TransNet

Environmental Mitigation Program: 2020-2021

SANDAG

Regional Habitat Conservation Vision

San Diego FORWARD

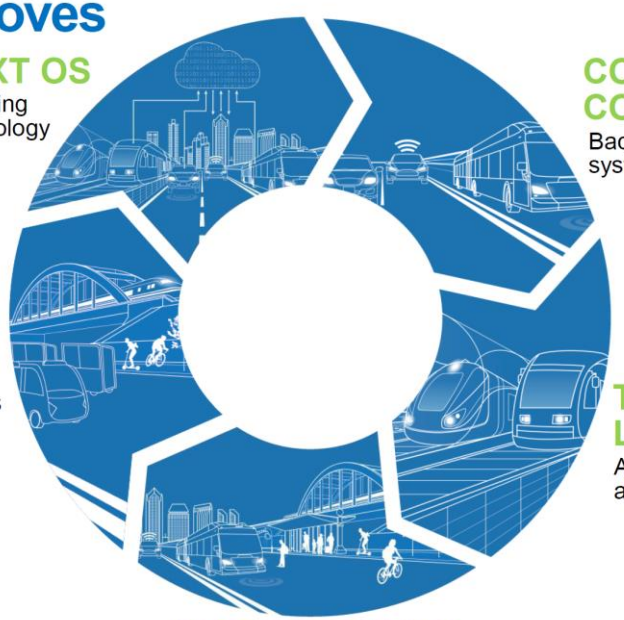
A Bold New Transportation Vision

2 A Strategy for Sustainability

Smart growth and environmental protection through transportation choices

The Sustainable Communities Strategy

5 Big Moves



NEXT OS
Enabling technology

COMPLETE CORRIDORS
Backbone of the system

FLEXIBLE FLEETS
Last mile options

TRANSIT LEAP
Alternatives to automobiles

MOBILITY HUBS
Transfer points

Preserve Metrics

SANDAG

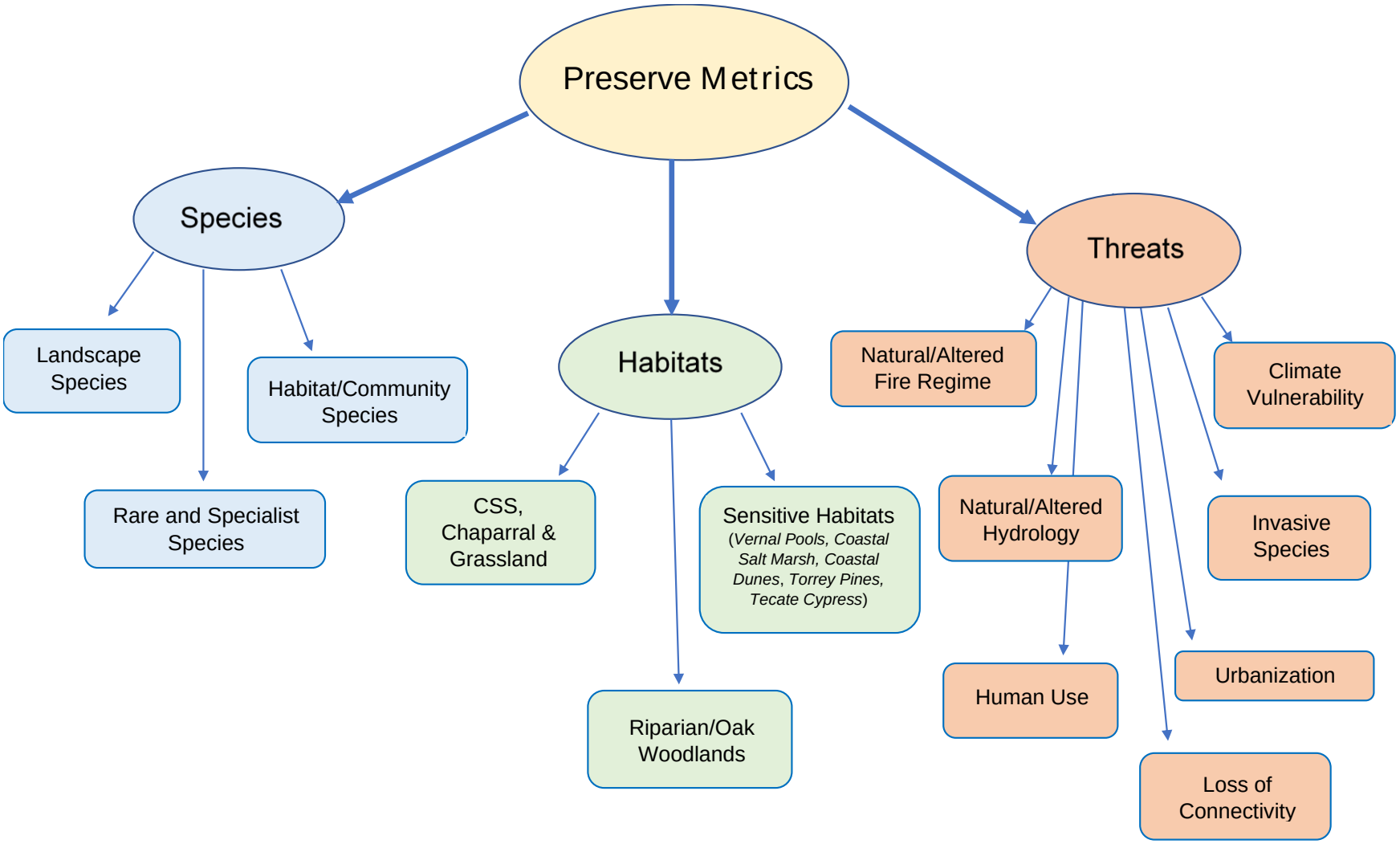
SDMMP
San Diego Management & Monitoring Program

Objectives

- ITOC Audit Recommendation

Measure progress in meeting specific and detailed EMP goals, objectives, and action items for regional monitoring and management under the Management Strategic Plan. Specifically, develop metrics using the abundance of data to holistically understand the status and trend of the overall health of the preserve against the baselines established in regional conservation plans and formalize a system to communicate complex performance results

- Promote Regional Habitat Vision


Preserve Metrics
Species
Habitats
Threats
Landscape Species
Habitat/Community Species
Rare and Specialist Species
CSS, Chaparral & Grassland
Sensitive Habitats (*Vernal Pools, Coastal Salt Marsh, Coastal Dunes, Torrey Pines, Tecate Cypress*)
Riparian/Oak Woodlands
Natural/Altered Fire Regime
Natural/Altered Hydrology
Human Use
Loss of Connectivity
Urbanization
Invasive Species
Climate Vulnerability

What's Next in 2021?

- Develop white paper on Regional Habitat Conservation Vision to include in the Regional Plan.
- Finalize the State of the Preserve Metrics Report by June and report results to the auditors, SANDAG Board and the public.
- 10th Cycle of Land Management Grants Call for Projects in Summer of 2021

Pandemic to Preserve Metrics

San Diego Management & Monitoring Program

2020 & 2021

USGS science for a changing world

SDMMP San Diego Management & Monitoring Program

SANDAG

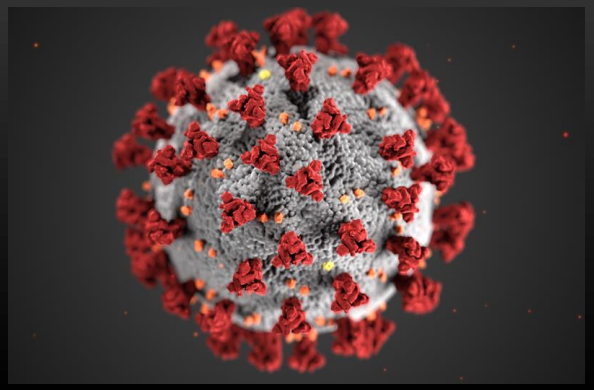
Photo: Emily Perkins

Photo: Patricia Gordon Reedy, CBI

SDMMP'S MOST IMPORTANT RECURRING EVENT!!!!

Harrison James & Maelys Elizabeth born
to Emily and Justin - one year on November 14th

PANDEMIC



- Challenges
- Thanks to partners for access permits
- Field season still very successful
- Going forward

REGIONAL MONITORING

SPECIES MONITORING 2020

- Rare plants (9)
- Hermes copper
- Arroyo toads
- SW pond turtle
- MAPS & SHB
- Coastal cactus wren
- Coastal California gnatcatcher
- SW willow flycatcher
- American badger
- Mountain lion

SPECIES MONITORING 2021

- Rare plants (15)
- Rare plant discovery (4)
- Willowy monardella (discovery & hydrology)
- Harbison's dun skipper
- Hermes copper
- Arroyo toads
- Western spadefoot
- SW pond turtle
- MAPS & SHB
- Coastal cactus wren
- Northern harrier
- SW willow flycatcher
- Tricolored blackbird
- American badger
- Mountain lion

CHANGES TO RARE PLANT MONITORING

- Sentinel Monitoring (6 spp)
- Revised monitoring frequencies

MANAGEMENT PLANS

- Rare plants (7)
- Golden eagle
- Coastal cactus wren
- Southwestern willow flycatcher
- Bats
- Invasive Animals
- Invasive Plants

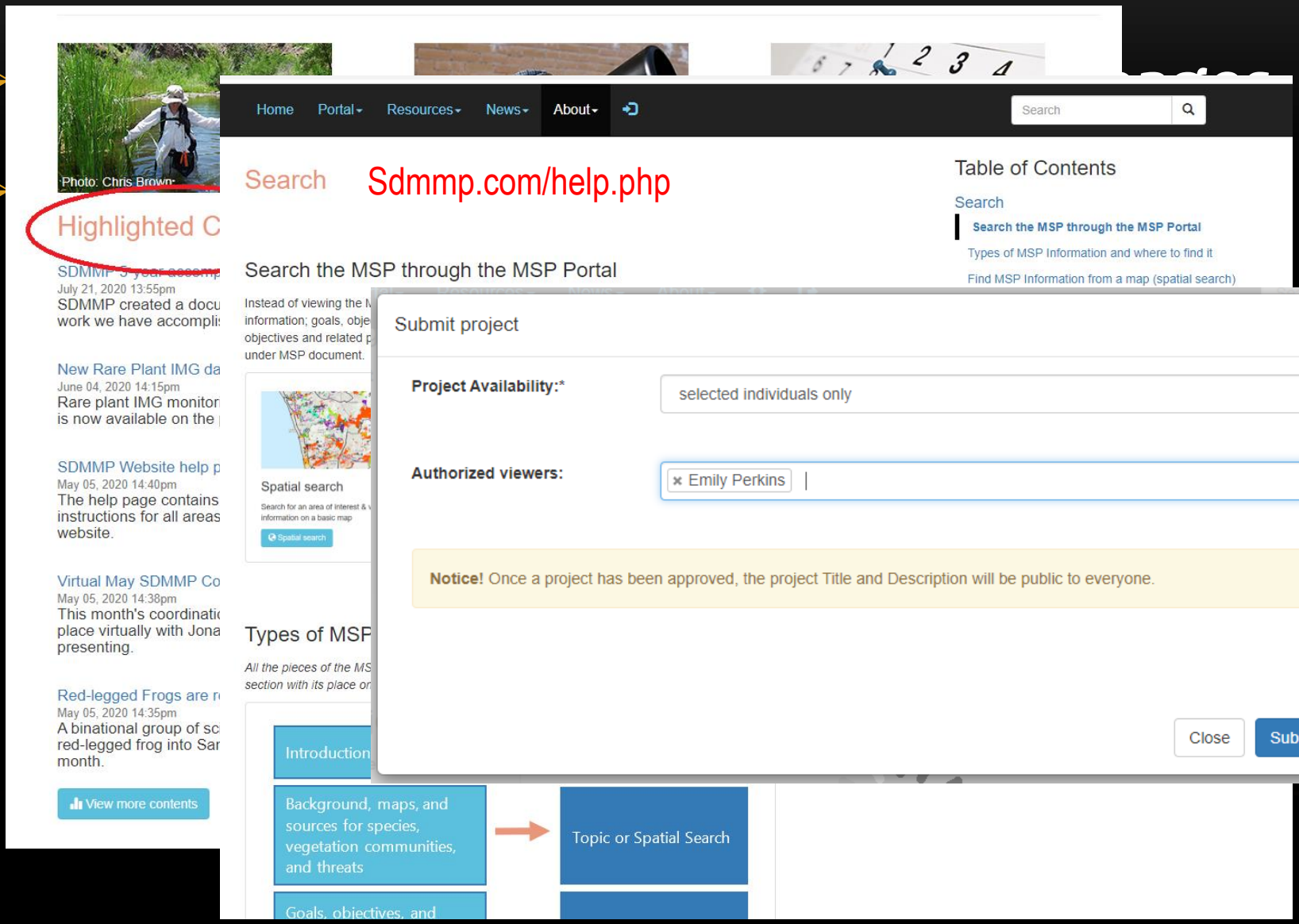
VEG

VEGETATION MONITORING 2021

- Developing CSS, Chaparral and Grassland long-term monitoring plan
- Developing VF species monitoring
- Developing companion pollinator monitoring plan

WEB PORTAL & DATABASE

WEB PORTAL 2020



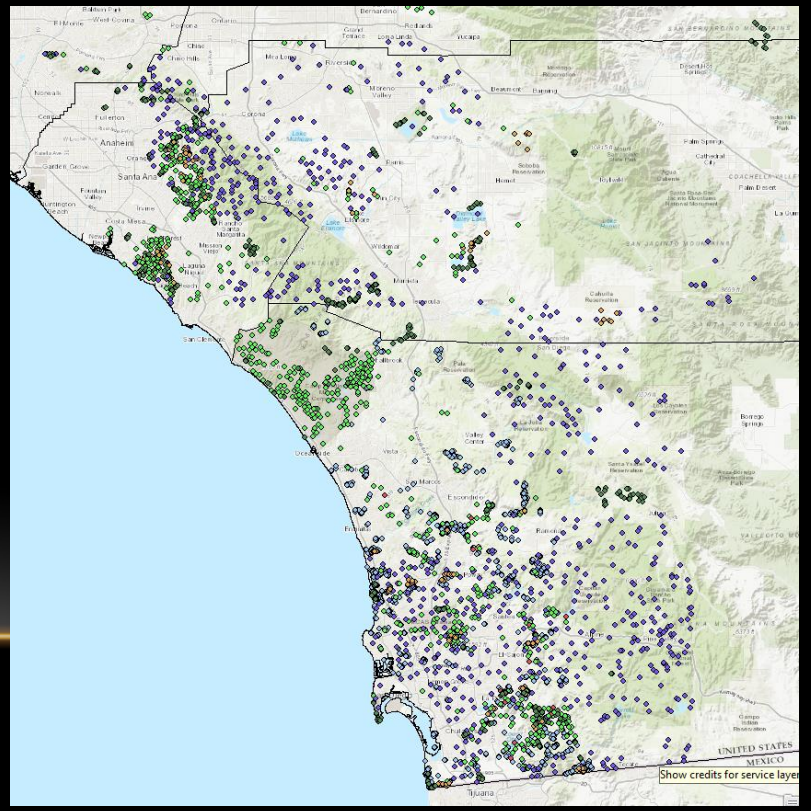
SDMMP GEODATABASE MGMT

- Migration and management of Rare Plants IMG data
- Integration of legacy and partner vegetation monitoring data sets
- Refinement of data entry, qc, and reduction tools
- Data reduction and output through GIS, KML, and XLS
- Server migration, broken links

4_RarePlantsPublicDataOutputAllYears_02June2020Draft.xlsx

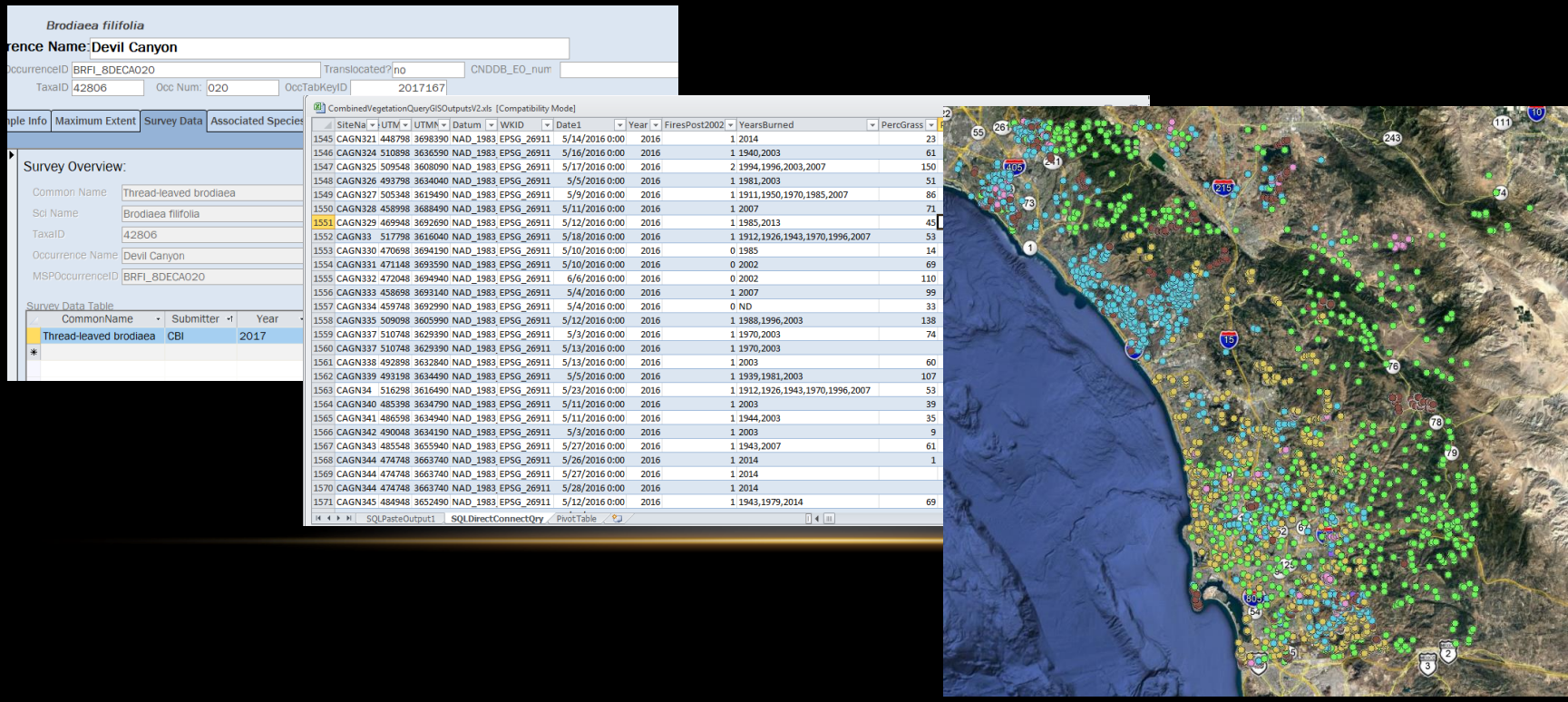
	A	B	C	D	E	F	G	H	I	
1	MSPOccurrenceID	OccurrenceName	SciName	ComName	NumSamples	Year	NumF	Exacto	uncertainty	Plants_cl
2	ACPR_7AGHE024	Agua Hedionda Lagoon - ACPR	Acmispon prostratus	Nuttall's acmispon	1	2015	23	exact	low	info not c
3	ACPR_7AGHE024	Agua Hedionda Lagoon - ACPR	Acmispon prostratus	Nuttall's acmispon	1	2017	7	exact	low	individ_pl
4	ACPR_7AGHE024	Agua Hedionda Lagoon - ACPR	Acmispon prostratus	Nuttall's acmispon	1	2018	0	exact	low	individual
5	ACPR_7AGHE024	Agua Hedionda Lagoon - ACPR	Acmispon prostratus	Nuttall's acmispon	1	2019	0	exact	low	individual
6	CYCA_2BPGC001	Balboa Park Golf Course - CYCA	Cylindropuntia californica	Snake cholla	1	2015	2	exact	very low	info not c
7	CYCA_2BPGC001	Balboa Park Golf Course - CYCA	Cylindropuntia californica	Snake cholla	1	2016	7	exact	very low	
8	CYCA_2BPGC001	Balboa Park Golf Course - CYCA	Cylindropuntia californica	Snake cholla	1	2017	8	exact	low	individual
9	CYCA_2BPGC001	Balboa Park Golf Course - CYCA	Cylindropuntia californica	Snake cholla	1	2018	8	exact	low	individual
10	CYCA_2BPGC001	Balboa Park Golf Course - CYCA	Cylindropuntia californica	Snake cholla	1	2019	8	exact	very_low	individual
11	PAGA5_3BAMT006	Barber Mountain East - PAGA5	Packera ganderi	Gander's ragwort	3	2016	525	estimate	medium	individ_pl
12	PAGA5_3BAMT005	Barber Mountain West - PAGA5	Packera ganderi	Gander's ragwort	1	2016	75	estimate	high	individ_pl
13	ACPR_7BALA020	Batiquitos Lagoon - ACPR	Acmispon prostratus	Nuttall's acmispon	2	2015	678	estimate	medium	info not c
14	ACPR_7BALA020	Batiquitos Lagoon - ACPR	Acmispon prostratus	Nuttall's acmispon	2	2016	116	exact	low	individ_pl
15	ACPR_7BALA020	Batiquitos Lagoon - ACPR	Acmispon prostratus	Nuttall's acmispon	1	2017	277	exact	very_low	individual
16	ACPR_7BALA020	Batiquitos Lagoon - ACPR	Acmispon prostratus	Nuttall's acmispon	1	2018	48	exact	medium	individual
17	ACPR_7BALA020	Batiquitos Lagoon - ACPR	Acmispon prostratus	Nuttall's acmispon	1	2019	722	exact	medium	individual
18	ACIL_6BLMO032	Black Mountain - ACIL	Acanthomintha ilicifolia	San Diego thornmint	1	2014	0	Exact	low	info not c
19	ACIL_6BLMO032	Black Mountain - ACIL	Acanthomintha ilicifolia	San Diego thornmint	1	2015	10	exact	very low	info not c
20	ACIL_6BLMO032	Black Mountain - ACIL	Acanthomintha ilicifolia	San Diego thornmint	1	2016	5	exact	very low	
21	ACIL_6BLMO032	Black Mountain - ACIL	Acanthomintha ilicifolia	San Diego thornmint	1	2017	1	exact	low	individual
22	ACIL_6BLMO032	Black Mountain - ACIL	Acanthomintha ilicifolia	San Diego thornmint	1	2018	0	exact	medium	individual
23	ACIL_6BLMO032	Black Mountain - ACIL	Acanthomintha ilicifolia	San Diego thornmint	1	2019	0	exact	low	individual
24	BRFI_6BMRA002	Black Mountain - BRFI	Brodiaea filifolia	Thread-leaved brodiaea	1	2014	10	Exact	low	info not c
25	BRFI_6BMRA002	Black Mountain - BRFI	Brodiaea filifolia	Thread-leaved brodiaea	1	2015	10	exact	low	info not c
26	BRFI_6BMRA002	Black Mountain - BRFI	Brodiaea filifolia	Thread-leaved brodiaea	1	2016	24	exact	low	
27	BRFI_6BMRA002	Black Mountain - BRFI	Brodiaea filifolia	Thread-leaved brodiaea	1	2017	635	exact	low	individual
28	BRFI_6BMRA002	Black Mountain - BRFI	Brodiaea filifolia	Thread-leaved brodiaea	1	2018	136	exact	low	individual
29	BRFI_6BMRA002	Black Mountain - BRFI	Brodiaea filifolia	Thread-leaved brodiaea	1	2019	130	exact	very_low	individual

SurveyInfoServer1 | OccInfoServer1 | RawDataServer1 | AsSppRawTop200Server1 | CollectionsServer1 | SppCodesServer1 | AsSpRawAllSpp | AsSpRaw



SDMMP GEODATABASE MGMT 2021

- Complete integrated vegetation analysis outputs
- Expand tools to enable users to reduce and manage their project data



MANAGEMENT

GRAZING MONITORING PLAN 2020

- Objectives and process
- Grazing Working Group met on February 26, 2020
  - 4 meetings total
  - 5 study questions with objectives
- Grazing Research Team assembled
- Visit to RJER pilot study site

GRAZING MONITORING PLAN 2021

- UC Berkley research team
- Pilot monitoring study at RJER & HCWA
- Timeline:
  - Currently – literature review
  - Winter 2021 design plan and pilot study
  - Spring 2021 implement pilot study

INVASIVE PLANTS 2020

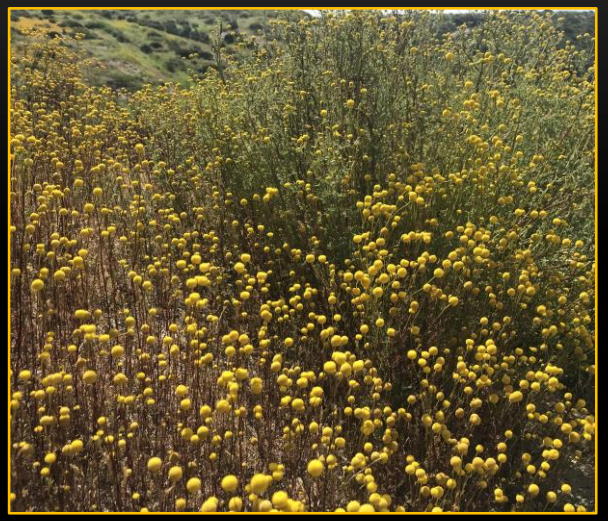
- Various projects EDRR
- Ward's weed
  - Continued treatment at Bressi Ranch and other areas
- *Oncosiphon pilulifer* (stinknet)
  - Mapping & coordination a priority
  - 2 meetings with partners (March & October)
  - SOW, treat up to 100 acres in SDPBR & SPV and 10 acres in Rice Canyon

INVASIVE PLANTS 2021

- Expanding treatment efforts
  - Various projects (almost $1 million)
    - *Oncosiphon pilulifer*
    - Arundo retreatment
    - Difficult EDRR Level 2 plants

Oncosiphon piluliferum (Stinknet)

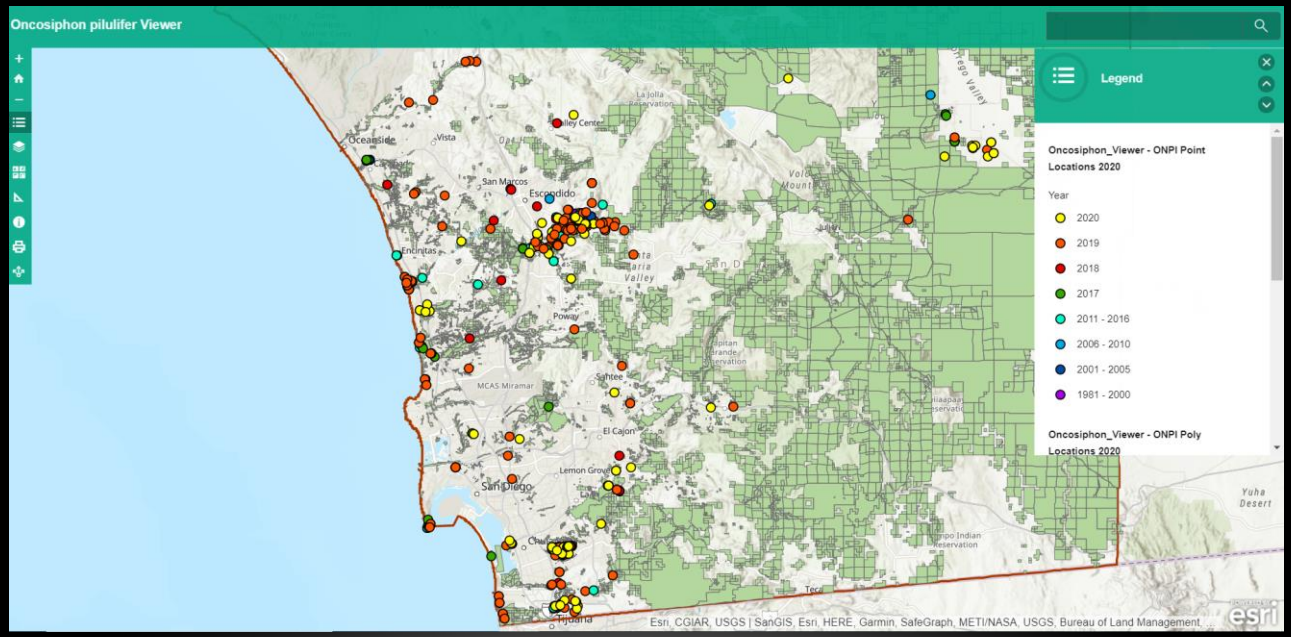
- Invasion into sensitive species habitats
- Gathered data from multiple sources
  - ✓ Online (CCH, CalFlora, iNaturalist)
  - ✓ Land Managers
  - ✓ Field surveys



Photos by: Annabelle Bernabe & Kris Preston

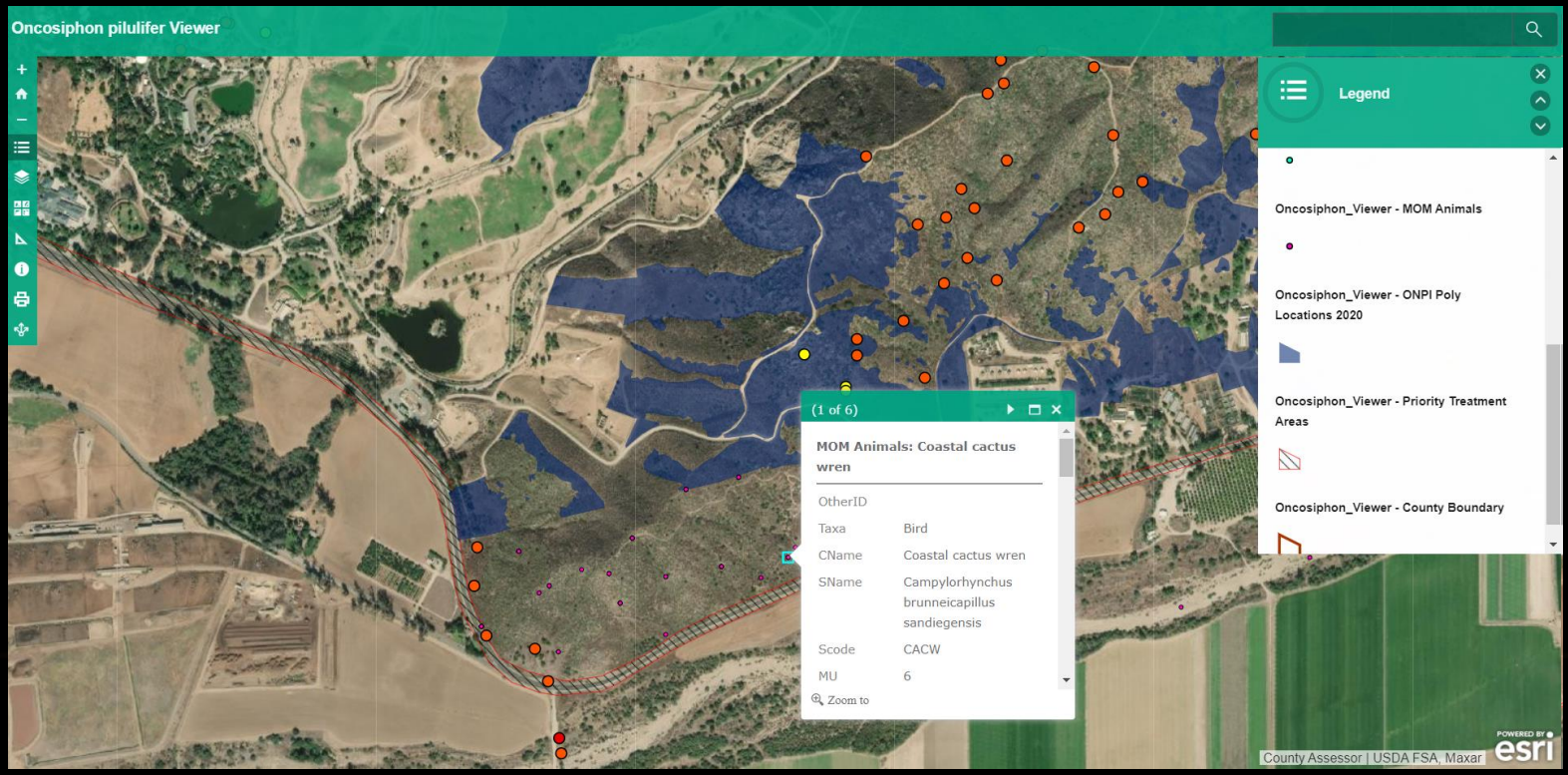
ONCOSIPHON 2020

- Coordinate with land managers and research partners to create an ArcViewer map with current data
- Project Page



ONCOSIPHON 2021

- Treatment areas have been identified and prioritized for 2021
- Rice Canyon: Priority near rare plant populations



SWPT RESTORATION

- Translocation monitoring and management
- Telemetry and camera stations
- Upland activity for overwintering and egg laying
- Invasives removal

SWPT RESTORATION

- Inventory and Monitoring-18 trapping surveys and 12 visual/hand surveys
- Confirmed pond turtles at Whelan Lake and Cottonwood Creek below Barrett
- Mark recapture surveys of known populations (Escondido Creek, Pine Valley Creek)

OUTREACH & COMMUNICATION

OUTREACH & COORDINATION IN A PANDEMIC

- 1 Virtual Land Manager Meeting
- 8 Coordination Meetings
  - 2 in-person
  - 6 virtual
    - Attendance almost doubled
- All meeting materials and recordings are on our website

Preserve Metrics & Annual Report

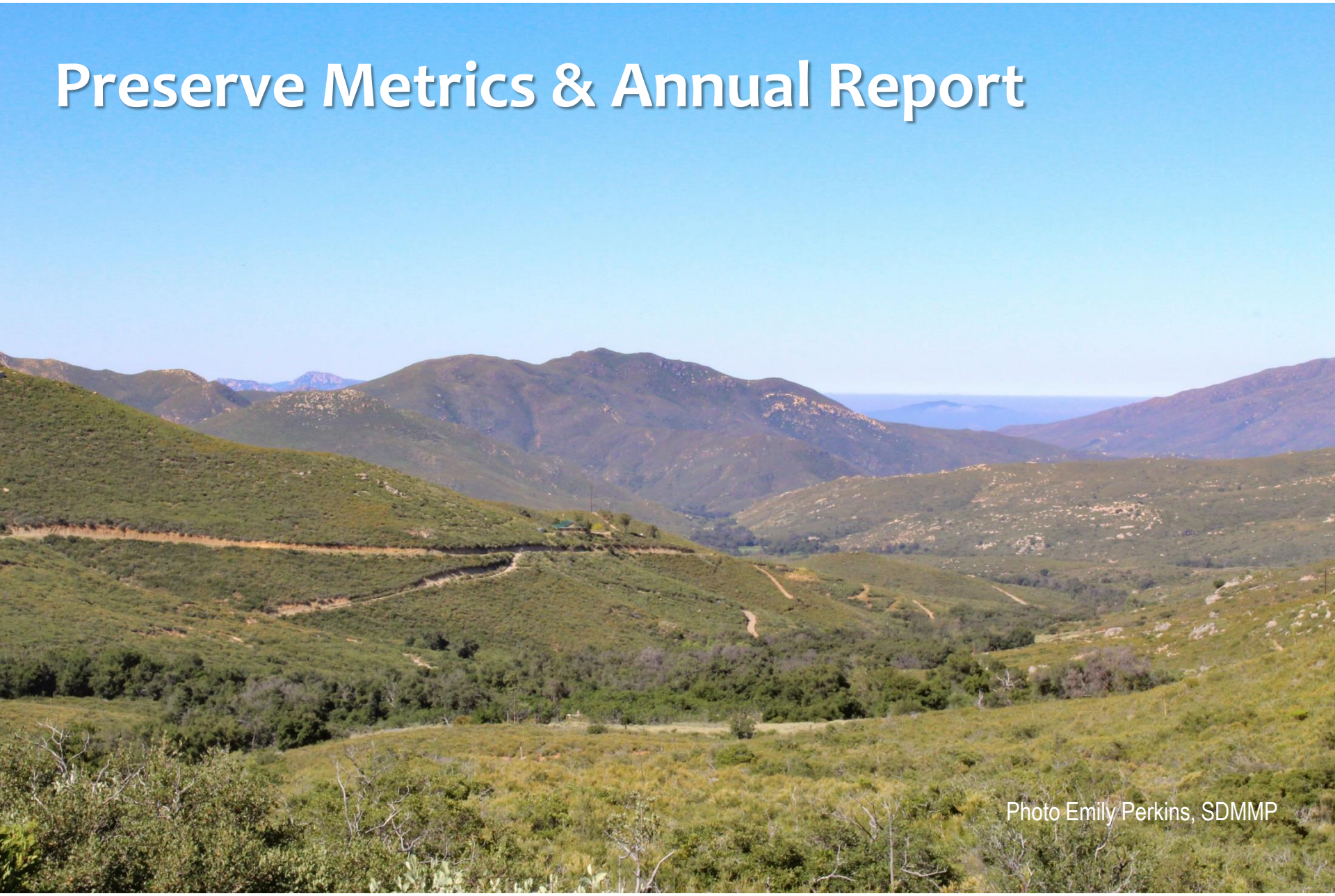
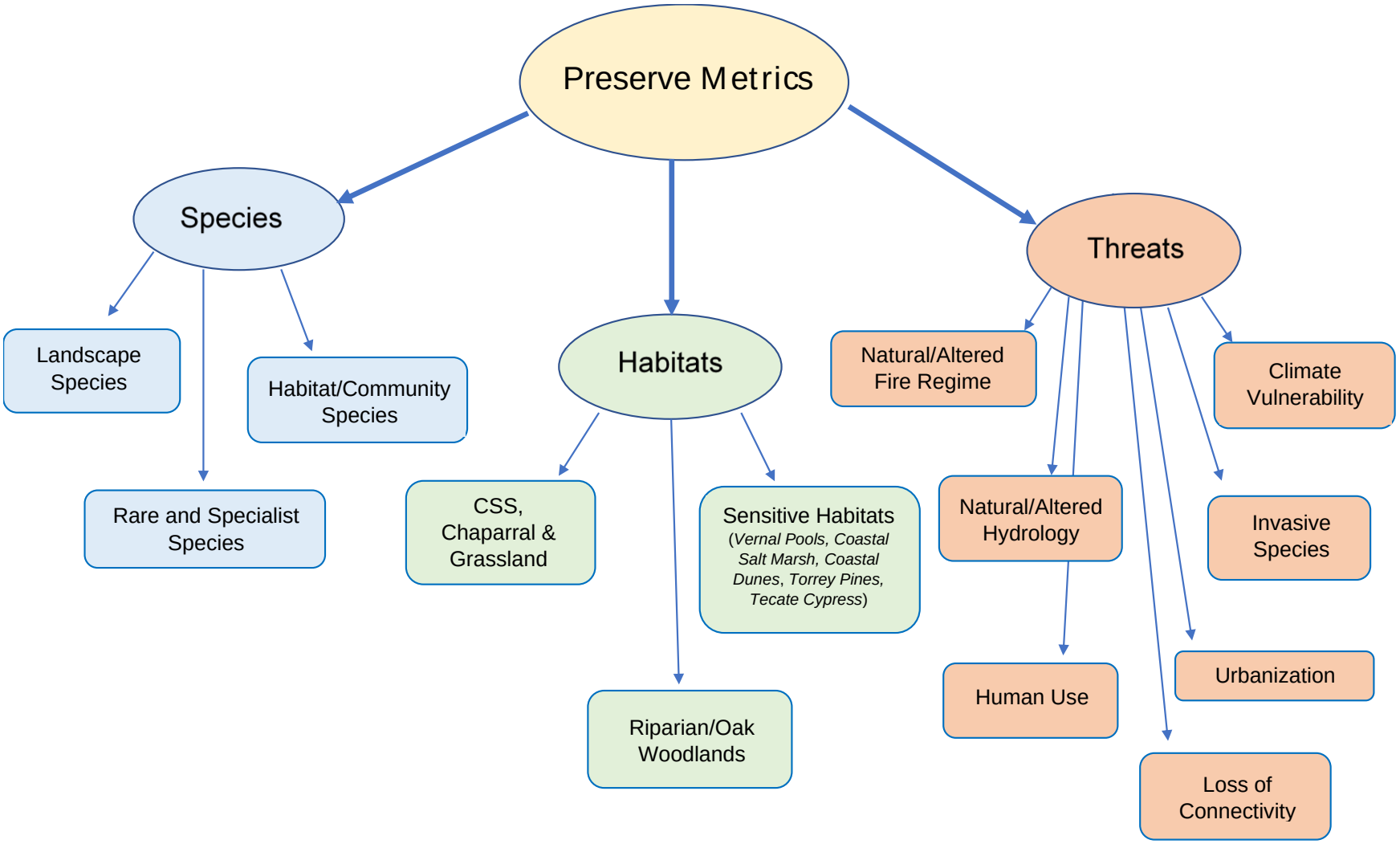


Photo Emily Perkins, SDMMP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Species
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Sensitive Habitats (*Vernal Pools, Coastal Salt Marsh, Coastal Dunes, Torrey Pines, Tecate Cypress*)
Riparian/Oak Woodlands
Natural/Altered Fire Regime
Natural/Altered Hydrology
Human Use
Loss of Connectivity
Urbanization
Invasive Species
Climate Vulnerability

Landscape Scale Species – Mountain Lion

Introduction

Condition, Trend, and Confidence

Condition: Caution (Moderate)

Trend: Unknown

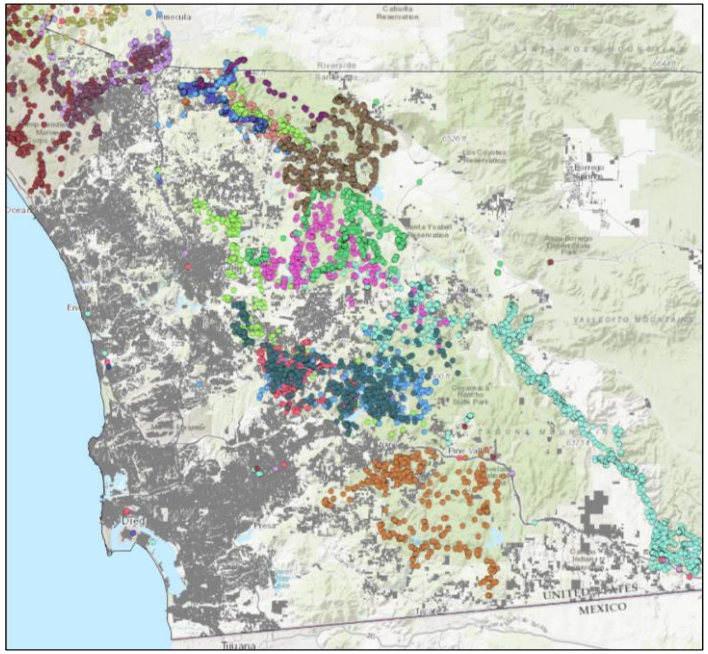
Confidence: High

Why is this Resource Included?

The mountain lion (*Puma concolor*) is the top carnivore in southern California and is important in maintaining the biodiversity and integrity of natural communities. These large cats use a variety of habitats except for open grassland and dense chaparral. Lions influence community composition and structure by affecting prey population dynamics, which impacts herbivory on plants and competition between herbivores. Mountain lions influence food webs and the flow of energy through natural ecosystems. These ecological functions help to maintain southern California as a global biodiversity hotspot. Mountain lions serve as a key indicator of preserve system connectivity; they have very large territories and young lions disperse long distances. In San Diego County, the average size of male territories is 375 km^2 (92,665 acres) and for females is 193 km^2 (47,691 acres). Maintaining and improving connectivity for mountain lions benefits other species, especially those that are wide roaming. Finally, the mountain lion is a charismatic species that sparks public interest and fascination.

Overall Condition

California's human population grew rapidly over the last half century, especially along the coast and in the south. This led to extensive habitat loss and fragmentation from urban and agricultural development. Mountain lions require large areas of interconnected natural habitats to sustain populations over time. Over the last 25 years, several multiple species conservation plans were established to conserve many sensitive species and their habitats, including mountain lions. Despite conserving large blocks of habitat, many mountain lion populations are small and isolated by freeways and surrounded by development. Young lions find it difficult to establish territories since most available habitat is occupied. A lack of habitat can lead to territorial males killing young lions dispersing through their territory. The combination of these factors contributes to the loss of genetic diversity among most populations and high mortality rates from vehicle strikes and human conflicts (i.e., depredation permits). The state is currently considering listing the coastal and southern California mountain lion populations as endangered. San Diego County's mountain lion population is primarily distributed in undeveloped areas of valleys, foothills, and mountains to the east and north of the urbanized coastal plain.



Mountain lion GPS telemetry points color coded by individual. Data collected from 2005 to 2016 (Vickers et al. 2017) Urbanized areas are shown in gray.

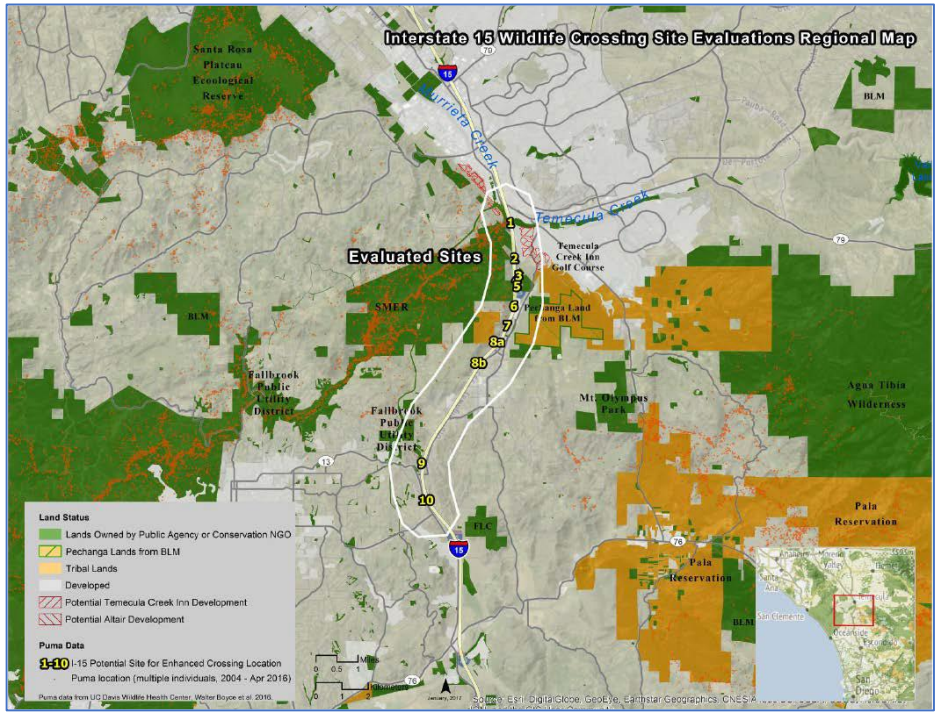
Desired Conditions

Goal: Enhance and expand areas occupied by mountain lions in San Diego County in large interconnected blocks (≥12,400 acres) of suitable natural vegetation surrounded by a limited number of high use roads, and increase connectivity (and reduce potential road mortality) between occupied and suitable habitat areas to allow expansion and movement of mountain lion occurrences within San Diego County and adjacent counties to increase effective population size to sustainable levels and work to reduce depredation on livestock to ensure persistence in the MSP over the long-term (>100 years).

Stressors

- **Climate vulnerability:** Increasing frequency, intensity and duration of droughts with a changing climate can negatively affect lion populations by reducing prey availability. Plant productivity in semi-arid regions is correlated with rainfall and drought limits food availability for prey and cause prey populations to shrink. A reduction in prey availability can lower lion productivity and survival and adversely impact populations.
- **Human use:** A growing human population results in less habitat for mountain lions that is free from human disturbance. There are increasing interactions between lions and humans that often result in safety and livestock protection concerns and can result in death of the lions.
- **Loss of connectivity:** Habitat loss and fragmentation are causing the decline of mountain lion populations in southern California. Lions are constrained or blocked in moving between small isolated populations leading to loss of genetic diversity. Loss of connectivity is leading to an extinction vortex in the Santa Ana Mountains population and is likely to similary affect the Eastern Peninsular Range (San Diego County) population over time.
- **Natural/altered fire regime:** Increasing fire frequency of large-scale wildfires in shrublands is leading to conversion of shrublands to invasive nonnative annual grassland, a habitat infrequently used by mountain lions.
- **Urbanization:** Loss and fragmentation of habitat is negatively impacting lion populations which require very large unfragmented natural habitats to persist. Lions bordering urbanized and rural residential areas are at risk of death from vehicle collisions and conflicts with humans.

Planning for critical wildlife crossing infrastructure improvements along the I-15 corridor to improve connectivity between the Santa Ana Mountains and Eastern Peninsular Range mountain lion populations.



Condition and Trends Assessment

Metrics and Goals

Metric 1: Mountain lion effective population size

Baseline: There are 10 genetically distinct mountain lion populations in California and Nevada. Most have small effective population sizes, especially in southern California. Effective population sizes are estimated to be 2.7 individuals in the Santa Monica Mountains, 5.0 in the San Gabriel Mountains, 15.6 in the Santa Ana Mountains, and 31.6 in the Eastern Peninsular Range.

While the Eastern Peninsula Range population in San Diego County is the largest in southern California, it is well below the threshold of 50 individuals to avoid inbreeding. Indications are that the Santa Ana Mountains population is becoming inbred as the Florida panther. A population viability analysis including inbreeding effects predicts this population is at risk of an extinction vortex and could go extinct within 12 years.

To increase effective population to ≥50 individuals in southern California requires improving connectivity so individuals can immigrate forming an interconnected metapopulation in the Santa Ana Mountains, San Gabriel Mountains, and Eastern Peninsular Range. To retain evolutionary potential (effective population size of ≥500 individuals) requires improving connectivity between all California and Nevada populations.

Effective population size is the number of individuals in a population producing offspring and contributing genes to the next generation.

An effective population size of ≥50 individuals is considered the minimum to prevent inbreeding depression over five generations in the wild. Recent research indicates this minimum threshold should be increased to 100 individuals.

Florida panthers experienced rapid decline in population growth as inbreeding depression reduced age specific survival rates. Without immigration and gene flow, inbreeding depression increases the risk of rapid extinction in mountain lion populations.

An effective population size of ≥500 individuals has been recommended to maintain enough genetic diversity to allow adaptation to changing conditions. Recent analyses indicate an effective population size of ≥1,000 individuals is required to maintain this evolutionary potential.

Condition Goal: Effective population size of ≥50 individuals for an interconnected southern California metapopulation, including ≥30 individuals in San Diego County.

Condition Thresholds:

- **Good:** Effective population size ≥30 individuals in San Diego County.
- **Caution**: Effective population size between 6 and 29 individuals in San Diego County.
- **Significant Concern**: Effective population size ≤5 individuals in San Diego County.

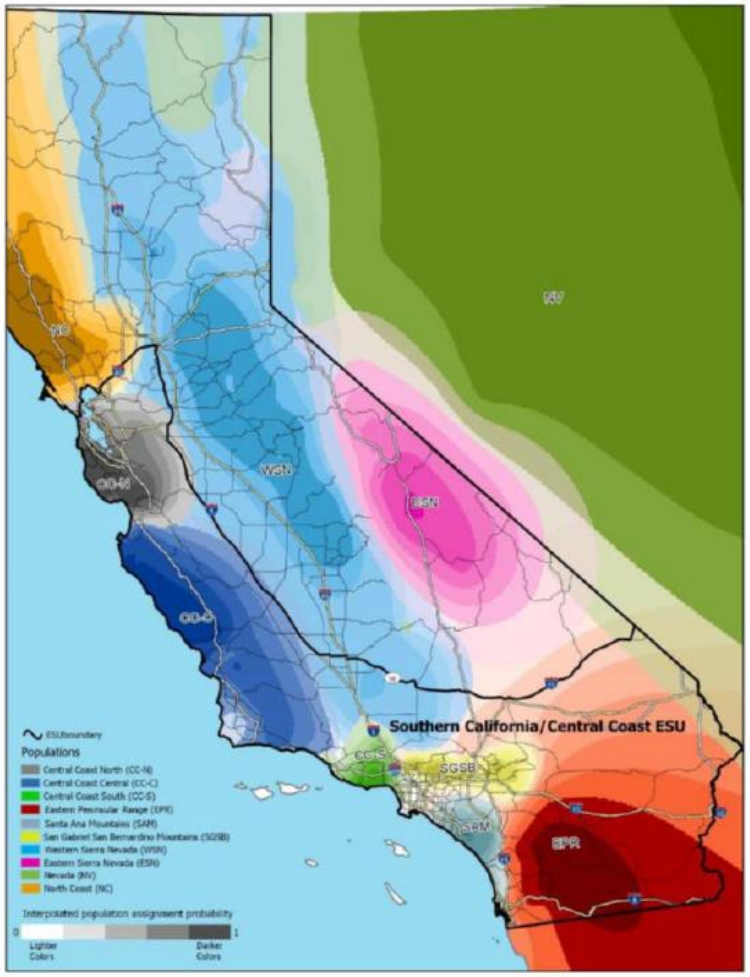
Current Condition: Good

Estimate of current effective population size in San Diego County is 31.6 (95% CI: 29.1 – 34.4).

Confidence: High

Trend: Unknown

Eastern Peninsular Range population recently went through a significant genetic bottleneck with an effective population size estimated to be 37.4 individuals (95% CI: 34.5-40.5). Current effective population estimate is lower than the genetic bottleneck estimate. Need another estimate to determine if there is a trend.



Genetically distinct mountain lion populations in California and Nevada (Gustafson et al. 2018)

Metric 2: Number of suitable habitat patches ≥12,400 acres conserved in San Diego County

Baseline: Currently, there are 25 patches of natural habitats in western San Diego County that are ≥12,400 acres and are not fragmented by roads or development. Twelve of these natural habitat patches are entirely conserved, with remaining patches showing varying levels of conservation (Figure XX).

Condition Goal: Conserve 25 natural habitat patches ≥12,400 acres to support an effective population size of mountain lions ≥30 individuals.

Condition Thresholds:

Good: Natural habitats conserved in ≥20 patches ≥12,400 acres.

Caution: Natural habitats conserved in 6 to 19 patches ≥12,400 acres.

Significant Concern: Natural habitats conserved in ≤5 patches ≥12,400 acres.

Current Condition: Caution

Currently, 12 of 25 patches of natural habitats ≥12,400 acres are conserved in western San Diego County.

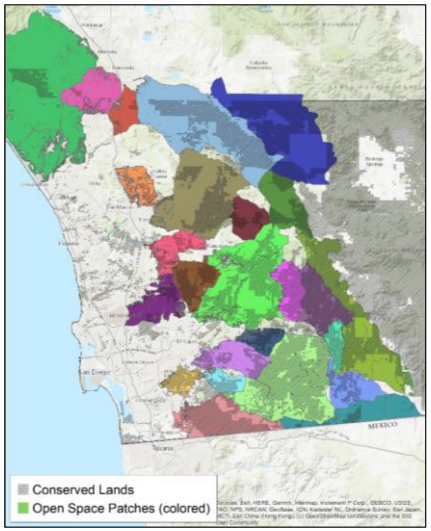
Confidence: High

Trend: Increasing

Individual survival of mountain lions in southern California is unusually low at 56%. The leading causes of death are vehicle collisions and depredation permits issued when a lion kills livestock.

To reduce mortality the goal is to conserve large interconnected patches that reduce road crossings and interactions with humans.

Mountain lions have very large territories; females have a minimum territory size of 12,400 acres in San Diego County. This patch size is used to determine conservation goals to support an effective population of ≥30 individuals. The analysis is based on the number of potential female territories since male territories overlap with female territories.



Open space patches ≥12,400 acres in western San Diego County with varying levels of conservation.

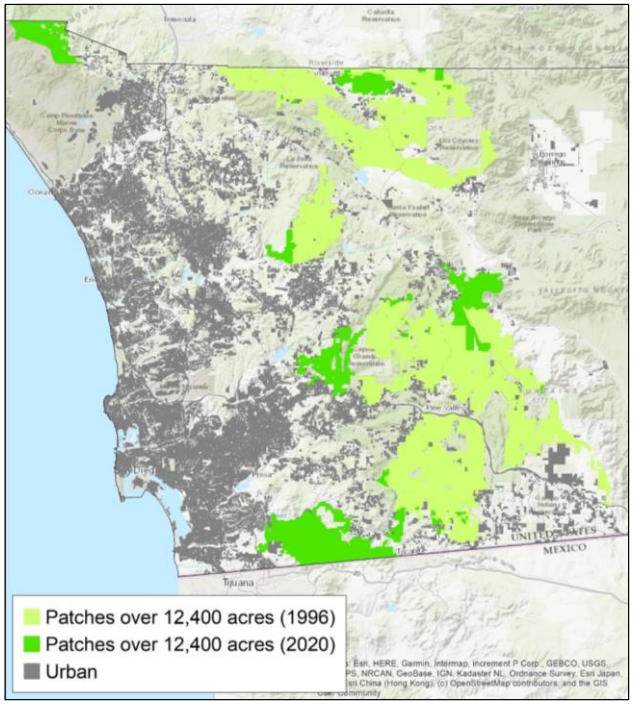
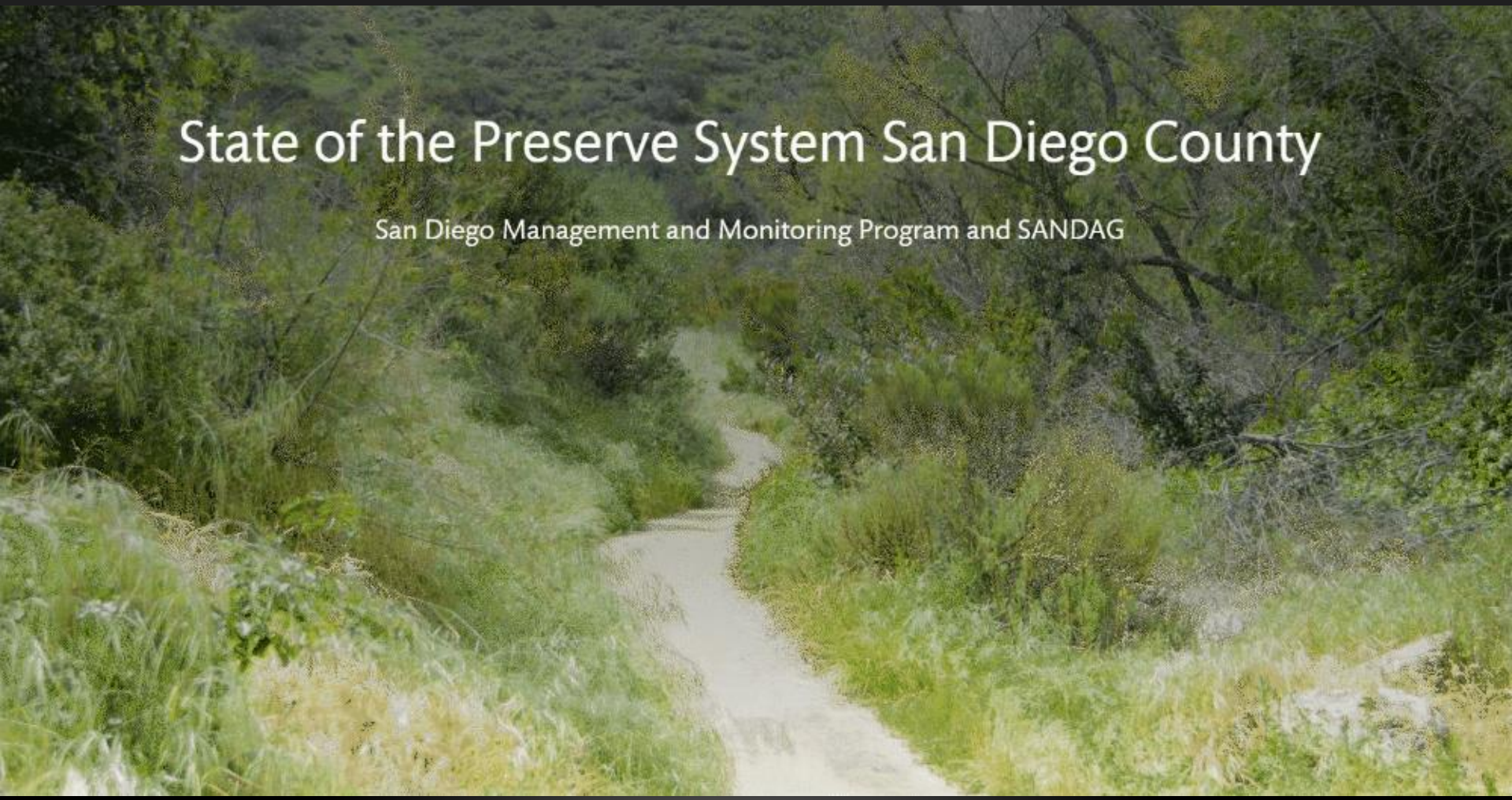


Figure X. Change in level of conservation from 1996 to 2020 for 25 patches of undeveloped lands ≥12,400 acres in western San Diego County. 12,400 acres is the minimum size of a female lion territory.

WEB PORTAL 2021

- SDMMP.com will be updated to include a metrics dashboard
  - Includes updates to internal database
  - Pages to view metrics with links to data and MSP objectives


State of the Preserve System San Diego County
San Diego Management and Monitoring Program and SANDAG

Mountain Lions (*puma concolor*)

Landscape Species

Goal:

Enhance and expand areas occupied by mountain lions in San Diego County in large interconnected blocks (≥12,400 acres) of suitable natural vegetation surrounded by a limited number of high use roads, and increase connectivity (and reduce potential road mortality) between occupied and suitable habitat areas to allow expansion and movement of mountain lion occurrences within San Diego County and adjacent counties to increase effective population size to sustainable levels and work to reduce depredation on livestock to ensure persistence in the MSP over the long-term (>100 years).

Threats:

- Climate vulnerability
- Human use of the preserve
- Loss of connectivity
- Natural/altered fire regime
- Urbanization

THANK YOU!!!!