Biomass Production Estimation

What is biomass?

- **Biomass or yearly production** is the weight of the aboveground parts of plants per unit area.
  - It includes the current year’s growth of:
    - Herbaceous biomass
    - Forbs, grasses, and grass-likes
    - Woody plant
      - Leaves, stems, flowers, seedheads, and fruits

How do we measure biomass?

- A site is selected to represent the plant community you wish to measure
  - This site should represent all aspects of the desired community
  - The 2 ft x 2 ft hoop is randomly placed over the desired area
    - Placing the circle randomly prevents bias data
    - Clip the total herbaceous biomass and weigh it
    - Clip the total woody biomass and weigh it
    - Only weigh the current year’s growth for both herbaceous and woody plants
      - Take note that current year’s growth may be “browned up” depending on what time of year it is, precipitation that year, etc.
    - The biomass is measured in grams and then multiplied by 20 to get lbs/acre

Why do we use “Dry Weight?”

- All plants are made of water
- Water is not included in living plant biomass
- Water doesn’t burn in a fire and does not nutritionally benefit animals (in terms of providing energy)
- Water content can vary based on the yearly precipitation and is not consistent
- Generally biomass estimation is done late in the year after plants are done growing and flowering
- Plant biomass can be dried using a drying oven
How much is water?

<table>
<thead>
<tr>
<th>Grass:</th>
<th>Shrubs/Trees (deciduous):</th>
<th>Shrubs/Trees (evergreen):</th>
</tr>
</thead>
<tbody>
<tr>
<td>• before heading = 35-30% dry matter</td>
<td>• lush new leaves = 20-35%</td>
<td>• lush new leaves = 55%</td>
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<tr>
<td>• headed out = 35-40%</td>
<td>• older, full-sized leaves = 50%</td>
<td>• older, full-sized leaves = 65%</td>
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<tr>
<td>• after bloom = 45-50%</td>
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<tr>
<td>• mature seeded = 55-60%</td>
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<td>• leave dry/stem partly dry = 80-85%</td>
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<tr>
<td>• apparent dormancy = 90-95%</td>
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<tr>
<td>Forbs:</td>
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<td></td>
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<tr>
<td>• very lush = 15-20% dry matter</td>
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<td></td>
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<tr>
<td>• mature, seed-stage = 35-40%</td>
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<tr>
<td>• seed rip, leaves drying = 60%</td>
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<tr>
<td>• dry and dormant = 90-100%</td>
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</tbody>
</table>

WNRCDE – Biomass Estimation Event

- For the WNRCDE field event, the area will be designated for you with the 2 ft x 2 ft hoop already placed
- Your job is to visually estimate the lbs/acre of biomass based on what is in the hoop – you don’t clip!
- After the event the biomass will be clipped for the correct production estimate
- You will be asked to categorize the biomass into one of the following:
  - 0-400 lbs/acre
  - 400-800 lbs/acre
  - 800-1200 lbs/acre
  - 1200-1600 lbs/acre
  - >1600 lbs/acre
Practice – Estimate the Biomass

Upper Medicine Lodge area, 25 mi NW of Dubois, ID. Site is a loamy 16-22” precipitation ecological site. Plant community is dominated by ARTRV/FEID (mountain big sagebrush and Idaho fescue) ESD = B12-21.

Upper Medicine Lodge area, 25 mi NW of Dubois, ID. Site is a windswept ridge, 11-16” precipitation ecological site (shallow stony). Plant community is dominated by ARFR/ARAR8/PHHO/Poa spp. (fringed sagebrush, low sagebrush, Hood’s phlox, and small bluegrasses) ESD = B12-14.
Upper Medicine Lodge area, 25 mi NW of Dubois, ID. Site is a shallow, gravelly loam, 8-12” precipitation ecological site. Plant community is dominated by ARAR8/PSSP (low sagebrush and bluebunch wheatgrass) ESD = B12-28.

Shotgun Valley, 5 mi N of Island Park Reservoir. Site is a loamy 16-22” precipitation ecological site. Plant community is dominated by ARTRV/FEID (mountain big sagebrush and Idaho fescue), but photo show PHPR3 (timothy) as the dominate grass, ESD = B13-23.
Medicine Lodge area, 15 mi NW of Dubois, ID. Site is a loamy 12-16” precipitation ecological site that burned in 2003. Plant community is dominated by ARTRV/PSSP (mountain big sagebrush and bluebunch wheatgrass) ESD = B12-27.

Table Butte area, 12 mi NW of Hamer, ID. Site is a sandy 7-10” precipitation ecological site that burned in 2001. Plant community is dominated by ARTRW/STCO-ORHY (Wyoming big sagebrush, needle-and-thread, and Indian ricegrass) ESD = B11b-19.
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