Using PISCES for a new task

Want rangemaps in your own area or of your own taxa? PISCES can be adapted

Not limited to acoustics or areas with HUC 12 coverage. Just need a set of polygon units that make sense for your taxa of interest.

While nobody has adapted it yet, the software was designed with this reuse in mind. In this sense, it's more of a tool suite and data model than an actual current set of quality controlled data.

Talk to me if you want more info on how to do this.
Nick Santos
UC Davis Center for Watershed Sciences
Presenting to the Society for Conservation GIS
6/24/2016
**hackronym:** We wanted it to be about fish. Officially stands for "a Programmable Information System for Cataloging and Encoding fish Species observations"
Software and Database

Adding metadata

Exports

Web access

Reuse

arcpy_metadata

new models
Want to create your own range maps for your fish species? PISCES can be adapted to your needs.

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Want rangemaps in your own area or of your own taxa? PISCES can be adapted.

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Website: pisces.ucdavis.edu

Get the software and all the data

View and explore the data in online viewers and download just the spatial data you need.
Problem
Freshwater species are declining, but information on where they are is lacking!

Objective
Complete, Expert-Verified Range Maps for all of California’s 134 native fish taxa

What we didn’t build
A standalone set of maps. They are out of date quickly and can’t utilize the power of databases for recombination and analysis of the data.

What we built
A general purpose set of software and data that allow for managing, analyzing, and mapping species range data. No server required.

It just so happens to generate the range maps we need as one small piece of its functionality
Problem

Freshwater species are declining, but information on where they are is lacking!

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Complete, Expert-Verified Range Maps for all of California's 134 native fish taxa

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What we built

A general purpose set of software and data that allow for managing, analyzing, and mapping species range data. No server required.

It just so happens to generate the range maps we need as one small piece of its functionality
PISCES acts as the glue that brings all the data together. You still have to collect it, but it holds it in a way that makes it more suitable for rangeland assessment.
Interfaces

- Add HUC12 Attributes
- Add Unique Field Values as Alt Codes
- Import Dataset
- Retry Import
- Add or Modify Data
- Add Species Data to Collection
- Undo Transaction (Undo Deletion)
- Generate Layer from Query
- Generate Map
- Generate Species Matrix
- Look Up Records
- Summary Stats
- Change Configuration Options

Calculating data stats
Total Number of Fish Species with Present QC Data: 174
Total Number of Valid and Active Observations: 117922
Total Number of Species tracked (no data bins, but includes nonfish): 321
Total Number of Native Fish Species with Data: 113
Total Number of Non-Native Fish Species tracked (no data bins): 48
Total Number of Fish Species tracked (no data bins): 285
Total Number of Fish Species with Historic QC Data: 113
Total Number of Datasets Included: 264
Total Number of Native Fish Species tracked (no data bins): 133
Total Number of Species tracked (including data bins and nonfish taxa): 338
Total Number of Law (including NonFish) with Data: 385
Total Number of Valid Observations in the Quality Controlled Set (5,15): 216??
Calculating data stats
Total Number of Fish Species with Present QC Data: 174
Total Number of Valid and Active Observations: 317225
Total Number of Species tracked (no data bins, but includes nonfish): 321
Total Number of *Native* Fish Species with Data: 133
Total Number of Non-Native Fish Species tracked (no data bins): 48
Total Number of Fish Species tracked (no data bins): 205
Total Number of Fish Species with Historic QC Data: 133
Total Number of Datasets Included: 264
Total Number of Native Fish Species tracked (no data bins): 133
Total Number of Species tracked (including data bins and nonfish taxa): 338
Total Number of Taxa (Including NonFish) with Data: 306
Total Number of Valid Observations in the Quality Controlled Set (5,15): 216077
PISCES exports:

- Map Documents
- PNG images
- PDFs
- FGDB feature classes
- Zipped Shapefiles
- KMZ
- Layer Packages
- CSV
- Tables
Database

SQLite

Data keyed to MUC 12 subwatersheds
(US Watershed Boundary Database)
Could be keyed to any polygon unit for another region using a through

Maps are just SQL queries, but they can have a callback function to process data.
Data keyed to HUC 12 subwatersheds (US Watershed Boundary Dataset)

Could be keyed to any polygon unit for another region using it though

Maps are just SQL queries, but they can have a callback function to postprocess
Can add extended attributes to watersheds and taxa (like the species sensitivity attributes that gave us this map)
Maps are just SQL queries, but they can have a callback function to postprocess data.
PISCES acts as the glue that brings all the data together. You still have to collect it, but it holds it in a way that makes it more suitable for rangemaps
arcpy_metadata

New Problem:
We're contracted to deliver hundreds of layers with metadata, but ArcGIS doesn't provide a way to edit metadata in Python.

It would be time-prohibitive and counter-productive to manually add metadata just for one contract.

Solution
Build our own Python library for editing metadata.

Free, open source, and available for use in your projects with a permissive license.

Using arcpy_metadata

Another workflow - update tags for all datasets in a folder

```python
import arcpy
import arcpy_metadata as md
data_folder = r"C:\path\to\data\folder_or_geodatabase"  # wherever your data is!
all_datasets = arcpy.ListDatasets(data_folder)
for dataset in all_datasets:  # do this for all of the datasets found in the folder
editor = md.MetadataEditor(dataset)
editor.tags.append("sgis")
editor.tags.append("gc_2016")
editor.finish()  # saves the metadata back to the dataset
```

Getting it and contributing
Have pip? Run pip install arcpy_metadata
https://github.com/ucd-wys/arcpy_metadata
New Problem:

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Using arcpy_metadata
Solution

Build our own Python library for editing metadata.

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Using arcpy_metadata

>>> import arcpy_metadata as md

>>> floodplain_metadata = md.MetadataEditor(r"C:\Users\dxs AD3\Code\FloodMitigation\regions\nfhf1_layers.gdb\odonah_generated_floodplain_v2")

Exporting metadata to temporary file C:\Users\dxs AD3\AppData\Local\Temp\arcEB\scratch\odonah_generated_floodplain_v2.xml

>>> floodplain_metadata.abstract

This layer was generated from NHDPplus V2 rivers data as a proxy for the approximate floodplain areas for this river. Each river segment was buffered by (.1*Upstream Drainage Area in SQ KM) meters to obtain these polygons. Validation was purely visual based on the fact that the true floodplain is unknown at this time. Instead, it was simply checking to make sure that the prior location of Odanah WI would have been substantially in the floodplain here, and it was. Additionally, given the flatness of the most important parts of the floodplain for this analysis, it is suitable. Only rivers with more than 250 square kilometers upstream were included to better approximate floodplains (by visual check against DEM).

>>> floodplain_metadata.tags

[]

>>> floodplain_metadata.title

'odonah_generated_floodplain_v2'

>>>
Generated Floodplain for Odanah, WI

File Geodatabase Feature Class

Summary
There is no summary for this item.

Description
This layer was generated from NHDPlus V2 rivers data as a proxy for the approximate floodplain areas for this river. Each river segment was buffered by (1)*Upstream Drainage Area in SQ KM) meters to obtain these polygons. Validation was purely visual based on the fact that the true floodplain is unknown at this time. Instead, it was simply checking to make sure that the prior location of Odanah WI would have been substantially in the floodplain here, and it was. Additionally, given the flatness of the most important parts of the floodplain for this analysis, it is suitable. Only rivers with more than 250 square kilometers upstream were included to better approximate floodplains (by visual check against DEM).

Updated 6/23/2016 for SCGIS Conference

Credits
There are no credits for this item.

Use limitations

Tags
scgis, floodplain, flood_mitigation

Python

Instead, it was simply checking to make sure that the prior location of Odanah WI would have been substantially in the floodplain here, and it was. Additionally, given the flatness of the most important parts of the floodplain for this analysis, it is suitable. Only rivers with more than 250 square kilometers upstream were included to better approximate floodplains (by visual check against DEM).</SPAN></P>

```python
>>> floodplain_metadata.tags
[]
>>> floodplain_metadata.title
'odanah_generated_floodplain_v2'
>>> floodplain_metadata.tags = ['scgis','floodplain','flood_mitigation']
>>> floodplain_metadata.tags
['scgis', 'floodplain', 'flood_mitigation']
>>> floodplain_metadata.title = "Generated Floodplain for Odanah, WI"
>>> floodplain_metadata.abstract += "Updated 6/23/2016 for SCGIS Conference"
>>> floodplain_metadata.finish()
Saving metadata
cleaning up from metadata operation
```
Another workflow - update tags for all datasets in a folder

```python
import arcpy
import arcpy_metadata as md

data_folder = r"C:\path\to\data\folder_or_geodatabase"  # wherever your data is!

all_datasets = arcpy.ListDatasets(data_folder)

for dataset in all_datasets:  # do this for all of the datasets found in the folder
    editor = md.MetadataEditor(dataset)
    editor.tags.append("scgis")
    editor.tags.append("qc_2016")
    editor.finish()  # saves the metadata back to the dataset
```
Getting it and contributing

Have pip? Run `pip install arcpy_metadata`

https://github.com/ucd-cws/arcpy_metadata
Website: pisces.ucdavis.edu
Get the software and all the data
What is PISCES?

PISCES is a suite of software and data describing the fish species richness in California. The software is

- Developed by the Center for Watershed Sciences, University of California, Davis
- Sponsored by the California Department of Fish and Wildlife

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OR

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Software Development
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PISCES: http://pisces.ucdavis.edu

Center for Watershed Sciences: https://watershed.ucdavis.edu

arcpy_metadata: https://github.com/ucd-cws/arcpy_metadata