

Conserving a Western Icon: Problems and Progress in Understanding Greater Sage-Grouse Ecology and Management

Shall this fine bird follow the Passenger Pigeon into Oblivion?



William T. Hornaday 1916

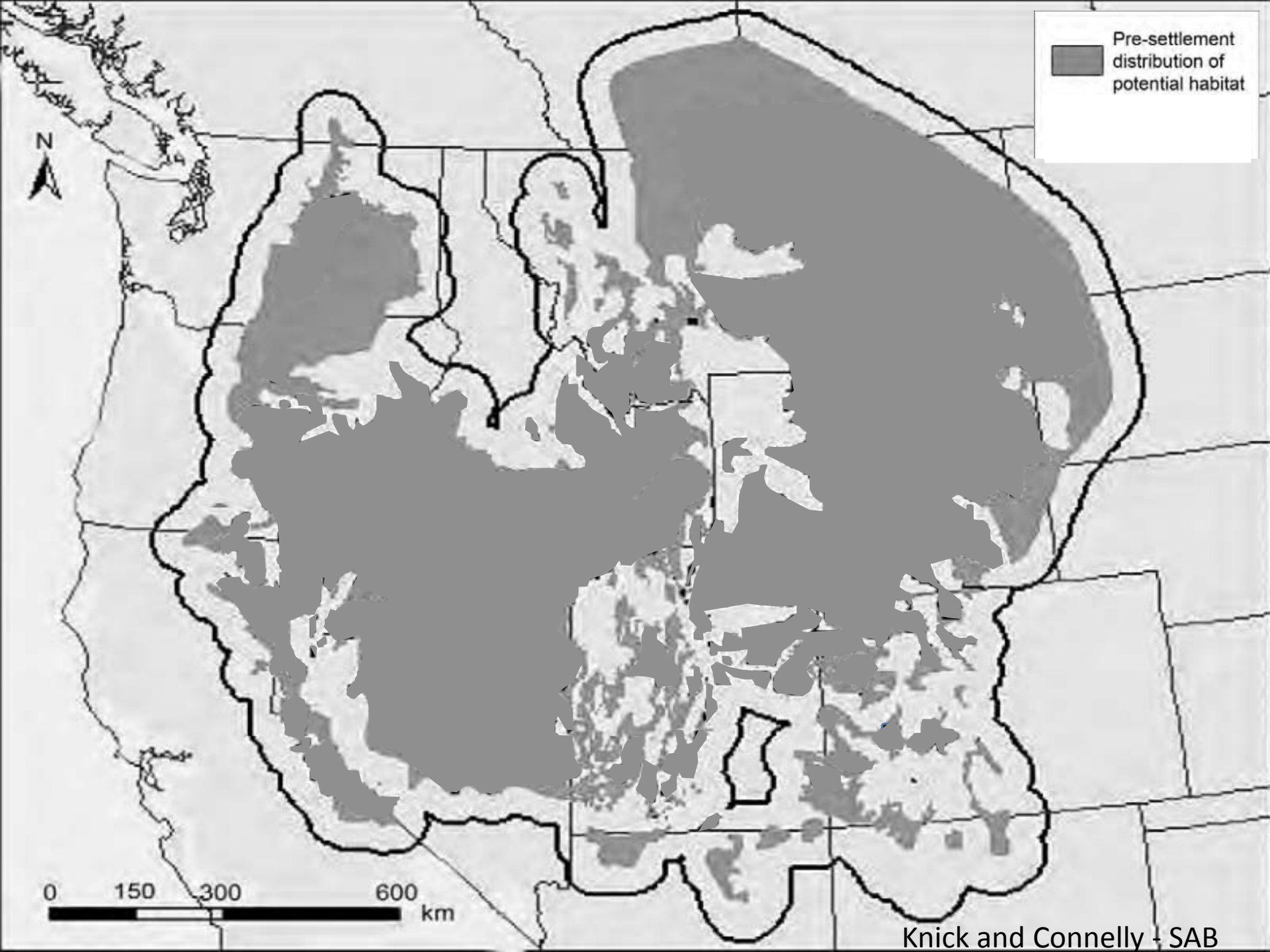


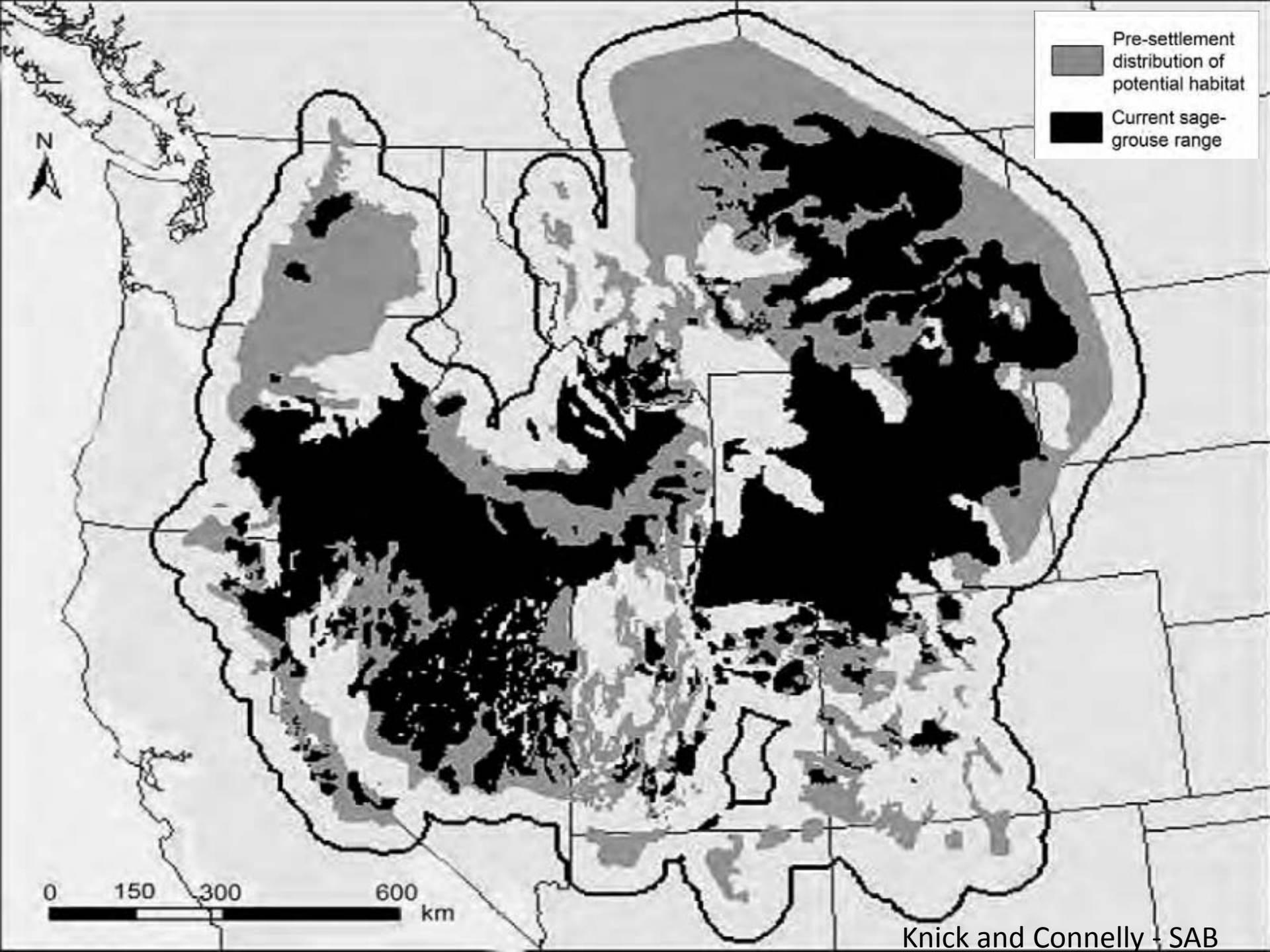


Photo by Todd Black

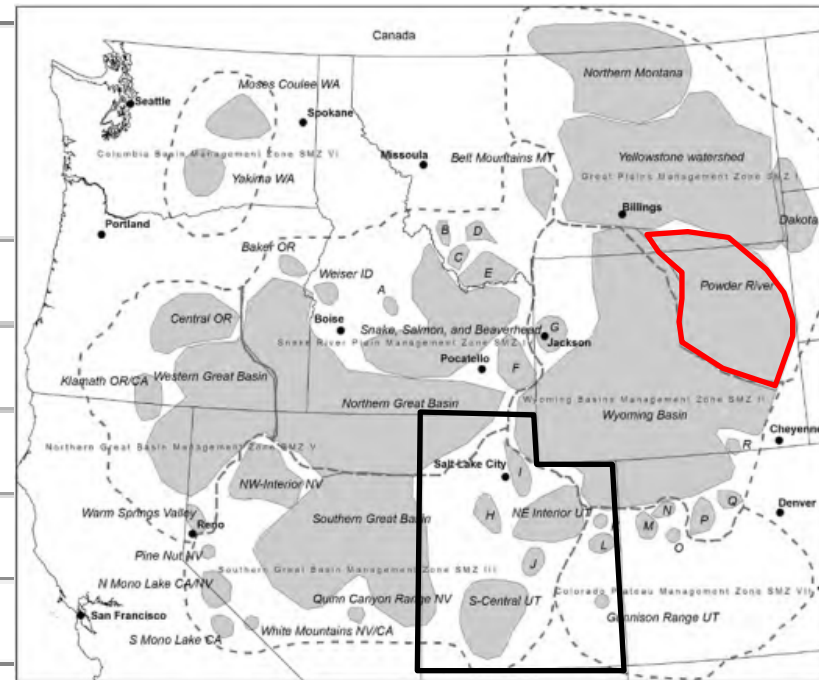
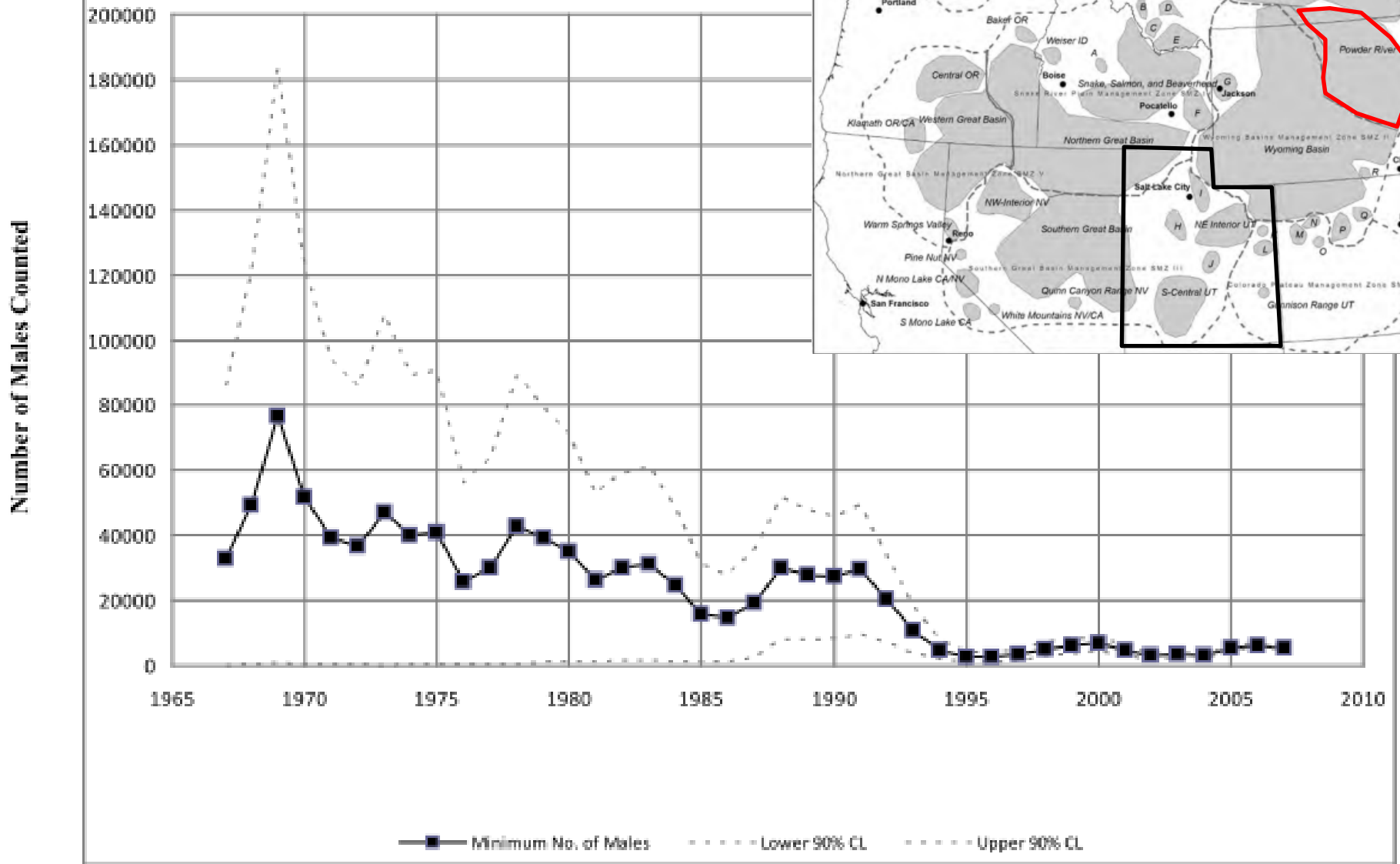




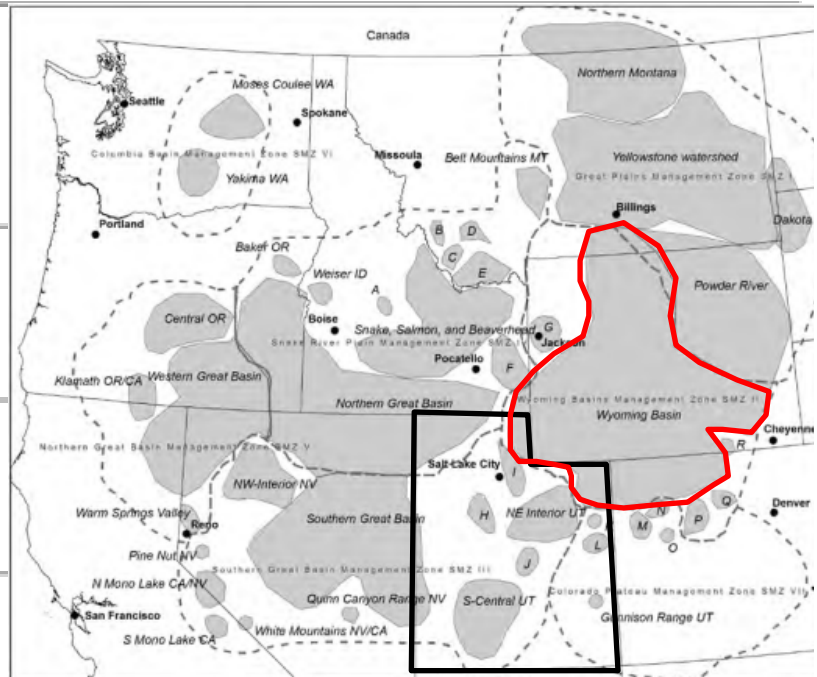
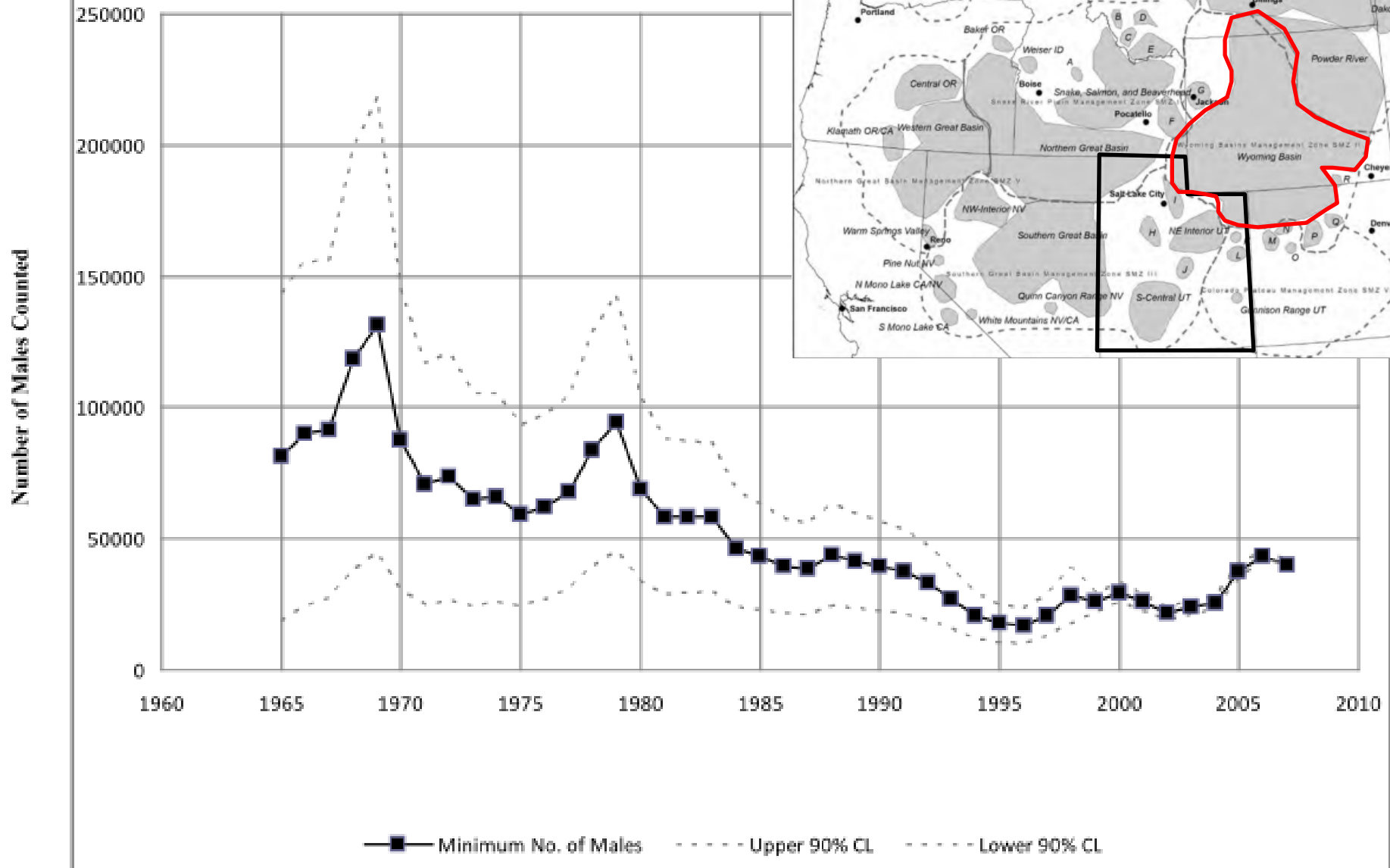




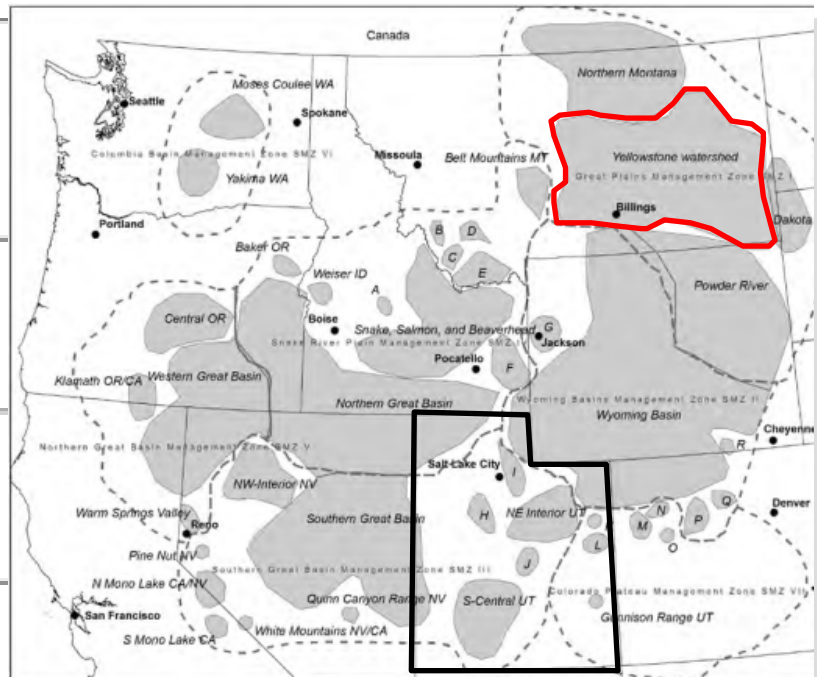
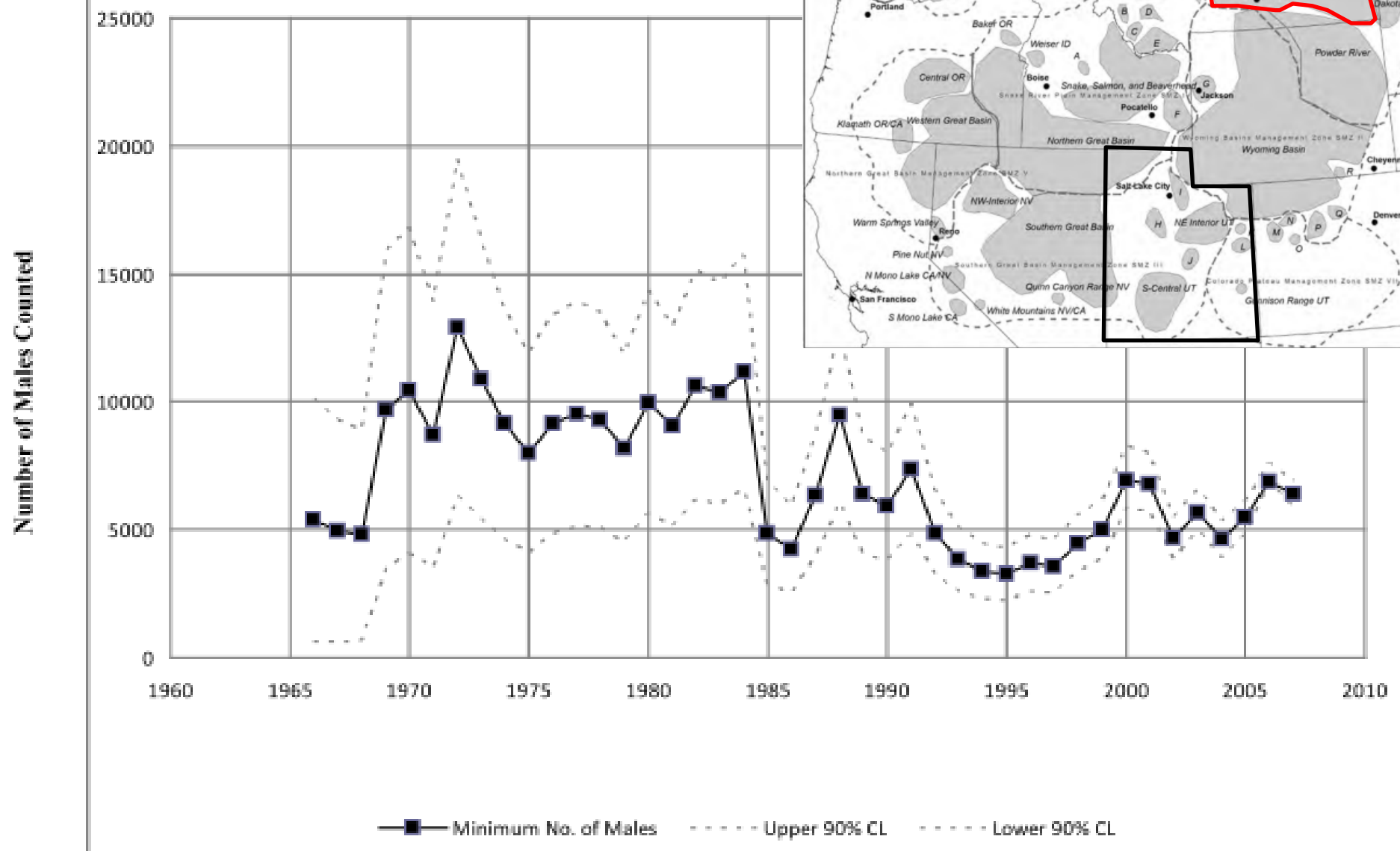
c. Powder River Basin



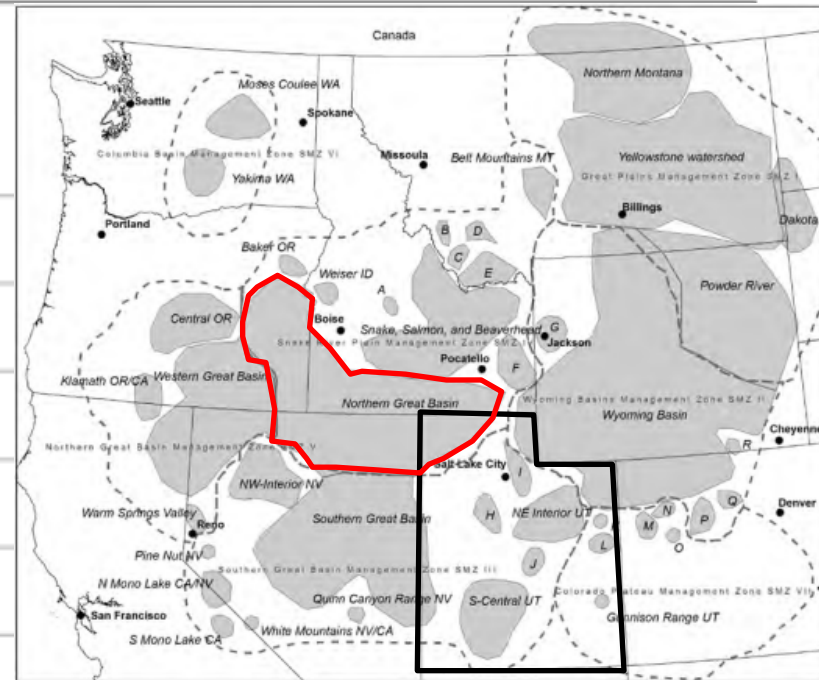
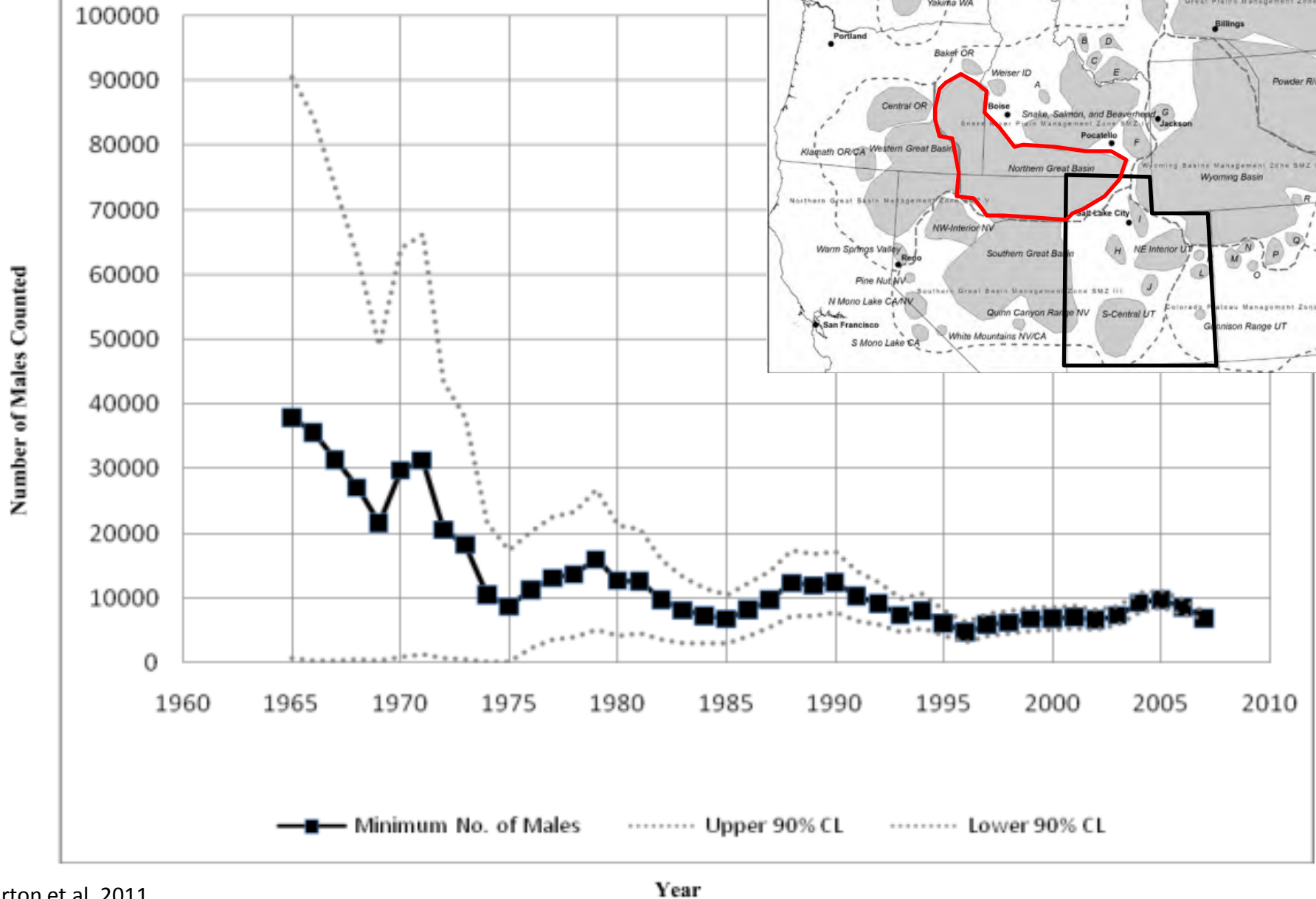
c. Wyoming Basin



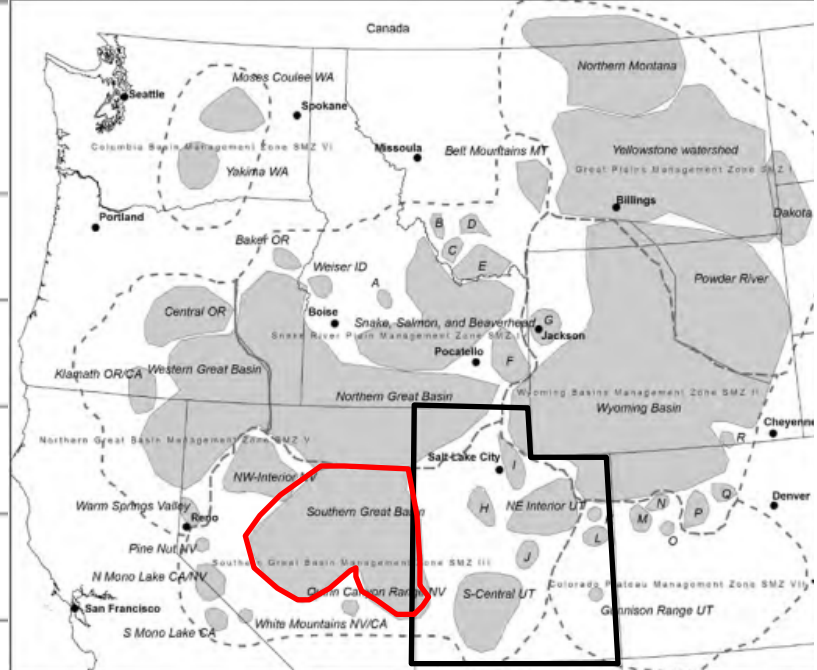
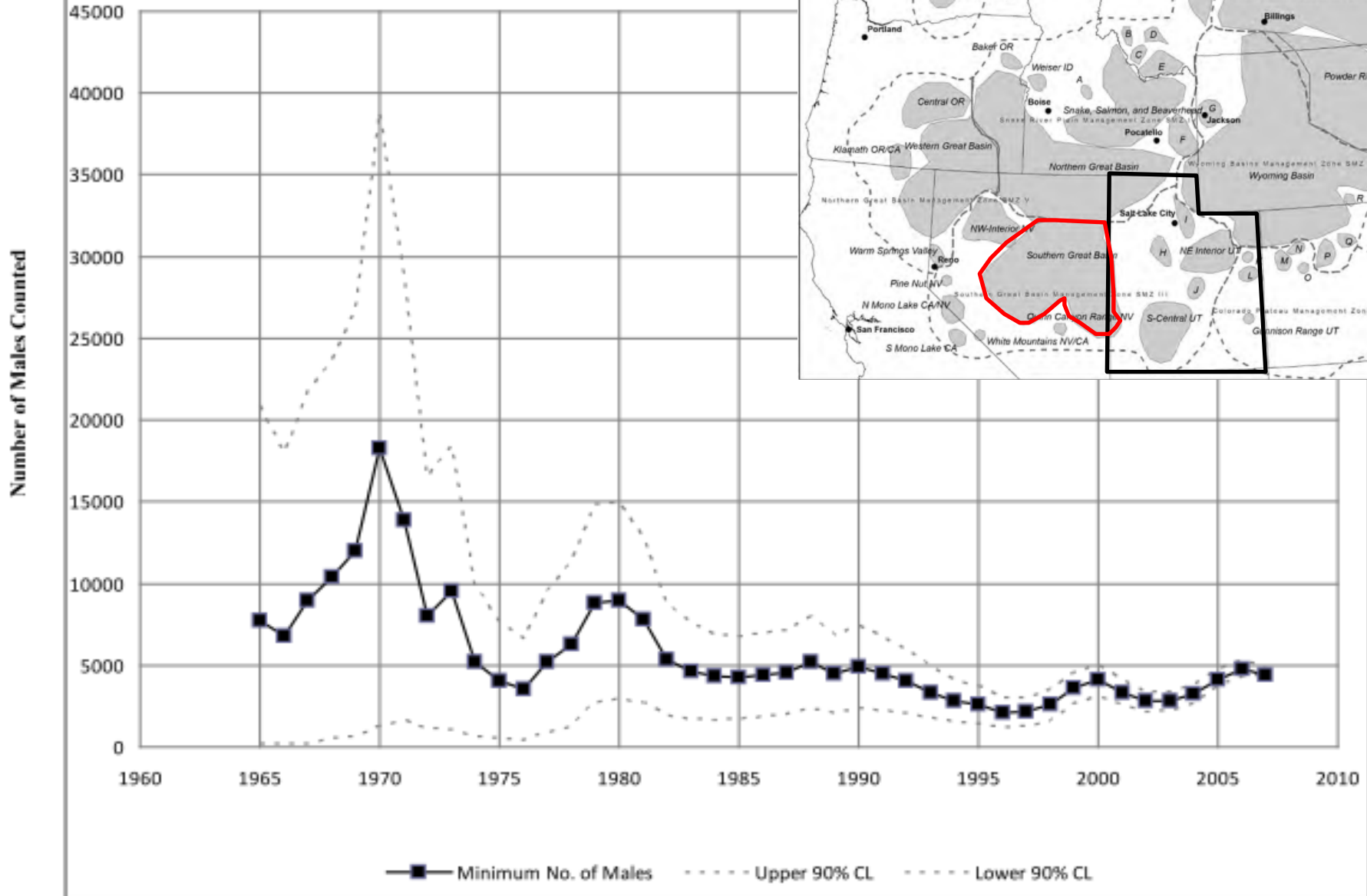
d. Yellowstone watershed



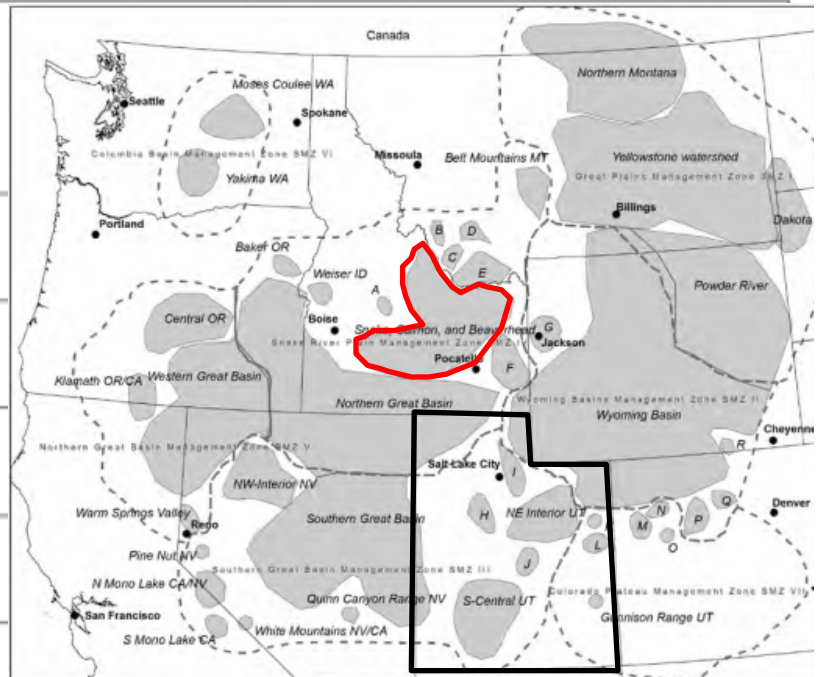
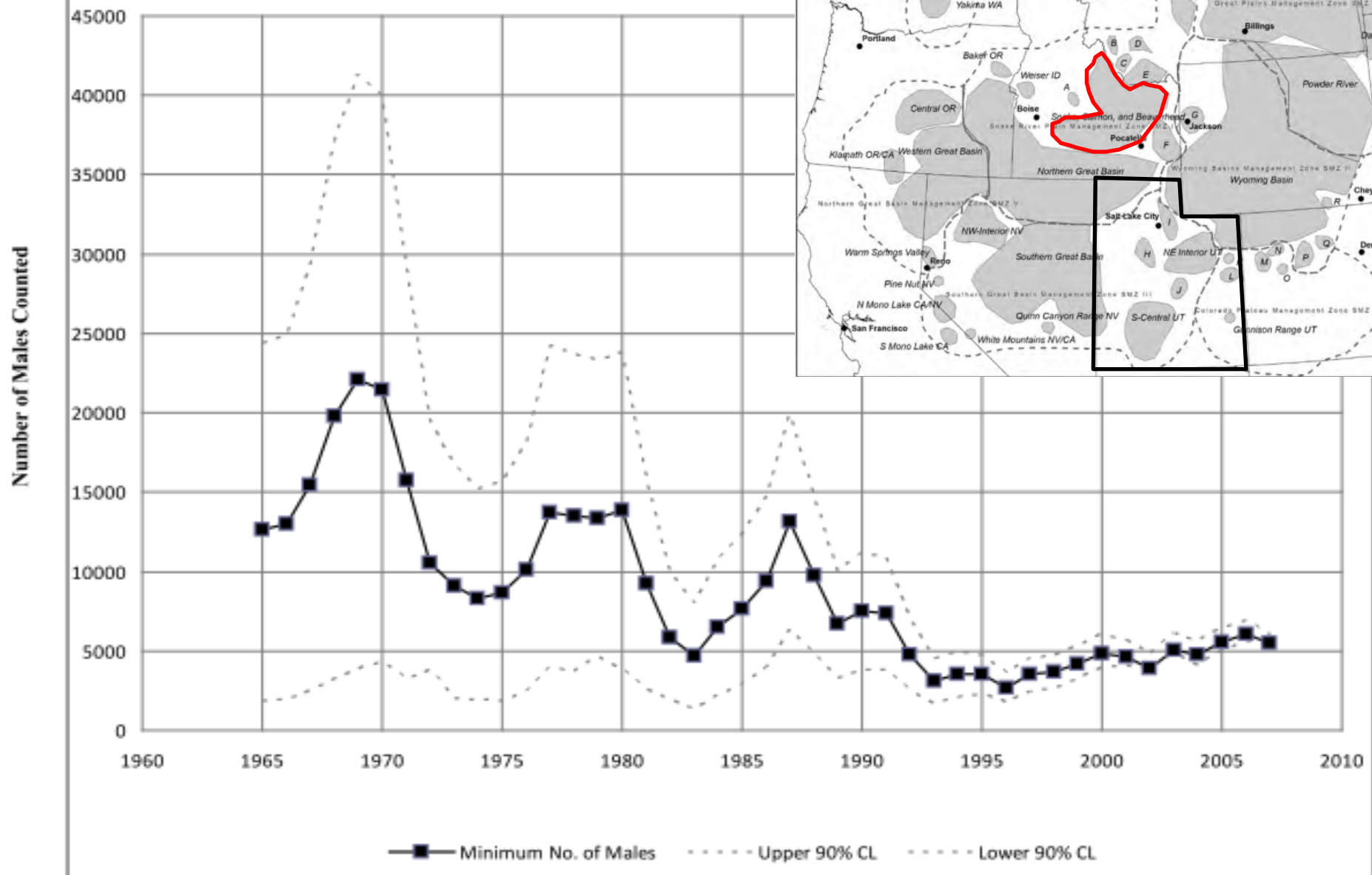
f. Northern Great Basin



h. Southern Great Basin



e. Snake-Salmon-Beaverhead, Idaho



ESA

Warranted but Precluded

What's the problem?

How many birds are there?



Lek Counts

- Less than 100% attendance
- Varies by day and time
- Imperfect detection



Sex Ratio

- Assumed to be 2:1
- In theory, this could be true
- Evidence?



Sex Ratio At Hatch

Site	Ratio	H _o = 2:1	H _o = 1:1
AM	0.494 ± 0.056	0.002	0.912
GC	0.488 ± 0.056	0.003	0.823
PM	0.475 ± 0.038	0.001	0.499
Total	0.482 ± 0.027	0.001	0.514

Sex Ratio At Fledging

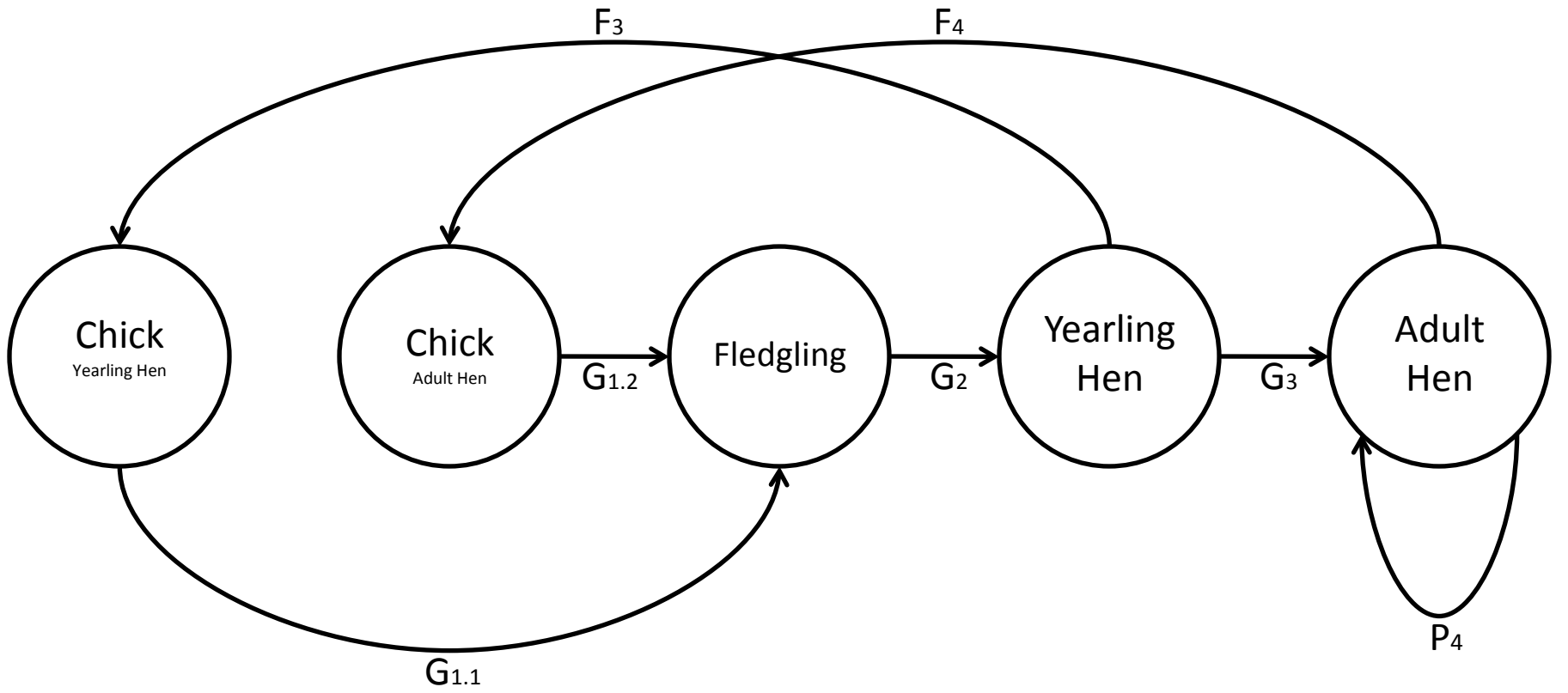
Timing	Ratio	H _o = 2:1	H _o = 1:1
Capture	0.495 ± 0.051	0.001	0.919
Fledge	0.508 ± 0.063	0.003	0.900

Sex Ratio At Harvest

Age	Ratio	H _o = 2:1	H _o = 1:1
Adult	0.430 ± 0.029	0.001	0.017
Yearling	0.343 ± 0.022	0.667	0.001
Chick	0.443 ± 0.020	0.001	0.004
Total	0.407 ± 0.013	0.001	0.001

What are the drivers of population growth?





Vital Rate	LTRE	Elasticity
Adult Survival		
Yearling Survival		
Fledgling Survival		
Adult Nest Initiation		
Yearling Nest Initiation		
Adult Nest Survival		
Yearling Nest Survival		
Adult Chick Survival		
Yearling Chick Survival		

Vital Rate	LTRE	Elasticity
Adult Survival	0.00269	
Yearling Survival	0.00191	
Fledgling Survival	0.00670	
Adult Nest Initiation	-0.00018	
Yearling Nest Initiation	-0.00008	
Adult Nest Survival	0.00232	
Yearling Nest Survival	0.00102	
Adult Chick Survival	0.00218	
Yearling Chick Survival	0.00305	

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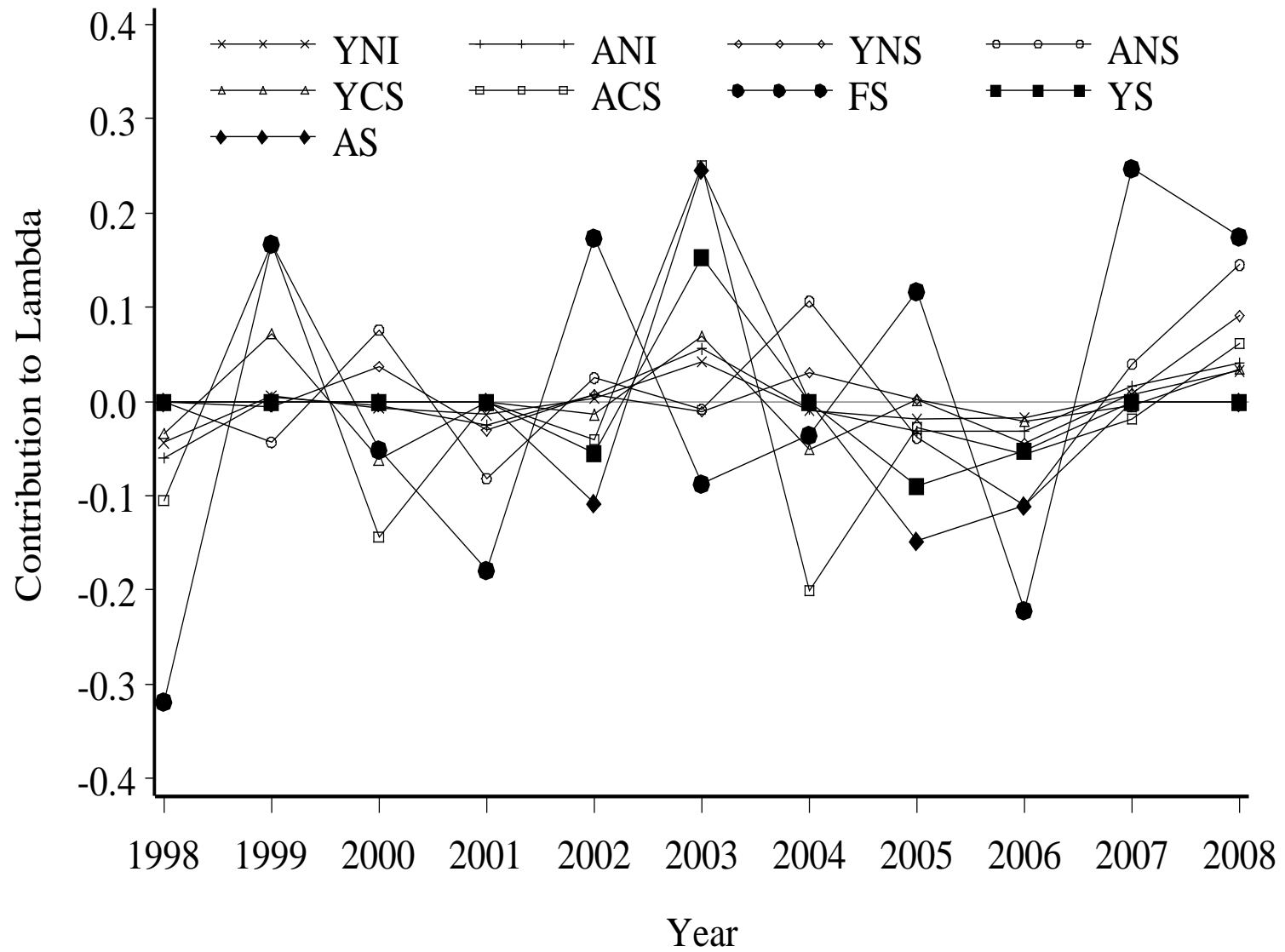
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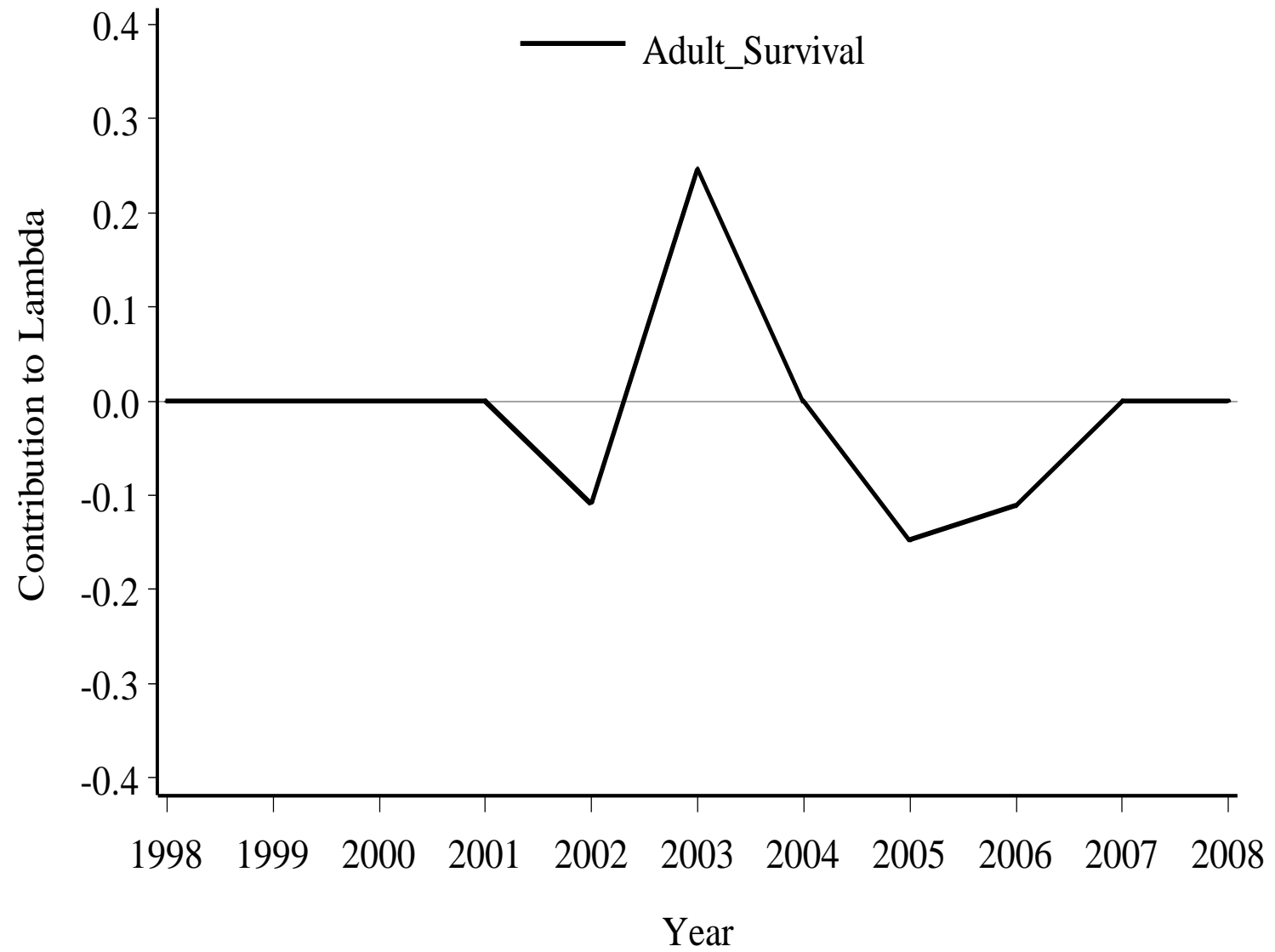
Vital Rate	LTRE	Elasticity
Adult Survival	0.00269	0.474
Yearling Survival	0.00191	0.212
Fledgling Survival	<u>0.00670</u>	0.314
Adult Nest Initiation	-0.00018	0.212
Yearling Nest Initiation	-0.00008	0.103
Adult Nest Survival	0.00232	0.212
Yearling Nest Survival	0.00102	0.103
Adult Chick Survival	0.00218	0.212
Yearling Chick Survival	0.00305	0.103

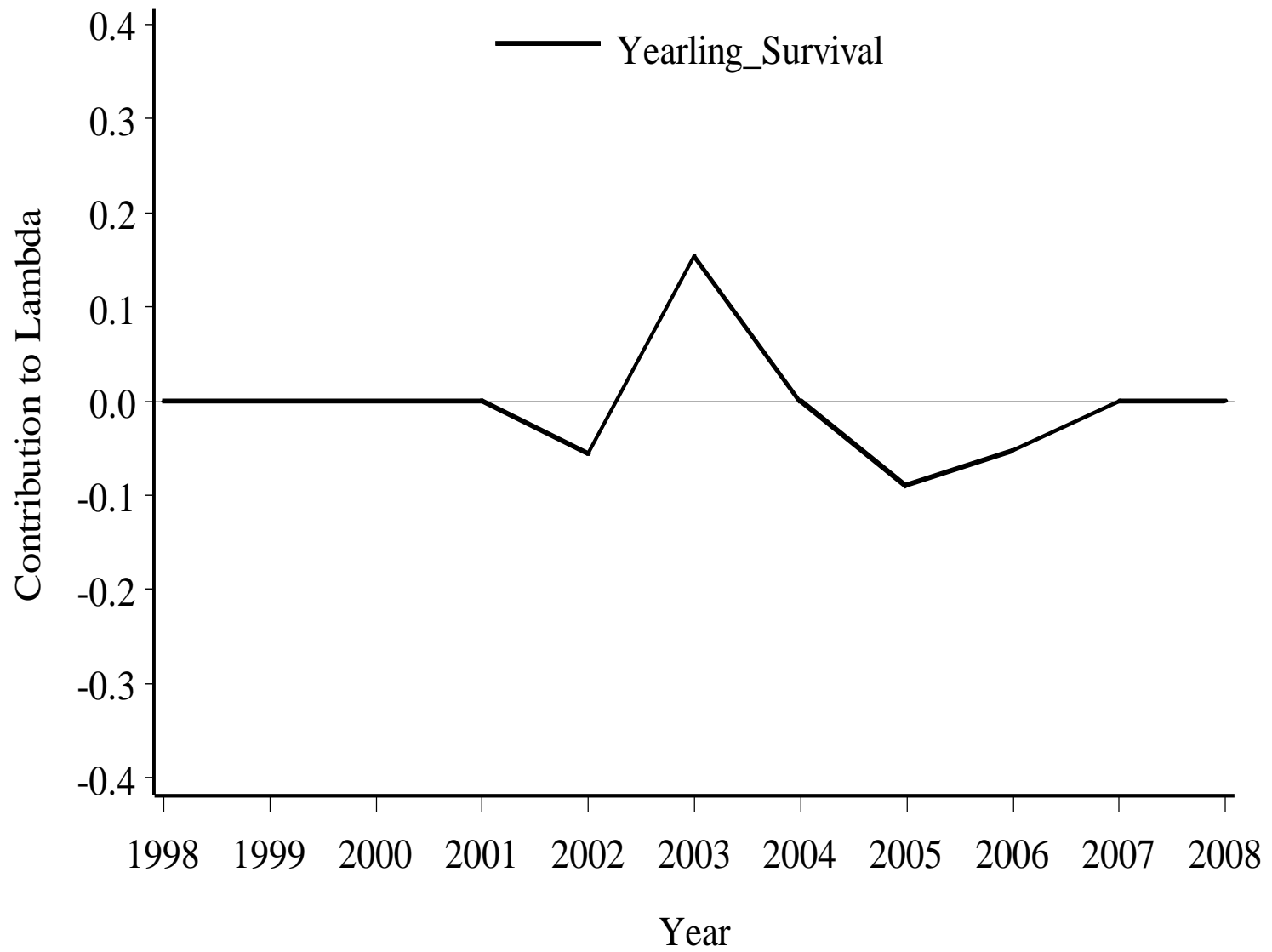
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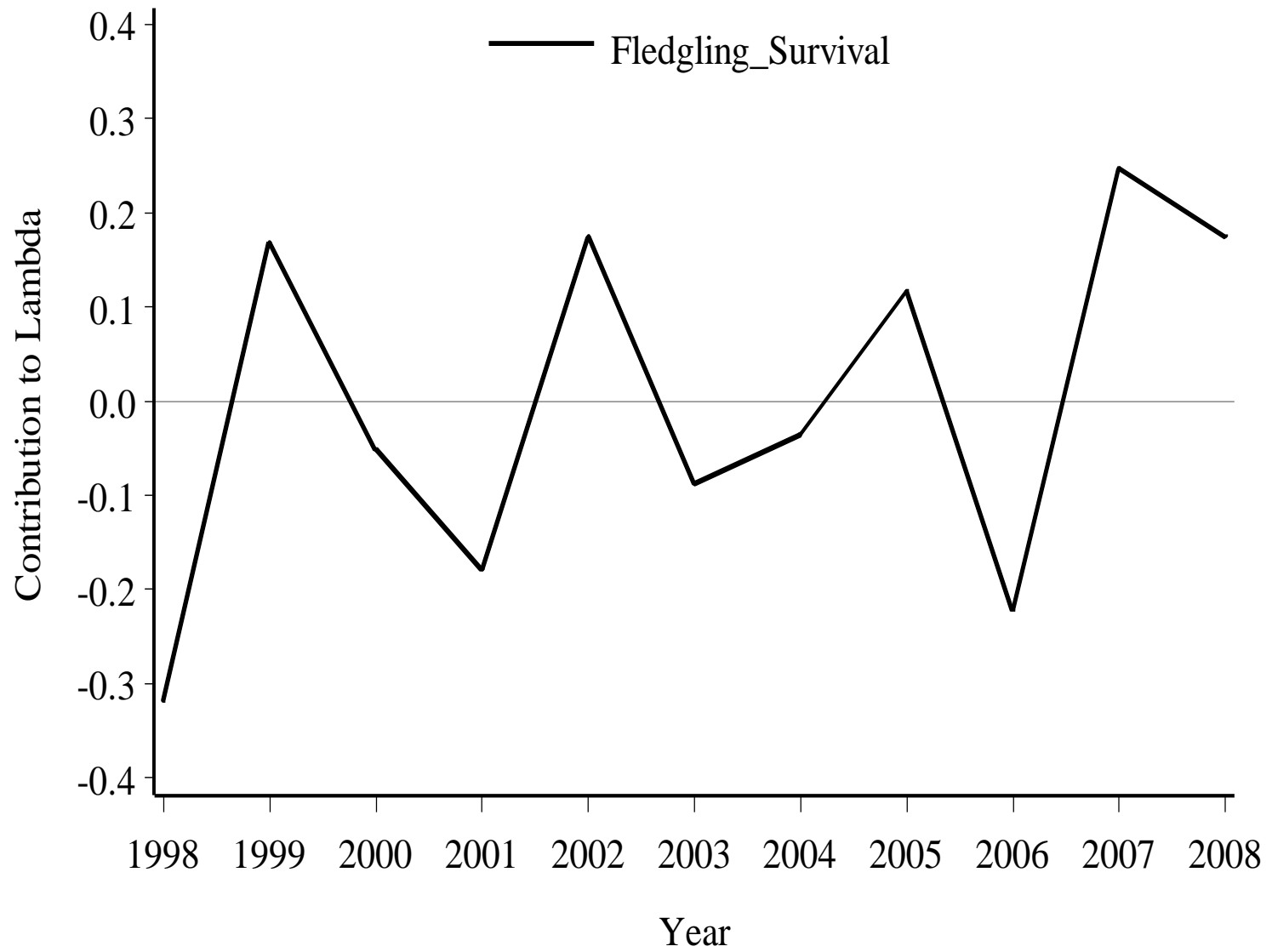
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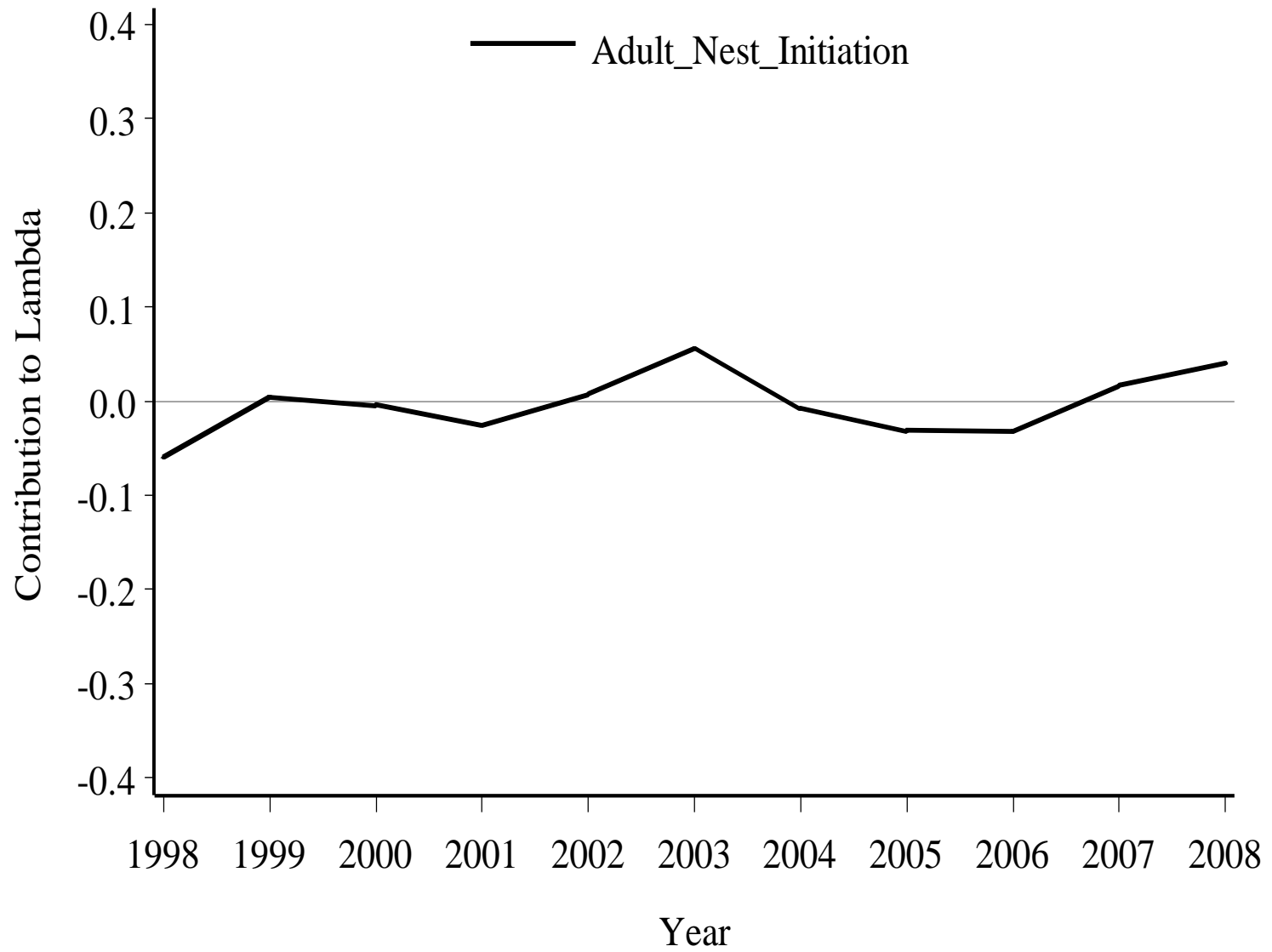
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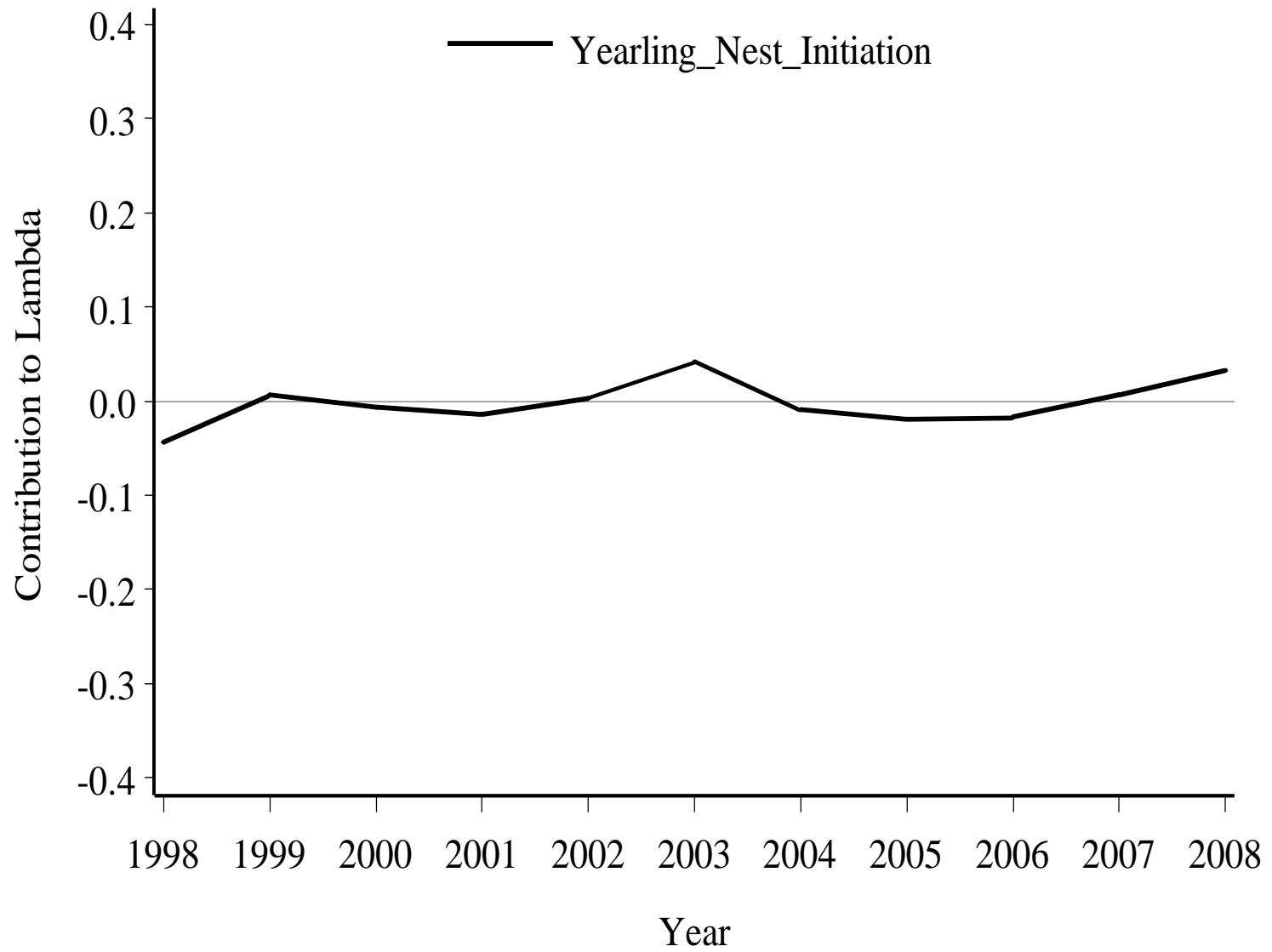


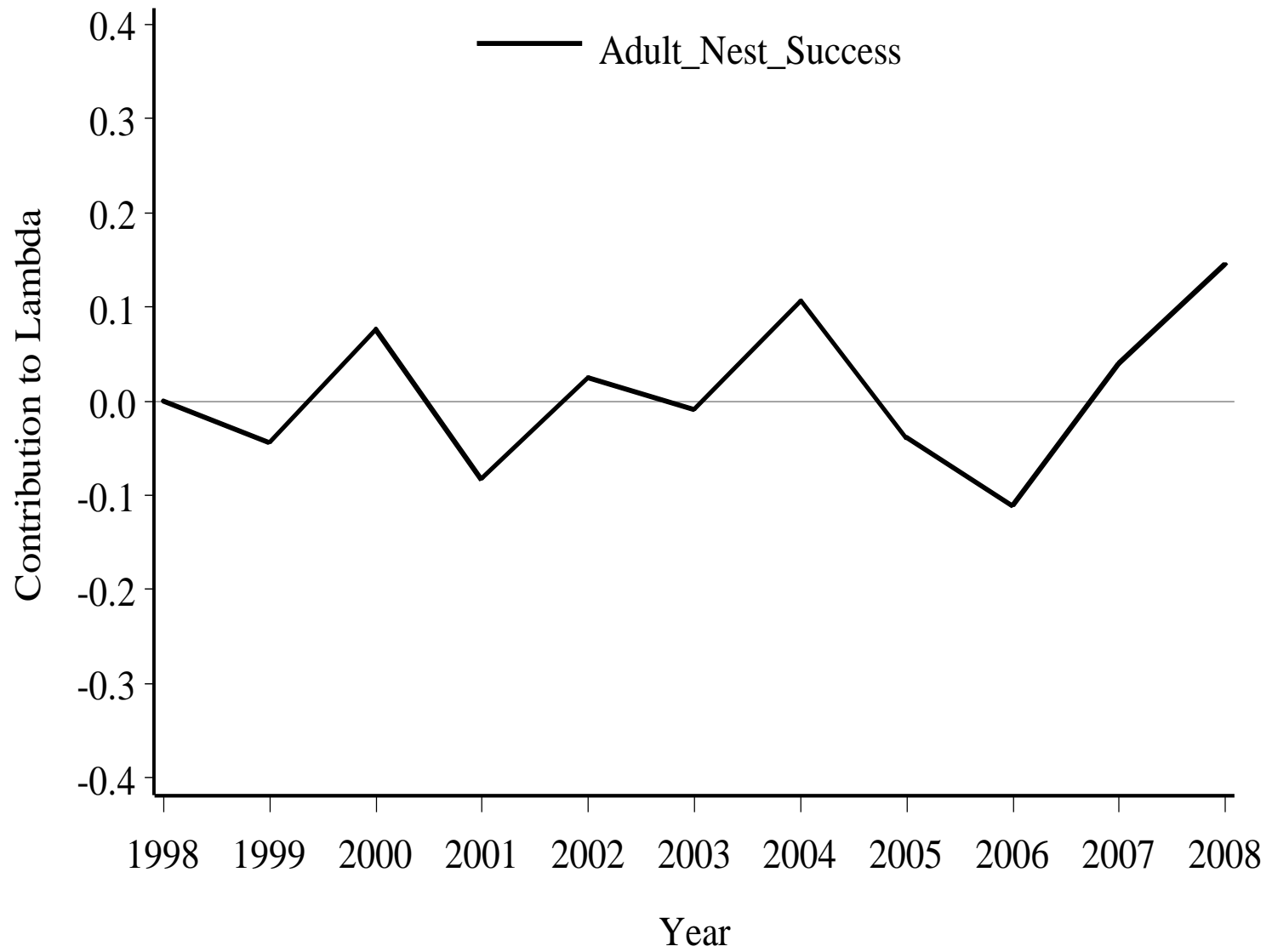


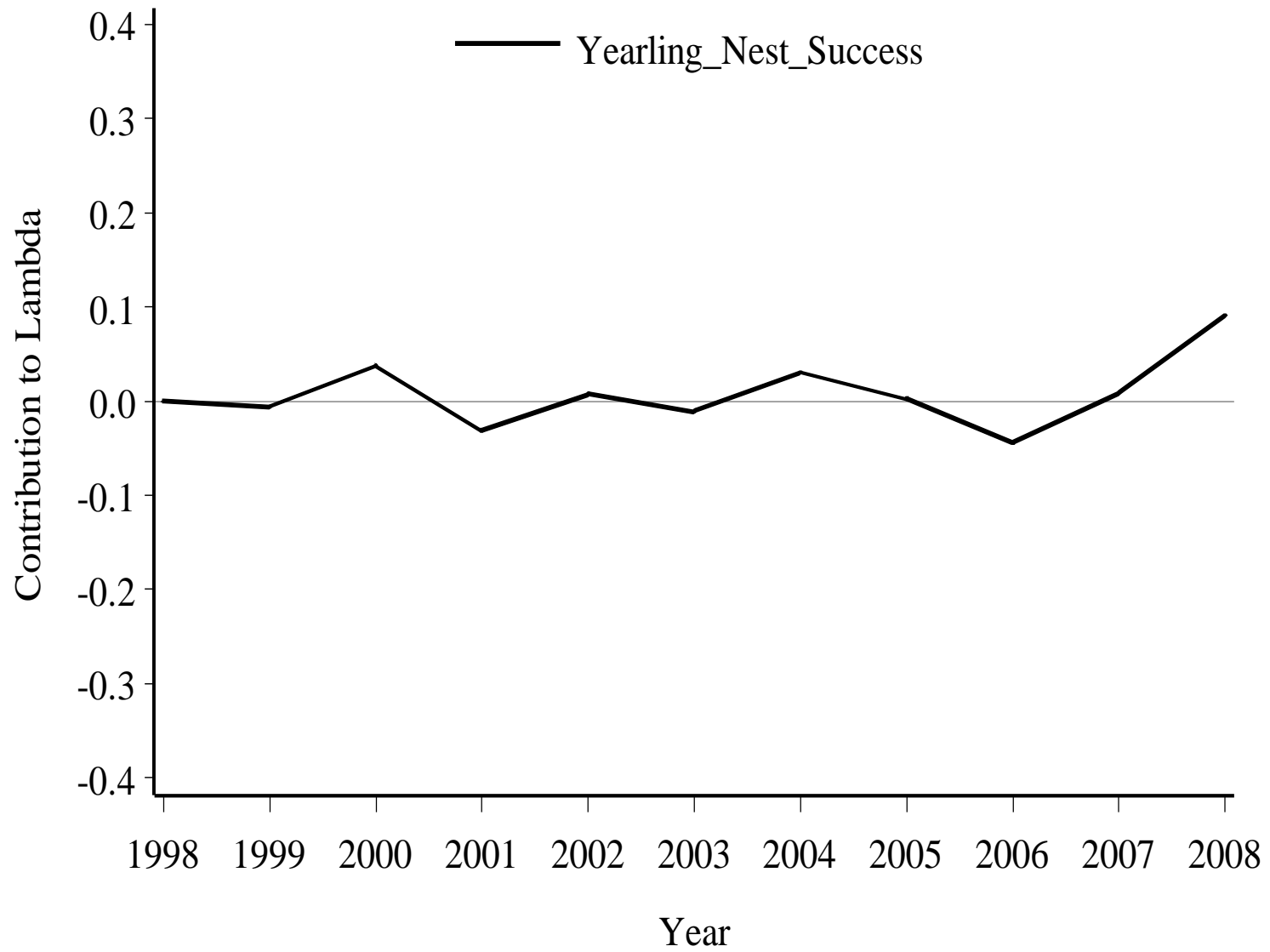


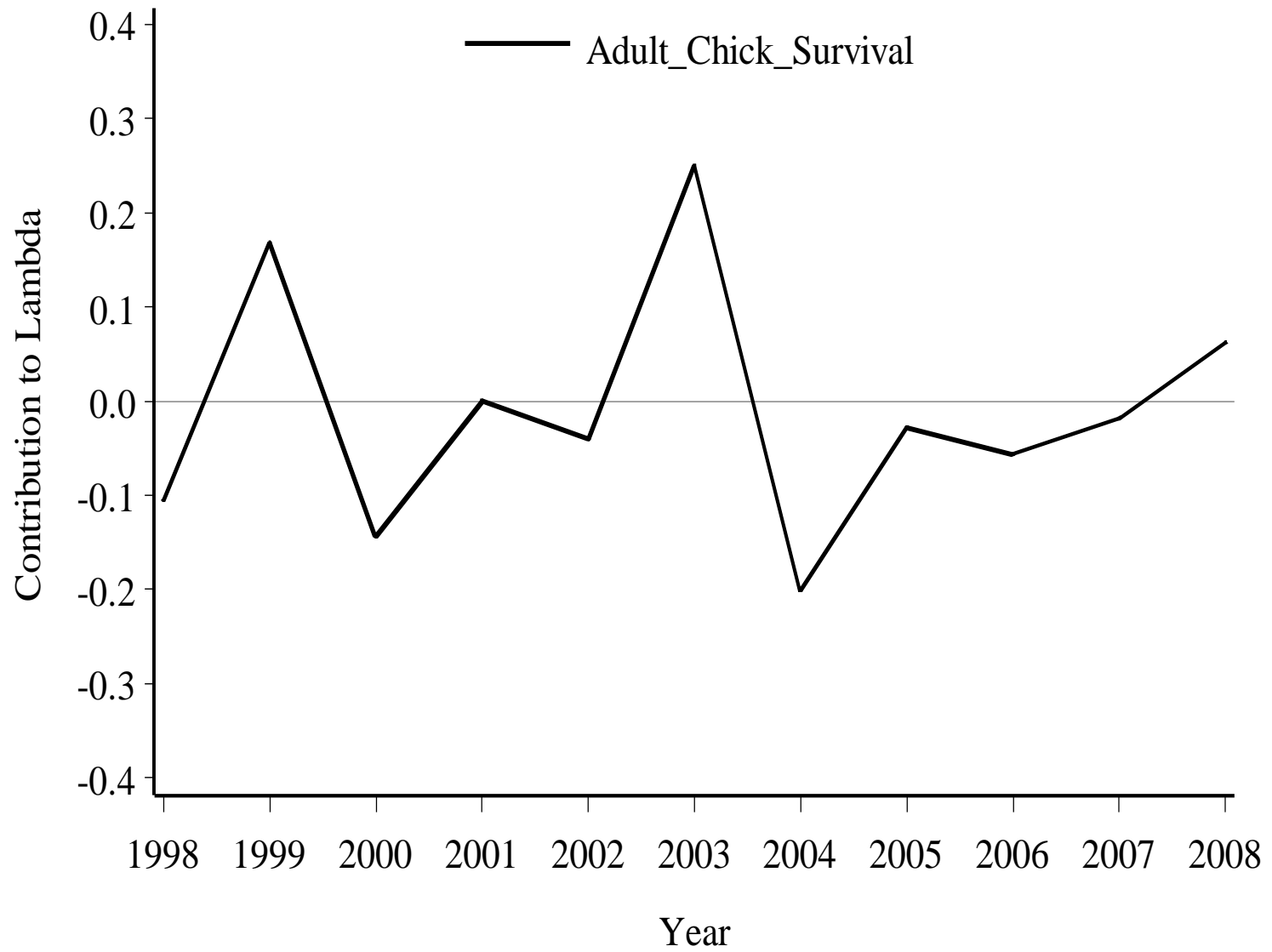


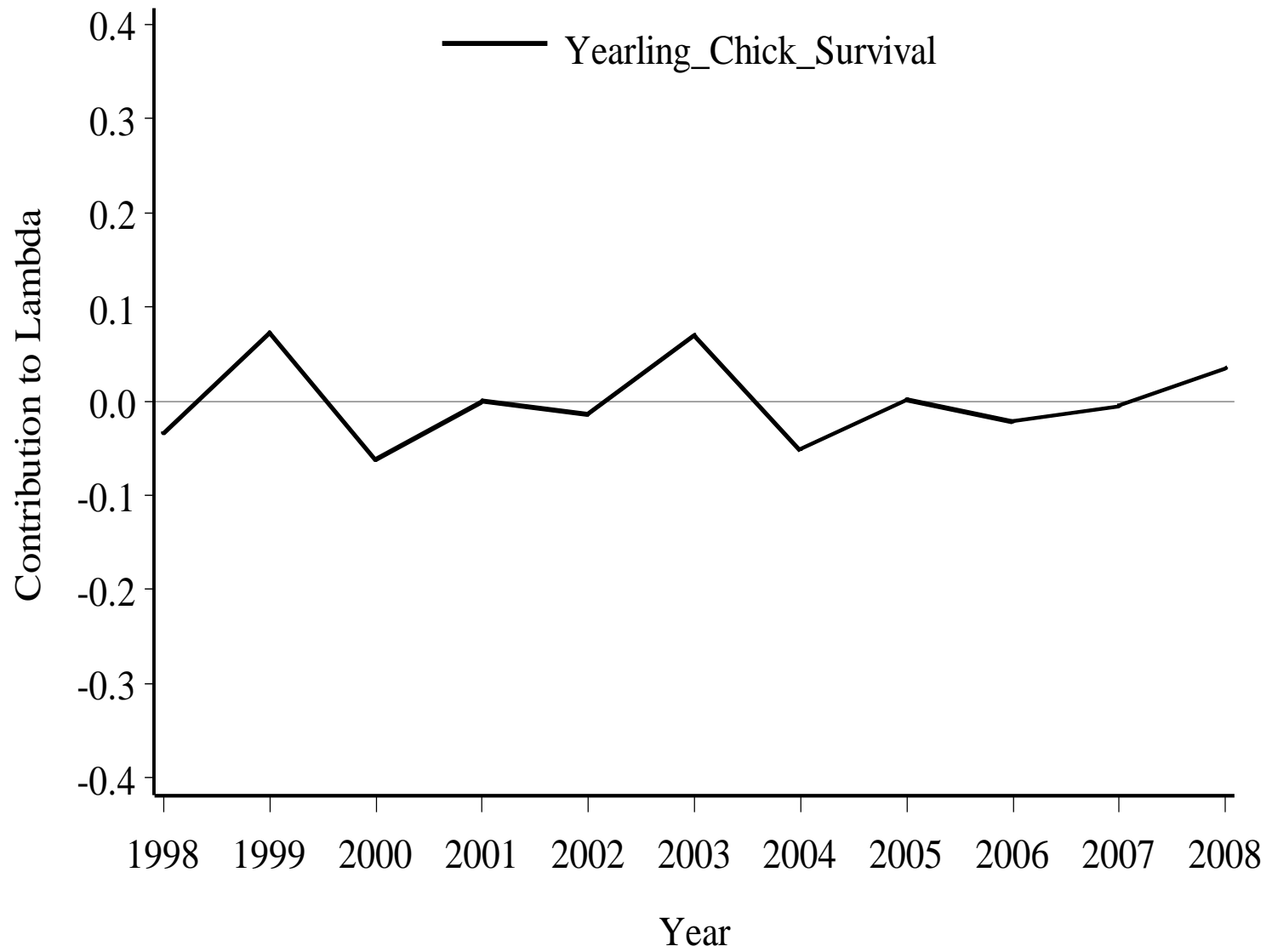








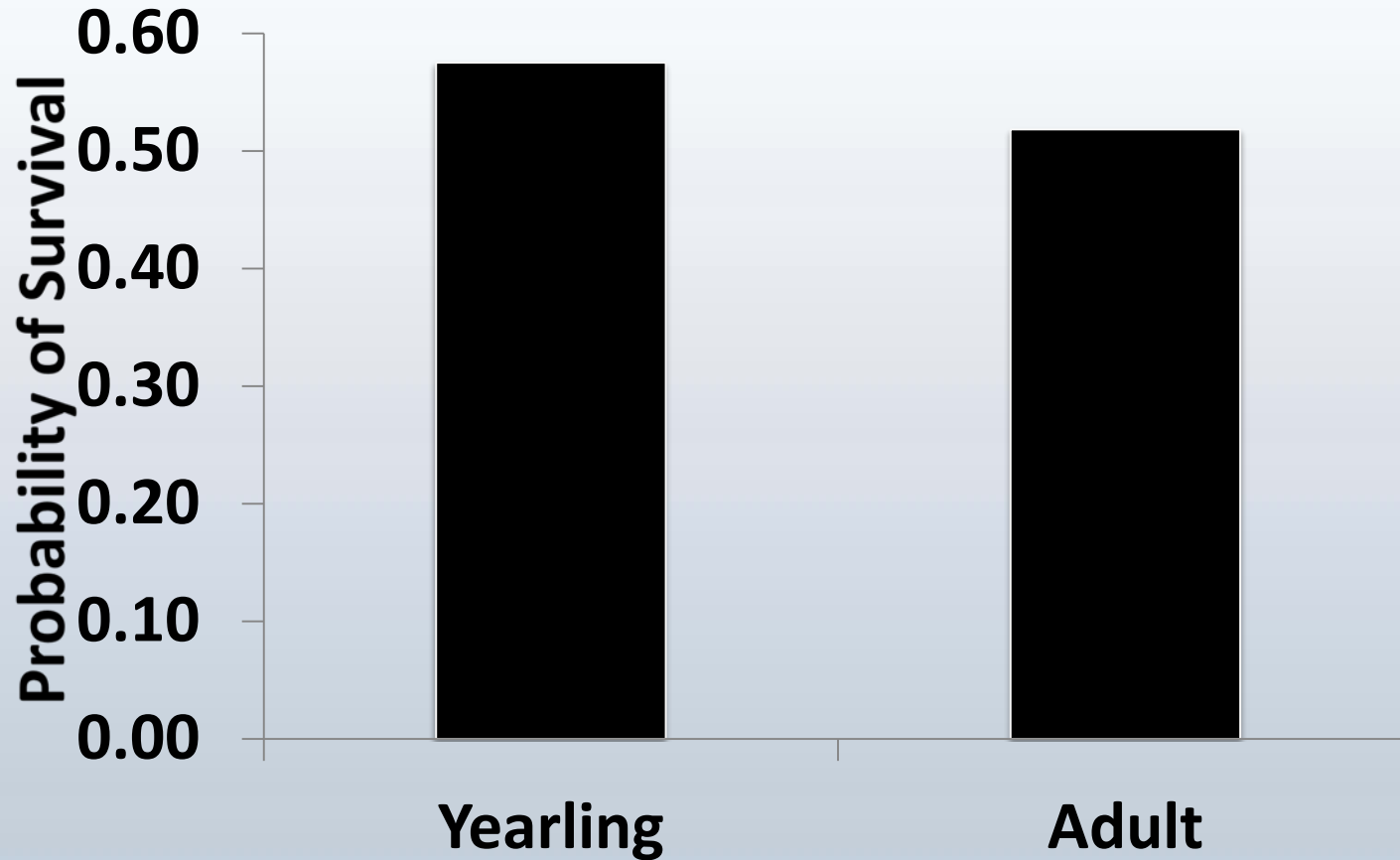




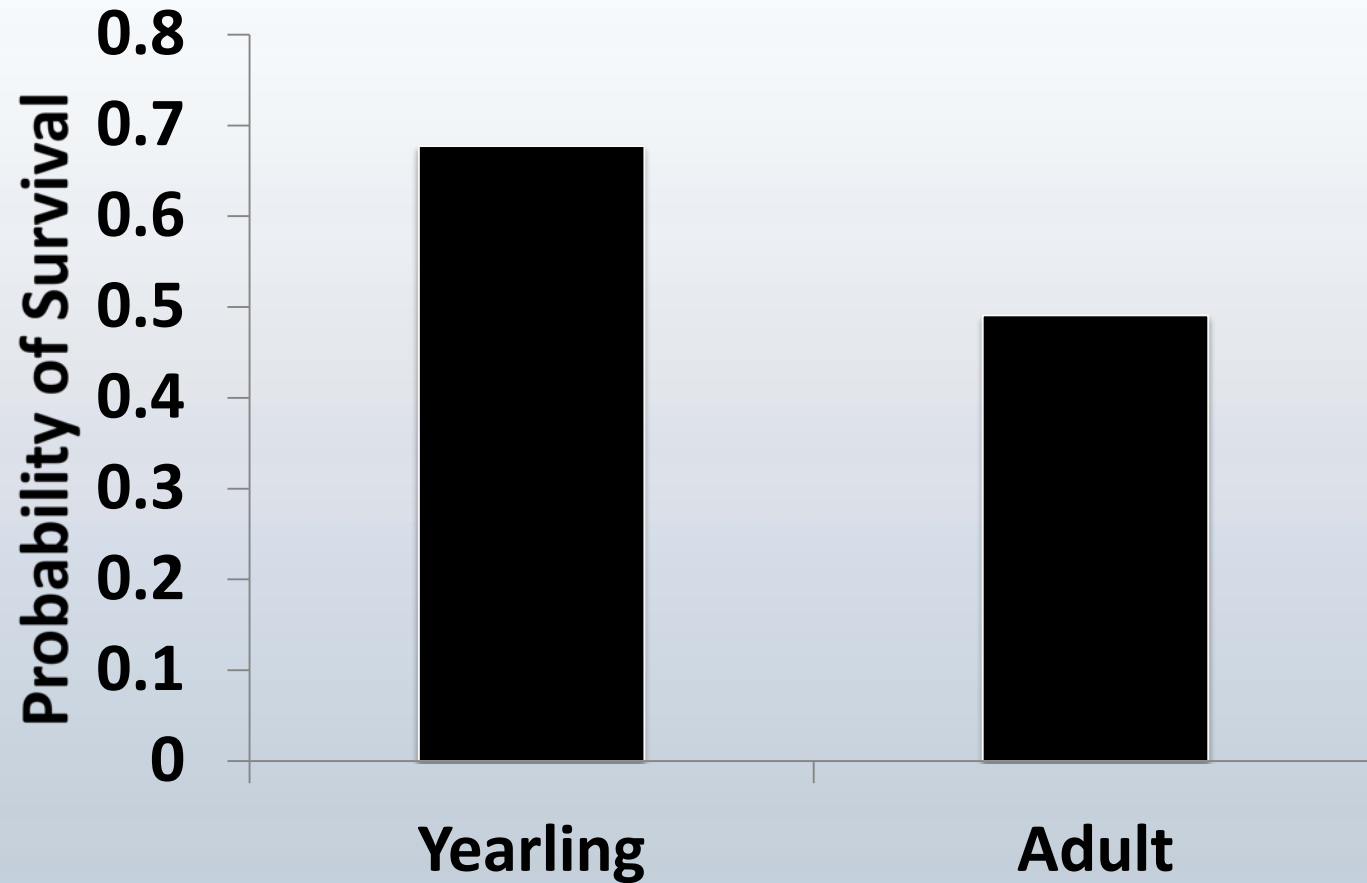
What factors influence chick survival?



Reproduction: Chick Survival

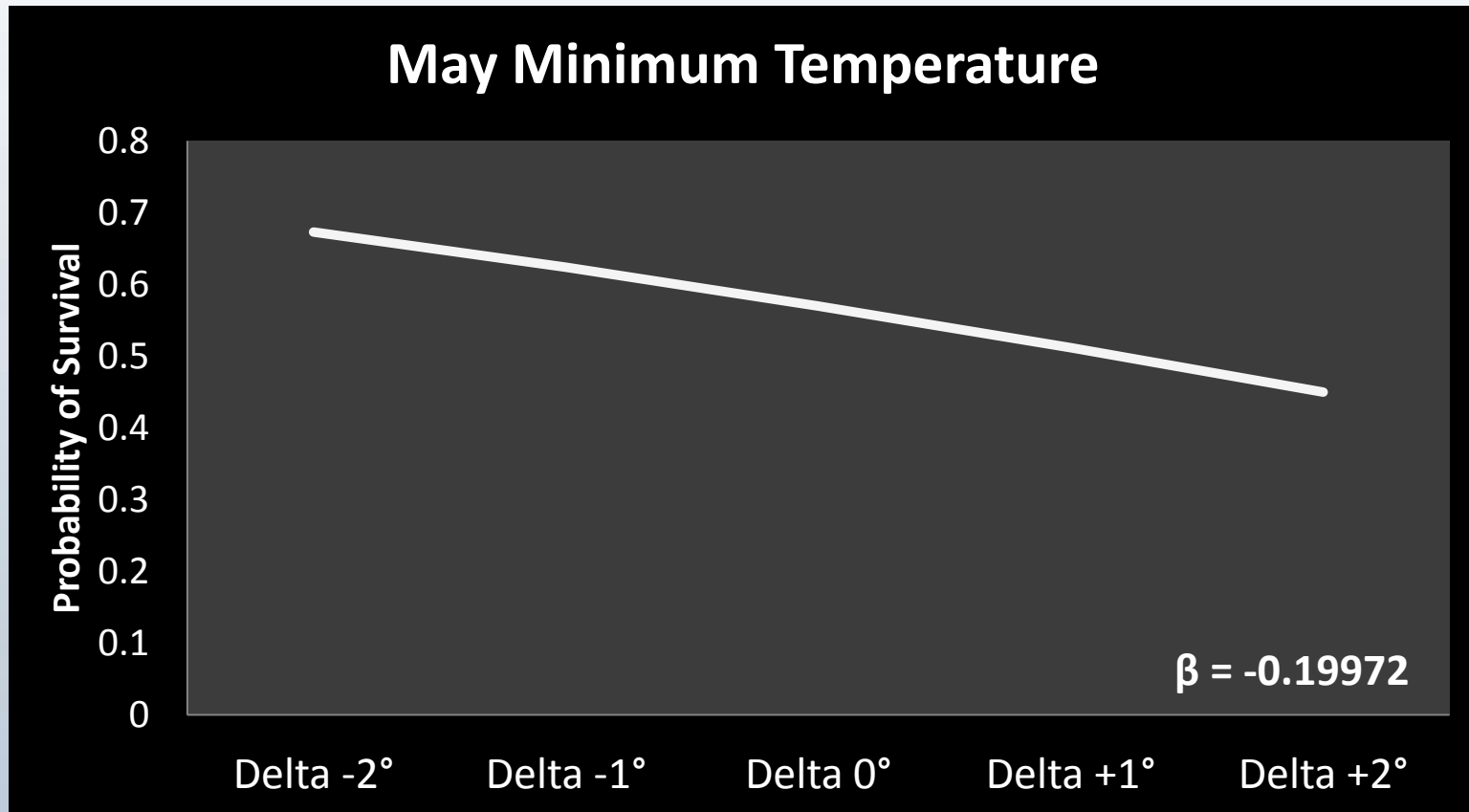


Reproduction: Chick Survival



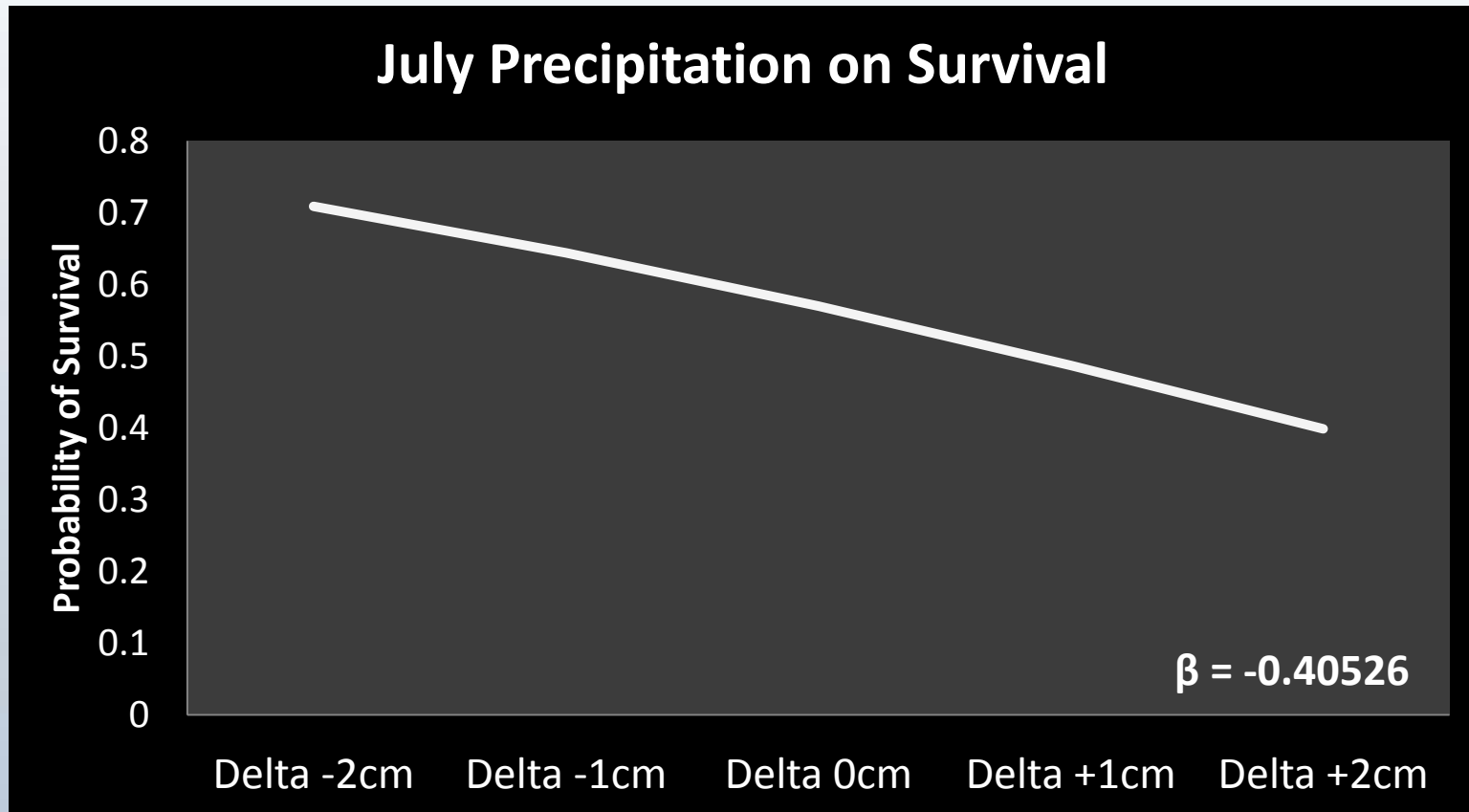
Reproduction: Chick Survival

Effects of Climate



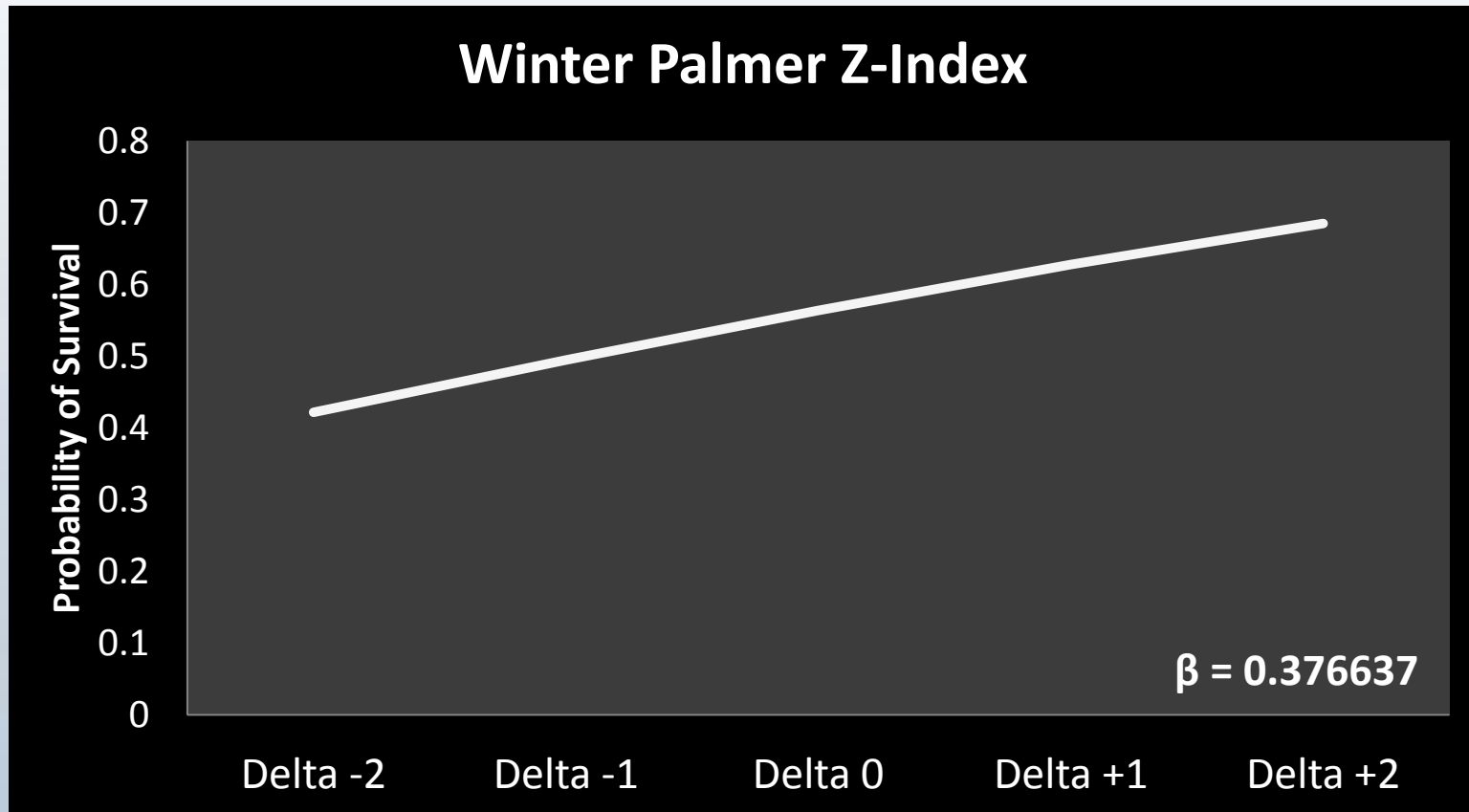
Reproduction: Chick Survival

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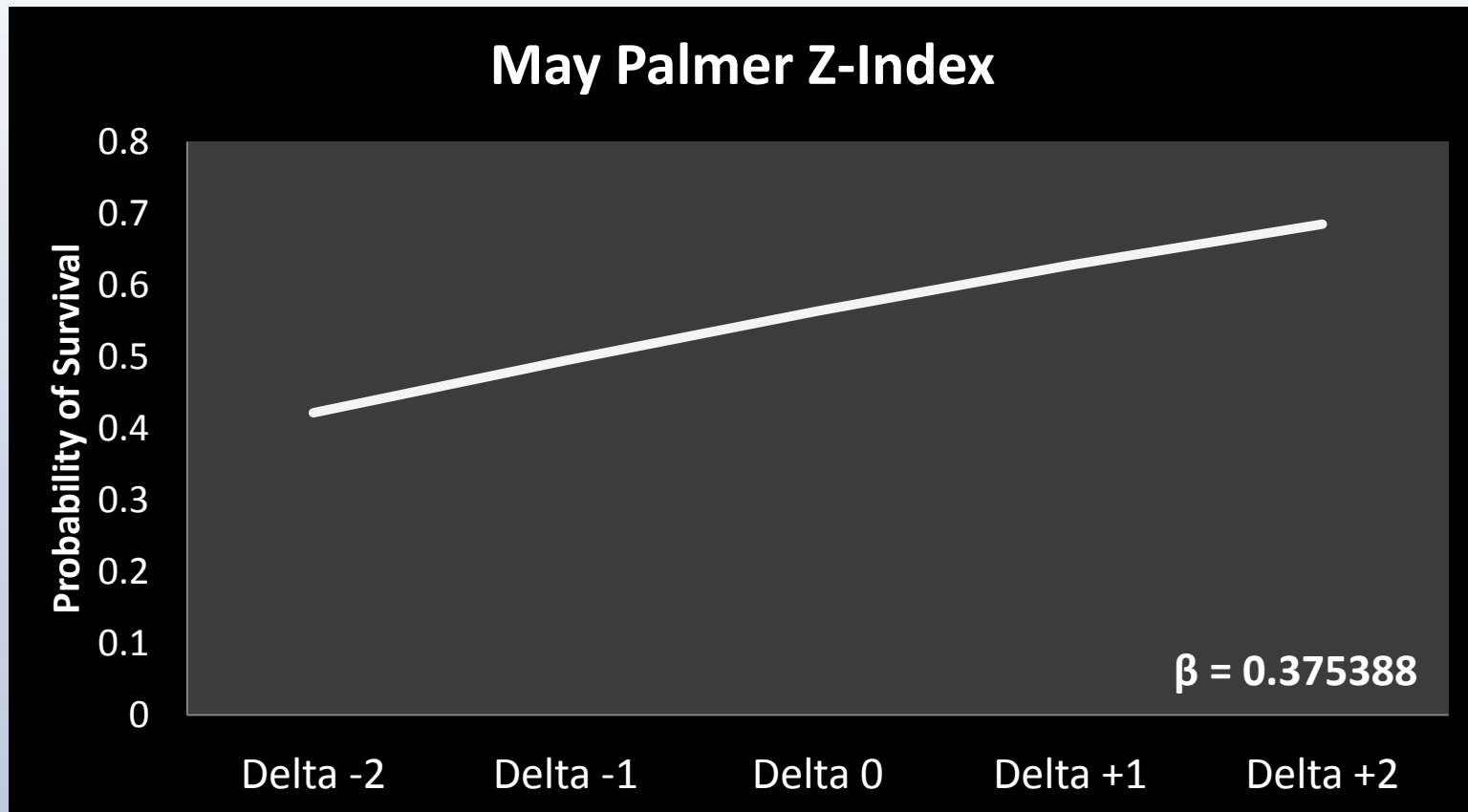
Reproduction: Chick Survival

Effects of Drought



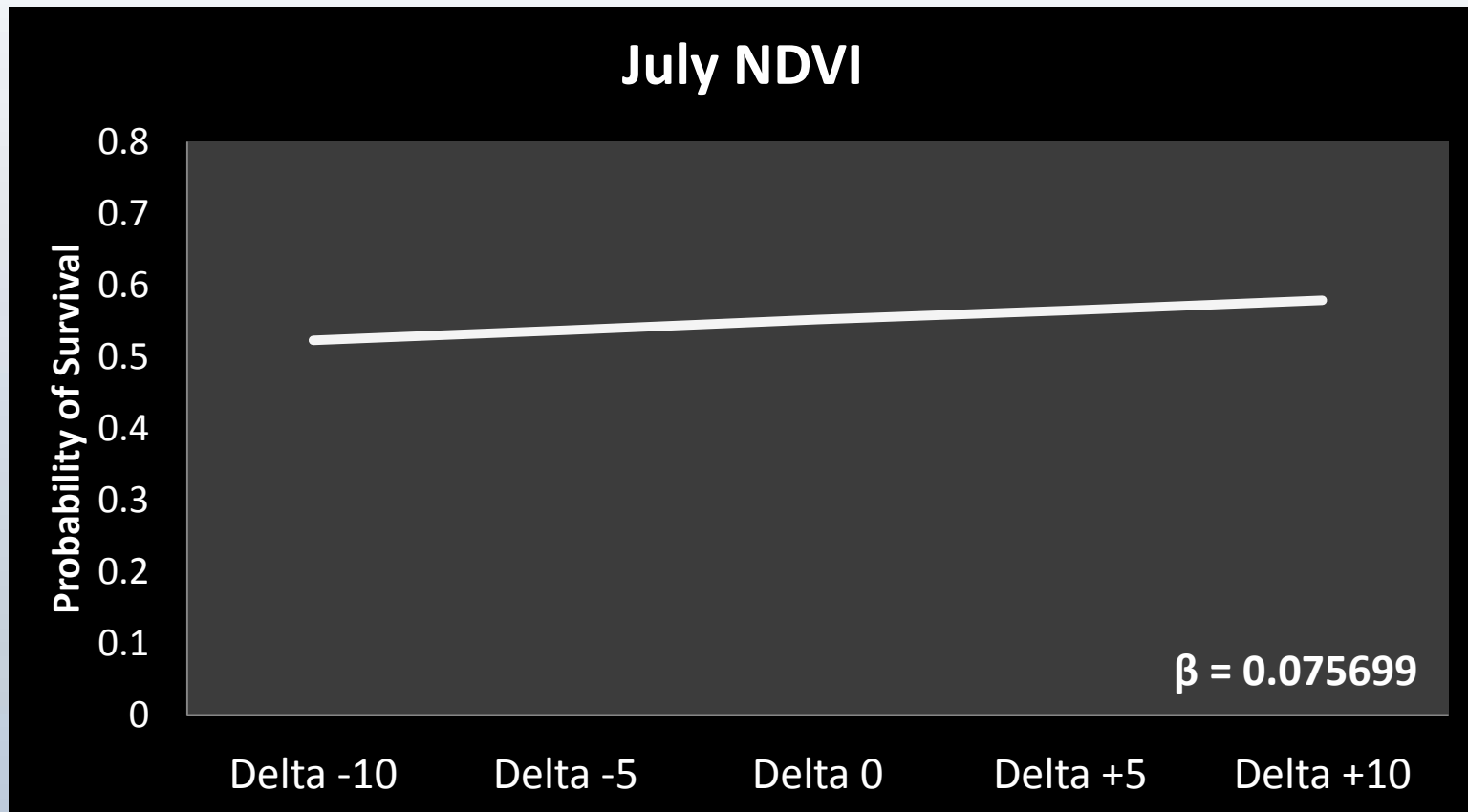
Reproduction: Chick Survival

Effects of Drought



Reproduction: Chick Survival

Effects of Greenness



Conclusions: Estimating Populations

- **Counting is hard!**
- **Current assumptions are not likely valid.**
- **More research needed.**



Conclusions: Population Drivers

- Intermediate along the fast-slow continuum.
- Population drivers vary episodically.
- Additional data needed concerning fledglings.
- Protect adult hens.



Conclusions: Chick Survival

- Yearling hens may be influential in some years.
- Climatic factors are important.
- Climate change?



Shall this fine bird follow the Passenger Pigeon into Oblivion?

