Name
Date
Math 214

**Lab 06**

Loggerhead Sea Turtle Subpopulations – Fill in the yearly proportional increase in each of the loggerhead sea turtle subpopulations with both current and past abundances given (from Checkpoint Exercise).

|  |  |  |
| --- | --- | --- |
| **Subpopulation** | **3-Generation Change** | **Yearly Proportional Change** |
| NW Atlantic | 0.02 |  |
| SW Atlantic | 0.70 |  |
| Mediterranean | 0.07 |  |
| NW Indian | -0.71 |  |
| SW Indian | 3.19 |  |
| N Pacific | 1.69 |  |

What are the dominant eigenvalue and associated normalized eigenvector for the Leslie matrix for the loggerhead sea turtle given in the Lab Assignment?

|  |  |  |
| --- | --- | --- |
| **Dominant Eigenvalue** | **Normalized Eigenvector**  | **What proportion of the loggerhead sea turtle population will be in one of the three breeding classes at the structural equilibrium?** |
| $$λ=$$ | $$x^{\*}=\left[\begin{matrix}\\\\\\\\\\\\\end{matrix}\right]$$ |
|  |

What is the index of imprimitivity? Will the loggerhead sea turtle population oscillate? If so, what is its period of oscillation?

Results from model simulation that increases hatchling survival.

Modified matrix:

$$A=\left[\begin{matrix}&&&&&&\\&&&&&&\\&&&&&&\\&&&&&&\\&&&&&&\\&&&&&&\\&&&&&&\end{matrix}\right]$$

What are the dominant eigenvalue and associated normalized eigenvector for the Leslie matrix for the loggerhead sea turtle given in the Lab Assignment?

|  |  |  |
| --- | --- | --- |
| **Dominant Eigenvalue** | **Normalized Eigenvector** | **Total Population Size After**  |
| $$λ=$$ | $$x^{\*}=\left[\begin{matrix}\\\\\\\\\\\\\end{matrix}\right]$$ | **5 Decades** |  |
| **10 Decades** |  |

*Place image A here.*

Results from model simulation that factor in the use of turtle excluder devices (TEDs) in shrimp trawling nets.

Modified matrix:

$$A=\left[\begin{matrix}&&&&&&\\&&&&&&\\&&&&&&\\&&&&&&\\&&&&&&\\&&&&&&\\&&&&&&\end{matrix}\right]$$

What are the dominant eigenvalue and associated normalized eigenvector for the Leslie matrix for the loggerhead sea turtle given in the Lab Assignment?

|  |  |  |
| --- | --- | --- |
| **Dominant Eigenvalue** | **Normalized Eigenvector** | **Total Population Size After**  |
| $$λ=$$ | $$x^{\*}=\left[\begin{matrix}\\\\\\\\\\\\\end{matrix}\right]$$ | **5 Decades** |  |
| **10 Decades** |  |

*Place image B here.*

*Comparing the impact of two conservation methods.*

*Suppose you were overseeing the conservation of the population of loggerhead sea turtles modeled by the original matrix* $A$*presented in the Lab Assignment. Assuming you only have funding to implement one conservation strategy (either to increase the hatching survival rate or to incorporate the use of TEDs in shrimp trawling nets), which method would you choose. Write a sentence or two to mathematically justify your choice.*