McWater's Park Permaculture Gardeners

Permaculture Design Workshop
and Charrette

Polyculture Design
Part 2

Selecting plants that will improve the local conditions:

Support a pollinators to improve fruit production

Support carnivorous insects to reduce herbivorous insect populations

Generalist and Specialist Nectories
- through out the growing season

Specialist Nectories

Feeding pollinators with shallow mouth parts

The Umbelliferae family, which includes carrots, parsley, dill, cilantro, fennel, chervil parsnip, celery, and celeriac — named after their umbrella shaped flowers, called umbels.

The Compositae, or daisy family (also called the Asteracea, or aster family), so named because the centre is in fact a composite flower, consisting of a cluster of many little flowers called ‘florets’, with one set of petals around them all.

Other plant families also have small flowers that can serve as a food source for beneficial insects



Specialist Nectories






Plan for blooms all season long

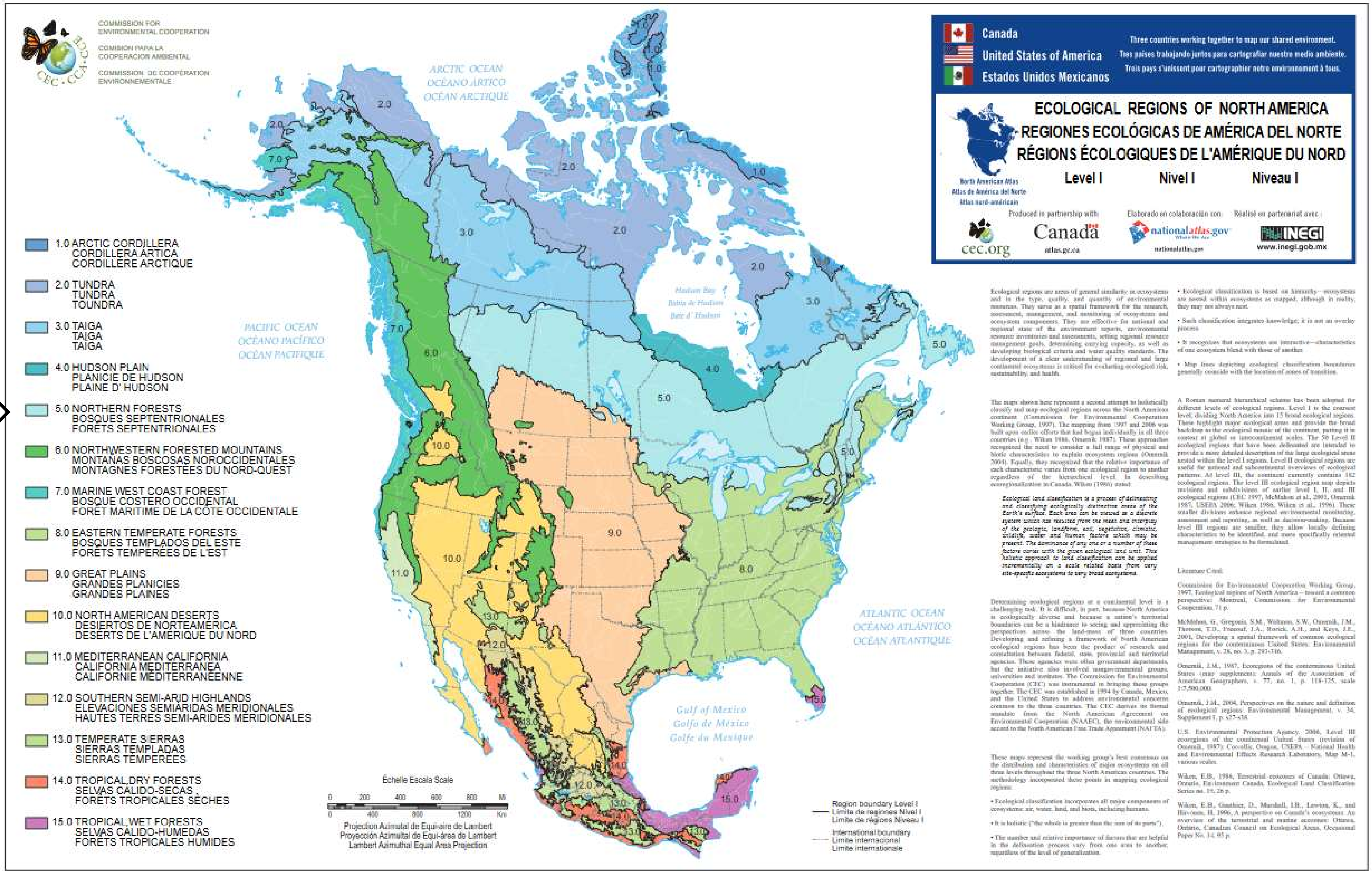
Bloom Period		Common Name	Scientific Name	Flower Color	Max. Height*	Water Needs
		Forbs			(Feet)	L: low; M: medium; H: high
Early	1	Golden Alexanders	*Zizia aurea*	yellow	3	H
	2	Wild geranium	*Geranium maculatum*	pink	3	M
Early–Mid	3	Spiderwort	*Tradescantia virginiana*	blue	3	M
Mid	4	Blue vervain	*Verbena hastata*	blue	5	H
	5	Narrowleaf mountain mint	*Pycnanthemum tenuifolium*	white	3	L–M
	6	Swamp milkweed	*Asclepias incarnata*	pink	5	M–H
	7	Wild bergamot	*Monarda fistulosa*	purple	4	M
Mid–Late	8	Boneset	*Eupatorium perfoliatum*	white	5	H
	9	Cardinal flower	*Lobelia cardinalis*	red	4	H
	10	Field thistle	*Cirsium discolor*	purple	6	M
	11	Wild golden glow	*Rudbeckia laciniata*	yellow	7	H
Late	12	Bottle gentian	*Gentiana clausa*	blue	2	M
	13	Calico aster	*Symphyotrichum lateriflorum*	white	3	M
	14	Gray goldenrod	*Solidago nemoralis*	yellow	2	L
	15	New England aster	*Symphyotrichum novae-angliae*	purple	6	M
	16	Wrinkleleaf goldenrod	*Solidago rugosa*	yellow	3	M–H

From https://xerces.org/publications/plant-lists/pollinator-plants-northeast-region

Tallamy Keystone Species

"All plants are not created equal, particularly in their ability to support wildlife. Most of our native plant-eaters are not able to eat alien plants, and we are replacing native plants with alien species at an alarming rate, especially in the suburban gardens on which our wildlife increasingly depends. My central message is that unless we restore native plants to our suburban ecosystems, the future of biodiversity in the United States is dim."

– Douglas W. Tallamy, **Bringing Nature Home**


COMMISSION FOR ENVIRONMENTAL COOPERATION
COMISIÓN PARA LA COOPERACIÓN AMBIENTAL
COMMISSION DE COOPÉRATION ENVIRONNEMENTALE
Canada
United States of America
Estados Unidos Mexicanos
Three countries working together to map our shared environment.
Tres países trabajando juntos para cartografiar nuestro medio ambiente.
Trois pays s'unissent pour cartographier notre environnement à tous.
ECOLOGICAL REGIONS OF NORTH AMERICA
REGIONES ECOLÓGICAS DE AMÉRICA DEL NORTE
RÉGIONS ÉCOLOGIQUES DE L'AMÉRIQUE DU NORD
Level I
Nivel I
Niveau I
North American Atlas
Atlas de América del Norte
Atlas nord-américain
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OCÉANO ATLÁNTICO
OCÉAN ATLANTIQUE
Gulf of Mexico
Golfo de México
Golfe du Mexique
Hudson Bay
Bahía de Hudson
Baie d'Hudson
1.0 ARCTIC CORDILLERA
CORDILLERA ÁRTICA
CORDILLÈRE ARCTIQUE
2.0 TUNDRA
TUNDRA
TOUNDRA
3.0 TAIGA
TAIGA
TAÏGA
4.0 HUDSON PLAIN
PLANICIE DE HUDSON
PLAINE D' HUDSON
5.0 NORTHERN FORESTS
BOSQUES SEPTENTRIONALES
FORÊTS SEPTENTRIONALES
6.0 NORTHWESTERN FORESTED MOUNTAINS
MONTAÑAS BOSCOSAS NOROCCIDENTALES
MONTAGNES FORESTÉES DU NORD-OUEST
7.0 MARINE WEST COAST FOREST
BOSQUE COSTERO OCCIDENTAL
FORÊT MARITIME DE LA CÔTE OCCIDENTALE
8.0 EASTERN TEMPERATE FORESTS
BOSQUES TEMPLADOS DEL ESTE
FORÊTS TEMPÉRÉES DE L'EST
9.0 GREAT PLAINS
GRANDES PLANICIES
GRANDES PLAINES
10.0 NORTH AMERICAN DESERTS
DESIERTOS DE NORTEAMÉRICA
DÉSERTS DE L'AMÉRIQUE DU NORD
11.0 MEDITERRANEAN CALIFORNIA
CALIFORNIA MEDITERRÁNEA
CALIFORNIE MÉDITERRANÉENNE
12.0 SOUTHERN SEMI-ARID HIGHLANDS
ELEVACIONES SEMIÁRIDAS MERIDIONALES
HAUTES TERRES SEMI-ARIDES MÉRIDIONALES
13.0 TEMPERATE SIERRAS
SIERRAS TEMPLADAS
SIERRAS TEMPÉRÉES
14.0 TROPICAL DRY FORESTS
SELVAS CÁLIDO-SECAS
FORÊTS TROPICALES SÈCHES
15.0 TROPICAL WET FORESTS
SELVAS CÁLIDO-HÚMEDAS
FORÊTS TROPICALES HUMIDES
Échelle Escala Scale
Projection Azimutal de Équi-aire de Lambert
Proyección Azimutal de Equi-área de Lambert
Lambert Azimuthal Equal Area Projection
Region boundary Level I
Límite de regiones Nivel I
Limite de régions Niveau I
International boundary
Límite internacional
Limite internationale

Keystone Species of the Northern Forests

Examples: Maple, Hickory*, Walnut*, Oak, American Linden (Bass Wood), Alder, American Plum, Hybrid Hazels*, Beach plum*, High bush Blueberry, Sunchokes, Maximillian Sunflowers, sweet golden rod, violets, common milkweed, New England asters, Bee balm, Lupin






Protection from competition from other plants

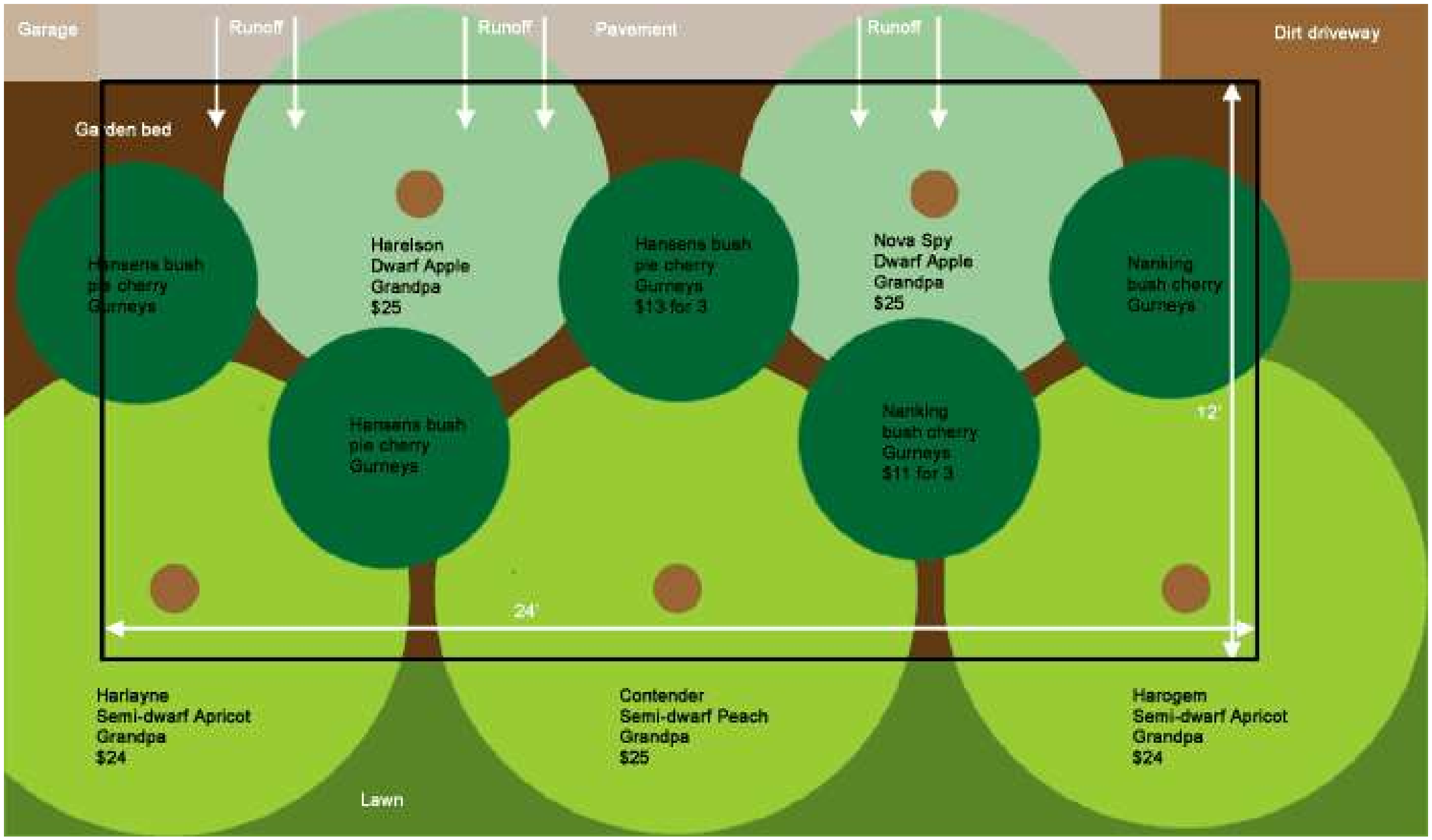
ground covers, edge protectors, spacing, planning for available light

Ground Covers

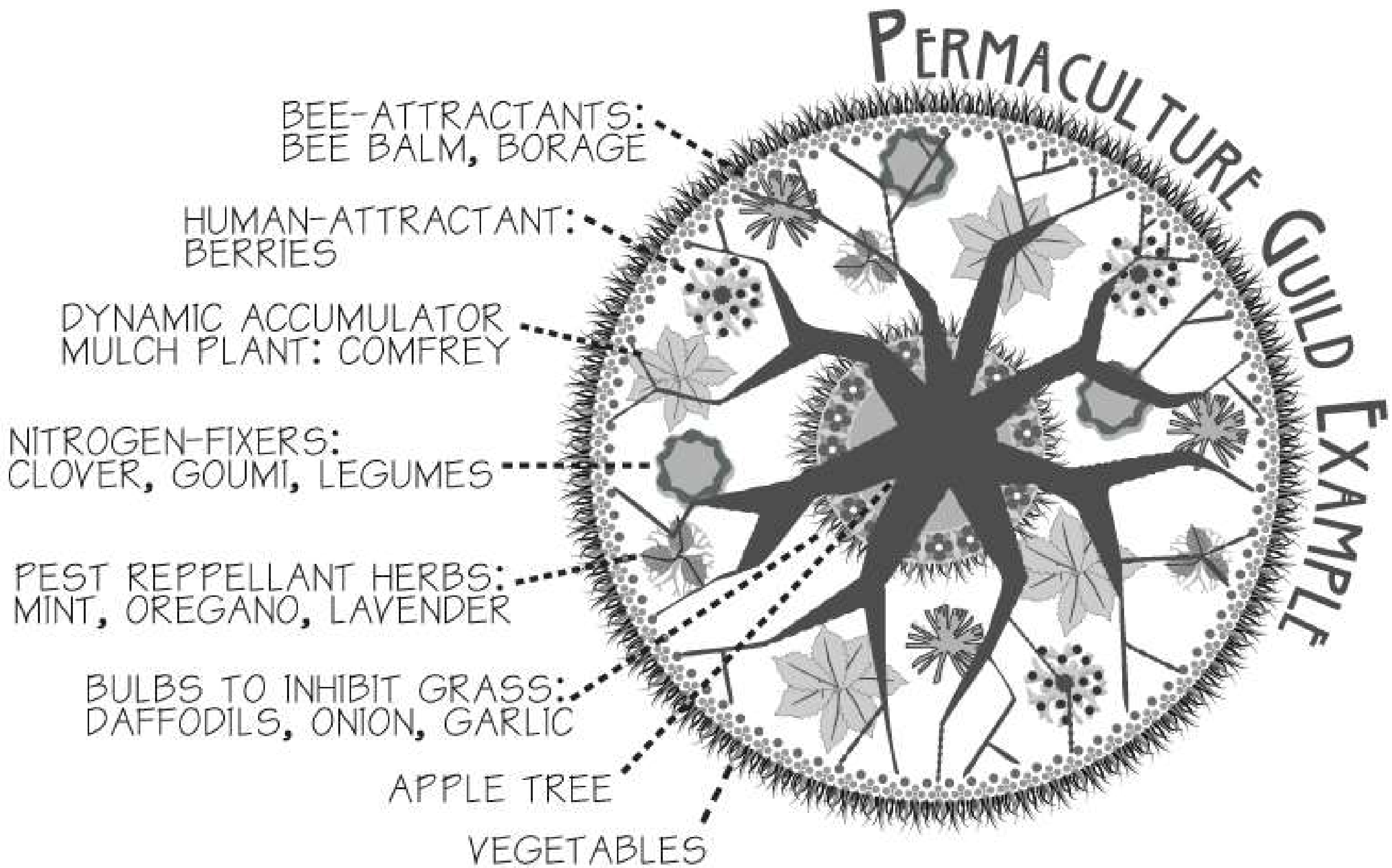


Edge Protectors

Pacing for Canopy Closure and Planning for Sun Exposure



Available light changes over the years



By planning maintenance:

- Plan for succession
- Protection from predation and destruction: humans, other mammals and insects
- Considering zone of use
- Considering maintenance resources
- Consider attractiveness

Forest Succession

Mature oak/hickory forest destroyed	Farmland abandoned	Annual plants	Grasses and biennial herbs	Perennial herbs and shrubs begin to replace grasses and biennials.	Pines begin to replace shrubs.	Young oak and hickory trees begin to grow.	Pines die and are replaced by mature oak and hickory trees.	Mature oak/hickory forest
		1–2 years	**3–4 years**	**4–15 years**	**5–15 years**	**10–30 years**	**50–75 years**	

Rich Northern Hardwood Forest is a quintessential Vermont forest type, dominated by sugar maple. White ash and basswood are common as well. Additional tree species that may be present include sweet birch, bitternut hickory, black cherry, yellow birch, hophornbeam, and butternut. American beech occurs locally, under specialized conditions and in older forests.
Limestone and marble bedrock in the Taconic Mountains weathers rapidly and provides important plant nutrients such as calcium and magnesium.

Soil biological succession causes plant succession

Bacteria …A few Fungi……Balanced ……..More Fungi…… Fungi

Bacteria:	**10 µg**	**100 µg**	**500**	**600 µg**	**500 µg**	**700 µg**
Fungi:	**0 µg**	**10 µg**	**250**	**600 µg**	**800 µg**	**7000 µg**

More Nitrate (type of nitrogen needed) More Ammonium

10% (percent of energy that plant puts below ground) 80%

Accelerated Forest succession

Conventional agricultural systems try to keep the the ground at the weed stage (annual plant stage) of forest succession by expending huge amount of energy in an attempt to try to reverse Nature's processes.

Ways to accelerate succession to a food producing forest:

- Using existing plants to build soil
- Introducing only hardy plants initially
- Raising the levels of organic matter in the soil artificially
- Substituting the plants of the forest succession stages with useful species that we choose

https://deepgreenpermaculture.com/permaculture/permaculture-design-principles/8-accelerating-succession-and-evolution/

Considerations: The desired point in succession may be before the transition to maturity where the canopy is not closed and the potential for food production is greatest.

Protection from predation and destruction: humans, other mammals and insects

Deer Fencing






Insect Protection

- Ideal conditions make healthier plants and healthier plants are less vulnerable.
- Established perennials are more resistant and resilient than annuals.
- Plant communication is better through healthier soil.
- Diversity of plants camouflages and distracts.
- Diversity of insects keeps anyone population in check.
- Plantings can be chosen to match the spot, to produce aromatic confusion, to support predatory insects

Considering zone of use

Zone 1

Zone 2 and Beyond

Consider Maintenance Resources

People - Time – Money

Source of Plants

Source of materials

People

- Who is going to do the work?
- How much time do you have?
- How much work can you do?
- What is going to keep you engaged and happy in your work?
- Can you afford to hire help?
- What kind of hired help is available?
- How can you attract more help?

Time

Time = people

Time = money

Time = good planning

Sources of Plants and Materials

Plants can be bought from nurseries

You can propogate them yourself

- Grafting
- Division
- Rooting
- Seeds

Materials can be bought or gathered

- Newspaper, cardboard
- Chips from road crews
- Other found and recycled ideas

Consider attractiveness

- Who is your audience
- What are your goals

It's a matter of goals and resources