

Some Basic (But often Ignored) Biological Processes By Steve Rich

1. Crusted Soils: Inhibit seedling emergence, seed penetration, and sexual reproduction success of grasses and forbs particularly.
2. Crusted Soil: Inhibit soil aeration critical to all oxygen dependant soil organisms and biological processes. This diminishes the total energy by 90%. Crusted soils cannot be as productive as aerated soils.
3. Crusted Soils: cause surface runoff of precipitation.
4. Crusted Soils: The combination of the above 3 factors severely inhibit ecological recovery and contribute powerfully to the decline of “at risk” and unhealthy ecological sites. Healthy sites – by definition – do not have crusted soils.
5. Woody Species: Once established – most woody species capable of site dominance will increase in canopy cover and density until the grass and flower (herbaceous) component of the plant community is purged from their understory and interspaces. This is especially true of many species whose foliage and or roots are chemically defended. Sage brush, piñon/juniper woodland, dense chaparral areas and the takeover of biodiverse aspen communities by conifers are examples.
6. Woody Species: The areas described in (5) above can be greatly improved in health and functioning, biodiversity and wildlife habitat by various human treatments including moderate to intense ungulate activity with optimal timing, prescribed fires that is optimally timed, mechanical treatments including firewood thinning and timber harvest.
7. Grasses: Grasses experience senescence if not periodically defoliated in most Western rangeland sites. The centers of bunchgrasses die after 3 to 6 years without defoliation. If allowed to progress the process will kill around 80% to

95% of living grass tissue. The whole plant may die especially in drought.

Asexually reproducing turf grasses like galleta, blue grama and sandhill muhlenburgia exhibit similar symptoms. The plant grows outward in a ring to escape shading, etc. from old growth which are lethal in combination.

8. Grasses: Proper grazing preserves the centers of bunch-grasses and turf grasses alive.
9. Grasses: Un-grazed areas generally exhibit around 3 to 10 times more litter (dead plant material) than properly grazed ones. Properly grazed areas generally exhibit 3 to 10 times more live biomass than un-grazed areas, more viable seed production, much higher seedling production and establishment rates, higher live plant and animal biomass and biodiversity and better rangeland health ratings using objective standards like the *Rangeland Health Matrix* or *Evaluating Indicators of Rangeland Health*.
10. Grasses: Grasses with primarily asexual reproduction strategies survive (as a class) prolonged rest (no grazing, fire, etc) longer than those with primarily seed based, sexual strategies.
11. Birds: Birds as a class prefer properly grazed areas to un-grazed areas.
12. Birds: Proper grazing generally favors birds over rodents as a class (rodents have increased avian/other predation).
13. Prolonged Rest: Prolonged rest often acts against all classes of wildlife as time progresses.
14. Prolonged Rest: Prolonged rest and general non-disturbance is a frequently expressed and powerful transitional pathway from biodiverse healthy grassland, grass/forb/shrubland

and grass/forb/woodland states to depauperate (un-biodiverse) and often unhealthy woody species dominated, coarse grass dominated, cactus dominated persistent states. These unhealthy states generally have no natural transitional pathway to healthy states without human intervention. Fire only makes things worse, leading generally to invasion by non-native annuals and fire followers.

15. Fire: Fires burning in 100 year fire suppression fuel environments and vastly increased fuel densities cannot logically be “natural.”
16. Fire: If campfires sterilize soils (amply attested by environmental literature) so do severe fires in heavy ground fuels. If “A” is bad “B” is catastrophic due to the vastly larger affected area.
17. Fire: Massive insect kills of forests without salvage cutting cause severe soil damage as they burn in severe crown/ground and severe ground fires after the bases rot and they fall down. Many if not most of these dead, dry trees fall in crown/ground fires, felled by the flames as they burn at ground level and underground. They then burn as heavy fuels in contact with soils.
18. Fire: Severe fires create hydrophobic (water repellent) soils which shed massive, destructive floods.
19. Native Culture: Native Americans and other land based cultures knew all this and more. They worked very hard to create productive, biodiverse, healthy native landscapes.
20. Native Culture: We should be so smart as they were.