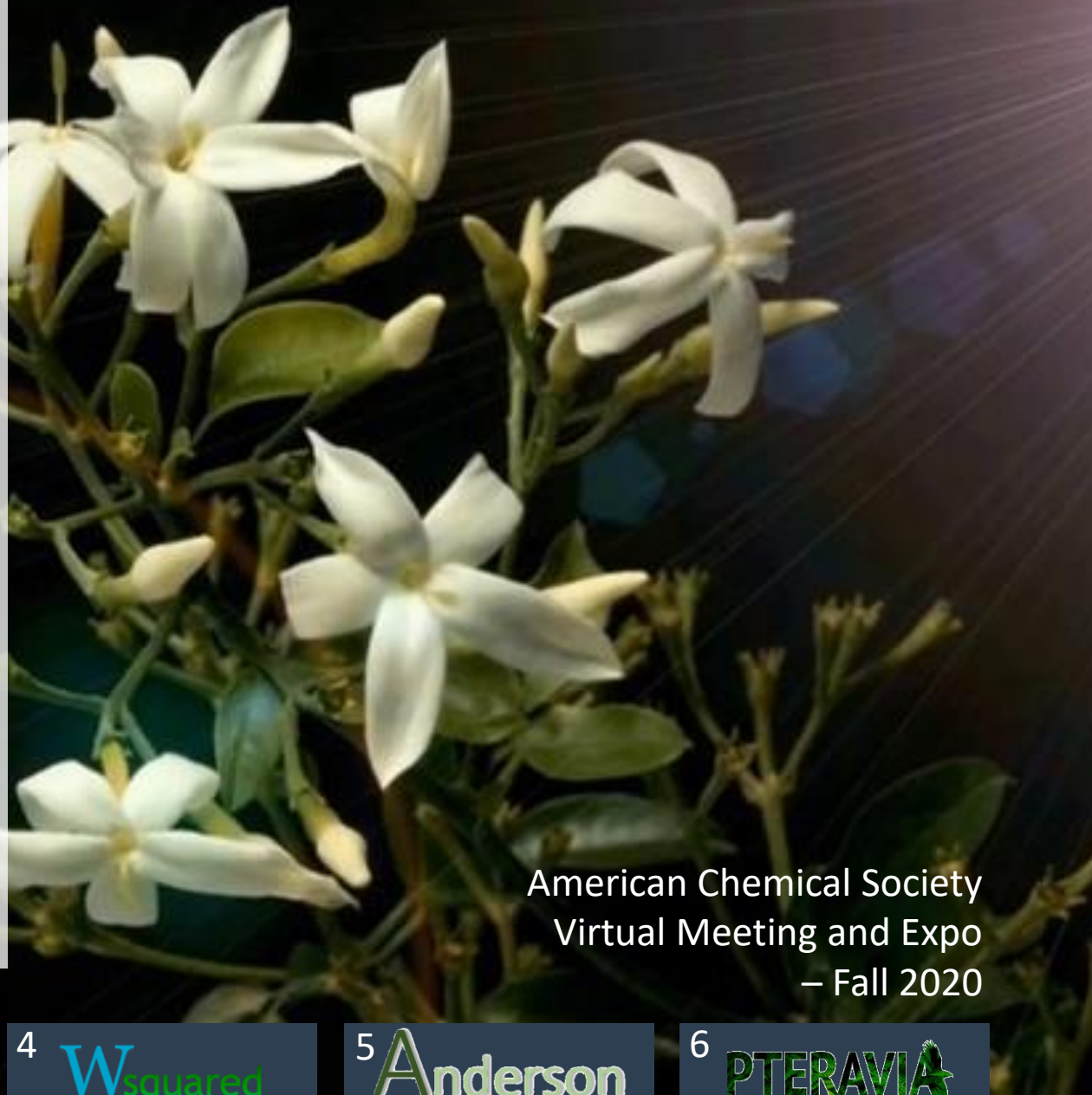


Population assessment and conservation (PAC) measures

for pesticide consultations
and meaningful stewardship
outcomes

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Introduction/ Background

MEANINGFUL CONSERVATION AT THE INTERSECT OF FIFRA AND ESA



EPA Risk Assessment

Yes/No Answer + Relatively High Conservatism
Probability of Risk... Not population effects



FWS/NMFS ES Population Effects Assessment

Individual & Population Levels
May Use Risk Assessment Results



Existing Hurdles

Disconnected Metrics:
Per chemical basis vs. Cumulative Effects

Disconnected goals:
Protecting Species vs. Maintaining/Recovering
Populations



What's Missing?


Conservation measures that are informed by
population-level implications of individuals
potentially impacted.

MY EXPERIENCE IN RISK
ASSESSMENT HAS LED ME TO
THE FOLLOWING

Non Sequitur:

1. Conservative risk assessment, focused on impacts to an individual organism, by default protects the population/species

Unfortunately, conservation measures derived from this logic would almost certainly be relatively low efficiency and low efficacy



*Conservation measures
should be focused on the
impacts of the action, the
species conservation status,
and the conservation
strategy.*



Avoidance



Minimization



Offsets

What do we mean by

Conservation Measures?

- *CMs defined and factored into the ES Impact Assessment (BE and BiOp)*
And/Or
- *CMs can be developed as a result of ES Impact Assessment*

CONNECTING CONSERVATION MEASURES TO POPULATION-LEVEL ASSESSMENTS

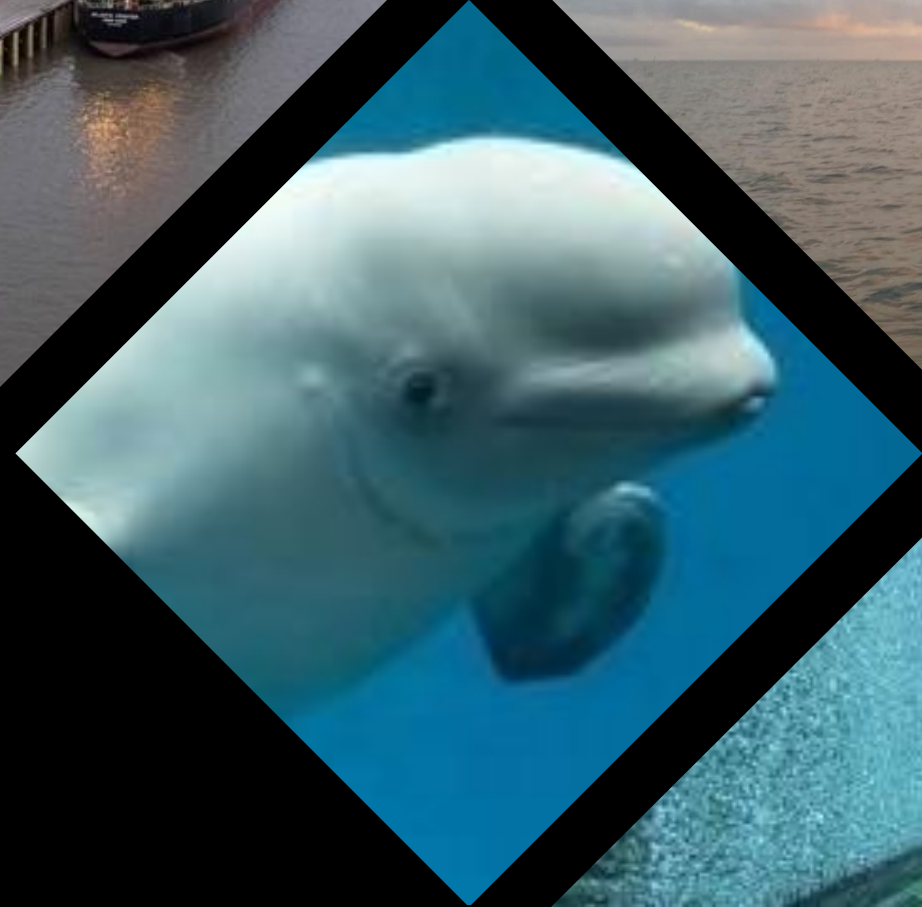
**Species conservation
status is largely
characterized using
population-level analysis
and synthesis**

1. Extrapolating individual effect to the population/species-level is needed.
 - Has been suggested by NAS
 - Has not been done by EPA (also, not their responsibility)
 - Is routinely done by The Services in non-pesticide consultations – Usually based on The Services expert opinion in combination with best-available data
2. Goal: Utilizing conservation measures to ensure that the species conservation status is not reduced.

Population-level Assessment

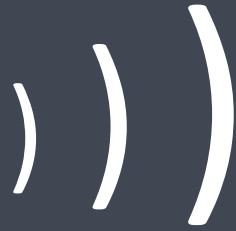
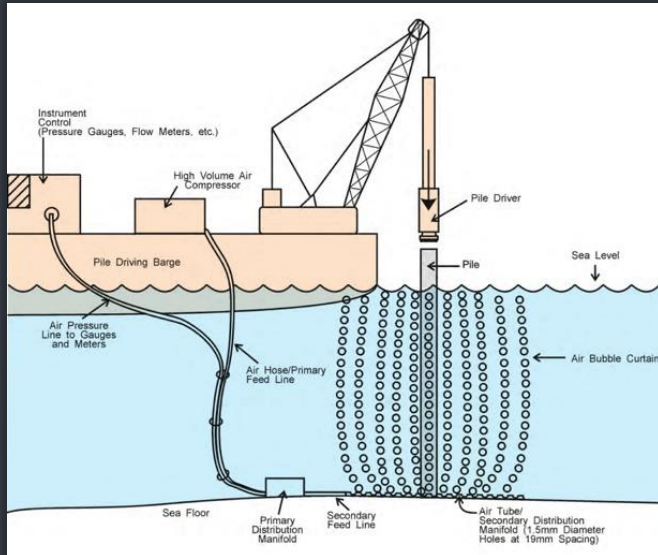
Outside-sector example:
Port of Alaska

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion
Port of Alaska's Petroleum and Cement Terminal, Anchorage, Alaska
NMFS Consultation Number: AKRO-2018-01332
March 23, 2020



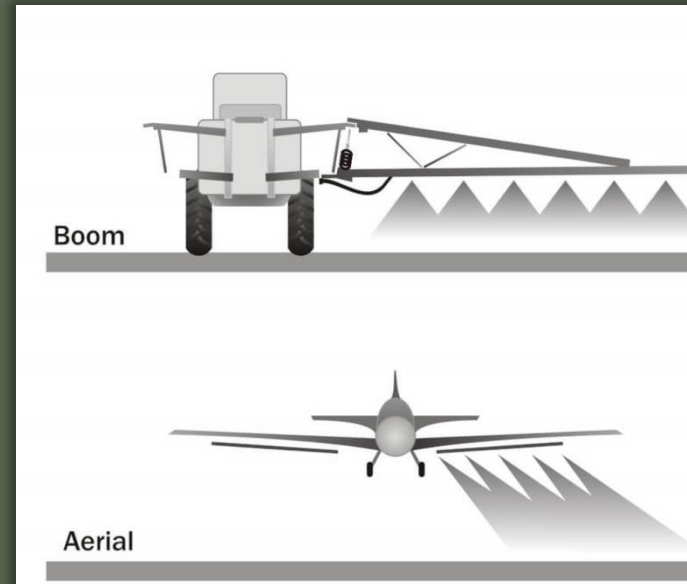
Pile driving

- 12-foot diameter pilings
- Pounded into the ground – sonic wave stress
 - With and without bubble curtain attenuation
- Distance to effect – hearing studies



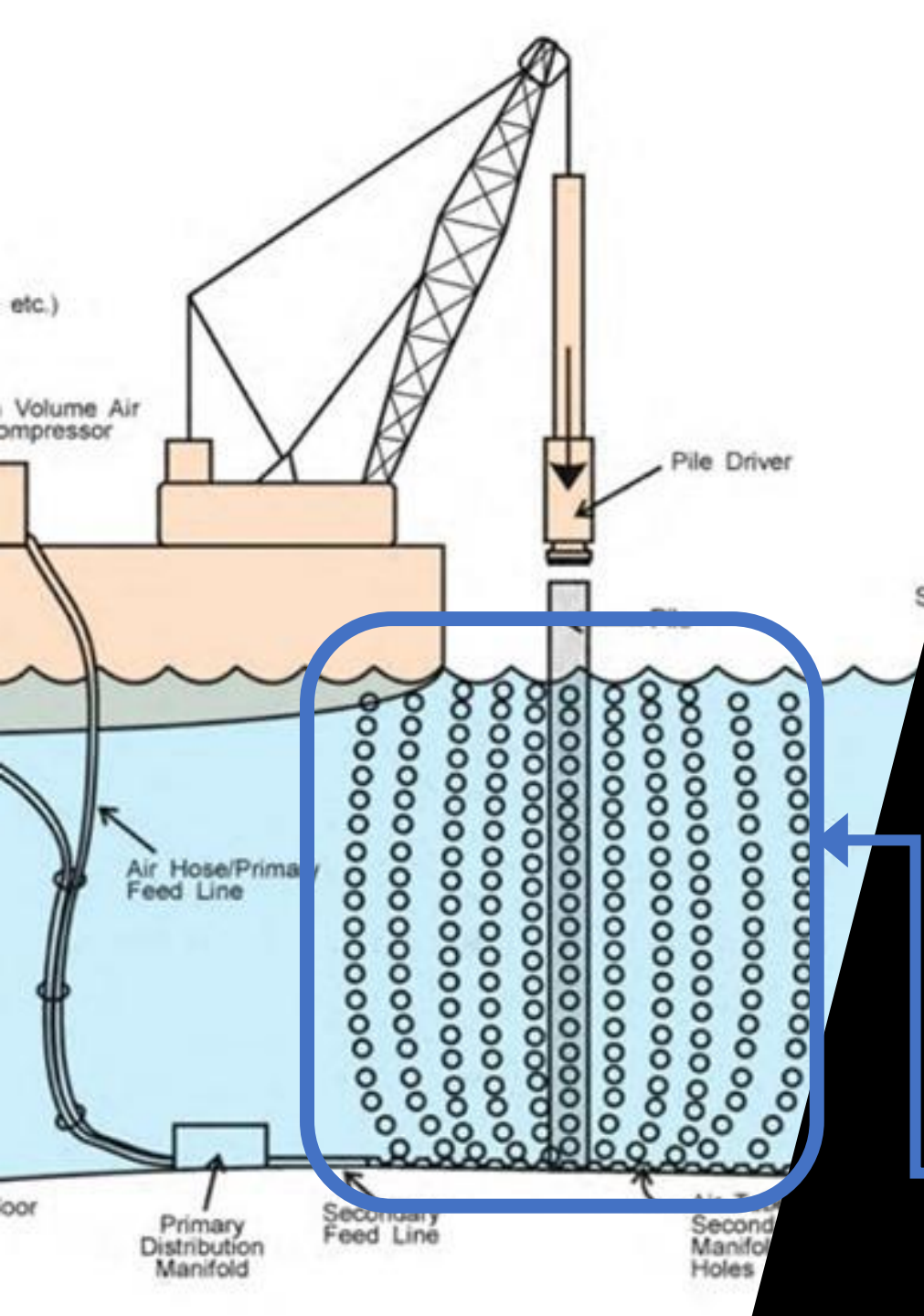
Spray drift

- Spray rig
- Airborne particulates drift from application area – chemical stress
 - Nozzles, wind speed, boom height, etc.
- Distance to effect – spray drift studies



Biological Opinion Fundamentals

EXPOSURE AND RESPONSE ANALYSES



**Activity:
Pile Driving**

Behavioral Responses
(avoidance)

Non-auditory physical
effects

Auditory interference

1. Consider specific types of biological responses associated with activities

2. Conservation measures assessment considered in exposure and response analysis

e.g. bubble curtain

Biological Opinion Fundamentals

INTEGRATION AND SYNTHESIS



1. Description of individual and cumulative effects
2. Corresponding opinion of level of risk and summary of impact
 - *To the individuals*
 - *To the population*
 - *Includes Conservation Measures*
3. Comparison of impact to species historical population dynamics
4. Take Authorization
5. Call of Jeopardy/No Jeopardy

Estimating Population-level species impact

Population-level assessment matrix

Estimated at
53,000

77% decrease
from 1970-
2000

Documented
sightings in
the Port

200 km to
nearest
population

2 sea lions
near action
every 19 days

Bubble curtain

8 sea lions
'injured'

No Jeopardy



Estimating Population-level species impact

Population-level assessment matrix



Population
Numbers



Population
History



Observations



Proximity to
action



Estimated
Individual
Impact



Conservation
Measures



Statement of
Take



Conclusion

PAC EVALUATION MODULAR ANALYSIS PLATFORM

Option to add increasing levels of qualitative-quantitative methods

1. Diagnostic PAC

- EPA BE/Risk Assessment
- Species status assessment
- Recovery plan
- Literature
- Product label

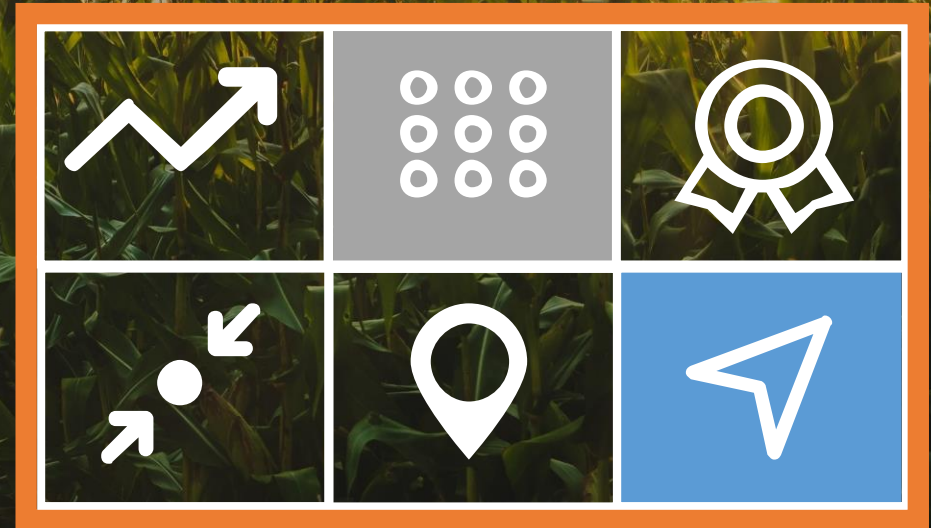
2. Demographic-Geographic PAC

- Addition of temporal and spatial revisions
- Multi-species or surrogate level assessment resolution

3. Species-Specific

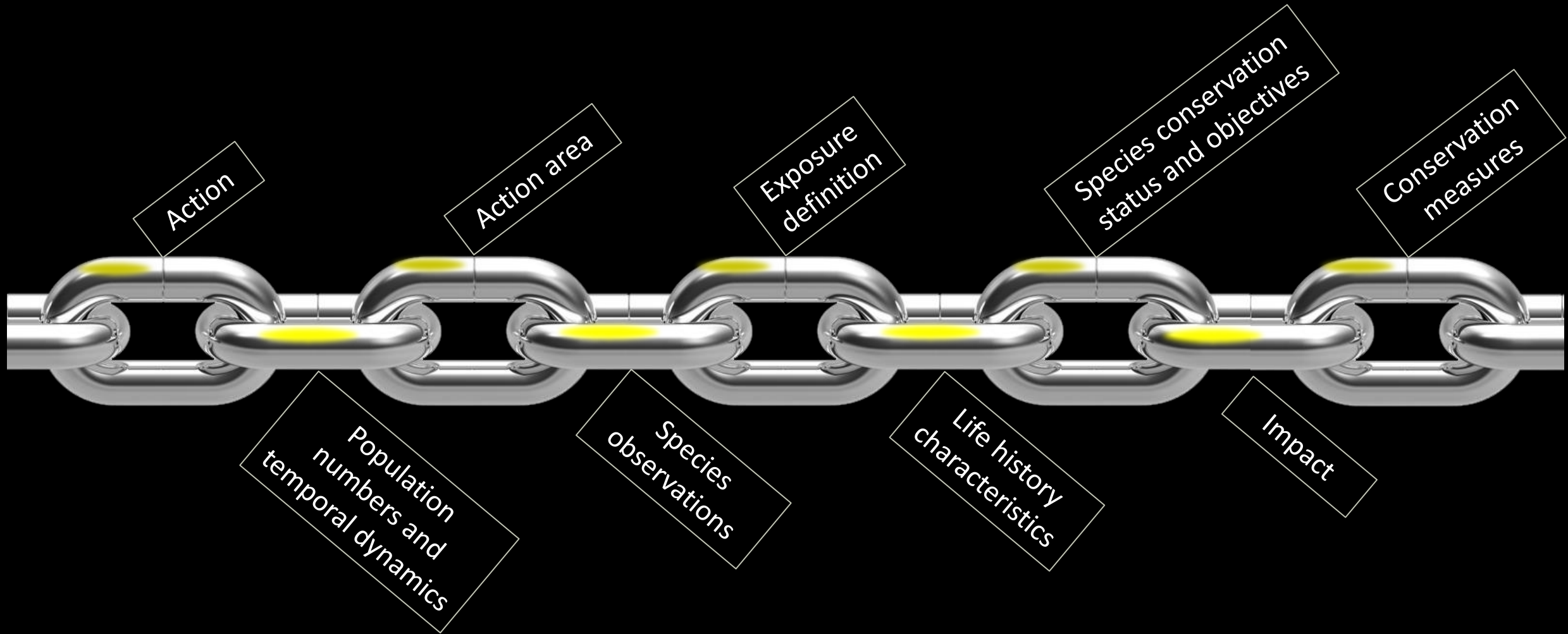
- Highly revised, numerical methods
- Single species resolution

Population-level
assessment matrix



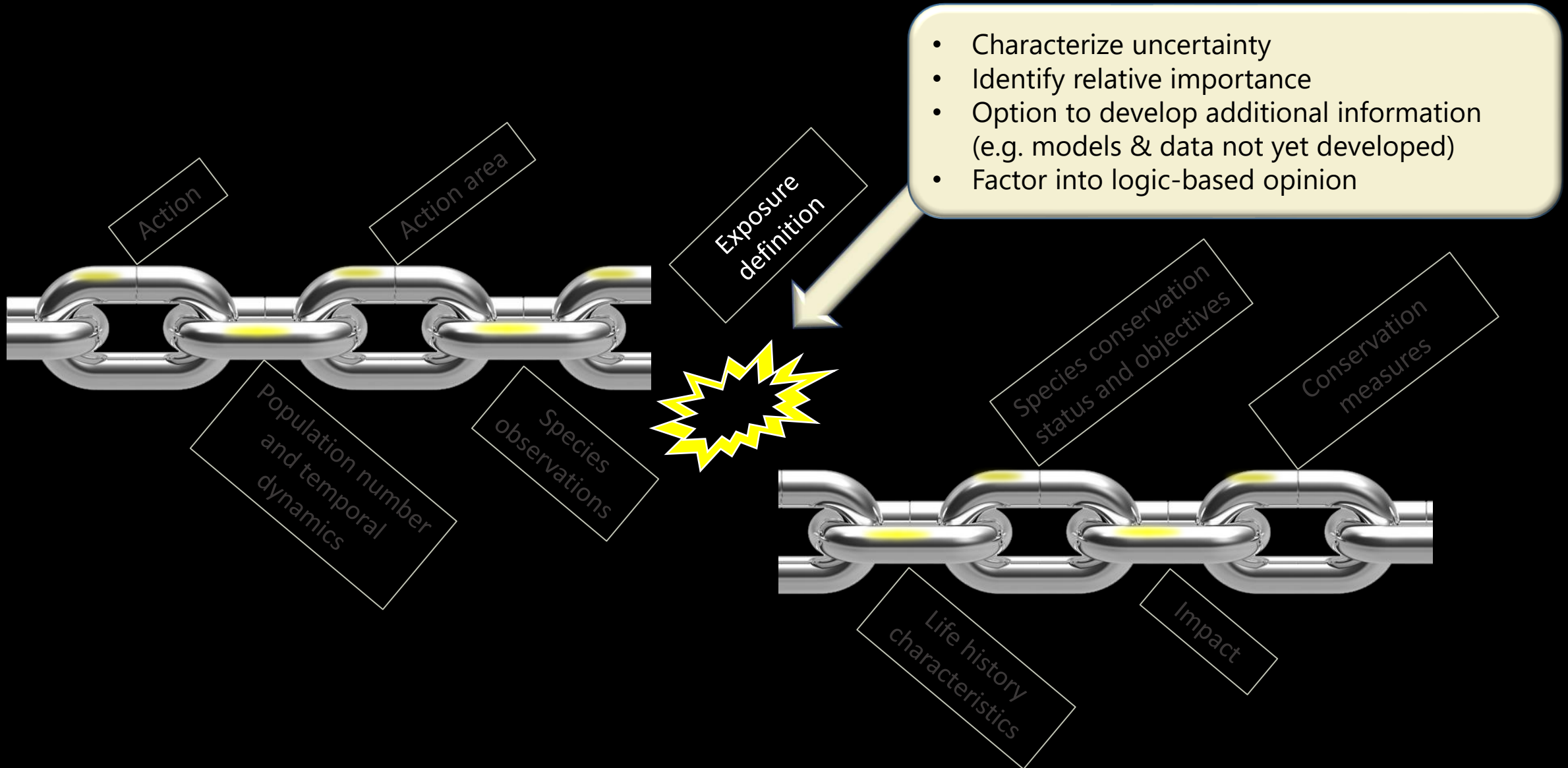
Conservation Measures

Population Assessment and Conservation (PAC) Chain



Logic-based Opinion

Population Assessment and Conservation (PAC) Chain



Conclusion

Not all Conservation is Created Equal

- Meaningful conservation must be tuned to species conservation status and strategy
- Population Assessment and Conservation (PAC) framework is needed to:
 - **Compile and synthesize** all evidence of potential impact from an action
 - **Determine** how individual impact scales to population level and species conservation strategies
 - **Implement** targeted conservation measures

Thank you

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Design by Jessica Odell Anderson

