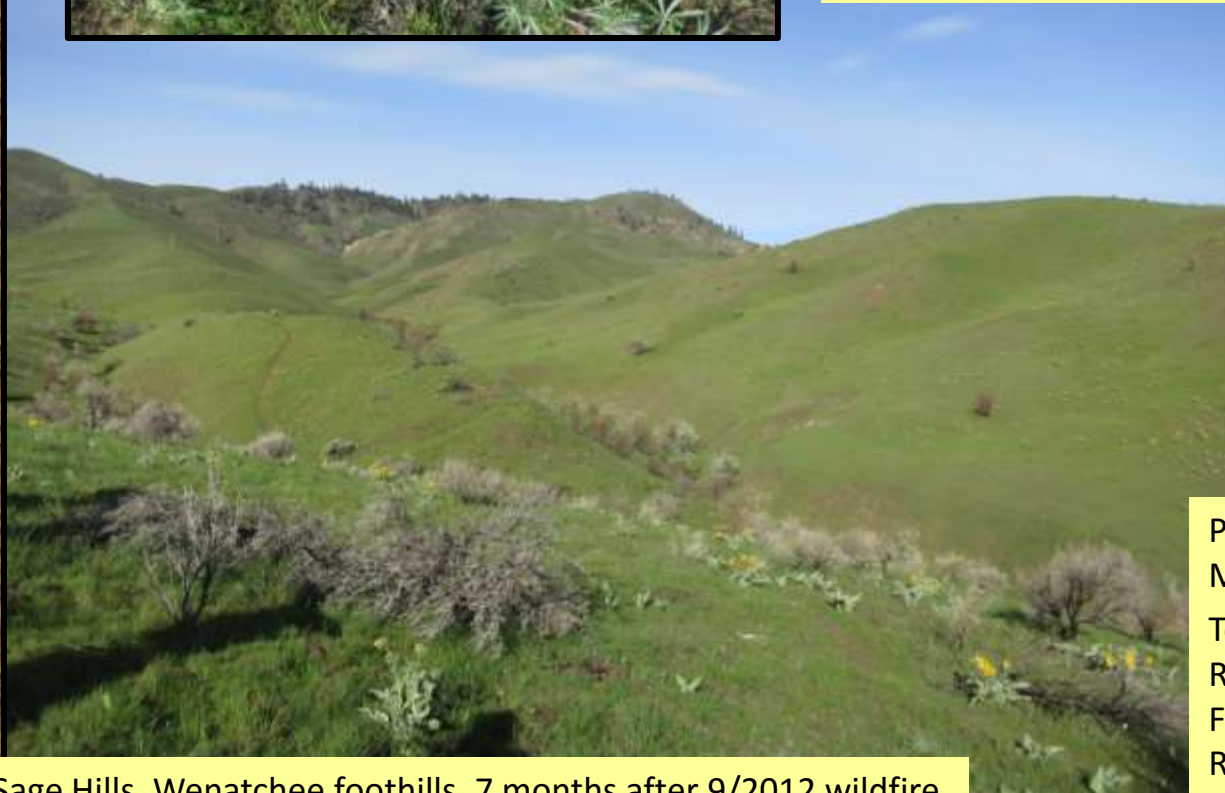


***East-side Cascades
Shrub-steppe
Ecosystems: Ecological
relationships to wildfire***



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Sage Hills, Wenatchee foothills, 7 months after 9/2012 wildfire

Historically, lightning strikes started wildfires in the shrub-steppe



Every patch of shrub-steppe burned, on average, every 35-75 years. Shrubs & bunchgrasses were well-spaced with bare ground in-between, so fuel levels were low. Wildfires were variable in size, resulting in a patchwork burn pattern across the landscape.

Fires burn hotter and faster on steep slopes.

In our area, fires fanned by winds move between shrub-steppe and forests and from valley bottoms to mountain tops.



Historically, shrub-steppe fires were fast moving due to small amounts of fuel (plants) and were stopped when they encountered other recently burned patches



Wenatchee Foothills wildfire on Jun. 28, 2015, View West from Balsamroot Trail, 2-weeks post burn

Outcomes of Fast-moving Surface Wildfire on Shrub-steppe Plants

- Shrubs:** Re-sprout, or seeds in soil are triggered to germinate
- Perennial grasses and wildflowers** re-sprout
- Soil:** new ash serves as fertilizer



Sage Hills, Wenatchee foothills, 5-weeks post wildfire . Photo taken 10/13/12



Photo taken 1-year post-fire (burned 7/7/2014), re-sprouting three-tip sagebrush, Saddle Rock city park

Adaptations to fire are traits that allow an organism to survive within the given fire pattern of its ecosystem

Photos by EllenKuhlmann

lupine species re-sprouting, 44-days post fire



Sage Hills, Wenatchee foothills, 5-weeks post wildfire 10/13/12



Tall buckwheat (*Eriogonum elatum*) re-sprouting

Very little heat is transferred into the soil when a fast-moving, low-intensity wildfire moves through shrub-steppe ecosystems.

Within the shrub-steppe, different plants have different adaptations to deal with wildfire

These photos taken on 10/13/12, 5- weeks after a quickly moving, low intensity wildfire burned in the shrub-steppe, Wenatchee foothills



Re-sprouted 6-inch tall green shoots on the long-lived perennial bluebunch wheatgrass (*Pseudoroegneria spicata*). Its below-ground buds are protected from heat by dense leaf bases



Big sagebrush (*Artemisia tridentata*) is mostly killed and will not re-sprout from roots, but instead will regenerate from seeds stored in the soil. Fire improves seed-sprouting conditions by reducing competition with existing plants for water and nutrients. Wildfire means fewer insect seed predators and a reduction in seed pathogens. Ash increased nutrient availability.

After wildfire, long-lived perennial grasses and wildflowers re-sprout from still-living underground roots



Photos taken in the Wenatchee Foothills
In April 2014- 7 months post-wildfire

Human activities in our urban-wildland interfaces have increased the severity & size of fires in shrub-steppe ecosystems

8/1/2014

1-month post-fire



7/10/2015

1 year post-fire



Saddle Rock City Park. Fire started by a person lighting fireworks along Skyline Drive. The fire was fast moving.

Historically, shrub-steppe fires were fast moving due to small amounts of fuel (plants) and were stopped when they encountered other recently burned patches



Saddle Rock City Park
Burned: July 6, 2014

Photo taken July 18, 2014



Photo taken July 20, 2015 1-year post burn

Shrub-steppe plants are adapted to fast-moving wildfires

Non-native cheatgrass increases in in post-fire shrub-steppe

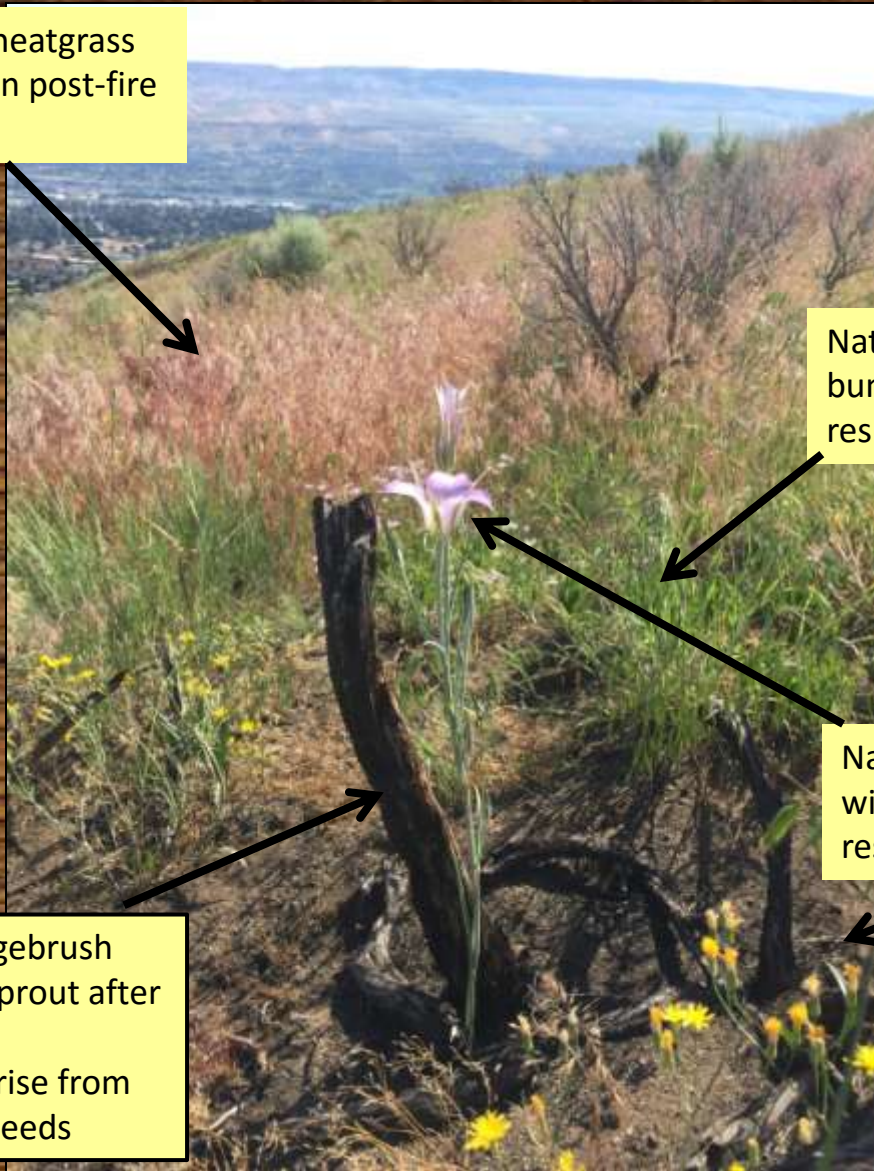
Photos taken 6/2015;
11-months post-fire at
Saddle Rock City Park

Native
bunchgrasses
resprout

Native three-tip sagebrush
re-sprouts after fire

Native perennial
wildflowers
resprout

Native big sagebrush
does not re-sprout after
fire.
New plants arise from
wind-blown seeds



Human activity (1850-present) has changed wildfire patterns in Eastside Shrub-steppe Ecosystems

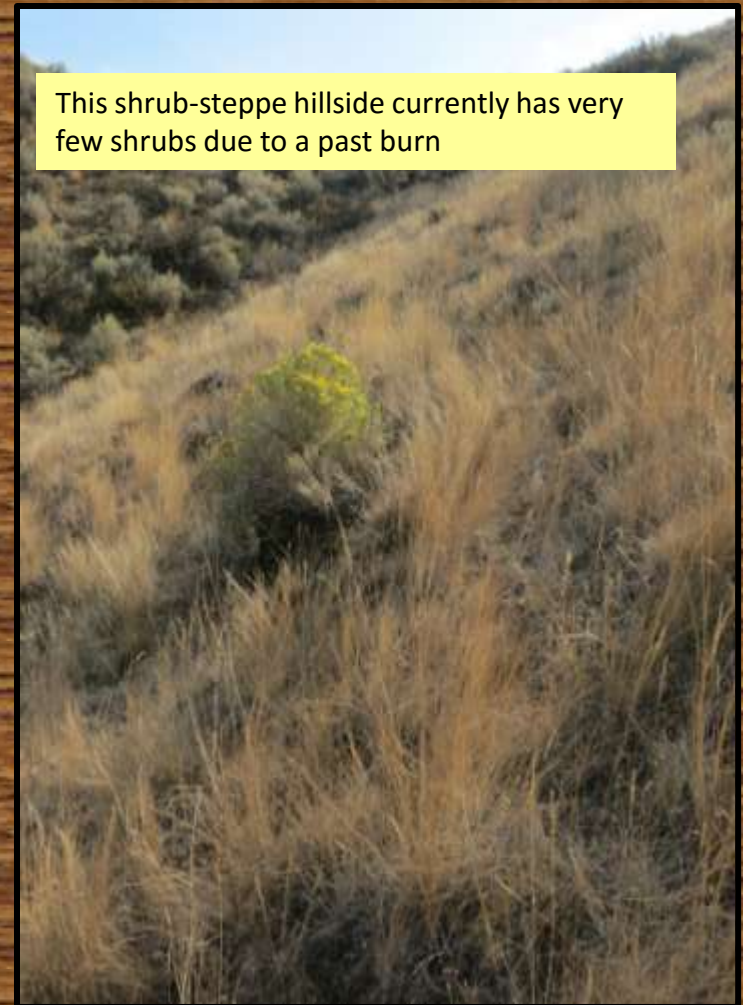
Introduction of cheat grass has created a fine, continuous layer of fuel, allowing fires to burn larger areas.

Newly burned ground allows increase in invasive non-native weeds that out-compete native plants.

Increased fire frequency results in decreased populations of shrubs that do not re-sprout after fire.

Reduction of native plant diversity after fire result in loss of food, cover, nesting areas, and water for native animals.

Burned soils are vulnerable to wind and water erosion.



This shrub-steppe hillside currently has very few shrubs due to a past burn

Consequences of cheatgrass dominated shrub-steppe: increased fire frequency with decreased fire severity

In cheatgrass dominated lands that lack shrubs:

- Fires spread rapidly
- Accumulated surface fuels are low
- Flame lengths are shorter
- fireline intensity is lower

Management Question:

In our urban-wildland interface areas, should we undertake prescribed burning that would convert shrub-steppe to grasslands?

