

iDDC: Generate species-specific expectations for patterns of genetic variation

He, Edwards & Knowles, Evolution 2013

integrative
Distributional
Demographic
Coalescent
modeling

DECRYPT uses a spatially explicit coalescent that is similar in execution (but instead of ABC, implements bpp)

Distributional model
(i.e., ecological niche model) with
predictions on probability of occurrence
across the landscape



Demographic model
informed by habitat
suitabilities



Spatially-explicit coalescent
simulations based on
demographic model



Tests of hypotheses/models
using ABC

Habitat suitability
scores

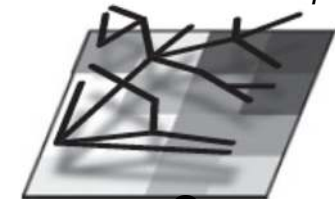
40	20	10	5
100	60	20	10
100	100	40	40
80	80	60	60

$K(m)$

400 (40)	200 (20)	100 (10)	50 (5)
1000 (100)	600 (60)	200 (20)	100 (10)
1000 (100)	1000 (100)	400 (40)	400 (40)
800 (80)	800 (80)	600 (60)	600 (60)

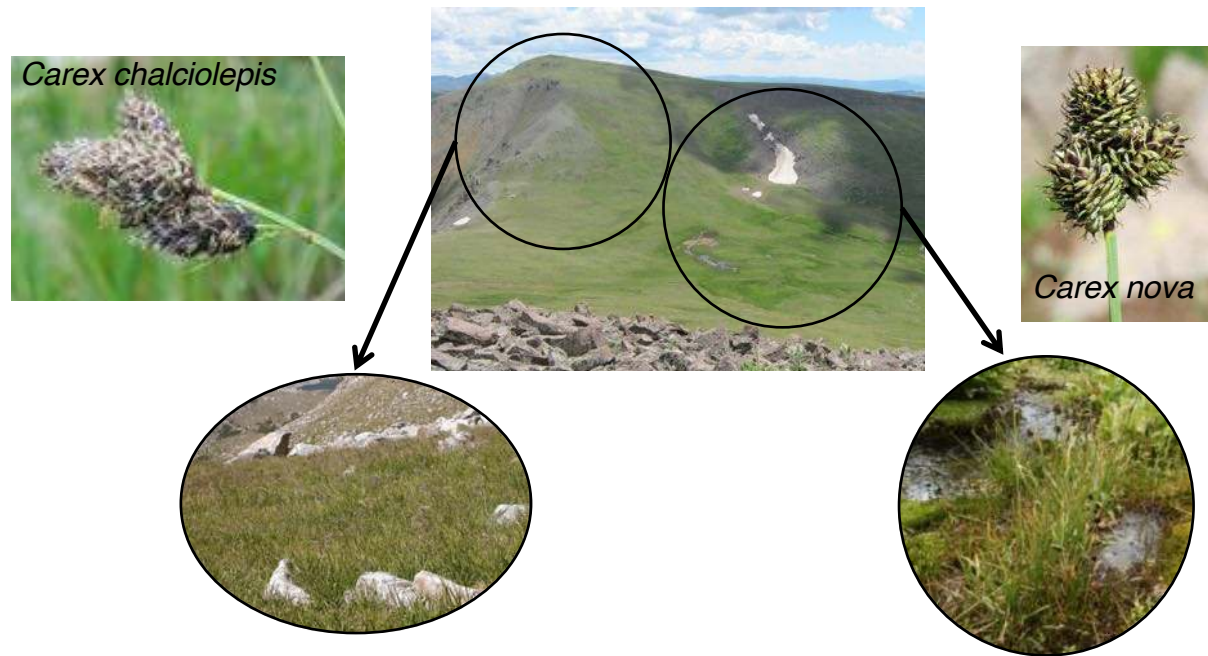
Carrying capacity: k_i

Gene coalescence
across the landscape



SPLATCHE2

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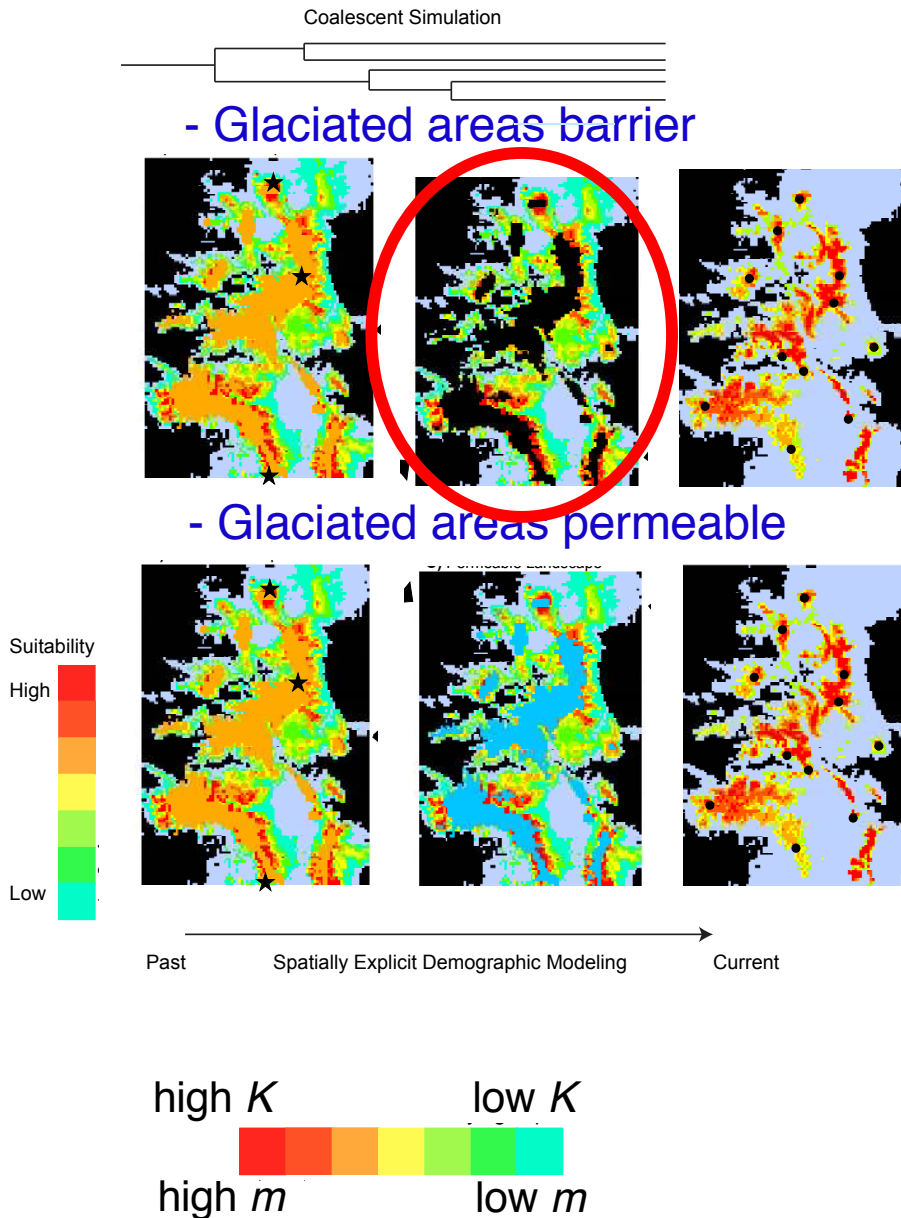


H: species-specific responses to climate change

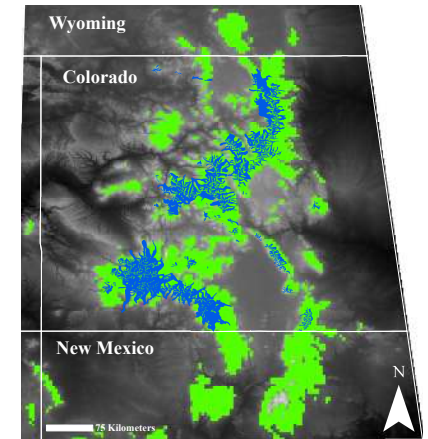
- Glaciated areas act as barriers, but only in wetland specialist



iDDC modeling:



Glaciers shown
in blue



Generate lots of simulated data
sets under each model

We identify sets of parameters for the
models that produce simulated data
that match the empirical data.

Model Selection using
Approximate Bayesian
Computation (ABC)