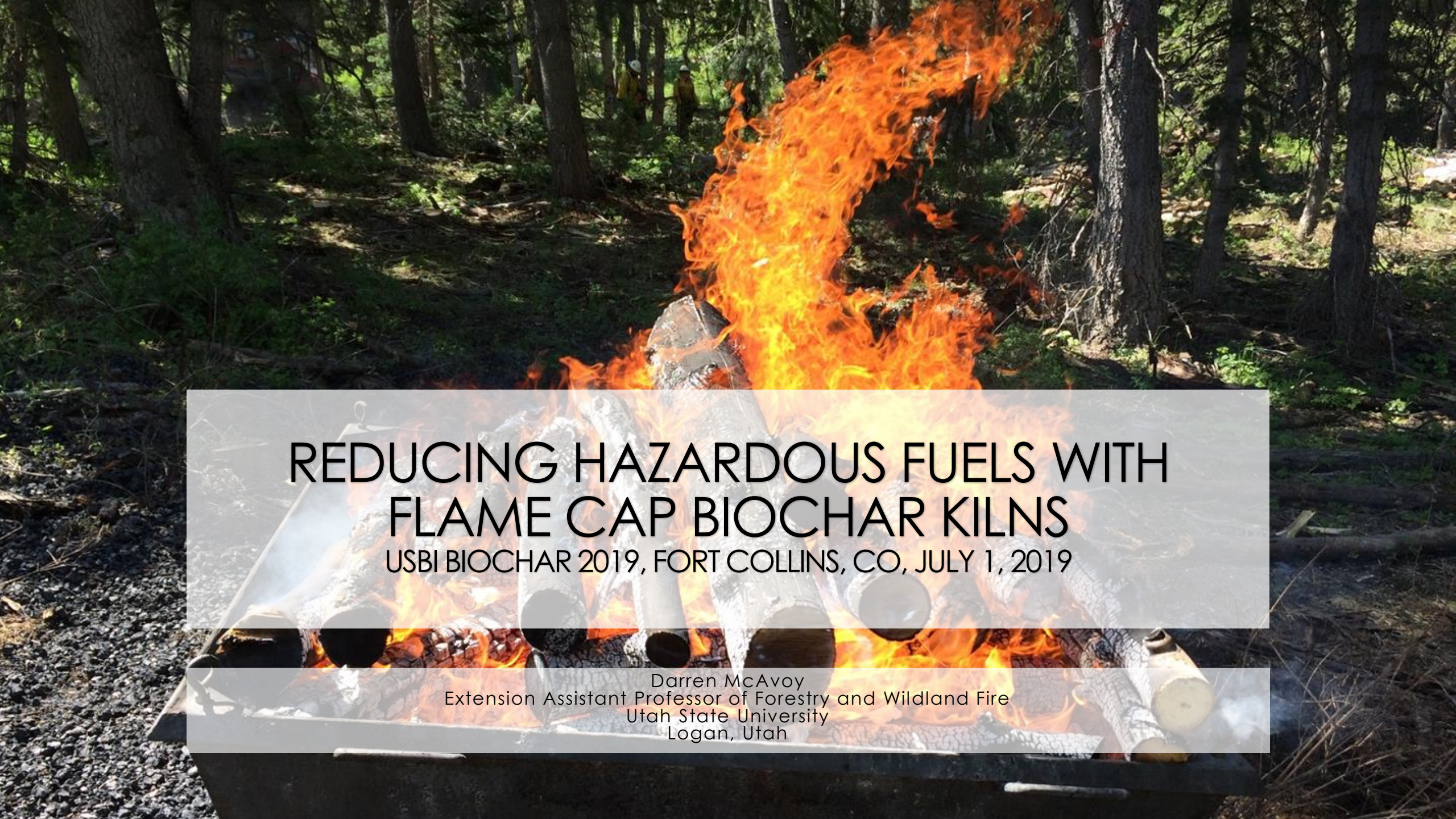

# REDUCING HAZARDOUS FUELS WITH FLAME CAP BIOCHAR KILNS

## USBI BIOCHAR 2019, FORT COLLINS, CO, JULY 1, 2019

Darren McAvoy
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Logan, Utah

Biochar kiln project goals:

Reduce hazardous fuels

Improve firefighter safety

Create a product

Develop the bioeconomy


# UTAH BIOMASS RESOURCES GROUP



UtahStateUniversity
COOPERATIVE EXTENSION

Amaron Energy



UBRG

Founded 2010

Partners

Fuels management

PJ

Beetle kill

WUI

Excess above-ground carbon

‘too much biomass’

Pile burning: business as usual

Air quality issues

Damage to soil

Season extremely limited

Location limited


# Pile burning problems:

40-plus year old burn pile scars on the Flathead National Forest

Balancing mechanism

Fuels reduction

Water retention

Durable

Direct carbon sequestration


2011:

Dragon Wagon

Mobile gasifier

Power for two homes

Hosted Utah's first wood-fired concert

2014:

Mobile pyrolysis

Amaron Energy

Rotary kiln

Gas
Oil
Biochar

Cost:
$500,000+


Precise controls

Temperature

Residence time

Can make precise products

Torrified wood

# Using whole logs minimizes feedstock preparation costs

2017:

Simple kilns

Oregon kilns

Flame-cap kilns

Flame-curtain kilns

Cost: $800 ish

Contracted with Kelpie Wilson for first workshop

Wilson Biochar Associates

Purchased four kilns

USU Extension Grant

Metal box

5 feet x 5 feet

2 feet high

Handles

Stackable

Transportable

Portable, can be carried by 4 people

# Fuels cut-to-length

Presorted

Method:

Load kiln

Up to 8 inch diameter material

Dry material most productive

Make a rick

All can participate

Top light kiln

Small fuels on top

Windscreens optional

Keep adding material until kiln is ¾ full of coals

Can consume 5 times its volume

Quench after shift from flaming to glowing combustion

Nearly ready to quench

No visible smoke

# Culinary features

Quenching to extinguish fire

100 gallons

Stir to mix

All material cool to touch

Spread out coals in non-flammable area for cooling

Brittle: can reduce piece size by crushing

Biochar on the forest floor

Restoration value

Cold trailing

Crews observed deer consuming char

Kilns work well in close proximity to sensitive features:

Stream Management Zones

Wildland Urban Interface

Heavy fuels

Proposed biochar economic model:

Reduce fuels

Absorb nutrients

Increase productivity

Sequester carbon

Partner Evergreen Soils and Recycling

Wood waste problem

Biochar makes soil darker

Dark soils worth more than light colored soils

Scale issues:

Next steps:
Big Box Burning

Heavy equipment for loading, tending

Kilns: 16 x 8 feet

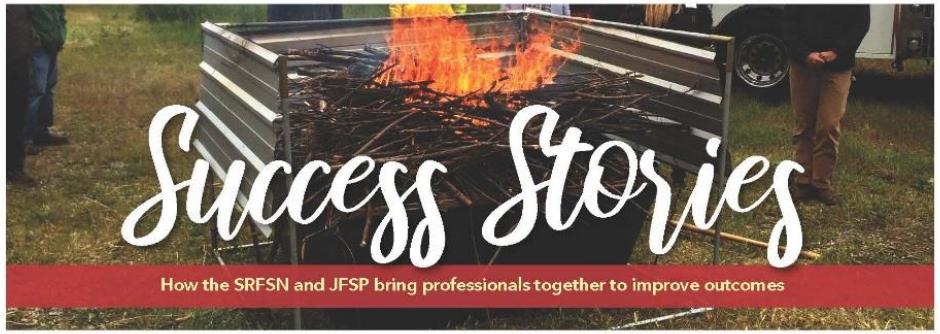
Biochar Trials:

BLM energy development

WSARE Ag farm trials

Utah Water Initiative

Utah Ag Experiment Station Sheep nutrition trials




## **Biochar kilns:** A simple and innovative approach to removing hazardous fuels and improving forest health

"For people not familiar with biochar, having SRFSN as a partner really provided legitimacy to the science. This has really helped to accelerate the adoption of the technology."

— Darren McAvoy, *Extension Assistant Professor, Utah State University*

THE SOUTHERN ROCKIES FIRE SCIENCE NETWORK (SRFSN) IS COLLABORATING WITH UTAH STATE UNIVERSITY (USU) FORESTRY EXTENSION to highlight an innovative approach to removing hazardous fuels and improving forest health.

- Traditional means of removing hazardous fuels can damage soils and air quality.
- Biochar kilns allow for burning of hazardous fuels in ways that result in production of useful biochar, while causing minimal damage to soils and air quality.
- The biochar can then be applied to soils to improve water-holding capacity and store carbon.
- The SRFSN, in partnership with Utah State University Forestry Extension has held multiple events promoting the science and technology of biochar kilns which has resulted in an increase in their use throughout Utah.

**SRFSN is a support system and catalyst for managers, scientists, policy makers, and citizens** to interact and share credible fire science for sound decisions in land management and planning. Our network helps improve efficiency and effectiveness for making communities and the environment safer from wildfire. The SRFSN is part of the Joint Fire Science Program Fire Science Exchange Network, a national collaboration of 15 regional fire science exchanges.

Learn more about our partners, products, and activities at www.southernrockiesfirescience.org.
Learn more about the Joint Fire Science Program and the Fire Science Exchange Network at firescience.gov.

# JFSP Success Stories

200 + attendees

52% built a kiln

69% added char to soil

78% felt more knowledge-able

100% are more interested in biochar

Air quality

Kiln use allowed when no burning allowed

Working on blanket exemption

Seven workshops hosted by USU Forestry Extension

State of Utah and Park City now hosting their own workshops

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