Algal turf and macroalgae productivity from the RLS dataset

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```
library(tidyverse)
library(brms)
library(tidybayes)
library(patchwork)
library(PNWColors)
```

Loading the two meta-analysis models

One developed to predict algal turf productivity from depth, and the other simply as an average macroalgal productivity (no predictors)

```
macr_prodmod <- readRDS('mods/macro_prod_brms.RDS')
turf_prodmod <- readRDS('mods/turf_prod_brms.RDS')
```

And loading RLS data for which they will be predicted

```
load('data/RLStropical_raw.rdata')
load('data/RLS_env_spatio_temporal.rdata')
load('data/RLS_sitesInfos.rdata')
```

But sure there is a bit of processing to be done

```
rls <- RLS_sitesInfos %>%
  select(SurveyID, depth=Depth) %>%
  right_join(.,
    RLStropical_raw %>%
      mutate(SurveyID = as.integer(rownames(RLStropical_raw))),
    by='SurveyID'
  ) %>%
  left_join(.,
    RLS_env_spatio_temporal %>%
      select(SurveyID,chl=median_chl_5year,sst=mean_sst_5year,minsst=min_sst_5year),
    by='SurveyID'
  ) %>%
  mutate(
    algal_turf = rowSums(.[,c('coral rubble','turf algae')])/100,
```

```
    macroalgae = rowSums(.[,c('canopy forming macroalgae','fleshy algae','understory macroalgae')])/100
  ) %>%
  select(SurveyID,depth,chl,sst,minsst,algal_turf,macroalgae)
```

Turf prediction coming

```
pred_val <- posterior_epred(turf_prodmod,
      newdata=rls %>% mutate(se_prod=0.1), ndraws=1000)

tot_turf_prod <- ((rls$algal_turf * t(pred_val)) * 10000)/1000
## in kg C ha day-1


# aggregating

rls_pred <- cbind(rls,
      turf_prod_kghaday_med=apply(tot_turf_prod,1,median),
      turf_prod_kghaday_lhd=apply(tot_turf_prod,1,function(x) median_hdci(x)$ymin),
      turf_prod_kghaday_uhd=apply(tot_turf_prod,1,function(x) median_hdci(x)$ymax))
```

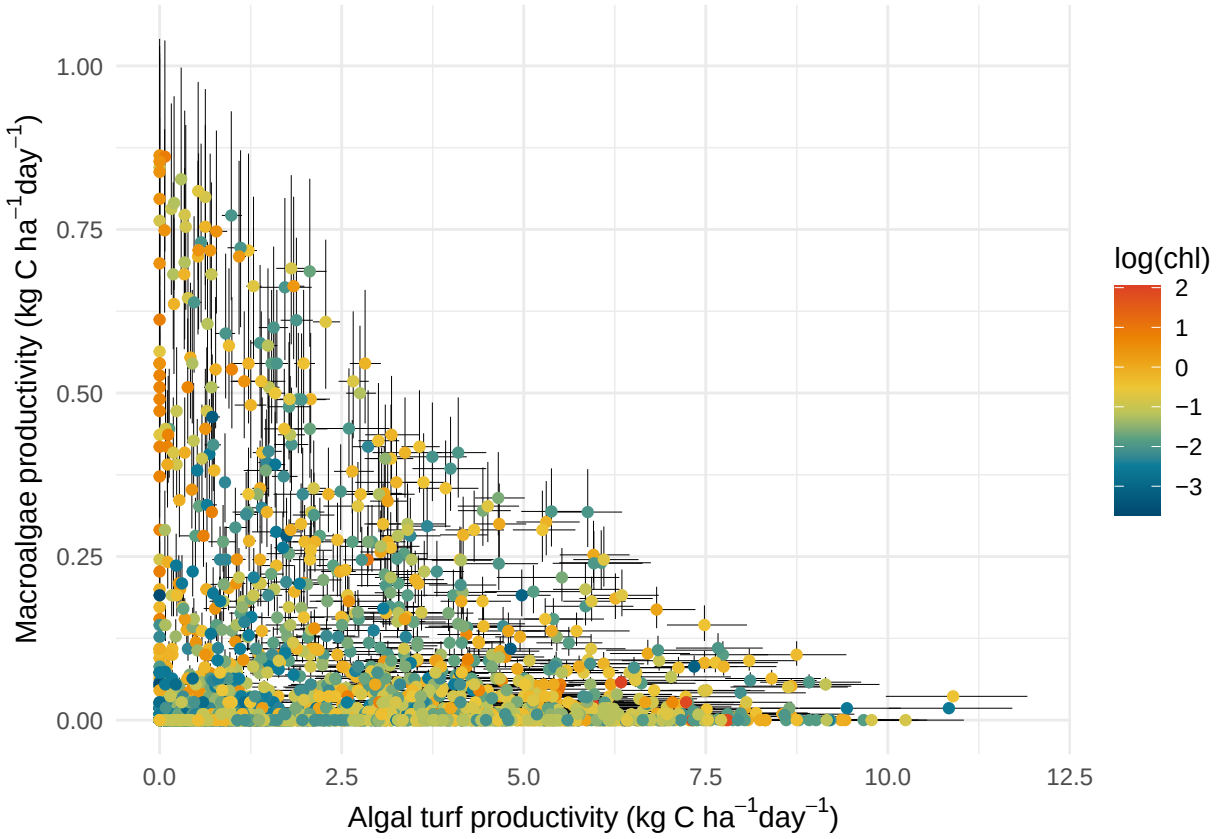
But also macroalgae

```
pred_val2 <- posterior_epred(macr_prodmod,
      newdata=rls %>% mutate(se_prod=0.1), ndraws=1000)

tot_macr_prod <- ((rls$macroalgae * t(pred_val2)) * 10000)/1000
## in kg C ha day-1


# aggregating

rls_pred <- cbind(rls_pred,
      macr_prod_kghaday_med=apply(tot_macr_prod,1,median),
      macr_prod_kghaday_lhd=apply(tot_macr_prod,1,function(x) median_hdci(x)$ymin),
      macr_prod_kghaday_uhd=apply(tot_macr_prod,1,function(x) median_hdci(x)$ymax))
```

How to they relate to each other?

```
ggplot(rls_pred) +
  geom_linerange(
    aes(xmin=turf_prod_kghaday_lhd,
        xmax=turf_prod_kghaday_uhd,
        y=macr_prod_kghaday_med),
    size=0.1) +
  geom_linerange(
    aes(ymin=macr_prod_kghaday_lhd,
        ymax=macr_prod_kghaday_uhd,
```

```
      x=turf_prod_kghaday_med),
  size=0.1) +
geom_point(
  aes(x=turf_prod_kghaday_med,
      y=macr_prod_kghaday_med,
      colour=log(chl))) +
scale_colour_gradientn(colours=pnw_palette("Bay",10)) +
labs(x=expression(Algal~turf~productivity~'('*kg~C~ha^-1*day^-1*')'),
     y=expression(Macroalgae~productivity~'('*kg~C~ha^-1*day^-1*')')) +
theme_minimal()
```




```
saveRDS(rls_pred,'preds/RLS_TurfMacroalgaeProd_preds.RDS')
```