

Ecological site F043AP908MT Upland Cold Woodland Group

Last updated: 9/09/2023
Accessed: 05/11/2025

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): 043A–Northern Rocky Mountains

This MLRA is located in Montana (43 percent), Idaho (34 percent), and Washington (23 percent). It makes up about 31,435 square miles (81,460 square kilometers). It has no large cities or towns. It has many national forests, including the Okanogan, Colville, Kootenai, Lolo, Flathead, Coeur d'Alene, St. Joe, Clearwater, and Kaniksu National Forests.

This MLRA is in the Northern Rocky Mountains Province of the Rocky Mountain System. It is characterized by rugged, glaciated mountains; thrust- and block-faulted mountains; and hills and valleys. Steep-gradient rivers have cut deep canyons. Natural and manmade lakes are common.

The major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA are: Kootenai-Pend Oreille-Spokane (1701), 67 percent; Upper Columbia (1702), 18 percent; and Lower Snake (1706), 15 percent. Numerous rivers originate in or flow through this area, including, the Sanpoil, Columbia, Pend Oreille, Kootenai, St. Joe, Thompson, and Flathead Rivers.

This area is underlain primarily by stacked slabs of layered sedimentary or metasedimentary bedrock. The bedrock formations range from Precambrian to Cretaceous in age. The rocks consist of shale, sandstone, siltstone, limestone, argillite, quartzite, gneiss, schist, dolomite, basalt, and granite. The formations have been faulted and stacked into a series of imbricate slabs by regional tectonic activity. Pleistocene glaciers carved a rugged landscape that includes sculpted hills and narrow valleys filled with till and outwash. Continental glaciation overrode the landscape in the northern half of the MLRA while glaciation in the southern half was confined to montane settings.

The average annual precipitation is 25 to 60 inches (635 to 1,525 millimeters) in most of this area, but it is as much as 113 inches (2,870 millimeters) in the mountains and is 10 to 15 inches (255 to 380 millimeters) in the western part of the area. Summers are dry. Most of the precipitation during fall, winter, and spring is snow. The average annual temperature is 32 to 51 degrees F (0 to 11 degrees C) in most of the area, decreasing with elevation. In most of the area, the freeze-free period averages 140 days and ranges from 65 to 215 days. It is longest in the low valleys of Washington, and it decreases in length with elevation. Freezing temperatures occur every month of the year on high mountains, and some peaks have a continuous cover of snow and ice.

The dominant soil orders in this MLRA are Andisols, Inceptisols, and Alfisols. Many of the soils are influenced by Mount Mazama ash deposits. The soils in the area have a frigid or cryic soil temperature regime; have an ustic, xeric, or udic soil moisture regime; and dominantly have mixed mineralogy. They are shallow to very deep, are very poorly drained to well drained, and have most of the soil texture classes. The soils at the lower elevations include Udivitrands, Vitrixerands and Haplustalfs. The soils at the higher elevations include Dystrocrypts, Eutrocrypts, Vitricryands, and Haplocryalfs. Cryorthents, Cryepts, and areas of rock outcrop are on ridges and peaks above timberline

This area is in the northern part of the Northern Rocky Mountains. Grand fir, Douglas-fir, western red cedar, western hemlock, western larch, lodgepole pine, subalpine fir, ponderosa pine, whitebark pine, and western white pine are the dominant overstory species, depending on precipitation, temperature, elevation, and landform aspect. The understory vegetation varies, also depending on climatic and landform factors. Some of the major wildlife species in this area are whitetailed deer, mule deer, elk, moose, black bear, grizzly bear, coyote, fox, and grouse. Fish, mostly in the trout and salmon families, are abundant in streams, rivers, and lakes.

More than one-half of this area is federally owned and administered by the U.S. Department of Agriculture, Forest Service. Much of the privately-owned land is controlled by large commercial timber companies. The forested areas are used for wildlife habitat, recreation, watershed, livestock grazing, and timber production. Meadows provide summer grazing for livestock and big game animals. Less than 3 percent of the area is cropland.

Classification relationships

ASSOCIATED HABITAT TYPES:

Major association with:

subalpine fir/menziesia

subalpine fir/beargrass-blue huckleberry phase

Minor association with:

subalpine fir/beargrass-grouse whortleberry phase

subalpine fir/beargrass

subalpine fir/queencup beadlily

subalpine fir/twinflower

subalpine fir/twinflower-twinflower phase

subalpine fir/queencup beadlily-dwarf huckleberry phase

subalpine fir/grouse whortleberry

Ecological site concept

- Site does not receive additional water
- Dominant Cover: Coniferous Forest
- Soils are

Reference phase vegetation is an overstory dominated by subalpine fir with an overstory dominated by rusty menziesia. A diverse understory of low shrubs and herbaceous species include: *Calamagrostis rubescens*, *Vaccinium scoparium*, *Spiraea betulifolia*, *Vaccinium membranaceum*, *Xerophyllum tenax*, *Paxistima myrsinites*, *Arnica* species, *Linnaea borealis*, *Carex geyeri*, *Vaccinium caespitosum* and *Clintonia uniflora*. The understory production averages 471 dry pounds per acre (200-800).

o Generally not limy (limited extent)

o Moderately deep, deep, or very deep

o Not ashy or medial textural family

o Typically less than 5% stone and boulder surface cover (<15% max)

• Soil surface texture gravelly ashy silt loam, silt loam or gravelly loam in surface mineral 4"

• Parent material is mixed volcanic ash over till or colluvium

• Drainage class is well to somewhat excessively well drained; no flooding frequency

• Site Landform: glaciated mountain slopes, ridges, moraines

• Moisture Regime: udic

• Temperature Regime: cryic

• Elevation Range: 3800-6000 ft

• Slope: 15-40%

Associated sites

F043AP904MT	Shallow Cold Woodland Group These sites are associated in that they reside in cold site conditions including landforms of glaciated mountain slopes and ridges, in elevations ranging 3800 to 6000 feet (though F043AP904MT can go up to 8000 feet) on moderate slopes of 30 to 40 percent (though F043AP904MT can have steeper slopes). The sites differ in that F043AP908MT has mixed volcanic ash in its parent material and F043AP904MT has shallow soils. The sites are also similar in that both reference communities have an overstory dominated by subalpine fir and an understory of cold adapted plants such as rusty menziesia.
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Similar sites

F043AP904MT	Shallow Cold Woodland Group These sites are similar in that they reside in cold site conditions including landforms of glaciated mountain slopes and ridges, in elevations ranging 3800 to 6000 feet (though F043AP904MT can go up to 8000 feet) on moderate slopes of 30 to 40 percent (though F043AP904MT can have steeper slopes). The sites differ in that F043AP908MT has mixed volcanic ash in its parent material and F043AP904MT has shallow soils. The sites are also similar in that both reference communities have an overstory dominated by subalpine fir and an understory of cold adapted plants such as rusty menziesia.
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Table 1. Dominant plant species

Tree	(1) <i>Abies lasiocarpa</i> (2) <i>Picea engelmannii</i>
Shrub	(1) <i>Menziesia ferruginea</i> (2) <i>Vaccinium membranaceum</i>
Herbaceous	(1) <i>Xerophyllum tenax</i> (2) <i>Vaccinium scoparium</i>

Physiographic features

- Site Landform: glaciated mountain slopes, ridges, moraines
- Elevation Range: 3800-6000 ft
- Slope: 15-40%

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2) Mountains > Ridge (3) Mountains > Moraine
Elevation	3,800–6,000 ft
Slope	15–40%
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

Moisture Regime: udic

Temperature Regime: cryic

- Representative Value (RV) of range of Mean Annual Precipitation: 30-60 inches
- Representative Value (RV) of range of Mean Average Annual Temperature: 37-43 degrees
- Representative Value (RV) of range of Frost Free Days: 35-70days

ONLY AVAILABLE CLIMATE STATIONS ARE LOCATED IN VALLEYS AND MAY NOT BE REPRESENTATIVE TO THIS PARTICULAR SITE. ABOVE INFORMATION IS REPRESENTATIVE.

Table 3. Representative climatic features

Frost-free period (characteristic range)	77-87 days
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Freeze-free period (characteristic range)	126-130 days
Precipitation total (characteristic range)	23-31 in
Frost-free period (actual range)	72-88 days
Freeze-free period (actual range)	124-130 days
Precipitation total (actual range)	21-32 in
Frost-free period (average)	81 days
Freeze-free period (average)	128 days
Precipitation total (average)	27 in

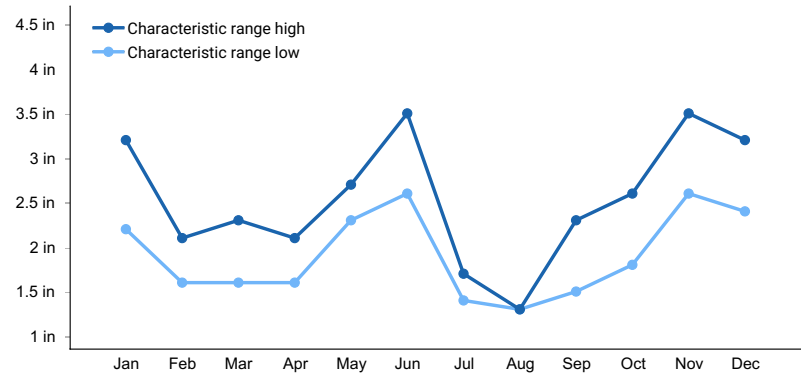


Figure 1. Monthly precipitation range

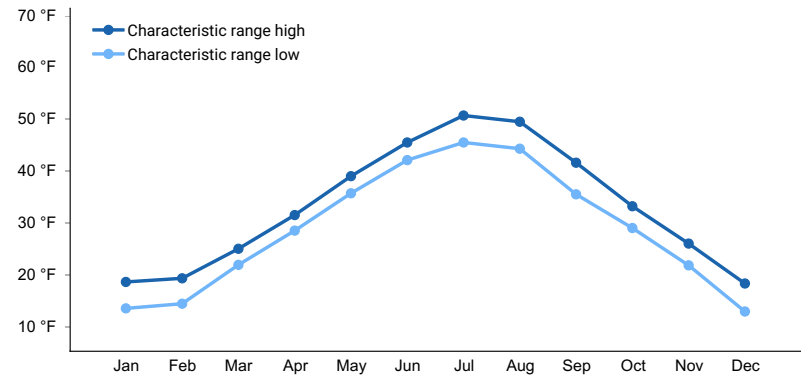


Figure 2. Monthly minimum temperature range

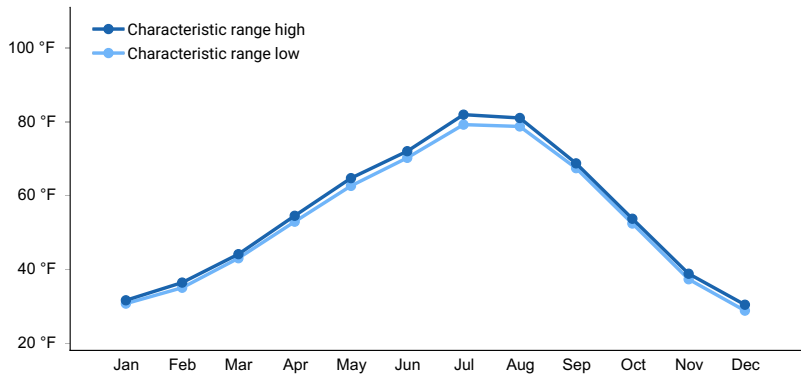


Figure 3. Monthly maximum temperature range

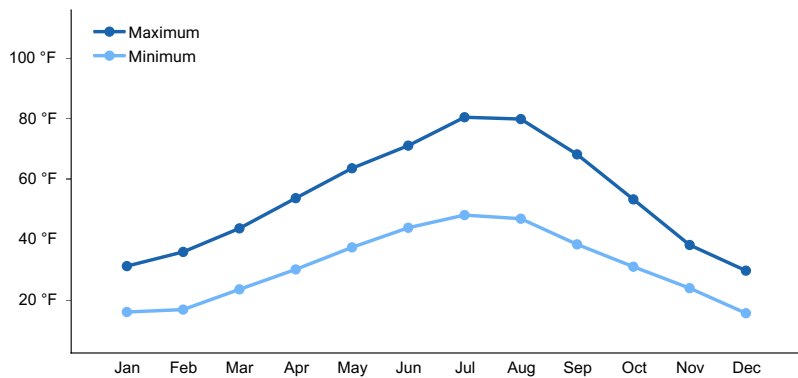


Figure 4. Monthly average minimum and maximum temperature

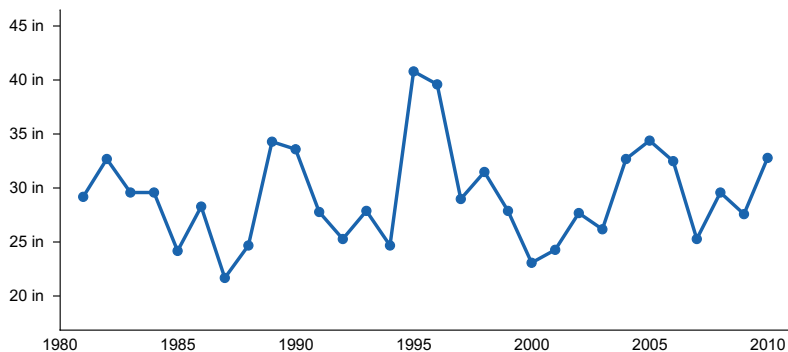


Figure 5. Annual precipitation pattern

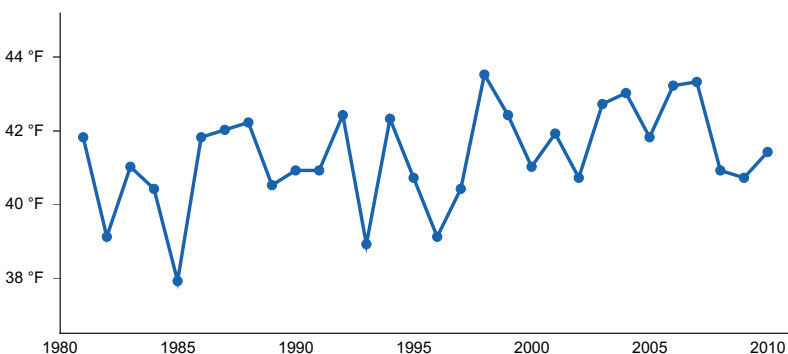


Figure 6. Annual average temperature pattern

Climate stations used

- (1) POLEBRIDGE 1 N [USC00246618], Essex, MT
- (2) WEST GLACIER [USC00248809], Kalispell, MT
- (3) HUNGRY HORSE DAM [USC00244328], Kalispell, MT
- (4) LINDBERGH LAKE [USC00245043], Seeley Lake, MT

Influencing water features

NO WATER FEATURES

- Site does not receive additional water

Wetland description

DOES NOT APPLY

Soil features

- Soils are

- o Generally not limy (limited extent)
- o Moderately deep, deep, or very deep
- o Not ashy or medial textural family
- o Typically less than 5% stone and boulder surface cover (<15% max)
- Soil surface texture gravelly ashy silt loam, silt loam or gravelly loam in surface mineral 4"
- Parent material is mixed volcanic ash over till or colluvium
- Drainage class is well to somewhat excessively well drained; no flooding frequency

Table 4. Representative soil features

Parent material	(1) Volcanic ash (2) Till (3) Colluvium
Surface texture	(1) Gravelly, ashy silt loam (2) Gravelly loam
Drainage class	Well drained to somewhat excessively drained
Soil depth	20–60 in

Ecological dynamics

STATE 1: Historic reference state with presence of western white pine as a major seral tree species.

Community Phase 1.1: Reference phase of multi-storied forest canopy dominated by subalpine fir and Engelmann spruce.

Community Phase 1.2: Post fire disturbance community of herb and shrub species.

Community Phase 1.3: Intermediate aged forest, dense thick pole sized trees.

Community Phase 1.4: Maturing forest phase of seral tree species and subalpine fir and Engelmann spruce.

Community Phase 1.5: Mature forest with some small gap dynamics, remnant seral trees species and subalpine fir and Engelmann spruce.

STATE 2: Current reference state with minor or none presence of western white pine as a seral tree species.

Community Phase 1.1: Reference phase of multi-storied forest canopy dominated by subalpine fir and Engelmann spruce.

Community Phase 1.2: Post fire disturbance community of herb and shrub species.

Community Phase 1.3: Intermediate aged forest, dense thick pole sized trees.

Community Phase 1.4: Maturing forest phase of seral tree species and subalpine fir and Engelmann spruce.

Community Phase 1.5: Mature forest with some small gap dynamics, remnant seral trees species and subalpine fir and Engelmann spruce.

STATE 3: Armillaria root rot induced shrubland state.

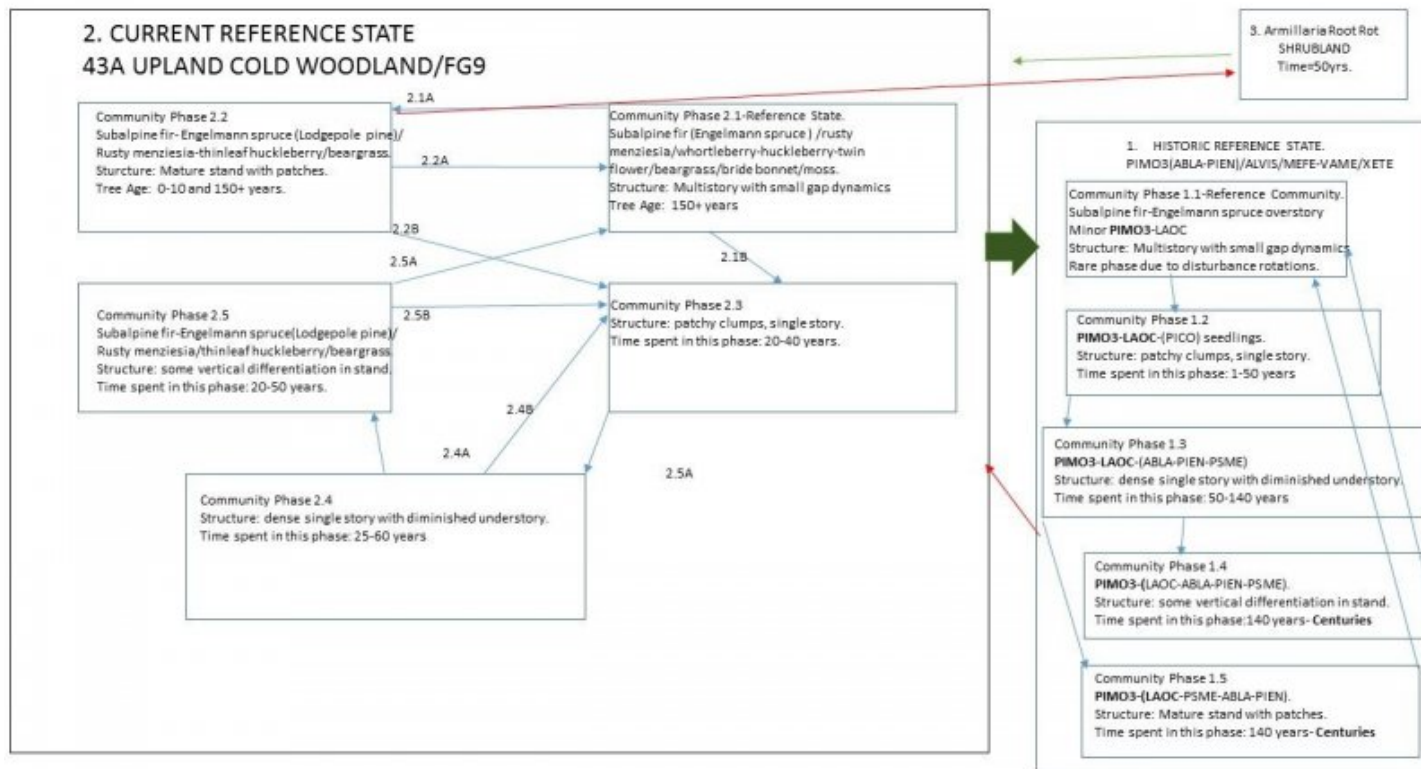
Transition from State 1 to State 2: Substantial loss of western white pine as a major seral tree species.

Restoration from State 2 to State 1: Western white pine restored as a major seral tree species.

Transition from State 2 to State 3: Significant loss of susceptible tree species at a site due to Armillaria root rot and conversion of the forest to a shrubland.

Restoration from State 3 to State 2: Conversion of the Armillaria root rot induced shrubland to forest, generally of less susceptible seral tree species and eventually to climax tree species.

State and transition model



Animal community

WILDLIFE USES

during the summer and fall, elk extensively use this site for forage and cover.
 Livestock use is low to very low.

Hydrological functions

Watershed values is high

Recreational uses

HIKING, BIKING, PHOTOGRAPHY

These uses may be limited by steep slopes and dense shrub undergrowth.

Wood products

LUMBER PRODUCTS

timber productivity is moderate to high but the potential for harvest is limited by steep slopes and thick brushy undergrowth. Site preparation and management must be assessed.

Other references

Pfister, Robert D., et al. "Forest habitat types of Montana." Gen. Tech. Rep. INT-GTR-34. Ogden, UT: US Department of Agriculture, Forest Service, Intermountain Forest & Range Experiment Station. 174 p. 34 (1977).

Contributors

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Approval

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	12/18/2020
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

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

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**
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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**
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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:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
-

14. **Average percent litter cover (%) and depth (in):**
-

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

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:**
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17. **Perennial plant reproductive capability:**
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