Assignment 14

Ellen Bledsoe

2025-12-01

2. When Did You Knit This Document? (5 pts)

```
## [1] "2025-12-01"
```

```
## [1] "2025-12-01 13:27:15 MST"
```

3. Plant Vouchers (20 pts)

```
## Rows: 165 Columns: 17
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr (11): season, sp_code, sci_name_fieldID, sci_name_profID, voucher, DNA, ...
## dbl  (6): year, month, day, easting, northing, elevation (m)
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
## # A tibble: 165 x 18
##     year month   day collection_date season sp_code   sci_name_fieldID
##    <dbl> <dbl> <dbl> <date>          <chr>  <chr>     <chr>
##  1  2017     1    26 2017-01-26      <NA>   <NA>      Panicum miliaceum
##  2  2016     3    20 2016-03-20      winter cass bauh Cassia bauhinoides
##  3  2016     3    20 2016-03-20      winter spha hast Sphaeralcea coccinea
##  4  2016     3    20 2016-03-20      winter amsi tess Amsinckia tessellata
##  5  2016     3    20 2016-03-20      winter micr lene Uropappus lindleyi
##  6  2016     3    20 2016-03-20      winter erig conc Erigeron concinnus
##  7  2016     3    20 2016-03-20      winter atri cane Atriplex canescens
##  8  2016     3    20 2016-03-20      winter euro lana Eurotia lanata
##  9  2016     3    20 2016-03-20      winter pros glan Prosopis glandulosa
## 10  2016     3    20 2016-03-20      winter phac ariz Phacelia arizonica
## # i 155 more rows
## # i 11 more variables: sci_name_profID <chr>, voucher <chr>, DNA <chr>,
## #   label_number <chr>, collector <chr>, location <chr>, easting <dbl>,
## #   northing <dbl>, `elevation (m)` <dbl>, vial_barcode <chr>, notes <chr>
```

```
## [1] "2016-03-20"
```

```
## [1] "2019-04-01"
```

```
## [1] "95644800s (~3.03 years)"
```

```
## # A tibble: 165 x 19
##     year month   day collection_date   DOY season sp_code   sci_name_fieldID
##    <dbl> <dbl> <dbl> <date>          <dbl> <chr>  <chr>     <chr>
##  1  2017     1    26 2017-01-26         26 <NA>   <NA>      Panicum miliaceum
##  2  2016     3    20 2016-03-20         80 winter cass bauh Cassia bauhinoides
```

```
##  3  2016     3    20 2016-03-20         80 winter spha hast Sphaeralcea coccinea
##  4  2016     3    20 2016-03-20         80 winter amsi tess Amsinckia tessellata
##  5  2016     3    20 2016-03-20         80 winter micr lene Uropappus lindleyi
##  6  2016     3    20 2016-03-20         80 winter erig conc Erigeron concinnus
##  7  2016     3    20 2016-03-20         80 winter atri cane Atriplex canescens
##  8  2016     3    20 2016-03-20         80 winter euro lana Eurotia lanata
##  9  2016     3    20 2016-03-20         80 winter pros glan Prosopis glandulosa
## 10  2016     3    20 2016-03-20         80 winter phac ariz Phacelia arizonica
## # i 155 more rows
## # i 11 more variables: sci_name_profID <chr>, voucher <chr>, DNA <chr>,
## #   label_number <chr>, collector <chr>, location <chr>, easting <dbl>,
## #   northing <dbl>, `elevation (m)` <dbl>, vial_barcode <chr>, notes <chr>
```

4. NDVI from the Santa Rita Experimental Range (20 pts)

```
## # A tibble: 110,270 x 6
##    datetime            r_mean g_mean b_mean ir_mean  NDVI_c
##    <chr>                <dbl>  <dbl>  <dbl>   <dbl>   <dbl>
##  1 2017-02-24 17:15:05     66     57     33      93 -0.0136
##  2 2017-02-24 17:30:05     67     56     31      92  0.0244
##  3 2017-02-24 17:45:06     72     58     30      91  0.0893
##  4 2017-02-24 18:00:05     77     58     28      87  0.179
##  5 2017-02-24 18:15:06     66     67     42      85  0.0668
##  6 2017-02-24 18:30:06     70     63     44      73 -0.792
##  7 2017-02-24 18:45:06     38     24     30      66 -0.0219
##  8 2017-02-24 19:00:06     21     12     15      19 -0.694
##  9 2017-02-25 06:15:05     24     14     19      19 -0.909
## 10 2017-02-25 06:30:05     48     37     43     104  0.127
## # i 110,260 more rows
```

```
## # A tibble: 110,270 x 6
##    datetime            r_mean g_mean b_mean ir_mean  NDVI_c
##    <dttm>               <dbl>  <dbl>  <dbl>   <dbl>   <dbl>
##  1 2017-02-24 17:15:05     66     57     33      93 -0.0136
##  2 2017-02-24 17:30:05     67     56     31      92  0.0244
##  3 2017-02-24 17:45:06     72     58     30      91  0.0893
##  4 2017-02-24 18:00:05     77     58     28      87  0.179
##  5 2017-02-24 18:15:06     66     67     42      85  0.0668
##  6 2017-02-24 18:30:06     70     63     44      73 -0.792
##  7 2017-02-24 18:45:06     38     24     30      66 -0.0219
##  8 2017-02-24 19:00:06     21     12     15      19 -0.694
##  9 2017-02-25 06:15:05     24     14     19      19 -0.909
## 10 2017-02-25 06:30:05     48     37     43     104  0.127
## # i 110,260 more rows
```

```
## [1] "220585501s (~6.99 years)"
```

```
## # A tibble: 110,270 x 9
##    datetime            r_mean g_mean b_mean ir_mean  NDVI_c  year month   DOY
##    <dttm>               <dbl>  <dbl>  <dbl>   <dbl>   <dbl> <dbl> <dbl> <dbl>
##  1 2017-02-24 17:15:05     66     57     33      93 -0.0136  2017     2    55
##  2 2017-02-24 17:30:05     67     56     31      92  0.0244  2017     2    55
##  3 2017-02-24 17:45:06     72     58     30      91  0.0893  2017     2    55
##  4 2017-02-24 18:00:05     77     58     28      87  0.179   2017     2    55
##  5 2017-02-24 18:15:06     66     67     42      85  0.0668  2017     2    55
##  6 2017-02-24 18:30:06     70     63     44      73 -0.792   2017     2    55
```

```
##  7 2017-02-24 18:45:06     38     24     30      66 -0.0219  2017     2    55
##  8 2017-02-24 19:00:06     21     12     15      19 -0.694   2017     2    55
##  9 2017-02-25 06:15:05     24     14     19      19 -0.909   2017     2    56
## 10 2017-02-25 06:30:05     48     37     43     104  0.127   2017     2    56
## # i 110,260 more rows
```

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

```
## # A tibble: 85 x 3
## # Groups:   year [8]
##     year month mean_NVDI
##    <dbl> <dbl>     <dbl>
##  1  2017     2  -0.0907
##  2  2017     3  -0.0802
##  3  2017     4  -0.0739
##  4  2017     5  -0.0734
##  5  2017     6  -0.0976
##  6  2017     7  -0.0810
##  7  2017     8   0.00581
##  8  2017     9  -0.0542
##  9  2017    10  -0.105
## 10  2017    11  -0.129
## # i 75 more rows
```

5. Vectors (10 pts)

```
## [1] "2a:"
```

```
## [1] 23 24 40
```

```
## [1] "2b:"
```

```
## [1]  TRUE FALSE FALSE
```

```
## [1] "2c:"
```

```
## [1] 0 0 4
```

```
## [1] "2d:"
```

```
## [1] "(woo)" "(hey)" NA
```

6. Dugout Data (15 pts)

```
## Rows: 102 Columns: 16
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (8): Site_ID, Date, Soil Salinity, pH, Soil Zone, Location of nearest o...
## dbl  (7): latitude, longitude, Elevation.m, ion Concentration in groundwater...
## time (1): Time
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
## # A tibble: 102 x 16
##    Site_ID Date      Time   latitude longitude SoilSalinity pH          SoilZone
##    <chr>   <chr>     <time>    <dbl>     <dbl> <chr>        <chr>       <chr>
##  1 5       24-Aug-17 10:03      51.4     -103. moderate     alkaline    dark gr~
##  2 20      24-Jul-17 11:41      50.1     -102. very slight  unclassifi~ black
```

```
##  3 36      10-Aug-17 15:05      52.5     -105. very slight  alkaline    dark gr~
##  4 49      24-Jul-17 13:15      50.0     -102. slight       unclassifi~ black
##  5 51      24-Jul-17 16:19      50.0     -102. slight       unclassifi~ black
##  6 52      25-Jul-17 11:27      49.9     -102. slight       unclassifi~ black
##  7 65      11-Aug-17 11:50      52.6     -110. very slight  slightly a~ dark br~
##  8 68      8-Aug-17  09:30      50.6     -105. very slight  alkaline    brown
##  9 10A     24-Aug-17 12:25      51.8     -103. slight       alkaline    dark gr~
## 10 10B     24-Aug-17 13:14      51.8     -103. slight       alkaline    dark gr~
## # i 92 more rows
## # i 8 more variables: Elevation.m <dbl>,
## #   `Location of nearest observation well` <chr>,
## #   `ion Concentration in groundwater (mg/L)` <dbl>, MajorSalts <chr>,
## #   Anion <chr>, `2017 Well groundwater depth` <dbl>,
## #   `dugout elevation above groundwater` <dbl>, Surface_Sal.ppt <dbl>
```

```
## [1] "3a:"
```

```
## # A tibble: 85 x 16
##    Site_ID Date      Time   latitude longitude SoilSalinity pH          SoilZone
##    <chr>   <chr>     <time>    <dbl>     <dbl> <chr>        <chr>       <chr>
##  1 20      24-Jul-17 11:41      50.1     -102. very slight  unclassifi~ black
##  2 36      10-Aug-17 15:05      52.5     -105. very slight  alkaline    dark gr~
##  3 49      24-Jul-17 13:15      50.0     -102. slight       unclassifi~ black
##  4 51      24-Jul-17 16:19      50.0     -102. slight       unclassifi~ black
##  5 52      25-Jul-17 11:27      49.9     -102. slight       unclassifi~ black
##  6 65      11-Aug-17 11:50      52.6     -110. very slight  slightly a~ dark br~
##  7 68      8-Aug-17  09:30      50.6     -105. very slight  alkaline    brown
##  8 10A     24-Aug-17 12:25      51.8     -103. slight       alkaline    dark gr~
##  9 10B     24-Aug-17 13:14      51.8     -103. slight       alkaline    dark gr~
## 10 10C     24-Aug-17 10:30      51.8      103. very slight  alkaline    dark gr~
## # i 75 more rows
## # i 8 more variables: Elevation.m <dbl>,
## #   `Location of nearest observation well` <chr>,
## #   `ion Concentration in groundwater (mg/L)` <dbl>, MajorSalts <chr>,
## #   Anion <chr>, `2017 Well groundwater depth` <dbl>,
## #   `dugout elevation above groundwater` <dbl>, Surface_Sal.ppt <dbl>
```

```
## [1] "3b:"
```

```
## # A tibble: 94 x 16
##    Site_ID Date      Time   latitude longitude SoilSalinity pH          SoilZone
##    <chr>   <chr>     <time>    <dbl>     <dbl> <chr>        <chr>       <chr>
##  1 10A     24-Aug-17 12:25      51.8     -103. slight       alkaline    dark gr~
##  2 10B     24-Aug-17 13:14      51.8     -103. slight       alkaline    dark gr~
##  3 10C     24-Aug-17 10:30      51.8      103. very slight  alkaline    dark gr~
##  4 10D     24-Aug-17 11:39      51.8     -103. very slight  alkaline    dark gr~
##  5 14A     12-Jul-17 10:15      51.0     -105. very slight  alkaline    brown
##  6 14B     12-Jul-17 12:50      51.0     -105. very slight  alkaline    black
##  7 15A     3-Aug-17  11:41      49.6     -102. slight       neutral to~ dark gr~
##  8 15B     3-Aug-17  14:15      49.5     -102. slight       neutral to~ dark gr~
##  9 22B     8-Aug-17  12:28      51.1      106. very slight  alkaline    brown
## 10 24A     14-Aug-17 14:15      49.9     -110. slight       neutral to~ brown
## # i 84 more rows
## # i 8 more variables: Elevation.m <dbl>,
## #   `Location of nearest observation well` <chr>,
## #   `ion Concentration in groundwater (mg/L)` <dbl>, MajorSalts <chr>,
```

```
## #   Anion <chr>, `2017 Well groundwater depth` <dbl>,
## #   `dugout elevation above groundwater` <dbl>, Surface_Sal.ppt <dbl>
```

```
## [1] "3c:"
```

```
## # A tibble: 102 x 16
##    Site_ID Date      Time   latitude longitude SoilSalinity pH          SoilZone
##    <chr>   <chr>     <time>    <dbl>     <dbl> <chr>        <chr>       <chr>
##  1 5       24-Aug-17 10:03      51.4     -103. moderate     alkaline    dark gr~
##  2 20      24-Jul-17 11:41      50.1     -102. very slight  unclassifi~ black
##  3 36      10-Aug-17 15:05      52.5     -105. very slight  alkaline    dark gr~
##  4 49      24-Jul-17 13:15      50.0     -102. slight       unclassifi~ black
##  5 51      24-Jul-17 16:19      50.0     -102. slight       unclassifi~ black
##  6 52      25-Jul-17 11:27      49.9     -102. slight       unclassifi~ black
##  7 65      11-Aug-17 11:50      52.6     -110. very slight  slightly a~ dark br~
##  8 68      8-Aug-17  09:30      50.6     -105. very slight  alkaline    brown
##  9 10A     24-Aug-17 12:25      51.8     -103. slight       alkaline    dark gr~
## 10 10B     24-Aug-17 13:14      51.8     -103. slight       alkaline    dark gr~
## # i 92 more rows
## # i 8 more variables: Elevation.m <dbl>,
## #   `Location of nearest observation well` <chr>,
## #   `ion Concentration in groundwater (mg/L)` <dbl>, MajorSalts <chr>,
## #   Anion <chr>, `2017 Well groundwater depth` <dbl>,
## #   `dugout elevation above groundwater` <dbl>, Surface_Sal.ppt <dbl>
```

7. Santa Cruz Rodents (20 pts)

```
## Rows: 51 Columns: 15
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (10): Site, Trap ID, Species, Status (R/N), Sex, Tail length, Hair samp...
## dbl   (4): Total Weight, Bag weight, Animal Weight, Hind foot length
## date  (1): Date
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
## [1] "Read in data:"
```

```
## [1] "4a:"
```

```
## # A tibble: 2 x 15
##   Date       Site  `Trap ID` Species `Status (R/N)` Sex   `Total Weight`
##   <date>     <chr> <chr>     <chr>   <chr>          <chr>          <dbl>
## 1 2022-11-14 <NA>  4J        SIOC?   N              <NA>              NA
## 2 2022-11-18 <NA>  D6        DIME?   N              F                 44
## # i 8 more variables: `Bag weight` <dbl>, `Animal Weight` <dbl>,
## #   `Hind foot length` <dbl>, TailLength <chr>, HairSample <chr>,
## #   Position <chr>, Handler <chr>, Notes <chr>
```

```
## [1] "4b:"
```

```
## # A tibble: 51 x 15
##    Date       Site     `Trap ID` Species `Status (R/N)` Sex   `Total Weight`
##    <date>     <chr>    <chr>     <chr>   <chr>          <chr>          <dbl>
##  1 2022-11-14 Heritage 4C        SIOC    N              F                134
##  2 2022-11-14 <NA>     4D        SIOC    N              M                136
##  3 2022-11-14 <NA>     4I        SIOC    N              <NA>              90
```

```
##  4 2022-11-14 <NA>     2H        REME    N             M                 38
##  5 2022-11-14 <NA>     4J        SIOC?   N             <NA>              NA
##  6 2022-11-14 <NA>     2F        REME    N             F                 22
##  7 2022-11-15 <NA>     4C        SIOC    R             <NA>              NA
##  8 2022-11-15 <NA>     4H        SIOC    N             F                 95
##  9 2022-11-15 <NA>     1H        REME    N             <NA>              26
## 10 2022-11-15 <NA>     1B        REME    N             F                 35
## # i 41 more rows
## # i 8 more variables: `Bag weight` <dbl>, `Animal Weight` <dbl>,
## #   `Hind foot length` <dbl>, TailLength <chr>, HairSample <chr>,
## #   Position <chr>, Handler <chr>, Notes <chr>
```

```
## [1] "4c"
```

```
## # A tibble: 51 x 15
##    Date       Site     `Trap ID` Species `Status (R/N)` Sex   `Total Weight`
##    <date>     <chr>    <chr>     <chr>   <chr>          <chr>          <dbl>
##  1 2022-11-14 Heritage 4C        SIOC    N              F                134
##  2 2022-11-14 <NA>     4D        SIOC    N              M                136
##  3 2022-11-14 <NA>     4I        SIOC    N              <NA>              90
##  4 2022-11-14 <NA>     2H        REME    N              M                 38
##  5 2022-11-14 <NA>     4J        SIOC    N              <NA>              NA
##  6 2022-11-14 <NA>     2F        REME    N              F                 22
##  7 2022-11-15 <NA>     4C        SIOC    R              <NA>              NA
##  8 2022-11-15 <NA>     4H        SIOC    N              F                 95
##  9 2022-11-15 <NA>     1H        REME    N              <NA>              26
## 10 2022-11-15 <NA>     1B        REME    N              F                 35
## # i 41 more rows
## # i 8 more variables: `Bag weight` <dbl>, `Animal Weight` <dbl>,
## #   `Hind foot length` <dbl>, TailLength <chr>, HairSample <chr>,
## #   Position <chr>, Handler <chr>, Notes <chr>
```

```
## [1] "4d:"
```

```
## # A tibble: 51 x 15
##    Date       Site     `Trap ID` Species `Status (R/N)` Sex   `Total Weight`
##    <date>     <chr>    <chr>     <chr>   <chr>          <chr>          <dbl>
##  1 2022-11-14 Heritage 4C        SIOC    N              F                134
##  2 2022-11-14 <NA>     4D        SIOC    N              M                136
##  3 2022-11-14 <NA>     4I        SIOC    N              <NA>              90
##  4 2022-11-14 <NA>     2H        REME    N              M                 38
##  5 2022-11-14 <NA>     4J        SIOC    N              <NA>              NA
##  6 2022-11-14 <NA>     2F        REME    N              F                 22
##  7 2022-11-15 <NA>     4C        SIOC    R              <NA>              NA
##  8 2022-11-15 <NA>     4H        SIOC    N              F                 95
##  9 2022-11-15 <NA>     1H        REME    N              <NA>              26
## 10 2022-11-15 <NA>     1B        REME    N              F                 35
## # i 41 more rows
## # i 8 more variables: `Bag weight` <dbl>, `Animal Weight` <dbl>,
## #   `Hind foot length` <dbl>, TailLength <chr>, HairSample <chr>,
## #   Position <chr>, Handler <chr>, Notes <chr>
```