Coral_Reef_Case_Study

George Ni

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Question 1

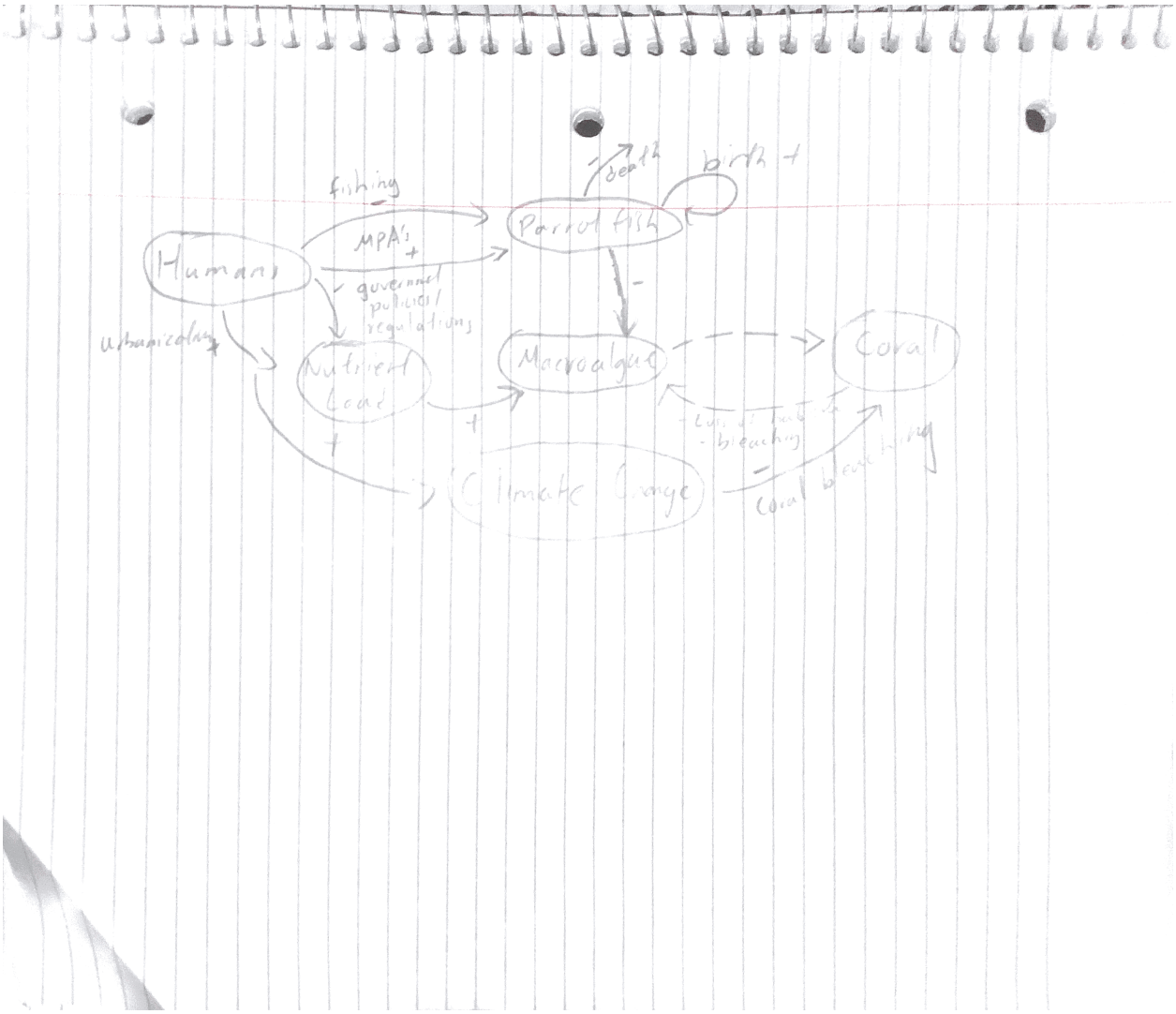
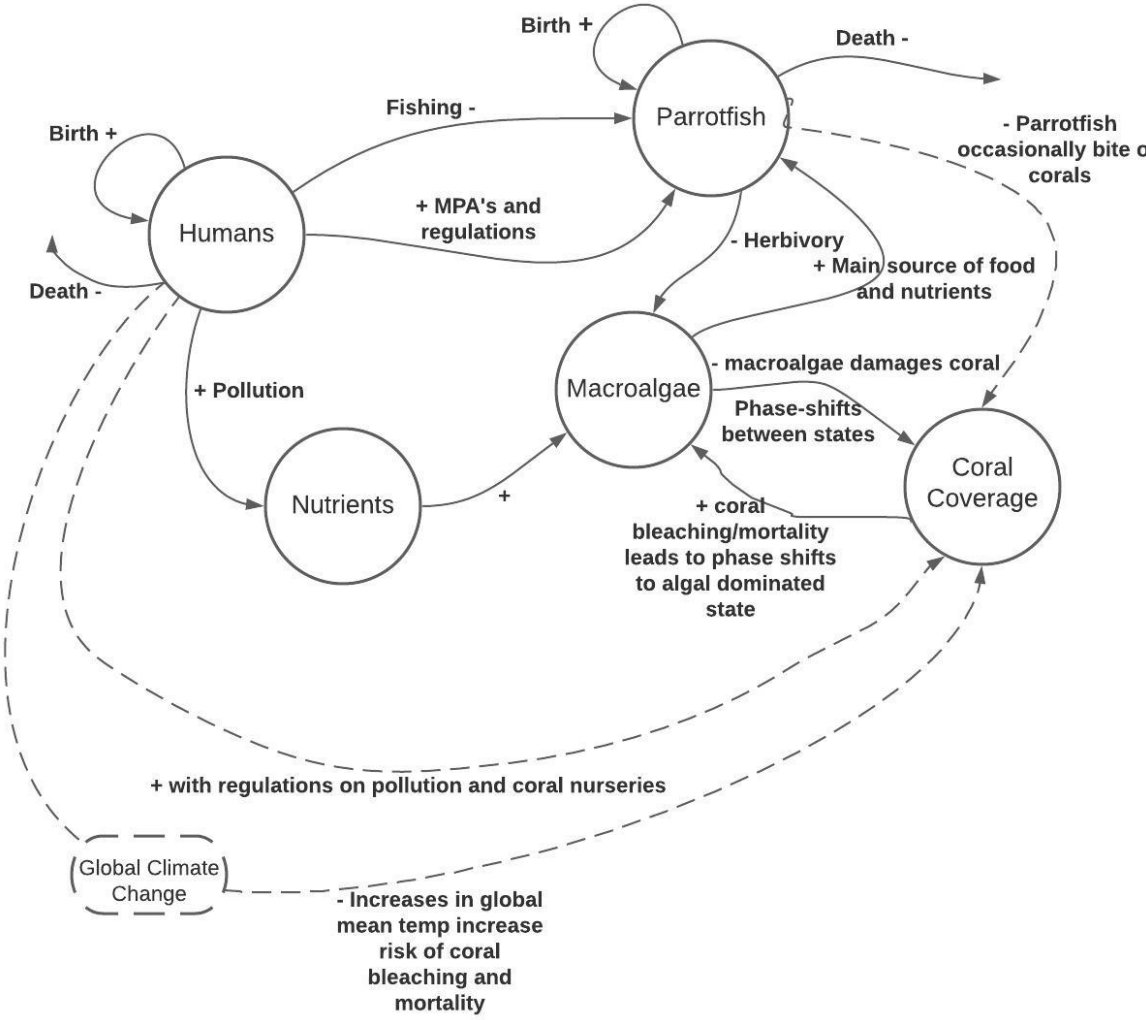


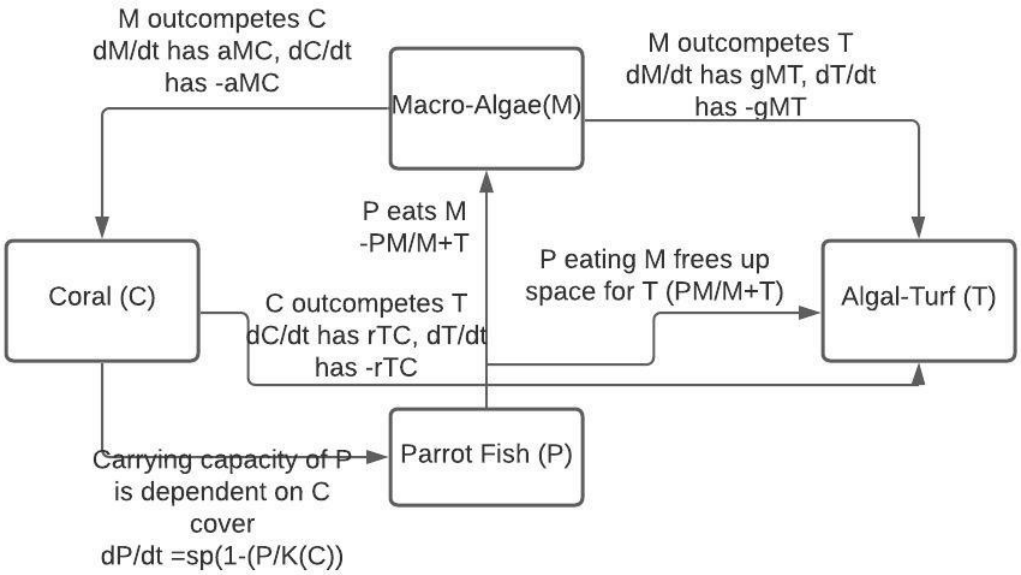
Figure 1: Crappy sketch of Individual Flow Diagram

Question 2



Group Flow Diagram:

Question 3



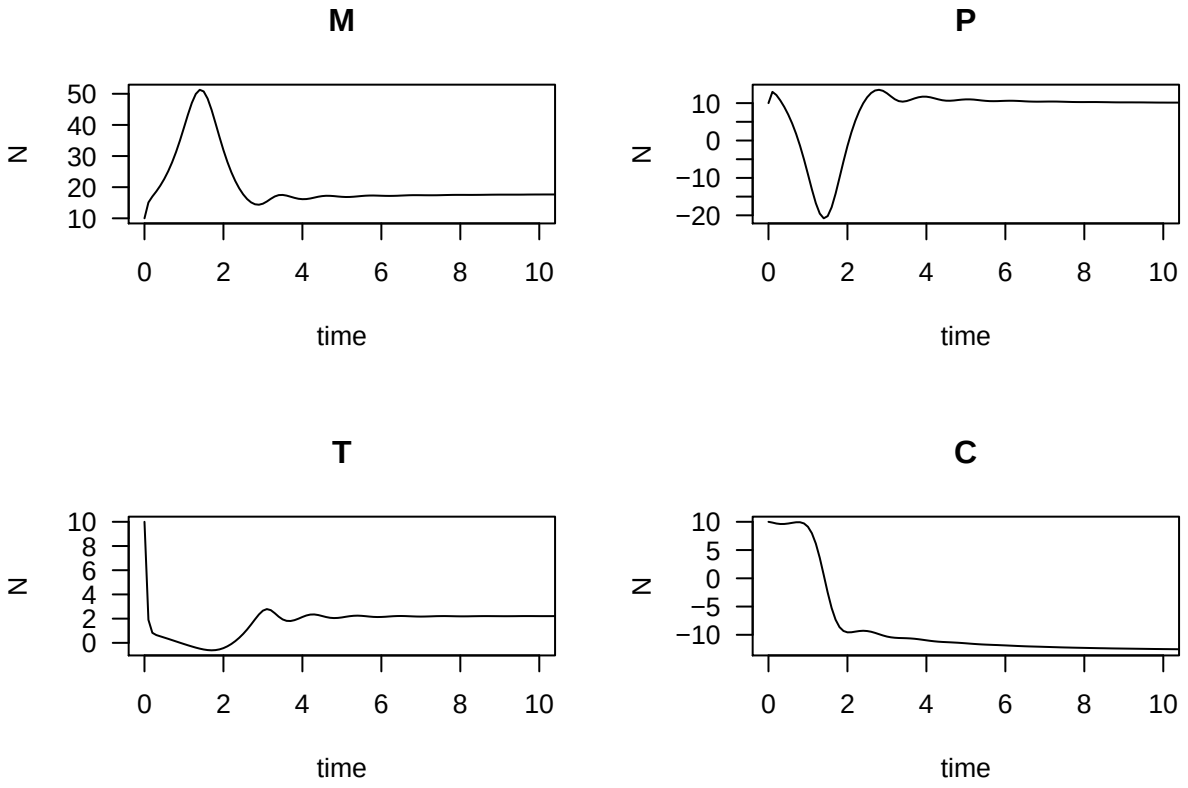
Flow Diagram:
Parameters:

- a represents competition between macro-algae and coral.
- g represents competition between macro-algae and turf
- r represents competition between turf and coral
- d represents some death parameter for coral

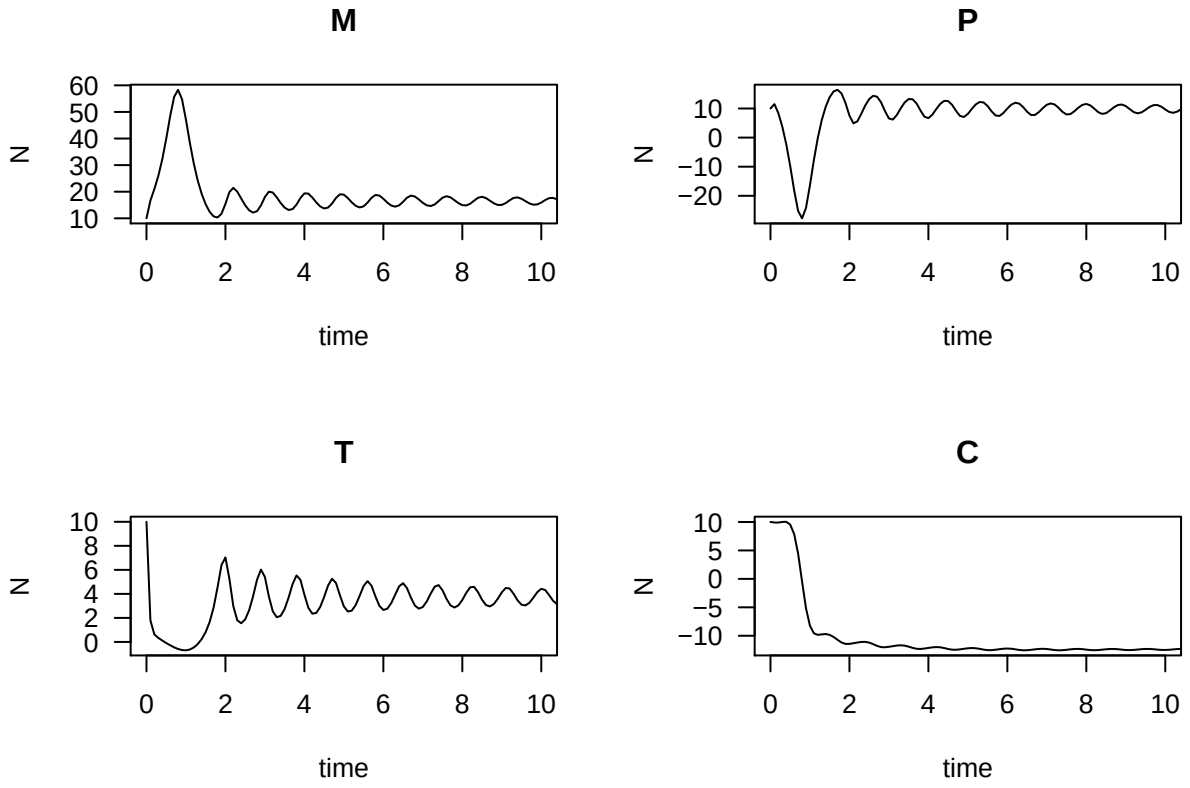
```
## Loading required package: deSolve
```

```
## Warning: package 'deSolve' was built under R version 3.6.3
```

```
# Model and plot results
out <- ode(y = state,times=times,func=coral_model,parms=parameters)
plot(out,ylab='N',xlab='time',las=1, xlim=c(0,10))
```




```
parameters <- c(a = 0.2,g=0.8,r=1.0,d=0.44,s=0.49,K=10) #Parameter a increased by .1
out <- ode(y = state,times=times,func=coral_model,parms=parameters)
plot(out,ylab='N',xlab='time',las=1, xlim=c(0,10))
```



We found that changes in parameter a resulted in the largest effect on coral populations, as increases in a, which is the competition between macro-algae and coral, resulted in coral population (N) declining faster.