Invasive Plant Management at Joshua Tree National Park

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Joshua Tree National Park (JOTR)

www.nps.gov/jotr

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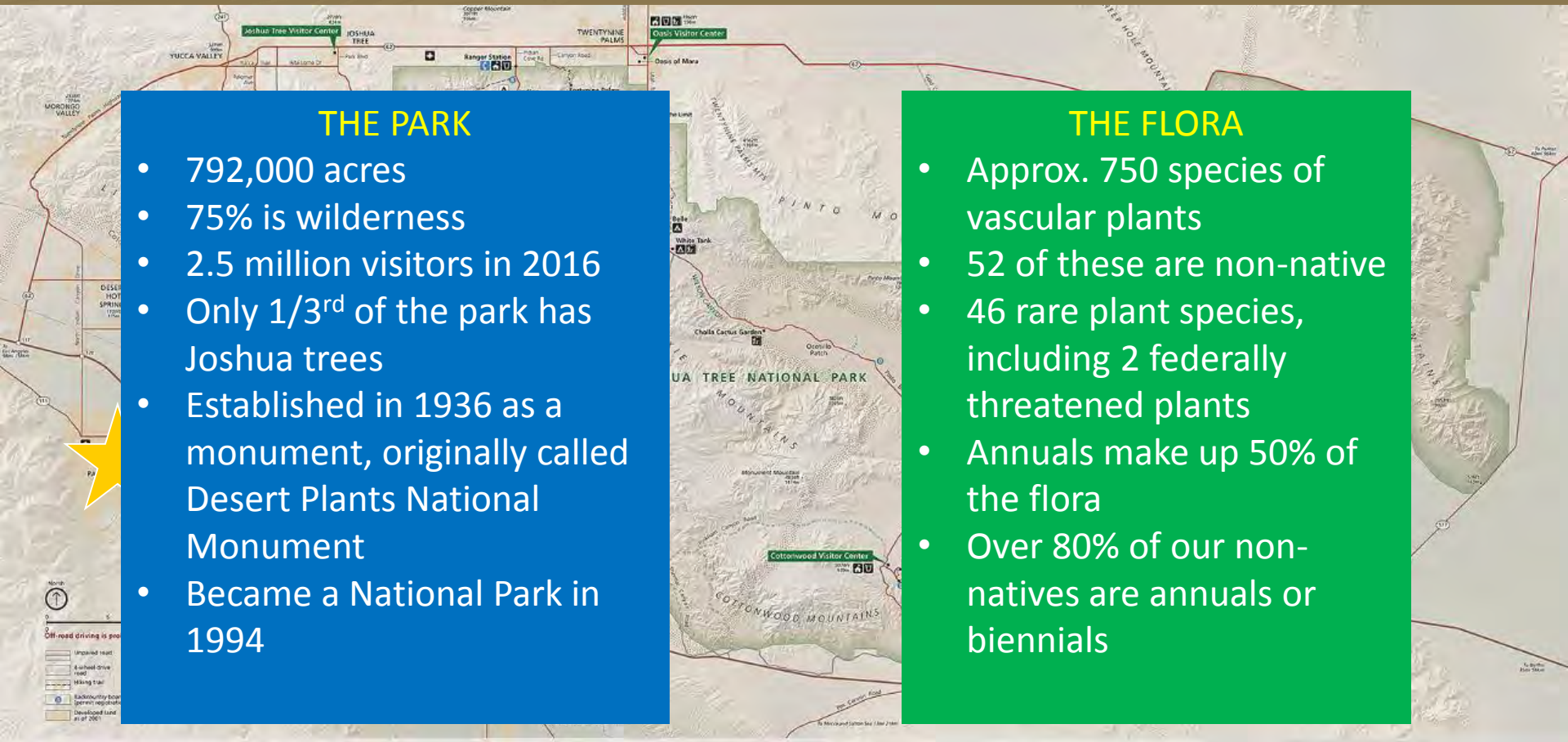
Joshua Tree National Park (JOTR)



THE PARK

- 792,000 acres
- 75% is wilderness
- 2.5 million visitors in 2016
- Only 1/3rd of the park has Joshua trees
- Established in 1936 as a monument, originally called Desert Plants National Monument
- Became a National Park in 1994

THE FLORA

- Approx. 750 species of vascular plants
- 52 of these are non-native
- 46 rare plant species, including 2 federally threatened plants
- Annuals make up 50% of the flora
- Over 80% of our non-natives are annuals or biennials

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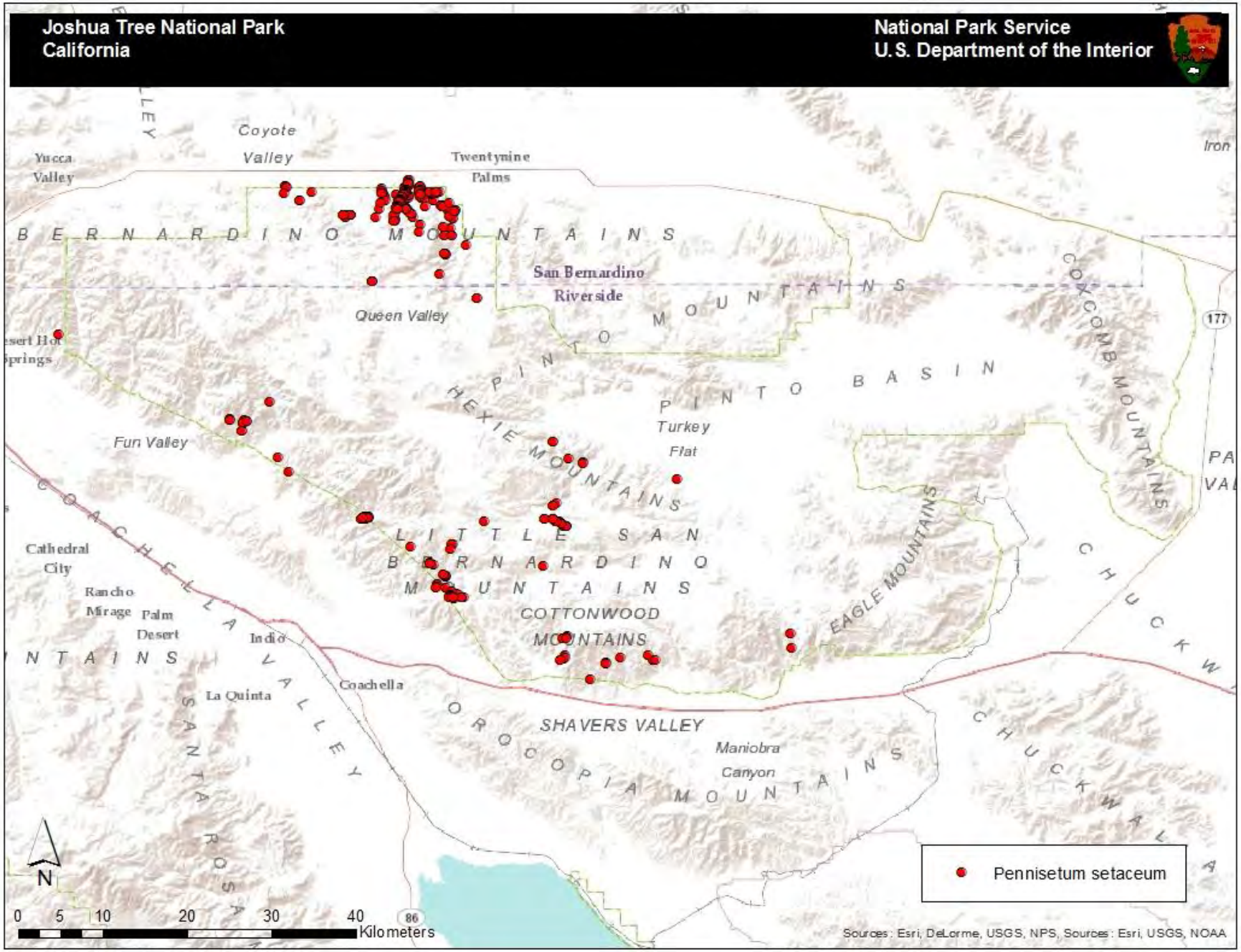
Invasive Plant Program at JOTR

Hand pulling Sahara mustard from sensitive dune habitat, February 2017

Chapter 1: Crimson fountain grass (*Pennisetum setaceum*)


Joshua Tree National Park
California
National Park Service
U.S. Department of the Interior
Coyote Valley
Yucca Valley
Twentynine Palms
Iron
B E R N A R D I N O M O U N T A I N S
San Bernardino
Riverside
Queen Valley
M O U N T A I N S
177
P I N T O B A S I N
P I N T O
Turkey Flat
Fun Valley
HEXIE MOUNTAINS
COXCOMB MOUNTAINS
L I T T L E S A N
B E R N A R D I N O
M O U N T A I N S
COTTONWOOD MOUNTAINS
EAGLE MOUNTAINS
C H U C K W
Cathedral City
Rancho Mirage
Palm Desert
Indio
Coachella
La Quinta
SHAVERS VALLEY
Maniobra Canyon
O R O C O P I A M O U N T A I N S
SANTA ROSA
N
0 5 10 20 30 40
Kilometers
86
Pennisetum setaceum
Sources: Esri, DeLorme, USGS, NPS, Sources: Esri, USGS, NOAA

Photos NPS/Lake Mead EPMT

Fountain grass treatment in Queen Mountain Region
Lake Mead Exotic Plant Management Team

Cultivated fountain grass

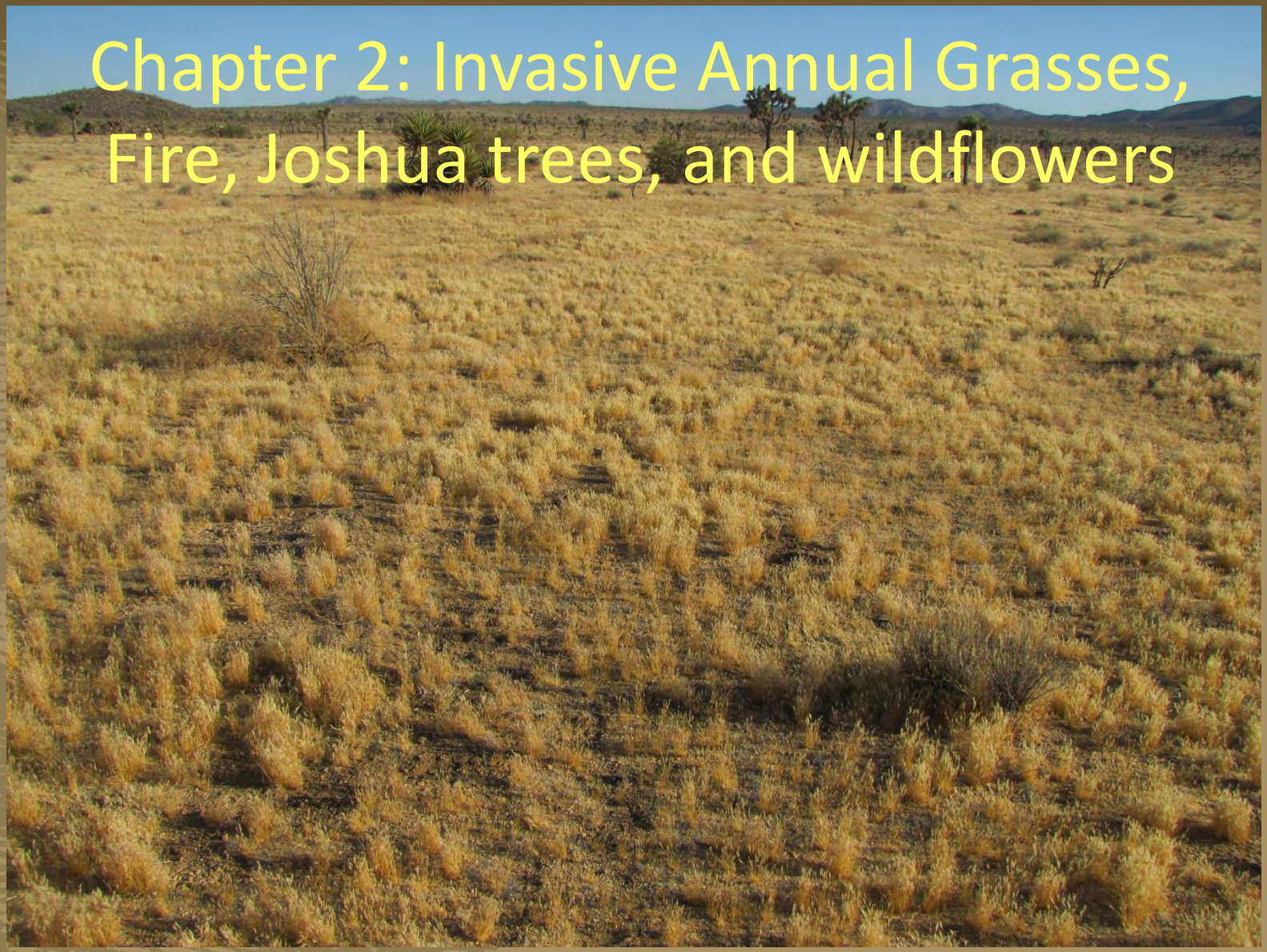
Escaped Fountain Grass

Fountain grass in the city of 29 Palms

Inventory data from Winter/Spring 2017

Approximately 75% of plants are escaped (not intentionally cultivated)

Chapter 2: Invasive Annual Grasses, Fire, Joshua trees, and wildflowers



Invasive grass, Schismus in Queen Valley, June 2017

Highly flammable cheatgrass (*Bromus tectorum*) near Eureka Peak

Invasive annual grasses changing desert fire regimes

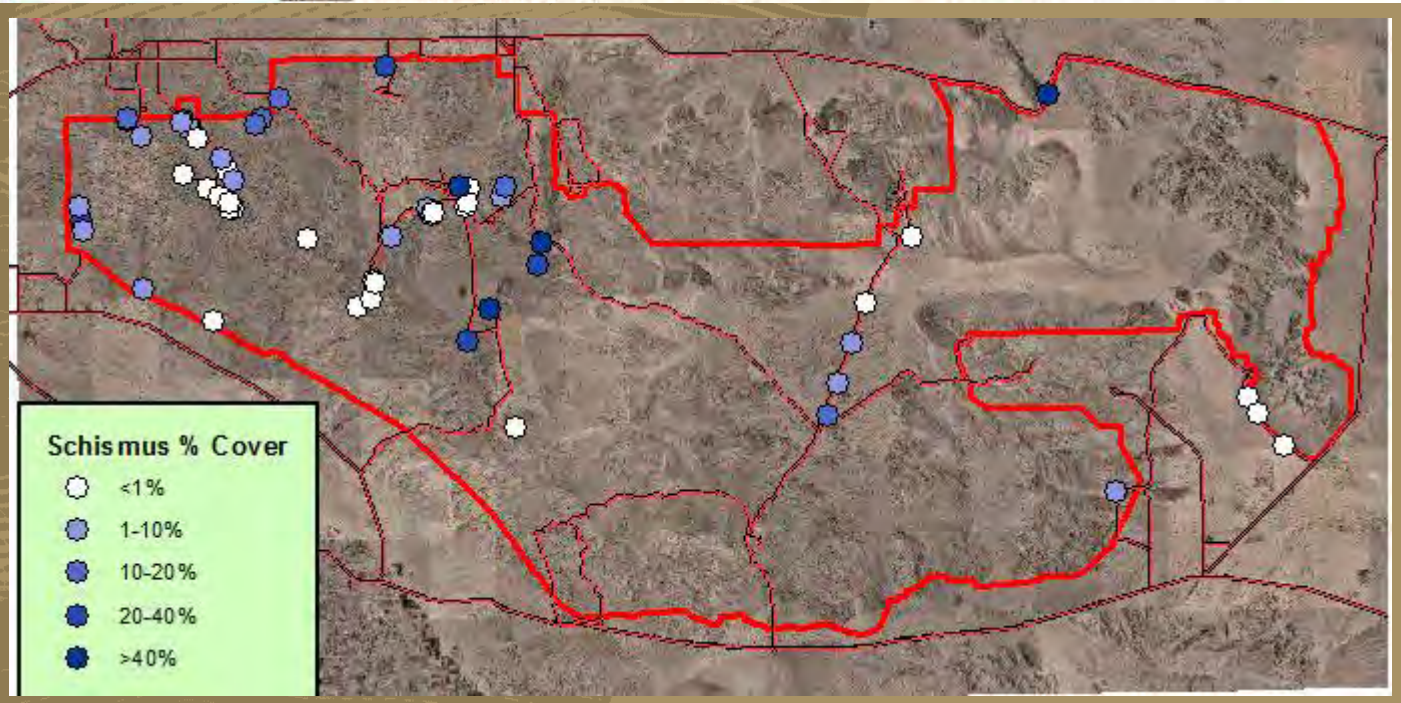
April 2, 2016: dominated by native annual *Chaenactis*

April 5. 2017: dominated by *Schismus* (35% cover)
5% cover of red brome

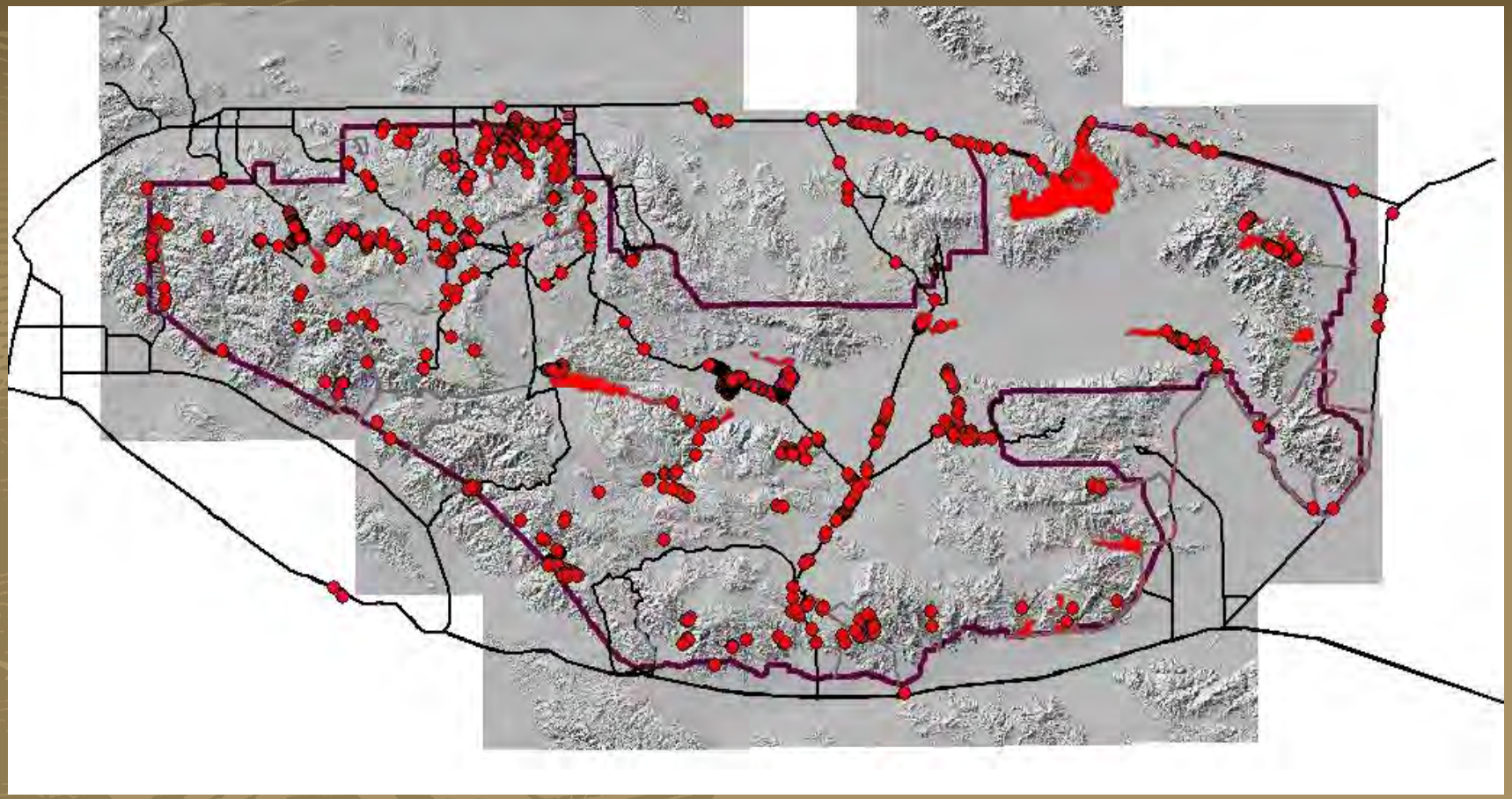
The Whispering Pines Fire of 2006

The abundance of invasive annual grasses can change drastically from year to year, correlated with precipitation

Invasive Annual Grass Cover, Spring 2017



We estimate that invasive annual grasses infested over 500,000 acres of the park in 2017



A snapshot of the JOTR invasive plant geodatabase. This database had no observations of Schismus or Bromus prior to 2017

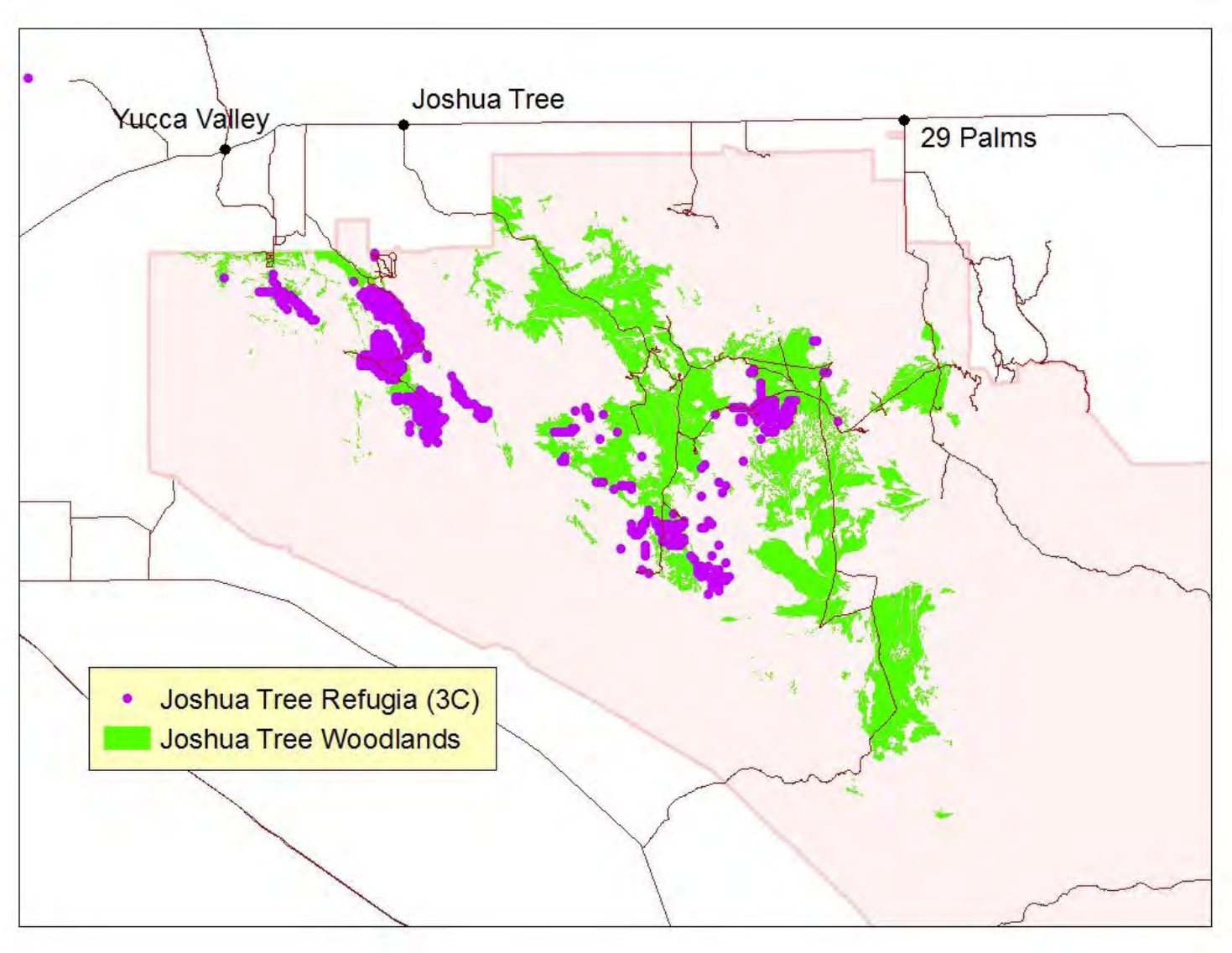
Invasive Annual Grasses:
Learn to live with them?

Red brome (*Bromus madritensis subsp. rubens*) April 2017

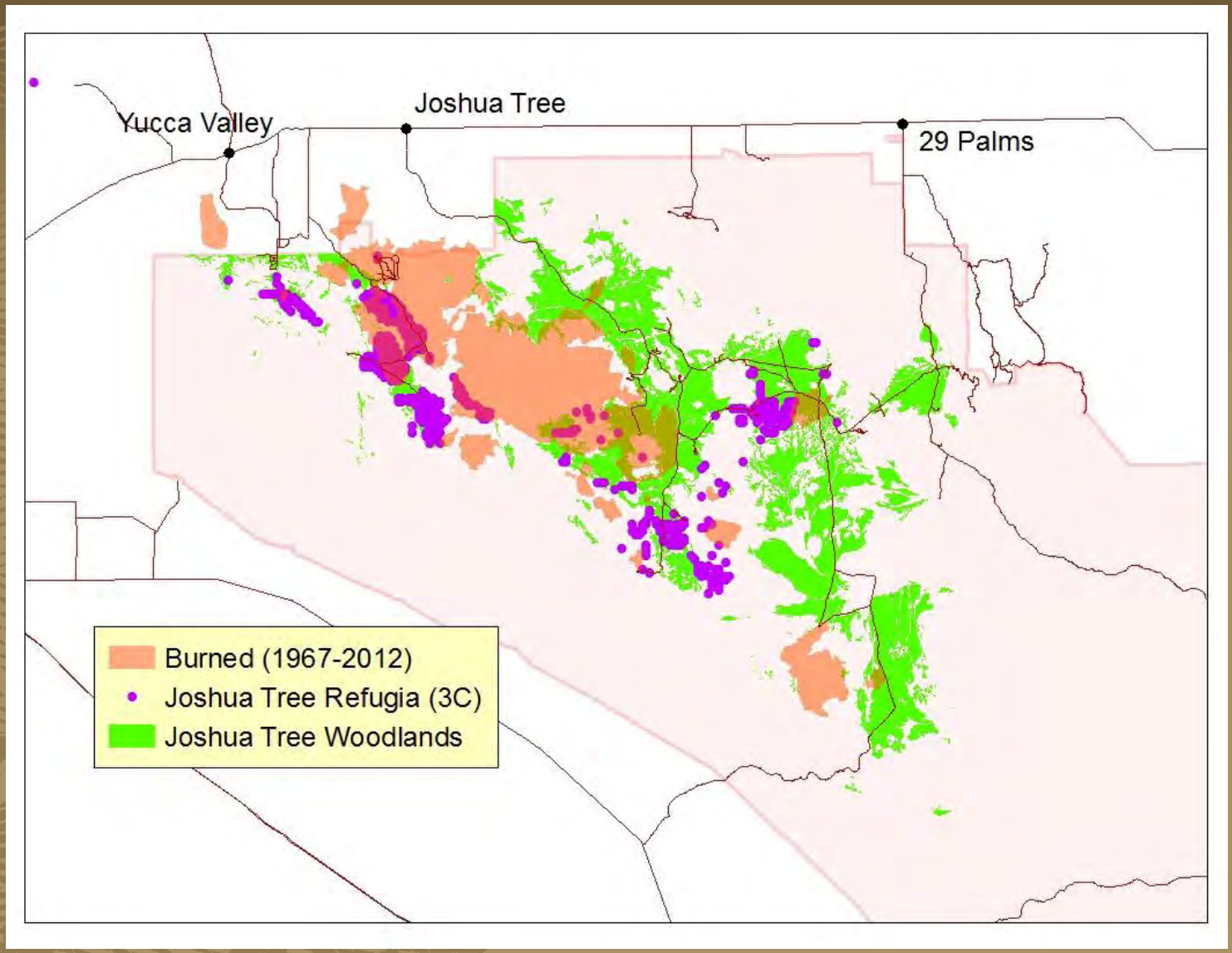
Joshua tree threats:
1) Climate change
2) Wildfire (invasive grasses)

The areas identified as climate refugia are the same areas most likely to burn!

Old growth Joshua tree, Upper Covington Flats



Joshua tree refugia as modeled by Barrows and Murphy-Mariscal (2012) under a 3 degree C warming scenario



Approximately 1/3rd of the refugia have already burned!

JOTR Resource Stewardship Strategy (2014)

"BIO4: Direct Management: Control non-native annual grasses associated with Joshua tree stands in order to minimize threats from fire".

*"**Finding effective control measures for invasive grasses** will help remaining Joshua tree habitats be resilient to fire and allow Joshua tree populations to persist into the future."*

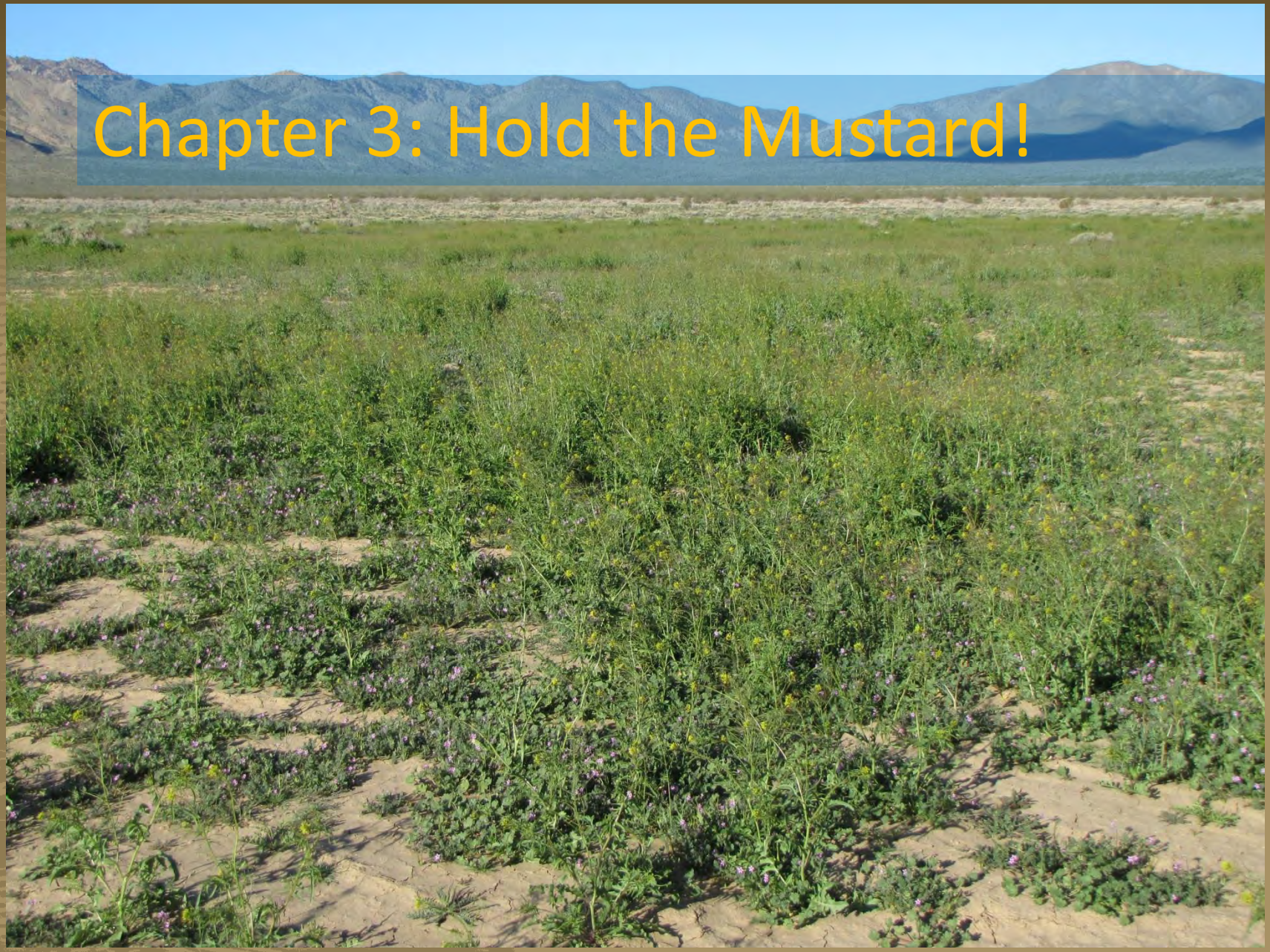
Invasive Grass and Fire Tour, July 2017

Senesced Bromus tectorum, Upper Covington Flats, September 2017

Schismus, March 2017

Invasive Annual Grasses: *Outcompeting our native wildflower species?*

Chapter 3: Hold the Mustard!



London rocket (Sisymbrium irio) infestation on the Pleasant Valley Playa, March 2017

Hirschfeldia incana

Sisymbrium irio

Sisymbrium orientale

Sisymbrium altissimum

Brassica tournefortii

Weed Pull Volunteer Days

April 2017: 27,500 tumble mustard plants removed

While we figure out ways to treat widespread infestations, we need to keep invasive plants out of areas they are just beginning to colonize.

Lone Sahara Mustard in wash south of Black Eagle Mine Road

Chapter 4: The Invasive Plant Patrol (IPP)

The Invasive Plant Patrol (IPP)

A group of trained volunteers and trained park staff from all divisions that map and report on satellite infestations.

The IPP also treat satellite infestations as they are encountered by cutting

For annuals, cut below basal rosette of leaves

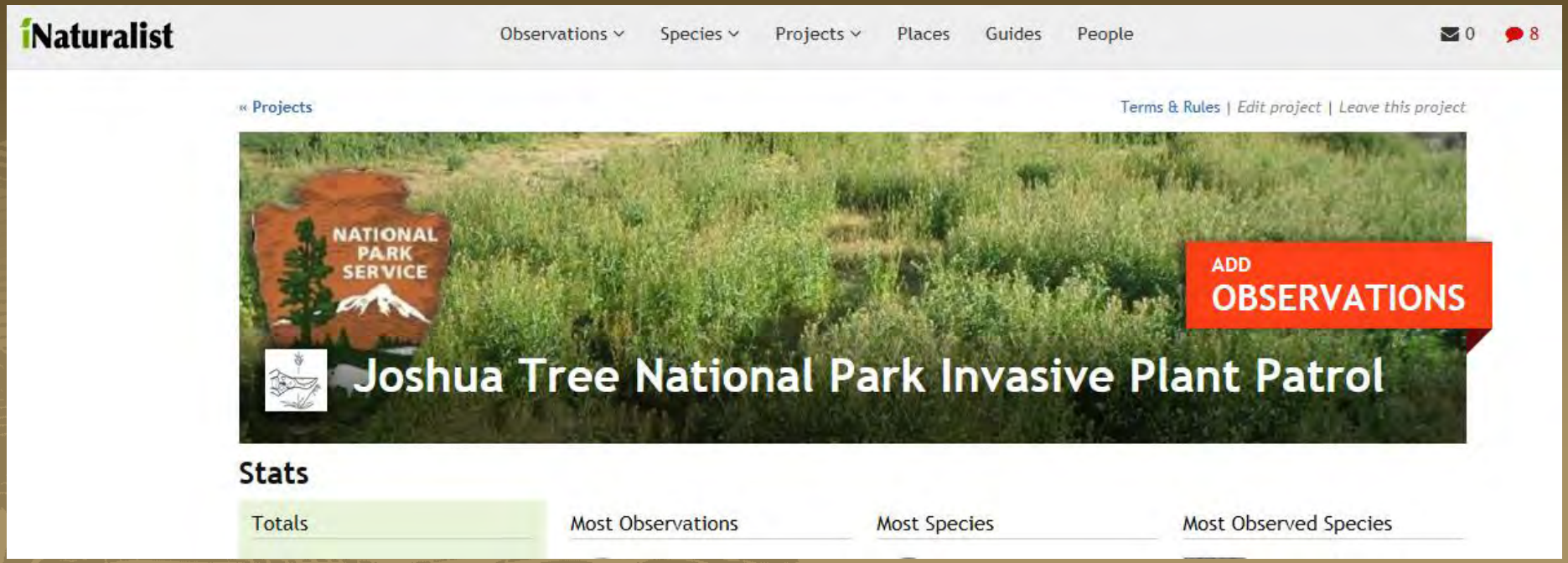
For perennials, cut off the reproductive parts

Before

After

Solitary fountain grass plant in Rockhouse Canyon

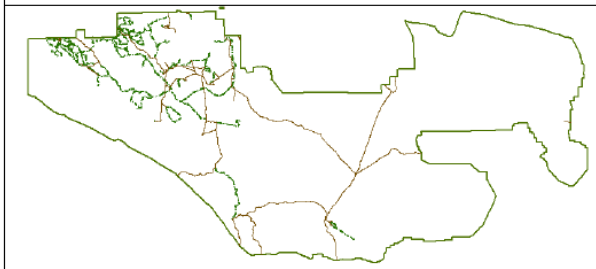
Early Detection
Rapid Response



NAME:_____

DATE:_____ TIME:_____

COORDINATES:	
E =	N =



AREA OF INFESTATION	_____X_____ ____^{2}
TOTAL # OF INDIVIDUALS	plants
TOTAL # OF PLANTS REMOVED	plants

PHENOLOGY (circle all those that apply)

SEEDLING	SAPLING
VEGETATIVE	ROSETTE
BOLTING/BUDDING	FLOWERING
FRUITING	SENESCING
MATURE	LEAFING

LOCATION DESCRIPTION	ADDITIONAL NOTES:

Volunteer Reporting Tools

Conclusions

- Leave your legacy (pass on the torch)
- The importance of “negative data”
- Annual plants present unique challenges
- Working across boundaries is key

Birdseed induced invasion of sorghum and millet at the park’s boundary