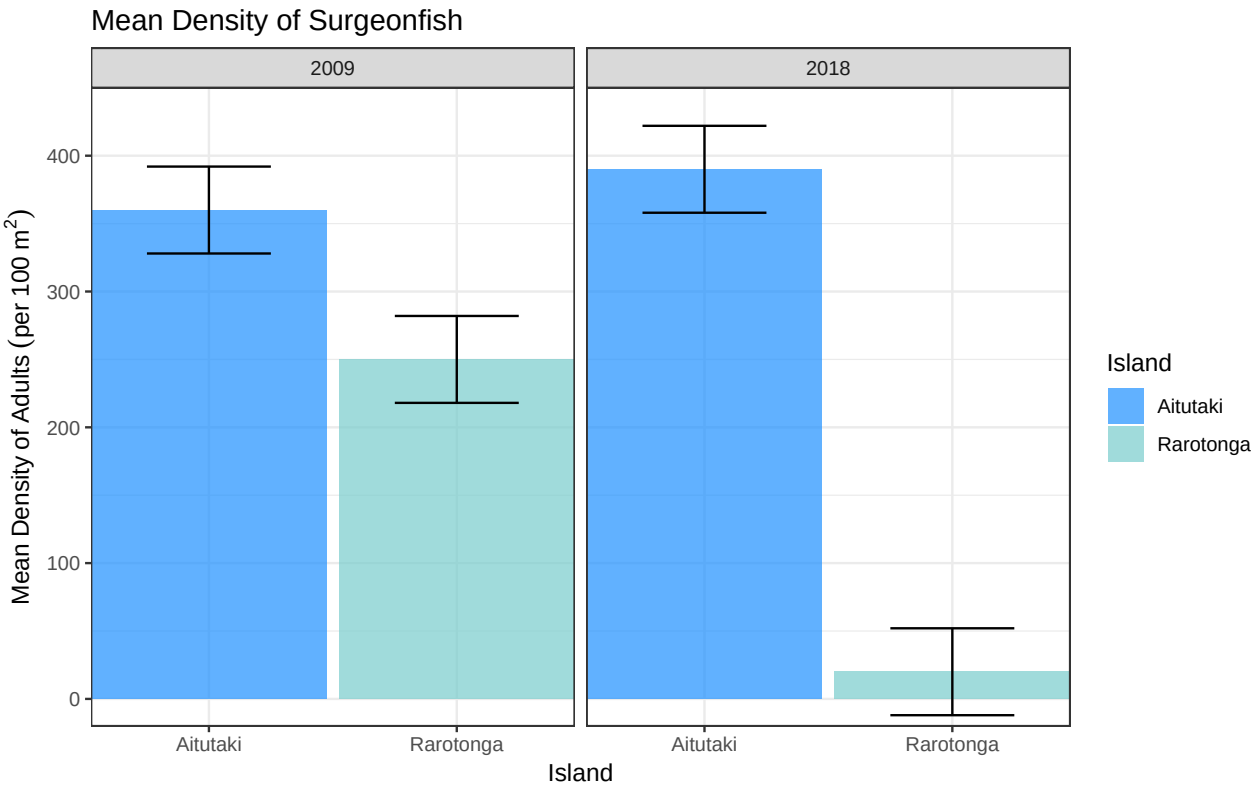
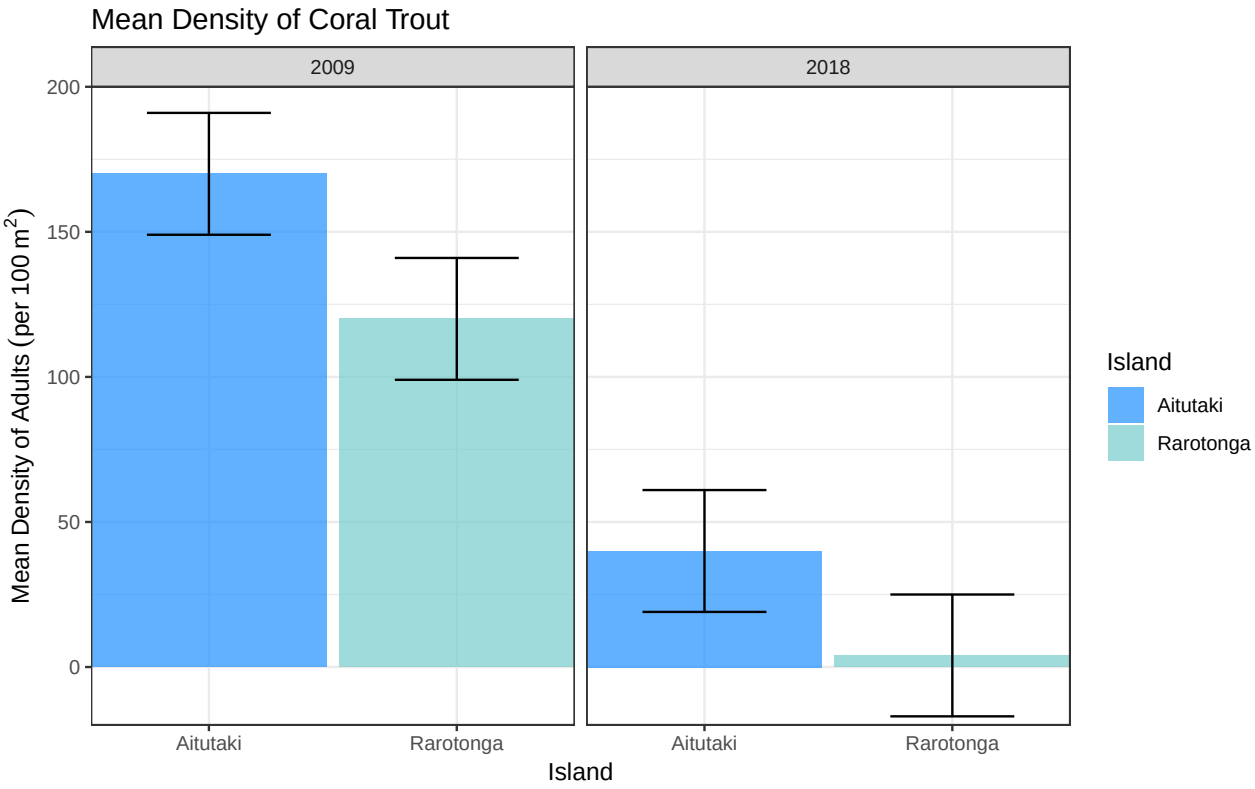
Sara Orofino
Problem Set 1
January 21, 2020

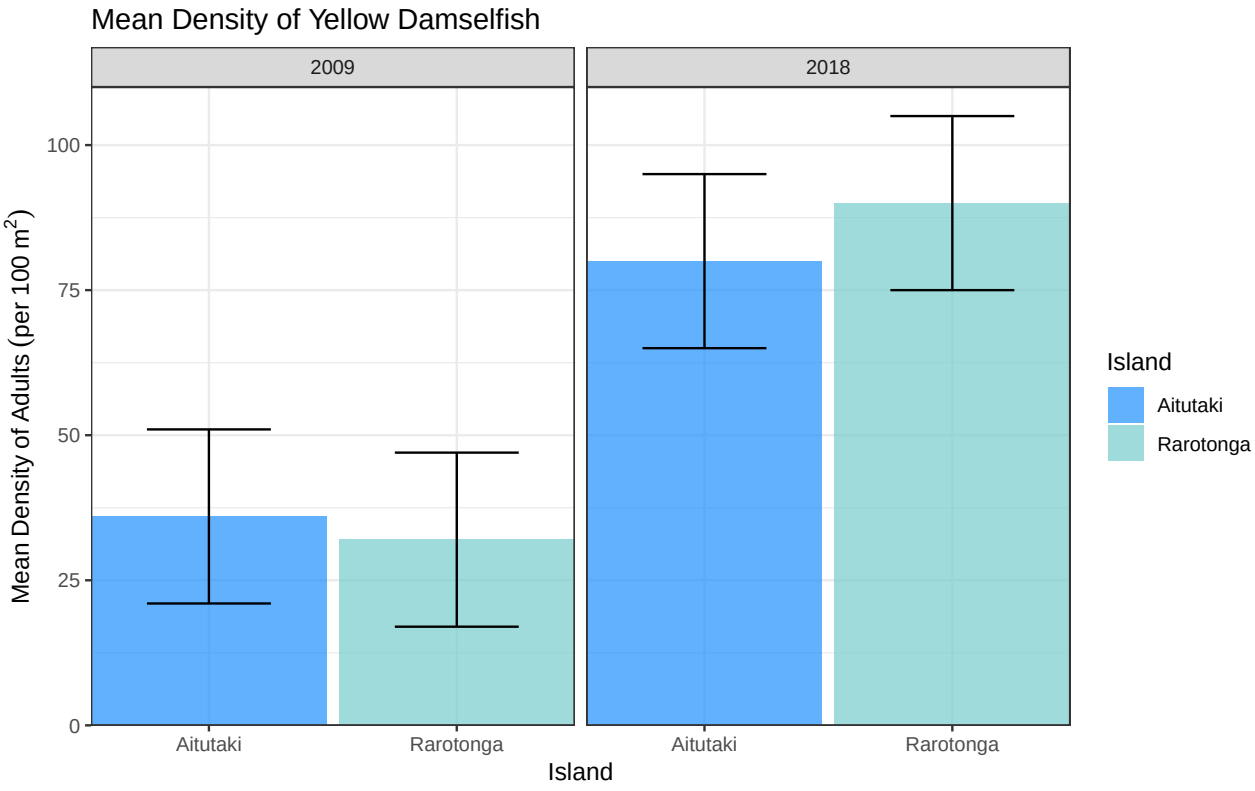
Question 1

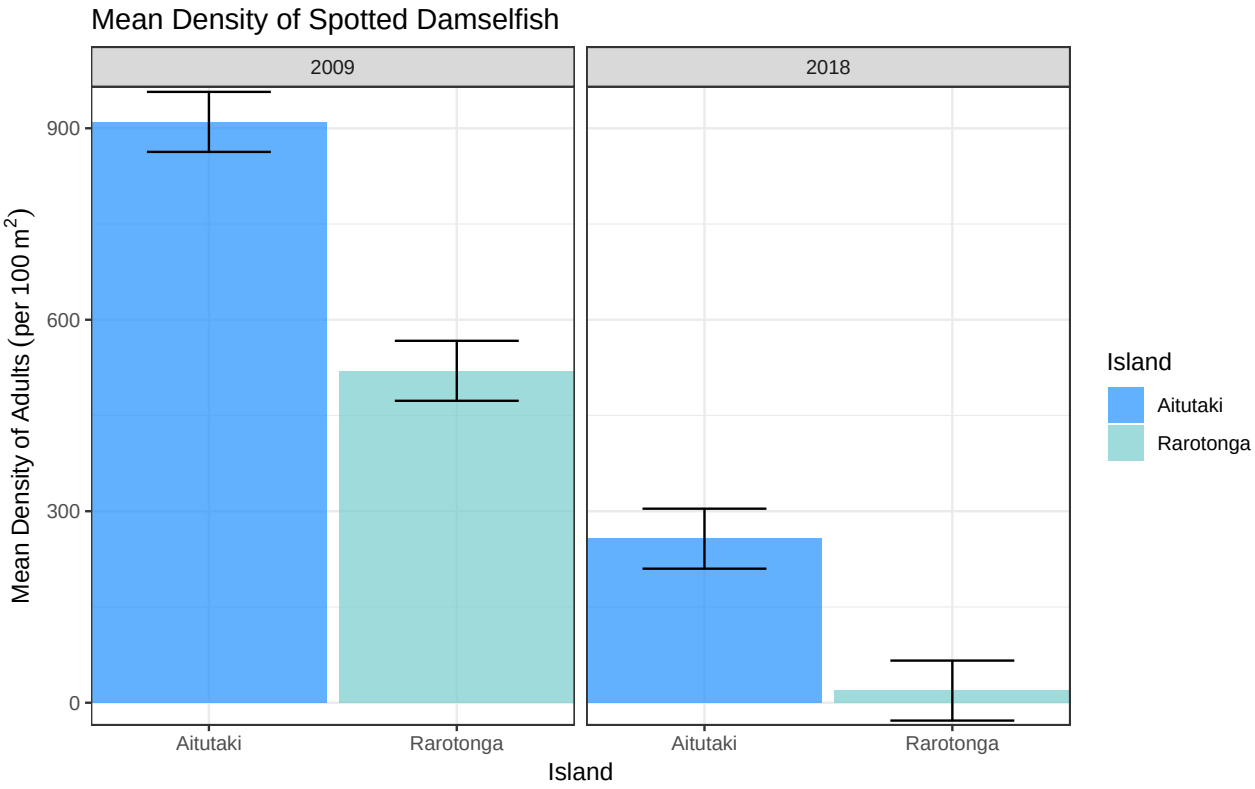
Mean Adult Density Graphs

Tasks:
- Graph mean adult density for each species at each lagoon, separate by years




Mean Density of Coral Trout
2009
2018
200
150
100
50
0
Mean Density of Adults (per 100 m2)
Aitutaki
Rarotonga
Island
Island
Aitutaki
Rarotonga

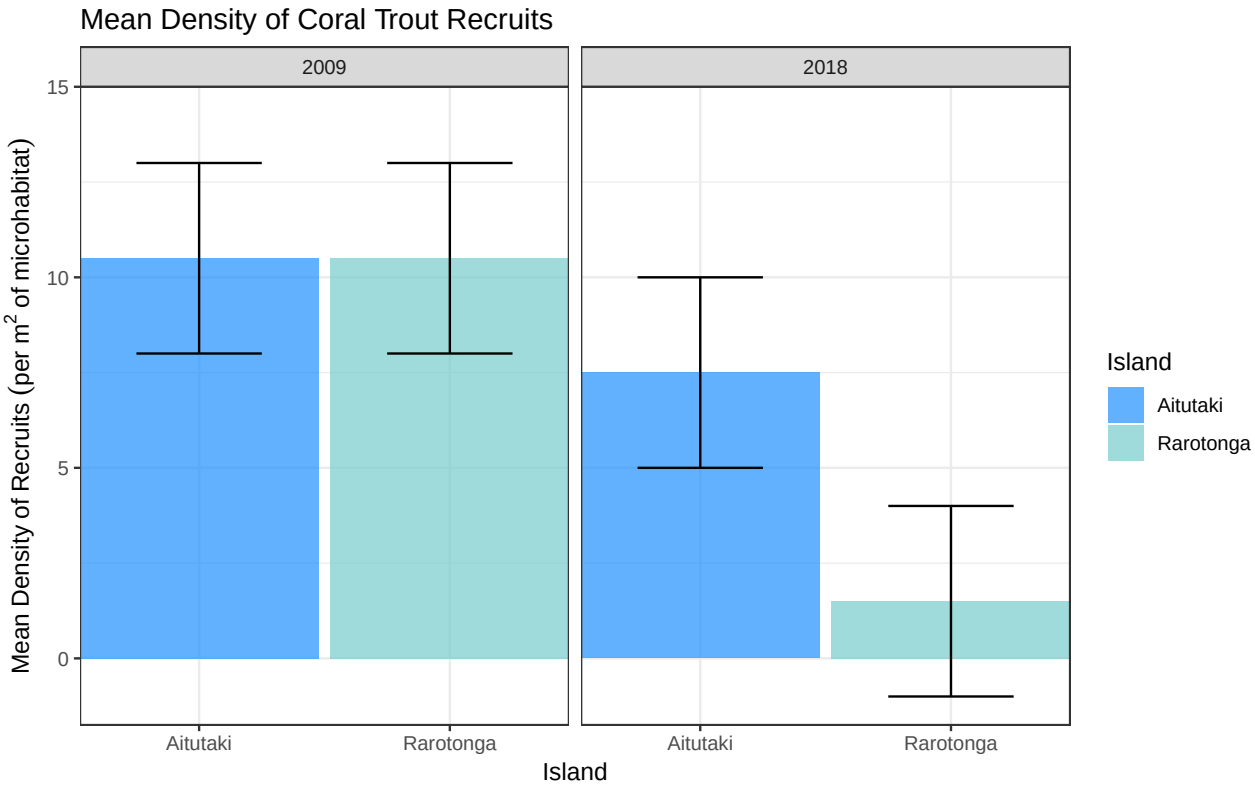

Mean Density of Yellow Damselfish
2009
2018
100
75
50
25
0
Mean Density of Adults (per 100 m2)
Aitutaki
Rarotonga
Island
Island
Aitutaki
Rarotonga

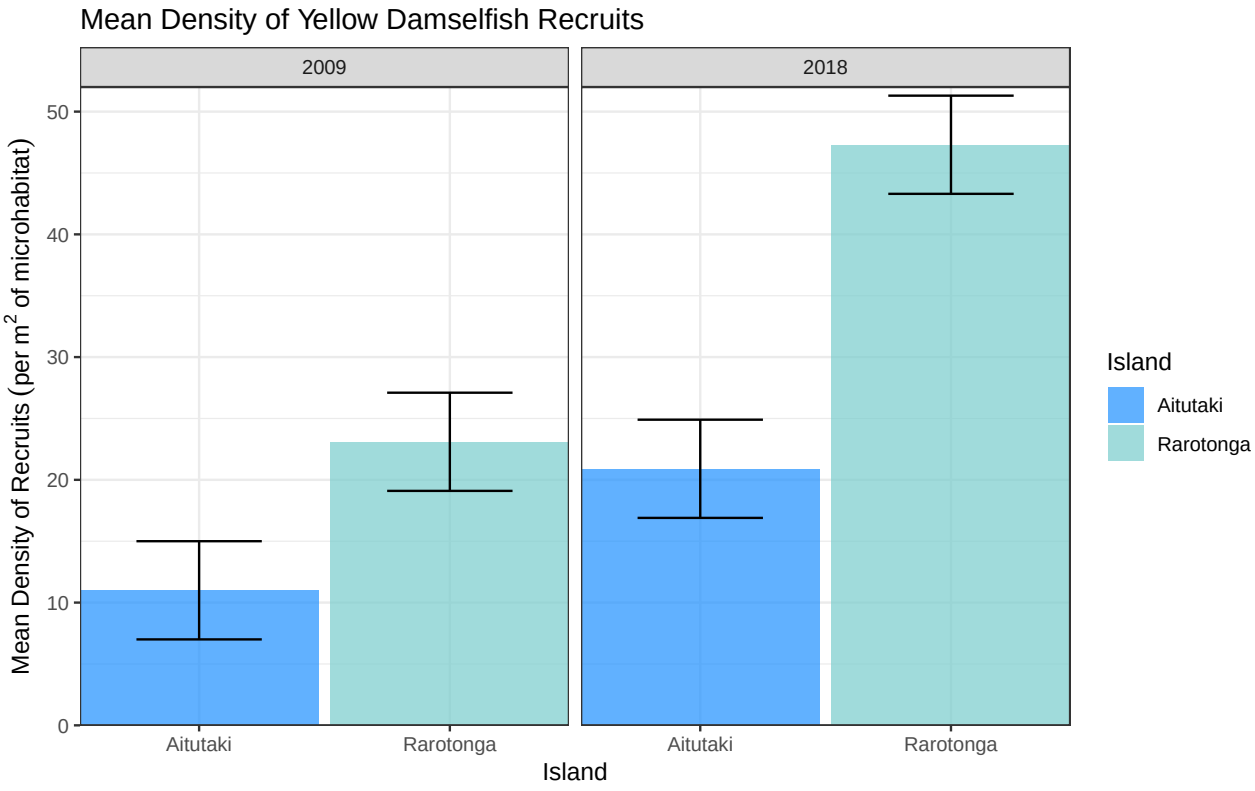

Mean Density of Spotted Damselfish
2009
2018
900
600
300
0
Mean Density of Adults (per 100 m2)
Aitutaki
Rarotonga
Aitutaki
Rarotonga
Island
Island
Aitutaki
Rarotonga

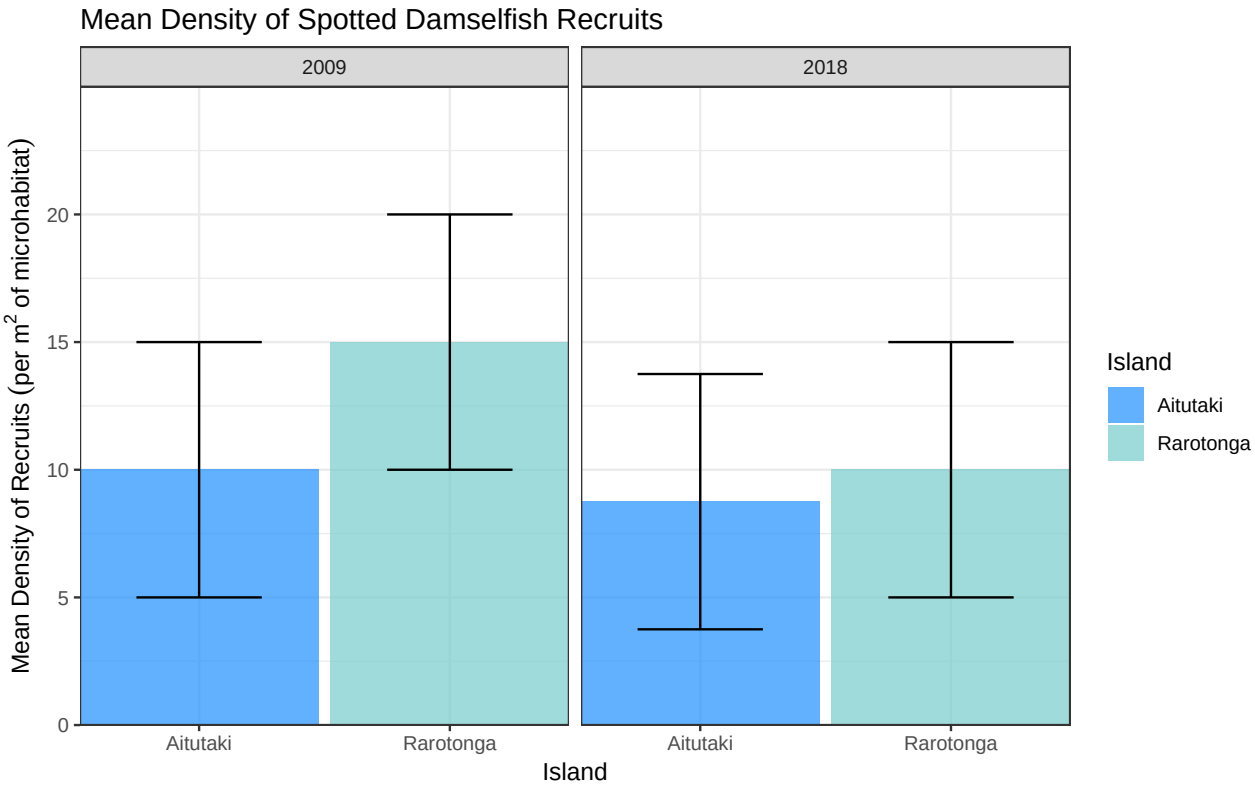
Question 2

Change in Density of Recruits

Tasks:
- Graph recruitment density for each species at each lagoon, separate by years


Mean Density of Coral Trout Recruits
2009
2018
15
10
5
0
Mean Density of Recruits (per m2 of microhabitat)
Aitutaki
Rarotonga
Aitutaki
Rarotonga
Island
Island
Aitutaki
Rarotonga


Mean Density of Yellow Damselfish Recruits
2009
2018
50
40
30
20
10
0
Mean Density of Recruits (per m2 of microhabitat)
Aitutaki
Rarotonga
Aitutaki
Rarotonga
Island
Island
Aitutaki
Rarotonga



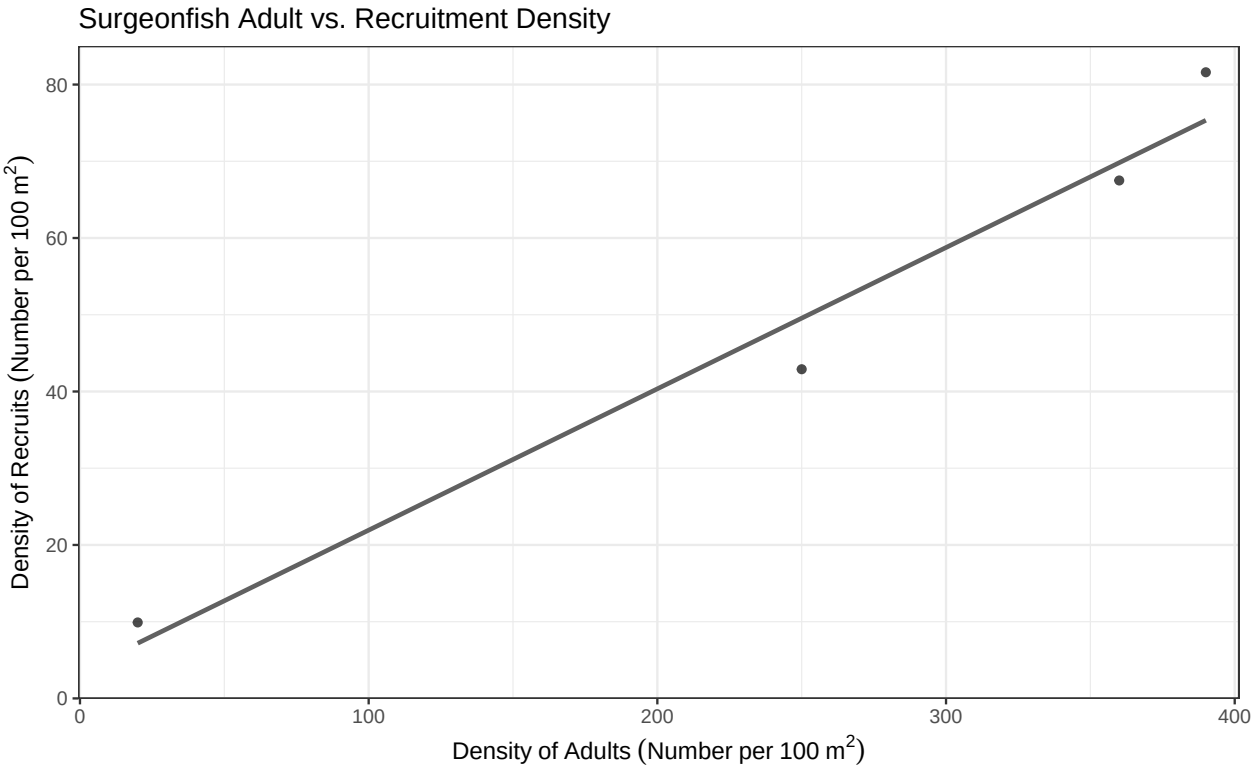
Question 3

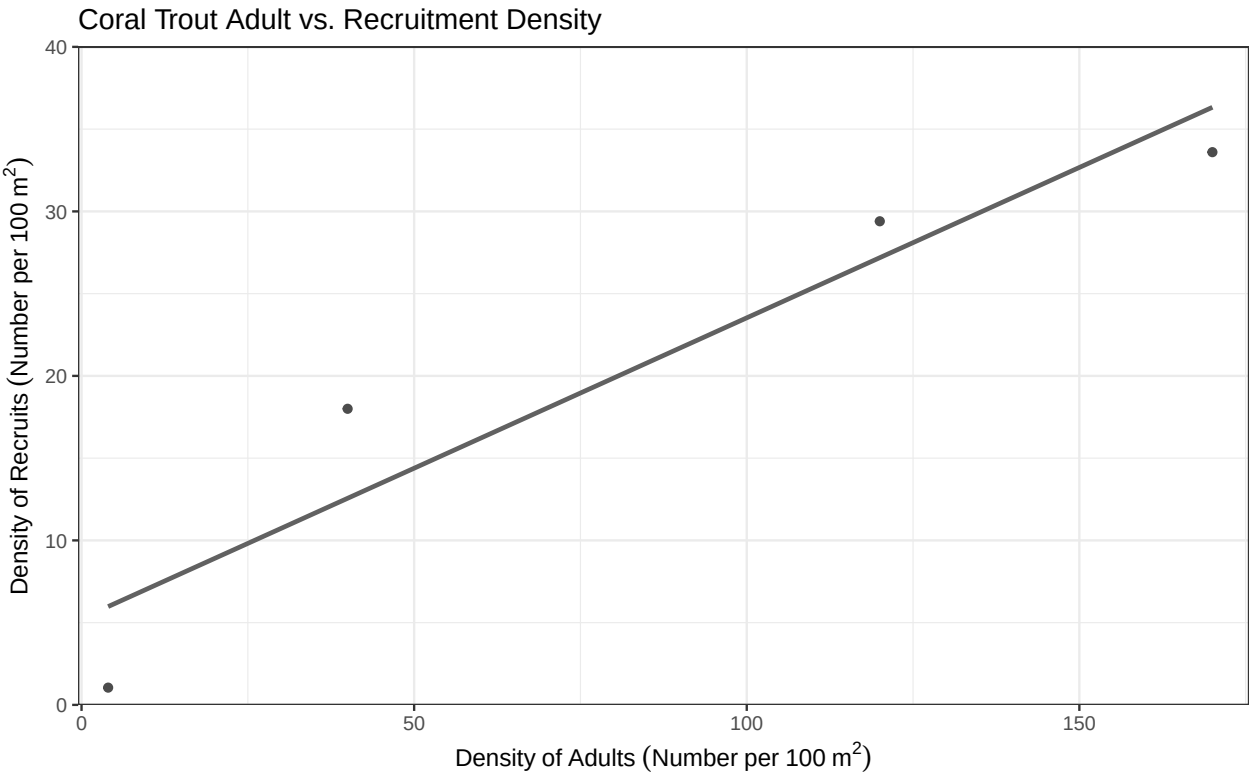
Density of Recruits by Microhabitat

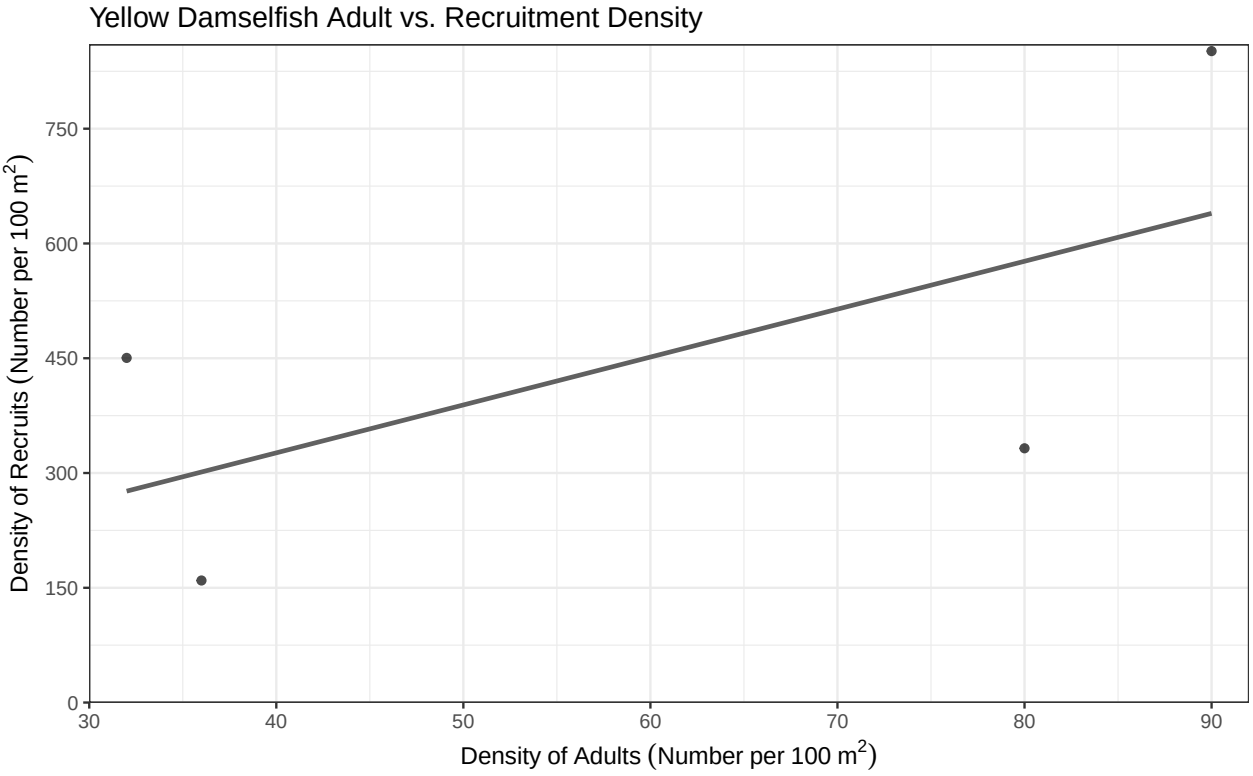
Tasks:
- Calculate the density of fish per 100 m2 area of reef
- Make a scatterplot of relationship between density of recruits and adults

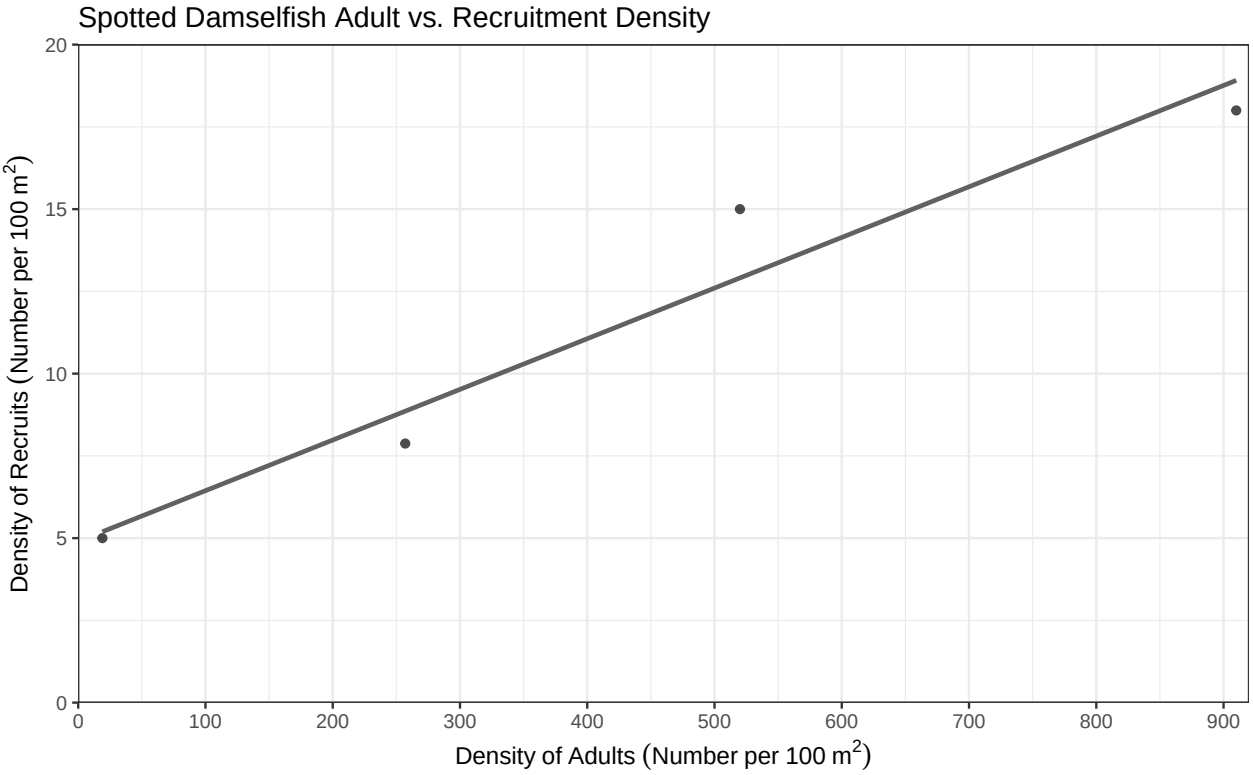
Calculate the Density

The density data gives the coverage of each microhabitat per 100 m^2 of reef. The recruitment density is per 1 m^2 of microhabitat. To get the density of recruits per 100 m^2 of reef, multiply the number of recruits by the density of the microhabitat.


Surgeonfish Adult vs. Recruitment Density
Density of Recruits (Number per 100 m2)
0
20
40
60
80
0
100
200
300
400
Density of Adults (Number per 100 m2)


Coral Trout Adult vs. Recruitment Density
Density of Recruits (Number per 100 m2)
0
10
20
30
40
0
50
100
150
Density of Adults (Number per 100 m2)

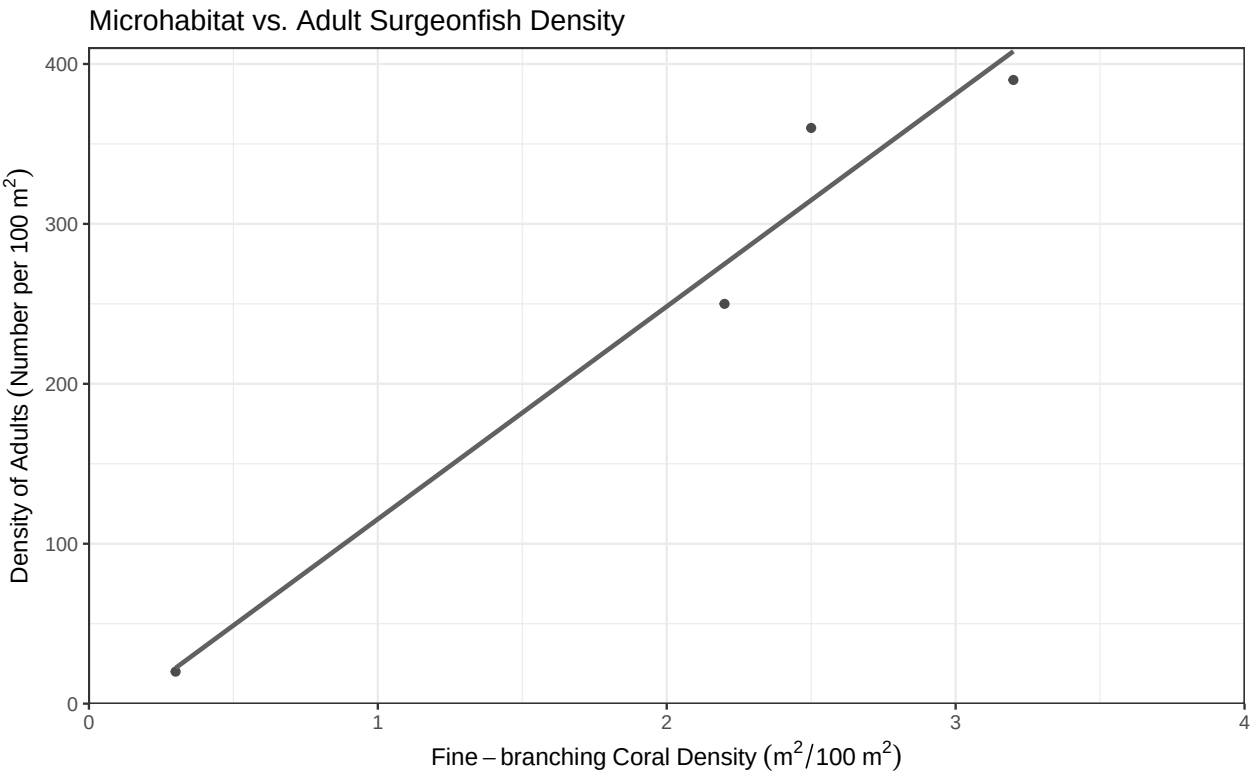

Yellow Damselfish Adult vs. Recruitment Density
Density of Recruits (Number per 100 m2)
0
150
300
450
600
750
30
40
50
60
70
80
90
Density of Adults (Number per 100 m2)

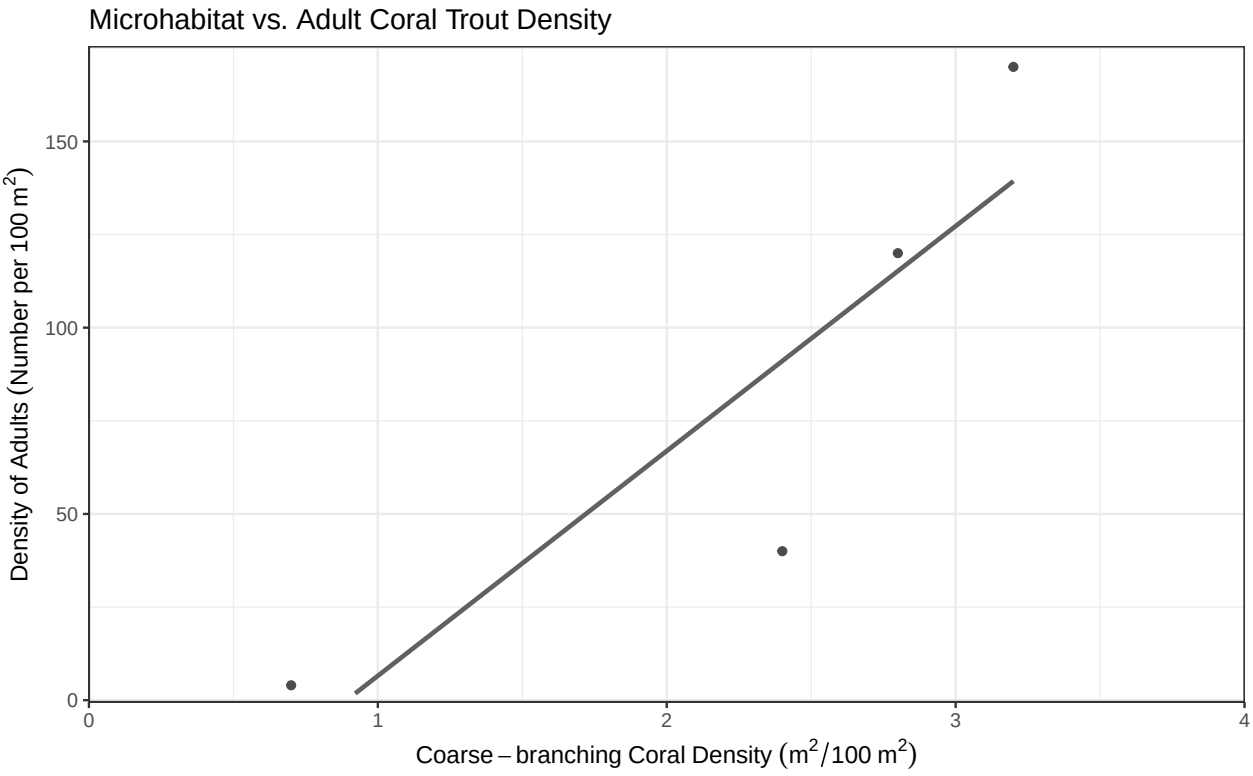

Spotted Damselfish Adult vs. Recruitment Density
Density of Recruits (Number per 100 m2)
0
5
10
15
20
0
100
200
300
400
500
600
700
800
900
Density of Adults (Number per 100 m2)

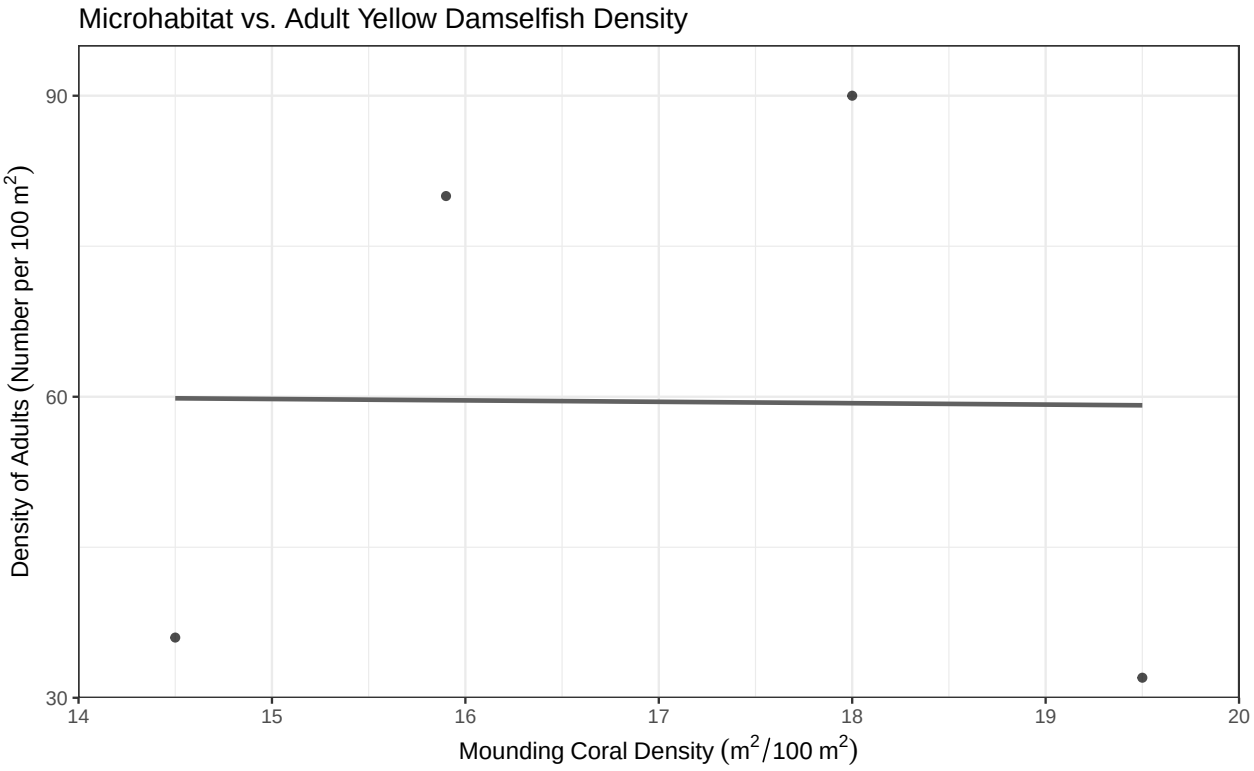
Question 4

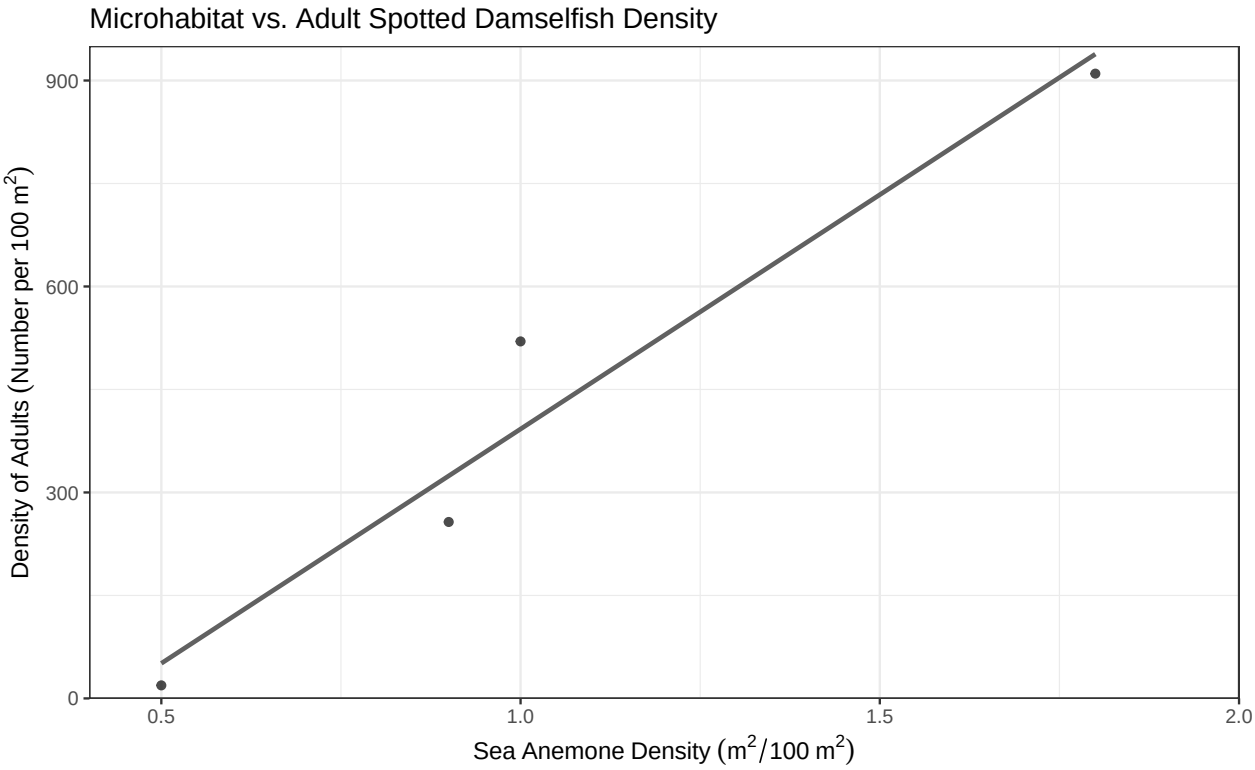
Adult Density vs. Microhabitat

Tasks:
- Scatterplots of adult density vs. density of microhabitat used by young




Microhabitat vs. Adult Coral Trout Density
Density of Adults (Number per 100 m2)
150
100
50
0
0
1
2
3
4
Coarse – branching Coral Density (m2/100 m2)

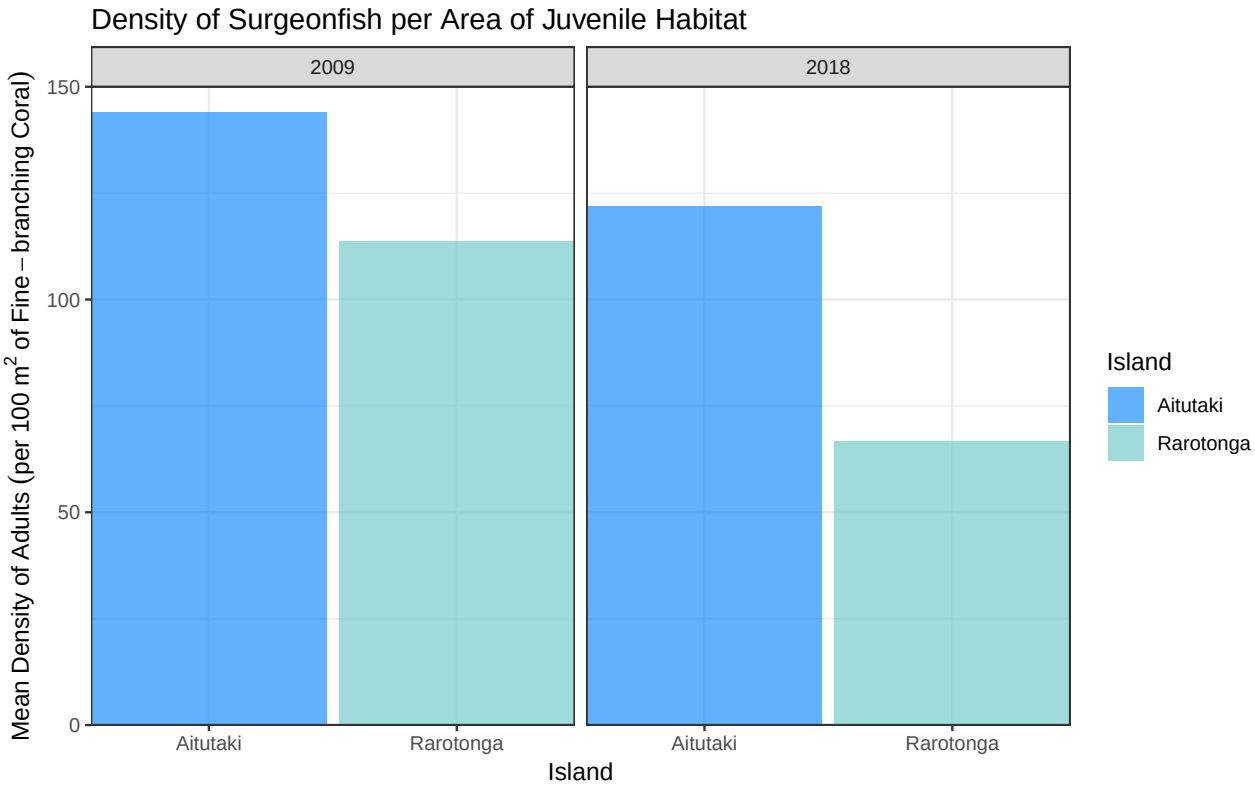

Microhabitat vs. Adult Yellow Damselfish Density
Density of Adults (Number per 100 m2)
90
60
30
14
15
16
17
18
19
20
Mounding Coral Density (m2/100 m2)

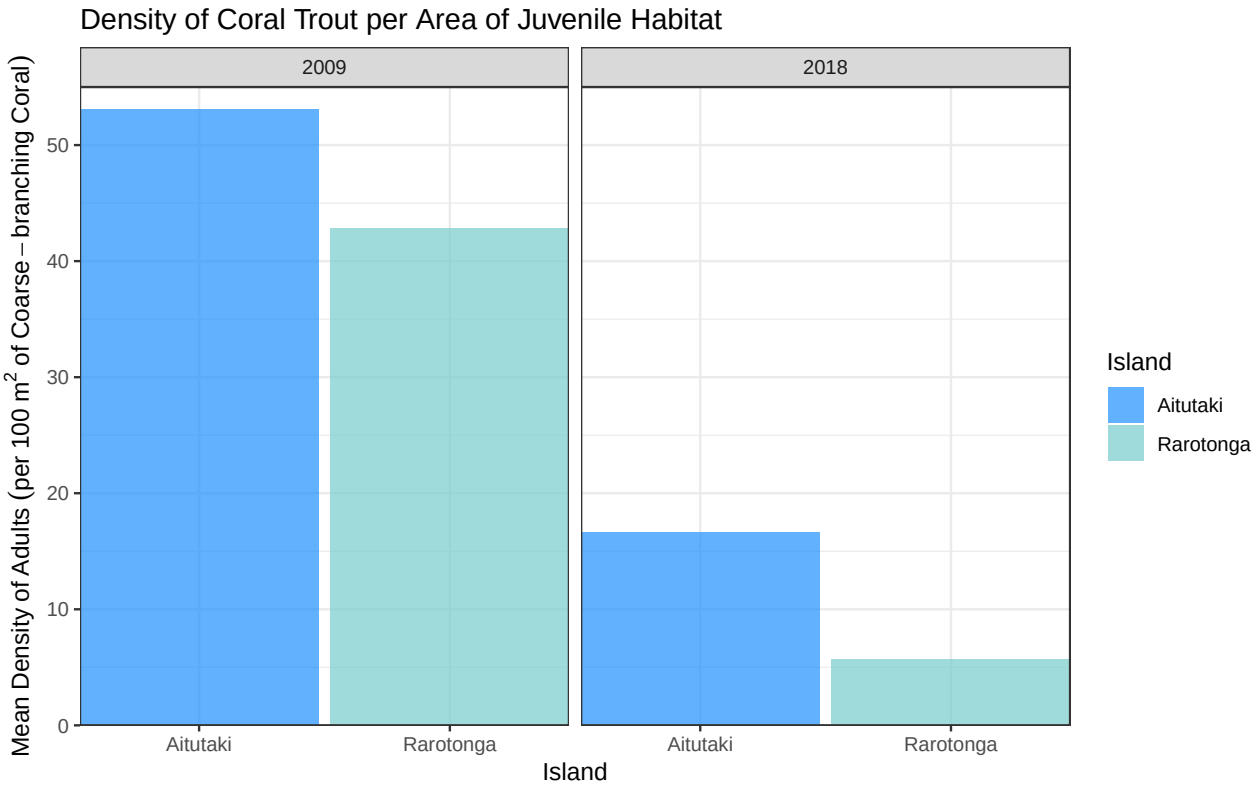


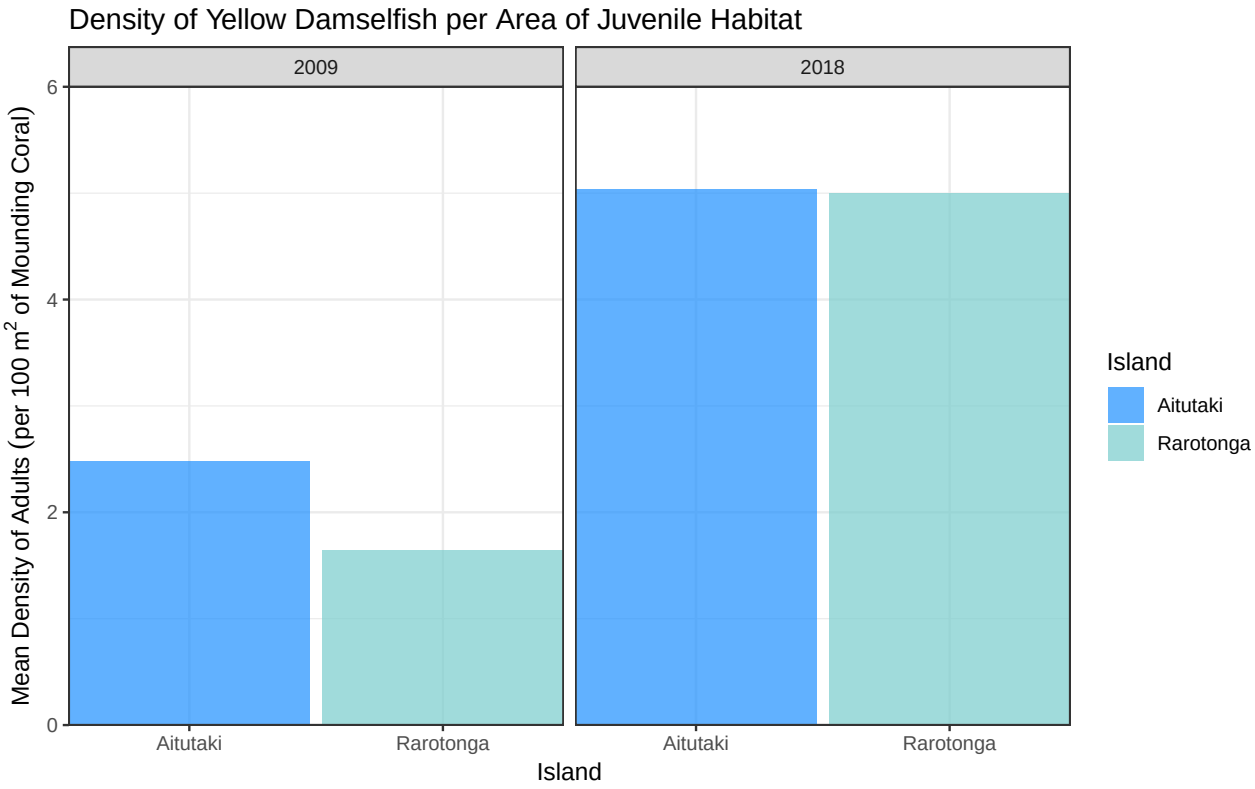
Question 5

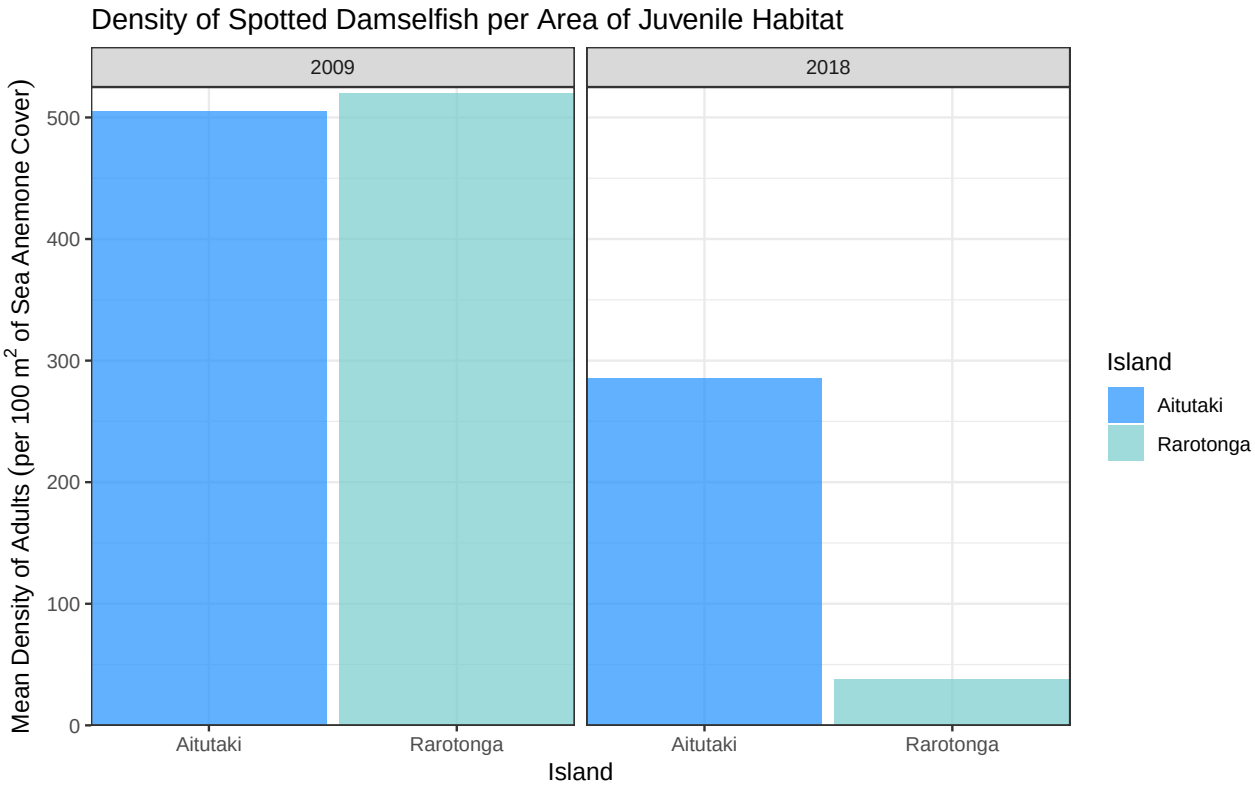
Adult Density by Juvenile Microhabitat

Tasks:
- Calculate the density of adults per area of bottom covered by the microhabitat used by the young (for each lagoon and year)
- Graph them (similar to questions one and two)


Density of Surgeonfish per Area of Juvenile Habitat
2009
2018
150
100
50
0
Mean Density of Adults (per 100 m2 of Fine – branching Coral)
Aitutaki
Rarotonga
Aitutaki
Rarotonga
Island
Island
Aitutaki
Rarotonga


Density of Coral Trout per Area of Juvenile Habitat
2009
2018
50
40
30
20
10
0
Mean Density of Adults (per 100 m2 of Coarse – branching Coral)
Aitutaki
Rarotonga
Aitutaki
Rarotonga
Island
Island
Aitutaki
Rarotonga

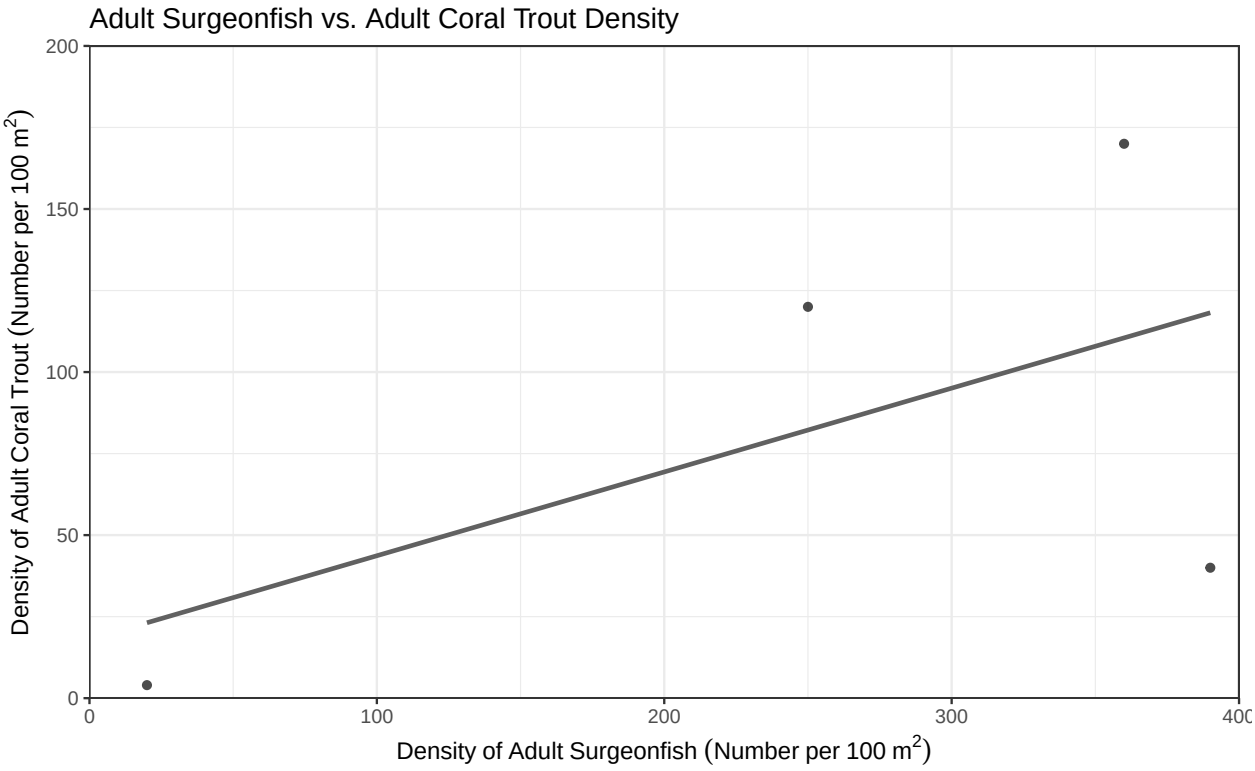

Density of Yellow Damselfish per Area of Juvenile Habitat
2009
2018
Mean Density of Adults (per 100 m2 of Mounding Coral)
0
2
4
6
Aitutaki
Rarotonga
Island
Island
Aitutaki
Rarotonga

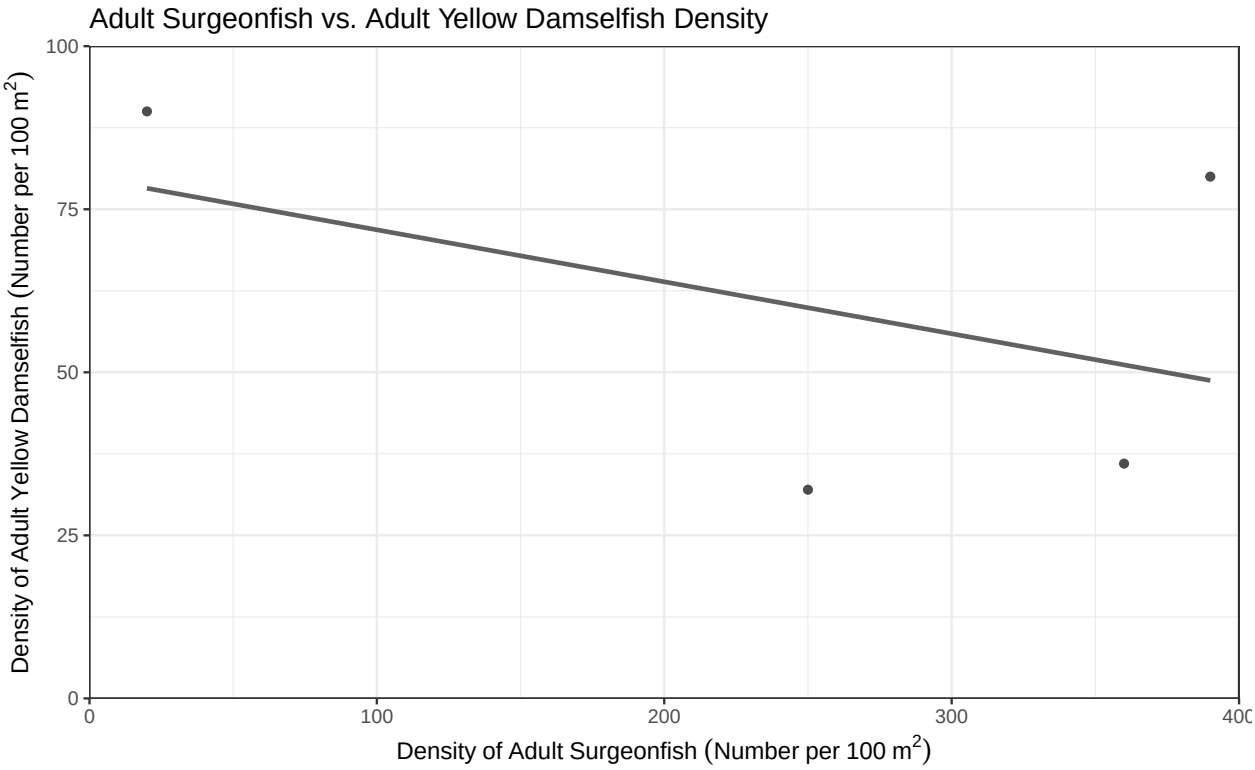

Density of Spotted Damselfish per Area of Juvenile Habitat
2009
2018
Mean Density of Adults (per 100 m2 of Sea Anemone Cover)
0
100
200
300
400
500
Aitutaki
Rarotonga
Island
Island
Aitutaki
Rarotonga

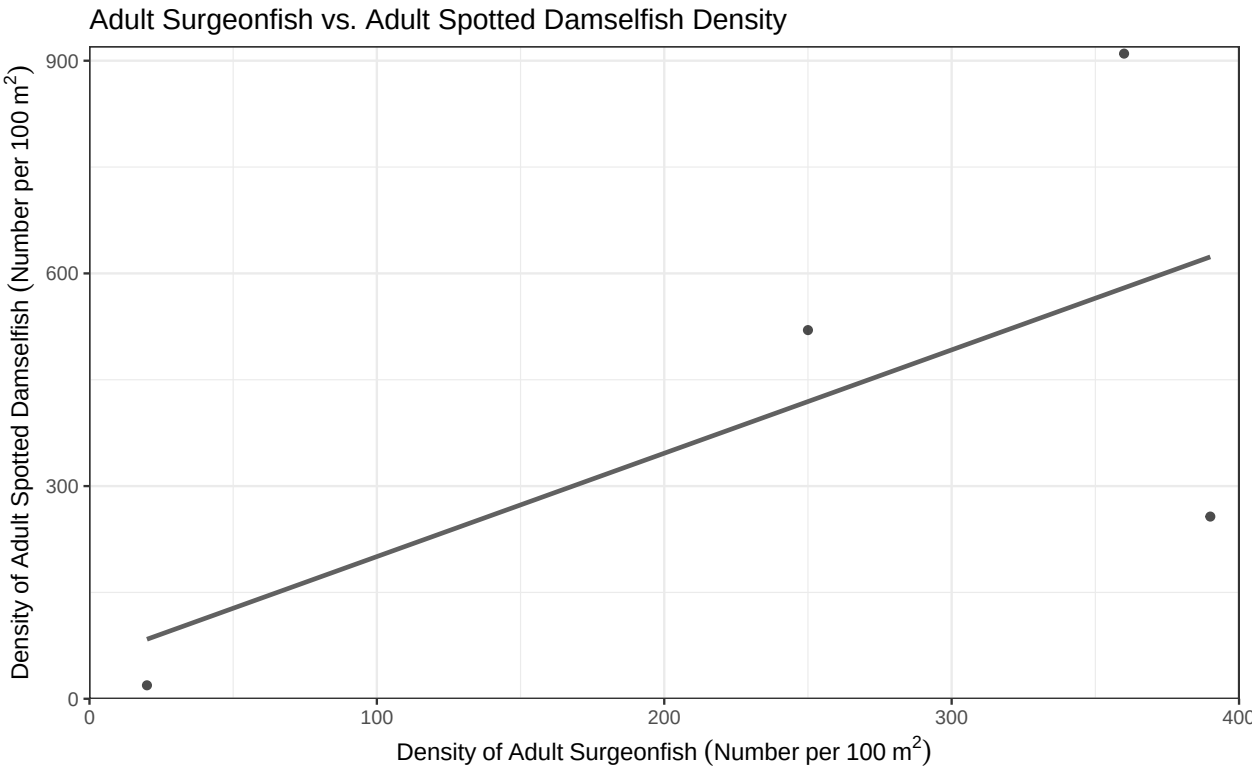
Question 6

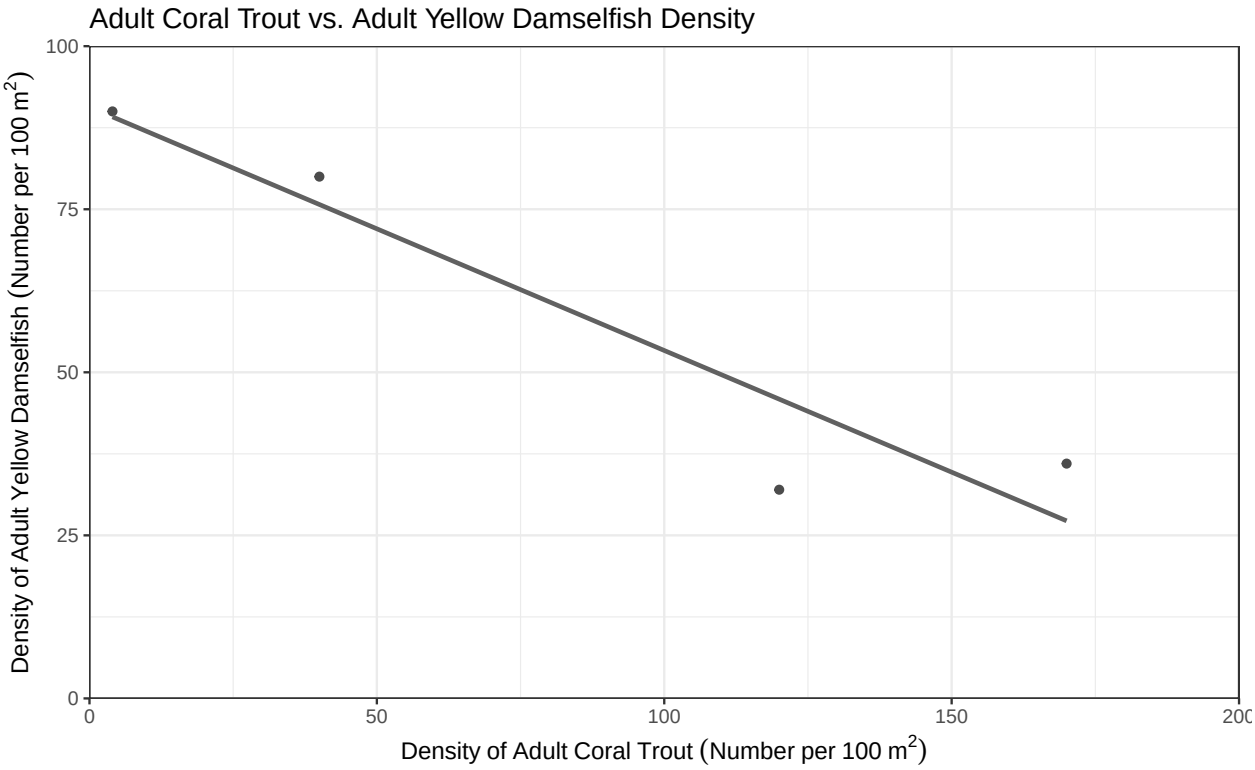
Adult Density Trends

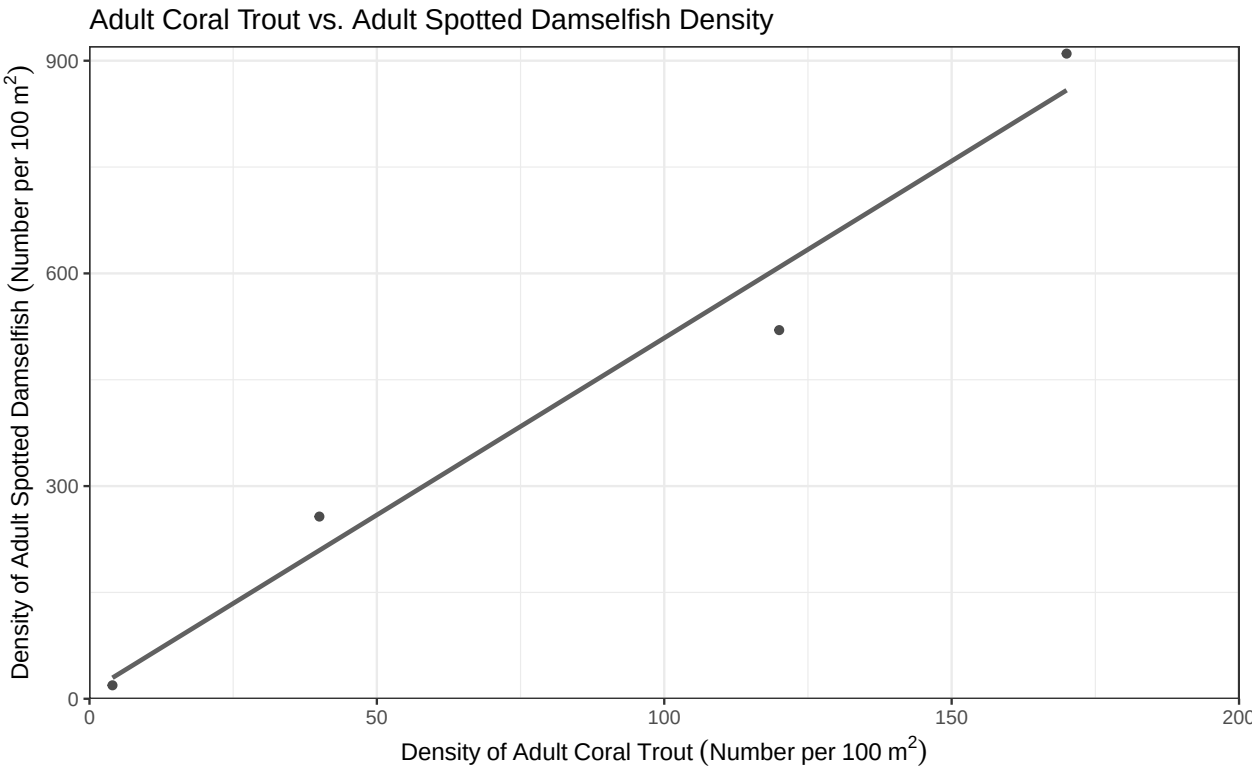
Tasks:
- Scatterplots (adult density) with trend line and r-squared value
- Surgeon vs. Coral Trout
- Surgeon vs. Yellow Damselfish
- Surgeon vs. Spotted Damselfish
- Coral Trout vs. Yellow Damselfish
- Coral Trout vs. Spotted Damselfish
- Yellow Damselfish vs. Spotted Damselfish

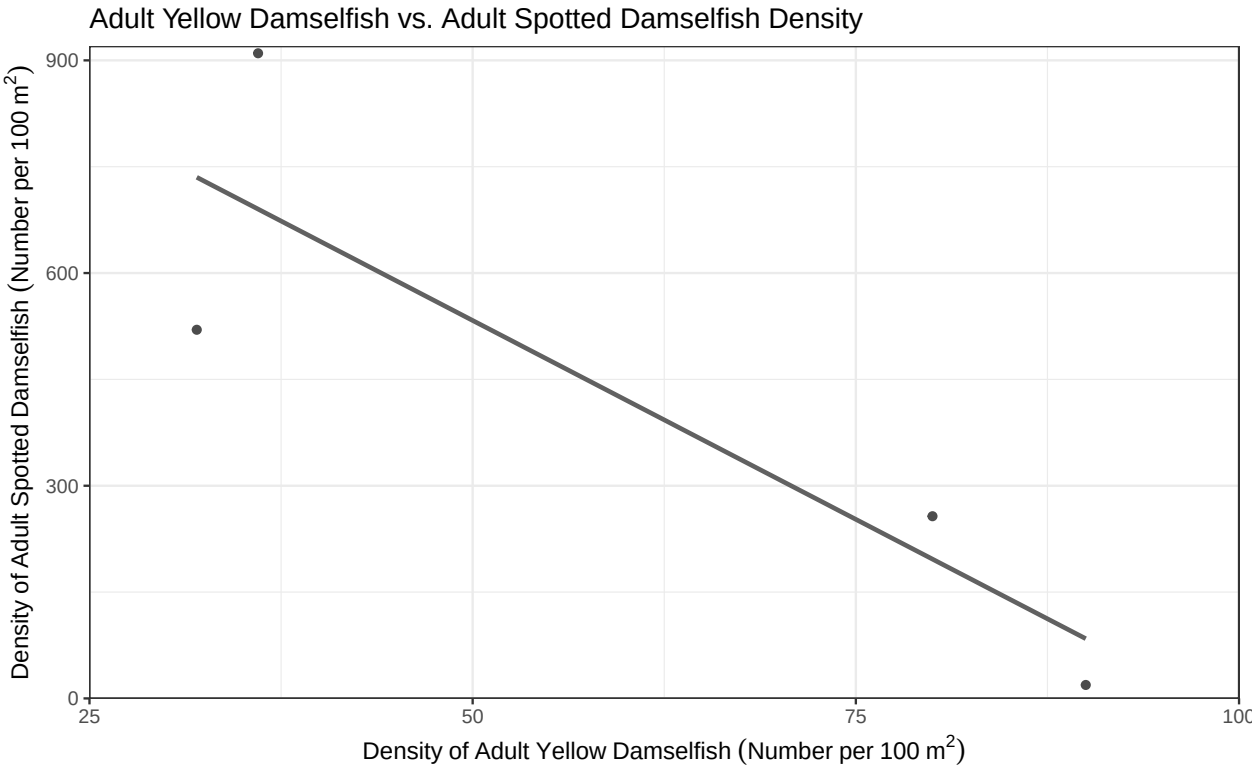



Adult Surgeonfish vs. Adult Yellow Damselfish Density
Density of Adult Yellow Damselfish (Number per 100 m2)
100
75
50
25
0
0
100
200
300
400
Density of Adult Surgeonfish (Number per 100 m2)


Adult Surgeonfish vs. Adult Spotted Damselfish Density
Density of Adult Spotted Damselfish (Number per 100 m2)
900
600
300
0
0
100
200
300
400
Density of Adult Surgeonfish (Number per 100 m2)


Adult Coral Trout vs. Adult Yellow Damselfish Density
Density of Adult Yellow Damselfish (Number per 100 m2)
100
75
50
25
0
0
50
100
150
200
Density of Adult Coral Trout (Number per 100 m2)


Adult Coral Trout vs. Adult Spotted Damselfish Density
Density of Adult Spotted Damselfish (Number per 100 m2)
900
600
300
0
0
50
100
150
200
Density of Adult Coral Trout (Number per 100 m2)


Adult Yellow Damselfish vs. Adult Spotted Damselfish Density
Density of Adult Spotted Damselfish (Number per 100 m2)
900
600
300
0
25
50
75
100
Density of Adult Yellow Damselfish (Number per 100 m2)