

Shrub Steppe:

- Multi-faceted
- Specialized plants
- Life that it sustains



Shrub-steppe: Shrub-steppe is the largest natural grassland in North America. It extends from southeastern Washington and eastern Oregon, through Idaho, Nevada, Utah, into western Wyoming and Colorado.

Shrub refers to the most abundant plant species that grows in this biome.

"Steppe" is a Russian word that means a vast treeless plain.

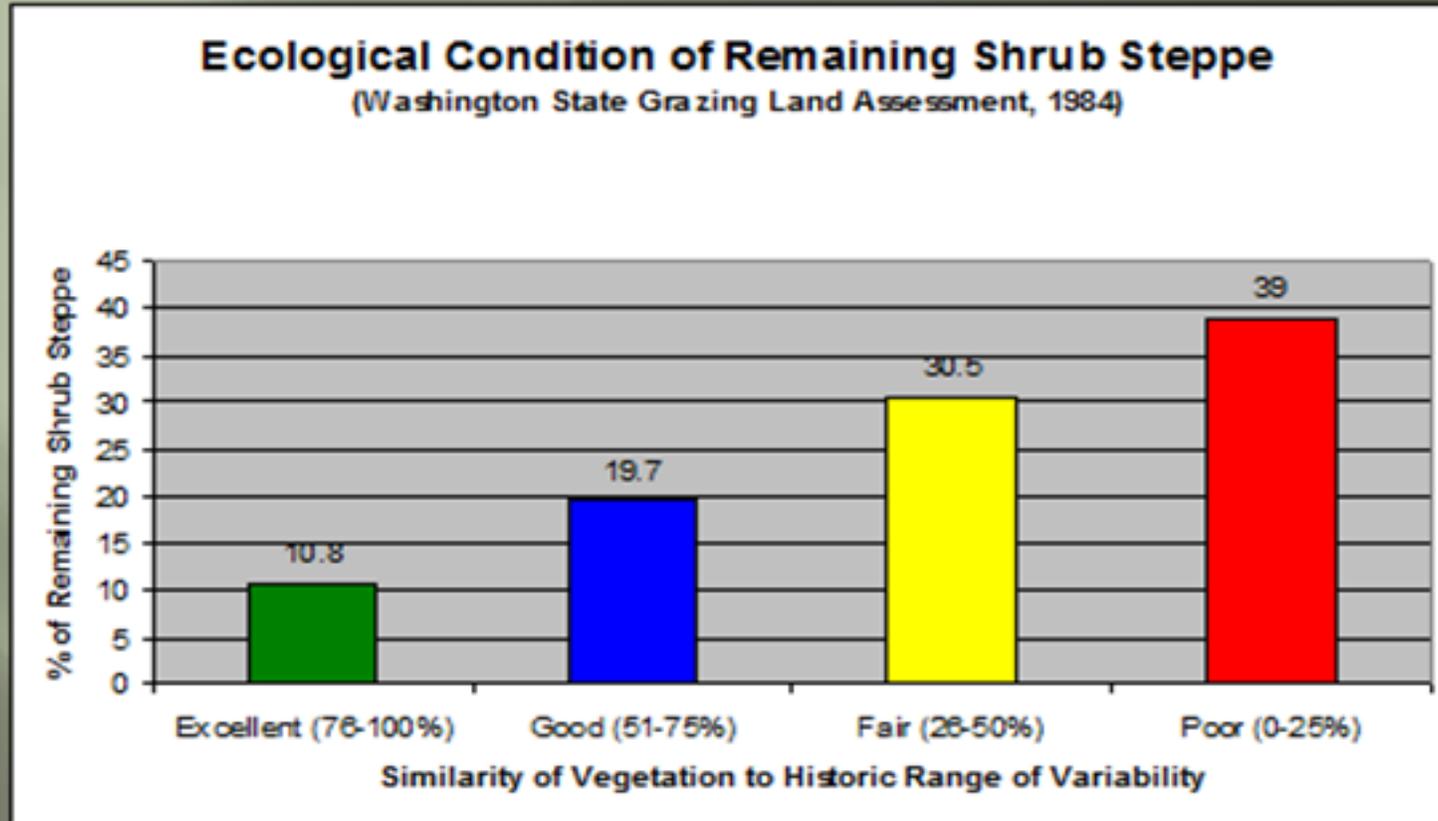
Shrub-steppe conditions in the Mid-Columbia Basin:
winters are cold and wet with strong winds and blowing snow.
Summers are hot, and dry then cool at night.

Annual rainfall is about 7-10 inches in Yakima area.

Shrub-steppe in bloom in spring.



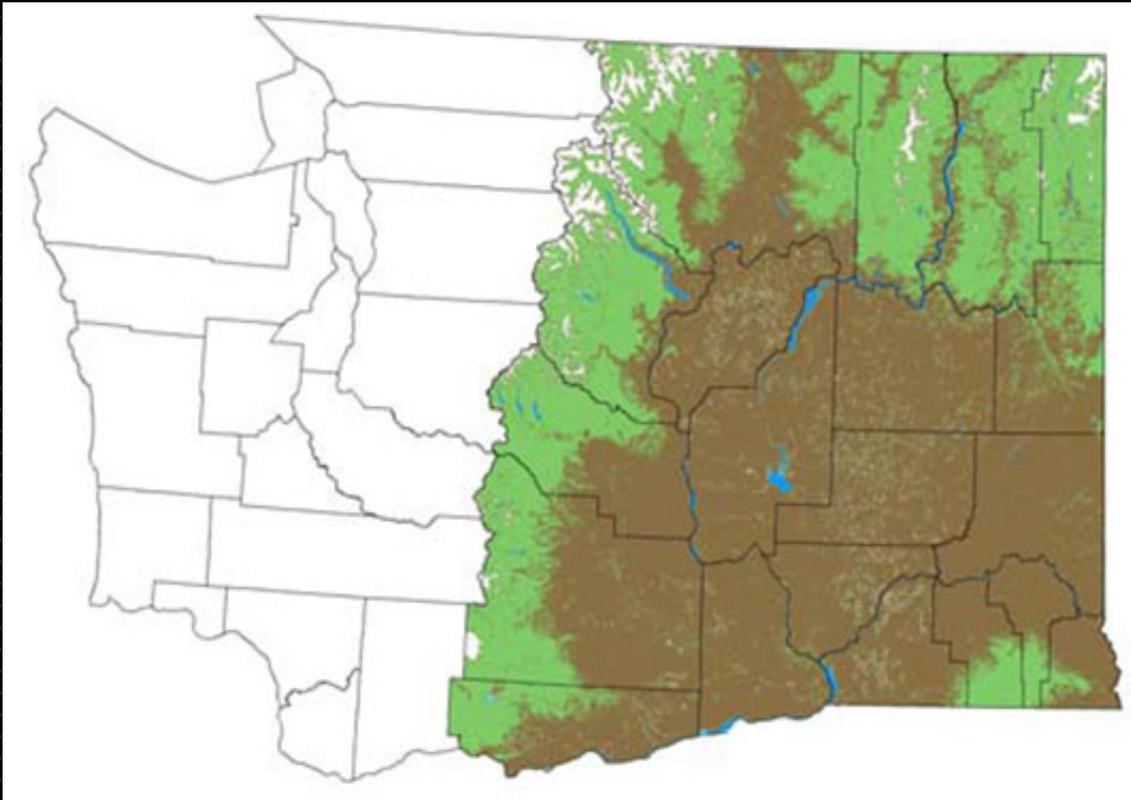
1984 Graph of Ecological Condition of Remaining Shrub-Steppe.



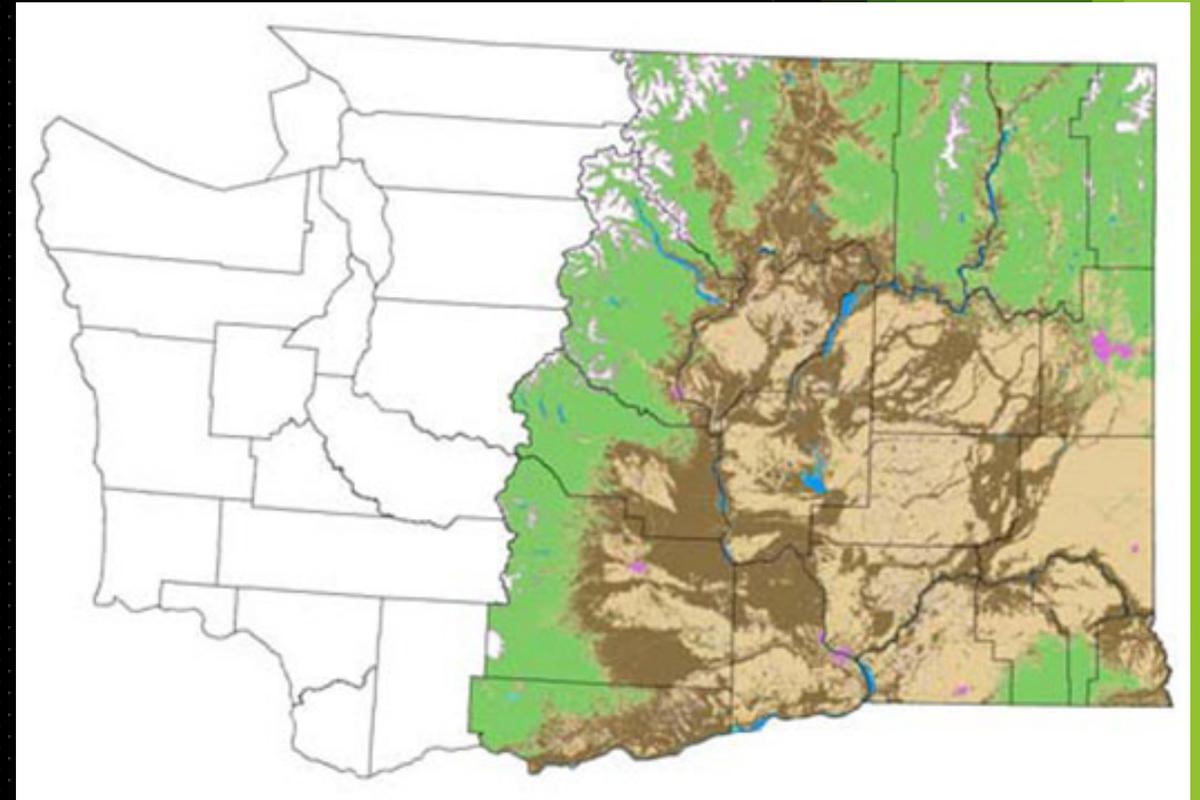
Shrubsteppe/steppe habitats in eastern Washington.

Green = Forest Brown = Shrubsteppe Tan = Cropland.

Historic Shrubsteppe/Steppe



Current Shrubsteppe



Loss of the original Shrub-Steppe is approximately 90% in the Yakima area, which magnifies the value of what is left.

Past: Shrub-Steppe looked at in a utilitarian way, land replaced with agriculture.



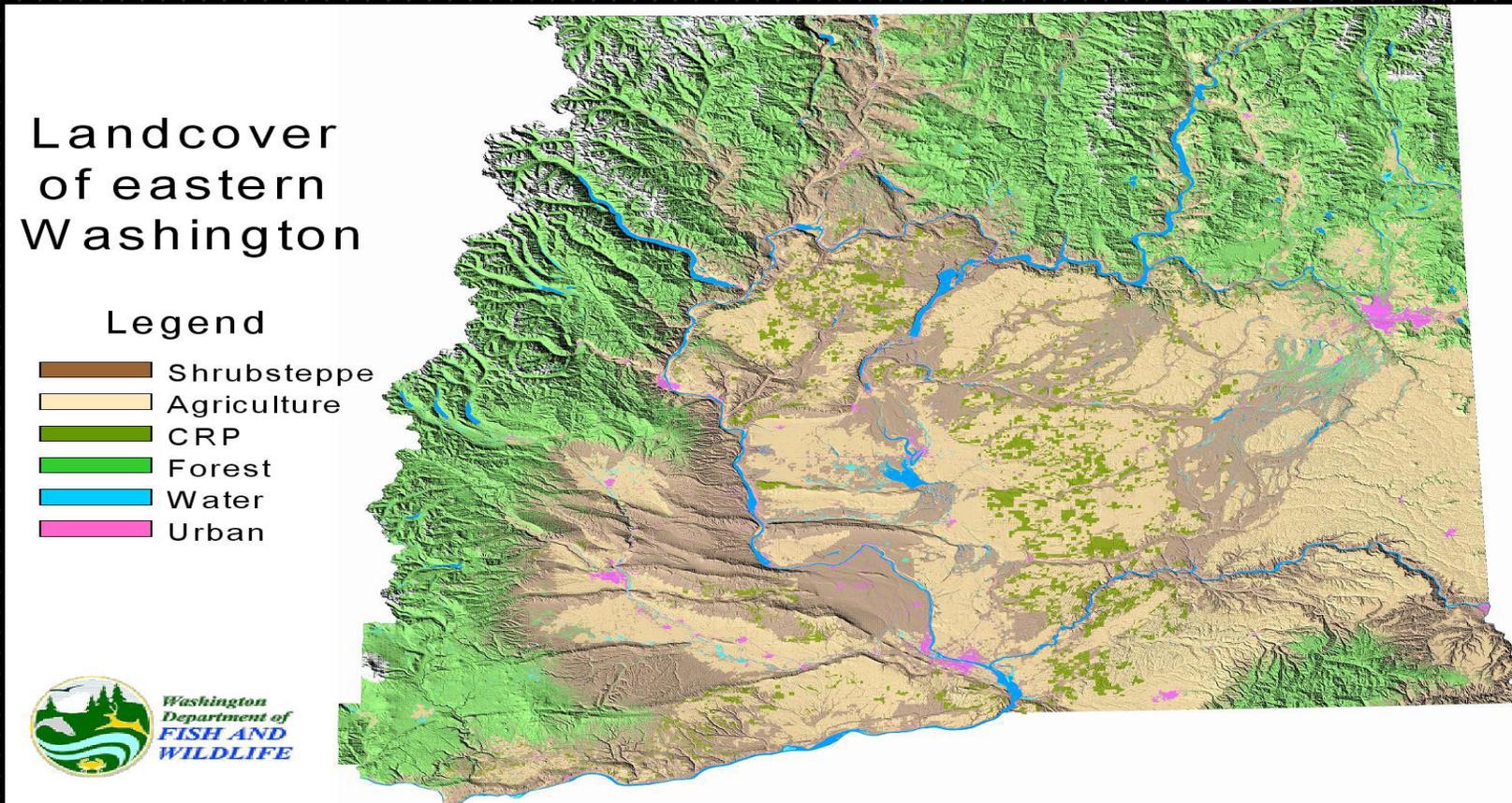
Future: Agriculture with Permaculture planning, Native Plants, and backyard habitats.



State of the Shrub-steppe throughout eastern Washington.

- The shrub-steppe is an endangered ecosystem.
- About 12% of a functional shrub-steppe ecosystem remains.
- At least 80% of the shrub-steppe has been reduced, fragmented, degraded.
- What remains has been substantially altered.
- It is an endangered ecosystem. It is estimated that less than 15% remains.

Aerial drawing from 2000 showing land uses & distribution.



- Brown = Shrubsteppe Green = Forest Pink = Urban
- Tan = Agriculture Blue = Water Hunter = CRP

Native Soil is Cryptogamic: The soil is a conglomerate of biological organisms together in intimate association comprised of cyanobacteria, algae, microfungi, lichens, and bryophytes. Cryptogamic: from the Greek *kryptos*, meaning "hidden," and *gamos*, meaning "marriage," and reproduces by spores.

▶ ROLE OF LICHENS

- ▶ Classified as a fungus
- ▶ Established by symbiosis
- ▶ Forms a partnership with algae/bacteria-cyanobacteria
- ▶ Up to 18,000 species of lichen/fungi
- ▶ Fungi are Ascomycetes
- ▶ Resistant to drought/quickly rehydrate
- ▶ Algae/cyanobacteria photosynthesize food for lichens, lichens provide protection.

▶ ROLE OF MOSSES AND ALGAE

- ▶ Blue-green algae/Cyanobacteria.
- ▶ Green Algae/Chlorophytes contain photosynthetic chlorophyll produce/store food.
- ▶ Algae are autotrophic producing compounds that sustain life.
- ▶ Mosses/Bryophytes absorb nutrients, moisture from the air.
- ▶ Have leaf-like structures for photosynthesis.
- ▶ Together Lichens, Algae, & Mosses can survive harsh conditions.

Images of what the Cryptogamic soil crust. The various organisms can be various shades of yellow, orange, red, and black.



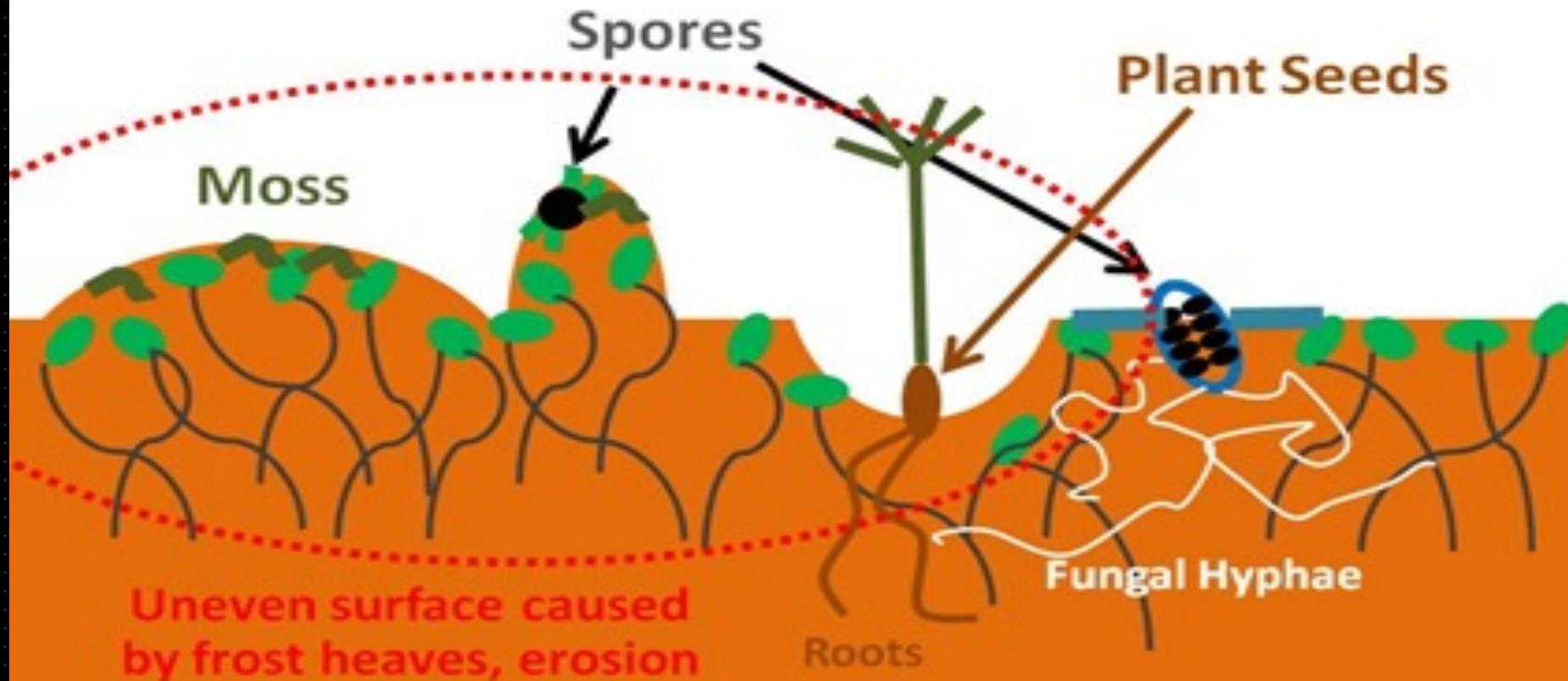
Plants and grasses benefit from cryptogamic soils.



Illustration of Cryptogamic soils.

Crypto- Soil Crust 4

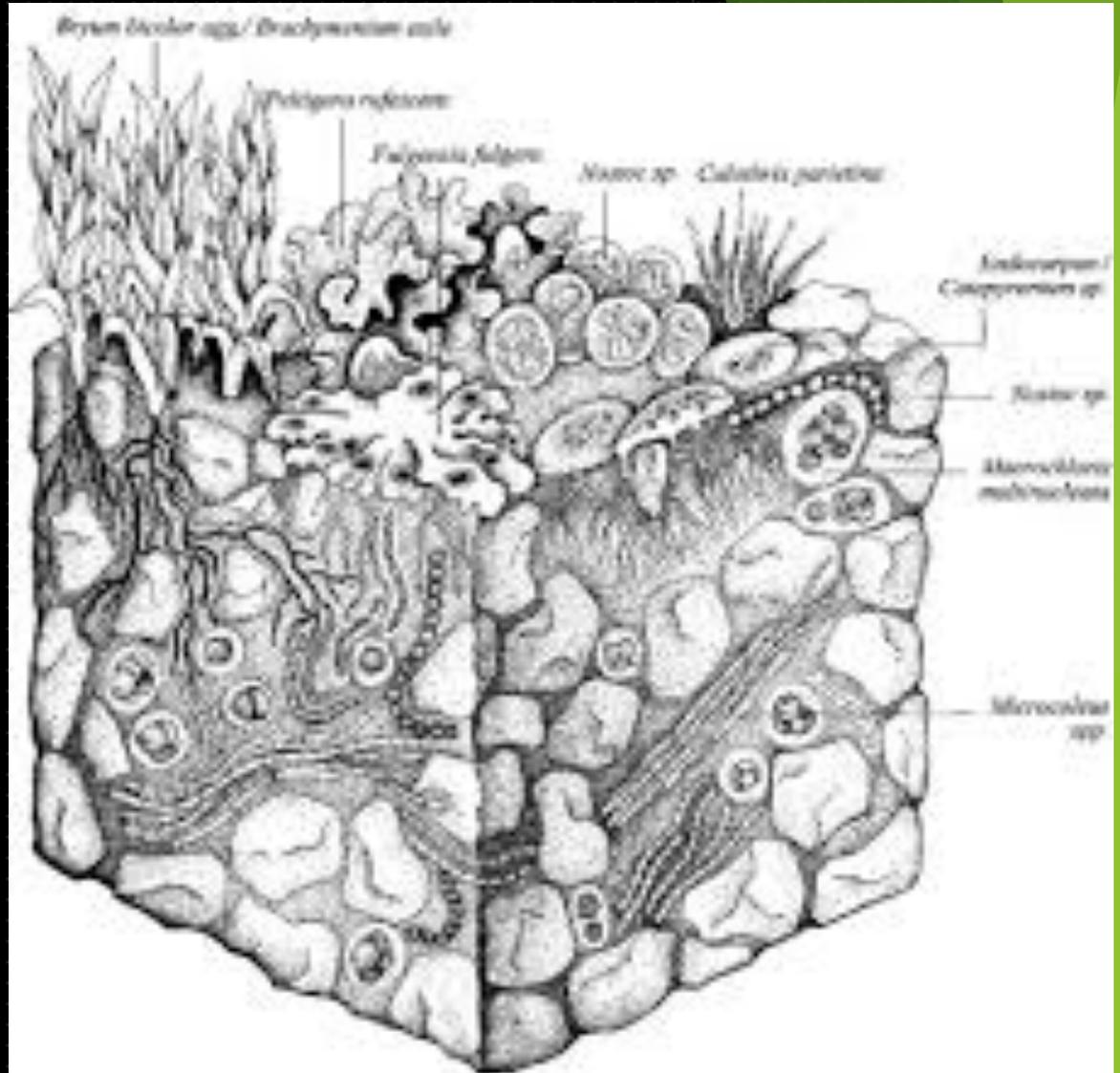
Stabilized soil allows mosses, fungi, lichen, plants to root, further strengthening structure



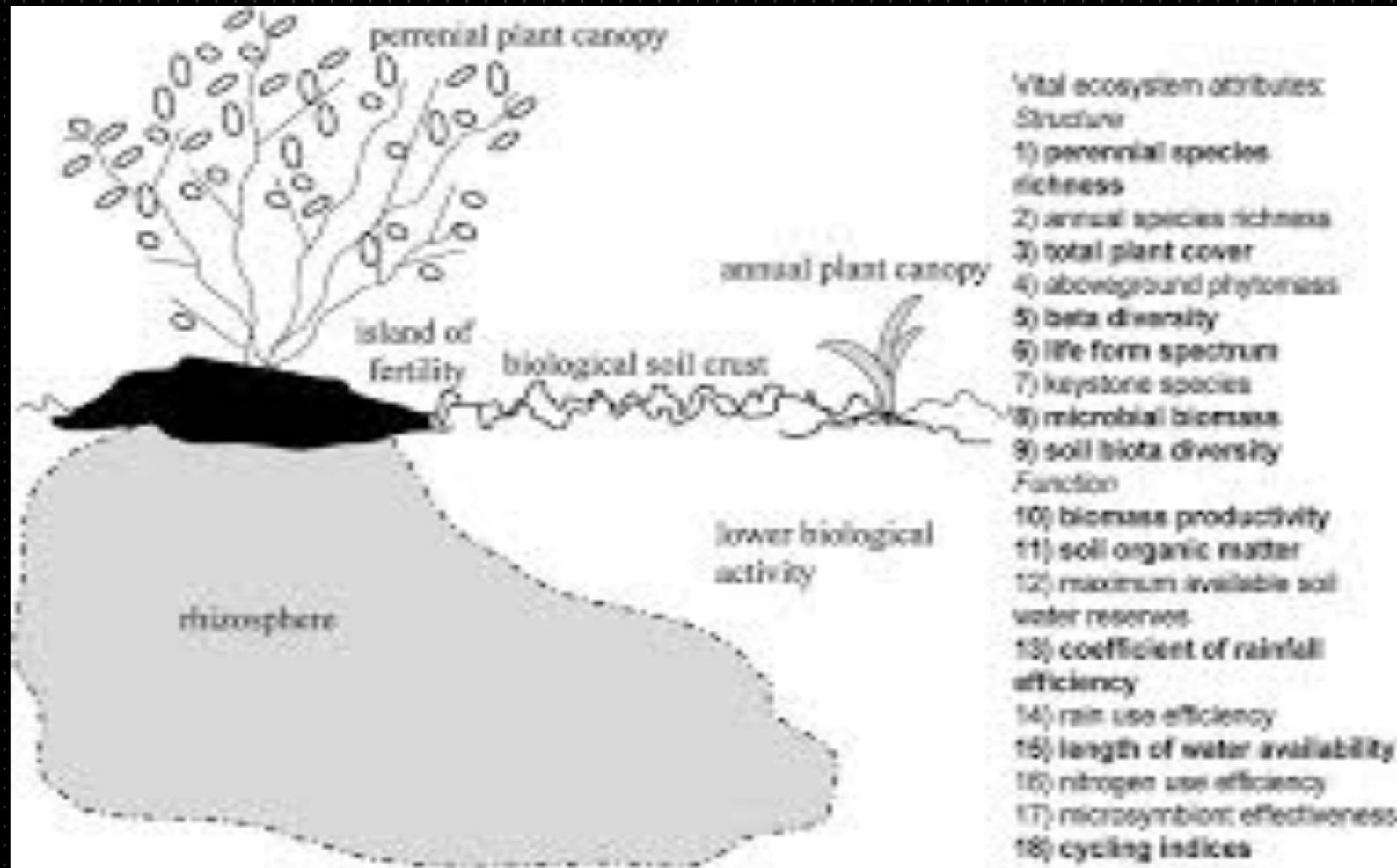
Cryptobiotic soil crust is most vital in the first 4mm.

Cryptogamic crust provides:

- Soil stability from wind & water erosion.
- Carbon fixation.
- Nitrogen cycle.
- Seed germination & plant growth.
- Aids in plant soil/water interactions.
- Increase water retention.
- Increase Nitrogen levels.
- Bind minerals into usable forms.



Cryptobiotic soil, once disturbed will degrade quickly.
It is possible to restore areas not badly degraded.
Some experiments with soil inoculation have been successful.



The shrub-steppe ecosystem is endangered.

It is disappearing, and we are pushing the sagebrush ecosystem at the edge of extinction in our area. We have options. In a word “Permaculture.”

Permaculture:

There are 12 permaculture design principles which are tools. When used together, help us to creatively re-design our environment and our attitudes to the natural world.

Is a system of agriculture, water management, and design principles centered around simulating or directly utilizing the patterns and features observed in natural ecosystems.

We Have A Choice!



Permaculture Considerations

- ▶ Observation of the land layout, and the natural system in place.
- ▶ What climate profile does the property reside in?
- ▶ What is the landscape profile?
- ▶ Where does the water come from and how does it leave?
- ▶ Observe patterns and systems.
- ▶ Learn about your region.

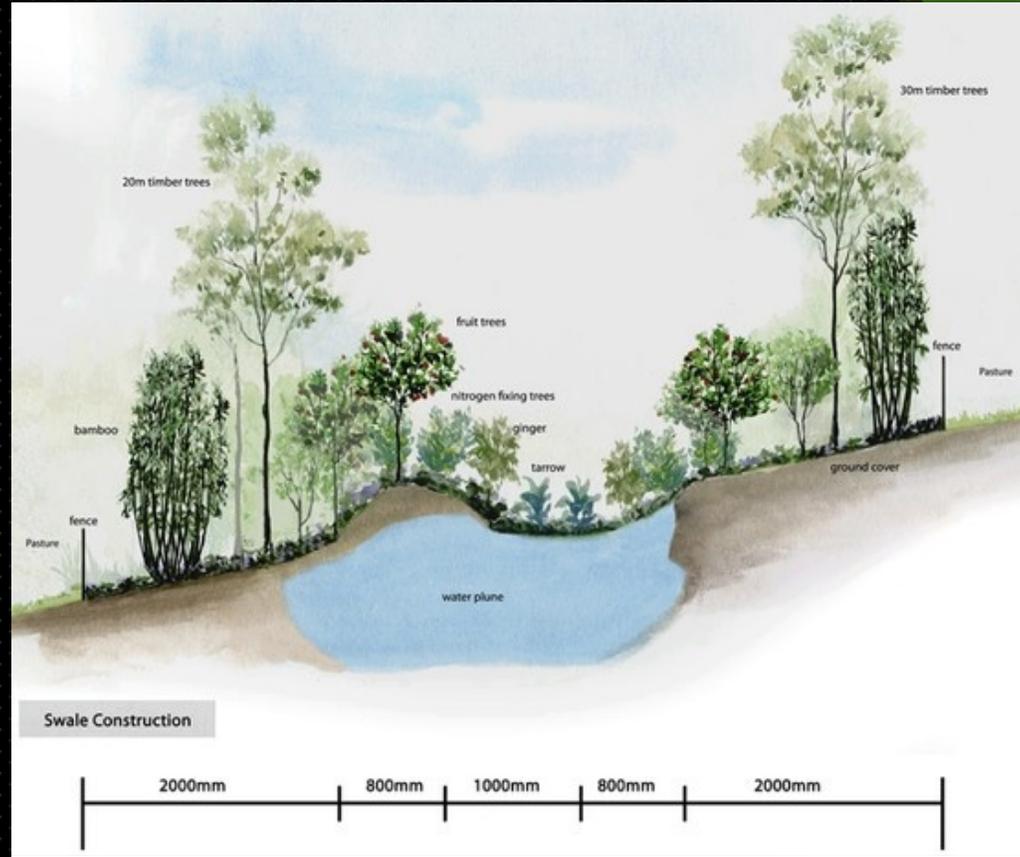
Permaculture Design helps to conserve water, improve land use, and increase productivity.



Some Permaculture Principles

- ▶ Design from natural patterns, and details.
- ▶ Integrate systems; develop a plan that benefits multiple systems.
- ▶ When we get the placement right, the beneficial relationships will be maximized as we continue to increase their function.
- ▶ Find the “leverage points” in the system and intervene there. It is where the least work accomplishes the most change.
- ▶ Use and Value Diversity; polyculture proven to be productive.
- ▶ Use edges and value margins; It is the edge in natural living systems that contain the largest amounts of biodiversity, and biomass.

Swales: Can be created in various ways to hold water.



Terracing: Great for sloped land.



Research the various types of permaculture designs that may work for your property.



Native plants of eastern Washington have evolved for thousands of years along with the native soils, microorganisms, insects, and animals. They have adapted to the climate, of the eco-region where they are found.



Native plants are a source of food, shelter, and breeding habitat for many species of animals, delightful birds, and beneficial insects. Native plants will thrive with minimal care, provide seasonal color, and variety of textures, and add to your garden a natural look.

Native Plants have evolved to thrive and lack uniformity or predictability of nursery stock.

- ▶ Native shrubs can be pruned and trained.
- ▶ Not very tolerant of conditional changes.
- ▶ Get out and observe natural habitat and placement of native plants.
- ▶ Knowing which like plants to be near each will benefit your plants.

In our semi-arid climate a good majority of native plants bloom from early spring to summer with, but there are some that bloom in the fall.

- ▶ A consideration is if the winter is particularly dry to moisten the ground weekly.
- ▶ Most native plants will die with over watering.
- ▶ If your plants are in a southern hot exposure they will benefit from a little water.
- ▶ Light watering may extend the flowering of some varieties of shrubs/plants.

Many varieties of native forbs can be propagated by seed. Propagation soil should be a mix of fine gravelly native soil and a small amount of a quality seed starter mix of medium fertility. In general most native forbs don't survive be dug up and transplanted.

▶ Best Forbs for Propagation

- | | |
|--------------------|--------------------------|
| ▶ Penstemons | Milkweed |
| ▶ Lupine | Scarlet Gilia |
| ▶ Blanket Flower | Violets |
| ▶ Brown-Eyed Susan | Columbine |
| ▶ Golden Rod | Sage |
| ▶ Asters | Monarda |
| ▶ Yarrow | Fleabane |
| ▶ Buckwheats | Oregon Sunshine |
| ▶ Phlox | Nodding Onion |
| ▶ Vetch | Bitterroot |
| ▶ Larkspur | Native Lilies (Mariposa) |



Designing Beneficial insect habitats.

- Diversity of wildflower selection.
- Habitat should be close to target crop.
- A no spray zone.
- Native plants low moisture, and fertilizer needs.
- Plant large grouping of individual varieties.
- Use various textures, colors, and sizes.
- Pollen, and nectar provide a source of food for beneficial insects.
- Prepare site by removing other non-natives, aggressive weeds, and grasses.

Toppenish community garden native plant border with Blanketflower, Western Aster, Lanceleaf Coreopsis.



Native grasses more drought tolerant than mixes which do not contain native varieties. Grasses are an important food source for birds and small animals.

Native Grasses

- ▶ Bluebunch Wheatgrass (tolerates light shade)
- ▶ Idaho fescue (needs north facing area, or shade from hot noon sun)
- ▶ Red Three-awn (plant with Bluebunch Wheatgrass or other native grasses for restoration projects.)
- ▶ Blue Gamma (low growing alternative to standard lawn grass.)
- ▶ Buffalograss (another low growing alternative to lawn grass that can be planted with Blue Gamma.)
- ▶ Junegrass (once established only needs water during extended hot periods.)



Native Shrubs



Native Trees



Insectary Plantings of Perennial Wildflowers Shrubs & Trees to Welcome Butterflies, Bees, and Beneficial Insects.

Hedgerows:

- Rows of small trees, flowering shrubs, with a grass/forb understory planted at the edges of agriculture.

Insectary strip:

- Bring beneficial insect habitat into the crop field.

Native plant borders:

- Surround the farm with beneficial biodiversity.



Conclusion

- ▶ Get out and re-discover the Shrub-steppe, it is a unique eco-system.
- ▶ Spring is the best time to see some of the jewels that are hidden.
- ▶ Observation will teach you about ideal plant placement, and the companions of plants.
- ▶ Bring a notebook, and a camera!

Nurseries

- ▶ Plants of the Wild
- ▶ Fourth Corner Nurseries
- ▶ L & H seeds
- ▶ BBB seed
- ▶ Yakima County Conservation District
- ▶ Derby Canyon Natives
- ▶ Wildlands Nursery

Resources

Native Plant Resources:

- ▶ Pollinator Partnership Native Plant Regional Guide
- ▶ Washington Native Plant Society.org
- ▶ www.bentler.us/easternwashington/plants
- ▶ plants.usda.gov (plant database)
- ▶ NRCS Washington Native Plant Guide
- ▶ Xerces Society
- ▶ Yakima Conservation District

