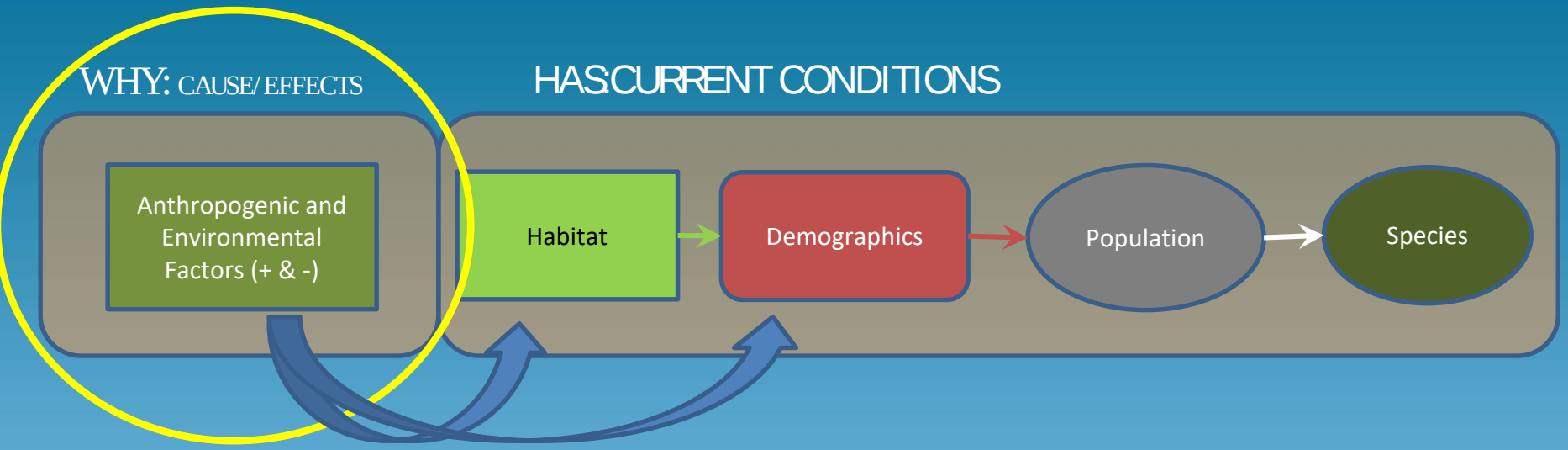
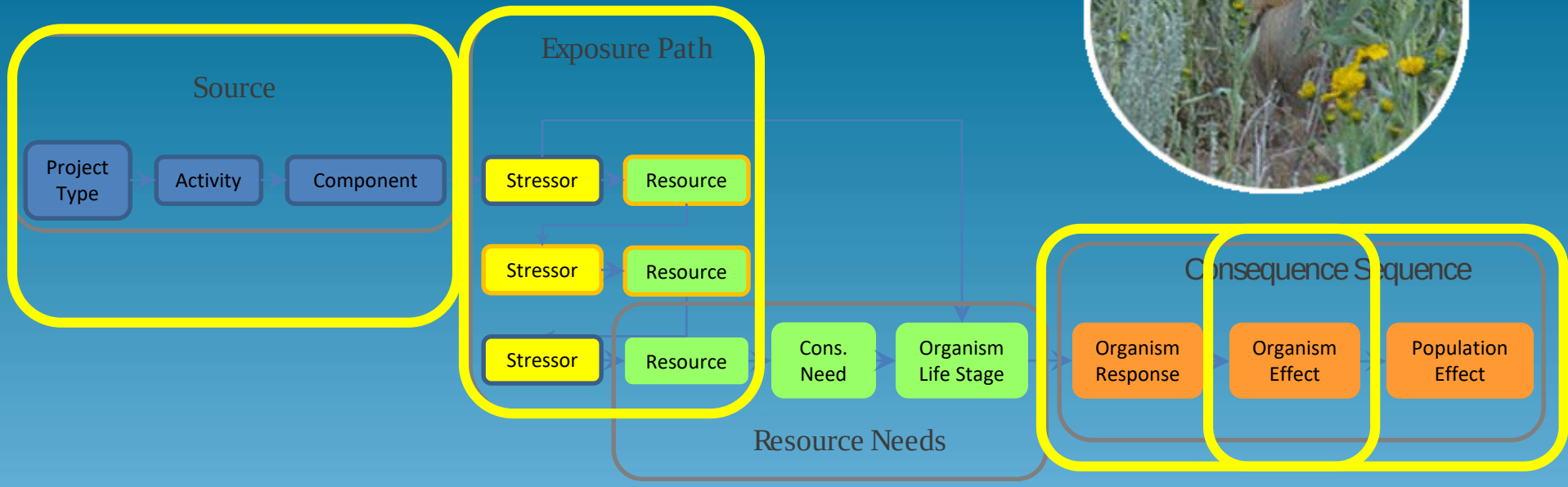
Current Condition



Current Condition



Activity | **Exposure** | **Biology Deconstruction** | **Consequences and Determination**

Current Condition

EXPOSED!

Current Condition

Any physical, chemical, or biological alteration of resources

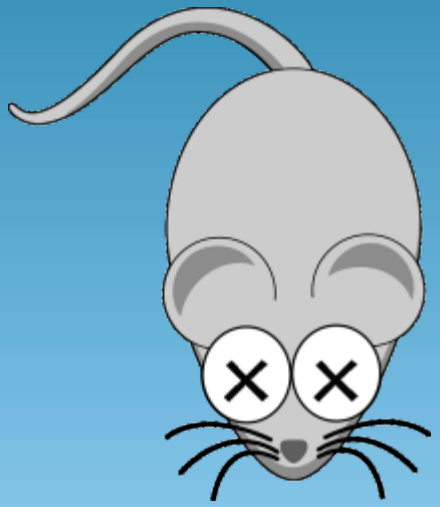
(i.e., increase, decrease, or introduction)

that can induce an adverse organism response is called a

STRESSOR

Current Condition

STRESSORS can act **directly** on an individual, or **indirectly** through impacts to resources.



Current Condition

Based upon this definition, what are some examples of stressors?

Current Condition

Change (alteration) → **in quality or quantity of** → **(resource)**

Increase in turbidity	(water)
Increase in temperature	(climate)
Removal of vegetative cover	(plant community)
Introduction of invasive competitors	(prey)
Change in microclimate to drier and hotter	(climate)
Change in fire regime to more frequent	(climate)

Current Condition

Change (alteration) → **in quality or quantity of** → **(resource)**

Alteration of channel morphology increasing velocity	(water)
Removal of hibernacula	(habitat)
Removal of soil	(substrate)
Crushing	(direct impact)
Vehicle strikes	(direct impact)

Current Condition

Exposure is

. . . the co-occurrence of :

- the species and its resources and
- the stressors resulting from an action.

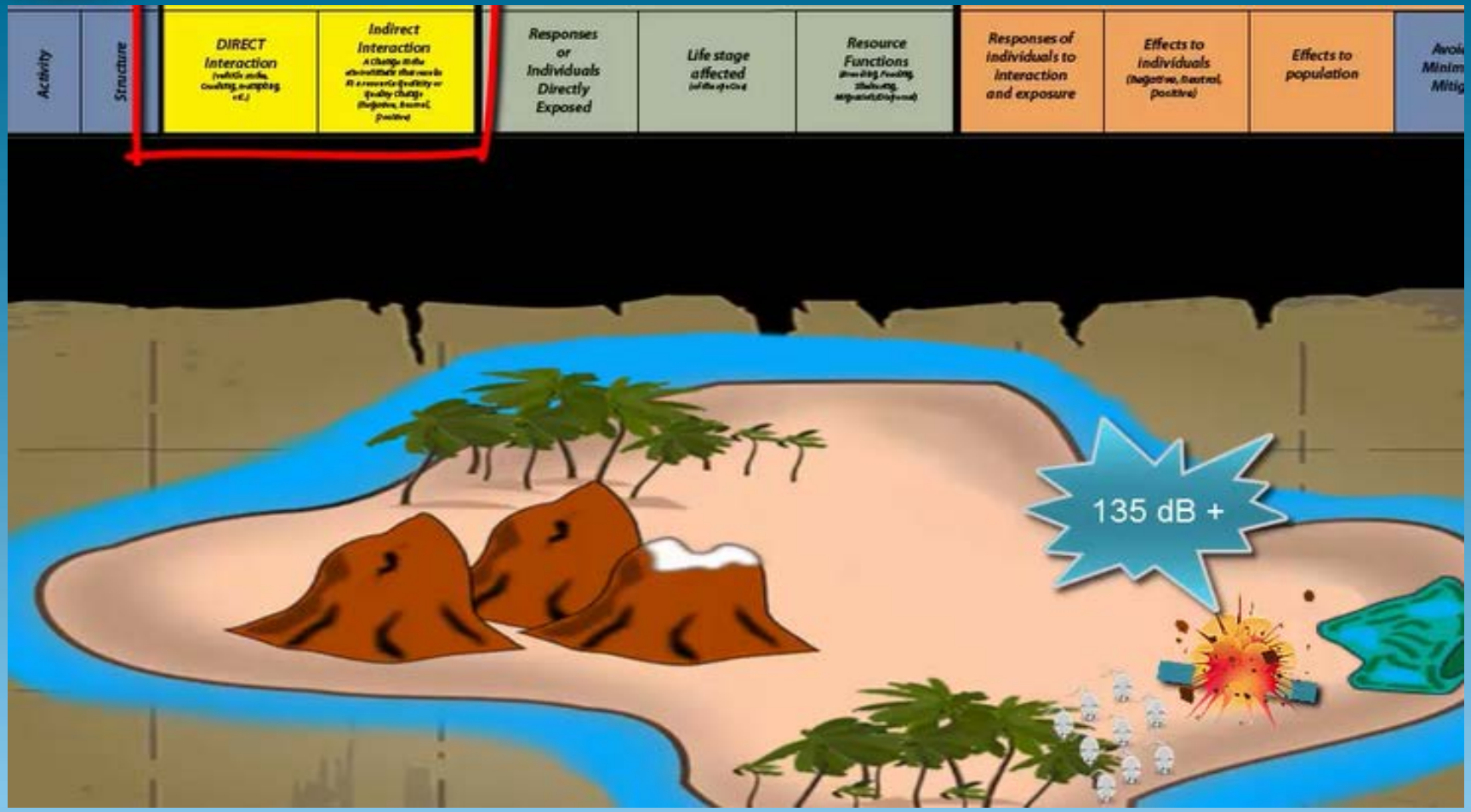
(The more precisely the exposure is described, the better our effects analyses will be.)

Current Condition

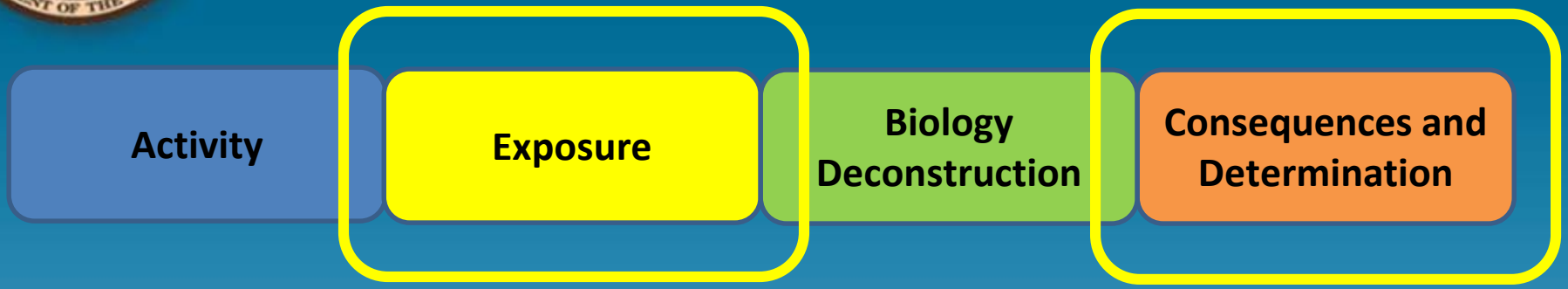
Exposure analyses are critical because:

- We can't change how a species and critical habitat responds to stressors
- We can sometimes change how they are exposed
- Conservation measures (BMPs, etc.) can reduce or avoid exposure

Current Condition



Current Condition



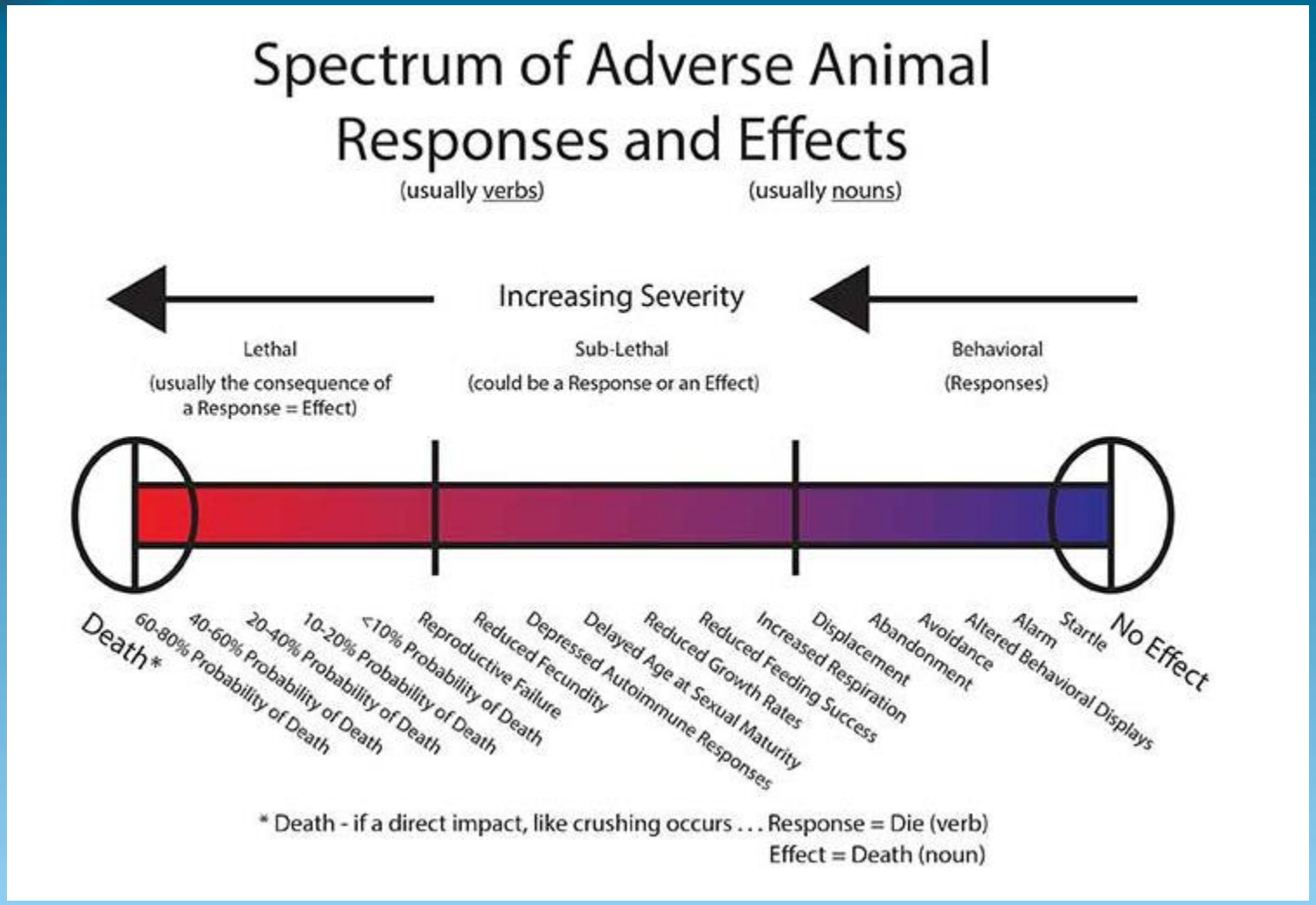
Exposure

Which organisms and habitats will be exposed to the stressors?

Response

What happens?

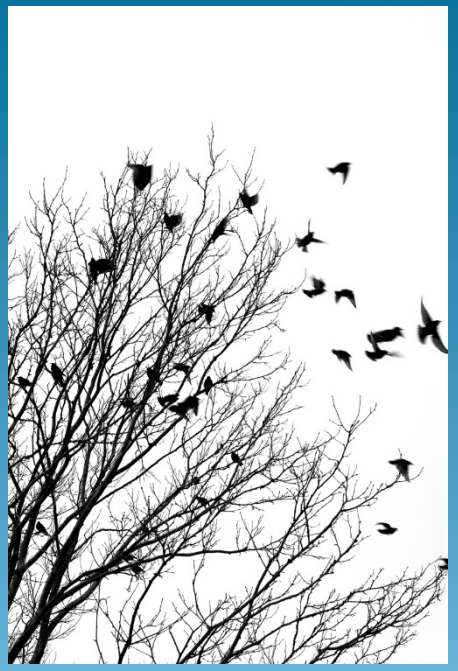
Current Condition



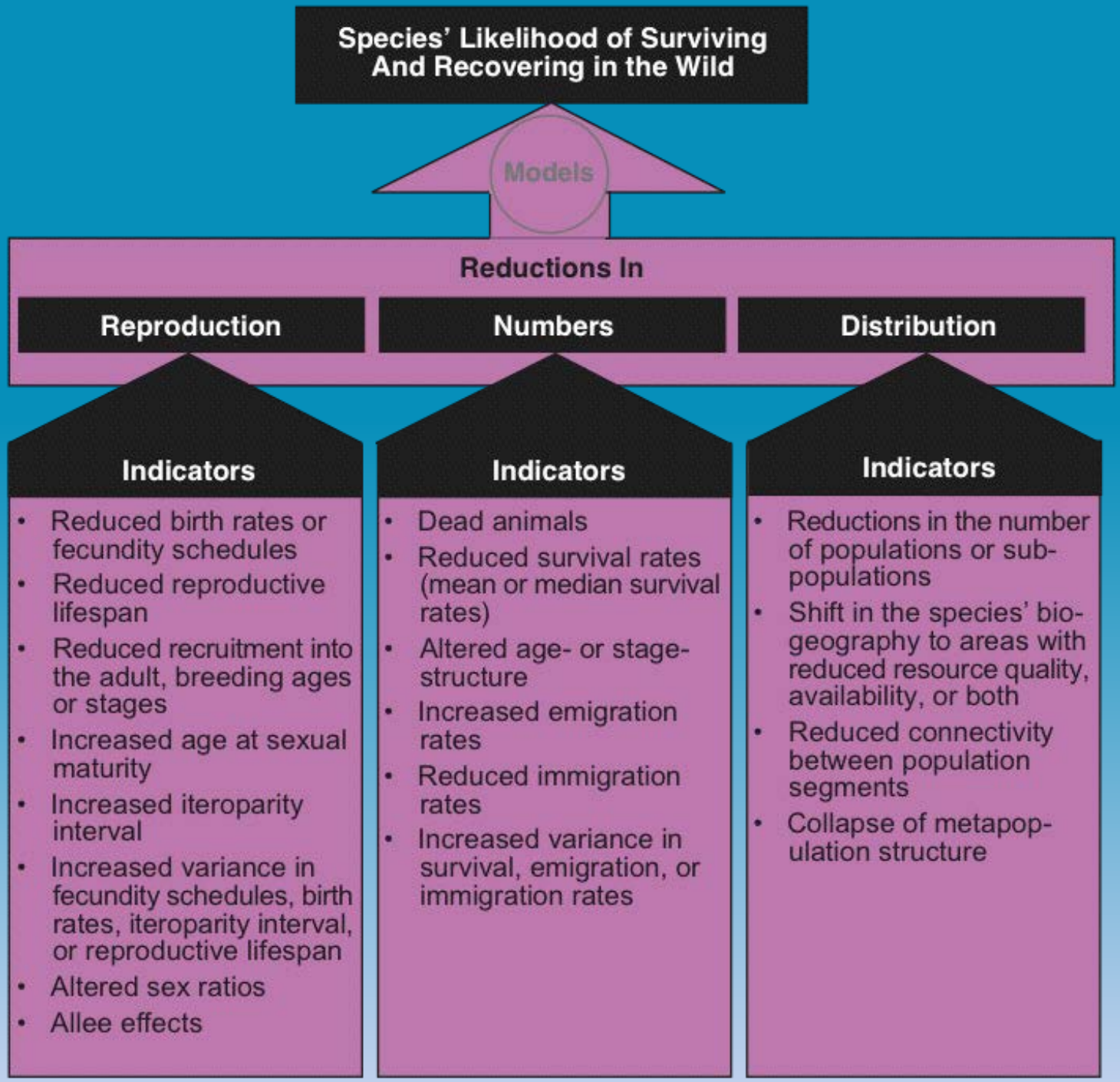
Current Condition

An effect is a consequence of a response to a stressor.

- Behavioral responses
- Physiological responses
- Physical responses



Interactions can be Direct or Indirect


Species' Likelihood of Surviving And Recovering in the Wild
Models
Reductions In
Reproduction
Numbers
Distribution
Indicators
• Reduced birth rates or fecundity schedules
• Reduced reproductive lifespan
• Reduced recruitment into the adult, breeding ages or stages
• Increased age at sexual maturity
• Increased iteroparity interval
• Increased variance in fecundity schedules, birth rates, iteroparity interval, or reproductive lifespan
• Altered sex ratios
• Allee effects
Indicators
• Dead animals
• Reduced survival rates (mean or median survival rates)
• Altered age- or stage-structure
• Increased emigration rates
• Reduced immigration rates
• Increased variance in survival, emigration, or immigration rates
Indicators
• Reductions in the number of populations or sub-populations
• Shift in the species' bio-geography to areas with reduced resource quality, availability, or both
• Reduced connectivity between population segments
• Collapse of metapop-ulation structure

Current Condition

Exposure + Response = Effects

Current Condition

Consequences and Determination

Responses of individuals to interaction and exposure	Effects to individuals (negative, neutral, positive)	Effects to population	Avoidance Minimization Mitigation	Effects remaining	Determination
Startled and Alarmed	Heart Attack and Die				

Current Condition

EXERCISE 6. Effects Pathways

Individual mice

Adults

Startle/alarm

Heart attack/death

Reduced numbers

Work window

None

Action Deconstruction		Exposure		Biology Deconstruction			Consequences and Determination					
Activity	Structure	DIRECT Interaction	Indirect interaction	Resource or Individuals Directly Exposed	Life stage affected	Conservation Functions of the Resource	Responses of individuals to interaction and exposure	Effects to individuals (negative, neutral, positive)	Effects to population	Avoidance Minimization Mitigation	Effects remaining	