

## Do You Know...Your Government Agencies???

### Local

BOCC - Board of County Commissioners

CD - Conservation District

CCD - Cody Conservation District

MCD - Meeteetse Conservation District

PCFCD - Powell-Clarks Fork Conservation District

TCD - Teton Conservation District

MLPAAC - Meeteetse Local Planning Area Advisory Committee

P&Z - Park County Planning & Zoning

W&P - Park County Weed & Pest Control District

### State of Wyoming

G&F - Wyoming Game and Fish Department

HC - Hydrographer/Commissioner of the SEO

## Do You Know...How to Read the Alphabet Soup???

### State of Wyoming (Continued)

SEO - State Engineer's Office

WSFD - Wyoming State Forestry Division

WWDC - Water Development Commission

WYDOT - Department of Transportation

### Federal (US)

NRCS - Natural Resources Conservation Service

BLM - Bureau of Land Management

EPA - Environmental Protection Agency

FEMA - Federal Emergency Management Agency

FSA - Farm Services Administration

USBR (BuRec) Bureau of Reclamation

USFS - US Forest Service

USFWS - US Fish & Wildlife Service

### Resources:

Barnyards & Backyards Rural Living in Wyoming: [www.backyardstobarnyards.com/](http://www.backyardstobarnyards.com/)

Conservation Districts: Cody CD, Diane Russell, 899-0037, [codycd@vcn.com](mailto:codycd@vcn.com)

Meeteetse CD, Steve Jones, 868-2484, [mcd@tctwest.net](mailto:mcd@tctwest.net), [www.meeteetsecd-wy.gov](http://www.meeteetsecd-wy.gov)

Powell-Clarks Fork CD Ann Trosper, 754-9301, [ann.trosper@wy.nacdnet.net](mailto:ann.trosper@wy.nacdnet.net), [www.pcfcd.org](http://www.pcfcd.org)

### Fire:

◆ Cody Volunteer Fire Department, 1125 11th Street Cody, 527-8780, Burn Permits 527-8700, [codyfireschool@parkcounty.us](mailto:codyfireschool@parkcounty.us)

Website: <http://www.codywyomingfire.com/>

◆ Meeteetse Volunteer Fire Department: 868-2627, [mfire@tctwest.net](mailto:mfire@tctwest.net), [www.townofmeeteetse.com/page8.html](http://www.townofmeeteetse.com/page8.html) ,

◆ Park County Dispatch 1-800-786-2848, Cody - 527-8700, Powell - 754-8700

◆ Park County Fire Warden - Russell Wenke, 527-8551 (w), 899-7507 (c), [rwenke@parkcounty.us](mailto:rwenke@parkcounty.us)

◆ Park County Deputy Fire Warden - Sam Wilde, 527-8552 (w), 899-7508 (c) [swilde@parkcounty.us](mailto:swilde@parkcounty.us)

◆ Powell City Fire Department 754-2211

◆ Wyoming State Fire Marshal, Wyo. Department of Fire Prevention & Electrical , 777-6264, <http://wyofire.state.wy.us>

◆ Wyoming State Fire Service Directory <http://wyofire.state.wy.us/training/pdf/Directory.pdf>

G&F - Dennie Hammer, Cody Region Information & Education Specialist 527-7125

Irrigation Districts: Badger Ditch Company (Clark) 645-3051

Cody Canal 587-3727

GVID Greybull Valley Irrigation District 868-2601

Heart Mountain Irrigation District 754-4685

Lakeview Irrigation District (South Fork) 587-4003

North Fork Valley Ditch 587-7580

Shoshone Irrigation District 754-5741

Willwood Irrigation District 754-3831

Bridger Plant Materials Center (406) 662-3579

(<http://plant-materials.nrcs.usda.gov/mtppmc>)

NRCS: Cody Field Office, Robin Moser, 587-3251

Powell Service Center, Dicksie Michael, 754-9301

Park County Courthouse (Many County offices) Toll Free 800-786-2844

Park County Master Gardeners, Powell, Joyce Johnston, 754-8836

Cody, Bobbie Holder, 527-8560

Rules and Regulations: Park County Planning Office, 527-8540

Surface Water Regulations: State Engineer's Office: <http://seo.state.wy.us/>

UW CES - Cooperative Extension Service - Big Horn Basin Area, Crops, Sandra M. Frost, Powell, 754-8836, [sfrost1@uwyo.edu](mailto:sfrost1@uwyo.edu),

Livestock, Dallen Smith, Greybull, 765-2868, [dsmith69@uwyo.edu](mailto:dsmith69@uwyo.edu)

Powell Research and Extension Center, Powell, WY 754-2223, Abdel Mesbah, Supt., Mike Killen, Farm Manager.

UW Crop Variety Trials <http://www.uwyo.edu/plants/key.htm>

Big Horn Crop Site <http://uwadmnweb.uwyo.edu/bighorncrops/>

Water: State Engineer's Office, 777-7354, <http://seo.state.wy.us/>

Weed information: Park County Weed and Pest Control District, 754-8884 or 527-1840

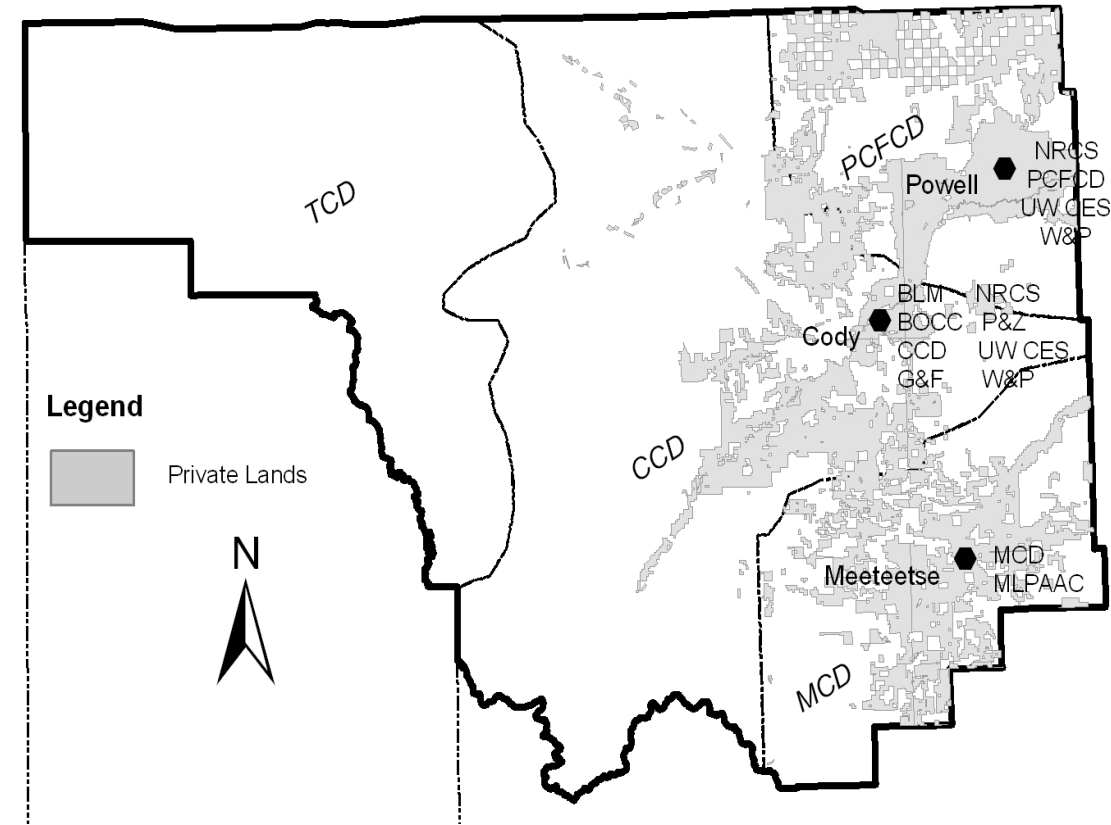
Wyoming Weed and Pest Council website: [www.wyoweed.org](http://www.wyoweed.org)



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## Do You Know Park County???



## Do You Know...

...The Plants YOU Want???

...What Grows???

...Climate???

...Soil???

## ...How they're all related???

*Climate and soil combine to create unique environments for Park County plants. Once you understand how climate and soil affect plants, you can choose plants that will be successful!*

## To The Residents of Park County

June, 2011

## Resources Available to Landowners

## For Assistance in Land Management Issues

From:

Your Local, State, and Federal Governments and their Agencies, and the University of Wyoming Cooperative Extension Service

Cody Conservation District, Meeteetse Conservation District, Park County Government, Park County Master Gardeners, Park County Planning and Zoning, Park County Weed & Pest Control District, Powell-Clarks Fork Conservation District, USDA-Natural Resources Conservation Service, Wyoming Game & Fish Department

## Do you know ABOUT PLANTS?

Native and some introduced plants have evolved and adapted to Park County climate and soils.

**Do you know? On most privately owned lands,** evaporation is greater than precipitation; drought is normal; temperature and precipitation vary with elevation; and precipitation is generally less than 12 inches?

Land managers who understand climate, soil, and adapted plants can choose plant materials that will be successful.

Stress is an external factor that exerts negative influence on a plant. Stress tolerance is a plant's fitness to cope with an unfavorable environment. Adaptation is a genetically determined level of stress resistance acquired by selection over many generations (deep roots, spines, etc.), while an acclimatized plant is an individual that has adjusted in response to stress in a physical way.

**Do you know? ...Adapted varieties** of many plants for Park County are available!

**Do you know? ...**Since 1959, the NRCS Bridger Plant Materials Center has provided plant solutions for the diverse ecosystems of Montana and Wyoming? The Center has released a number of conservation plants including 'Rimrock' indian ricegrass, 'Critana' thickspike wheatgrass, 'Bridger-select' Rocky Mountain juniper, 'Trailhead' basin wildrye and Old Works Germplasm fuzzytongue penstemon. The Center has developed new plant solutions for extending livestock grazing periods; **low-water landscaping**; restoring woody plants to native range; propagating threatened species and culturally significant plants; and reclaiming disturbed areas from mining, wildfire and road construction on 130 acres leased from the Conservation Districts of Montana and Wyoming.

**Do you know? ...Successful gardeners** harden off tomatoes (acclimatize) before putting plants outside in the spring by gradually exposing the tomato starts to outdoor conditions of light and temperature so that individual plants change their physiology in response to exposure to stress?

Plants have strategies for dealing with water stress - avoid, postpone, or tolerate drying out. Avoidance is achieved when seeds persist in the soil until conditions are right for germination; by germinating, growing and reproducing quickly during the wet season; or with a determinant life cycle – when there is a pre-programmed end to growth, and reproduction takes place before the dry season. Plants can postpone drying out by having an indeterminate life cycle, renewed growth whenever there is enough water. Plant shape and leaf arrangement can postpone drying out by shading lower parts of the plant or soil below the plant, and deep roots can prevent drying out.

Temperature stress includes chilling, freezing and heating, resulting in loss of cell membrane functions. Plants have developed strategies for avoiding and/or surviving **cold stress** -some go dormant during winter – above ground growth stops. Annuals are plants that over winter as seeds. Deciduous trees, drop leaves before winter. Many plants protect themselves by increasing the salt concentration in their fluids (create their own anti-freeze) and lowering the temperature at which cells will freeze. When leaf stomata close to avoid drying out, **heat stress** occurs when leaf temperature increases due to a water deficit and the plant roots cannot take up enough water to compensate for the high temperatures.

## Do you know ... How to avoid or fix problems?

Take the advice of reputable horticulturalists while learning about how climate and soil affect the plants you want to grow. Recognize that the Park County environment may not suit the plants you thought you wanted, and look for acceptable alternatives. Usually it will be

easier to find alternative plant materials than to change the soil or climate. Plants from elsewhere usually won't do well here unless they are from a similar climate and soil.

But before you give up on your desired flora, inventory the physical features of your site and try to identify the micro-climates on the site. The aspect (amount of slope and its direction) is important, because of the combination of water infiltration, sun angle, and temperature. Notice the types of established local vegetation that grow on similar sites nearby. Establish some management goals for the property, matching plants to the available water and soil conditions.

## Do you know where to get INFORMATION and HELP?

Information is available from the Natural Resource Conservation Service (NRCS) in Cody and Powell, and the Bridger PMC (<http://www.wy.nrcs.usda.gov> ). Conservation districts provide information, workshops, and tree sales. The Park County Master Gardeners can provide ornamental and turf information. The UW Cooperative Extension Service in Cody or Powell has a catalog of publications that cover regional plants. The catalog is available online at <http://ces.uwyo.edu/pubs.asp>. Local landscape and garden professionals are knowledgeable about regional vegetation.

## Do you know PARK COUNTY CLIMATE?

Life in the western US, and Wyoming in particular, depends upon adaptations for a harsh climate. Scientists define climate as the mean value of thirty years of continuous weather data. Trends may be slightly different depending upon which thirty-year time period is selected. Long-term recorded climate data is available, and pre-historical climate is learned by looking at tree rings and other means.

## Geography

Wyoming is the 5<sup>th</sup> driest state (16.84 inches) in the US behind Nevada, Arizona, Utah and New Mexico. The geography of Park County heavily influences its climate. Elevation affects precipitation a great deal. The mountain ranges run north-south, and force westerly flowing air to rise and drop moisture on west slopes. The “upslope” weather patterns that bring precipitation to the mountains' east slopes occur when low pressure passes south of Park County, with cyclonic circulation forcing moist air against the east-facing slopes. Precipitation increases with elevation and the mountains are reservoirs of moisture where precipitation exceeds evaporation. Lower elevations are desert where evaporation exceeds precipitation. In some places, by one or two **feet!**

## Temperature

Park County has a relatively cool climate due to its elevation. Temperatures vary dramatically in a day, in a month and in a year. In the wintertime, it is common to have rapid, frequent changes between mild and cold spells. January is usually the coldest month. Mountains and valleys can trap cold air, resulting in much colder air in a valley compared to the mountainside above it.

## Drought

*“We continue to approach each new drought as if it is a disaster rather than the norm, ignoring the past, and paying only lip service to sustainable uses of dry rangelands.”* - Thad Box, Rangelands, April 2005

Drought severity is a function of dryness, duration and regional extent. In the Big Horn Climate Division there are three or four consecutive months with below average precipitation about 68 percent of the time. The most recent drought began in spring 2000 and may not be ended. A recent study in the Big Horn Basin sampled 95 conifer trees at 5 sites in the Big Horn, Pryor, and Absaroka mountains. These samples were used to develop a record of annual precipitation from 1260 to 1998. In general, single and multi-year dry

events were longer and more severe prior to 1900 in the Big Horn Basin area. One severe drought lasted 50 years. Overall, long dry-spells are a normal part of life in Wyoming.

## How does Climate affect us?

The US Department of Agriculture has established Plant Zones, 1 through 10, to generally describe climate conditions. The horticulture industry labels plant material with the zone number for which the plant is most suitable. Park County's populated areas range from zone 6 in its northeast corner, 5 at Powell and Cody to 3 at Meeteetse. <http://www.gardeningplaces.com/heatzonemap/index.htm>

## Do you know... The Park County growing season?

It's generally about 90 to 120 days, has early and late freezes, has frequent variation in spring and fall, and is highly dependent on site elevation and aspect.

## Do you know PARK COUNTY SOIL?

**Do you know...** Our soils are usually alkaline (pH>7) and vary greatly with location? Many soils have high clay, salt, or sodium content; often soils are low in organic matter and fertility; in summary, creating difficult growing conditions for many plants.

For some places in the County, as part of an ongoing statewide program, soils mapping has been done by the NRCS, marked on aerial photos available in the NRCS offices in Cody and Powell. County soils maps and information should be online soon.

## What is soil?

Soil develops when climate, topography, living organisms break down underlying rock materials over a long time. Physical processes such as weathering by wind or water and fracturing by ice break down rock into smaller and smaller particles. Chemical reactions in the presence of heat and/or water can change rock particles. Living organisms such as plant roots, earth worms, fungi and bacteria promote chemical reactions in soils that more fully develop soils.

Collect soil samples and request a soil analysis to identify problems. The University of Wyoming Soil Testing Laboratory in Laramie analyzes samples and makes recommendations to help you.

## Soil Texture and Structure

A well developed soil is forty-five percent minerals, twenty to thirty percent air, twenty to thirty percent water, and 1 to 5 percent organic matter (living or dead matter). Soil texture is identified as how much sand, silt or clay is in the soil. Sand, silt and clay particle sizes are between 0.05 and 2mm, between 0.002 and 0.05mm, and less than 0.002mm, respectively. Soil texture has an enormous impact on all other properties of a soil due to the size of pores between particles and due to possible chemical reactions on the surfaces of particles. Soil particles stick together with organic residues (glue) and form larger structures, some of which we can see when we hold soil in our hands. Pores between particles provide pathways for air and water, both necessary for plant roots and animals. Critical pore space can be lost when soil by compaction or oxidation of organic matter.

Water-holding capacity of soil is a function of texture, including the size of pore space and the surface area of soil particles that bind water. Field capacity is the amount of water retained in soil after it has been saturated and allowed to drain freely (small pores are filled). “Plant available” water is soil water bound to the soil particles loosely enough that plants can extract it for use. A film of water bound too tightly to the surface of soil particles for plants to extract and use is called “plant unavailable water”. Good irrigation practices take advantage of texture and structure to your plants' advantage!

## Do you know... your soil's Soil pH?

The concentration of the hydrogen ion (pH), determines much of the nutrient availability for plants. Neutral soils (pH=7) are usually best for plant growth. However, our soils tend to be alkaline (pH = 7.5 to 8.5). Iron, manganese, boron, copper and zinc in alkaline soils are not available to plants, but are tightly bound to soil particles. Plants have optimal pH ranges in which they will flourish. Crops grown in Wyoming such as alfalfa and sugar beets do well in alkaline soils and are an example of selecting the plant to fit the environment. It is usually very difficult and expensive to change soil pH. Adding elemental sulfur and organic matter may help in small areas.

## Do you know... about Salty and Sodic soils?

Salts are chemicals dissolved in water such as calcium carbonate (lime), calcium sulfate (gypsum), sodium carbonate, bicarbonate and chloride, magnesium carbonate. When salts dissolve in water, they dissociate into positively and negatively charged ions. Calcium, sodium, magnesium, and potassium are the most common positive ions (cations) while bicarbonate, sulfate, carbonate and chloride are the most common negative ions (anions). Plant roots extract water from soil and move it into the plant, by moving it from a lower salt concentration to a higher salt concentration. If the concentration of salts in the soil is higher than the concentration in plant roots or upper parts, the roots cannot pull water from the soil. Park County soils are usually moderately to highly salty. Salinity limits the number of plant species that will do well in a location. Planting salt-tolerant species is usually the least expensive management tool for saline soils.

Normal clay soils have calcium bound to soil particles. In **sodic soils** sodium takes the place of calcium and disrupts the soil structure. Sodic soils occur in Park County and can be a real problem since they are impermeable to water and may be high in salts as well. Gypsum, added in tons per acre, may improve sodic soils, but avoidance is best.

**Do you know... signs of salt stress** in plants placed into saline soils include leaf discoloration, poor growth, and loss of biomass? Test your soil to confirm.

Salt levels can be reduced with irrigation that leaches the salts lower into the soil profile (below the root zone) and drains off to a suitable sink area, but bad irrigation practices can build up salts.

## Organic Matter and Microbes...

Organic matter is the carbon-containing residue of living organisms, dead or alive, usually 1-3% in our arid soils. Usually, more is better. Organic matter greatly influences soil properties and plant growth. The size and structure of organic matter increases the water holding capacity of soils and holds many nutrients within the soil where they are available to plants. Microbes - soil fungi and bacteria - can digest organic matter and release nutrients for plants.

## Soil Fertility...

Soil fertility is the capacity of soil to produce plant growth and development. It varies by site and can be changed somewhat with management (soil amendments, fertilizer, and water). Plants need carbon, hydrogen, nitrogen, phosphorous, potassium, sulfur, calcium, and magnesium. In addition, plants need smaller amounts of iron, manganese, zinc, copper, molybdenum, boron, and chlorine.

Soil fertility can be measured with a soil test. Add fertilizers or amendments as recommended by the soil testing laboratory for the crop proposed. Ask about timing.

The site may need changes in irrigation practices. Windbreaks can mitigate evaporation. Mulch can slow water evaporation and release organic carbon. Pastures may need to be reseeded with appropriate, adapted species. **Match plant species to the existing conditions.**