Appendix A

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# Prepare input rasters  
  
## 1. Data  
### Study area polygon  
study\_area <- rgdal::readOGR(dsn = file.path("E:","study\_area"), layer = "study\_area")  
  
### DEM   
DEM <- raster::raster("C://nsdnr//dp055v2gr//e055ns20//grid//dem020hy")  
  
### Other input rasters  
  
  
## Crop, reproject and resample the DEM  
DEM <- raster::crop(DEM, study\_area) # crop & reproject  
temp\_raster <- raster(ext = extent(DEM),  
 resolution = res(DEM)) # dummy raster to resample to  
DEM <- raster::resample(DEM, temp\_raster, method = "bilinear")   
par(mfrow = c(2,2))  
  
  
# Create raster brick  
## Set exactly similar properties by resampling to solar raster  
solar\_raster\_df <- make\_temporal\_raster\_df("E://GOES\_200m",  
 ymd('2016-06-01'),  
 ymd('2016-06-08'),  
 date\_chars= c(16,-4),  
 date\_format = "%Y\_%j")  
solar\_raster <- raster(solar\_raster\_df[[1]][[1]])  
for(i in seq\_along(rasters\_list)){  
 rasters\_list[[i]] <- raster::resample(rasters\_list[[i]], solar\_raster)  
}  
  
  
# Modify the Aspect and PTOC Rasters   
  
##### Recalculate Aspect Raster #####  
asp\_raster\_in <- raster(file.path("Rasters","200","asp.tif"))  
asp\_raster\_out <- abs(asp\_raster - 180)  
writeRaster(asp\_raster\_out, file.path("Rasters","200","asp.tif"),  
 overwrite = TRUE)  
  
##### Limit Proximity to the Coastline Raster #####  
limit <- 30000 # metres  
ptoc\_raster\_in <- raster(file.path("Rasters","200","ptoc.tif"))  
ptoc\_raster\_out <- ptoc\_raster\_in  
ptoc\_raster\_out[ptoc\_raster\_in >= limit] <- limit  
  
gam\_six\_years\_lim <- gam(temp\_mean ~   
 s(dem, k = 9) +  
 s(ptoc, k = 3) +   
 s(sum\_irradiance, k= 9) +   
 s(east,north),  
 data = model\_stations\_df)  
  
  
daily\_temperatures\_df <- read.csv(file.path("E:","WeatherData","daily\_20110101\_20180218"))  
# Add stations easting and northing to data frame  
ns\_stations\_in <- rgdal::readOGR(dsn = file.path("E:","WeatherData"), layer = "NSWeatherStns")  
ns\_stations <- ns\_stations %>% dplyr::select(stationid = StnID, NORTHING = Northing, EASTING = Easting)  
  
swns\_stations\_df <- left\_join(daily\_temperatures\_df,   
 ns\_stations,   
 by = "stationid") %>%  
 extract\_constant\_raster\_values(rasters\_list)  
  
solar\_irradiance\_rasters\_df <- make\_temporal\_raster\_df(  
 in\_folder = "E:\\GOES\_200m",  
 start\_date = ymd('2012-01-01'),  
 end\_date = ymd('2017-12-31'),  
 date\_chars = c(16,-5),  
 date\_format = "%Y\_%j",  
 extension = ".tif")  
  
swns\_stations\_df <- extract\_temporal\_raster\_values(temporal\_rasters\_df = solar\_irradiance\_rasters\_df,  
 temperatures\_df = swns\_stations\_df,  
 col\_name = "sum\_irradiance")