



Tim Ragen, Ph.D.
Executive Director (retired, sorta)
U.S. Marine Mammal Commission

Individual v population: which to save?

	Individual	Population
Does it foster empathy?	Yes	Yes, but sometimes less so than for single whale
Is it a moral/ethical issue?	Yes	Yes
Does it promote scientific understanding?	Yes	More so
Does it involve added risks?	Captivity-related risks, adaptation	Wild population risks
Does it conserve a stock (in perpetuity)?	Not directly	Yes

Individual v population: which to save?



	Individual	Population
Does it foster empathy?	Yes	Yes, but sometimes less so than for single whale
Is it a moral/ethical issue?	Yes	Yes
Does it promote scientific understanding?	Yes	More so
Does it involve added risks?	Captivity-related risks, adaptation	Wild population risks
Does it conserve a stock (in perpetuity)?	Not directly	Yes

Individual v population: which to save?



	Individual	Population
Does it foster empathy?	Yes	Yes, but sometimes less so than for single whale
Is it a moral/ethical issue?	Yes	Yes
Does it promote scientific understanding?	Yes	More so
Does it involve added risks?	Captivity-related risks, adaptation	Wild population risks
Does it conserve a stock (in perpetuity)?	Not directly	Yes

Individual v population: which to save?



	Individual	Population
Does it foster empathy?	Yes	Yes, but sometimes less so than for single whale
Is it a moral/ethical issue?	Yes	Yes
Does it promote scientific understanding?	Yes	More so
Does it involve added risks?	Captivity-related risks, adaptation	Wild population risks
Does it conserve a stock (in perpetuity)?	Not directly	Yes

Individual v population: which to save?

	Individual	Population
Does it foster empathy?	Yes	Yes, but sometimes less so than for single whale
Is it a moral/ethical issue?	Yes	Yes
Does it promote scientific understanding?	Yes	More so
Does it involve added risks?	Captivity-related risks, adaptation	Wild population risks
Does it conserve a stock (in perpetuity)?	Not directly	Yes



Individual v population: which to save?

	Individual	Population
Does it foster empathy?	Yes	Yes, but sometimes less so than for single whale
Is it a moral/ethical issue?	Yes	Yes
Does it promote scientific understanding?	Yes	More so
Does it involve added risks?	Captivity-related risks, adaptation	Wild population risks
Does it conserve a stock (in perpetuity)?	Not directly	Yes





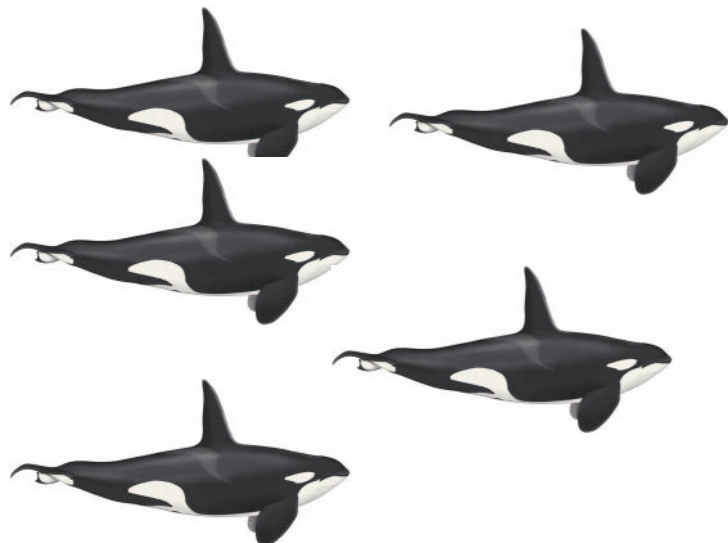
Individual v population: which to save?

	Individual	Population
Does it foster empathy?	Yes	Yes, but sometimes less so than for single whale
Is it a moral/ethical issue?	Yes	Yes
Does it promote scientific understanding?	Yes	More so
Does it involve added risks?	Captivity-related risks, adaptation	Wild population risks
Does it conserve a stock (in perpetuity)?	Not directly	Yes



Individual v population: which to save?

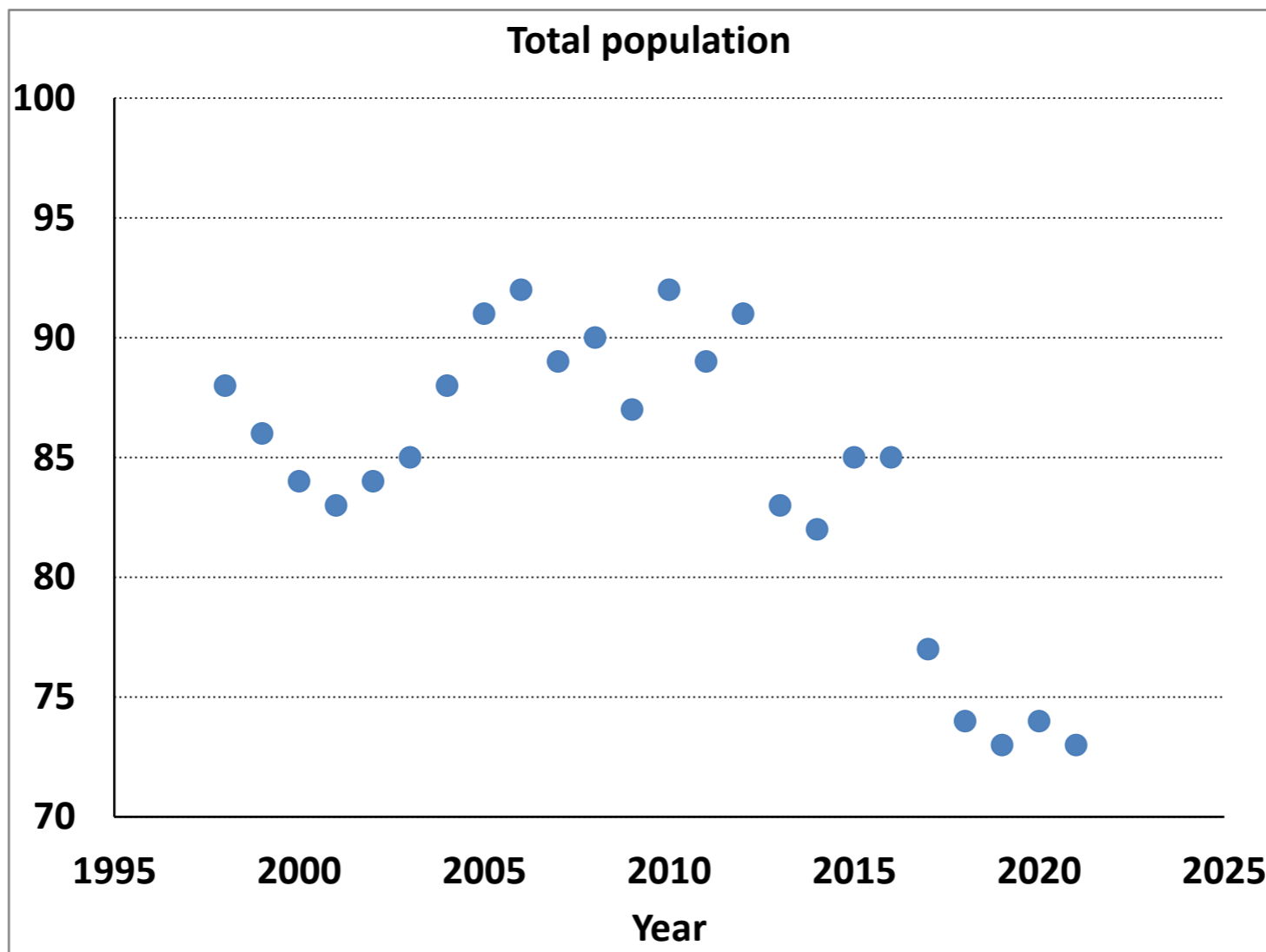
	Individual	Population
Does it foster empathy?	Yes	Yes, but sometimes less so than for single whale
Is it a moral/ethical issue?	Yes	Yes
Does it promote scientific understanding?	Yes	More so
Does it involve added risks?	Captivity-related risks, adaptation	Wild population risks
Does it conserve a stock (in perpetuity)?	Not directly	Yes



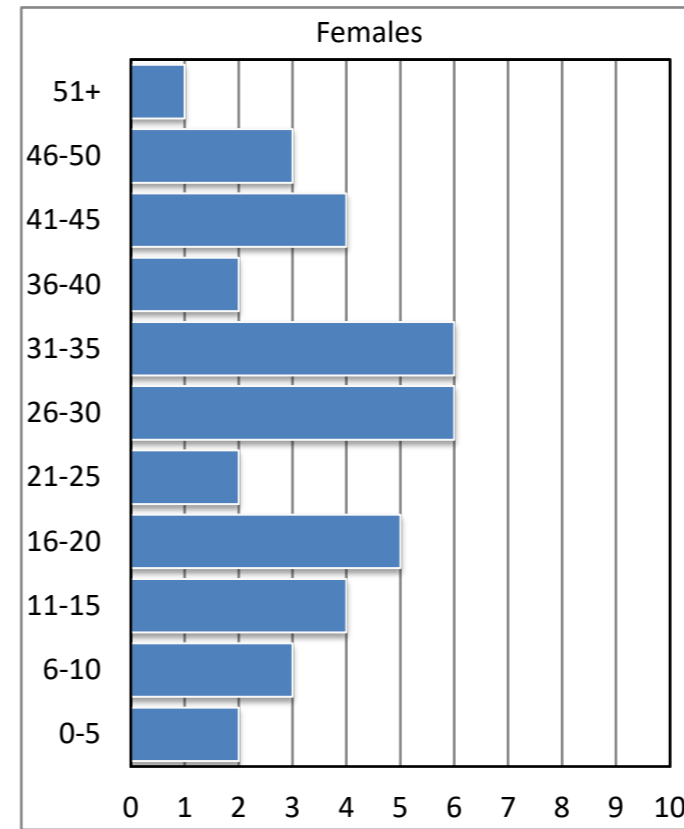
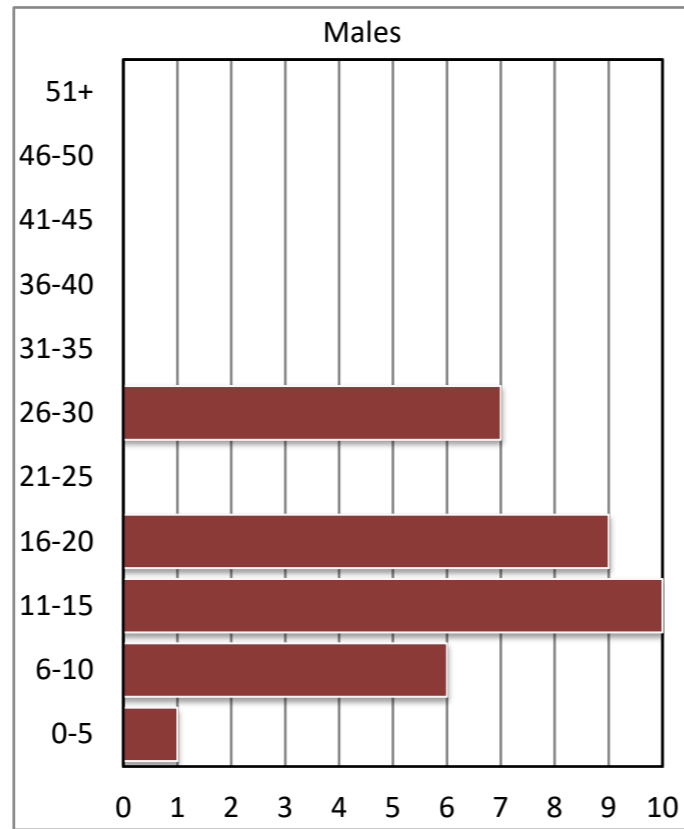
Abundance and trend



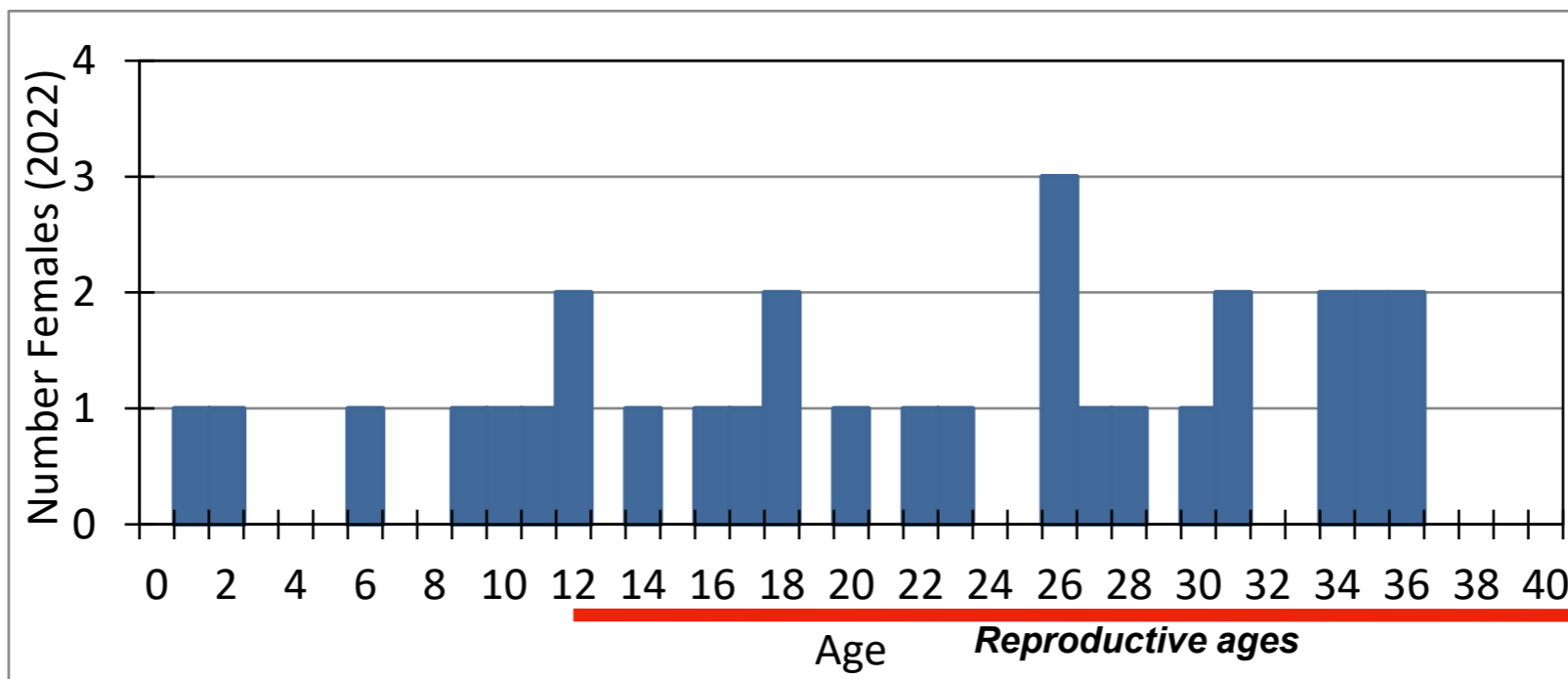
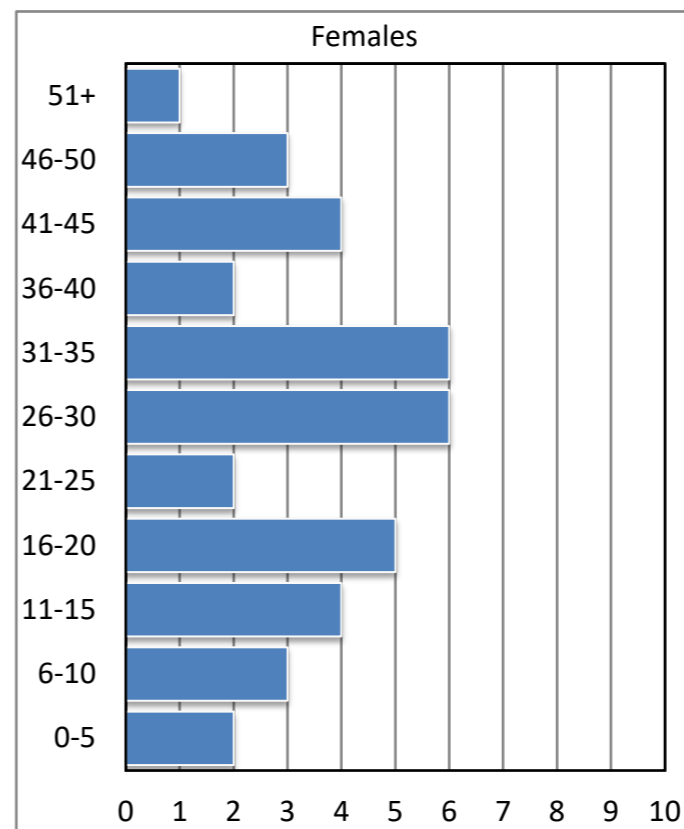
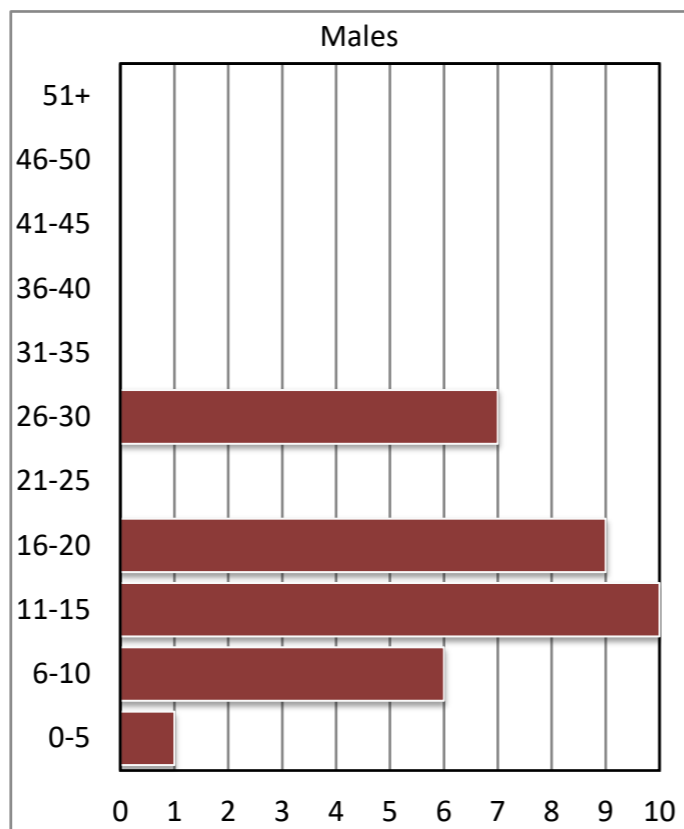
Abundance and trend



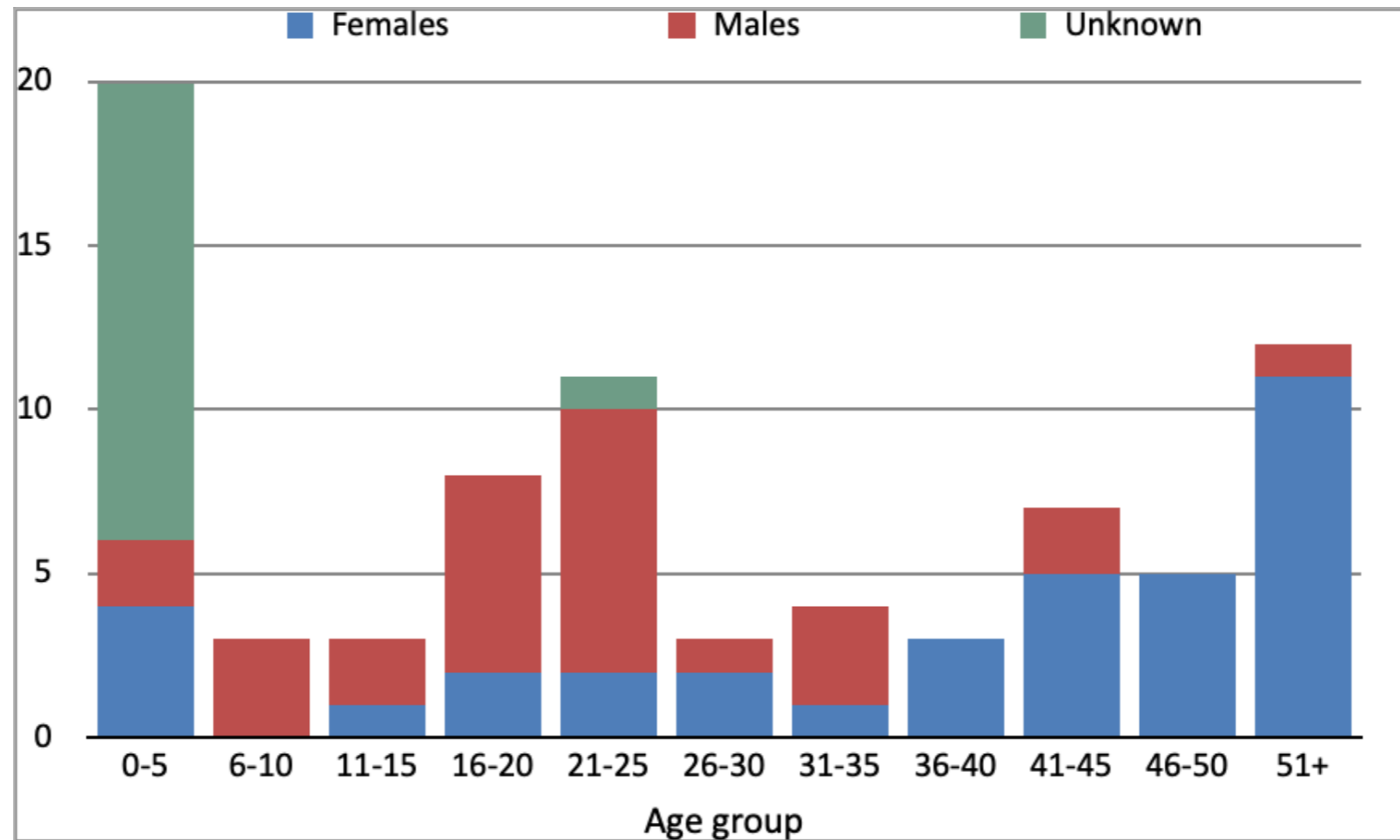
Age/sex structure



Age/sex structure



Mortality by sex and age group, 1998-2021



Health and condition



Fearnbach, Durban, Barrett-Lennard

What are the risks?

(Risk = likelihood * consequences)

Insufficient prey — Chinook salmon

Ocean



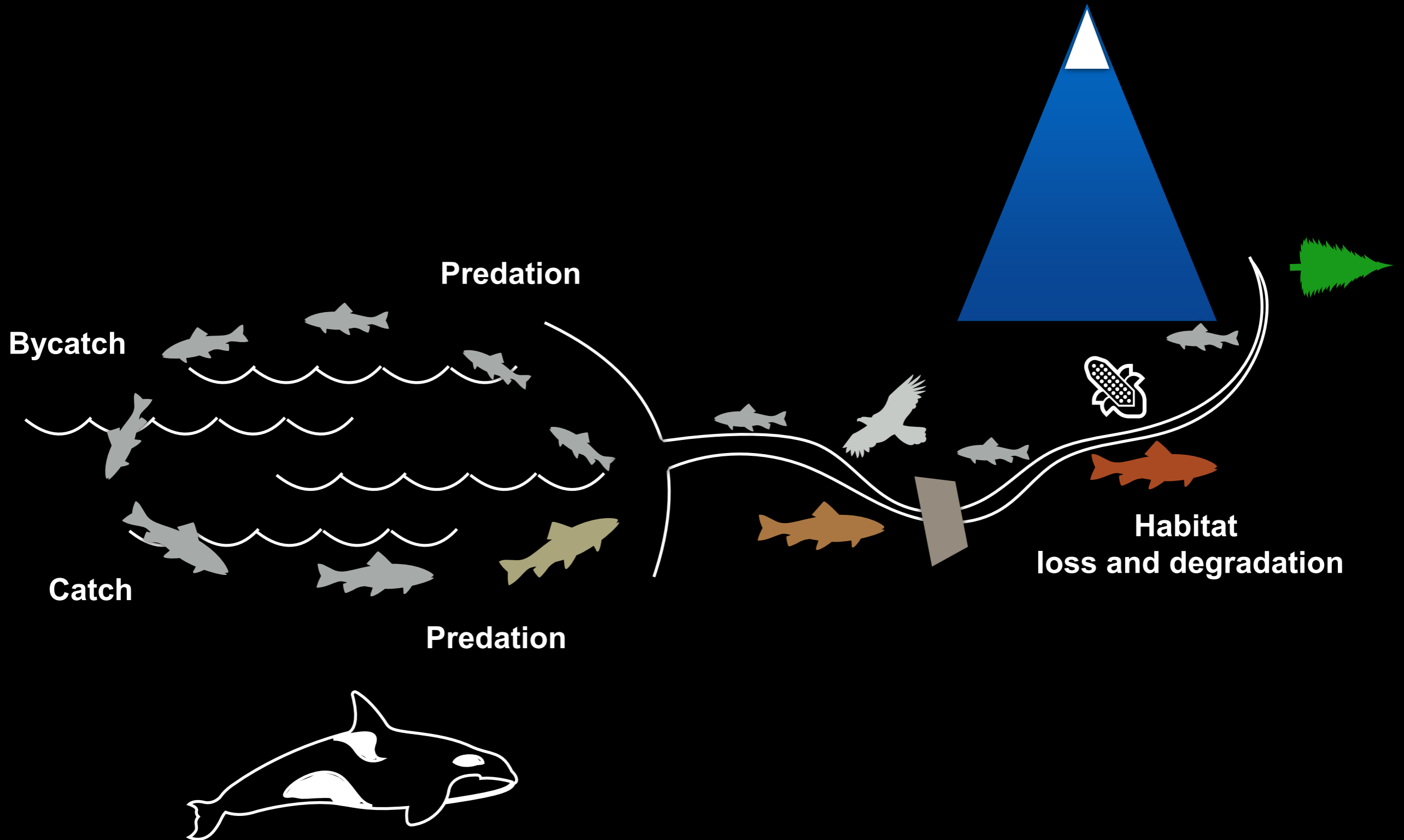
700 × 252 - Images may be subject to copyright. [Learn More](#)

Spawning

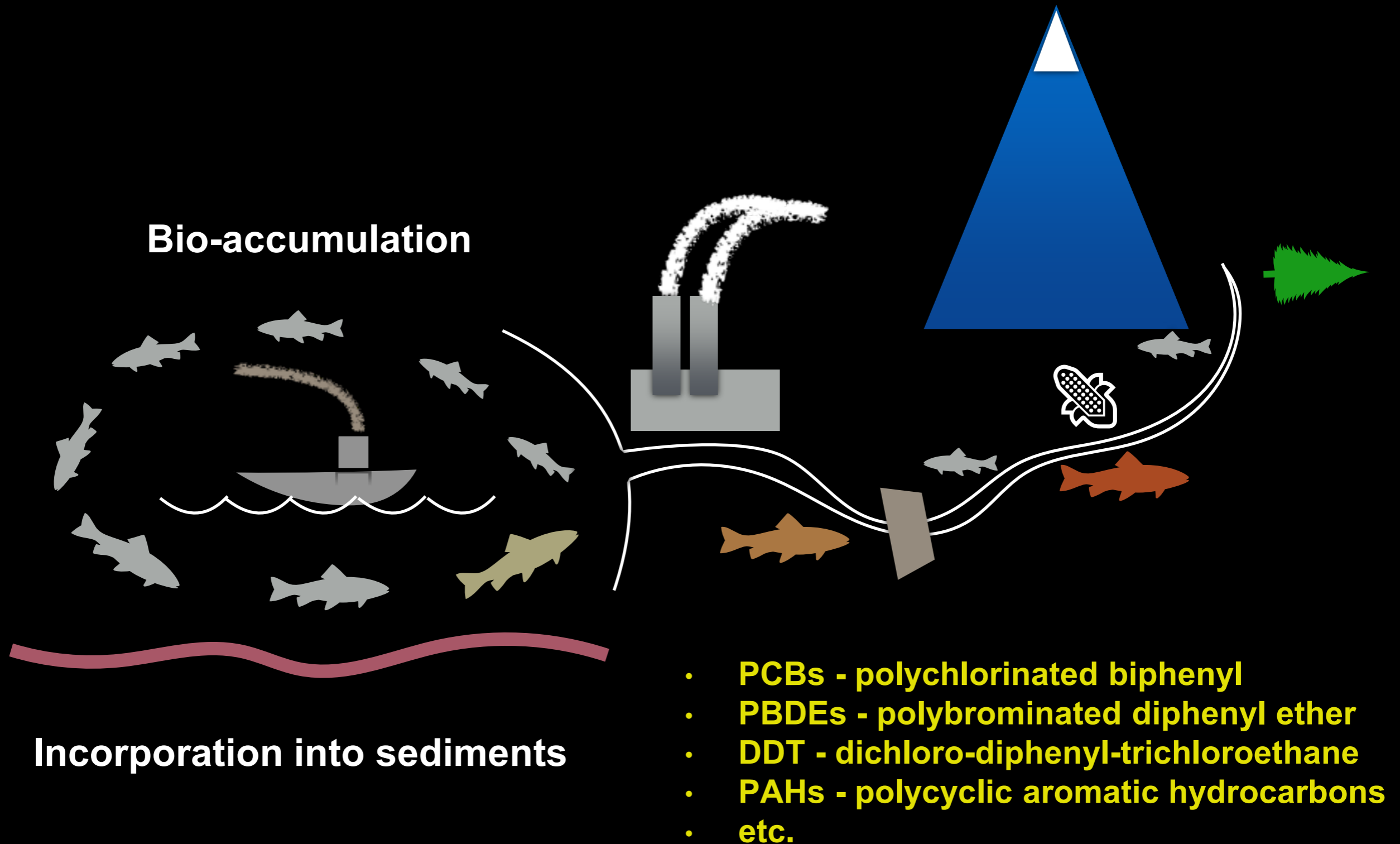


600 × 278 - Images may be subject to copyright. [Learn More](#)

Chinook salmon cycle



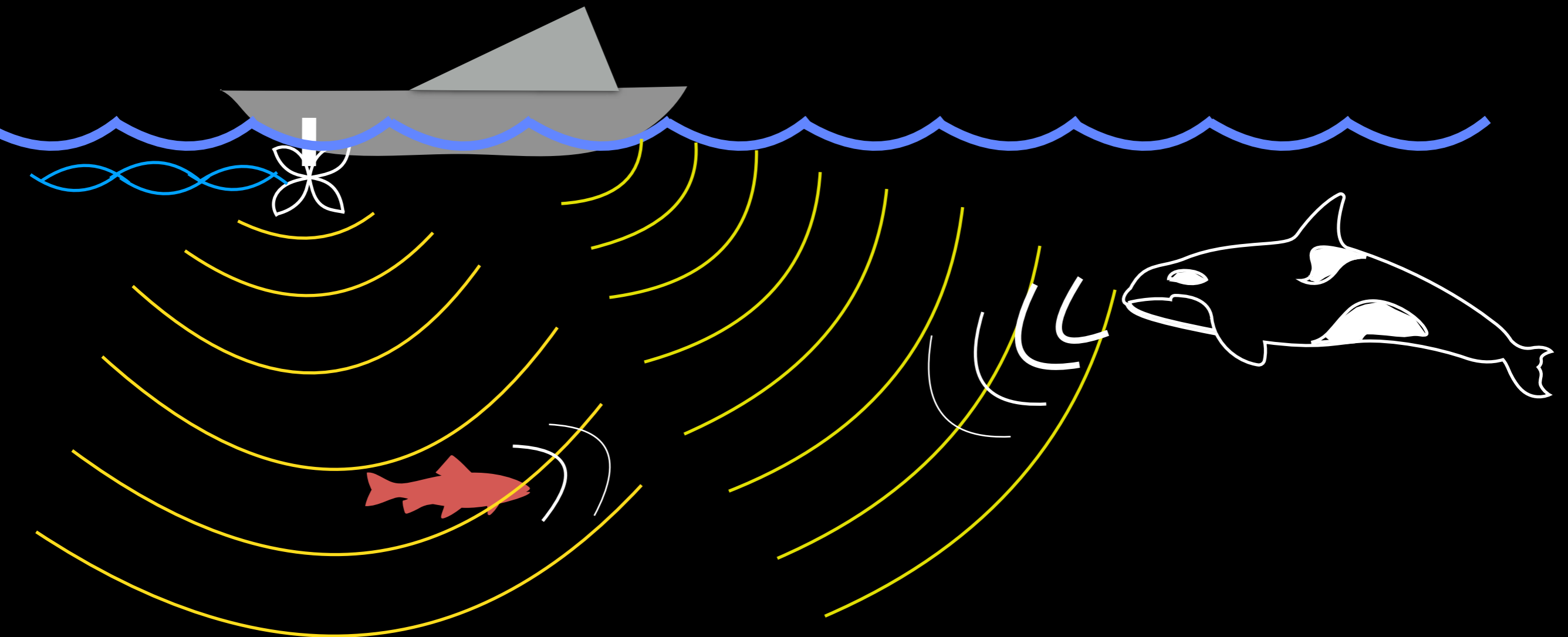
Contaminants



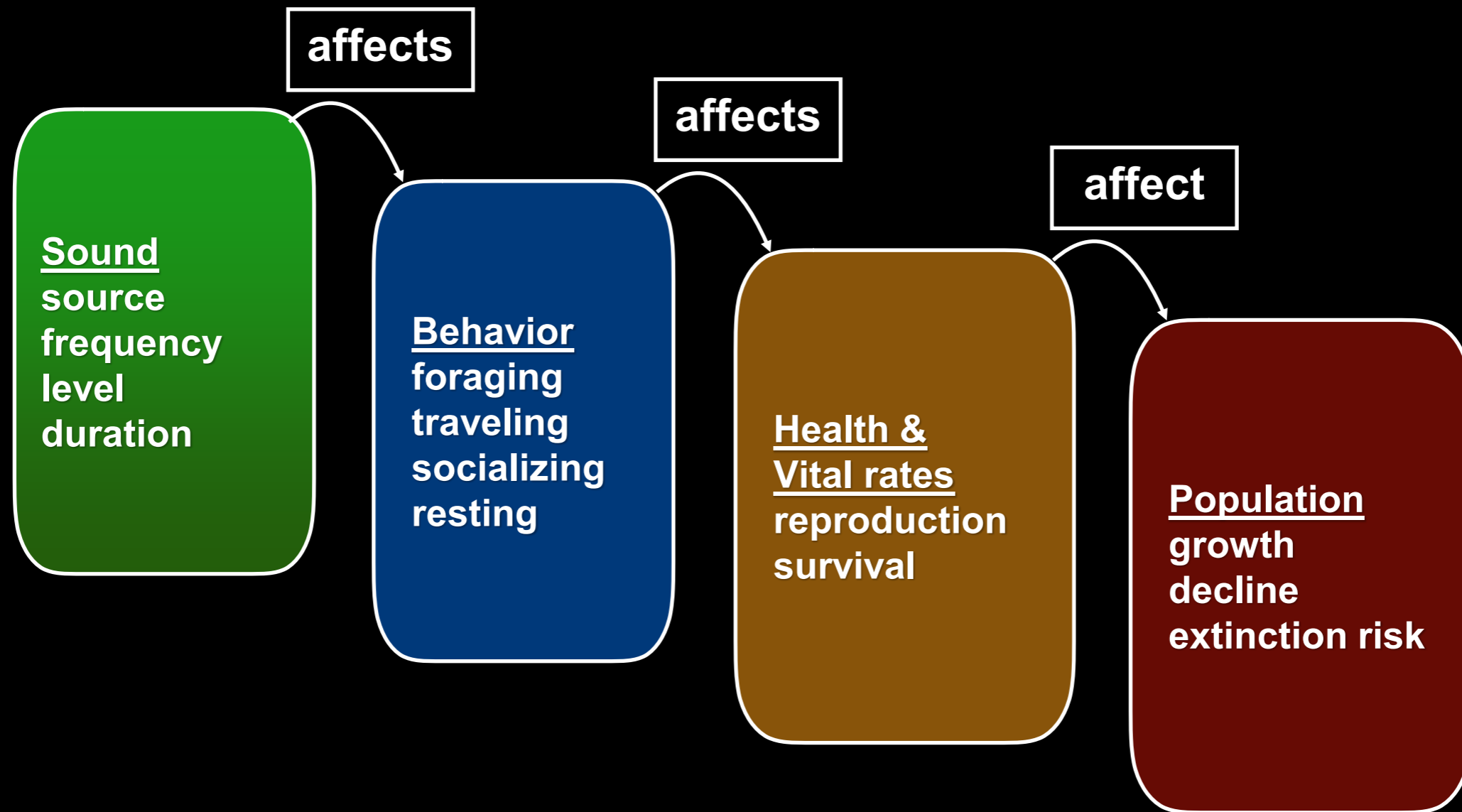
Noise and disturbance

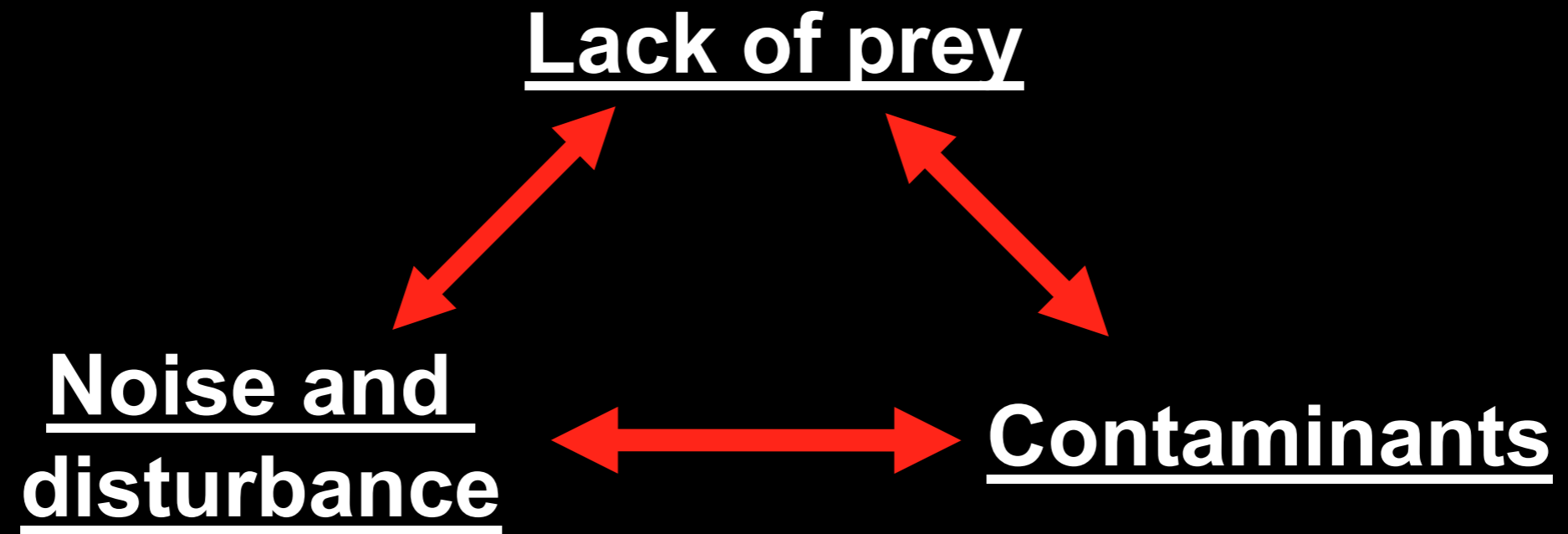
Masking

Interference competition



Noise and disturbance





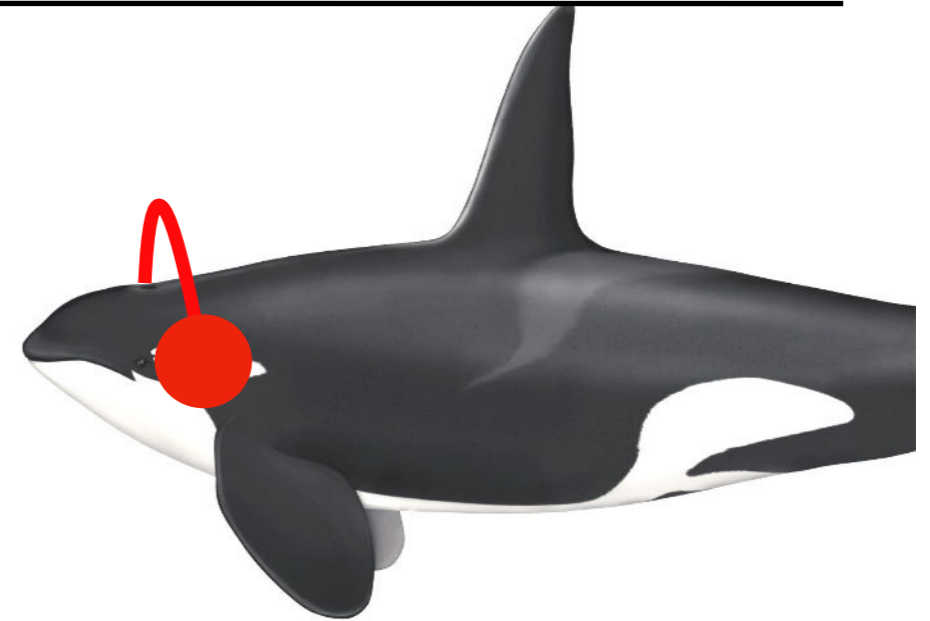
Risks



+

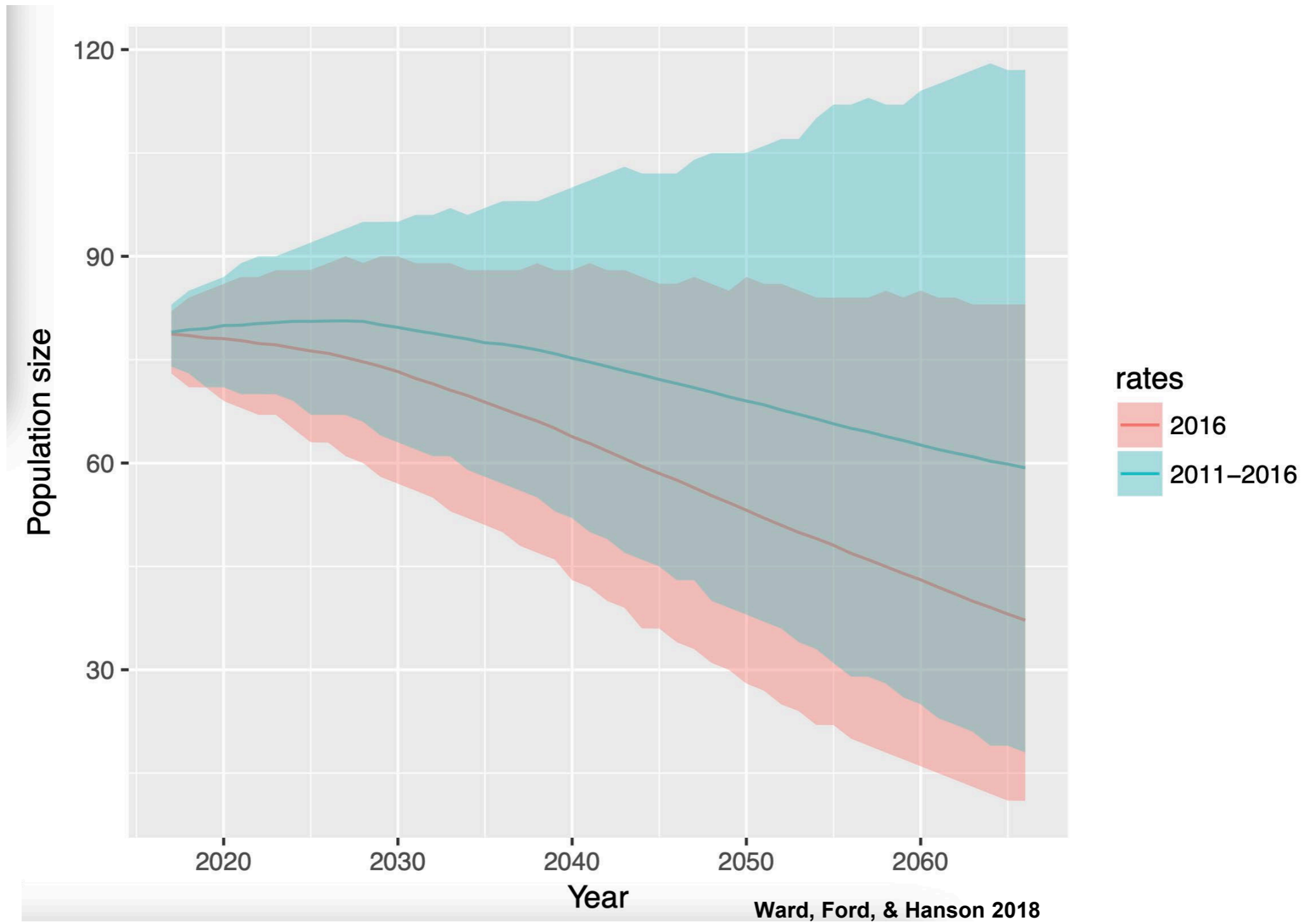
- PCBs
- PBDEs
- DDT
- PAHs
- Other?

*

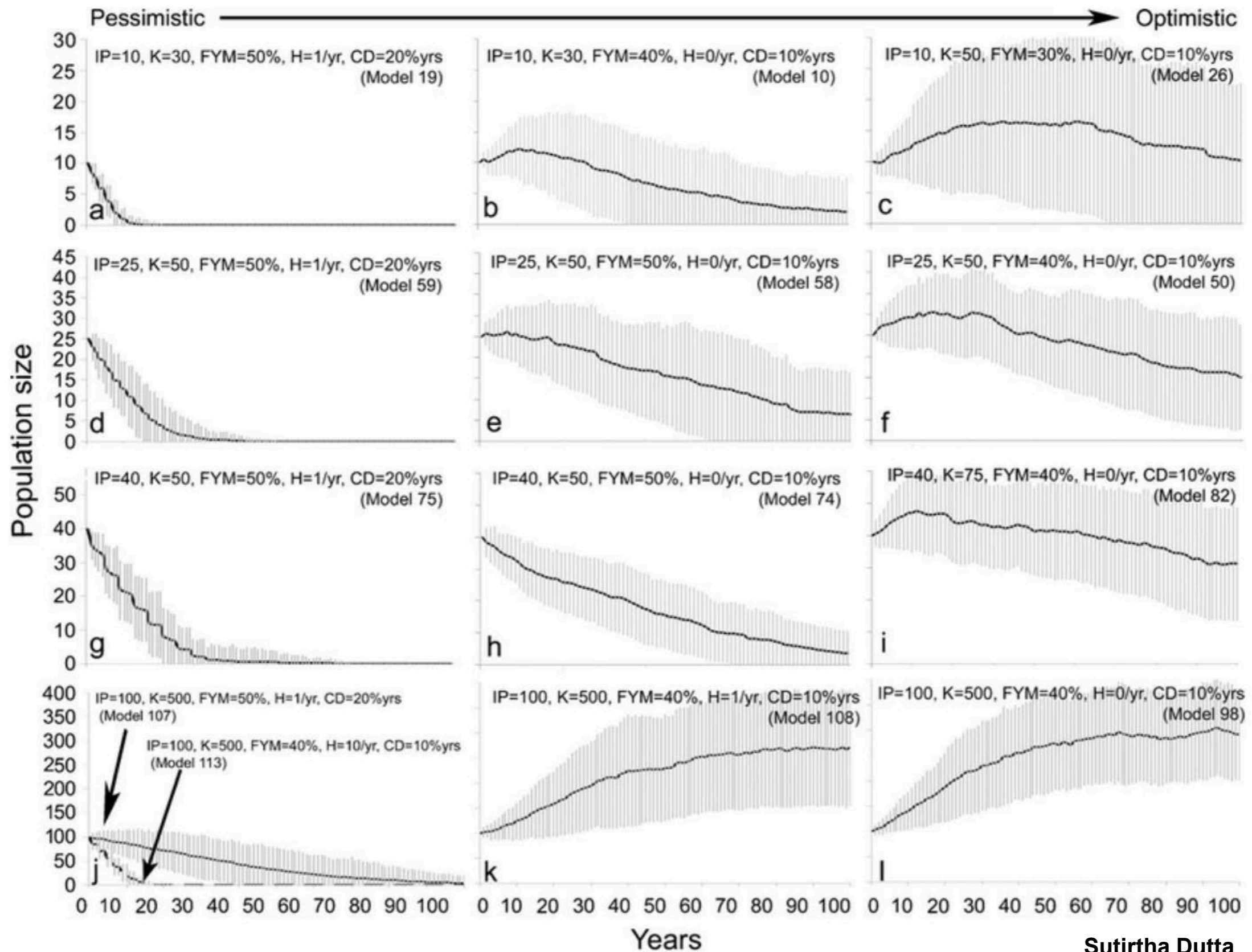


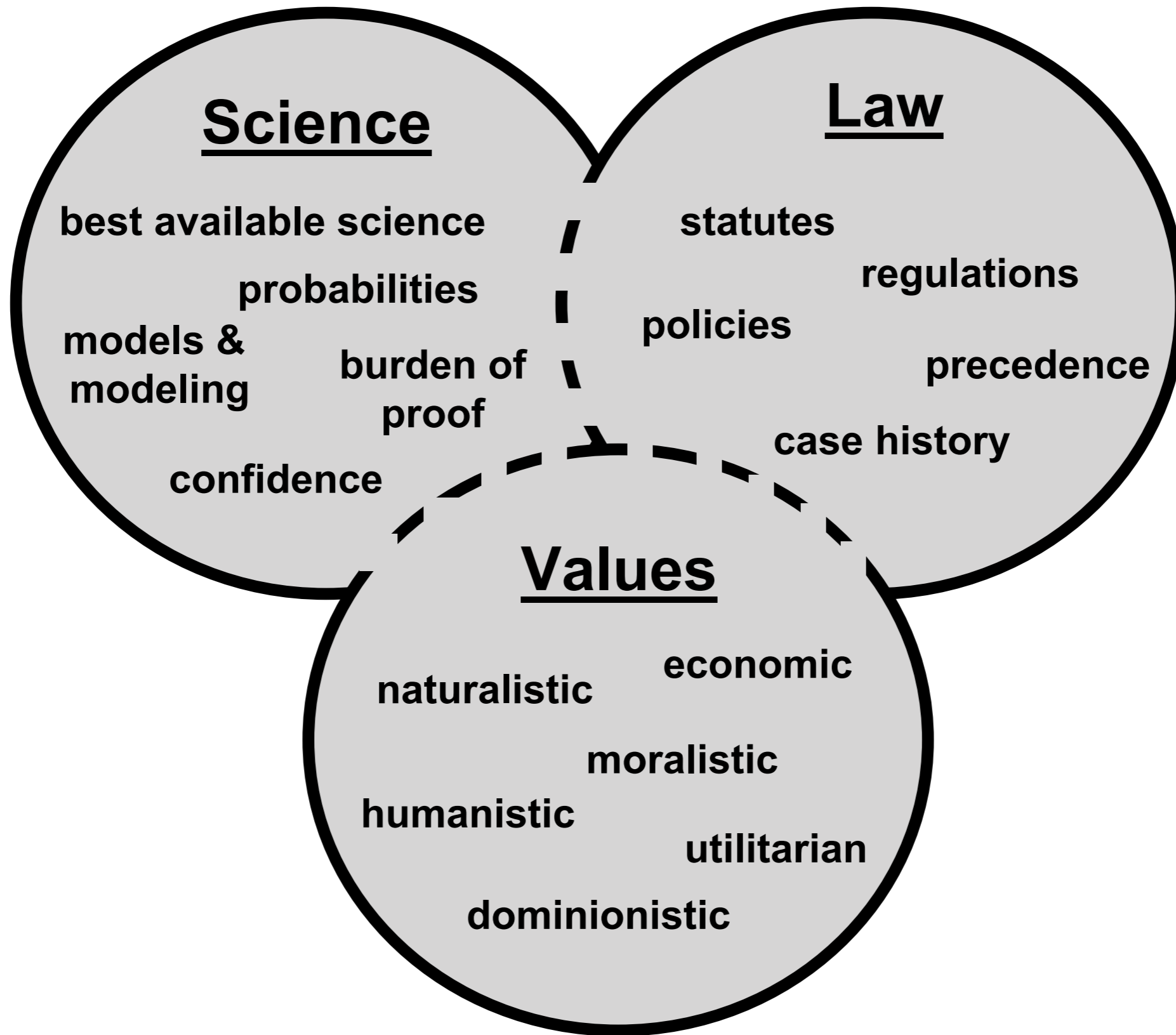
- **Single or multiple?**
- **Predictable - same in the future?**
- **Proximate v ultimate**
- **Uncertainty requires precaution**

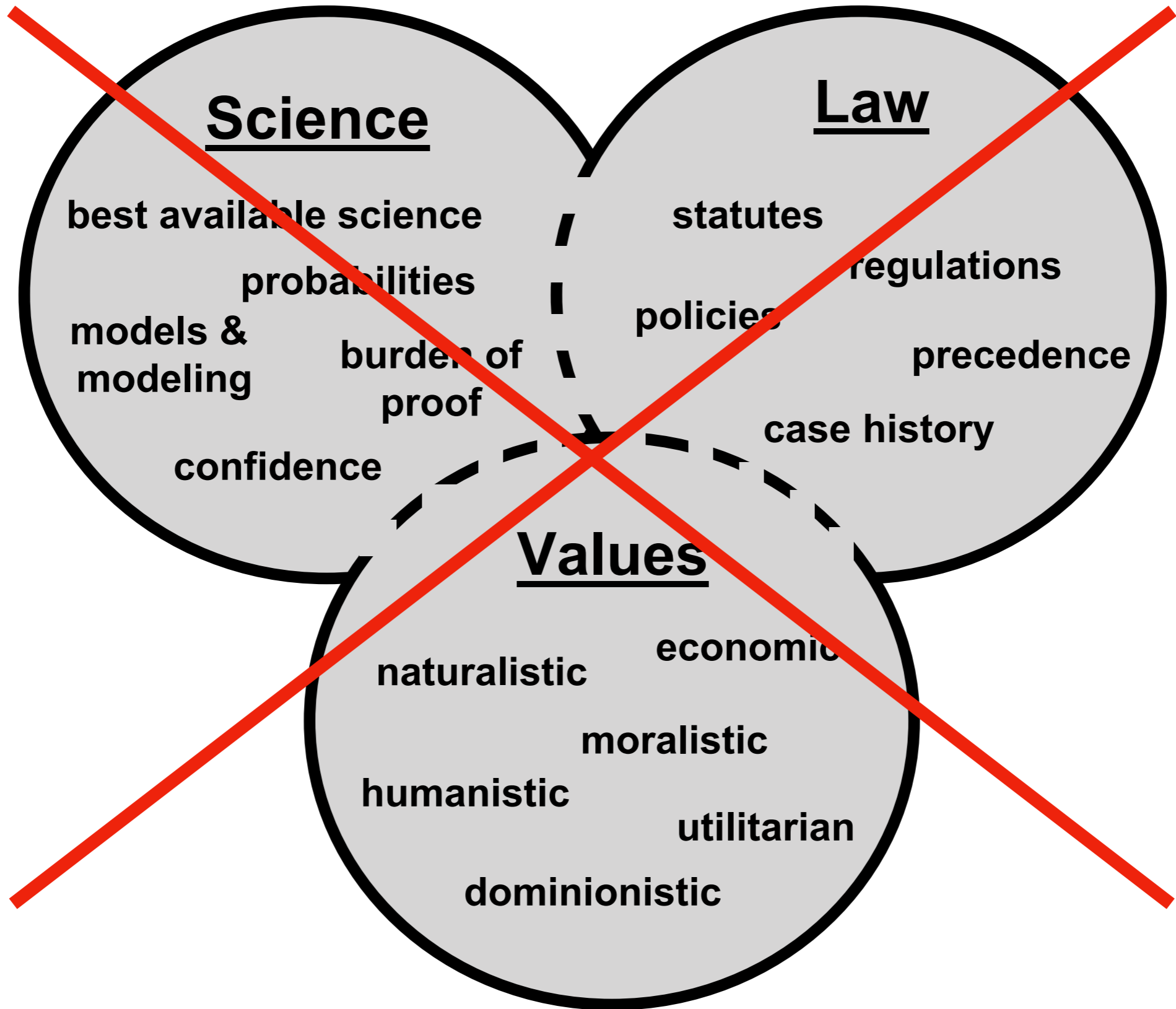
Population viability analysis

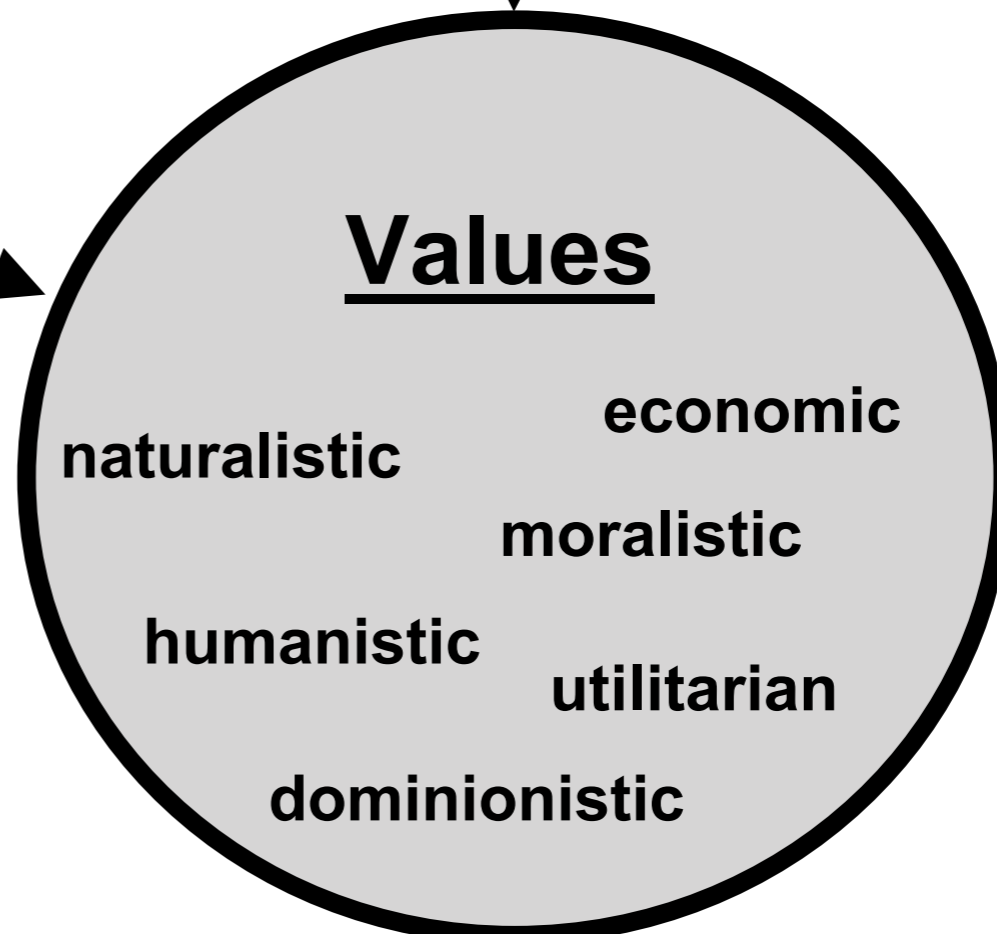
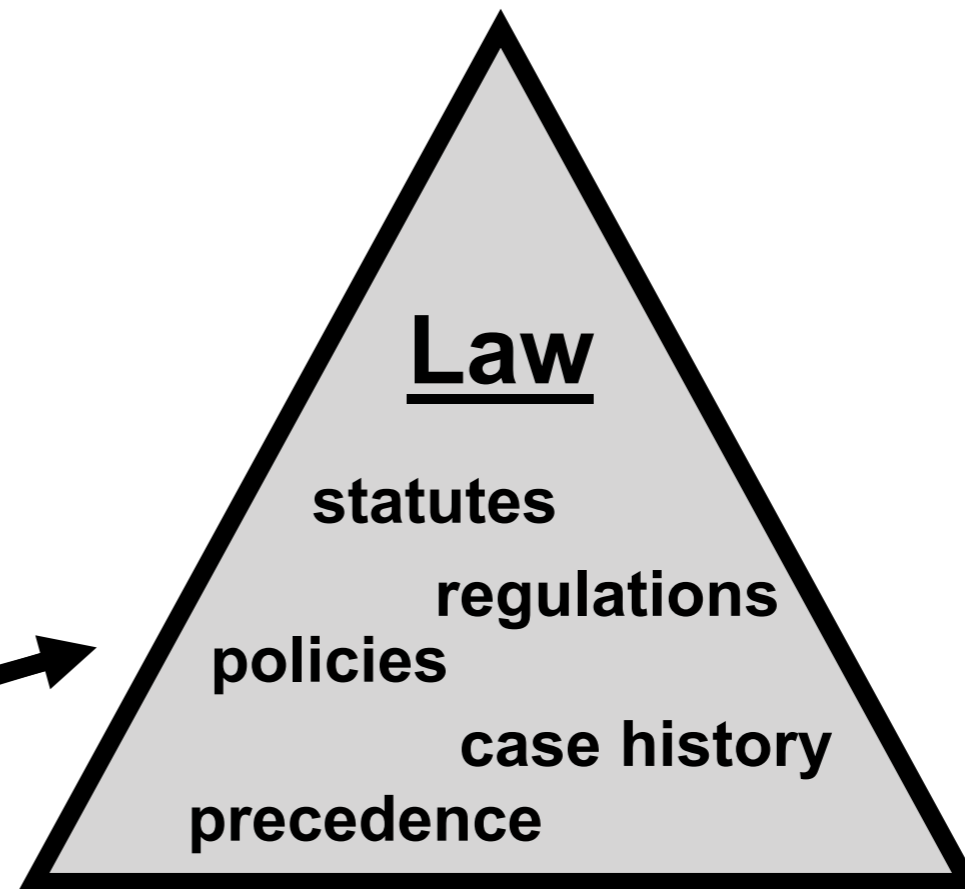
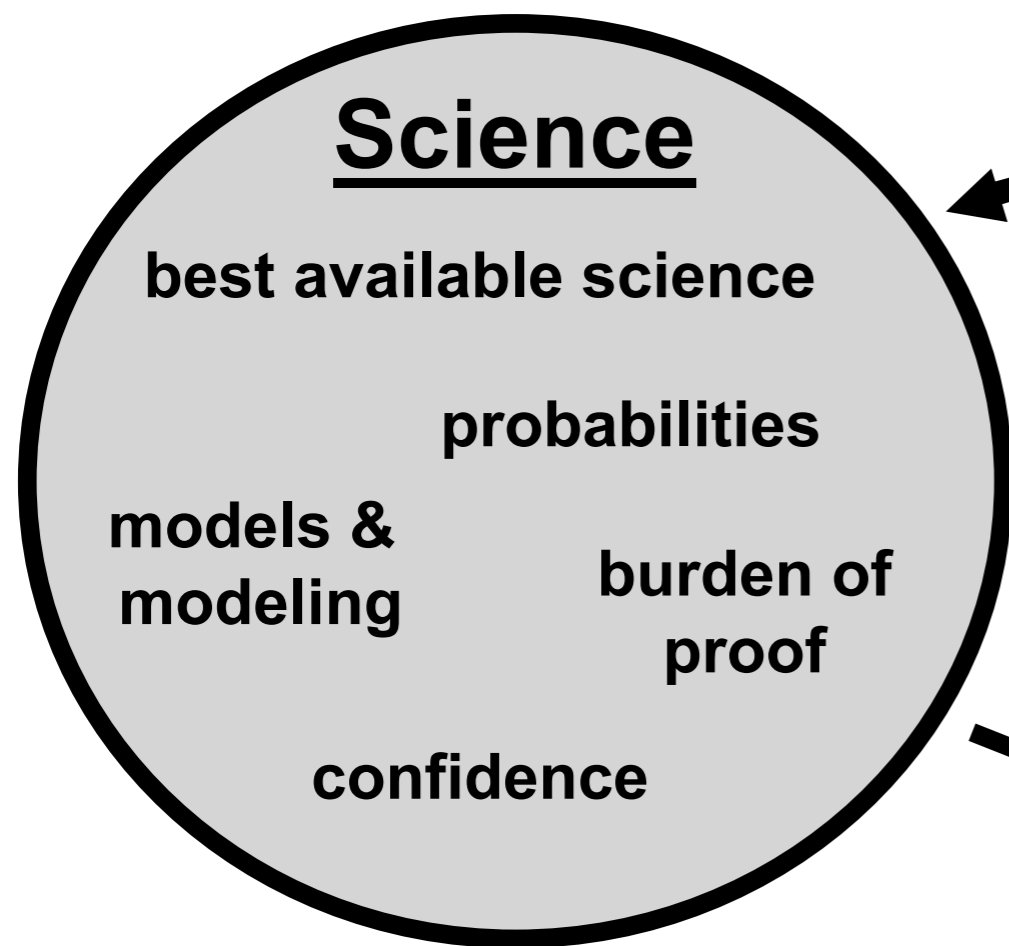


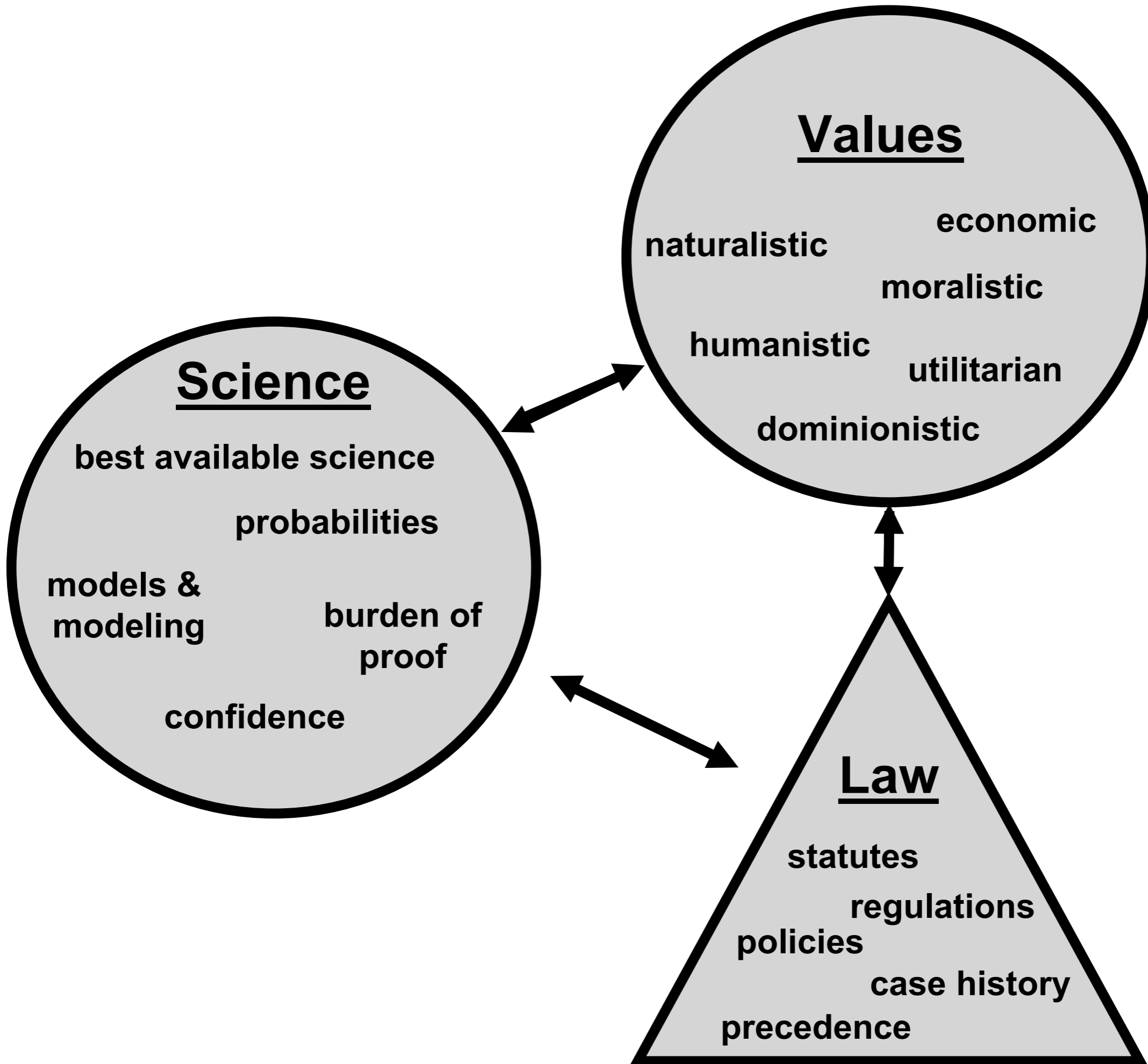
Population viability analysis











Abiding by laws (MMPA)

Sec. 101. (a) [IMPOSITION; EXCEPTIONS.] — There shall be a moratorium on the *taking* and importation of marine mammals....

(13) The term “*take*” means to *harass*, hunt, capture, or kill, or attempt to *harass*, hunt, capture, or kill any marine mammal.

(18)(A) The term “*harassment*” means any act of pursuit, torment, or annoyance which—

- (i) has the *potential to injure* a marine mammal or marine mammal stock in the wild [*Level A harassment*]; or
- (ii) has the *potential to disturb* a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [*Level B harassment*].