Selection of locations for insect monitoring in oaks

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11 May, 2023

Contents

Set up a cache variable for saving intermediate work. Set it to false to use stored intermediates. Set to TRUE to rerun from scratch.

```
cache_var <- TRUE
```

```
con <- NinaR::postgreSQLConnect()
```

Plan

From Rannveig's notes.

Vi skal trekke 150 eiker (100 til overvåkingen, men må ha ekstra for å justere i forhold til logistikk, grunneiertillatelse og i felt feks om noen trær er borte) fra de 600 ARKO-eikene (657 minus «gone» og «not found» i 2019), etter følgende kriterier:

Doblet sannsynlighet for å trekke trær med omkrets over 200 cm.

Andel eiker i vårt utvalg speiler fordelingen blant alle ARKO-eiker; hvis det feks er 20% i Vestland, 30% i Agder, 30% i V/T, 20% i Viken, så skal overvåkingseikene fordeles etter samme andeler.

Maks 2 overvåkingstrær per ARKO-rute.

Da hule eiker i utgangspunktet er relativt jevnt fordelt mellom skog og åpent landskap, regner vi med at dette vil reflekteres i utvalget av overvåkingstrær uten å legge inn noe styrende kriterium for dette. Vi sjekker om vi har tilfredsstillende fordeling av eiker i skog og utenfor skog totalt og i hver region etter å ha trukket et sett overvåkingstrær.

Etter å ha gjort et utvalg sjekker vi fordeling i forhold til ulike parametre (feks hulrom, vedmuld, barktype, treform), særlig hvor mange A-eiker som er representert.

In addition to this, we only will consider squares with a single tree if that square isn't too far away from other squares (other chosen squares?)

Jens interpretation

It's not that straightforward to meet all these criteria, with an 'automatic' algorithm. Need to set up a random draw with a set total size, that is weighted on tree diameter, allows up to 2 trees per square, only takes squares if they are closer to other squares than a set distance.

Apropos "double probability to draw a tree > 200 cm in circumference". This can be interpreted in several ways. There are slightly more trees above the treshold, so a random sample will produce a higher probability of large trees anyway. We could interpret it as drawing double the amount of large trees (>200cm) than smalller.

After some thinking, I will try this algorithm, based on a random draw of trees, with later filtering:

1. Order the trees randomly. I.e., draw a random order of all trees, with probablities based on tree diameter.
2. Note the distance for each square to the closest square.
3. Note the (randomly drawn) order of trees within each square.
4. Note the randomly drawn order of squares.
5. Record the total number of trees within each square.
6. Discard trees with order > 2.
7. Discard squares with total number of trees <2 & distance_to_nearest_neighbor < distance_limit (Note that actually should depend on that the other squares are selected the same year. This get's complex.)

Load the source excel-file

```
loc_raw <- openxlsx::read.xlsx("../rawData/Oak_2017data_2019resurveydata.xlsx") %>%
  as_tibble()

loc_raw
```

```
## # A tibble: 657 x 47
##    row_number RuteID RuteJA TreID Antall Verdi Omkrets Synlig_~1 Hulhe~2 Hulhe~3
##         <dbl>  <dbl> <chr>  <chr>  <dbl> <chr> <chr>   <chr>     <chr>   <chr>
##  1          1      7 Nei    7_01       1 A     332     JA        1615    2
##  2          2     23 Nei    23_1       1 C     225     NEI       <NA>    <NA>
##  3          3     23 Nei    23_2       1 C     205     NEI       <NA>    <NA>
##  4          4     24 Nei    24_10      1 B     300     JA        <NA>    2
##  5          5     24 Nei    24_2       1 B     237     JA        100     2
##  6          6     24 Nei    24_3       1 C     230     NEI       <NA>    <NA>
##  7          7     24 Nei    24_4       1 C     222     NEI       <NA>    <NA>
##  8          8     24 Nei    24_5       1 C     216     NEI       <NA>    <NA>
##  9          9     24 Nei    24_6       1 B     245     JA        2750    2
## 10         10     24 Nei    24_7       1 B     320     NEI       <NA>    <NA>
## # ... with 647 more rows, 37 more variables: Vedmuld <chr>, Treform <chr>,
## #   Barktype <chr>, Mosedekning <chr>, Vitalitet <dbl>, Kulturspor <chr>,
## #   Omgivelser <chr>, Renskog <chr>, Mestskog <chr>, Noeskog <chr>,
## #   PlasseringAR5 <chr>, Forskrift_gammel <dbl>, Forskrift <dbl>, Vern <chr>,
## #   Gjenvoksing <dbl>, Gjenvoksing2 <dbl>, Skjøtselsbehov <chr>,
## #   UTM32_X_koordinat <dbl>, UTM32_Y_koordinat <dbl>, Kommune <dbl>,
## #   Områdenavn <chr>, Nøyaktighetsklasse <dbl>, Utvalgt.Natur.type <chr>, ...
```

Filter out trees that is gone or not found in 2019.

```
loc <- loc_raw %>%
  filter(
    Gone != 1,
    Not_found != 1
  )

nrow(loc)
```

```
## [1] 600
```

```
loc %>%
  group_by(Omkrets > 200) %>%
  summarise(no = n())
```

```
## # A tibble: 3 x 2
##   `Omkrets > 200`    no
##   <lgl>           <int>
## 1 FALSE             269
## 2 TRUE              329
```

```
## 3 NA                  2
```

A quick look at the distribution of trees

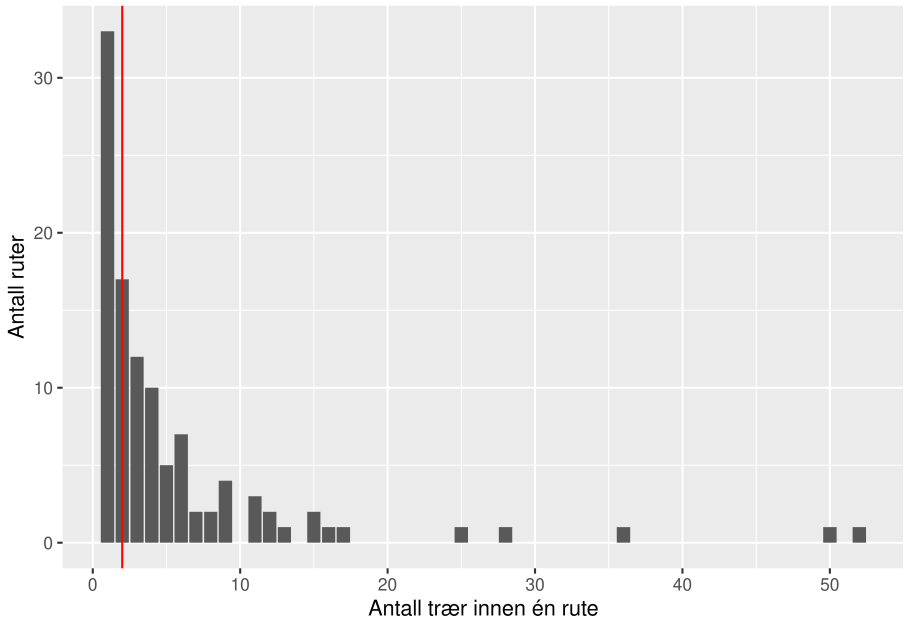
```
no_rute <- loc %>%
  summarise(no_rute = n_distinct(RuteID)) %>%
  pull()

squares <- loc %>%
  select(RuteID) %>%
  distinct() %>%
  pull()
```

```
loc_with_at_least_two <- loc %>%
  group_by(RuteID) %>%
  summarise(no_trees = n()) %>%
  filter(no_trees > 1) %>%
  summarise(n_distinct(RuteID)) %>%
  pull()
```

We have 107 distinct survey squares (SSB) to choose from. But only 74 survey squares with at least 2 trees (if we want to restrict it to that).

```
loc %>%
  group_by(RuteID) %>%
  summarise(no_trees = n()) %>%
  ggplot() +
  geom_bar(aes(x = no_trees)) +
  geom_vline(aes(xintercept = 2),
    col = "red"
  ) +
  xlab("Antall trær innen én rute") +
  ylab("Antall ruter")
```



Add info on distance to other squares

Add a column with distances to the other squares (if we want to use squares with only 1 tree, if they are close enough to other squares)

Make an SF object (create a geometry).

```
loc_sf <- loc %>%
  st_as_sf(
    coords = c(
      "UTM32_X_koordinat",
      "UTM32_Y_koordinat"
    ),
    crs = 25832
  )
```

Get the ssb square geometries (from the gisdata database).

```
ssb_500m <- read_sf(
  con,
  Id(
    schema = "ssb_data_utm33n",
    table = "ssb_500m"
  )
) %>%
  st_transform(crs = 25832)
```

```
cand_ssb_500m <- ssb_500m %>%
  st_join(loc_sf,
    left = FALSE
  ) %>%
  mutate(ssbid = as.character(ssbid)) %>%
  select(ssbid) %>%
  distinct()

system("mkdir -p out")

save(cand_ssb_500m,
  file = "out/cand_ssb_500m.Rdata"
)
```

```
load(file = "out/cand_ssb_500m.Rdata")
```

Get the distance to the nearest neighbor ssb square.

```
cand_ssb_500m <- cand_ssb_500m %>%
  mutate(nearest_dist = st_distance(., cand_ssb_500m[st_nearest_feature(cand_ssb_500m), ], b

cand_ssb_500m %>%
  select(ssbid, nearest_dist) %>%
  arrange(nearest_dist)
```

```
## Simple feature collection with 105 features and 2 fields
## Geometry type: MULTIPOLYGON
## Dimension:     XY
## Bounding box:  xmin: 304498.2 ymin: 6429778 xmax: 622204.1 ymax: 6842370
## Projected CRS: ETRS89 / UTM zone 32N
## # A tibble: 105 x 3
##    ssbid          nearest_dist                                          geom
##    <chr>                   [m]                                <MULTIPOLYGON [m]>
##  1 20830006464000          0  (((435998.5 6442574, 435954.1 6443071, 436451.1 ~
##  2 20835006463500          0  (((436539.8 6442121, 436495.5 6442618, 436992.4 ~
##  3 20605006483000        499. (((411948.5 6459458, 411904.1 6459955, 412400.9 ~
##  4 20610006482000        499. (((412534.3 6458509, 412489.9 6459006, 412986.7 ~
##  5 21035006539000        499. (((449693.8 6518953, 449649 6519450, 450146.1 65~
##  6 21040006540000        499. (((450101.4 6519991, 450056.7 6520488, 450553.7 ~
##  7 21720006586000        499. (((513594.4 6571828, 513549.5 6572326, 514046.8 ~
##  8 21730006586000        499. (((514589.1 6571918, 514544.1 6572416, 515041.4 ~
##  9 21965006564500       1117. (((539896 6552641, 539851.2 6553139, 540348.6 65~
## 10 21980006563500       1117. (((541478 6551781, 541433.2 6552278, 541930.6 65~
## # ... with 95 more rows
```

Get some background geometries.

```
regions <- read_sf(
  con,
  Id(
    schema = "insect_survey",
    table = "new_landsdel"
  )
)

south <- regions %>%
  filter(!(fylke %in% c("Trøndelag", "Nordland", "Troms og Finnmark")))
```

Join the locations with the ssbids and distances.

```
loc_sf <- loc_sf %>%
  st_join(cand_ssb_500m,
    left = TRUE
  )
```

```
loc_sf %>%
  select(ssbid, nearest_dist)
```

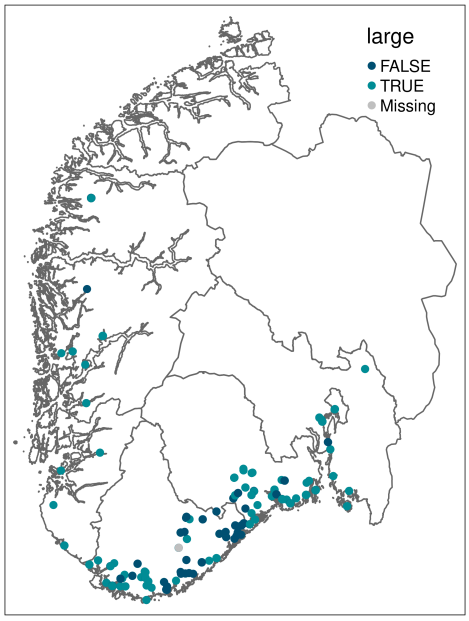
Add large/small tree category.

```
# loc_sf %>%
#   st_drop_geometry() %>%
#   select(Synlig_hul) %>%
#   distinct()

loc_sf <- loc_sf %>%
  mutate(
    large = Omkrets > 200,
    visible_hole = Synlig_hul == "JA"
  )
```

```
# tmap_mode("view")
tm_shape(south) +
  tm_borders() +
  tm_shape(cand_ssb_500m) +
  tm_borders() +
  tm_shape(loc_sf) +
  tm_dots(
    col = "large",
    size = 0.1,
    palette = ninaPalette()
  )
```

```
## Warning: palette colors names missing for FALSE, TRUE. Therefore, palette color
## names will be ignored
```



Draw random selection of trees

```
largest_dist_to_neighbor_m <- 30000 # as the bird flies (might be longer on roads)
```

Draw random order.

```
set.seed(12345)

tree_sel_random_order <- loc_sf %>%
  filter(!is.na(large)) %>% # Must know the diameter
  mutate(sel_prob = ifelse(large & visible_hole, 2 / 3, 1 / 3)) %>% # double the probabilit
  slice(sample(1:n(), n(), prob = sel_prob)) %>%
  ungroup() %>%
  mutate(rand_selection_order = row_number())
```

Note tree order within squares, total amount of trees within square, and (random) rute order. Order it after square random order and tree random order within squares.

```
# This was surprisingly tricky. Needed to make a character factor to be able to preserve th

tree_sel_random_order <- tree_sel_random_order %>%
  group_by(RuteID) %>%
  mutate(
    tree_order_within_square = row_number(),
    no_trees_within_square = n()
```

```
  ) %>%
  ungroup() %>%
  mutate(rute_id_rand_order = forcats::fct_inorder(paste0("rute_", RuteID))) %>%
  group_by(rute_id_rand_order) %>%
  mutate(rute_id_order = cur_group_id()) %>%
  arrange(
    rute_id_order,
    tree_order_within_square
  ) %>%
  ungroup() %>%
  mutate(selection_order = row_number())
```

```
tree_sel_random_order %>%
  st_drop_geometry() %>%
  select(
    RuteID,
    rute_id_rand_order,
    rute_id_order,
    tree_order_within_square,
    no_trees_within_square
  )
# %>%
# print(n = 80)
```

Add a note if single trees are farther away than distance limit.

```
tree_sel_random_order <- tree_sel_random_order %>%
  mutate(
    single_and_lonely = no_trees_within_square < 2 &
      nearest_dist < units::set_units(largest_dist_to_neighbor_m, "m"),
    fylke_navn = "",
    kommune_navn = "",
    kommune_no_2022 = ""
  ) %>%
  select(
    selection_order,
    rand_selection_order,
    rute_id_order,
    tree_order_within_square,
    single_and_lonely,
    no_trees_within_square,
    RuteID,
    everything()
  )
```

This gives us 30 single trees farther away than 3×10^4 meters to other surveyed squares.

```
tree_sel_random_order %>%
  filter(single_and_lonely) %>%
  select(
    RuteID,
    rute_id_rand_order,
    rute_id_order,
    tree_order_within_square,
    no_trees_within_square
  )
```

```
## Simple feature collection with 30 features and 5 fields
## Geometry type: POINT
## Dimension:     XY
## Bounding box:  xmin: 304977 ymin: 6442025 xmax: 574419 ymax: 6678309
## Projected CRS: ETRS89 / UTM zone 32N
## # A tibble: 30 x 6
##    RuteID rute_id_rand_order rute_id~1 tree_~2 no_tr~3         geometry
##     <dbl> <fct>                  <int>   <int>   <int>      <POINT [m]>
##  1    338 rute_338                   4       1       1 (449872 6460653)
##  2     32 rute_32                    6       1       1 (387947 6442025)
##  3    359 rute_359                   9       1       1 (504971 6508837)
##  4    269 rute_269                  23       1       1 (523040 6539178)
##  5     40 rute_40                   42       1       1 (436656 6442542)
##  6    177 rute_177                  46       1       1 (562559 6549777)
##  7    159 rute_159                  66       1       1 (502203 6501995)
##  8    239 rute_239                  71       1       1 (449725 6504552)
##  9     56 rute_56                   73       1       1 (477967 6476865)
## 10    372 rute_372                  75       1       1 (571996 6566924)
## # ... with 20 more rows, and abbreviated variable names 1: rute_id_order,
## #   2: tree_order_within_square, 3: no_trees_within_square
```

Save this complete list for QGIS. Also do some PostGIS stuff.

```
# Need my permissions
my_con <- dbConnect(Postgres(),
  host = "gisdata-db.nina.no",
  dbname = "gisdata"
)
dbSendStatement(
  my_con,
  "
                DROP TABLE hule_eiker_insekt.oak_sel_random_order cascade;
```

```
                "
)
```

```
## NOTICE:  drop cascades to view hule_eiker_insekt.squares_for_map
```

```
## <PqResult>
##   SQL
##                 DROP TABLE hule_eiker_insekt.oak_sel_random_order cascade;
##
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbWriteTable(my_con,
  name = Id(
    schema = "hule_eiker_insekt",
    table = "oak_sel_random_order"
  ),
  value = tree_sel_random_order,
  overwrite = TRUE
)
```

```
## Note: method with signature 'DBIObject#sf' chosen for function 'dbDataType',
##  target signature 'PqConnection#sf'.
##  "PqConnection#ANY" would also be valid
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
dbSendStatement(
  my_con,
  "
                ALTER TABLE hule_eiker_insekt.oak_sel_random_order
                ADD PRIMARY KEY(row_number);
                "
)
```

```
## <PqResult>
##   SQL
##                 ALTER TABLE hule_eiker_insekt.oak_sel_random_order
##                 ADD PRIMARY KEY(row_number);
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
  ALTER TABLE hule_eiker_insekt.oak_sel_random_order
```

```
  ADD COLUMN geom Geometry(Point, 25832);
  "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   ALTER TABLE hule_eiker_insekt.oak_sel_random_order
##   ADD COLUMN geom Geometry(Point, 25832);
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
  ALTER TABLE hule_eiker_insekt.oak_sel_random_order
  ADD COLUMN geom_25833 Geometry(Point, 25833);

  "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   ALTER TABLE hule_eiker_insekt.oak_sel_random_order
##   ADD COLUMN geom_25833 Geometry(Point, 25833);
##
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
                UPDATE hule_eiker_insekt.oak_sel_random_order
                set geom = geometry::Geometry(Point, 25832),
                geom_25833 = ST_Transform(geometry, 25833)::Geometry(Point, 25833)
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
```

```
##   SQL
##                 UPDATE hule_eiker_insekt.oak_sel_random_order
##                 set geom = geometry::Geometry(Point, 25832),
##                 geom_25833 = ST_Transform(geometry, 25833)::Geometry(Point, 25833)
##
##   ROWS Fetched: 0 [complete]
##        Changed: 598
```

```
dbSendStatement(
  my_con,
  "
  ALTER TABLE hule_eiker_insekt.oak_sel_random_order
  DROP COLUMN geometry;
  "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   ALTER TABLE hule_eiker_insekt.oak_sel_random_order
##   DROP COLUMN geometry;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
                CREATE INDEX ON hule_eiker_insekt.oak_sel_random_order USING Gist(geom);
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##                 CREATE INDEX ON hule_eiker_insekt.oak_sel_random_order USING Gist(geom);
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
                CREATE INDEX ON hule_eiker_insekt.oak_sel_random_order USING Gist(geom_25833
```

```
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##                 CREATE INDEX ON hule_eiker_insekt.oak_sel_random_order USING Gist(geom_25
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
UPDATE hule_eiker_insekt.oak_sel_random_order oak
set fylke_navn = f.navn
FROM \"AdministrativeUnits\".norway_counties_fylker_polygons_2020 f
WHERE ST_Intersects(oak.geom_25833, f.geom)
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
## UPDATE hule_eiker_insekt.oak_sel_random_order oak
## set fylke_navn = f.navn
## FROM "AdministrativeUnits".norway_counties_fylker_polygons_2020 f
## WHERE ST_Intersects(oak.geom_25833, f.geom)
##
##   ROWS Fetched: 0 [complete]
##        Changed: 598
```

```
dbSendStatement(
  my_con,
  "
UPDATE hule_eiker_insekt.oak_sel_random_order oak
set kommune_navn = f.navn
FROM \"AdministrativeUnits\".norway_municipalities_kommuner_polygon_2020 f
WHERE ST_Intersects(oak.geom_25833, f.geom)
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
## UPDATE hule_eiker_insekt.oak_sel_random_order oak
## set kommune_navn = f.navn
## FROM "AdministrativeUnits".norway_municipalities_kommuner_polygon_2020 f
## WHERE ST_Intersects(oak.geom_25833, f.geom)
##
##   ROWS Fetched: 0 [complete]
##        Changed: 598
```

```
dbSendStatement(
  my_con,
  "
UPDATE hule_eiker_insekt.oak_sel_random_order oak
set kommune_no_2022 = f.kommunenum
FROM \"AdministrativeUnits\".norway_municipalities_kommuner_polygon_2020 f
WHERE ST_Intersects(oak.geom_25833, f.geom)
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
## UPDATE hule_eiker_insekt.oak_sel_random_order oak
## set kommune_no_2022 = f.kommunenum
## FROM "AdministrativeUnits".norway_municipalities_kommuner_polygon_2020 f
## WHERE ST_Intersects(oak.geom_25833, f.geom)
##
##   ROWS Fetched: 0 [complete]
##        Changed: 598
```

```
dbSendStatement(
  my_con,
  "
  ALTER TABLE hule_eiker_insekt.oak_sel_random_order ADD COLUMN east_west text;
  "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   ALTER TABLE hule_eiker_insekt.oak_sel_random_order ADD COLUMN east_west text;
##
##   ROWS Fetched: 0 [complete]
```

```
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
UPDATE hule_eiker_insekt.oak_sel_random_order oak
set east_west = CASE
WHEN fylke_navn IN ('Oslo', 'Vestfold og Telemark','Viken')
THEN 'east'
ELSE 'west'
END;

"
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
## UPDATE hule_eiker_insekt.oak_sel_random_order oak
## set east_west = CASE
## WHEN fylke_navn IN ('Oslo', 'Vestfold og Telemark','Viken')
## THEN 'east'
## ELSE 'west'
## END;
##
##
##   ROWS Fetched: 0 [complete]
##        Changed: 598
```

```
dbSendStatement(
  my_con,
  "
  ALTER TABLE hule_eiker_insekt.oak_sel_random_order ADD COLUMN lon_lat_25833 text;
  "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   ALTER TABLE hule_eiker_insekt.oak_sel_random_order ADD COLUMN lon_lat_25833 text;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
                UPDATE hule_eiker_insekt.oak_sel_random_order
                SET lon_lat_25833 = round(ST_X(geom_25833)::numeric, 6) ||
                  ',' || round(ST_Y(geom_25833)::numeric, 6)
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##                 UPDATE hule_eiker_insekt.oak_sel_random_order
##                 SET lon_lat_25833 = round(ST_X(geom_25833)::numeric, 6) ||
##                   ',' || round(ST_Y(geom_25833)::numeric, 6)
##
##   ROWS Fetched: 0 [complete]
##        Changed: 598
```

```
dbSendStatement(
  my_con,
  "
  ALTER TABLE hule_eiker_insekt.oak_sel_random_order
  ADD COLUMN matrikkel_no text;
  "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   ALTER TABLE hule_eiker_insekt.oak_sel_random_order
##   ADD COLUMN matrikkel_no text;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
  ALTER TABLE hule_eiker_insekt.oak_sel_random_order
  ADD COLUMN grunneier text;
  "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   ALTER TABLE hule_eiker_insekt.oak_sel_random_order
##   ADD COLUMN grunneier text;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
  ALTER TABLE hule_eiker_insekt.oak_sel_random_order
  ADD COLUMN grunneier_telefon text;
  "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   ALTER TABLE hule_eiker_insekt.oak_sel_random_order
##   ADD COLUMN grunneier_telefon text;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
  ALTER TABLE hule_eiker_insekt.oak_sel_random_order
  ADD COLUMN grunneier_epost text;
  "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   ALTER TABLE hule_eiker_insekt.oak_sel_random_order
##   ADD COLUMN grunneier_epost text;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
  ALTER TABLE hule_eiker_insekt.oak_sel_random_order
  ADD COLUMN grunneier_adresse text;
  "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   ALTER TABLE hule_eiker_insekt.oak_sel_random_order
##   ADD COLUMN grunneier_adresse text;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
  ALTER TABLE hule_eiker_insekt.oak_sel_random_order
  ADD COLUMN kommentar text;
  "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   ALTER TABLE hule_eiker_insekt.oak_sel_random_order
##   ADD COLUMN kommentar text;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
  GRANT ALL ON TABLE hule_eiker_insekt.oak_sel_random_order TO \"oyvind.hamre\"
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
```

```
##   SQL
##   GRANT ALL ON TABLE hule_eiker_insekt.oak_sel_random_order TO "oyvind.hamre"
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
  GRANT ALL ON TABLE hule_eiker_insekt.oak_sel_random_order TO \"rannveig.jacobsen\"
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   GRANT ALL ON TABLE hule_eiker_insekt.oak_sel_random_order TO "rannveig.jacobsen"
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
  GRANT ALL ON TABLE hule_eiker_insekt.oak_sel_random_order TO gisuser;
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##   GRANT ALL ON TABLE hule_eiker_insekt.oak_sel_random_order TO gisuser;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
   UPDATE hule_eiker_insekt.oak_sel_random_order o
   SET matrikkel_no =  teig.kommunenummer || ';' ||
    REPLACE(teig.matrikkelnummertekst, '/', ';')

   FROM matrikkeleneiendomskartteig.teig teig
   WHERE ST_Intersects(o.geom_25833, teig.omrade)
```

```
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##    UPDATE hule_eiker_insekt.oak_sel_random_order o
##    SET matrikkel_no =  teig.kommunenummer || ';' ||
##     REPLACE(teig.matrikkelnummertekst, '/', ';')
##
##    FROM matrikkeleneiendomskartteig.teig teig
##    WHERE ST_Intersects(o.geom_25833, teig.omrade)
##
##
##   ROWS Fetched: 0 [complete]
##        Changed: 598
```

```
dbSendStatement(
  my_con,
  "
                DROP TABLE IF EXISTS hule_eiker_insekt.oak_sel_random_order_backup;
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##                   DROP TABLE IF EXISTS hule_eiker_insekt.oak_sel_random_order_backup;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
               CREATE TABLE hule_eiker_insekt.oak_sel_random_order_backup
               AS TABLE hule_eiker_insekt.oak_sel_random_order WITH DATA;
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
```

```
##   SQL
##                 CREATE TABLE hule_eiker_insekt.oak_sel_random_order_backup
##                 AS TABLE hule_eiker_insekt.oak_sel_random_order WITH DATA;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 598
```

Test results of filtering out a set of trees

Here we consider only the first 2 trees within each square, plus the single trees that are not isolated. Then we take the first 100 rows (trees).

This can be filtered in QGIS with "tree_order_within_square<=2 OR (no_trees_within_square<2 AND single_and_lonely IS FALSE)"

```
tree_sel_test <- tree_sel_random_order %>%
  filter(tree_order_within_square <= 2 |
    (no_trees_within_square < 2 & !single_and_lonely)) %>%
  slice(1:100)
```

Trestørrelse

```
n_tree_size <- tree_sel_test %>%
  st_drop_geometry() %>%
  group_by(large) %>%
  summarise(no_trees = n())

n_tree_size
```

```
## # A tibble: 2 x 2
##   large no_trees
##   <lgl>    <int>
## 1 FALSE       40
## 2 TRUE        60
```

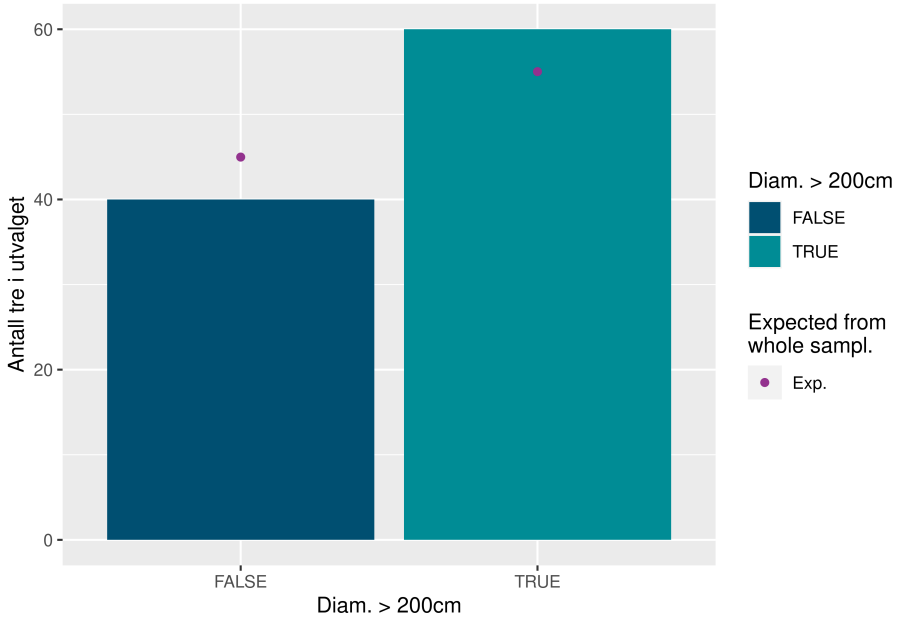
```
n_tree_size_exp <- tree_sel_random_order %>%
  st_drop_geometry() %>%
  group_by(large) %>%
  summarise(no_trees = n()) %>%
  ungroup() %>%
  mutate(no_trees_perc = round((no_trees / sum(no_trees) * 100), 2))


n_tree_size_exp
```

```
## # A tibble: 2 x 3
##   large no_trees no_trees_perc
```

```
##   <lgl>    <int>         <dbl>
## 1 FALSE      269          45.0
## 2 TRUE       329          55.0
```

```
ggplot(n_tree_size, aes(y = no_trees, x = large)) +
  geom_bar(aes(fill = large),
    stat = "identity"
  ) +
  geom_point(
    aes(
      y = no_trees_perc,
      x = large,
      col = "Exp."
    ),
    data = n_tree_size_exp
  ) +
  scale_fill_nina(name = "Diam. > 200cm") +
  scale_color_nina(
    name = "Expected from\nwhole sampl.",
    palette = "purple-green"
  ) +
  ylab("Antall tre i utvalget") +
  xlab("Diam. > 200cm")
```



Of these first 100 prioritized trees, we have 35 small trees, and 65 small. Pretty close to double the amount of larger trees. The red dots show the expected number of large and small, if we had choosen them randomly. Good enough?

Isolerte trær

```
n_isolated <- tree_sel_test %>%
  st_drop_geometry() %>%
  group_by(no_trees_within_square > 1) %>%
  summarise(no_trees = n())

n_isolated
```

```
## # A tibble: 2 x 2
##   `no_trees_within_square > 1` no_trees
##   <lgl>                           <int>
## 1 FALSE                               8
## 2 TRUE                               92
```

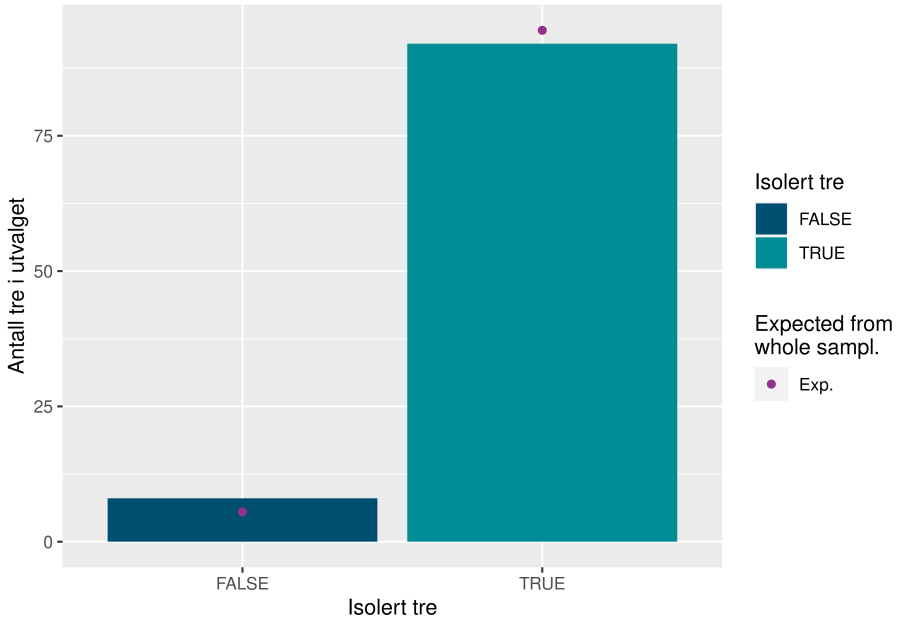
```
n_isolated_exp <- tree_sel_random_order %>%
  st_drop_geometry() %>%
  group_by(no_trees_within_square > 1) %>%
  summarise(no_trees = n()) %>%
  ungroup() %>%
  mutate(no_trees_perc = round((no_trees / sum(no_trees) * 100), 2))


n_isolated_exp
```

```
## # A tibble: 2 x 3
##   `no_trees_within_square > 1` no_trees no_trees_perc
##   <lgl>                           <int>         <dbl>
## 1 FALSE                              33          5.52
## 2 TRUE                              565         94.5
```

```
ggplot(n_isolated, aes(y = no_trees, x = `no_trees_within_square > 1`)) +
  geom_bar(aes(fill = `no_trees_within_square > 1`),
    stat = "identity"
  ) +
  geom_point(
    aes(
      y = no_trees_perc,
      x = `no_trees_within_square > 1`,
      col = "Exp."
    ),
    data = n_isolated_exp
  ) +
```

```
  scale_fill_nina(name = "Isolert tre") +
  scale_color_nina(
    name = "Expected from\nwhole sampl.",
    palette = "purple-green"
  ) +
  ylab("Antall tre i utvalget") +
  xlab("Isolert tre")
```



Verdi-kategorier, fordeling

```
n_verdi <- tree_sel_test %>%
  st_drop_geometry() %>%
  group_by(Verdi) %>%
  summarise(no_trees = n())

n_verdi
```

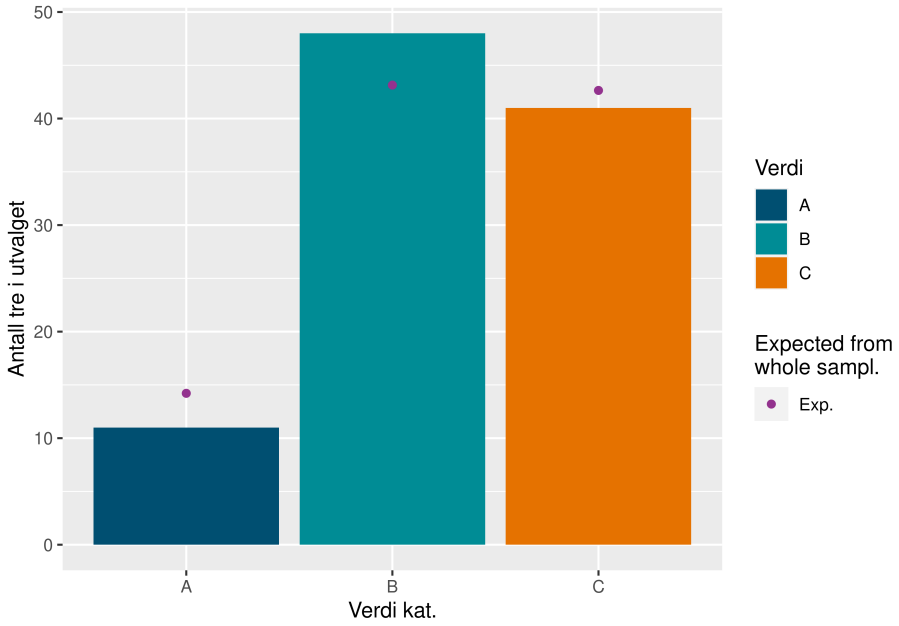
```
## # A tibble: 3 x 2
##   Verdi no_trees
##   <chr>    <int>
## 1 A           11
## 2 B           48
## 3 C           41
```

```r
n_verdi_exp <- tree_sel_random_order %>%
  st_drop_geometry() %>%
  group_by(Verdi) %>%
  summarise(no_trees = n()) %>%
  ungroup() %>%
  mutate(no_trees_perc = round((no_trees / sum(no_trees) * 100), 2))


n_verdi_exp
```

```
## # A tibble: 3 x 3
##   Verdi no_trees no_trees_perc
##   <chr>    <int>         <dbl>
## 1 A           85          14.2
## 2 B          258          43.1
## 3 C          255          42.6
```

```r
ggplot(n_verdi, aes(y = no_trees, x = Verdi)) +
  geom_bar(aes(fill = Verdi),
    stat = "identity"
  ) +
  geom_point(
    aes(
      y = no_trees_perc,
      x = Verdi,
      col = "Exp."
    ),
    data = n_verdi_exp
  ) +
  scale_fill_nina(name = "Verdi") +
  scale_color_nina(
    name = "Expected from\nwhole sampl.",
    palette = "purple-green"
  ) +
  ylab("Antall tre i utvalget") +
  xlab("Verdi kat.")
```



Plassering

```
n_plass <- tree_sel_test %>%
  st_drop_geometry() %>%
  group_by(PlasseringAR5) %>%
  summarise(no_trees = n())

n_plass
```

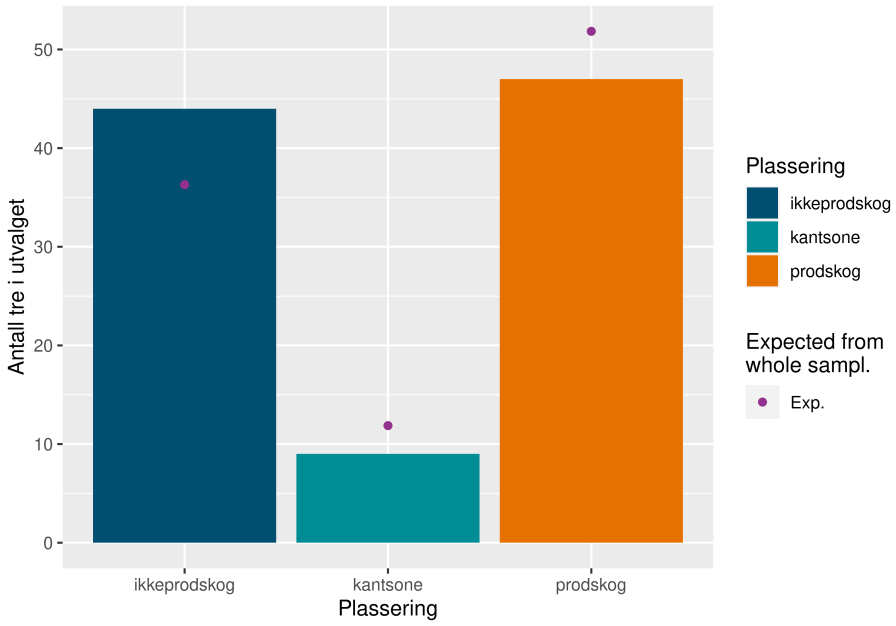
```
## # A tibble: 3 x 2
##   PlasseringAR5 no_trees
##   <chr>            <int>
## 1 ikkeprodskog        44
## 2 kantsone             9
## 3 prodskog            47
```

```
n_plass_exp <- tree_sel_random_order %>%
  st_drop_geometry() %>%
  group_by(PlasseringAR5) %>%
  summarise(no_trees = n()) %>%
  ungroup() %>%
  mutate(no_trees_perc = round((no_trees / sum(no_trees) * 100), 2))


n_plass_exp
```

```
## # A tibble: 3 x 3
##   PlasseringAR5 no_trees no_trees_perc
##   <chr>            <int>         <dbl>
## 1 ikkeprodskog       217          36.3
## 2 kantsone            71          11.9
## 3 prodskog           310          51.8
```

```
ggplot(n_plass, aes(y = no_trees, x = PlasseringAR5)) +
  geom_bar(aes(fill = PlasseringAR5),
    stat = "identity"
  ) +
  geom_point(
    aes(
      y = no_trees_perc,
      x = PlasseringAR5,
      col = "Exp."
    ),
    data = n_plass_exp
  ) +
  scale_fill_nina(name = "Plassering") +
  scale_color_nina(
    name = "Expected from\nwhole sampl.",
    palette = "purple-green"
  ) +
  ylab("Antall tre i utvalget") +
  xlab("Plassering")
```



Visible holes

```
n_hole <- tree_sel_test %>%
  st_drop_geometry() %>%
  group_by(Synlig_hul) %>%
  summarise(no_trees = n())

n_hole
```

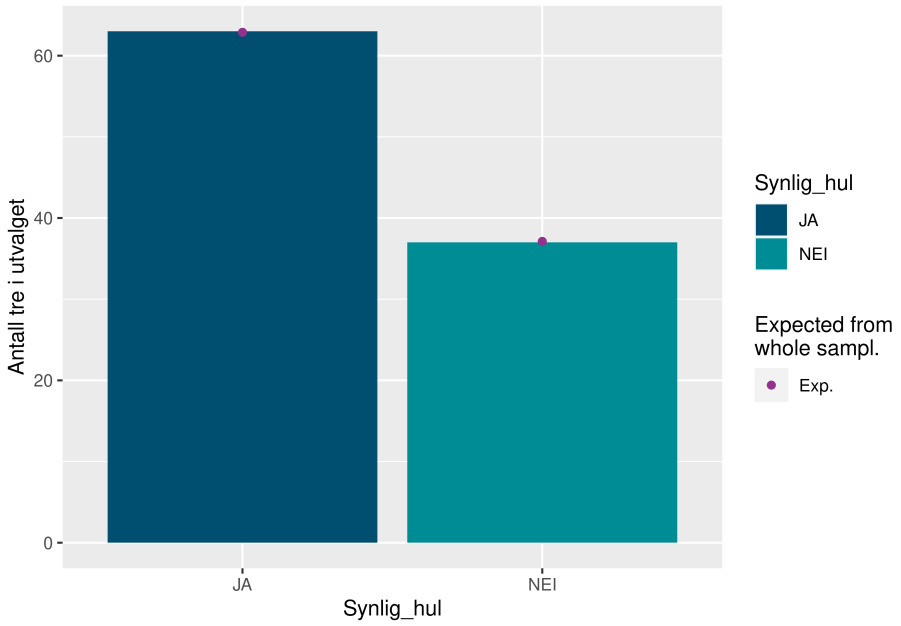
```
## # A tibble: 2 x 2
##   Synlig_hul no_trees
##   <chr>         <int>
## 1 JA               63
## 2 NEI              37
```

```
n_hole_exp <- tree_sel_random_order %>%
  st_drop_geometry() %>%
  group_by(Synlig_hul) %>%
  summarise(no_trees = n()) %>%
  ungroup() %>%
  mutate(no_trees_perc = round((no_trees / sum(no_trees) * 100), 2))


n_hole_exp
```

```
## # A tibble: 2 x 3
##   Synlig_hul no_trees no_trees_perc
##   <chr>         <int>         <dbl>
## 1 JA              376          62.9
## 2 NEI             222          37.1
```

```
ggplot(n_hole, aes(y = no_trees, x = Synlig_hul)) +
  geom_bar(aes(fill = Synlig_hul),
    stat = "identity"
  ) +
  geom_point(
    aes(
      y = no_trees_perc,
      x = Synlig_hul,
      col = "Exp."
    ),
    data = n_hole_exp
  ) +
  scale_fill_nina(name = "Synlig_hul") +
  scale_color_nina(
    name = "Expected from\nwhole sampl.",
    palette = "purple-green"
  ) +
  ylab("Antall tre i utvalget") +
  xlab("Synlig_hul")
```



Fylke

Only got fylke in DB.

```
fylke_test_raw <- tbl(
  con,
  Id(
    schema = "hule_eiker_insekt",
    table = "oak_sel_random_order"
  )
) %>%
  collect()

fylke_test <- fylke_test_raw %>%
  filter(tree_order_within_square <= 2 |
    (no_trees_within_square < 2 & !single_and_lonely))

fylke_test_100 <- fylke_test %>%
  slice(1:100)
```

```
n_fylke <- fylke_test_100 %>%
  st_drop_geometry() %>%
  group_by(fylke_navn) %>%
  summarise(no_trees = n())

n_fylke
```

```
## # A tibble: 6 x 2
##   fylke_navn           no_trees
##   <chr>                   <int>
## 1 Agder                      26
## 2 Oslo                        2
## 3 Rogaland                    5
## 4 Vestfold og Telemark       51
## 5 Vestland                    6
## 6 Viken                      10
```

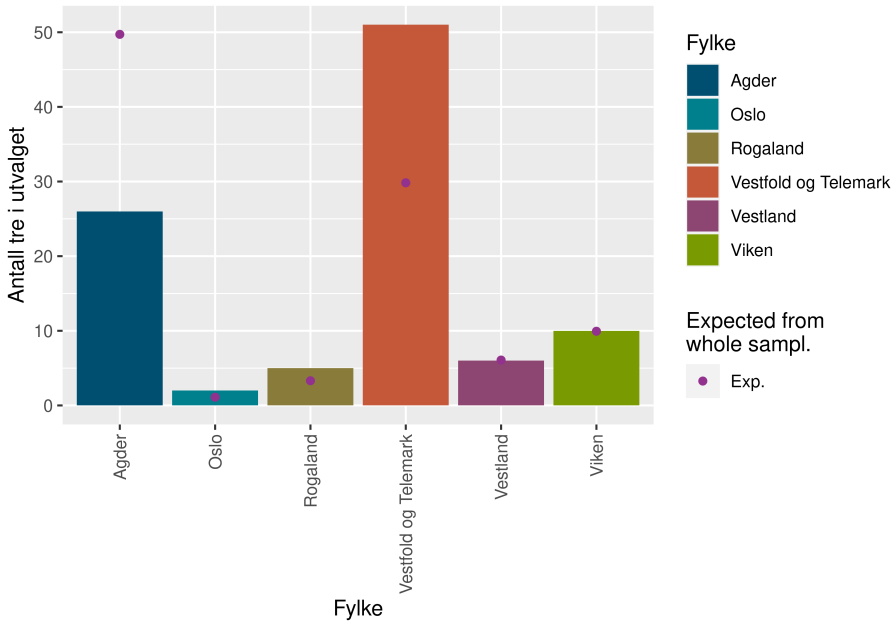
```
n_fylke_exp <- fylke_test %>%
  st_drop_geometry() %>%
  group_by(fylke_navn) %>%
  summarise(no_trees = n()) %>%
  ungroup() %>%
  mutate(no_trees_perc = round((no_trees / sum(no_trees) * 100), 2))


n_fylke_exp
```

```
## # A tibble: 6 x 3
```

```
##   fylke_navn           no_trees no_trees_perc
##   <chr>                   <int>         <dbl>
## 1 Agder                      90         49.7
## 2 Oslo                        2          1.1
## 3 Rogaland                    6          3.31
## 4 Vestfold og Telemark       54         29.8
## 5 Vestland                   11          6.08
## 6 Viken                      18          9.94
```

```
ggplot(n_fylke, aes(y = no_trees, x = fylke_navn)) +
  geom_bar(aes(fill = fylke_navn),
    stat = "identity"
  ) +
  geom_point(
    aes(
      y = no_trees_perc,
      x = fylke_navn,
      col = "Exp."
    ),
    data = n_fylke_exp
  ) +
  scale_fill_nina(name = "Fylke") +
  scale_color_nina(
    name = "Expected from\nwhole sampl.",
    palette = "purple-green"
  ) +
  ylab("Antall tre i utvalget") +
  xlab("Fylke") +
  theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust = 1))
```



Fetch the ssb info for the selection.

```
shortlist_ssb_500m <- cand_ssb_500m %>%
  filter(ssbid %in% tree_sel_test$ssbid)
```

```
dbSendStatement(
  my_con,
  "
      DROP TABLE IF EXISTS hule_eiker_insekt.selection_ssb ;
      "
)
```

```
## <PqResult>
##   SQL
##       DROP TABLE IF EXISTS hule_eiker_insekt.selection_ssb ;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
      CREATE TABLE hule_eiker_insekt.selection_ssb as
```

```
      SELECT distinct on(ssbid) s.ssbid, s.geom
      FROM hule_eiker_insekt.oak_sel_random_order o,
      ssb_data_utm33n.ssb_500m s
      WHERE o.ssbid::bigint = s.ssbid;
"
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##       CREATE TABLE hule_eiker_insekt.selection_ssb as
##
##       SELECT distinct on(ssbid) s.ssbid, s.geom
##       FROM hule_eiker_insekt.oak_sel_random_order o,
##       ssb_data_utm33n.ssb_500m s
##       WHERE o.ssbid::bigint = s.ssbid;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 105
```

```
dbSendStatement(
  my_con,
  "
                ALTER TABLE hule_eiker_insekt.selection_ssb ADD PRIMARY KEY(ssbid);
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##                   ALTER TABLE hule_eiker_insekt.selection_ssb ADD PRIMARY KEY(ssbid);
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
                CREATE INDEX ON  hule_eiker_insekt.selection_ssb USING Gist(geom);
                "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##                 CREATE INDEX ON  hule_eiker_insekt.selection_ssb USING Gist(geom);
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
                -- View: hule_eiker_insekt.squares_for_map

-- DROP VIEW hule_eiker_insekt.squares_for_map;

CREATE OR REPLACE VIEW hule_eiker_insekt.squares_for_map
 AS
 SELECT DISTINCT ON (s.ssbid, foo.matrikkel_no) row_number() OVER (ORDER BY s.ssbid) AS id,
    foo.\"Områdenavn\" AS omrade,
    foo.\"RuteID\" AS rute_id,
    s.ssbid,
    foo.matrikkel_no,
    foo.grunneier,
    foo.grunneier_telefon,
    foo.kommentar,
    foo.kommune_navn,
    foo.fylke_navn,
    foo.no_trees_within_square,
    round(st_x(st_transform(st_centroid(s.geom), 4326))::numeric, 6) AS lon_senterpkt,
    round(st_y(st_transform(st_centroid(s.geom), 4326))::numeric, 6) AS lat_senterpkt,
    s.geom
   FROM ( SELECT sel.selection_order,
             sel.rand_selection_order,
             sel.rute_id_order,
             sel.tree_order_within_square,
             sel.single_and_lonely,
             sel.no_trees_within_square,
             sel.\"RuteID\",
             sel.row_number,
             sel.\"RuteJA\",
             sel.\"TreID\",
             sel.\"Antall\",
             sel.\"Verdi\",
             sel.\"Omkrets\",
             sel.\"Synlig_hul\",
             sel.\"Hulhet_areal_åpning\",
             sel.\"Hulhet_Plassering\",
```

```
            sel.\"Vedmuld\",
            sel.\"Treform\",
            sel.\"Barktype\",
            sel.\"Mosedekning\",
            sel.\"Vitalitet\",
            sel.\"Kulturspor\",
            sel.\"Omgivelser\",
            sel.\"Renskog\",
            sel.\"Mestskog\",
            sel.\"Noeskog\",
            sel.\"PlasseringAR5\",
            sel.\"Forskrift_gammel\",
            sel.\"Forskrift\",
            sel.\"Vern\",
            sel.\"Gjenvoksing\",
            sel.\"Gjenvoksing2\",
            sel.\"Skjøtselsbehov\",
            sel.\"Kommune\",
            sel.\"Områdenavn\",
            sel.\"Nøyaktighetsklasse\",
            sel.\"Utvalgt.Natur.type\",
            sel.\"Eikeart\",
            sel.\"Renskog3\",
            sel.\"Mestskog4\",
            sel.\"Noeskog5\",
            sel.\"Renskog6\",
            sel.\"Mestskog7\",
            sel.\"Noeskog8\",
            sel.\"Gone\",
            sel.\"Not_found\",
            sel.\"Ny_vitalitet\",
            sel.\"Ny_gjenvoksing\",
            sel.\"Ny_gjenvoksing2\",
            sel.\"Change_vitalitet\",
            sel.\"Change_gjenvoksing\",
            sel.ssbid,
            sel.nearest_dist,
            sel.large,
            sel.sel_prob,
            sel.rute_id_rand_order,
            sel.fylke_navn,
            sel.kommune_navn,
            sel.kommune_no_2022,
            sel.geom,
            sel.geom_25833,
```

```
            sel.east_west,
            sel.lon_lat_25833,
            sel.matrikkel_no,
            sel.grunneier,
            sel.grunneier_telefon,
            sel.grunneier_epost,
            sel.grunneier_adresse,
            sel.kommentar
           FROM hule_eiker_insekt.oak_sel_random_order sel
          WHERE sel.tree_order_within_square <= 2 OR sel.no_trees_within_square < 2 AND sel.
     LEFT JOIN hule_eiker_insekt.selection_ssb s ON foo.ssbid::bigint = s.ssbid;
     "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
##                 -- View: hule_eiker_insekt.squares_for_map
##
## -- DROP VIEW hule_eiker_insekt.squares_for_map;
##
## CREATE OR REPLACE VIEW hule_eiker_insekt.squares_for_map
##  AS
##  SELECT DISTINCT ON (s.ssbid, foo.matrikkel_no) row_number() OVER (ORDER BY s.ssbid) AS i
##     foo."Områdenavn" AS omrade,
##     foo."RuteID" AS rute_id,
##     s.ssbid,
##     foo.matrikkel_no,
##     foo.grunneier,
##     foo.grunneier_telefon,
##     foo.kommentar,
##     foo.kommune_navn,
##     foo.fylke_navn,
##     foo.no_trees_within_square,
##     round(st_x(st_transform(st_centroid(s.geom), 4326))::numeric, 6) AS lon_senterpkt,
##     round(st_y(st_transform(st_centroid(s.geom), 4326))::numeric, 6) AS lat_senterpkt,
##     s.geom
##    FROM ( SELECT sel.selection_order,
##             sel.rand_selection_order,
##             sel.rute_id_order,
##             sel.tree_order_within_square,
##             sel.single_and_lonely,
##             sel.no_trees_within_square,
##             sel."RuteID",
```

```
##             sel.row_number,
##             sel."RuteJA",
##             sel."TreID",
##             sel."Antall",
##             sel."Verdi",
##             sel."Omkrets",
##             sel."Synlig_hul",
##             sel."Hulhet_areal_åpning",
##             sel."Hulhet_Plassering",
##             sel."Vedmuld",
##             sel."Treform",
##             sel."Barktype",
##             sel."Mosedekning",
##             sel."Vitalitet",
##             sel."Kulturspor",
##             sel."Omgivelser",
##             sel."Renskog",
##             sel."Mestskog",
##             sel."Noeskog",
##             sel."PlasseringAR5",
##             sel."Forskrift_gammel",
##             sel."Forskrift",
##             sel."Vern",
##             sel."Gjenvoksing",
##             sel."Gjenvoksing2",
##             sel."Skjøtselsbehov",
##             sel."Kommune",
##             sel."Områdenavn",
##             sel."Nøyaktighetsklasse",
##             sel."Utvalgt.Natur.type",
##             sel."Eikeart",
##             sel."Renskog3",
##             sel."Mestskog4",
##             sel."Noeskog5",
##             sel."Renskog6",
##             sel."Mestskog7",
##             sel."Noeskog8",
##             sel."Gone",
##             sel."Not_found",
##             sel."Ny_vitalitet",
##             sel."Ny_gjenvoksing",
##             sel."Ny_gjenvoksing2",
##             sel."Change_vitalitet",
##             sel."Change_gjenvoksing",
##             sel.ssbid,
##             sel.nearest_dist,
```

```
##             sel.large,
##             sel.sel_prob,
##             sel.rute_id_rand_order,
##             sel.fylke_navn,
##             sel.kommune_navn,
##             sel.kommune_no_2022,
##             sel.geom,
##             sel.geom_25833,
##             sel.east_west,
##             sel.lon_lat_25833,
##             sel.matrikkel_no,
##             sel.grunneier,
##             sel.grunneier_telefon,
##             sel.grunneier_epost,
##             sel.grunneier_adresse,
##             sel.kommentar
##            FROM hule_eiker_insekt.oak_sel_random_order sel
##           WHERE sel.tree_order_within_square <= 2 OR sel.no_trees_within_square < 2 AND s
##      LEFT JOIN hule_eiker_insekt.selection_ssb s ON foo.ssbid::bigint = s.ssbid;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
ALTER TABLE hule_eiker_insekt.squares_for_map
    OWNER TO \"jens.astrom\";
    "
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
## ALTER TABLE hule_eiker_insekt.squares_for_map
##     OWNER TO "jens.astrom";
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
GRANT SELECT ON TABLE hule_eiker_insekt.squares_for_map TO gisuser;
```

```
"
)
```

```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
## GRANT SELECT ON TABLE hule_eiker_insekt.squares_for_map TO gisuser;
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

```
dbSendStatement(
  my_con,
  "
GRANT ALL ON TABLE hule_eiker_insekt.squares_for_map TO \"jens.astrom\";
                "
)
```

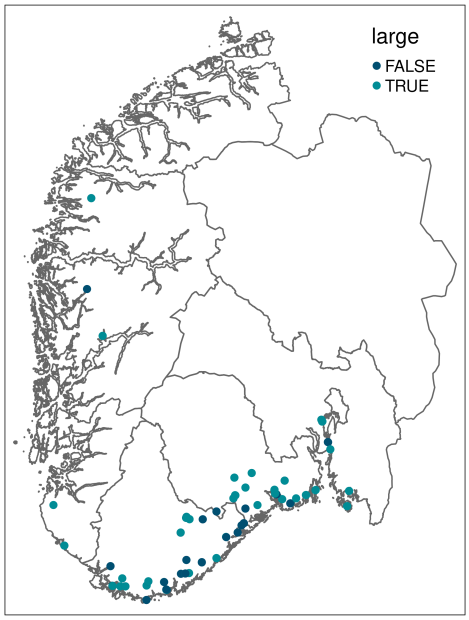
```
## Warning in result_create(conn@ptr, statement, immediate): Closing open result
## set, cancelling previous query
```

```
## <PqResult>
##   SQL
## GRANT ALL ON TABLE hule_eiker_insekt.squares_for_map TO "jens.astrom";
##
##   ROWS Fetched: 0 [complete]
##        Changed: 0
```

Take a look at the selection

```
# tmap_mode("view")
tm_shape(south) +
  tm_borders() +
  tm_shape(shortlist_ssb_500m) +
  tm_borders() +
  tm_shape(tree_sel_test) +
  tm_dots(
    col = "large",
    size = 0.1,
    palette = ninaPalette()
  )
```

```
## Warning: palette colors names missing for FALSE, TRUE. Therefore, palette color
## names will be ignored
```



Instruction for QGIS

Project "hule_eiker" at P:\153018_overvaking_av_insekter_i_hule_eiker\GIS.

Use the layer oak_sel_random_order.

Some new columns: 'selection_order': Use this order to select trees. This is a random order we can follow. 'rand_selection_order': the original random order (not sorted on RuteID, for documentation) 'rute_id_order': the order the squares appeared in the random sample 'tree_order_within_square': the (random) order of trees within each square. Use tree 1 & 2, but if needed higher numbers if we don't find tree no 1 and 2. 'single_and_lonely': Is the tree alone in its square and is the square > 30 000 km from the nearest square?

I have filtered the entire selection to only look at 2 trees or 1 tree if they are not isolated.

Filter = tree_order_within_square<=2 OR (no_trees_within_square<2 AND single_and_lonely IS FALSE)

If these trees are not enough, we can remove or change the 'tree_order_within_square<=2' to show more trees within each square.

Proposed work within qgis:

1. Sort the table on selection order. Start with tree 1 (selection_order = 1), show the info with the "i" button in QGIS.

2. Use the matrikkel_no with https://matrikkeldata.nina.no/ to get the owner.
3. Find the contact info for the owner.