Flycatcher Status Update 2013
The Good, the Bad, and the Ugly

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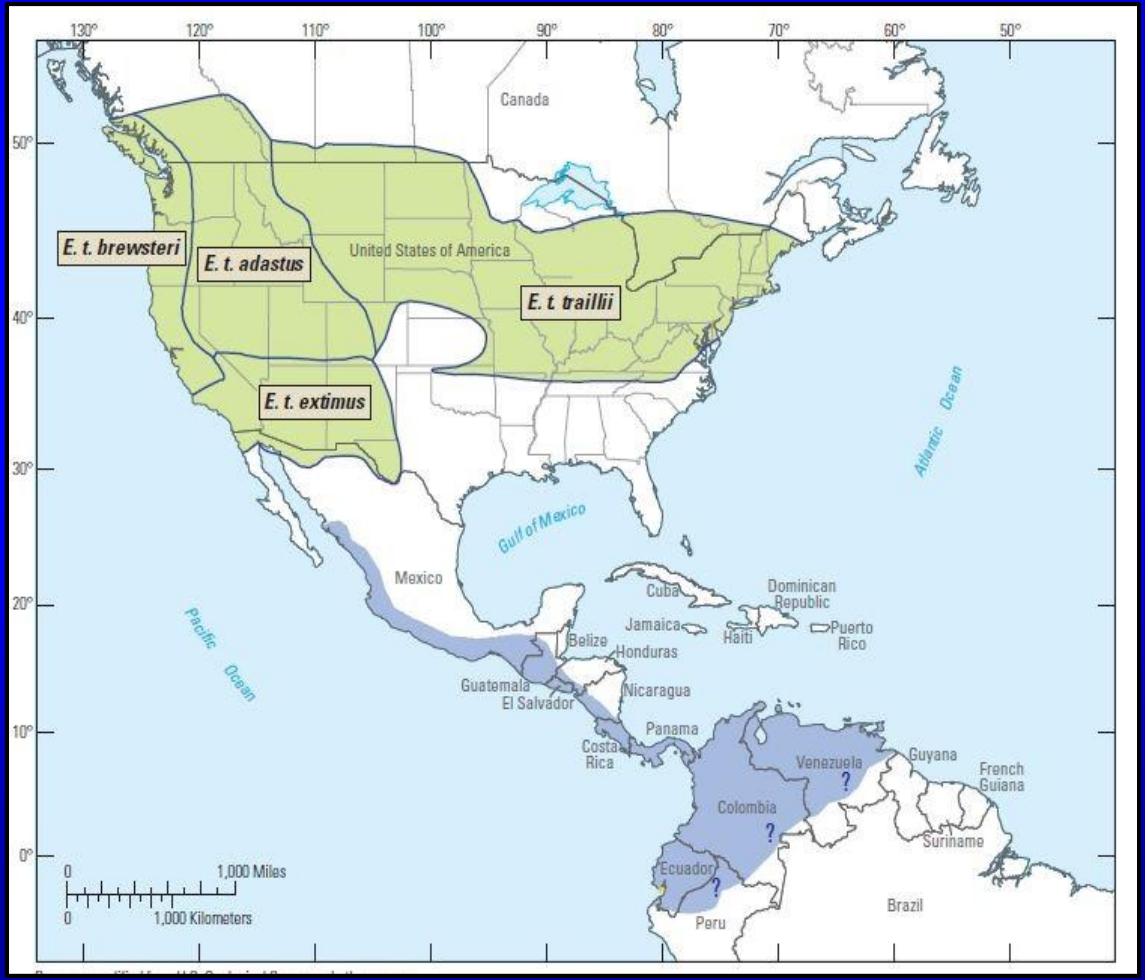
Lower Colorado River
Multi-Species Conservation Program

Southwestern willow flycatcher
(*Empidonax traillii extimus*)

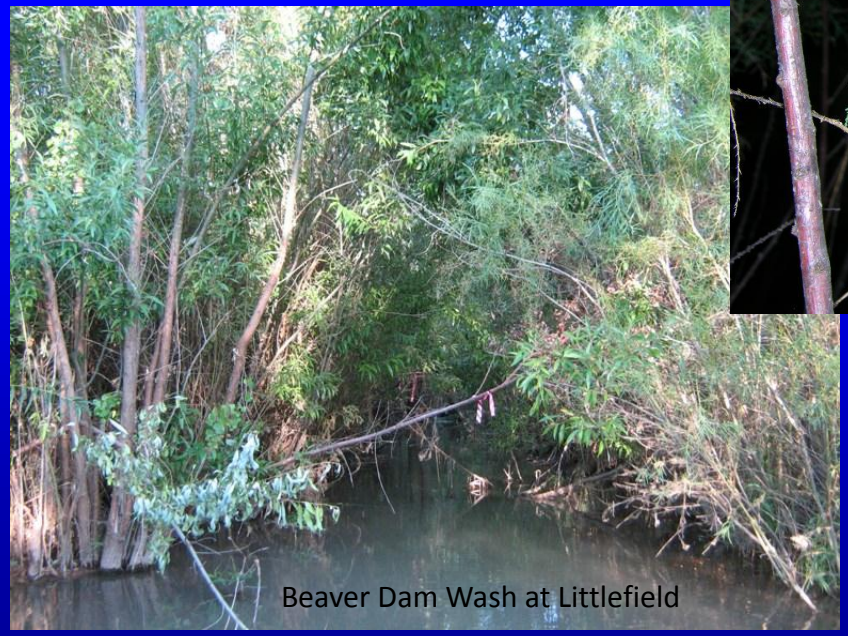
- One of 4 subspecies of willow flycatcher
- Breed in AZ, NM, and adjacent portions of neighboring states
- Neotropical migrant



Empidonax traillii extimus

- Breeds in dense, wet riparian habitats, both native and tamarisk
- Builds open-cup nests
- Listed as endangered in 1995

Along Virgin River at Mesquite


Beaver Dam Wash at Littlefield

Study Components

Territory/nest monitoring

- nest success rates
- causes of failure

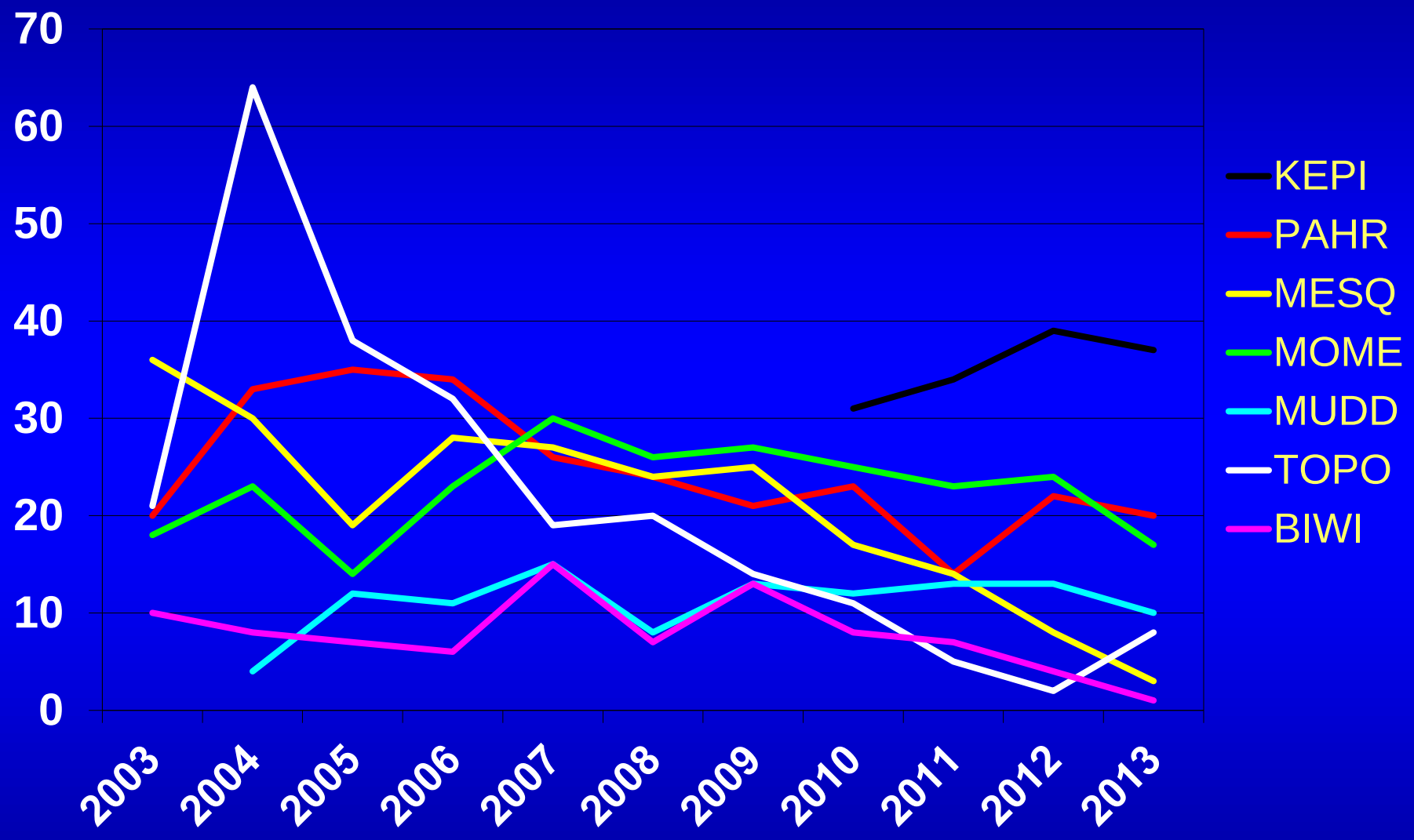
Banding/resighting

- survival
- site fidelity
- dispersal

Tamarisk beetle monitoring

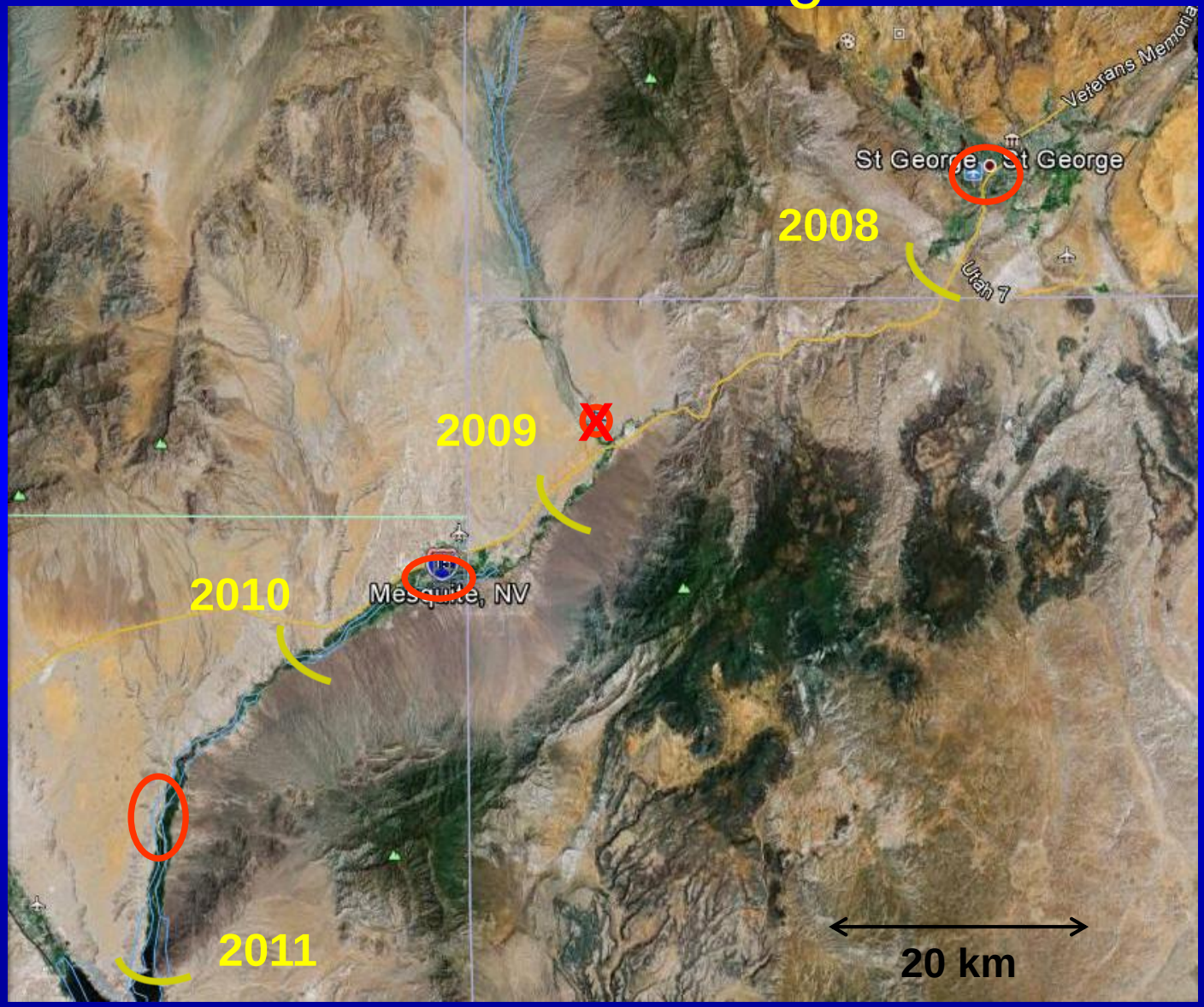
- beetle numbers
- veg conditions
- temp/humidity
- light levels

Resident Adult Flycatchers



No resident willow flycatchers recorded south of Bill Williams

Flycatcher locations and beetle expansion on the Virgin River



- This is a census, not a subsample!

Effects on tamarisk:

Complete defoliation

Repeated 1-3 times within a season, May-August

Repeated over many consecutive years

Reduced foliage volume

Partial mortality

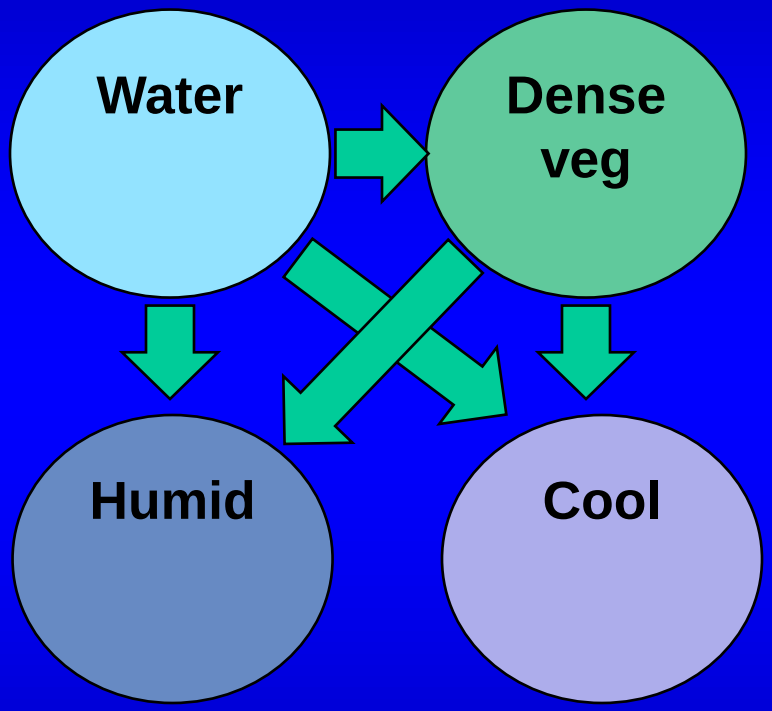
This was the healthiest looking tamarisk around!

Aug 2010

May 2013

Flycatcher Habitat Preferences

Flycatchers are picky!



Prey base

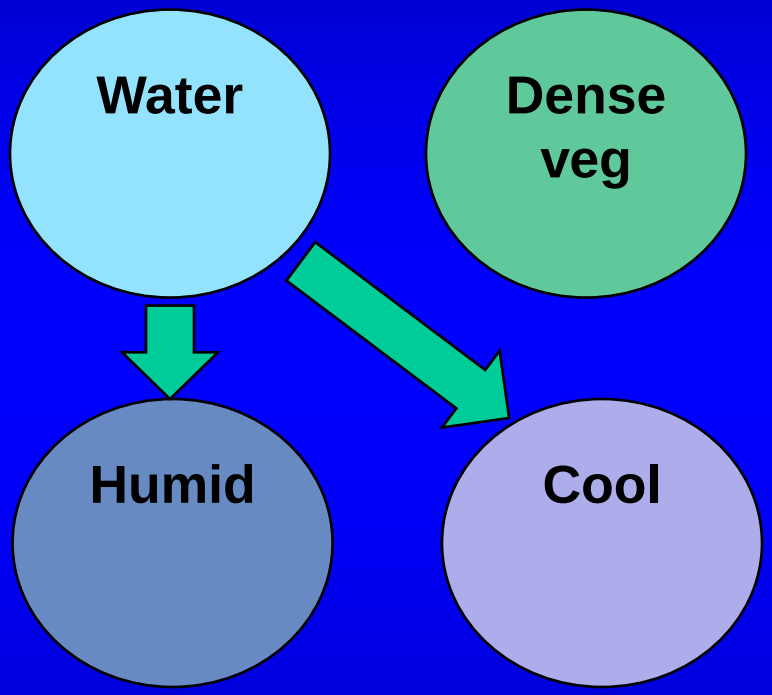
Concealment

Less time & energy on thermoregulation

Eggs less likely to reach lethal temp (41°C = 106°F)

Flycatcher Habitat Preferences

Flycatchers are picky!



- Missing environmental cues that attract flycatchers

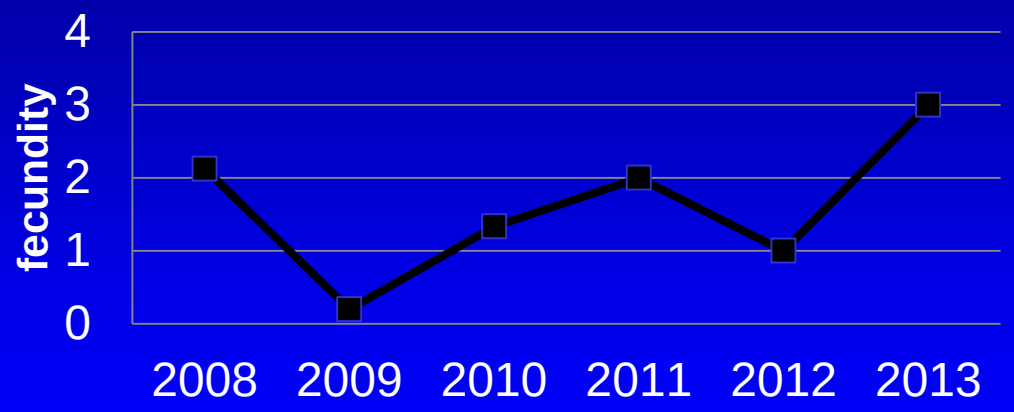
Prey base

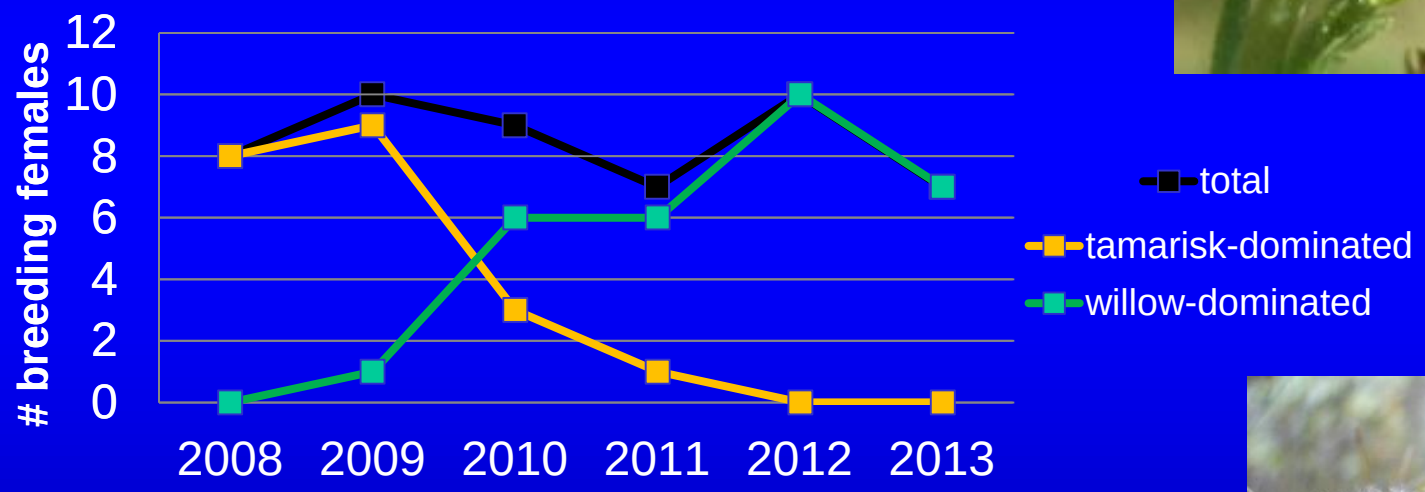
Increased visibility

More time & energy on thermoregulation

Eggs more likely to reach lethal temp (41°C = 106°F)

St. George, UT (UDWR)



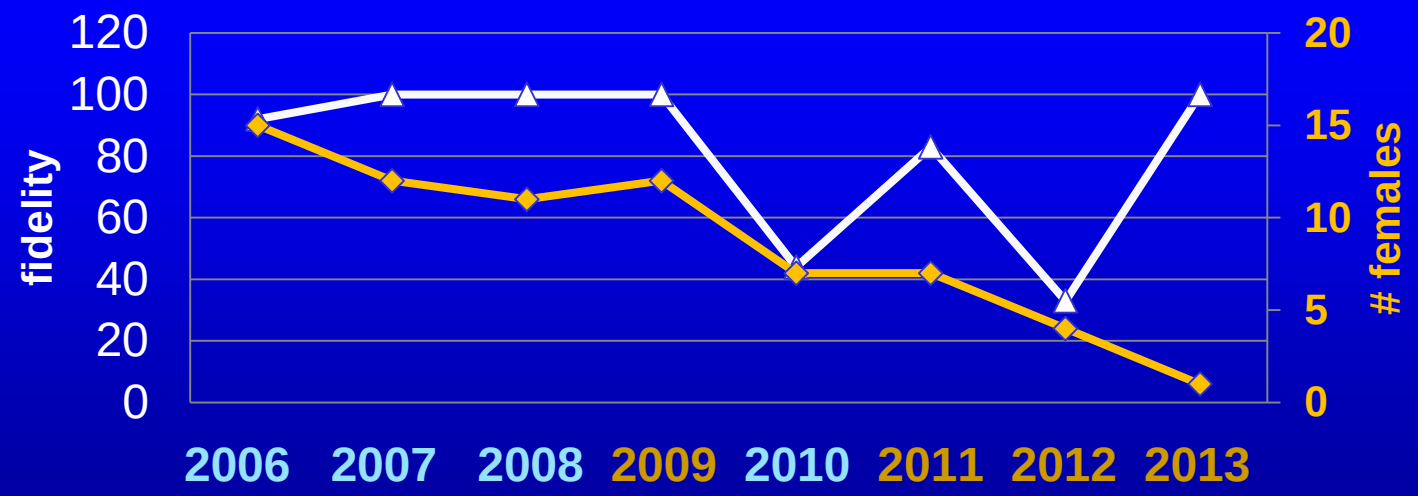


- Flycatchers show local plasticity in site selection
- Active revegetation of riparian areas

Mesquite

Flycatcher response to lack of water

- Mesquite, NV



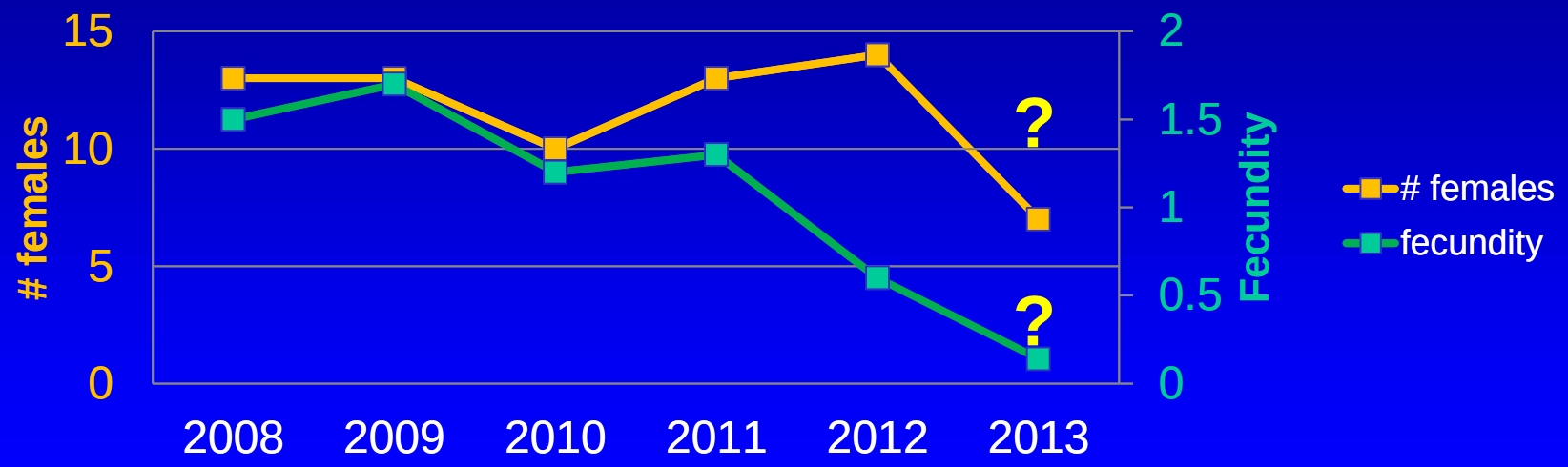
What to do about Mesquite?

- Need to ensure that irrigation return flows go through the site
  - Plans underway to build a diversion
  - Cooperative project
    - Partners in Conservation
    - NDOW
    - City of Mesquite
    - Walton Family Foundation
    - Local landowners
- Investigating opportunities to increase flow

Mormon Mesa, NV

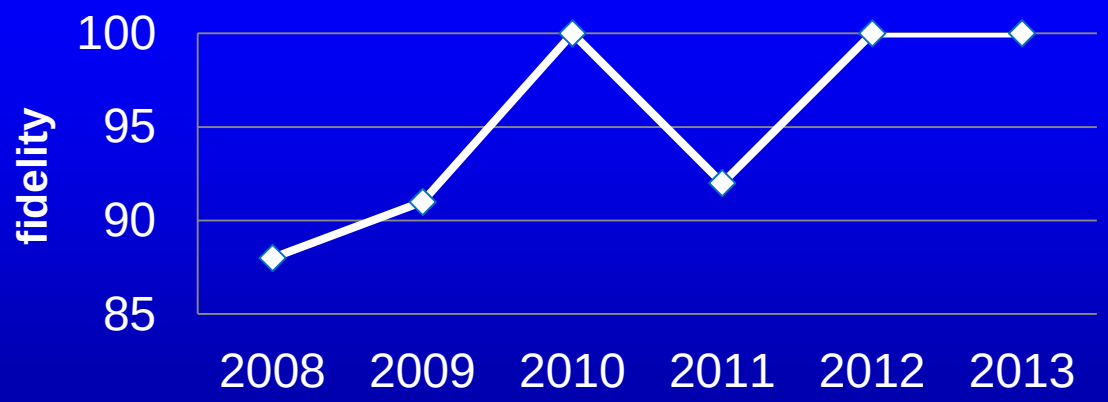
- mixed willow & tamarisk
- defoliated through most of 2012
- no defoliation events in 2013, but high levels of partial mortality
- 2012 and 2013 nests clustered in willow areas

Mormon Mesa, NV



Abandonment
Nest desertion during laying

Fewer renests
Parasitism (2013)



No new recruits

What to do about Mormon Mesa?

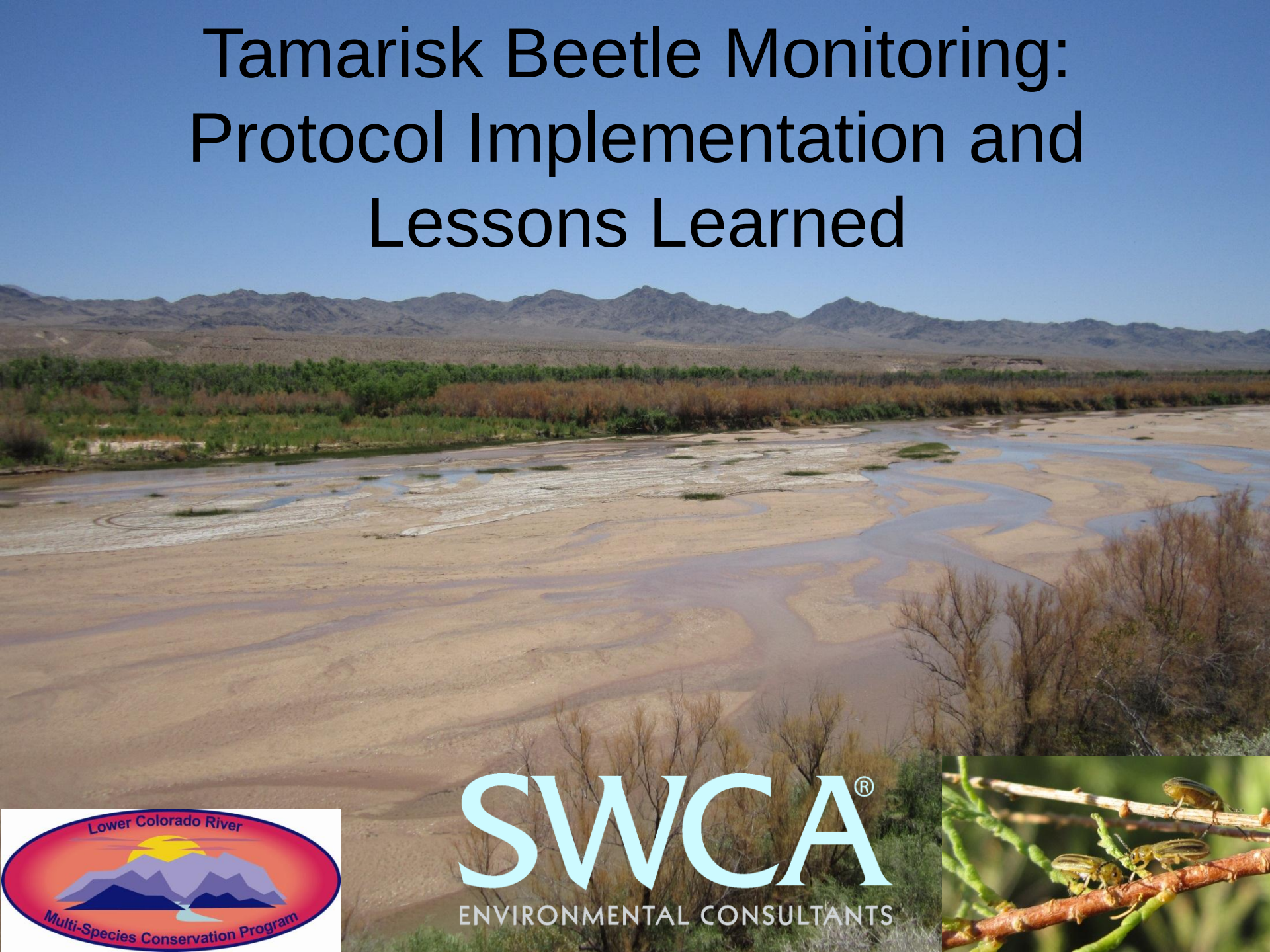
- Current revegetation project:
  - Great Basin Institute and Clark County
  - 0.3 acres cleared; scheduled to be planted later in winter

- Impediments to extensive restoration projects

Virgin River flycatcher summary

- St. George:
- Mesquite:
- Mormon Mesa:

Tamarisk Beetle Monitoring: Protocol Implementation and Lessons Learned



Lower Colorado River Multi-Species Conservation Program

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Study Design

Monitoring points established in recently occupied habitat at four study areas:

- Mesquite (MESQ)
- Mormon Mesa (MOME)
- Topock Marsh (TOPO)
- Bill Williams River NWR (BIWI)

Points were randomly distributed among available vegetation types:

- Coyote willow (SAEX)
- Tamarisk (TASP)
- Mixed Tamarisk / Coyote Willow (SAEX_TASP)
- Tamarisk with emergent Goodding Willow (TASP_SAGO)
- Goodding Willow overstory with Tamarisk understory (SAGO_TASP)

Study Design

Mesquite

- SAEX ..... (10 points)
- SAEX_TASP ..... (10 points)

Mormon Mesa

- SAEX ..... (5 points)
- TASP_SAGO ..... (5 points)
- TASP ..... (10 points)

Topock Marsh

- TASP ..... (10 points)
- TASP_SAGO ..... (10 points)

Bill Williams River NWR

- SAGO_TASP ..... (15 points)

Study Design

At each monitoring point, we monitored:

- **Beetle Populations**: abundance estimates of beetles by life stage (adults, larvae, and egg clusters)
- **Vegetation**: recorded visual estimations of foliar color (% green, % yellow, % brown) and % leafless stems. Also measured % total canopy closure using a Model-A spherical densiometer.
- **Light Intensity (lux)** using a HOBO Pendant® temperature/light data logger
- **Temperature and Relative Humidity** using a Hygrochron iButton

Monitoring schedule:

- Bi-weekly in the absence of beetles
- Weekly if beetles were detected

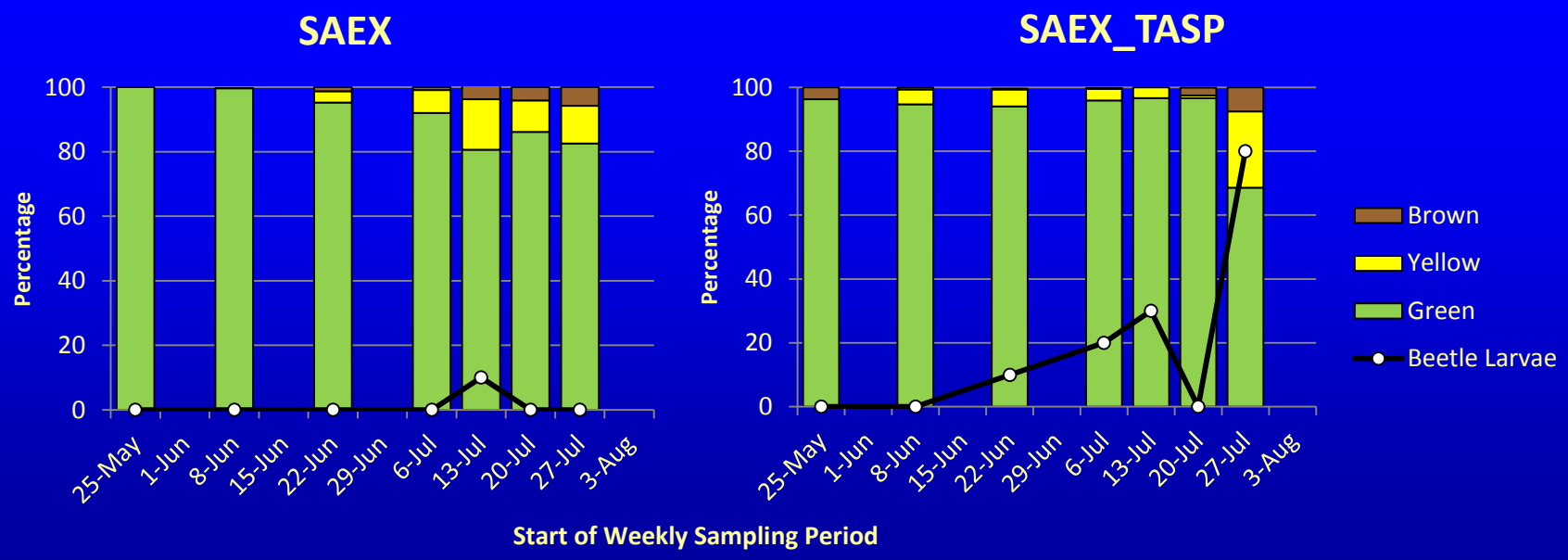
Results

- No beetles observed at:
  - Mormon Mesa
  - Topock Marsh
  - Bill Williams
- Beetle larvae detected at Mesquite starting in late June.
  - Full defoliation did not occur until early-mid August.

Results

Mesquite

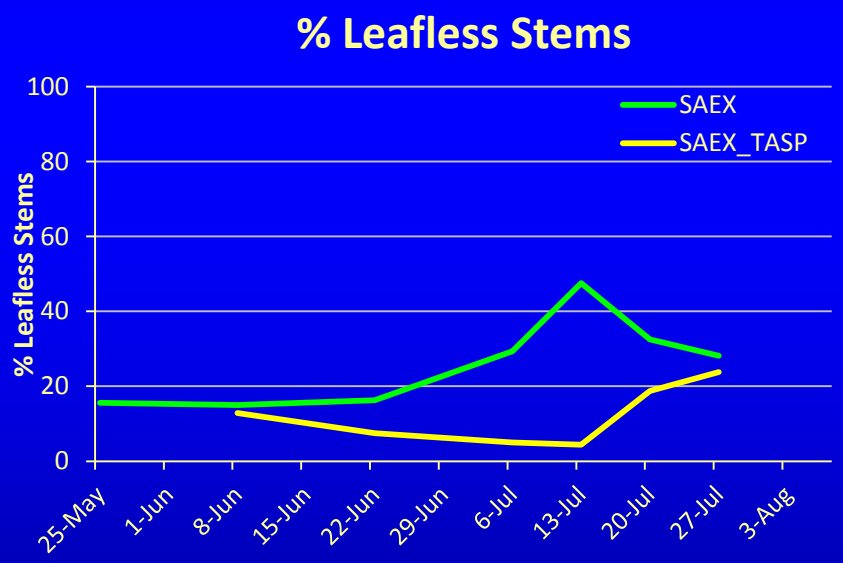
- % yellow and % brown foliage increased during the season in both veg types
- Change gradual in coyote willow
- Change sharp in mixed tamarisk / coyote willow – coincides with sharp increase in beetle larvae

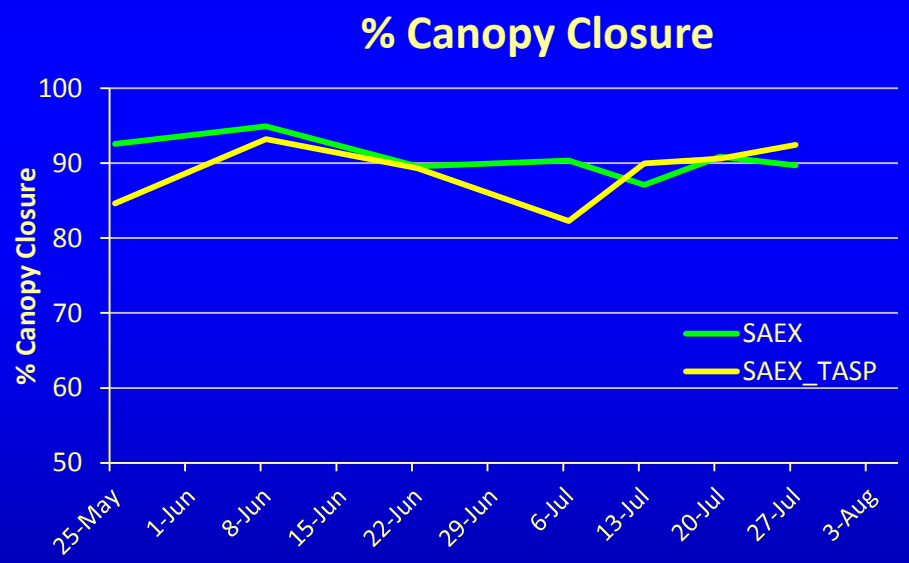


Results

Mesquite

- % leafless stems increases in mixed veg at end of season
- % leafless stems in coyote willow??
- No noticeable trend in % canopy closure



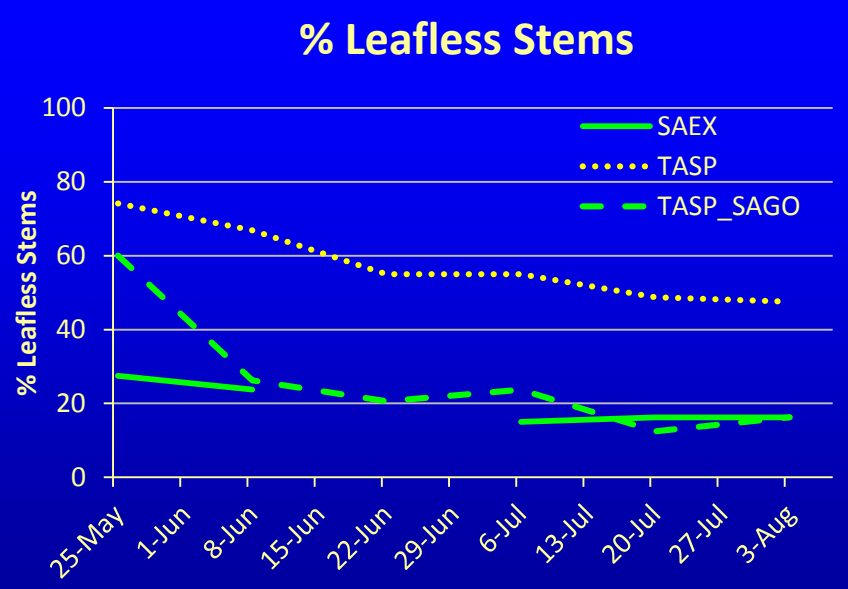


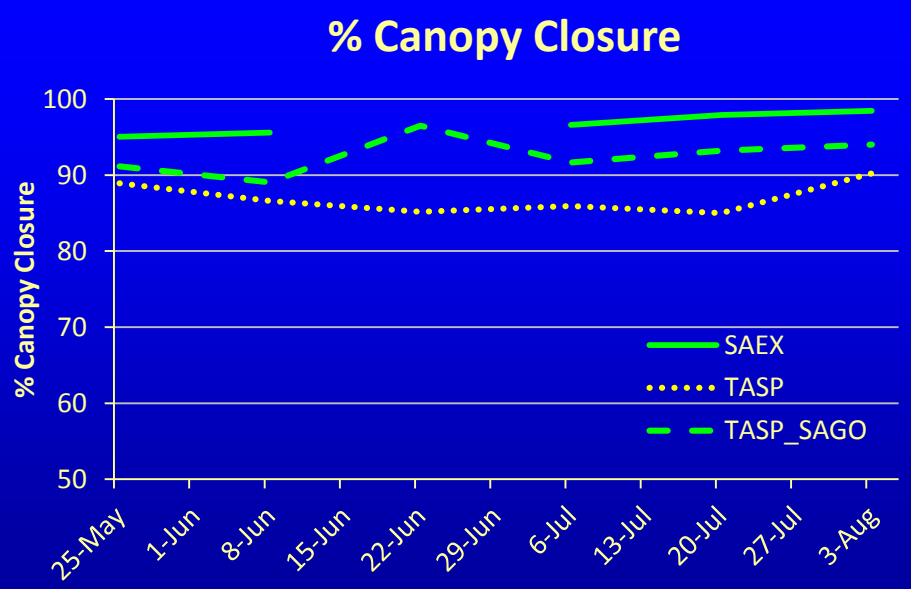
Start of Weekly Sampling Period

Results

Mormon Mesa

- No change in foliar color – all live foliage mostly green
- Coyote willow has the lowest % leafless stems and highest % canopy closure
- Tamarisk has the highest % leafless stems and lowest % canopy closure
- Seasonal trend?



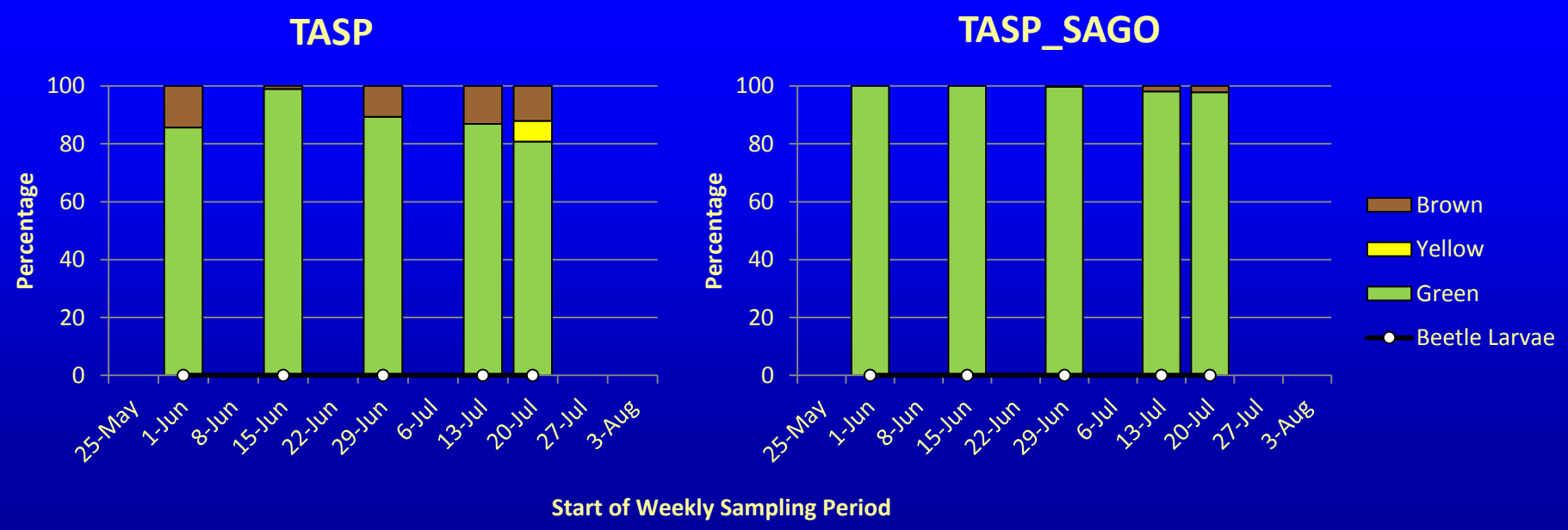


Start of Weekly Sampling Period

Results

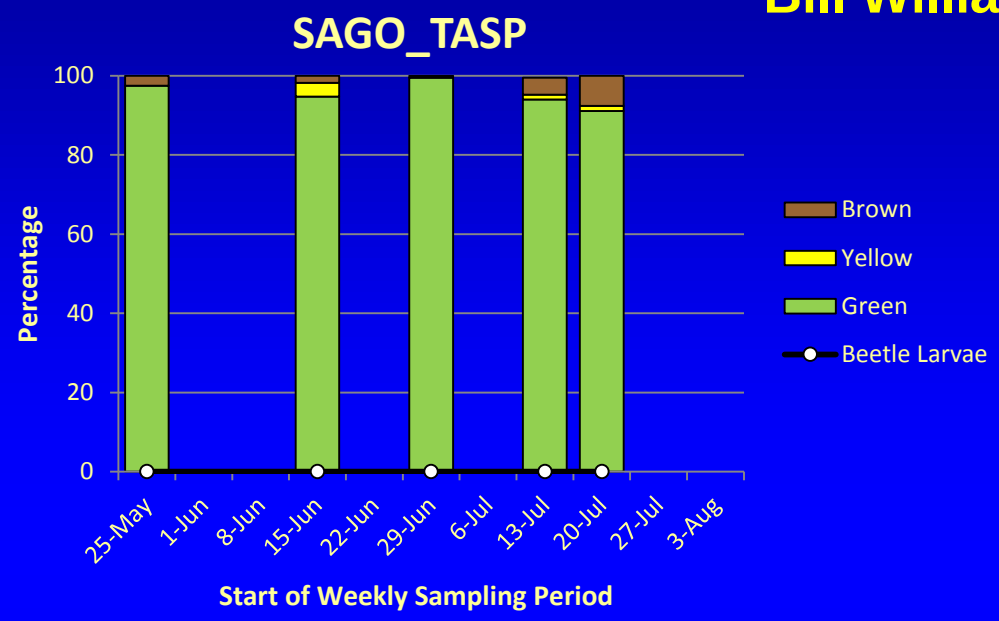
Topock Marsh

- No seasonal trend
- Monotypic tamarisk more brown than areas with Goodding willow
- Monotypic tamarisk had higher % leafless stems and lower % canopy closure than areas with Goodding willow
- Observer variation?

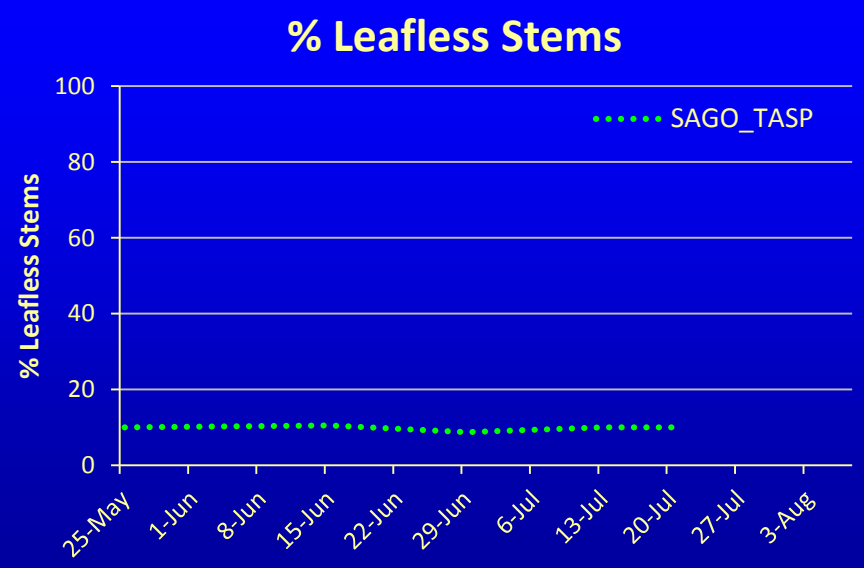


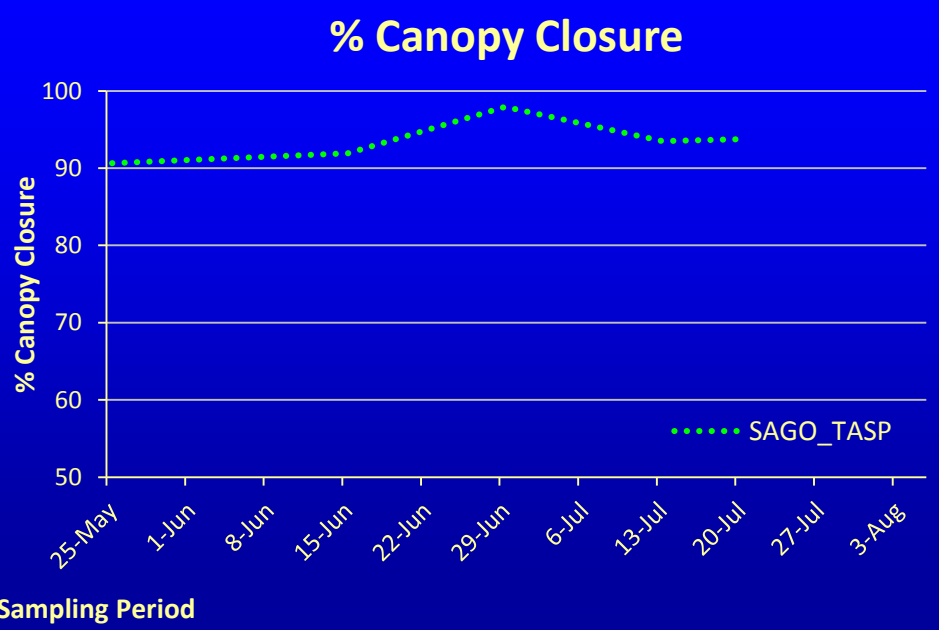
Results

Bill Williams



- Slight decrease in % green foliage – obs variation?
- No change in % leafless stems
- Slight increase in % canopy closure

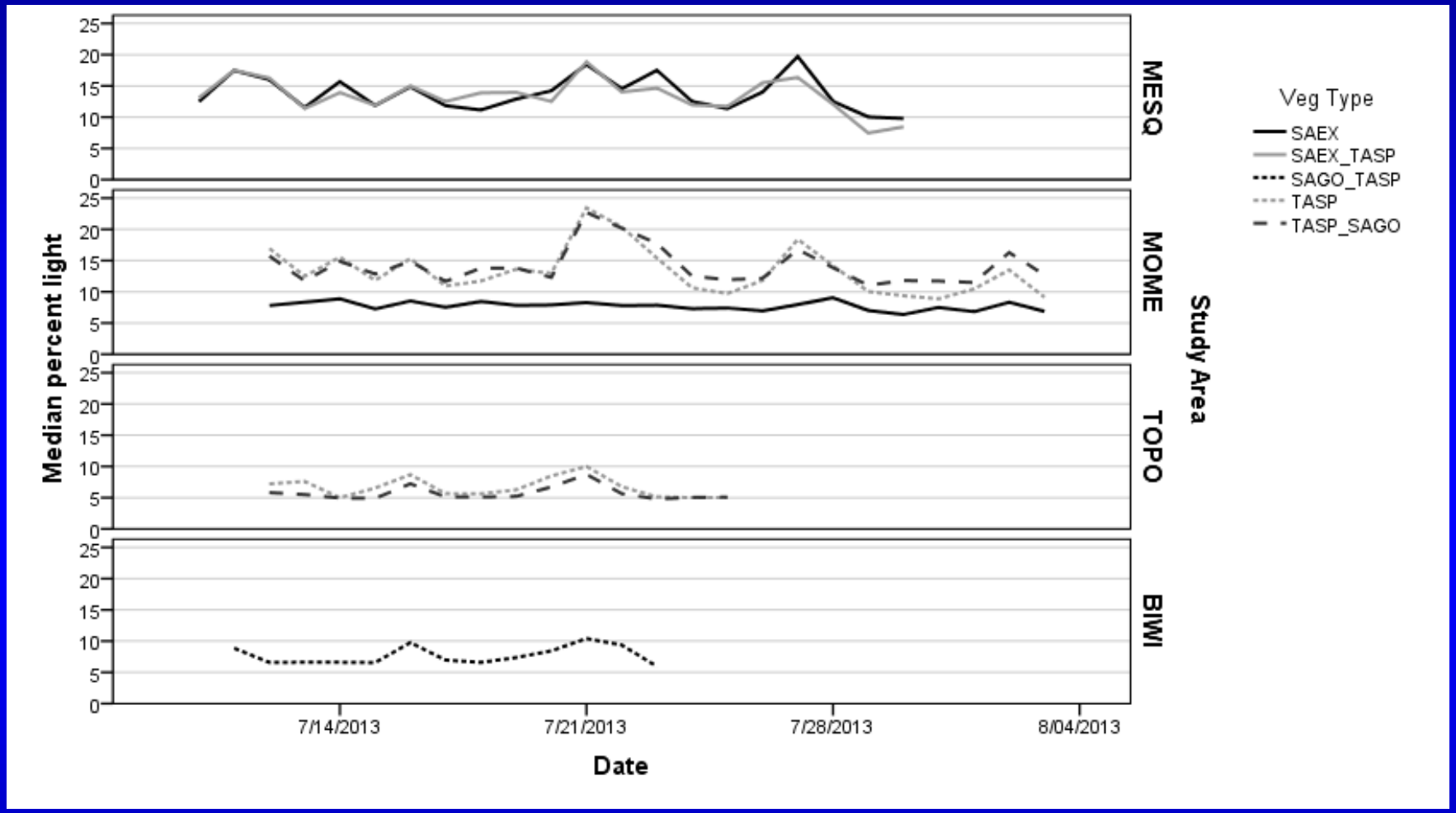




Light loggers

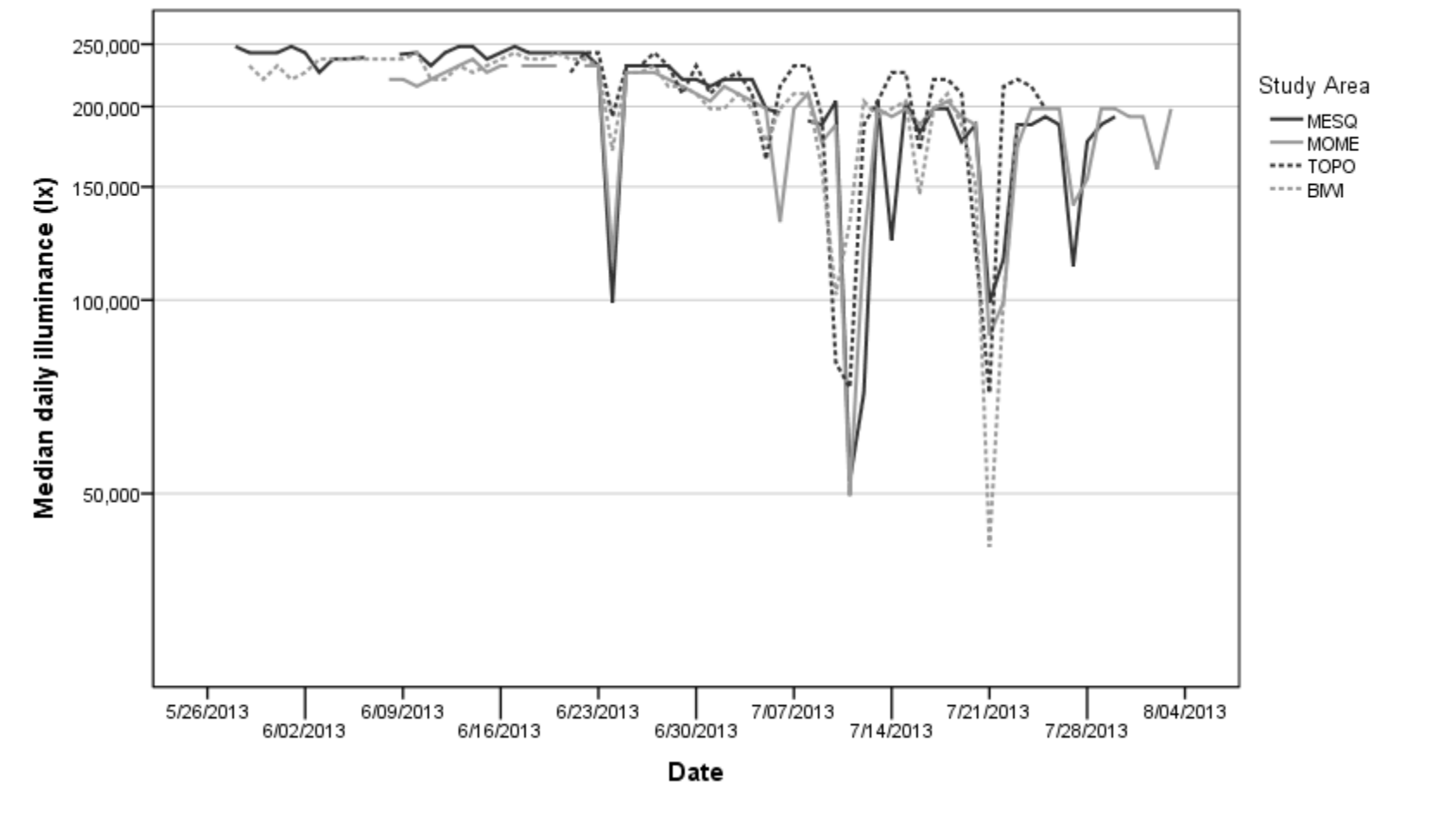
- Pilot year:
  - 2 test and 1 control for full season
  - remainder of test loggers installed early July
  - controls make good scratching posts!
- Data management:
  - calculated percent light
  - truncated data to 0900-1500h

Percent light at monitoring points



- TOPO and BIWI shadier than MESQ and MOME
- At MOME, SAEX shadier than TASP and TASP_SAGO
- Peaks in % light correspond with cloudy days

Light levels at control loggers

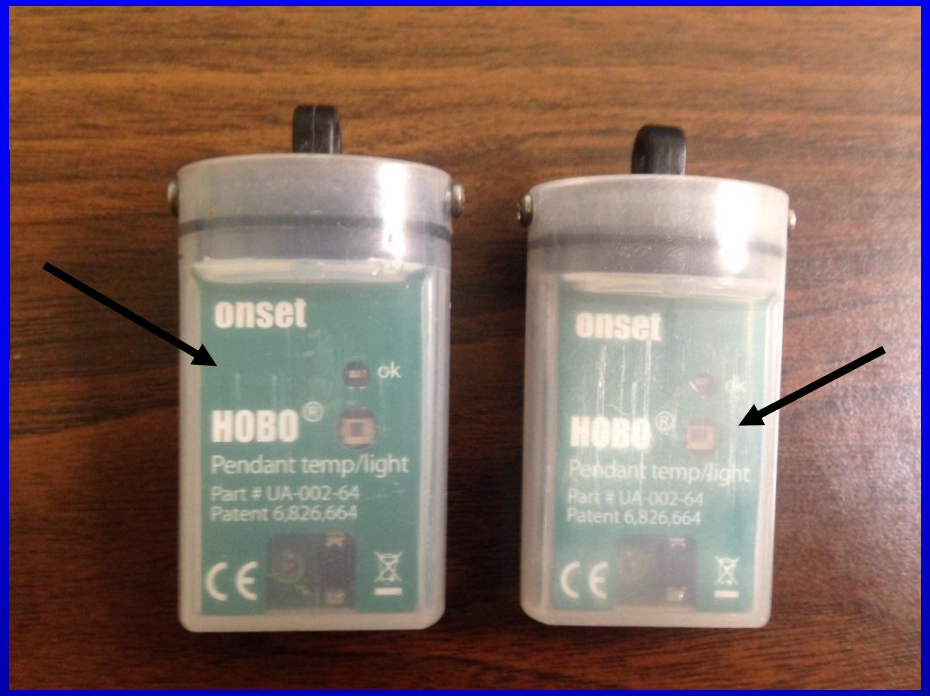


- Cloudy days are readily apparent
- Decreasing light intensity through the season (20%)

Light loggers

- Decreasing light intensity through the season
  - Result of increasing sun angle after solstice?
  - No, this only accounts for about 2%.
  - Loggers intended to record light levels are housed in plastic that gets cloudy when exposed to …. light.

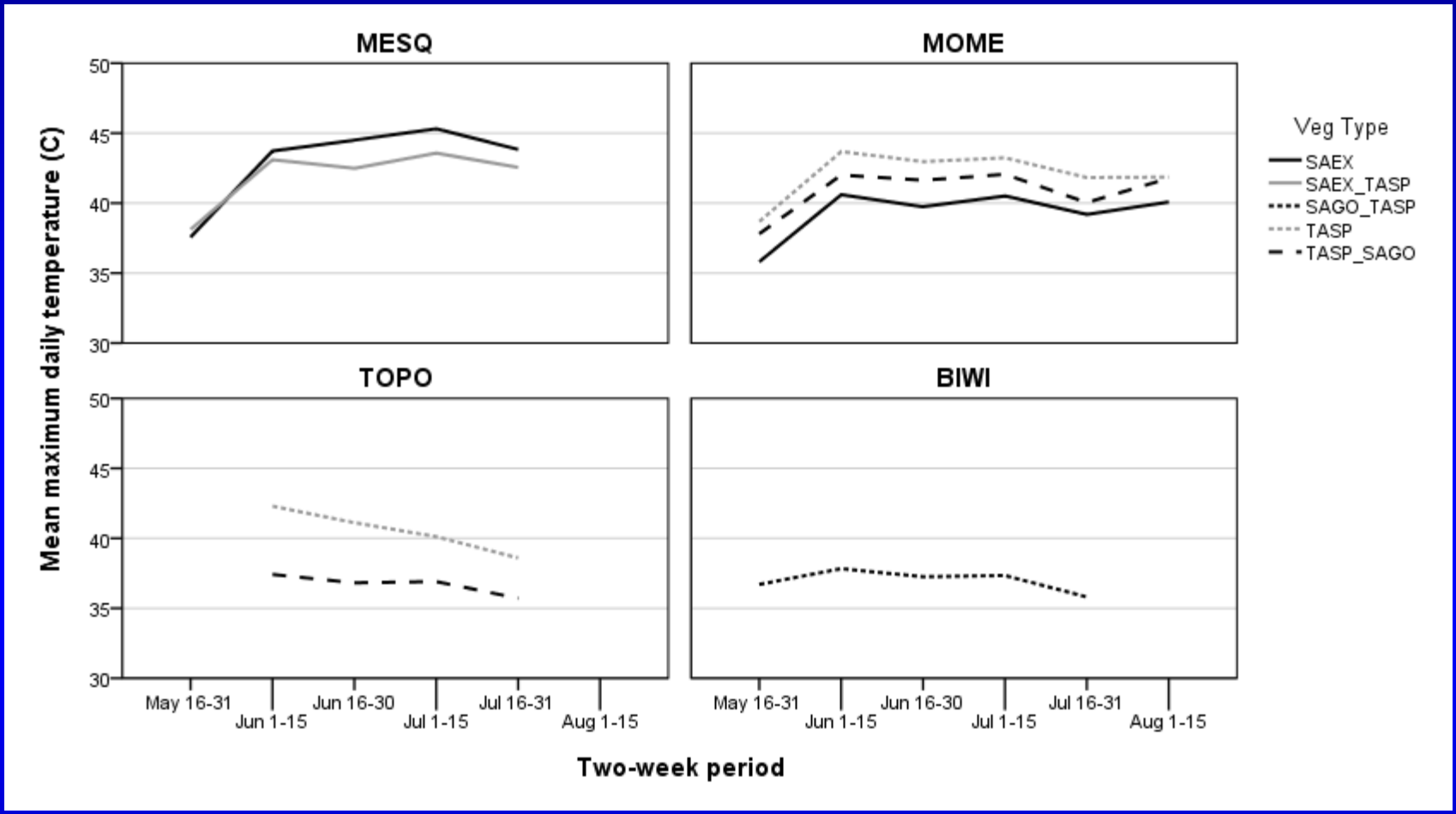
In the shade



In the sun

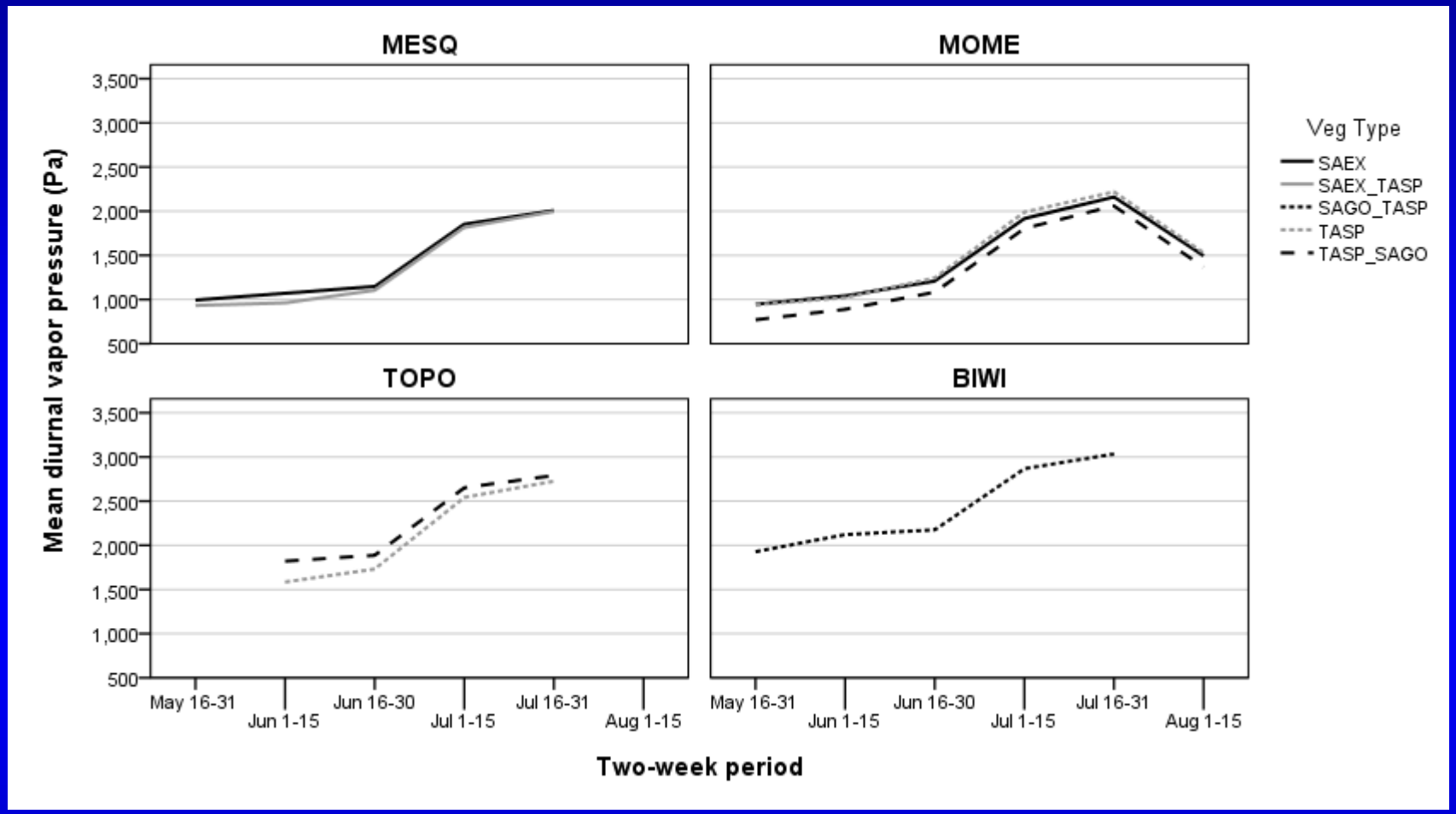
  - Need to change housing monthly

Temperature



- Of veg types at MOME, SAEX was coolest
- MESQ and MOME hotter than TOPO and BIWI

Humidity



- No huge differences between veg types at any study area
- MESQ and MOME less humid than TOPO and BIWI

Results

Other Invertebrates

Splendid tamarisk weevils noted at Topock Marsh and Muddy River

Results

Other Invertebrates

Evidence of vegetation damage presumed from weevils seen many places.

Results

Other Invertebrates

Topock Marsh: a scale-like insect with yellowing foliage

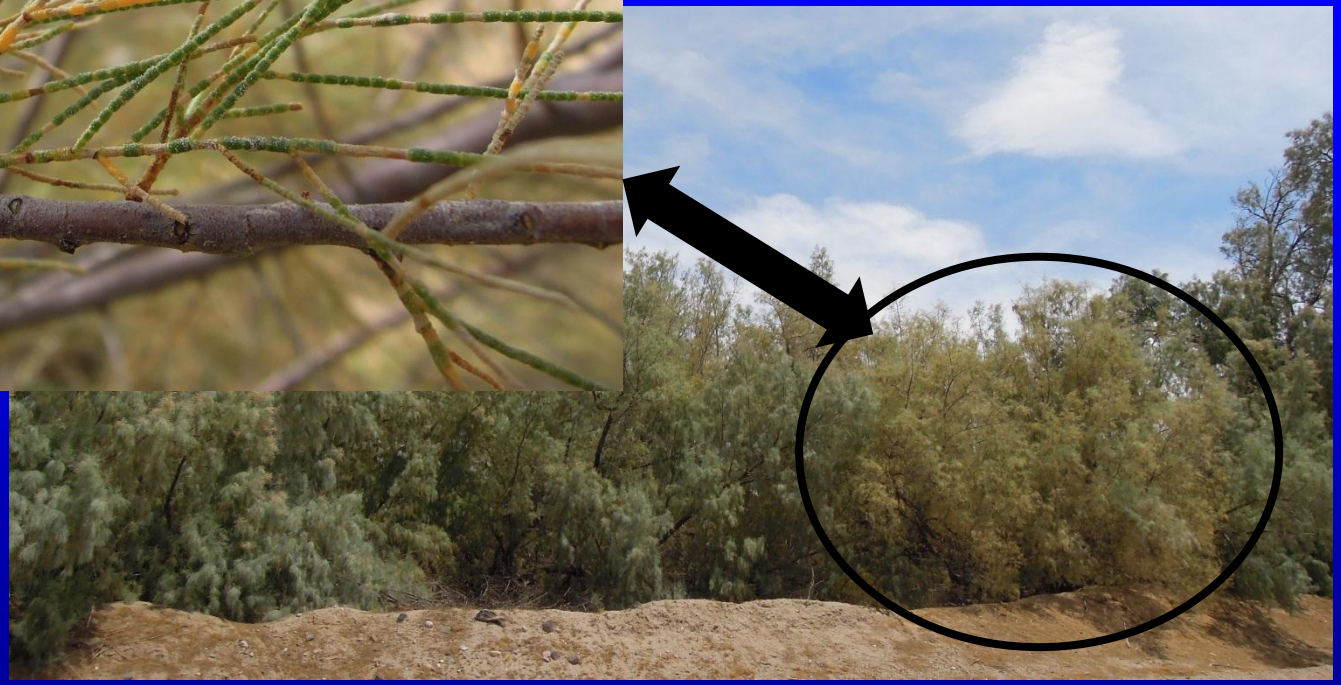
Results

Other Invertebrates

Topock Marsh: Manna mealybug??

Results

Other Tamarisk Yellowing



Lessons Learned

- In general, the measured metrics tracked well with each other
- Unknown amount of observer variation present in data as well as possible seasonal drift
  - need to quantify??
- Cause of tamarisk vegetation damage not clear-cut
  - several invertebrates feeding on tamarisk
- Our light meters are not meant to be placed in direct sunlight…
  - go figure

Questions?