

Ecological site R034AY356WY  
Shallow Breaks High Plains Southeast (SwBr)

Accessed: 08/16/2024

General information

**Provisional.** A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

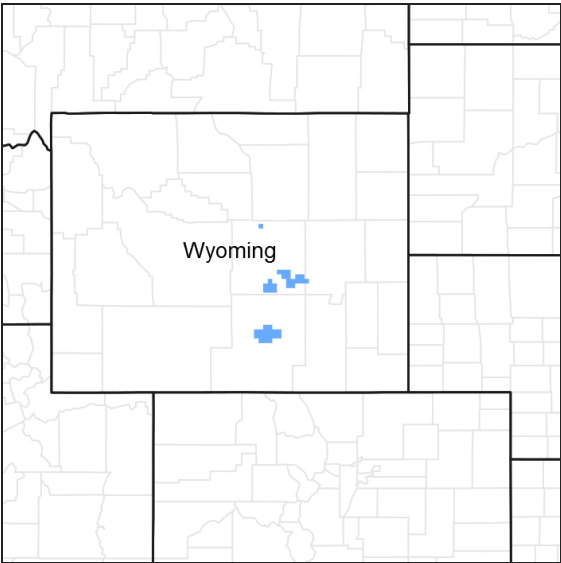


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is usually found in an upland position on gently sloping to very steep topography. It may be found on all exposures, but is primarily found on south and west facing slopes. Elevations are mostly above 7000 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge (3) Escarpment
Flooding frequency	None
Ponding frequency	None
Elevation	5,500–7,500 ft
Slope	1–70%

Ponding depth	0 in
Aspect	Aspect is not a significant factor

## Climatic features

Annual precipitation ranges from 10-14 inches per year. Wide fluctuations may occur in yearly precipitation and result in more dry years than those with more than normal precipitation. Temperatures show a wide range between summer and winter and between daily maximums and minimums. This is predominantly due to the high elevation and dry air, which permits rapid incoming and outgoing radiation. Cold air outbreaks in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Extreme storms may occur during the winter, but most severely affect ranch operations during late winter and spring.

Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 mph.

Growth of native cool season plants begins about April 15 and continues to about June 15. Some green up of cool season plants usually occurs in September.

The following information is from the "Laramie" climate station:

Minimum Maximum 5 yrs. out of 10 between

Frost-free period (days): 57 149 June 1 – September 16

Freeze-free period (days): 94 183 May 15 – September 28

Annual Precipitation (inches): 5.8 17.34

Mean annual precipitation: 11.53 inches

Mean annual air temperature: 42.2 F (30.4 F Avg. Min. to 53.9 F Avg. Max.)

For detailed information visit the Natural Resources Conservation Service National Water and Climate Center at <http://www.wcc.nrcs.usda.gov/> website. Other climate station(s) representative of this precipitation zone include "Dixon " and "Medicine Bow".

**Table 3. Representative climatic features**

Frost-free period (average)	149 days
Freeze-free period (average)	183 days
Precipitation total (average)	14 in

## Influencing water features

Stream type: None

## Soil features

The soils of this site are shallow (less than 20"to bedrock) well-drained soils formed in residuum. These soils have rapid to slow permeability and can be of any texture. This site usually occurs on steep slopes, but may be on any slope. Included in this site are small areas of exposed bedrock and very shallow to deep pockets of soil. This bedrock usually develops large cracks and crevices where junipers can utilize moisture.

**Table 4. Representative soil features**

Surface texture	(1) Sandy loam (2) Loam (3) Loamy fine sand
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained

Permeability class	Moderately rapid to rapid
Soil depth	10–20 in
Surface fragment cover ≤3"	0–20%
Surface fragment cover >3"	0–20%
Available water capacity (0–40in)	0.5–1.2 in
Calcium carbonate equivalent (0–40in)	0–15%
Electrical conductivity (0–40in)	0–8 mmhos/cm
Sodium adsorption ratio (0–40in)	0–5
Soil reaction (1:1 water) (0–40in)	6.6–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0–40%
Subsurface fragment volume >3" (Depth not specified)	0–30%

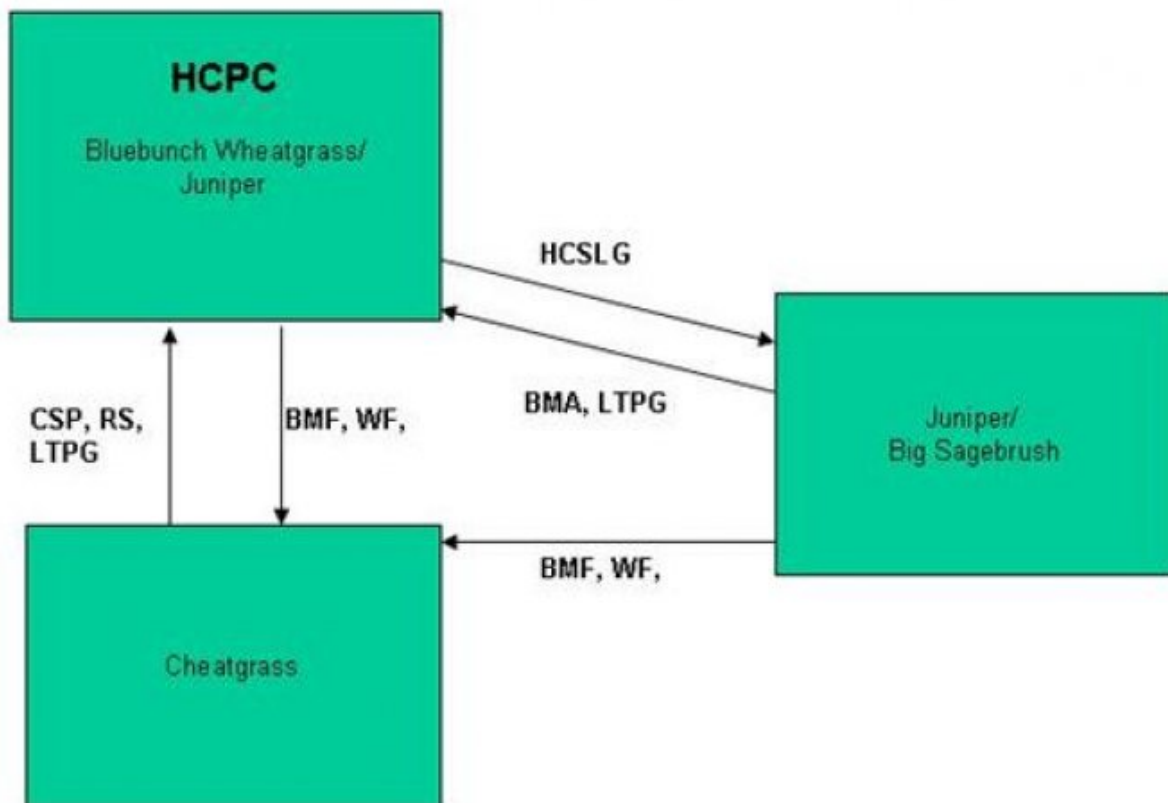
## Ecological dynamics

As this site deteriorates, species such as juniper and big sagebrush increase. Cheatgrass and annual forbs often invade. Cool season bunchgrasses such as bluebunch wheatgrass, Indian ricegrass, and needleandthread will decrease in frequency and production.

The Historic Climax Plant Community (description follows the plant community diagram) has been determined by study of rangeland relic areas, or areas protected from excessive disturbance. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

The following is a State and Transition Model Diagram that illustrates the common plant communities (states) that can occur on the site and the transitions between these communities. The ecological processes will be discussed in more detail in the plant community narratives following the diagram.

## State and transition model



BMA – Brush Management (all methods)  
BMC – Brush Management (chemical)  
BMF – Brush Management (fire)  
BMM – Brush Management (mechanical)  
CSP – Chemical Seedbed Preparation  
CSLG – Continuous Season-long Grazing  
DR – Drainage  
CSG – Continuous Spring Grazing  
HB – Heavy Browse  
HCSLG – Heavy Continuous Season-long Grazing  
HI – Heavy Inundation  
LPG – Long-term Prescribed Grazing  
MT – Mechanical Treatment (chiseling, ripping, pitting)  
MCSLG – Moderate Continuous Season Long Grazing

NF – No Fire  
NS – Natural Succession  
NWC – Noxious Weed Control  
NWI – Noxious Weed Invasion  
NU – Nonuse  
P&C – Plow & Crop (including hay)  
PG – Prescribed Grazing  
RPT – Re-plant Trees  
RS – Re-seed  
SGD – Severe Ground Disturbance  
SHC – Severe Hoof Compaction  
WD – Wildlife Damage (Beaver)  
WF – Wildfire

State 1  
Bluebunch Wheatgrass/Juniper Plant Community (HCPC)

Community 1.1  
Bluebunch Wheatgrass/Juniper Plant Community (HCPC)

The interpretive plant community for this site is the Historic Climax Plant Community. This state evolved with grazing by large herbivores and is suited for grazing by domestic livestock. Potential vegetation is about 50% grasses or grass-like plants, 10% forbs, and 40% woody plants. The major grasses include bluebunch wheatgrass, rhizomatous wheatgrass, bottlebrush squirreltail, and needleandthread. Other grasses include Sandberg bluegrass, prairie junegrass, plains reedgrass, and needleleaf sedge. Juniper and Wyoming big sagebrush are the dominant woody plants. Other woody plants include limber pine, black sagebrush, big sagebrush and green rabbitbrush. A typical plant composition for this state consists of bluebunch wheatgrass 10-25%, rhizomatous wheatgrass 5-10%, needleandthread 5-10%, bottlebrush squirreltail 5-10%, other grasses and grass-like plants 5-20%, perennial forbs 5-15%, juniper 40-50%, and 5-10% other woody species. Ground cover, by ocular estimate, varies from 10-25%. The total annual production (air-dry weight) of this state is about 1000 pounds per acre, but it can range from about 800 lbs./acre in unfavorable years to about 1300 lbs./acre in above average years. The state is stable and well adapted to the Cool Central Desertic Basins and Plateaus climatic conditions. The diversity in plant species allows for high drought resistance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity). Transitions or pathways leading to other plant communities are as follows: • Heavy Continuous Season-Long Grazing will convert this plant community to the Juniper/Big Sagebrush Plant Community. • Wildfire or Prescribed Fire will convert this plant community to the Cheatgrass Plant Community.

Figure 3. Plant community growth curve (percent production by month).  
WY0901, 34AI, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	10	0	5	0	0	0

State 2  
Juniper/Big Sagebrush Plant Community

Community 2.1  
Juniper/Big Sagebrush Plant Community

This plant community is a result of frequent and severe grazing in the absence of fire or brush management. Juniper, Wyoming big sagebrush, and other woody species dominate this community, often exceeding 80% of the annual production. Rhizomatous wheatgrass and annual forbs make up the majority of the understory. The total annual production (air-dry weight) of this state is about 800 pounds per acre, but it can range from about 400 lbs./acre in unfavorable years to about 1000 lbs./acre in above average years. Soil erosion is accelerated because of increased bare ground. The biotic community has been compromised, but is relatively stable. The watershed is functioning, but is at risk of further degradation. Water flow patterns and pedestals are obvious. Infiltration is reduced and runoff is increased. Transitional pathways leading to other plant communities are as follows: • Brush Management followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this state to near Historic Climax Plant Community (Bluebunch Wheatgrass/Juniper). Care should be taken when planning brush management to consider wildlife habitat and critical winter ranges. • Wildfire or Prescribed Fire will convert this plant community to the Cheatgrass Plant Community.

Figure 4. Plant community growth curve (percent production by month).  
WY0901, 34AI, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	10	0	5	0	0	0

State 3  
Cheatgrass Plant Community

Community 3.1

Cheatgrass Plant Community

This plant community is the result of wildfire or a hot prescribed fire. Dominant species include green rabbitbrush and rhizomatous wheatgrass. Cheatgrass often invades, on south and west facing slopes in particular effectively increasing the fire frequency and preventing the re-establishment of non-sprouting woody species. The total annual production (air-dry weight) of this state is about 400 pounds per acre, but it can range from about 200 lbs./acre in unfavorable years to about 600 lbs./acre in above average years. The state is vulnerable to excessive erosion. The biotic integrity of this plant community is at risk depending on how far a shift has occurred in plant composition toward green rabbitbrush, cheatgrass, and annual forbs. The watershed is at risk as bare ground increases. Transitional pathways leading to other plant communities are as follows: • Chemical Seedbed Preparation and Re-seeding followed by deferment for 1 to 2 years as part of a Prescribed Grazing plan will return this plant community to near Historic Climax Plant Community (Bluebunch Wheatgrass/Juniper State) although cheatgrass will remain a part of the plant community. Additional deferment may be necessary and should be prescribed on an individual site basis.

Figure 5. Plant community growth curve (percent production by month).  
WY0901, 34AI, Upland Sites. All Upland Sites.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	35	40	10	0	5	0	0	0

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1				100–250	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	100–250	–
2				50–100	
	needle and thread	HECO26	<i>Hesperostipa comata</i>	50–100	–
3				50–100	
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	50–100	–
4				50–100	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	50–100	–
5				50–200	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–50	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–50	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0–50	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–50	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–50	–
	mountain muhly	MUMO	<i>Muhlenbergia montana</i>	0–50	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–50	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0–50	–
<b>Forb</b>					
6				50–150	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–50	–
	yarrow	ACHIL	<i>Achillea</i>	0–50	–
	Indian paintbrush	CASTI2	<i>Castilleja</i>	0–50	–
	fleabane	ERIGE2	<i>Erigeron</i>	0–50	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–50	–
	aster	EUCEP2	<i>Eucephalus</i>	0–50	–
	beardtongue	PENST	<i>Penstemon</i>	0–50	–
	stonecrop	SEDUM	<i>Sedum</i>	0–50	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–50	–
	clover	TRIFO	<i>Trifolium</i>	0–50	–
<b>Shrub/Vine</b>					
7				400–500	
	Rocky Mountain juniper	JUSC2	<i>Juniperus scopulorum</i>	400–500	–
8				50–100	
	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–50	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	0–50	–
	big sagebrush	ARTR2	<i>Artemisia tridentata</i>	0–50	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	0–50	–
	limber pine	PIFL2	<i>Pinus flexilis</i>	0–50	–

## Animal community

## Animal Community – Wildlife Interpretations

Bluebunch Wheatgrass/Juniper Plant Community (HCPC): This plant community provides excellent thermal and escape cover for wintering mule deer and elk. Year-round habitat is provided for mule deer, bobcat, cottontail rabbits, jackrabbits, sage grouse and many other birds such as the black-throated sparrow, lark sparrow, green-tailed towhee, and neotropical migrants. Juniper provides good thermal cover and nesting habitat for many bird species.

Juniper/Big Sage Plant Community: This plant community may be useful for the same wildlife that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals.

Cheatgrass Plant Community: This plant community exhibits a low level of plant species diversity. In most cases it is not a desirable plant community to select as a wildlife habitat management objective.

## Animal Community – Grazing Interpretations

The following table lists suggested stocking rates for cattle under continuous season-long grazing under normal growing conditions. These are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended, in all cases, to document plant composition and production. More precise carrying capacity estimates should eventually be calculated using this information along with animal preference data, particularly when grazers other than cattle are involved. Under more intensive grazing management, improved harvest efficiencies can result in an increased carrying capacity. If distribution problems occur, stocking rates must be reduced to maintain plant health and vigor.

### Plant Community Production Carrying Capacity\*

(lb./ac) (AUM/ac)

Bluebunch Wheatgrass/Juniper (HCPC) 800-1300 .15

Juniper/Big Sage 400-1000 .12

Cheatgrass 200-600 .4

\* - Continuous, season-long grazing by cattle under average growing conditions.

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage for cattle, sheep, or horses. During the dormant period, the forage for livestock use needs to be supplemented with protein because the quality does not meet minimum livestock requirements.

## Hydrological functions

Water is the principal factor limiting forage production on this site. This site is highly variable and is dominated by soils in hydrologic group B and C, with localized areas in hydrologic group D. Infiltration ranges from slow to very rapid. Runoff potential for this site varies from moderate to high depending on soil hydrologic group, depth to and permeability of bedrock, slope, and ground cover (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information).

Rills and gullies may be present, but should be small. Water flow patterns should be barely distinguishable. Pedestals are only slightly present in association with bunchgrasses such as bluebunch wheatgrass. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogammic crusts are present, but only cover 1-2% of the soil surface.

## Recreational uses

This site provides hunting opportunities for upland game species. Variable topography, rock outcrop, and juniper trees appeal to hikers.

## Wood products

Limber pine and juniper may be used for firewood and very limited use for fence posts.



## Other products

None noted.

## Inventory data references

Inventory Data References (narrative)

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel were also used. Other sources used as references include: USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Inventory Data References

Data Source Number of Records Sample Period State County

SCS-RANGE-417 69 1967-1988 WY Carbon

& others

## Contributors

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## Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	05/01/2005
Approved by	E. Bainter
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** Due to the wide slope range associated with this site, the number and extent of rills will vary from none on slope < 9% to common on slopes > 25%

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2. **Presence of water flow patterns:** Due to the wide slope range associated with this site, water flow patterns vary from barely observable on slopes of < 9% and from broken and irregular in appearance to continuous on slopes > 25%

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3. **Number and height of erosional pedestals or terracettes:** Not evident on slopes < 9% present on slopes > 9%

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 40-50%

- 
5. **Number of gullies and erosion associated with gullies:** Active restricted to concentrated water flow patterns on steeper slopes
- 
6. **Extent of wind scoured, blowouts and/or depositional areas:** None
- 
7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement on slopes < 9%. Litter movement does occur on slopes > 9%
- 
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 50% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 4 or greater.
- 
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use Soil Series description for depth and color of A-horizon
- 
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Infiltration varies with soil texture from slow to very rapid.
- 
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer or soil surface crusting should be present.
- 
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant:
- Sub-dominant:
- Other:
- Additional: Trees/Shrubs > Mid stature Bunch Grasses > Mid stature rhizomatous grasses = Short Grasses/Grasslikes = Forbs
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very Low
- 
14. **Average percent litter cover (%) and depth ( in):** Average litter cover is 15-25% with depths of 0.25 to 0.5 inches
-

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1000 lbs/ac
- 

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Junipers, Limber pine, Sedges, Prickly Pear, Annuals, and Species found on Noxious Weed List
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17. **Perennial plant reproductive capability:** All species are capable of reproducing
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