Charrtoon #2

Global Warming Intensifies Forest Ecosystem Decline.

Four Forcemen of the Climate Apocalypse

- Destructive Storms
- Deadly Heatwaves
- Deluge & Flood
- Drought & Wildfire

Surging deluges, floods, and landslides generate disturbances that provide portals for fire-prone invasive species.

Insects and disease, augmented by droughts and higher temperatures, will intensify forest decline.

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Forest decline means a loss of ecosystem resilience. It usually reduces a forest community's ability to sustainably respond to injury and disturbance, decreases diversity, diminishes capacity to retain and recycle minerals, and increases entropy (energy loss from the system).

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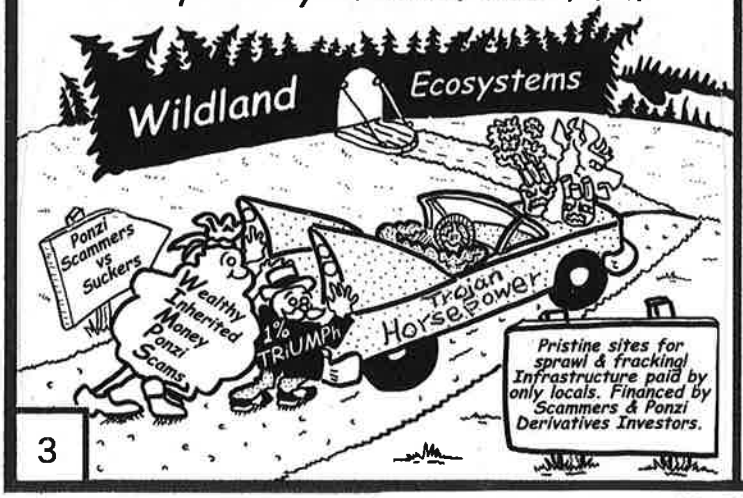
Then accelerated Global Warming will change weather patterns and increasingly influences wildfires. Extreme weather events enhance entrance opportunities for invasive diseases and species that intensify forest decline and impact the quality and quantity of wildfires' fuel.



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Incremental increases in atmospheric heat slow stratospheric jet streams and can bring devastating windstorms, persistent heat waves, and droughts or extensive, prolonged inundations.

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Floods and deluge-induced landslides produce barren soil areas. Severe windstorms, droughts, floods, heat waves, and lightning-caused wildfire create landscapes of dead, dying, and stressed vegetation.

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Foreign species and diseases often invade and colonize these stressed and ecological destabilized areas because ecosystem resilience and community resistance has diminished.

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Once established, invasive plants, insects, and disease can spread into more robust ecological communities. Synergistic with Global Warming they can contribute to ecosystem decline in a number of ways.

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First, invasive species can experience "character release" and rapid population growth when they encounter areas easily colonized (or massive new food supplies), few predators, and only weak competitors.

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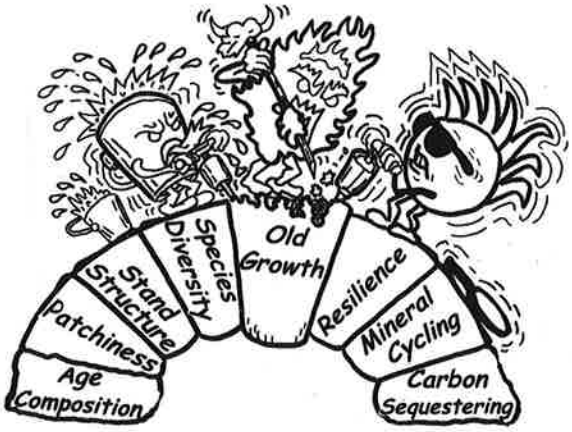
Second, invasive species may harm prominent, keystone species and favor usually rare native species that then proliferate and unravel the usual, stable, resilient, and sustainable ecosystem.



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Third, in recently climate-induced degraded environments, invading plant pathogens could symbiotically associate with native insect vectors to exacerbate ecosystem decline.

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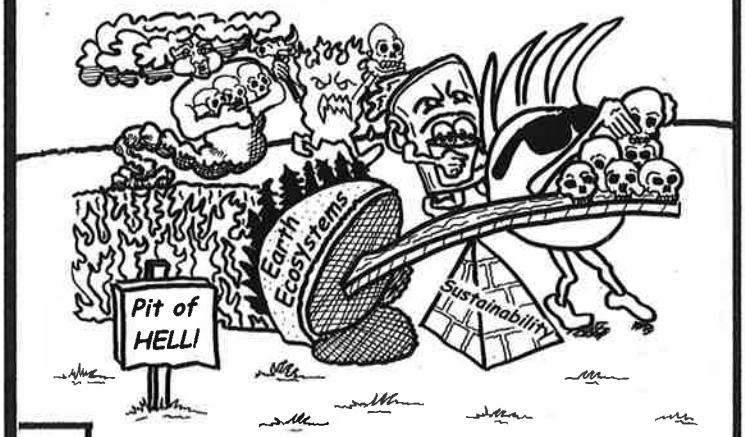
Fourth, invasive species may incrementally contribute to slow, cumulative effects that reach a critical tipping point, then suddenly destabilize plant communities and increase ecosystem decline.



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Fifth, when invading species favor fire-prone species, then the fire regime changes and landscapes may more frequently experience severe fires that aggravates ecosystem decline.

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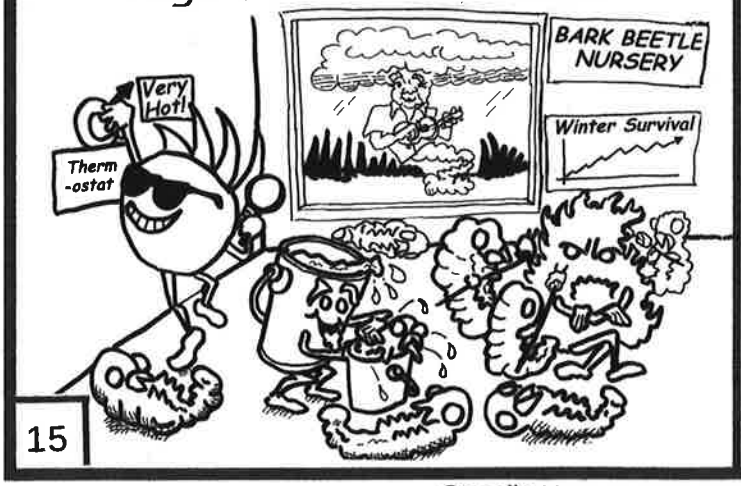
Charrtoon #2. Global Warming Intensifies Forest Ecosystem Decline. February 2017.

Recent experiences with bark beetles provide heuristic similes. Although not an invasive species, climate change and naïve forest management allowed bark beetles to acquire an invader's characteristics.

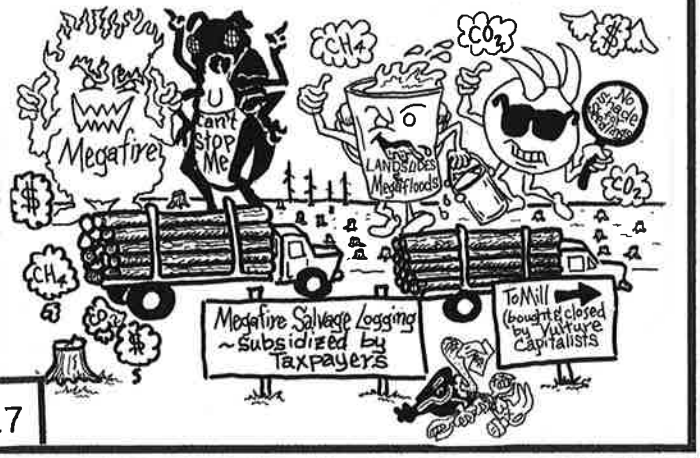
Over the last century, managed forests favored timber production and grew plantation-like stands. They favored large, uniform, and mature conifers maintained by industrialized harvest and fire suppression. Bark beetles prefer stands of low diversity with mature host trees.

Warmer temperatures due to climate change reduce beetles' winter mortality. The higher winter survival rate accentuated incredible beetle population growth that killed vast conifer landscapes. Many feared severe mega-fires would follow.



However, not all beetle-killed forests experience high severity fire. In fact, most do not. Some beetle-killed areas even stop crown fires. The flashy fuel (aerated, unrotted foliage) can kindle and carry fires, but remains available to fires for only a few years.

Still, management responses intensified ecosystem decline. Conflating total fuel with conditionally available fuel, managers attempted to clearcut beetle-killed stands, cut in "protective fuelbreaks," and allowed other ecologically-confused thinning projects.



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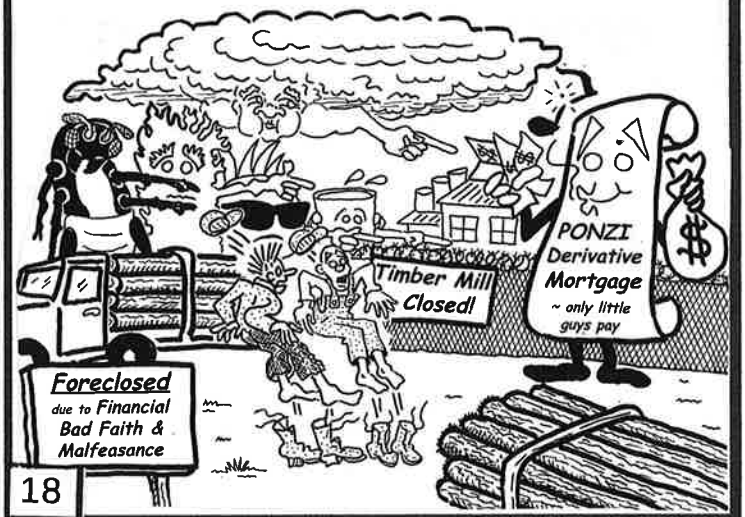
Also, managers, using tax money for administration, planning, roads, and timber extraction services, hoped to retrieve the economic value of the killed trees through "salvage logging." However, market conditions foiled management plans.



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Salvage logging squandered tax money, private investors, & ecologically injured lands. Global Warming makes clearcuts & plantations highly prone to intense & severe wildfires & landslides. Modern logging usually rely on lavish subsidies and rarely benefit local communities. Clearcut areas often eliminate options for tourism, recreation, & transition.

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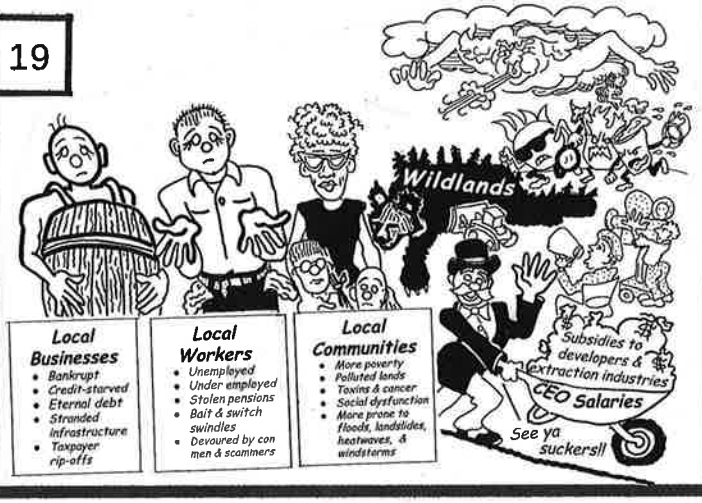

Instead of wasting money and resources on logging and mechanical thinning, prudent management looks to alternatives. Prescribed & Natural Fire Use remain the best methods to respond to ecosystem decline caused by bark beetle outbreaks, invasive species, and Climate Change.

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The Torch Singer

Low intensity prescribed fire every few years could eliminate flashy fuel and potentially reduce severity in large fires. Fire-induced nutrient release from foliage, duff, and flashy fuel can enhance plant and soil carbon sequestration.

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Costs of prescribed fire in remote, unbounded wildlands can be less than $10 per acre. Suppose that prescribed fire near wildland-urban interface (WUI) zones costs $300 per acre. Imagine using it on a perimeter acre of WUI that protects four adjacent landowners.

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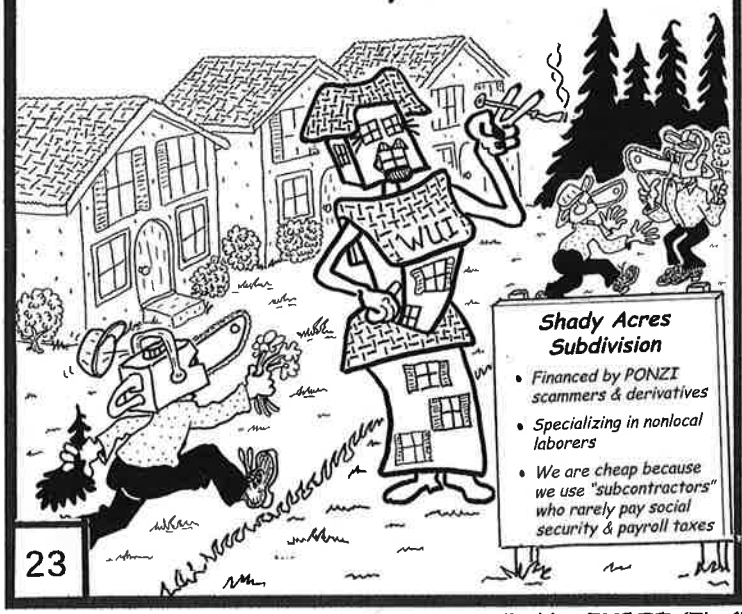
If each resident contributed an extra $25 per year to their insurance premiums to be used for prescribed fire, then this acre could be treated every third year.



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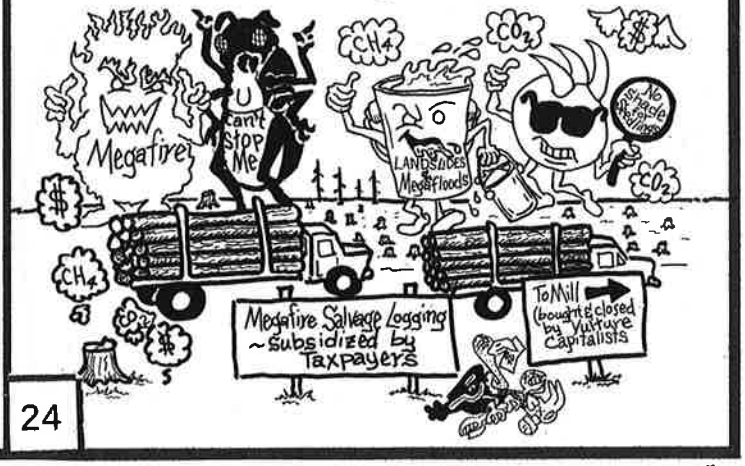
Imprudent responses to changed wildland conditions due to Global Warming include salvage logging, mechanical thinning, and spending millions to battle large wildfires. Natural fire use and prescribed fire remain the only inexpensive and viable responses to preserve wildlands' ecological services.



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