Introduction
The Atlantic Forest of Brazil is highly fragmented and it is estimated that less than 7% of its original area remains (IUCN et al. 2006). This high rate of fragmentation is primarily due to the conversion of forested areas into agricultural lands. This may hinder the dispersal of many species that inhabit this area because of an increase in edge effects, decrease in reproductive success, and higher limitation of resources. However, the inter-habitat matrix, or heterogeneous mosaic of varying habitats, may allow population dispersal and the creation of metapopulations within species. In particular, amphibians are extremely sensitive to habitat degradation and fragmentation because their complex life cycle and specific physiological requirements (Smith et al. 2008). Amphibians have low mobility and many studies use one species as a model to determine the smallest polygon, the largest polygon, the average area of the population polygons, the number of classified water polygons, and the number of “probable water location” polygons, number of “forest” polygons, number of “agricultural” polygons, number of “metapopulation” polygons, and number of “agricultural and other” polygons. Additionally, for each set of polygons, we determined the smallest polygon, the largest polygon, the average area of the polygons, the sum area of the polygons, and the count of polygons.

Results

| Table 1. Summary statistics for various classified polygons. (*Data not relevant.) |
|---------------------------------------------|-----------------------------|
| Count (n) | Minimum (m²) | Mean (m²) | Maximum (m²) |
| Forest fragments with overlapped water polygons | 10,499 | 247,315 | 285,080 |
| Meta-populations with overlapped water polygons | 2,499 | 247,315 | 285,080 |

Discussion
The average percent of forest remaining in the Atlantic Forest region is estimated at 7% (IUCN et al. 2006); however, in the São Luís do Paratinga greater area, we estimated that approximately 19% of forest remains. These forest fragments are highly connected, as shown by the reduction from 97.072 forest fragments to 79 metapopulation polygons, allowing for the dispersal of a variety of organisms. Probable sources of water are found within only 38% of forest fragments and may have an impact on species survival of amphibians. Forest fragments without probable water sources are most likely to have high amphibian populations. Probable sources of water are very abundant within metapopulations and most likely do not limit amphibian dispersal. Limitations to this study fall into two categories: data deficiencies and errors in classifications. LandSat data has a resolution of 30 meters which may exclude some of the smaller fragments. There may be water and human cover within the classifications of land cover and probable water sources. A better representation of potential amphibian habitat would rely more heavily on the type of land cover in between forest fragments. For example, information on roads, fences, and crop type would enhance the analysis. Further research on amphibian dispersal through different types of habitat and better land cover data are needed.

Works Cited

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Distribution of Atlantic Forest Fragments in Relation to Probable Water Sources

Dominique Kone and Lydia Ball

Environmental Studies Program, Colby College, Waterville, Maine, Spring 2012

Study Area

Figure 1. Map of São Luís do Paratinga area with land cover classification and roads.

Figure 2. Classification of water, forest, planted agriculture and other, and agriculture.

Figure 3. Forest fragments of the study area with connected buffers of 0.25 kilometers, representing metapopulations.

Figure 4. Forest fragments of the study area with overlayed probable sources of water.

Figure 5. Metapopulations of the study area with overlayed probable sources of water.

Figure 6. Percent of varying classified polygons.

Figure 7. Percent of forest fragments with overlapped probable water polygons.

Figure 8. Percent of meta-populations with overlapped probable water polygons.

Figure 9. Percent of varying classified land cover.