

#1B Creating the figures associated with the jump analysis

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Aim and setup

This vignette computes all the figures included in the manuscript that is associated with the `jumpID` package. This vignette requires loading data frames generated in the first vignette of this package.

Load files generated in the previous vignette

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```

slf <- read.csv(file.path(here::here(), "data", "lyde_data_v2", "lyde.csv"), h=T)
grid_data <- read.csv(file.path(here::here(), "exported-data", "grid_data.csv"), h=T)
centroid <- data.frame(longitude Rounded = -75.675340, latitude Rounded = 40.415240)

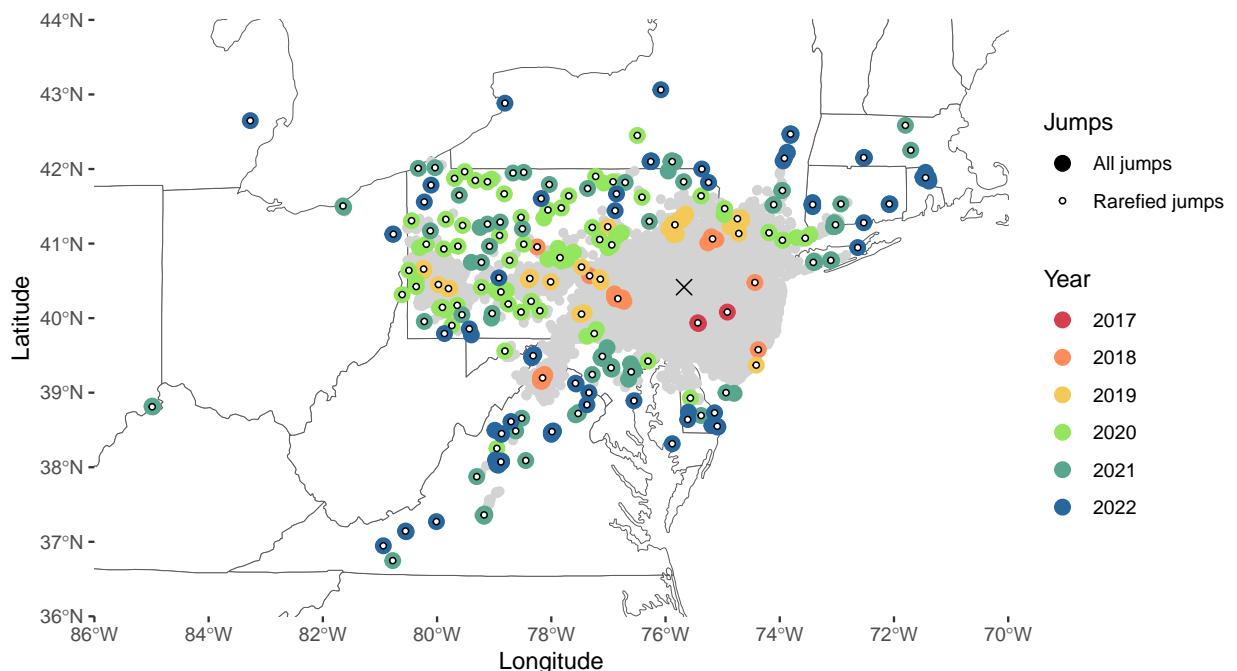
Jumps <- read.csv(file.path(here::here(), "exported-data", "jumps.csv"))
Jump_clusters <- read.csv(file.path(here::here(), "exported-data", "jump_clusters.csv"))
Thresholds <- read.csv(file.path(here::here(), "exported-data", "thresholds.csv"))
diffusion <- read.csv(file.path(here::here(), "exported-data", "diffusion.csv"))
secDiffusion <- read.csv(here::here("exported-data", "secdiffusion.csv"))

```

Figure 2: Faceted jump map, barplot & distance

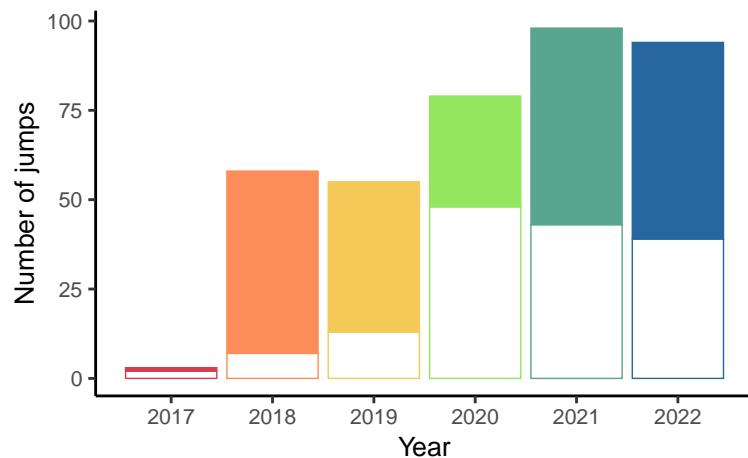
2A: jump map

Map the position of jumps and identify jump clusters per year



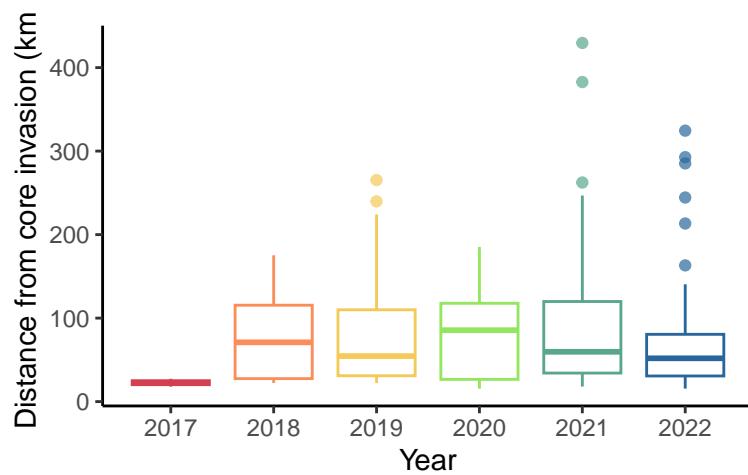
2B: number of jumps per year bar plot

Count how many jumps there are per year

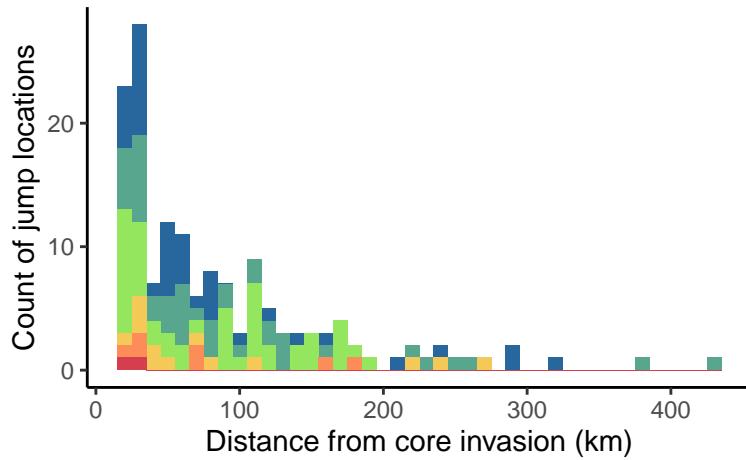


2C: distance of jumps box plot

calculate the distance between the invasion front and jumps every year



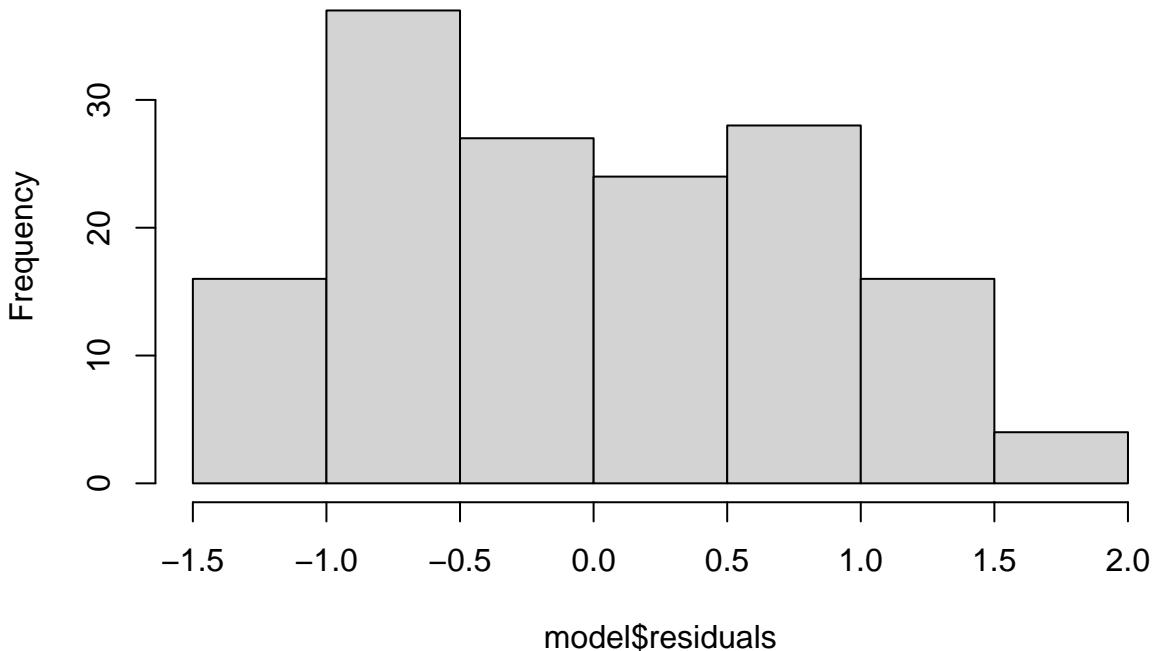
2D Evolution of jump distances



Linear model for statistical test

```
# generate model
model <- lm(log(DistToFront) ~ year, data = Jump_clusters)
# look at residuals
hist(model$residuals)
```

Histogram of model\$residuals



```
# look at results
summary(model)

##
## Call:
## lm(formula = log(DistToFront) ~ year, data = Jump_clusters)
##
## Residuals:
##       Min     1Q   Median     3Q    Max
## -1.41134 -0.74153 -0.09242  0.61409  1.92588
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -38.04036 115.38662 -0.330  0.742
## year        0.02087   0.05711   0.365  0.715
##
## Residual standard error: 0.8217 on 150 degrees of freedom
## Multiple R-squared:  0.0008896, Adjusted R-squared:  -0.005771
## F-statistic: 0.1336 on 1 and 150 DF, p-value: 0.7153
```

Assemble figure 2ABCD

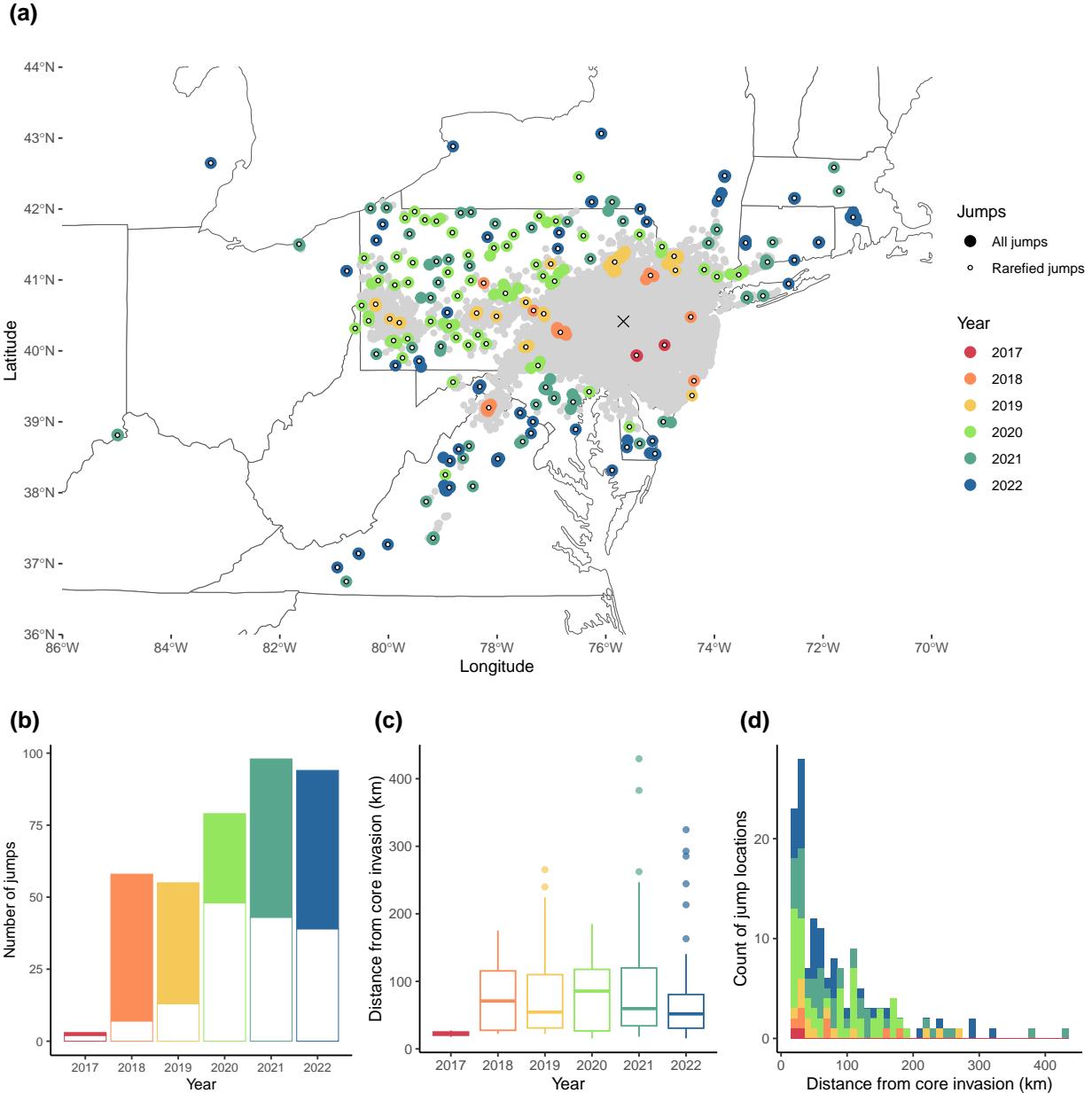


Figure 3: Invasion radius

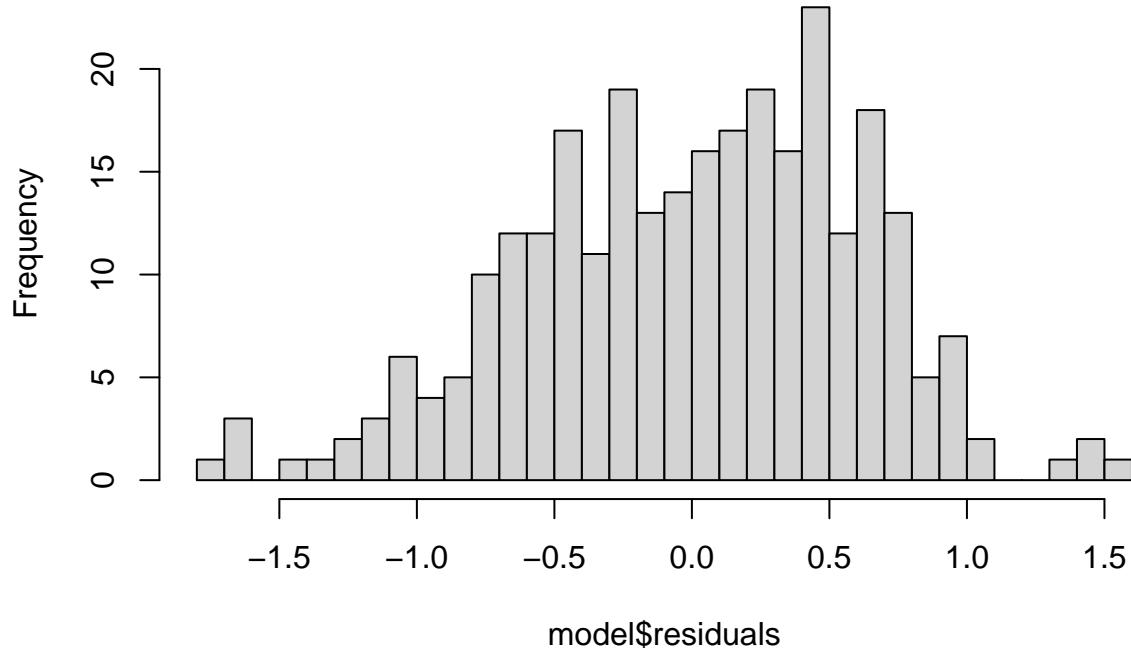
To estimate the spread of the SLF, we extract for each year the radius of the invasion in each sector. We can look at how the radius of the invasion increases over time, when differentiating diffusive spread and jump dispersal.

Test the difference in invasion radius between spread types

```
# generate model
model <- lm(log(maxDistToIntro) ~ year*Type, data = radiusData)
```

```
# look at residuals
hist(model$residuals, breaks = 30)
```

Histogram of model\$residuals



```
# look at results
anova(model)
```

```
## Analysis of Variance Table
##
## Response: log(maxDistToIntro)
##              Df Sum Sq Mean Sq   F value   Pr(>F)
## year          1 552.44  552.44 1510.4347 < 2.2e-16 ***
## Type          1   2.92    2.92   7.9834  0.005058 **
## year:Type     1   1.89    1.89   5.1753  0.023661 *
## Residuals   282 103.14    0.37
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Calculate the yearly increase in invasion radius

```
# All spread:
meanRadius %>% filter(Type == "All spread") %>%
  mutate(radiusIncrease = c(NA, diff(mean))) %>%
  summarise(mean = mean(radiusIncrease, na.rm = T),
            sd = sd(radiusIncrease, na.rm = T))
```

```

## # A tibble: 1 x 2
##   mean     sd
##   <dbl> <dbl>
## 1 41.3  23.6

# Invasion front:
meanRadius %>% filter(Type == "Invasion front") %>%
  mutate(radiusIncrease = c(NA, diff(mean))) %>%
  summarise(mean = mean(radiusIncrease, na.rm=T),
            sd = sd(radiusIncrease, na.rm = T))

```

```

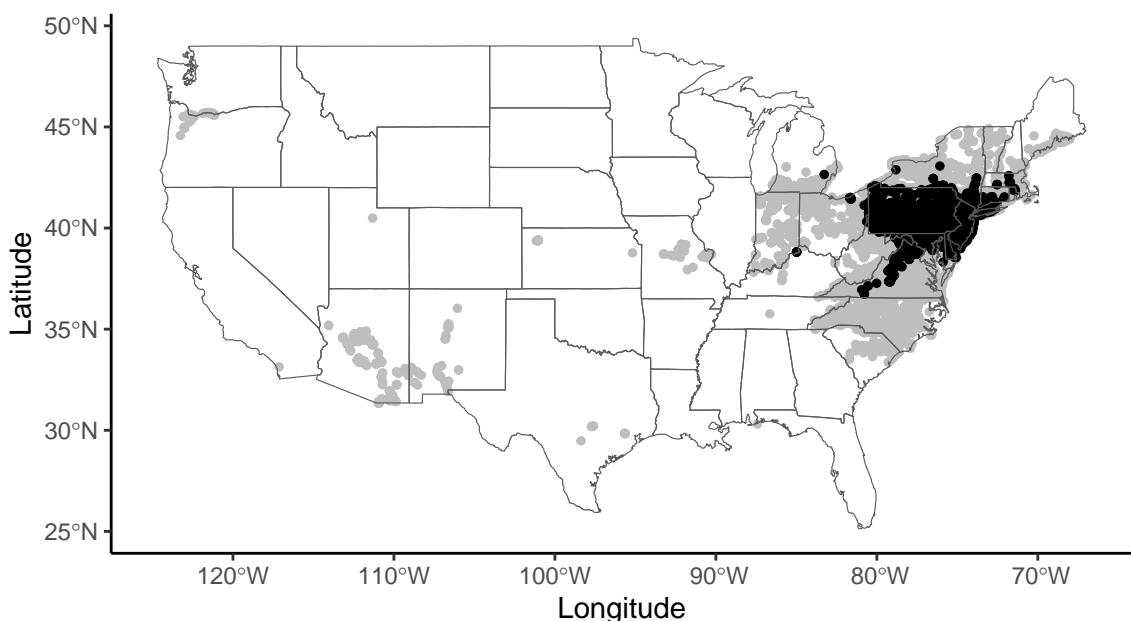
## # A tibble: 1 x 2
##   mean     sd
##   <dbl> <dbl>
## 1 25.1  11.4

```

Supplementary figures

Figure S1: Map all points

Facet A: Overview of all SLF surveys



Facet B: Zoomed map on established SLF

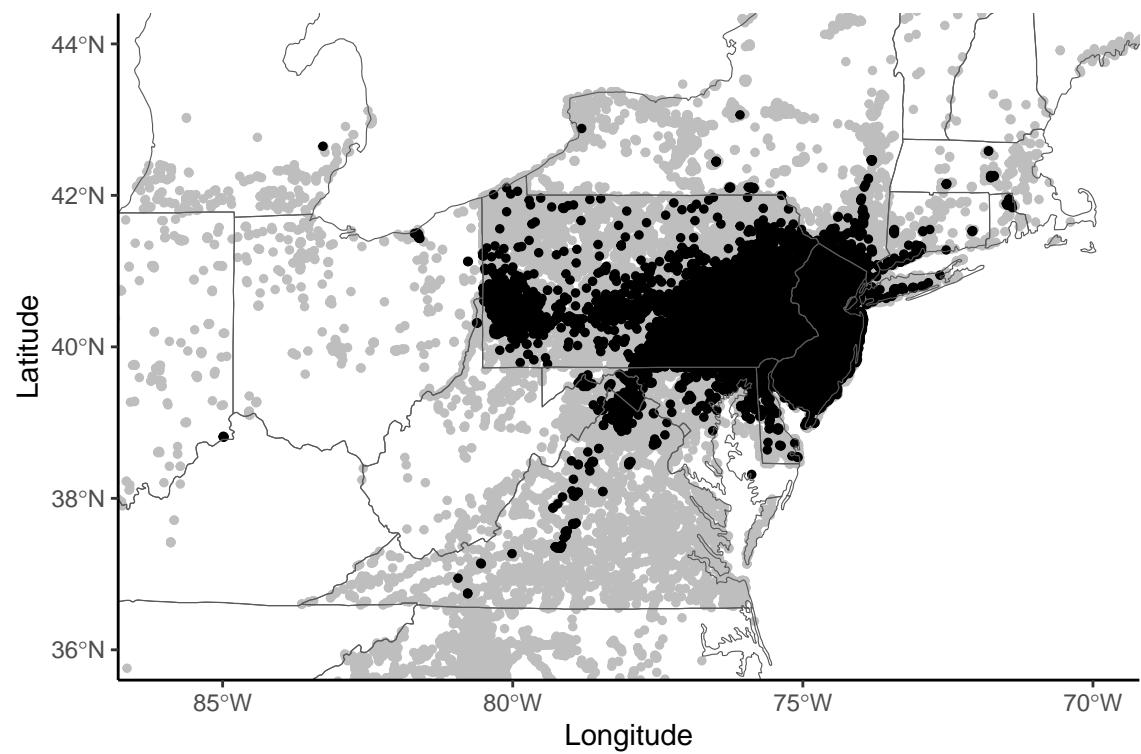


Figure S2: Visualizing Jumps, Thresholds, and SecDiff

Visualize all results, faceted by year

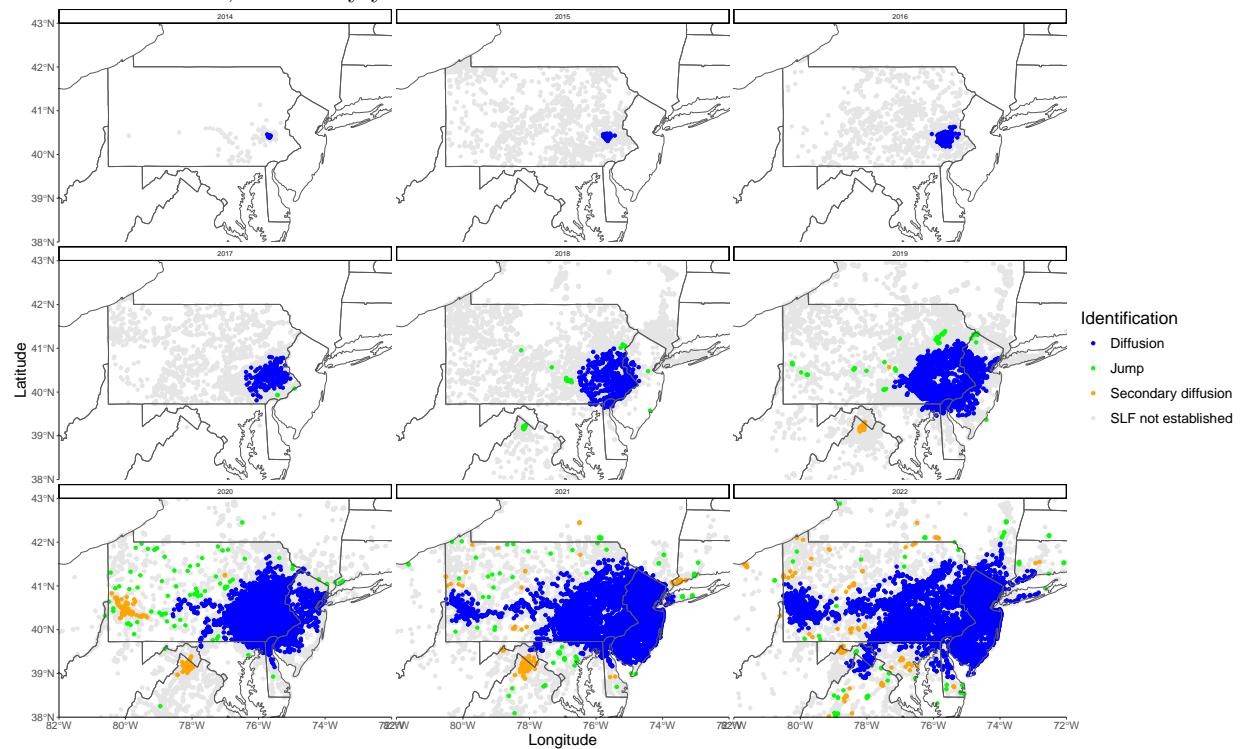
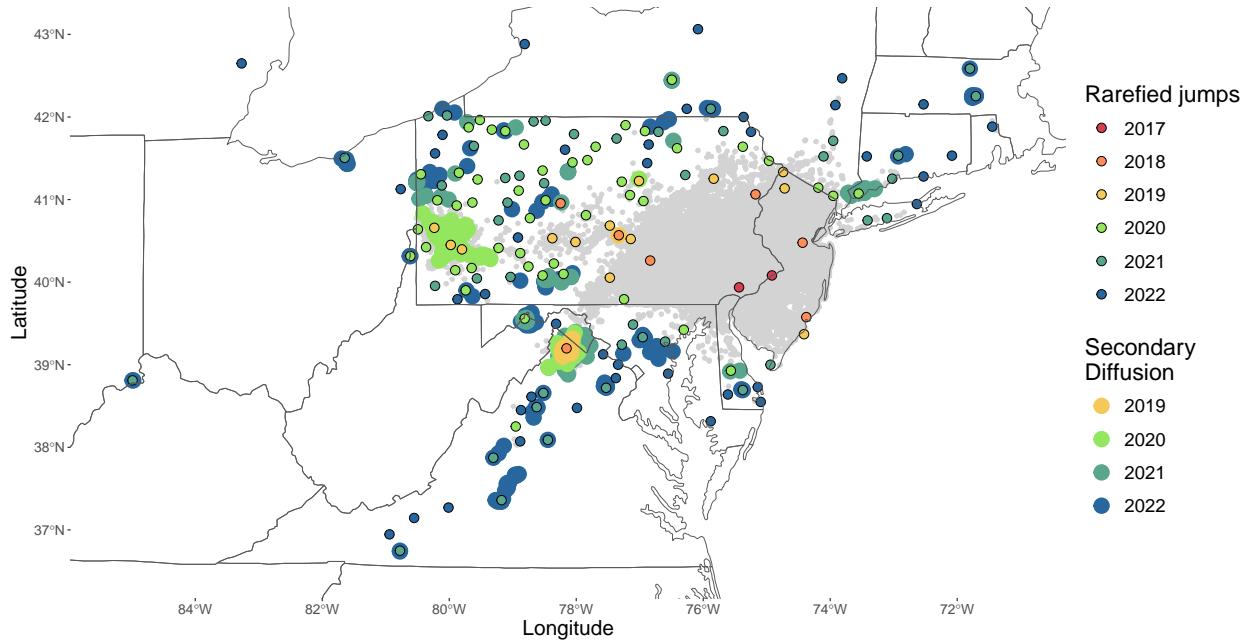


Figure S3: secondary diffusion

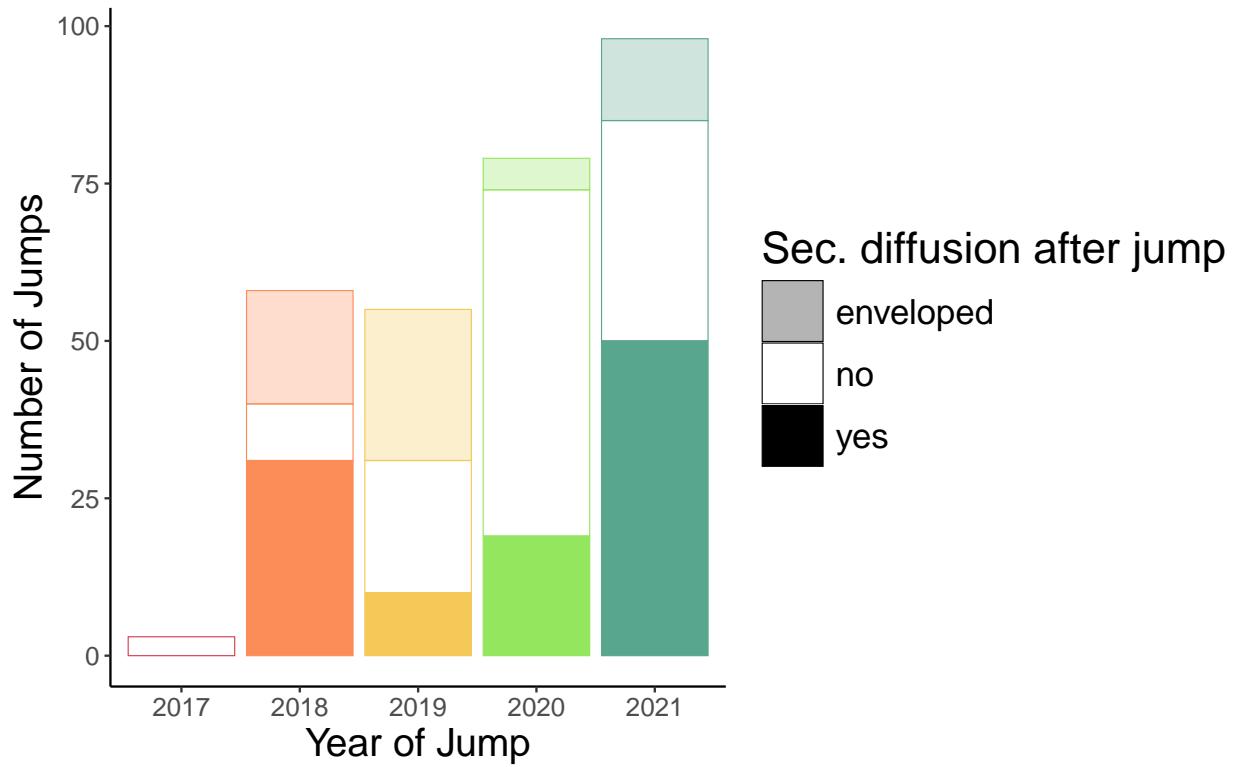
S3A: Map

Map the points identified as secondary diffusion around dispersal jumps.



S3B: Secondary diffusion Bar Plot

Count how many jumps were followed by secondary diffusion



Assemble figure S3AB

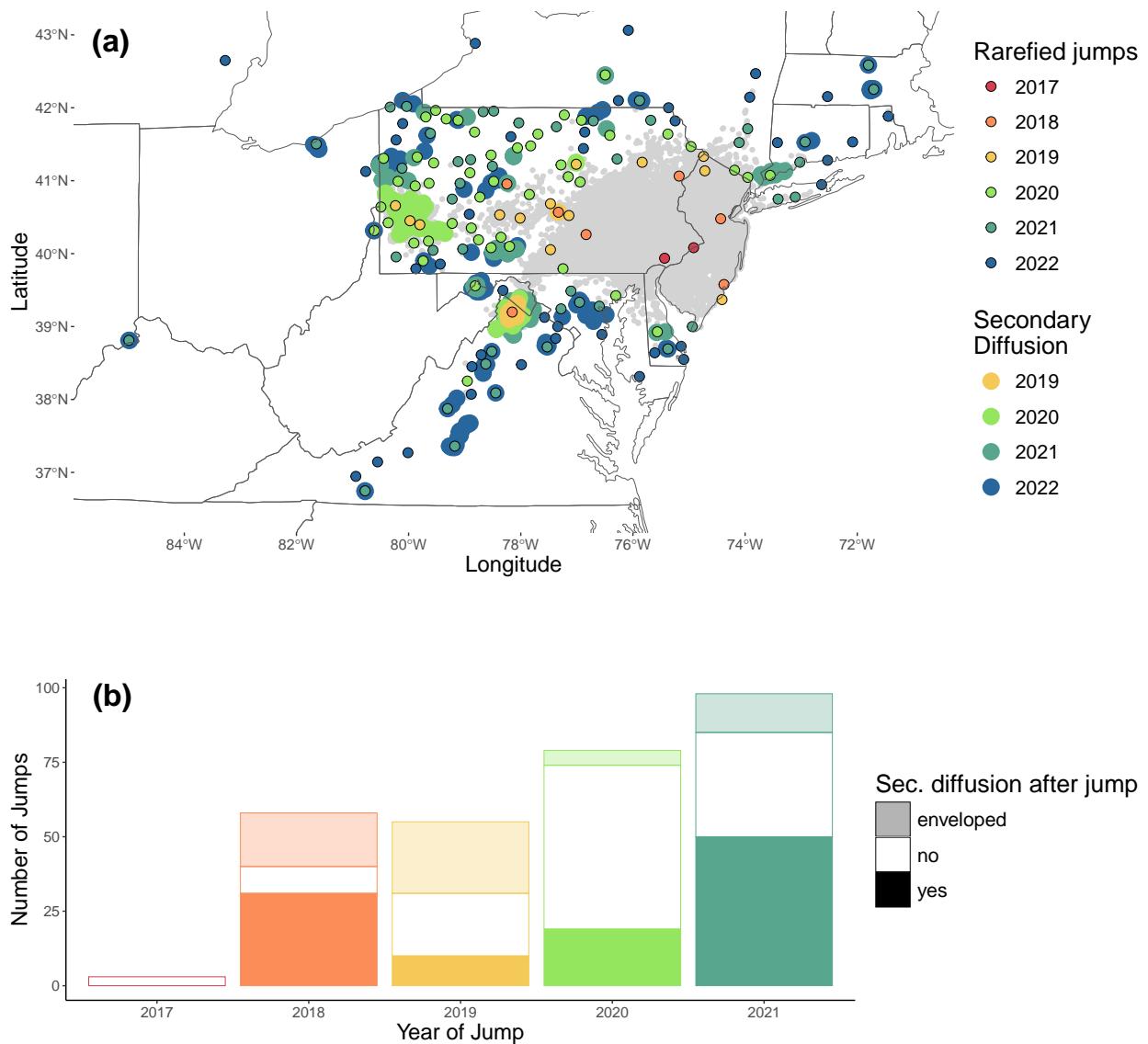
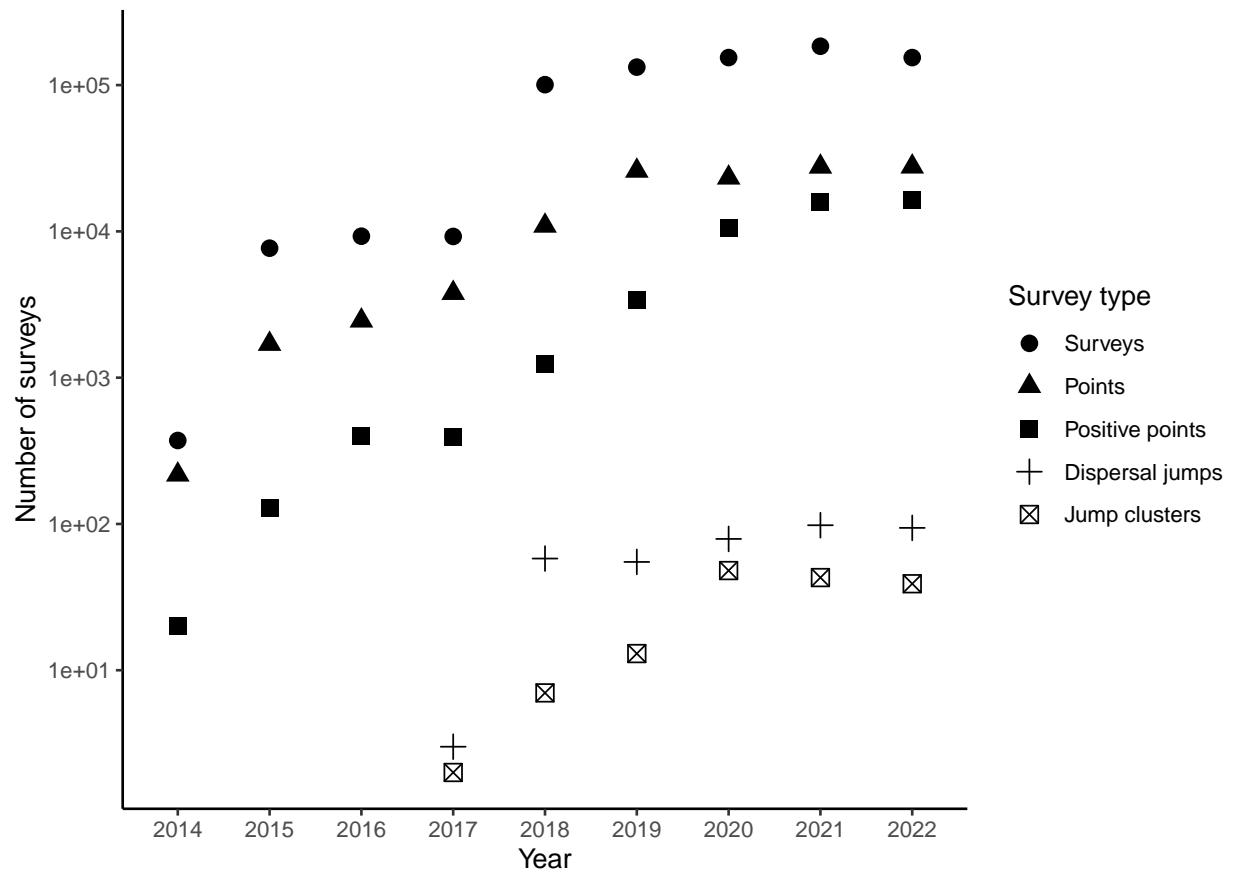


Figure S4: Sampling effort

Show the evolution of the sampling effort and jump occurrences over time



– end of vignette –