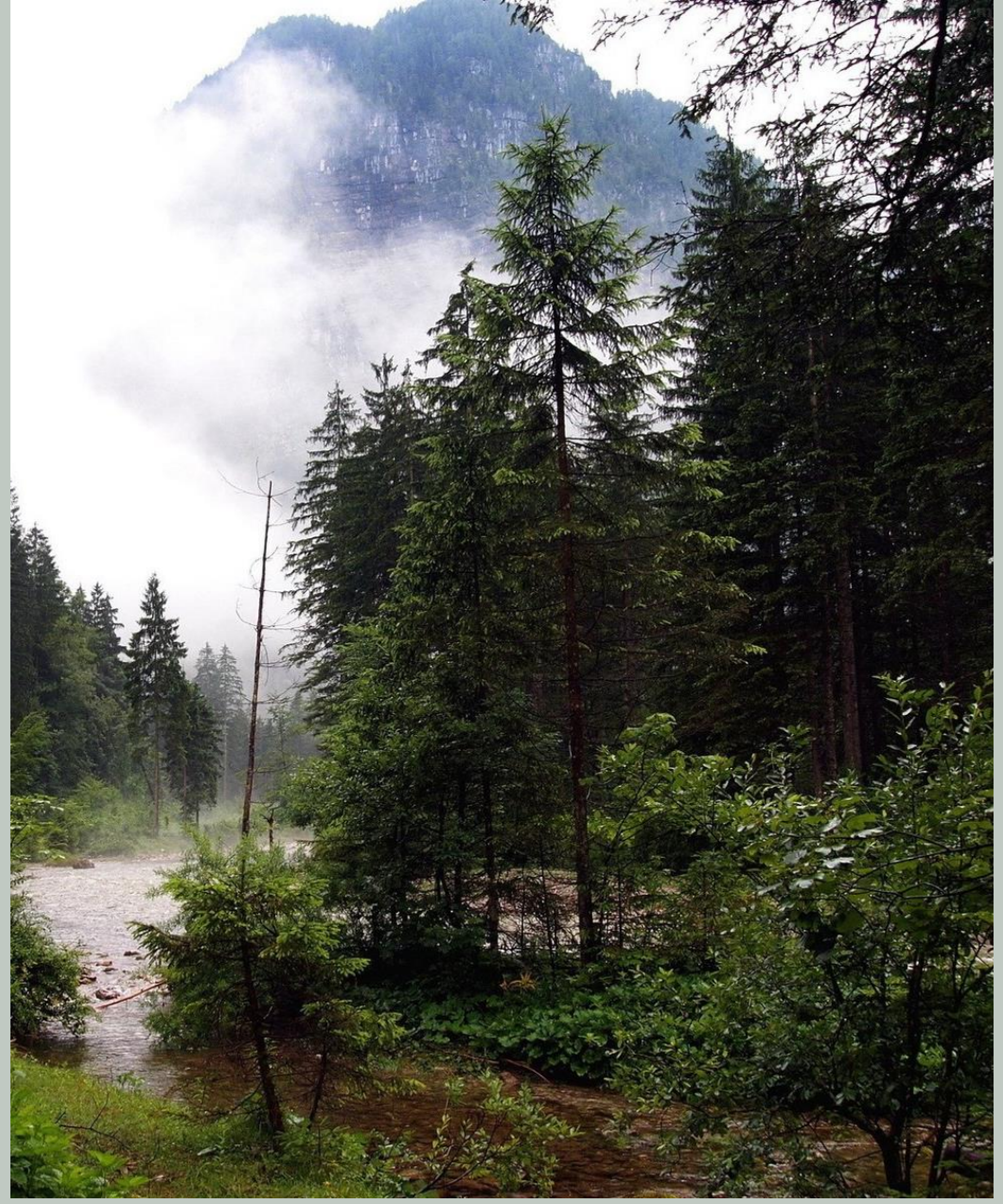
Module 6 - Final Project



By Mohammad Hossein Movahedi

February 20, 2022

Customer Success Team

Agenda

01 Introduction

02 DATA DESCRIPTION

03 SUMMARY AFTER CLEANING DATA

04 ANALYSING DATA

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06 Summary

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01 Introduction

- I use data from the Canadian government for this research (Canada.ca, 2020).
- The diameter of the DWD at the site of impact, tree species, decomposition class, and various other characteristics of downed woody debris are documented.
- Downed woody debris is woody plant material that has fallen to the ground or is close to it. It's a well-known indicator of forest production and resilience.

02 DATA DESCRIPTION

- A very messy data of 1722 records with 22 attributes
- Measures several aspects of DWDs and is associated with long-term Ecological Monitoring and Assessment Network (EMAN) forest plots.

```
> str(woody)
tibble [1,722 × 22] (S3: tbl_df/tbl/data.frame)
 $ Year                                          : chr [1:1722] "2006" "2006" "2006" "2006" ...
 $ Date (dd-mm-yyyy)                             : Date[1:1722], format: "2006-07-18" "2006-07-19" ...
 $ Observer Names                                : chr [1:1722] "BF,SC" "BF,SC" "BF,SC" "BF,SC" ...
 $ Easting (at SE Corner)                        : num [1:1722] 418551 405837 405837 405837 405837 ...
 $ Northing (at SE Corner)                       : num [1:1722] 4928947 4937008 4937008 4937008 4937008 ...
 $ Site Name                                     : Factor w/ 3 levels "CSI","GPE","TINP": 2 3 3 3 3 3 3 3 3 3 ...
 $ Plot Name                                     : Factor w/ 39 levels "Aubrey","Beaupre",..: 9 36 36 36 36 36 36 36 36 19 ...
 $ Plot Number                                   : Factor w/ 42 levels "1","10","11",..: 42 1 1 1 1 1 1 1 1 12 ...
 $ Line Number                                   : Factor w/ 3 levels "1","2","3": 1 1 1 1 2 2 2 3 3 1 ...
 $ Distance in meters                            : num [1:1722] 41.2 21.8 37.4 42.4 0.5 ...
 $ Diameter (cm)                                 : num [1:1722] 8.97 19.5 19.2 7.5 10.3 9.2 26.3 13 16.4 8 ...
 $ Species Code                                  : Factor w/ 45 levels "AI","Apple sp.",..: 8 42 42 42 27 1 39 42 42 39 ...
 $ Species Common Name                           : Factor w/ 45 levels "American Beech",..: 7 40 40 40 38 23 17 40 40 17 ...
 $ Species Scientific Name                       : Factor w/ 45 levels "Acer rubrum",..: 40 45 45 45 2 29 27 45 45 27 ...
 $ Decomposition Class                           : Factor w/ 5 levels "1","2","3","4",..: 1 1 4 4 3 2 1 3 4 4 ...
 $ Cause of Origin for DWD Natural(N)/Human Caused(C): Factor w/ 3 levels "C","N","Y": NA NA NA NA NA NA NA NA NA NA ...
 $ Type: Stump or Log                            : Factor w/ 5 levels "Log","N","Stump",..: 1 1 1 1 1 1 1 1 1 1 ...
 $ Covered in more than 50% moss                 : Factor w/ 2 levels "N","Y": NA NA NA NA NA NA NA NA NA NA ...
 $ Burned                                        : Factor w/ 2 levels "N","Y": 1 1 1 1 1 1 1 1 1 1 ...
 $ Hollow                                        : Factor w/ 2 levels "N","Y": 1 1 1 1 1 1 1 1 1 1 ...
 $ Evidence of the presence of wildlife          : Factor w/ 3 levels "N","NN","Y": 1 1 3 3 1 1 3 3 3 1 ...
 $ Notes                                         : chr [1:1722] NA "formerly 401" NA NA ...
```

```
> head(woody,5)
# A tibble: 5 × 22
  Year  `Date (dd-mm-yyyy)` `Observer Names` `Easting (at S…` `Northing (at …` `Site Name`
  <chr> <date>              <chr>                      <dbl>            <dbl> <fct>
1 2006  2006-07-18          BF,SC                     418551          4928947 GPE
2 2006  2006-07-19          BF,SC                     405837          4937008 TINP
3 2006  2006-07-19          BF,SC                     405837          4937008 TINP
4 2006  2006-07-19          BF,SC                     405837          4937008 TINP
5 2006  2006-07-19          BF,SC                     405837          4937008 TINP
# … with 16 more variables: `Plot Name` <fct>, `Plot Number` <fct>, `Line Number` <fct>,
#   `Distance in meters` <dbl>, `Diameter (cm)` <dbl>, `Species Code` <fct>,
#   `Species Common Name` <fct>, `Species Scientific Name` <fct>,
#   `Decomposition Class` <fct>,
#   `Cause of Origin for DWD Natural(N)/Human Caused(C)` <fct>,
#   `Type: Stump or Log` <fct>, `Covered in more than 50% moss` <fct>, Burned <fct>,
#   Hollow <fct>, `Evidence of the presence of wildlife` <fct>, Notes <chr>
>
```

03 SUMMARY AFTER CLEANING DATA

```
> summary(woody)
     Year          Date (dd-mm-yyyy)    Observer Names     EastingCorner)
 Length:1722        Min.   :2006-07-18   Length:1722        Min.   :384164
 Class :character   1st Qu.:2010-08-19   Class :character   1st Qu.:411350
 Mode  :character   Median :2012-10-18   Mode  :character   Median :421191
                    Mean   :2013-03-28                      Mean   :418892
                    3rd Qu.:2016-08-15                      3rd Qu.:428595
                    Max.   :2019-08-22                      Max.   :441434
                    NA's   :657
 Northing (at SE Corner) Site Name          Plot Name     Plot Number
Line Number
 Min.   :4898208         CSI : 278   WillsCSI   : 188   21     : 180
1:616
 1st Qu.:4910505         GPE : 231   Hill3      : 118   36     : 118
2:539
 Median :4912789         TINP:1213   Mulcaster  :  86   42     :  86
3:567
 Mean   :4915625                     Endymion   :  75   26     :  75
 3rd Qu.:4920749                     GWR2       :  74   5      :  75
 Max.   :4941584                     Mallorytown:  74   47     :  74
                                     (Other)    :1107   (Other):1114
```

03 SUMMARY AFTER CLEANING DATA

```
 Distance in meters Diameter (cm)        Species Code         Species
Common Name
 Min.   :   0.19    Min.   :  0.00   UK          :331   Unknown
:342
 1st Qu.:  10.90    1st Qu.:  9.00   Pw          :254   Eastern White
Pine:254
 Median :  20.40    Median : 11.50   Mh          :150   Sugar Maple
:150
 Mean   :  22.76    Mean   : 14.54   UK - Decid:136   Deciduous
:136
 3rd Qu.:  32.75    3rd Qu.: 16.90   Aw          :126   White Ash
:127
 Max.   :1659.00    Max.   :100.10   (Other)     :694   (Other)
:682
 NA's   :10         NA's   :61       NA's        : 31   NA's              :
31
       Species Scientific Name Decomposition Class
 Unknown            :336         1   :179
 Pinus strobus      :253         2   :414
 Acer saccharum     :150         3   :548
 Deciduous          :136         4   :378
 Fraxinus americana:127          5   :170
 (Other)            :688         NA's: 33
 NA's               : 32
```

03 SUMMARY AFTER CLEANING DATA

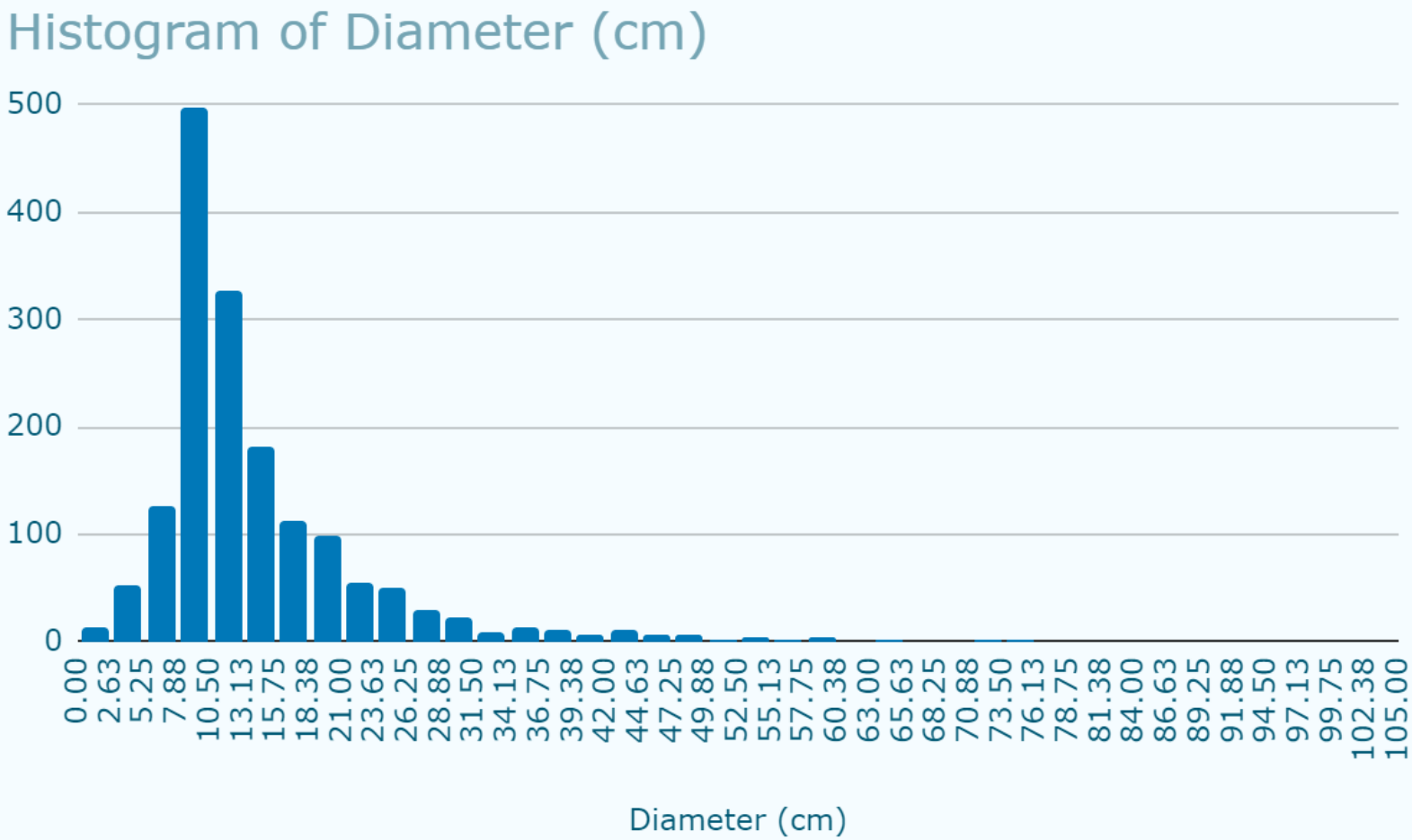
```
      Species Scientific Name Decomposition Class
Unknown            :336        1   :179
Pinus strobus      :253        2   :414
Acer saccharum     :150        3   :548
Deciduous          :136        4   :378
Fraxinus americana:127         5   :170
(Other)            :688        NA's: 33
NA's               : 32
Cause of Origin for DWD Natural(N)/Human Caused(C) Type: Stump or Log
C   :   1                                          Log    : 282
N   :1319                                          N      :  37
Y   :   1                                          Stump  :   1
NA's: 401                                          Unknown:  19
                                                   Y      :   8
                                                   NA's   :1375

Covered in more than 50% moss  Burned      Hollow
N   :1155                     N   :1679   N   :1577
Y   : 286                     Y   :   4   Y   : 106
NA's: 281                     NA's:  39   NA's:  39



Evidence of the presence of wildlife    Notes
N   :1297                            Length:1722
NN  :   1                            Class :character
Y   : 379                            Mode  :character
```

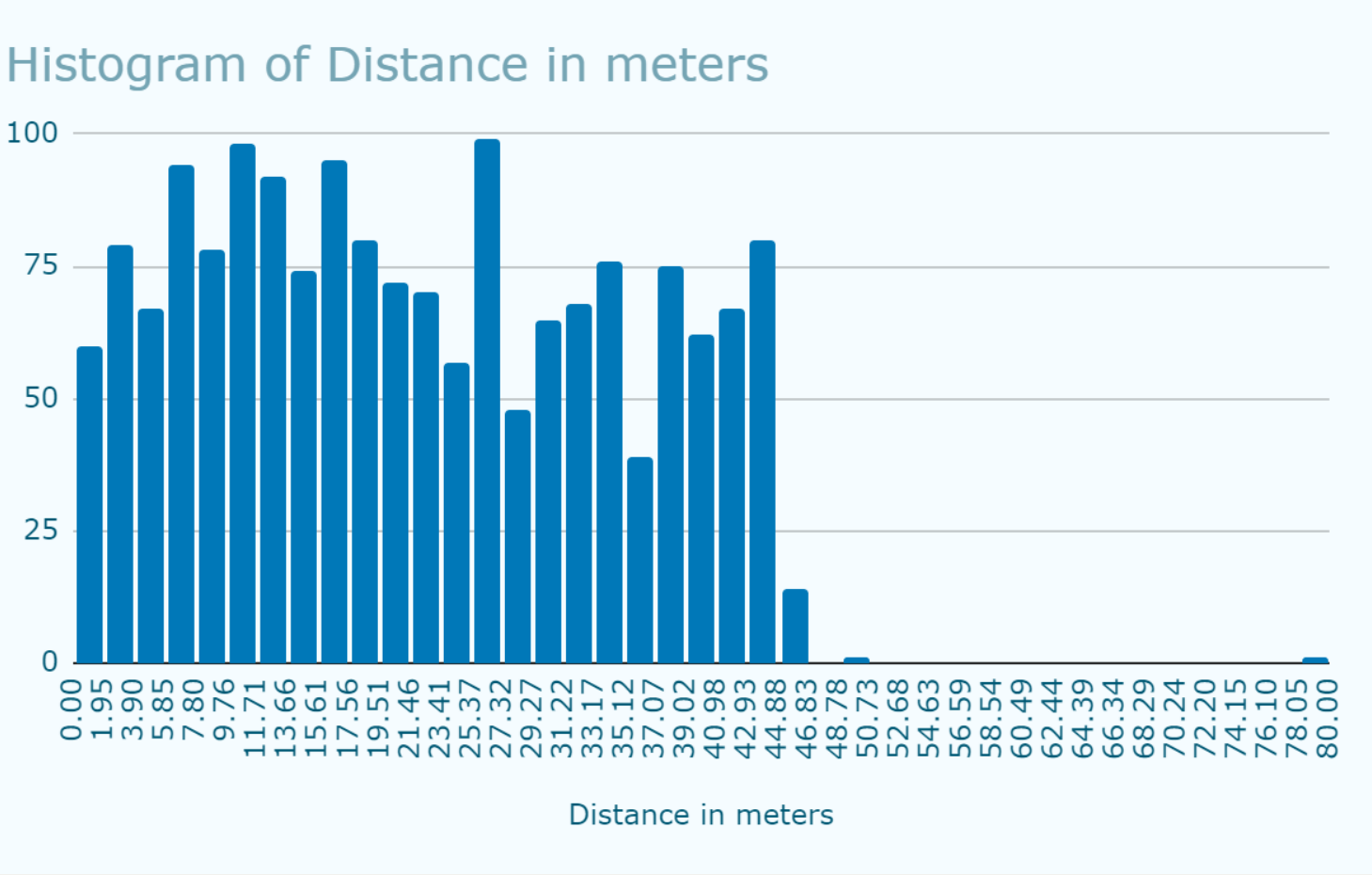
04 ANALYSING DATA



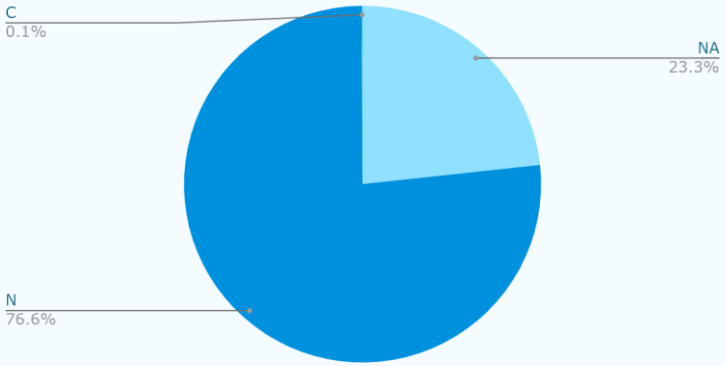
Site Name	AVERAGE of Diameter (cm)
CSI	12.217
GPE	14.693
TINP	14.993
Total average	**14.543**

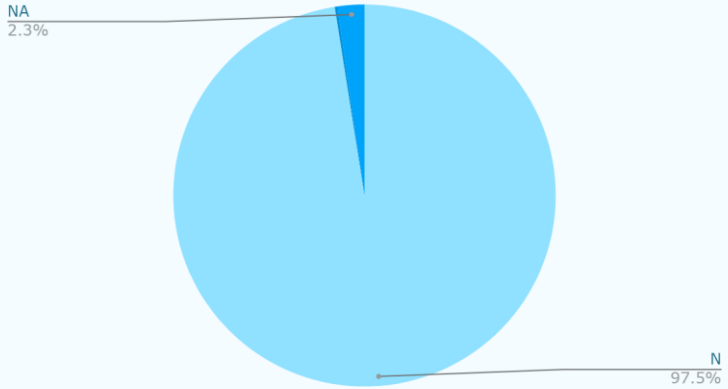
Evidence of the presence of wildlife	AVERAGE of Diameter (cm)
N	13.5
NA	7.8
Y	18.4
Grand Total	**14.5**

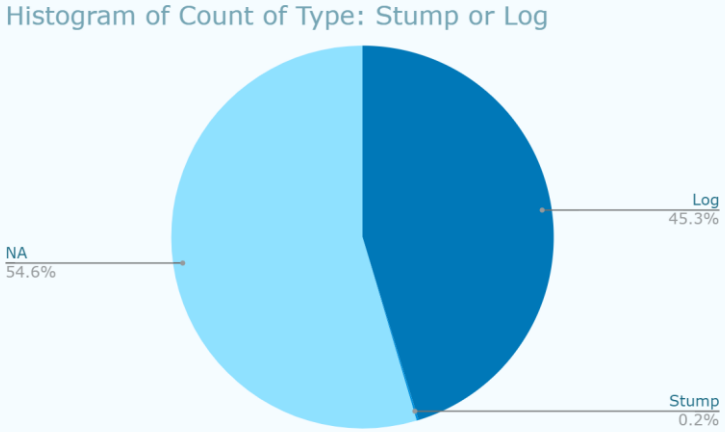
ANALYSING DATA

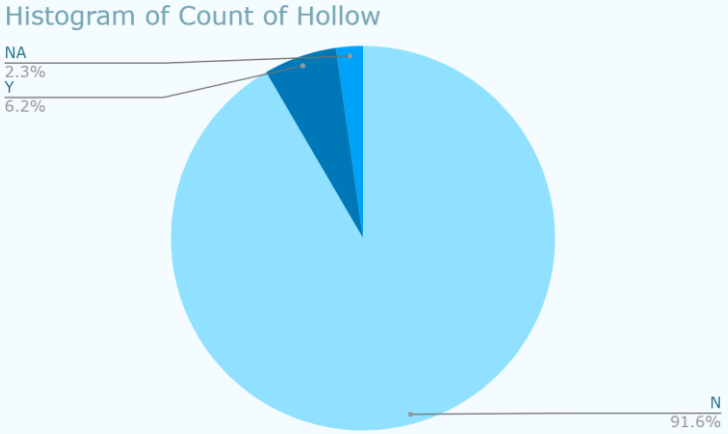


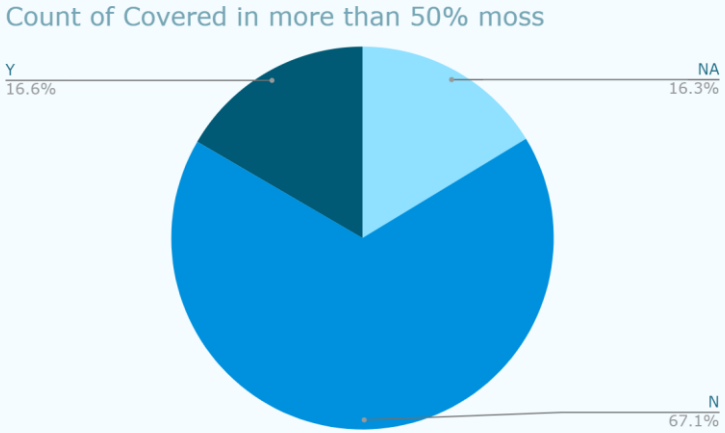
Year	AVERAGE of Distance in meters
2006	24.48
2007	21.49
2008	20.32
2009	21.83
2010	24.84
2011	18.10
2012	19.45
2013	19.61
2014	24.21
2015	24.32
2016	20.01
2017	20.04
2018	22.01
2019	24.41
Grand Total	21.81

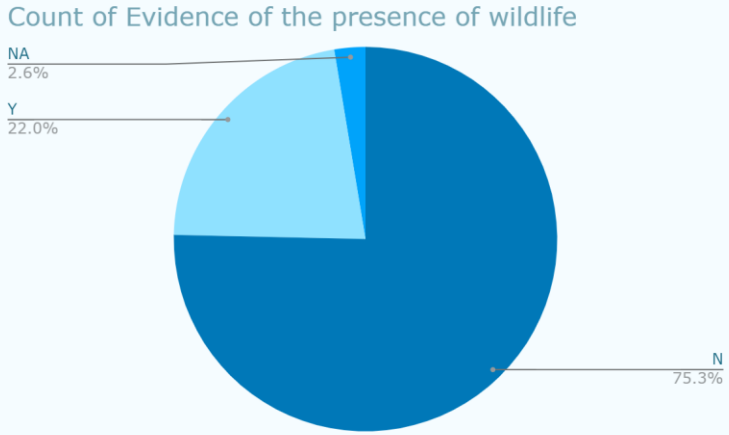












As it can be seen in these Charts most descriptive data are not available which means the observation team needs to be retrained

05 Project’s data timeline

Most Evidence of the presence of wildlife
89 Records

Most Covered in more than 50% moss
39 Records

Most Hollow
14 Records

Most Cause of Origin for DWD Natural(N)
157 Records

06 Summary

The Team need to be Retrained

The Data entry should be controlled

Most of the is gathered under 30 m distance

The year 2010 was probably a rainy year

DWD collected with Evidence of the presence of wildlife where longer than others

Almost all collected DWDs were log

07 Closing

Thanks to your paying attention to my presentation .

“A nation that destroys its soils destroys itself. Forests are the lungs of our land, purifying the air and giving fresh strength to our people.”

-Franklin D. Roosevelt

Mohammad Hossein Movahedi

References

- Canada.ca. (2020). Downed Wood Debris - Thousand Islands - Open Government Portal. (online) Available at: https://open.canada.ca/data/en/dataset/02c92519-0338-4fef-a79e-37e197cbca4a (Accessed 21 Feb. 2022).

- ontario.ca. (2013). Downed woody material. (online) Available at: https://www.ontario.ca/page/downed-woody-material (Accessed 21 Feb. 2022).

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