

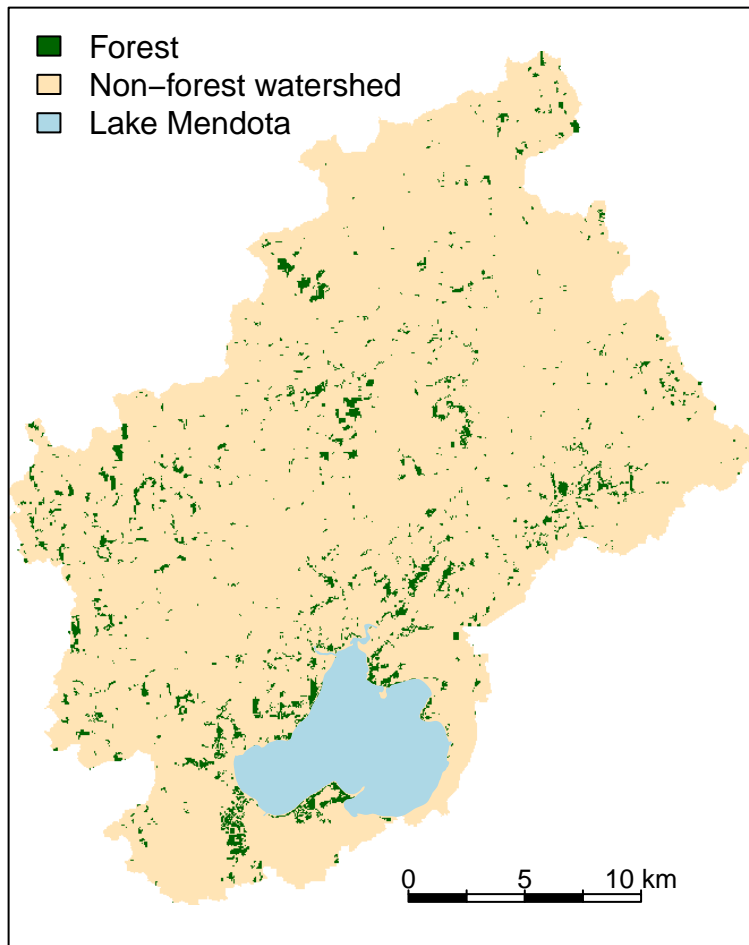
Loken_HW4

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Dear Dr. Dugan:

Question 1: What is the percent of forest in the Mendota catchment?



```
#Calculate with Lake Mendota included in catchment
nlcdVals = freq(nlcd)

# Sum values, minus zero values
total = as.data.frame(nlcdVals) %>% dplyr::filter(value >= 1) %>%
  summarise_at('count',sum)

# Total forest counts
forest = as.data.frame(nlcdVals) %>% dplyr::filter(value >= 41 & value <= 43) %>%
  summarise_at('count',sum)
```

```

perFor = forest/total
perFor

##          count
## 1 0.04385327

#Remove Lake Mendota from catchment
#Mask raster by Lake Mendota
nlcd_nolake <- mask(nlcd, ME2, inverse=T)
nlcdVals_nolake = freq(nlcd_nolake)

total_nolake = as.data.frame(nlcdVals_nolake) %>% dplyr::filter(value >= 1) %>%
  summarise_at('count',sum)

# Total forest counts
forest_nolake = as.data.frame(nlcdVals_nolake) %>% dplyr::filter(value >= 41 & value <= 43) %>%
  summarise_at('count',sum)

perFor_nolake = forest_nolake/total_nolake
perFor_nolake

##          count
## 1 0.0468934

```

4.68% of Lake Mendota's catchment is forest if you exclude Lake Mendota from the total catchment area. If you include Lake Mendota in its catchment (which I would be inclined to do), the percent forest would be 4.39%

Question 2: What is the area of forest in the Mendota catchment?

```

res<-res(nlcd)
crs(nlcd) #check units

## CRS arguments:
## +proj=aea +lat_1=29.5 +lat_2=45.5 +lat_0=23 +lon_0=-96 +x_0=0
## +y_0=0 +ellps=GRS80 +towgs84=0,0,0,-0,-0,-0,0 +units=m +no_defs

pixelarea<-res[1]*res[2] #in m2
forest_area <- forest*pixelarea/1000000
names(forest_area)[1]<-'area_km2'
print(forest_area)

##    area_km2
## 1    26.4123

```

The total area of forest in the Lake Mendota watershed is 26.4 km²