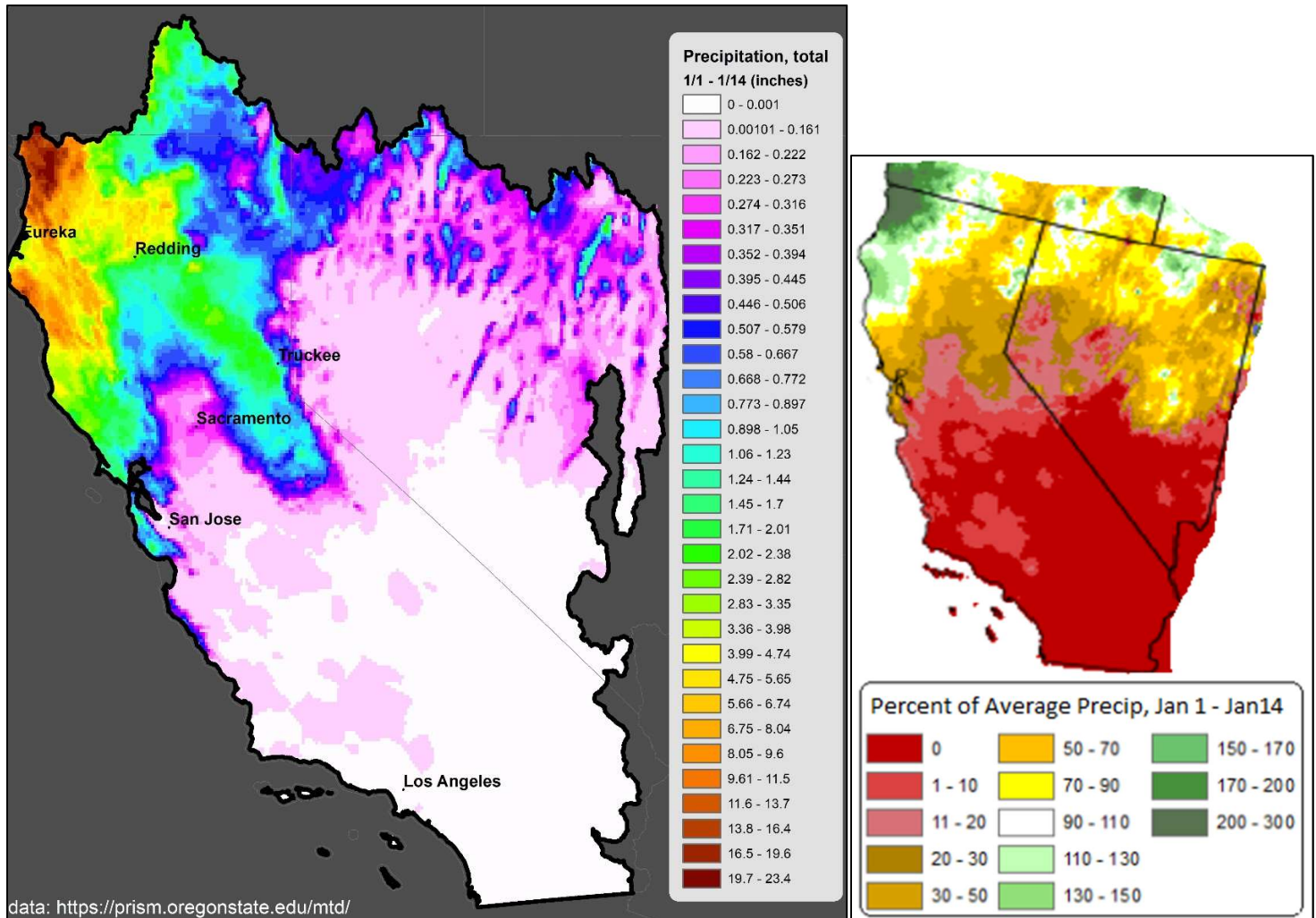


WY2021 Water Resources Update – 15 January 2021

Summary:

- Below average snowpack for the N. Sierra & near record low snowpack for S. Sierra
- Dismally dry January so far (except for a drenched northwest corner of California)
- Some chance for wetter pattern change starting around Jan 23rd

Details, observations:



<https://prism.oregonstate.edu/mtd/>

Last two weeks: overall far below average, except for the far North Coast

In the previous update, we mentioned 3 months of precipitation deficits and the possibility for a succession of minor storms to cross the CNRFC Region during the first week of January that could have blanketed large portions of the Sierra with sizeable precipitation totals. Unfortunately, the storm track then and over the last couple of weeks kept steady aim at the Pacific Northwest, only clipping the top of California and sometimes grazing the Sierra, with just very small amounts delivered to just the Northern and Central Sierra. The above left image shows a steep gradient, from 15+” accumulated over the past couple of weeks in northwest California’s Smith Basin, to just ~1 - 3” amounts for the Northern/Central Sierra, and to zero for Southern Sierra and Southern California. The above right image shows how the amounts on the left stack up to historical early Januarys: badly for the San Joaquin system and entire southern portion of the Region. After a previous

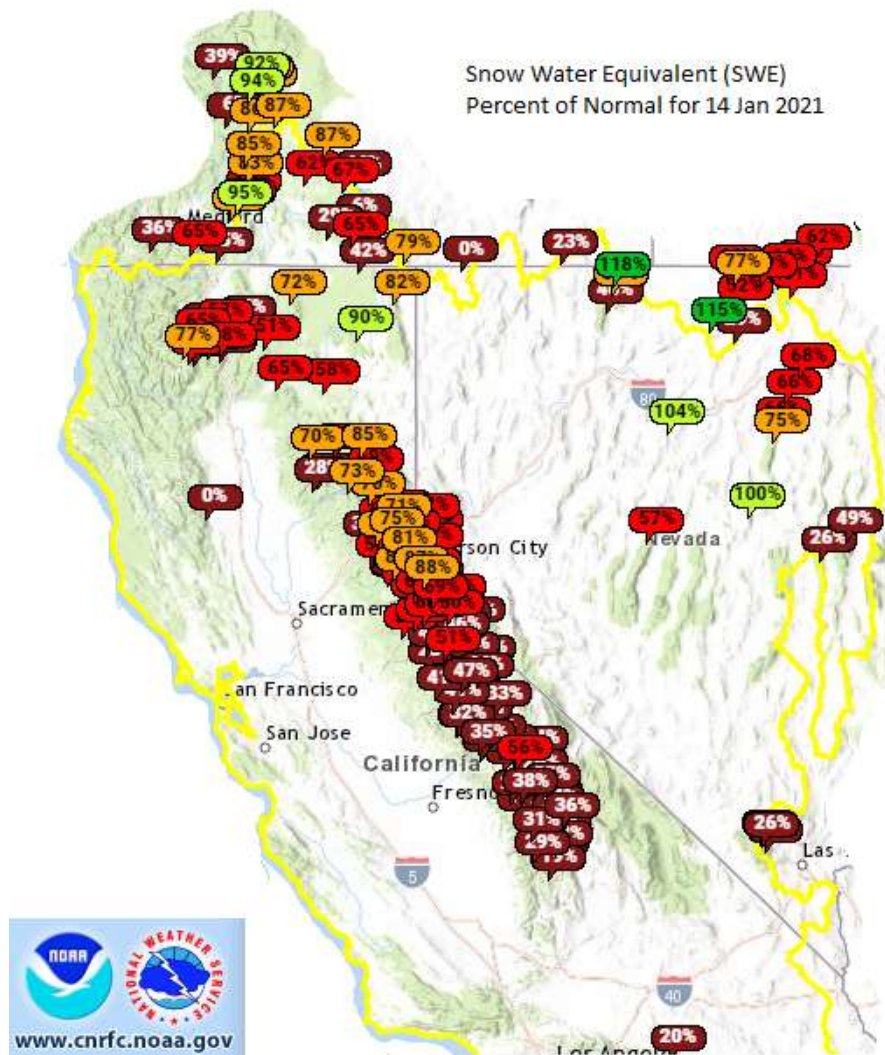
dry water year, and a dry fall and December too, the majority of the CNRFC Region saw either no precipitation or less than 20% of average. So, with January typically one of California's top two wettest months, California's water supply now has even more catching up to do.

Water year to date

Sierra Precipitation Indices

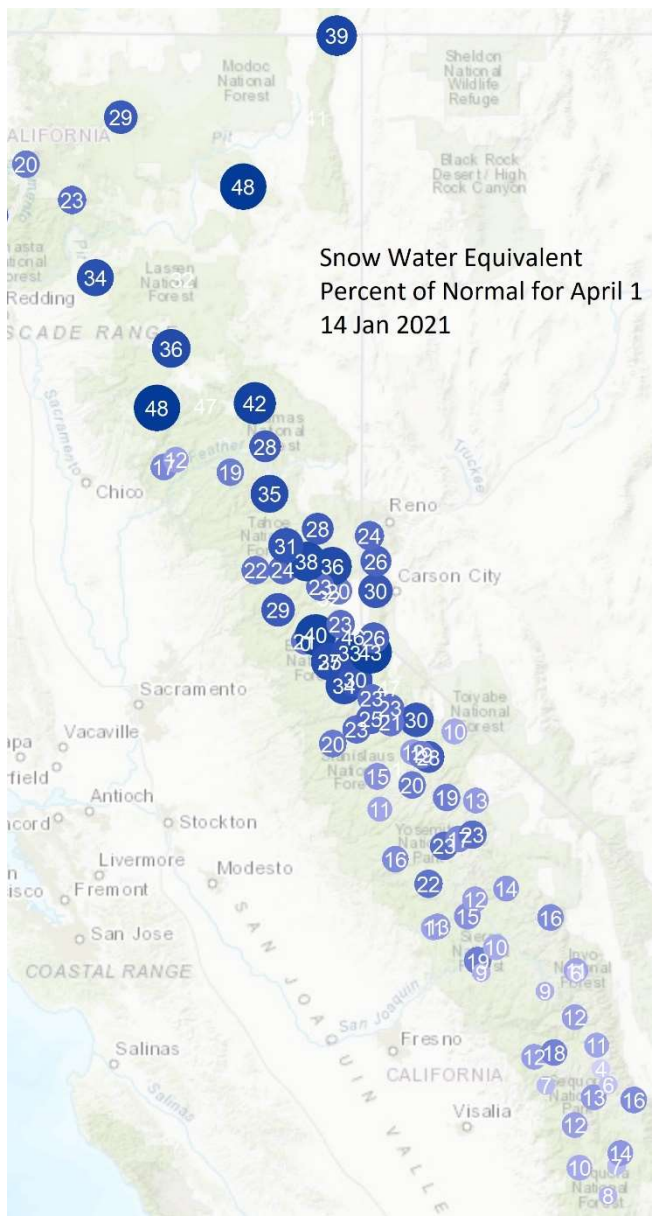
| | North (8-Station) | Central (5-Station) | South (6-Station) |
|-------------|-------------------|---------------------|-------------------|
| Inches | 9.2 | 5.0 | 2.6 |
| % of normal | 40 | 30 | 23 |

Because today is close to a standard midpoint (1/25) of the general precipitation accumulation season, we'll look at some snow and reservoir inflow data. Similar to above, here's a view of percent of normal for snow water equivalent (SWE) ("pillow") data.



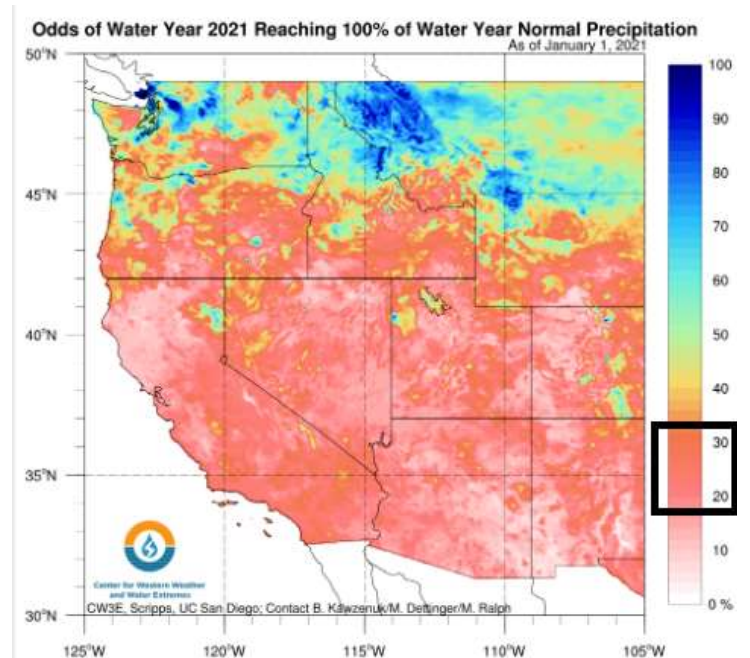
Few storms this water year have made it much south of Lake Tahoe. Tulare basin stations percent of normal values range from the lowly teens to thirties, increasing to the thirties to forties northward through the San Joaquin tributaries up to the Stanislaus basin, and generally in the 50s-80% range northward through Tahoe and the Northern Sierra. Klamath basin stations are in the 60-90% range and Lake Shasta basins, generally ~40s-60s%.

The next image shows the percent of normal of station SWE data (typically a period of record from '82/'83-2007) with respect to the mean historical conditions observed on April 1.



data: <https://cdec.water.ca.gov/reportapp/javareports?name=PAGE6>

Values range from single percentage digits in Tulare Basin watersheds to some values close to 50% for the Feather and Pit River basins. These low values in the San Joaquin and Tulare basins observed about halfway through the accumulation season suggest a low probability of having below normal water years there. The below image shows the probability of reaching 100% of normal water year precipitation as of January 1, as given by CW3E. For these southern Sierra basins that received virtually no precipitation since then, the probability is now lower.



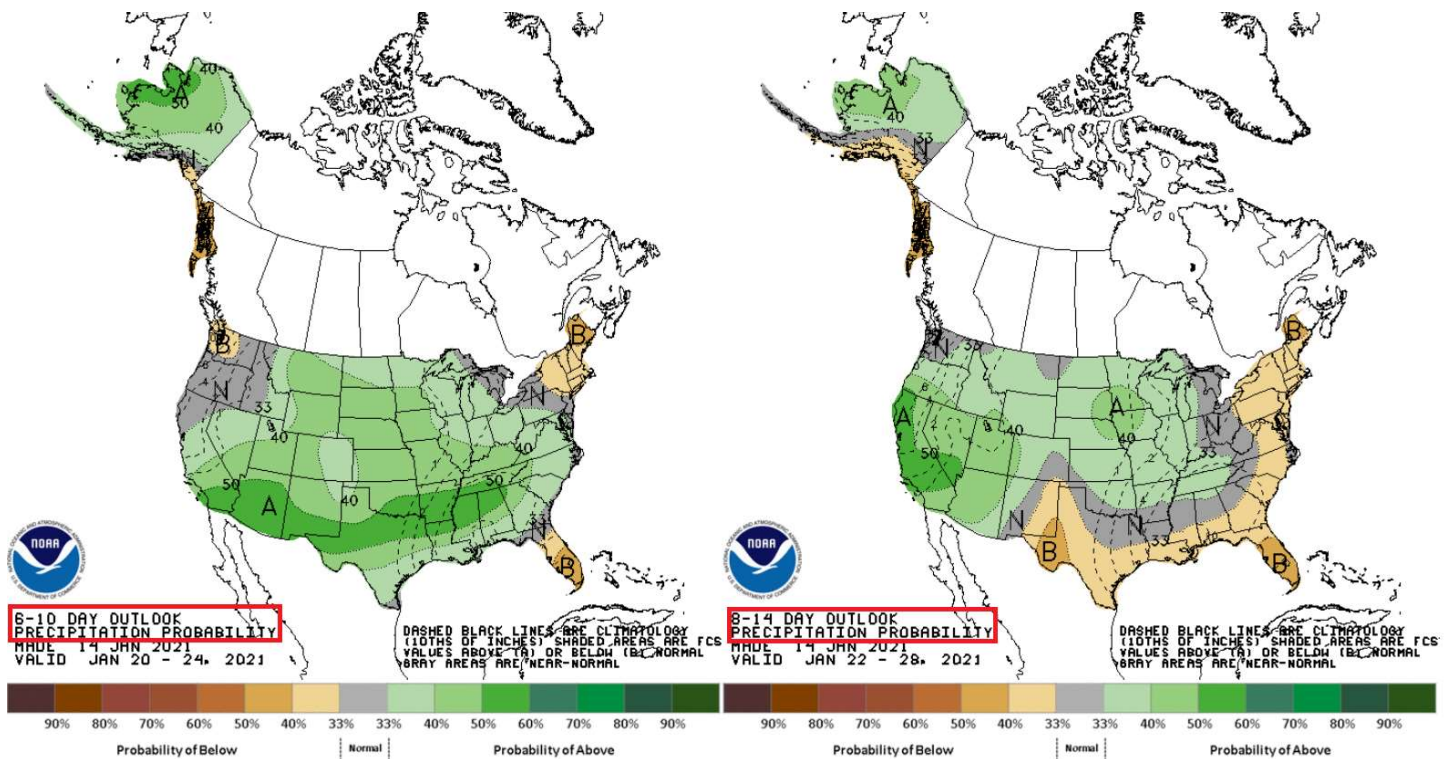
<https://cw3e.ucsd.edu/odds-of-normal-water-year-precipitation/>

For inflow volumes (“full natural flow”) to reservoirs, plots are attached (some data are preliminary) showing how the current year’s October 1 through January 15th inflow volumes compare with previous years’ (generally starting in the ‘60s) for some of the major Ca reservoirs. For some reservoirs, this year competes with some major historical drought years, such as ’77, early 90s and 2012-2015 droughts.

Outlook

Over the next six days CNRFC is predicting no substantial precipitation. European and American ensembles are showing some chance for moderate precipitation around the start of next weekend (1/23)

The below image shows 6-10 day, and 8-14 day guidance from the Climate Prediction Center, depicting elevated probability of above normal precipitation for the Jan 20th-28th period, with the later end of the window shown as the more promising one for California and the Sierra as a whole.



<https://www.cpc.ncep.noaa.gov/>

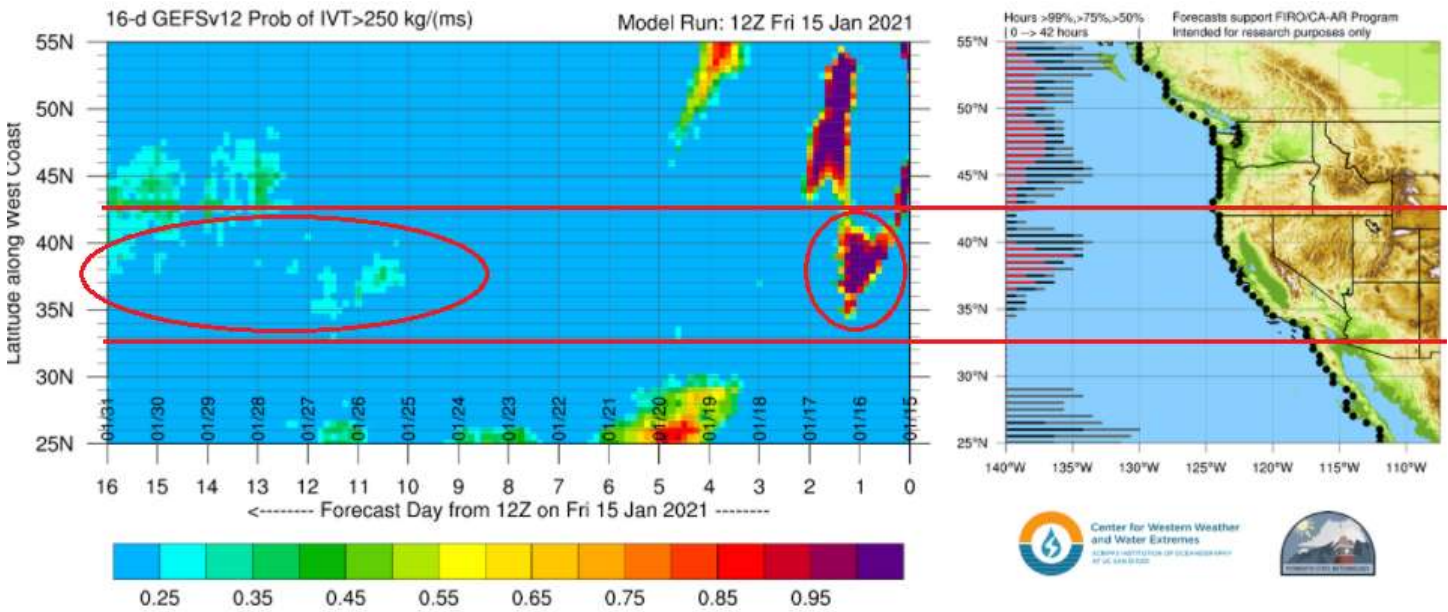
1/15 CPC Discussion:

The anomalous troughing aloft over the West combined with surface low pressure prevailing over the southwestern CONUS supports an increased risk for heavy snow across parts of the Sierras, Great Basin, Rockies, and Southwest. Reforecast tools continue to indicate at least a 20% chance that precipitation accumulations exceed the 85th percentile and 1 inch over California, and a slight risk of heavy precipitation is posted over the region, as well as a slight risk of heavy snow over the higher elevations of Sierra Nevada's and the Cascades for Jan 23 to 29. During the middle of the period, higher probabilities are indicated in the reforecast guidance for precipitation exceeding the 85th percentile, with the ECMWF reforecast tool notably showing at least a 20% chance that 3-day precipitation amounts exceed 2 inches in parts of northern California. As a result, a moderate risk of heavy precipitation and a moderate risk for heavy snow are issued for the region for Jan 25 to 27.

Hazards:

- Moderate risk of heavy precipitation for northern California, Mon-Wed, Jan 25-27
- Slight risk of heavy precipitation for parts of California and southern Oregon, Sat-Fri, Jan 23-29.
- Slight risk of heavy snow for the higher elevations of the Sierra Nevadas and the Cascades, Sat-Fri, Jan 23-29.
- Moderate risk of heavy snow for the higher elevations of the Sierra Nevadas of northern California, Mon-Wed, Jan 25-27

The Atmospheric River (AR) Landfall Tool from CW3E pictured shows two clusters of AR conditions possible on the horizon (highlighted here with red ellipses). Only windy, 'dry storm' conditions are expected for the right cluster in the 0-2 forecast day – no substantial precipitation is expected over the weekend. The left cluster shows some, but low probabilities for AR conditions occurring over Sierra latitudes after next week.



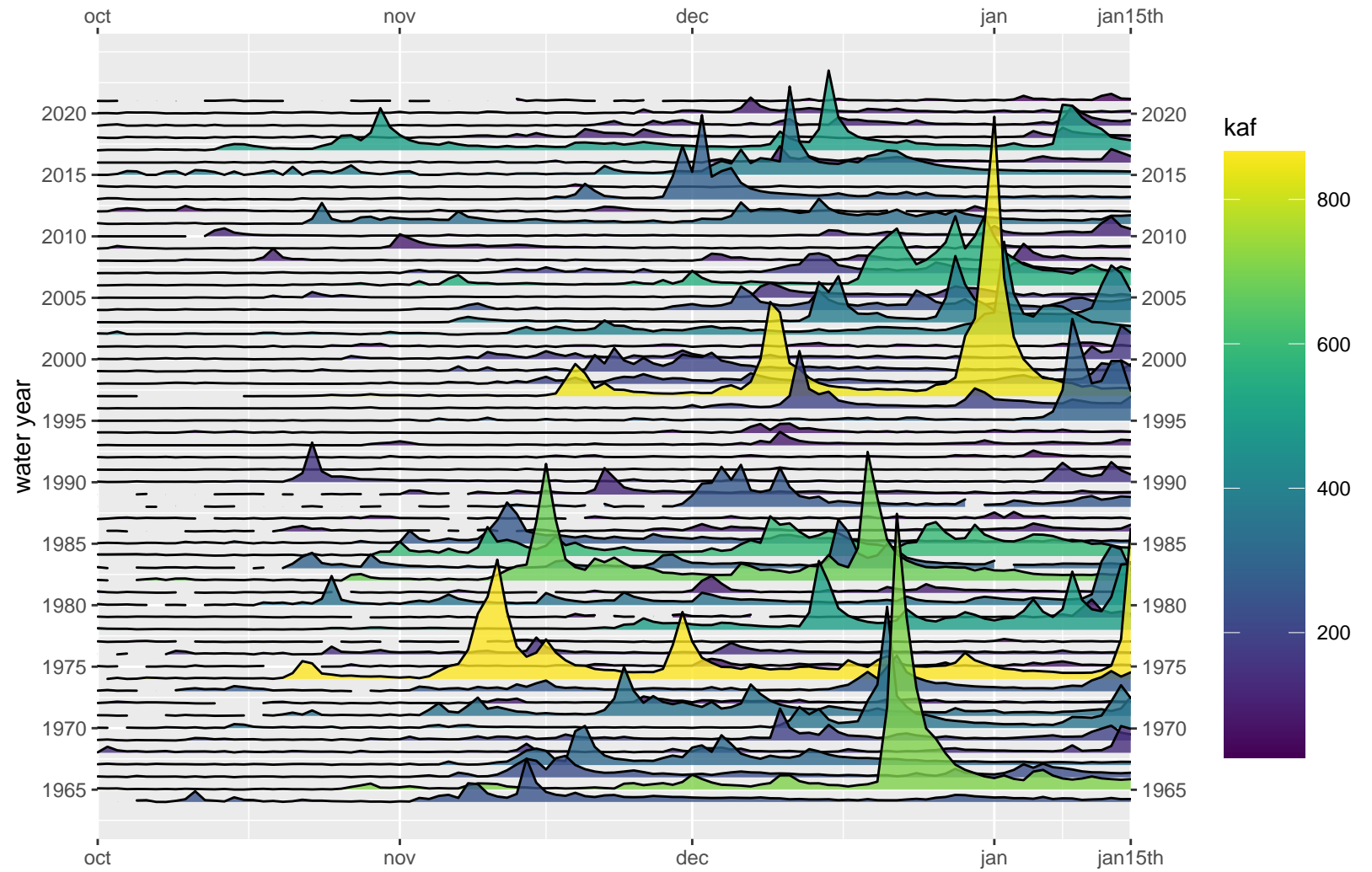
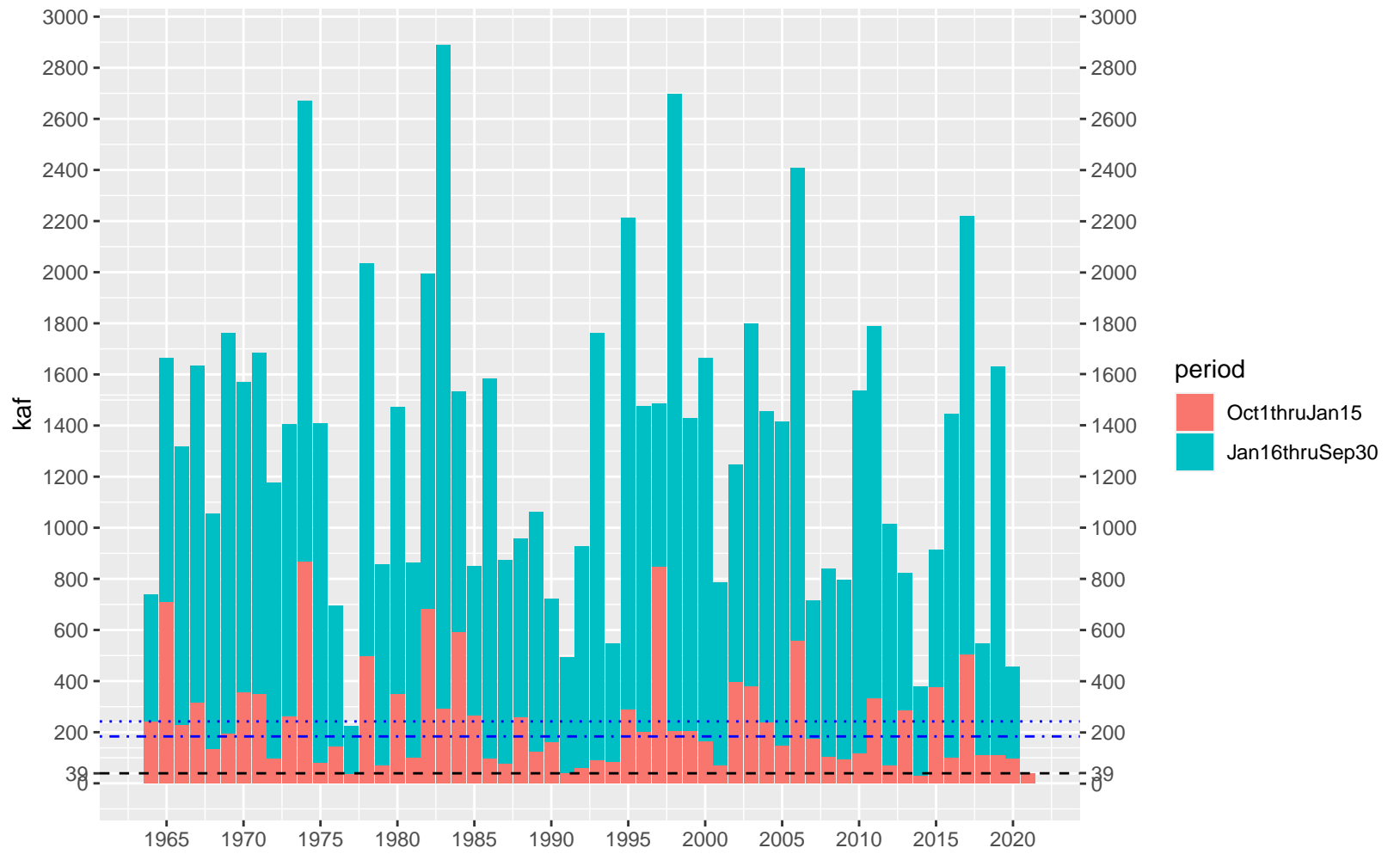
<https://cw3e.ucsd.edu/iwv-and-ivt-forecasts/>

Conclusion

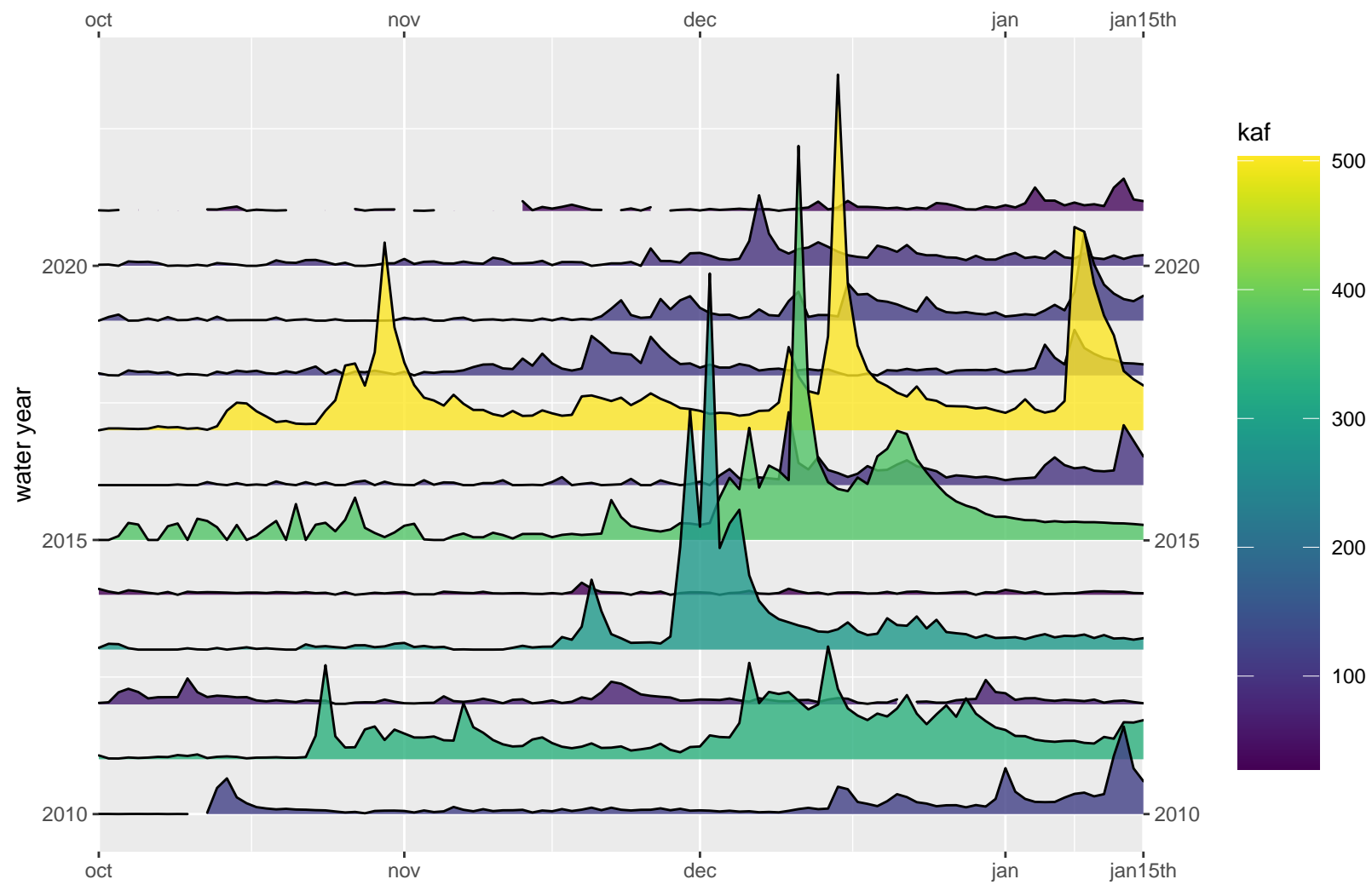
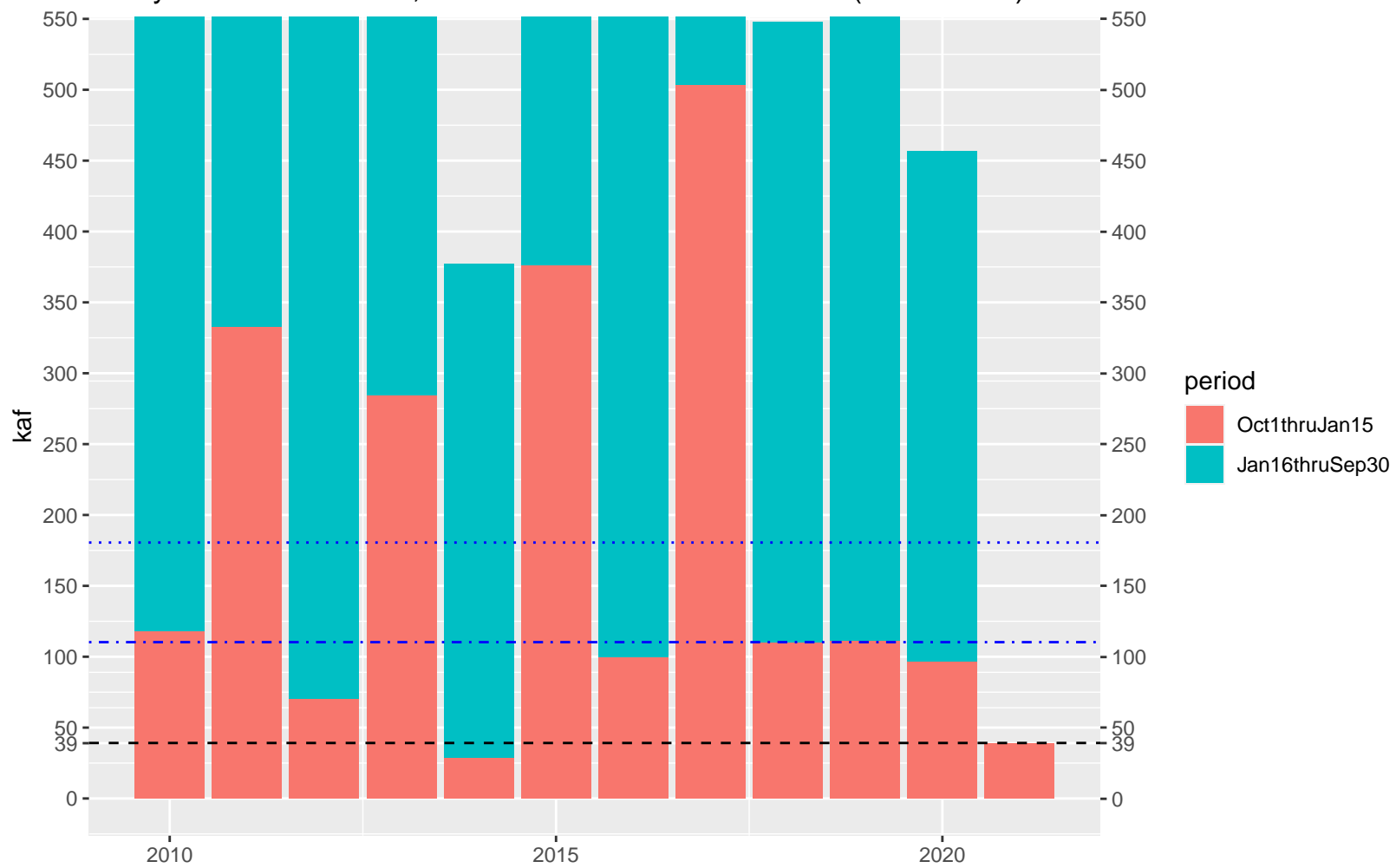
January has limited time left to significantly contribute to the water year. A decent chance exists for a pattern change to bring wet conditions starting around January 23. Overall, there are clear signs pointing toward below normal water year likelihood for many Central Valley basins.

Attachment A – select reservoir inflows, historical perspective

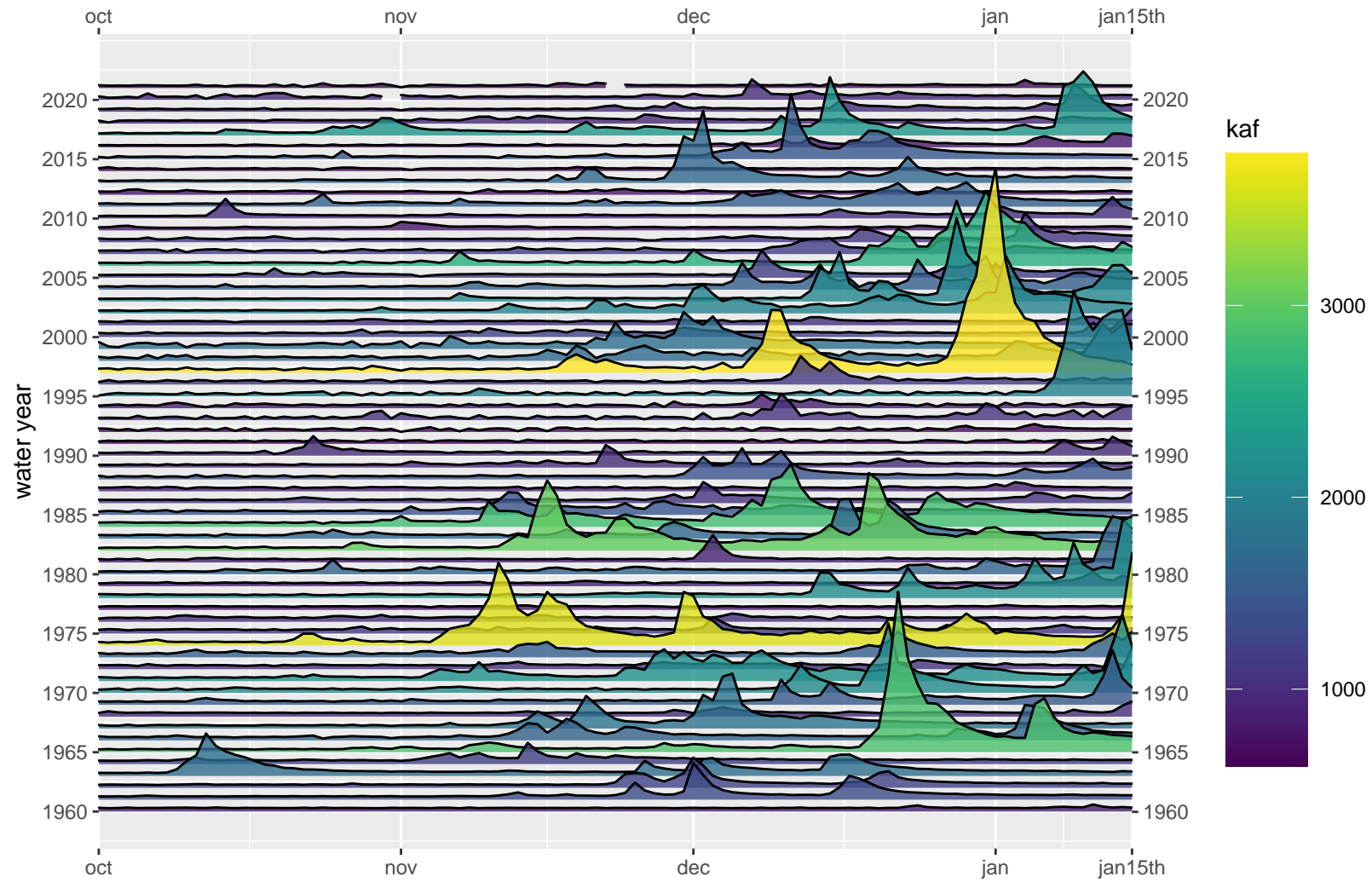
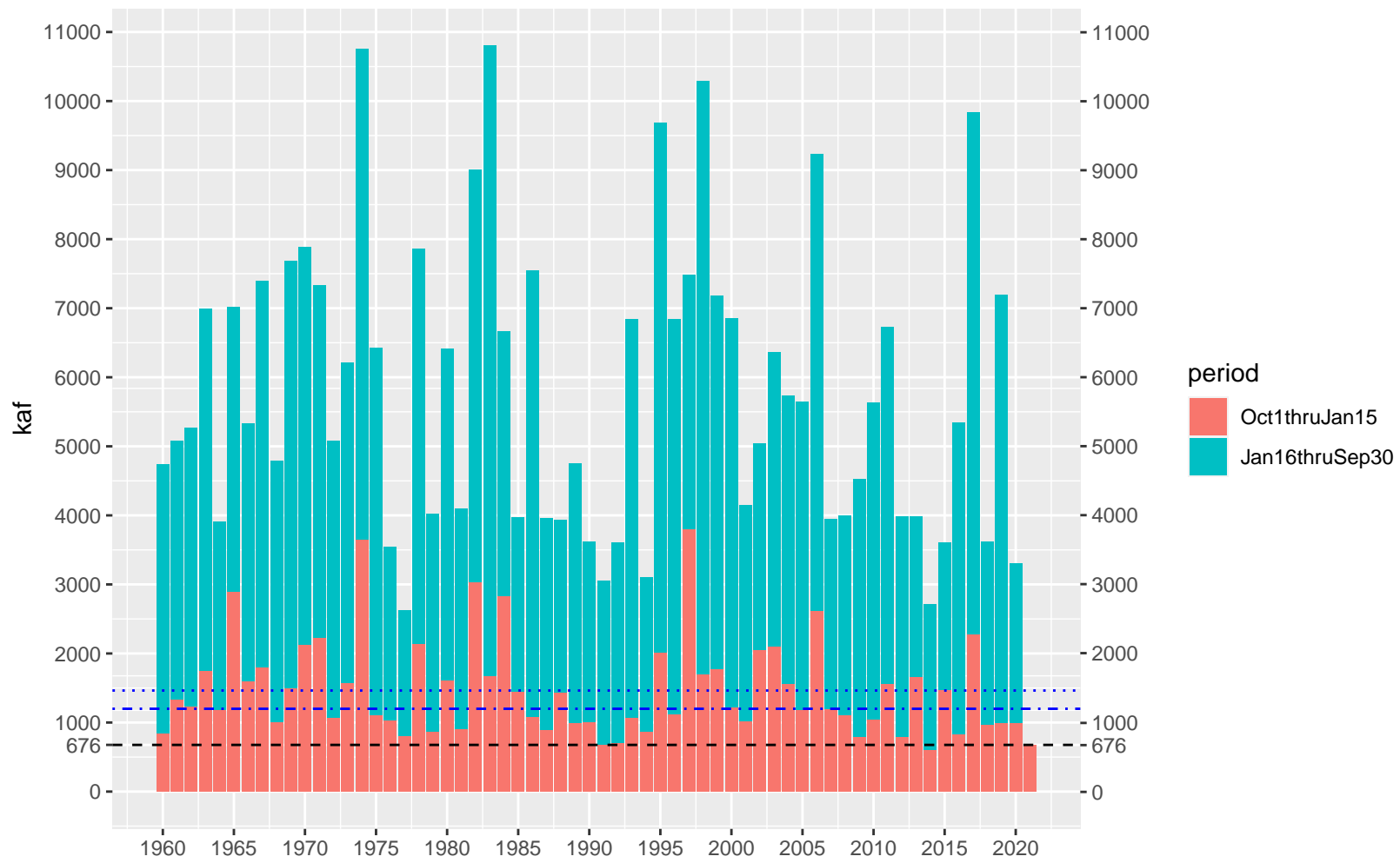
Trinity FNF – 16% mean, 21% median 10/1–1/15 volume



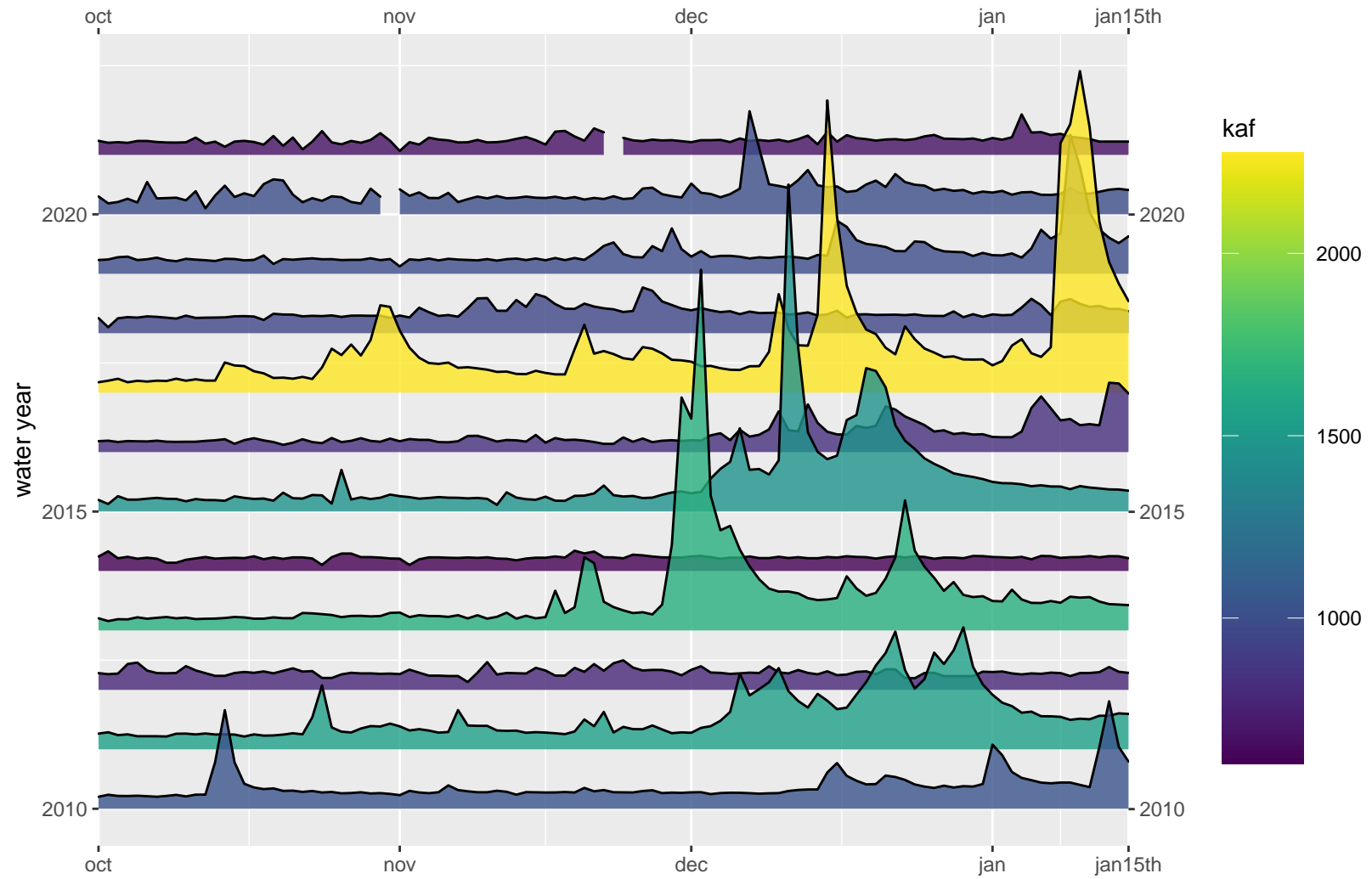
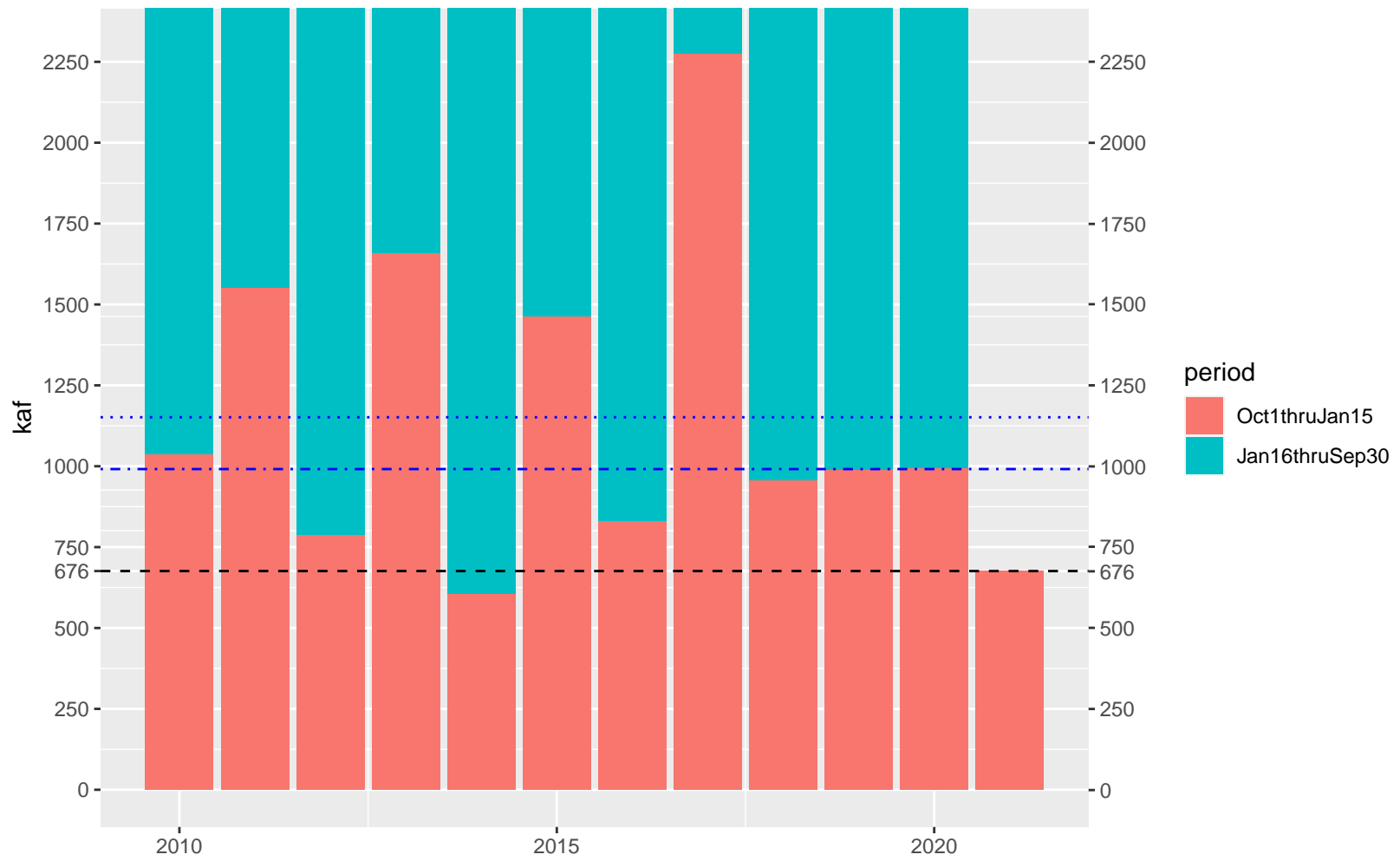
Trinity FNF – 22% mean, 35% median 10/1–1/15 volume (last decade)



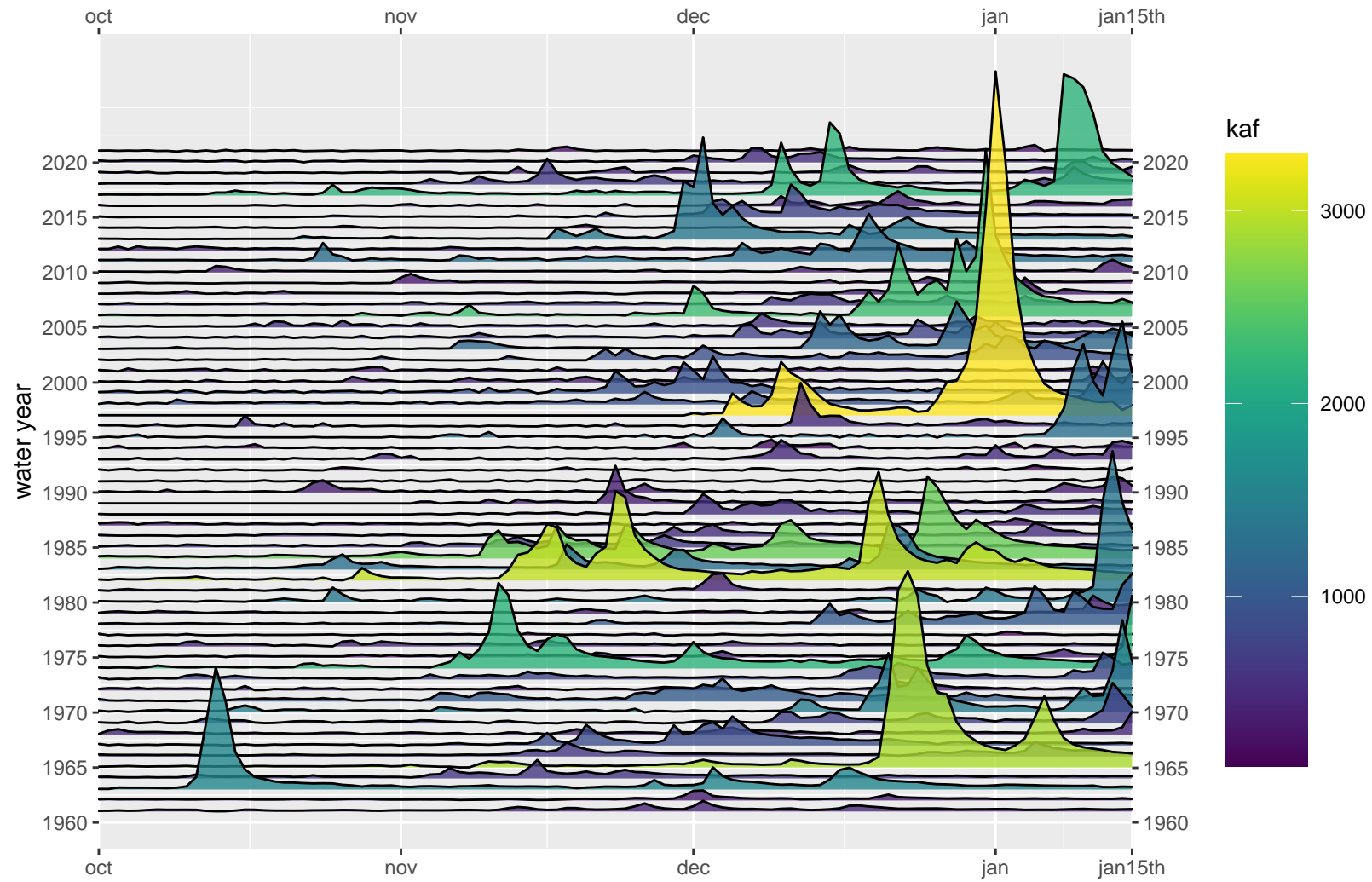
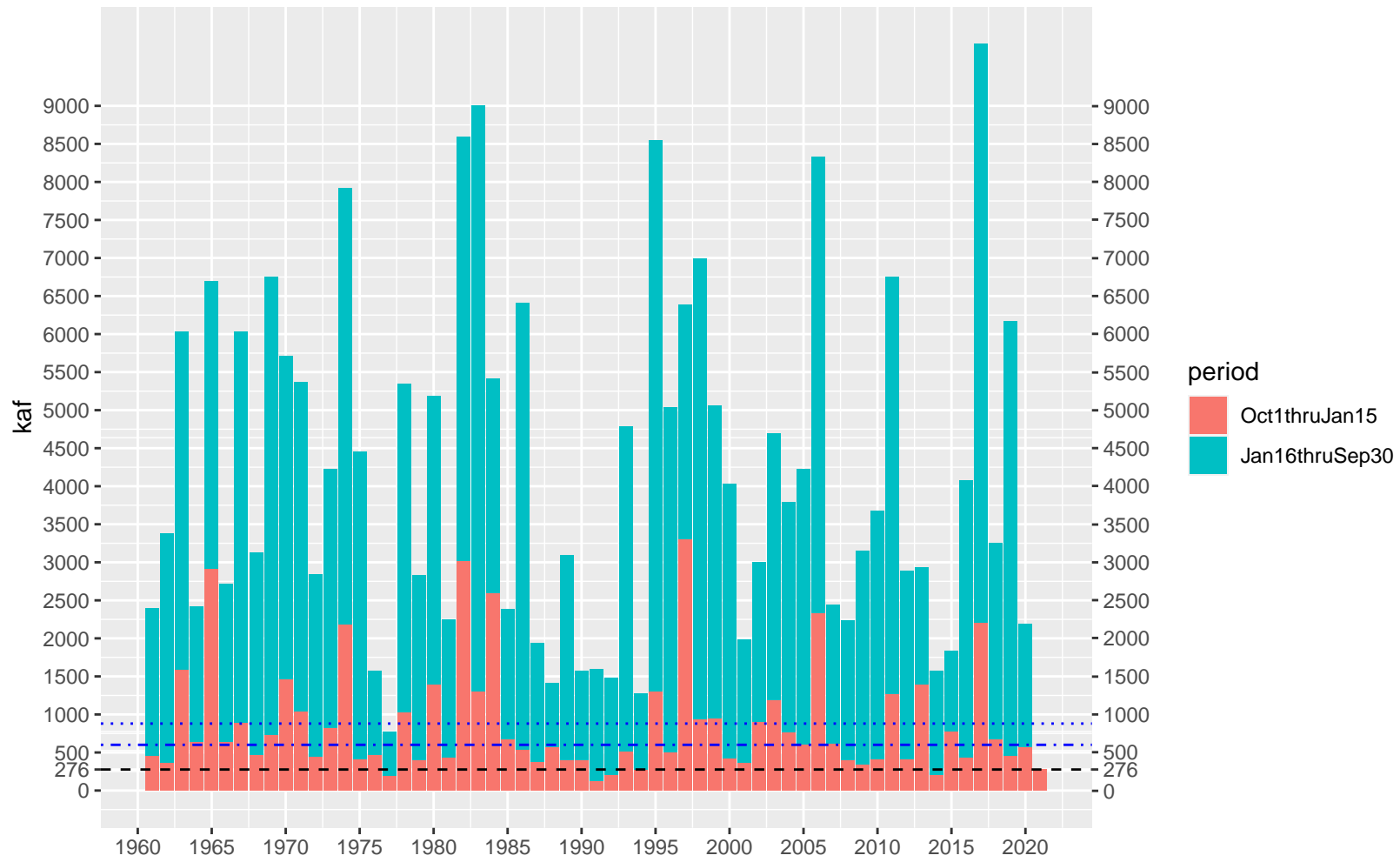
Shasta FNF – 46% mean, 56% median 10/1–1/15 volume



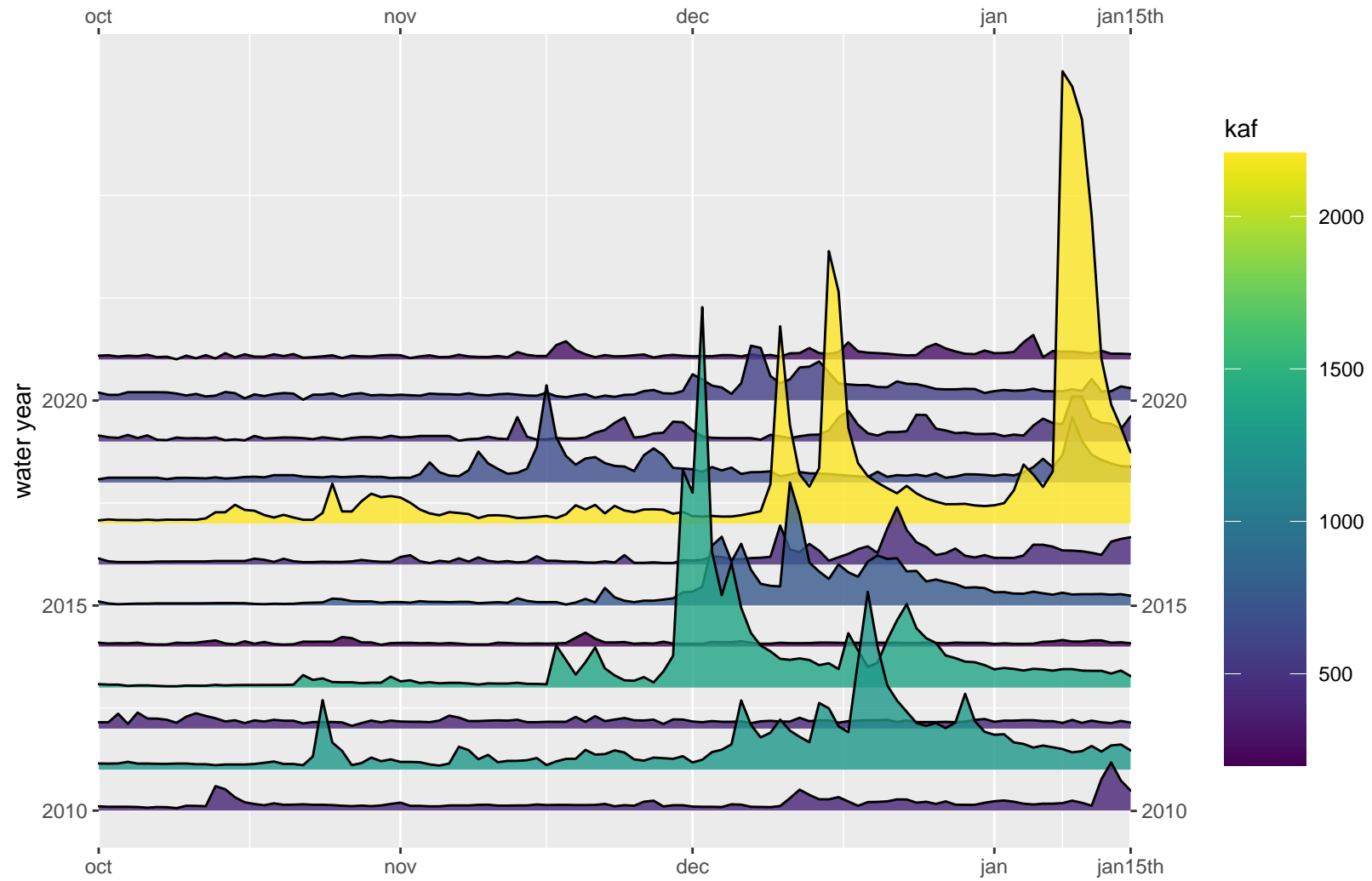
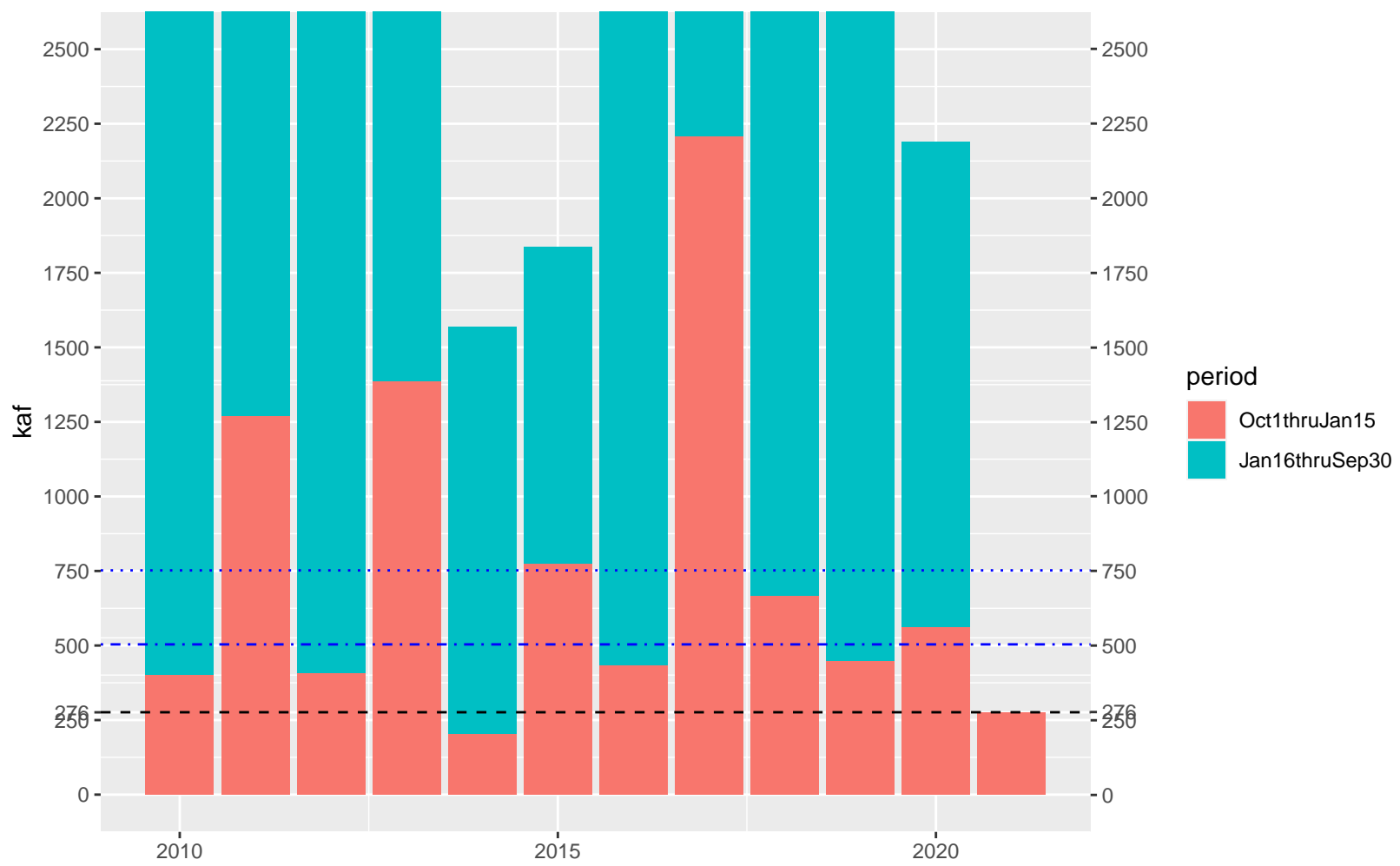
Shasta FNF – 59% mean, 68% median 10/1–1/15 volume (last decade)



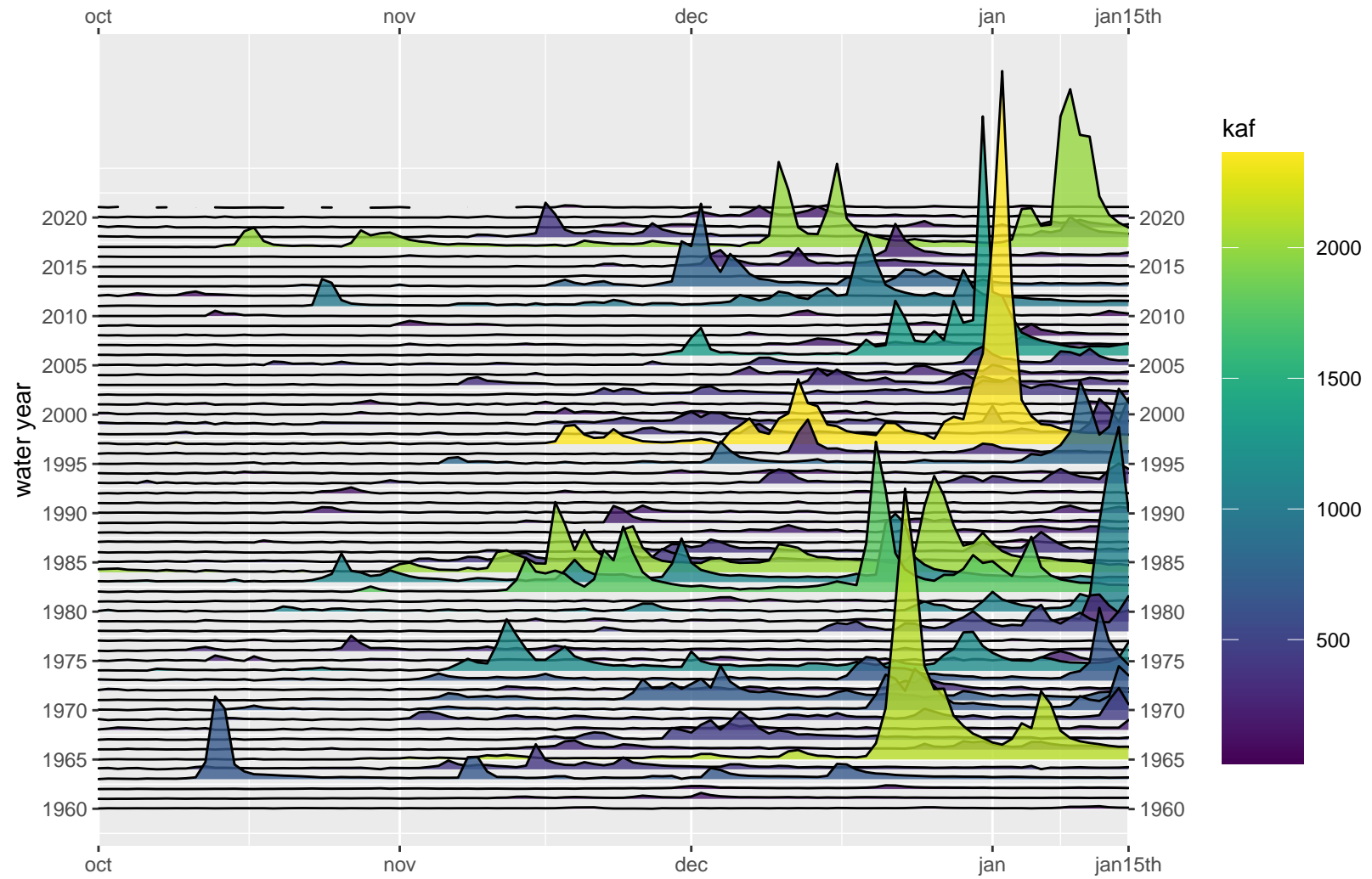
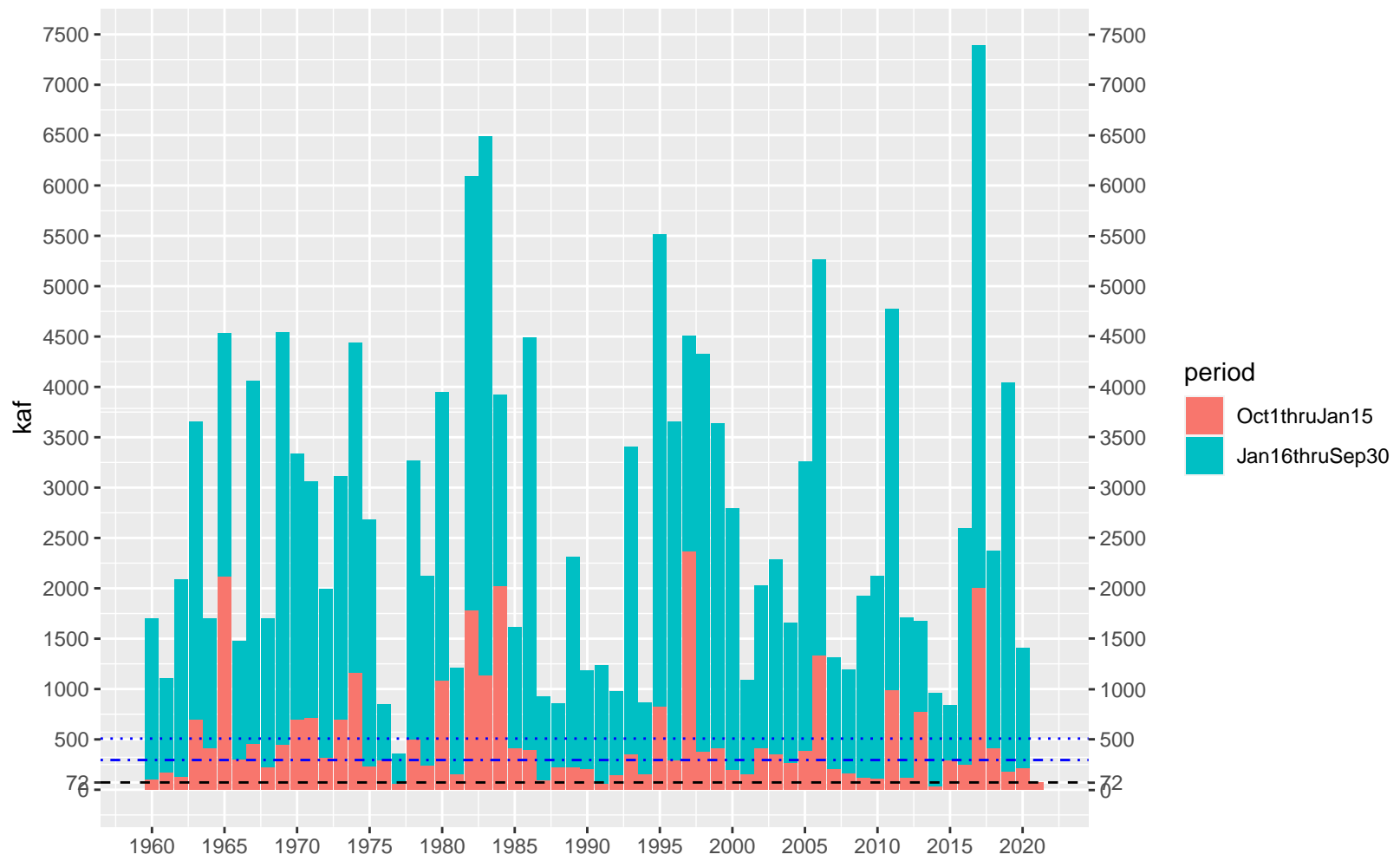
Oroville FNF – 31% mean, 46% median 10/1–1/15 volume



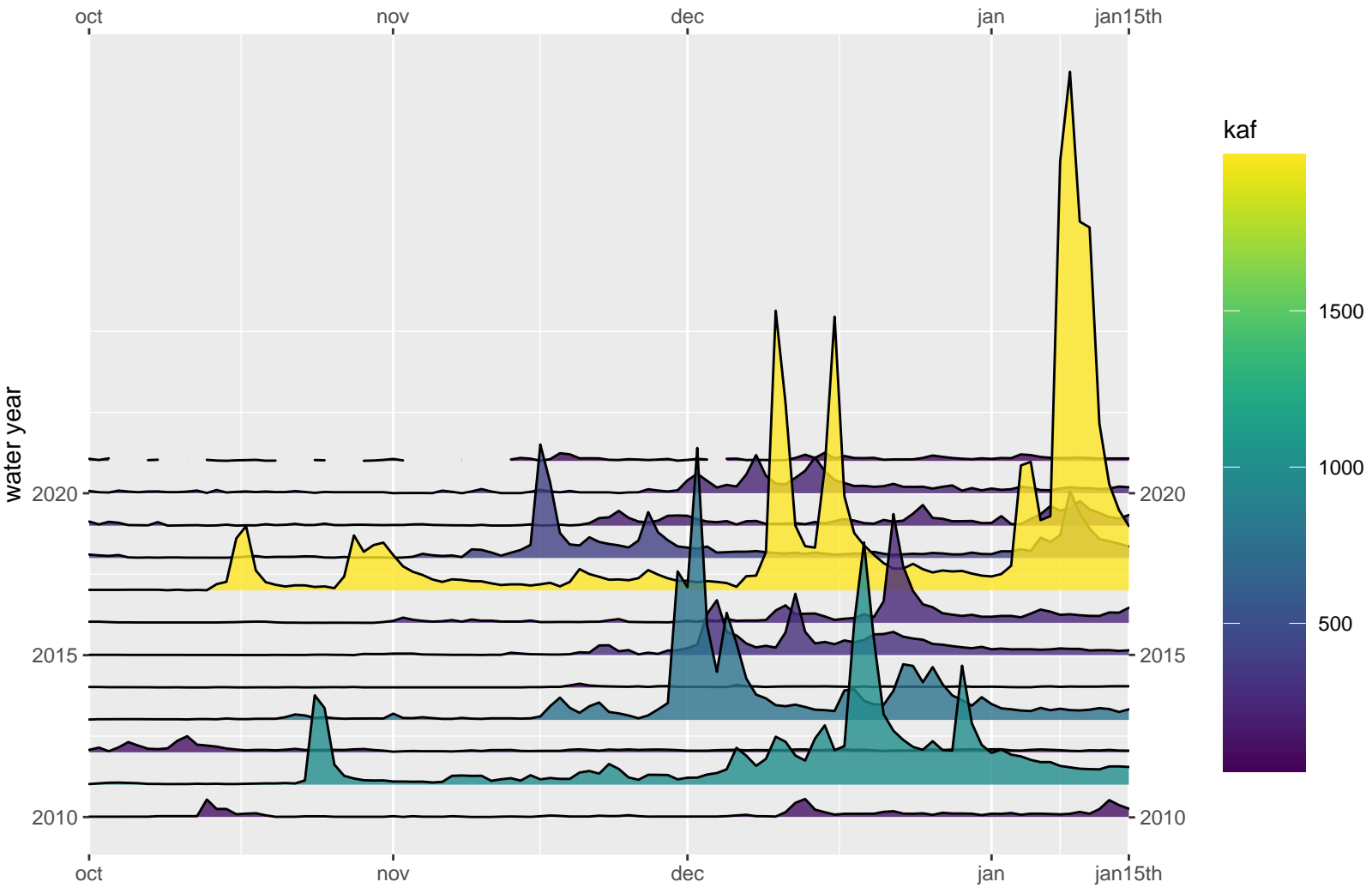
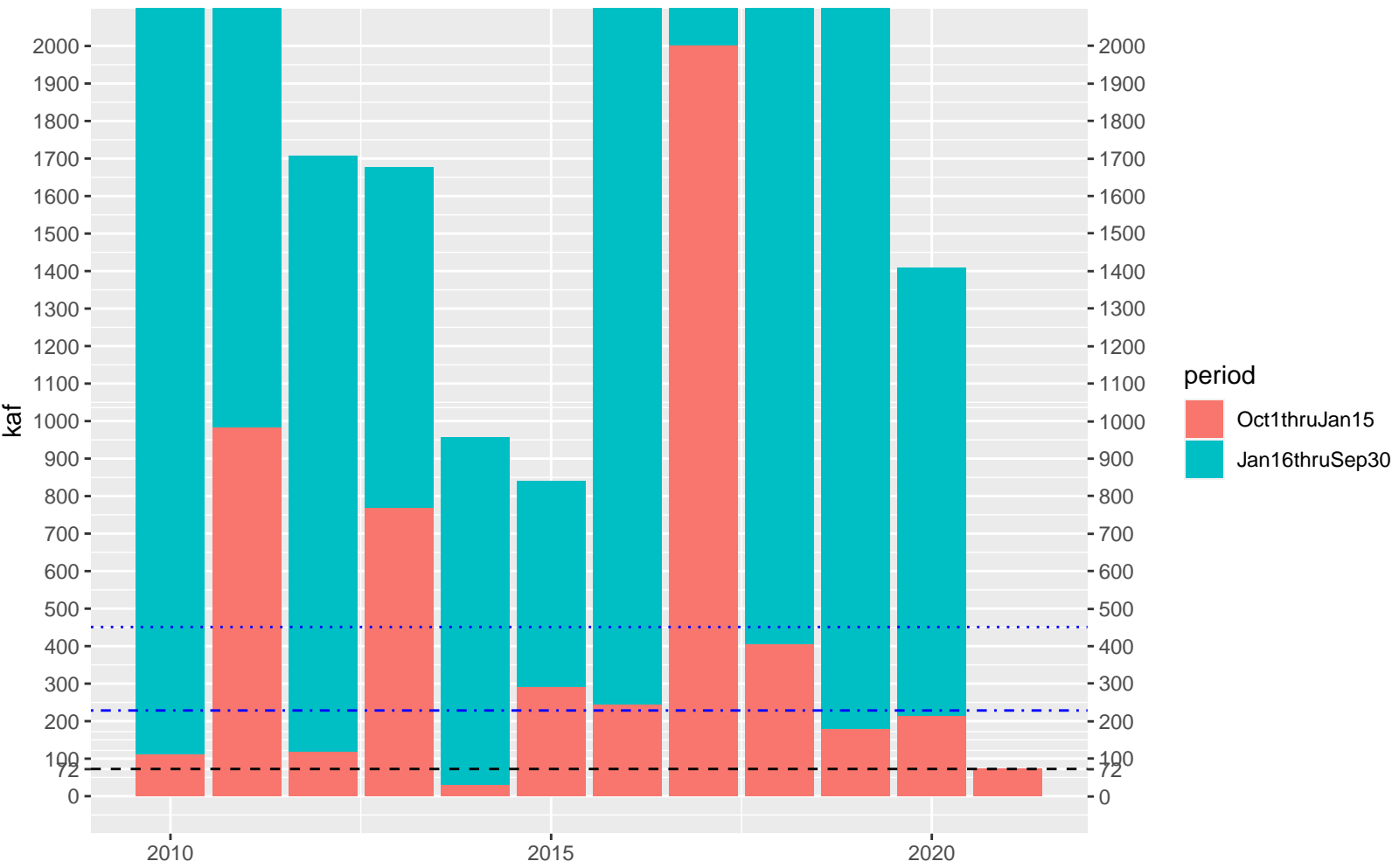
Oroville FNF – 37% mean, 55% median 10/1–1/15 volume (last decade)



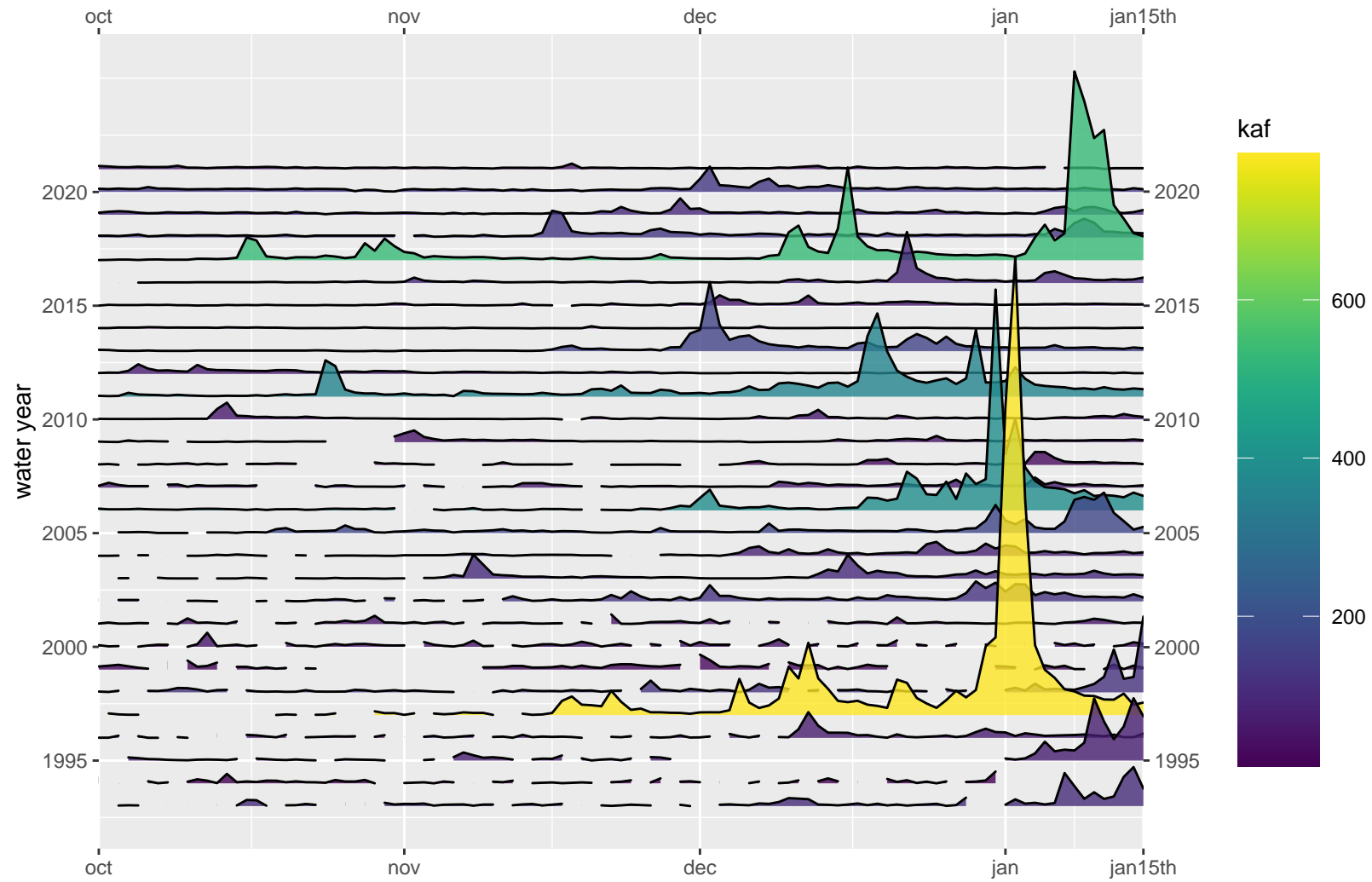
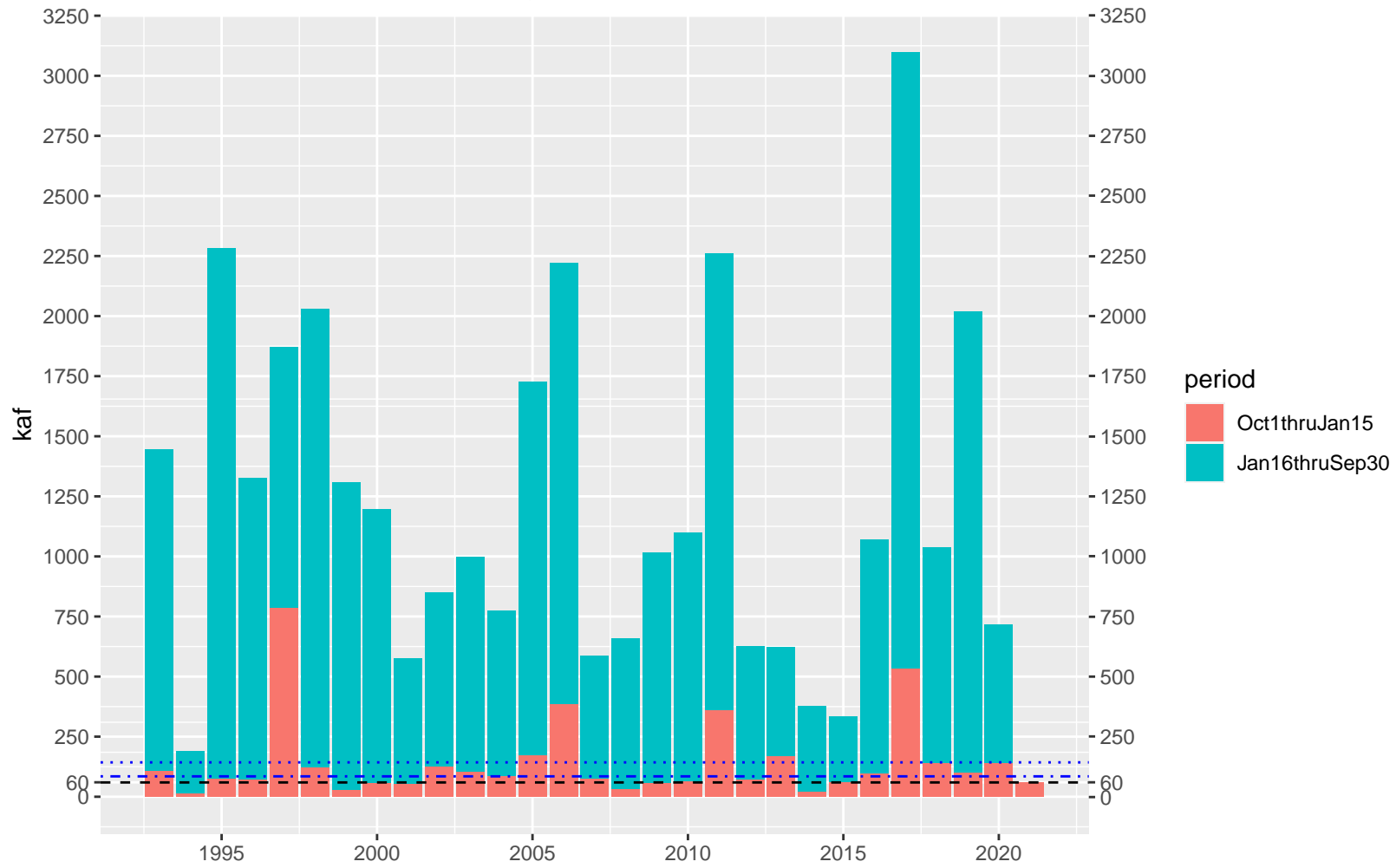
Folsom FNF – 14% mean, 25% median 10/1–1/15 volume



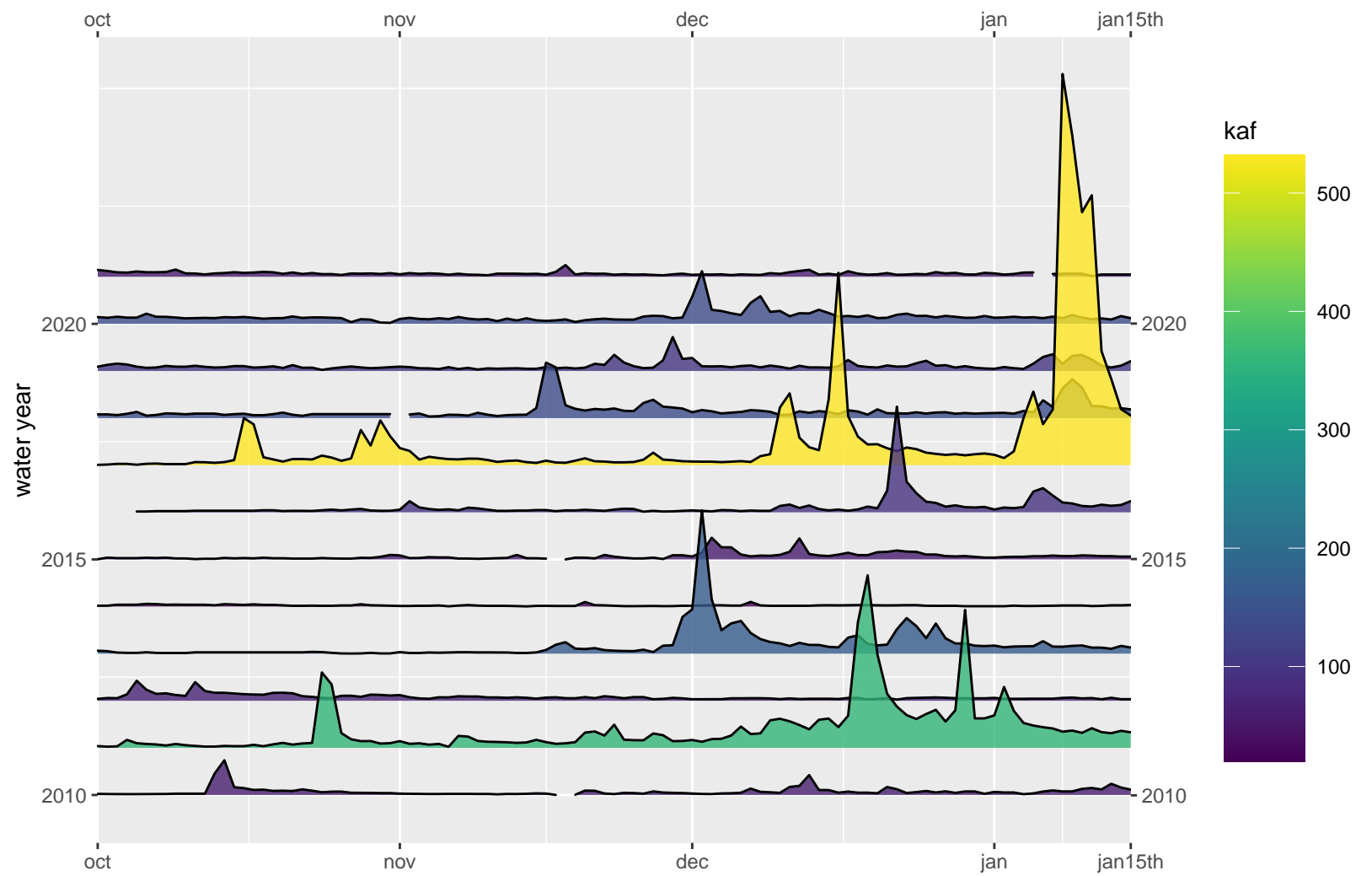
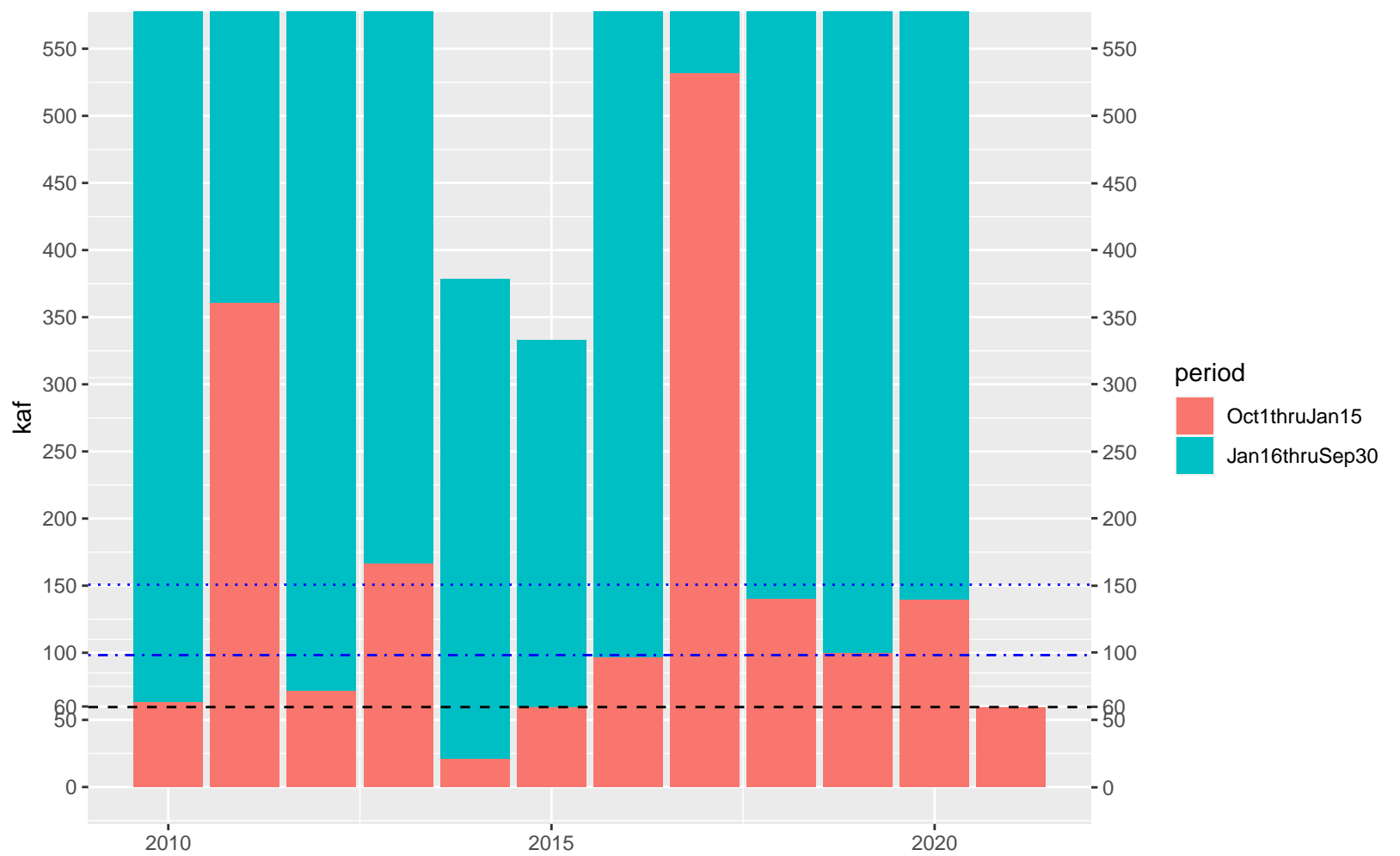
Folsom FNF – 16% mean, 32% median 10/1–1/15 volume (last decade)



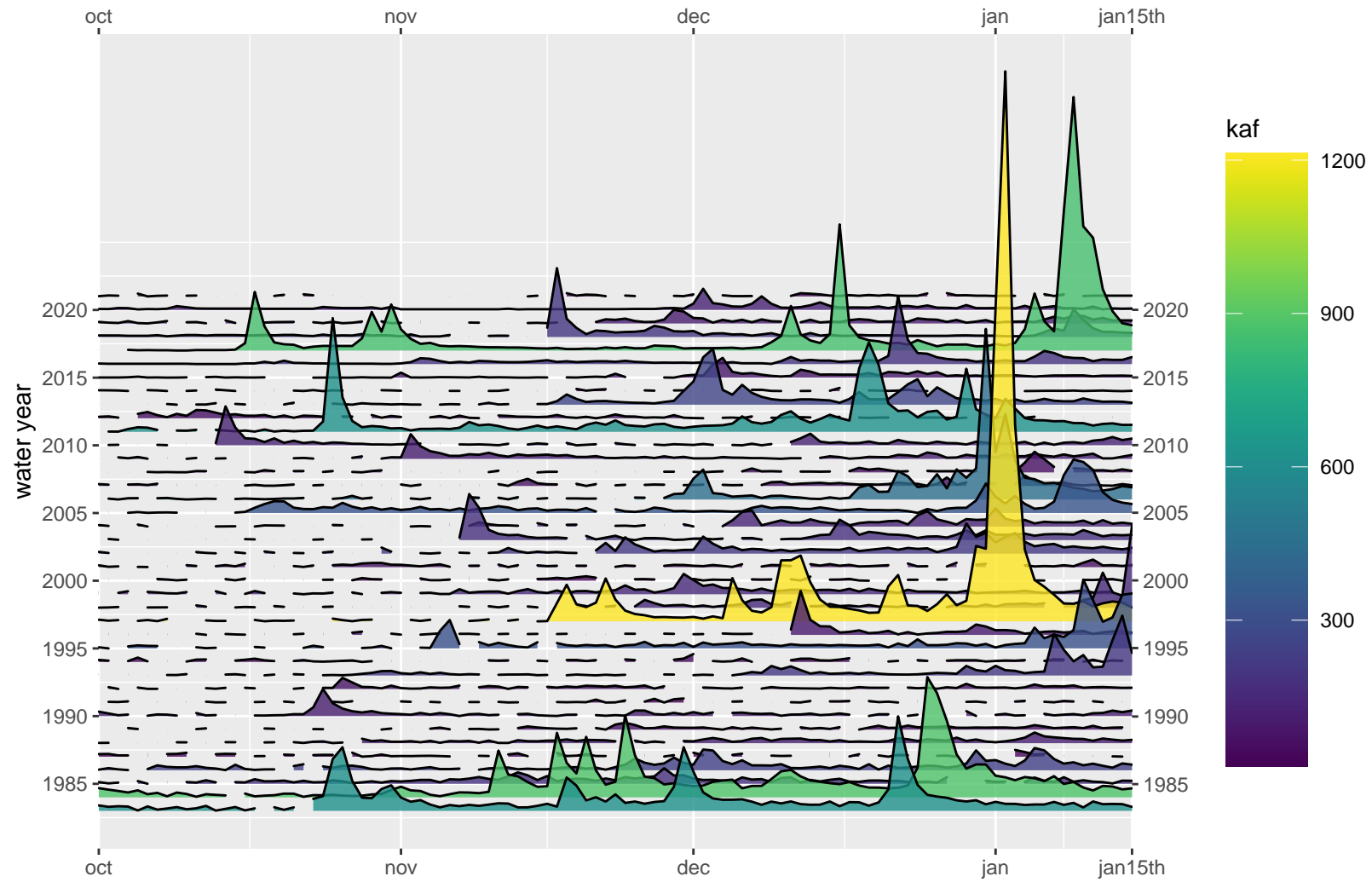
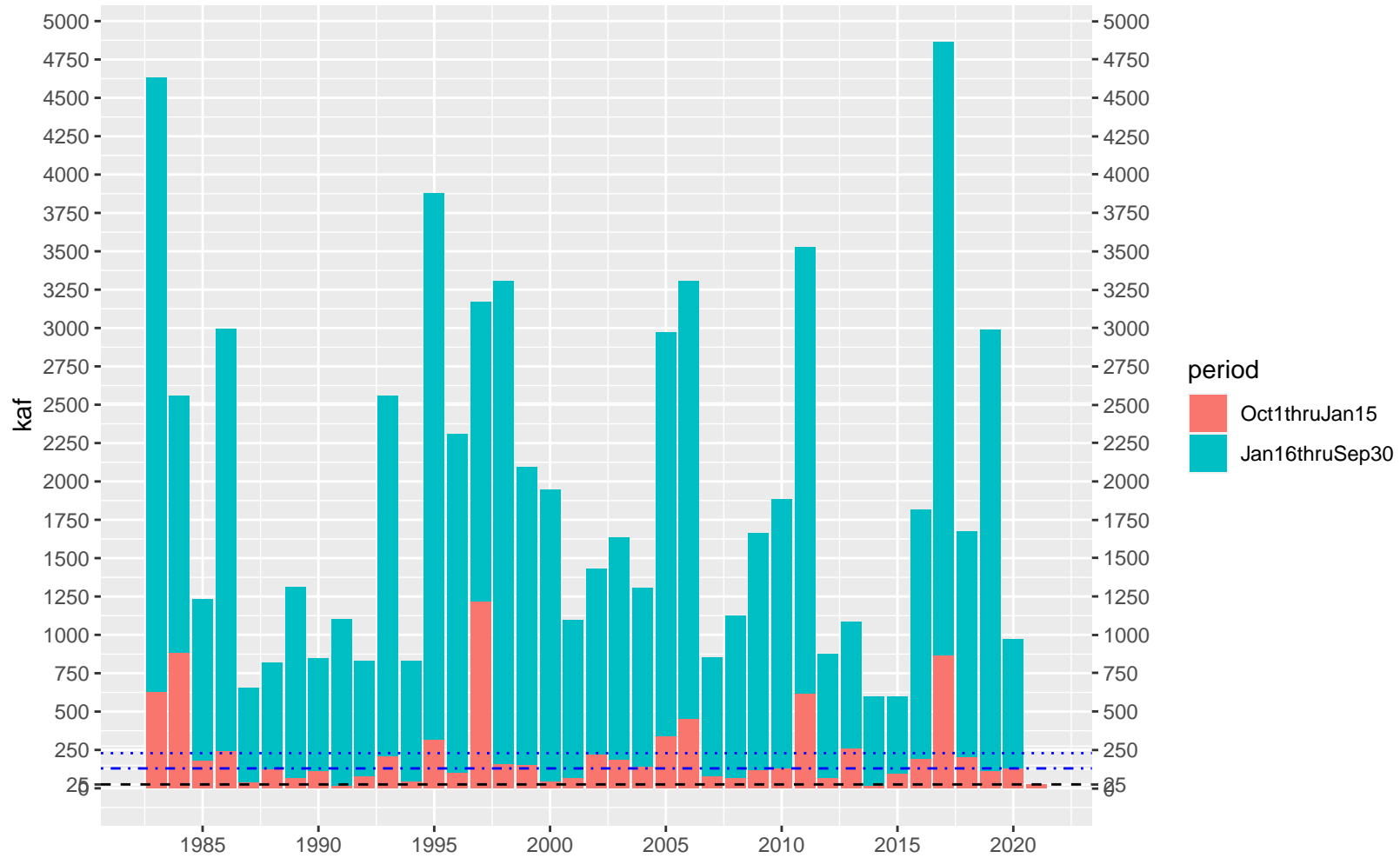
New Melones FNF – 42% mean, 70% median 10/1–1/15 volume



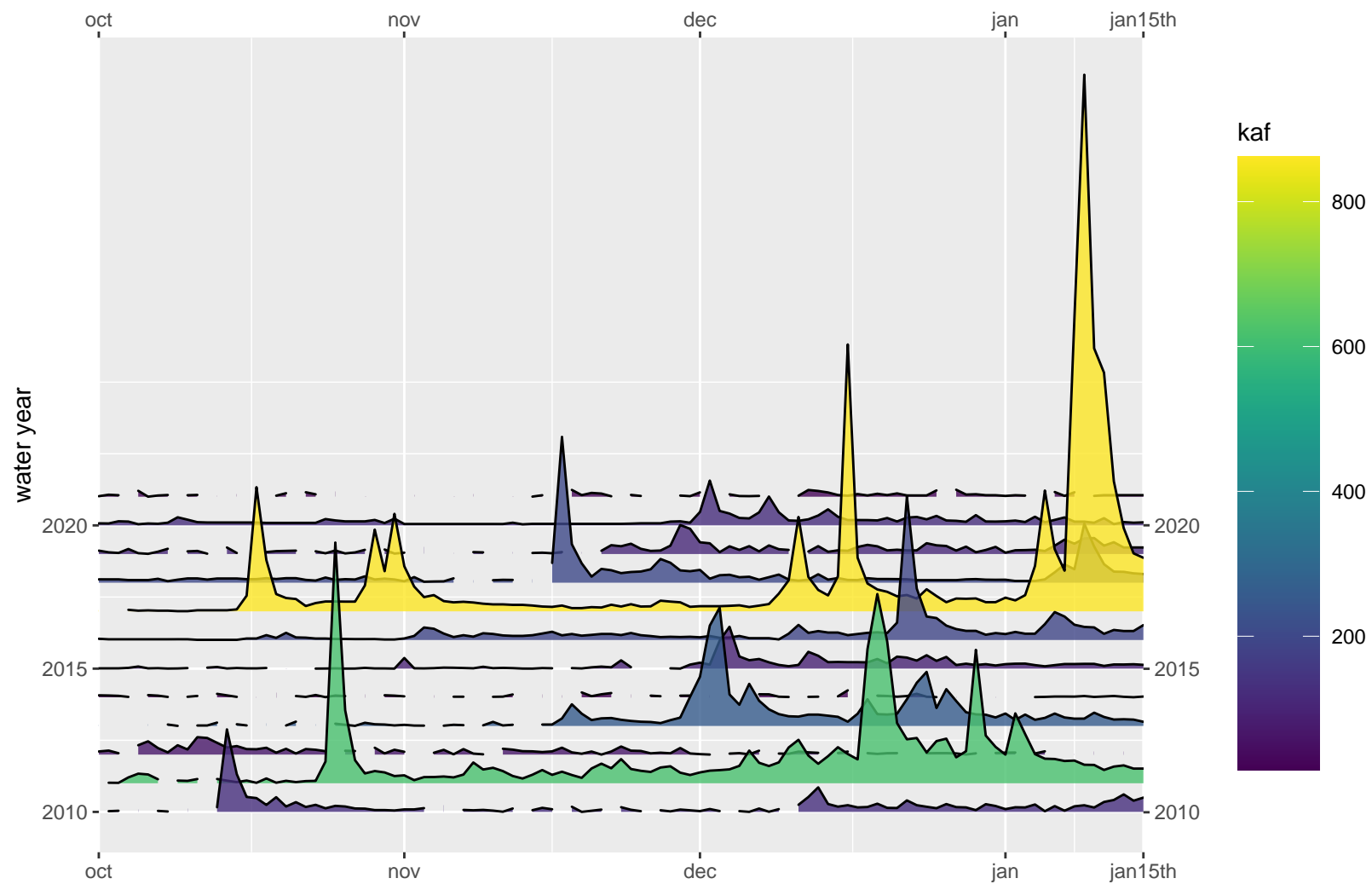
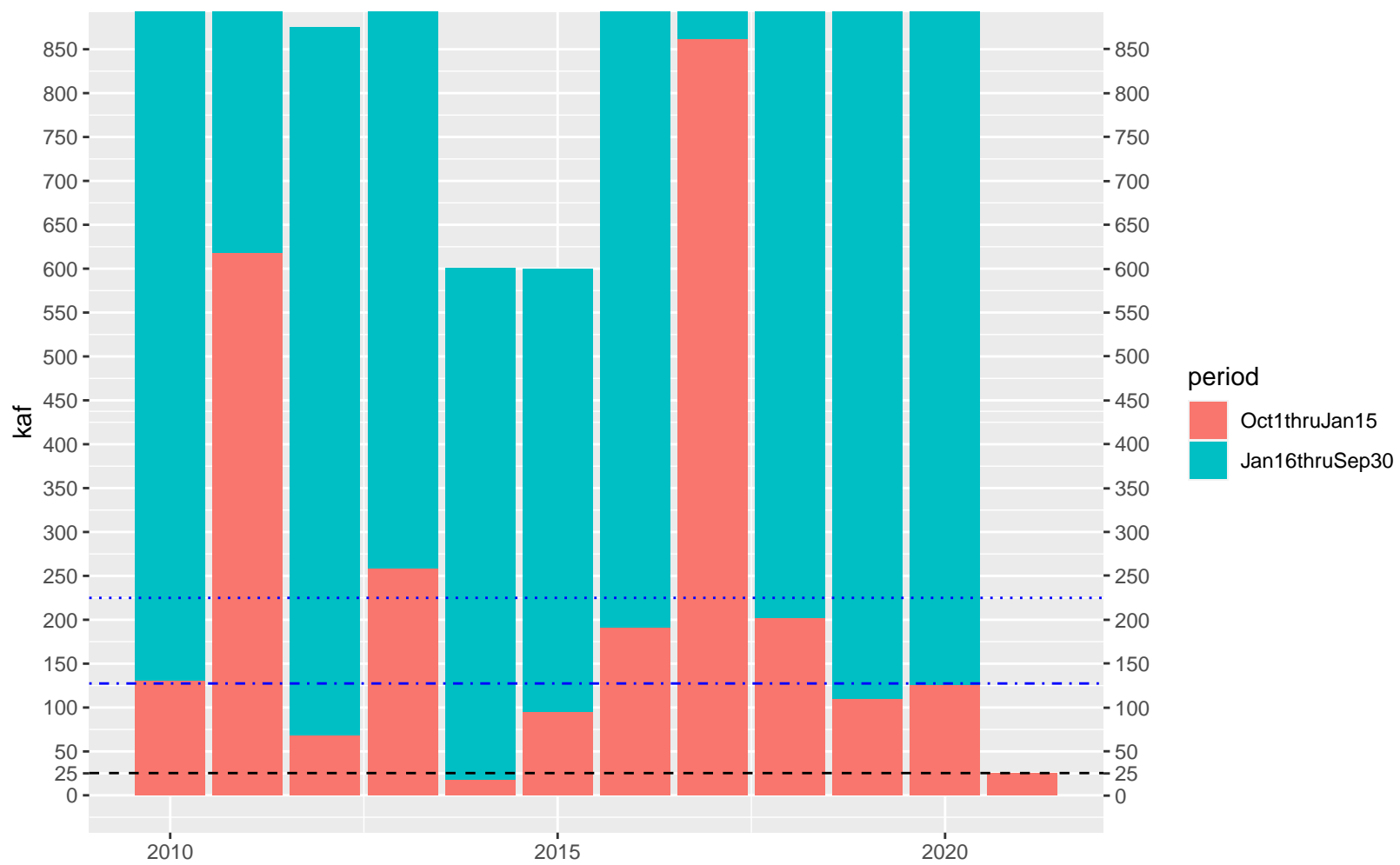
New Melones FNF – 40% mean, 61% median 10/1–1/15 volume (last decade)



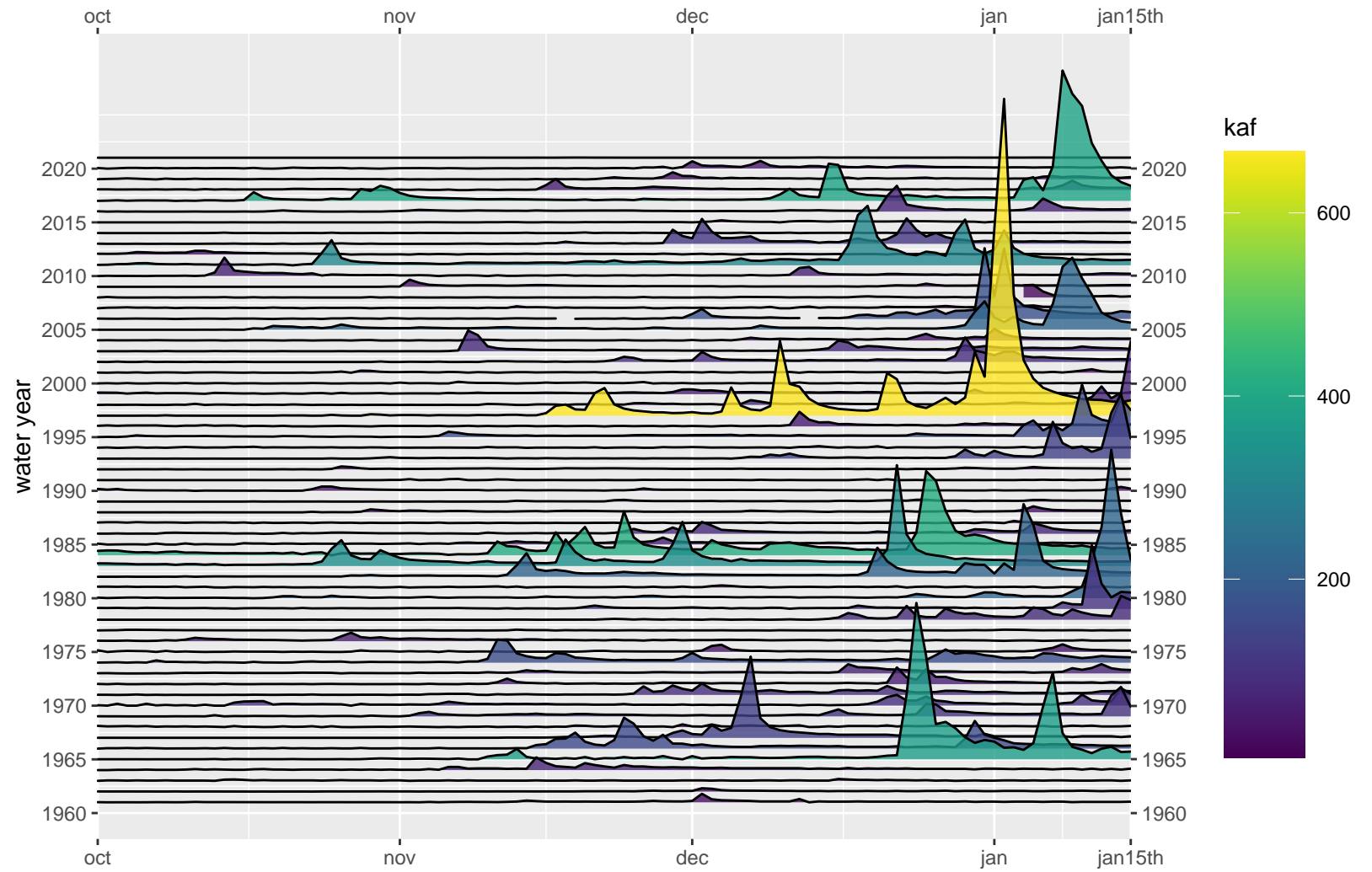
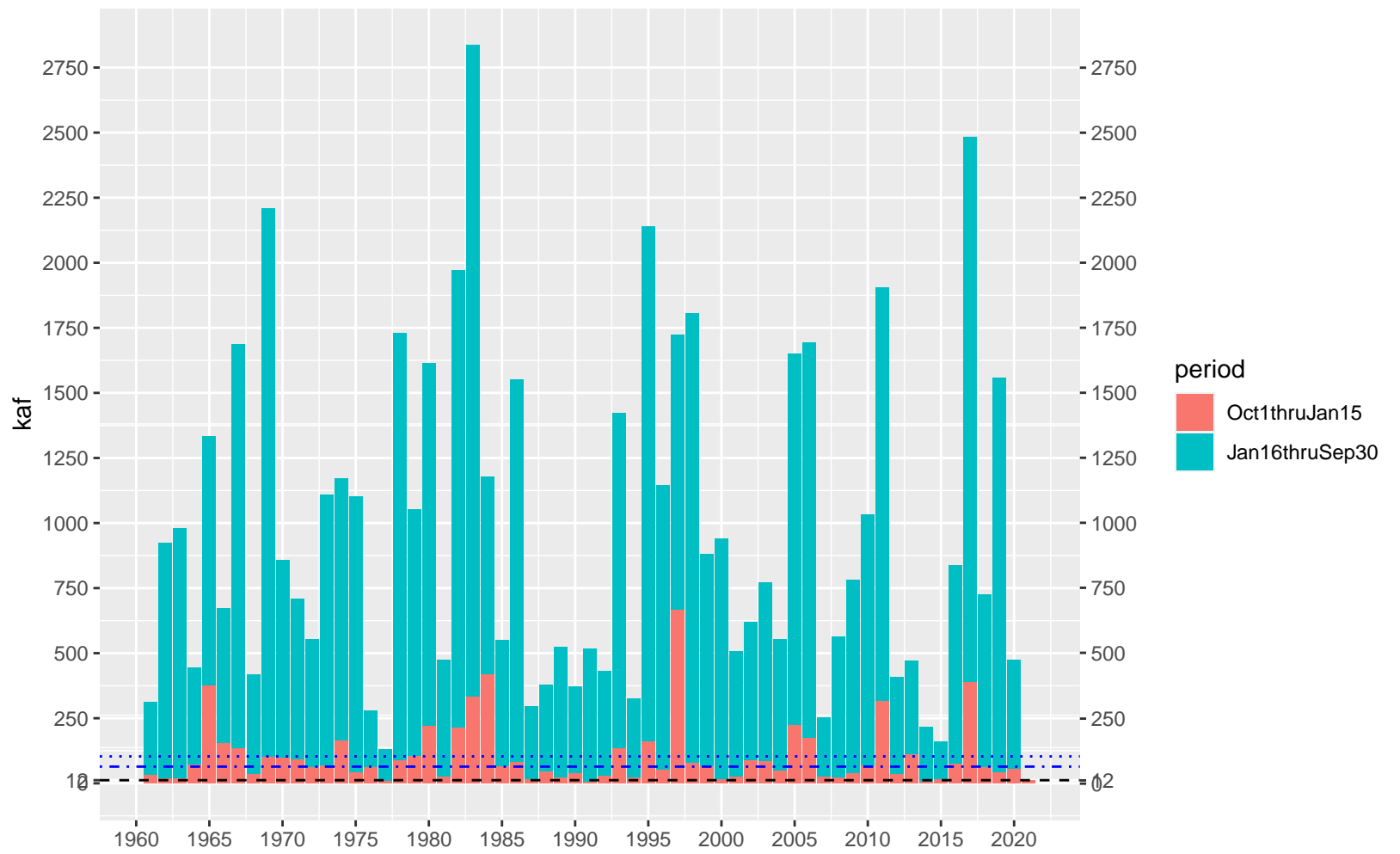
New Don Pedro FNF – 11% mean, 19% median 10/1–1/15 volume



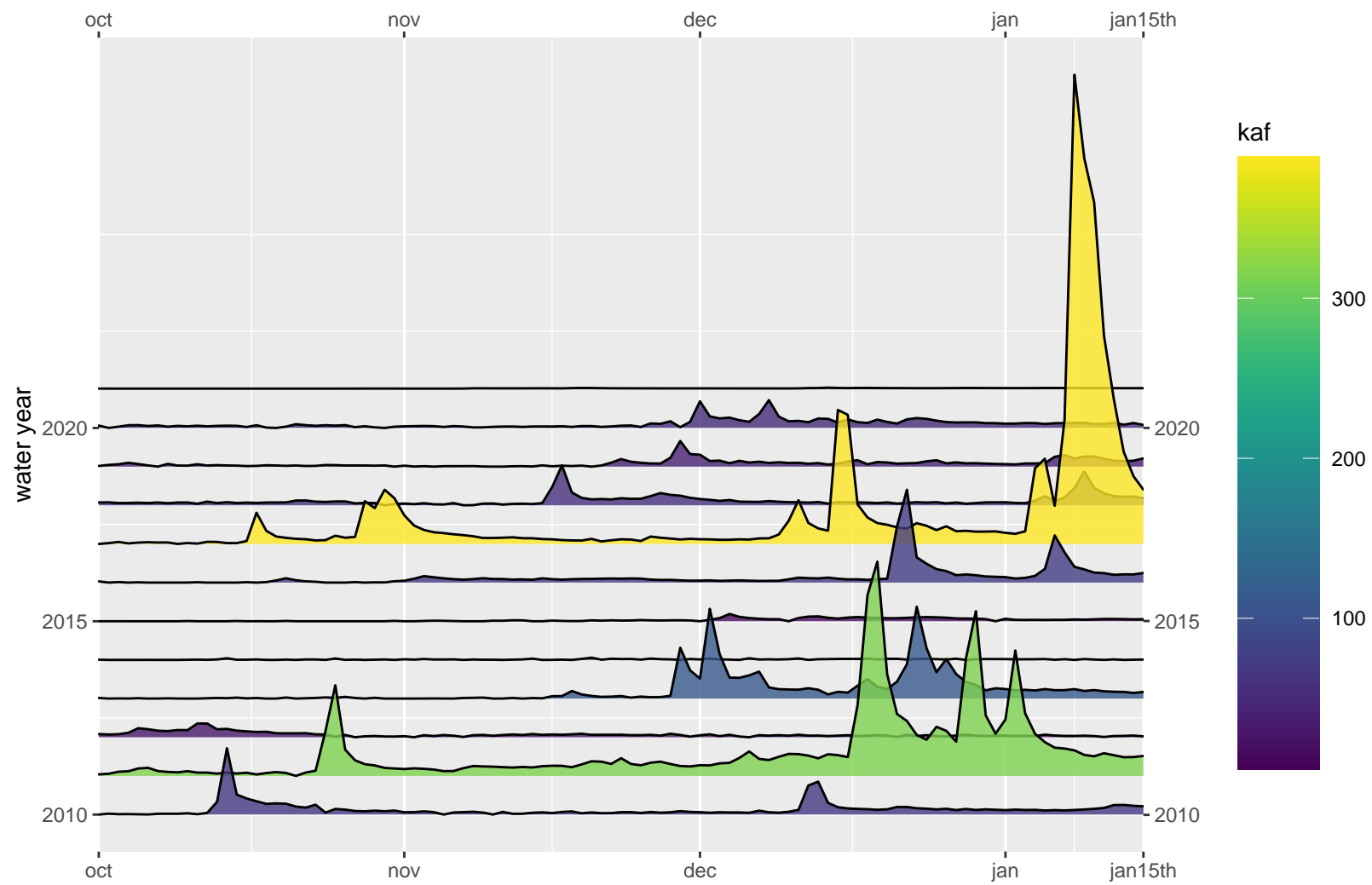
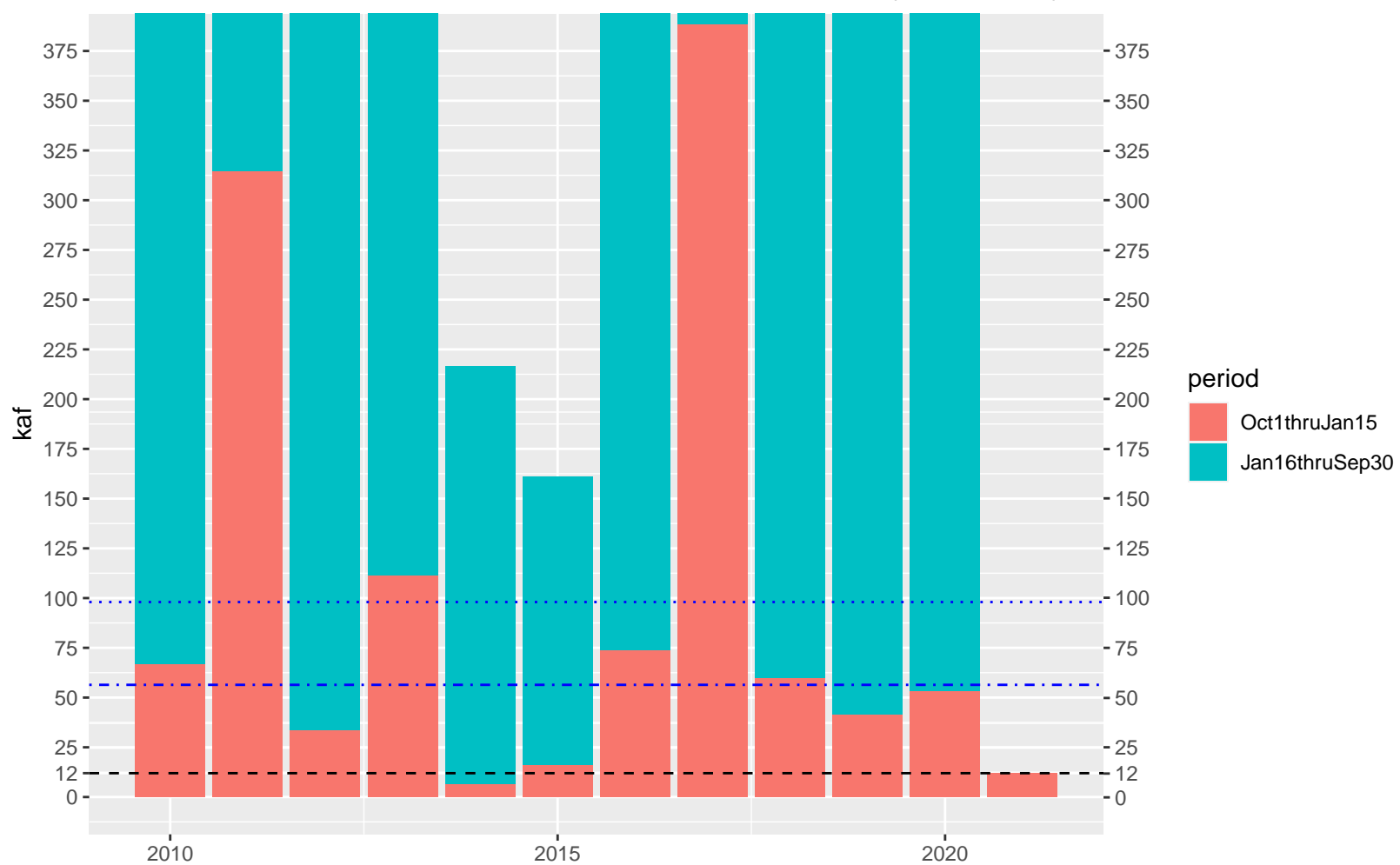
New Don Pedro FNF – 11% mean, 20% median 10/1–1/15 volume (last decade)



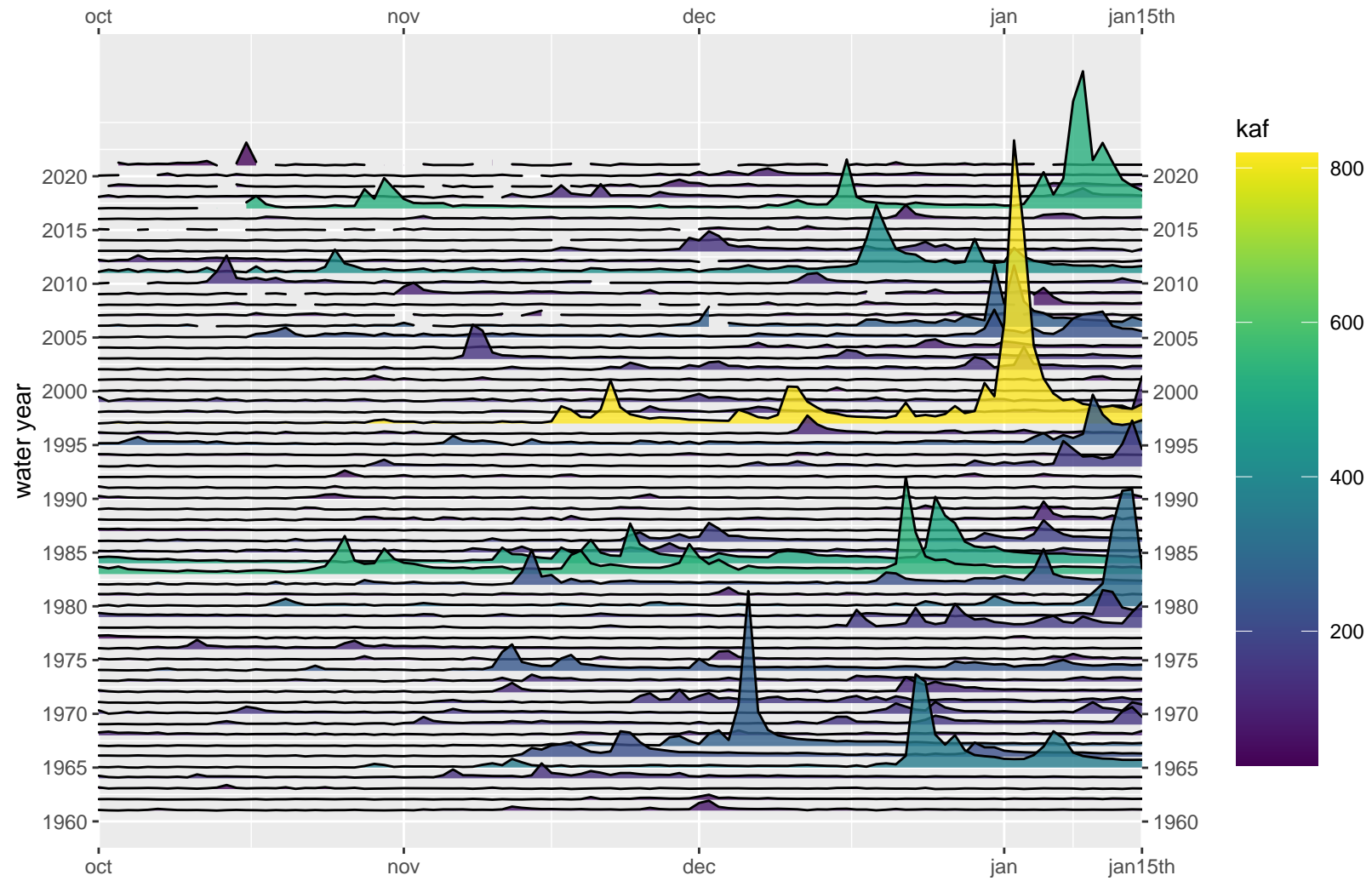
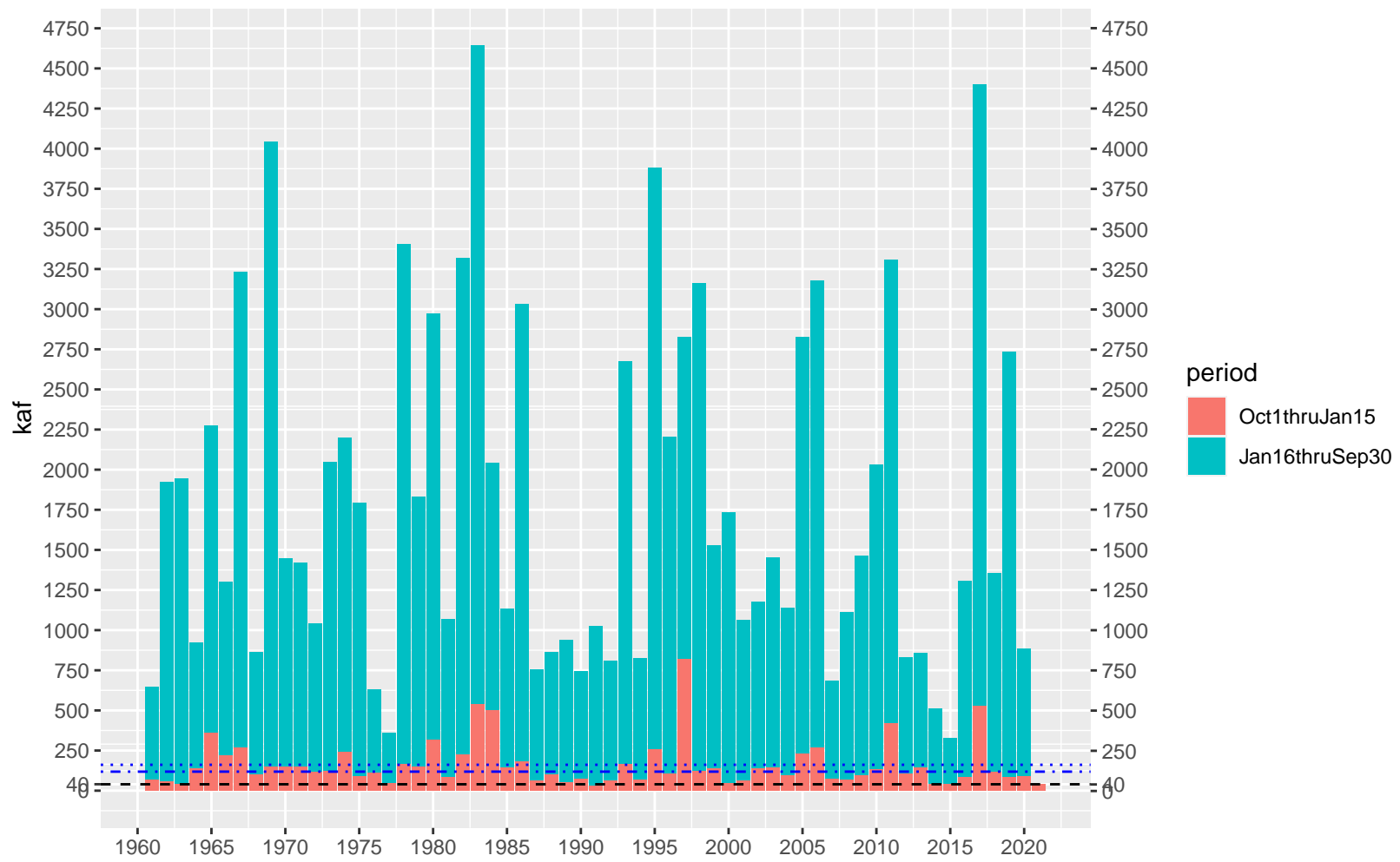
McClure FNF – 12% mean, 19% median 10/1–1/15 volume



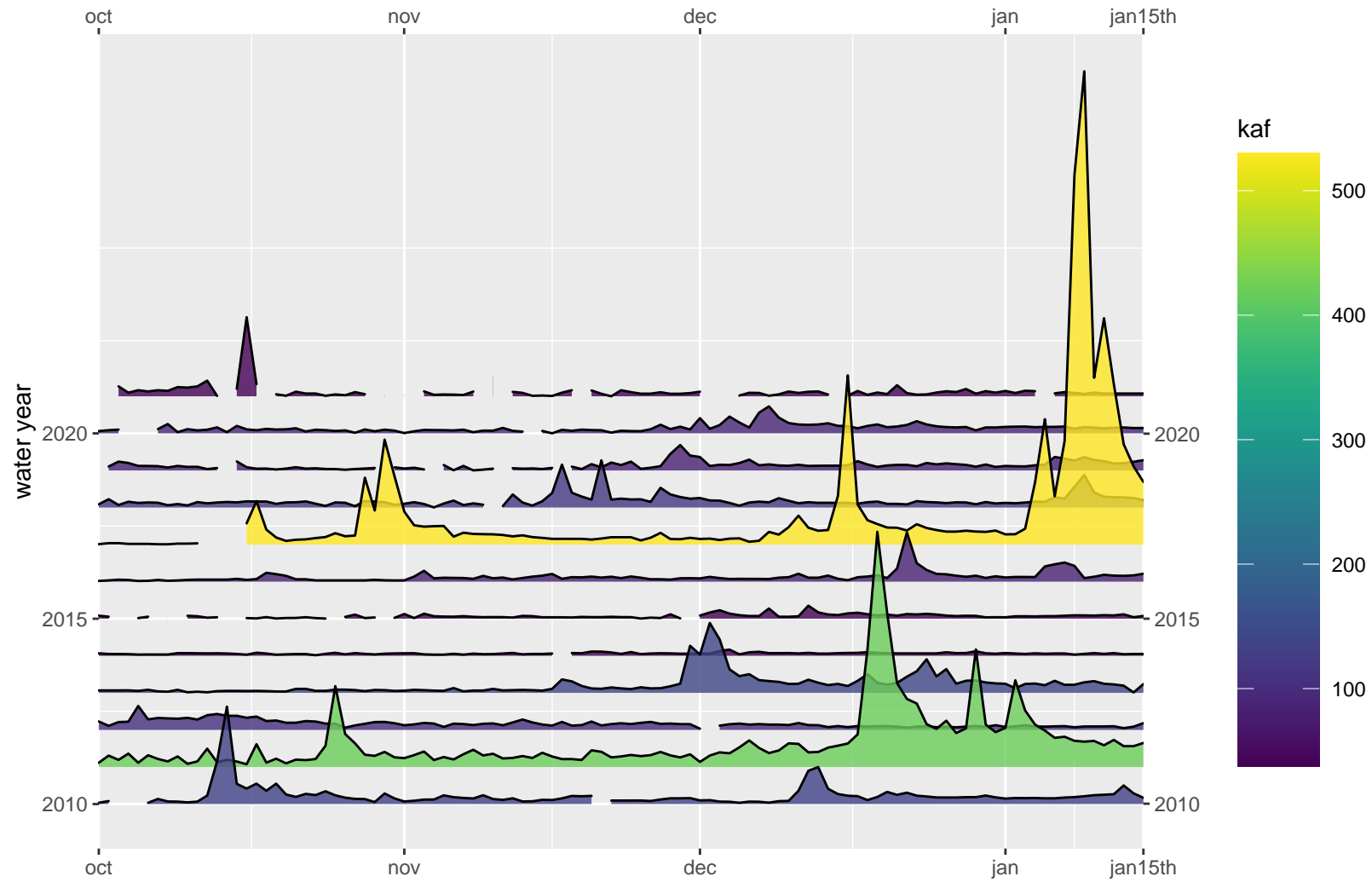
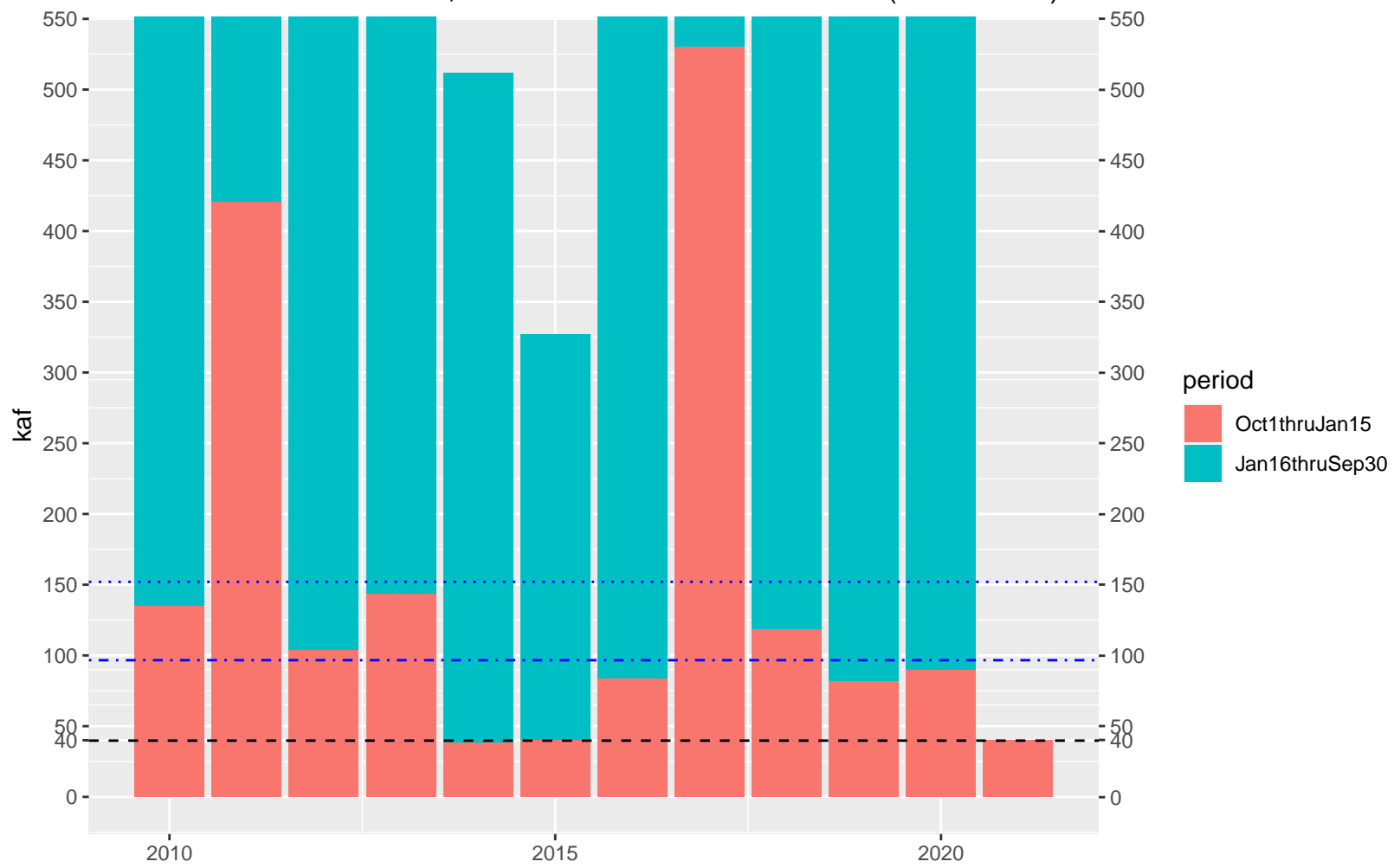
McClure FNF – 12% mean, 21% median 10/1–1/15 volume (last decade)



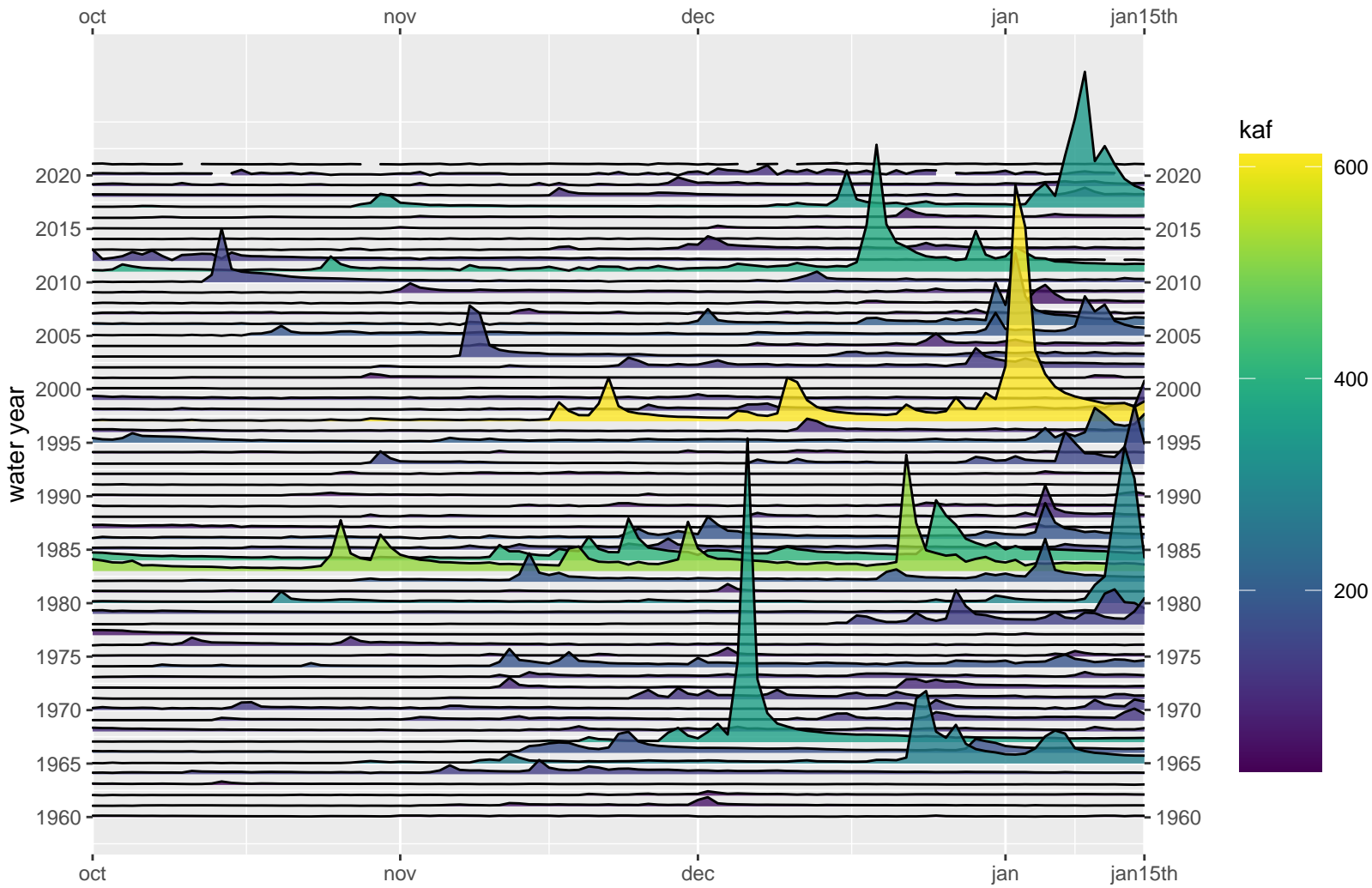
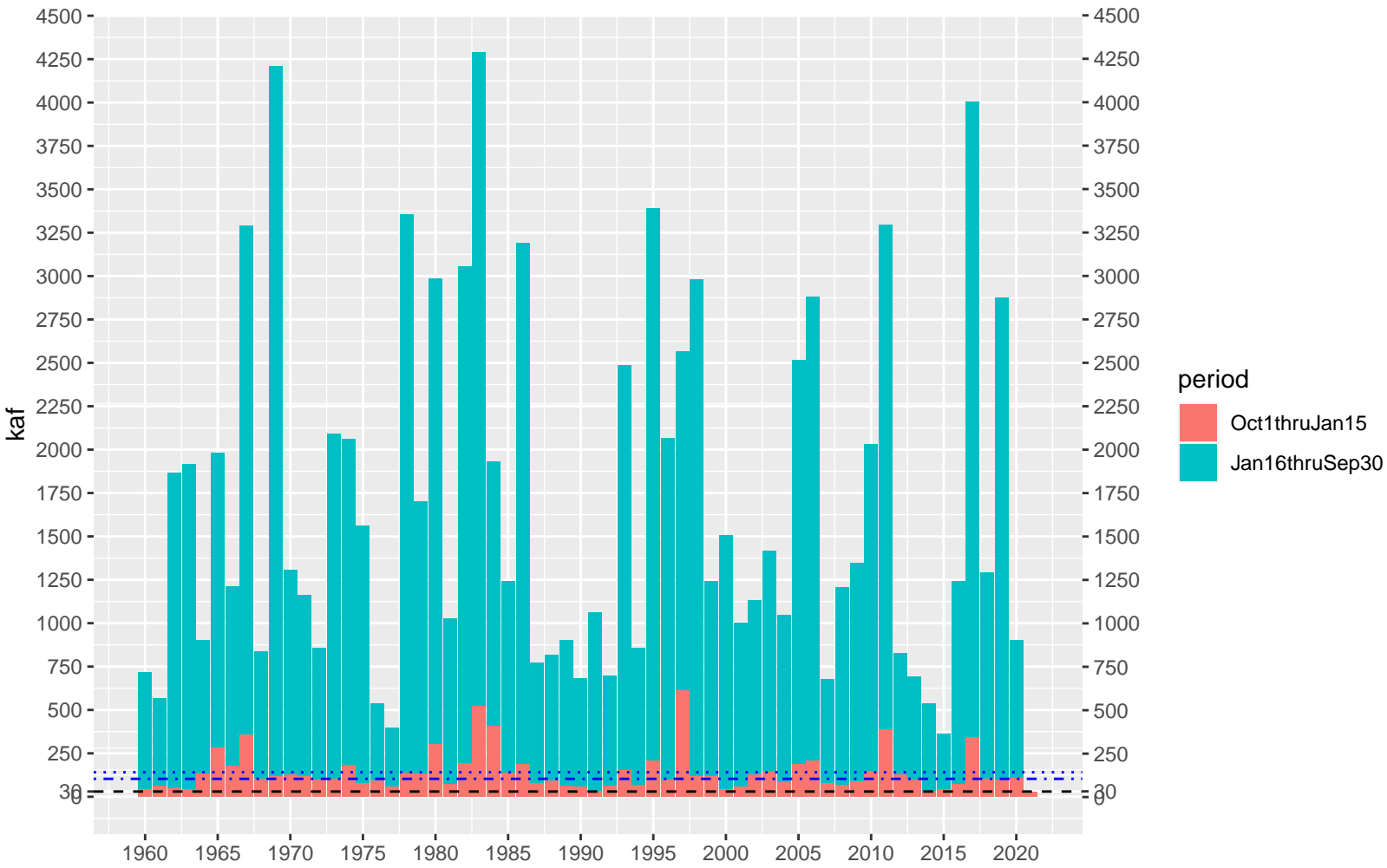
Millerton FNF – 25% mean, 34% median 10/1–1/15 volume



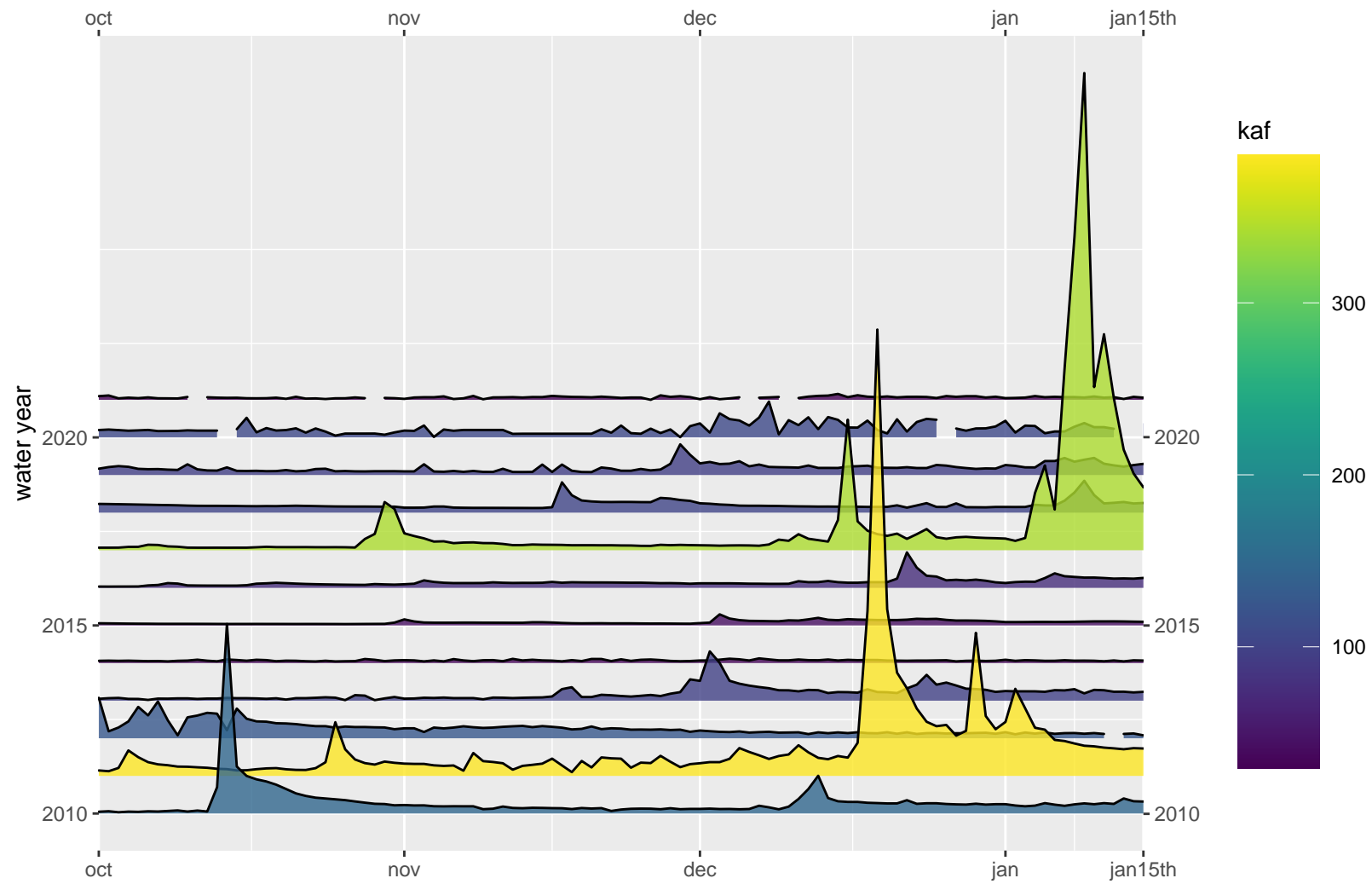
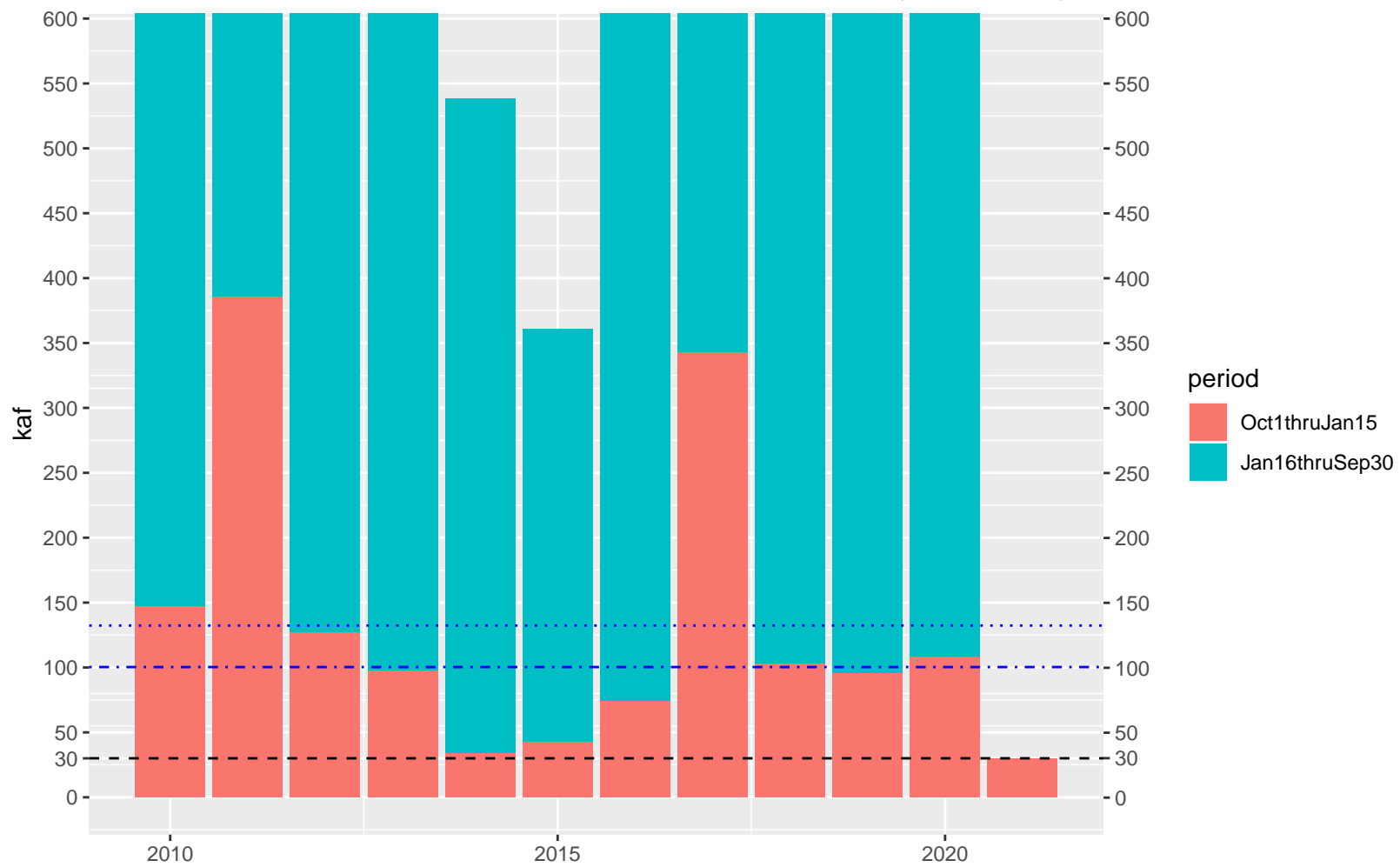
Millerton FNF – 26% mean, 41% median 10/1–1/15 volume (last decade)



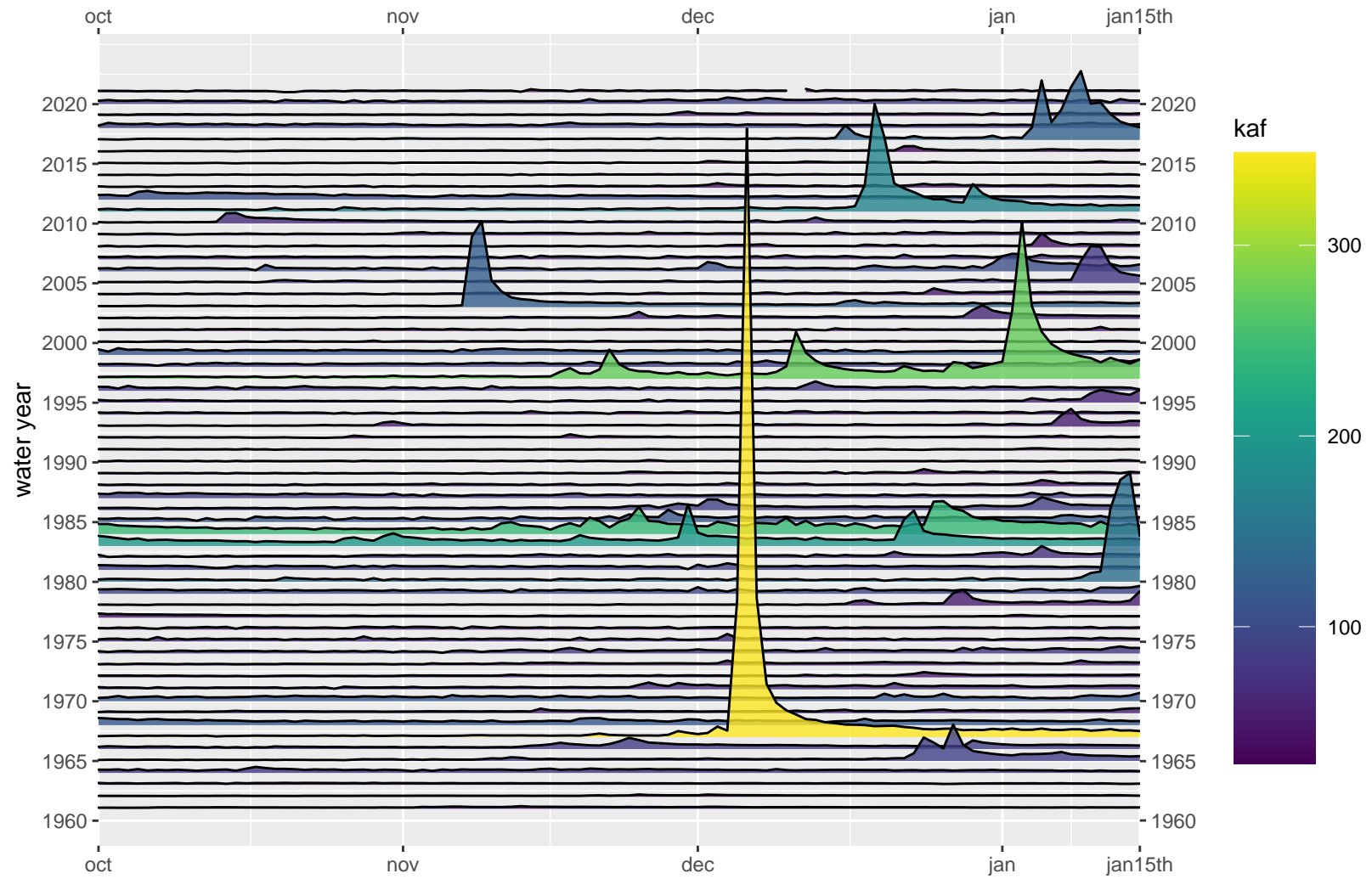
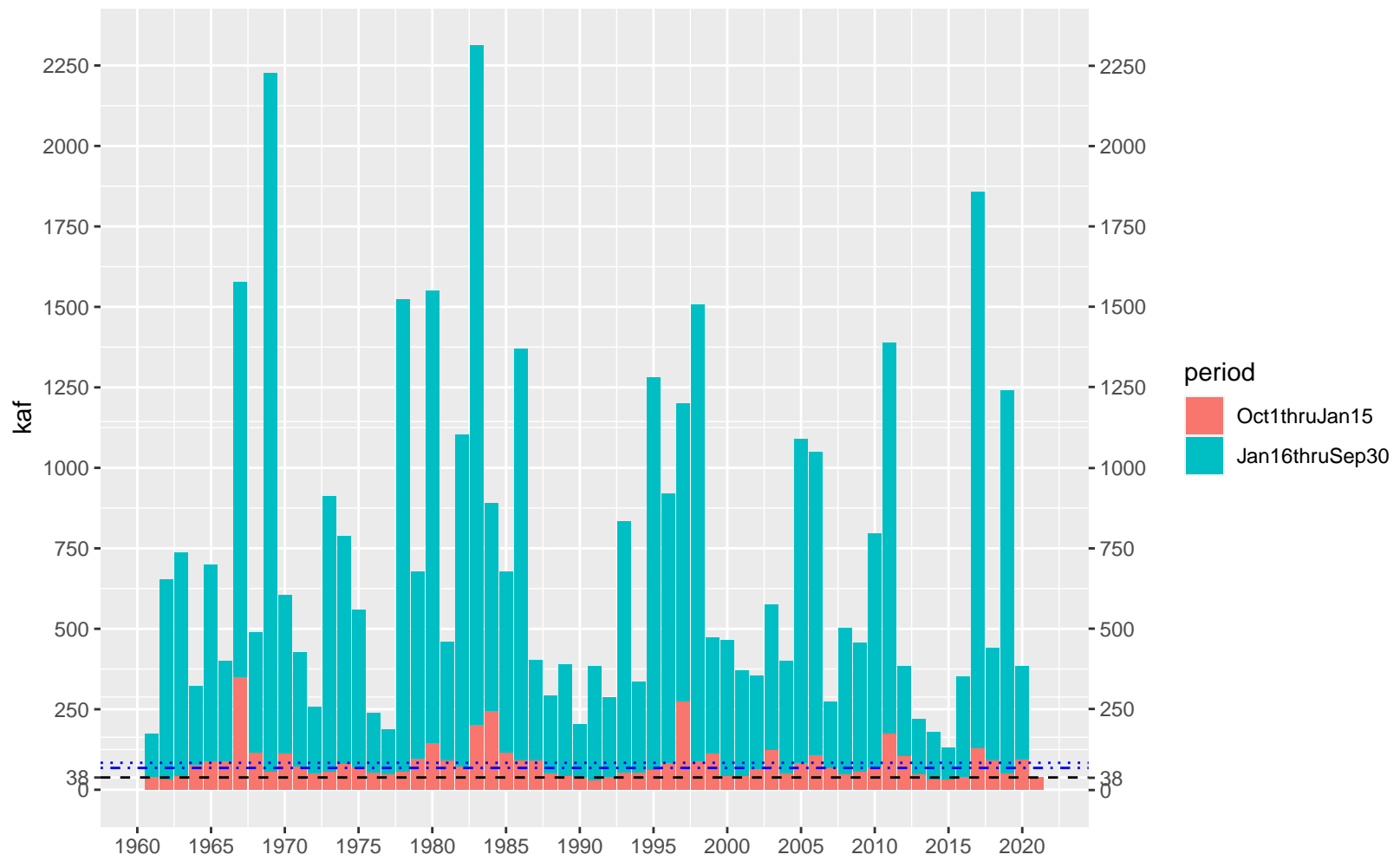
Pine Flat FNF – 21% mean, 29% median 10/1–1/15 volume



Pine Flat FNF – 23% mean, 30% median 10/1–1/15 volume (last decade)



Isabella FNF – 46% mean, 56% median 10/1–1/15 volume



Isabella FNF – 51% mean, 65% median 10/1–1/15 volume (last decade)

