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Supplement A: Example R Code for Conducting a Comparison of Analytical and Empirical Sample Size Estimates of Effort for Priest Lake, Idaho

```
#Import data
data<-read.table(data)

#View first few rows of data
head(data)
```

#Number	Date	EffortEst	ObservedCatch	ObservedHoursFished	DayType	Fishery
#1	3/2/2014	0	0	0	WE	Priest
#2	3/6/2014	27	1	3	WD	Priest
#3	3/7/2014	54.13333	8	17	WD	Priest
#4	3/8/2014	285.25	19	60	WE	Priest

```
#Set the number of weekend, week days, and total days in the population
N.we<-104
N.wd<-260
N<-N.we+N.wd

#Subset weekend and weekday data
we.data<-subset(data, DayType=='WE')
wd.data<-subset(data, DayType=='WD')

#Estimate weekend and weekday effort and add them to estimate total effort
we.effort<-N.we*mean(we.data$EffortEst)
wd.effort<-N.wd*mean(wd.data$EffortEst)
total.effort<-(we.effort+wd.effort)

#Calculate empirical sample size

#Set sample sizes to evaluate
samp.size<-c(2:15,seq(16,400,20))

#Set the number of iterations
reps<-10000

#Create an empty vector to store standard error estimates
se.ss<-c()

#Create a for loop to loop over the sample size vector
for(i in 1:length(samp.size)){
#Allocate sample size to weekends and weekdays
```

```
n.wd<-round(((5/7)*samp.size[i]))
n.we<-round(((2/7)*samp.size[i]))
#Create empty vector to store season-long effort estimates
effort.est<-c()
        #Create a for loop to loop over iterations
        for(j in 1:reps){
        #Estimate effort for weekend and weekdays and add them for season
        #effort estimate
        wd.est<-N.wd*mean(sample(wd.data$EffortEst, n.wd, T))
        we.est<-N.we*mean(sample(we.data$EffortEst, n.we, T))
        effort.est[j]<-wd.est+we.est
        }
#Calculate empirical standard error
se.ss[i]<-sd(effort.est)
}
#Calculate relative confidence interval
CI.empirical<-100*(1.96*se.ss)/(total.effort)

#Display results
data.frame(CI.empirical, samp.size)

#Analytical sample size estimator

#Set the precision levels
CI.prop.analytical<-seq(.15,1,.05)
CI.analytical<-100*CI.prop.analytical

#Calculate the actual precision
CI<-CI.prop.analytical*total.effort

#Calculate weekend and weekday sample variance
we.var<-var(we.data$EffortEst)
wd.var<-var(wd.data$EffortEst)

#Set critical value
Z<-1.96

#Set weights
w.wd<-5/7
w.we<-2/7

#Calculate sample size (n)
n<-((N^2*Z^2)/(CI^2)*((N.wd/N)^2*(wd.var/w.wd)+(N.we/N)^2*(we.var/w.we)))

#Display results
data.frame(CI.analytical, n)
```

```
#Plot results
plot(CI.analytical, n, xlim=c(0,100), xlab='Relative 95% CI (%)', ylab='Sample size (days)',
type='l')
lines(CI.empirical, samp.size, lty=2)
legend('topright', legend=c('Analytical', 'Empirical'), lty=c(1,2))
```