



GROW WILD  
DECEMBER 2022

Background Review:

# Increasing Ecological Health of Private Yards in Kamloops

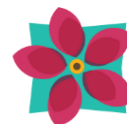
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## Land Acknowledgement

We acknowledge that this work is being done on the lands of the Tk'emlúps te Secwépemc, within the lands of Secwepemcúl'ecw, the unceded territory of the Secwépemc. Secwépemc Peoples have cared for and nourished this land since time immemorial and continue to do so today. As guests on this land, we commit to learning from and walking alongside those who have always called this land home.

## Introduction

This background review is in support of the Grow Wild Project in Kamloops, British Columbia. It was funded by the Real Estate Foundation of BC, and prepared by the Kamloops Naturalist Club and Tapestry Collective Co-op.

The main goal of Grow Wild is to help gardeners or small-scale land stewards evaluate and improve the ecological health of the land around their homes. Increasing ecological health and biodiversity within urban areas can increase ecological resilience and help to mitigate the impacts of climate change. Grow Wild is a community wide effort to address the twin crises of climate change and collapsing biodiversity. It involves empowering land stewards to utilize native plantings to increase urban plant diversity, to trap carbon in soils and to recreate wildlife habitat within urban environments. We'll do so by increasing community awareness of the environmental benefits of native plantings, building a practical knowledge base around how to work with these plants in our uniquely challenging semi-arid environment, and showcasing several completed installations.

Our yards can impact the environment in positive ways if we are thoughtful about how we use them<sup>1</sup>. Consideration should be given to the local climate, wildlife, pollinators, cooling needs, and invasive species when planning yards and gardens.

This literature review looks at many topics related to the ecological value of gardens, including encouraging birds, pollinators and other insects, improving mental health, limiting invasive species, removing barriers to change and many other topics. There are many facilitators and opportunities that support shifting culture, changing mindsets, and making changes to policies and regulations. The rest of the document will explore these factors.

This is meant to be a living document to be added to as more research is completed. We are releasing this document now as Grow Wild needs assessment phase is coming to a close, and it may be revised and added to in the next phases of the work and as we begin to implement the

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<sup>1</sup> Over time there has been a trend for western cultures to view themselves as separate and removed from the ecosystems they inhabit. Humans and our activities are, however, deeply connected and woven into the ecosystems we live in. The hope is that Grow Wild will help us to remember that humans are part of the natural world, and that these lands have interacted with humans for millennia. Instead of thinking of yard tending as “work”, we can think of it as a means of connecting with nature and empowering each of us to be part of a positive change in addressing climate resilience.

strategies we identify. It also complements other resources we are creating as part of the Grow Wild Project:

- A qualitative tool for assessment of ecological value of land. This is a user-friendly tool to help residents assess the ecological health of their yards and gardens.
- A policy analysis, which focused on understanding municipal policies that could help or hinder the enhancement of ecological health on private land (backyards, new developments, multifamily landscaping etc.). In particular, we examined which City of Kamloops policies are currently adopted, implemented, evaluated or actualized related to ecological health of private urban land.

## **What do we mean by “Increasing Ecological Health of Private Yards”?**

### **Prevalence and Limitations of Turf Grass**

In the past, lawns were viewed as indicators of socio-economic standing (D’Costa 2017). They are often seen as low maintenance, “mow it and forget about it” options, but lawns use a lot of water and chemicals to maintain the pristine, monoculture ideal. In summer time, in Canada, half to three-quarters of all municipally treated water is used for lawns (Logan, 2019). There are also spill over impacts; the city of Kamloops xeriscaping guide estimates that 60% of the nitrogen added to lawns runs off into our rivers, from over-fertilizing and over-watering lawns. This can lead to algal blooms, die-off of aquatic species and unsafe swimming conditions, impacts that increase in unseasonably warm conditions (Anderson et al. 2008). Pesticide use on lawns also contributes to water pollution through run-off and can impact beneficial insect populations. Additionally, gas powered lawn mowers contribute to air pollution and the amount of volatile organic compounds emitted by a 3.5 horsepower lawnmower running for one hour is equal to the emissions of a car being driven 550 kms. Using a mower less also helps reduce noise pollution within a city (“Create a Kamloops Xeriscape by City of Kamloops - Issue” n.d.).

There are an estimated 6.2 million lawns in Canada, so even small changes in the culture of yard care can have massive impacts across the country (May 2021).

### **Land-Based Practices with Higher Ecological Value**

Based on the literature, converting turfgrass lawns to gardens or a lawn alternative is the overwhelmingly single best way to increase the ecological value of land. Turfgrass lawns are monocultures that support very little plant and animal diversity. If people wish to have a lawn, there are many lawn alternatives available from clover to thyme to low-growing wildflower mixes, with many options for durability and resistance to walking and playing. For example, West Coast Seeds has created many alternative lawn mixes that grow well in the Kamloops area. Replacing turfgrass lawns with alternatives helps to increase plant diversity, increasing blooming time for flowers, which provides pollinators with season-long food sources. This in turn provides more food sources for birds and contributes to overall health and resilience of the ecosystem. Native plants are adapted to exist with local insect populations, requiring no chemical

intervention to control “pests”. These plants also need very little in the way of fertilizers and once established will grow very well on their own (“The Environmental Benefits of Eco-Friendly Xeriscaping - Lifescape Colorado”).

## **Desirable Real Estate for more than Humans**

Valley bottoms in British Columbia are important for human habitation and for wildlife use. The Kamloops area is no different. The valley bottom here, as in other places, is under immense pressure from human use and has been augmented greatly from what it looked like pre-settlement. Valley bottoms are corridors for wildlife, refuge from the cold, high elevation lands around us and places to access food resources. They are also, of course, desirable for humans also; valleys generally offer water, milder weather and easier transportation corridors. It is important that we remember to share the valley bottoms and allow safe passage through for wildlife and insects.

“Land cover and connectivity – if every person in a block rewilds a section of their garden – the combined land cover would really benefit all wildlife (pollinators and birds as well as amphibians), through the creation of mini wildlife corridors.” - Stakeholder doing similar initiative outside of Kamloops

## **How can we define and assess the ecological health of private and public municipal land?**

### **Measuring Ecological Value of Natural Lawns**

No garden grows overnight and all gardens benefit from their gardeners monitoring what worked and what didn't. In attempting to increase the ecological health of Kamloops' urban gardens, it's important to evaluate their current ecological health in order to develop a baseline against which to measure future change. This literature review supports the development of an evaluation rubric useable by all members of the community. The intent of this rubric will be to provide a metric to gauge the ecological health and diversity of individual yards. In addition, this rubric will also help its users gain knowledge in best practices and to see themselves as land stewards, small parts of a larger global system of biological health and well being. The rubric will also offer advice on how to increase the ecological health of private yards in Kamloops specifically and will be a go-to source for local information about yard care.

“Many metrics can be used to monitor improvements in ecological health i.e., reduction in watering needs, before and after insect surveys, percent plant survival and before and after soil microbe testing.” - Stakeholder doing similar initiative outside of Kamloops

## **Drawing Inspiration**

Worldwide, as people begin to really understand and experience the impact of climate change on our lives, there are an increasing number of rewilding projects to learn from. Observations of loss of birds and pollinators, changing weather patterns and fire regimes has led to a desire for tangible action. One such example from 2021 is the “No Mow May” campaigns that began in the UK. This campaign, in support of early spring pollinators, encouraged people to leave lawns unmowed, in both private and public spaces (May 2021). A UK study found that species diverse lawns that were mowed once a month produced the highest amounts of nectar for bees. They also found that the average unmowed lawn supported as many as 400 bees, but the lawns with even greater diversity of plant species support upwards of 4000 bees (Plantlife n.d.)

There have been other similar initiatives in other countries to measure the ecological impacts of landscaping practices. One such example is the “GartenApp” from Germany that allows gardeners to measure the value of their yards using a smartphone application. Data entered can help the land steward to measure their efforts and can also be gathered by researchers to help in future studies and policy development (Schneider et al. 2020).

A Seattle study took a financial perspective to quantify the impact of converting landscaping practices to more natural methods. The study found that each single family household would produce, conservatively, \$75 in annual ongoing public health, ecological, water conservation and hazardous waste management benefits (Morris and Bagby 2008).

There are excellent examples to look at from within Canada. In the spring of 2021, the Vancouver Park Board decided to let 37 hectares of land grow into meadows within the city (Zimmer 2021). Maintaining more naturally managed parks will allow more native pollinators to thrive.

The Kelowna Nectar Trail in the Okanagan Valley, part of the [Border-Free Bees Project](#), is a collaborative project in support of pollinators. Private yards, churchyards and schools signed up for this initiative and, collectively, have formed a 7.4 km long “stepping-stone” pathway for bees to move through the community. In each location, community members plant and care for a patch (one metre minimum) of drought-tolerant flowers that will support bees.

Another large pollinator project is the Rotary District 1050 [Pollinator Highway Project](#), which includes Washington and BC. This project’s aim to encourage every Rotary club in the larger 1050 district to plant a pollinator garden in their community.

The city of Kamloops has had a number of demonstration gardens, like the xeriscaping or the pollinator garden at McArthur Island. Over time these demonstrations have changed focus and may not have been managed as the original designers intended. It would be very beneficial for the city to install and maintain more demonstration gardens or meadows to show different options.

## Best Practices for Increasing Ecological Value and Biodiversity of Land

Many goals can drive plant selection and yard design: low water consumption, the creation of bird- or pollinator-friendly habitat, high native plant species diversity, or high diversity. Identifying goals can help guide plant selection and yard design decisions. Thoughtful layout can allow yards, and the gardens within them, to function for all sorts of visitors, i.e., birds, reptiles, insects, and different aged humans. Consideration should be given also to the soil, the foundation of any strong ecosystem. Mulching and the addition of compost as well as consideration for the nutritional and pH requirements of specific plants can help to make the garden thrive. The following subsections will outline suggestions for encouraging different visitors to the garden and ways to increase and maintain soil health. We will begin with considering the potential approaches to landscaping change around the home.

“A whole system approach is needed, including: healthy living soil (mulching), right plant-right place, water conservation, protecting air and water quality, conserving energy (efficient irrigation and water management), creating and protecting wildlife habitat, landscape locally (local plants with deep roots as well as using local rocks and materials for hardscaping).”

- Stakeholder doing similar initiative outside of Kamloops

### Revolutionary or Evolutionary approach to change

There are two major approaches to changing any system, even a turfgrass yard: evolutionary and revolutionary. With an evolutionary approach the gardener can take a slower approach with small changes towards the overall goal of increasing biodiversity around the home. The revolutionary approach is more dramatic, making large scale changes over a short time i.e., replacing turfgrass with alternatives or gardens, stopping chemical use and reducing water consumption in the gardens. Both approaches reach the ultimate goal of increased ecological health of urban spaces. However, community members might find that evolutionary change is easier if neighbours or strata agreements need to be eased into accepting new ideas of landscaping. There is no need to start with a large, potentially overwhelming project. Slow changes over time can ease the process and allow for learning over time. Gaining the knowledge to carefully steward the land around your home might not happen overnight, but it is definitely possible for most anyone and on any scale.

“Start small, make changes gradually. Start with a 'wild corner' where plants such as Goldenrod and Joe Pye weed (or herbs like dill, endive, cilantro) can be left to blossom and attract pollinators.” -Master Gardener

### From a Grass Monoculture to a Biodiverse Oasis

Grass lawns are monocultures of a single plant species; healthy, vibrant ecosystems require a variety of plant species to fulfill different ecological niches i.e., do different jobs in the ecosystem. Believe it or not, the area around your house is an ecosystem that can support many plants and animals, clean the air you breathe, help alleviate stress and make your neighbourhood a safer place to live in. In fact, the simple addition of a few trees has been



shown to reduce crime rates (Kuo and Sullivan 2001). Moving away from a turfgrass lawn is the first step in creating more ecological health in a yard. One might simply choose to grow a meadow by allowing the lawn to grow long, mowing only a few times a year to control for woody species that might pop up (“From Lawn to Meadow: Conservation Tools” n.d.). Wildflower mixes, without invasive species, can also be seeded within the lawn to create a beautiful, pollinator-friendly meadow. Paths and borders can be mowed within the meadow-yard to create areas for movement throughout the area and make the yard look tidier, when transitioning to a more natural aesthetic. One concern with this method in Kamloops may be ticks as they are found, primarily in springtime, in tall grasses and shrubs in this area. Keeping meadow-like yards separate from surrounding grassland and wooded areas can help to keep them at bay. The US Centre for Disease control recommends using wood chips, bark mulch or a small border of gravel as a buffer if the property in question is adjacent to wildlands (CDC, 2019). Some plants like lavender, which grows well in the Kamloops climate, have been shown to repel ticks and a few urban chickens wandering the yard can also help to keep the population at bay (Zerbe n.d.; Michel 2020).

Another option is to create garden spaces within the yard. A thick layer of mulch over cardboard or newsprint can be very effective in suppressing weeds and grass and retaining water. However, heavy mulch can impede the spread of perennial plants, so over time some of the mulch can be pulled back or allowed to break down (“Healthy Yards – Learn How to Change to More Sustainable Landscaping.” n.d.). As bare soil can be important for insect habitat (especially for some solitary bee species) and as bird nesting material, leaving some exposed soil in a shady part of the garden can increase the value of yards as wildlife habitat. Eventually mature plants can shade and protect the soil without the need for heavy mulch.

Turfgrass lawns don’t offer habitat elements needed by many organisms, yet increasing the ecological health of urban yards doesn’t require the *entire* lawn be removed. Adding flowering plants, shrubs, trees and other species within the lawn can help (Crain 2018) or even just adding the species like clover within the lawn can help. Overall, reducing the aerial extent of turfgrass can go a long way to increase the ecological health of urban yards. Crain suggested some question can help to guide decisions around the landscape around a home:

1. What part of the yard is used for playing on?
2. What part is used for sitting, relaxing, and eating outdoors?
3. What are the natural pathways used to get around the property?
4. Where is it important to have an open view?

These questions can help decide where to plant gardens, trees, or shrubs and where to put paths and even what parts to leave as lawn.

## **The Ground Beneath Our Feet**

Soil is the foundation of any terrestrial ecosystem. If gardens maintain healthy soils, the ecological health of yards is also better maintained. Gardeners can improve soil health by following protective soil management practices such as applying compost and mulch and

avoiding tilling (Tresch et al. 2019). Compost adds nutrients back into the soil and helps healthy microbes to thrive. Mulch helps to reduce evaporation and weeds from sprouting. Reducing tilling or no-dig methods can help maintain a healthy soil microbiome, the microscopic ecosystem that feeds the plants above. Education around soil health is not very common, however, so Grow Wild could have a great impact in this area. Healthy soils not only benefit plants, insects, and microbes, they also directly benefit the humans exposed to them. See the [Health Starts in the Garden](#) section for more on this.

“Soil type and structure provide information about how quickly water can be absorbed into the soil and how much water can be stored in the soil.” - Stakeholder doing similar initiative outside of Kamloops

### **Embracing Native Plant Species**

Native plant species are ideal for gardening, especially considering water conservation and encouraging native animals and insect species. Native plants are adapted to exist with local insect populations, requiring no chemical intervention to control “pests”. Native plants also need very little in the way of fertilizers and once established will grow very well on their own (“The Environmental Benefits of Eco-Friendly Xeriscaping - Lifescape Colorado”). These plant species offer local beneficial insects the food and habitat they require. They are also adapted to local insects and can coexist easily with them, reducing the need for chemical pesticides (Martinson 2020). Gardeners who embrace native plants not only support ecological principles, but often their gardens require less work in the garden and welcome more native wildlife (Weaner and Christopher 2016). It is important to remember, however, that managing a yard is a long term relationship and all methods require some level of input from their human stewards.

“Go for a walk in the garden before you buy more plants, think about the spaces and the environmental niches you have available.” - Stakeholder doing similar initiative outside of Kamloops

### **Encouraging Birds**

It is hard to overestimate the joy that seeing birds can bring people and bird watching is a peaceful activity for young and old. Birds in the garden are also a sign of healthy, diverse ecosystems. Birds can help control insect outbreaks and even help to pollinate some plant species (Carroll and Loeb 2019; Byrne and Wojcik, n.d.). Welcoming birds into your urban gardens comes through providing birds resources, like seed-producing plants, and eliminating their threats, by providing safe places to perch and disperse feeding options so they don’t congregate.

Adding nesting or roosting sites, year-round, can help to encourage birds to stick around. Roosting or perching sites can be provided by trees, shrubs or even vines. Nest boxes or bird houses can also be used however it’s important to use the right size box for local birds. Bird houses need to have proper roofs, drainage and be built from untreated wood (“NestWatch |

Features of a Good Birdhouse - NestWatch" n.d.). Some examples of differing nest box entrance sizes can be found in Figure 1.

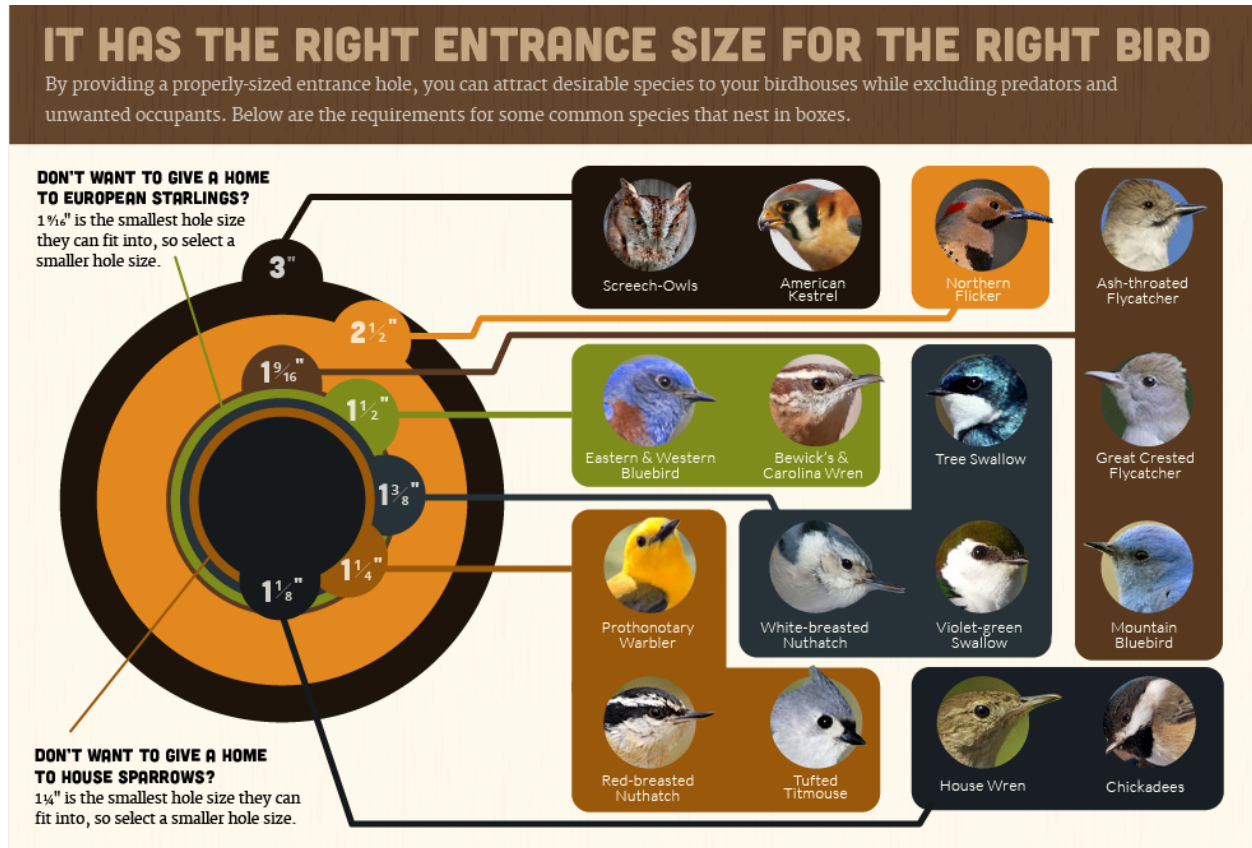


Figure 1. Bird house entrance size from the Cornell Lab of Ornithology, NestWatch <https://nestwatch.org/learn/all-about-birdhouses/features-of-a-good-birdhouse/>

It is also important to make sure that there are natural food sources available for birds such as insects, fruits, or nuts. Insects benefit from leafy detritus in the garden, as do birds when making nests (Donnelly 2018; "How to Make Your Yard Bird-Friendly | Audubon" 2016). People are often concerned when they see caterpillars in the garden, but these caterpillars can be the larval stage of important insects. Others provide vital food for young birds that require the high protein found in these insects. Many people like to use bird feeders to encourage our feathered friends to visit and stay through the winter months. However, bird feeders require maintenance. Disease transmission can be increased by the congregation of birds around bird feeders, so proper cleaning of feeders is important for reducing disease and insect pests in urban bird populations (Schaper, Hutton, and McGraw 2021). One easy way around this impact is to plant seed-bearing plants like sunflowers so that birds can gather food from a wider area and reduce disease and pest transmission among the population. While plants like lilac or forsythia can provide good perching sites, they aren't considered food sources for birds. Some birds also enjoy berries, so planting berry bushes can encourage those species to visit the yard. Hummingbird feeders are often sources of illness if the sugar-water isn't changed daily, so if the feeder cannot be cleaned regularly nectar-bearing plants like bee balm, larkspur and columbine

can be a safer option (Hillock, Schnelle, and Toscano, n.d.). If a hummingbird feeding is used, a dye-free sugar mix is recommended (Williamson 2008).

## Pollinator Gardens

The importance of pollinators and their decline worldwide has been a frequent topic in the news for many years now (Potts et al. 2010). The use of chemicals to control “pest” species has had a negative impact on all kinds of insects including important pollinators. The first step to help with this decline is to stop the use of broad-spectrum pesticide. Instead companion plantings can help reduce insect predation on garden plants. Planting species like calendula, alongside desirable plants can help to keep insects away (Philbrick and Gregg 2016). In addition to pollinating flowers and food crops, beneficial pollinators that nest in the ground can help mix nutrients into the soil and even help water access roots easier (Dunk, n.d.). Fall leaves and dried plants are important for insects and tidy yards don’t offer shelter or food for insects. Keeping a slightly messy yard or garden, especially over winter, can help insect populations by offering food, nesting sites and places safe from freezing temperatures (Wheeler 2017).

“We view wildlife friendly yards as messy or unkempt instead of wild natural places. This mindset needs to change.” - Master Gardener

Gardeners can encourage pollinators by using single bloom plants; these simpler blooms display their pollen-covered stamens and nectar glands prominently, and it is easy for pollinators to access these resources when compared to blooms bred to display numerous, dense petals (Finneran 2015). Creating mass plantings or clumps of the same species also helps attract pollinators as they prefer to feed on one type of plant at a time. Mass plantings also allow the insects to better find plants and to expend less energy as they forage (Johnston 2015). Ground-nesting pollinators will also benefit if they can access bare exposed soil for nesting sites or for nesting materials (“Pollinator Friendly Garden - Landscape Ontario” n.d.). Likewise, leaving rotting wood, old woody plant stems and leaves around the yard provide nesting areas for cavity-nesting insects (Jordan, Hopwood, and Morris 2020). Pollinators will also benefit if they can forage for pollen and nectar throughout the growing season. “Bug hotels” have become popular in recent years, but care must be taken to ensure the “hotels” are suitable. Many commercially available bug hotels, while decorative, do not provide the correct protection from the elements that pollinators require. There are many great resources available to ensure insect nesting boxes are built correctly. In particular, the Xerces Society website, <https://xerces.org/pollinator-conservation/nesting-resources>, provides many valuable references. Just like with food sources for birds, natural options are always best when it comes to providing habitat and overwintering sites for insects.

“Plant flowers so that there is a succession of bloom of high nutritional value that bloom in blocks from spring to fall.” - Master Gardener

Native bees do not need additional water sources, as they get what they need through the nectar (Dunk, n.d.). If water is left out for birds, care must be taken to ensure that other insect

species don't become trapped or drown in the water. Many sources recommend a shallow water dish with rocks in it for these insects to perch on.

“Use the Master Gardener's pamphlet: "Gardening for Pollinators" for ideas.” - Master Gardener

“We've been doing pollinator counts for the past five years in Kamloops. Most of the participants over the years have made changes to their gardens after being involved with this Citizen Science. They've said it has changed their lives!” - Master Gardener

### **Reptile-friendly spaces**

Native reptiles and amphibians (frogs, toads, salamanders, and snakes) are a wonderful sight in the home garden. They can help to control mice and insects and are food, themselves, for some birds and small mammals. Encouraging these animals can be helped by using native plants that have co-evolved with them. Creating a wildlife corridor through the garden to connect to any wild lands nearby can be very beneficial. Brush piles and leaf litter offer cover and cooling shade for reptiles and amphibians also. Gardeners may wish to create safe basking areas, away from pets and children to allow them to safely warm up on cool days. Having a reliable water source nearby is also very important. Waiting to turn the soil until late spring and leaving the compost heap untouched in the summer months can help to maintain nesting sites (“Tips for Gardeners to Help Reptiles,” n.d.; “Helping Reptiles | The Amphibian and Reptile Conservation Trust” n.d.).

### **Water-wise Gardening**


As this project is designed for urban spaces in Kamloops, water conservation should be a top priority. Kamloops is in the dry interior of British Columbia where drought increasingly impacts urban landscapes. The first step in planning an alternative to a lawn is to consider the water needs of plants before they are purchased. Most plant tags will include a note about how much sun and water each plant needs, and generally highlight plants that are water-wise or drought tolerant. Native plants are always a great option, as they are adapted to local climatic conditions and will require very little additional water in seasonally normal years. Turfgrass takes a lot of water but supplementing or replacing the grass with deeper rooted species, like clover or yarrow, can help reduce water needs while still staying green. These deeper rooted species can reach water resources deeper in the soil. It is estimated that as much as 50% of irrigation water is lost due to run-off and evaporation, perhaps even more so in hot, dry climates like Kamloops (“From Lawn to Meadow : Conservation Tools” n.d.). Within garden spaces there are many options for water conservation and retention. Adding a layer of mulch or leaf litter to the top layer of the soil will help to retain water (Larum 2020). Some soil can be left bare and undisturbed in areas shaded by perennial plants or in other shady areas, where water loss from solar radiation isn't a concern.

An article from the Permaculture Research Institute lists multiple ways, in addition to mulch, to retain moisture within a garden (Meier 2013):

- Hügelkultur: planting over buried logs and branches

- Swales and berms: to collect water
- Drip irrigation: to prevent evaporation
- Terraces: to slow water and soil run off
- Deep rooted plants: store water during drought and provide water to plants nearby

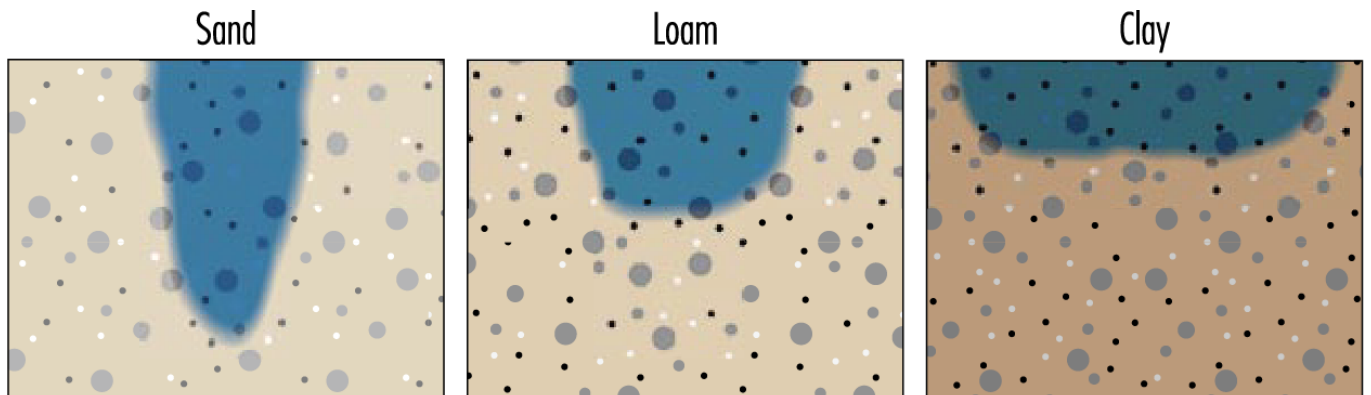
Knowing the types of plant present in the yard will help to know how much water to use and prevent waste. Figure 2 shows some examples of water frequency and depth for different plant types.

 <b>How Much &amp; How Often</b> Water to the outer edge of the plant's canopy and to the depth indicated. Watering frequency will vary depending on season, plant type, weather and soil.		Seasonal Frequency — Days Between Waterings				Water This Deeply (Typical Root Depth)
		Spring Mar - May	Summer May - Oct	Fall Oct - Dec	Winter Dec - Mar	
<b>Trees</b>	Desert adapted	14-30 days	7-21 days	14-30 days	30-60 days	24-36 inches
	High water use	7-12 days	7-10 days	7-12 days	14-30 days	24-36 inches
<b>Shrubs</b>	Desert adapted	14-30 days	7-21 days	14-30 days	30-45 days	18-24 inches
	High water use	7-10 days	5-7 days	7-10 days	10-14 days	18-24 inches
<b>Groundcovers &amp; Vines</b>	Desert adapted	14-30 days	7-21 days	14-30 days	21-45 days	8-12 inches
	High water use	7-10 days	2-5 days	7-10 days	10-14 days	8-12 inches
<b>Cacti and Succulents</b>		21-45 days	14-30 days	21-45 days	if needed	8-12 inches
<b>Annuals</b>		3-7 days	2-5 days	3-7 days	5-10 days	8-12 inches
<b>Warm Season Grass</b>		4-14 days	3-6 days	6-21 days	15-30 days	6-10 inches
<b>Cool Season Grass</b>		3-7 days	none	3-10 days	7-14 days	6-10 inches

These guidelines are for established plants (1 year for shrubs, 3 years for trees). Additional water is needed for new plantings or unusually hot or dry weather. Less water is needed during cool or rainy weather. Drip run times are typically 2 hours or more for each watering.

Figure 2. Water use table by plant type (“Lawn Watering Guide - Water Use It Wisely” n.d.)

Another consideration is soil type; different types of soil will hold different amounts of water and in different ways (Figure 3). Sandy soil requires less water to reach the root zone, but that water will not be held for as long as in clay soils. Changing watering intensity and frequency based on soil type will help with gardening success (“Lawn Watering Guide - Water Use It Wisely” n.d.).



**Figure 3. Water penetration depth by soil type (“Lawn Watering Guide - Water Use It Wisely” n.d.)**

Additionally, finances are always a factor in any decision at home and beyond. Municipal water meters can help to encourage water conservation as people try to stay within their water use limit. Restrictions on water days can also help people to think more wisely about water use, although enforcement and education are a vital part of this solution.

“One way to look at sustainable landscapes is as mini-watersheds that retain and clean storm water, conserve resources, and provide a healthy habitat for plants and wildlife. It is important to understand the sources of water, how water flows, and how water is used.” - Stakeholder doing similar initiative outside of Kamloops

### **Xeriscaping**

Another way to be water-wise in the yard is through the use of xeriscaping. This approach is sometimes seen as only rocks and few prickly desert-adapted plants, but there is a lot more to it than that. In fact, xeriscaping principals do not dictate the use of plants like yucca, unless that is the style the gardener is going for. Many xeriscaping sources encourage the use of native vegetation that are adapted to the local rainfall and therefore need little to no supplemental water. The city of Kamloops has a xeriscaping demonstration garden at 790 Harrington Rd. that is quite lush

There are 7 principles of xeriscaping (“Xeriscaping | City of Kamloops”)

1. Appropriate planning/design,
2. Develop healthy soil with abundant organic matter,
3. Choose appropriate plant selection and group by water needs,
4. Incorporate clover into practical turf areas,
5. Water wisely using efficient irrigation systems and use less water as plants mature,
6. Use mulch that is 3 inches deep (can be rock on fabric, but does not work long term),
7. Design low maintenance and well maintained landscapes

Although this method uses little water and is quite low maintenance, there are some things to consider when creating a xeriscaped garden. Many xeriscaped spaces used hardened surfaces like gravel or flagstone, which is inhospitable to insects and can create heat islands, increasing the need for watering (Dyer and Spenger 2020). This design feature is not integral to the principles of xeriscaping, but many people mistakenly equate xeriscaping to landscaping with gravel and rocks.

### **Invasive Species**

It is always important to consider local invasive plant lists when planning a garden. There are many ways to classify non-native plants from weed to invasive species to noxious weed. There are many non-native plants that don't have invasive habits and can only really thrive in garden conditions, like annual vegetable plants. There are, however, several plants that are considered noxious and can outcompete native plants on wildlands and even some that cause injury to

humans like Giant Hogweed, for example, that causes painful blisters. Consulting local invasive plant councils can help distinguish which plants to avoid in your garden. In Kamloops, the Thompson-Nicola Invasive Plant Management Committee (<https://www.tnrd.ca/services/invasive-plant-management/>) and the Invasive Species Council of BC (<https://bcinvasives.ca/resources/publications/>) will both offer relevant information.

## Human Connection

### Ethnobotany

Many plants, native and exotic, have medicinal, food or ceremonial use and are inextricably interwoven into both human history and present-day practices. Development pressure, colonial practices and climate change have impacted the availability and timing of these important plants (Dana 2013). Understanding these important connections between plants and peoples presents opportunities for learning and knowledge sharing within the community. It is important to approach Indigenous plant knowledge with respect and an understanding that there is no obligation to share that knowledge outside of the local community. A review of the cultural significance of plants is beyond the scope of this project; however it is important to acknowledge and appreciate the wisdom shared by knowledge keepers through the ages in our community. Understanding that there are many ways of relating to plants and making space for First Peoples to maintain their culturally important practices with plants are important steps in decolonizing our landscapes.

“[Western Culture] live[s] as if separate from the land and natural world – not living with nature.” - Master Gardener

### Health Starts in the Garden

Working in a garden has innumerable health benefits for people throughout their entire lives. Being outside, with our hands in the soil has many benefits: exposure to soil microbes can increase general well-being (Oliver and Gregory 2015; Wall, Nielsen, and Six 2015), exposure to sunlight facilitates natural vitamin D production. As medicine for the body and soul, cultivating plants influence our health directly through their own biology and indirectly through the benefits of being outdoors and stewarding a healthy space around the home. During the recent/ongoing pandemic many people turned to gardening and discovered the myriad benefits of working in the soil, from growing healthy foods to having a regular practice of moving to mental health benefits that come from being outside (Sofa 2020).



## Native plant sources

In the Kamloops area, native species and/or arid-adapted species can be found from select nurseries, seed supply companies and community members. Split Rock Nursery in Lillooet specializes in native vegetation and has great information on their website about how to care for these plants. Kamloops Quality Seed is a good source for bulk native seeds, and might be a good option for a group of people to create a combined order and share the seeds. Neighbours and local online plant swaps can be great sources for local plants that thrive in our climate. Some residents are even starting to sustainably grow native seed for gardens and restoration projects.

## Barriers to Increasing Ecological Health of Private Land in Kamloops

We used systems change framework that is articulated in the *Water of Systems Change*<sup>2</sup> to characterize the barriers to increasing ecological health of private land in Kamloops. See Figures 4 and 5 below for a visual and description of this framework.

One of the parables that is shared by the authors to capture the concept of systems change is as follows:

*A fish is swimming along one day when another fish comes up and says “Hey, how’s the water?”  
The first fish stares back blankly at the second fish and then says “What’s water?”*

The work of systems change is to make visible the ubiquitous water that we swim in. The figure below is the framework that helps to tease apart the various conditions that comprise the “water”. This includes structural, semi-explicit and transformative change.

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<sup>2</sup> Kania, Kramer, & Senge (2018). *The water of systems change*.  
[https://www.fsg.org/publications/water\\_of\\_systems\\_change](https://www.fsg.org/publications/water_of_systems_change)

## Six Conditions of Systems Change

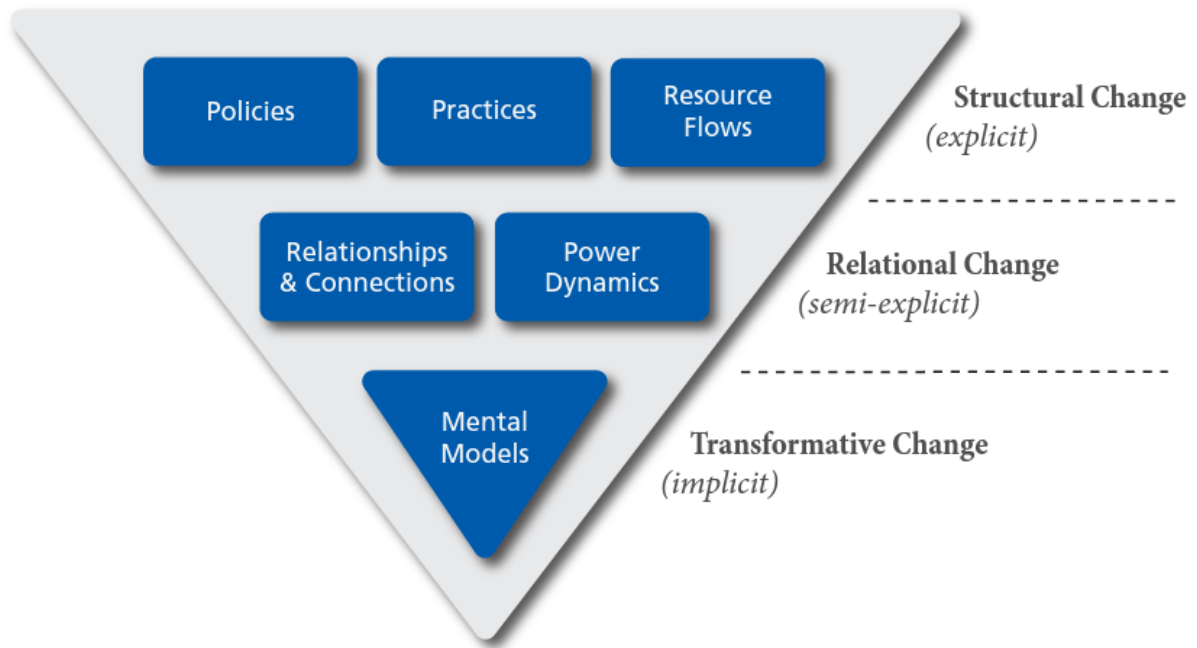


Figure 4. Visual of Six Conditions of Systems Change from (Kania, Kramer, and Senge 2018).

### SYSTEMS CHANGE CONDITIONS—DEFINITIONS

**Policies:** Government, institutional and organizational rules, regulations, and priorities that guide the entity's own and others' actions.

**Practices:** Espoused activities of institutions, coalitions, networks, and other entities targeted to improving social and environmental progress. Also, within the entity, the procedures, guidelines, or informal shared habits that comprise their work.

**Resource Flows:** How money, people, knowledge, information, and other assets such as infrastructure are allocated and distributed.

**Relationships & Connections:** Quality of connections and communication occurring among actors in the system, especially among those with differing histories and viewpoints.

**Power Dynamics:** The distribution of decision-making power, authority, and both formal and informal influence among individuals and organizations.

**Mental Models:** Habits of thought—deeply held beliefs and assumptions and taken-for-granted ways of operating that influence how we think, what we do, and how we talk.

Figure 5. Description of Six Conditions of Systems Change from (Kania, Kramer, and Senge 2018).

The key barriers we identified are shared below, presented as:

- Culture barriers (including considerations related to mental models, relationships and connections, and power dynamics)
- Policy barriers
- Practice barriers (including practices and resource flows)

### **Culture Barriers**

- Misconceptions or misinterpretations of bylaws, and strata rules.
- Belief that lawns are the standard and are easiest to maintain.
- Cultural biases about what makes a good Neighbour.
- Lack of agreement of what higher ecological value means, including:
  - Misunderstanding of “xeriscaping” versus “zeroscaping”.
  - Lack of consistency for aesthetic goals (e.g., even within city staff or departments).
  - Disagreement about what is a weed (e.g. clover).

### **Policy Barriers**

- Pesticide bylaws don’t apply to commercial installations.
- Inconsistent and inaccurate interpretations of bylaws by city staff and bylaw officers
- Policy analysis for City of Kamloops suggested that many policies have been adopted that support land with higher ecological value vs. lawns, and that there is some level of operationalizing these policies (identifying lead departments and updating related procedures).. However, there are few formal evaluation metrics and processes in place, and the policies around ecological values are not widely actualized and impacting change on the ground.

### **Practice Barriers**

- General public/individual yards:
  - Many yard tenders and professionals default to lawns or “seas of rock” because of the assumption that it is the easiest and cheapest to install.
  - Transitioning to more natural yards may save some time and money, and will reduce the use of water tools that use fossil fuels. However, many individual yard tenders do not currently have the skills or upfront resources required to make that transition.
- Professionals:
  - Horticulturalists and landscape architects vary in terms of skills and experience with native plants and green infrastructure.

- There is a lot of turnover of landscaping staff, and they are often not invested in the work. Furthermore, landscaping companies need to stay afloat in the current economy. There is an incentive to do designs that look good at first with no thought to appearance or maintenance 5-15 years later. There is also incentive to advise clients to put in designs that require more maintenance by the landscaping company.
- No local training available that would provide professionals and the general public with the values, approaches and practices needed to increase ecological health of private yards.
- Professionals and individual yard tenders and professionals are not incentivized to use native plants, because they:
  - Are not always available locally, and in the high amounts that may be required if public demand increases.
  - Can be higher cost.
  - Can be harder to propagate and transplant.
  - May need more space and be seen as more “messy”.
- Local nurseries do not currently differentiate between native plants and other desirable plants<sup>3</sup>, and plants that are not desirable to include in Kamloops yards and other landscapes. This includes continuing to sell invasive plants.

“Plants at the nurseries are often treated like fast fashion – they have a perennial plant of the year to push sales and unfortunately they still sell invasive [plants].” - Master Gardener

- Challenges with maintenance on city and institutional property:
  - Maintenance requires ongoing knowledge from staff, ongoing budget.
  - Example gardens often change over time, away from original intent.
  - City council priorities change over time.

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<sup>3</sup> “Other desirable plants” include plants with functions similar to native plants, plants that have potential to increase ecological health in private yards (e.g. carbon sequestration, pollinator friendly, provide habitat, provide shade, firesmart, etc.). Plants are particularly desirable if they are also well suited for yards, for commercial sales and/or sharing among yard tenders. See Appendix A for a preliminary list of plants partners want to see more of and less of in Kamloops.

## Strategies for Increasing Ecological Health of Private Land in Kamloops

This section presents strategies and suggested next steps for increasing the ecological value of private land in Kamloops at a municipal level. We will work with Kamloops Naturalist Club, City of Kamloops and other stakeholders to pursue funding for implementing these strategies (e.g. pursuing further funding from the Real Estate Foundation in spring 2023). The strategies were identified based on the findings presented in this literature review, particularly best practices for increasing ecological value, and the barriers and facilitators identified. A major aspect of this Grow Wild Needs Assessment was also engaging stakeholders to help identify strategies and next steps. This included background interviews, partnership development and identifying opportunities for collaboration, and getting feedback on draft documents (including early drafts of these strategies). The key strategies that we propose based on the findings of the needs assessment are:

- Addressing policy and culture barriers
- Increasing supply of and access to native plants and other desirable plants<sup>4</sup>
- Building capacity for ecological preservation and restoration
- Evaluation and Assessment

The remainder of this section describes specific activities and current and potential partnerships for implementing each strategy. As we move forward, we will continue to vet these strategies with stakeholders, adding more detail about partnerships and activities based on these discussions.

### Addressing Policy and Culture Barriers

***Start with changing mindsets and culture of key champions, including City of Kamloops staff. Move towards shifting mindsets among other key partners and the general public.***

- This includes working to identify and encourage reflection on key messages, such as:
  - Addressing myths and barriers of transitioning from lawns to land with higher ecological value.
  - Clear research and statistics on benefits, such as reductions in cost, labour, and water; climate resilience.
  - Helping us remember that humans are part of the natural world, and that these lands have interacted with humans for years. Instead of thinking of yard tending as “work”, we can think of it as a means of connecting with nature and

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<sup>4</sup> “Other desirable plants” include plants with functions similar to native plants, plants that have potential to increase ecological health in private yards (e.g. carbon sequestration, pollinator friendly, provide habitat, provide shade, firesmart, etc.). Plants are particularly desirable if they are also well suited for yards, for commercial sales and/or sharing among yard tenders. See Appendix A for a preliminary list of plants partners want to see more of and less of in Kamloops.

empowering each of us to be part of a positive change in addressing climate resilience.

- Approaches and activities that can help shift mindsets and culture include:
  - Engagement with lots of time for questions and reflection/
  - Awareness campaigns on social media, signage, pamphlets and educational material.
  - Online education campaign and/or contest that helps homeowners/renters envision the look of a transitioned lawn.
  - Partner with the City of Kamloops Sustainability Office, Transition Kamloops and other partners who have existing newsletters and outreach.
- Demonstration projects on private, commercial, and public land are also helpful in shifting people's perceptions of what is possible, and what a yard that is ecologically healthy looks like.
  - Kamloops Naturalist Club was previously awarded a sustainability grant from Thompson Rivers University (TRU). These funds will be used in 2023 to implement a demonstration project on the university grounds, partnering with the TRU sustainability office, the TRU horticulture program, and the TRU Grounds/Facilities.

***Work with partners from the City of Kamloops to address current policy barriers, in particular to increase implementation and evaluation of existing policies that support enhancing the ecological health of private land.***

- Support the Landscape Planning Technician with the City of Kamloops leading an update of the Landscape design guidelines update in 2023. For example, include practices for increasing use of native plants and increasing ecological health.
- Create a roundtable and/or working groups to encourage collective action to increase implementation and evaluation of existing policies related to ecological health of urban land. A similar process for food policy implementation in Kamloops and area was funded by REFBC and completed in 2019. Evaluation suggested that this collective approach was effective in bringing together key stakeholders to address gaps for policies that had been adopted but not fully implemented. The policy analysis completed for this needs assessment identified four related policies in the 2021 Community Climate Action Plan (CCAP) Big Move # 8 and the 2015 Food and Urban Agriculture Plan (FUAP).
- Consider whether it would be helpful to adopt an Urban Ecosystem Health and Biodiversity Municipal Strategy and/or update the 2016 City of Kamloops Urban Forest Management Strategy
- Engage City of Kamloops Bylaws staff to better understand how they are interpreting and implementing current bylaws.
- Investigate whether the tree coupon program could be extended to include coupons for purchasing native plants or other desirable plants.

“City of Kamloops should increase water restrictions as incentive to replace lawn with xeriscape gardens.” - Master Gardener

## Increasing supply of and access to native plants and other desirable plants<sup>5</sup>

- Partner with local garden suppliers to have clear signage for native plants and plants that have potential to increase ecological health in private yards (e.g. pollinator friendly, provide habitat, provide shade, etc.). We have identified several individuals and organisations that we have existing relationships with, who we plan to contact in the next phase of Grow Wild.
- Identify partners who could potentially grow and distribute native plants and plants that have good potential to increase ecological health of private yards. This may include supporting a social enterprise to distribute native plants. We are currently working closely with the Tk’emlúps te Secwepemc Food Sovereignty Team to plan next steps for a social enterprise for propagating and selling native and culturally significant plants, using the Tk’emlúps te Secwepemc greenhouse.
- Investigate distribution of native plants and other plants outside of commercial sales. This includes working with local gardening groups to increase sharing of seed and plant material (e.g., Thompson Shuswap Master Gardeners Association, Kamloops Green and Garden Facebook group, Kamloops permaculture discussion group).
- Investigate partnership with a seed supplier to produce and sell a lawn alternative seed mix that is well suited for the dry interior climate. We have spoken with West Coast Seeds to investigate the possibility of a project similar to the “Bee Turf” seed mix developed in partnership with the City of Richmond. We have also identified several potential local partners that may be interested in developing and distributing a similar seed mix.

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<sup>5</sup> “Other desirable plants” include plants with functions similar to native plants, plants that have potential to increase ecological health in private yards (e.g. carbon sequestration, pollinator friendly, provide habitat, provide shade, firesmart, etc.). Plants are particularly desirable if they are also well suited for yards, for commercial sales and/or sharing among yard tenders. See Appendix A for a preliminary list of plants partners want to see more of and less of in Kamloops.

## Building capacity for ecological preservation and restoration

### ***A suite of tools and an online guide to help homeowners assess and increase the ecological value of their land.***

- The next phase of this work would include continued research and consultation to clearly identify which plants are best suited for private land in Kamloops, including suitability for commercial sales and/or sharing and which plants that have potential to increase ecological health in private yards (e.g. pollinator friendly, provide habitat, provide shade, etc.). Resources should also include a clear list of undesirable plants (e.g., invasive or noxious).
  - See Appendix A for a preliminary list of plants partners want to see more of and less of in Kamloops.
  - Partners also indicated that the Grow Me Instead Guide from the Invasive Species Council of BC would be a good starting point, but that it would more useful if it was tailored to our region specifically.
- Resources should also include a guide for growing, buying and sharing native plants and other desirable plants. Ideally, this would include links with regularly updated information about where to source plants. This would require identifying which partner would be responsible for keeping the list updated, and how often that would need to be done.
- We have talked to partners with the City of Kamloops about working with them to revise existing City of Kamloops resources and add new resources as needed to meet the desired outcomes of Grow Wild and Big Move 8 of the Community Climate Action Plan.
- We have talked to partners such as the City of Kamloops and the Thompson Shuswap Master Gardeners Association about distributing tools and resources.

“The City of Kamloops needs to play a larger role in helping people to transition to eco-friendly yards. They need to provide courses and workshops, reading materials, websites with good links to expert advice, have a better and/or more demonstration gardens.” - Master Gardener

### ***Work with neighbourhood associations to encourage residents to use the Grow Wild rubric to assess and improve the ecological health of their yards.***

- We are working with a partner from the City of Kamloops to develop a pilot project to partner with neighbourhood associations to encourage residents to use the Grow Wild rubric to assess and improve the ecological health of their yards. Using a Community-Based Social Marketing approach, the would foster high-quality interactions between volunteer Grow Wild Specialists and residents.



***Work with key partners to streamline and harmonize current training opportunities for professionals and the general public, in order to ensure that it encompasses the values, approaches and practices needed to increase ecological health of private yards.***

- Develop and regularly update a list of courses and workshops available in Kamloops and other locations.
- Partner with Master Gardeners, TRU Horticulture program, and landscape architects to offer more in-depth skill development for increasing ecological health of urban land.
- Offer workshops in the City of Kamloops activity guide.

## **Evaluation and Assessment**

- Work towards widespread use of the Evaluation rubric to assess the ecological value of private land in Kamloops, using GIS software to visualise areas with higher vs. lower ecological health, identify potential corridors for pollinators and wildlife, and assess changes in ecological health over time.
- Include estimates of changes in ecological health, carbon sequestration, and resilience to climate change in the pilot project described above, to work with neighbourhood associations to encourage residents to assess and improve the ecological health of their yards.
- Support City of Kamloops with evaluation and measurement of existing policies that support enhancing the ecological health of private land.
- Collaborate with partners such as the Thompson Nicola Conservation Collaborative and other conservation collaboratives in British Columbia to investigate considerations and potential tools for assessing ecological health.

## Appendix A: Preliminary list of plants partners want to see more of and less of in Kamloops

### Plants that experts would like to see in more yards in Kamloops

- Bunch grass
- Golden tickseed (*Coreopsis tinctoria*)
- Edible chestnut
- Fall asters
- Gaillardia
- Goldenrod
- Hazelnuts
- Low-water vegetables
- Mock orange
- Mulberry – firesmart/good for birds
- Native bee balm
- Oregon grape
- Penstemon fruticose
- Rabbitbrush
- Rocky mountain bee plant
- Saskatoon (these last three are good for food security)
- Scarlet gilia
- Simple seed-grown annuals
- Snowberry, wild rose
- Upland larkspur
- Sumac – drought resistant
- Native common sunflower (*Heliathus annus*)

### Plants that local experts would like to see less of in Kamloops

- Goji - invasive
- Non-hardy rosebushes
- Turfgrass lawns
- Annual bedding plants
- Cedars - high water use in this climate
- Ornamental grasses
- Double roses
- Non-native shrubs

## Appendix C: Books and resources identified by partners for increasing ecological health of yards and urban land

- [The 3rd Edition of the Green Bylaws Toolkit 2021 - Stewardship Centre for BC](#)
- [Skinny Streets and Green Neighborhoods: Design for Environment and Community Paperback – Dec 23 2005](#)
- [Cities as Sustainable Ecosystems](#)
- [Xerces.org](#) - resources website for invertebrate conservation
- Invasive Species Council of BC – [“Grow me instead” guide](#)
- [“Cultivating the Wild”](#) – book by Eva Durance (available at the library) book about BC interior native plants for gardens
- Demonstration gardens eg [unH2O Garden](#) Kelowna, [Splitrock Nursery](#)
- Hands on workshop with mentorship
- Workshops/mentor to help identify native plants
- Knowledge from our elders, utilized in [Kwesetken Ag guide](#)
- [Pollinator partnership Canada](#) – plant directory done by regions
- [Thompson Shuswap Master Gardeners](#)
- [Kamloops Naturalist Club](#)
- Permaculture workshops

## Appendix D: BC Interior Native Plant Suppliers (2022)

- Sagebrush Nursery, Oliver
- Dogwood Nursery, West Kelowna
- Xeriscape Endemic Nursery, West Kelowna
- Split Rock Environmental, Sekw’el’was, Lillooet
- Rooted by the River, Clearwater
- Art Knapp, Kamloops (occasional native species available)
- Lyon Landscaping, Kamloops (occasional native species available)

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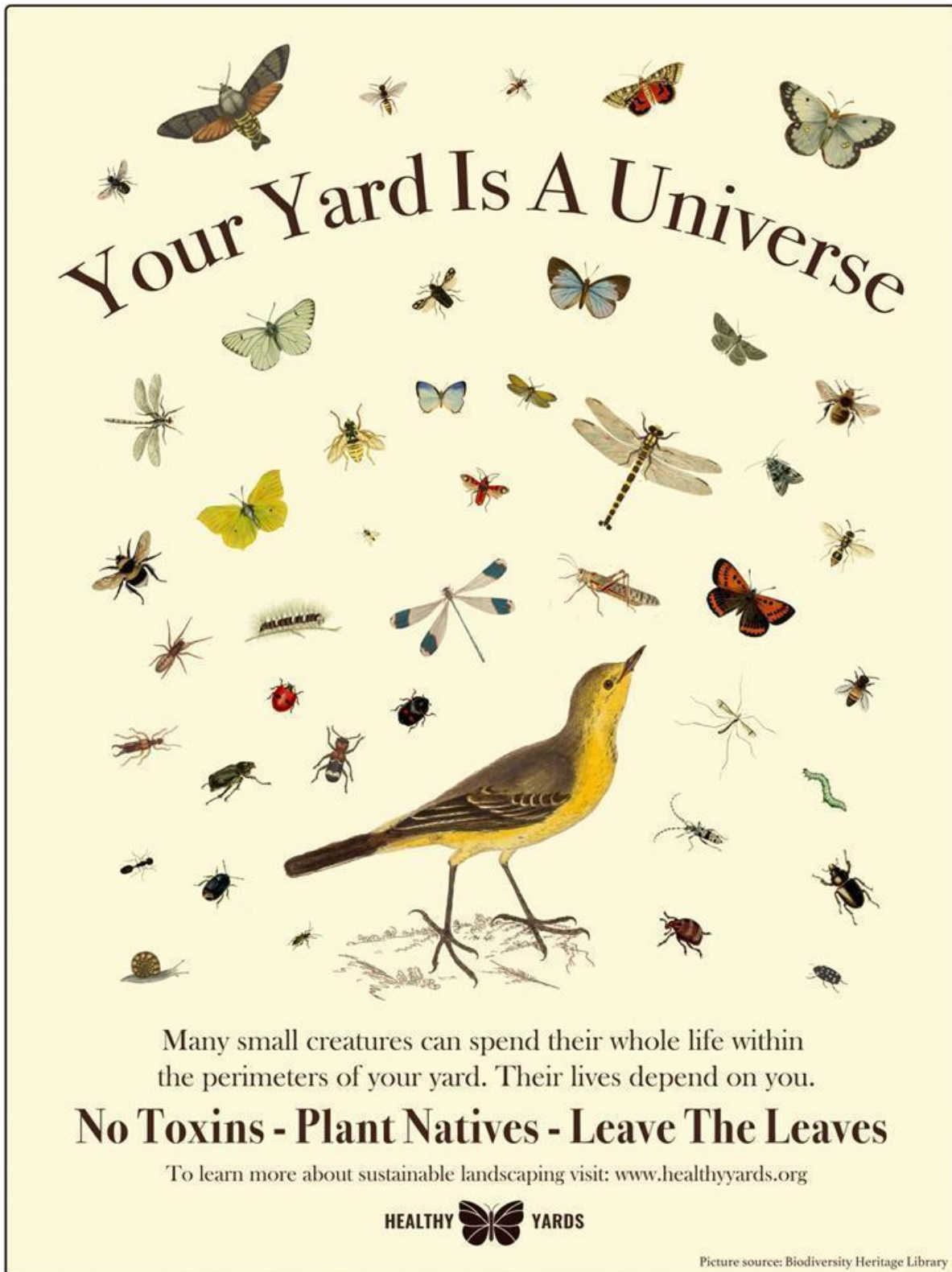


Figure 4. Your Yard Is A Universe poster (“Healthy Yards – Learn How to Change to More Sustainable Landscaping.” n.d.)