

Edwards Aquifer Recovery Implementation Program

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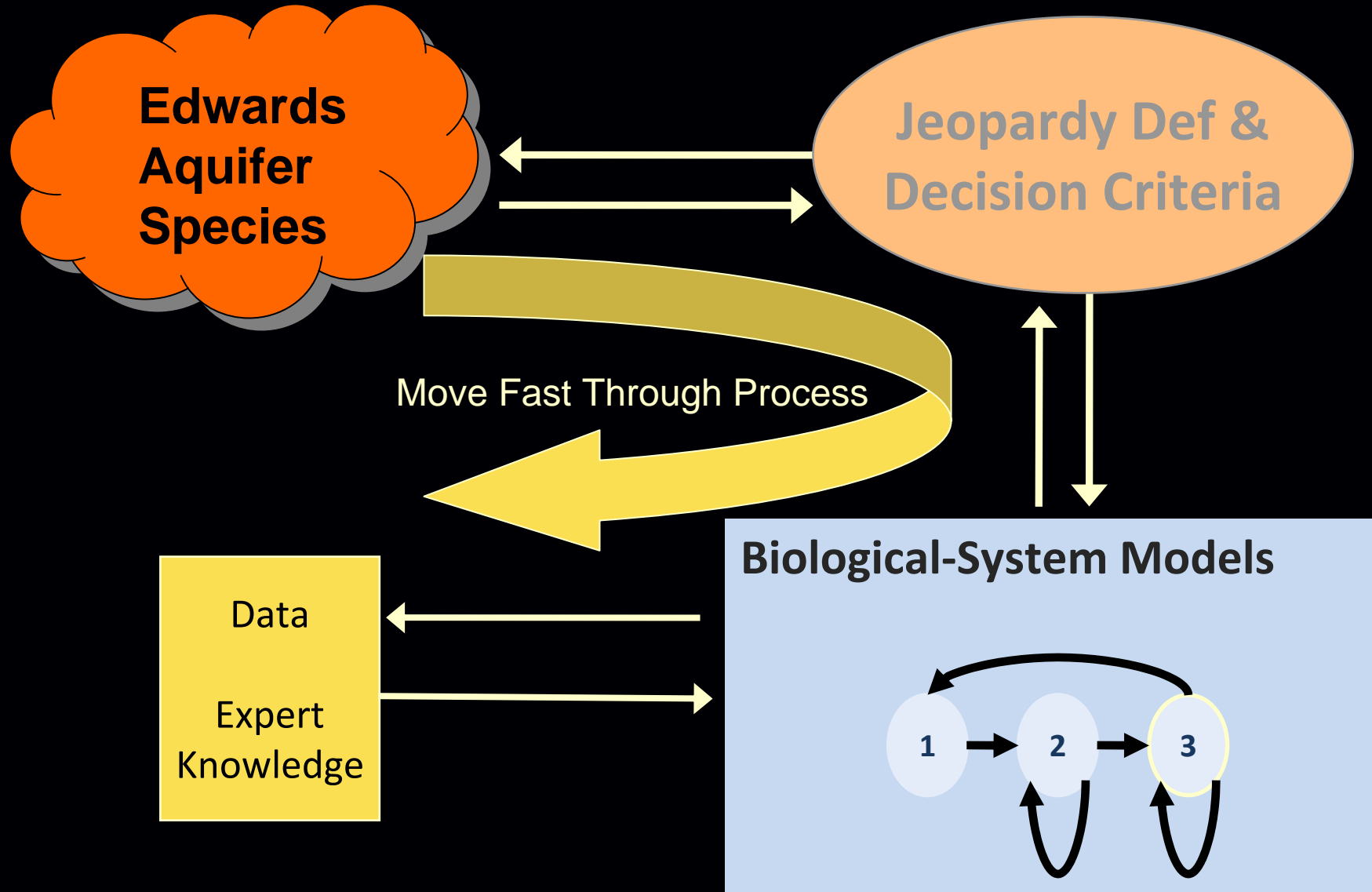
What is Structured Decision Making?

- Carefully organized and transparent process for making decisions based on explicit:
 - Questions (decision problems)
 - Analysis
 - Decision criteria

Structured Decision Making

- Is a formal method for analyzing a decision by breaking it into components
- Helps identify where the impediments to a decision are, to focus effort on the right place
- Provides a wide array of analytical tools for dealing with particular impediments

Jeopardy Rapid Prototyping



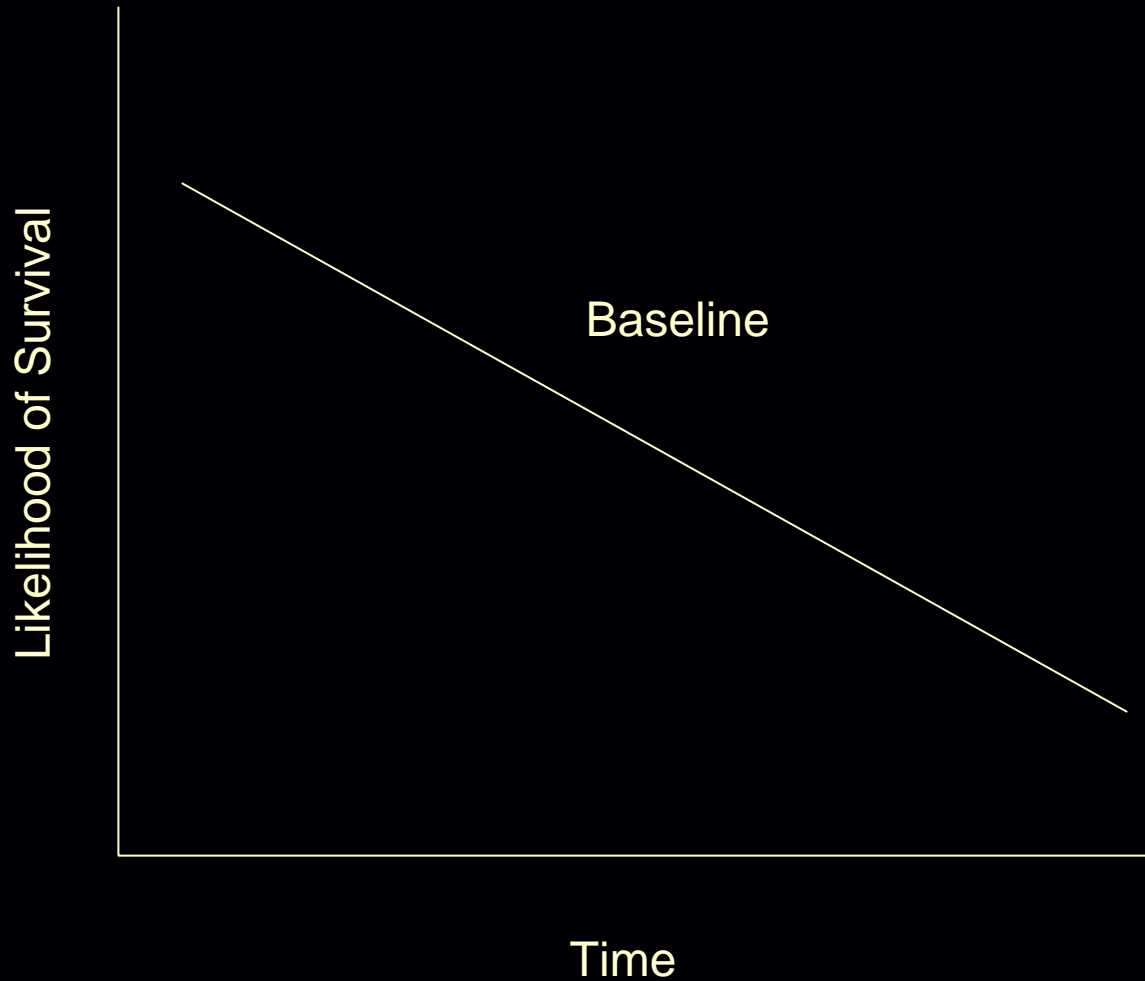
What is Jeopardy?

“Jeopardize the continued existence of”
to engage in an action that reasonably
would be expected, directly or indirectly, to
reduce appreciably the likelihood of both
the survival and recovery of a listed
species in the wild by reducing the
reproduction, numbers, or distribution of
that species. [50 CFR §402.02]

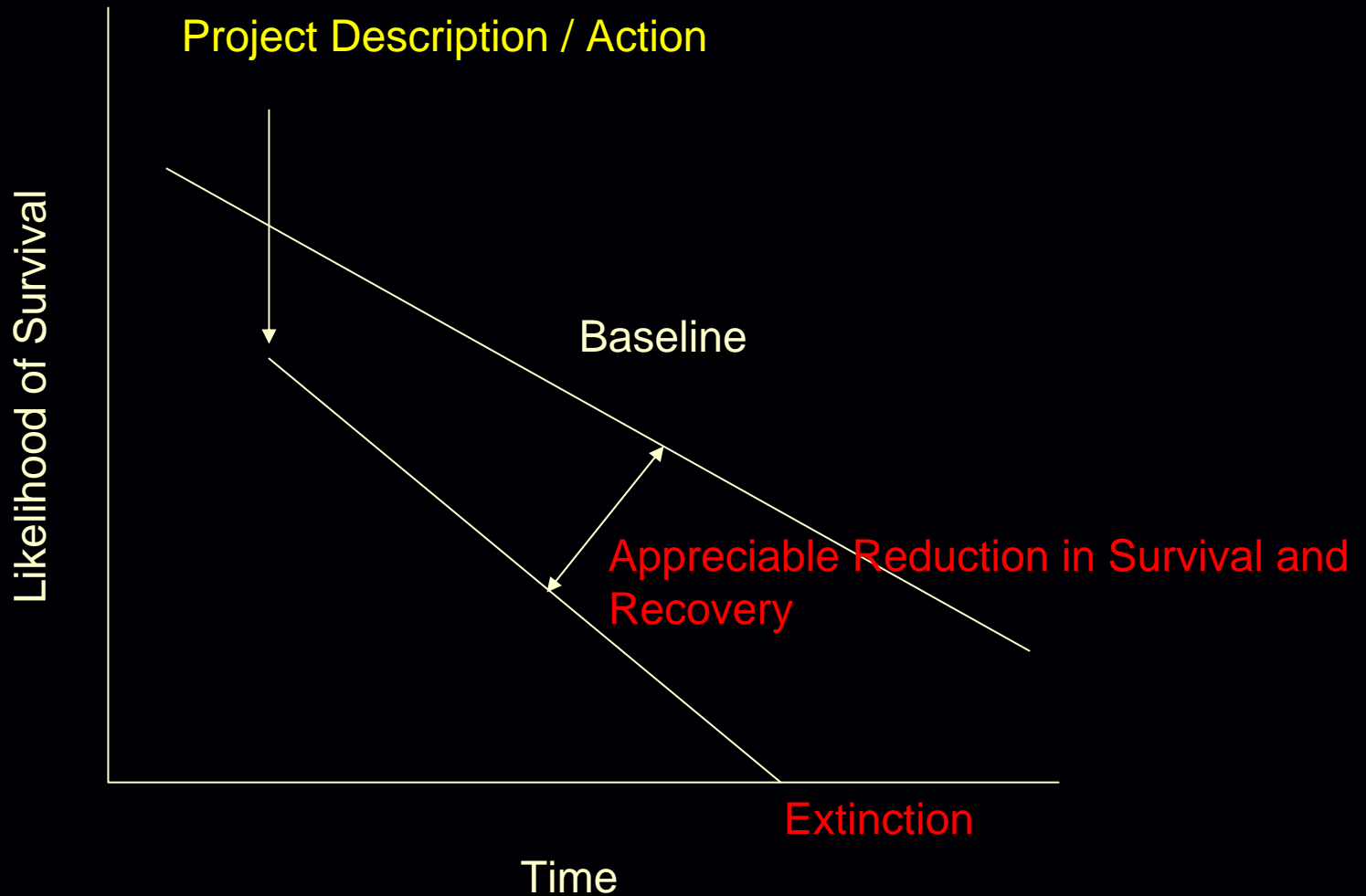
What is the Baseline?

The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. [50 CFR §402.02]

Baseline of Species



Jeopardy

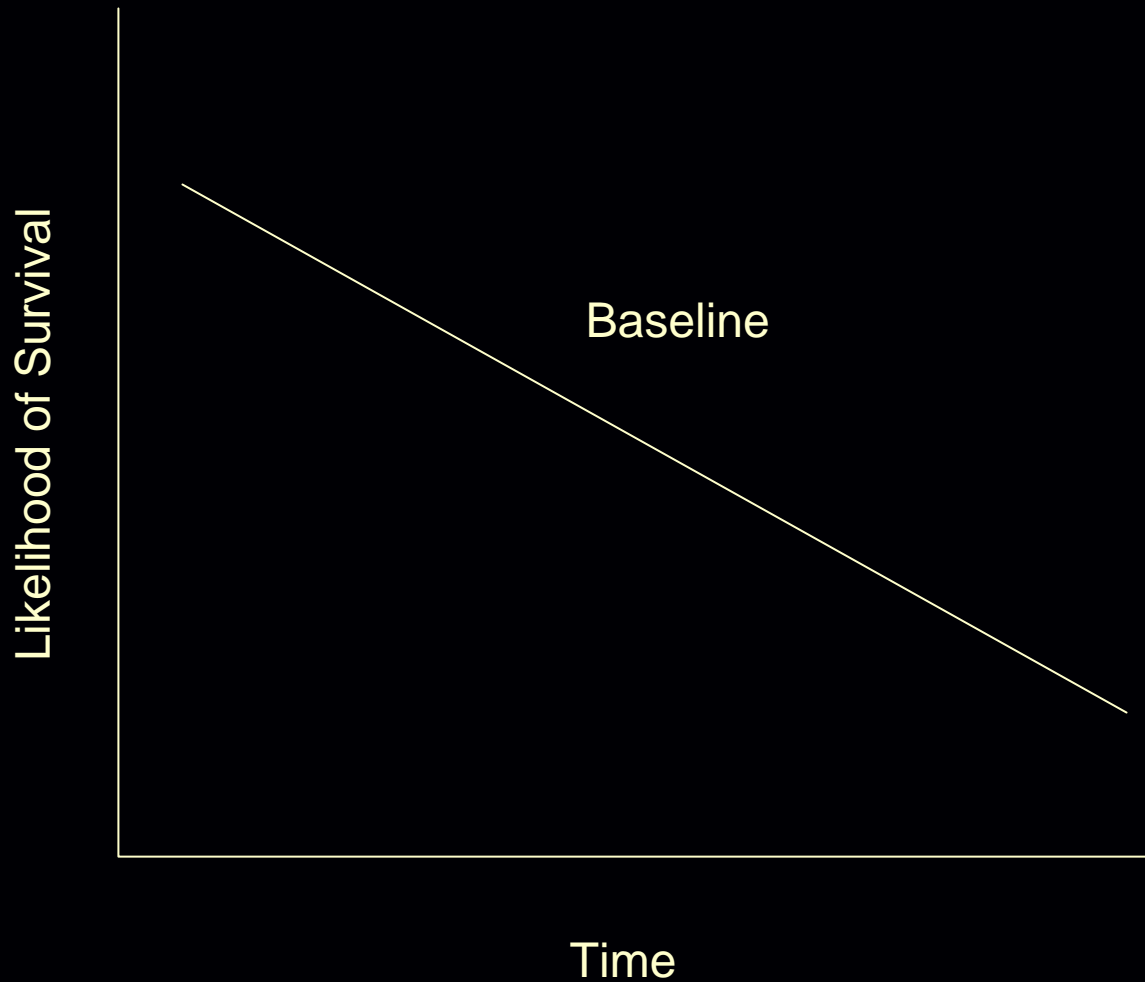


Recovery is the point at which a species no longer warrants listing under the ESA

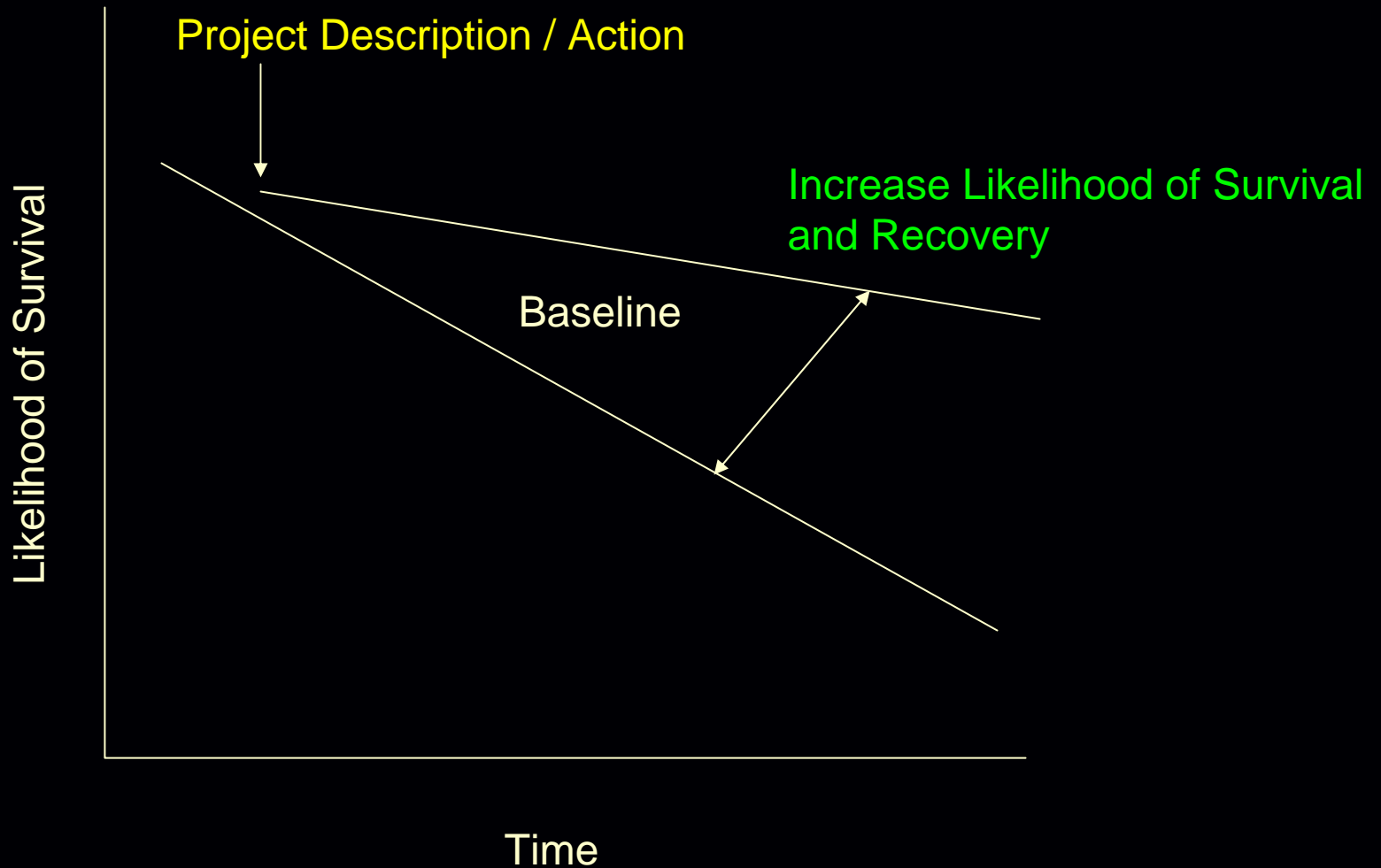
This means, the species is no longer “likely to become in danger of extinction in all or a significant portion of its range in the foreseeable future.” (e.g, no longer a threatened or endangered species)

So, recovery is when the likelihood (or probability) of extinction over some future (time) is low enough again to no longer be a danger

Baseline of Species



Contribution to Recovery



**EDWARDS AQUIFER MINIMUM SPRINGFLOW FOR MAINTAINING LISTED SPECIES AT
COMAL AND SAN MARCOS SPRINGS
(Minimum springflow determined by USFWS)**

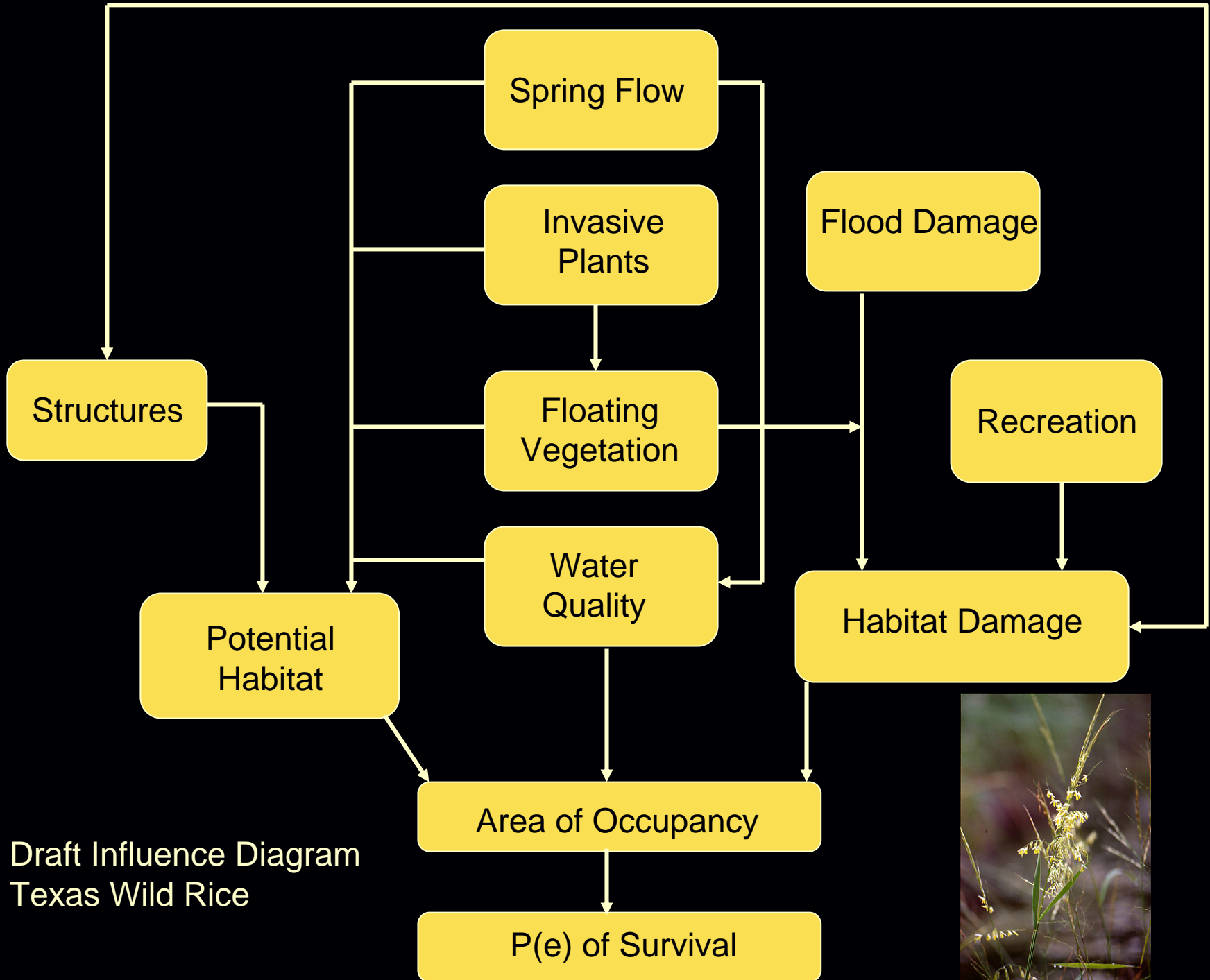
SPECIES	MINIMUM FLOW (cubic feet/second)
"TAKE" LIMITS	
Comal Springs	
Fountain Darter (without snail control)	200
(with snail control)	150
San Marcos Springs	
Fountain Darter	100
San Marcos Gambusia	100
San Marcos Salamander	60
Texas Blind Salamander	50
"JEOPARDY" LIMITS	
Comal Springs	
Fountain Darter (without snail control)	150
(with snail control)	60
San Marcos Springs	
Fountain Darter	100
San Marcos Gambusia	100
Wild Rice	100
San Marcos Salamander	60
Texas Blind Salamander	50

Species

Texas wild-rice
(*Zizania texana*)



Comal Springs dryopid
beetle (*Stygoparnus
comalensis*)



Draft Influence Diagram
Texas Wild Rice

Hypothetical Belief Net Model

Texas Wild-rice

Factors most influencing extinction risk

Spring Flow (depth & velocity)	
< 50	10.0
50 - 100	30.0
100 - 180	40.0
> 180	20.0

Invasive Plant Cover	
High	20.0
Med	70.0
Low	10.0

Floating Veg Amount	
High	22.0
Med	61.0
Low	17.0

Recreation Use	
High	69.0
Med	21.0
Low	10.0

Flood Damage	
High	10.0
Med	46.0
Low	44.0

Potential Habitat (m-sq)	
<100	44.5
<1000	25.2
1000-3500	19.6
3500-7500	10.6

% of Poten Habitat Occupied	
<25	34.5
25-50	16.1
50-75	15.2
75-100	34.2



Area Occupancy 20 yr (m-sq)	
<100	54.1
<1000	26.7
1000-3500	14.2
3500-7500	5.03

Area < "x" →
~ extinction risk

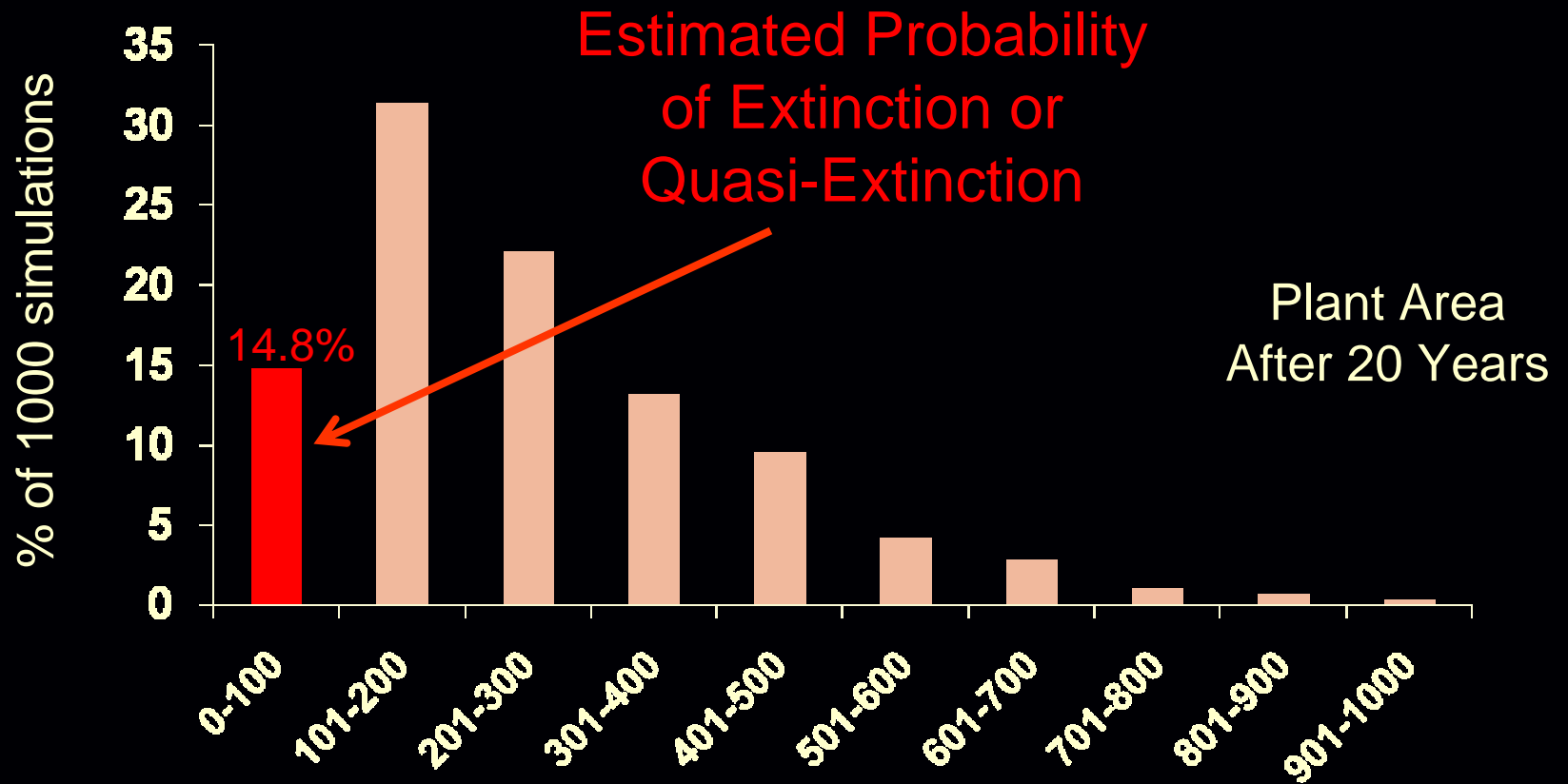
Note: Model was used as a learning tool and data in slide should only be interpreted as such

Hypothetical Outcomes

(Area of TWR in m²)

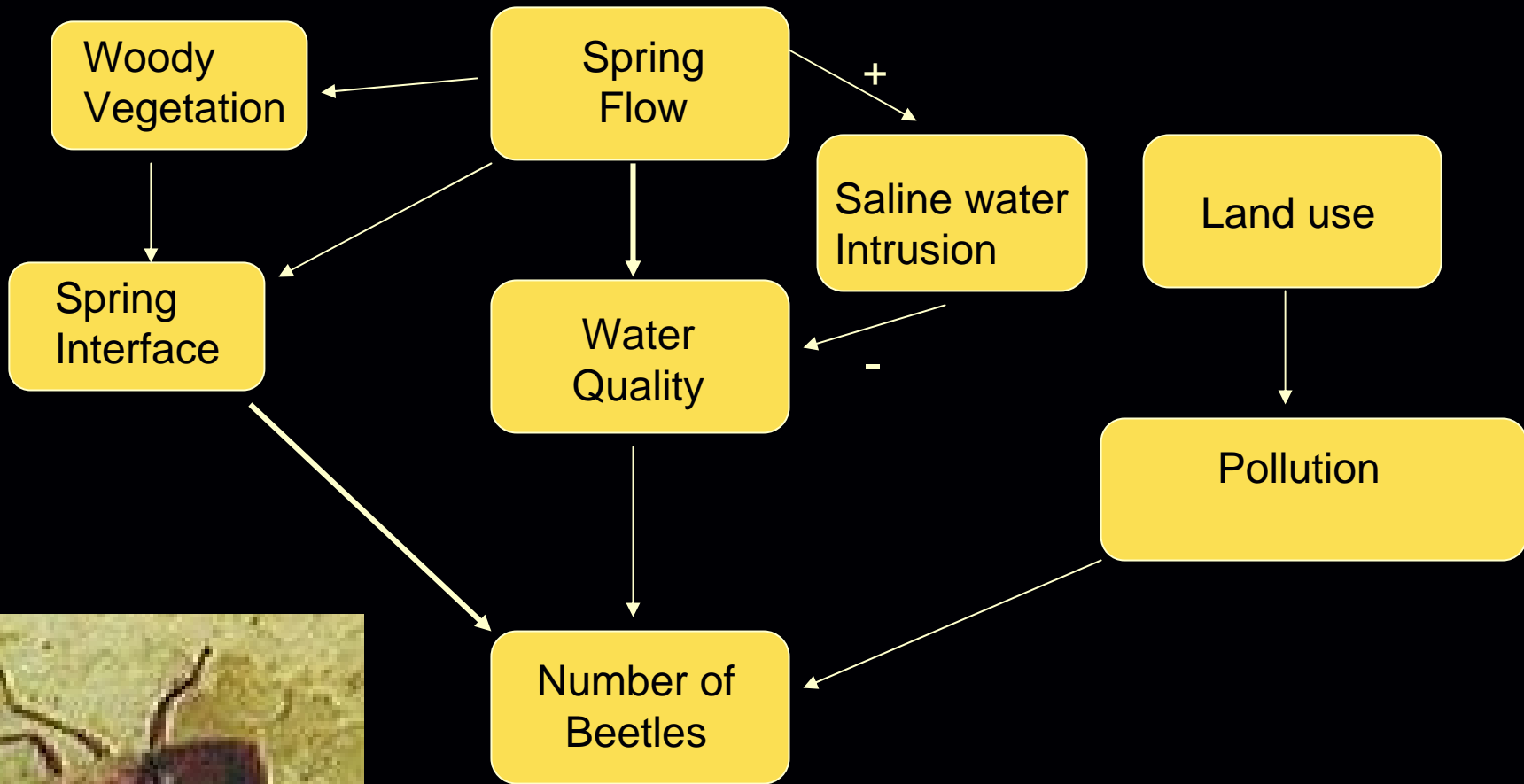
Baseline	Gone	51.7	
	Flow 100-180 Invasive – med. Floating - low Flood - low Recreation - low	<1000	30.3
		1000-3500	13.7
		>3500	4.3
Alt. 1	Gone	50.6	
	Flow 50 -100 Invasive – low Floating - low Flood - low Recreation - low	<1000	20.9
		1000-3500	15.2
		>3500	13.4
Alt. 2	Gone	35.8	
	Flow 100-180 Invasive – low Floating - med Flood - med Recreation - med	<1000	46.4
		1000-3500	17
		>3500	8

Hypothetical Example Simulation Result



Note: Model was used as a learning tool and results in slide should only be interpreted as such

m² plant cover



Draft Influence Diagram
Dryopid Beetle

Questions / Next Steps?

- Workshop - February 29, March 4, or March 5
- Next March RIP Meeting
- SDM Presentation April RIP Meeting