Powerful Mapping Web Applications with Open Source Tools

Part Two: OpenStreetMap

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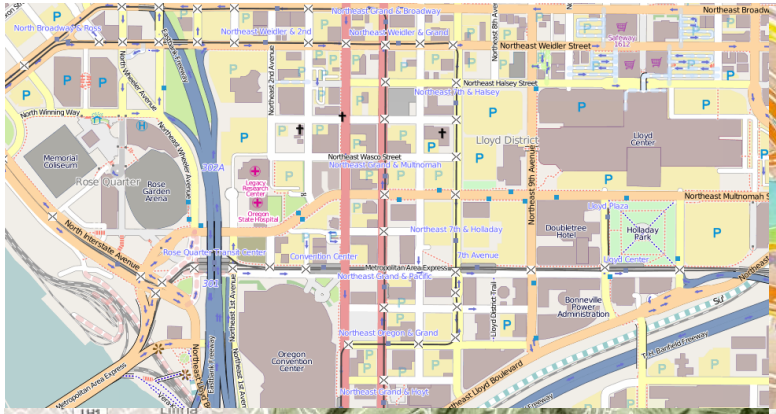
An Introduction to OpenStreetMap

OpenStreetWhat?

- OpenStreetMap or OSM
- ***Not*** "Open Street Maps"
- Founded in 2004
- Worldwide and seamless
- "Wikipedia of Maps"
  - Editable by anyone with an account
  - Data available to anyone, for free
  - … as long as you credit the contributors
- http://www.openstreetmap.org

What does it look like?

OSM.org default



Stamen Design

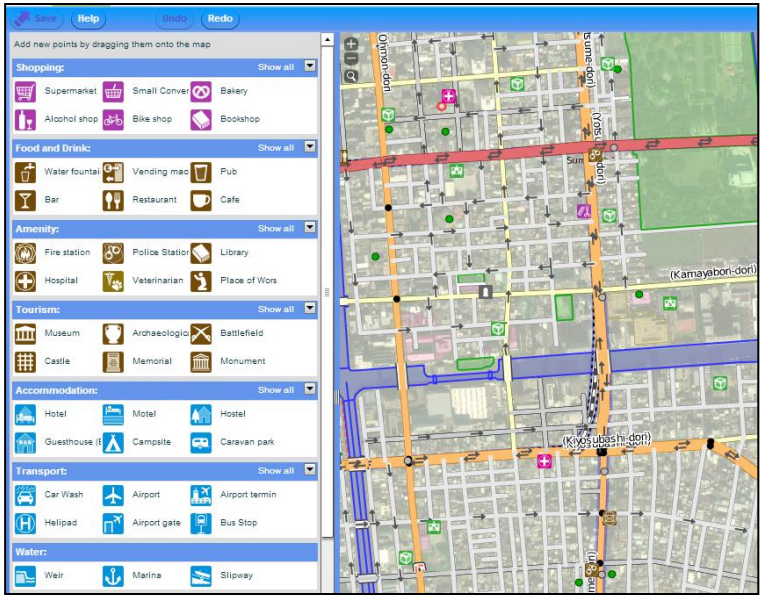
Who uses OpenStreetMap?

- http://switch2osm.org

(you)

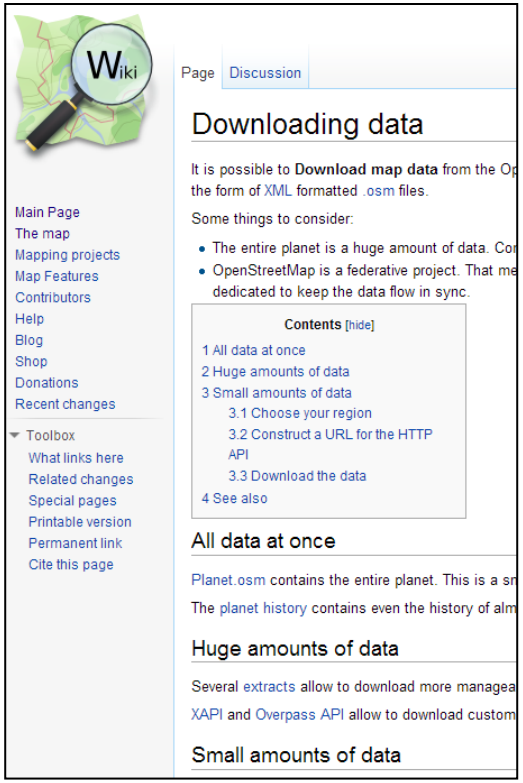
How do you edit it?

- Create an account
- Various free and open source editors available
- Potlatch and JOSM are very popular
- We will be using Potlatch 2, a flash-based, in-browser editor



How do you get the data?

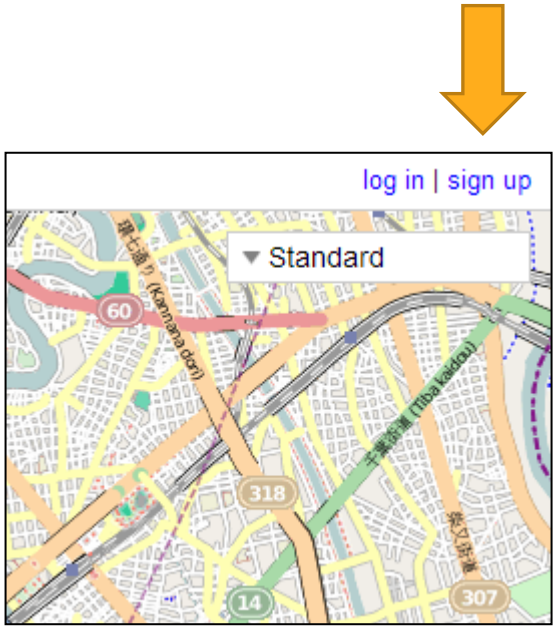
- http://wiki.openstreetmap.org/wiki/Downloading_data
- Download via JOSM
  - Easily download and save small areas
  - "Mirrored Download" plugin for large areas
- Large extracts hosted around the web, updated at differing schedules
- We will be using the OSM plugin for QGIS



Editing basics: Points of interest

Step 1: Sign up for an account

- Go to http://osm.org
- Click the "sign up" link in the top right corner
- Set up your account!



Create a User Account

Fill in the form and we will send you a quick email to activate your account.

Email Address:

Confirm Email Address:

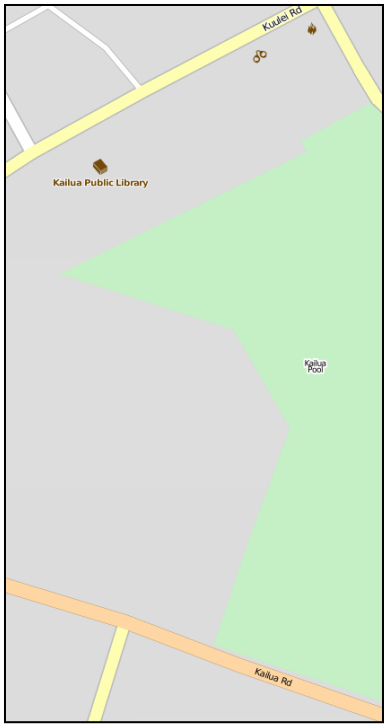
Not displayed publicly (see privacy policy)

Display Name:

Your publicly displayed username. You can change this later in the preferences.

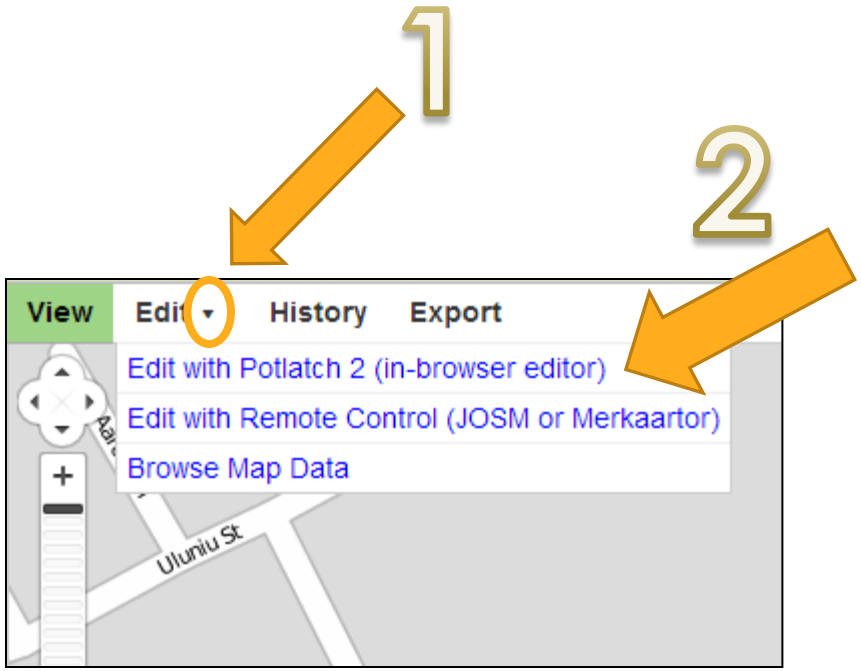
Step 2: Where and what

- Congratulations! You are now the owner of one of ~850,000 OSM editing accounts!
- Go back to http://osm.org
- Find a neighborhood that you know well
- Think about what you know about in that place
- ***Local knowledge***
- Notice anything missing?



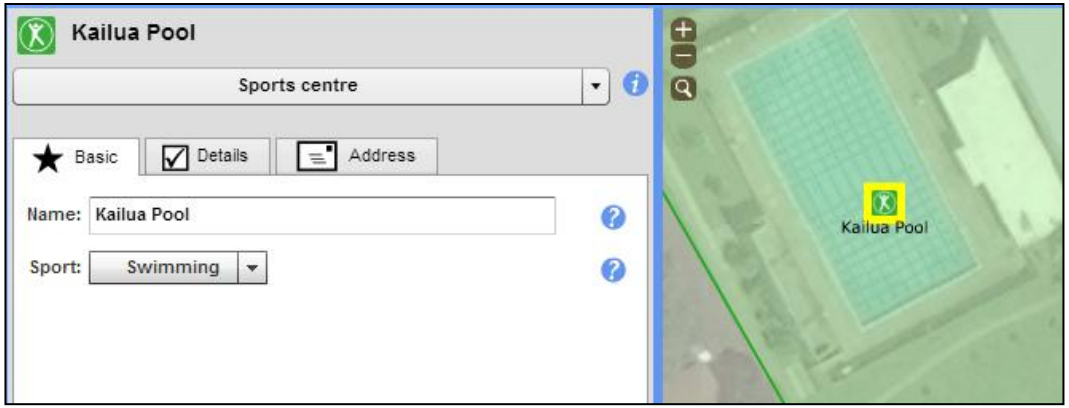
Step 3: Open the editor

- Click on the down-arrow next to the "Edit" menu
- Select "Edit with Potlatch 2"



Step 4: Explore

- Start familiarizing yourself with Potlatch
- Don't worry, you can't break anything ***until you click "Save"***
- Click things to see how they're classified

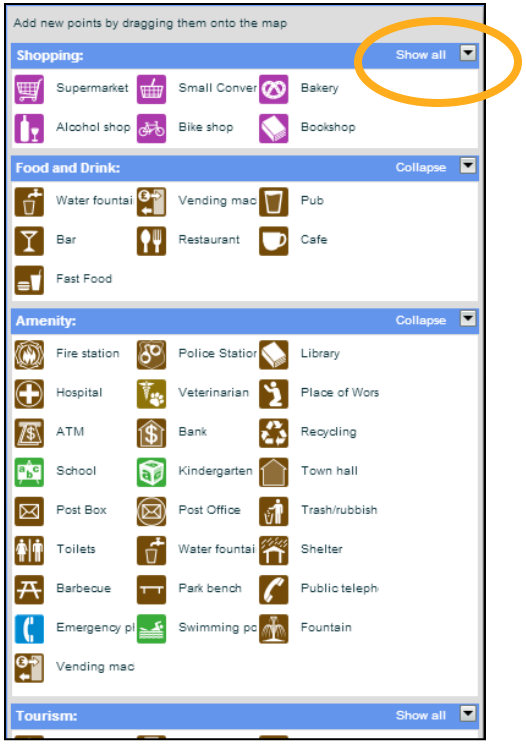


Step 5: Add something

- But first, what's your source?
- **Don't copy from other maps**
- Local knowledge is best, but a dataset with the correct license and permissions can be a source
- You even need permission for aerial imagery (imagery included in OSM editors is OK)
- More info about the OpenStreetMap license (OdBL) can be found at http://www.openstreetmap.org/copyright

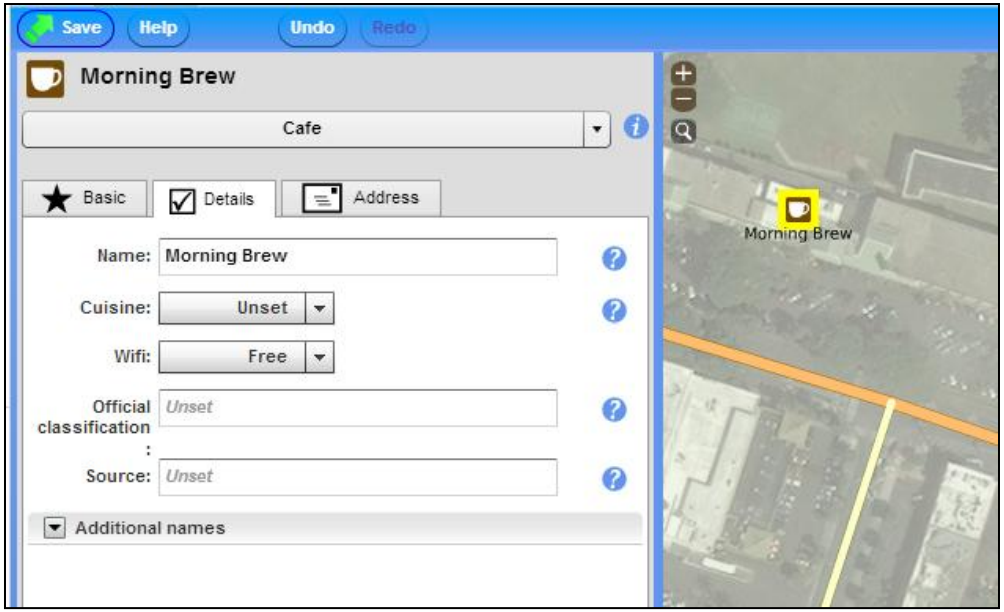
Step 5: Add something

- Pick something in the panel
- Click the arrow to expand
- What do you know about in this area? What are you interested in mapping?
- I picked a café
- Drag it onto the map where the POI is



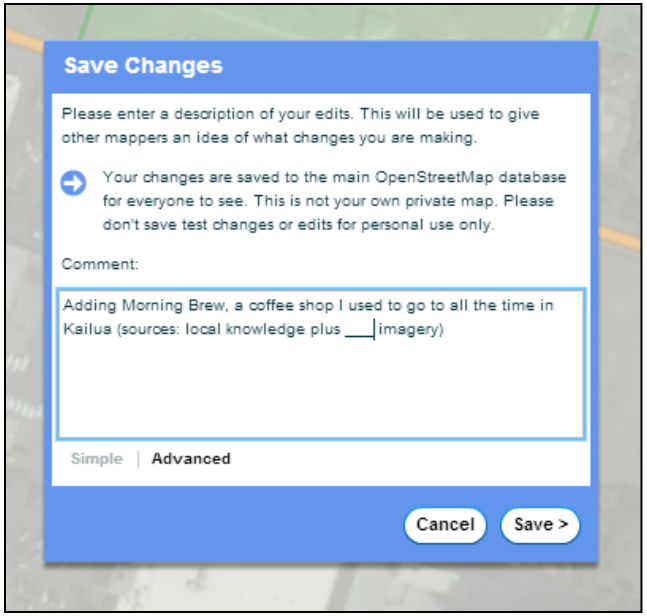
Step 5: Add something

- Next, fill in the details that you know



Step 5: Save your edits

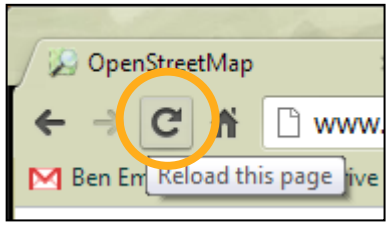
- Save early, save often
- This creates a "changeset" that is sent to the database
- **Give an informative changeset comment** *that includes what you were working on and what your sources were*
- What imagery are you using? Do you know how to change it?

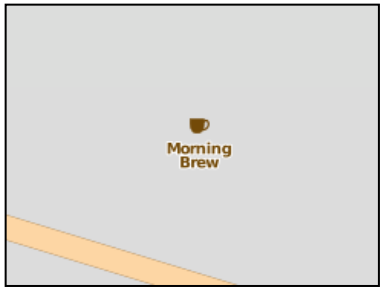


Step 6: View your edits

- Click the "View" button in the top left to go back to the map
- *Hold down Ctrl while clicking refresh* to clear your browser's cache of map tiles (shift-refresh with Firefox)

Ctrl +





Example workflow: Fixing something

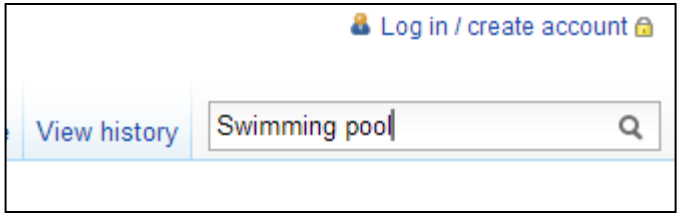
- Find a POI (point of interest) you know about that's already in the map
- Click the "Advanced" button at the bottom to see all the tags on the POI

Node: **1165895778**

Key	Value
leisure	sports_centre
name	Kailua Pool
sport	swimming

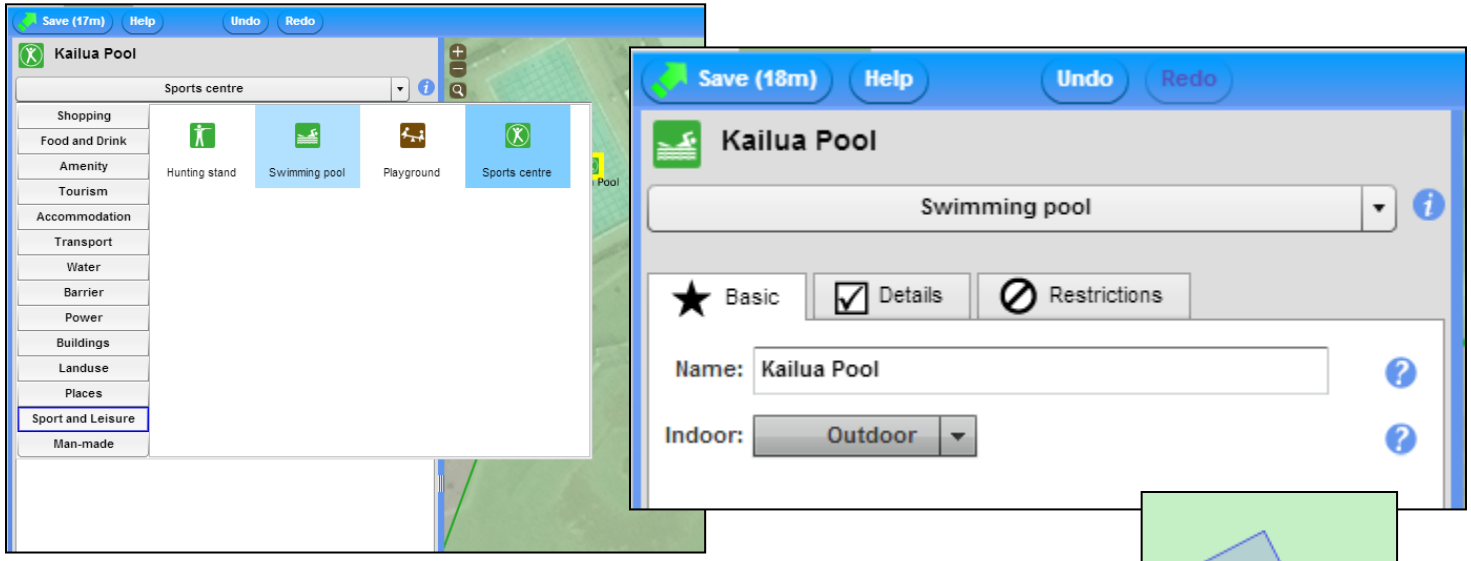
Example workflow: Fixing something

- Look that type of thing up on http://wiki.openstreetmap.org
- Is it tagged correctly?
- This one should be fixed

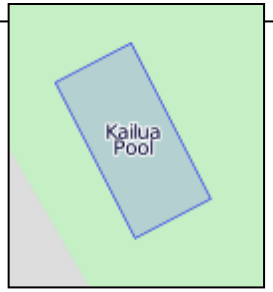


leisure=swimming_pool,
not leisure=sports_centre

Example workflow: Fixing something



… and after changing it to a polygon…



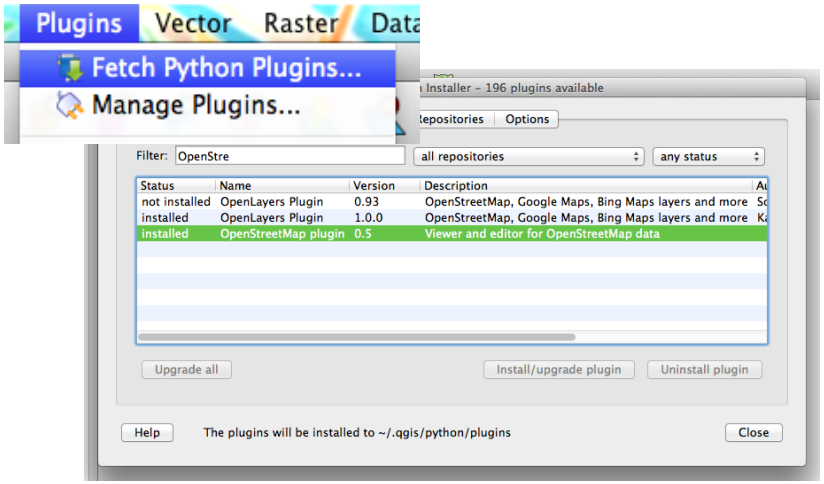
More about editing

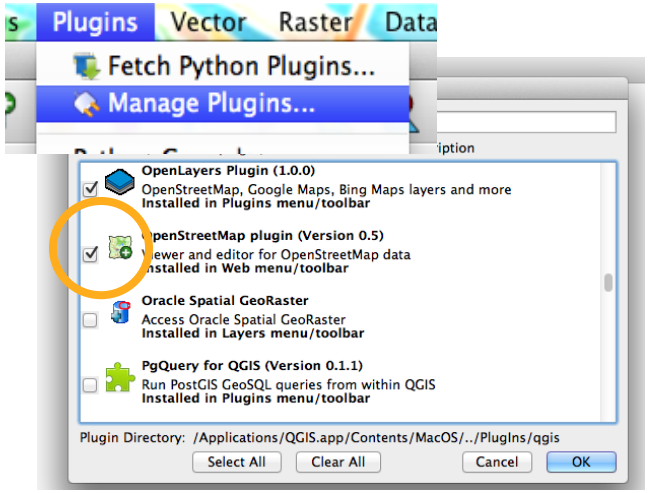
- For anything more than point of interest editing, we recommend using JOSM (Java OpenStreetMap Editor)
- Not too hard to learn, especially if you're familiar with GIS software
- Handy tools that automatically line up nodes, orthagonalize, and make circles
- Remember to visit the wiki for tagging help, or ask on the newbies listserv http://lists.openstreetmap.org/listinfo/newbies

Getting and Preparing your OSM Data

Step 1: Get your plugin working

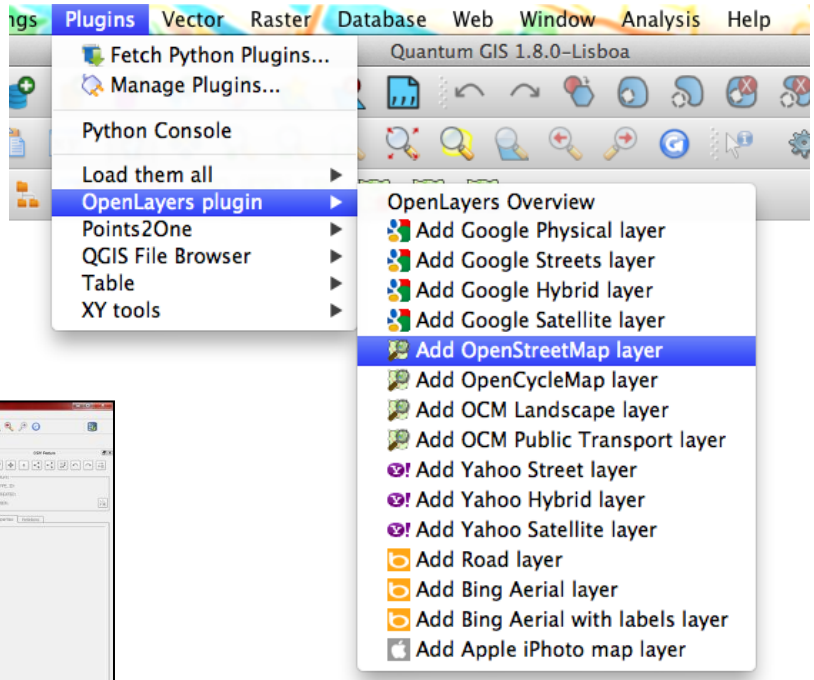
- We will be using QuantumGIS today to limit the software you needed to install
- Make sure you've not only downloaded the OSM plugin, but turned it on (2 steps)

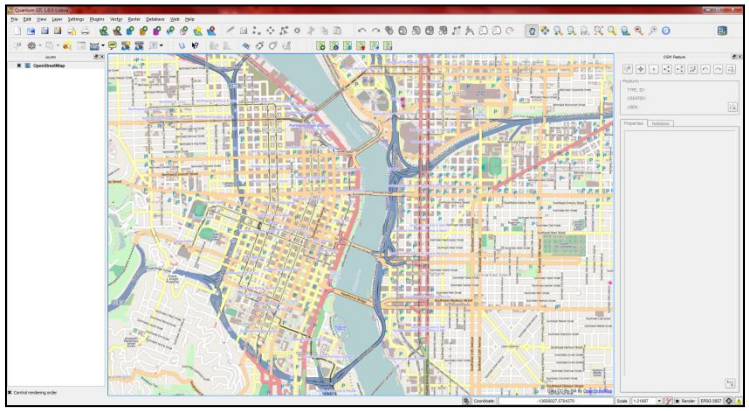




Step 2: Select an area of interest

- Go to Plugins-> OpenLayers plugin -> Add OpenStreetMap Layer
- Zoom and pan to an area of interest

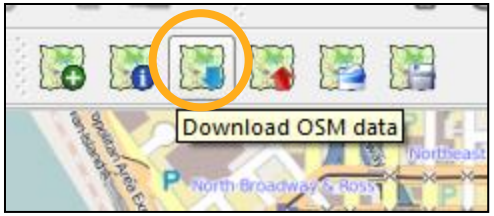




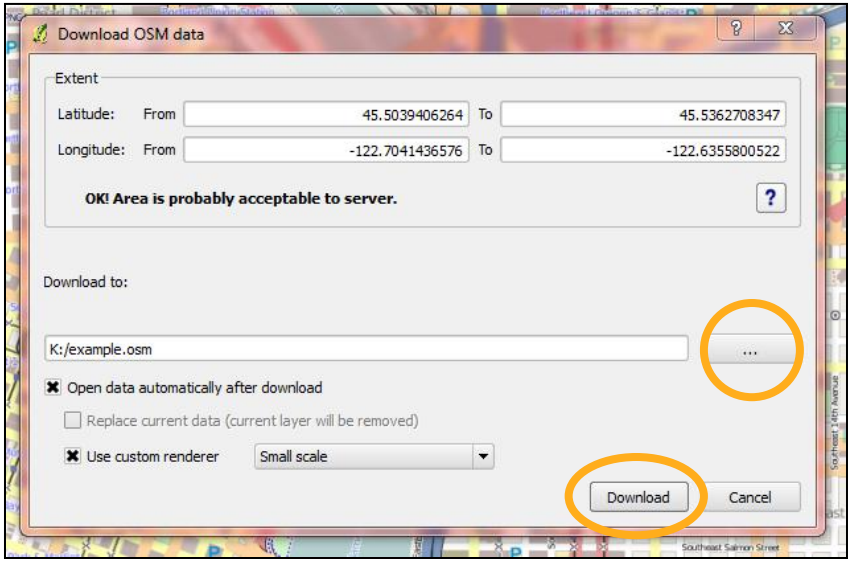
Not too big, now!

Step 3: Download from OSM

- Click the "Download OSM data" button (blue arrow pointing down)
- If you can't see the button, look for and expand the plugin's toolbar

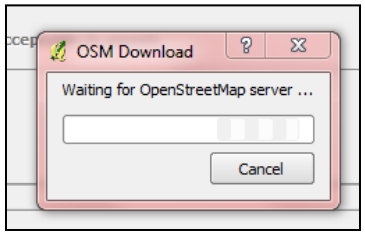


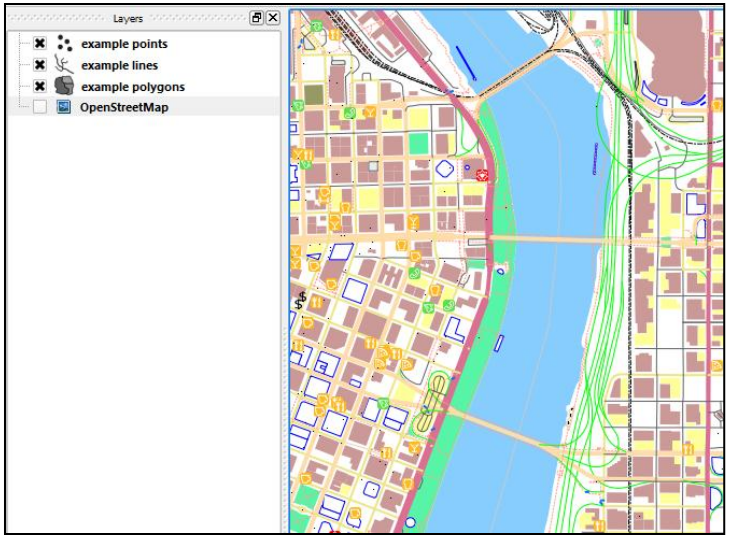
- The extent should be filled automatically
- Click the "…" button to browse for where you want to save the .osm file
- Click "Download"



Step 4: Wait… then view

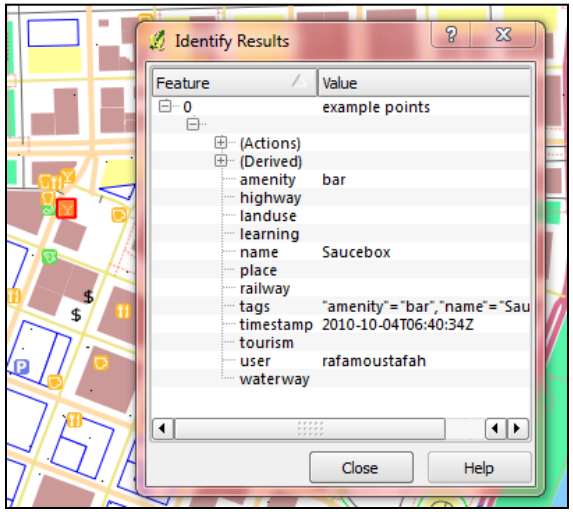
- Again, you can do faster, larger downloads via JOSM's "Mirrored download" plugin, and then open them in QGIS for the next step (though QGIS will still take a while to process large files)
- Check it out! You may want to turn off the OpenLayers OSM Layer

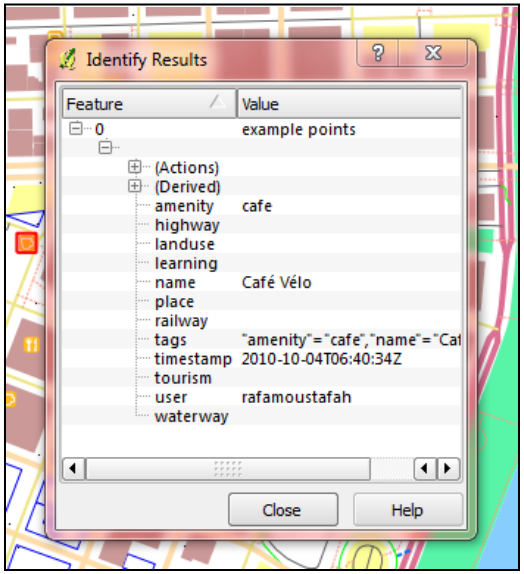




Step 5: Explore

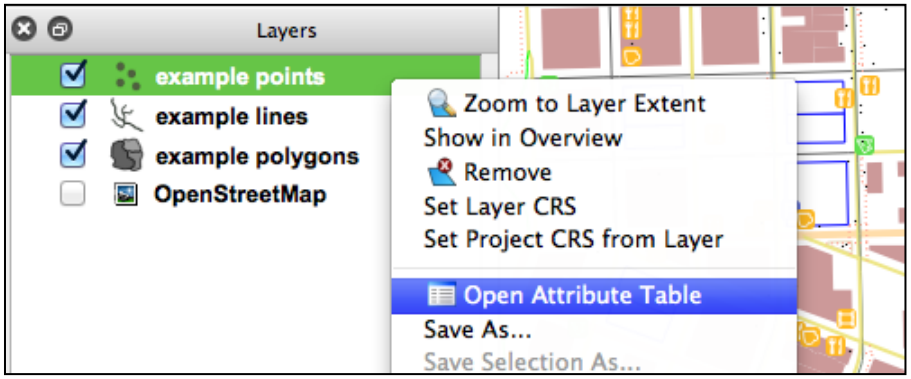
- Use the identify tool to check out the attributes of some points (may need to select that layer first)





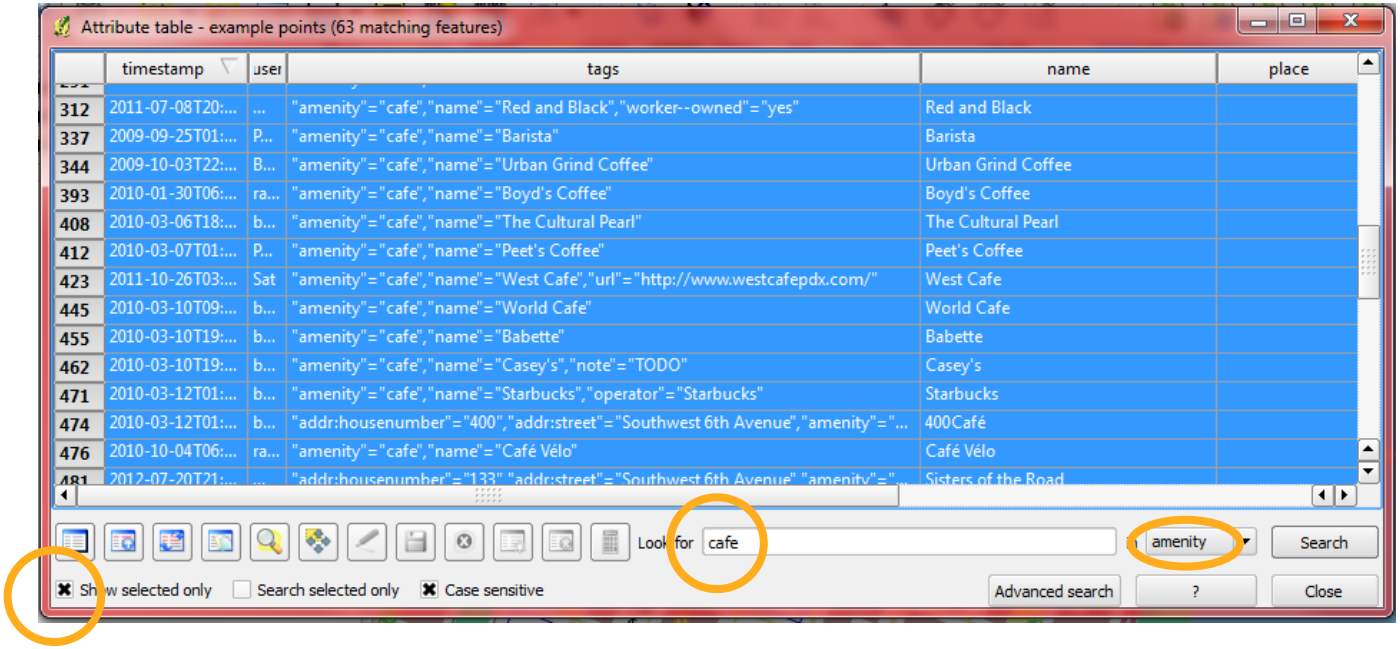
Step 6: Choose what you want

- Right-click on the points layer and select "Open Attribute Table"



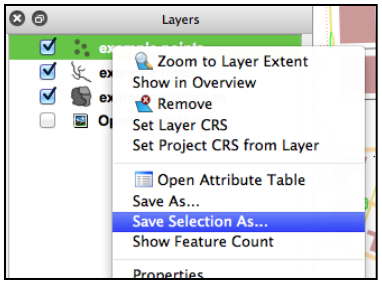
Step 6: Choose what you want

- Look for **cafe**, in **amenity**
- Click the box for **"Show selected only"**

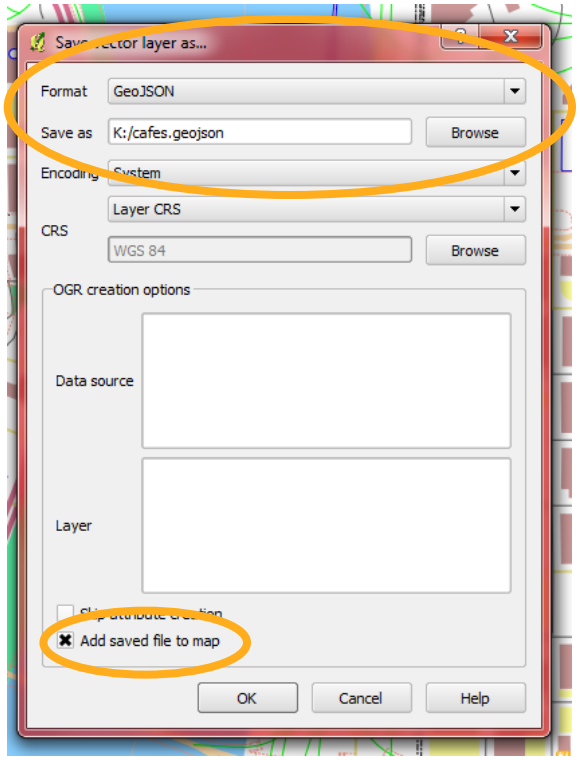


Step 7: Save it as a GeoJSON

- Right-click on the layer and choose "Save Selection As…"

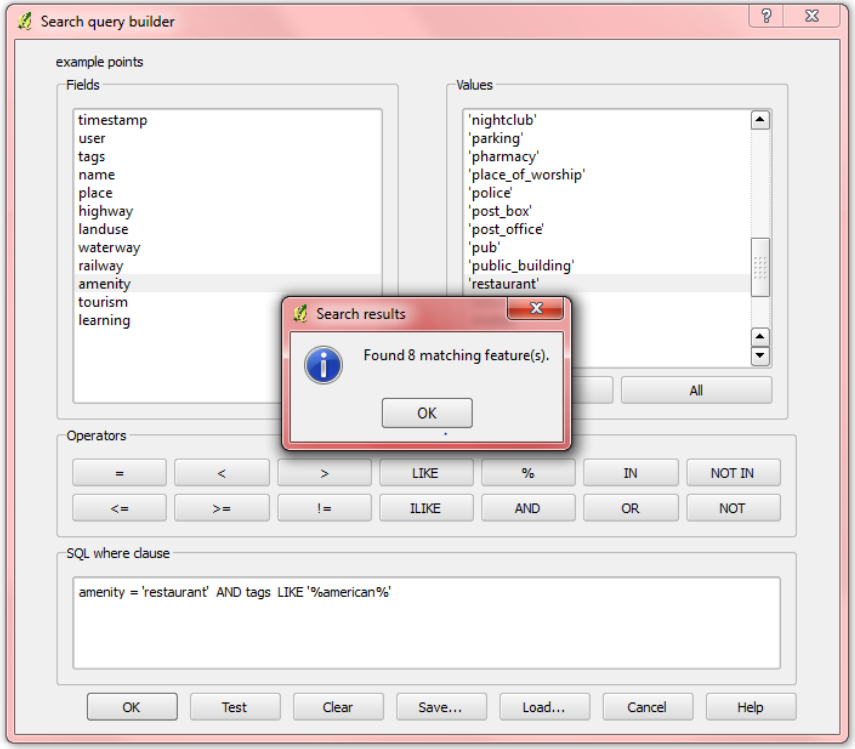


- Choose GeoJSON for the format
- Browse for a file location and choose a name
- Click the box for "Add saved file to map"

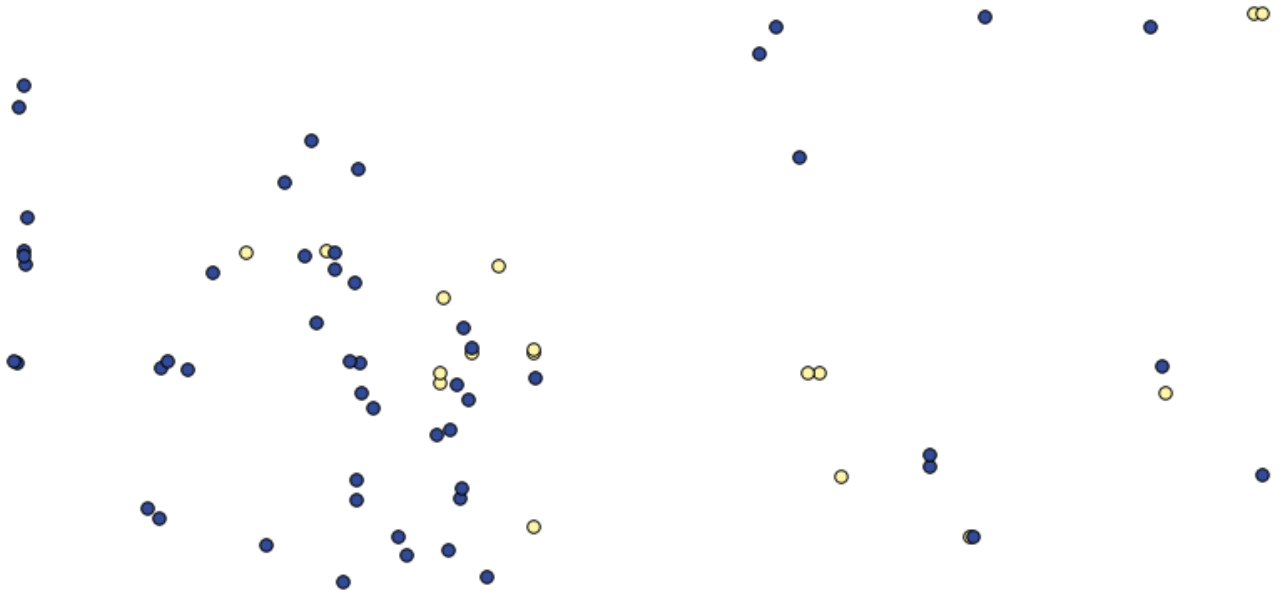


Step 8: Do it again

- Repeat with a different type of POI
- Grant and I are here to help!
- I'm choosing bars
- You can also use the "Advanced search" button to use the Search query builder for more complex queries
- Additional tags should be in the 'tags' field



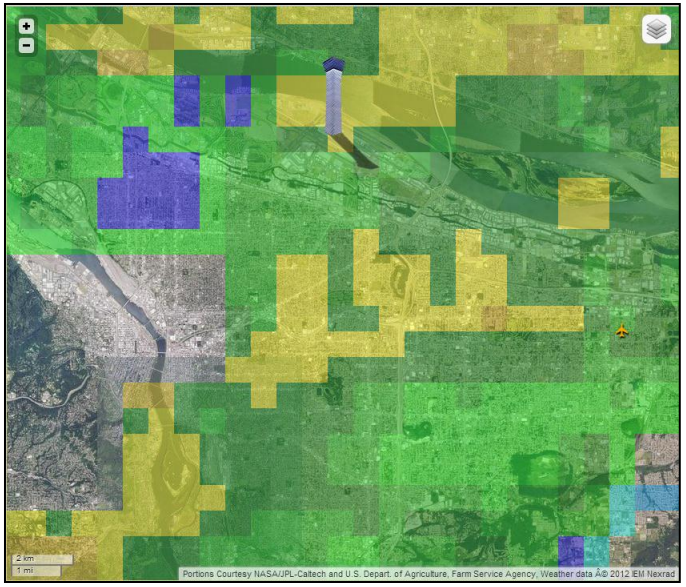
Your OSM-Leaflet Map



Putting GeoJSON OSM POIs into a Leaflet Map

Step 1: Getting started

- Let's build off of one of Wm's examples (Exercise 9)
- Oh no, the rain is coming! Where are some bars or coffee shops that I can hide out in for a while?
- How does the code need to be modified?



Step 2: Adapt what we have

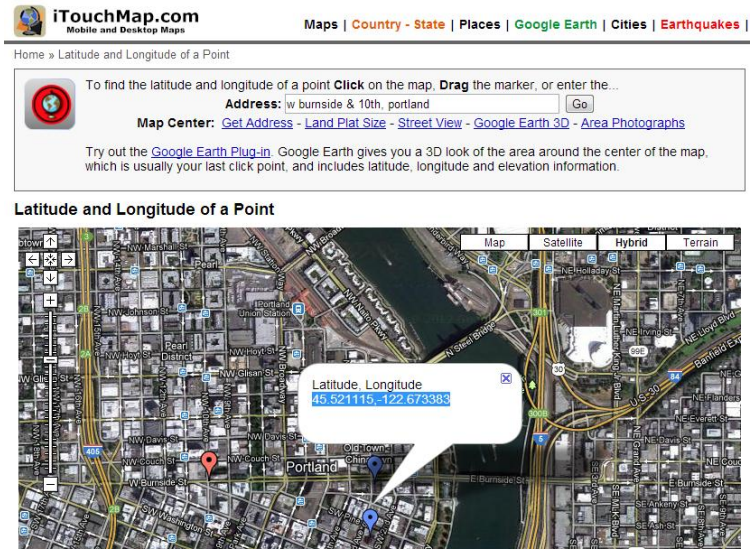
- Let's get rid of:
  - The airport (and its icon)
  - The planes
  - Google street overlay
- Do this yourself, or get some tidy files to start with at http://pdxmele.github.com/OSM-Leaf-example
- What we'll be doing:
  - Changing the zoom and center
  - Adding a couple of new GeoJSON layers

Step 3: Change the center & zoom

- http://itouchmap.com/latlong.html and similar tools can help you determine your new map center
- Paste it in

```
var map = L.map('map_div', {
    center: [45.521115,-122.673383],
    zoom: 14,
```

- Increase the zoom



Step 4: Prepare the GeoJSON

- So what is GeoJSON anyway? Open up your files in SublimeText and have a look
- They are just specially-formatted JavaScript files
- Save them as .js files instead of .geojson files and put them in the same folder as your other files
- Add "var *name* = " (e.g. var cafes =) to the beginning of each document

Step 5: Adding the GeoJSON layers to your map

- Add references to these files in your HTML file (put them before the Leaflet js and jQuery)

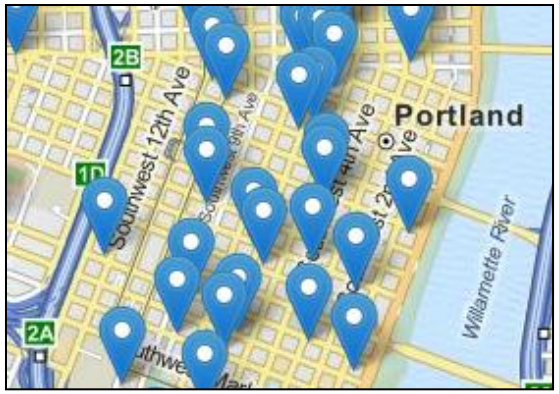
```
<script src="bars.js" type="text/javascript"></script>
<script src="cafes.js" type="text/javascript"></script>
```

- Add this after weather:

```
var cafelayer = L.geoJson(cafes);
var barlayer = L.geoJson(bars);
```

- Update your layer control:

```
var layercontrol = L.control.layers(
    { street: osmtiles, satelite: sattiles },
    { radar: weather, cafes: cafelayer, bars: barlayer}
);
```



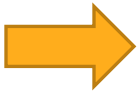
Step 6: Improve it with styling

- Let's make it so we can tell our layers apart
- Start with this code, and mimic it for your second dataset

```
var cafemarkers = {
    radius: 6,
    fillColor: "#ff7800",
    color: "#000",
    weight: 1,
    opacity: 1,
    fillOpacity: 0.8
};
var cafelayer = L.geoJson(cafes, {
    pointToLayer: function (feature, latlng) {
        return L.circleMarker(latlng, cafemarkers);
    }
});
```

Step 7: Popups

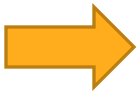
- Add this section before your GeoJSON layers



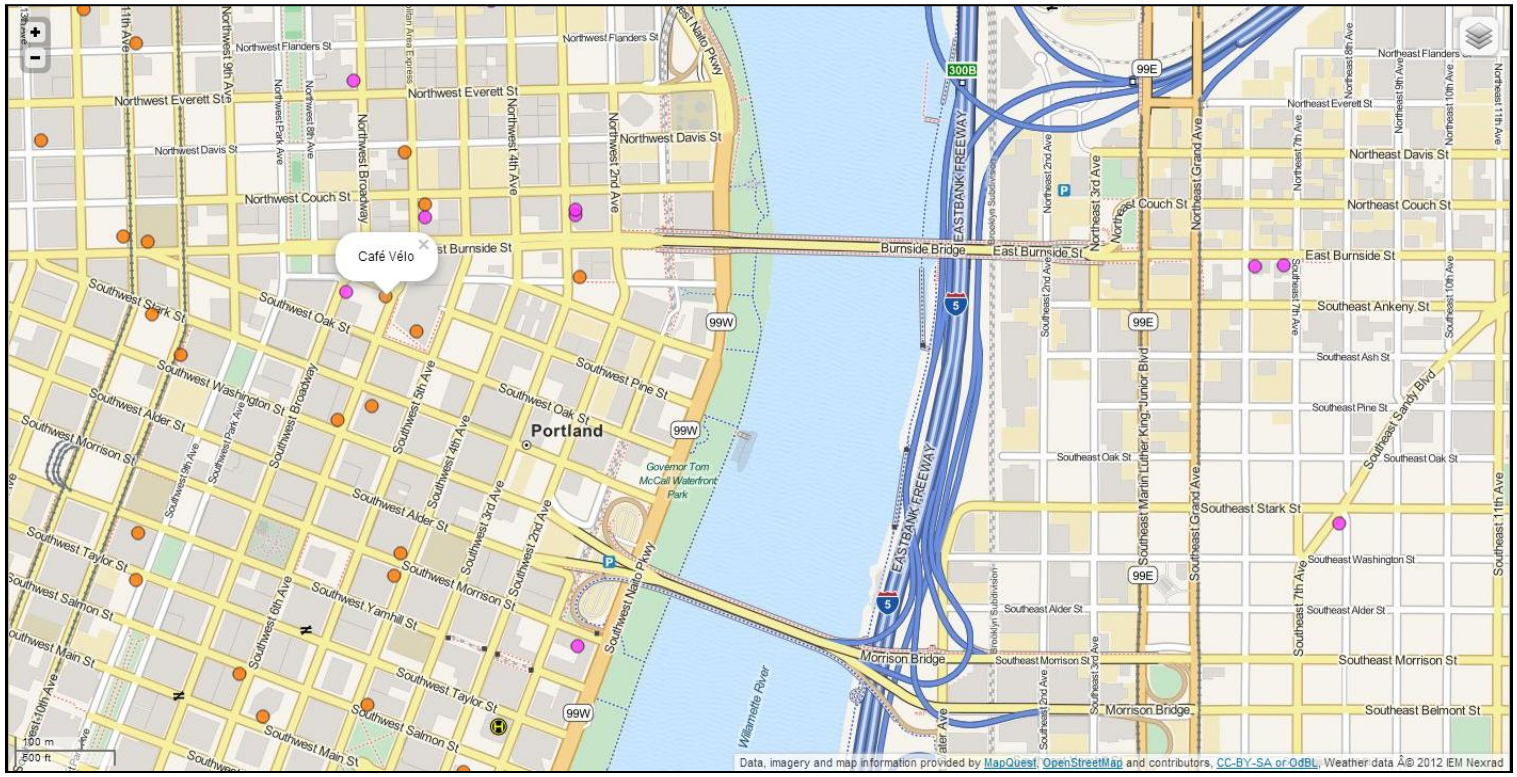
```
function onEachFeature(feature, layer) {
// grabs the property "name" and uses it for the popup
if (feature.properties && feature.properties.name) {
    layer.bindPopup(feature.properties.name);
}}

var cafemarkers = {
    radius: 6,
    fillColor: "#ff7800",
    color: "#000",
    weight: 1,
    opacity: 1,
    fillOpacity: 0.8
};
var cafelayer = L.geoJson(cafes, {
    pointToLayer: function (feature, latlng) {
        return L.circleMarker(latlng, cafemarkers);
    },
    onEachFeature: onEachFeature
});
```

- Add this highlighted bit to each layer



Looking good!



One last word on attribution

- The OpenStreetMap license has recently changed (it was previously CC-by-SA)
- You need to credit OSM properly somewhere in your map or on your webpage
- Since we're already using an OSM tile layer, we can just modify the attribution for that (we should really fix that anyway)

```
k">MapQuest</a> and © <a href="http://www.openstreetmap.org/copyright" target="_blank">OpenStreetMap contributors</a>'
```

Congratulations!

Great job!
The final code is at:

http://pdxmele.github.com/OSM-Leaf-example/complete