

CALIFORNIA RED-LEGGED FROG WORKSHOP



Trish Tatarian, M.Sc. and Greg Tatarian

BIOGRAPHY

Trish Tatarian

Biological consultant – 25 years

CRF Researcher – 14 years

- ❖ CRF Radio-telemetry – Sierran and Inland
- ❖ Bd occurrence in Sierran CRF populations
- ❖ Genetic composition of Sierran populations

BIOGRAPHY

Greg Tatarian

Wildlife Consultant - 27 years

CRF Research – 6 years

- ❖ CRF Radio-telemetry
- ❖ Bd occurrence in Sierran CRF populations
- ❖ Bat Specialist – banding, telemetry, roosts, mitigation, research

ACKNOWLEDGEMENTS

Norm Scott and Galen Rathbun

U. S. Fish and Wildlife Service

U.S. Forest Service

East Bay Regional Park District

East Bay Municipal Utility District

California Department of Transportation

U. S. Geological Survey

California State Parks

ACKNOWLEDGEMENTS

Alameda County Resource Conservation District

Contra Costa Water District

**San Francisco Bay National Estuarine Research
Reserve**

AND YOU – THE ATTENDEES!

TODAY'S SCHEDULE

0800-1200	Lecture
1200-1230	Lunch
1230-1430	Lecture & Demonstrations
1530-1800	Field Demonstrations
1830-2000	Dinner Break
2000-2400	Nighttime Instruction

ADDITIONAL INFORMATION

WWW.ELKHORNSLOUGHCTP.ORG

Bibliography
Peer-reviewed papers

GOALS FOR THIS WORKSHOP?

- ❖ Gain better understanding of CRF biology and ecology
- ❖ Insights into management concerns, techniques and solutions
- ❖ Learn how to conduct Site Assessments
- ❖ All/most: learn how to conduct Protocol CRF Surveys
- ❖ Some/few: obtain a U.S.F.W.S. individual research permit – 10(A)1(a)
- ❖ Improve field biology skills

MANAGING EXPECTATIONS

- ❖ This workshop does not present ALL research and management of CRF
- ❖ Use the concepts, biological information, and specific examples to gain broader and deeper understanding, however;
- ❖ Site-specific or project-specific questions by attendees are limited to available time, applicable experience of presenters
- ❖ NOT a CEQA or NEPA permitting workshop, but we can offer experience and insights as consultants

KEEP IN MIND...

- ❖ Listed species – no take of individuals w/o permit
- ❖ Manage on a site-by-site basis
- ❖ Information presented here provides some tools for management of species
- ❖ Variations in habitat use by bioregion determines each project analysis

MAJOR DISCUSSIONS

Part One

- Taxonomy, Phylogeny
- Distribution
- Effects of Mediterranean Climate
- Biology
- Population Data
- Habitats

MAJOR DISCUSSIONS

Part Two

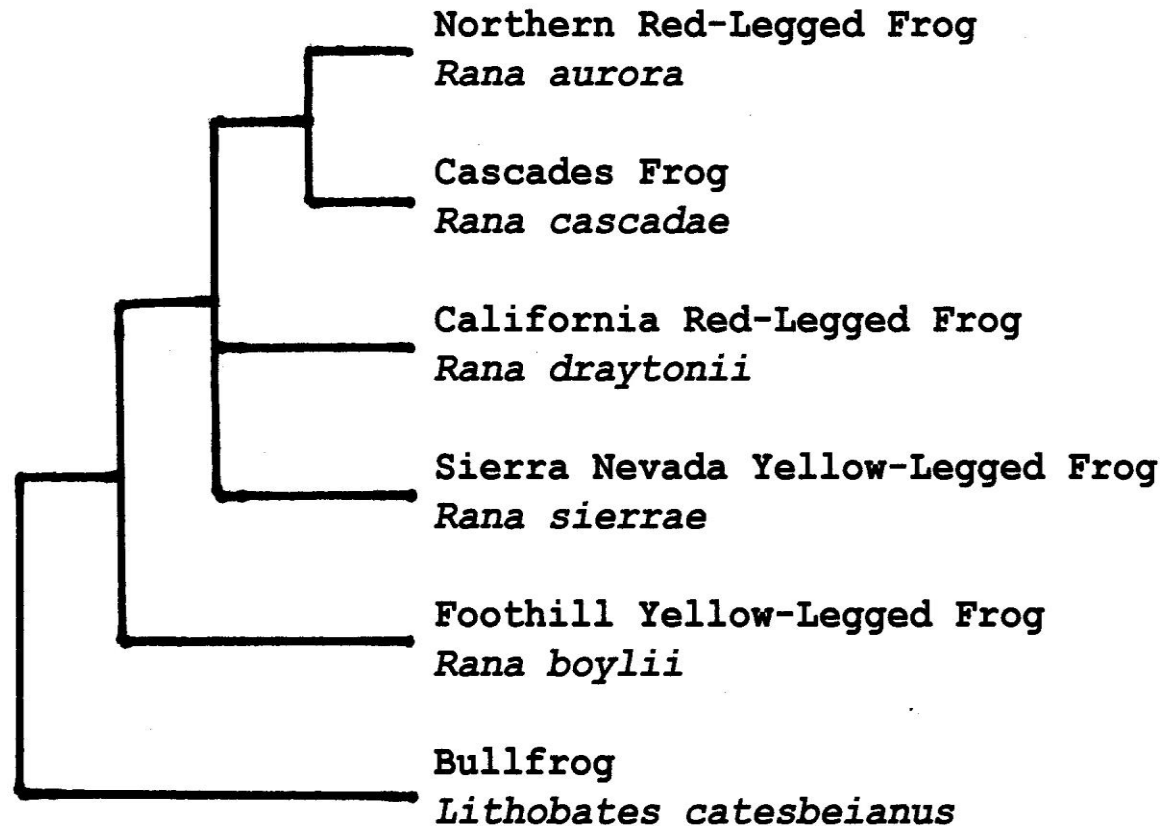
- Movements
- Population Biology
- Extinction Sequence
- Threats
- Management
- Regulatory

TAXONOMY
PHYLOGENY
IDENTIFICATION
NOMENCLATURE

PHYLOGENY

Rana draytonii Phylogeny

(Shaffer, et. al. 2004)



PHYLOGENY

Phylogeny - looks can be deceiving

	<i>Rana aurora</i>	<i>Rana draytonii</i>
<i>Male size</i>	65 mm	116 mm
<i>Female size</i>	93	138 mm
<i>Calling position</i>	Underwater	Above water surface
<i>Egg position</i>	Below surface	At surface

IDENTIFICATION

Nomenclature

- ❖ Age
- ❖ Egg
- ❖ Embryo
- ❖ Tadpole (Larva)
- ❖ Metamorph
- ❖ Froglet
- ❖ Juvenile
- ❖ Adult

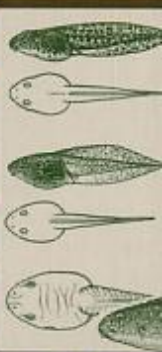
IDENTIFICATION

PETERSON FIELD GUIDES®

Western Reptiles and Amphibians

Third Edition

NEWLY
REVISED AND
IN FULL
COLOR



Robert C. Stebbins



Plate 8. a, Western Spadefoot Toad; b, Western Toad; c, Yellow-legged Frog (d, ventral surface); e, Red-legged Frog (f, ventral surface); g, Bullfrog; h, Pacific Treefrog in brown phase (i, green phase).

IDENTIFICATION Frogs and Toads in California

IDENTIFICATION AND DIFFERENTIATION

Correct ID is critically important for
Protection of Individuals and Populations

WHY?

IDENTIFICATION

Foothill Yellow-Legged Frog *Rana boylii*



IDENTIFICATION

Sierra Nevada Yellow-legged Frog

Rana sierrae



IDENTIFICATION

Western Toad *Anaxyrus boreas* (*Bufo boreas*)



IDENTIFICATION



Sierran Treefrog
Pseudacris sierra
(*Hyla regilla*)

IDENTIFICATION

Bullfrog
Lithobates
catesbeianus
(*Rana catesbeianus*)





IDENTIFICATION

Bullfrog

California
Red-Legged Frog



IDENTIFICATION



California
Red-Legged Frog

IDENTIFICATION

Variation in California Red-Legged Frogs



IDENTIFICATION

Colorful Individuals
Light and Dark



Colorful With Minimal Pattern



9/12/2000

IDENTIFICATION

Male vs. Female



DIFFERENTIATING FEATURES

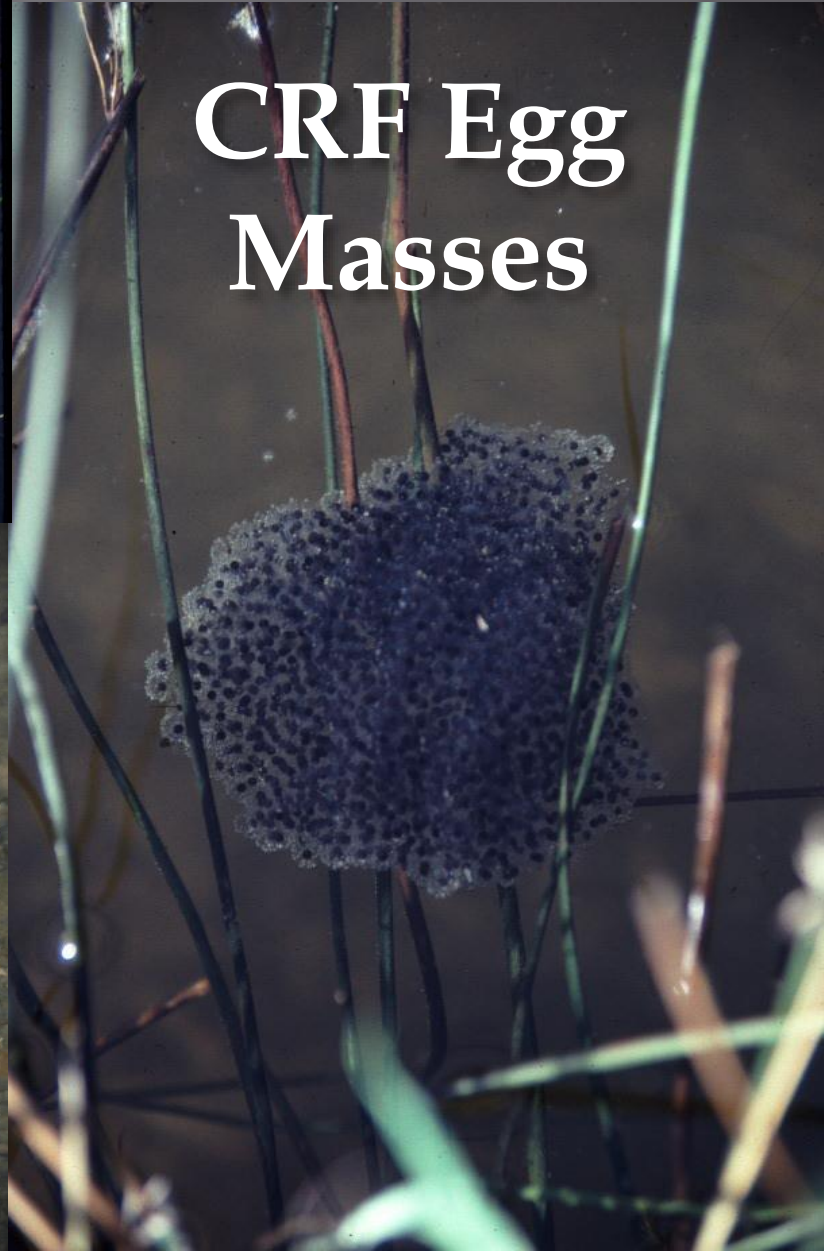
Adults

- ❖ *Rana draytonii*
- ❖ *Lithobates catesbeianus*
- ❖ *Rana boylei*
- ❖ *Pseudacris sierra*

IDENTIFICATION



CRF Egg Masses



IDENTIFICATION

Bullfrog Egg Mass



IDENTIFICATION

Bullfrog Egg Mass



IDENTIFICATION

Treefrog Egg Mass



IDENTIFICATION

Treefrog Egg Mass



Gosner Embryo/Tadpole Staging System

Stage 1= Undivided fertilized egg

Stage 26 = Hind leg bud apparent

Stage 46 = Metamorphosis complete

(Gosner 1960)

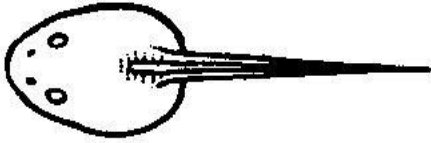
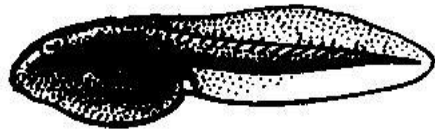
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California Red-
Legged Frog

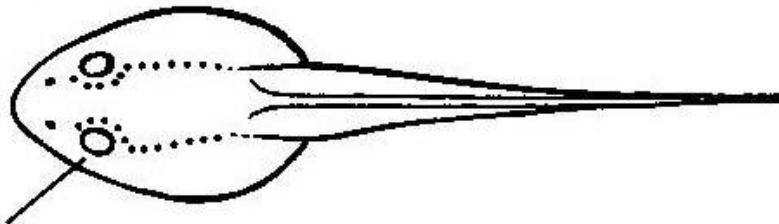
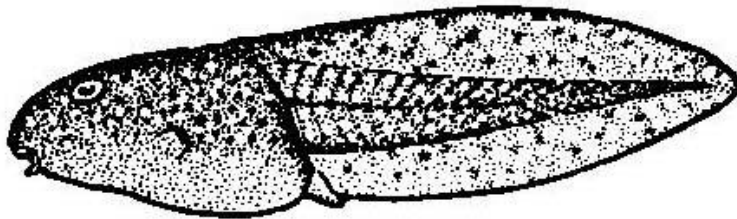


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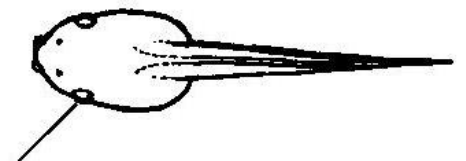
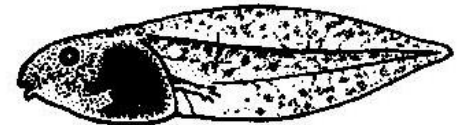
Tadpole Comparisons



WESTERN TOAD



RED-LEGGED FROG



PACIFIC TREEFROG

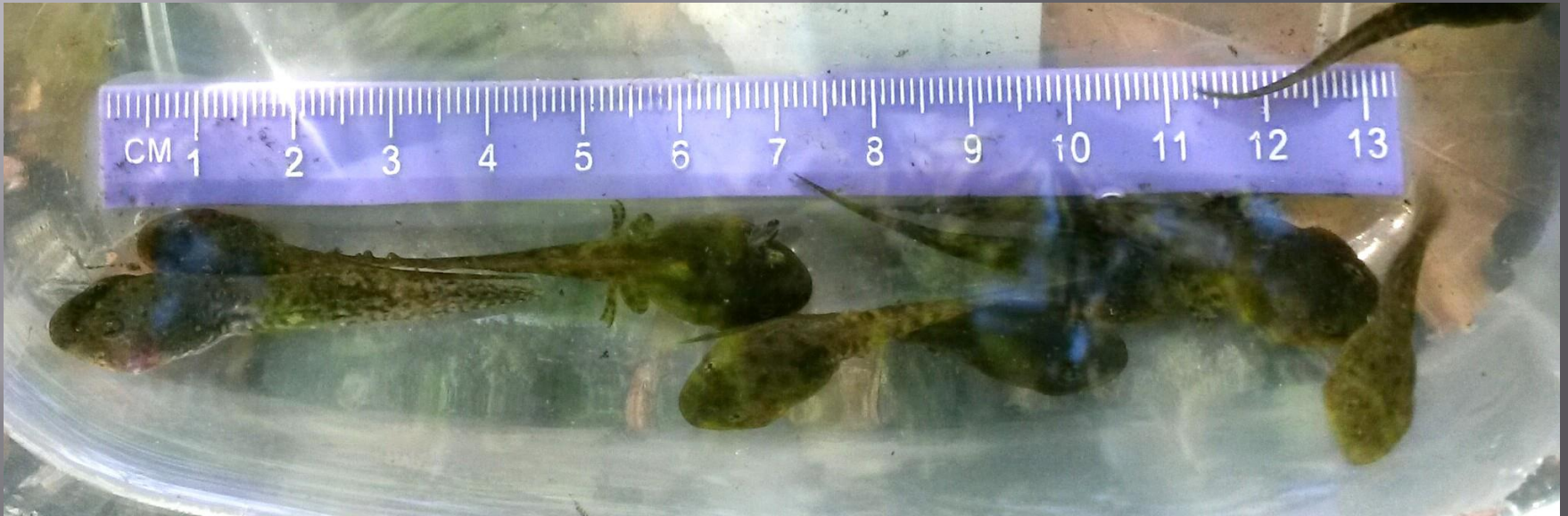
IDENTIFICATION

Western Toad Tadpole



IDENTIFICATION

Foothill Yellow-legged Frog Tadpoles



RELATIVE LOCATION OF EYES



Treefrog



Red-Legged Frog

IDENTIFICATION

BODY PROFILES

A close-up photograph showing two frog tadpoles being held in a person's hands. The hands are positioned to display the tadpoles against a light-colored, possibly tiled, background. The top hand holds a small, dark-colored tadpole, while the bottom hand holds a larger, yellowish-green tadpole with dark spots. The text 'BODY PROFILES' is overlaid at the top, 'Red-Legged Frog Tadpole' is overlaid near the top tadpole, and 'Bullfrog tadpole' is overlaid near the bottom tadpole. The word 'IDENTIFICATION' is in the bottom left corner.

Red-Legged Frog Tadpole

IDENTIFICATION

Bullfrog tadpole

IDENTIFICATION

TADPOLE COMPARISONS

	Bullfrog	Red-legged
<i>Hatching period</i>	April - September	December - April
<i>Overwinter</i>	Sometimes	Sometimes
<i>Color</i>	Greenish-yellow with dots, white ventral	Brown dorsal, pinkish ventral
<i>Size</i>	Larger than most, up to 8 in.	Up to 4 in.

IDENTIFICATION



DIFFERENTIATING FEATURES

Larvae

- ❖ *Rana draytonii*
- ❖ *Lithobates catesbeianus*
- ❖ *Rana boylei*
- ❖ *Pseudacris sierra*
- ❖ *Anaxyrus boreas*

IDENTIFICATION

Call Comparisons: California red-legged frog vs. American bullfrog

(Davidson 1995)



R. draytonii



R. draytonii



L. catesbeianus

CALIFORNIA RED-LEGGED FROG BIOLOGY

BIOLOGY

Duration of Life Stages and Corresponding Months

Stage	Duration	Months
Calling	1 - 2 months	December - April
Egg	2 weeks	December - April
Tadpole (non-overwintering)	4 - 6 months	January - September
Tadpole (overwintering)	Up to 12 months	April
Metamorph	3 - 4 months	June - September
Juvenile	20 - 32 months	June - December
Adult	~ 4 years	

(c) J. Kirkhart

BIOLOGY



Amplexus

Mating
Embrace
During
External
Fertilization

BIOLOGY



Fresh Red-legged
Frog
Egg Mass





BIOLOGY

Tadpoles (Up to 4")



BIOLOGY

Metamorphosis





Physiology of Anurans

Majority of water loss is through the skin.

Reabsorption through the ventral pelvic region.

The larger the size the greater the distance travelled between aquatic sites.

Small amphibians have proportionately more surface area and, therefore, have higher rates of evaporative loss.

(Wells 2007)

BIOLOGY



Adult



Tadpole Food

“Aufwuchs” (Slime!)

Algae, fungi

Microscopic animals

Carrion

Frog Food

Arthropods

Molluscs

Annelid worms

Largest frogs eat fish, other frogs, mice

Terrestrial prey = 90% of total prey items

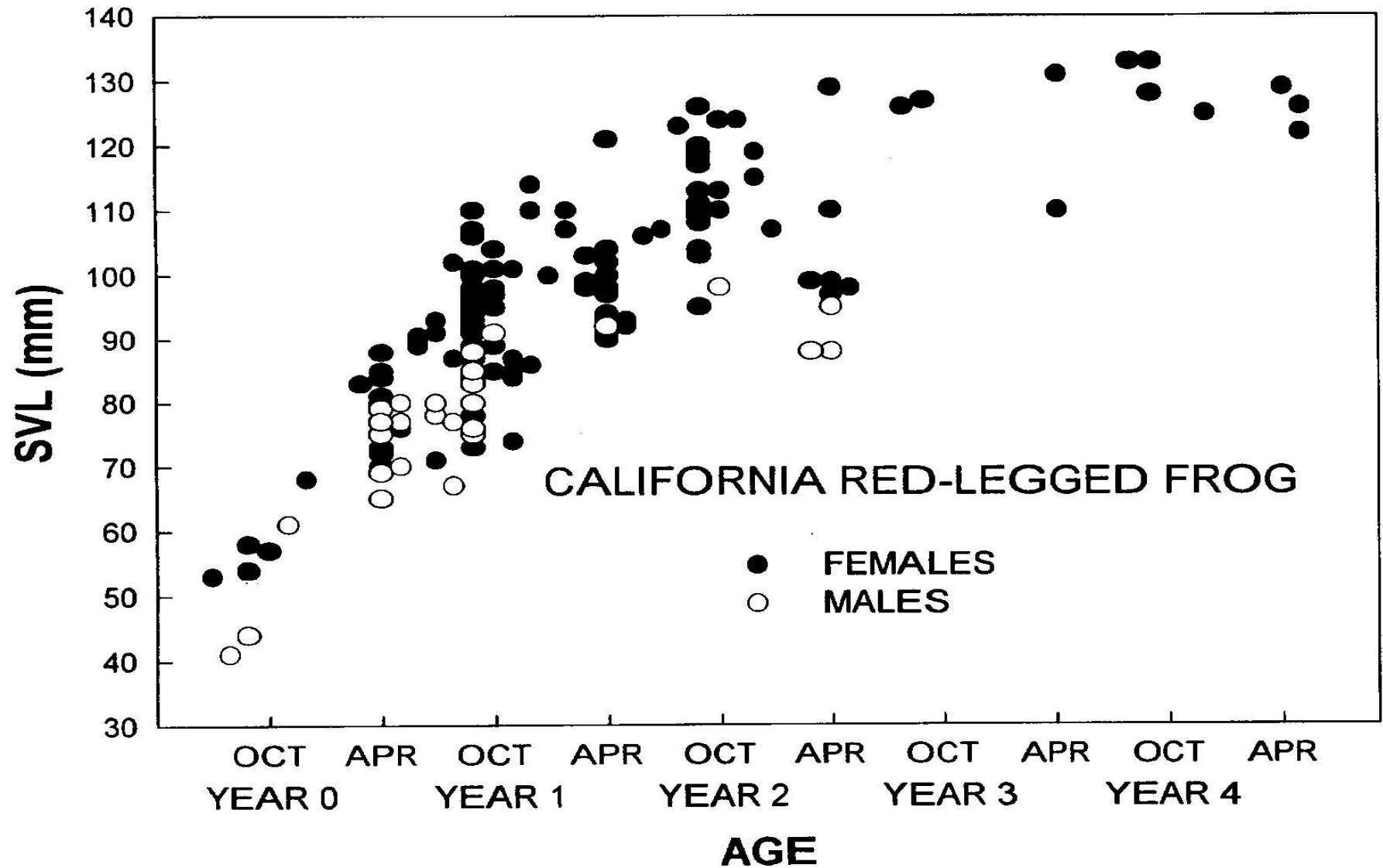
(Bishop 2011)

BIOLOGY

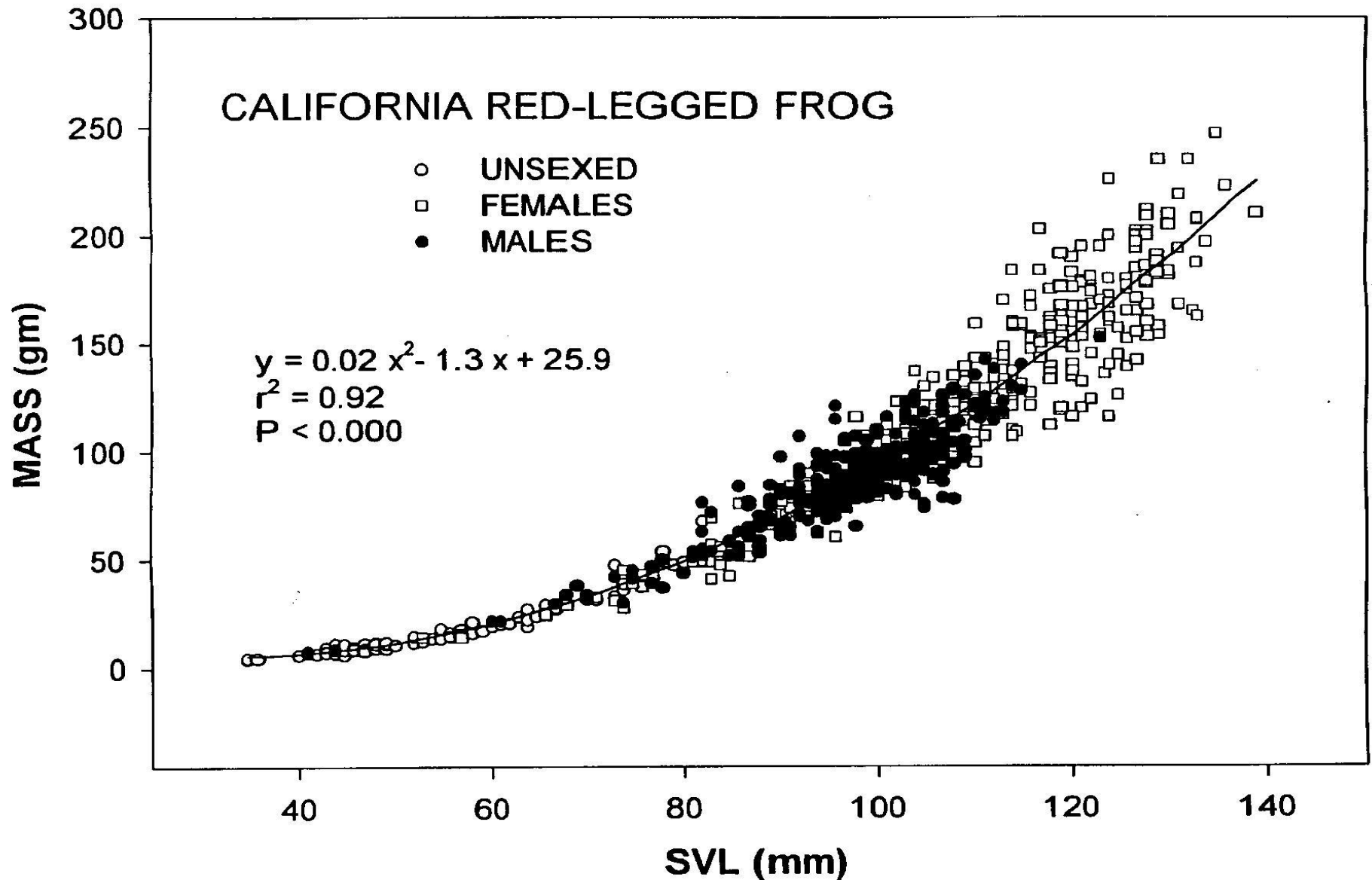
SIZE AND WEIGHT

Sexual dimorphism

Age - Size



Weight - Length



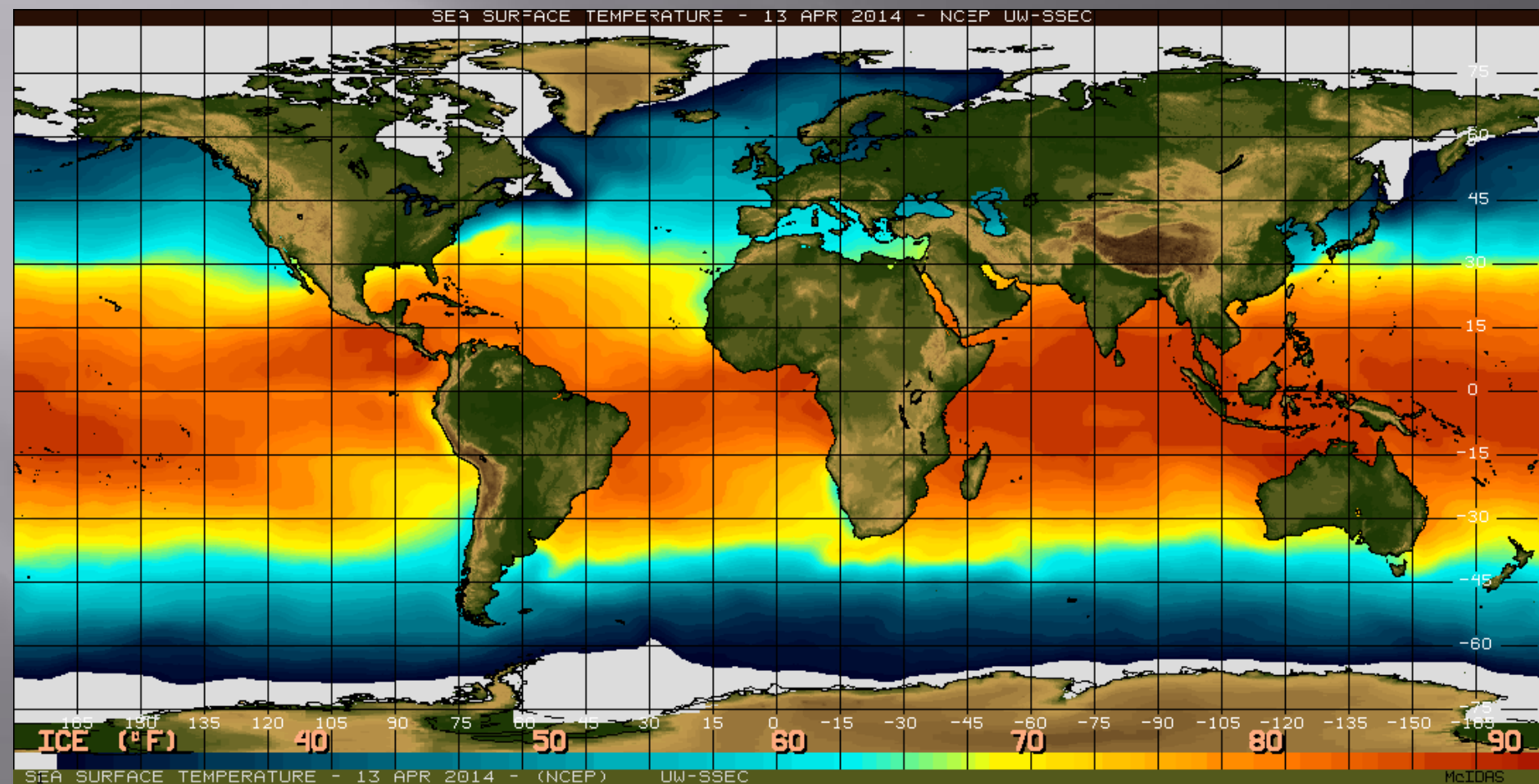
CALIFORNIA'S MEDITERRANEAN CLIMATE

HOT AND DRY IN SUMMER, WET
AND COLD IN WINTER!

*Dramatically impacts where CRF are
found and how they move within
different habitats*

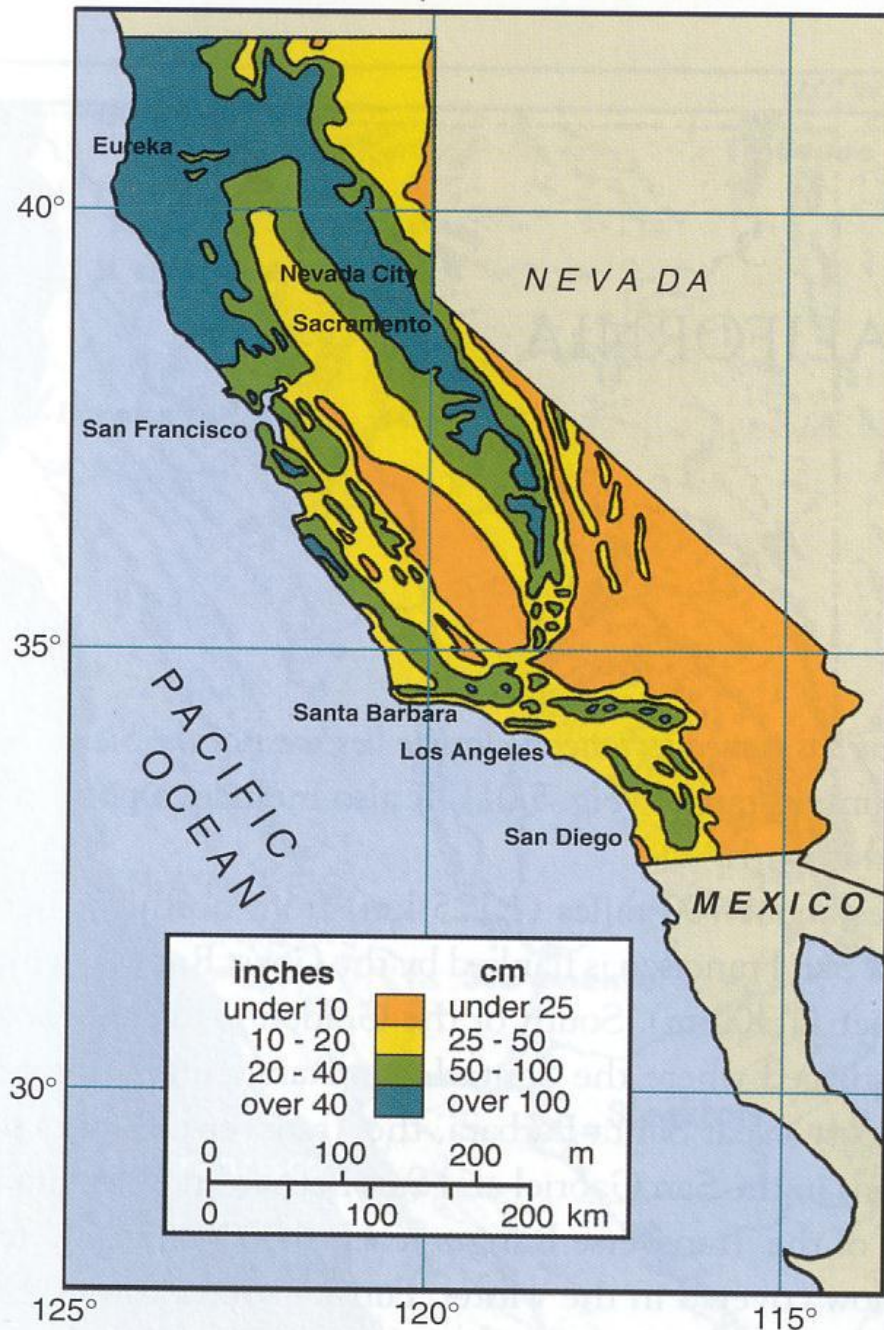
CLIMATE

El Nino-Southern Oscillation

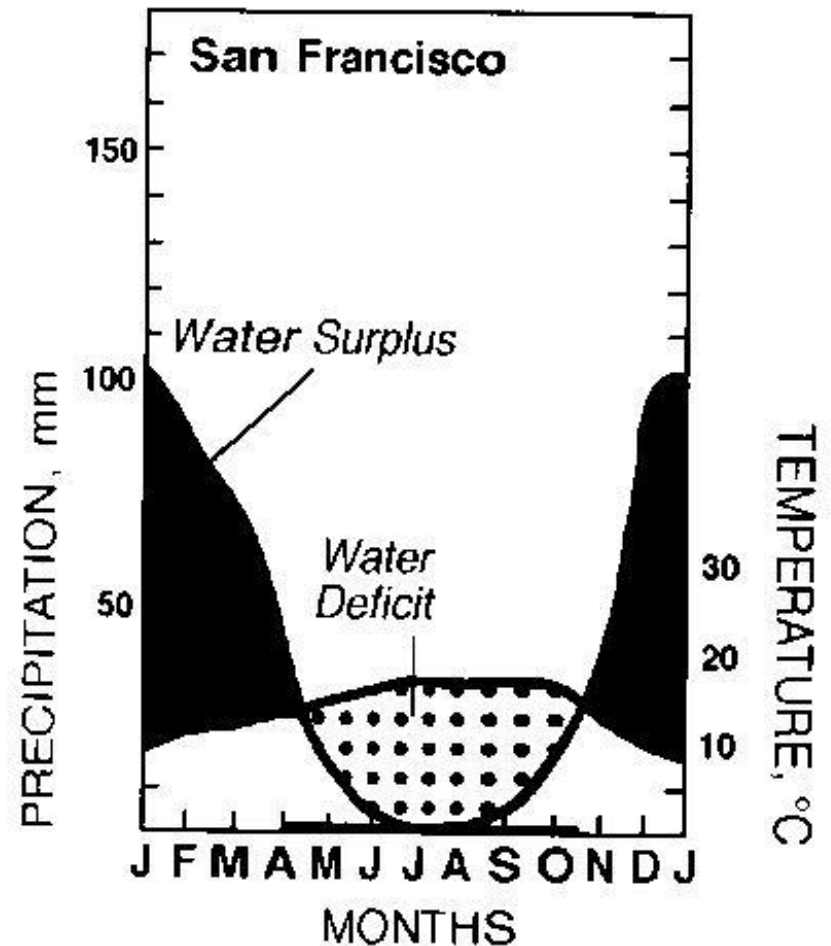


Source: www.elnino.noaa.gov

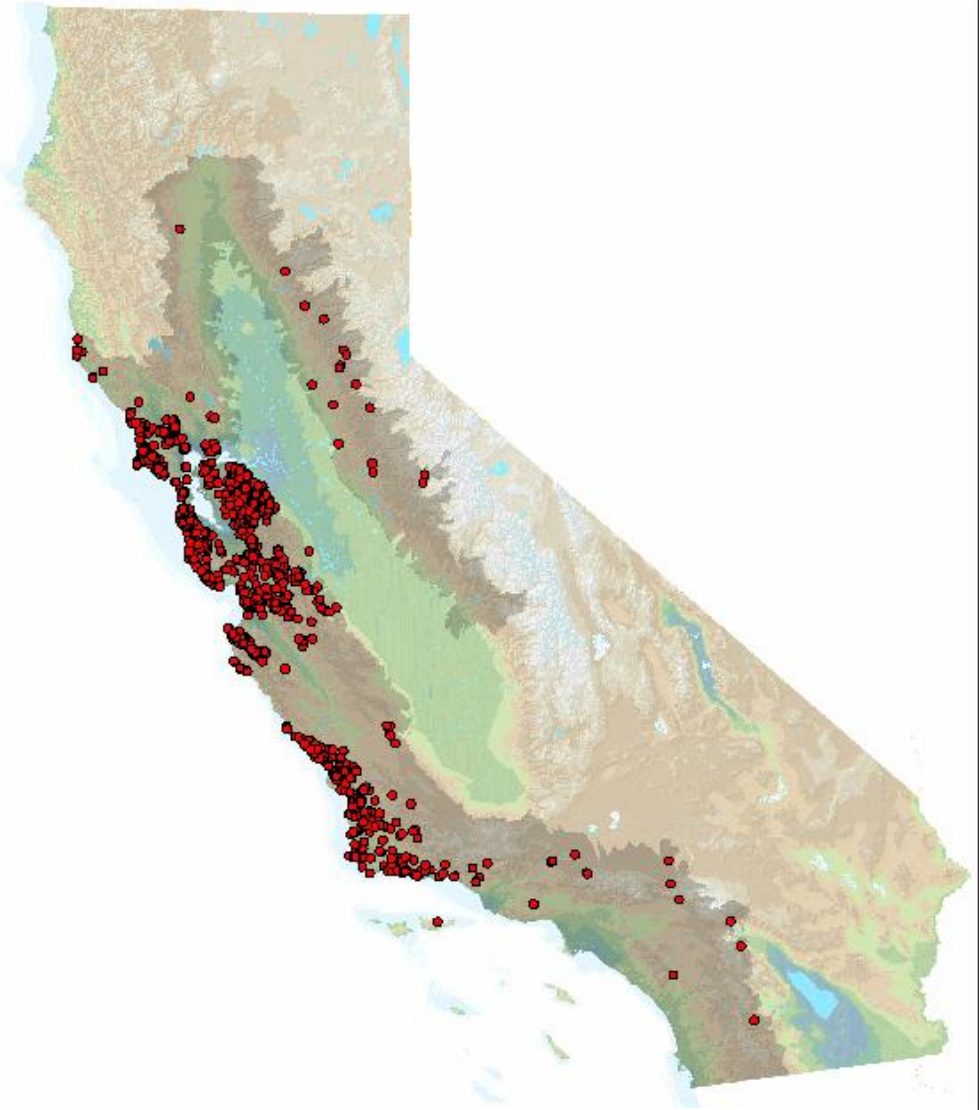
Annual Precipitation: California



Mediterranean Climate



California Red-legged Frog Range and Distribution

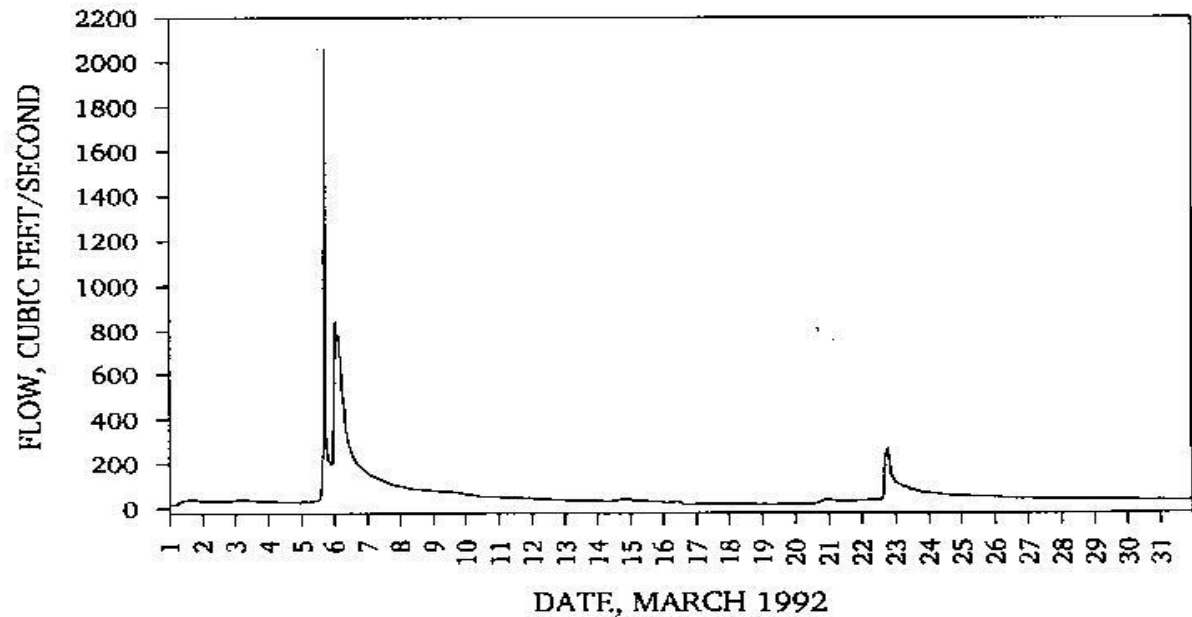
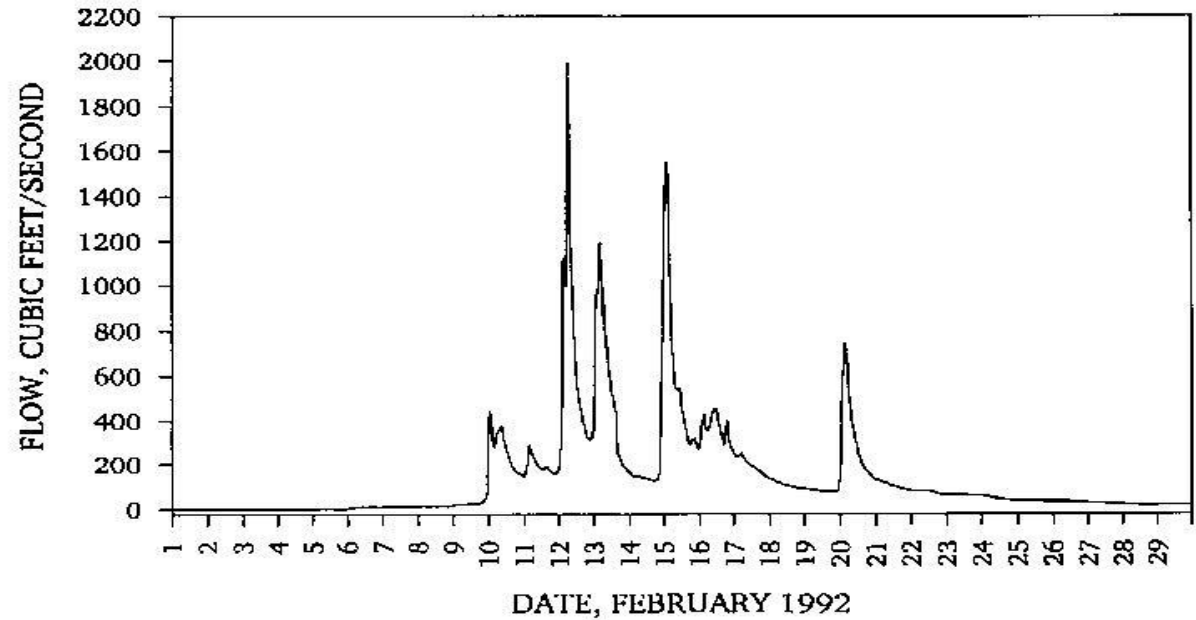


Source: CDFW 2018

CLIMATE

Stream Flow Extremes

FIGURE 9. Instantaneous stream flow at segment 72 on San Simeon Creek. Data were recorded hourly by automatic gage, which was maintained by the Engineering Department, San Luis Obispo County.



CLIMATE



Flow Extremes



San Simeon - Spring



San Simeon - Summer





CLIMATE

Calm and
Stable
Water is
ESSENTIAL
for
Egg Laying

CLIMATE

How does the California
Mediterranean climate affect CRF?

HABITATS

3 BIOREGIONS

COASTAL – e.g., Marin, Santa Cruz, San Luis Obispo, Sonoma Counties

INLAND – e.g., Alameda, Contra Costa, Santa Clara Counties

SIERRAN – e.g., Butte, Yuba, Plumas, Calaveras Counties

HABITATS

Characteristics



HABITATS

Ponds - Coastal



HABITATS

Stream Pools – Inland



HABITATS

Ponds - Inland



HABITATS

Ponds - Sierra



HABITATS

Other

Seeps

Spring boxes

Cement wells

Sewage basins



HABITATS

Aquatic Habitat Use



HABITATS

Aquatic Habitat Use



HABITATS



HABITATS



Riparian Upland Use



POPULATION ECOLOGY

MANAGEMENT IMPLICATIONS!

POPULATION ECOLOGY

EIGHT-YEAR STUDY

(Scott, et. al., 2001)

Populations in four coastal streams

San Luis Obispo County

> 700 marked frogs

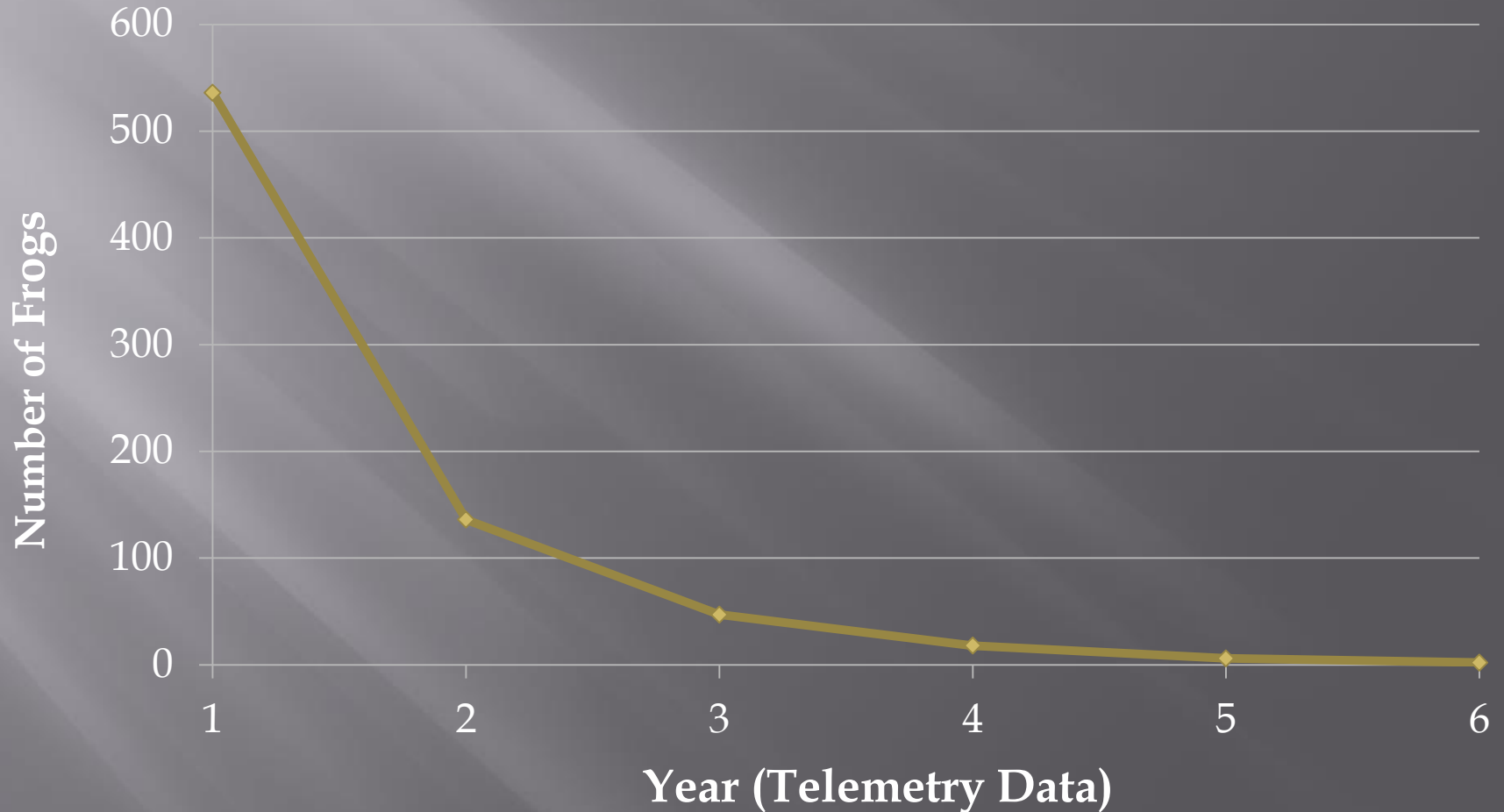
POPULATION ECOLOGY

Survivorship

Stage	Age (months)	Survival Rate	Number of Individuals
<i>Egg>>metamorph (assume 2,500/mass)</i>	0-5	1-5%**	125
<i>Metamorph>> juvenile</i>	5-12	10%	12.5
<i>Juvenile>>adult</i>	12-24	25%	~ 3.12
<i>Adults</i>	24-80	~33%/yr	1

POPULATION ECOLOGY

Adult Survivorship *Rana draytonii*



POPULATION ECOLOGY

Roughly Speaking...

The average female (~66%) only breeds
once/year

and

One egg mass (2,000-4,000 eggs) will
produce ~1 breeding pair

OUR RECOMMENDATION

Manage for Tadpoles and Juveniles

CALIFORNIA RED-LEGGED FROG MOVEMENTS

Why?

Where?

When?

MOVEMENTS

Breeding, Dispersal, and Avoiding Adversity



MOVEMENTS

RESEARCH STUDIES

Scott and Rathbun (Observations 1993-1999)
San Luis Obispo Co.

Bulger, et al. (2003)
Santa Cruz Co.

Fellers & Kleeman (2007), Halstead and Kleeman (2017)
Marin Co.

Tatarian (2008)
Contra Costa Co.
Butte Co. (Observations 2007- 2009)

MOVEMENTS

INTERPRETING MOVEMENT STUDIES

Climatic Regime

Length & Seasonality of Study

Habitat Characteristics

MOVEMENTS

Coastal Habitat Movement Comparisons

	Santa Cruz Co	Marin Co
<i>Breeding Timing (Male vocalizations)</i>	November	December
<i>Sample Size</i>	n = 56	n = 123
<i>% of Sample Moved</i>		
<i>Terrestrial</i>	14-32%	29%
<i>Aquatic</i>	10-23%	2%
	16%	27%
<i>Duration of Terrestrial Movements</i>		
<i>Average</i>	23-30 days	4 days
<i>Maximum</i>	63 days	6 days
<i>Greatest Distances</i>		
<i>Terrestrial</i>	1,200 m	430 m
<i>Aquatic (riparian)</i>	2,800 m	1,400 m

MOVEMENTS

Inland Habitat Movement Comparisons

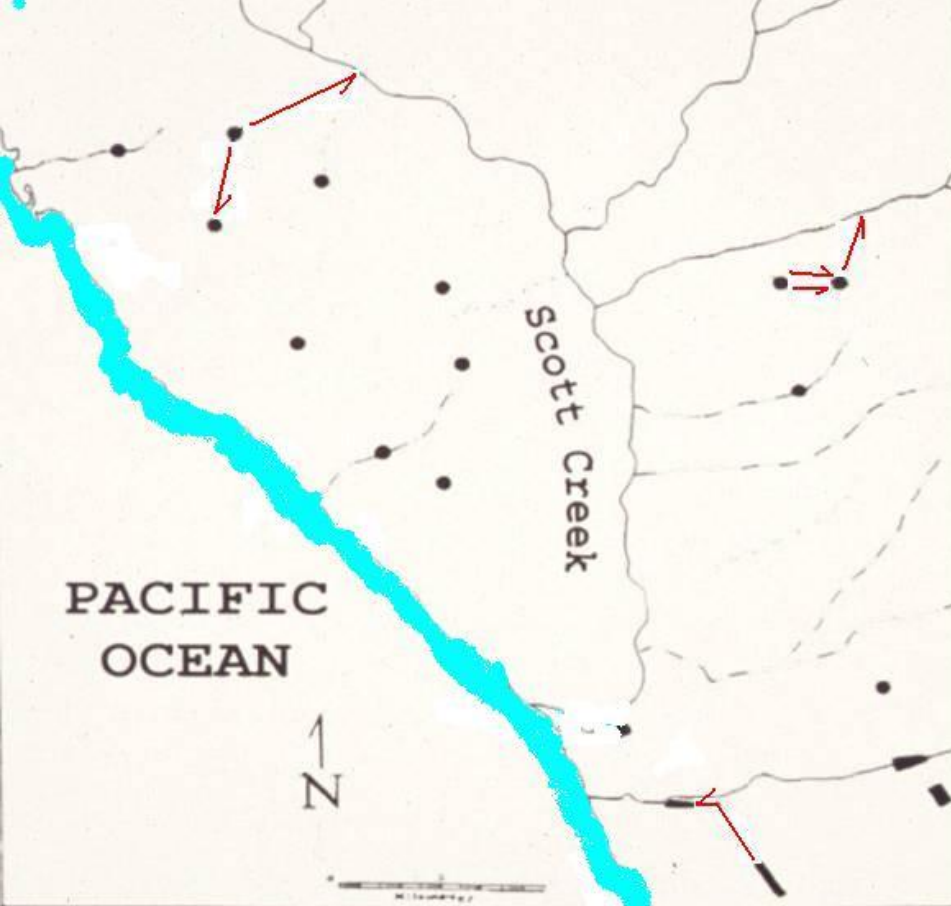
	Round Valley	San Pablo Watershed	Plumas Nat. Forest
<i>Breeding Timing (Male vocalizations)</i>	December	December	February
<i>Sample Size</i>	n = 49	n = 22	n = 13
<i>% of Sample Moved</i>	42%	50%	100%
<i>Terrestrial</i>	26.5%	18%	1%
<i>Aquatic</i>	24.4%	36%	100%
<i>Duration of Terrestrial Movements</i>			
<i>Average</i>	1-4 days	1-6 days	1-7 days
<i>Maximum</i>	50 days		
<i>Greatest Distances</i>			
<i>Terrestrial</i>	91 m	215 m	10 m
<i>Aquatic</i>	661 m	643 m	152 m

MOVEMENTS

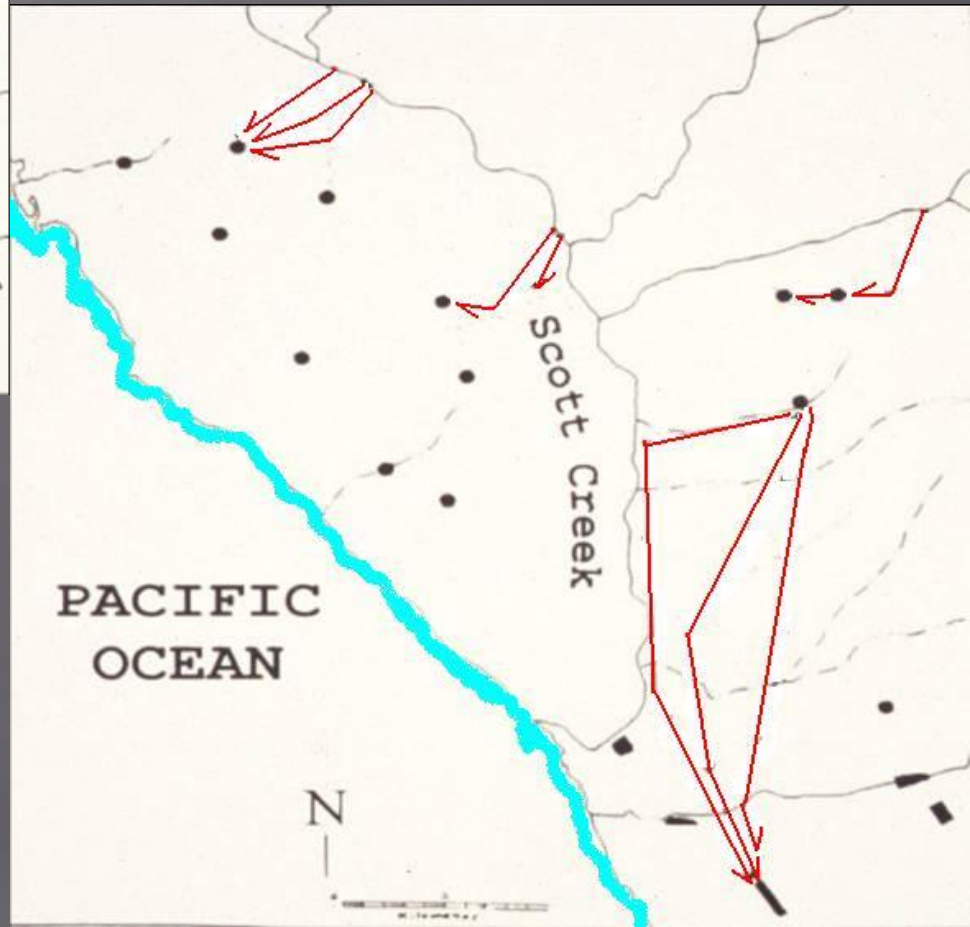
Generalities

- ❖ Most do not move far
- ❖ Movement between aquatic habitats
- ❖ Escape adversity
- ❖ Move in damp conditions (first rains)
- ❖ Move at night
- ❖ Rarely use corridors

MOVEMENTS



Scott Creek
Santa Cruz County



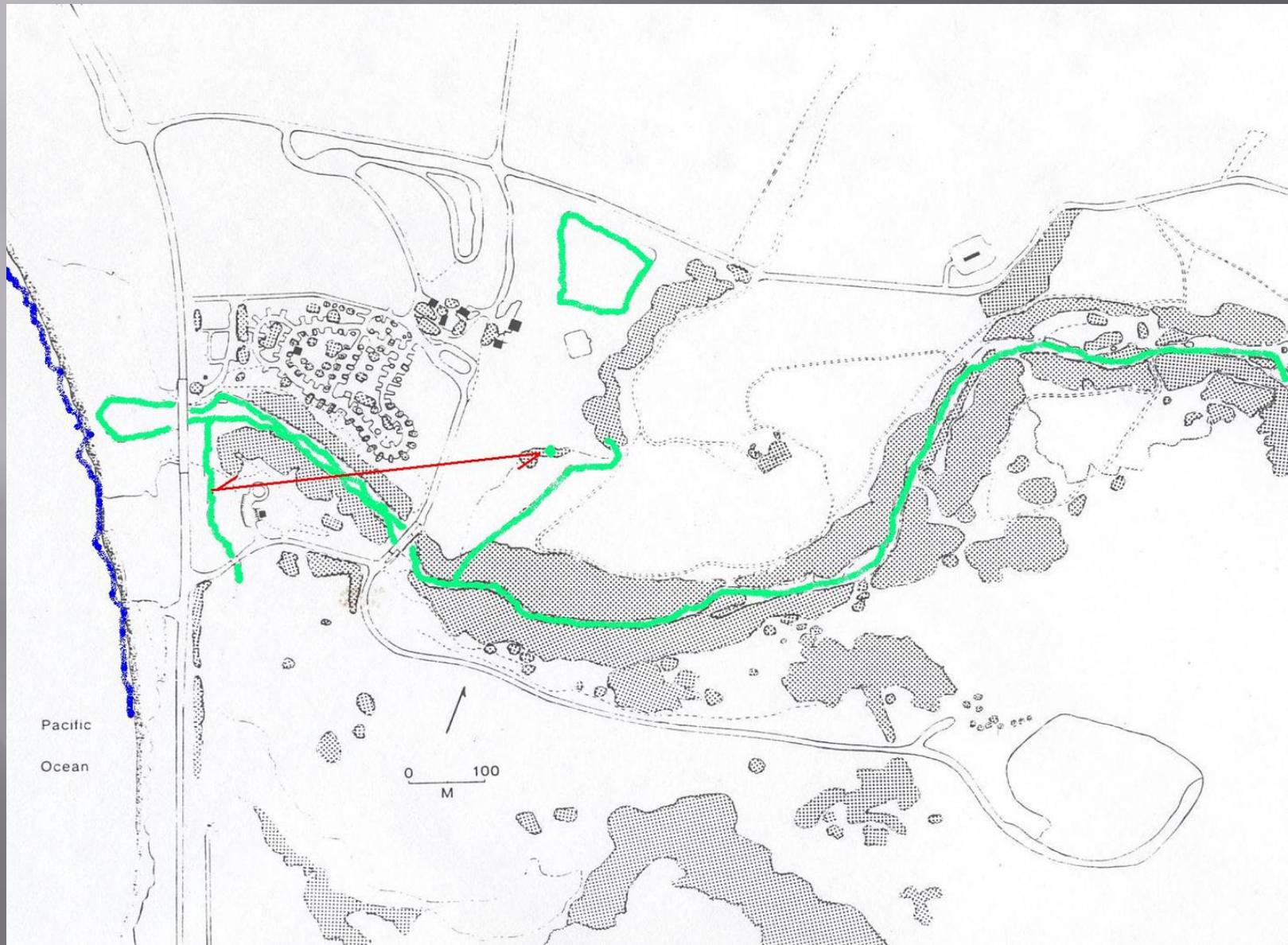
MOVEMENTS

Scott Creek Valley



MOVEMENTS

San Simeon Creek



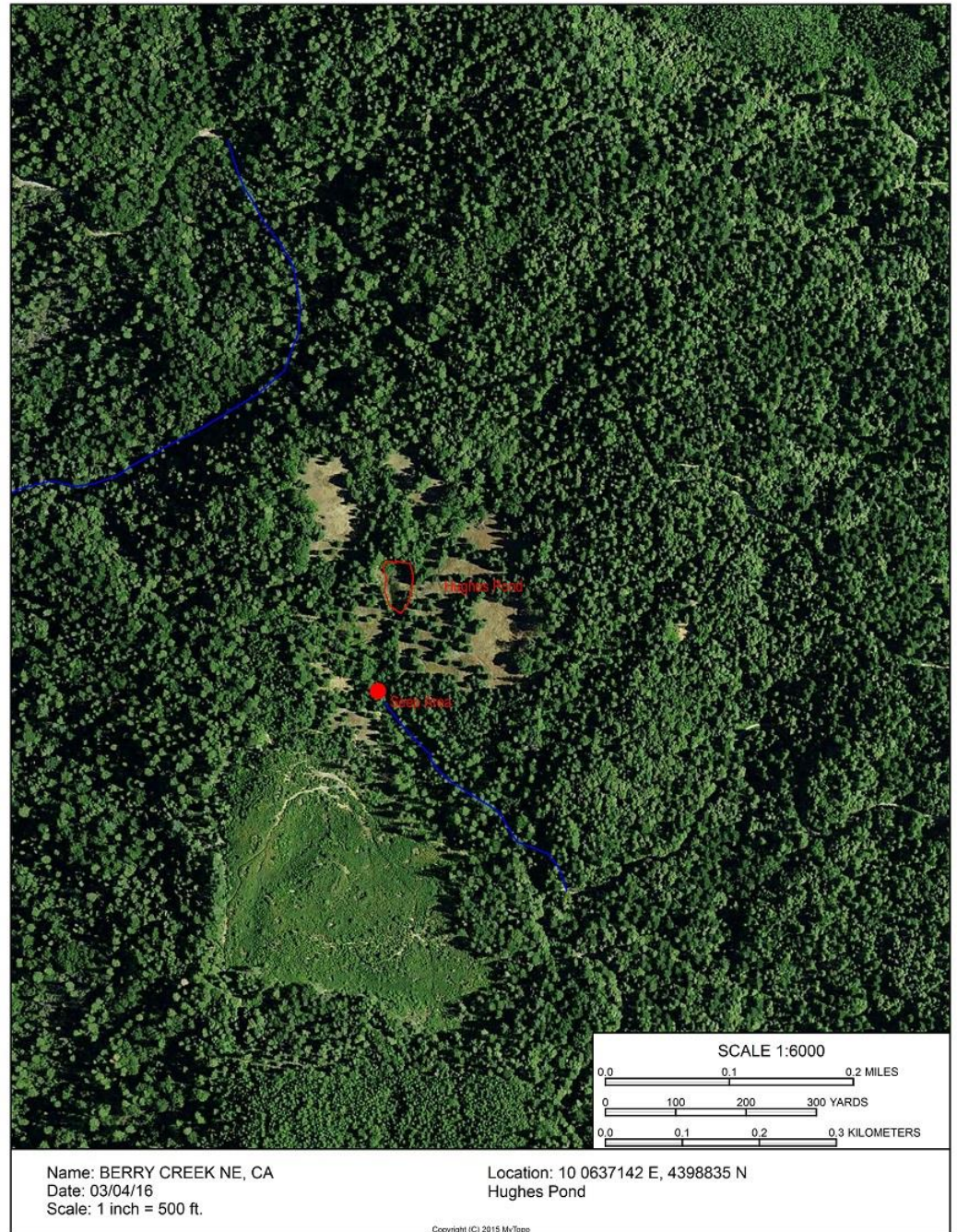
MOVEMENTS

Round Valley Contra Costa County



MOVEMENTS

Hughes Pond Butte County



MOVEMENTS

Juvenile Frogs - Dispersal

Constrained by physiology
Lack of knowledge of landscape and
environmental conditions

Studies of adult California red-legged frog Movements

- ❖ Name 3 regions of studies
- ❖ Were movements alike in all regions?
- ❖ Why or why not?
- ❖ What are some appropriate generalities of CRF movements?

POPULATION DYNAMICS

Terminology

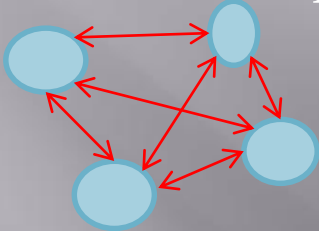
LOCAL POPULATION - Frogs in habitats linked by the regular exchange of individuals

METAPOPULATION - Two or more local populations rarely linked by migrating individuals

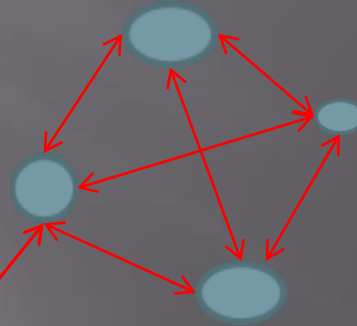
ISOLATED POPULATION - A local population not exchanging individuals with any other local population

POPULATION DYNAMICS

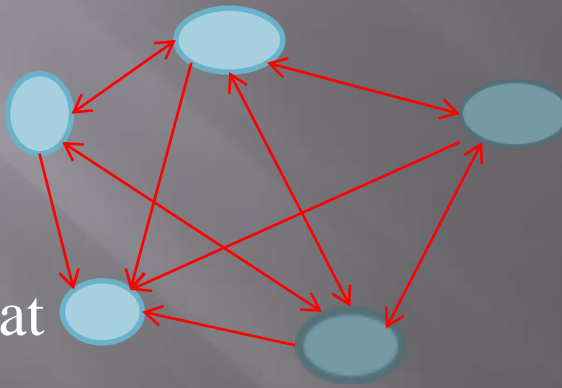
Isolated Population



Local Population



Local Population



Sink Habitat

Source Habitat

Metapopulation



POPULATION DYNAMICS

European Pool Frog (*Rana lessonae*)

- ❖ 155 permanent ponds in Sweden
 - ❖ 60 local frog populations
 - ❖ All 24 ponds >4 km from another population had no frogs
 - ❖ 70% of ponds <1 km from another population had frogs
 - ❖ 33% of ponds 1-4 km from another had frogs
- (Sjögren 1991)

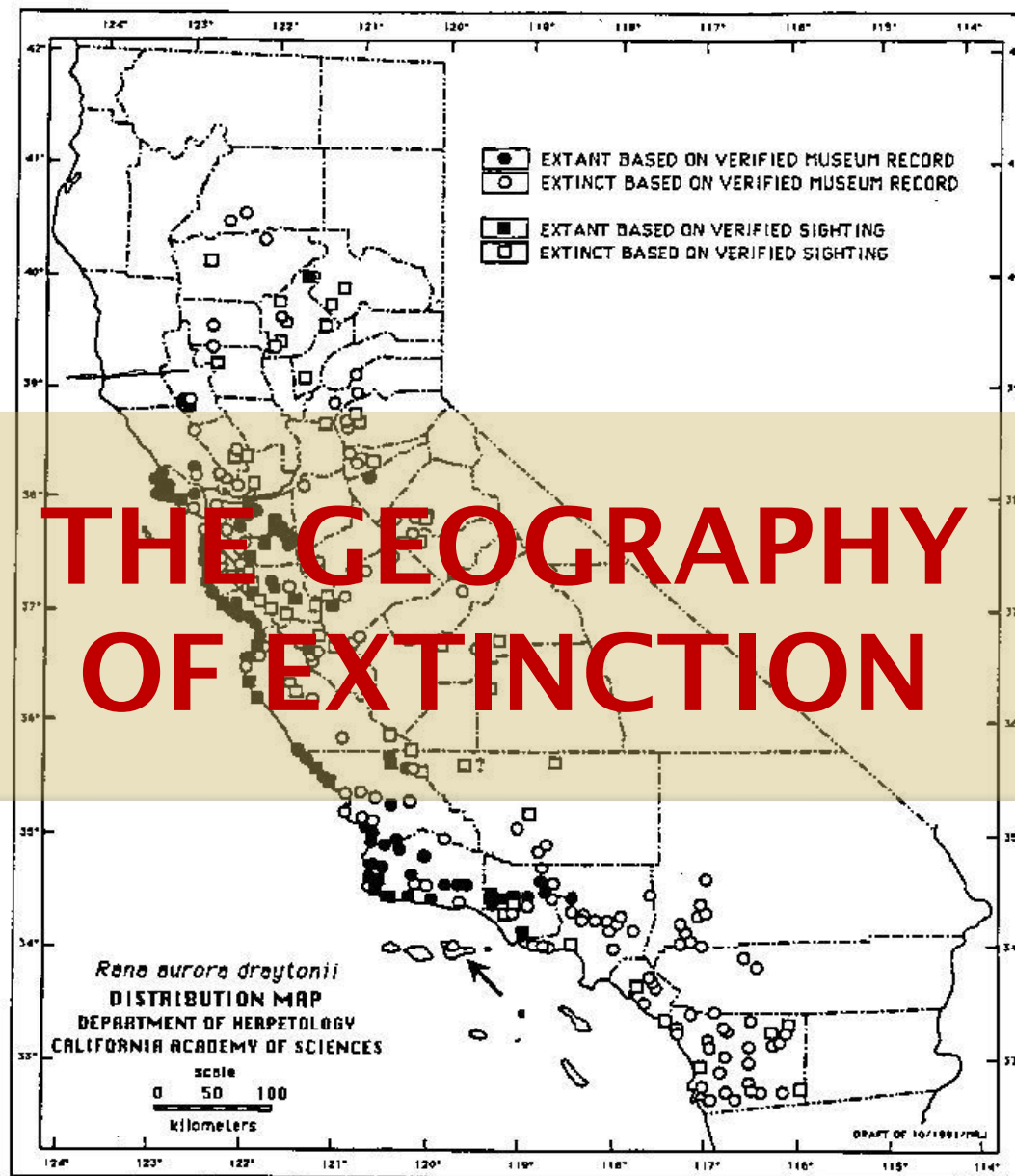
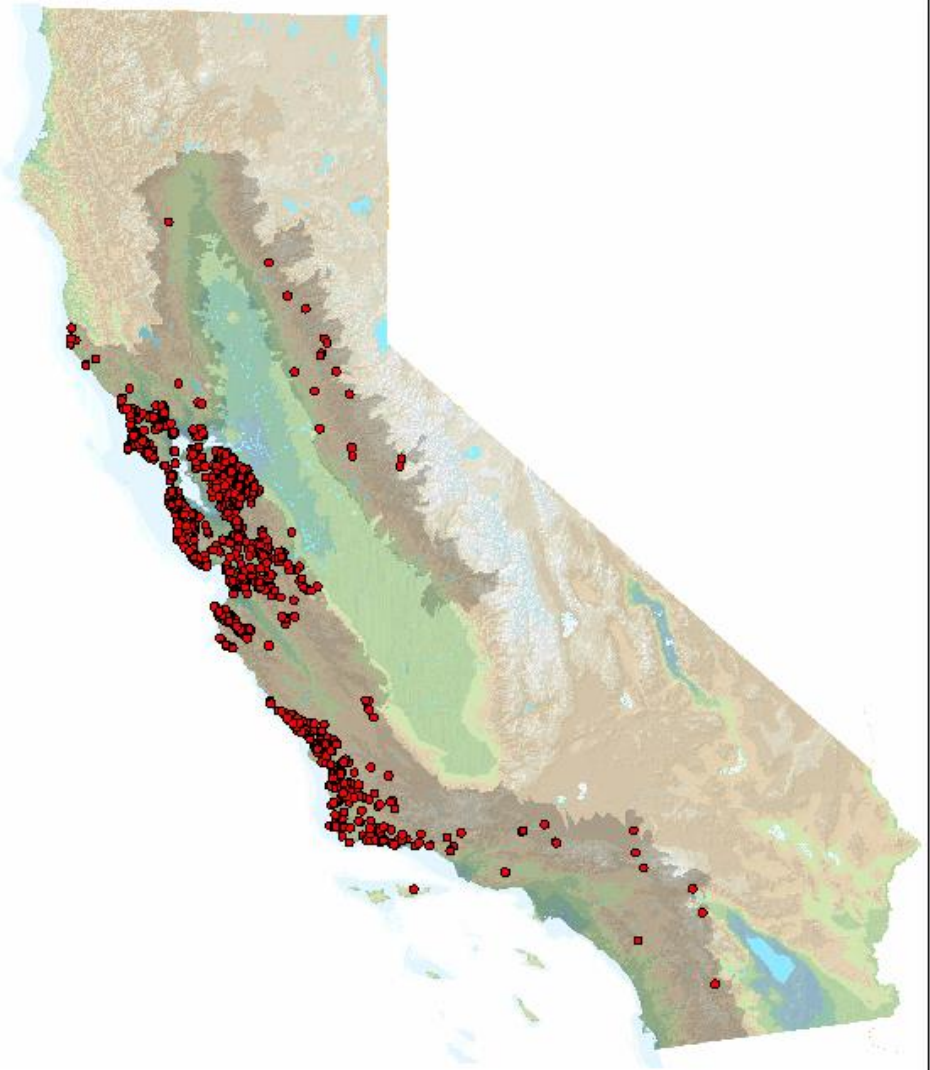


Figure 17. Historic and current distribution of the California red-legged frog (*Rana aurora draytonii*) in California based on 762 locations from 1229 museum records and 291 records from other sources.

Extinction Sequence

1. Metapopulation linkages are broken, creating isolated local populations
2. Local populations lose mosaic of local habitats
3. Local populations go extinct

California Red-legged Frog Range and Distribution



Source: CDFW 2018

POPULATION DYNAMICS

“Isolated populations will not persist without management.”

(Hanski and Gilpin 1997)

THREATS

NAME A FEW

THREATS

Roadways

Urban Influences

Agricultural Influences

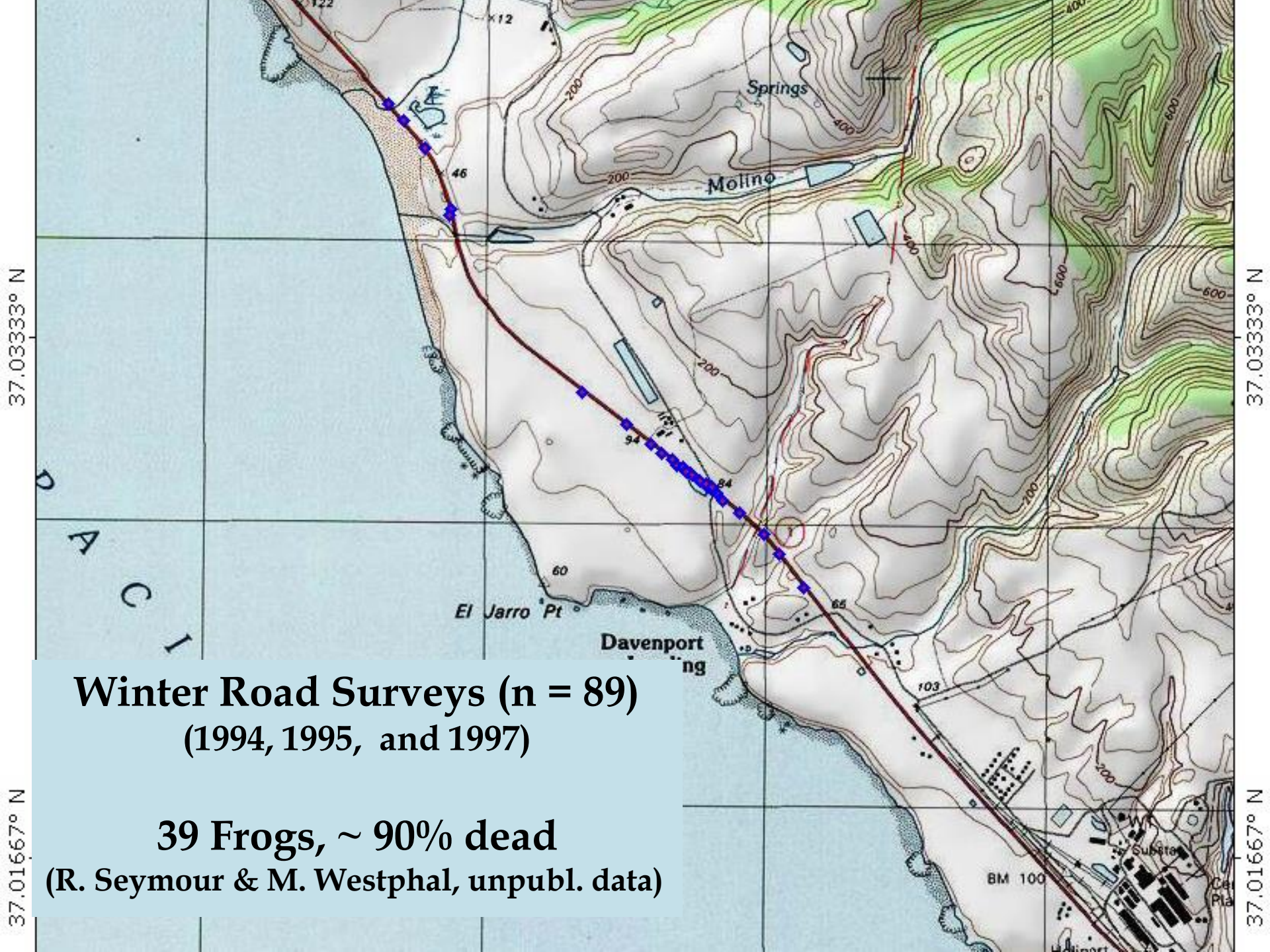
Exotic Predators

Natural Predators

Disease

Climate Change





THREATS

Roadways – Barriers and Mortality

Canadian study (*Carr and Fahrig 2001*): Significant negative effect on leopard frog (*Lithobates pipiens*) abundance due to vehicular traffic density within 1.5 km radius of pond (i.e., greater impact because of increased traffic density).

German study (*Andrews and Jochimsen 2007*) - Zero to 50% survival rate of toads (*Bufo bufo*) crossing roads with traffic densities of 24-40 cars per hour.

THREATS

Urban Influences

- ❖ Loss/Modification of Wetlands
- ❖ Loss of Terrestrial Habitats
- ❖ Loss of Habitat Connectivity
- ❖ Toxins – pesticides, pharmaceuticals, heavy metals



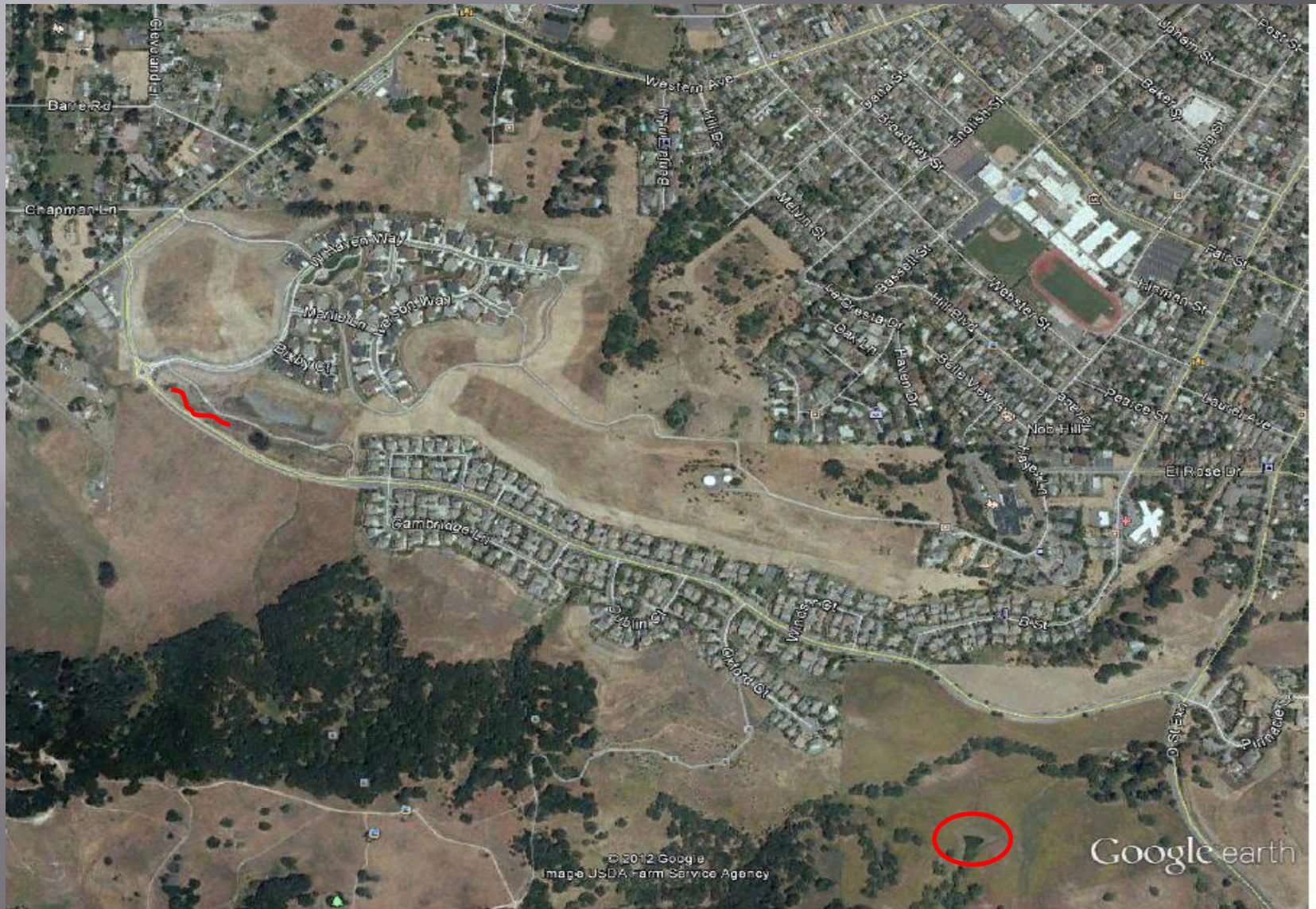
THREATS

Modification
of wetlands



THREATS

Urbanization



THREATS

Cattle and Vegetation



THREATS

Agricultural Influences



THREATS



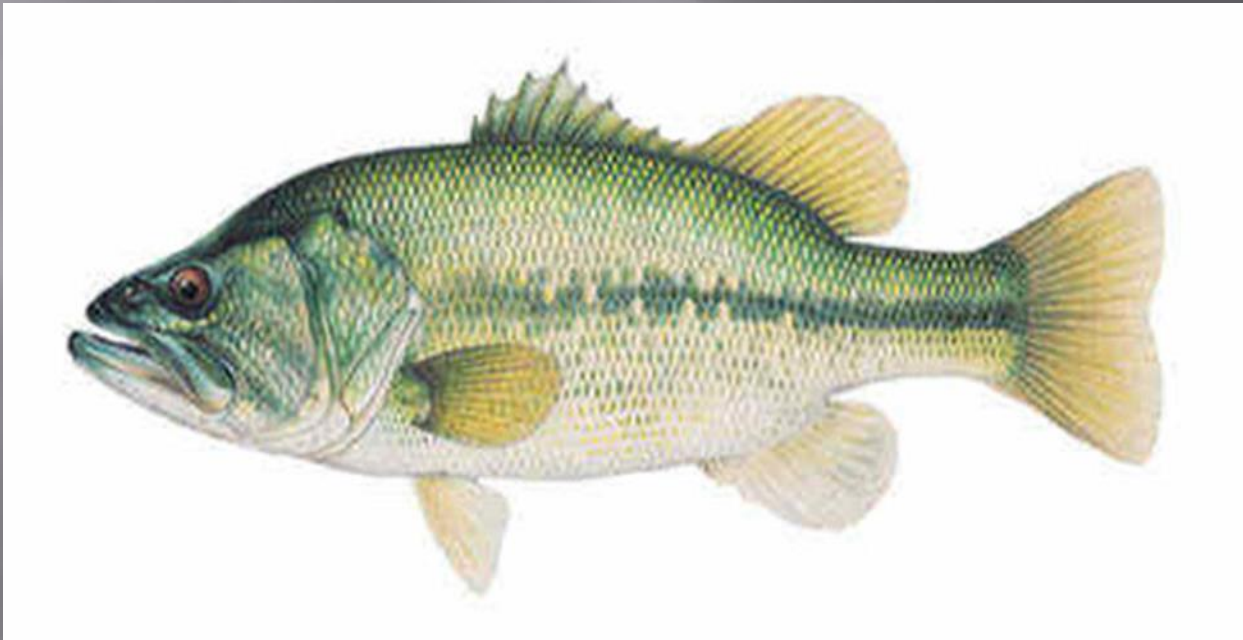
Exotic Predators

THREATS

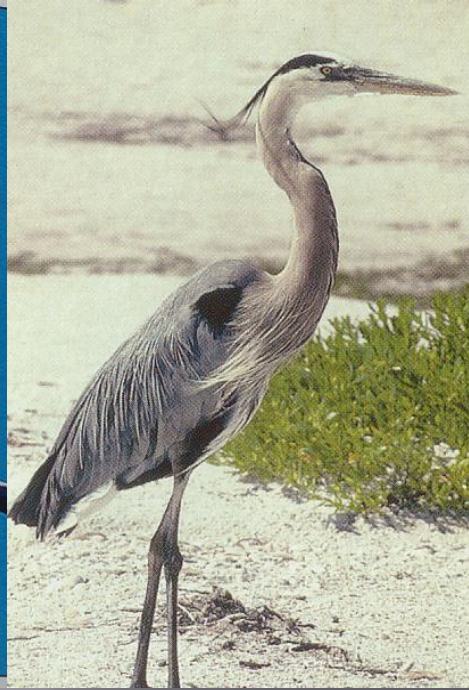


Introduced Centrarchid Fish

Bluegill &
Largemouth bass



THREATS



Native Predators



THREATS

Agricultural Chemicals

[www.epa.gov/espp/litstatus/
effects/redleg-frog/](http://www.epa.gov/espp/litstatus/effects/redleg-frog/)

THREATS

Emerging Diseases

Batrachochytrium dendrobatidis genome sequenced and even most recently evolved clade contained more genetic variation than previously reported. Important to consider Bd in broader evolutionary context and identify mechanisms that led to shift in virulence.

(Rosenblum, et al. 2013)

THREATS

Emerging Diseases

Ranavirus – Highly infective to a range of animals and detected in frogs and salamanders , U.K., U.S.A and Canada

(Dazak, et al., 2003)

THREATS

Climate Change

- ❖ Decrease in cold days and nights and frost occurrences
- ❖ Increase in hot days and nights
- ❖ Increase in heat waves
- ❖ Stronger storm events
- ❖ Wildfires
- ❖ Emerging pathogens and invasive species

*(Intergovernmental Panel on Climate Change (IPCC)
Synthesis Report 2013)*

THREATS

Climate Change Potential Effects

<i>Biology</i>	<i>Deluge</i>	<i>Drought</i>
<i>Breeding habitat</i>	Increases	Decreases
<i>Egg survival</i>	Stays the same	Stays the same or decreases
<i>Larval survival</i>	Stays the same or decreases	Decreases
<i>Metamorph survival</i>	Dependent on larval stage	Decreases
<i>Adult</i>	Stays the same	Decreases

MANAGEMENT

MANAGEMENT

Management Tools

- ❖ Control of exotic predators
- ❖ Pond construction
- ❖ Vegetation and silt removal
- ❖ Buffer zones
- ❖ Translocation
- ❖ Population re-establishment

MANAGEMENT

U.S. Fish & Wildlife Service

Recovery Plan for the California Red-legged Frog

(Rana aurora draytonii)





MANAGEMENT

FISH & BULLFROG

MANAGEMENT



Use of Stock Ponds to Manage CRF Populations (Caution: rarely maintenance free)

- ❖ Manage for soil accretion/aquatic biomass accumulation, e.g. weirs for water control, veg. removal
- ❖ Must prevent individual loss

MANAGEMENT

Creating Good Frog Ponds



MANAGEMENT



MANAGEMENT



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MANAGEMENT



MANAGEMENT

Constructed Breeding Pond - *Failed*



MANAGEMENT Constructed Pond – Successful for Breeding





MANAGEMENT

Constructed Summer Habitat



Translocation

...removal to a different place or habitat

(Henderson's Dictionary of Biological Terms 1995)

Moving frogs out of habitat before impact to, or loss of, habitat

- ❖ Success dependent on many factors – not appropriate for all projects
- ❖ Requires USFWS approval (project permit)

MANAGEMENT

Translocation - successful

San Pablo Dam



April Creek Barn



Translocation – Successful



Egg Deposition

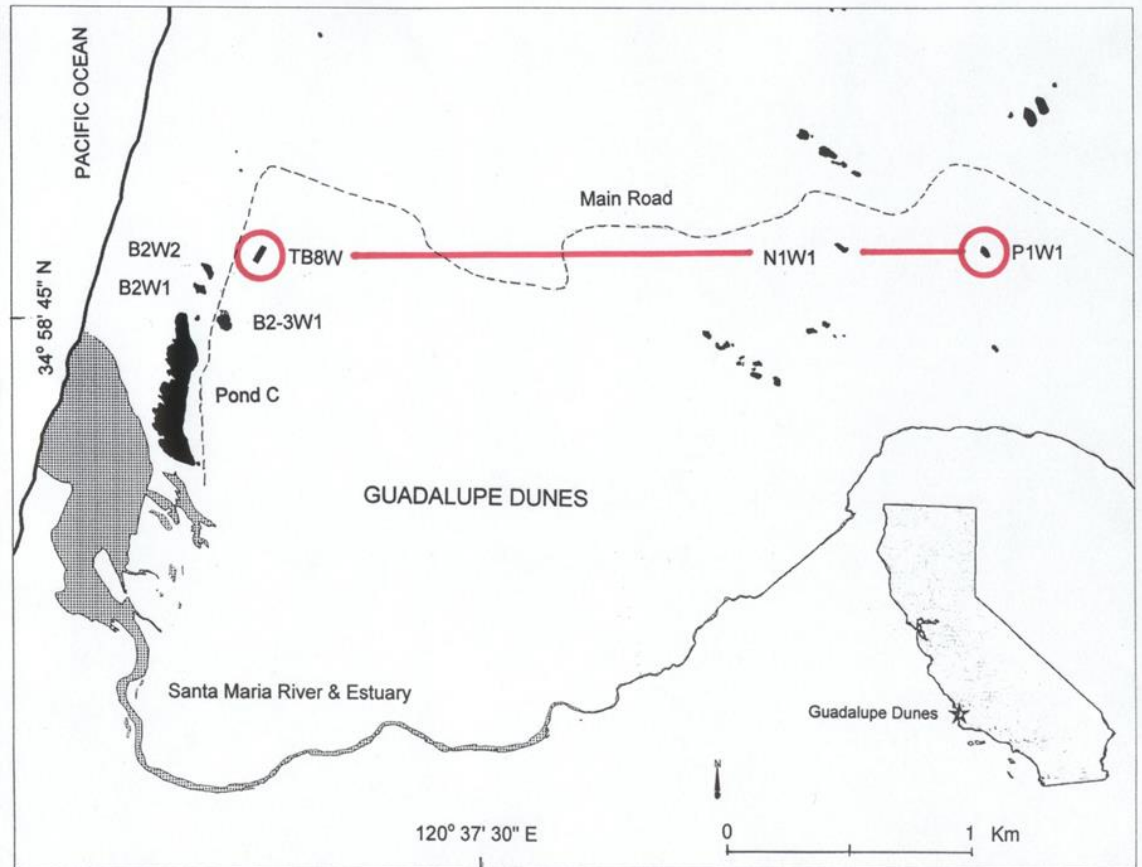
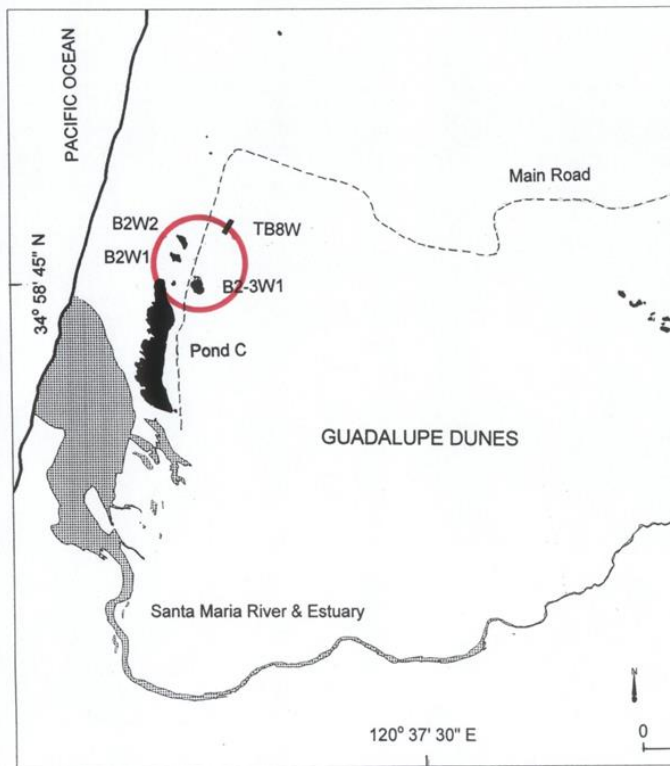
March 3 – Frog
mass: 148g

March 18 – Egg
mass observed

March 26 – Frog
mass: 106g

MANAGEMENT

Translocation – Unsuccessful Guadalupe Oil Field



MANAGEMENT

Population Re-establishment (Headstarting)

Moving egg masses from a self-sustaining, stable population, to a different location to establish a new population

- ❖ Success dependent on many factors – not appropriate for all projects
- ❖ Requires USFWS approval (project permit)



POPULATION RE-ESTABLISHMENT

PINNACLES NATIONAL MONUMENT (2001)

BEAR GULCH RESERVOIR HISTORY

1934	Reservoir completed
1960's-70's	Red-legged frogs present
~1980	Catfish introduced
1985	Drained, catfish removed
198?-2000	Frogs absent
2001	Re-establishment started



POPULATION RE-ESTABLISHMENT

CHALONE CREEK
Wet Season

POPULATION RE-ESTABLISHMENT

Chalone Creek Headstarting Program

- ❖ Collection - 20% of egg masses from Chalone Creek
- ❖ Headstart - held tadpoles in mesh boxes in reservoir
- ❖ Release - placed tadpoles into reservoir

POPULATION RE-ESTABLISHMENT

NUMBER OF EGG MASSES AND TADPOLES RELEASED

Year	Egg Masses	Tadpoles Released	Metam.	Adults/Juv.
2001	5	116+	17	0
2002	9	914	154	12
2003	3	841	427	29
2004			485	20
2005			317	12
2006			329	22
2007			68+	15+
2008			206	14

Headstarting a Population

Upper Las Virgenes Canyon Open
Space Preserve,
Los Angeles - 2012



POPULATION RE-ESTABLISHMENT



Monitoring



Additional Sites
Added

RECAP

Management Tools

WHAT WE'VE COVERED

BIOLOGICAL FACTORS

- Mediterranean climate - water regimes
- Habitat types used by frogs
- Population dynamics
- Threats
- Population-level management
- Clear objectives for species management

REGULATORY PROCESS

REPORTING (Consider impacts:
temp. vs. perm., indiv. vs. pop.)

- ❖ Site Assessment (*USFWS 2005*)
- ❖ Habitat Assessment
- ❖ Biological Assessment
- ❖ Habitat Conservation Plan

REGULATORY

PERMITTING Project

Project Permits (Allow Take of CRF):

- ❖ Section 7 – federal nexus
- ❖ Section 10 – no federal nexus

REGULATORY

PERMITTING

Individual 10(A)(1)(a)

- ❖ **Required for capture/handling**
- ❖ Issued to Individual

- ❖ NOT Required for:
 - ❖ Site Assessments
 - ❖ Field surveys for adults (no capture)
 - ❖ Construction monitoring

REGULATORY

INDIVIDUAL 10(A)1(A) PERMIT

Minimum requirements to obtain a permit:

See: Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog (*USFWS 2005*)

Minimum requirements for Service-approval

REGULATORY

USFWS PROTOCOL:

- 1) SITE ASSESSMENT
- 2) FIELD SURVEYS

Results are valid for two (2) years, unless the following has occurred:

- ❖ Appropriate Service Fish and Wildlife Office was not contacted to review the results of the site assessment prior to field surveys being conducted;
- ❖ Field surveys were conducted in a manner inconsistent with the Guidance or with survey methods not previously approved by the Service;

REGULATORY

USFWS PROTOCOL:

- 1) SITE ASSESSMENT
- 2) FIELD SURVEYS

Results are valid for two (2) years, unless the following has occurred (continued):

- ❖ Field surveys were incomplete;
- ❖ Surveyors were not adequately qualified to conduct the surveys;
- ❖ Reporting requirements, including submission of CNDDDB forms, were not fulfilled.

REGULATORY

SITE ASSESSMENT

1. Is the site within the current or historic range of the CRF?
2. Are there known records of CRF at the site or within a 1.6-km (1-mi) radius of the site?
3. What are the habitats within the project site and within 1.6 km (1-mi) of the project boundary?

REGULATORY

SITE ASSESSMENT

Site Evaluation:

- ❖ Ponds - size, max. depth, vegetation components, substrates, hydrologic duration
- ❖ Streams – bank full width, max. depth, stream gradient, pools present, depth of pools, characteristics of non-pool habitat, vegetation components, substrate, hydrologic cycle, hydrologic connectivity

REGULATORY

FIELD SURVEYS

BREEDING SEASON SURVEYS: Greatest numbers of adults in ponds (highest potential for observation).

Indicates breeding population.

NON-BREEDING SEASON SURVEYS: Greatest numbers of metamorphs and sub-adults.

Indicates reproductive success.

“Surveys may begin anytime during January and should be completed by the end of September.”

(USFWS 2005)

REGULATORY

FIELD SURVEYS

	Surveys	
	<i>Diurnal</i>	<i>Nocturnal</i>
<i>Breeding (mating-metamorphosis) ca. Jan - Apr</i>	2	4
<i>Non-breeding (metamorphosis-dispersal) ca. Jul - Sep</i>	1	1
<i>Intervals (min.)</i>	7 days	7 days

Decontamination guidelines must be used between
each separate hydrologic site for all equipment.
(USFWS 2005)

REGULATORY

FIELD SURVEY METHODS

Visual Encounter Surveys

DETECTION:

- ❖ Approach pond at distance
- ❖ Stop, listen
- ❖ Scan entire pond with lights AND binos
- ❖ Locate, count frog eyeshine (ID later)
- ❖ Make mental or actual notes on counts and location of frogs detected

REGULATORY

FIELD SURVEY METHODS

Visual Encounter Surveys

IDENTIFICATION:

- ❖ Move closer, survey pond in sections using lights and binoculars
- ❖ REDUCE LIGHT INTENSITY AS YOU GET CLOSER TO FROG (≤ 25 ft.)
- ❖ Identify frog species (move closer as needed to identify!), make a list of species and numbers

FIELD SURVEY METHODS

Other

- ❖ Dip-netting for tadpoles – Limitations:
 - Requires 10(A)1(a) Individual Permit
 - Entire pond must be dip-netted (consider total volume)
- ❖ Calling surveys – Limitations:
 - Males call for a very limited time period (3-4 weeks/year)
 - Quiet calls, may be drowned out by other noise

INCREASED POTENTIAL FOR FALSE NEGATIVES

REGULATORY

SURVEY EQUIPMENT

VISUAL ENCOUNTER SURVEYS:

Decontamination supplies

Chest waders

Headlamps and Lights

Binoculars

SPECIAL CIRCUMSTANCES:

Float tubes or boat

“See, Frank? Keep the light in their eyes and you can bag them without any trouble at all”



“See, Frank? Keep the light in their eyes and you can bag them without any trouble at all.”