

## Plant Productivity and Health

Soil

Water

Air

**Plants**

Degraded Plant Condition

Plant Productivity and Health

Structure and Composition

Plant Pests

Wildfire Hazard

Animals

Energy

### Degraded Plant Condition - Plant Productivity and Health

Plant productivity, vigor and/or quality negatively impacts other resources or does not meet yield potential due to improper fertility, management or plants not adapted to site.

#### What is it?

Plants established in the wrong climate or soil may be under stress and may never thrive, no matter how much fertilizer or water you supply. Natural events, such as drought, or mismanagement can cause plant stress. Plants under stress are more susceptible to disease and insect damage. Symptoms of poor plant vigor and health may include slow growth, discoloration of leaves, wilting or drooping foliage, leaf drop, and/or discolored roots.

#### Why is it important?

For plants to produce the expected yield, preferred products, or desired environmental outcomes they must be adapted to the site on which they are growing, provided with the appropriate amounts of nutrients, water, and sunshine, and protected from unchecked animal, weed, insect, and disease pests.

#### What can be done about it?

Management is the key to maintaining plant productivity and health. Check that the desired plant is suited to the climate, soil type, and intended use. Set realistic yield goals based on soil productivity information, historical yield data, climatic conditions, level of management, and/or local research on similar soil and cropping systems. The NRCS Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov>) is a source of soils information and their limitations for growing various crops. University Extension is a resource for nutritional, cultural, and management practices needed to keep plants healthy and productive. Nutrient management specifies the amount, timing, form, and method of application of nutrients needed to achieve realistic production goals. Integrated pest management specifies techniques to detect, avoid, and treat pests and diseases. Some causes of poor health and vigor may require the use of cover crops, the adoption of new crop rotations, or changes to tillage methods to address soil quality issues, such as soil compaction, poor drainage, low organic matter, or the presence of contaminants in the soil.

### Plant Productivity and Health at a Glance

Problems / Indicators - Yield or growth is substantially less than expected, plants are disease and/or pest-ridden, plants fail to thrive	
Causes	Solutions
<ul style="list-style-type: none"> <li>Plants receive inadequate nutrition during critical growth periods</li> <li>Plants fail to thrive due to poor soil conditions</li> <li>Plants wilt, freeze or rot even during normal climate conditions</li> <li>Plants not adapted to site</li> </ul>	<ul style="list-style-type: none"> <li>Use nutrient management to address the form, rate, placement, and timing of nutrient application</li> <li>Consider crop rotations, deep rooted cover crops, drainage, and deep tillage</li> <li>Consider alternate crops or different plant varieties</li> </ul>

# PLANTS

## Structure and Composition

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### Degraded Plant Condition - Structure and Composition

Plant communities have insufficient composition and structure to achieve ecological functions and management objectives. Inadequate structure and composition also includes degradation of wetland habitat, targeted ecosystems, or unique plant communities.

#### What is it?

A stand of plants and associated organisms (bacteria, fungi, animals) that share a defined area or environment lack the diversity, density, distribution patterns, and three-dimensional structure necessary to produce the preferred products or desired environmental outcomes.

#### Why is it important?

If landowners hope to achieve their production or environmental objectives, it is critical that they understand and work with the processes that affect structure and composition of plant communities. The interaction between plants, other organisms, and environmental factors such as soil, climate, and topography influence how a plant community functions to cycle nutrients, capture and release water, protect and build soil, nurture wildlife, or produce usable products.

#### What can be done about it?

Addressing inadequate structure and composition is a complex problem that varies with the natural plant community that is desired. All human activities have the potential to impact natural communities, whether it is land use changes, drainage activities, controlling fires, or the introduction of different animal and plant species. Activities can include removal of unwanted plants to provide more space for desired species to increase in number or size. Desired plants can be reintroduced that are missing from the community. Practices such as grazing, mowing, fertilization, and burning can be used to promote and/or repress growth of target plants to attain the desired structure and composition.

### Structure and Composition at a Glance

Problems / Indicators - Inadequate structure and composition	
Causes	Solutions
<ul style="list-style-type: none"> <li>• Stress, disease and/or mismanagement reduces and/or eliminates key components of plant community</li> <li>• Plant community is allowed to grow to late succession stage and fails to produce desired habitat for wildlife and/or insects that depend on early succession habitat</li> <li>• Invasive species outcompete desired plants creating a monoculture</li> <li>• Loss of fire regime</li> </ul>	<ul style="list-style-type: none"> <li>• Employ or modify use of cultural practices (e.g., grazing, burning, mowing)</li> <li>• Treat or remove vegetation to reestablish desired habitat</li> <li>• Control invasive species, reestablish desired plant community, and utilize integrated pest management techniques to maintain stand</li> </ul>

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## Plant Pests

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### Degraded Plant Condition - Plant Pests

Excessive pest damage to plants including that from undesired plants, diseases, animals, soil borne pathogens, and nematodes.

#### What is it?

Plants provide food for many forms of life. Human beings and grazing animals depend on plants for food. It is important to note that large numbers of other much smaller creatures, such as insects and their larvae, also feed on plants. Other plants, fungi, bacteria, and viruses use plants as a host during part of their life cycle. Generally, these interactions are normal, predictable, and benign. However, we apply the term "pest" to any animal, insect, bacteria, or virus when any of these interactions become unbalanced and unacceptable plant damage results. Pests can also take the form of any organism that competes for space, nutrients, or water (e.g., weeds). Heat, drought, wind, sun, and cold create stress on plants that make them more susceptible to pests. Pests can vary from place to place, crop to crop, year to year.

#### Why is it important?

For plants to produce the expected yield, preferred products, or desired environmental outcomes, they must be protected from unchecked animal, weed, insect, and disease pests.

#### What can be done about it?

Management is the key to keeping damage from plant pests within tolerable limits. Integrated Pest Management is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense treatments. Set Thresholds - Before taking any pest control action, set a point at which pest populations or environmental conditions indicate that pest control action must be taken. Monitor and Identify Pests - Not all insects, weeds, and other living organisms require control. Identify pests accurately so appropriate control decisions can be made in conjunction with action thresholds. Prevention - As a first line of pest control, manage to prevent pests from becoming a threat. Rotate crops and select pest-resistant varieties. Control - If pest control is required, evaluate control methods for effectiveness and risk. Use less risky pest controls first, such as pheromones to disrupt pest mating, or mechanical control, such as trapping or weeding. If further monitoring indicates controls are not working, additional pest control methods such as targeted spraying of pesticides should be used. Use broadcast spraying of non-specific pesticides only as a last resort.

### Plant Pests at a Glance

Problems / Indicators - Animal, insect, and/or disease damage, or competition from common weeds or invasive plants substantially reduces yield or growth

#### Causes

- Plants suffer from attacks by pests or disease
- Weeds or invasive plants out compete desired crop
- Plants are weak or not thriving

#### Solutions

- Use Integrated Pest Management to employ early detection, avoidance, and treatment of pests
- Consider brush management, vegetative weed control, mulching, or prescribed grazing or burning
- Use plants adapted to climate and soils



United States Department of Agriculture  
Natural Resources Conservation Service

## Resource Concerns

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### Degraded Plant Condition - Wildfire Hazard

Accumulated plant residue (biomass) creates wildfire hazards that pose risks to human safety, structures, plants, animals, and air resources.

#### What is it?

All plants produce litter from leaves, stalks, or stems. Normally, this residue is either left to decompose and nourish the next generation of plants and animals, or it is harvested and used for straw, mulch, bio-fuel, pulp, etc. When the rate of utilization and/or decomposition is slower than the rate of biomass production, residues can accumulate to the point of becoming a fire hazard.

#### Why is it important?

While fire is an important and often beneficial part of the natural ecosystem, uncontrolled or "wild" fire poses a threat to life, health, and property. In addition, the secondary effects of wildfires, including erosion, landslides, introduction of invasive species, and changes in water quality, are often more disastrous than the fire itself.

#### What can be done about it?

The amount of flammable biomass can be reduced to decrease the incidence of wildfires; the distribution of biomass can be manipulated to influence the direction and rate at which wildfires spread; and precautionary steps can be taken to protect life and property to lessen the impacts of wildfires.

### Wildfire Hazard at a Glance

Problems / Indicators - Excess biomass, biomass distribution, lack of preparedness	
Causes	Solutions
<ul style="list-style-type: none"> <li>Overstocked forest increases the risk of fire outbreak</li> <li>Unbroken expanse of flammable biomass increases the risk of the spread of fire</li> <li>Lack of a plan on how to respond to fire increases risk to life and property</li> </ul>	<ul style="list-style-type: none"> <li>Thin excess trees and brush</li> <li>Treat or remove vegetation, debris, and detritus</li> <li>Create and implement a wildfire plan:               <ul style="list-style-type: none"> <li>post fire control agency phone numbers</li> <li>locate and map water sources</li> <li>map out evacuation routes</li> <li>equip vehicles with fire fighting tools</li> </ul> </li> </ul>