

Sturgeon TidBits Encounter Form QAQC

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Packages

```
library(dplyr)
```

Attaching package: 'dplyr'

The following objects are masked from 'package:stats':

filter, lag

The following objects are masked from 'package:base':

intersect, setdiff, setequal, union

```
library(ggplot2)
```

Warning: package 'ggplot2' was built under R version 4.5.1

```
library(sf)
```

Warning: package 'sf' was built under R version 4.5.1

Linking to GEOS 3.13.1, GDAL 3.11.0, PROJ 9.6.0; sf_use_s2() is TRUE

```
library(ggspatial)
```

Warning: package 'ggspatial' was built under R version 4.5.1

Load Data and Check Characteristics

```
enc_IC <- read.csv("2025/tagsheet_to_tidbits2025/output/UEF_IC_AST_SNS_SE_RAW.csv",
                     na.strings = "")
enc_RCNT <- read.csv("2025/tagsheet_to_tidbits2025/output/UEF_RCNT_AST_SNS_SE_RAW.csv",
                      na.strings = "")
glimpse(enc_IC)
```

Rows: 56

Columns: 44

```
$ Event           <chr> "Initial capture", "Initial capture", "Initial~  
$ Species         <chr> "AST", "AST", "AST", "AST", "AST", "AST~  
$ Rearing_Origin  <chr> "Wild", "Wild", "Wild", "Wild", "Wild", "Wild"~  
$ Stage            <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~  
$ System           <chr> "Kennebec", "Kennebec", "Kennebec", "Kennebec"~  
$ Encounter_Time_zone <chr> "Eastern", "Eastern", "Eastern", "Eastern", "E~  
$ Encounter_Timestamp  <chr> "07/29/2025 00:00", "07/29/2025 00:00", "07/29~  
$ Encounter_Location   <chr> "Gardiner", "Gardiner", "Gardiner", "Gardiner"~  
$ Encounter_Easting    <int> 438716, 438716, 438716, 438716, 438716~  
$ Encounter_Northing   <int> 4899033, 4899033, 4899033, 4899033, 4899033, 4~  
$ Encounter_UTMZone     <int> 19, 19, 19, 19, 19, 19, 19, 19, 19, 19~  
$ Encounter_Disposition <chr> "Live", "Live", "Live", "Live", "Live", "Live"~  
$ Release_Status       <chr> "Yes", "Yes", "Yes", "Yes", "Yes", "Yes"~  
$ Release_Timezone      <chr> "Eastern", "Eastern", "Eastern", "Eastern", "E~  
$ Release_Timestamp     <chr> "07/29/2025 00:00", "07/29/2025 00:00", "07/29~  
$ Release_Location       <chr> "Gardiner", "Gardiner", "Gardiner", "Gardiner"~  
$ Release_Easting        <int> 438716, 438716, 438716, 438716, 438716~  
$ Release_Northing       <int> 4899033, 4899033, 4899033, 4899033, 4899033, 4~  
$ TagType              <chr> "Multiple", "Multiple", "Multiple", "Multiple"~  
$ TagManufacturer        <chr> "Innovosea", "Innovosea", "Innovosea", "Innov~  
$ TagModel               <chr> "V16-4x-BLU-1", "V16-4x-BLU-1", "V16-4x-BLU-1"~  
$ TagSerialNumber        <int> 1638361, 1638355, 1638362, 1638356, 1638359, 1~  
$ EstTagLife             <int> 2560, 2560, 2560, 2560, 2560, 2560, 2560~  
$ Acoustic_ID            <chr> "A69-2801-201133", "A69-2801-201127", "A69-280~  
$ Acoustic_Sensor_type    <lgl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA~
```

```

$ Acoustic_.Sensor_idcode <lgl> NA, NA~  

$ Acoustic_Sensor_value <lgl> NA, NA~  

$ PIT_ID <chr> "3DD.003E185F8C", "3DD.003E185F8D", "3DD.003E1~  

$ Radio_ID <lgl> NA, NA~  

$ Radio_Freq <lgl> NA, NA~  

$ Radio_BurstRate <lgl> NA, NA~  

$ External_TagID <lgl> NA, NA~  

$ Mark.Observed <chr> "None", "None", "None", "None", "None", "None"~  

$ Mark.Applied <chr> "None", "None", "None", "None", "None", "None"~  

$ VIE <chr> "None", "None", "None", "None", "None", "None"~  

$ ForkLength..cm. <dbl> 138.0, 156.0, 116.0, 174.2, 156.3, 134.0, 149.~  

$ TotalLength..cm. <dbl> 158.0, 179.0, 179.0, 194.7, 177.9, 149.5, 173.~  

$ Mass..g. <lgl> NA, NA~  

$ Sex <chr> "UNK", "UNK", "UNK", "UNK", "UNK", "UNK", "UNK"~  

$ STRG_Interorbital.mm. <dbl> 102.00, 138.00, 138.00, NA, 127.37, 110.50, 12~  

$ STRG_InsideMouth.mm. <dbl> 33.70, 61.00, 41.60, 53.00, 56.91, 48.80, 46.9~  

$ STRG_OutsideMouth.mm. <dbl> 61.00, 101.00, 71.30, 87.00, 89.37, 75.10, 71.~  

$ Notes <chr> NA, NA, NA, NA, NA, NA, NA, "Milt", "Milt", NA~  

$ Operator.s. <chr> "JZ,SE", "JZ,SE", "JZ,SE", "JZ,SE", "JZ,SE", "~

```

```
glimpse(enc_RCNT)
```

Rows: 7
 Columns: 47

	\$ Event	<chr> "New Tag", "New Tag", "New Tag", "New Tag", "N~
	\$ Species	<chr> "AST", "SNS", "SNS", "SNS", "AST", "AST"
	\$ Rearing_Origin	<chr> "Wild", "Wild", "Wild", "Wild", "Wild", "Wild"~
	\$ Stage	<lgl> NA, NA, NA, NA, NA, NA, NA
	\$ System	<chr> "Kennebec", "Penobscot", "Penobscot", "Penobsc~
	\$ Encounter_Time_zone	<chr> "Eastern", "Eastern", "Eastern", "Eastern", "E~
	\$ Encounter_Timestamp	<chr> "07/29/2025 00:00", "08/05/2025 00:00", "08/05~
	\$ Encounter_Location	<chr> "Gardiner", "The Spindle", "The Spindle", "The~
	\$ Encounter_Easting	<int> 438716, 514494, 514494, 514494, 514494, 514494~
	\$ Encounter_Northing	<int> 4899033, 4948116, 4948116, 4948116, 4948116, 4~
	\$ Encounter_UTMZone	<int> 19, 19, 19, 19, 19, 19, 19
	\$ Encounter_Disposition	<chr> "Live", "Live", "Live", "Live", "Live", "Live"~
	\$ Release_Status	<chr> "Yes", "Yes", "Yes", "Yes", "Yes", "Yes", "Yes"~
	\$ Release_Timezone	<chr> "Eastern", "Eastern", "Eastern", "Eastern", "E~
	\$ Release_Timestamp	<chr> "07/29/2025 00:00", "08/05/2025 00:00", "08/05~
	\$ Release_Location	<chr> "Gardiner", "The Spindle", "The Spindle", "The~
	\$ Release_Easting	<int> 438716, 514494, 514494, 514494, 514494, 514494~
	\$ Release_Northing	<int> 4899033, 4948116, 4948116, 4948116, 4948116, 4~

Initial Capture QAQC

```
ICvalues <- enc_IC %>%
  summarise(across(
    c(TagType, TagManufacturer, TagModel, TagSerialNumber, EstTagLife,
      Acoustic_ID, Acoustic_Sensor_type, Acoustic_.Sensor_idcode,
      Acoustic_Sensor_value, PIT_ID, Radio_Freq),
    ~ list(unique(.))))
```



```
str(ICvalues)
```

```
'data.frame': 1 obs. of 11 variables:
$ TagType           :List of 1
..$ : chr "Multiple" "PIT"
$ TagManufacturer   :List of 1
..$ : chr "Innovosea" NA
$ TagModel          :List of 1
..$ : chr "V16-4x-BLU-1" NA
$ TagSerialNumber   :List of 1
..$ : int 1638361 1638355 1638362 1638356 1638359 1638358 1638360 1645258 1645261 1645265
$ EstTagLife        :List of 1
..$ : int 2560 NA
$ Acoustic_ID       :List of 1
..$ : chr "A69-2801-201133" "A69-2801-201127" "A69-2801-201134" "A69-2801-201128" ...
$ Acoustic_Sensor_type :List of 1
..$ : logi NA
$ Acoustic_.Sensor_idcode:List of 1
..$ : logi NA
$ Acoustic_Sensor_value :List of 1
..$ : logi NA
$ PIT_ID            :List of 1
..$ : chr "3DD.003E185F8C" "3DD.003E185F8D" "3DD.003E185F93" "3DD.003E185F8F" ...
$ Radio_Freq         :List of 1
..$ : logi NA
```

`ICvalues$TagSerialNumber`

```
[[1]]
[1] 1638361 1638355 1638362 1638356 1638359 1638358 1638360 1645258 1645261
[10] 1645265 1645264 1645262 1645267 1645266 1638357 1645269 1645268 1645263
[19] 1645260 1645259 1645271 1645270 1645282 1645287 1645291 1645292 1645289
[28] 1645288 1645275 1645279 1645285 1645286 1645281 1645276 1645277 1645272
[37] 1645284 1645298 1645297 1645273 1645283 1645294 1645299 1645296 NA
```

`ICvalues$Acoustic_ID`

```
[[1]]
[1] "A69-2801-201133" "A69-2801-201127" "A69-2801-201134" "A69-2801-201128"
[5] "A69-2801-201131" "A69-2801-201130" "A69-2801-201132" "A69-2801-201212"
[9] "A69-2801-201215" "A69-2801-201219" "A69-2801-201218" "A69-2801-201216"
[13] "A69-2801-201221" "A69-2801-201220" "A69-2801-201129" "A69-2801-201223"
[17] "A69-2801-201222" "A69-2801-201217" "A69-2801-201214" "A69-2801-201213"
```

```
[21] "A69-2801-201225" "A69-2801-201224" "A69-2801-201236" "A69-2801-201241"
[25] "A69-2801-201245" "A69-2801-201246" "A69-2801-201243" "A69-2801-201242"
[29] "A69-2801-201229" "A69-2801-201233" "A69-2801-201239" "A69-2801-201240"
[33] "A69-2801-201235" "A69-2801-201230" "A69-2801-201231" "A69-2801-201226"
[37] "A69-2801-201238" "A69-2801-201252" "A69-2801-201251" "A69-2801-201227"
[41] "A69-2801-201237" "A69-2801-201248" "A69-2801-201253" "A69-2801-201250"
[45] NA
```

```
IC_acN <- enc_IC %>%
  summarise(fish = n(),
            tags = n_distinct(Acoustic_ID, na.rm = TRUE))
IC_acN
```

```
fish tags
1   56   44
```

Recapture NT QAQC

```
RCNTvalues <- enc_RCNT %>%
  summarise(across(
    c(TagType, TagManufacturer, TagModel, TagSerialNumber, EstTagLife,
      Acoustic_ID, Acoustic_Sensor_type, Acoustic_.Sensor_idcode,
      Acoustic_Sensor_value, PIT_ID, Radio_Freq),
    ~ list(unique(.))))
```

```
str(RCNTvalues)
```

```
'data.frame': 1 obs. of 11 variables:
 $ TagType           :List of 1
 ..$ : chr "Multiple" "PIT"
 $ TagManufacturer   :List of 1
 ..$ : chr "Innovosea" NA
 $ TagModel          :List of 1
 ..$ : chr "V16-4x-BLU-1" NA
 $ TagSerialNumber   :List of 1
 ..$ : int 1645274 1645290 1645293 1645278 1645280 1645295 NA
 $ EstTagLife        :List of 1
 ..$ : int 2560 NA
 $ Acoustic_ID       :List of 1
 ..$ : chr "A69-2801-201228" "A69-2801-201244" "A69-2801-201247" "A69-2801-201232" ...
```

```
$ Acoustic_Sensor_type    :List of 1
..$ : logi NA
$ Acoustic_.Sensor_idcode:List of 1
..$ : logi NA
$ Acoustic_Sensor_value   :List of 1
..$ : logi NA
$ PIT_ID                  :List of 1
..$ : chr  "3D9.257C65BA2C" "3DD.003BEF3671" "3D9.1C2D7E000E" "3D9.1C2D6CC918" ...
$ Radio_Freq               :List of 1
..$ : logi NA
```

```
RCNTvalues$TagSerialNumber
```

```
[[1]]
[1] 1645274 1645290 1645293 1645278 1645280 1645295      NA
```

```
RCNTvalues$Acoustic_ID
```

```
[[1]]
[1] "A69-2801-201228" "A69-2801-201244" "A69-2801-201247" "A69-2801-201232"
[5] "A69-2801-201234" "A69-2801-201249" NA
```

```
RCNT_acN <- enc_RCNT %>%
  summarise(fish = n(),
            tags = n_distinct(Acoustic_ID, na.rm = TRUE))
RCNT_acN
```

	fish	tags
1	7	6

Make sure fish and tags between sets add up

Size QAQC

```
sumszIC <- enc_IC %>%
  group_by(Species, System) %>%
  summarise(n_captures = n(),
            min_FL = min(ForkLength..cm.),
```

```

max_FL = max(ForkLength..cm.),
range_FL = max(ForkLength..cm.) - min(ForkLength..cm.),
min_TL = min(TotalLength..cm.),
max_TL = max(TotalLength..cm.),
range_TL = max(TotalLength..cm.) - min(TotalLength..cm.))

```

`summarise()` has grouped output by 'Species'. You can override using the `groups` argument.

`sumszIC`

```

# A tibble: 4 x 9
# Groups:   Species [2]
  Species System    n_captures min_FL max_FL range_FL min_TL max_TL range_TL
  <chr>   <chr>        <int>   <dbl>   <dbl>   <dbl>   <dbl>   <dbl>   <dbl>
1 AST     Kennebec      9     116    174.    58.2   150.   195.   45.2
2 AST     Penobscot     26      1     159.    158.   90.6   185.   94.7
3 SNS     Kennebec     14     58.8    75.8     17     69.6   88.2   18.6
4 SNS     Penobscot     7     85.4    109.    23.8    97     118    21

```

```

sumszRCNT <- enc_RCNT %>%
  group_by(Species, System) %>%
  summarise(n_captures = n(),
            min_FL = min(ForkLength..cm.),
            max_FL = max(ForkLength..cm.),
            range_FL = max(ForkLength..cm.) - min(ForkLength..cm.),
            min_TL = min(TotalLength..cm.),
            max_TL = max(TotalLength..cm.),
            range_TL = max(TotalLength..cm.) - min(TotalLength..cm.))

```

`summarise()` has grouped output by 'Species'. You can override using the `groups` argument.

`sumszRCNT`

```

# A tibble: 3 x 9
# Groups:   Species [2]
  Species System    n_captures min_FL max_FL range_FL min_TL max_TL range_TL
  <chr>   <chr>        <int>   <dbl>   <dbl>   <dbl>   <dbl>   <dbl>   <dbl>
1 AST     Kennebec      1     197    197      0     225    225      0
2 AST     Penobscot     2     90.4   176.    85.8   105.   210    105.
3 SNS     Penobscot     4     86.8   91.1    4.30   100.   105    4.60

```

Fix Size

Check tag sheet on AST with FL = 1

```
wrong_FL <- enc_IC %>%
  filter(ForkLength..cm.< 2)
wrong_FL
```

	Event	Species	Rearing_Origin	Stage	System	Encounter_Time_zone
1	Initial capture	AST	Wild	NA	Penobscot	Eastern
	Encounter_Timestamp	Encounter_Location	Encounter_Easting	Encounter_Northing		
1	08/17/2025 00:00	The Spindle		514494		4948116
	Encounter_UTMZone	Encounter_Disposition	Release_Status	Release_Timezone		
1		19	Live	Yes		Eastern
	Release_Timestamp	Release_Location	Release_Easting	Release_Northing	TagType	
1	08/17/2025 00:00	The Spindle		514494	4948116	Multiple
	TagManufacturer	TagModel	TagSerialNumber	EstTagLife	Acoustic_ID	
1	Innovosea	V16-4x-BLU-1		1645276	2560	A69-2801-201230
	Acoustic_Sensor_type	Acoustic_.Sensor_idcode	Acoustic_Sensor_value			
1		NA	NA		NA	
	PIT_ID	Radio_ID	Radio_Freq	Radio_BurstRate	External_TagID	
1	3DD.003E185F6B	NA	NA	NA	NA	
	Mark.Observed	Mark.Applied	VIE	ForkLength..cm.	TotalLength..cm.	Mass..g.
1	None	None	None	1	114	NA UNK
	STRG_Interorbital.mm.	STRG_InsideMouth.mm.	STRG_OutsideMouth.mm.	Notes		
1		80		43	59	<NA>
	Operator.s.					
1	JZ,SE					

```
## supposed to be 109
enc_IC1 <- enc_IC %>%
  mutate(ForkLength..cm. = case_when(ForkLength..cm. == 1 ~ 109,
                                      TRUE ~ ForkLength..cm.))

sumszIC1 <- enc_IC1 %>%
  group_by(Species, System) %>%
  summarise(n_captures = n(),
            min_FL = min(ForkLength..cm.),
            max_FL = max(ForkLength..cm.),
            range_FL = max(ForkLength..cm.) - min(ForkLength..cm.),
            min_TL = min(TotalLength..cm.),
```

```

max_TL = max(TotalLength..cm.),
range_TL = max(TotalLength..cm.) - min(TotalLength..cm.))

```

`summarise()` has grouped output by 'Species'. You can override using the `groups` argument.

```
sumszIC1
```

	# A tibble: 4 x 9	# Groups: Species [2]	Species	System	n_captures	min_FL	max_FL	range_FL	min_TL	max_TL	range_TL
	<chr>	<chr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
1	AST	Kennebec	9	116	174.	58.2	150.	195.	45.2		
2	AST	Penobscot	26	79.8	159.	79.4	90.6	185.	94.7		
3	SNS	Kennebec	14	58.8	75.8	17	69.6	88.2	18.6		
4	SNS	Penobscot	7	85.4	109.	23.8	97	118	21		

Interorbital to Mouth

check ratios of IO to Mouth **AST < 0.55; SNS > 0.55**

```

ICioRatio <- enc_IC1 %>%
  mutate(ratio = `STRG_InsideMouth.mm.` / `STRG_Interorbital.mm.`) %>%
  filter(!is.na(ratio), is.finite(ratio)) %>%
  group_by(Species) %>%
  summarise(min = min(ratio),
            max = max(ratio))

ICioRatio

```

	# A tibble: 2 x 3	Species	min	max
	<dbl>	<dbl>	<dbl>	
1	AST	0.301	0.540	
2	SNS	0.64	1.12	

```

RCNTioRatio <- enc_IC1 %>%
  mutate(ratio = `STRG_InsideMouth.mm.` / `STRG_Interorbital.mm.`) %>%
  filter(!is.na(ratio), is.finite(ratio)) %>%
  group_by(Species) %>%
  summarise(min = min(ratio),
            max = max(ratio))

RCNTioRatio

```

```

# A tibble: 2 x 3
  Species   min   max
  <chr>    <dbl> <dbl>
1 AST      0.301 0.540
2 SNS      0.64   1.12

```

Map Locations

```

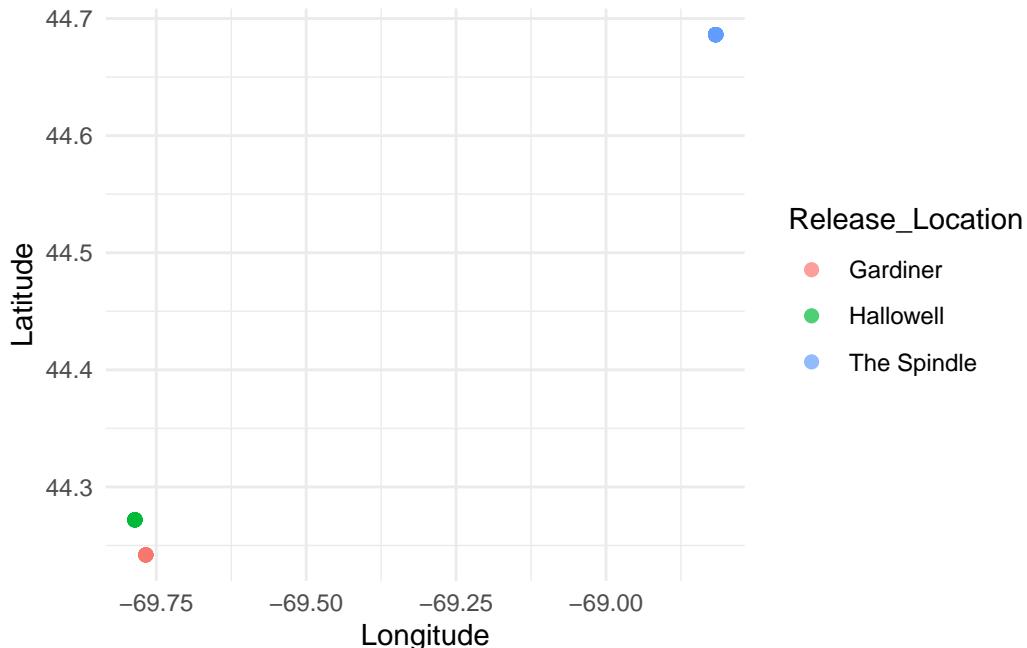
## IC

ICloc_sf <- enc_IC1 %>%
  st_as_sf(coords = c("Encounter_Easting", "Encounter_Northing"), crs = 26919) %>%
  st_transform(crs = 4326)

ICloc_df <- ICloc_sf %>%
  mutate(Longitude = st_coordinates(.)[,1], Latitude = st_coordinates(.)[,2]) %>%
  as.data.frame()

ggplot(data = ICloc_df) +
  geom_point(aes(x = Longitude,
                 y = Latitude,
                 color = Release_Location),
             size = 2, alpha = 0.7) +
  theme_minimal()

```



```
ggplot(data = ICloc_df) +
  annotation_map_tile(type = "cartolight", zoom = 12) +
  geom_point(aes(x = Longitude, y = Latitude, color = Release_Location),
             size = 2, alpha = 0.7) +
  coord_sf(crs = 4326,
           xlim = c(min(ICloc_df$Longitude) - 0.15,
                    max(ICloc_df$Longitude) + 0.15),
           ylim = c(min(ICloc_df$Latitude) - 0.05,
                    max(ICloc_df$Latitude) + 0.05),
           expand = FALSE) +
  labs(title = "IC")+
  theme_minimal()
```

Loading required namespace: raster

Zoom: 12

IC

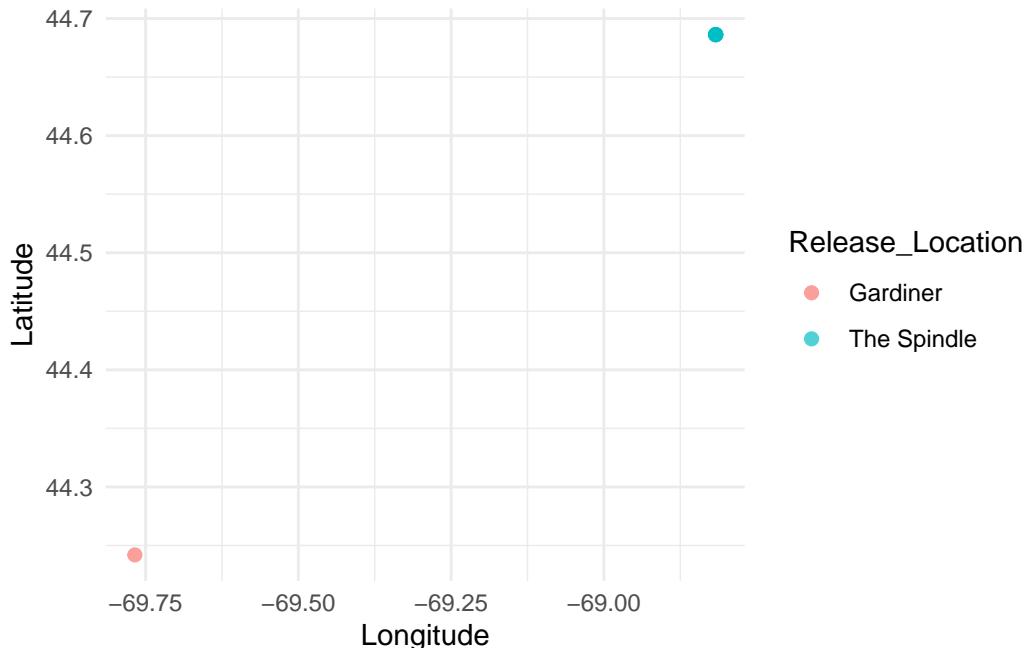


```
## RCNT

RCNTloc_sf <- enc_RCNT %>%
  st_as_sf(coords = c("Encounter_Easting", "Encounter_Northing"), crs = 26919) %>%
  st_transform(crs = 4326)

RCNTloc_df <- RCNTloc_sf %>%
  mutate(Longitude = st_coordinates(.)[,1], Latitude = st_coordinates(.)[,2]) %>%
  as.data.frame()

ggplot(data = RCNTloc_df) +
  geom_point(aes(x = Longitude,
                 y = Latitude,
                 color = Release_Location),
             size = 2, alpha = 0.7) +
  theme_minimal()
```



```
ggplot(data = RCNTloc_df) +
  annotation_map_tile(type = "cartolight", zoom = 12) +
  geom_point(aes(x = Longitude, y = Latitude, color = Release_Location),
             size = 2, alpha = 0.7) +
  coord_sf(crs = 4326,
           xlim = c(min(RCNTloc_df$Longitude) - 0.15,
                   max(RCNTloc_df$Longitude) + 0.15),
           ylim = c(min(RCNTloc_df$Latitude) - 0.05,
                   max(RCNTloc_df$Latitude) + 0.05),
           expand = FALSE) +
  labs(title = "RCNT") +
  theme_minimal()
```

Zoom: 12

RCNT



Output csv

```
write.csv(enc_IC1, "2025/output/UEF_IC_AST_SNS_SE.csv", na = "", row.names = FALSE)
write.csv(enc_RCNT, "2025/output/UEF_RCNT_AST_SNS_SE.csv", na = "", row.names = FALSE)
```