

## **WILDERNESS INSTITUTE WILDERNESS CHARACTER MONITORING PROTOCOLS -2013**

The following wilderness character monitoring protocols were developed by the Wilderness Institute ([www.cfc.umt.edu/wi](http://www.cfc.umt.edu/wi)) as a guideline for the collection of field data related to certain measures of wilderness character. These protocols do not include measures of wilderness that involve non-field measures, professional expertise, or resources or equipment beyond basic observational data-collection.

For all features, a GPS reading (point, area, or line) is taken (e.g. Weed\_Area, Campsite\_Point, NST\_line), recording date, time and location. Additional attributes of a feature are indicated in capital letters and are distinct data fields within the Wilderness Institute database/data dictionary. Unless otherwise described, the notes sections for each field is optional and can be used to record anything unusual or not fully reflected in the other data collected.

### **Weeds** (Weed\_Point, Weed\_Line, Weed\_Area)

Weeds are collected as point, line or area features, following these criteria: Weed\_Point is used to map an area less than 2 x 2 ft (1-5 single plants), with a radius of 1 foot. Weed\_Line is used to map a larger patch that follows a linear trail (note that an average width of the line, in feet, is required, and notes section should include whether infestation is center, right or left of line). Weed\_Area is used to map patches larger than 2 x 2 feet that do not follow a linear route. When multiple species are found in the same area, data must be collected separately for each species. The following attributes are collected for all weed patches (except 6 below, as noted).

1. **Collector** (WEED\_COLLECTOR): This attribute identifies the Wilderness Institute as the collector of this data.
2. **Landowner** (WEED\_LANDOWNER): Choose from USFS, private, state of MT, or municipal. USFS is the default.
3. **Weed Unit** (WEED\_UNIT): Choose from Beaverhead-Deerlodge, Lolo or Bitterroot National Forests.
4. **Commons Species Name** (WEED\_SPP): Correctly identify and record the common name of the weed species. (Note: If there is more than one weed species present in the same location, record separate points and attributes for each species.)
5. **Spatial Distribution of Weed** (WEED\_DIST): Choose from none found, single individual (one plant), clumpy (one dense patch), scattered-patchy (patches scattered across area of infestation), scattered-even (weeds scattered but evenly distributed across area of infestation). PLEASE NOTE: USE "NONE FOUND" WHEN NO EVIDENCE IS FOUND OF A WEED PATCH RECORDED PREVIOUSLY (enter only fields 1 through 5).
6. **Width or Radius of Infestation** (WEED\_RADIUS): For Weed\_Line and Weed\_Point, width of linear patch or radius of non-linear patch (radius only if polygon not taken; in feet).
7. **Weed Density** (WEED\_DENSITY): Select a numeric value between 1 and 100 that estimates the amount of area within the infestation that the invasive species is covering.

8. **Phenology** (WEED\_PHENOLOGY): Identify and record life history phase of plant within following phases:
  - leaves/rosette present: at least 3 leaves have fully unrolled (are flat) and you can see stem (petiole at base)
  - first flower (flower buds are visible on the flower, and at least 3 have a few open flowers – you can see the anthers)
  - peak flowering (at least 50% of the plants with flower buds have open flowers)
  - end flowering (greater than 50% of the plants have flowers or have flowered – no plants in the patch have open fresh flowers)
  - first ripe fruit (fruit refers to any seed vessel; if the plant has any sort of mature seed, capsule, or berry present it is in the fruiting phase of its life history)
  - all leaves withered (the leaves and stems seem dry, and the plant is no longer producing flowers or fruits)
9. **Disturbance** (WEED\_DISTURB1/DISTURB2): Record up to two disturbance types that are present in the area and likely vectors of the infestation. DISTURB1 should be the most obvious/prominent disturbance. Disturbance types may include: trail, trailhead, recent fire, recent windthrow, recent flooding, mine, timber harvest, stock, rodents, road, game trail, cabin, campsite, other, or undisturbed.
10. **Dominant Life Form** (WEED\_DOM\_LIFE): Establish whether other plants within the area of infestation mostly consist of: conifers, broadleaf trees, woody shrubs, graminoids (grasses), or forbs (herbaceous, non-woody, leafy, flowering plants).
11. **Ecosystem type** (WEED\_ECOTYPE): Choose from wet meadow, grassland, forest, alpine, riparian, scree. Forest= >10% tree cover; alpine=above tree line; riparian=areas near streams and rivers within floodplain/highwater mark. *If forest, proceed through features 12-16. If riparian, skip to feature 16. If grassland, wet meadow or alpine, skip to 17.*
12. **Percent Tree Cover** (WEED\_TREECOV): Choices are <25%, 25-50%, 50-75%, >75%
13. **Pfister Habitat Series** (WEED\_HAB\_SERIES). Using the series key from *Forest Habitat Types of Montana* by Robert Pfister establish the habitat type series (regenerating tree species) of the area in which the infestation occurs (plot of 11m radius centered on infestation). Note that this should only be done for forest ecosystems.
14. **Pfister Habitat Type** (WEED\_HAB\_TYPE): Also using *Forest Habitat Types of Montana* by Robert Pfister, follow the habitat type key (after establishing the series) to determine habitat type. Note that this should only be done for forest ecosystems.
15. **Pfister Habitat Phase** (WEED\_HAB\_PHASE): Using the *Forest Habitat Types of Montana* key identify the understory phase, if applicable. Not all habitat types have phases. Note that this should only be done for forest ecosystems.
16. **Dominant Overstory Species** (WEED\_DOM\_OVER1/DOM\_OVER2/DOM\_OVER3): Identify up to three dominant overstory species if >10% is represented in the plot (plot size is 11m radius centered on infestation). This applies to forest and riparian ecosystems. Use forest service 4-6 character acronym for each species.
17. **Dominant Understory Species** (WEED\_DOM\_UNDER1/DOM\_UNDER2/DOM\_UNDER3): Identify up to three dominant understory species if >10% is represented in the plot. This

applies to all ecosystem types, noting that in grasslands, wet meadows, alpine and some riparian, there may be no overstory. Use forest service 4-6 character acronym for each species.

18. **Tree Structure** (WEED\_STRUCT1/STRUCT2):
  - STRUCT 1**- Establish the diameter in inches of largest tree within 15 feet of infestation
  - STRUCT2**- Establish the diameter in inches of the largest tree within 50 feet of the infestation \*Diameters include: no trees, 0-5, 5-9, or >9 inches.
19. **Distance from Water** (WEED\_WATER): Indicate whether the infestation lies within 0-10, 10-50, or >50 feet from the closest water source.
20. **Actions** (WEED\_ACTIONS): Indicate which of the following actions were taken to manage the infestation: none, patch 0-10% pulled, patch 11-20% pulled, patch 21-30%, patch 31-40% pulled, patch 41-50% pulled, patch 51-60% pulled, patch 61-70% pulled, patch 71-80% pulled, patch 81-90% pulled, patch 91-100% pulled, pulled/reseeded, seed heads collected. There is a specific field protocol for choosing to take action on an infestation (see below).
21. **Bio-control** (WEED\_BIOCONTROL): Enter detected or not detected. Enter any further detail (abundance, brief description) in notes section below.
22. **Weed Photo** (WEED\_PHOTO1/PHOTO2)
23. **Notes** (WEED\_NOTES): Enter observations not entirely captured by protocols; e.g. if patch has multiple species, if patch size is estimated due to difficulty circumnavigating the patch, abundance of biocontrol, etc.

### **Action Protocols**

Hand-pull or collect flower buds, flowers, and seed heads from weed infestations whenever feasible given time and manpower available. Hand-pulling can be effective even on rhizomatous species when small and newly established. Seed heads, flower buds, and flowers can be collected if time allows and stored in plastic bags and packed out. If appropriate local seed source is available and hand-pulling has created soil disturbance, reseed area.

### **Campsites** (Camp\_Point)

Campsite inventories follow established forest service protocols. For additional information, please refer to Anaconda Pintler Wilderness Campsite Monitoring directions and Site Impacts Worksheet (SIW) instructions. In conjunction with filling out the following fields, field crews manually fill out SIWs for each site, including a sketch of each site.

1. **Site Number** (CAMP\_ID): If revisiting previous site, manually enter site ID here. If documenting a new site, manually enter "new".
2. **Campsite Class** (CAMP\_CLASS): Summary description of level of user impact. Choose from: high impact, low impact, cannot find, naturalized.
3. **Campsite Occupied** (CAMP\_OCCUPIED?): Choose from drop-down menu yes or no. If campsite is occupied, go to 4 (below); if unoccupied, continue from 5 (below).

4. **Campsite Current Solitude** (CAMP\_SOLITUDE): From the vicinity of each occupied camp, count and enter the number of other occupied camps within sight or continuous sound. (Continuous sound refers to sounds like conversation or routine camp activities that can be regularly heard from one campsite to the next.) If you are working in the same area for several days, complete the survey (items 1-4) each day. Thus, if a group camped on more than one day, there will be data recorded for that camp once per day. It is essential that all occupied campsites be recorded – **regardless of whether or not there are other groups camping within sight or continuous sound** – so that data will be accurate. If no other occupied camps are within sight or continuous sound of an occupied site, enter a “0”.
5. **Landform** (CAMP\_LANDFORM): Choose from floodplain, other valley bottom, cirque basin, sideslope, ridgetop, lakeside, stream saddle, meadow, other.
6. **Type of Use** (CAMP\_TYPE): Choose from foot, river, stock, outfitter, multiple, other.
7. **Closest Water Source** (CAMP\_WATERSOURCE): Choose from creek, river, lake, other.
8. **Distance to Water** (CAMP\_WATERDIST): Enter numeric estimate in feet.
9. **Damage to Trees** (CAMP\_DAM\_TREES): Damaged trees are trees with obvious human or stock caused scars. Included are trees with broken off branches, nails, wire, rope burns, ax marks and trees that are girdled, cut down or killed. A stump counts as a damaged tree. Establish how many trees associated with the core campsite have been damaged on the following scale: no more than broken lower branches; 1-9 damaged trees; 10-25 damaged trees; >25 damaged trees associated with site.
10. **Root Exposure** (CAMP\_ROOT\_EXP): Record the number of trees on the site with exposed roots caused by soil erosion or trampling by stock or humans. Many trees in shallow soils will have naturally exposed roots; compare with an unused adjacent area to help identify natural root exposure. Establish how many trees associated with core campsite have exposed roots on the following scale: none, 1-4 trees with roots exposed, 5-10 trees with roots exposed, or >10 trees with exposed roots.
11. **Development** (CAMP\_DEVELOP): Note: EXCLUDE FIRE RINGS. Choose from: no facilities; all facilities dismantled but remnants may be visible; primitive seat(s) present and/or facilities such as hitch rail and tent poles stored; more facilities present than in previous category.
12. **Cleanliness** (CAMP\_CLEAN): Establish the cleanliness of the site based on the following scale; no waste, manure, trash or fire scar; 1 fire scar/ring, or microtrash present, or human waste not obvious or manure not obvious; >1 fire ring/scar, or microtrash and some trash present, or human waste not obvious, or manure present; >2 fire rings/scars, or trash prevalent, or microtrash persistent, or human waste obvious, or manure prevalent.
13. **Social Trails** (CAMP\_TRAILS): Record number of social trails associated with campsites on the following scale (count any trail passing through the site as 1 trail): none; 1 discernible; 2-3 discernable; >3 discernable.
14. **Barren Area Estimate** (CAMP\_BARREN): Estimate the amount of barren area (living plants absent for 90% or more of surface area) of the main and associated camp areas using the following scale: none; < 300 sq ft.; 300-1,499 sq ft.; > 1,500 sq ft.

15. **Off Site Ground Vegetation Cover Percentage** (CAMP\_VEG\_OFF): Estimate percentage ground cover canopy coverage (forbs, grasses, woody shrubs, and trees less than one inch basal diameter) on a nearby, unimpacted area with similar ground cover plant species, soils, slope, landform, and aspect.
16. **Mineral Soil Exposed Area** (CAMP\_MIN\_ON): Estimate area of exposed mineral soil (area without live vegetation, duff, or organic dirt) on core campsite area. Choose from: 0 sq. ft; 1-36 sq. ft; 37-150 sq. ft; >150 sq. ft. Mineral soil is not fibrous, fluffy or light, but may be compacted, eroded or churned.
17. **Off Site Mineral Soil Exposure Percentage** (CAMP\_MIN\_OFF): Estimate percentage of the naturally exposed mineral soil on a nearby, unimpacted area with similar ground cover plant species, soils, slope, landform, and aspect.
18. **Photographs** (CAMP\_PHOTO#1; CAMP\_PHOTO#2): Take a photograph of the site from two locations to best capture what it looks like and overall impacts.
19. **Notes** (CAMP\_NOTES)

#### **Wildlife Encounters** (Wild\_Point)

Wildlife encounters focus on direct observations of focal species identified in species drop-down menu. Scat and track data should be collected only if it can be definitively identified to species.

1. **Species** (WILD\_SPEC): Record the following species observed with the common name (not latin), or species group. Encounters with wolves, mountain lions, lynx, bobcat, wolverine, fisher, marten, bears (grizzly or black), bighorn sheep, mountain goats, porcupine, hoary marmots, pikas, mule deer, elk, moose, and owls will be recorded. There are also fields for canid (dog), felid (cat), when scat or track data can be identified to specie group (family). NOTE: scat and track location data should only be collected for felids (cats), canids (dogs – not domestic), and moose. Be sure to photograph (with scale).
2. **Type of Observation** (WILD\_OBSTYPE): Type of sign will be noted. Choose from drop-down menu: aural, scat, carcass, shed or molt, track, visual, or visual and aural.
3. **Group Type** (WILD\_GROUP): Choose from drop-down menu: family, group, pair, single, unknown.
4. **Reproduction Status** (WILD\_REPRO): Choose from the drop-down menu: failed reproduction, non-reproducing, reproducing, unknown or non applicable.
5. **Observer Qualifications** (OBSERV\_QUAL): Describe observers expertise from drop-down menu: experienced, limited experience, no experience, taxon expert, unknown.
6. **Total detected** (WILD\_TOTAL): enter numeric total of number of individuals detected.
7. **Description/Notes** (WILD\_NOTES): Note additional interesting information about the encounter, such as activity, gender, and age of species encountered. Also coloration in the case of wolves and bears. For example: 3 grizzly bear, 1 sow and 2 cubs of the year; sow was light colored except for dark legs and cubs were dark brown; or 4 bighorn sheep consisting of 2 ewes, 1 ram, 1 lamb. Also note what the animal was doing, or in the case of pika, the more specific location. For example: pika heard in upper 1/3 of

rockslide above the large wolverine lake. For a scat siting, enter either large carnivore (cat/dog) or bear. If bear hair is collected for Wild Things Unlimited, detail notes here.

8. **Photo** (WILD\_PHOTO#1): Take photos of animals encountered, or tracks and sign; For tracks and scat photos, use a ruler in the photo as a frame of reference for size.
9. **Pika Detail1** (PIKA\_BEHAVIOR). Choose from drop-down menu: undetermined, courtship, reproduction, foraging, resting, vocalizing, standing, running.
10. **Pika Detail2** (PIKA\_HABITAT). Choose from drop-down menu: talus, forested area, grass-like types, disturbed areas, other.
11. **Pika Notes** (PIKA\_NOTES). Note if green haystacks were observed and how many. Record anything else notable.

### **Solitude Sample** (SolitudeSample\_Point)

This field is used when recording data within a pre-specified solitude sampling area. The intent is to capture location and time of when sampling session begins and ends.

1. **Sample Start** (Solitude\_Start): Record start time of sample in 24-hour clock.
2. **Sample Stop** (Solitude\_Stop): Record end time of sample in 24-hour clock.
3. **Sample Notes** (Solitude\_Notes): Enter any relevant notes relating to context of data collection (e.g. only 3 miles of trail was covered during sampling session due to....).

### **Encounters With People** (People\_Point)

Record encounters with distinct groups of people. Count all people seen or heard, no matter how close or far you are from them. If you hike past a camping group, include the number of people you see as traveling encounters (this includes administrative or outfitted camps – the idea is to document the impacts to visitors’ experiences). In this protocol, any group seen more than one time is considered an additional (new) encounter if more than 15 minutes have elapsed since the time the group was first seen.

1. **Activity** (PEOPLE\_ACTIVITY): Record the type of user. Choices include: hiker/backpacker, mountain bike, horse, ATV, motorbike, UTVs, Forest Service staff, other.
2. **Number** (PEOPLE\_NUMBER): Record the number of people seen within this one encounter.
3. **Packstock Number** (PACKSTOCK\_NUMBER): Record number of packstock in party
4. **Ridingstock Number** (RIDING\_NUMBER): Record number of riding stock in party.
5. **Trip length** (TRIP\_LENGTH): Use drop-down menu to select overnight or day trip.
6. **Notes** (PEOPLE\_NOTES): In case of an encounter with a Forest Service staffer, record in this optional notes section, what they are doing.

### **Trailheads** (TH\_Point)

Trailhead point data should be collected at the time of entry and at the time of exit (provided these are on different days).

1. **Trailhead Name** (TH\_NAME): Assign a name and/or number to the trailhead.
2. **Total Vehicles** (TH\_TOT\_NUMBER): Record number of total vehicles, INCLUDING project vehicle.
3. **Horse Trailers** (TH\_HORSE\_NUMBER): Record total number of horse trailers.
4. **Notes** (TH\_NOTES)

### **Noise** (Noise\_Roving\_Point)

Note: no need to collect data from trails leading into Wilderness. Airplane data should only be recorded if the plane is heard (e.g. do not collect data on a sighting only). Collect opportunistic noise points between campsites or from Wilderness boundary to campsite.

1. **Source** (NOISE\_SOURCE): Select from airplane, ATV, chainsaw, helicopter, motorbike, UTV, automobile (from road), cattle, other, unknown.
2. **Duration of noise** (NOISE\_DURATION): Select from distinct categories of time: under 1 minutes, 1-5 minutes, 5-10 minutes, >10 minutes, other.
3. **Intensity** (NOISE\_INTENSITY): Select between the following options to characterize the intensity of the noise: Barely audible (very soft and far away), can hear clearly (moderately near), loud and close (seems to be within a mile), or variable (for sounds that get substantially louder or softer).
4. **Visual Confirmation** (NOISE\_VIS\_CONF): Indicate whether source was confirmed by siting (yes or no).
5. **Notes** (NOISE\_NOTES): Optional field to record additional information, such as multiple noises/sources of noise occurring at the same time. If there is no visual confirmation but source is clearly identifiable (e.g. helicopter), enter suspected source here.

### **Noise** (Noise\_Sample\_Point)

Noise samples will be collected from a static point for a period of fifteen minutes. One person will be tasked with collecting sound for the day. Noise samples will be collected at 8:00 A.M., 1:00 P.M., and 7:00 P.M. Use a stopwatch and notebook to take notes on all sounds and their duration. Following the data collection period, data is entered into the GPS unit using the below entries. When collecting noise samples, be sure to time the duration of each noise so the data can be quantified into the total amount of time the natural soundscape is interrupted during the 15 minute window. If more than 3 sounds are recorded during the sample, indicate relevant details in notes section.

1. **Noise Sample Session** (NOISE\_SESS): Select from drop down: morning, mid-day, evening.
2. **Noise Sample Start** (NOISE\_START): Indicate start time for 15 minute sample in 24 hour clock (e.g. 0700, 1302, 1901).

3. **Presence/absence** (NOISE\_HEARD?): Select noises heard or no noises heard from drop-down menu. If no noises are heard, no further entries are required.
4. **Source** (NOISE\_SOURCE\_1): Select from airplane, ATV, chainsaw, helicopter, motorbike, UTV, vehicle (from road), cattle, human, other, or unknown.
5. **Duration of Noise** (NOISE\_DURATION\_1): Enter duration of noise in seconds (e.g. 4 min = 240 seconds).
6. **Intensity** (NOISE\_INTENSITY\_1): Characterize noise intensity : Barely audible (very soft and far away), can hear clearly (moderately near), loud and close (seems to be within a mile), or variable (for sounds that get substantially louder or softer).
7. **Visual Confirmation** (NOISE\_CONF\_1): Indicate whether source was confirmed by sighting (yes or no).
8. **Notes** (NOISE\_NOTES\_1): Optional field to record additional information. If there is no visual confirmation but source is clearly identifiable (e.g. helicopter), enter suspected source here. Enter the exact time that the sample started and ended.
9. **Source** (NOISE\_SOURCE\_2) See above.
10. **Duration of Noise** (NOISE\_DURATION\_2) See above.
11. **Intensity** (NOISE\_INTENSITY\_2): See above.
12. **Visual Confirmation** (NOISE\_CONF\_2): See above.
13. **Notes** (NOISE\_NOTES\_2): See above
14. **Source** (NOISE\_SOURCE\_3): See above.
15. **Duration of Noise** (NOISE\_DURATION\_3): See above.
16. **Intensity** (NOISE\_INTENSITY\_3): See above.
17. **Visual Confirmation** (NOISE\_CONF\_3): See above.
18. **Notes** (NOISE\_NOTES\_3): See above.

### **Visual Intrusions from Wilderness Area** (VI\_Point)

1. **Type** (VI\_TYPE): Record any human development outside the Wilderness Area that you can see while inside the Wilderness Area. Choices include: buildings, highways, powerlines, lights at night, cities/towns, dirt road, clear cut, towers/repeaters, rural/agricultural, or railways. Seeing your trailhead or road from the first quarter mile of trail does not need to be recorded. Do not record any moving items (e.g. high-flying airplanes).
2. **Photo** (VI\_PHOTO): If possible, take photo of visual intrusion.
3. **Notes** (VI\_NOTES): Describe how long you are seeing the intrusion. In this way you can map the point and continue on, going back to edit this notes section when you no longer see the visual intrusion. Describe where the visual intrusion ends in such a way, "Road is visible until drop down into saddle between Fox Peak and Congdon Peak." If it is the same visual intrusion but disappears and reappears later down the trail it should be mapped as a new point. Note direction of visual intrusion from trail.

### **Trail Width and Condition** (TW\_Point or TW\_Line)

This field is used to record the condition of the trail, when it deviates notably from single-track. Each time the trail varies from a single track trail, a trail width point or line is created, depending on circumstance. For example, when trail width is collected on a nonsystem trail (during collection of a line), start and stop points will be taken. On system trails, line or start/stop data may be taken depending on other data collection needs. Note: also use this field to capture severe trail erosion events that result in significant impacts to either user experience (e.g. deep gullies make trail navigation difficult) or the natural environment surrounding the trail corridor (e.g. erosion is significantly impacting adjacent areas).

1. **Name** (TW\_NAME): Provide a name for the evidence so it can be linked with its finish point. The name should include the trail number and an assigned number for the segment being monitored (e.g. TW\_TR341#1).
2. **Type** (TW\_TYPE): Choose from: double track, braided/multiple trails, old road bed, failed in-trail feature, standing water in trail, erosion on trail. When collecting start/stop data, the classification is representative of the trail for the entire distance until another point is recorded. Trail where there is no width entry is assumed to be single track trail.
3. **Start and Finish points** (TW\_START/END): On the menu select start or finish depending on if the designated trail width category (above) has just started or ended. Note: this is only necessary when collecting point (start/stop) data.
4. **Notes** (TW\_NOTES): If a trail is widening or eroding severely, such that it is becoming a resource issue (negatively impacting the ecosystem) or degrading the 'apparent naturalness' of the area then it should be noted here, and photographed.

### **Water Erosion** (Water\_Point)

1. **Landform** (WATER\_LANDFORM): Select whether the area impacted is a stream, spring, wetland, pond, or lake. Note that this point is taken only at sites where there is human-caused erosion or impact along a natural water body.
2. **Stream Width** (WATER\_WIDTH): For streams only. Measure width at the high water mark (in feet) immediately upstream of trail.
3. **Pond, Lake, Wetland Size** (WATER\_ACRES): Estimate acres for all non-stream water-features (Note: 0.1 acre = 66' per side when square or 37 foot radius; 1 acre = 209' per side when square or 118' radius; 5 acres = 467' per side or 263' radius).
4. **Erosion Severity** (WATER\_SEV): Only human caused stream erosion should be recorded. Most times when trails cross streams or are adjacent to water bodies, they cause some sort of erosion. Choose the severity of this erosion from the following choices.

Slight- Entry to stream channel shows signs of bank instability, such as muddy entries or some tread widening, but most of the bank and trail integrity is intact. Erosion of the trail entry and streambank scour is minimal. Channel width is less than twice natural channel width. *Stream channel width and characteristics (such*

*as depth, bank structure, vegetation, stream bottom material) return to normal within the distance of one natural channel width downstream of trail edge. Lake or pond shore shows some disturbance but bank form and function are still intact. Some bare soil and vegetation trampling. Disturbance is less than 20 linear feet of bank.*

Moderate- Entry to stream channel is showing moderate erosion or instability and tread is widened. Channel is more than twice the width of normal average channel width, and may continue to widen. Streamside vegetation outside of trailway is becoming impacted. Some scour of banks related to trail is evident. *Stream channel width and characteristics (such as depth, bank structure, vegetation, stream bottom material) return to normal within the distance of two natural channel widths downstream of trail edge. Lake or pond shore is disturbance and portions of the bank have sloughed off or collapsed. Mostly bare soil with little vegetation. Disturbance is less than 20 linear feet of bank.*

Severe- Entry to stream channel is entrenched and showing severe, active erosion. Stream channel is well over twice natural width, and appears to be actively widening. The trail is more than three times normal width and/or has multiple eroded points of entry. Severe bank scour is eroding trailway and banks on either side of trail. Streamside vegetation is impacted and large areas of sod and soil are missing. *Stream channel width and characteristics (such as depth, bank structure, vegetation, stream bottom material) return to normal in excess of the distance of three natural channel widths downstream of trail edge. Lake or pond shore shows signs of heavy use and most of the bank has sloughed off or collapsed. Mostly bare soil. Disturbance is greater than 20 linear feet.*

5. **Photos** (WATER\_PHOTO#1/PHOTO#2): Take photo(s) that best represent site (and concerns if any).
6. **Notes** (WATER\_NOTES): Describe site and any concerns identified.

### **Installations and Developments** (Dev\_Point)

This field captures all human-made developments found within the study area. Do not include in-trail features (erosion bars, etc.), but do include any constructed bridges or walkways.

1. **Type of Installation or Development** (DEV\_TYPE): Record type of development. Choices may include: bridges, restrooms, corrals, dams, repeaters, fences, old cabin, lookout, pole stash, cairn, or hitch rail, cache, insulated wire (to look-outs), mine adit, mine pit, mine trench.
2. **Condition of Installation or Development** (DEV\_COND): Record condition as excellent, good, fair, or poor.
3. **Who made the installation or development** (DEV\_SOURCE): Choose from user-created, agency-created, unclear.

4. **Photographs** (DEV\_PHOTO#)- Take a photograph of the development or installation to best capture what it looks like.
5. **Notes** (DEV\_NOTES): Expand on any relevant condition details.

#### **Signage** (Sign\_Point)

1. **Type of Sign** (SIGN\_TYPE): Note the type of sign you have come across. Choices include: trailhead, trail junction, interpretive, trail markers, flagging, survey marker, recreational use signs (allowable uses/closures- signs that describe what types of recreational use are permitted in which areas), boundary, user-created, other, unclear.
2. **Condition of Sign** (SIGN\_COND): Record condition only for signs with words or indicating allowable use. Assessments include: poor condition, vandalized- legible, vandalized- illegible, missing (post with no sign), faded- illegible, faded- legible, or good condition. **Photograph** (SIGN\_PHOTO#): Photograph all signs with words or indicating allowable use.
3. **Who made the sign** (SIGN\_SOURCE): Choose from user-created, agency-created, unclear.
4. **Notes** (SIGN\_Notes): Signs that occur intermittently or at consistent intervals along the trail such as snowmobile markers do not need to be mapped individually but can be mapped like a visual intrusion with one point and then notes about how long they extend along the trail. This section can also be used to record anything interesting or unusual about a sign.

#### **Trail Closure Devices** (Closure\_Point)

1. **Type of Trail Closure Device** (CLOSURE\_TYPE): Record the type of trail closure device. Choices include: locked gate, unlocked gate, berm, boulders, or fence.
2. **Evidence of Violations of Closure** (CLOSURE\_EVIDENCE): In this optional notes section write a short description of evidence (if it occurs) of violation of closure. Evidence might include visible tracks going around the closure or a broken closure with tracks going straight through. If this violation continues, you should also map it as a MotorUse\_Point (below).
3. **Photograph** (CLOSURE\_PHOTO1/PHOTO2): Take a photograph(s) of evidence of violation of closure if it exists.
4. **Notes** (CLOSURE\_NOTES)

#### **Evidence of Motorized or Mechanized Use on Trails** (MotorMech\_Point)

When evidence of motorized use is encountered, collect point data, with details in notes section indicating length of evidence. If single source appears to be creating multiple evidence points, collect one point but indicate in notes duration of evidence points. If it is unclear if evidence comes from a single source, collect multiple points and indicate ambiguity in notes section. NOTE: think about evidence in terms of presence/absence on a given trail segment; if

evidence persists from one trail segment to the next (e.g. you cross a trail junction and continue seeing tracks) collect a new data point.

1. **Point** (MOTORMECH\_POINT): Provide a name for the evidence, including the trail number and an assigned number for the track.
2. **Width** (MOTORMECH\_WIDTH): Indicate whether the trail is from a single track bicycle or motorbike, or a double track ATV or UTV.
3. **Photo** (MOTORMECH\_PHOTO): Indicate if photo is taken.
4. **Notes** (MOTORMECH\_NOTES):

### **Non-System Trails** (NST\_LINE)

Use the line function to walk the length of the non system trail. Pause collection of line to collect additional attributes as needed. .

1. **Type of Non-System Trail** (NST\_TYPE): Note what sort of impact made the non-system trail. Choices include: motorbike, ATV/UTV, horse travel, foot travel, livestock, unclear. It is not necessary to walk game trails even if they are well developed.
2. **Old Route/New Route** (NST\_VECTOR): Note whether or not the non-system trail was created by recreation or is following an old logging, fire access, or mine road.
3. **Finished/Not Finished** (NST\_FINISH): Note whether or not you were able to walk the entire distance of the non-system trail.
4. **Notes** (NST\_NOTES)

### **Sensitive Plant Species** (Sensitive\_Point)

1. **Name** (SENSITIVE\_NAME): Indicate the species name (see list for Anaconda Pintler and/or Welcome Creek)
2. **Population** (SENSITIVE\_POP): Use the drop-down menu to find the appropriate size class to categorize the population of sensitive plants. Choose from <10, 10-100, >100 individuals.
3. **Phenology** (SENSITIVE\_PHENOLOGY): Identify and record life history phase of plant from drop-down menu (see categories in weed section, above).
4. **Ecosystem type** (SENSITIVE\_ECOTYPE): Choose from wet meadow, grassland, forest, alpine, riparian, scree. Forest= >10% tree cover; alpine=above tree line; riparian=areas near streams and rivers within floodplain/highwater mark. *If forest, proceed through features 6-8. If not forest, skip to 9.*
5. **Percent Tree Cover** (SENSITIVE\_TREECOV): Choices are <25%, 25-50%, 50-75%, >75%
6. **Pfister Habitat Series** (SENSITIVE\_HAB\_SERIES). Using the series key from *Forest Habitat Types of Montana* by Robert Pfister establish the habitat type series (regenerating tree species) of the area in which the infestation occurs (plot of 11m radius centered on infestation). Note that this should only be done for forest ecosystems.

7. **Pfister Habitat Type** (SENSITIVE\_HAB\_TYPE): Also using *Forest Habitat Types of Montana* by Robert Pfister, follow the habitat type key (after establishing the series) to determine habitat type. Note that this should only be done for forest ecosystems.
8. **Pfister Habitat Phase** (SENSITIVE\_HAB\_PHASE): Using the *Forest Habitat Types of Montana* key identify the understory phase, if applicable. Not all habitat types have phases. Note that this should only be done for forest ecosystems.
9. **Notes** (SENSITIVE\_NOTES): Note any obvious threats to this population.
10. **Photo** (SENSITIVE\_PHOTO)

### **General Point**

### **General Line**

### **Hardcopy Backup Forms**

1. **Numbers:** At the beginning of each trip a new data file should be started and named. This should correlate to the name of the trip, generally some sort of prominent geographic feature and the Wilderness Areas (i.e. Weasel Creek-SWSA). Once a file has been opened, you should not exit out of that file for the remainder of the trip. Once a file is started, the GPS unit begins to number the points recorded in the order they are taken, thus the first thing recorded will be 1 etc. If you lose track this number can be found in the top left of the bar that has the 'OK' and 'Cancel' buttons.
2. **Maps:** Each of the GPS units will have an accompanying hardcopy set of USGS quads representative to the area being covered. When a point is entered into a GPS unit, a dot and the point number (described above) should be written onto the quad representative of where the point was taken. That quad should then only have points from that GPS unit drawn onto it for the remainder of the trip.
3. **Notebooks:** In a separate pocket notebook (one for each GPS unit and quad set) the point number and type of point is recorded. The notebooks are back up and they are meant to be descriptive to help you remember what you recorded. For example, if you are taking a point of a lookout under the Installations/Developments menu, you could record in the notebook...

1. Bare Cone Lookout

In the case of weeds more information is recorded in the notebooks. Species common name, acres, and percent infested will be recorded. So for example, the entry in your field notebook would look like this:

1. Leafy Spurge .01 10%