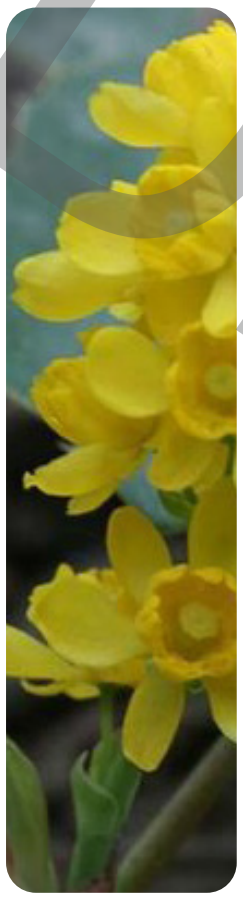
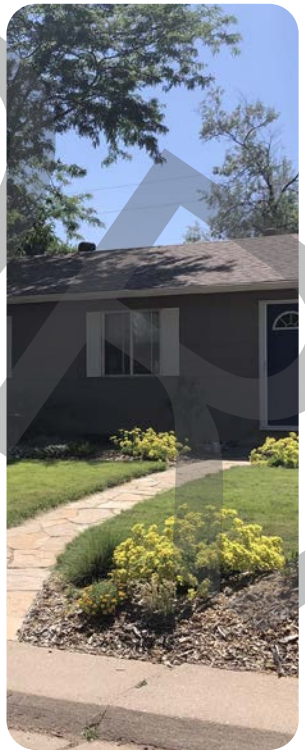
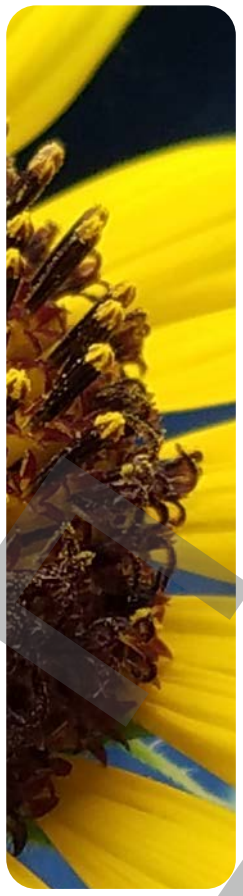
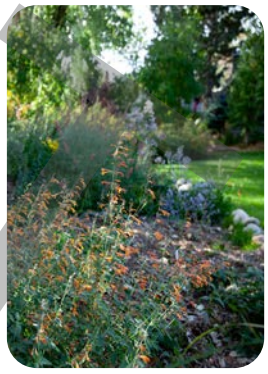
City of Fort Collins

Design Guide







Chapter 7: Weed Management April 2024

An Introduction to Diversifying Urban Landscapes in Fort Collins

Acknowledgments

City of Fort Collins

Kate Rentschlar- Environmental Planner, Nature in the City

Kelly Smith- Senior Environmental Planner, Nature in the City

Kristy Bruce- Environmental Planner, Nature in the City

Scott Benton- Environmental Planner, Community Development & Neighborhood Services

Leslie Spencer- Business Support II, Community Development & Neighborhood Services

Bryan Fischer- Horticulture Technician Gardens on Spring Creek

Bernadette Kuhn- Senior Environmental Planner, Natural Areas

Crystal Strouse- Botanist, Natural Areas

Jennifer Torry- Senior Landscape Architect, Park Planning and Development

Emma Pett- Lead Water Conservation Technician, Utilities

Katie Collins- Water Conservation Specialist, Utilities

Chickadee Pine Designs

Desneige Sodano- Owner-Chickadee Pine Designs

Design Guide:

An Introduction to Diversifying Urban Landscapes in Fort Collins

Introduction

Overview of the Guide

The purpose of this guide is to showcase a wide variety of diverse urban landscape options in Fort Collins. This guide will help you determine which landscape options are best for you, whether you are a homeowner, renter, business owner, school, developer, or part of a Homeowners Association. The overarching goal is to provide inspiration for your next dream landscape.

The examples in this guide apply to Northern Colorado Front Range ecosystems, however the context may be appropriate for projects in other regions, as well.

In this guide, you will find an introduction and the main considerations needed for installing each landscape option. Tips for design, installation, and maintenance are included in each chapter. In addition, each landscape option comes with its own curated plant list to help you select plants that will thrive in your landscape.

Thank you for creating diverse, beautiful, and resilient landscapes!

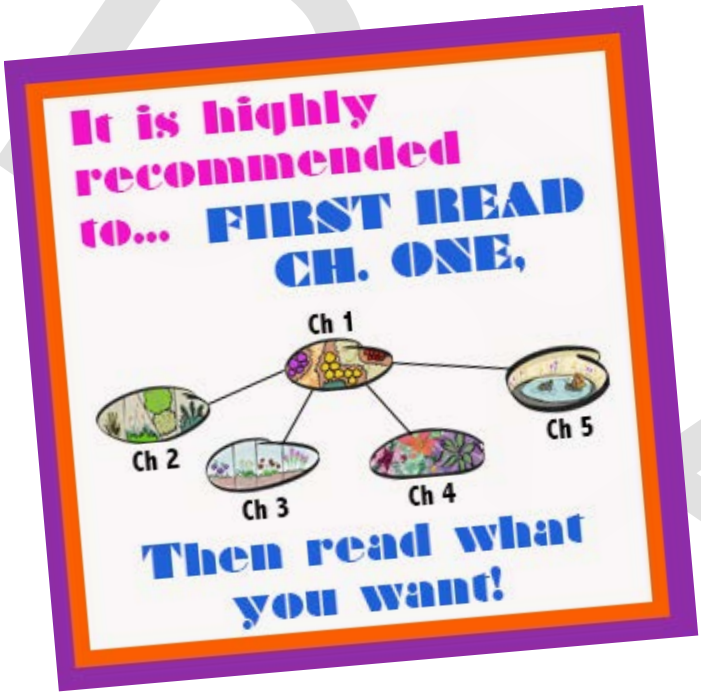
Why Diversify Landscapes?

Diverse landscapes are beautiful and resilient. They contain a variety of native and adapted species that provide important habitat and resources for wildlife and pollinators. They are naturally adapted to the Front Range's semi-arid climate and native soils, which translates to lower water and chemical inputs, and a better ability to withstand short- and long-term changes in climate. They invoke a Colorado landscape aesthetic and establish a sense of place. Spending time in them benefits our physical and mental health. In short, moving towards diverse landscapes is more sustainable and brings nature into the city, which provides considerable ecological, economic, and social benefits.

The use of plants that are native to Colorado is highly encouraged when you diversify your landscape. Native plants have evolved here and are adapted to our climate and soil types. In addition, our local pollinators and wildlife co-evolved with these plants and many are dependent on specific native plant species for survival. As such, native plants form the base of local food webs. However, it is also important to recognize that native plants may not be appropriate in all situations, e.g., your aesthetic preferences, the level of activity on site, HOA policies.

Navigating the Guide

This guide is broken into chapters (see Table of Contents), which primarily revolve around different landscape options (e.g., Pollinator Gardening, Lw Water Lawn). The guide also includes chapters on other relevant landscaping topics (e.g., Soil Amendment, Weed Management). It is highly recommended to start with Chapter One – Site Characteristics and Planning.



Within each chapter, you will find information on the following (when applicable):

- Overview of topic
- Physical requirements
- Design examples or case studies
- Irrigation
- Maintenance
- Plant list
- Additional resources
- Installation tips
- Fun fact!

FUN FACT

Converting your yard from turf to a xeriscape and or native garden is On TREND!

Over 390 residential projects in Fort Collins were granted Xeriscape Incentive Program (XIP) funding for a total of 462,100 square feet of converted landscape. That is 10 acres or approximately 7.5 football fields!

XERISCAPE INCENTIVE PROGRAM

fcgov.com/xip

Definitions

Adapted Species	Non-native species that grow well in a given habitat with human adjusted changes to the environment such as water or nutrients.
Aggregate	A material or structure formed from a loosely compacted mass of larger soil or rocks.
Aspect	The direction the land is facing. eg: north, south, northeast etc.
Cues to Care	(CTC) are landscape elements that are immediately recognizable as designed, and that signal continuing human presence to care for a landscape.
Complementary Colors	Colors opposite from each other on the color wheel. They have a strong contrast that increases how noticeable they are when placed close together.
Exotic Plants	Plants not native to the area where they are planted.
Forb	A herbaceous flowering plant that is not a grass.
Hydrozone	Areas where plants with similar water needs are grouped together - very low water, low water, medium water, and high water plants should be grouped by water needs.
Impervious Surface	A hard surface that does not let water soak into the ground, causing puddling or resulting in runoff.
Larval Host Plants	Plants required for the growth and development of insect larvae such as caterpillars. Butterflies are often particular about the species where they host their eggs to support the larva.
Microclimate	Small areas that have a different climate than the overall climate of a site. They can be created by structures, topography, water, boulders, and impervious surfaces.
Native Plant	A plant species that grew in an area before colonization of that area.
Organic Matter	Any of the carbon-based compounds that exist in nature or material that comes from living things. This can include carbon-rich soils, manure, mulch, or compost.
Perennial	Any plant that persists for several years, usually with new herbaceous growth from a part that survives from growing season to growing season.
Permaculture	Permacultre stands for permanent agriculture. It uses whole systems thinking to create spaces for planting that encourages naturally flourishing ecosystems.
Pruning	Selective removal of certain parts of a plant such as branches, buds, or roots.
Resilient	Ability to bounce back after experiencing a setback.
Slope	A surface of which one end is at a higher level than the other; a rising for falling surface.
Soil Amendment	Anything that is added to a soil to improve water retention, nutrients, or drainage.
Xeriscape	Principles of sustainable design including use of low water plants, and sustainable gardening techniques.

Chapter 7
Weed Management for Alternative Landscapes

The low-water and lower-maintenance landscapes described in this guide still require keeping a close eye on weeds. Total control of weeds is not a realistic goal, but there are some important principles to consider that can help set our gardens up to be healthy habitats for a larger ecological system beyond our backyards.

Weed management can be as much of an art as a science and as such demands a lot of attention and flexibility from the landowner/manager. Weed management is highly site and situationally specific, especially with the more diverse alternative landscapes promoted in this Design Guide. Frequent observation and monitoring are critical so that you can understand how the plants, both the ones you want and the weeds, are reacting to that year's precipitation, heat, etc. This chapter will help you understand weeds, describe different control methods, and outline basic principles to assist you in formulating a plan of how to manage weeds.

What is a weed?

Generally speaking, a weed is a plant out of place. What is a plant out of place? That depends on your desired aesthetics, the plant and insect community you want to achieve, and your management goals for your garden. It also depends on the type of "plant out of place" you are dealing with. There are two types of weeds to be knowledgeable on and manage: invasive weeds and noxious weeds.

Invasive Weeds vs Noxious Weeds

Invasive weeds are any plant out of place that can reproduce aggressively and is located out of its natural range. Sometimes these plants can out-compete our desirable plant species for resources and they need to be controlled. While some native plants can be aggressive spreaders, they are not considered an invasive weed since they are in their natural range where the surrounding plant community evolved with this behavior.

Noxious weeds are any non-native plant that threatens the environment, economy, and human health as defined by the Colorado Noxious Weed Act. The Colorado Department of Agriculture defines noxious weeds as "non-native aggressive invaders that replace native vegetation, reduce agricultural productivity, cause wind and water erosions and pose increased threat to communities from wildfire." In fact, PlantTalk Colorado reports noxious weeds cost Colorado residents more than $10 million annually in lost productivity. Noxious weeds are important to remove and either suppress, contain, or eliminate and eventually eradicate, if possible.

Noxious weeds in Colorado have been divided into three categories:

1. List A – Elimination mandatory throughout Colorado
2. List B – Plants whose continued spread should be halted.
3. List C – Selected for recommended control methods

Many noxious weeds were brought into the US for use in gardens and then escaped into ecosystems. Be careful what you plant

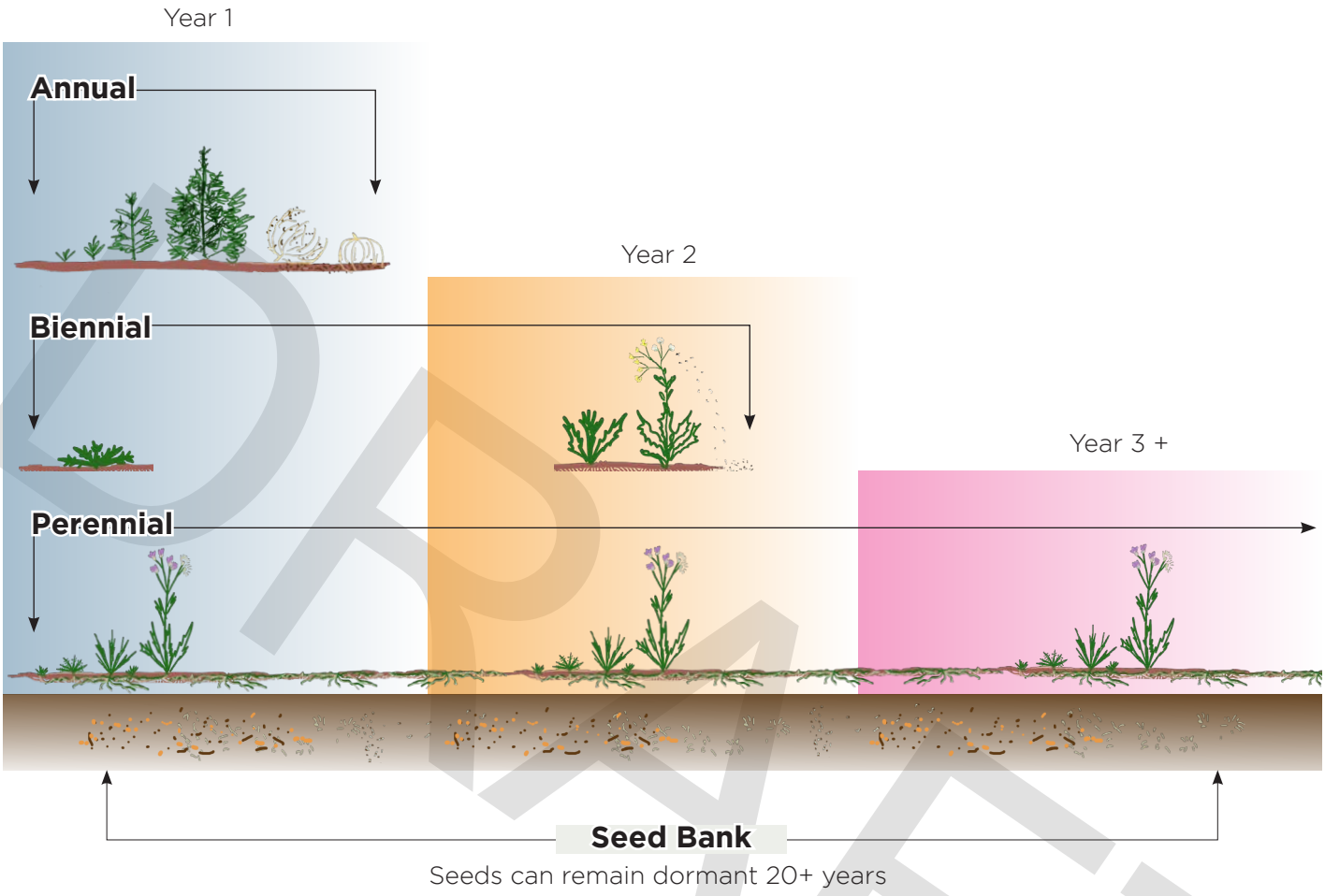
Go to the Colorado Department of Agriculture website to see the weeds associated with each list mentioned above.

List of Common Invasive & Noxious Weeds

Invasive (List C or Troublesome*)	Issues	Noxious (List A&B*)	Issues
Kochia	Cause pasture and farmland issues	**Canada thistle**	Significantly reduces crop and cattle forage and native species and is a host plant to several ag pests and diseases
Dandelion	Easily spreads by seed and can take over a lawn	**Orange hawkweed**	Displaces native veg, and reduces livestock and wildlife forage
Common mullein	Livestock avoid eating due to hairy leaves of the plant	**Dalmation toadflax**	Reduces ecological diversity and rangeland value
Downy brome	Dense stands of dry grass can create source for wildfires	**Leafy spurge**	Where it gets established it crowds out ALL other vegetation
Puncturevine 'goathead'	Burs are sharp enough to puncture bike tires and hurt barefoot walkers	**Oxeye daisy**	Displaces native veg, and reduces livestock and wildlife forage
Prickly lettuce	Easily spreads by seed and can take over a lawn	**Russian olive**	Can out compete native veg, interfere with natural plant succession and nutrient cycling, and tax water reserves
Field bindweed	Most competitive perennial weed disrupting all areas	**Purple loosestrife**	Can out compete native veg, impede water flow and has little wildlife value.

*Plant list developed from research done on the Larimer County Weed District and Colorado Department of Agriculture websites as well as City of Fort Collins' municiple code.

Types of Weeds



Annual, Biennial, Perennial Weeds & Seed Banks

Understanding the life history of a weed as an annual, biennial, or perennial will help guide which control methods to be used.

Annual: A plant that completes its life cycle (from germination to producing seeds) in one growing season and then dies off each year. Control of annual weeds focuses on preventing seed production and providing ample competition for resources from desirable plant species.

Biennial: A plant that requires two seasons to complete their growth cycle. In the first year, seeds germinate without flowering, forming a circular array of leaves, called a rosette. In the second year they send up a stalk, flower, and go to seed. They can be eliminated in both their first and second year but should be prevented from producing seeds in their second year.

Perennial: A plant that can live for three or more growing seasons. Some perennial species rely on seed to reproduce, some on vegetative reproduction (e.g., spreading roots), and some use both strategies. However, all use their roots for energy storage between growing seasons and therefore it's important to deplete those energy stores as much as possible. It is best to research the most effective way to control each perennial species, as the timing and method can vary widely.

Seed Bank: A reserve of seeds that exist in your soil (from previous homeowners, neighbor's yards, seeds floating in, etc.) and the ones being added by the plants in your yard that go to seed. Any weed that is allowed to go to seed can contribute thousands of seeds to a gardener's seed bank with some seeds able to persist and still be viable in the soil for years to come. Field Bindweed seeds, for example, can remain viable in the soil for up to 40 years! It is impossible to know your initial seed bank, but if you can keep new weeds from going to seed, you can help deplete the seed bank over time.

Weed Management and Weed Management Plans

Whether you are installing a new garden or trying to maintain an existing one, weed management is important and prevention is a key first step. Below are a few preventative techniques you can use to tackle weeds. But keep in mind that every situation is different – for example, if you are removing existing well-managed sod that has low weed pressure and replacing with a perennial bed, the level of weed management post-disturbance will be very different than if you are installing that same perennial bed where a long-neglected patch of weeds had been.

A Weed Management Plan is simply a guide to help you effectively manage undesired weeds. It is the who, what, where, when, and how of any kind of plan. They can be as detailed as a plan for a large-scale restoration effort or as simple as saying you'll pull weeds in your yard once a week. You can check out the free 'Weed Management Guidance Document' from the City of Fort Collins Environmental Planning's website. A link to the document can be found in resources at the end of this chapter.

Pre-installation Weeding: If you know you have existing weeds, intensively managing them before you start any installation can put you ahead. Weeds thrive on the flush of released nutrients and decreased competition for resources that comes with any disturbance (like installing a new planting bed), so removing or stressing them as much as possible is a strategy to save you time, effort, and money over the long term.

Post-Disturbance Weeding: Installing a new garden bed or landscaping element entails some level of disturbance, like sod removal, tilling of amendments, etc. Once that happens the weeds think, 'Now is my time to shine!' and will start growing in a hurry. This is called a 'flush'. We can use this flush to our advantage by practicing patience, waiting two weeks or so, and then intensively removing the young, vulnerable weeds that pop up. You can even promote the weeds' germination with some light watering. The young weeds will be much easier to remove with mechanical means than their mature forms and can help avoid excessive herbicide use.

Pre-emergent Herbicides: If you go the route of herbicide application, then a pre-emergent herbicide can be an option and needs to be applied before any weeds germinate. Keep in mind a pre-emergent will not kill existing weeds, only help control those annual and perennial weeds in your seed bank before they germinate. Using a pre-emergent that will persist in the soil beyond two weeks could also kill any seeds you plan to plant so choose your type of pre-emergent carefully. Some pre-emergents target specific types of weeds (e.g., broadleaf), while others are non-selective and will kill all plants. So, remember to read labels and directions carefully!

Sneaky Weed Seeds

Some weed seeds can be brought onto your site from the materials you import, like soil, straw, mulch, seed mixes, and even the soil your plants are potted in. When you bring in outside materials select certified weed free products. These products are part of a program the North American Invasive Species Management Association (NAISMA) is spearheading that hopes to limit the spread of noxious weeds with weed free standards for forage, mulch, and gravel. If you can not get weed free products, expect to get weeds from the materials you import and use methods like flushing or pre-emergent to stay on top of them before they get too established.

Also, keep in mind that using compost or richer soil to amend your existing soil may increase the success of weeds. Fortunately, native plants are adapted to the Front Range's generally nutrient-poor soils and don't generally like enriching soil amendments. So, if you're planting a native plant garden, you can likely skip the enriching amendments and that too can help suppress weeds. A soil test can help you determine if amendments are needed for what you plan on planting.

Flushing Technique

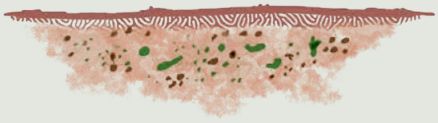


Fig 1: Seed Bank - weed seeds wait in the soil

Fig 2: Tilling - disturbance event wakes the seeds

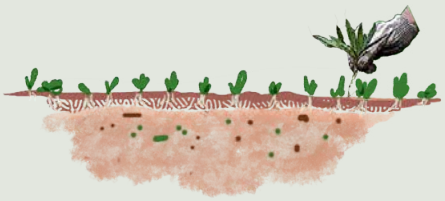
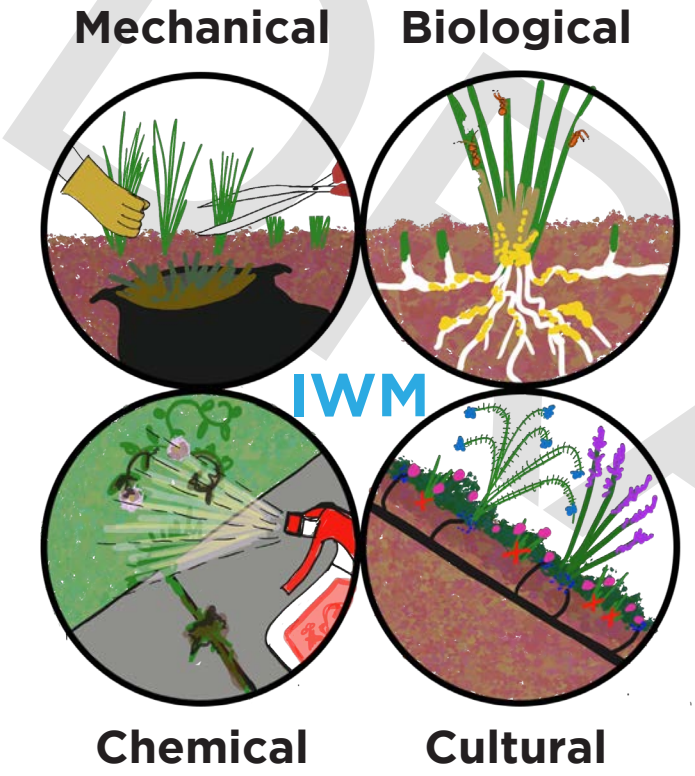


Fig 3: Flush of weed growth - these seedlings are easier to weed than a mature plant

Integrative Weed Management and Early Detection Rapid Response

Maintaining a garden old or new requires various weed management techniques. Integrative Weed Management (IWM) is an approach that utilizes multiple control methods during a growing season to manage troublesome weeds. For example, simply resorting to herbicides can create herbicide resistant weeds, but used in combination with other methods, herbicides can continue to be effective. IWM is composed of the following methods:



Mechanical or Physical: This method uses physical actions to disrupt germination and kill weeds such as – hand-pulling, tillage, burning, and mowing.

Biological: This tactic uses living organisms, like bacteria, fungi, or insects to target and control weeds. These organisms target only one species, typically a noxious weed, and have been thoroughly tested to ensure that they do not spread to unintended plants. The Colorado Department of Agriculture has information and resources through their "Request-A-Bug" program (additional information on page 11).

Chemical: This method includes the use of herbicides, which can be synthetic or organic (like concentrated vinegar). It is important to correctly identify the target weeds and know how to use the herbicide correctly - at the right rate and frequency, the right time, with the right conditions, and in a safe manner for both people and the environment. Read the label - the label is the law!

Cultural: Cultural practices are those practices that help your desired plants compete against weeds. They are often cost-effective and the most ecological of all the control methods. Practices include selecting plants adapted to the local environment (right plant in the right place), cultivating as much desirable plant cover to outcompete weeds for resources, using appropriate irrigation practices (e.g., only where it's needed and not too much), using effective mulches, and can even include grazing in the right circumstances.

Early Detection and Rapid Response

The central idea of the IWM approach is to stress weeds in as many different ways as possible for effective management. It is the 'how' of weed management, whereas Early Detection and Rapid Response (EDRR) is to help guide your 'when' and 'how often'. Weeds are far easier, cheaper, and less-time intensive to manage when you can spot them early, before they establish and spread. Ultimately, regular monitoring and observation are important to detect a weed problem early. Make sure you check your garden at least once a week if not more. Enjoy monitoring with your favorite morning or afterwork beverage. Make it a routine but do not let it take over the enjoyment of being in your garden. In your Weed Management Plan, create a schedule for monitoring and only monitor during the times you have set aside to do so.

Additional Considerations

Aesthetics: Your aesthetic preference can drastically change how you manage weeds. If you are trying to cultivate a very neat, botanic garden look then your weed management will be more intense than if you are cultivating a more naturalistic look and trying to attract pollinators and wildlife to your home.

Effort and Cost: An important question to consider is what level of effort, whether physical, time, or financial, you are willing and able to put into your garden and managing weeds? If you do not have the time, perhaps your budget allows you to hire a landscaper. Or, if you do have some time to spare and can monitor weeds on a regular basis with your daily morning or afternoon routine but then only tackle them every two weeks or once a month, put that schedule in your Weed Management Plan.

City Requirements: The City of Fort Collins has some requirements for weed management in the Municipal Code. Chapter 20 states that weeds must remain below 6” height and lawns need to be mowed. Noxious weeds must be removed and not permitted to grow. This can be challenging depending on the size of the property and quality of the vegetation, so it is important to think about how to incorporate these requirements into your Weed Management Plan.

Homeowner and Renter

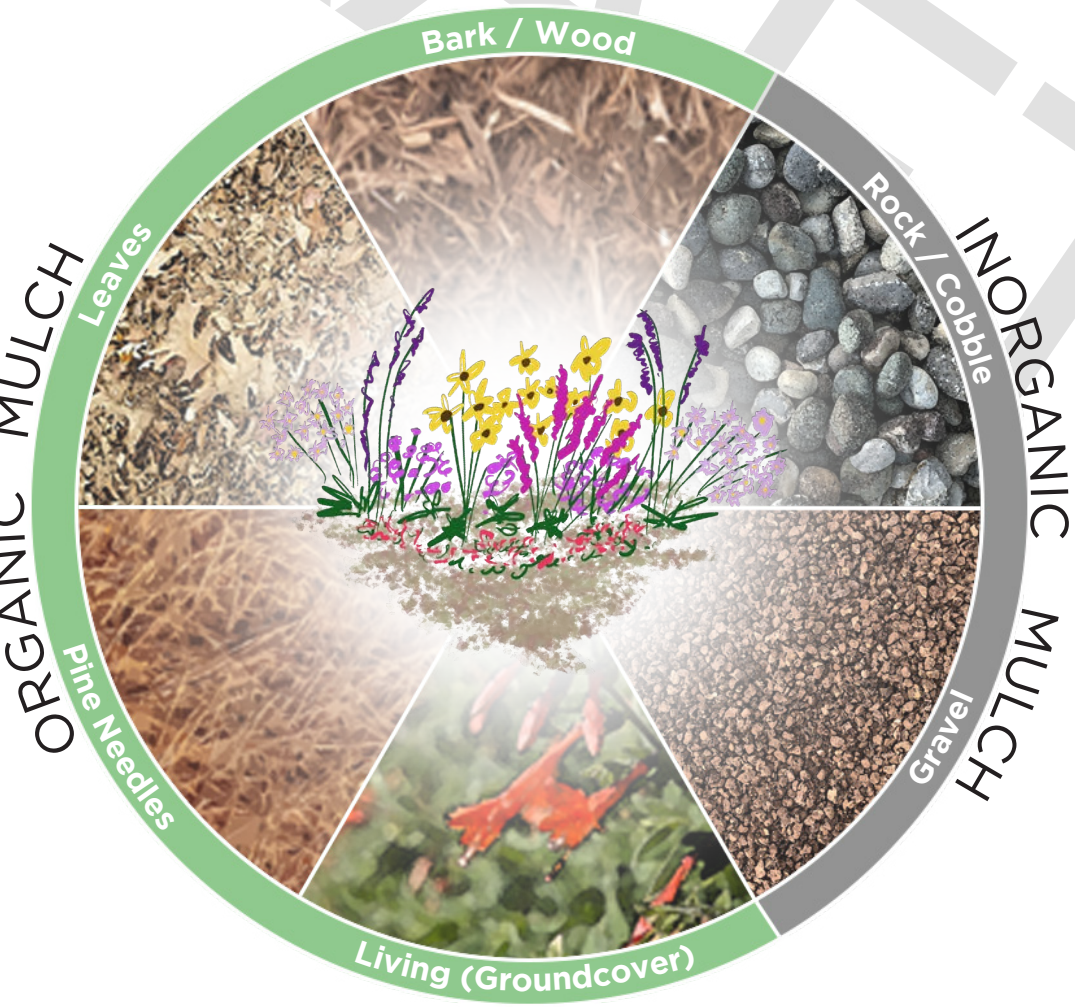
Finally, whose job is it to manage weeds on a property? For most, being a homeowner also means taking care of the surrounding outside property, but for others who rent, the conversation with your landlord about weed management can be challenging. Weed management, especially if it has been neglected, can be costly and take a lot of time to address. Ultimately the landlord is responsible for handling the weed management on a property and will often require the renter to at least mow the lawn. Those who rent can engage their landlords to address certain weed issues and ask about a Weed Management Plan. Perhaps offering to help maintain weeds for a break in the rent can help everyone involved.

Pros and Cons of Weed Barriers, Mulch, and Herbicides

Now that you are well on your way to developing a Weed Management Plan, here are some more details and some pros and cons of different Cultural and Chemical methods to think about before diving in:

Weed Barrier Fabric: The main benefit is helping suppress weeds for 1 - 3 years while your new plants get established and save you time weeding. However, weed barrier can start to look messy after a few years and is very difficult to replace. After a year or two, weed seeds can usually grow on top of the weed barrier since most weeds need very little organic material to germinate. Often the amount of weeds it prevents in the long run is negligible. In addition, plastic weed barrier does not allow air or water to go through it, effectively killing the soil underneath it. It can also make it difficult for our ground nesting native bees to access nesting spots.

Mulch: When applied at a 3-4” depth, mulch can suppress annual weeds by limiting the light needed for weed growth.



Mulch can also help retain soil moisture. Mulch should typically be reapplied every few years and can also impede ground nesting pollinators. Many weed seeds can easily grow in mulch after a few years once enough organic material ends up in the mulch.

If you do choose to use mulch, choosing between organic mulches (i.e., chipped wood) and inorganic mulches (i.e., rock or gravel) depends on your aesthetic, the level of work you want to put in, and budget. Also, remember to get certified weed free products if you can.

Wood mulch is the best bang for your buck, is organic, and can break down and add nutrients to the soil. Wood mulch is best used under trees or shrubs, where you might find wood 'mulch' in nature and with plants that are used to those conditions.

Decorative River Rock looks nice but can be more expensive than wood, make soil more alkaline, and can sometimes get too hot and burn desirable plants. Larger river rock (~1.5" screen size) is less effective than sharp-edged fractured rock (like crushed gravel) of a smaller screen size. Rock mulch is good in limited quantities and best used to create an aesthetic accent in your garden.

Smaller rock gravel or mulch is a good choice if you want to create a garden that resembles more mountainous or prairie terrain. Crushed rock with ½-inch screen or less, with or without fines, spread at a depth of 3 inches is recommended as the sharper edges lock together and hold moisture and prevent weeds more effectively than rounded pea gravel. The cons to crushed rock and gravel are similar to using River Rock but with a less expensive price tag.

Yard litter mulch comes from your own yard and includes leaves, grass clippings, and other yard trimmings. Some benefits of this mulch are that it is free, it is typically easier for pollinators to navigate if they nest in the ground, and you can do less clean up maintenance in your yard. So don't be hasty to clean up your gardens if you are trying to provide lifecycle habitat for bees, butterflies, and other beneficial insects. One downside of this method is if the litter mulch gets too deep and wet for an extended period of time, it can become anaerobic (no oxygen) and kill the plants around it.

Vinegars and Herbicides: Before choosing an herbicide, whether a synthetic chemical or vinegar, it is extremely important to identify the weeds you want to kill. Herbicides come in many different types and do different things to different kinds of weeds. You must read the labels to know what the particular herbicide targets. Is it a pre-emergent or post-emergent? Does it kill only broad-leaf weeds or all weeds? Is it systemic, killing the entire plant and spreading into the roots, or a contact herbicide only killing the part of the plant it touches? Contact herbicides can be effective for annual weeds but will only chemically mow perennials as the roots are left unscathed. Many organic herbicides like vinegar are considered contact herbicides and need frequent reapplication through the growing season. Again, if you choose to use herbicides, remember to also use another method of weed control – IWM works best when you utilize all the techniques in conjunction with each other.

Some Common Weeds of Fort Collins

The following are a few of the most common invasive and noxious weeds found in your garden. Remember the importance of correctly identifying your weeds before you attempt to remove them.

Kochia (*Kochia scoparia*) -
Not State-Listed but Invasive

An invasive non-native summer annual broad-leaf species brought over from Europe as an ornamental. This plant emerges in early spring, grows rapidly, and tolerates heat, drought, and salty soil. Its seeds do not last more than a year or two in the soil. Seed dispersal occurs via a “tumbleweed” process after the plant reaches the end of its lifecycle and its base can be broken off by strong winds. This plant is easily hand-pulled and best to do so before it flowers. You’ll also want to bag this weed for added seed dispersal prevention. If you choose to mow kochia, be aware that timing is very important because kochia is able to produce seeds after being mowed, just at a lower height. So, if you mow too early, the plant will produce seeds at height that most mowers aren’t able to drop to. Hand-pulling and bagging this plant is the most effective technique for its control.

Images depict Kochia from button stage to maturity.
Image credit Eric Westra, Colorado State University.
Image Credit: https://adams.extension.colostate.edu/ag-acreage/kochia/

Prickly Lettuce (*Latuca serriola*) -
Not State-Listed but Invasive

An invasive non-native summer biennial, resembling lettuce or arugula but with stiff prickly bristles on the leaves. Flowers are small yellow florets arranged in a ray, similar to lettuce. It reproduces by seed and germinates in the spring. Seeds do not live past 1-2 years, but germination can be immediate. This plant is easily hand-pulled and best to do so before it flowers.

Prickly Lettuce from seedling to maturity. Image credit Division of Plant Sciences, University of Missouri. Image Credit: https://adams.extension.colostate.edu/ag-acreage/prickly-lettuce/

Canada Thistle (*Cirsium arvense*)
List B Noxious Weed

A noxious non-native, deep-rooted perennial weed. It aggressively spreads by wind dispersed seeds and creeping horizontal roots called rhizomes. Its seeds can persist in the soil for up to 20 years. They have flower clusters with 1-5 purple flowers and spiny bright green oblong leaves. The trick to controlling it is to use a combination of methods to eliminate seed production and to weaken the root system. The roots are the biggest problem because they can reproduce from a fragment of root so simply pulling it creates another plant. Timing is critical when cutting back these plants. You want to let them put effort into the stalk and almost flowering, then cut them down at the base of the stalk in order to weaken the plant. There are several effective herbicide options for Canada thistle that vary depending on the life stage and location of the plant; refer to CO Department of Agriculture's factsheet to learn more.

Canada Thistle from rosette state to maturity. Image credit: Colorado State University Extension. Image Credit: https://adams.extension.colostate.edu/ag-acreage/canada-thistle/

Field Bindweed (*Convolvulus arvensis*)
List C Noxious Weed

An invasive troublesome non-native, creeping perennial weed of the Morning glory family. It reproduces by seed and rhizomes and has a tap root that can extend 20 feet below ground. Its seeds can persist in the soil for up to 40 years. Stems are twining, hence the common name bindweed, and can reach up to 6 feet long. Flowers range in color from pink to white and resemble morning glory flowers. The plant is poisonous to horses causing intestinal issues. Using a combination of methods helps to control this weed as it is one of the trickiest weeds to control and it doesn't respond to round-up. Look for herbicides that target Field Bindweed and have the chemical quinclorac (active ingredient) in it. Cultural methods such as cutting back the plant or crowding it with desirable plants can be effective. Biological methods like releasing bindweed mites can be helpful too.

Field Bindweed from seedling to maturity. Image credit: Division of Plant Sciences, University of Missouri and Phil Westra, Colorado State University (pink bindweed flower). Image credit https://poisonousplants.cvmbs.colostate.edu/Plants/Details/52

Additional Resources

Larimer County Weed District: www.larimer.gov/naturalresources/weeds

Colorado Department of Agriculture https://ag.colorado.gov/conservation/noxious-weeds

CSU Planttalk Colorado: https://planttalk.colostate.edu/topics/weeds-cultural-problems/

Certified Weed Free Products: https://naisma.org/programs/weed-free-products/

IWM: https://growiwm.org/what-is-integrated-weed-management/

Request-A-Bug: https://ag.colorado.gov/conservation/biocontrol-at-palisade-insectary/request-a-bug

EDRR: https://ag.colorado.gov/conservation/noxious-weeds/edrr

Guidance for Weed Management Plans in the City of Fort Collins: www.fcgov.com/developmentreview/files/weed-management-plan-guidance-10-21-2020.pdf?1689267488

Mulches: //www.leaflimb.com/too-many-choices-which-mulch/#:~:text=At%20Leaf%20%26%20Limb%2C%20we%20recommend,erosion%2C%20and%20it%20regulates%20temperature.

Flushing Technique: https://gallandt.files.wordpress.com/2017/10/seedbankmanagement.pdf

Weed Seed Bank: https://planttalk.colostate.edu/topics/weeds-cultural-problems/2113-many-weeds-weed-seed-bank/

Books:

Greer, Tasha. Weed Free Gardening; A Comprehensive and Organic Approach to Weed Management. Beverly, MA: Quarto Publishing Group Inc., 2022

(not so) FUN FACT

Did you know that Bindweed can grow as much as 3 feet in one season?

Bindweed roots can sink as deep as 9 feet into the soil, though most of the roots work to spread horizontally to sprout in other locations, and one plant can return annually for 20 years! Not only that, plants spread rhizomatously- (through the roots) spread and by seed.

If you are having a hard time battling bindweed-take heart you are up against one powerful weed.

https://today.oregonstate.edu/news/controlling-perennial-bindweed-takes-persistence