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Stephanie Hazlitt[2]

GIS CoP Face to Face

2019-11-27

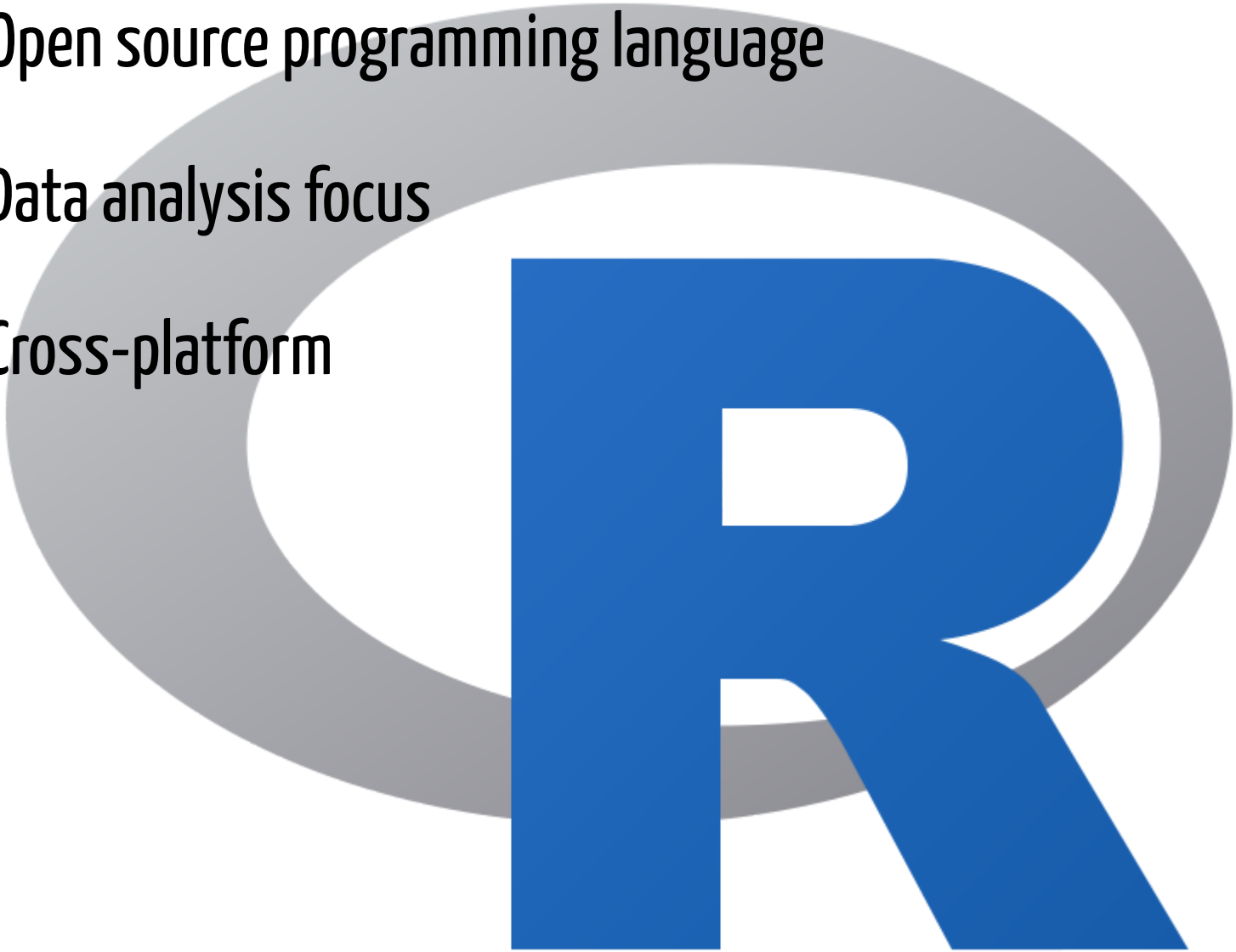
1: Ministry of Environment & Climate Change Strategy

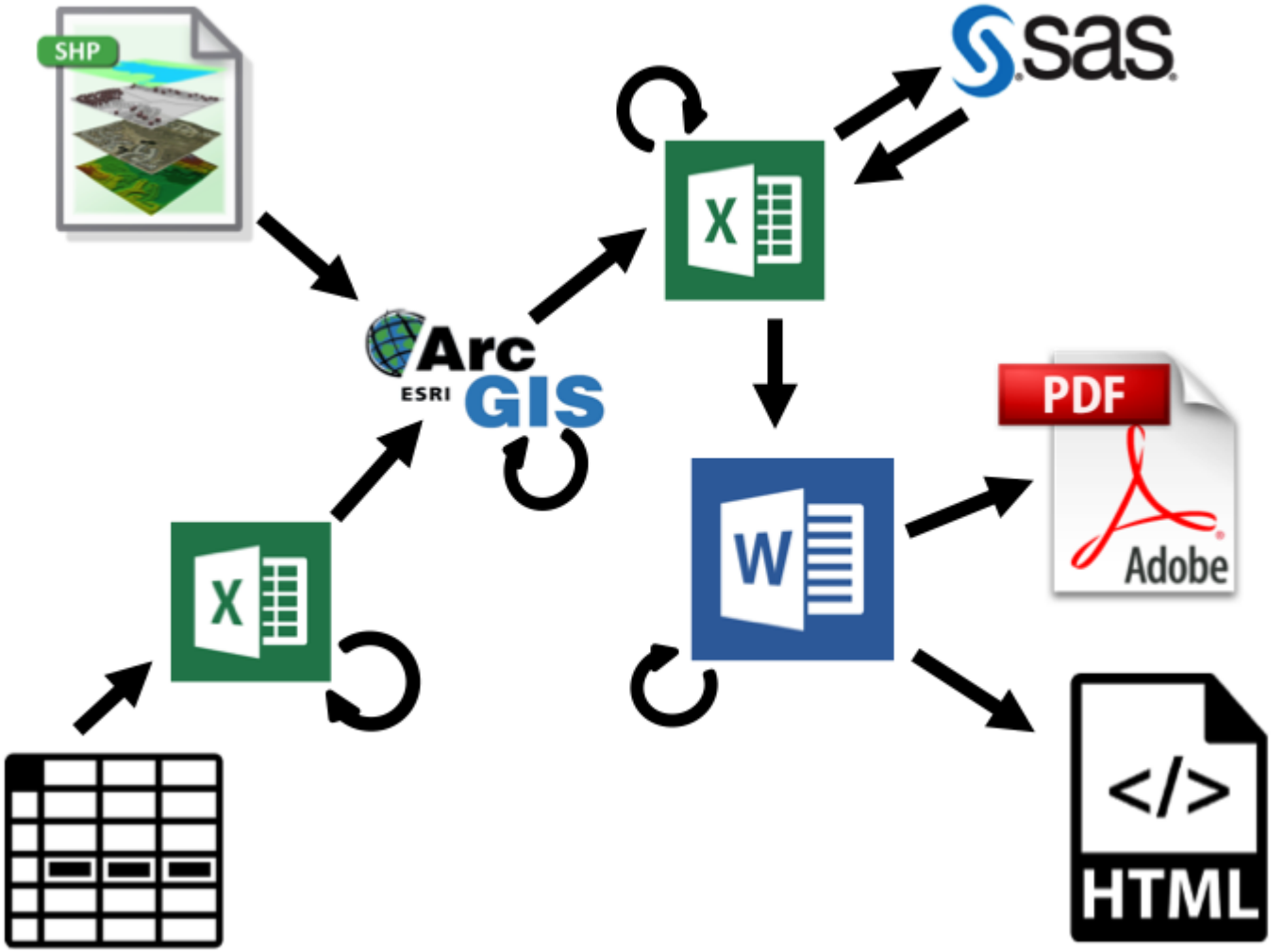
2: Ministry of Citizens' Services

Open source programming language

Data analysis focus

Cross-platform

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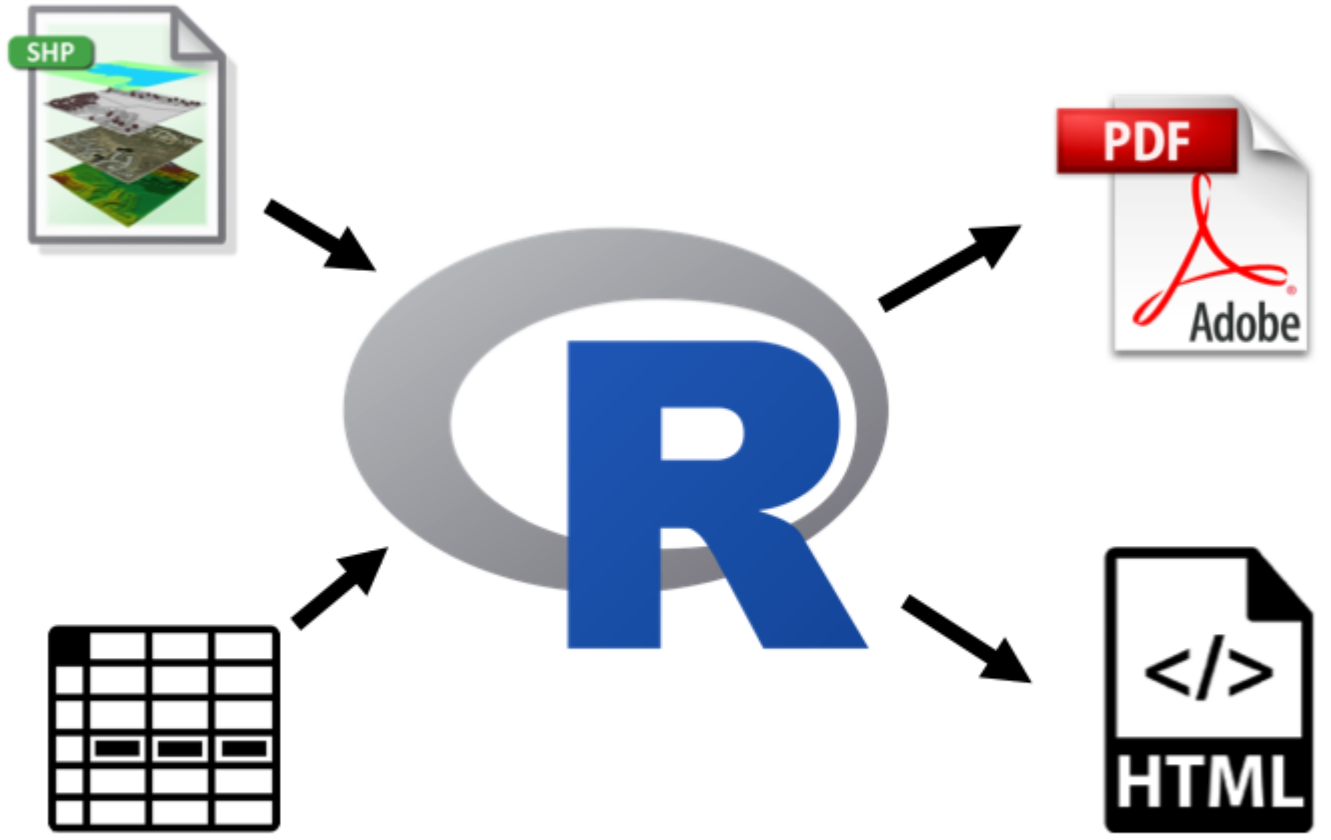
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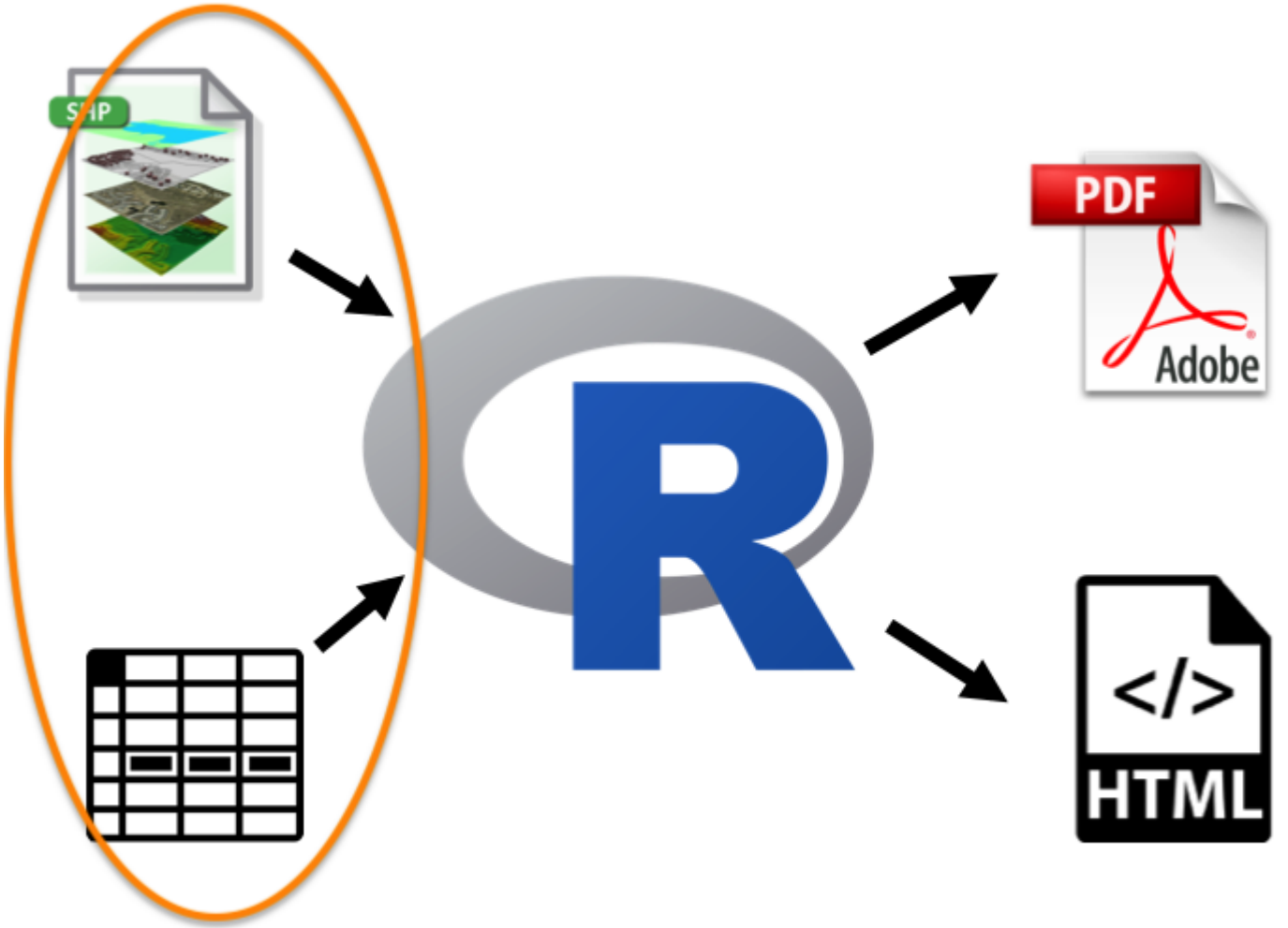
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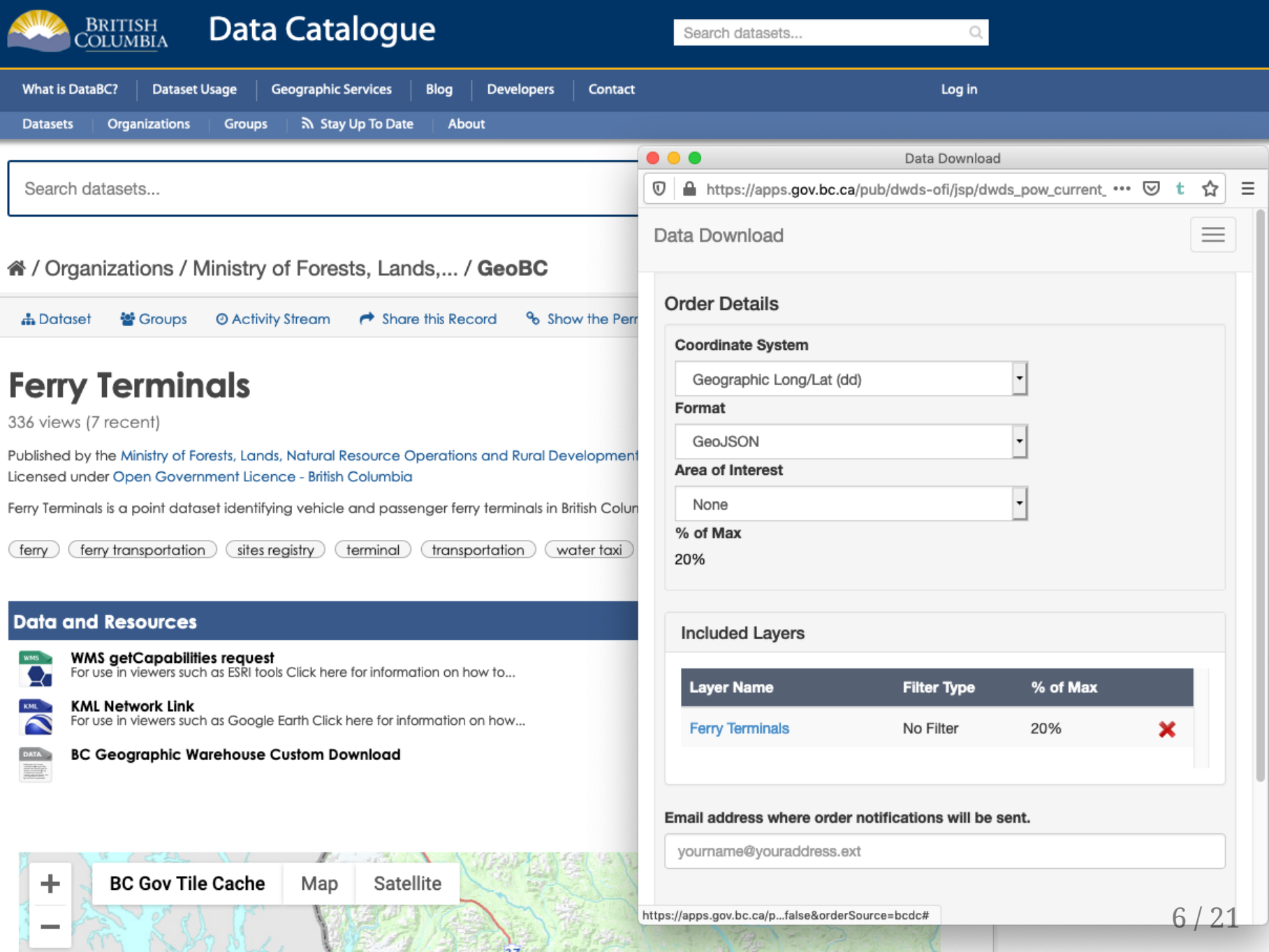
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Ferry Terminals is a point dataset identifying vehicle and passenger ferry terminals in British Colun
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20%
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Layer Name
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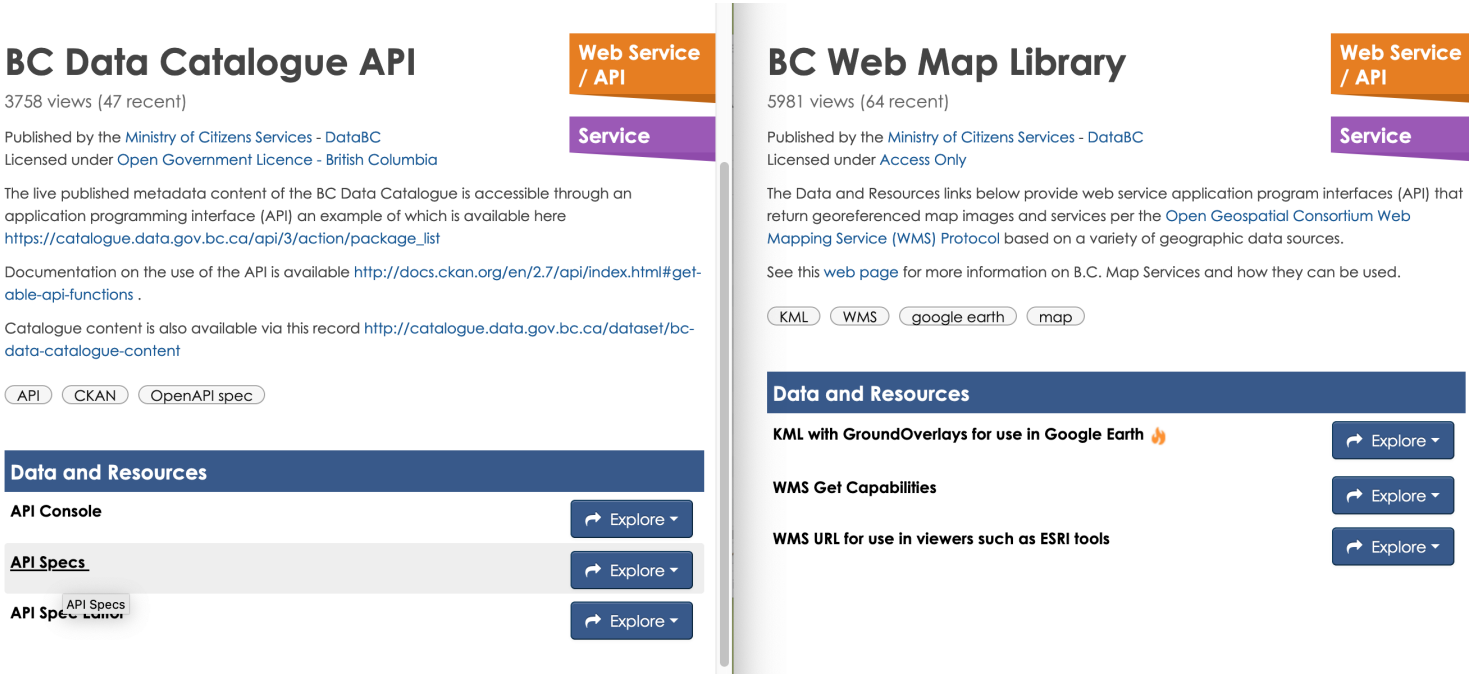
% of Max
Ferry Terminals
No Filter
20%
Email address where order notifications will be sent.
yourname@youraddress.ext
https://apps.gov.bc.ca/p...false&orderSource=bcdc#
6 / 21

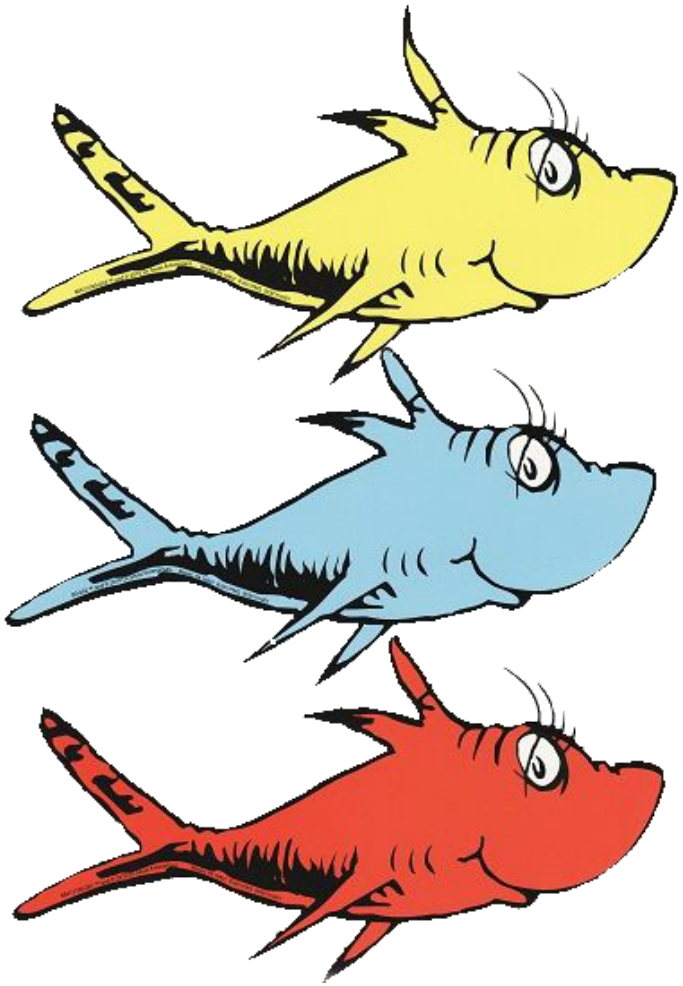
Application Programming Interfaces (APIs)



one `function()`

two `function()`

I need a `function()`



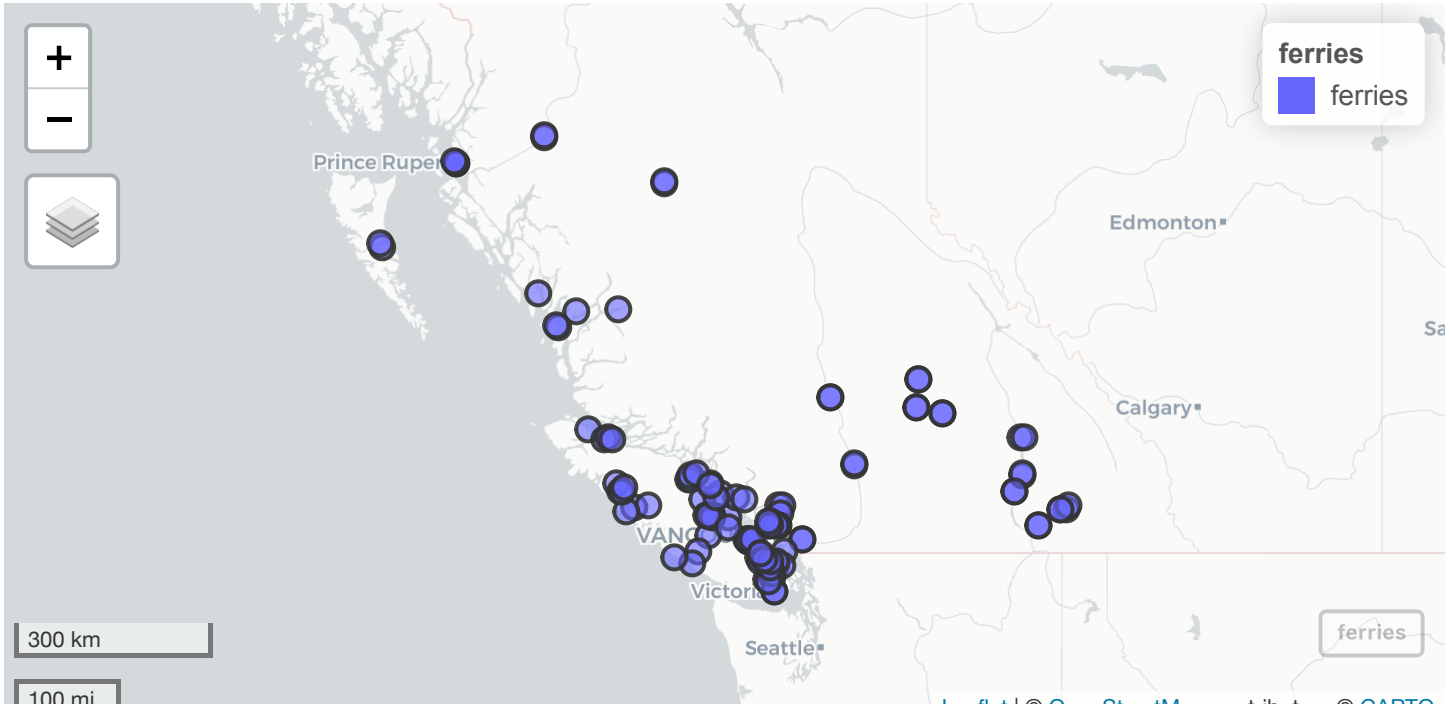
- **`bcdc_browse()`**
  - Open the catalogue in your default browser
- **`bcdc_search()`**
  - Search records in the catalogue
- **`bcdc_get_record()`**
  - Print a catalogue record
- **`bcdc_get_data()`**
  - Get catalogue data
- **`bcdc_query_geodata()`**
  - Get & query B.C. geospatial data from a web service

bcdc_get_data() - spatial data

```
bcdc_get_data("ferry-terminals", resource = "40d2b150-06a8-488c-8d88-d9df978d696d")
```

```
### OR use BCGW name #####
ferries <- bcdc_get_data("WHSE_IMAGERY_AND_BASE_MAPS.GSR_FERRY_TERMINALS_SV")

library(mapview)
mapview(ferries)
```



bcdc_query_geodata()

```
bcdc_query_geodata("municipalities-legally-defined-administrative-areas-of-bc")
```

```
Querying 'municipalities-legally-defined-administrative-areas-of-bc' record
• Using collect() on this object will return 161 features and 17 fields
• At most six rows of the record are printed here
```

```
Simple feature collection with 6 features and 17 fields
geometry type:  MULTIPOLYGON
dimension:      XY
bbox:           xmin: 1011118 ymin: 528481.5 xmax: 1631603 ymax: 1056560
epsg (SRID):    3005
proj4string:    +proj=aea +lat_1=50 +lat_2=58.5 +lat_0=45 +lon_0=-126 +x_0=1000000 +y_0=0 +e
# A tibble: 6 x 18
  id    LGL_ADMIN_AREA_… ADMIN_AREA_NAME ADMIN_AREA_ABBR… ADMIN_AREA_BOUN… ADMIN_AREA_TYPE
  <chr>            <int> <chr>           <chr>            <chr>            <chr>
1 WHSE…              160 Village of Lyt… Lytton           Legal            Municipality
2 WHSE…              161 City of Merritt Merritt          Legal            Municipality
3 WHSE…              162 Sun Peaks Moun… Sun Peaks        Legal            Municipality
4 WHSE…              174 The Corporatio… Nelson           Legal            Municipality
5 WHSE…                3 The Corporatio… Burns Lake       Legal            Municipality
6 WHSE…                4 District of Fo… Fort St James    Legal            Municipality
# … with 12 more variables: ADMIN_AREA_GROUP_NAME <chr>, CHANGE_REQUESTED_ORG <chr>,
#   UPDATE_TYPE <chr>, WHEN_UPDATED <date>, OIC_NUMBER <chr>, OIC_YEAR <chr>,
#   AFFECTED_ADMIN_AREA_ABRVN <chr>, FEATURE_AREA_SQM <dbl>, FEATURE_LENGTH_M <dbl>,
#   OBJECTID <int>, SE_ANNO_CAD_DATA <chr>, geometry <MULTIPOLYGON [m]>
```

Select columns (attributes) with `select()`

```
bcdc_query_geodata("municipalities-legally-defined-administrative-areas-of-bc") %>%
  select(ADMIN_AREA_ABBREVIATION, ADMIN_AREA_GROUP_NAME)
```

```
Querying 'municipalities-legally-defined-administrative-areas-of-bc' record
• Using collect() on this object will return 161 features and 5 fields
• At most six rows of the record are printed here
```

```
Simple feature collection with 6 features and 5 fields
geometry type:  MULTIPOLYGON
dimension:      XY
bbox:           xmin: 1011118 ymin: 528481.5 xmax: 1631603 ymax: 1056560
epsg (SRID):    3005
proj4string:    +proj=aea +lat_1=50 +lat_2=58.5 +lat_0=45 +lon_0=-126 +x_0=1000000 +y_0=0 +e
# A tibble: 6 x 6
  id    LGL_ADMIN_AREA_… ADMIN_AREA_ABBR… ADMIN_AREA_GROU… OBJECTID
  <chr>            <int> <chr>            <chr>                <int>
1 WHSE…              160 Lytton           Thompson-Nicola…    13685
2 WHSE…              161 Merritt          Thompson-Nicola…    13686
3 WHSE…              162 Sun Peaks        Thompson-Nicola…    13687
4 WHSE…              174 Nelson           Regional Distri…    13688
5 WHSE…                3 Burns Lake       Regional Distri…    13602
6 WHSE…                4 Fort St James    Regional Distri…    13603
# … with 1 more variable: geometry <MULTIPOLYGON [m]>
```

Filter rows (features) with `filter()`

```
bcdc_query_geodata("municipalities-legally-defined-administrative-areas-of-bc") %>%
  select(ADMIN_AREA_ABBREVIATION, ADMIN_AREA_GROUP_NAME) %>%
  filter(ADMIN_AREA_GROUP_NAME == "Capital Regional District")
```

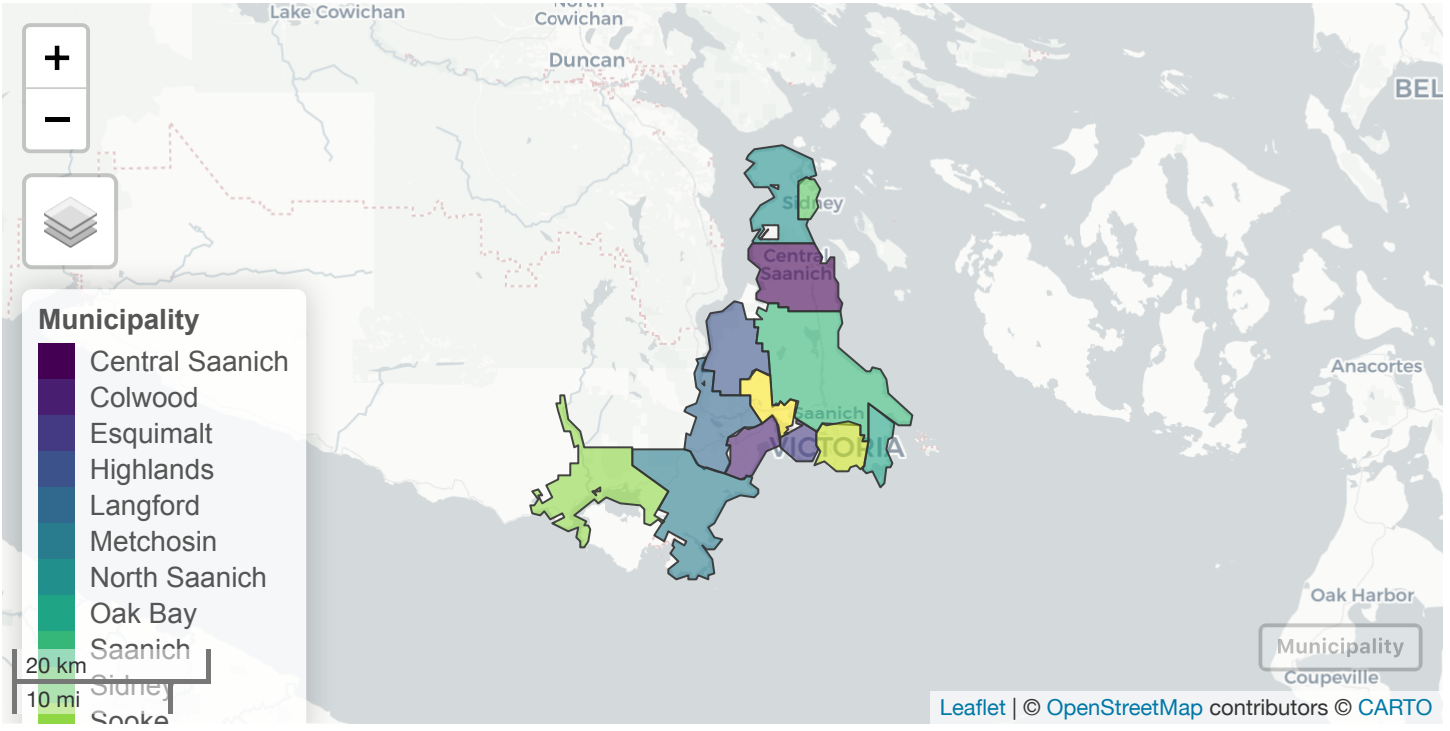
```
Querying 'municipalities-legally-defined-administrative-areas-of-bc' record
• Using collect() on this object will return 13 features and 5 fields
• At most six rows of the record are printed here
```

```
Simple feature collection with 6 features and 5 fields
geometry type:  MULTIPOLYGON
dimension:      XY
bbox:           xmin: 1174651 ymin: 368738.7 xmax: 1195365 ymax: 403223.9
epsg (SRID):    3005
proj4string:    +proj=aea +lat_1=50 +lat_2=58.5 +lat_0=45 +lon_0=-126 +x_0=1000000 +y_0=0 +e
# A tibble: 6 x 6
  id    LGL_ADMIN_AREA_… ADMIN_AREA_ABBR… ADMIN_AREA_GROU… OBJECTID
  <chr>            <int> <chr>            <chr>                <int>
1 WHSE…              258 Central Saanich  Capital Regiona…    13727
2 WHSE…              259 Colwood          Capital Regiona…    13728
3 WHSE…              260 Esquimalt        Capital Regiona…    13729
4 WHSE…              261 Highlands        Capital Regiona…    13730
5 WHSE…              262 Langford         Capital Regiona…    13731
6 WHSE…              263 Metchosin        Capital Regiona…    13732
# … with 1 more variable: geometry <MULTIPOLYGON [m]>
```

Get the data with `collect()`

```
crd_mun <- bcdc_query_geodata("municipalities-legally-defined-administrative-areas-
  select(ADMIN_AREA_ABBREVIATION, ADMIN_AREA_GROUP_NAME) %>%
  filter(ADMIN_AREA_GROUP_NAME == "Capital Regional District") %>%
  collect()
```

```
mapview(crd_mun, zcol = "ADMIN_AREA_ABBREVIATION", layer = "Municipality")
```



Let's find the 'greenest' city in the CRD

In addition to normal logical predicates (`==`. `!=`, `>`, `<`, etc.), `filter()` can take *geometric predicates*:

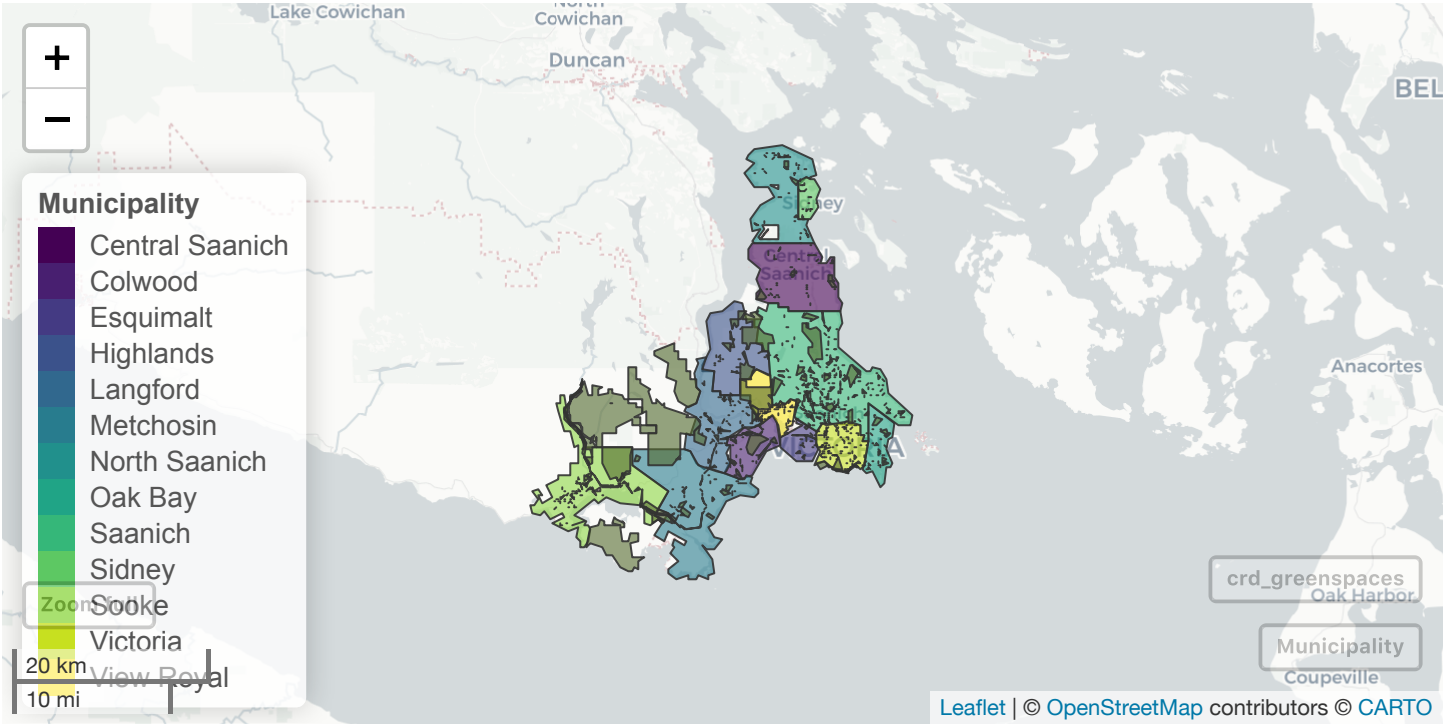
`EQUALS`, `DISJOINT`, `INTERSECTS`, `TOUCHES`, `CROSSES`, `WITHIN`, `CONTAINS`, `OVERLAPS`, `RELATE`, `DWITHIN`, `BEYOND`

```
crd_greenspaces <- bcdc_query_geodata("local-and-regional-greenspaces") %>%
  select(PARK_NAME, PARK_TYPE, PARK_PRIMARY_USE) %>%
  filter(INTERSECTS(crd_mun)) %>%
  collect()
```

https://catalogue.data.gov.bc.ca/dataset/local-and-regional-greenspaces

```
muni_map <- mapview(crd_mun, zcol = "ADMIN_AREA_ABBREVIATION",
                    layer = "Municipality")

muni_map +
  mapview(crd_greenspaces, col.regions = "darkolivegreen")
```



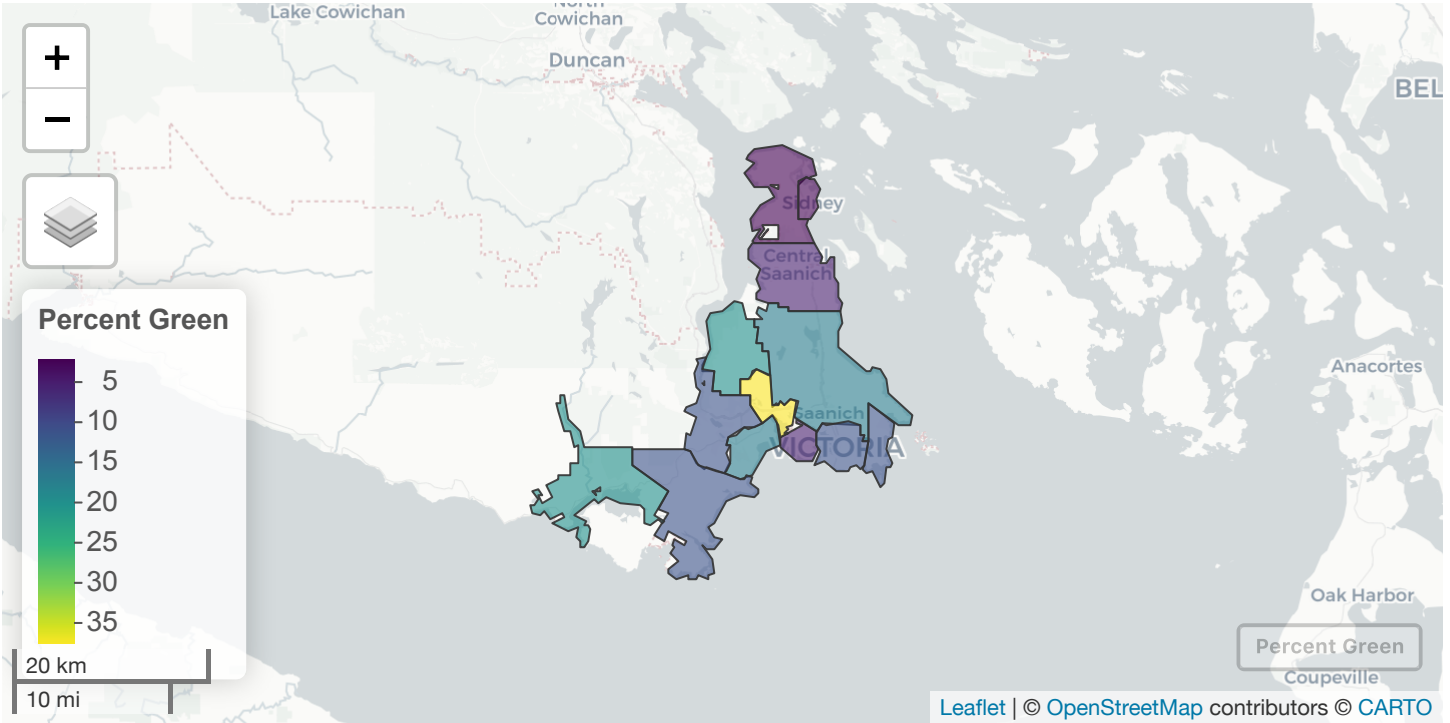
Find the amount of green space in each municipality

```
library(sf)
grn_intersected <- st_intersection(crd_greenspaces, crd_mun)

grn_intersected_summary <- group_by(grn_intersected,
                                    ADMIN_AREA_ABBREVIATION) %>%
  summarise(grn_area = sum(st_area(geometry)))

crd_mun <- left_join(crd_mun, st_drop_geometry(grn_intersected_summary),
                     by = "ADMIN_AREA_ABBREVIATION") %>%
  mutate(muni_area = st_area(geometry),
         percent_green = (grn_area / muni_area) * 100)
```

```
mapview(crd_mun, zcol = "percent_green", layer = "Percent Green")
```



Kudos

- BC Data Catalogue Team
- Michelle Douville
- Simon Norris
- Our bosses for giving us time/space for innovation and collaboration

- Install from CRAN:
  - https://cran.r-project.org/package=bcdata
  - `install.packages("bcdata")`
- Help & documentation:
  - https://bcgov.github.io/bcdata
- Issues/bugs:
  - https://github.com/bcgov/bcdata/issues

Bonus slide!

Get VRI for ~ 10kmx10km area NW of Prince George

```
tictoc::tic()
vri_pg <- bcdc_query_geodata("WHSE_FOREST_VEGETATION.VEG_COMP_LYR_R1_POLY") %>%
  filter(BBOX(c(1196754.2218,1005314.8161,1206862.4977,1015887.0438),
              crs = "EPSG:3005")) %>%
  collect()
tictoc::toc()
6.265 sec elapsed

plot(vri_pg["PROJ_AGE_1"])
```