

## Transect 1. Lowder Mountain (LWDR 1).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 570005, 4879856	1680	10 T 570047, 4879913	1686
Transect bearing (deg): 37	Transect length (m): 76.0	Rebar locations (m): 0.0, 10.0, 21.0, 30.0, 40.0, 50.0, 76.0	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Turn L at the top of Cougar Dam and drive east along the E Fork of the McKenzie River on Rd 1993. Rd 1993 eventually turns sharply to the S. Continue S for ~2.5 mi until the intersection w/ Rd 555 (which heads sharply back to the N). Park at intersection—this is the trailhead to Lowder Mountain (via Walker Creek Trail, #3329 on Wilderness map), and to Quaking Aspen Swamp (transects 11 and 12).
2. Hike: Hike W ~2.5 mi along Walker Creek Trail to intersection with Lowder Mountain trail (trail #3330).
3. Trail up Lowder Mountain is short and steep. Upon reaching the top (plateau) take a bearing of 8 deg; this should point to the most distant (and largest/tallest) clump of TSME —this is the high point of Lowder Mountain.
4. Upon reaching large TSME clump (forest), enter the stand to W of invading front of ABLA2 which lies S of TSME. Take a bearing of ~12 deg and pace ~30 m from opening to largest TSME.
5. This TSME is tagged #801 on its N side. **Rebar beneath TSME, ~1 m to the NE, marks beginning (0 m) of transect. 1993 note:** now aluminum rebar.
6. Tree tags #801-811 on large trees; all face meadow to the N. **#801 is behind the rebar, not on the transect.** Tag #811 is at the base of the tree.

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the L side of transect between 0-1 m marks. Plots are consecutive to the end of the transect, alternating L and R: P2 is from 1-2 m on the R, P3 is from 2-3 m on the L, etc. (odd number plots on the L, even number plots on the R). Last cover plot is 76R.

**Belt width for tree sampling (1983, 1993, and 2009):** see details in [TP06413\\_tree sampling history.xlsx](#)

### Additional 1993 notes:

- Reestablished start point rebar.
- Reestablished copper pins #1, 2, 3 (#1 found on the ground). All replaced with aluminum rebar.
- Some trees are tagged facing away from meadow.
- Other comments on cover forms: heavy snow loads; most stems are bent at the base and some are snapped and leaning; lots of gopher activity in meadow.

### Additional 2009 notes:

- Meter tapes run 0-50 m, 50-76 m.
- Trees sampled to 6 m on L and R, tagged all stems >2 yr old. Talled but did not measure seedlings <2 yr old. Did not move old tags.
- Hot temperatures. In the meadow grasses are in full seed, Calochortus has senesced. Substantially less Stipa in open meadow than in 1983 or 1993 (based on photos).



Looking N → S toward ecotone and old forest. Right photo: 1993; left photo: 2009

## Transect 2. Lowder Mountain (LWDR 2).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 569873, 4880022	1684	10 T 569950, 4879967	1676
Transect bearing (deg): 119	Transect length (m): 93.0	Rebar locations (m): 0.0, 20.0, 35.0, 50.0, 70.0, 80.0, 93.0	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Turn L at the top of Cougar Dam and drive east along the E Fork of the McKenzie River on Rd 1993. Rd 1993 eventually turns sharply to the S. Continue S for ~ 2.5 mi until the intersection w/ Rd 555 (which heads sharply back to the N). Park at this intersection—this is the trail head to Lowder Mountain (via Walker Creek Trail, #3329 on Wilderness map) and to Quaking Aspen Swamp (transects 11 and 12).
2. Hike: Hike W ~2.5 mi along Walker Creek Trail to intersection with Lowder Mountain trail (#3330).
3. Trail up Lowder Mountain is short and steep. Upon reaching the top (plateau) follow rock cairns to opposite side of Lowder Mountain (NW corner) to the point where the Walker Creek Trail descends off the back side of Lowder Mountain. Alternatively, from the center of the TSME forest from which Transect #1 originates, take a bearing of 306 deg to approximate location of same descent point of Walker Creek Trail.
4. From cairn, trail heads magnetic N (20.5 deg E at the time). Follow trail for ~50 m; look to L for large TSME (1.2 m dbh) (largest TSME; chunk of bark off at dbh). Rebar lies directly under this tree. Transect crosses the trail ~5 m from this tree.
5. Square aluminum flasher with transect description is on tree #814, faces away from trail.
6. Tree tags #812-816 all face away from trail (tags #812 and 813 are at tree bases).
7. Transect bearing is 119 deg (corrected from 115.5) from rebar through original copper pin #1 (at 12.2 m, still in place in 2009, accompanied by aluminum rebar) to original copper pin #2 (at 29.8 m). Original copper pin #1 is in TSME forest and pin #2 is in TSME reproduction. **1993 update:** pin #1 dropped; pin #2 replaced with rebar. Bearing to former pin #1 point at 12.2 m is 119 deg (corrected from 115.5).
8. Transect bearing is **118.5** deg from original copper pin #2 to copper pin #3 (at 47.8 m); copper pin #3 is in *Festuca viridula/Arenaria capillaris* meadow. **1993 update:** dropped copper pin #2; established rebar at 25.0 m.
9. Transect bearing is **121.5** deg from original copper pin #3 to copper pin #4 (at 92.8 m); original copper pin #4 is in *Festuca viridula/Calochortus subalpinus* meadow. **1993 update:** dropped copper pin #3; established rebar at 50.0 m.

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the L side of transect between 0-1 m marks. Plots are consecutive to the end of the transect, alternating L and R: P2 is from 1-2 m on the R, P3 is from 2-3 m on the L, etc. (odd number plots on the L, even number plots on the R). Last cover plot is 93L.

**Belt width for tree sampling (1983, 1993, and 2009):** see details in [TP06413\\_tree sampling history.xlsx](#)

### Additional 1993 notes:

- Nails need to be replaced.
- Bearing from start point to point #1 (12.2 m) is 119 deg.
- Dropped copper pins #1 at 12.2 m (2009 note indicates that pin is still in place), #2 at 29.8 m, and #3 at 47.8 m; established rebar #2 at 25.0 m and #3 at 50.0 m.
- Couldn't find pin #4 at 92.8 m. Established rebar #4 (end point) at 93 m.

### Additional 2009 notes:

- Easily found the transect from the trail crossing the top of LWDR MTN, at fork head into the forest.
- Flasher no longer present at origin.
- Copper pin at 12.2m was still in place & aluminum rebar
- Could not find rebar @ 93m, resurveyed from 50m and installed new rebar.
- For sampling, tapes run 0-50m, 50-93m
- Tree tags #356-368 are new tags. Beneath, on ground is #856, old tag at tree base.
- Rebar at 50 m flagged.
- Can't find rebar @ 93 m; resurveyed from 30 m, installed new rebar.



Looking W → E where transect crosses ecotone (1993 photo)

### Transect 3. Yankee Mountain (YANK).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 569715, 4879568	1602	10 T 569737, 4879519	1564
Transect bearing (deg): 158	Transect length (m): 67.7	Rebar locations (m): 0.0, 16.9, 26.5, 40.0, 49.1, 50.0, 67.7	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Turn L at the top of Cougar Dam and drive east along the E Fork of the McKenzie River on Rd 1993. Rd 1993 eventually turns sharply S. Continue S for ~ 2.5 mi until the intersection w/ Rd 555 (which heads sharply back to the N). Park at this intersection—this is the trail head to Lowder Mountain (via Walker Creek Trail; #3329 on Wilderness map) and to Quaking Aspen Swamp (transects 11 and 12).
2. Hike: Hike W ~2.5 mi along Walker Creek Trail to intersection with Lowder Mountain trail (#3330).
3. Continue ~0.1 mile past intersection with Lowder Mountain trail to the first meadow upslope of trail with concave topography (in the horizontal plane, i.e., cross-slope). The transect lies in the main draw of this meadow (see photo pair).
4. Head toward the opening to R of large snag at the top of the hill where forest begins (snag has branches only in the top 20% of the crown). ~50 m to the L of this snag is another tall snag that has all of its branches to its base.
5. Transect emerges from forest across a large log with diameter ~1 m.
6. Rebar #5 (end point of transect in meadow), lies directly uphill (unknown distance) from a 2-m wide patch of *Holodiscus discolor*, and is directly in line with opening in forest above (see photo pair).
7. Small, 3-m tall PSME (in 1983) lies 2 m E of the transect and 5 m from rebar #5.
8. ~7 m W of the PSME and ~2 m uphill is a larger, 5 m tall ABGR.
9. In the forest, a square aluminum flasher on tree #817 contains the transect description.
10. Tree tags #817-819 all face downhill.
11. Rebar #1 is at 0.0 m in forest (**2009 note:** above flasher, base of ABGR; rebar needs replacing, bent).
12. Rebar #2 at 16.9 m (**2009 notes:** beneath small rock outcrop, under small ABGR #133. Large ABGR #819 now a snag; ACGL clump).
13. Rebar #3 is at 26.5 m in opening with tree reproduction, *Sedum spathulatum*, and rocky soil. (**2009 note:** needs to be replaced).
14. Rebar #4 is at 49.1 m in meadow at *Rubus parviflorus/Bromus carinatus/Cirsium callilepes* edge.
15. Rebar #5 is at 67.7 m in *Eriophyllum lanatum/Bromus carinatus* meadow (**2009 note:** now under edge of PSME canopy).

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the R side of transect between 0-1 m marks. Plots are consecutive to the end of the transect, alternating R and L: P2 is from 1-2 m on the L, P3 is from 2-3 m on the R, etc. (odd number plots on the R, even number plots on the L). Last cover plot is 67R even though rebar is at 67.7 meters (last 0.7 m are not sampled).

**Belt width for tree sampling (1983, 1993, and 2009):** see details in **TP06413\_tree sampling history.xlsx**

#### Additional 1993 notes:

- 6/27: Transect was relocated with all rebar present.
- Additional notes, but for 2009, these can be ignored: For trees, transects widened by 5 to create a 6-m wide transect; additional 5-m was placed to the W-side of transect. New Transect 3A was established W of original line. Aspect 346 deg, distance of 80 m from forest → meadow). Transect 3A: we decided after starting that the accessory transect was not going to cover enough forest individuals. The 0 point of the transects runs 1 m by tree 199 on the W side. ABGR 197 is at 23 m and transect passes ~10 cm on W side. ABGR 198 marks end of the transect which runs ~1.5 m W. Negative transect values run uphill from 0 point to ~15 m and tree #156 marks upslope-most tree (not on transect though). The whole transect 3A is ~30 m W of transect 3. Azimuth = 346 deg.

#### Additional 2009 notes:

- New rebar added a 40 and 50 m, did not add rebar with tape is off the ground (i.e., 20 and 30 m); replaced rebar at 0, 26.5, 49.1 and 67.7 m.
- For sampling, tapes run 0 – 50 m, 50 - 93 m
- Tape run 0 - 50 m, difficult on steep wooded slope. Tape somewhat slack to rebar @16.9 m. Tape clamped at precise distances on rebar, some microplots seemed off by ~0.25 m. Tape seemed loose at 0 - 50 m, 50 - 67.7 m.
- Significant species gain/loss in forest; significant vegetation change in open meadow, presumably due to RUPA; did not find any *Polygonum* species or *Nemophila*. Very dry annuals in meadow (LIBI, GABI).
- All trees >2 year old tagged and measured on R and L side to 1 m; trees <2 yr old tallied within 1 x 1 m belt.
- Tagged and measured all trees >10 cm DBH to 3 m on L and R resulting in some trees being tagged for the first time.

**Transect 3. Yankee Mountain (YANK) (cont.)**

- *Rhamnus* clump w/ many stems encountered – gave one tag and counted/measured all stems



View from trail uphill to transect location (1993 photo)

#### Transect 4. Olallie Meadow (OLAL).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 576500, 4875876	1544	10 T 576589, 4875807	1531
Transect bearing (deg): 126	Transect length (m): 120	Rebar locations (m): 0.0, 23.0, 50.0, 80.0, 93.0, 102.0, 120.0	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Turn L at the top of Cougar Dam and drive east along the E Fork of the McKenzie River on Rd 1993. Rd 1993 eventually turns sharply S. Continue S for ~2.5 mi until the intersection w/ Rd 555 (which heads sharply back to the N). Continue past the intersection w/ Rd 555 along Rd 1993 for ~2 miles. Park at "Pat Saddle" trailhead off Rd 5555 (goes to Olallie Mtn, Olallie Meadow and French Pete Creek).
2. Hike: Hike S along trail #3529, past intersection with trail to Olallie Mountain, then continue another 2.5 miles to Olallie Meadows (**2009 note**: this distance seems way off; map suggests <1 mile). Formerly, a guard station was situated ~1/4 E of the meadow near the head of Olallie Creek but was removed in the 1990s.
3. Upon making a slight E bend in trail and hitting the S edge of meadow (note clearing to the N with invading PICO), enter meadow next to the tallest ABGR on your L (this is essentially the forest edge).
4. From this ABGR take a bearing of 14 deg. End point of transect lies ~125 m from this ABGR.
5. Along the 14 deg bearing pass over large, downed log at ~18 m.
6. Stand on log. Along same 14 deg bearing, travel ~33 m to E edge of the tallest and furthest visible boulder to the N.
7. From boulder travel ~50 m on same bearing, and pass through one line of fairly dense pine at ~45 m from boulder.
8. End-point rebar (last point in meadow) lies ~2 m E of pine (fallen and decayed in 2009) and 1 m before bedrock along same 14 deg bearing.
9. Tree tags #820-842; all face meadow. #841, 842 are between #825, 826 on transect; #821 is off of transect.
10. Transect bearing is 306 deg from this meadow rebar to forest rebar. (*I don't understand this azimuth, CBH 2009*)
11. Six copper pins mark intermediate points between initial forest and final meadow rebar (**note 1993 updates**)
  - Copper pin #1 is at 23.0 m at edge of tall forest near boulders. **1993 comment**: not found; established **rebar #2** at **23.0 m** (just east of forest/first meadow strip edge). **2009 note**: beneath tag #537, ~10 cm ABGR.
  - Copper pin #2 is at 49.4 m in ABGR reproduction (narrow band of trees). **1993 comment**: found, but removed and replaced with **rebar #3** at **50.0 m** (in young ABGR forest). **2009 note**: previously noted reproduction is all dead, on ground), rebar in front of tag #503.
  - Copper pin #3 is at 68.3 m in ABGR reproduction with moss. **1993 comment**: found (but not in proper position) and removed
  - Copper pin #4 is at 80.8 m in ABGR reproduction with no understory. **1993 comment**: found and replaced with **rebar #4** at **80.0 m** (in young ABGR forest). **2009 note**: small opening with no understory; dead and fallen small ABGR.
  - Copper pin #5 is at 89.3 m, 2 m W of two large pines. **1993 comment**: found/replaced w/ **rebar #5** at **93.0 m** (just E of large pair of pines at young forest/meadow edge). **2009 note**: pines are dead, ABGR clump, beneath canopy of ABGR #754.
  - Copper pin #6 is at 102.0 m in *Haplopappus/Gilia aggregata* meadow. **1993 comment**: found and replaced with **rebar #6** at **102.0 m** (in *Haplopappus/Gilia* meadow)
12. Final rebar is at 119.5 m, 2 m E of pine. **1993 comment**: final rebar found and reset as **rebar #7** at 120.0 m. **2009 note**: End rebar is 1 m before (S of) bedrock. PICO have fallen between single ABGR (to south) and clump of ABGR (to north).

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009)**: P1 is on the L side of transect between 0-1 m marks. Plots are spaced every 2 m to the end of the transect, alternating L and R: P3 is from 2-3 m on the R, P5 is from 4-5 m on the L, etc. Last cover plot is 119R (118-119 m).

**Belt width for tree sampling (1983, 1993, and 2009)**: see details in [TP06413\\_tree sampling history.xlsx](#)

#### Additional 1993 notes:

- Bearing of 126 deg between rebar **except for one section: 122 deg between rebars 2 and 3** (from m marks 23 to 50).

#### Additional 2009 notes:

- For sampling, tapes run from 0-50 m, 50-80 m, 80-102 m, 102-120 m
- Tree measurements: all trees  $\geq 2$  yr old tagged and measured; trees < 2 year old tallied.
- Tags collected from snags
- Phenology good: most plants were flowering, very few had senesced
- Difficult to match photo points (directions were not sufficiently descriptive).

**Transect 4. Olallie Meadow (OLAL). (cont.)**



Looking S→N to top of meadow and old forest in the background (1993 photo)

## Transect 5. Walker Creek Trail (WLKR 1).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 571773, 4879451	1554	10 T 571802, 4879392	1530
Transect bearing (deg): 159	Transect length (m): 64.4	Rebar locations (m): 0.0, 23.3, 42.1, 50.0, 60.0, 64.4	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Turn L at the top of Cougar Dam and drive east along the E Fork of the McKenzie River on Rd 1993. Rd 1993 eventually turns sharply S. Continue S for ~2.5 mi until the intersection w/ Rd 555 (which heads sharply back to the N). Park at this intersection—this is the trail head to Lowder Mountain (via Walker Creek Trail; #3329 on Wilderness map) and to Quaking Aspen Swamp (transects 11 and 12).
2. Hike: Hike W along Walker Creek Trail toward Lowder Mountain (transects 1 and 2). Transect lies in the first meadow opening, uphill of the trail. Meadow edges (sides, top, and bottom) are “squared.”
3. Upon entering meadow along trail, walk 10 m to largest PSME on L edge of trail. This is the fourth tree into the meadow along trail (three ABGR, then PSME, with the first ABGR a snag).
4. Stand at midpoint of PSME base and take a bearing of 299 deg sighting on large ABGR invader in meadow above. ABGR should be an isolated individual; there is a second ABGR downhill and to the L, but these are the only two obvious ones.
5. End point rebar, #4, lies along this bearing, ~8 m before the above mentioned ABGR invader. It is ~65 paces (0.75 m/pace?) to the rebar along this bearing.
6. Transect lies E of first snag in from forest edge (as visible from trail). Snag lies ~30 m from edge as you site from trail (**2009 note**: snag now down). Transect runs through a lobe of ACCI and ~8-15 m tall ABGR that extends down into meadow.
7. Square aluminum flasher with transect description is on R side of tree #848. This is the "snag" (snapped top with crown lying uphill).
8. Tags on large trees are #843-851.
9. **Rebar #1 (0.0 m)** is in forest between two large ABGR, #843 @ 67 cm and #844 @ 59 cm dbh (in 1983), almost at the edge of the meadow above.
10. **Rebar #2** is at **23.3 m**, at base of downhill side of snag ABGR (#848 @ 65.0 cm dbh). **2009 note**: blue/white flagging along game trail above rebar #2. Trees #848, 842 flagged.
11. **Rebar #3** is at **42.1 m**, in invasion lobe of ABGRs (below #849-851) and *Acer circinatum*.
12. **Rebar #4** is at **65.0 m**, in meadow, ~8 m from isolated firs. **Bearing between rebars 3 and 4 is 157 deg.**

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the R side of transect between 0-1 m marks. Plots are consecutive to the end of the transect, alternating R and L: P2 is from 1-2 m on the L, P3 is from 2-3 m on the R, etc. (odd number plots on the R, even number plots on the L). Last cover plot is 63R even though rebar is at 65.0 m (last 2 m are not sampled).

**Belt width for tree sampling (1983, 1993, and 2009):** see details in **TP06413\_tree sampling history.xlsx**

**Additional 1993 notes:** Transect was extended uphill 50 m as transect 5A. Trees were tagged 5 m to the L and R of the uphill transect line. Many trees were tagged in the 500 series. Tree closest to 0 m point in this uphill extension is #541 ABGR (Plot -1L, 5 m from the line). Ignore the uphill extension of the transect.

### Additional 2009 notes:

- Extended transect intersects the trail near two 30-cm DBH ABGR on left of trail
- Tape too tight from 0.0 - 23.3 m so, we adjusted 0.05 m on either end (0.05 to 23.25 m).
- But, from Rebar #2 (23.3 m) to #3 (42.1 m) tape was quite loose (~5 - 10 cm); slack distributed throughout.
- Between rebar 3 (42.1 m) and 4 (65.0 m), transect was off by almost 90 cm likely due to running the tape over tall RUPA previously.
- Rebar #3 @ 42.1m actually measured 42.0 m. Measured 7.9 m and installed rebar at 50.0 m. Ran second tape to last rebar (65.0 m). Tape actually measured 14.4 m, so end point is 64.4 m on the transect. Installed new rebar @10.0m on the tape (60.0m) and clamped the tape at 14.4m (64.4m). Unsure of cause of this variation, but likely because RUPA previously extended further uphill. Before running a second tape, we double checked distances with tagged trees on the tree form and positions checked out OK.
- Phenology similar to that recorded on YANK3
- Tree measurements: trees >2 yr old measured (5 m on L and R); trees < 2 year old tallied in 1-m wide belt (L and R).

**Transect 5. Walker Creek Trail (WLKR 1) (cont.)**



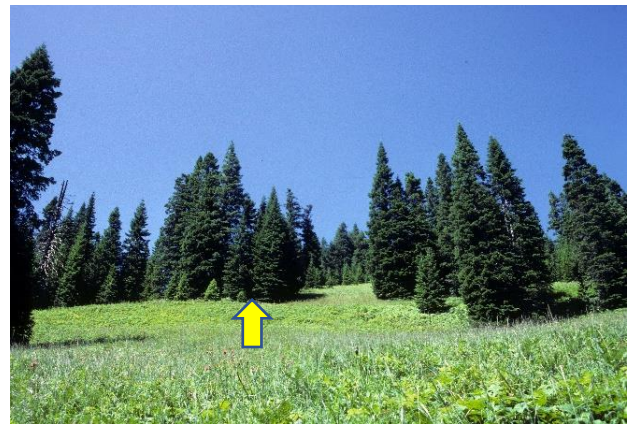
From trail to forest edge where transect originates (yellow arrow; 2009 photo)



## Transect 6. Walker Creek Trail (WLKR 2).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 571418, 4879292	1620	10 T 571473, 4879177	1527
Transect bearing (deg): 154	Transect length (m): 150.7	Rebar locations (m): 0, 30.0, 50.0 59.0, 90.0, 115.0, 127.6, 130.0, 150.0	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Turn L at the top of Cougar Dam and drive east along the E Fork of the McKenzie River on Rd 1993. Rd 1993 eventually turns sharply S. Continue S for ~2.5 mi until the intersection w/ Rd 555 (which heads sharply back to the N). Park at this intersection—this is the trail head to Lowder Mountain (via Walker Creek Trail; #3329 on Wilderness map) and to Quaking Aspen Swamp (transects 11 and 12).
2. Hike: Hike W along Walker Creek Trail toward Lowder Mountain (transects 1 and 2). Transect lies in the second major meadow opening, uphill of the trail.
3. Enter meadow along trail and walk past several large ABGR with RUPA understory. Walk to last tree (ABGR) on L. This should be approx. half-way into meadow, aligned with main drainage.
4. From this last ABGR ("trail-side ABGR"), take bearing of 317 deg to rock outcrop beneath an invading front of ABGR.
5. Rebar #5 lies slightly downhill from the outcrop.
6. Other landmarks:
  - large snag lies ~50 m W of transect and outcrop
  - transect lies W of "bowl", or concavity in slope (see photo)
  - transect lies perpendicularly uphill from the larger ABGR in the lower portion of the meadow (bearing is 292 deg to this ABGR from "trail-side ABGR")
  - meadow opening to R of rock outcrop and line of invading trees which descend to the outcrop. Center of opening lies at a bearing of 326 deg from "trail-side" ABGR.
7. Square aluminum flasher with transect description is on tree #852.
8. Large trees are tagged #852-873. Trees #852, 854-857, 859, 862 are not in the belt transect.



From last ABGR along the trail, looking uphill; transect emerges into meadow at yellow arrow (1993 photo).

9. **Rebar #1 (0 m)** is just downhill from ABGR #852.
10. **Rebar #2** is at **30.0 m** in *Rubus parviflorus* portion of meadow, below rocky opening, beneath forest edge and *Stipa occidentalis*/*Carex pensylvanica* meadow type.
11. **Rebar #3** is at **59.0 m** in *Rubus parviflorus* type but in small tree reproduction.
12. **Rebar #4** is at **90.0 m** in *Rubus parviflorus* type (but only 5% cover), near ABGR. (**1993 note:** originally at 89 m but lost; replaced with new aluminum rebar at **90.0 m**, rock precludes rebar at 89 m)
13. **Rebar #5** is at **115.0 m** under dense ABGR and PSME cover adjacent to drier *Carex pensylvanica* type. Here lies final tree invasion group #864-873.
14. **Rebar #6** is at **127.6 m** at base of rock outcrop seen from trail, in transitional area between rocky-mineral soil and *Rubus parviflorus* meadow.
15. **Rebar #7** is at **150.0 m** in *Rubus parviflorus* meadow (originally at 150.7 m)

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the R side of transect between 0-1 m marks. Plots are spaced every 2 m to the end of the transect, alternating R and L: P3 is from 2-3 m on the L, P5 is from 4-5 m on the R, etc. Last cover plot is 149R (148-149 m).

**Belt width for tree sampling (1983, 1993, and 2009):** see details in [TP06413\\_tree sampling history.xlsx](#)

### Additional 1993 notes:

1. Lost old **rebar #4**; put in new aluminum **rebar #4** at 90 m (rock precludes solid driving at 89 m). **Rebar #4** distance was 89.6 m when veg plot was taken.
2. **Rebar #7** at 150.0 m; soft soil, it may not hold.

## Transect 6. Walker Creek Trail (WLKR 2) (cont.)

### Additional 2009 notes:

- No repeat photos taken due to rain. Very cold, wet conditions.
- For sampling, tapes run 0 – 50 m, 50 – 100 m, 100 – 130 m, 130 – 150 m
- Tree measurements: trees  $\geq 2$  yr were tagged and measured; seedlings  $< 2$  yr were tallied to 1 m on L and R side; trees  $\geq 30$  cm dbh were measured to 3 m on L and R side; tags were removed from snags.
- Rebar #2 (30.0 m) seems out of position; found aluminum rebar (1993) very close to newly installed #3 rebar at 50.0 m.
- Started first tape 5 cm downhill from rebar #1 (0.0 m). Clamped tape @ 30.1 m at rebar #2. Clamped tape @ 49.95 m at rebar #3. Clamped tape at 8.9 m mark on tape (= 58.9 m) @ rebar #4. Clamped tape @ 9 m on tape (= 59.0 m mark); 10 cm slack between 50.0 and 59.90 m.
- Old aluminum rebar @ 90.0 m. Clamped tape at 39.85 m. Between 50 and 90 m, tape is 15 cm too short.
- Added rebar @ 100.0 m, exactly 10.0 m from 90.0 m rebar with tape run between 90.0 and 115.0 m; pulled tight, exactly correct.
- Installed rebar @ 130.0 m, tape run from 100.0 m, did not clamp at 127.6; 130-m rebar loose, couldn't pound into bedrock.

## Transect 7. Corral Flat (CORL).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 581900, 4864135	1405	10 T 581935, 4864160	1428
Transect bearing (deg): 70.0	Transect length (m): 58.0	Rebar locations (m): 0.0, 15.0, 23.0, 40.0, 58.0 (not clear if original copper pins were left in place)	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Continue along W side of Cougar Reservoir along Highway 19 and up the S. Fork of McKenzie River to Rd 1958, just S of Box Canyon Guard Station. Turn E onto Rd 1958 and drive 2+ miles to the trail head (not sure what signs will be at the trailhead—perhaps Blondie L., Mink L., Irish Mtn.).
2. Hike: from the trail head, ~1.3 miles to the wilderness boundary, then ~3.8 miles to Corral Flat along the old McBee trail (**2009 note:** this is an old name that may no longer be relevant; trail is #3523 on Wilderness map). **2009 note:** McBee Junction is overgrown. See additional 2009 notes below.
3. Transect lies in the second major meadow opening of Corral Flat with PICO invasion. First opening is E of trail, second is W of trail. Second opening downhill from the first; also has a rocky stream that must be crossed before reaching transect.
4. Upon reaching this opening, proceed to the end of it along the trail.
5. Look for the largest clump of PIEN and PIMO (several trees of each) next to the trail (PICO also present, behind) (2009 note: PIMO may now be dead, susceptible to white-pine blister rust).
6. From W edge of this clump of trees, stand on rock beside trail to take a bearing of 260 deg. Pace along this bearing, pass a piece of bedrock just to the S @ ~20 paces.
7. Rebar #4 lies another ~28 paces away on this bearing. Transect runs back to forest from rebar #4 along a 250 deg bearing.
8. Large trees are tagged #874-889 in the forest.

**Spacing of microplots (P1, P2, etc.) for species cover (1983, not sampled in 1993, 2009):** P1 is on the R side of transect between 0-1 m marks. Plots alternate R and L consecutively to 34R: P2 is from 1-2 m on the L, P3 is from 2-3 m on the R, etc. (odd number plots on the R, even number plots on the L). After 34R, plots are spaced one meter apart: 36L, 38R, 40L, etc. to 54R. Last cover plot is not 57L, not 56L.

**Belt width for tree sampling (1983, 1993, and 2009):** see details in [TP06413\\_tree sampling history.xlsx](#)

**1983 notes on photo sheet:** copper pins #1 at 21.0 m, #2 at 30.0 m, #3 at 41.0 m, and #4 at 58.0 m

**Additional 1993 notes:** rebar at 0, 30 and 58 m. The above description does not include initial rebar locations. We found only one (intermediate) pin at 30 m.

**Additional 2009 notes:** New directions (with UTM):

- From the Elk Creek Junction with the old McBee Trail (at NAD27 UTM 10 T 0582253, 4864242) head south on McBee Trail to the first meadow (~ 400 m down the trail). From the middle of the meadow, head toward the NW corner toward PIEN encroachment. The 58.0 m mark rebar is at NAD27 UTM 10 T 0582028, 4863965.
- Found one original rebar at 58.0 m and one copper pin @ 41.0 m. Added rebar at 0.0, 15.0, 23.0 and 40.0 m.
- Transect position was reconstructed using photos and tree location data.
- Tree sampling: 0-1 m on R and L: trees <10 cm tall were tallied in continuous strips on both sides of the transect; trees ≥10 cm tall were sampled (and retagged if necessary) in continuous strips on both sides of the transect
- Only 5 trees with tags were found; most identified. 6 trees not listed in 1993 were added (well over 16 yr old). Measured 2 trees outside the 1-m wide belt that were measured in 1993 (old tag #518, now #1885 and old tag #508, now #1894). Tagged only 1 ingrowth ≥10 cm tall (#1869).
- New species found: *Veronica serpyllifolia* (VESE).

Taken 5 m from transect line, facing 270 degrees.  
Note transect tape emerging near forest edge and crew (1983 photo).



## Transect 8. Cow Swamp (COW 1).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 582428, 4865999	1426	10 T 582346, 4865934	1410
Transect bearing (deg): 234.0	Transect length (m): 110.0 (orig. 74.0)	Rebar locations (m): 0.0, 30.0, 50.0, 80.0, and 110.0	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Continue along W side of Cougar Reservoir along Highway 19 and up the S. Fork of McKenzie River to Rd 1958, just S of Box Canyon Guard Station. Turn E onto Rd 1958 and drive 2+ miles to the trail head (not sure what signs will be at the trailhead—perhaps Blondie L., Mink L., Irish Mtn.).  
**2009 note:** Trailhead signed at Elk Creek.
2. Hike (see **2009 notes for significant updates**): from the trail head, ~1.3 miles to the wilderness boundary, then ~3.8 miles to Corral Flat along the old McBee trail. **2009 note:** this is an old name that may no longer be relevant; trail is #3523 on Wilderness map. From Corral Flat, ~1+ mi to Cow Swamp along old McBee trail. **1993 notes:** Pass through several other meadows, wet areas, ponds, between Corral Flat and Cow Swamp. Pass intersection with trail that heads E/SE (*2009 comment: not sure that trails and intersections will still be evident in this area*). Pass intersection w/trails to Rock Lake and Junction Lake. Cow Swamp is huge; it is off the trail and not visible from the trail. Head NW off the trail where the trail veers NE (adjacent to E edge of Cow Swamp). (Take old McBee Trail as opposed to the NEW McBee trail;  
**2009 note:** Old and new McBee Trails are completely gone, visible only in patches. Hiked cross-country from trail #3510 (2001 Geo-Graphics map) to Cow Swamp. Difficult hiking with much CWD on the ground. Enter Cow swamp from the SSW corner – difficult in most areas due to thick shrubs and very wet ground.
3. Walk toward center of Cow Swamp—large expanse of *Deschampsia caespitosa* and *Juncus balticus* – transect lies along NE edge of meadow.
4. Locate large, slightly leaning, whitened snag that is ~20 m into meadow (**2009 note** snag is now gone). A bowed, leaning PICO (45 deg lean) is to the E of the snag. To the E of these in the meadow is a string of PICO parallel to forest edge with meadow between the forest edge and the string of trees (see photo below).
5. From the whitened snag take a bearing of 324 deg. It is ~45 m to copper pin #2 (now rebar) located in PICO reproduction with *Vaccinium occidentale*. **2009 note:** all original rebar are gone. A single copper pin was found at 44.0 m.  
Along this bearing, note:
  - large snag to the R at ~9 m— 8 m away from bearing line
  - clump of eight live and dead PICO (pass through the left edge at ~14 m)
  - one large PICO to the L at ~26 m
  - 8 moderate to large PICOs in a tight clump to the L at ~32 m
  - Finally, large cluster in front of you has three smaller "clusters" in it — look for largest PICO (~44 cm dbh in 1983).
6. Large trees are tagged #890-901; #901 is tagged w/ rectangular aluminum flasher.
7. Rebar at 0 m marks forest endpoint near PIEN #890 and small ABAM reproduction.



Looking SE (110 deg), 40 m from pin #3 (@74 m mark).  
Transect tape is evident to the right of the tree island.  
Note swale separating forest and tree island (1993 photo).

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the L side of transect between 0-1 m marks. Initially, plots are spaced every 2 m, alternating L and R: P3 is from 2-3 m on the R, P5 is from 4-5 m on the L, etc.  
**Note:** at various points along the transect, plot spacing and side of the transect are systematically ordered. Pay careful attention to the cover data forms for the correct plots to sample. The last cover plot is 110R (109-100 m).

**Belt width for tree sampling (1983, 1993, and 2009):** see details in [TP06413\\_tree sampling history.xlsx](#)

## Transect 8. Cow Swamp (COW 1) (cont.)

### Additional 2009 notes:

- All original rebar are gone. A single copper pin was found at 44.0m.
- New (final) rebar installed at 0.0, 30.0, 50.0, 80.0, and 110.0 m.
- For sampling, tapes were run 0 - 50, 50 - 100, and 100 – 110 m.
- Tree measurements: 1 m on L and R for all trees; trees  $\geq 2$  yr old tagged and measured; seedlings < 2 yr old tallied; measured trees  $\geq 30$  cm DBH to 3 m on the L and R.
- One tree tag found and copper pin @ 44.0 m; two nails @ origin tree (flasher?)
- Reestablished transect based on copper pin, photos, and tree data.
- Reestablishment went well: accurate within 20 cm across length of transect based on tree data.
- Re-tagged trees @ base facing the meadow.
- Veg in forest seems consistent with older data
- Questions on grass ID. Many originally listed as *Danthonia intermedia*; ID'd as *D. californica* when very hairy stems > hairy leaves. Decided not *Trisetum*, as not as open a panicle.

## Transect 9. Cow Swamp (COW 2).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 582626, 4866040	1423	10 T 582653, 4865941	1400
Transect bearing (deg): 170.0	Transect length (m): 114.0	Rebar locations (m): 0.0, 23.0, 50.0, 75.0, 100.0, 114.0	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Continue along W side of Cougar Reservoir along Highway 19 and up the S. Fork of McKenzie River to Rd 1958, just S of Box Canyon Guard Station. Turn E onto Rd 1958 and drive 2+ miles to the trail head (not sure what signs will be at the trailhead—perhaps Blondie L., Mink L., Irish Mtn.). **2009 note:** Trailhead signed at Elk Creek.
2. Hike (see **2009 notes for significant updates**): from the trail head, ~1.3 miles to the wilderness boundary, then ~3.8 miles to Corral Flat along the old McBee trail. **2009 note:** this is an old name that may no longer be relevant; trail is #3523 on Wilderness map. From Corral Flat, ~1+ mi to Cow Swamp along old McBee trail. **1993 notes:** Pass through several other meadows, wet areas, ponds, between Corral Flat and Cow Swamp. Pass intersection with trail that heads E/SE (*2009 comment: not sure that trails and intersections will still be evident in this area*). Pass intersection w/trails to Rock Lake and Junction Lake. Cow Swamp is huge; it is off the trail and not visible from the trail. Head NW off the trail where the trail veers NE (adjacent to E edge of Cow Swamp). (Take old McBee Trail as opposed to the NEW McBee trail; **2009 note:** Old and new McBee Trails are completely gone, visible only in patches. Hiked cross-country from trail #3510 (2001 Geo-Graphics map) to Cow Swamp. Difficult hiking with much CWD on the ground. Enter Cow swamp from the SSW corner – difficult in most areas due to thick shrubs and very wet ground.
3. Cow 9 lies east of Cow 8 (see previous instructions).
4. From center of main Cow Swamp expanse move to NE edge. Walk along edge in meadow to boggy opening to E.
5. Just before the opening, pass a large pool of water (20' x 6', 3 - 4' deep). **2009 note:** large pool of water still present in 2009. Continue east 25 m. Unable to follow directions #6-9, below, apparent changes to forest. All rebar and most copper pins are gone (see old notes re: copper pins, below).
6. Proceed through center of entrance to meadow with scattered PICOs, heading E for tall PICO clump. There are seven PICO, two PIEN, and one large snag in front of clump.
7. From the E side of the E-most PIEN take a bearing of 118 deg. Along this bearing, pass through the tallest PICO snag at ~25 m. Head for tallest PICO in the same direction, another ~25 m.
8. From the E side of this large PICO, take a bearing of 120 deg, walk 15 m.
9. Rebar lies at E edge of *Vaccinium occidentale* patch ~1 m in front of 15 m long white log. There is a wet area with *Carex sitchensis*, *C. vesicaria*, and *Juncus balticus* to the L of rebar and *Vaccinium* patch.
10. Transect bearing is 350 deg from this last rebar to the start-point rebar in forest.
11. If rebar is lost, use large PICO in *Vaccinium* patch. Bearing of 20 deg from its center, rebar lies ~4 m away.
12. Transect runs from *Vaccinium occidentale*/drainage edge along E side of whitened stump, along 350 deg bearing.
13. Tree tags #902-908 all face meadow (**1983 note:** all made from aluminum flasher material).
14. Square aluminum flasher with transect description is on tree #902, facing meadow.
15. Forest rebar is adjacent to tree #902 along 15 m downed log lying at 170 deg orientation.
16. All original copper pins were found and reinserted in their proper positions. **New rebar inserted as noted below.**
  - Copper pin #1 is at 23 m in forest in *Xerophyllum* - *Vaccinium membranaceum*.
  - Copper pin #2 is at 39 m at forest edge in *Vaccinium occidentale* - *Spiraea douglasii*, 0.5 m away from downed log lying in N-S orientation, and 2 m W of 5-m tall, broken topped PICO.
  - Copper pin #3 is at 53 m in *Vaccinium occidentale* patch in *Deschampsia caespitosa* meadow, N of three PICOs, E of two topped PICOs (both ~2 m away).
  - Copper pin #4 is at 77 m in middle of *Deschampsia caespitosa* meadow. Two PICOs to the W (~10 m away, with 1 and 2 m tall PIENs at their bases); one PICO to the SW (~5 m away), all three PICOs are ~20-25 m tall with sparse crowns.
  - Copper pin #5 is at 94 m, on SW side of PIEN with full tree-length crown.
  - Copper pin #6 is at 107 m in *Deschampsia caespitosa* - *Hypericum anagalloides* on other side of *Carex* drainage (two <1 m tall PICOs near it).
  - End-point rebar lies at 114.0 m at edge of *Vaccinium occidentale*.
17. **In 1993, rebar were added at the following meter marks: 0, 23.0, 50.0, 75.0, 100.0, 114.0 m.**

## Transect 9. Cow Swamp (COW 2) (cont.)



From meter mark 86 on the transect line looking back to the forest/meadow boundary. Note clump of PICO (1993 photo).

### Additional 2009 notes:

- 3 tree tags found, transect re-established based on photos and tree data.
- Later, copper pin found @ 39.05 m on tape and tape to left of pin ~10 cm. Cooper pin was originally at 39.0 m, transect is accurate within 10-15 cm of original.
- Questions on vaccinium ID within forest, work out to VACCA and VAME, photos taken.
- Tree sampling: Due to lack of time, only trees large enough to nail were re-tagged and measured for DBH. Distances were recorded along the transect. Seedlings and regrowth were measured while completing the vegetation microplots. Ingrowth was not completed, only seedlings were done while doing veg microplots. **As a result 2009 tree data were incomplete and not included in the full database.**

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the L side of transect between 0-1 m marks. **Note: at various points along the transect, plot spacing and side of the transect are not systematically ordered.** Pay careful attention to the cover data forms for the correct plots to sample. The last cover plot is 114L (113-114 m). 2009 note: completed all veg sampling except for microplots 82, 86, 90, which were “additional” and not resampled to save time.

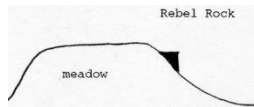
**Belt width for tree sampling (1983, 1993, and 2009):** see details in **TP06413\_tree sampling history.xlsx**.

**Not fully sampled in 2009; not included in TP064 Entity 13.**

## Transect 10. Rebel Rock (REBL).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 569801, 4870602	1623	10 T 569739, 4870572	1600
Transect bearing (deg): 251.0	Transect length (m): 82.3	Rebar locations (m): 0.0, 20.0, 30.4, 40.0, 50.0, 60.0, 70.0, 80.0, 82.3	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Continue along W side of Cougar Reservoir along Highway 19 and up the S. Fork of McKenzie River past French Pete Campground. ~3 mi further, just before crossing Rebel Creek, turn E up Rd 570 and drive ~0.25 mi to Rebel Rock trailhead.
2. Hike: Rebel Rock trail #3324 on Wilderness map (not Rebel Creek Trail #3323). Distance = ~5.7 mi. Trail ascends in several long switch-backs through lush *Rubus parviflorus* meadow that transitions to *Festuca viridula* meadow near ridge top. Transect lies on W-facing slope of ridge, W of Rebel Rock; lush valley between here and Rebel Rock (see USGS map).
3. Upon reaching this west-facing slope, **walk N along the rocky ridge/flat; do not walk through the meadow.** This is where the trail crosses the rocky flat before it drops E toward Rebel Rock Overlook (Lookout). Walk N until you reach a relatively open rocky flat; this is ~150 m (max.) from where trail emerged onto the ridge. **1993 note:** If you reach a castle-turret-like opening of rock ~30 x 70 m, you've gone too far.
4. Now sight to Rebel Rock to the east—it should look like this (sketch and R photo, below). **2009 note:** photo not from rocky point directed to; also, rocky point partially grown over.



Looking ENE from ~10 m S of transect line (1993 photo).

View of Rebel Rock to the east.

5. Bearing should be 98 deg (**1993 note:** 94-96 deg) through an opening in the trees below.
6. Turn around— ~10 m to the NW are two large ABGR. Transect starts at ~2.5 m below first ABGR (#6801, **dead in 2009**) on the meadow side and 1.5 m below the second (#6802). **2009 note:** standing on *Sorbus* when laying out the tape.
7. Large trees are tagged #6801-6822. Tags #6808, 6809, and #6820 are missing; #6822 lies between #6815 and 6816.
8. Square aluminum flasher with transect description is on tree #6801.
9. Copper pin #1 (**aluminum rebar in 2009**) at 30 m in *Festuca/Erigeron/Stipa* meadow in first major opening along transect.
10. Copper pin #2 is at 60 m in *Festuca viridula/Erigeron aliceae* meadow—second major opening along transect. **1993 note:** copper pin @ 60.0 m finally found in veg plot; pin is 75 cm to R of our line at 60 m  $\pm$  5 cm. However the tree data and photo shows our line to be correct. The pin would require a bow in the transect line; this bow may account for the 20 cm discrepancy in the last rebar.
11. Rebar end point #2 is at 82.5 m. **1993 note:** 82.3 m. **2009 notes:** at base of large *Abla2* (~30 cm dbh). Tagging continues past last aluminum rebar @ 82.3 m. 1993 tree data extends well past current transect end point.

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the R side of transect between 0-1 m marks. Plots are spaced every 2 m to the end of the transect, alternating R and L: P3 is from 2-3 m on the L, P5 is from 4-5 m on the R, etc. Last cover plot is 83L (82-83 m) even though transect ends prior to 83 m.

**Belt width for tree sampling (1983, 1993, and 2009):** see details in [TP06413\\_tree sampling history.xlsx](#). **1983 notes:** Tree tag #s 6808, 6809, and 6820 were not used; #6822 falls between #6815 and 6816.

### Additional 1993 notes (inconsistent with notes elsewhere):

- Copper pin #1 at 30 m (located at 29.9 m). Rebar put in.
- Copper pin #2 at 60 m not found. New rebar at 50 m.
- Rebars at 0 m, 26 m, 50 m, 70 m, and 82.5 (82.3 m).
- Mt. ash (*Sorbus*) covers transect from 14 to 22 m. 2009 note: run meter tape under *Sorbus*



## Transect 10. Rebel Rock (REBL) (cont.)

**1993 notes about camping and water:** Water from pipe: from the high point on the trail before it heads down and E, turn around and head W the way you came. Pass the first corner to the R ~1/3 of the way down the straight section on the L near three snags, a pipe yields water. Can also camp at the lookout. **2009 note:** camped up on ridge off trail. Could not find “water pipe”; had to hike down to where trail parallels the stream (~45 minutes from camp).

### Additional 2009 notes:

- For sampling, ran the tape based on tree and rebar locations; bearing seems off by a couple of degrees.
- Aluminum rebar at 70 m in last forest patch.
- End rebar at 82.3 m with original copper pin, #6821 (dead), #6816-6819 (TSME even-aged) in closed canopy patch.
- No repeat photos taken: in the clouds for two days.
- Tree sampling: 0-1 m, R and L. Seedlings <2 yr old were tallied in all plots in a continuous strip on both sides of the transect line (1 m R and L); trees  $\geq 2$  yr old were sampled and retagged if necessary in all plots in a continuous strip on both sides of the transect line (0 to 1 m on R and L side). For most trees that were found, tags were in place (buried under litter or wired on). Wires were replaced with new aluminum loops (with nail inserted in the ground as well on small seedlings. Trees were recorded on in-growth sheets due to time constraints and rain. Tag #s used were 1735–1800.
- Some of the vegetation already gone to seed (*Arenaria*, graminoids, *Arabis*, *Calochortus*, *Montia*, *Galium*).

## Transect 11. Quaking Aspen Swamp (QAS 1).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 572005, 4878873	1349	10 T 572060, 4878937	1358
Transect bearing (deg): 42.0	Transect length (m): 87.0	Rebar locations (m): 0.0, 20.0 (PVC on top), 24.1 (aluminum rebar), 40.0 (PVC on top), 51.0 (aluminum rebar), 87.0	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Turn L at the top of Cougar Dam and drive east along the E Fork of the McKenzie River on Rd 1993. Rd 1993 eventually turns sharply to the S. Continue S for ~2.5 mi until the intersection w/ Rd 555 (which heads sharply back to the N). Park at this intersection—this is the trail head down to Quaking Aspen Swamp (0.5 mi from road to meadow).
2. Hike: follow trail to S edge of QAS. An old, often hard-to-follow trail runs along this edge, with many of the trees blazed—trail goes almost to the far W end of QAS. Transect 11 is W of transect 12.
3. Look toward W-most quaking aspen tree. When bearing is 300 deg to this tree you are near a blazed tree on the L side of trail with a small metal sign that has an "11" mile mark (green number on white). From here spot 2 large PIEN ~20 m out into meadow—transect runs through these (note 3 snag PIEN near these, two toward the SW, one toward the W).
4. Continue another ~30 m to next blazed tree on the L side of the trail.
5. Transect crosses trail after another ~28 m, but trail is masked here because of many invading trees (PIEN, TSME, ABLA2, ABAM). From here it is 338 deg to the W-most quaking aspen noted above. Trail cross the transect at a point where the bearing to the top of English Mt. is 65 deg and a bearing to the furthest W quaking aspen is 338 deg.
6. Large trees are tagged #6823-6825, all face meadow. **1993 note:** about 25 m uphill from trail.
7. Rebar is near TSME with snags adjacent to it, adjacent to tree #6823; TSME are touching a crumbling stump. **1993 note:** Couldn't find crumbling stump. **2009 note:** original rebar bent; second rebar added with flagging.
8. Copper pin #1 is ~5 m from trail uphill into forest; it lies at 24 m mark. **1993 note:** currently reads 24.25 m) along the transect; and ~2 m W of largest TSME off trail. **2009 note:** copper pin #1 found at 24.1 m.
9. Copper pin #2 is at ~51 m and ~2 m W/SW of largest PIEN in meadow in *Veratrum*. **2009 note:** aluminum rebar added in 1993 (found, flagged).
10. Copper pin #3 is at 70.0 m in *Carex sitchensis/Glyceria elata*/mixed herb meadow type. **1993 note:** no longer present. **2009 note:** not found.
11. Copper pin #4 is at 87 m. **2009 note:** aluminum rebar added in 1993 (found 8/20/2009).

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the R side of transect between 0-1 m marks. Plots are consecutive to 56L, alternating R and L: P2 is from 1-2 m on the L, P3 is from 2-3 m on the R, etc. (odd number plots on the R, even number plots on the L); then, skip to 56R, 58L, etc., alternating every 2 m R and L. Last cover plot is 88L (87-88 m)

**Belt width for tree sampling (2009):** See details in [TP064\\_tree sampling history\\_16Sep2022.xls](#).

### 1993 notes:

- Copper pin replaced with aluminum rebar at 24.25 m (2009 note: 24.1 m), 51 m, and 87 m.
- Line may not be on original bearing; plots 82→ 88 may be off line; did not sample m mark 99; drop in future.
- Alder thicket center at 32 m, left 3 m; ~5 m diameter and 6 m height, fairly dense.

Facing 290 deg from blazed tree along trail; ~20 m to transect line and ecotonal area with abundant reproduction. Note snags in the background and *Alnus sinuata* to the right of center and trail (1993 photo).



## Transect 11. Quaking Aspen Swamp (QAS 1) (cont.)

### Additional 2009 notes:

#### Rebars:

- Start point (0.0 m) iron rebar found bent and retained. New straight iron rebar inserted immediately adjacent.
- Added new iron rebar at 20.0 and 40.0 m. Covered each with white PVC for safety (~30-40 cm tall)
- Found copper pin #1 at 24.1 m (retained).
- Aluminum rebar installed in 1993 @ 24.25 m never found; added new iron rebar capped with white PVC at 20.0 m.
- Copper pin #2 @ 51.0 m replaced with aluminum rebar in 1993; rebar found in place at SW edge of large tree island.
- Copper pin #3 @ 70.0 m was never found and never replaced.
- Found end point aluminum rebar at 87.0 m standing in place; ran 100-m tape down transect and reached end point at exactly 87.0 m.

#### Sampling:

- Trees were sampled from 0-1 m on both the R and L.
- Trees <10 cm tall were tallied in all plots in a continuous strip on both sides of the transect line.
- Trees >10 tall were sampled (and retagged if necessary) in all plots in a continuous strip on both sides of the transect line. For most trees that were found, tags were in place (buried under litter or wired on). Wires were replaced with new aluminum loops (with nail inserted in the ground as well on small seedlings).
- Trees with tags at DBH had tags moved to the base (nailed).

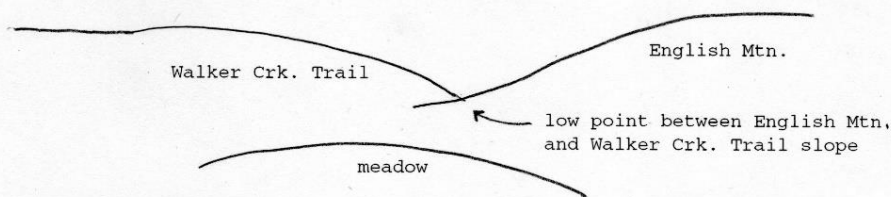
#### Vegetation:

- Large % of plots beyond the last tree island in meadow suffered from a combination of early senescence (*Veratrum* in particular) and elk damage (bedding). Cover had to be reconstructed in many plots.
- Plots with CALE5 in meadow: if comment suggests changing CALE5 to CASI3 (Kim Auker sheet), do so in 2009 and 1993 data.

## Transect 12. Quaking Aspen Swamp (QAS 2).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 572290, 4878871	1349	10 T 572307, 4878904	1359
Transect bearing (deg): 0, 16.0*	Transect length (m): 70.1	Rebar locations (m): 0.0, 14.2, 24.96, 40.05, 50.00, 70.0	

1. Drive: From Hwy 126, make a right onto Hwy 19 (Cougar Reservoir road). Turn L at the top of Cougar Dam and drive east along the E Fork of the McKenzie River on Rd 1993. Rd 1993 eventually turns sharply to the S. Continue S for ~2.5 mi until the intersection w/ Rd 555 (which heads sharply back to the N). Park at this intersection—this is the trail head down to Quaking Aspen Swamp (0.5 mi from road to meadow).
2. Hike: follow trail to S edge of QAS. Follow same trail as for QAS transect 11; transect 12 is located approx. midway along S edge of QAS. It spans from TSME forest to *Deschampsia caespitosa* meadow to *Carex sitchensis* meadow.
3. Transect lies on W side of a rather large forest gap. To the S (uphill) are four TSME with rebar in between them. To the N are two pairs of two larger TSME growing together.
4. Tree tags should be evident, but if missing, should still see slashes in bark used to put on tree tags.
5. Two snags stand fairly close to trail to the N (i.e., meadow-side) where transect crosses trail.
- \*6. Transect bearing is variable: 11 deg from rebar #0-1, and 16 deg from rebars #1-4.
7. Large trees are tagged #6826-6838. #6829 and 6830 dbh measurements are approximate (trees grown together) Dbh for #6831 and 6832 are taken above tag above confluence (trees grown together).
8. Note: on 17 June 1991 (day trip), could not find tags #6829-6832 and #6835.
9. Rebar #0 lies between tagged trees #6826 and 6827. **2009 note:** found bent, but left in place.
10. Rebar #1 underneath and W of TSMes #6829 and #6830 at 14.2 m. **2009 note:** originally 14.1 m.
11. Rebar #2 is slightly to meadow side of ecotone tree reproduction, beneath 2 m tall TSMes and 4 m tall snag at 25.0 m.
12. Rebar #3 is on meadow side of first tree island under TSHE #6836 at 40.0 m. **1993 note:** at 40 m; check this against other direction sheet.
13. Rebar #4 is in *Carex sitchensis* meadow near stream channel with *Vaccinium occidentale* border at 70.1 m. **1993 note:** rebar lost; new aluminum rebar reestablished at 70.0 m. **2009 note:** lost again
14. **Note:** From this #4 rebar it is 293 deg to far left quaking aspen at W end of meadow; 67 deg to peak of English Mtn.; 69 deg to road cut with *Acer circinatum* opening beneath R flank of English Mtn.; 11 deg to low point in trees created by slope of English Mtn. and slope of Walker Creek trail.



**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the L side of transect between 0-1 m marks. Plots are consecutive to the end of the transect, alternating L and R; P2 is from 1-2 m on the R, P3 is from 2-3 m on the L, etc. (odd number plots on the L, even number plots on the R). Last cover plot is 70R.

**Belt width for tree sampling (2009):** See details in [TP064\\_tree sampling history\\_16Sep2022.xls](#)

**1993 comment:** Small tree tags are nailed to the ground.

~20 m from transect looking 290 deg toward 5-m mark; note snags and abundant tree regeneration (1993 photo).



## Transect 12. Quaking Aspen Swamp (QAS 2). (cont.)

### Additional 2009 notes:

#### Rebars:

- Start point (0.0 m) iron rebar is bent, but solid; left in place.
- Rebar #1 was found at 14.2 m and replaced.
- Rebar #2 was in place at 24.96 m (originally listed as 25.0 m).
- Rebar #3 in place, bent uphill at 40.05 m at meadow edge beneath canopy of #6836 (TSHE, 20 cm dbh). New iron rebar added adjacent to old one.
- Inserted new iron rebar at 50.0 m. Rebar is short (exposed 35 cm) at N edge of VAOC2 clump.
- Old rebar #4 at 70.0 m was missing. Replaced at 70.0 m.

#### Sampling:

- Trees were sampled from 0-1 m on both the R and L side.
- Trees <10 cm tall were tallied in all plots in a continuous strip on both sides of the transect line.
- Trees  $\geq$ 10 cm tall were sampled (and retagged if necessary) in all plots in a continuous strip on both sides of the transect line. For most trees that were found, tags were in place (buried under litter or wired on). Wires were replaced with new aluminum loops (with nail inserted in the ground as well on small seedlings).
- Trees with tags at DBH had tags moved to the base (nailed).

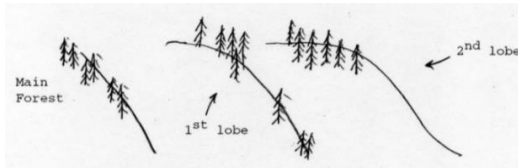
#### Vegetation:

- No major issues to discuss.

### Transect 13. James Creek (JMES).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 594459, 4882129	1852	Not taken	Not taken
Transect bearing (deg): 233.0		Transect length (m): 97.8	
Rebar locations (m): 0.0, 26.0, 43.91, 50.00, 63.9, 75.0, 83.8, 96.8			

- Driving: if from the N, McKenzie Pass Hwy (242) to Obsidian trailhead. If from the S, Hwy 126 to Santiam Pass to Sisters, then to Bend. From Bend, take Century Drive Hwy past Bachelor Butte. Park at Devils Lake.
- Hike: if from the N toward Obsidian Falls/Sister Spring, then along the PCNST for 2 mi. At this point there are two choices: 1) continue on PCNST above Linton Meadow to the intersection with the old Oregon Skyline Trail, or 2) down through Linton Meadows and S toward Separation Meadows along the old Oregon Skyline Trail to the James Creek Shelter.
- If from the S, take the trailhead at Devils Lake that leads under Century Drive Hwy and goes to Sisters Mirror Lakes. Turn N at Wickiup Plains and hike along PCNST toward James Creek Shelter.
- Transect lies in meadow in which PCNST and old Oregon Skyline trail intersect.
- From James Creek Shelter, it is SE ~1/2 -3/4 mile to first LARGE, open *Festuca viridula* meadow. Large sloping meadow with *Festuca viridula* in upper portion, sloping down to a flat to the W with *Carex nigricans*.
- Approach meadow on flat; trail veers to the R downhill into forest.
- Stand on the trail where it drops downslope—there should be a rock cairn to the R.
- From this point take a bearing of 104 deg to a large stand of TSME (100+ dbh) ~150 m away. They lie up the hill and appear as a lobe of forest (first lobe to L) in a slightly concave land surface:



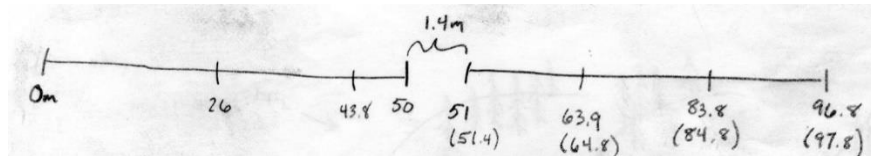
From directly below the transect on the trail through the meadow. Facing 60 deg looking uphill at invading TSME with larger TSME forest behind (1993 photo).



- Transect begins in these trees; at their edge are 2 large ABLA2; large well-decayed log lies into the meadow.
- Transect bearing is 233 deg from forest to meadow.
- Large trees are tagged #6501-6517 (#6503 is not in original belt transect; bent over).
- Square aluminum flasher with description on tree #5601.
- Rebar #0 is at the base of #5601.
- Copper pin #1 is at 26 m in open *Carex pensylvanica*/*Festuca viridula* meadow. (**1993 note:** found this pin 38 cm L and 10 cm downhill from where we had put in our pin after doing most of transect).
- Rebar #1 is at 43.8 m in TSME reproduction (**1993 note:** see below)
- Copper pin #2 is at 64.8 m in TSME reproduction (**1993 note:** see below)
- Copper pin #3 is at 84.8 m in TSME reproduction (**1993 note:** see below)
- Rebar #2 is at 97.8 m in *Festuca viridula* meadow, down slope ~10 m from all TSME reproduction.

**1993 notes:** 0-50 m are OK. From 50 m to end things were screwy. Pins at 64.8 m, 84.8 m, and rebar at 97.8 m were off by 50 cm (e.g., pin at 64.8 m was at 64.3 m). To confound things further, tree data revealed that positions were off by another 40 cm. Veg data after 50 m were screwy as well (unable to reconstruct). Tree cover differences of 50-100%. Small ABLA2 ~1 m tall in the 1983 tree data are not the cover data. Finding the veg data hopeless, we chose to match the tree data by pulling the tape out 40 cm. Now copper pin at 64.8 m is rebar at 63.9 m (2009 comment, CBH, how is this 40 cm?), 83.8, and 96.8 m. To do this we left a gap of 40 cm between 50 and 51 m. The veg plot will be read with a corner on 51 m (2009 comment, CBH: not clear). Pin #1 at 26 m was found after 99% of work was completed; pin lies 38 cm to R of line and 10 cm down from present rebar.

### Transect 13. James Creek (JMES). (cont.)



**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the R side of transect between 0-1 m marks. Plots are spaced every 2 m to the end of the transect, alternating R and L: P3 is from 2-3 m on the L, P5 is from 4-5 m on the R, etc. Last cover plot is 97R (96-97 m) although transect extends to 97.8 m.

**Belt width for tree sampling (2009):** See details in [TP064\\_tree sampling history\\_16Sep2022.xls](#)

#### Additional 2009 notes:

##### Tape and rebar:

- Found rebar @ 0.0, 26.0, 43.91, 63.9, 83.8, 96.8 m
- Installed additional rebar @ 50 and 75 m
- GPS'd the 0.0 m rebar: 10 T 0594459, 4882129

##### Sampling:

- Trees were sampled from 0-1 m on both the R and L side.
- Trees <10 cm tall were tallied in a continuous strip on both sides of the transect line. Some trees were under this limit but were tagged in 1993. They remained tagged or were retagged. This is exciting for a demographic study
- Trees  $\geq 10$  tall were sampled (and retagged if necessary) in all plots in a continuous strip on both sides of the transect line.
- Many trees <20 cm were not found, but trees that were above 10 cm that may have been around in '93 were tagged which could be these 'missing' ones. On the data sheets this was indicated by "not found, see ingrowth"
- Some trees were misidentified (or misrecorded) in 1993 and need to be changed from ABLA2 to TSME in the data; notes were made on the data sheets.
- Many trees seem to have shrunk; actually the litter is just accumulating faster than their growth. We had to dig down up to 3" to find some tags. Sometime the digging resulted in dead trees. Sorry.
- From 84 - 86 m many trees < 1m tall were not tagged; they are now tagged and were added to the ingrowth sheet.

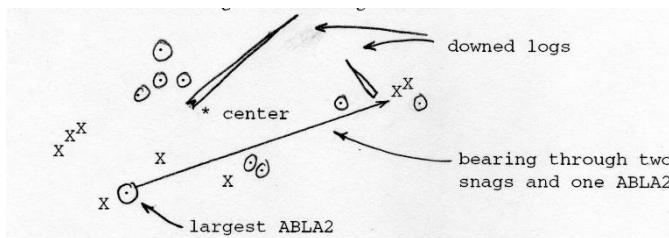
##### Vegetation:

- Collected graminoids
- A *Carex* recorded in the past as CAMI (*C. microptera*) was collected, however when we tried to key it out we could not get to CAMI. In the plant press it is noted as CAMI
- Another *Carex* found just above the origin of the transect was collected due to its close resemblance to CAPE5 (*C. pennsylvanica*). We are sure of our ID of CAPE5, but just for the future if it becomes a problem.
- *Antennaria alpina* (ANAL) collected

## Transect 14. Separation Creek Meadow (SPCM).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 592799, 4884430	1753	10 T 592865, 4884398	1739
Transect bearing (deg): 125.0		Transect length (m): 75.0	
Rebar locations (m): 0.0, 19.2, 20.0, 40.0, 45.0 55.15, 60.0, 75.0			

- Driving: if from the N, McKenzie Pass Hwy (242) to Obsidian trailhead. If from the S, Hwy 126 to Santiam Pass to Sisters, then to Bend. From Bend, take Century Drive Hwy past Bachelor Butte. Park at Devils Lake.
- Hike: if from the N, hike toward Obsidian Falls/Sister Spring and then along the PCNST for 2 mi, then down into Linton Meadows and S along old Skyline Trail to where Separation Creek crosses the trail. Or take the Foley Ridge trail to Racetrack Meadows. Then take old, abandoned trail down to Separation Meadows.
- If from the S, take the trailhead at Devils Lake that leads under Century Drive highway and goes to Sisters Mirror Lakes. Turn N at Wickiup Plains and hike along PCNST to intersection w/ old Oregon Skyline Trail. Take Skyline trail north past James Creek Shelter. From James Creek Shelter it is ~1 mi N to where Separation Creek crosses the trail.
- Hike down (W) along Separation Creek ~0.5 miles to Separation Cree. Meadow (not sure if there is real trail). **2009 note:** trail down Separation Creek is faint and incomplete. Continue west through meadow.
- Transect lies in the mid- to lower portion of main meadow. **2009 note:** transect is in NW corner of main meadow.
- Transect runs 125 deg from NW side of meadow, ~100 m N of E end of rock face in ~~SW~~ corner of the meadow. **2009 notes:** correction to direction #6: rock face is in NW (not SW) corner of meadow. Look for clumps of *Veratrum*; these are near the transect end point.
- Look for group of ABLA2 ~150 m S of forest beneath rock face. From opening in the center of these trees to the mid-rock face is 284 deg. ABLA2 and snags are arranged like this (circle w/ dot = live ABLA2, X = snag):



From end point rebar #4 (@75 m) facing 315 deg. Note invading TSME (clump #2) with stump at base and large downed logs; rock face to the L in the forest (1993 photo).



Approx. the same orientation, but closer (2009 photo).

- Largest ABLA2 (#6536) has a flasher that says "sight tree 6 deg, 45 m" (bark has been slashed slightly). Stand on the side facing Middle Sister and take a bearing of 6 deg, passing through two snags and one ABLA2 (6 m tall) at 15 m. **2009 note:** flasher gone.
- Rebar #4 is 45 m from the edge of this same largest ABLA2.
- Transect bearing is 305 deg from Rebar #4 to forest.
- Transect runs through two clumps of TSME of 6-8 trees each. The clump further from the forest is surrounded on W side by large "stump blob" (tree fall to the NW), its end near two large ABLA2.



## Transect 14. Separation Creek Meadow (SPCM) (cont.)

12. Large trees are tagged #6518-6535: #6518-6528 are in forest, #6529-6531 are in the first tree island, #6532-6535 are in the second tree island. All tags face South Sister (toward meadow). #6518 is not in the belt transect (behind 0-m rebar).
13. Total of 5 pieces of rebar on transect.

**2009 note:** from endpoint: 93 deg to South Sister; 158 deg to short snag across narrow part of meadow; 224 deg to closer tall snag at N end of meadow; 278 deg to rock face.

- Rebar #0 amongst trees—ABLA2 and TSME.
- Rebar #1 at 19.0 m in TSME forest. **1993 note:** when tape was tight, rebar was at 19.2 m.
- Rebar #2 at 45.0 m in meadow, 5 m before first TSME clump. **1993 note:** when tape was pulled tight, rebar was at 45.1 m; others lined up perfectly.
- Rebar #3 at 55.0 m at base of second TSME clump facing forest, near edge of "stump blob".
- Rebar #4 at 75.0 m in meadow with no trees nearby. **1993 note:** did not find original rebar, new aluminum rebar established at 75.0 m

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the L side of transect between 0-1 m marks. Plots are consecutive to the end of the transect, alternating L and R; P2 is from 1-2 m on the R, P3 is from 2-3 m on the L, etc. (odd number plots on the L, even number plots on the R). Last cover plot is 75L (74-75 m).

**Belt width for tree sampling (2009):** See details in [TP064\\_tree sampling history\\_16Sep2022.xls](#)

### Additional 2009 notes:

#### Rebars:

- Start point (0.0 m) iron rebar was found and retained. Flasher on tree #6536 is gone.
- Rebar at 19.2 found and retained (2009 distance = 1993 distance). Added new iron rebar at 20.0 and 40.0 m.
- Rebar at 45.1 m was never found; replaced with new iron rebar at 45.0 m.
- Rebar at 55.0 m (1993 distance) was found at 55.15 m.
- Installed new iron rebar at 60.0 m.
- Rebar at 75.0 m not found; installed new iron rebar at 75.0 m.
- Tape runs sigmoidally between meters 57 and 58 due to trees #6532, 6533, and 6534.

#### Sampling:

- Trees were sampled from 0-1 m on both the R and L due to time constraints (not 0-2 m on R, as per directions).
- Trees <10 cm tall were tallied in all plots in a continuous strip on both sides of the transect line.
- Trees  $\geq 10$  tall were sampled (and retagged if necessary) in all plots in a continuous strip on both sides of the transect line.
- Previous crews apparently did not tag upright TSME vegetative reproduction emanating from the base of a larger tree. Where these appeared separate from the larger tree (i.e., FLITT in between), they were tagged. Tagging of vegetative reproduction has been a source of confusion as methodology seems to have varied from site to site in the past. Please clarify which trees to tag for future crews.
- Trees with tags at DBH had tags moved to the base (nailed) facing the forest.
- Many trees near tape (0-1 m) tagged by previous crews but not recorded on tree sheet.

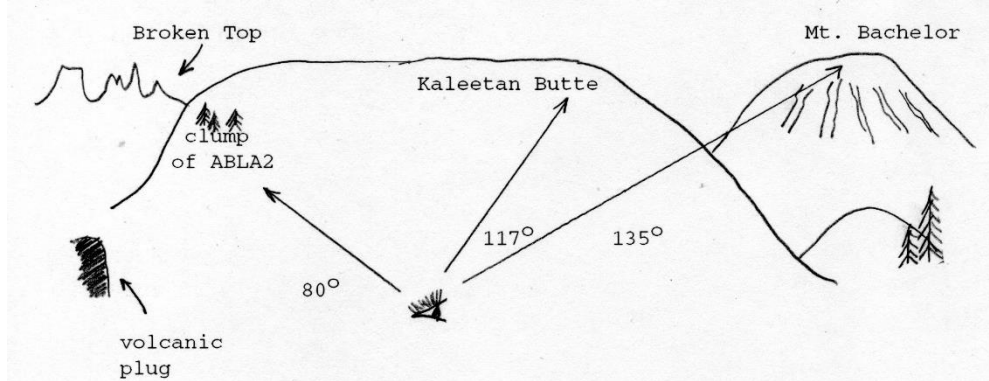
#### Vegetation:

- POGR not seen in any plots – POFL2 seen in plots where POGR listed (3 leaflets, not 5). Consider changing 1993 POGR data to POFL2.
- HYAN was prevalent at this site, but not previously recorded (?)
- No VAMY or MOSI found.
- Our best guess for Unknown#1 is *Mimulus moschatus* – collected.

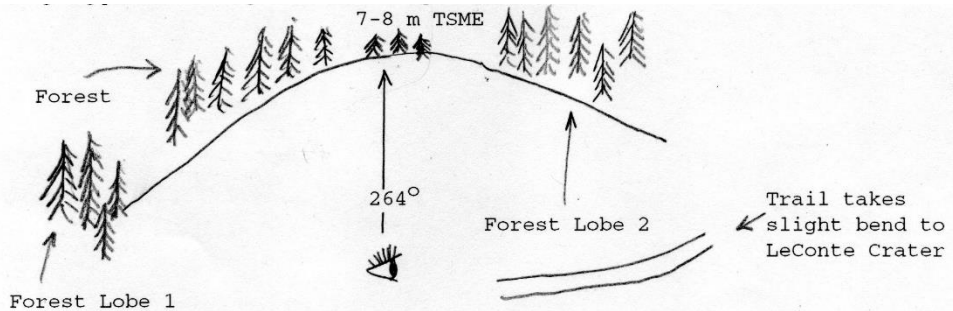
**Transect 15. Wickiup Plains (WICK).**

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 596186, 4877756	1912	10 T 596260, 4877773	1887
Transect bearing (deg): 84.0		Transect length (m): 78.7	
Rebar locations (m): 0.0, 28.7, 40.0, 50.0, 60.0, 67.7 (copper pin), 78.7			

1. Drive: Hwy 126 to Santiam Pass to Sisters, then to Bend. From Bend, take Century Drive Hwy past Bachelor Butte. Park at Devils Lake.
2. Hike: take trailhead at Devils Lake that leads under Century Drive highway and heads to Sisters Mirror Lakes. Pass intersection with trail to Moraine Lake after ~1.5 miles. After an additional 0.3 miles, turn N onto trail that runs along W edge of Wickiup Plains. It is “wagon-road” like and passes through PICO invasion. After several hundred meters you will be aligned with the mid-point of Kaleetan Butte to the E (see sketch below):



3. Transect lies on W side of S portion of Wickiup Plains, across from Kaleetan Butte, 0.25-0.50 mi S of LeConte Crater.
4. Site from trail along bearing of 80 deg to the middle of a clump of ~6 ABLA2 ~75 m away. From same position it is 135 deg to the peak of Bachelor and 117 deg to where Kaleetan Butte ridge drops down on the R. About 50 m further up the trail, the trail takes a bend toward LeConte Crater.
5. Now look W to the forest edge behind you. Transect lies between two major lobes of forest. There is a slight incline to where the transect lies, then a relative flat to forest edge (see photos on next page).
6. Several small (7-8 m tall; in 1983) TSME lie just on the other side of the incline in this gap—between two lobes of forest. From the same point it is 264 deg to the TSME clump:



7. The largest TSME is tagged #6717, but it is not on the transect.
8. From W side of this tree it is 284 deg to rebar #2; final rebar is in *Festuca viridula* meadow, 25 m from last invading tree.
9. Transect runs through the invasion clump in the low portion of the meadow (along 84/264 deg bearing).
10. Large trees are tagged #6709-6716, with #6701-6709 in the forest, #6710-6716 in the meadow (meadow trees are 6-7 m tall [in 1983]). #6701 is not in the belt transect, but behind the rebar.
11. Rebar #0 is in front of #6701 and to the R of #6702 (looking uphill, i.e., W); rebar #1 is at 29.7 m (near #6705 and 6707); rebar #2 is at 78.7 m in meadow; copper pin #1 is at 58.7 m, just past invasive clump.

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 2009):** P1 is on the L side of transect between 0-1 m marks.

Plots alternate every 2 m through 37L (i.e., 3R, 5L, 7R); then are consecutive to the end of the transect (i.e., 38R, 39L, 40R, etc.), alternating L and R. Pay careful attention to plot designations on the cover form. Last cover plot is 79L (78-79 m) although rebar is located at 78.7 m.

**Belt width for tree sampling (2009):** See details in [TP064\\_tree sampling history\\_16Sep2022.xls](#)

## Transect 15. Wickiup Plains (WICK) (cont.)

Not sampled in 1993.

### Additional 2009 notes:

#### Tape and rebar:

- Found rebar @ 0.0, 28.7, 67.7 (copper pin); installed new rebar @ 40.0, 50.0, 60.0, and 78.7 m

#### Sampling:

- Trees were sampled from 0-1 m on both the R and L.
- Trees <10 cm tall were tallied in a continuous strip on both sides of the transect line.
- Trees >10 tall were sampled (and retagged if necessary) in all plots in a continuous strip on both sides of the transect.
- Most tree tags were found.

#### Vegetation:

- New *Carex* found which was collected; did not find *Carex brewerii*



Entire transect line viewed from ~25 m from end-point Rebar (@ 78.7 m) facing 249 deg; note tree clump in front of older forest (1983 photo).



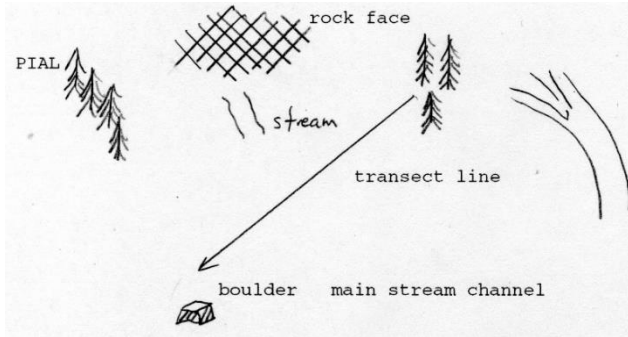
From start-point rebar (@ 0 m) facing 84 deg down the transect line. Kaleetan Butte is in the background (1983 photo).

**Transect 16. Green Lakes (GREN).**

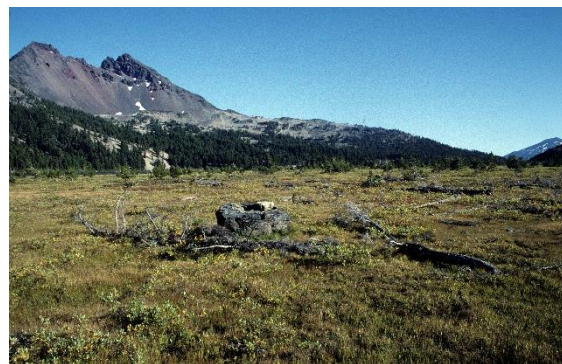
UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 600862, 4882700	2031	10 T 601013, 4882547	1995
Transect bearing (deg): 140.0	Transect length (m): 220.0	Rebar locations (m): 0.0, 30.0, 65.0, 100.0, 125.0, 150.0, 200.0, 220.5	

**Not sampled in 1993.**

1. Drive: Hwy 126 to Santiam Pass to Sisters, then to Bend. From Bend, take Century Drive Hwy past Bachelor Butte. Park N of Sparks Lake at Fall Creek trailhead.
2. Hike: Fall Creek trail up to Green Lakes (~4.4 miles).
3. Transect lies on W side of Green Lake, N of stream channel where it emerges from the base of the slope (see upper right photo, below), ~50 m below concave rock face (only large rock face on W side of Green Lake). Main stream channel emerges ~20 m N of transect line (see diagram below).
4. Take trail along E, then N end of Green Lake. Head S along W side of Green Lake, look for large group of whitebark pine with 100+ cm dbh tree w/ broken top (tree is just N of transect line). Transect begins on steep (68%) slope in forest.
5. Look for cube-shaped boulder 2 m long x 1 m wide out in meadow—transect runs 1 m to the S of this boulder.
6. Main stream channel to Green Lake runs out on the flat to N of the transect (see photo below)
7. Large trees are tagged #6718-6724, all in the forest.
8. Rebar #0 is in forest on slope; rebar #1 is at 30 m at base of slope (in trees); rebar #2 is at 220 m in meadow (see left photo, below)



Where transect descends the slope and crosses the trail, viewed from N → S. Note stream channel in the background (19083 photo).



From 100 m mark looking down the transect line (140 deg) to large boulder @ 113 m. Note position of white transect line in 1983 photo (left). Note new CWD in 1993 photo (right).

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 2009):** P1 is on the R side of transect between 0-1 m marks. Plots are consecutive through 54R, however, P30 and P31 are both on the L. After 54R, the sequence is more complex: use the cover data form to determine which meter marks and sides of the transect to sample. Last cover plot is 219L (218-219 m).

**Belt width for tree sampling (2009):** See details in [TP064\\_tree sampling history\\_16Sep2022.xls](#)

## Transect 16. Green Lakes (GREN) (cont.)

### Additional 2009 notes:

#### Tape and rebar:

- Found rebar @ 0.0, 30.0, and 220.5 m
- Installed rebar @ 65,100.0, 125.0, 150.0, and 200.0 m

#### Sampling:

- Trees were sampled from 0-1 m on both the R and L.
- Trees <10 cm tall were tallied in a continuous strip on both sides of the transect line.
- Trees >10 tall were sampled (and retagged if necessary) in all plots in a continuous strip on both sides of the transect line.
- Lack of detail on 1983 distance from transect line made it difficult to identify trees, however I think we did a pretty good job of lining them up. (**2009 pre-sampling note:** distances from transect were not recorded in 1983; stems may be 1-10 m away; obtain real distances in 2009).

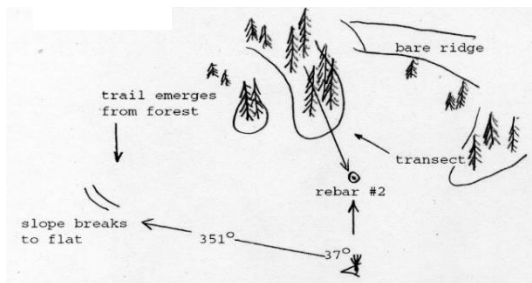
#### Vegetation:

- Collected graminoids CASP, CAIN5, LUPA, CASC5, JUPA, JUME, CAMI

## Transect 17. Linton Meadow (LINT 1).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 593490, 4887701	1840	10 T 593462, 4887652	1833
Transect bearing (deg): 202.0	Transect length (m): 60.0	Rebar locations (m): 0.0, 10.0, 20.0, 30.0, 50.0, 60.0	

1. Drive: McKenzie Pass Hwy (242) to Obsidian trailhead.
2. Hike: Hike to Obsidian Falls/Sister Spring and then along the PCNST for 2 mi, entering Linton Meadow south of the pumice flats of Lane Plateau walking down the steep trail into the NE portion of Linton Meadow.
3. Transect lies on the NE slope of Linton Meadow passing from TSME forest through *Pteridium aquilinum*/*Festuca viridula* meadow type.
4. Walk ~100+ m to the first major tree island on the **left** (**2009 note**: should read “right”)—large group of TSME among boulders with a lot of bare soil. Walk to the end of the tree island; stop along trail where it bends S toward the stream. Here, the original trail would have continued straight, but it has been blocked with boulders/sticks and is rerouted S.
5. At this intersection, take bearing of 37 deg to the last rebar (#2) in *Festuca viridula* meadow.
6. Transect runs through the group of trees uphill and slightly to the L—the largest lobe of trees in that portion of the meadow (see illustration below). Transect runs at 202 deg bearing from small forest on top to rebar #2 at 60 m.



From the main flat in Linton Meadow (below *Carex nigricans*/*C. spectabilis* type) upslope along an azimuth of 37 deg to *Festuca*/*Pteridium* meadow and TSME invasion. Large invasion lobe in the diagram (left) is the same as in the photos; arrows marks location of transect emergence from forest (1993 left, 2009 right). Note tree mortality at the edge in the 2009 photo.

7. Large trees are tagged #6901-6907, all face downhill; #6901-6905 are in the forest, #6906, 6907 are large TSME and ABLA2 in the first clump of invasion (#6902 is just outside the transect).
8. Square aluminum flasher with description is on tree #6901 which lies 1 m NE of rebar #0.
9. Rebar #0 in ABLA2/TSME forest.
10. Rebar #1 in first group of invasive trees at 30.0 m.
11. Rebar #2 in *Festuca viridula* meadow at 60 m.

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 2009):** P1 is on the L side of transect between 0-1 m marks.

Plots are consecutive to the end of the transect, alternating L and R: P2 is from 1-2 m on the R, P3 is from 2-3 m on the L, etc. (odd number plots on the L, even number plots on the R). Last cover plot is 60R.

**Belt width for tree sampling (2009):** See details in [TP064\\_tree sampling history\\_16Sep2022.xls](#)

## Transect 17. Linton Meadow (LINT 1) (cont.)

### Additional 2009 notes:

#### Directions:

- Location was not plotted correctly on original topo map; needs to be changed. Location correctly plotted on 2009 TSBR map containing sticky notes.

#### Rebars:

- Found rebars at 0.0 and 30.0 m.; did not find end-point rebar at 60.0 m; reestablished 60.0 m rebar. Inserted new rebar at 10.0, 20.0, and 50.0 m.

#### Sampling:

- Conducted by Mike Stefancic, Meghan Colkitt, and Charlie Halpern with help from Olivia Duren, Bridget McNassar, and Hannah Marx in the afternoon.
- Trees were sampled from 0-1 m on both the R and L.
- Trees <10 cm tall were tallied in continuous strips (0-1 m) on both sides of the transect line.
- Trees >10 tall were sampled and tagged in continuous strips (0-1 m) on both sides of the transect line. Nails and tags were moved to the bases of DBH trees, facing downhill or toward the transect line.

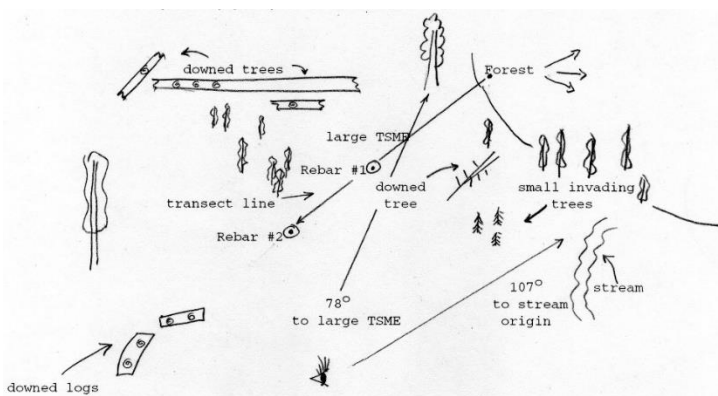
#### Vegetation:

- At time of sampling the vegetation was in prime phenology (vigorous and green) including the bracken and graminoids. Bracken dominated from the invasion lobe edge down to ~50 m. *Stipa* and *Sitanion* were in flower. Found *Pedicularis racemosa* frequently in the forest where none had been recorded previously.
- Significant recent tree mortality and tree fall. See also notes on vegetation sheets. (1) A >30 cm ABLA2 to right of transect at ~32 m was a snag in 1993. Recently (based on bare soil), it fell down the transect line creating considerable soil disturbance where it was rooted and a large amount of CWD. Resulting log and branches now span the transect from ~32 to 46 m. (2) Large ABLA2 to the right of the transect line at ~38 m, at the leading edge of the invasion front, is also dying. Upper canopy is dead, lower canopy is sparse and lower branches (skirt) are alive (now crushed under aforementioned log); the latter will probably layer over time. This is the brown standing tree evident in the 2009 photos. (3) Large ABLA2 #6903 at 4-5 m is dead; top snapped and landed along transect at ~8 m and is now interacting with small ABLA2 along the transect.

## Transect 18. Linton Meadow (LINT 2).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 594000, 4887009	1866	10 T 593923, 4887026	1831
Transect bearing (deg): 289.0	Transect length (m): 90.0	Rebar locations (m): 0.0, 20.0, 50.0, 60.0, 80.0, 90.0	

1. Drive: McKenzie Pass Hwy (242) to Obsidian trailhead.
2. Hike: Hike to Obsidian Falls/Sister Spring and then along the PCNST for 2 mi, entering Linton Meadow south of the pumice flats of Lane Plateau walking down the steep trail into the NE portion of Linton Meadow.
3. Two descriptions and illustrations follow, the first from 1983, the second from 1993.
4. **1983 description:** Transect is in SE portion of Linton Meadow, in meadow arm detached from main meadow complex. Area is S of large stream entering middle/lower portion of Linton Meadow from rock face along E edge (see illustration).
5. Find stream channel S of the above-mentioned stream channel. It flows from S to N into Linton Meadow from the SE corner (**1993 note:** from E corner) of meadow and joins with the above-mentioned stream channel (**1993 note:** but then E to W).
6. Follow this N-flowing (**1993 note:** W-flowing) stream to its origin in the sloping meadow—here is where the transect lies. The stream originates as a spring at the edge of the forest-meadow ecotone (see photo, below).
7. Meadow is dry at the top, *Festuca viridula*/*Lupinus latifolius*/*Polygonum newberryi*, grading to *Festuca viridula*, then to *Festuca viridula*/*Carex spectabilis* down slope.
8. There is a large sink-hole or sink-channel forming in the center of the meadow where the slope breaks off.
9. Transect emerges from forest to the L of the stream channel origin and to the L of large tree top that has fallen into dry portion of meadow. Transect lies to the R of the largest TSME that seems out in the middle of meadow (see photo below).
10. This is a view from dry, bouldery, gravelly, elevated area below stream:

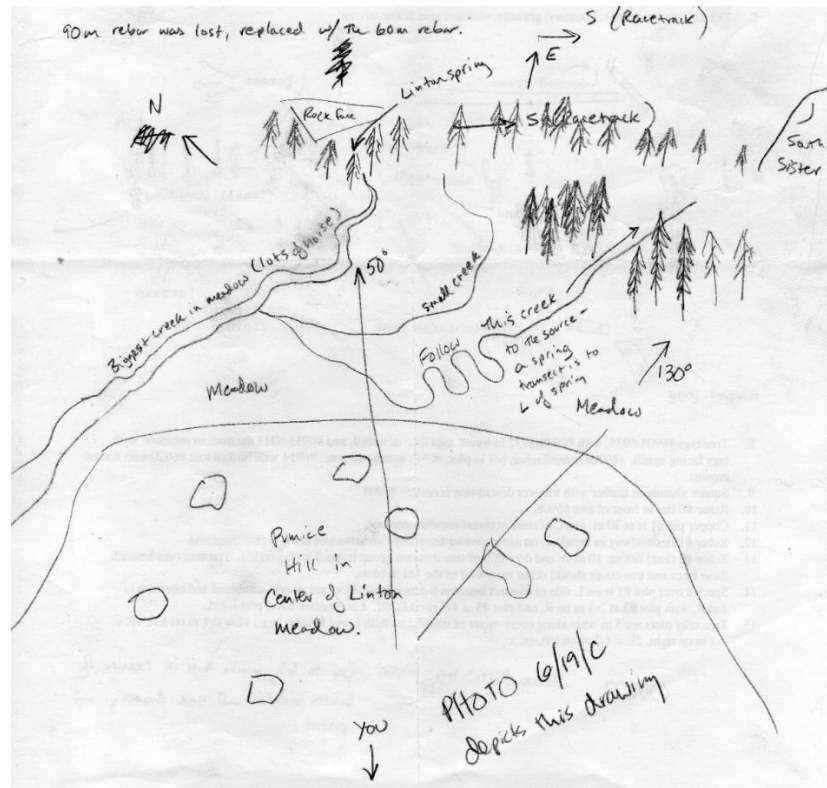


Distant view of transect area (same aspect as schematic diagram), facing 75 deg. Note spring and stream to the R on the slope. White transect line is visible, angling from center R to lower L in the photo, sampler in red.

11. Large trees are tagged #6908-6935: #6908-6932 are in the forest (tags face downhill); #6933-6935 are in the meadow (tags face uphill); #6908 is behind rebar, not in the belt transect; #6914 has a broken top; #6920 has a forked crown.
12. Square aluminum flasher with transect description is on tree #6908.
13. Rebar #0 lies in front of tree #6908.
14. Original copper pin #1 at 30.0 m, just L of trees at forest-meadow ecotone (**1993 note:** 30 m pin found but at 30.3 m when tape is pulled tight).
15. Rebar #1 lies midway in meadow, on same contour from large invasive tree to the L (see illustration).
16. Rebar #2 (last) lies ~10 m W and downhill of tree invasion group (tagged #6933-6935). Transect runs beneath these trees and tree cover should occur in several of the 1x1 m plots.
17. **Other 1993 notes:** 50 m rebar installed; 60 m rebar was found, but moved to replace the lost 90 m rebar; 90 m rebar was lost, replaced with 60 m rebar (2009 comment, CBH: not sure why the switch).
18. **1993 description:** Go to big "pumite" hill in the center of Linton Meadow and see illustration. Transect is not in the main meadow. It is a lobe that extends E.



## Transect 18. Linton Meadow (LINT 2) (cont.)



**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the L side of transect between 0-1 m marks. Plots are spaced every 2 m to the end of the transect, alternating L and R: P3 is from 2-3 m on the R, P5 is from 4-5 m on the L, etc. Last cover plot is 89L (88-89 m) although rebar is at 90 m.

**Belt width for tree sampling (2009):** See details in [TP064\\_tree sampling history\\_16Sep2022.xls](#)

### Additional 2009 notes:

#### Directions:

- Location was not plotted correctly on original topo maps; needs to be changed. Location has been correctly plotted on the 2009 TSBR map containing sticky notes. Bearing is 289 deg. Clarify this on the transect directions sheet.
- There was a rebar at 60 m (see 1993 note).

#### Rebars:

- Found rebar at 0.0 and 50.0 m only. At 0.0 m point, a large branch had fallen, knocking off tag #6908 which was buried under the branch. Tag and rebar found.
- Re-established the location of the 90.0 m rebar (end point).
- Installed new rebar at 20.0, 60.0, and 80.0 m.

#### Sampling:

- Conducted by Mike Stefancic., Meghan Colkitt, Olivia Duren, Bridget McNassar, and Hannah Marx. Photos by Charlie Halpern, but light conditions in the meadow were suboptimal (sunny morning).
- Trees were sampled from 0-5 m on the L, 0-7 m on the R.
- Trees <10 cm tall were tallied in continuous strips (0-1 m) on both sides of the transect line.
- From 1-5 (L) and 1-7 m (R) trees  $\geq 10$  m tall were measured, but only those  $\geq 30$  cm tall were tagged. Nails and tags were moved to the bases of DBH trees (tag direction not noted).

#### Vegetation:

- Plant phenology was good.
- Significant tree mortality (stem snap and wind throw) throughout the forest, leading to a large amount of CWD and a number of rootwads. Forest canopy has opened up significantly since 1993 (see 2009 photos of the forest). Some rootwads (including one in the sample area) had dense regeneration of TSME. Some establishment of *Sambucus*.

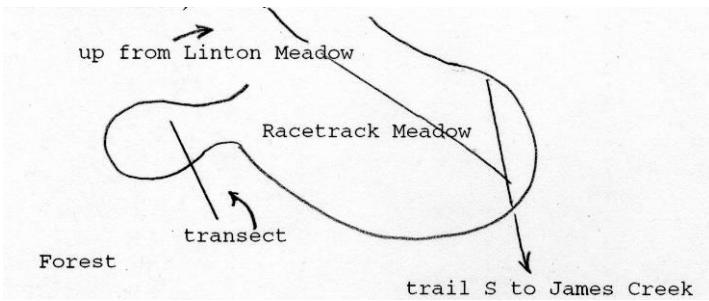
**Transect 19. Racetrack Meadow (RACE).**

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 593146, 4885971	1888	10 T 593212, 4886042	1874
Transect bearing (deg): 42.0	Transect length (m): 100.0	Rebar locations (m): 0.0, 20.0, 30.0, 40.0, 50.0, 60.8, 71.0, 80.2, 100.17	

**Rebar locations in 2009 (m):** 0.0, 20.0, 30.0, 40.0, 50.0, 60.80, 71.0, 80.2, and 100.17.

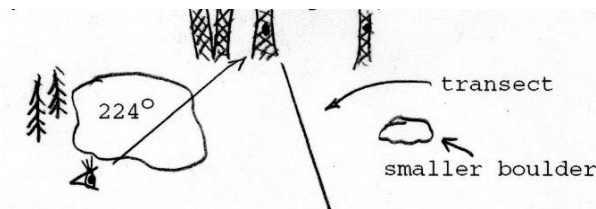
**Note:** not the same "Racetrack Meadow" labeled on the Wilderness map. Transect lies west of that meadow.

1. Drive: McKenzie Pass Hwy (242) to Obsidian trailhead.
2. Hike: Hike to Obsidian Falls/Sister Spring and then along the PCNST for 2 mi, entering Linton Meadow south of the pumice flats of Lane Plateau walking down the steep trail into the NE portion of Linton Meadow. Then climb to Racetrack Meadow by continuing S along the old Skyline Trail out of Linton Meadow.
3. Upon entering flats of "Racetrack" (see caution above about name), make a sharp turn back to the R (W) to a meadow enclosed by elevated forest on all sides except at the entrance (essentially the W portion of "Racetrack" Meadow).  
**2009 notes:** transect is at N end of this meadow. Transect endpoint is at a bearing of 207 deg from the junction of Skyline trail and trail to Husband Lake, and at bearing 293 deg from the "Camping Prohibited" sign in Racetrack Meadow. Transect is behind a low rise between these two points, to the W.
4. There are some small TSME reproduction in the opening to this meadow.

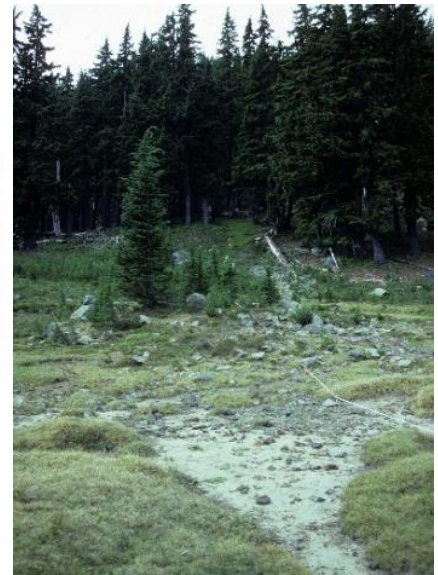


View from ~NW→SE of entire w/ TSME forest through bouldery heather slope to *Carex lobes* and pumice flat (1993 photo)

5. Meadow has a flat w/ *Carex* and heather side-slopes. Most of flat is *Eriogonum pyrolaefolium*/*Polygonum newberryi* type.
6. Upon entering meadow to the N is a slope with dense regeneration. Looking uphill, transect runs through the R portion of this. Note large TSME reproduction in boulder pile—go to it. There should be a large TSME (see photo) and a TSME with a smaller basal diameter.
7. From large boulder take bearing of 224 deg to forest and tagged trees #6940 and 6941 that face the meadow.



Up the transect line (222 deg) from edge of CAN12 flat to where transect emerges from forest; note boulders and tall TSME among dense invasion (1993 photo).



## Transect 19. Racetrack Meadow (RACE) (cont.)

8. Bearing should pass over largest boulder in sight which has relatively large TSME reproduction to its E (boulder is actually two pieces, one flat one behind a larger one):
9. Large trees are tagged #6936-6941, all in forest. #6941 has a dead crown.
10. Square aluminum flasher with transect description is on tree #6936.
11. Rebar #0 is at the base/W edge of tree #6936.
12. Rebar #1 at 30.0 m (**1993 note:** 29.8 m; **2009 note:** 30.0 m), ~5 m up from boulder. Transect runs to W of boulder.
13. **1993 note:** New rebar inserted at 50.0 m in *Cassiope/TSME*.
14. Rebar #3 is at 60.7 m. **1993 note:** 60.75 m, replaced with aluminum rebar, at end of invading reproduction, ~4 m from large TSME from which bearing was taken.
15. Copper pin #1 is at 80.0 m (**1993 note:** 80.15 m, replaced w/ aluminum rebar) in channel between *Carex* patches.
16. Copper pin #2 is at 100 m (**1993 note:** 100.1 m, replaced with aluminum rebar) in center of *Polygonum newberryi/Eriogonum pyrolaeifolium* area.
17. **1993 note:** for meter tape fit rebar locations, tape must be pulled tight so that in places it hangs 1-2 m in the air.

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the R side of transect between 0-1 m marks. Plots are consecutive to the end of the transect, alternating R and L: P2 is from 1-2 m on the L, P3 is from 2-3 m on the R, etc. (odd number plots on the R, even number plots on the L). Last cover plot is 100L.

**Belt width for tree sampling (2009):** See details in **TP064\_tree sampling history\_16Sep2022.xls**

**Additional 1993 notes:** Trees <10 cm tall were not tagged, but all information was taken (small trees don't hold tags despite being nailed to the ground). Tags on trees were either moved or located so they face **away** from the meadow to make them less obvious (thus, nailed tags face away from the meadow)

### Additional 2009 notes:

#### Rebars:

- Start point (0.0 m) iron rebar was found. Flasher on tree #6936 is gone. In 2009, it was necessary to move the transect origin 34 cm toward endpoint to make tree data align and distance to 2<sup>nd</sup> rebar fit. Iron rebar was installed at the new origin; the old rebar left in place.
- Second rebar, at 30.0 m in 2009, found and retained.
- Third rebar, at 50.0 m in 2009, found and retained.
- Rebar, at 60.8 m in 2009, found and retained – this is iron, not aluminum.
- Rebar, at 80.2 m in 2009, found and retained.
- Rebar, at 100.17 m in 2009, found and retained.
- New rebar installed at new origin, and at 20.0, 40.0, and 71.0 m.
- Tape is slack between rebars at 30 and 50 m to make fit, but all other sections were at max tightness.

#### Sampling:

- Trees were sampled from 0-1 m on both the R and L.
- Trees <10 cm tall were tallied in all plots in a continuous strip on both sides of the transect line.
- Trees >10 tall were sampled in all plots in a continuous strip on both sides of the transect line.
- Tag wire replaced for ~ first half of trees (fewer for the second half due to limited wire supply). Suggestion for future: tag using larger diameter wire (2009 wire is fine, previous wire was thin and brittle and degraded quickly). Loop wire loosely around side branch, not the main stem. Replacing wire was very time consuming; aim for wire longevity.
- Trees with tags at DBH had tags moved to the base (nailed) away from meadow (toward forest).

#### Vegetation:

- Previous "unknown *Ranunculus*" appears to be a POFL2 seedling.
- Collected: ANUM, AGVA, DEAT, CANI2, CASP, JUPA, *Luzula* (parviflora?) (CBH 2022: more likely to be *L. hitchcockii*)
- Also see notes on veg sheets.

## Transect 19. Racetrack Meadow (RACE) (cont.)

**Historical note:** In 1983, at 92.4 m along the transect line, a copper pin was installed to monitor potential movement of the *Carex nigricans* lobe. Three additional pins (some twisted or bent) were installed at 3 m intervals from the first along the edge of the *Carex* lobe (see photos below). Please relocate these if you can. Has the *Carex* lobe advanced or retreated?



### 1993 report on advancing *Carex nigricans* lobe:

- Pin at 92.52 m: rooted *Carex* advanced 4 cm; cover has advanced 9 cm
- 1<sup>st</sup> pin to L of transect: rooted *Carex* advanced 5 cm; cover advanced 11 cm
- 2<sup>nd</sup> pin to L of transect: rooted *Carex* advanced 3 cm; cover advanced 0 cm
- 3<sup>rd</sup> pin to the L of transect could not be relocated. Photograph of lobe below.

### 2009 report:

- Pin at 92.52 m: rooted *Carex* advanced 12 cm (8 cm past 1993); cover advanced 13 cm.
- 1<sup>st</sup> pin: rooted *Carex* advanced 18 cm, cover advanced 23 cm.
- 2<sup>nd</sup> pin: rooted *Carex* advanced 8 cm, cover advanced 12 cm.
- 3<sup>rd</sup> pin: rooted *Carex* advanced 8 cm, cover advanced 12 cm.
- Advance measured as local average perpendicular to lobe edge, with 'average' being between the edges of the lobe on ~ 30 cm of either side of the copper pin.

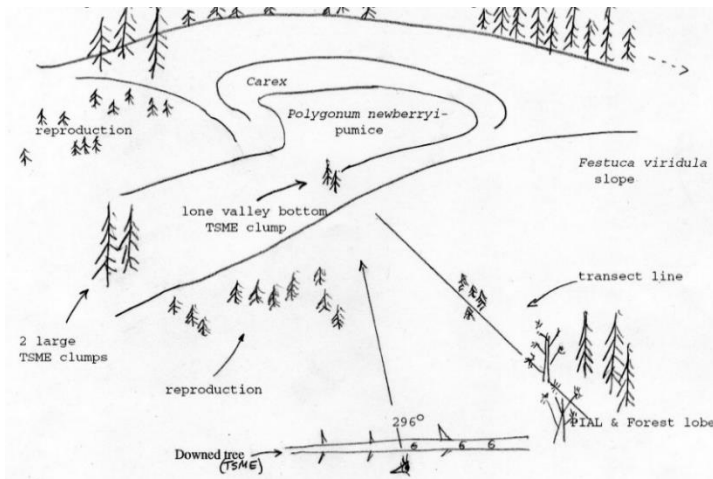
All photos are from 1993.



## Transect 20. Obsidian Flats (OBFL).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
10 T 593555, 4892151	1885	10 T 593497, 4892168	1872
Transect bearing (deg): 288.0		Transect length (m): 60.0	
Rebar locations (m): 0.0, 10.0, 20.0, 30.0, 45.0, 60.0.			

1. Drive: McKenzie Pass Hwy (242) to Obsidian trailhead. **2009 note:** no changes to directions were needed.
2. From Obsidian trailhead hike toward Obsidian Falls, cross lava flows and White Branch Creek. Take Obsidian Cliffs Trail from White Branch Creek.
3. Transect lies on the plateau above Obsidian Cliffs. Upon reaching level ground on the plateau, walk until it appears that you are walking straight toward Middle Sister — this is the first time that you will see the mountain.
4. Continue for ~1/8 mi until you enter a small "valley" with *Carex nigricans* on the S side, and a bare, obsidian- pumice ground surface on the N. This is the entrance to the flats. Walk west on the obsidian covered surface. To the L there appears to be a ridge along the other side of this valley.
5. Continue thru opening (bearing 295 deg) until you see the broad expanse of the main portion of Obsidian Plateau.
6. Transect begins in the first lobe of forest, slopes down from *Festuca* meadow to pumice - *Polygonum newberryi* type.
7. "Markers" are 2 large TSME clumps in "valley bottom," SW of above-mentioned forest lobe, and 1 lone, somewhat smaller TSME clump at the base of the slope where it levels into the "valley" (lone valley bottom clump in the illustration below). The latter is ~50+ m further into the meadow. Transect emerges from forest toward this clump (see photo below).
8. Note the forest lobe to the R, immediately in front of you; from it lies a large downed TSME in the meadow. There are several white bark pine (PIAL) on the edge of the lobe (see illustration below).
9. Bearing from the mid-point of the downed tree to the lone TSME clump in the flats is 296 deg. **2009 notes:** Down TSME in sketch map still evident, but decayed. PIAL at lower R in sketch map is standing dead (died before 1993). 2009 photo 2037.jpg faces west, and shows the approach to the transect from the obsidian-covered flat near the hiking trail.



sampUpper right (1993 photo). Similar to schematic diagram (upper left). Note pumice flat in the distance, lone "valley bottom" TSME clump at break in slope, and ABLA2 invader near the transect line.

Lower right (2009 photo): transect emerges from TSME/PIAL forest at arrow; sampler is adjacent to the line.



## Transect 20. Obsidian Flats (OBFL) (cont.)

10. Transect begins (rebar #0) begins within the forest lobe. All tagged trees lie within the forest.
11. Trees tagged #6601-6619: #6601-6603 behind transect; #6602, 6605 touch snag; #6606 with damaged top.
12. Rebar #1 is in invasion area at 30.0 m, just beyond clump of two TSMEs and three PIALs.
13. Rebar #2 is at 45.0 m, in *Festuca viridula* meadow.
14. Rebar #3 is at 60.0 m, in *Festuca viridula* meadow.

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the R side of transect between 0-1 m marks. Plots are consecutive to the end of the transect, alternating R and L: P2 is from 1-2 m on the L, P3 is from 2-3 m on the R, etc. (odd number plots on the R, even number plots on the L). Last cover plot is 100L (99-100 m).

**1993 note:** plots read early phenologically relative to 1983.

**Belt width for tree sampling (2009):** See details in [TP064\\_tree sampling history\\_16Sep2022.xls](#)

## Transect 20. Obsidian Flats (OBFL) (cont.)

### Additional 2009 notes:

#### Rebars:

- Rebar at 0 m was lost, buried beneath tree fall. 0.0 m point reestablished from other rebar, set in CWD. Rebar found at 30.0 m, 45.0 m, and 60.0 m (end point). Rebar at 60.0 m was completely bent over, but in place. Installed additional erect rebar at this point. Installed new rebar at 10.0 and 20.0 m.

#### Sampling:

- Conducted by Mike Stefancic., Meghan Colkitt, Olivia Duren, Bridget McNassar, Charlie Halpern, and Hannah Marx. Photos by Charlie Halpern.
- Trees were sampled from 0-4 m on the L, 0-4 m on the R.
- Trees <10 cm tall were tallied in continuous strips (from 0-1 m) on both sides of the transect line.
- Trees  $\geq$ 10 cm tall were tagged and measured in continuous strips from 1-4 m on the R and 1-4 m on the L.side.
- Nails and tags were moved to the bases of DBH trees, facing toward the transect line.

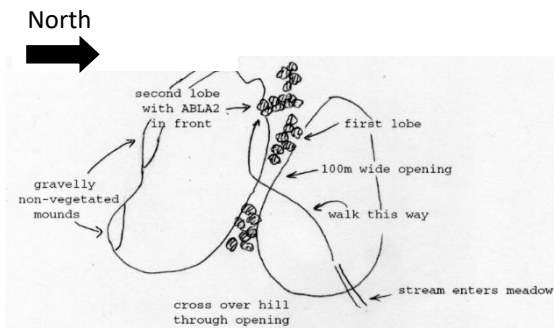
#### Vegetation:

- Plant phenology was good for the most part although some species (e.g., *Hieracium gracile* and *Polygonum newberryi*) were mostly dead and the former was shriveled. Graminoids (mainly *Festuca*) were in full flowered/seed.
- Forest is suffering from considerable mortality of TSME. PIAL had died previously (prior to 1993 remeasurement). Some mortality has given rise to snags, some to tree fall or stem snap, producing lots of down wood. Some TSMEs are not dead but have lost their tops or suffered top dieback. Some 2009 photos were taken of decaying forest (e.g., 2036.jpg).
- Surviving trees in the forest have been growing little to well depending on local competition (many of the TSME occur in groups, with smaller trees somewhat suppressed). Some trees have eaten their tags.
- Regeneration in the forest understory is good; healthy vigorous trees dominated by ABAM with some TSME, ABLA2, and PIAL. In the flat of the basin beyond the transect end point, PICO is the only invader (into *Carex* mats and pumice barrens).
- Some PIAL on the transect is in good shape, some shows signs of blister rust. Found one small PIPO (!) in the ecotone. CBH: if I recall correctly, the S-facing slope, south of the basin has large PIPO.

## Transect 21. Obsidian Creek (OBCR).

UTM (E, N): Start rebar	Elevation (m): Start rebar	UTM (E, N): End rebar	Elevation (m): End rebar
Not taken	Not taken	10 T 593051, 4890805	1839
Transect bearing (deg): 194.0	Transect length (m): 90.0	Rebar locations (m): 0.0, 11.0, 21.35, 40.0, 50.0, 60.0, 75.0, 90.0	

1. Drive: McKenzie Pass Hwy (242) to Obsidian trailhead. **2009 note:** no changes to directions were needed.
2. Hike: from Obsidian trailhead hike toward Obsidian Falls, cross lava flows and White Branch Creek. Take Obsidian Cliffs Trail from White Branch Creek.
3. Stop at the intersection to Sister Spring/Obsidian Falls to the E. Head W, down Obsidian Creek itself to the large "double-lobed" meadow at its base. At this time of year, 22 Sep) the creek is dry just above the flat meadows.
4. Enter the northerly of the two meadows by following the stream down. Approximately half way across meadow, go uphill to the L (S) through ~100 m wide opening on top of elongate hill that separates the two meadow sections.
5. Walk to forest edge on the N side of this opening on the crest of the elongate hill.
6. Walk around this first forest lobe to a 2<sup>nd</sup> forest lobe (see illustration below) that points downhill into meadow. There is a concavity in the forest here that separates the first and second forest lobes.
7. At the edge of the 2<sup>nd</sup> lobe are a group of ABLA2 with up-curved branches (layering). Just inward from them is a large gap with lots of CWD. Here lies the transect. Transect begins further back in forest lobe to the R (north).



Looking 94 deg E across transect. Note sampler wearing orange vest (1993, upper right photo) and white shirt in front of invading trees (2009, lower right photo).



8. Reproduction scattered between first forest section and 2<sup>nd</sup> lobe where transect lies. First forest section not very dense.
9. Large trees are tagged #6620-6637, but only 2 trees lie in the 2-m wide belt transect: #6632 (~92 cm dbh) and #6635 (~75 cm dbh). Tree #s 6620 and 6621 have grown together and are behind the rebar; #6633 and 6634 have grown together at the base; #6622 and 6623 have forked crowns; #6626, 6628, 6630, 6634 have broken tops/crowns.
10. Transect begins beneath large TSME #6620, one of the largest in the stand (90+ cm dbh).
11. Rebar #0 is at 0.0 m, ~1 m E of center of #6620 (0.5 m if facing aluminum flasher) (**1993 note:** rebar found).
12. Rebar #1 is at 21.35 m, just W of #6635, large TSME that overlooks fir invasion clump (**1993 note:** rebar found).
13. Rebar #2 is at 30.0 m, ~3 m from fir invasion front, in boulders in *Sitanion/Lupinus* type (**1993 note:** rebar missing).
14. Rebar #3 is at 60.0 m, ~6 m below two lone TSME invaders in *Festuca viridula/Carex spectabilis* type. The two invading trees are 2+ m tall (in 1983) and are at 54 m along the transect. The rebar is ~2 m upslope of where slope breaks off to the flat (**1993 note:** rebar missing).
15. Rebar #4 is at 90.0 m, in *Carex spectabilis* flat (~28 m from where slope transitions to flat) (**1993 note:** rebar missing).



## Transect 21. Obsidian Creek (OBCR) (cont.)

**Additional 1993 notes:** rebars at 0.0, 21.35, 50.0 and 90.0 m (rebar at 50 and 90 m are aluminum and sunk deep). Old picket stake found in plot 56R.

**Spacing of microplots (P1, P2, etc.) for species cover (1983, 1993, and 2009):** P1 is on the L side of transect between 0-1 m marks. Plots are consecutive to the end of the transect, alternating L and R: P2 is from 1-2 m on the R, P3 is from 2-3 m on the L, etc. (odd number plots on the L, even number plots on the R). Last cover plot is 90R (89-90 m).

**Belt width for tree sampling (2009):** See details in [TP064\\_tree sampling history\\_16Sep2022.xls](#)

**Additional 2009 notes:**

### Rebars:

- Ground-nesting bees were active near the transect origin, so tapes were not run from there. Microplot 1 and 2 cover values were guesstimated from a distance. All rebars were found (0.0, 21.35, 50.0 and 90.0 m). Additional rebar installed at 11.0 m (due to class 2 log at 10 m), 40.0 m, 60.0 m, and 75.0 m. Tape was run loose the entire length of transect to match 1993 rebar distances.

### Sampling:

- Conducted by Mike Stefancic, Meghan Colkitt, Olivia Duren, Charlie Halpern, Bridget McNassar, and Hannah Marx. Photos by Charlie Halpern.
- Trees were sampled from 0-1 m on both the R and L.
- Trees <10 cm tall were tallied in continuous strips (0-1 m) on both sides of the transect line.
- Trees  $\geq 10$  tall were sampled and tagged in continuous strips from 0 to 1 m on both sides of the transect line.
- Nails and tags were moved to the bases of DBH trees, facing away from the meadow.
- Tried to follow the tagging/measuring protocol of the 1993 team: did not tag branches that emerged from bases of larger trees.
- Tree clump from 53-55 m on L and R: very confusing, with many saplings from the base of larger trees, but most not tagged; yet, others previously tagged were not found. Olivia Duren's methodological suggestion: clarify protocol when vegetative regeneration gets tagged: inconsistent between sites and year to year.

### Vegetation:

- Plant phenology was good. Some herbaceous species were somewhat senescent (e.g., *Hieracium gracile* and *Polygonum newberryi*).
- *Veratrum* appears to be *V. californicum* (erect flowering stems) – not on site, but in adjacent meadow.