Evaluating Land for Fire Management

- Natural community:
  - past, present and desired future
- Considerations for prescribed fire:
  - access, hazards, landscape context
Historic Natural Community

- Historic photos
- Land survey records
- Local reference sites
- Past disturbance (agriculture – grazing, cropping, drained wetlands)
Present Site Conditions

- What is the current plant community?
  - intact remnant
  - degraded remnant
  - highly disturbed, novel community
- Invasive species present?
- Does it provide adequate receptive fuel to burn?
- High fuel loads?
Invasive Species Considerations

Biennials
(e.g., sweet clover)

- Dormant season burns will stimulate seed germination.
- Burns timed during flower period show best control.
- Mowing at during flower period is an alternative.

Invasive Species Considerations

Woody species (e.g., buckthorn)

- Growing season burns may result in greater mortality.
- Dormant season kills seedlings, but established plants will generally resprout.
- Wide variation in fire effects depending on a number of factors – residence time, fire intensity.

Tom Brock

http://pvcblog.blogspot.com
Invasive Species Considerations

Perennial, clonal species (e.g. Canada thistle, goldenrod)

- Often stimulated by dormant season burns.
- Growing season burns, especially during flower period more likely to reduce population vigor and density, opening space for other plants.

Richard Gardner, UMES, Bugwood.org
Invasive Species Considerations

- Fire can be used as a preparatory treatment for herbicide application. Removes thatch/leaf litter and stimulates fresh growth for treatment.
- Fire is one tool to be used in an integrated program.

http://pvcblog.blogspot.com
Other Considerations

- Access for crew/equipment (topography)
- Water features, wetlands
- Hazards: old fence, poison ivy, snags, brush piles...
- Threatened and endangered species present?
- WUI – sensitive receptors (smoke management)
Desired Future Community

- Identify goals that feed into prescribed burn planning to guide timing and frequency of fire application.
Developing a Burn Plan

Prescribed Burn Plan

Biocore Prairie

Signatures and Dates

Explosion Date of Plan: March 15, 2023

Legal Considerations

Ownership of the site: University of Wisconsin System Board

Burn Boss, crew and equipment will be provided by the UW to accept liability for the burn. The responsibilities of the contract are approved by the UW Safety Department.

UW Chancellor Rebecca Blank, Vice Chancellor of Facilities, Chief of Police Kristen Roman have the authority to call off the burn.

Wisconsin law provides that anyone who sets a fire and all costs of suppression by the UW or local fire department. Insurance covers such damages and costs relating thereto.

Biocore Prairie Burn Units

Spring 2019

- Bright red - primary burn units
- Green outlined - new seedings
- Faded red - potential spot ignition site
- Blue - refuge

Google Earth
Prescribed Burn Definition

Fire applied under prescribed environmental conditions (the prescription) to meet specific resource management objectives.
Components of Rx Burn Plan

- Burn unit location/description
- Burn objectives
- Permits/notifications
- Weather prescription
- Resource requirements
- Ignition plan
- Contingency
- Safety plan
- Go/No-go checklist

http://prescribedfire.org
Components of Rx Burn Plan

1. Determine area you want to burn
2. Detailed site description
   - Aerial photo/map
   - Surrounding area (sensitive receptors)
   - Identify potential hazards
   - Location of firebreaks
Components of Rx Burn Plan

3. Establish Burn Objectives
   • Prepare area for planting
   • Maintain grassland community
   • Consume leaf litter (xx\%)
   • Brush control (top-kill xx\%)

4. Prescription: Weather and fuel conditions needed to conduct a burn that will meet objectives.

5. Smoke management
Components of Rx Burn Plan

6. Equipment and personnel needed
7. Ignition plan
8. Contingency plan
9. Safety plan
10. List of contacts to be made prior to lighting (neighbors, Sherriff Dept., etc)
11. Go/No Go checklist
Site Hazards

- Dumps, tires, & hazardous materials (treated wood)
- Brush piles, wood piles, snags
Holding Concerns & Smoke

- Fence posts, bird houses, septic system
- Utility poles, pipelines
- Buildings, roads
- Nearby airports, hospitals
- Livestock and production barns
Firebreaks

Roads or Driveways

Mowed
Firebreaks

Pop-quiz – what is wrong here?

Plowed fields or disked breaks
Streams, rivers, or ponds

Wet line
Firebreaks

- Leaf-blown line
- Raked line

Our Stihl leaf blower has served us well in preparing fire breaks through heavy oak leaves in the savanna.
Weather Conditions

- Wind speed and direction
- Relative humidity
- Air temperature

![Weather Conditions Image]
Safe Wind Conditions

- Wind speeds of 5-15 mph are preferable, > 20mph unsafe
- Wind direction should pose least risk
- Light and variable winds are unsafe due to unpredictability
- Weather forecasts give 20-ft wind speeds, rather than on-the-ground wind speeds
  (multiply by .4 to reduce 20-ft wind speed)
Choose Wind Direction for Smoke Management

- Determine the best wind direction for your burn
- Safe implementation: downwind break is most secure (water, plowed field, gravel driveway)
- Identify sensitive smoke receptors around burn unit (roads, buildings, hospitals, airports, or livestock operations)
Smoke Management

Weather conditions will affect what the smoke does!
Relative Humidity

RH controls fuel drying rate and the potential of embers to be carried outside of your burn unit.

Generally, as air temp goes up, RH goes down

Safe RH levels for prescribed burning = 20% - 50%

Do not burn at an RH below 20%, it is unsafe
Temperature/Relative Humidity Chart

Max temp
Min RH
Midnight
Min temp
Max RH
Noon

Temp
Relative Humidity
Safe Temperature Conditions

Best range is 35° - 70° F

- Fire behavior can increase when the temperature is above 70°F
- It is also physically hard on your crew in warmer weather

- Burning is usually safer late afternoon to sunset as relative humidity tends to increase, winds tend to decrease and the fire is easier to control.
Components of a Burn Plan

Show unit boundary and hazards on your burn plan map.
Crew Requirements

• Crew size depends on burn size & complexity, amount of equipment, & crew experience

• Tasks for crew members on fire line:
  - Burn Boss or Fire Leader
  - Ignition (starting the fire with torch or rake)
  - Holding (control the fire with water or hand tool, ATV/UTV, fire engine)
  - Lookout (watch for spot fires, smoke on road, etc)
  - Mop up (extinguishing remaining flames)
Ignition Plan

- Test fire
- Firing pattern
  - Back fire
  - Head fire
  - Flank fire
- Firing device
- Preferred wind direction
- Hazards/special considerations
A burn boss’s first priority is to conduct a safe burn, which requires long hours of preparation. Wind speed and direction, humidity and a host of other factors must meet safety requirements before a burn can begin. After establishing a perimeter of natural and hand-cleared firebreaks devoid of fuel, the crew will light a downwind backfire, which burns slowly as it moves into the wind. As the backfire burns away fuels, it creates a blackline. The crew patrols the firebreak perpendicular to the backfire, establishing a handline, where an igniter will use a drip torch to set a flank fire to clear fuels along the handline. When the flank fire has burned away enough fuel, an igniter will set the headfire along the windward firebreak. Fueled by the wind, the headfire typically burns quickly, but extinguishes itself by burning straight into the backfire.
Contingency: Plan B

- Have a back-up plan in case the fire escapes
- Secondary control lines/catch points
- Contingency resources (extra water, additional people and equipment to assist)
Safety Plan

- Escape routes – how to get out of danger
- Safety zones – safe areas with no burnable fuel
- Communication – how to reach emergency help, address of your location
- First Aid Kit
- Closest hospital
Go/No-Go Checklist

Crew Briefing

- Do you have everything as listed in your plan?
- Is the weather as listed in your plan?
- Should you wait for another day?