A Virtual, 2-Day Tour of
Yellow Jacket and Flodine Park Park Allotment Areas
Canyons of the Ancients National Monument
Colorado

What you'll see on this tour:

1. In the past ten years of no cattle grazing, light and dark cyanobacterial (early seral) biological soil crusts are developing in areas that would be open to trampling if grazed by cattle.
2. Later-seral biocrusts (lichen, moss) are present mostly under shrubs where they have been protected from heavy grazing in the past.
3. Soil is lacking mid- or later-seral biocrust where ungulates have been trampling.
4. There are some areas that have been less grazed by cattle in the recent past (e.g., parts of the Yellow Jacket South stop; parts of the Horny Toad (Flodine Park) stop. These areas show some of the potential for diversity that exists on the Monument, but which has been largely depleted by past grazing
5. Large expanses of exotic, invasive species that are not eaten often by cattle: Russian thistle, cheatgrass. Cheatgrass has a short fire return interval, threatening shrub viability. Both Russian thistle and cheatgrass are often highly dominant on a site, reducing diversity.
6. Mixtures of cheatgrass and native species in both allotments. As cheatgrass is only briefly palatable early In the season, the cheatgrsss will likely increase as nearby native bunchgrasses will be heavily grazed.
7. The most common native grass seen in the two allotments are near-monocultures of galleta grass (*Hilaria jamesii*), which is an increaser under heavy grazing. Other native grasses that are more palatable to cattle tend to be eliminated, while increasers are plants less likely to be eaten and thus they are more likely to retain seedheads and reproduce. Little diversity is present in most of the galleta grass areas on the Monument.
8. Rapidly-invading Russian olive. Tamarisk has some beetles (a biological control) on It, but tamarisk is another invasive exotic.
9. Scattered headcutting and gullies that will be extended and deepened if not protected from cattle grazing
10. Extensive areas with depleted grass or forb production, little "forage" for cattle.
11. Many dung piles from trespass horses; trespass horses may be seen. Horse hooves often trample biocrusts, which either eliminates them or sets them back toward early seral stages (e.g., light cyanobacteria) .
12. Some strongly invasive, exotic knapweed, which will rapidly spread unless eradicated. Livestock grazing will help spread seeds, which will readily establish in land disturbed by livestook hooves.

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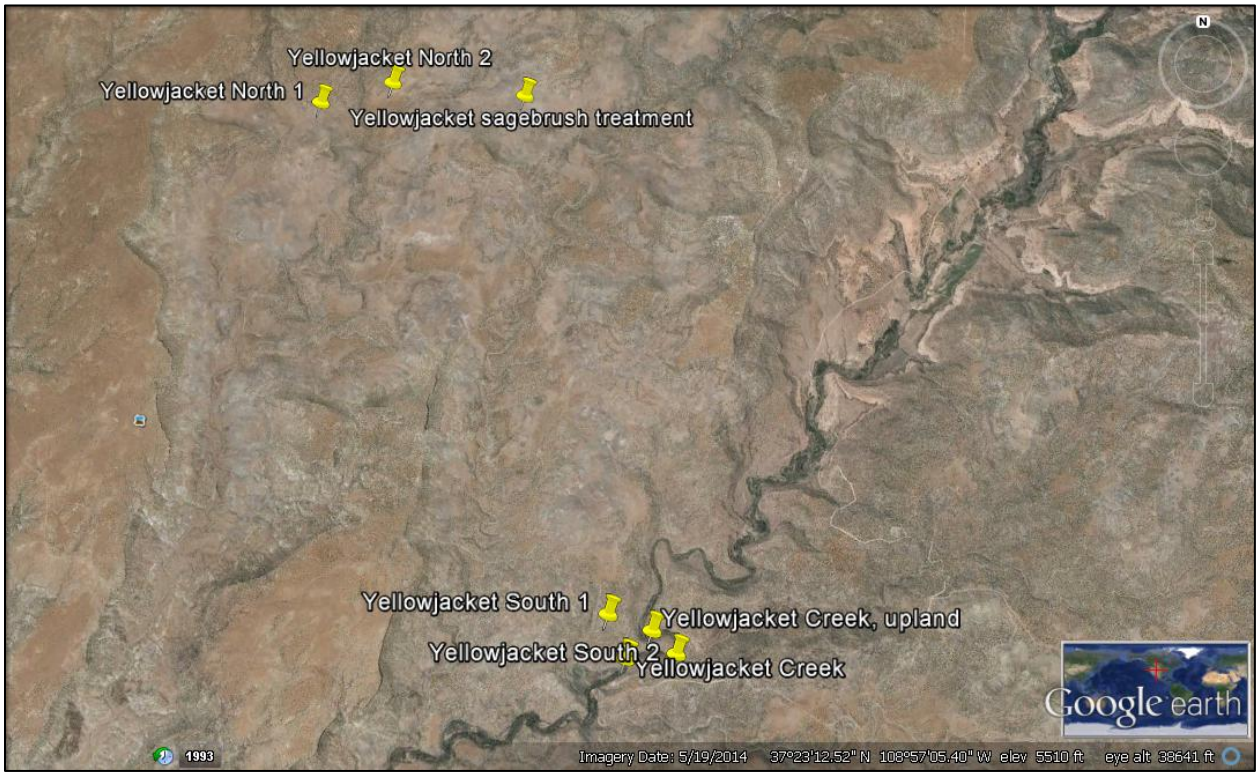
Yellow Jacket Virtual Tour (7 stops)



Yellow Jacket Stop #1: Yellow Jacket Creek

Fig. 1 Russian olive will spread if not removed

Fig. 2 Young Russian Olive invading riparian area

Fig. 3 Russian Olive (exotic) and young coyote willow (native)

Fig. 4 Knapweed will rapidly spread if not removed

Fig. 5 Musk thistle patch

Fig. 6 Dense and tall Russian Olive will exclude other plants if not removed

Yellow Jacket Stop #2: Yellow Jacket South 2

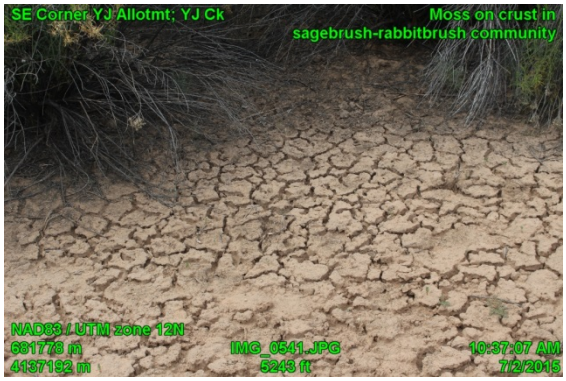


Fig. 7 Moss developing on cyanobacteria crust ; sagebrush and rabbitbrush community with ten years of rest

Fig. 8 Well-developed dark cyanobacterial crust shows potential with rest from trampling

Yellow Jacket Stop #3: Yellow Jacket Creek Upland

Fig. 9 Biocrust developing among sagebrush

Fig. 10 Dark cyanobacterial crust and moss in sagebrush interspace - vulnerable to trampling

Fig. 11 4' tall knapweed - needs to be removed

Fig. 12 Extensive biocrust on steep slopes

Fig. 13 Horse sign, trampling; crust mostly obliterated

Fig. 14 Biocrust forming in sagebrush/rabbitbrush; would be easily eliminated with grazing

Yellow Jacket Stop #4: Yellow Jacket South 1

Fig. 15 Is Juniper, horse tail, greasewood, broom snakeweed considered "forage"?

Fig. 16 Example of a forb (*Eriogonum* sp.) in absence of grazing

Fig. 17 Another *Eriogonum* (buckwheat) sp. (there are 6 or 7 *Eriogonum* species in this area; high diversity)

Fig. 18 Biocrust sheltered by shrubs

Fig. 19 Biocrust in openings is vulnerable to trampling, dust generation

Fig. 20 Early development of drust near old bladed road

Yellow Jacket Stop #5: Yellow Jacket North 1

Fig. 21 Two soils (red in distance, light in foreground) supporting biocrust

Fig. 22 Native galleta grass and exotic, invasive cheatgrass; could be tipped to cheatgrass with livestock grazing

Fig. 23 Little "forage" in sagebrush treatment

Yellow Jacket Stop #6: Yellow Jacket North 2

Fig. 24 Light cyanobacteria developing in open space

Fig. 25 Lichen diversity (late seral crust) in area likely little used in the past by livestock;protected by rock

Fig. 26 Crust developing among galleta grass

Yellow Jacket Stop #7: Yellow Jacket North (Sagebrush) Treatment

Fig. 27 (a) Headcuts

Fig. 27 (b) Incising of unstable soils

Fig. 28 Early-seral biocrusts forming throughout the area

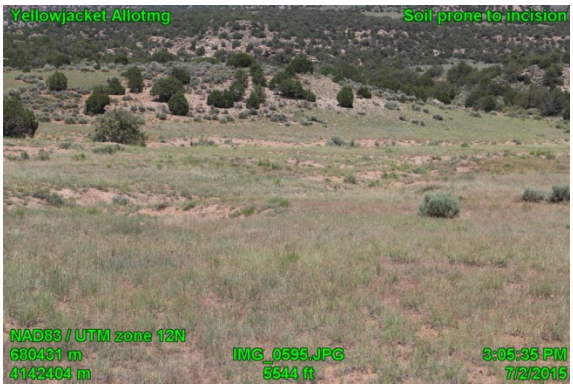


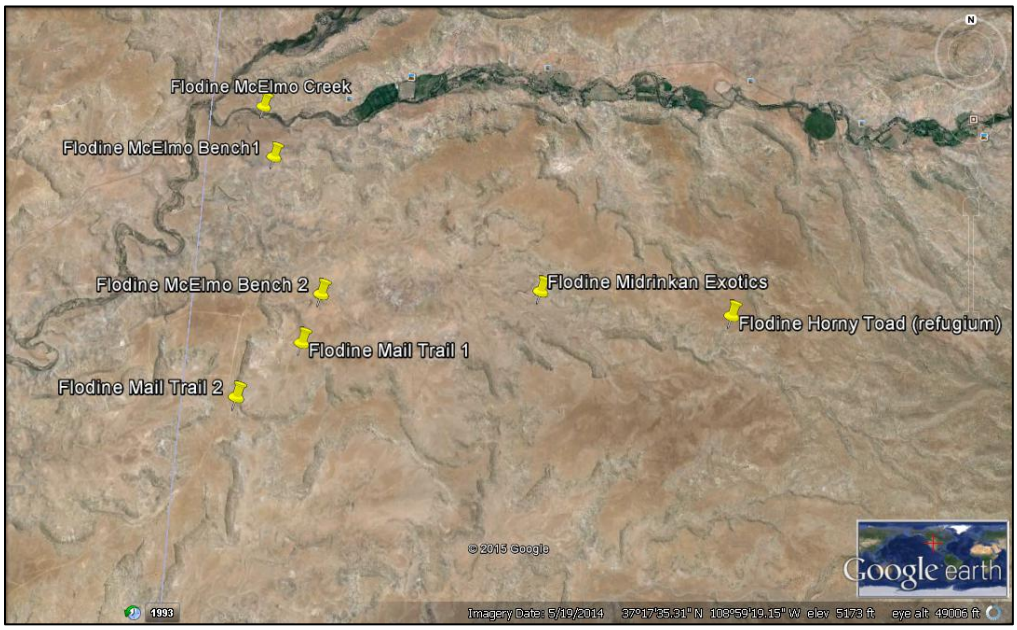
Fig. 29 Numerous gullies; soil prone to erosion

Fig. 30 Sagebrush, galleta, trampling in biocrusts

Fig. 31 Russian thistle and some (native) galleta grass

Fig. 32 Cheatgrass and galleta mixture; could be returned to cheatgrass with grazing

Flodine Park Virtual Tour (7 stops)



Flodine Park Stop #1: McElmo Creek

Fig. 33 Exotic invasives: tamarisk, cheatgrass

Fig. 34 Biocrust, moss inaccessible under sagebrush

Flodine Park Stop #2: McElmo Bench 1

Fig. 35 Russian thistle, adjacent to galleta grass patch; Russian thistle could gain if galleta grass is grazed

Fig. 36 Dense, young Russian thistle

Fig. 37 Lack of forage; a small patch of galleta grass

Fig. 38 Biocrust trampled by horse

Flodine Park Stop #3: McElmo Bench 2

Fig. 39 Extensive cheatgrass

Fig. 40 Sagebrush island (background) amid extensive Russian thistle

Fig. 41 Lack of forage

Flodine Park Stop #4: Mail Trail 2

Fig. 42 Ungulate footprint, crushed biocrust

Fig. 43 Almost no grasses in large interspaces between shrubs

Fig. 44 Pinnacled crust (later seral)

Flodine Park Stop #5: Mail Trail 1

Fig. 45 Extensive cheatgrass, Russian thistle

Fig. 46 Russian thistle, 4-wing saltbush

Fig. 47 Trespass horses frequently seen

Fig. 48 Trespass horses, Russian thistle

Fig. 49 Active headcutting

Flodine Park Stop #6: Midrinkan Exotics

Fig. 50 Cheatgrass expanse

Fig. 51 Russian thistle expanse

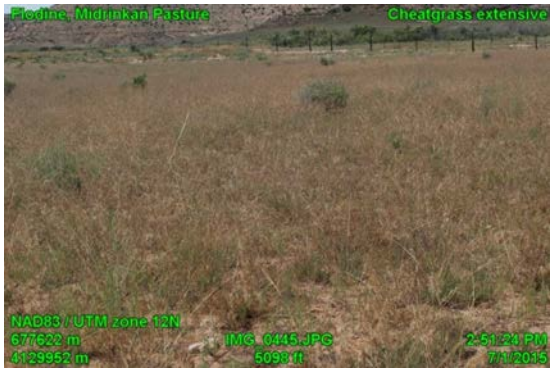


Fig. 52 Extensive cheatgrass

Fig. 53 A 4-wing saltbush in sea of Russian thistle

Flodine Park Stop #7: Horny Toad (refugium)
(I.e., has not been so heavily grazed in recent past;
shows potential for native diversity, biocrust in the Monument)

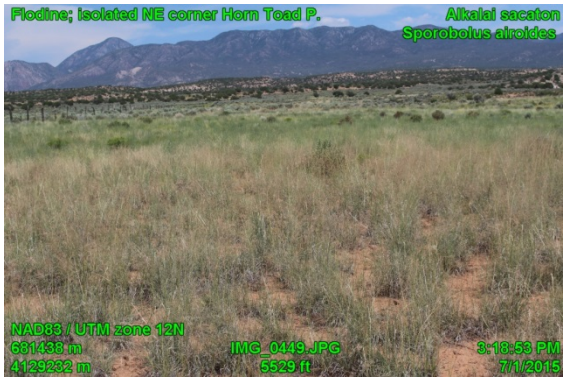


Fig. 54 Alkali sacaton (native bunchgrass)

Fig. 55 Diversity: needle and thread grass, rice grarss, galleta grass, 4-wing salbush

Fig. 56 Dark cyanobacterial crust in open area

Fig. 57 Dense, pinnacled biocrust in open area

Fig. 58 Hoofprint in biocrust