



TURNING BACK THE INVASIVE WEED ASSAULT ON MADERA CANYON

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What we will cover :

- The biological wonder of Madera Canyon
- How did invasive plants get here ?
- Successful invasive control
- Yellow Bluestem in Madera Canyon



Biotic Influences in the Sky Island Region



Species Richness



➤ 65 mammals

➤ 45 herps

➤ 260 birds

➤ 1000 butterflies and moths

➤ 1000 plants

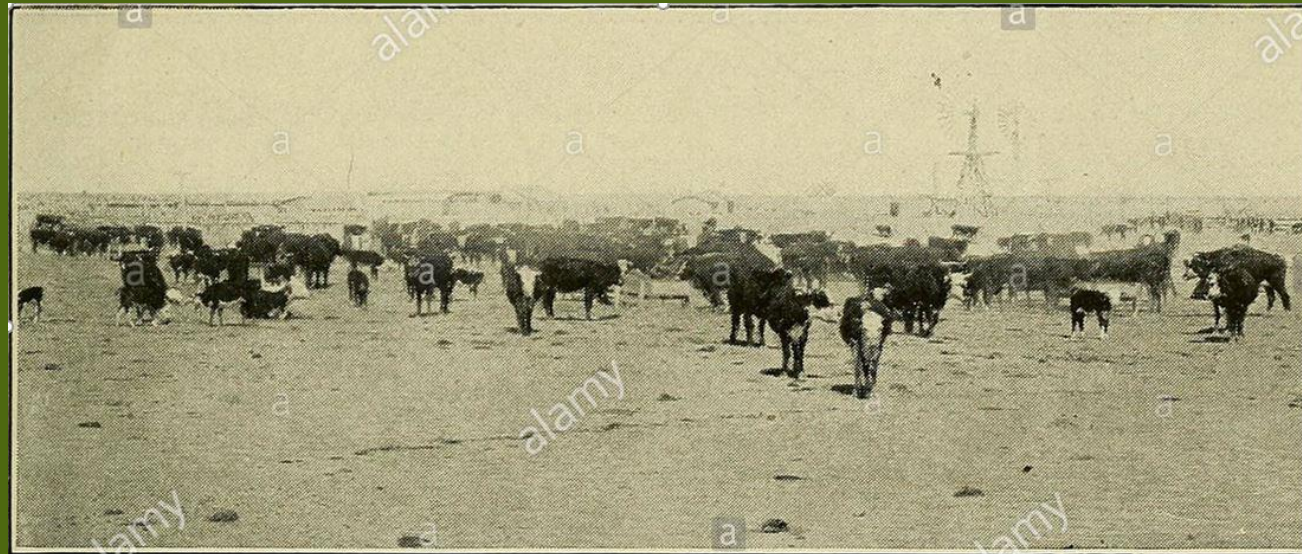
➤ 143 grasses

How did invasive plants get here ?

Bovine Imperialism

Severe droughts 1880-1930

devastated cattle herds and depleted soils worldwide in dry areas



The severe droughts set off a worldwide search for grasses that were :

- Drought resistant
- Tolerant to cattle compaction and could stabilize soils
- Able to maintain cattle production

The British

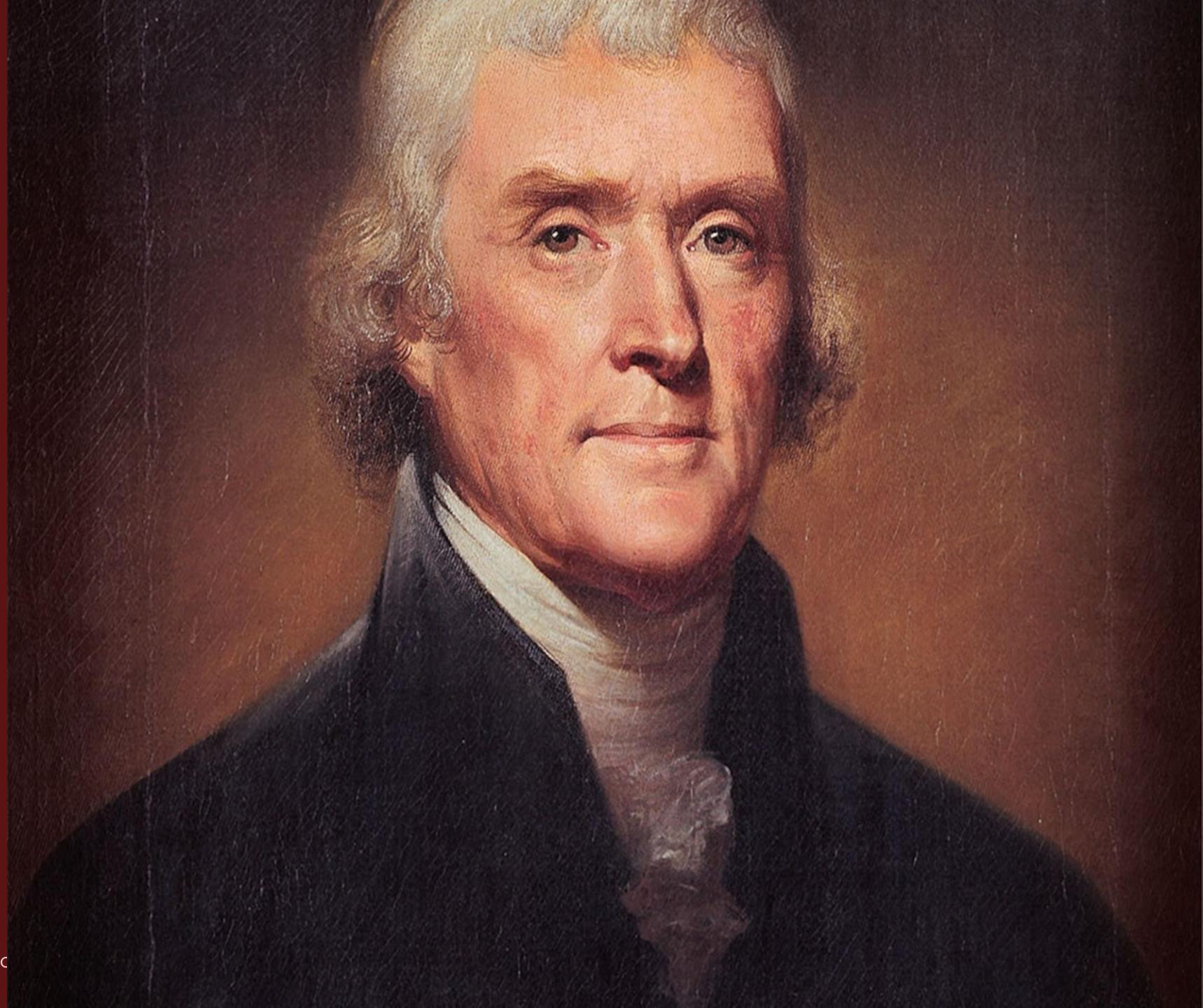
- Established Colonial Agricultural Service and antecedents
- Most active : South Africa, Kenya/Uganda, Australia
- Extensive rangeland research, plant evaluation, publication, seed exchange.



The Americans

**The greatest service
which can be rendered
any country is to add a
useful plant to its
culture.**

THOMAS JEFFERSON



The Americans

- Department of Agriculture established in 1862
- One of main mandates : “find the best seeds for planting”.
- USA embassy agricultural attachés with diplomatic status started in late 1800s and facilitated seed exchange.
- Soil Conservation service established in 1935

The Americans cont.

- USDA sent out international ‘agricultural explorers’ starting in the 1880s.
- US embassy agricultural attachés with diplomatic status started in late 1800s and facilitated seed exchange.

Arizona

- Established the Santa Rita Experimental Range in 1902



Arizona

- Established the Tucson Soil Conservation Service plant evaluation and propagation nursery in 1935



Arizona 1930s-1980s

1. Testing and selection of cattle adapted exotic grasses
2. Extensive plantings on federal lands, Indian Reservations, and roadsides
3. By the early 1960s seed of many species was cheap and available by the ton
4. Plantings for revegetation on mine tailings south of Tucson
5. Principle promoters in Arizona were the Department of Agriculture agencies :
 1. SCS-NRCS and Arizona Cooperative Extension
 2. USDA-ARS
 3. US Forest Service
 4. BLM

Arizona major selected exotic grasses

1. The African Lovegrasses : **Lehmann's, Boers, and Weeping** lovegrass etc
2. **Buffelgrass**
3. **Fountaingrass**—evaluated in 1930s but used as an ornamental

The African Lovegrasses



Lehmann's



Boers



Weeping

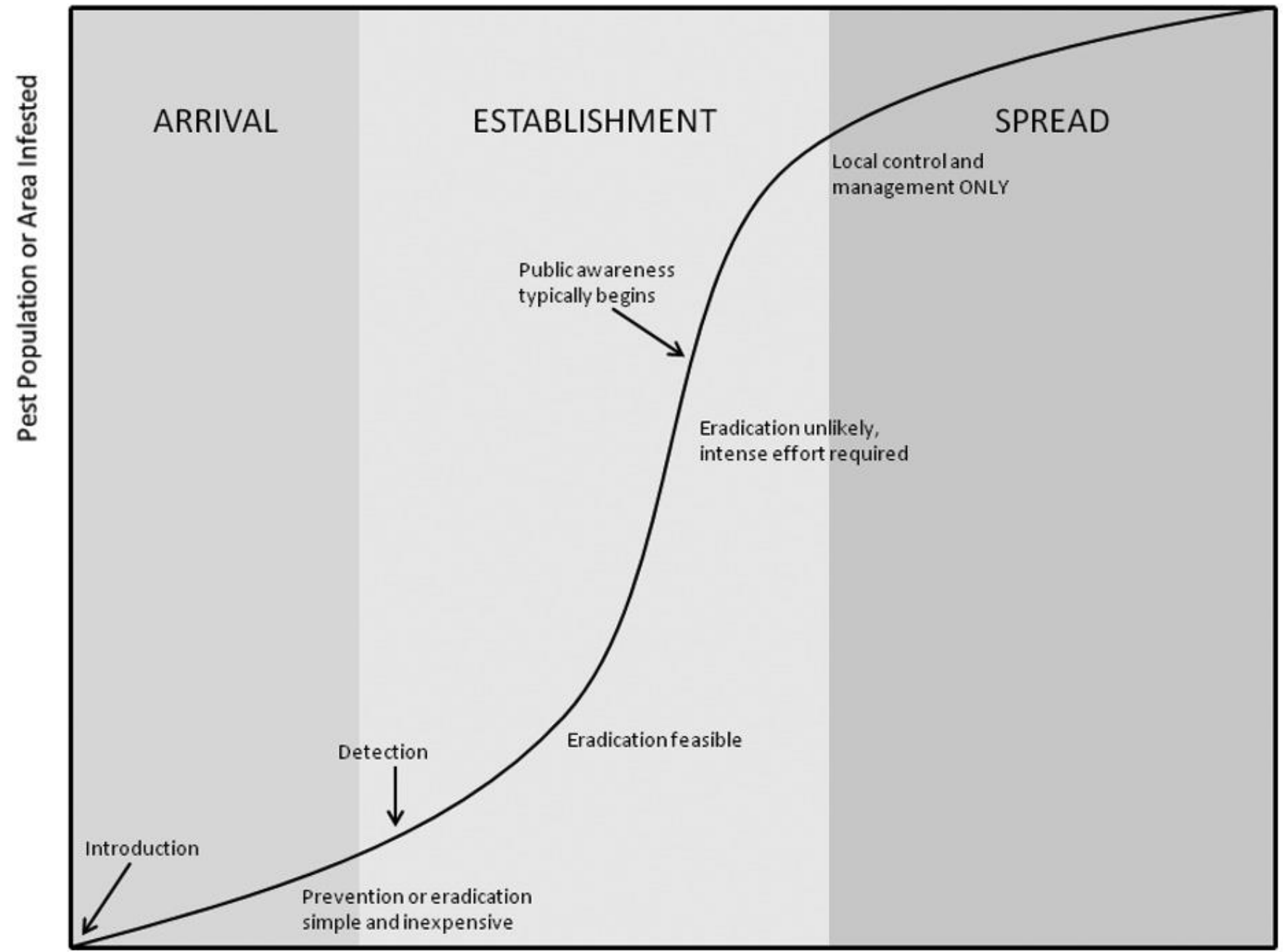
Buffelgrass



Fountaingrass



Phases of Invasion



The Buffelgrass Explosion

1983-2010

Year	Tucson Winter (inches +/- average of 5.0 “)	Tucson Monsoon (inches +/- average of 6.1”)	Phoenix Winter (inches +/- average of 4.6”)	Phoenix Monsoon (inches +/- average of 2.6”)
1981	+0.2	+2.1	-1.5	-1.4
1982	-0.9	+1.4	+1.0	-0.1
1983	+2.0	+4.4	+4.8	+2.7
1984	+3.3	+3.9	-0.9	+7.0
1985	+3.0	+0.2	+1.1	+0.2
1986	+2.0	-0.4	+3.6	+0.4
1987	+1.8	-0.6	+0.4	-0.5
1988	-0.2	+0.2	+0.9	-1.1
1989	-0.2	-3.7	+1.1	-0.9
1990	-0.7	+3.9	-1.9	+2.2

The Santa Cruz Flood of 1983



The Buffelgrass Explosion and Spread 1983-2010



The Buffelgrass Explosion and Spread 1983-2010



Successful invasive control example

The Waterman infestation on Ironwood Forest Natl Monument (BLM)
known as the
“Mother of all Buffelgrass Patches”



By 2003, the site had become a monoculture of Buffelgrass that infested the upper slopes of the entire Waterman range

Buffelgrass control and native plant restoration
Started in Summer 2010



From July-September 2010 on 7 events, volunteers hand planted whole pods of Foothill Palo Verde and Ironwood



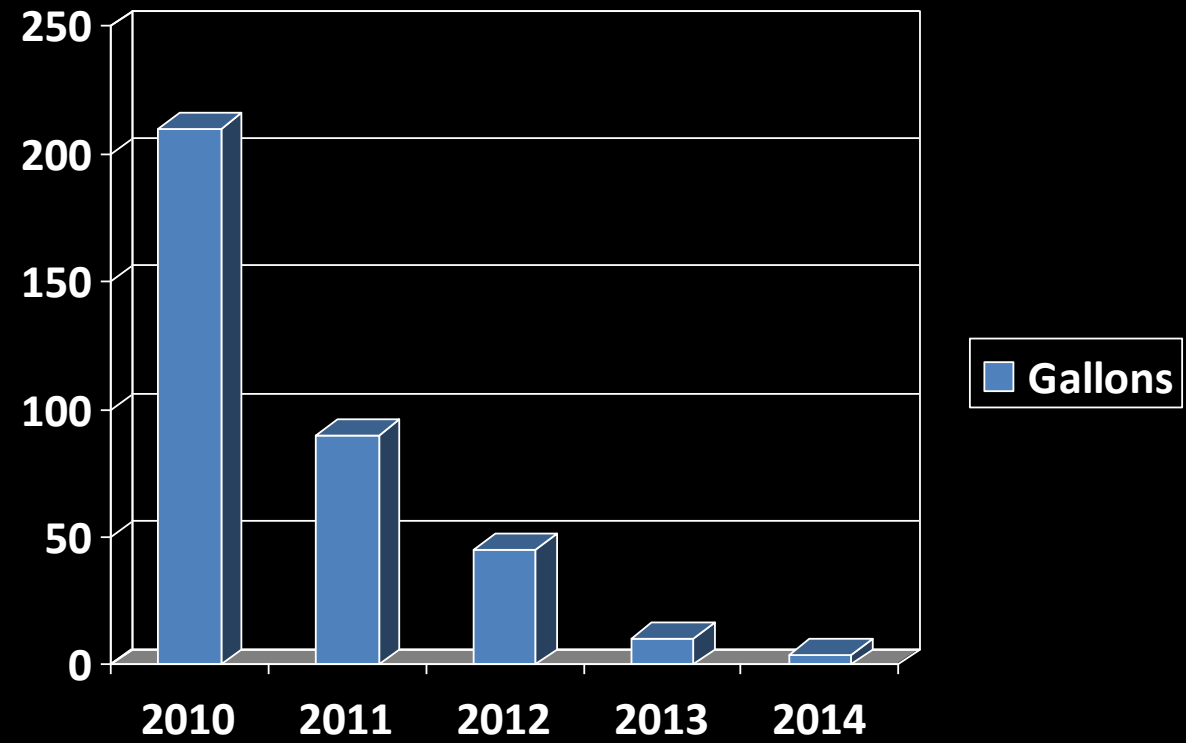


By August 2010, the entire site was like a golf course of emerging buffelgrass seedlings. Volunteers spot sprayed 3x weekly from August through October 2010.



**Volunteers continued to spot spray
and dig out buffelgrass in 2011, 2012, 2013, and 2014**

Herbicide gallons applied per year over 28 acres



Restoration Repeat Images 2010



2015



Restoration Progress 2020



Restoration Progress 2024





Yellow Bluestem Grass

Bothryochloa Ishaemum



Yellow Bluestem Grass

Bothryochloa Ishaemum

- Native to Eurasia and North Africa
- It ticked off the boxes :
 - Drought resistant
 - Tolerant to cattle compaction and could stabilize soils
 - Able to maintain cattle production

How did Yellow Bluestem Grass get here ?

Bothryochloa Ishaemum

- 1917 seed sent by the American consul in Xiamen China to Berkeley CA
- Selected and propagated by the King Ranch—now known as KR Bluestem in Texas
- 1938 was tested by the SCS farm in Tucson
- 1980s was planted in TX, OK, and NM in the Conservation Reserve Program (CRP)
- 1980s onward : massive infestations in TX---now the #1 invasive plant in TX
- 1980s onward : gradual infestation of grasslands across Cochise Cty AZ
- 2014 : first record in Bog Springs Campground
- 2024 : 4+ acres infestation in Madera Canyon, mostly concentrated in Bog Springs

Yellow Bluestem Grass : An Invasive Weed

Bothryochloa Ishaemum

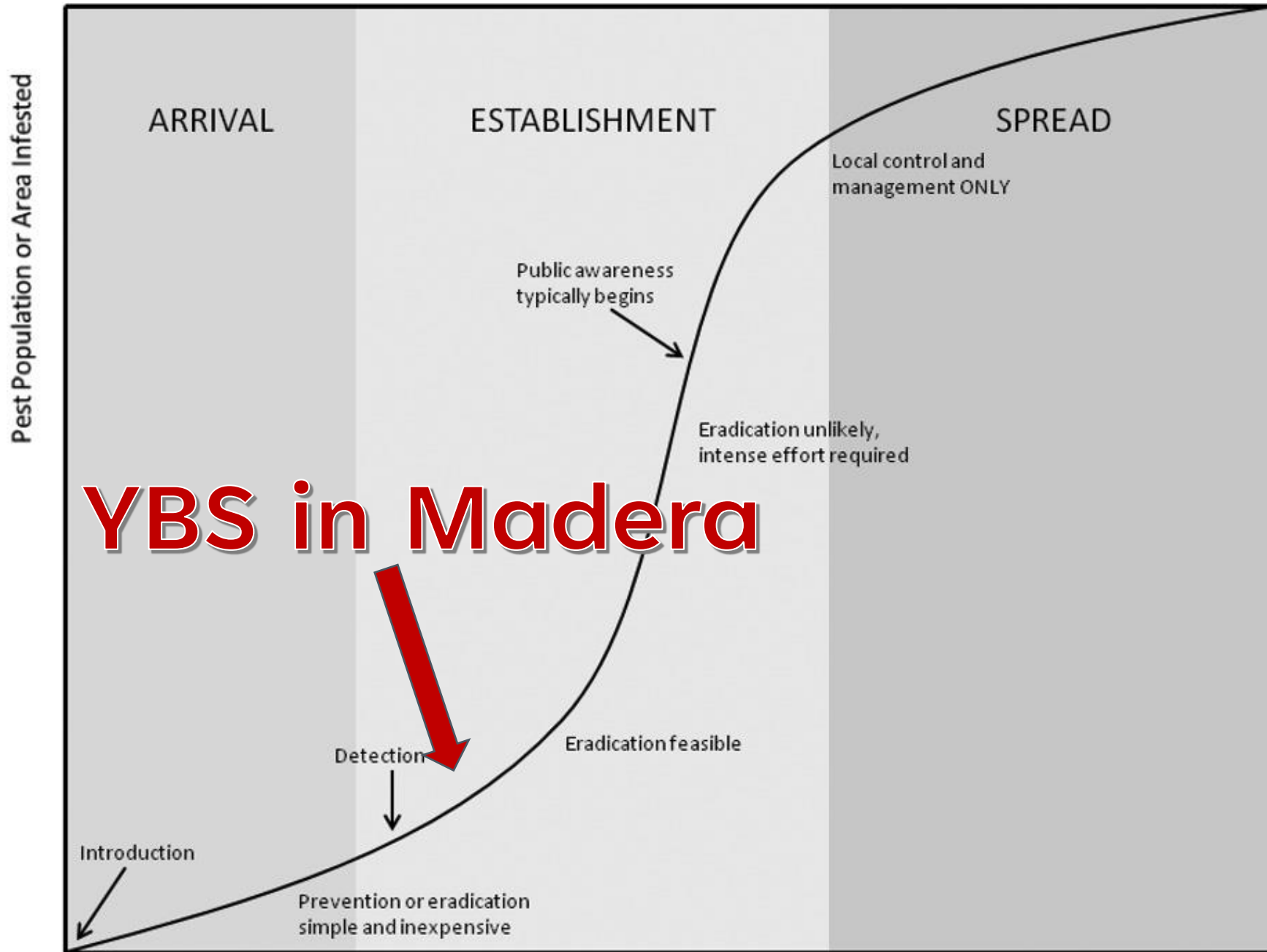
- Outcompetes and eliminates native grasses
- Forms dense stands
- Spreads like lightning once it is established
- Changes the fire regime







Phases of Invasion







Madera Slopes are knitted together with native grasses





Conclusion

1. Yellow Bluestem needs to be stopped now in Madera Canyon
2. FoMC and USFS together can do it !

DISCUSSION

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