



# Hilton or Hotel California? Migratory dragonfly species' use of Crystal Springs Creek in Westmoreland Park

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# Crystal Springs Creek, Westmoreland Park

Post-restoration:

- ~4X increase in odonate diversity (16 spp.)
- increased abundance



# Crystal Springs Creek, Westmoreland Park

Post-restoration:

- all life stages
- patrolling, mating, ovipositing, emerging



Tule Bluets; CASM



Twelve-spotted Skimmer; CASM



Darner nymph; CASM

# Crystal Springs Creek, Westmoreland Park

Post-restoration:

- 3 migratory dragonfly species used habitat throughout season
- (wait a minute... dragonflies migrate?!?)



Variegated Meadowhawk; CASM



Black Saddlebags; CASM

# Wait...dragonflies migrate???

5 species in N. America are annual long-distance migrants:

- Common Green Darner \*
- Variegated Meadowhawk \*
- Black Saddlebags \*
- Wandering Glider
- Spot-winged Glider



Dragonfly swarm, Tabasco; CASM

# Wait...dragonflies migrate???

- large aggregations and/or sustained directional southward flights in late summer/early fall
- movement north in spring over longer period, broader front, smaller groups



# Wait...dragonflies migrate???

CGD, BS, and VM have overwintering strategies

- residents & migrants can have spatial & temporal overlap
- facultative migrants
- physiological triggers not fully known



Common Green Darners CASM

# Wait...dragonflies migrate???

Still much to be learned at regional levels

- timing of movement
- local life history
- relationship between resident & migrant populations



Common Green Darners (*Anax junius*), CASM



# Surveys

- nymphs & adults surveyed every 10-16 days
- nymphs surveys year-round
- adult surveys March - October



California Spreadwing; CASM



Skimmer nymph, CASM



← Nymphs

- all weather

Adults →

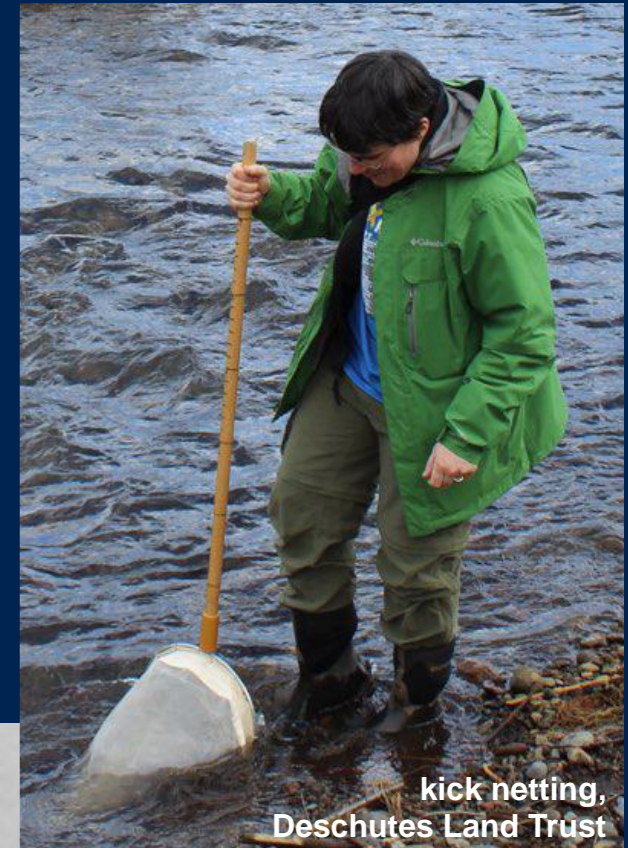
- full to part sun
- little/no wind
- 58 - 88F  
(14 - 31C)



# Surveys

## Nymphs

- D-net kick & sweep samples
- 6 net sets each from wetlands & stream processed separately
- body length
- ID to family & genus



kick netting,  
Deschutes Land Trust



Black Saddlebags;  
Great Lakes Seagrant Extension

# Surveys

## Adults

- walk slow transects
- net for in-hand ID
- photographic vouchers



Western Forktail (*Ischnura perparva*), CASM

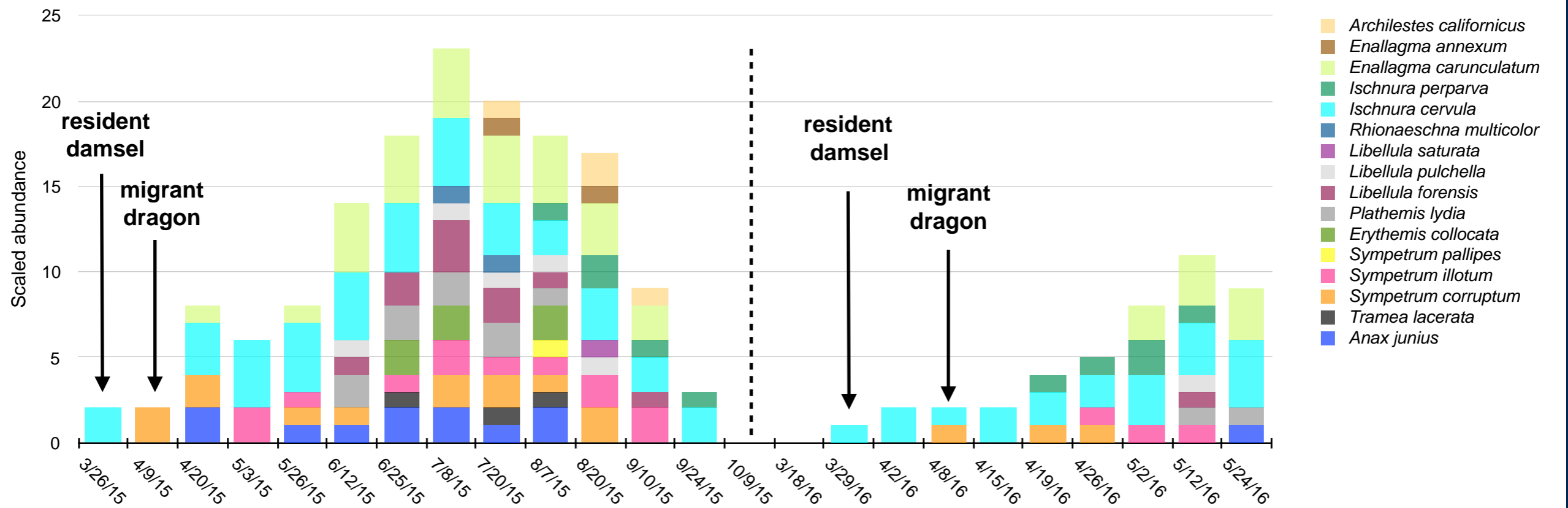


Cardinal Meadowhawk (*Sympetrum illotum*), CASM

# Findings

- resident (*Ischnura cervula*) is first & last to fly
- first dragonflies to appear are migrants

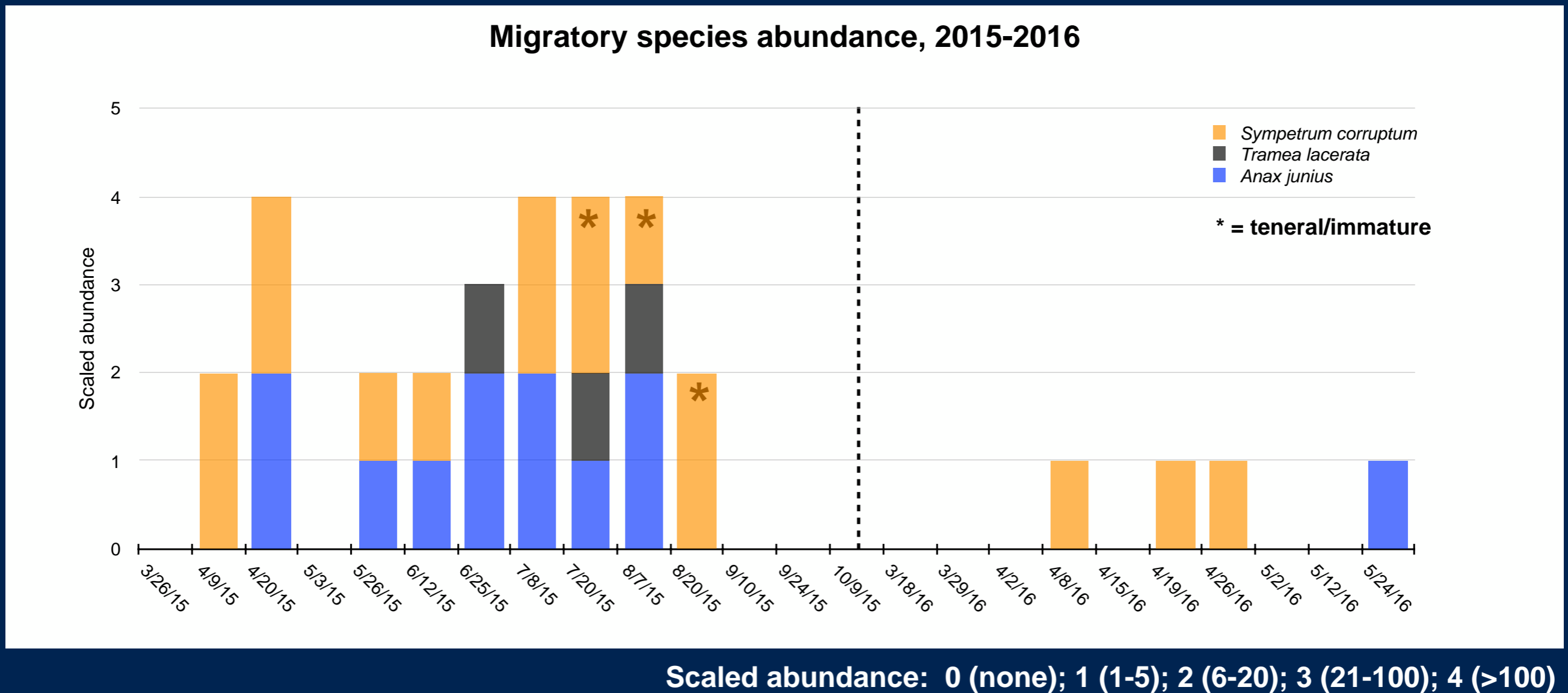
Adult odonate abundance, 2015-2016



Scaled abundance: 0 (none); 1 (1-5); 2 (6-20); 3 (21-100); 4 (>100)

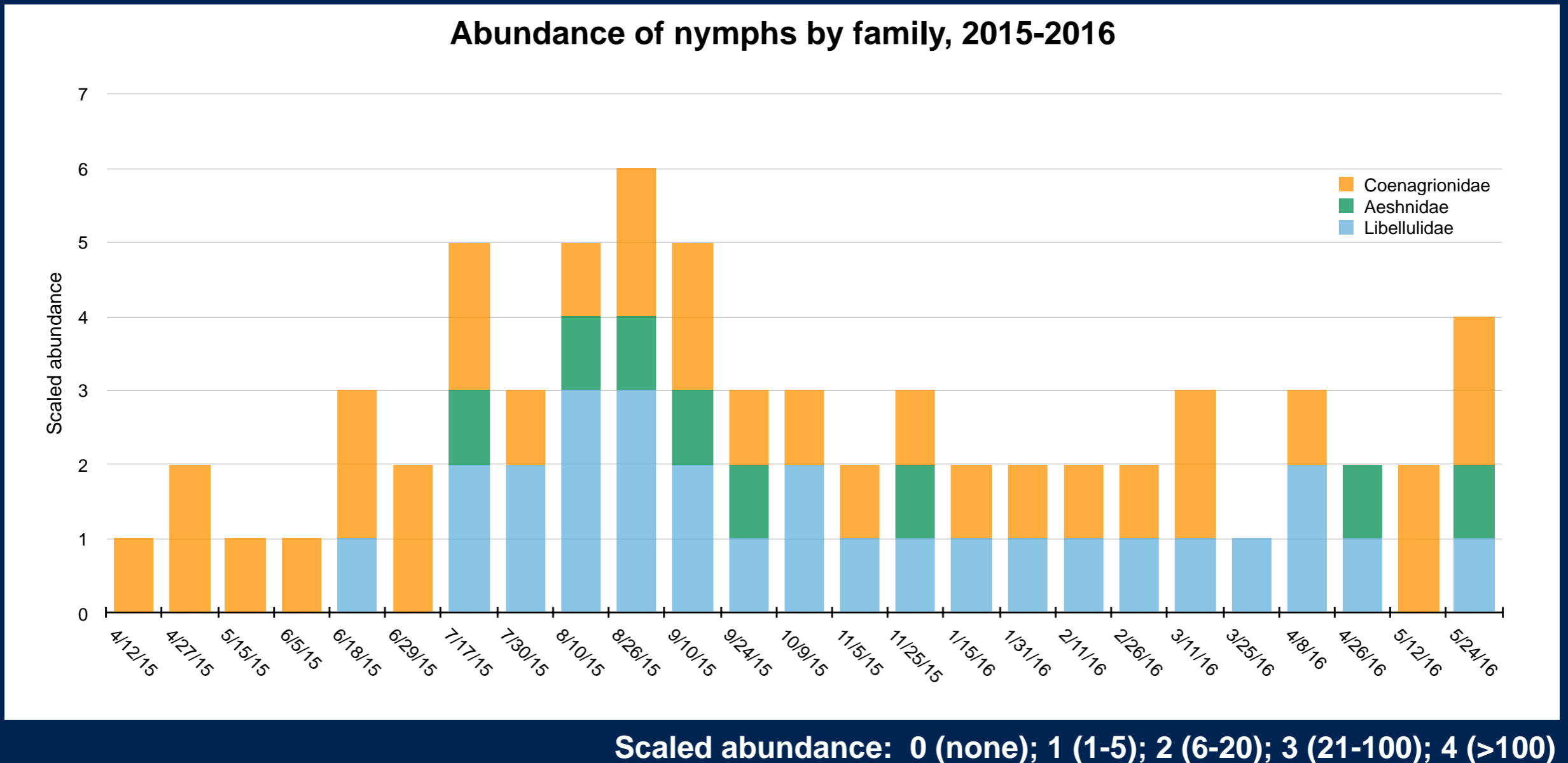
# Findings

- patrolling, mating, ovipositing
- only teneral seen were *S. corruptum*



# Findings

- Skimmer nymphs in wetlands
- Darner & damsel nymphs in stream



# Findings

- *S. corruptum* arrival dates same in 2015 & 2016 but abundances differ
- pattern consistent with successful migrant reproduction, emergence, and fly-off



mature Variegated Meadowhawk; CASM



immature Variegated Meadowhawk; CASM



# Findings

- Much mating & oviposition in Anax but few nymphs & no tenerals
  - reproductive sink?
  - site for re-fueling & resting



Darner nymph; CASM



Common Green Darner (*Anax junius*), CASM

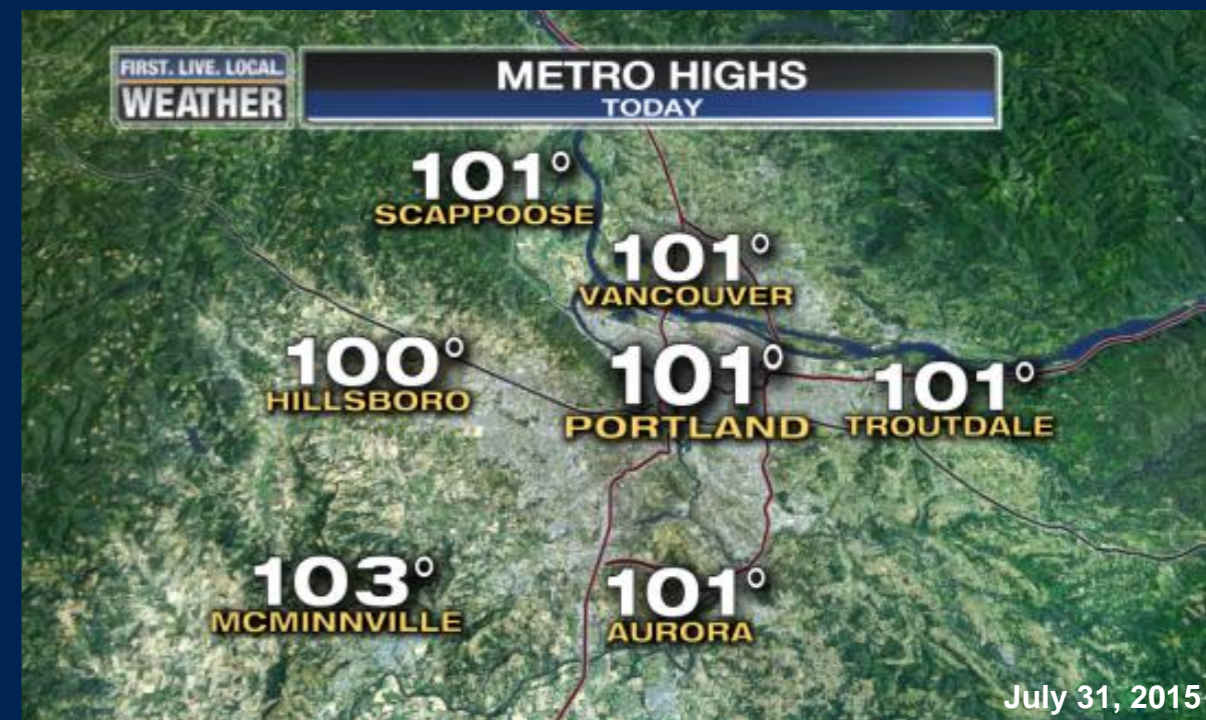
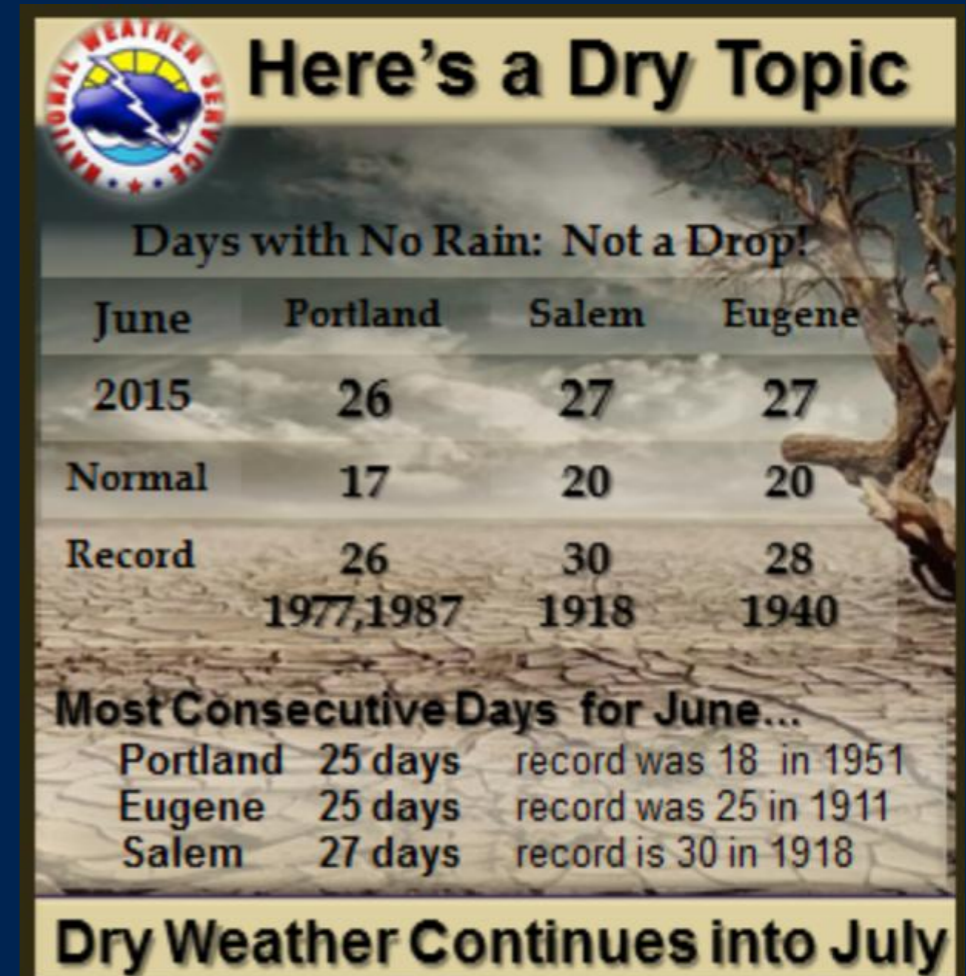
# Findings

- Anax arrived late in 2016 despite earlier presence at other Portland-area wetlands
  - habitat suitability or random chance?



# Potential climatic factors

- hot dry summer in 2015
  - increased nymph & adult mortality?
- wet winter in northern CA
  - survival of overwintering adults?
  - impetus for returning migrants to move north?



# Changes in hydrology at park

- extensive, cool, vegetated wetland persisted through winter 2015
  - productive site for skimmer nymphs
  - dry in spring 2016

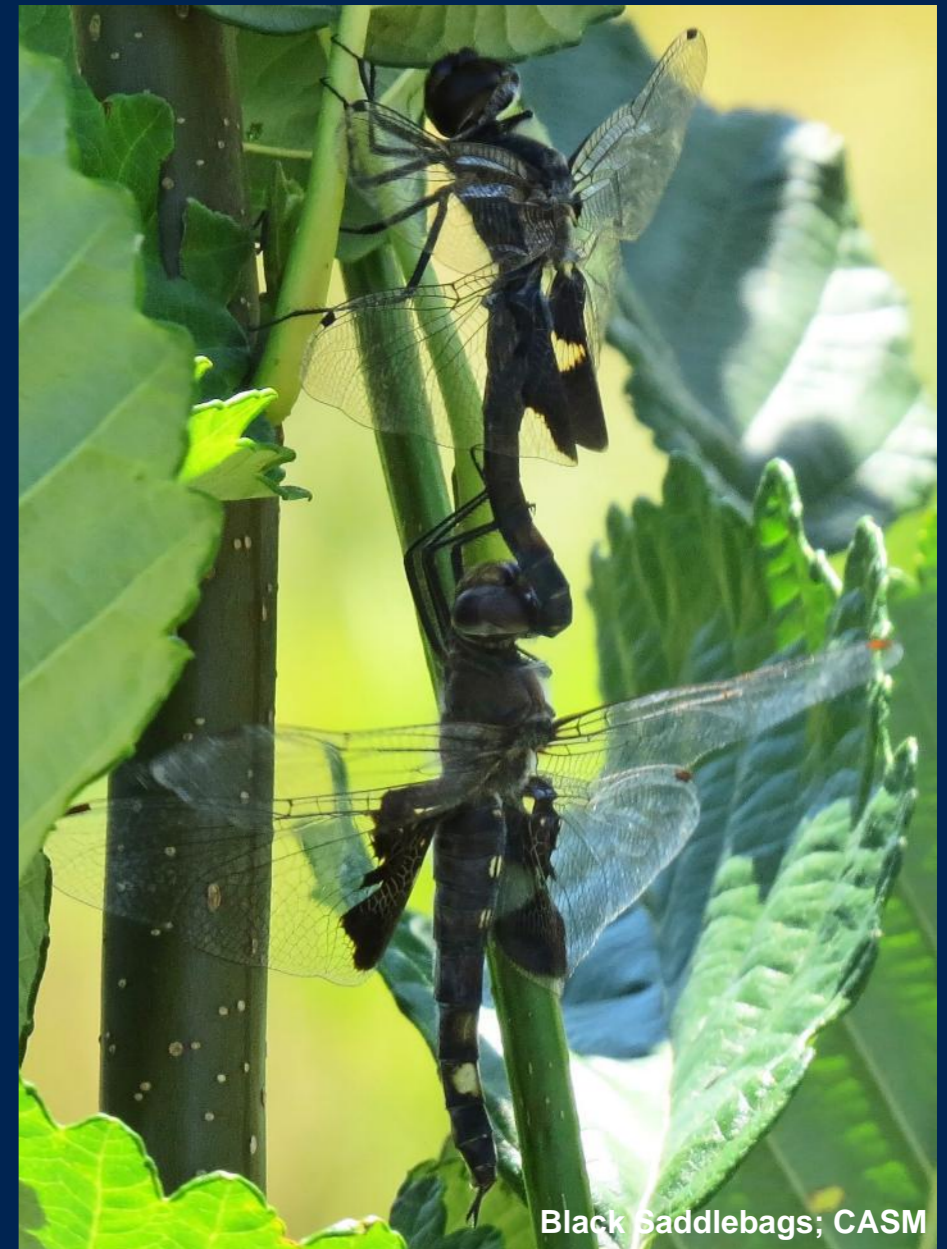


overlook wetland, Westmoreland Park, CASM

# So...Hilton or Hotel California?

Continuing field lab for migratory dragonflies

- population connectivity, ecosystem impacts, timing, climate change



# Acknowledgements

- Betsy Redfearn (Portland Parks & Recreation), permits
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Flame Skimmer; CASM

# Questions?

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Striped Meadowhawk (*Sympetrum pallipes*); CASM



Common Whitetail (*Plathemis lydia*); CASM



Western Pondhawk  
(*Erythemis collocata*); CASM