

Brood Parasitism and Nest Predation of Southwestern Willow Flycatchers along the Lower Colorado River and Tributaries

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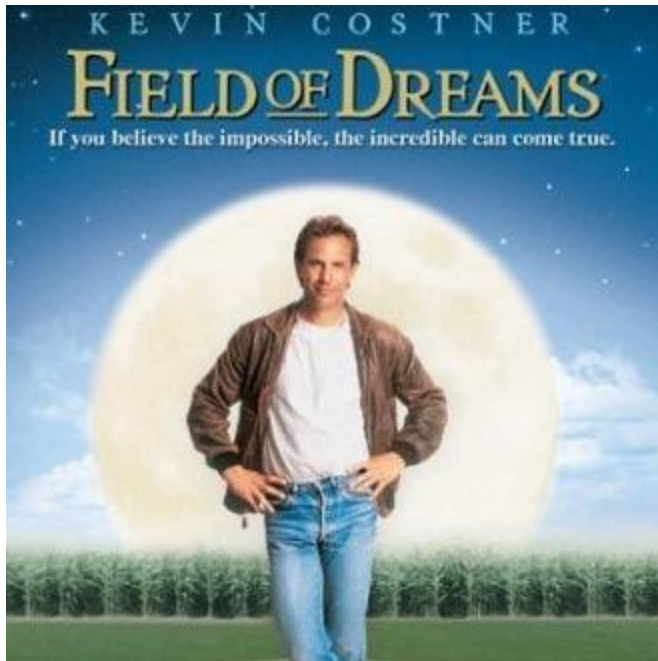
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**“If you build it
they will come”**

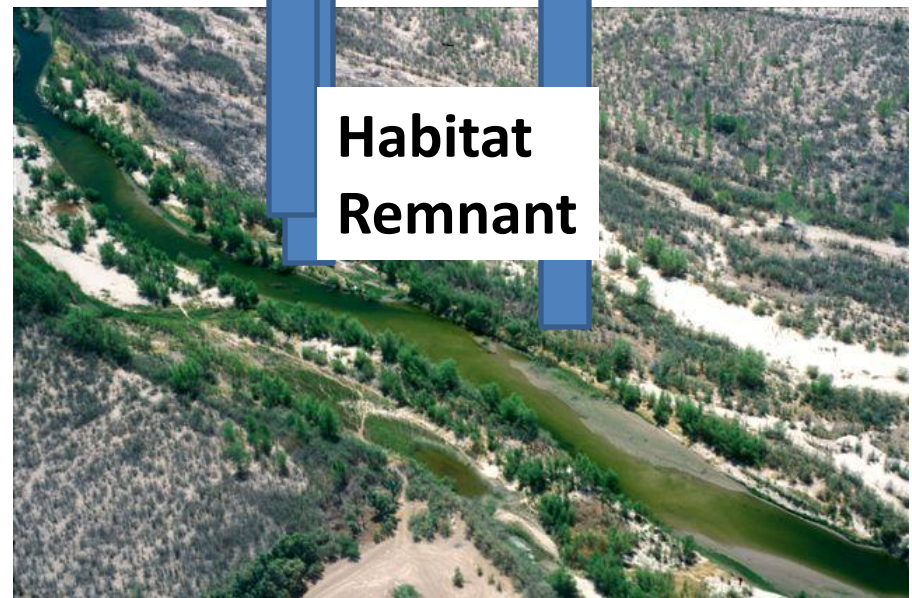




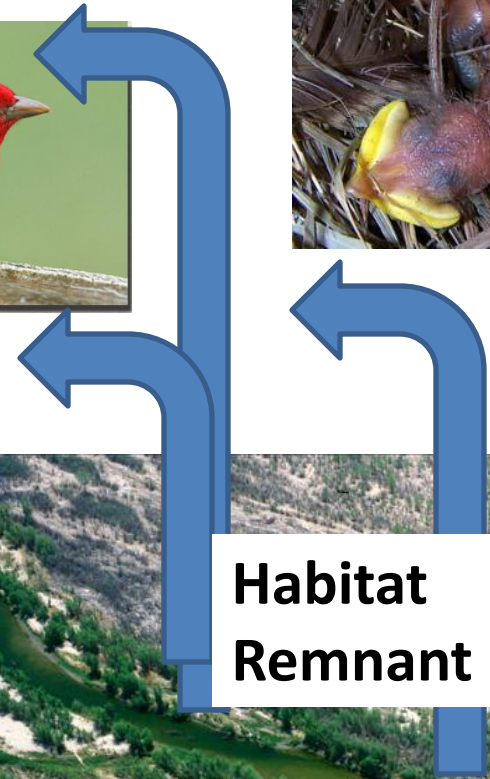
“If you build it they will come”



Restored Site



Habitat Remnant



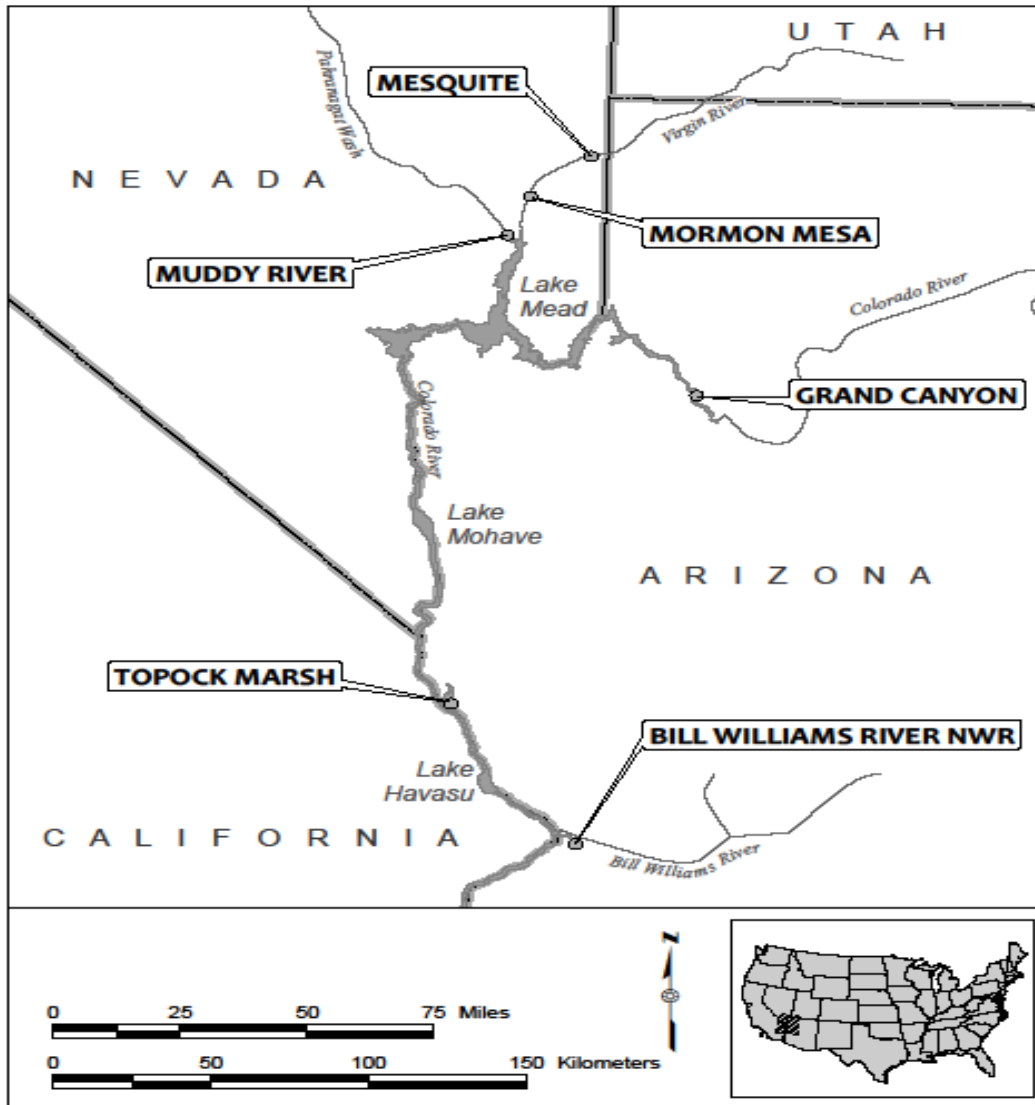


Hypothesis 1: Habitat features associated with parasitism or predation could be managed to increase productivity

Hypothesis 2: Identification of nest predators could suggest how predation could be controlled through habitat manipulation or predator control to increase productivity

Hypothesis 3: Parental activity increases with ambient temperature around nest and increased parental activity increases predation

1) Habitat features and predation/parasitism



233 nests at 6 sites
from 2003-2007

Stumpf et al. in revision



Tom & Mary Anne

Predation models

Temporal + site

Temporal + parasitism status

Temporal + canopy height

Temporal + nest height

Temporal + canopy cover

Temporal + ground cover

Temporal + distance to edge

Temporal + edge*site (interaction)

Temporal + nest-site

Global

Parasitism models

Temporal + distance to edge

Temporal + canopy cover

Temporal + nest height

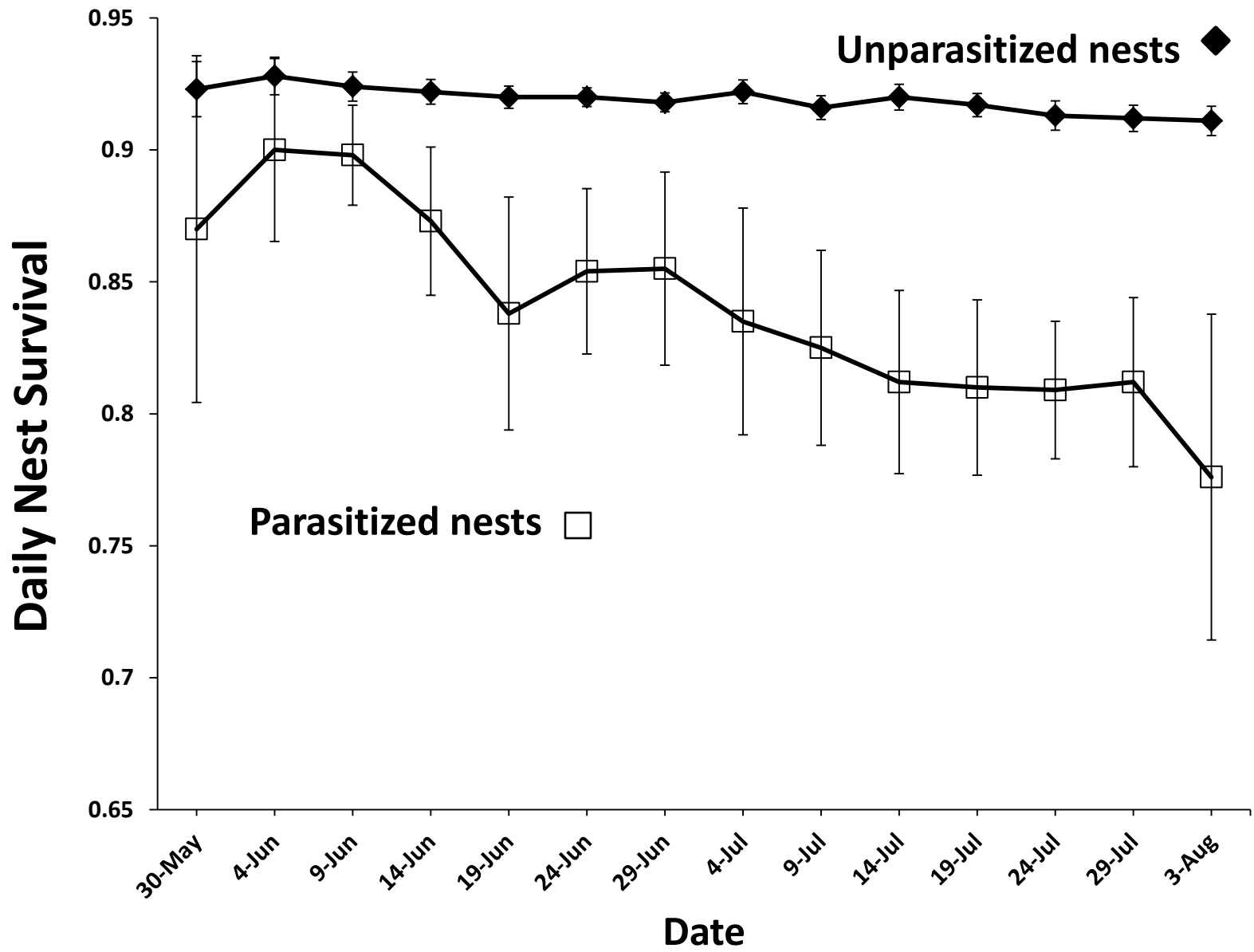
Temporal + site

Temporal + canopy height

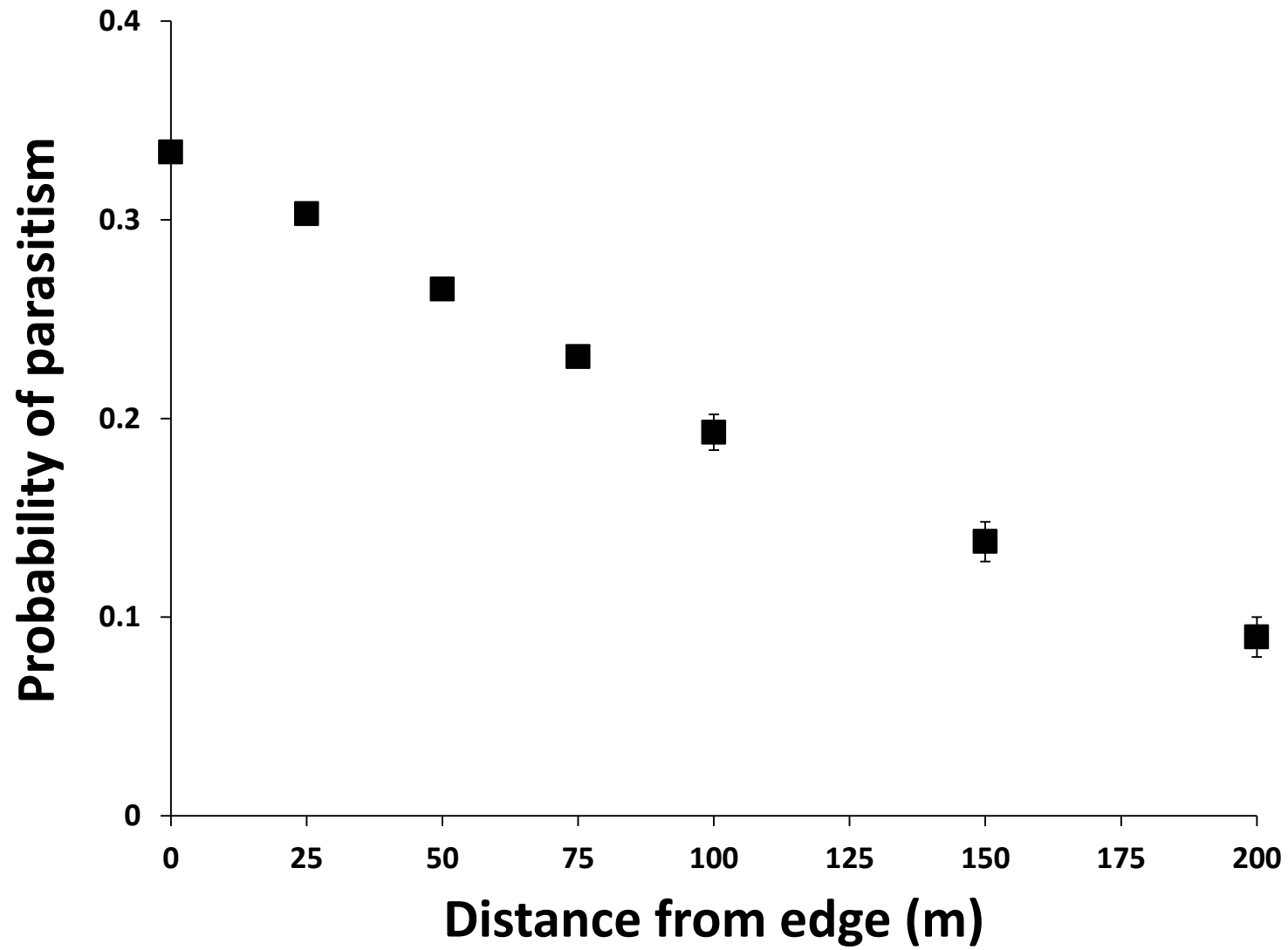
Temporal + ground cover

Global

Predation models	k^a	AIC_C^b	ΔAIC_C^c	w_i^d
Temporal + parasitism	6	1415.8	0.00	0.98
Global	16	1424.20	8.35	0.02
Temporal + site	10	1459.71	43.86	0.00
Temporal (null)	5	1460.57	44.72	0.00
Temporal + canopy height	6	1461.68	45.83	0.00
Temporal + nest height	6	1461.89	46.05	0.00
Temporal + canopy cover	6	1462.02	46.17	0.00
Temporal + ground cover	6	1462.29	46.45	0.00
Temporal + distance to edge	6	1462.48	46.63	0.00
Temporal + edge*site (interaction)	16	1465.55	49.70	0.00
Temporal + nest-site ^h	9	1466.85	51.00	0.00



Parasitism models (n = 233)	k^a	AIC_C^b	ΔAIC_C^c	w_i^d
Temporal + distance to edge	7	282.93	0.00	0.37
Temporal + canopy cover	7	287.62	4.69	0.04
Temporal + nest height	7	287.97	5.05	0.03
Temporal + site	11	288.06	5.13	0.03
Temporal + canopy height	7	288.97	6.05	0.02
Temporal + ground cover	7	288.98	6.05	0.02
Global	16	293.61	10.68	0.00



Hypothesis 1: Habitat features associated with parasitism or predation could be managed to increase productivity

Results:

- None of the habitat features are candidates for management to reduce either parasitism or predation**
- Increased predation on parasitized nests.
Causal link between parasitism and predation?**
- Increase distance to edge to reduce parasitism**

Hypothesis 2: Identify nest predators to increase productivity

Site	No. Depredated nests/total (%)	No. Parasitized nests/total (%)
Bill Williams NWR, AZ	5/13 (38)	2/13 (15)
Grand Canyon	3/4 (75)	0/4 (0)
Mesquite, NV	52/75 (69)	18/75 (24)
Mormon Mesa, NV	24/33 (72)	4/33 (12)
Muddy River, NV	15/19 (78)	6/19 (31)
Havasus NWR, AZ	67/89 (75)	21/89 (23)
	166/233 (71%)	51/233 (22%)

**9 WIFL Nests at 2 sites in 2009, 29 WIFL Nests at 3 sites 2010
(additional 7 YEWA and 2 YBCH, 1 BEVI)**

11 predation events recorded

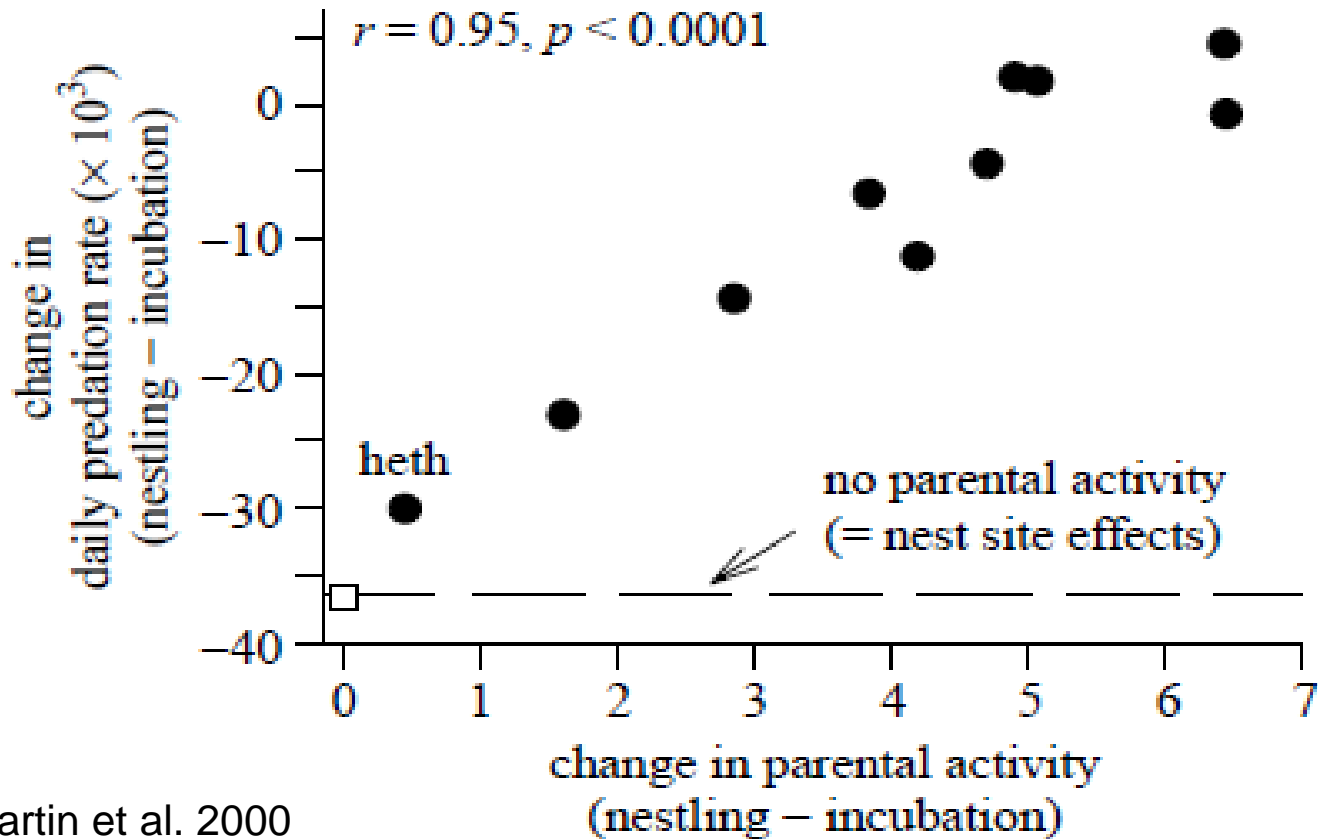


<u>Predator</u>	<u>Central Arizona (Ellis et al)</u>		<u>Southern Nevada (this study)</u>	
	<u>Egg</u>	<u>Nestling</u>	<u>Egg</u>	<u>Nestling</u>
Western screech owl	1			
Bewick's wren			1	
Gray catbird			1	
American crow			2	
Yellow-breasted chat	1	1	1	
Brown-headed cowbird				4
Coopers hawk		9		
Red-shouldered hawk				1
Common kingsnake		7		1
Gopher snake		1		
Clark's spiny lizard		1		

Results/Recommendations:

- **Egg predators a suite of birds difficult to manipulate through habitat alteration**
- **Nestling predators include snakes.
Reduced by water under nests?**
- **At one site, 4/4 nestling predation events were by BHCO
Manage BHCO an option at this site?**
- **Nest predators likely site specific and best managed at site level
Monitor nests at sites with highest potential for increased productivity with reduced predation**

Hypothesis 3: Parental activity increases with ambient temperature around nest and increased parental activity increases predation



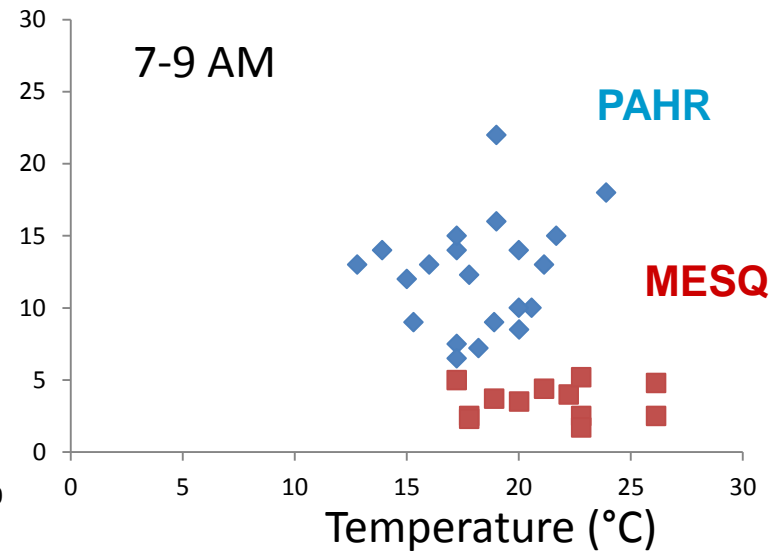
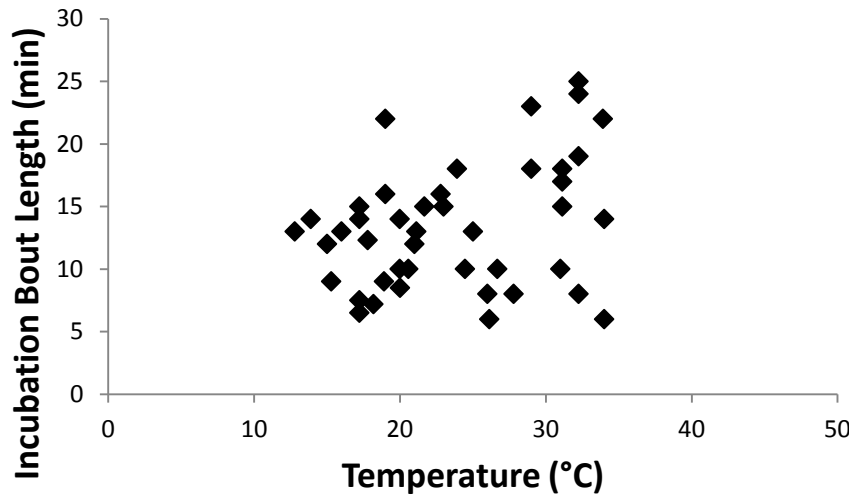
Martin et al. 2000



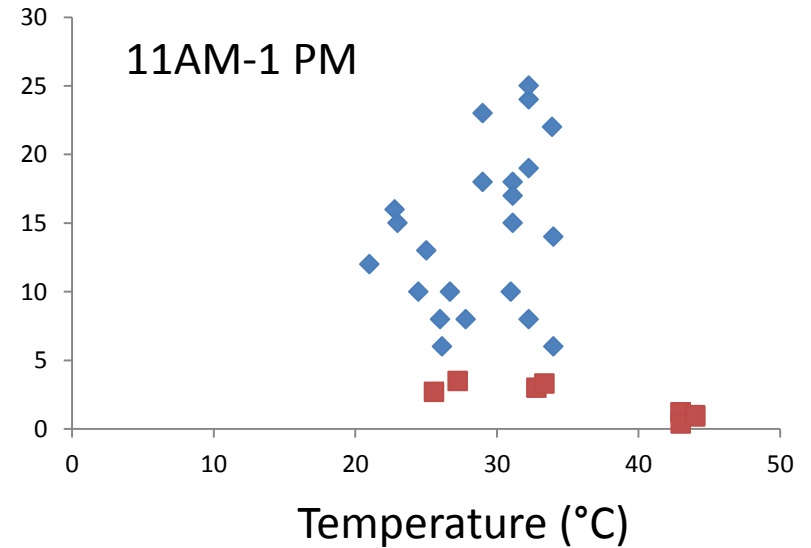
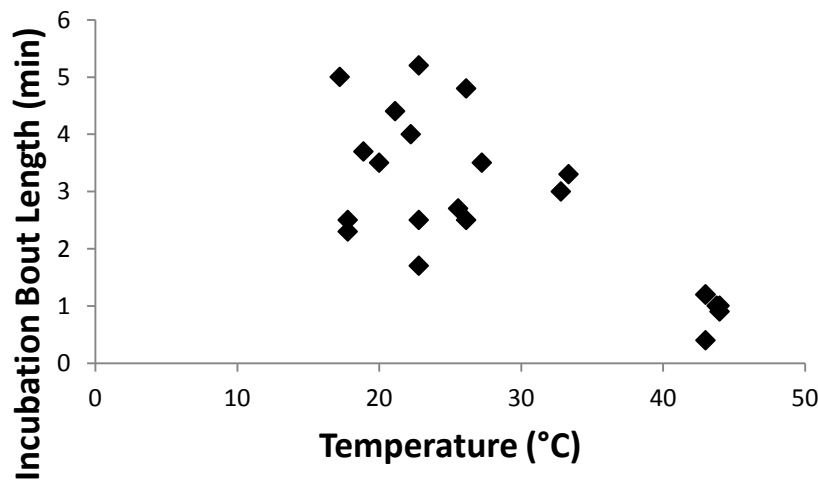
Conway and Martin 2000

Hypothesis 3: Parental activity increases with ambient temperature

Pahrnagat 2009



Mesquite 2009



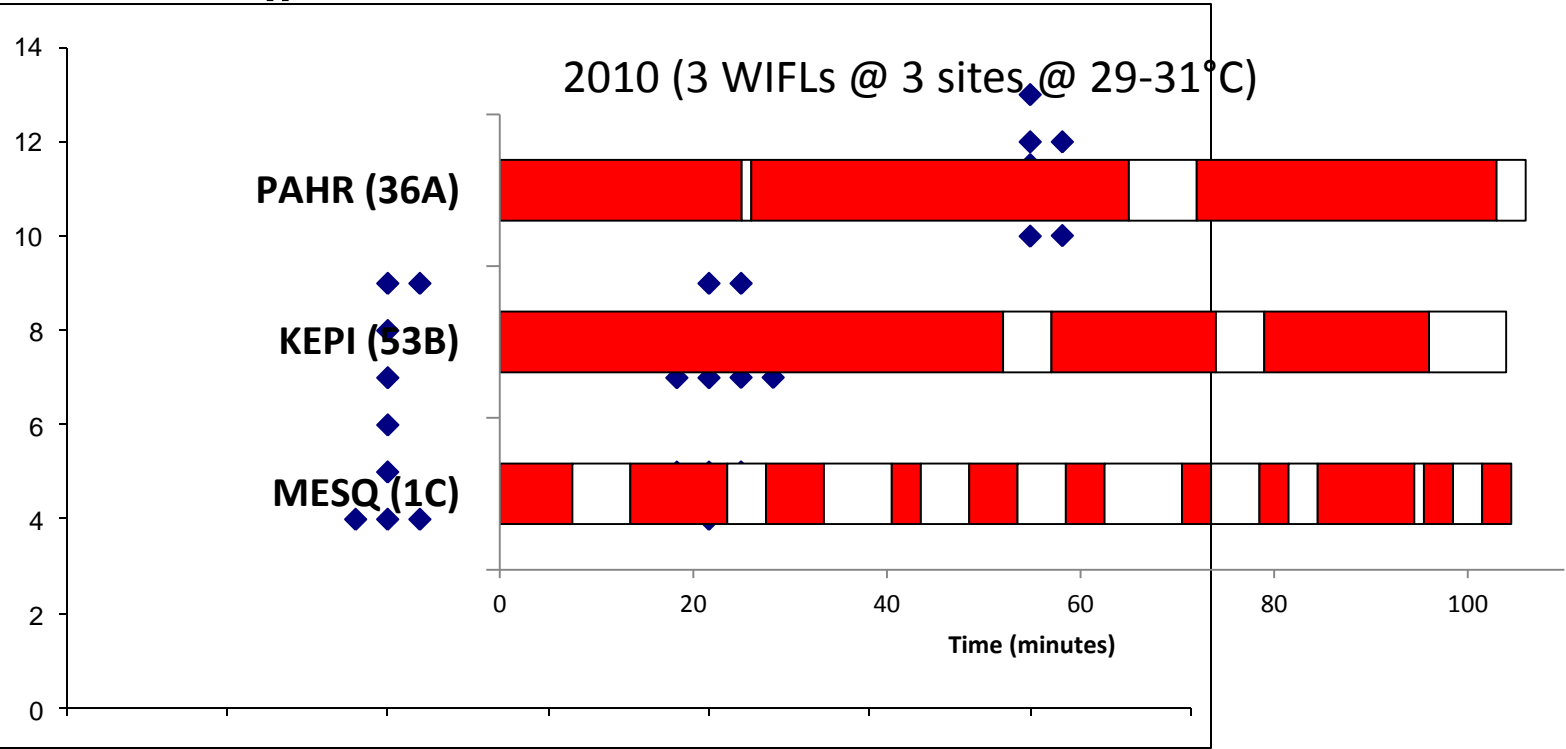
F = 13.8, D.F. 2,28 P < 0.001

Incubation Bouts

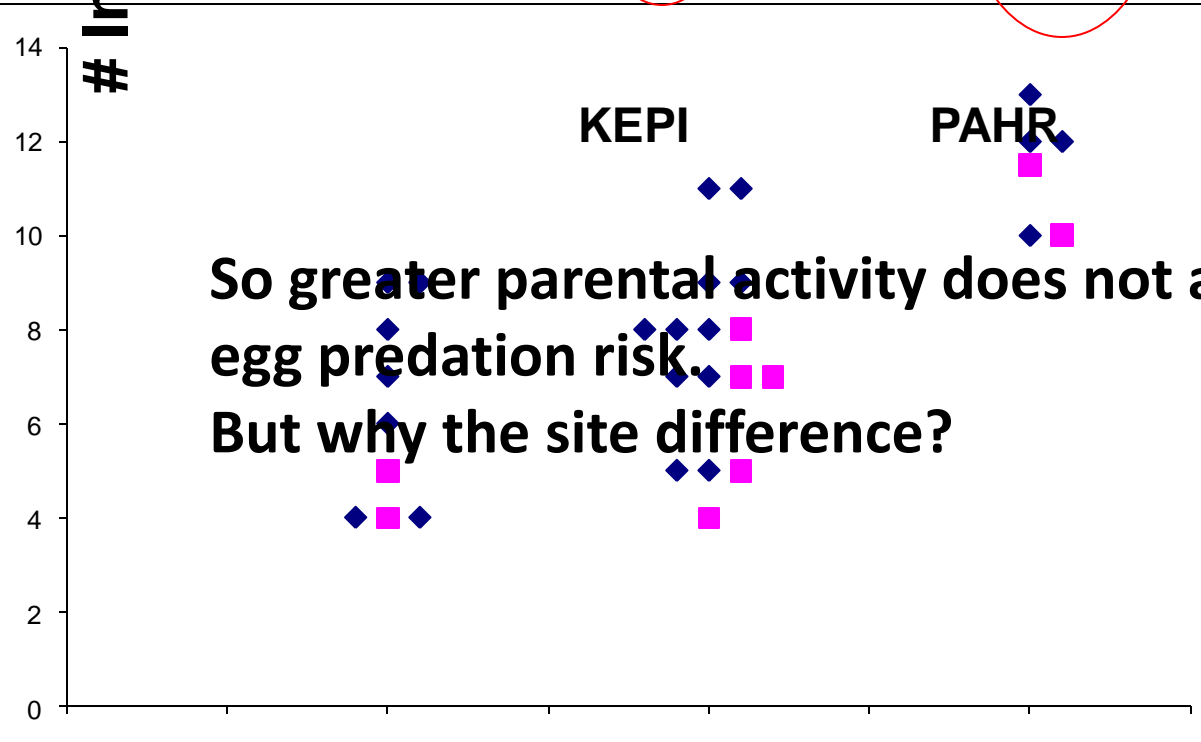
KEPI

PAHR

MESQ



Incubation Bouts



So greater parental activity does not appear to increase egg predation risk.
But why the site difference?

KEPI

PAHR

MESQ

Hypothesis 1. Nest predation associated with parasitism.

Recommendation:

Determine causal link

Consider BICO control on site specific basis

Minimize edge and increase distance from edge where possible

Hypothesis 2. Nest predators site and nest stage specific and best managed at site level

Recommendation:

Identify predators at sites with both high predation rates and high reproductive potential and implement strategies to reduce predation (e.g. water, predator control, etc)

Hypothesis 3. Incubation behavior, predation and temperature not tightly linked

Recommendation:

Investigate basis for site differences in incubation behavior

Nestling feeding rates? Still to come...



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Thanks!

