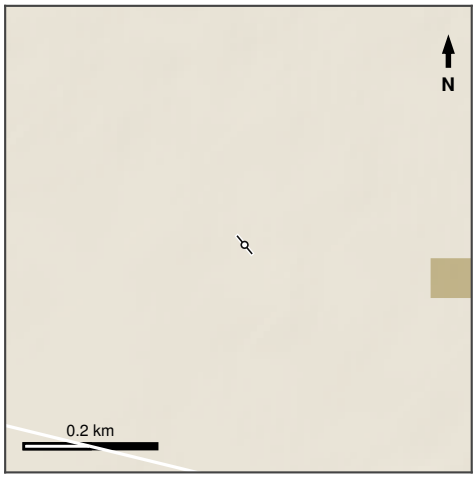
Site card — CCM01

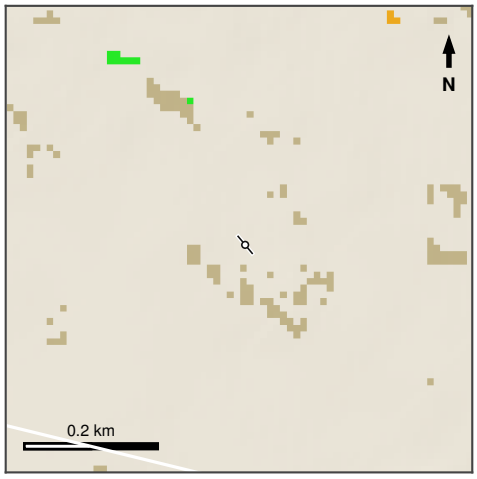
700 m frame around the transect · baseline summer2025 · primary summer2026

Hoop-level MAE (absolute cover): 0.169. What changed since July: documented limit: sagebrush, grass and greasewood are one spectrum in the 2026 drought; reads Bare + cured cover.

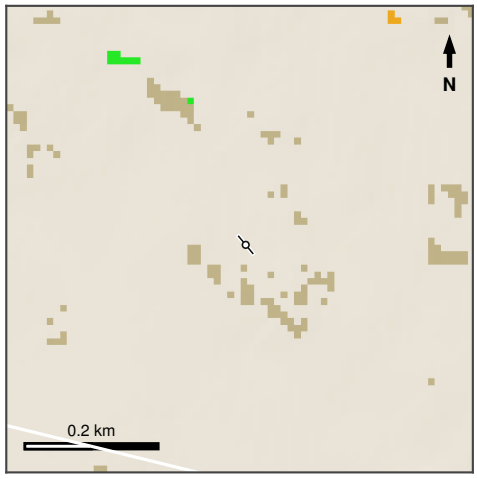
July 2026 delivery (v3.3) — label, summer2025



September 2026 (v3.4) — label, summer2025



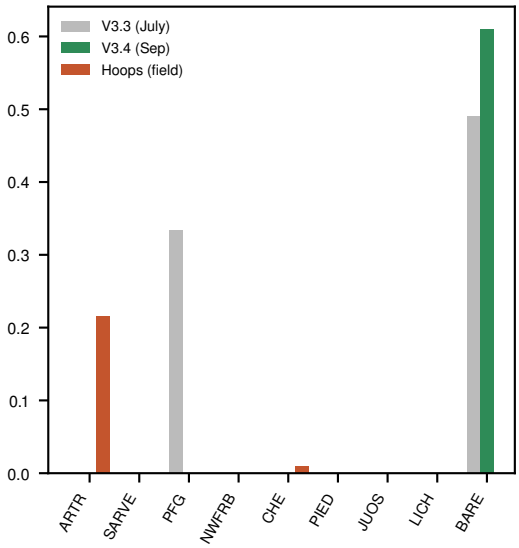
V3.4 co-occurrence rank-1, summer2025



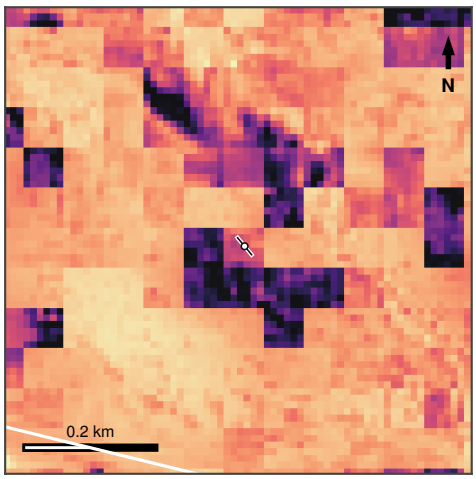
Species key — code · class — scientific (common) · share of labeled cells

- 22 · BARE — bare soil (exposed soil) 96.8%
- 17 · NPV_GRASS — standing dead and cured grass (grass litter) 2.9%
- 20 · NPV_NEEDLE — needle litter (conifer needle litter) 0.2%
- 1 · ARTR — Artemisia tridentata (big sagebrush) 0.1%

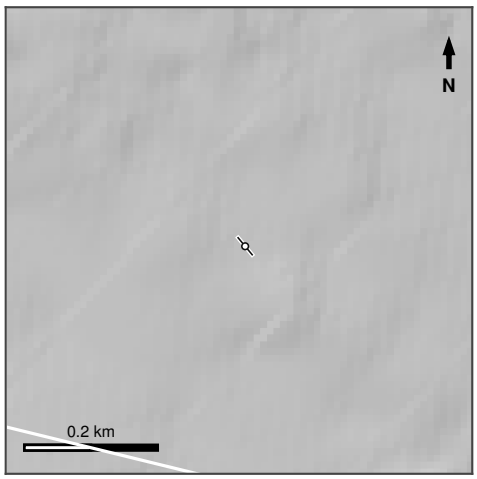
Cover fraction at the transect center



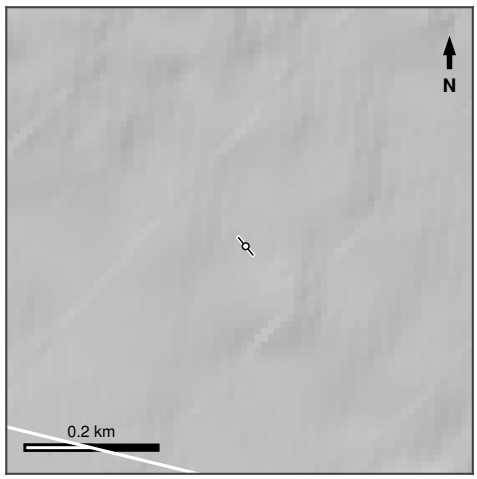
V3.4 total sigma, summer2025

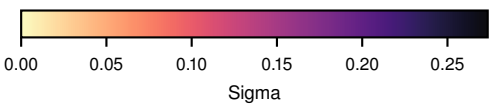


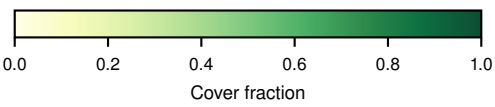
V3.4 sagebrush cover, summer2026

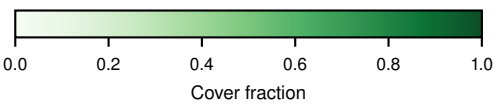


V3.4 evergreen conifer cover, summer2026







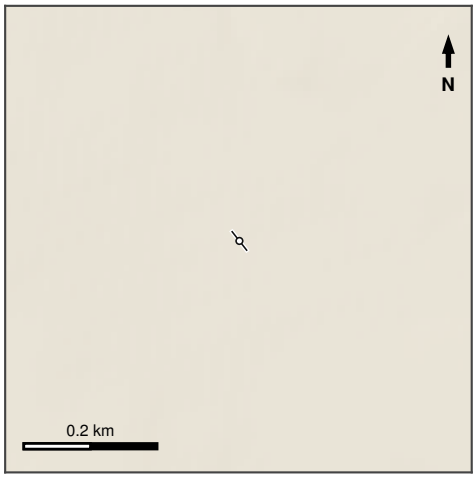


Site card — CCM02

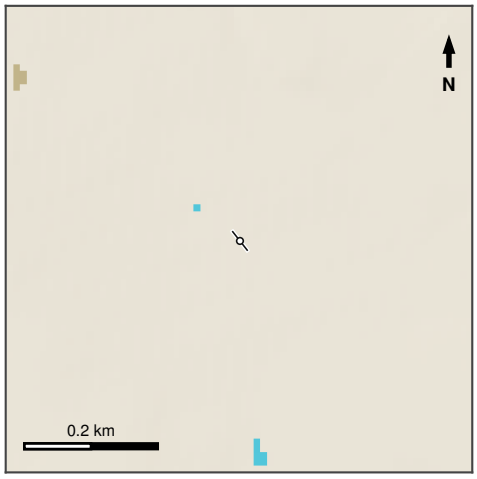
700 m frame around the transect · baseline summer2025 · primary summer2026

Hoop-level MAE (absolute cover): 0.067. What changed since July: annual grasses at 15 % live canopy read as bare; unchanged.

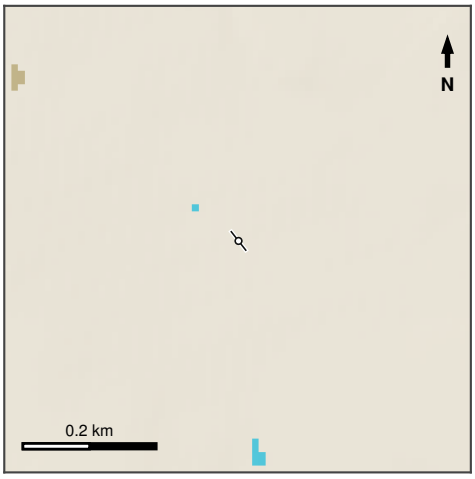
July 2026 delivery (v3.3) — label, summer2025



September 2026 (v3.4) — label, summer2025



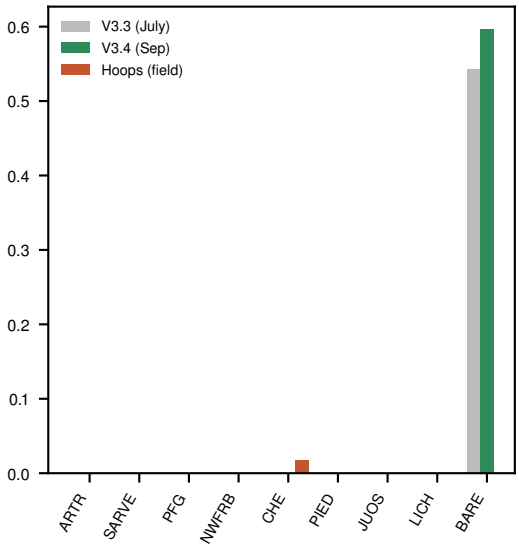
V3.4 co-occurrence rank-1, summer2025



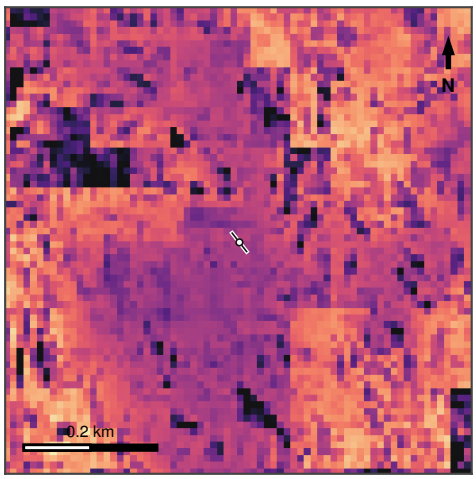
Species key — code · class — scientific (common) · share of labeled cells

22 · BARE — bare soil (exposed soil) 99.7%
19 · NPV_LEAF — leaf litter (fallen leaves) 0.1%
17 · NPV_GRASS — standing dead and cured grass (grass litter) 0.1%

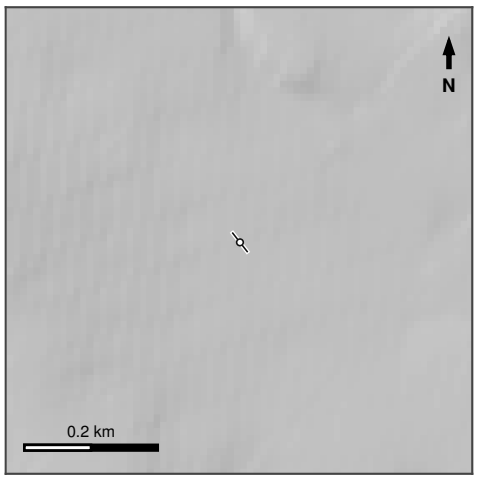
Cover fraction at the transect center



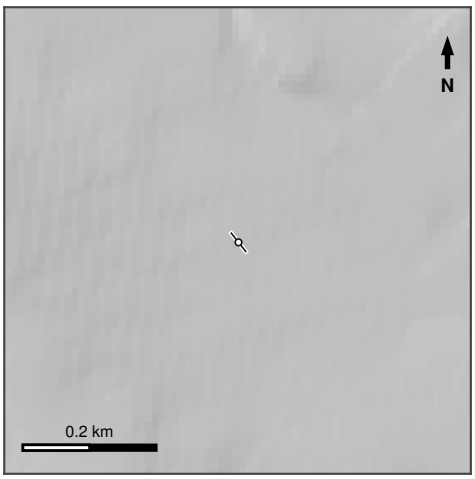
V3.4 total sigma, summer2025

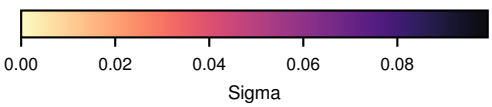


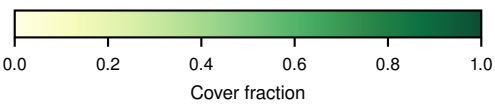
V3.4 sagebrush cover, summer2026

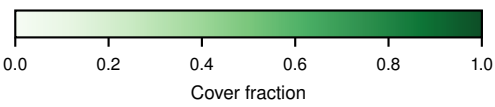


V3.4 evergreen conifer cover, summer2026









Site card — CCM03

700 m frame around the transect · baseline summer2025 · primary summer2026

Hoop-level MAE (absolute cover): 0.081. What changed since July: annual bromes at 19 % live canopy read as bare; unchanged.

July 2026 delivery (v3.3) — label, summer2025



September 2026 (v3.4) — label, summer2025



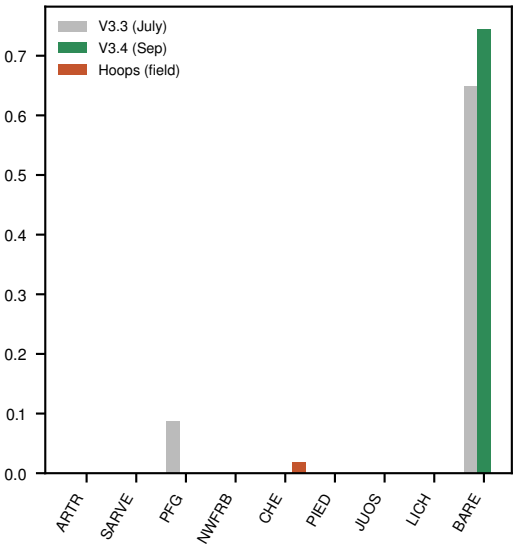
V3.4 co-occurrence rank-1, summer2025



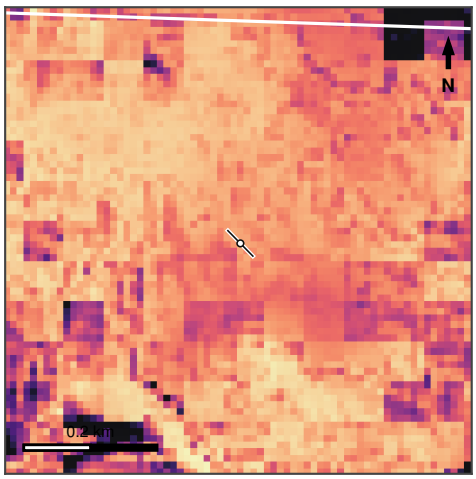
Species key — code · class — scientific (common) · share of labeled cells

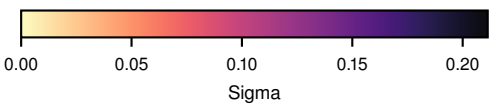
- 22 · BARE — bare soil (exposed soil) 99.4%
- 17 · NPV_GRASS — standing dead and cured grass (grass litter) 0.5%
- 19 · NPV_LEAF — leaf litter (fallen leaves) 0.0%
- 47 · SARVE — Sarcobatus vermiculatus (greasewood) 0.0%
- 1 · ARTR — Artemisia tridentata (big sagebrush) 0.0%

Cover fraction at the transect center

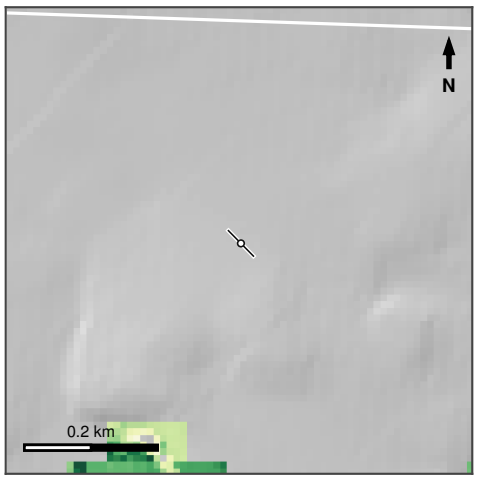


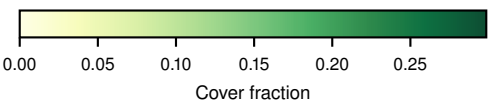
V3.4 total sigma, summer2025



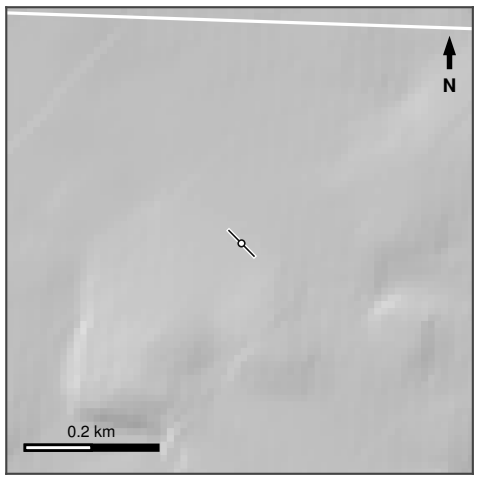


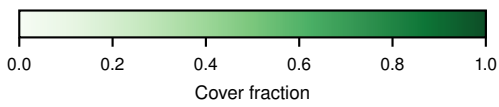
V3.4 sagebrush cover, summer2026





V3.4 evergreen conifer cover, summer2026



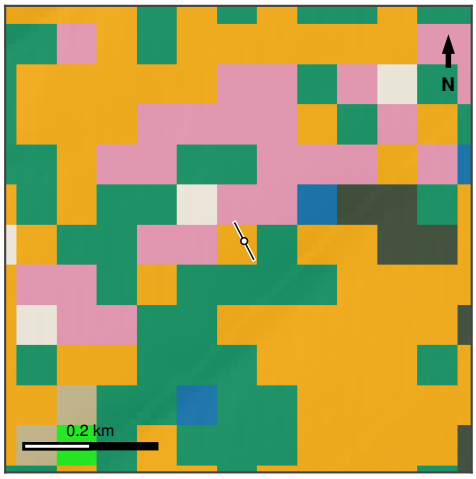


Site card — CCM07

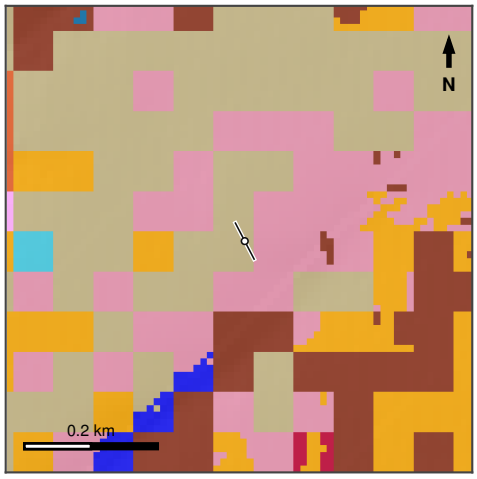
700 m frame around the transect · baseline summer2025 · primary summer2026

Hoop-level MAE (absolute cover): 0.058 (July 0.109). What changed since July: sagebrush + greasewood + forbs recovered; cured grass partitioned from live perennial Grass.

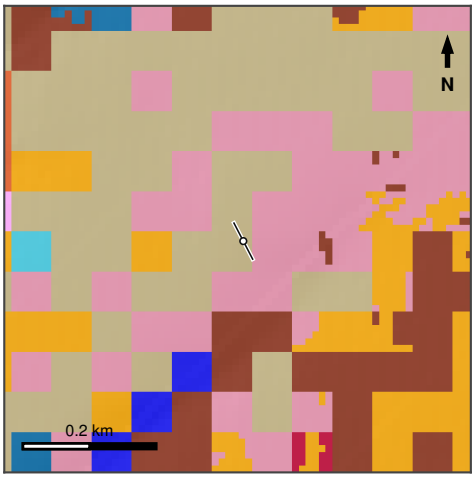
July 2026 delivery (v3.3) — label, summer2025



September 2026 (v3.4) — label, summer2025



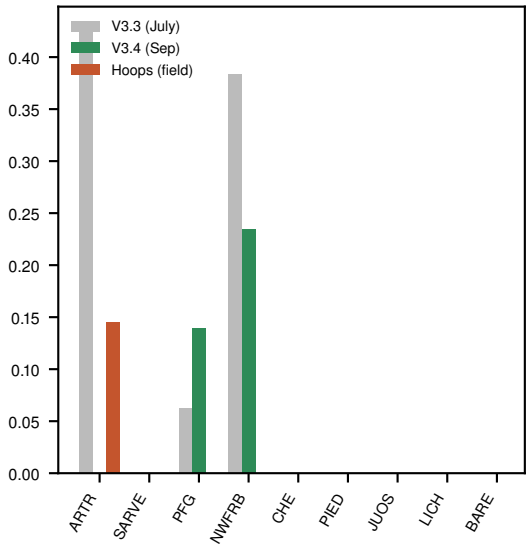
V3.4 co-occurrence rank-1, summer2025



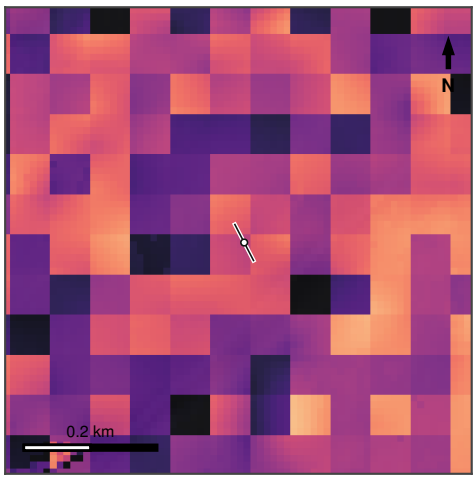
Species key — code · class — scientific (common) · share of labeled cells

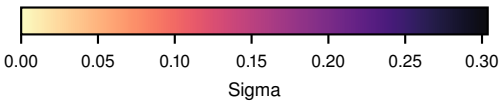
- 17 · NPV_GRASS — standing dead and cured grass (grass litter) 39.7%
- 16 · NWFRB — native perennial forbs (wildflowers and perennial forbs) 26.7%
- 47 · SARVE — Sarcobatus vermiculatus (greasewood) 15.2%
- 1 · ARTR — Artemisia tridentata (big sagebrush) 15.0%
- 13 · SALI — Salix spp. (willow) 1.7%
- 19 · NPV_LEAF — leaf litter (fallen leaves) 0.7%
- 5 · CHE — Bromus tectorum (cheatgrass) 0.4%
- 2 · CHRY — Chrysothamnus viscidiflorus (green rabbitbrush) 0.4%
- 6 · AFG_AF — annual forbs, e.g. Bassia scoparia (kochia and other annual forbs) 0.1%
- 9 · PIED — Pinus ponderosa / P. flexilis (ponderosa and limber pine; library Pinus edulis rows) 0.1%
- 8 · PFG — perennial graminoids (perennial grasses, live share) 0.0%
- 11 · CONI — other conifers (mixed conifer) 0.0%
- 20 · NPV_NEEDLE — needle litter (conifer needle litter) 0.0%
- 22 · BARE — bare soil (exposed soil) 0.0%

Cover fraction at the transect center

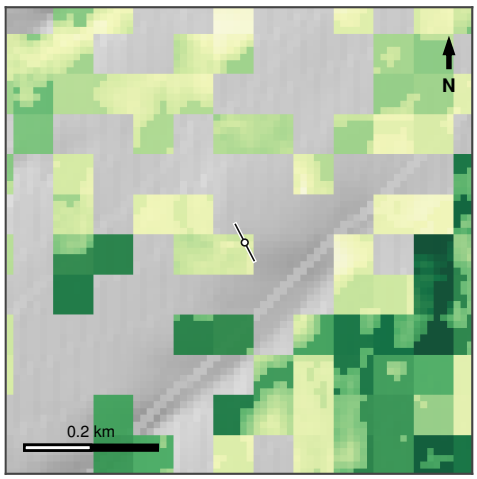


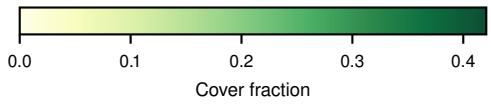
V3.4 total sigma, summer2025



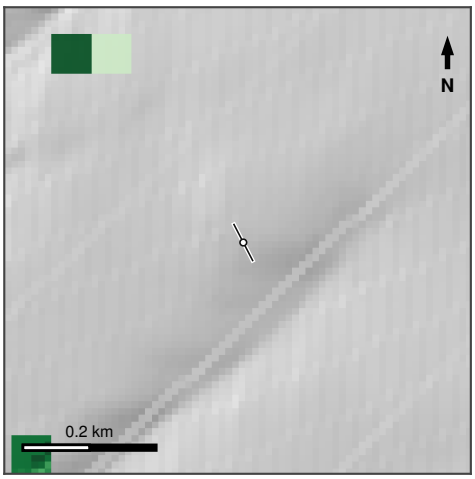


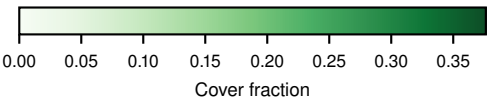
V3.4 sagebrush cover, summer2026





V3.4 evergreen conifer cover, summer2026



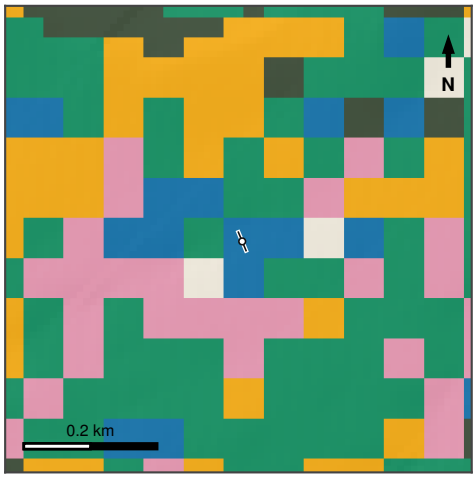


Site card — CCM08

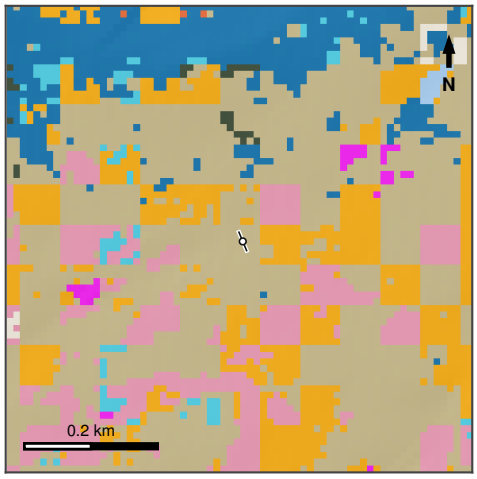
700 m frame around the transect · baseline summer2025 · primary summer2026

Hoop-level MAE (absolute cover): 0.038. What changed since July: pine in the cells, cured-grass ground label; transect runs between conifer groves (photo-confirmed).

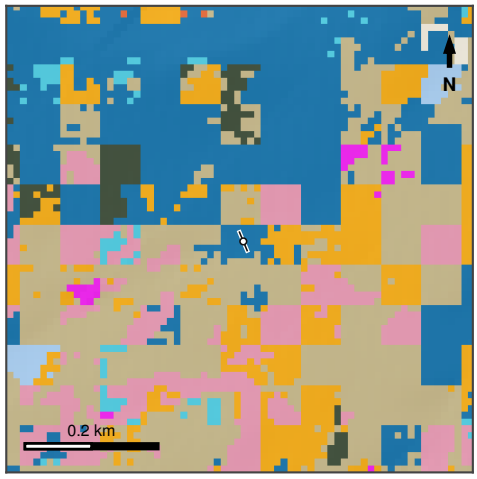
July 2026 delivery (v3.3) — label, summer2025



September 2026 (v3.4) — label, summer2025



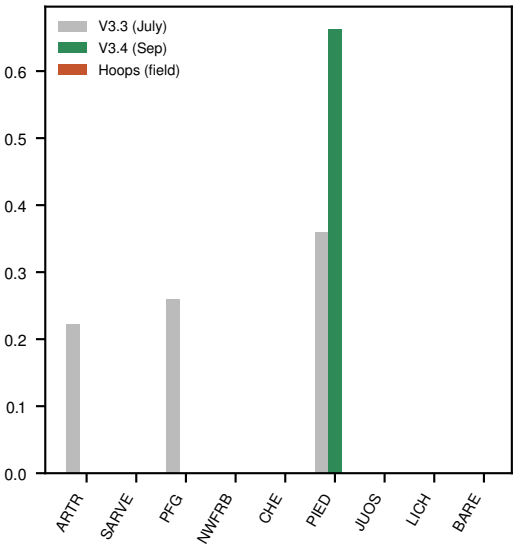
V3.4 co-occurrence rank-1, summer2025



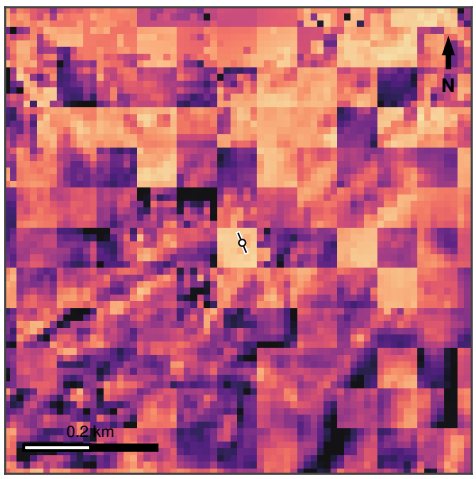
Species key — code · class — scientific (common) · share of labeled cells

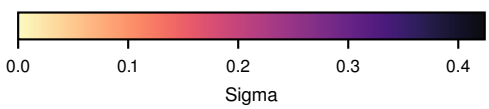
- 17 · NPV_GRASS — standing dead and cured grass (grass litter) 49.4%
- 1 · ARTR — Artemisia tridentata (big sagebrush) 18.7%
- 9 · PIED — Pinus ponderosa / P. flexilis (ponderosa and limber pine; library Pinus edulis rows) 14.0%
- 16 · NWFRB — native perennial forbs (wildflowers and perennial forbs) 13.5%
- 19 · NPV_LEAF — leaf litter (fallen leaves) 2.2%
- 21 · NPV_BRANCH — woody debris (branches and stems) 0.8%
- 11 · CONI — other conifers (mixed conifer) 0.6%
- 22 · BARE — bare soil (exposed soil) 0.5%
- 10 · JUOS — Juniperus osteosperma / J. scopulorum (juniper) 0.3%
- 2 · CHRY — Chrysothamnus viscidiflorus (green rabbitbrush) 0.1%
- 8 · PFG — perennial graminoids (perennial grasses, live share) 0.0%

Cover fraction at the transect center

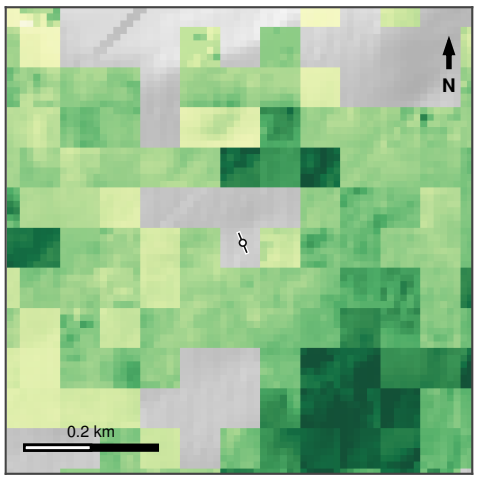


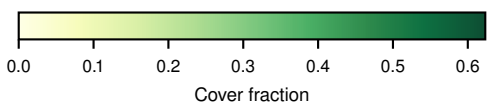
V3.4 total sigma, summer2025



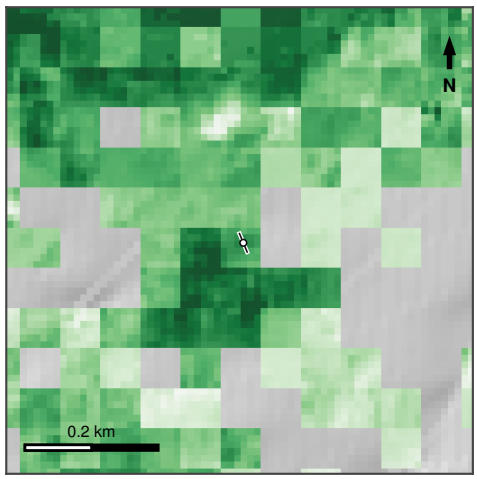


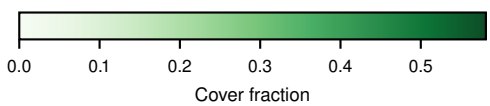
V3.4 sagebrush cover, summer2026





V3.4 evergreen conifer cover, summer2026



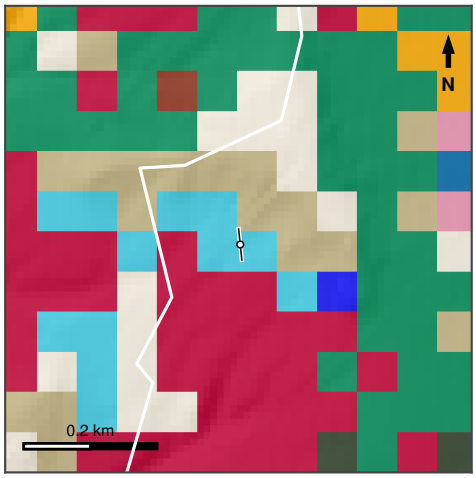


Site card — CCM09

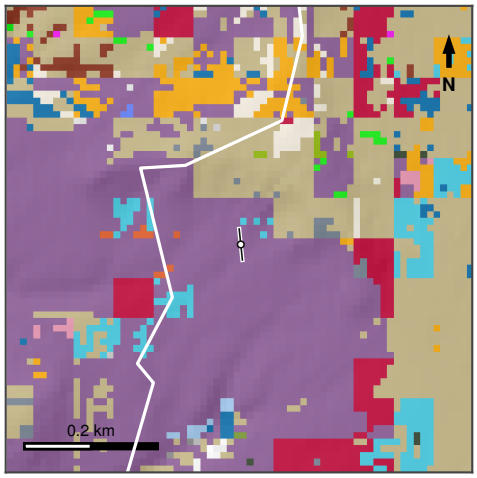
700 m frame around the transect · baseline summer2025 · primary summer2026

Hoop-level MAE (absolute cover): no hoop composition. What changed since July: biological crust 0.67–0.81 with the crust label; the juniper label override removed.

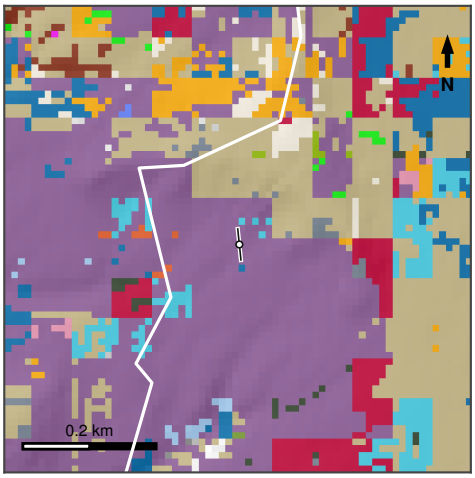
July 2026 delivery (v3.3) — label, summer2025



September 2026 (v3.4) — label, summer2025



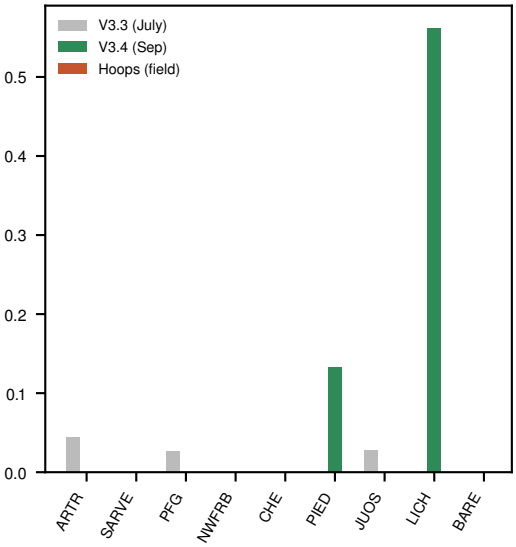
V3.4 co-occurrence rank-1, summer2025



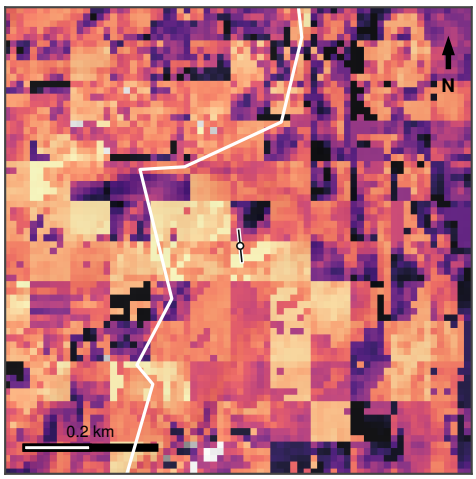
Species key — code · class — scientific (common) · share of labeled cells

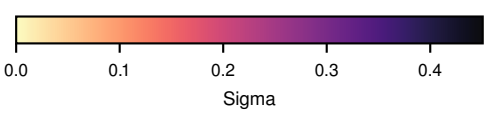
- 15 · LICH — lichen and cyanobacteria (biological soil crust) 48.3%
- 17 · NPV_GRASS — standing dead and cured grass (grass litter) 28.6%
- 5 · CHE — Bromus tectorum (cheatgrass) 6.4%
- 1 · ARTR — Artemisia tridentata (big sagebrush) 5.1%
- 19 · NPV_LEAF — leaf litter (fallen leaves) 4.5%
- 22 · BARE — bare soil (exposed soil) 1.9%
- 9 · PIED — Pinus ponderosa / P. flexilis (ponderosa and limber pine; library Pinus edulis rows) 1.8%
- 47 · SARVE — Sarcobatus vermiculatus (greasewood) 1.0%
- 25 · ROCK_MET — metamorphic rock (exposed metamorphic rock) 0.7%
- 20 · NPV_NEEDLE — needle litter (conifer needle litter) 0.4%
- 16 · NWFRB — native perennial forbs (wildflowers and perennial forbs) 0.3%
- 10 · JUOS — Juniperus osteosperma / J. scopulorum (juniper) 0.2%
- 2 · CHRY — Chrysothamnus viscidiflorus (green rabbitbrush) 0.2%
- 4 · SATR — Salsola tragus (Russian thistle) 0.2%
- 11 · CONI — other conifers (mixed conifer) 0.1%
- 3 · ATCA — Atriplex canescens (fourwing saltbush) 0.1%
- 14 · DECI — other deciduous broadleaf (deciduous shrubs and trees) 0.0%
- 21 · NPV_BRANCH — woody debris (branches and stems) 0.0%
- 8 · PFG — perennial graminoids (perennial grasses, live share) 0.0%
- 13 · SALI — Salix spp. (willow) 0.0%

Cover fraction at the transect center

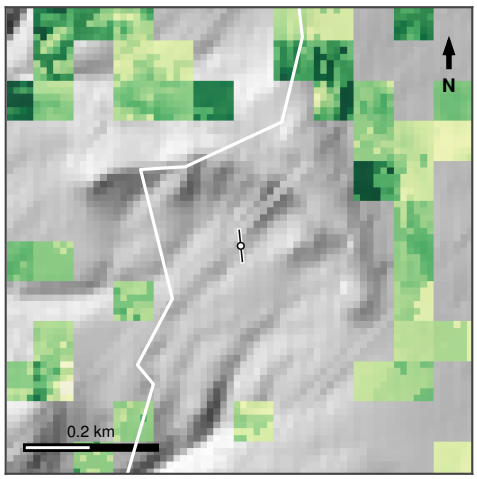


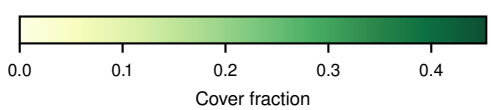
V3.4 total sigma, summer2025



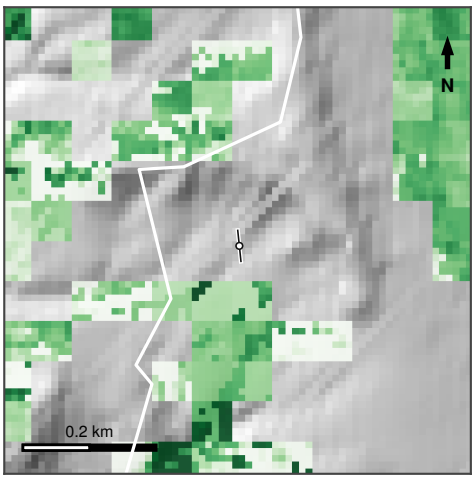


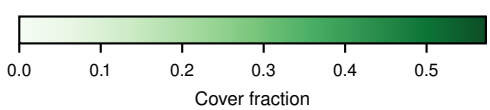
V3.4 sagebrush cover, summer2026





V3.4 evergreen conifer cover, summer2026

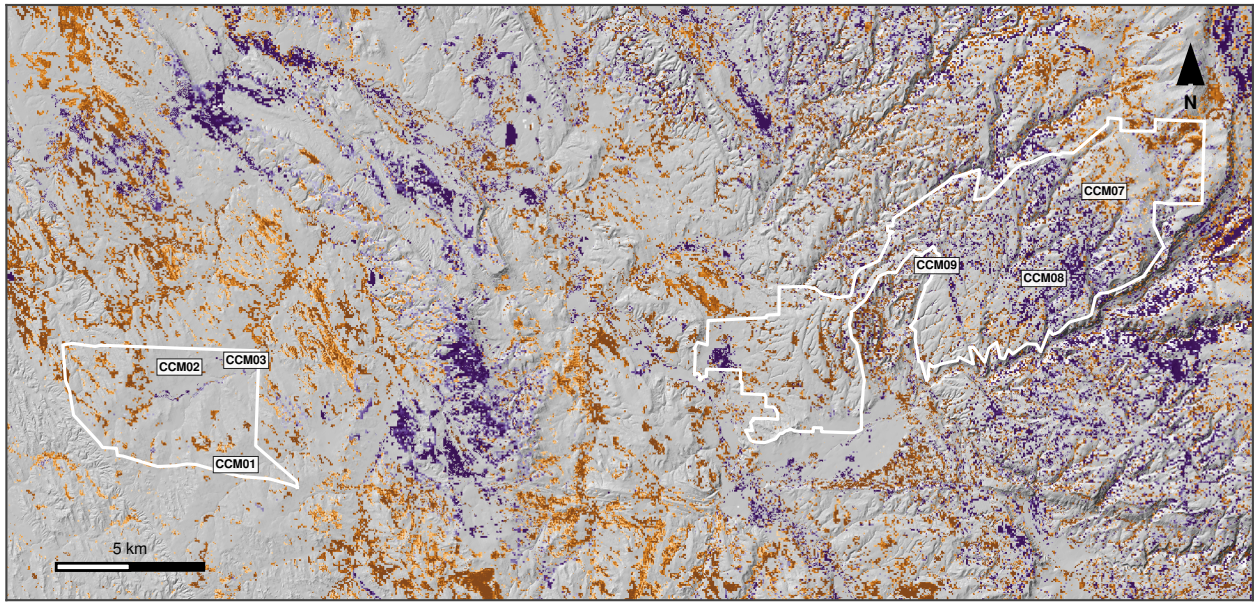




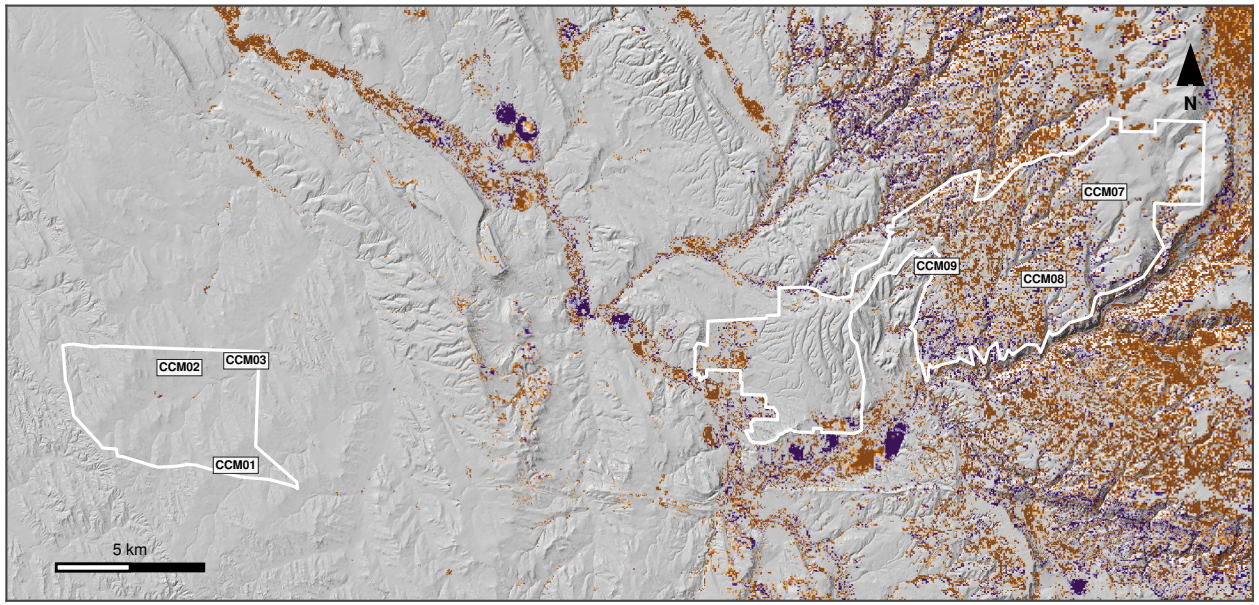
Change summer2025 to summer2026, masked where |change| < total sigma

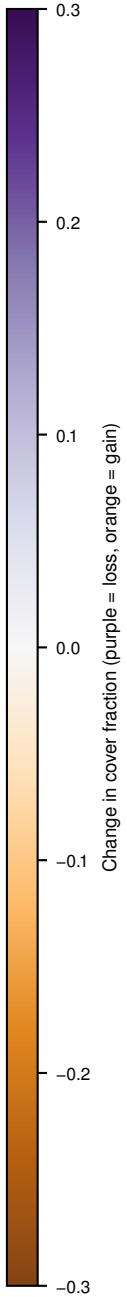
Summer2025: 2 admitted scenes (2025-06-19, 2025-08-04) | summer2026: 5 admitted scenes (2026-06-01, 2026-06-05, 2026-06-16, 2026-07-13, 2026-08-01)

Sagebrush: change in cover



Evergreen conifer: change in cover

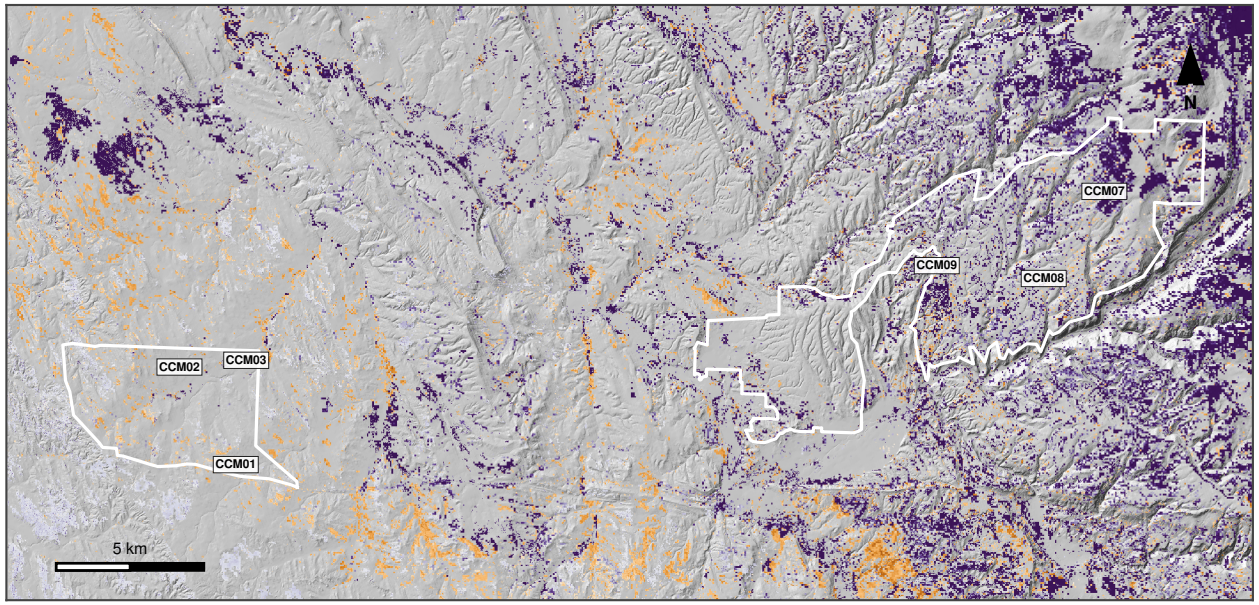




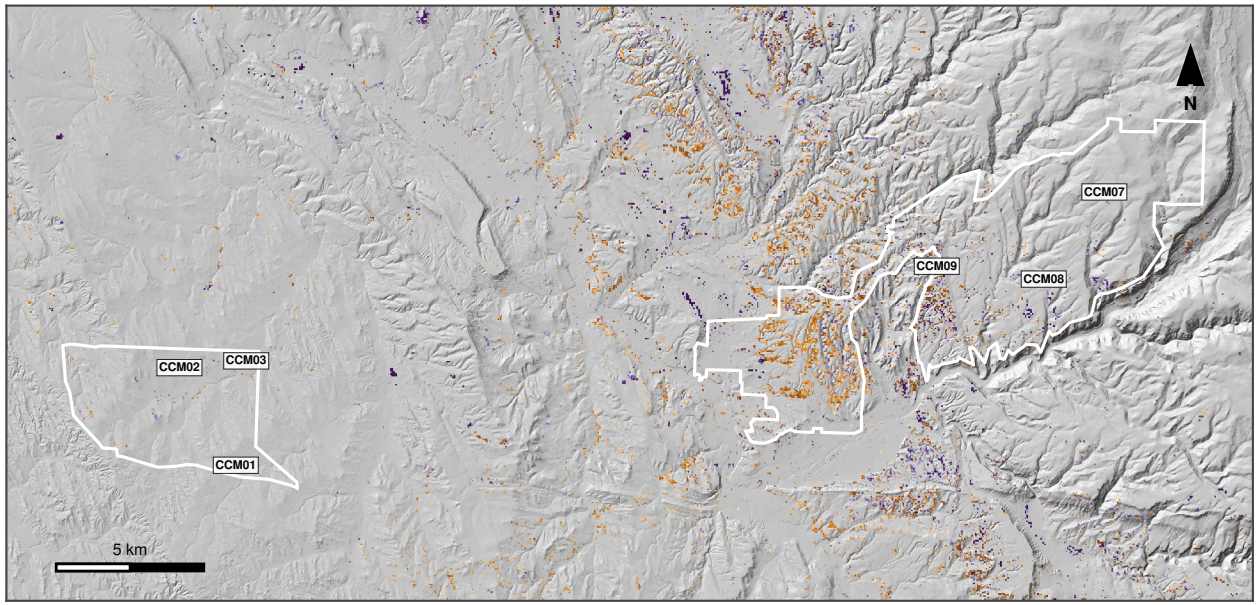
Change summer2025 to summer2026, masked where |change| < total sigma

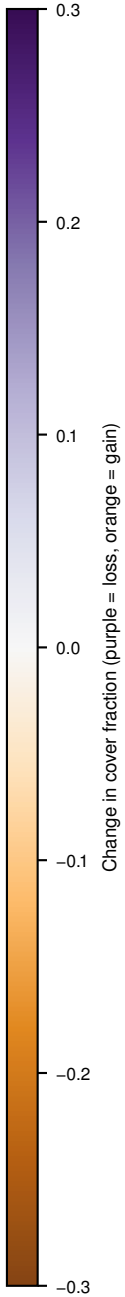
Summer2025: 2 admitted scenes (2025-06-19, 2025-08-04) | summer2026: 5 admitted scenes (2026-06-01, 2026-06-05, 2026-06-16, 2026-07-13, 2026-08-01)

Perennial grass (live): change in cover



Cheatgrass: change in cover

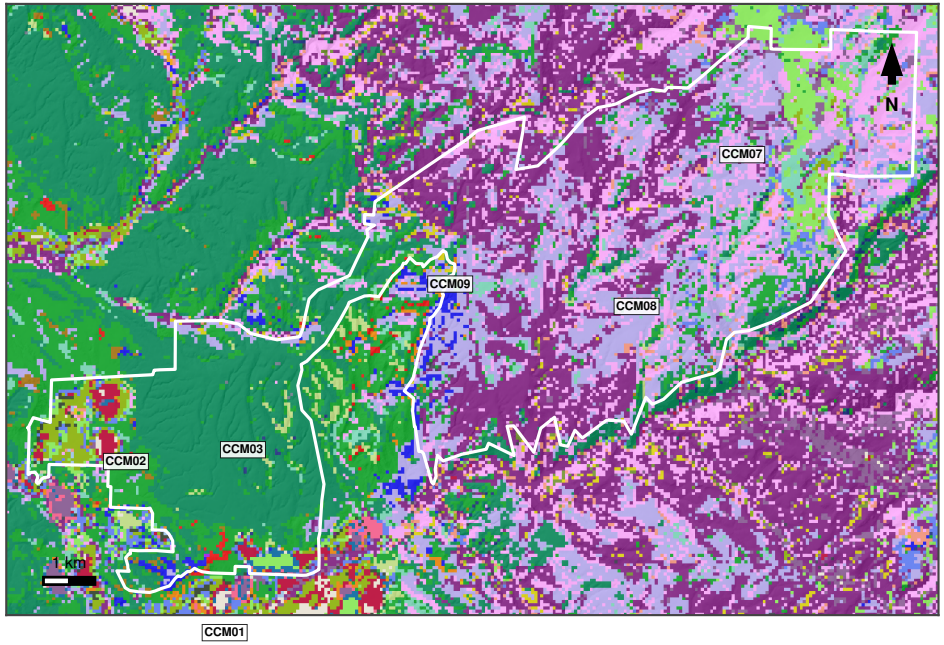




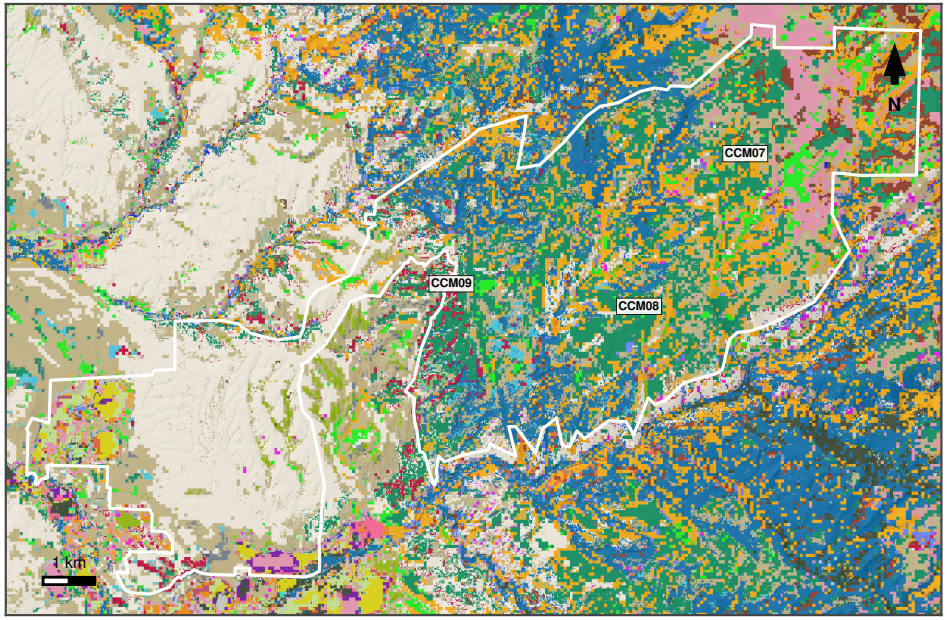
Pipeline progression — species label on the 4 Aug 2025 scene, steps 1 and 2 of 6, plateau parcel

Each configuration adds one data source; frames identical

1. EMIT spectra only (60 m)



2. + HLS 10 m disaggregation

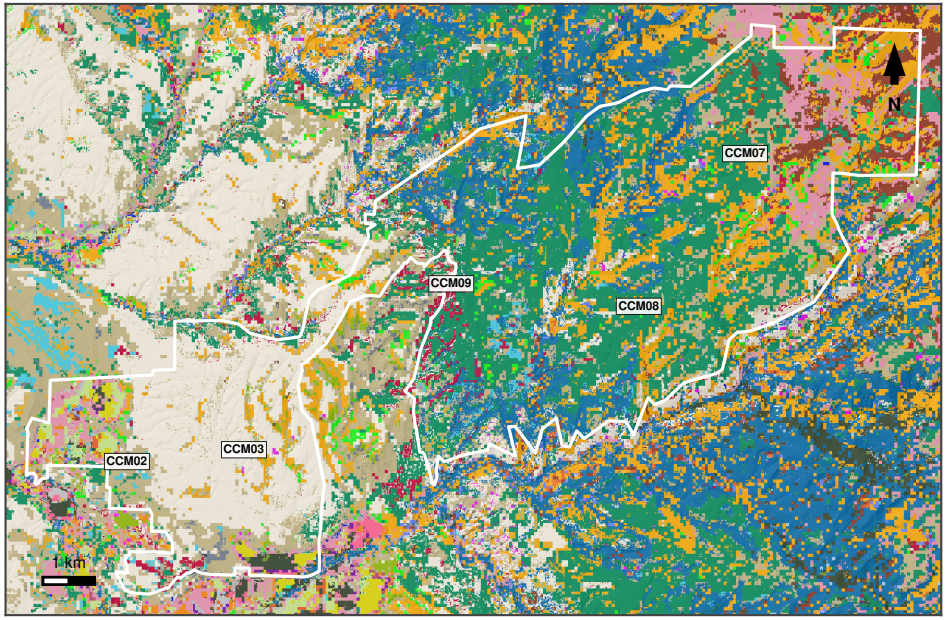


22 · BARE — bare soil (exposed soil) 23.5%
17 · NPV_GRASS — standing dead and cured grass (grass litter) 18.2%
9 · PIED — Pinus ponderosa / P. flexilis (ponderosa and limber pine; library Pinus edulis rows) 15.7%
8 · PFG — perennial graminoids (perennial grasses, live share) 12.7%
1 · ARTR — Artemisia tridentata (big sagebrush) 12.1%
16 · NWFRB — native perennial forbs (wildflowers and perennial forbs) 3.0%
11 · CONI — other conifers (mixed conifer) 2.2%
47 · SARVE — Sarcobatus vermiculatus (greasewood) 2.1%
20 · NPV_NEEDLE — needle litter (conifer needle litter) 2.1%
5 · CHE — Bromus tectorum (cheatgrass) 1.2%
3 · ATCA — Atriplex canescens (fourwing saltbush) 1.0%
19 · NPV_LEAF — leaf litter (fallen leaves) 0.9%
4 · SATR — Salsola tragus (Russian thistle) 0.9%
40 · ALFALFA_SENESCENT — Medicago sativa (alfalfa, senescent) 0.8%
39 · ALFALFA_VEG — Medicago sativa (alfalfa, vegetative) 0.7%
21 · NPV_BRANCH — woody debris (branches and stems) 0.5%
2 · CHRY — Chrysothamnus viscidiflorus (green rabbitbrush) 0.5%
38 · ALFALFA_EMERGENT — Medicago sativa (alfalfa, emergent) 0.4%
25 · ROCK_MET — metamorphic rock (exposed metamorphic rock) 0.4%
41 · BARLEY_EMERGENT — Hordeum vulgare (barley, emergent) 0.2%
44 · SUGARBEET_VEG — Beta vulgaris (sugar beet, vegetative) 0.2%
42 · BARLEY_VEG — Hordeum vulgare (barley, vegetative) 0.2%
18 · NPV_BARK — bark (woody bark) 0.1%
10 · JUOS — Juniperus osteosperma / J. scopulorum (juniper) 0.1%
13 · SALI — Salix spp. (willow) 0.1%
14 · DECI — other deciduous broadleaf (deciduous shrubs and trees) 0.1%
15 · LICH — lichen and cyanobacteria (biological soil crust) 0.0%
43 · BARLEY_SENESCENT — Hordeum vulgare (barley, senescent) 0.0%
7 · AFG_BD — annual bromes, Bromus spp. (Japanese brome and other annual bromes) 0.0%
23 · ROCK_IG — igneous rock (exposed igneous rock) 0.0%
6 · AFG_AF — annual forbs, e.g. Bassia scoparia (kochia and other annual forbs) 0.0%
12 · POPU — Populus spp. (cottonwood and aspen) 0.0%
24 · ROCK_SED — sedimentary rock (exposed sandstone / shale) 0.0%
26 · CORN_VEG — Zea mays (corn, vegetative) 0.0%
27 · CORN_SENESCENT — Zea mays (corn, senescent) 0.0%
28 · CORN_HARVESTED — Zea mays (corn, harvested) 0.0%
29 · SOYBEAN_VEG — Glycine max (soybean, vegetative) 0.0%
30 · SOYBEAN_SENESCENT — Glycine max (soybean, senescent) 0.0%
31 · SOYBEAN_HARVESTED — Glycine max (soybean, harvested) 0.0%
32 · COTTON_VEG — Gossypium hirsutum (cotton, vegetative) 0.0%
35 · WHEAT_VEG — Triticum aestivum (wheat, vegetative) 0.0%
36 · WHEAT_SENESCENT — Triticum aestivum (wheat, senescent) 0.0%

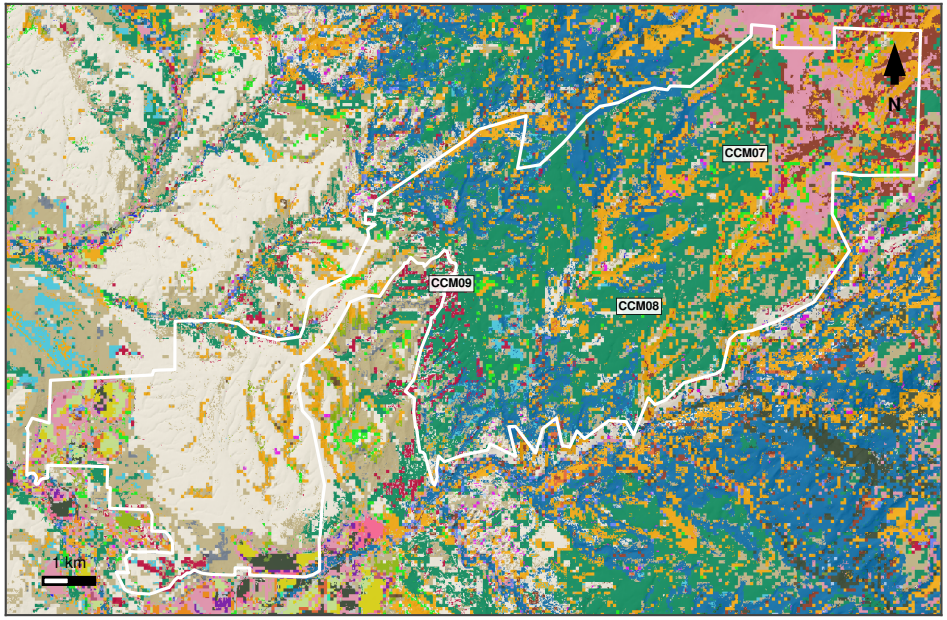
Pipeline progression — species label on the 4 Aug 2025 scene, steps 3 and 4 of 6, plateau parcel

Each configuration adds one data source; frames identical

3. + EnMAP-supervised rows



4. + GEDI / CHM canopy evidence

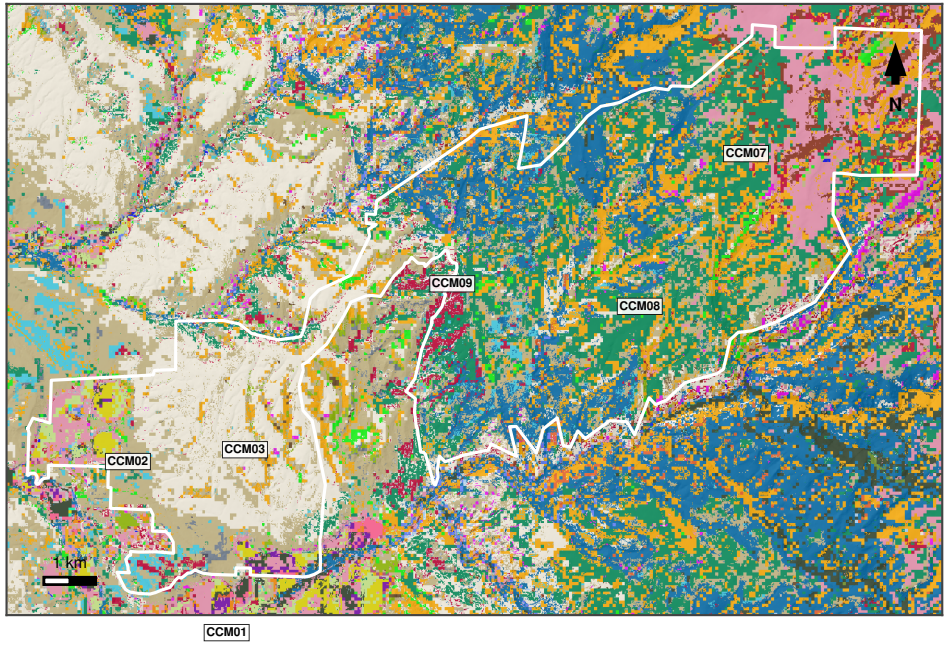


22 · BARE — bare soil (exposed soil) 20.6%
8 · PFG — perennial graminoids (perennial grasses, live share) 19.8%
9 · PIED — Pinus ponderosa / P. flexilis (ponderosa and limber pine; library Pinus edulis rows) 15.2%
17 · NPV_GRASS — standing dead and cured grass (grass litter) 14.3%
1 · ARTR — Artemisia tridentata (big sagebrush) 12.6%
16 · NWFRB — native perennial forbs (wildflowers and perennial forbs) 4.3%
47 · SARVE — Sarcobatus vermiculatus (greasewood) 2.3%
11 · CONI — other conifers (mixed conifer) 2.1%
5 · CHE — Bromus tectorum (cheatgrass) 1.4%
19 · NPV_LEAF — leaf litter (fallen leaves) 1.4%
20 · NPV_NEEDLE — needle litter (conifer needle litter) 1.1%
3 · ATCA — Atriplex canescens (fourwing saltbush) 0.7%
40 · ALFALFA_SENESCENT — Medicago sativa (alfalfa, senescent) 0.7%
4 · SATR — Salsola tragus (Russian thistle) 0.6%
39 · ALFALFA_VEG — Medicago sativa (alfalfa, vegetative) 0.5%
2 · CHRY — Chrysothamnus viscidiflorus (green rabbitbrush) 0.5%
21 · NPV_BRANCH — woody debris (branches and stems) 0.4%
25 · ROCK_MET — metamorphic rock (exposed metamorphic rock) 0.3%
38 · ALFALFA_EMERGENT — Medicago sativa (alfalfa, emergent) 0.3%
44 · SUGARBEET_VEG — Beta vulgaris (sugar beet, vegetative) 0.2%
41 · BARLEY_EMERGENT — Hordeum vulgare (barley, emergent) 0.1%
18 · NPV_BARK — bark (woody bark) 0.1%
10 · JUOS — Juniperus osteosperma / J. scopulorum (juniper) 0.1%
42 · BARLEY_VEG — Hordeum vulgare (barley, vegetative) 0.1%
14 · DECI — other deciduous broadleaf (deciduous shrubs and trees) 0.1%
13 · SALI — Salix spp. (willow) 0.1%
43 · BARLEY_SENESCENT — Hordeum vulgare (barley, senescent) 0.0%
15 · LICH — lichen and cyanobacteria (biological soil crust) 0.0%
23 · ROCK_IG — igneous rock (exposed igneous rock) 0.0%
6 · AFG_AF — annual forbs, e.g. Bassia scoparia (kochia and other annual forbs) 0.0%
7 · AFG_BD — annual bromes, Bromus spp. (Japanese brome and other annual bromes) 0.0%
12 · POPU — Populus spp. (cottonwood and aspen) 0.0%
24 · ROCK_SED — sedimentary rock (exposed sandstone / shale) 0.0%

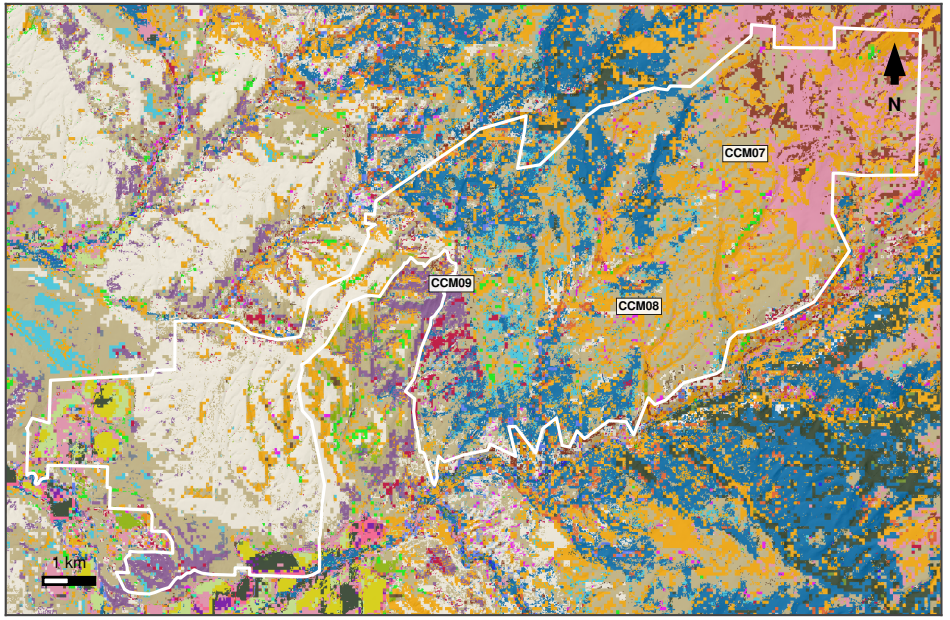
Pipeline progression — species label on the 4 Aug 2025 scene, steps 5 and 6 of 6, plateau parcel

Each configuration adds one data source; frames identical

5. + terrain and habitat strata



6. + ground observations (current)

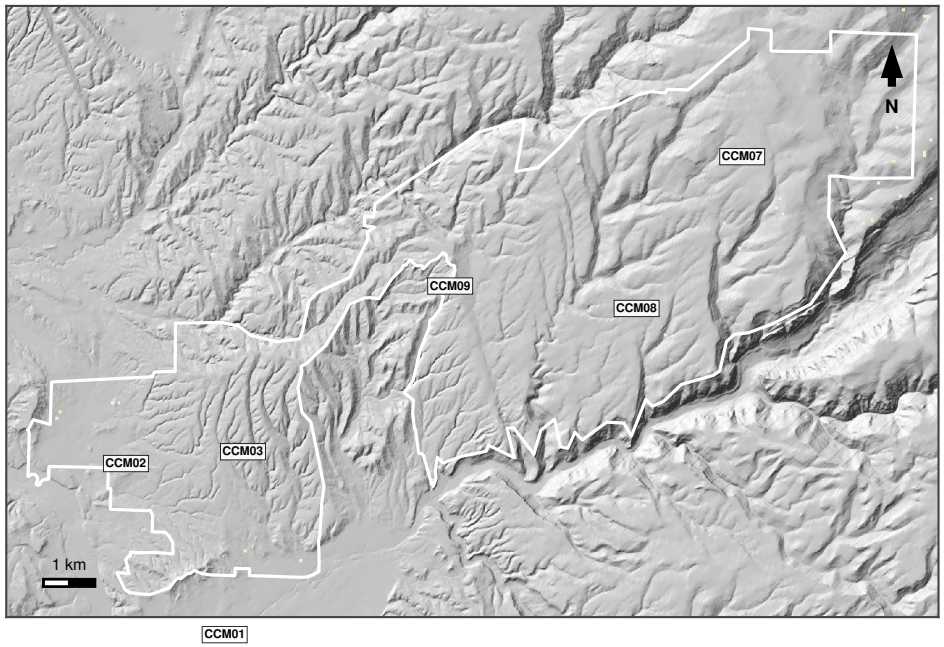


17 · NPV_GRASS — standing dead and cured grass (grass litter) 26.7%
22 · BARE — bare soil (exposed soil) 17.5%
1 · ARTR — Artemisia tridentata (big sagebrush) 16.0%
9 · PIED — Pinus ponderosa / P. flexilis (ponderosa and limber pine; library Pinus edulis rows) 14.7%
16 · NWFRB — native perennial forbs (wildflowers and perennial forbs) 5.7%
11 · CONI — other conifers (mixed conifer) 3.8%
15 · LICH — lichen and cyanobacteria (biological soil crust) 3.2%
19 · NPV_LEAF — leaf litter (fallen leaves) 2.4%
2 · CHRY — Chrysothamnus viscidiflorus (green rabbitbrush) 1.8%
47 · SARVE — Sarcobatus vermiculatus (greasewood) 1.6%
5 · OHE — Bromus tectorum (cheatgrass) 0.9%
39 · ALFALFA_VEG — Medicago sativa (alfalfa, vegetative) 0.9%
40 · ALFALFA_SENESCENT — Medicago sativa (alfalfa, senescent) 0.8%
3 · ATCA — Atriplex canescens (fourwing saltbush) 0.7%
21 · NPV_BRANCH — woody debris (branches and stems) 0.7%
20 · NPV_NEEDLE — needle litter (conifer needle litter) 0.6%
4 · SATR — Salsola tragus (Russian thistle) 0.6%
18 · NPV_BARK — bark (woody bark) 0.3%
25 · ROCK_MET — metamorphic rock (exposed metamorphic rock) 0.3%
44 · SUGARBEET_VEG — Beta vulgaris (sugar beet, vegetative) 0.2%
10 · JUOS — Juniperus osteosperma / J. scopulorum (juniper) 0.2%
14 · DECI — other deciduous broadleaf (deciduous shrubs and trees) 0.2%
41 · BARLEY_EMERGENT — Hordeum vulgare (barley, emergent) 0.1%
38 · ALFALFA_EMERGENT — Medicago sativa (alfalfa, emergent) 0.1%
42 · BARLEY_VEG — Hordeum vulgare (barley, vegetative) 0.1%
43 · BARLEY_SENESCENT — Hordeum vulgare (barley, senescent) 0.1%
13 · SALI — Salix spp. (willow) 0.1%
46 · URBAN_BUILT — built surfaces (roads, structures) 0.0%
45 · WATER_CLEAR — open water (clear water) 0.0%
24 · ROCK_SED — sedimentary rock (exposed sandstone / shale) 0.0%
23 · ROCK_IG — igneous rock (exposed igneous rock) 0.0%
7 · AFG_BD — annual bromes, Bromus spp. (Japanese brome and other annual bromes) 0.0%
6 · AFG_AF — annual forbs, e.g. Bassia scoparia (kochia and other annual forbs) 0.0%
48 · BURN — burned surface (char and ash) 0.0%
12 · POPU — Populus spp. (cottonwood and aspen) 0.0%
8 · PFG — perennial graminoids (perennial grasses, live share) 0.0%

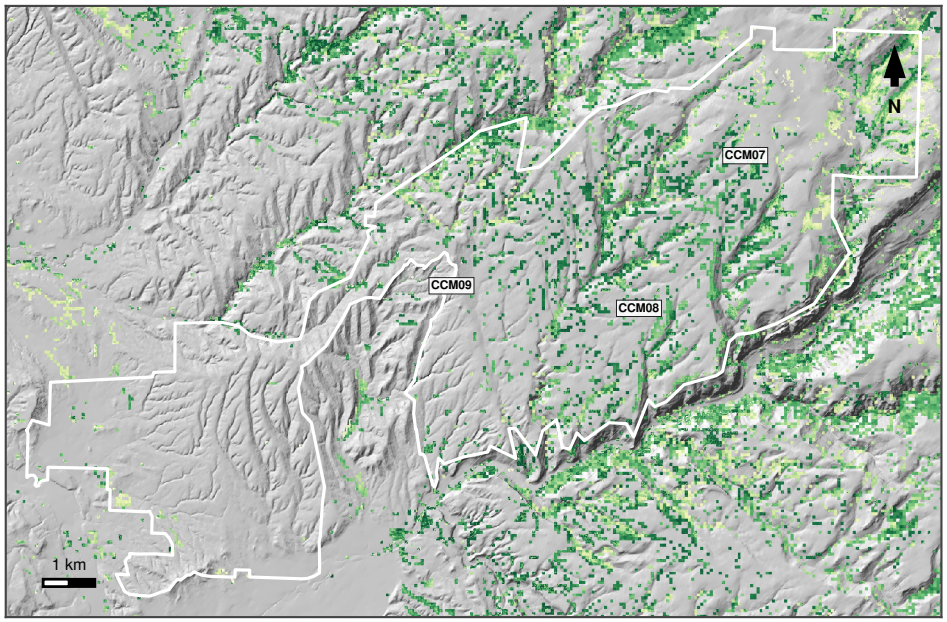
Pipeline progression — sagebrush (ARTR) cover on the 4 Aug 2025 scene, steps 1 and 2 of 6, plateau parcel

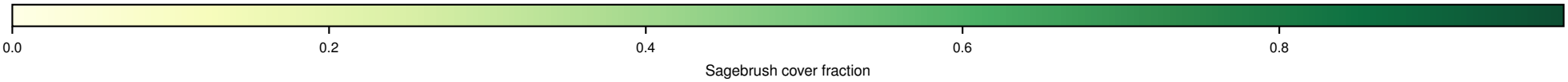
Each configuration adds one data source; frames identical; shared scale

1. EMIT spectra only (60 m) (mean 0.000)



2. + HLS 10 m disaggregation (mean 0.102)

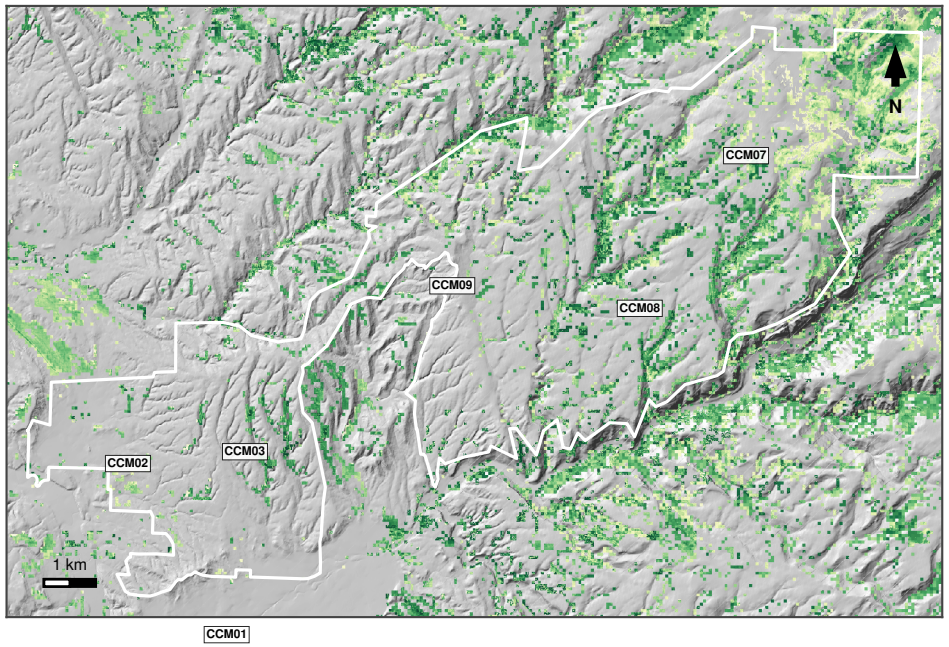




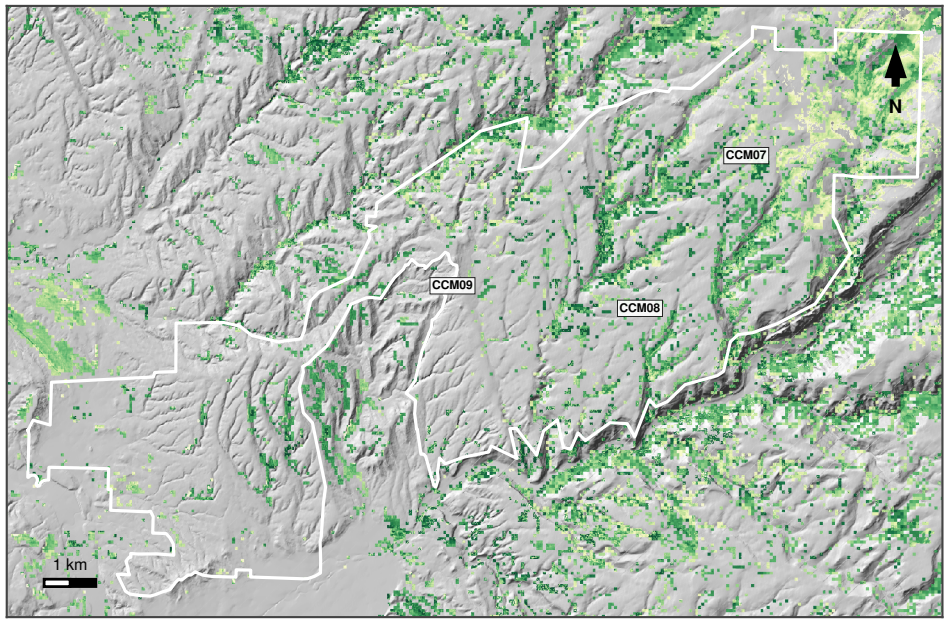
Pipeline progression — sagebrush (ARTR) cover on the 4 Aug 2025 scene, steps 3 and 4 of 6, plateau parcel

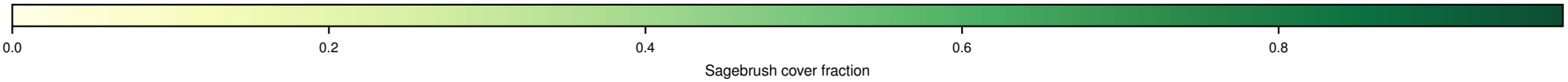
Each configuration adds one data source; frames identical; shared scale

3. + EnMAP-supervised rows (mean 0.111)



4. + GEDI / CHM canopy evidence (mean 0.109)

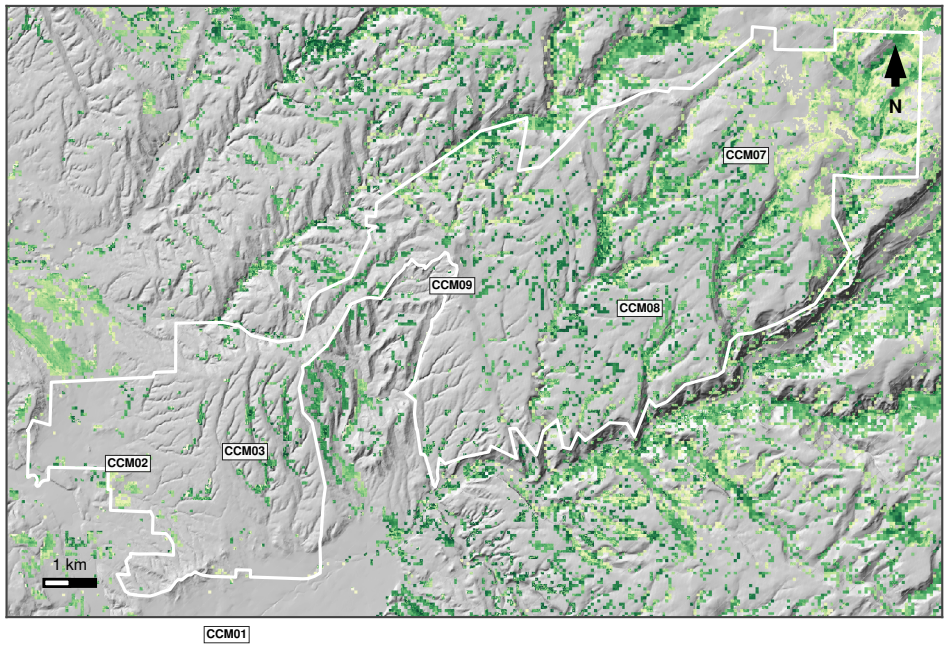




Pipeline progression — sagebrush (ARTR) cover on the 4 Aug 2025 scene, steps 5 and 6 of 6, plateau parcel

Each configuration adds one data source; frames identical; shared scale

5. + terrain and habitat strata (mean 0.122)



6. + ground observations (current) (mean 0.135)

