Invasive Species Program

Coronado National Forest

Sharon Biedenbender, Ecologist / Invasive Species Coordinator

Sabino/Bear Canyon Field Trip 01/31/2014

Buffelgrass on the Coronado NF

Pennisetum ciliare syn. Cenchrus ciliaris

- **A warm-season perennial African grass introduced in the 1930's for livestock forage & erosion control**
- **Spreading at an exponential rate throughout southern AZ; still seeded in Mexico, NM, TX; on state noxious weed list only in AZ**

The buffelgrass invasion of the Sonoran Desert Upland in the Santa Catalina Mountains is the Coronado NF's most pressing invasive species threat with respect to abundance and ecological effects.

- **A genuine *ecological emergency;* buffelgrass threatens literally thousands of acres, including Pusch Ridge Wilderness Area, along entire western slope of the Catalinas below ~4500 ft**
- **2013 helicopter survey found 1500 acres of buffelgrass on Nogales District along international Mexican border**
- **Buffelgrass found in road fill at Parker Canyon Lake on Sierra Vista District southeast of Tucson; District Range folks removed & bagged it; did not persist – probably too cold at 5200 ft elevation for seeds/seedlings**

Why is Buffelgrass an Ecological Emergency?

- **Highly invasive, can convert native ecosystems to exotic grass monocultures through competition for water, soil nutrients, seedling establishment sites**
- **Alters wildlife habitat, including habitat for Forest species of concern desert bighorn sheep, Sonoran desert tortoises**
- **Incompatible with other multiple use values on Forest lands – wilderness character, scenic quality, recreational experience**

Why is Buffelgrass an Ecological Emergency?

- Huge fine fuel loads lead to increased fire frequency and intensity
- Sonoran Desert saguaro ecotype not fire adapted
- Buffelgrass increases with fire, creating a positive feedback cycle of
  Fire ➡ More Buffelgrass ➡ More Fire
- Wildfires are a major life & property safety hazard at the WUI
- Grass fires at low elevations can carry fires into woody fuels at higher elevations

Other Invasive Plants in Sabino Canyon

Soft feather pappusgrass
Enneapogon cenchroides

Bermuda Grass
Cynodon dactylon

Fountain Grass
Pennisetum setaceum

Sweet Resinbush
Euryops multifidus

African sumac
Rhus lancea

Natal Grass
Melinis repens

Giant Reed
Arundo donax

Lehmann & Boer Lovegrass
Eragrostis lehmanniana,
E. chloromelas

Salt Cedar
Tamarisk spp.

Johnsongrass
Sorghum halepense

Other Invasive Plants On/Near the Coronado National Forest

Onionweed
Asphodelus fistulosus
Sierra Vista District

Cheatgrass
Bromus tectorum
Mt. Lemmon,
Chiricahua Mtns

Sahara Mustard
Brassica tournefortii
Redington Pass

Tree of Heaven
Ailanthus altissima
Sierra Vista, Nogales Districts

Malta Starthistle
Centaurea melitensis
Douglas, Safford Districts

Invasive Species Program Strategy

Early Detection Rapid Response

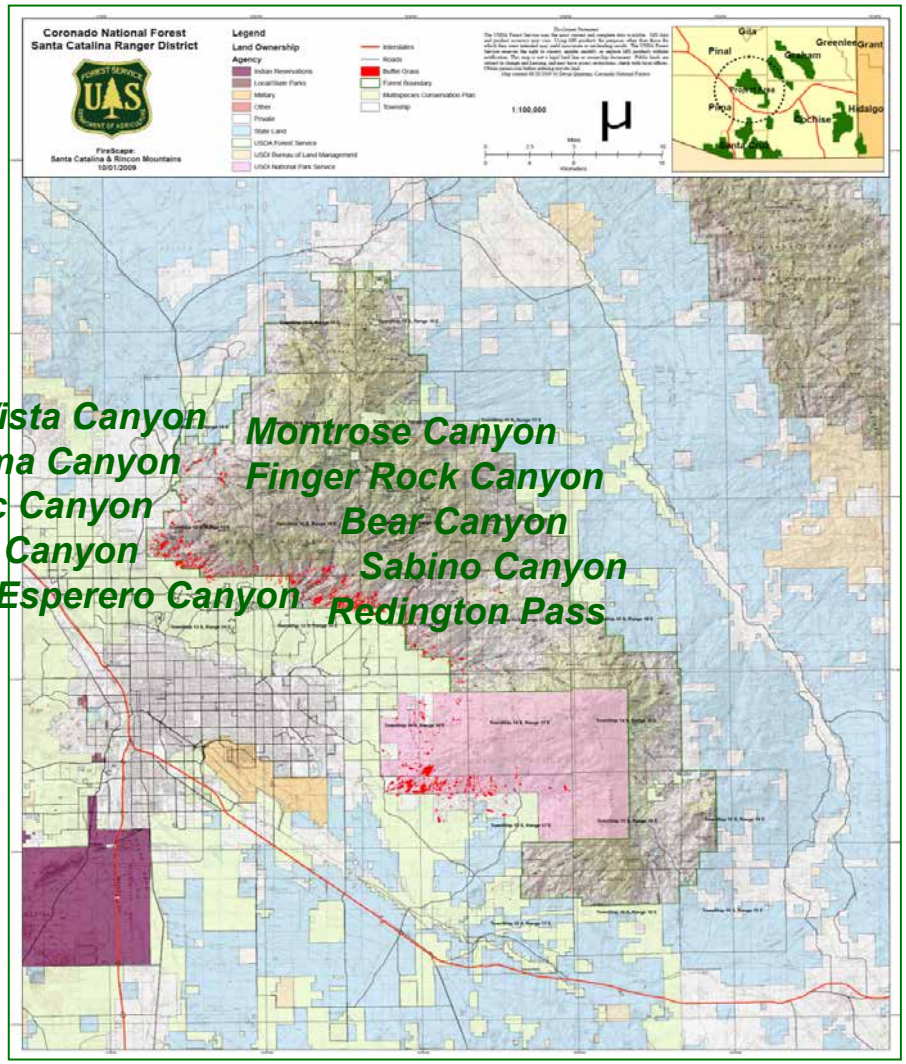
- **Identify species of concern for each District**
- **Recent large-scale fires increase invasion potential**
  - **Disturbed ground, opened canopies**
  - **Seed introduced on equipment from other areas; no wash stations**
  - **Post-fire invasive plant surveys: 2011 Horseshoe 2, Monument, Murphy Fires, 2013 Soldier Basin Fire**
- **Assess the status of identified species – survey and map**
- **Involve/inform appropriate resource areas at District level: Range, Wildlife, Recreation, Fire, Heritage**
- **Train field-going personnel in plant ID; establish simple reporting protocols**
- **Qualify District Range Staff & delegate invasive species responsibility**

Lesson Learned from buffelgrass invasion in the Catalinas – work proactively to avoid another ecological emergency

Invasive Species Program Strategy

High-Value, High-Priority Sites

- Focus limited resources on high-value, high-priority sites
- Ecological values – vegetation, especially riparian and saguaro areas, wildlife habitat
- Accessibility
- WUI fire hazard
- Wilderness Areas – Pusch Ridge, Rincon Mountain WAs
- Scenic quality; recreational use
- Sabino Canyon at top of priority list – riparian area with perennial water, endangered fish, high recreational use



2008 Buffelgrass Helicopter Survey Map
Coronado NF, Saguaro NP

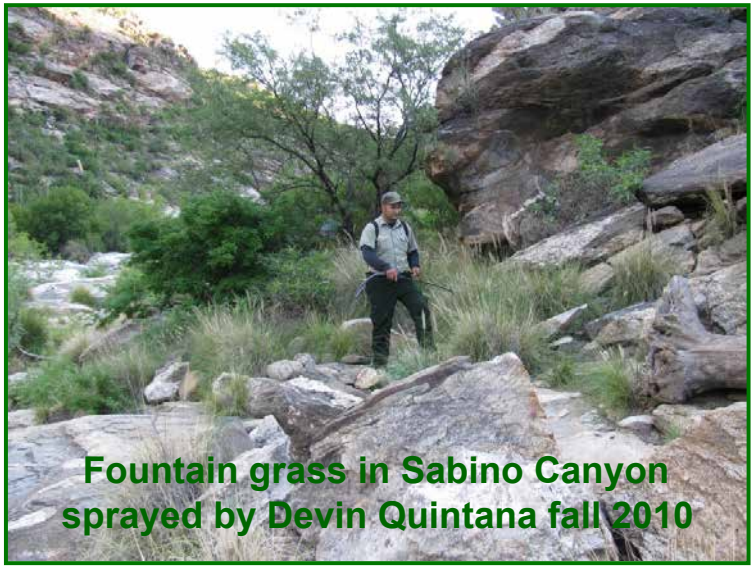
Invasive Species Program Strategy

Diverse Work Force

- Volunteers
- Forest Service personnel
- Contractors
- DOC crews

Cutting Edge Forestry
Soldier Canyon, summer 2011

BBBG Day 2011
Tucson Metropolitan
Convention & Visitors Bureau



Fountain grass in Sabino Canyon
sprayed by Devin Quintana fall 2010

Invasive Species Program Strategy

Integrated Pest Management

- **Manual removal is effective, especially for small infestations**
- **Manual removal can be done year-round**
- **But it is very labor and time intensive, erosion potential on steep slopes**
- **Herbicide applications can treat much larger areas much more quickly with less erosion risk**
- **But standard glyphosate treatments have a narrow, seasonal window of opportunity during summer green-up**

Sabino Canyon Weedwackers

Buffelgrass in Sabino Canyon sprayed fall 2010

Invasive Species Program Strategy

Treatment Monitoring and Maintenance

Regardless of species, site, or method, it is absolutely critical to monitor and maintain initial treatments to prevent re-establishment from persistent soil seedbank and reinfestation from nearby seed sources.

Romero Trail 2008 Before Treatment

Romero Trail After 2010 Manual Treatment by DOC crew; retreated in 2011 & 2012

What Does the Future Hold ?

The buffelgrass problem is enormous:

- **Regional scale - other jurisdictions in SE AZ face the same problem - Saguaro National Park, Bureau of Land Management, Pima County, City of Tucson, other municipalities**
- **Exponential rate of spread**

What we collectively believe will be required:

- **Investment of resources that matches the severity of the problem**
- **Funding – hundreds of thousands if not millions of dollars over the next 10 – 20 years**
- **Methods at our disposal than can treat large acreages**

***The Reality Is**: without this level of investment and commitment, we will lose the ecological integrity of very large portions of the Sonoran Desert Upland, and replace it with a highly flammable exotic grassland and all the consequences that entails.*

Aerial Herbicide Application

Treat much larger acreages
Treat rugged areas unsafe for backpack spraying

- **Summer 2010, helicopter experiment to apply herbicide to buffelgrass in Tucson Mountains**
- **Collaborative effort, funded in part by Forest Service Regional Office**
- **Results – effectiveness, collateral damage - being analyzed by SNP**
- **SNP proceeding with the NEPA EIS for helicopter treatments**
- **Coronado NF hopes to follow suite**

New Herbicide Strategy

- Glyphosate is the standard herbicide treatment for buffelgrass
- Many advantages: very low toxicity to mammals, birds, fish & invertebrates, aquatic formulations, does not move in soil to non-target plants
- But plants must be green to absorb & translocate the herbicide

photo credit
Polly Raymond

- Our summer rains are unpredictable, spatially & temporally variable, often scant
- Extreme heat is dangerous for crews working in 100+ degree heat on steep rugged slopes carrying heavy spray equipment
- Summer 2013, our contracted herbicide crew finished only half of our 1500 acres of funded buffelgrass treatments

Imazapyr for Dormant Plant Applications

What is Imazapyr

- Like glyphosate, a non-selective herbicide
- Foliar, cut stump or soil applied
- Mode of action - inhibits acetolactate synthase, a plant enzyme necessary for protein synthesis

New Research by U. of A. Drs. Bill McClosky & Travis Bean

- Conducted in Santa Catalina Mtns on the Coronado NF, under our soil, slope, vegetation & climate conditions
- Funded in part by Forest Service Regional Office grant

How it Works

- Herbicide applied to dry leaves is washed into root zone by winter and/or summer rainfall; roots absorb it when they break dormancy with the onset of warm wet weather
- Herbicide is translocated throughout the plant

Imazapyr for Dormant Applications
"A Game Changer"

Advantages

- Effective in killing dormant buffelgrass plants at low application rates
- Some pre-emergence activity
- Very low toxicity to mammals, birds, fish & invertebrates
- Aquatic-approved formulations available

Issues

- Unlike glyphosate, imazapyr does not bind to soil & OM
- Potential to move in soil to non-target plants
- Depends on soil texture, slope, application rates, rainfall amounts
- More research needed

A Game Changer for Land Managers

- Treatments can be done virtually year-round; no reliance on unpredictable/inadequate rainfall
- Crews spared hazards of heat-related injury