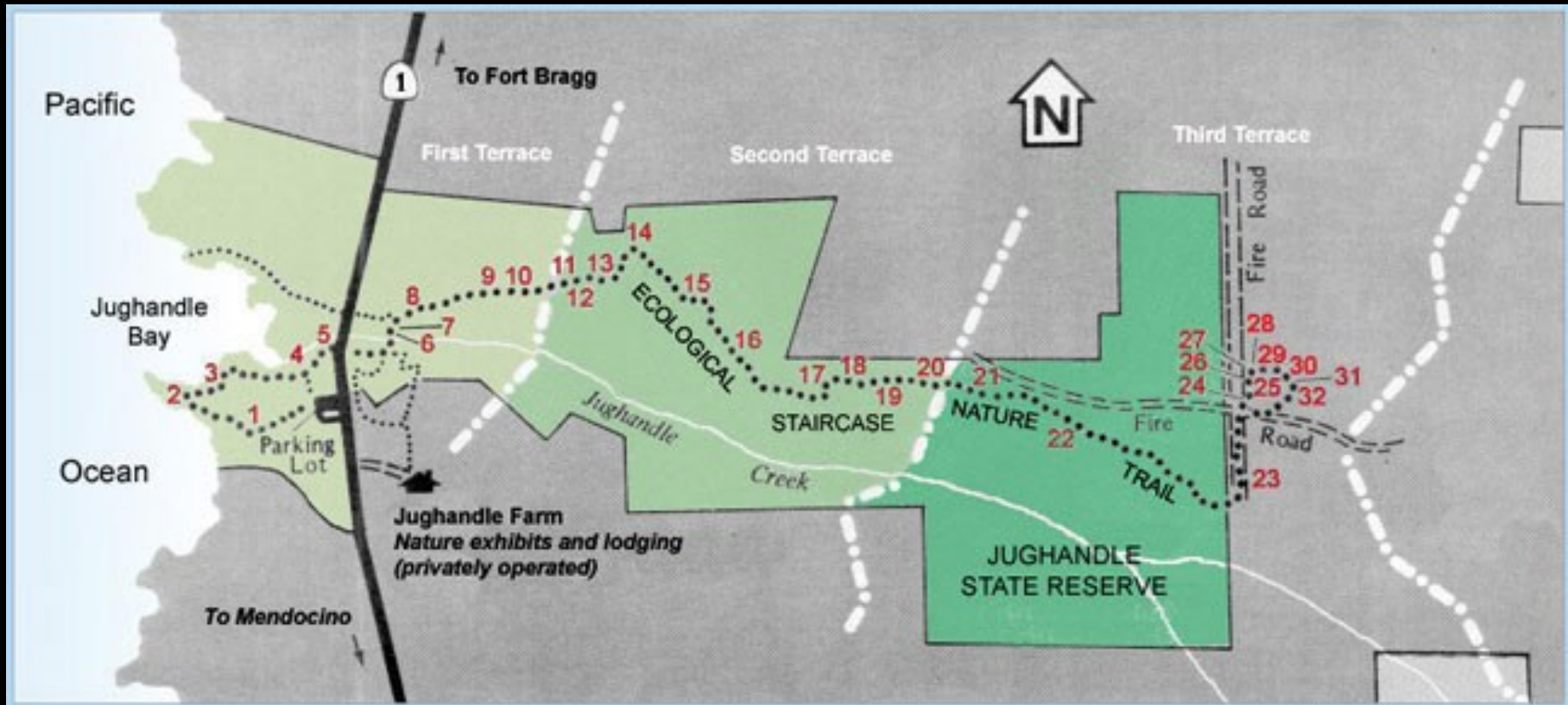


Preserving Vernal Pool Landscapes One Property at a Time:

**How We Work within our
Socio-economic System to Achieve
Landscape-scale Conservation**



Jughandle State Reserve Map

A person wearing a plaid shirt, shorts, and a hat is standing in a vast, green, rolling landscape. They are holding a long-handled tool, possibly a rake or a similar agricultural implement, and appear to be working in the field. The landscape is filled with green grass and small white and yellow flowers. In the distance, there are rolling hills and a few small structures or animals. The sky is blue with scattered white clouds.

Presentation Goal:

“To inform and inspire individuals to work to conserve vernal pool landscapes in areas of personal interest.”

Presentation Outline



- Why Do We Care?
- What Have We Achieved?
- How Did We Achieved It?
- Where Are We Going?



Section 1: Why Do We Care?

Hardpan Vernal Pools - Howard Ranch, SE Sacramento Co

Photo Credit: John Vollmar

Why Do We Love Vernal Pools?



Photo Credit: Linnea Neuhaus

**Bastions of Unique
Native Species**



**Numerous Endemic
Rare Species**

Photo Credit: Gillian Seymour

Photo Credit: Jake Schweitzer



**Important Wetland
Function**



**Valuable Migratory
Bird Habitat**

Why Do We Love Vernal Pool Landscapes?



Photo Credit: Jake Schweitzer

**Hydrological
Connectivity**



**Metapopulation
Dynamics**

Photo Credit: Lauren Kivlen



Photo Credit: Linnea Neuhaus

**Drought/Climate
Change Resilience**



Photo Credit: Linnea Neuhaus

**Conservation of
Rare Pool Types**

“Because they’re cool!”



**- Dr. Bob Holland
2014 Chico Vernal Pool Symposium
Keynote Address**

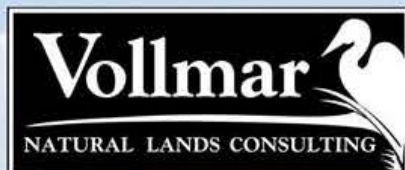
Photo Credit: Daniel Toews



Section 2: What Have We Achieved?

Claypan Vernal Pools – Wilcox Ranch, Greater Jepson Prairie, Solano Co

Photo Credit: Linnea Neuhaus



Bay Area Office
1720 Solano Avenue
Berkeley, CA 94707
Phone: (510) 559-9603
www.vollmarconsulting.com

MULTI-SCALE ASSESSMENT OF PAST ACHIEVEMENTS AND FUTURE DIRECTIONS FOR VERNAL POOL HABITAT CONSERVATION AND MANAGEMENT GREAT VALLEY, CALIFORNIA

Prepared For:

**U.S. Environmental Protection Agency
75 Hawthorne Street, WTR-8
San Francisco, CA 94105
Wetland Program Development Grant
No. 99T06001**

EPA STUDY QUESTIONS

- **What's the acreage and distribution of conserved habitat?**
- **Who are the landowners?**
- **What are the conservation instruments, who holds them?**
- **Where did the funding come from?**

- **Great Valley**
- **Vernal Pool Ecoregion**
- **Geologic Formation (by Ecoregion)**
- **County**

**What's the Acreage and Distribution
of Conserved Habitats?**

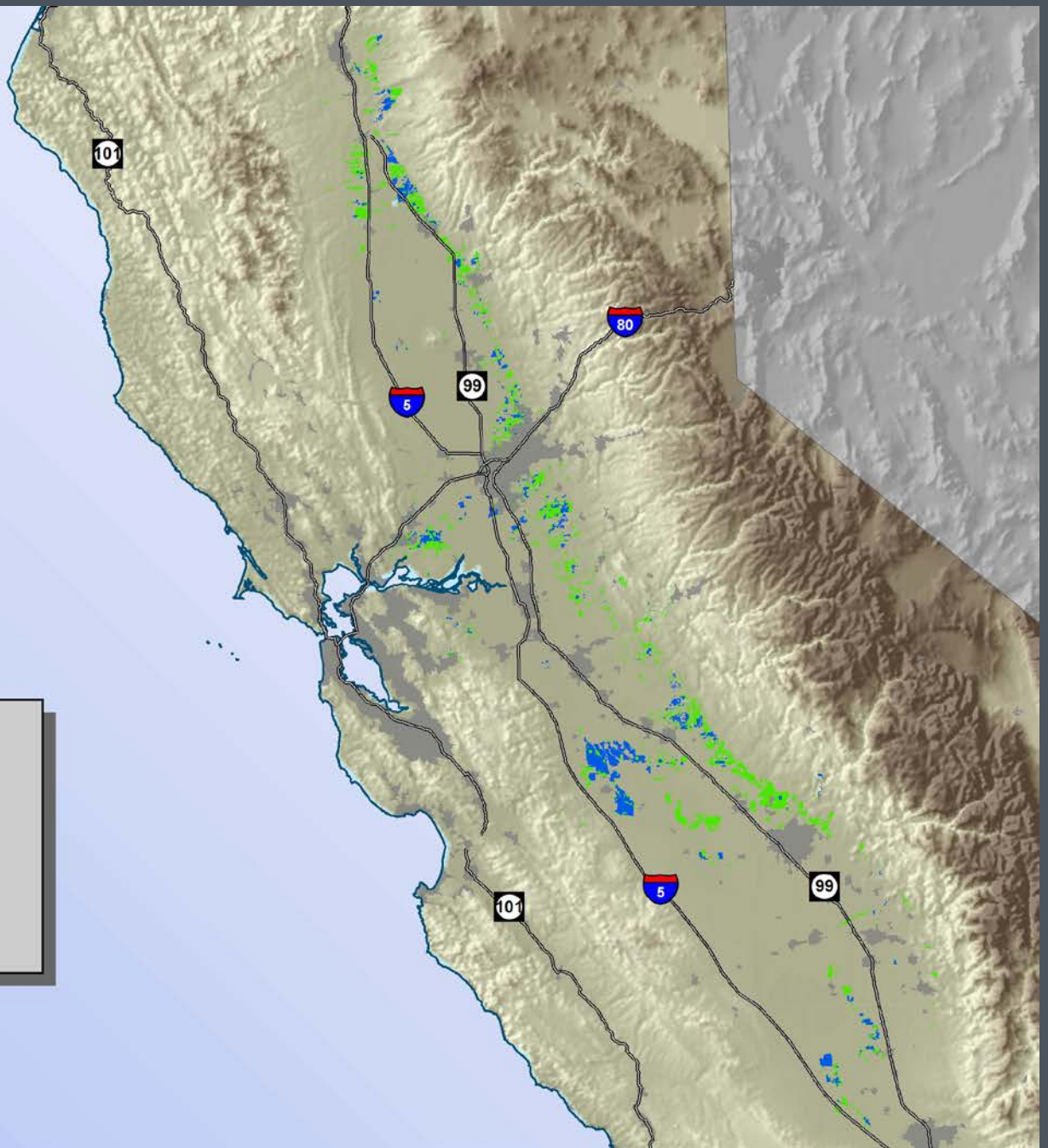
Great Valley Summary Data

**764,862 acres of extant
vernal pool habitat**
(as of 2012; Witham et
al. 2014)

**270,329 acres (35%)
preserved**

**724 individual
preserves in 360
contiguous 'blocks'.**

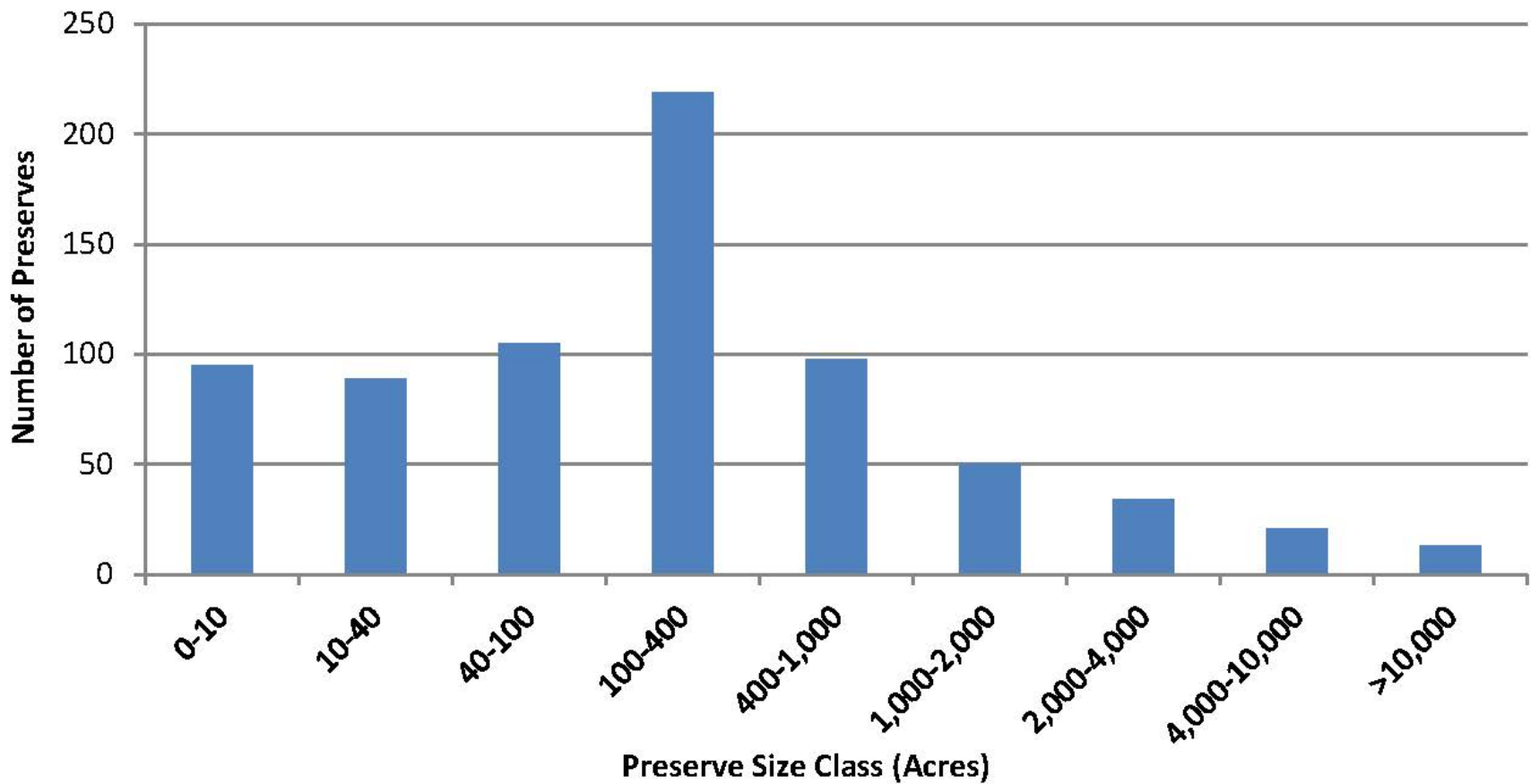
Great Valley Vernal Pool Habitat



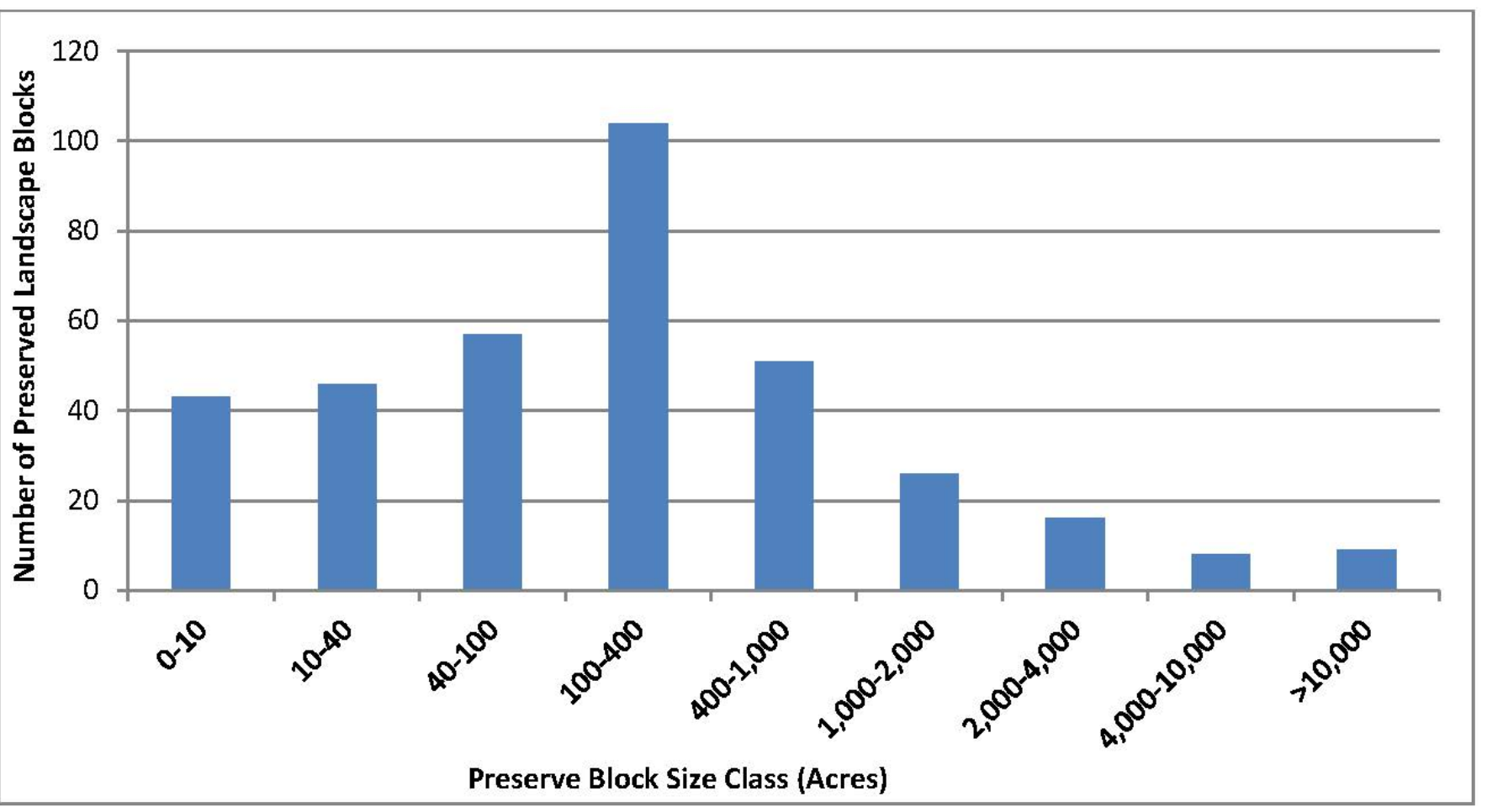
Legend

-  Vernal Pool Habitat
-  Preserved Vernal Pool Habitat
-  Highway

Number of GV Preserves by Size Class



Number of GV Preserve Blocks by Size Class

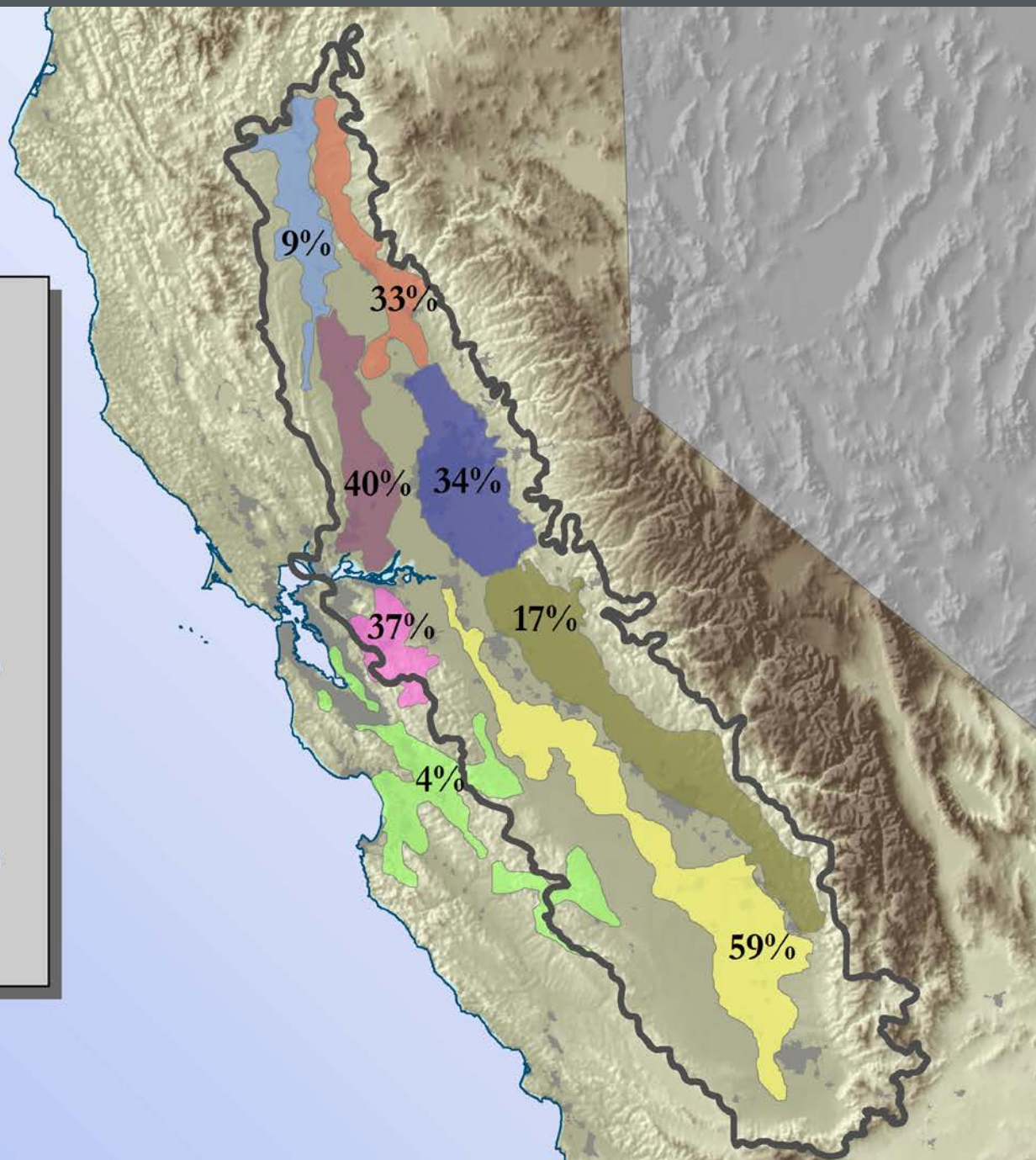


Great Valley Vernal Pool Ecoregions

Vernal Pool Regions

Region (Percent Vernal Pool
Habitat Preserved)

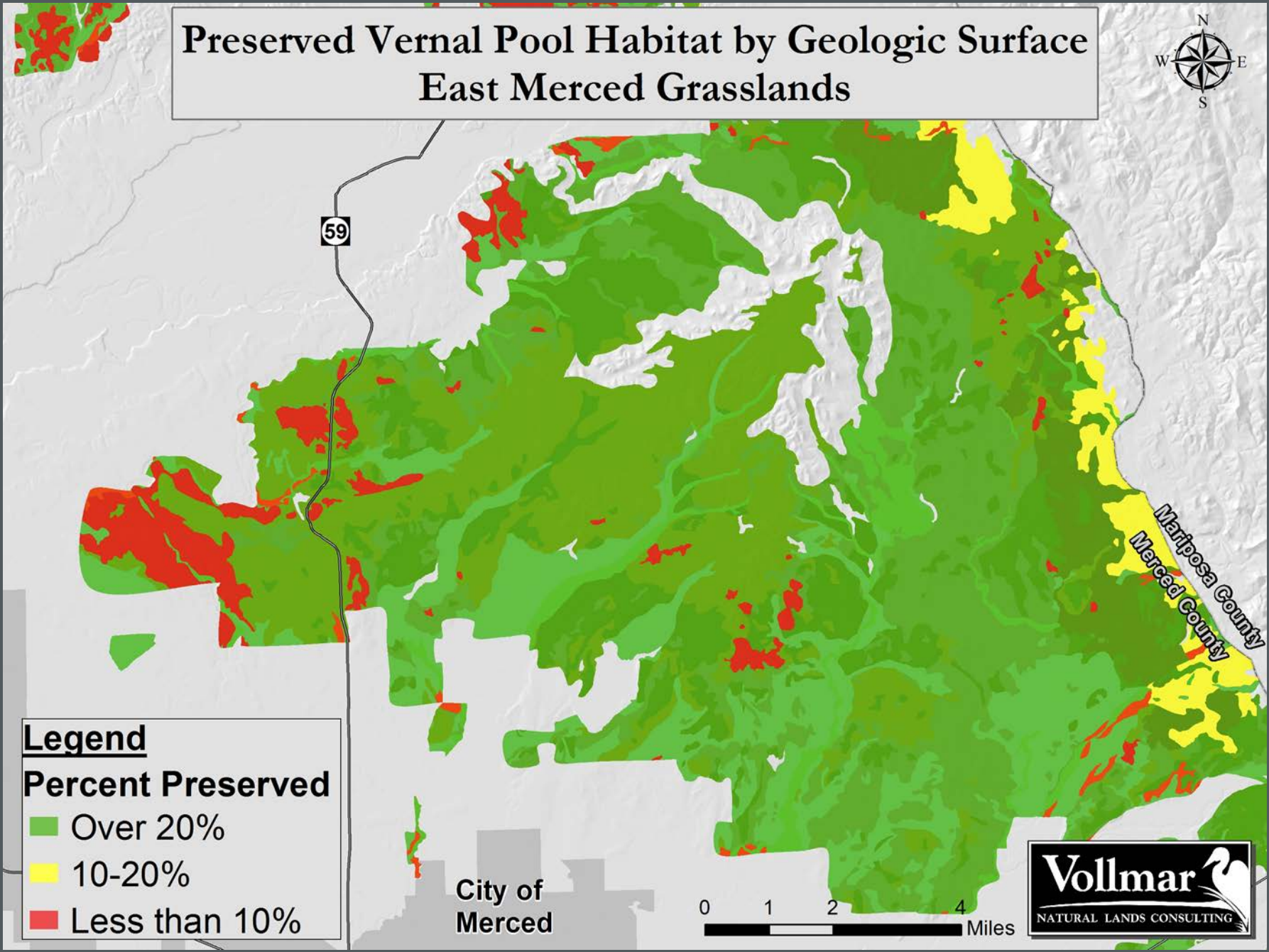
- Central Coast
- Livermore
- Northeastern Sacramento Valley
- Northwestern Sacramento Valley
- San Joaquin Valley
- Solano-Colusa
- Southeastern Sacramento Valley
- Southern Sierra Foothills



SSF Ecoregion Geologic Surfaces: Acreage/Percent Preserved VP Habitat

Geology	Acreage Extant	Acreage Preserved	Percent Preserved
Riverbank Formation	40,612	9,665	24
Turlock Lake Formation	37,627	1,474	4
Mehrten Formation	21,945	5,167	24
North Merced Gravels	15,147	5,354	35
Modesto Formation	14,550	549	4
Jurassic-Cretaceous Rock	13,370	481	4
Laguna Formation	10,066	2,351	23
Valley Springs Formation	7,421	1,826	25
Basalt Rock	5,696	1,851	32
Holocene Deposits	4,646	1,191	26
Ione Formation	2,803	364	13
Volcanic Rock	1,922	41	2
Tertiary Gravel	908	0	0
Unnamed Alluvial Deposits	539	0	0
Dry Lake Bed	297	0	0
Mariposa Formation	209	5	3
Tailings	97	0	0
Ultramafic Rock	88	0	0
Unnamed Tertiary Deposits	88	0	0
Unnamed Sedimentary Rocks	69	0	0
Unnamed Colluvium	20	0	0
Andesite Rock	8	0	0
No Data	12,725	2,378	19
Total	190,835	32,697	17

Preserved Vernal Pool Habitat by Geologic Surface East Merced Grasslands



Legend

Percent Preserved

 Over 20%

 10-20%

 Less than 10%

City of
Merced

0 1 2 4
Miles



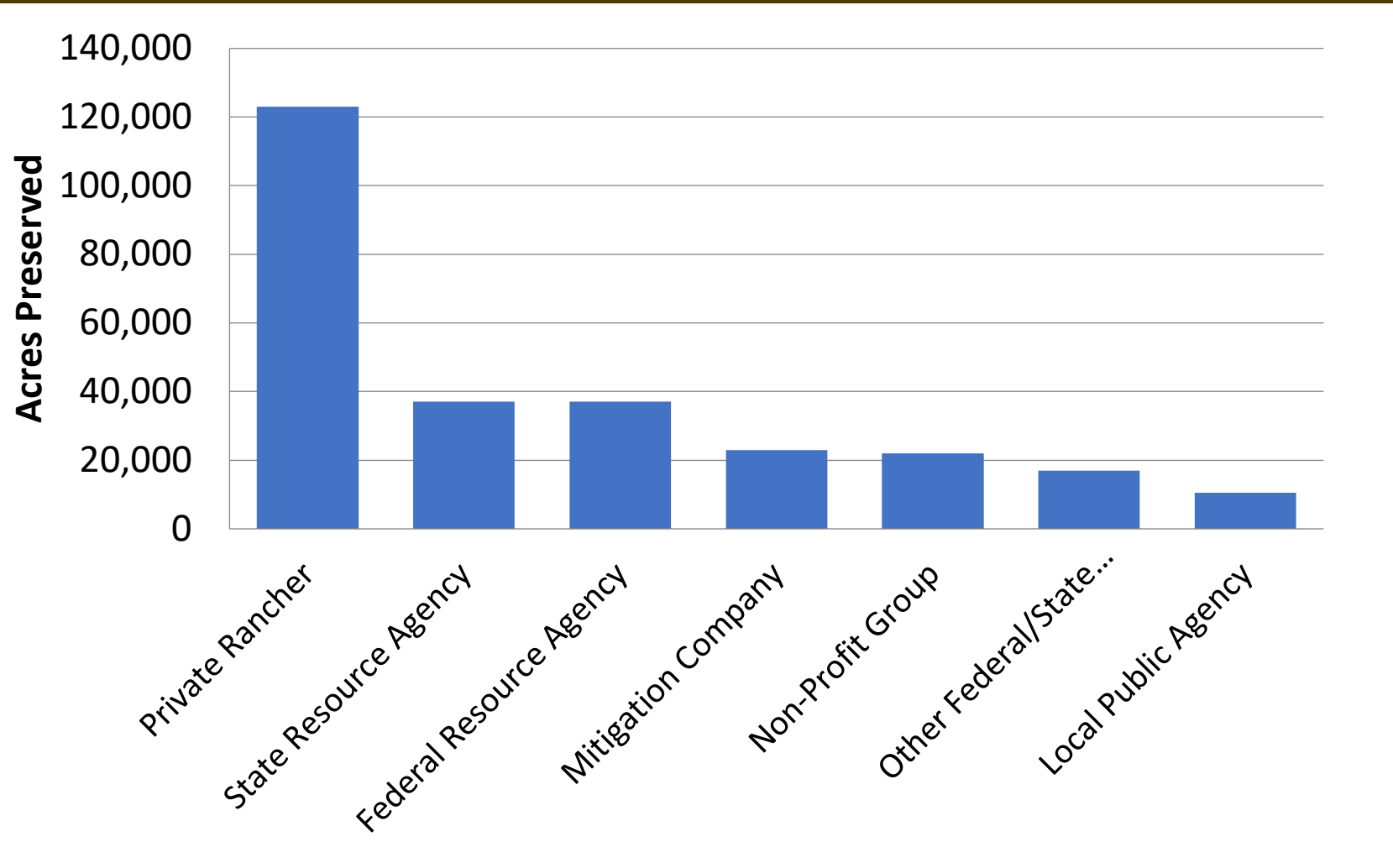
Great Valley Counties: Acreage/Percent Preserved VP Habitat

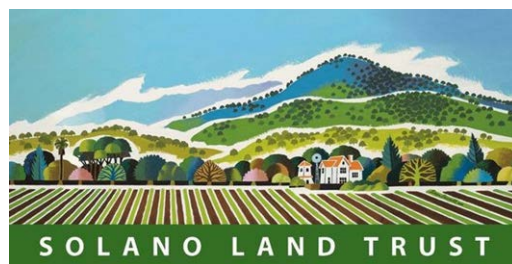
County	Acreage Extant	Acreage Preserved	Percent Preserved
Alameda	1,966	333	17
Amador	3,664	0	0
Butte	54,227	10,493	19
Calaveras	5,942	503	8
Colusa	1,407	756	54
Contra Costa	3,465	1,651	48
El Dorado	852	51	6
Fresno	25,784	4,273	17
Glenn	3,847	1,640	43
Kern	29,718	15,168	51
Kings	6,762	0	0
Madera	77,753	2,137	3
Mariposa	3,055	7	0
Merced	196,399	120,954	62
Placer	29,893	8,981	30
Sacramento	62,197	26,355	42
San Joaquin	25,557	3,648	14
Shasta	20,739	3,368	16
Solano	37,548	12,026	32
Stanislaus	20,489	2,393	12
Sutter	1,254	36	3
Tehama	99,100	34,023	34
Tulare	27,313	11,463	42
Tuolumne	5,161	402	8
Yolo	4,750	3,767	79
Yuba	16,019	5,900	37
Total	764,862	270,329	35



Who are the Landowners?

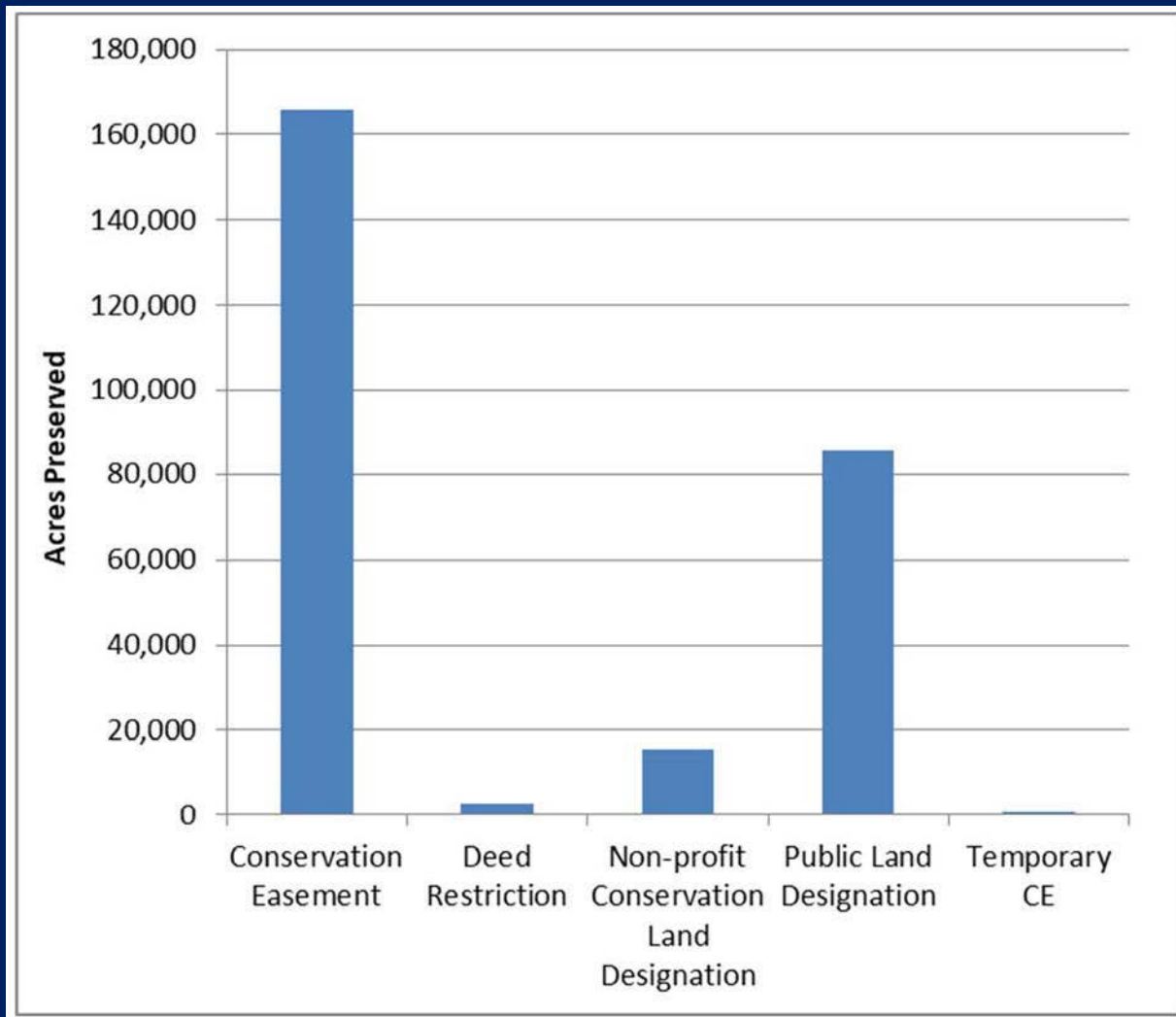
Acres of Preserved VP Habitat by Ownership Type (Great Valley)



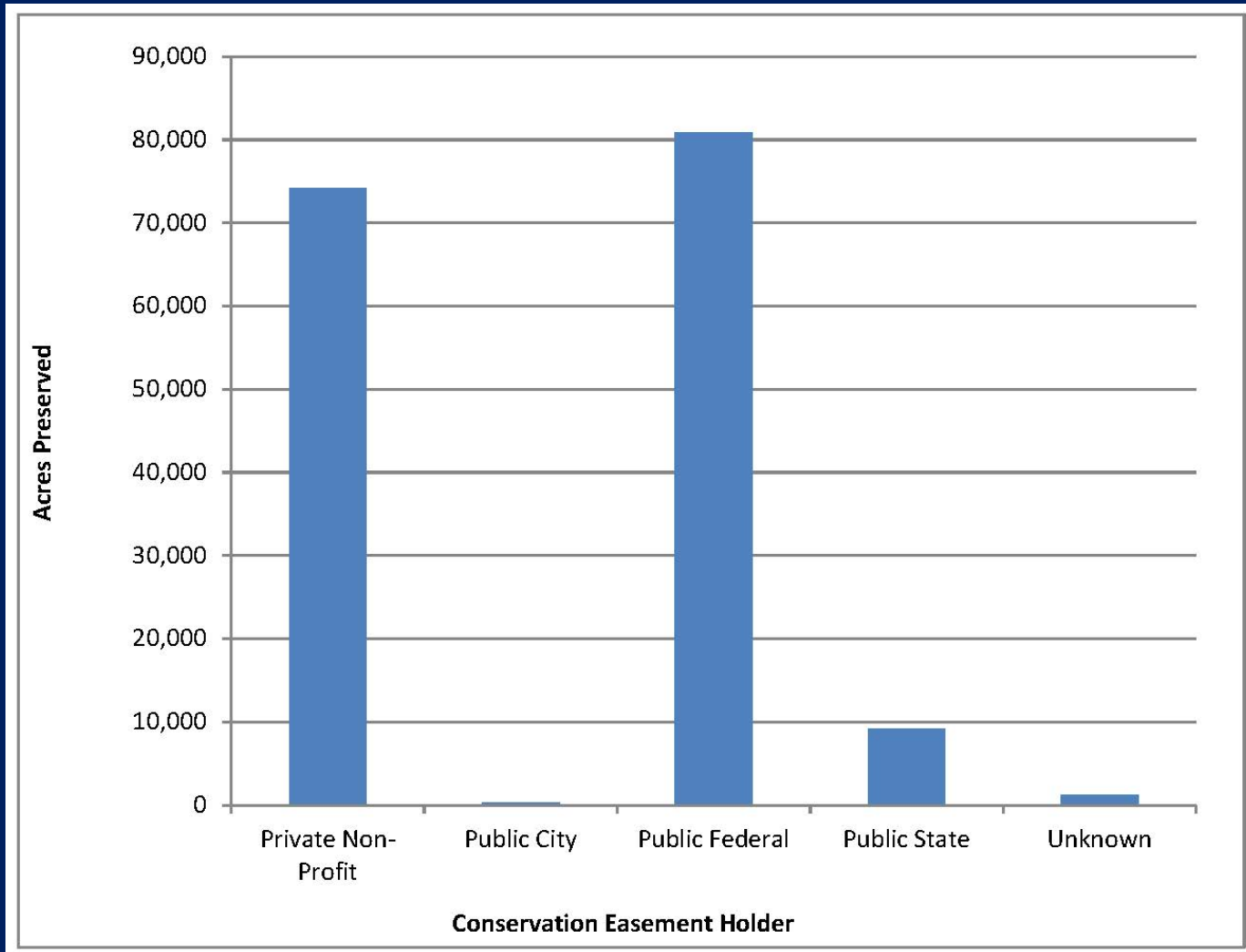


What are the Conservation Instruments, who holds them?

Acres of Preserved VP Habitat by Conservation Instrument (Great Valley)



Acres of Preserved VP Habitat by Conservation Easement Holder (Great Valley)



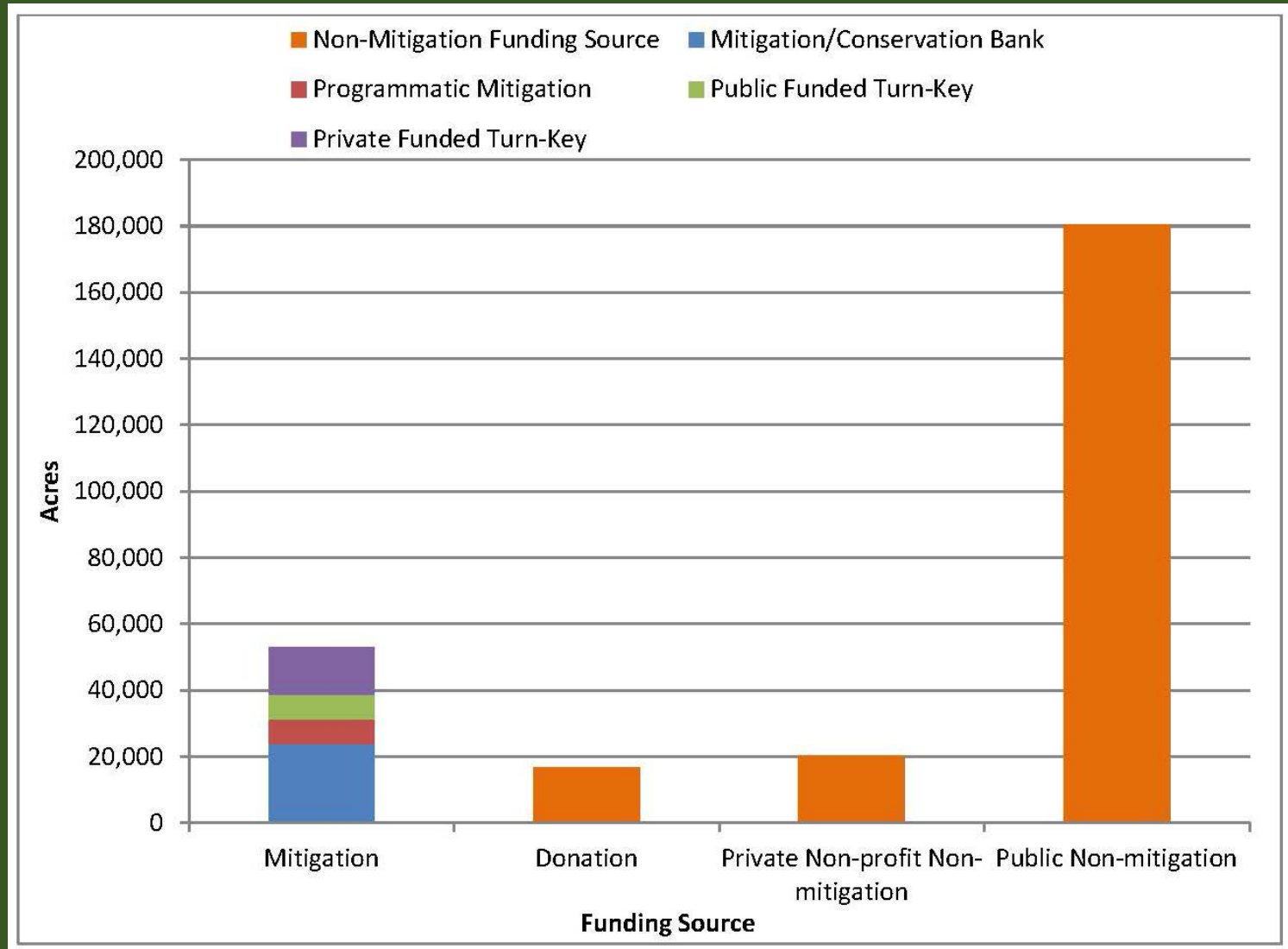


Federal/State Grant Programs
Conservation Groups
Mitigation Buyers
Land Trust Members/Donors
Private Landowner Donations



Where did the funding come from?

Acres of Preserved VP Habitat by Funding Source (Great Valley)



Number of VP Habitat Preserves by Funding Source and Size Class (Great Valley)

Funding Source	Total Number of Preserves	Preserve Size Class (Acres)				
		0-400	>400-1,000	>1,000-4,000	>4,000-10,000	>10,000
Mitigation	317	83%	12%	4%	1%	-
Public Non-Mitigation	371	60%	16%	17%	4%	3%
Private Non-Mitigation	27	63%	7%	26%	4%	-
Donation	9	45%	11%	-	22%	22%
Total	724	69%	14%	12%	3%	2%



Section 3: How Have We Achieved It?

Volcanic Mudflow Vernal Pools – Hog Lake, Lassen Foothills, Tehama Co

Photo Credit: Carol Witham

Grappling with
Landscape-
scale Ecology
vs. Land
Ownership



Greater Jepson Prairie



Legend

Mapped Vernal Pool Habitat

- Low Density
- Medium Density
- High Density

Special-Status Species Legend

- Colusa grass
- San Joaquin Valley Orcutt grass
- California tiger salamander

12

113

0 0.75 1.5 3 Miles



Greater Jepson Prairie



Legend

Mapped Vernal Pool Habitat

- Low Density
- Medium Density
- High Density

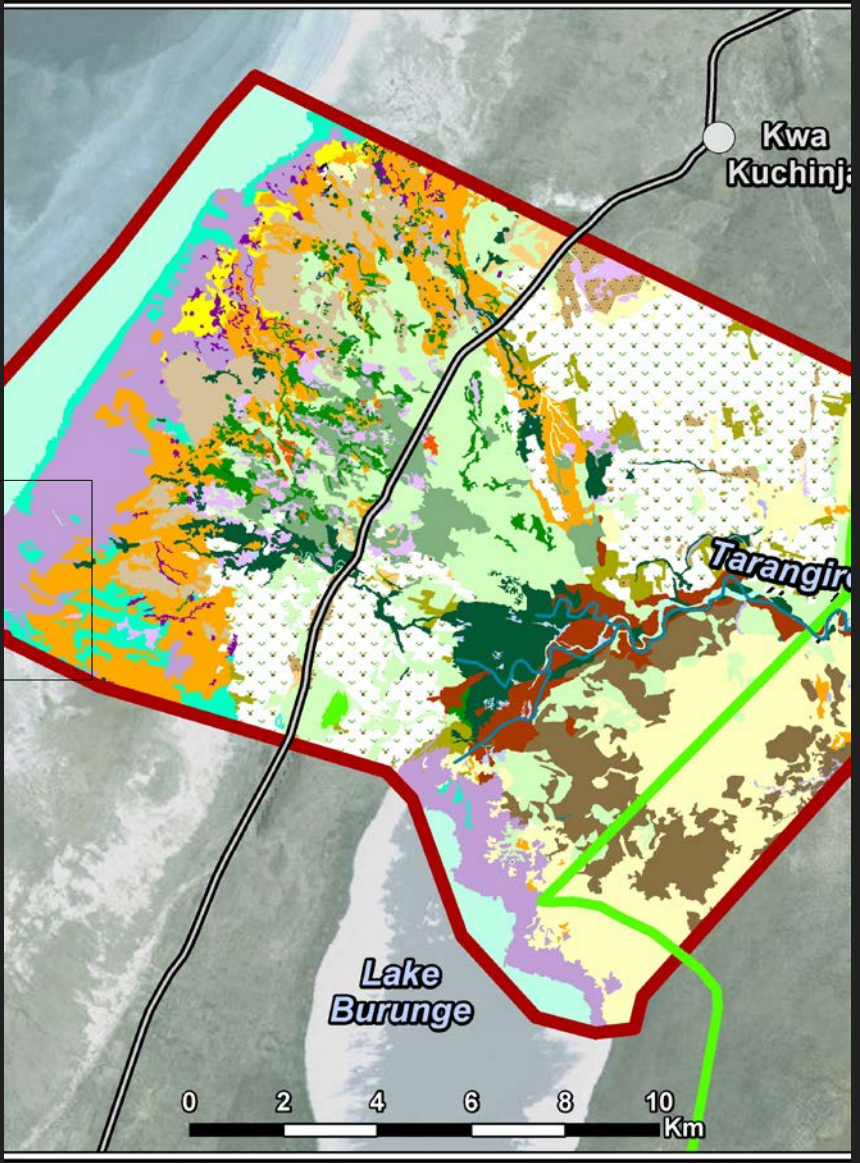
Special-Status Species Legend

- Colusa grass
- San Joaquin Valley Orcutt grass
- California tiger salamander

12

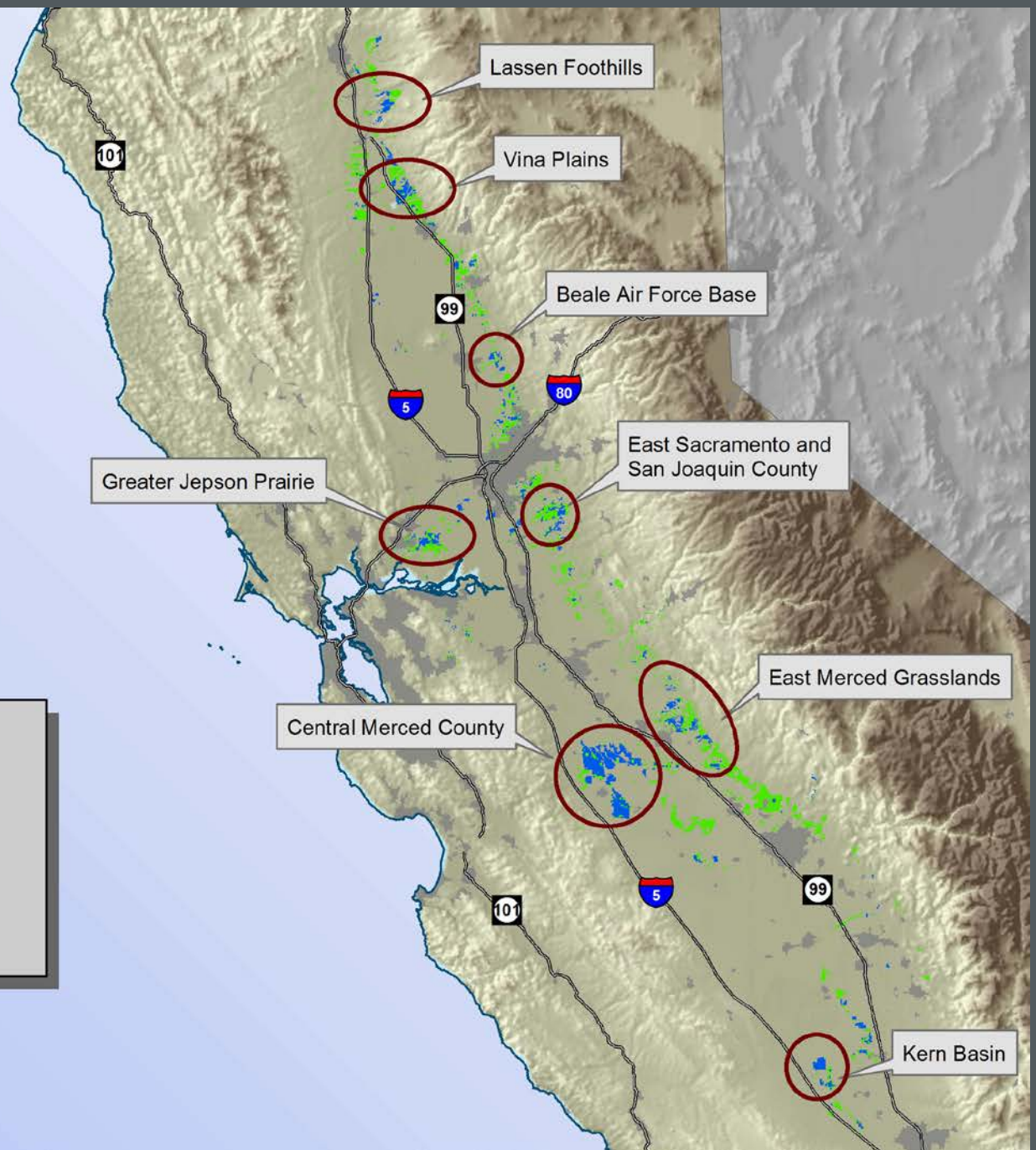
113





Map File: ViciinitySlide_31

Great Valley Vernal Pool Habitat

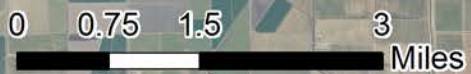
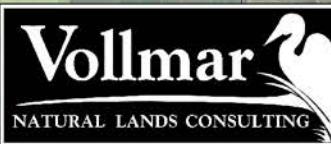


Legend

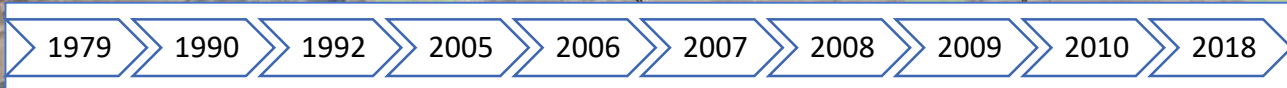
-  Vernal Pool Habitat
-  Preserved Vernal Pool Habitat
-  Highway

Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



Travis Air Force Base



Legend

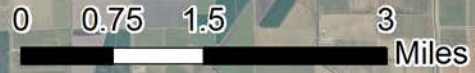
Vernal Pool Habitat

Funding Source

- Mitigation
- Non-profit Funds
- Public Grant

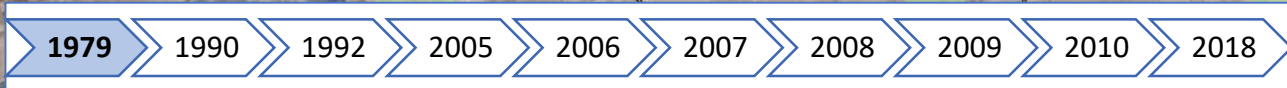
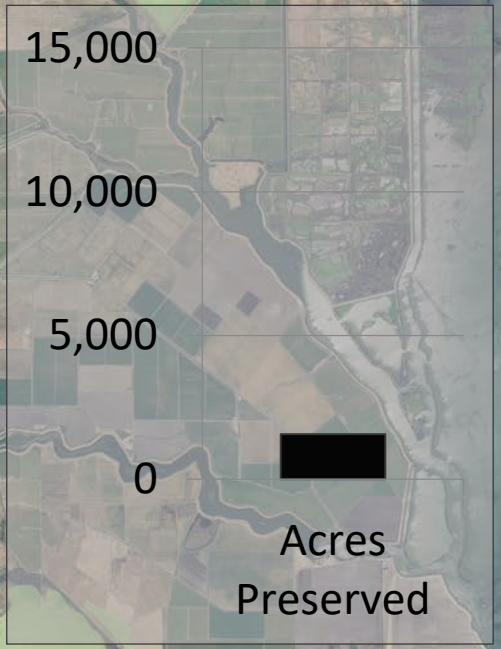
Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



Travis Air Force Base

JEPSON PRAIRIE PRESERVE

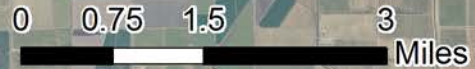


Legend

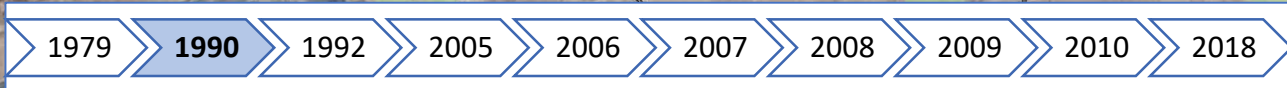
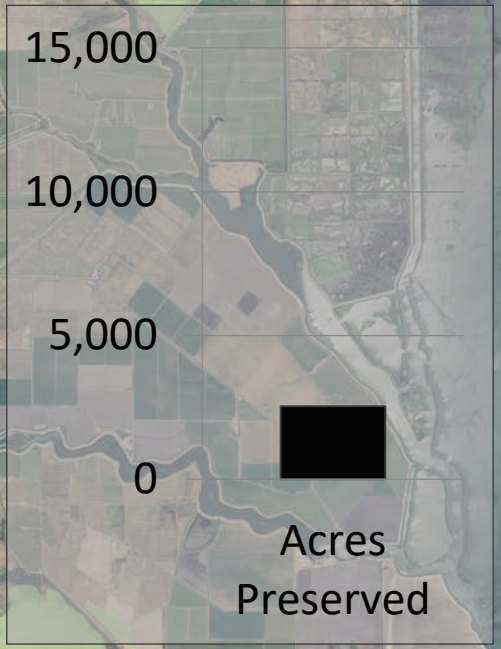
- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant

Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



Travis Air Force Base

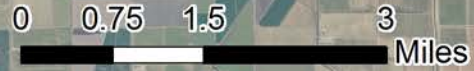


Legend

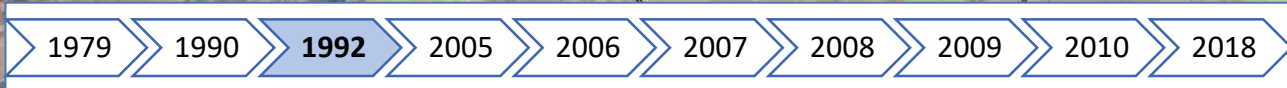
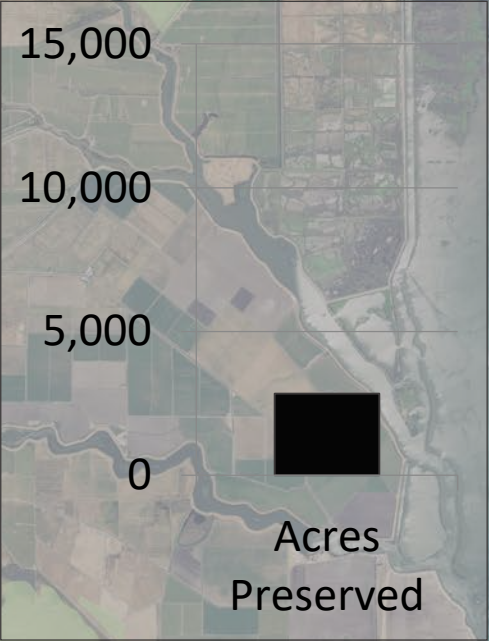
- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant

Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



Travis Air Force Base

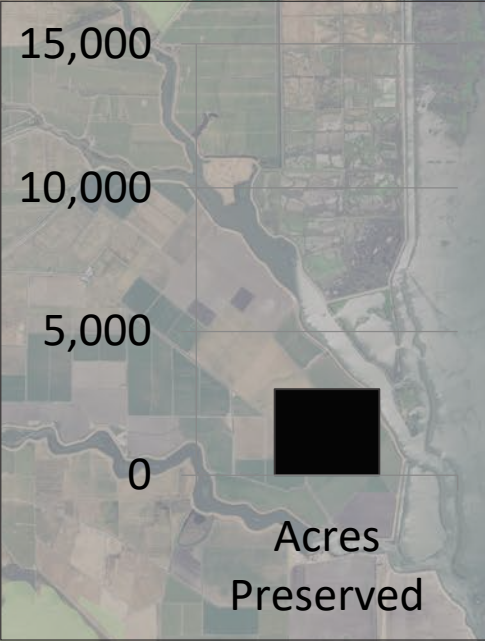
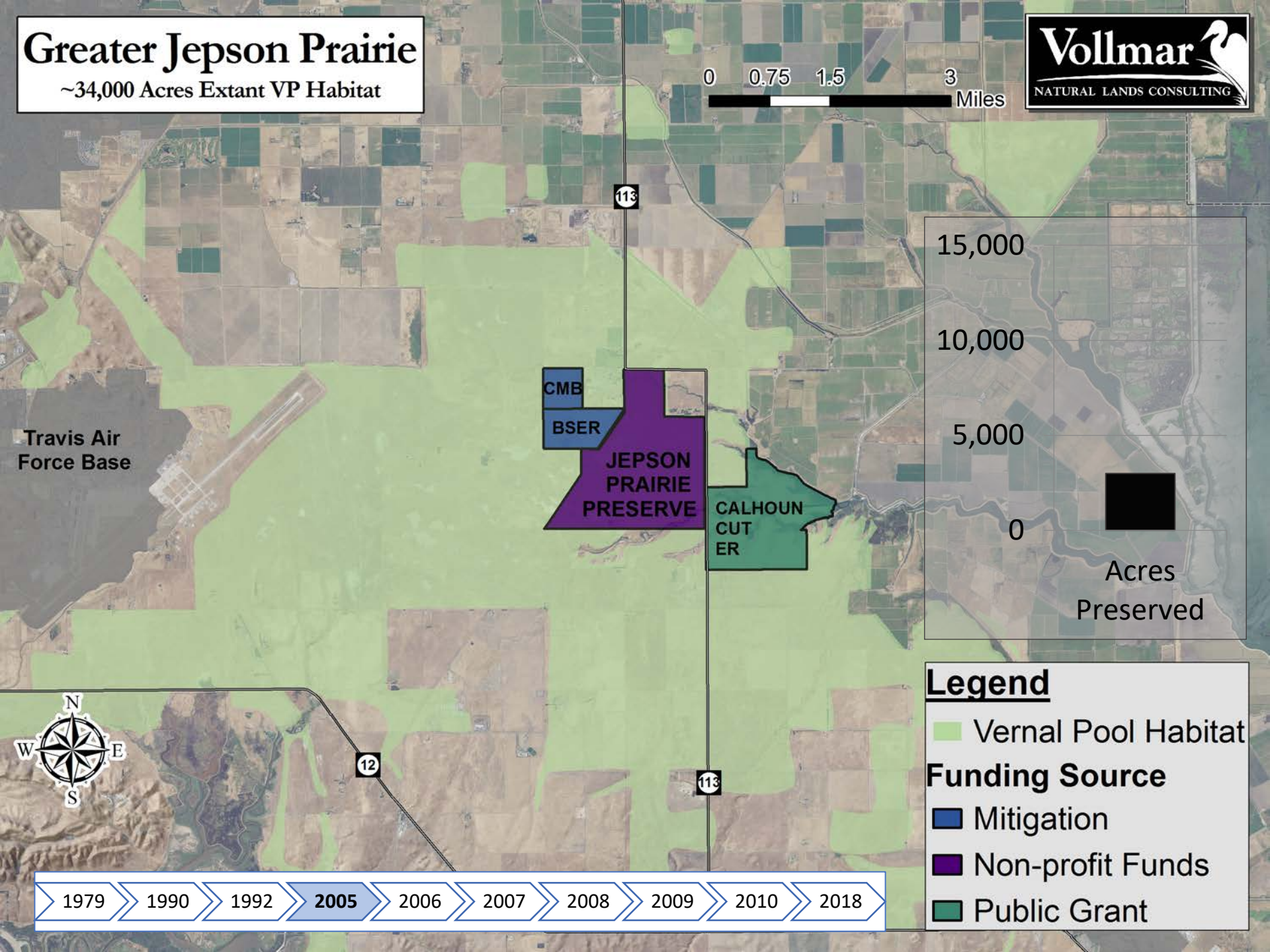
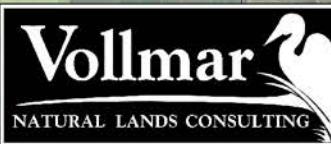


Legend

- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant

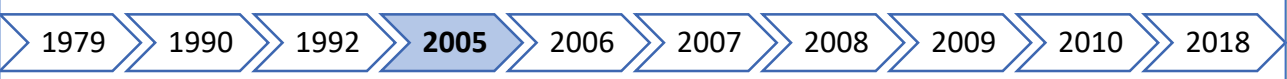
Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



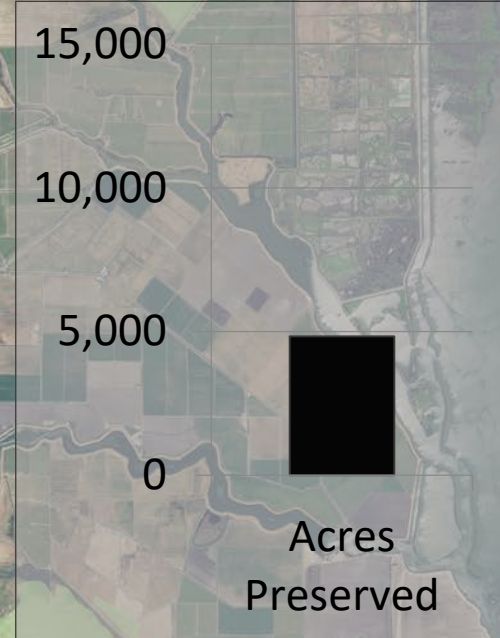
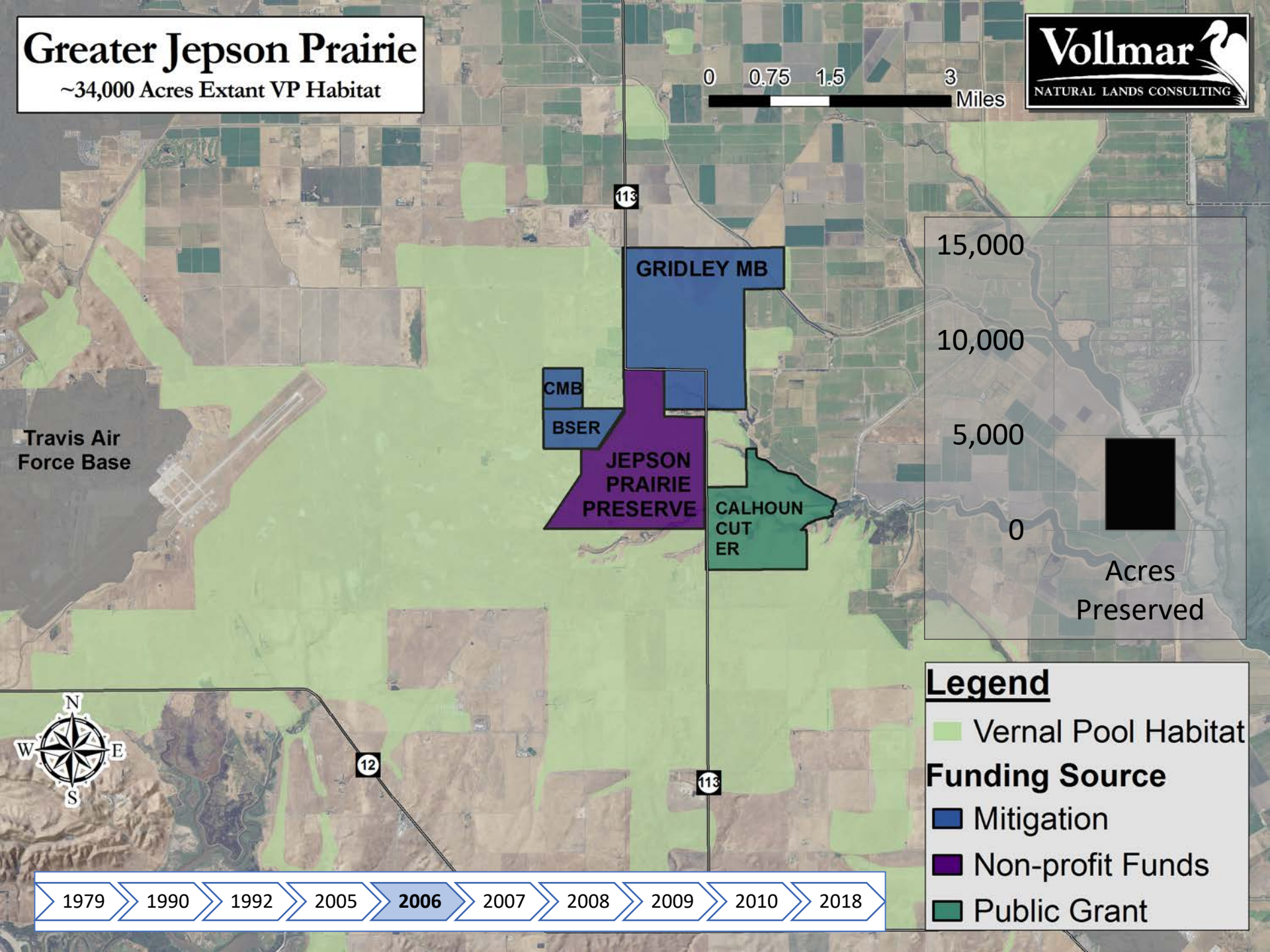
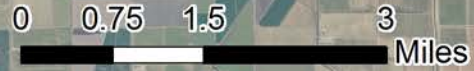
Legend

- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant



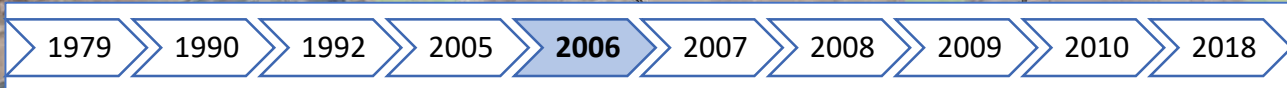
Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



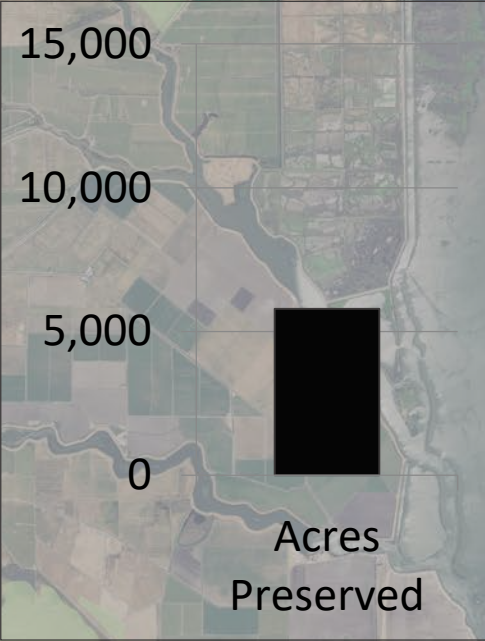
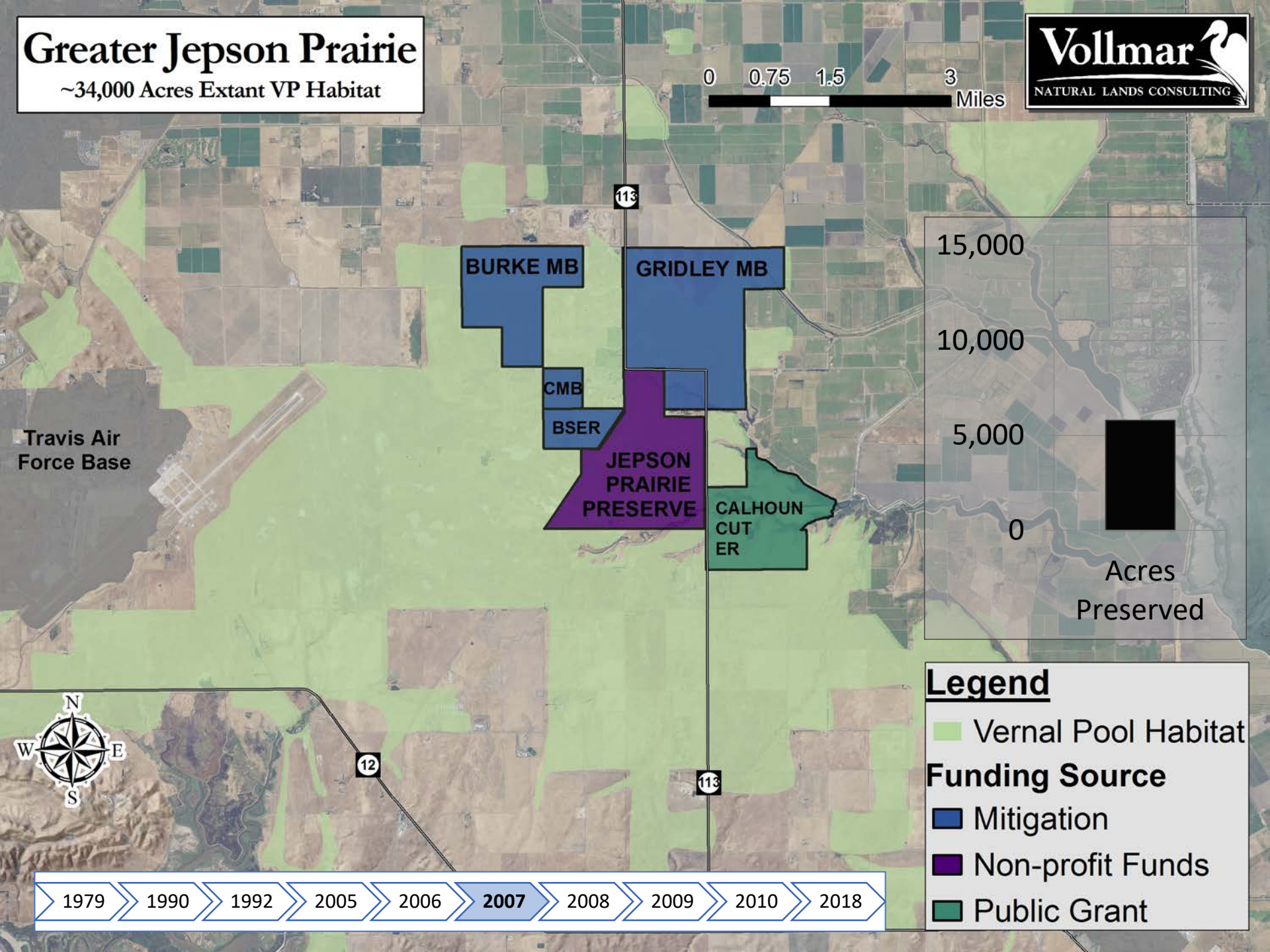
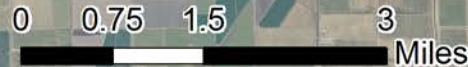
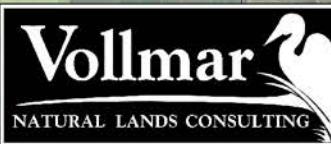
Legend

- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant



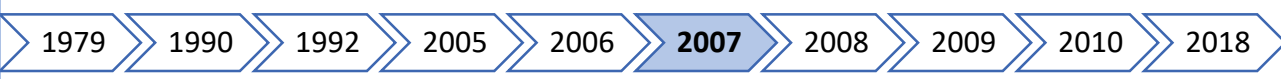
Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



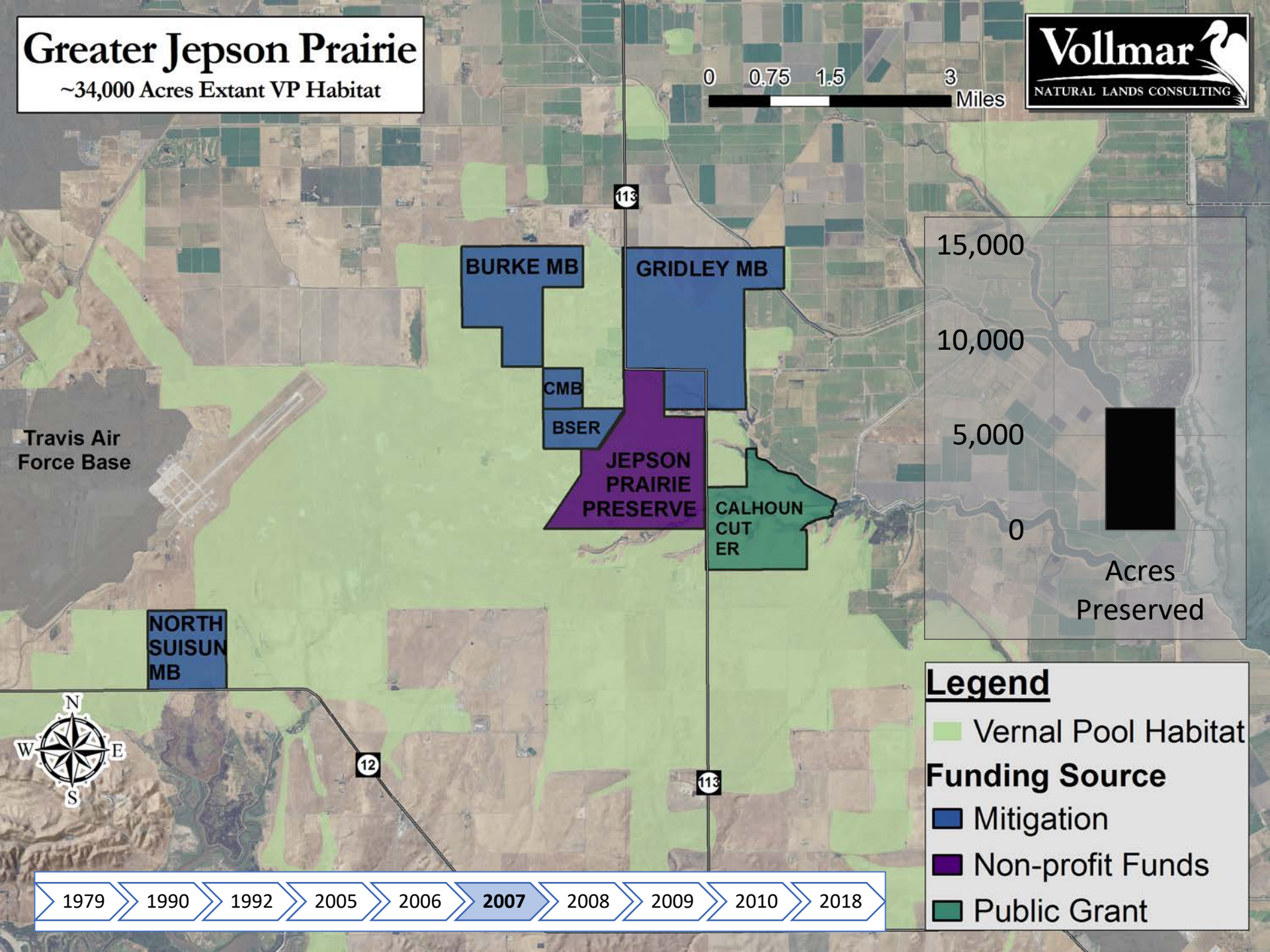
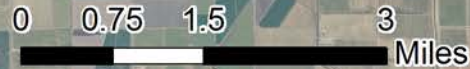
Legend

- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant



Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



Travis Air Force Base

NORTH
SUISUN
MB

BURKE MB

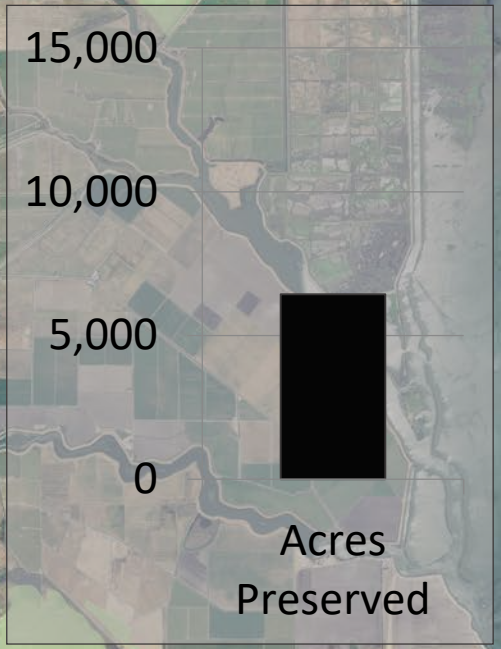
GRIDLEY MB

CMB

BSER

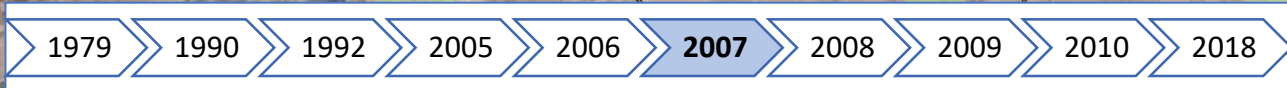
JEPSON
PRAIRIE
PRESERVE

CALHOUN
CUT
ER



12

113

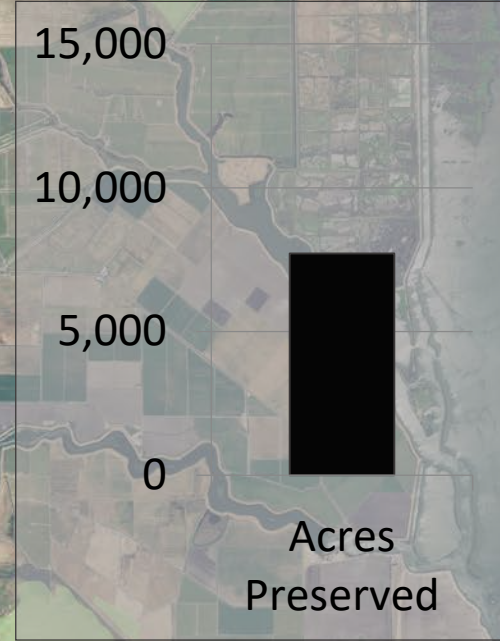
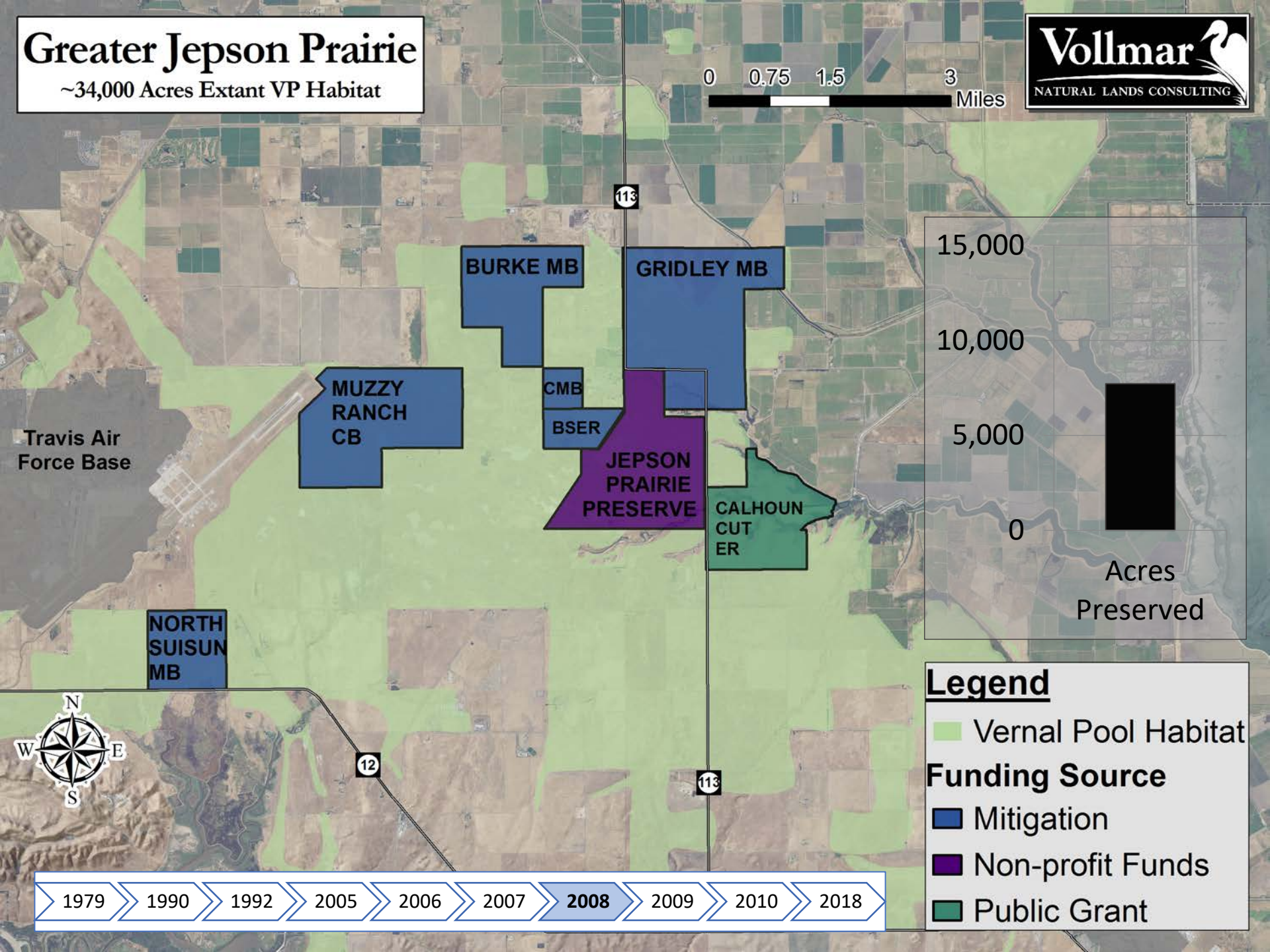
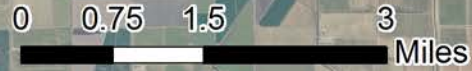


Legend

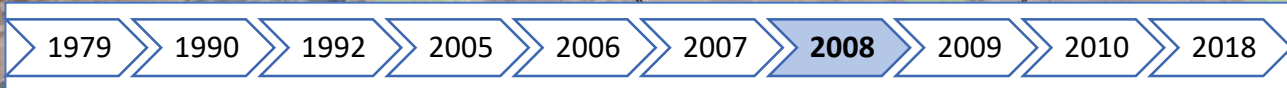
- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant

Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



Travis Air Force Base

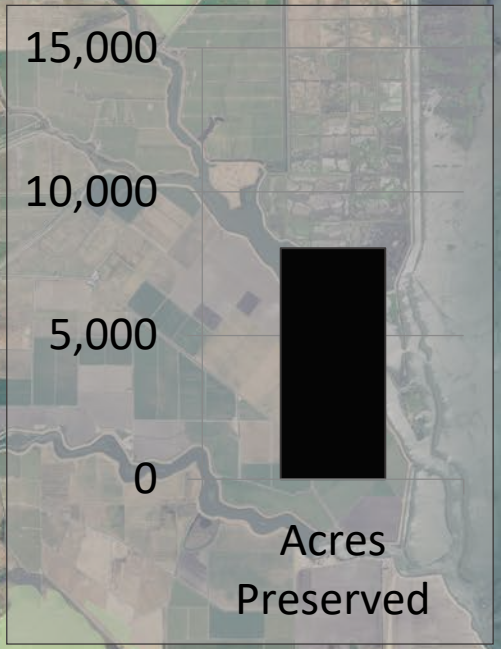
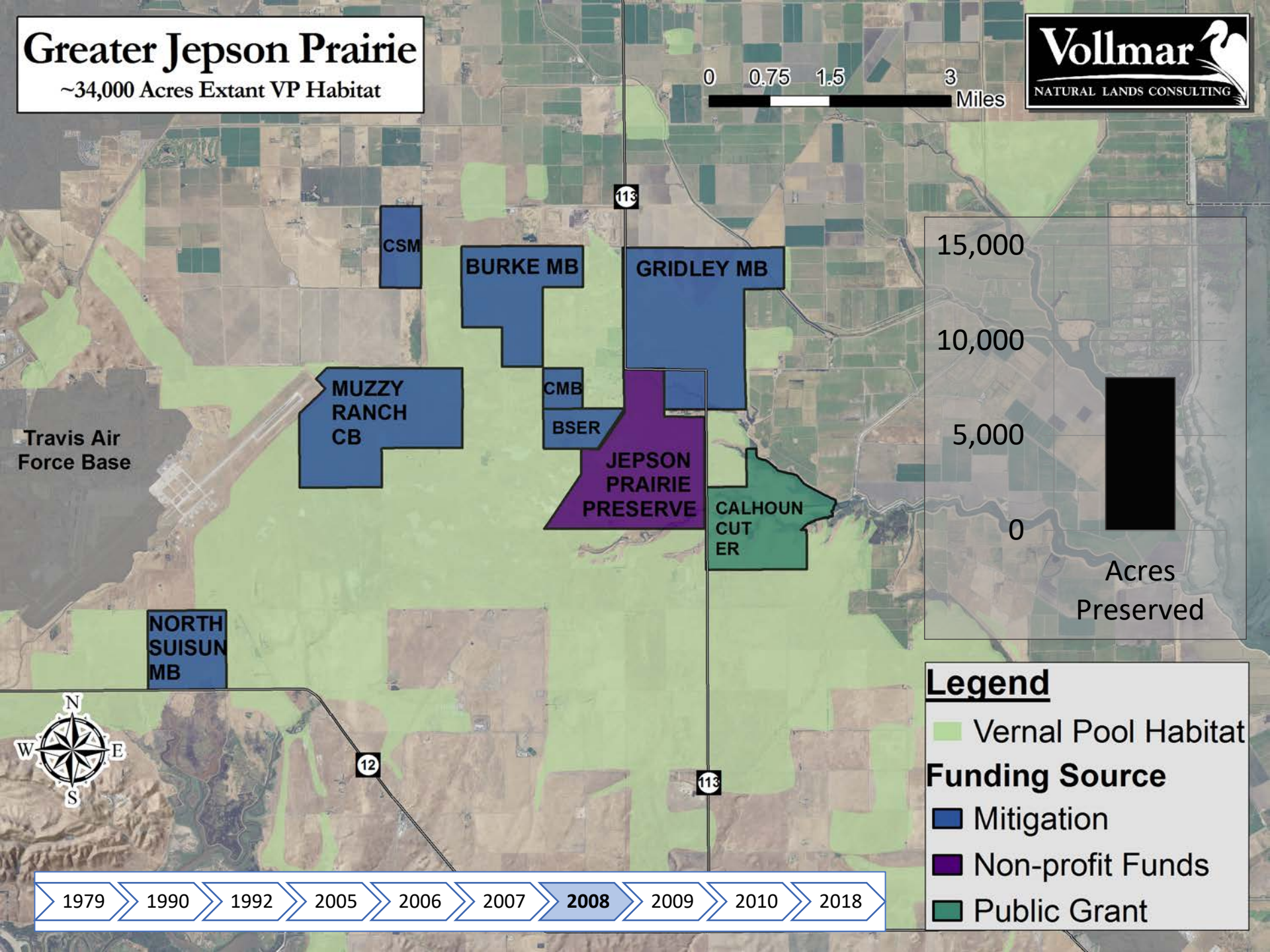
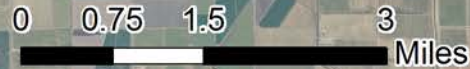


Legend

- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant

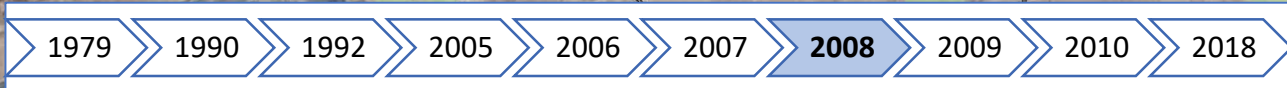
Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



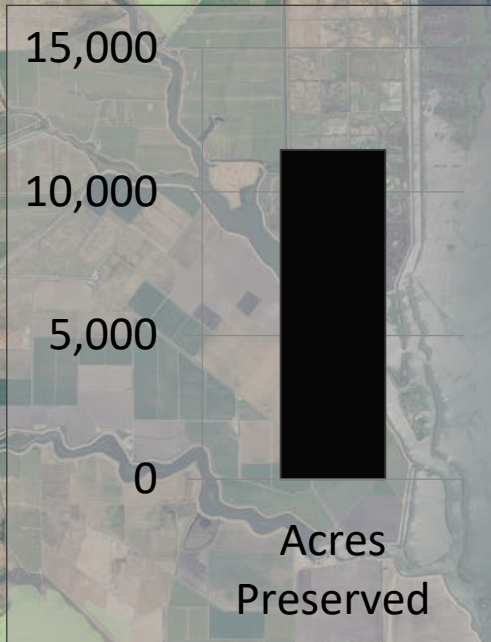
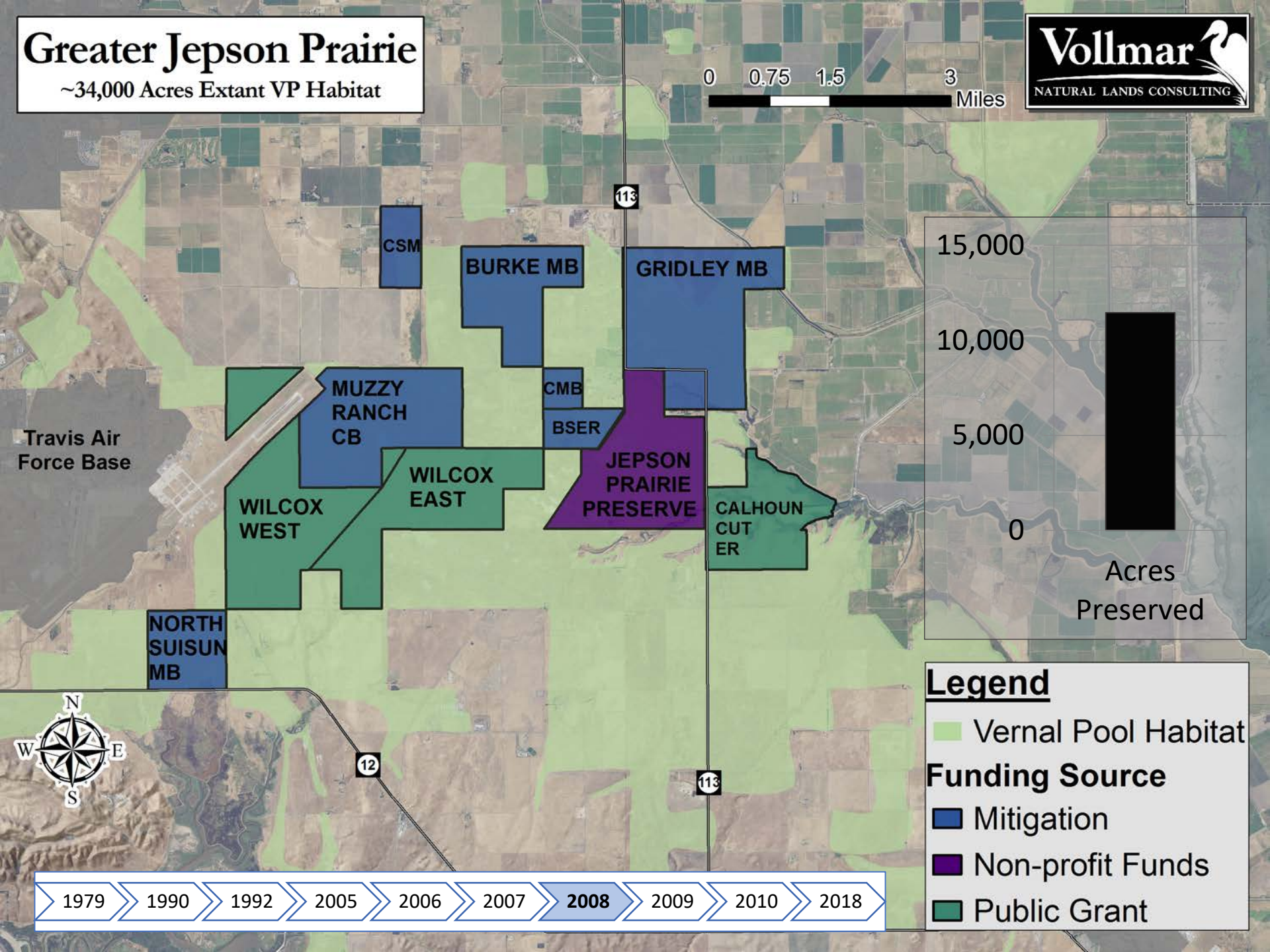
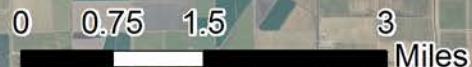
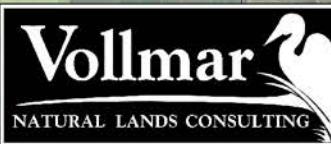
Legend

- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant



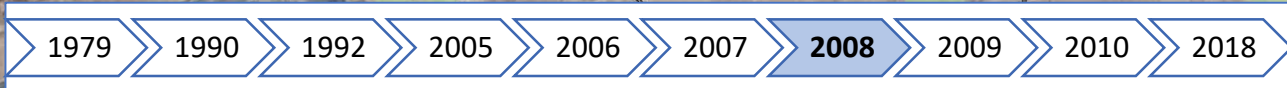
Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



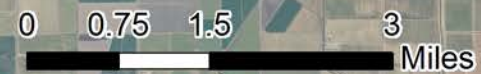
Legend

- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant

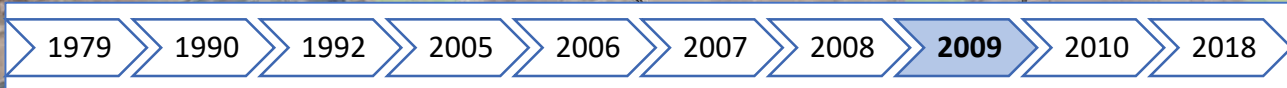
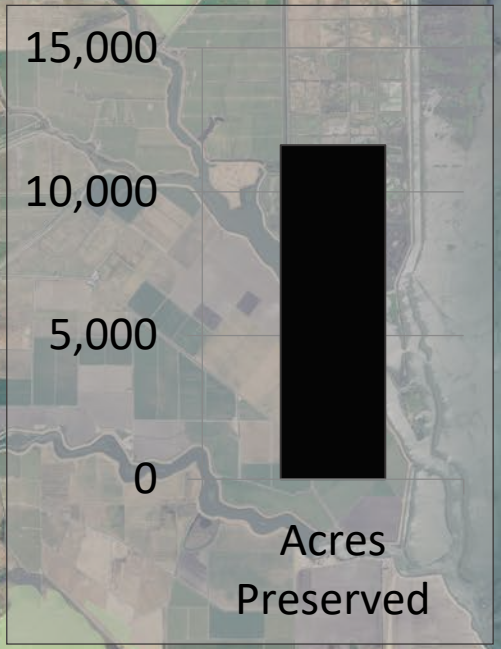


Greater Jepson Prairie

~34,000 Acres Extant VP Habitat

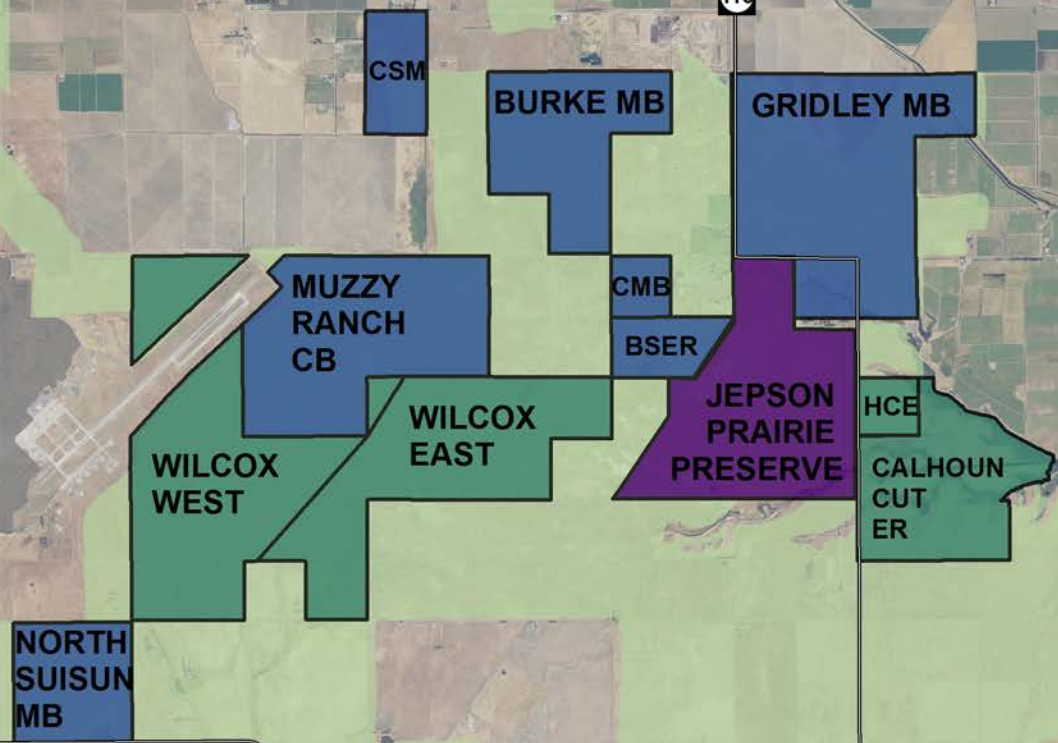


Travis Air Force Base



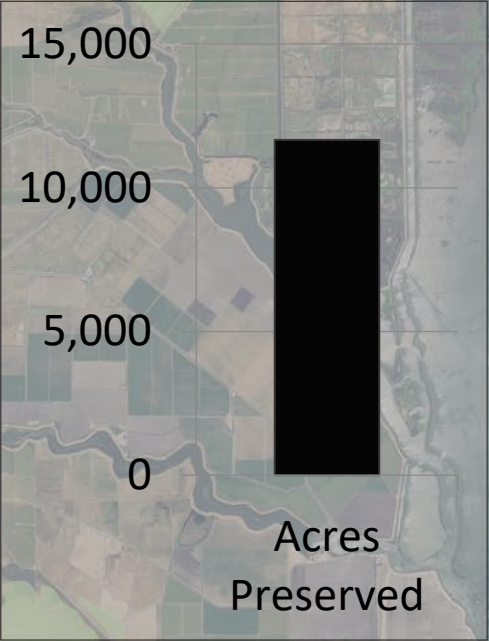
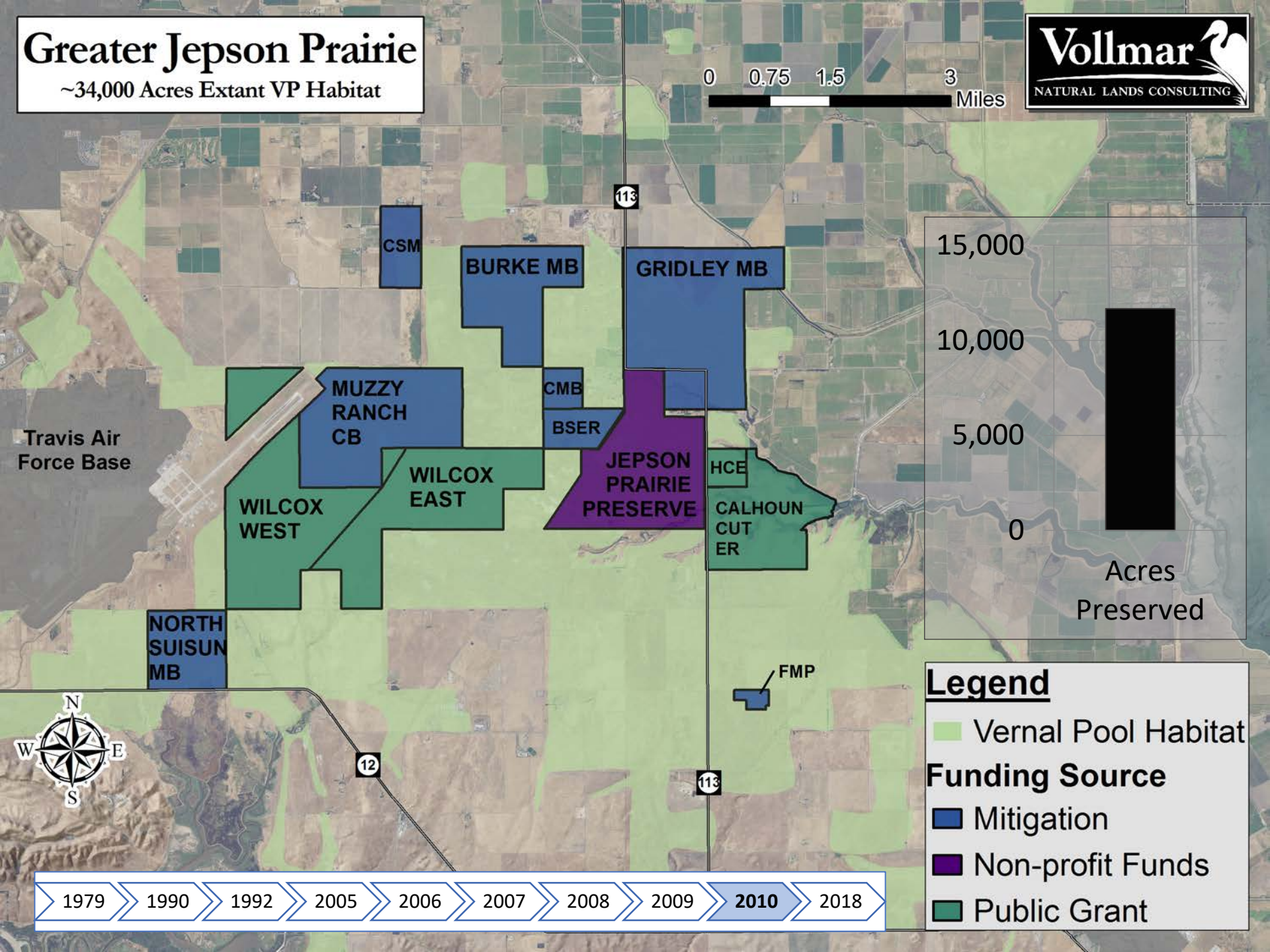
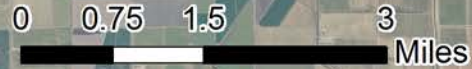
Legend

- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant



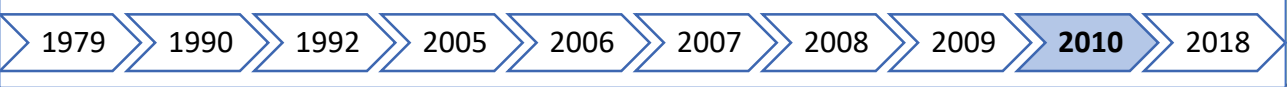
Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



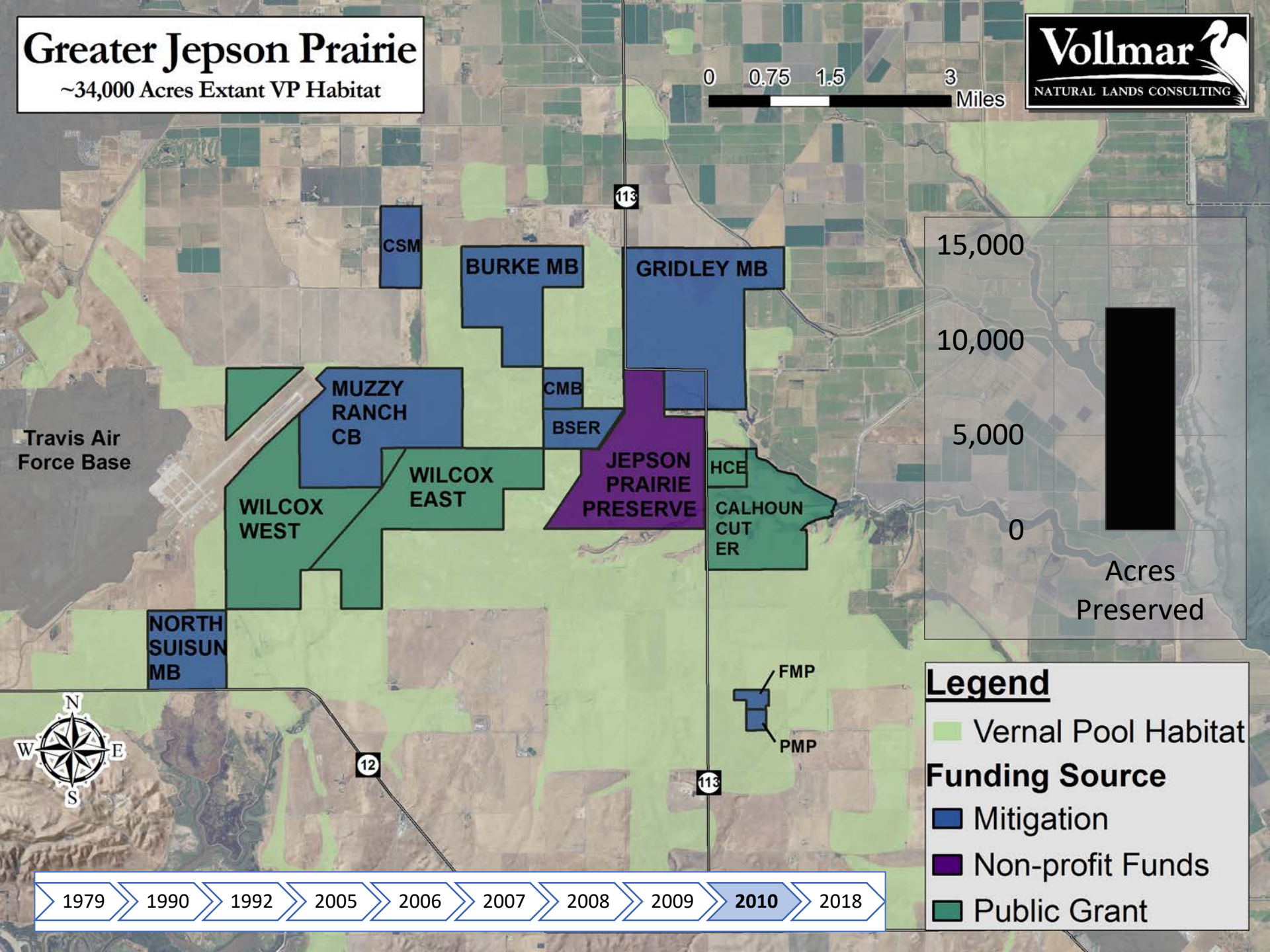
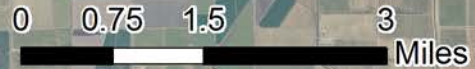
Legend

- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant

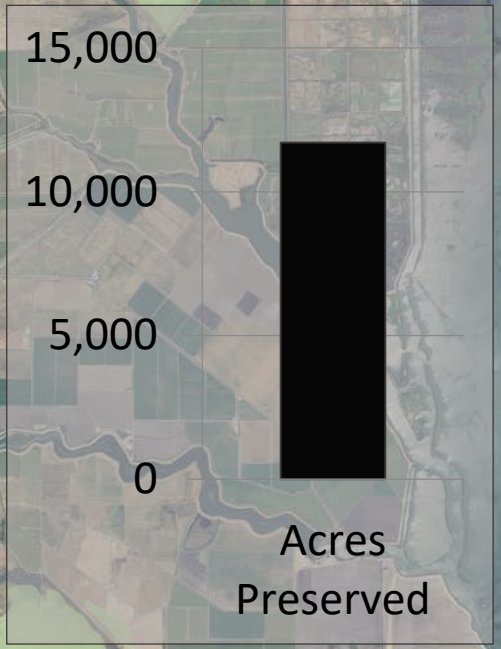
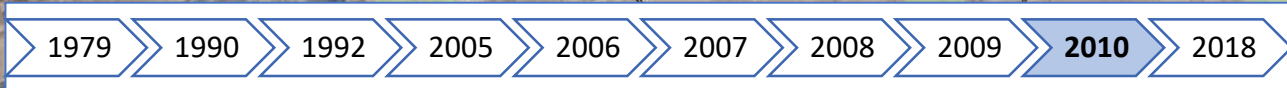


Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



Travis Air Force Base

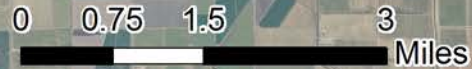


Legend

- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant

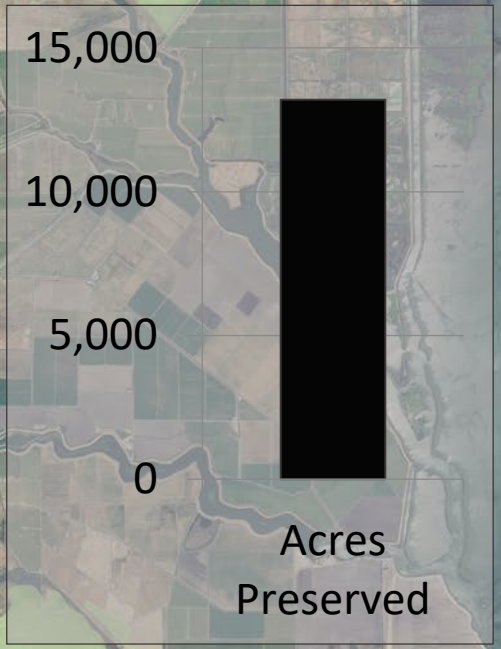
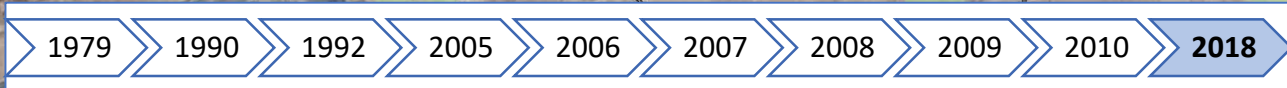
Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



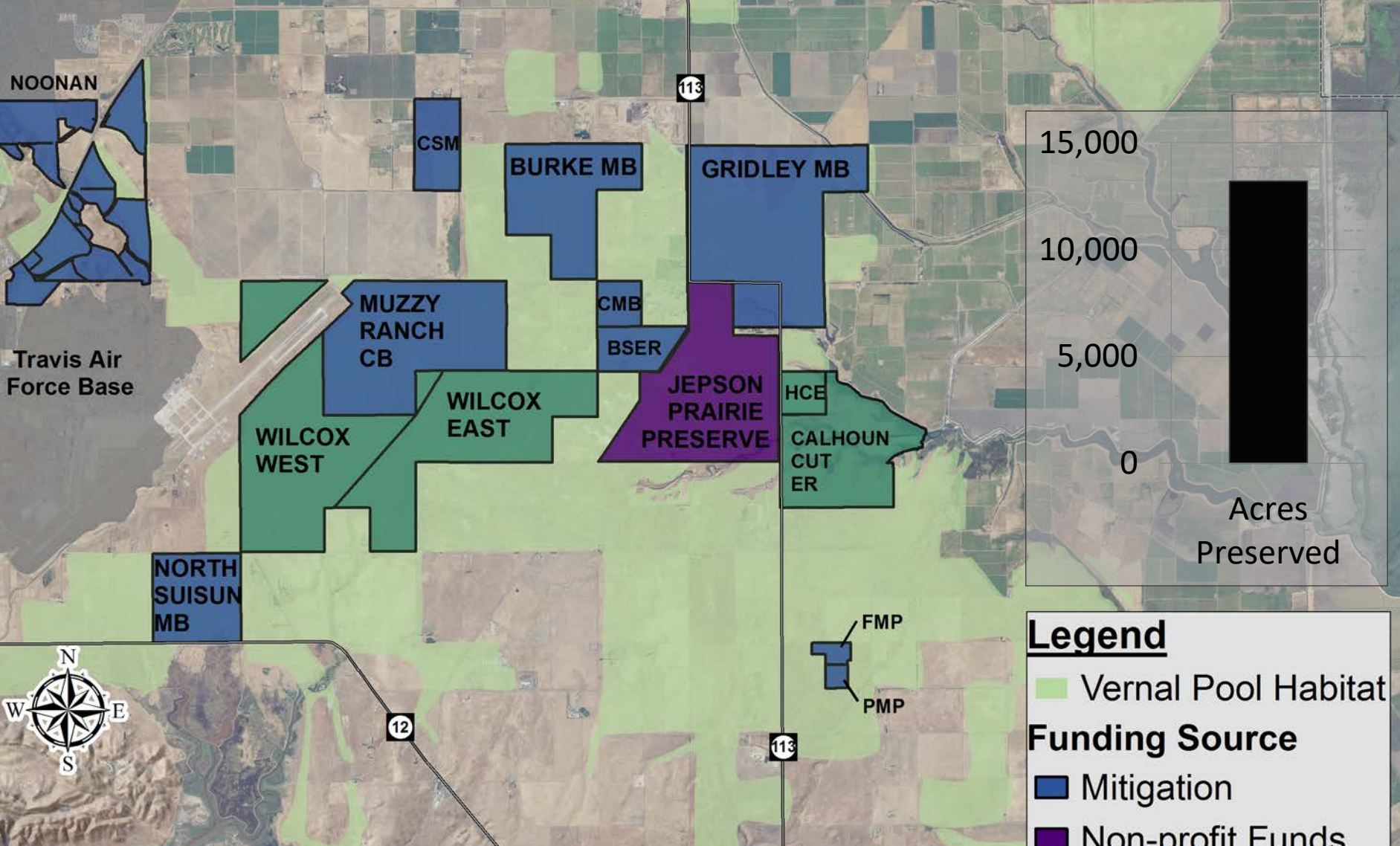
NOONAN

Travis Air Force Base



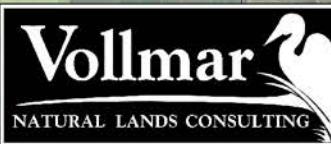
Legend

- Vernal Pool Habitat
- Funding Source**
 - Mitigation
 - Non-profit Funds
 - Public Grant



Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



Travis Air Force Base

~13,000 Acres Preserved

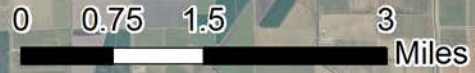


Legend

- Vernal Pool Habitat
- Type of Landowner**
 - Mitigation Group
 - Rancher
 - Land Trust
 - City
 - State Resource Agency

Greater Jepson Prairie

~34,000 Acres Extant VP Habitat



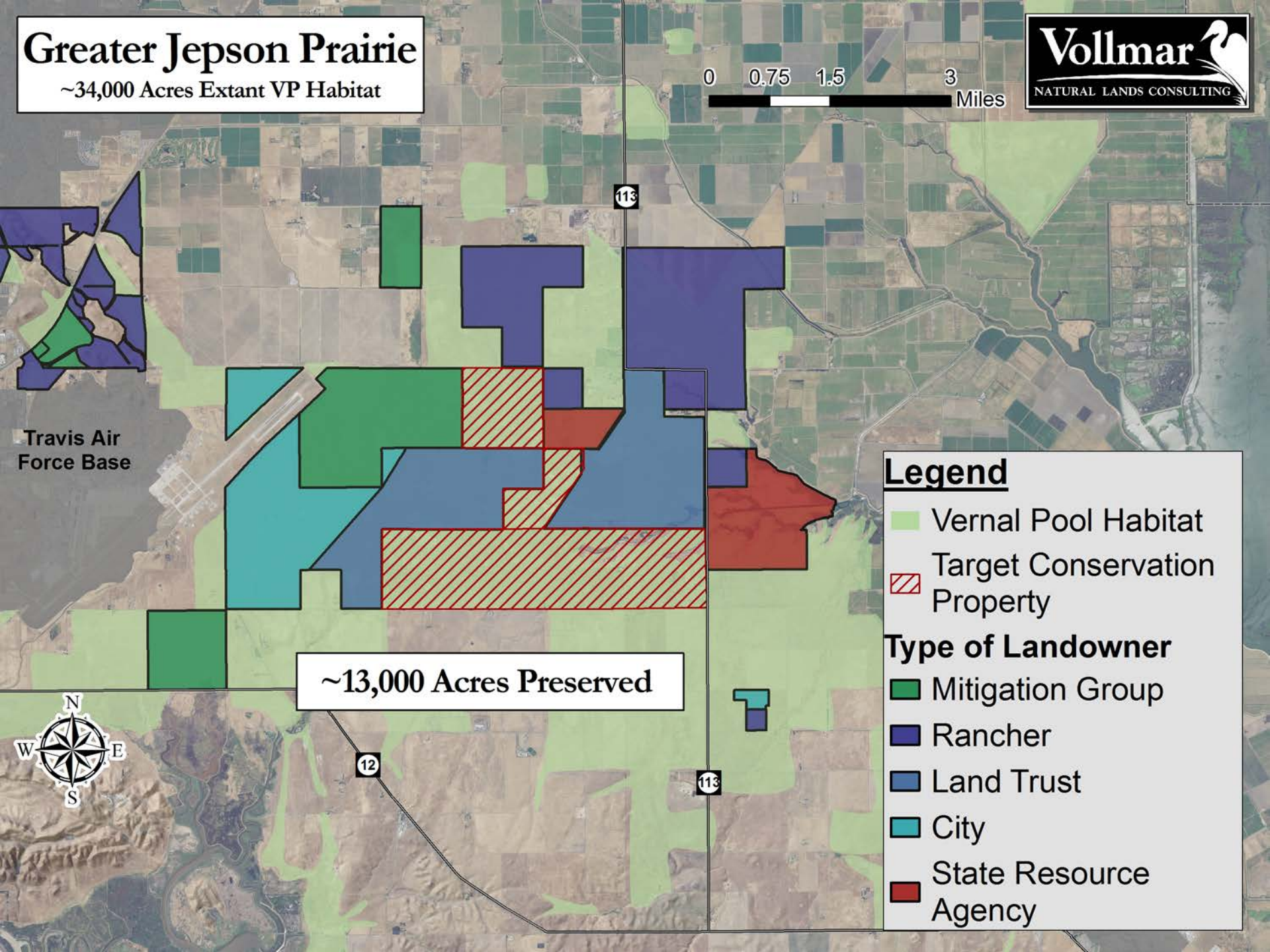
Travis Air Force Base

~13,000 Acres Preserved



Legend

- Vernal Pool Habitat
- Target Conservation Property
- Type of Landowner
 - Mitigation Group
 - Rancher
 - Land Trust
 - City
 - State Resource Agency



East Merced Grasslands

~160,000 Acres Extant VP Habitat



59

99

City of Merced

140

Legend

 Vernal Pool Habitat

Funding Source

 Donation

 Mitigation

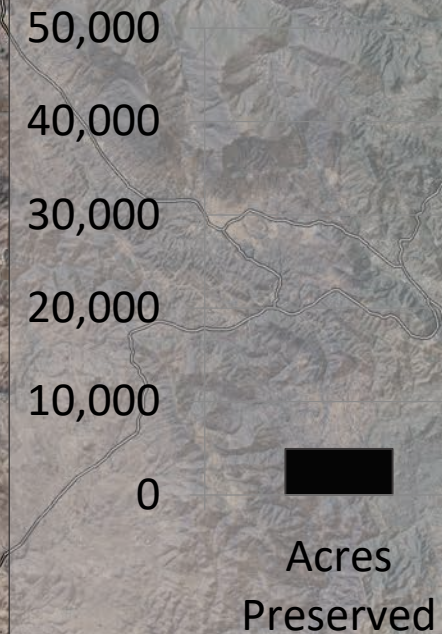
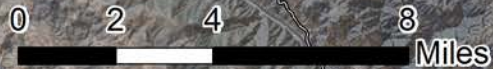
 Non-profit Funds

 Public Grant

1982 2000 2001 2002 2003 2008 2011 2014 2015 2016 2018

East Merced Grasslands

~160,000 Acres Extant VP Habitat

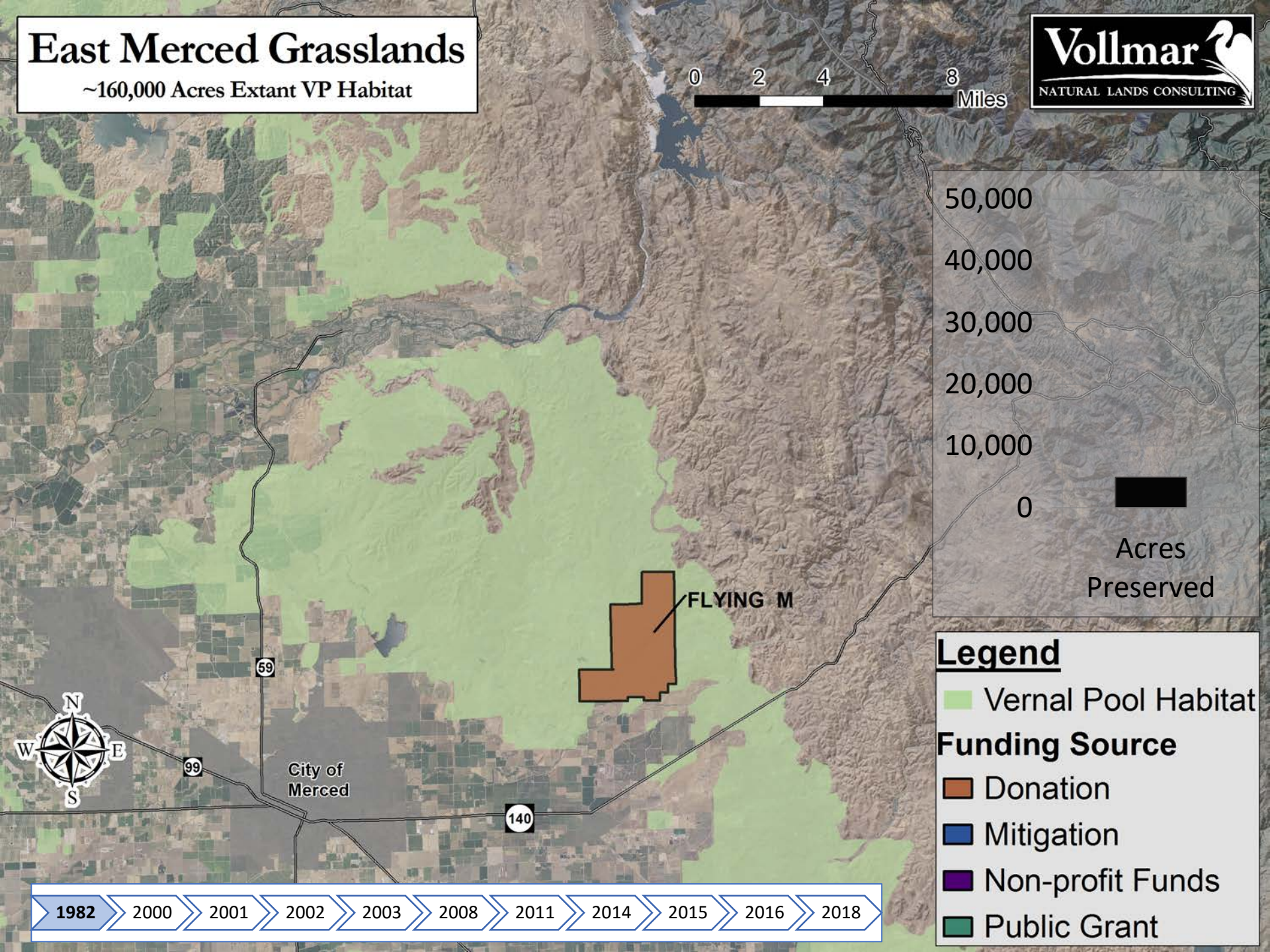


Acres Preserved

Legend

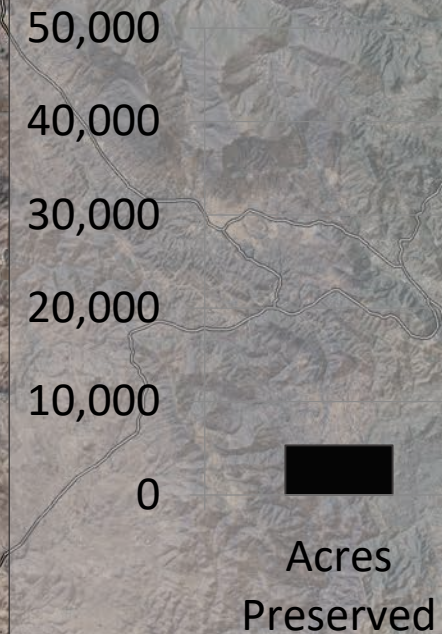
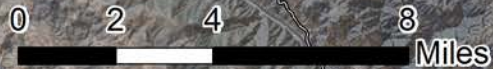
- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant

FLYING M



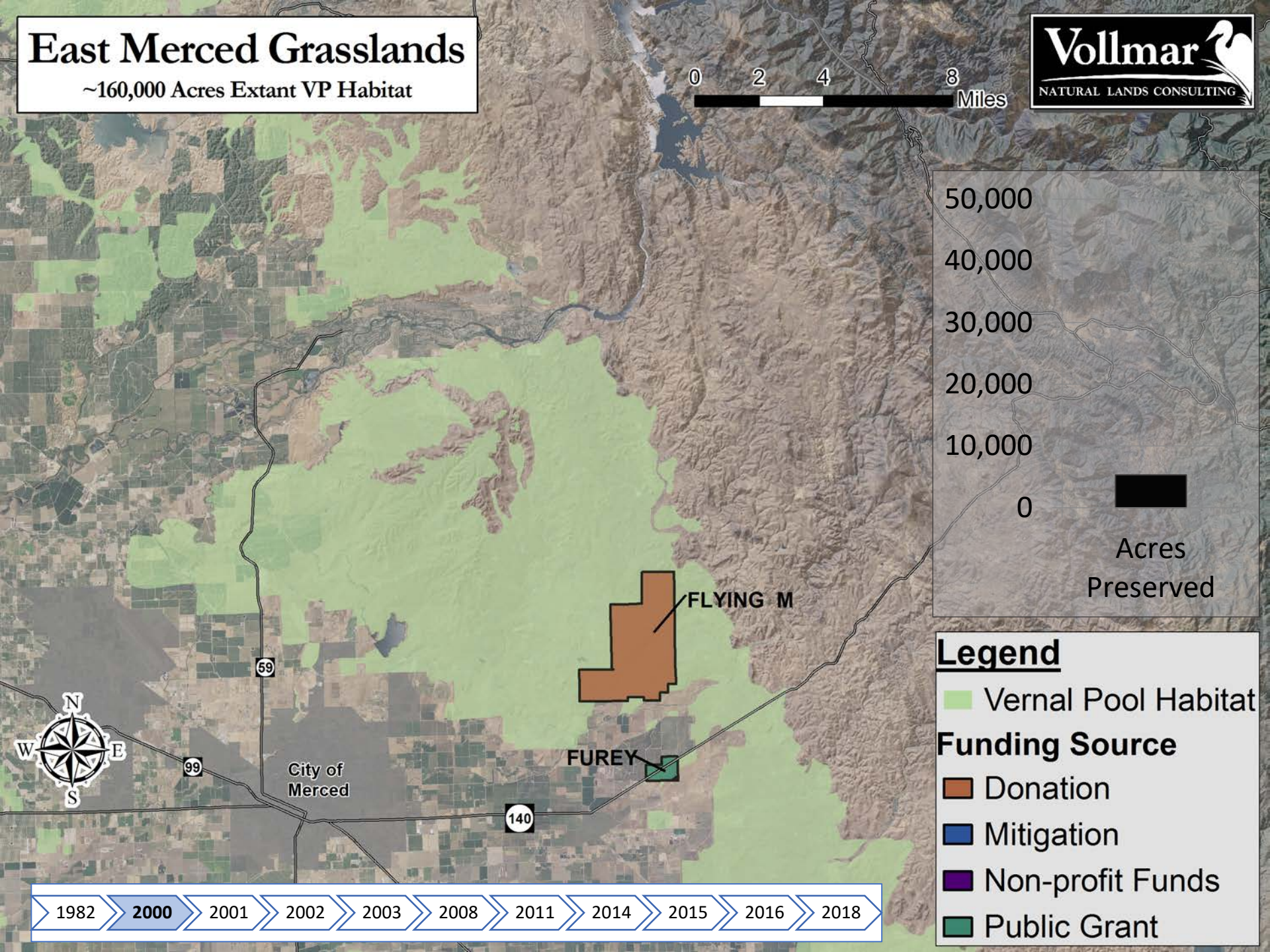
East Merced Grasslands

~160,000 Acres Extant VP Habitat



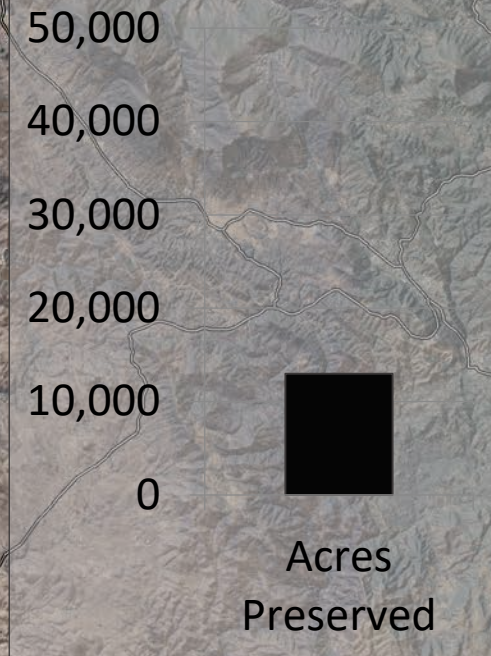
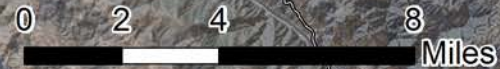
Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant



East Merced Grasslands

~160,000 Acres Extant VP Habitat



CHANCE (S)

FLYING M

FUREY

City of Merced

59

99

140

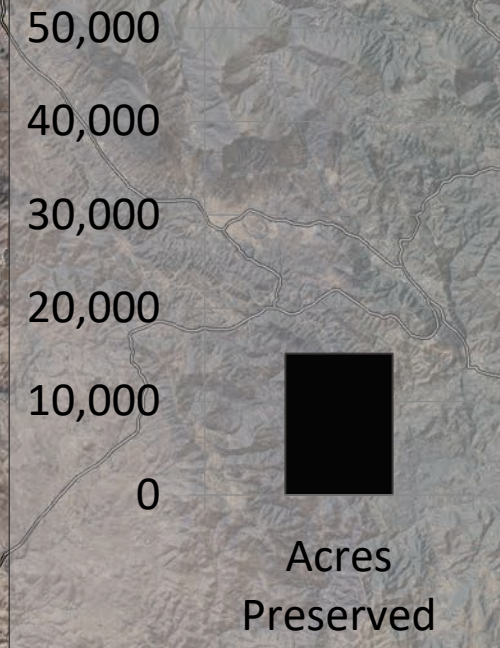
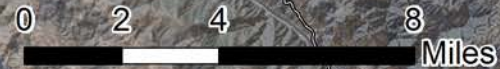
Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant



East Merced Grasslands

~160,000 Acres Extant VP Habitat



CHANCE (S)

FLYING M

FUREY

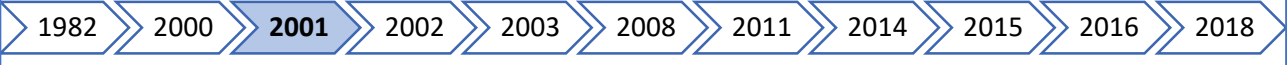
CUNNINGHAM

City of Merced

59

99

140

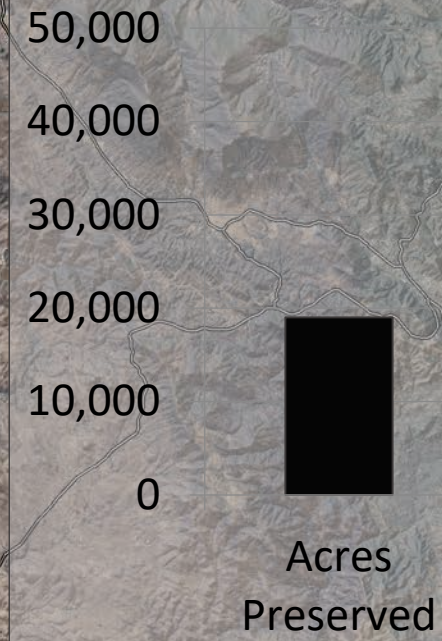
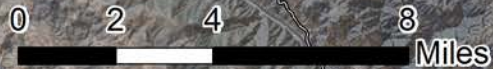


Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant

East Merced Grasslands

~160,000 Acres Extant VP Habitat



Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant

CHANCE (S)

FLYING M

FUREY

CUNNINGHAM

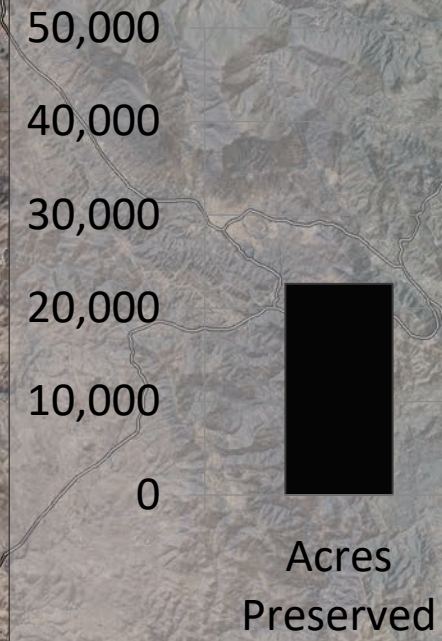
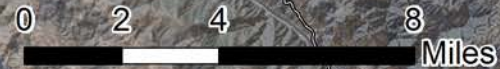
NELSON

City of Merced



East Merced Grasslands

~160,000 Acres Extant VP Habitat



CHANCE (S)
ROBINSON

FLYING M

FUREY
NELSON
CUNNINGHAM

City of Merced

59

99

140

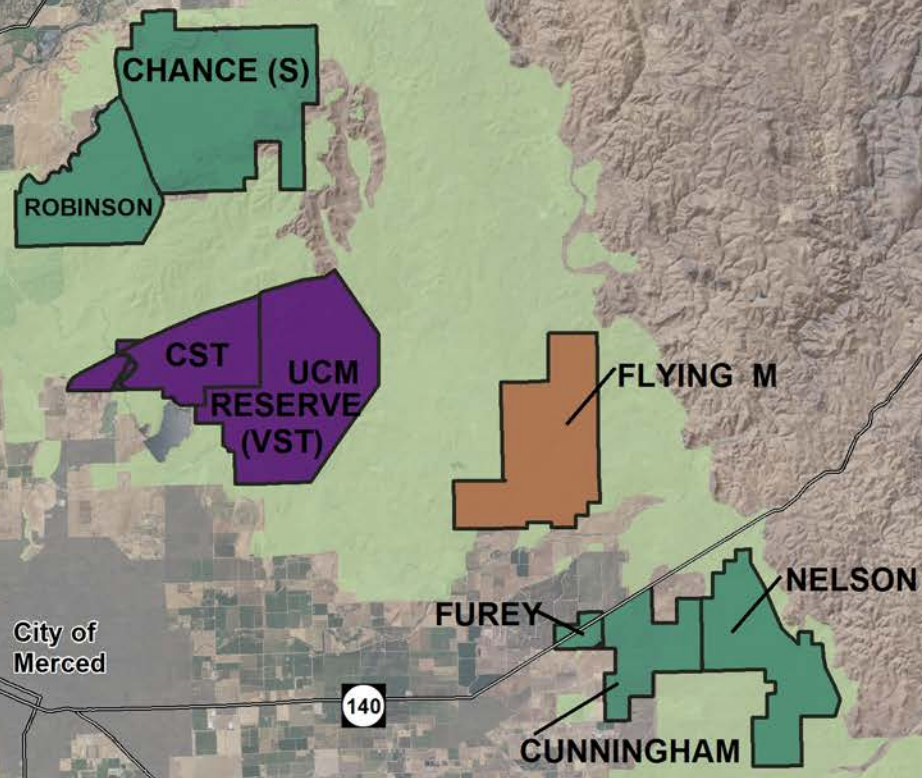
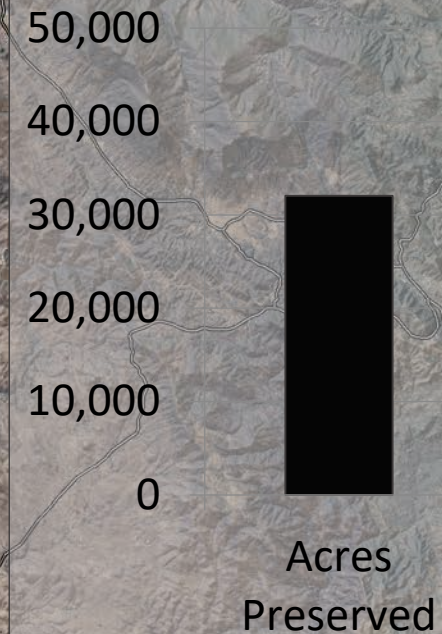
Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant



East Merced Grasslands

~160,000 Acres Extant VP Habitat



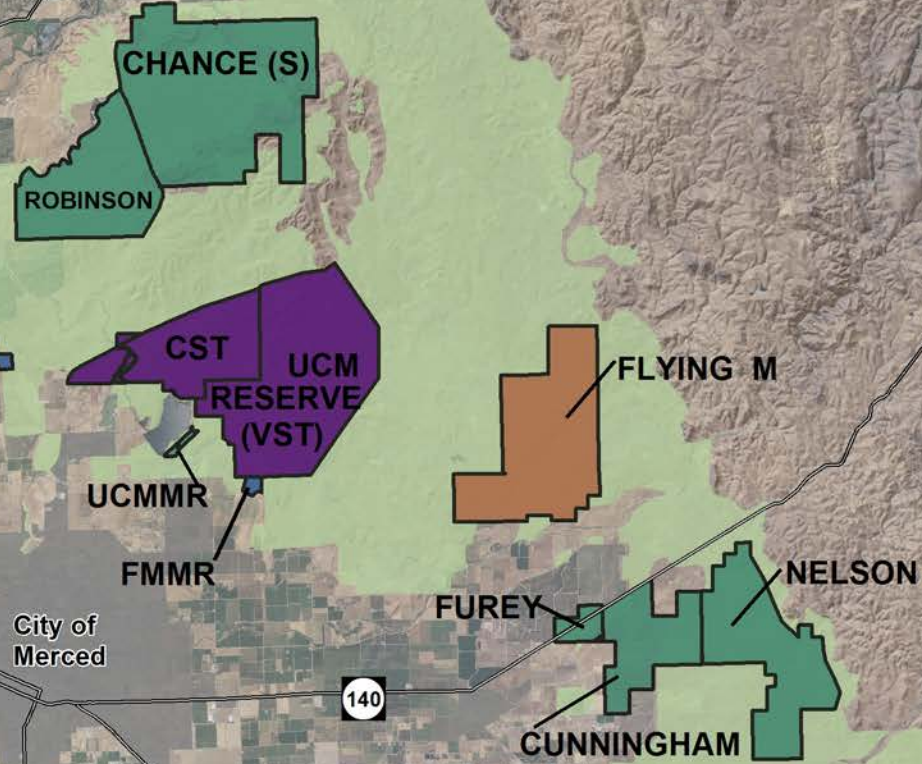
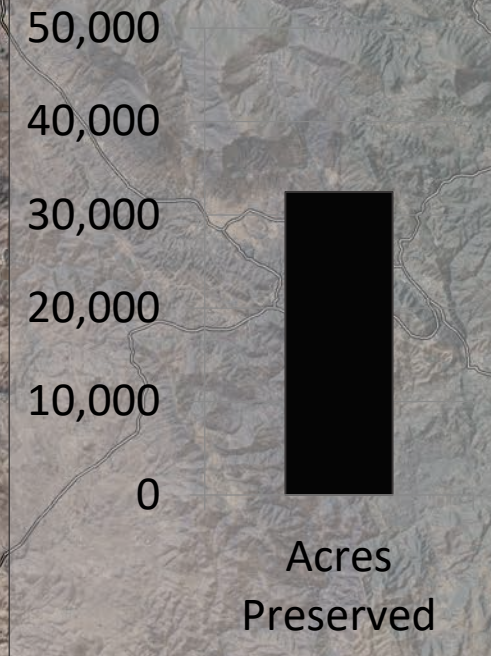
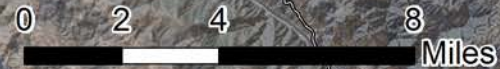
Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant



East Merced Grasslands

~160,000 Acres Extant VP Habitat



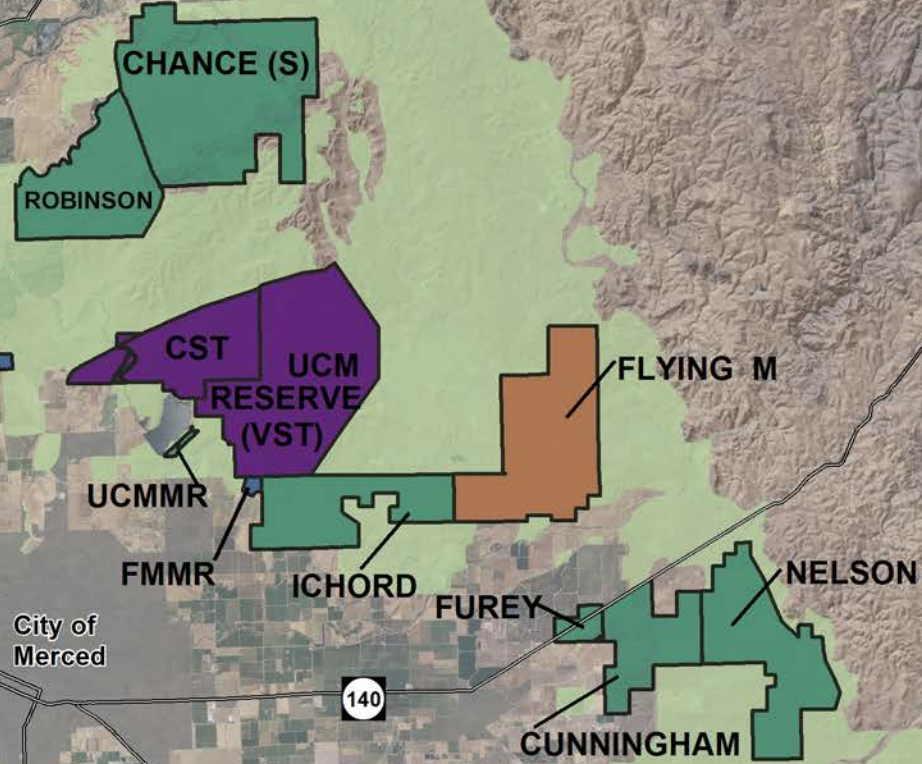
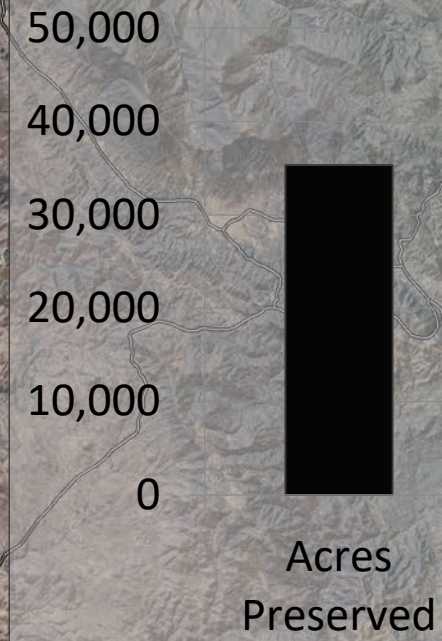
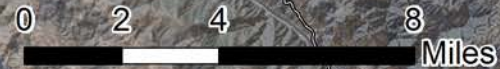
Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant



East Merced Grasslands

~160,000 Acres Extant VP Habitat



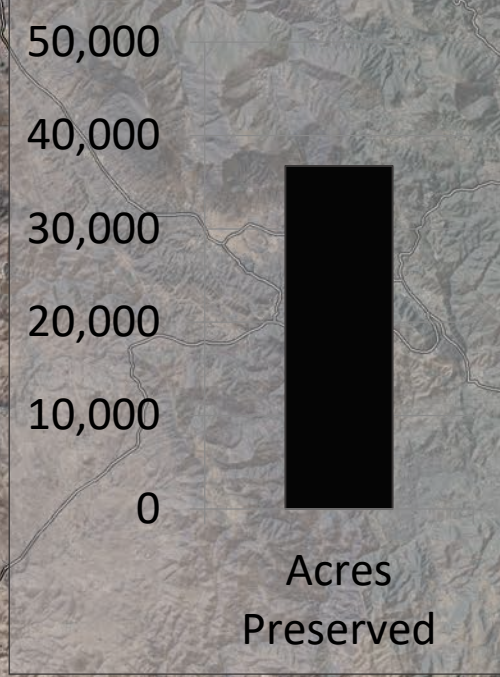
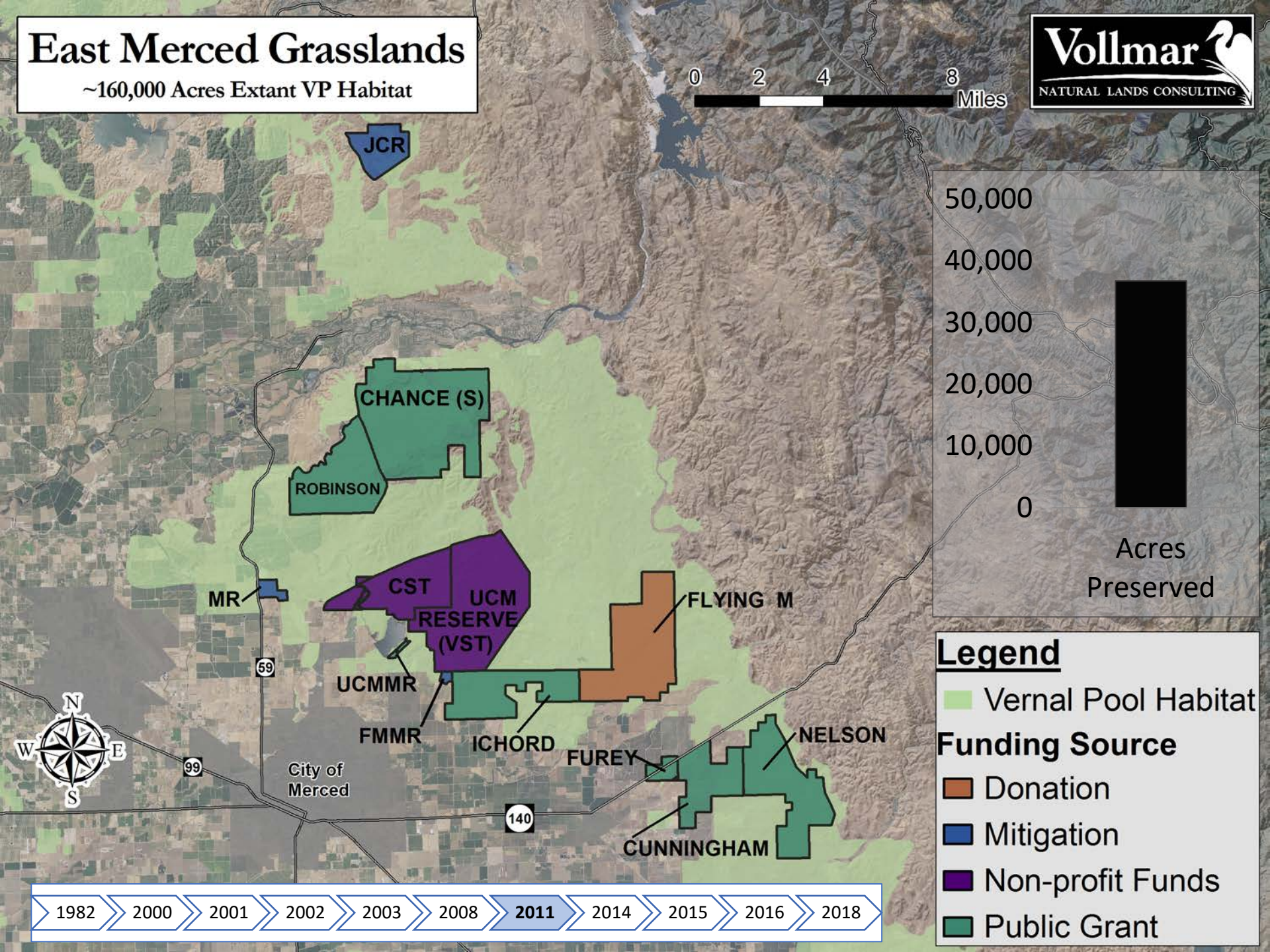
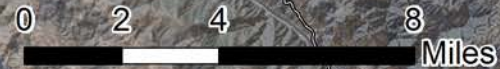
Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant



East Merced Grasslands

~160,000 Acres Extant VP Habitat



Legend

Vernal Pool Habitat

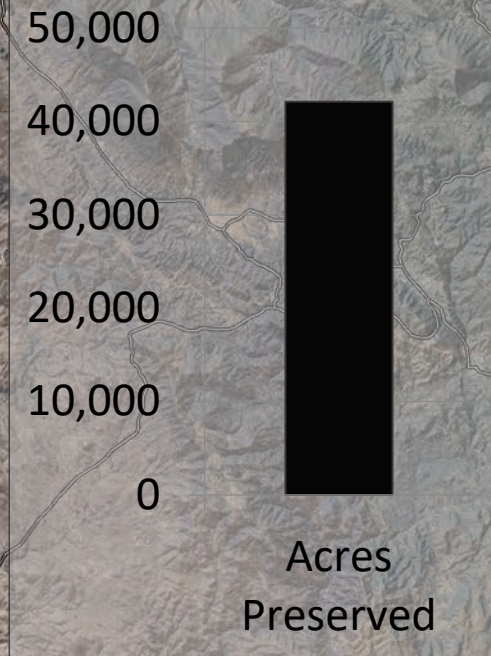
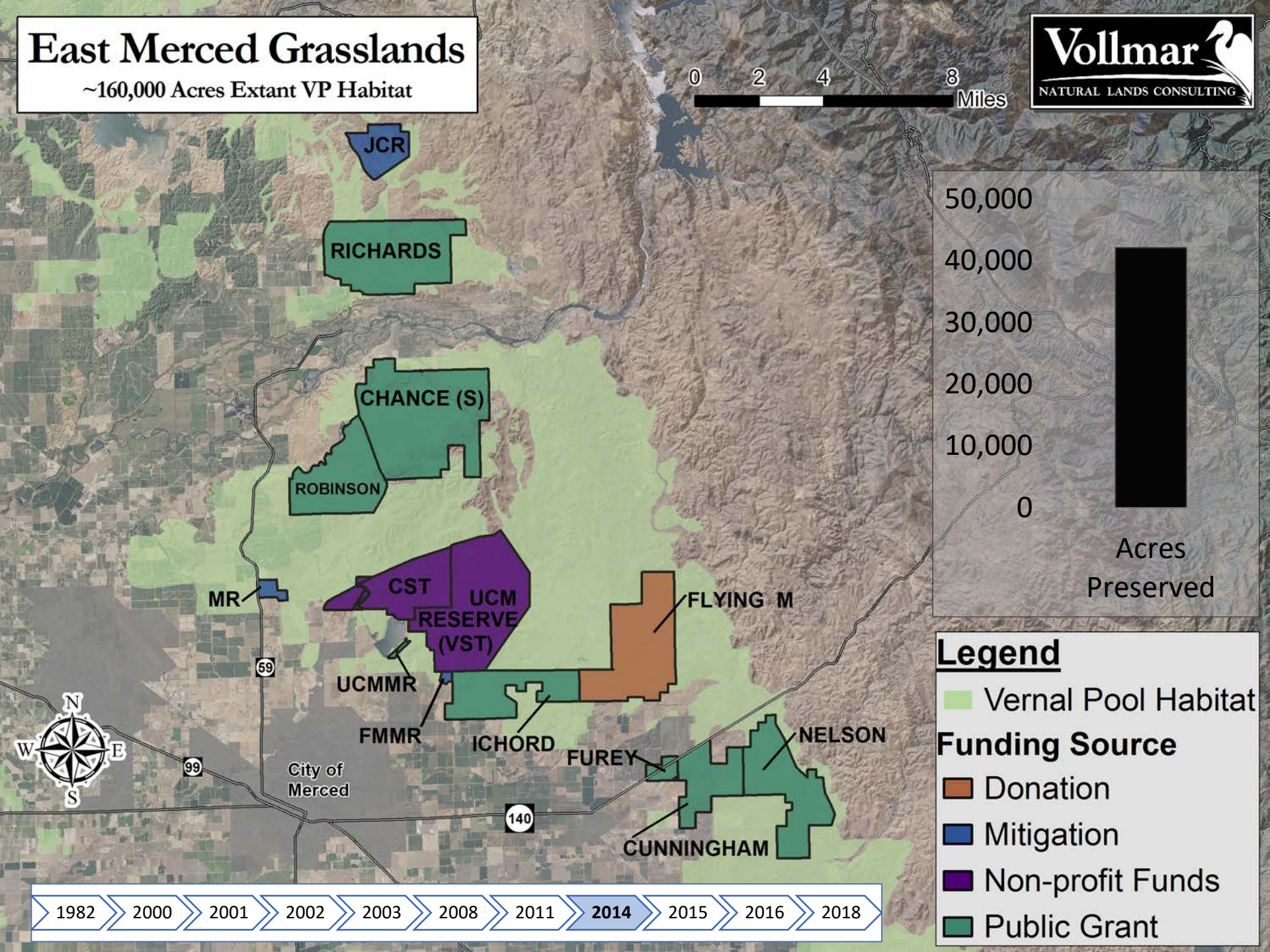
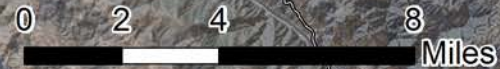
Funding Source

- Donation
- Mitigation
- Non-profit Funds
- Public Grant



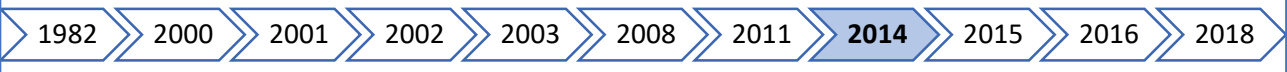
East Merced Grasslands

~160,000 Acres Extant VP Habitat



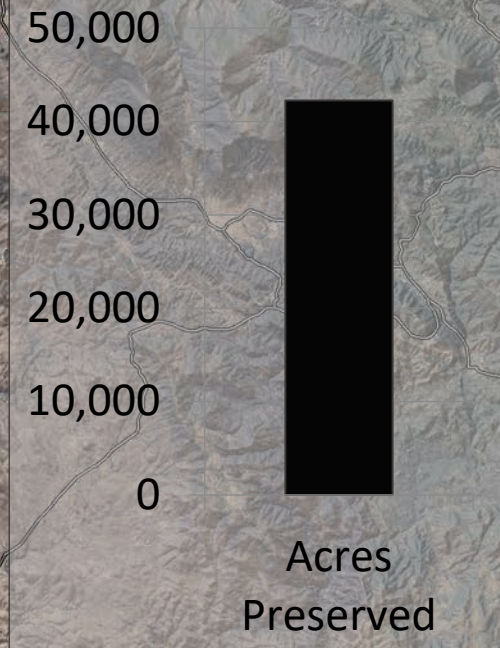
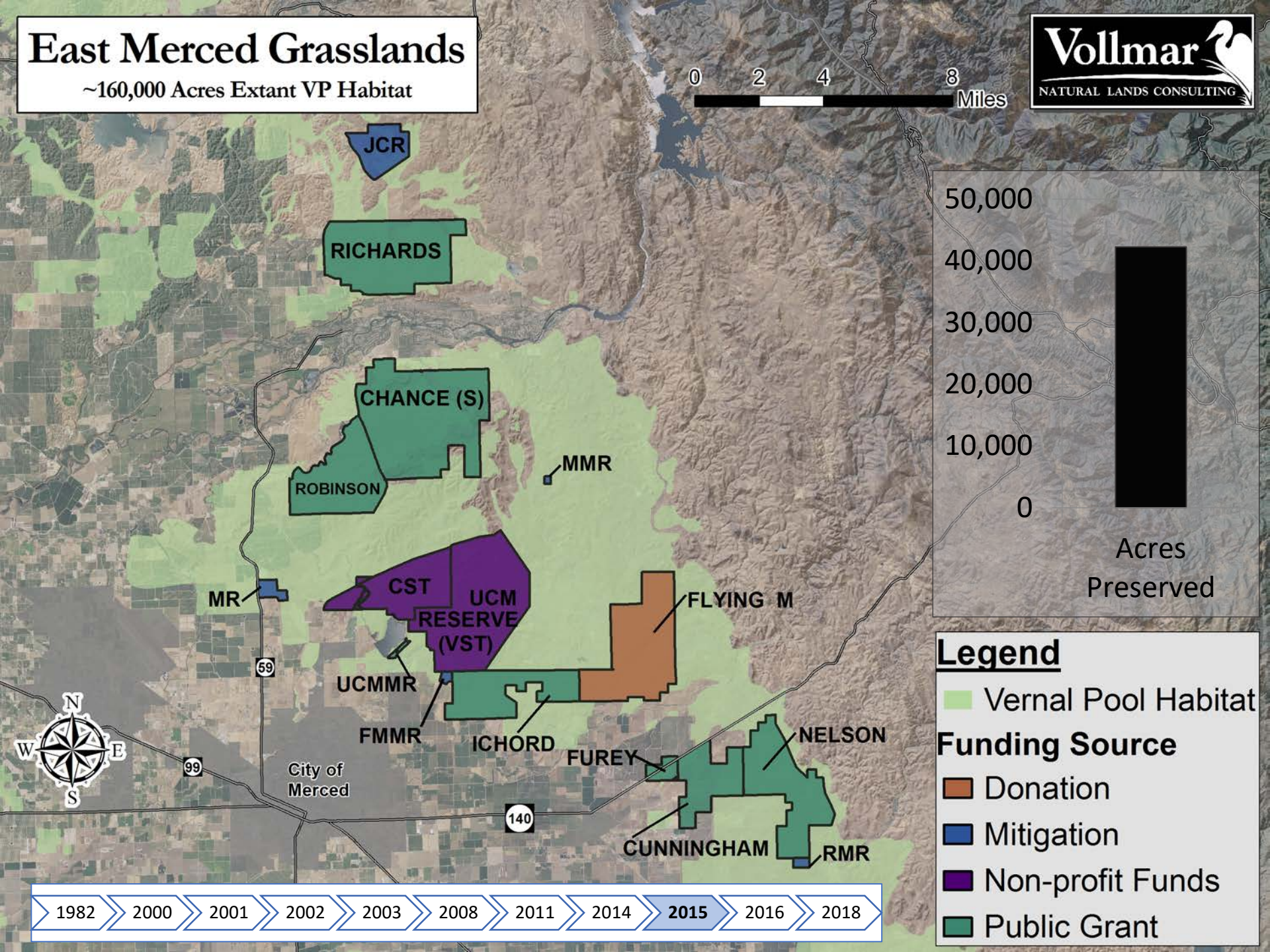
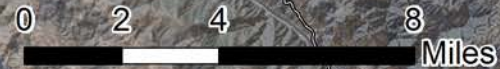
Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant



East Merced Grasslands

~160,000 Acres Extant VP Habitat



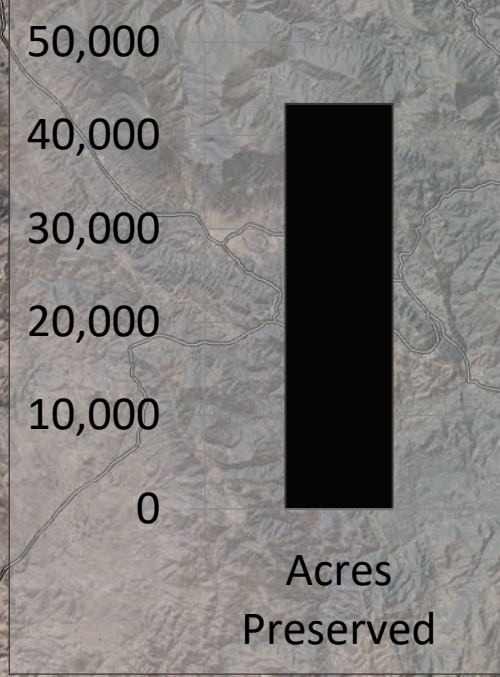
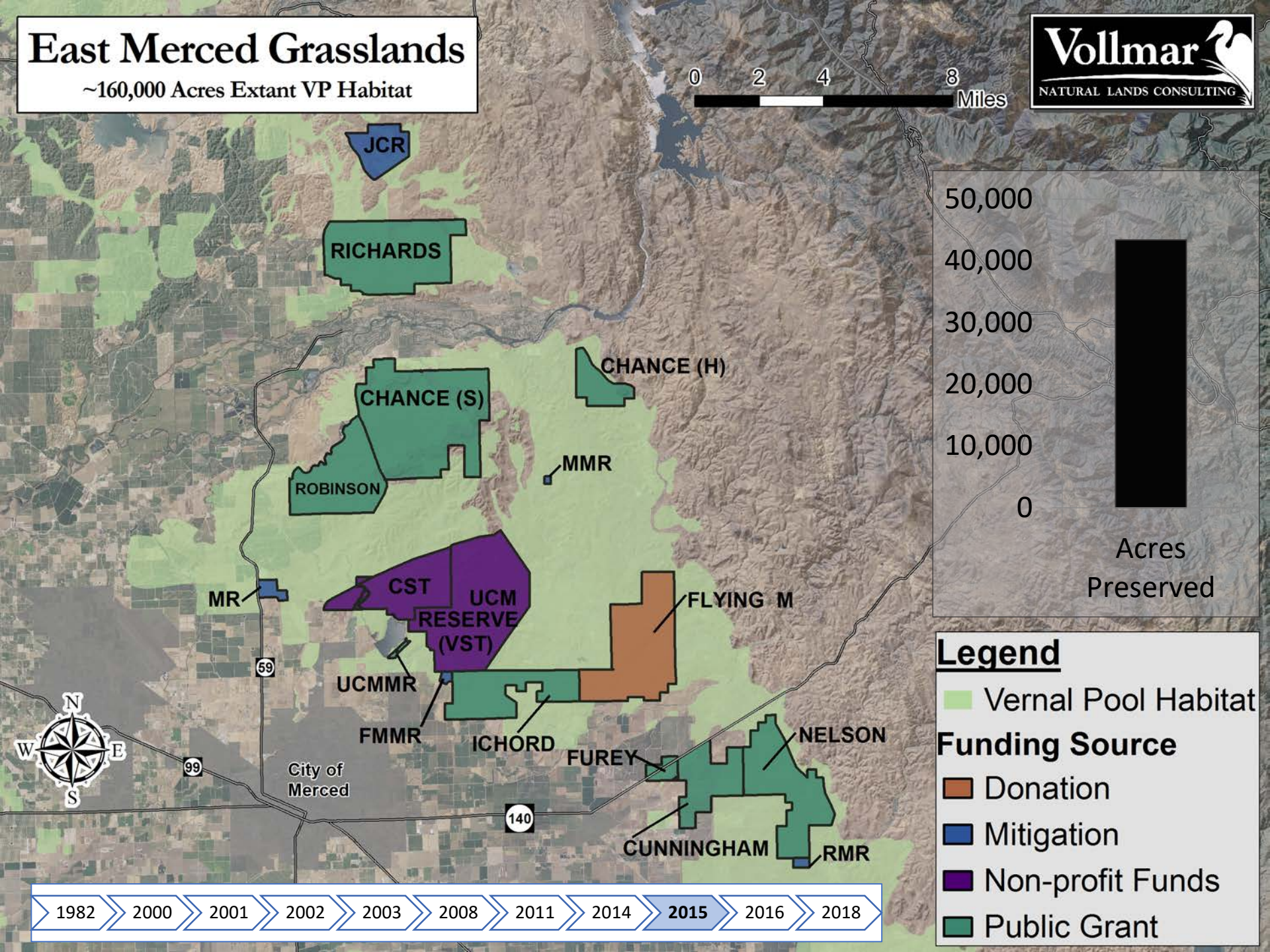
Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant



East Merced Grasslands

~160,000 Acres Extant VP Habitat



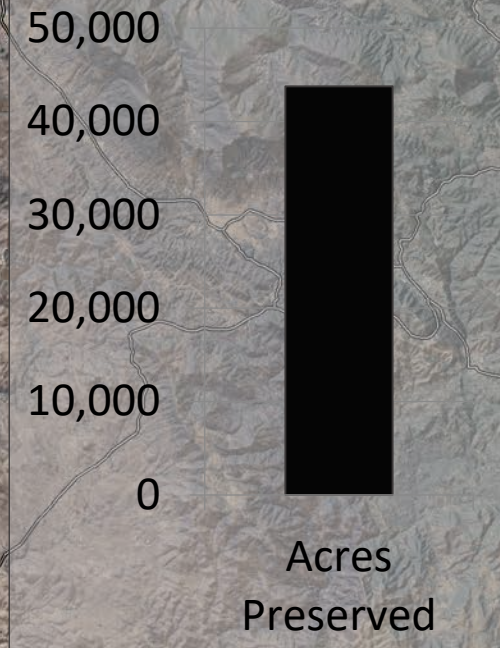
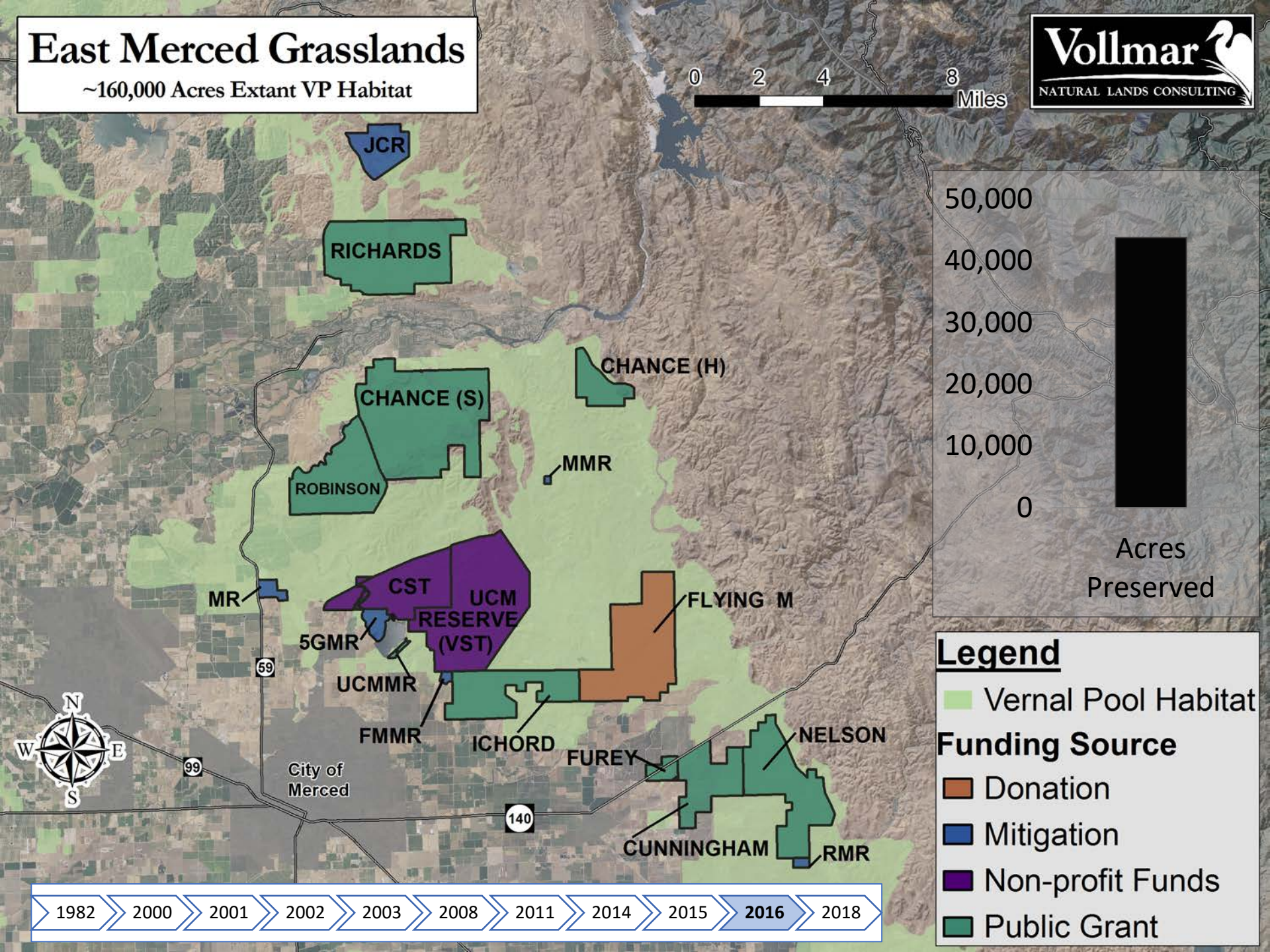
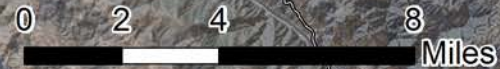
Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant



East Merced Grasslands

~160,000 Acres Extant VP Habitat



Legend

- Vernal Pool Habitat
- Funding Source**
 - Donation
 - Mitigation
 - Non-profit Funds
 - Public Grant

East Merced Grasslands

~160,000 Acres Extant VP Habitat



~44,000 Acres Preserved



59

99

City of Merced

140

Legend

 Vernal Pool Habitat


Type of Landowner

 Mitigation Group

 Rancher

 Non-profit

 County

 UC Natural Reserve System

East Merced Grasslands

~160,000 Acres Extant VP Habitat



~44,000 Acres Preserved



59

99

City of Merced

140

Legend

- Vernal Pool Habitat
- Target Conservation Property
- Type of Landowner**
 - Mitigation Group
 - Rancher
 - Non-profit
 - County
 - UC Natural Reserve System



Section 4: Where Are We Going?

Sandstone Outcrop Vernal Pools - Vasco Caves, Contra Costa Co

Photo Credit: Jake Schweitzer

Action Points for Conserving Vernal Pool Landscapes!

- **Conservation of a landscape is a long-term process!**

Action Points for Conserving Vernal Pool Landscapes!

- Conservation of a landscape is a long-term process!
- Yet...ongoing, incremental protection of individual properties yields a conserved landscape

Action Points for Conserving Vernal Pool Landscapes!

- Conservation of a landscape is a long-term process!
- Yet...ongoing, incremental protection of individual properties yields a conserved landscape
- **Conservation initiatives and funding opportunities provide unique opportunities to leverage conservation**

Action Points for Conserving Vernal Pool Landscapes!

- Conservation of a landscape is a long-term process!
- Yet...ongoing, incremental protection of individual properties yields a conserved landscape
- Conservation initiatives and funding opportunities provide unique opportunities to leverage conservation
- **Actual land protection is the core metric of success**

Action Points for Conserving Vernal Pool Landscapes!

- **Individuals passionate about vernal pool habitats have been major drivers for conservation achievements**

Action Points for Conserving Vernal Pool Landscapes!

- Individuals passionate about vernal pool habitats have been major drivers for conservation achievements
- **Whether part of an agency, non-profit group, consulting firm, or a private individual – you can make a difference**

Action Points for Conserving Vernal Pool Landscapes!

- Individuals passionate about vernal pool habitats have been major drivers for conservation achievements
- Whether part of an agency, non-profit group, consulting firm, or a private individual – you can make a difference
- **If it's your calling - pick a vernal pool landscape you love and commit to a 10+ year commitment to help conserve it**

Action Points for Conserving Vernal Pool Landscapes!

- Individuals passionate about vernal pool habitats have been major drivers for conservation achievements
- Whether part of an agency, non-profit group, consulting firm, or a private individual – you can make a difference
- If it's your calling - pick a vernal pool landscape you love and commit to a 10+ year commitment to help conserve it
- **Or... pick a group involved in such work and support it through financial contributions or volunteer work**

Action Points for Conserving Vernal Pool Landscapes!

- Individuals passionate about vernal pool habitats have been major drivers for conservation achievements
- Whether part of an agency, non-profit group, consulting firm, or a private individual – you can make a difference
- If it's your calling - pick a vernal pool landscape you love and commit to a 10+ year commitment to help conserve it
- Or... pick a group involved in such work and support it through financial contributions or volunteer work
- **Feel free to contact me or others involved in land conservation if you want help or advice**

Acknowledgements

- **USEPA for funding our study**
- **Individuals from numerous agencies, non-profit groups, mitigation companies, and consulting groups for providing baseline data for the study**
- **Jaymee Marty for developing the concept and proposal for the study**
- **Barbara Vlamis, Rob Schlising, and AquaAlliance for hosting this conference**

Contact Information

John Vollmar

Vollmar Natural Lands Consulting, Inc.

Berkeley, CA 94707

510-220-9001

jvollmar@vollmarconsulting.com

Copies of the EPA study available by July 1.

The geodatabase developed for the study will also be publicly available after July 1.