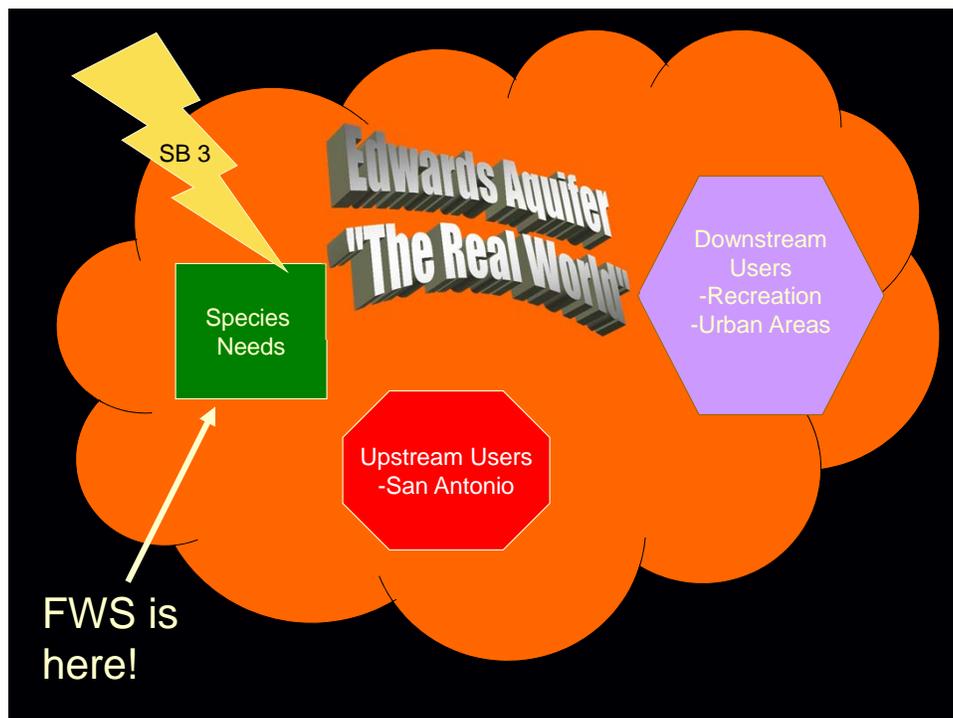
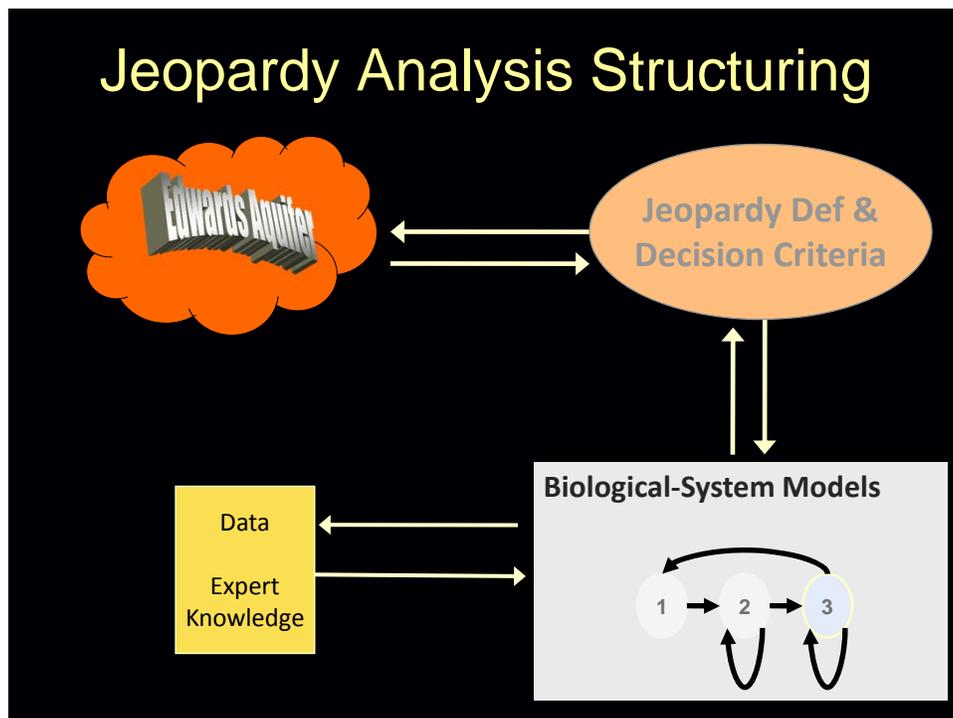
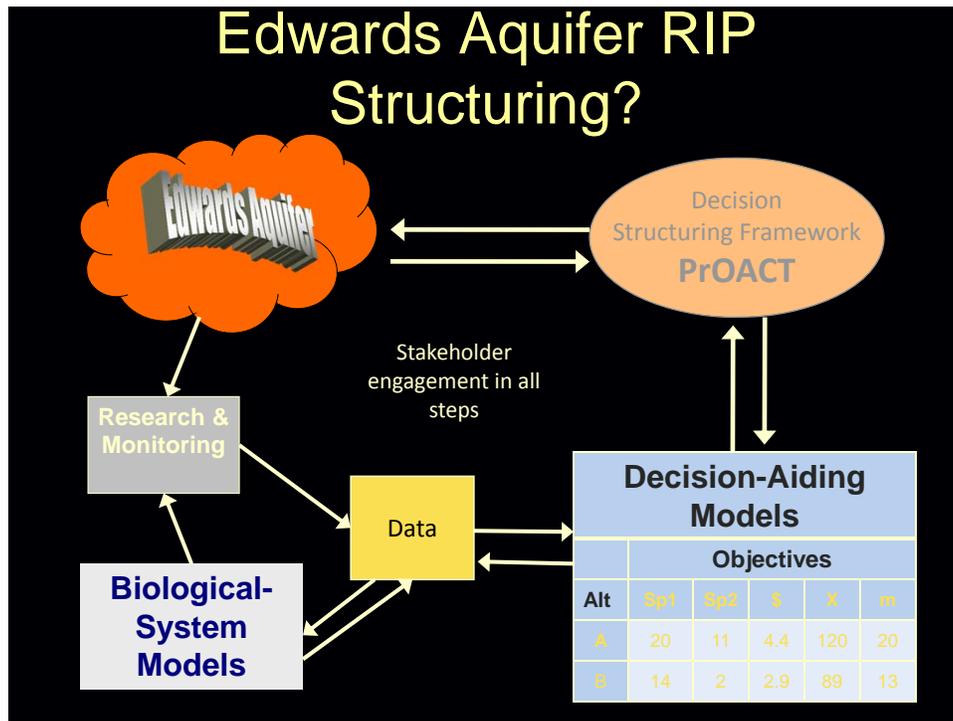
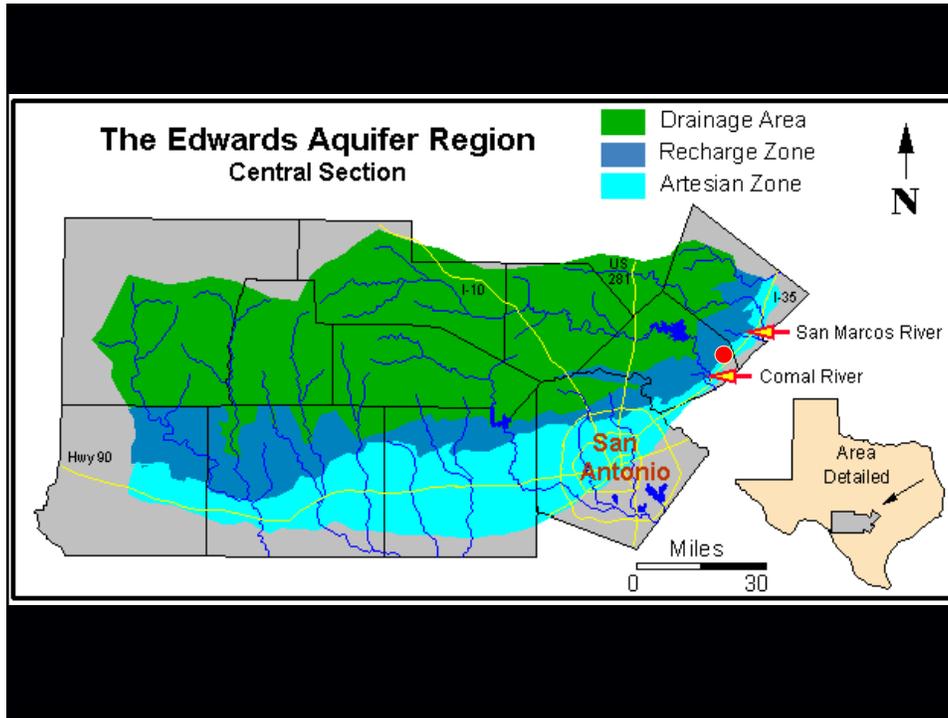


Edwards Aquifer Recovery Implementation Program









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
Fountain Darter (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
Fountain Darter (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

Decision Problem

Avoid jeopardy and contribute to the recovery of the Texas wild rice and Comal Springs dryopid beetle through a Habitat Conservation Plan with a 20 year permit

Species

Texas wild-rice
(*Zizania texana*)



Comal Springs dryopid
beetle (*Stygoparnus
comalensis*)

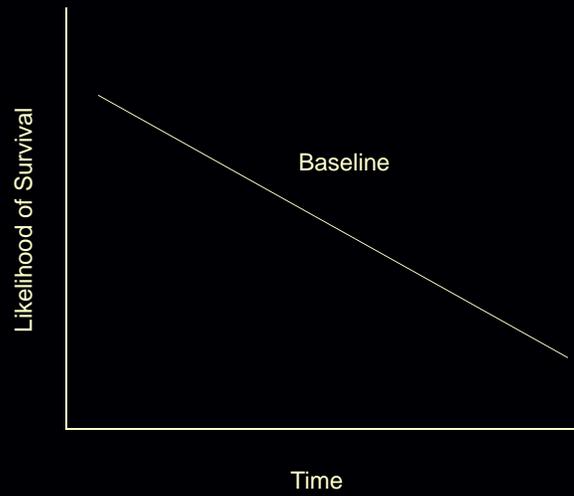
FWS Objectives

- Avoid jeopardy of two specie
 - Texas Wild Rice
 - Comal Springs Dryopid Beetle
- Contribute to their recovery

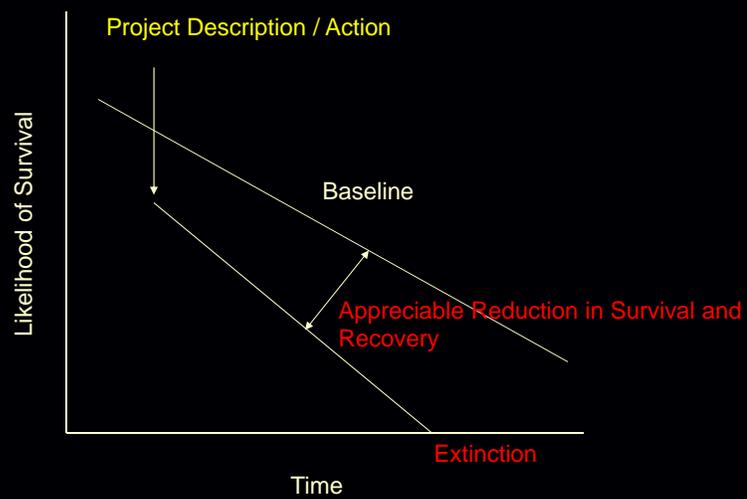
What is Jeopardy?

“Jeopardize the continued existence of” means 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...

Baseline of Species



Jeopardy

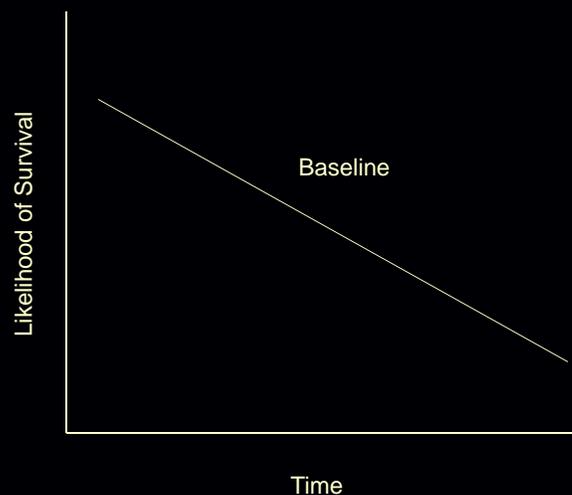


Recovery is the point at which a species no longer warrants listing under the ESA

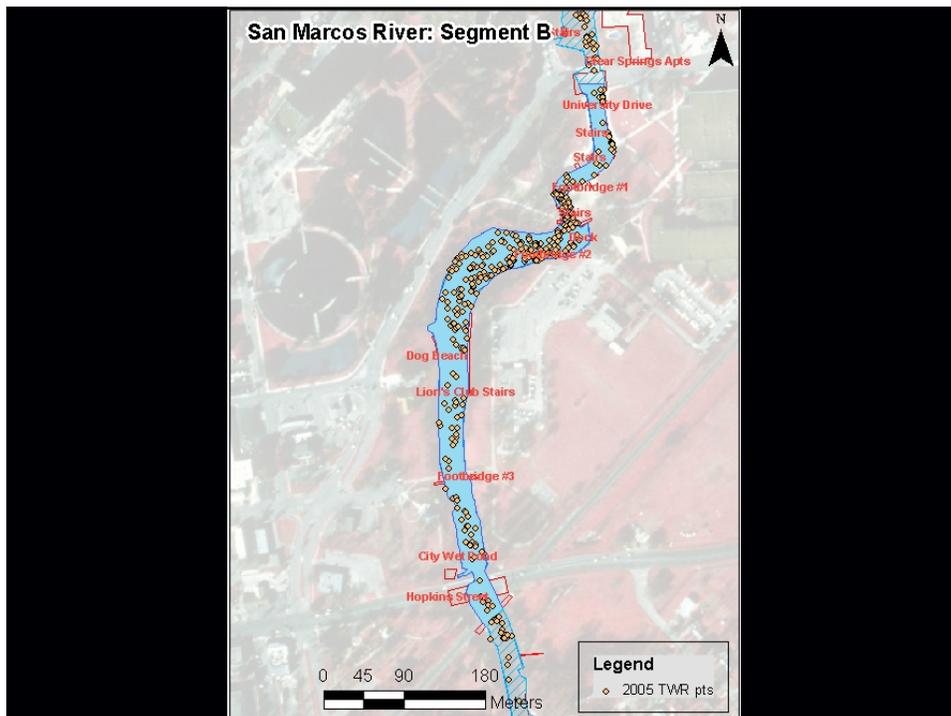
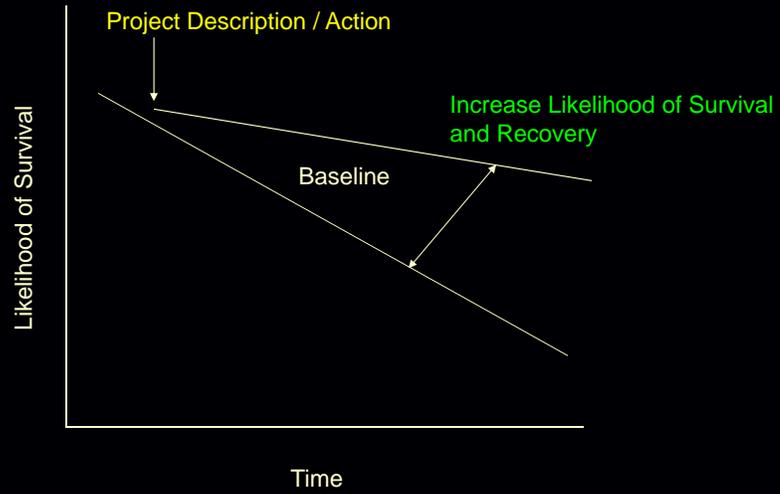
This means, the species is no longer “likely to become in danger of extinction in all or a significant portion of its range in the foreseeable future.” (e.g, no longer a threatened or endangered species)

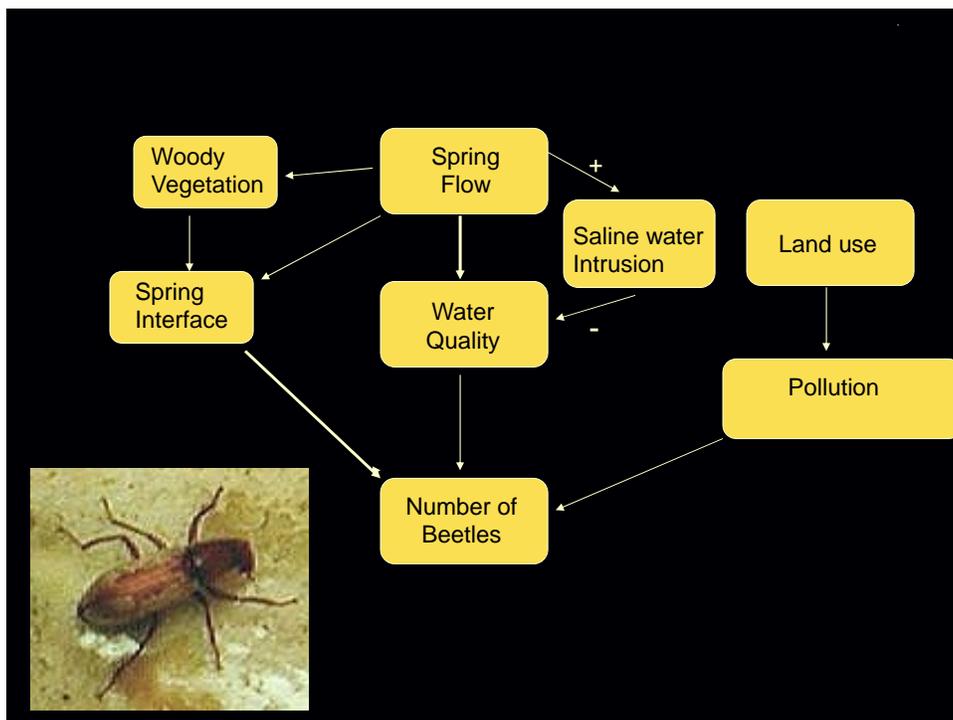
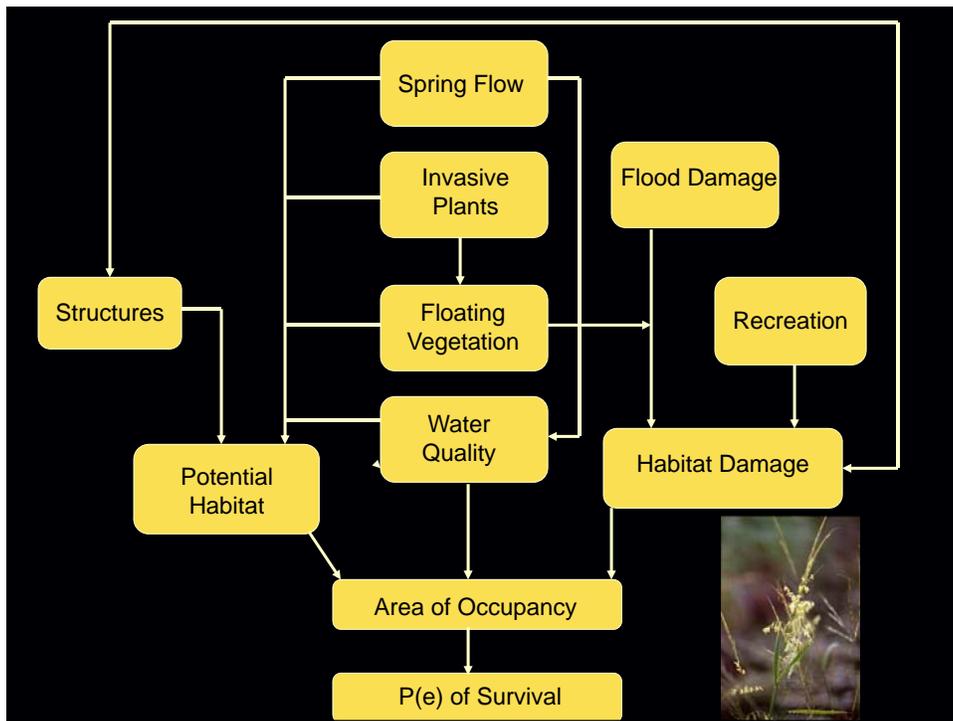
So, recovery is when the likelihood (or probability) of extinction over some future (time) is low enough again to no longer be a danger

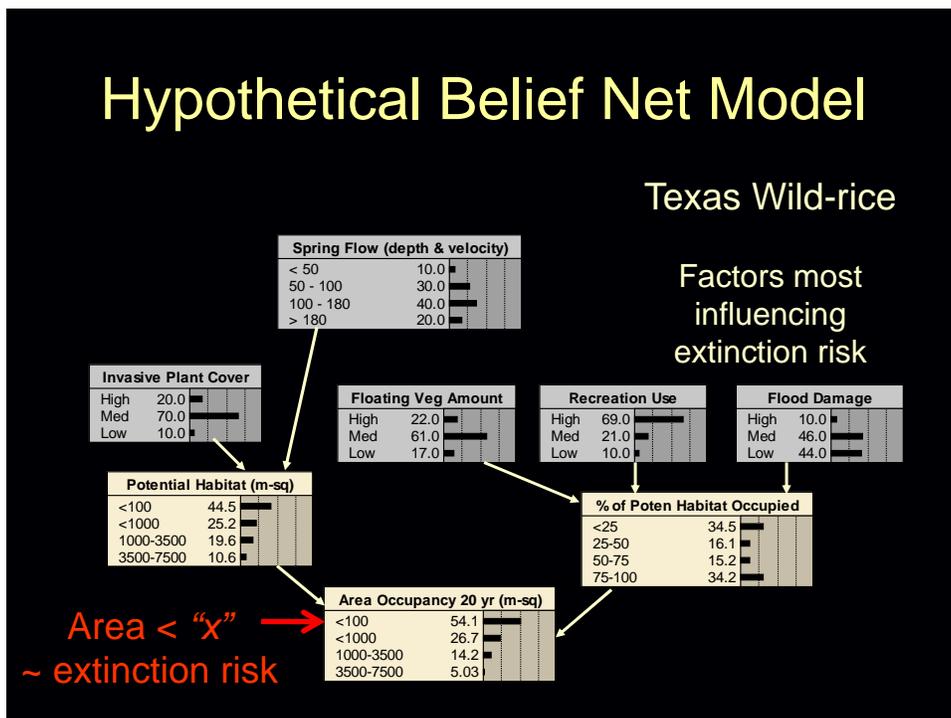
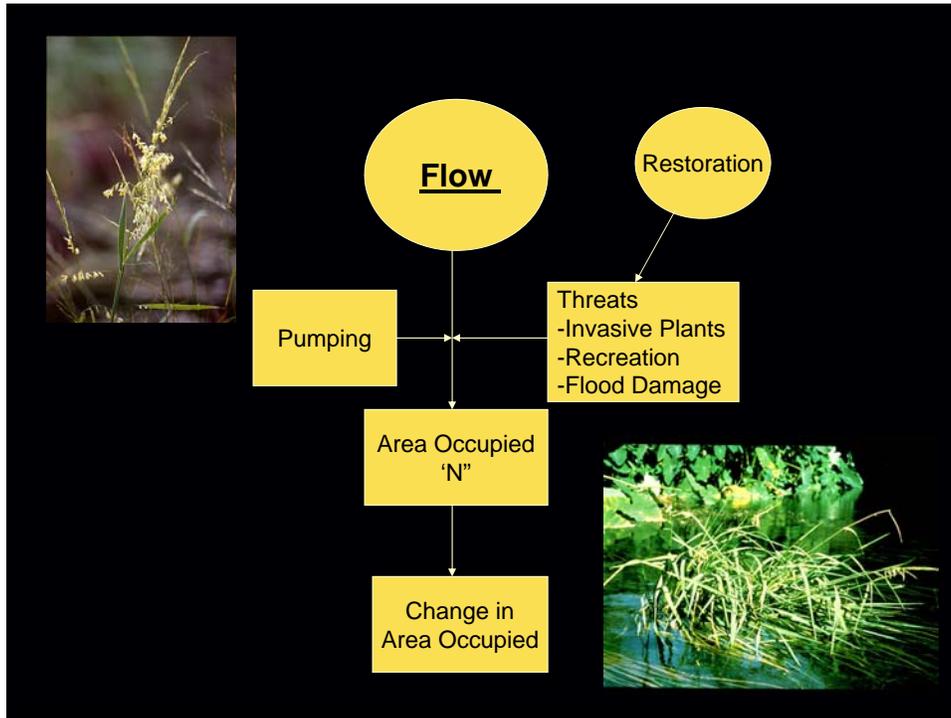
Baseline of Species



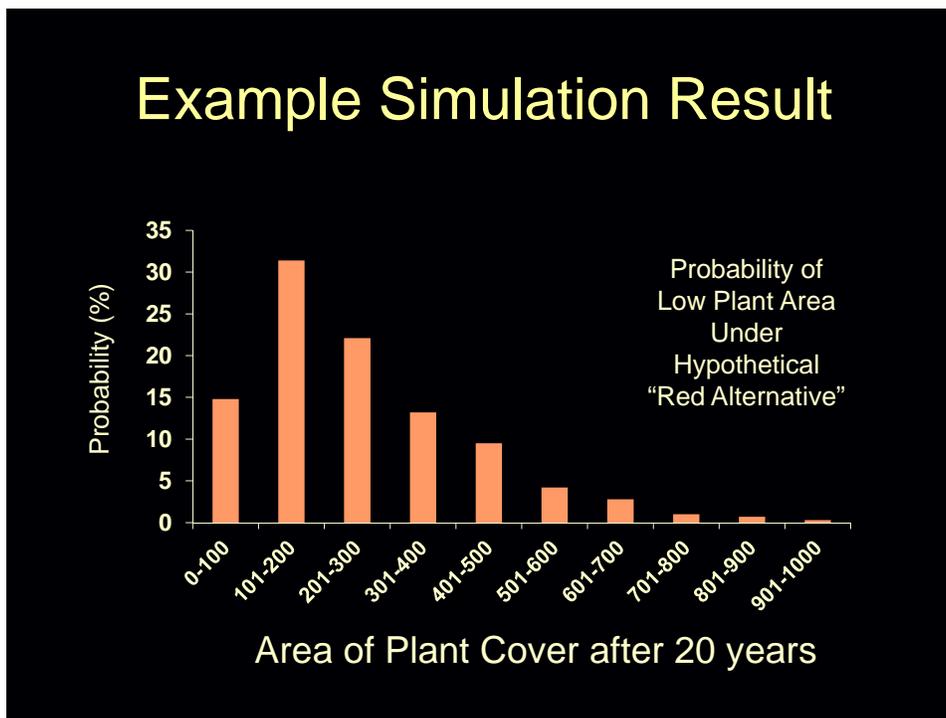
Recovery



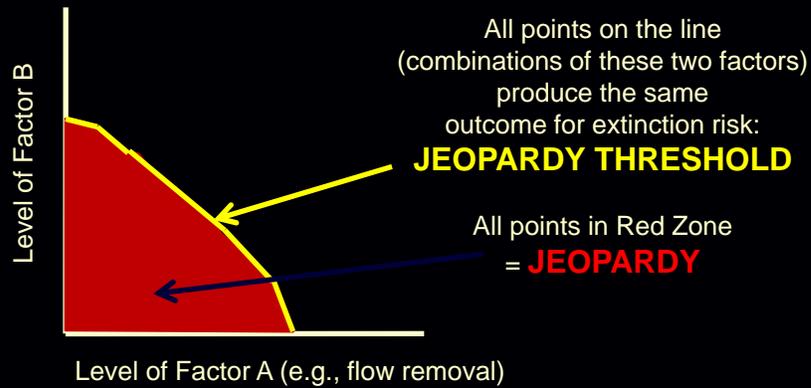




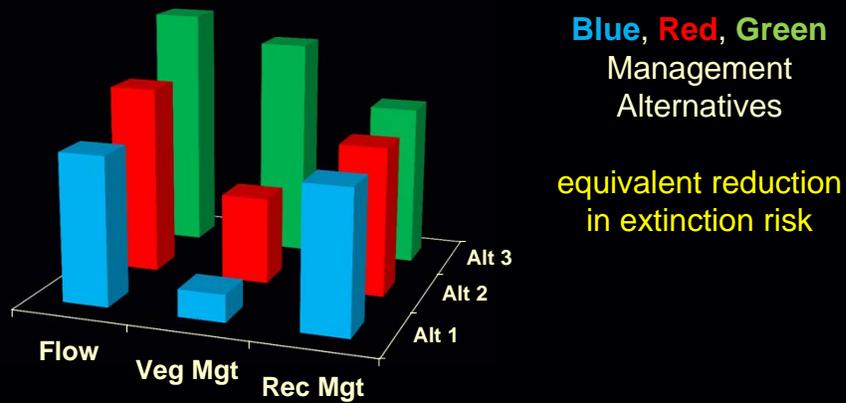
OUTCOMES (Area of TWR in m ²)			
Baseline Flow 100-180 Invasive – med. Floating - low Flood - low Recreation - low	Gone	51.7	←
	<1000	30.3	
	1000-3500	13.7	
	>3500	4.3	
Alt. 1 Flow 50 -100 Invasive – low Floating - low Flood - low Recreation - low	Gone	50.6	←
	<1000	20.9	
	1000-3500	15.2	
	>3500	13.4	
Alt. 2 Flow 100-180 Invasive – low Floating - med Flood - med Recreation - med	Gone	35.8	←
	<1000	46.4	
	1000-3500	17	
	>3500	8	

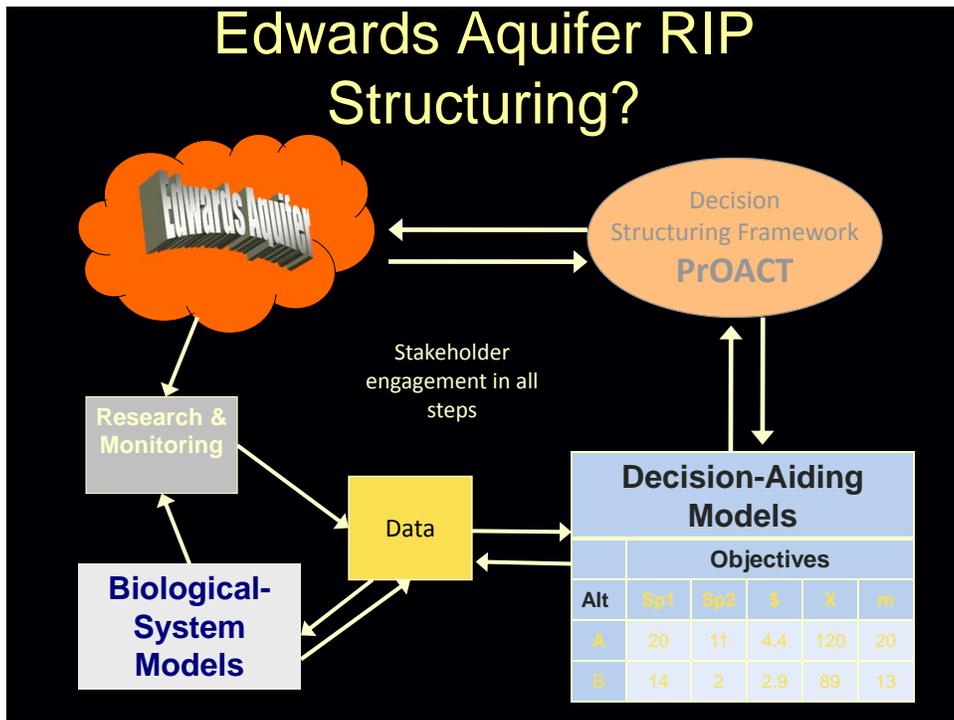
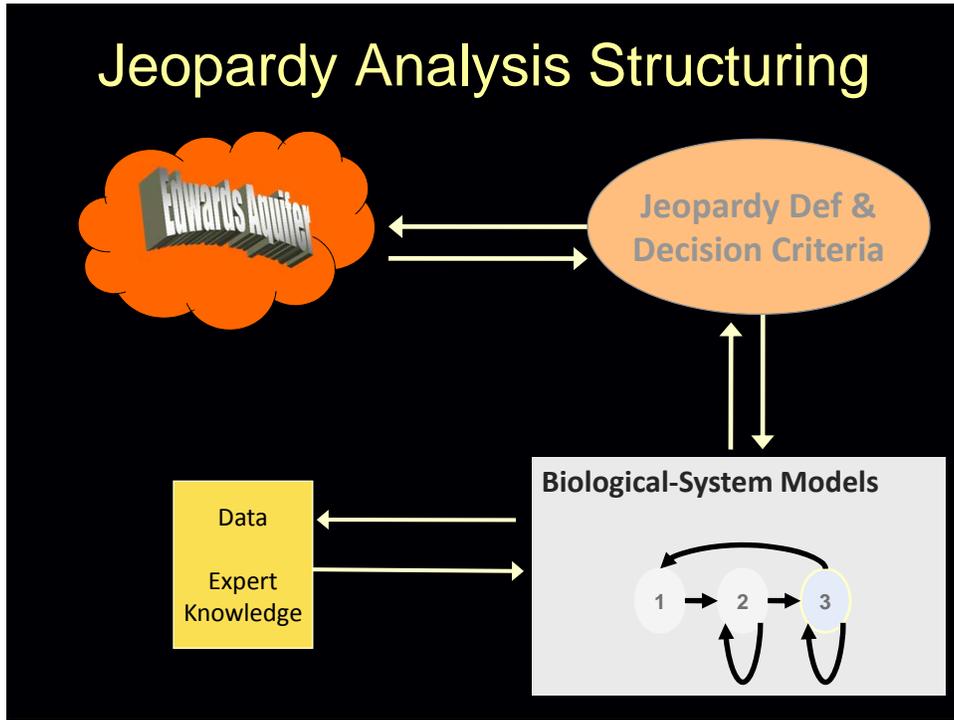


Finding Factor *Combinations* Delineating JEOPARDY



Finding Factor *Combinations* Delineating RECOVERY





Next Steps

Go Back to the RIP – PrOACT

- Determine decision problem
- **Stakeholder objectives**
- Multi-objective alternatives
- Consequences
- Tradeoffs