Final Project 456

```
library(astsa)
```

```
## Warning: package 'astsa' was built under R version 4.0.5
```

```
library(forecast)
```

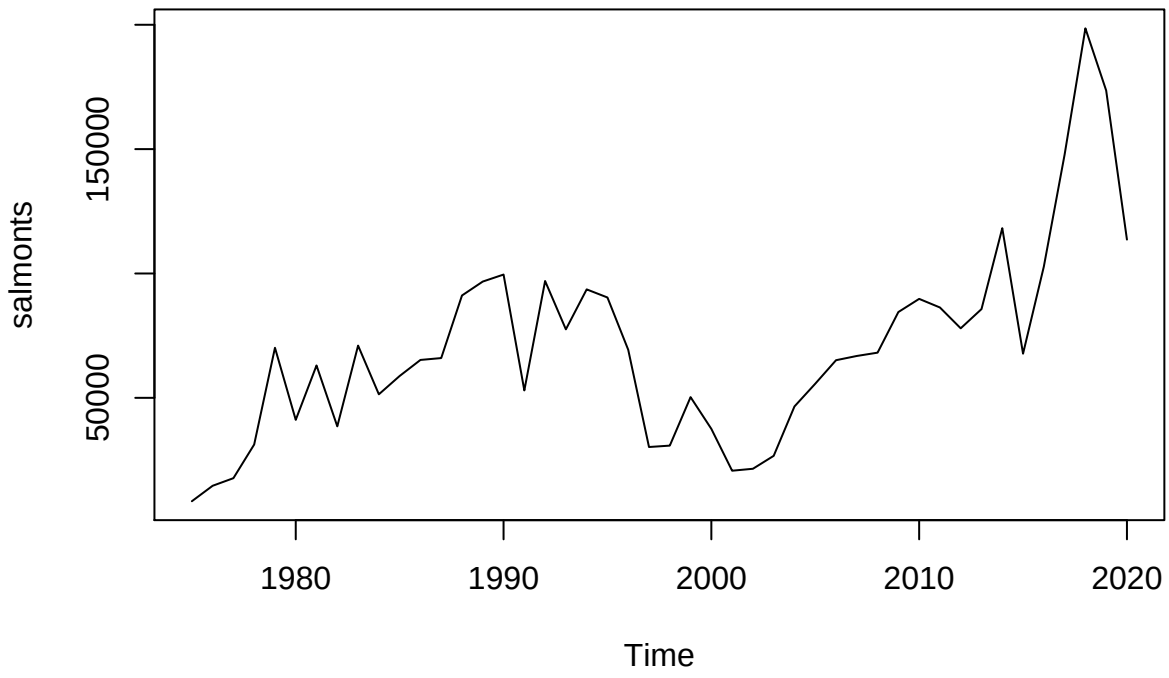
```
## Warning: package 'forecast' was built under R version 4.0.5
```

```
## Registered S3 method overwritten by 'quantmod':
##   method            from
##   as.zoo.data.frame zoo
```

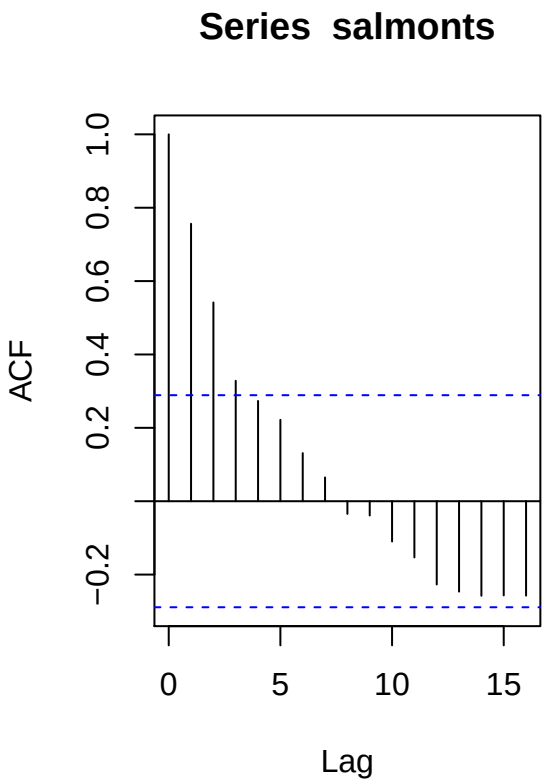
```
##
## Attaching package: 'forecast'
```

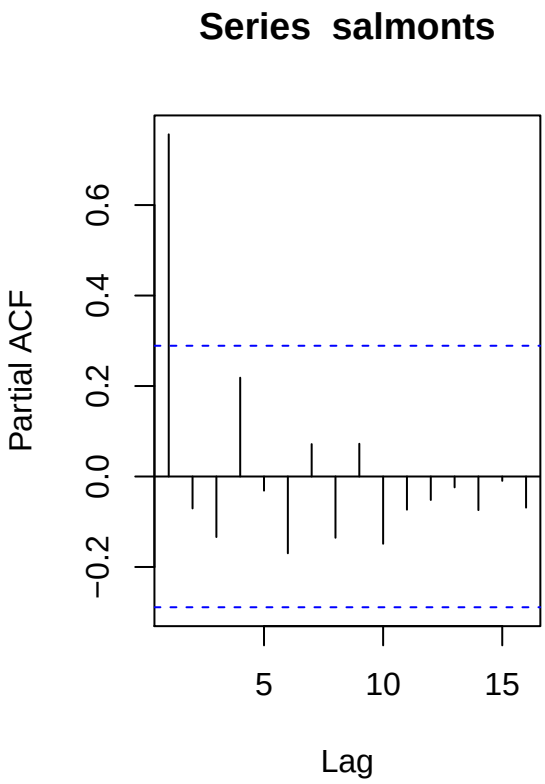
```
## The following object is masked from 'package:astsa':
##
##     gas
```

```
setwd("C:/Users/Eric Folsom/Desktop/School work/Stats 456")
data=read.csv("fishdat.csv")
year=rev(data$Year)
earnings=rev(data$Average.Earnings)
salmonts=ts(earnings, start=1975)
plot(salmonts)
```




```
par(mfrow=c(1,2))
acf(salmonts)
pacf(salmonts)
```





Trying to forecast this with an ARMA(2,0,0) or an ARMA(3,0,0)

```
fit1=arima(salmonts, order=c(2,0,0))
fit2=arima(salmonts, order=c(3,0,0))
fit1
```

```
##
## Call:
## arima(x = salmonts, order = c(2, 0, 0))
##
## Coefficients:
##          ar1     ar2  intercept
##       0.7774  0.0362   68941.83
## s.e.  0.1516  0.1679   17240.86
##
## sigma^2 estimated as 567831661:  log likelihood = -529.42,  aic = 1066.83
```

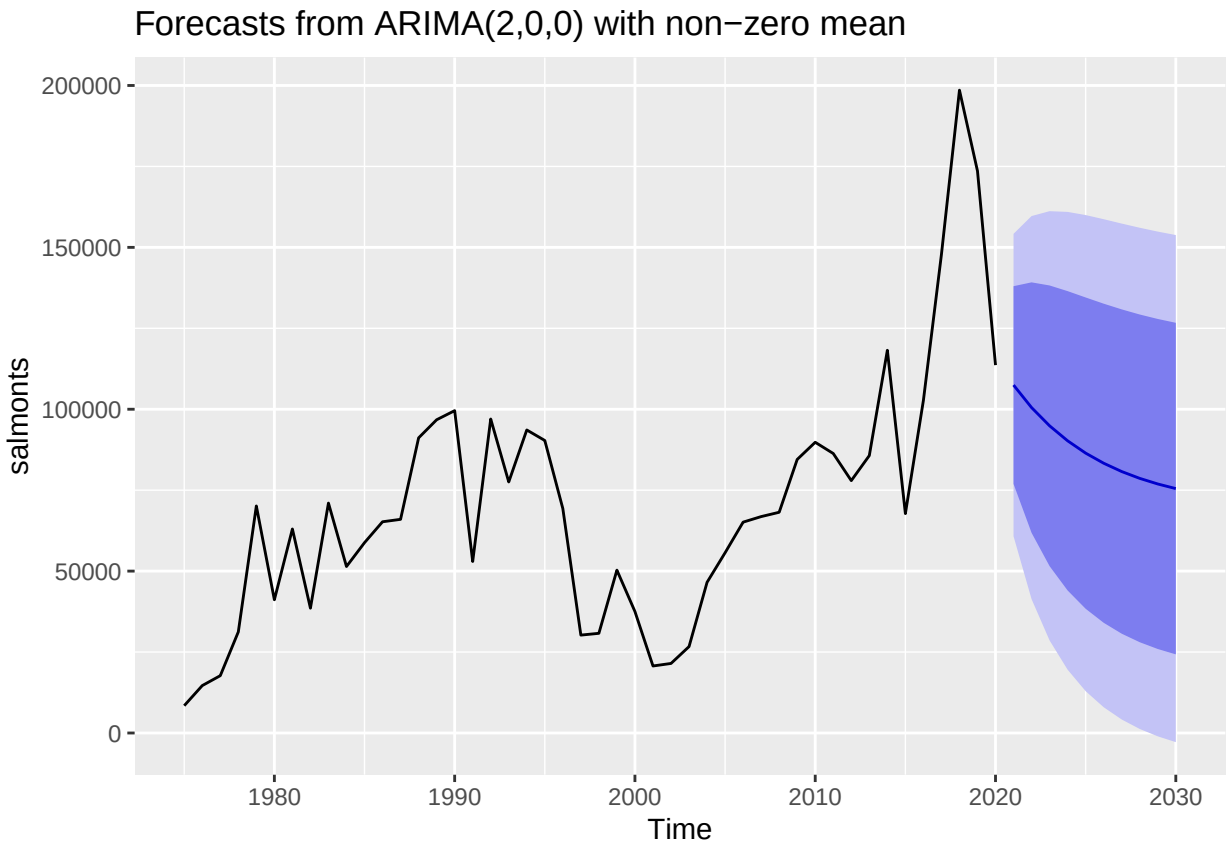
```
fit2
```

```
##
## Call:
## arima(x = salmonts, order = c(3, 0, 0))
##
## Coefficients:
##          ar1     ar2      ar3  intercept
##       0.7908  0.0838  -0.0961   68341.24
## s.e.  0.1528  0.1909   0.1857   14936.19
##
```

```
## sigma^2 estimated as 564795028:  log likelihood = -529.28,  aic = 1068.57
```

Because the AIC on the ARMA(2,0,0) process is lower than the AR(3) process, we will choose the AR(2) process for forecasting.

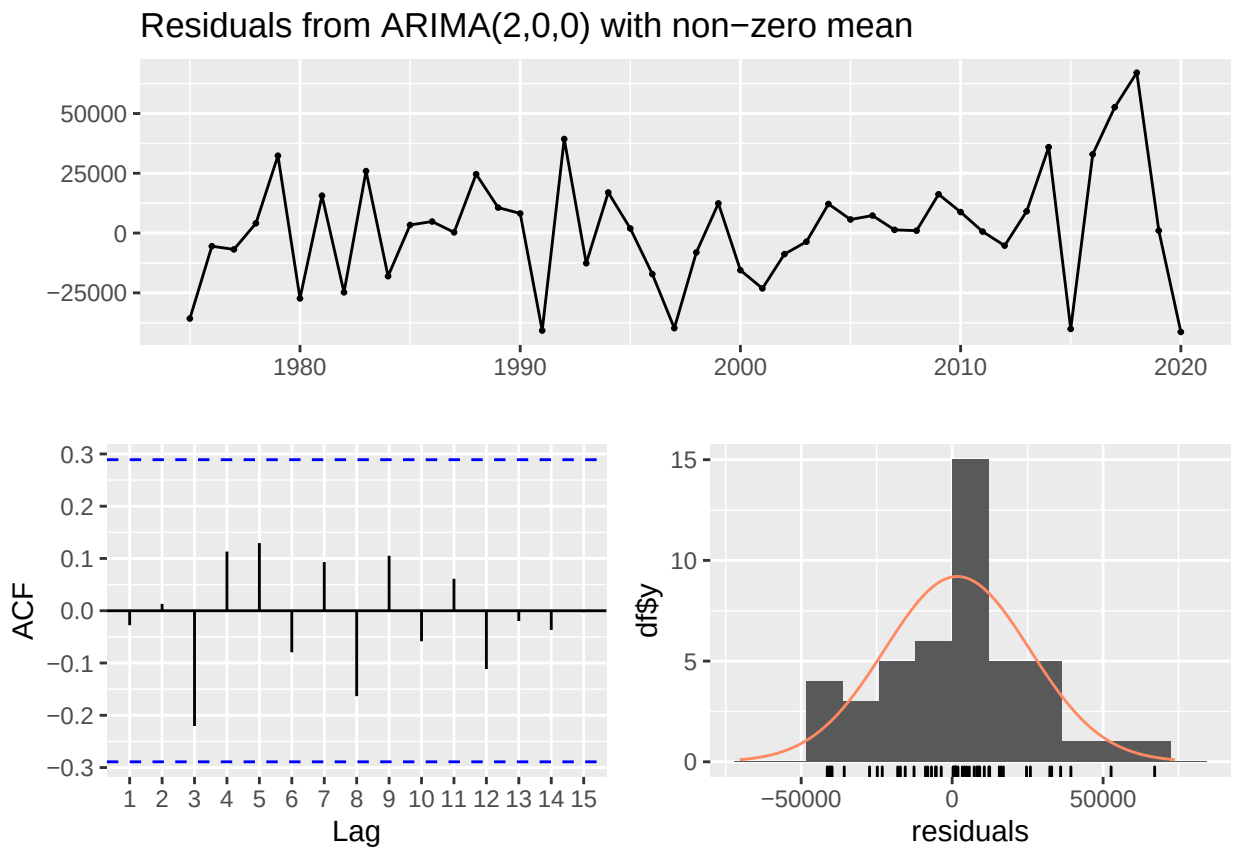
```
fit1_fore=forecast(fit1,10)
autoplot(fit1_fore)
```




```
fit1_fore
```

```
##      Point Forecast    Lo 80    Hi 80     Lo 95    Hi 95
## 2021      107469.04 76930.67 138007.4 60764.628 154173.4
## 2022      100511.26 61830.84 139191.7 41354.663 159667.9
## 2023       94879.36 51533.91 138224.8 28588.212 161170.5
## 2024       90249.11 44021.67 136476.6 19550.339 160947.9
## 2025       86445.56 38370.73 134520.4 12921.450 159969.7
## 2026       83320.98 34038.56 132603.4  7950.023 158691.9
## 2027       80754.16 30673.26 130835.1  4162.035 157346.3
## 2028       78645.55 28032.91 129258.2  1240.203 156050.9
## 2029       76913.34 25945.00 127881.7 -1036.007 154862.7
## 2030       75490.35 24283.36 126697.3 -2823.981 153804.7
```

```
checkresiduals(fit1)
```




```
##
##  Ljung-Box test
##
## data:  Residuals from ARIMA(2,0,0) with non-zero mean
## Q* = 7.1705, df = 6, p-value = 0.3054
##
## Model df: 3.   Total lags used: 9
```