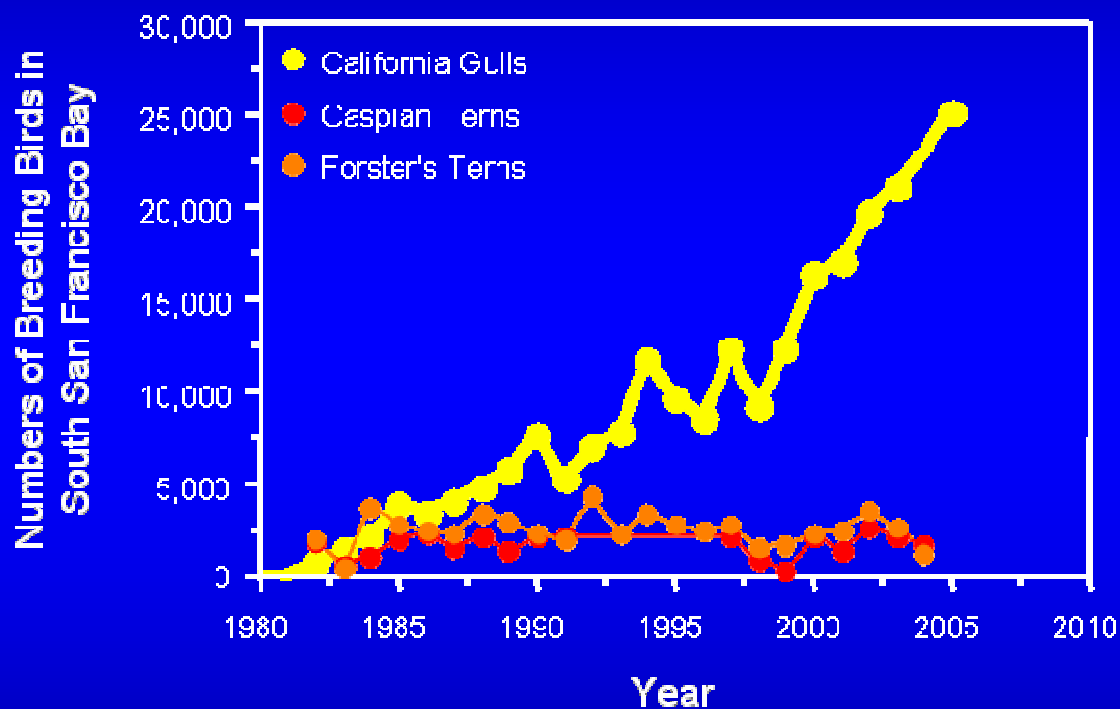




# Gull Predation on Waterbird Nests and Chicks in the South San Francisco Bay

Josh Ackerman and John Takekawa  
USGS, Davis & San Francisco Bay Estuary Field Stations

# Gull Impacts on Breeding Birds



- Displacement of nesting birds
- Harassment of foraging & nesting birds
- Egg Depredation
- Chick Depredation

\*Data from Strong et al. 2004 and San Francisco Bay Bird Observatory.

# Gull Impacts: Nest Success of Avocets, Stilts, & Forster's Terns



# Nest Monitoring

- A1, A8, A16, New Chicago Marsh
- 430 Avocet, 168 Stilt, & 581 Forster's Tern Nests
- Nests checked weekly
- Calculated Mayfield nest success for each pond



# Nest Success

## Forster's Terns

- 88% Mayfield nest success
- 407 nests monitored in A1, A8, & A16

## Avocets

- 55% Mayfield nest success
- 352 nests monitored in A8 & A16

## Stilts

- 48% Mayfield nest success
- 98 nests monitored in New Chicago Marsh

# Nest Success by Site

## A1

- 94% tern (124 nests)
- No avocet nests

## A16

- 94% tern (168 nests)
- 86% avocet (164 nests)

## A8

- 73% tern (115 nests)
- 35% avocet (216 nests)

→ A8 was a gull foraging and roosting area and is close to A6 gull colony with >17,000 breeding gulls (C. Strong)

# Fake Eggs Added to Avocet Nests in A8 to Determine Predator Type

18 nests:

- 4 nests with no depredation
- 5 nests had all eggs missing
- 9 nests with predator marks in fake eggs
  - 100% caused by avian predators (likely gulls)



# Nest Success by Site

## Gull Predation

### A1

- 94% tern (124 nests)
- No avocet nests

### A16

- 94% tern (168 nests)
- 86% avocet (164 nests)

### A8

- 73% tern (115 nests)
- 35% avocet (216 nests)

→ using remote nest cameras in 2006 to determine nest predators



# Gull Impacts: Avocet & Stilt Chick Survival via Radio Telemetry



# Radio-marking Chicks at Hatching

- 74 Avocet and 33 Stilt Chicks Radio-Marked
- Transmitters weighed 1.1 g for avocets and 0.8 g for stilts
- Attached to back with sutures

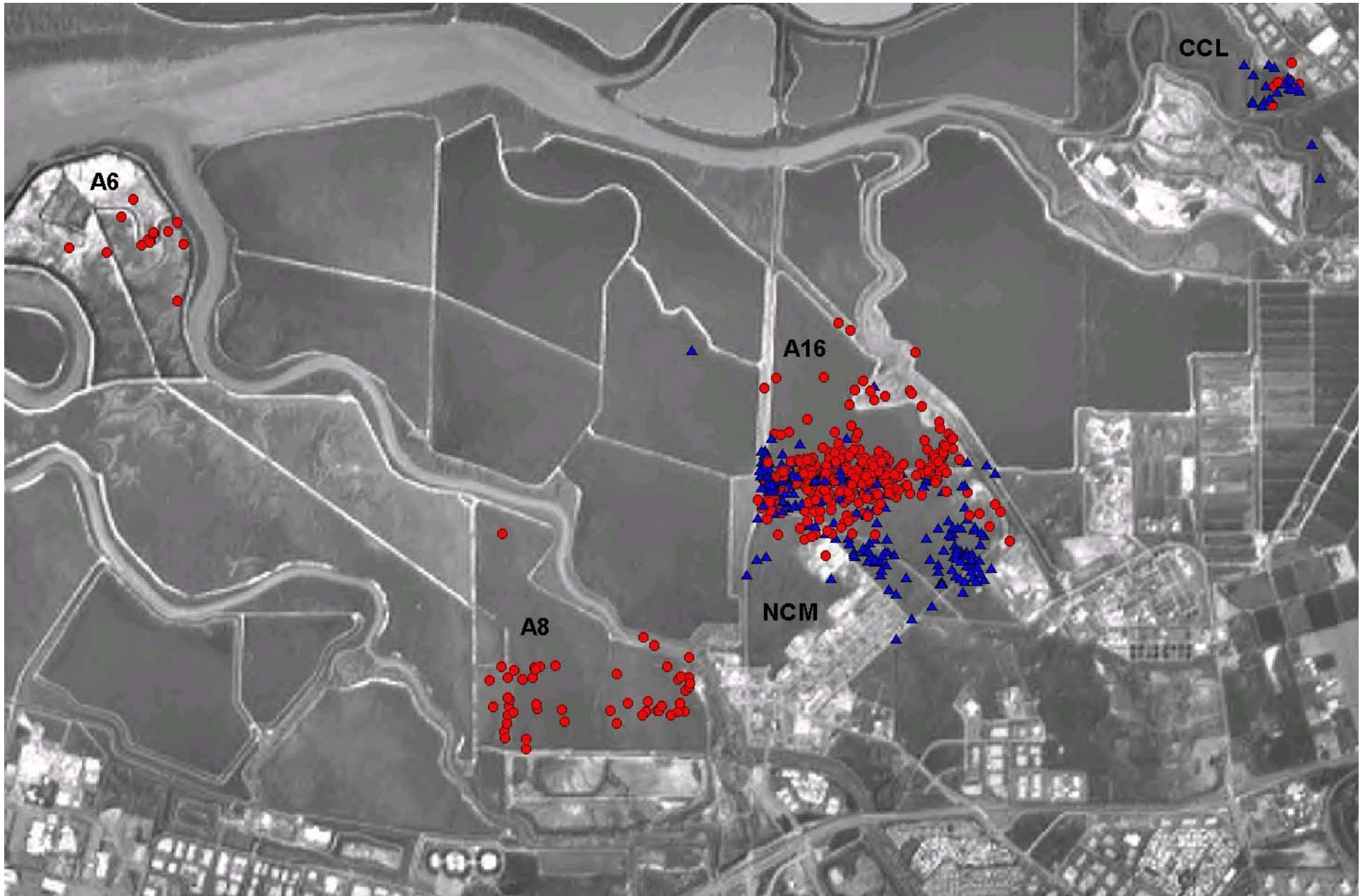


# Radio-tracking Chicks

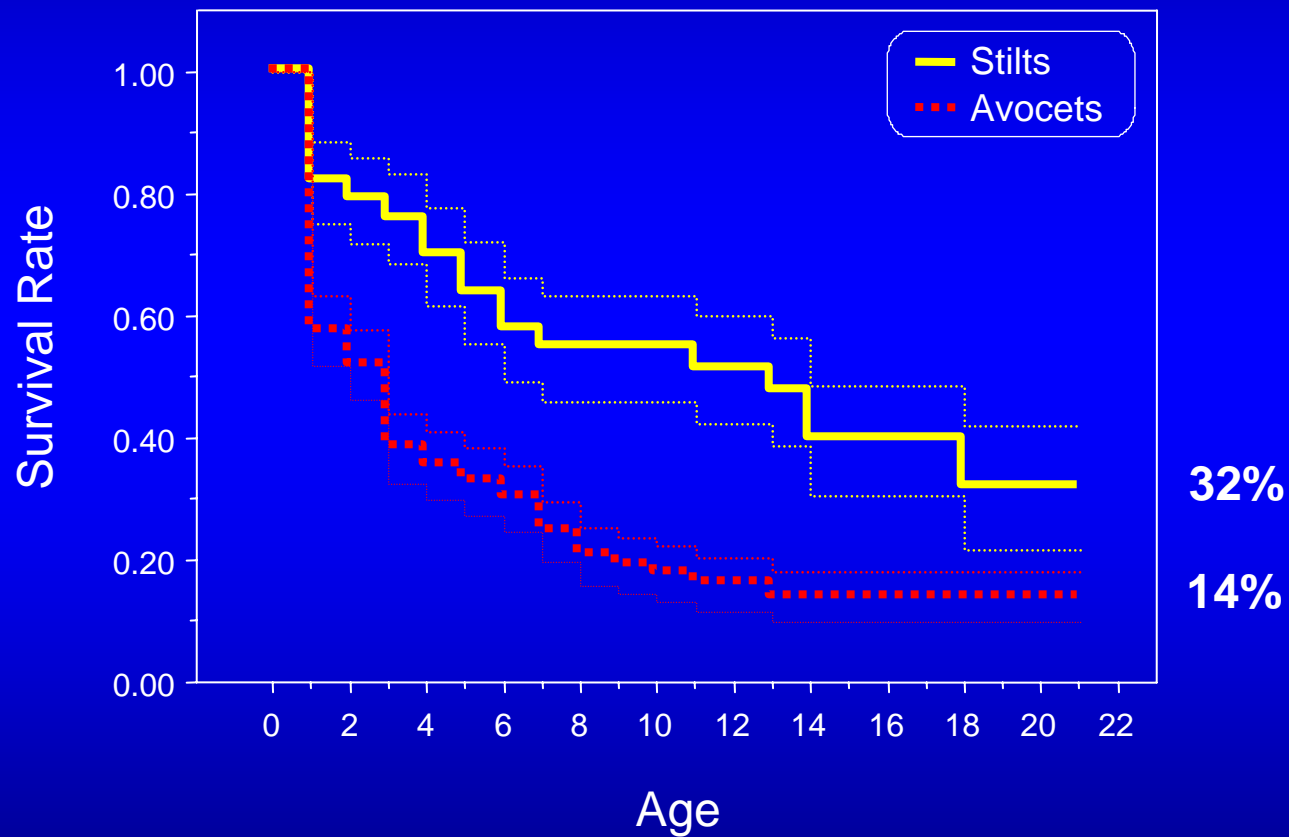
- Located chicks daily
- Truck-mounted telemetry systems
- Searched for dead chicks by foot with hand-held antennas



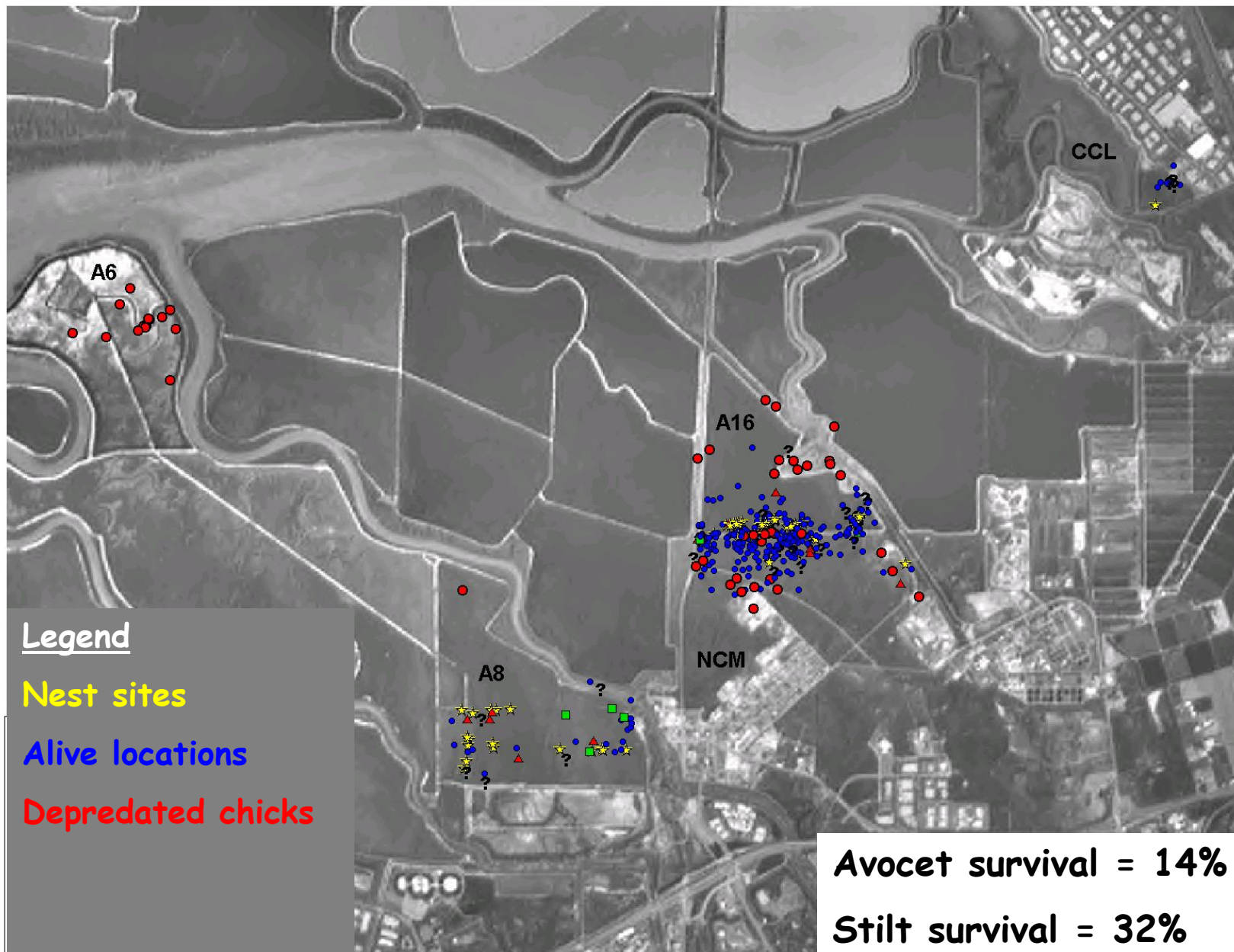
# Radio Locations of **Stilt** and **Avocet** Chicks



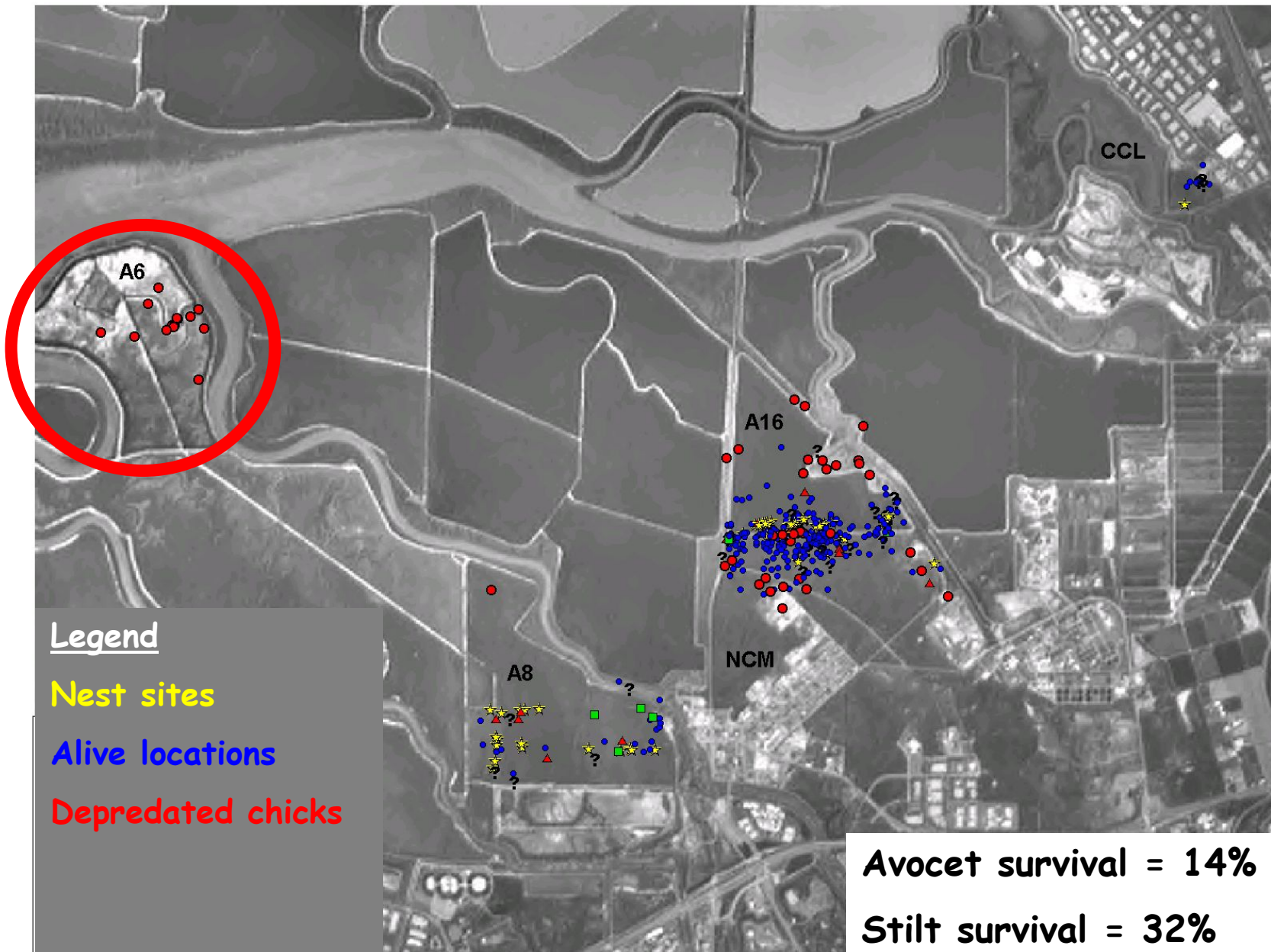
# Survival Rates of Stilt and Avocet Chicks (Cox's Proportional Hazards Model)



# Locations & Fates of Avocet Chicks



# Locations & Fates of Avocet Chicks



- 15 radios were found in A6 gull colony in 2005 (already found 10 radios in A6 in 2006)
- A6 colony has >17,000 breeding gulls (C. Strong)





# Locations & Fates of Stilt Chicks

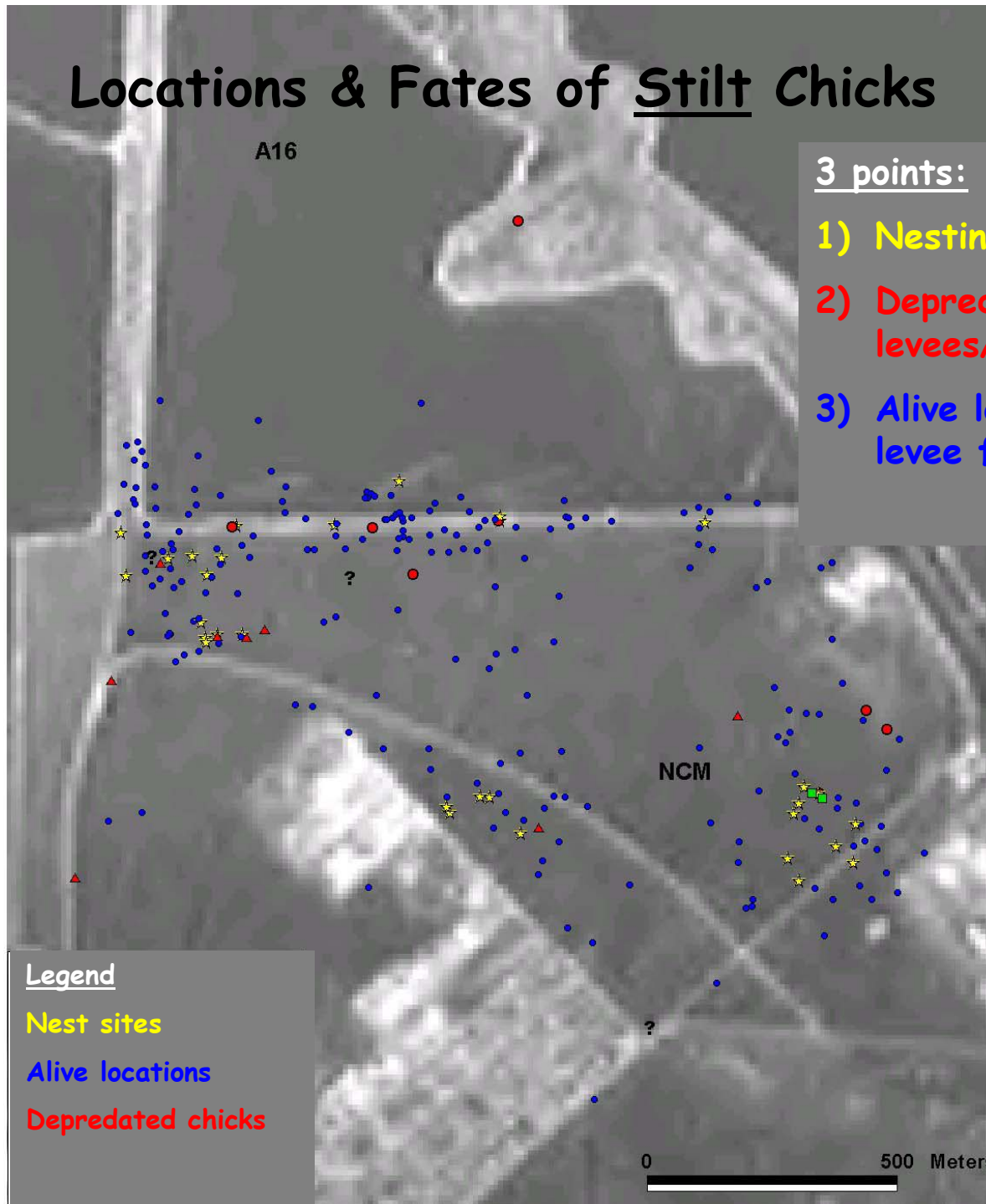


# Predators of Chicks

	<u>Avocet</u>	<u>Stilt</u>
Avian*	74%	43%
Mammals	16%	29%
Snakes	5%	0%
Burrows	5%	29%

\*54% of avian depredations on avocets by gulls;  
no gull depredation on stilts

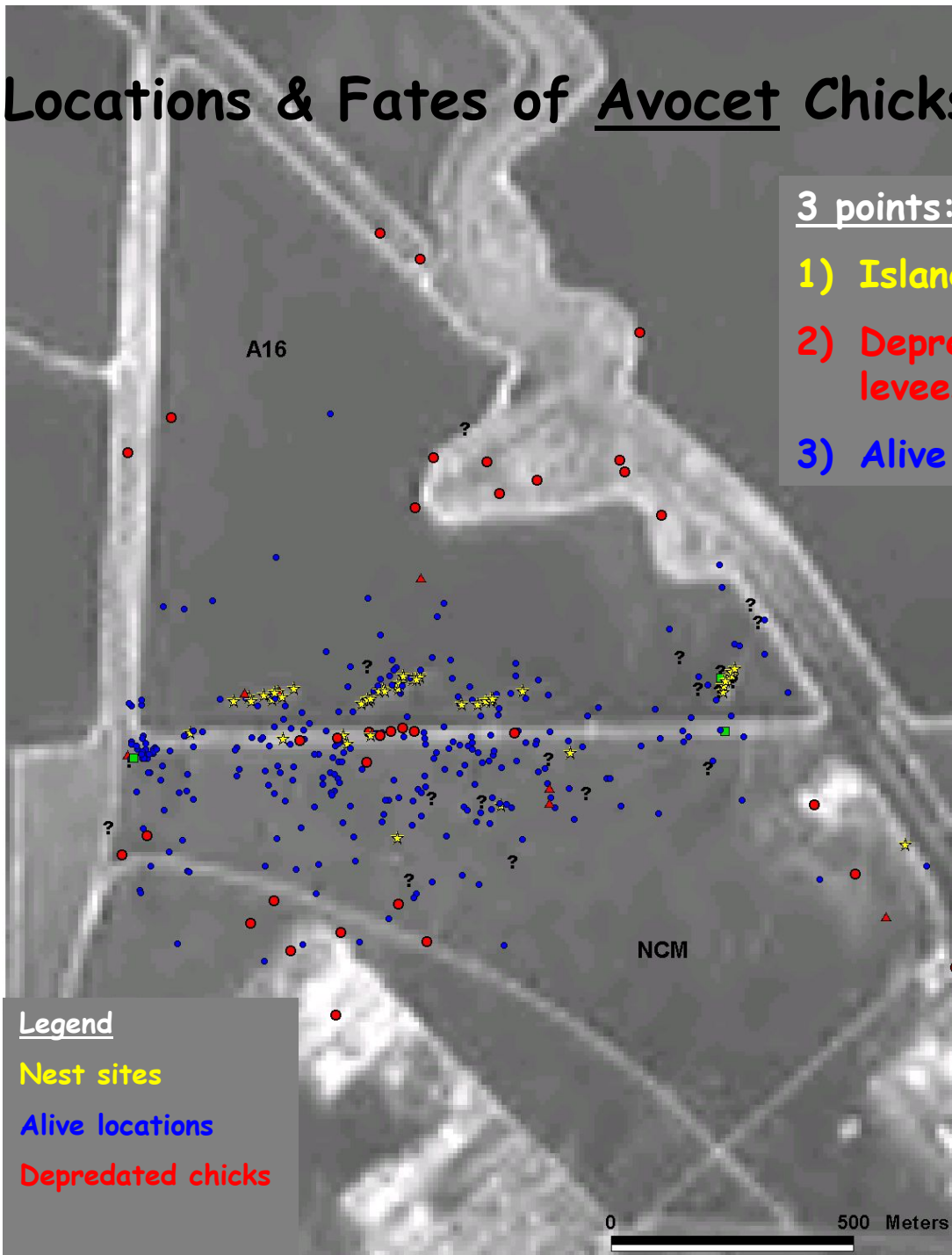
# Locations & Fates of Stilt Chicks



# Locations & Fates of Avocet Chicks

## 3 points:

- 1) Island nest sites in A16
- 2) Depredated chicks along levees/canals
- 3) Alive locations in NCM



## Legend

Nest sites

Alive locations

Depredated chicks

0 500 Meters

# Locations & Fates of Avocet Chicks

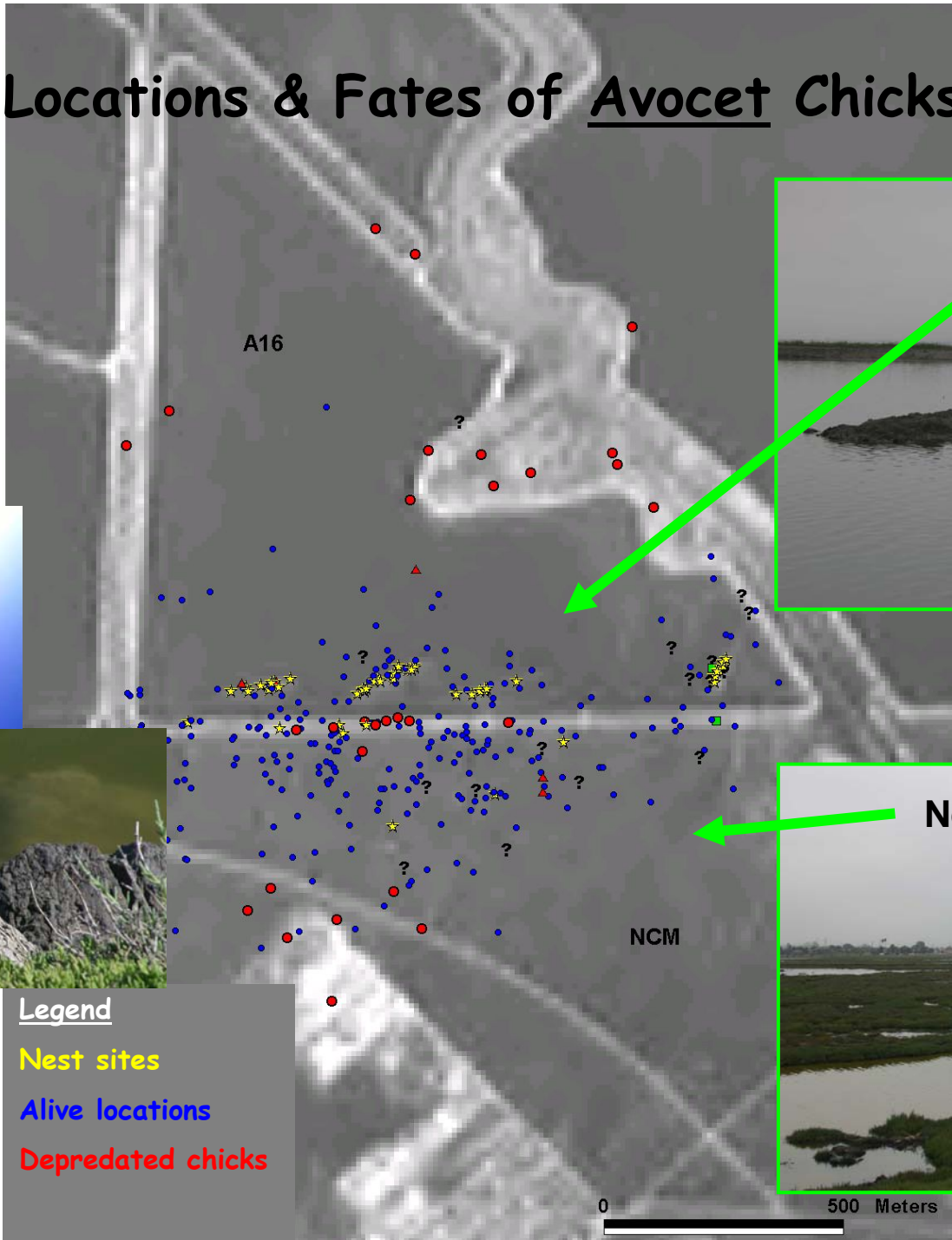


## Legend

Nest sites

Alive locations

Depredated chicks



0 500 Meters

## Conclusions: Nest Success

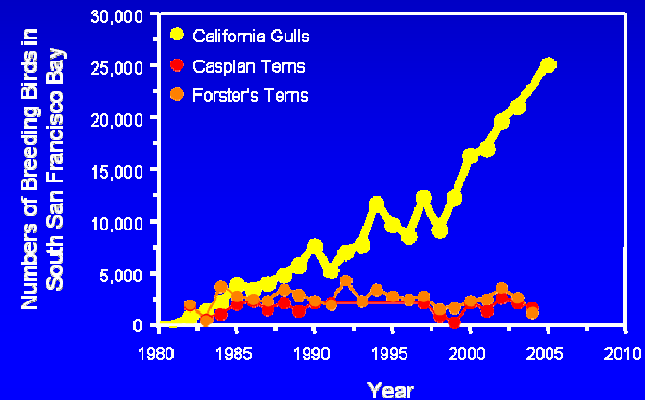
- Forster's tern nest success was higher in A1 (94%) and A16 (94%) than in A8 (73%)
- Avocet nest success was lower in A8 (35%) than A16 (86%)
- Gulls caused fake egg depredations in A8

## Conclusions: Chick Survival

- Avocet chick mortality rate was 2.4 times higher than stilt chicks
- California gulls were the main predator of avocet chicks (39%), but not stilt chicks (0%)
- Avocet chicks that survived longest moved from salt pond nesting islands into adjacent marshes with emergent cover to escape predation

# Management Implications

- Expanding gull population will likely have negative impacts on waterbirds nesting in exposed salt pond habitats
- Avocets might benefit by having salt ponds, with nesting islands, in close proximity to tidal or managed marshes where chicks can find escape cover from predators





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# Thanks for listening!

