Quino Checkerspot Butterfly (*Euphydryas editha quino*) Reinforcement Project:

Past Progress and Future Directions

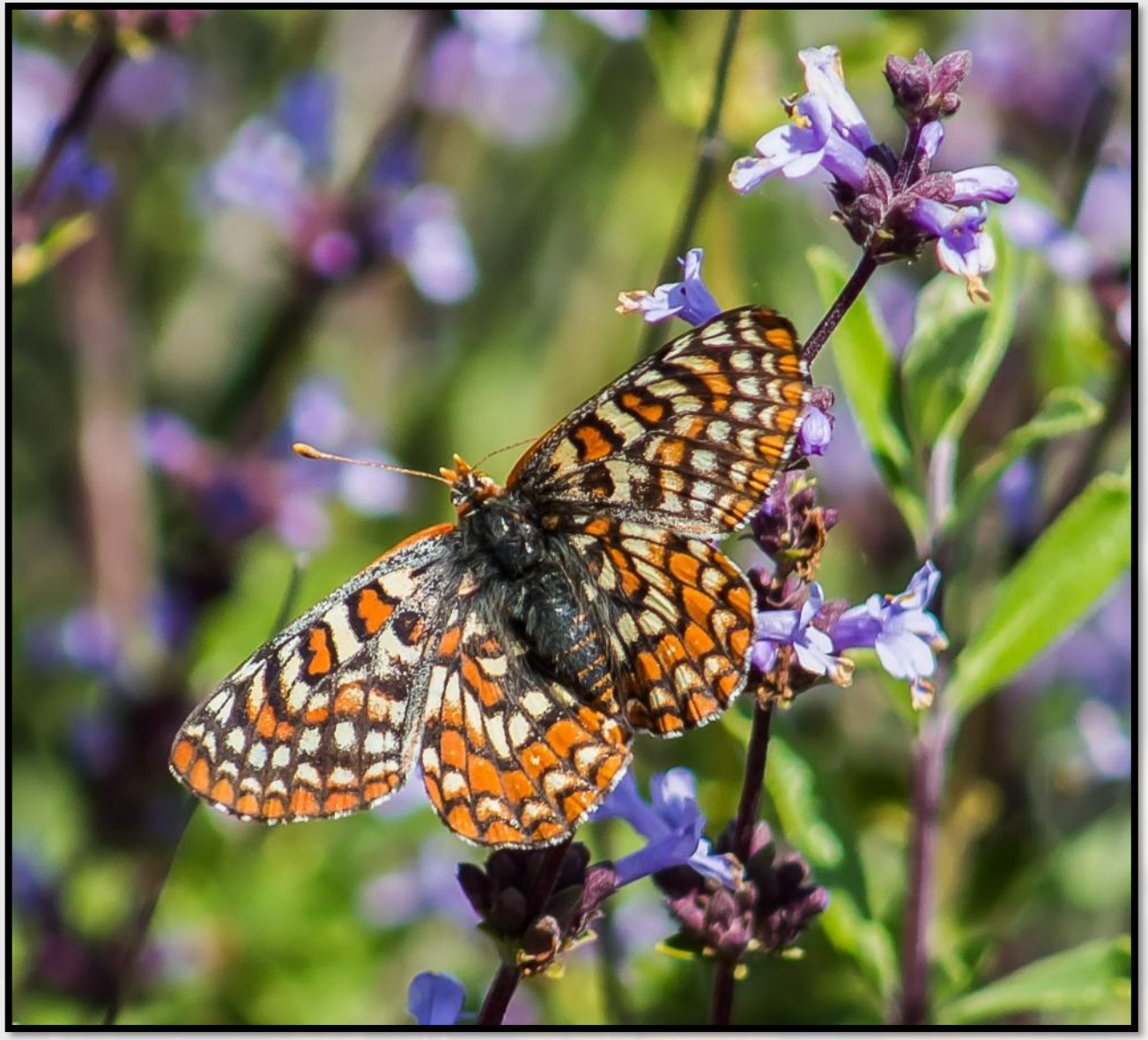
Outline

- Background
- Reinforcement Process and Results
- Upcoming project

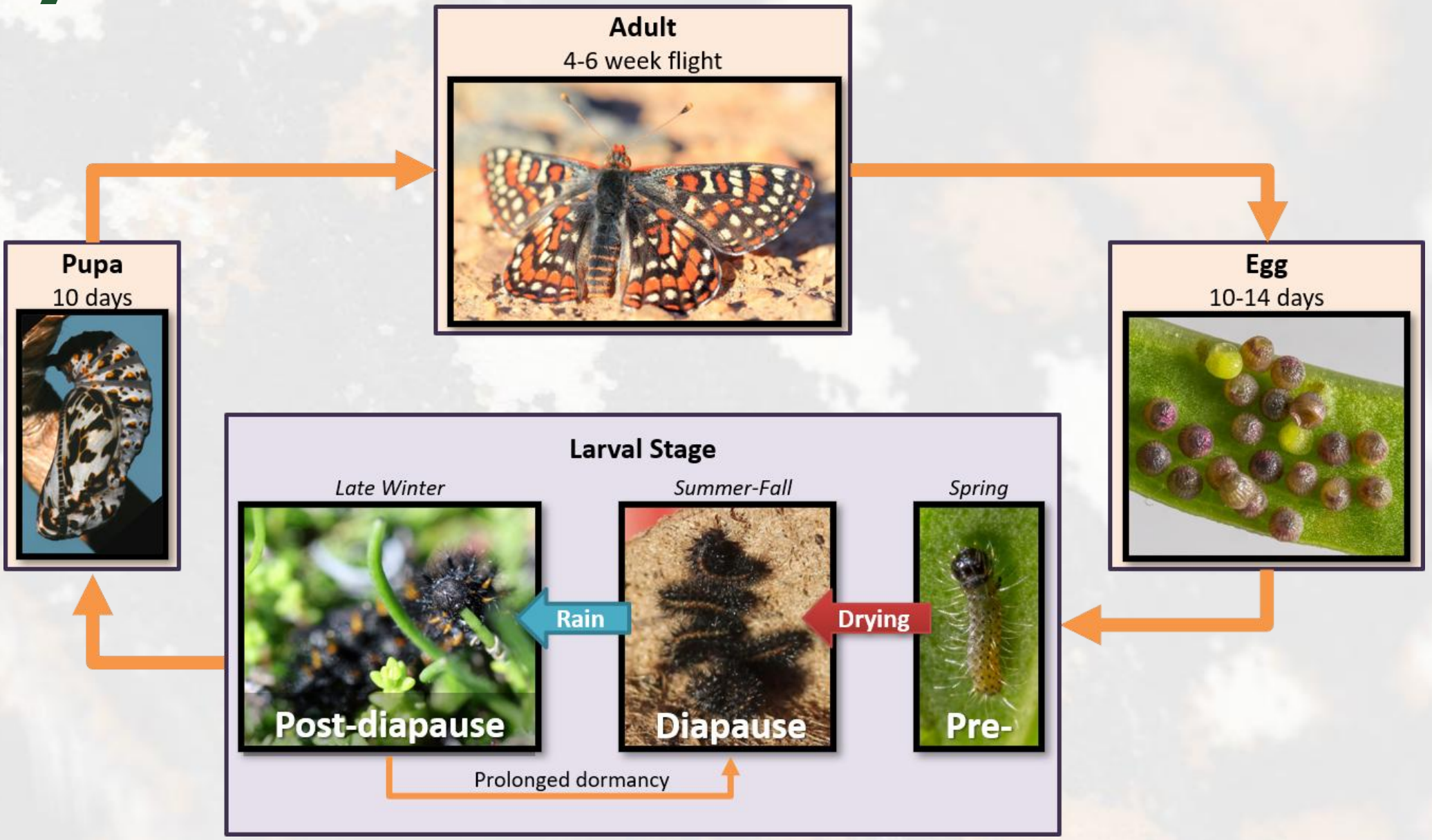
Quino checkerspot

"...a once common wide-spread species crashing to extinction over a few decades."

--Mattoni et. al 1997



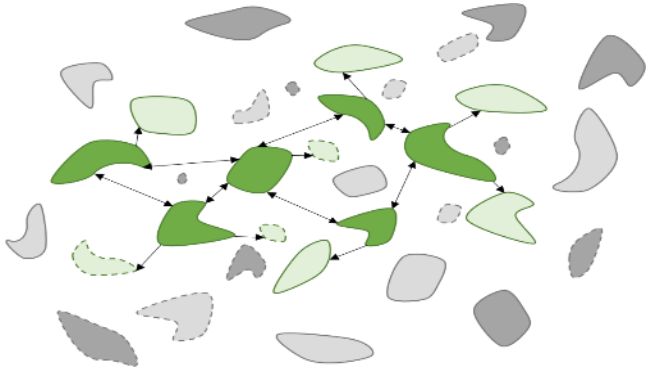
Life Cycle


Adult
4-6 week flight
Egg
10-14 days
Larval Stage
Late Winter
Summer-Fall
Spring
Rain
Drying
Post-diapause
Diapause
Pre-
Prolonged dormancy
Pupa
10 days

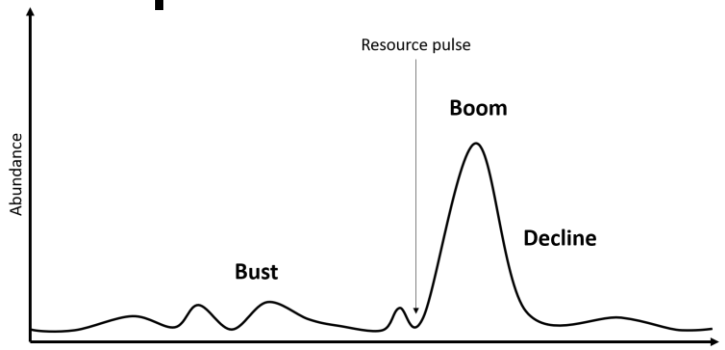
Adaptations for a Variable Environment

Prolonged Diapause

Metapopulations



Population "Booms"



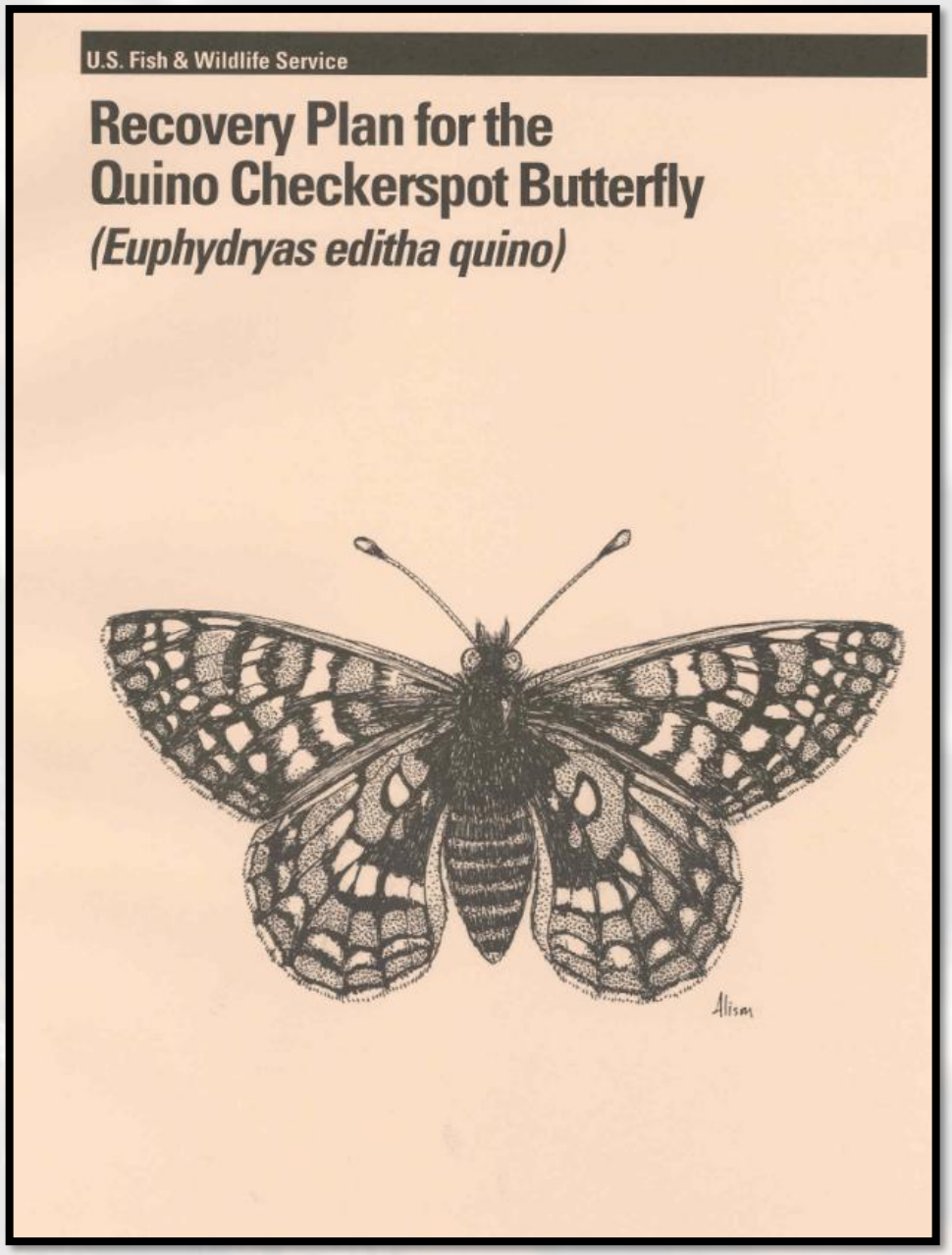
Variable Vagility

Endangerment

- 90% of historical range lost
- Threats
  - Habitat loss, fragmentation, non-native plants, fire, ORV, etc.
- Climate change
  - Distribution shifting
  - Boom years?

Recovery

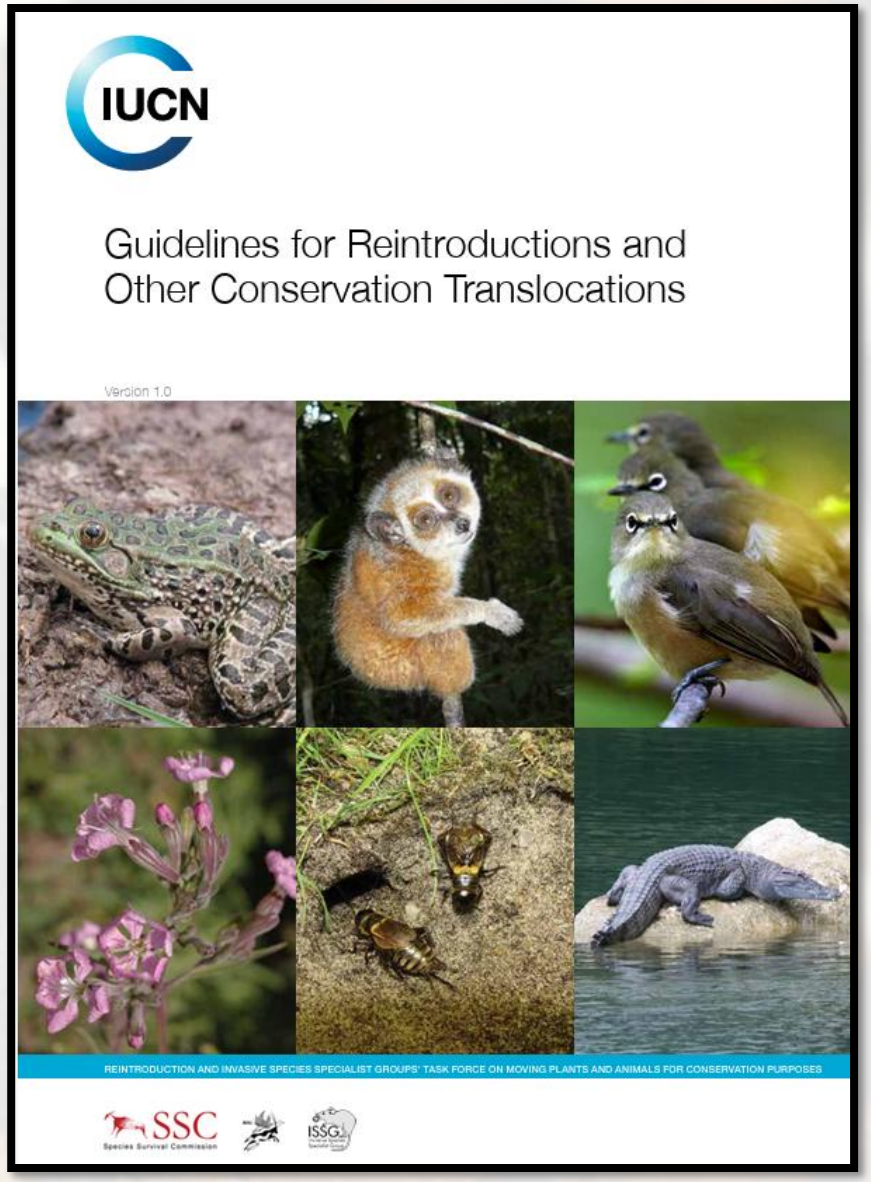
- Protection
- Restoration
- Habitat management
- Population augmentation
- Reintroduction



Population Reinforcement Project

What is Population Reinforcement?

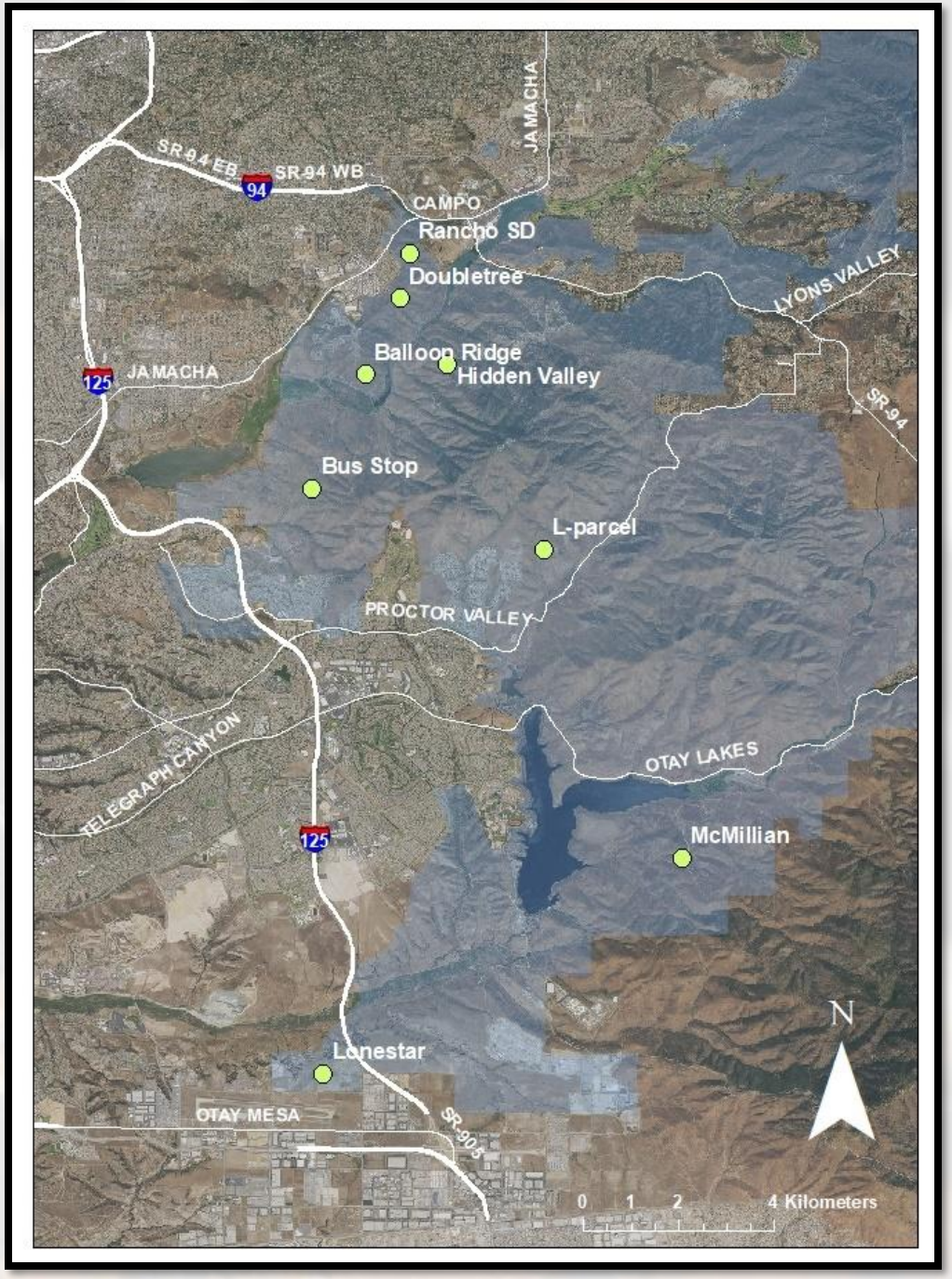
"Intentional movement and release of an organism into an existing population of conspecifics"



IUCN – SSC Species Conservation Planning Sub-Committee. (2017). Guidelines for Species Conservation Planning. Version 1.0. Gland, Switzerland: IUCN. xiv + 114 pp.

Step 1: Select a site

- Abundant host plants
- Abundant nectar
- Basking spaces
- Easy-ish access
- Low weeds
- Open shrub canopy
- Occupancy?

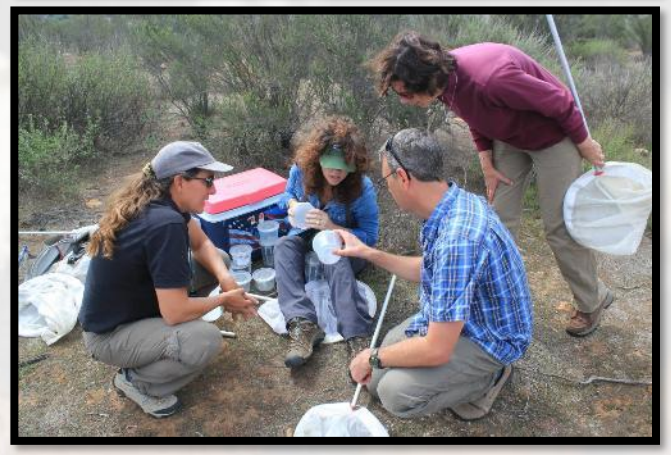


Step 2: Habitat Enhancement

- Weed management
- Dethatching
- Host/ nectar plant seeding

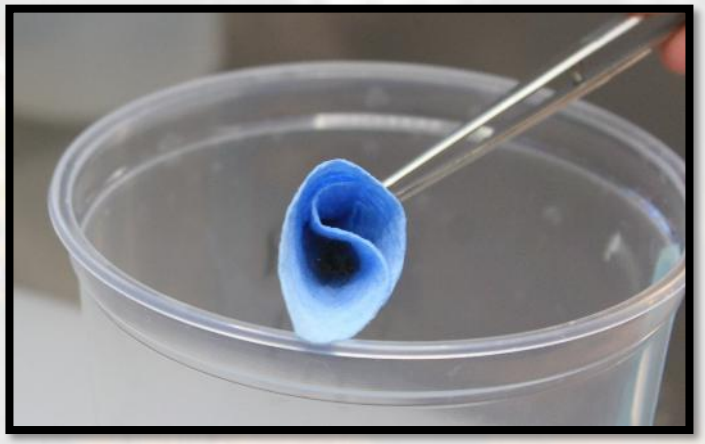
Step 3: Collect Founders

- Find a reliably large population
- 10 gravid females
- Transport to Butterfly Conservation Lab
- Housed in oviposition chambers
- Screen for pathogens if/as needed



Step 4: Rear Larvae

- Fresh hostplant
- Ambient temperature/ humidity
- Sanitary environment
- Diapausing material

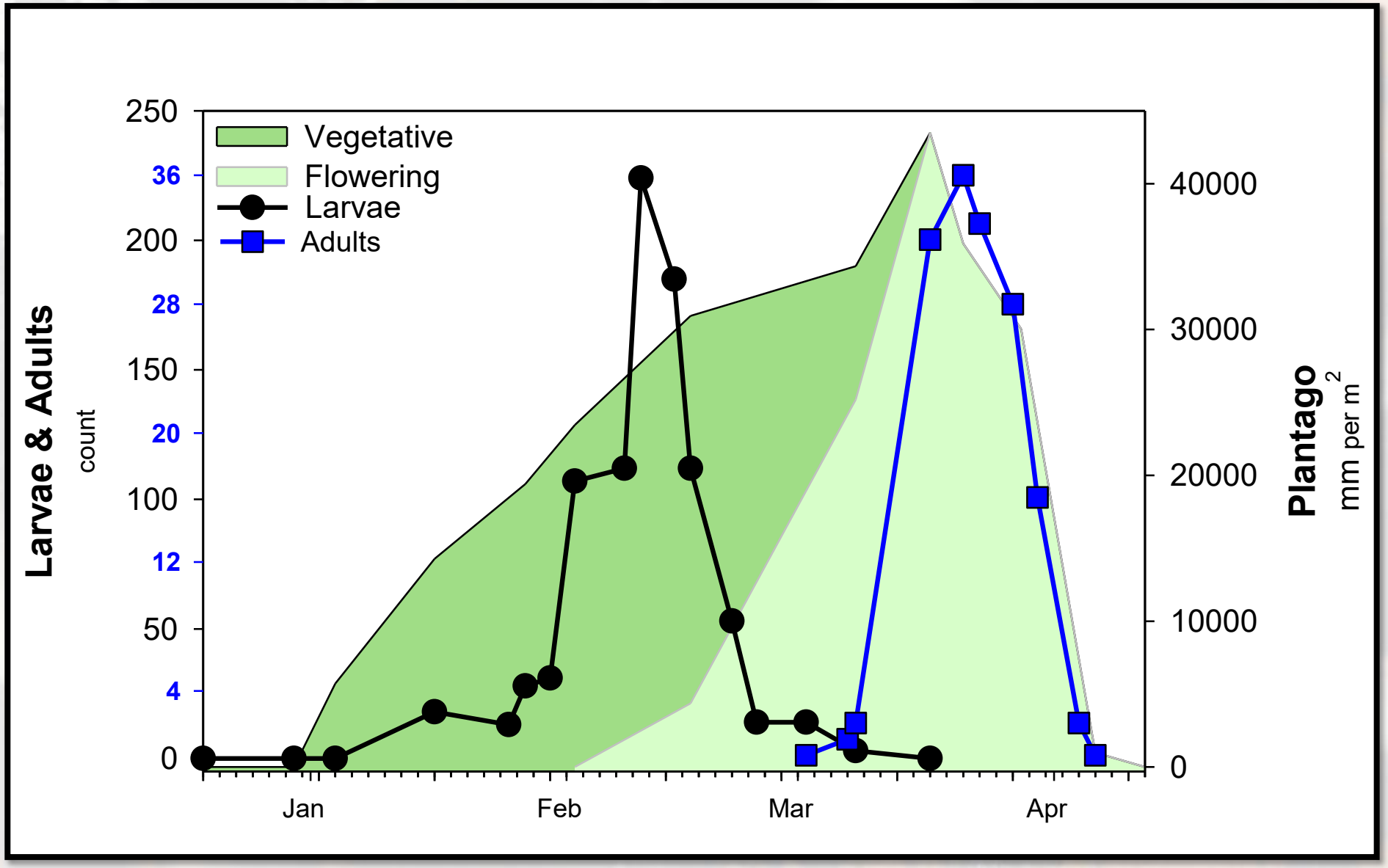


Step 5: Release Larvae

- In diapause
- October/ November
- Protective shelters
- Wired under shrubs
- Design approved by larvae!

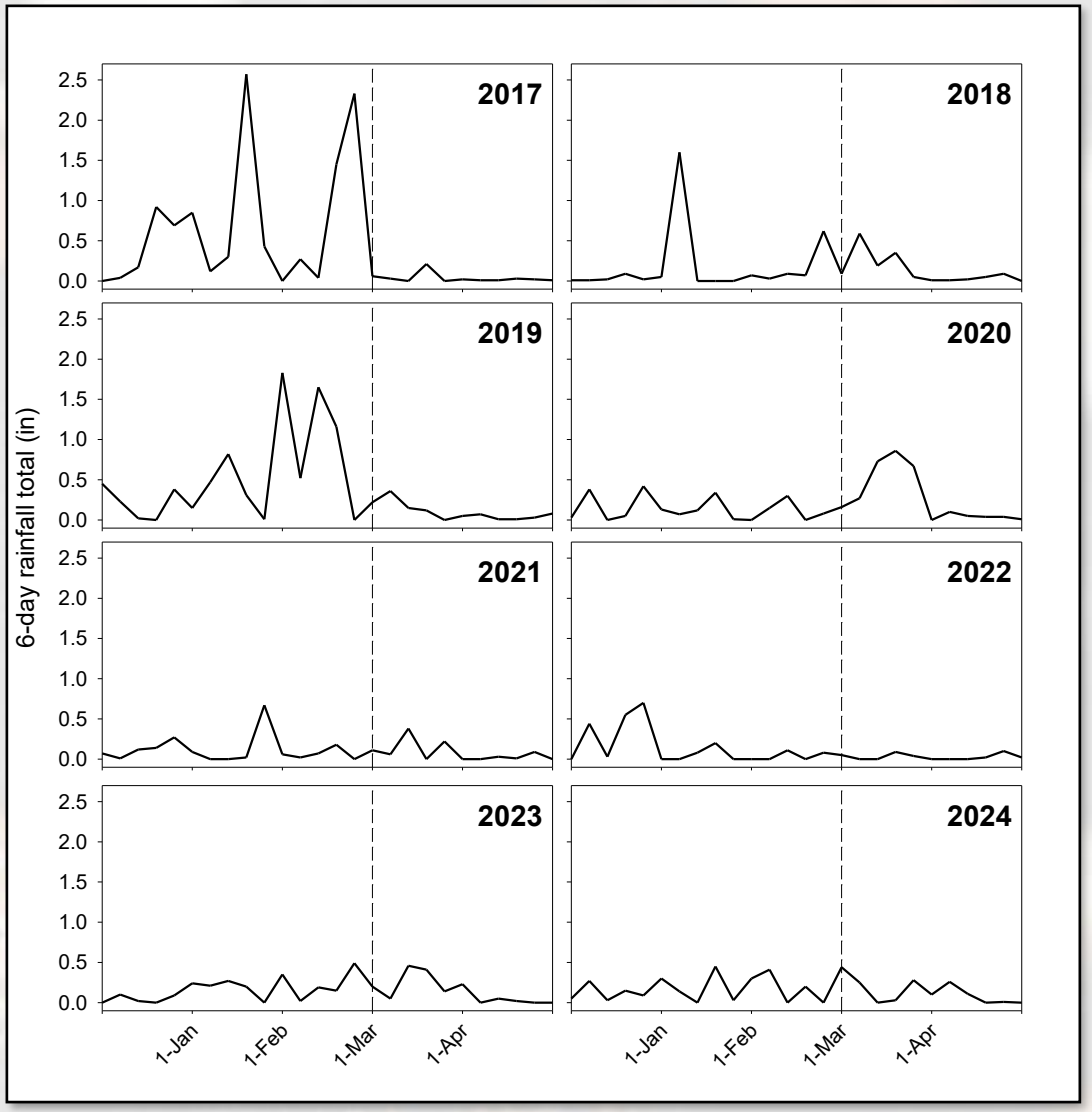
Step 6: Monitoring

Step 7: Assess Results



Assessing Results…

Flight Season	Site	# Released	Yr1 Adults (Max Count)
2017	Hidden Valley	1513	36
2018	Bus Stop	1,711	4
	L-parcel	1,729	5
	Lonestar	1,692	2
2019	Balloon Ridge	1,382	6
	Rancho San Diego		7
2020	Balloon Ridge	1,368	3
	Bus Stop	1,404	6
2021	Doubletree	2,520	2
2022	Doubletree	937	0
2023	Hidden Valley	1410	3
Total		**15,666**	**-**



Lessons Learned

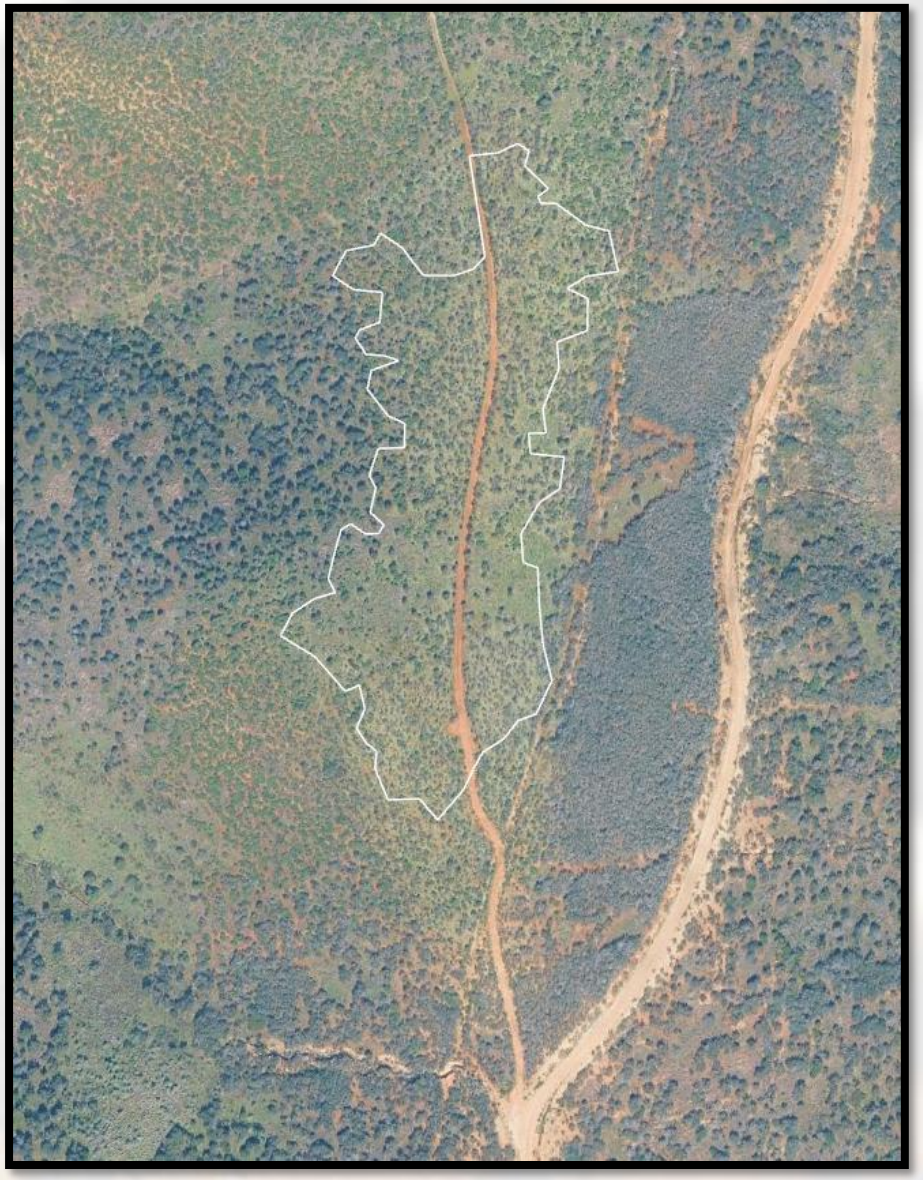
- Weather is important
- Booms occur on regional and local scales
  - Cool days, warm nights during larval season
- How to collect, rear, and release
- “Success” looks different for QCB

Step 8: Adjust approach

- “Seeding” approach
- In situ egg laying
- Release site choice

Upcoming efforts

Otay Lakes Collection Site



Open shrubland, low weeds, shelter

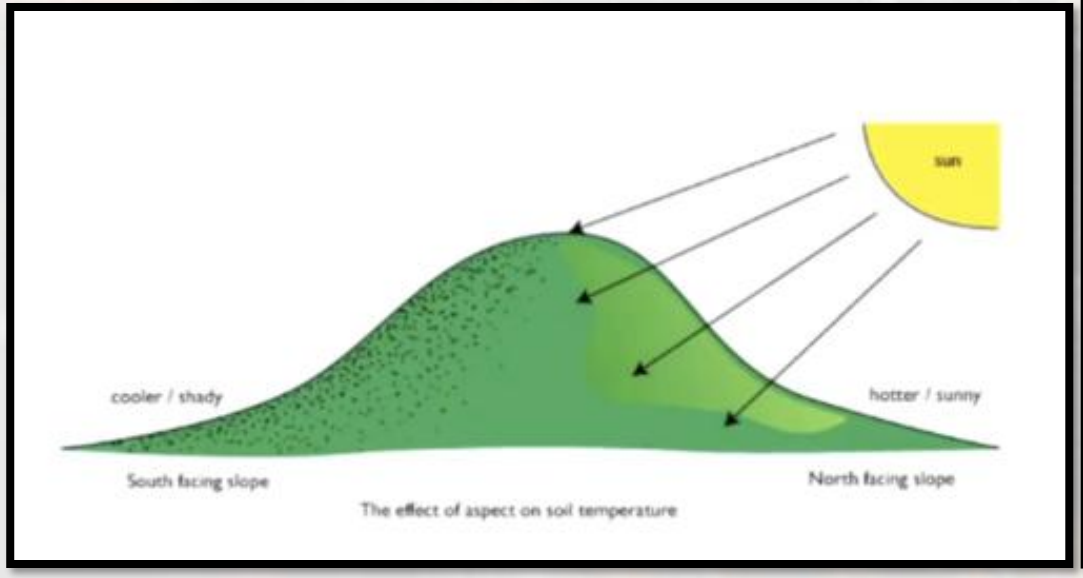
Abundant *Plantago erecta*

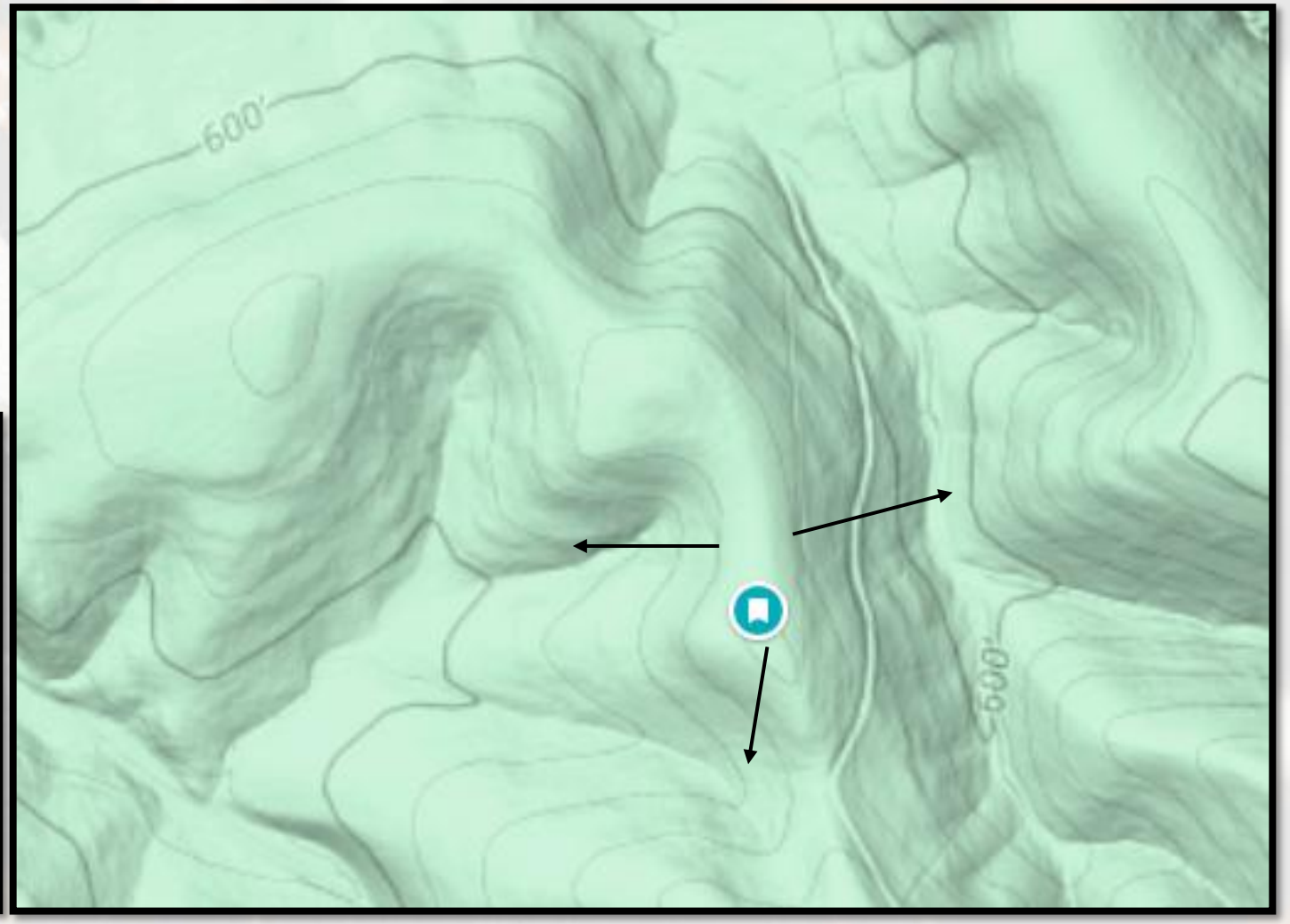
Abundant *Castilleja* spp. near by

Abundant nectar

Biocrust and Basking Space

“Diversity of Aspects”





2025 Border 2 Fire

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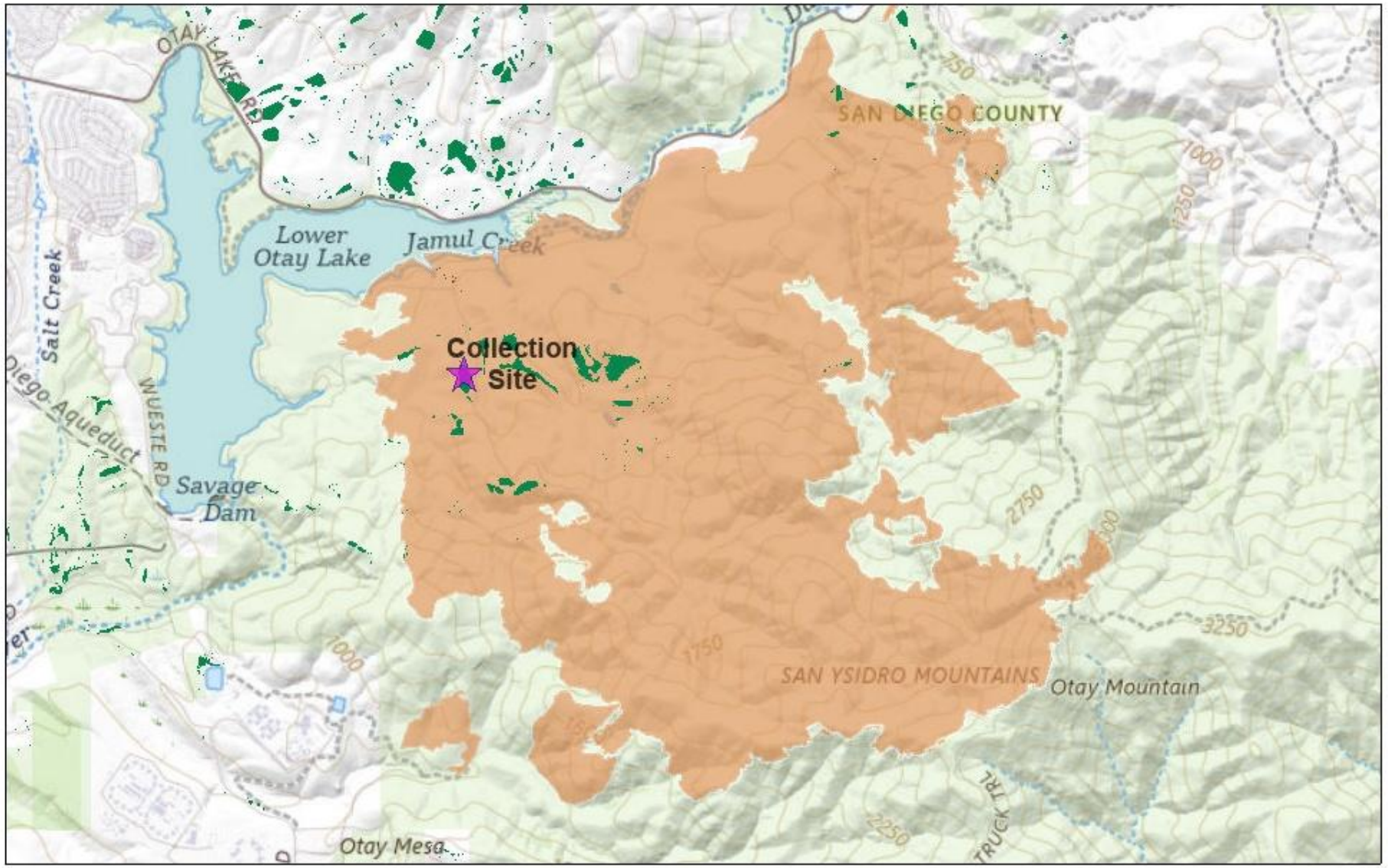
Photo courtesy of CalFire San Diego

2025 Border 2 Fire

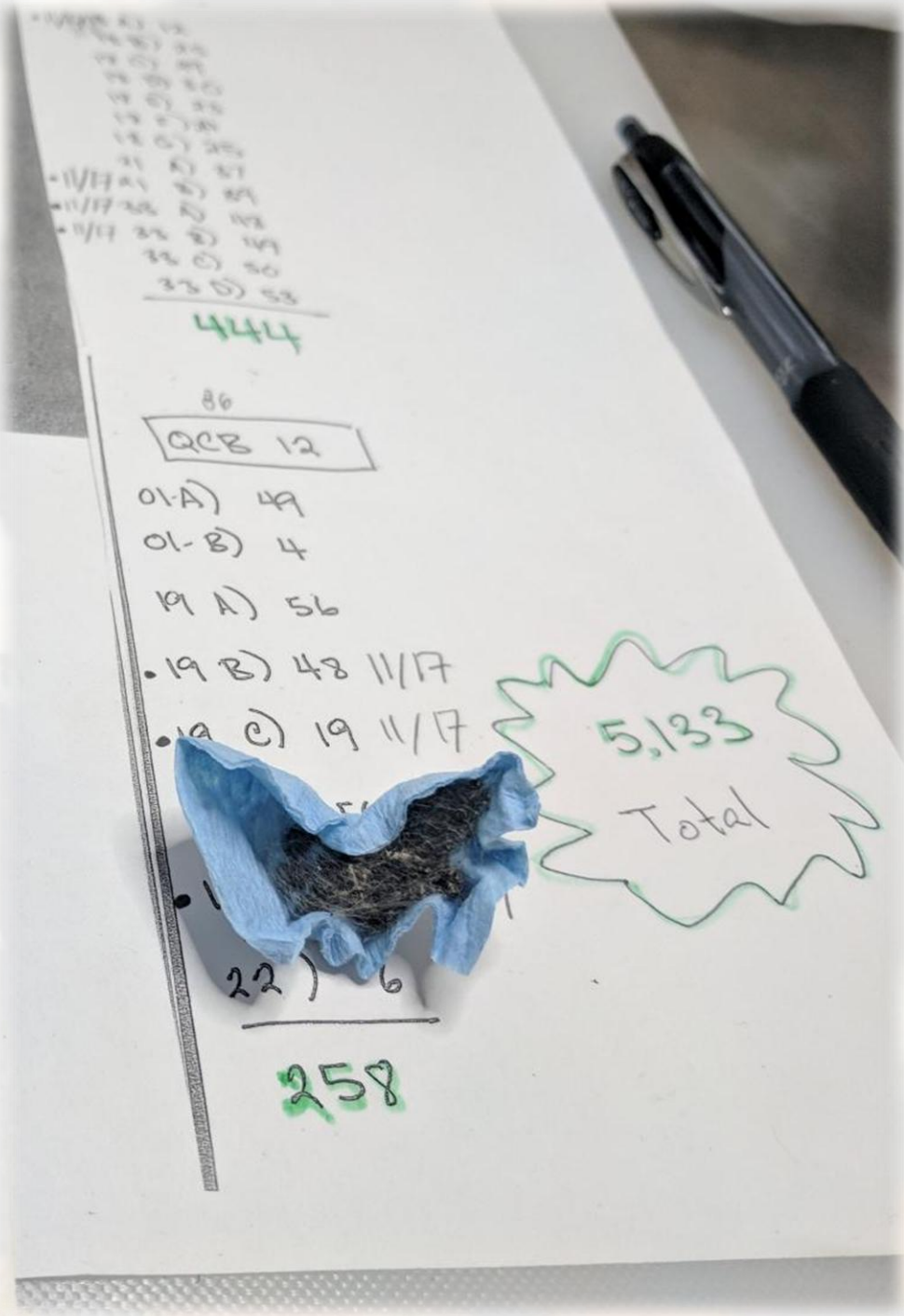


Year	Max Count
2018	30
2019	142
2020	228
2021*	57
2022*	150
2023*	68
2024*	108
2025	1
2026	1

Before

After

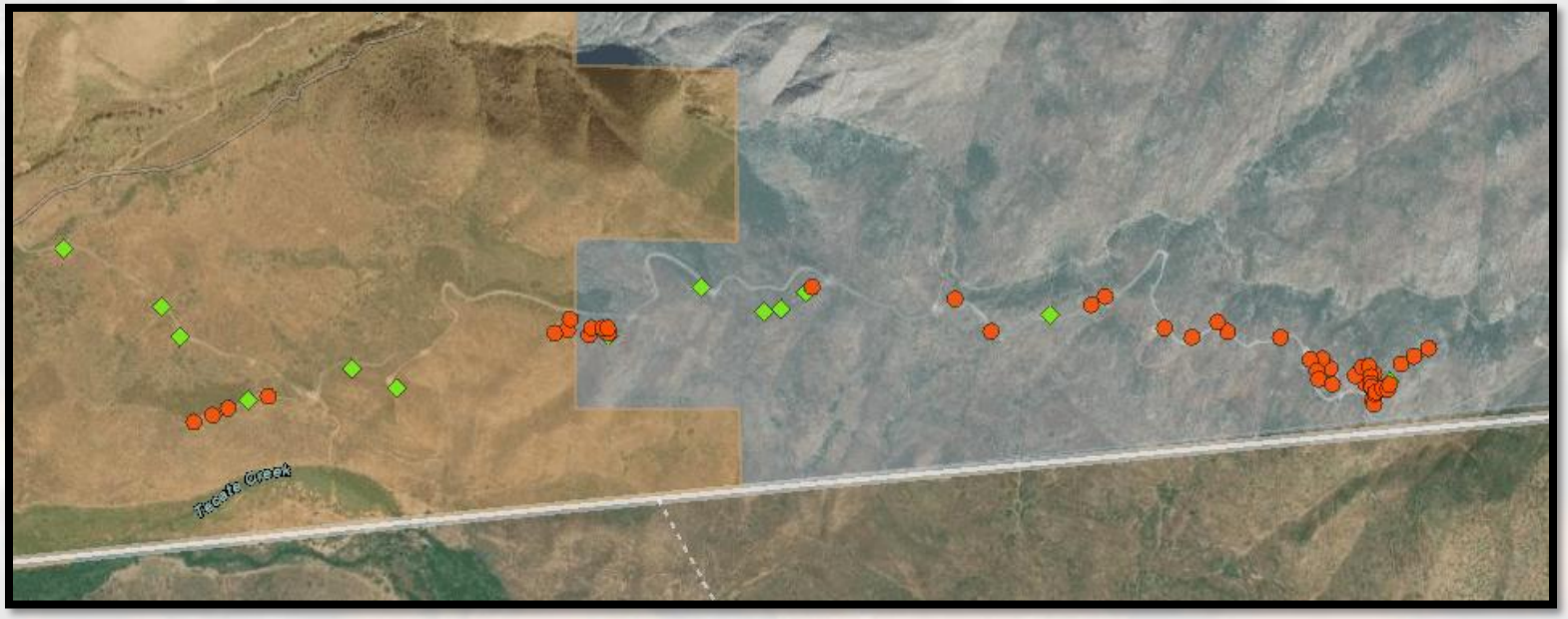
Otay Lakes Population Restoration Project



Task 1: Quino surveys

- Locate a donor population
- Confirm fire impact

Photo courtesy of Michael Ready

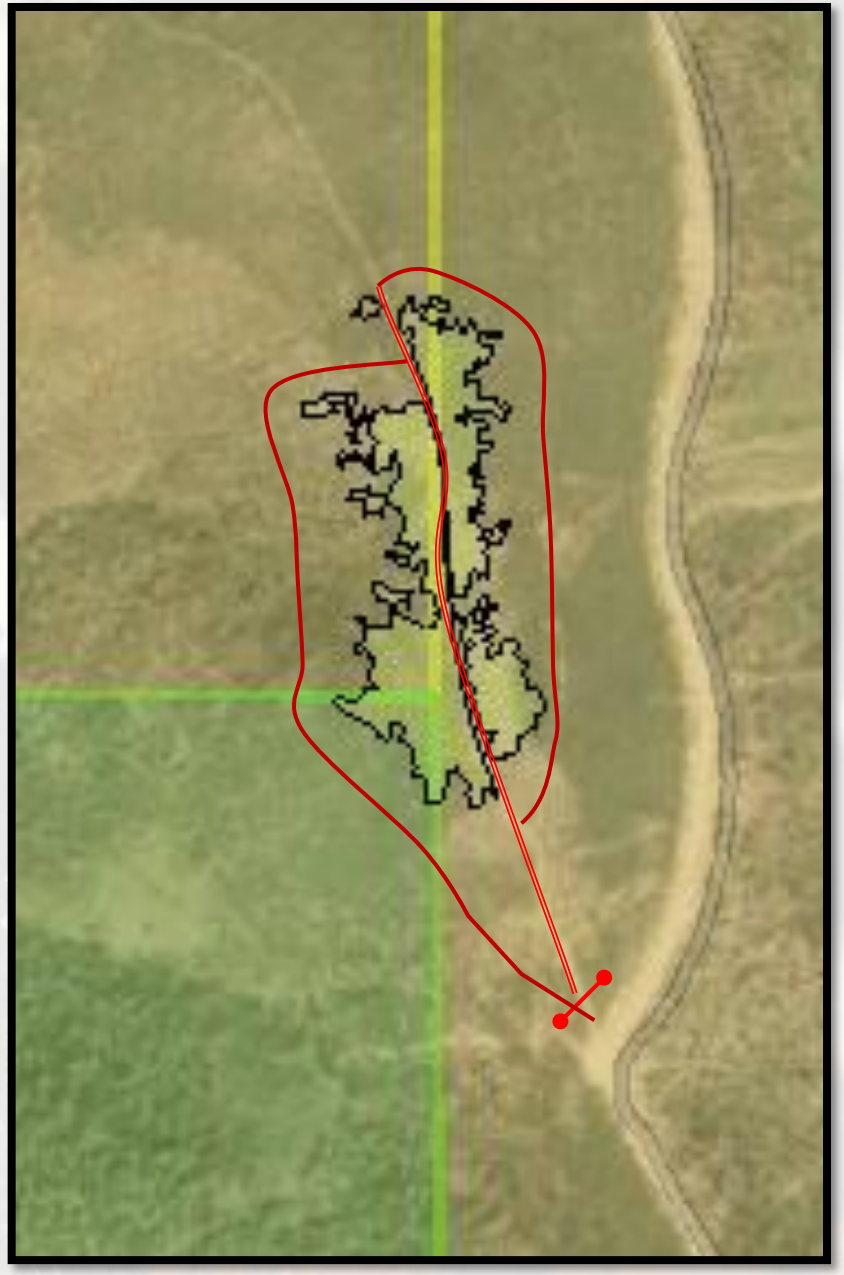


Task 2: Habitat monitoring

- Larval food plants
- Nectar
- Basking space
- Biocrust
- Nonnative herbs

Task 3: Collect and distribute seed

Task 4: Site protection



Task 5: Biocrust Restoration

- Blocks weeds
- Maintains basking spaces
- *Plantago erecta* growth
- Traps soil moisture
- Collaboration with DIRT lab

Task 6: QCB Population Restoration

- 3 years
- 5-10 founders per year
- Up to 2,000 larvae per year

Photos courtesy of Michael Ready

Thank You!

For more information, contact:

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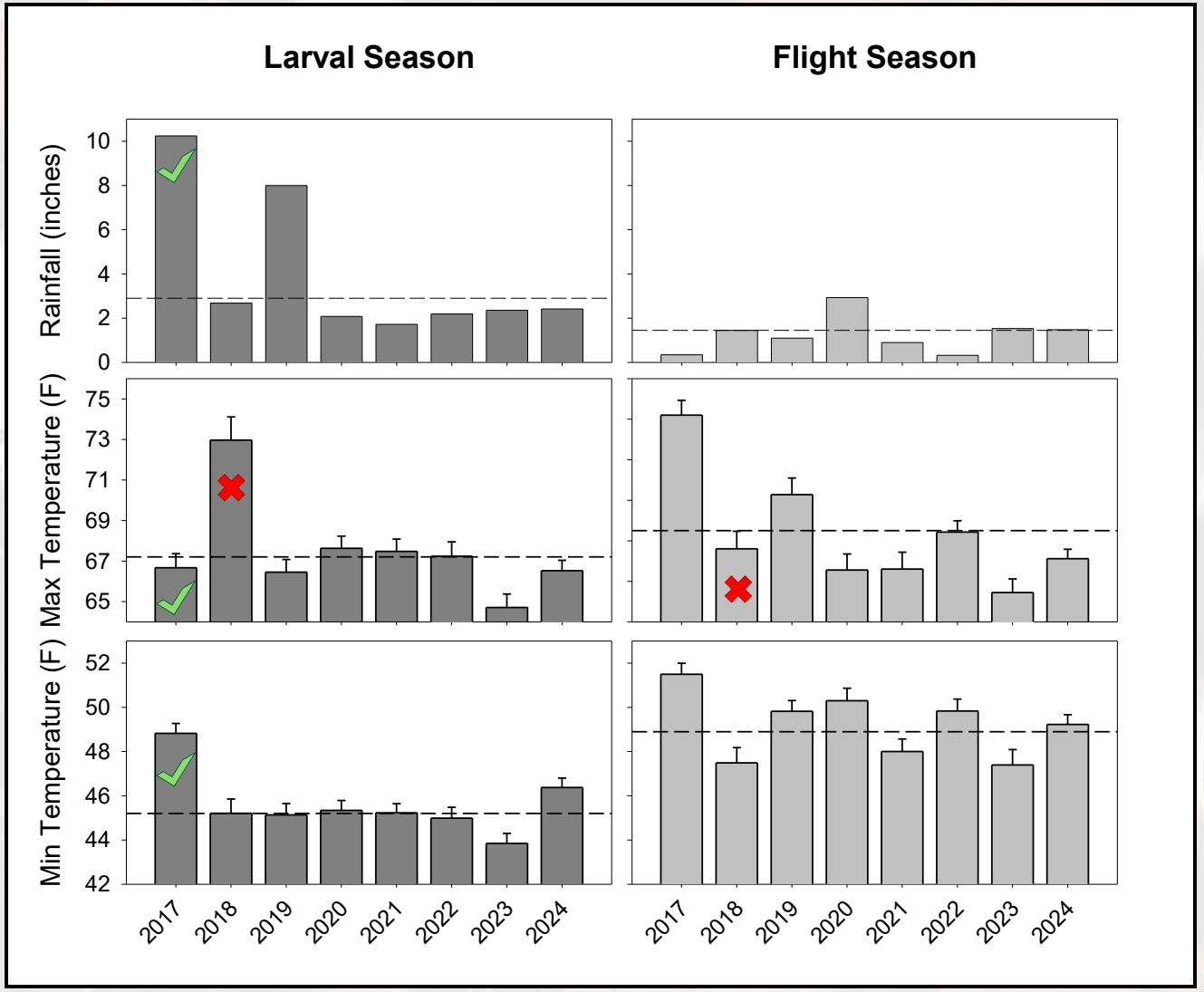
sdzwa.org

Oviposition chamber

Example
(Not a Quino!)

Sometime later...

Boom conditions?

- Otay Lakes population
- 2017 & 2020 = boom
- OTC weather station
- Cool days, warm nights during larval season