

**Southwestern Willow Flycatcher habitat use
and interactions with tamarisk beetles on the
Virgin River, Utah**



Robert Dobbs

Washington County Field Office

Utah Division of Wildlife Resources

Southwestern Willow Flycatcher

Empidonax traillii extimus

Breeding Habitat

- Lowland riparian forest
 - Early successional
 - Heterogeneous structure
 - Dense vegetation 2-4 m height
- Associated with water
 - Still-slow moving; saturated soil



Southwestern Willow Flycatcher

Empidonax traillii extimus

Recovery Actions

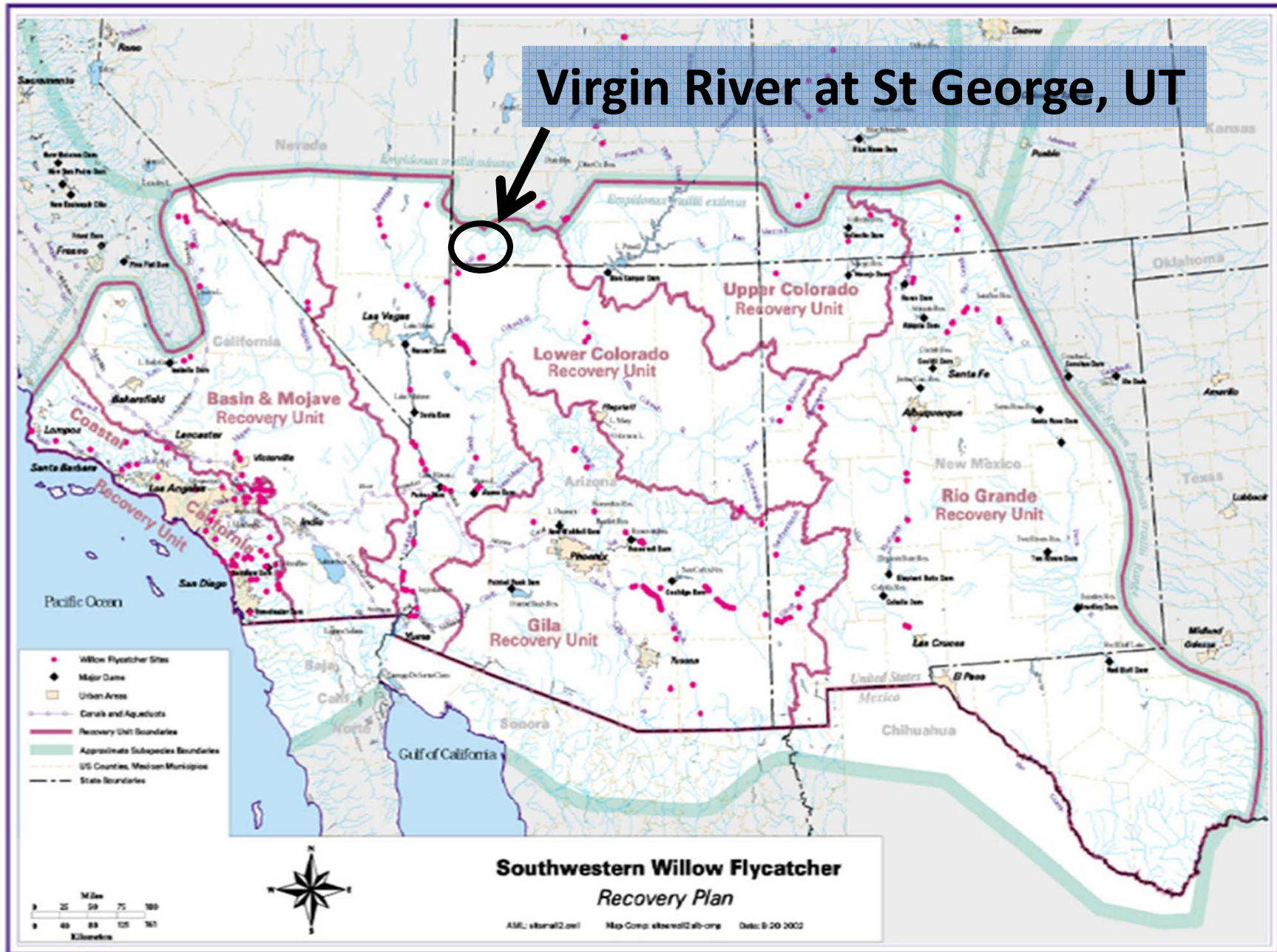
1: Increase and improve currently and potentially suitable habitat

6.1: Determine habitat characteristics that influence occupancy and reproductive success...

- Plant species / habitat structure
 - Use vs. availability of exotic & native plant species
- Microhabitat / microclimate



UDWR monitoring (2008-2011)



Tamarisk Leaf Beetles (*Diorhabda carinulata*) in St George

- Tamarisk beetles introduced in 2006
- Tamarisk defoliation:
 - 2008: August, *after* SWFL breeding
 - 2009: June
 - 2010: June
 - 2011: late July

peak SWFL breeding

2 June 2010



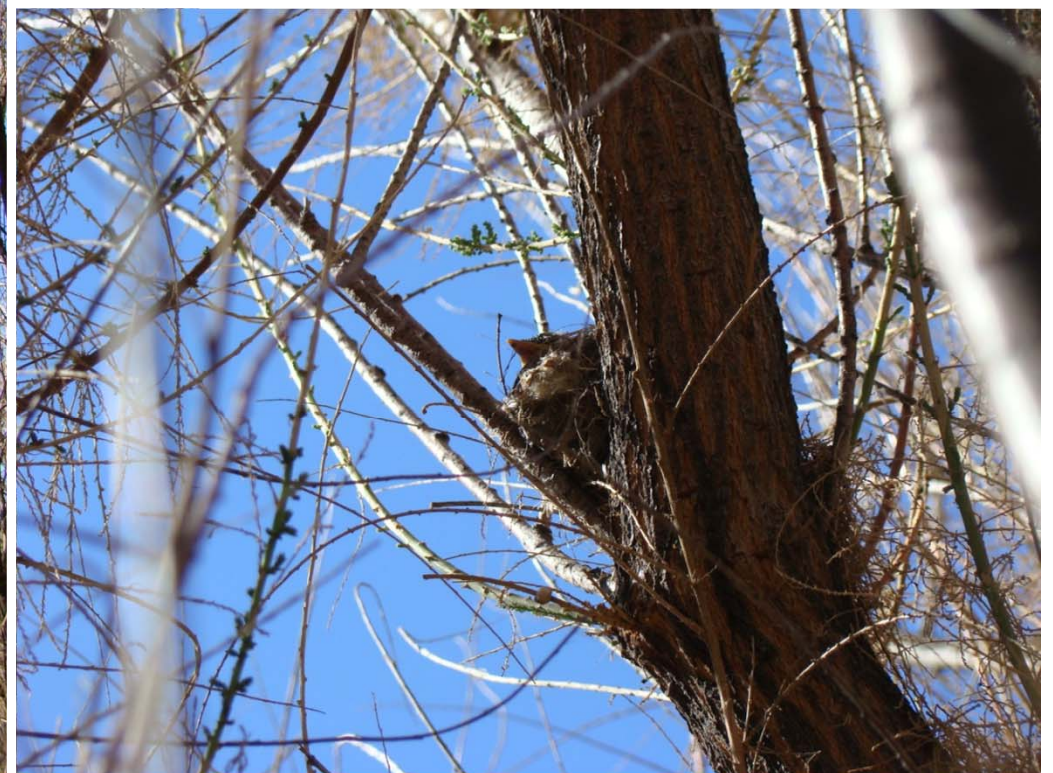
17 June 2010



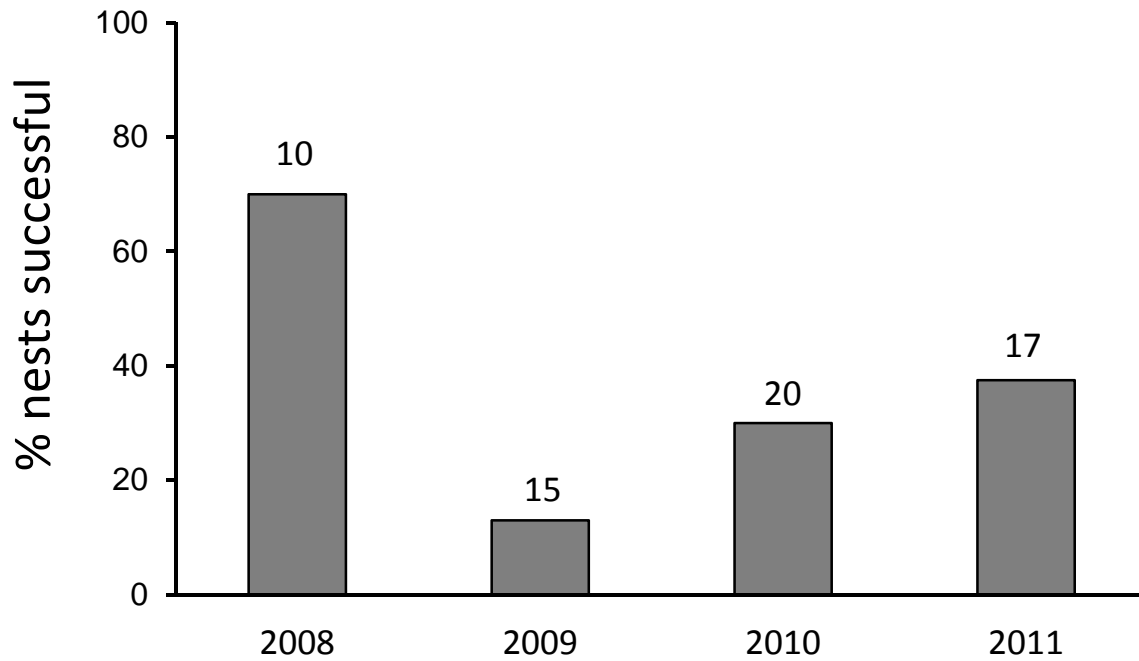


Beetle-induced tamarisk defoliation

- **Affects nest site microclimate**
 - Higher temp, Lower RH
 - Decrease hatching success
- **Affects nest concealment**
 - Increase predation
 - Increase brood parasitism

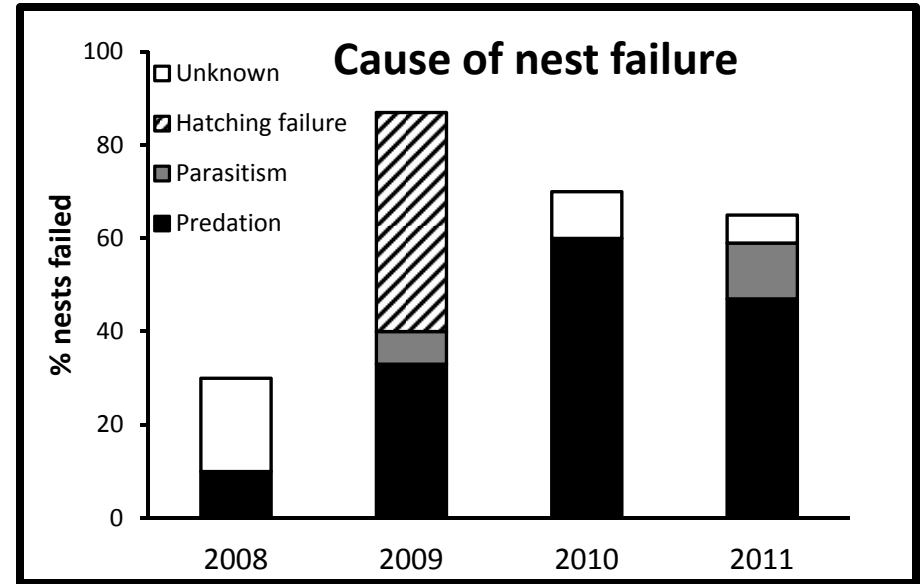
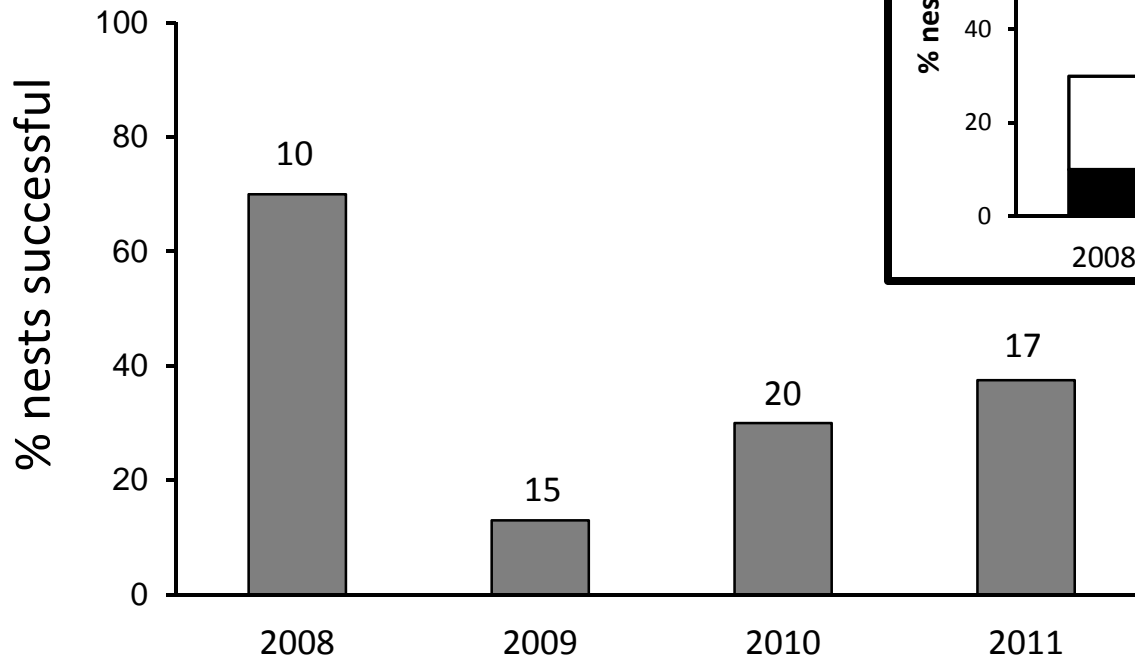


Apparent nest success declined in 2009



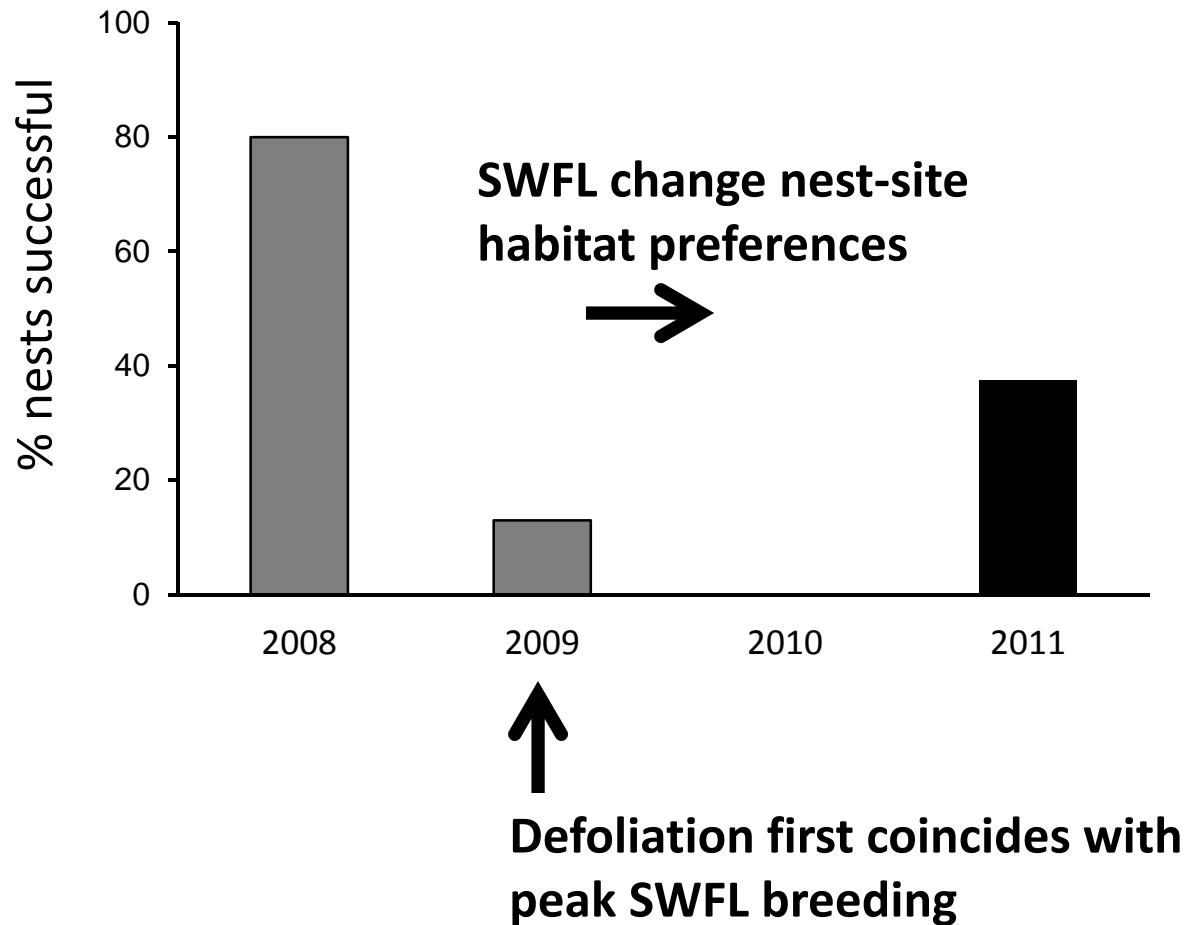
**Defoliation first coincides with
peak SWFL breeding**

Due to decreased hatching success & increased predation

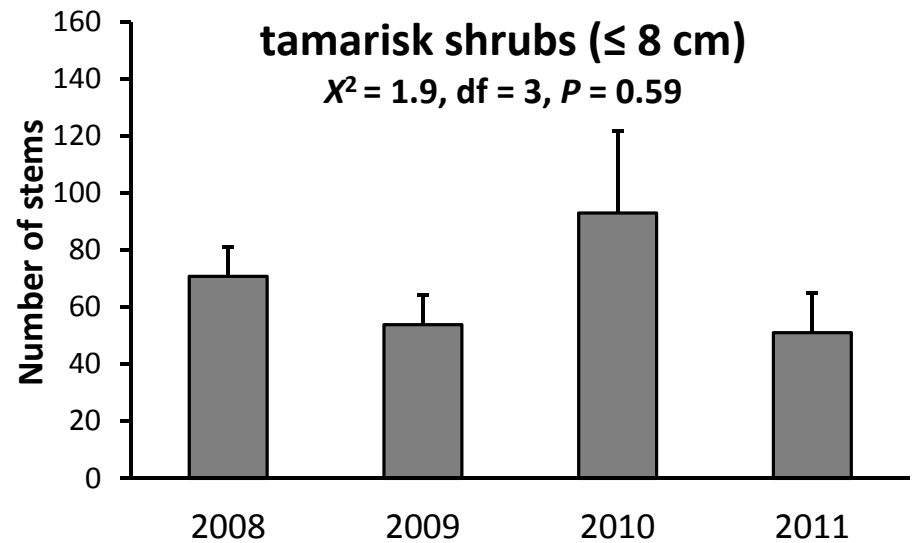
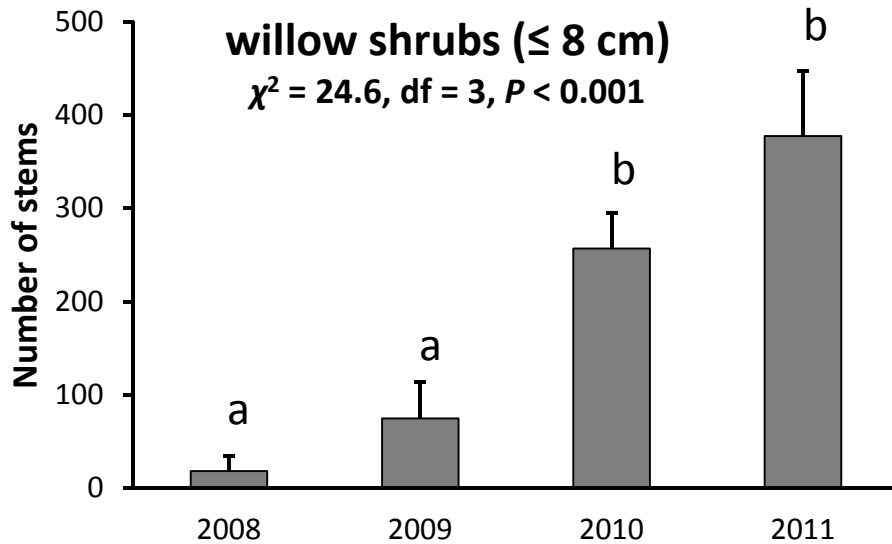
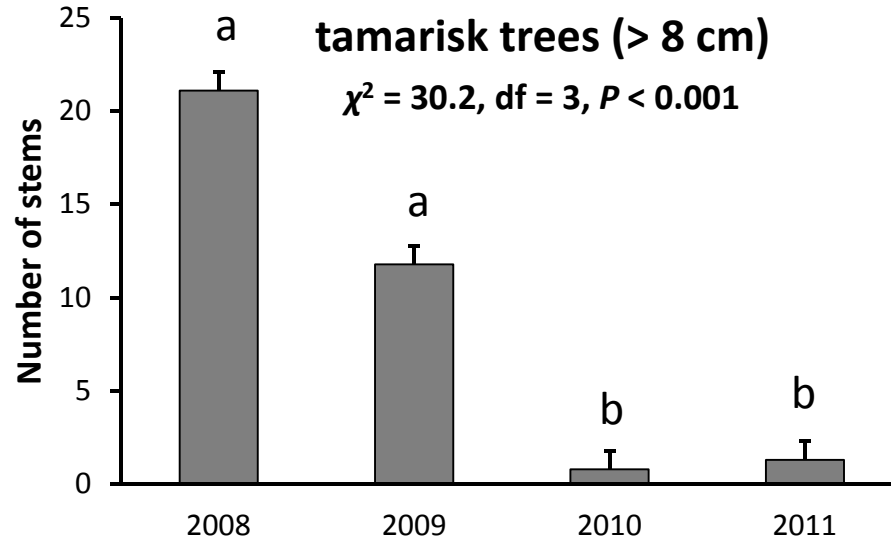


Defoliation first coincides with
peak SWFL breeding

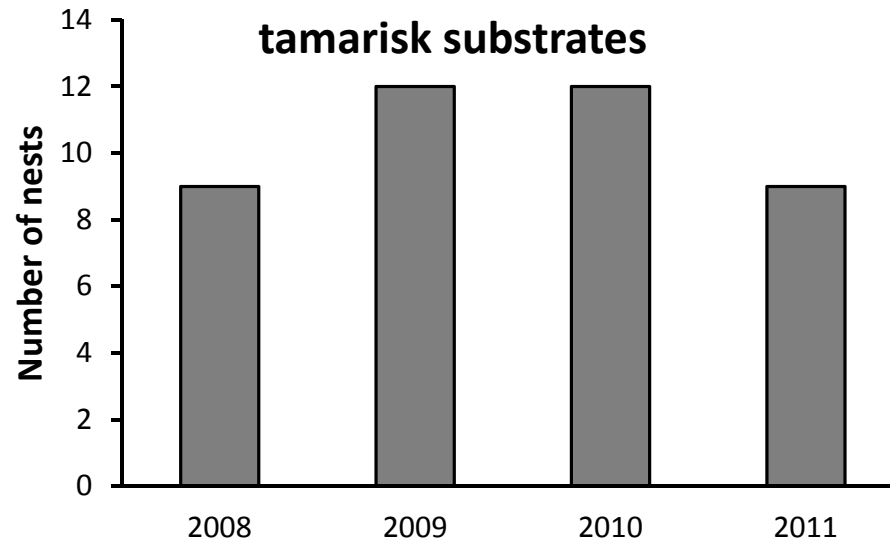
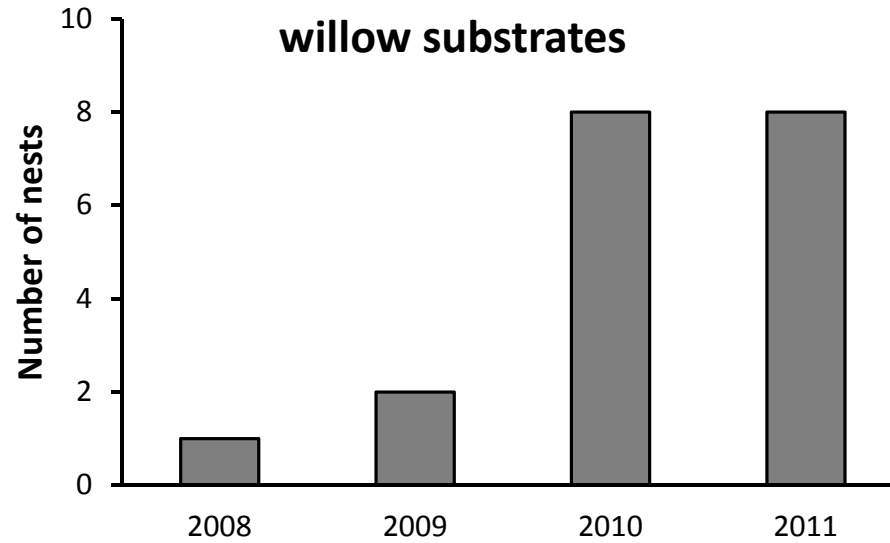
Apparent nest success rebounded in 2010-2011, with shift in habitat use



Habitat use shifted between 2009 & 2010

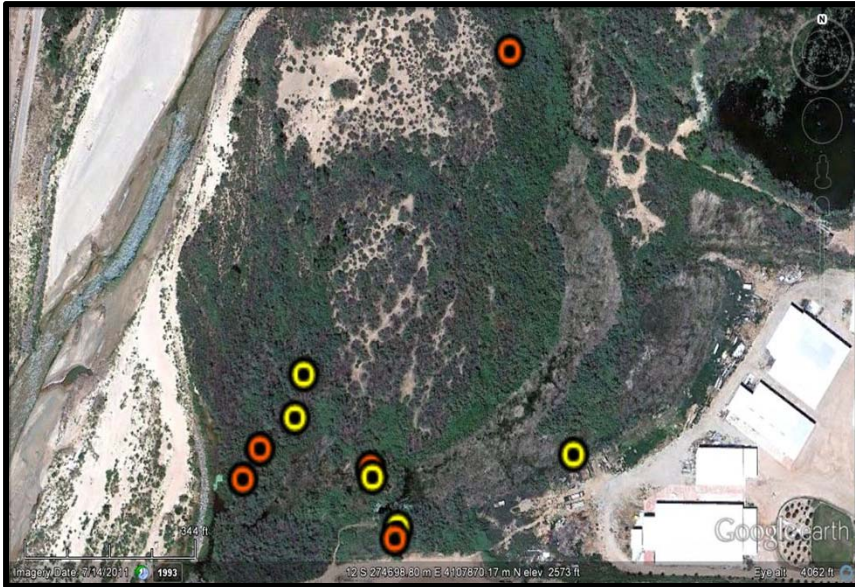


Nest substrate use shifted between 2009 & 2010



Seegmiller Marsh

2008-2009:

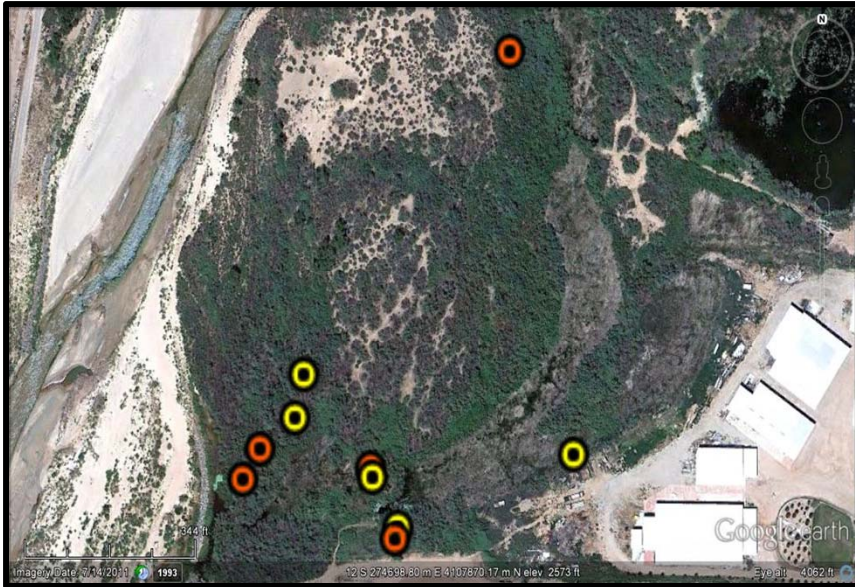


Snipe Pond



Seegmiller Marsh

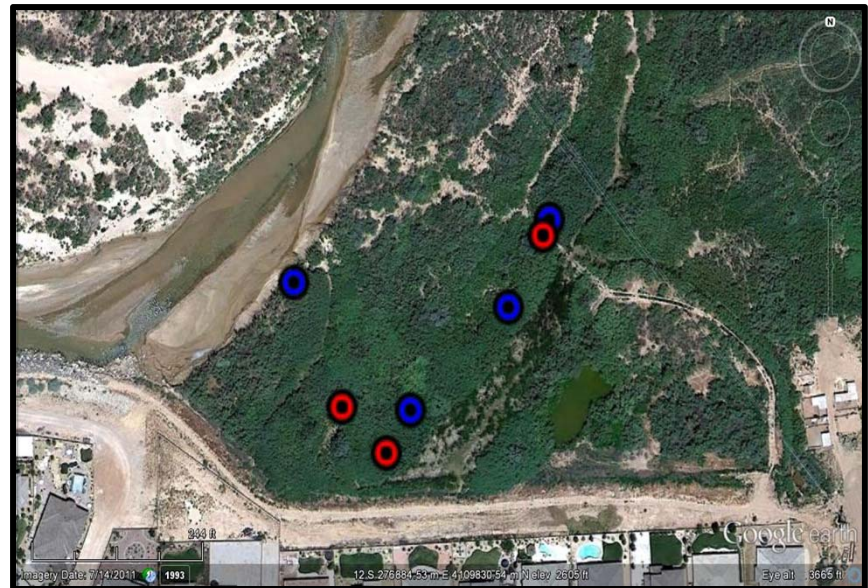
2008-2009:



2010-2011:



Snipe Pond



Microhabitat questions (2010-2011)

-Do SWFL select microhabitat features?

- Compare vegetation at nests & nonuse sites
- Compare nest substrate use given availability

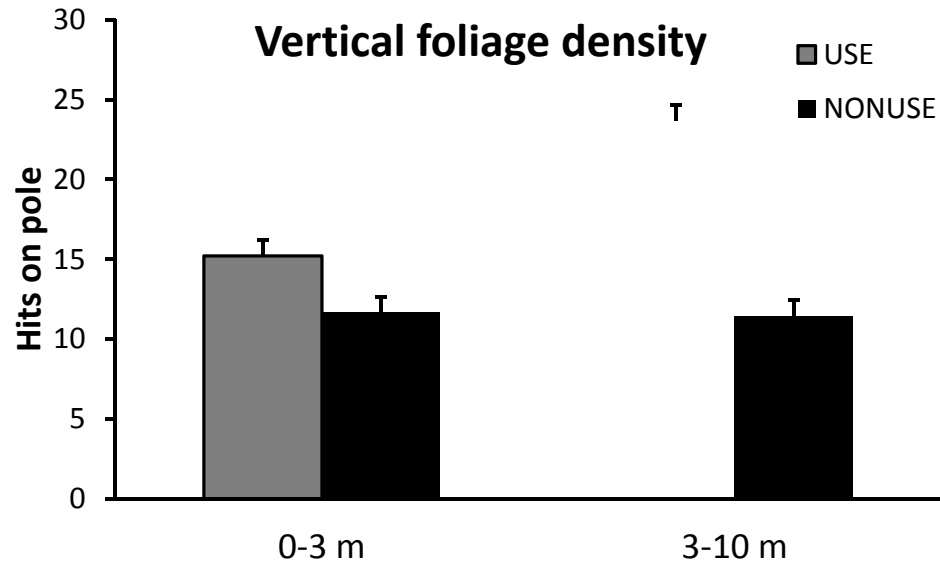
-Are microhabitat features associated with nest success?

- Compare nest substrate use at successful and unsuccessful nest sites
- Compare vegetation at successful and unsuccessful nest sites

-What do results suggest about habitat restoration and enhancement?



SWFL select nest sites:



-Higher foliage density

-0-3 m: $t=-2.1, P=0.04$

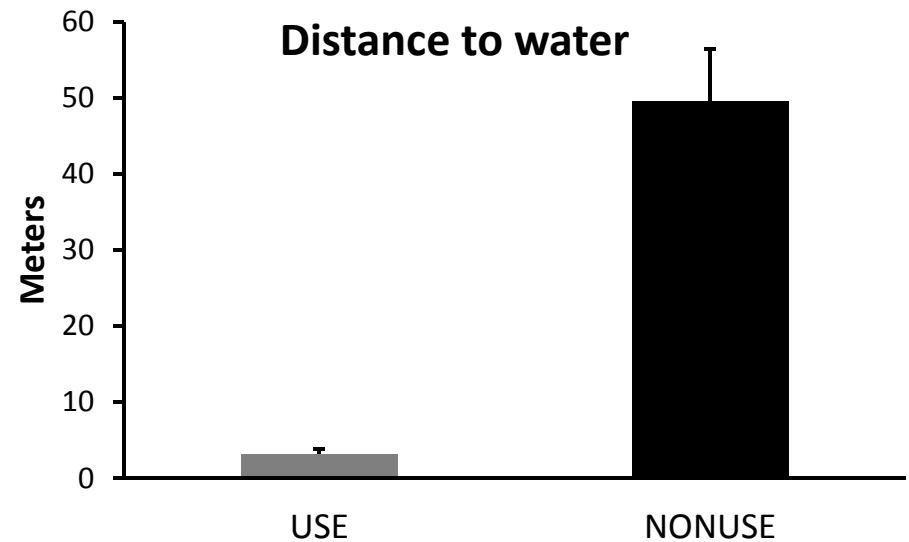
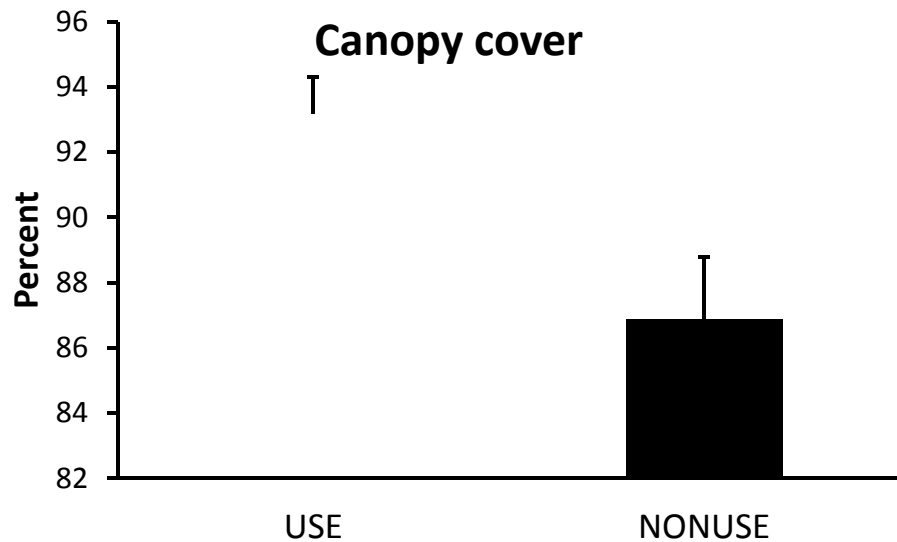
-3-10 m: $t=-5.4, P<0.001$

-Greater canopy cover

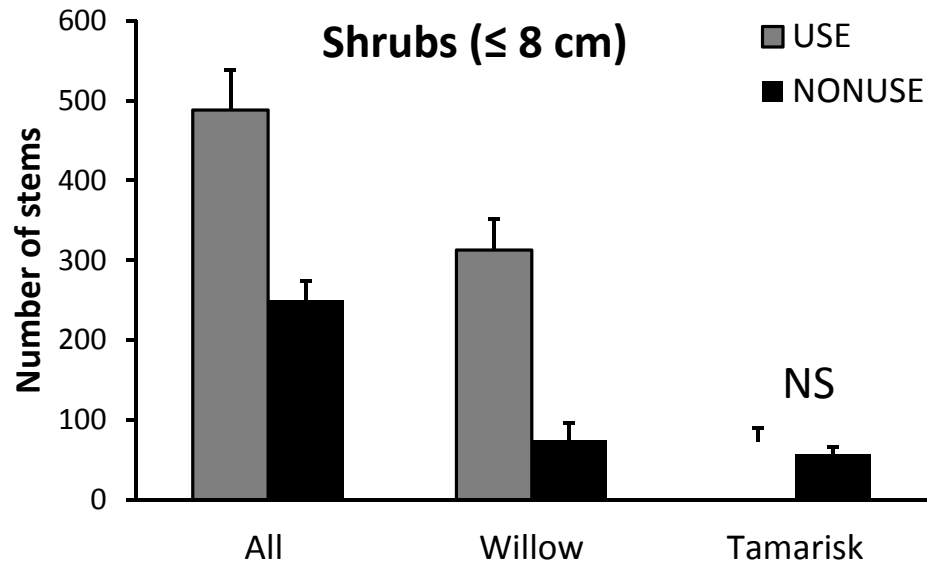
- $U=180.5, P<0.001$

-Closer to water

- $U=732.5, P<0.001$



SWFL select nest sites:



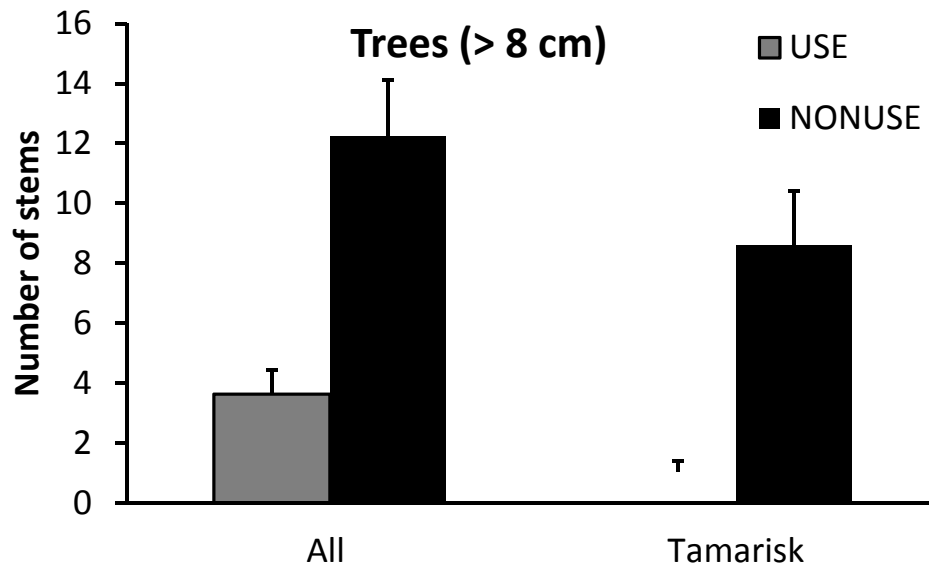
-Higher shrub density

-All species combined

-t=-4.7, P<0.001

-Willow

-U=107.0, P<0.001



-Lower tree density

-All species combined

-U=649.5, P<0.001

-Tamarisk

-U=633.5, P<0.001

SWFL prefer tamarisk as nest substrate (2010-2011)

SWFL use tamarisk more than expected, and willow less than expected, given availability of both species

Plant species	Nests		Stems (5 m)		Nest height (m)		
	No.	%	No.	%	Mean	SD	Range
Coyote willow	10	42	4525	82	2.48	0.42	1.85-3.05
Tamarisk	14	58	1026	18	2.58	0.70	1.65-3.92

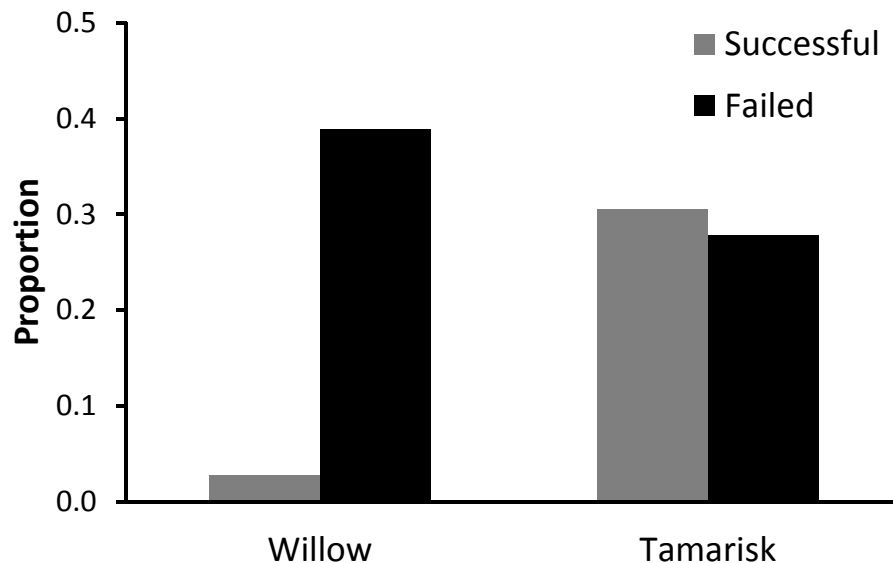
$\chi^2 = 6.3, df = 1, P = 0.01$

SWFL prefer tamarisk as nest substrate (2010-2011)

SWFL use tamarisk more than expected, and willow less than expected, given availability of both species

Plant species	Nests		Stems (5 m)		Nest height (m)		
	No.	%	No.	%	Mean	SD	Range
Coyote willow	10	42	4525	82	2.48	0.42	1.85-3.05
Tamarisk	14	58	1026	18	2.58	0.70	1.65-3.92

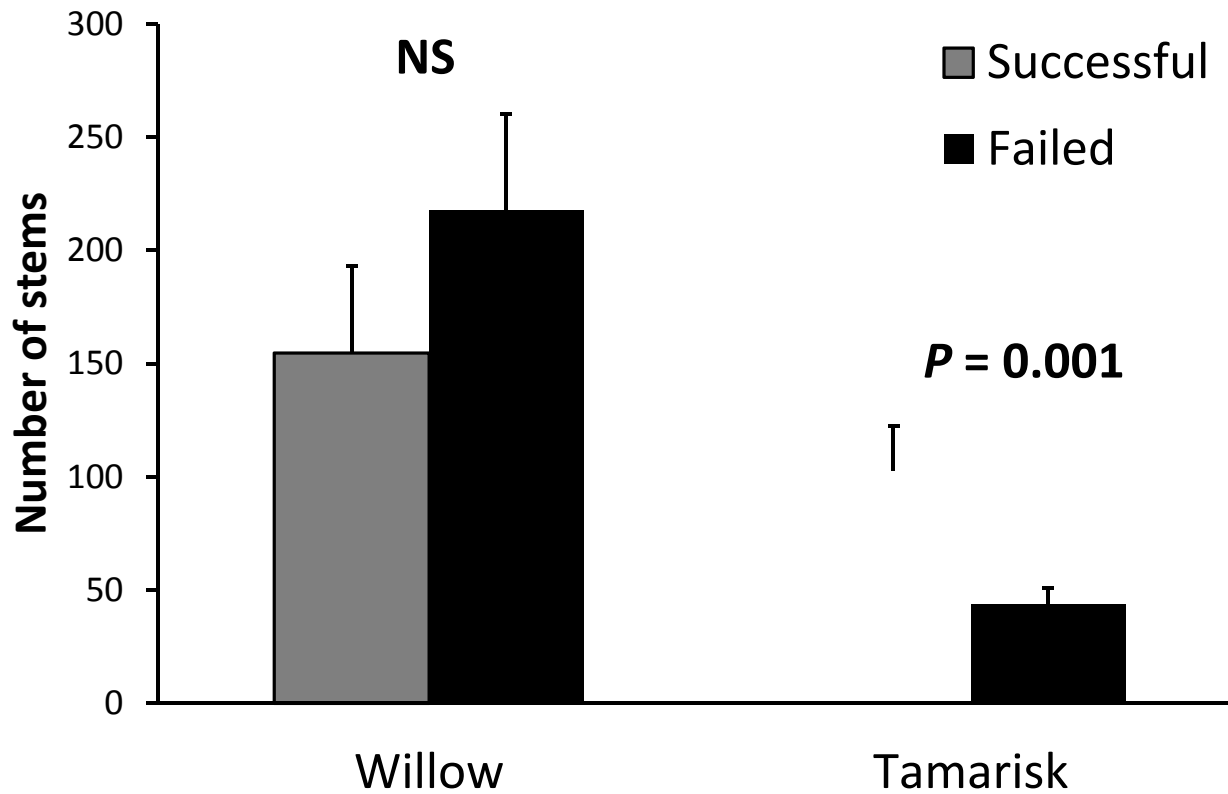
$\chi^2 = 6.3, df = 1, P = 0.01$



Nests more likely to fledge in tamarisk than willow substrates

$\chi^2 = 22.4, df = 1, P < 0.001$

Nests more likely to fledge with higher tamarisk shrub density



**Nest concealment may contribute to nest success if
visual (avian) predators important**

Coyote willow only



Mixed coyote willow-tamarisk



**Tamarisk adds structural complexity to coyote
willow-dominated habitat—increases concealment**

Habitat restoration and enhancement

- Tamarisk-dominated habitat (tamarisk trees = canopy) no longer suitable for SWFL
- Tamarisk shrubs valuable when mixed with native vegetation
- Reduce tamarisk density by 50 %
 - Prioritize tamarisk *trees* for removal
- Replant thinned areas with mix of native species that provide understory structure
 - e.g., Goodding's willow, boxelder
- Prioritize areas with appropriate hydrology