An Online Data Management System for Coordinated Buffelgrass Management in Southern AZ

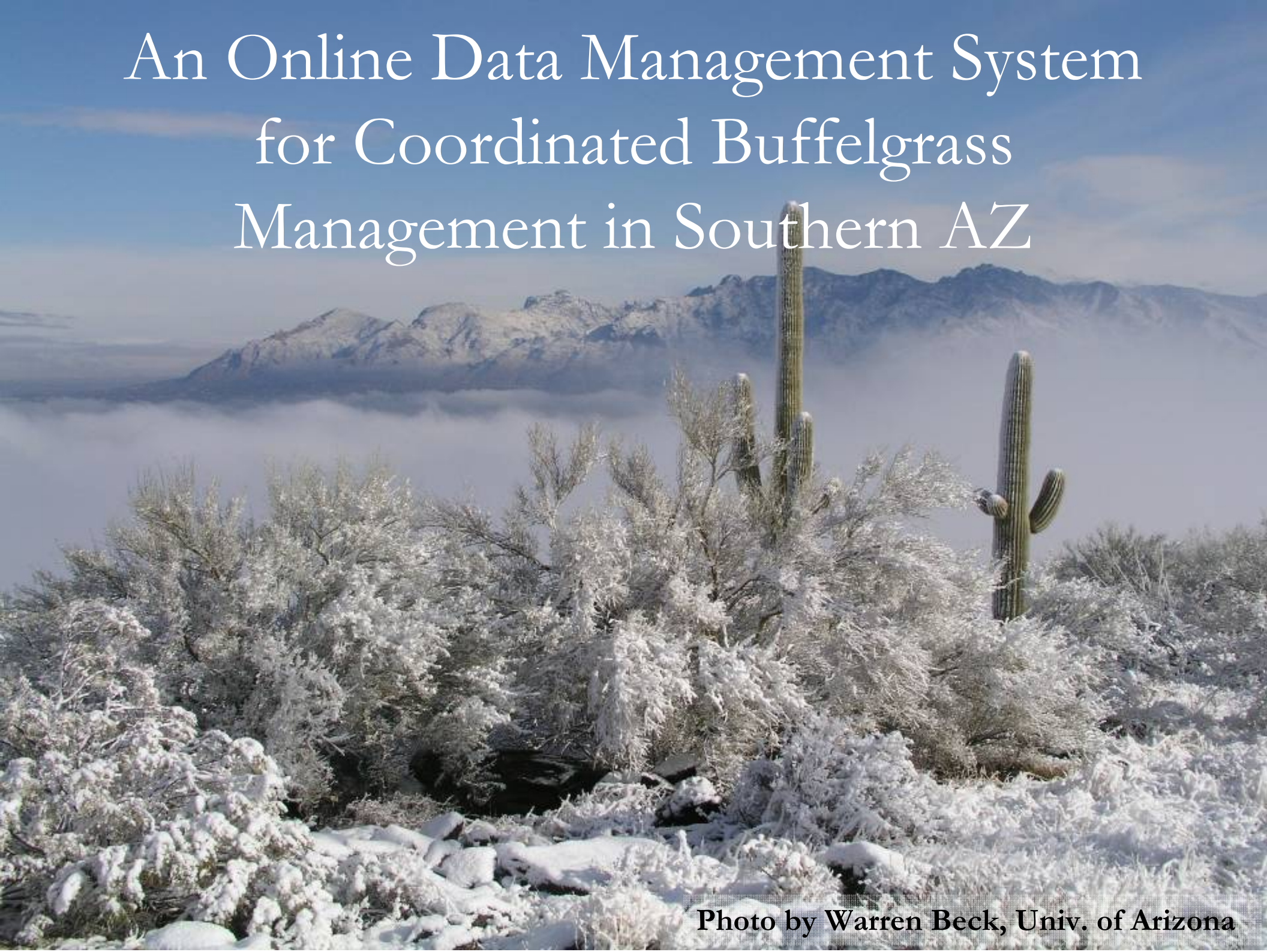


Photo by Warren Beck, Univ. of Arizona

Buffelgrass Attributes

- Perennial C4 bunchgrass from Africa/S. Asia
- Individuals can live 20 yrs
- Swollen stem bases allow it to store carbs & survive grazing, drought & fire
- Apomictic, seeds viable for up to 4 yrs
- Susceptible to cold
- Introduced throughout subtropics; escapes readily
- Fire temperatures >1400°F, >20′ flames

History of Buffelgrass Introduction

1930's	USDA-SCS reintroduces T-4464 from Kenya into South Texas, where it becomes "wonder grass"
1938	USDA-SCS plants it at Plant Materials Center in Tucson
1958	USDA & UA range scientists convince Mexican gov't to convert millions of acres in Sonora to "zacate bufel"
1970's	discovery of sexual clone jumpstarts aggressive breeding by USDA-ARS & Texas Ag. Res. Station at Texas A&M
1973-1974	Planted at Caterpillar Company's Proving Grounds
1979	Planted at USDA SCS Plant Materials Center in Tucson
1982-1986	Planted at USDA Santa Rita Exp. Range south of Tucson
1985-1995	USDA-ARS uses to reclaim abandoned farmland in S. AZ
2002-2005	USDA-ARS Crop Germplasm Unit & Texas A&M develop & release "Frio", now planted in Cananea, Sonora

Ecological Impacts

- Threats to not just TER plant and animal species, but also more dominant & iconic ones (saguaros)
- Compromises to protected lands & conservation
- Undetermined impacts to food webs, nutrient cycling, and the transport, supply & quality of water and sediment
- Food & fiber provisioning (Tohono O'odham, etc.)
- Carbon sequestration in shrubland vs grassland
- Pollination Services

Social & Economic Impacts

- Immediate threats to life & property in urban and exurban areas that now have to plan around a fast-evolving fire risk
- Economic costs including market-based costs
  - *decreased property values in infested & increasingly fire-prone areas*
  - *losses in tourism revenues with decaying ecological backdrop*
  - *escalating weed control and fire suppression budgets across all jurisdictions*

Completed Jan 2008

Southern Arizona Buffelgrass Strategic Plan

http://www.buffelgrass .org

A Regional Guide for Control, Mitigation and Restoration

- Minimize spread in areas where buffelgrass not yet established
- Implement control priorities based on actual & potential impacts
- Restore treated areas in ways that increase resilience against future invasion
- In areas where control is no longer feasible, mitigate fire risks to life & property
- Motivate legislation aimed at sustaining the control effort
- Create a template for invasive spp mgmt in AZ

NGO established Nov 2008

SOUTHERN ARIZONA

Buffelgrass

COORDINATION CENTER

- *Lindy Brigham,* Executive Director, SABCC
- *Sarah Smallhouse*, Pres., T. R. Brown Foundations
- *Jim Kiser*, VP, So. Arizona Leadership Council
- *Erik Bakken*, VP, Tucson Electric Power
- *Lisa Lovallo*, VP, Cox Communications-SoAz
- *Chuck Huckelberry*, Pima County Administrator
- *Claire Zucker*, Pima Association of Govt's
- *Tom Brandhuber*, Fire Chief, Pima Rural Metro
- *Chuck Hutchinson*, Dir., SNRE, University of Arizona
- *Marilyn Hanson*, Sonoran Desert Weedwackers
- *Rick Brusca*, Arizona-Sonora Desert Museum
- *Julio Betancourt*, U. S. Geological Survey
- *Darla Sidles,* Supt., Saguaro National Park
- *Jeanine Derby*, Sup., Coronado National Forest
- *Michael Taylor*, Deputy Director, BLM, AZ

Losing Ground: The War On Buffelgrass In The Sonoran Desert - April 10, 2010, Tucson

Panel 1

Bert Frost, Associate Director
Natural Resource Stewardship & Science
National Park Service

Faye Krueger, Deputy Regional Forester
Southwestern Region
U.S. Forest Service

Dr. Ned Norris, Chairman
Tohono O'odham Nation

Panel 2

Sarah Smallhouse
The Thomas R. Brown Foundations

Chuck Huckelberry
Pima County Administrator

Dr. Richard Mack
Washington State University

Dr. John Brock
Brock & Associates

Buffelgrass Planning & Mitigation on Federal Lands

- Design, implement and monitor/evaluate buffelgrass control treatments across
- 14 national parks, monuments, forests, wildlife refuges & military reservations in 5 federal agencies
- 2-yr project will be used to develop 10-yr mitigation plan and inform annual budgeting and appropriations process for five federal agencies
- Data Management and Decision Analysis Framework in place to execute project and develop 10-yr mitigation plan

Science and Management Priorities for Mitigating the Impacts of Buffelgrass Invasion and Novel Fire Regimes in the Sonoran Desert

First Annual Workshop, May 4-6, 2010 Tucson

Southern Arizona Buffelgrass Coordination Center

U.S. Department of the Interior Bureau of Land Management

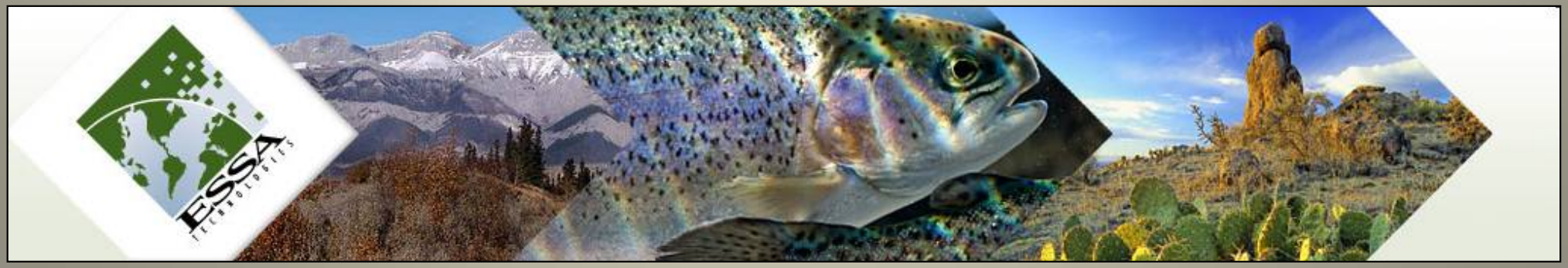
National Park Service

Forest Service U.S. Department of Agriculture

USGS science for a changing world

Fort Collins Science Center

Invasives Species Science Branch



Test Server (Ibis-test)

Welcome Lindy **Logout** | **My Profile** | December 4th 2010

Southern Arizona Buffelgrass Coordination Center

Data Portal

Logout

Home
Partners
Collect Data
Submit Data
View / Map Data
Download Data
Contact Us

My Profile
Logout

Welcome

Our Mission

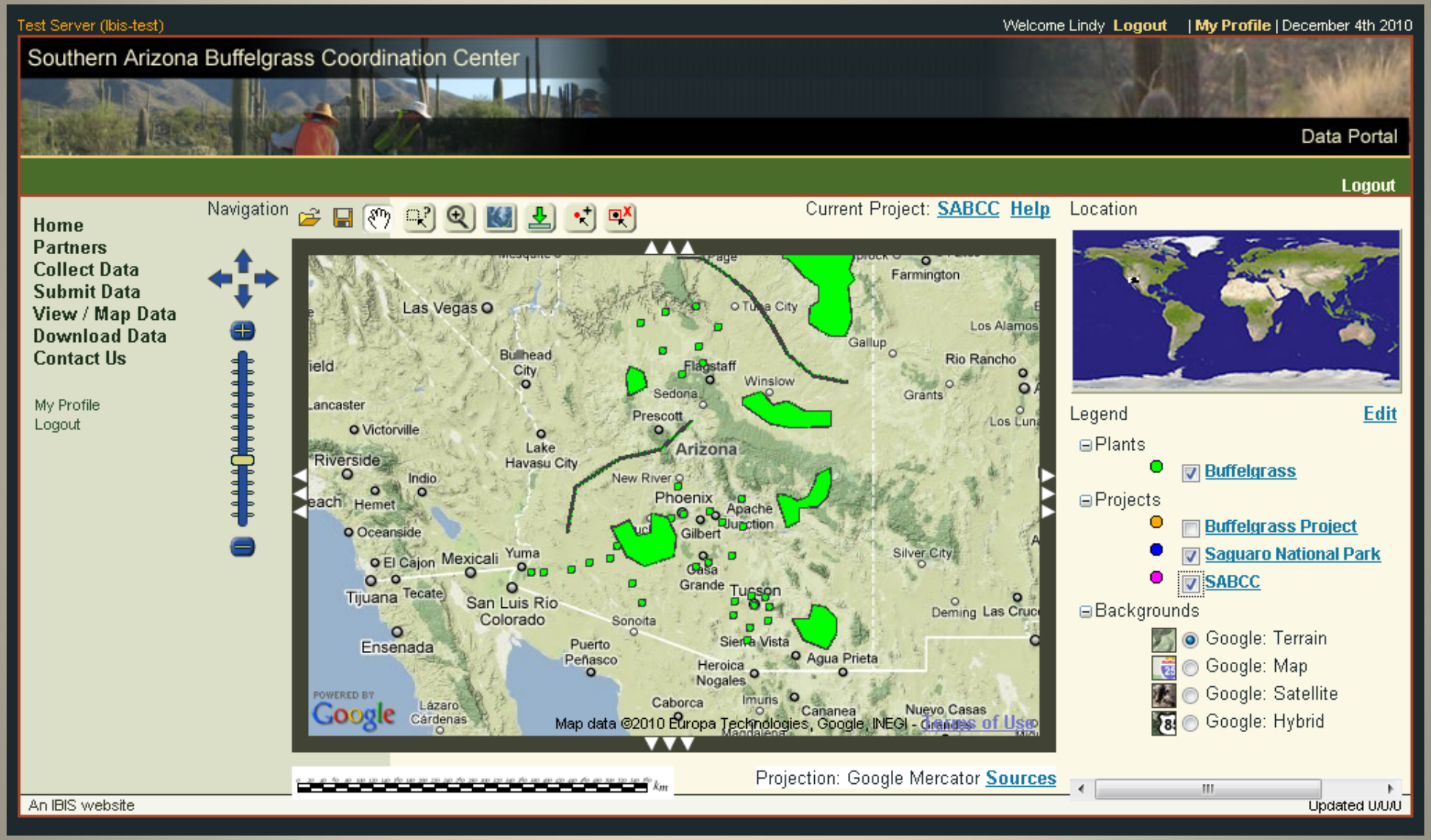
The **Southern Arizona Buffelgrass Coordination Center**'s mission is to coordinate Buffelgrass mapping, monitoring, control, and prioritization efforts across multiple concerned partner organizations throughout southern Arizona.

Why a Data Portal?

To help meet this goal, we created this data portal as a "one stop" place to go to submit, view, and download data. The data stored in the portal have been contributed by numerous organizations and the portal continues to grow and share these data with other data repositories through web services where appropriate. Data in the data portal are partitioned by "**projects**," one for each **partner organization**. The complete buffelgrass dataset integrates data across all partner organizations and can be downloaded at any time.

An IBIS website

Updated 0/0/0


Test Server (Ibis-test)
Welcome Lindy Logout | My Profile | December 4th 2010
Southern Arizona Buffelgrass Coordination Center
Data Portal
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Logout
Navigation
Current Project: SABCC Help
Location
Legend
Edit
Plants
Buffelgrass
Projects
Buffelgrass Project
Saguaro National Park
SABCC
Backgrounds
Google: Terrain
Google: Map
Google: Satellite
Google: Hybrid
Las Vegas
Farmington
Tuba City
Los Alamos
Gallup
Rio Rancho
Bullhead City
Flagstaff
Winslow
Sedona
Grants
Prescott
Victorville
Lake Havasu City
Arizona
Riverside
Indio
New River
Phoenix
Apache Junction
Hemet
Oceanside
Gilbert
Silver City
El Cajon
Mexicali
Yuma
Casa Grande
Tucson
Tijuana
Tecate
San Luis Río Colorado
Deming
Sonoita
Ensenada
Puerto Peñasco
Sierra Vista
Agua Prieta
Heroica Nogales
Caborca
Imuris
Cananea
Nuevo Casas Grandes
Lázaro Cárdenas
Map data ©2010 Europa Technologies, Google, INEGI - Terms of Use
Projection: Google Mercator Sources
An IBIS website
Updated 0/0/0

Key Data Fields

Species, Location, GIS information

Treatment information

- Has the mapped area been treated?
  - NT = No Treatment
  - M = Mechanical (pulling or mowing)
  - C = Chemical (herbicide)
- If Chemical:
  - Which herbicide?
  - % brown of plants (measure of mortality)
- Percent of area treated
- Cost information
  - Person hours
  - Amount of herbicide
- Lifestage of surviving plants
  - Seedling vs mature
  - Flowering vs nonflowering

Logout

- Home
- Partners
- Collect Data
- Submit Data
- View / Map Data
- Download Data
- Contact Us

My Profile
Logout

SABCC Data Entry Form

To Form List | To Project Information

Date of the observation

Date:	December	4th	2010
Recorder:	-- Select a Recorder --		
Authority:	-- Select an Authority --		
Search Time (minutes):			Minutes
Comments:			

Location information

Name:		Required
Datum:	NAD_83	Required
Longitude[1]:		Required
Latitude[2]:		Required
Accuracy[3] (meters):		Required

[1] X coordinate; data must be in decimal degrees and should contain at least 5 decimal places. (Example: -72.99999)
[2] Y coordinate; data must be in decimal degrees and should contain at least 5 decimal places. (Example: 41.99999)
[3] Approximate uncertainty of your GPS unit in meters. We only accept data below 50 meters in accuracy

Site Characteristics

Diameter of point	The recorded diameter of the area (e.g., buffelgrass point)		Meters

Organism Information

buffelgrass (Pennisetum ciliare) ()

Presence	--- Select ---	
Percent Cover		%

Treatment Information

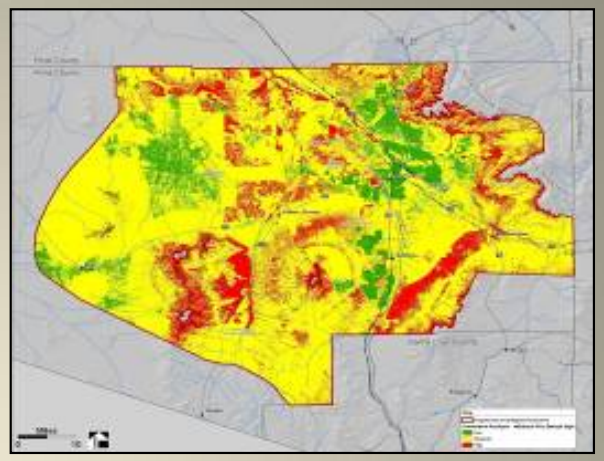
Rodeo (glyphosate)	active ingredient glyphosate	To control:	Not used

Vulnerability, Risk, & Priority Assessment Associated with Buffelgrass Invasion in the Tucson Basin

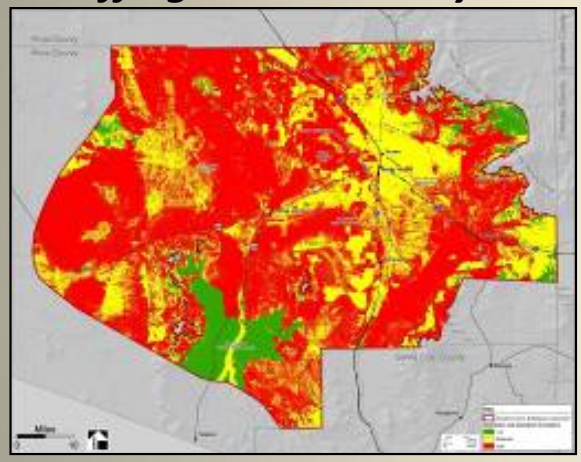
Vulnerability, Risk, & Priority Assessment Associated with Buffelgrass Invasion in the Tucson Basin

Landcover

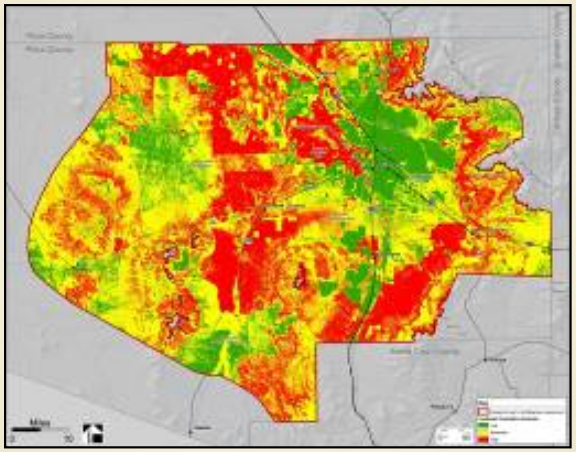
Ecological impacts



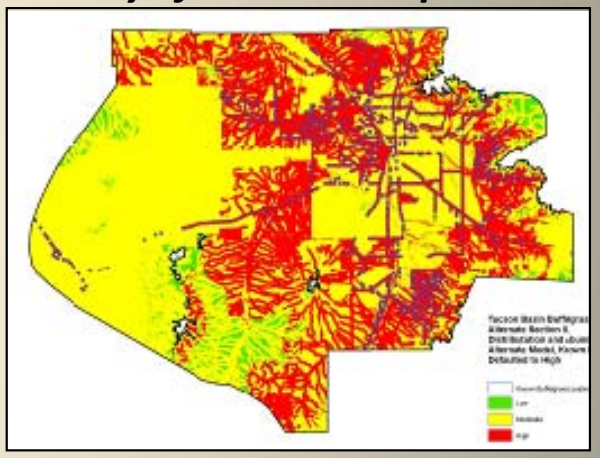
Buffelgrass Suitability



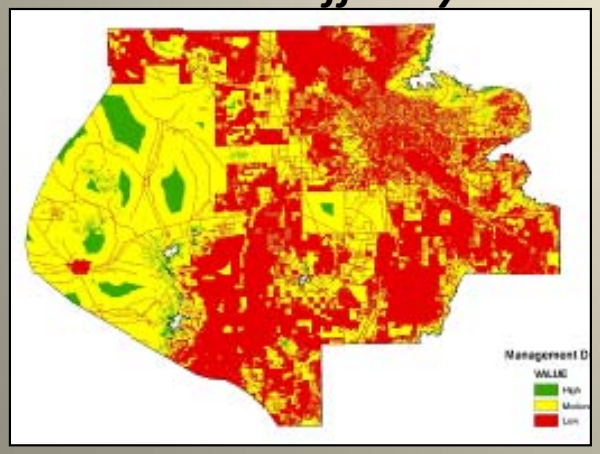
Cumulative Risk



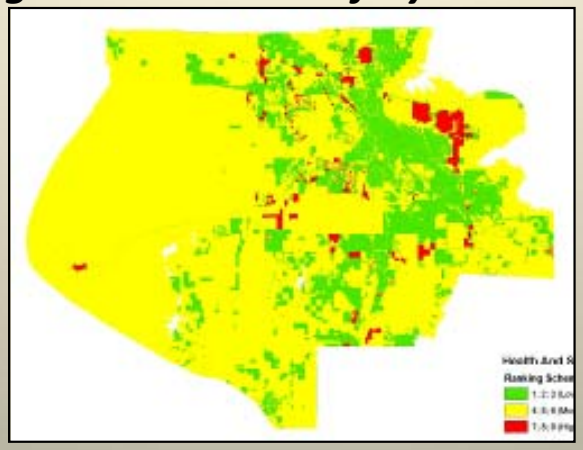
Pathways for Further Spread



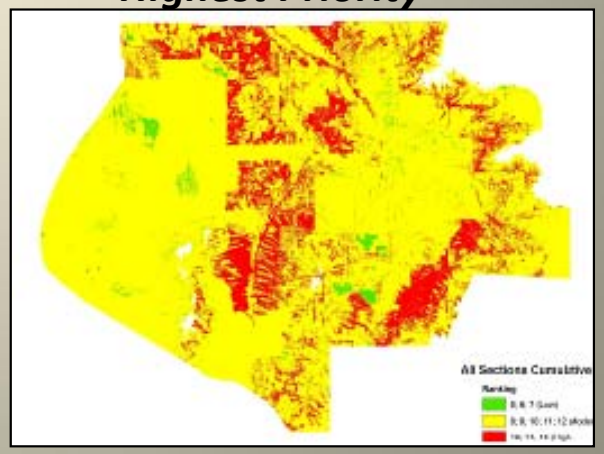
Treatment Difficulty



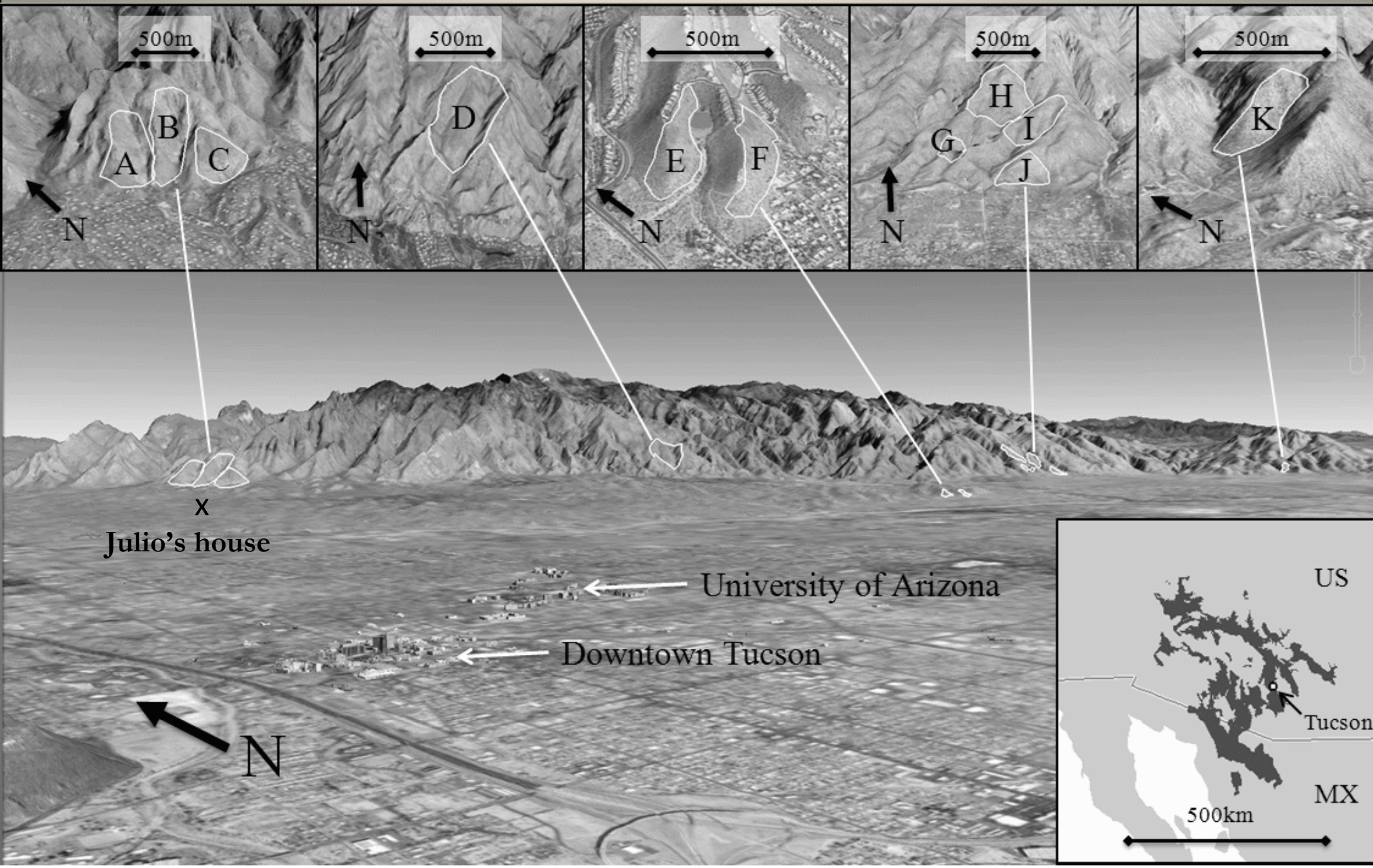
Highest Health & Safety Risk

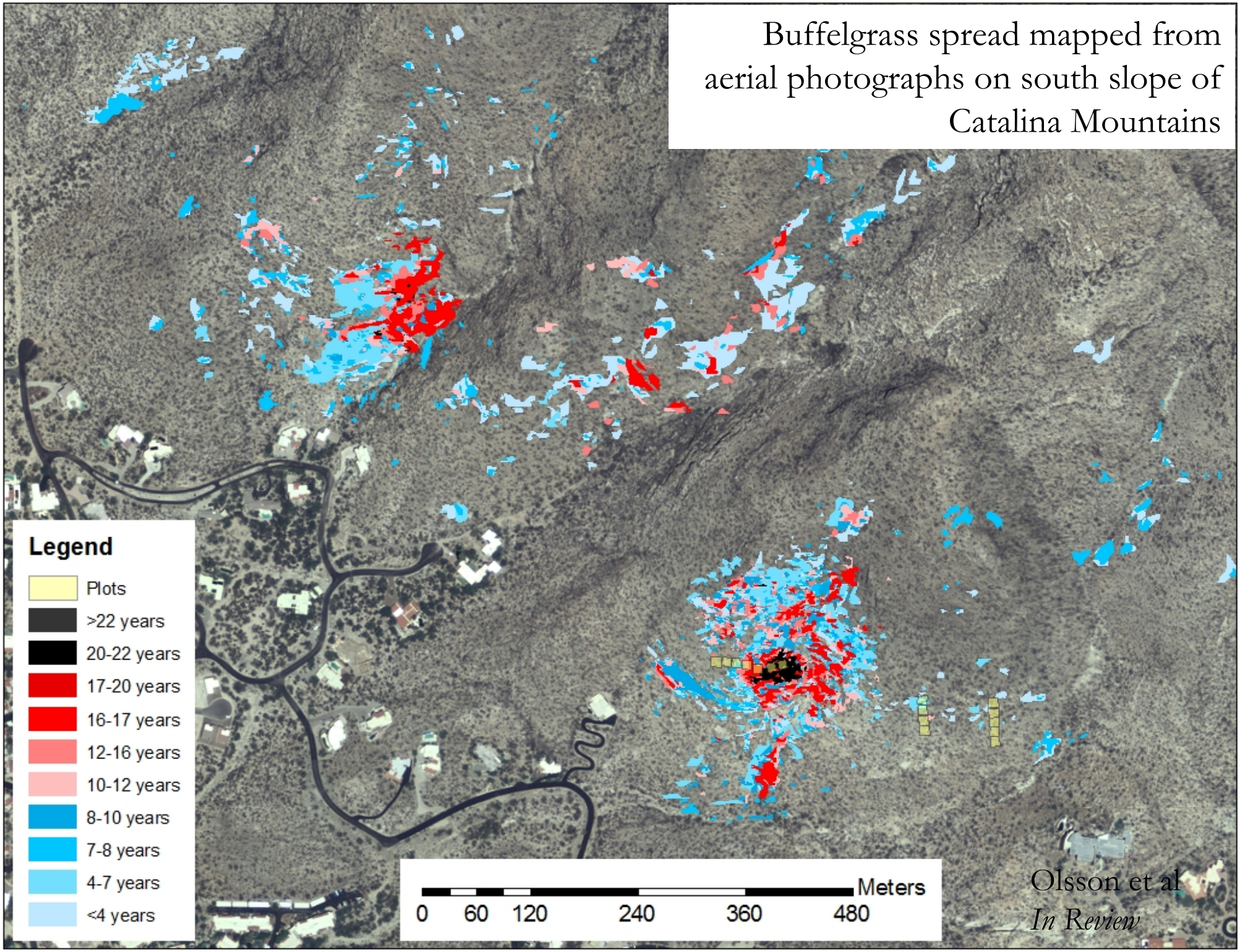


Highest Priority

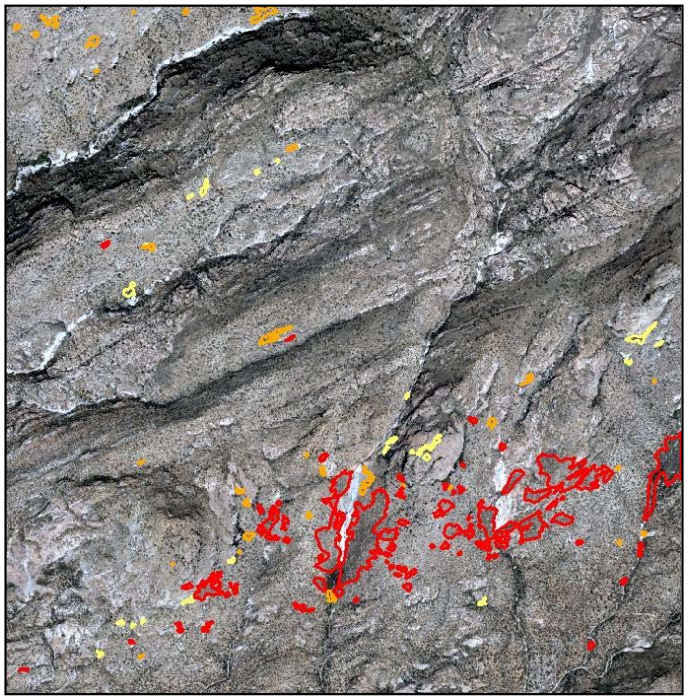


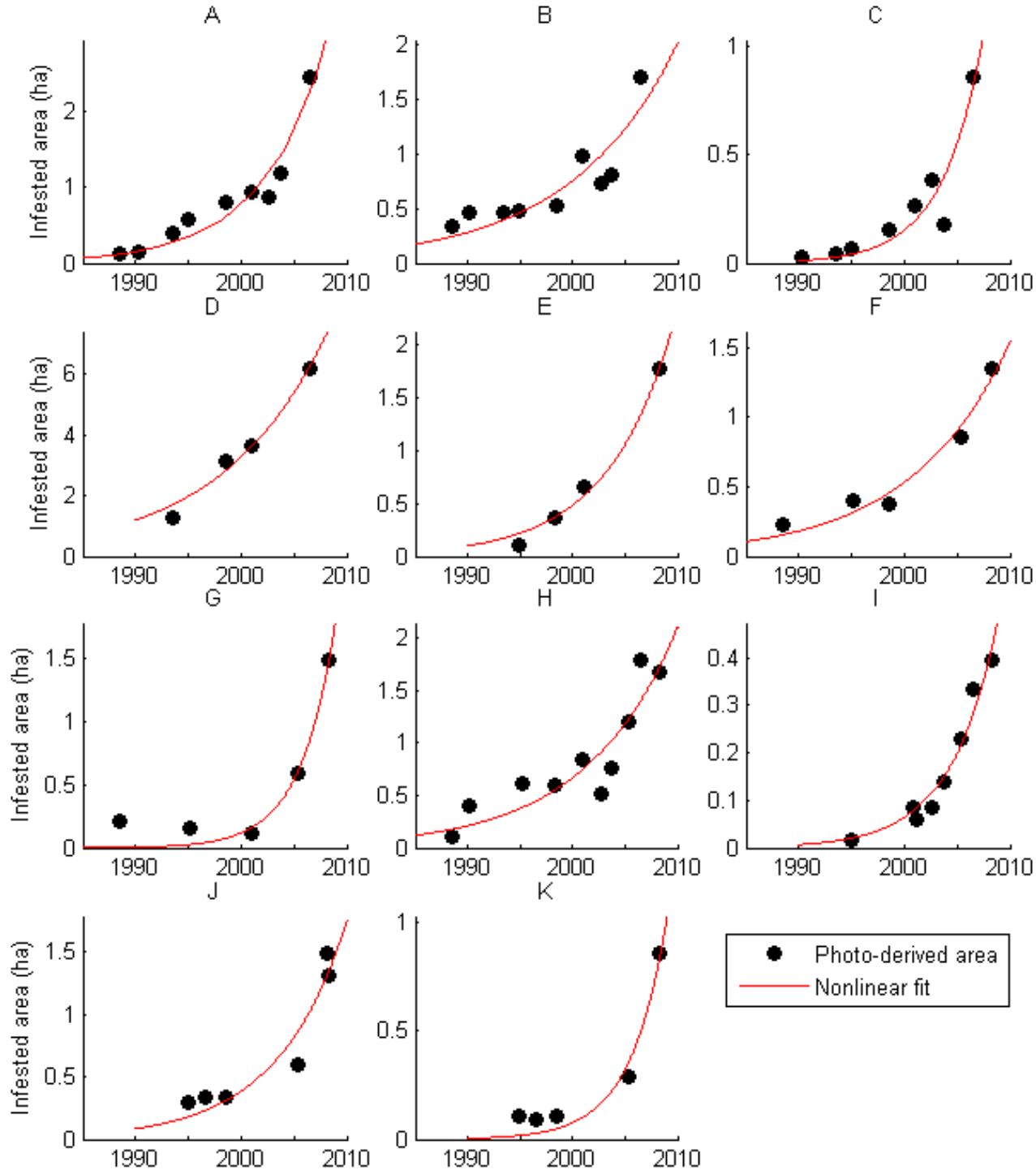
View E-NE across the Tucson Basin to the south slope of the Catalina Mountains where 11 buffelgrass patches were measured for rate of spread using aerial photographs taken in different years



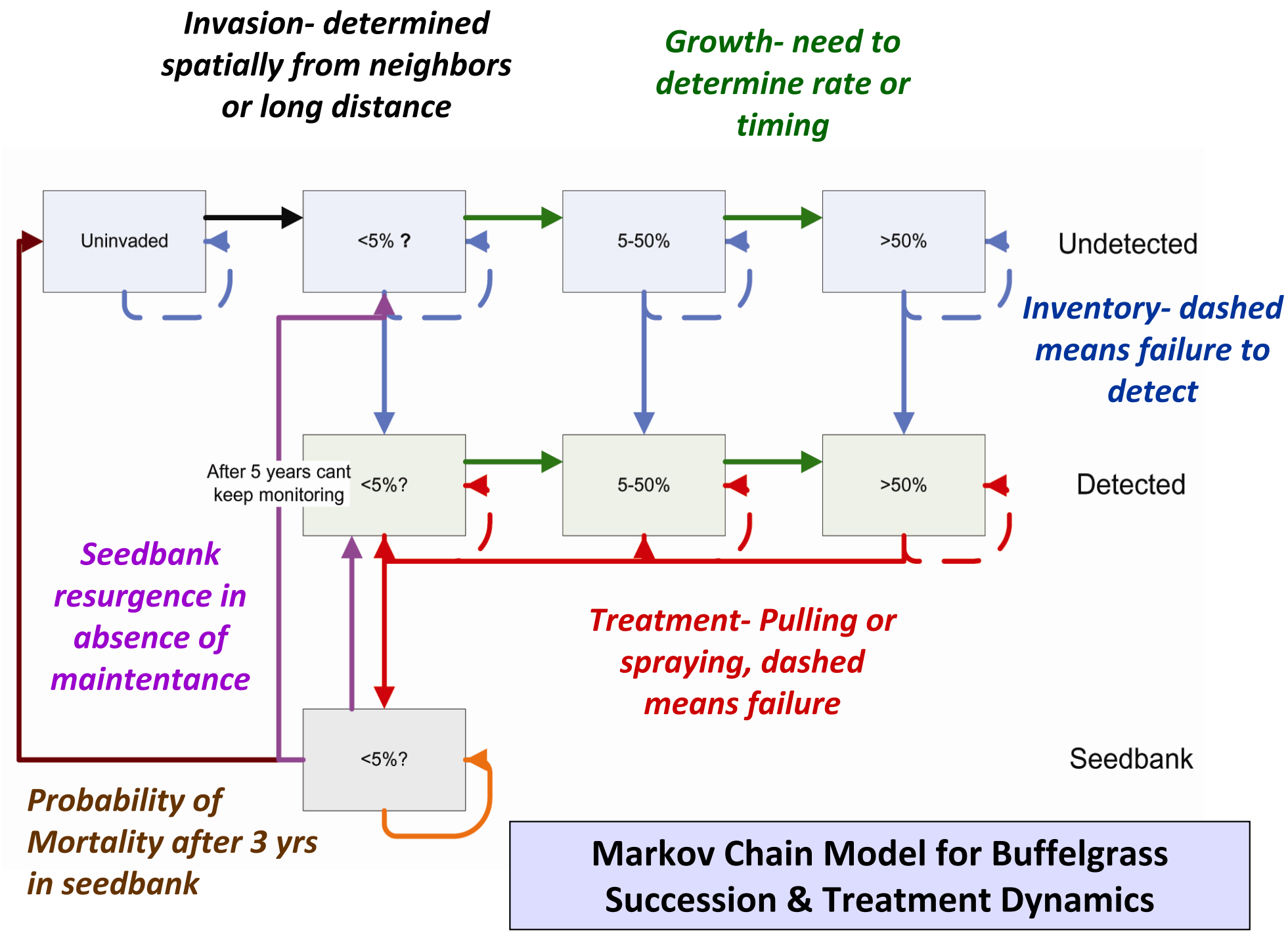

Buffelgrass spread mapped from aerial photographs on south slope of Catalina Mountains
Legend
Plots
>22 years
20-22 years
17-20 years
16-17 years
12-16 years
10-12 years
8-10 years
7-8 years
4-7 years
<4 years
Meters
0
60
120
240
360
480
Olsson et al
In Review

Buffelgrass Spread Rates at 11 sites South slope Catalina Mts

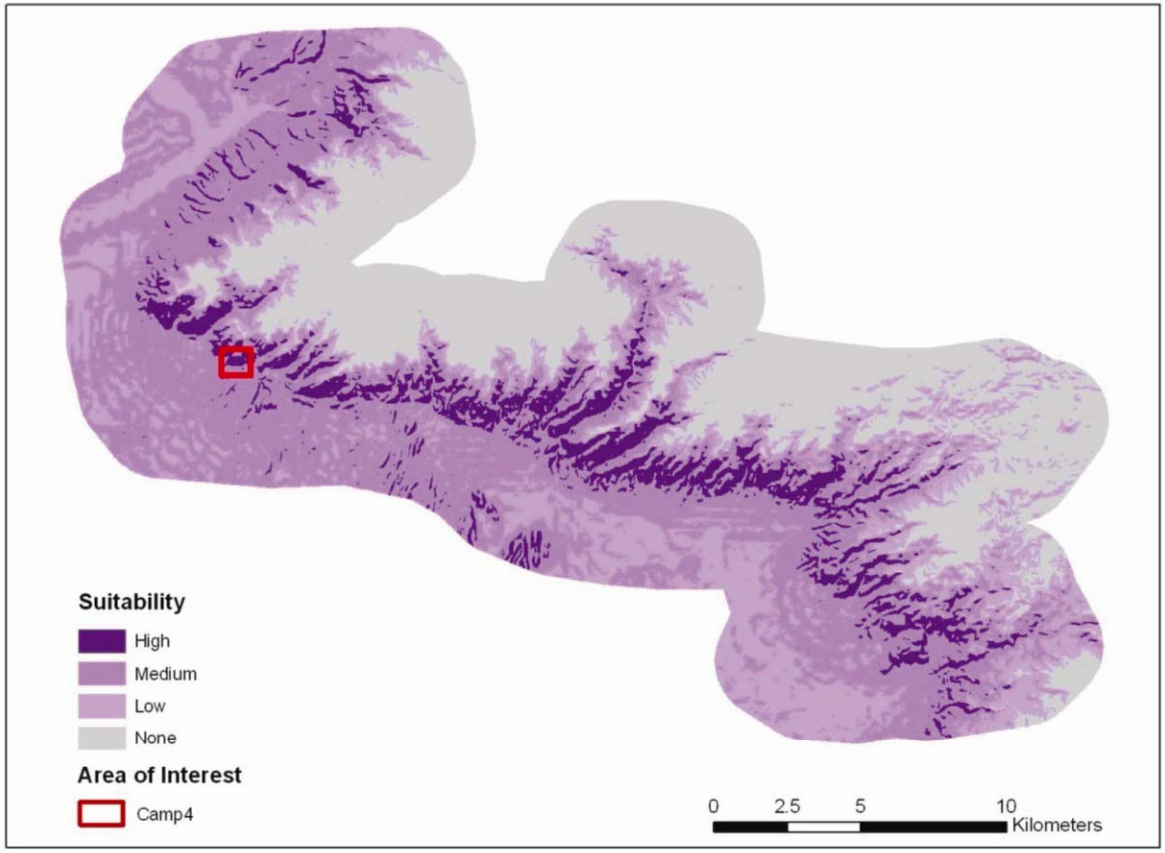


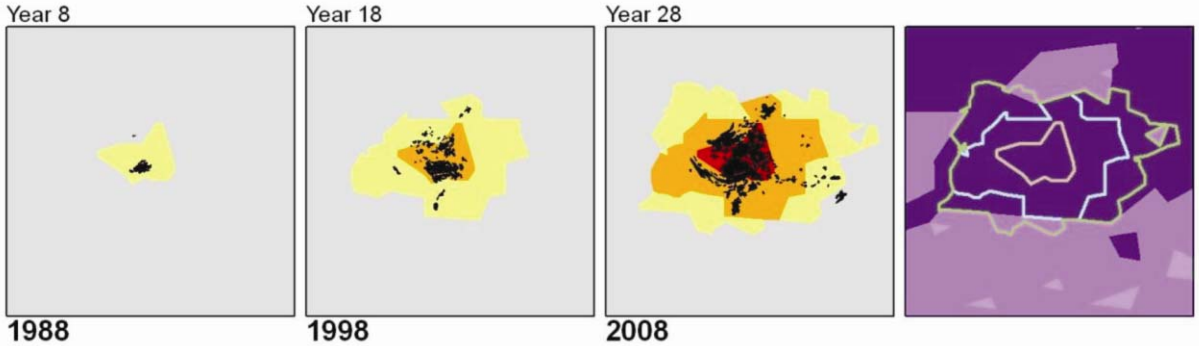


Olsson, Betancourt, Marsh & Crimmins, submitted 2010, *Biological Invasions*



Markov Chain Model for Buffelgrass Succession & Treatment Dynamics





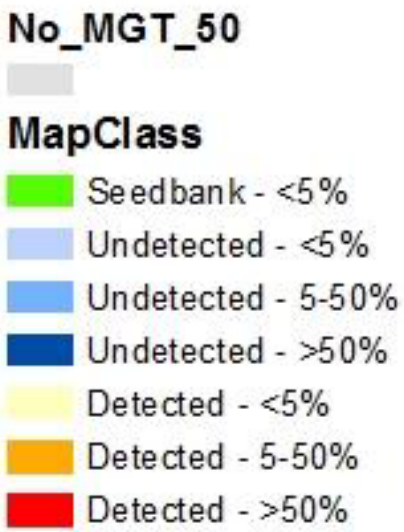
Calibration data
Undetected - <5%
Undetected - 5-50%
Undetected - >50%
Study area

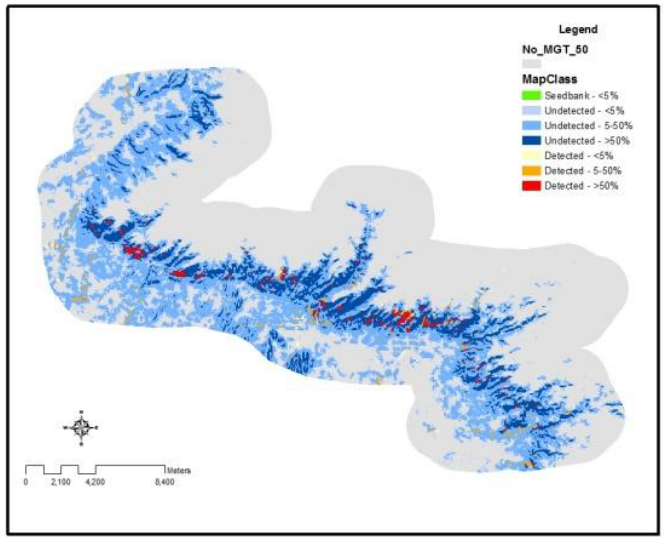
0 125 250 500 Meters

Suitability
High
Medium
Low
None

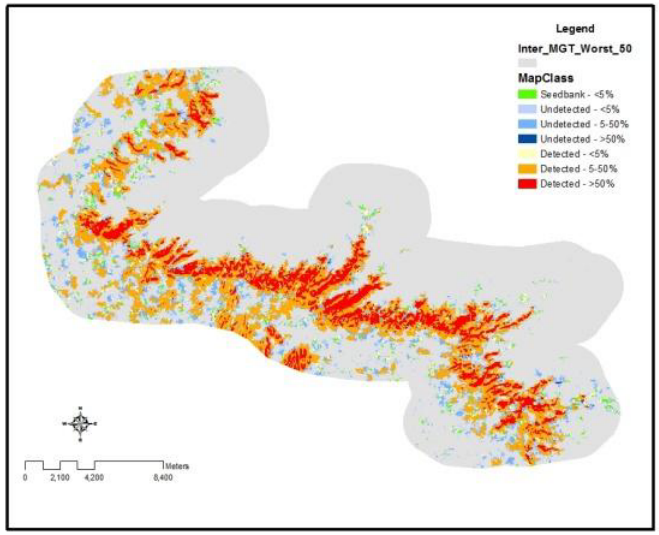
Spread extent
1988
1998
2008

2060 Simulation Scenarios for Buffelgrass Invasion in the Catalina Mts

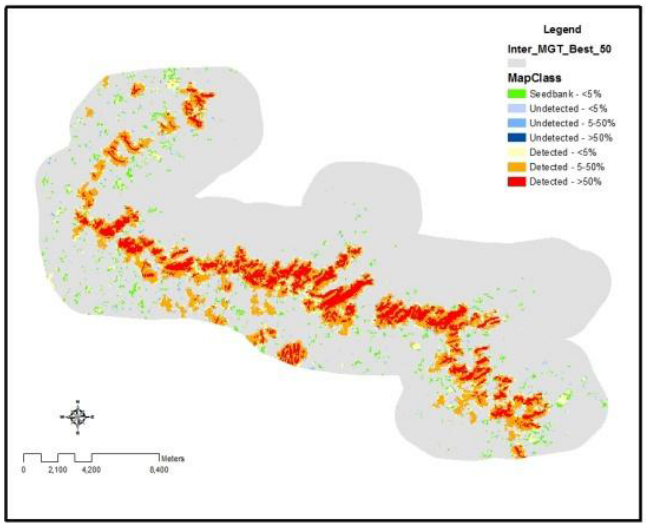




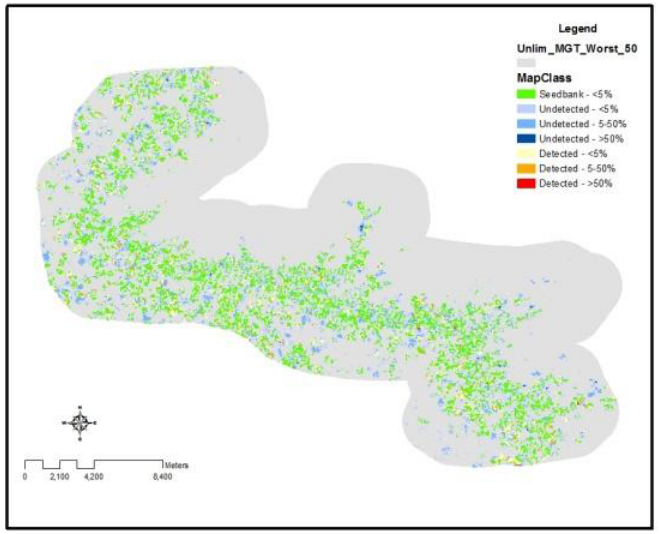
No Management



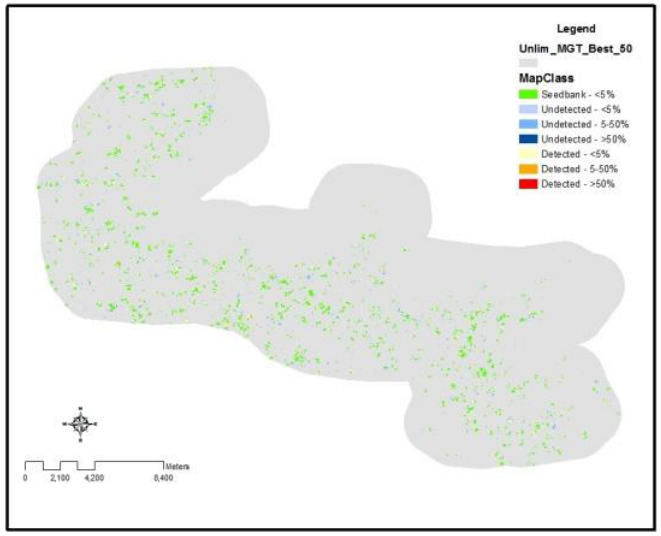
Intermediate Management
Worst Case



Intermediate Management
Best Case



Unlimited Management
Worst Case



Unlimited Management
Best Case

Acknowledgements

Julio Betancourt[1], Travis Bean[2] Lindy Brigham[3], Leonardo Frid[4], George Frisvold[2], Tracy Holcombe[1], Jeff Morisette[1], Aaryn Olsson[2], & Richard Remington[5]

[1]USGS; [2]Univ. of Arizona;
[3]SoAz Buffelgrass Coord. Center;
[4]ESSA Technologies LTD,
[5]Logan Simpson Design Inc.

Questions?

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