



Southeast Region GIS Newsletter

February, 2015

Notes from the Regional Coordinator

Jason Duke

As we prepare to conduct the 17th Annual Region 4 GIS Training from May 19-21, 2015, we are also rolling out another edition of our Regional GIS Newsletter. Regional GIS users are continuing to use GIS to support the mission of the FWS through analysis, modeling and mapping. GIS practitioners are supporting Refuges, ES, Fisheries, Law Enforcement, Migratory Birds, LCCs and Science Applications across the board. Traditional map products are being developed in addition to web mapping portals and electronic map products and applications designed for tablets, smart phones, and traditional desktops and laptops.

Our 2015 Annual R4 GIS Training will take place from May 19-21 at Tennessee Technological University in Cookeville, Tennessee, and we are expecting about 100 attendees. The Regional GIS Committee will meet on Monday, May 18, prior to the training to address Regional issues and to work on an updated Regional GIS Strategy.

GIS is a mainstream application in the Region and the attached project examples attest to that mantra. Our Region has been fortunate to have received excellent support from top management in regard to the utilization and implementation of GIS in all Programs. We are also fortunate to have a large user base (over 500 users), who are well trained in part from our annual training events. Communication is an important part of GIS and please remember the following methods of communication (in addition to contacting me directly):

1. Regional GIS Listserver - send an e-mail with Subscribe in Subject line to:
fws-r4gis@lists.fws.gov
2. Regional GIS SharePoint Site -
<https://fishnet.fws.doi.net/projects/gisnew/r4/Sitepages/Home.aspx>
3. ArcGIS Licenses or ArcGIS Campus Courses – E-mail matthew_snider@fws.gov
4. Legacy Regional GIS Website – <http://www.fws.gov/southeast/gis>

Calendar:

May 19-21, 2015 – Region 4 GIS Training at Tennessee Tech University in Cookeville, TN

July 20-24, 2015 – ESRI International GIS User Conference in San Diego, CA

December 1-3, 2015 – Regional GIS Committee Meeting in Asheville, NC

Stories From the Field

Geomorphons

Mark Endries – Asheville Field Office, Asheville, NC, Doug Newcomb – Raleigh Field Office, Raleigh, NC

Introduction to GitHub

Roy Hewitt – Ecological Services – Southeast Regional Office, Atlanta, GA

SEACAP: A Tool to Assess Aquatic Connectivity in the Southeast

Emily Granstaff – Southeast Region GIS

Rio Loco Watershed/Guánica Bay Watershed Initiative Story Map

Roy Hewitt/Jose Barrios – Ecological Services – Southeast Regional Office, Atlanta, GA

Guinea Pigs Wanted: Distance Learning Pilot Course – Cartographic Design

Jim Besley – Arkansas Field Office, Conway, AR, Kurt Snider – Tennessee Field Office, Cookeville, TN, Mark Richardson – NCTC

Cadastral Data – What layer is the Boundary?

Brian Hickinbotham – Realty – Southeast Regional Office, Atlanta, GA

Clearhead icefish, a new non-native species has established a population in the Amur River, China

James Henne – Bears Bluff National Fish Hatchery, Wadmalaw Island, SC, Brian Paddock – South Carolina Field Office, Charleston, SC

ESRI Virtual Campus

Matthew Snider – Southeast Region GIS

Technical Tip – Equally distributing area between overlapping buffers

Brian Van Druten – Alligator River NWR, Manteo, NC, Doug Newcomb – Raleigh Field Office, Raleigh, NC

Pine Woodlands – Restoring the Woodlands of the Past for the Birds of the Future

Blaine Elliott – Mississippi Valley Joint Venture,

Geomorphons

The Asheville Ecological Services Field Office, with assistance from the Raleigh Ecological Services Field Office, is involved in a multi-agency spruce-fir forest restoration initiative. A major component to the initiative is to map criteria critical to restoration. These criteria include items such as historic presence of spruce-fir forest, elevation, aspect, and topography. To map topography we are using a new pattern recognition approach to classification and mapping of landforms called Geomorphons. Geomorphons uses a Digital Elevation Model (DEM) and classifies land form elements into a finite number of 498 forms then generalizes all of these forms to a small number of the most common landform elements. The 10 classified landforms that geomorphons reports are Summit, Ridge, Shoulder, Spur, Slope, Flat, Footslope, Hollow, Valley, and Depression. Using the Geomorphons output, a map of sheltered landforms (Footslope, Hollow, Valley, and Depression categories) is being used to help identify sheltered areas that can support spruce-fir forests. Sheltered areas are desirable for spruce-fir forests because they are inherently more mesic due to greater precipitation or more frequent cloud cover. The geomorphons extension (r.geomorphon) is an extension for the GRASS 7.0 GIS program.

Links:

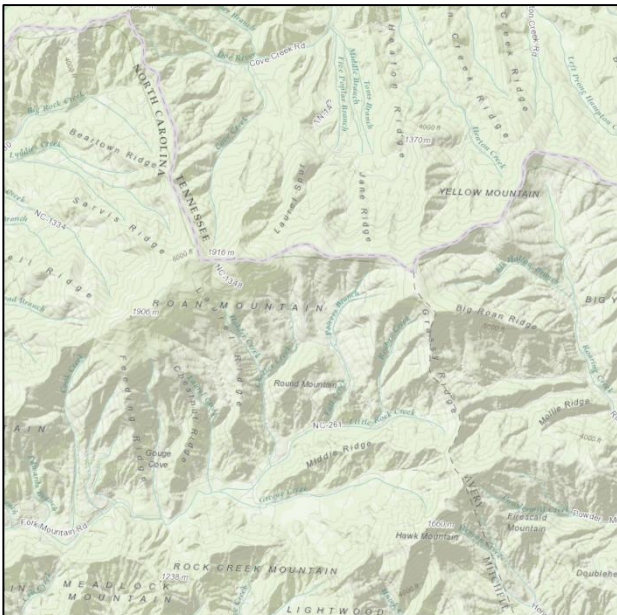
Geomorphons Website: <http://sil.uc.edu/geom/app>

r.geomorphon extension for GRASS:

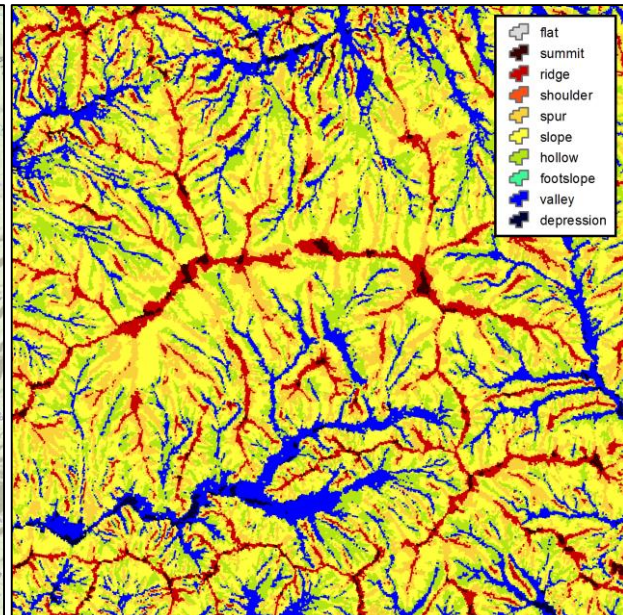
<http://grass.osgeo.org/grass70/manuals/addons/r.geomorphon.html>

Images: Roan Mountain area along North Carolina and Tennessee Border

Topographic Map



Geomorphons Output



An Introduction to GitHub

GitHub is a social network built that helps manage projects that make heavy use of text documents. The majority of the projects on GitHub are code-based, but the underlying technology supports management of many other types of text files. GitHub is built on top of a program called Git, which

manages version control of files. If you have ever tried to manage a series of documents as they change over time you already understand how difficult it can be to manage a document's complete history.

What is Version Control?

A file managed with GitHub keeps its' complete history allowing you to revert to any previous state of your project. GitHub serves as a place to collaborate around projects be they centered on code projects, document collaboration, data sharing, etc. [One prospective congressman](#) even released his political platform to GitHub to let citizens consider his policies and suggest changes.

One of the greatest aspects of a distributed version control system like git is that anyone who collaborates on the document stores the complete project history on their local computer. This means if one team member's computer crashes you can always find the entire project on another team member's computer.

Why use GitHub?

The Service recently created an [Organizational](#) account on GitHub that helps to organize Fish and Wildlife specific GitHub projects. The goal is to share things like handy GIS scripts like [batch processing NDVI](#), or projects like the [Leaflet Web Mapping Template](#) that allow you to hit the ground running on a web map without reinventing the wheel. GitHub also provides basic project management tools like bug reporting and does a good job of documenting back-and-forth discussions pertaining to specific changes in documents, scripts, or coding projects.

GitHub and Web Mapping

The Web Mapping Task Group has been asked to work with the developers at ECOS to identify common map elements and functions that can be used in a variety of web mapping applications. These map controls will make it easy for application developers throughout the Service to easily drop in a layer-switcher control that has common FWS reference layers (Refuges, Critical Habitat, etc.) already built-in. This will allow users of our maps to learn a specific tool once and use that tool on any number of maps on [fws.gov](#). ECOS has adopted LeafletJS as their mapping software, which is just another [project on GitHub](#), and the same software used to build the FWS Web Mapping Template.

For a more complete introduction try [Understanding GitHub: A Journey for Beginners Part I](#)

SEACAP: A Tool to Assess Aquatic Connectivity in the Southeast

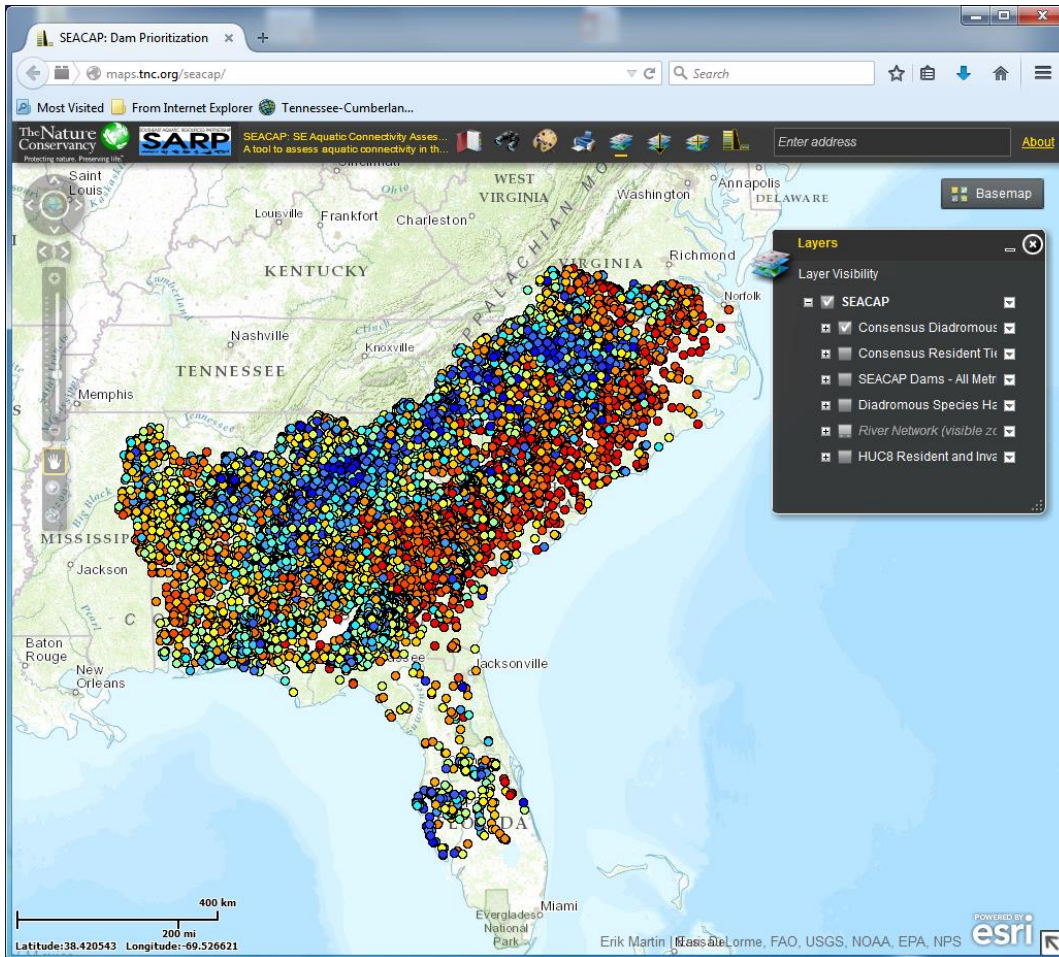
There is a new web mapping tool just released for aquatic resources manager interested in dams in the Southeast. The Southeast Aquatic Connectivity Assessment Project (SEACAP) compiles information on dams that are fish barriers, assesses them for their impact to aquatic habitat fragmentation, and prioritizes the barriers for their potential benefit to diadromous or resident species, if removed.

This GIS-based analysis uses custom geoprocessing tools to develop over 40 ecologically-significant metrics about each of the approximately 17,000 dams in the database. Metrics include the number of river miles upstream and downstream of each dam point, the number of dams upstream or downstream, number of rare species in the watershed, watershed conditions, and location of dam within the river network.

An interactive web mapping tool allows users to view the locations of the dams in the inventory, view the metrics for a particular dam, view the SEACAP Workgroup priorities, and produce on-the-fly custom prioritizations based on the users' interests.

You can see the tool in action by visiting: maps.tnc.org/seacap

For more info on the tool or SEACAP, contact Emily Granstaff (emily_granstaff@fws.gov).

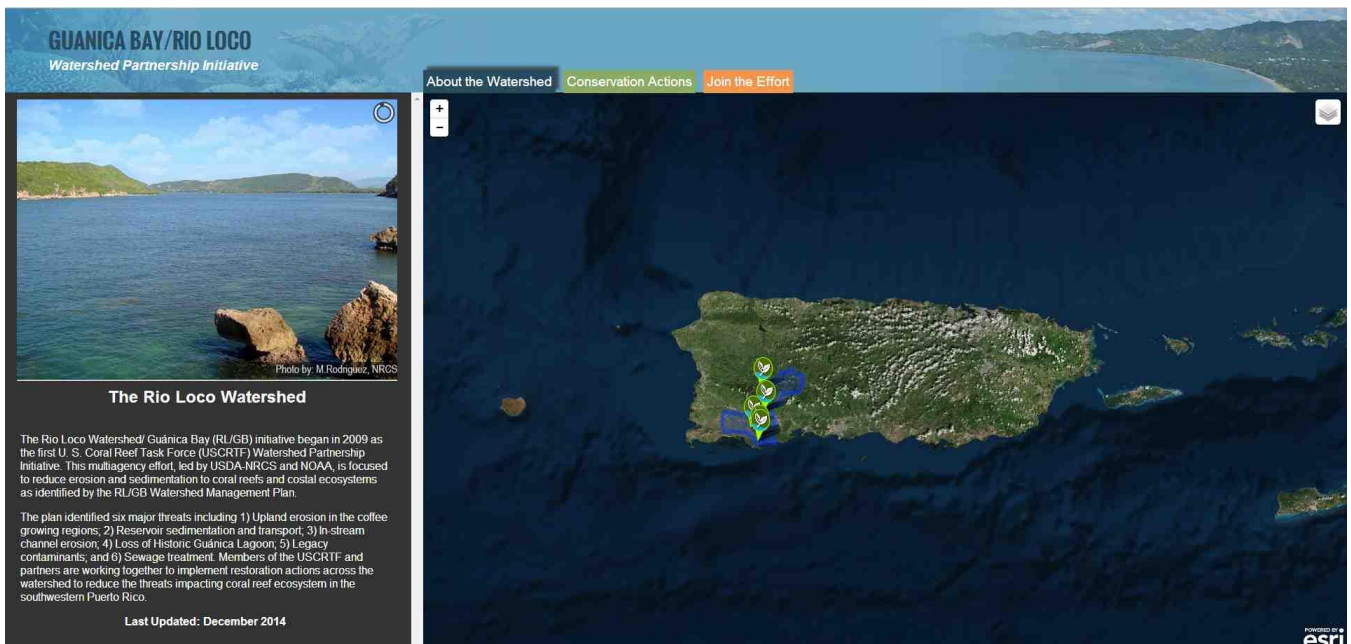


[Rio Loco Watershed/Guánica Bay Watershed Initiative Story Map](#)

What is a Story Map?

[According to ESRI](#), Story maps use geography as a means of organizing and presenting information. They tell the story of a place, event, issue, trend, or pattern in a geographic context. They combine interactive maps with other rich content—text, photos, video, and audio—within user experiences that are basic and intuitive.

This project was developed as an outreach tool by the U.S. Fish & Wildlife Service, Southeast Region in collaboration with U.S. Coral Reef Task Force - Sunia Coral Reef Conservation Internship Program. The interactive story map combines a description and images of the different restoration projects completed as well graphs illustrating the contributions of various agencies made to the task force.



The Initiative

The Rio Loco Watershed/ Guánica Bay (RL/GB) initiative began in 2009 as the first U. S. Coral Reef Task Force (USCRTF) Watershed Partnership Initiative. This multi-agency effort, led by USDA-NRCS and NOAA, is focused on reducing erosion and sedimentation to coral reefs and coastal ecosystems as identified by the Rio Loco Watershed/Guánica Bay Watershed Management Plan.

The plan identified six major threats including:

1. Upland erosion in the coffee growing regions
2. Reservoir sedimentation and transport
3. In-stream channel erosion
4. Loss of Historic Guánica Lagoon
5. Legacy contaminants
6. Sewage treatment

Members of the USCRTF and partners are working together to implement restoration actions across the watershed to reduce the threats impacting coral reef ecosystem in the southwestern Puerto Rico.

The Gritty Details

This story map was created with modern web standards (HTML5, CSS3, and JavaScript) by combining several open source software tools. The map portion of the application was built with [LeafletJS](#). The [ESRI extension](#) to Leaflet was used to bring in basemaps including Imagery and a Topographic layer. A second Leaflet extension, [omnivore](#), was used to display a csv file of projects on the map. The map of Agency monetary contributions was created with [ChartsJS](#). Finally, [jQuery](#) and several plugins were used to handle application interaction, [modal windows](#), and [image slideshows](#).

The project was scaffolded with [Yeoman](#), and used [GruntJS](#) to improve performance.

[The source code](#) for this project was released on the [USFWS GitHub page](#) in the Public Domain. Feel free to remix the application for your own use case, suggest improvements, or report any problems that you may encounter.

Guinea Pigs Wanted: Distance Learning Pilot Course – Cartographic Design

For ten years NCTC has been offering Cartographic Design, a four day course in the fundamentals of designing and producing maps with ArcGIS. Last year, course instructors Jim Besley, Kurt Snider and Mark Richardson created an online version of the course with video lectures, hands-on exercises and live webinar critiques. It is ready to test on live subjects and we want you!

The course is self-paced and designed to be completed in one month. Topics covered are: **What is a good map, Map design theory, Map elements, Map projections, Typography (labeling), Symbolization** and the **Use of color**. Many tips and tricks are infused as the class progresses.

If you are interested in participating you must **commit** to the following:

- Actively participate in the scheduled Adobe Connect sessions

February 11, 18, 25 (1.5 hrs each - starting at 2:00 pm Eastern Time)

- View the assigned pre-recorded presentations (9) VIA the web before each session
- Complete all the course exercises (3-4 guided map compositions - to be posted on Moodle)
- Provide constructive feedback after each session

Detailed instructions, exercises, data sets and links to the video presentations will be made available/hosted on Moodle.

Prerequisites:

The ability to make maps in ArcMap10.x or higher

Software/Hardware Requirements:

ArcGIS 10.x

Google Chrome or IE

In- office speaker phone

Adobe Connect Account (set up procedures will be provided at the Moodle site)

Moodle Account

If you are interested in participating in the pilot, please contact Mark Richardson at mark_richardson@fws.gov.

Cadastral Data – What layer is the Boundary?

If you have downloaded the Cadastral Geodatabase, or used other cadastral layers available from the USFWS National Cadastral Data webpage, you may have been confused as to which layer to use. If so, do not be alarmed, for you are not alone! This article will aim to explain the differences between the two primary layers available for download or use as a web service.

First: Where can I download these layers or web services?

<http://www.fws.gov/gis/data/CadastralDB/index.htm>

That page contains a geodatabase, two web services, a few shapefiles, and detailed metadata for all of the layers. The two main layers you will find in those products are FWSApproved and FWSInterest. These are the two layers that will be explained further.

FWSApproved:

The layer is named for the Approved Acquisition Boundary. This data layer depicts the external boundaries of lands and waters that are “approved” for the acquisition by the U.S. Fish and Wildlife Service. The boundary gives FWS the authority to request funds for the acquisition of land and water within this area. This area SHOULD NOT be identified as “Refuge Lands” on any map.

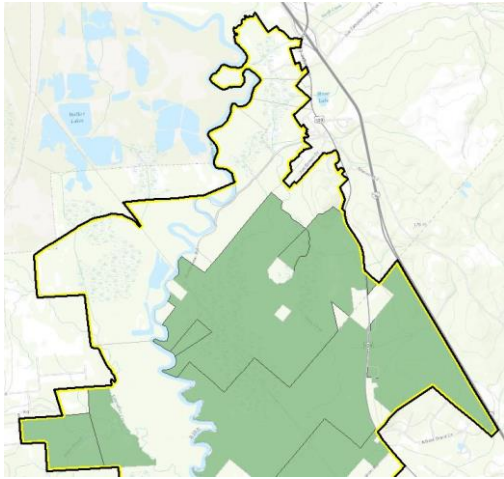
FWSInterest:

The layer is named for the “Interest” that FWS has in each parcel. This data layer depicts the lands and waters administered by the U.S. Fish and Wildlife Service. It may also include inholdings that are not administered by USFWS. If you are working with the feature class from the cadastral geodatabase, you will notice the layer is categorized into a subtype field named Status, which contain the values: Acquired, Divested, or Inholding. If you are working with a shapefile, the coded values are: “0” for Acquired, “1” for Inholding, and “2” for Divested. Acquired parcels are ones that FWS has administration rights. Inholding parcels are lands within the approved acquisition boundary for which the FWS has yet to acquire an interest. Divested parcels are ones that FWS has exchanged or relinquished interest. To further clarify the FWS interest, use the field named “INTTYPE1”. If the alias values are displayed in the attribute table, the field name will be shown as “Primary Interest Type”.

The following are values, or coded values for shapefiles, found in this domain:

- **Agreement** or “**A**” – A written concurrence USFWS and another party(ies) for management of a parcel of land or water.
- **Easement** or “**E**” – An area of land where USFWS shares interest via easement of lease.
- **Fee** or “**O**” – Lands owned in Fee by the United States where the Service is the primary administering agency.
- **Partial Interest** or “**P**” – A shared ownership in a tract of land, between the Service and others.
- **Lease** or “**R**” – Management of land and/or water is given by the owner to the FWS for a specified period of time.
- **Secondary** or “**S**” – An area of land where FWS holds secondary interest to another federal agency(ies).
- **Unknown** or “**U**” – Status of the parcel is uncertain because it is unknown or requires additional research.
- **None** or “**N**” – The parcel is not owned or managed by FWS.

Below is an example of both layers on a map. The FWSApproved is displayed with a black and yellow line and shows the extent to which FWS can request funds to acquire land. The FWSInterest is displayed with the green polygons, and shows the tract of land FWS has Fee ownership.



For any questions, please email Brian Hickinbotham, Lead Cartographer, Division of Realty at brian_hickinbotham@fws.gov

Clearhead icefish, a new non-native species has established a population in the Amur River, China

The U.S. Fish and Wildlife service, Bears Bluff National Fish Hatchery requested a basic map to be produced from the South Carolina ES Field Office depicting a set of point locations and stream coverage within a specific Province in China. We produced a map with the given coordinate system and imagery that was available. While placing the locations we found that some of the coordinate data was inaccurate, placing one of the points very far away from the Province that we were working in.

While building this map we also endured communication barriers, data / imagery availability problems and publication restrictions for the article. We worked on the map for quite a few months, and finally were able to build something everyone could agree on.

This map was included in an article written for the [Journal of Applied Ichthyology](#). (View the maps on the next page)

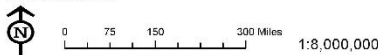


Occurrence sites of *P. hyalocranius* in Amur River system

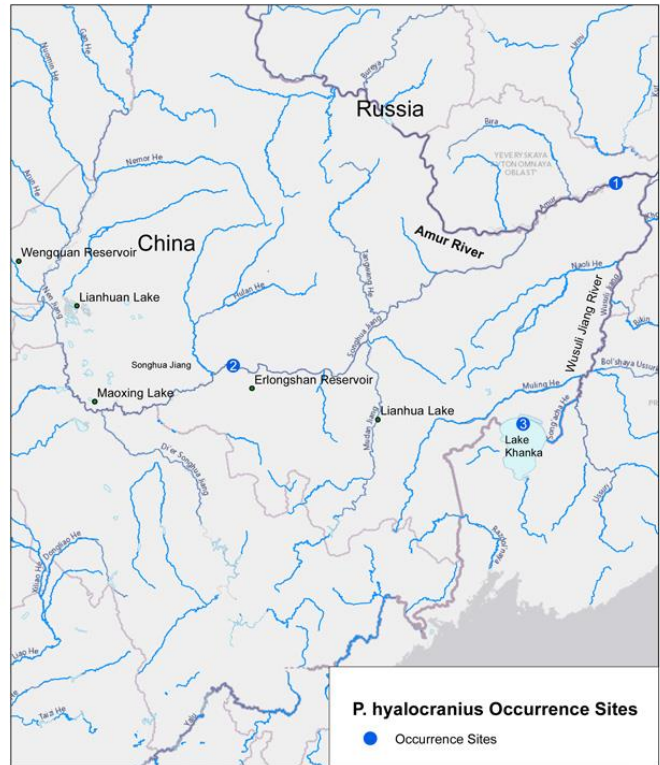


Produced in the Division of Information Resources and Technology Management
 South Carolina ES Fish Office
 Produced May 14, 2013
 Basemap: ESRI World Topo
 File: 21130514_BBF_China.mxd

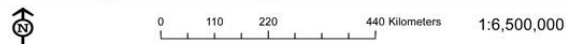
The USFWS makes no warranty for use of this map and cannot be held liable for actions or decisions based on map content.



First Draft map submitted for Chinese review.



P. hyalocranius Occurrence Sites
 ● Occurrence Sites



Final accepted version.

ESRI Virtual Campus

Do you need extra GIS training? And want to complete it at your own pace? And not have to pay anything for it? ESRI offers a wide variety of over 50 online self-paced training classes and they are available to the USFWS for free! Below are some of the classes available to you!

- Getting Started with GIS
- Getting Started with the Geodatabase
- Solving Spatial Problems Using ArcGIS
- Building Models for GIS Analysis Using ArcGIS
- Python Scripting for Geoprocessing Workflows

Link to full catalog of courses:

<http://training.esri.com/gateway/index.cfm?fa=aul.premiumCourses>

You must sign up for a free Esri Account at the link below:

https://accounts.esri.com/signup?redirect_uri=http%3A%2F%2Fwww.esri.com%2F

Once you have signed up for an account, please email matthew_snider@fws.gov with the title of the course(s) you would like to take.

Technical Tip – Equally distributing area between overlapping buffers

Have you ever had overlapping point buffer polygons that you wanted to split so the overlapping areas were equally distributed between the polygons? Here's how to do this:

1. If your point data is in WGS 84, project your points to a projected coordinate system. Buffer results will not align with the Thiessen polygon layer if they are projected to a geographic coordinate system.
2. Second, create Thiessen polygons from your newly projected point shapefile. **ArcToolbox > Analysis Tools > Proximity > Create Thiessen Polygons**. **Input** is your point shapefile.
3. Buffer your points. **ArcToolbox > Analysis Tools > Proximity > Buffer**. **Input** is your point shapefile. **Linear unit** is how far you want to buffer each point. Under **Dissolve Type** change it to **ALL**.
4. Divide them up! **ArcToolbox > Analysis Tools > Overlay > Intersect**. **Input Features** will be the newly created buffer and Thiessen polygon layers.

Please note that your buffers will be clipped to the edge of the Thiessen polygon layer and this may skew your results. For instance, we were working with 1000 meter buffered data. Two of the buffers were partially outside of the Thiessen polygons and were clipped when we intersected the data. Something to watch out for when using larger buffer distances.

This process can also be done in **QGIS** (after projecting your data) by using the following commands: **Vector-->Geoprocessing Tools--> Buffer** (set segments to 30) to buffer the points,

Zoom to extent of the buffer vector layer (right click on the layer -->zoom to layer),

GRASS v.voronoi program called from within QGIS Geoprocessing Toolbox using the display canvas for the extent to create the voronoi (thiessen) polygons, **Vector-->Geoprocessing Tools-->Clip** to clip the voronoi polygons with the point buffers.

This method avoids the overlapping buffer/clipping problem in ArcGIS.

Pine Woodlands – Restoring the Woodlands of the Past for the Birds of the Future

Fire-dependent pine woodland ecosystems once dominated much of the landscape of the southeastern U.S. and these habitats promoted an amazing species richness and diversity, including many bird species. With the clearing of pinelands across the geography and the wide-scale reduction of frequent fires, these habitats and the associated bird species suffered drastic declines and include some of the more threatened and endangered species / habitats that are the concerns of conservation interests in the region.

Cooperative, regional bird conservation partnerships, known as Migratory Bird Joint Ventures, work to conserve habitat for the benefit of birds, other wildlife, habitats and people. Since they were first established in 1986, joint ventures have grown to cover nearly all of the U.S. and Canada, and much of Mexico. These self-directed partnerships address priority bird conservation issues within their geographic areas. Joint venture partners have developed practical conservation strategies by using the

latest scientific understanding of bird habitat needs in order to identify and target the most appropriate locations for action in pine savannah habitats. For more information, see the article in [American Birding Association Birder's Guide to Conservation & Community](#).

