MONITORING TOOLS
Tools for Monitoring

- Transect Stakes (PVC pipe, Rebar)
- 100' Tape
- Two Carpenter Rules
- Wire Pointer
- Camera
- Forms
- GPS Unit & Maps
- PDR/PDA/Palm (Pocket PC)
Digital Cameras

• Pixels determines quality
• Storage (sd card, cf card, internal)
• Optical and Digital Zoom
• Prints from Digital images
• Easily added to documents
• Multiple storage options
35mm and Other Cameras

There are many varieties of throw away cameras both 35mm and digital that work good for monitoring (throw in bag or saddlebag so always have on hand).

There are also a variety of point and shoot cameras, with auto focus and other auto or manual settings.

Recommend getting double prints. Also if storing on computer or some other electronic format they will need to be scanned or can get photo disk at processing.
GPS Units
Global Positioning System

- Records position locations
- Downloadable data to laptops.pc’s
- Can upload data as well
- Can store waypoints, tracks, routes
- Mapsource backgrounds
- Navigate to locations
Waypoints and Routes

Waypoints are used to mark transect locations and locations of special interest.

Routes and/or Track lines can be used to record landscape appearance transects, routes to and from transects, trails, roads, etc.
Pocket PC’s (PDR)

These are basically mini computers with Windows operating systems and software. They are useful for recording data, mapping and GPS, utilizing multiple documents, and it is all downloadable to laptops and personal computers.
Monitoring Schedule

Use as an aid to help keep monitoring on track

Develop monitoring schedule similar to grazing schedule

Pre Grazing 1 week before move into area
Post grazing 1 week after leave unit

(1 week is guideline to keep the pictures true to what is being seen on the ground and with the post grazing shots take within week of leaving the unit so there is minimal regrowth and pictures will help to reflect actual utilization)
(the more regrowth there is the harder it is to see or tell the utilization)
### Monitoring Schedule for the 2008 Grazing Season:

<table>
<thead>
<tr>
<th>PRE- prior to DATE</th>
<th>PASTURE</th>
<th>POST- Week of DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 1</td>
<td>Fish Lake</td>
<td>July 31 – Aug 6</td>
</tr>
<tr>
<td>July 31</td>
<td>East Salt Creek</td>
<td>Sept 1 - 7</td>
</tr>
<tr>
<td>August 31</td>
<td>West Salt Creek</td>
<td>Oct 1 - 7</td>
</tr>
</tbody>
</table>

*Pre – Prior to Date refers to date that monitoring should be done by for that unit (Pre monitoring should be completed before cattle enter each unit)*

*Post- Week of Date refers to date that monitoring should be done by to reflect current years use (Post-monitoring is completed right after cattle leave the unit)*
MONITORING METHODS
SITE INFORMATION FORM

• Site Information
  (Unit Name, Pasture Name, Study Site, Date, Observer, Monitoring Methods, Date Study Established, Study Located, Access, Ownership)

• Site Characteristics
  (Landform, Elevation, % Slope, Avg Annual Precip, Range Site, Exposure, Soil, Other Climatic Info)

• Unit/Pasture Use Information
  (Kind & Class of Animal, Season of Use, Number, Grazing System, Current Grazing Year Management, Other Notes)

• Vegetation and Vegetation Use
  (Dominant Plants, Primary Forage Species)(Degrees of Use - High, Moderate, Low of each Category), Notes)

• Site Location Map
  (Location and info to aid in locating site)

• Site Location Photograph
  (Photo with Photo Info Sheet in it)
SITE INFORMATION FORM

INITIAL: X ANNUAL
UNIT NAME/#: Maxon Basin
PASTURE NAME/#: Maxon Basin and Hidden Creek
STUDY SITE (# or name): MB1 & MB2
OBSERVER: Buzalsky
DATE: 7/30/03
MONITORING METHOD (S): Permanent Photo Point, Cover by Life, Landscape Appearance
DATE STUDY ESTABLISHED: 7/30/2003
STUDY LOCATED: N S E W of T R SEC 1/4 1/4 1/4
ACCESS:
OWNERSHIP:
GPS COORDINATES: MB1: N42 37.267 W108 48.597; MB2: N42 37.207 W108 49.573

SITE CHARACTERISTICS

LANDFORM: Mountain Meadow
ELEVATION: MB1: 8212' & MB2: 8256'
% SLOPE:
AVERAGE ANNUAL PRECIPITATION:
RANGE SITE: Upland __ Riparian X
CURRENT GROWING CONDITIONS: Above Average (1) __ Average (2) __ Below Average (3)
EXPOSURE: N__ S__ E__ W__ NE__ SE__ SW__ NW__
SOIL: Sand (1) __ Silt (2) __ Clay (3) __ Loam (4)
OTHER CLIMATE INFORMATION: (snow depth/persistence, temperatures, storm/flooding, etc.)
drought; forage production is average with a little lower than average water.

UNIT / PASTURE USE INFORMATION

KIND & CLASS OF ANIMAL: Cow Calf pairs
SEASON OF USE: 6/26 TO 9/30
NUMBER: varies from 200 – 500 pr
GRAZING SYSTEM: deferred rotation
CURRENT YEAR GRAZING MANAGEMENT:
OTHER NOTES (for example: growth stage of plants at time of use): Use was late summer, plan

VEGETATION

DOMINANT PLANTS: Carex, Willow
PRIMARY FORAGE OR INDICATOR ("KEY") SPECIES: Carex

VEGETATION USES

LIVESTOCK: High __ Moderate X __ Low __ Comment __
BIG GAME: High __ Moderate __ Low X __ Comment __
RODENT: High __ Moderate __ Low X __ Comment __
INSECTS: High __ Moderate __ Low X __ Comments __
RECREATION: High __ Moderate __ Low X __ Comments __
Non-Motorized: High __ Moderate __ Low X __ Comments __
Horse: High __ Moderate __ Low X __ Comments __
Dispersed Camping: High __ Moderate __ Low X __ Comments __
OTHER: (Fishing) High __ Moderate X __ Low __ Comments __

NOTES: Increased use during hunting season in whole area, moderate fishing use along river, ____________ conjunction with South Pass, Ed Young and Bayer Mountain allotments.
PERMANENT PHOTO-POINT TRANSECT FORM

Site ID: FL5A  Date: 8/7/07  Observer: Buzalsky/McKay

Unit Name & #: Fish Lake  Pasture Name & #: Fish Lake Mtn

Grazing System: Def Rot  Season of Use: _______ to _______

Transect/Point Location: 43°32'46" N 109°56'25" W 9508'

Photo Direction: NE

Photo Subjects: Ridgetop - Meadow

Purpose of Photo: Trend, Condition, Utilization

Camera: HP945  Lens: Digital  Film Speed: _______

PERMANENT PHOTO POINT TRANSECT

- Site Id
- Date
- Observer
- Unit Name/#
- Pasture Name
- Transect Location
- Photo Direction
- Photo Subjects
- Purpose of Photo
- Camera Info
Photo Point Layout

**General Shots:** Stand at the stake, center photo down the transect line, top third should be sky/horizon, both at the 0' stake and 100' stake.

**Close-up Shots:** Stand straddling the tape, take picture looking straight down at square. If getting shadows stand to one side or other of tape.
PERMANENT PHOTO-POINT TRANSECT FORM

Site ID: SC5  Date: 8/15/07  Observer: Buzalsky

Unit Name & #: Salt Creek  Pasture Name & #: East Salt

Grazing System: Def Rot  Season of Use: _______ to _______

Transect/Point Location: 43°29'25"N 109°52'21"W  9239'

Photo Direction: NE to SW

Photo Subjects: Mountain Meadow

Purpose of Photo: Trend, Condition, Utilization

Camera: HP945  Lens: Digital  Film Speed: _______

Observer: Buzalsky  Date: 8-15-07
LANDSCAPE APPEARANCE

Procedure:

• Select a beginning point for a paced transect in key area.
• Stay within the same veg type & Photograph the area.
• Observe and record at least 25 samples per transect.
• Examine the immediate area around you and determine which landscape appearance class most accurately represents the vegetation use and record.
• At end of transect, total dots, multiply count by class midpoint.
• Calculate average utilization by dividing the sum of products by the total count.

• This method estimates general forage utilization.
• It is especially helpful when grazing or browsing use must be estimated for large areas.
• For this method, an ocular estimate of forage utilization is based on the general appearance of the rangeland.
• Utilization levels are determined by comparing observations with the written utilization class descriptions.
• Utilization estimates are evaluated against the standards, goals, or objectives for the area.
LANDSCAPE APPEARANCE

- Unit Name
- Pasture Name
- Transect ID
- Date/Observer
- Animal Kind/Class
- Season of Use
- Sample Interval
- Use Classes and Descriptions of Landscape Appearance

<table>
<thead>
<tr>
<th>Class (Midpoint)</th>
<th>Dot Tally</th>
<th>(#) Count</th>
<th># x Midpoint</th>
<th>Description of Landscape Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5% (2.5%)</td>
<td></td>
<td>3</td>
<td>7.5</td>
<td>The rangeland shows evidence of no grazing, of negligible use.</td>
</tr>
<tr>
<td>6-20% (13.0%)</td>
<td></td>
<td>6</td>
<td>78.0</td>
<td>The rangeland has the appearance of very light grazing. The herbaceous forage plants may be topped or slightly used. Few current seedstalks and young plants are grazed.</td>
</tr>
<tr>
<td>21-40% (30.0%)</td>
<td></td>
<td>12</td>
<td>360.0</td>
<td>The rangeland may be topped, skimmed, or grazed in patches. The low value herbaceous plants are ungrazed and 60-80% of the number of current seedstalks of herbaceous plants remain intact. Fewer than 50% of the young plants are grazed.</td>
</tr>
<tr>
<td>41-60% (50.0%)</td>
<td></td>
<td>9</td>
<td>450.0</td>
<td>The rangeland appears entirely covered as uniformly as natural features and facilities will allow. 15-25% of the number of current seedstalks of herbaceous species remain intact. No more than 10% of the number of low-value herbaceous forage plants have been utilized.</td>
</tr>
<tr>
<td>61-80% (70.0%)</td>
<td></td>
<td>4</td>
<td>280.0</td>
<td>The rangeland has the appearance of complete search. Herbaceous species are almost completely utilized, with less than 10% of the current seedstalks remaining. Shoots of rhizomatous grasses are missing. More than 10% of the number of low-value herbaceous forage plants have been utilized.</td>
</tr>
<tr>
<td>81-94% (88.0%)</td>
<td></td>
<td>3</td>
<td>264.0</td>
<td>The rangeland has a mown appearance and there are indications of repeated coverage. There is no evidence of reproduction or current seedstalks of herbaceous species. Herbaceous forage species are completely utilized. The remaining stubble of preferred grasses is grazed to the soil surface.</td>
</tr>
<tr>
<td>95-100% (97.5%)</td>
<td></td>
<td>0</td>
<td>0.0</td>
<td>The rangeland appears to have been completely utilized. More than 50% of the low-value herbaceous plants have been utilized.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Totals</th>
<th>A</th>
<th>37</th>
<th>B</th>
<th>1439.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Utilization =</td>
<td>$\frac{B}{A}</td>
<td>39%$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GRAZING USE MAPS

• Very useful management tools.
• Help to identify key areas, distribution problems, or management opportunities.
• May also be used to modify the grazing management plan.
• To map utilization, examine the grazing unit and sketch utilization patterns on the map.
• Landscape appearance observations are often used to develop grazing use maps, Stubble Height can also be used.
GRAZING USE MAPS

Procedure:

- Should be done shortly after grazing period.
- Establish a transect wherever a significant change in use patterns or vegetation type occurs.
- Obtain map of different plant communities or ecological types.
- When using Landscape appearance map utilization using following classes:
  
  0-5%   61-80%
  6-20%  81-94%
  21-40% 95-100%
  41-60%

- Try not to make areas smaller than 5 Acres, but make notes of area and use.
- Include a map legend.
COVER BY LIFE FORM

• This is simply an estimation of the relative amounts of different life forms on a site.

• Repeating this data collection over time provides an indication of trend on the site.

Procedure:
• Install stakes and stretch 100’ tape between them.
• Take two photos, a closeup and one centered on the 5’ mark.
• Beginning at the 1’ mark, lower a pointer until initial contact with vegetation or ground surface is made.
• Record data on form.
• Repeat at each foot mark until have 100 points sampled.
• Life form categories are: grasses, forbs, shrubs, litter, moss & lichen, rock and bare ground.
• The total number of tallies converts to percent cover for each life form.
COVER BY LIFEFORM

- Unit Name
- Pasture Name
- Transect ID
- Date
- Observer
- Lifeform Categories

## SAMPLE COVER BY LIFEFORM TRANSECT

<table>
<thead>
<tr>
<th>Unit Name</th>
<th>Tongue River</th>
<th>Pasture Name</th>
<th>Willow Ridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transect ID</td>
<td>#3</td>
<td>Date</td>
<td>06/23/2001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observer</td>
<td>J. Hicks</td>
</tr>
</tbody>
</table>

Litter includes everything but soil, moss and lichen, rock, or live plants.

You may record dot counts optionally for separate species (e.g., perennial vs. annual species, desirable vs. undesirable species, or noxious weeds vs. native forbs) if doing so will help meet objectives. “Other” categories below may be used for specific species or groupings of interest.

<table>
<thead>
<tr>
<th></th>
<th>Grasses</th>
<th>Forbs</th>
<th>Shrubs</th>
<th>Litter</th>
<th>Moss/Lichen</th>
<th>Rock</th>
<th>Bare Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perennial</td>
<td>![Dot Count]</td>
<td>![Dot Count]</td>
<td></td>
<td>![Dot Count]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual</td>
<td>![Dot Count]</td>
<td>![Dot Count]</td>
<td></td>
<td>![Dot Count]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noxious</td>
<td>![Dot Count]</td>
<td></td>
<td></td>
<td>![Dot Count]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td>![Dot Count]</td>
<td></td>
<td></td>
<td>![Dot Count]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td>![Dot Count]</td>
<td></td>
<td></td>
<td>![Dot Count]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td>![Dot Count]</td>
<td></td>
<td></td>
<td>![Dot Count]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total (\(^{=100}\))

- Grasses: 33%
- Forbs: 26%
- Shrubs: 17%
- Litter: 9%
- Moss/Lichen: 3%
- Rock: 6%
- Bare Ground: 6%
Was developed to describe annual grazing use, interpret annual grazing effects, and to aid in planning the grazing pattern for the following year.

Understanding plant physiology and plant response to grazing is essential in the development of unit management plans; with this there is a need for a monitoring tool that adequately estimates rangeland use due to grazing.

Must not only access how much of the plant was grazed but also when the plant was grazed and how many times it was defoliated during the growing season.

GRI is an effective tool to assess grazing systems or complications associated with situations such as early season big game use followed by livestock use.

Consequently, GRI is based on general determinations of annual grazing use, and is not intended to be the only method for resolving major conflicts.

GRI considers three key concepts related to plant health: frequency, intensity, and opportunity.
GRAZING RESPONSE INDEX

- **Frequency** - the number of times plants are defoliated during grazing period
- **Intensity** - the amount of leaf material removed during grazing period
- **Opportunity** - the amount of time plants have to grow prior to grazing or regrow after grazing.

- **Dependent on the length of time plants are exposed to grazing animals:** Approx. 7-10 days required for a plant to re-grow enough to be grazed again during late spring or early summer when plants experiencing rapid growth.
- **Utilization:** the primary concern is the amount of photosynthetically active leaf material remaining for the plant to recover from grazing.
- **Opportunity is the one factor most highly related to long term health and vigor of the vegetation.**
Grazing Response Index

- GRI gives a more comprehensive basis to plan future use that will maintain or improve plant health, structure, and vigor.

- Overall Rating of the expected response to grazing is the sum of all three values. The index is a simple method to evaluate whether the grazing system has long-term beneficial, neutral, or harmful effects to the rangeland forage.
Vegetation provides streambank protection, traps sediments, contributes to rebuilding degraded stream channels, and ensures residual forage and habitat.

Retaining an adequate amount of standing herbaceous vegetation (stubble) along the streambanks and within the primary floodplain slows overland water flow velocity from winter and spring runoff, traps and retains sediments necessary to build and maintain streambanks.

Occurs on predetermined key species in key areas.

STUBBLE HEIGHT
STUBBLE HEIGHT

Procedure:

- Measure key species in key area, paced through the area along a predetermined course or transect.
- Determine how many paces (2 steps) for sample interval and begin pacing the transect.
- Locate the plant nearest the toe of your boot. Record the average stubble height (leaf length) for each key species.
- Record a minimum of 36 stubble heights.
- Total the measurements for each column and divide by the number of plants sampled for each species to get average stubble height.
GREENLINE STABILITY

Procedure:

• Locate transect along a stream reach representative of the area and of streams being sampled. The gradient, soil conditions and stream shape should be fairly consistent.

• Permanently mark the transect, it begins on the right side of the stream (downstream).

• Take a photo looking down the transect.

• Sample for 363 feet along the greenline, recording the community encountered at each pace on the form.

• At the end of the downstream transect, cross and sample the other side back along the upstream greenline (left-side).
**GREENLINE STABILITY**

**DATE:** 7/10/2002  
**UNIT NAME / #:** Dunoir  
**PASTURE NAME / #:** West Dunoir  
**TRANSECID:** WD2  
**TRANSEC NAME:**  
**GPS LOCATION:** UTM 0588430  4845552 Zone 12T  
**OBSERVER:** TSS - Green Group

<table>
<thead>
<tr>
<th>EXISTING COMMUNITY TYPE</th>
<th>VALUE</th>
<th>DOT TALLY</th>
<th>COUNT</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANCHORED ROCK/LOGS</td>
<td>10</td>
<td>17</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>TREES (coniferous &amp; deciduous)</td>
<td>7</td>
<td>1</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>WILLOWS</td>
<td>8</td>
<td>15</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>OTHER SHRUBS (sagebrush, cinquefoil, etc)</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>WET SEDGES &amp; RUSHES</td>
<td>9</td>
<td>6</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>OTHER SEDGES</td>
<td>4</td>
<td>3</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>WET GRASSES (exp. Hairgrass, canarygrass, reedgrass, cordgrass)</td>
<td>8</td>
<td>2</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>OTHER GRASSES (exp. biggrass, redtop, bentgrass, barley, muhly)</td>
<td>3</td>
<td>51</td>
<td>153</td>
<td></td>
</tr>
<tr>
<td>Sandbars, loose rock, bare soil (unvegetated areas)</td>
<td>1</td>
<td>16</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL** 111 543  
**NUMERIC RATING** 4.93

Multiply the value for each community type by the number of tally points (count) to get the rating. Sum all the ratings and divide by the total count (number of paces) to get the numerical rating. Use the table below to determine overall stability rating for the riparian/stream reach sampled.

<table>
<thead>
<tr>
<th>Numerical Rating</th>
<th>Stability Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-10</td>
<td>Excellent (Very High)</td>
</tr>
<tr>
<td>7-8</td>
<td>Good (High)</td>
</tr>
<tr>
<td>5-6</td>
<td>Moderate</td>
</tr>
<tr>
<td>3-4</td>
<td>Poor (Low)</td>
</tr>
<tr>
<td>0-2</td>
<td>Very Poor (Very Low)</td>
</tr>
</tbody>
</table>

**DIRECTIONS TO SITE:**
QUESTIONS??