



## Management Cards

Use these variables to modify your a forest systems diagram by adding arrows to depict direct effects. Label the arrows with an S for SAME or an O for OPPOSITE to describe how one variable changes another. Only some variables and connections are illustrated in the Forest Systems Diagram to emphasize relationships that play particularly important roles in influencing pine tree growth.

<p><b>THINNING</b> helps reduce competition between trees and promotes growth of the remaining trees by increasing the light and nutrients they receive. Thinning can also increase the amount of water that each tree obtains. As a result, reducing forest density reduces the risk of insects, disease, and wildfires. Properly managing forest density through thinning is critical for maintaining the health of our forests.</p>	<div style="border: 1px solid black; padding: 5px; text-align: center;"><b>THINNING</b></div>
<p><b>PRESCRIBED FIRE</b> is an important tool to reduce fuels and the risk of wildfire, reduce invasive plants and insects, improve wildlife habitat, and maintain native forest ecosystem health. However, changes in temperature, precipitation, and storm events may reduce opportunities to use prescribed fire safely. Wildfire risk increases with elevated summer temperatures and reduced rainfall during the growing season.</p>	<div style="border: 1px solid black; padding: 5px; text-align: center;"><b>PRESCRIBED FIRE</b></div>
<p><b>INCREASING GENETIC DIVERSITY</b> by planting seedlings from different species or different families of a single species may help forest owners prepare for uncertainty. In some situations, forests with some variation in genetic diversity may be more resilient and better able to withstand uncertain environmental changes than forests with little genetic diversity. Species and families differ in their ability to grow under different climate conditions. Species with larger geographic ranges, and therefore with the genetic potential to tolerate a wider variety of conditions, may offer less risk than species with narrowly defined ranges.</p>	<div style="border: 1px solid black; padding: 5px; text-align: center;"><b>GENETIC DIVERSITY</b></div>
<p><b>FERTILIZING</b> a forest once or twice in the lifetime of the trees encourages more rapid tree growth in places where nutrients such as nitrogen and phosphorus are naturally limiting in the soil. Landowners must be careful to only apply minimal amounts of fertilizer and not let it drift into streams or wetlands. Maintaining vigorous growth of the trees makes them less susceptible to insect attacks and drought. Prices of fertilizer may increase as fossil fuel prices climb, making it more costly to manage for proper tree nutrition.</p>	<div style="border: 1px solid black; padding: 5px; text-align: center;"><b>APPLY FERTILIZER</b></div>