## Bird Strikes

July 5, 2024

```
[1]: import pandas as pd
     df=pd.read_csv("Bird Strikes Data Original - Replaced Formatted.csv")
     #display(df)
     display(df.head(10))
     df.info()
       Record ID Aircraft: Type
                                                        Airport: Name Altitude bin \
    0
          208033
                        Airplane
                                             MINNEAPOLIS-ST PAUL INTL
                                                                          > 1000 ft
    1
          261733
                        Airplane
                                                  JOE FOSS FIELD ARPT
                                                                          < 1000 ft
    2
          309151
                        Airplane
                                                  SALT LAKE CITY INTL
                                                                          < 1000 ft
    3
          200097
                        Airplane
                                                    INDIANAPOLIS INTL
                                                                          < 1000 ft
    4
                                                   PORT COLUMBUS INTL
          268701
                        Airplane
                                                                          < 1000 ft
    5
                                             CHICAGO MIDWAY INTL ARPT
                                                                          < 1000 ft
          309212
                        Airplane
                        Airplane
    6
          200219
                                                   SPIRIT OF ST LOUIS
                                                                          > 1000 ft
    7
                        Airplane
                                                       VANCOUVER INTL
                                                                          < 1000 ft
          205904
    8
                        Airplane
                                                  SALT LAKE CITY INTL
                                                                          < 1000 ft
          204178
    9
            6632
                        Airplane
                                 EGLIN AFB/NW FLORIDA REGIONAL ARPT
                                                                          < 1000 ft
       Aircraft: Make/Model Wildlife: Number struck
    0
                    SAAB-340
                                              2 to 10
       CITATION MUSTANG 510
                                              2 to 10
    1
    2
                       A-320
                                              2 to 10
    3
                   B-737-300
                                            11 to 100
    4
                     EMB-145
    5
                                              2 to 10
                   B-737-500
    6
                       C-560
                                              2 to 10
                   B-737-400
    7
                                              2 to 10
                                              2 to 10
    8
               RKWL SABRLNR
    9
                      C-130E
                                              2 to 10
       Wildlife: Number Struck Actual Effect: Impact to flight FlightDate
    0
                                      3
                                           Precautionary Landing 13/11/2000
    1
                                      4
                                           Precautionary Landing 10/03/2009
    2
                                           Precautionary Landing
                                      8
                                                                   24/11/2010
    3
                                     97
                                           Precautionary Landing 11/03/2000
    4
                                      1
                                           Precautionary Landing
                                                                   18/09/2009
    5
                                     10
                                                            Other
                                                                   25/12/2010
```

No Impact

30/01/2000

2

6

```
7
                                  7
                                                    No Impact
                                                                14/12/2000
8
                                  9
                                                                12/02/2001
                                                    No Impact
9
                                  9
                                                                01/02/2002
                                                    No Impact
                             ... Remains of wildlife sent to Smithsonian
  Effect: Indicated Damage
0
              Caused damage
                                                                        NO
                                                                        NO
1
              Caused damage
                                                                       YES
2
                  No damage
3
             Caused damage
                                                                        NO
4
                                                                        NO
                  No damage
5
                                                                        NO
              Caused damage
6
                                                                        NO
                  No damage
7
                                                                        NO
              Caused damage
8
                                                                        NO
                  No damage
9
                  No damage
                                                                        NO
                                                Remarks Wildlife: Size \
   JUST ENTERING CLOUD BASES, STRUCK UNKN # OF BI...
                                                                Large
   BIRD REPTD AS BLUE GOOSE. DMG TO LWR L ENG COW...
                                                                Large
   ID BY SMITHSONIAN. A/C INGESTED BIRD IN #1 ENG...
                                                               Medium
   FLT 439. HIGH VIBRATIONS IN #1 ENG. ENG DID NO...
                                                                Small
                            DEPARTURE END END RWY 28R.
                                                                  Large
   ATIS WARNING. FLT 44 ADVISED OF BIRDSTRIKE IN ...
                                                                Large
6
                                               HIT FLAP
                                                                  Small
   SNOW PLOW PROBABLY DISTURBED GEESE CAUSING THE ...
                                                                Large
                               WE WERE 1ST A/C ON RWY.
8
                                                                  Small
9
                                                                 Medium
                                                    NaN
                       Wildlife: Species Pilot warned of birds or wildlife?
  Conditions: Sky
0
         Overcast
                    Unknown bird - large
1
         Overcast
                               Snow goose
                                                                             No
2
                                  Gadwall
         Overcast
                                                                            Yes
3
         Overcast
                       European starling
                                                                             No
4
       Some Cloud
                    Unknown bird - large
                                                                             No
5
       Some Cloud
                             Canada goose
                                                                            Yes
6
                    Unknown bird - small
         Overcast
                                                                             No
7
       Some Cloud
                               Snow goose
                                                                             No
8
         Overcast
                    Unknown bird - small
                                                                            Yes
9
                     Unknown bird or bat
         Overcast
                                                                            Yes
  Cost: Total $ Feet above ground Number of people injured Is Aircraft Large?
               0
0
                              1,800
                                                             0
                                                                                No
1
         31,624
                                500
                                                             0
                                                                                No
2
                                                             0
               0
                                300
                                                                                No
3
               0
                                                             0
                                200
                                                                               Yes
4
               0
                                                             0
                                700
                                                                                No
5
               0
                                200
                                                             0
                                                                               Yes
6
               0
                              1,800
                                                                                No
```

7	0	50	0	Yes
8	0	0	0	No
9	0	150	0	No

[10 rows x 26 columns]

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 25558 entries, 0 to 25557
Data columns (total 26 columns):

```
#
    Column
                                             Non-Null Count Dtype
    _____
                                             _____
 0
    Record ID
                                             25558 non-null int64
 1
    Aircraft: Type
                                             25429 non-null object
 2
    Airport: Name
                                             25429 non-null object
 3
    Altitude bin
                                             25429 non-null object
 4
    Aircraft: Make/Model
                                            25558 non-null object
    Wildlife: Number struck
                                            25429 non-null object
    Wildlife: Number Struck Actual
                                            25558 non-null int64
 7
    Effect: Impact to flight
                                             25429 non-null object
    FlightDate
                                            25429 non-null object
    Effect: Indicated Damage
                                            25558 non-null object
 10 Aircraft: Number of engines?
                                            25291 non-null object
 11 Aircraft: Airline/Operator
                                            25429 non-null object
 12 Origin State
                                             25109 non-null object
 13 When: Phase of flight
                                             25429 non-null object
 14 Conditions: Precipitation
                                             25558 non-null object
                                             25558 non-null object
 15 Remains of wildlife collected?
 16 Remains of wildlife sent to Smithsonian 25558 non-null object
                                             20787 non-null object
 17 Remarks
 18 Wildlife: Size
                                             25429 non-null object
 19 Conditions: Sky
                                             25558 non-null object
 20 Wildlife: Species
                                             25558 non-null object
 21 Pilot warned of birds or wildlife?
                                             25429 non-null object
22 Cost: Total $
                                             25558 non-null object
 23 Feet above ground
                                            25429 non-null object
 24 Number of people injured
                                            25558 non-null int64
 25 Is Aircraft Large?
                                            25429 non-null object
dtypes: int64(3), object(23)
memory usage: 5.1+ MB
```

```
df_cleaned = df.fillna('Unvailable')
display(df_cleaned.head(10))
df_cleaned.info()
   Record ID Aircraft: Type
                                                     Airport: Name Altitude bin \
0
      208033
                    Airplane
                                         MINNEAPOLIS-ST PAUL INTL
                                                                       > 1000 ft
                    Airplane
                                               JOE FOSS FIELD ARPT
                                                                       < 1000 ft
1
      261733
2
      309151
                    Airplane
                                              SALT LAKE CITY INTL
                                                                       < 1000 ft
3
      200097
                    Airplane
                                                 INDIANAPOLIS INTL
                                                                       < 1000 ft
4
                    Airplane
                                               PORT COLUMBUS INTL
      268701
                                                                       < 1000 ft
5
      309212
                    Airplane
                                         CHICAGO MIDWAY INTL ARPT
                                                                       < 1000 ft
6
      200219
                    Airplane
                                               SPIRIT OF ST LOUIS
                                                                       > 1000 ft
7
      205904
                    Airplane
                                                    VANCOUVER INTL
                                                                       < 1000 ft
                                               SALT LAKE CITY INTL
                    Airplane
                                                                       < 1000 ft
8
      204178
9
        6632
                    Airplane
                              EGLIN AFB/NW FLORIDA REGIONAL ARPT
                                                                       < 1000 ft
   Aircraft: Make/Model Wildlife: Number struck
                                          2 to 10
0
               SAAB-340
1
   CITATION MUSTANG 510
                                          2 to 10
                                          2 to 10
2
                   A-320
3
              B-737-300
                                        11 to 100
4
                EMB-145
                                                 1
                                          2 to 10
5
              B-737-500
6
                   C-560
                                          2 to 10
7
                                          2 to 10
              B-737-400
                                          2 to 10
8
           RKWL SABRLNR
9
                                          2 to 10
                  C-130E
   Wildlife: Number Struck Actual Effect: Impact to flight
                                                               FlightDate
                                       Precautionary Landing
0
                                  3
                                                               13/11/2000
                                  4
                                       Precautionary Landing
                                                               10/03/2009
1
2
                                  8
                                                               24/11/2010
                                       Precautionary Landing
3
                                 97
                                       Precautionary Landing
                                                                11/03/2000
                                       Precautionary Landing
4
                                  1
                                                               18/09/2009
5
                                 10
                                                        Other
                                                                25/12/2010
6
                                  2
                                                    No Impact
                                                               30/01/2000
7
                                  7
                                                    No Impact
                                                                14/12/2000
8
                                  9
                                                    No Impact
                                                                12/02/2001
9
                                  9
                                                    No Impact
                                                                01/02/2002
  Effect: Indicated Damage
                             ... Remains of wildlife sent to Smithsonian
0
             Caused damage
                                                                       NO
             Caused damage
                                                                       NO
1
2
                                                                      YES
                  No damage
3
             Caused damage
                                                                       NO
4
                                                                       NO
                  No damage
5
             Caused damage
                                                                       NO
6
                  No damage
                                                                       NO
```

```
Caused damage
8
                                                                       NO
                  No damage
9
                  No damage
                                                                       NO
                                               Remarks Wildlife: Size \
   JUST ENTERING CLOUD BASES, STRUCK UNKN # OF BI...
                                                               Large
  BIRD REPTD AS BLUE GOOSE. DMG TO LWR L ENG COW...
                                                               Large
   ID BY SMITHSONIAN. A/C INGESTED BIRD IN #1 ENG...
                                                              Medium
  FLT 439. HIGH VIBRATIONS IN #1 ENG. ENG DID NO...
                                                               Small
                           DEPARTURE END END RWY 28R.
4
                                                                  Large
  ATIS WARNING. FLT 44 ADVISED OF BIRDSTRIKE IN ...
5
                                                               Large
6
                                              HIT FLAP
                                                                  Small
   SNOW PLOW PROBABLY DISTURBED GEESE CAUSING THE ...
7
                                                               Large
8
                              WE WERE 1ST A/C ON RWY.
                                                                  Small
9
                                            Unvailable
                                                                Medium
  Conditions: Sky
                       Wildlife: Species Pilot warned of birds or wildlife?
0
         Overcast
                    Unknown bird - large
                                                                            No
1
         Overcast
                              Snow goose
                                                                            No
2
         Overcast
                                  Gadwall
                                                                           Yes
                       European starling
3
         Overcast
                                                                            No
4
       Some Cloud
                    Unknown bird - large
                                                                            No
5
       Some Cloud
                            Canada goose
                                                                           Yes
6
         Overcast
                    Unknown bird - small
                                                                            No
7
       Some Cloud
                              Snow goose
                                                                            No
8
                   Unknown bird - small
         Overcast
                                                                           Yes
9
                     Unknown bird or bat
         Overcast
                                                                           Yes
  Cost: Total $ Feet above ground Number of people injured Is Aircraft Large?
0
                             1,800
         31,624
                                                            0
1
                               500
                                                                                No
2
              0
                               300
                                                            0
                                                                               No
3
              0
                               200
                                                            0
                                                                              Yes
4
              0
                               700
                                                            0
                                                                               No
5
              0
                               200
                                                            0
                                                                              Yes
6
              0
                             1,800
                                                            0
                                                                               No
7
              0
                                50
                                                            0
                                                                              Yes
8
              0
                                  0
                                                            0
                                                                               No
9
                               150
                                                            0
                                                                               No
[10 rows x 26 columns]
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 25558 entries, 0 to 25557
Data columns (total 26 columns):
 #
     Column
                                                 Non-Null Count
                                                                  Dtype
                                                 _____
     _____
```

NO

7

Record ID

25558 non-null int64

```
2
         Airport: Name
                                                   25558 non-null
                                                                   object
     3
         Altitude bin
                                                   25558 non-null
                                                                   object
     4
         Aircraft: Make/Model
                                                                   object
                                                   25558 non-null
         Wildlife: Number struck
     5
                                                   25558 non-null
                                                                   object
     6
         Wildlife: Number Struck Actual
                                                                   int64
                                                   25558 non-null
     7
         Effect: Impact to flight
                                                   25558 non-null
                                                                   object
                                                                   object
     8
         FlightDate
                                                   25558 non-null
         Effect: Indicated Damage
                                                   25558 non-null
                                                                   object
     10 Aircraft: Number of engines?
                                                   25558 non-null
                                                                   object
     11 Aircraft: Airline/Operator
                                                   25558 non-null
                                                                   object
         Origin State
     12
                                                   25558 non-null
                                                                   object
        When: Phase of flight
                                                                   object
     13
                                                   25558 non-null
         Conditions: Precipitation
                                                   25558 non-null
                                                                   object
         Remains of wildlife collected?
                                                   25558 non-null
                                                                   object
        Remains of wildlife sent to Smithsonian 25558 non-null
                                                                   object
     17
         Remarks
                                                   25558 non-null
                                                                   object
        Wildlife: Size
                                                   25558 non-null
     18
                                                                   object
        Conditions: Sky
                                                   25558 non-null
                                                                   object
     20 Wildlife: Species
                                                   25558 non-null
                                                                   object
     21 Pilot warned of birds or wildlife?
                                                   25558 non-null
                                                                   object
     22 Cost: Total $
                                                   25558 non-null
                                                                   object
     23 Feet above ground
                                                   25558 non-null
                                                                   object
     24 Number of people injured
                                                   25558 non-null
                                                                   int64
     25 Is Aircraft Large?
                                                   25558 non-null object
    dtypes: int64(3), object(23)
    memory usage: 5.1+ MB
[3]: #df_cleaned[['Number of people injured', 'Wildlife: Number struck', 'Cost:
      →Total $']].describe()
     df_cleaned.describe()
[3]:
                Record ID Wildlife: Number Struck Actual Number of people injured
             25558.000000
                                             25558.000000
                                                                        25558.000000
     count
    mean
            253916.085609
                                                  2.691525
                                                                            0.001056
     std
             38510.453382
                                                 12.793975
                                                                            0.050420
                                                                            0.000000
    min
              1195.000000
                                                 1.000000
     25%
            225783.750000
                                                  1.000000
                                                                            0.000000
     50%
            248749.000000
                                                  1.000000
                                                                            0.000000
     75%
            269168.750000
                                                  1.000000
                                                                            0.000000
                                               942.000000
            321909.000000
                                                                            6.000000
     max
[4]: display(df_cleaned.head(10))
       Record ID Aircraft: Type
                                                       Airport: Name Altitude bin \
    0
                       Airplane
                                            MINNEAPOLIS-ST PAUL INTL
          208033
                                                                        > 1000 ft
                       Airplane
                                                 JOE FOSS FIELD ARPT
                                                                        < 1000 ft
    1
          261733
    2
          309151
                       Airplane
                                                 SALT LAKE CITY INTL
                                                                        < 1000 ft
```

25558 non-null

object

Aircraft: Type

1

```
3
      200097
                    Airplane
                                                 INDIANAPOLIS INTL
                                                                        < 1000 ft
4
      268701
                    Airplane
                                                PORT COLUMBUS INTL
                                                                        < 1000 ft
5
      309212
                    Airplane
                                         CHICAGO MIDWAY INTL ARPT
                                                                        < 1000 ft
6
      200219
                    Airplane
                                                SPIRIT OF ST LOUIS
                                                                        > 1000 ft
7
                    Airplane
                                                    VANCOUVER INTL
                                                                        < 1000 ft
      205904
8
      204178
                    Airplane
                                               SALT LAKE CITY INTL
                                                                        < 1000 ft
                               EGLIN AFB/NW FLORIDA REGIONAL ARPT
9
        6632
                    Airplane
                                                                        < 1000 ft
   Aircraft: Make/Model Wildlife: Number struck
0
                SAAB-340
                                           2 to 10
   CITATION MUSTANG 510
                                           2 to 10
1
2
                   A-320
                                           2 to 10
                                        11 to 100
3
               B-737-300
4
                 EMB-145
                                                 1
5
                                           2 to 10
               B-737-500
                                           2 to 10
6
                   C-560
7
               B-737-400
                                           2 to 10
                                           2 to 10
8
           RKWL SABRLNR
9
                  C-130E
                                           2 to 10
   Wildlife: Number Struck Actual Effect: Impact to flight
                                                                FlightDate
0
                                  3
                                       Precautionary Landing
                                                                13/11/2000
                                  4
1
                                       Precautionary Landing
                                                                10/03/2009
2
                                  8
                                       Precautionary Landing
                                                                24/11/2010
3
                                 97
                                       Precautionary Landing
                                                                11/03/2000
4
                                       Precautionary Landing
                                  1
                                                                18/09/2009
5
                                 10
                                                         Other
                                                                25/12/2010
6
                                  2
                                                    No Impact
                                                                30/01/2000
7
                                  7
                                                    No Impact
                                                                14/12/2000
8
                                  9
                                                    No Impact
                                                                12/02/2001
9
                                  9
                                                    No Impact
                                                                01/02/2002
                             ... Remains of wildlife sent to Smithsonian
  Effect: Indicated Damage
0
              Caused damage
                                                                        NO
              Caused damage
                                                                        NO
1
                                                                       YES
2
                  No damage
3
              Caused damage
                                                                        NO
4
                  No damage
                                                                        NO
5
              Caused damage
                                                                        NO
                  No damage
6
                                                                        NΩ
7
              Caused damage
                                                                        NO
8
                  No damage
                                                                        NO
9
                  No damage
                                                                        NO
                                                Remarks Wildlife: Size \
   JUST ENTERING CLOUD BASES, STRUCK UNKN # OF BI...
                                                                Large
   BIRD REPTD AS BLUE GOOSE. DMG TO LWR L ENG COW...
                                                                Large
  ID BY SMITHSONIAN. A/C INGESTED BIRD IN #1 ENG...
                                                               Medium
```

```
FLT 439. HIGH VIBRATIONS IN #1 ENG. ENG DID NO...
                                                                     Small
                                DEPARTURE END END RWY 28R.
                                                                       Large
    5
       ATIS WARNING. FLT 44 ADVISED OF BIRDSTRIKE IN ...
                                                                    Large
    6
                                                   HIT FLAP
                                                                       Small
       SNOW PLOW PROBABLY DISTURBED GEESE CAUSING THE ...
    7
                                                                    Large
                                   WE WERE 1ST A/C ON RWY.
    8
                                                                       Small
    9
                                                 Unvailable
                                                                     Medium
      Conditions: Sky
                            Wildlife: Species Pilot warned of birds or wildlife?
    0
              Overcast
                        Unknown bird - large
    1
              Overcast
                                   Snow goose
                                                                                 No
    2
              Overcast
                                      Gadwall
                                                                                Yes
    3
              Overcast
                            European starling
                                                                                 No
    4
            Some Cloud
                        Unknown bird - large
                                                                                 No
    5
            Some Cloud
                                 Canada goose
                                                                                 Yes
    6
              Overcast
                        Unknown bird - small
                                                                                 No
    7
            Some Cloud
                                   Snow goose
                                                                                 No
    8
                        Unknown bird - small
              Overcast
                                                                                Yes
    9
              Overcast
                          Unknown bird or bat
                                                                                Yes
      Cost: Total $ Feet above ground Number of people injured Is Aircraft Large?
    0
                   0
                                  1,800
                                                                                     No
                                                                 0
              31,624
                                    500
                                                                                     No
    1
    2
                                    300
                                                                 0
                   0
                                                                                     No
    3
                   0
                                    200
                                                                 0
                                                                                    Yes
    4
                   0
                                    700
                                                                 0
                                                                                     No
    5
                   0
                                    200
                                                                 0
                                                                                    Yes
    6
                                                                 0
                   0
                                  1,800
                                                                                     No
    7
                   0
                                                                 0
                                     50
                                                                                    Yes
    8
                   0
                                      0
                                                                 0
                                                                                     No
    9
                                                                 0
                                    150
                                                                                     No
    [10 rows x 26 columns]
[5]: df_cleaned.to_csv('output.csv')
     df_cleaned.to_excel('output.xlsx')
```

[]: