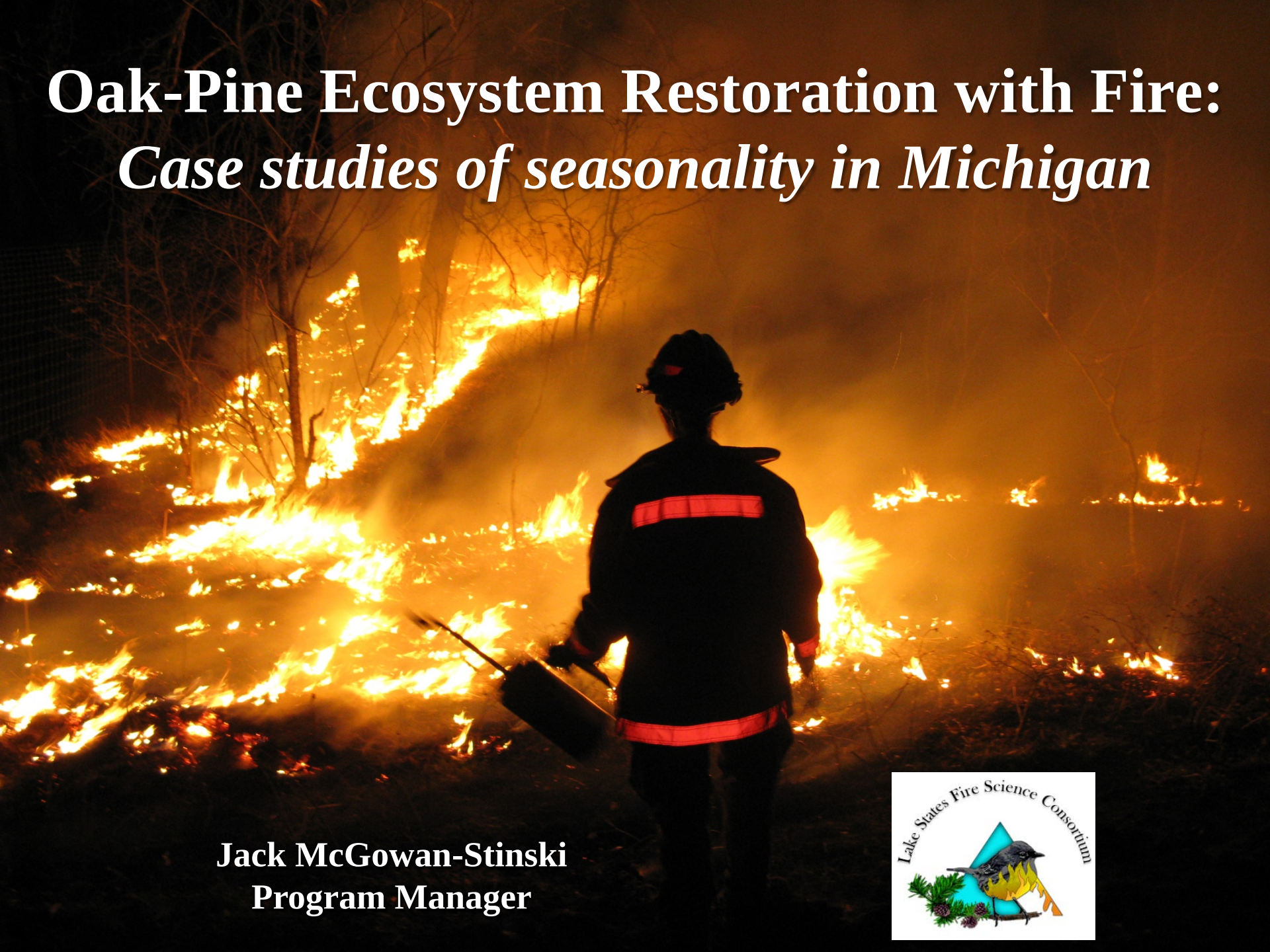
Oak-Pine Ecosystem Restoration with Fire:
Case studies of seasonality in Michigan



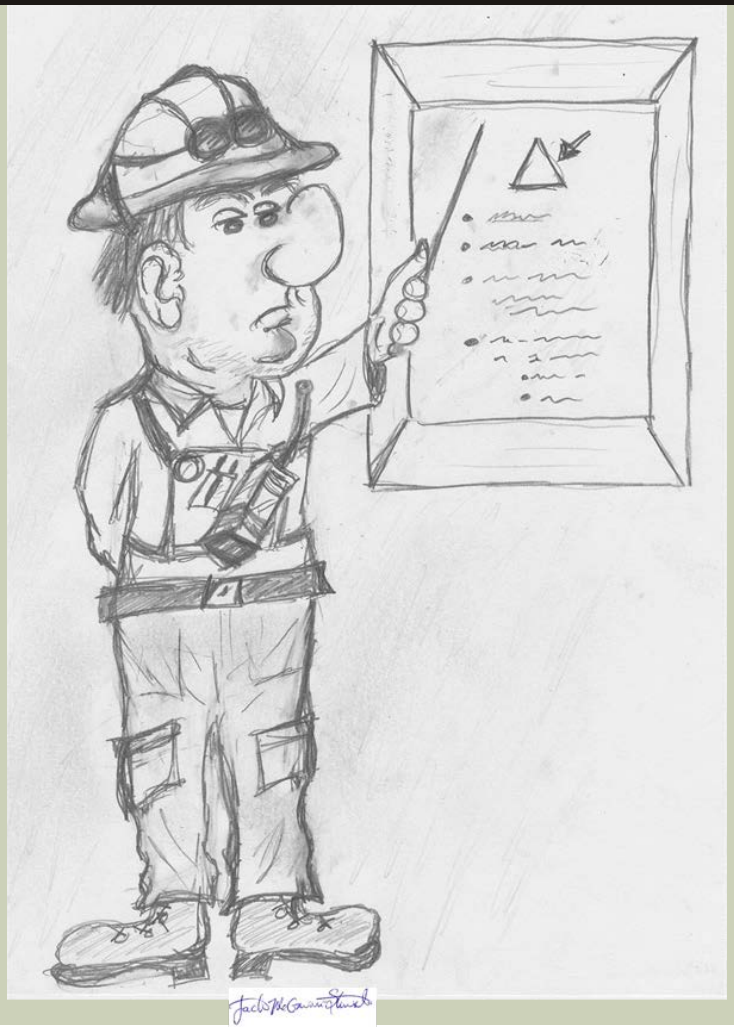
Jack McGowan-Stinski
Program Manager

Lake States Fire Science Consortium

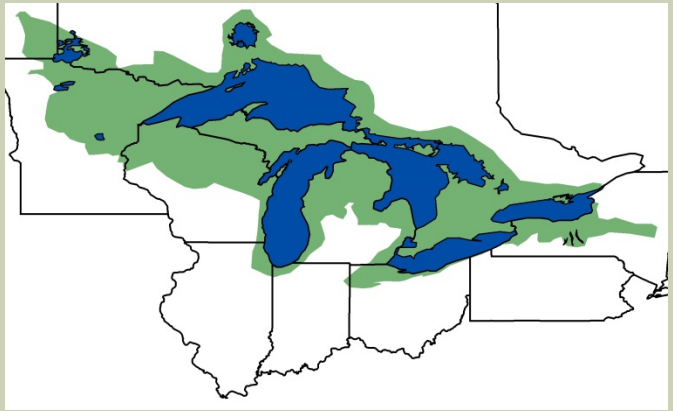
FIRE SCIENCE EXCHANGE NETWORK
JOINT FIRE SCIENCE PROGRAM

Lake States Fire Science Consortium

A JFSP KNOWLEDGE EXCHANGE CONSORTIUM



A network of fire managers and scientists interested in the fire-dependent ecosystems of the northern Lake States region.

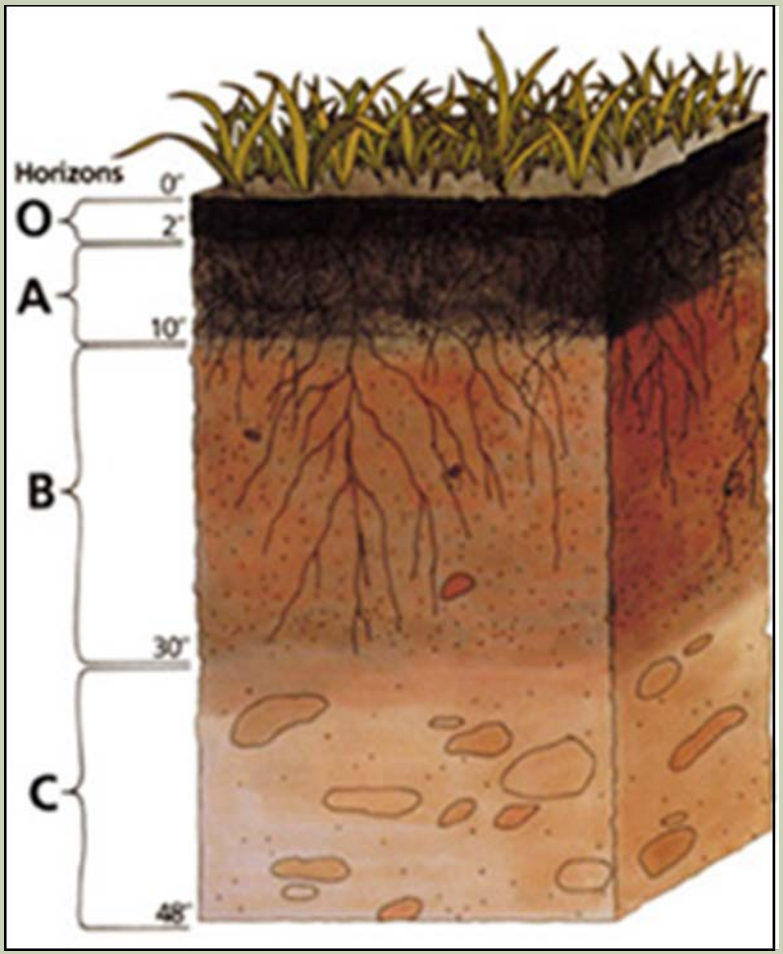


lakestatesfiresci.net/

(MY) SIDEBARS TO "OAK-BARRENS-OAK SAVANNA- OAK FOREST" MANAGEMENT AND RESTORATION….

Oak Barrens

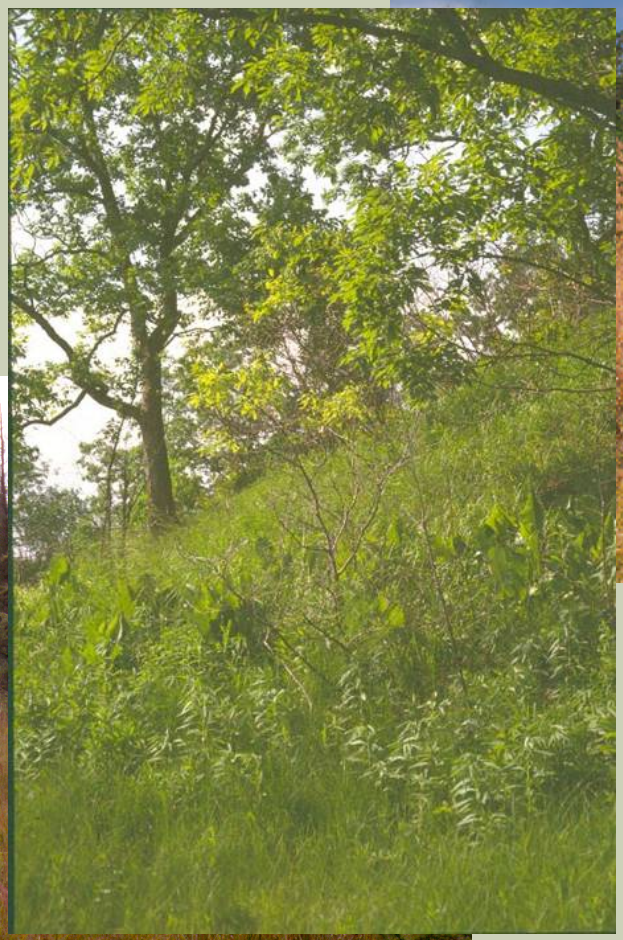
- Less nutrients available
- Sandier soils
- May take 2 seasons+ to "grow" fuel for next fire



Oak Savanna

- more nutrients available
- "better" soils
- Takes 1 season to "grow" fuel for next fire

LANDSCAPE GRADIENTS



SHIFTING MOSAIC

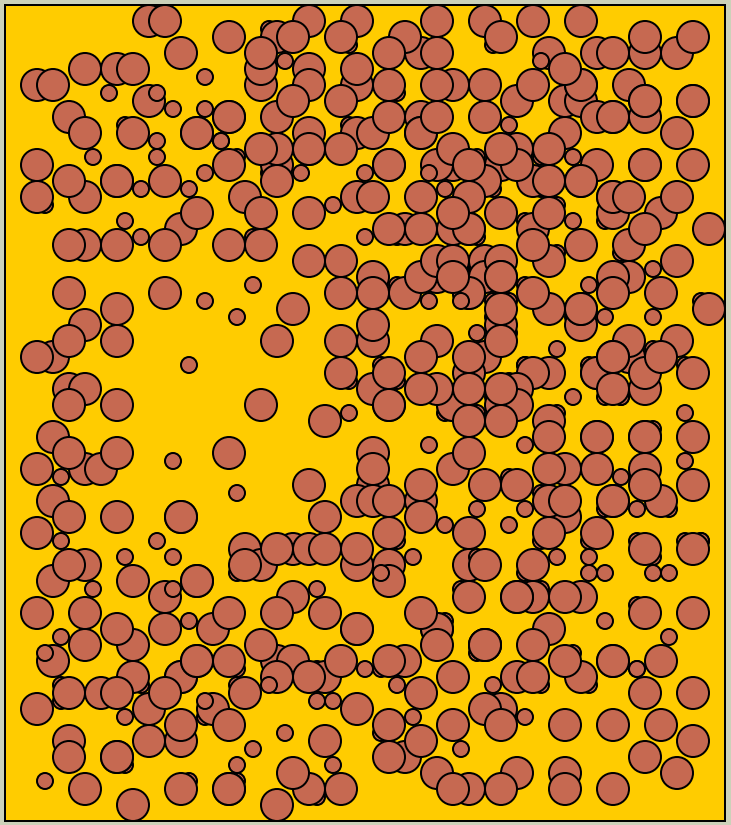
Occur in a shifting landscape mosaic with a pyric geography

oak forest

savanna or barrens

dry sand prairie

MANY OF OUR OAK-PINE “FORESTS” ARE ACTUALLY FORMER SAVANNAS


















"MANAGEMENT RECOMMENDATIONS… GOOD VS. USELESS"

fire implementation vs. single species or "–ologist" view

Cannot burn (Snow, or dormant effects)	Ecological burns, feasible times to burn	Cannot burn (Snow, or dormant effects)
Mgmt. recommendation: OK to burn since minimize effects on herps, birds, insects	Mgmt. recommendation = No Burn: might impact nesting/breeding birds, insects, herps that are active, game species, roost trees for bats	Mgmt. recommendation: OK to burn since minimize effects on herps, birds, insects

Jan Feb Mar Apr May June July Aug Sep Oct Nov Dec

Fire is…

- An Ecological Process in a
- Fire-dependent System
- A Management Tool
- A High Risk Activity

FOR EACH BURN….

Keep fire in the “box” and keep crew and public safe

“Good Fire” versus “Bad Fire”

“Well, thank God we all made it out in time….
‘Course, now we’re equally screwed.”

WHAT IS YOUR MANAGEMENT/RESTORATION OBJECTIVES?

- To make unit black?
- Reduce shrubs?
- Thin canopy?
- Enhance grasses?
- Enhance forbs?
- Enhance habitat for a certain animal species?
- keep oaks in an oak system….
- Achieve full range of variability in the fire-dependent community?

- Mechanical
- Chemical
- Biological
- Fire


...let the Fire
Effects lead you

- Energy released

- Organic matter consumed
- Char height
- Scorch height

- Effects on flora and fauna

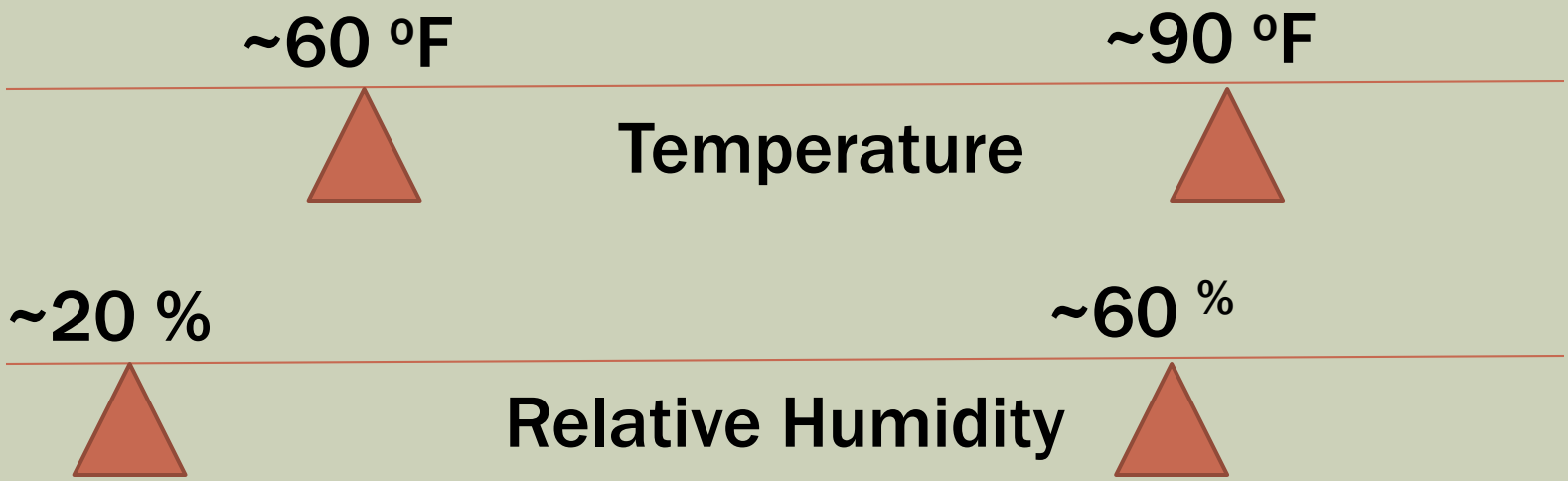
Fire Environment:
backfire – headfire
rate of spread – wind and slope affects

Residence time of heat

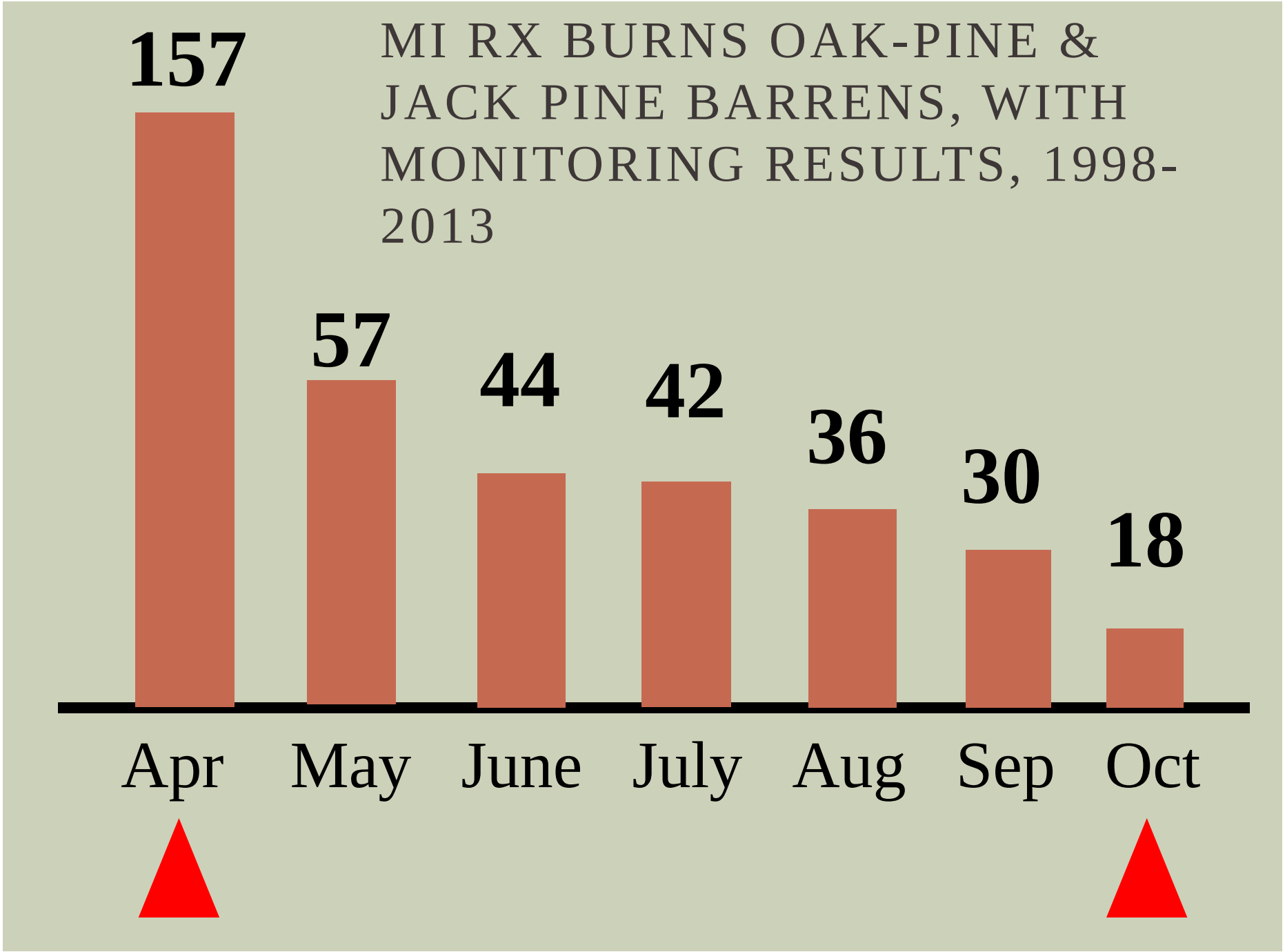
YOUR "PRESCRIPTION" FOR FIRE AND OAK RESTORATION…

Your "prescription" to use prescribed fire as one of the management techniques for oak restoration or regeneration is:

Burn at exactly ___ºF, ___%RH, with FDFM at _____% and 10 HR and 100 HR fuel at ____%, on this day ____in the month of_____ , starting ignition at and ending at _____, use this firing pattern _____, and keep the rate of spread at _____, and let the unit burn out for _____days……

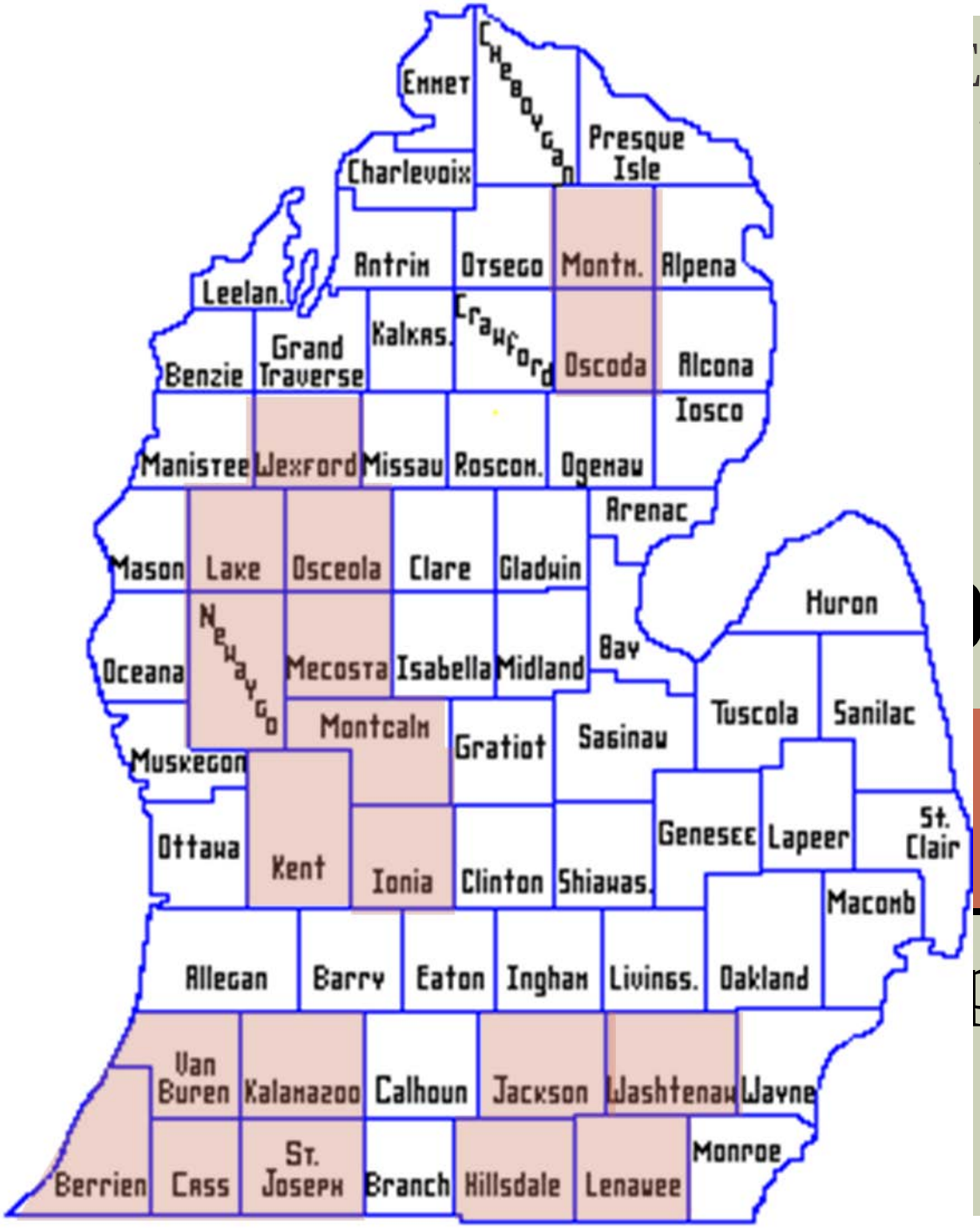


Duff Moisture Code and Drought Code….


MI RX BURNS OAK-PINE & JACK PINE BARRENS, WITH MONITORING RESULTS, 1998-2013
157
57
44
42
36
30
18
Apr
May
June
July
Aug
Sep
Oct

157

Apr



& ITH 1998-

18

p Oct

MONITORING

- Photo-monitoring
- Vegetation transects
- Rare butterfly surveys
- Modified Brown's transects
- Oak-Pine Barrens Coarse–level Metrics

COARSE-LEVEL METRICS

- canopy closure
- complexity of canopy structure and percent of canopy composed of oak or pine species
- sub-canopy oak and oak recruitment
- shrub cover
- ground cover of native herbaceous species (grass, sedge, forbs) compared to non-native invasive and competitive plant species.

SEASONALITY: "TRADITIONAL" BURN WINDOWS

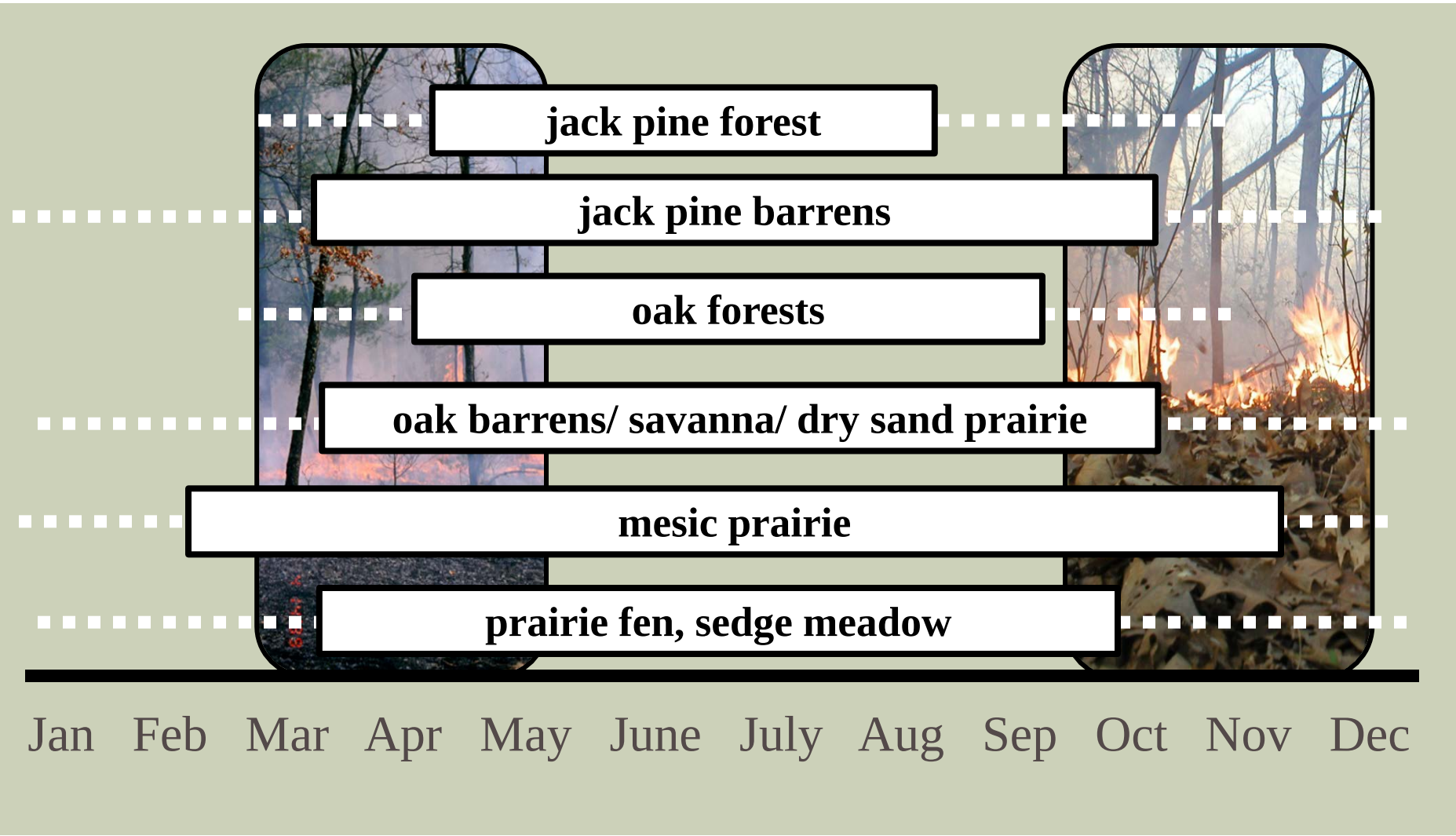
Spring season

Growing season = Summer Burning

Fall season

Jan Feb Mar Apr May June July Aug Sep Oct Nov Dec

SEASONALITY: BURN WINDOWS BY NATURAL COMMUNITY



SEASONALITY:
GROWING SEASON = SUMMER BURNING

Apr

May

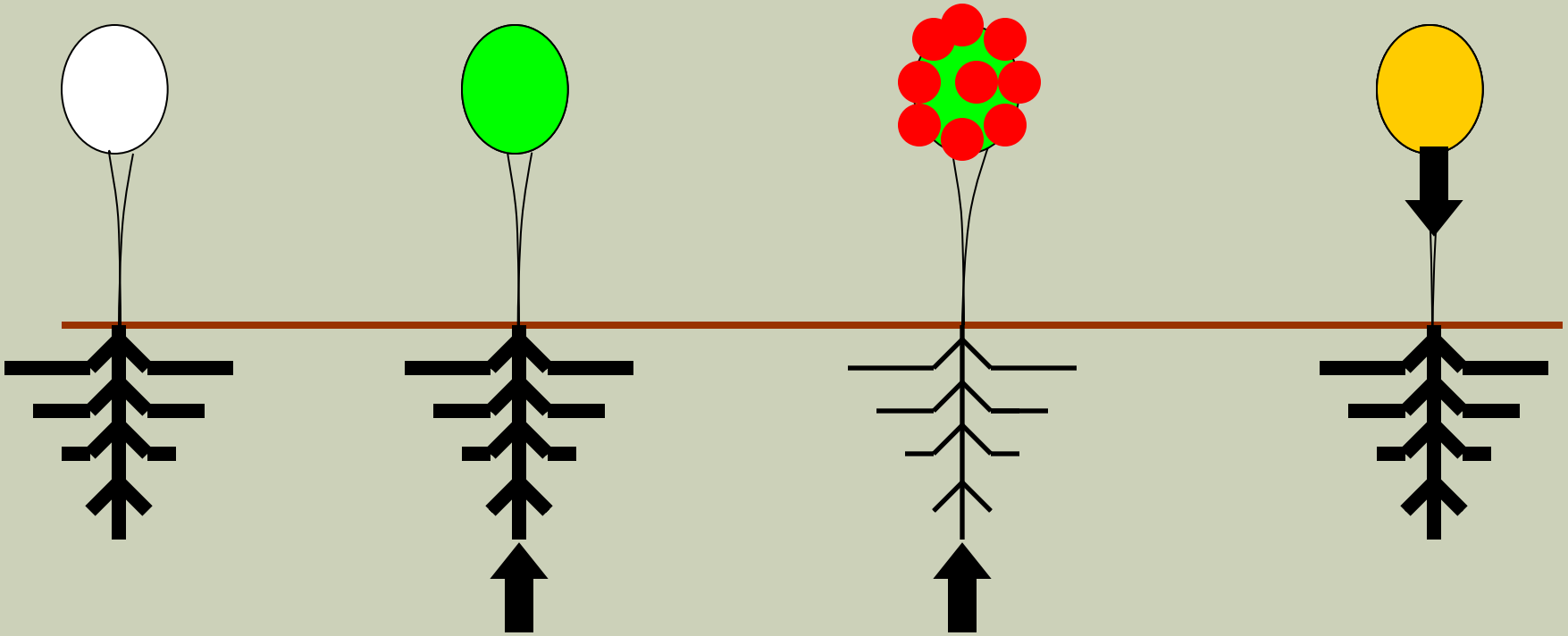
June

July

Aug

Sep

PHENOLOGY



Dormancy (Oct-March)

Leafout (mid-late April)

Flowering/Fruiting (May-Aug)

Senescence (Sept-Oct)


5 1999


6 2007


7 2010


8 2010

after 1st burn:
Burn May 31, 2007
(photo Sept 2007)

after 2nd burn
June 20, 2009
(photo Sept 2009)

“We tried a summer burn and it did not work, so we are not going to try again….”

Changes in dominance of different groups of grasses and forbs in response to fire seasonality

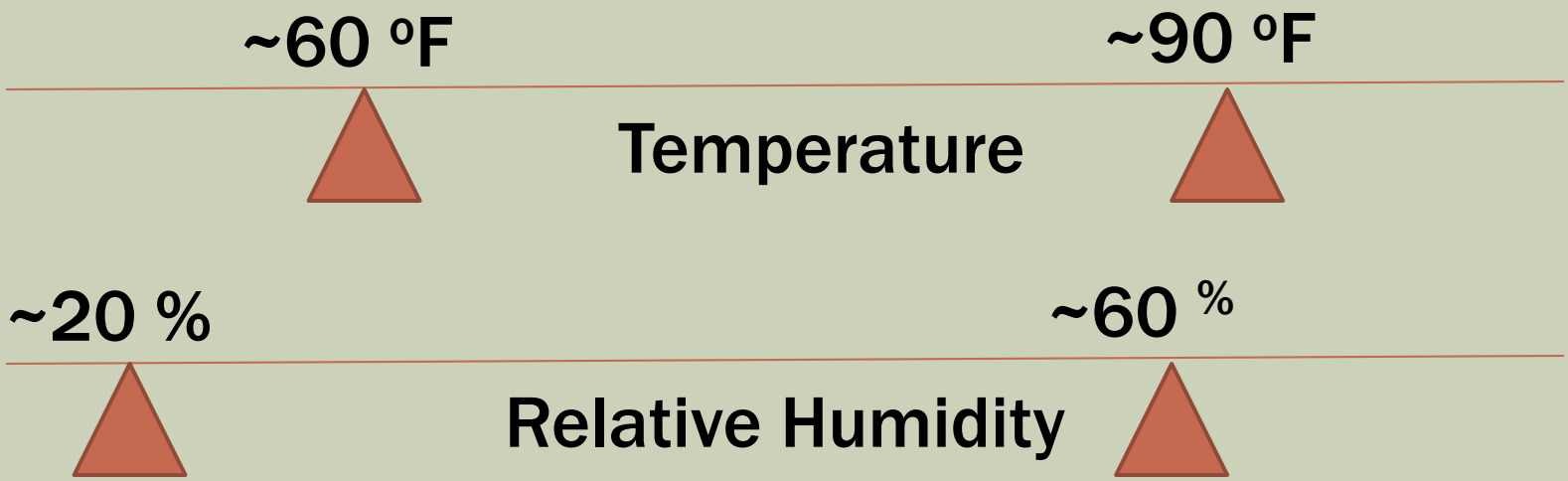
	April-May	June-Aug	Sept	Oct-Nov
Grasses and sedges				
Warm season	↑	↓	↔	↑
Cool season	↓	↑	↑	↓?
Forbs				
Early-flowering forbs	↓	↑	↑	↓?
Mid-flowering forbs	↓	↑	↑	↑?
Late-flowering forbs	↑	↓	↑	↑?
Legumes (Fabaceae)	↑	↑	↑	↑

Fire Effects - Invasive's & Competitive Species - Seasonality

	March-April	May	June-Aug	Sept	Oct-Nov
knapweed					
sweet clovers					
garlic mustard					
St. Johnswort					
bouncing bet					
buckthorn					
autumn olive					
honeysuckles					
pennsylvania sedge					

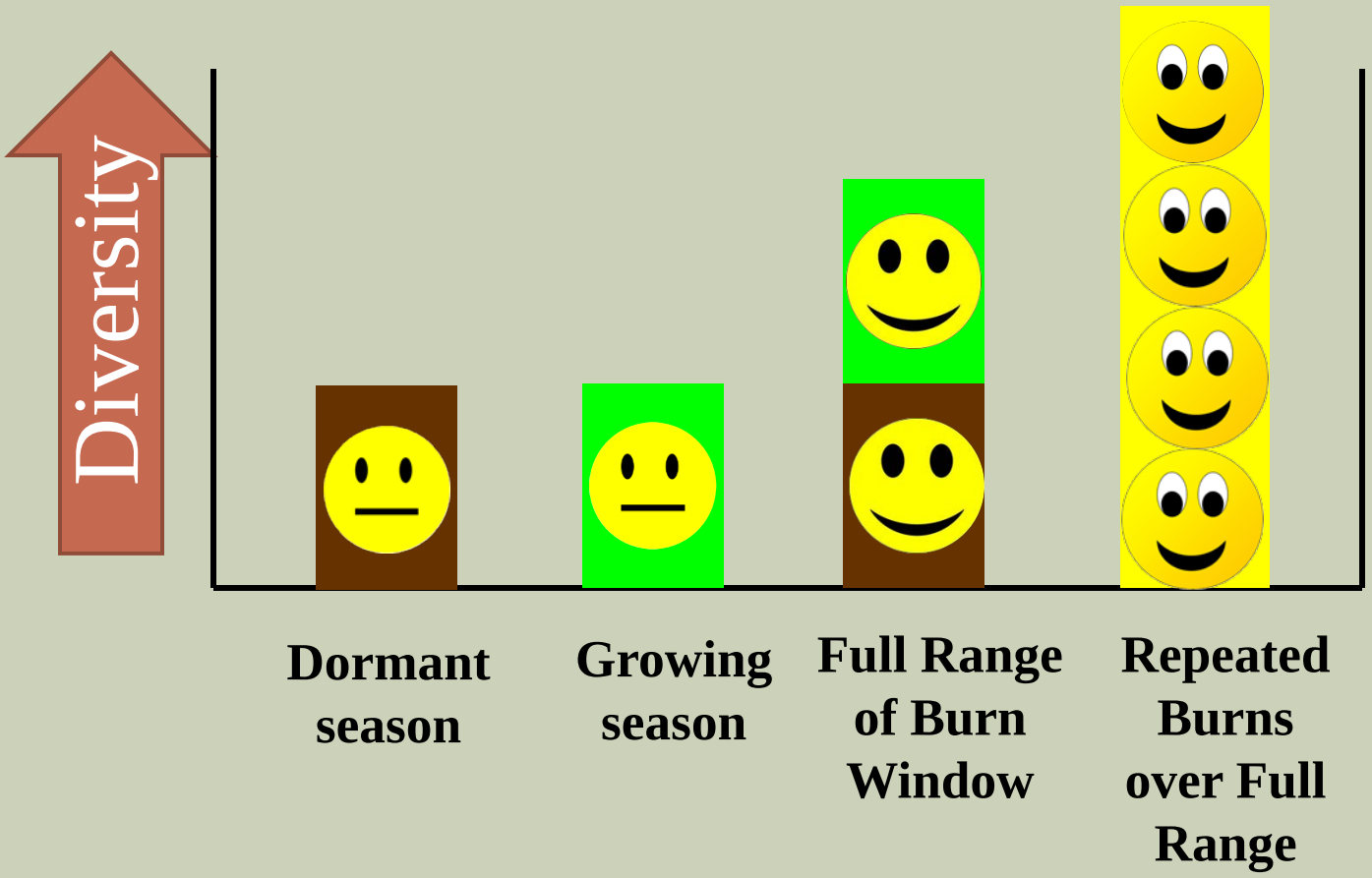
Note: it is better to use yearly Phenology, but illustrate in general terms with calendar dates

Smoke Management



Duff Moisture Code and Drought Code….

FIRE-DEPENDENT SYSTEMS



Questions?