Southwestern Willow Flycatcher status and habitat restoration efforts on the Virgin River, Washington Co., Utah

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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

Breeding Biology

-Territorial

- -Territory size 0.2 – 0.5 ha

-Facultative polygynous

-Nests

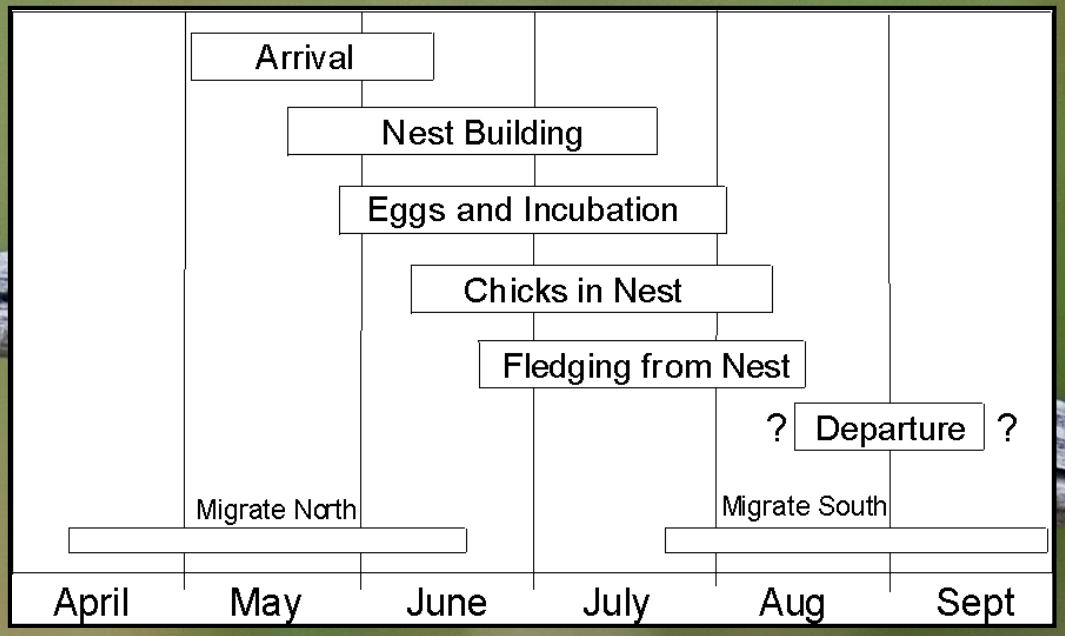
- -Female builds
- -Compact cup of grasses, plant fibers
- -Fork of tree, 2–5 m above ground

Southwestern Willow Flycatcher

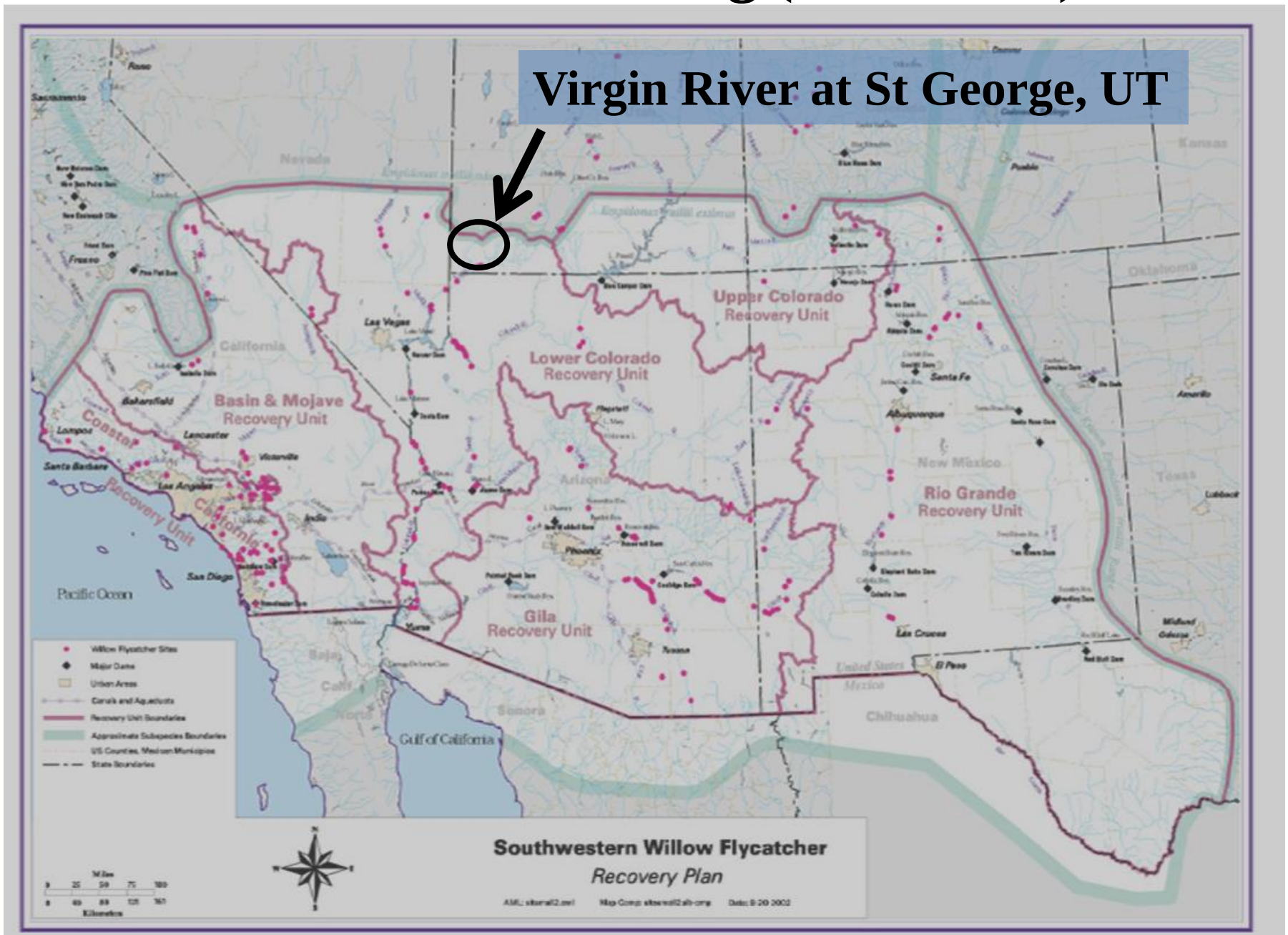
Empidonax traillii extimus

Breeding Biology

- **Eggs**
  - Clutch size 2–4 eggs
  - Female incubates, 12–13 d
- **Parental care**
  - Male & female feed nestlings, 12–15 d
  - Fledglings remain in territory 14+ d



UDWR monitoring (2008-2020)



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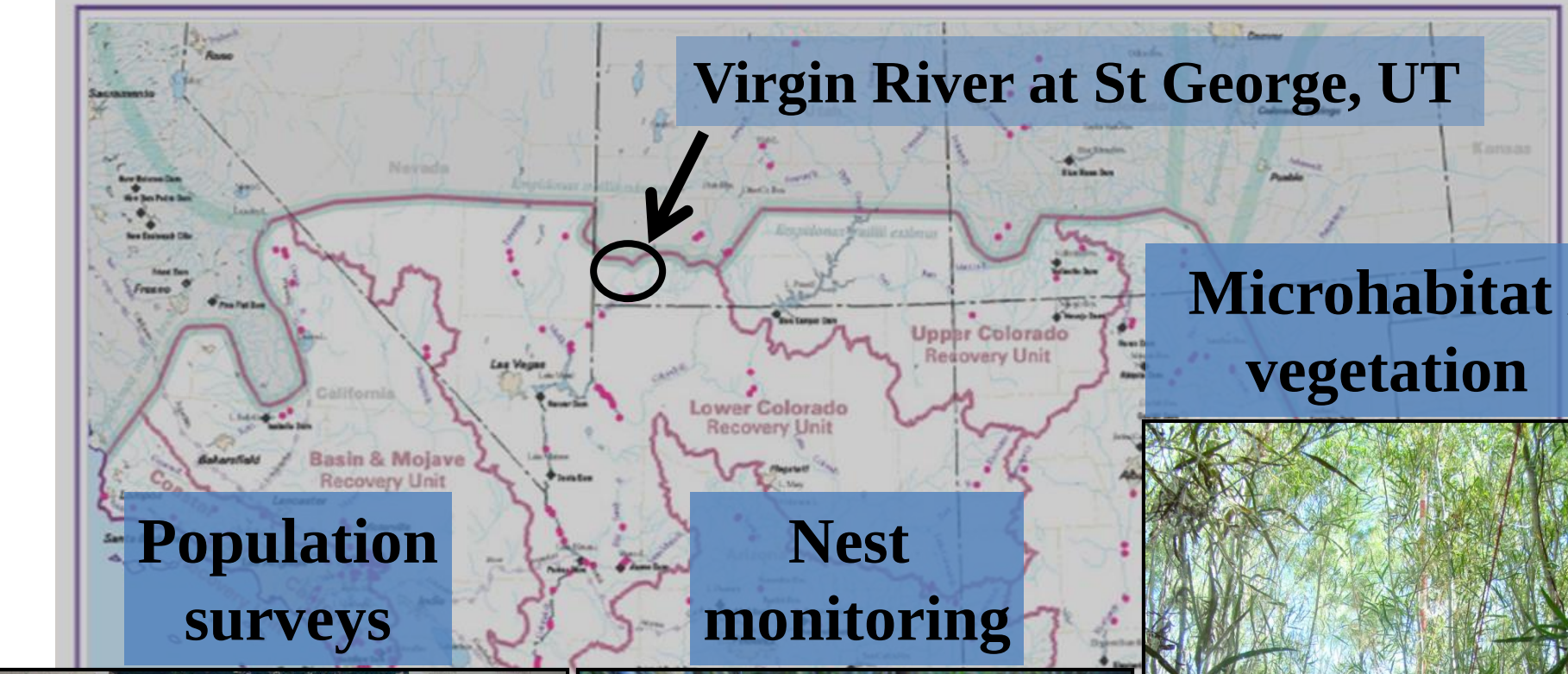

Tamarisk Leaf Beetles (*Diorhabda carinulata*) in St George

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- **Tamarisk defoliation:**
  - **2008: August, *after* SWFL breeding**
  - **2009: June**
  - **2010: June**

  ] ***peak* SWFL breeding**

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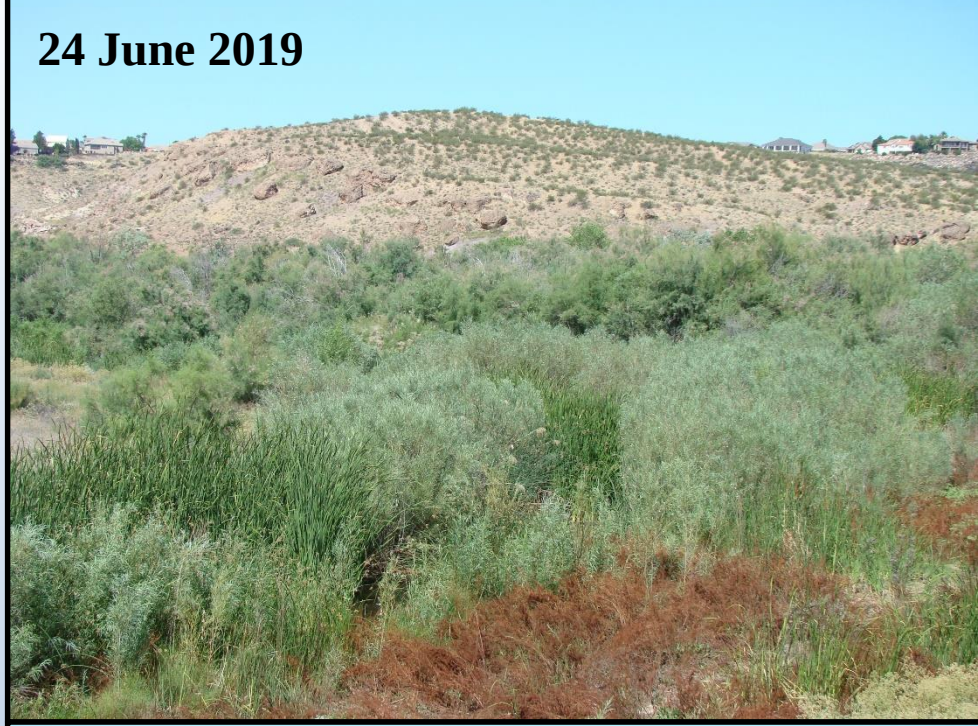
    ] ***peak*** **SWFL breeding**
  - **2011-2017: July-August**

    ] ***after*** **SWFL breeding**
  - **2018: early July**
  - **2019: early July**
  - **2020: mid-July**

    ] ***late*** **SWFL breeding**

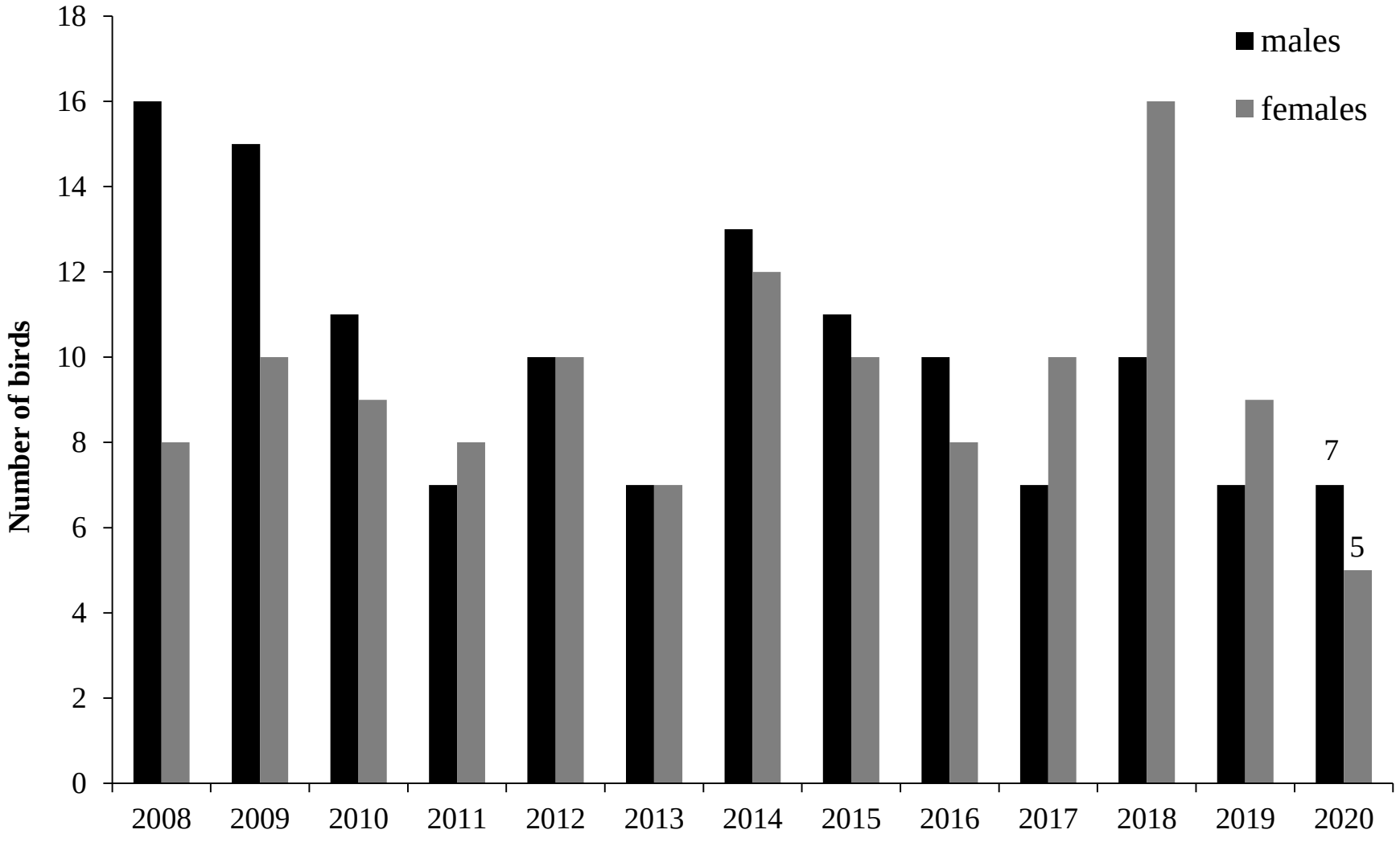



Brinton Pond
14 July 2020

Beetle-induced tamarisk defoliation

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

Total breeding SWFLs

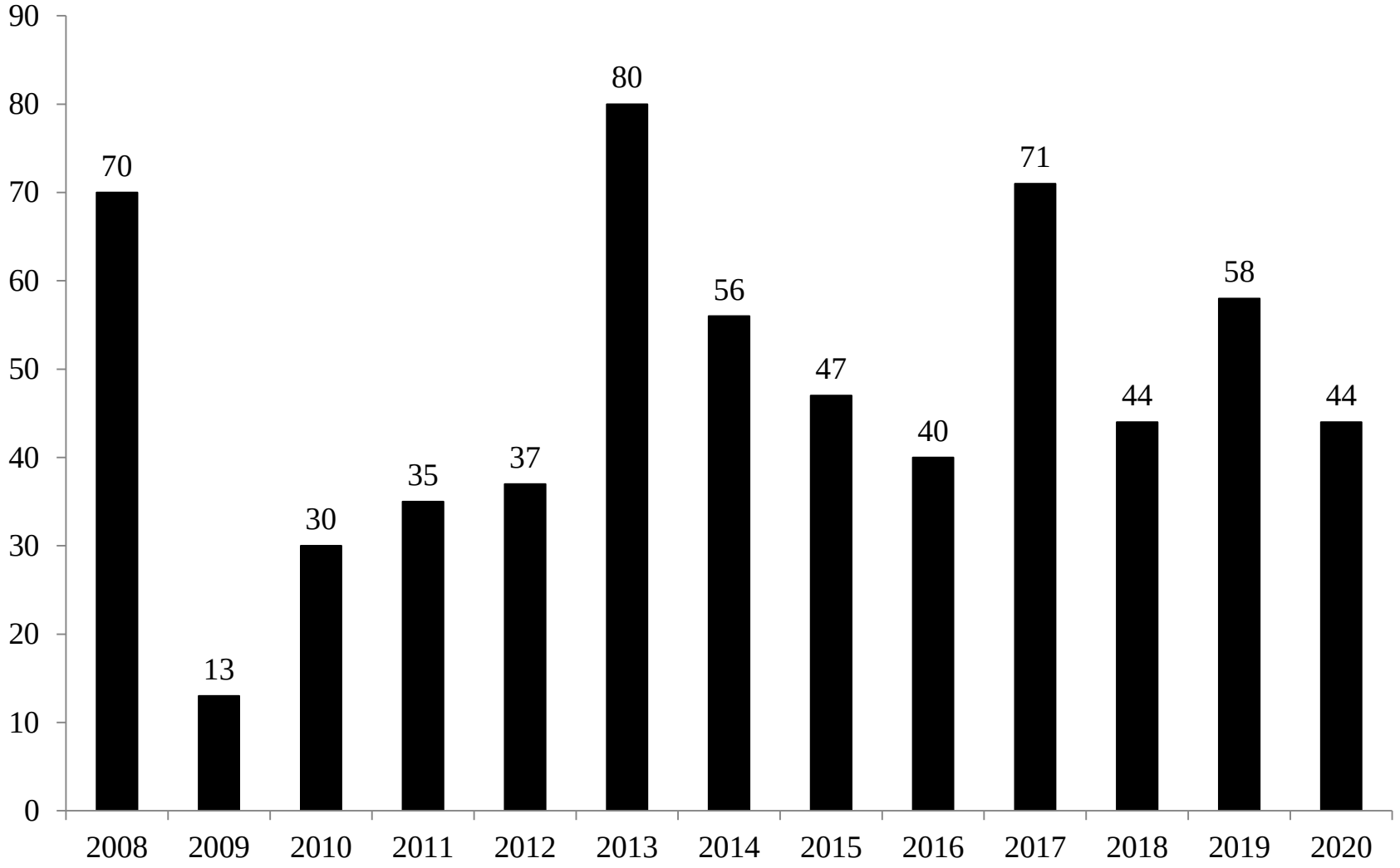


Total fledglings (2008-2020)

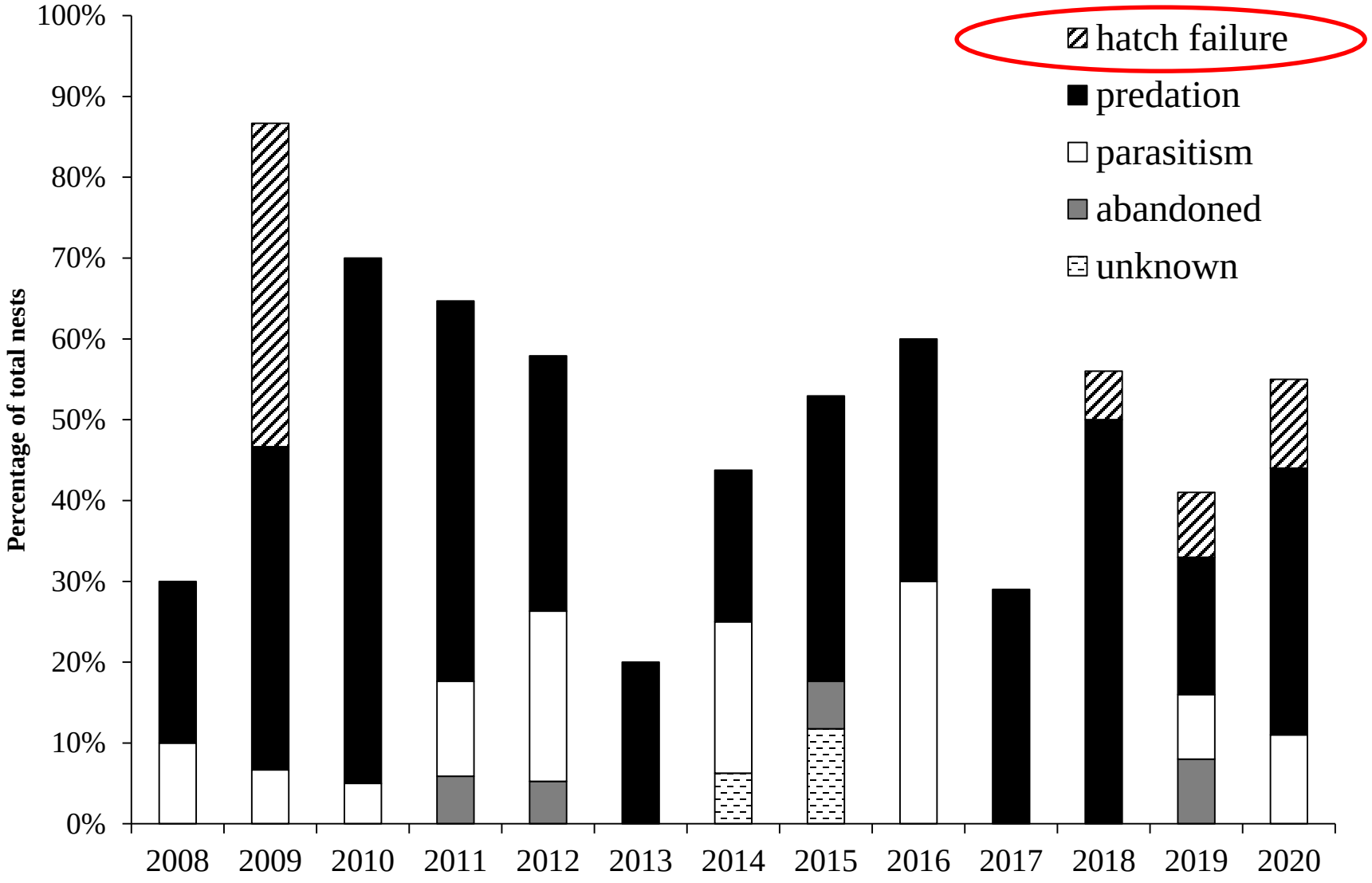
year	active nests	fledglings
2008	10	16
2009	15	2
2010	20	12
2011	17	14
2012	19	14
2013	10	21
2014	16	18
2015	17	15
2016	10	14
2017	14	29
2018	18	22
2019	12	16
2020	9	8
Average	**14.4**	**15.5**

Apparent nest success

(% of active nests producing at least 1 SWFL fledgling)



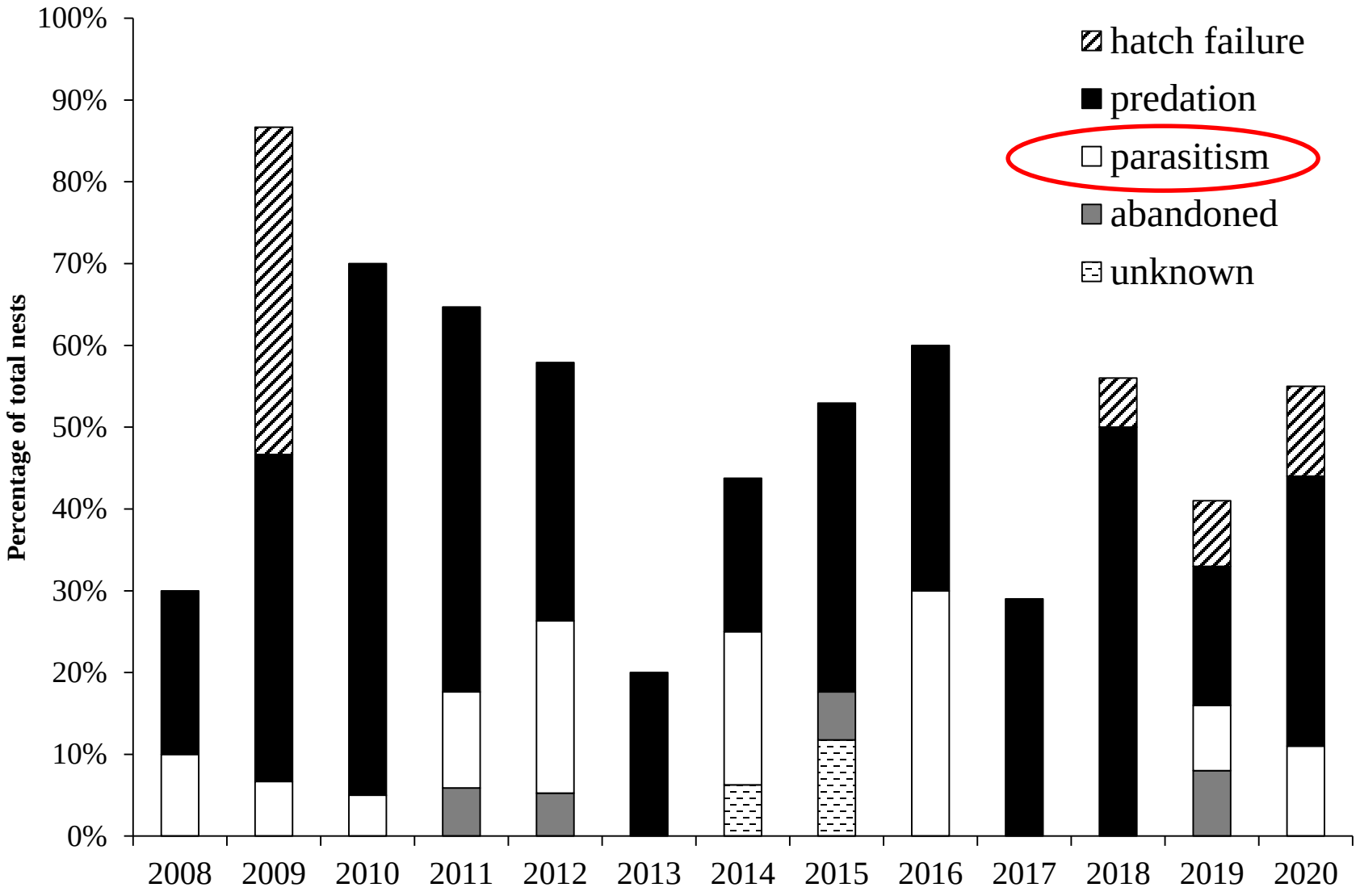
Cause of Failure



2018 Y-Drain Marsh 2017

Seegmiller Marsh - 2019

Cause of Failure



Brown-headed Cowbird Parasitism

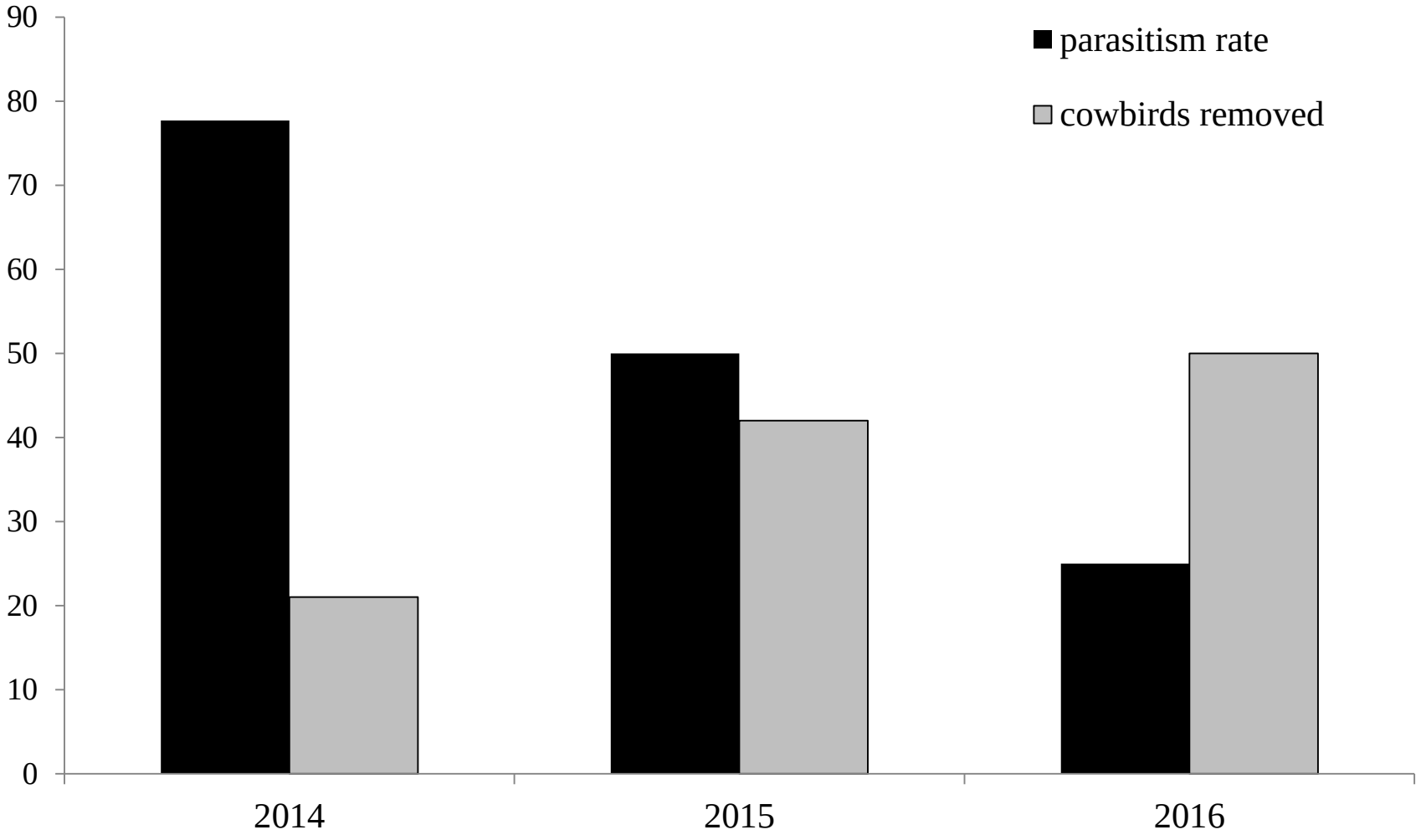
Brown-headed Cowbird Parasitism

Year	Active flycatcher nests	Parasitized nests	Parasitism rate
2008	10	2	20.0%
2009	15	6	40.0%
2010	20	5	25.0%
2011	17	10	58.8%
2012	19	9	47.4%
2013	10	2	20.0%
2014	16	10	62.5%
2015	17	6	35.3%
2016	10	5	50.0%
2017	14	2	14.3%
2018	18	0	0.0%
2019	12	2	16.7%
2020	9	1	11.1%
Total	**187**	**60**	**32.1%**

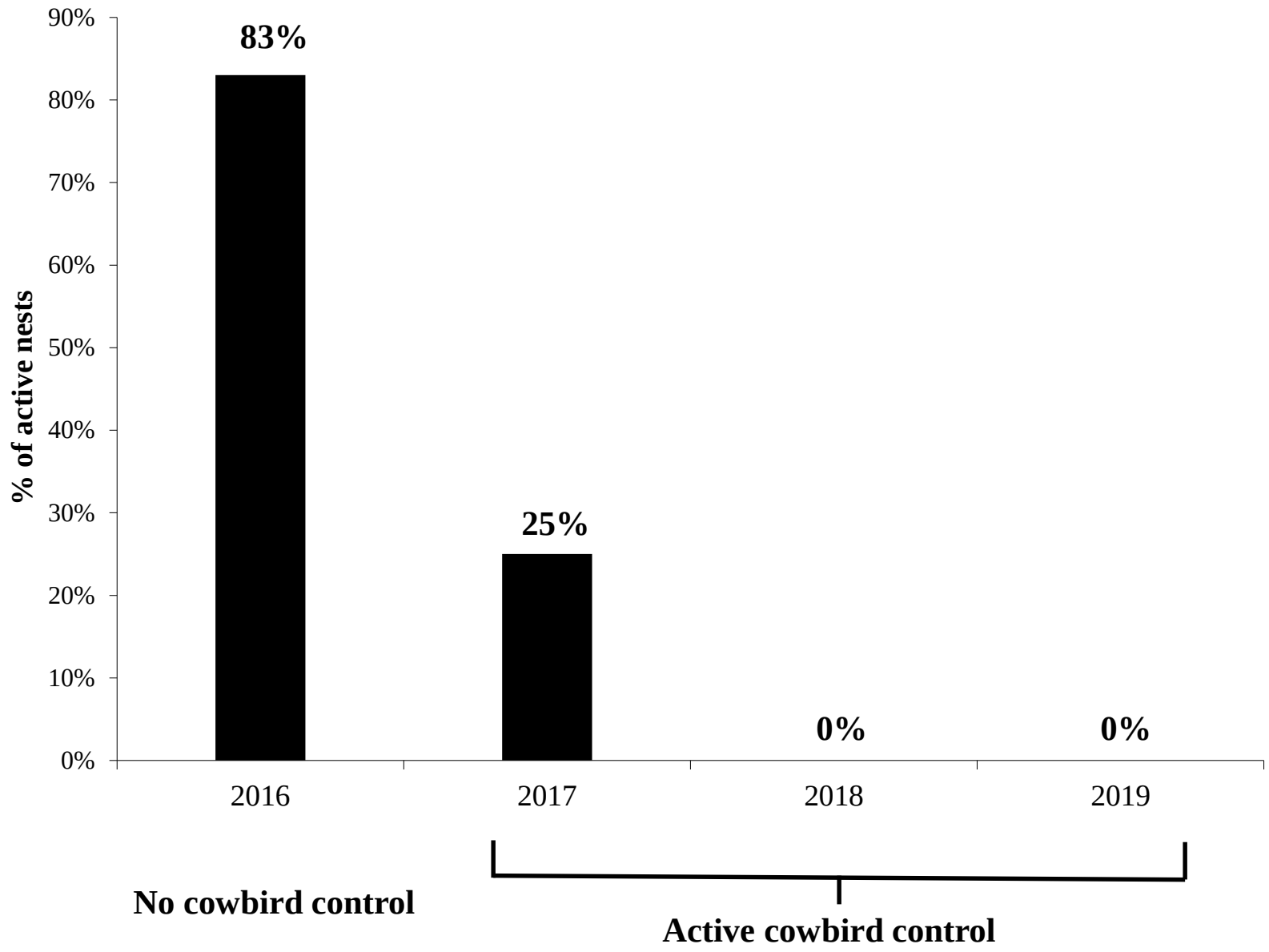
Brown-headed Cowbird Control

- **2013** = 53 cowbirds removed
  - Snipe Pond and Y-Drain Marsh
- **2014** = 65 cowbirds removed
  - Riverside Marsh and Schmutz Drain
- **2015** = 70 cowbirds removed
  - Riverside Marsh and Schmutz Drain
- **2016** = 77 cowbirds removed
  - Riverside Marsh and Schmutz Drain
- **2017** = 59 cowbirds removed
  - Riverside Marsh and Y-Drain Marsh
- **2018** = 20 cowbirds removed
  - Riverside Marsh and Y-Drain Marsh
- **2019** = 11 cowbirds removed
  - Y-Drain Marsh
- **2020** = 64 cowbirds removed
  - Seegmiller Marsh, Y-Drain Marsh, and Brinton Pond
- **Total 2013-2020 = <u>419 cowbirds</u>**

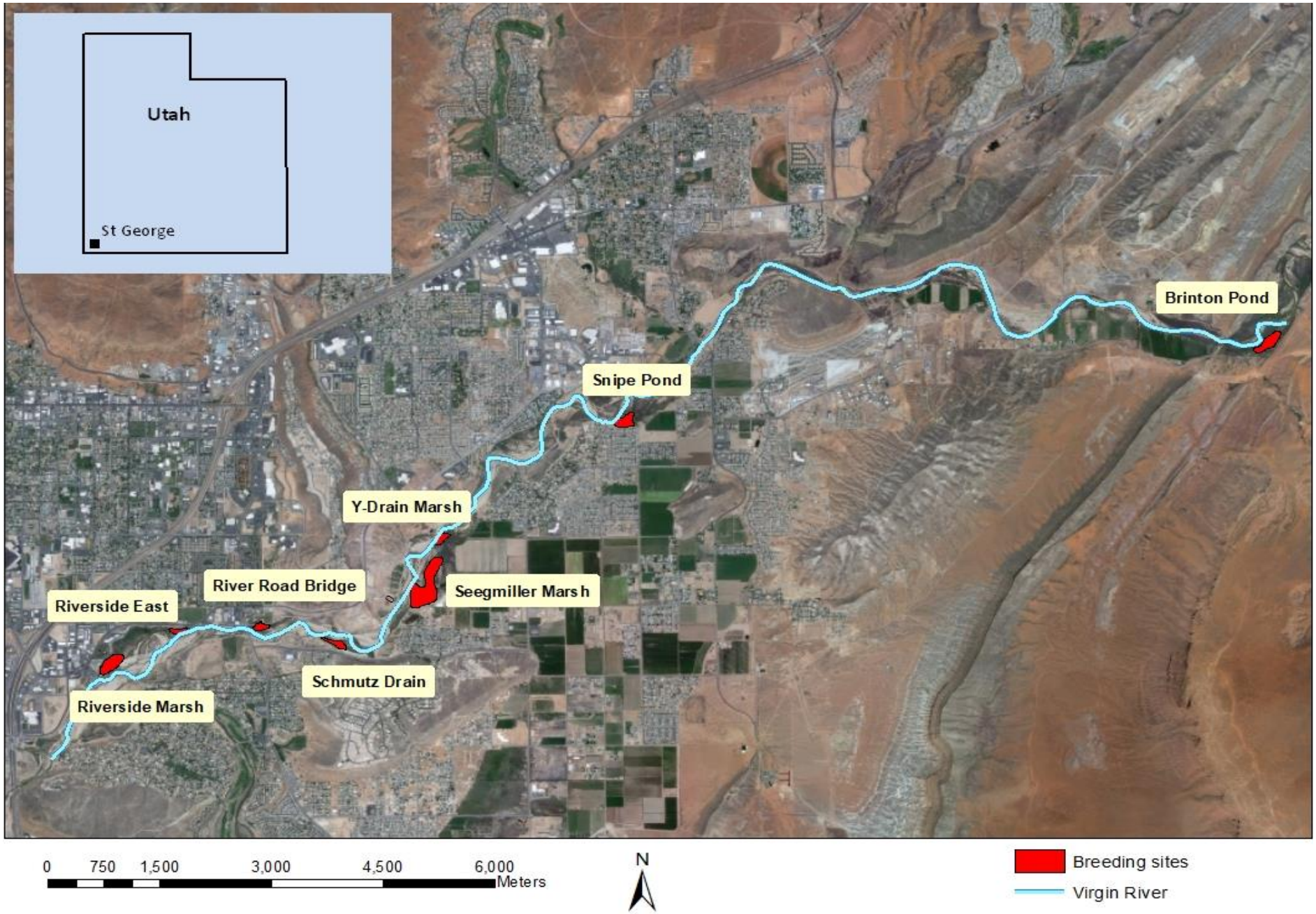
Cowbird Control 2014-2016 – Schmutz Drain



Cowbird Parasitism – Y-Drain Marsh

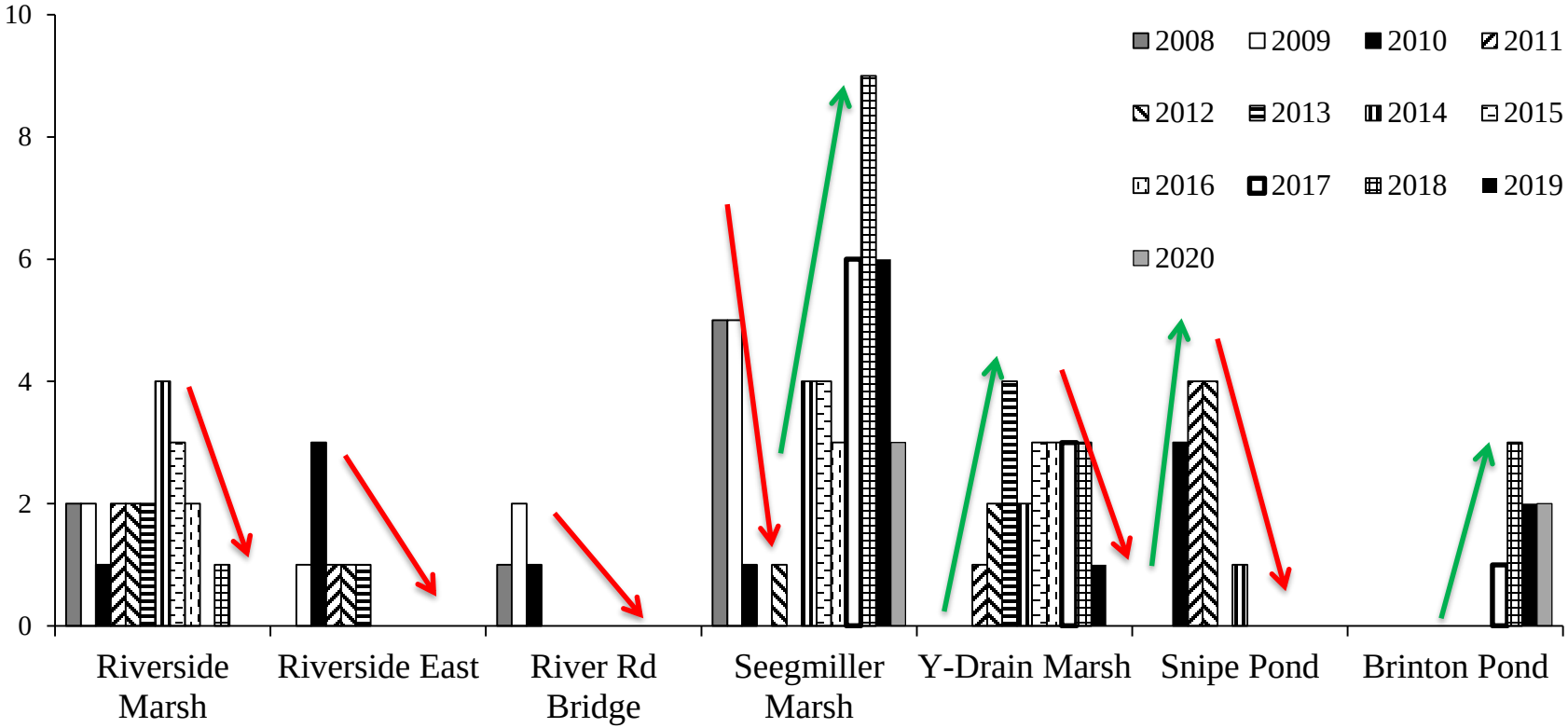


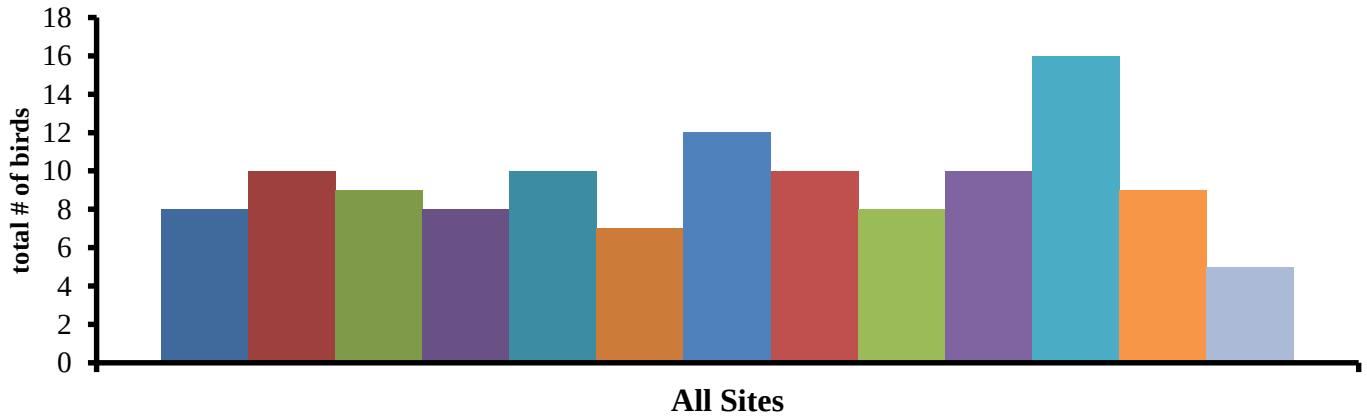
St George study area



SWFL numbers in St George, 2008-2020

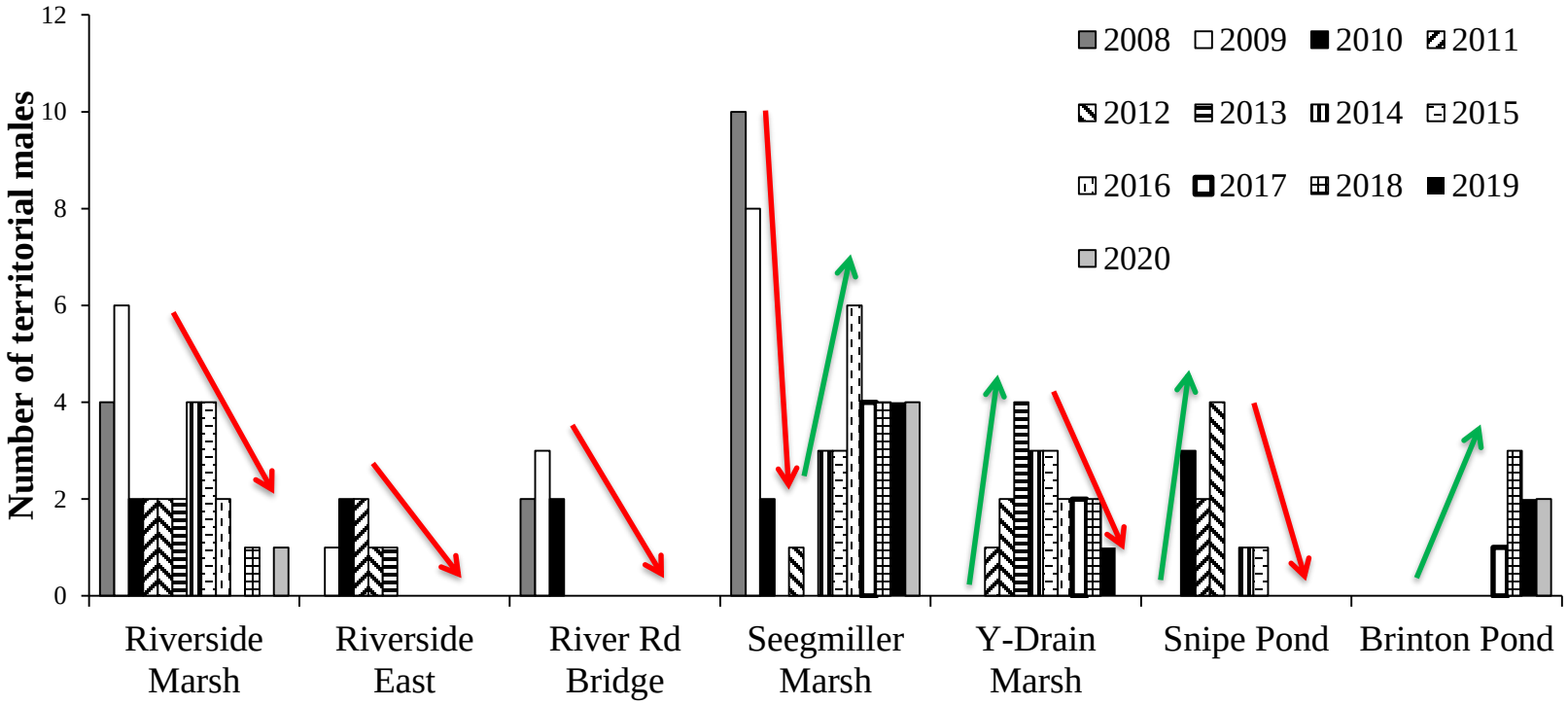
Females: distribution shift; overall number minimal change, 2020 decline

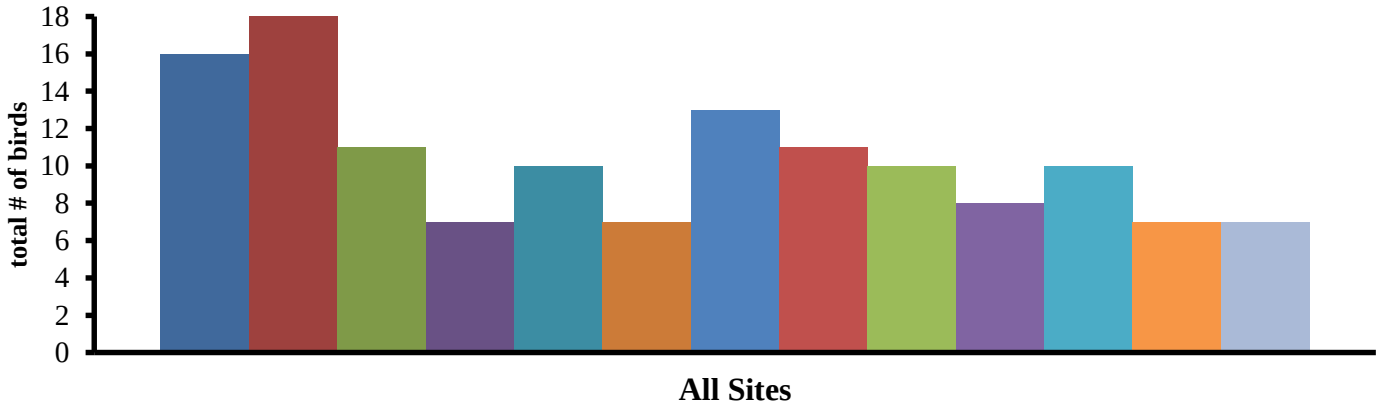




SWFL numbers in St George, 2008-2020

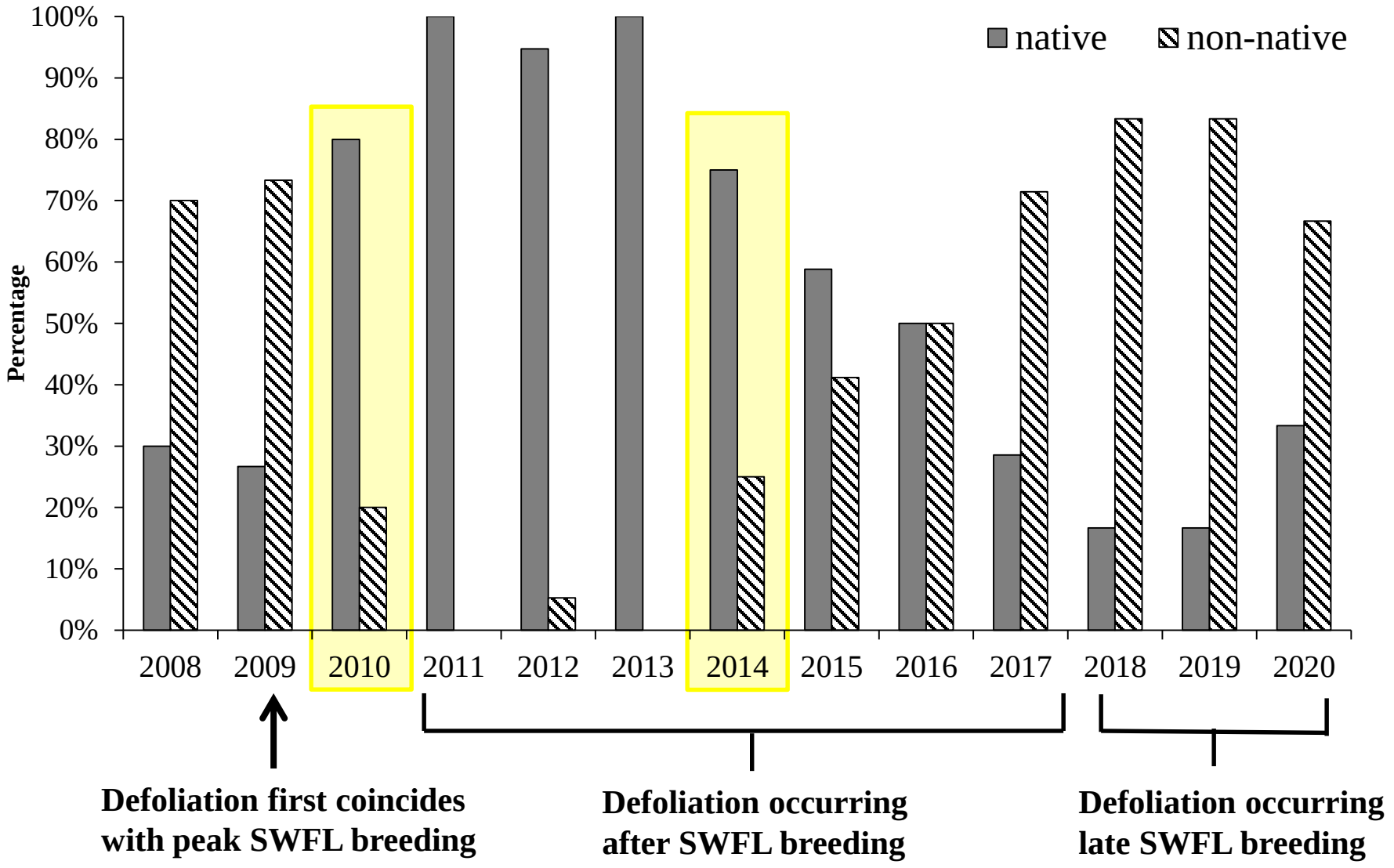
Males: distribution shift; overall number minimal change after 2009 decline





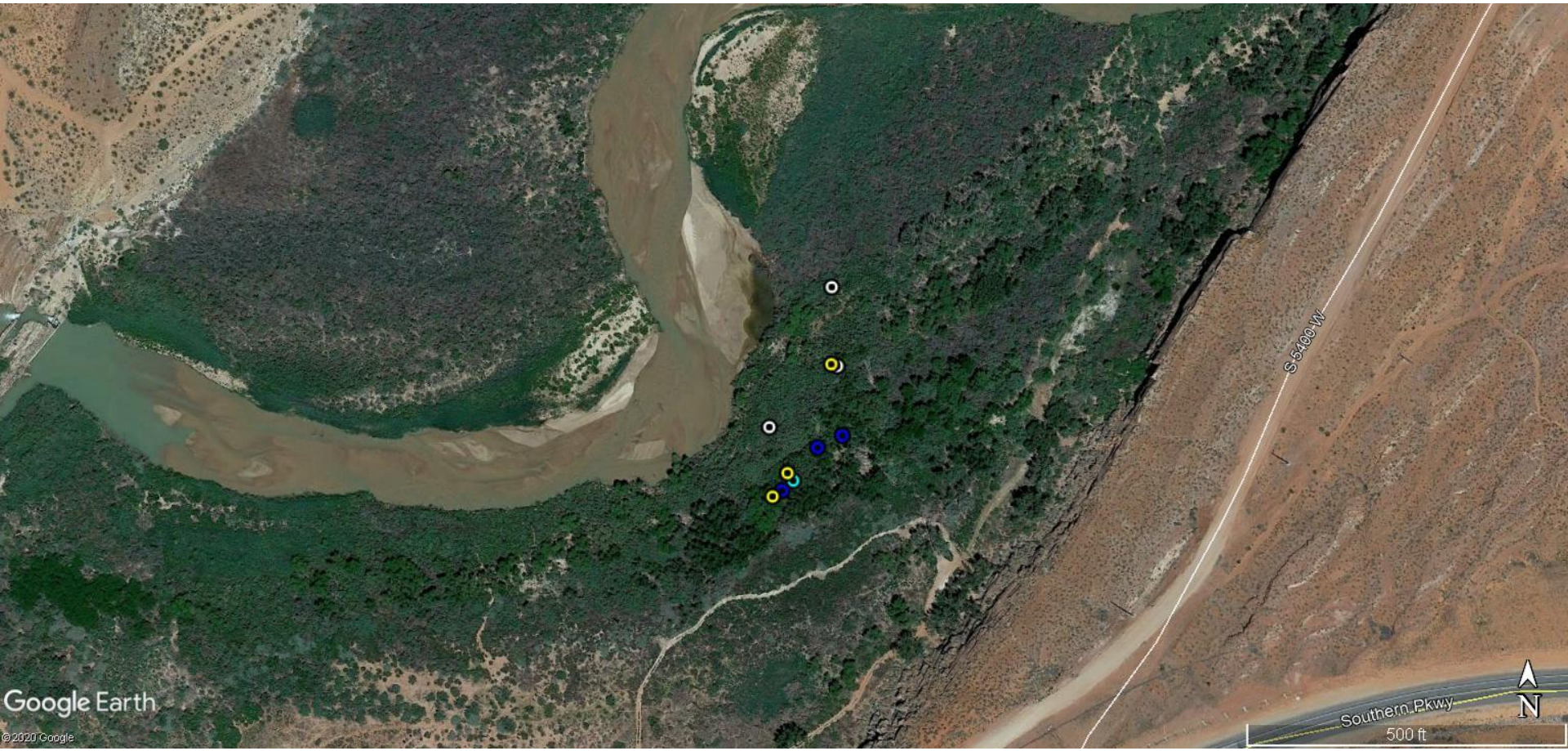
Habitat use shifts (2010, 2014)

-- nest site dominant species (5m-radius)



Brinton Pond

2017-2020



Brinton Pond

Microhabitat questions

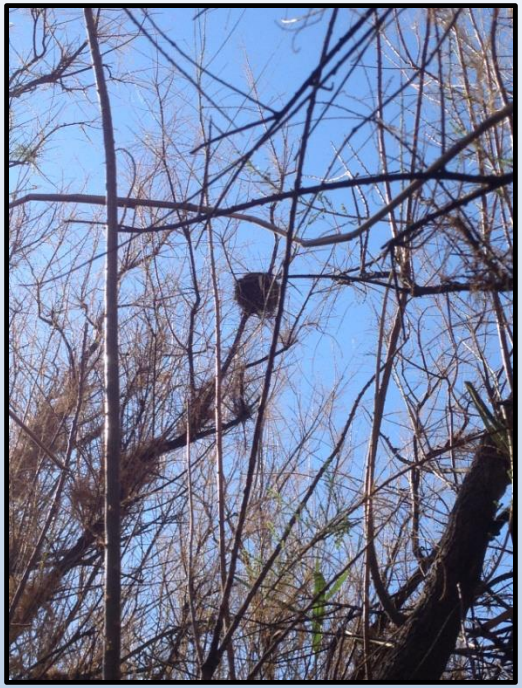
-Do SWFL select microhabitat features?

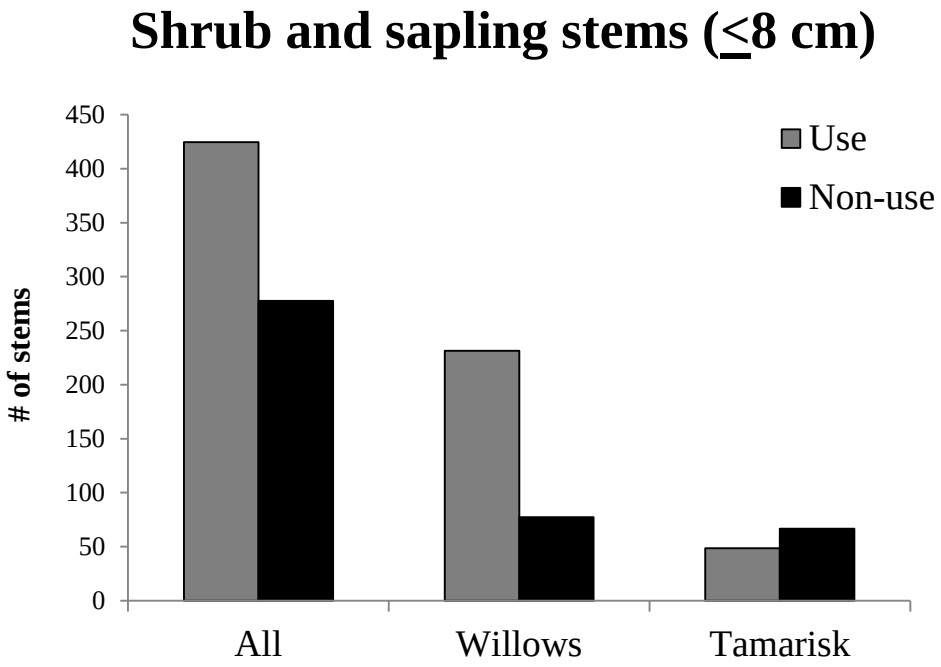
- **-Compare vegetation at nests & nonuse sites**
- **-Compare nest substrate use given availability**

-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**

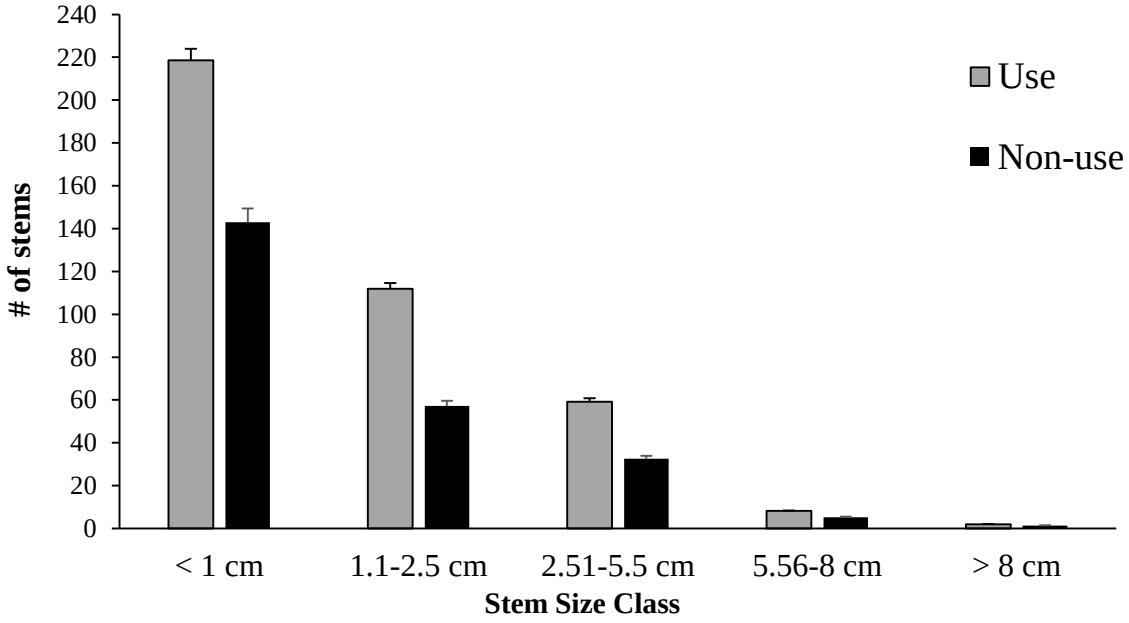
-What do results suggest about habitat restoration and enhancement?





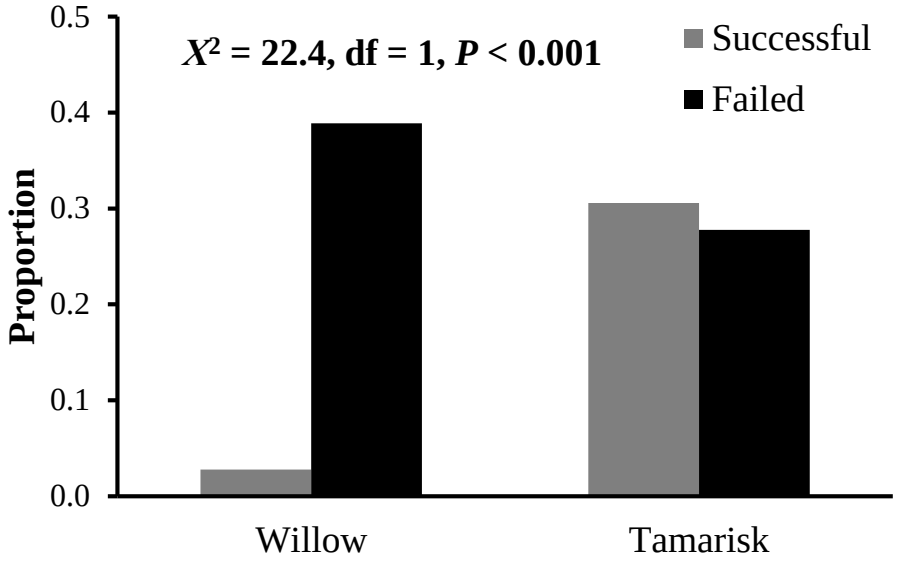
Microhabitat features at nesting sites:

- Nests are located in areas with high shrub and sapling density; low tree density

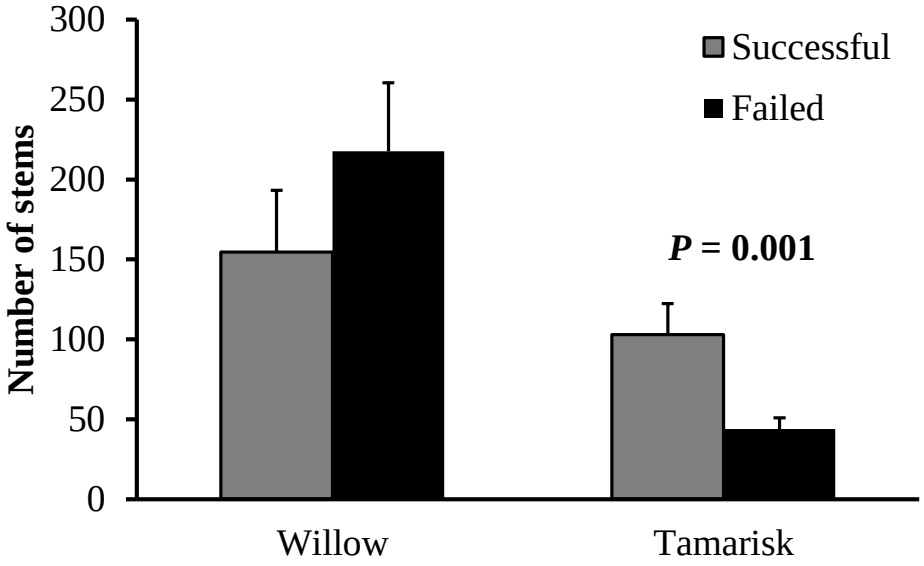


Nest success habitat-mediated

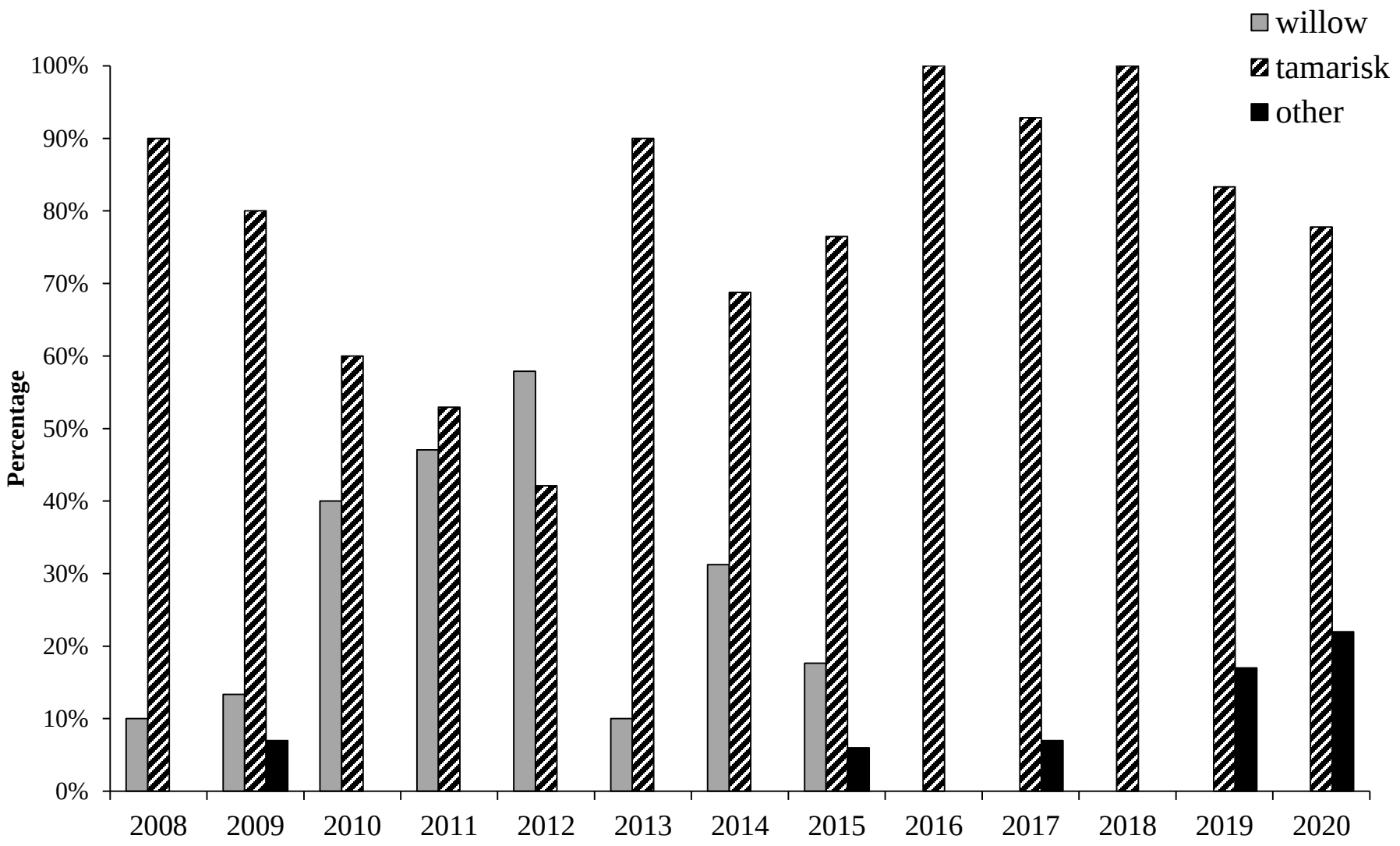
Nests more likely to fledge in tamarisk than willow substrates



Nests more likely to fledge with higher tamarisk shrub density



Nest substrate



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 preferred by SWFL in the absence of beetle defoliation
- SWFL select for habitat with sapling undergrowth and select against habitat with mature, old-growth willow
-Tamarisk shrubs valuable when mixed with native vegetation

-1) Reduce tamarisk density by approx. 25-30%
-Prioritize tamarisk trees for removal

-2) Replant thinned areas with mix of native species that provide understory structure
-e.g. Coyote willow, cottonwood, seep-willow

-3) Prioritize areas with appropriate hydrology

Riverside Marsh Restoration Area

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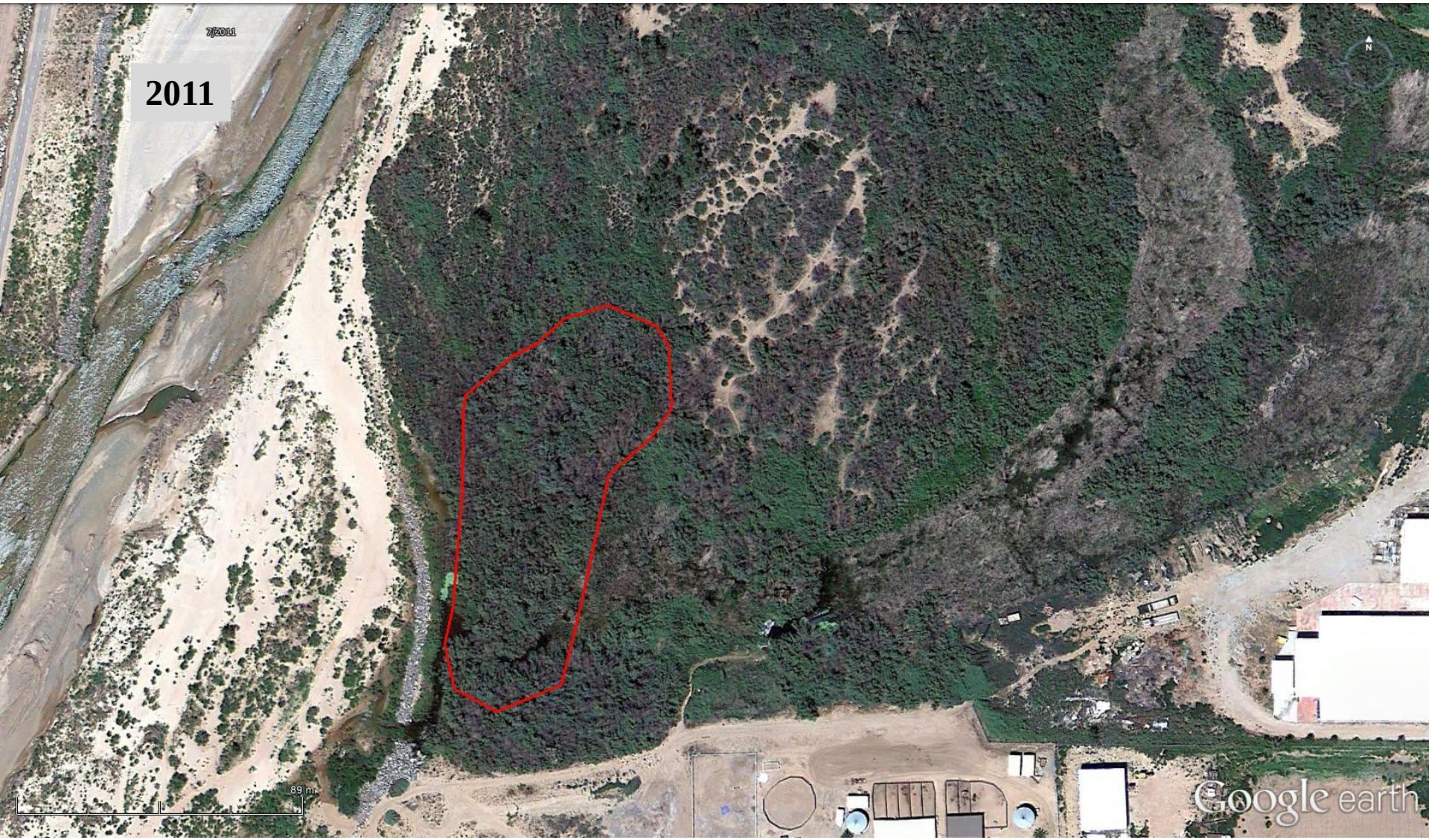
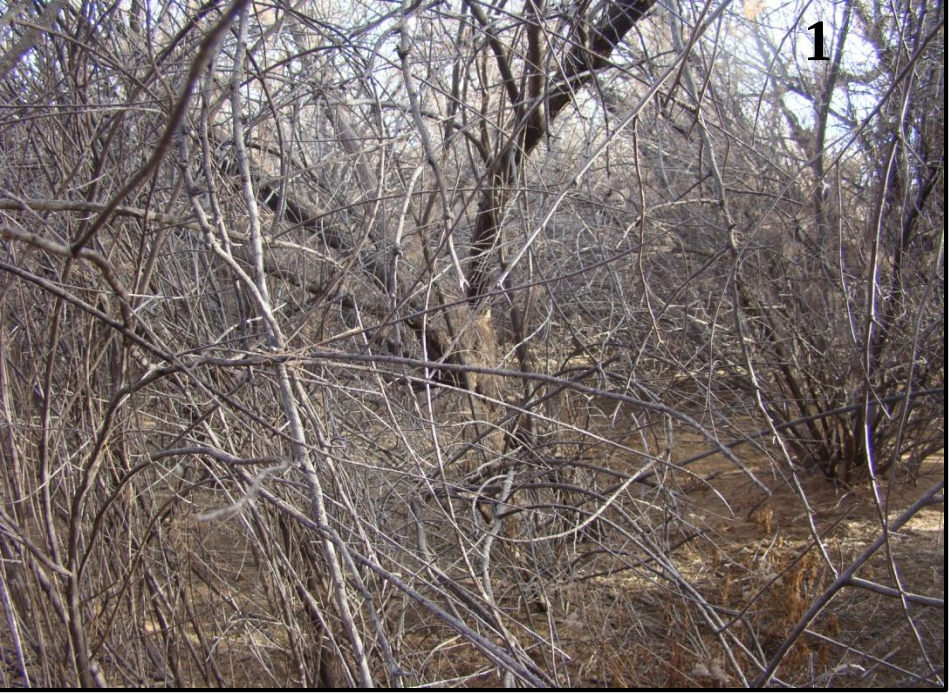
Seegmiller Marsh Restoration

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Riverside East Restoration - 2017

Riverside East Restoration - 2017


February 7


February 27


July 13


October 10

Priorities for future work

- -SWFL habitat restoration
  - -Mitigation / ACE / Flood Control Authority
    - -River Rd Bridge
    - -Snipe Pond
    - -Riverside East
    - -Springs Pond outflow
    - -Seegmiller Marsh
- -Continue SWFL monitoring
  - -Population size, nest success, & habitat use
  - -Distribution
    - - expand/increase survey sites
  - -Cowbird control
    - - continued management in 2021
  - -Identify nest predators
    - -video monitoring

Seegmiller Marsh - 2020

Partners

Lower Virgin River Fuels & Fire Council
Northern Arizona University
US Bureau of Reclamation
US Fish & Wildlife Service
Utah Division of Forestry, Fire & State Lands
Utah's Watershed Restoration Initiative
Virgin River Program
Washington County Habitat Conservation Plan
Washington County Water Conservancy District