The Opportunities and Obstacles of Life Cycle Models: Perspectives from Salmon Ecologists

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Background

- Life Cycle Models (LCMs) are dynamic statistical models that predict future populations.
- LCMs are used to inform crucial decisions around conservation, restoration, funding, research, and policy.
- The efficacy of LCM's has become part of a larger environmental conversation.

Research Question

What are the barriers and limitations to scientific modeling?

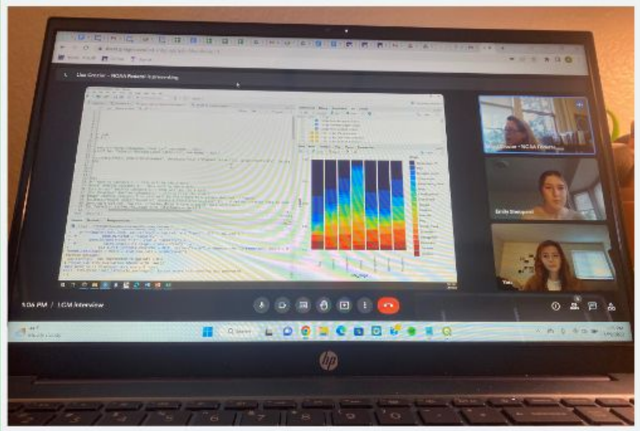

Figure 1: Interview with Dr. Lisa Crozier (NOAA) as she explains her model built in R.

Internship and Methods

- Interviews with scientists from NOAA, WDFW, & USDA, to understand state of knowledge around Coho Salmon lifecycles
- Populated database with current research
- Conducted literature reviews, summarized and synthesized findings into database

Results

- Responses were consistent: answers fell into two main categories, which was corroborated by literature.

Lack of Data

- Models are built based on foundational data.
- There is concern that there is not enough data available as LCM input.

"These types of models....need a tremendous amount of data. The largest challenge is getting the numbers we need."

Capturing Complexity of Living Systems

- Concern that LCM's cannot fully capture the components and interactions of a dynamic living system.

"The biggest challenge is....making sure that [LCM's] are representing the dynamics of the populations."

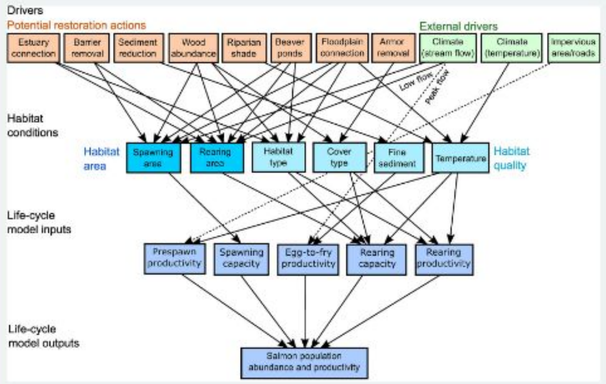

Figure 2: Diagram from Dr. Beechie's (NOAA) HARP model, showing the complex relationships between all the components.

Significance

- Knowing where LCMs excel and fail can help us use this technology more efficiently.
- Better LCMs will equate to more informed decision making and more educated actions being taken to protect crucial species like the Coho salmon.

Figure 3: An adult Coho Salmon

Next Steps

- Scientists often propose a similar solution: to simply reframe the use of LCMs.
- No decision should be made based on one set of outputs - LCMs should be used in tandem with other tools.
- This will create more diversified & informed decision making.

Acknowledgments

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