

VARIABLE INVESTIGATION
FOR
KELOWNA WEATHER-CRASH PROJECT

Contents

| | | |
|----------|-------------------------------------------|-----------|
| 1 | Summary Statistics | 2 |
| 2 | Accidents over Time | 4 |
| 2.1 | Throughout the Day | 4 |
| 2.2 | Day of the Week | 5 |
| 2.3 | Month of the Year | 6 |
| 2.4 | Over the Years | 7 |
| 3 | Distributions of Weather Variables | 8 |
| 3.1 | Temperature | 8 |
| 3.2 | Relative Humidity | 10 |
| 3.3 | Precipitation | 12 |
| 3.4 | Wind Speed | 13 |
| 3.5 | Wind Direction | 15 |
| 3.6 | Visibility | 17 |
| 3.7 | Air Pressure | 18 |
| 4 | Crash Subtypes | 19 |
| 4.1 | All Combined | 19 |
| 4.2 | Cyclist Crashes | 21 |
| 4.3 | Animal Crashes | 23 |
| 4.4 | Heavy Vehicle Crashes | 25 |
| 4.5 | Motorcycle Crashes | 27 |
| 4.6 | Parked Vehicle Crashes | 29 |
| 4.7 | Pedestrian Crashes | 31 |
| 5 | Regression/Neural Network Dataset | 33 |
| 5.1 | Weather Variables | 34 |
| 5.1.1 | Temperature | 34 |
| 5.1.2 | Relative Humidity | 35 |
| 5.1.3 | Precipitation | 36 |
| 5.1.4 | Wind Direction | 37 |
| 5.1.5 | Wind Speed | 38 |
| 5.1.6 | Visibility | 39 |
| 5.1.7 | Air Pressure | 40 |
| 5.2 | Crash Variables | 41 |
| 5.2.1 | Number of Crashes | 41 |
| 5.2.2 | Number of Deaths | 42 |
| 5.2.3 | Locations | 43 |

1 Summary Statistics

Need to remove dew point temp and wind chill,
since they are so correlated with temperature.

| | Temp...C. | Dew.Point.Temp...C. | Wind.Chill |
|---------------------|-----------|---------------------|------------|
| Temp...C. | 1.000000 | 0.9209662 | 0.9517406 |
| Dew.Point.Temp...C. | 0.9209662 | 1.000000 | 0.9312014 |
| Wind.Chill | 0.9517406 | 0.9312014 | 1.000000 |

Summary of all variables:

| linker | Date.Of.Loss.Year | Animal.Flag | Crash.Severity |
|------------------|-------------------|-------------|----------------------------|
| Length:56136 | Min. :2017 | No :54118 | CASUALTY CRASH :11473 |
| Class :character | 1st Qu.:2018 | Yes: 2018 | PROPERTY DAMAGE ONLY:44663 |
| Mode :character | Median :2019 | | |
| | Mean :2019 | | |
| | 3rd Qu.:2020 | | |
| | Max. :2021 | | |

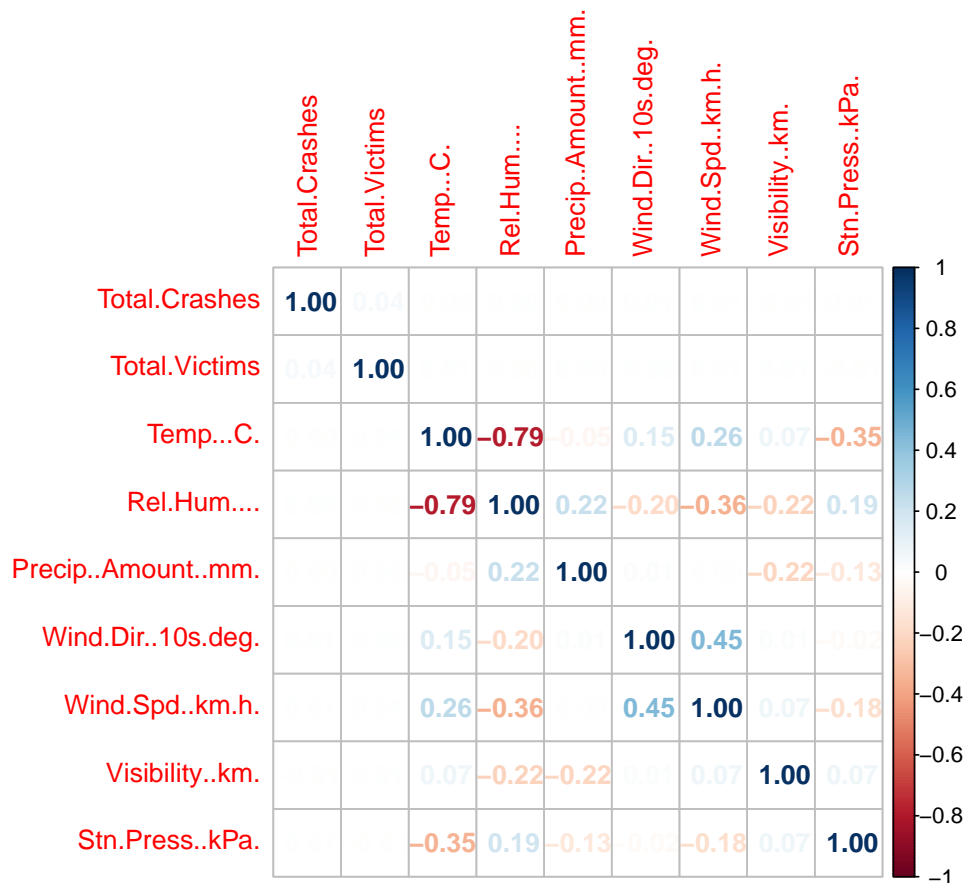
| Cyclist.Flag | Day.Of.Week | Derived.Crash.Configuration |
|--------------|----------------|-----------------------------------|
| No :55725 | FRIDAY :9316 | REAR END :13024 |
| Yes: 411 | MONDAY :8024 | SINGLE VEHICLE :12495 |
| | SATURDAY :6753 | UNDETERMINED :11453 |
| | SUNDAY :5464 | SIDE IMPACT :11369 |
| | THURSDAY :9061 | CONFLICTED : 3068 |
| | TUESDAY :8728 | SIDE SWIPE - SAME DIRECTION: 1833 |
| | WEDNESDAY:8790 | (Other) : 2894 |

| Heavy.Veh.Flag | Intersection.Crash | Month.Of.Year | Motorcycle.Flag |
|----------------|--------------------|----------------|-----------------|
| No :54085 | No :31677 | JULY : 5152 | No :55673 |
| Yes: 2051 | Yes:24459 | DECEMBER: 5095 | Yes: 463 |
| | | JANUARY : 5063 | |
| | | AUGUST : 4907 | |
| | | OCTOBER : 4836 | |
| | | JUNE : 4735 | |
| | | (Other) :26348 | |

| Parked.Vehicle.Flag | Parking.Lot.Flag | Pedestrian.Flag | Time.Category |
|---------------------|------------------|-----------------|-------------------|
| No :38567 | No :37189 | No :55790 | 12:00-14:59:14870 |
| Yes:17569 | Yes:18947 | Yes: 346 | 15:00-17:59:14473 |
| | | | 09:00-11:59:11021 |
| | | | 18:00-20:59: 5805 |
| | | | 06:00-08:59: 5489 |
| | | | 21:00-23:59: 2684 |
| | | | (Other) : 1794 |

| Municipality.Name | Road.Location.Description | Street.Full.Name |
|--------------------|---------------------------|----------------------|
| KELOWNA :45943 | UNKNOWN : 2211 | HWY 97 : 6019 |
| WEST KELOWNA:10193 | HWY 97 : 1961 | HARVEY AVE : 3168 |
| | HARVEY AVE : 1670 | HWY 33 : 2064 |
| | LAKESHORE RD: 932 | GORDON DR : 1921 |
| | LOUIE DR : 751 | LAKESHORE RD : 1372 |
| | HWY 33 : 715 | SPRINGFIELD RD: 1326 |
| | (Other) :47896 | (Other) :40266 |

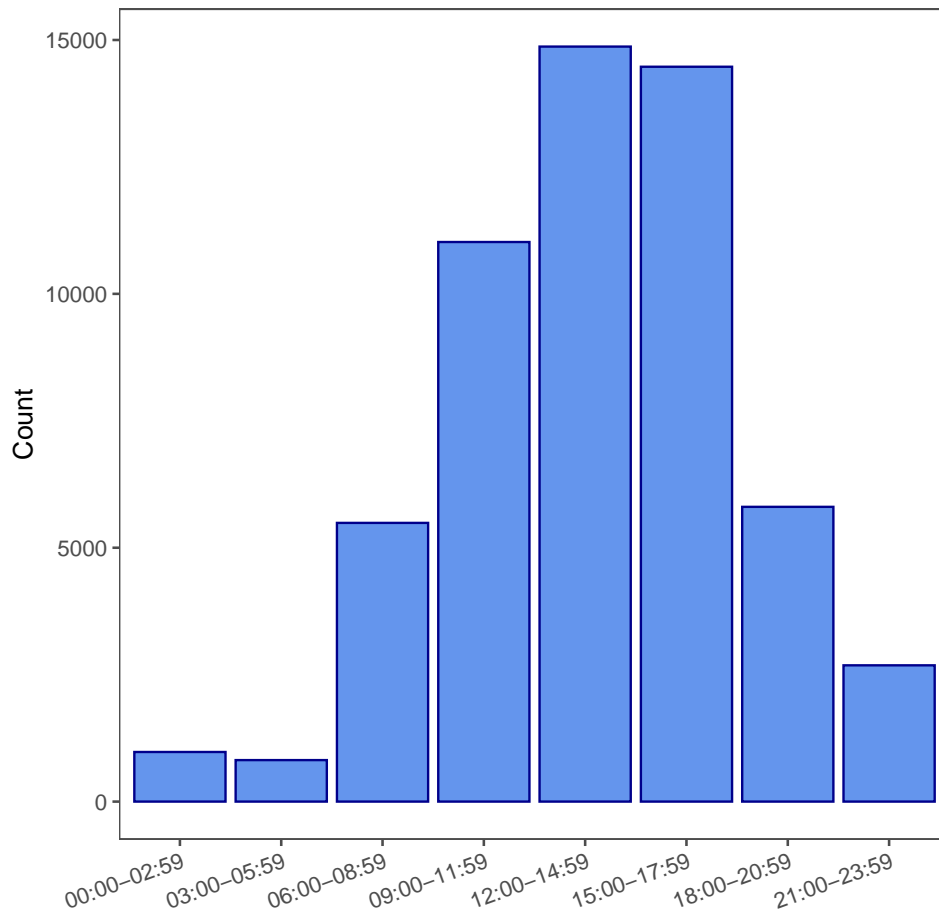
| | | | | | |
|---------------------|--------------------|-----------------|-----------------|---------|---------------|
| Total.Crashes | Total.Victims | Temp...C. | Rel.Hum.... | | |
| Min. :1.000 | Min. :0.0000 | Min. :-22.43 | Min. : 12.67 | | |
| 1st Qu.:1.000 | 1st Qu.:0.0000 | 1st Qu.: 1.60 | 1st Qu.: 38.00 | | |
| Median :1.000 | Median :0.0000 | Median : 10.37 | Median : 62.00 | | |
| Mean :1.006 | Mean :0.2917 | Mean : 10.92 | Mean : 60.51 | | |
| 3rd Qu.:1.000 | 3rd Qu.:0.0000 | 3rd Qu.: 20.00 | 3rd Qu.: 82.33 | | |
| Max. :3.000 | Max. :9.0000 | Max. : 37.73 | Max. :100.00 | | |
| | | NA's :35 | NA's :35 | | |
| Precip..Amount..mm. | Wind.Dir..10s.deg. | Wind.Spd..km.h. | Visibility..km. | | |
| Min. : 0.00000 | Min. : 1.00 | Min. : 0.000 | Min. : 0.20 | | |
| 1st Qu.: 0.00000 | 1st Qu.:15.67 | 1st Qu.: 4.667 | 1st Qu.:16.10 | | |
| Median : 0.00000 | Median :19.50 | Median : 8.000 | Median :16.10 | | |
| Mean : 0.09327 | Mean :21.16 | Mean :10.277 | Mean :15.15 | | |
| 3rd Qu.: 0.00000 | 3rd Qu.:31.00 | 3rd Qu.:13.667 | 3rd Qu.:16.10 | | |
| Max. :12.00000 | Max. :36.00 | Max. :51.333 | Max. :16.10 | | |
| | NA's :4020 | NA's :35 | NA's :36 | | |
| Stn.Press..kPa. | Fog | Freezing.Rain | Snow | Rain | Thunderstorms |
| Min. :94.08 | 0:52106 | 0:56134 | 0:52325 | 0:50075 | 0:56002 |
| 1st Qu.:96.10 | 1: 4030 | 1: 2 | 1: 3811 | 1: 6061 | 1: 134 |
| Median :96.51 | | | | | |
| Mean :96.56 | | | | | |
| 3rd Qu.:96.90 | | | | | |
| Max. :99.33 | | | | | |
| NA's :35 | | | | | |



2 Accidents over Time

2.1 Throughout the Day

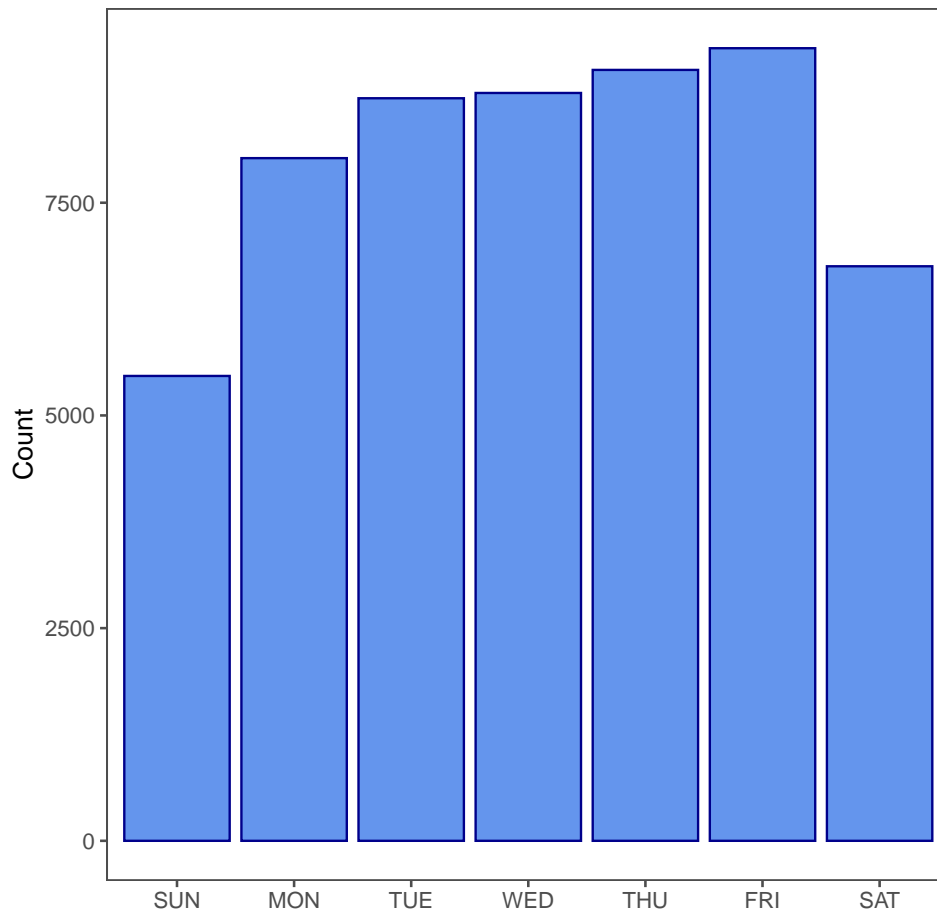
| | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|
| 00:00-02:59 | 03:00-05:59 | 06:00-08:59 | 09:00-11:59 | 12:00-14:59 | 15:00-17:59 |
| 977 | 817 | 5489 | 11021 | 14870 | 14473 |
| 18:00-20:59 | 21:00-23:59 | | | | |
| 5805 | 2684 | | | | |



2.2 Day of the Week

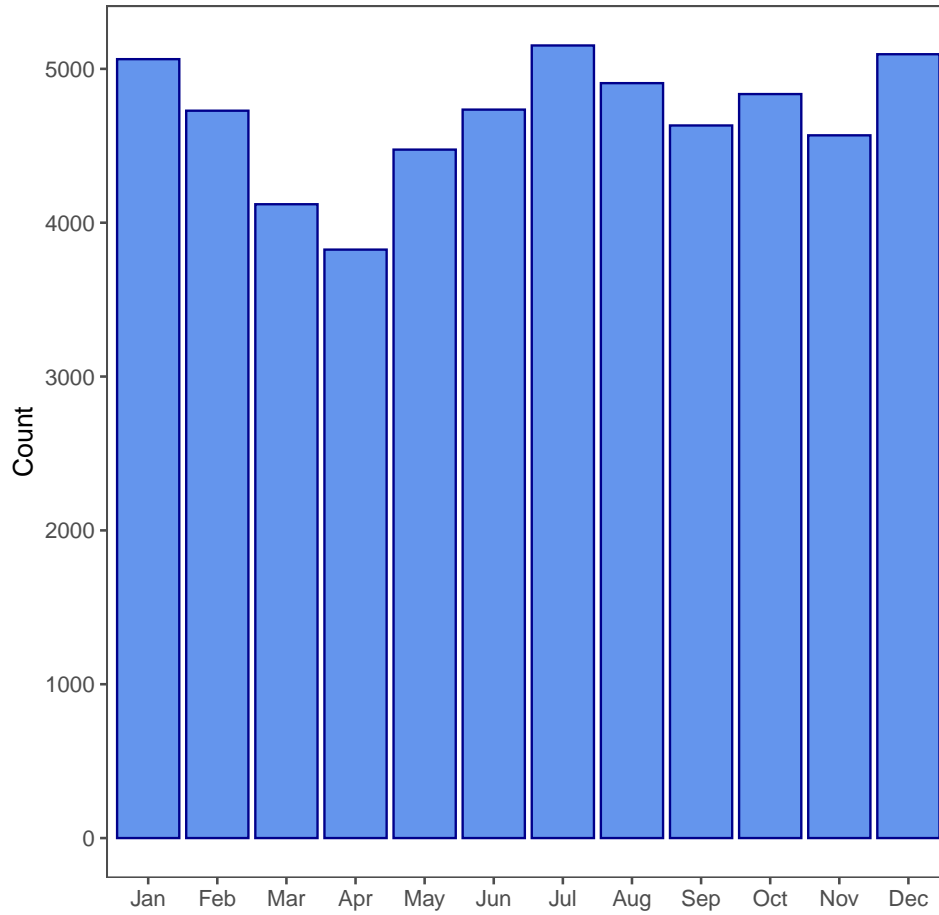
Distribution of accidents throughout the week:

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|--------|--------|---------|-----------|----------|--------|----------|
| 5464 | 8024 | 8728 | 8790 | 9061 | 9316 | 6753 |



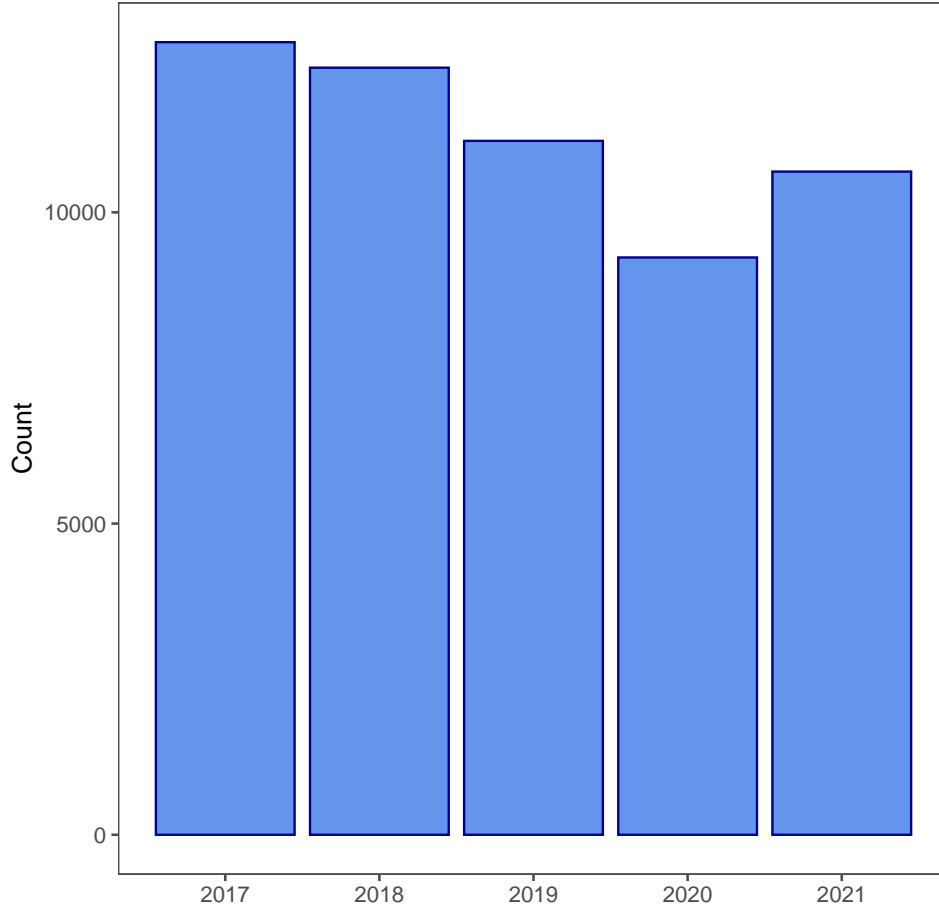
2.3 Month of the Year

| | | | | | | | |
|-----------|----------|----------|----------|------|------|------|--------|
| JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST |
| 5063 | 4728 | 4120 | 3825 | 4475 | 4735 | 5152 | 4907 |
| SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER | | | | |
| 4632 | 4836 | 4568 | 5095 | | | | |



2.4 Over the Years

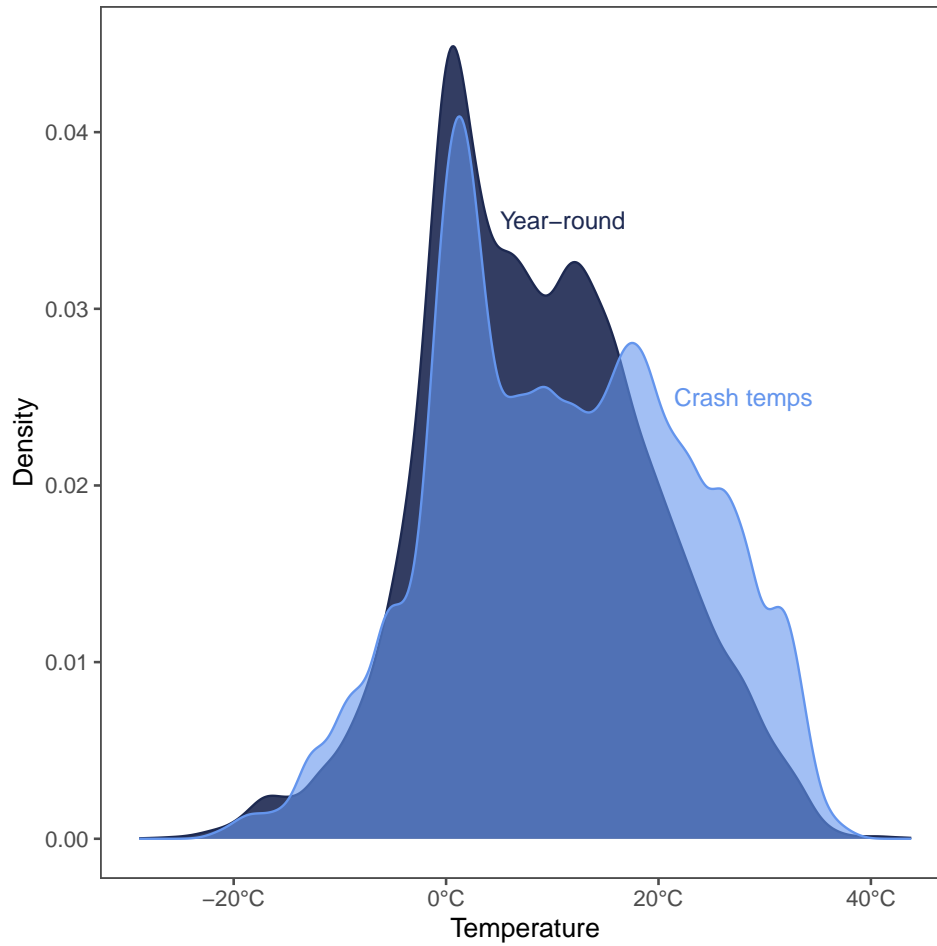
| 2017 | 2018 | 2019 | 2020 | 2021 |
|-------|-------|-------|------|-------|
| 12734 | 12324 | 11148 | 9275 | 10655 |

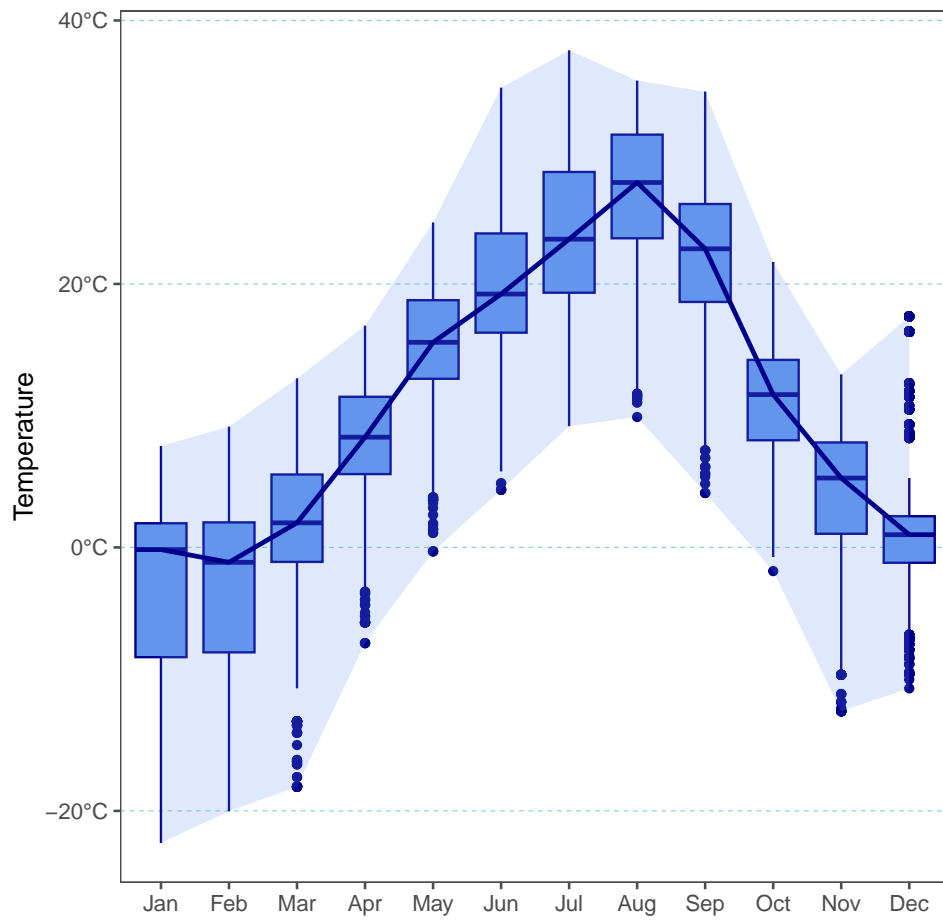


3 Distributions of Weather Variables

3.1 Temperature

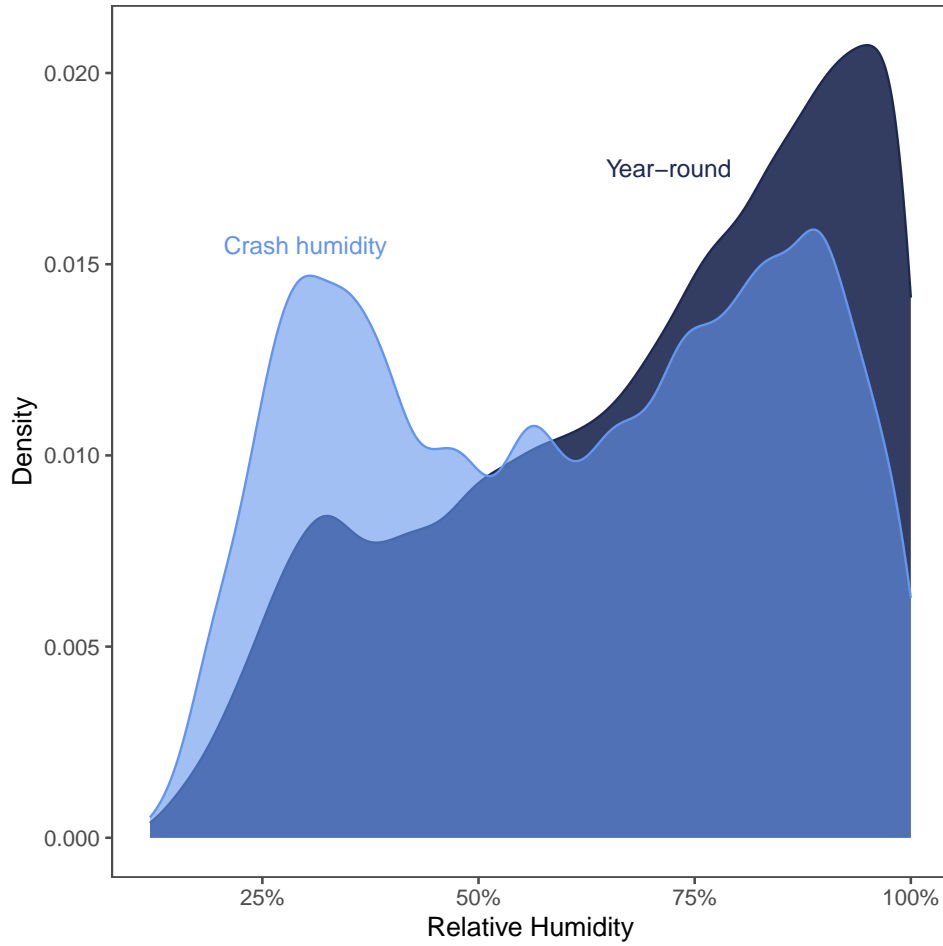
| | Avg.temp. | Avg.crash.temp. |
|---|-----------|-----------------|
| 1 | 8.511442 | 10.91872 |

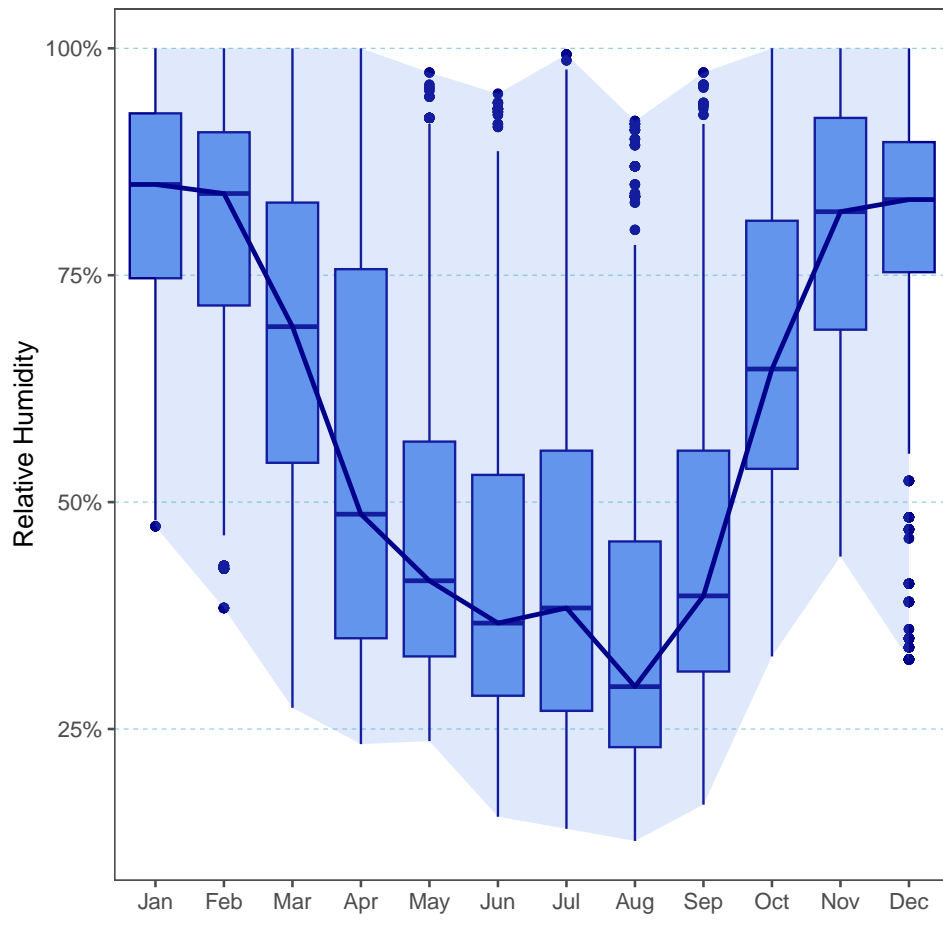




3.2 Relative Humidity

| | Avg.humidity | Avg.crash.humidity |
|---|--------------|--------------------|
| 1 | 69.32555 | 60.50743 |





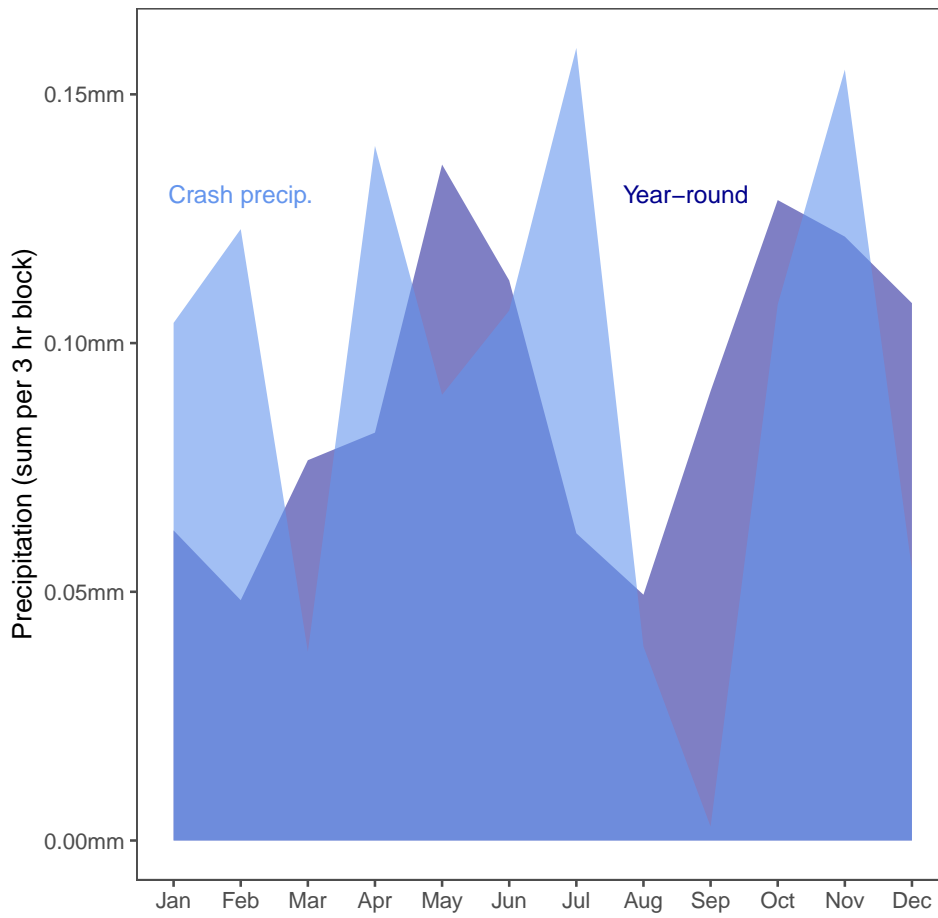
3.3 Precipitation

```
Avg.precipitation Avg.crash.precipitation  
1      0.08996575      0.09326635
```

Rounded table of precipitation values:

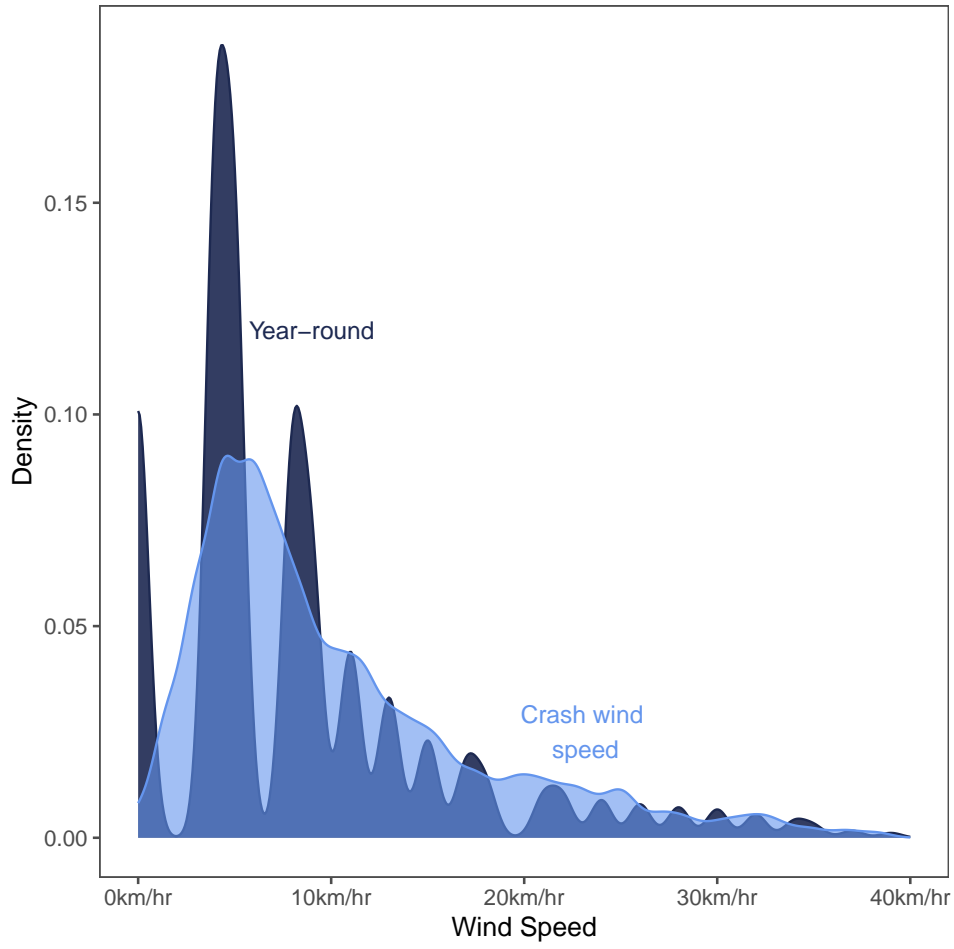
```
      0      1      2      3      4      5      6      7      8      12  
53658 1174   781   263   206   11    34    1     1     7
```

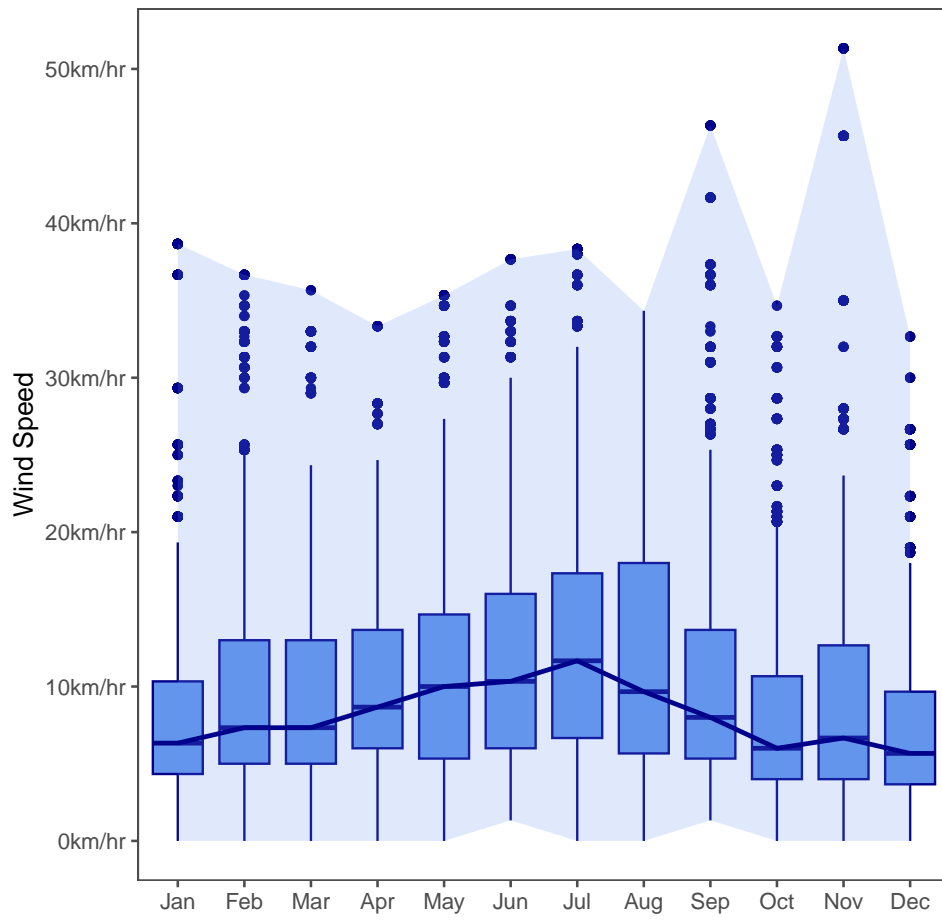
Many are 0...



3.4 Wind Speed

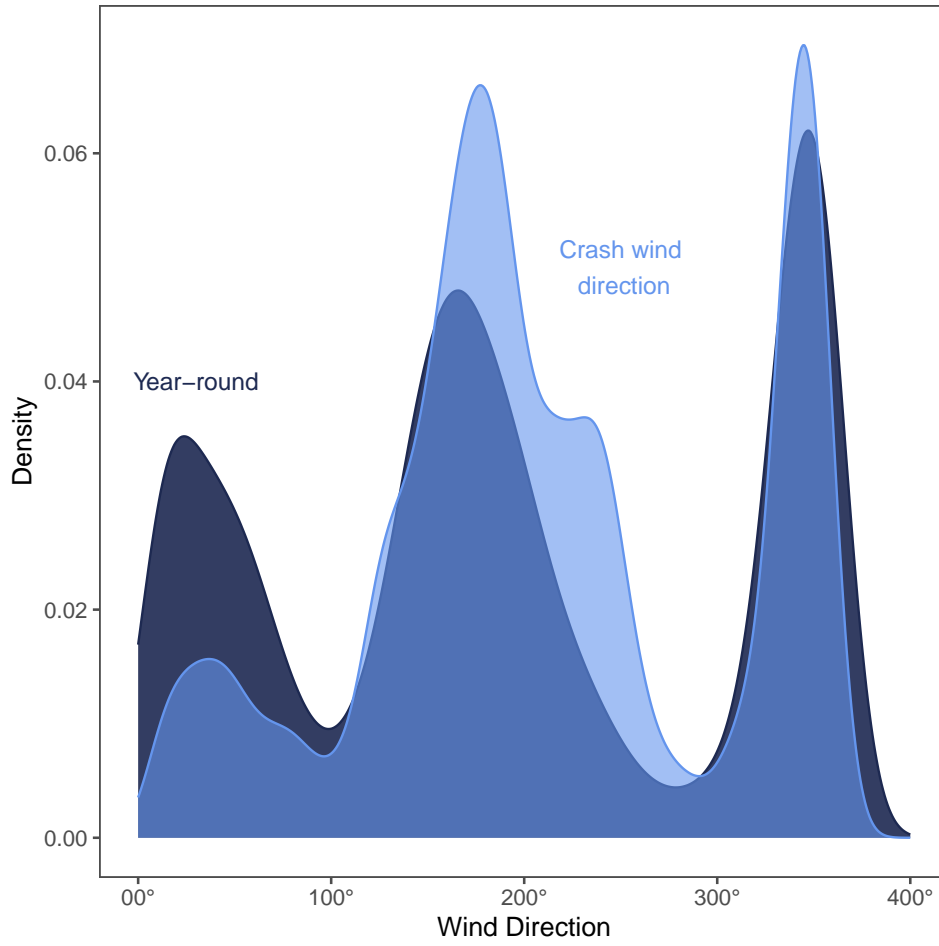
| | Avg. wind. speed | Avg. crash. wind. speed |
|---|------------------|-------------------------|
| 1 | 8.41538 | 10.27689 |

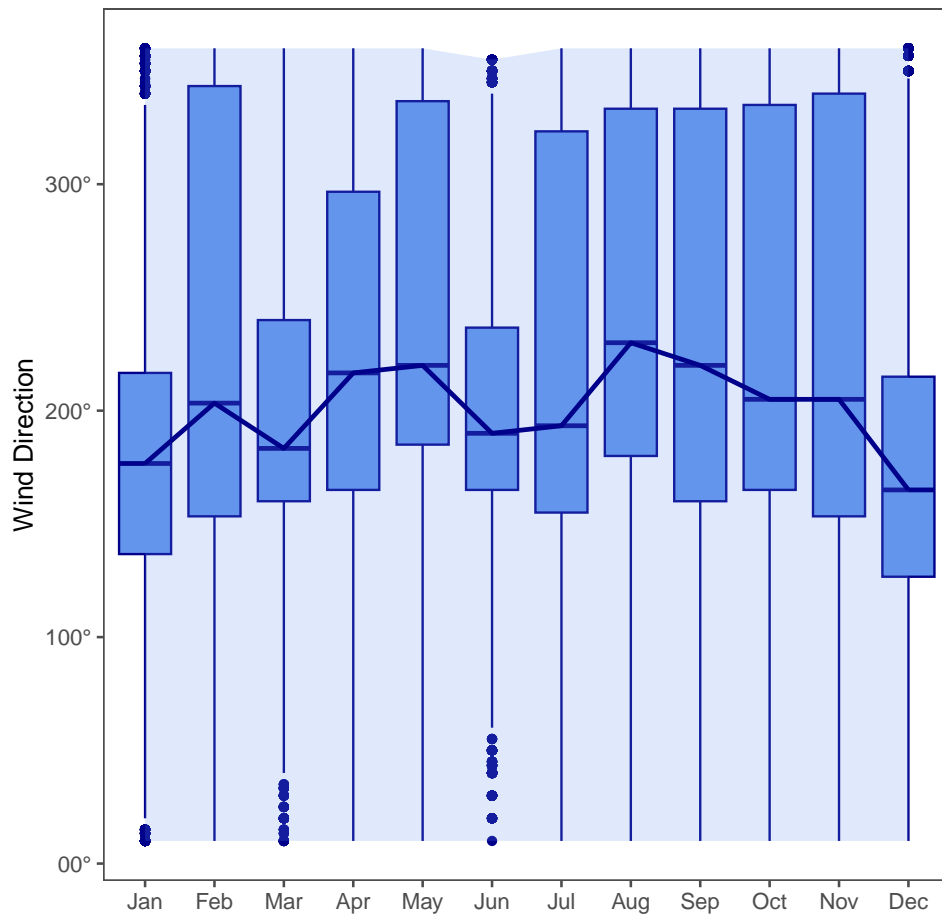




3.5 Wind Direction

| | Avg.wind.dir. | Avg.crash.wind.dir. |
|---|---------------|---------------------|
| 1 | 19.1302 | 21.163 |



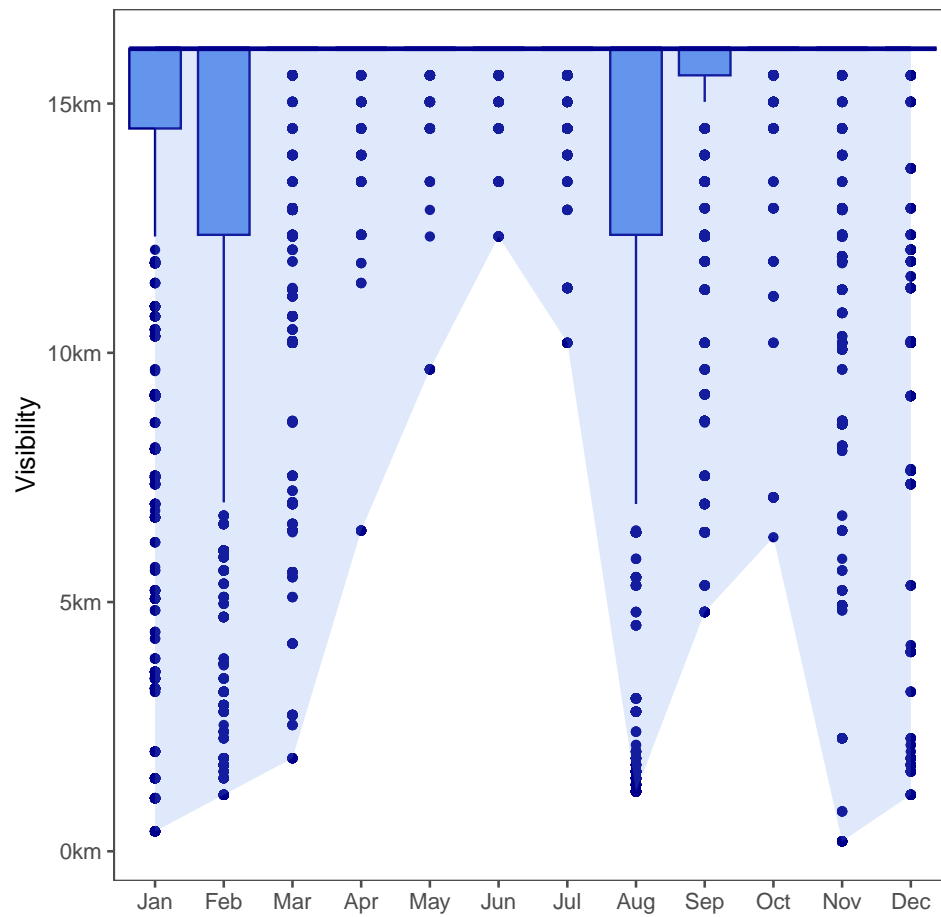


3.6 Visibility

```
Avg.visibility Avg.crash.visibility
1      15.10429      15.14964
```

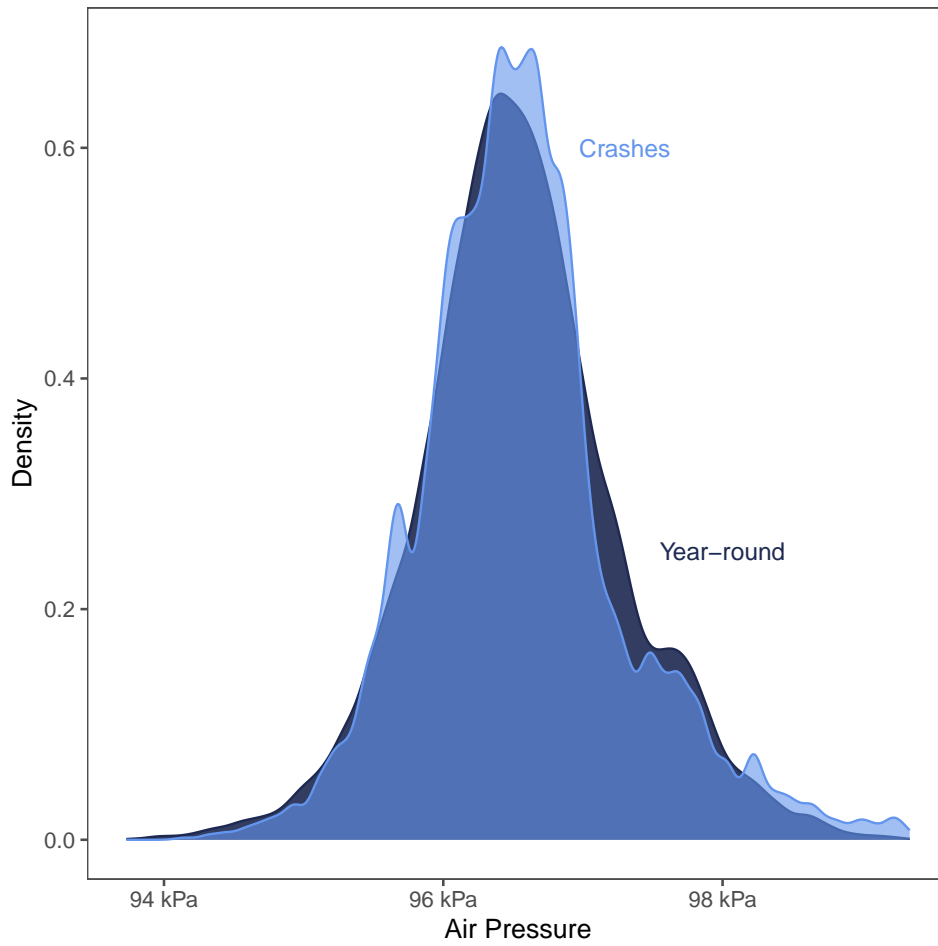
Very little differences in visibility...

Density plot isn't helpful because cases are so spread out.



3.7 Air Pressure

| | Avg. air. pressure | Avg. crash. air. pressure |
|---|--------------------|---------------------------|
| 1 | 96.55096 | 96.56156 |



4 Crash Subtypes

4.1 All Combined

 Number of crashes: 56136

 Number of intersection crashes: 24459 (43.6%)

 Number of casualty crashes: 11473 (20.4%)

 Top 5 most common streets:

| | | | | |
|--------|------------|--------|-----------|--------------|
| HWY 97 | HARVEY AVE | HWY 33 | GORDON DR | LAKESHORE RD |
| 6019 | 3168 | 2064 | 1921 | 1372 |

 Avg. victims per year: 3275

 Months of the year: (same as above)

| | | | | | | | |
|-----------|----------|----------|----------|------|------|------|--------|
| JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST |
| 5063 | 4728 | 4120 | 3825 | 4475 | 4735 | 5152 | 4907 |
| SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER | | | | |
| 4632 | 4836 | 4568 | 5095 | | | | |

 Days of the week: (same as above)

| | | | | | | |
|--------|--------|---------|-----------|----------|--------|----------|
| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
| 5464 | 8024 | 8728 | 8790 | 9061 | 9316 | 6753 |

 Avg. Temperature: (same as above)

| | | |
|---|-----------|-----------------|
| | Avg.temp. | Avg.crash.temp. |
| 1 | 8.511442 | 10.91872 |

 Avg Relative Humidity: (same as above)

| | | |
|---|--------------|--------------------|
| | Avg.humidity | Avg.crash.humidity |
| 1 | 69.32555 | 60.50743 |

 Avg. Precipitation Amount (mm): (same as above)

| | | |
|---|-------------------|-------------------------|
| | Avg.precipitation | Avg.crash.precipitation |
| 1 | 0.08996575 | 0.09326635 |

Avg. Wind Speed (km/h): (same as above)

| | Avg.wind.speed | Avg.crash.wind.speed |
|---|----------------|----------------------|
| 1 | 8.41538 | 10.27689 |

Avg. Visibility (km): (same as above)

| | Avg.visibility | Avg.crash.visibility |
|---|----------------|----------------------|
| 1 | 15.10429 | 15.14964 |

Top 5 Most Common Crash Types:

| REAR END SINGLE VEHICLE | UNDETERMINED | SIDE IMPACT | CONFLICTED |
|-------------------------|--------------|-------------|------------|
| 13024 | 12495 | 11369 | 3068 |

4.2 Cyclist Crashes

Number of crashes: 411

Number of intersection crashes: 328 (79.8%)

Number of casualty crashes: 332 (80.8%)

Top 5 most common streets:

| | | | | |
|-----------|--------------|--------|-------------|--------|
| GORDON DR | LAKESHORE RD | HWY 97 | BERNARD AVE | HWY 33 |
| 40 | 23 | 21 | 19 | 18 |

Avg. victims per year: 72

Months of the year:

| | | | | | | | |
|-----------|----------|----------|----------|-----|------|------|--------|
| JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST |
| 2 | 11 | 18 | 24 | 45 | 48 | 53 | 68 |
| SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER | | | | |
| 60 | 36 | 30 | 16 | | | | |

Days of the week:

| | | | | | | |
|--------|--------|---------|-----------|----------|--------|----------|
| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
| 32 | 52 | 78 | 75 | 65 | 78 | 31 |

Avg. Temperature:

| | | | |
|---|-----------|-----------------|-------------------------|
| | Avg.temp. | Avg.crash.temp. | Avg.cyclist.crash.temp. |
| 1 | 8.511442 | 10.91872 | 17.02561 |

Avg Relative Humidity:

| | | | |
|---|--------------|--------------------|----------------------------|
| | Avg.humidity | Avg.crash.humidity | Avg.cyclist.crash.humidity |
| 1 | 69.32555 | 60.50743 | 50.07967 |

Avg. Precipitation Amount (mm):

| | | | |
|---|-------------------|-------------------------|---------------------------------|
| | Avg.precipitation | Avg.crash.precipitation | Avg.cyclist.crash.precipitation |
| 1 | 0.02998858 | 0.2797991 | 0.08126521 |

Avg. Wind Speed (km/h):

| | Avg.wind.speed | Avg.crash.wind.speed | Avg.cyclist.crash.wind.speed |
|---|----------------|----------------------|------------------------------|
| 1 | 8.41538 | 10.27689 | 10.45772 |

Avg. Visibility (km):

| | Avg.visibility | Avg.crash.visibility | Avg.cyclist.crash.visibility |
|---|----------------|----------------------|------------------------------|
| 1 | 15.10429 | 15.14964 | 15.40862 |

Top 5 Most Common Crash Types:

| | |
|----------------|-----------------------------|
| SINGLE VEHICLE | UNDETERMINED |
| 318 | 71 |
| SIDE IMPACT | SIDE SWIPE - SAME DIRECTION |
| 21 | 1 |
| CONFLICTED | |
| 0 | |

4.3 Animal Crashes

 Number of crashes: 2018

 Number of intersection crashes: 686 (34%)

 Number of casualty crashes: 130 (6.4%)

 Top 5 most common streets:

| | | | | |
|--------|--------|-------------|--------------|--------------|
| HWY 97 | HWY 33 | WESTSIDE RD | LAKESHORE RD | BOUCHERIE RD |
| 366 | 272 | 194 | 71 | 52 |

 Avg. victims per year: 30

 Months of the year:

| | | | | | | | |
|-----------|----------|----------|----------|-----|------|------|--------|
| JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST |
| 152 | 135 | 153 | 126 | 127 | 152 | 143 | 158 |
| SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER | | | | |
| 182 | 257 | 280 | 153 | | | | |

 Days of the week:

| | | | | | | |
|--------|--------|---------|-----------|----------|--------|----------|
| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
| 244 | 307 | 284 | 312 | 303 | 329 | 239 |

 Avg. Temperature:

| | | | |
|---|-----------|-----------------|------------------------|
| | Avg.temp. | Avg.crash.temp. | Avg.animal.crash.temp. |
| 1 | 8.511442 | 10.91872 | 8.280433 |

 Avg Relative Humidity:

| | | | |
|---|--------------|--------------------|---------------------------|
| | Avg.humidity | Avg.crash.humidity | Avg.animal.crash.humidity |
| 1 | 69.32555 | 60.50743 | 70.59081 |

 Avg. Precipitation Amount (mm):

| | | | |
|---|-------------------|-------------------------|--------------------------------|
| | Avg.precipitation | Avg.crash.precipitation | Avg.animal.crash.precipitation |
| 1 | 0.08996575 | 0.09326635 | 0.08062438 |

 Avg. Wind Speed (km/h):

| | Avg.wind.speed | Avg.crash.wind.speed | Avg.animal.crash.wind.speed |
|---|----------------|----------------------|-----------------------------|
| 1 | 8.41538 | 10.27689 | 8.21608 |

Avg. Visibility (km):

| | Avg.visibility | Avg.crash.visibility | Avg.animal.crash.visibility |
|---|----------------|----------------------|-----------------------------|
| 1 | 15.10429 | 15.14964 | 15.27789 |

Top 5 Most Common Crash Types:

| SINGLE VEHICLE | UNDETERMINED | REAR END | SIDE IMPACT | CONFLICTED |
|----------------|--------------|----------|-------------|------------|
| 2005 | 7 | 3 | 2 | 1 |

4.4 Heavy Vehicle Crashes

 Number of crashes: 2051

 Number of intersection crashes: 932 (45.4%)

 Number of casualty crashes: 365 (17.8%)

 Top 5 most common streets:

| | | | | |
|--------|--------|------------|----------|-----------|
| HWY 97 | HWY 33 | HARVEY AVE | HWY 97 N | GORDON DR |
| 310 | 77 | 73 | 58 | 47 |

 Avg. victims per year: 100

 Months of the year:

| | | | | | | | |
|-----------|----------|----------|----------|-----|------|------|--------|
| JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST |
| 187 | 173 | 145 | 116 | 157 | 197 | 182 | 181 |
| SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER | | | | |
| 185 | 170 | 184 | 174 | | | | |

 Days of the week:

| | | | | | | |
|--------|--------|---------|-----------|----------|--------|----------|
| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
| 56 | 370 | 378 | 365 | 380 | 402 | 100 |

 Avg. Temperature:

| | | | |
|---|-----------|-----------------|-----------------------|
| | Avg.temp. | Avg.crash.temp. | Avg.heavy.crash.temp. |
| 1 | 8.511442 | 10.91872 | 10.61056 |

 Avg Relative Humidity:

| | | | |
|---|--------------|--------------------|--------------------------|
| | Avg.humidity | Avg.crash.humidity | Avg.heavy.crash.humidity |
| 1 | 69.32555 | 60.50743 | 61.85107 |

 Avg. Precipitation Amount (mm):

| | | | |
|---|-------------------|-------------------------|-------------------------------|
| | Avg.precipitation | Avg.crash.precipitation | Avg.heavy.crash.precipitation |
| 1 | 0.08996575 | 0.09326635 | 0.09780595 |

 Avg. Wind Speed (km/h):

| | Avg.wind.speed | Avg.crash.wind.speed | Avg.heavy.crash.wind.speed |
|---|----------------|----------------------|----------------------------|
| 1 | 8.41538 | 10.27689 | 9.744303 |

Avg. Visibility (km):

| | Avg.visibility | Avg.crash.visibility | Avg.heavy.crash.visibility |
|---|----------------|----------------------|----------------------------|
| 1 | 15.10429 | 15.14964 | 15.04907 |

Top 5 Most Common Crash Types:

| | | | |
|--------------|-------------|-------------------------|------------|
| UNDETERMINED | SIDE IMPACT | REAR END SINGLE VEHICLE | CONFLICTED |
| 546 | 422 | 392 | 330 |
| | | | 137 |

4.5 Motorcycle Crashes

 Number of crashes: 463

 Number of intersection crashes: 288 (62.2%)

 Number of casualty crashes: 275 (59.4%)

 Top 5 most common streets:

| | | | | |
|--------|------------|--------|-------------|--------|
| HWY 97 | HARVEY AVE | HWY 33 | WESTSIDE RD | KLO RD |
| 67 | 22 | 20 | 13 | 11 |

 Avg. victims per year: 66

 Months of the year:

| | | | | | | | |
|-----------|----------|----------|----------|-----|------|------|--------|
| JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST |
| 0 | 4 | 17 | 43 | 51 | 71 | 97 | 71 |
| SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER | | | | |
| 61 | 39 | 9 | 0 | | | | |

 Days of the week:

| | | | | | | |
|--------|--------|---------|-----------|----------|--------|----------|
| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
| 65 | 49 | 58 | 57 | 69 | 90 | 75 |

 Avg. Temperature:

| | | | |
|---|-----------|-----------------|----------------------------|
| | Avg.temp. | Avg.crash.temp. | Avg.motorcycle.crash.temp. |
| 1 | 8.511442 | 10.91872 | 19.28287 |

 Avg Relative Humidity:

| | | | |
|---|--------------|--------------------|-------------------------------|
| | Avg.humidity | Avg.crash.humidity | Avg.motorcycle.crash.humidity |
| 1 | 69.32555 | 60.50743 | 45.53852 |

 Avg. Precipitation Amount (mm):

| | | | |
|---|-------------------|-------------------------|------------------------------------|
| | Avg.precipitation | Avg.crash.precipitation | Avg.motorcycle.crash.precipitation |
| 1 | 0.08996575 | 0.09326635 | 0.0762419 |

 Avg. Wind Speed (km/h):

| | Avg.wind.speed | Avg.crash.wind.speed | Avg.motorcycle.crash.wind.speed |
|---|----------------|----------------------|---------------------------------|
| 1 | 8.41538 | 10.27689 | 11.33549 |

Avg. Visibility (km):

| | Avg.visibility | Avg.crash.visibility | Avg.motorcycle.crash.visibility |
|---|----------------|----------------------|---------------------------------|
| 1 | 15.10429 | 15.14964 | 15.54327 |

Top 5 Most Common Crash Types:

| SIDE IMPACT SINGLE VEHICLE | REAR END | UNDETERMINED | CONFLICTED |
|----------------------------|----------|--------------|------------|
| 111 | 102 | 101 | 86 |
| | | | 38 |

4.6 Parked Vehicle Crashes

Number of crashes: 17569

Number of intersection crashes: 2790 (15.9%)

Number of casualty crashes: 353 (2%)

Top 5 most common streets:

| | | | |
|------------|---------------------|----------|-----------|
| HARVEY AVE | HWY 97 LAKESHORE RD | LOUIE DR | GORDON DR |
| 1221 | 760 | 520 | 473 |
| | | | 446 |

Avg. victims per year: 92

Months of the year:

| | | | | | | | |
|-----------|----------|----------|----------|------|------|------|--------|
| JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST |
| 1589 | 1415 | 1369 | 1271 | 1439 | 1566 | 1629 | 1607 |
| SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER | | | | |
| 1449 | 1487 | 1316 | 1432 | | | | |

Days of the week:

| | | | | | | |
|--------|--------|---------|-----------|----------|--------|----------|
| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
| 1948 | 2518 | 2615 | 2649 | 2664 | 2780 | 2395 |

Avg. Temperature:

| | | | |
|---|-----------|-----------------|------------------------|
| | Avg.temp. | Avg.crash.temp. | Avg.parked.crash.temp. |
| 1 | 8.511442 | 10.91872 | 11.32006 |

Avg Relative Humidity:

| | | | |
|---|--------------|--------------------|---------------------------|
| | Avg.humidity | Avg.crash.humidity | Avg.parked.crash.humidity |
| 1 | 69.32555 | 60.50743 | 59.20128 |

Avg. Precipitation Amount (mm):

| | | | |
|---|-------------------|-------------------------|--------------------------------|
| | Avg.precipitation | Avg.crash.precipitation | Avg.parked.crash.precipitation |
| 1 | 0.08996575 | 0.09326635 | 0.08685184 |

Avg. Wind Speed (km/h):

| | Avg.wind.speed | Avg.crash.wind.speed | Avg.parked.crash.wind.speed |
|---|----------------|----------------------|-----------------------------|
| 1 | 8.41538 | 10.27689 | 10.38783 |

Avg. Visibility (km):

| | Avg.visibility | Avg.crash.visibility | Avg.parked.crash.visibility |
|---|----------------|----------------------|-----------------------------|
| 1 | 15.10429 | 15.14964 | 15.1956 |

Top 5 Most Common Crash Types:

| | |
|-----------------------------|-------------|
| UNDETERMINED | SIDE IMPACT |
| 7156 | 5519 |
| REAR END | CONFLICTED |
| 1501 | 852 |
| SIDE SWIPE - SAME DIRECTION | |
| 692 | |

4.7 Pedestrian Crashes

 Number of crashes: 346

 Number of intersection crashes: 220 (63.6%)

 Number of casualty crashes: 289 (83.5%)

 Top 5 most common streets:

| | | | | |
|------------|-----------|--------|--------|----------|
| HARVEY AVE | GORDON DR | HWY 97 | HWY 33 | BANKS RD |
| 26 | 22 | 22 | 12 | 11 |

 Avg. victims per year: 69

 Months of the year:

| | | | | | | | |
|-----------|----------|----------|----------|-----|------|------|--------|
| JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST |
| 35 | 13 | 21 | 19 | 27 | 28 | 28 | 32 |
| SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER | | | | |
| 34 | 40 | 33 | 36 | | | | |

 Days of the week:

| | | | | | | |
|--------|--------|---------|-----------|----------|--------|----------|
| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
| 33 | 44 | 39 | 66 | 57 | 65 | 42 |

 Avg. Temperature:

| | | | |
|---|-----------|-----------------|----------------------------|
| | Avg.temp. | Avg.crash.temp. | Avg.pedestrian.crash.temp. |
| 1 | 8.511442 | 10.91872 | 10.77013 |

 Avg Relative Humidity:

| | | | |
|---|--------------|--------------------|-------------------------------|
| | Avg.humidity | Avg.crash.humidity | Avg.pedestrian.crash.humidity |
| 1 | 69.32555 | 60.50743 | 63.38247 |

 Avg. Precipitation Amount (mm):

| | | | |
|---|-------------------|-------------------------|------------------------------------|
| | Avg.precipitation | Avg.crash.precipitation | Avg.pedestrian.crash.precipitation |
| 1 | 0.08996575 | 0.09326635 | 0.09364162 |

 Avg. Wind Speed (km/h):

| | Avg.wind.speed | Avg.crash.wind.speed | Avg.pedestrian.crash.wind.speed |
|---|----------------|----------------------|---------------------------------|
| 1 | 8.41538 | 10.27689 | 9.628131 |

Avg. Visibility (km):

| | Avg.visibility | Avg.crash.visibility | Avg.pedestrian.crash.visibility |
|---|----------------|----------------------|---------------------------------|
| 1 | 15.10429 | 15.14964 | 15.20434 |

Top 5 Most Common Crash Types:

| SINGLE VEHICLE | UNDETERMINED | SIDE IMPACT | CONFLICTED | REAR END |
|----------------|--------------|-------------|------------|----------|
| 273 | 53 | 8 | 5 | 4 |

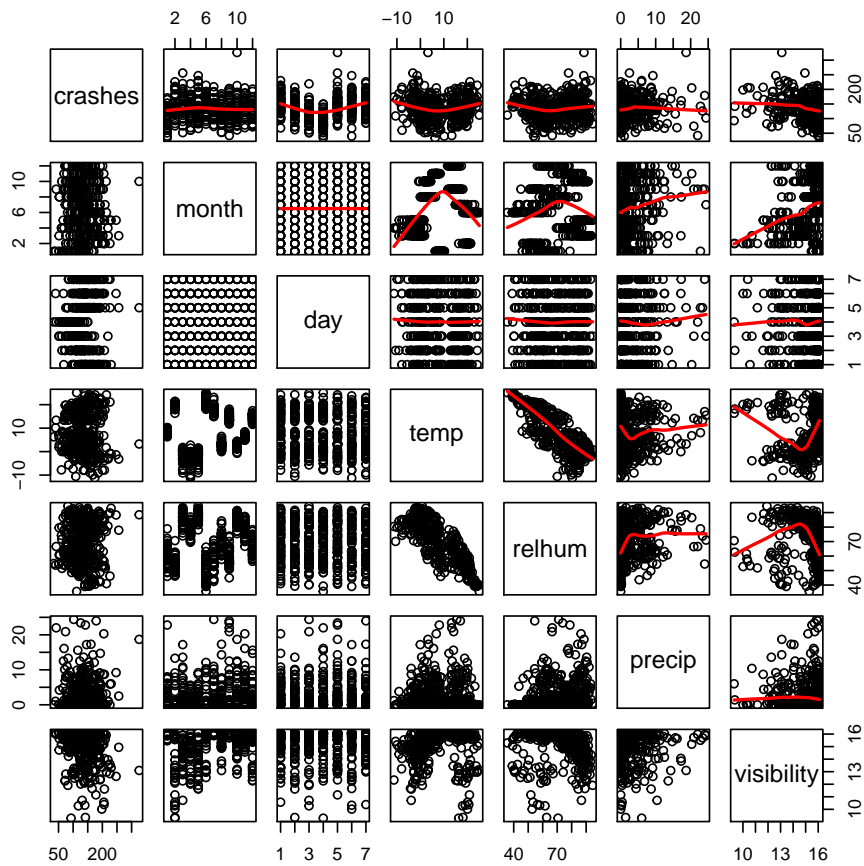
5 Regression/Neural Network Dataset

As opposed to linking the weather to each crash, this dataset links (some) crash data to the weather on each individual day (ie. the reverse). This is desirable if we want to predict the # of crashes and # of victims per day based on weather conditions.

Notice that rows are a bit weird/unintuitive for this dataset. Each row is a unique weekday in each month, and so actually represents the sum of all of these weekdays (ex. Fridays in October, Mondays in December, etc.). This is the case because the crash dataset was anonymized.

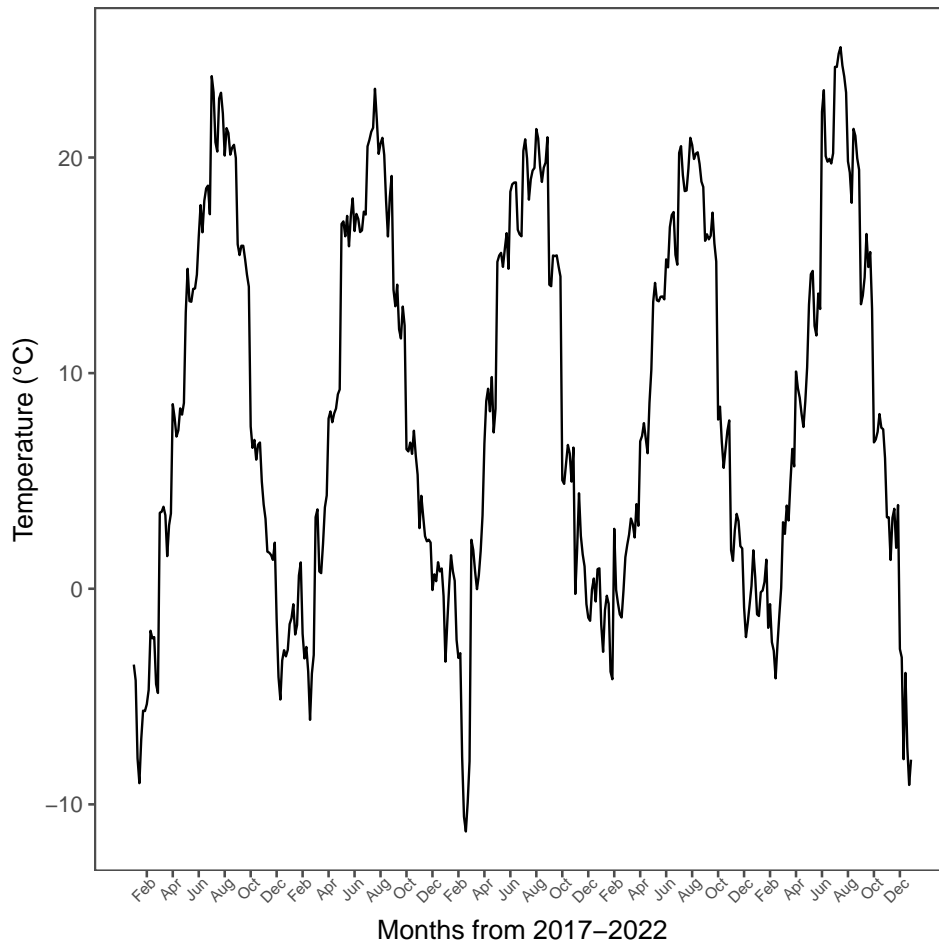
Variables:

```
[1] "linker"      "month"      "day"        "temp"       "relhum"
[6] "precip"      "wind.dir"   "wind.spd"   "visibility"  "pressure"
[11] "crashes"     "victims"    "parked"     "HWY97"      "HARVEY"
[16] "HWY33"      "GORDON"
```

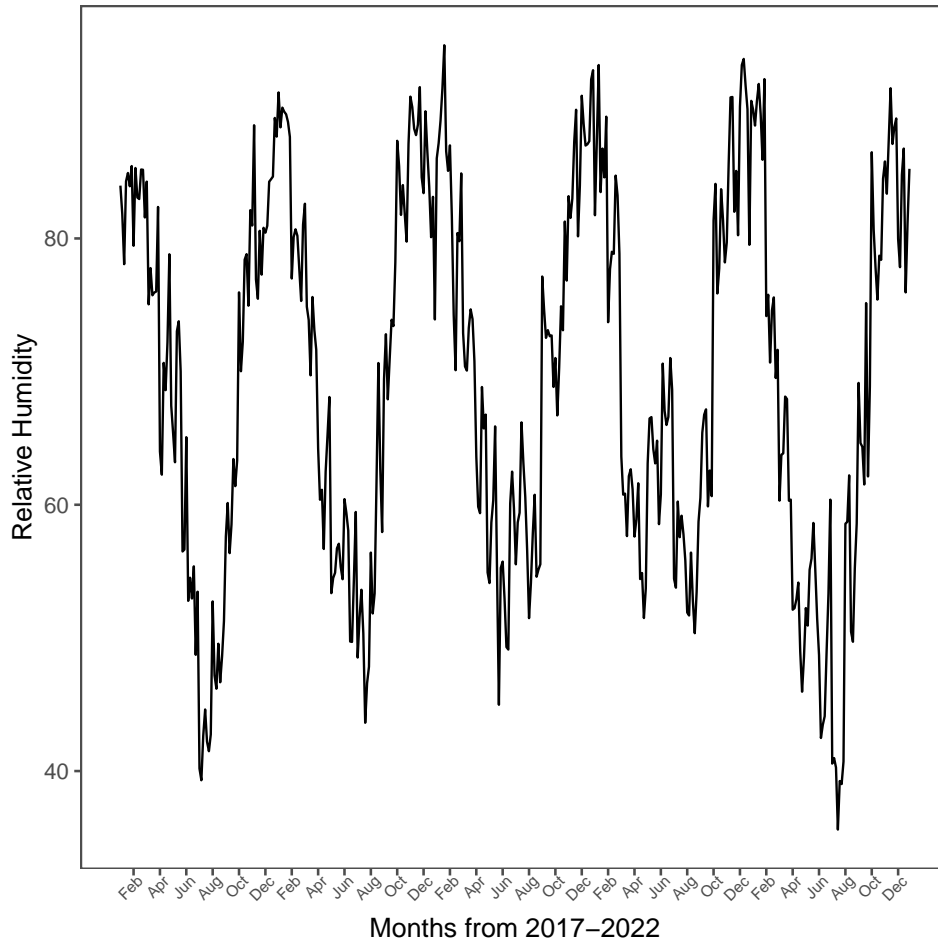


5.1 Weather Variables

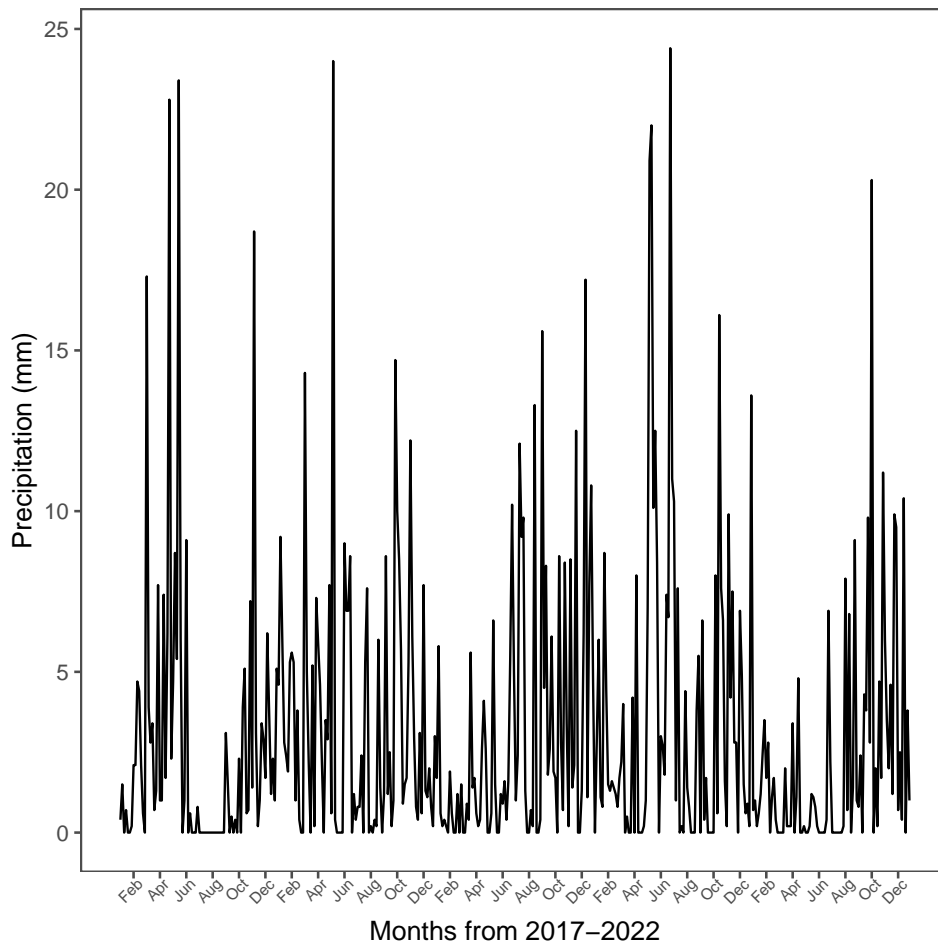
5.1.1 Temperature



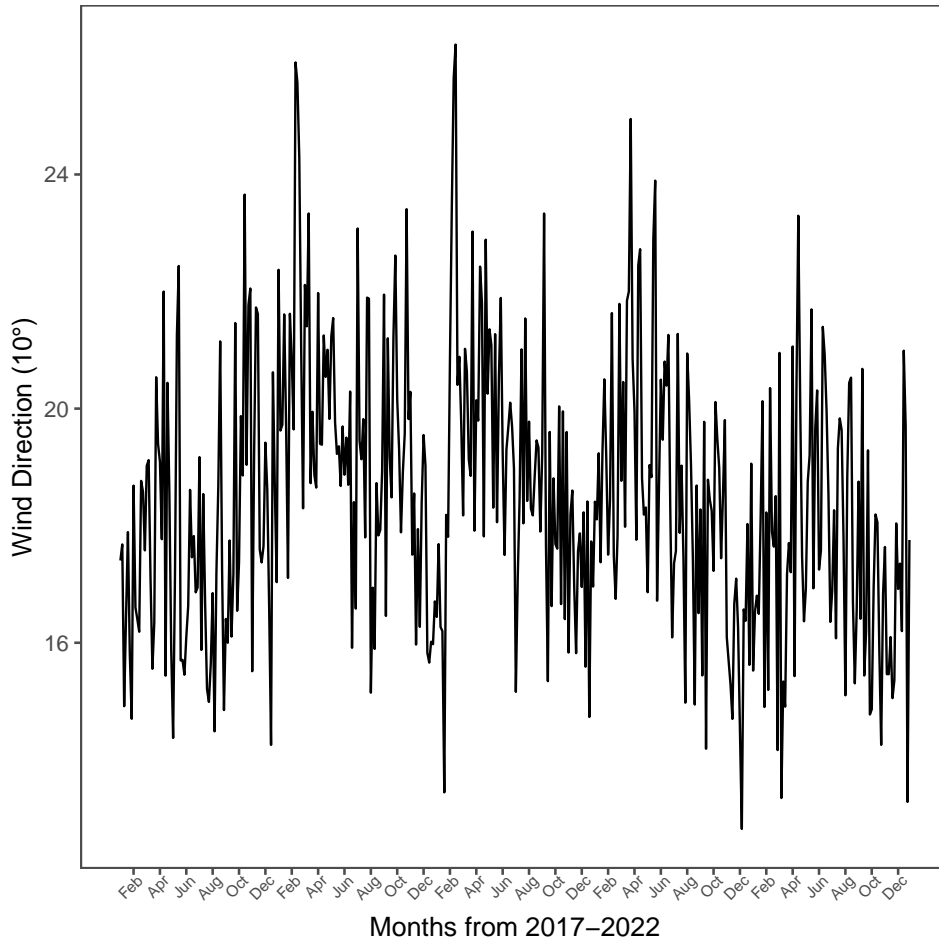
5.1.2 Relative Humidity



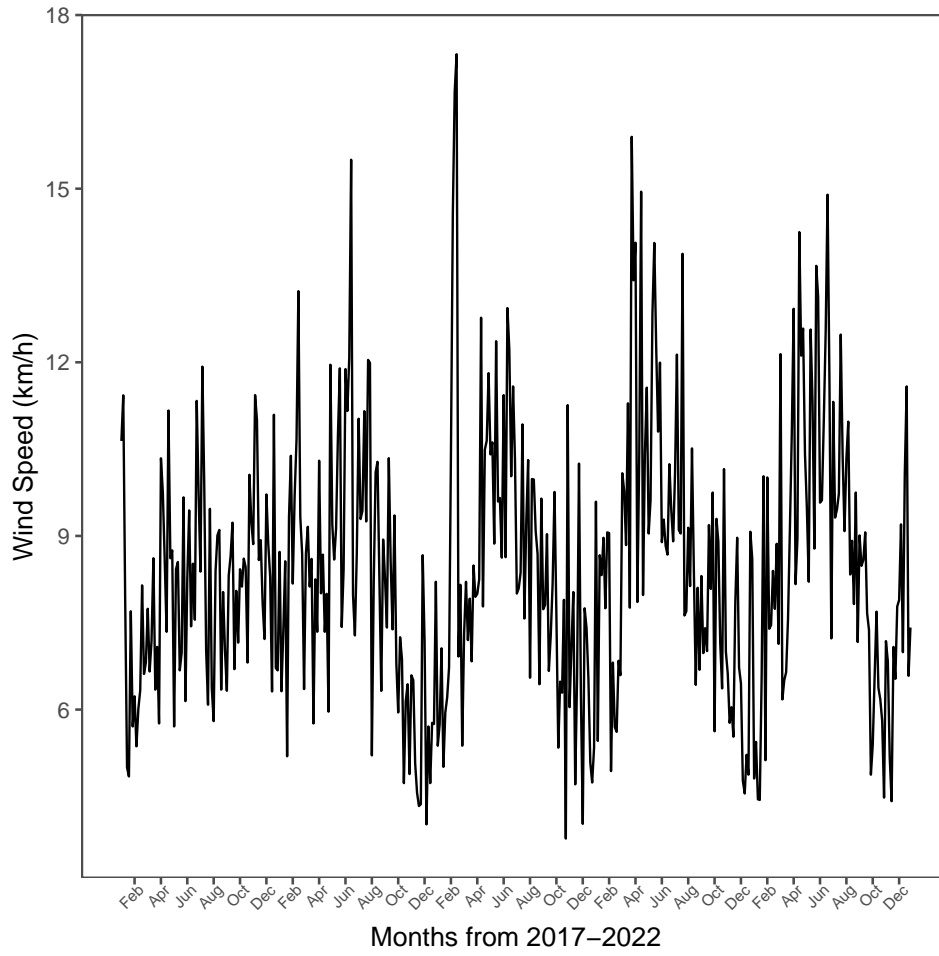
5.1.3 Precipitation



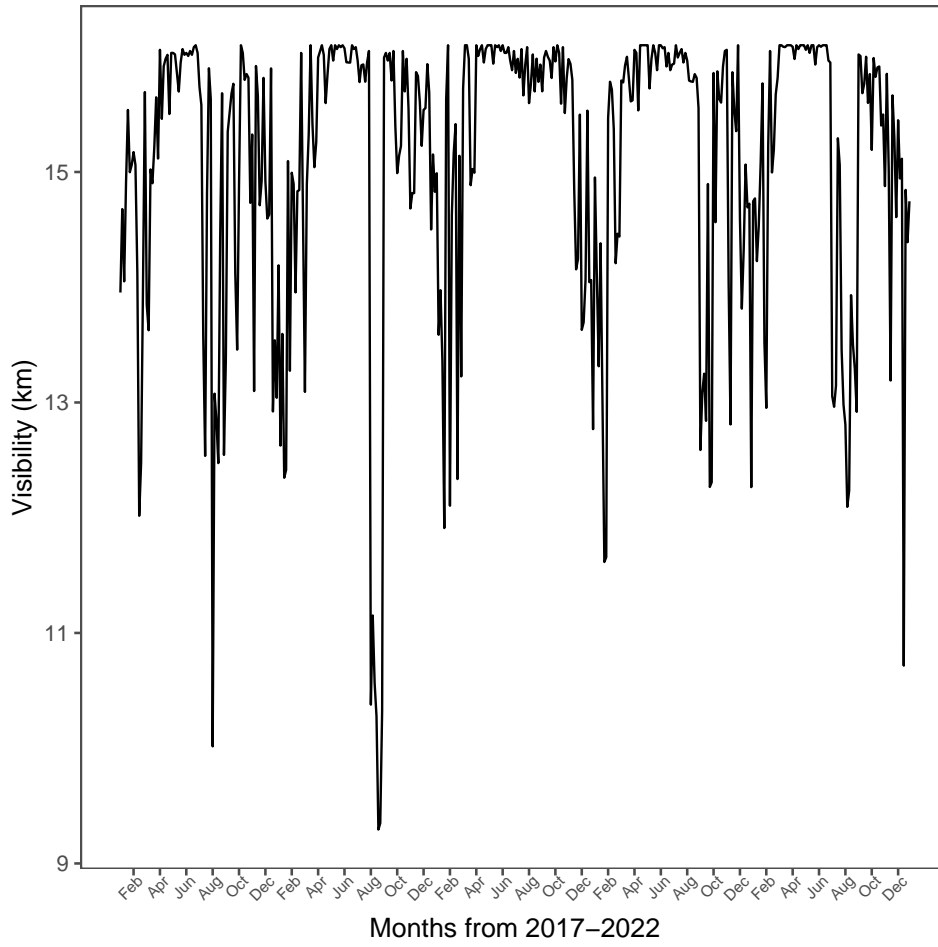
5.1.4 Wind Direction



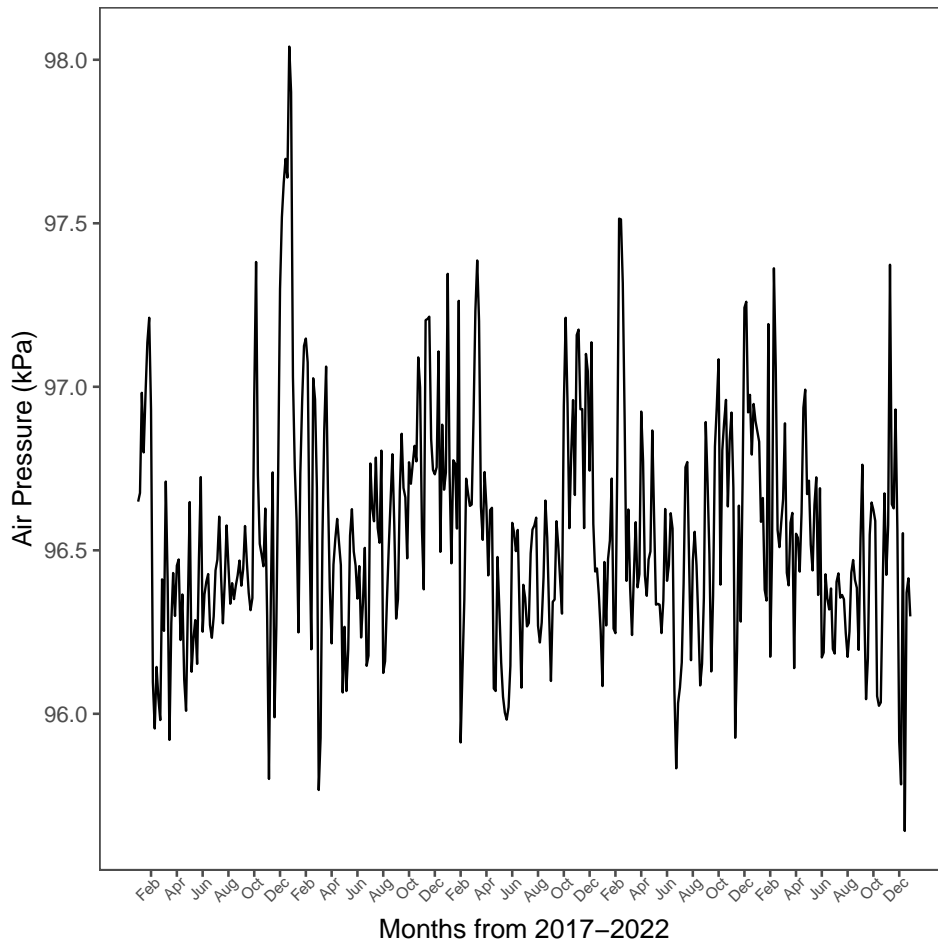
5.1.5 Wind Speed



5.1.6 Visibility



5.1.7 Air Pressure



5.2 Crash Variables

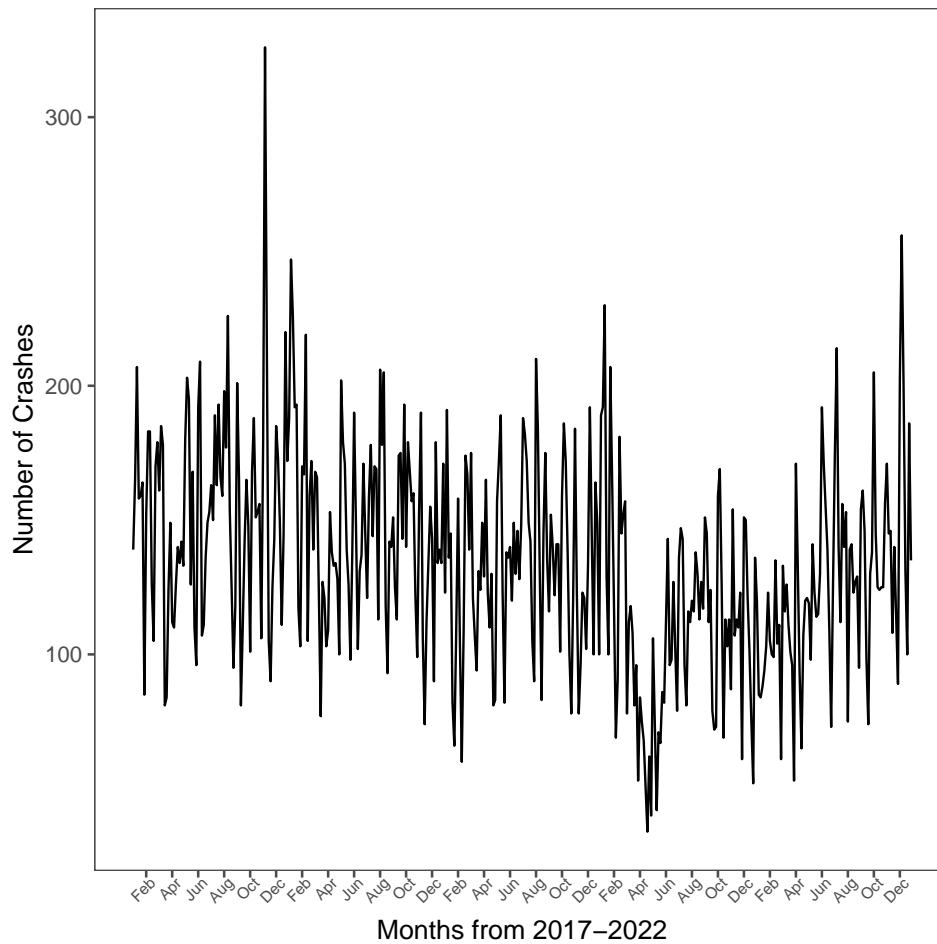
5.2.1 Number of Crashes

Row with abnormally high number of crashes:

```

linker      month      day      temp relhum precip wind.dir
72 2017 NOVEMBER THURSDAY NOVEMBER THURSDAY 3.244167 88.5 18.7 19.20085
wind.spd visibility pressure crashes victims parked HWY97 HARVEY HWY33
72 11.43333 13.09917 95.80075 326 147 70 33 10 21
GORDON
72 14

```

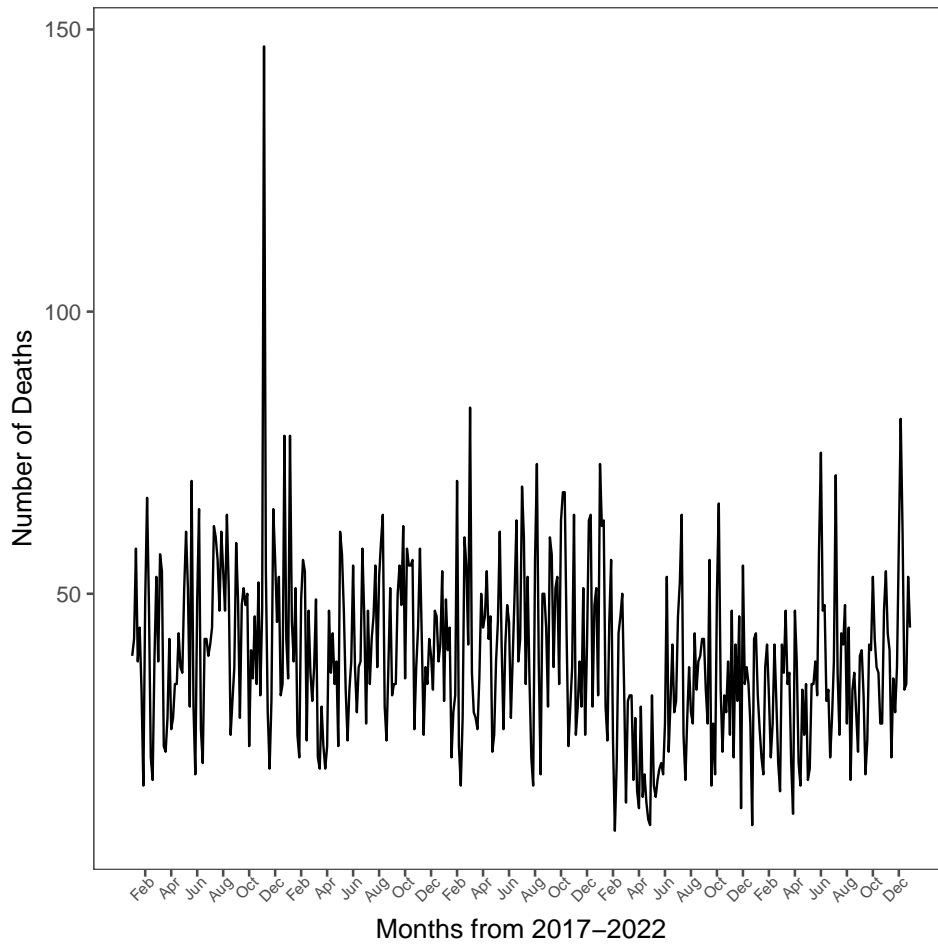


5.2.2 Number of Deaths

Row with abnormally high number of deaths:

```

linker      month      day      temp relhum precip wind.dir
72 2017 NOVEMBER THURSDAY NOVEMBER THURSDAY 3.244167 88.5 18.7 19.20085
wind.spd visibility pressure crashes victims parked HWY97 HARVEY HWY33
72 11.43333 13.09917 95.80075 326 147 70 33 10 21
GORDON
72 14
    
```



5.2.3 Locations

