



Forest Service  
U.S. DEPARTMENT OF AGRICULTURE



# Using the CharBoss to reduce hazardous fuels and create biochar

---

**Debbie Page-Dumroese**

USDA Forest Service, Rocky Mountain Research Station  
Moscow, ID

February 2024

# Rocky Mountain Station Team Biochar

---

- Nate Anderson
- Jim Archuleta
- Dan McCollum
- Jeff Morisette
- Derek Pierson
- Carlos Rodriguez-Franco (Washington DC)
- Joanne Tirocke

# Delivery day!

- 2 CharBoss units in Moscow, ID
- Demonstrations
- Testing
- Production measurements
- Carbon analyses



# Design ideas and collaboration

- Field-generated ideas pitched to Air Burners, Inc
- Developed a Cooperative Research and Development Agreement between the FS and Air Burners, Inc
- Tested a proto-type
- Revamped the equipment
- Testing production units



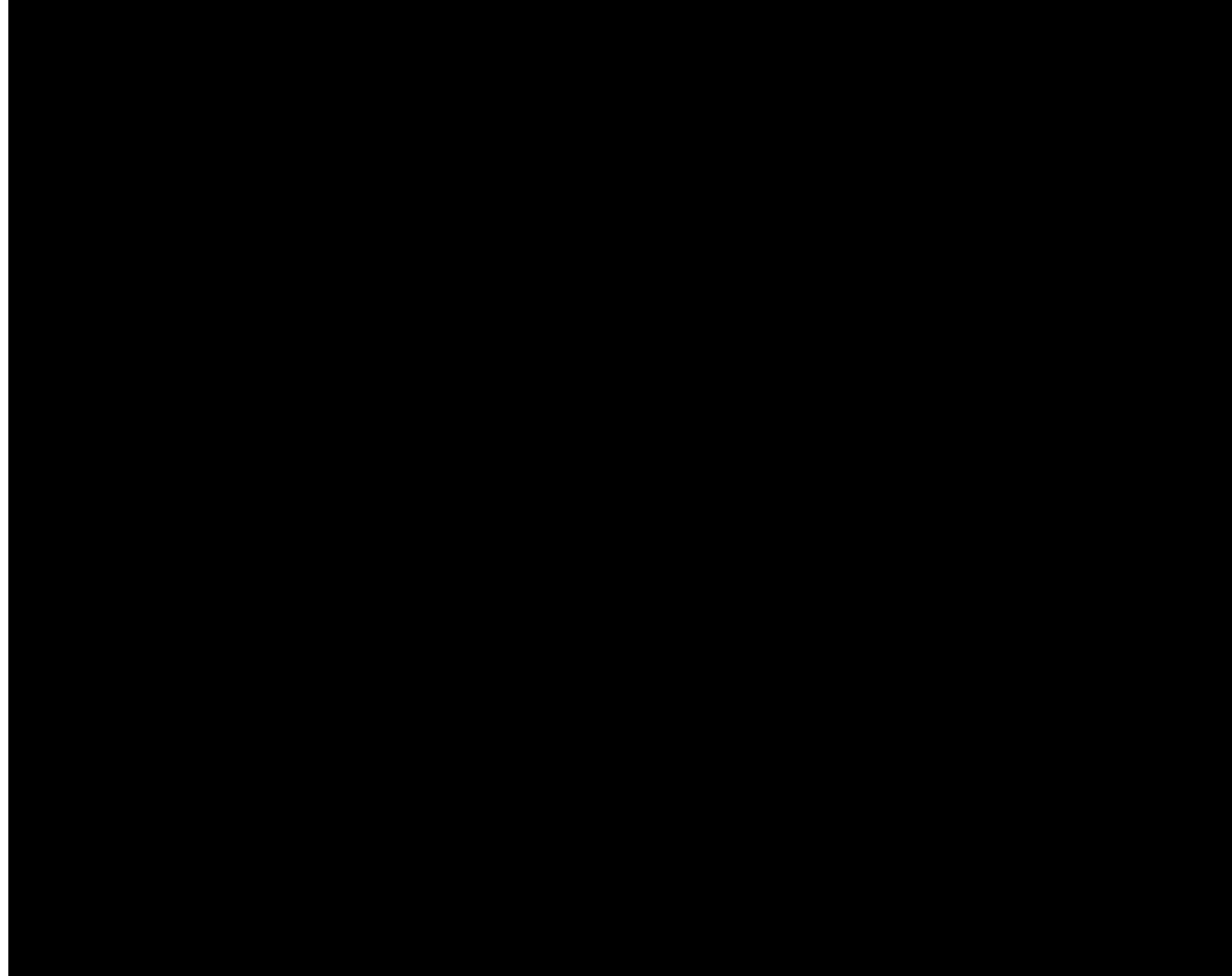
# Why is mobile biochar equipment needed?

- Thinning, salvage logging, harvesting
- Large volumes of slash to dispose
- Create a durable carbon for soil remediation
- Climate change mitigation



# What it looks like and How it works

---



# Where to use it

- Roadside
- Log landings
- Skid trails
- Campgrounds
- Parks
- Landfills (yard waste disposal)
- Site must be relatively level for operations



# Transportation to the site

- Class A Commercial Drivers License
- 1 ton (or larger) utility truck
- Does not travel well on ice and snow!





# Types of feedstock



- Up to ~3m (10 feet) long
- Any diameter
  - Large diameter material
    - Cut into 1-2 m (3-6 feet) bolts
- Conifers
- Hardwoods
- Woody shrubs
- Clean lumber
- Yard waste
- Wet or dry
  - Start base fire with dry wood, if possible

# Operations

- Straightforward control panel
- Directions on panel cover
- QR code to download most recent manual
- Adjust blower
- Biochar production (or not)



## End of the day...

- Ash builds up under the conveyor belt
- Can slow or stop belt
- Move CharBoss each day to rake out ash



# Collecting biochar

- Quench pan uses ~100 gallons of water/day
- Coals drop from a conveyor belt
- Snow can be used to quench coals



# Biochar

---

- Process 1000-2000 pounds/hour
- 15-25% biochar
- C content ranges from 64-94%



# Safety consideration

- Worker personal protection equipment
  - Hardhats, eye/ear protection, leather gloves, non-flammable clothing (cotton/nomex)
- Site protection
  - Few embers emitted from the Firebox
  - Adding wood breaks air curtain



# Advantages and disadvantages

---

## Advantages:

- Easy to use
- Continuous production
- Low volume of water needed
- Low emissions
- Few embers
- Variety of feedstocks
- Variety of sizes
- All-weather

## Disadvantages

- Need a level area
- Move it every day to remove ash build-up
- It is heavy(!) and requires a CDL and 1-ton (or larger) truck to transport

# Thanks for your attention



Debbie Page-Dumroese  
[debbie.dumroese@usda.gov](mailto:debbie.dumroese@usda.gov)





Forest Service  
U.S. DEPARTMENT OF AGRICULTURE

---

USDA is an equal opportunity provider, employer, and lender.