Integral projection model for a Gizzard Shad population before and after
the introduction of Asian Carp

Idea:

- Create IPM for native fish population before carp arrival
- Create IPM for native fish population after carp arrival
- Compare parameter sets and apply statistical tests

Data needs: individuals tracked over time, so that for an individual observed in one census we know its fate (survived or died, and how many offspring it produced) and state (e.g., how big it is, or where it is) at the next census.

TABLE 1. Parameter symbols, names, values, and sources used for gizzard shad and bigmouth buffalo integral projection model. All units are in annual time step. Lengths are in cm and weight in kg.

Parameter	Meaning	Value	Source
Gizzard Shad	LaGrange Reach	Before Carp Introduction	
α_{LW}	intercept for length-weight model	17.88	LTRM data
β_{LM}	slope for length-weight model	-9.74	
Gizzard Shad	LaGrange Reach	After Carp Introduction	
α_{LW}	intercept for length-weight model	-4.83	LTRM data
β_{LM}	slope for length-weight model	2.90	
Gizzard Shad	Pool 26	Before Carp Introduction	
α_{LW}	intercept for length-weight model	-4.93	LTRM data
β_{LM}	slope for length-weight model	2.98	
Gizzard Shad	Pool 26	After Carp Introduction	
α_{LW}	intercept for length-weight model	-4.74	LTRM data
β_{LM}	slope for length-weight model	2.87	
Bigmouth Buffalo	LaGrange Reach	Before Carp Introduction	
α_{LW}	intercept for length-weight model	-5.32	LTRM data
β_{LM}	slope for length-weight model	3.20	
Bigmouth Buffalo	LaGrange Reach	After Carp Introduction	
α_{LW}	intercept for length-weight model	-4.89	LTRM data
β_{LM}	slope for length-weight model	3.03	
Bigmouth Buffalo	Pool 26	Before Carp Introduction	
α_{LW}	intercept for length-weight model	-5.02	LTRM data
β_{LM}	slope for length-weight model	3.09	
Bigmouth Buffalo	Pool 26	After Carp Introduction	
α_{LW}	intercept for length-weight model	-4.77	LTRM data
β_{LM}	slope for length-weight model	2.99	
a_G	maximum length	$(233.473, 234.533), 394.30$	[3, 2]
k_G	growth rate	0.60	[2]
σ_G	growth σ		
s_{min}	minimum survival		
s_{max}	maximum survival		
α_s	inflection point		
β_s	slope		

TABLE 2. Parameter symbols, names, **general** values, and sources used for gizzard shad and bigmouth buffalo integral projection model. All units are in annual time step. Lengths are in cm and weight in kg.

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Parameter	Meaning	Value	Source
α_{LW}	intercept for length-weight model	-4.71241	[1]
β_{LM}	slope for length-weight model	3.02313	[1]
a_G	maximum length	$(233.473, 234.533)$, 394.30	[3, 2]
k_G	growth rate	0.60	[2]
σ_G	growth σ		
s_{min}	minimum survival		
s_{max}	maximum survival		
α_s	inflection point		
β_s	slope		

REFERENCES

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