



SAN DIEGO AUDUBON

Presented by: Rebecca Schwartz, Conservation Program Manager at San Diego Audubon  
Presented to: San Diego Management and Monitoring Program monthly coordination meeting  
February 24, 2016

# Ternwatchers

## Volunteer predator monitoring in Mission Bay, San Diego



*Fostering the protection and appreciation of birds, other wildlife, and their habitats...*



# Presentation Outline

- About SD Audubon
- Mission Bay conservation planning
- Ternwatchers
  - Goals, activities
  - Training, field protocol
  - Results
- Next steps



*California least tern (with band)..  
Photo: B. Struck*



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# About San Diego Audubon

- Mission: Protection and appreciation of birds, other wildlife, and their habitats
- Vision: Appreciate, understand, and actively protect the natural world



*Black and White Warbler. Photo: K. Strauss*



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# About San Diego Audubon

- 6 full time staff
- Programs:
  - Education
  - Sanctuaries
  - Outreach
  - Conservation



*Volunteers clearing coastal dune habitat. Photo: SDAS*



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About San Diego Audubon:

# Our Programs

- Education
  - Hands on environmental education
  - Mostly underserved schools
  - Outdoor Explore
    - Open space nearby schools
    - >10,000 experiences in nature, 1,000 students this year
  - Silverwood Science Discovery
    - Naturalist-guided field trips
    - Meets curriculum standards



*Students on a field trip at Silverwood Wildlife Sanctuary.*

*Photo: SDAS*



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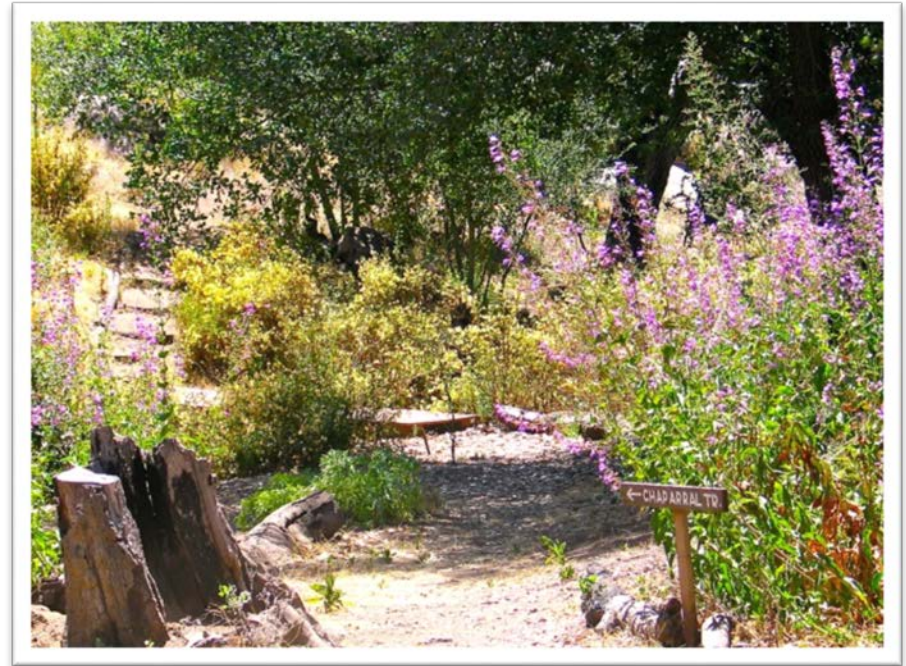




About San Diego Audubon:

# Our Programs

- Education
- Sanctuaries
  - Silverwood Wildlife Sanctuary
    - 787 acres in Lakeside, CA
    - Chaparral and riparian, >320 native plant species, 124 bird species
  - Anstine-Audubon Nature Preserve
    - 11 acres in Vista, CA
    - Coastal Sage Scrub, Southern Willow Riparian Forest, and Coast Live Oak Woodland

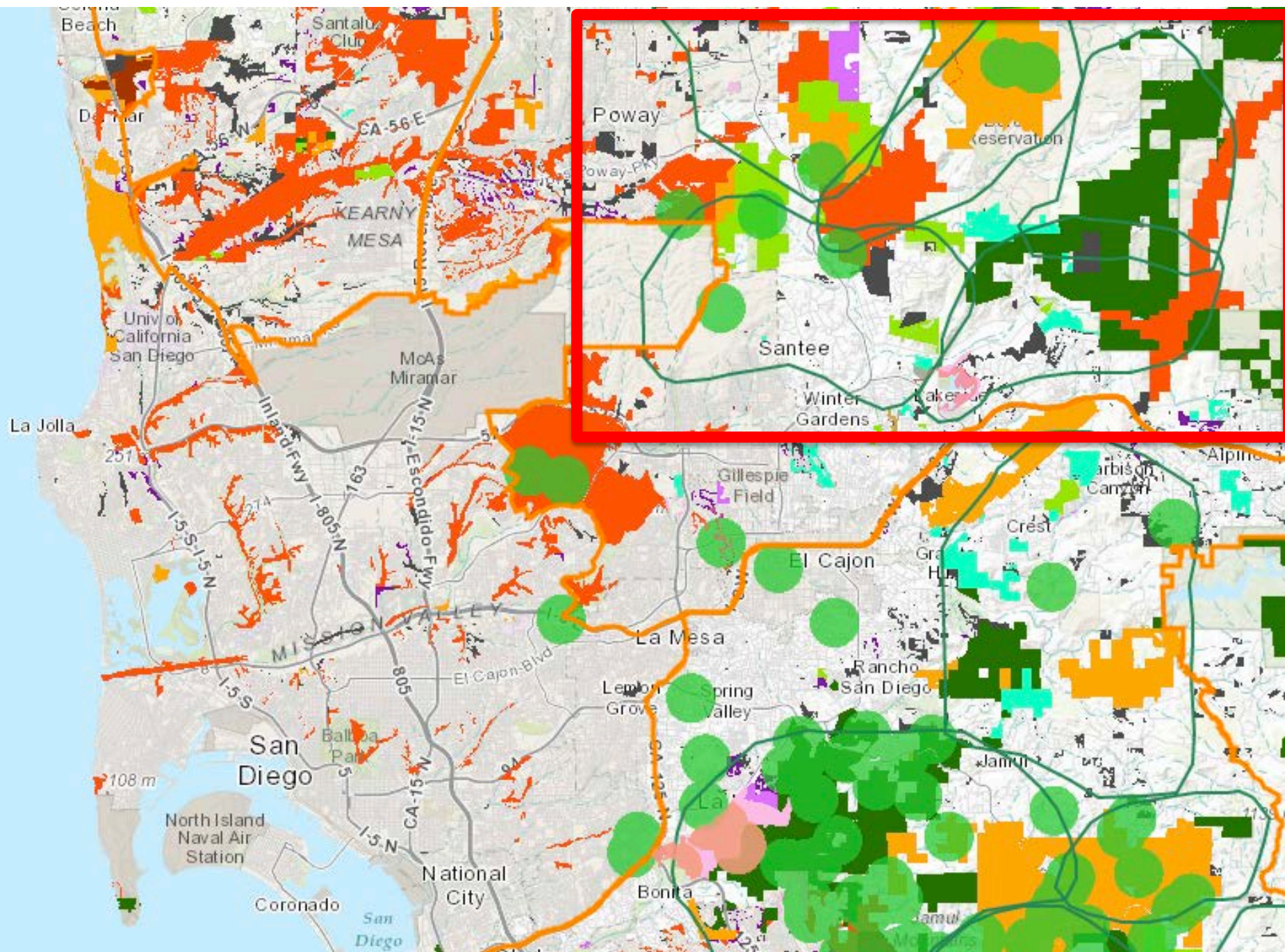


*Silverwood Wildlife Sanctuary. Photo: SDAS*

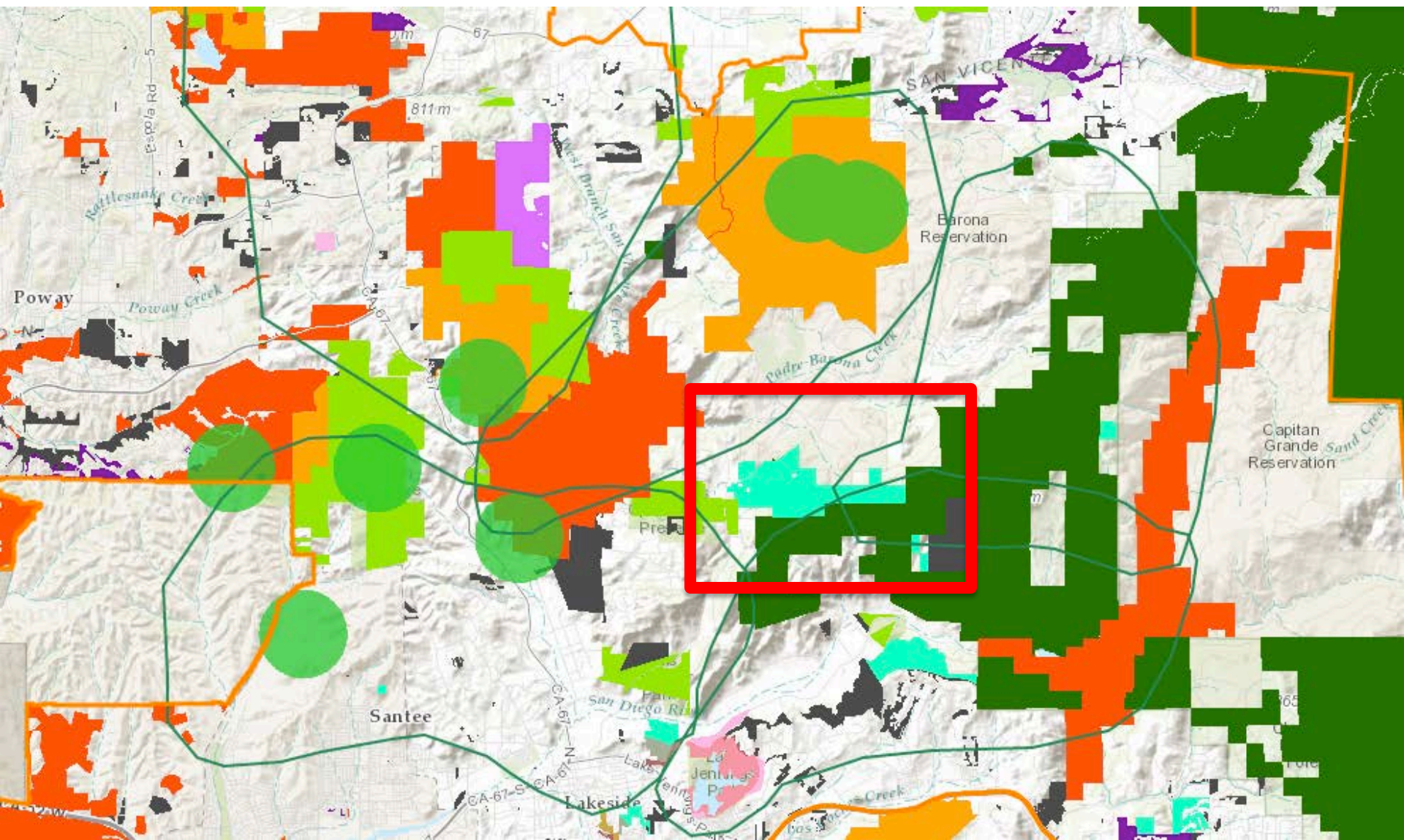


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# About San Diego Audubon:

## Our Programs

- Education
- Sanctuaries
- Outreach
  - >50 free guided bird walks per year
  - San Diego Bird Festival
    - >700 attendees in 2015
    - Dozens of workshops
  - >1,200 field trip participants



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About San Diego Audubon:

# Our Programs

- Education
- Sanctuaries
- Outreach
- Conservation
  - Habitat restoration (mostly in MB), conservation planning, environmental advocacy
  - >2,300 habitat restoration hours donated in 2015



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# About Mission Bay

Audubon California  
Mission Bay Important Bird Area



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# Intro to Mission Bay



*Mission Bay c. 1920*

- Formerly: 4000+ acre estuary system
- 150+ years of large-scale alteration
- Created “Mission Bay Park”, largest aquatic recreational park in US
- Today: Highly altered, wetlands replaced



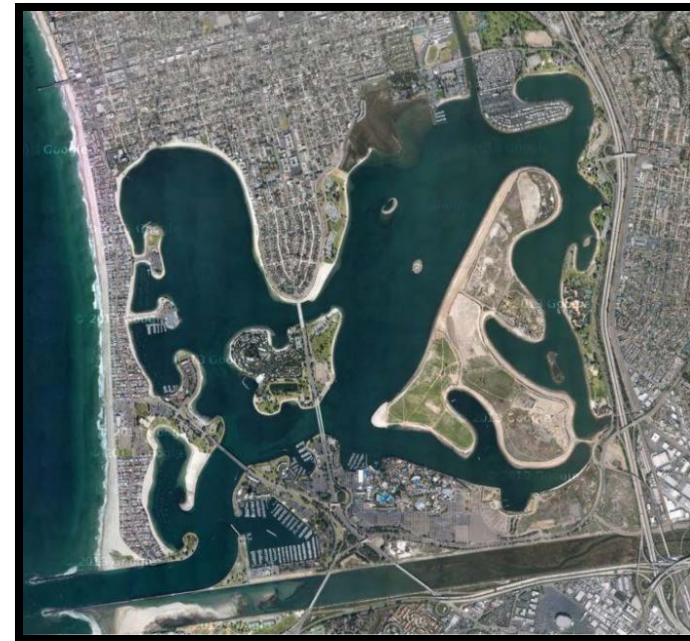
Intro to Mission Bay:

# From Bahia Falsa to Mission Bay Park

c. 1930

1948

2014



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About Mission Bay:

# Natural Resources

- Supports thousands of waterfowl, shorebirds
- Threatened and endangered species
- Salt marsh, eelgrass beds, sandy beaches, mudflats, open water
- Global Important Bird Area (IBA)



*Belding's savannah sparrow (top left), CA least tern (top right)*

*Light footed clapper rail (bottom left), brant (bottom right).*

*Photos: L. Wan, W. Dalton, M. Stinnett*



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# Conservation Planning

- MB is a a Global Important Bird Area
- 2011 IBA assessment
- 24 stakeholders from across 12 organizations
- Identified conservation targets and threats
- Action plan and working groups



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Conservation planning in MB:

# Targets

Light-footed Ridgway's Rail



Nuttall's Lotus



California Least Tern



Salt marsh



Coastal dunes



Migratory shorebirds/  
mudflats



Eel Grass Beds



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Conservation planning in MB:

# Biggest Results



SAN DIEGO STATE  
UNIVERSITY



SAN DIEGO MANAGEMENT  MONITORING PROGRAM



Coastal  
Conservancy



SOUTHERN CALIFORNIA  
**WETLANDS  
RECOVERY  
PROJECT**



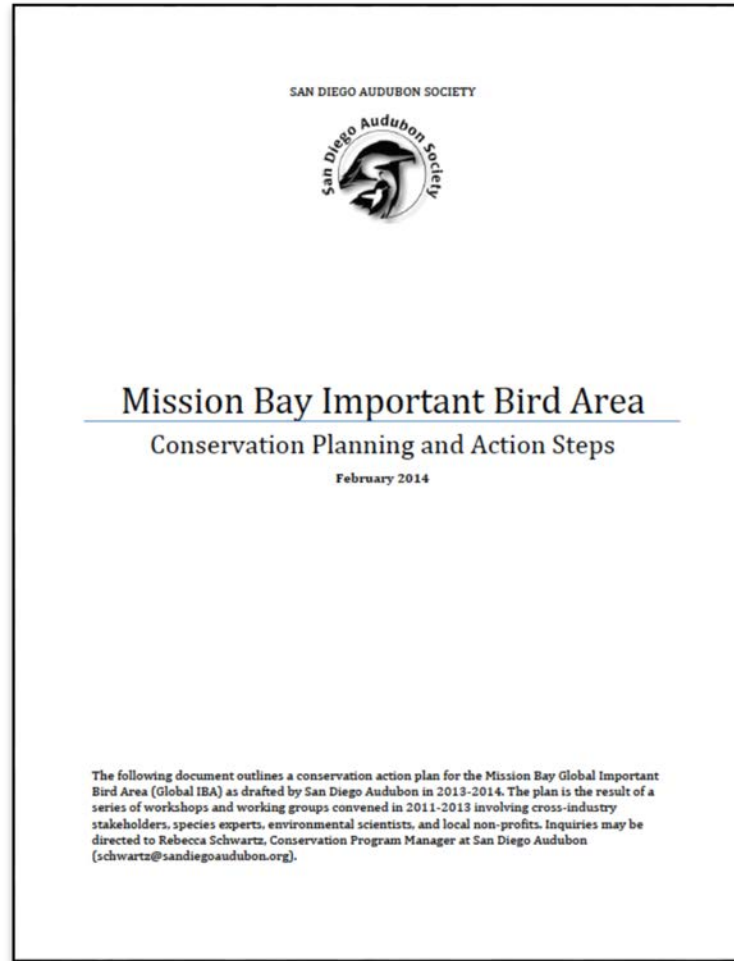
- **Relationships** with city/state/fed agencies, land managers, non profits
- **Conservation Action Plan**
- **Over \$700,000 funding** for MB since 2011
  - **Wetlands restoration**
  - **CA Least Tern management**



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Conservation planning in MB:

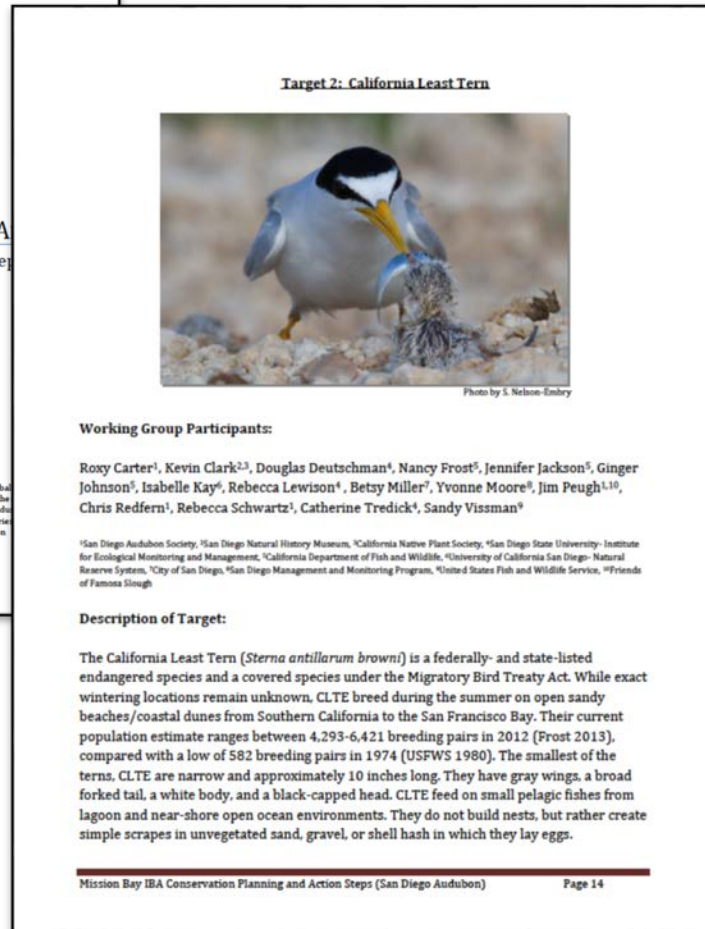
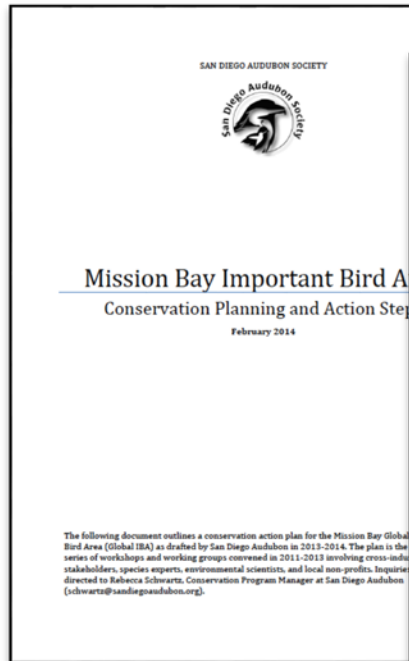
# Action Plan



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# Conservation planning in MB:

# Action Plan

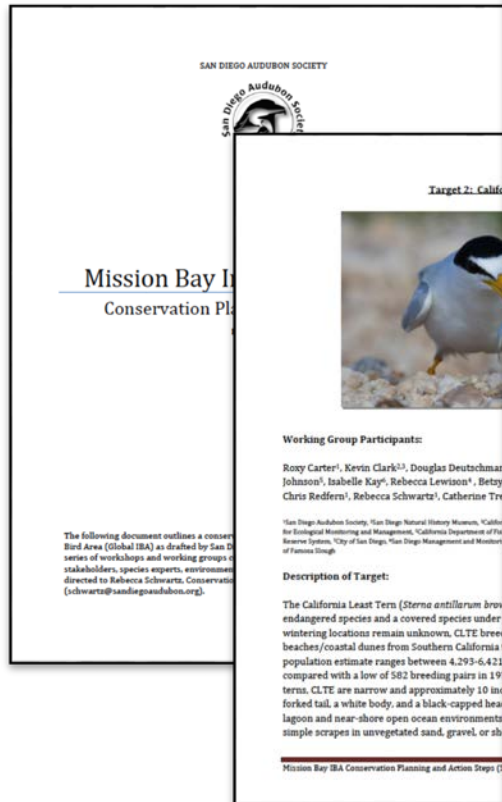


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# Conservation planning in MB:

# Action Plan

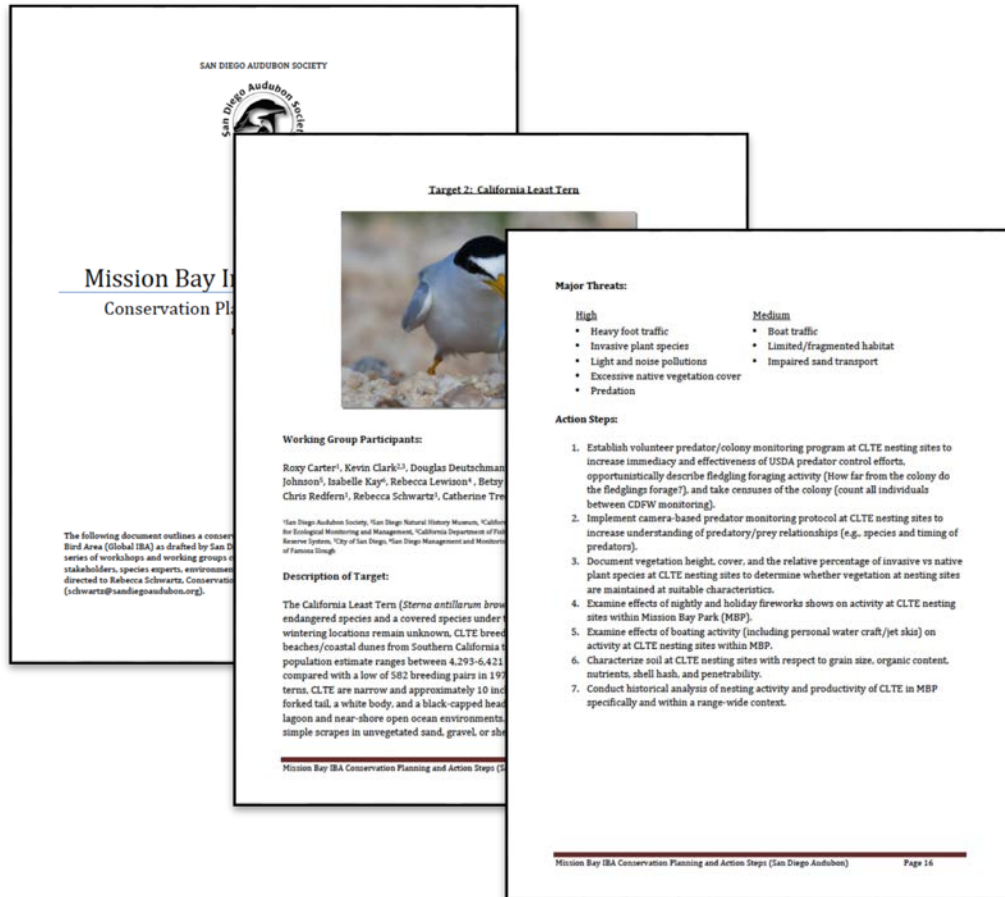


<p><b>Major Threats:</b></p>	
<p><u>High</u></p> <ul style="list-style-type: none"> <li>• Heavy foot traffic</li> <li>• Invasive plant species</li> <li>• Light and noise pollutions</li> <li>• Excessive native vegetation cover</li> <li>• Predation</li> </ul>	<p><u>Medium</u></p> <ul style="list-style-type: none"> <li>• Boat traffic</li> <li>• Limited/fragmented habitat</li> <li>• Impaired sand transport</li> </ul>
<p><b>Action Steps:</b></p> <ol style="list-style-type: none"> <li>1. Establish volunteer predator/colony monitoring program at CLTE nesting sites to increase immediacy and effectiveness of USDA predator control efforts, opportunistically describe fledgling foraging activity (How far from the colony do the fledglings forage?), and take censuses of the colony (count all individuals between CDFW monitoring).</li> <li>2. Implement camera-based predator monitoring protocol at CLTE nesting sites to increase understanding of predatory/prey relationships (e.g., species and timing of predators).</li> <li>3. Document vegetation height, cover, and the relative percentage of invasive vs native plant species at CLTE nesting sites to determine whether vegetation at nesting sites are maintained at suitable characteristics.</li> <li>4. Examine effects of nightly and holiday fireworks shows on activity at CLTE nesting sites within Mission Bay Park (MBP).</li> <li>5. Examine effects of boating activity (including personal water craft/jet skis) on activity at CLTE nesting sites within MBP.</li> <li>6. Characterize soil at CLTE nesting sites with respect to grain size, organic content, nutrients, shell hash, and penetrability.</li> <li>7. Conduct historical analysis of nesting activity and productivity of CLTE in MBP specifically and within a range-wide context.</li> </ol>	
<p>Mission Bay IBA Conservation Planning and Action Steps (San Diego Audubon)</p>	

Conservation planning in MB:

# Action Plan

Action Step #1:  
“Establish volunteer predator/colony monitoring program at CLTE nesting sites to increase immediacy and effectiveness of USDA predator control efforts”



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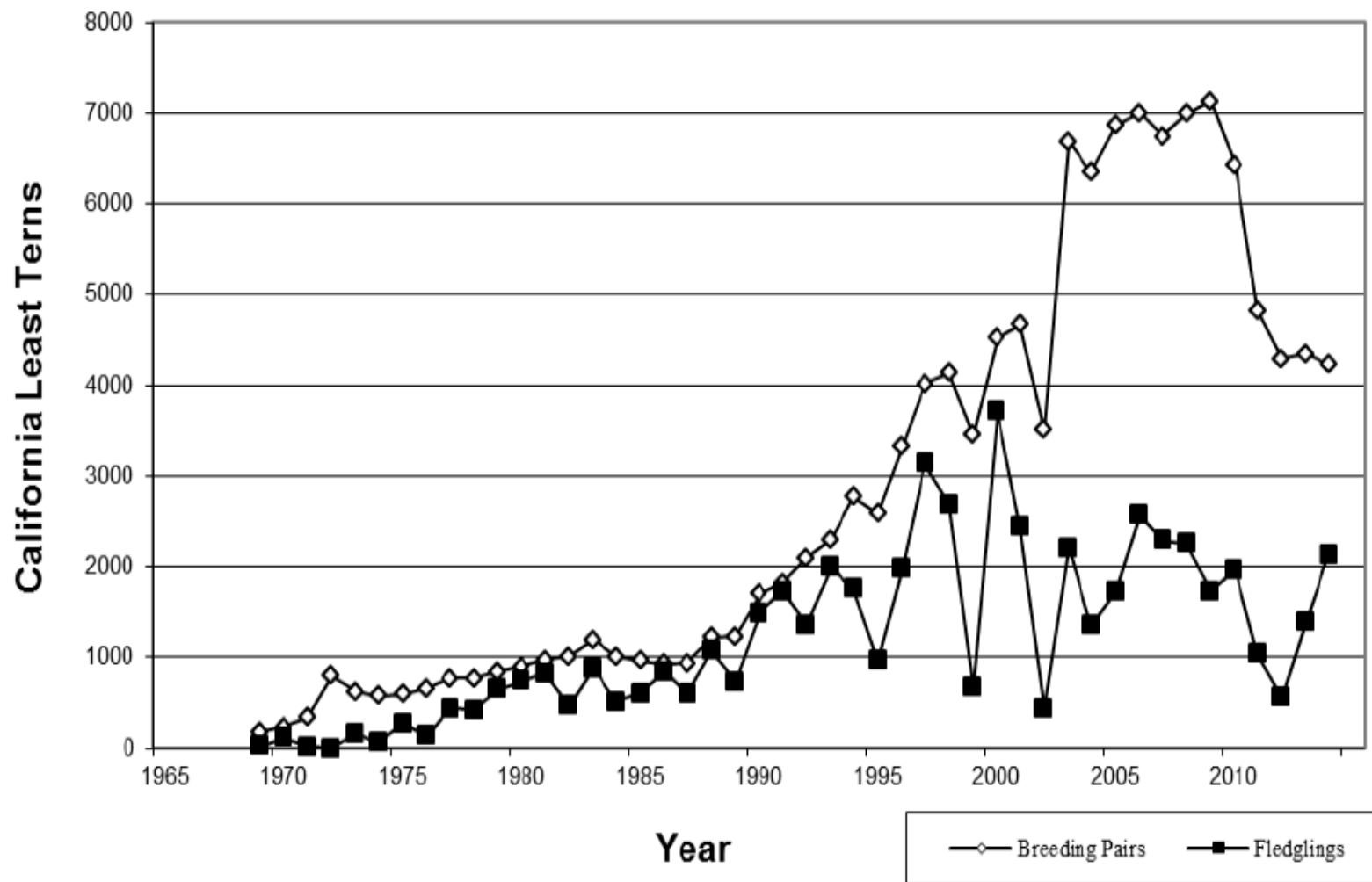


Figure 2. Minimum number of documented California least tern breeding pairs and fledglings in California during annual surveys, 1969-2014 (data from: Craig 1971; Bender 1974a, 1974b; Massey 1975, 1988, 1989b; Atwood *et al.* 1977; Jurek 1977; Atwood *et al.* 1979; Collins 1984, 1986, 1987; Gustafson 1986; Johnston and Obst 1992; Obst and Johnston 1992; Caffrey 1993, 1994, 1995b, 1997, 1998; Keane 1998, 2000, 2001; Patton 2002, 2004 unpublished table; Marschalek 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012; Frost 2013, 2014).



TERNWATCHERS



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# Ternwatchers



*SDAS staff and Ternwatcher volunteers at Mariner's Point.  
Photo: Katie Schoolov*

- SANDAG 2013 grant
  - Vol. pred. monitoring program
- Goals:
  - Inc fledgling per pair ratio from 0.20 to 0.40
  - Inc ratio of predator control effort-hours to predators removed from 0.35 to 0.50
  - Recruit 30 volunteers over each 18 week nesting season
  - Provide timely predation reports to USDA staff
  - Record predation events by species, CLTE age class, time



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# Ternwatchers



*SDAS staff and Ternwatcher volunteers at Mariner's Point.  
Photo: Katie Schoolov*

- 2013 TransNet grant
- Goals:
  - Inc fledgling per pair ratio from 0.20 to 0.40
  - Inc ratio of predator control effort-hours to predators removed from 0.35 to 0.50
  - Recruit 30 volunteers over each 18 week nesting season
  - Provide timely predation reports to USDA staff
  - Record predation events by species, CLTE age class, time



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Ternwatchers:

# Program Details

- Trained volunteers conduct 2-4 hr shifts at CLTE nesting sites
- Volunteers observe from outside colony fence
- Record data
- Call WS for active “take”, send weekly batched data sheets

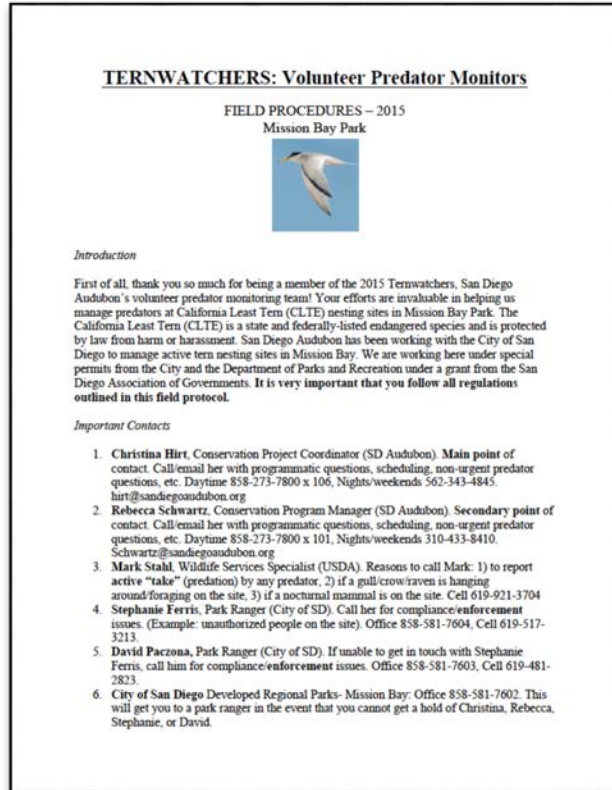


*CA least tern in Mission Bay  
Photo: B. Struck*



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# Ternwatchers: Training and Field Protocol



- 2 hour in-office training
  - Program history
  - CLTE life history
  - Bird ID
  - Thoroughly review field protocol
- All first time volunteers paired with experienced



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## TERNWATCHERS: 2015 PREDATOR SURVEY FORM

[illegible]

**Predator species codes (Avian):**

CaGu- California Gull	RtHa- Red-tailed Hawk
WeGu- Western Gull	CoHa- Coopers Hawk
OtGu- Other Gull	NoHa- Northern Harrier
AmCr- American Crow	CaTe- Caspian Tern
CoRa- Common Raven	GBTe- Gull-billed Tern
EuSt- European Starling	GbHe- Great blue heron
PeFa- Peregrine Falcon	BNHe- Black-crowned night heron
AmKe- American Kestrel	GrEg- Great Egret

**Predator Species Codes (non-Avian):**

**Mammals:**

GrSq- CA Ground Squirrel  
BIRa- Black Rat  
ViOp- Virginia Opossum  
StSk- Striped Skunk  
HoMo- House Mouse  
FeCa- Feral Cat  
CoYo- Coyote

### Reptiles:

GoSn- Gopher Snake  
KiSn- King Snake

**Predator Activity Code:**

H- Hunting = flying low over ground  
T- Transit = flying straight  
W- Walking on island  
SRP- Sit/Roost/Perch  
F- Foraging on island  
S- Soaring = flying high/circling with  
little wing flapping

## CLTE Rxn Code:

AC- Alarm call  
FL- Fly ups  
MOB- Mobbing  
predator  
Si- Silent

\*WS: Wildlife Services (USDA), Mark Stahl: 619-921-3704



# Ternwatchers:

## Results to date

- 2014:
  - 27 volunteers
  - 384 hours
  - [KPBS coverage](#)
- 2015:
  - 26 volunteers
  - 10 returners
  - 368 hours



*CA least tern in Mission Bay  
Photo: E. Henry*



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Ternwatchers:

# Results to date

- From WS:  
“Tern Watchers...were instrumental in advising WS of potential avian predators actively hunting all Mission Bay tern sites.”
- 2013 (pre TW)
  - 205 birds, 3 raptors
  - 0.37 predator per hr
  - 0.003 raptors per hr
- 2014
  - 187 birds, 13 raptors
  - 0.19 PPH
  - 0.013 RPH
- 2015
  - 84 birds, 6 raptors
  - 0.22 PPH
  - 0.007 RPH



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Ternwatchers:

# Results to date

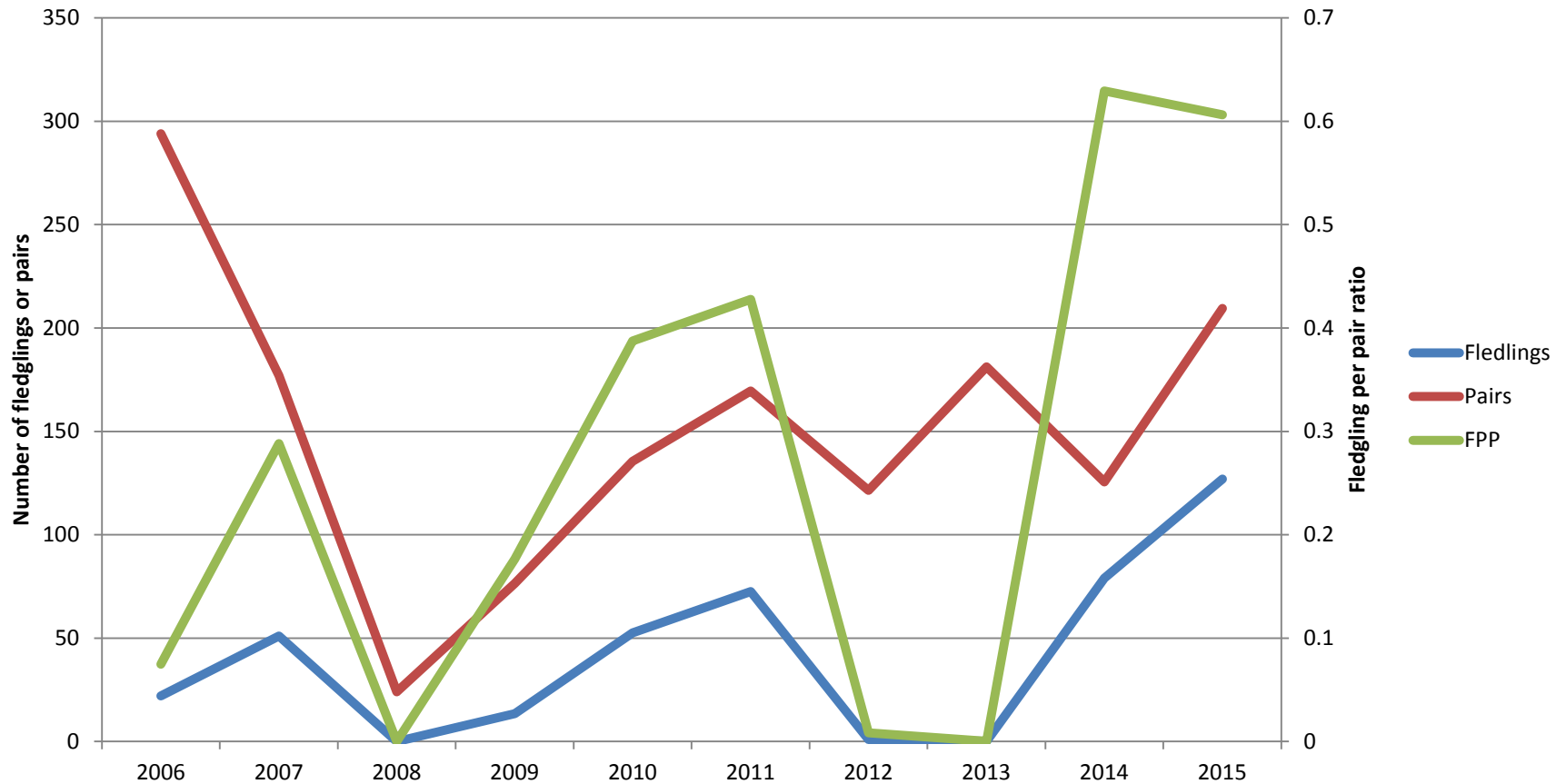
- From WS:  
“Tern Watchers...were instrumental in advising WS of potential avian predators actively hunting all Mission Bay tern sites.”
- Mariner’s Point fledgling per pair ratio\*
  - 2006-2013: 0.31
  - 2014-2015: 0.65
- Both years of TW has had double FPP ratio

\* fledglings and pairs is average of min and max



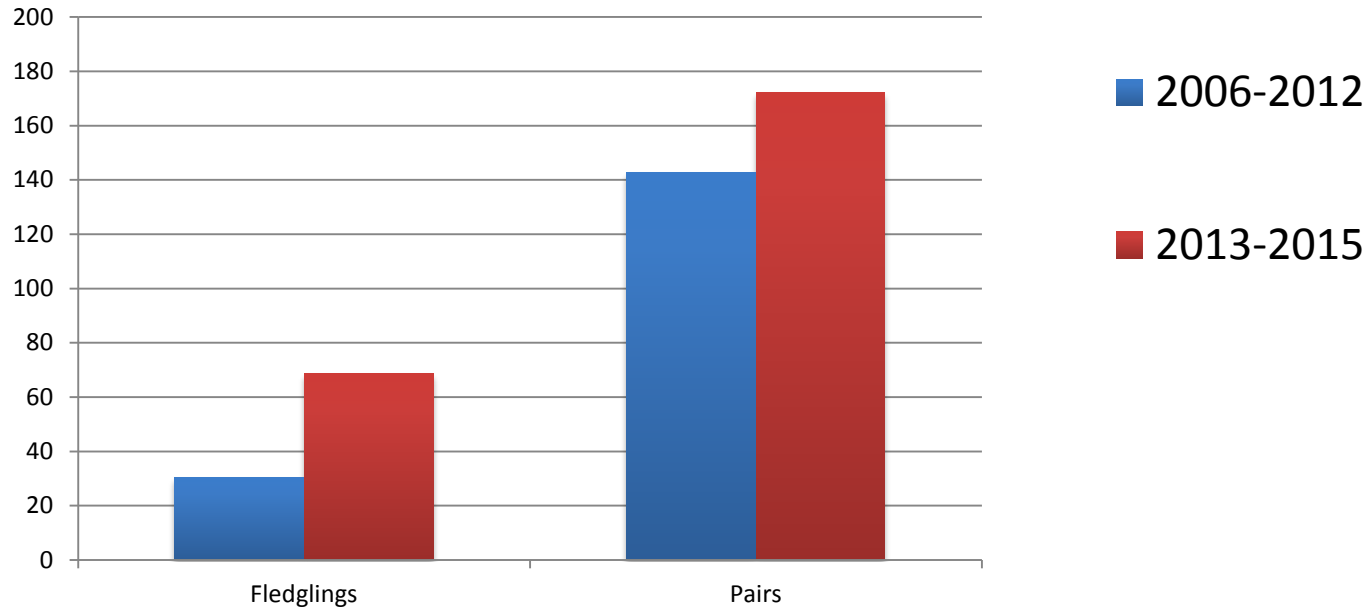
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# Nesting Productivity in Mission Bay

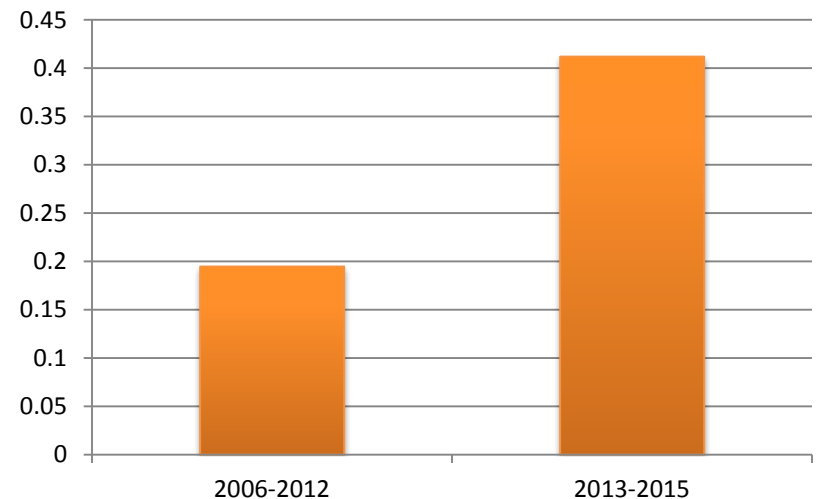




# CLTE productivity pre/post TW and gap funding



## Fledgling per pair ratio



Ternwatchers:

# Overall take aways

- Requires significant staff coordination of volunteers
- Fewer, more highly trained volunteers are better
- Great “entry” to conservation



CA least tern with chick in Mission Bay  
Photo: B. Whiteside



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Ternwatchers:

# Overall take aways

- Confirmed negatives are highly valuable
- Success of program dependent on USDA's Wildlife Services (funded by SANDAG and City of SD)
- Increase in FPP also coincides with SANDAG gap funding



*CA least tern with chick in Mission Bay  
Photo: B. Whiteside*



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Ternwatchers:

## Next steps

- Night time/camera monitoring
- Analyze predator data
- Funding expires after 2016 nesting season
  - Very high priority to find sustainable funding sources
- Program is easily replicated



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# Acknowledgements



SAN DIEGO STATE  
UNIVERSITY



SAN DIEGO MANAGEMENT  MONITORING PROGRAM



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# Questions?



*CA least tern chick (with band) spreads its wings.  
Photo: Bruno Struck*