



Open Source Tooling and Development in Forestry

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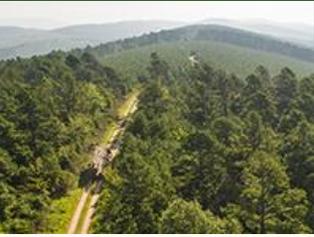
IFC Technical Meeting- March 19, 2019



Overview

- 🌲 What does “open source” mean?
- 🌲 Why should we care about open source?
- 🌲 How does this impact forestry?
- 🌲 Examples
 - Geospatial
 - Forestry





Definitions

▲ Open source is typically used as shorthand for many different ideas

Free

“Free as in beer”



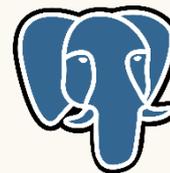
Libre

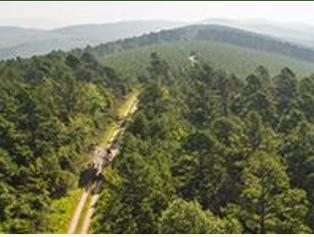
“Free as in speech”

Open

Source

Software





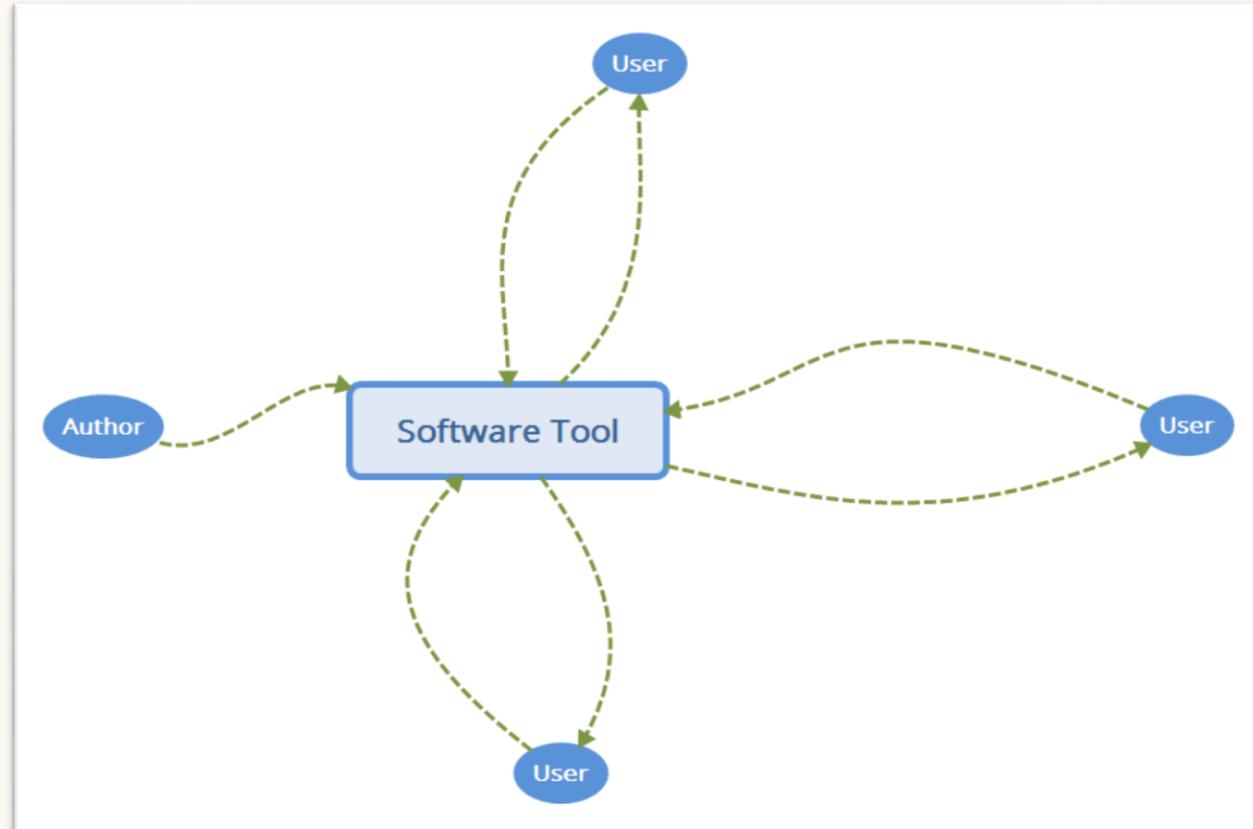
The open source development model

A proprietary model confines creation/modification/maintenance within an organization

The OSS model allows end users to modify code and allows for changes to be

- source
- version control
- automated

testing/builds





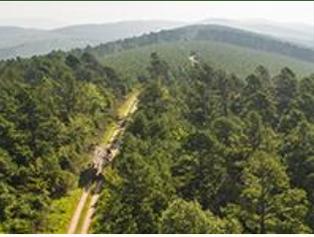
The open source development model

Advantages:

- 🌲 Decrease project maintenance burden, improve longevity
- 🌲 Collaborative process allows for faster software improvement
- 🌲 Increased adaptability for users
- 🌲 Remove barriers for small firms with limited budgets

Disadvantages:

- 🌲 Can require upfront technical knowledge (“build it yourself”)
 - Personnel strategy
- 🌲 Limited support
- 🌲 “Distrust”



Open source benefits for forestry

▲ Factors that make the open source model a good fit for forestry specific problems include:

- User population
- Regionality
- Professional precedent

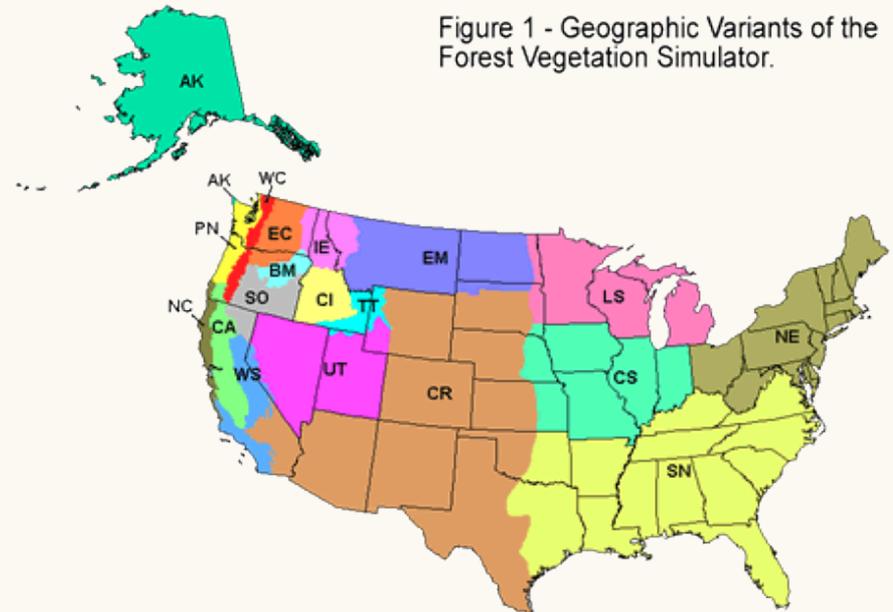
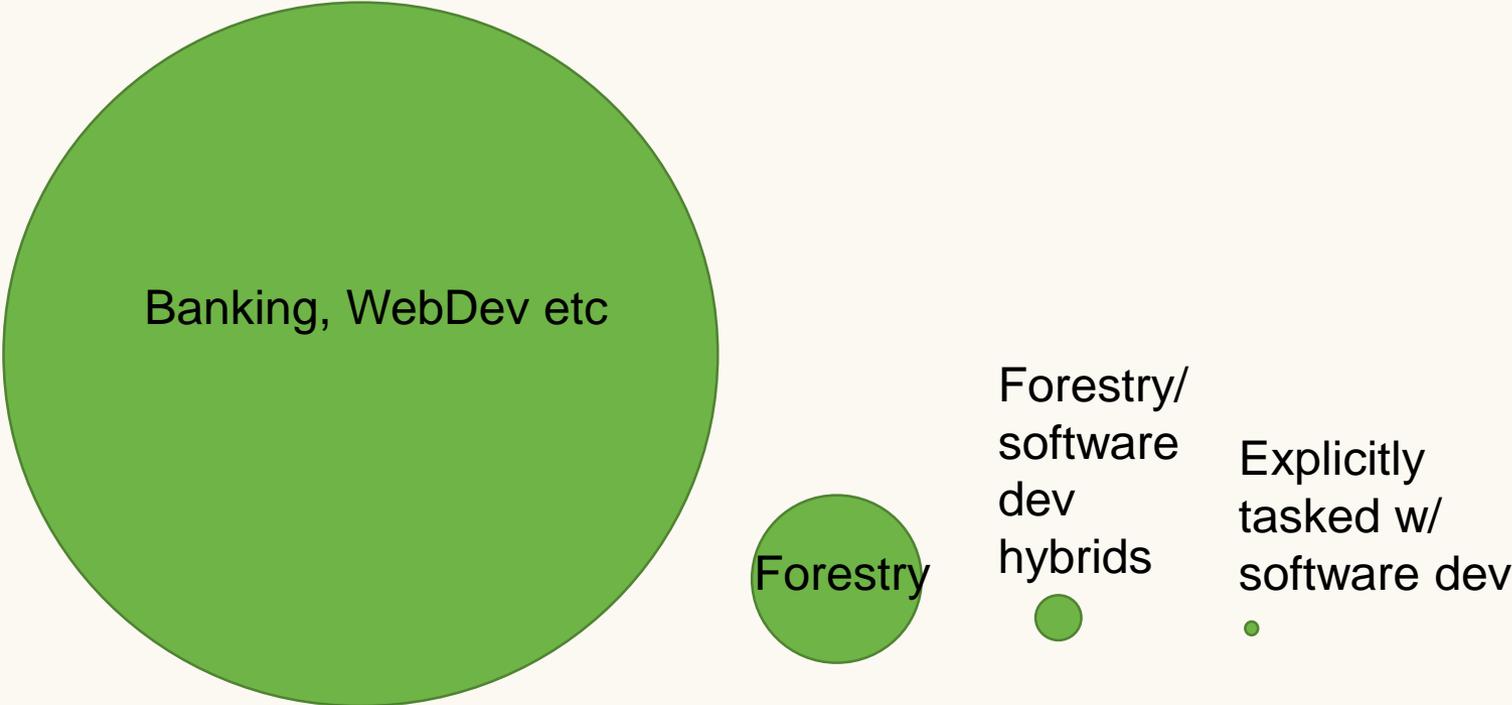


Figure 1 - Geographic Variants of the Forest Vegetation Simulator.

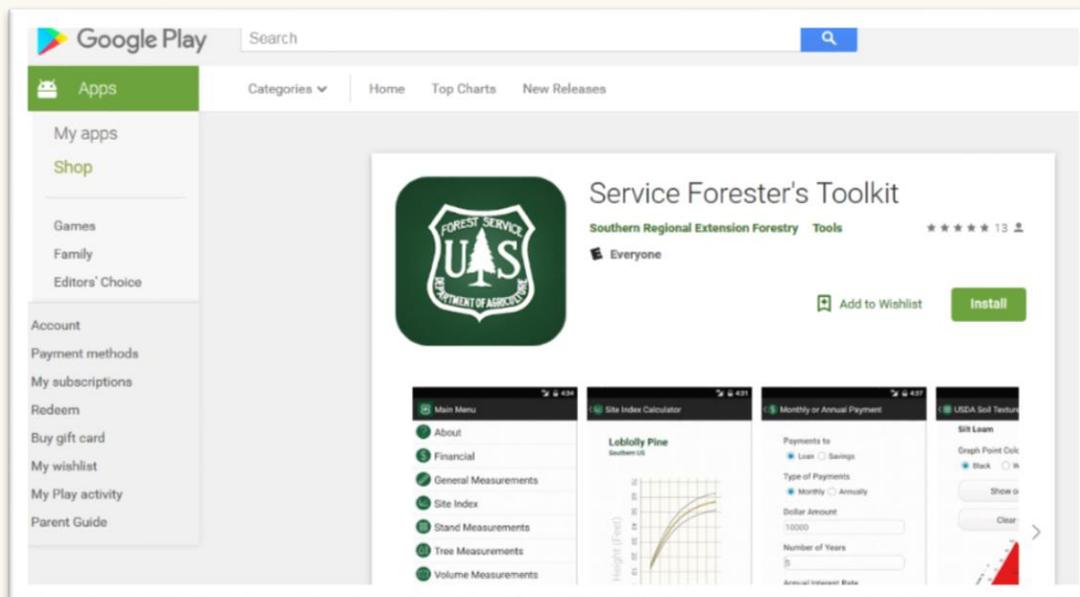


Population



Regionality

🌲 We're all largely doing the same thing, with the caveat of more explicit biological boundaries than other industries



Service Forester's Toolkit

Available on both Android and iOS



Professional precedent

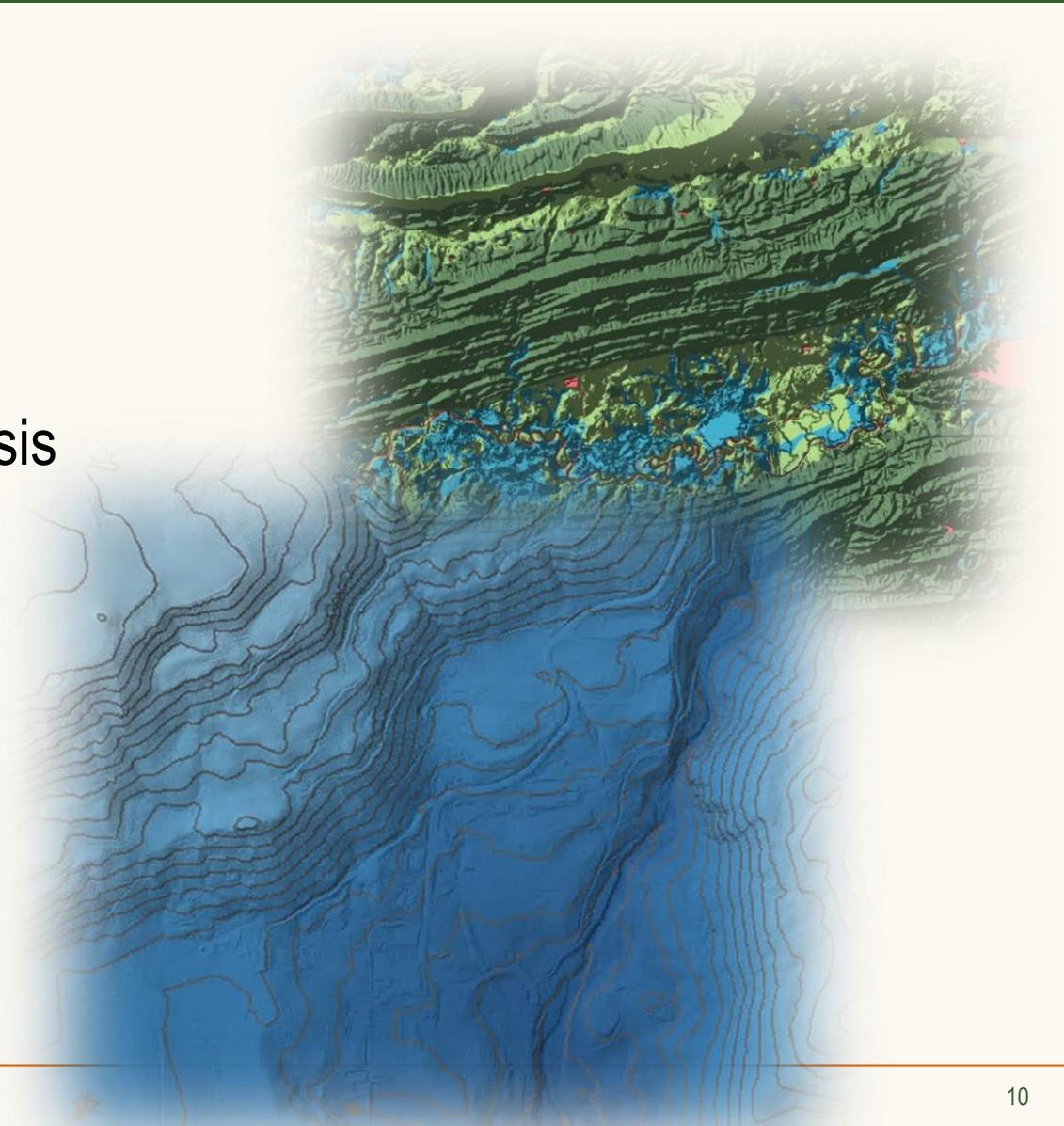
- ▲ USFS as a R&D powerhouse
 - Creative Commons Licensing
- ▲ Success of FIA program
- ▲ University cooperative model





Geospatial

- ▲ QGIS – Quantum GIS
- ▲ SAGA – System for Automated Geoscientific Analyses
- ▲ GRASS
- ▲ Whitebox Geospatial Analysis Tools
- ▲ R Libraries
 - sp
 - sf
 - Wrapper libraries – GDAL/GEOS/GRASS





FIAPI

- Created and maintained by the New Jersey Forest Service
- A python interface for using the FIA web based API
- Goal: to make batch EVALIDator reporting easier

The screenshot shows the GitHub repository page for FIAPI. At the top, it displays the repository name "New-Jersey-Forest-Service / FIAPI" and interaction buttons for "Watch" (8), "Star" (6), and "Fork" (0). Below this is a navigation bar with tabs for "Code", "Issues" (7), "Pull requests" (0), "Projects" (1), "Wiki", and "Insights". The main heading reads "Applications and Libraries for USDA Forest Service, FIA Program's EVALIDator". A summary bar shows "141 commits", "3 branches", "0 releases", "4 contributors", and the "MIT" license. Below the summary bar are buttons for "Branch: master", "New pull request", "Find file", and "Clone or download". At the bottom, a notification for a merge pull request #41 is visible, along with the latest commit hash "8d7662F" dated "Dec 16, 2018".



CAPSIS

- Created and maintained by CIRAD
- Modular forest modelling platform – “common platform”
- Goal: Common modeling platform for forestry

Capsis
Computer-aided projection of strategies in silviculture

- Home
- Presentation
- Download
- FAQ
- Screenshots
- Charte
- Publications
- Documentation
- Projects
- Development
- Contact

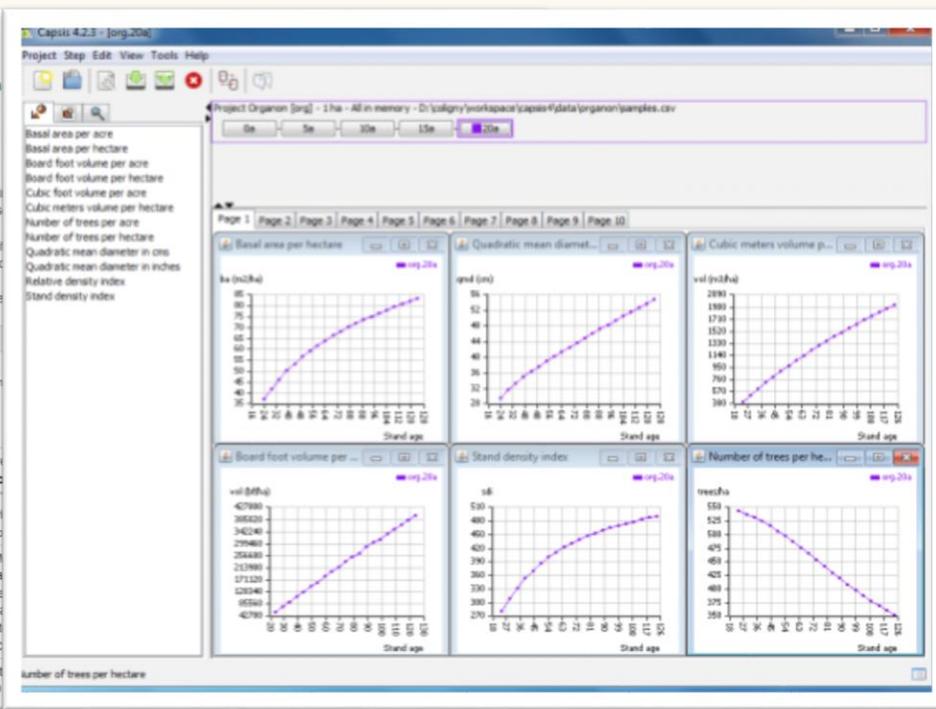
Capsis projects

This page contains the list of active projects and dynamics models (i.e. Capsis modules) and simulation models.

Some of these components are distributed with the software and can be downloaded from the Download page. To get more information, see the documentation.

Search the list: *the most recent projects are*

Project	Description
EcoAF	An Agroforestry model. Keywords : Agroforestry, Gen...
Luberon2	A distance-dependent tree growth model, a new version of the Luberon model of the RMT-IGS project: an adaptation-oriented silviculture model. Keywords : Genetics, Tree lo...
Salem	Salem is a STAnd LEvel 1 mixed stands. Salem is a data for a good robustness test. It includes climate effect. It is according to IPCC climate change scenarios. Keywords : Growth model, C...
AlloStand3D	A tree localisation algorithm based on 3D...



Organon growth model outputs



sitree

- Created and maintained by Norwegian Institute of Bioeconomy Research (NIBIO)
- R package for individual tree simulation
- Goal: modular growth model design in R

Package 'sitree'

October 25, 2018

Version 0.1-4

Date 2018-10-25

Title Single Tree Simulator

Author Clara Anton Fernandez [aut, cre],
Nikolas von Lupke [ctb]

Maintainer Clara Anton Fernandez <caf@nibio.no>

Depends R (>= 3.1.0), data.table, methods, lattice, latticeExtra

Suggests knitr

VignetteBuilder knitr

Description Forecasts plots at tree level.

License GPL (>= 2)

Encoding UTF-8

LazyLoad yes

LazyData yes

NeedsCompilation no

Repository CRAN

Date/Publication 2018-10-25 13:10:21 UTC

Examples

```
result.sitree <- sitree (tree.df = tr,  
  stand.df = fl,  
  functions = list(  
    fn.growth = 'grow.dbhinc.htginc',  
    fn.dbh.inc = "dbh.BN2009",  
    fn.htg.inc = "height.korf",  
    fn.mort = 'mort.B2007',  
    fn.recr = 'recr.BBG2008',  
    fn.management = 'management.prob',  
    fn.tree.removal = 'mng.tree.removal',  
    fn.modif = NULL, #'ext.modif.fun',  
    fn.prep.common.vars = 'prep.common.vars.fun'  
  ),  
  n.periods = 5,  
  period.length = 5,  
  mng.options = NA,  
  print.comments = FALSE,  
  species.spruce = c(1, 2, 3),  
  species.pine = c(10, 11, 20, 21, 29),  
  species.harw = c(30, 31),  
  fun.final.felling = "harv.prob",  
  fun.thinning = "thin.prob",  
  'BN2009',  
  'BBG2008', 'SBA.m2.ha', 'spp','pr.spru.ba', 'QMD.cm',  
  per.vol.harv = 0.83  
)
```



Forest Service projects

🌲 The USFS has begun to release of number of projects online

- Growth Modelling – FVS
- Cruising – FSCruiser/CruiseManager

The screenshot shows the SourceForge project page for 'open-fvs'. The header includes the SourceForge logo and navigation tabs for 'Open Source Software', 'Business Software', 'Services', and 'Resources'. The project title 'open-fvs' is prominently displayed, along with the description 'The Forest Vegetation Simulator (FVS) forest growth model' and the authors 'lancedavid, mshettles521, mrandyck'. Below the title, there are tabs for 'Summary', 'Files', 'Reviews', 'Support', 'Mailing Lists', and 'Discussion'. A 'Browse Commits' section is visible, showing a table of recent commits.

File	Date	Author	Commit
VB.Net-FVS	2014-11-28	drolinsonessa@gmail.com	[r1372] modified for
branches	3 days ago	lancedavid	[r2609] OOBC datab
rFVS	2019-02-04	nickcrookston	[r2596] FVSOnline: t
tags	2016-09-28	rthavis	[r1881] create 3rd q
trunk	5 days ago	nickcrookston	[r2606] Moved the c
trunkV2468	2018-09-04	lancedavid	[r2479] Renamed tru

The screenshot shows the GitHub organization page for 'FMSC-Measurements'. The header includes the USFS logo and the organization name. It displays statistics for 'Repositories: 22', 'People: 0', and 'Projects: 0'. A prominent banner encourages users to 'Grow your team on GitHub' with a 'Sign up' button. Below the banner, there are search filters for 'Find a repository...', 'Type: All', and 'Language: All'. A list of repositories is shown, including 'CruiseDAL', 'TwoTrails', 'FScruiser', and 'FMSC.Core', each with a commit count and update date. A 'Top languages' section lists C#, Java, C++, Python, and Fortran. A 'People' section indicates that the organization has no public members.



Thank you

🌲 Email: Casey.Ghilardi@PotlatchDeltic.com

🌲 GitHub: [Crghilardi](https://github.com/Crghilardi)

🌲 What tools are you building?

🌲 What projects are you watching?

🌲 What tools do you wish someone would build?