This document is just an illustration of what your methods document should include. The information included is not real, and the methods may or may not be valid for an actual analysis. Instead, it's designed to provide the kind of details you will want to include in your own methods and results, and illustrate the non-GIS side of your results.

Methods

For this analysis, Landsat 7 images for the months of June, July, August, and September for the years 1996, 2006, and 2016 were retrieved. Scenes from Path 44/Row 32, Path 43/Row 33 and Path 42/Row 34 were used at each date. For 2016 images, SLC-off errors were filled by mosaicking images from neighboring scenes with the primary scenes of interest. Dates for images retrieved are included in table 1. The images were each masked to include only pixels within mountain meadows. Using pre-collected data on amphibian habitat locations, a maximum Likelihood classifier was trained in ArcGIS to detect other amphibian habitat locations. NDWI was also generated in order to detect open water habitat that may be of value to amphibians. Since it normalizes values, NDWI ranges in value from -1.0 to 1.0 with values closer to 1.0 representing pixels that contain more water. For Landsat imagery, NDWI is derived from the Near-Infrared (NIR) band and a second infrared (SWIR) band≈1.24µm when available or the nearest available IR band otherwise such that NDWI = (NIR - SWIR) / (NIR + SWIR).

Year	Dates
1996	June 15th July 17th August 18th September 19th
2006	June 12th July 14th August 15th September 16th
2016	June 19th July 21st August 22nd September 23rd

Table 1: Dates of Landsat 7 images used for this analysis

NDWI was thresholded to values > .3 to determine locations of open water. The classification results were intersected with the thresholded NDWI, and the resulting locations were considered suitable amphibian habitat for this analysis.

Results

Each season included in this analysis had a decrease in available habitat over the course of each season as water availability decreased. In the year 1996, 50% of habitat available in June was still available in September. In 2006, 65% of habitat available in June was still available in September, and in 2016, only 24% of habitat available in June was still available in September. Table 2 shows calculated habitat areas for each month and year and figure 1 charts these values.

Stick to just the results in this section and leave interpretation for the next section. You can also combine them, but it's still best to lay out pure results before analysis

	June	July	August	September	Sept/June Ratio
1996	64.5	53.3	40.9	32.4	.50
2006	50.7	46.4	39.1	33.2	.65
2016	45.1	38.4	25.2	10.8	.24

Table 2: Table showing total area of detected amphibian habitat within meadows in the study region by year, in square kilometers.

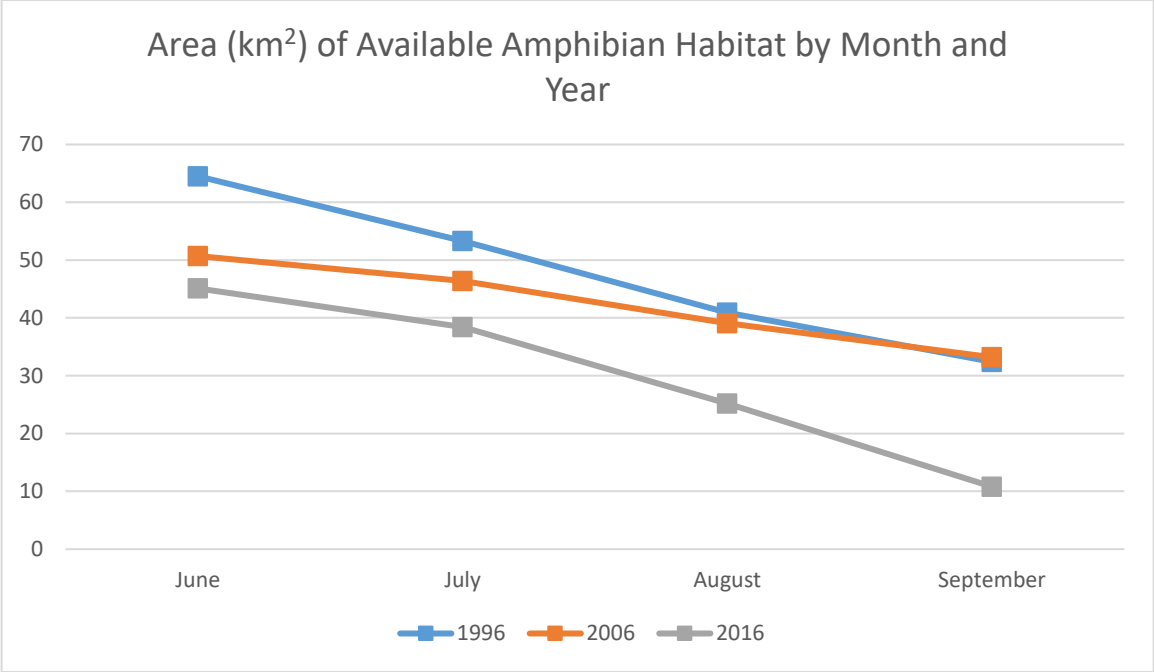

Figure 1: Area of Available Habitat in Square Kilometers

Discussion

Results from this analysis are mixed and a more thorough analysis would be needed to make strong conclusions. While the June 2006 scene shows significantly decreased habitat from June 1996, by September 2006 more habitat remains than in September 1996, and as a ratio of the available June habitat, 2006 has the most remaining in September. Regardless, 2016 shows a significant decline in total availability and September availability, with only 24% of June habitat remaining in September. While the data may support the conclusion that our hypothesis is correct and habitat declined each season, it's highly subject to which portion of the data one looks at.

This section is where you can speculate on what the data means based on your own knowledge and interpretation of the data in the context of other information not included in the analysis. You can also discuss limitations of the analysis here.

Still, it's possible these results are an artifact of the years chosen for analysis. The broad spacing of years, while intended to capture long-term variability, may instead be capturing a snapshot of the localized climate variation – 1996 was a very wet year, 2016 was merely normal, and 2006 was a somewhat normal year leading into a drought. Analyzing a larger set of years could help tease out these distinctions.

Another limitation is the resolution. As expected, amphibian habitat was hard to capture using Landsat imagery, and it may not be suited to this task. Sentinel 2's higher resolution imagery may provide better images to estimate these types of changes once it has a longer record.

Finally, we expect that the methods for estimating the extent of habitat could be improved in consultation with an amphibian expert. A classifier is consistent, but dependent on the training data. It's possible that digitizing habitat with an expert could yield more reliable results.