

The Lands Council presents...



## **Watershed Restoration in the Inland Northwest**

*A presentation by Amanda Parrish*  
**WATERSHED PROGRAM DIRECTOR**

# Who is The Lands Council?



Environmental Non-Profit  
Spokane, WA

*We preserve and revitalize Inland Northwest forests, water, and wildlife through advocacy, education, effective action, and community engagement.*



*We collaborate with a broad range of interested parties to seek smart and mutually respectful solutions to environment and health issues.*

# Programs by The Lands Council

Forest & Wildlife Watch

Project SUSTAIN

Coal & Oil Campaign

Green Sleeves

Beaver Solution

Stormwater Improvement

Watershed Restoration



# Riparian Restoration Techniques

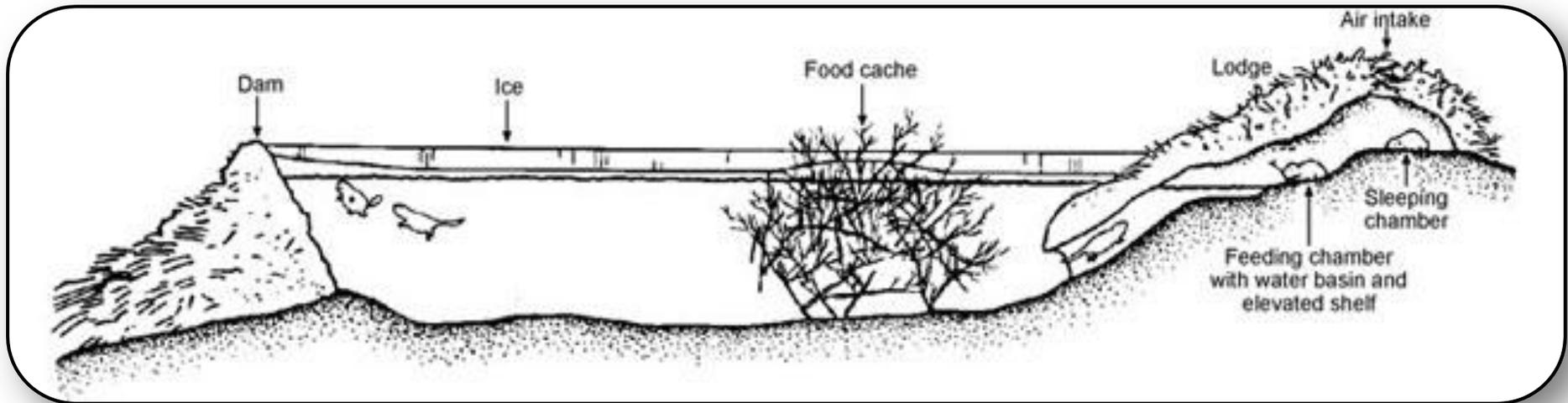


Re-establishing native  
vegetation



Hydrologic/geomorphic  
changes

# Why Beavers Build Dams



# Beaver Ecology Basics

- Store spring runoff and releases in late-season
- Cool stream temperature by storing water as groundwater
- Filter water of sediment and pollutants
- Sediment aggradation can restore floodplain connectivity in incised channels
- Recruit hydric vegetation and create wetlands
- Provide habitat for fowl, amphibians, semi-aquatic mammals, and more
- Slowed flows provide habitat for fish rearing

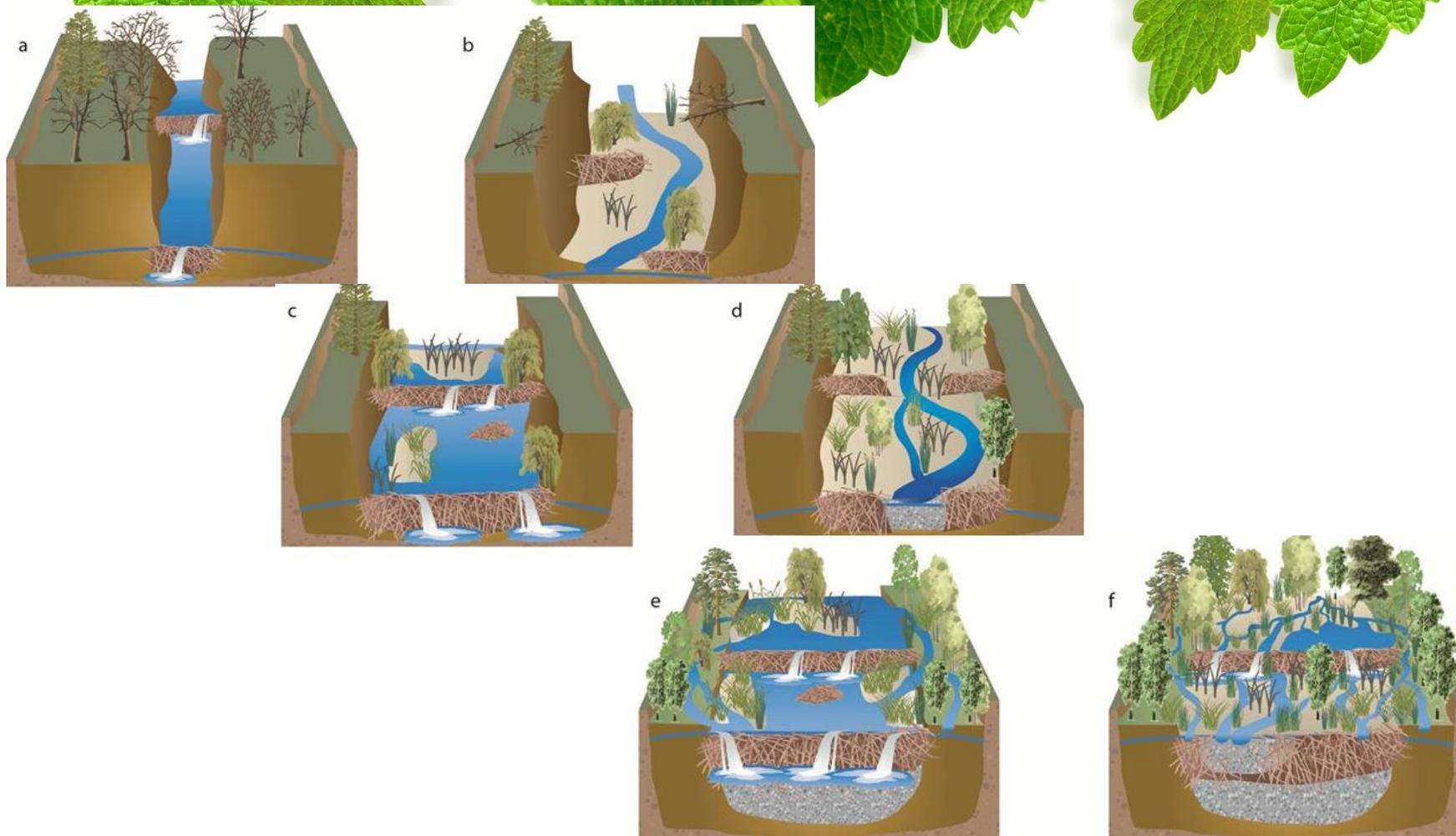


# Beavers and Water Storage

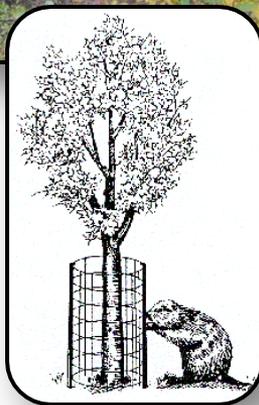
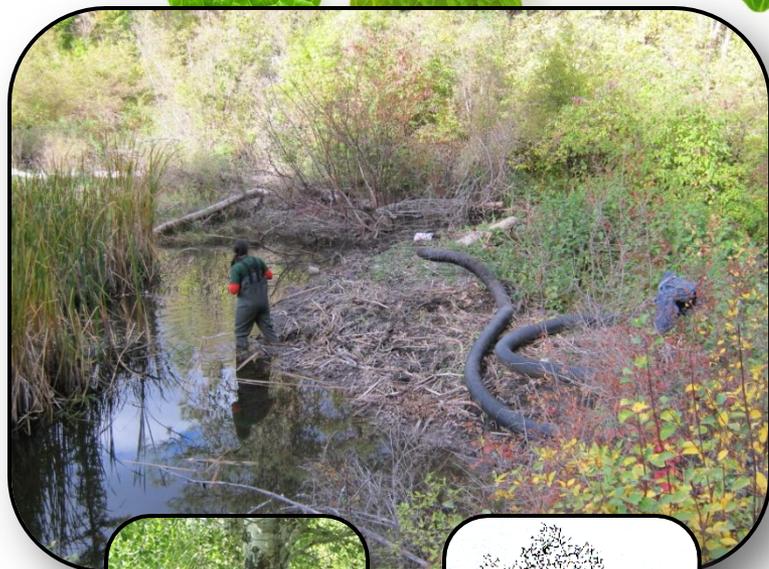
- Glynnis Hood, Suzanne Bailey. *Beaver mitigate the effects of climate on the area of open water in boreal wetlands in western Canada, 2007.*
- Used aerial photographs and climate data over 54-year period (1948-2002)
- Presence of beaver associated with 9-fold increase in open water
- 1950, no beaver, 4<sup>th</sup>-driest year with 47% more precipitation than 2002, driest year on record. 61% less open water in 1950 than 2002 when beaver were present
- Concludes “[beaver] removal should be considered wetland disturbance and should be avoided.”



# Beaver Dams and Sediment



# Beaver Management Techniques



**Goal:** keep existing beaver populations where they are  
**Strategies:** mitigate damage caused to roads and private land  
**Case study:** S Boyles et al. *An analysis of the efficacy and comparative costs of using flow devices to resolve conflicts in beavers along roadways in the Coastal Plain of Virginia*, 2008. Transportation dept. saved \$8.37 for every \$1.00 spent to install, monitor, and maintain flow devices

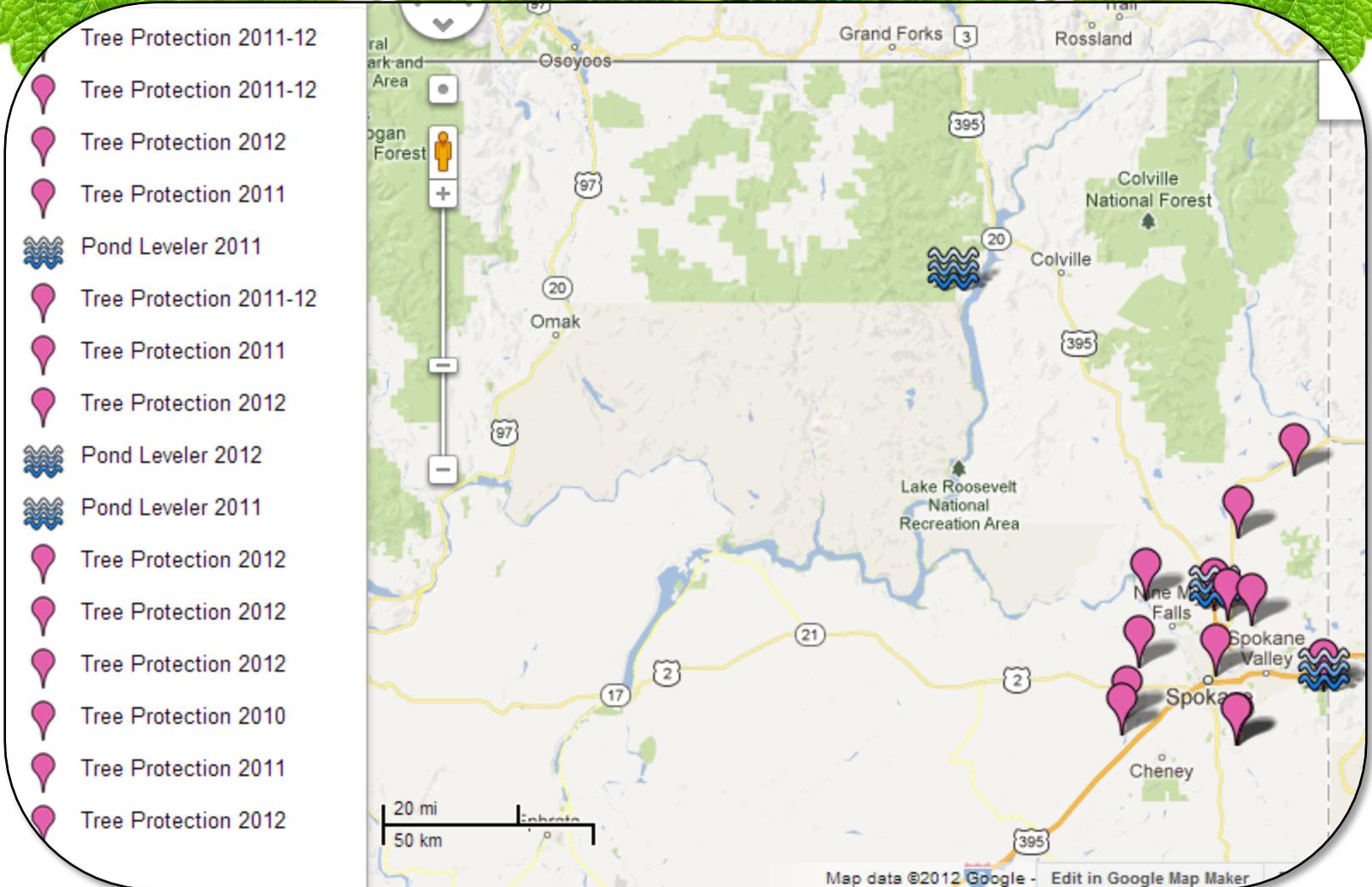
# Beaver Management Techniques



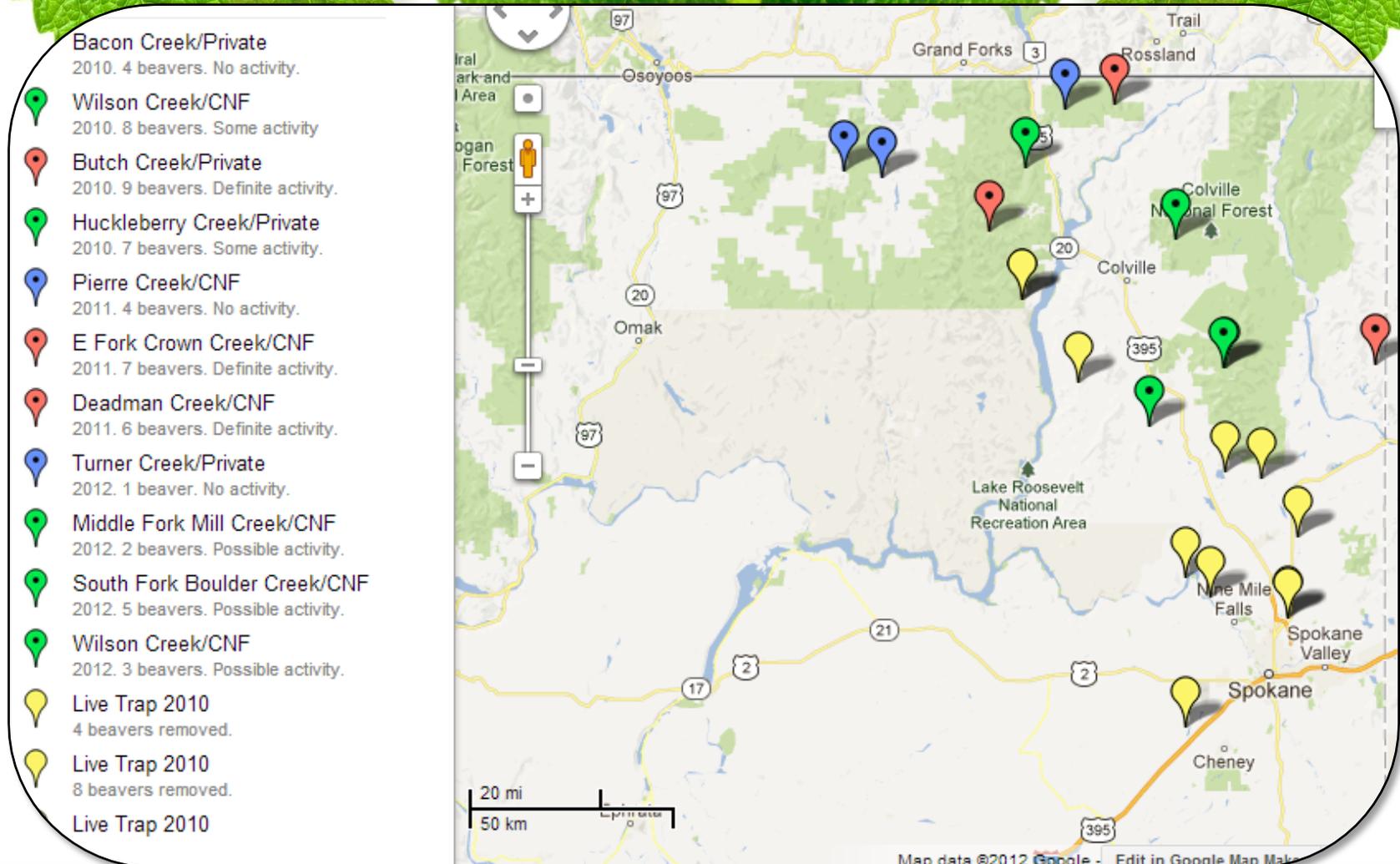
**Goal:** relocate “nuisance” beaver families to appropriate watersheds

**Accomplishments:** in 2010-12 relocated 11 families, 58 beaver total, to private property and Colville Nat’l Forest

# Beaver Management Devices



# Live-Trap and Relocation Sites





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# Riparian Restoration Techniques



Re-establishing native  
vegetation



Hydrologic/geomorphic  
changes

# Riparian Ecology: Water Improvement

## **Erosion Reduction**

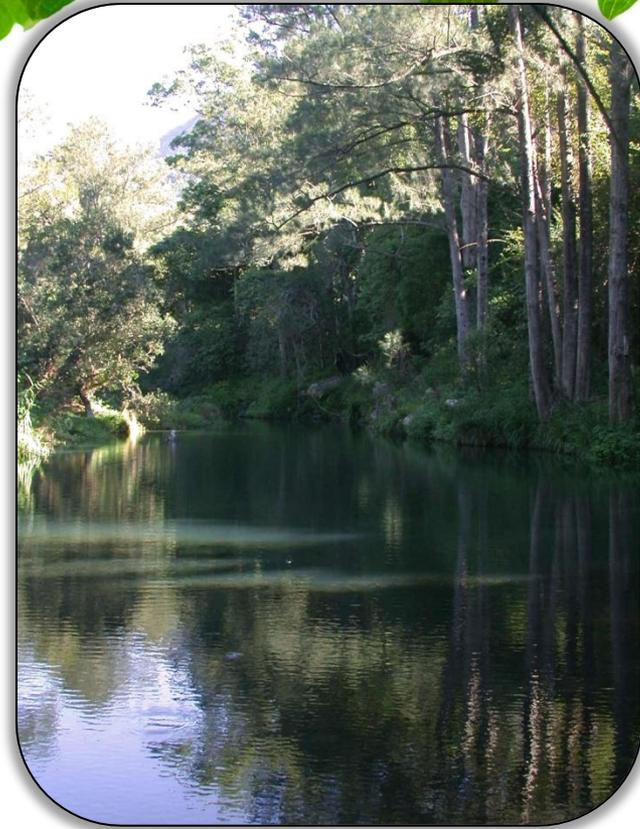
*Pollutants such as heavy metals and excess nutrients, like phosphorous and nitrogen from fertilizers, bind to sediment*



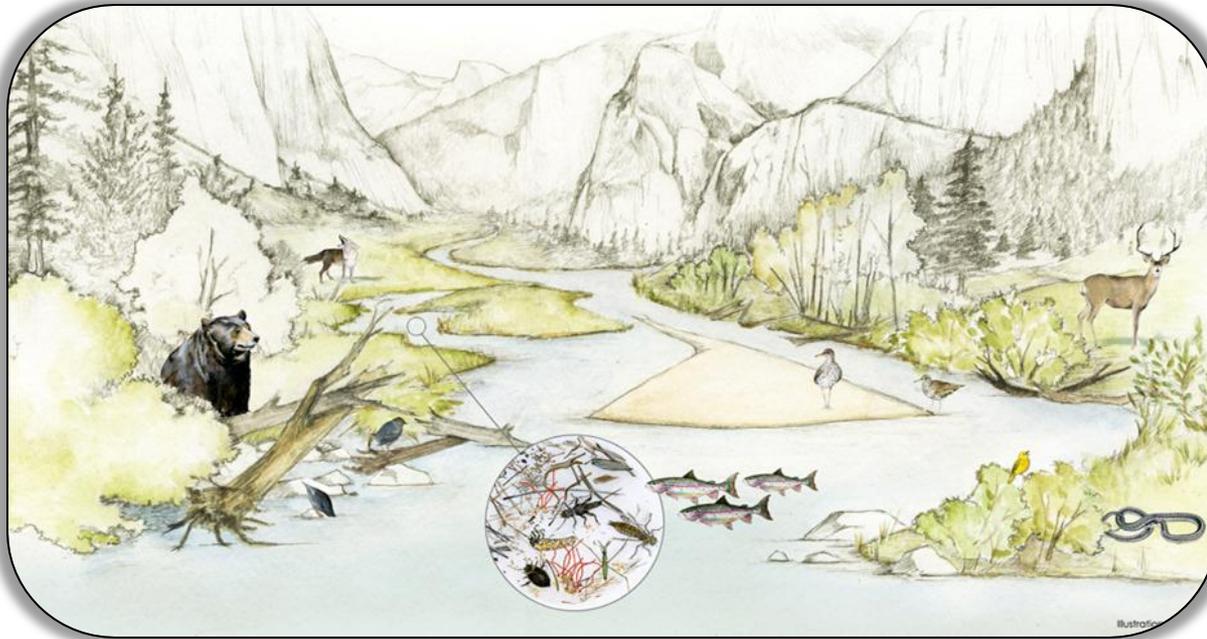
# Riparian Ecology: Water Improvement

## **Temperature Reduction**

*Trees provide shade which regulates and lowers water temperature. Temperature dictates amount of dissolved gas in water, which affects fish habitat*



# Riparian Ecology: Habitat Improvement



- Up to 86% of NW wildlife species utilize riparian zones
- Provides “wildlife highway” corridors
- Provides protective cover for drinking water
- Provides spawning and rearing habitat

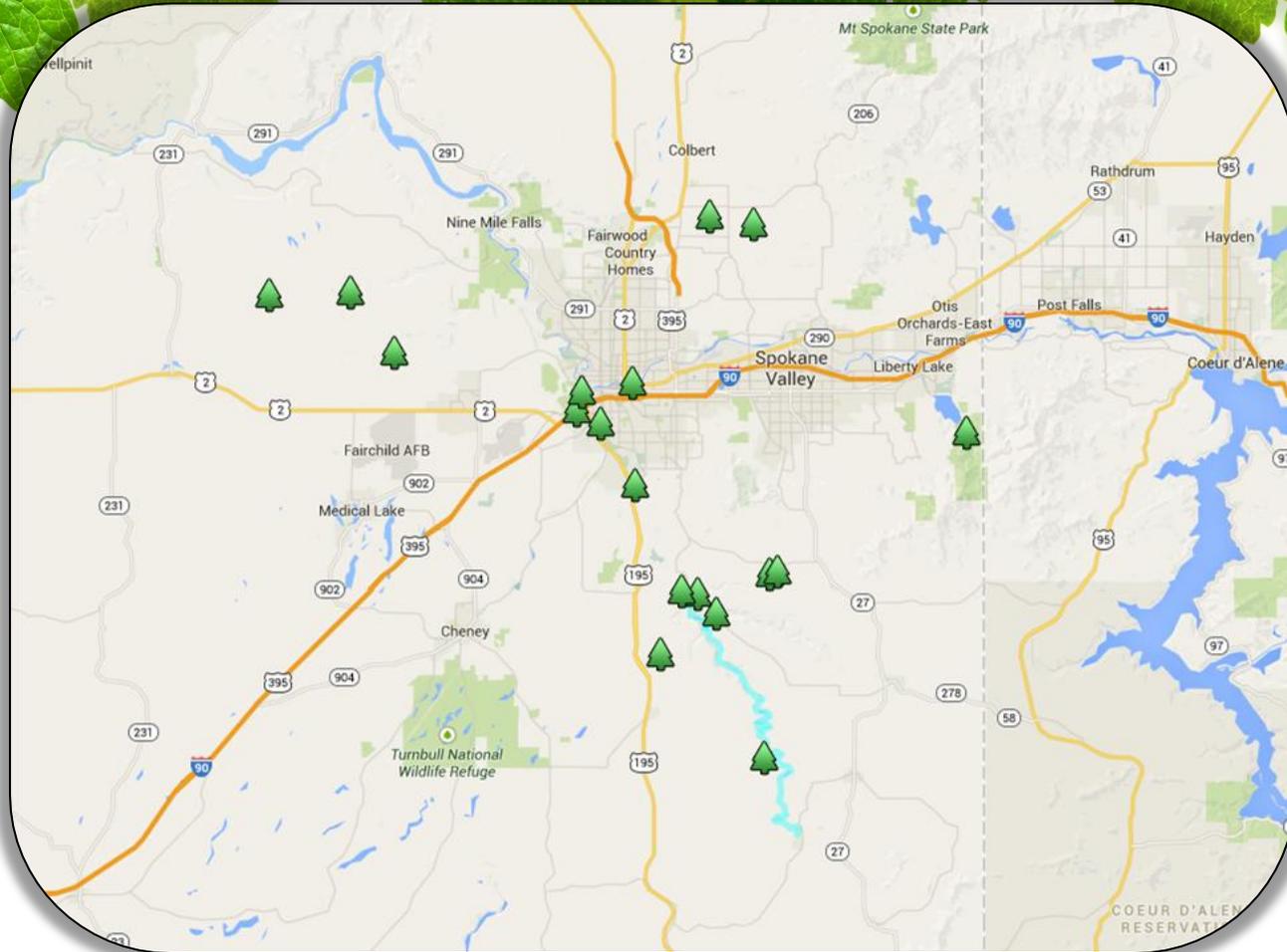
# Riparian Restoration Philosophy



- Low cost
- Low tech
- Collaborative



# Restoration Sites



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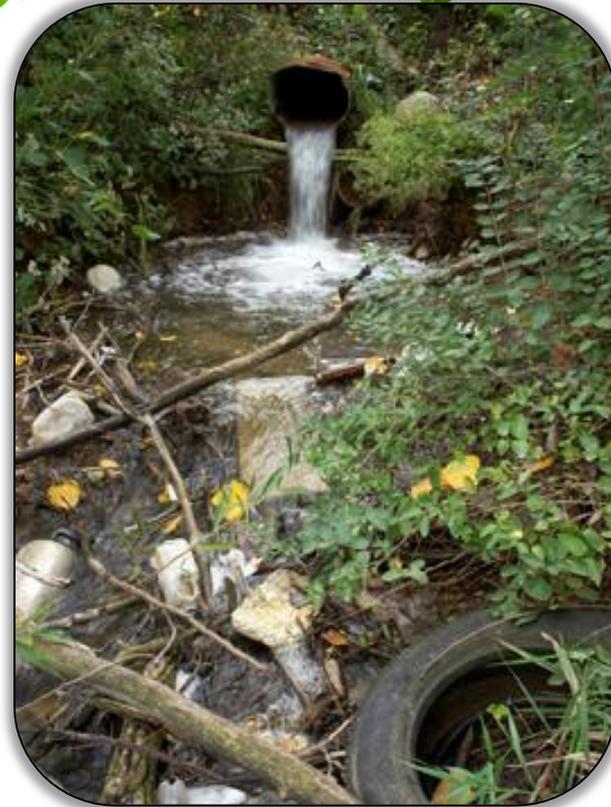
# Stormwater



**Stormwater** is water that originates precipitation events and snowmelt. The runoff often ends up in nearby streams, rivers, and other water bodies.

# Stormwater Pollution

- Sediment
- Excess nutrients
- Bacteria and pathogens
- Debris
- Household hazardous waste

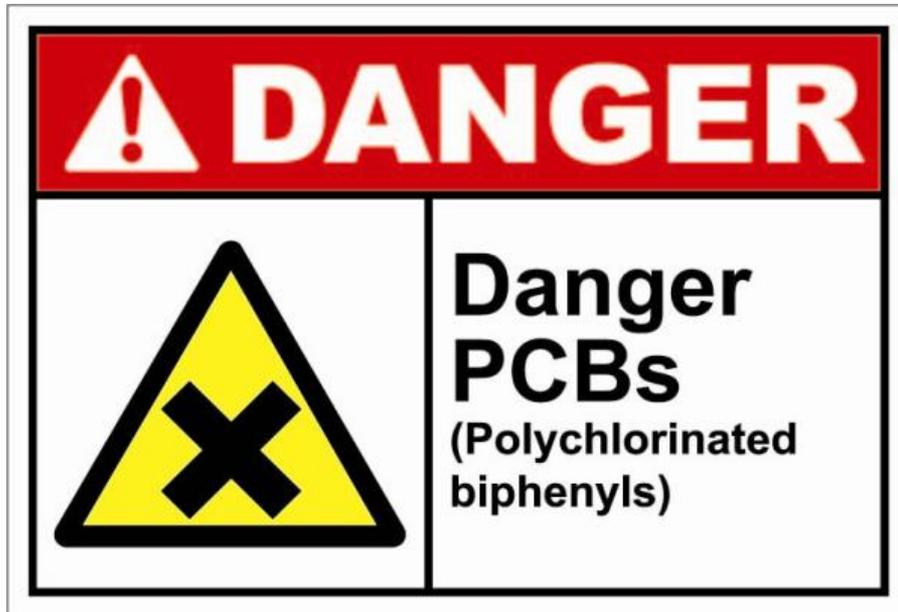


# Stormwater in Spokane

Combined Sewer Overflows (CSOs) v.  
Municipal Separate Storm Sewer System

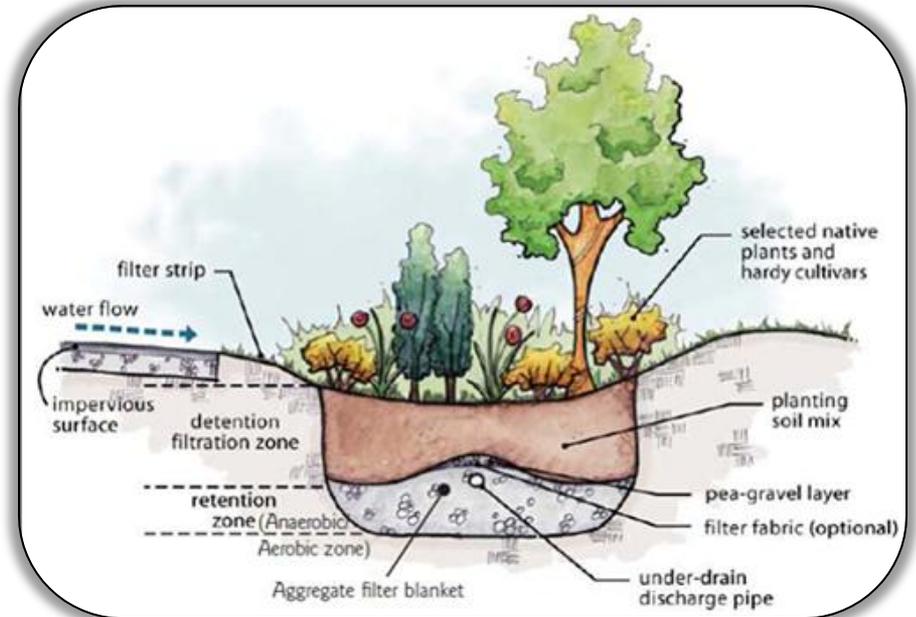


# Stormwater and PCBs



- Chemicals still found in products like paint, caulk, lighting ballasts
- Hazardous to health, especially for children
- Eaten by fish and then accumulate in fish tissue

# Storm Gardens



# Biochar Production

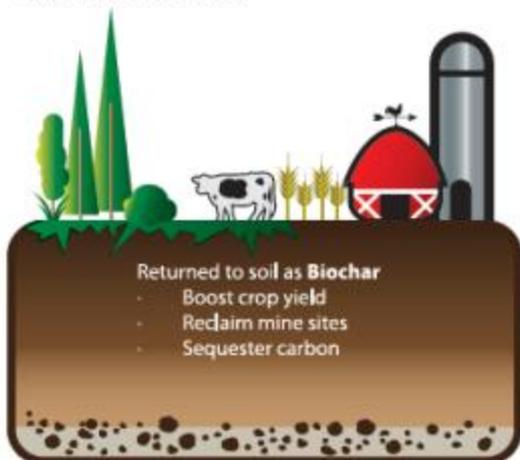
## Alberta Biochar Program

The Alberta Biochar Program works to enable the deployment of biochar for the benefit of Alberta, through:

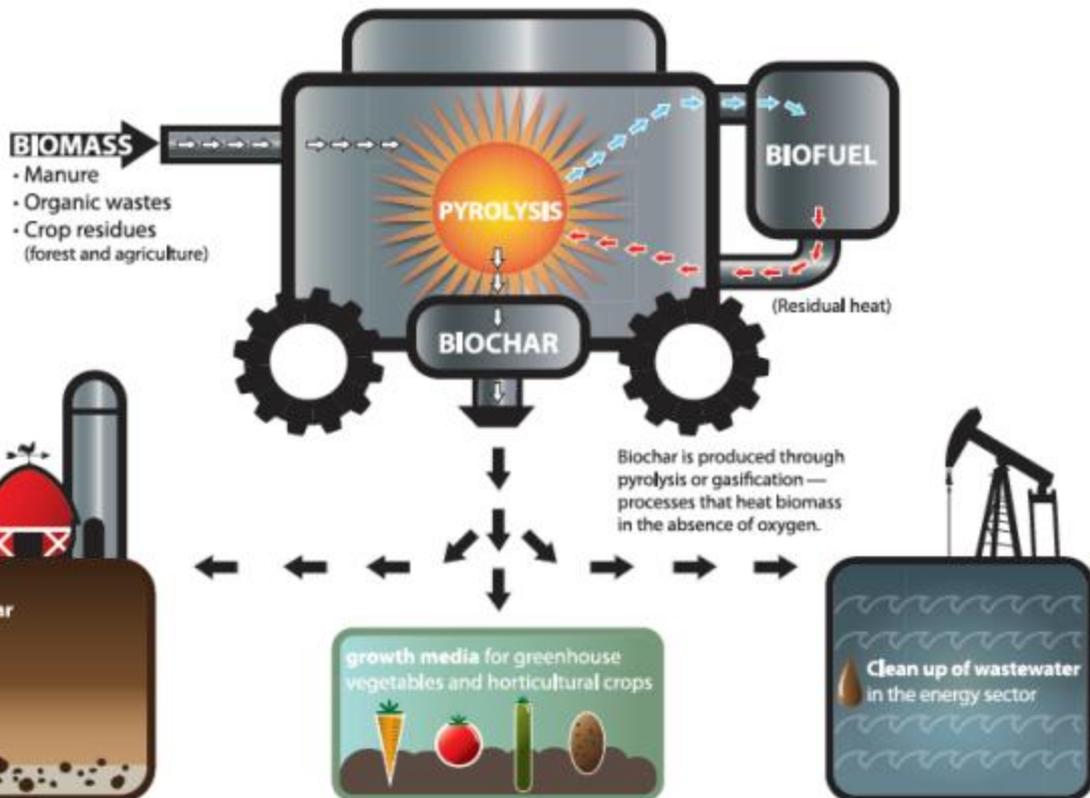
**R&D:** biochar is a green, clean platform technology with great potential for reducing greenhouse gases and improving soil.

**Regional Networking:** engages research and academic institutions, entrepreneurs and small-medium enterprises in rural Alberta.

**Local development:** providing expertise, resources and equipment to develop and demonstrate biochar products, applications and technology.



## How biochar is made, and its potential applications



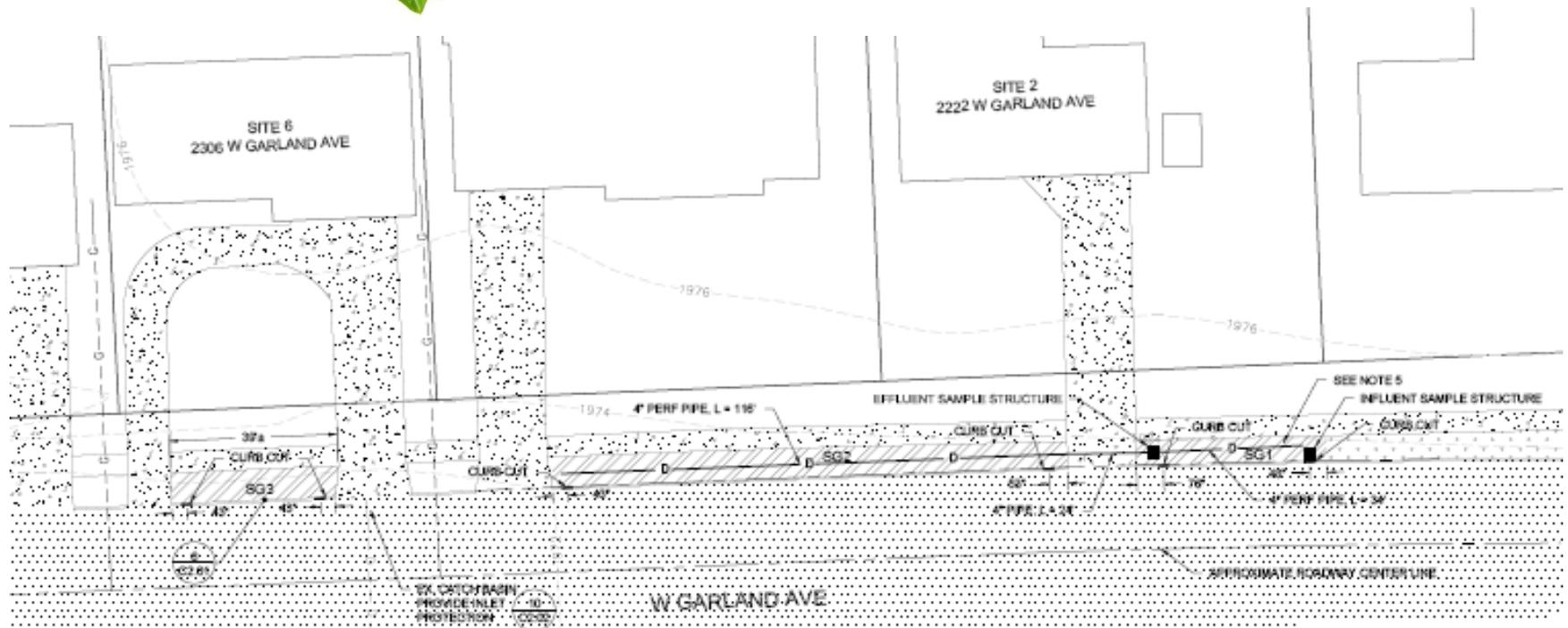
Supported by: Western Economic Diversification Canada / Diversification de l'économie de l'Ouest Canada

Canada

Alberta  
Innovation  
Technology  
Future

Lakehead  
100  
years

# Final Site Selection



Final plan courtesy of AHBL, Inc.

# Construction



Average annual precipitation: 16.5"  
Gallons to be treated annually: 335,144

# Native Plant Landscaping



Ninebark



Red Osier Dogwood



Oregon Grape

# Native Plant Landscaping



Parsnip Flowered Buckwheat



Purple Sage



Scarlet Gilia

# Native Plant Landscaping



Prairie Smoke



Camas



Idaho Fescue

# Questions?



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