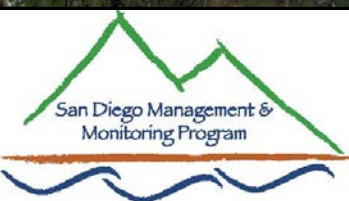# Ideas on Developing a Coastal Sage Scrub, Chaparral and Grassland Monitoring Program for Western San Diego County

Inter-Agency Sub-Committee Meeting - Regional Vegetation Monitoring
May 4, 2017

Kris Preston & Yvonne Moore

Photo Patricia Gordon-Reedy

San Diego Management & Monitoring Program

MSP Roadmap Area

➢ **MSCP, MHCP & NCP**

➢ **MSPA *aka "MSP Area"***

➢ **Western San Diego County**

➢ **Only willing partners on Conserved Lands**

➢ **11 Management Units**

MSPA Geographic Area
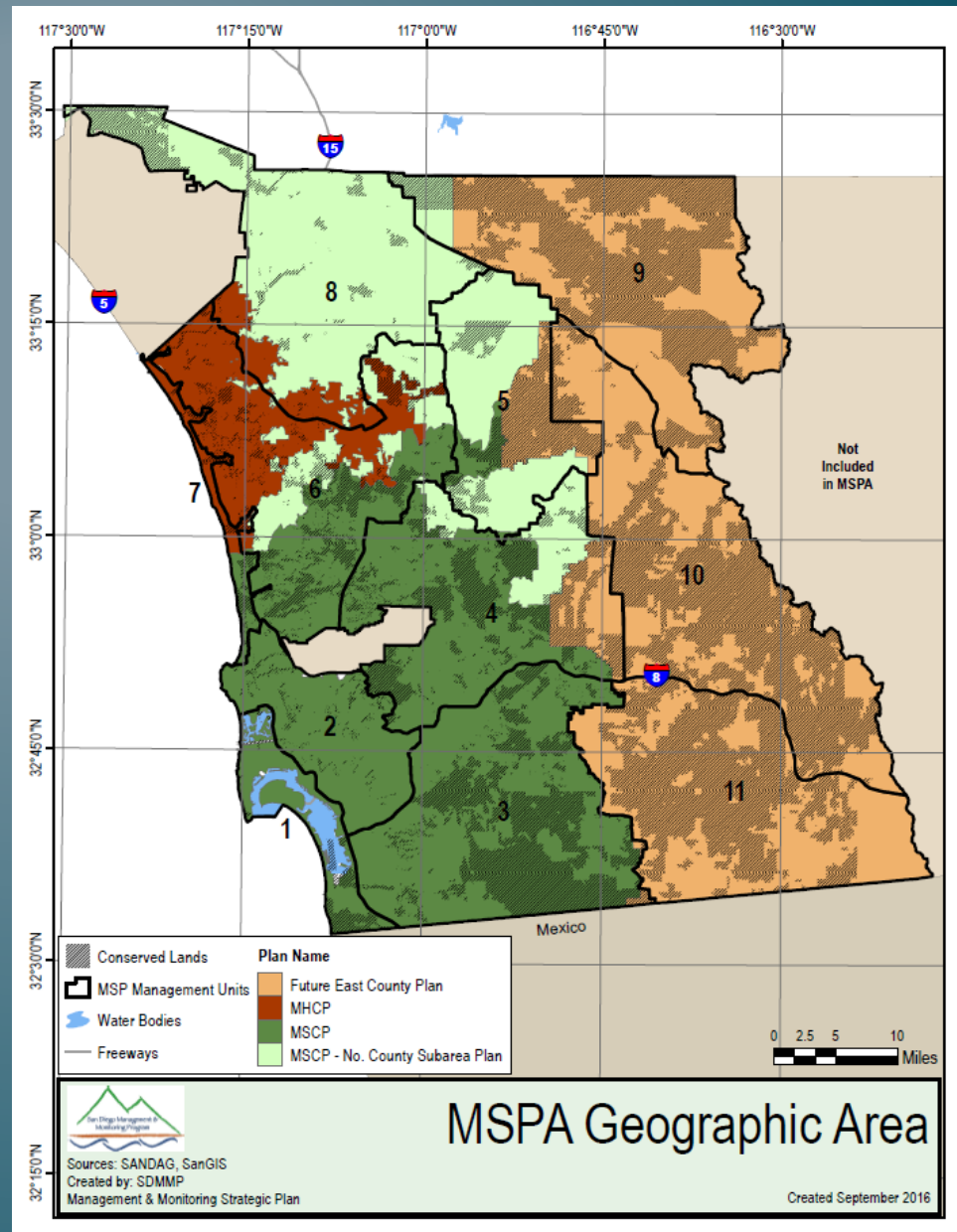
WHY MONITOR?

Success in meeting management goals & objectives

➢ **Species/vegetation/ecosystem status & trends**

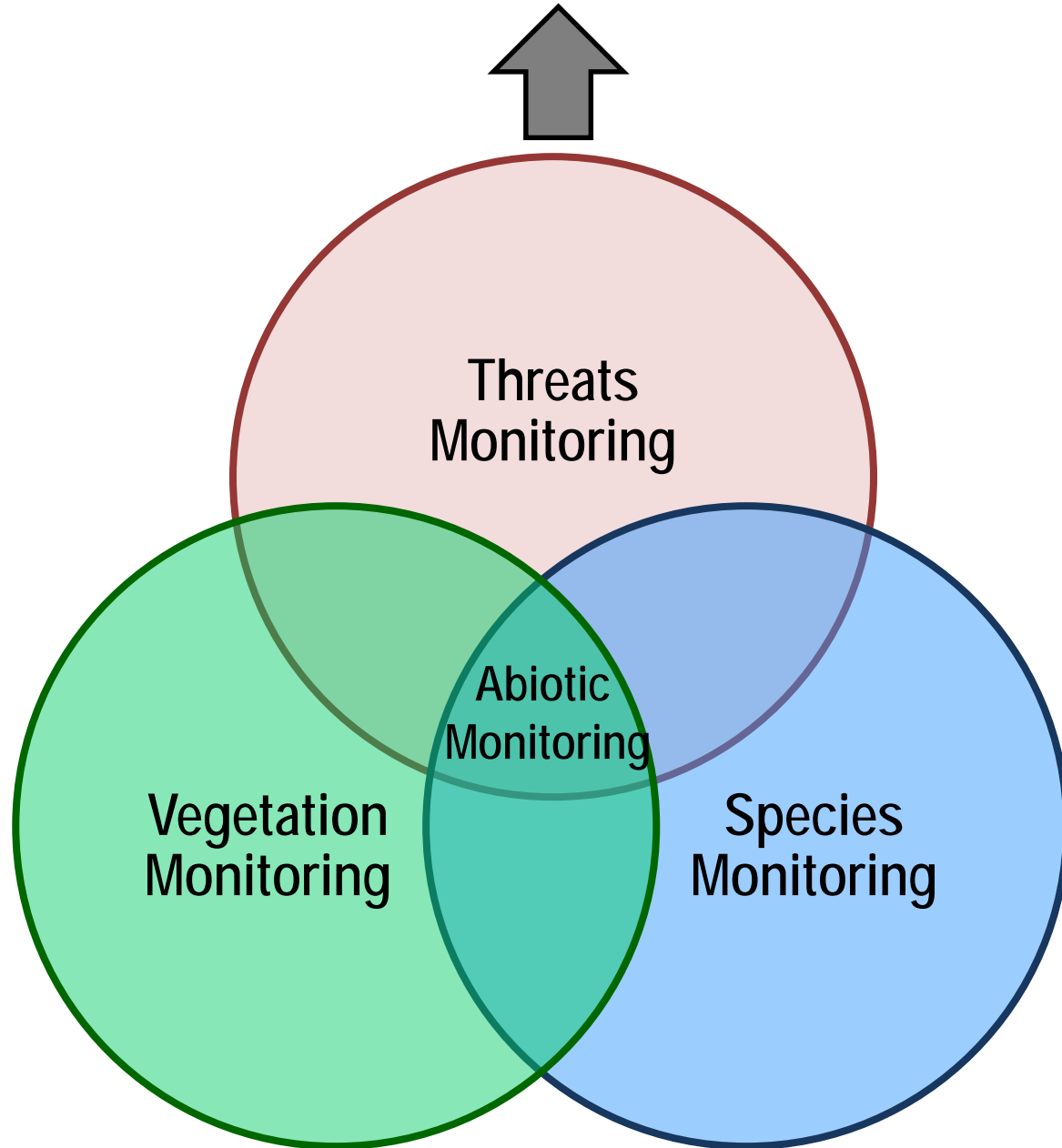➢ **Track response to threats, habitat & environmental conditions to inform management**

➢ **Effects of management**

Photo Emily Perkins

ORGANIZING PRINCIPLE

Ecological integrity –

The ability of an ecological system to support & maintain a community of organisms that has species composition, diversity & functional organization comparable to those of natural habitats within a region
Karr & Dudley 1981, Parrish et al. 2003

RELEVANCE TO MANAGEMENT

❖ **Ecological thresholds = tipping points**

➢ **small change in driver →large change in environmental response**

❖ **Preventing shift to more degraded state = more effective & cost efficient than trying to recover degraded ecosystem**

Photo Patricia Gordon-Reedy

CSS & CHAPARRAL SYSTEMS

Conceptual Model:

Primary threats =

❖ Altered fire regime

❖ Invasive plants

❖ Climate change (e.g., drought)

Photo Patricia Gordon-Reedy

CSS & CHAPARRAL MONITORING APPROACH

Determine status & ecological integrity of CSS & chaparral systems in MSPA & whether these are changing in response to threats & environmental conditions

Approach is based on synthesizing & analyzing data from species, veg, threat & abiotic monitoring

Photo Patricia Gordon-Reedy

MANAGEMENT GOAL

Maintain, enhance & restore CSS (or chaparral) in the MSPA that supports or has potential to support _Vegetation Focus_ species & to incidentally benefit a diverse array of other species so that the vegetation community has high ecological integrity & these species are resilient to environmental stochasticity, catastrophic disturbances & threats, & will be likely to persist over the long-term (>100 years)

Photo John Martin

MONITORING GOAL

Provide monitoring to detect changes in CSS & chaparral vegetation communities impacted by fire, drought & invasive plants & use this information to guide management to maintain, enhance or restore ecological integrity across the MSPA.

Photo Dave Hogan

Regional Preserve System Monitoring Questions

What is the ecological integrity of the MSPA preserve system, is it changing over time & why?
(Meta-analysis of datasets in MSP Web Portal)

Threats Monitoring Questions

❖ What are the types & levels of threats in the MSPA preserve system, are they changing over time & why?

❖ What are BMPs for managing threats?

❖ Is management effective at reducing threats?

Abiotic Questions

❖ Are abiotic elements in the MSPA changing over time & why?

MSP Vegetation Monitoring Questions

❖ What is the distribution, composition, structure & integrity of vegetation communities in the MSPA & are these changing over time?

❖ What threats & abiotic factors are associated with changes in vegetation community attributes?

❖ What are BMPs for managing threats?

❖ Is management effective at reducing threats & enhancing vegetation communities?

MSP Species Monitoring Questions

❖ What is the distribution & status of MSP species in the MSPA & are they changing over time?

❖ What threat, habitat & abiotic characteristics are associated with changes in MSP species distribution & status?

❖ Research oriented questions (e.g., connectivity & genetic diversity, demographics) to address critical uncertainties important for management.

❖ What are BMPs for managing threats & enhancing species' populations?

❖ Is management effective at reducing threats & enhancing species populations?

CSS & CHAPARRAL MONITORING OBJECTIVES

1) Map the ecological integrity of CSS & chaparral across the MSPA & track changes in integrity over time in response to fire, drought & other threats to identify sites at integrity thresholds requiring management actions.

Fuels Model Mapping (Technosylva 2014)

5 Miles

1	3	5	7	9	11	13	15
2	4	6	8	10	12	14	

CSS & CHAPARRAL MONITORING OBJECTIVES

2) Monitor to inform management & ensure X acres of CSS (or chaprral) are maintained in the high ecological integrity class & X acres are restored from low or moderate to high integrity CSS (or chaparral) at important locations for MSP species and/or connectivity.

Photo Kris Preston

CSS & CHAPARRAL MONITORING OBJECTIVES

3) Monitor CSS, chaparral & converted grassland at reference sites along environmental gradients in the MSPA to correlate vegetation integrity metrics with species composition, structure, diversity & ecosystem fxn. Track responses to changing threat & environmental conditions to better understand system & inform management of non reference sites.

WHAT HAVE WE LEARNED?

CSS, chaparral & grassland vegetation

❖ Evaluated multiple approaches (field & landscape-scale) with recommendations to improve

❖ Developed vegetation classification for mapping

❖ Determined efficacy of field methods & sources of variability

❖ Initiated conceptual models, questions & objectives

❖ Power analyses → sample sizes to detect specified change in vegetation/species cover

Photo Emily Perkins

WHAT HAVE WE LEARNED?

Index of Biological Integrity (Diffendorfer et al. 2007)**:**

❖ **IBI for CSS – measure biodiversity along disturbance gradient**

❖ **Sampled ants, herps, birds, small mammals & veg**

❖ **Gradient of disturbance = % NNG cover**

❖ **No single taxon, sp, or community measure = good indicator**

❖ **Turnover in spp along gradient**

❖ **Multi-taxa IBI > sensitivity than % NNG cover & can decompose**

Photo Patricia Gordon-Reedy

CSS & CHAPARRAL VEG MONITORING APPROACH

Ecological Integrity of Vegetation:

❖ **Integrity classes defined by % cover & density of shrubs, % cover of NNG as determined by range of variation in MSPA**

❖ **Model integrity classes across landscape & verify in field**

❖ **NNG serves as surrogate for multi-taxa IBI, but need to validate over time with reference sites**

Photo Patricia Gordon-Reedy

SPECIES MONITORING INSIGHTS INTO CSS SYSTEM

Ex: CAGN Fire Study obj

❖ **Determine CAGN PAO & recovery from 2003, 2007 & 2014 fires**

❖ **Identify relation between CAGN PAO & veg covariates**

❖ **Determine recovery of CSS with different fire histories, time since fire, spatial distribution & environmental conditions**

❖ **Use CSS veg data to develop landscape-scale ecological integrity maps over time**