Methods for GLO data

Study Area

The study area included 9 townships located in current day Rio Grande Del Norte National Monument (RGDN).

* Climate, elevation, soil types ect….?
* Land use history
* Study area selected bc…

Data Collection and Survey Interpretation

Surveys along township section lines were taken by the US General Land Office (GLO) in the 1880s and 1940s in the study area. Surveys were conducted during the growing season and usually lasted a few months per township surveyed. Surveyors walked alone sections lines noting land type and use, vegetation, and water sources. At each section line, descriptions and notes were taken along the line, as well as a section summary at the end of each section line. Surveyors recorded these observations in field notes, which we used to visualize vegetation types. We extracted the transect summary data, found written or typed at the end of each section line description. Key words noting vegetation, such as timber, sagebrush and grass were especially focused on.

To categorize into “present”, “absent” and “unknown” a criterion was formed. Descriptions for vegetation that included the vegetation type name along with descriptors such as “good” or “poor” were included in present. If there was no mention of vegetation type was made or there was explicit description of a vegetation type’s absence, it was marked “absent.” The exception was made for grass in the 1940s surveys, as the surveyors did not mention grass until the final township description and usually denoted grass presence across the entire township. Surveyors that mentioned all vegetation types in at least some transect summaries were assumed to be omitting absent vegetation types. For example, when other vegetation was mentioned in the transect summary, but no mention of sage brush was preset, we marked sage brush as absent. If no mention of vegetation was made, sage brush was marked as unknown. If sage brush was mentioned in the transect summary, sage brush was marked as present.

Table Vegetation Classifications

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| --- | --- |
| **Classification** | **Description in GLO Survey** |
| Present | “good grama grass”, “good grass”, “poor grass”, “sage understory”, “sage brush” |
| Absent | “no sage brush”, or omitted description of vegetation type |
| Unknown | No mention of vegetation type but unable to confidently |
| Missing | Sections that were not surveyed |

Visualization

* From shape file downloaded from BLM (?) extracted the NSDI lines because they had more sections
* Select sections out from NSDI and create new layers.
* Polygon to poly line for each section shape file
* Extract the S and W lines from the poly line files, one shape file for W, one for S
* Merge S and W shape files to create one file per section

Survey data was visualized using QGIS and R. Shape files of RGDN were downloaded online as well as the townships within the study area. Individual townships were extracted to create a shape file for each township (9 total). Then the townships were processed using Polygon to Polyline vector geometry. The lines in each township were duplicated, one shape file for Western boundaries and one for Southern boundaries. Exceptions were made for townships that did not have neighboring townships so the data could still be included. In the shape file designated for southern section lines, all lines except southern lines were deleted. The same process was done for the western section lines shapefiles. These two shapefiles were then merged to create the final shapefile for each township. R code was used to merge the data and shapefiles to visualize on QGIS.

From Yanoff paper

(GIS). GLO surveys, despite shortcomings (e.g. uncertain plant names and abundances, protracted survey periods) provide the most spatially explicit historical vegetation data available for large tracts of land in the US (Bahre, 1991).