Get Wild: What determines tree line?

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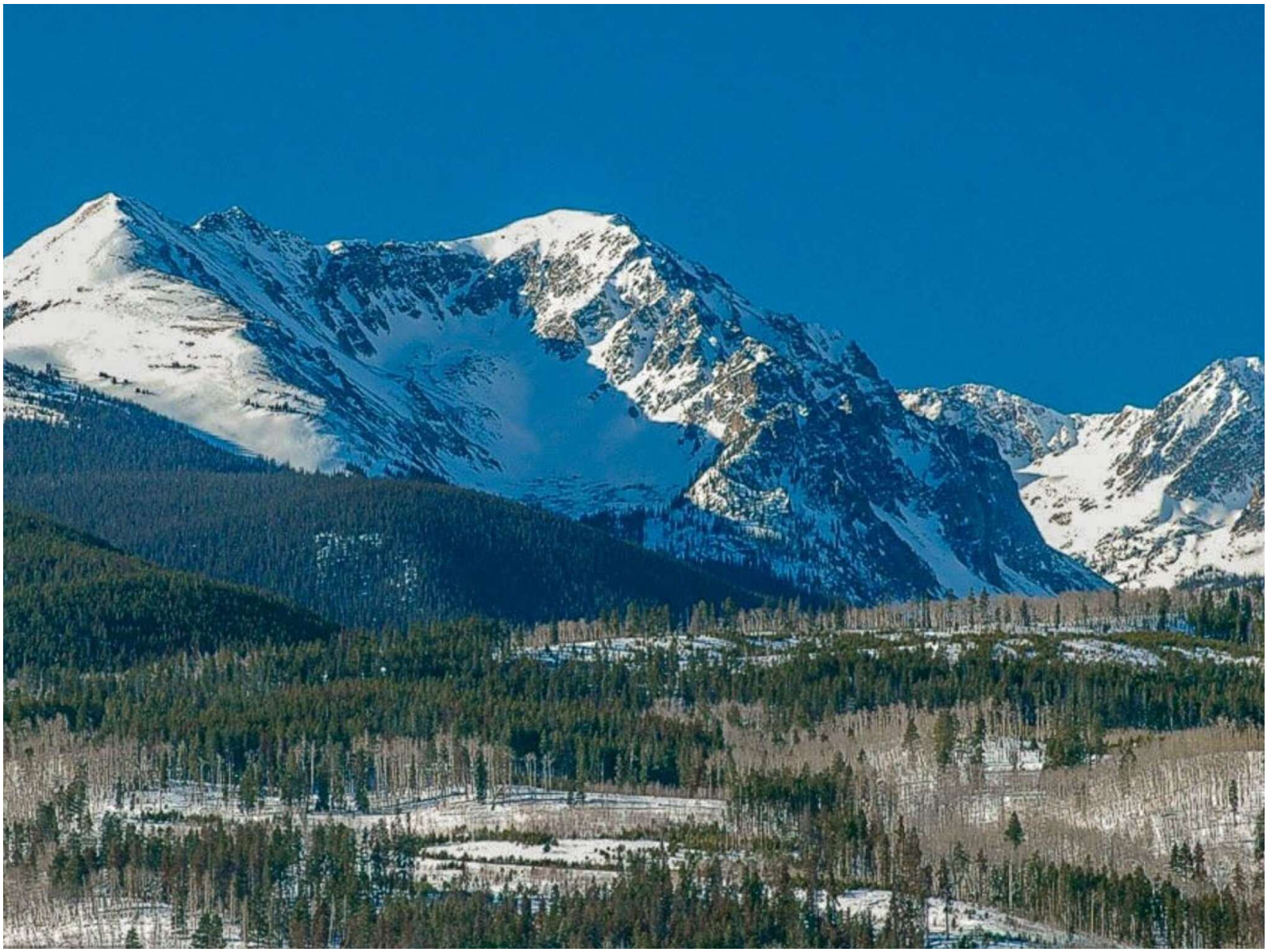


Tree line is pictured on Keller Mountain on Jan. 23, 2005.
Paul Winters/Courtesy photo

We all know what tree line is in Colorado: the point above which trees don't grow. But what determines tree line: Cold? Soil conditions? Precipitation? And is tree line different in various parts of the world?

Although tree line looks like a sharp delineation from a distance, you can see that it actually consists of three different zones upon closer inspection. The area above which trees cannot grow thick enough to form a canopy is called timberline or forest line. Above timberline there is usually an area where small groups of trees can survive but not enough to form a canopy, and the limit of these trees is called tree line. Individual, though often stunted, trees may grow above tree line up to what is called the species line. These three zones usually occur within a hundred vertical feet of one another.

There are also different kinds of tree lines depending on the main factors that inhibit tree growth. When we refer to tree line in the Colorado Rockies, we are normally referring to the Alpine tree line, where cold, snowpack, soil quality and high winds are among the limiting factors. In other regions, there are desert tree lines, where moisture is the key limiting factor. There are also desert-Alpine

tree lines, where cold and moisture are the key limiting factors.

Current research is directed at how climate change affects tree line. And locals have noted trees growing on some of our formerly tree-free summits. There are complex and interesting dynamics involved here. For instance, because seedlings have different limitations than trees, sometimes seedlings will survive when trees can't, or vice versa. So the current tree line might reflect the climate from decades or centuries ago. Or there might be lags for when tree line moves because seedlings struggle to get established.

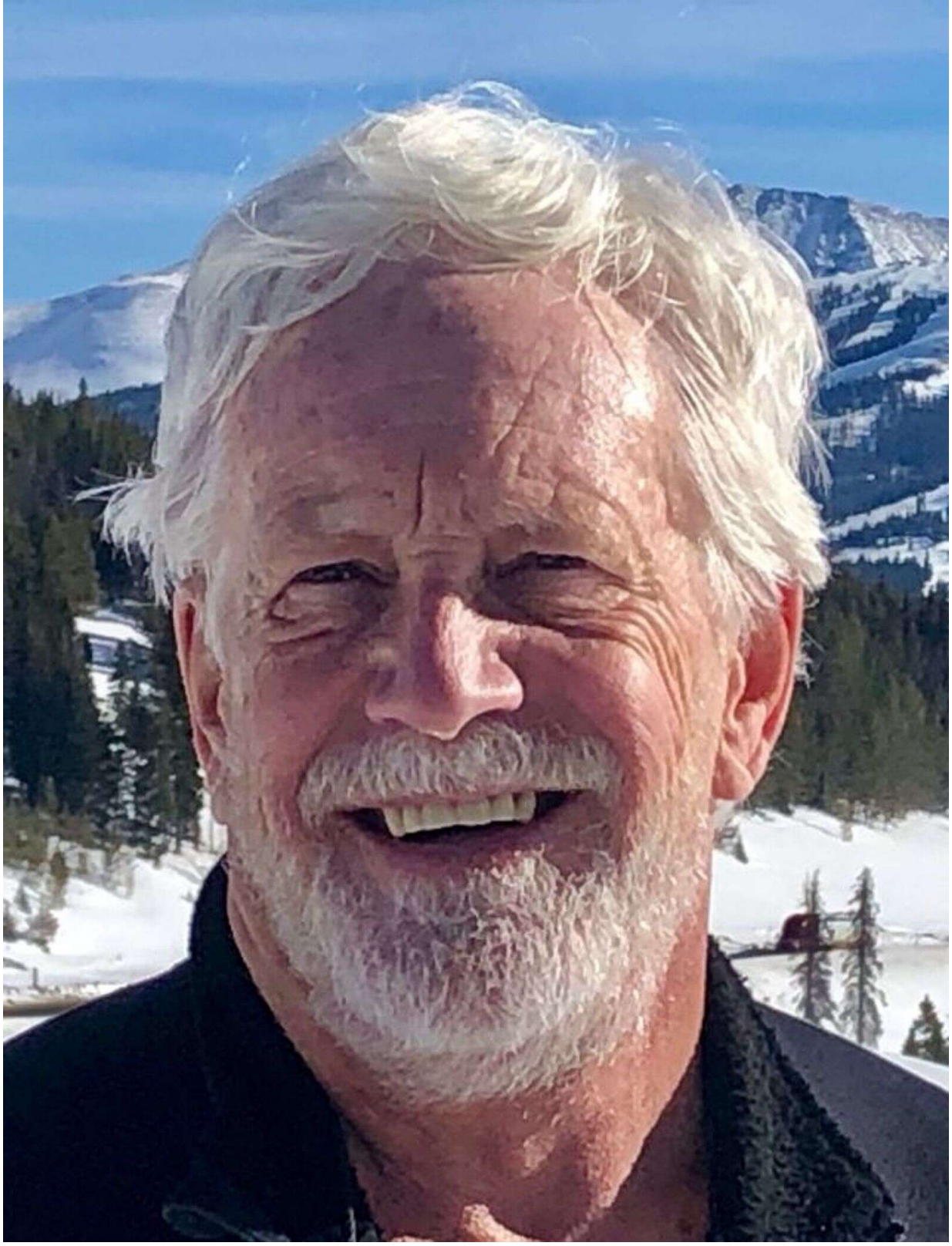
Alpine tree lines vary greatly across the world, especially in areas north of 30 degrees north or south of 20 degrees south in latitude. In Colorado, tree line is around 11,500 feet. In contrast, tree line in the Swiss Alps is around 7,200 feet.

Other tree lines in descending order are:

- Bolivian Andes: 17,100 feet
- Himalayas: 13,800 feet
- Japanese Alps: 9,500 feet
- Canadian Rockies: 7,900 feet
- Mt. Katahdin in Maine: 3,800 feet
- Torres del Paine in Chile: 3,100 feet
- Scotland: 1,600 feet

Even within a given locale, tree line might vary. In Alpine areas in the Northern Hemisphere, tree line on north-facing slopes is lower than on south-facing slopes because the shade on north-facing slopes means the snowpack takes longer to melt, shortening the growing season. Areas with higher moisture or protection from wind also have somewhat higher tree lines. And although the forest usually consists of conifers at tree line in Colorado and most of the rest of the U.S., it is southern beech species in South American and New Zealand and birch trees in parts of Japan and Europe.

So the next time you gaze up at our mountains and view the line between forest and Alpine tundra, remember that the line is not as sharp as it looks and that a lot is going on — literally a battle between life and death for trees. And when you travel up to tree line, remember that those trees are struggling for survival. This is one of many reasons campfires are prohibited above 11,000 feet in our local wilderness areas. The trees are having a challenging time surviving without also supplying firewood. Lastly, when traveling above tree line, kindly keep boots and dogs on the trail. Foot and paw traffic can easily destroy the delicate plants and lichens that struggle for survival in our Alpine tundra.



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> “Get Wild” publishes on Fridays in the Summit Daily News. Mike Browning is the chair of Eagle Summit Wilderness Alliance, an all-volunteer nonprofit that helps the U.S. Forest Service protect and preserve the wilderness areas in Eagle and Summit counties. For more information, visit EagleSummitWilderness.org.