

# Turtle Rescue Predictor

# Introduction

Forecast for the Local Ocean's sea turtle rescue program in Kenya

- 29 Capture Sites with 5 Landing Sites
- Active since 1998
- Rescued turtles are accidentally caught by local fishers
- Turtles are examined and either released or admitted





# Problem Statement

Can you predict the rescued turtles per Landing Site per week for the next year?

Can you help decide how to allocate staff members throughout the year across the 5 Landing Sites?





# The Data

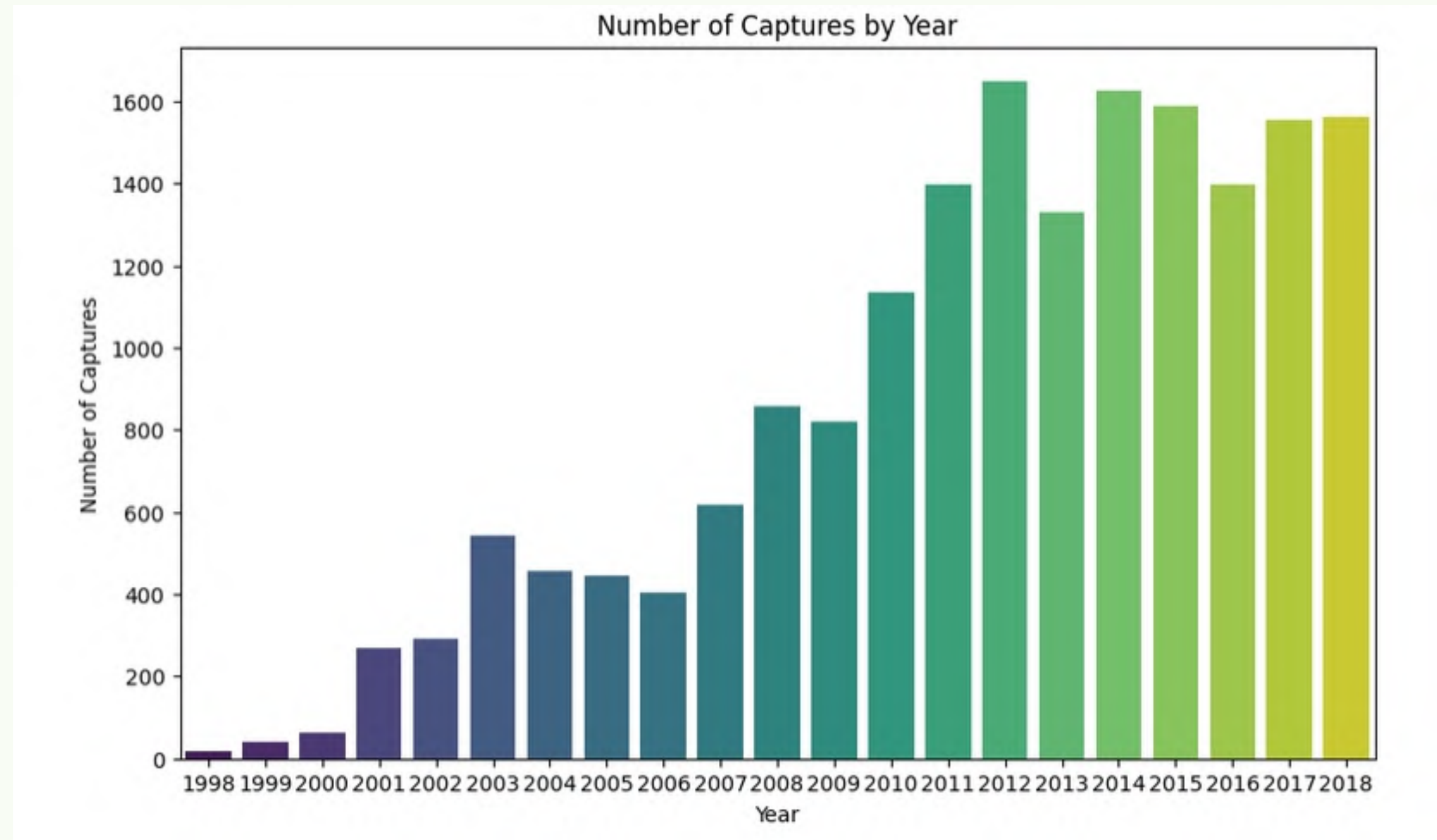
- About 18,000 turtles rescued between 1998 and 2018
- For each rescue, we have the date and LandingSite
- Turtle information: species, weight, width, length, status, qualitative description
- Further information: fisher, capture method, researcher



# Data Analysis

- 2011 and 2018: EDA
- 2014 – 2017: Train Data
- 2018: Test Data

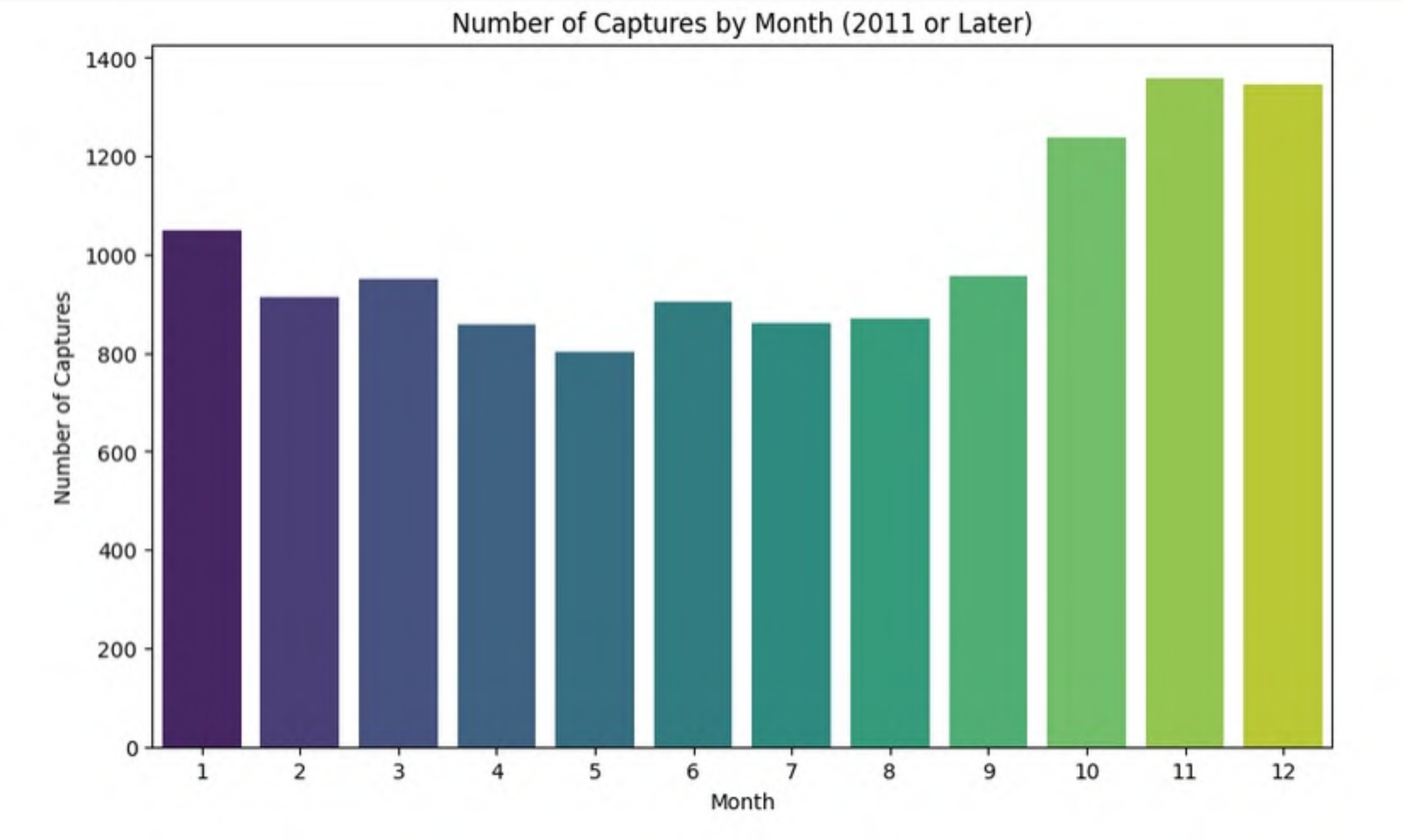
Yearly Amount of Turtles Rescued



# Data Analysis

Higher number of turtles during breeding season (October – December)

Turtles rescued per Month

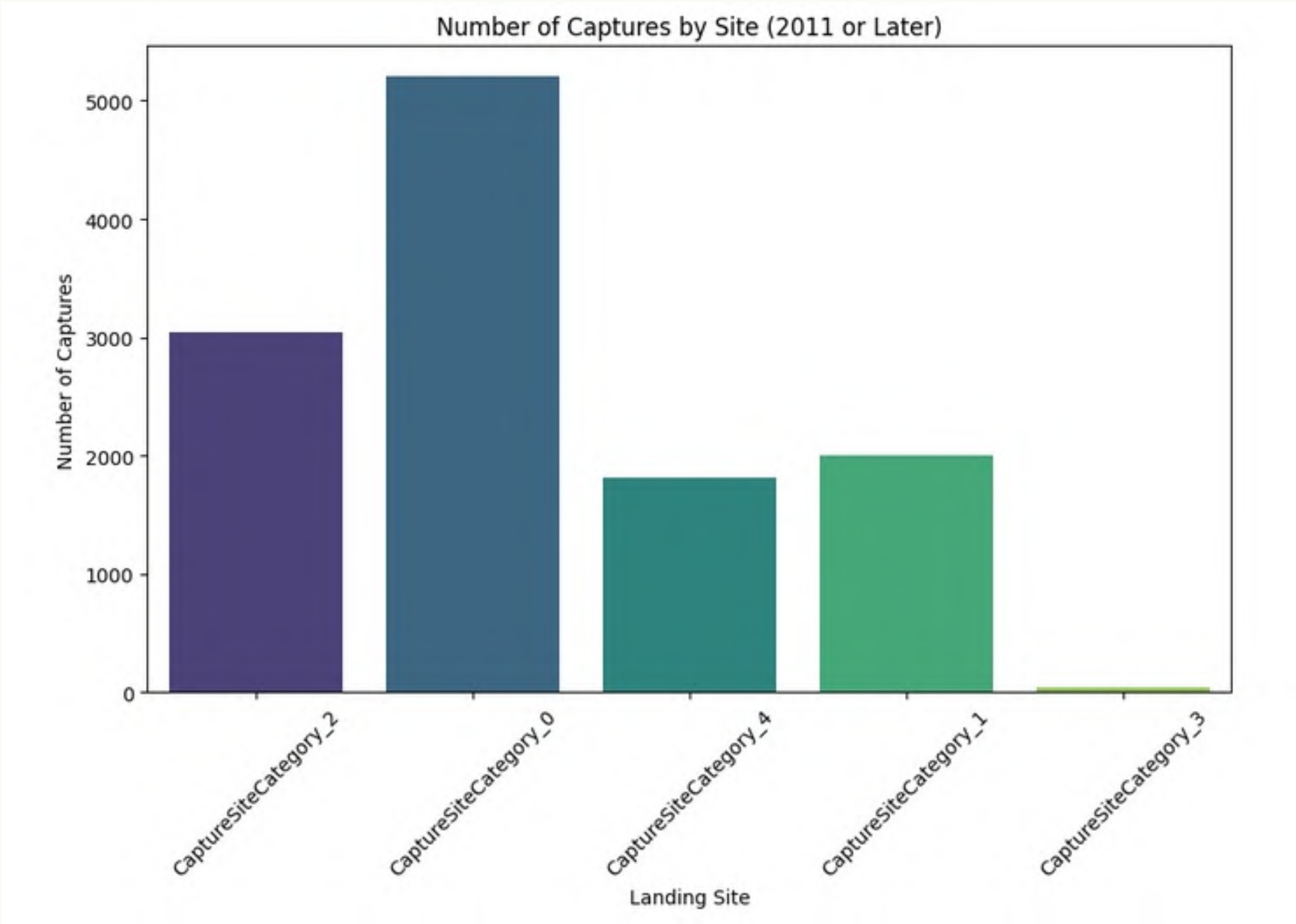


# Data Analysis

CaptureSiteCategory =  
LandingSite

Nearly no turtles on  
LandingSite3

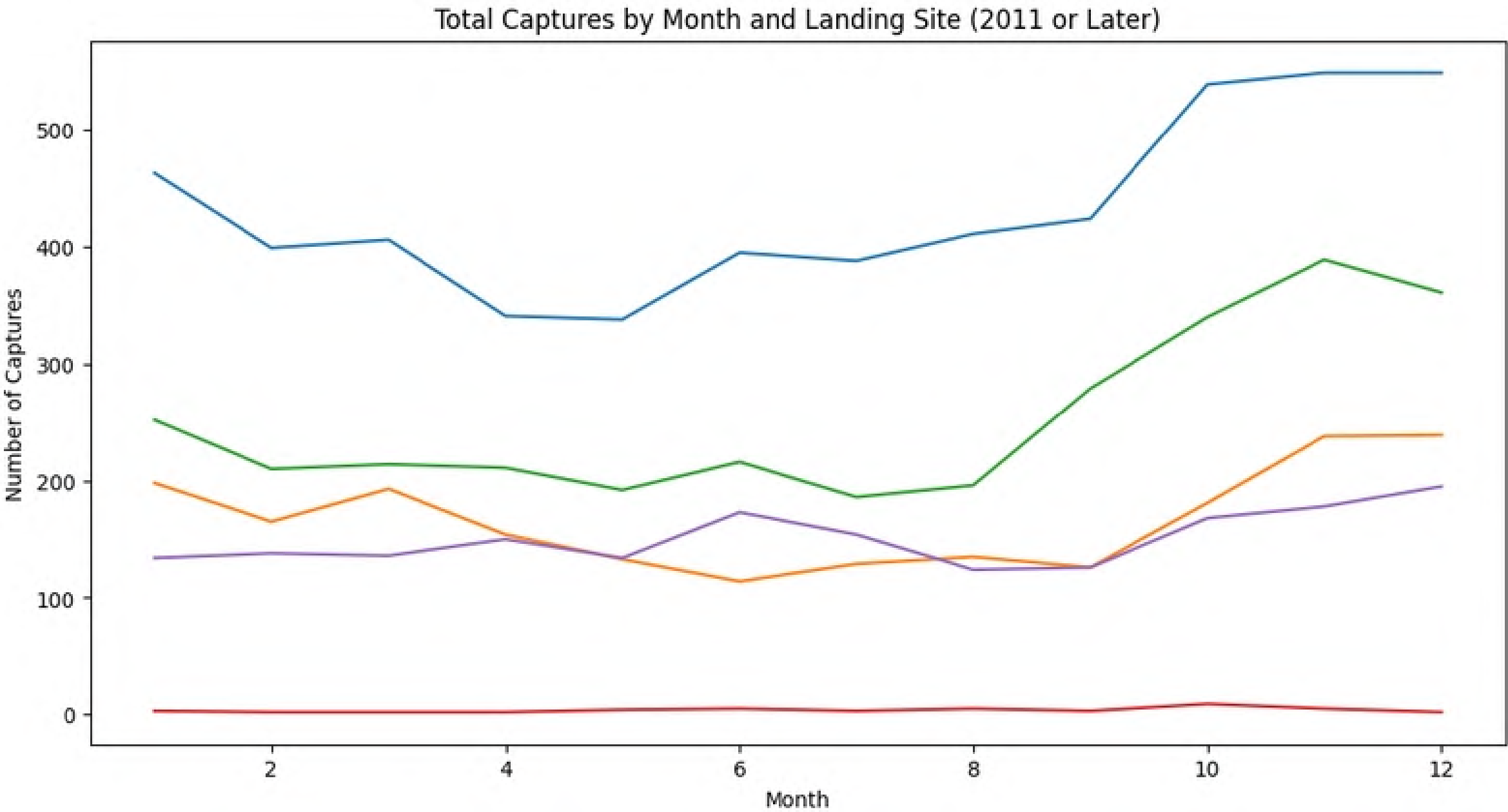
Total Turtles rescued per Month per Site 2011+



# Data Analysis



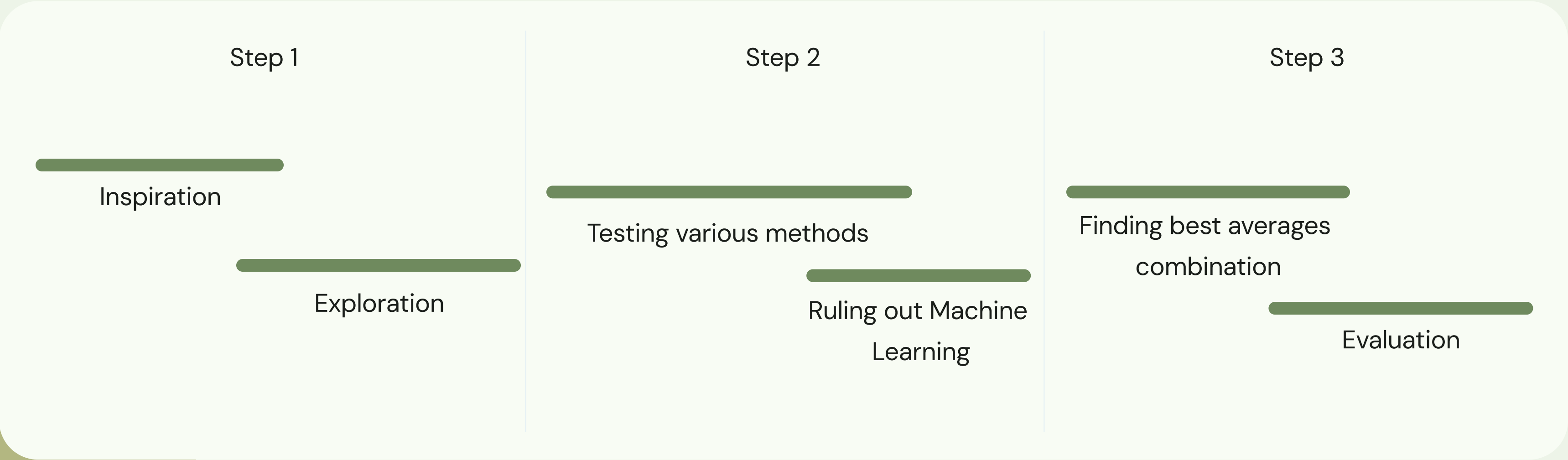
Turtles rescued per LandingSite and Month





# Predictive Model

Developing an algorithm to forecast the number of rescued turtles per landing site by week of the year



# The Product

Calendar is generated

Predictions for each  
LandingSite per week

Number of turtles  
anticipated & suggested  
number of staff to allocate

Suggestions for temporary  
workers for extra busy weeks

CSV file: data/train.csv  
Number of full-time/year-round staff members: 24

Most recent date in dataset: 2018-12-31 00:00:00  
One year prior: 2017-12-31 00:00:00  
Number of rows in train data after separation: 6164  
Number of rows in test data (the past year): 1564

Evaluation of Best Model:  
RMSE: 4.079863112761006  
R-squared: 0.45434256334801293

|    | Week Dates (YYYY-MM-DD) | Landing Site | Number of Turtles | Proportion | Allocated Staff | Need_Temps |
|----|-------------------------|--------------|-------------------|------------|-----------------|------------|
| 0  | 2018-01-01 - 2018-01-07 | Category_0   | 11                | 0.407      | 8               | False      |
| 1  | 2018-01-01 - 2018-01-07 | Category_1   | 4                 | 0.148      | 3               | False      |
| 2  | 2018-01-01 - 2018-01-07 | Category_2   | 9                 | 0.333      | 7               | False      |
| 3  | 2018-01-01 - 2018-01-07 | Category_3   | 0                 | 0          | 1               | False      |
| 4  | 2018-01-01 - 2018-01-07 | Category_4   | 3                 | 0.111      | 3               | False      |
| 5  | 2018-01-08 - 2018-01-14 | Category_0   | 12                | 0.429      | 9               | False      |
| 6  | 2018-01-08 - 2018-01-14 | Category_1   | 5                 | 0.179      | 4               | False      |
| 7  | 2018-01-08 - 2018-01-14 | Category_2   | 9                 | 0.321      | 7               | False      |
| 8  | 2018-01-08 - 2018-01-14 | Category_3   | 0                 | 0          | 1               | False      |
| 9  | 2018-01-08 - 2018-01-14 | Category_4   | 2                 | 0.071      | 2               | False      |
| 10 | 2018-01-15 - 2018-01-21 | Category_0   | 10                | 0.385      | 8               | False      |
| 11 | 2018-01-15 - 2018-01-21 | Category_1   | 4                 | 0.154      | 3               | False      |
| 12 | 2018-01-15 - 2018-01-21 | Category_2   | 8                 | 0.308      | 6               | False      |
| 13 | 2018-01-15 - 2018-01-21 | Category_3   | 0                 | 0          | 1               | False      |
| 14 | 2018-01-15 - 2018-01-21 | Category_4   | 4                 | 0.154      | 3               | False      |
| 15 | 2018-01-22 - 2018-01-28 | Category_0   | 8                 | 0.32       | 7               | False      |
| 16 | 2018-01-22 - 2018-01-28 | Category_1   | 6                 | 0.24       | 5               | False      |
| 17 | 2018-01-22 - 2018-01-28 | Category_2   | 6                 | 0.24       | 5               | False      |
| 18 | 2018-01-22 - 2018-01-28 | Category_3   | 1                 | 0.04       | 1               | False      |
| 19 | 2018-01-22 - 2018-01-28 | Category_4   | 4                 | 0.16       | 4               | False      |
| 20 | 2018-01-29 - 2018-02-04 | Category_0   | 12                | 0.387      | 8               | True       |
| 21 | 2018-01-29 - 2018-02-04 | Category_1   | 6                 | 0.194      | 4               | True       |
| 22 | 2018-01-29 - 2018-02-04 | Category_2   | 8                 | 0.258      | 5               | True       |
| 23 | 2018-01-29 - 2018-02-04 | Category_3   | 1                 | 0.032      | 1               | True       |
| 24 | 2018-01-29 - 2018-02-04 | Category_4   | 4                 | 0.129      | 3               | True       |
| 25 | 2018-02-05 - 2018-02-11 | Category_0   | 9                 | 0.391      | 8               | False      |
| 26 | 2018-02-05 - 2018-02-11 | Category_1   | 4                 | 0.174      | 4               | False      |
| 27 | 2018-02-05 - 2018-02-11 | Category_2   | 6                 | 0.261      | 5               | False      |
| 28 | 2018-02-05 - 2018-02-11 | Category_3   | 0                 | 0          | 1               | False      |
| 29 | 2018-02-05 - 2018-02-11 | Category_4   | 4                 | 0.174      | 4               | False      |
| 30 | 2018-02-12 - 2018-02-18 | Category_0   | 10                | 0.357      | 7               | False      |
| 31 | 2018-02-12 - 2018-02-18 | Category_1   | 6                 | 0.214      | 5               | False      |
| 32 | 2018-02-12 - 2018-02-18 | Category_2   | 6                 | 0.214      | 5               | False      |
| 33 | 2018-02-12 - 2018-02-18 | Category_3   | 1                 | 0.036      | 1               | False      |
| 34 | 2018-02-12 - 2018-02-18 | Category_4   | 5                 | 0.179      | 4               | False      |
| 35 | 2018-02-19 - 2018-02-25 | Category_0   | 8                 | 0.308      | 6               | False      |
| 36 | 2018-02-19 - 2018-02-25 | Category_1   | 6                 | 0.231      | 5               | False      |
| 37 | 2018-02-19 - 2018-02-25 | Category_2   | 8                 | 0.308      | 6               | False      |
| 38 | 2018-02-19 - 2018-02-25 | Category_3   | 0                 | 0          | 1               | False      |





# Conclusion

## Recommendations

- Increase amount of employees from October to December
- Try to assign annual leave between April and August
- Build a better relationship with fishers in LandingSite 3
- Follow Fisher with ID 1478
- Try to work with fishers to coordinate fishing activities around the breeding seasons of turtles — Most turtle bycatch happens during the breeding season

## Improve forecast

- Tracking the weather conditions
- Provide information about fishing activities
- Shorten forecast period





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