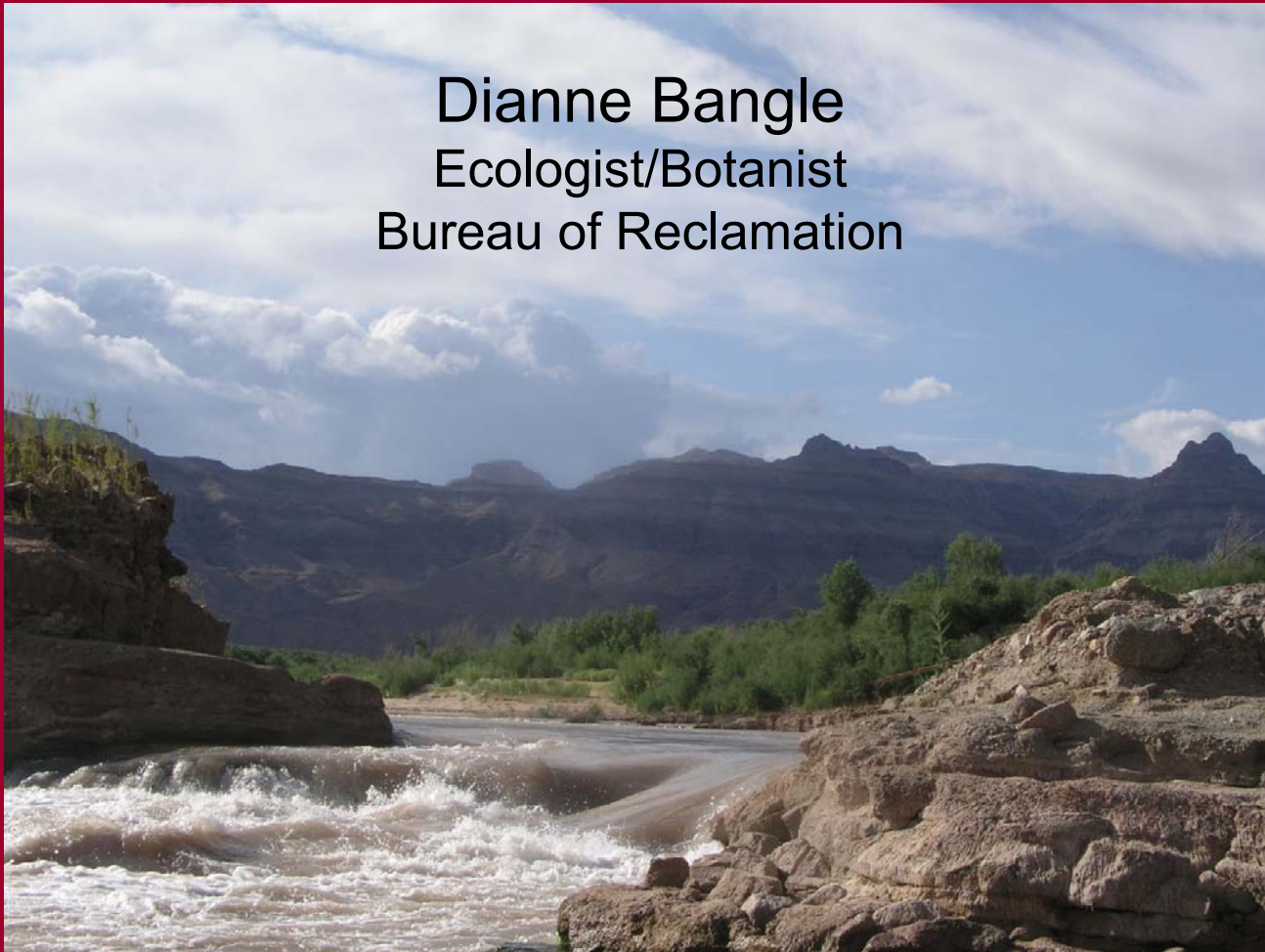


Multiple Species Conservation Program Future Post-development Vegetation Monitoring -Lower Colorado River-

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MSCP Goals and Objectives

- Conserve habitat and work toward the recovery of threatened and endangered species
- Create and maintain habitat for MSCP covered species (Yuma clapper rail, Southwestern willow flycatcher, Western red bat, Western yellow bat, Colorado River cotton rat, Yuma hispid cotton rat, Western least bittern, California black rail, Yellow-billed cuckoo, Elf owl, Gilded flicker, Vermilion flycatcher, Arizona Bell's vireo, Sonoran yellow warbler, summer tanager)

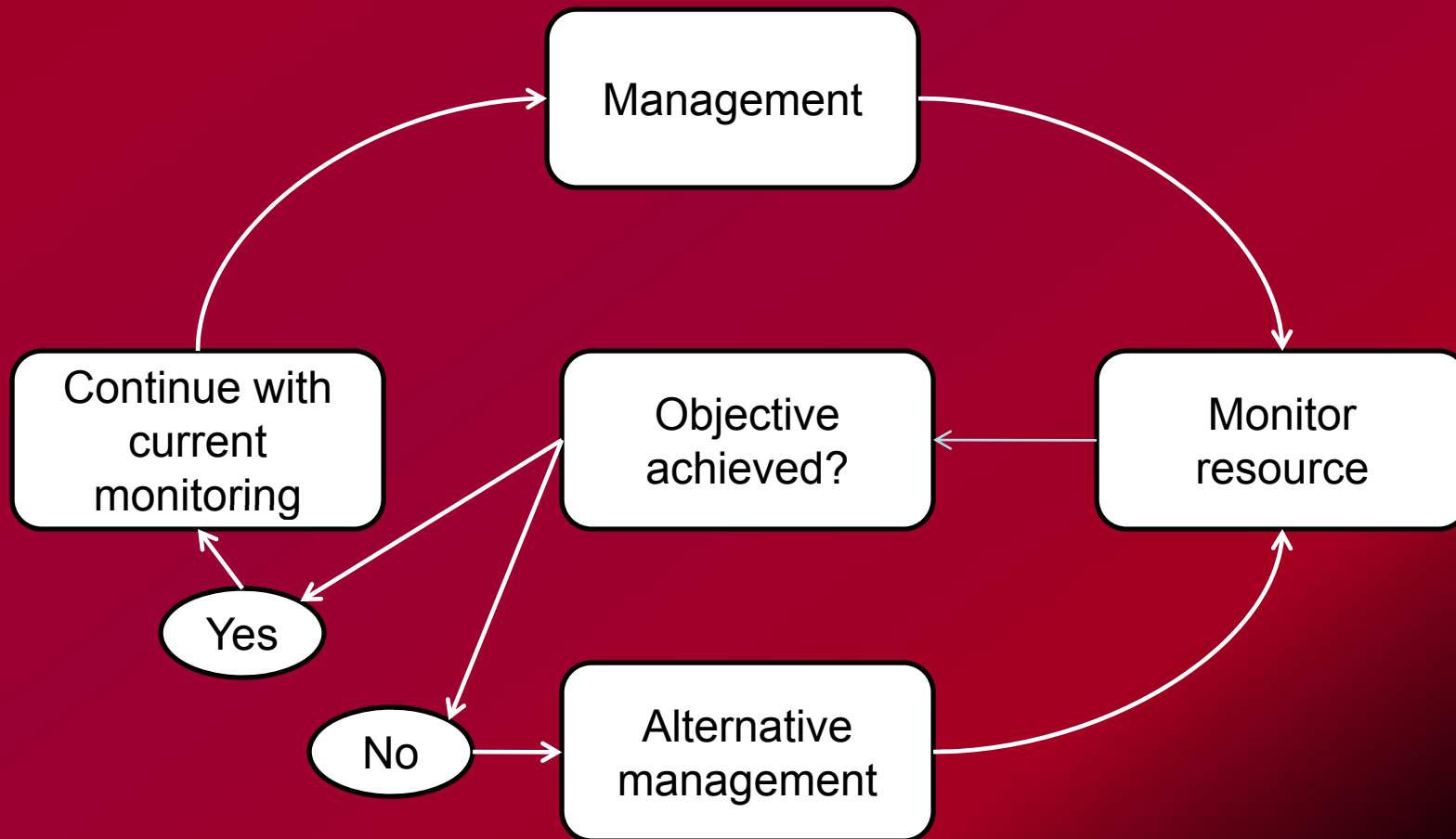


Vegetation Monitoring on the Lower Colorado River

Why do we monitor?

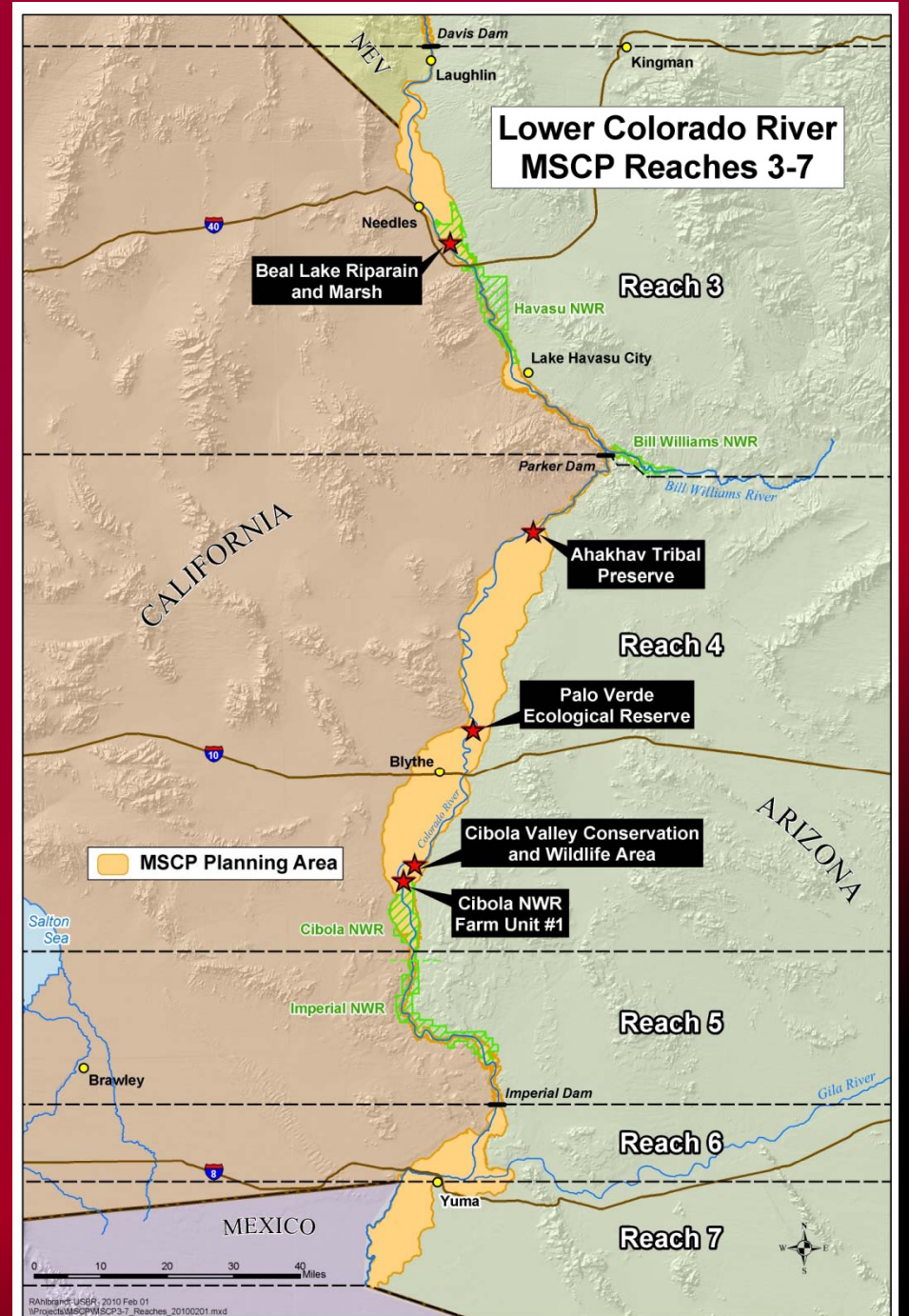
- Evaluate the effectiveness of management actions in order to make necessary improvements to management practices
- We use monitoring data to better understand the complexity of the system and to reduce uncertainty caused by limited control, limited observability, environmental stochasticity...
- A learning process - *Adaptive Management*

Adaptive management



Restoration sites along the LCR that are currently included in the post-development vegetation monitoring program...

- Beal Lake
- Ahakhav Tribal Preserve
- Palo Verde Ecological Reserve
- Cibola Valley Conservation Area
- Cibola NWR Unit #1



Will monitoring be effective?

We must first...

- Set clear management objectives
- Develop monitoring and sampling objectives
- Develop a good sampling design that will provide useful data
- Determine acceptable level of precision
- Is the monitoring efficient and repeatable?

Determine management objectives for each site?

Examples

- Create habitat for Southwestern willow flycatcher and yellow-billed cuckoo
- Create habitat for other MSCP covered species
- Determine what density and what mix of tree species are most effective for creating suitable habitat
- Determine which shrub species and at what densities shrubs should be planted within restoration sites
- Determine existing microclimate conditions at each site
- Determine soil conditions at each plot location (along a gradient within each monitored phase)

Why do we need new monitoring protocols?



Three-tiered approach

Different questions require a different approach.

1. Status monitoring – qualitative (defines)
2. Trend monitoring – quantitative (describes)
3. Effectiveness monitoring – quantitative;
more narrow in focus


Three-tiered approach

Different questions require a different approach.

1. Status monitoring –

2. Trend monitoring –

3. Effectiveness monitoring – quantitative;
more narrow in focus



Similar to
double
sampling
method

1. Status Monitoring:

- Less intense sampling and precision
- Provides a measure of overall success
- Quickly assess the current condition of each management area

→ **Example** – Quick, yet systematic approach for gathering densities of target tree species at set intervals along belt transects

- gather either presence/absence data or tallies of trees in certain size classes

Status monitoring example

- Collect presence/absence or tally data every 30 meters



Random placement of transects →

Phase 2

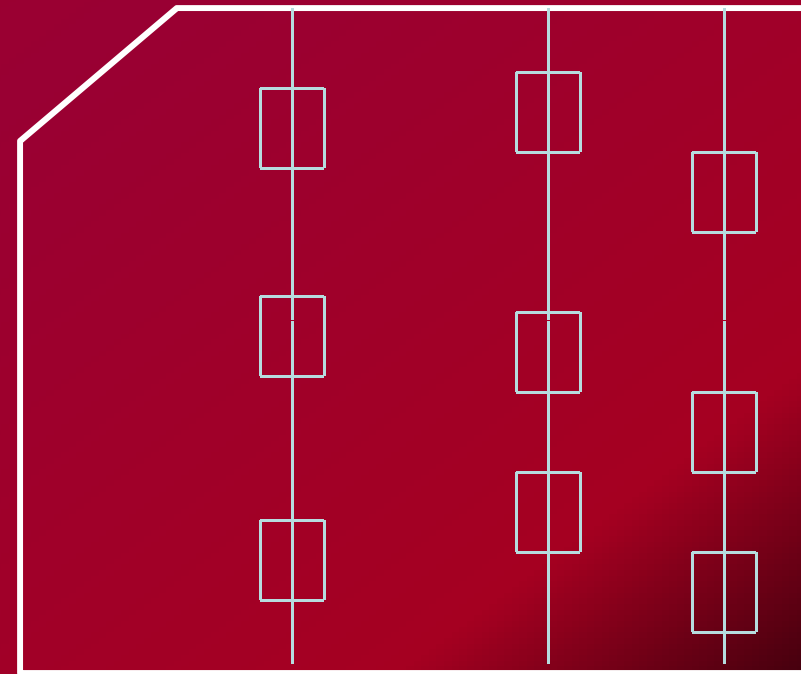
3. Effectiveness Monitoring:

- Are the conservation actions having the intended impact on the target?
- Observational study – wildlife survey results related to current habitat conditions
- Experimental study – more rigorous; controls, replication etc.
- Most appropriate for adaptive management

Back to...

Trend monitoring – Experimental Design

- Permanent, nested plots
 - 10x30m plots for large trees (density, height, DBH)
 - 5x10m plots to evaluate shrub and smaller trees
 - Foliage height diversity
 - 4 - 1x1m plots to evaluate ground cover
- Account for edge effects when establishing plots- 5 meter buffer around all field/check edges



Phase 2

More...

- Transects and plots must be a minimum distance apart to ensure plot independence
- Monitor phases every year for the first 3 years after planting, then move to rotational basis (every other year)
- Record variables such as planting type, watering schedule, soil chemistry, soil moisture, microclimate, distance to nearest valve or gate, slope, etc.

CVCA Example



- Determine which direction is “best” to lay the transects
- Leaning towards cutting across all checks
- Each site is different

Questions or comments are welcome...

Acknowledgements

MSCP wildlife group

- Chris Dodge
- Theresa Olson

MSCP restoration group