Prescribed Burn Preparation and Execution

Lecture Outline

- Prescribed Burn Equipment and Safety Considerations.
- Considerations Before You Burn.
- Planning and Preparing Your Prescription.
- Burn Boss Duties and Responsibilities.

Planning for a Prescribed Burn

Prescribed Burn Equipment and Safety Considerations



Basic Fire Starting Equipment

Strike Anywhere Matches



- Drip Torch
 - -30% gasoline
 - -70% diesel



Fire Weather Equipment

Belt Weather Kit

- Sling psychromoter
- Anemometer
- Compass

Kestrel

- Humidity
- Wind speed
- Temperature
- Dew Point
- Heat index





Personal Protective Equipment

- Nomex Jacket and Pants.
- Hard hat and goggles.
- Leather gloves and boots.
- Bandana soaked in water.



Hand Held Radio

- Each person
 participating in burn
 should have a hand held
 radio.
 - Range of 1-5 miles
- GPS should be used on fire line for suppression and reporting.





Sustenance

- Drinking water in all vehicles.
- Water bottles or canteens.
- Snacks
- Lunch
- Be prepared.

Fire Suppression Equipment





- Centrifugal Pumps.
- Secure tank in vehicle with chain, bolts, and come-a-longs.
 - A sliding tank in a pickup will take out a tailgate.

Fire Suppression Equipment

- Water barrel
- Jeep 50 gallon water sprayer
- 4-Wheeler
- Surfactants soap
- Foam nossels
- Phos-check





Fire Suppression Equipment

Fire Rake



Leaf Blower



Chainsaw



Heavy Fire Suppression Equipment

Slip-In Spray Unit



Bulldozer



Extra Safety Equipment

Wire/Bolt Cutters



Heavy chain for towing or pulling



Equipment Safety

All power equipment should be in good repair and started prior to conducting the burn

Planning for a Prescribed Burn

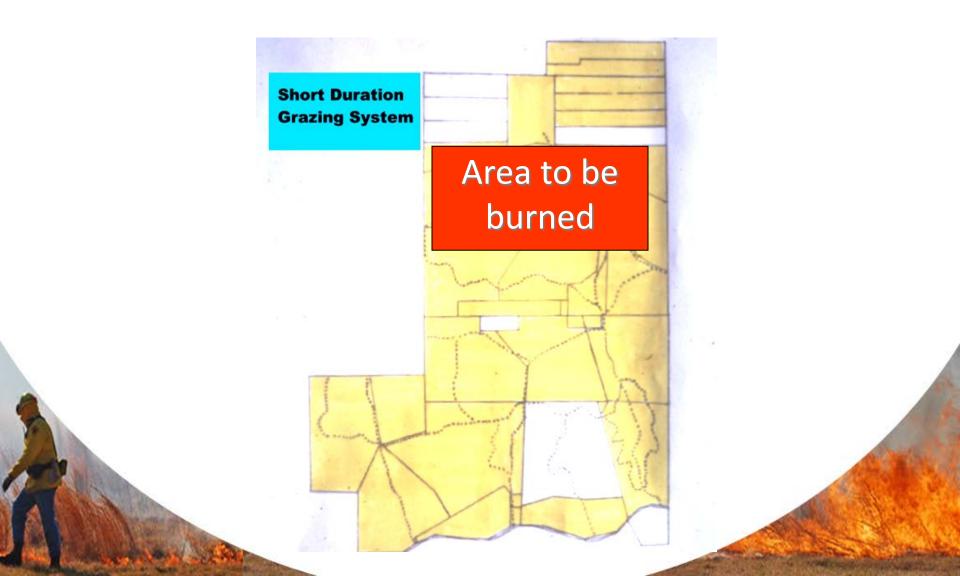
Considerations Before You Burn



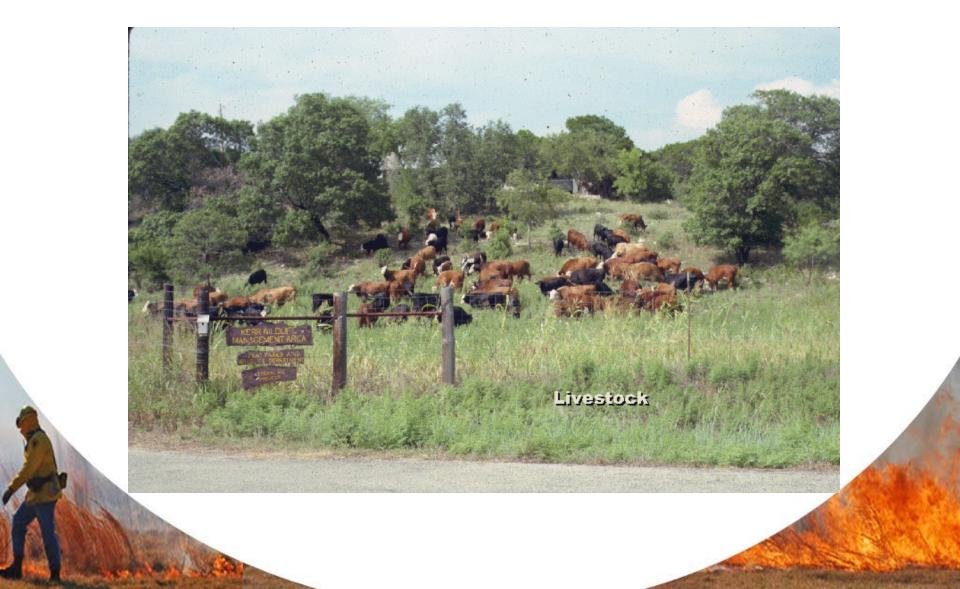
Burn Preparation

- Rest pasture at least 1 growing season.
- Reduce fuel loads in surrounding pastures.
- Build fire lanes.
- Remove brush piles.

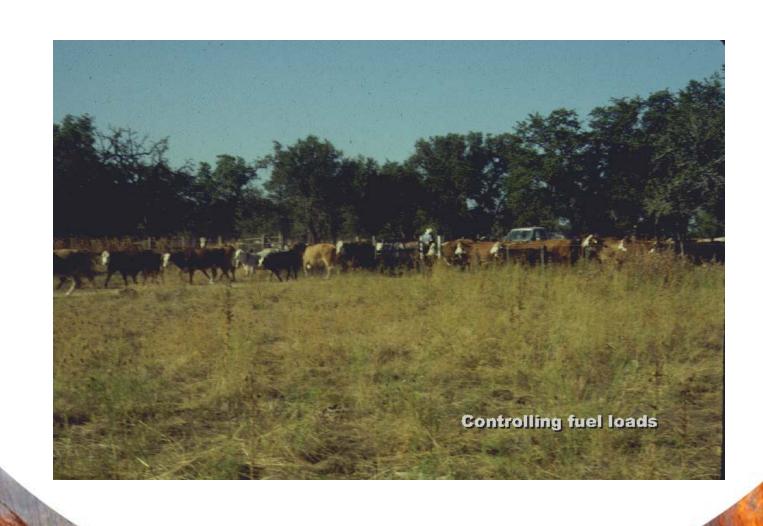
Select Pasture to be Burned



Adjust Stocking Rates



Controlling Fuel Loads





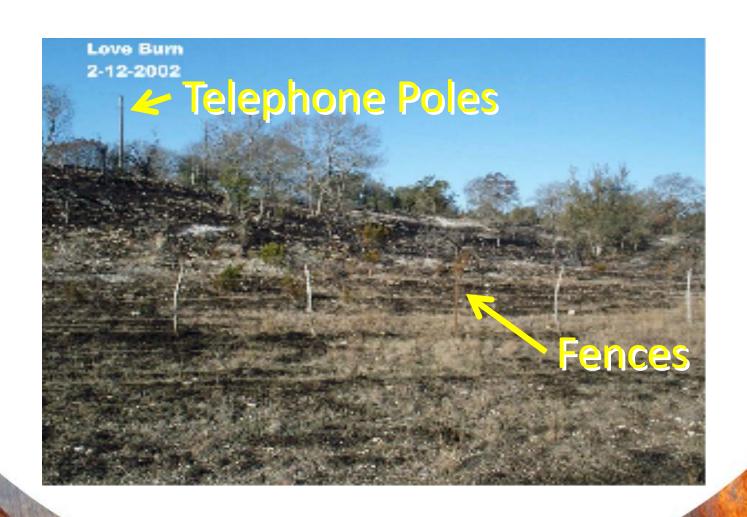
- A written document with pertinent information about conducting the burn.
 - Personnel
 - Equipment
 - Areas of concern
 - Conducting the burn
 - -Clean up

Preburn Preparation

- Deer blinds and feeders.
 - Move or Burn around.



Telephone Poles and Fences



Water Locations

- Consider time to fill sprayers.
- Water storage areas should be full.
- Use transfer pumps to fill sprayers.
- Temporary water storage.



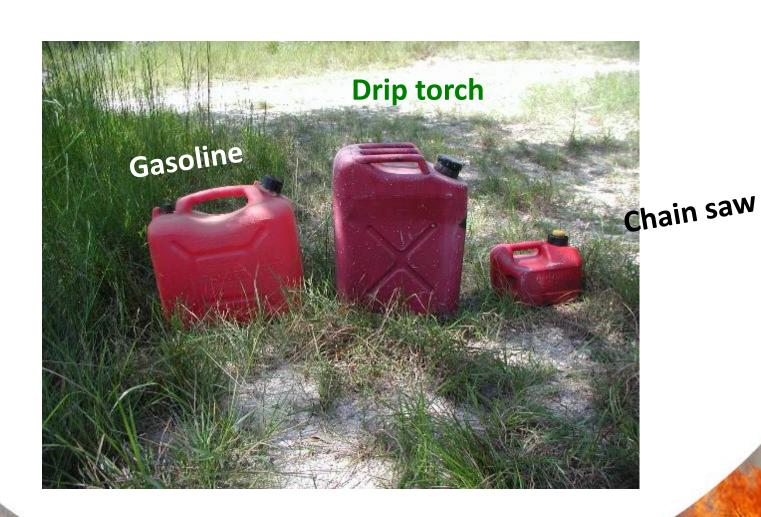
Identify Different Fuel Mixes

Label drip torch mix.

Chain saw and leaf blower gas.



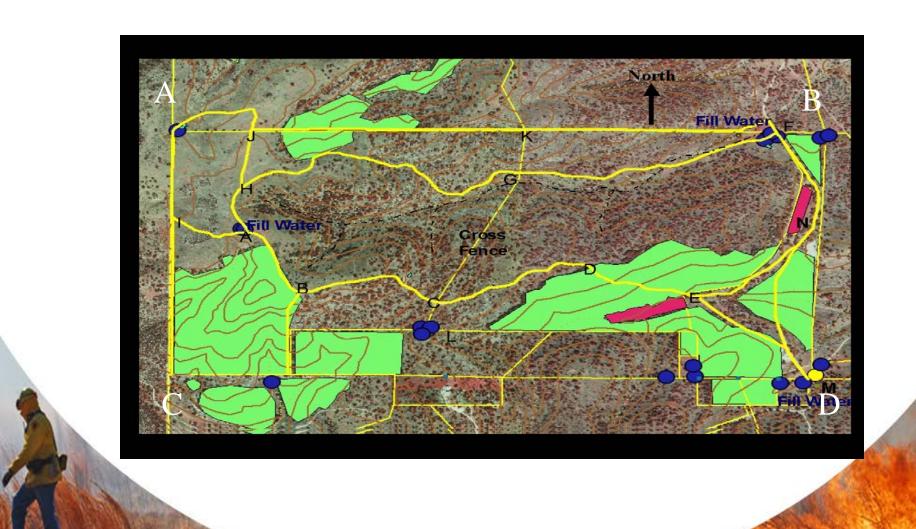
Properly Marked Gas Cans



Mapping

- Map locations of roads, water points, fire lines, equipment and fuel.
- Selected features should be marked both on the map and on the ground.
 - Topography
 - GPS points
 - "Fall Back" positions.
 - Location designations (1 or A)

Mapping -continue



Notifications

- Neighbors
- Sheriff Department
- Highway Patrol
- Fire Departments

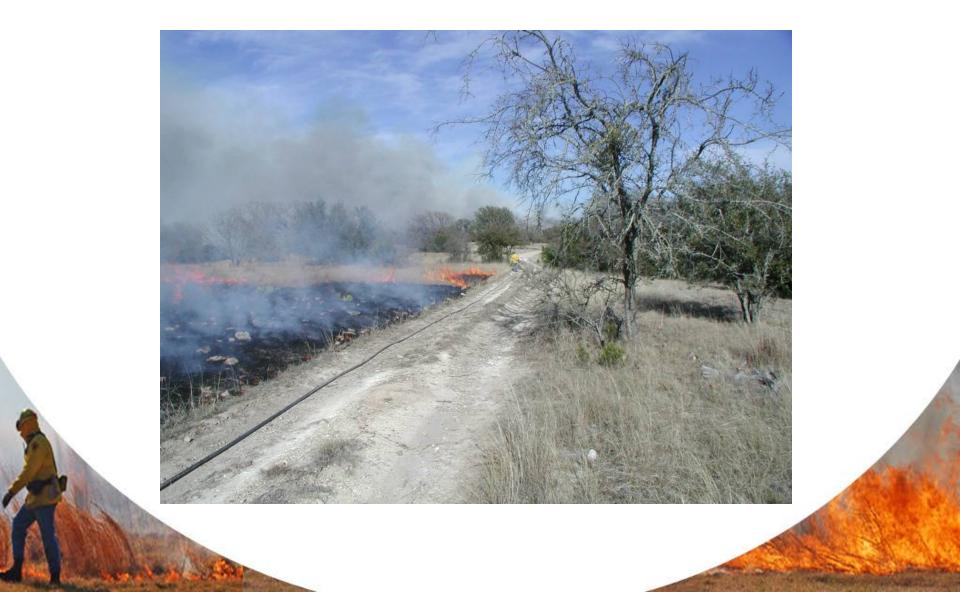
Other Considerations

- Burning near roads.
- Sensitive receptors.
 - Oil wells, gas wells, propane tanks
- Fences and stays.





Water Lines



Portable Radios

- UHF, FM or other radio type.
- Charged batteries.
- All persons participating in fire should have a radio with an extra battery and be on the same frequency.

Ignition

- Ground
 - Drip torches
 - Butane burners

- Aerial Ignition
 - Fixed wing
 - Helicopter

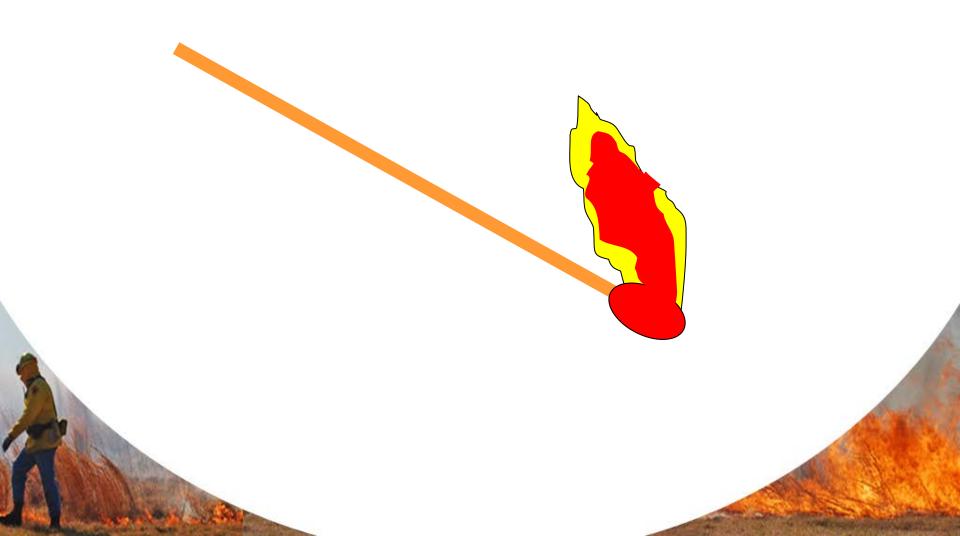
Responsibility for Lunch



Areas of Concern



Fight Fire Before Striking Match



Agarita Near Fire Lanes

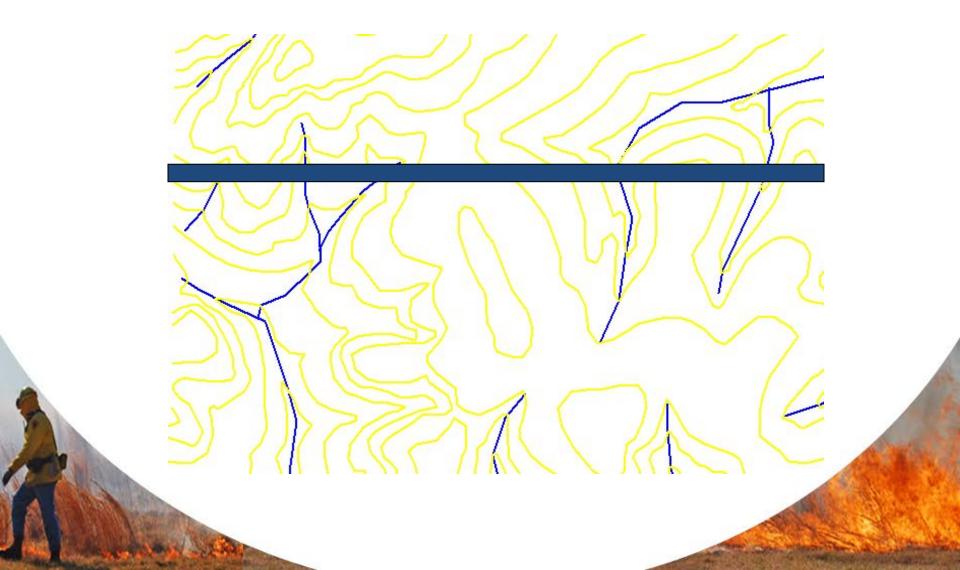


Yuccas Near Fire Lanes

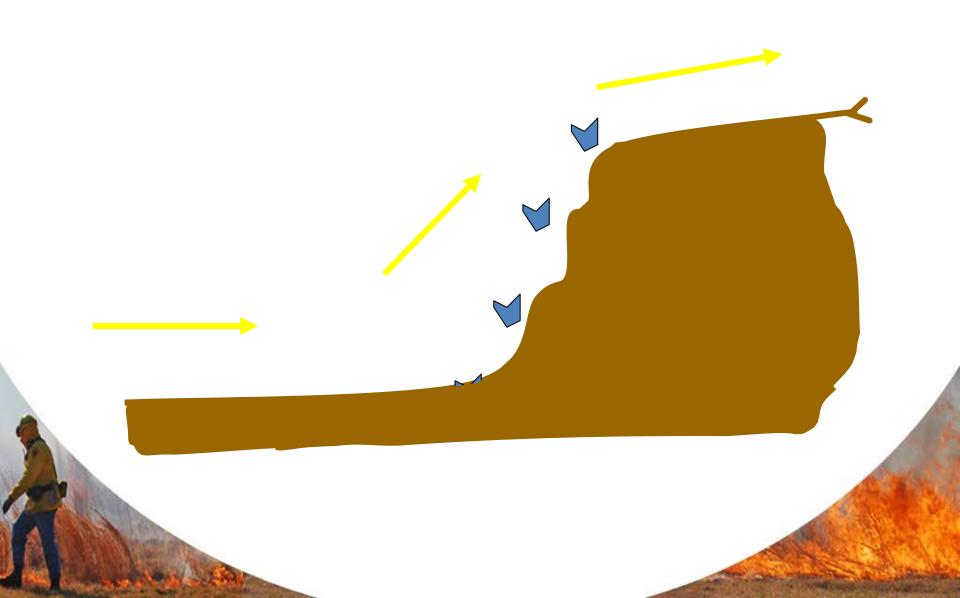




Topography (Draws and Gullies)



Bluffs and Ledges



Brush Piles within 300 ft. of Fire Lane



Water Gap Slash





Culverts

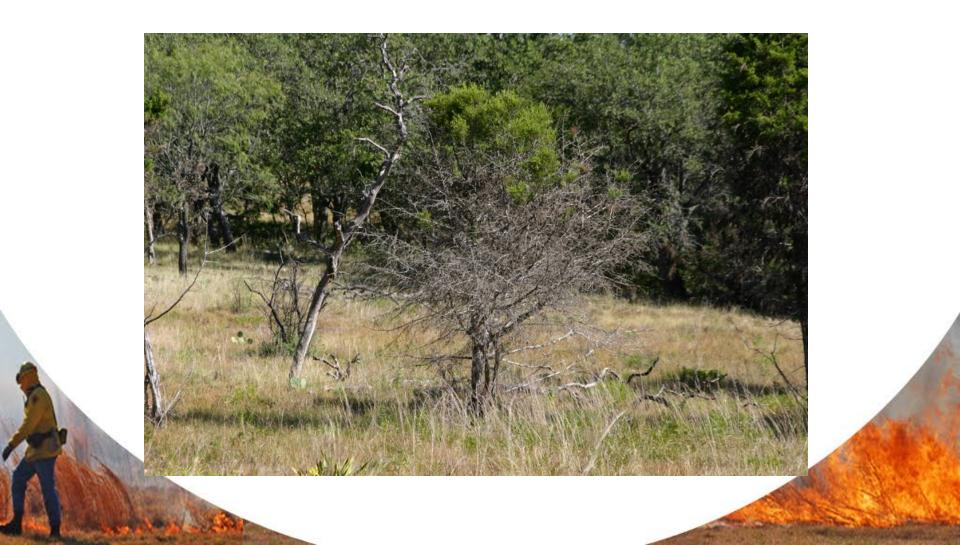




Past Fire Scars



Dead Standing Trees Near Fire Line



Power Transmission Lines





Planning for a Prescribed Burn

Planning and Preparing Your Prescription



6 P's of Prescribed Burning

- Prior Proper Planning Prevents Poor Performance.
 - Planning should begin one year before scheduled burn date.
 - Identify burn goals and objectives.



- Part of fire plan.
- Specifies ideal environmental conditions for fire.
- Describes ignition procedures and location of ignition, suppression crews, and firelines.



Elements of a Prescription

- Purpose and objectives
- Safety Plan
- Crew Size
- Description of burn unit
- Map of burn unit
- Pre-fire actions
- Weather factors
- Fuel Conditions
- Crew Experience

- Season and time of day
- Smoke forecast
- Smoke Management
- Publicity
- Firing Plan
- Control and Mop-up
- Evaluation and Critique
- Legal Requirements
- Fire Guards

Fire Boss Role

- Coordinates fire crews.
- Checks equipment and weather conditions.
- Notifies proper authorities.
- Directs fire implementation.



- Cavalary
 - Suppress spot fires and gather intelligence.
- Artillery
 - Spray units.
- Infantry
 - Drip torch carriers.

Torch Fuel Mixture

Air Temperature

-<40 F

-40-60 F

-60-80 F

->80 F

Diesel: Unleaded

-50:50

-55:45

-60:40

-65:35

Need Adequate Fuel for Burn

- Grazed buffalo grass = 300 lbs/ac
- Ungrazed buffalo grass = 1,000 lbs/ac
- Ungrazed Texas wintergrass = 2,000 lbs/ac
- Ungrazed sideoats grama = 3,000 lbs/ac
- Ungrazed little bluestem = 5,000 lbs/ac
- Ungrazed mixed grass = 1,500-2,500 lbs/ac

Fire Suppression and Management

- Cut firelanes ahead of the burn.
- Require communication equipment.
- Pumper units should be in working order.
- Check insurance coverage and upgrade if necessary.
- Attend a burn school and join a burn association.
- Attend as many burns as time allows to gain experience.



Prescription Outlines Burn Purpose and Objectives

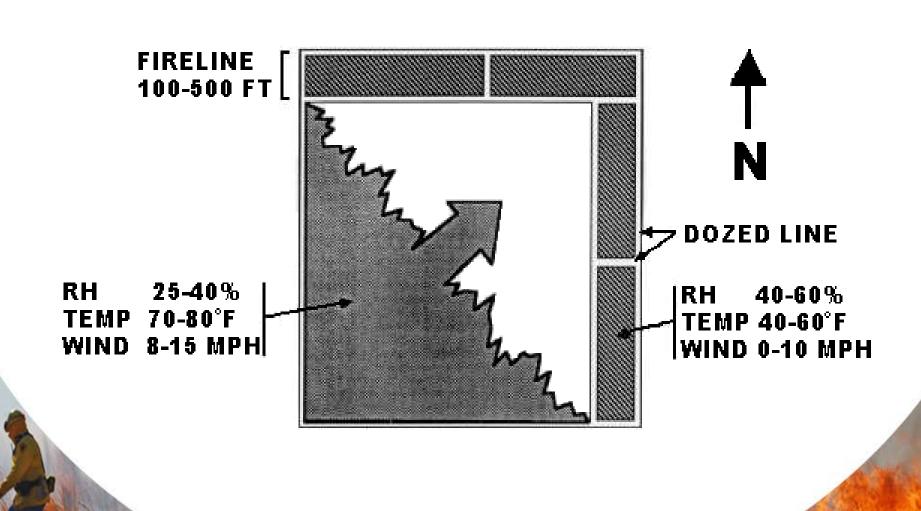
- Measurable land owner objectives:
 - Why does land require prescribed burn?
 - –What will prescribe burn accomplish?



Manager Prescribed Burn Objectives

- Improve wildlife habitat depending on timing of burn.
 - Late fall or early winter burns:
 - Increase forb production.
 - Winter burning of Texas winter grass:
 - Improves palatability and forage quality.
 - Hot fires:
 - Manage undesirable woody plants.

General Prescription

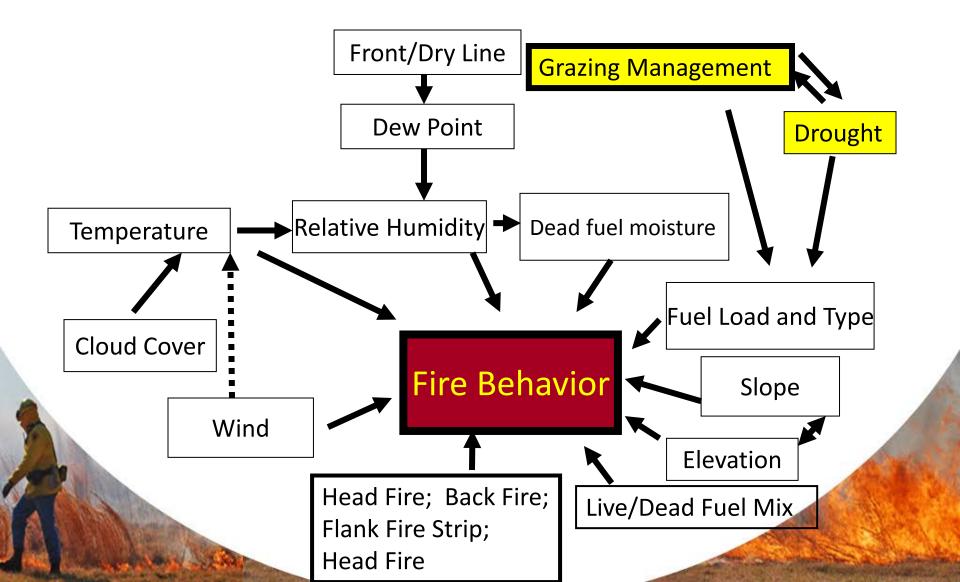


Planning for a Prescribed Burn

Types of Fire

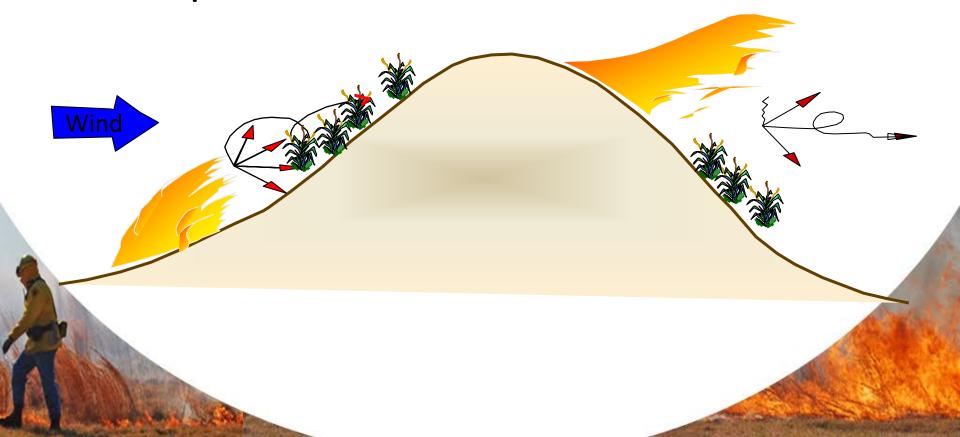


Factors Affecting Fire Behavior





• Each 10% slope increase, doubles rate of fire spread.



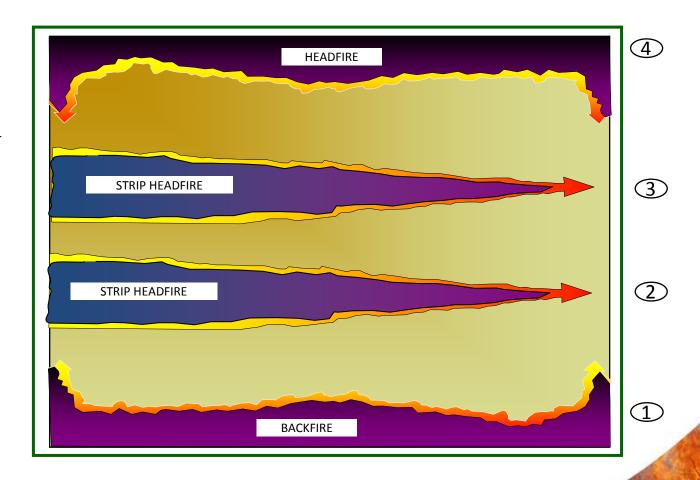


- Headfires
 - Move with wind, most intense, have high rates-of-spread.
- Backfires
 - Move against the wind, effective for burning fine fuels.
- Strip-head fires
 - Vary by ignition techniques in order to control fire intensity.

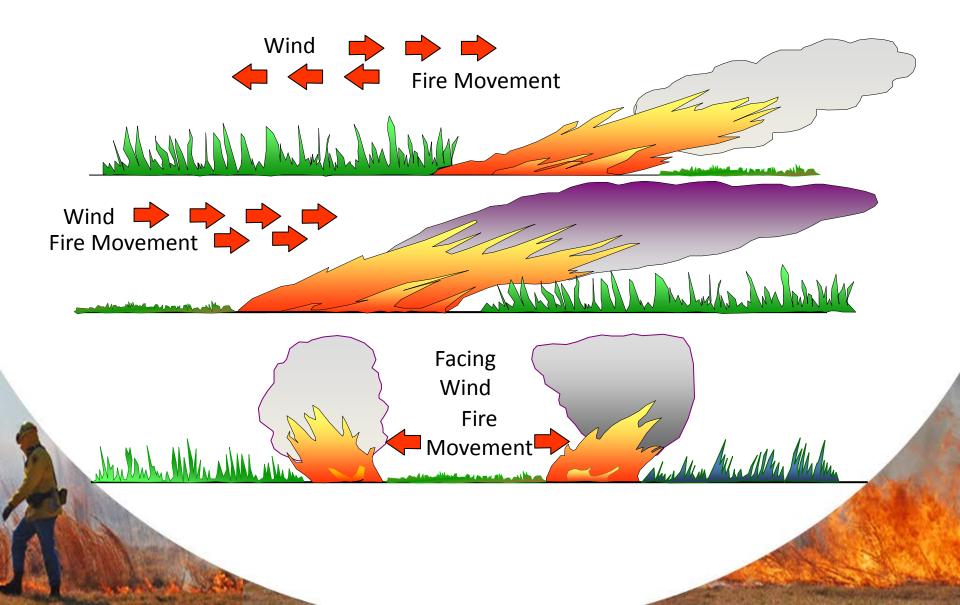


Types of Fire - continue





Backfires



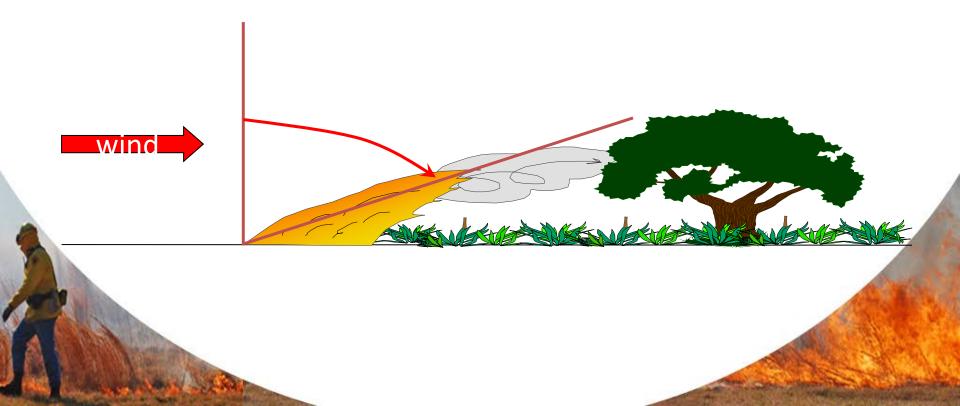


- Dry fuel amount determines available fuel.
- The greater the available fuel, the greater the fire intensity and rate of spread.



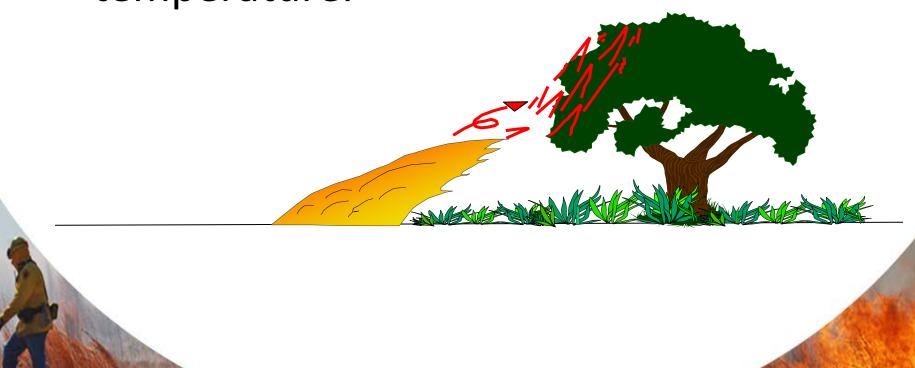
Preheating of Fuels

 High wind speeds tilt fire front causing preheating of fuels assisting ignition.

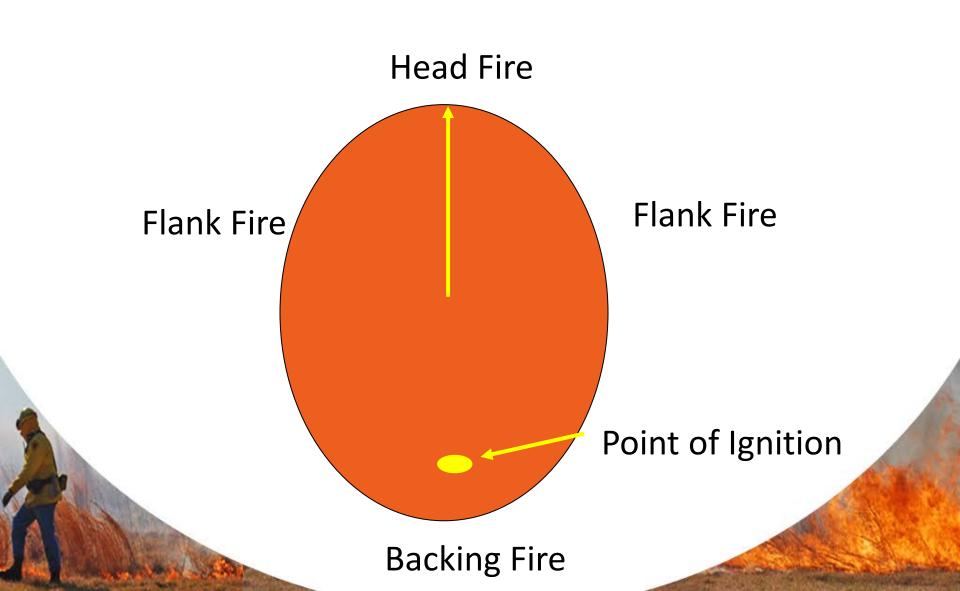


Ignition Temperature

 High air temperatures facilitate crown fires of woody plants and reduce ignition temperature.

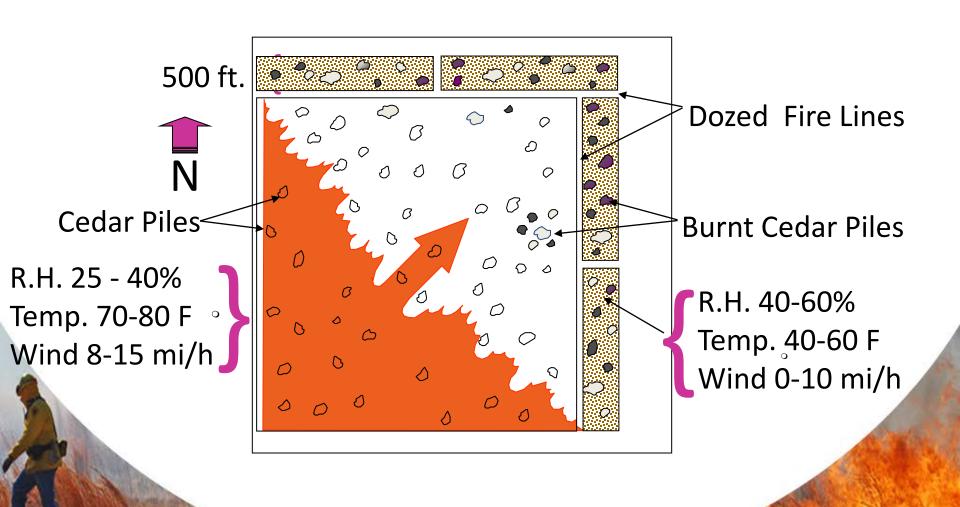


Ignition Temperature - continue



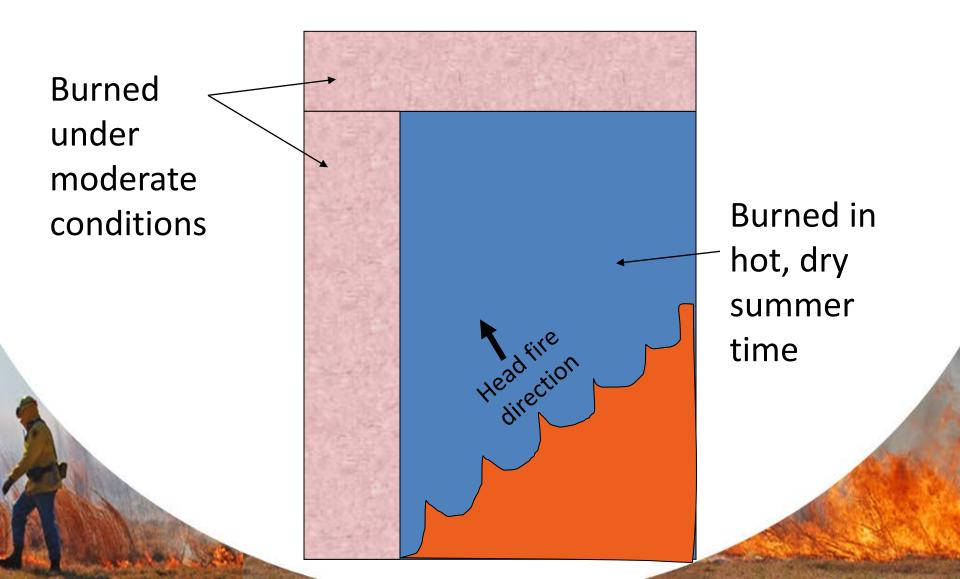


Fire Plan for Juniper

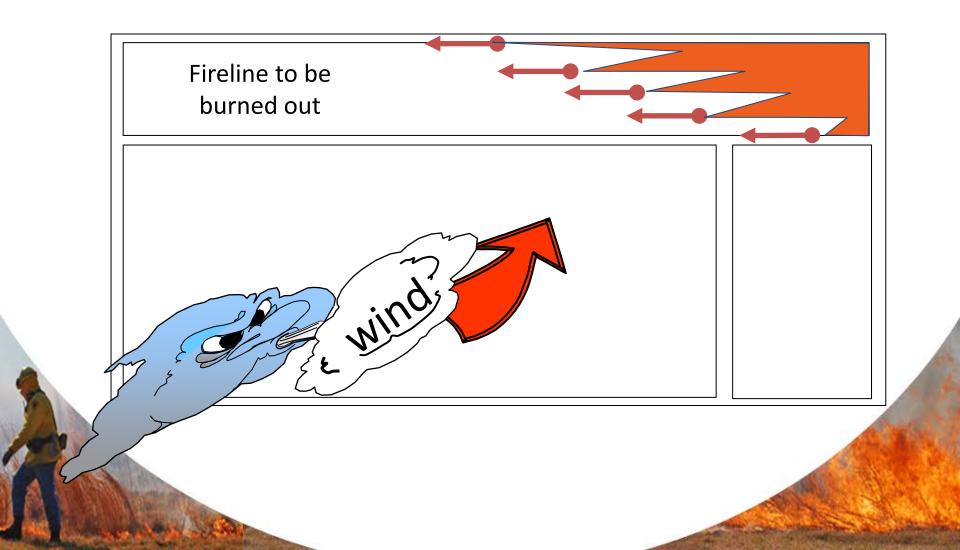




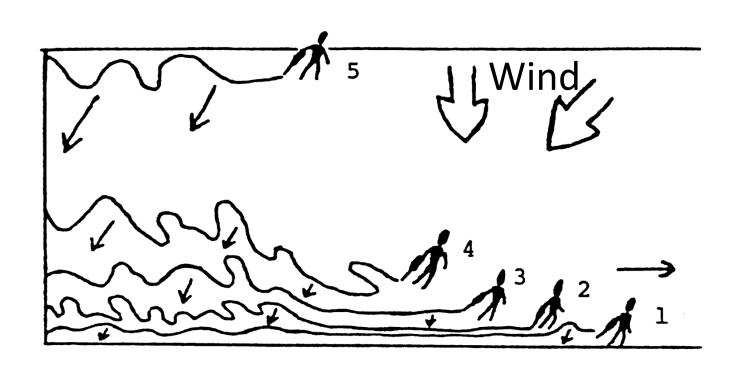
Headfires



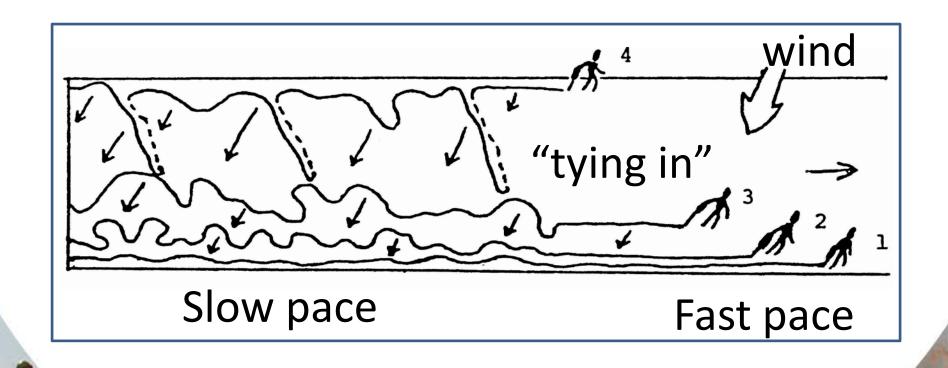




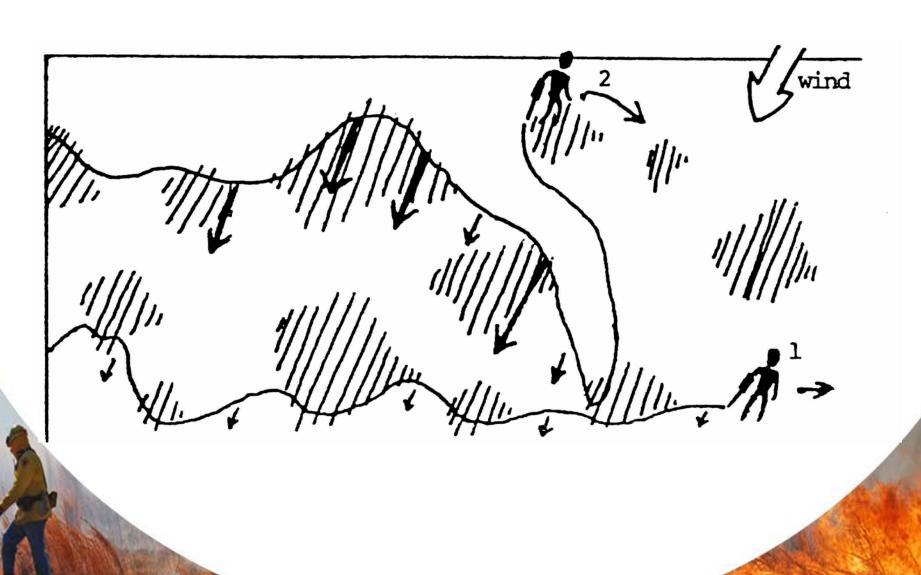
Strip Headfire



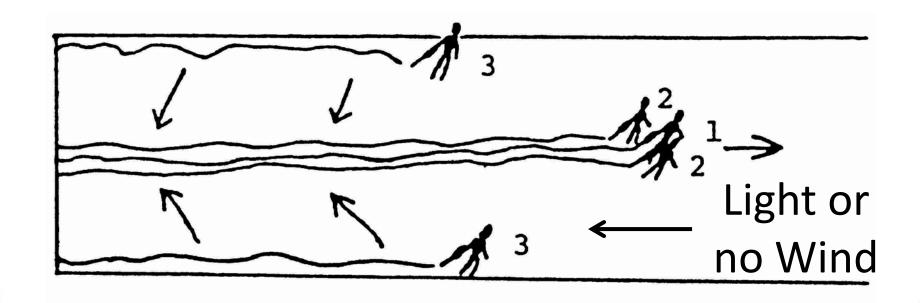
Pace



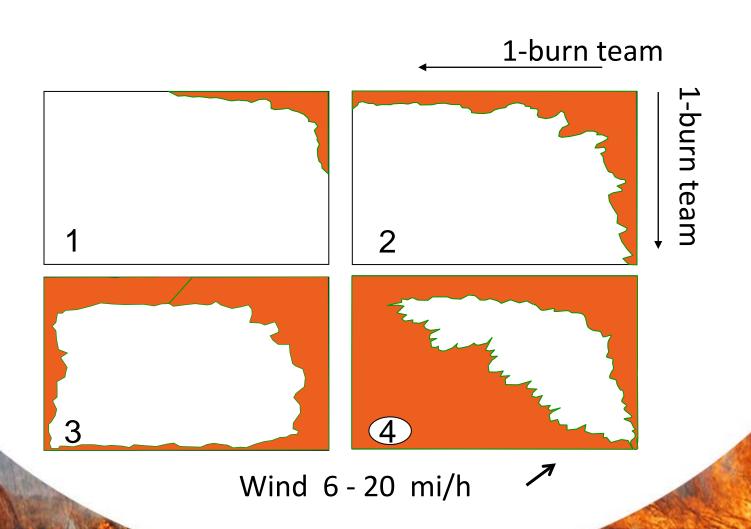
Fuel Considerations



Moving Centerfire



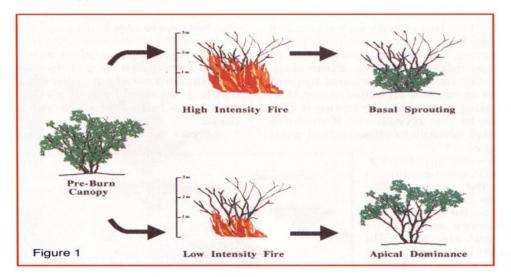
Backfires



Burning Mesquite



2. Low-intensity fires kill some lower canopy foliage and stems to create what appears to be a browse line.



Winter/Spring Burns for Mesquite

	<u>Fire-line</u>	Top-Kill Fire	<u>Savanna Fire</u>
Air Temp	40-60F	70-80F	50-70F
RH	40-60%	25-40%	30-50%
Wind	0-10 mph	8-15 mph	8-12 mph

Burning Juniper



Juniper Fuel Moisture Guidelines

- <60%
 - Drought and/or summer conditions with high fire intensity.

- 60-75%
 - Relatively dry conditions with high fire intensity.

Juniper Fuel Moisture Guidelines - *continue*

- 76-85%
 - Moderate conditions with moderate fire intensity in juniper, often used for burning blacklines.
- >85%
 - Relatively moist conditions with moderate to low fire intensity in juniper, often poor topkill of juniper.

Weighing Samples

Wet weight - Dry Weight X 100 = %LFM Dry weight



Stripping of Leaves from Juniper



Juniper Leaves





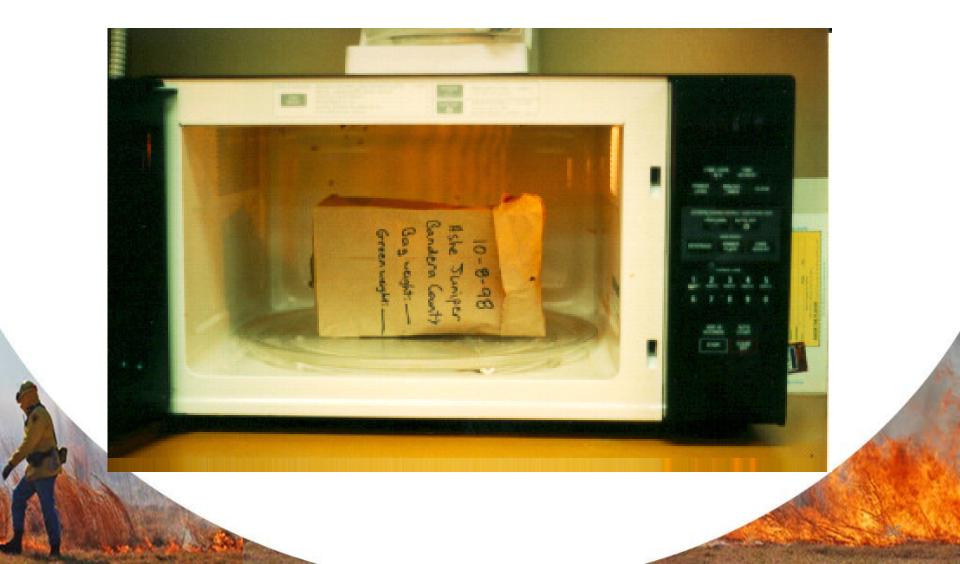
Sampling



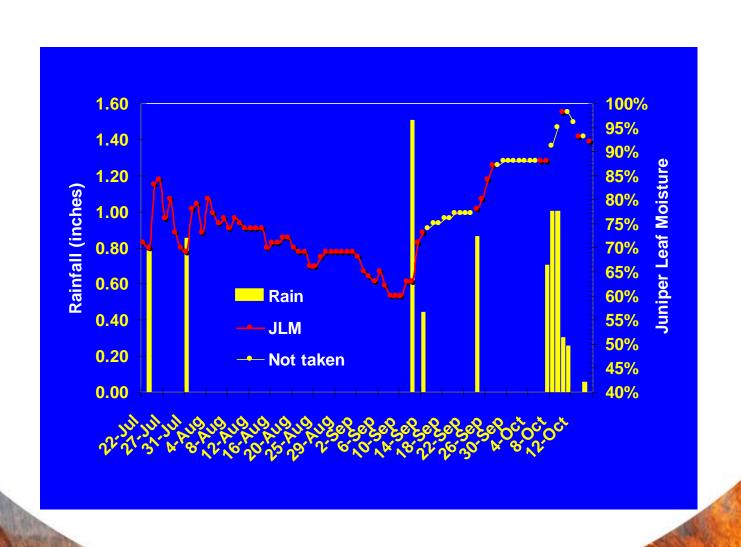
- Take sample at 3 ft level from similar sized juniper.
- Vary samples across burn unit to obtain accurate measure of fuel moisture.
- Weigh sample in field.



Drying Samples



Juniper and Fuel Moisture



Planning for a Prescribed Burn

Burn Boss Duties and Responsibilities



Burn Boss Duties

- Responsible individual at a burn.
- Pre-burn planning.

Actual burn responsibilities.

Post-burn responsibilities.

Pre-Burn

- Contract with landowner.
- Plan at least 1-year in advance.
- Survey the area.
- Identify landowner goals and objectives.
- Develop a burn plan.
- Contact potential fire crew.



Write Fire Prescription

- Written set of burn parameters needed to meet landowner objectives.
 - Burn timing
 - Weather conditions
 - Fuel moisture
 - Fuel load
 - Identify target species



- Part of fire plan developed to meet landowner goals and objectives.
- Specifies environmental conditions ideal for burn.
- Describes ignition procedures and location of ignition, suppression crews, and fire-lines.



- Plan will protect you in case of lawsuit.
- Specify range of weather conditions as not to limit when you can conduct burn.
- Follow prescription.

Goals and Objectives

- What are you trying to control or improve?
- How will plants affected by burn respond?
- What is grazing management required before and after burn?
- How will success of burn be evaluated?



Burn Boss Organization

- Know laws and regulations.
- List needed equipment.
- List individuals who will assist in burn.
- List all contacts required to conduct burn.

Burn Boss Pre-burn Responsibilities





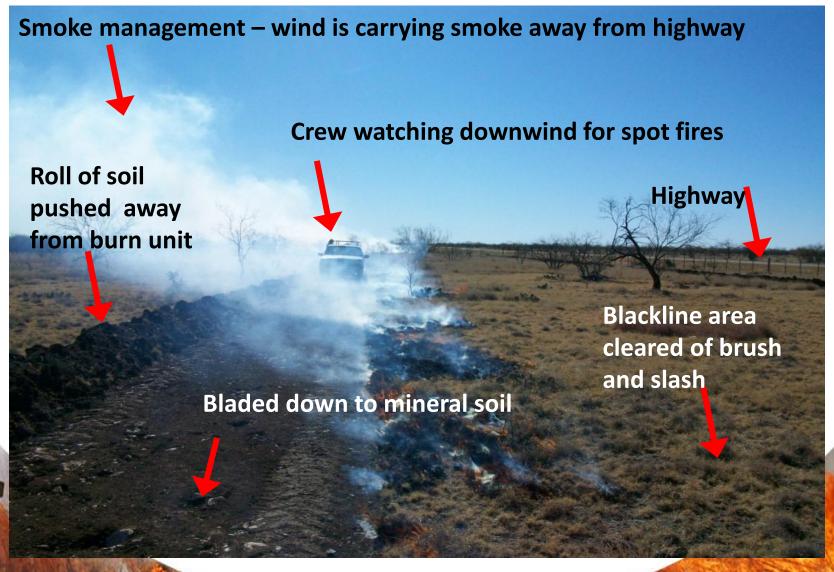


- Verify insurance policy covers burn.
- Contact hunters and oil and gas lessees.
- Contact neighbors
 - Reduces risk and encourage good relations.

1-3 Months Pre-burn - continue

- Identify people and equipment required for burn.
- Become familiar with pasture and potential problem areas.
- Photograph fuel load, problem areas and brush piles to assist in writing burn plan.
- Locate water sources.
- Know prevailing wind direction(s) and access roads.

Example Fire Guard



Fireguard Construction

- Must be bladed down to mineral soil.
- Wider is better.
- Throw the "roll" of the soil away from burn area.
- Double fireguards work best.
- Straight lines are safer.
- Try to avoid steep topography.
- Avoid fences.
- Cut stopping points in black line area.

Poor Fireguard





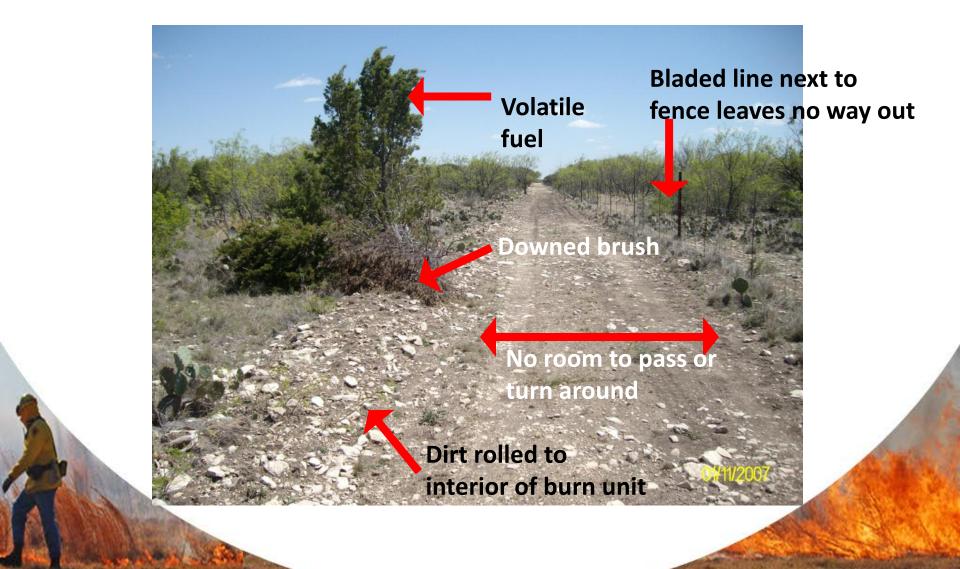
Safety Considerations



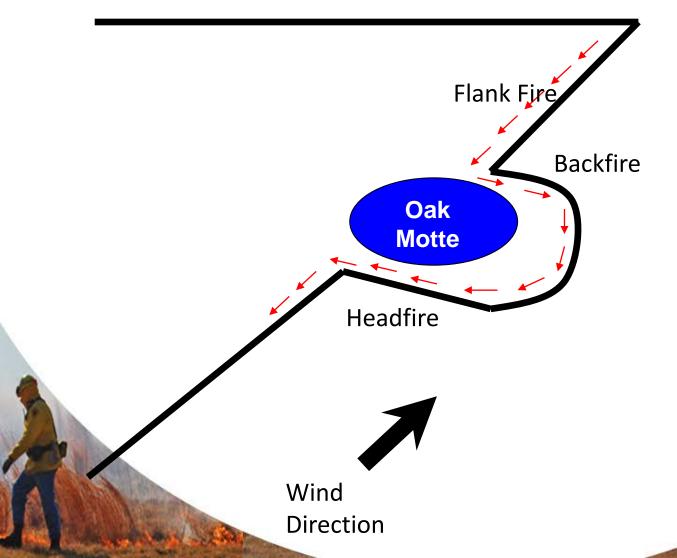
Safety Considerations - continue



Safety Considerations -continue



Considerations For Wanted Vegetation





Vegetation Considerations















Grazing



1-3 Weeks Pre-burn - continue

- Make meal and snack arrangements for burn day and round up ice chests and water coolers.
- Remind neighbors of burn.
- Make list of available personnel and equipment.
- Get all necessary paperwork in order.
 - Burn plan
 - Notifications
 - Insurance policies

1-3 Weeks Pre-burn

- Monitor weather.
 - http://www.srh.noaa.gov
 - Fire weather planning forecast
 - Online spot-forecast request



Equipment and Supplies

- Slip-in sprayers for pick-ups
- Sprayers in backs of ATVs
- Radios
- Nearby water source
- Transfer pump and hoses
- Weather instruments (Kestrel)
- Lighter or matches
- Hand tools (rakes, hoes, flappers, shovels)
- Drinking water or Gatorade
- Appropriate clothing (cotton or Nomex)
- Warning signs or flags for public roads
 - Wire cutters

- Extra fuel for sprayers and vehicles
- Drip torch fuel
- Breathing mask or bandana
- Camera
- Mobile phone
- Leather gloves
- Change of clothes
- All necessary paperwork (maps, burn plans, insurance information, certification, contact info for county sheriff, VFDs, National Weather Service, etc.)
- Keys or combinations for locked gates



Elements of a Prescription

- Season and time of day
- Safety plan
- Crew size
- Description of burn unit
- Map of burn unit
- Pre-fire actions
- Weather factors
- Fuel Conditions
- Crew Experience

- Smoke forecast
- Smoke management
- Publicity
- Firing plan
- Control and mop-up
- Evaluation and Critique
- Legal requirements
- Fire guards

Summary

- Write a burn plan.
- Do not burn unless prescription conditions exist.
- Plan fire escapes, spot fires, equipment failures and weather changes.
- 12-person crew works well for most burns.

Burn Boss Burn Day Responsibilities



Burn Day

- Check weather.
- Call proper authorities.
- Brief personnel on burn plan.
- Walk through burn area.
- Ensure burn participants familiar with maps and burn plan.

Burn Day - continue

- Assign each crew member with a task.
- Brief crew on predicted weather.
- Ensure crew members can operate equipment.
- Make sure equipment is working properly.
- Be willing to cancel the burn if needed.



- If someone hired to act as burn boss, do not pressure that person to burn.
- Ultimately the burn boss decided whether it is appropriate to burn.



Burn Boss Duties During The Burn

- Provide guidance and direction.
- Be a good communicator.
 - -Remain calm.
 - -Speak <u>slow</u> and <u>clear</u> on radios.
 - Use directional queues.
 - -Communicate changes in plan or weather.
- Patrol burn area.
- Ensure everyone stays hydrated.

Post Burn Mop-Up

- Ensure burn material is carried into interior of burn unit.
- Check weather.
- Beware wind shifts.
- Cut or extinguish all burning tree/limbs near perimeter.
- Drag limbs and debris into interior of unit.



- Notify all burn local or county burn entities.
- Rake leaves away from base of trees in oak mottes.
- Pile scattered burning branches, logs, and brush to speed burn-up.
- Prepare to stay with the burn over night.

Example Mop-Up











Post Burn Considerations

- Livestock grazing deferment
- Herbicide application
- Erosion
- Reseeding
- Using goats to manage resprouting brush
- Using cattle to manage prickly pear



Summary

- Watch burn unit until it is completely safe.
- Mop up fire line preferably at night.



Conclusion

- Properly serviced equipment will increase your success rate and safety.
- Plan your prescription well in advance.
- Prepare for your burn day weeks in advance but don't force it when the day comes.
- Know your Burn Boss and let them manage the fire, (Too many cooks spoil the broth).