**Georeferencing for Research Use Workshop Summary of Desired Learning Outcomes**

Summary of topics to be covered in an ideal workshop as identified by workshop applicants in the workshop call for participation.

***Topics to be covered***

Pre-workshop materials

* Introductory information about datums, mapping, coordinate systems
* Basic georeferencing how-to

During workshop

* Data standards, DwC terminology and fields (e.g. lat, long, datum), differences among disciplines (neo- and paleontological fields)
* Georeferencing toolkit and workflow examples (GeoLocate, maps, other resources, pros and cons)
* Best practices for field collection of data (locality strings and GPS units, precision, datum)
* How best to record and store georeferencing notes from other data sources (dependent on databases!)
* Best practices for georeferencing of legacy data given:
  + Varied research requirements for precision
  + Project and collection management limitations
  + Uncertainty data -, polygon vs. point radius, description etc.
  + Datum - georectify to standard or verbatim
* Workflows for incorporating data into different collections databases
  + Best practice syntax in locality descriptions for use in automation vs verbatim strings
  + Database limitations
  + Multiple geopoint values and storage (verbatim, automated-non-vetted value, georef to nearest named place, update to more accurate value, etc.)
* Downloading datasets - sources, different mechanisms
  + Assessing data quality
  + Uncertainty data - availability in data sources and interpretation
* Tools for aggregating, cleaning, visualizing and analyzing data
  + e.g. R, QGIS
  + Creating maps
  + Spatial analyses
  + Automated tools using Geo data?? Like LifeMapper?
* Difficult cases, such as geopolitically fluid locations over time, offshore localities
* Hands-on practice & case studies

***Topics out of scope*** - post-workshop; further information provided via Wiki; whitepaper discussion

* Role of original field notes and interviews with original collectors
* Community engagement for best practices; engagement with text-mining scholars, historians, geographers to advance gazetteers, practices and tools
* Tool improvement/new tool development, and integration in CM databases/software
* Archiving data and sharing data with collections, data aggregators, others (e.g. PostGIS, GRASS, ArcGIS community) (see iDigBio blogs)
* Developing a TCN
* Best practices for georeferencing skills training, creating materials to train students and staff at the home institution in georeferencing for research purposes (point to wiki and previous TTT’s)
* Python
* Using gismo (Graphical Internet Server Monitor) in R, and using sample data sets in analysis Niche/Species distribution modeling
* Review of requirements, needs and existing gaps from various perspectives; key findings and action items, white paper
* Tool to automatically convert township-range-section into lat/long (an example might be the NEVP TCN)
* Georectification, or the alignment of an aerial image with a map of the same area