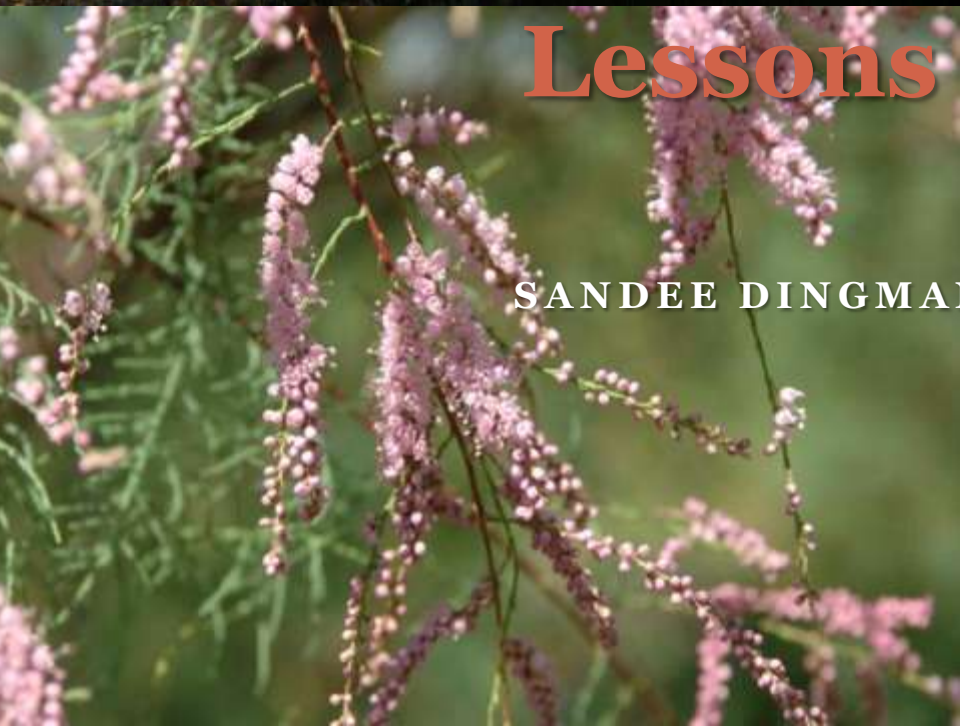




# The Ideal Approach to Fire and Invasive Species Management: Lessons Learned



SANDEE DINGMAN, LAKE MEAD NRA



# Major Themes in Fire and Invasive Plants




- 1) fire effects and fire management impacts on nonnative plant invasions
- 2) changes in fuel characteristics and fire regimes caused by nonnative plant invasions
- 3) use of fire to control nonnative invasives

Citation: Zouhar, Kristin; Smith, Jane Kapler; Sutherland, Steve; Brooks, Matthew L., eds. Wildland Fire in Ecosystems: Fire and Nonnative Invasive Plants. Gen. Tech. Rep. RMRS-GTR-42-volume 6. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

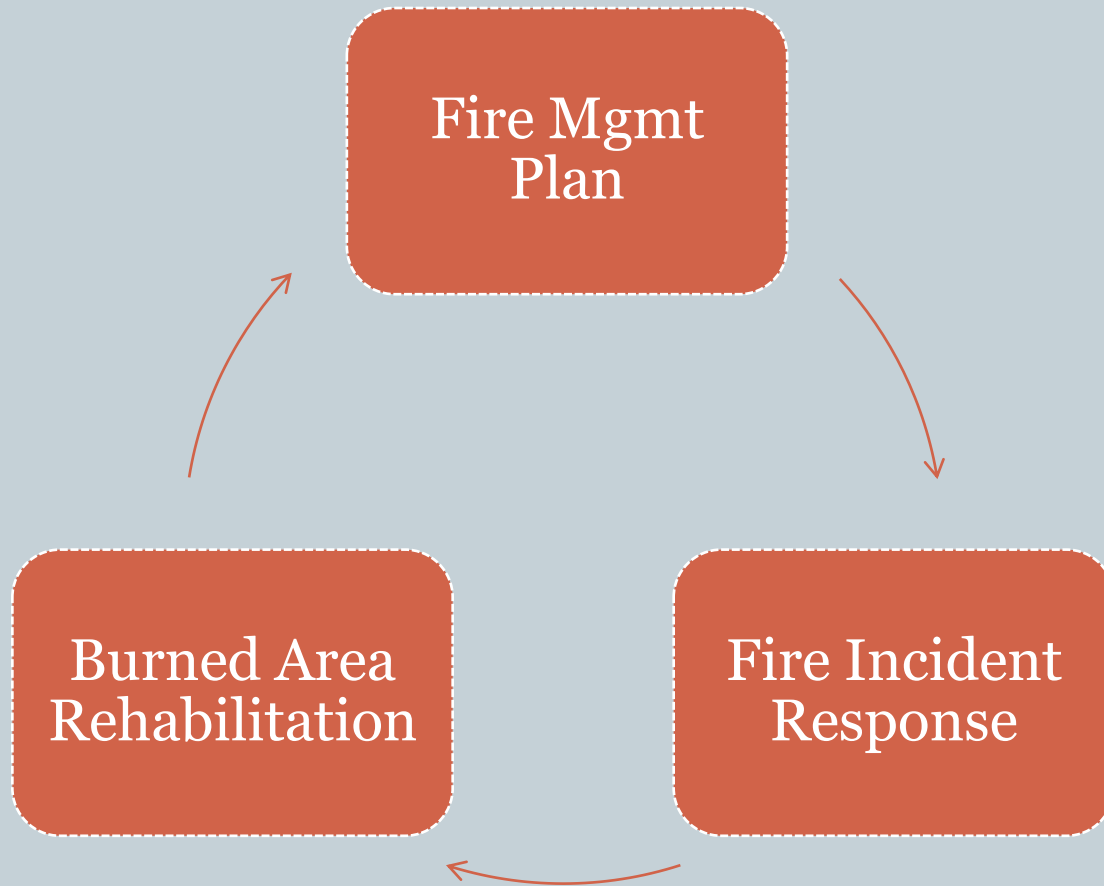
# Major Themes in Fire and Invasive Plants



- 1) fire effects and fire management impacts on nonnative plant invasions 
- 2) changes in fuel characteristics and fire regimes caused by nonnative plant invasions
- 3) use of fire to control nonnative invasives

Citation: Zouhar, Kristin; Smith, Jane Kapler; Sutherland, Steve; Brooks, Matthew L., eds. 2008. Wildland Fire in Ecosystems: Fire and Nonnative Invasive Plants. Gen. Tech. Rep. RMRS-GTR-42-volume 6. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

# Life Cycle Approach = Ideal Approach



# FIRE MANAGEMENT PLAN



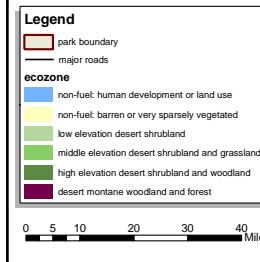
# Inventory Vegetative Resources



- Location, abundance, and variability
- Response to fire and ground disturbance
  - Useful tool: Fire Effects Information System
- Altered fire regime
  - Useful tool: Fire Regime Condition Class Assessment
- Native response to fire

**Figure 4: Fire Regime**

This map is an interpretation of the vegetation map (Thomas 2004) whereby mapped vegetation classes were assigned to fire regimes based on ecological zones and fire ecology described by Brooks and Minnich (in press). More complete descriptions of these ecological zones and fire regimes can be found in the Death Valley Fire Effects Monitoring and Research Plan.



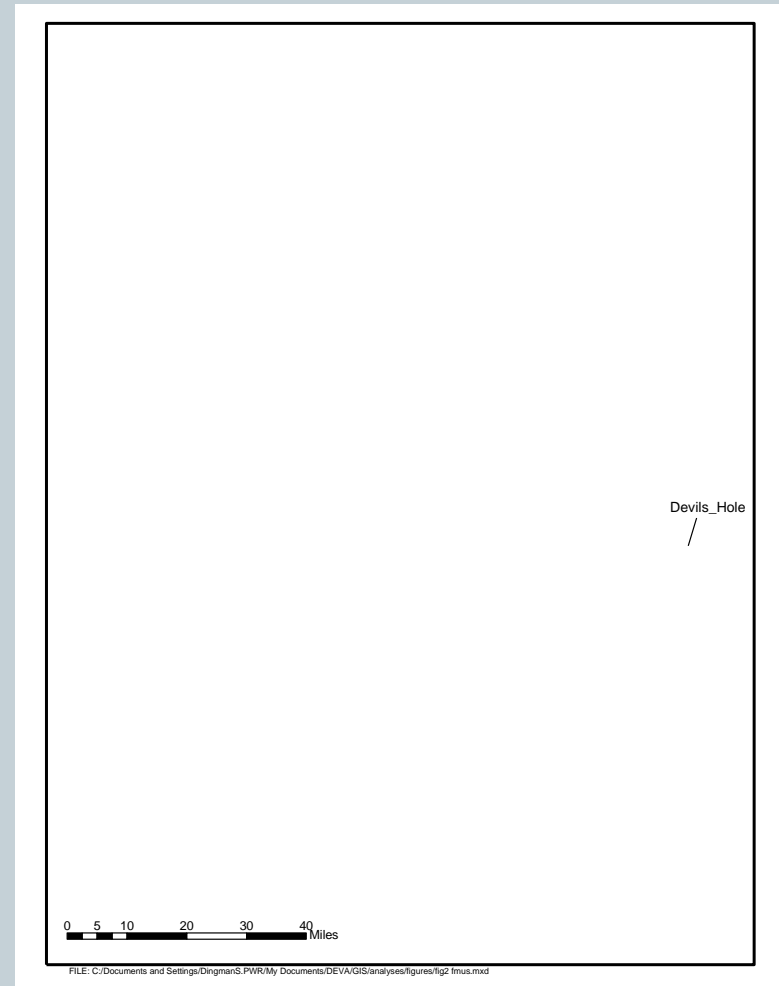
FILE: F:\DEVA\GIS\analyses\figures\fig4 fire regime.mxd

**Lessons Learned:** It takes time to do this during FMP, but you have more time during planning than during a fire incident.

# Make FMP Useful



- Invasive species considerations in...
  - goals and objectives
  - descriptions of Fire Management Unit
  - burned area emergency stabilization and rehab section
  - environmental protection measures
- Appendix: Resource Advisors Guide
  - compile relevant geospatial data
- Appendix: Fire Effects Research and Monitoring Strategy
  - Fire Monitoring Handbook, FEAT, etc.



# Include invasive species considerations in local operational guidelines



- Decontamination protocols for incoming equipment from out of the area
- Decontamination protocols for local equipment returning from non-local assignments
- Include a broad range of invasive species, including aquatic invasive species

**Lesson Learned:** Some aquatic invasives can also foul fire equipment and make it inoperable (e.g. NZ mudsnails and quagga mussels). See SW Guidelines.



New Zealand mudsnails



Giant salvinia



Quagga mussels



# Prepare for Fire



- Train and equip competent resource specialists to serve as qualified Resource Advisors (READ).
- Establish a call-out schedule so that a Resource Advisor is available whenever needed.



# FIRE INCIDENT



Hackberry Fire 2005

# Invasive Species Prevention During Fire



- **Manipulate Resource Availability**
  - Minimize resource input
    - ✦ Use fire retardant only to avoid vegetation removal
  - Maximize resource uptake
    - ✦ Minimize vegetation removal
    - ✦ Cover exposed soil with organic mulch
- **Propagule Pressure**
  - Minimize dispersal
    - ✦ avoid known infestations
    - ✦ wash vehicles and equipment

From: Brooks, M.L. 2008. Chapter 14: Effects of Fire Suppression and Postfire Management Activities on Plant Invasions. In: Wildland Fire in Ecosystems: Fire and Nonnative Invasive Plants.

(Adapted from Asher and others 2001, Goodwin and Sheley 2001)

# Location, location, location....

- Where should fire incident operations be located?
  - Incident Command Post
  - Base Camp
  - Spike Camps
  - Staging Areas
  - Fueling Areas
  - Helibase and helispots
  - Retardant base
  - Dip/draft locations

Kingston 2 Fire, 2005



**Lesson learned:** Think carefully about the conventional wisdom of using previously disturbed areas. People and equipment become vectors for weed dispersal!

# Communicate



- Transfer local knowledge and guidelines to the Incident Management Team
- Provide local GIS data
- Ensure a local Resource Advisor attends all planning meetings and briefings

**Lesson Learned:** Communicate with the public about fire and invasives via Fire Info Officer and keep talking about the subject to the media and the public after the fire.



# Initial Attack



First priority is firefighter and public **SAFETY!**

- During IA, staging is informal and highly mobile
  - Avoid known infestations
  - Clean vehicles before use on fireline

Wildhorse Fire, 2002



**Lesson Learned:** IC, firefighters, and READs will be focused on other concerns and there's rarely enough water available to wash incoming vehicles. Just try to keep track of where vehicles are gathered, what water sources are used, where response vehicles came from, etc.

# Extended Attack Incident

- Extended attack, will have large footprints
- Time to be pro-active:
  - Establish wash station for both check-in and demob equipment
  - Identify known infestations to avoid, alternative sites that could be used
  - Be diligent in requiring cleaning of earth moving equipment

**Lesson Learned:** Do quality control on the wash station operation!



Incident Command Post, Angora Fire, 2007



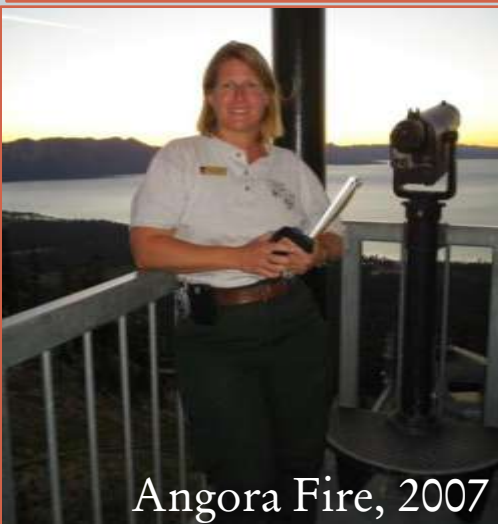
Staging Area, Hackberry Complex, 2005

# Throughout any Incident



- Pay attention to what is carrying the fire – is it primarily carried in native or non-native fuels?
  - Indication of how “natural” the fire effects are
- Gather daily information for follow-up
  - Where are all the incident operation areas?
  - Where are ground-based equipment coming from?
  - Map frequently wet areas – dip sites, hydrants
  - Work with Sit Unit and FOBS to get info

**Lesson Learned:** Write it all down somewhere, preferably on an IAP map, and keep your IAPs. You won't remember everything!





# Don't forget Air Ops!



- Where raw water was drafted/dipped and dropped?
- What type & where was retardant was mixed and applied?

## **February 19, 2008 *Missoulian* Newspaper Article: Researchers analyze retardant use, By John Cramer**



A year after the Fourth of July fire on Mount Jumbo, a long green line of cheatgrass is visible where fire retardant was dropped. The red slurry retardant allows some exotic weeds to replace native grasslands, according to preliminary results of a study by Salish Kootenai College and the University of Montana.

Photo by Jed Little

# POST-FIRE RESPONSE



Sacramento Wash Fire, 2008

# Invasive Species Prevention During Emergency Stabilization, Rehab, and Restoration



- **Manipulate Resource Availability**
  - **Minimize resource input**
    - ✦ Do not use fertilizers to promote plant growth
    - ✦ Avoid using nitrogen-fixing plants where nitrogen may aid invasion
  - **Maximize resource uptake**
    - ✦ Cover exposed soil with organic mulch
    - ✦ Minimize land uses that reduce native plant establishment or vigor
    - ✦ Revegetate with fast-growing, non-invasive species to speed uptake of available resources
- **Propagule Pressure**
  - **Prevent deliberate dispersal**
    - ✦ Revegetate with native species or non-invasive nonnative species
  - **Minimize accidental dispersal**
    - ✦ Consider temporary closure of public access
    - ✦ Survey burned areas to locate nascent populations and eradicate or contain
    - ✦ Ensure vehicles, equipment, and personnel do not disperse propagules
    - ✦ Test seed mixes and other types of re-vegetation materials for invasive contaminants
    - ✦ Implement a monitoring and retreatment plan for invasive plants

From: Brooks, M.L. 2008. Chapter 14: Effects of Fire Suppression and Postfire Management Activities on Plant Invasions. In: Wildland Fire in Ecosystems: Fire and Nonnative Invasive Plants. (Adapted from Asher and others 2001, Goodwin and Sheley 2001)

# Suppression Rehab

- During an incident and up to 90 days after
- Keep good records for follow-up monitoring
- Minimize ground disturbance during rehab
  - Reconsider the traditional wisdom of re-contouring or ripping incident operation areas if it may increase weeds
  - Clean equipment between rehab areas

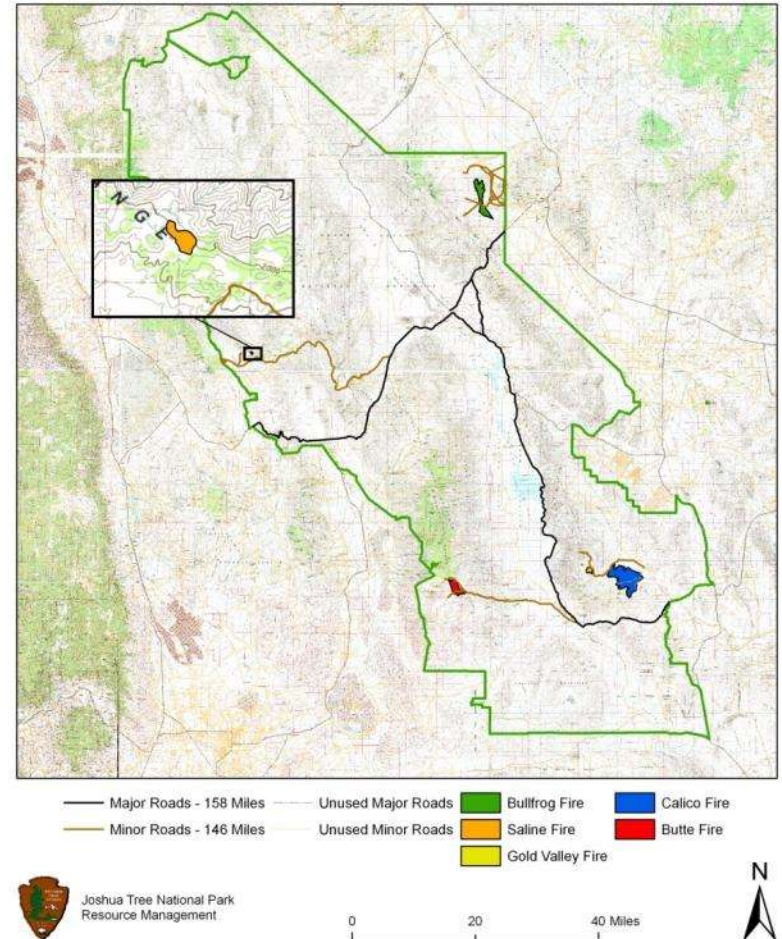


**Lesson Learned:** Leaving fireline accessible to roads invites off-road vehicle travel – a well known weed vector in the Mojave Desert.

# Emergency Stabilization & Burned Area Rehab

- Funds for weed control for 3 years post-fire
- At a minimum should include early detection and eradication in high risk areas that burned
  - Roads and trails
  - Incident operational areas
  - Springs and shorelines
- Need NEPA document for intensive treatments

Potential Invasive Species Vector Corridors



Kelly Complex, 2006

# Emergency Stabilization & Burned Area Rehab

- Be aggressive in weed control
- Be wary of ESR treatments that cause additional ground disturbance
- Make sure mulch treatments use sterile straw
- Require clean equipment in all contracts and thoroughly inspect equipment
- To seed or not to seed – big issue!
  - Native vs non-native species
  - Availability of local genotypes
  - Timing & type of application
  - Even certified seed still allows .01% contamination

Kolob Fire, aerial herbicide, 2006



Kolob Fire, post treatment, 2008



# Allow for Recovery



Hackberry Complex, 2006, 1 yr post fire

- Reconsider visitor use management
  - Area closures or use reductions
  - Limit or prohibit ground disturbing uses (e.g. ORV)
- Reconsider resource management activities in a burned landscape
  - Defer livestock grazing (2 yrs +)
  - Remove wild horses and burros
- Monitor recovery and continue to adapt management actions

# LEARN FROM EXPERIENCE



Hackberry Fire, 2005, native *Verbena goodingii*



# Prepare for the Next Fire (Season)



- Implement Fire Effects Monitoring Strategy and analyze data.
- Invite fire effects research and incorporate findings.
- Use Fire Management Plan annual updates to refine local guidelines and environmental protection measures.
- Use Five-year Fuel Plan updates to incorporate new knowledge of fire and fuel dynamics.
- Update READ Guide and datasets.

Willow Fire, 2004



A large, dark silhouette of a Joshua tree stands prominently in the center of the frame. The tree's characteristic spiky leaves and branching structure are clearly visible against the sky. To the left, another smaller Joshua tree is partially visible. The background is a dramatic sunset sky, transitioning from a deep red and orange glow near the horizon to a darker, blue-grey hue at the top. The overall scene is a classic desert landscape at dusk.

Questions?

Sandee Dingman, Lake Mead NRA  
sandee\_dingman@nps.gov, 702-298-1070