CDW maximum probable diameter by site

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Background

- Field Operations technicians requested a standardized procedure for determining the length of transects for CDW tally sampling. To support this request, I have analyzed Vegetation Structure / Vegetation Characterization DBH data on a per domain basis.
- For most sites, datasets are filtered to remove stems with DBH <= 10cm; filtered stem DBH data are then analyzed visually with histogram plots, and the 95th percentile of DBH was also calculated. The initial assumption is that the 95th percentile of DBH will correspond to the maximum likely DBH encountered.
- The choice of F-value for each site is initially based on the maximum expected size of the particles, as well as qualitative estimates of particle density at the site. The F-value may be revised iteratively with feedback from Field Operations technicians.
- Results are documented in NEON-2474 (https://neoninc.atlassian.net/browse/NEON-2474).

D01 stemDiameter analysis

D01: Load and clean data

Load 2015 VegStructure data from D01, located in CI Dropbox (10.100.128.37). There are three files with `apparentIndividual` data, these are associated with three different versions of the Access ingest DB that were used in 2015. From conversation with D01 on 2016-05-05, these files should not contain duplicates, but will need to verify.

Results of dataframe comparison and cleanup:

- All names in `vst2b` present in `vst2d`
- `basalDiameter`, `basalDiameterHeight`, and `growthForm` are lacking in vst2b
- All names present in `vst1` are present in `vst2d`
- 1 duplicate record in `vst2d`
- 27 duplicate records in `vst2b`
- 1 duplicate record in `vst1`

### D01: Create unified VST dataset

Results of dataframe merge

- `vstd1` has 6978 records using the full_join technique
- Using rbind (code not shown), total number of records is 8439; but using distinct() on rbind result gives 6978 records.
- The results from 'full_join' automatically get rid of duplicates -> very nice

D01: DBH percentiles and histograms

- Create a histogram in ggplot of stemDiameter data, and look only at `stemDiameter` $>= 10$ cm, since there are often many small diameter stems that do not contribute significantly to CDW production.
- Calculate the 95th percentile and the max DBH using the DBH data.
- Overlay the 95th %tile as a vertical line.
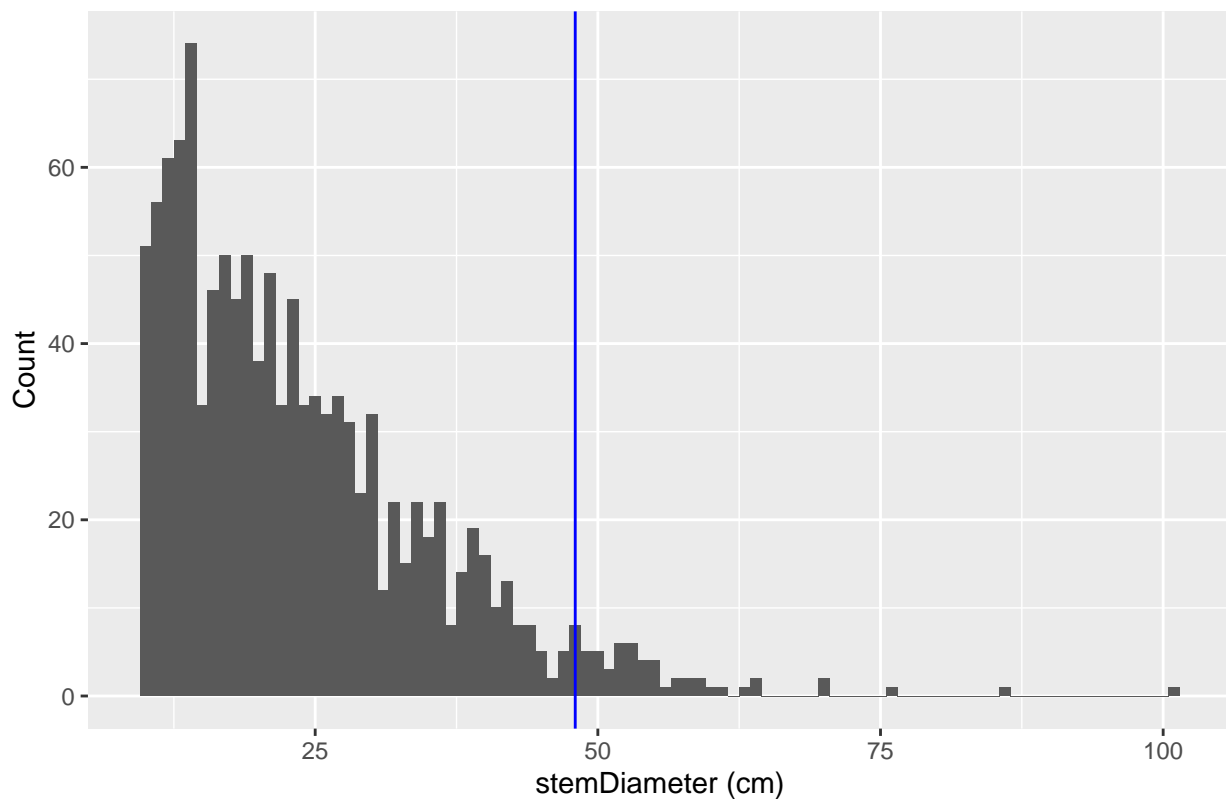
HARV: Results of stem diameter analysis

D01 HARV stemDiameter distribution
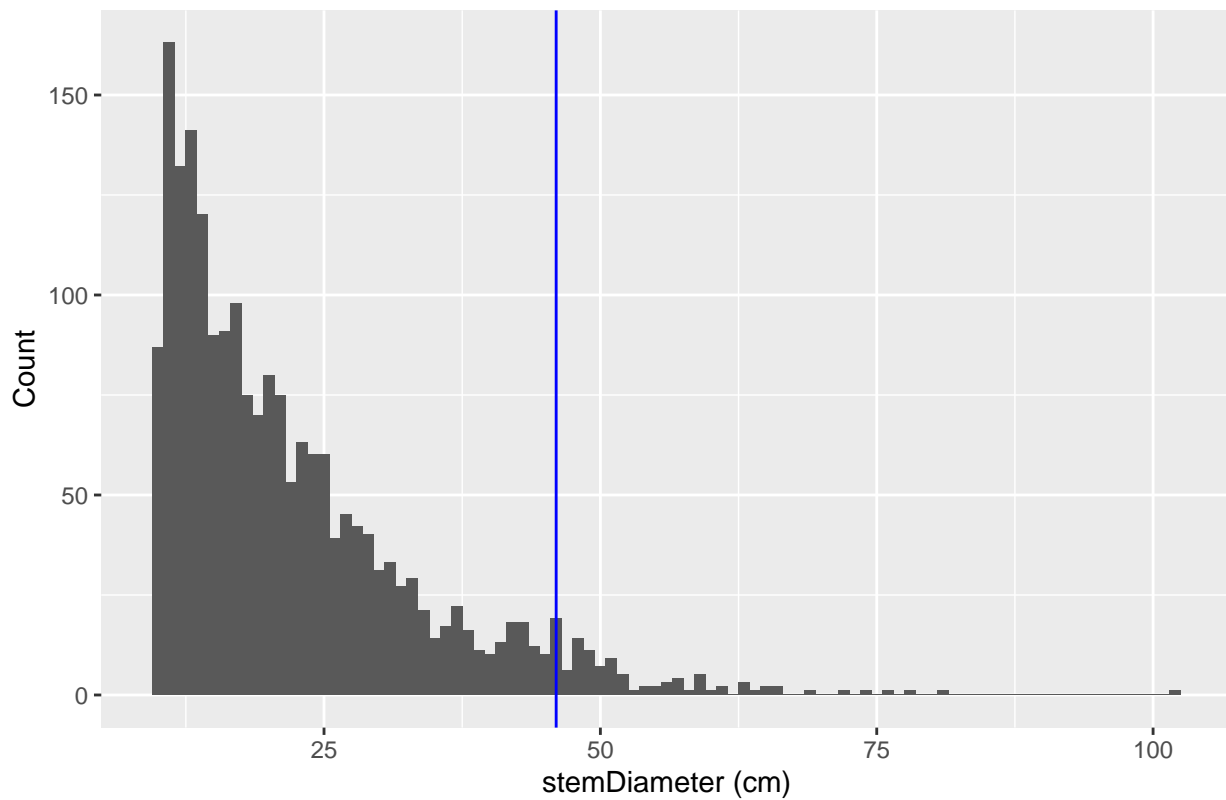
- Histogram: Virtually all logs have DBH < 65 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` $->$ 46 cm
- Max `stemDiameter` = 102 cm
- Dlim for maxLikelyStemDiameter = 170 m @ F=5

BART: Results of stem diameter analysis

D01 BART: stemDiameter distribution

- Histogram: Virtually all logs have DBH < 65 cm
- maxLikelyStemDiameter = 99th percentile for `stemDiameter` –> 48 cm
- Max `stemDiameter` = 101 cm
- Dlim for maxLikelyStemDiameter = 190 m @ F=5

D02 stemDiameter analysis

D02: Load and clean data

In the CI Dropbox (10.100.128.37), there are VST data in the 'Veg Characterization data' folder, as well as in the '2015data' folder. Based on preliminary visual checks, there are data for SCBI, SERC and BLAN in these locations.

Results of D02 dataframe comparison and cleanup:

- All colnames in `vst2` present in `vst1`
- `basalDiameter`, `basalDiameterHeight`, and `growthForm` are lacking in vst2
- All names in `vst2` match those in `vst3`
- 15 duplicate records in `vst1`
- 18 duplicate records in `vst2`
- 0 duplicate records in `vst3`

### D02: Create unified VST dataset

Results of dataframe merge

- **vstd2** has 7249 records using the full_join technique
- Most records in **vst2** and **vst3** appear to be duplicates of data in **vst1**
- All data collected between 2015-09-14 and 2015-10-21

D02: DBH percentiles and histograms

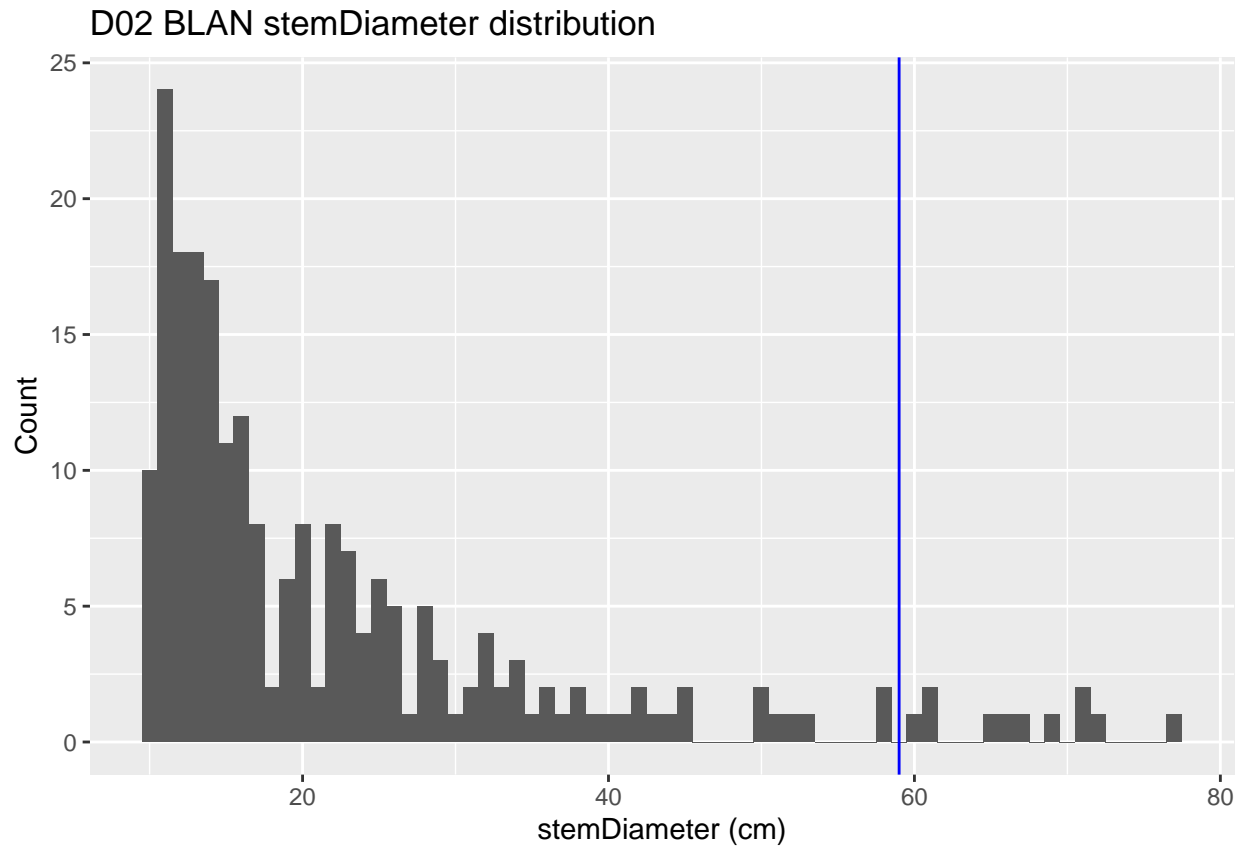- Histograms and analyses for D02 are identical to those created for D01

SCBI: Results of stem diameter analysis

D02 SCBI stemDiameter distribution
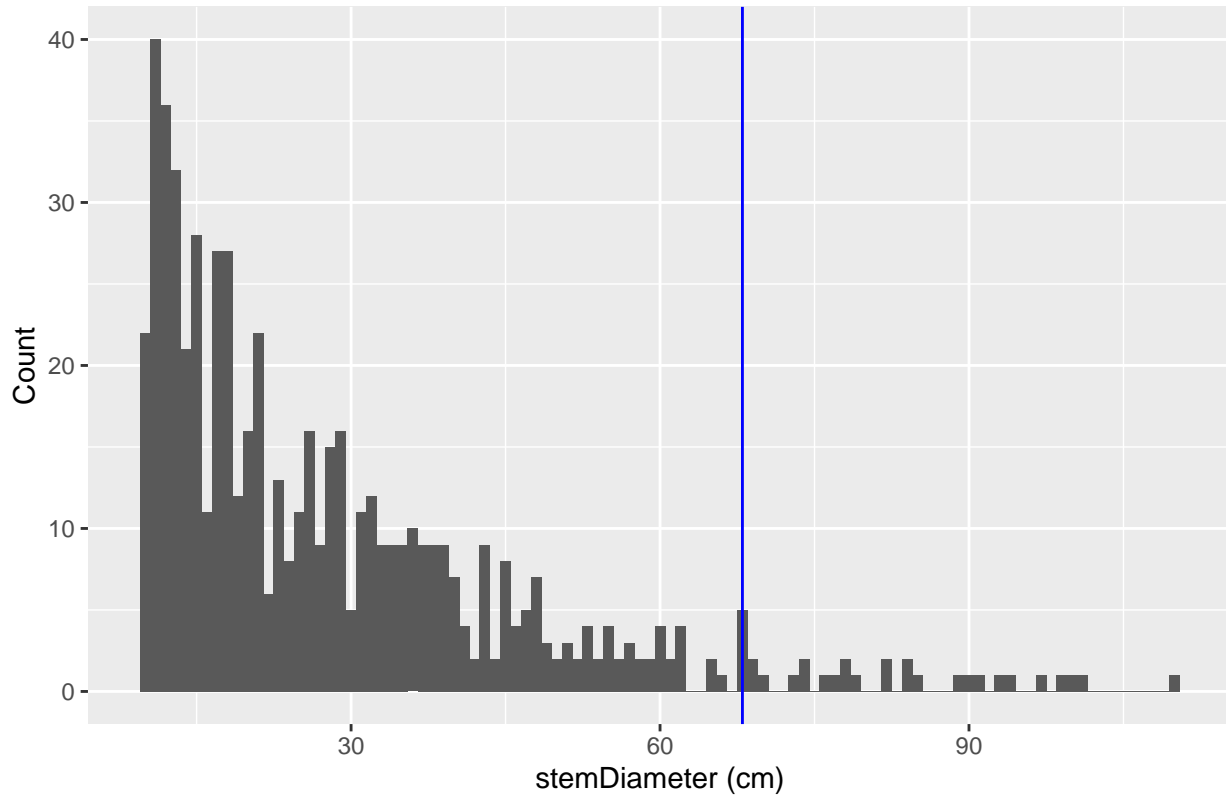
- Histogram: No clear breakpoint in distribution tail
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 68 cm
- Max `stemDiameter` = 110.4 cm
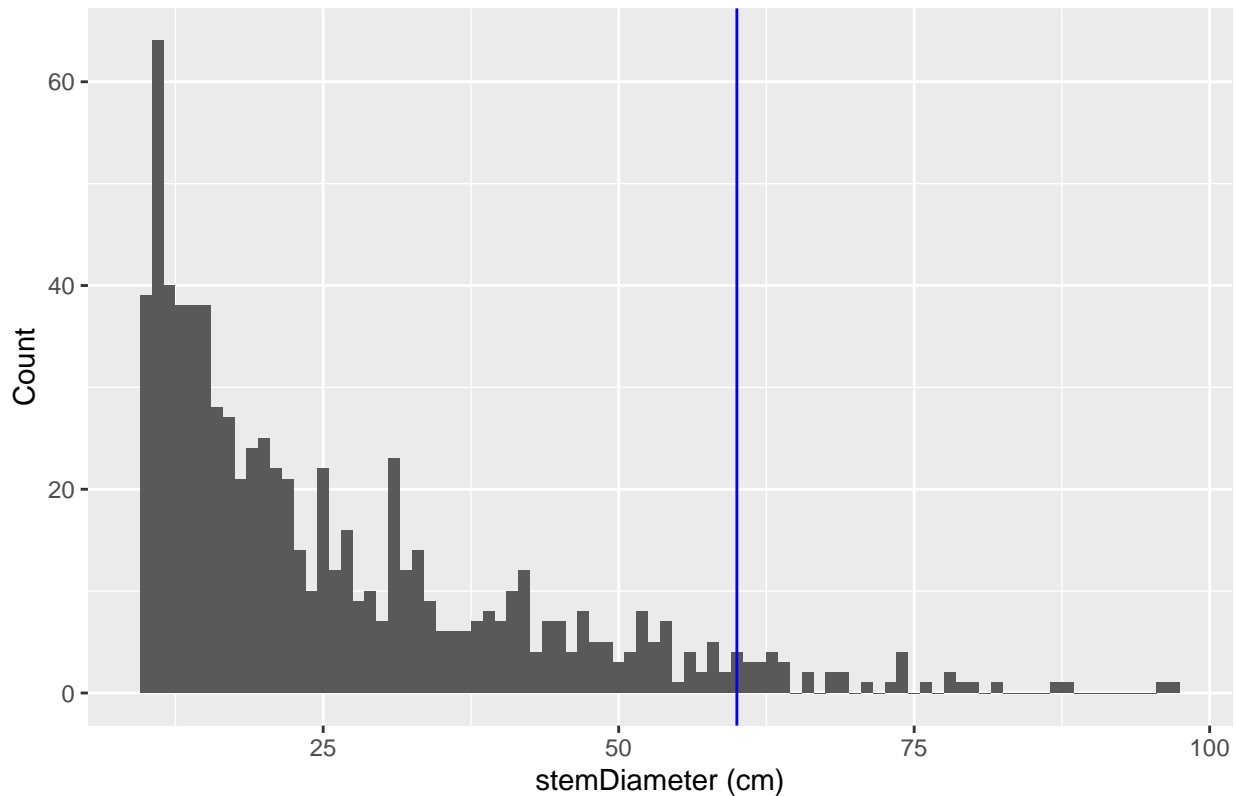- Dlim for maxLikelyStemDiameter = 240 m @ F=8

BLAN: Results of stem diameter analysis

D02 BLAN stemDiameter distribution

- Histogram: No clear breakpoint in distribution tail
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 59 cm
- Max `stemDiameter` = 76.7 cm
- Dlim for maxLikelyStemDiameter = 290 m @ F=5

SERC: Results of stem diameter analysis

D02 SERC stemDiameter distribution

- Histogram: No clear breakpoint in distribution tail
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 60 cm
- Max `stemDiameter` = 97.5 cm
- Dlim for maxLikelyStemDiameter = 300 m @ F=5

D03 stemDiameter analysis

D03: Load and clean data

In the CI Dropbox (10.100.128.37), there are VST data in the '2015data' folder. Based on preliminary visual checks, there are data for OSBS and JERC, but not DSNY.

- 27 duplicate records in `vst1`
- `date` recorded spans from 2015-03-04 to 2015-10-13
- OSBS_004: duplicates based on tagID result because tagIDs were measured in 2015-03, and 2015-10 -> *remove 2015-03 records*
- OSBS_008: duplicates based on tagID are identical except for subplotID value -> *remove records with subplotID=40*
- OSBS_017: One dup - tagID for larger bole should not have 'A' -> *change tagID*
- OSBS_027: Same action as for 004 plot above
- OSBS_029: One tagID repeated 3X; records appear identical based on selected columns -> *choose one record*
- OSBS_030: Same action as for 004 plot above
- OSBS_031: tagID 3381 appears identical based on selected columns -> *choose one record*
- OSBS_033: tagID 03708 appears identical based on selected columns -> *choose one record*
- OSBS_051: Same action as for 004 plot above

- JERC: No duplicate records
- `vst_D03_cleanData.csv` **ONLY CONTAINS STEMS >= 10 cm DBH**

D03: Create unified VST dataset

Results of dataframe merge

- `vstd3` has 886 records
- Of the total records, JERC has 193 records
- Most data collected between 2015-08-01 and 2015-10-13, but some collected in 2015-03

D03 DSNY: Pull VST Tower Plot data from Fulcrum database
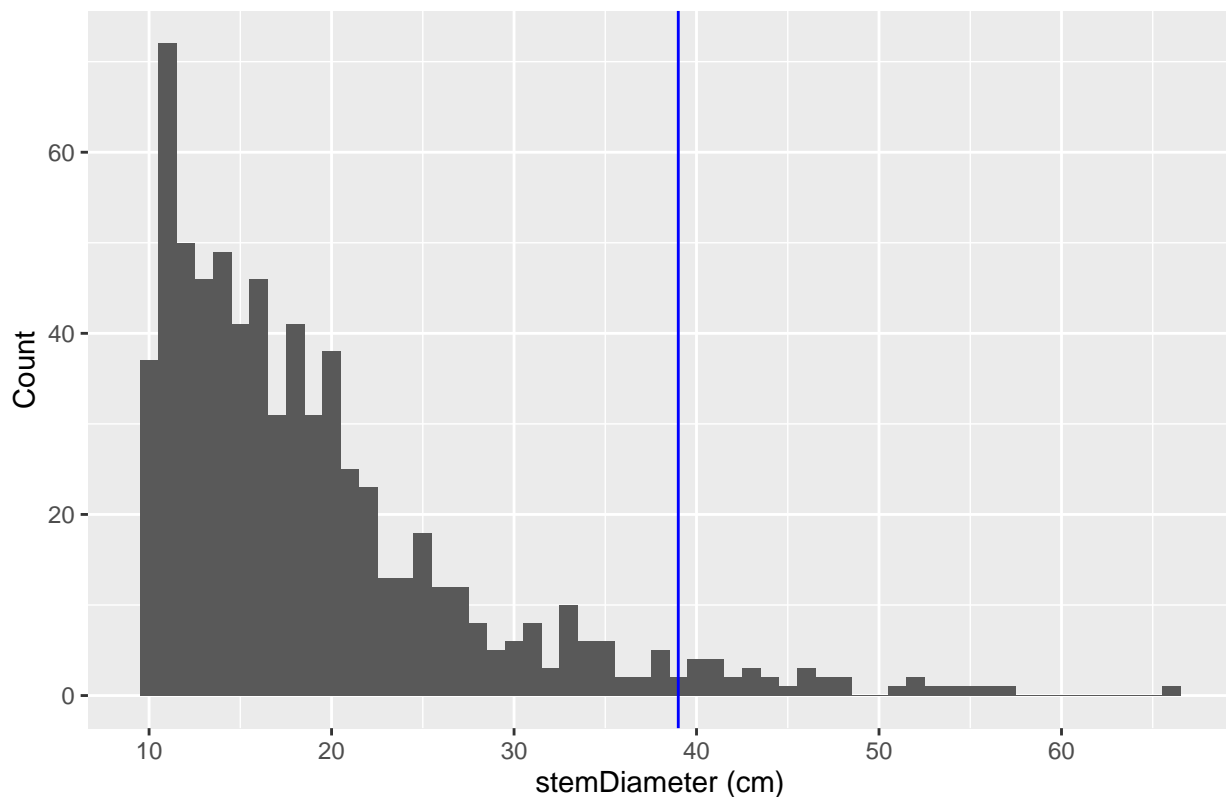
Summary of DSNY Fulcrum Data

- 1207 records in Fulcrum, collected between 2018-01-02 to 2018-01-18
- 93 records of individuals for which a **stemdiameter** was recorded

D03: DBH percentiles and histograms

- Histograms and analyses for D03 are identical to previous analyses

OSBS: Results of stem diameter analysis
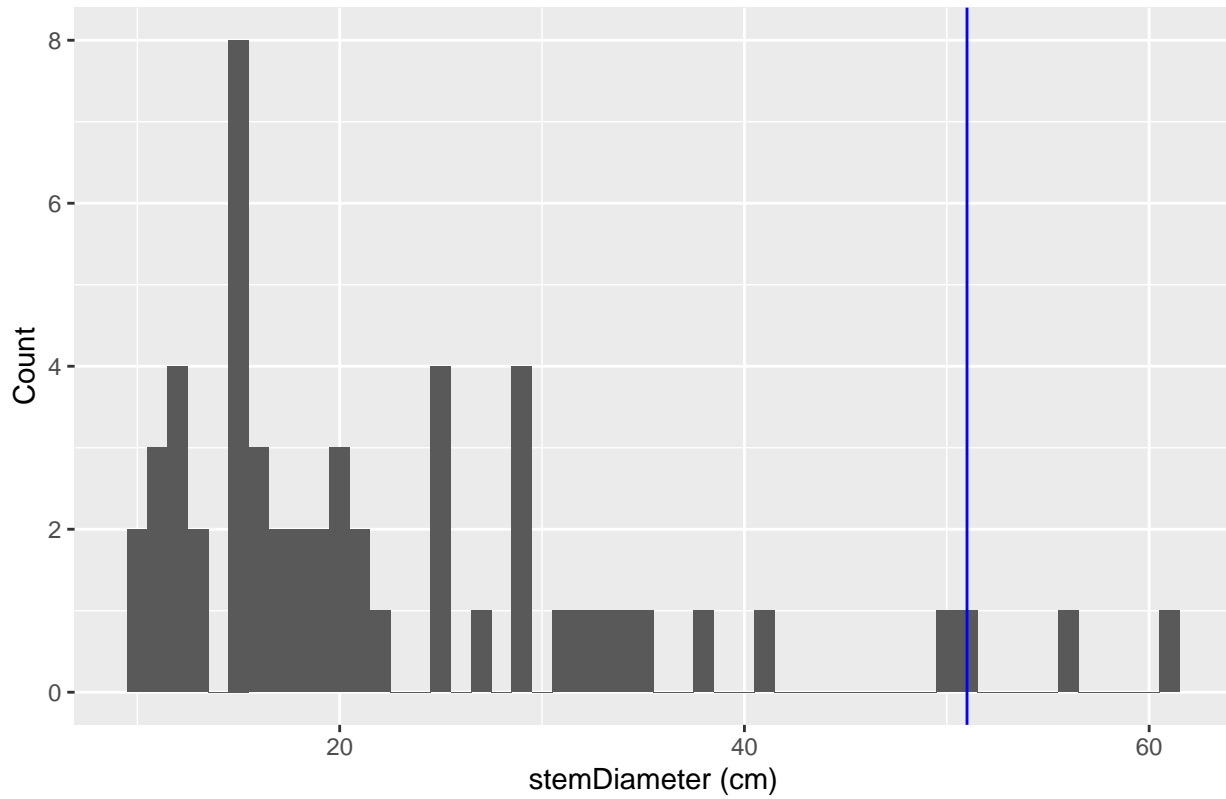
D03 OSBS stemDiameter distribution

- Histogram: No clear breakpoint in distribution tail
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 39 cm

- Max `stemDiameter` = 66.1 cm
- Dlim for maxLikelyStemDiameter = 130 m @ F=5
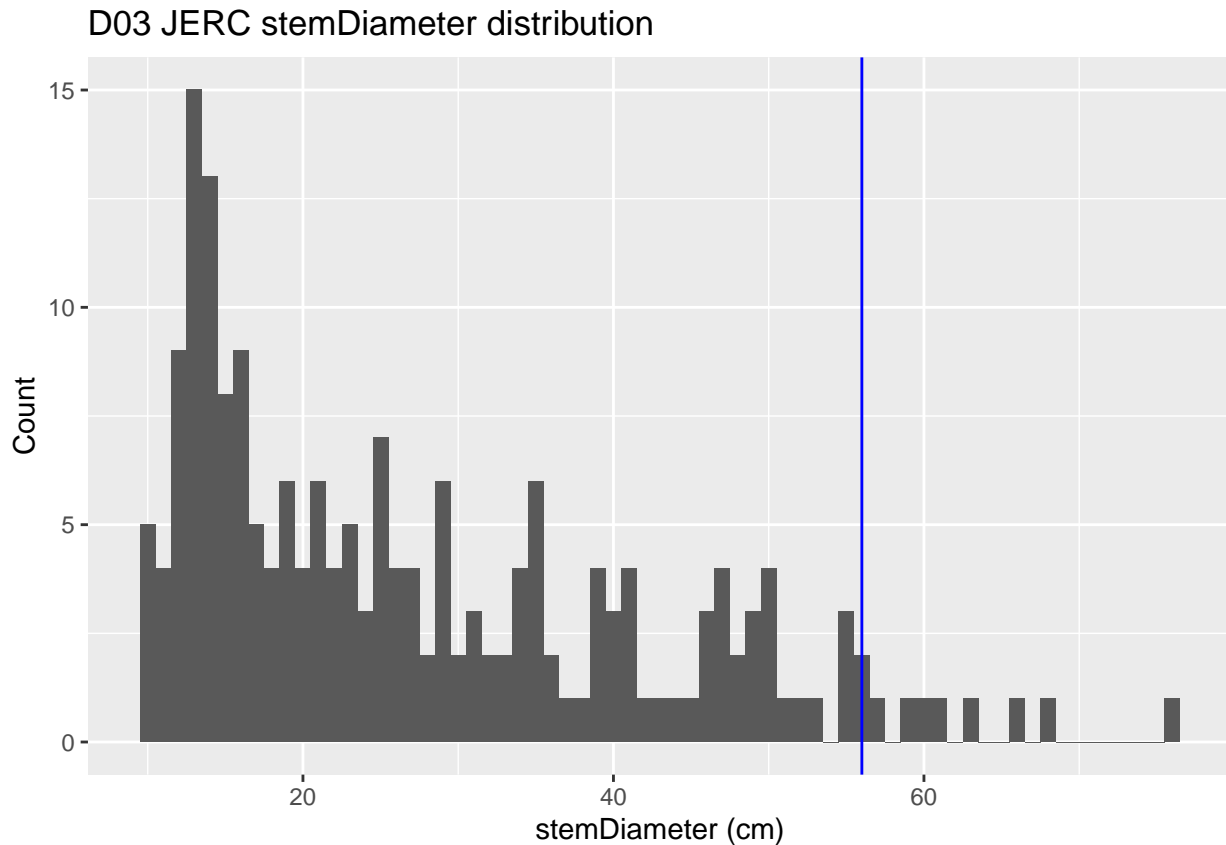
DSNY: Results of stem diameter analysis

D03 DSNY stemDiameter distribution

- Histogram: Most individuals encountered have DBH <= 40 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 51 cm
- Max `stemDiameter` = 61 cm
- Dlim for maxLikelyStemDiameter = 210 m @ F=5

JERC: Results of stem diameter analysis

D03 JERC stemDiameter distribution

- Histogram: No clear breakpoint in distribution tail
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 56 cm
- Max `stemDiameter` = 76.2 cm
- Dlim for maxLikelyStemDiameter = 260 m @ F=5

D04 stemDiameter analysis

D04: Load and clean data

There are VST data for GUAN in the 'Veg Characterization data' folder on Sharepoint, which have been dowloaded to the working directory of this repo. There are also 2014 VST data from one plot at GUAN (GUAN_002), but analysis of these data is not included here.

Results of D04 dataframe comparison and cleanup:

- 21 plots sampled at GUAN –> includes GUAN_002; based on plotID, need to cross-check with 'applicableModules.csv' to determine whether should be part of dataset. Including it will likely not affect results of stemDiameter analysis.
- 20 duplicates in the GUAN input data frame

D04: Create and check unified VST dataset
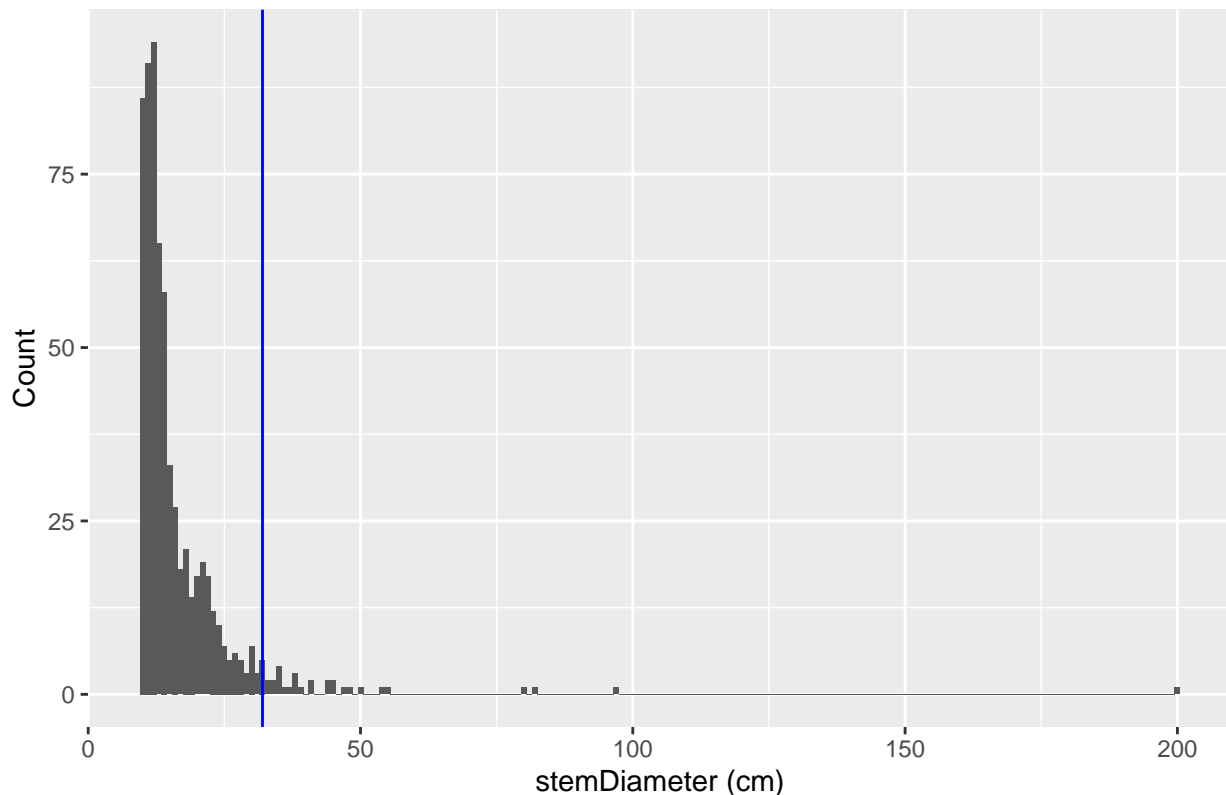
Summary statistics for dataframe(s)

- `guan` has 2668 unique records
- GUAN data collection: Significant effort Jun-Aug 2015, big effort in November 2015.

D04: DBH percentiles and histograms

- Histograms and analyses for D04 are identical to those created for other sites

GUAN: Results of stem diameter analysis

D04 GUAN stemDiameter distribution

- Histogram: Most individuals encountered have DBH <= 50 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 32 cm
- Max `stemDiameter` = 200 cm; extreme outlier –> likely data entry error.
- Dlim for maxLikelyStemDiameter = 84 m @ F=5

D05 stemDiameter analysis

D05: Load and clean data

There are VST data for TREE and STEI in the 'Veg Characterization data' folder on Sharepoint, which have been dowloaded to the working directory of this repo. Some VST data from UNDE from 2014 are in the CI Dropbox (10.100.128.37). For STEI, it is necessary to assess transect length separately for Distributed Plots and Tower Plots, as the Distributed Plots are in the CNF, are miles away, and are managed completely differently than the Tower Plots.

Results of D05 dataframe comparison and cleanup:

- `uid` column missing from `vst2` -> remove from `vst1`
- Data were collected in only 4 plots at UNDE in 2014
- `siteID`, `measuredBy`, and `recordedBy` columns missing from `vst1` -> added `siteID`=="UNDE" to `vst1`

- 7 duplicate records in `vst1`
- 23 duplicate records in `vst2`

D05: Create and check unified VST dataset

Results of dataframe merge

- `vstd5` has 3028 records using the full_join technique: an exact sum of the two input data frames
- UNDE data collected in 2014-10
- STEI data collected in 2015-08, over two weeks
- TREE data collected in 2015-07 and 2015-08, over two weeks

D05: DBH percentiles and histograms

- Histograms and analyses for D05 are identical to those created for other sites

UNDE: Results of stem diameter analysis

D05 UNDE stemDiameter distribution
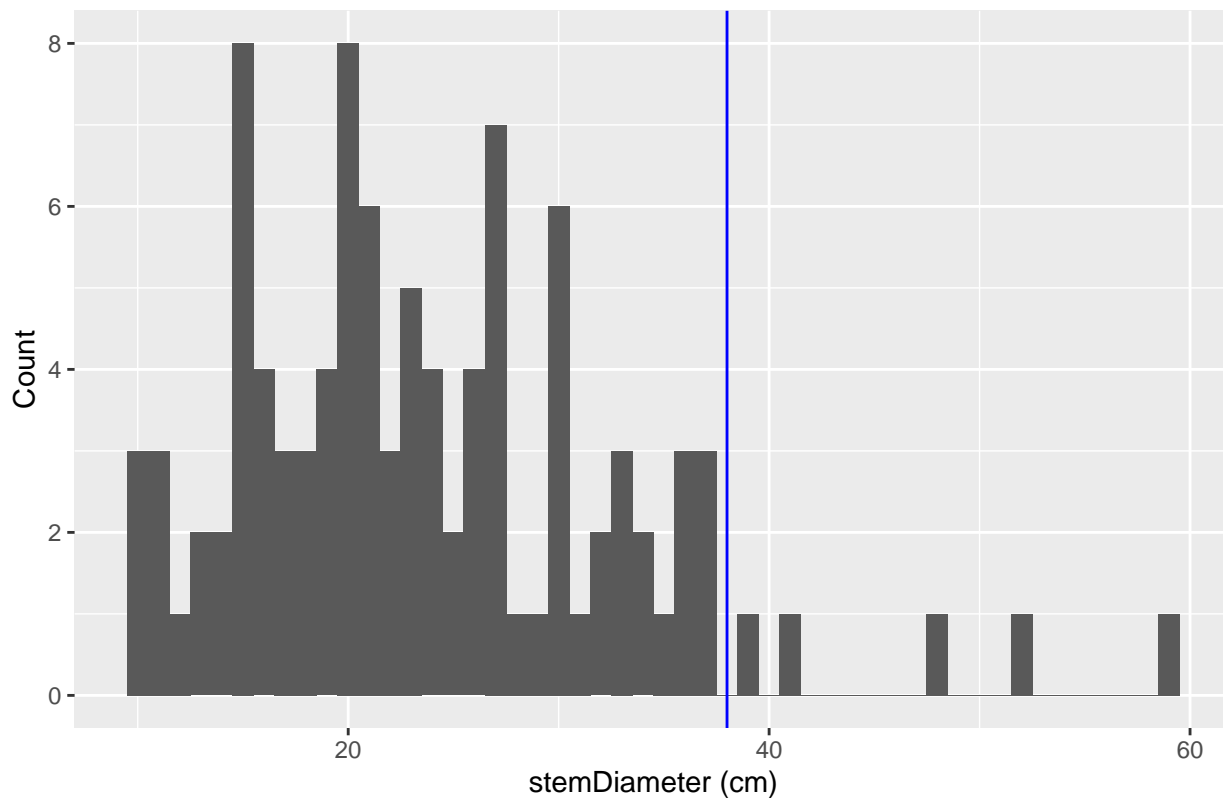
- Only 100 individuals >= 10 cm diameter measured at UNDE -> incomplete data collection effort or data entry effort.
- Histogram: Clear breakpoint at about 38 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 38 cm
- Max `stemDiameter` = 59.3 cm
- Dlim for maxLikelyStemDiameter = 120 m @ F=5

### *STEI: Results of stem diameter analysis*

D05 STEI stemDiameter distribution
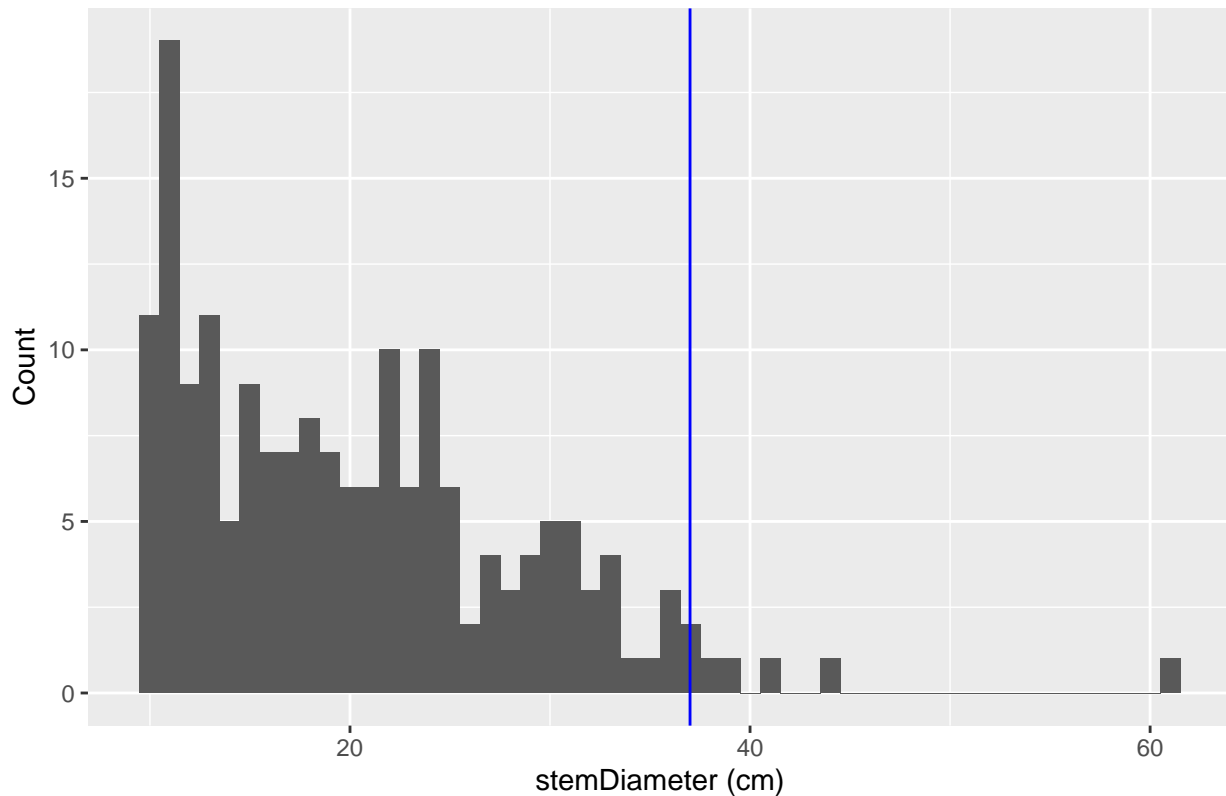
- All data used for STEI analysis are Tower Plot data; no Distributed Plots sampled in this dataset. Only 179 individuals $>=$ 10 cm diameter measured at STEI -> few records likely because the Tower airshed is very small
- Histogram: Clear breakpoint at about 40 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 37 cm
- Max `stemDiameter` = 61.2 cm
- Dlim for maxLikelyStemDiameter = 110 m @ F=5

TREE: Results of stem diameter analysis

D05 TREE stemDiameter distribution
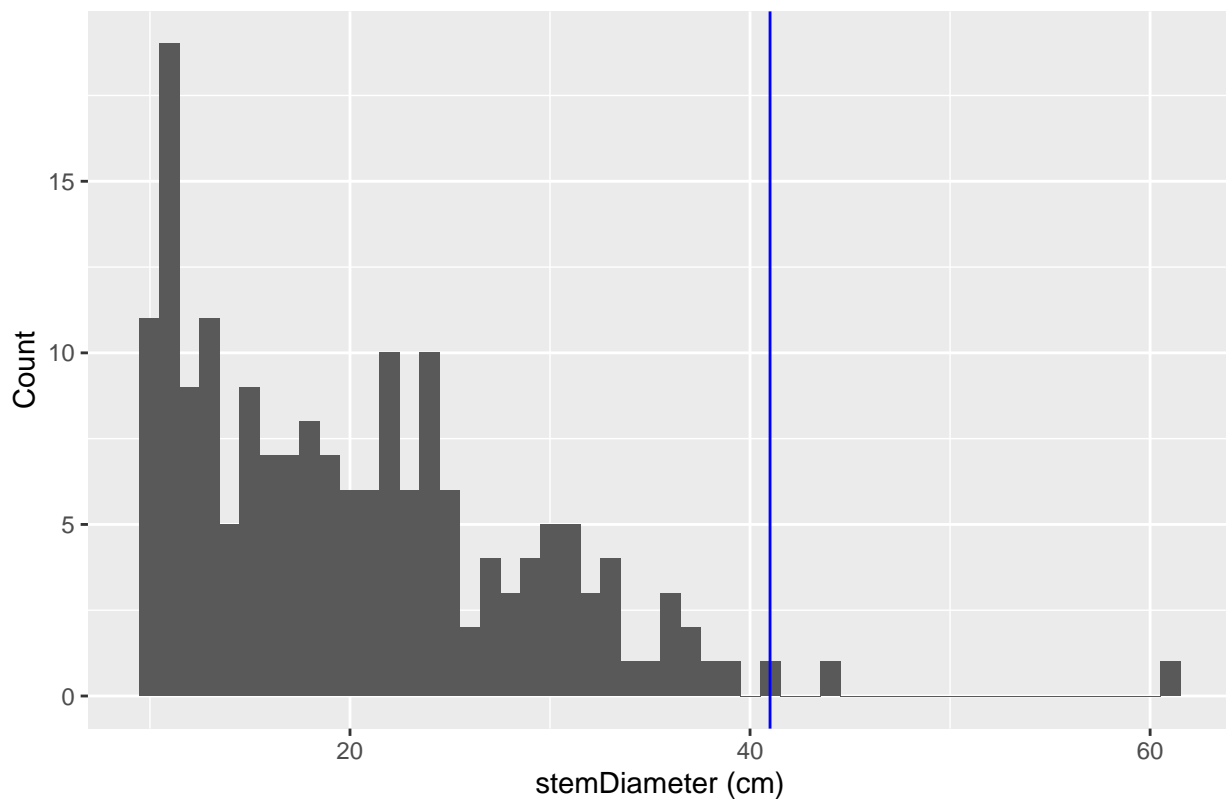
- 736 individuals >= 10 cm diameter measured at TREE
- Histogram: Clear breakpoint at about 39 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 41 cm
- Max `stemDiameter` = 55.3 cm
- Dlim for maxLikelyStemDiameter = 140 m @ F=5

D06 stemDiameter analysis

D06: Load and clean data

There are VST data for UKFS in the 'Veg Characterization data' folder on Sharepoint, which have been dowloaded to the working directory of this repo. Data for KONZ come from Fulcrum.

Results of D06 dataframe comparison and cleanup:

- 20 plots sampled at UKFS
- 0 duplicates in the UKFS input data frame
- 10 plots with tree and small tree individuals at KONZ
- 2 duplicates in input data from Fulcrum

D06: Create and check unified VST dataset

Summary statistics for dataframe(s)

- UKFS has 1561 unique records
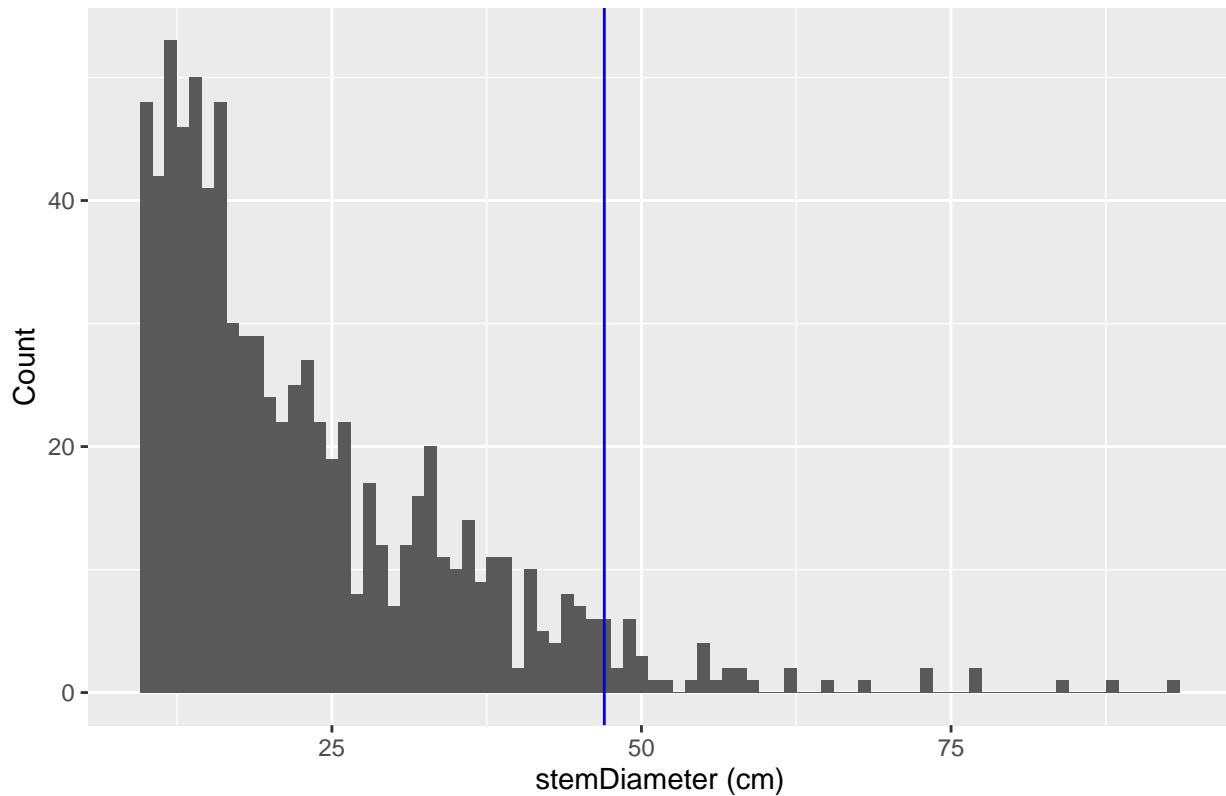- UKFS data collection: Effort in Aug 2015.

- KONZ has 236 unique records
- KONZ data collection for analysis: Effort from 2016-10-26 to 2016-11-09

D06: DBH percentiles and histograms

- Histograms and analyses for D06 are identical to those created for other sites

UKFS: Results of stem diameter analysis

D06 UKFS stemDiameter distribution

- Histogram: Most individuals encountered have DBH <= 55 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 47 cm
- Max `stemDiameter` = 93.1 cm; extreme outlier –> likely data entry error.
- Dlim for maxLikelyStemDiameter = 180 m @ F=5

KONZ: Results of stem diameter analysis
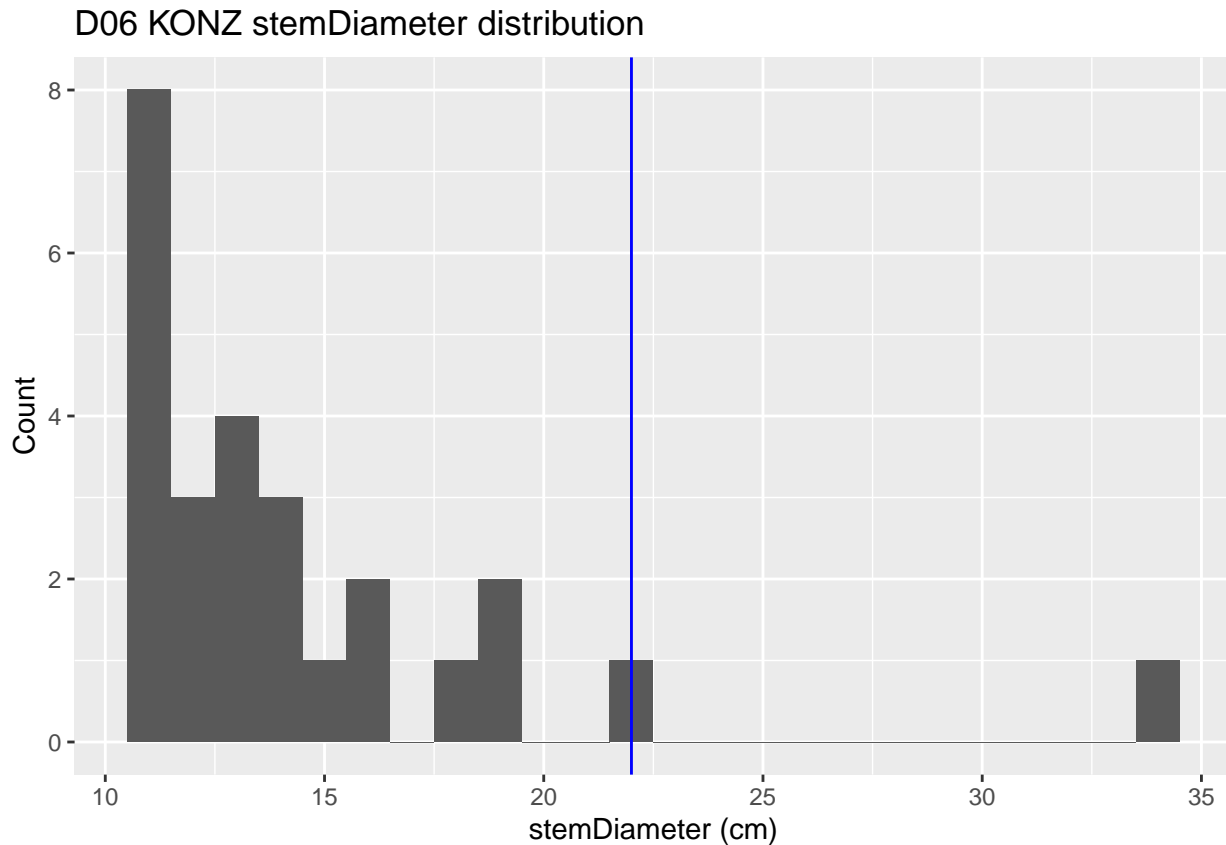
D06 KONZ stemDiameter distribution

- Histogram: Most individuals encountered have DBH $<=$ 20 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 22 cm
- Max `stemDiameter` = 33.8 cm
- Dlim for maxLikelyStemDiameter = 40 m @ F=5

D07 stemDiameter analysis

D07: Load and clean data

There are VST data for ORNL and GRSM in the in the CI Dropbox (10.100.128.37).

Results of D07 dataframe comparison and cleanup:

- In `vst_ORNL_apparentindividual_in.csv`, `vd1Height` and `vd2Height` values appear to have been switched; `vd1Height` values are negative.
- All colnames in `vst1` exist in `vst2`
- colnames in `vst2` not in `vst1`: Field1, basalDiameter, basalDiameterHeight, growthForm
- Field1 is all NAs -> remove from `vst2`
- 20 plots sampled at GRSM
- 40 plots sampled at ORNL
- 7 duplicate records in `vst1`
- 10 duplicate records in `vst2`

D07: Create and check unified VST legacy dataset

D07 MLBS: Pull VST Tower Plot data from Fulcrum database

Results of dataframe merge

- `vstd7` has 5539 records using the full_join technique: an exact sum of the two input data frames
- GRSM data collected between 2015-05-18 and 2015-06-26
- ORNL data collected between 2015-11-04 and 2016-01-19
- 16 plots sampled at MLBS between 2017-10-02 and 2017-10-24
- 3 duplicates in the MLBS data frame

D07: DBH percentiles and histograms

- Histograms and analyses for D07 are identical to those created for other sites

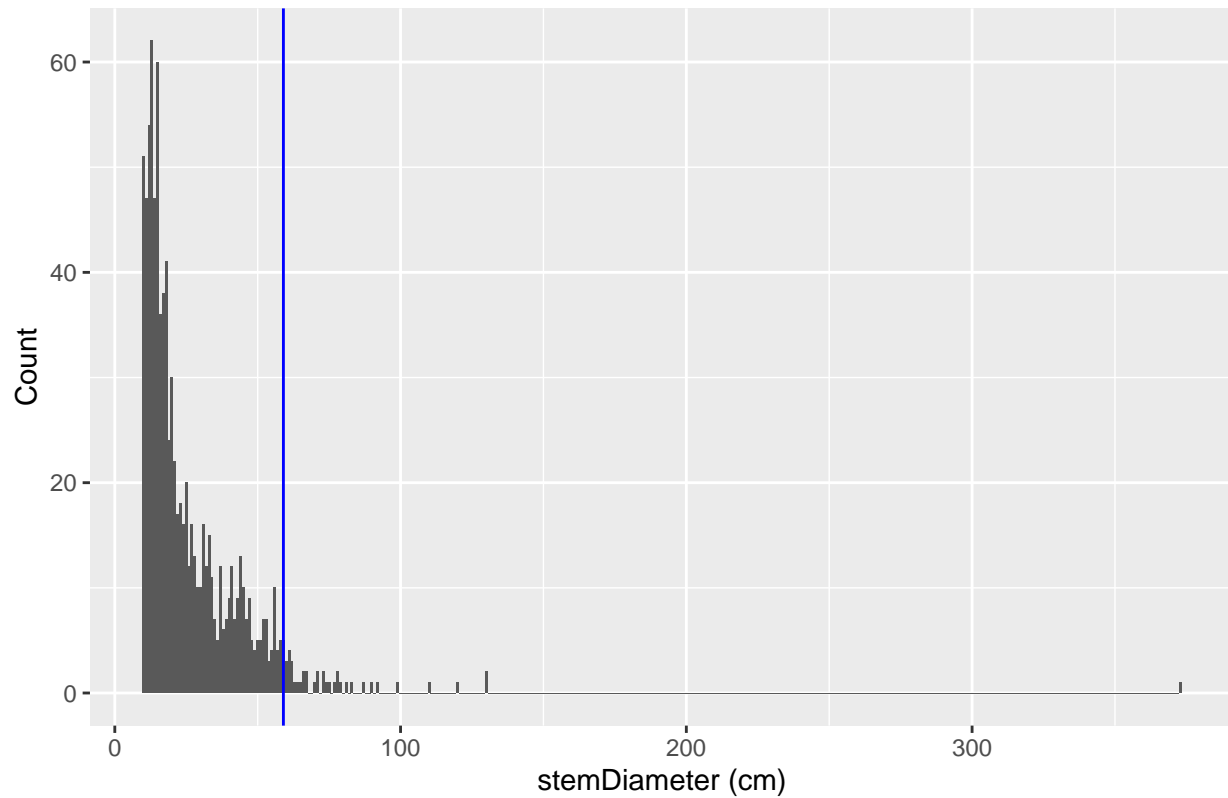*ORNL: Results of stem diameter analysis*

D07 ORNL stemDiameter distribution
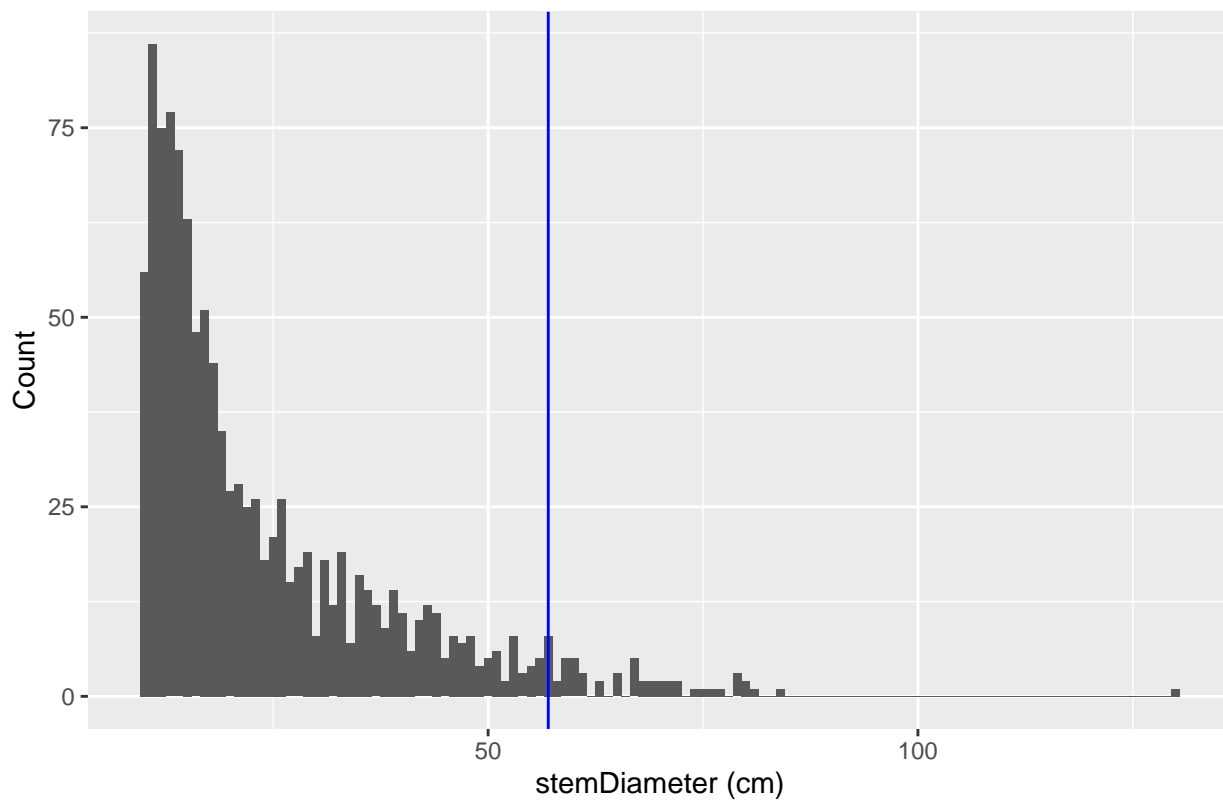
- Histogram: Most individuals encountered have DBH $<=$ ~60 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` $->$ 57 cm
- Max `stemDiameter` = 130 cm
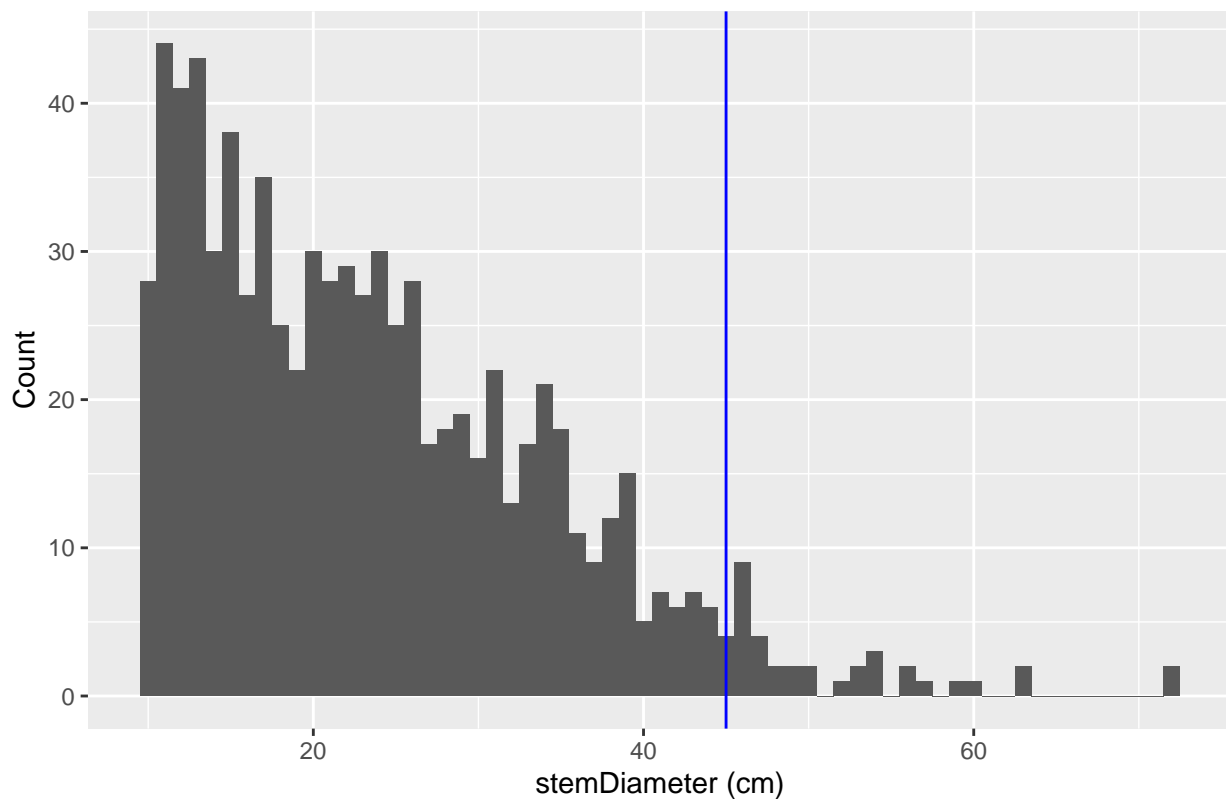- Dlim for maxLikelyStemDiameter = 270 m @ F=5

GRSM: Results of stem diameter analysis

D07 GRSM stemDiameter distribution

- Histogram: Most individuals encountered have DBH <= ~65 cm
- With F=5, Dlim=290 m; selected F=8 since 300 m transects are very long
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 59 cm
- Max `stemDiameter` = 373.3 cm
- Dlim for maxLikelyStemDiameter = 180 m @ F=8

MLBS: Results of stem diameter analysis

D07 MLBS stemDiameter distribution

- Histogram: Most individuals encountered have DBH <= 50 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` -> 45 cm
- Max `stemDiameter` = 72.4 cm
- Dlim for maxLikelyStemDiameter = 170 m @ F=5

D08 stemDiameter analysis

D08: Load and clean data

The 2015 VST data reside in one file in the CI Dropbox (10.100.128.37).

Results of D08 dataframe comparison and cleanup:

- 20 plots sampled at DELA
- 10 plots sampled at LENO
- 40 plots sampled at TALL
- 21 duplicate records in `vst1`

D08: Create and check unified VST dataset

Results of dataframe merge

- `vstd8` has 7657 records
- DELA data collected between 2015-09-14 and 2015-09-29
- LENO data collected between 2015-11-03 and 2015-11-12
- TALL data collected between 2015-09-30 and 2015-10-28

D08: DBH percentiles and histograms

- Histograms and analyses for D08 are identical to those created for other sites
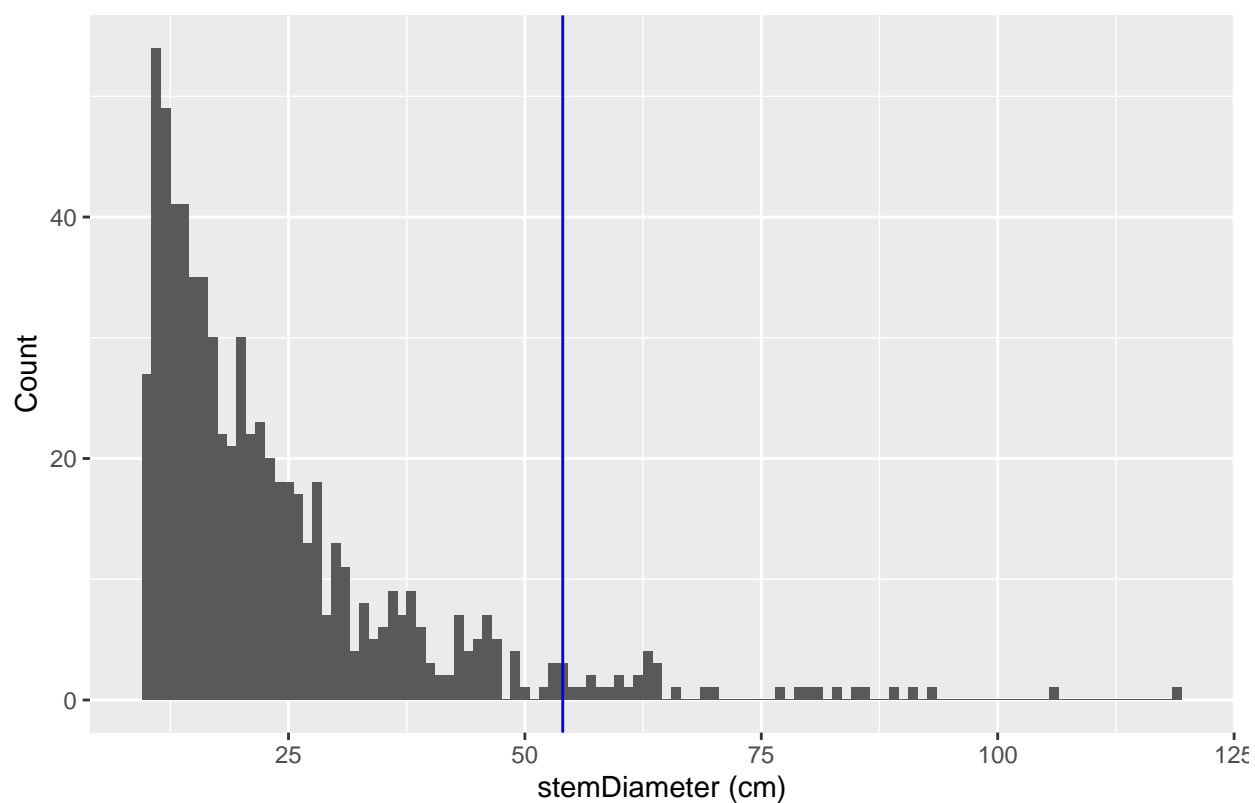
TALL: Results of stem diameter analysis

D08 TALL stemDiameter distribution
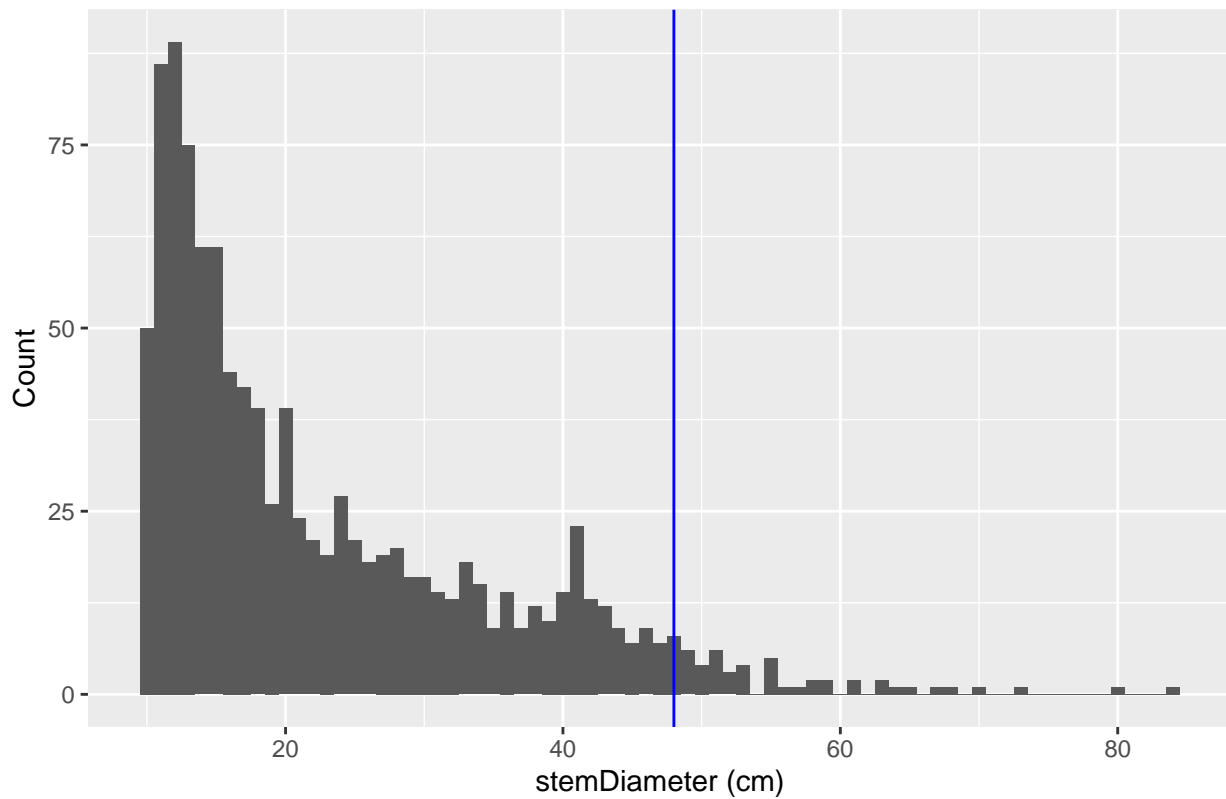
- Histogram: Most individuals encountered have DBH <= 52 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 48 cm
- Max `stemDiameter` = 83.7 cm
- Dlim for maxLikelyStemDiameter = 190 m @ F=5

DELA: Results of stem diameter analysis

D08 DELA stemDiameter distribution

- Histogram: Most individuals encountered have DBH <= 50 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 54 cm
- Max `stemDiameter` = 119 cm
- Dlim for maxLikelyStemDiameter = 240 m @ F=5

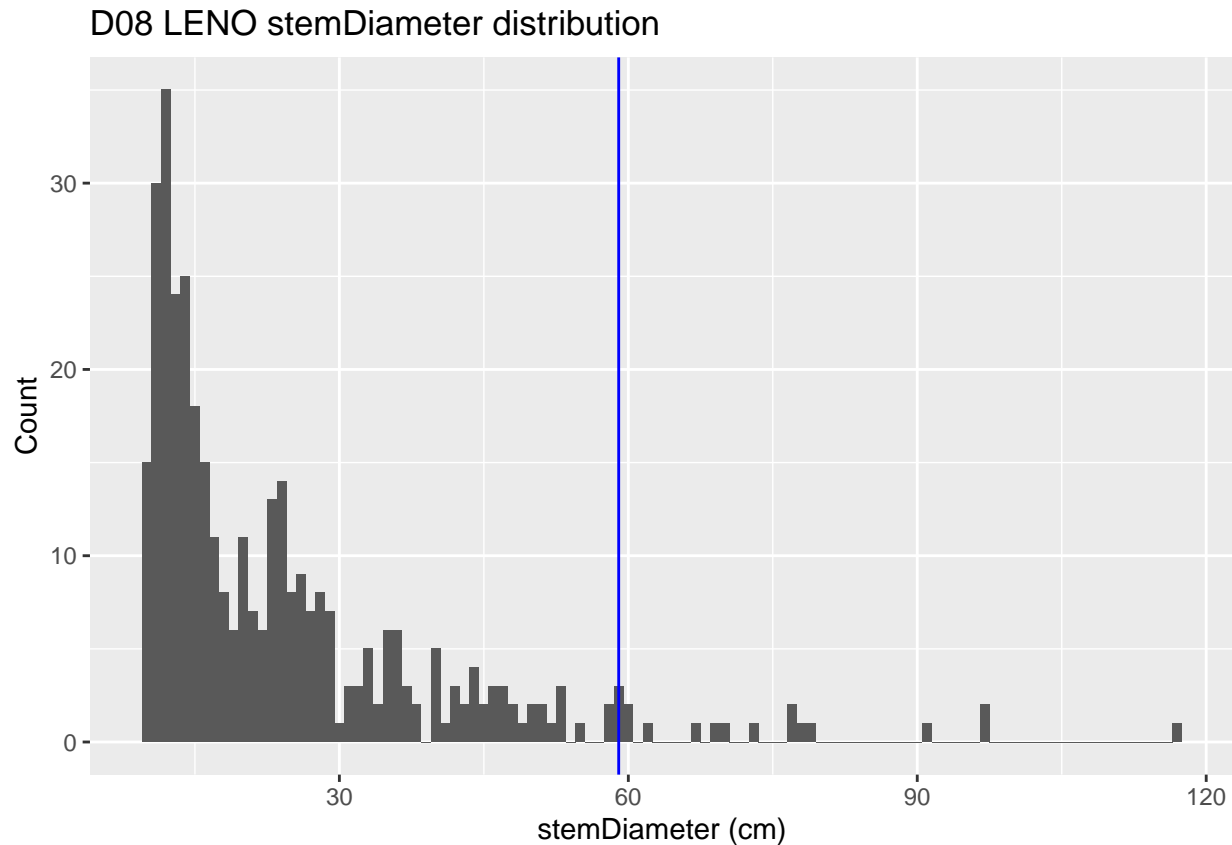***LENO: Results of stem diameter analysis***

D08 LENO stemDiameter distribution

- Histogram: Most individuals encountered have DBH <= 55 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 59 cm
- Max `stemDiameter` = 117 cm
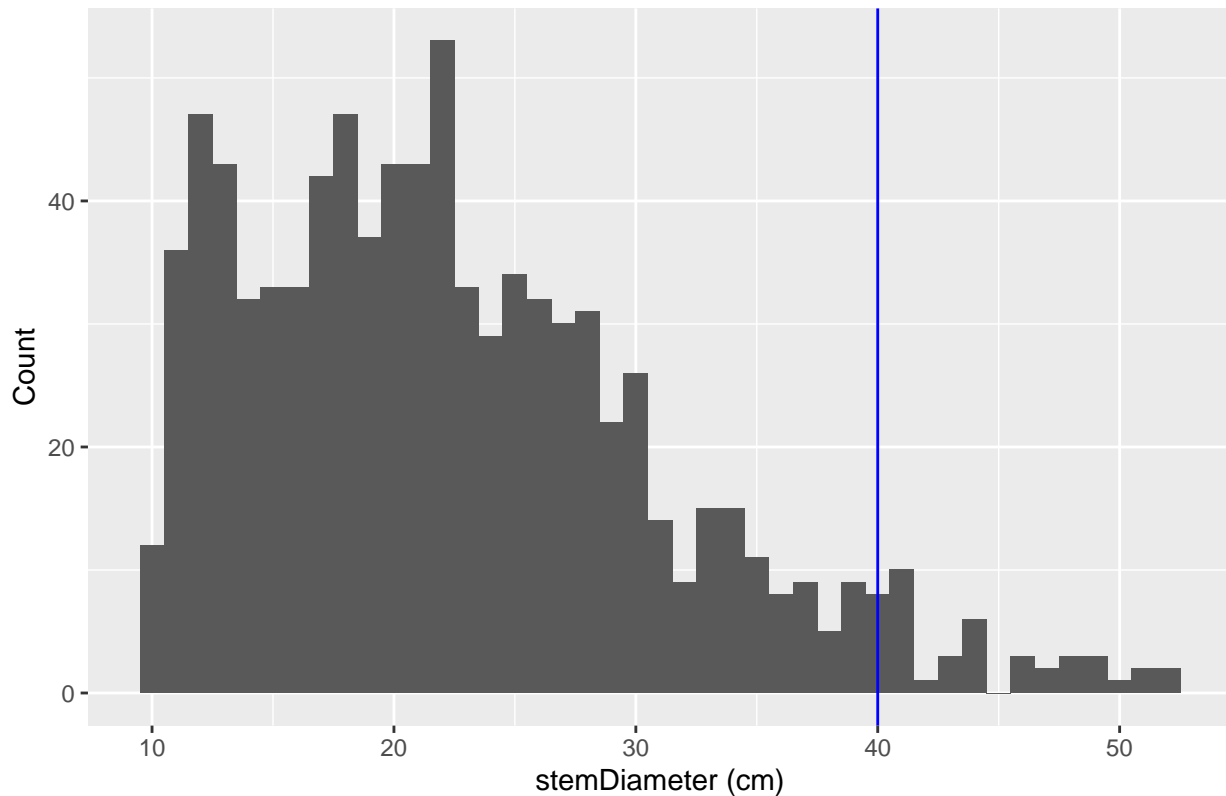- Dlim for maxLikelyStemDiameter = 180 m @ F=8

D10 stemDiameter analysis

D10 RMNP Tower Plots: Pull VST data from Fulcrum database

Summary of RMNP Tower Plot Fulcrum Data

- **1239** records in Fulcrum for which a **stemdiameter** was recorded
- Data collected between 2017-09-26 to 2017-10-10
- 877 records for individuals with DBH >= 10 cm.

RMNP: Results of stem diameter analysis in Tower Plots

D10 T RMNP Tower Plot stemDiameter distribution

- Histogram: Most individuals encountered have DBH <= 42 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 40 cm
- Max `stemDiameter` = 52.2 cm
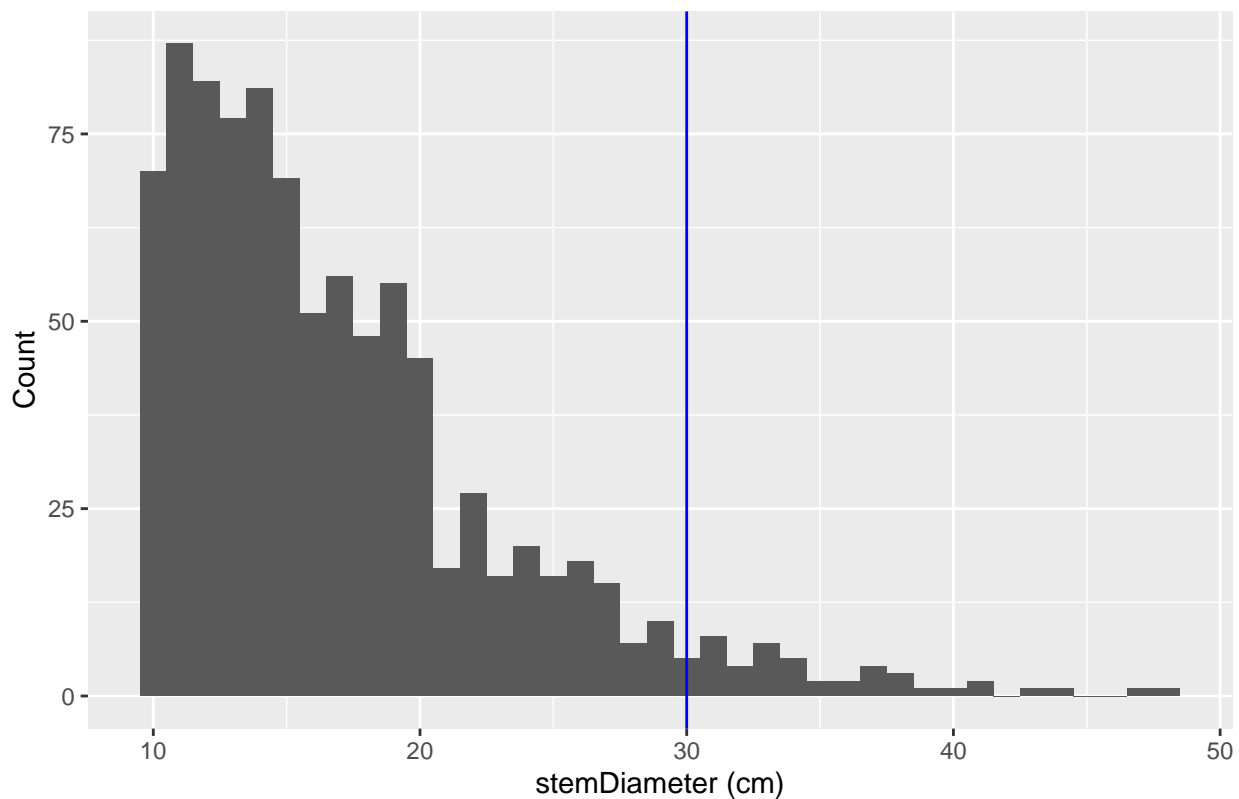- Dlim for maxLikelyStemDiameter = 130 m @ F=5

D10 RMNP Distributed Plots: Pull VST data from Fulcrum database

Summary of RMNP Distributed Plot Fulcrum Data

- **1166 records** in Fulcrum for which a **stemdiameter** was recorded
- Data collected between 2018-09-07 and 2018-10-03
- 915 records for individuals with DBH >= 10 cm.

RMNP: Results of stem diameter analysis in Distributed Plots

D10 D RMNP RMNP Distributed Plot stemDiameter distribution

- Histogram: Most individuals encountered have DBH $<=$ 34 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` $->$ 30 cm
- Max `stemDiameter` = 48.4 cm
- Dlim for maxLikelyStemDiameter = 74 m @ F=5

D11 stemDiameter analysis

D11: Load and clean data

The VST data used here come from VegCharacterization data collected in March/April 2016, and stored in the working directory of this Rmd file.

Results of D11 dataframe comparison and cleanup:

- 29 Tower Plots sampled at CLBJ (no other sites in D11 in this data input file)
- 13 duplicate records in `clbj` input data frame

D11: Create and check unified VST dataset
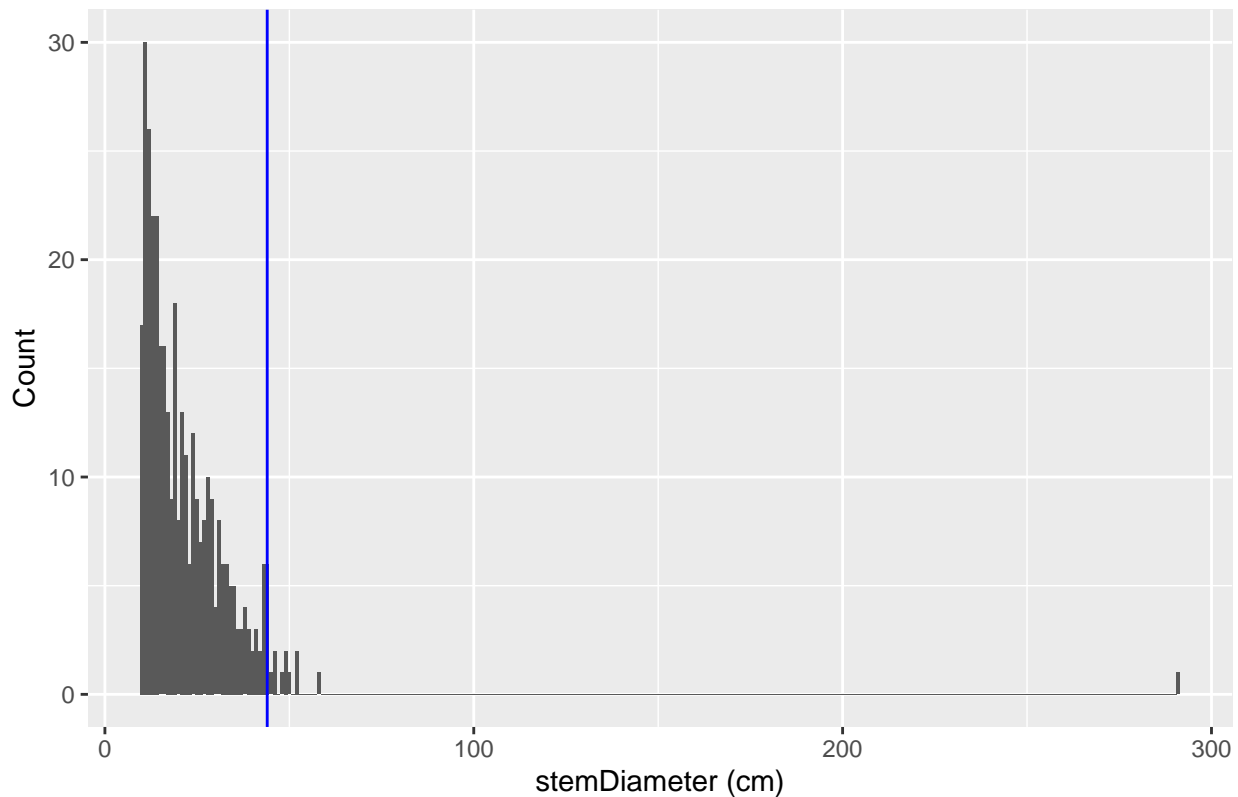
Dataframe details

- `clbj` has 1486 records
- `clbj` data collected between 2016-02-09 and 2016-05-11

D11: DBH percentiles and histograms

- Histograms and analyses for D11 are identical to those created for other sites

CLBJ: Results of stem diameter analysis

D11 CLBJ stemDiameter distribution

- Histogram visual inspection: Most individuals encountered have DBH $<= 50$ cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` $->$ 44 cm
- Max `stemDiameter` = 291 cm; clearly a data entry error
- Dlim for maxLikelyStemDiameter = 160 m @ F=5

D12 stemDiameter analysis

## D12 YELL Distributed Plots: Pull VST data from Fulcrum database

Summary of YELL Distributed Plot Fulcrum Data

- 251 records in Fulcrum for which a **stemdiameter** was recorded
- Data collected in two efforts: Between 2018-05-17 to 2018-05-22, and 2019-07-23 to 2019-08-26
- 216 records for individuals with DBH $>= 10$ cm

YELL: Results of stem diameter analysis in Distributed Plots

D12 D YELL YELL Distributed Plot stemDiameter distribution
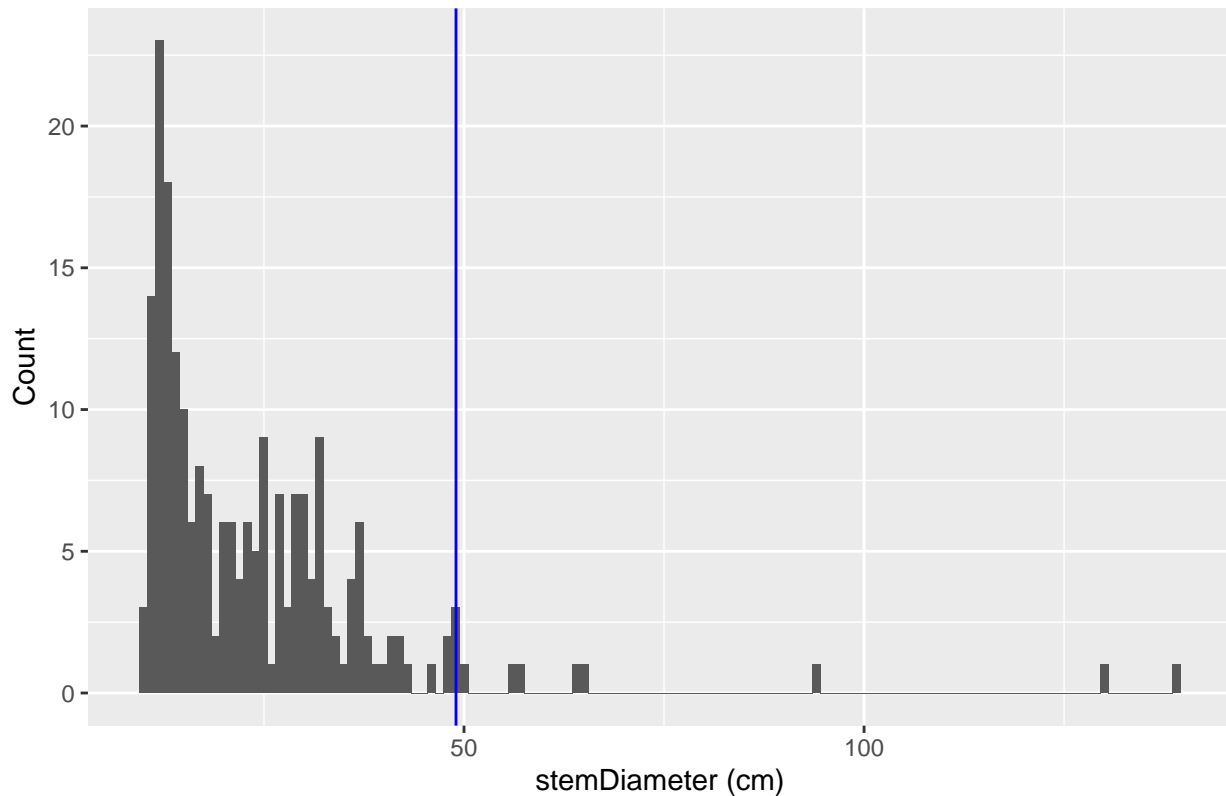
- Histogram: Most individuals encountered have DBH <= 55 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 49 cm
- Max `stemDiameter` = 139 cm
- Dlim for maxLikelyStemDiameter = 200 m @ F=5

D13 stemDiameter analysis

D13 NIWO: Load and clean data

The NIWO VST data used here come from VegStructure data collected from Distributed Plots in September of 2015. Data are are currently stored in the Field Ops 'Dropbox' (10.100.128.37). Data for MOAB come from VegCharacterization (Tower Plots only).

Results of D13 NIWO dataframe comparison and cleanup:

- 16 Distributed Plots sampled at NIWO
- 5 duplicate records in `niwo` input data frame
- 21 plots sampled at MOAB
- Zero duplicate records in `moab` input data frame

D13 NIWO: Create and check unified VST dataset
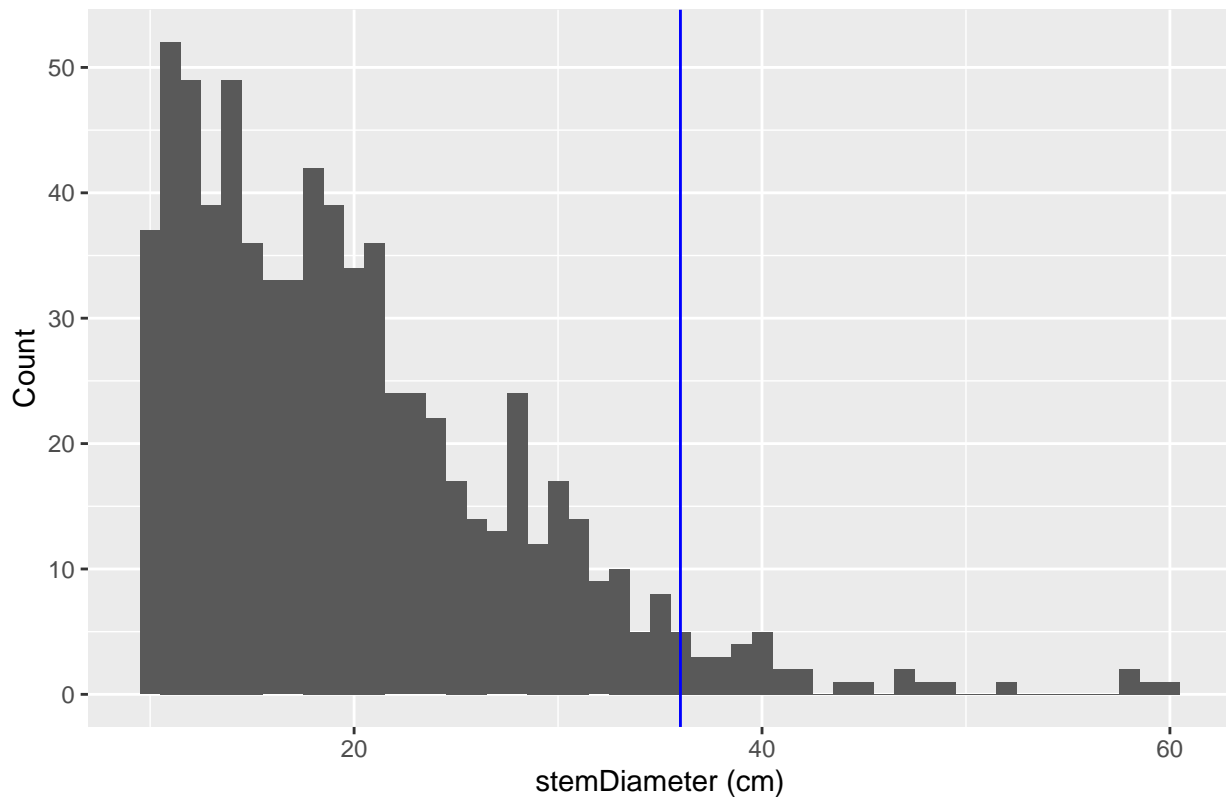
Dataframe details

- `niwo` has 1233 records
- NIWO data collected between 2015-08-19 and 2015-09-16

D13 NIWO: DBH percentiles and histograms

- Histograms and analyses for D13 are identical to those created for other sites

NIWO: Results of stem diameter analysis

D13 NIWO stemDiameter distribution

- Histogram visual inspection: Most individuals encountered have DBH $<= 42$ cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` $->$ 36 cm
- Max `stemDiameter` = 60.5 cm
- Dlim for maxLikelyStemDiameter = 110 m @ F=5

D13 MOAB stemDiameter analysis

D13 MOAB: Pull VST Tower Plot data from Fulcrum database

Summary of MOAB VST Fulcrum Data

- 1861 records in Fulcrum, collected between 2016-09-26 and 2016-10-24
- 119 records for which a **stemdiameter** was recorded
- Individuals with **stemdiameter** existed in 4 Distributed Plots only.

MOAB: Results of stem diameter analysis

D13 MOAB Distributed Plot stemDiameter distribution
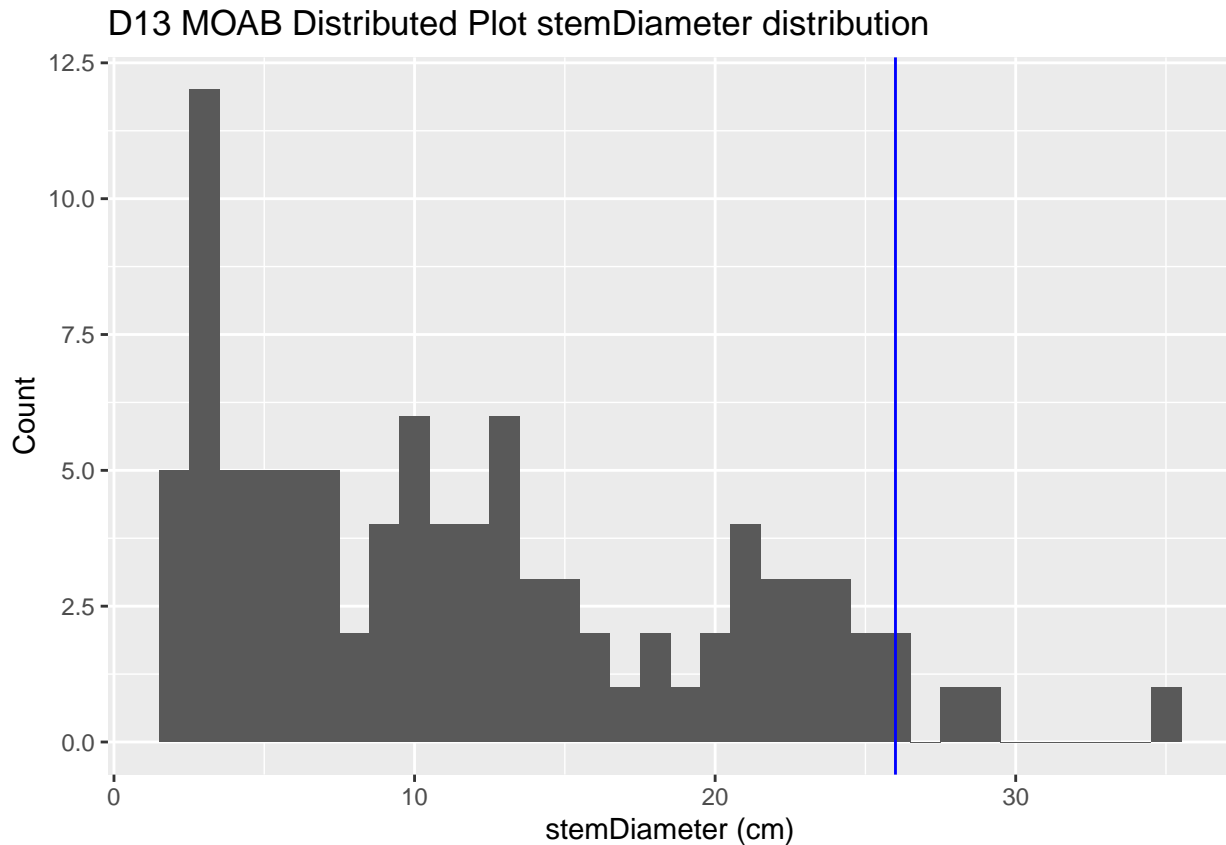
- Tower Plots do not contain qualifying VST individuals, so likely no qualifying CDW either –> no sampling in Tower Plots.
- Histogram: Most individuals encountered have DBH <= 25 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 26 cm
- Max `stemDiameter` = 34.8 cm
- Dlim for maxLikelyStemDiameter = 56 m @ F=5

D14 stemDiameter analysis

D14 SRER: Load and clean data

VST Distributed Plot data only, loaded from Fulcrum and collected in 2016.

Results of D14 dataframe comparison and cleanup:

- 18 plots with qualifying woody individuals at SRER
- 934 records with stemDiameter != 'NA', 7 records with DBH   10 cm, 135 records with DBH   2 cm; analysis for SRER uses all stems with DBH   2 cm
- 34 duplicates in input data frame from Fulcrum
- Data collected between 2016-10-18 and 2017-01-19

D14: DBH percentiles and histograms

- Histograms and analyses for D14 are identical to those created for other sites

D14 SRER stemDiameter distribution

- Histogram: Most individuals encountered have DBH $<= 10$ cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` $->$ 9 cm
- Max `stemDiameter` = 16.6 cm
- Dlim for maxLikelyStemDiameter = 6.7 m @ F=5

D15 stemDiameter analysis

D15 ONAQ: Load and clean data

VST Distributed Plot data only, loaded from Fulcrum and collected in 2016.
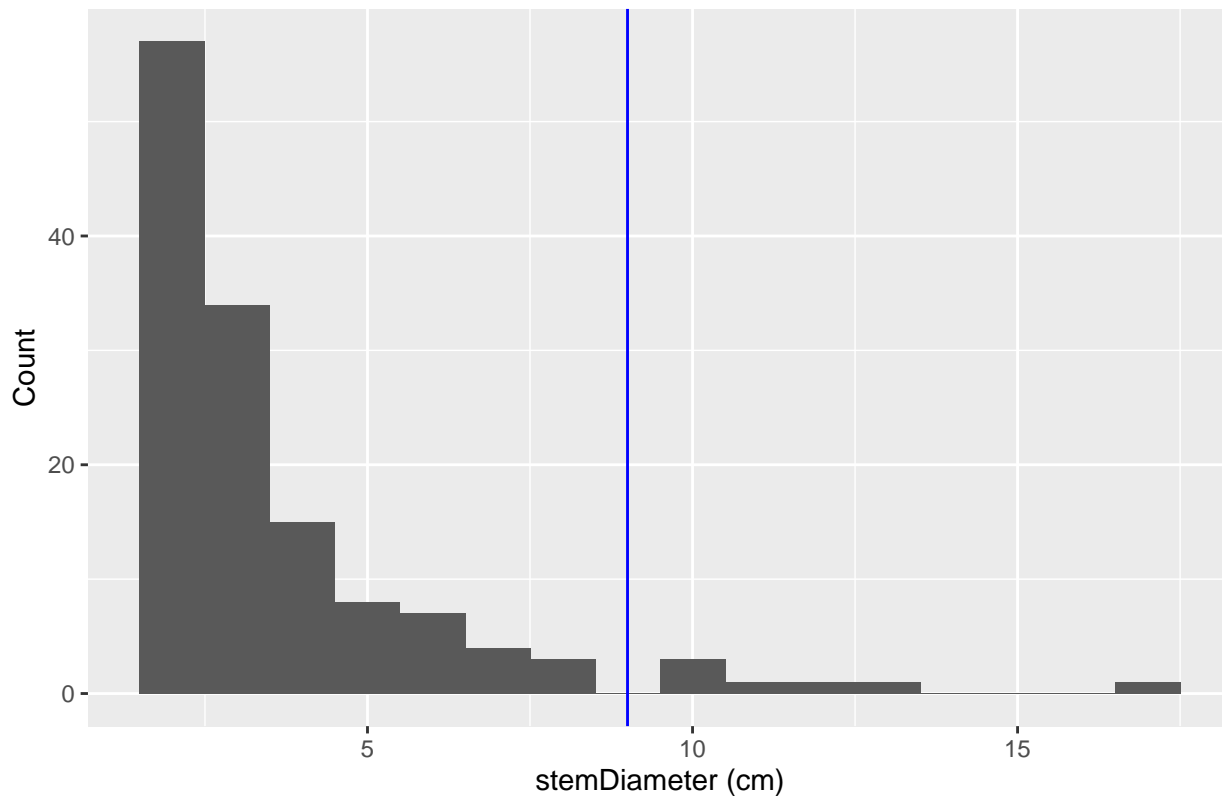
*Results of D15 dataframe comparison and cleanup*:

- 4 plots sampled at ONAQ
- 153 records with stemDiameter != 'NA' in Distributed Plots
- Zero duplicates in input data frame from Fulcrum
- Data collected between 2016-10-18 and 2016-11-03

D15: DBH percentiles and histograms

- Histograms and analyses for D15 are identical to those created for other sites

ONAQ: Results of stem diameter analysis

D15 ONAQ stemDiameter distribution
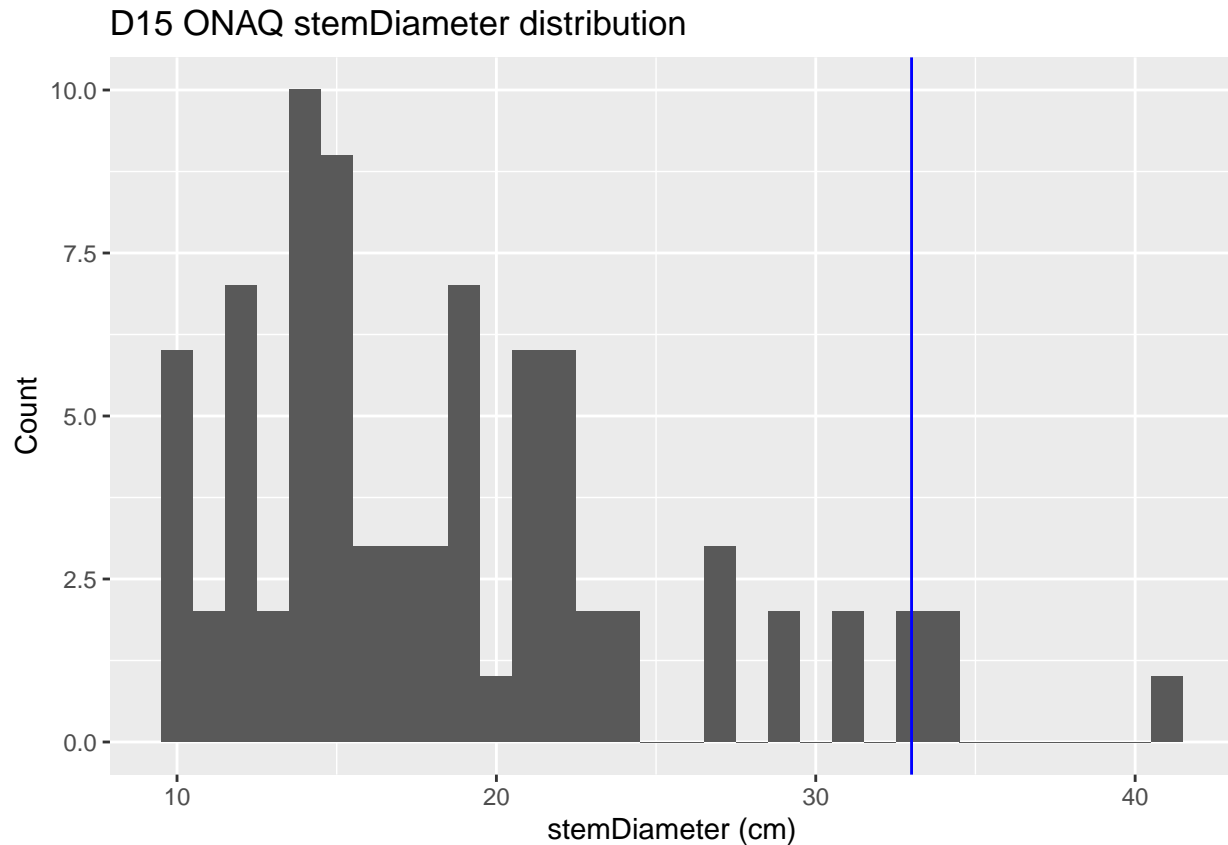
- Histogram: Most individuals encountered have DBH <= 35 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 33 cm
- Max `stemDiameter` = 41 cm
- Dlim for maxLikelyStemDiameter = 90 m @ F=5
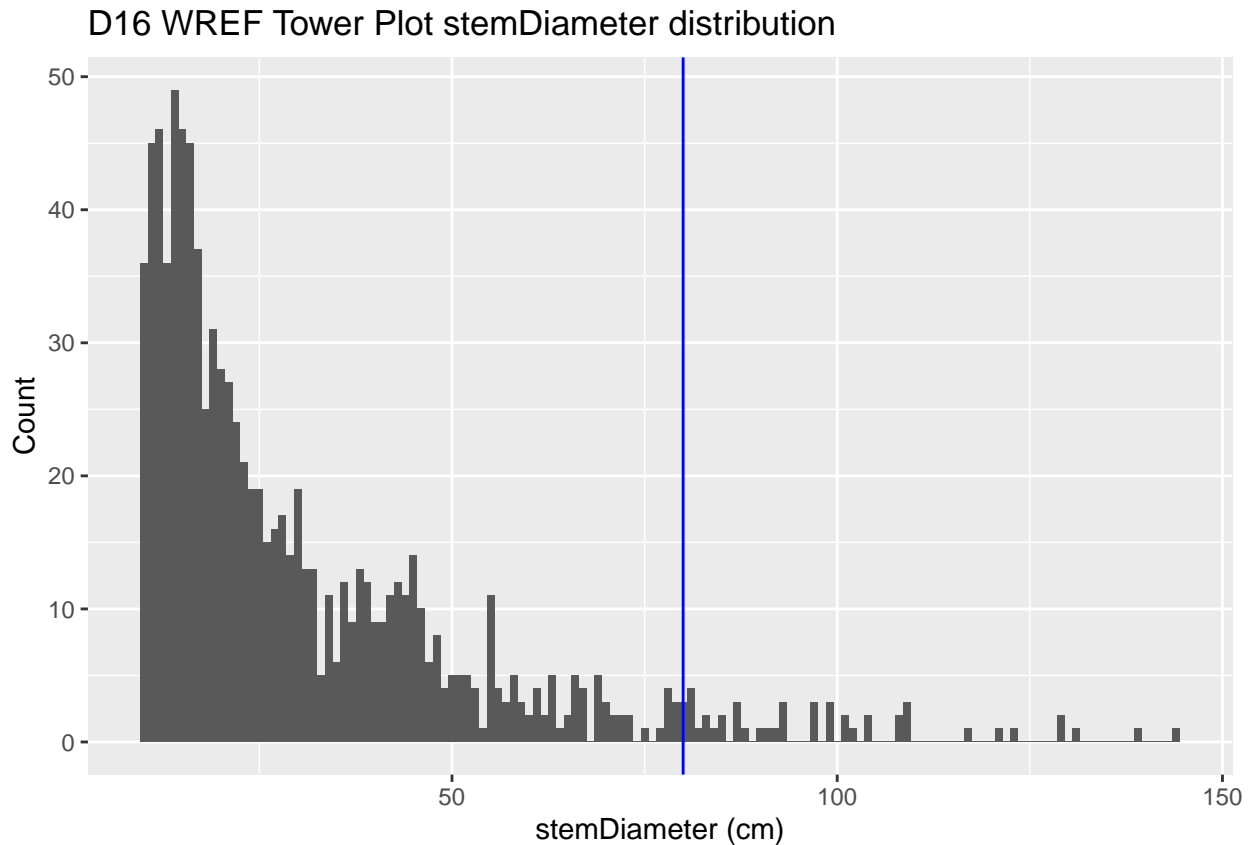
D16 stemDiameter analysis

D16 WREF Tower Plots: Pull VST data from Fulcrum database

Summary of WREF Tower Plot Fulcrum Data

- **1598** records in Fulcrum for which a **stemdiameter** was recorded
- Data collected between 2017-10-16 to 2017-11-01
- **944** records for individuals with DBH >= 10 cm.

WREF: Results of stem diameter analysis in Tower Plots

D16 WREF Tower Plot stemDiameter distribution

- Histogram: Most individuals encountered have DBH <= 90 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 80 cm
- Max `stemDiameter` = 144.2 cm
- Dlim for maxLikelyStemDiameter = 180 m @ F=15

D17 stemDiameter analysis

D17: Load and clean data

The 2015 VST data used here come from the 2015 VegCharacterization effort, and reside in site-specific files on Sharepoint. One file each for `SJER`, `SOAP` and `TEAK`.

Results of D17 dataframe comparison and cleanup:

- 20 plots sampled at SJER
- 20 plots sampled at SOAP
- 20 plots sampled at TEAK
- Zero duplicates in all input data frames

D17: Create and check unified VST dataset

Results of dataframe merge

- `vstd17` has 4258 records
- SJER data collected between 2015-04-14 and 2015-05-07
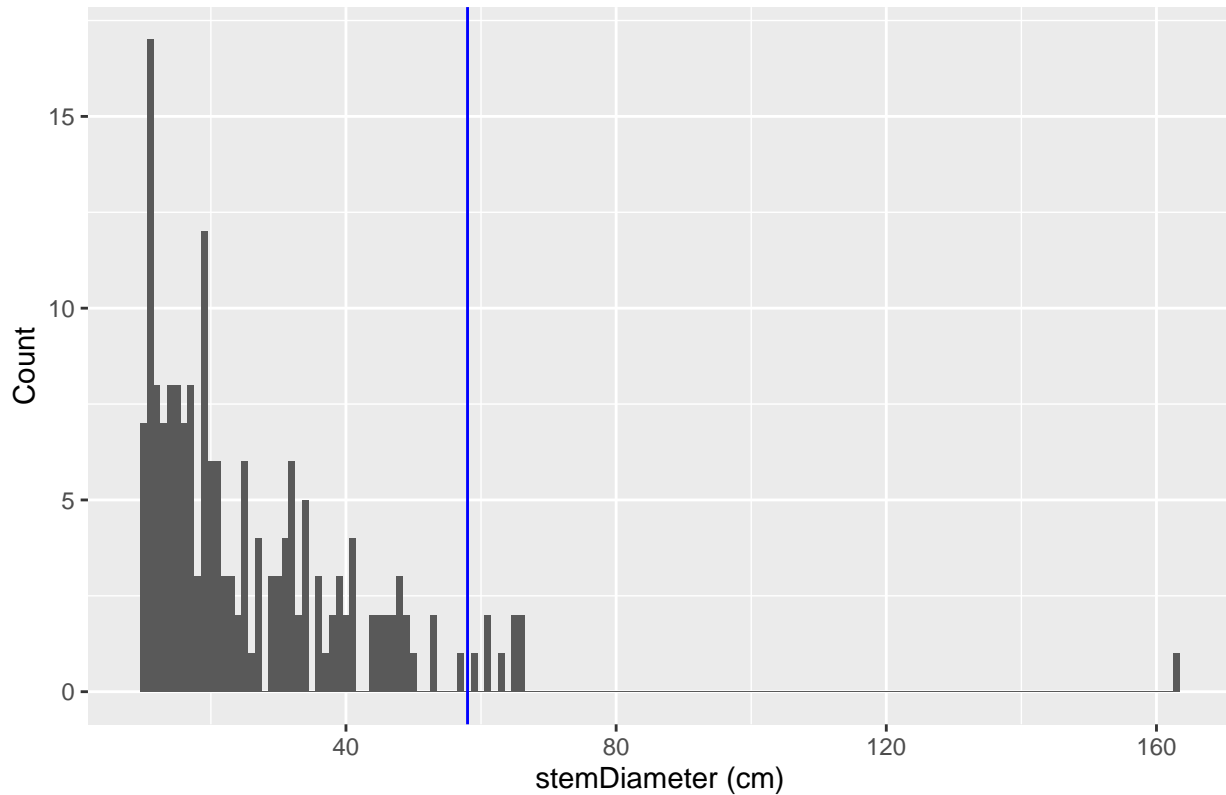- SOAP data collected between 2015-08-12 and 2015-11-20

- TEAK data collected between 2015-08-13 and 2015-10-20

D17: DBH percentiles and histograms

- Histograms and analyses for D17 are identical to those created for other sites
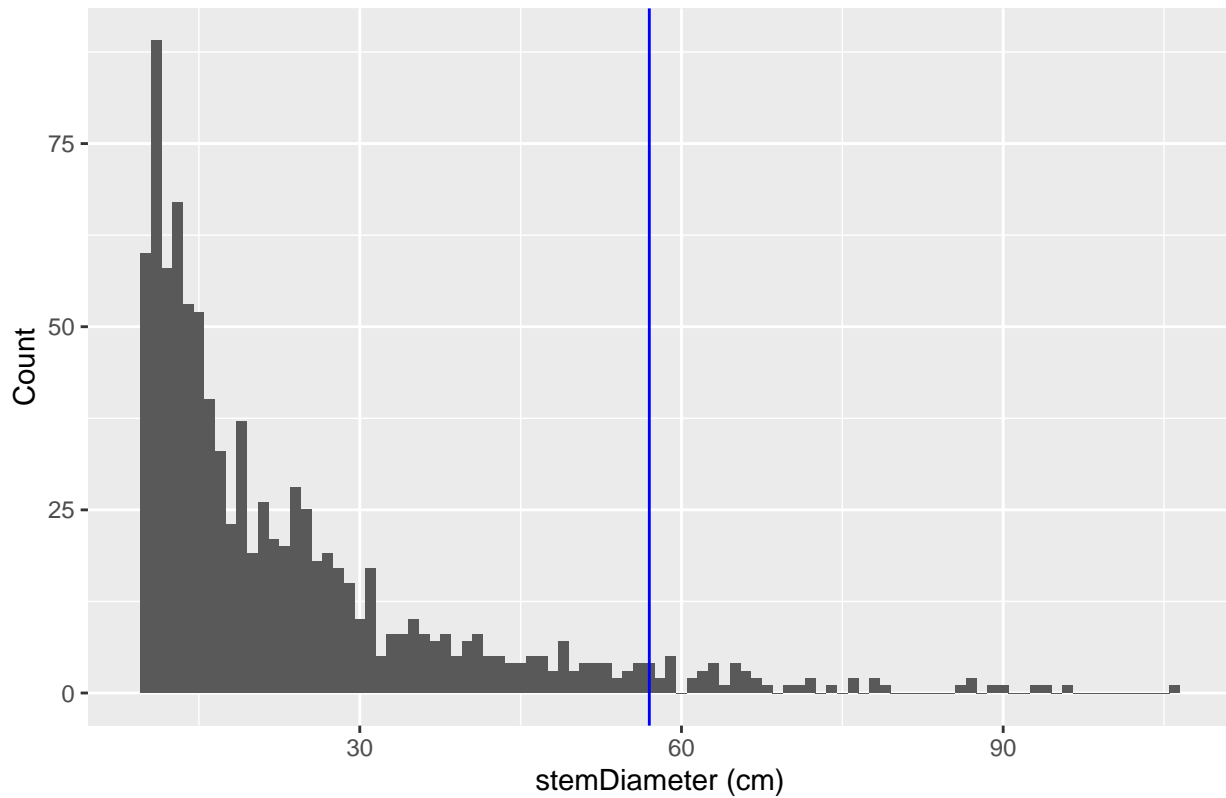
SJER: Results of stem diameter analysis

D17 SJER stemDiameter distribution

- Histogram: Most individuals encountered have DBH $<= 65$ cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` $->$ 58 cm
- Max `stemDiameter` = 163 cm; extreme outlier $->$ likely data entry error.
- Dlim for maxLikelyStemDiameter = 280 m @ F=5

SOAP: Results of stem diameter analysis

D17 SOAP stemDiameter distribution

- Histogram: Most individuals encountered have DBH <= 60 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 57 cm
- Max `stemDiameter` = 105.7 cm; extreme outlier –> likely data entry error.
- Dlim for maxLikelyStemDiameter = 170 m @ F=8

TEAK: Results of stem diameter analysis
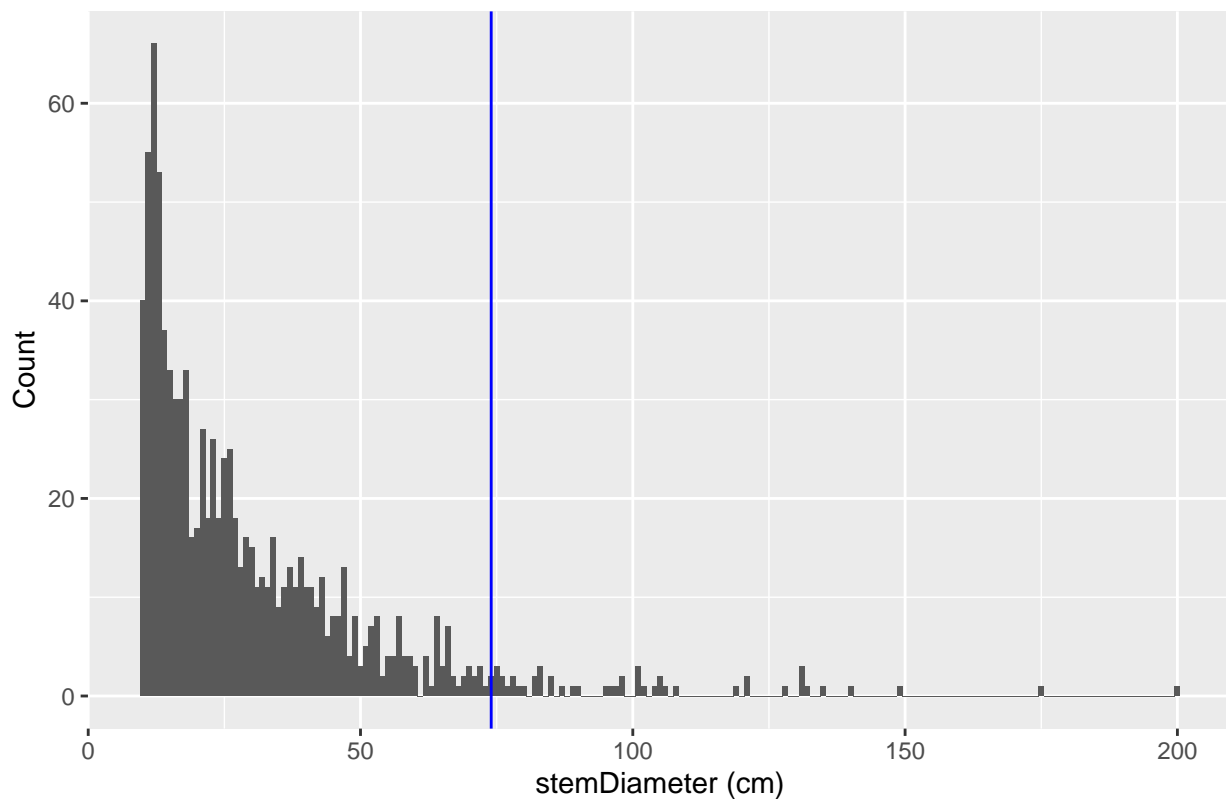
D17 TEAK stemDiameter distribution

- Histogram: Most individuals encountered have DBH <= 90 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 74 cm
- Max `stemDiameter` = 200 cm; extreme outlier –> likely data entry error.
- Dlim for maxLikelyStemDiameter = 230 m @ F=10

D19 stemDiameter analysis

D19: Load and clean data

The 2015 VST data used here come from the 2015 VegCharacterization effort, and reside in site-specific files on Sharepoint. Files have all been copied to the `neonPlantSampling` Git repo.

Results of D19 dataframe comparison and cleanup:

- 20 plots sampled at DEJU
- 28 plots sampled at HEAL
- 20 plots sampled at BONA
- Zero duplicates in `deju` input data frame
- 2 duplicates in `heal` input data frame
- 27 duplicates in `bona` input data frame

D19: Create and check unified VST dataset

Results of dataframe merge

- `vstd19` has 5247 records

- DEJU data collected between 2015-06-15 and 2015-06-24
- HEAL data collected between 2015-05-14 and 2015-06-08
- BONA data collected between 2016-06-13 and 2016-07-01, and again between 2016-09-12 and 2016-09-15

D19: DBH percentiles and histograms

- Histograms and analyses for D19 are identical to those created for other sites

DEJU: Results of stem diameter analysis

D19 DEJU stemDiameter distribution
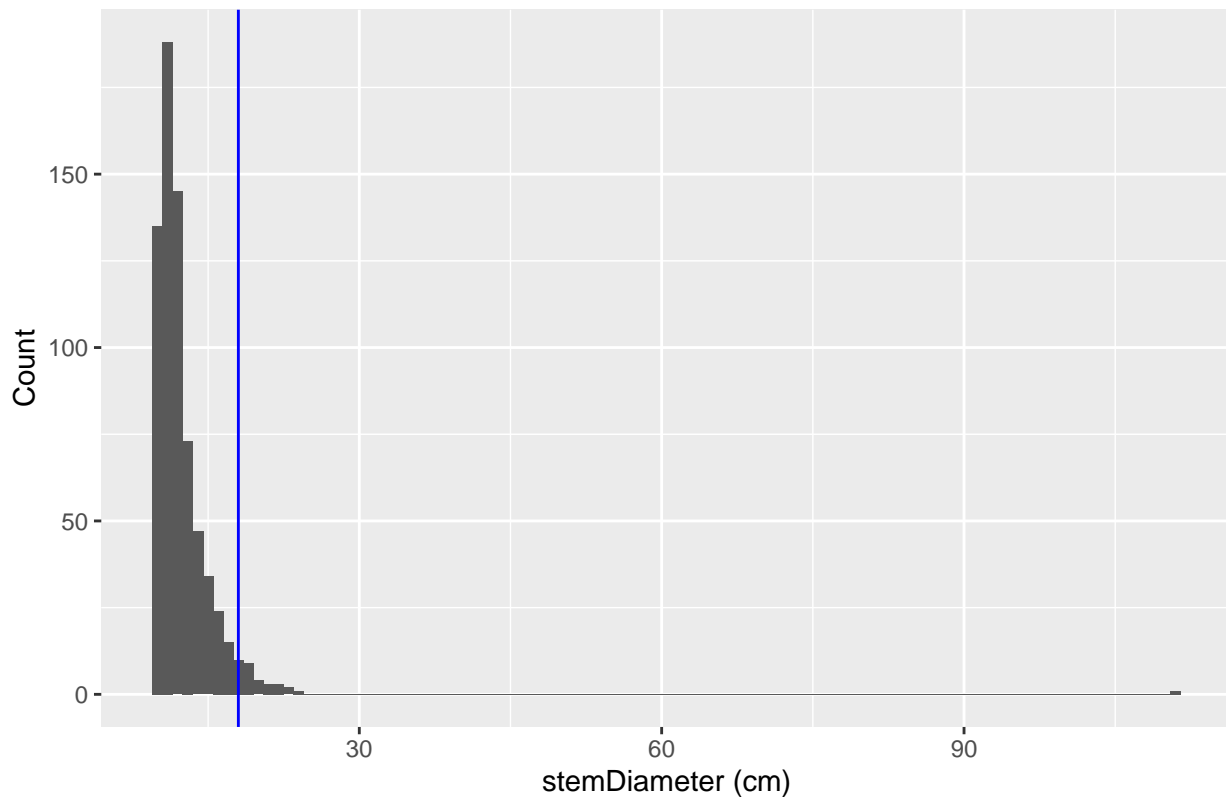
- Histogram: Most individuals encountered have DBH <= 20 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 18 cm
- Max `stemDiameter` = 111.2 cm; extreme outlier –> likely data entry error.
- Dlim for maxLikelyStemDiameter = 27 m @ F=5

HEAL: Results of stem diameter analysis

D19 HEAL stemDiameter distribution
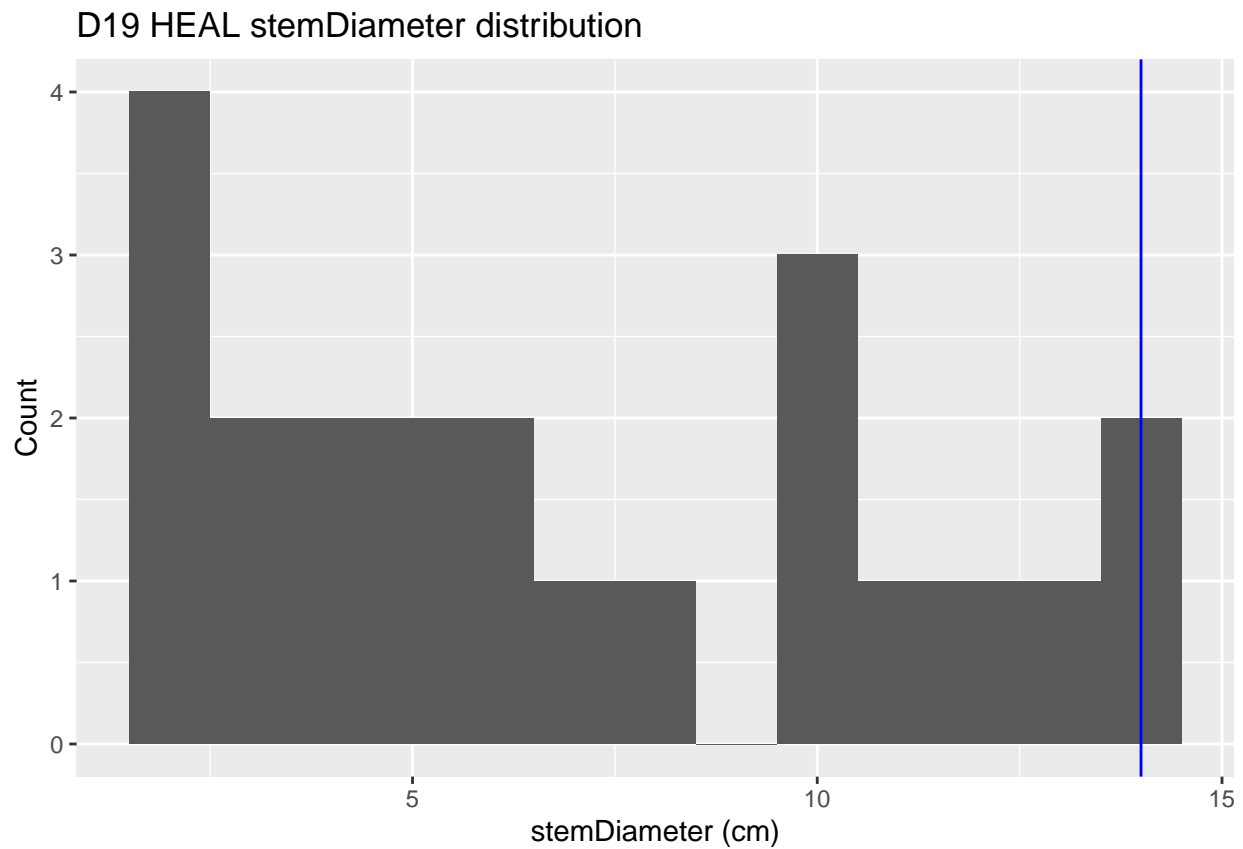
- Histogram: All individuals encountered have DBH <= 14 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 14 cm
- Max `stemDiameter` = 13.6 cm
- Dlim for maxLikelyStemDiameter = 16 m @ F=5

BONA: Results of stem diameter analysis

D19 BONA stemDiameter distribution

- Histogram: Most individuals have DBH $<=$ 25 cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` –> 24 cm
- Max `stemDiameter` = 120 cm, likley a data entry error
- Dlim for maxLikelyStemDiameter = 47 m @ F=5

D20 stemDiameter analysis

Pull VST Tower Plot data from Fulcrum database

Summary of VST Fulcrum input data

- `puumVst` has 1646 records, of which 1305 contain a non-null `stemdiameter` value.
- 0 duplicates in the PUUM data frame
- 949 individuals with DBH $>=$ 10 cm
- 20 plots sampled at PUUM, data collected between 2018-03-29 and 2018-08-06
- Stems per plot, with stemdiameter != NULL, range from 36 (PUUM_032) to 111 (PUUM_034)

D20: DBH percentiles and histograms

- Histograms and analyses for D20 are identical to those created for other sites

PUUM: Results of stem diameter analysis
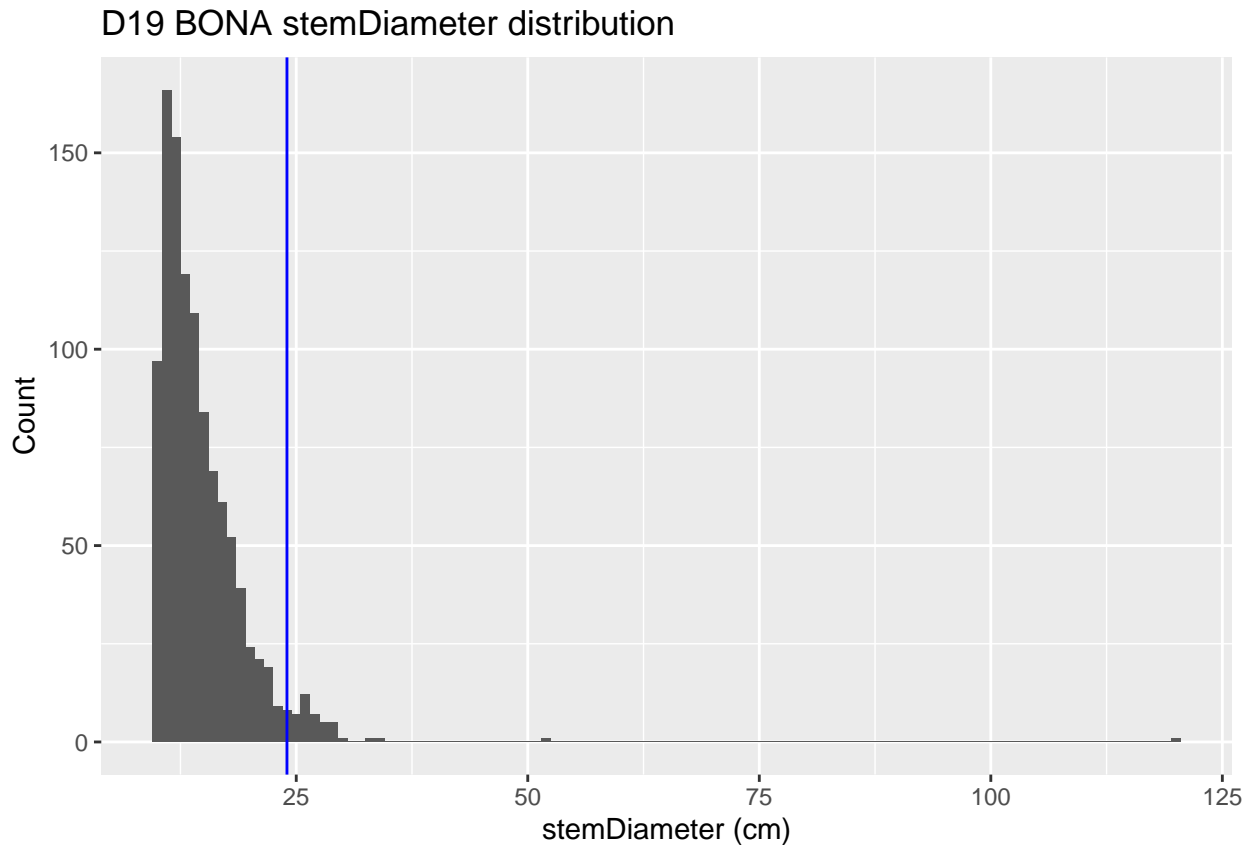
D20 PUUM stemDiameter distribution
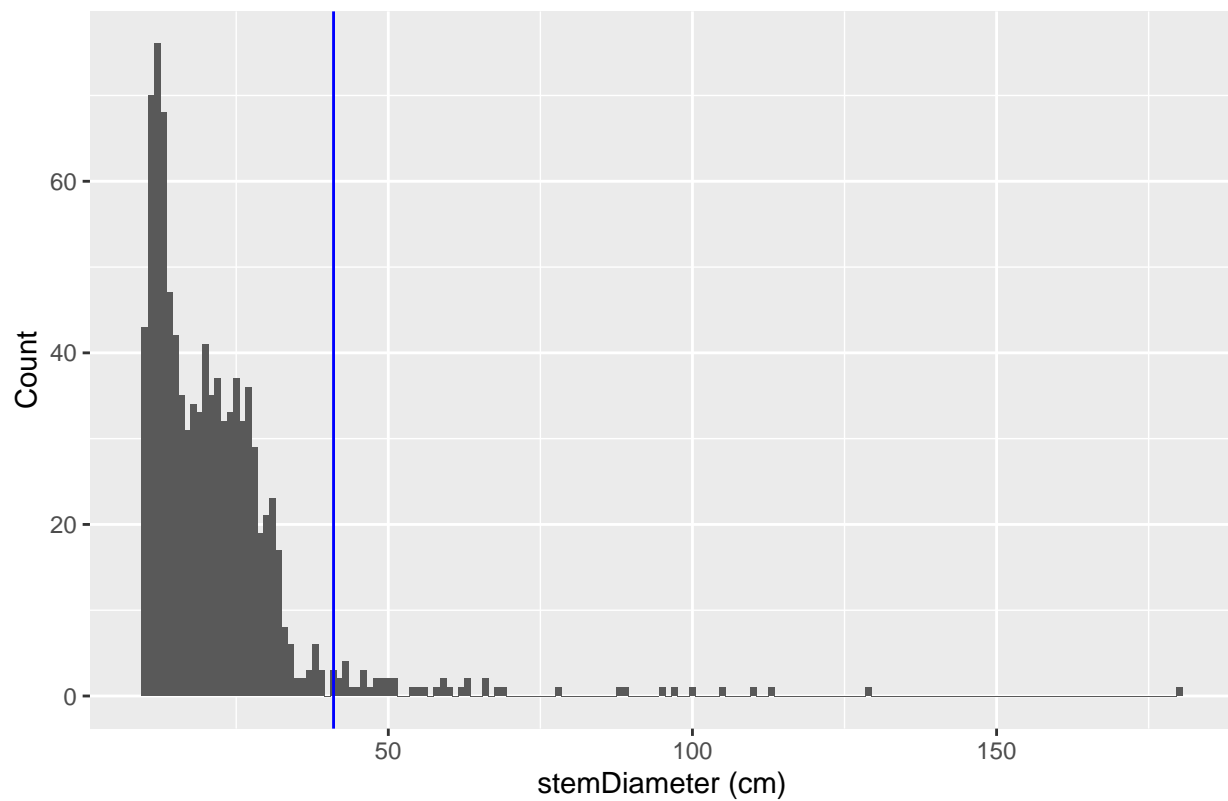
- Histogram: Most individuals encountered have DBH $<= 40$ cm
- maxLikelyStemDiameter = 95th percentile for `stemDiameter` $->$ 41 cm
- Max `stemDiameter` = 180 cm
- Dlim for maxLikelyStemDiameter = 86 m @ F=8

Summary

CDW F-values and transect length (Dlim) by site

Desired transect lengths (`Dlim`, meters) associated with the `maxLikelyStemDiameter` (cm) at each site. The maximum likely stemDiameter is calculated as the 95th percentile for stemDiameter as recorded in 2014 and 2015 Vegetation Structure data from both Distributed and Tower Plots, and `count` indicates the total number of individuals with DBH >= 10 cm used for the analysis; exception(s) are HEAL, where individuals with DBH >= 2 cm were used for the analysis. Transect lengths are based on F-values specific to each site, and will change if a new F-value is chosen for a site.

domain	site	fValue	count	maxLikelyStemDiam	maxStemDiam	Dlim
D01	HARV	5	2033	46	102.0	170.0
D01	BART	5	1189	48	101.0	190.0
D02	SCBI	8	601	68	110.4	240.0
D02	BLAN	5	220	59	76.7	290.0
D02	SERC	5	765	60	97.5	300.0
D03	OSBS	5	693	39	66.1	130.0
D03	DSNY	5	54	51	61.0	210.0
D03	JERC	5	193	56	76.2	260.0
D04	GUAN	5	652	32	200.0	84.0
D05	UNDE	5	100	38	59.3	120.0
D05	STEI	5	179	37	61.2	110.0
D05	TREE	5	736	41	55.3	140.0
D06	UKFS	5	818	47	93.1	180.0
D06	KONZ	5	26	22	33.8	40.0
D07	ORNL	5	1128	57	130.0	270.0
D07	GRSM	8	914	59	373.3	180.0
D07	MLBS	5	807	45	72.4	170.0
D08	TALL	5	1075	48	83.7	190.0
D08	DELA	5	699	54	119.0	240.0
D08	LENO	8	363	59	117.0	180.0
D10 T	RMNP	5	877	40	52.2	130.0
D10 D	RMNP	5	915	30	48.4	74.0
D11	CLBJ	5	359	44	291.0	160.0
D12 D	YELL	5	216	49	139.0	200.0
D13	NIWO	5	727	36	60.5	110.0
D13	MOAB	5	97	26	34.8	56.0
D14	SRER	5	135	9	16.6	6.7
D15	ONAQ	5	81	33	41.0	90.0
D16	WREF	15	944	80	144.2	180.0
D17	SJER	5	180	58	163.0	280.0
D17	SOAP	8	933	57	105.7	170.0
D17	TEAK	10	946	74	200.0	230.0
D19	DEJU	5	694	18	111.2	27.0
D19	HEAL	5	22	14	13.6	16.0
D19	BONA	5	1072	24	120.0	47.0
D20	PUUM	8	949	41	180.0	86.0