

Ecological site R043BY009ID**Loamy****16-22 PZ ARTRV/FEID**

Last updated: 2/03/2020

Accessed: 08/30/2026

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.

MLRA notes

Major Land Resource Area (MLRA): 043B–Central Rocky Mountains

Major Land Resource Area (MLRA): 043B–Central Rocky Mountains Major Land Resource Area (MLRA): 43B – Central Rocky Mountains – This MLRA is extensive including Montana, Idaho, Wyoming and a small portion in Utah. MLRA 43B includes the Rocky Mountains. A revision of the MLRA's in 2006 lead to the inclusion of the foothills with the mountains for much of Wyoming. Cartographic standards limited the ability to capture the foothills as a separate MLRA . Further information regarding MLRAs, refer to: United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook.

Classification relationships

Artemisia vaseyana/*Festuca idahoensis* HT in "Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush-Grass Habitat Types of Southern Idaho. University of Idaho, Moscow, Idaho. Bulletin Number "35".

Ecological site concept

• Site receives no additional water. • Slope is 30% • Soils are: o Textures range from very fine sandy loam to clay loam in top 4" (10 cm) of mineral soil surface o Clay content is or = 35% in top 4" (10 cm) of mineral soil surface o Each following subsurface horizon has a clay content of 35% by weighted average o Moderately deep to very deep (20-79+ in. (50-200+ cm) o 3% stone and boulder cover and 20% cobble and gravel cover o Not skeletal (35% rock fragments) within 20" (51 cm) of mineral soil surface o None to Slightly effervescent throughout top 20" (51 cm) of mineral soil surface o Non-saline, sodic, or saline-sodic

Associated sites

R043BY013ID	South Slope Loamy 16-22 PZ ARTRV/FEID
R043BY016ID	Shallow Gravelly 16-22 PZ ARAR8/FEID

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified

Herbaceous	Not specified
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Physiographic features

This site occurs on rolling to steep glacial moraines, fans, and fan terraces. Slopes are generally less than thirty percent and can occur on all aspects. Elevations range from 6000 to 7300 feet (1800-2225 meters).

Table 2. Representative physiographic features

Landforms	(1) Hill
Elevation	1,830 – 2,230 m
Slope	0 – 30 %
Aspect	Aspect is not a significant factor

Climatic features

The Central Rocky Mountains range in elevation from 6000 to 10000 feet above sea level with some peaks reaching over 12000 feet. The average annual precipitation, based on 10 long term climate stations located throughout the MLRA , is 21 inches. The annual average minimum is 18 and the annual average maximum recorded is 24 inches. The annual average temperature is 41.7 degrees Fahrenheit. The annual average low is 26.7 and the annual average high is 56.7 degrees F. The frost free period ranges from 58 to 80 days while the freeze free period ranges from 90 to 116 days.

Table 3 Representative climatic features

Frost-free period (average)	80 days
Freeze-free period (average)	120 days
Precipitation total (average)	610 mm

Influencing water features

This site is not influenced by adjacent wetlands, streams, or run on.

Soil features

The soils on this site usually have thick, dark colored surface colors with 5-35 percent rock fragments on the surface. The surface layer textures are silt loams, loams and sandy loams. Typically, the underlying material is loamy, clayey or sandy, and has greater than 60 percent rock fragments. The soils are very deep and well drained. Water intake is moderate and permeability is moderately slow to rapid. The available water-holding capacity (AWC) ranges from low to high. Runoff is slow and water erosion is slight to moderate.

Ecological dynamics

The dominant visual aspect of the site is mountain big sagebrush and Idaho fescue. Composition by weight is approximately 50-70 percent grasses, 10-20 percent forbs, and 20-30 percent shrubs.

During the last few thousand years, this site has evolved in a montane climate characterized by cool summers and cold winters.

Herbivory has historically occurred on this site at low levels of utilization. Herbivores include mule deer, Rocky Mountain elk, bighorn sheep, and small rodents.

Fire has historically occurred on the site at intervals of 25-40 years.

The Historic Climax Plant Community (HCPC), the Reference State (State 1), moves through many phases depending on the natural and man-made forces that impact the community over time. State 1, described later, indicates some of these phases. The Reference Plant Community Phase is Phase A. This plant community is dominated by Idaho fescue in the understory and mountain big sagebrush in the overstory. Subdominant species include bluebunch wheatgrass, slender wheatgrass, Columbia needlegrass, mountain brome, prairie junegrass, rose pussytoes, tapertip hawksbeard, and mountain snowberry. There is a large variety of other forbs and some other shrubs that can occur in minor amounts. The plant species composition of Phase A is listed later under "Reference Plant Community Phase Plant Species Composition".

Total annual production is 1300 pounds per acre (1444 kilograms per hectare) in a normal year. Production in a favorable year is 1750 pounds per acre (1944 kilograms per hectare). Production in an unfavorable year is 850 pounds per acre (944 kilograms per hectare). Structurally, cool season deep rooted perennial bunchgrasses are very dominant, followed by tall shrubs being more dominant than perennial forbs while shallow rooted perennial bunchgrasses are subdominant.

FUNCTION:

This site is suited for grazing by domestic livestock in summer and fall. This site provides fair to good habitat for various upland wildlife. This site offers minimal recreation value.

The site is fairly resistant to disturbances that can potentially degrade it as long as a good herbaceous cover is retained.

Impacts on the Plant Community.

Influence of fire:

When this site burns within the normal fire frequency of 25-40 years, it has a minor and temporary affect on the plant community. Vigor of Idaho fescue is usually reduced for a few years. Mountain big sagebrush is killed; however it begins to re-seed back within five years and will be at pre-burn density within 20-25 years.

In the absence of normal fire frequency mountain big sagebrush and snowberry will increase slightly. When fires become more frequent than historic levels (25-40 years), vigor of the bunchgrasses will generally be reduced for a year or two. Root sprouting shrubs such as gray horsebrush and snowberry will increase. With continued short fire frequency, fine leaved grasses such as Idaho fescue, will have their vigor reduced significantly and death may result. These species may be replaced by annual grasses such as ventenata along with a variety of annual and perennial forbs including noxious and invasive plants.

Influence of improper grazing management:

Season-long grazing and/or excessive utilization can be detrimental to this site. This type of management leads to reduced vigor of Idaho fescue and other deep-rooted perennial bunchgrasses. With reduced vigor, recruitment of these species declines. As these species decline, the plant community becomes susceptible to an increase in big sagebrush and/or an invasion of noxious and invasive species.

Continued improper grazing management influences fire frequency by increasing fine fuels. If annual grasses and forbs increase due to improper grazing management, fires become more frequent.

Proper grazing management that addresses frequency, duration, and intensity of grazing can keep fine fuels from developing, thereby reducing fire frequency. Proper grazing management also maintains the integrity of the plant community.

Weather influence:

Above normal precipitation in April, May, and June can dramatically increase total annual production. These weather patterns can also increase viable seed production of desirable species to provide for recruitment. Extended drought reduces vigor of the perennial grasses and shrubs. Extreme drought may cause plant mortality. Prolonged drought can lead to a reduction in fire frequency.

Influence of Insects and disease:

Outbreaks can affect vegetation health. An outbreak of a particular insect is usually influenced by weather but no specific data is available for this site.

Influence of noxious and invasive plants:

Annual and perennial invasive species compete with desirable plants for moisture and nutrients. The result is reduced production and change in composition of the understory. Once they become established the fire frequency increases. As a result, the shrub component can be lost.

Influence of wildlife:

Relatively low numbers of wildlife use this site and have little impact on it. Mule deer and Rocky Mountain elk are the dominant large herbivores using the site. They use the site yearlong but prefer it in the spring, fall, and early winter.

Watershed:

Decreased infiltration and increased runoff occurs when mountain big sagebrush is removed with frequent fires, particularly the year following the fire event. The increased runoff also increases sheet and rill erosion. The long-term effect is a transition to a different state.

Plant Community and Sequence:

Transition pathways between common vegetation states and phases.

State 1.

Phase A to B. Develops with improper grazing management and no fire.

Phase A to C. Develops with fire.

Phase B to A. Develops with prescribed grazing.

Phase C to A. Develops with prescribed grazing and no fire.

State 1, Phase B or Phase C to State 2. Develops through frequent fire and/or continued improper grazing management. The site crosses the threshold. It is not economically feasible to move this state back to State 1 with accelerating practices.

State 2 to unknown site. Excessive soil loss and changes in the hydrologic cycle caused by continued improper grazing management and/or frequent fire cause this state to cross a threshold and retrogress to a new site with reduced potential. It is not economically feasible to move this state back to State 1 with accelerating practices.

State 3. Rangeland seeding. The site may be seeded to introduced species or native species that attempt to mimic or duplicate the Reference Plant Community.

Practice Limitations.

Only slight limitations exist on this site for accelerating, facilitating, and vegetative management practices.

State and transition model

Additional community tables

Table 4. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 5. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 5.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 6.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

Wildlife Interpretations. Animal Community – Wildlife Interpretations This rangeland ecological site provides diverse habitat for native wildlife species. The plant community exhibits a diverse mixture of forbs throughout the growing season offering excellent habitat for invertebrates. Mule deer and elk may utilize the site throughout the year. The rangeland provides seasonal habitat for resident and migratory animals including western toad, shrews, bats, ground squirrels, mice, coyote, red fox, badger, Ferruginous hawk, and prairie falcon. Area sensitive species include Merriam's shrew, Brewer's sparrow, sage thrasher, sage sparrow, sharp-tailed grouse, and Greater sage-grouse. Water features are sparse provided by seasonal runoff, artificial water catchments, and springs. State 1 Phase 1.1 – Mountain Big Sagebrush/ Idaho Fescue/ Bluebunch Wheatgrass Reference Plant Community (RPC): This plant community provides a diversity of grasses, forbs, and shrubs used by native insect communities that assist in pollination. An extensive array of forbs is represented throughout the growing season leading to a diverse insect community. Many avian and mammal species utilize this habitat based on the availability of invertebrate prey species and plant structural diversity. The reptile and amphibian community is represented by common sagebrush lizard, western rattlesnake, western toad, and northern leopard frog. Amphibians are associated with springs and isolated water bodies adjacent to this plant community. Development of spring sites that collect all available water would exclude amphibian use on these sites. Native shrub-steppe obligate avian species utilizing the habitat include the Brewer's sparrow, sage sparrow, sage grouse, and sage thrasher. Sage-grouse may utilize this site for nesting, brood rearing, winter cover, and winter food. Sharp-tailed grouse may also utilize this plant community. The plant community provides spring, fall, and winter (south slopes) food and cover for mule deer, moose, and elk. The site can provide young of year cover for large mammals. A diverse small mammal population including golden-mantled ground squirrels, jackrabbits, Great Basin pocket mice, and deer mice would utilize this plant community. Antelope bitterbrush and mountain snowberry are present in the plant community and provides desirable forage for large herbivores. The deer mouse is beneficial to this site as it is the principal vector for planting bitterbrush seed. State 1 Phase 1.2 – Mountain Big Sagebrush/ Sandberg Bluegrass/ Mountain Brome/ Mountain Snowberry Plant Community: This plant community is the result of improper grazing management and no fire. An increase in canopy cover of sagebrush contributes to a decline in vigor and production of native deep rooted grasses and forbs. The reduced diversity of the herbaceous understory results in lower diversity of insects. The reptile community would be similar to the reptile community in State 1 Phase 1.1. Shrub-steppe obligate avian species using the site include Brewer's sparrow, sage sparrow, sage thrasher, and sage-grouse. Quality of habitat (brood-rearing and nesting cover) for sage-grouse is reduced due to poor vigor and lower diversity in the herbaceous plant community. Winter habitat (cover and food) for sage-grouse is provided. The reduced vigor and production of understory vegetation provides a shorter grazing season for mule deer and elk. Young of year cover may be provided for large herbivores. Small mammal diversity and populations would be similar to those in State 1 Phase 1.1. State 1 Phase 1.3– Bluebunch Wheatgrass/ Idaho Fescue Plant Community: This plant community is a result of recent wildfire, prescribed burning, or brush management. The plant community, dominated by herbaceous vegetation with little or no sagebrush would provide less vertical structure for animals. Patches of root sprouting shrubs (mountain snowberry and gray horsebrush) may be present to provide limited vertical structure for wildlife. Insect diversity would be reduced but a native forb plant community similar to that in State 1 Phase 1.1 would still support select pollinators. Habitat quality for reptiles including common sagebrush lizard and western rattlesnake would decline due to the loss of sagebrush. Amphibian habitat would be tied to permanent spring sites in the area. Development of spring sites that collect all available water would exclude amphibians on these sites. The lack of sagebrush canopy cover would limit use of this area as nesting habitat for Brewer's sparrow, sage sparrow, sage grouse, and sage thrasher. The herbaceous vegetation improves habitat for bird species that favor grassland habitat including horned lark, savannah sparrow, vesper sparrow, and western meadowlark. Sage-grouse may use this site for brood-rearing habitat when sagebrush cover is nearby. Habitat quality for sharp-tailed grouse may increase as patches of shrubs become established. Mule deer and elk use would be seasonal (spring and fall) but the site would offer little thermal cover and young of year cover due to the reduced shrub cover. The diversity and populations of small mammals would be dominated by open grassland species. Large blocks of this plant community would fragment the reference plant community and reduce the quality of habitat for shrub-steppe obligate animal species. State 2 – Annual Grasses/ Forbs Plant Community: This state has developed due to improper grazing management and/or frequent fire. The reduced native forb and shrub components in the plant community would support a very limited population of pollinators. Season long pollinator habitat is not provided at the same quality level as in State 1 Phase 1.1. Habitat quality would decline for common sagebrush lizard and western rattlesnake due to the loss of sagebrush. The loss of sagebrush would severely reduce the quality of habitat for sage thrasher, Brewer's sparrow, sage-grouse, and sage sparrow, eliminating nesting and escape cover. Birds of prey including hawks and falcons may range throughout this area looking for prey species. Large mammals may utilize the herbaceous vegetation in the early part of the year when it is more palatable. Kentucky bluegrass, when managed properly, can provide desirable forage in spring and fall for mule deer and throughout the year for elk. The populations of small mammals would be dominated by open grassland species. Hunting success by predators on small mammals would increase. Large blocks of this plant community would fragment the reference plant community and reduce the quality of habitat for shrub-steppe obligate animal species. State 3 – Rangeland Seeding Plant Community: The seeding mixture (native or non-native) determines the animal species that utilize this site. A diverse seed mixture of native grasses and forbs would provide similar habitat conditions as in the herbaceous plant community described in State 1 Phase 1.3. A diverse seed mixture of native grasses, forbs, and shrubs would provide similar habitat conditions as described in State 1 Phases 1.1 or 1.2. A monoculture of non-native grass species would not support diverse populations of insects, reptiles, birds, mammals, or shrub-steppe obligate animal species. Given a monoculture of herbaceous vegetation, grassland animal species including western meadowlark, horned lark, savannah sparrow, deer mouse, kangaroo rat, mule deer, and elk would utilize this site for nesting and/or foraging at certain times of the year. Birds of prey including hawks and falcons may range throughout this community looking for prey species. Large areas of State 3 with no shrubs in the plant community would fragment the reference plant community and would reduce the quality of habitat for shrub-steppe obligate animal species. Grazing Interpretations. This site is suited for grazing by domestic livestock in summer and fall. Estimated initial stocking rate will be determined with the landowner or

decision-maker. They will be based on the inventory which includes species, composition, similarity index, production, past use history, season of use, and seasonal preference. Calculations used to determine estimated initial stocking rate will be based on forage preference ratings.

Hydrological functions

Soils on this site are in hydrologic group B. The runoff potential is slow and medium on steeper slopes. Erosion hazard ranges from slight to moderate.

Recreational uses

This site offers minimal recreation value.

Wood products

None.

Other products

None.

Other information

Field Offices Arco, ID Cascade, ID Challis, ID Nezperce, ID Emmett, ID Grangeville, ID Gooding, ID Lewiston, ID Mountain Home, ID Orofino, ID Salmon, ID Shoshone, ID St. Anthony, ID Weiser, ID

Inventory data references

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used. Those involved in developing this site description include: Dave Franzen, co-owner, Intermountain Rangeland Consultants, LLC Jacy Gibbs, co-owner, Intermountain Rangeland Consultants, LLC Jim Cornwell, Range Management Specialist, IASCD Brendan Brazee, State Rangeland Management Specialist, NRCS, Idaho Bruce Knapp, Resource Soil Scientist, NRCS, Idaho Lee Brooks, Range Management Specialist, IASCD

Type locality

Location 1: Blaine County, ID	
Township/Range/Section	T7N R14E S26
General legal description	SW 1/4
Location 2: Custer County, ID	
Township/Range/Section	T7N R14E S14
General legal description	NE 1/4
Location 3: Custer County, ID	
Township/Range/Section	T8N R14E S15

General legal description	SE 1/4
Location 4: Blaine County, ID	

Other references

Hironaka, M., M.A. Fosberg, A. H. Winward. 1983. Sagebrush-Grass Habitat Types of Southern Idaho. University of Idaho, Moscow, Idaho. Bulletin Number "35".

USDA Forest Service, Rocky Mountain Research Station. 2004. Restoring Western Ranges and Wildlands. General Technical Report RMRS-GTR-136-vols. 1-3.

USDA, NRCS.2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, Forest Service, Fire Effects Information Database. 2004. www.fs.fed.us/database.

USDI Bureau of Land Management, US Geological Survey; USDA Natural Resources Conservation Service, Agricultural Research Service; Interpreting Indicators of Rangeland Health. Technical Reference 1734-6; Version 4-2005.

Approval

Scott Woodall, 2/03/2020

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)	Dave Franzen and Jacy Gibbs Intermountain Range Consultants 17700 Fargo Rd. Wilder, ID 83676
Contact for lead author	Brendan Brazee, State Rangeland Management Specialist USDA-NRCS 9173 W. Barnes Drive, Suite C, Boise, ID 83709
Date	06/03/2009
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** rills can occur on this site. If rills are present they are likely to occur immediately following wildfire. Rills are most likely to occur on soils with surface textures of silt loam and on slopes greater than 15%.

2. **Presence of water flow patterns:** water-flow patterns occur on this site. When they do, it is usually on slopes >15% and they are short and disrupted by cool season grasses, tall shrubs, and an occasional surface stone. They are not extensive.

3. **Number and height of erosional pedestals or terracettes:** both can occur on this site but neither is extensive. In areas where flow patterns and/or rills are present, a few pedestals may be expected. Terracettes occur uphill from the bases of tall shrubs and large bunchgrasses on slopes greater than 15%.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** may range from 10-20 percent but additional data is needed.

5. **Number of gullies and erosion associated with gullies:** gullies do not occur on this site.

6. **Extent of wind scoured, blowouts and/or depositional areas:** blowouts and depositional areas are usually not present. Immediately following wildfire some soil movement may occur on lighter textured soils.

7. **Amount of litter movement (describe size and distance expected to travel):** fine litter in the interspaces may move up to 3 feet following a significant run-off event. Coarse litter generally does not move.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** values should range from 3-5 but needs to be tested.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** no data.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** bunchgrasses, especially deep-rooted perennials, slow run-off and increase infiltration. Tall shrubs catch blowing snow in the interspaces.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** is not 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: cool season deep-rooted perennial bunchgrasses

Sub-dominant: tall shrubs

Other: perennial forbs

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** bluebunch wheatgrass, Idaho fescue and mountain big sagebrush will become decadent in the absence of normal fire frequency and ungulate grazing. For the grasses, decadence is usually in the form of litter build-up in the crown of the plant. Over an extended period of time the center of the plant may die.
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14. **Average percent litter cover (%) and depth (in):** additional litter cover data is needed but is expected to be 15-30 percent to a depth of 0.1 inches. Under mature shrubs litter is >0.5 inches deep and is 90-100 percent ground cover.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** is 1300 pounds per acre (1444 kilograms per hectare) in a year with normal temperatures and precipitation. Perennial grasses produce 50-70 percent of the total production, forbs 10-20 percent and shrubs 20-30 percent.
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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: includes cheatgrass, medusahead, ventenata, Kentucky bluegrass, curlycup gumweed, St. Johnswort, rush skeletonweed, musk, yellow star, and scotch thistle, and diffuse and spotted knapweed.
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17. **Perennial plant reproductive capability:** all functional groups have the potential to reproduce in most years.
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