print(zero\_inflation\_rates)

# A tibble: 23 × 5

Species Zero\_Count Non\_Zero\_Count Total\_Observations Zero\_Inflation\_Rate

<chr> <int> <int> <int> <dbl>

1 Eel 437 24 462 0.946

2 Porcupine.Puffer 435 27 462 0.942

3 Ray 430 31 462 0.931

4 Slingjaw 377 85 462 0.816

5 Batfish 372 90 462 0.805

6 Thicklip 325 137 462 0.703

7 Triggerfish 289 173 462 0.626

8 Barracuda 264 198 462 0.571

9 Squirrel.Soldier 257 205 462 0.556

10 Red\_Breast 226 236 462 0.489

# ℹ 13 more rows

# ℹ Use `print(n = ...)` to see more rows

>

>

> # identify species with extremely high counts

> extreme\_counts <- fish\_long %>%

+ group\_by(Species) %>%

+ summarise(

+ Max\_Count = max(Count, na.rm = TRUE),

+ Mean\_Count = mean(Count, na.rm = TRUE),

+ Median\_Count = median(Count, na.rm = TRUE),

+ SD\_Count = sd(Count, na.rm = TRUE)

+ ) %>%

+ arrange(desc(Max\_Count))

>

> print(extreme\_counts)

# A tibble: 23 × 5

Species Max\_Count Mean\_Count Median\_Count SD\_Count

<chr> <dbl> <dbl> <dbl> <dbl>

1 Barracuda 1019. 75.7 0 160.

2 Russels\_Snapper 459 25.4 0.79 57.8

3 Brown\_Stripe\_Snapper 385 14.6 0.5 32.5

4 Rabbitfish 182 29.2 18 29.8

5 lrg\_Snapper 134 2.86 0.25 9.58

6 Emperorfish 128 4.45 1.71 10.3

7 Squirrel.Soldier 85.5 5.20 0 11.5

8 Trevally 85 6.53 1.75 13.3

9 Sweetlips 62 11.9 3 15.6

10 Butterflyfish 53 10.2 9 6.55

# ℹ 13 more rows

**Analysis of the Outlier Checks**

1. **Zero-Inflation Rates:**
   * *High Zero Inflation (>90% zeros):*
     + Eel: 94.6%
     + Porcupine.Puffer: 94.2%
     + Ray: 93.1%

These species are observed in less than 10% of surveys, meaning they contribute very little data when present.

* + *Moderate Zero Inflation:*
    - Barracuda: 57.1% zeros

Barracuda appears in about 43% of surveys, but its counts are highly variable.

1. **Extreme Counts:**
   * *Barracuda:*
     + Maximum count is 1019, with a mean of 75.7 and a standard deviation of 160.  
       The median is 0, indicating that most surveys record zero Barracudas, but when they do occur, the counts can be very high.
   * *Other species:*
     + For example, Russels\_Snapper and Brown\_Stripe\_Snapper also show a high maximum count relative to the median, though less extreme than Barracuda.

