

This research stems from Wildlife Conservation Society Fellowship

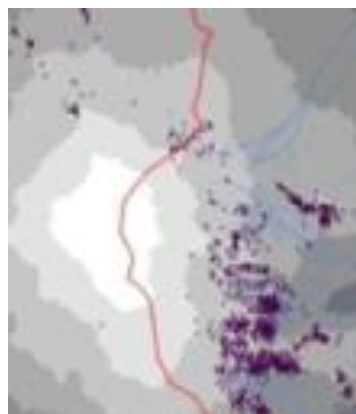


GPS animal movement data assessed in combination with Moderate Resolution Spectroradiometer [MODIS] derived Enhanced Vegetation Index [EVI] data provides a brief snapshot in time of the landscape. An example of the MOD13Q1 product is at MODIS Level 3-16-day composite EVI at a 250m resolution is shown in this factsheet. A green-brown linear color table was applied to the data set for contrast emphasis. The data of one MODIS scene covers an extensive swath of the Pacific Northwest, a homerange boundary was used to subsample the MODIS scene to a smaller sub scene for this research.

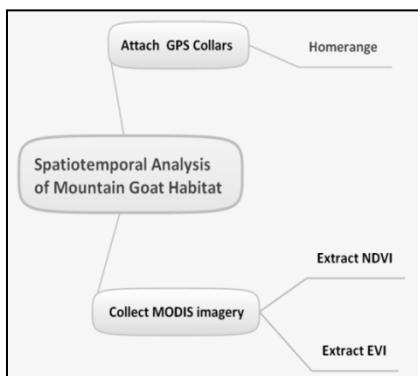
The MODIS EVI measures the amount of vegetation present on the ground via examination of the red (620-670 nm), near-infrared (841-876 nm), and blue (459-479nm) reflectance bands. The images enhance the vegetation signal and the resulting measurement allows for a precise inter-comparison of spatial and temporal variations in terrestrial photosynthetic activity on the landscape. Combining these images with the GPS derived animal movement and overlaying the homerange polygon allows for the examination of the abundance and availability of vegetation that mountain goats are utilizing. Going one step further and examining the intra-annual variation of habitat usage could help identify a vegetative predictor variable that to assess current extent of habitat across its entire range as well as; assessing any declines in habitat based upon historic conditions.



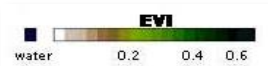
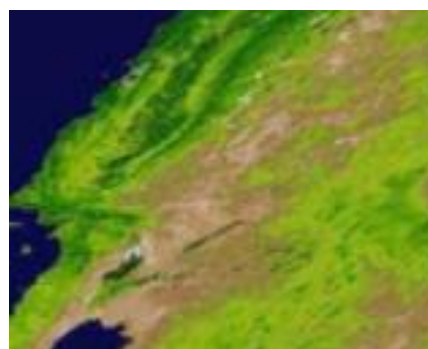
Spatiotemporal analysis of the GPS data results in the intra-annual establishment of the home range polygons in bi-weekly cycles.



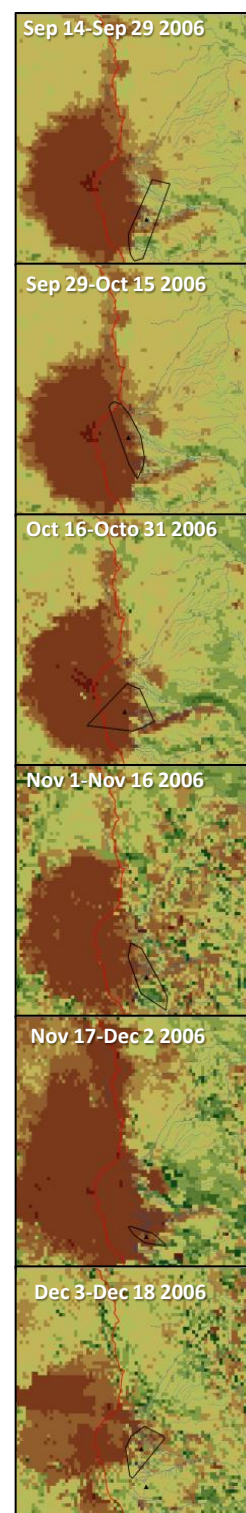
A digital elevation model [DEM] allows for the extraction of topographic data for all data.



- Import GPS collar data to coincide with MODIS tiles
- Calculate Minimum Convex Polygons for each tile
- Calculate centroid for each Polygon
- Extract MODIS EVI indices for each centroid
- Extract elevation data for each centroid
- Combine GIS and MODIS data and export to EXCEL



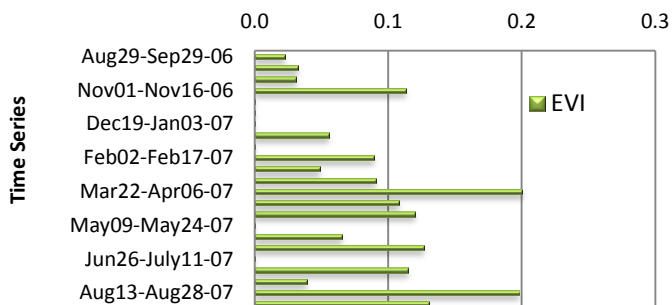
The MOD13Q1 product is a sample of the MODIS Level 3-16-day composite EVI at a 250m resolution. A green-brown linear color table was applied to the data set for contrast emphasis.



Time series EVI Indices and homerange for one annual cycle.

Applications

The vegetation phenology will assist in identifying the preferred range of available habitat in their known habitat use areas. Applying this variable to the remaining landscape as a habitat predictor variable will enable the assessment of current and historic habitat conditions; noting any fluctuations that could assist in assessing species decline.



Measure of indices: Intra-annual Home Range Polygon

The combination of assessments of the time series home range polygons provides a snapshot in time of the amount and quality of vegetation available with the EVI index showing the lush vegetation from 0.2 to 0.6 being available and the times of year that it is utilized. This can be seen in the images on the right side of this factsheet. The data series provides insight into intra-annual home range movements and a brief glimpse of the current available habitat that can be compared with previous years to highlight any decline in total available habitat. This is accomplished through the development of a habitat EVI predictor variable gained from the first years' data. This predictor variable can be used to define total available habitat in other regions of the state.

THE KEY QUESTIONS:

Can EVI be used as a predictor variable to assess mountain goat habitat?

THE ISSUE: A reduction in available habitat is a factor in the reduction of Mountain goat populations within Washington State. MODIS time series analysis of intra-annual vegetation phenology can be assessed in combination with GPS derived bi-monthly home range polygons to examine the links between habitat usage and vegetation indices. Application of this knowledge will assist in determining the fluctuations in current available habitat and/or declining habitat conditions across the entire range of available habitat.