

# GIS in R

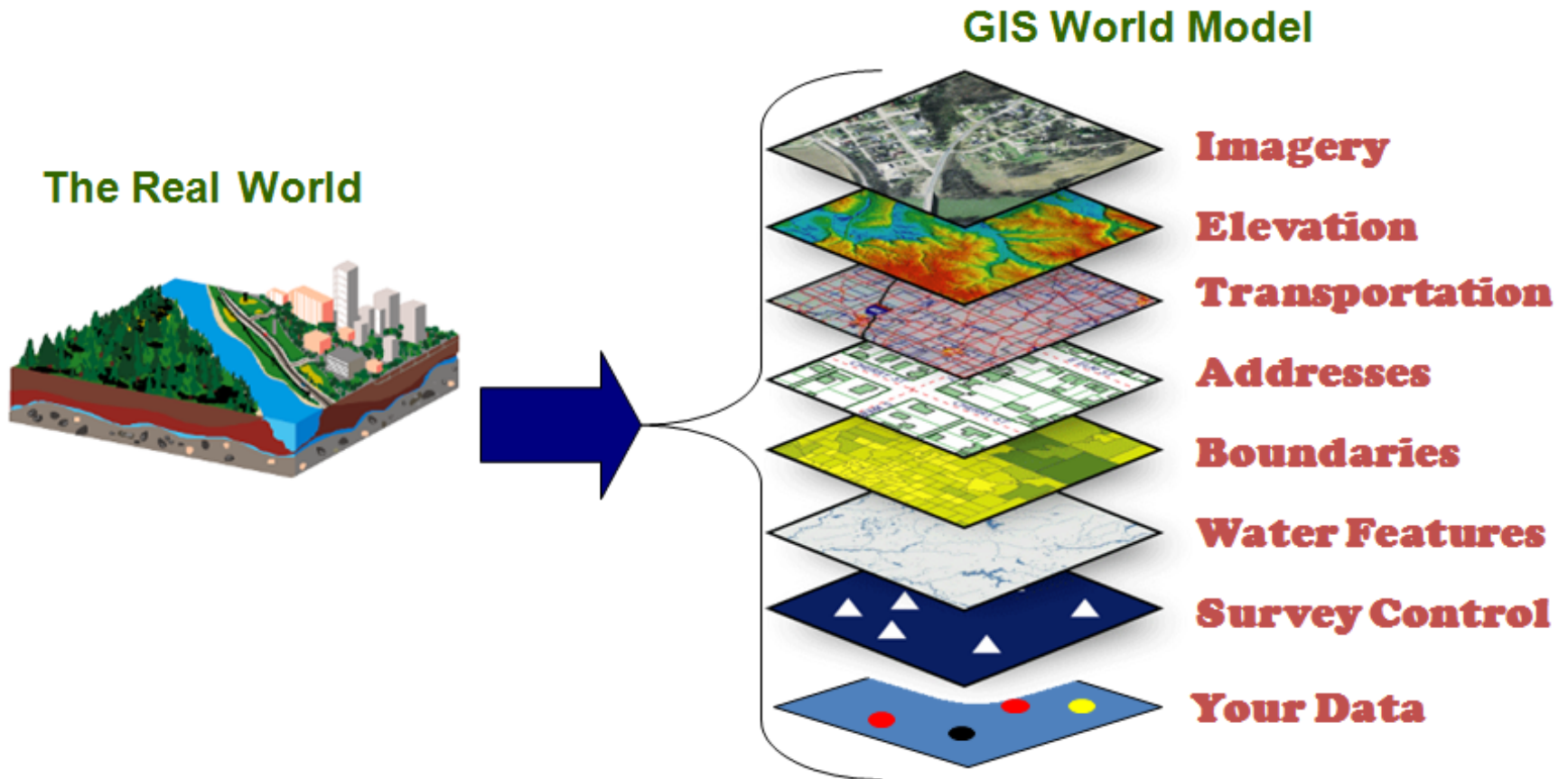
## Lecture 4

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# Topics of today

- Layers
- Manipulations of layers

# What are layers



# What are layers in R

- Each of our Spatial objects

```
# OTN slamon point data
kntm <- readOGR(dsn = ".", layer = "kntm")

## OGR data source with driver: ESRI Shapefile
## Source: ".", layer: "kntm"
## with 3677 features and 6 fields
## Feature type: wkbPoint with 2 dimensions

# Main rivers
mainRiv <- readOGR(dsn = ".", layer = "mainRivers")

## OGR data source with driver: ESRI Shapefile
## Source: ".", layer: "mainRivers"
## with 20 features and 1 fields
## Feature type: wkbLineString with 2 dimensions

# Administrative boundaries and coast lines
bounds <- readOGR(dsn = ".", layer = "borders")

## OGR data source with driver: ESRI Shapefile
## Source: ".", layer: "borders"
## with 6 features and 2 fields
## Feature type: wkbPolygon with 2 dimensions
```

# What are layers in R

- Each of our Spatial objects

```
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kntm <- readOGR(dsn = ".", layer = "kntm")

## OGR data source with driver: ESRI Shapefile
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# Main rivers
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## with 20 features and 1 fields
## Feature type: wkbLineString with 2 dimensions

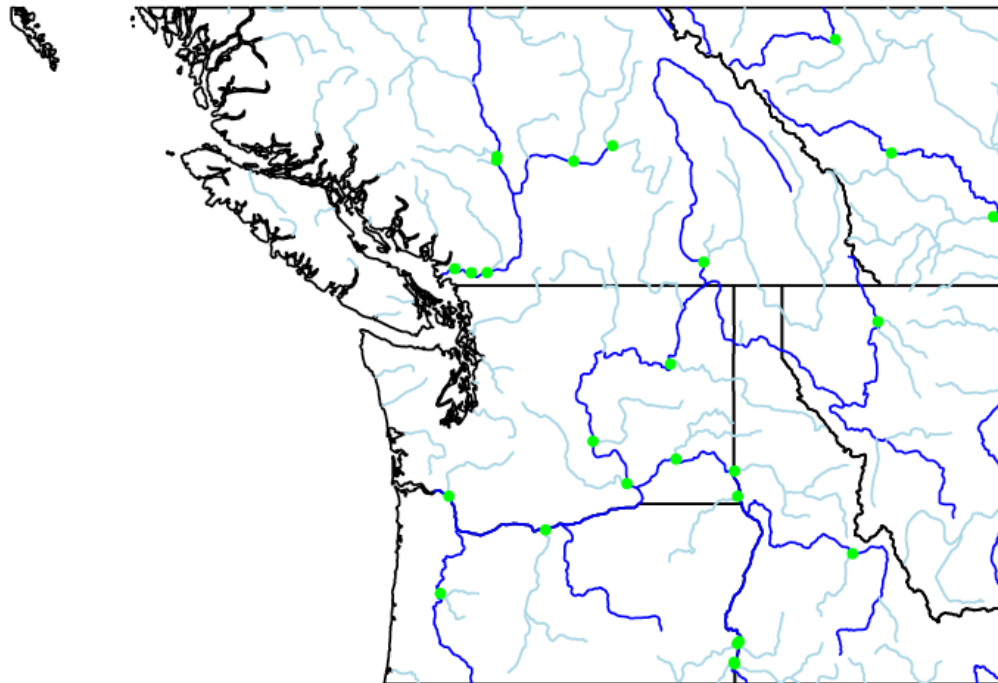
# Administrative boundaries and coast lines
bounds <- readOGR(dsn = ".", layer = "borders")

## OGR data source with driver: ESRI Shapefile
## Source: ".", layer: "borders"
## with 6 features and 2 fields
## Feature type: wkbPolygon with 2 dimensions
```

These need to be  
in the same CRS!

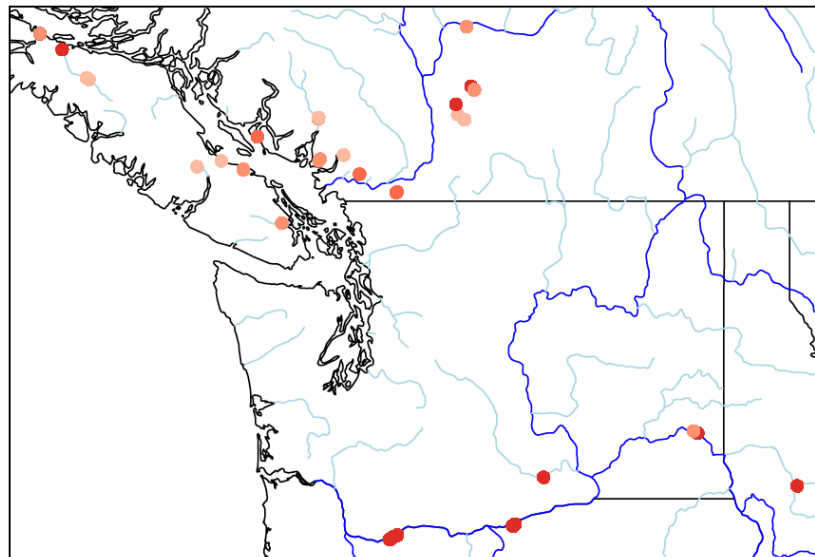
# Plot layers in R

```
plot(bounds)  
plot(mainRiv, add = TRUE, col = "blue")  
plot(smallRiv, add = TRUE, col = "lightblue")  
plot(rivInt, add = TRUE, col = "green", pch = 19, cex = 0.5)
```



# Plot layers in R

```
spplot(kntm, zcol = "scntfcn", col.regions = brewer.pal(6,  
  "Reds")[-1], sp.layout = list(list("sp.polygons",  
  bounds), list("sp.lines", mainRiv, col = "blue"),  
  list("sp.lines", smallRiv, col = "lightblue")))
```



- Oncorhynchus kisutch
- Oncorhynchus mykiss
- Oncorhynchus nerka
- Oncorhynchus tshawytscha
- Salvelinus malma

# Topics of today

- Layers
- Manipulations of layers



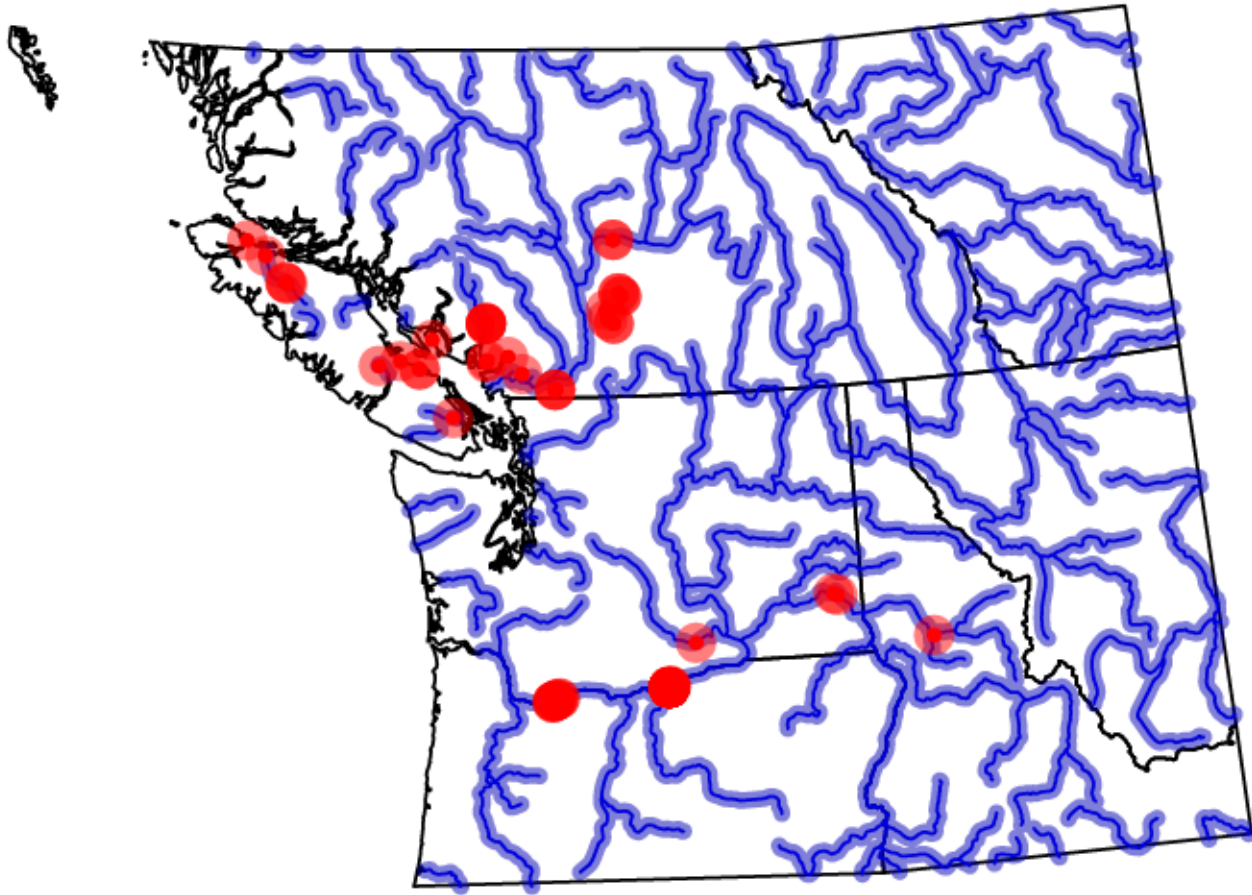
# Geometry Engine, Open Source (GEOS)

- GEOS contain the complete functionality of the Java Topology Suite
- Java Topology Suite has function for processing spatial and geometrical objects.
- GEOS includes functions such as:
  - Intersects
  - Touches
  - Contains
  - Union
  - Distance
  - Buffer

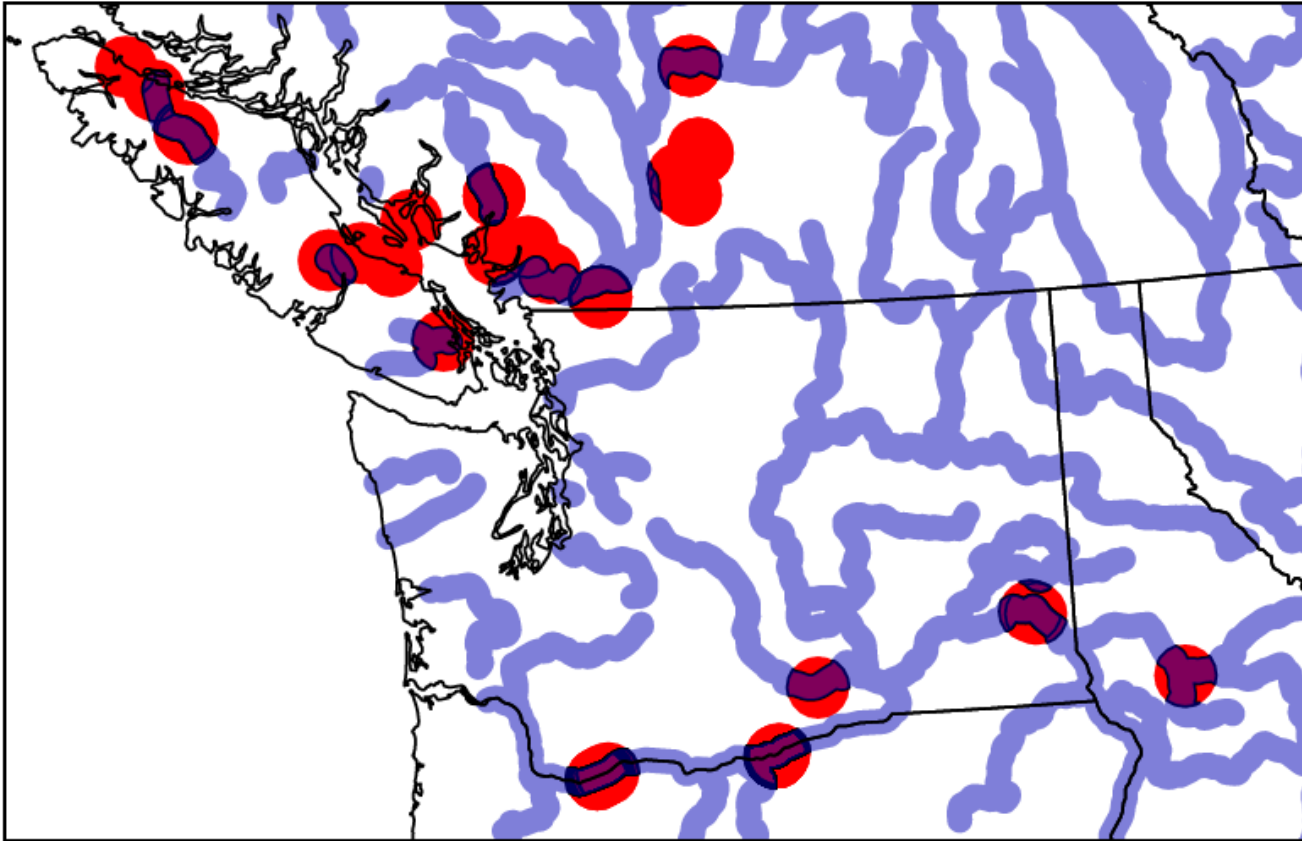
# R package rgeos

- rgeos is an interface to GEOS
- rgeos gives access to GEOS functions

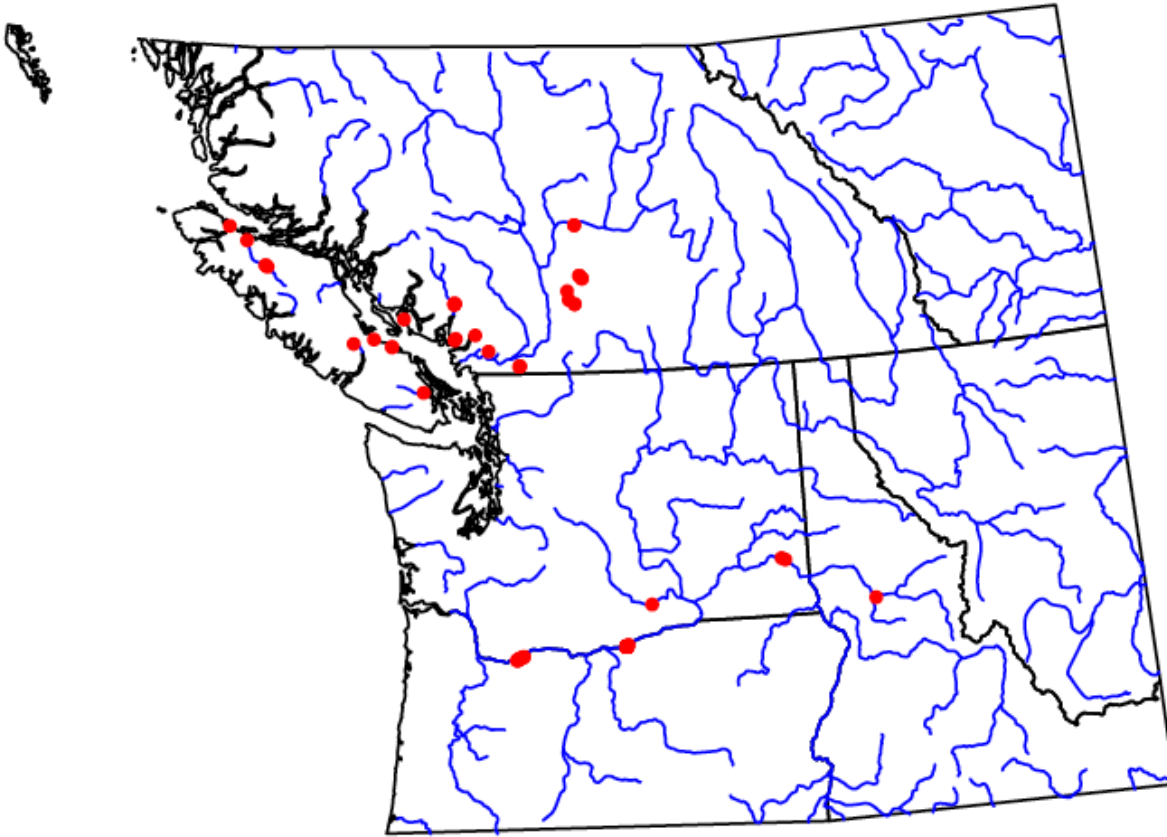
# gBuffer



# gIntersection

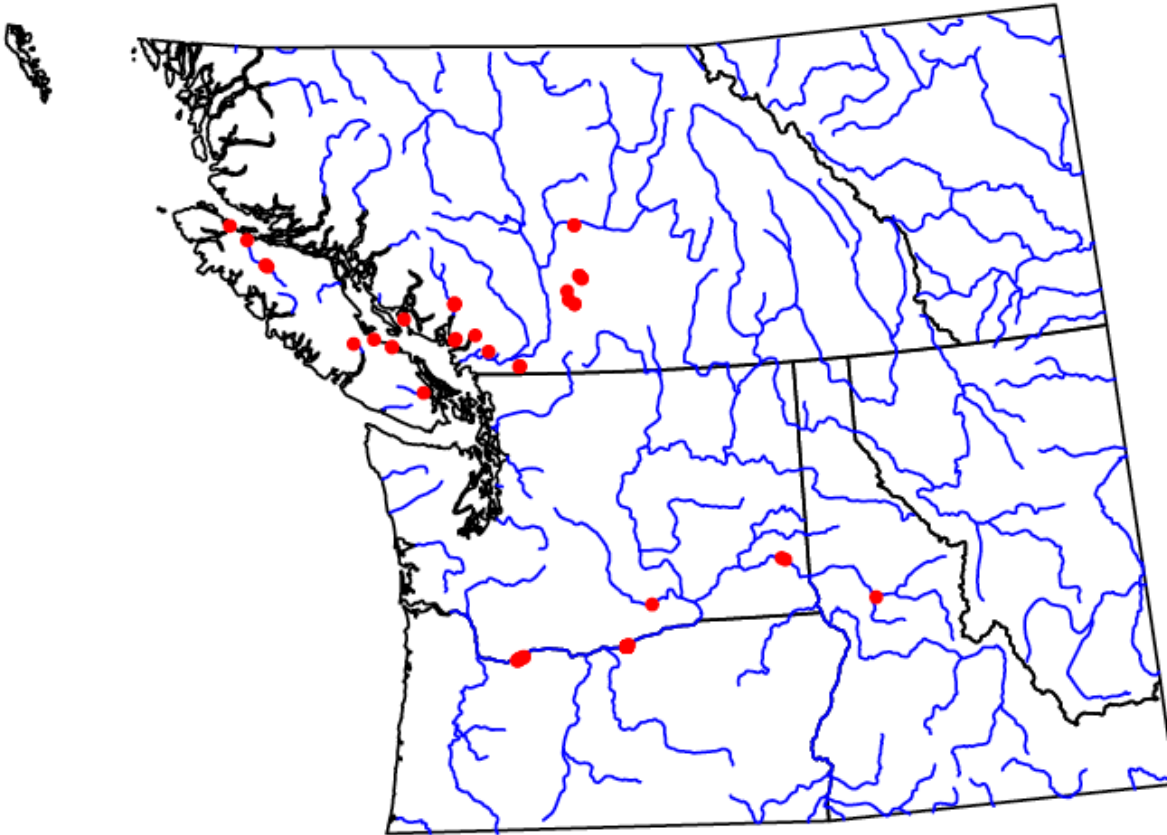


# gArea and gDistance



Need to be a  
**projected CRS!**

# gArea and gDistance



Need to be a  
**projected CRS!**

byid = TRUE