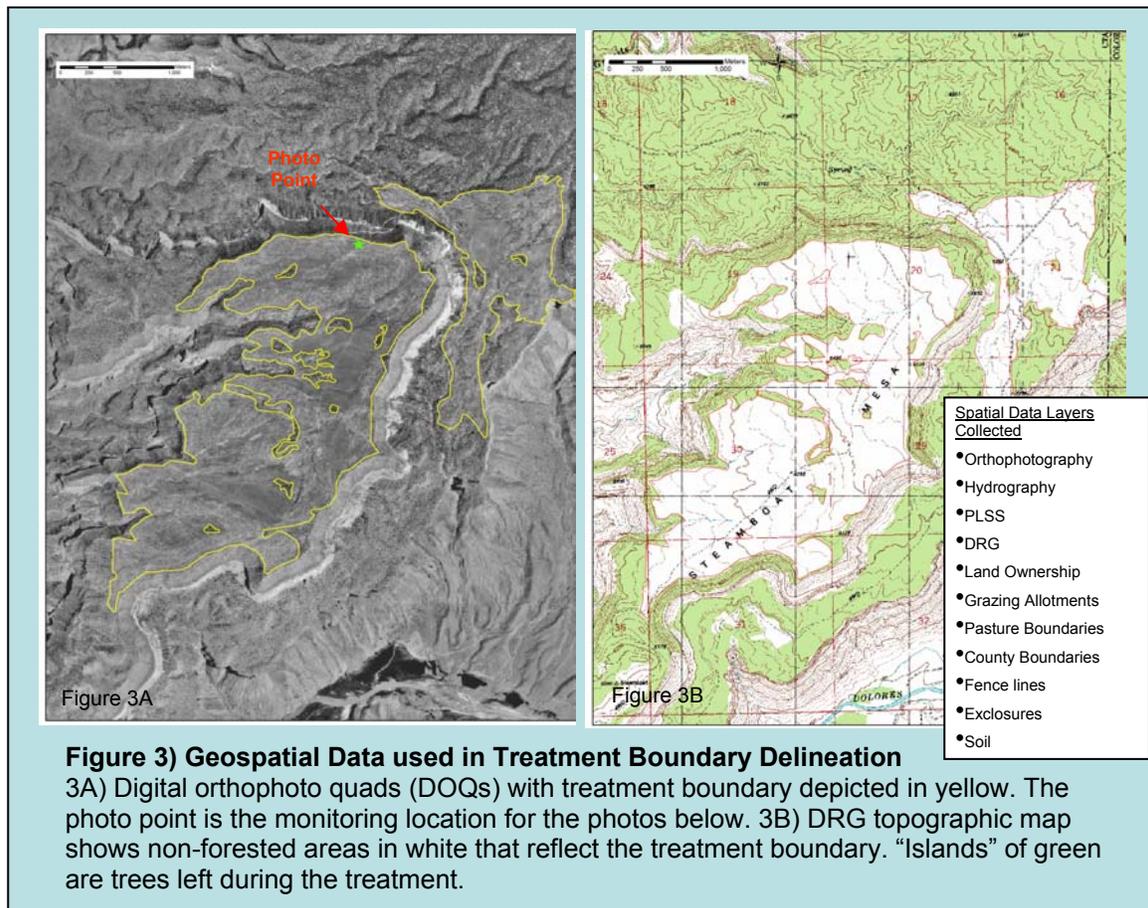
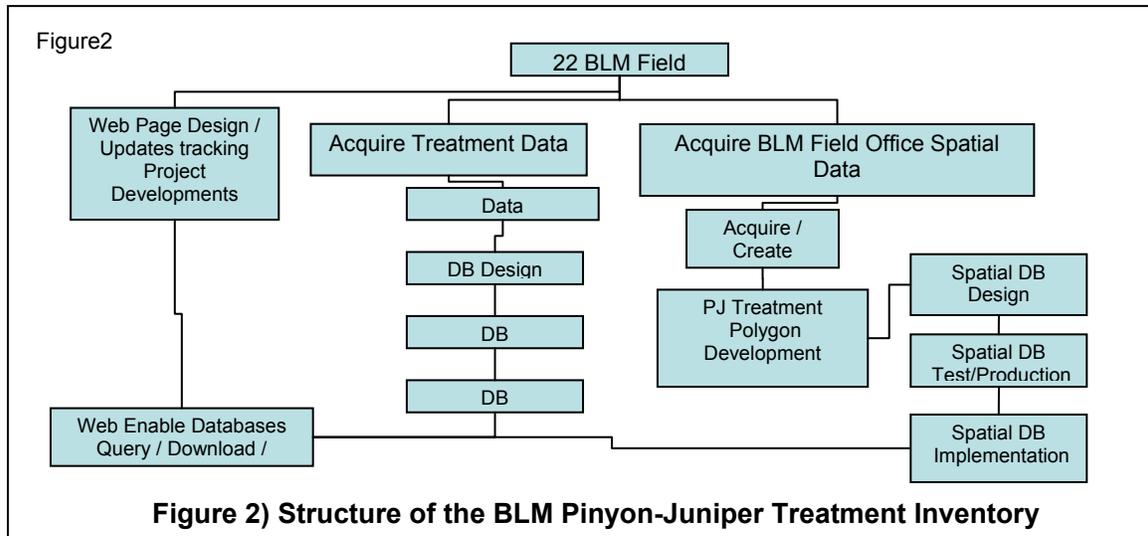


Figure 1) Pinyon-Juniper Treatment Inventory boundary with PJ Woodlands and Treatments in the northern study area.



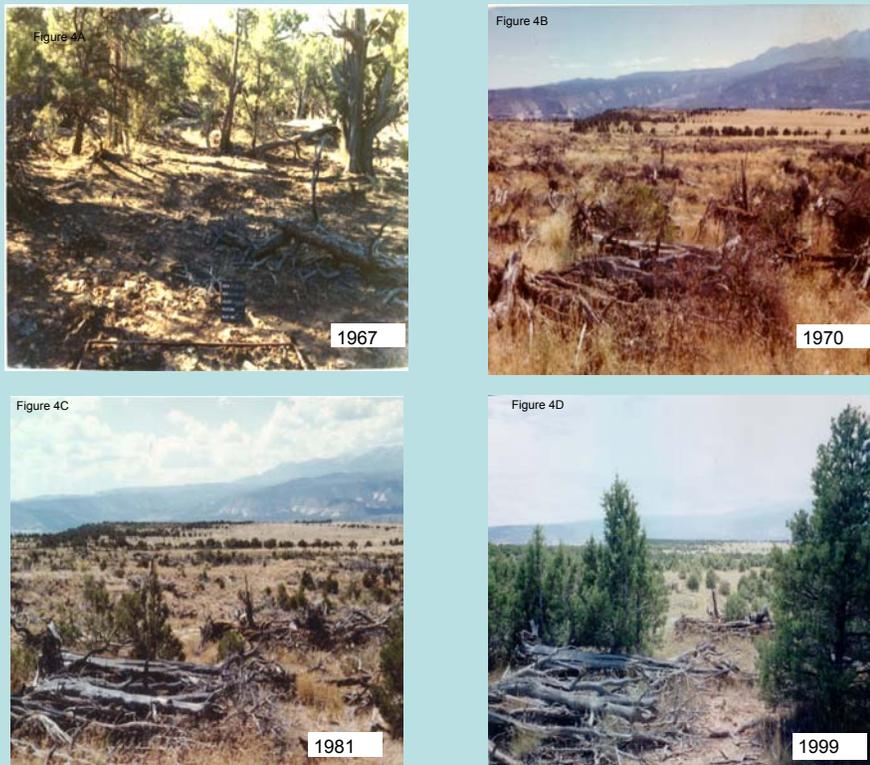


Figure 4) Before / After Photos

Repeat photography from 1967 to 1999 used in BLM monitoring and assessment programs. This treatment was chained in 1967, seeded with crested wheatgrass, sagebrush and shadscale, and then chained again. All photos were taken from the same permanent transect plot (arrow denotes reference point). Here a combination of surviving seedlings and recolonization of pinyon and juniper has produced an emerging PJ woodland within 32 years.

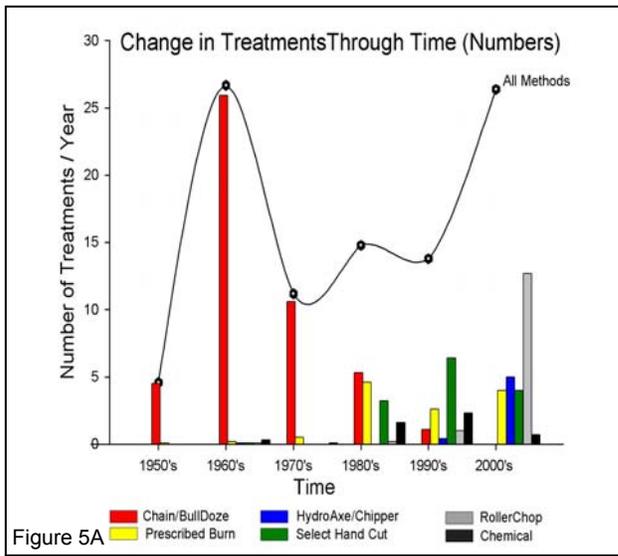


Figure 5A

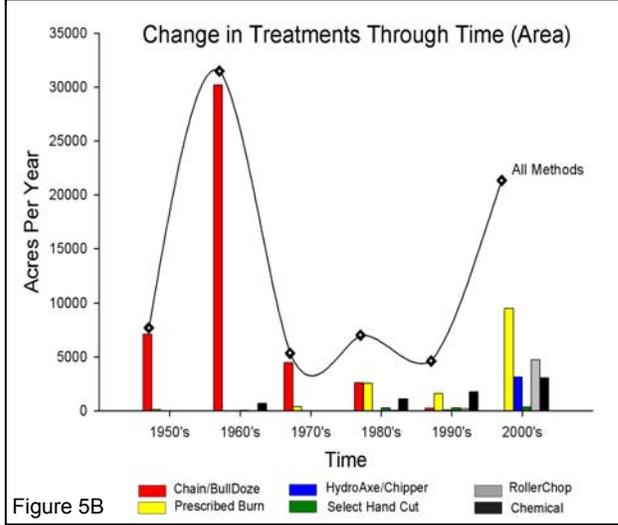


Figure 5B

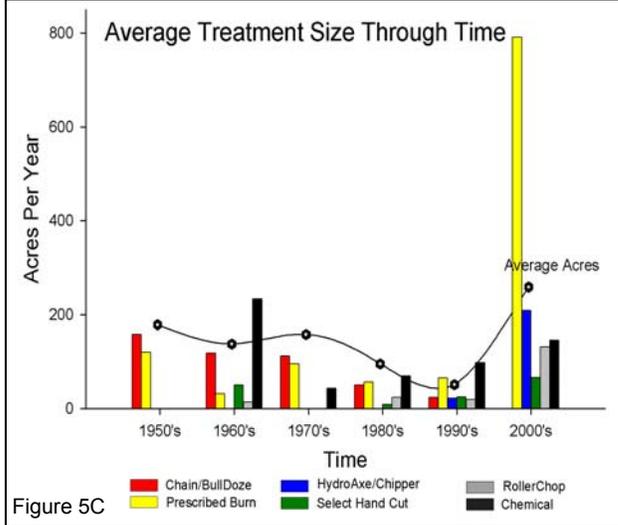


Figure 5C



HydroAxe



RollerChop



Chaining



Prescribed Burn

Figure 5) Treatment effort varied greatly over time, as measured in numbers of treatments (5a) and in the area treated (5b). Chaining dominated until the 1980's, then multiple methods became common, especially since 2000. Since 2000 there has been a sharp increase in total treated area (5b) and in the average size of treatments (5c) due to prescribed burning.

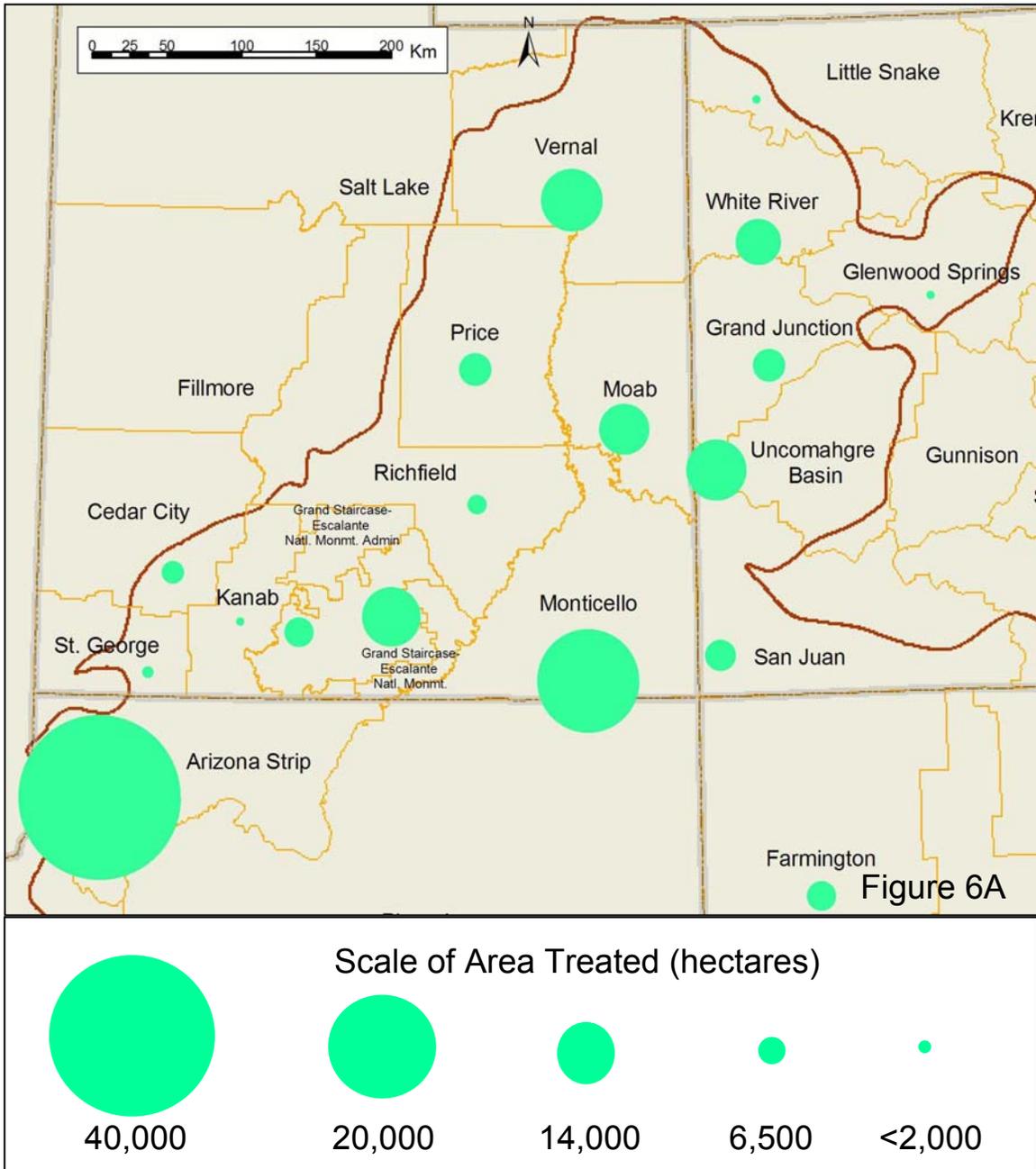


Figure 6A) The Early Years: Chain & Bull Doze Field Offices varied 100-fold in acres treated by chain and bull doze treatment methods during 1950-1979. The proportionate area treated in each field office is represented by the circle size.

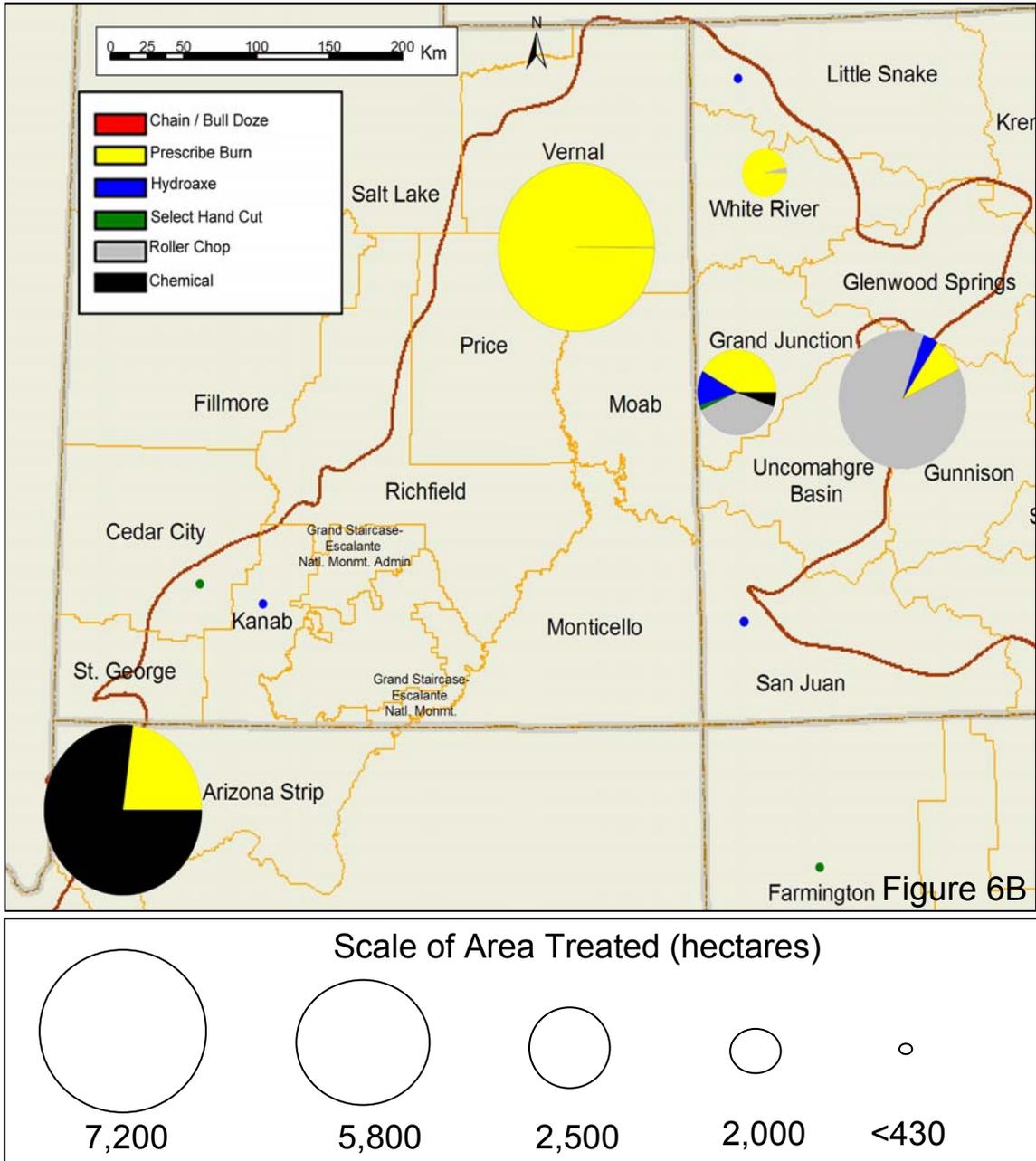


Figure 6B) Present Treatments (2000-2003): Choice of methods differs greatly across the Colorado Plateau with acres treated per field office varying 80 fold. Based on the amount of area treated, current methods are dominated by prescribed burning and rollerchops. The use of multiple methods is common.

Visit our website:

http://www.mpcer.nau.edu/pj/blm_project_new/pji_main_tmpl.htm

BLM PINYON-JUNIPER TREATMENT INVENTORY COLORADO PLATEAU

OVERVIEW

Colorado Plateau Project Boundary Map

LEGEND

Hydrologic Regions

- Great Basin
- Upper Colorado
- Lower Colorado
- Rio Grande
- Other

- BLM Field Offices
- Pinyon - Juniper Woodland
- Colorado Plateau Project Boundary

Pinyon-juniper woodlands comprise 39.3% of lands administered by the Bureau of Land Management (BLM) on the Colorado Plateau. The goal of this project is to provide relational and GIS databases of BLM pinyon-juniper woodland removal and revegetation practices on the Colorado Plateau benefiting regional land management planning efforts.

The project boundary depicted on the map in black was determined through the combination of the four major hydrologic regions, Great Basin, Upper Colorado, Lower Colorado and Rio Grande, and pinyon-juniper distribution.

This website best viewed with Internet Explorer 6.0 or later.

Acknowledgements

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