Welcome to the Conservation Lecture Series

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Questions? Contact margaret.mantor@wildlife.ca.gov

Ecology and Conservation of the Alameda Striped Racer (=Alameda Whipsnake)

Overview:

Description & Status

Distribution & Critical Habitat

Field Study Methods (1989-2013)

Findings:

Taxonomy and Potential Refinement of Distribution

Taxonomy

Masticophis lateralis - (Hallowell, 1853) –
Proc. Acad. Nat. Sci. Philadelphia, Vol. 6, p. 237

Masticophis lateralis euryxanthus - (Riemer, 1954) -
Copeia 1954 (1): 45-48p.

Now: *Coluber lateralis euryxanthus*

Two Subspecies of California Striped Racer

Alameda Striped Racer

(*Coluber lateralis euryxanthus*)

Chaparral Striped Racer

(*Coluber lateralis lateralis*)

- Slender body, fast moving, diurnal
- Large head and eyes
- Adults up to 5 feet total length
- Relatively large hatchlings-

- Alameda Striped Racer (*Coluber lateralis euryxanthus)*
- State Threatened (1971) and Federally Threatened (1997)
- Subspecies of California Striped Racer

Alameda Striped Racer

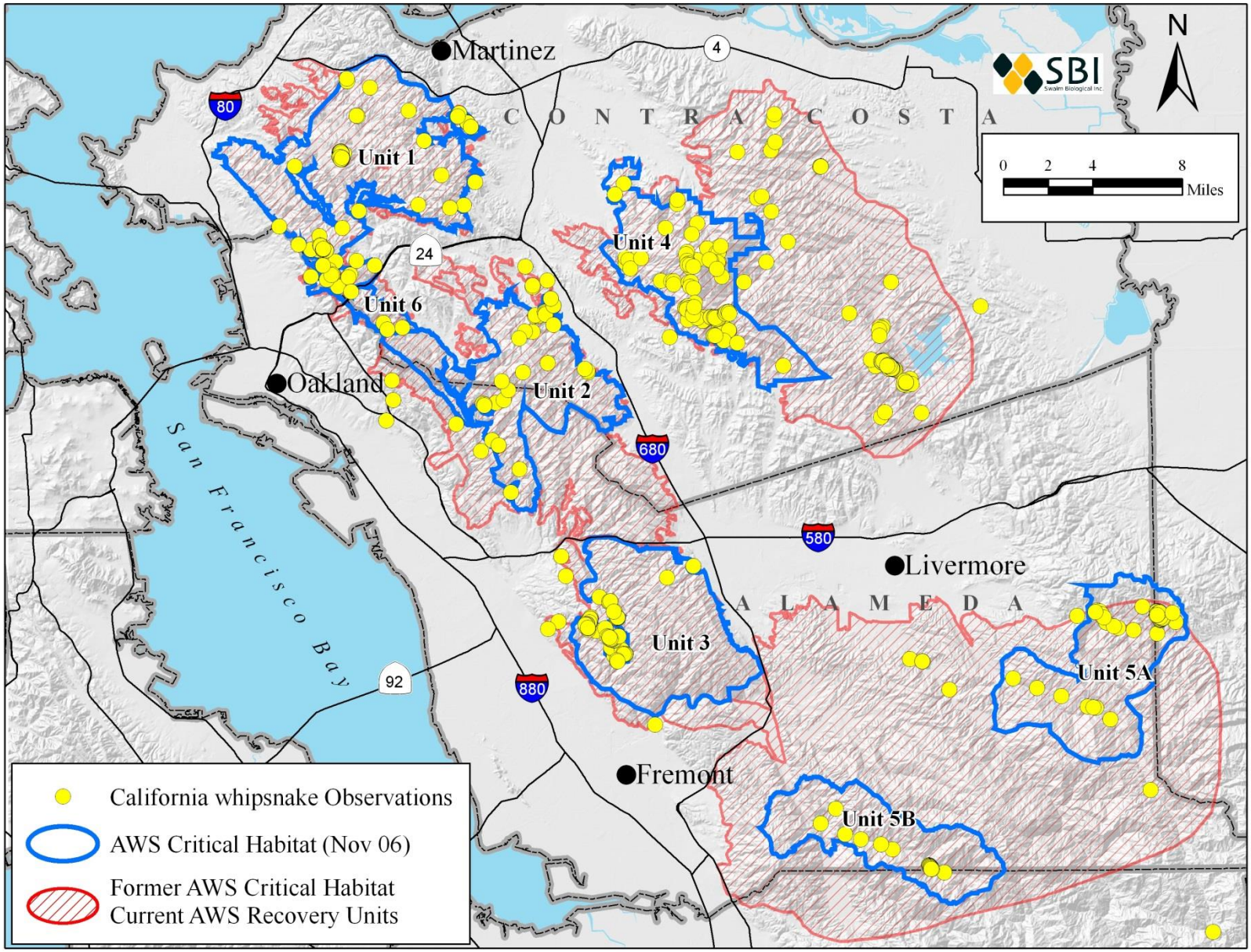
Range: Alameda and Contra Costa Counties?????????

- Characters Described by Riemer in 1954
- All of the 8 differences between subspecies are color characteristics

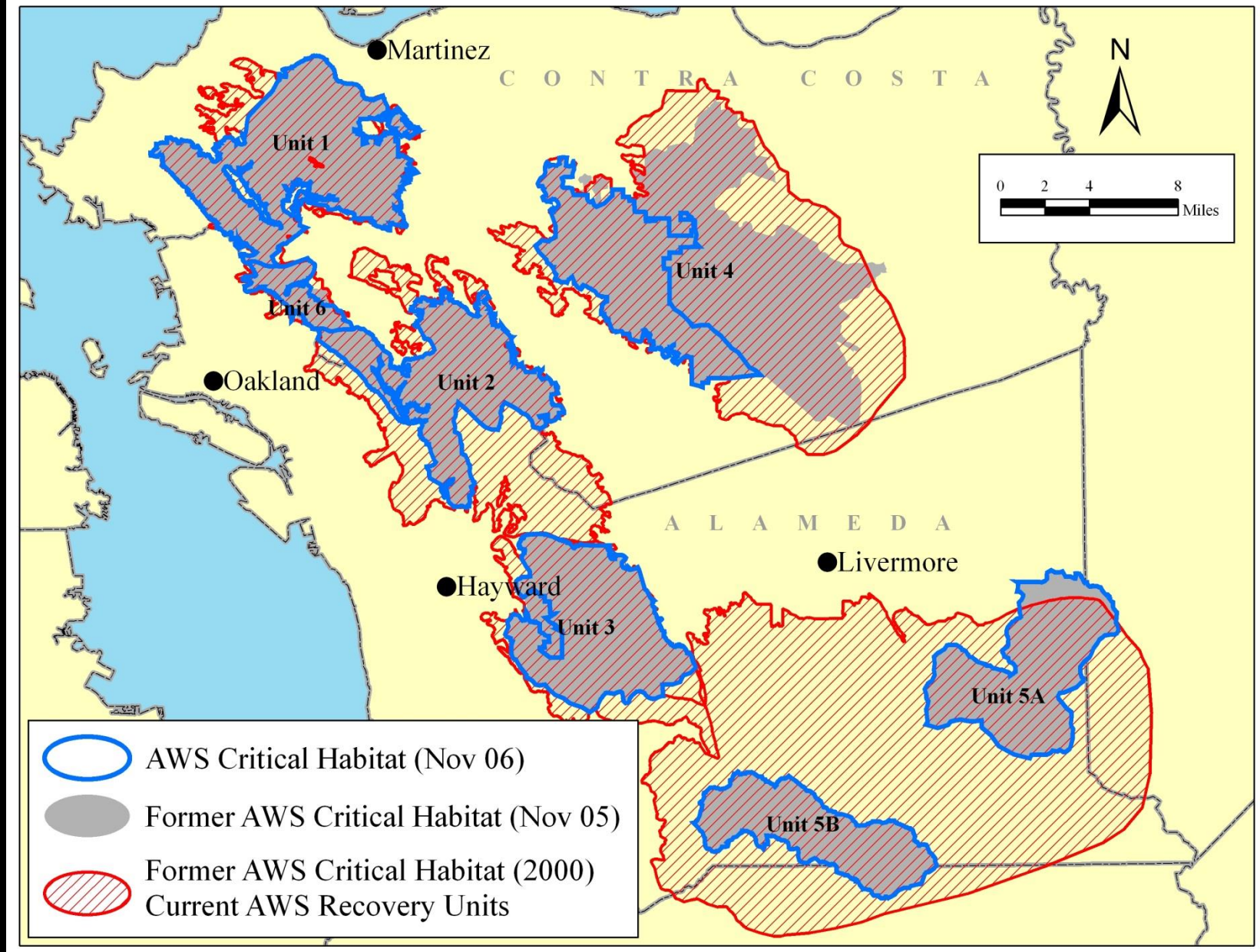
Alameda Whipsnake

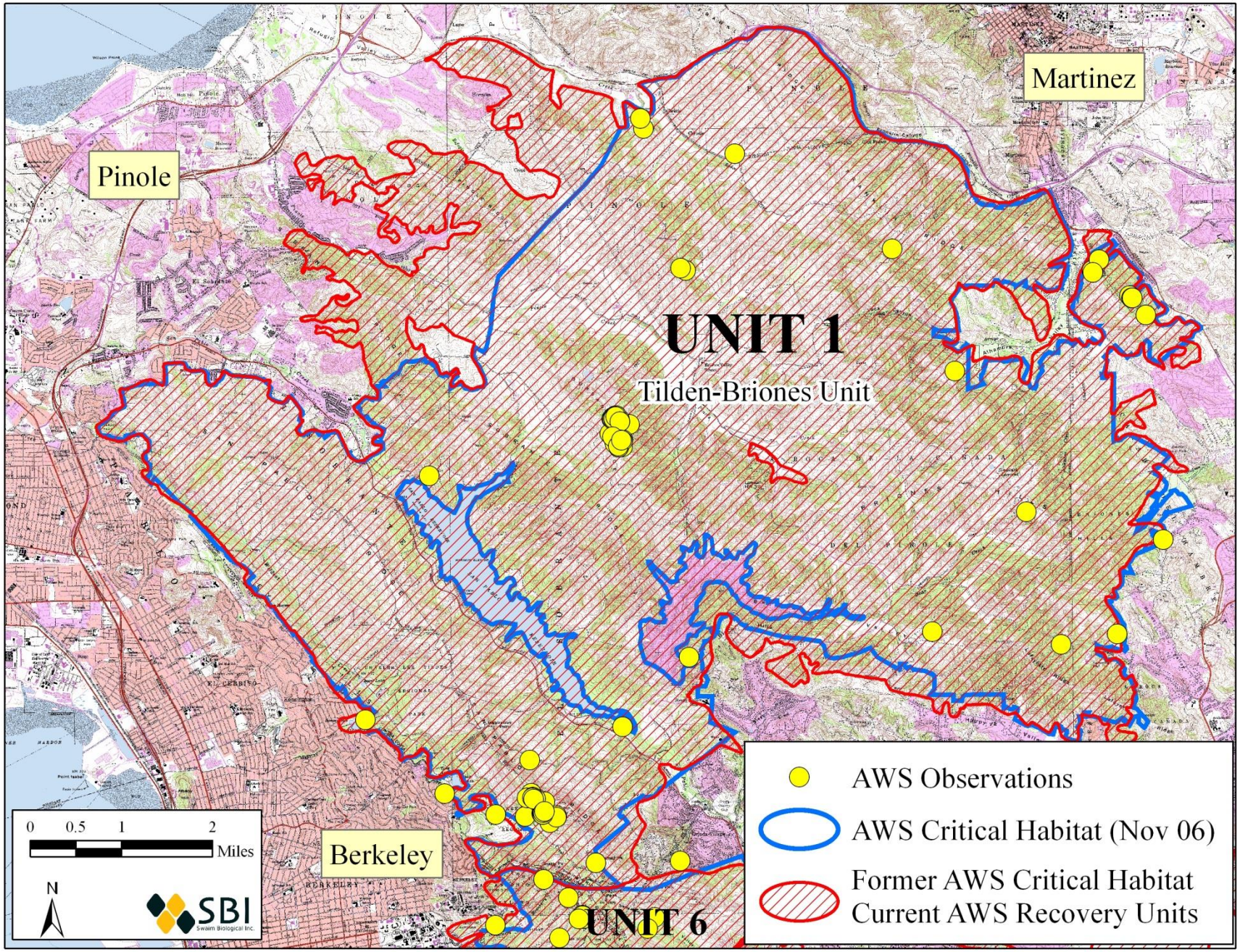
AWS Distribution and Critical Habitat

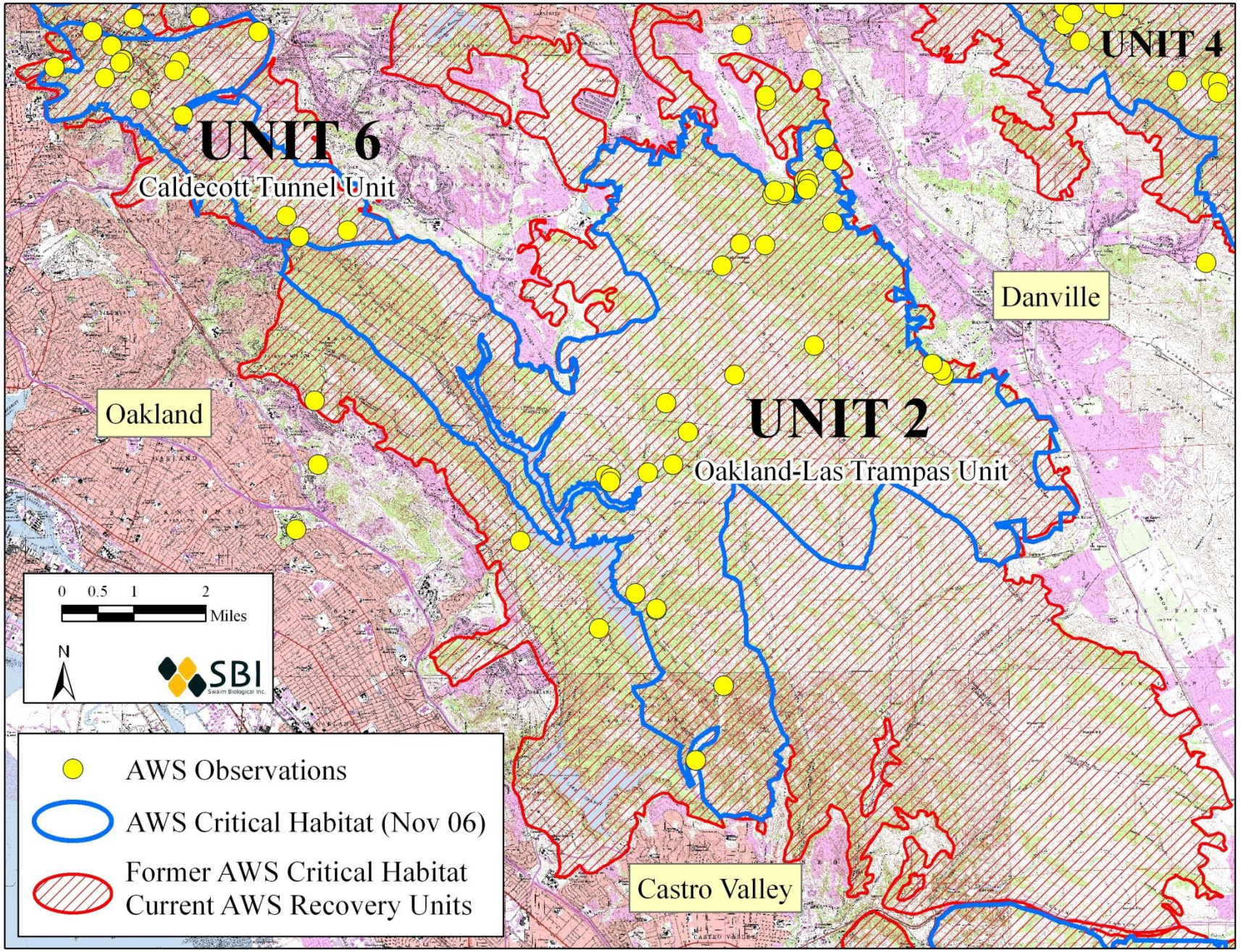
California Whipsnake Distribution in Contra Costa, Alameda and Northern Santa Clara Counties



AWS Critical Habitat




Martinez
Pinole
UNIT 1
Tilden-Briones Unit
Berkeley
UNIT 6
0 0.5 1 2
Miles
N
SBI
Swaim Biological Inc.
AWS Observations
AWS Critical Habitat (Nov 06)
Former AWS Critical Habitat
Current AWS Recovery Units


UNIT 4
UNIT 6
Caldecott Tunnel Unit
Danville
Oakland
UNIT 2
Oakland-Las Trampas Unit
Castro Valley
0 0.5 1 2
Miles
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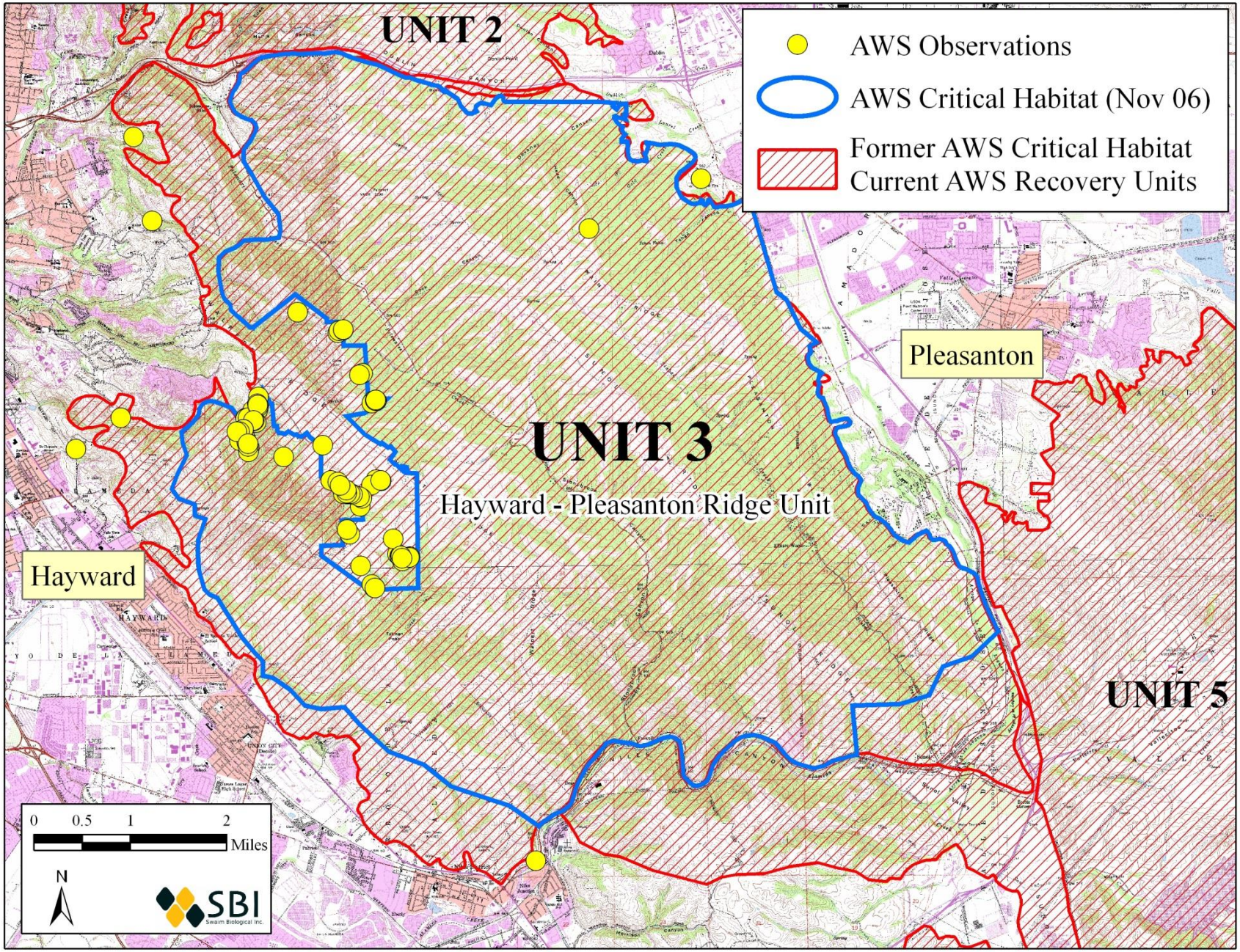
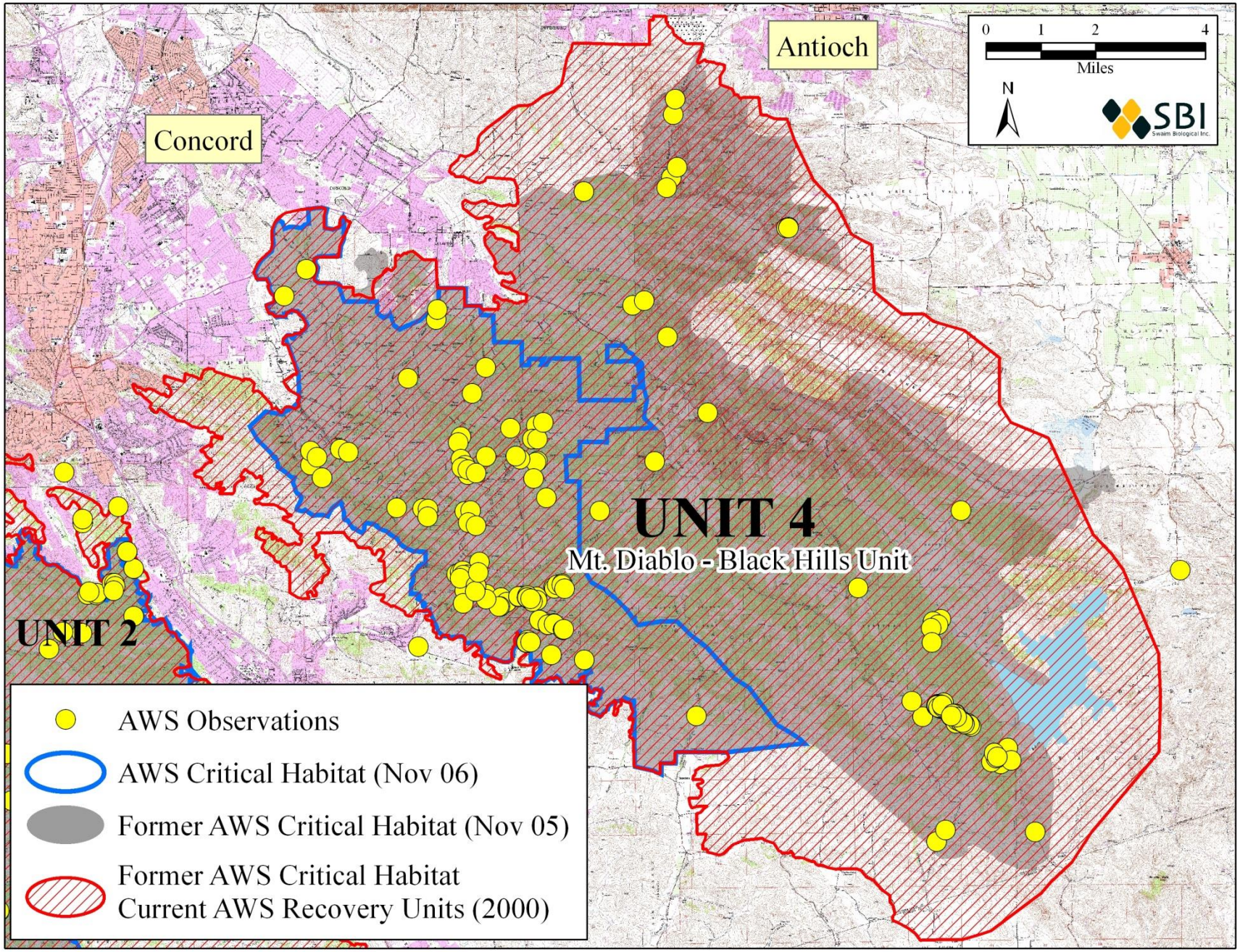
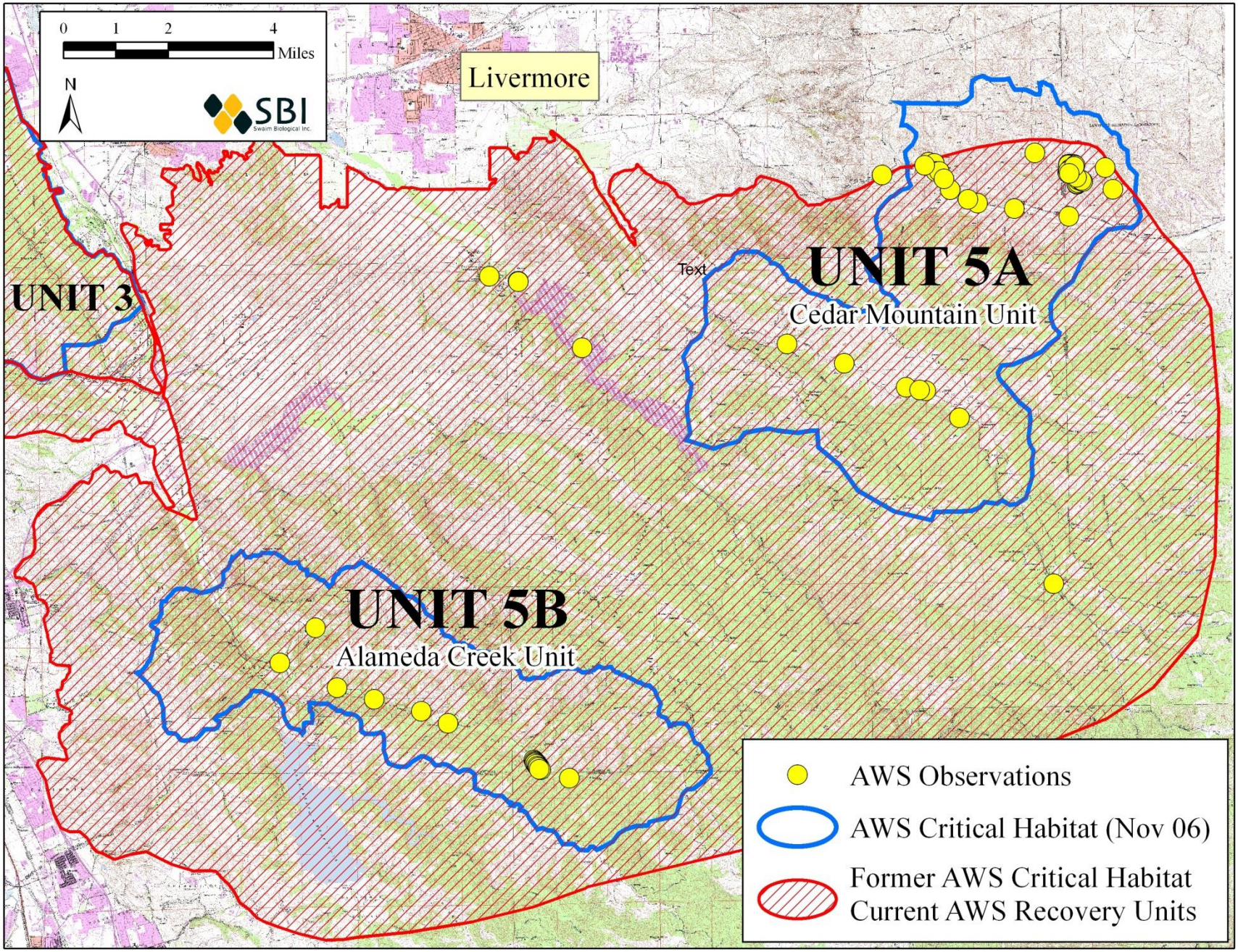
SBI
Swaim Biological Inc.
AWS Observations
AWS Critical Habitat (Nov 06)
Former AWS Critical Habitat
Current AWS Recovery Units


UNIT 2
AWS Observations
AWS Critical Habitat (Nov 06)
Former AWS Critical Habitat
Current AWS Recovery Units
Pleasanton
UNIT 3
Hayward - Pleasanton Ridge Unit
Hayward
UNIT 5
0 0.5 1 2
Miles
N
SBI
Swaim Biological Inc.


Antioch
Concord
0 1 2 4
Miles
N
SBI
Swaim Biological Inc.
UNIT 4
Mt. Diablo - Black Hills Unit
UNIT 2
AWS Observations
AWS Critical Habitat (Nov 06)
Former AWS Critical Habitat (Nov 05)
Former AWS Critical Habitat
Current AWS Recovery Units (2000)


0 1 2 4
Miles
N
SBI
Swaim Biological Inc.
Livermore
UNIT 3
Text
UNIT 5A
Cedar Mountain Unit
UNIT 5B
Alameda Creek Unit
AWS Observations
AWS Critical Habitat (Nov 06)
Former AWS Critical Habitat
Current AWS Recovery Units

Field Study Methods

Trapping Surveys

- Drift fences with funnel traps at each end.
- Traps constructed of large hardware cloth panels on a wooden frame for air circulation.
- Foam refugia are placed inside traps to provide retreat from heat, minimize nose rubbing.
- A wood coverboard on top of the trap provides additional shade

Trapline with Activated Traps

Typical Trapping Period

Season	# of Trap Days	Begin Date
Spring	90	March 15 - April 1
Fall	45	Aug. 15 - Nov. 1

Data Collection

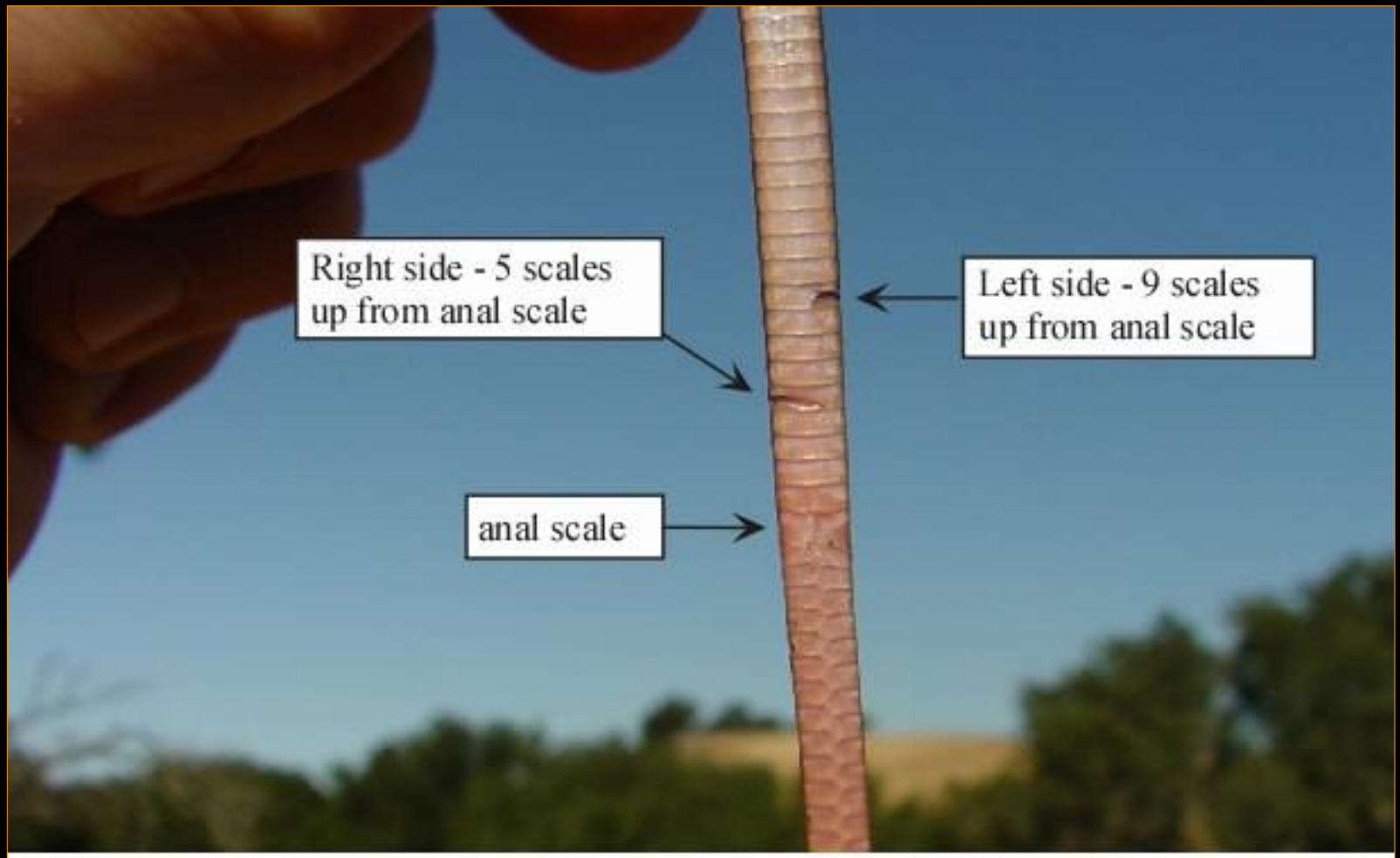
Processing AWS

- Sex
- Length (snout – vent & total length)
- Weight
- Age class
- Reproductive status
- Capture location
- Mark individuals (PIT tag and/or scale clip)
- Taxonomy data
- Recent meal?

Identify and Record all other vertebrate species at a minimum

Marking- PIT Tagging

Marking-Scale Clipping



Example of a scale mark on a juvenile whipsnake. (Whipsnake #59).

Taxonomy

- Record taxonomic characters (8 scale color differences) on data sheet.
- Sequence of photographs to support demonstration of each of the 8 color differences.
- Tail/scute clip for on-going genetic work.

Radiotelemetry

* N=6
* 4 males
* 2 females (gravid)
* Tilden Park (Berkeley) = 5
* Moller Ranch (Pleasanton)= 1

Results

The Eight Color Characters – Refinement

Scale Types

Loreal scale

Dorsum

Venter

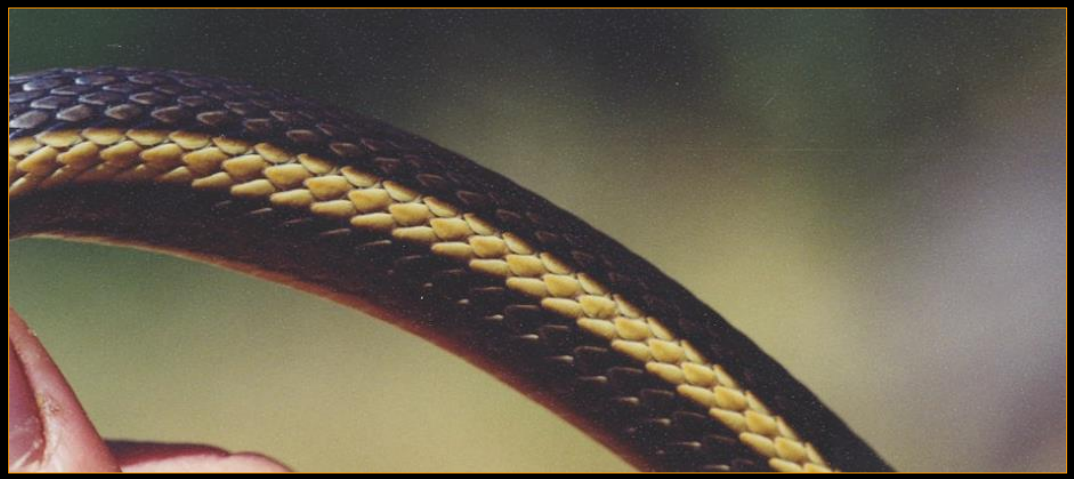
Rostral

Parietals

1.Width of Lateral Stripe:

Distinct, ≥ 1 plus 2 half scale rows wide or nearly 2 full scale rows

Alameda Whipsnake



>1.5 scale rows

Chaparral Whipsnake

<1.5 scale Rows wide

2. Spotting on chin and ventral surface

Almost none

Minimal

Moderate

Moderate -heavy

Heavy

Degree of spotting

Alameda Whipsnake

Chaparral Whipsnake

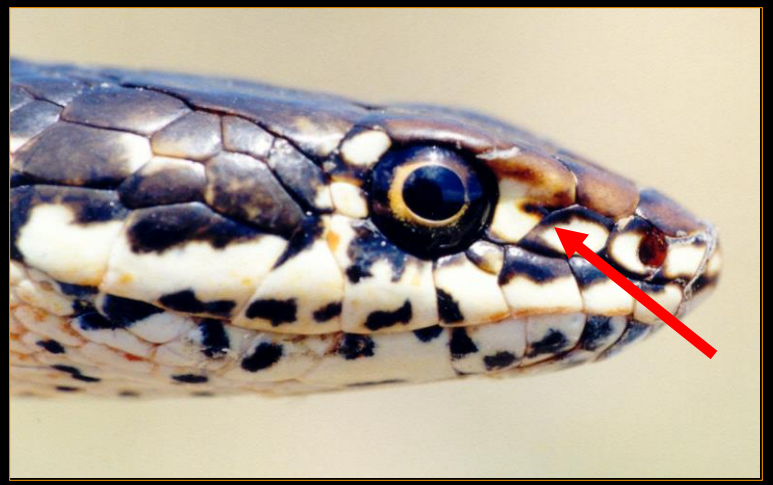
3. Presence or absence of dark vertical lines along margins of loreal scale

Alameda Whipsnake

Dark vertical lines usually absent

Chaparral Whipsnake

Dark vertical lines usually present



4. Presence or Absence of Horizontal Stripe on rostral scale

Alameda Whipsnake

Usually absent

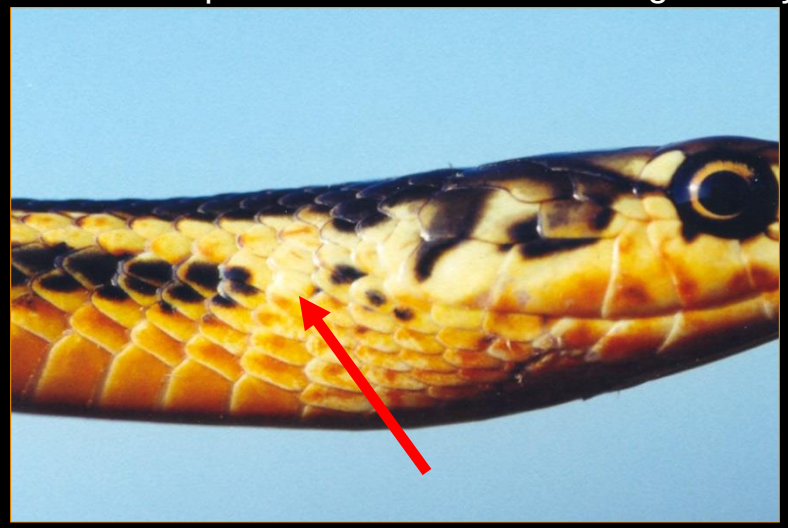
Chaparral Whipsnake

Usually present

5. Presence or absence of Direct communication of light ventral color with lateral stripe

Alameda Whipsnake

Connection present in counties touching the bay

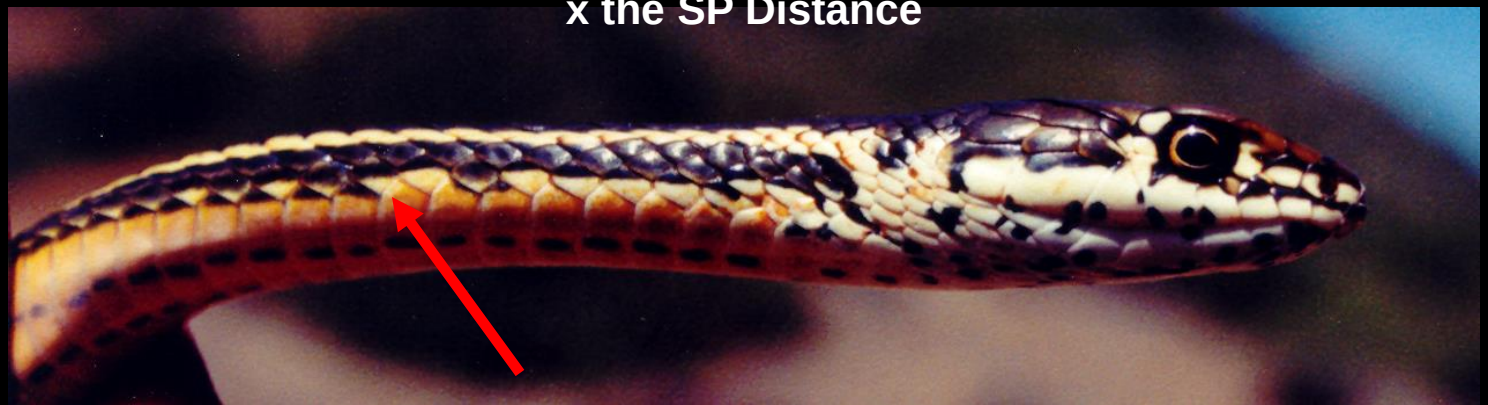


Chaparral Whipsnake

6. Absence of dorsal color on edge of ventral scales

Alameda Whipsnake 4.5-6 x the SP Distance

Chaparral Whipsnake **1.5 – 4 x the SP Distance**



7. Dorsal Coloration

Alameda Whipsnake

Sooty Black

Chaparral Whipsnake

Dark Brown, Olive, or Grayish

8. Suffusion of orange pigment on anterior light portions of the snake

Heavy orange-Rufous

Moderate orange-rufous

Light orange-rufous

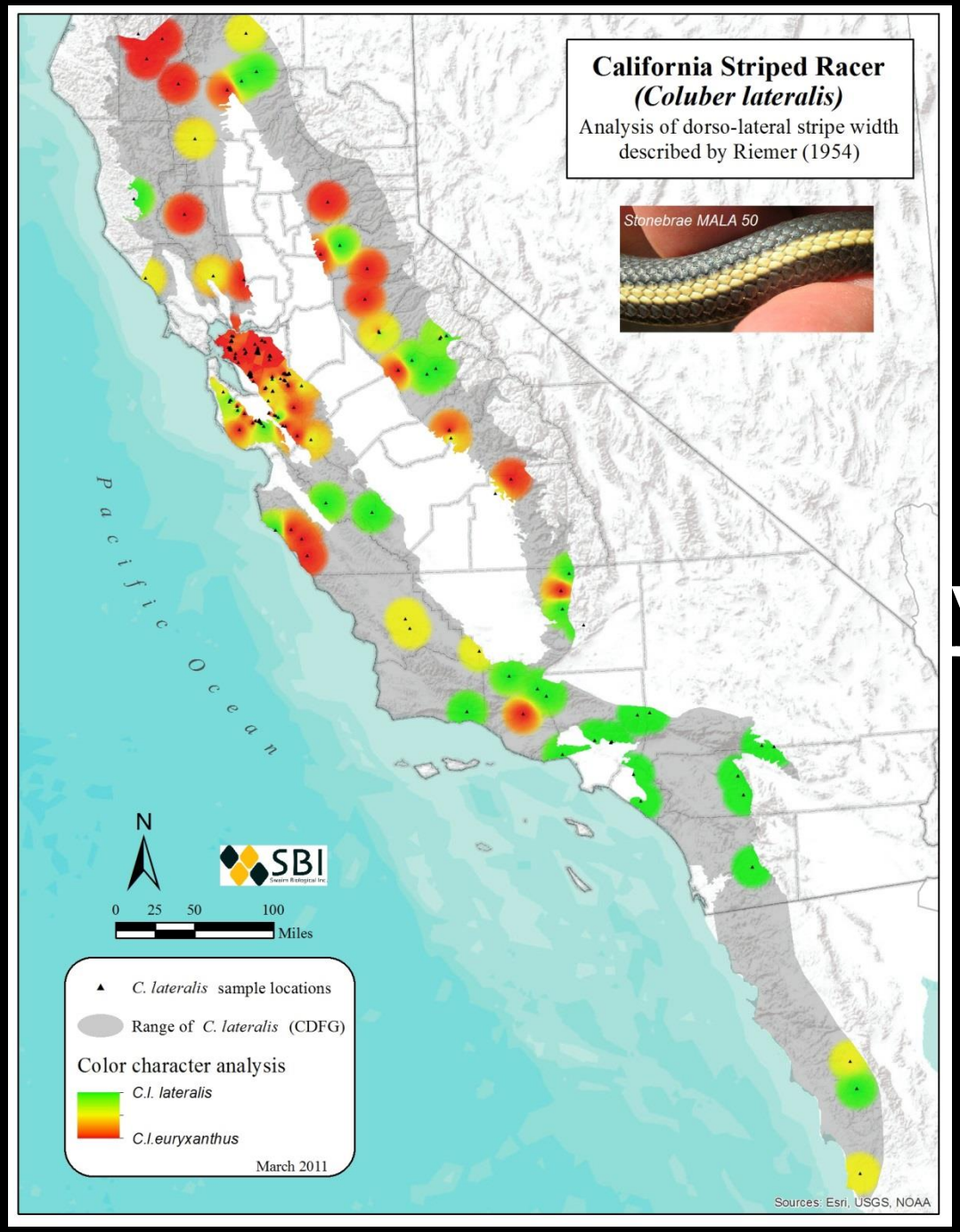
Yellow

Light cream

Alameda Whipsnake

Color Gradient

Chaparral Whipsnake


California Striped Racer
(Coluber lateralis)
Analysis of dorso-lateral stripe width described by Riemer (1954)
Stonebrae MALA 50
Pacific Ocean
N
SBI
0 25 50 100
Miles
C. lateralis sample locations
Range of C. lateralis (CDFG)
Color character analysis
C.l. lateralis
C.l.euryxanthus
March 2011
Sources: Esri, USGS, NOAA

California Striped Racer
(Coluber lateralis)

Analysis of dorsal color on ventral scales described by Riemer (1954)

Pacific Ocean

N

SBI
Swain Biological Inc

0 25 50 100
Miles

▲ *C. lateralis* sample locations

Range of *C. lateralis* (CDFG)

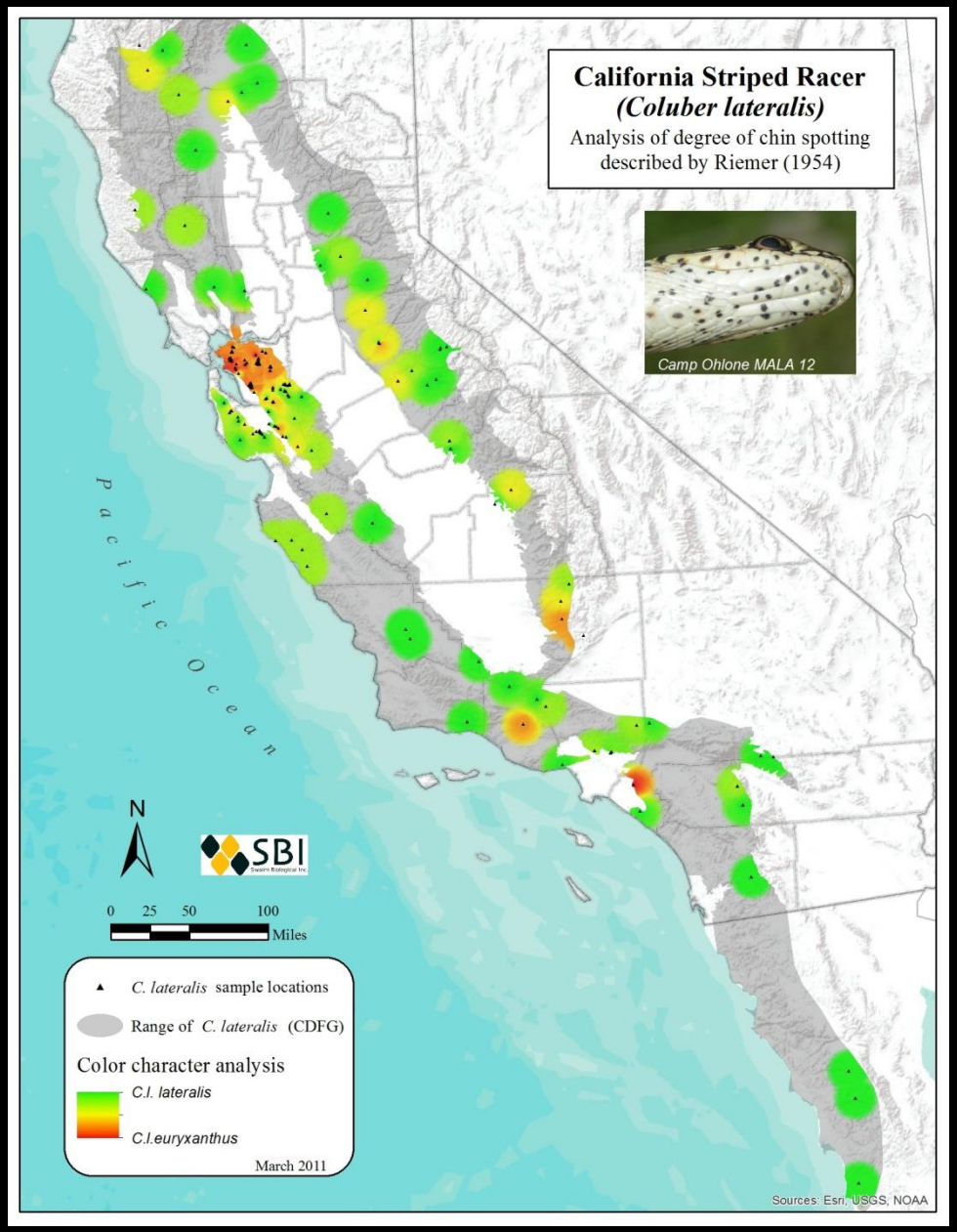
Color character analysis

C.l. lateralis

C.l.euryxanthus

March 2011

Sources: Esri, USGS, NOAA


California Striped Racer
(Coluber lateralis)
Analysis of degree of chin spotting described by Riemer (1954)
Camp Ohlone MALA 12
Pacific Ocean
N
SBI
0 25 50 100
Miles
C. lateralis sample locations
Range of C. lateralis (CDFG)
Color character analysis
C.l. lateralis
C.l.euryxanthus
March 2011
Sources: Esri, USGS, NOAA

California Striped Racer
(Coluber lateralis)

Analysis of stripe and ventral color communication described by Riemer (1954)

Pacific Ocean

N

SBI
Swaim Biological Inc.

0 25 50 100
Miles

▲ *C. lateralis* sample locations

Range of *C. lateralis* (CDFG)

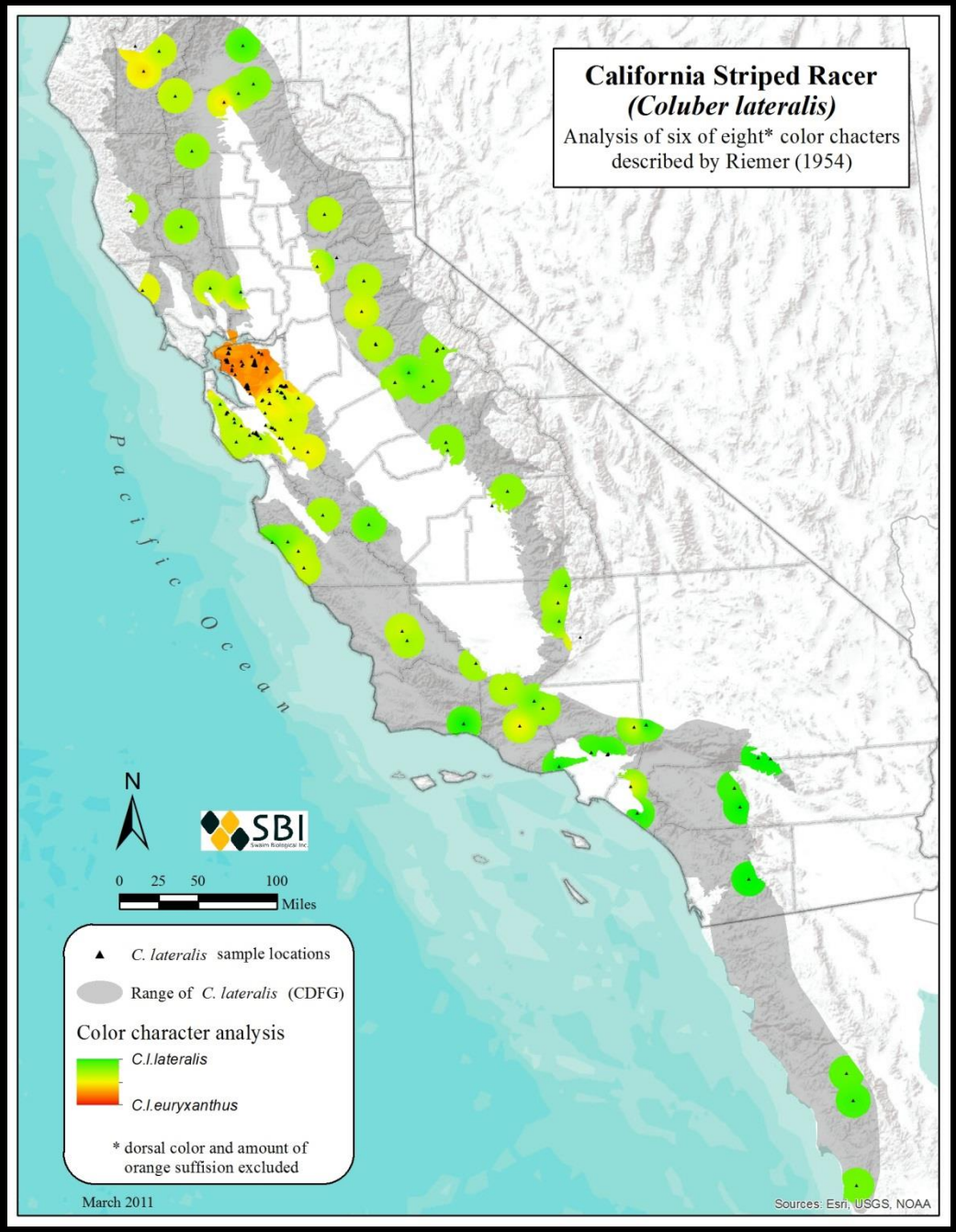
Color character analysis

C.l. lateralis

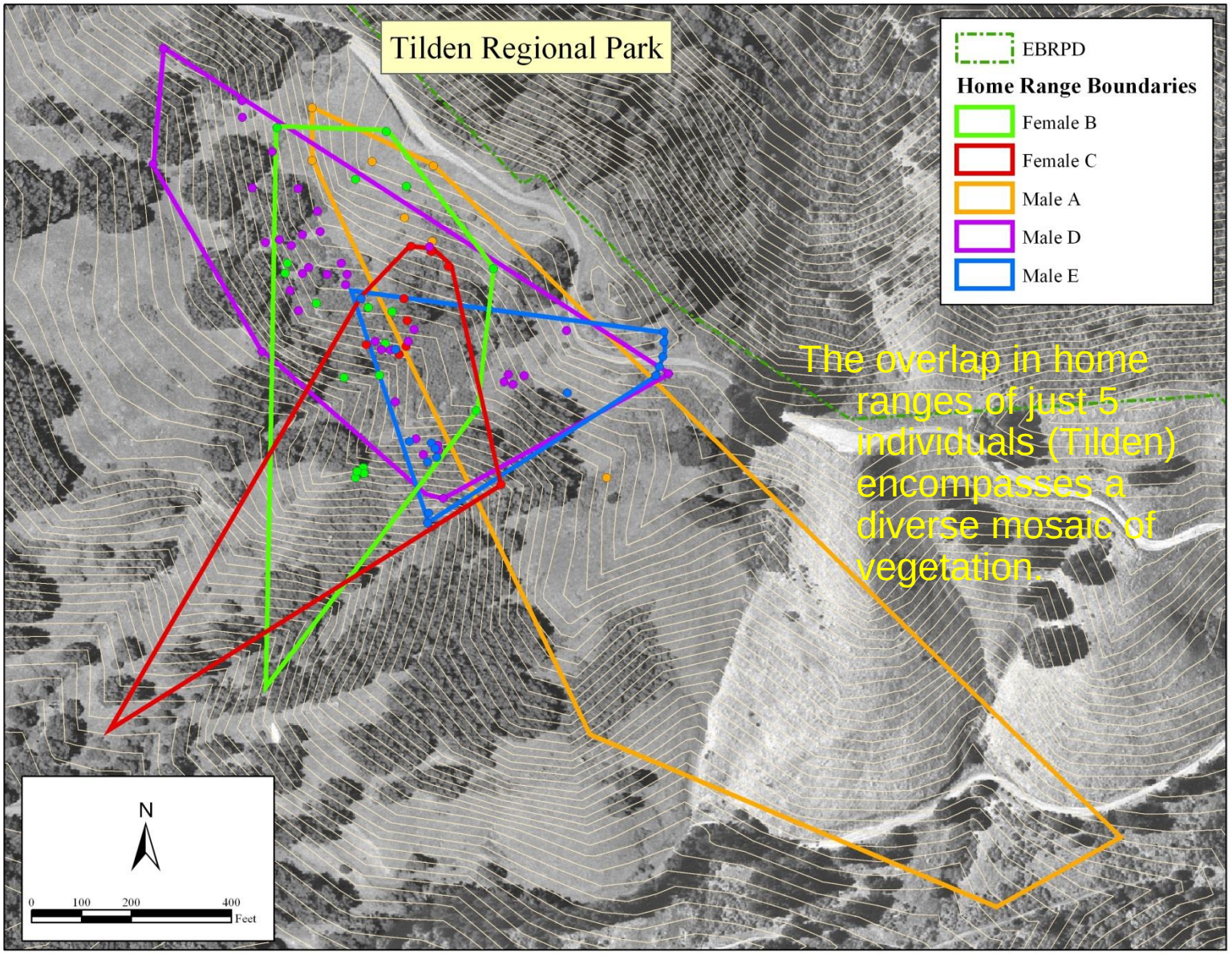
C.l.euryxanthus

March 2011

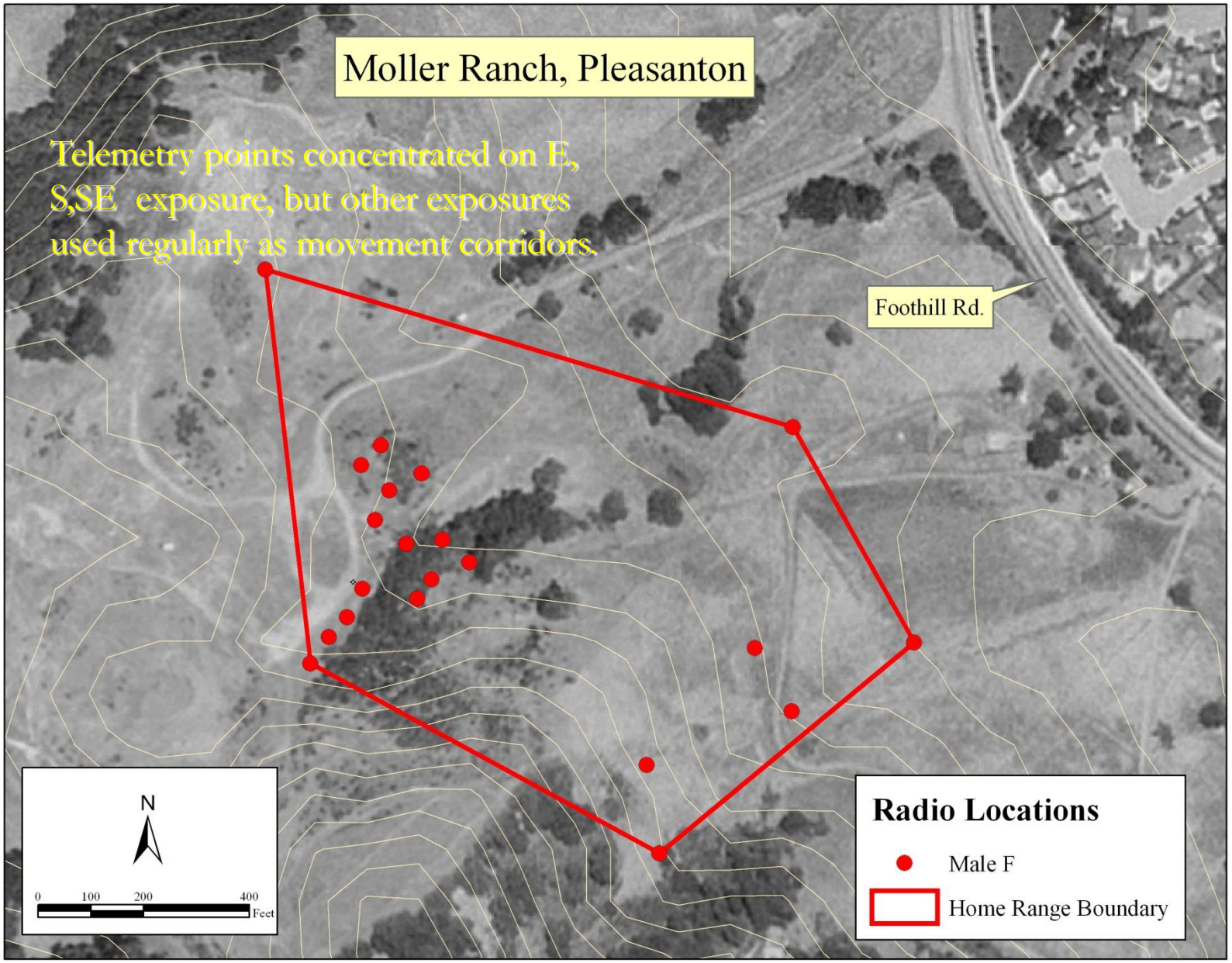
Sources: Esri, USGS, NOAA


California Striped Racer
(Coluber lateralis)
Analysis of six of eight* color chacters described by Riemer (1954)
Pacific Ocean
N
SBI
0 25 50 100
Miles
C. lateralis sample locations
Range of C. lateralis (CDFG)
Color character analysis
C.l.lateralis
C.l.euryxanthus
* dorsal color and amount of orange suffision excluded
March 2011
Sources: Esri, USGS, NOAA

Home Ranges


Tilden Regional Park
EBRPD
Home Range Boundaries
Female B
Female C
Male A
Male D
Male E
The overlap in home ranges of just 5 individuals (Tilden) encompasses a diverse mosaic of vegetation.
N
0
100
200
400
Feet

Home Range


Moller Ranch, Pleasanton
Telemetry points concentrated on E, S,SE exposure, but other exposures used regularly as movement corridors.
Foothill Rd.
N
0
100
200
400
Feet
Radio Locations
Male F
Home Range Boundary

Mean Home Range Size

Sex	Home Range in Hectares	Mean Home Range
M	*8.7	5.5
M	4.7	
M	1.9	
M	7.0	
F	3.9	3.4
F	2.9	

Movement Patterns

- Gravid females appear more sedentary than non-gravid females
- Gravid female movement is unidirectional to oviposition site
- Female movement becomes multidirectional in late summer/fall
- Males generally multidirectional throughout home range in the active season
- Fidelity for certain areas/retreats

Foraging Behavior

Active, fast, diurnal visual hunters adapted to pursuing and capturing lizards, birds, other snakes

Lizards are the primary prey

Also prey on small rodents, frogs

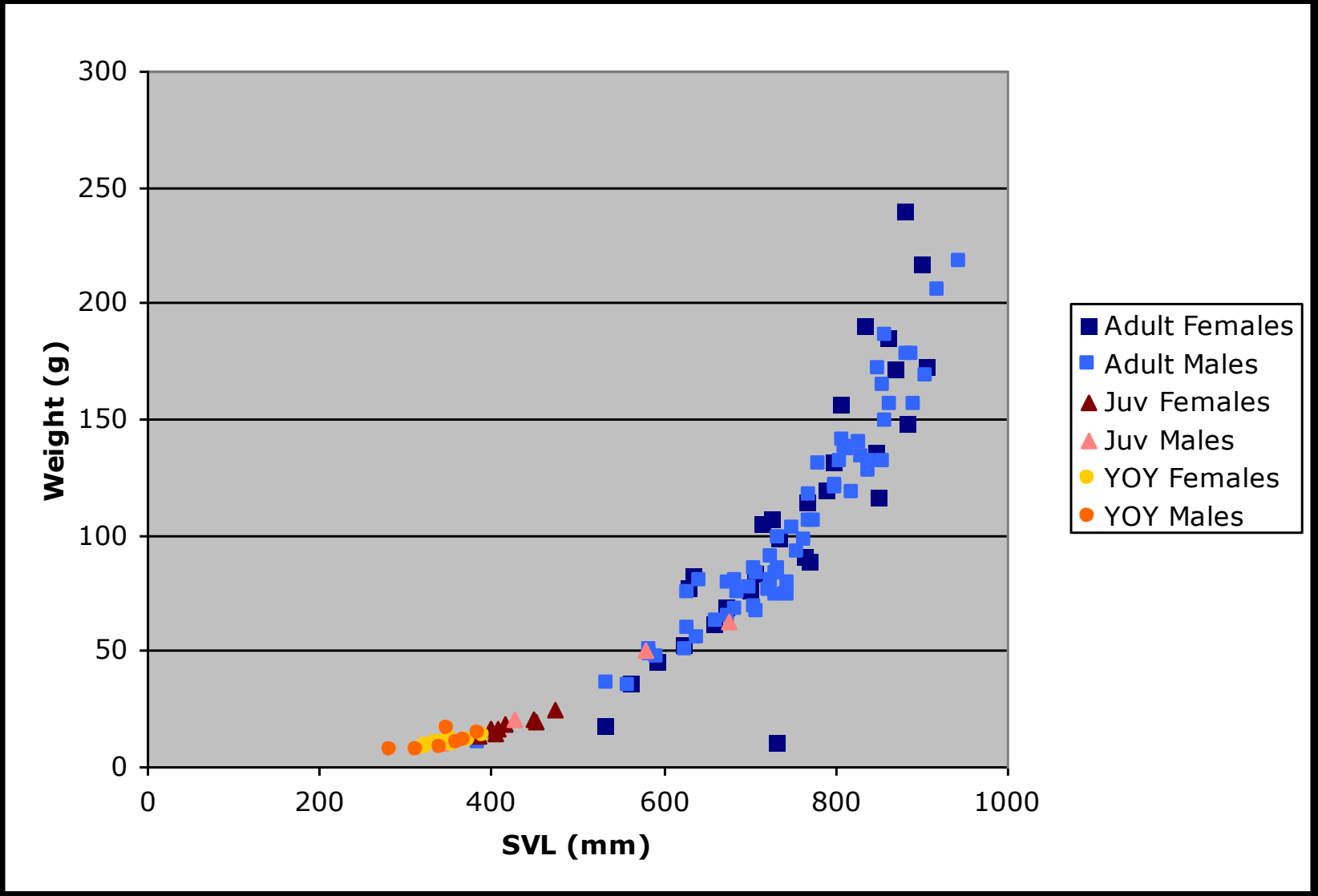
Reproduction

- Mating occurs late March-mid June
- Copulation usually occurs at or near the female's winter retreat
- Males and females may both mate with several individuals

Reproduction

- Oviparous- Egg laying
- Eggs hatch August through September
- Egg laying sites unknown- rodent burrows?

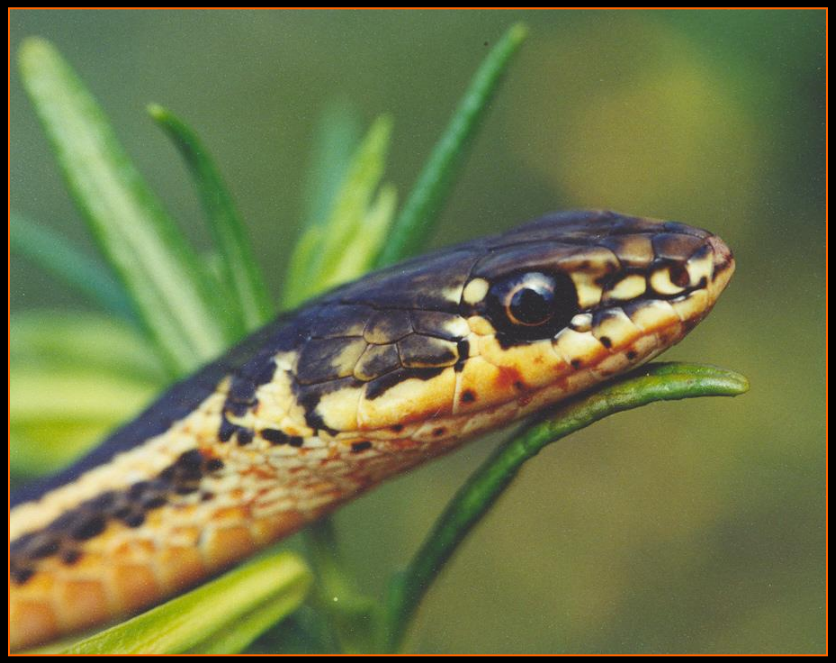
Weight Distribution by Age Class and Sex



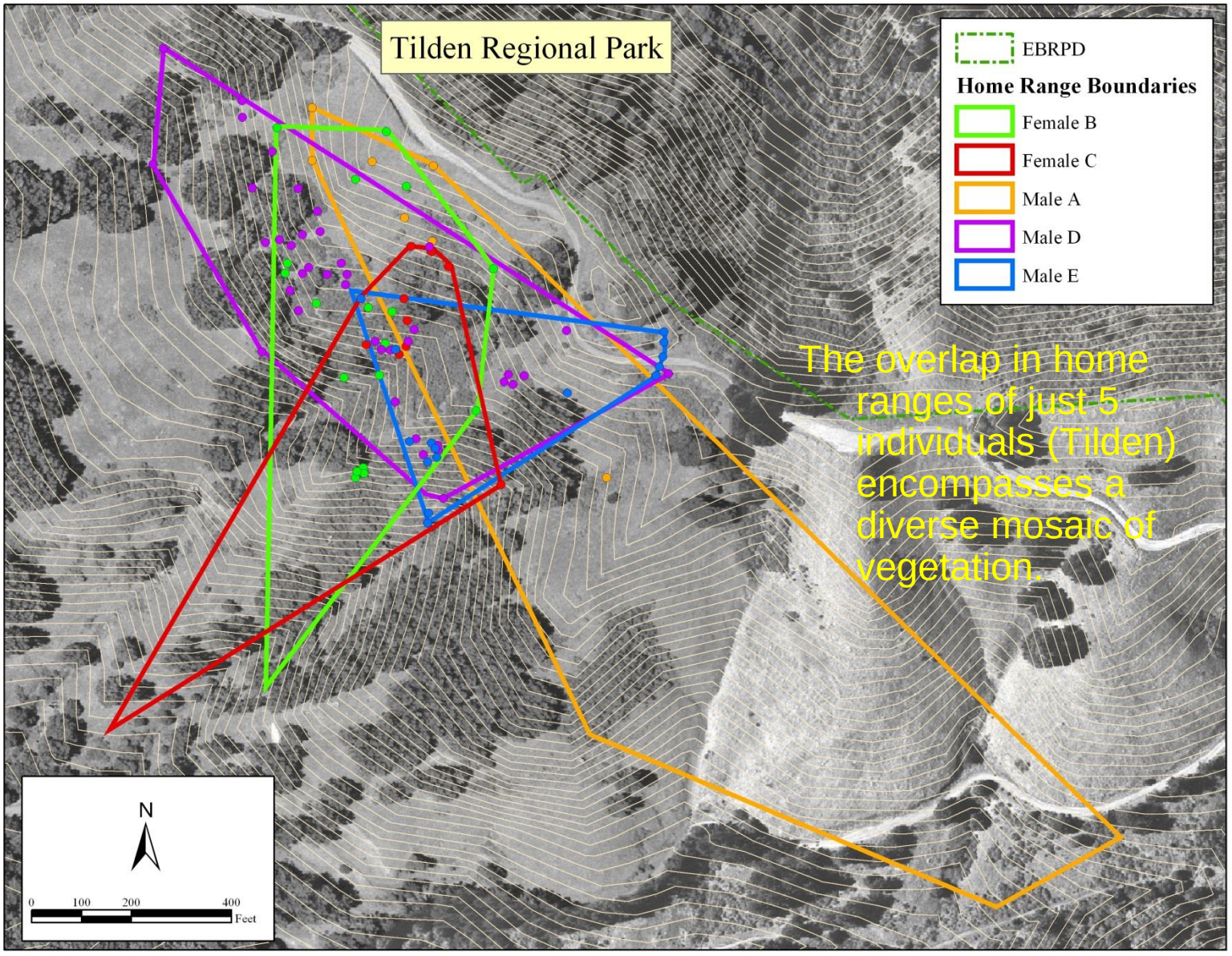
Habitat

Habitat Parameters Studied

- Aspect of Scrub/Chaparral
- Canopy cover (closure)
- Species Composition (vegetation)
- Scrub patch size & distribution
- Use of non-scrub habitats
- Spatial use of habitat
- Importance of Rock Outcrops



Results: Telemetry



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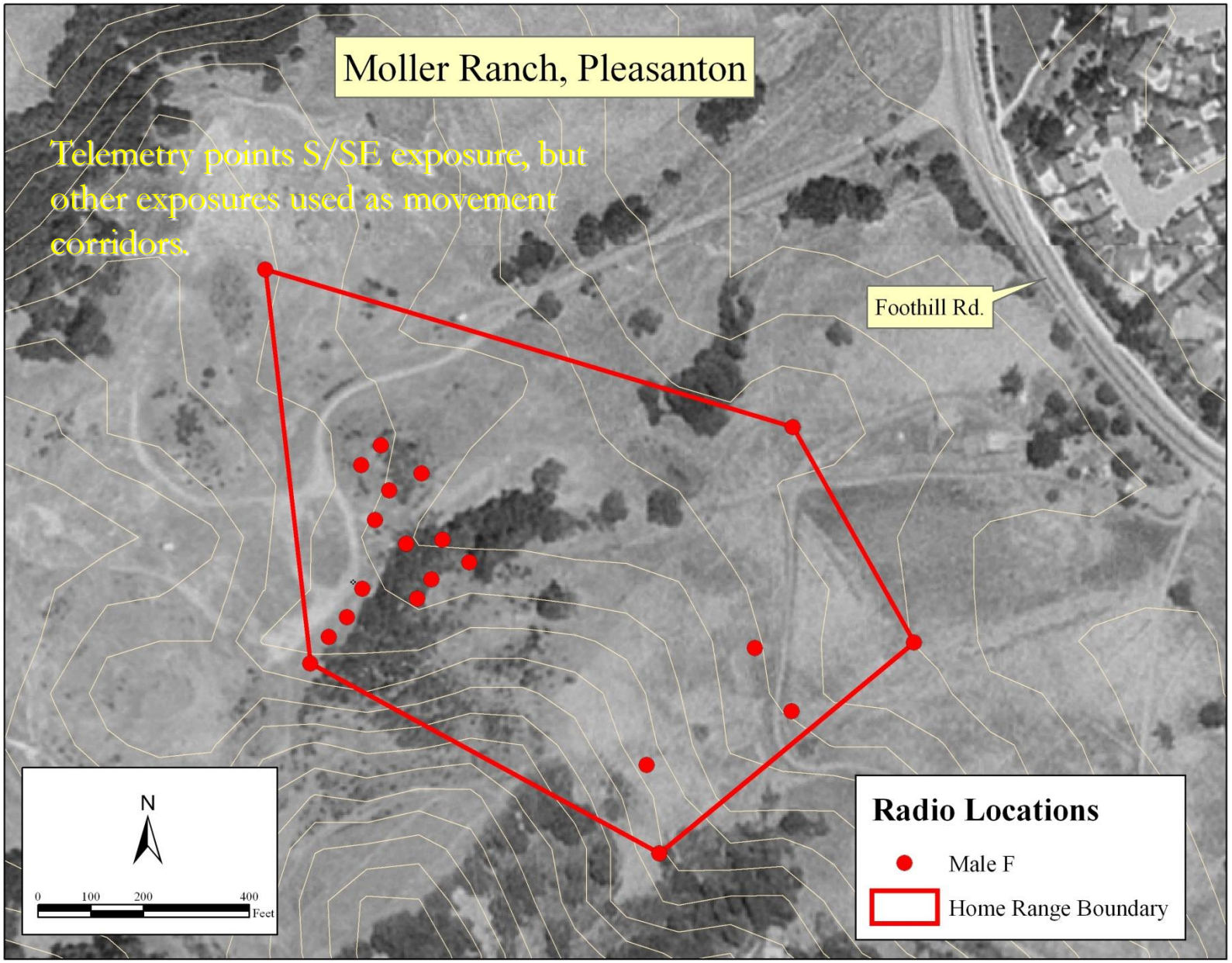


Telemetry Data Biases

- Sample Size N=6
  - Habitat Use information skewed towards only that of large Adult AWS.
  - AWS have incredible site fidelity and knowledge of home range
  - Use same retreats (burrows, rock interstices) over and over with long intervals between use.
  - Experience of large adults makes them less likely to wander or explore some habitats.
  - Only represents habitat types and scrub patch configuration at two sites

Results: Trapping

- Trapping Data (22 Thesis Sites-ONLY Trapping Scrub and Chaparral)
- AWS detected and relatively abundant at sites with open and partially open canopy/scrub chaparral, on SW, S, SE, E, NE aspects
- No AWS detected at sites with only closed canopy coyote brush, poison oak, on N, NW aspect.
- Low or no captures indicates lesser frequency of use versus absence in many cases.

Clarifications of Myths and Misinterpretations from Swaim and McGinnis 1992[1] and Swaim 1994[2]

- Condensation and simplification of the research findings has led to misinterpretations of what constitutes AWS habitat and resulted in project review missing potential effects to the species and its habitat.

- Closed Canopy does not negate potential for AWS to occur-
- Lack of a sunny slope aspect does not negate the potential for AWS to occur.

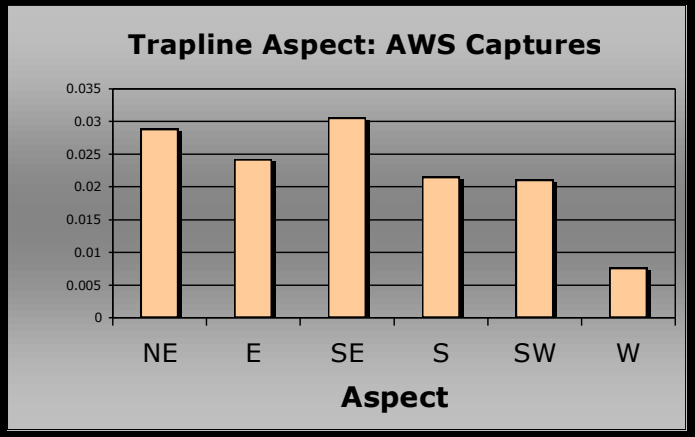
[1] Swaim. K.E. and S. M. McGinnis1992. Habitat associations of the Alameda Striped Racer. Transactions of the Western Wildlife Society 28:107-111.
[2]Swaim, K.E. 1994. Aspects of the ecology of the Alameda Striped Racer (Masticophis lateralis euryxanthus). Unpublished Masters Thesis. 140 pages

Clarifications of Myths and Misinterpretations from Swaim and McGinnis 1992 and Swaim 1994

- Lack of "core habitat" does not negate potential for AWS to occur.
- Core Habitat was defined as areas of concentrated use- not extent of habitat use and was not limited to scrub/chaparral habitats.
- An individual can have multiple core habitat areas in patches of scrub/chaparral separated by less suitable habitats.

Trapping Studies

Post 1994 More Oriented to Detailing Habitat Use



Significant use of NE aspect at Los Vaqueros

- Multiple trap captures of AWS on N facing slopes
- Detections of AWS populations using scattered patches ranging from .25 to 0.8 acres
- Marked AWS moving between distant scrub patches (approx. 1000 feet) through woodland and grassland

Whipsnake Observations > 500 feet outside of scrub

General Location	*Habitat*	*Approximate Distance to Scrub (ft.)*	*Locality Source*
Moller Ranch-Pleasanton	G	627	Swaim (1994)
Rossmoor, Walnut Creek	G	680	Pers. obs.
Site 300, Livermore	G	1,190	J. Woollett, pers. comm.
Site 300, Livermore	G	770	J. Woollett, pers. comm.
Tesla Road, Livermore	G	3,300+	J. Woollett, pers. comm.
Corral Hollow Road	G	600+	B. Sullivan, pers. comm.
Finley Road	G/R	2,000	Pers. obs.
Morgan Territory Road	G	5,000+	Greene (MVZ database)
Round Valley	G	8,000+	J. DiDonato and B. Bozein
Los Vaqueros Res. Watershed	G	21,100+	J. Alvarez, pers. comm.
Los Vaqueros Res. Watershed	G/S	2,500	J. Alvarez, pers. comm.
Los Vaqueros Res. Watershed	G/S	21,100+	CDFG

Range of observations = > 500 feet – 21,000 feet from Scrub

G=grassland S=savanna R=riparian

Swaim, K.E. 2000. Alameda Striped Racer habitat assessment for Carnegie State Vehicle Recreation Area and Alameda/Tesla Properties, Alameda and San Joaquin Counties, CA. Unpublished report prepared for California Department of Parks and Recreation, Twin Cities District. 16+ pp.

Acknowledgments

SBI Staff Present and Past

CDFW

USFWS

Contra Costa Water District

EBRPD

California State Parks

LLNL

ACRCD

SFPUC