

Impact of Recent Weed Invasions on Desert Ecosystems



Mark Dimmitt, Arizona-Sonora Desert Museum

Part 1

Sahara Mustard & Desert Wildflower Displays



Photo: Jack Kitchen

Wildflowers vs. Wild Flowers

- Wildflowers are annuals and some herbaceous perennials that behave much like annuals;
- These plants sprout in large numbers only when moisture conditions are well above average, and are dormant as seeds or underground bulbs/crowns in dry times;
- Half of the >2000 plant species in the Sonoran Desert are annuals;
- Desert annuals are of crucial importance to many wildlife species even in dry years;
- Soil seed banks can exceed 100,000 seeds/sq. meter, most of which are annuals.



Mexican gold poppy, Arizona lupine, owl clover

Wildflowers...



Desert mariposa, desert larkspur

ocotillo



brittlebush



desert ironwood tree

...vs. Wild Flowers

fairy duster



Baja devil's club cholla



Requisite Conditions for a Good Bloom

1. Winter rainy season must begin earlier than normal;
2. Winter must be much wetter than average;
3. Rains must continue regularly throughout the winter and early spring;
4. Probably best after a drought that reduces populations of seed and seedling predators;
5. These conditions are met about once every ten years;
6. A wildflower history of the past 50 years in several desert localities is posted on the Arizona-Sonora Desert Museum website.



Baja California
Bahía de Los Angeles

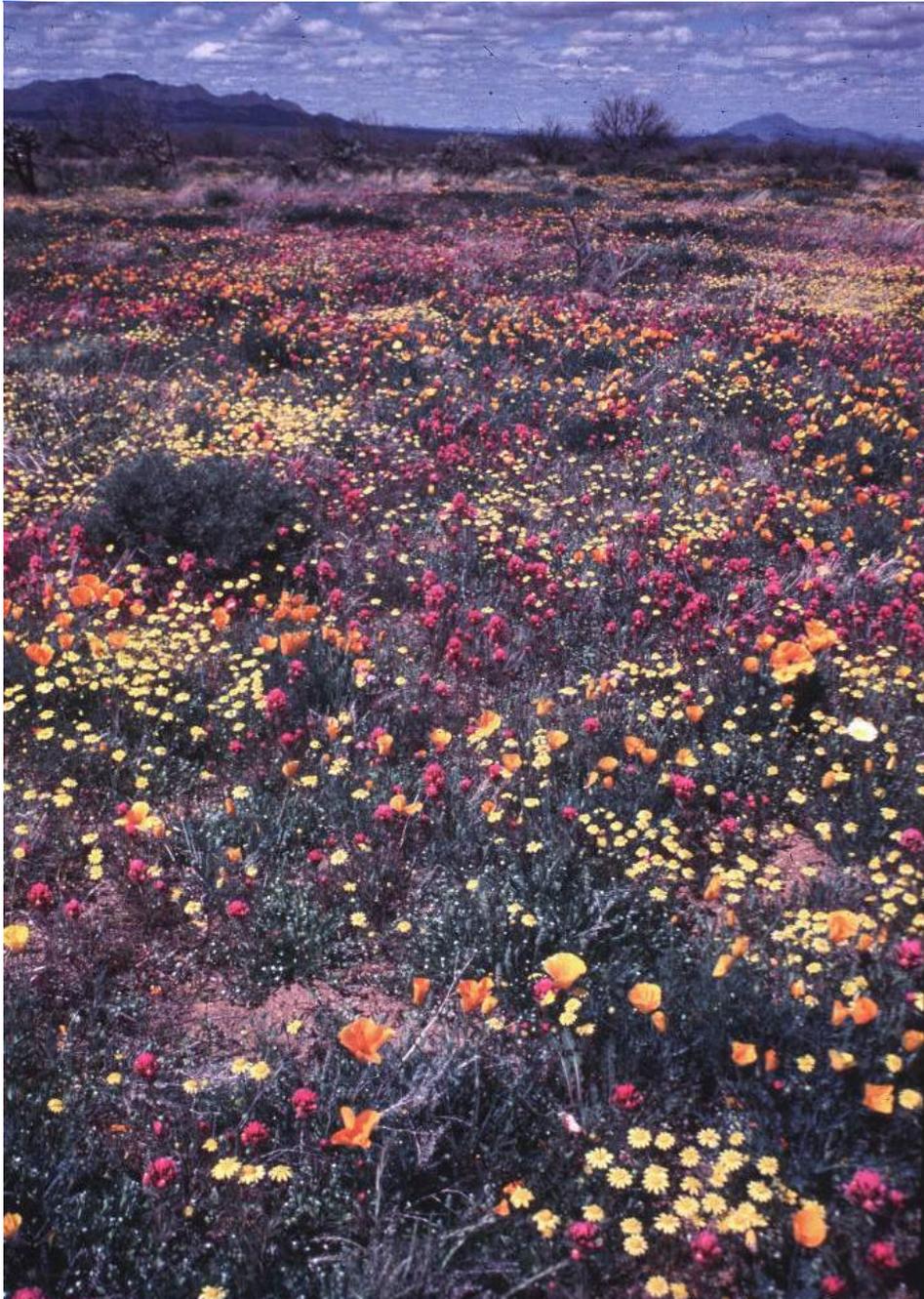
2002



1998



Tohono O'odham Nation, Arizona, 1998



Robert Perrill

Tohono O'odham Nation, AZ, 1979

Peter Kresan



Chuckwalla Valley dunes,
CA, 1973

Mohawk Dunes,
AZ, 1998



Photo: Walter Miller



Joshua Tree National
Monument (Park), 1973



Death Valley, 1973

Banning Pass
(Coachella Valley), CA
1973 & 1978





Antelope Valley, CA,
1998

Ron Fridlind



Gran Desierto de Pinacate
Natural Park, 1998



Biomass production in wet
years is enormous

Near Barstow, CA, 1978

West of Needles, CA, 1998
(10 X 40 miles)





Russian thistle invading along road, Saline Valley

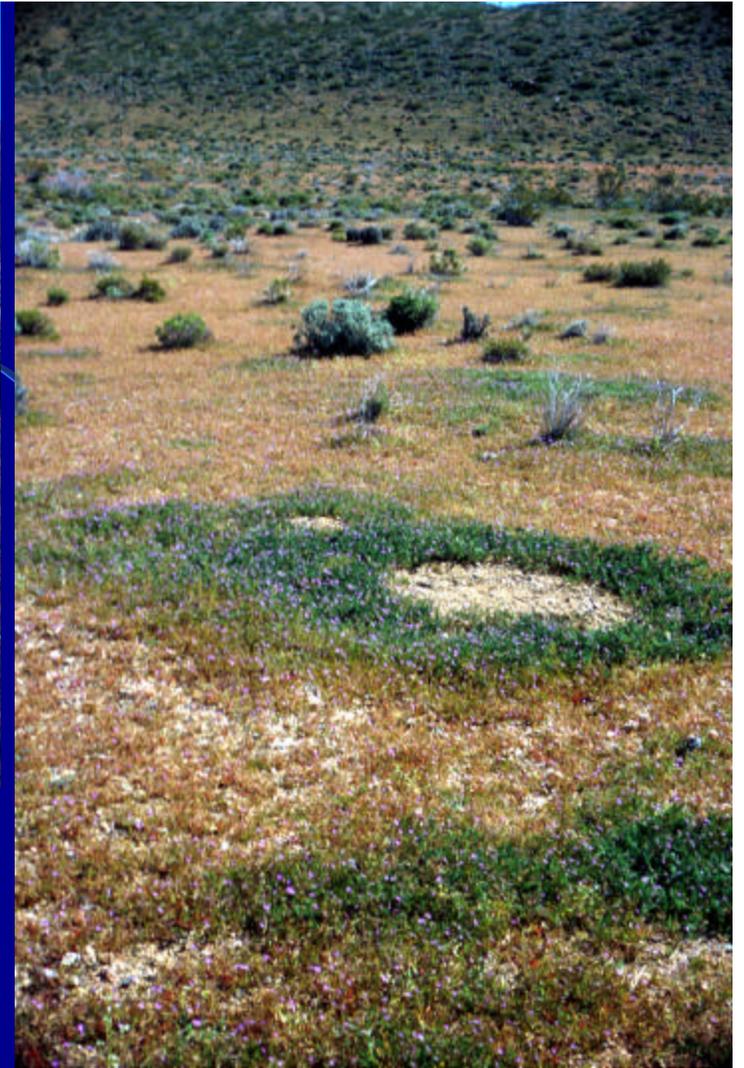
(1976)



Red brome (*Bromus rubens*)



Anza-Borrego Desert State Park



Ord Mts.

Filaree (*Erodium cicutarium*)

Documented Invasions in U.S.

- Filaree introduced to U.S. well before 1770;
- Red brome in the early 1800s;
- Russian thistle in the 1880s;
- Mediterranean grass ca. 1925;
- All now ubiquitous in the Southwest;
- Grow well in undisturbed habitat (Russian thistle only in sand dunes), where they displace native species.

Status of Old Introductions

- These older invasions have probably progressed to near their full potential, i.e., most of the damage has been done?;
- They are serious ecological threats that require scientific research to find effective controls;
- However, there is little that land managers can do about them except to be aware of the problem, and support efforts at control if and when they become feasible.

**Some recent introductions
are a different story...**

1964



1972



Mohave Desert east of 29 Palms

1977



1998





Sahara mustard, *Brassica tournefortii*

Sahara Mustard

- First found in Arizona & Sonora in 1957, invading along Mex Hwy 2;
- By the 1990s it was common in sandy habitats from central Sonora to Central Arizona;
- In wet winters it almost completely displaces native annuals.



Sahara mustard, *Brassica tournefortii*

Actions Needed

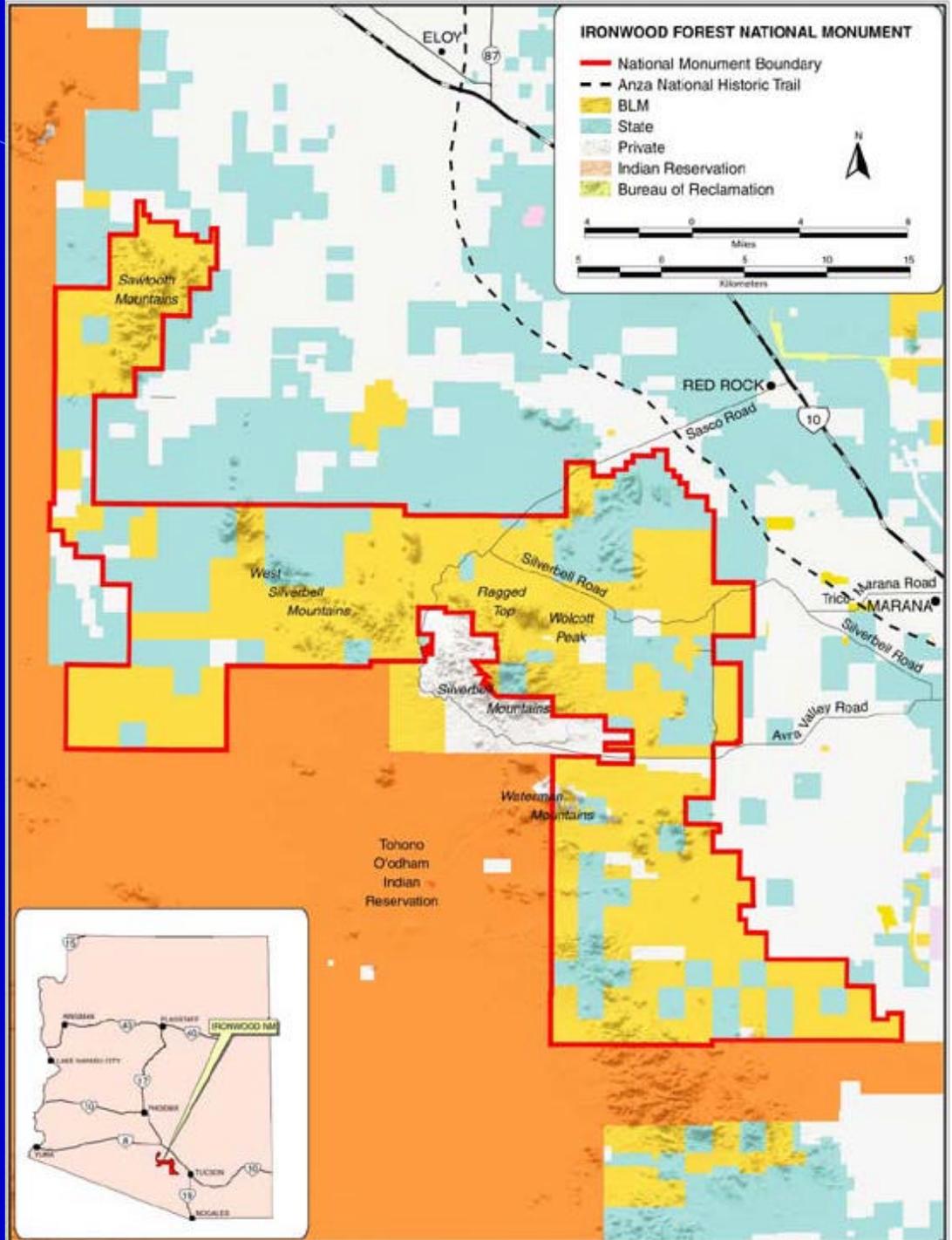
- Established populations will require research to find a biological control;
- There are still sandy habitats not invaded;
- These areas should be monitored for the appearance of Sahara mustard;
- Manual eradication of seedlings is feasible before a seed bank has been established.

Part 2

Buffel Grass & Ironwood Forest National Monument



- Created in 2000
- 129,000 acres
- 6 mountain ranges
- Ecologically most diverse ironwood groves known in U.S.





Ragged Top



West Silverbell Mts.



Waterman Mts.



Bajada of Roskrige Mts.





Photo: T. R. Van Devender

Buffel Grass, *Pennisetum ciliare*



Buffel Grass

- Introduced in U.S. in 1940s for erosion control;
- Extensively planted in Mexico for forage beginning in 1960s;
- By 1991 it dominated >20 million acres & was spreading rapidly into undisturbed habitat;
- Its density supports hot fires which kill native desert vegetation, resulting in monocultures;
- Such conversion is probably permanent in deserts without intervention.

Buffel pasture in former tropical
dry forest, Sonora



Photo: T. R. Van Devender



Coastal Sonora near Bahía Kino

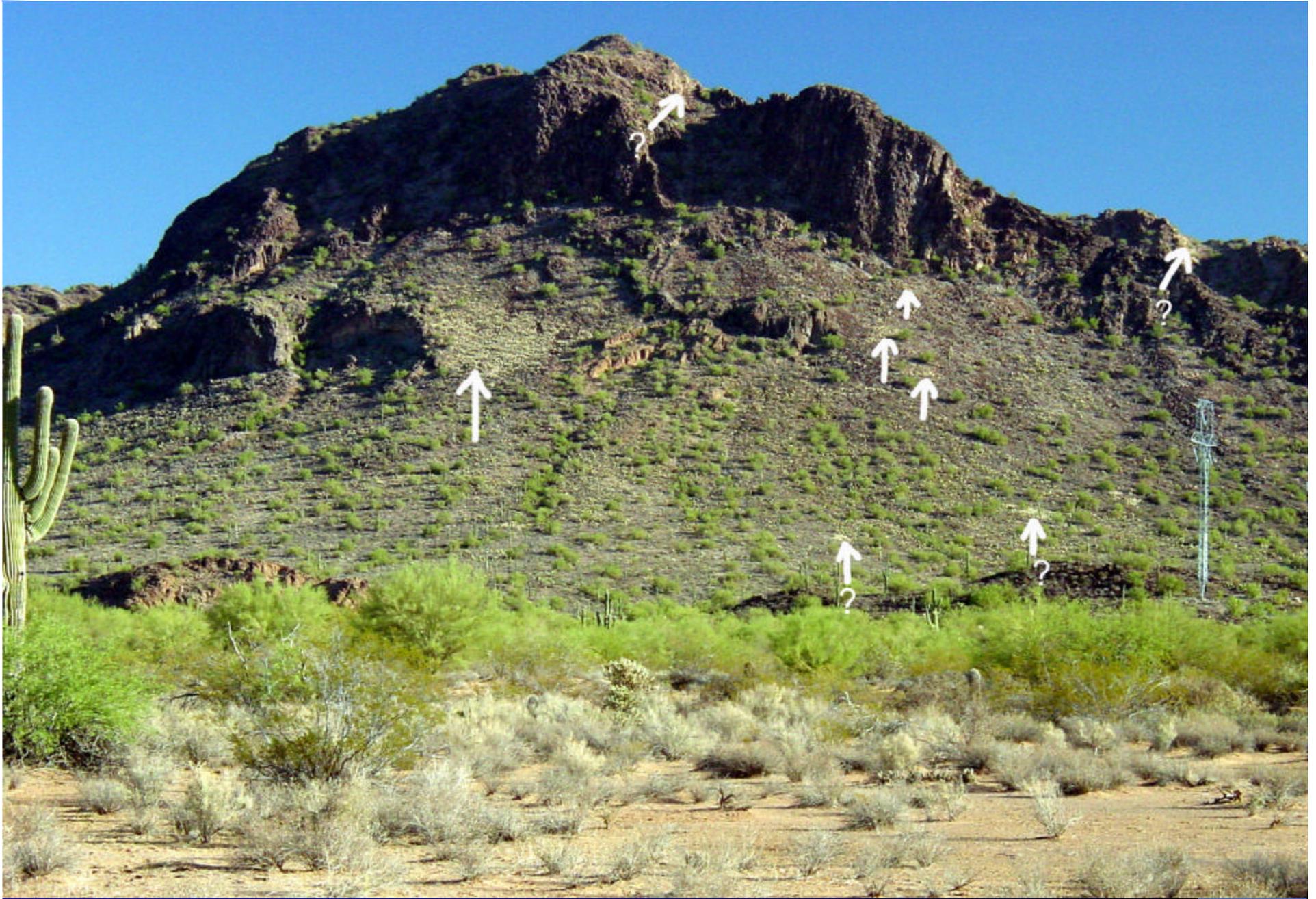


How Bad Is It?

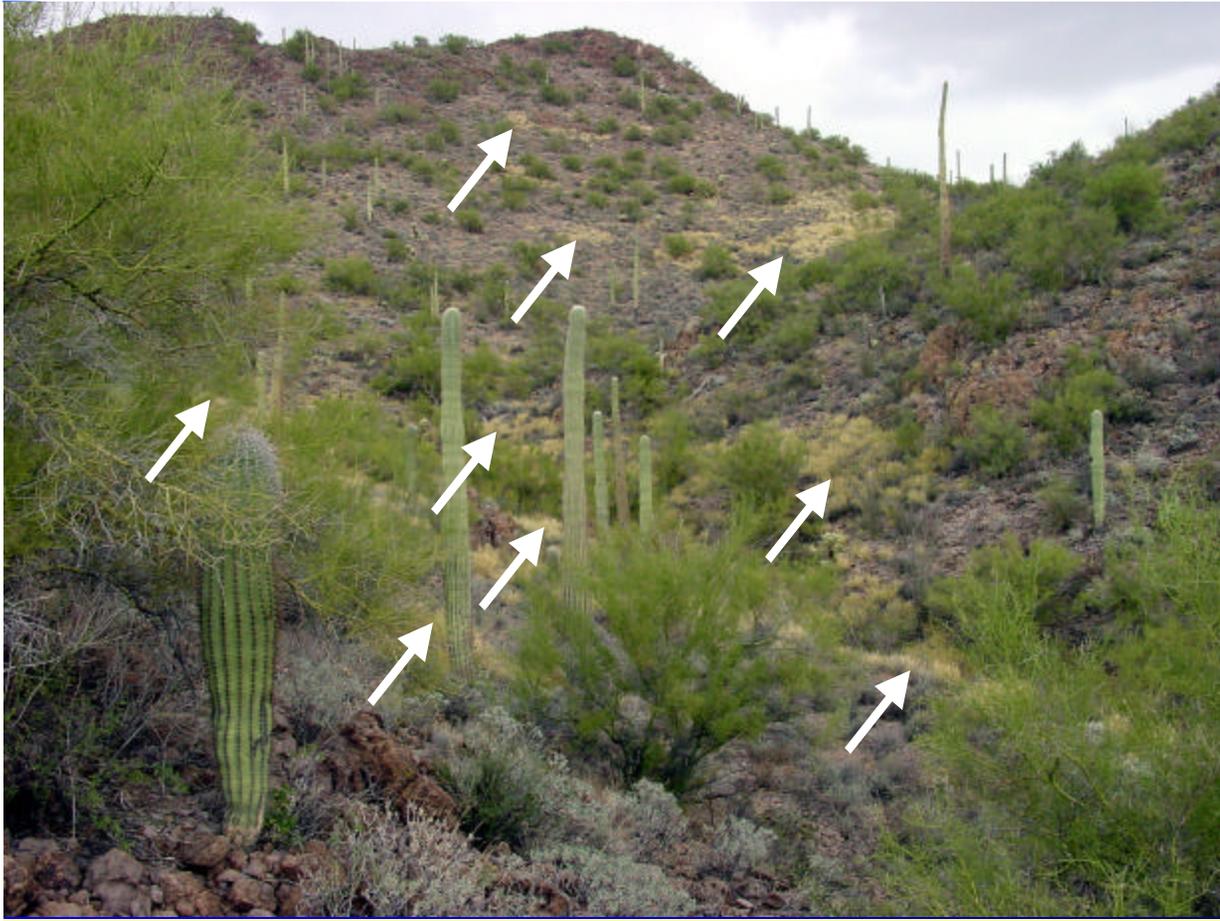
- Buffel grass was found on 20% of 160 plant transects in IFNM;
- Most patches were NOT found along roadsides or areas grazed by livestock;
- 2001 was the driest year ever recorded in southern Arizona (and much of the Southwest);
- Tucson recorded no biologically effective rainfall (>1/4 inch) for 13 months;
- Patches of buffel grass in IFNM expanded during this period.



Steep slope in Ironwood Forest National Monument



Sawtooth Mts., IFNM



Pan Quemado Mts., IFNM

Extent of mature plants in late 2000

Seedlings established by end of 2001



Population Trends of Exotics

- Introductions of exotic plants with annual generation times seem to take about 50 years to adapt to the new environment;
- Then they begin to spread rapidly;
- Buffel grass and Sahara mustard appear to be in the early stages of an exponential range expansion.

Action Needed

- Be alert for new invasions;
- Eradicate them wherever possible;
- Support listing buffel grass as a federal noxious weed;
- Support research to find biological control methods.



Volunteer “Buffel Bashers”

Photo: A. Segade

THANK YOU!

