The Undesirable Guide to Ecological Restoration

Dan Binkley and Megan Matonis

But we can use the past to *inform* how we might wisely influence future forests

Give a professor a chance to talk, and you never know where he'll ramble…

Todays key points:

1. New thinking won't happen overnight
2. Command and Control is good for farming, but not for people and forests
3. Complex systems can be fostered, not controlled
4. The goal: move away from undesirable conditions
5. Pocket Science: helping you to avoid repeating mistakes

New thinking won’t happen overnight

We aim to turn thinking upside down, to get it rightside up

Gifford Pinchot's Dream: Command+Control = Great Good

"The outgrowth of conservation, the inevitable result, is national efficiency"

G. Pinchot

Take away uncertainty!

Stand-level Command and Control:

Growth rate high enough?

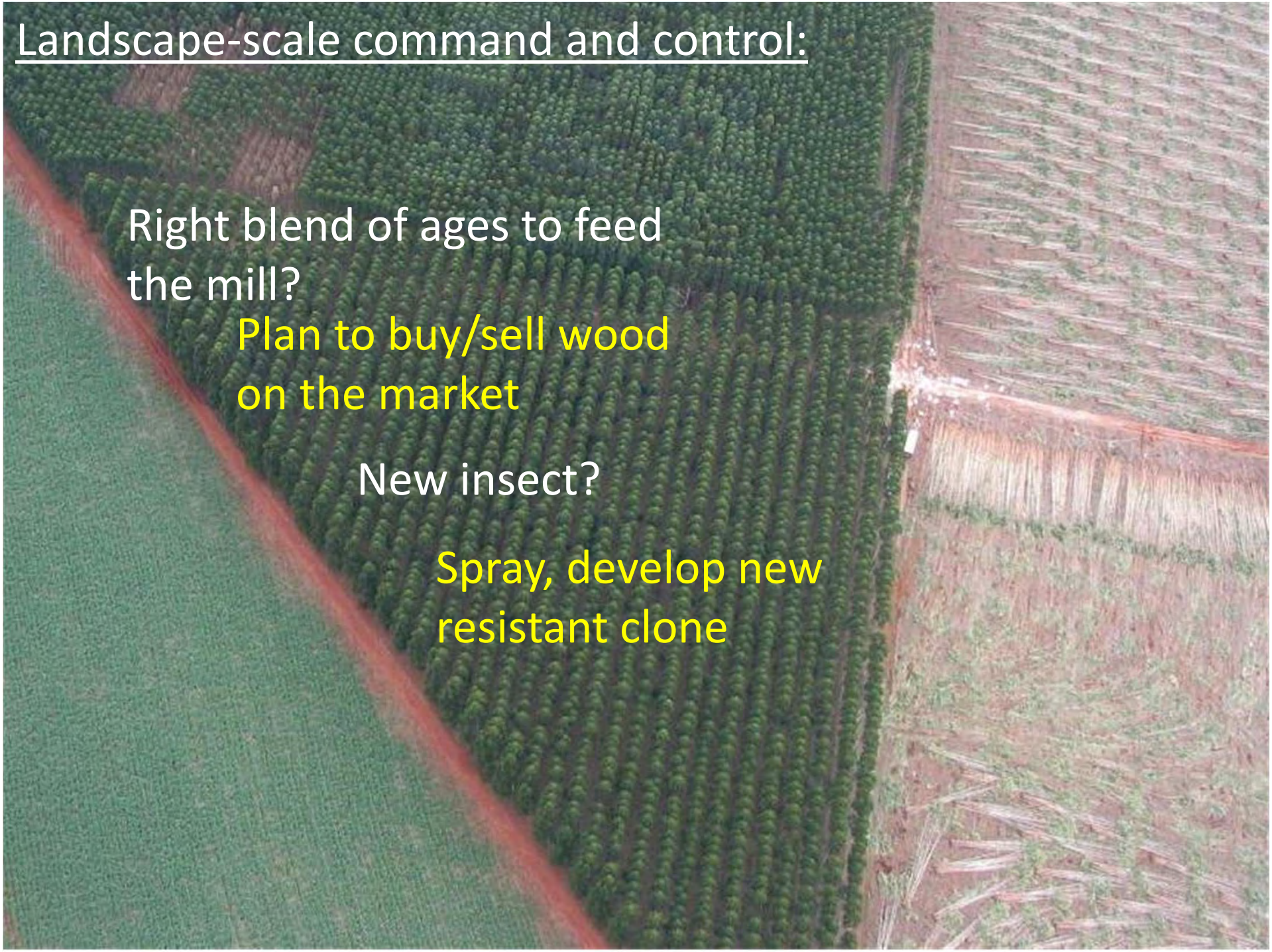
More fertilizer

Leaf-cutting ants?

More ant-bait poison

Poor stem form?

Use a different clone next rotation


Landscape-scale command and control:
Right blend of ages to feed the mill?
Plan to buy/sell wood on the market
New insect?
Spray, develop new resistant clone

But forests aren't tree farms – there are no precise structures or functions for "success"

Uncertainty is unavoidable for forests

(Why would we imagine otherwise?)

John Muir's Nightmare:

Command+Control = Great Evil

Good questions for uncertain future forests:

What is this forest "missing"?

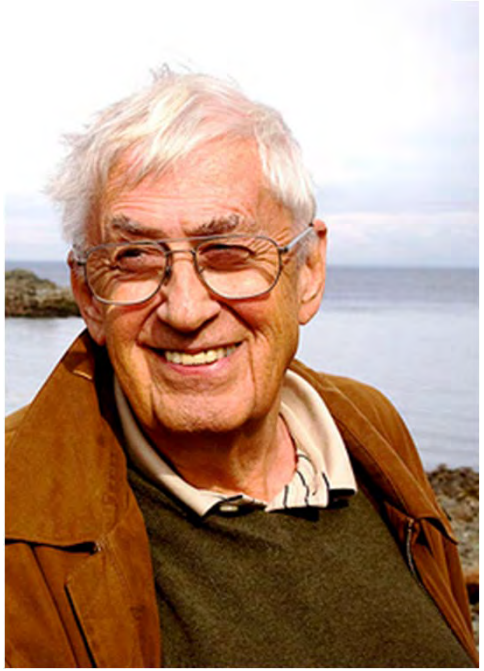
What is this landscape "missing"?

What are the risks, the dangers, in the near future?

Where did we get the idea that “desired future condition” was useful?

1982 Planning Rule, USDA Forest Service:

Sec. 219.11 Forest plan content. The forest plan shall contain the following: … (b) Forest multiple-use goals and objectives that include a description of the **desired future condition** of the forest…



Conservation Biology 1996

Essays

Command and Control and the Pathology of Natural Resource Management

C. S. HOLLING* AND GARY K. MEFFE†

A tree-farm vs. forest analogy:

What should her career be?

1960-1980: Command and Control

"You should be a cardiologist like your father was"

1980-2000: Desired Future Condition

"You can choose to be a doctor in *any* medical specialty you want"

2010-future: Avoiding undesirable futures

"I hope you're NOT unhealthy, unhappy, unkind, or poor – the rest is unforeseeable, or up to you"

"Wait a minute – aren't "desired conditions" and "undesired conditions" pointing to the same thing?"

<u>Desired condition:</u>

"Choose curtain #2"

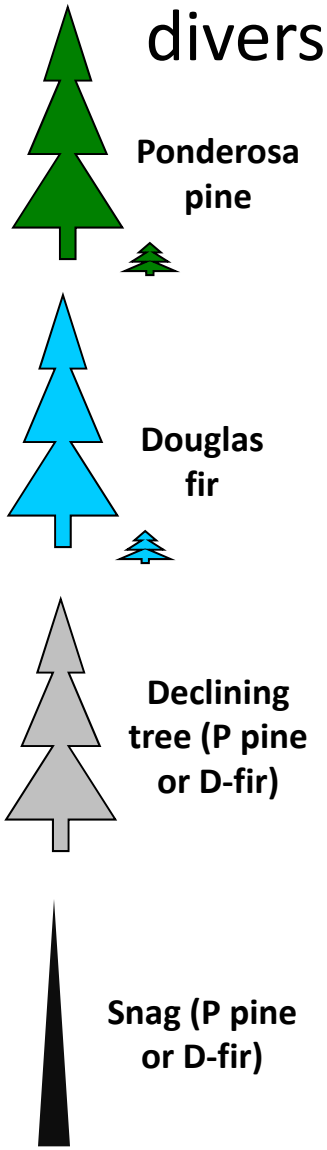
<u>Undesirable condition:</u>

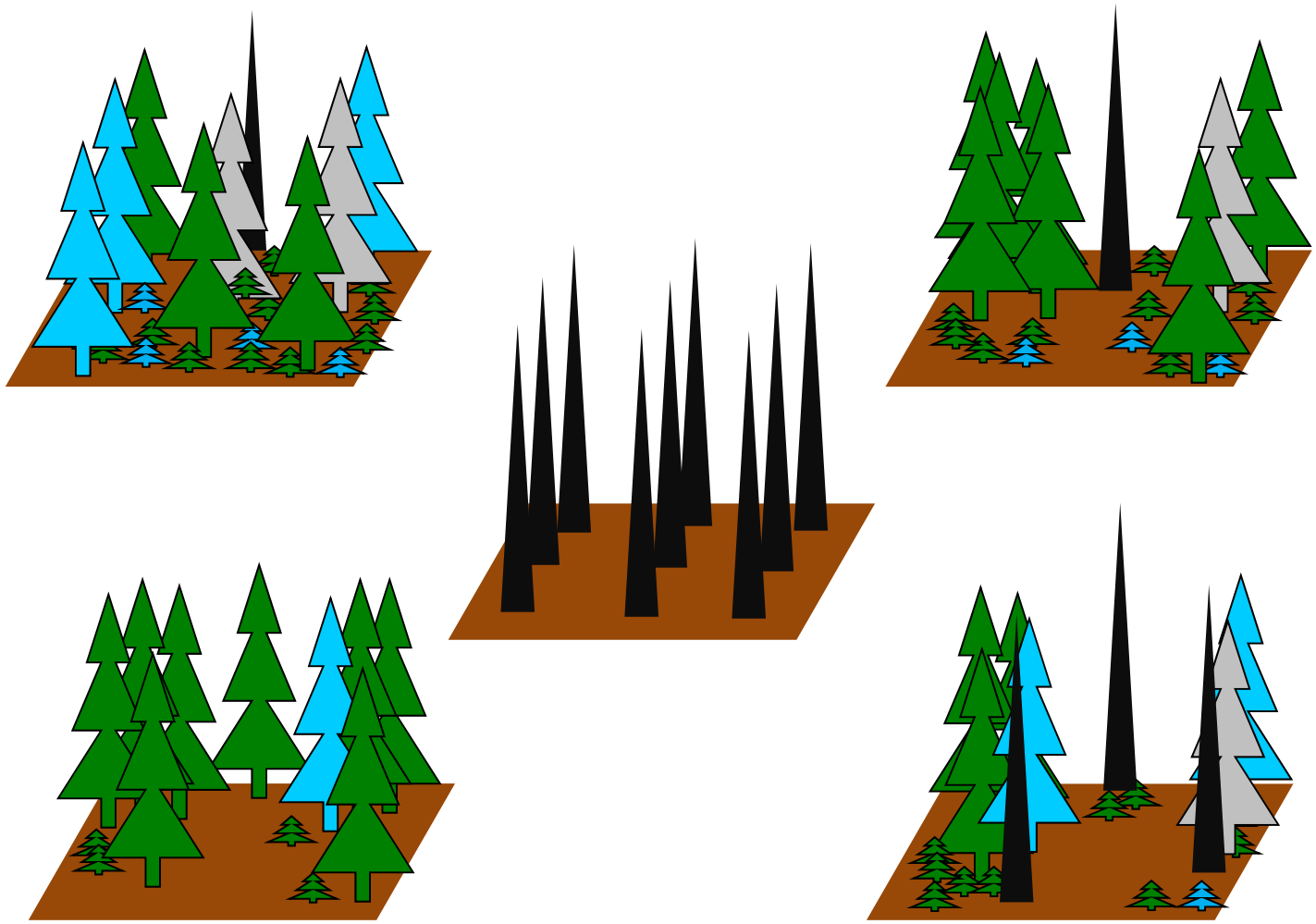
"Don't choose Curtain #1 or #3"

But forest decisions have dozens, (hundreds?) of possibilities, about dozens (hundreds?) of features: which species, what basal area, what spacing, what fire, how often – *and then Nature does what it wants anyway…*

Possible Benefits of “Undesirable Thinking”

1. More consensus about undesirable conditions among diverse stakeholders (and across generations).





Possible benefits of “Undesirable Thinking”

1. More consensus about undesirable conditions among diverse stakeholders (and across generations).
2. Easier to monitor progress away from a known baseline than progress towards a shifting future.

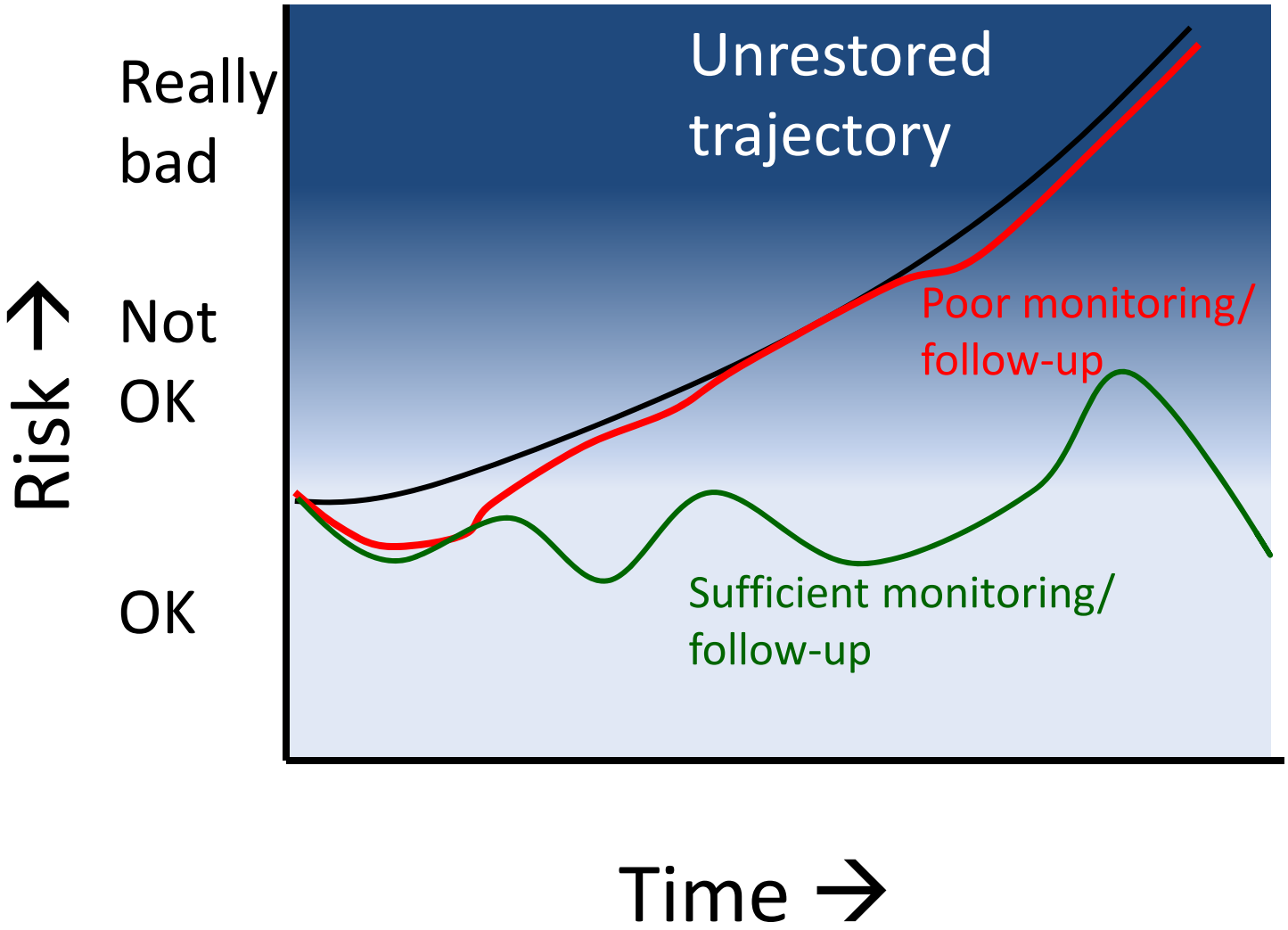
3. Keeps us from believing the future of a complex forest is predictable and controllable
4. Allows for more flexible and creative management.

Responsible (and wise) forest stewardship is NOT about Command and Control – not even in restoration forestry

Turning our thinking upside down = Getting it Right Side Up

Upside down thinking	Right Side Up Thinking
"Desired Future Condition"	"Undesirable risks"
Target basal area 80-100 ft^2/acre	Dangerous basal areas (too much of landscape > 120 ft^2/acre; too little < 50 ft^2/acre)
15% of landscape in old-growth condition	No less than 10% of landscape in old-growth condition
14-foot spacing between tree crowns	No more than 30% of crowns < 10 foot spacing

Implications for restoration at landscape scales

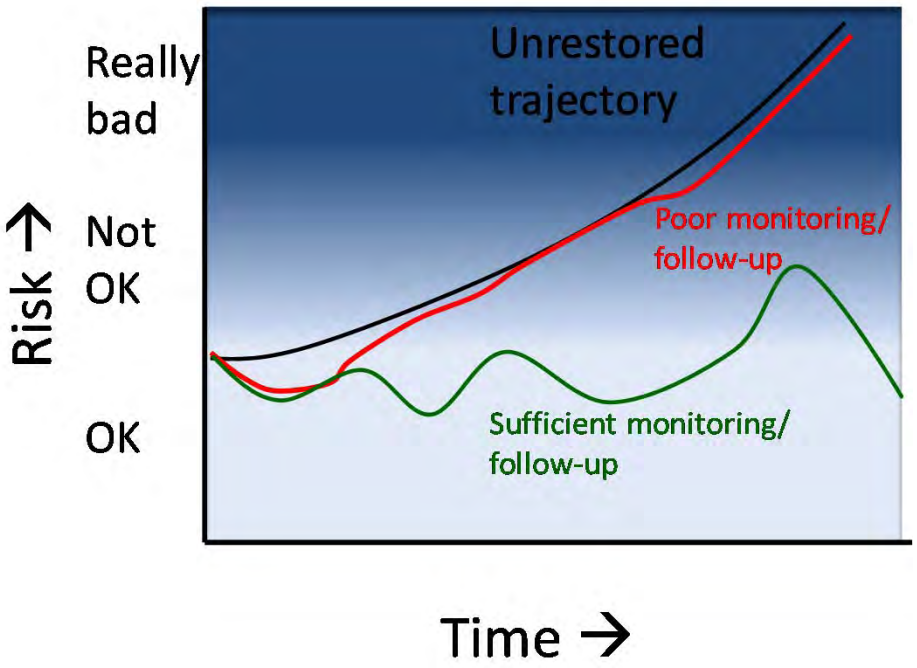


Monitoring and assessment is needed to inform us about CHANGES IN RISK

How much do we need to know to deal with risks?

How undesirable?

How likely?	A bit	Some	Very	*OUCH!*
For sure	**0**	**+**	**++**	**++++!**
Probable	**0**	**++**	**+++**	**++++**
Not likely	**0**	**+**	**++**	**+++**
Nunca por años	**0**	**+**	**++**	**++**



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Not likely	**0**	**+**	**++**	**++++**
Nunca por años	**0**	**+**	**++**	**+++**

Putting these two figures together: monitoring is needed to give enough information to tell us NOT if we got our desired outcomes, but if *risks of undesirable outcomes are low enough*

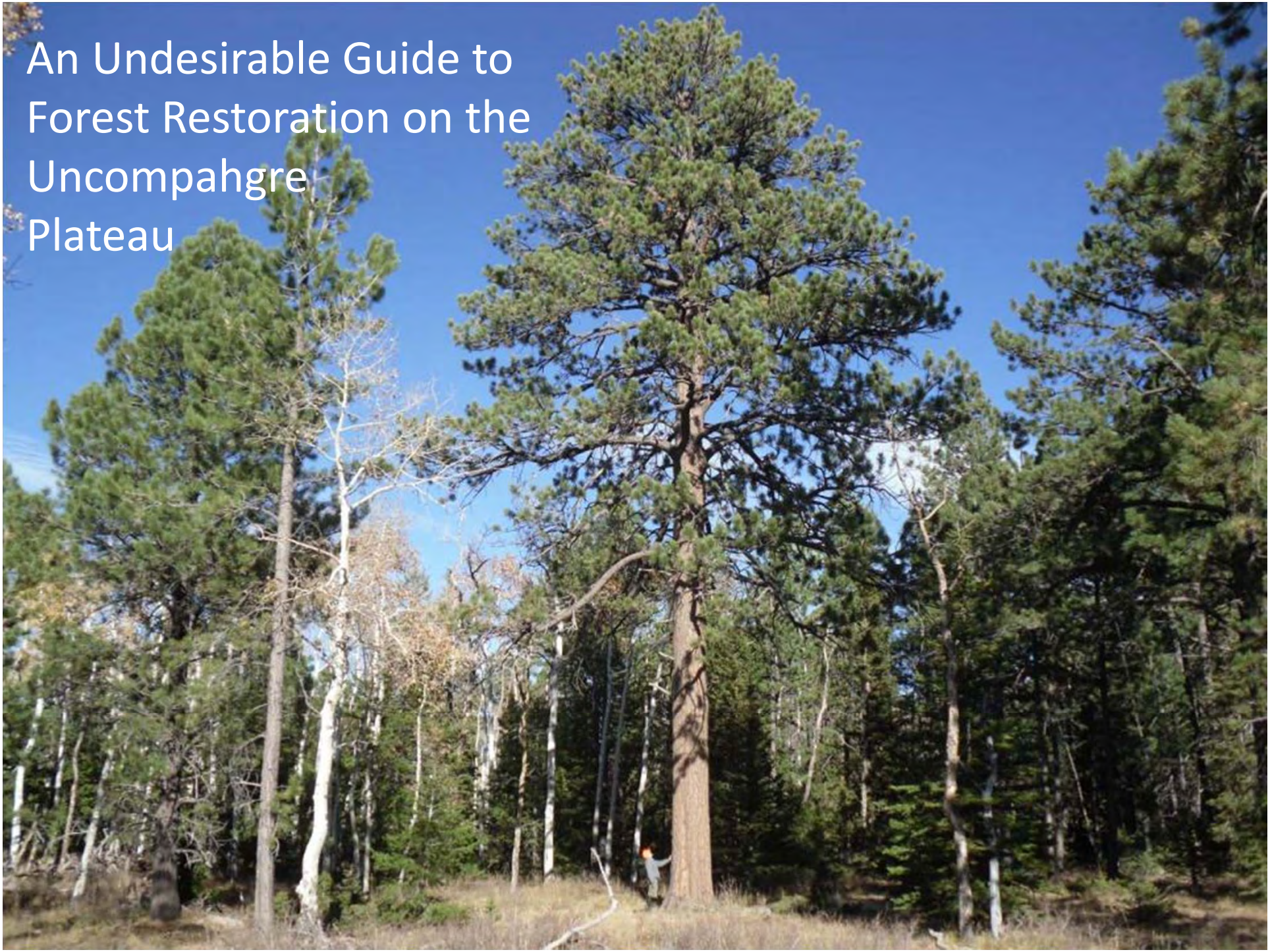
"…whether risks of undesirable outcomes are low enough"

Planning Rule #1 for monitoring and adaptive management:

How large of an observed change would lead us to modify our actions?

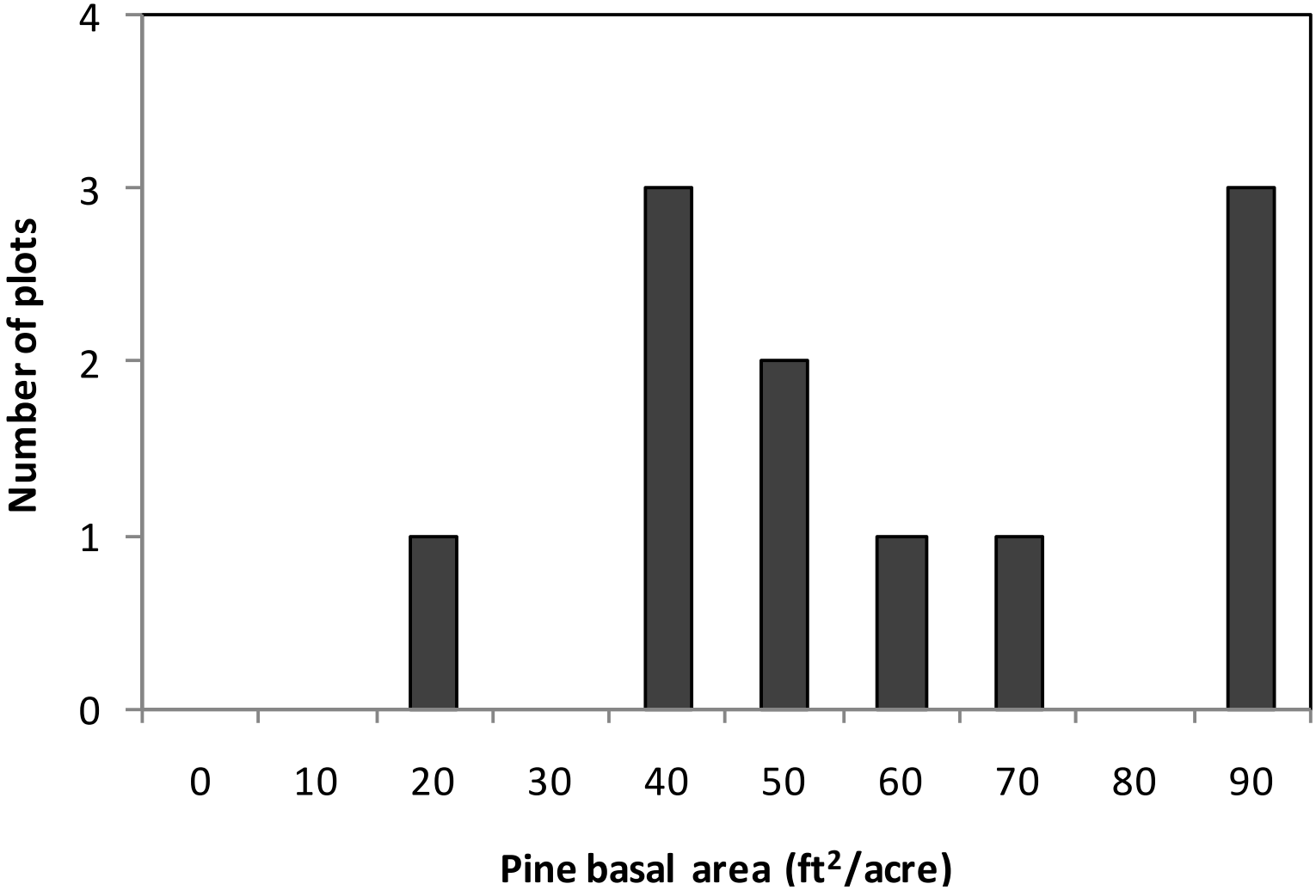
If we can't define *when* information would change our actions, we don't *need* that information ("luxury" monitoring).

An Undesirable Guide to Forest Restoration on the Uncompahgre Plateau

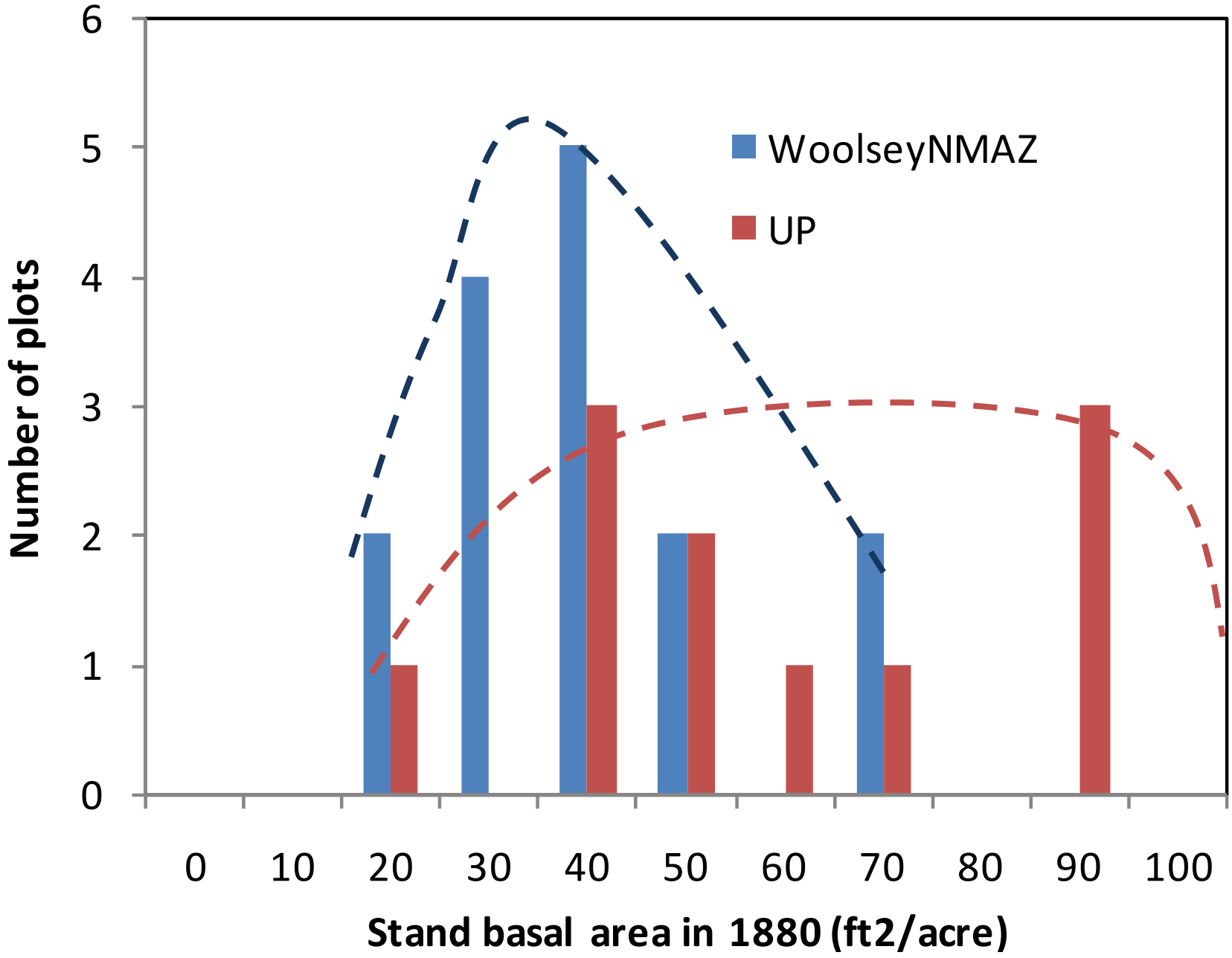


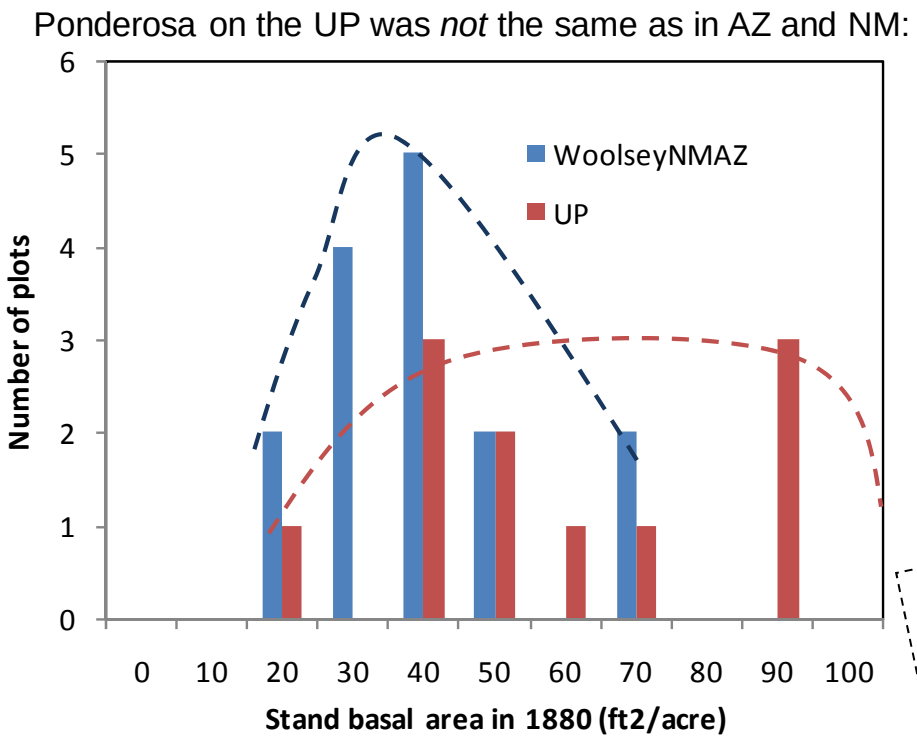
A science of land health needs, first of all a base datum of normality, a picture of how healthy land maintains itself as an organism. *Leopold 1941*

1875 Distribution of basal area of the ponderosa pine plots.
(almost all current stands exceed 80 ft^2/acre)



Ponderosa on the UP may have been different from AZ and NM:





Desired future condition:

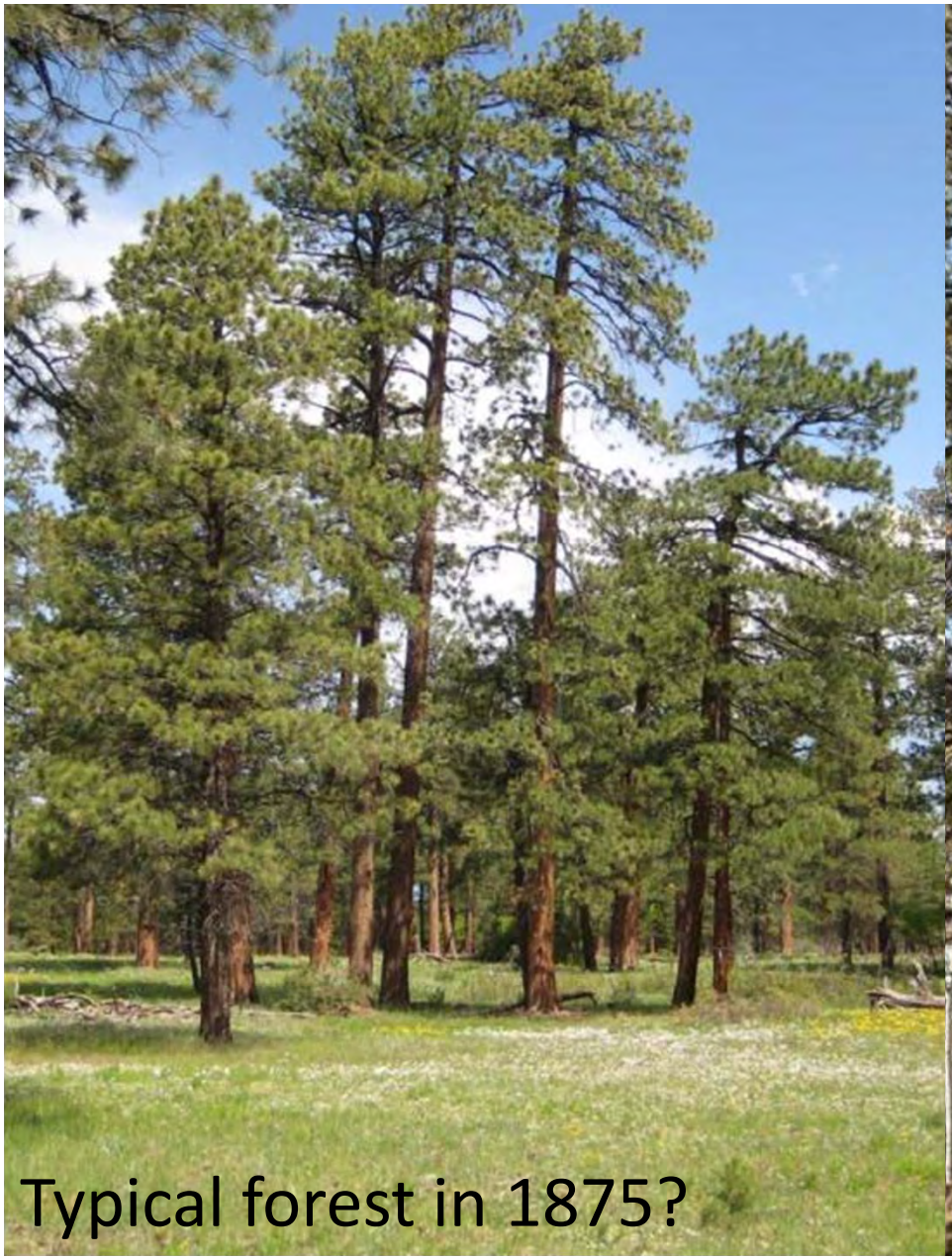
Target basal areas to recreate the distribution of pre Euro-American settlement conditions.

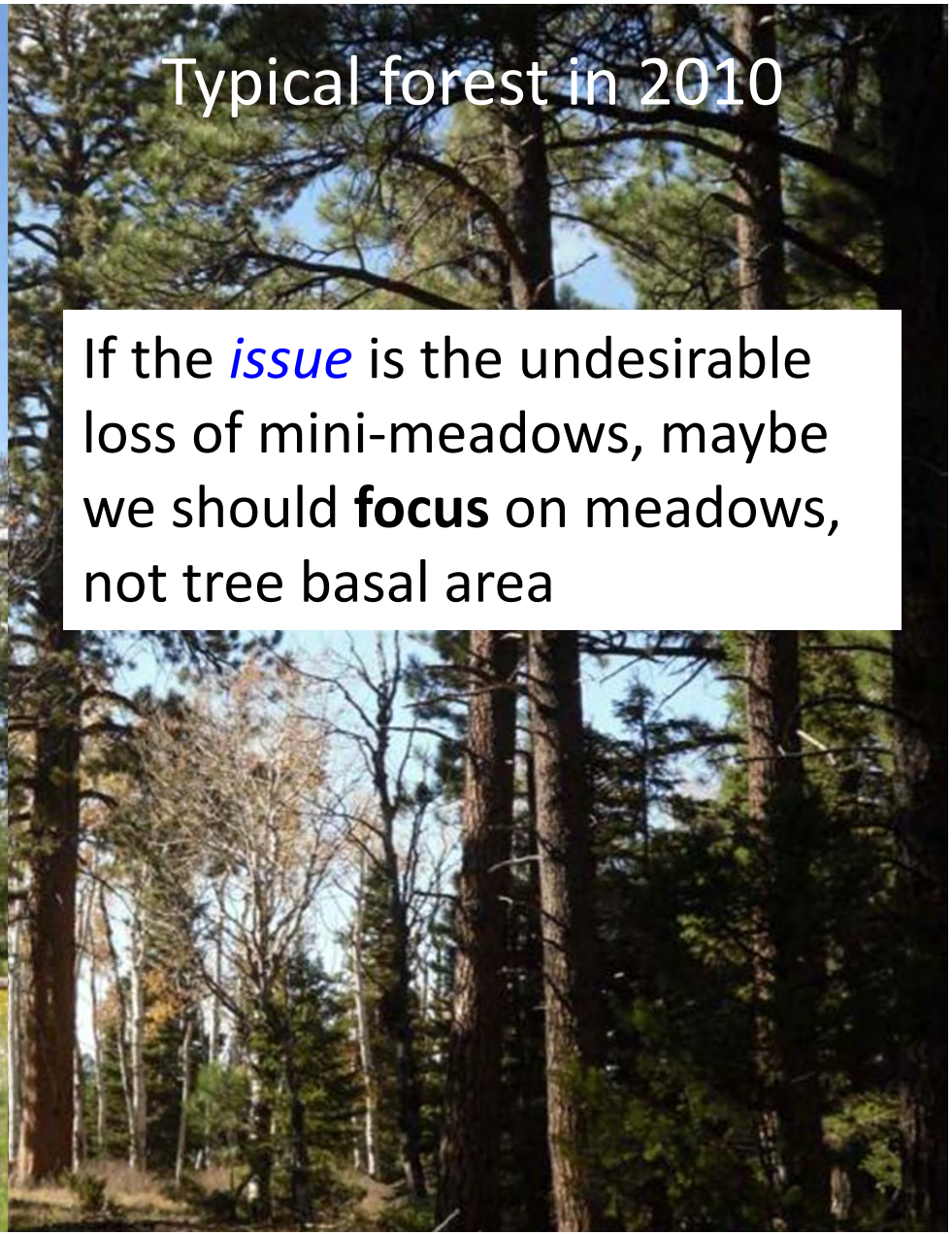
Reality check: If we get the BA on target, is the rest of the ecosystem restored?

Undesirable condition: What's currently rare or missing on the landscape? Almost no ¼ to 1-acre mini-meadows.

Implementation: Enhance the landscape removing trees, leaving clumps of trees

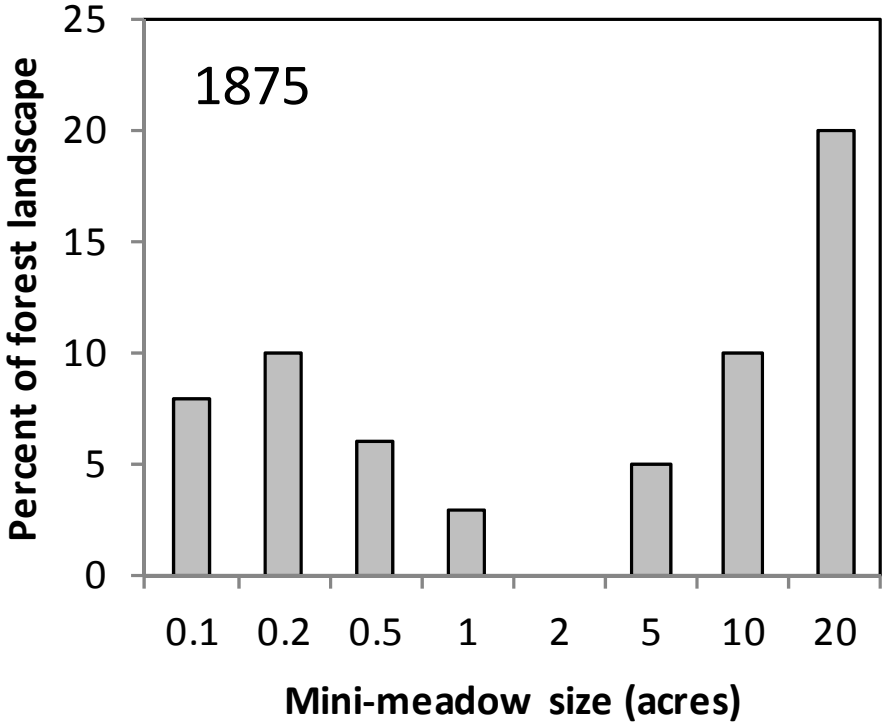
Focusing on increased basal area may be looking at the wrong end of the horse – it's the mini-meadows that are missing

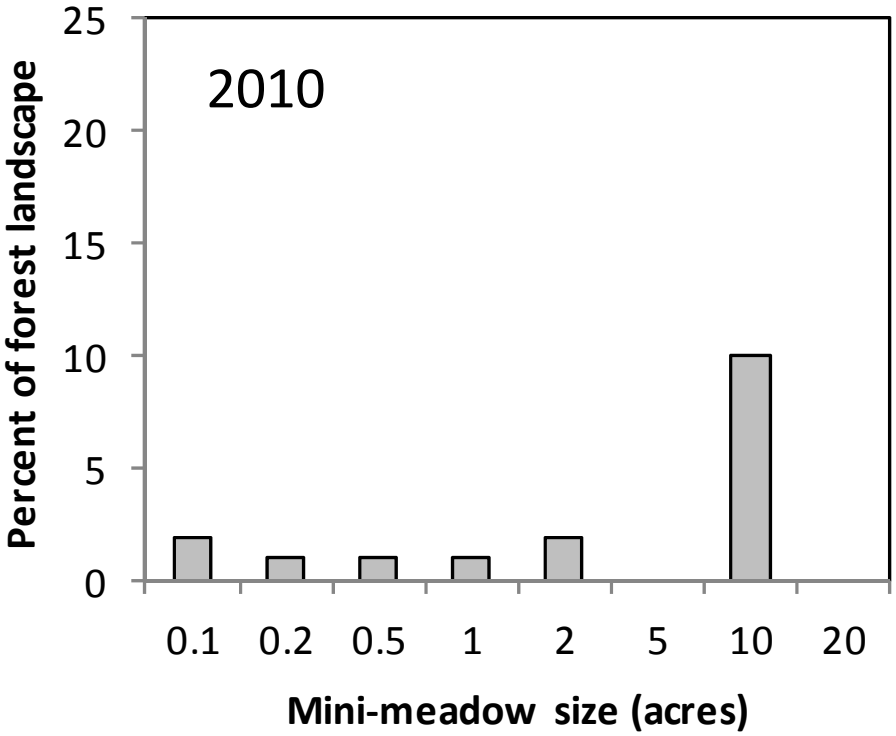


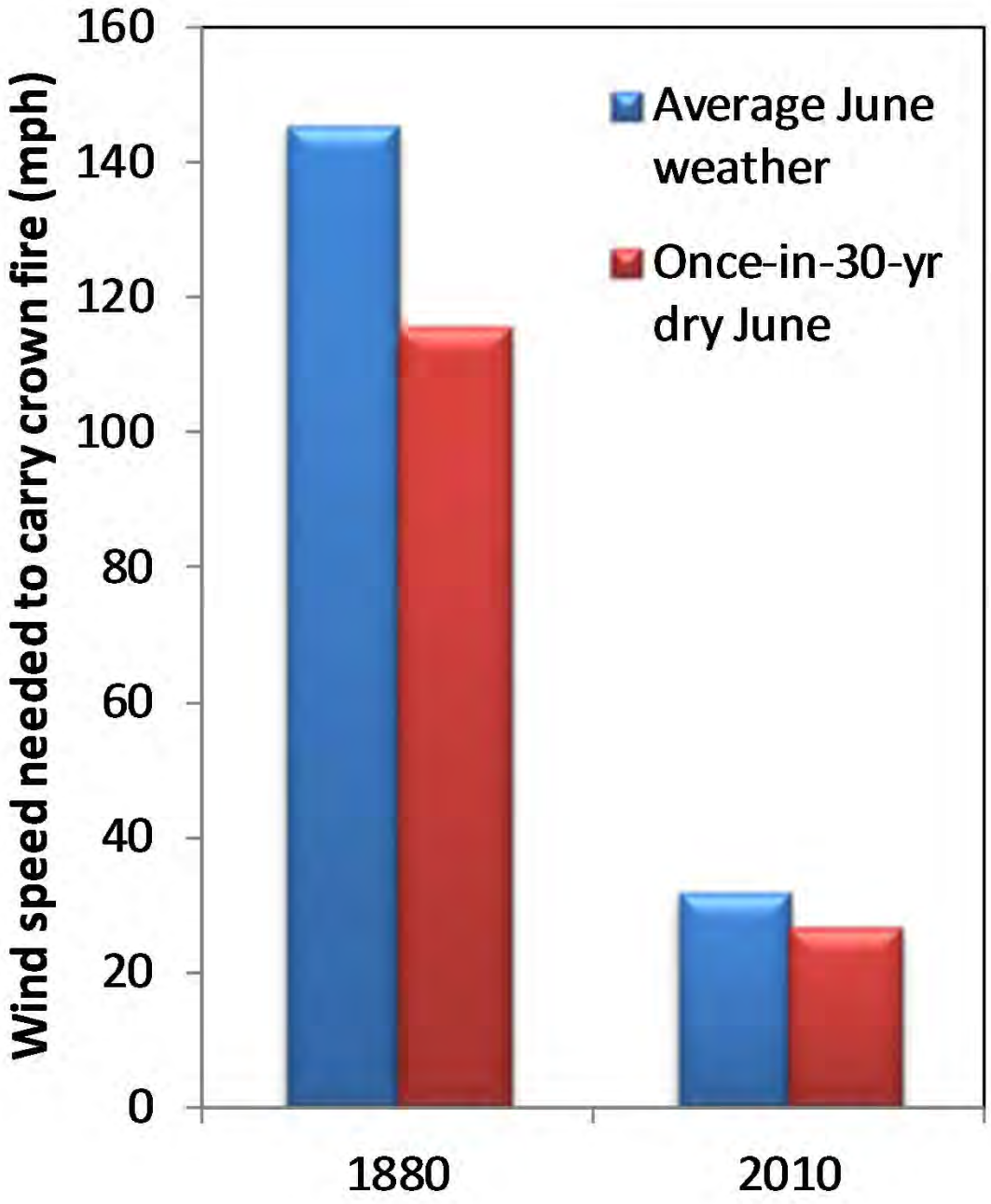


If the *issue* is the undesirable loss of mini-meadows, maybe we should **focus** on meadows, not tree basal area

The ponderosa forest landscapes in 1875 may have been half mini-meadows ; more than 90% are “missing” now







In 1880, typical ponderosa pine stand would not carry a crown fire in a *drought* without a Category 2 Hurricane wind.

In 2010, typical ponderosa pine stand would carry a canopy fire with a stiff breeze, even without a drought.

Desired future condition:
Create and maintain fire resilient stands that enable successful management of wildfires.

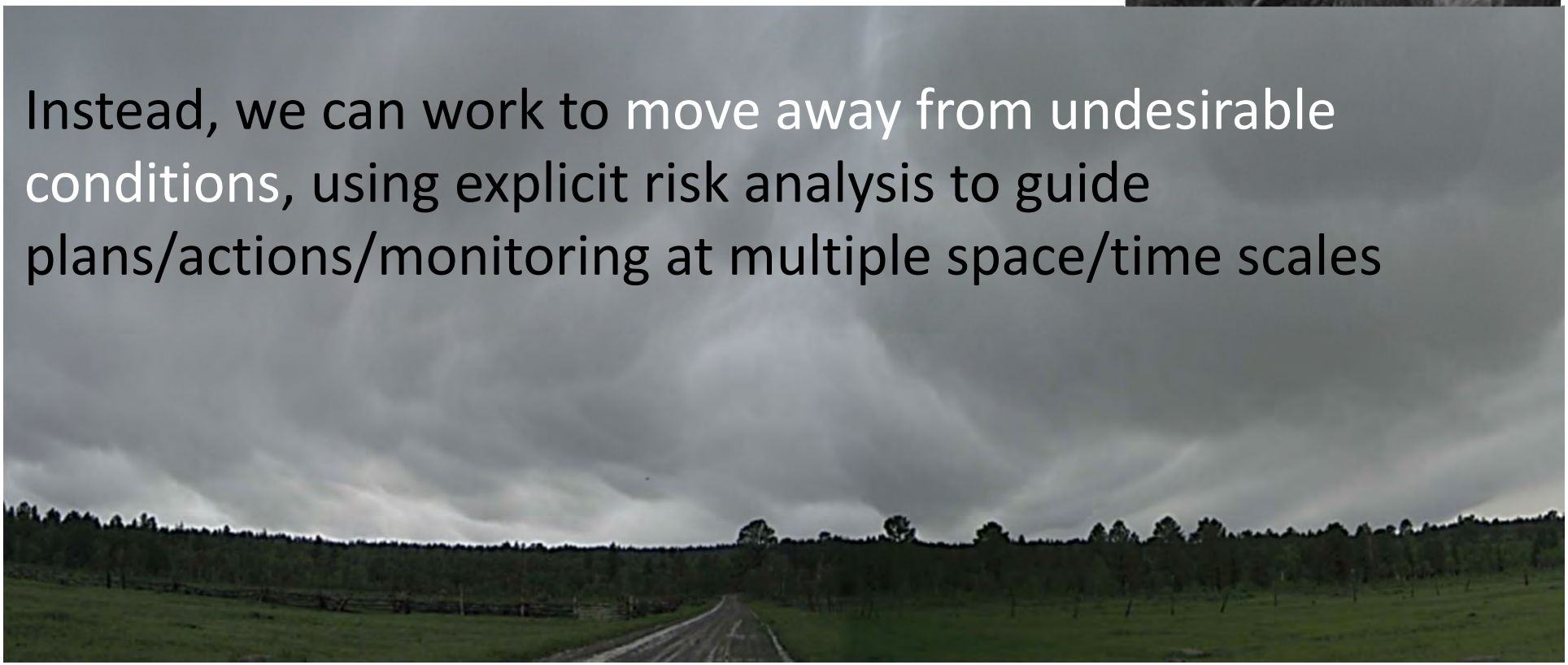
Reality check: Sounds good on paper, but do we really know how to accomplish this?

Undesirable condition: Fuel treatments fail to alter fire behavior across the landscape.

Implementation: Increase spatial heterogeneity of stands, more mini-meadows, more aspen, landscape-scale forest structure to interrupt canopy-fire potential.

We can't see into the future. Really, we can't. Nope, we can't.

Aldo Leopold's Hope: ..to understand that a living forest is not a machine; there should be no desired future condition for a living landscape.



Instead, we can work to move away from undesirable conditions, using explicit risk analysis to guide plans/actions/monitoring at multiple space/time scales

¿Y ahora qué?

Time to think about whether “undesirable” thinking seems to make sense to you

Meanwhile, here’s an idea you can run with, starting tomorrow:

“Undesirable” learning opportunities

The Best Available Science comes in all sizes and budgets

Million $
Science

Every stand, every landscape, at every point in time is unique

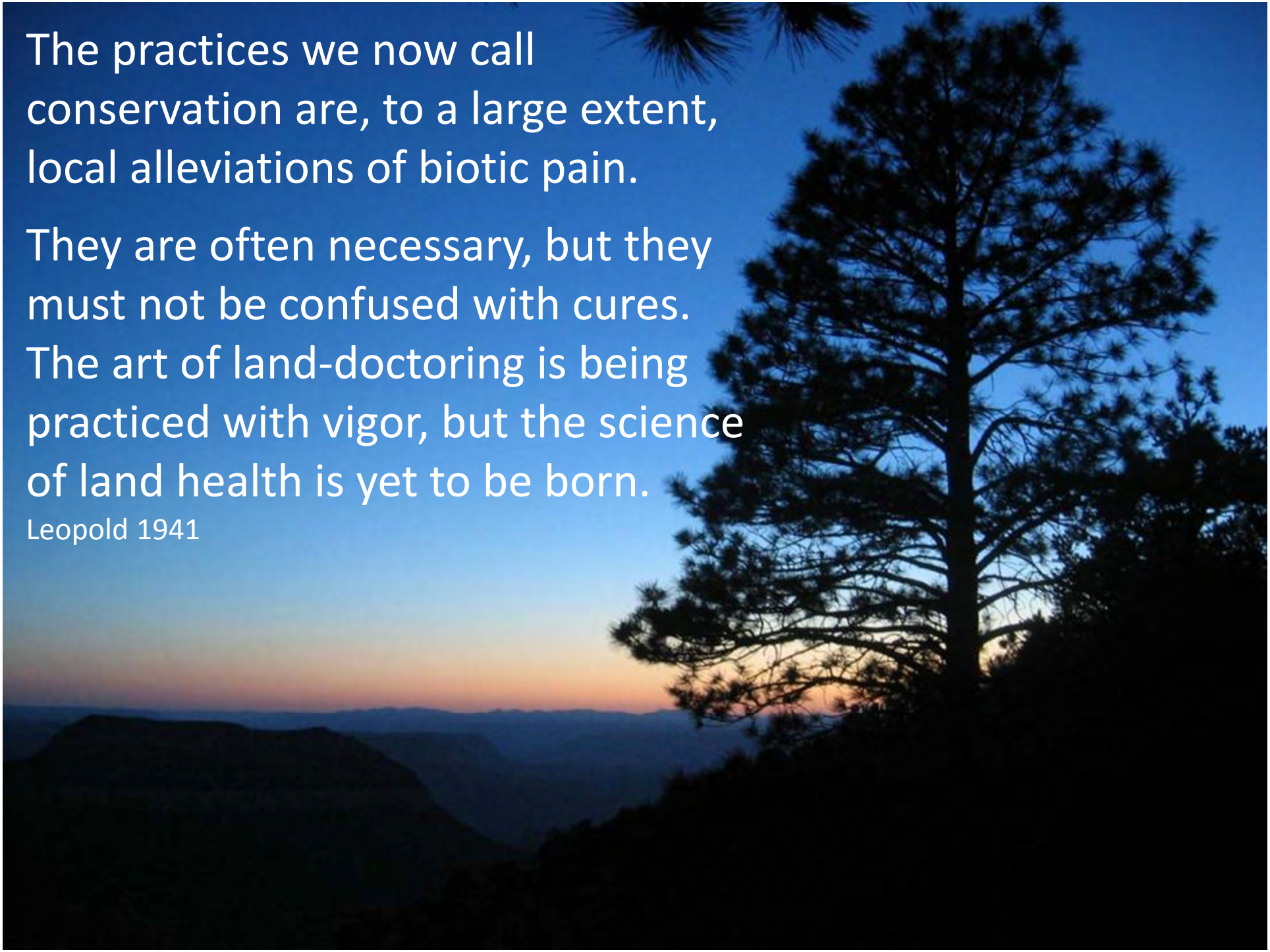
"Pocket Science" can provide a link between general knowledge ("book learning") and case-specific implementation

"Pocket science won't get you to the moon, but it can keep you from making the same old mistakes."

Pocket Science makes every management unit a schoolhouse

Principles of Pocket Science:

1. Never treat an entire unit the same; always leave a portion untreated, and always treat another portion differently.
2. GPS and photograph
3. Commit 2 days each year to revisiting Pocket Science projects: *Aim to find out when you've been wrong!*



The practices we now call conservation are, to a large extent, local alleviations of biotic pain.

They are often necessary, but they must not be confused with cures. The art of land-doctoring is being practiced with vigor, but the science of land health is yet to be born.

Leopold 1941