## LTAR Remote Sensing and GIS activity and contacts from 2016 Annual LTAR meeting

Summary

1. *Prior to the meeting:* Following the 2015 Annual meeting, Alisa Coffin (Southeastern Coastal Plains), David Augustine, and Lauren Porensky (both, of Central Plains Experimental Range), met by phone 3 times to discuss the remote sensing and geospatial needs and protocols, in the context of the Biodiversity Sub-group of the Biological Working Group. Outcomes of these meetings included:
2. A brief providing a discussion on geospatial data and remote sensing in the LTAR network. The paper provided some background, comments about temporal and spatial scale methods standardization, further planning and points about standardized geospatial datasets.
3. Decisions to:
   1. Development of a survey for each LTAR site to complete, providing basic information on geospatial data needs and capabilities.
   2. Look for an opportunity at the 2016 meeting to identify and meet with contacts from the various LTAR locations who are either experienced working with geospatial data, or whose job it is to manage geospatial data for their locations.
   3. Ask the wider group to identify remote sensing and GIS as a working group, independent of the Biology Working Group, as the data types and modeling methods cut are common to all working group subject areas.
4. *During the meeting*: During the first day of the 2016 meeting, we established an impromptu sub-group meeting during the afternoon working group breakout session (participants listed below).
5. *Breakout session notes:* We reviewed the brief developed during the intervening year, as well as the survey. Breakout session participants gave some feedback about questions on the survey and began to address some critical issues with regard to geospatial data:
6. Agreed that we need to have available the following geospatial datasets:
   1. Boundaries
   2. Instrument locations
   3. Flux tower locations
   4. Soil moisture sensor locations
   5. Rain gauge locations
   6. Stream gauge locations
7. The “rest is doable” – we don’t need to be storing datasets that are readily available in other GIS services
8. Standardized projection? Probably a good idea – best if it’s a continental projection, and should be standard operating procedure for the geospatial data submitted to NAL. The group recommends using the USA Contiguous Albers Equal Area Conic USGS version:

PROJCS["USA\_Contiguous\_Albers\_Equal\_Area\_Conic\_USGS\_version",

GEOGCS["GCS\_North\_American\_1983",

DATUM["D\_North\_American\_1983",

SPHEROID["GRS\_1980",6378137.0,298.257222101]],

PRIMEM["Greenwich",0.0],

UNIT["Degree",0.0174532925199433]],

PROJECTION["Albers"],

PARAMETER["False\_Easting",0.0],

PARAMETER["False\_Northing",0.0],

PARAMETER["Central\_Meridian",-96.0],

PARAMETER["Standard\_Parallel\_1",29.5],

PARAMETER["Standard\_Parallel\_2",45.5],

PARAMETER["Latitude\_Of\_Origin",23.0],

UNIT["Meter",1]]

1. Data types: Geodatabase or shapefile? There are pros and cons to both types – shapefiles are very well understood by most novice GIS users, but they lack topology and the relational database features of geodatabase structures. While shapefiles cannot be read directly into R, there are geospatial modules that can do this. We recommend using shapefile data structures for vector data (no decision on raster data format).
2. Suggest a common set of terminology for geographic terms to be adopted across the network. Terminology like “pasture” and “field” are often used interchangeably. Recommend that geospatial data submitted to the NAL data hub use common reference terminology with definitions to be determined (e.g. field, pasture, farm, ranch, plot, fetch).
3. Recommend coordinates for boundaries and instrument locations be provided in projected units:
   1. MINIMUM– coordinates provided by Google Earth and transformed into projected units.
   2. REQUIRED – coordinates measured with a GPS unit with no larger than 5m error (handheld GPS will suffice for that)
   3. Higher level precision is nice but not required – if someone needs higher level precision and it is not available on the data portal, contact the R/S-GIS contact for the LTAR location.
4. Add to the survey:
   1. Do you have a GIS data server on site?
   2. What are the personnel resources at each site? Identify at least one individual at each site to serve as a RS/GIS contact person.
   3. Add another column to the “spatial data usage” question: “Would like to use”
5. PRIORITY 1: Have every LTAR site specify if or their GIS/RS point of contact, and ask them to complete the survey. Tabulate the results for use by the WG and develop a list of human resources across the LTAR network.
6. PRIORITY 2: Coordinate with the NAL data portal to set up the geospatial data as recommended.
7. QUESTION:

How can remote sensing support or help answer the research questions being developed across working groups and aimed at the broader LTAR hypothesis of improving production and ecosystem services?

1. *Post-breakout, during the remaining sessions:*

* A list of contacts was identified, with representatives from each site, who agreed to serve as a RS/GIS working group point of contact, or, at a minimum, receive and complete a survey.
* A few surveys completed surveys have been received. Next step is to follow through and send to LTAR contacts on list below.
* The question was brought and the point was made by several speakers at the meeting that Remote Sensing and Geospatial Data within LTAR ought to be a separate working group. No opposition to this notion was voiced at the meeting, although it was also noted that there is a clear connection, dependency and overlap with the Data Management Working Group. Consequently, it is clear that the RS/GD working group must work in close coordination with the Data Management Working Group.

1. *Following the 2016 Annual Meeting:*

* A request was sent out by Peter Kleinman to provide shapefiles of the boundary of the LTAR sites.
* The purpose of this was to provide a standard set of boundary files that can be used to “see” all of the LTAR sites
* The LTAR web mapping service is up and running with real time map display of LTAR sites, soil climate data, atmospheric data, camera images, aerial imagery, and boundaries.

List of contacts for RS/GIS working group by LTAR site:

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| --- | --- | --- |
| LTAR Site | Name | email |
| Archbold Biological Station | Raoul Boughton | rboughton@ufl.edu |
|  | Vivienne Sclater | vsclater@archbold-station.org |
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| Central Plains Experimental Range | Nicole Kaplan | nicole.kaplan@ars.usda.gov |
|  | Lauren Porensky | lauren.porensky@ars.usda.gov |
|  | David Augustine | david.augustine@ars.usda.gov |
|  |  |  |
| Eastern Corn Belt | NEED A NAME |  |
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| Goodwater Creek Experimental Watershed | Ken Sudduth | ken.sudduth@ars.usda.gov |
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| Great Basin | Mark Seyfried | mark.seyfried@ars.usda.gov |
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| Gulf Atlantic Coastal Plains | Alisa Coffin | alisa.coffin@ars.usda.gov |
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| Jornada Experimental Range | Dawn Browning | dbrowning@nmsu.edu |
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| Kellogg Biological Station | Jiquan Chen | jchen@msu.edu |
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| El Reno/Southern Plains | Prasanna Gowda | prasanna.gowda@ars.usda.gov |
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| Lower Chesapeake | Cathleen Hapeman | cathleen.hapeman@ars.usda.gov |
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| Lower Mississippi River Basin | J.R. Rigby | jr.rigby@ars.usda.gov |
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| Northern Great Plains Research Laboratory | Igathinathane Cannayen | igathinathane.cannayen@ndsu.edu |
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| Platte River High Plains Aquifer | Brian Wienhold | brian.wienhold@ars.usda.gov |
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| RJ Cook Agronomy Farm | David Huggins | david.huggins@ars.usda.gov |
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| Texas Gulf Research Partnership | Wayne Polley | wayne.polley@ars.usda.gov |
|  |  |  |
| Upper Chesapeake Bay | Sara Goslee | sara.goslee@ars.usda.gov |
|  |  |  |
| Upper Mississippi River Basin | Thomas Moorman | thomas.moorman@ars.usda.gov |
|  |  |  |
| Walnut Gulch Experimental Watershed | Chandra Holifield Collins | chandra.holifield@ars.usda.gov |
|  | Phiip Heilman | phil.heilman@ars.usda.gov |
|  |  |  |
| NAL | Jeff Campbell | jeff.campbell@ars.usda.gov |