

Shelters

```
shelterdat <- read_csv2("shelter.csv") %>%
  mutate(date = as.Date(date,
    format = "%d.%m.%Y")) %>%
  mutate(date2 = as.POSIXct(date,
    tz = "GMT")) %>%
  mutate(sheltertype = case_when(cage ==
    12 ~ "Seaweed",
    cage == 7 ~ "Seaweed",
    cage == 4 ~ "Seaweed",
    cage == 1 ~ "Plastic",
    cage == 3 ~ "Plastic",
    cage == 8 ~ "Plastic")) %>%
  mutate(condition = as.ordered(condition *
    -1 + 4)) %>%
  mutate(pests = as.ordered(pests)) %>%
  mutate(biofouling = as.ordered(biofouling *
    -1 + 4))

shelterbio <- shelterdat %>%
  group_by(date, sheltertype, biofouling) %>%
  summarise(n = n(), .groups = "drop") %>% # Summarize counts
  complete(date, sheltertype, biofouling, fill = list(n = 0)) %>% # Fill missing levels
  group_by(date, sheltertype) %>%
  mutate(percentage = n / sum(n)) %>% # Recalculate percentages
  ungroup() %>%
  mutate(date2 = as.POSIXct(date, tz= "GMT")) %>%
  mutate(biofouling = fct_rev(biofouling))

ggplot(shelterbio, aes(x = date, y = percentage, fill = factor(biofouling))) +
  geom_area(alpha=0.6 , size=1,color = "black") +
  facet_wrap(~ sheltertype) +
  scale_fill_manual(
    name = "Biofouling",
    values = c("#014636", "#01665E", "#2A9D8F", "#56B881", "#98D4C3"),
    labels = c("3", "2.5", "2", "1.5", "1")
  ) +
  labs(
    x = "Date",
    y = "Proportion",
    title = "Biofouling on plastic and seaweed shelters over time"
  ) +
  theme_classic() +
  theme(
    #strip.text = element_text(face = "bold"),
    legend.position = "right"
  )

#ggsave("biofouling_green.png")
```

The biofouling model fails to converge when date is included, producing all NAs. Therefore, date was excluded from the analysis, and the difference between shelters was analysed alone.

```
foulingmod <- clm(biofouling ~
  sheltertype, data = shelterdat)
```

```
summary(foulingmod)
```