

# CA\_WILDFIRE\_PLOTS

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```
# Read in Data
```

```
all_mfri = list.files('./Wildfire_MFRI/',pattern = '.tif',full.names = T)
for(file in all_mfri){
  object_name = file_path_sans_ext(basename(file))
  assign(object_name, raster(file))
}

CC4a_reg = read_sf('./Boundries/CC4a_RegionsSub.shp')
CC4a_reg = st_transform(CC4a_reg, "+proj=aea +lat_1=34 +lat_2=40.5 +lat_0=0 +lon_0=-120 +x_0=0 +y_0=-4000000")
# dissolve multipart Sierra Mountain feature
CC4a_reg = ms_dissolve(CC4a_reg,field = 'Region')
```

```
# Get stats for 01-25 & 26-50 MFRI cap at 500 years
```

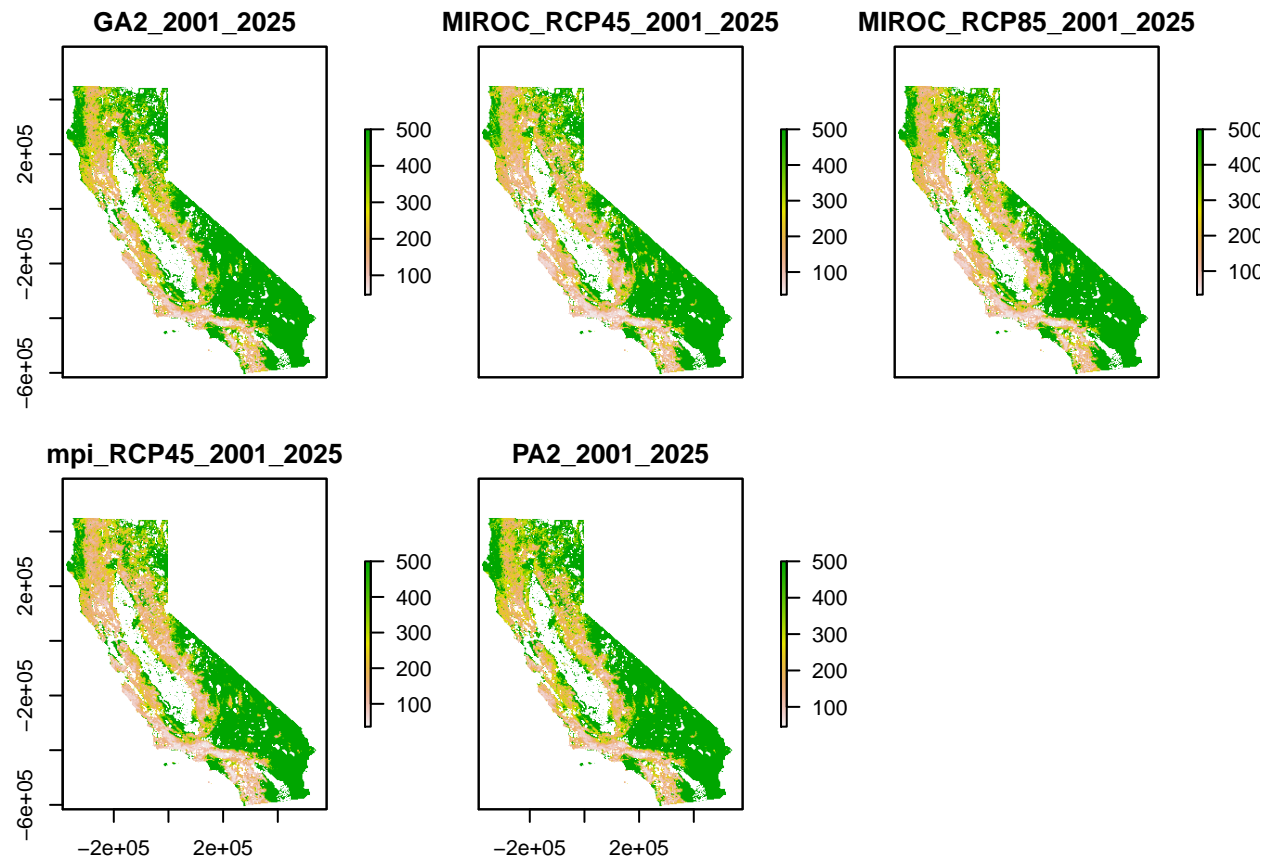
```
all_2001_2025 = stack(all_mfri[grepl('2001_2025',all_mfri)])
all_2026_2050 = stack(all_mfri[grepl('2026_2050',all_mfri)])

# years for maximum plotted MFRI
capat=500

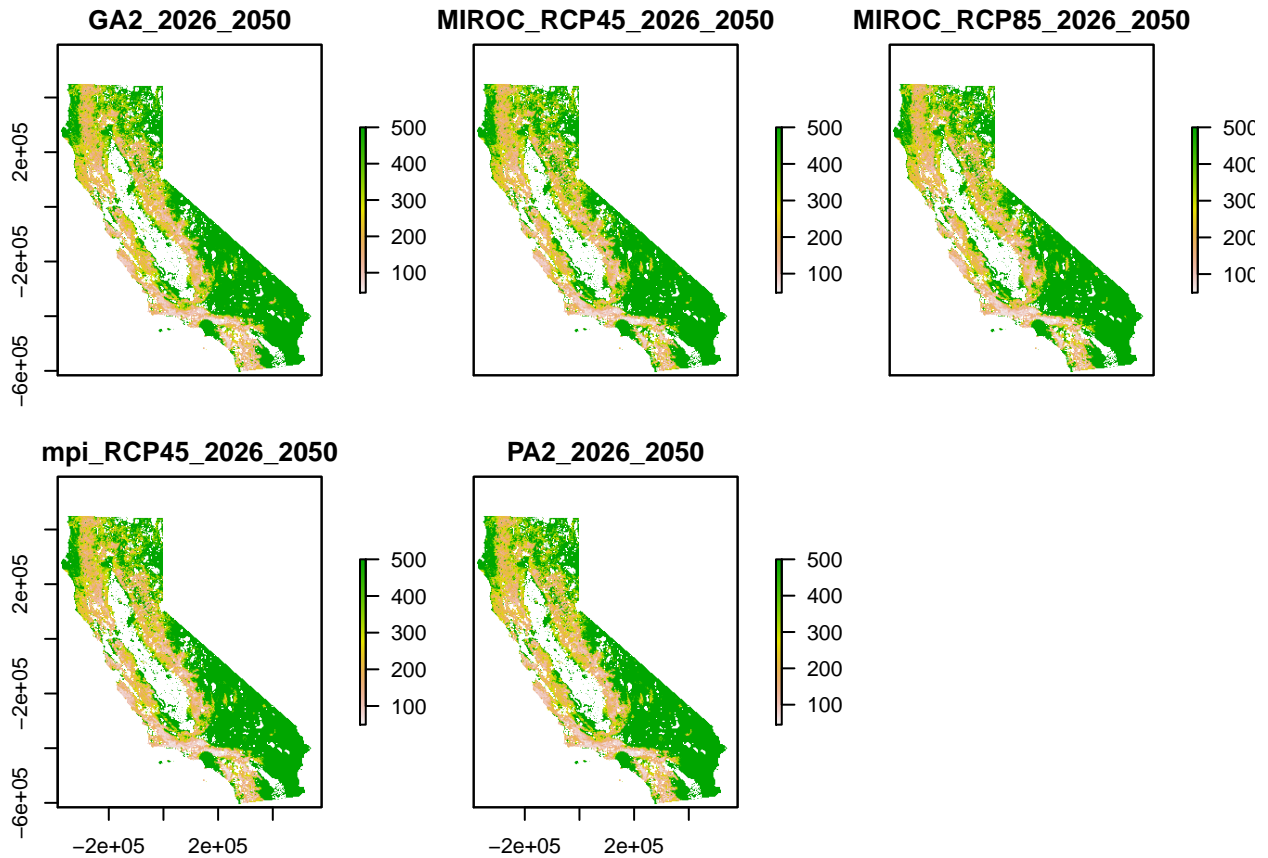
# calculate stats for stacks and cap MFRI
# writes out files with 3 different postfix _stat for statisic (mean etc), _df for dataframe for ggplot
summary_functions = c('min','max','mean' )
for(summary in summary_functions){
  for(stac in c('all_2001_2025','all_2026_2050')){
    assign(paste(summary,stac,sep='_'),do.call(summary,list(x=get(stac),na.rm=T)))
    capper = get(paste(summary,stac,sep='_'))
    # write out df for ggplot
    capper.df = data.frame(rasterToPoints(capper))
    names(capper.df) =c("lon", "lat","MFRI")
    assign(paste(summary,stac,'df',sep='_') ,capper.df)
    # cap at catat yrs
    capper[capper>capat]=capat
    assign(paste(summary,stac,'capped',sep='_'),capper)
  }
}

# write out df for ggplot
MFRI_76_00.df = data.frame(rasterToPoints(MFRI_76_00))
names(MFRI_76_00.df) =c("lon", "lat","MFRI")
```

```
all_2001_2025[all_2001_2025>500]=500
all_2026_2050[all_2026_2050>500]=500
plot(all_2001_2025)
```



```
plot(all_2026_2050)
```



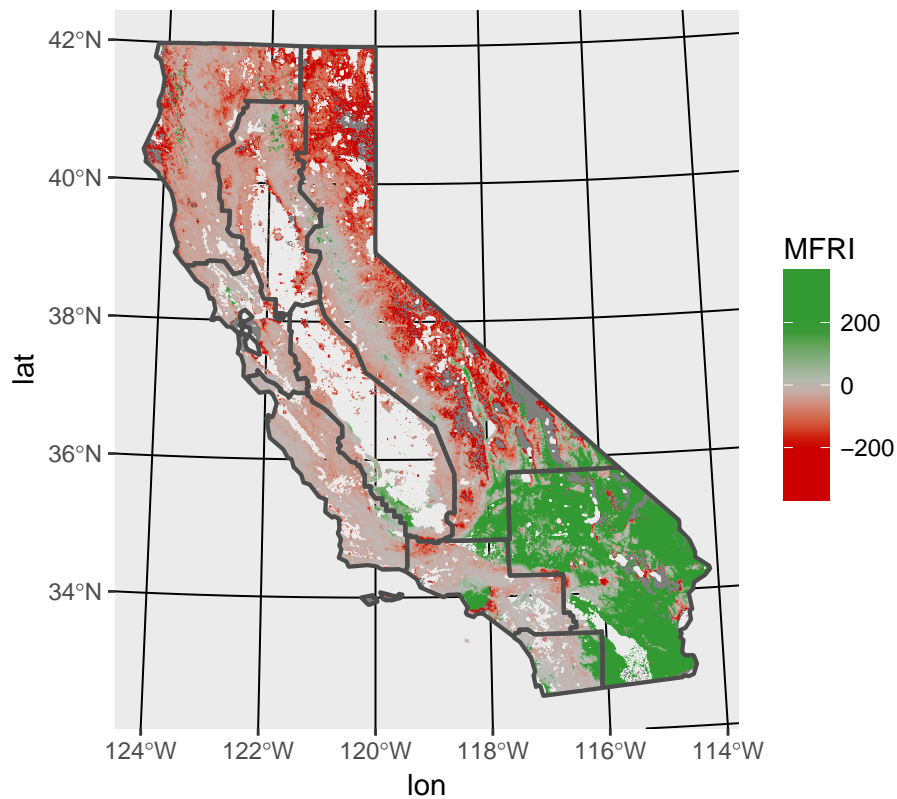
```

mean_chg_76_25 = MFRI_76_00.df
mean_chg_76_25$MFRI = mean_all_2001_2025_df$MFRI-mean_chg_76_25$MFRI
mean_chg_76_25$MFRI[ mean_chg_76_25$MFRI >350]=350
rng= range(mean_chg_76_25$MFRI)

ggplot()+geom_raster(data=mean_chg_76_25,aes(x=lon,y=lat,fill=MFRI))+
  scale_fill_gradientn(colours= c("#cc0000", "#cc0000", 'grey', "#339933", "#339933"), #colors in
    limits=c(-350, 350))+ geom_sf(data=CC4a_reg,colour = "grey30", fill = NA,size=.75) + #same limits
  ggtitle('Change in MFRIs 2000 - 2025 mean model run')+coord_sf()

```

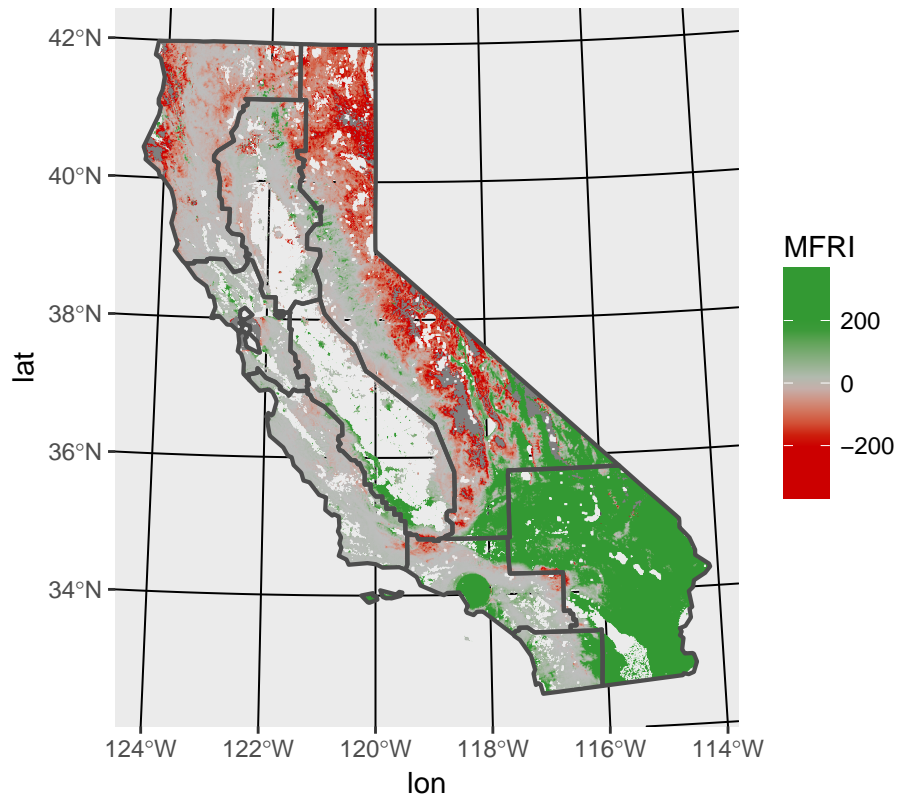
## Change in MFRIs 2000 – 2025 mean model run



```
mean_chg_76_50 = MFRI_76_00.df
mean_chg_76_50$MFRI = mean_all_2026_2050_df$MFRI - mean_chg_76_50$MFRI
mean_chg_76_50$MFRI[ mean_chg_76_50$MFRI > 350] = 350
rng = range(mean_chg_76_50$MFRI)

ggplot()+geom_raster(data=mean_chg_76_50,aes(x=lon,y=lat,fill=MFRI))+
  scale_fill_gradientn(colours= c("#cc0000", "#cc0000", 'grey', "#339933", "#339933" ),
    limits=c(-350, 350))+ geom_sf(data=CC4a_reg,colour = "grey30", fill = NA,size=.75)+
  ggtitle('Change in MFRIs 2000 - 2050 mean model run')+coord_sf()
```

## Change in MFRIs 2000 – 2050 mean model run



```
the_fun = min # function used to summarize raster values by polygons
region_code = data.frame(ID=seq(1,9),as(CC4a_reg,'Spatial')@data$Region)
full_mean_stack = stack(MFRI_76_00,mean_all_2001_2025,mean_all_2026_2050)
names(full_mean_stack) =c('2000','2025','2050')
extract_full_mean_df = extract(full_mean_stack, as(CC4a_reg,'Spatial'), fun=the_fun, na.rm=T, df=T)
extract_full_mean_df = left_join(region_code,extract_full_mean_df,by='ID') %>% select(-ID)%>%melt()
```

## Using as.CC4a\_reg...Spatial...data.Region as id variables

```
extract_full_mean_df$Year = as.numeric(substr(as.character(extract_full_mean_df$variable),2,5))
names(extract_full_mean_df)=c('Region','variable','value','Year')
```

```
full_min_stack = stack(MFRI_76_00,min_all_2001_2025,min_all_2026_2050)
names(full_min_stack) =c('2000','2025','2050')
extract_full_min_df = extract(full_min_stack, as(CC4a_reg,'Spatial'), fun=the_fun, na.rm=T, df=T)
extract_full_min_df = left_join(region_code,extract_full_min_df,by='ID') %>% select(-ID)%>%melt()
```

## Using as.CC4a\_reg...Spatial...data.Region as id variables

```
extract_full_min_df$Year = as.numeric(substr(as.character(extract_full_min_df$variable),2,5))
names(extract_full_min_df)=c('Region','variable','value','Year')
```

```
ggplot()+geom_smooth(data=subset(extract_full_min_df, Region != 'Inland South' ),aes(x=Year,y=value,color=Region))
```

Minimum observed MFRI by region –  
omitting Inland South & Central Coast

