Building habitat resilience for an endangered butterfly

Sarah Hamman, Adam Martin, Maggie Anderson – Ecostudies Institute

Scott Harris, Denise Giles – Institute for Applied Ecology

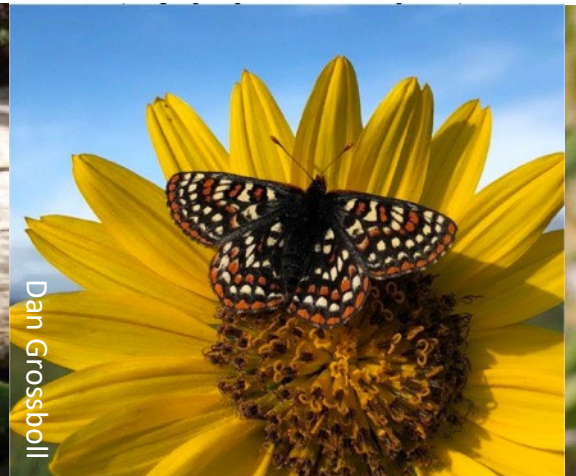
Climate impacts on prairie habitat

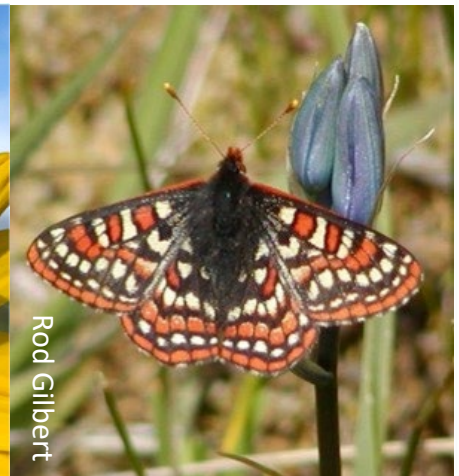
- Prairie species are adapted to summer drought
- More extreme conditions (i.e., summer heat dome) have had uneven impacts on habitat and species
- Need to build resilience into landscape to sustain populations of rare species
- Rare species reintroduction efforts should account for climate and microclimate impacts on habitat

Taylor's checkerspot butterfly (*Euphydryas editha taylori*)

- Endangered butterfly – listed in 2013
- Historically existed from Southern British Columbia down into California
- There are currently small, fragmented populations in BC, Olympic Peninsula, the South Sound, and Willamette Valley
- Persists in open prairie and bald habitat

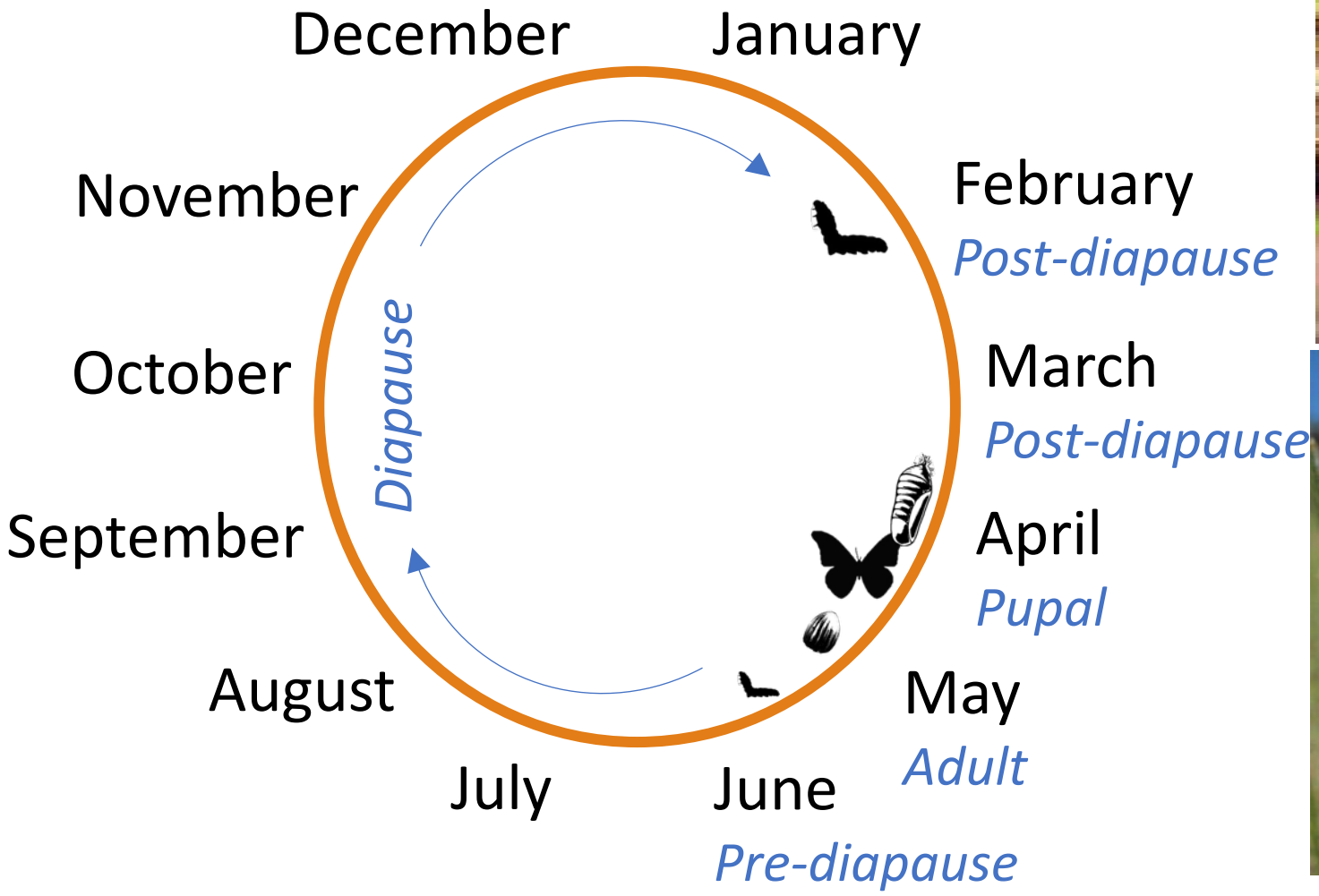








Taylor's checkerspot butterfly habitat and life cycle









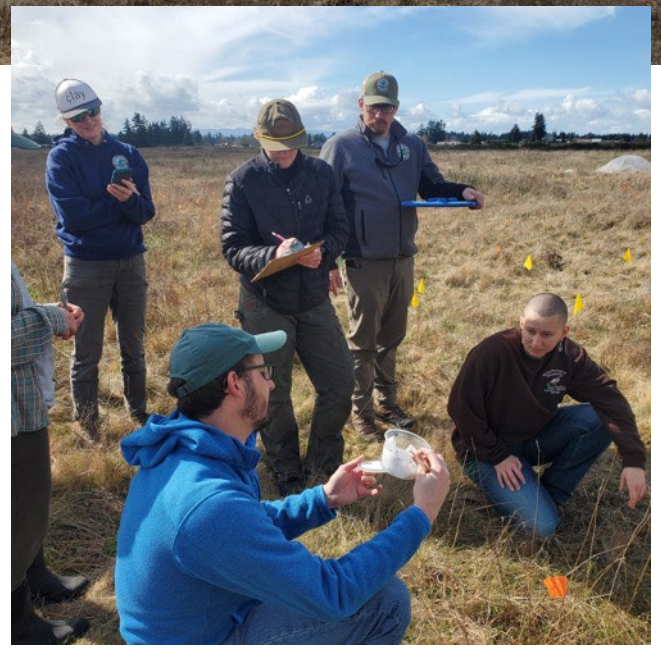
TCB Reintroduction efforts







Technicians at MCCCW hold a Taylor's checkerspot butterfly. Photo by SPP Staff.



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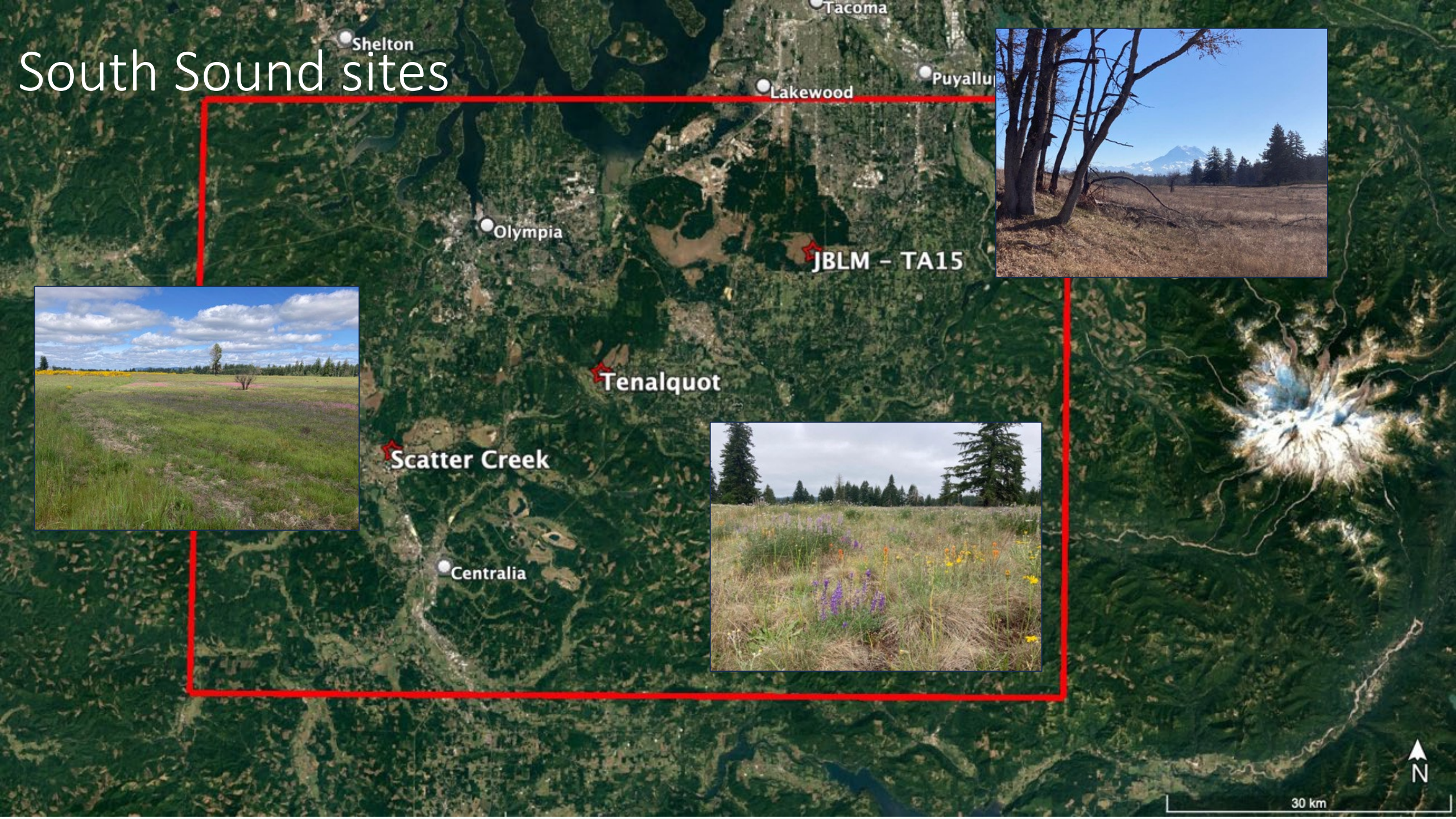
SPP
Sustainability in Prisons Project

Project Objectives

1. Characterize site & microsite conditions across the landscape that support host plant species.
   - Microsites: Hot-Xeric; Hot-Mesic; Cool-Xeric; Cool-Mesic
   - Established 5 replicate 4m x 4m plots in each of 4 microsites at each of 3 sites (60 plots) in 3 regions
2. Evaluate the effects of microsite conditions on the phenology of *Castilleja* sp. and *P. lanceolata*.



South Sound sites



Methods

Microsite characterization



Collected:

- soil temperature (year-round)
- soil moisture (every 2 weeks during active larval stages)

Host plant availability



Recorded (every 2 weeks)

- host plant phenology
- Plant growth
- Plant health metrics every 2 weeks

TCB habitat suitability



Monitored (in each microsite):

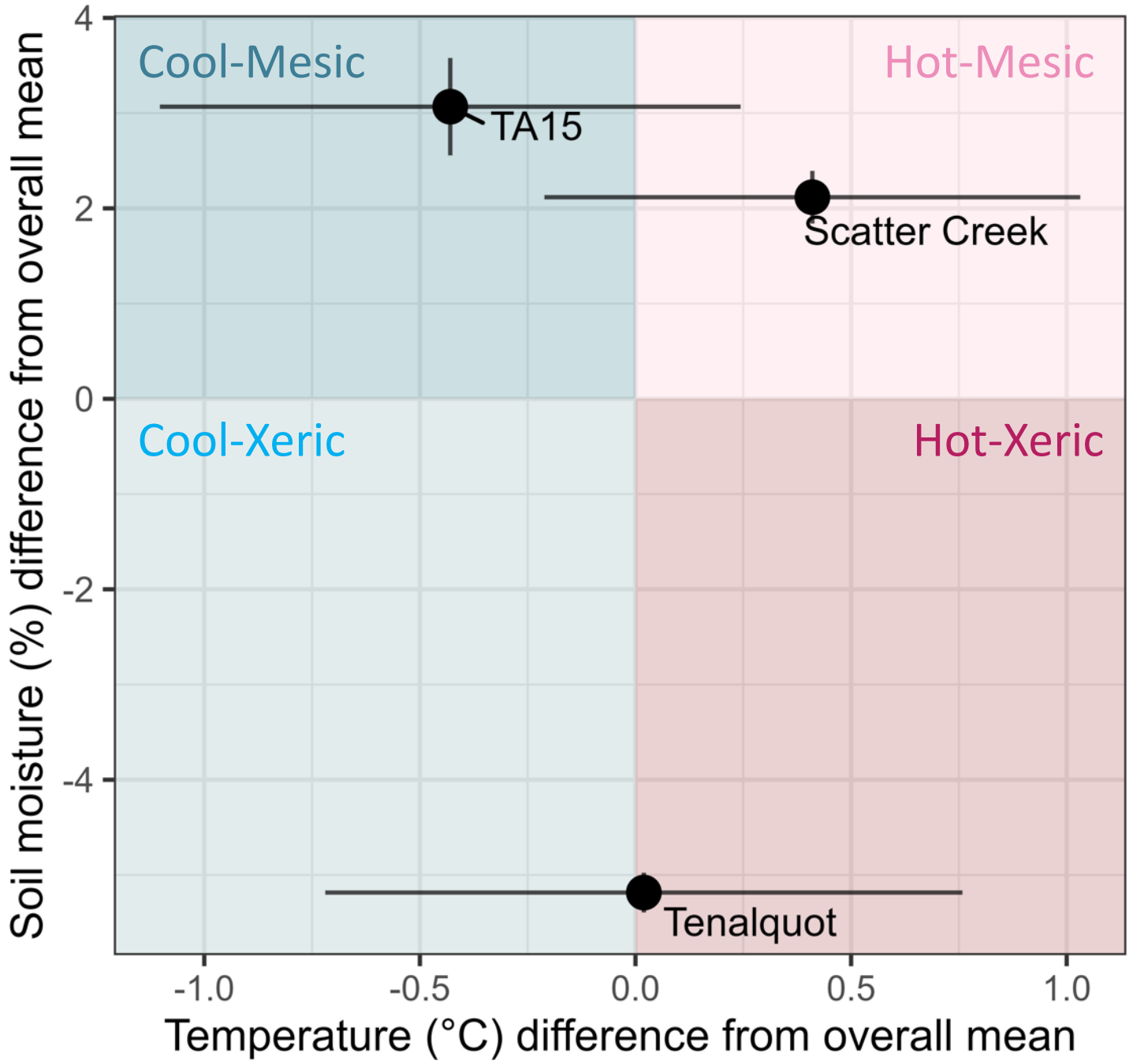
- species richness/nectar resources
- bare ground
- TCB host plant patch size

Results

Characterizing sites

<u>Overall:</u>

- TA-15 is cooler and wetter than the other sites
- Scatter Creek is generally warmer than the other sites
- Tenalquot is substantially drier than the other sites



Results

Characterizing microsites

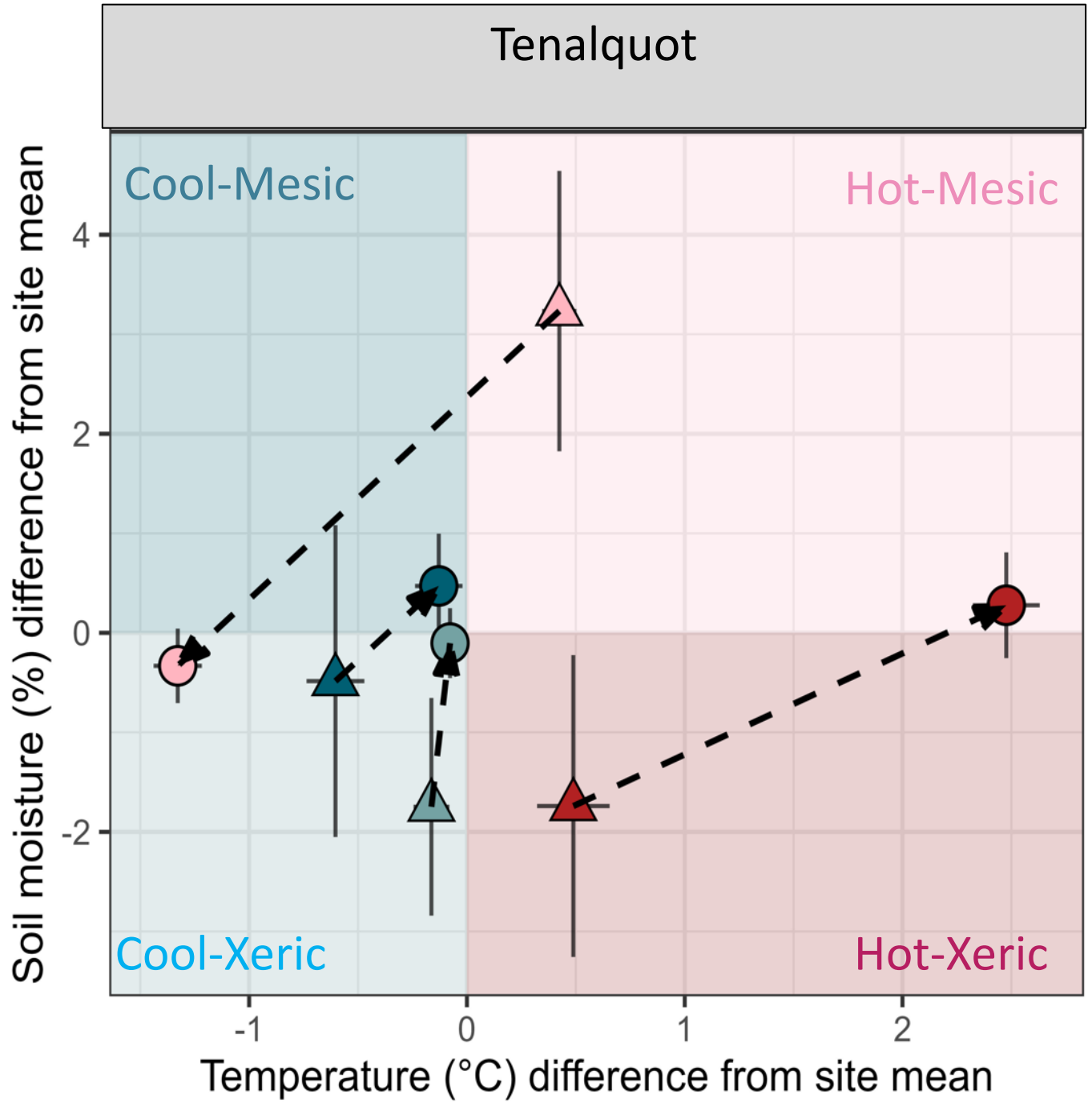
TCB Phase

▲ Post-diapause (Feb-March)

● Pre-diapause (June-July)

Microsite

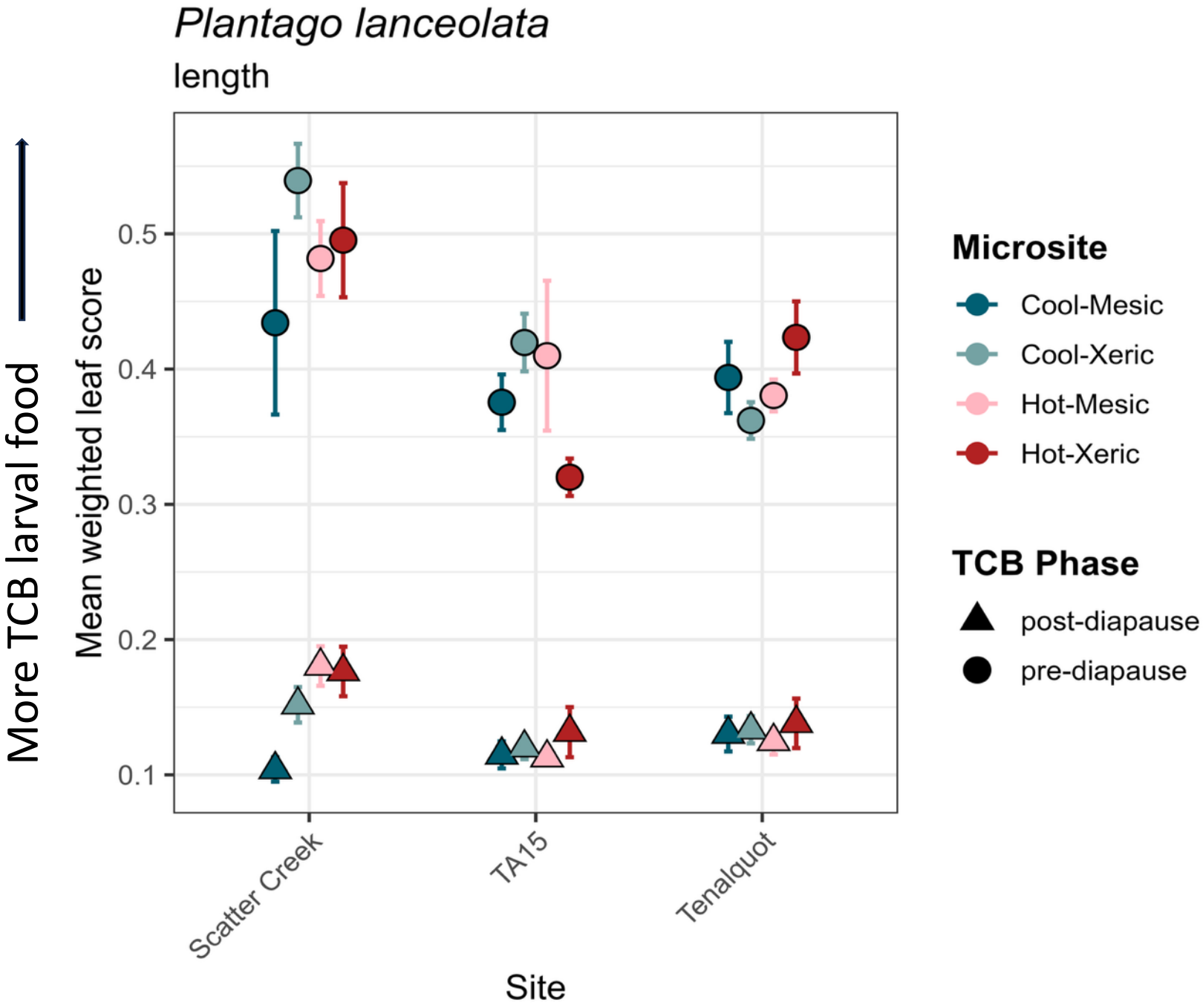
- Cool-Mesic
- Cool-Xeric
- Hot-Mesic
- Hot-Xeric



Results

Microsite effects on TCB host plants





Results

Microsite effects on TCB host plants



More TCB larval food

Castilleja sp.

tallest stem height

Mean weighted plant score

0.0
0.2
0.4
0.6

Scatter Creek
TA15
Tenalquot

Site

Microsite

- Cool-Mesic
- Cool-Xeric
- Hot-Mesic
- Hot-Xeric

TCB Phase

- post-diapause
- pre-diapause

Conclusions

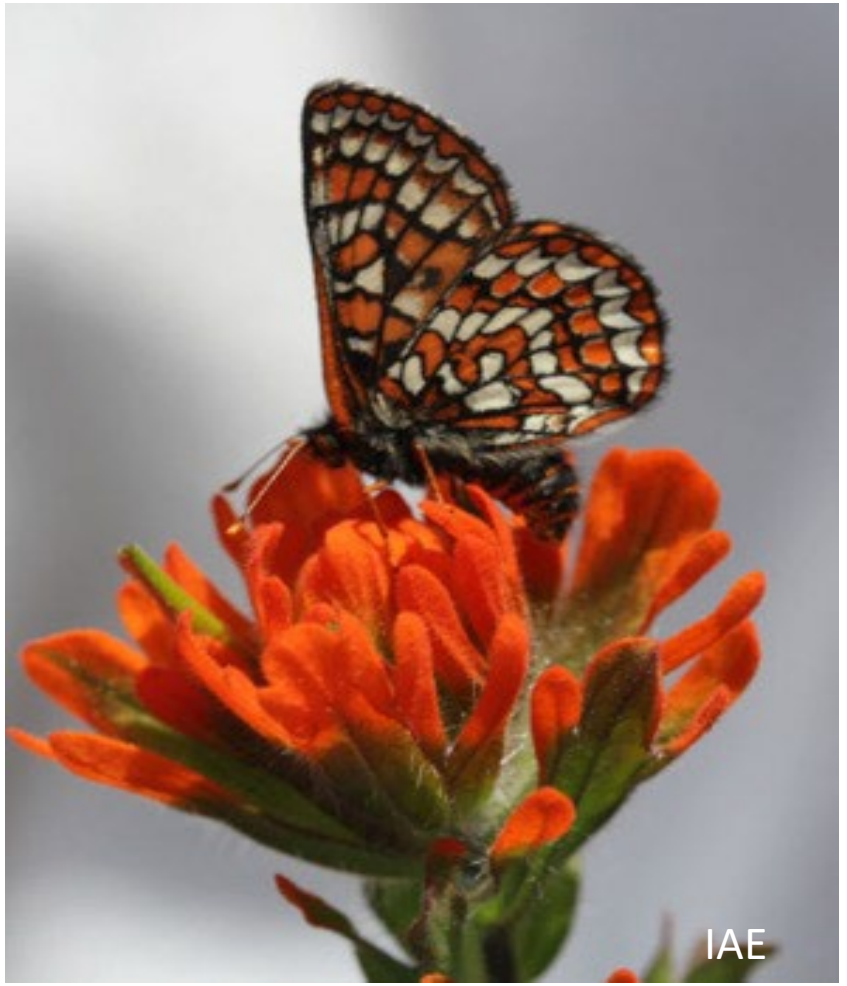
- **Between site variation:** Each site had different abiotic conditions (soil temperature and moisture)
- **Microsites matter:** Microsites followed different soil/temperature patterns throughout the year
- **Larval food availability varies by species and microsite:**
  - **Plantain** – grows best in the hot-xeric sites during post-diapause; No pattern during pre-diapause. *Did not grow well in cool-mesic!*
  - **Paintbrush** – no pattern during post-diapause (too small); grows best in hot-mesic and cool-xeric during pre-diapause.





Implications for restoration and recovery

- Identifying and tracking site abiotic conditions can inform site selection for reintroduction effort
- Important to choose microsites that support maximum host plant growth potential during critical butterfly life stages.
- Sites that host multiple microsites, ranging from cool and dry to warm and dry will provide greatest resiliency for Taylor's checkerspot butterfly habitat



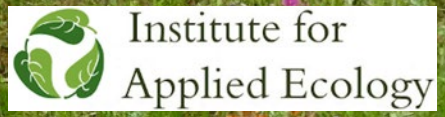
Questions?

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