

# EXPLORATIONS INTO OPEN SOURCE GIS



Presented by  
**David Howes &  
Matt Stevenson**  
*GIS Day*  
*November 19, 2014*

# Agenda

- Introduction
- Observations
- Matt's perspectives
- David's perspectives
- Closing thoughts
- Q & A



# Who are We?

David Howes, Ph.D.

- David Howes, LLC
- GIS tools, processes and supporting infrastructure
- <http://www.dhowes.com>

Matt Stevenson

- CORE GIS
- Cartography, spatial analysis, conservation planning, urban planning, and GIS project management
- <http://www.coregis.net>

**David Howes** LLC

Geographic Information Systems Development Services

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Welcome to GISPD.com

Our mission is to support GIS professionals by providing informative resources on our website, organizing and participating in professional gatherings and conducting training events.

## Events

**OCT 15 2014** Opening the Door to Open Source GIS  
Session at the 2014 Northwest GIS Conference  
David Howes, David Howes, LLC & Matt Stevenson, CORE GIS  
📍 Lynnwood Convention Center, Lynnwood, WA

**OCT 15 2014** Extending ArcGIS for Desktop: Python and .NET Add-ins in a Nutshell  
Presentation at the 2014 Northwest GIS Conference  
David Howes, David Howes, LLC & Jason Pardy, NewfoundGEO Consulting  
📍 Lynnwood Convention Center, Lynnwood, WA

[All events >](#)

*Venturing Into Open Source GIS: A Global Conference Comes To Our Doorstep*

The Summit

The Washington  
URISA  
Newsletter

Autumn 2014



# Objectives

Explore and understand the individual, organizational and cultural facets related to open source GIS and proprietary GIS

Relate our findings and experiences with respect to each world

Promote consideration of the sorts of wider issues that can impact our effectiveness as GIS professionals in ways that are often profound and far-reaching

Above all else, help GIS professionals help each other.





# Observations



# Typical Questions

What are the best characteristics of OS vs Proprietary GIS?



Why would you switch in one direction or the other?



How well do the groups persuade each other of the relative benefits of their capabilities?

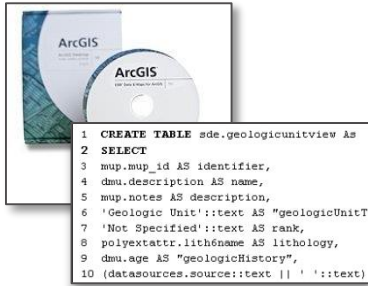


# Individual Considerations



Rebellion against the wizard syndrome


Technological preference - pop in a disk and go vs. plug away for a month to get something working?



Desire for freedom and growth





I want to learn GIS, reading books and academic papers and articles about geospatial data, map projections, server-side technologies, databases, different geospatial standards and protocols and their implementations in available range of server and client software, perform analysis of my data and use cases, preferably involving other GIS specialists and do a lot of other research so that I can make sensible decisions about the required technology stack, adjust it to the needs of my application and finally **make a**  **map** (maybe in a couple years)

# Organizational Considerations

What's the relationship between IT and GIS?



Do you have the financial certainty sufficient to support investment in proprietary technology?

Is the organization open to a sharing culture?



# Cultural Considerations

Maybe you just don't like dealing with corporations (anti-establishment)?

Macs vs. Windows machines (which way does your slash lean?)

```
C:\>cd Temp
C:\Temp>cd "Another Dir"
C:\Temp\Another Dir>
```



```
David@Bajada /cygdrive/c/Temp
$ mkdir "Another Dir"

David@Bajada /cygdrive/c/Temp
$ cd Another\ Dir/

David@Bajada /cygdrive/c/Temp/Another Dir
$ |
```

Some people want complete control over their machines and everything on them





“I will share pretty much everything with you because we are all  
in this together and we are building something

**SUPER AWESOME AND FUN!”**



“I have developed a superior product and if you *pay me lots of money* I will help you leverage your data and create strategic synergies between your enterprise database solutions and customer-centric blah blah blah”

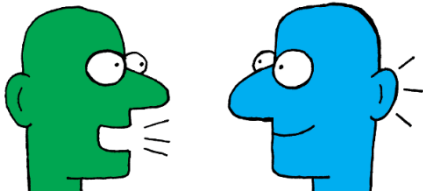




# The Value of the Conversation?



It can support decision-making, particularly regarding effort and expenditure



It aids communication



It can help drive technological innovation



# Decision-Making



Understand the implications of moving to or introducing OS vs. proprietary

Assess the likelihood of success when adopting technology within one world or the other or both



Can we consider an OS or proprietary aptitude test?

EI Workbook for Sample Name April 15, 2003 Account #: 1234-00665 Page 1 Overview

The Blue Bar = Your Tendencies. 'S' = How You See Yourself. 'O' = How You Think Others See You. 'V' shows Variability.

Category	Sub-Category	How You See Yourself	How You Think Others See You	Very Active
Energy	Sub-Category	Moderate/High	Moderate/Low	Very Active
Stress	Sub-Category	Relaxed/Calm	Stressed from	Stressed from
Optimism	Sub-Category	Wary/Can see problems	Optimistic/Sees problems & some good	Optimistic/Sees problems & some good
Self-Esteem	Sub-Category	Humble/Not vain	Moderate/Seems	High/Seems
Work Ethic	Sub-Category	Laziness/Not working or playing	Working/Moderate	Work-Focused
Detail	Sub-Category	Spontaneous & intuitive	Moderate-Detail	Careful/Precise
Change	Sub-Category	Consistent/Likes routines & repetition	Flexible/Prefer sameness	Change-Resistant
Courage	Sub-Category	Safe/Likes safety & comfort	Cautious/Some courage	Brave/Plugged/Threat
Direction	Sub-Category	Confusing/Values guidance & procedures	Organized/Prefer advice	Decisive/Sees, Can share decisions
Assertive	Sub-Category	Compliant/Cooperative	Assertive/Ready	Assertive/Tells, tells, asserts
Tolerance	Sub-Category	Intolerance of abuse	Easy/Some patience	Patience/Shows no anger/Forgiving
Conscientious	Sub-Category	Self-Preoccupied/Takes care of one's needs	Care/Modestly caring	Helpful/Listeners/Altruist
Sociable	Sub-Category	Solitary/Enjoy being alone	Reserved/Likes to talk with others	Social/Talkative, Wants people nearby/Very talkative

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# Communication



OS world may learn from the proprietary world's marketing strategies



Proprietary world can learn from the OS culture of collaboration, agility and growth



Don't always say it's so easy, although things are getting easier



# Technological Innovation



Increased understanding of the intended audience should, in theory, lead to better products

Growing need for focused and low-cost solutions that can be put in place relatively quickly



Thousands of people focusing on solving a problem vs. waiting for the next release cycle



# Increasing Maturity of OS

Australian Federal government chief technology officer John Sheridan, in 2013:

“When people asked me why we were not using more open source I would say, imagine fronting Senate estimates to explain why your system failed and having to say:

*'I was just relying on help by posting to the bulletin board on the internet and nobody came back to me fast enough.'*

Now the development of companies that provide support to those open-source solutions changes what we can do.”



*Open-Source Platform Gains Popularity in Government* - The Sydney Morning Herald September 24, 2013

<http://www.smh.com.au/it-pro/government-it/opensource-platform-gains-popularity-in-government-20130924-hv1sj.html>

From Andrew Dennison, FOSS4G 2014, <http://vimeo.com/107478903>



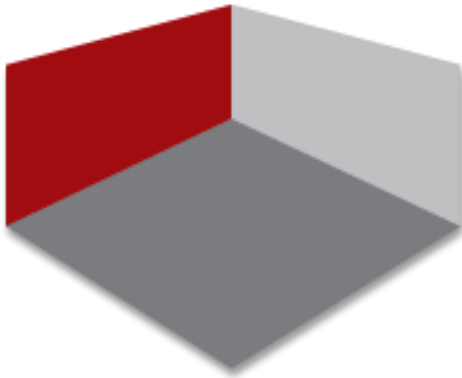


# Service Providers



# Descriptive Dimensions

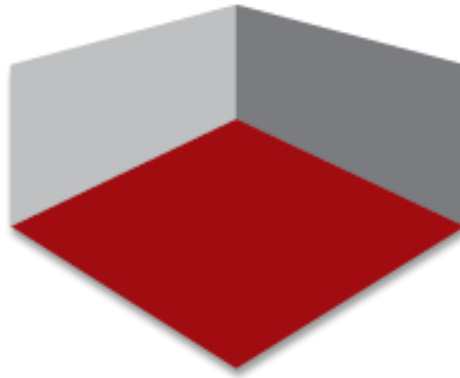
## Extent of Adoption



How many different flavors of software do you use?

- Proprietary - I only need two EXEs...
- OS - I use more libraries than you!

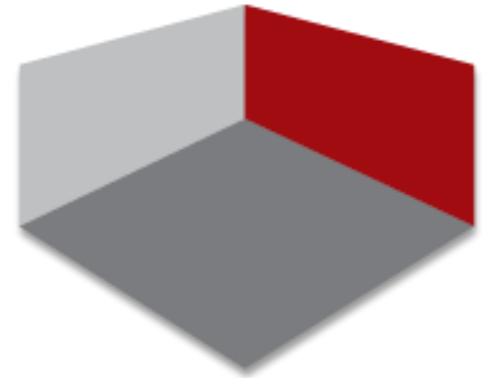
## OS/Proprietary Balance



How much time do you spend in each world?

- Proprietary – do you worship Jack?
- OS – do you want to stick it to the man?

## Setup/Installation



- How involved are you in the nitty gritty aspects of getting things working?
  - Proprietary - what's the installation investiture?
  - OS - what's your geek quotient?



# Use Scenarios

## Matt

- Use OS web apps for cartography and user interactivity
- Don't have to be concerned with local installation, functionality just has to work and be affordable



## David

- Focus on desktop geoprocessing
- Need to deal with installation issues, getting things working locally

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# Matt's Perspectives



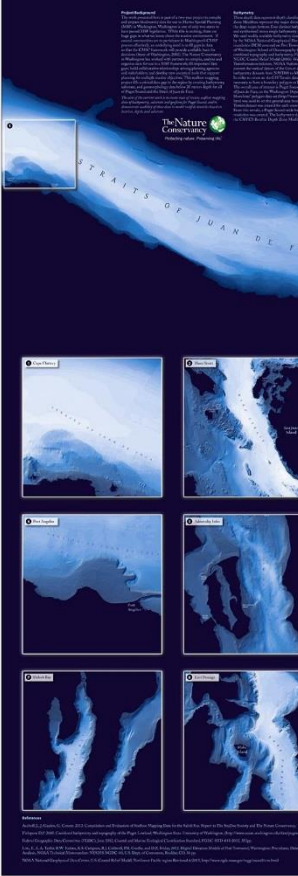
# Matt's Perspectives

- I am a visual thinker, not a developer (not to suggest for a moment that those two traits are mutually exclusive)
- When I think of maps, I see pictures
- When I think of code, I get headaches
- OS is too complicated! Wait, proprietary software is too...
- But Esri is too expensive!
- Time to start hiking up the learning curve





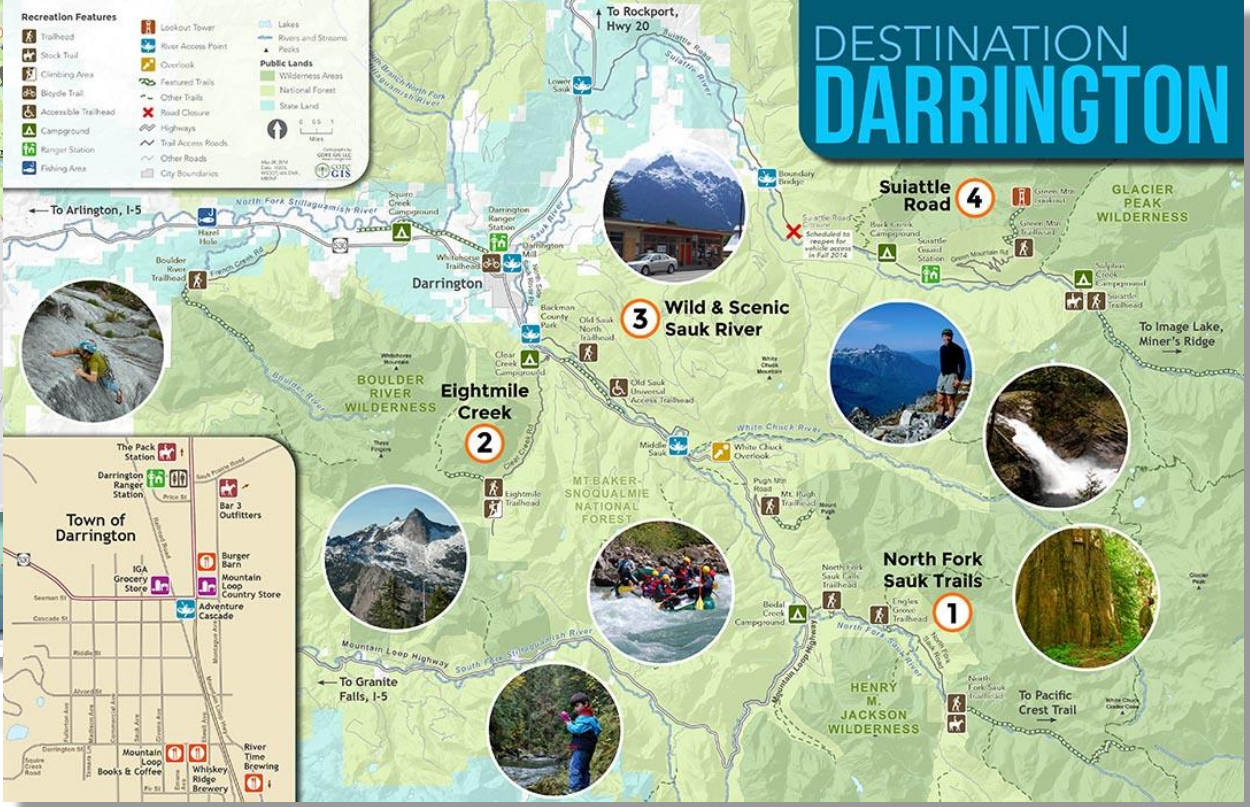
# Bathymetry of Puget Sound



## Greater Everglades Region Building Resilient Habitats in Florida



### Welcome to MARYMOOR PARK



When I think of maps, I think of this

# ...not this!

```
.leaflet-top .leaflet-control-zoom {
  top:20px;
}
</style>

<div id='map'></div>
<input id='range' class='range' type='range' min='0' max='1.0' step='any' />

<script>
L.mapbox.accessToken = 'pk.eyJ1IjoiY29yZS1naXMiLCJhIjoiaUxqQS1zQSJ9.mDT5nb81_dWIHzbn0TebcQ';
var map = L.mapbox.map('map');
L.mapbox.tileLayer('examples.map-i87786ca').addTo(map);

var overlay = L.mapbox.tileLayer('examples.map-i875mjb7').addTo(map);
var range = document.getElementById('range');

function clip() {
  var nw = map.containerPointToLayerPoint([0, 0]),
      se = map.containerPointToLayerPoint(map.getSize()),
      clipX = nw.x + (se.x - nw.x) * range.value;

  overlay.getContainer().style.clip = 'rect(' + [nw.y, clipX, se.y, nw.x].join('px,') + 'px)';
}

range['oninput' in range ? 'oninput' : 'onchange'] = clip;
map.on('move', clip);
map.setView([49.434,-123.272], 7);

clip();
</script>
```



# Heartache and Brain Damage of OS

## Desktop Applications

- Quantum GIS
- gvSIG
- Udig
- GRASS
- JOSM (OpenStreetMap editor)

## Server Applications

- GeoExt (WebGIS framework)
- MapFish (WebGIS framework)
- GeoServer (WebGIS server)
- MapServer (WebGIS server)
- PostgreSQL, PostGIS (Geo-database)
- Magento\* (Webshop framework)
- SilverStripe\* (Content Management System)

## Libraries and Tools

- OpenLayers (WebGIS framework)
- ExtJS\*, jQuery\* (JavaScript library)
- pgRouting (Routing module for PostgreSQL/PostGIS)
- GeoTools (Java GIS Toolkit)
- GDAL/OGR (Geospatial Data Abstraction library)





# But proprietary software is complicated too



Explorations into Open Source GIS



# The Great Breakthrough!

## Browser Cartography: Some Safehouses for ESRI Refugees

Wednes  
day,  
May 30,  
2012



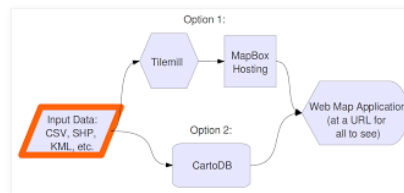
"Island" by Konstantin Kafer

### A Primer for Getting Started With Open-Source Web Maps

Now that you know [why I care](#) about telling compelling stories with widely-distributed maps, let's look at a few of the many tools that are out there to help the process. I confess to narrow experience here; I use [MapBox](#) and [CartoDB](#) for the majority of my projects, and there are plenty of alternatives to those. But as a starting point I think that these open-source web map design platforms are perfect - they minimize the amount of code required, they use the [best graphic rendering engine in the field](#), and they are extremely cheap (or free) to use, even in an enterprise or high-traffic environment. I'm avoiding ESRI's "ArcWhatever Online for Server" options because of a.) [the high price tag](#), and b.) [the actual user-facing sites](#) are only as robust as the javascript or flash developer who builds them. My preferred options give you a lot more to work with out of the box, for free.

I am not going to walk you step-by-step through the process below - I'll point you to resources that will - but rather I mean to sketch the structure that can get your map applications up and running. If you're stumbling and need some help, drop me a line through the [GeoSprocket contact page](#) or on [Twitter](#)

#### Step 1: Data



Data in this context can mean a lot of different things. The tools we're using aren't picky, so this includes:

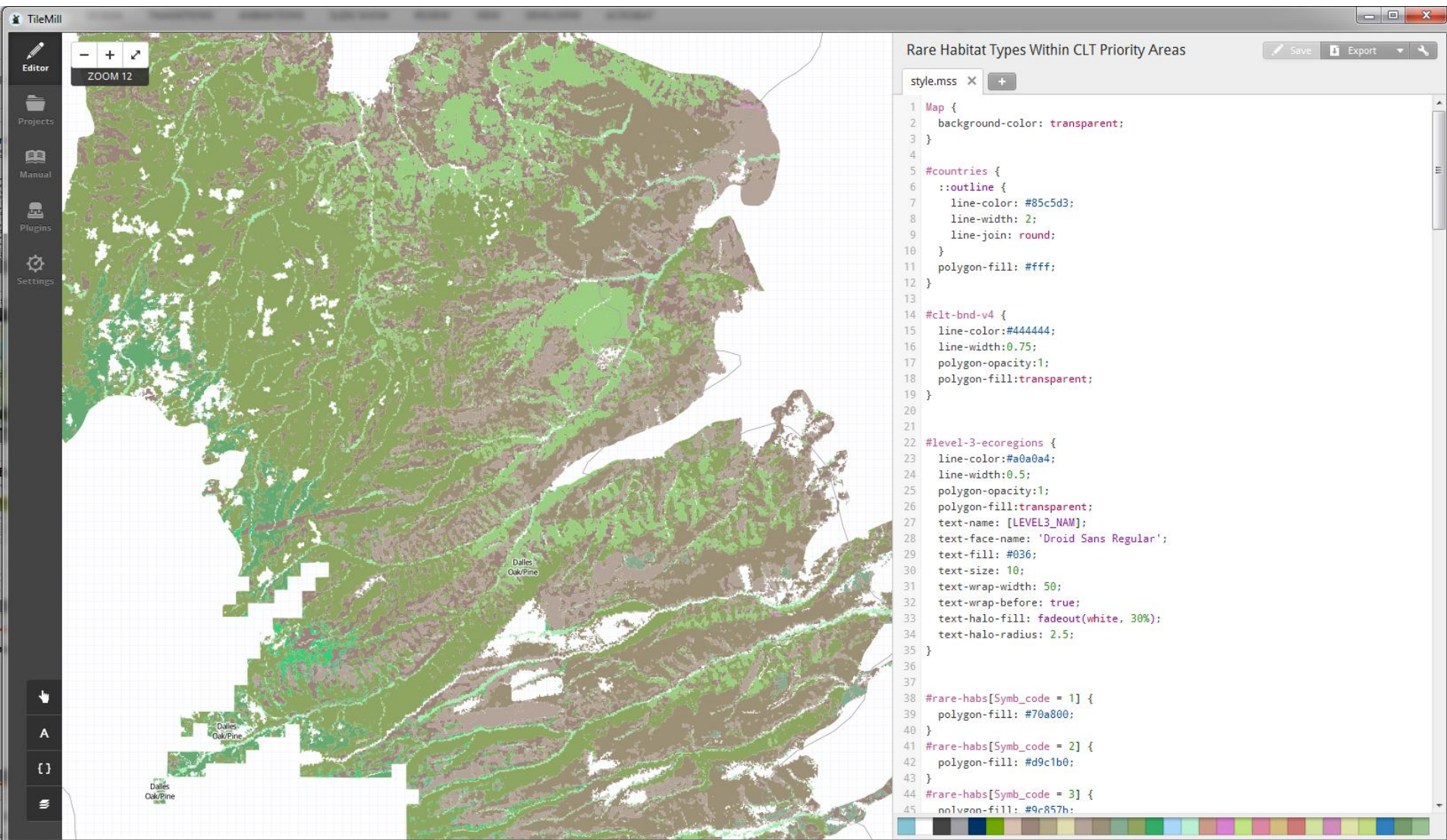
- Shapefiles (but this will need to be in a compressed folder)
- Spreadsheets (CSV, XLS, DBF, you name it)
- KML or KMZ
- GPX or in many cases raw text from various GPS units

[geosprocket.blogspot.com](http://geosprocket.blogspot.com)





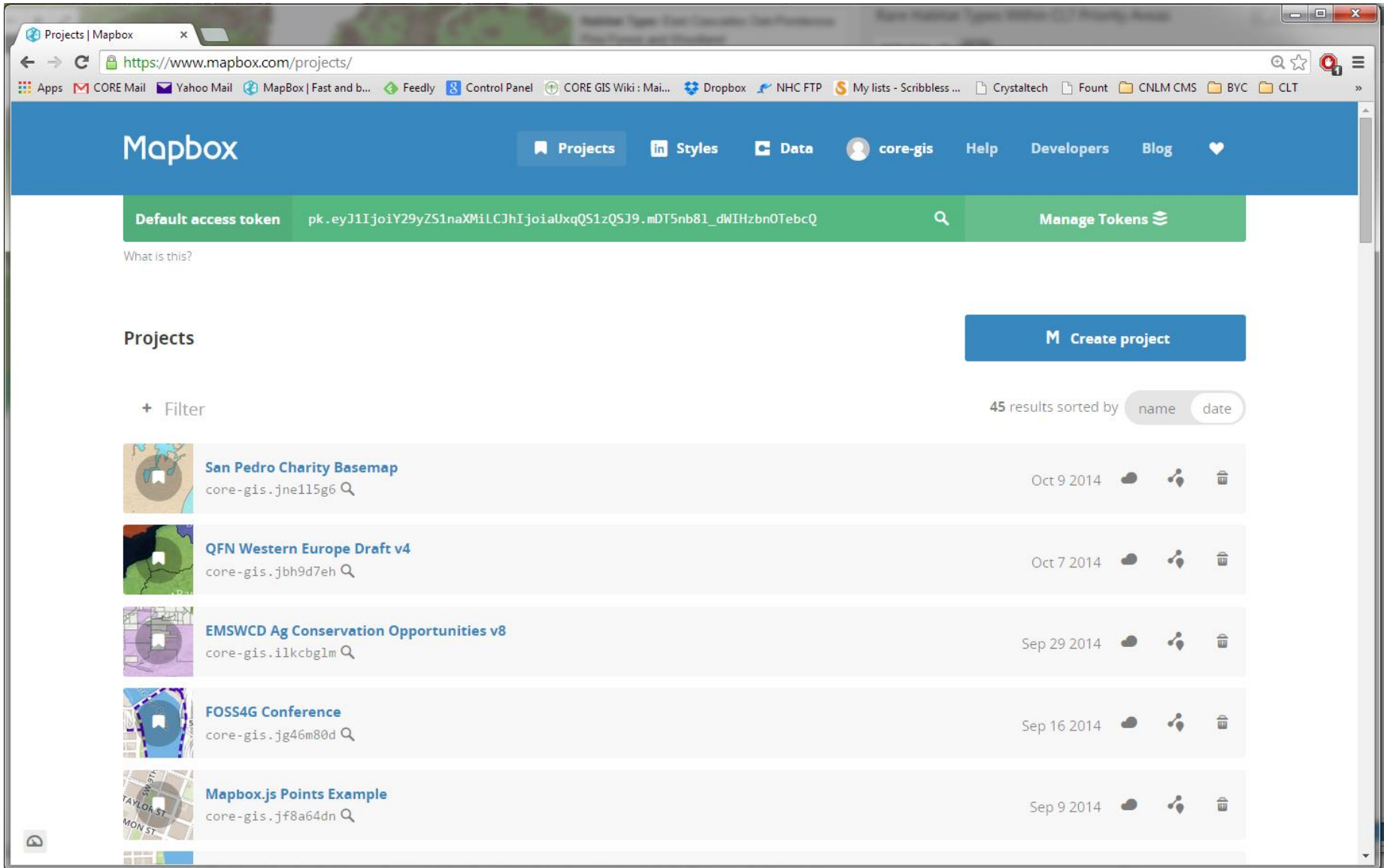
# Combining the visual with a bit of code



The image shows the TileMill application interface. On the left is a vertical toolbar with icons for Editor, Projects, Manual, Plugins, and Settings. The main area displays a map with a grid overlay, showing a landscape with green and brown areas. Labels on the map include "Dalles Oak/Pine". The right side features a code editor window titled "Rare Habitat Types Within CLT Priority Areas" with a "style.mss" file open. The code defines styles for map elements, including countries, CLT priority areas, and rare habitat types. A color palette is visible at the bottom of the code editor.

```
1 Map {
2   background-color: transparent;
3 }
4
5 #countries {
6   ::outline {
7     line-color: #85c5d3;
8     line-width: 2;
9     line-join: round;
10  }
11  polygon-fill: #fff;
12 }
13
14 #clt-bnd-v4 {
15   line-color:#444444;
16   line-width:0.75;
17   polygon-opacity:1;
18   polygon-fill:transparent;
19 }
20
21
22 #level-3-ecoregions {
23   line-color:#a0a0a4;
24   line-width:0.5;
25   polygon-opacity:1;
26   polygon-fill:transparent;
27   text-name: [LEVEL3_NAM];
28   text-face-name: 'Droid Sans Regular';
29   text-fill: #036;
30   text-size: 10;
31   text-wrap-width: 50;
32   text-wrap-before: true;
33   text-halo-fill: fadeout(white, 30%);
34   text-halo-radius: 2.5;
35 }
36
37
38 #rare-habs[Symb_code = 1] {
39   polygon-fill: #70a800;
40 }
41 #rare-habs[Symb_code = 2] {
42   polygon-fill: #d9c1b0;
43 }
44 #rare-habs[Symb_code = 3] {
45   polygon-fill: #9c857b;
```





# How I Use FOSS4G

TileMill → Mapbox

Tilemill → Mapbox + Mapbox.js +  
HTML/CSS

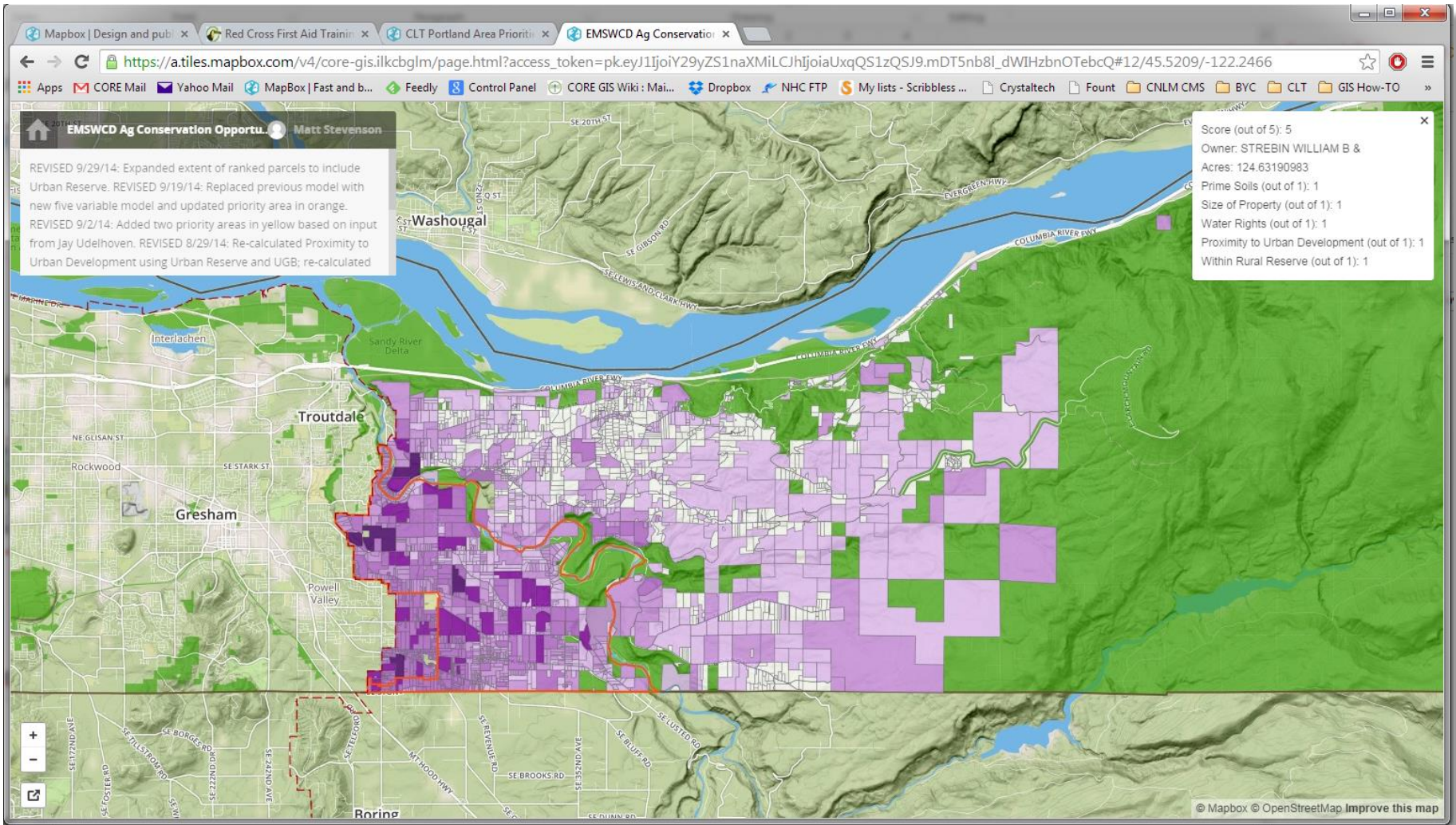
Tilemill → Mapbox + Leaflet.js + HTML/CSS

Leaflet.js/Mapbox.js + HTML/CSS



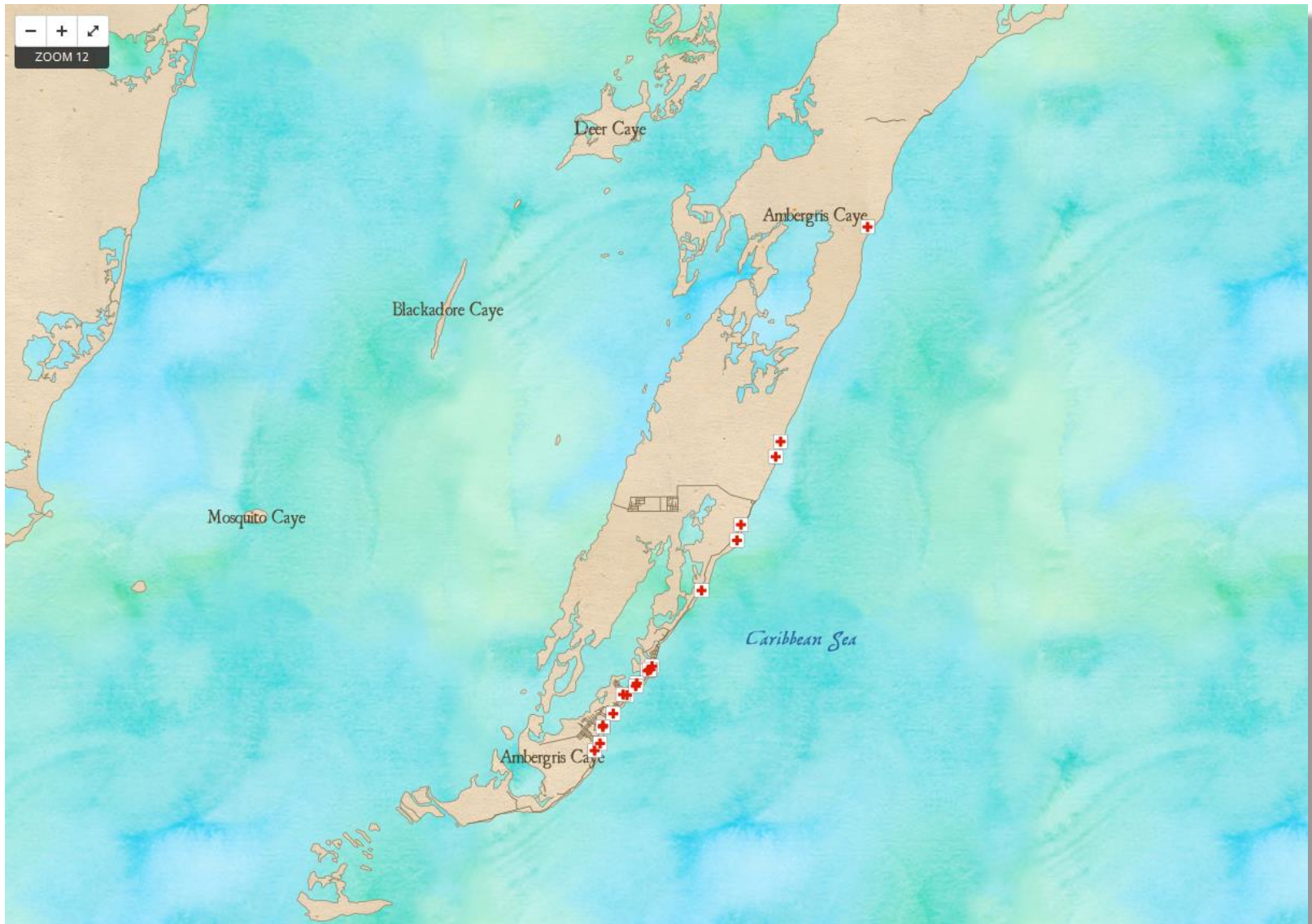


# Examples: EMSWCD



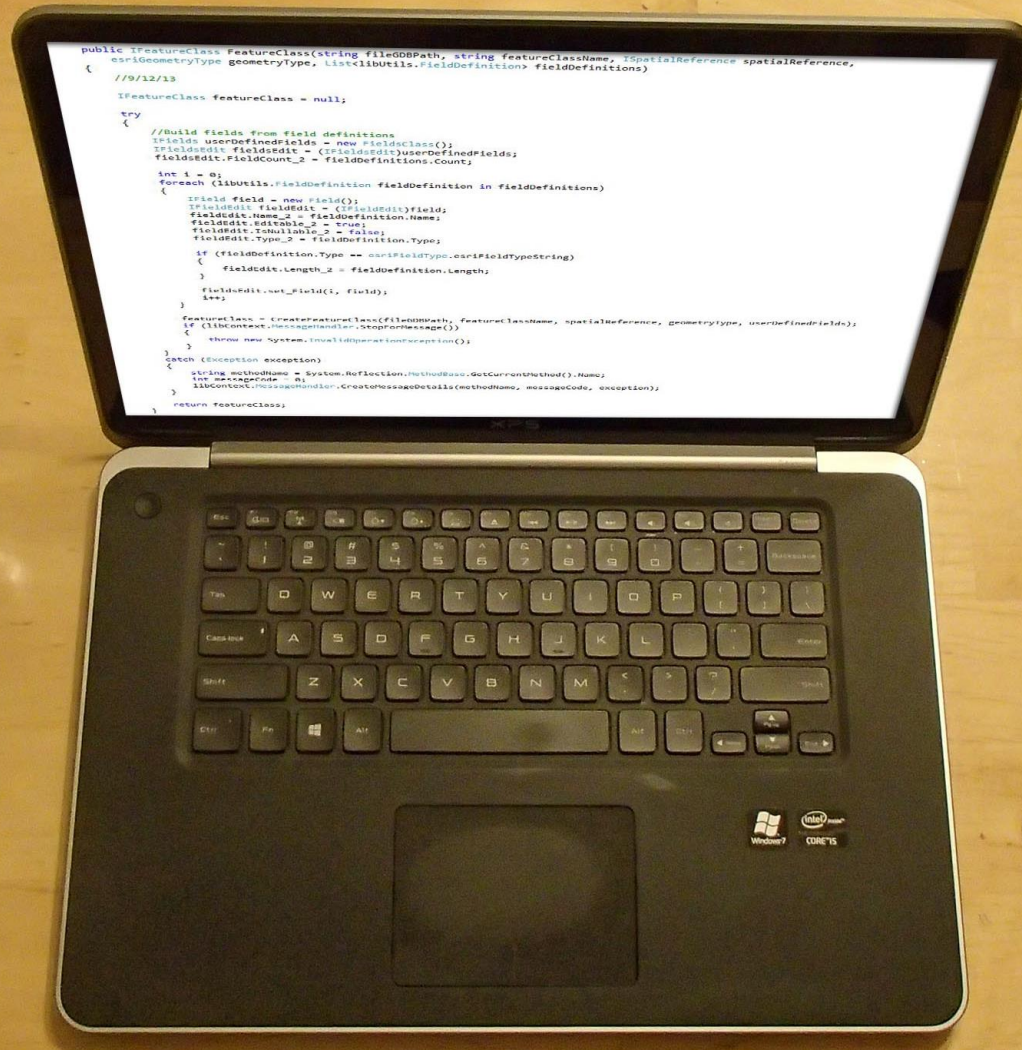


# Examples: Belize Red Cross





# David's Perspectives





```

public IFeatureClass FeatureClass(string fileGDBPath, string featureClassName, ISpatialReference spatialReference,
    esriGeometryType geometryType, List<libUtils.FieldDefinition> fieldDefinitions)
{
    //9/12/13

    IFeatureClass featureClass = null;

    try
    {
        //Build fields from field definitions
        IFields userDefinedFields = new FieldsClass();
        IFieldsEdit fieldsEdit = (IFieldsEdit)userDefinedFields;
        fieldsEdit.FieldCount_2 = fieldDefinitions.Count;

        int i = 0;
        foreach (libUtils.FieldDefinition fieldDefinition in fieldDefinitions)
        {
            IField field = new Field();
            IFieldEdit fieldEdit = (IFieldEdit)field;
            fieldEdit.Name_2 = fieldDefinition.Name;
            fieldEdit.Editable_2 = true;
            fieldEdit.IsNulllable_2 = false;
            fieldEdit.Type_2 = fieldDefinition.Type;

            if (fieldDefinition.Type == esriFieldType.esriFieldTypeString)
            {
                fieldEdit.Length_2 = fieldDefinition.Length;
            }

            fieldsEdit.set_Field(i, field);
            i++;
        }

        featureClass = CreateFeatureClass(fileGDBPath, featureClassName, spatialReference, geometryType, userDefinedFields);
        if (libContext.MessageHandler.StopForMessage())
        {
            throw new System.InvalidOperationException();
        }
    }
    catch (Exception exception)
    {
        string methodName = System.Reflection.MethodBase.GetCurrentMethod().Name;
        int messageCode = 0;
        libContext.MessageHandler.CreateMessageDetails(methodName, messageCode, exception);
    }

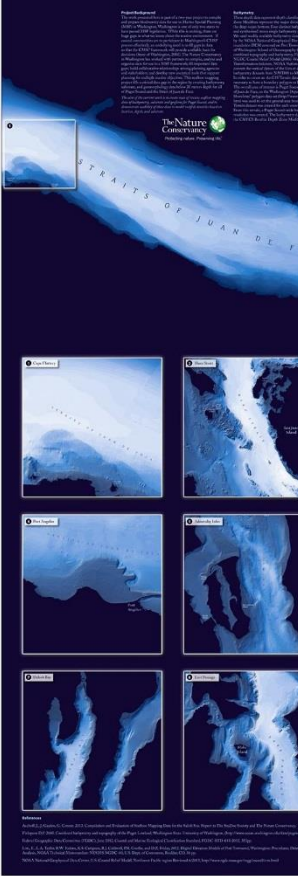
    return featureClass;
}

```

When I think of  
GIS, I think of  
this



# Bathymetry of Puget Sound

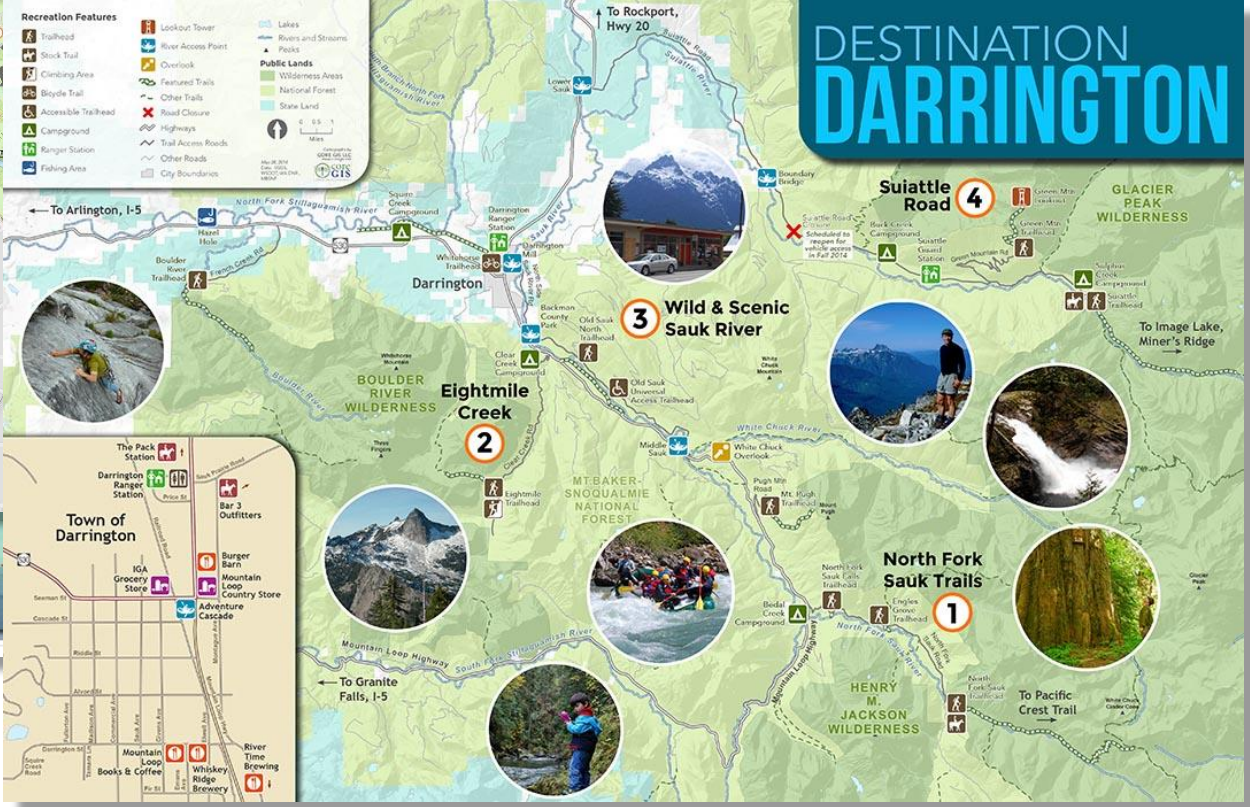


## Greater Everglades Region

Building Resilient Habitats in Florida



### Welcome to MARYMOOR PARK



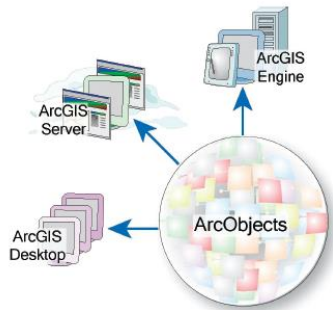
# ...not this!



# Likelihood of Success?

## Command-line background

```
terminal
[user@host] ~/project> testool -v --color --regex='test[0-3]' tests/suites.py
test0 (suites.CaseDigits.test0) ... FAIL
test1 (suites.CaseDigits.test1) ... OK
test2 (suites.CaseDigits.test2) ... OK
test3 (suites.CaseDigits.test3) ... OK
-----
FAIL: test0 (suites.CaseDigits.test0)
-----
Traceback (most recent call last):
  File "tests/suites.py", line 32, in test0
    def test0(self): self.assertEqual("0" + "0", "01")
AssertionError: '00' != '01'
-----
Ran 4 tests in 0.010s
FAILED (failures=1)
[user@host] ~/project>
```



If you can work with ArcObjects, well, you know...

## OS GIS is not a trivial undertaking

- Need to be able to program
- Many steep learning curves
- OS experts appear to constantly seek to challenge themselves





# Personal Development



Enabling factor for  
OS = freedom

Personal growth



Become less stubborn, be open to criticism



# Getting Used to the OS Community

Initial pain - need to learn how to deal with responses on forums, chatrooms etc.



Strong egos and trolls – need to have a thick skin

Help others in whatever ways you can





# The Nature of a FOSS4G Project

FOSS4G 2014 Day 2 Keynote - Sarah Novotny,  
NGINX:

Source Code

+

License

+

Humility, Respect & Trust

= FOSS4G project



# Appealing Characteristics of OS



- No lock-in
- Easier integration
- A-la-carte approach

Adherence to standards



Developing a greater understanding of what's happening 'under the hood'



# Confidence vs Control



*“Either you have to have full confidence in a software platform or you have to have full control”*



Ben Sainsbury, Oregon Metro  
FOSS4G 2014



# Lessons So Far



OS experts often tend to suggest that things are really easy

- Sometimes they are
- Generally, they're not
- Need to adjust the marketing message

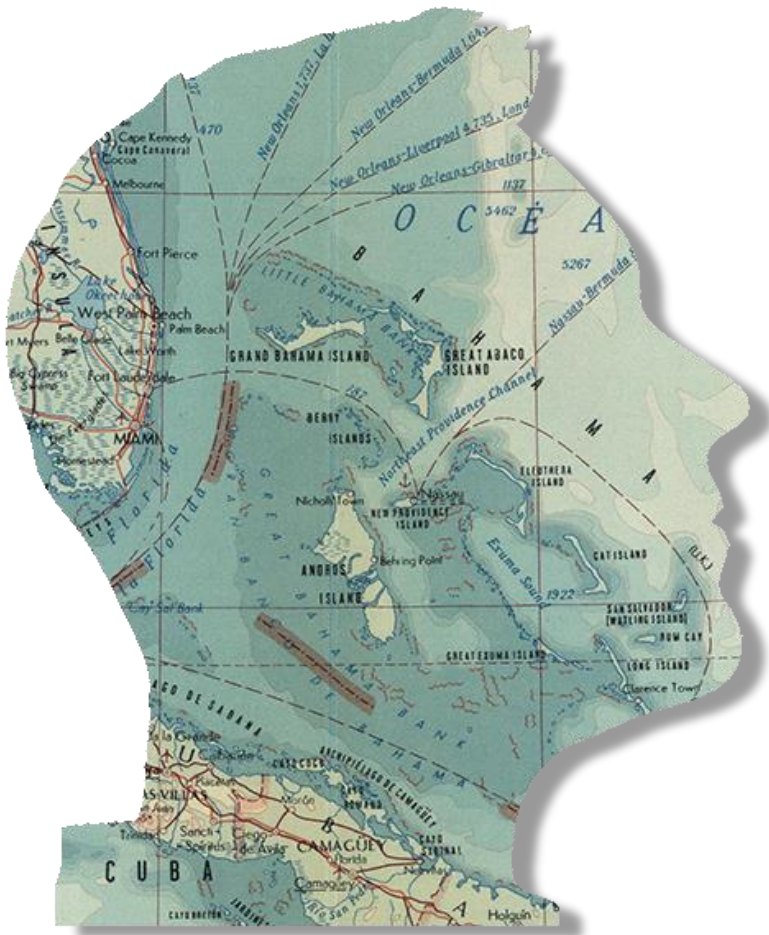
## *Library shock*

- Many options can be great
- Too many options can be paralyzing
- Geekdom doesn't always sell well





# Closing Thoughts



# Ending Option I – Civil War





# Ending Option 2 - Wedding





# Ending Option 3 – Something in Between?





# Q & A

- Who are you?
- Where are you from?
- Why are you interested in proprietary GIS or OS GIS or both?

