

Graduate Student Research Day 2014

Florida Atlantic University

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A Generalized Population Model based on Indian River Lagoon Dolphins

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For over a decade, researchers at Harbor Branch Oceanographic Institute have conducted surveys of the population of bottlenose dolphins, *Tersiops truncatus*, in Indian River Lagoon along the east coast of Florida. I have constructed a detailed 4-stage population model using the statistical program R. The model is used as a tool for conducting a viability analysis that projects the dolphin population into the future by analyzing the relationship between birth, calf survival and adult survival rates. The model also includes a power analysis, which compares survey frequency to expected confidence intervals in estimating abundance. The model shows a strong chance of viability over a 50 year time span, primarily due to the large population size of approximately 700 adult dolphins. The population is vulnerable to long periods of decline if birth, calf or adult survival rates fall below certain thresholds. The sensitivity analysis, based on the partial derivatives of the eigenvalue with respect to each matrix element, shows that the population is most sensitive to changes in adult survival, followed by birth rate and calf survival. Overall, the model simulates the future impacts of demographic change, and thereby provides a tool for conservation efforts.