PINEMAP DSS & MACA updates

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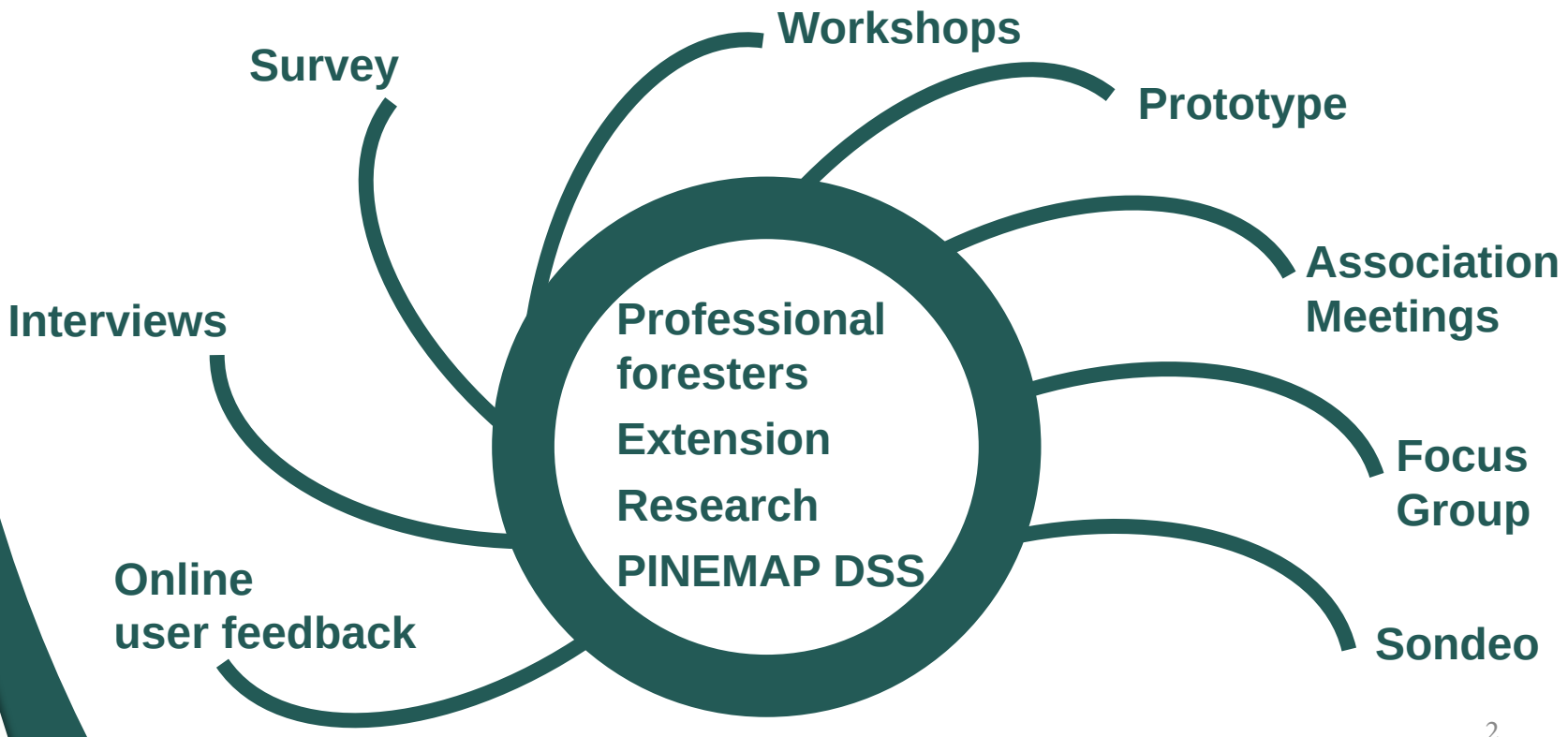
United States Department of Agriculture

National Institute of Food and Agriculture

What are we doing and why?

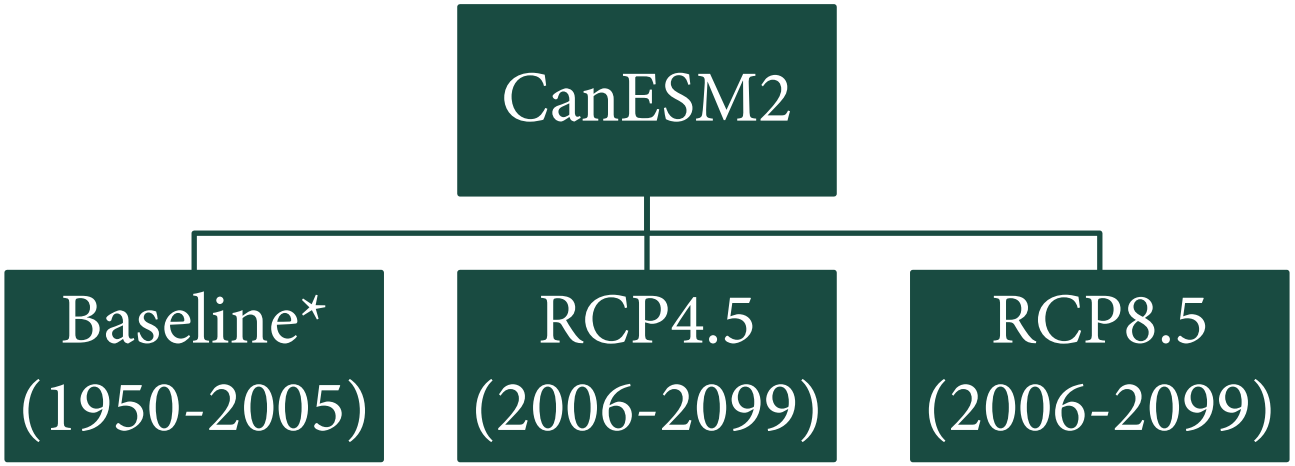
- PINEMAP DSS: version 3 (iterative process)

SECC multi-feedback loop model:



What are we doing and why?

- Multivariate Adaptive Constructed Analogs (MACA) Downscaled Climate Data
  - Statistical downscaling method – daily data
  - 20 different GCMs used by IPCC 5th Assessment



*not actual observations (see email from Tim)

What are we doing and why?

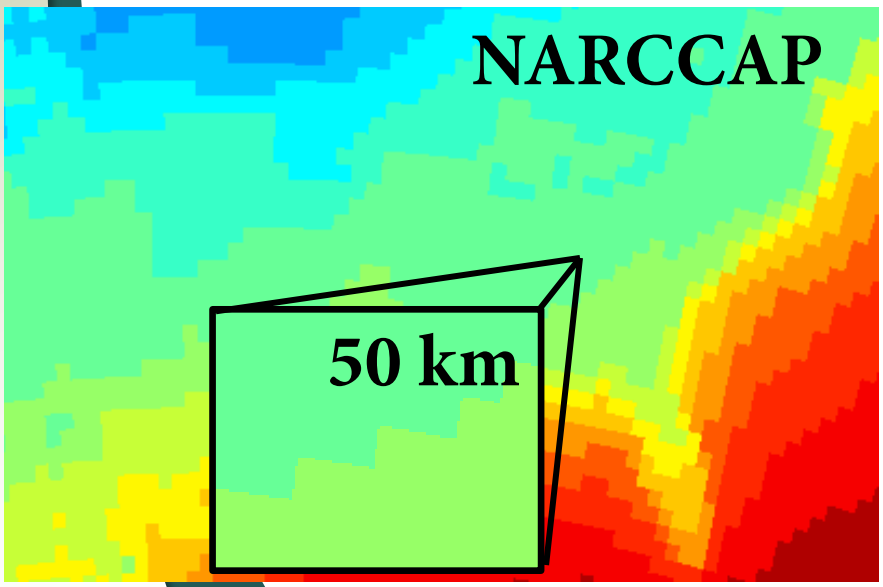
- Multivariate Adaptive Constructed Analogs (MACA)

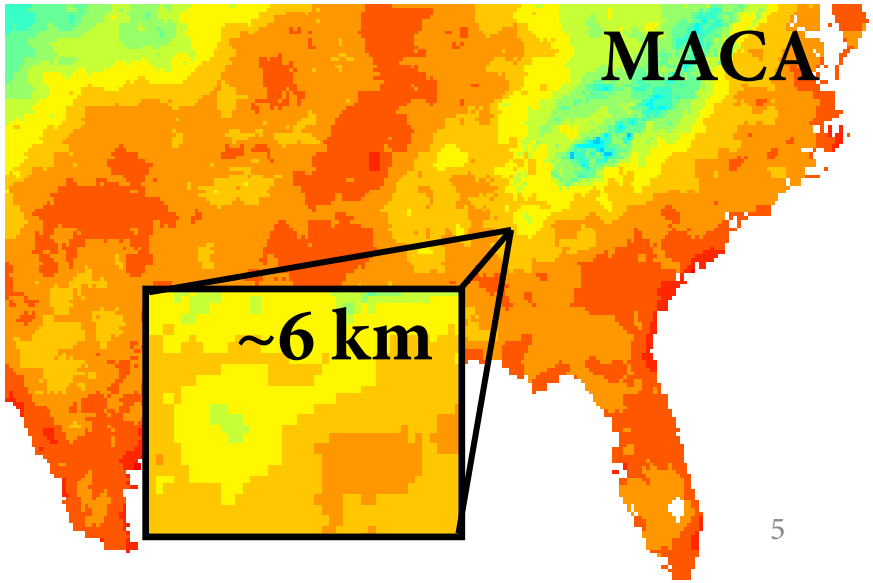
Climate Projections	Spatial Resolution	Temporal Resolution	Future Periods
NARCCAP	50 km	Monthly	2041-2070
MACA	~ 6 km	Daily	2006-2099

What are we doing and why?

- Variables:
  - ***mean wind speed***
  - ***mean specific humidity***
  - ***surface downwelling shortwave radiation***
  - accumulated precip
  - min/max air temp

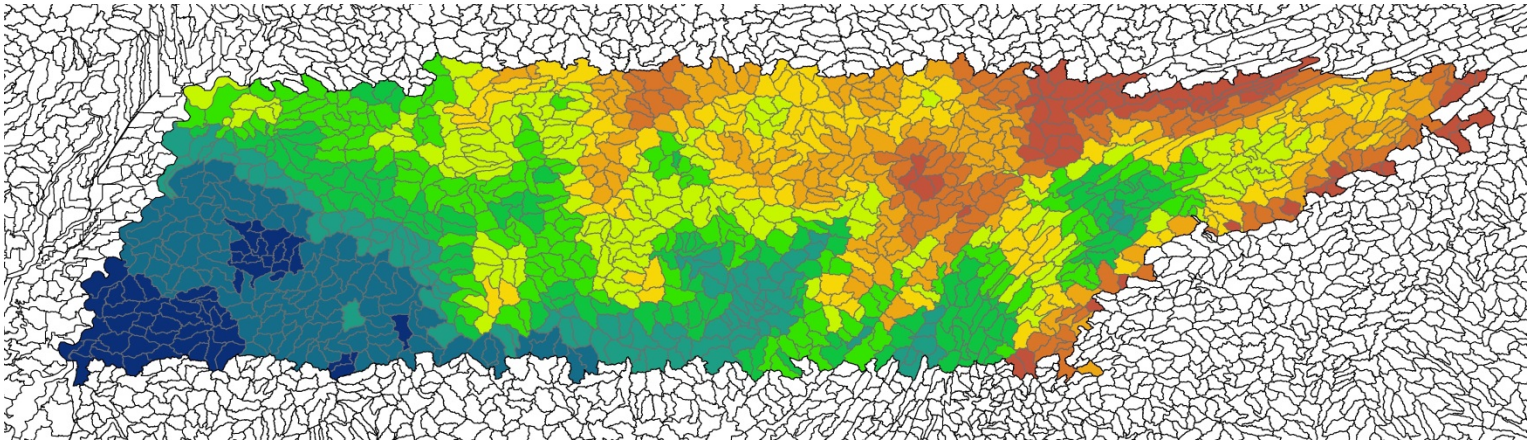
- Example -- spatial resolution differences:



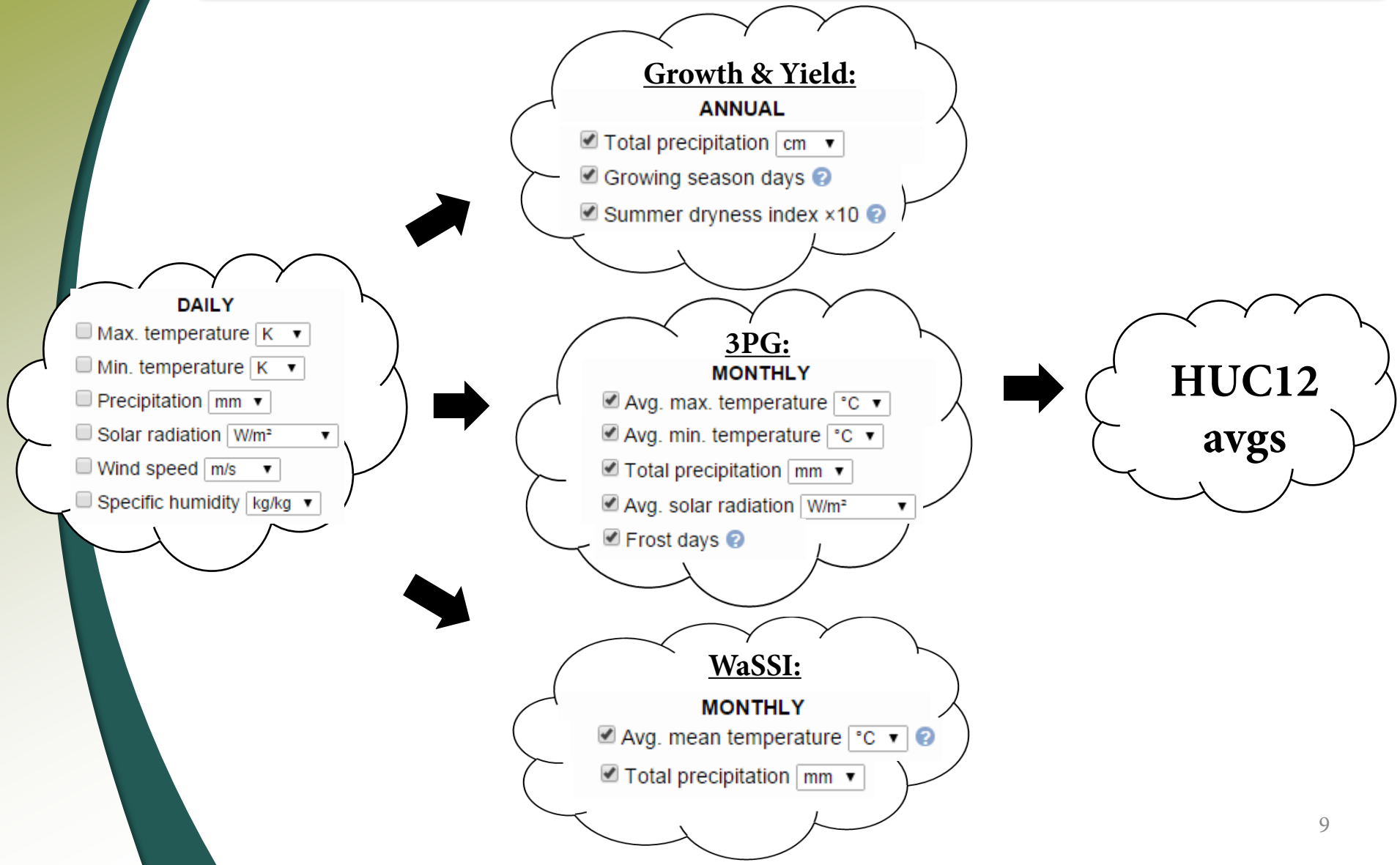


Status Update

- MACA data generated to meet modeler needs
- Why? Wanted dataset to have consistent computation to HUC12 and other calculations
  - Customized formatting for each model

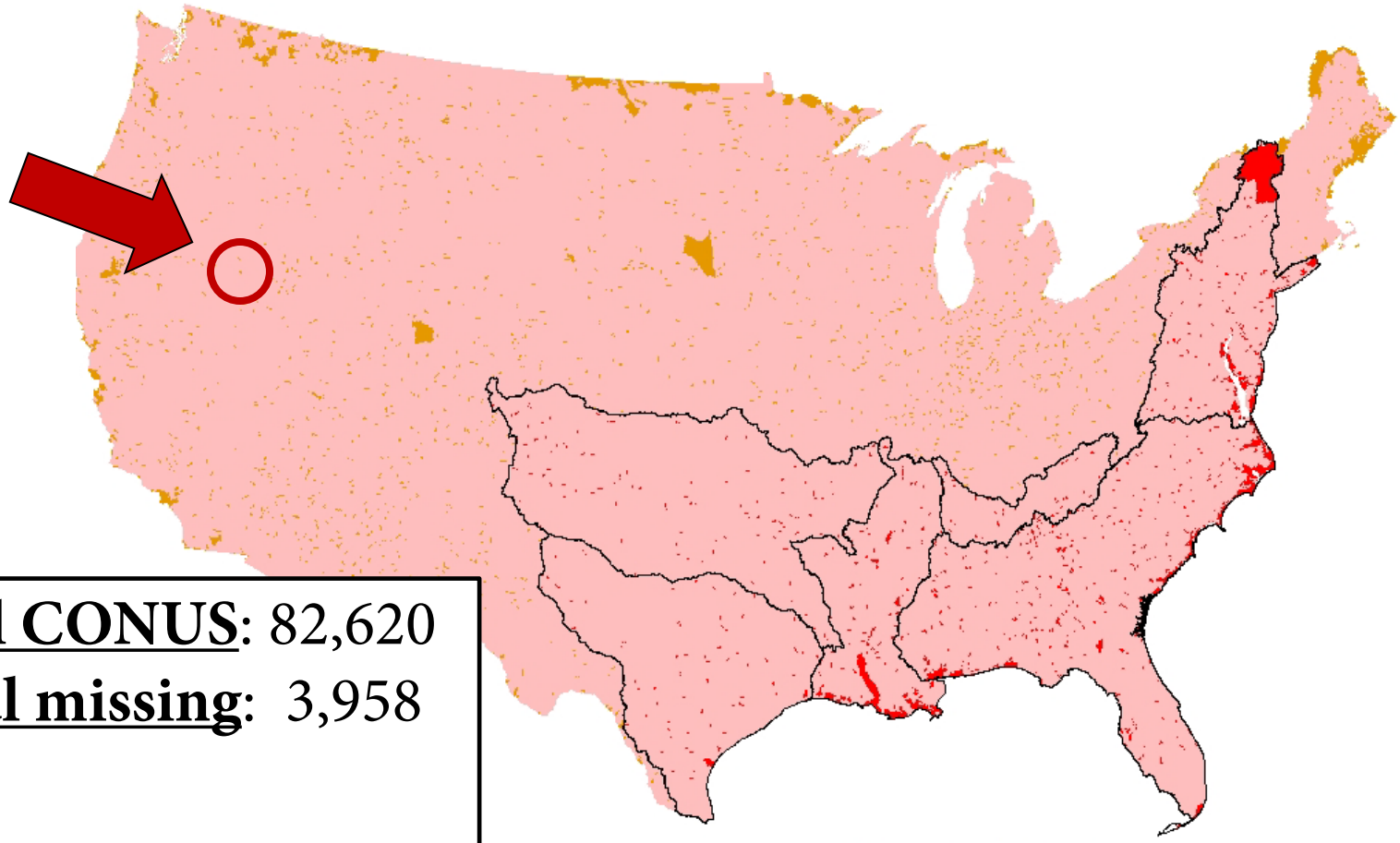


Modeling Needs



Status Update

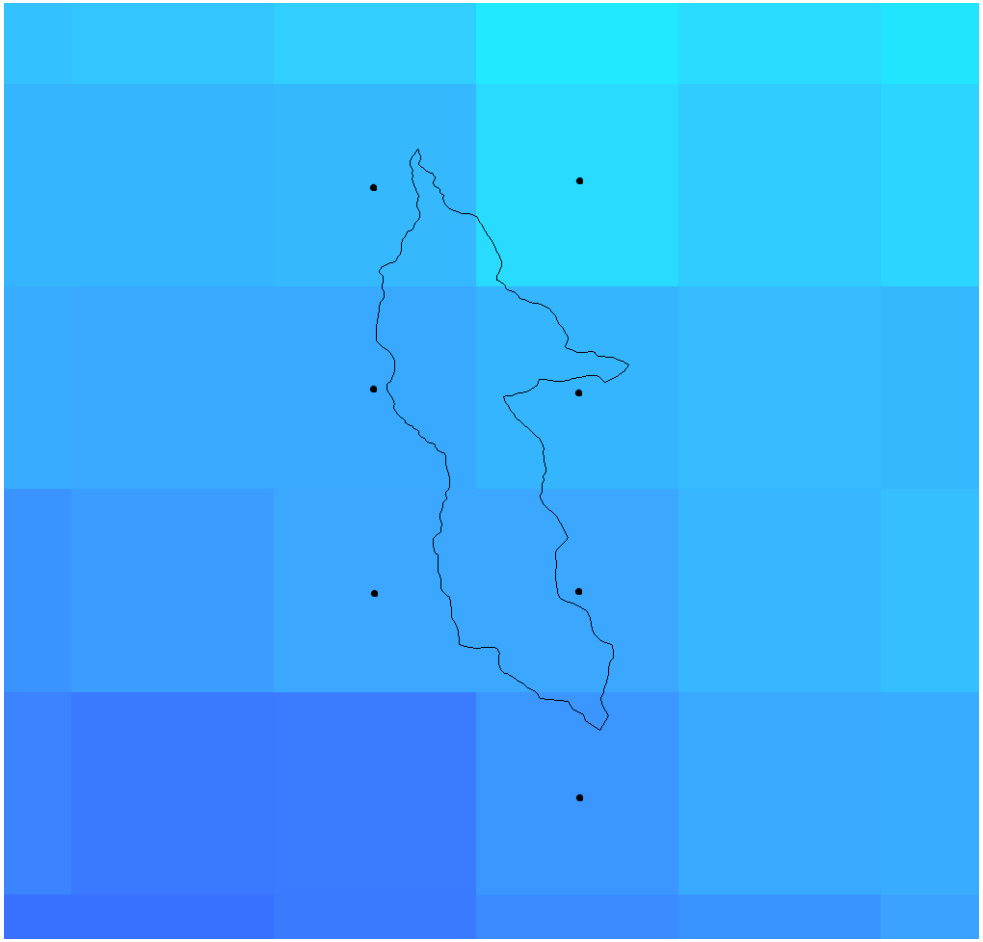
- Another hiccup: missing HUC12 avgs due to centroid methodology



Total CONUS: 82,620
Total missing: 3,958

Status Update

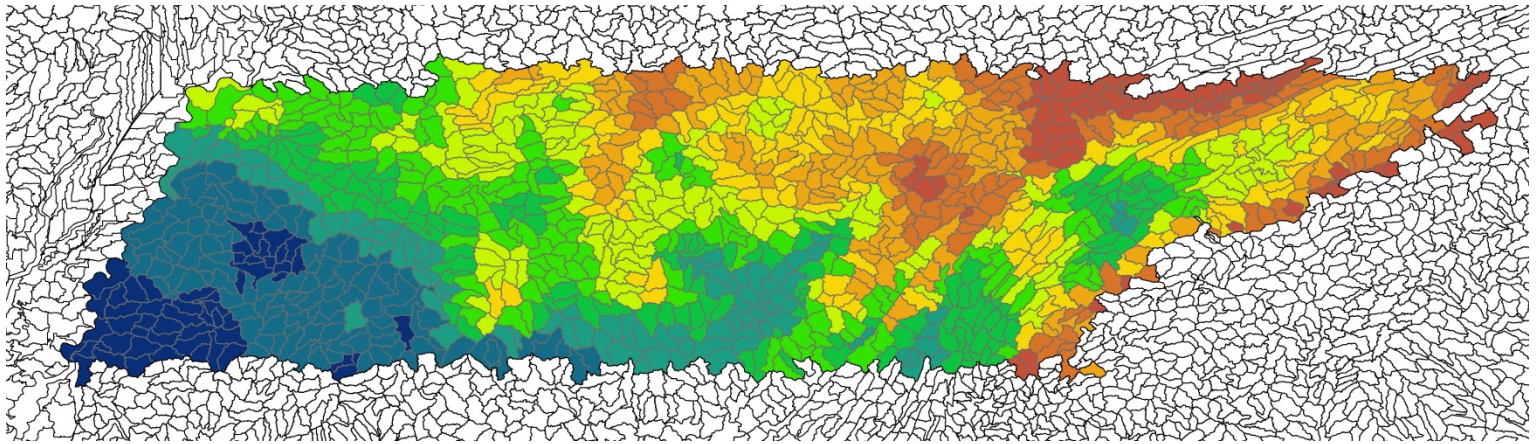
- Centroid methodology “misses” small HUC12s



- Solution: weighted average methodology

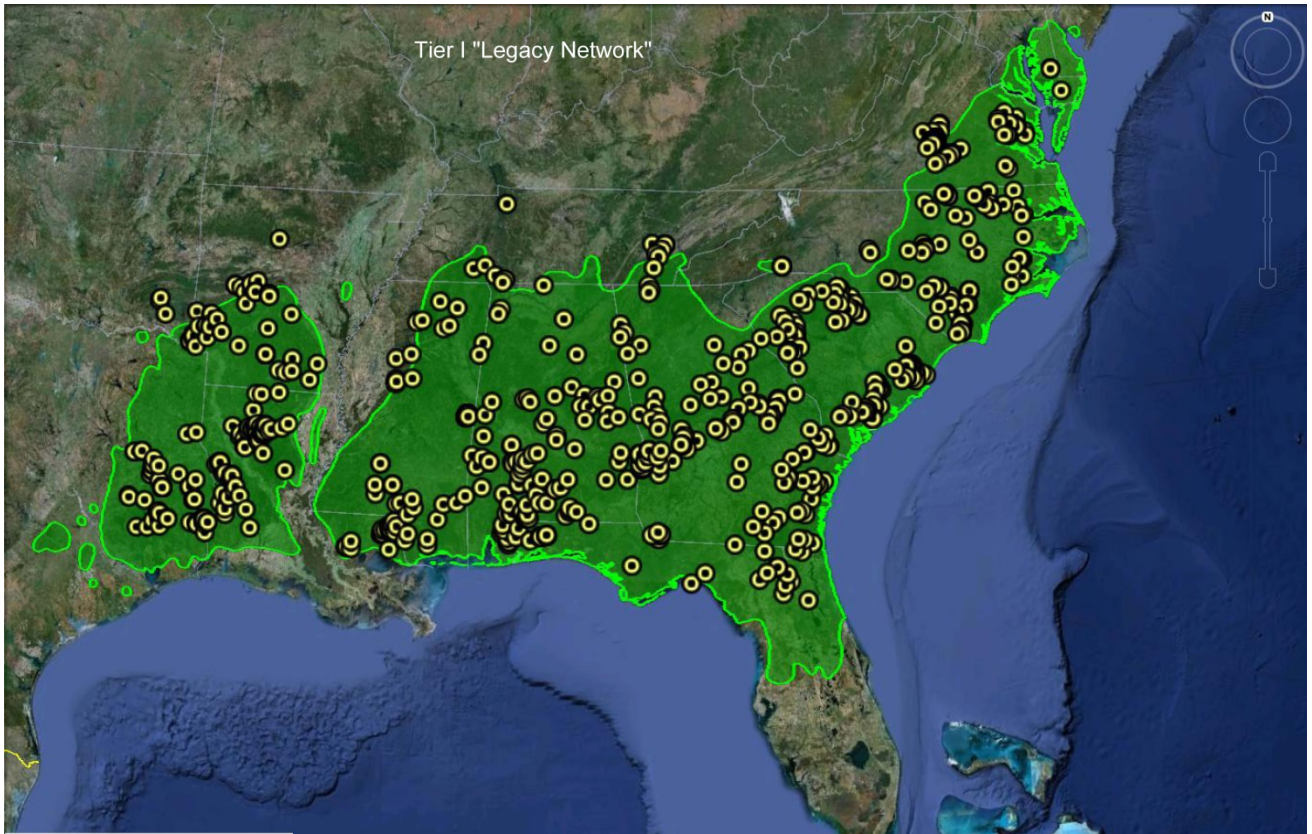
Status Update

- Regional modeling
  - 3PG (all PINEMAP states done)
  - G&Y (all PINEMAP states done)
  - WaSSI (CONUS done)



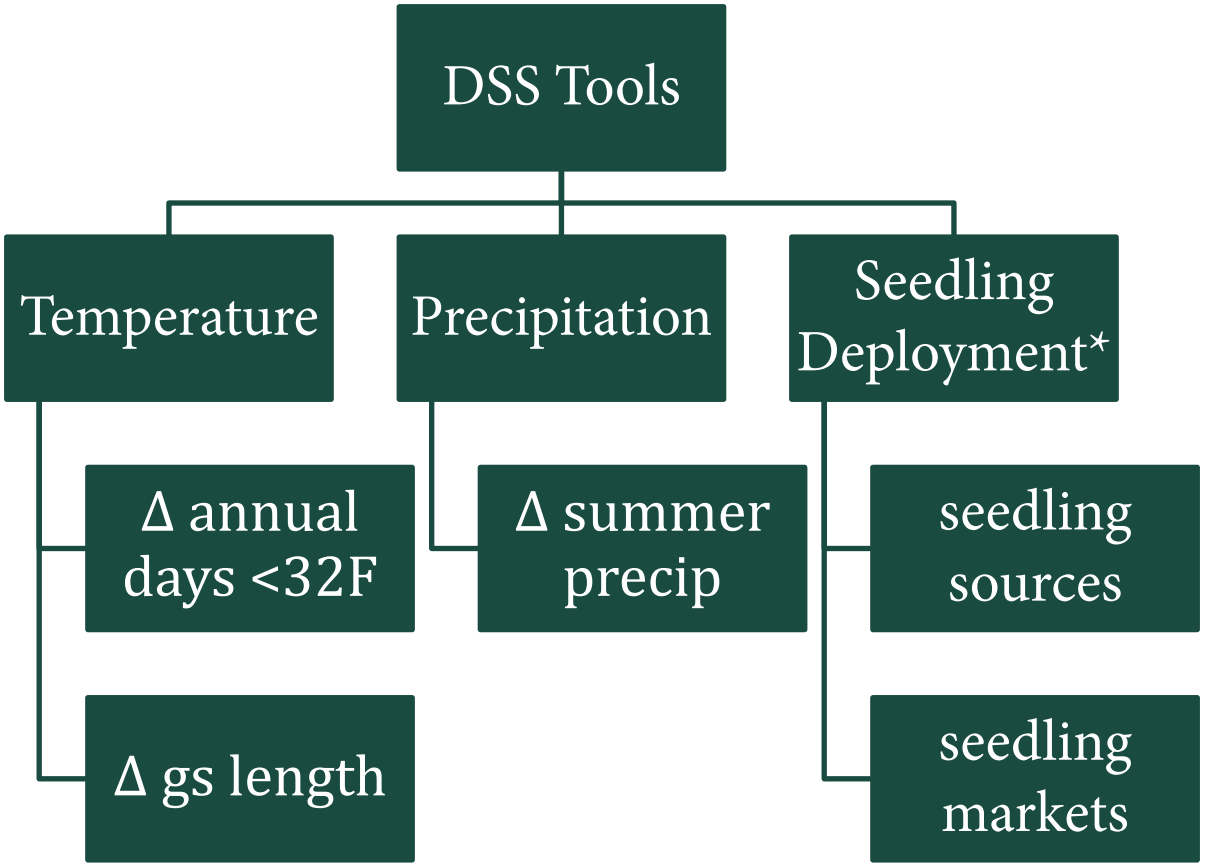
Status Update

- Tier extractions: daily time step
  - Tiers 1-3 (~850 total) & 36 3PG validation sites
  - Min/max temp, precip, wind speed, specific humidity, solar radiation



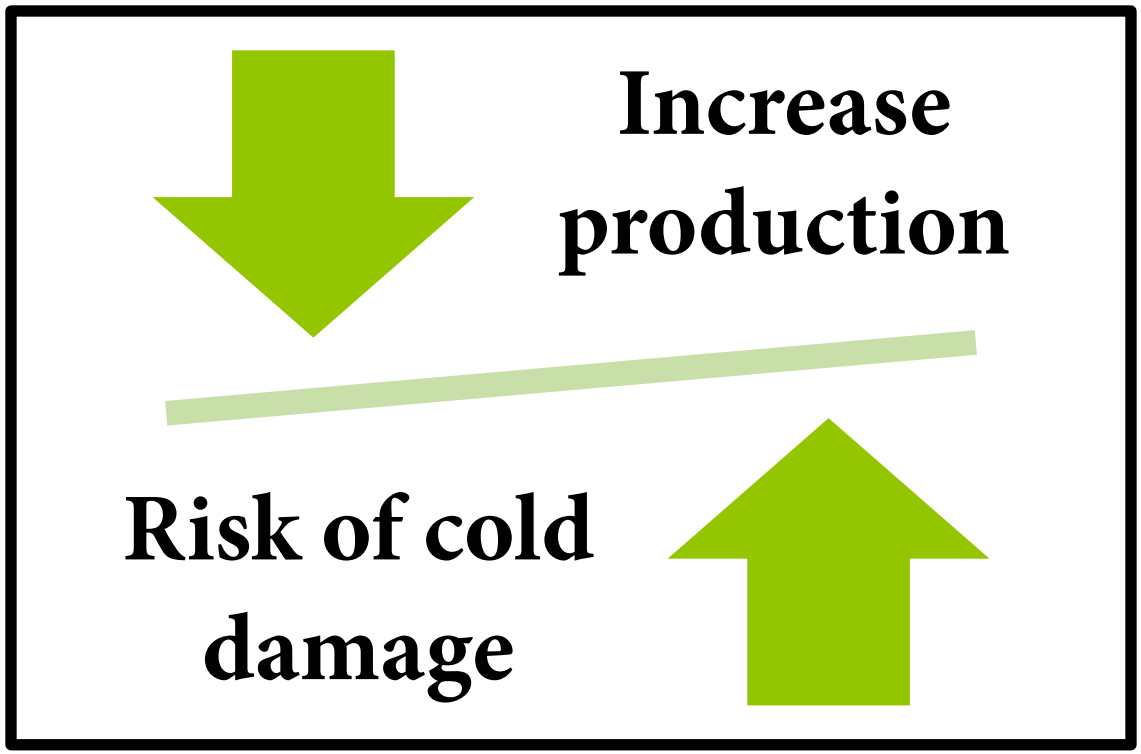
Status Update

- PINEMAP customized data requests and…



Seedling Deployment Tools: Background

- Goal: enable foresters to better match seed sources with future climates to increase and optimize productivity
- Builds on Schmidtling's guidelines, USDA Hardiness Zones



Seedling Deployment Tools: Background

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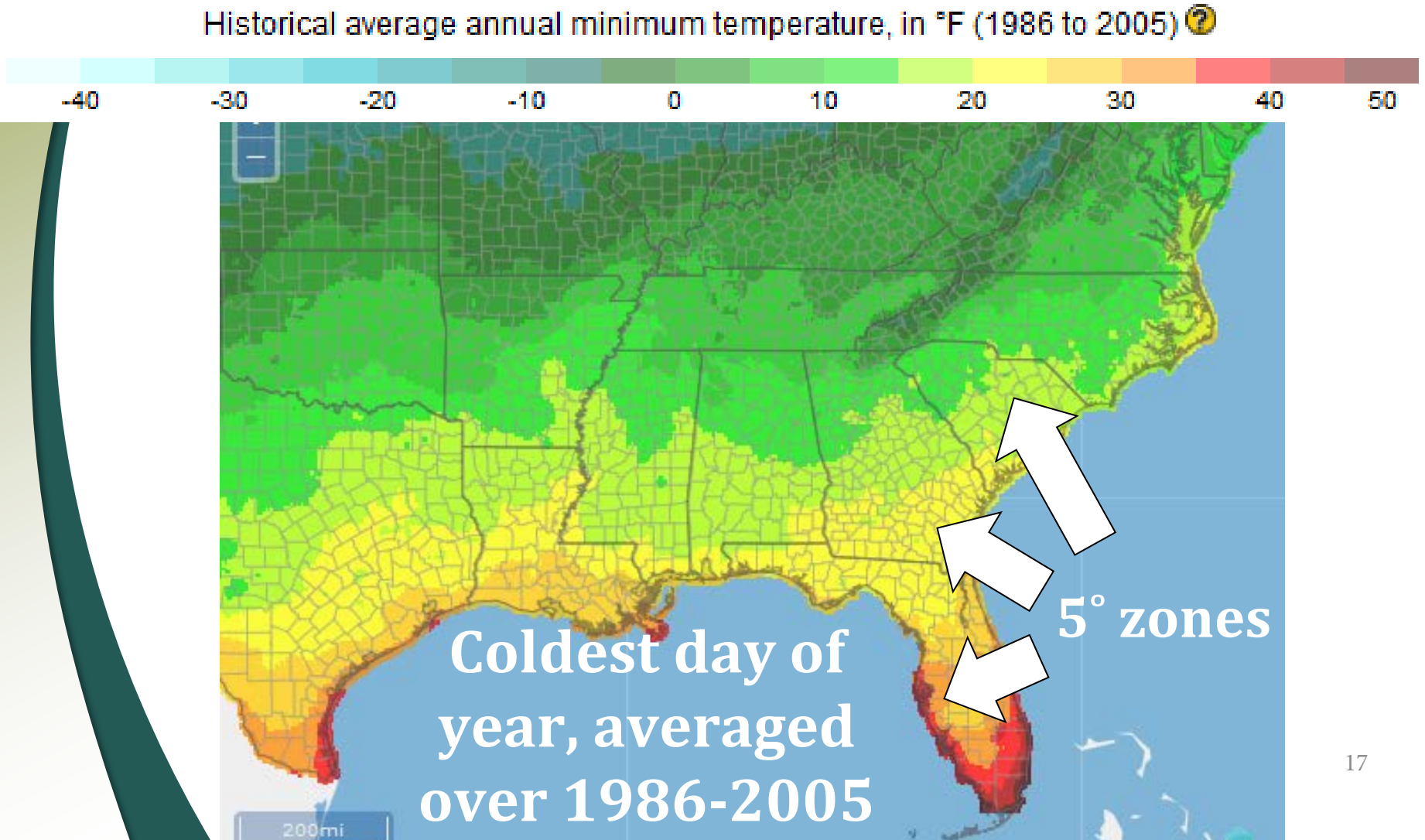
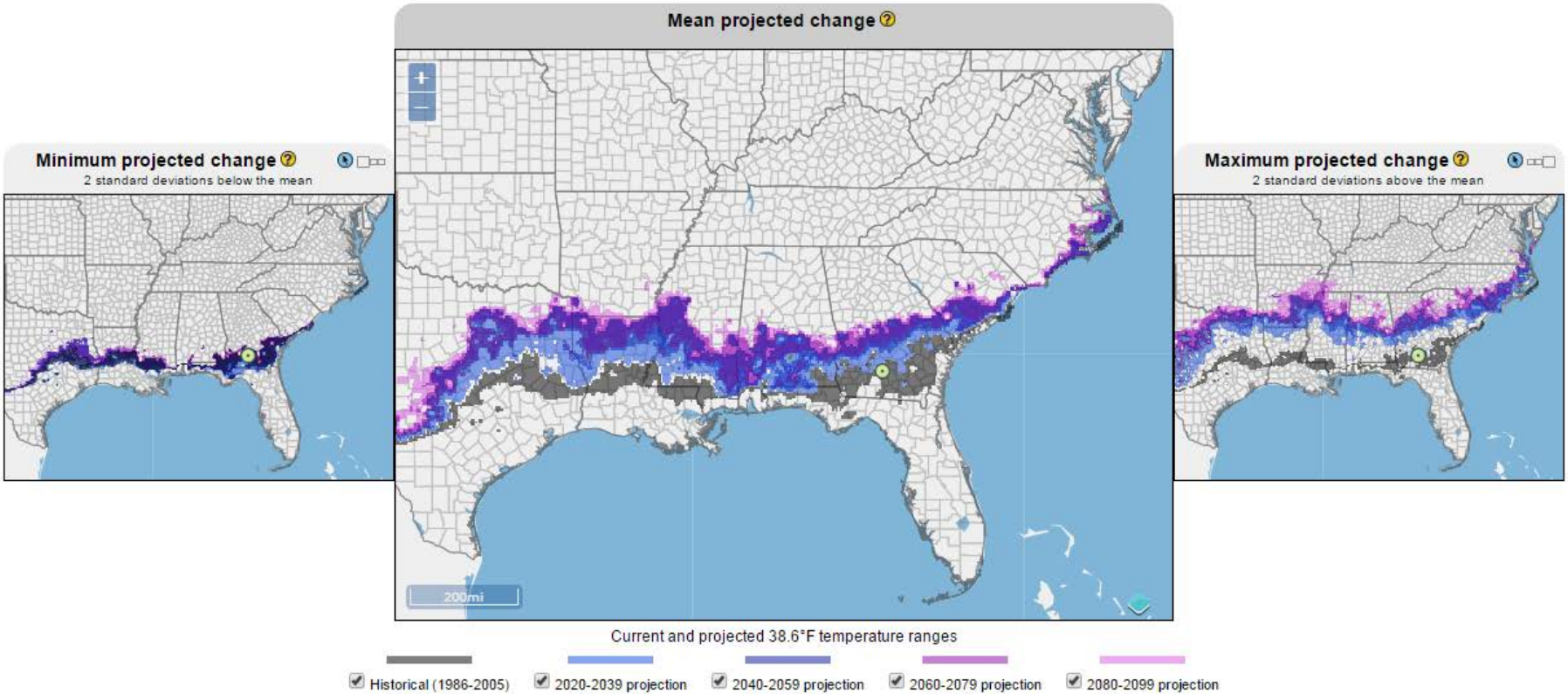


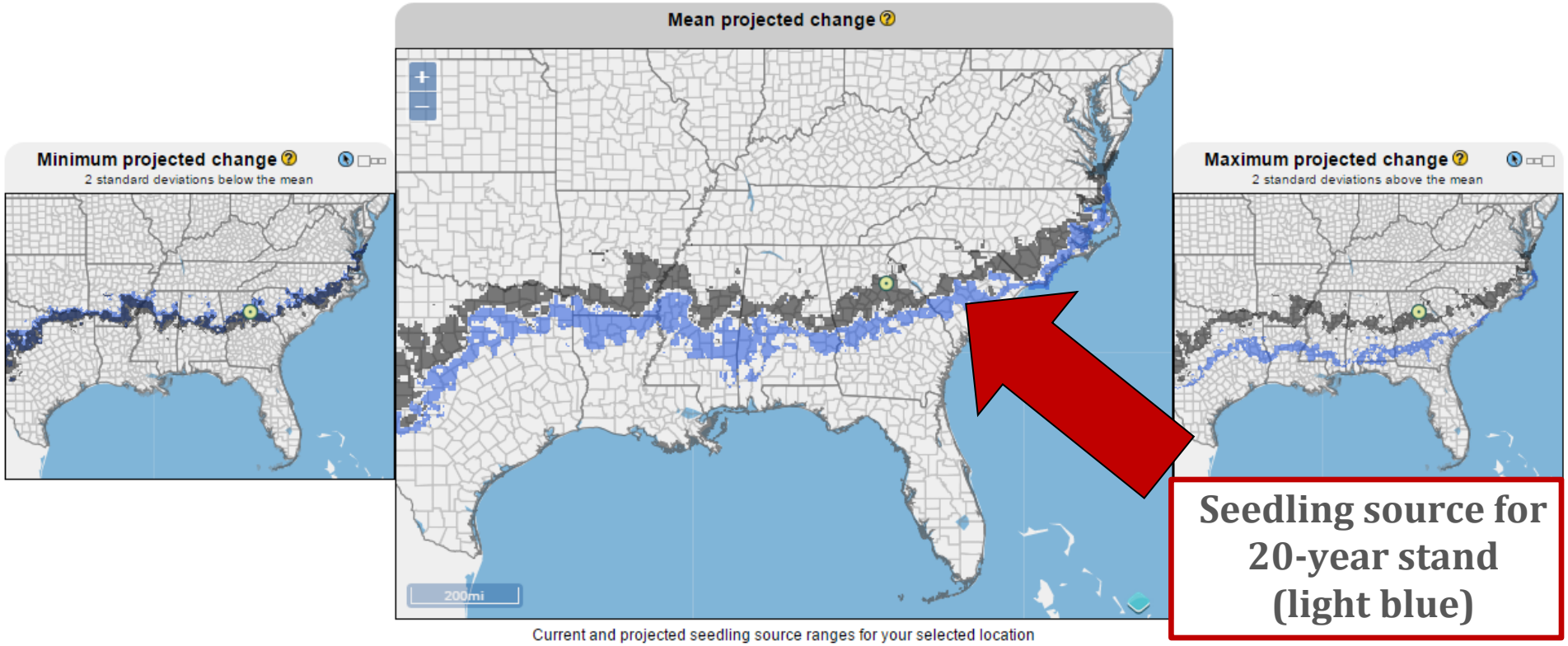
Seedling Deployment Tools: Background

- Seedling markets tool: nurseries can see where current seed may be most effective in the future
- What does it show?
  - projected migration of historical location-specific isotherm for 20yr future periods, e.g. 2020-2039



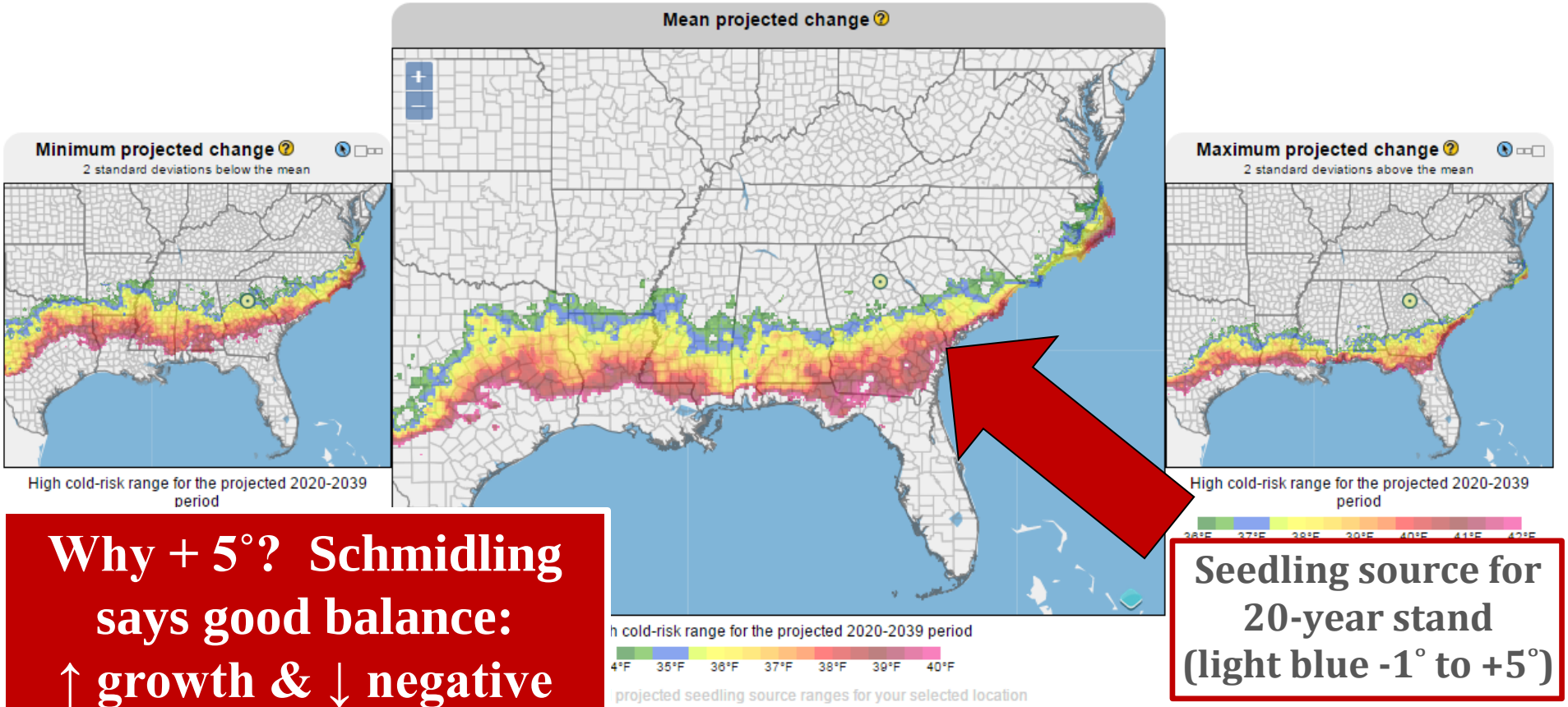
Seedling Deployment Tools: Background

- Seedling sources tool: local growers can see where they could pull seedlings from for their site in the future
- What does it mean?
  - Over a 20-year stand, current temp of light blue band will migrate to Athens so may want to consider pulling from there



Seedling Deployment Tools: Background

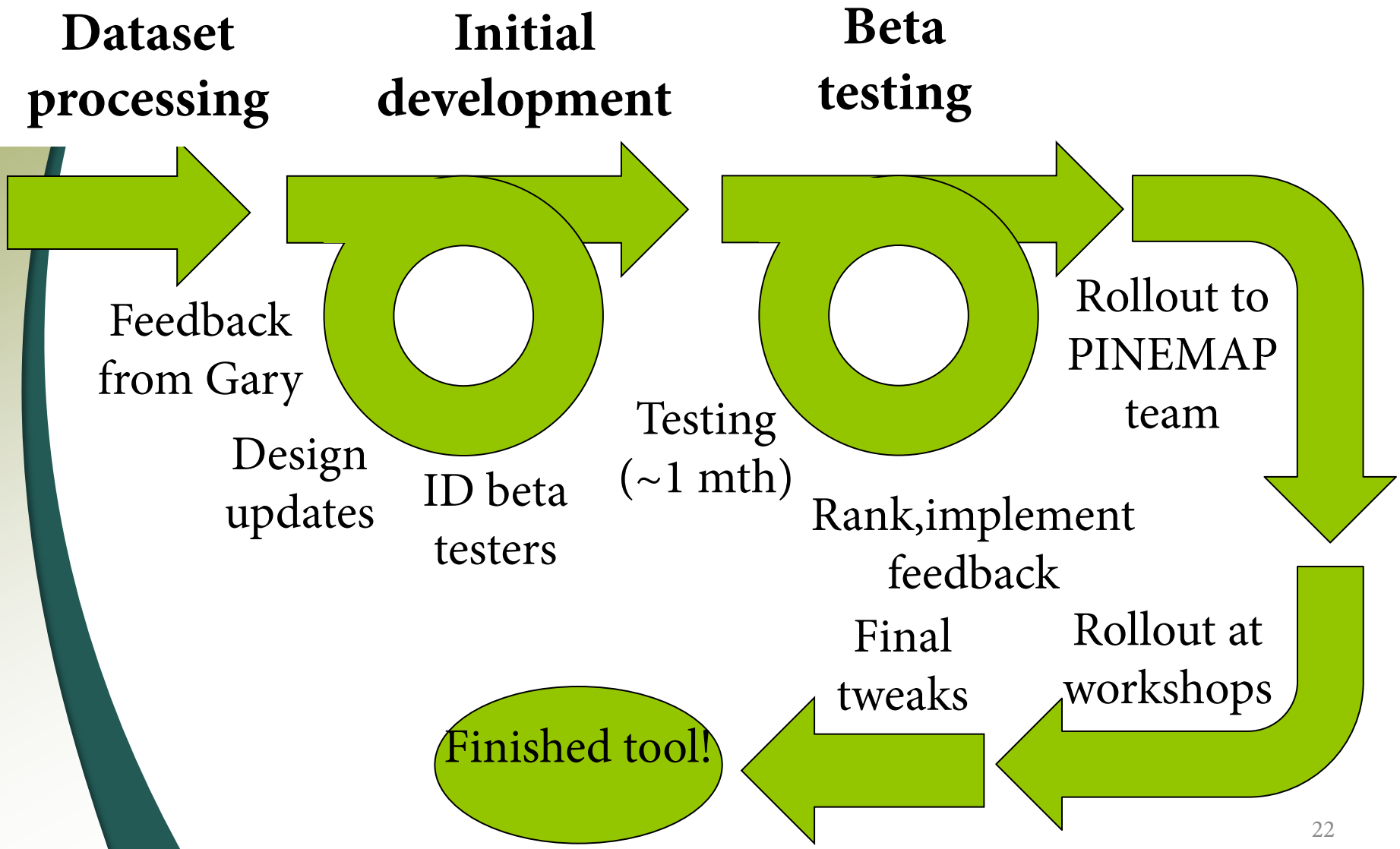
- Ability to visualize risk
  - Display temperature range (5˚) around any isotherm



Why + 5˚? Schmidling says good balance: ↑ growth & ↓ negative effects from less cold tolerance

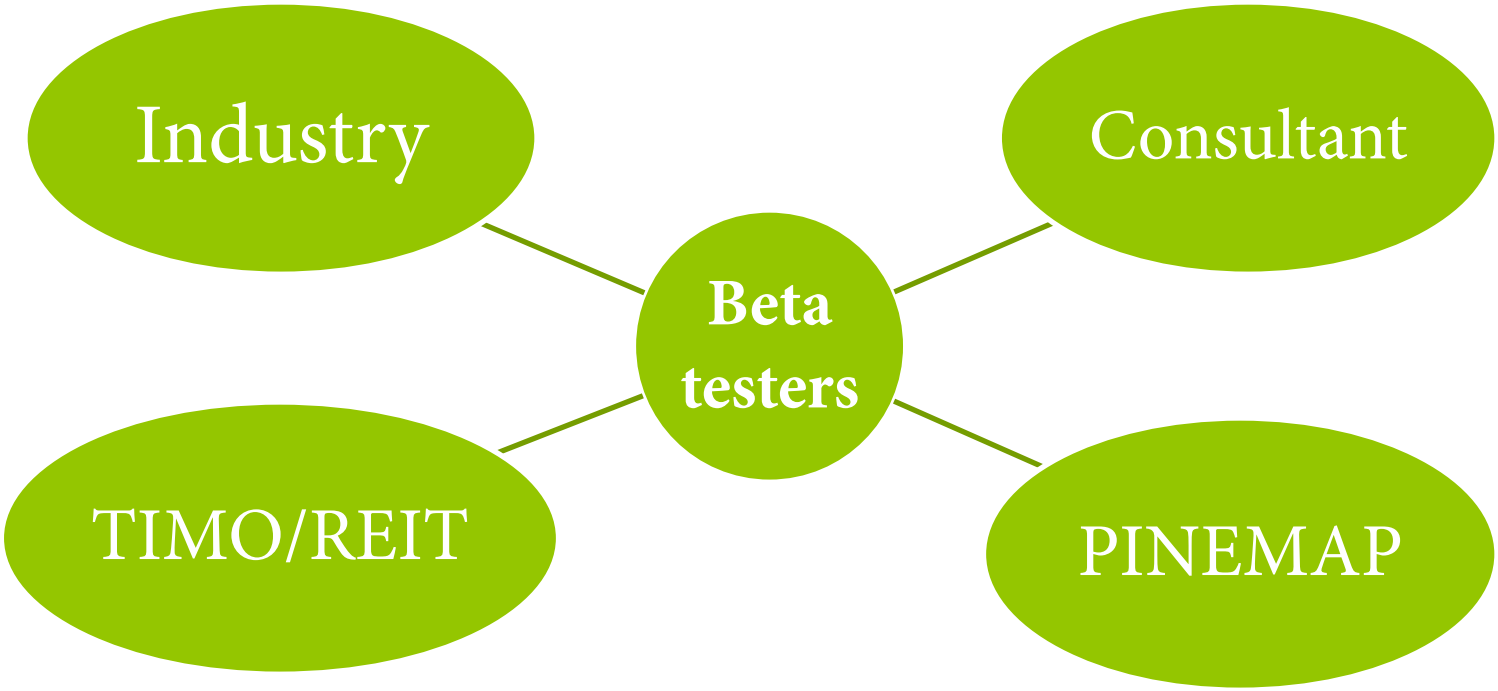
Seedling source for 20-year stand (light blue -1˚ to +5˚)

DSS Tool Development Process



Seedling Deployment Tools: Beta Testing

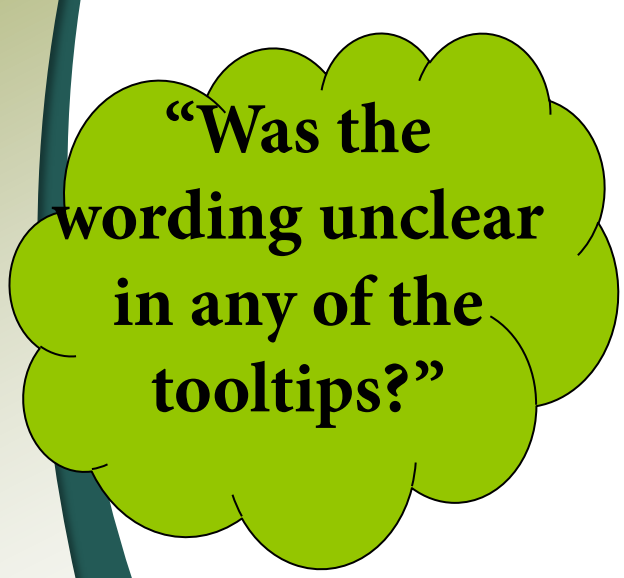
- Partnered with Gary, Tim, and Eric T to identify core group of beta testers

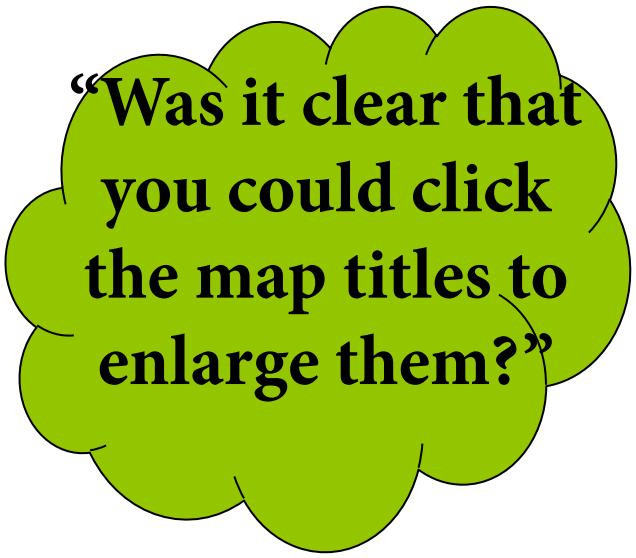


Thanks to Steve McNulty, Martha Monroe, Mark Megalos, John Hastings, and Ross Whetten!

Seedling Deployment Tools: Beta Testing

- First step: independent exploration (~2 weeks)
  - Work through scenario(s)
  - Submit feedback via short survey

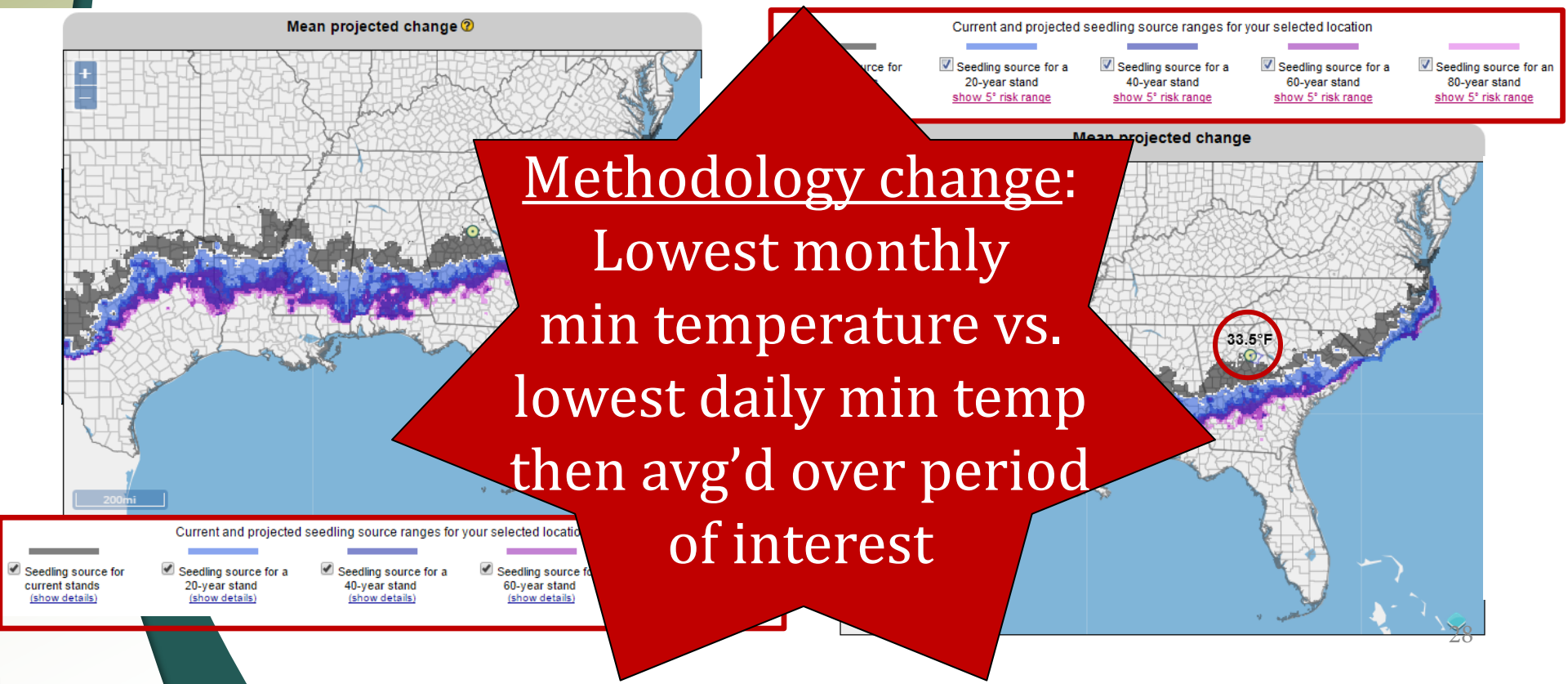




- Received feedback from 7 beta testers
  - Diverse group, common feedback

Seedling Deployment Tools: Beta Testing

- Second step: small group calls (~1 hour)
  - Discuss common concerns or misconceptions
- Third step: developers implement changes



Methodology change: Lowest monthly min temperature vs. lowest daily min temp then avg'd over period of interest

Seedling Deployment Tools: Beta Testing

- Fourth step: roll-out to full PINEMAP team (today)

- Fifth step: follow-up with breeders at Southern Tree Improvement Conference (next week)

Live Demo

Be thinking about…

- How will your dataset(s) fit into the 3 map layout?
- Who would be your beta testers?
- Who will be your "Gary" (our contact) for your output?

Meet with us during the poster session!

Next steps

- "Final" seedling deployment tools
- Climate risk and opportunity tools: development & beta testing
- Regional model integration: what is/will be available?
- Assess tools/info for market change inclusion

Next steps

- Website language/design feedback from Aim 6
- Regional modeling output: integrate & identify beta testers
- Beta testing regional modeling output
- Other tools: hurricane risk, fire risk, SPB/density mgmt
- Roll out DSS to target audiences (Fall 2015)

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Pine Integrated Network: Education, Mitigation, and Adaptation project (PINEMAP) is a Coordinated Agricultural Project funded by the USDA National Institute of Food and Agriculture