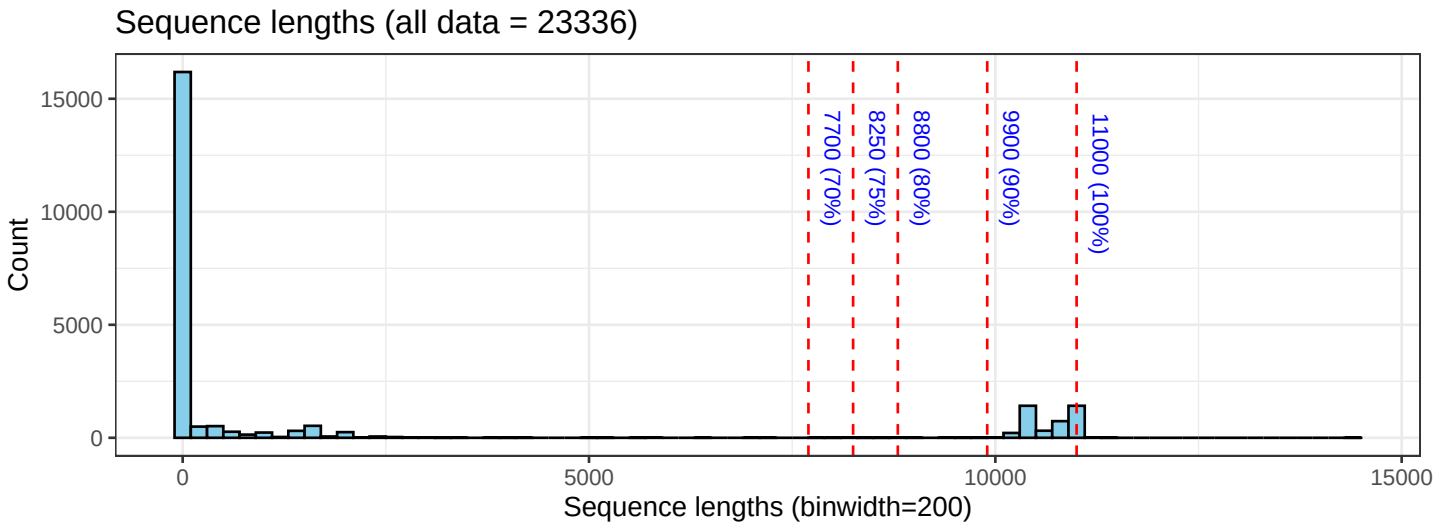
Background

CDC website: `https://www.cdc.gov/west-nile-virus/index.html`

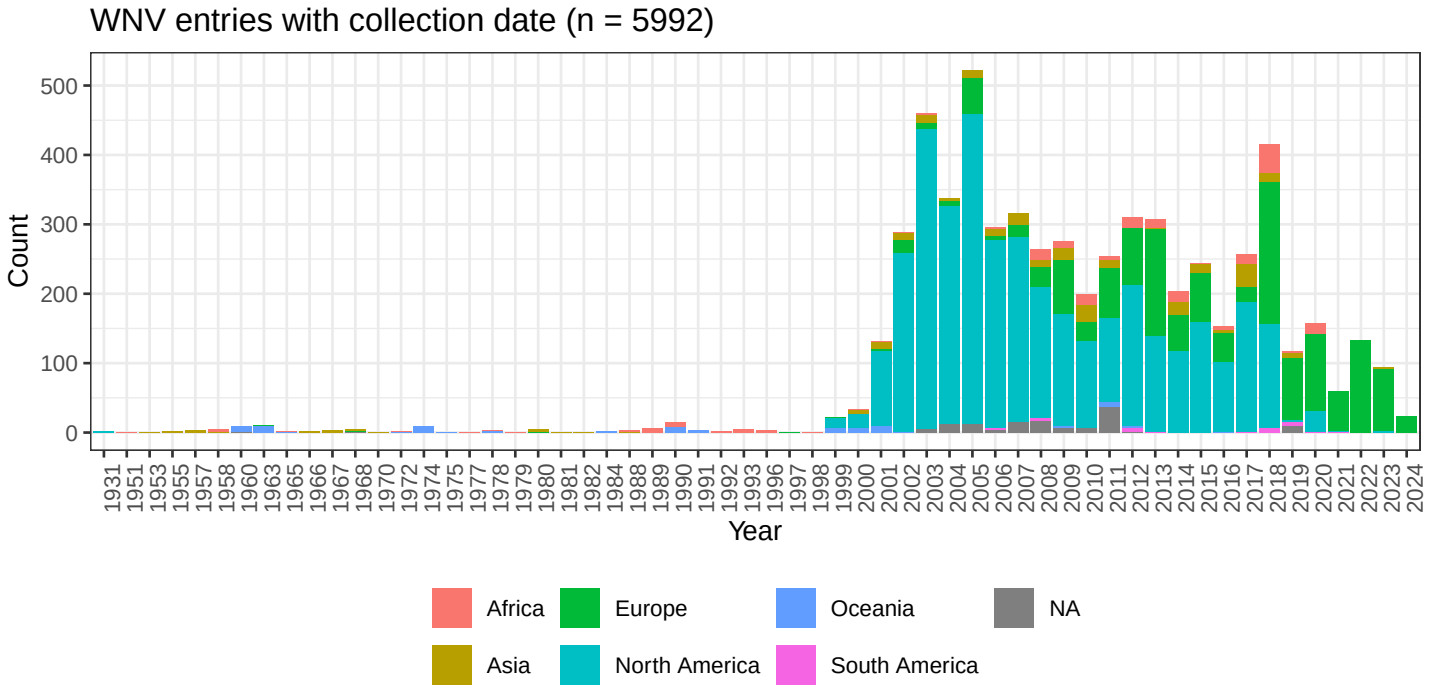
Exploratory Graphics

How long is the WNV genome?

WNV is approximately 11k nt long. The samples pulled from NCBI GenBank have the following distribution of lengths. We can pick a length cut-off for the phylogenic tree:



How well sampled is WNV across time and space?



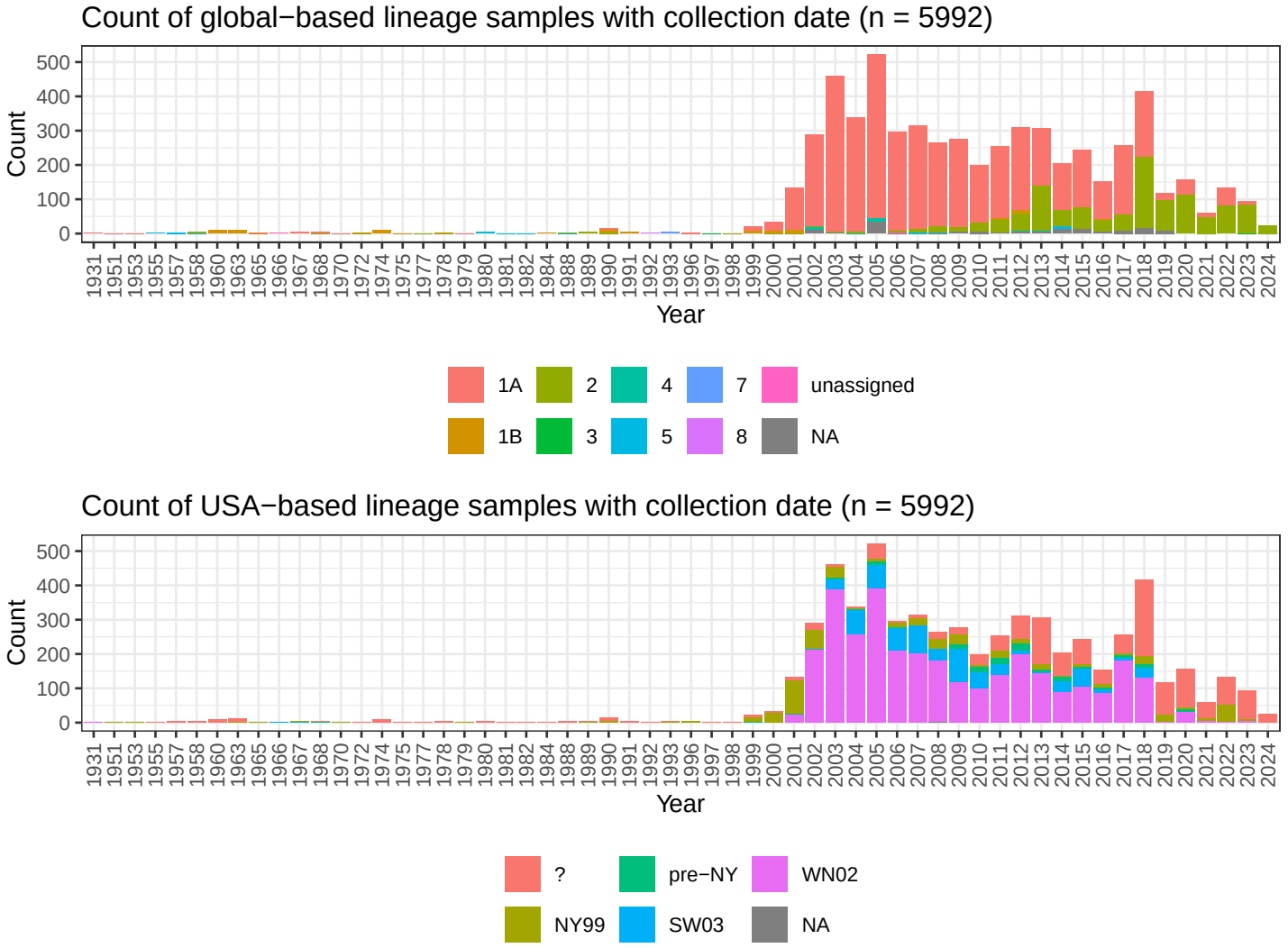
The earliest samples seem to be from 1931. However, these are EF631122 and EF631123 and are supposedly collected in Illinois, USA, much earlier than the NY99 event. We might need to dig into publications that contain these GenBanks to

check if this collection date is correct. Such as publication:

- Amore, G., Bertolotti, L., Hamer, G.L., Kitron, U.D., Walker, E.D., Ruiz, M.O., Brawn, J.D. and Goldberg, T.L., 2010. Multi-year evolutionary dynamics of West Nile virus in suburban Chicago, USA, 2005–2007. Philosophical Transactions of the Royal Society B: Biological Sciences, 365(1548), pp.1871-1878.

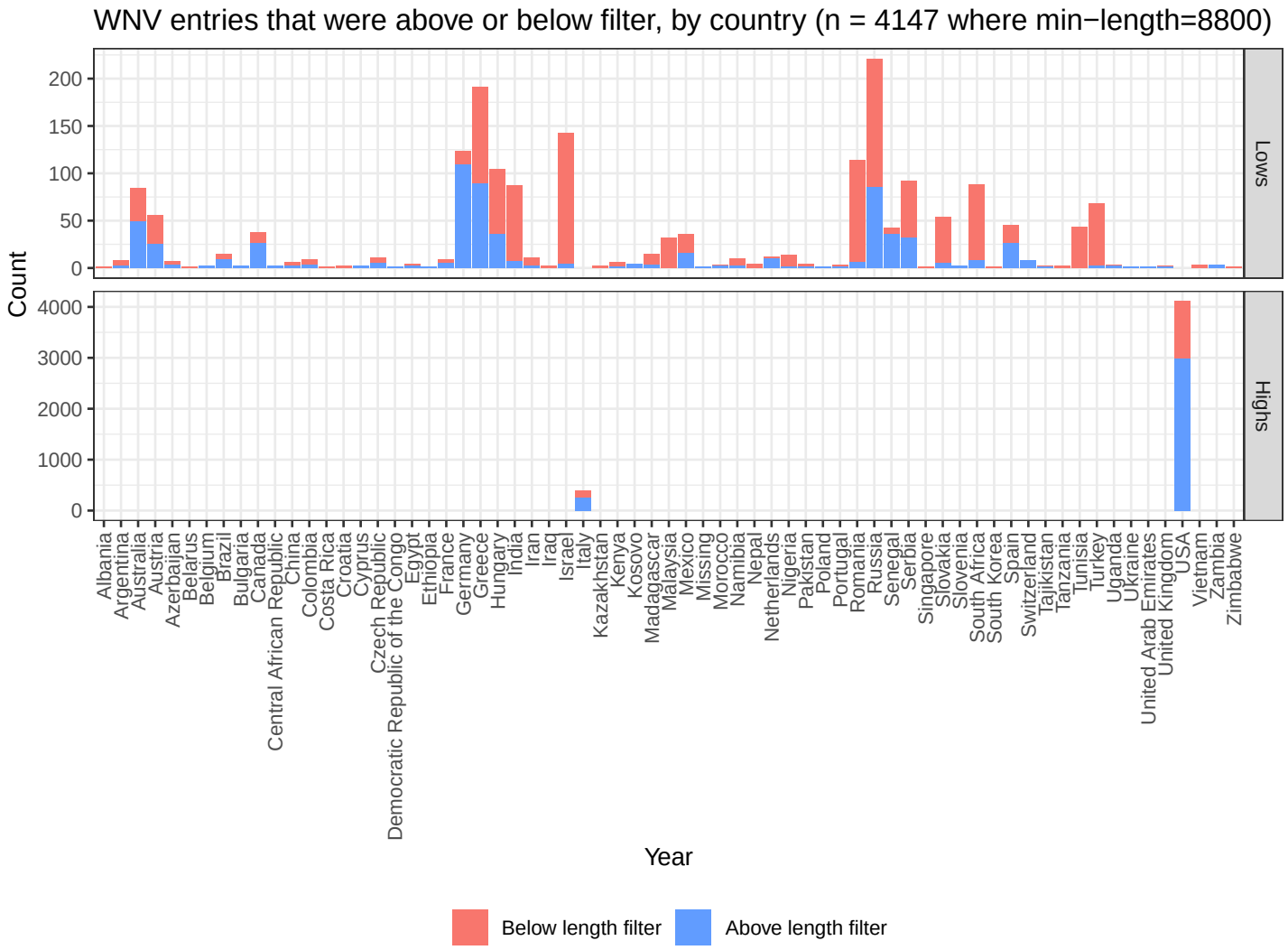
What lineages are available for WNV?

- **Global lineage system:** Koch, R. Tobias, Diana Erazo, Arran J. Folly, Nicholas Johnson, Simon Dellicour, Nathan D. Grubaugh, and Chantal BF Vogels. "Genomic epidemiology of West Nile virus in Europe." One Health (2023): 100664.
- **USA-based system:** Hadfield, J., Brito, A.F., Swetnam, D.M., Vogels, C.B., Tokarz, R.E., Andersen, K.G., Smith, R.C., Bedford, T. and Grubaugh, N.D., 2019. Twenty years of West Nile virus spread and evolution in the Americas visualized by Nextstrain. PLoS pathogens, 15(10), p.e1008042.



Global subsampling

If min length is set to 80 percent, or 8800nt:



- Total WNV records = 23336. Note how this includes records without collection date
- Total WNV records that passes the length filter = 4147

If this number is lower than 4k, probably don't need to sub sample further.

Who are the main submitters of sequence data?

Table 1: Top 25 most frequent sequence submitters with their region and countries

authors	n	regions	countries
blatt et al.	15308	NA	NA
grubaugh et al.	1180	North America	USA
newman et al.	479	North America	USA
shabman et al.	458	North America	USA
linnen et al.	342	NA	NA
henn et al.	273	NA, North America	NA, USA
bertolotti et al.	208	North America	USA
herring et al.	199	North America	USA, Canada
derby et al.	171	NA	NA
ebel et al.	141	NA, North America	NA, USA
duggal et al.	132	North America, NA	USA, NA
amore et al.	126	North America	USA
anderson et al.	126	North America	USA
phillips et al.	112	North America	USA
platonov et al.	109	Europe, Asia	Russia, Azerbaijan
davis et al.	108	North America, NA	USA, NA
dinu et al.	105	Europe	Romania
armstrong et al.	104	North America, NA	USA, NA
nagy et al.	98	Europe	Hungary, Serbia
swetnam et al.	91	North America	USA
bernardin et al.	88	North America	USA
?	87	Europe, Asia	Germany, India
papa et al.	84	Europe	Greece
monaco et al.	83	Europe, Africa	Italy, Turkey, Tunisia
shulman et al.	81	Asia	Israel