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Outline

- Basics of Fire Regimes
- Ecological Role of Fire
- Fire in Local Forest Ecosystems
- Fire-Adapted Traits

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What is a Fire Regime?

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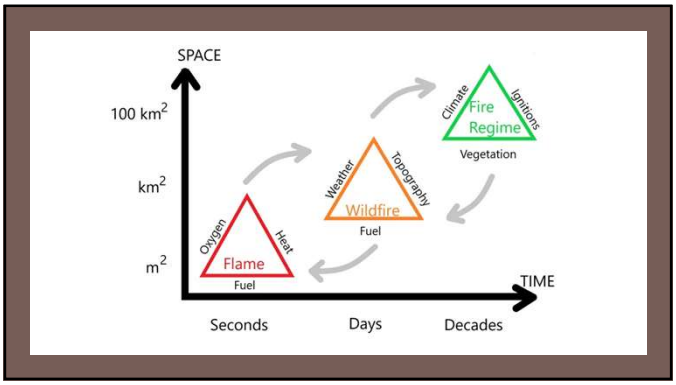

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Characterizing Fire Regimes

Frequency	Severity	Extent/Pattern	Seasonality
Average amount of time between fires (Fire Return Interval)	Vegetation mortality or impact on soils	Size of fires and where they burn	Time of the year that fires burned
Frequent (0 – 30 yrs)	Low	Small	Spring
Infrequent (>80 yrs)	Mixed	Large	Summer
Variable (fluctuates)	High	Megafire	Fall
		Mosaic pattern	Winter

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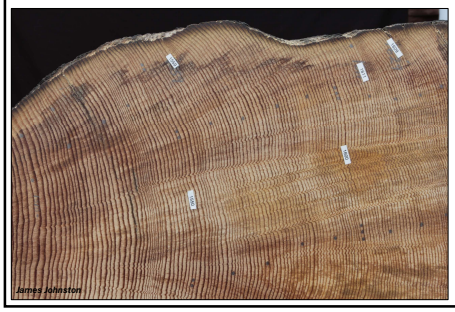
How do we know?



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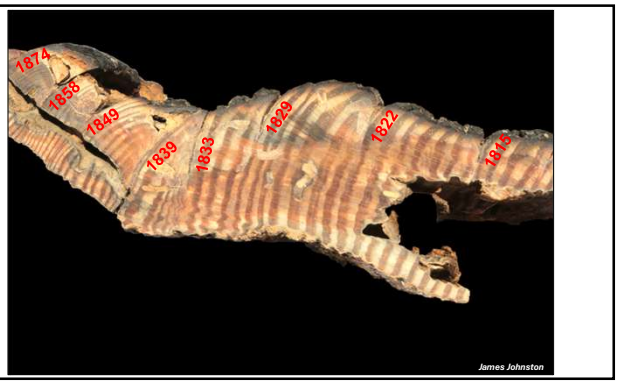

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Ecological Role of Fire

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Fire's Beneficial Role in the Forest

- Influences future wildfire behavior
- Supports tree regeneration and growth
- Improves forest resistance to drought and insects/disease
- Diversifies vegetation composition and structure
- Enhances forage and wildlife habitat
- Cycles nutrients
- Effects vary by vegetation type, burn severity, seasonality, etc.

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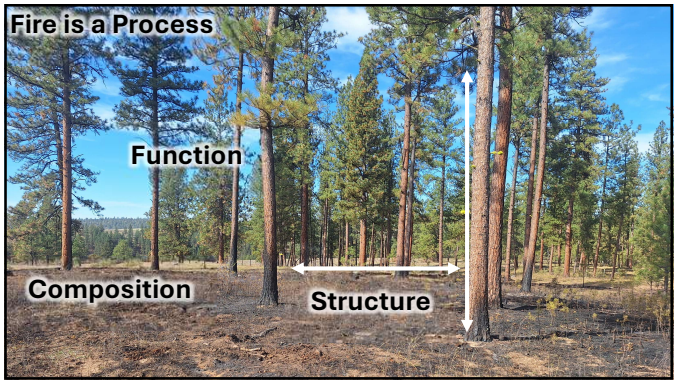

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Fire can also be detrimental

We are seeing more intense fires due to:

- Long-term fuel accumulation
- Hotter temperatures, snow melting earlier
- Long-term drought
- Tree mortality due to overcrowding, insects, and disease
- Invasive species (e.g. annual grasses)

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Fire in Local Forest Ecosystems

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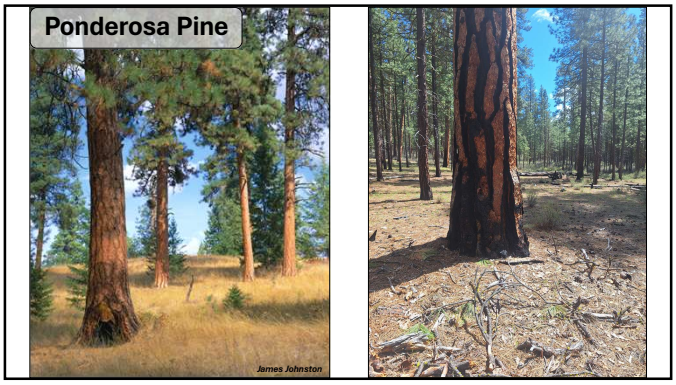

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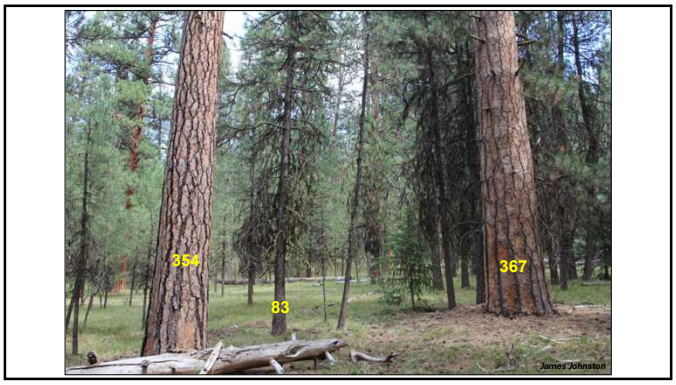

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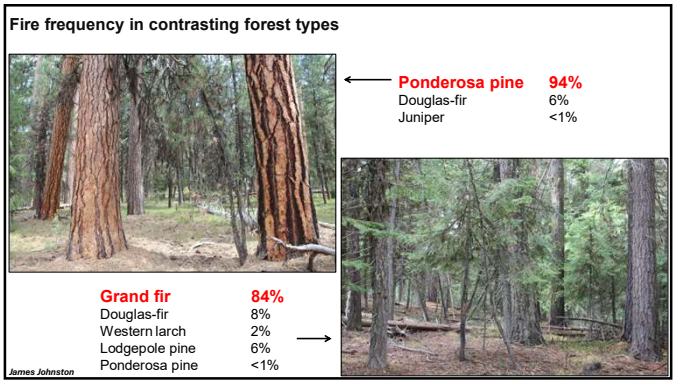

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Fire frequency in contrasting forest types

← Historical fire frequency = **11-18 years**

Historical fire frequency = **12-21 years** →

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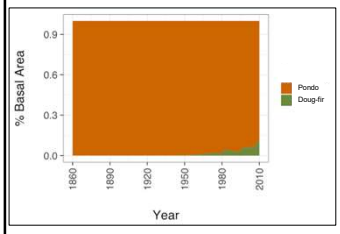
Fire frequency in contrasting forest types



← Historical fire frequency = **11-18 years**

Historical fire frequency = **12-21 years** →

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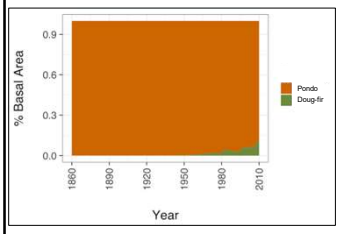
Fire frequency in contrasting forest types



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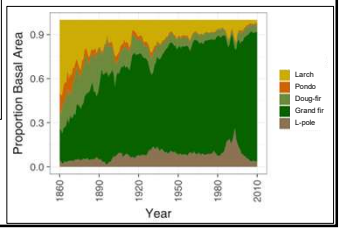

Historical fire frequency = **12-21 years** →

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Species	Basal area change 1880 to 2016
Ponderosa pine	57%
Douglas-fir	924%
Grand fir	2,346%
Western larch	-57%

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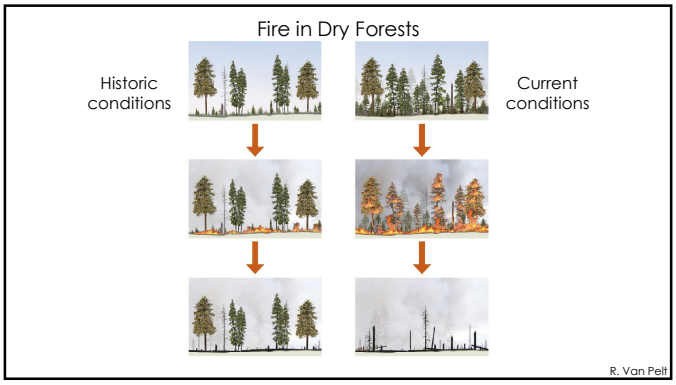

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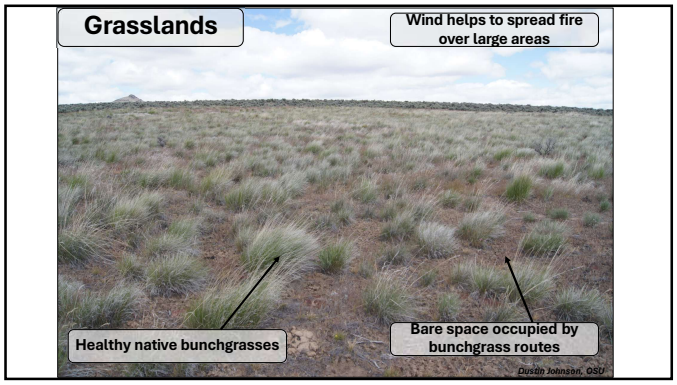

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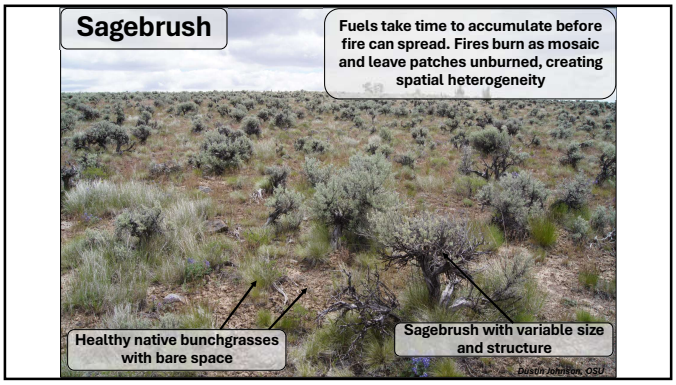

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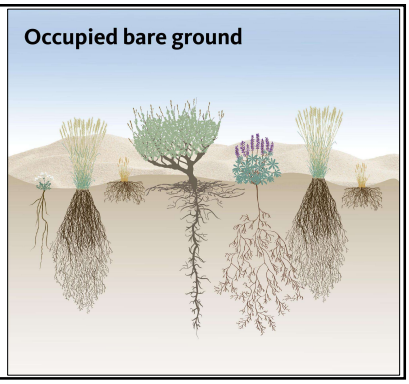
- Extensive root systems
- Fire topkills, cycles nutrients into the soils, stimulates growth, and enhances flowering in some plants
- Bunchgrasses are long-lived and fire resilient due to resprouting capabilities
- Sagebrush is long-lived, but does not resprout, making it more vulnerable to fire and requiring more time to recover



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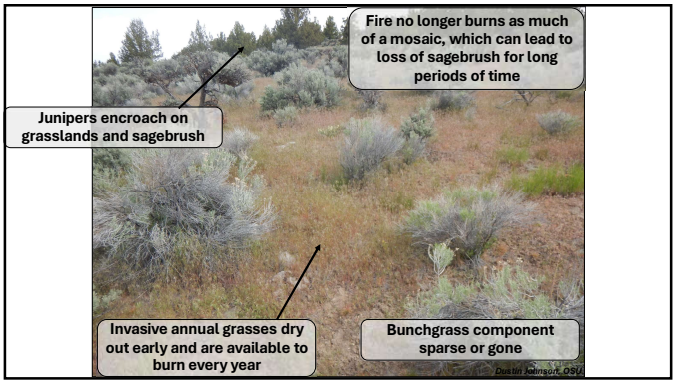

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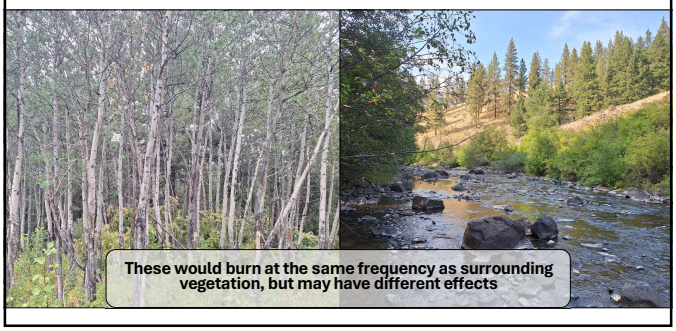
Special habitats – Aspen, Wetlands, Riparian



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Fire-Adapted Traits

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Resistance	Ability to persist through or withstand a disturbance Fire-Resistant Traits -Thick bark -Open branching structure or limb pruning -Scales protecting stem and leaf buds -High water content
Resilience	Ability to recover after being impacted by disturbance Fire-Resilient Traits -Sprouting capability -Prolific regeneration -Persistent seed -Cone serotiny

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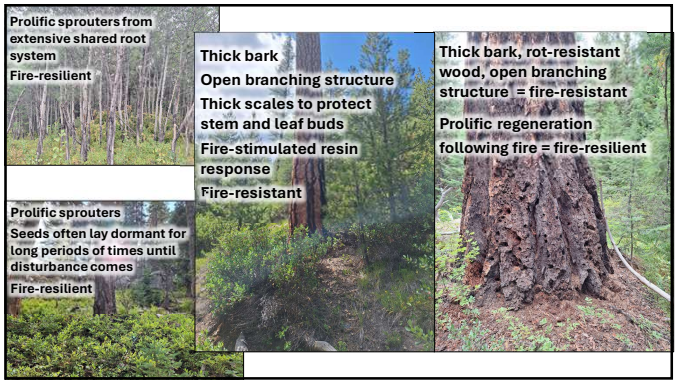

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Conclusion

- Fire regimes are generally characterized by the frequency, severity, extent/pattern, and seasonality of fire. Understanding historical fire regimes helps us better understand the type of fire that ecosystems have adapted to over thousands of years as we look to return fire to our wildlands.
- Fire plays many beneficial roles, but can also be detrimental due to long-term fire exclusion, fuel accumulation, invasive species, etc.
- Fire varied throughout different ecosystems, but virtually all local ecosystems were historically shaped by fire.
- Resistance and resilience traits both play a role in an ecosystem's ability to withstand and/or recover from disturbance.

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