A Risk Analysis of Primate Electrocutions in Costa Rica

A Shocking Problem:
Each risk factor can be found in the following table:

- Human Population Density
- Distance from Roads
- Elevation
- Distance from Protected Areas
- Density of Primate Observations
- Primate Population Density

Roadways:
- Power lines are often strung across roads where primates use the wires as bridges to cross to the other side and avoid cars. Euclidean distance was run on the roads layer and reclassified for suitability where being near roads posed the highest risk.

Tree Loss:
- Canopy gaps force primates to cross power lines more often to avoid the ground where they are vulnerable to predators. The tree loss layer was reclassified for suitability where being near tree loss posed the highest risk.

Primate Observations:
- A higher primate density increases the likelihood of primates encountering power lines. Kernel density was run on the primate observations layer and reclassified for suitability where high density posed the highest risk.

Suitability Factors

- Protected areas preserve the tree cover required for primate mobility and limit the construction of power lines within their borders. Euclidean distance was run on the protected areas layer and reclassified for suitability where being far from protected areas posed the highest risk.

- Population Density:
  - Well populated areas are often more developed and contain more habitat gaps and artificial structures such as power lines. The Costa Rica population density layer was reclassified for suitability where a higher density posed the highest risk.

- Land Cover:
  - Primate habitat consists largely of broad leaf forests where roads and power lines are also common. The land cover data was extracted from a world data set and reclassified for suitability where broad leaf forests posed the highest risk.

- Elevation:
  - Primates remain at lower elevation levels due to the natural ranges of the plants in their diet. The Costa Rica elevation layer was reclassified for suitability where low elevation levels posed the highest risk.

**Risk Factor Weight:**
- Distance from Roads: 25%
- Distance from Protected Areas: 20%
- Elevation: 20%
- Land Cover Risk Level: 15%
- Density of Primate Observations: 10%
- Distance from Tree Loss: 10%
- Human Population Density: 5%

**Risk Level in Each Risk Level:**
- Risk Level 1: 10%
- Risk Level 2: 20%
- Risk Level 3: 27%
- Risk Level 4: 73%

Percentage of Electrocutions in Each Risk Level:
- Risk Level 1: 1%
- Risk Level 2: 5%
- Risk Level 3: 9%
- Risk Level 4: 95%

This analysis seeks to identify the areas of highest risk for primate electrocutions to better direct intervention efforts such as insulating existing power lines and installing alternative rope bridges for primates to cross. Additionally, this analysis uses the locations of electrocuted primates provided by the organization Kids Saving the Rainforest (KSTR) to assess the accuracy of the risk analysis.