APPALACHIAN
LANDSCAPE CONSERVATION COOPERATIVE

CONSERVATION PLANNING/DESIGN PHASE I UPDATE

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Review of Last Weeks Call

- Strong support for revising special systems models using element occurrence data (e.g., shale barrens)
- Suggestion for new NatureServe Veg Class to update existing models
- Support for Allegheny Wood Rat to represent Rocky Outcrops
- Some support for Field Sparrows to cover additional early succession

Webinar Outline

- Additional input from last week?
- Visualize conservation targets in design
- Examine conservation design elements
- Discuss threats matrix to design
- Identify opportunities to strengthen individual elements (e.g., interpretation, cultural resonance, etc.)

Key Terminology

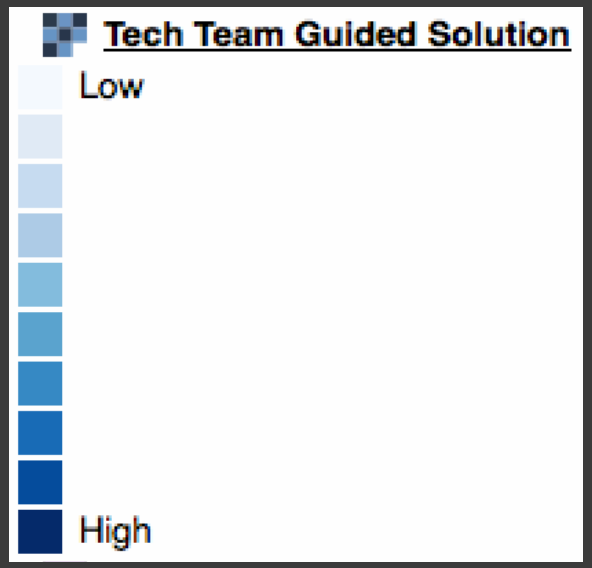
- Priority Resource / Seed Resource = Targets
  - Amount of any of these represented in a plan = Goals
- Design Elements = locations that contain multiple targets and are crucial for achieving goals.
- Irreplaceability = frequency at which a planning unit was selected over multiple iterations in a near-optimal solution

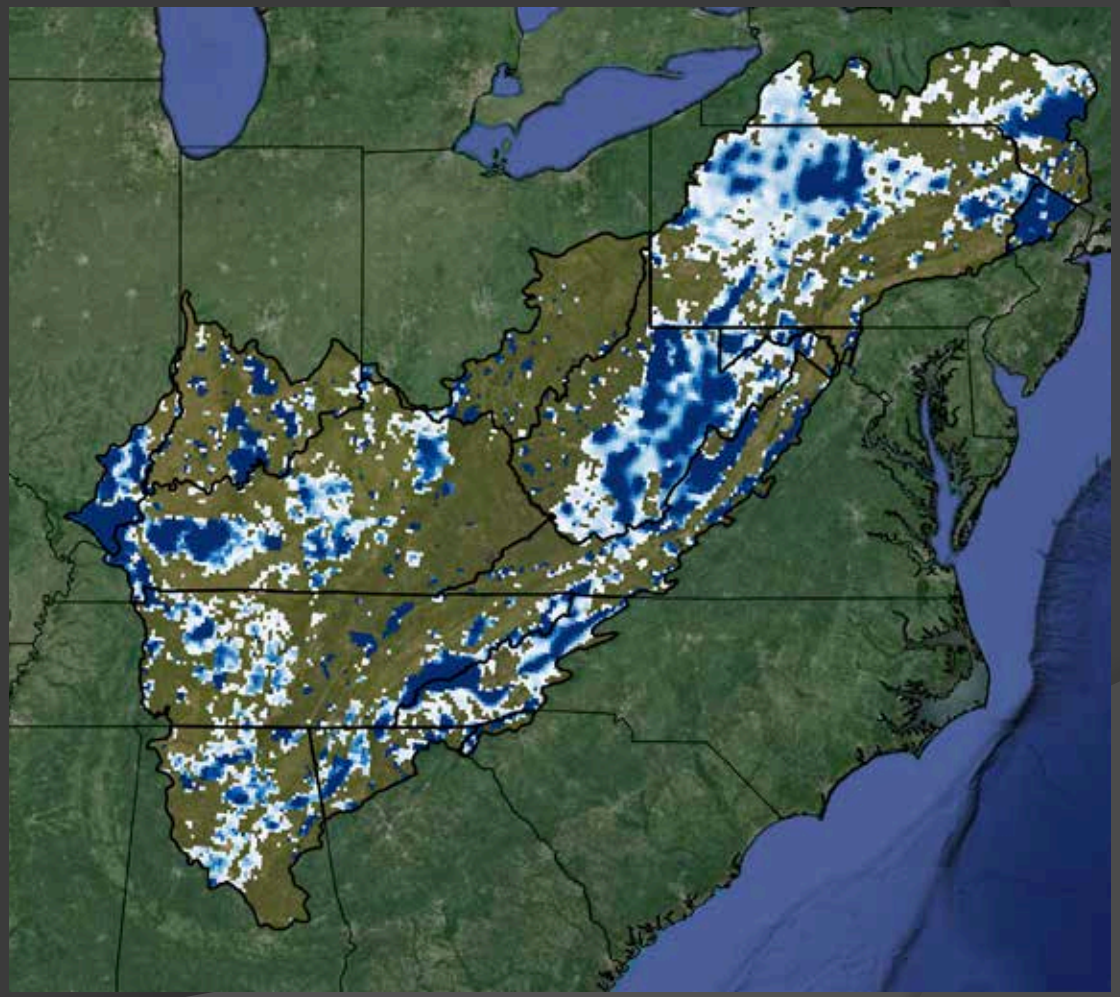
Phase I Targets to capture 'Priority Resources'

1. Hellbender SDM*
2. Forested Wetlands
3. Golden-winged warbler
4. Typic Foothills Cove Forests
5. Typic Montane Cove Forests
6. Shale Barrens
7. Rock Outcrops
8. Rich Montane Cove Forests
9. Least likely to depart from historical climate regimes
10. Cave Obligates (Aquatic) Species Richness
11. Cave Obligates (Terrestrial) Species Richness
12. Moderate gradient, warm headwaters*
13. Brook Trout SDM
14. Headwaters > 3k feet in elevation*
15. Spotted Skunk SDM
16. Top resilient sites
17. Red Spruce SDM
18. Roadless forest blocks > 75% canopy cover
19. Acidic Fens*
20. Prairie Warbler SDM

* In active revision

Model outputs of technical team irreplaceability scenario (500 million iterations)





Moving from model output maps to a conservation design

- Produce generalized regions with specific conservation functions related to multi-scale process relevant to decision making
- Move beyond complex model outputs to simplified representations that can be more easily communicated
- Provide discrete areas to assess by threat
- Provide names for areas that have natural and cultural resonance and give “sense of place”

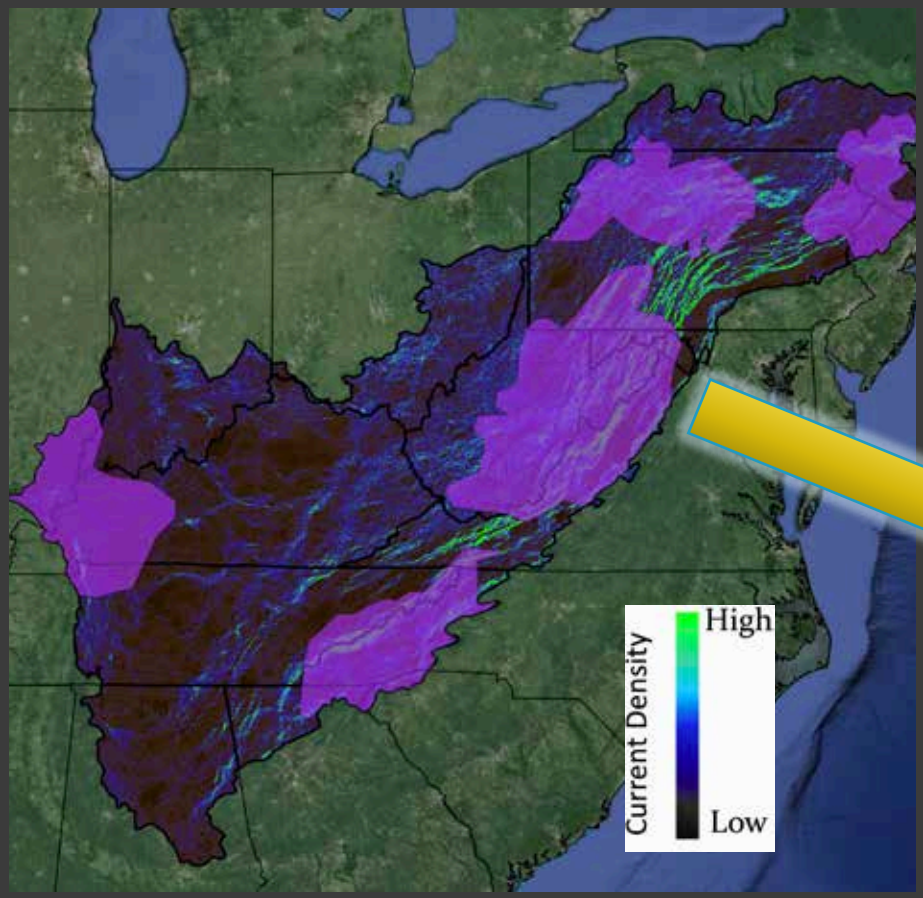
We mapped five conservation design elements

1. Regionally Connected Cores
   - Mean Area = 37,128 sq. km
   - Mean Irreplaceability score = 47.4 (possible max 100)
   - Mean Target Richness score = 4.97 (possible max 19)
   - Mean Threat Score = 1.45 (possible max 3)
2. Locally Connected Cores
   - Mean Area = 6,408 sq. km
   - Mean Irreplaceability score = 44.8 (possible max 100)
   - Mean Target Richness score = 3.54 (possible max 19)
   - Mean Threat Score = 1.41 (possible max 3)
3. Regional Linkages
4. East-West Linkages
5. Local Build Outs
   - Mean Area = 84 sq. km
   - Mean Irreplaceability score = 83.1 (possible max 100)
   - Mean Target Richness score = 4.09 (possible max 19)
   - Mean Threat Score = 1.40 (possible max 3)

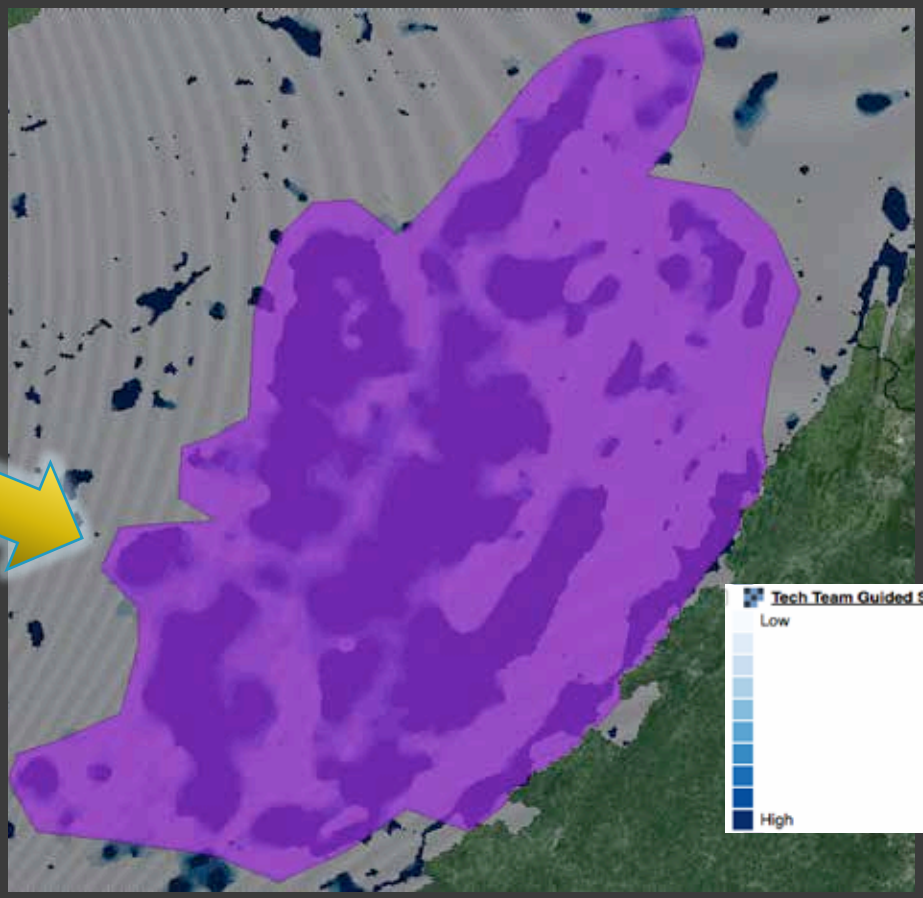
Regionally connected cores

- Large regionally significant areas that have high internal connectivity, based on irreplaceability and current density
- We mapped 5:
  1. Shawnee-Peabody-Land Between the Lakes Regional Core
  2. Southern Blue Ridge – Upper Tennessee River Basin Regional Core
  3. Central Appalachian-Alleghany Regional Core
  4. Heart's Content NW Pennsylvania Regional Core
  5. Delaware Water Gap-Catskills Regional Core

Regionally Connected Cores



Cores with Connectivity

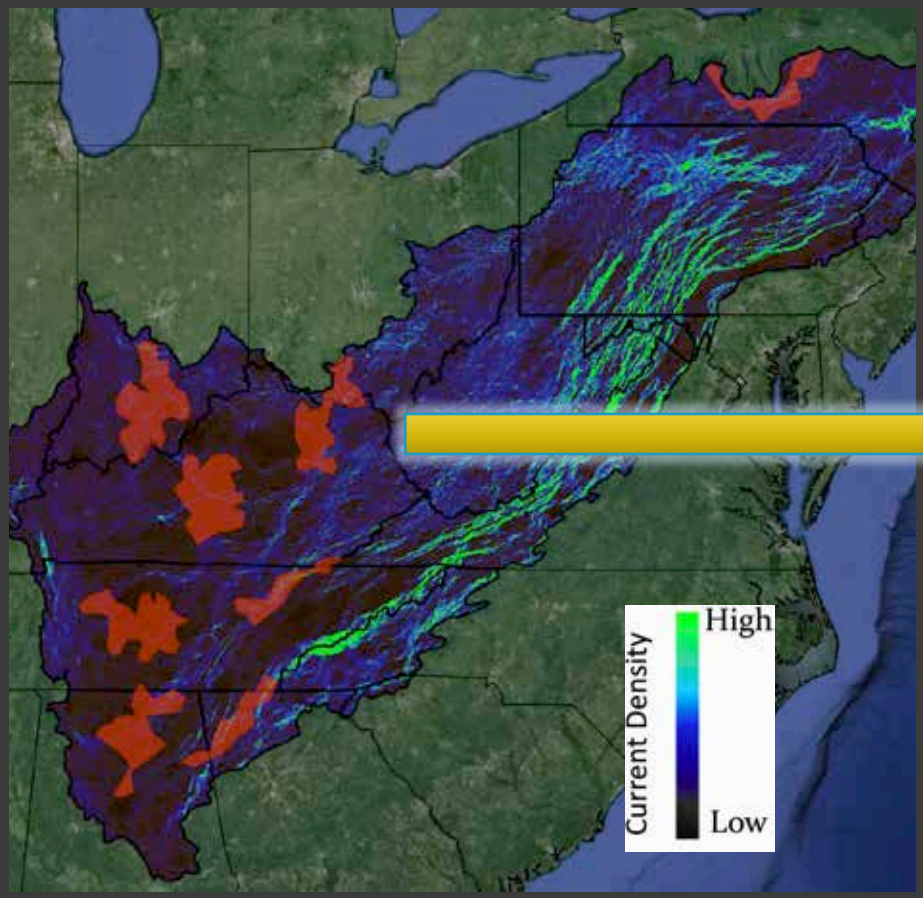


Central Appalachian – Allegheny Core with Irreplaceability

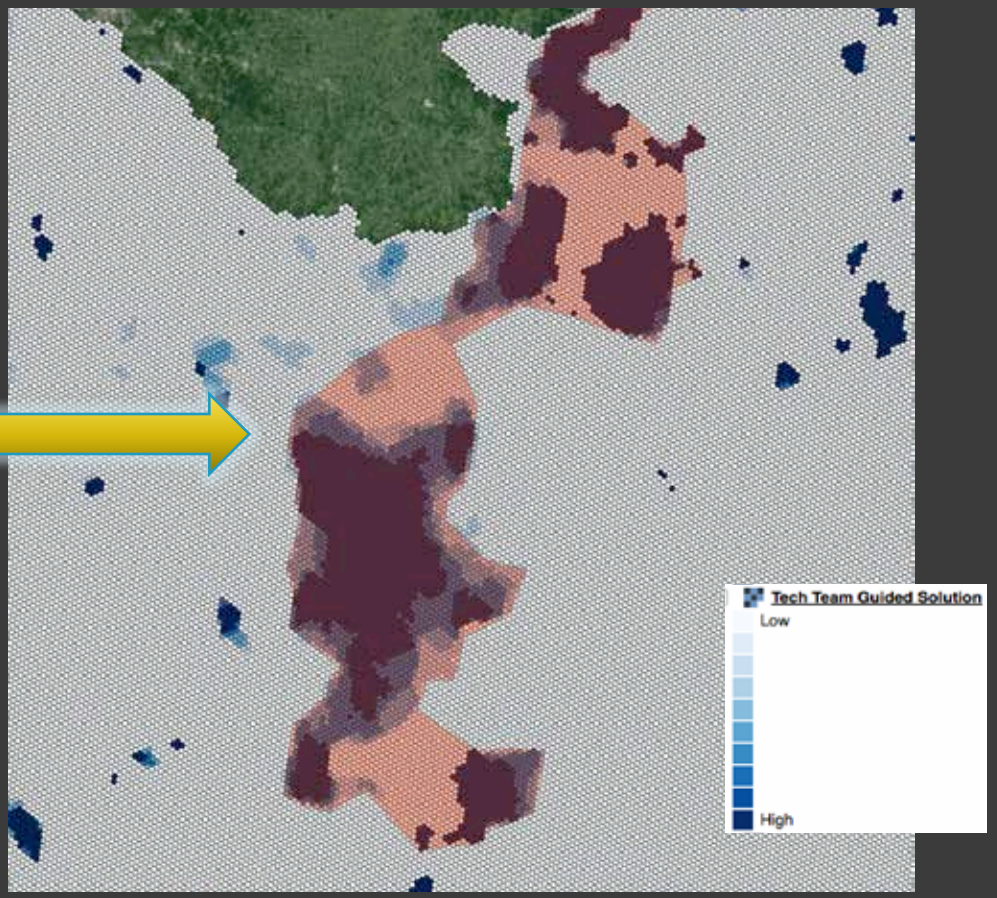
Locally Connected Cores

- Locally significant areas that have high internal connectivity, based on irreplaceability and current density
- We mapped 8
  1. Cumberland Plateau – Chattanooga Local Core
  2. Daniel Boone Local Core
  3. Nashville Basin Local Core
  4. Hoosier – Interior Low Plateau Local Core
  5. Mammoth Cave-Campbellsville Local Core
  6. Cumberland Gap-Big South Fork-Chickamauga Local Core
  7. Southern Finger Lakes – Alleghany Plateau Local Core
  8. Lower Tennessee-Bankhead-Wheeler Local Core

Locally Connected Cores



Cores with Connectivity

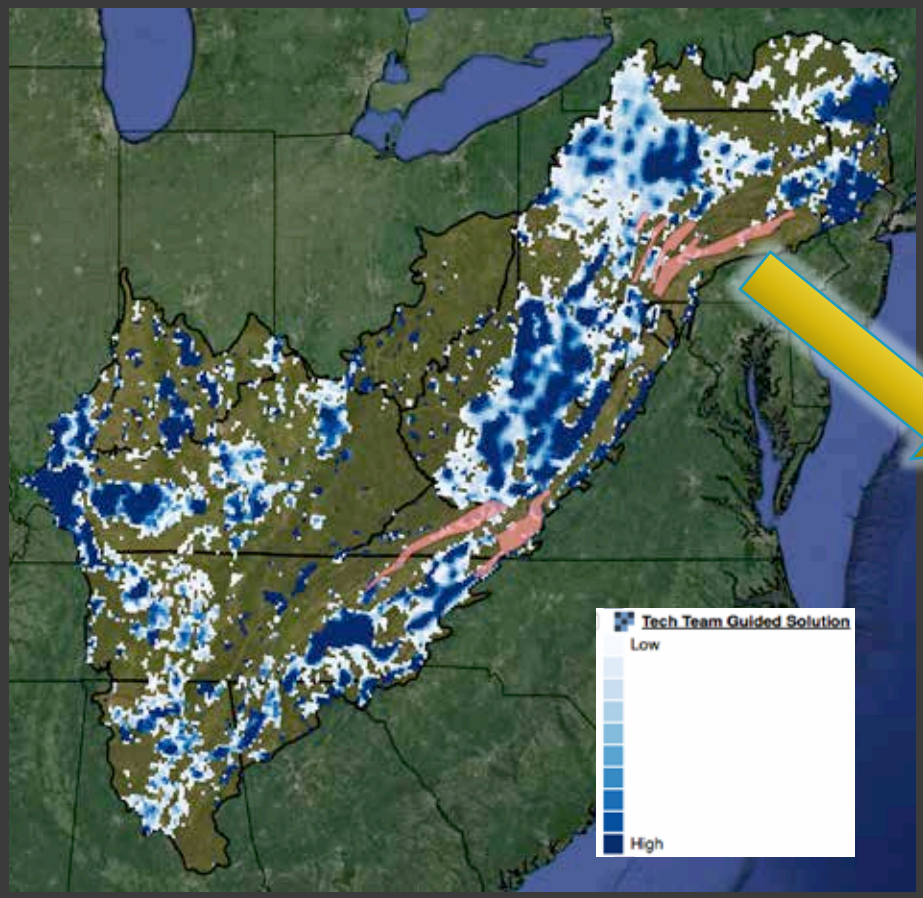


Daniel Boone Local Core with Irreplaceability

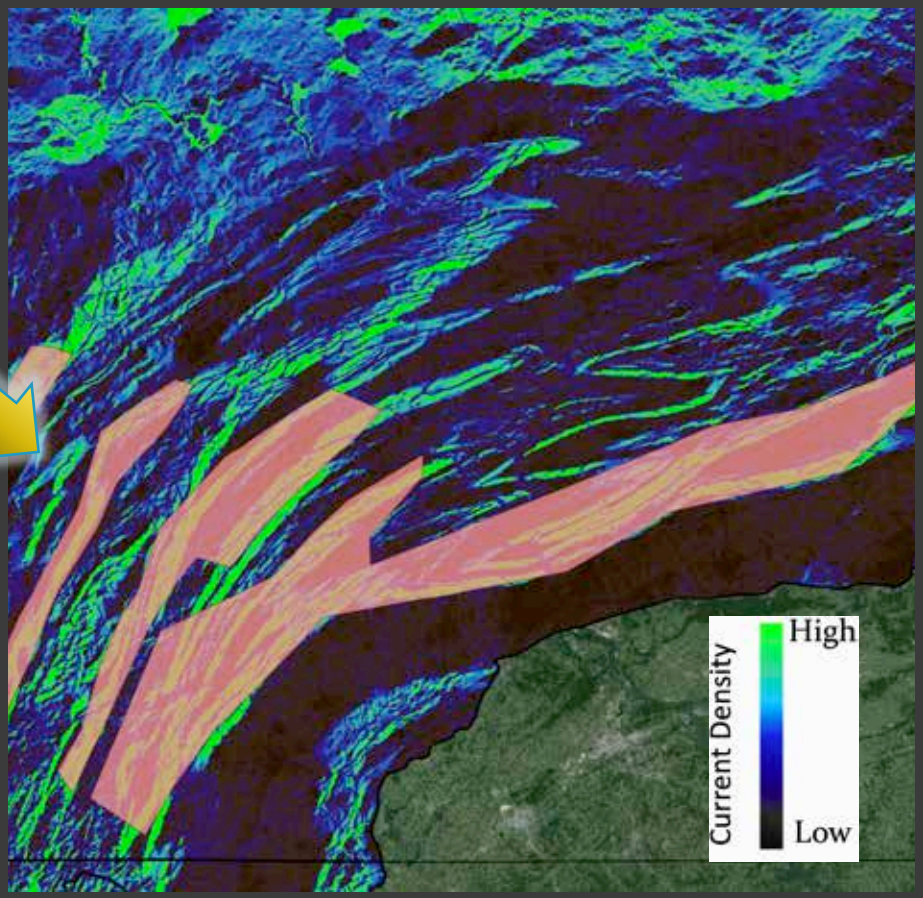
Regional Linkages

- Region scale corridors that provide connectivity among cores, based on current density flow
- We mapped 3
  1. Northern Cumberland-Blue Ridge Linkage
  2. Southern Cumberland-Blue Ridge Linkage
  3. Northern Sandstone Ridges Linkage Connect Cores 3 & 5

Regional Linkages



Linkages with Irreplaceability

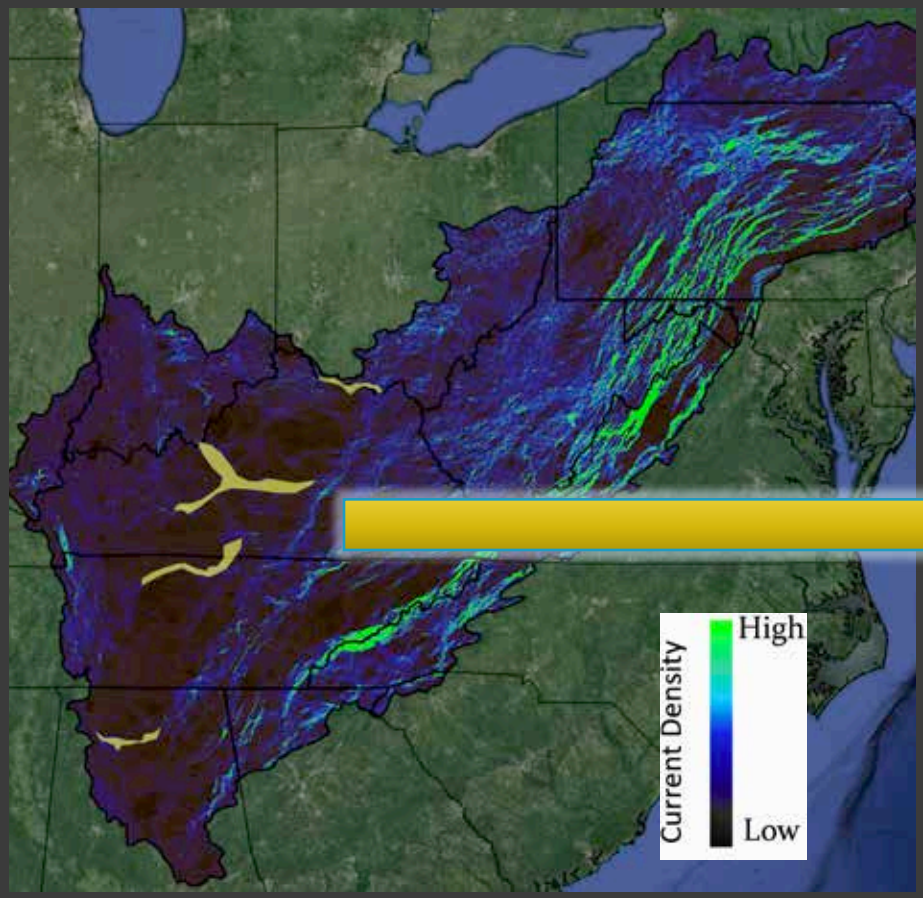


Northern Sandstone Ridges Linkage with Connectivity

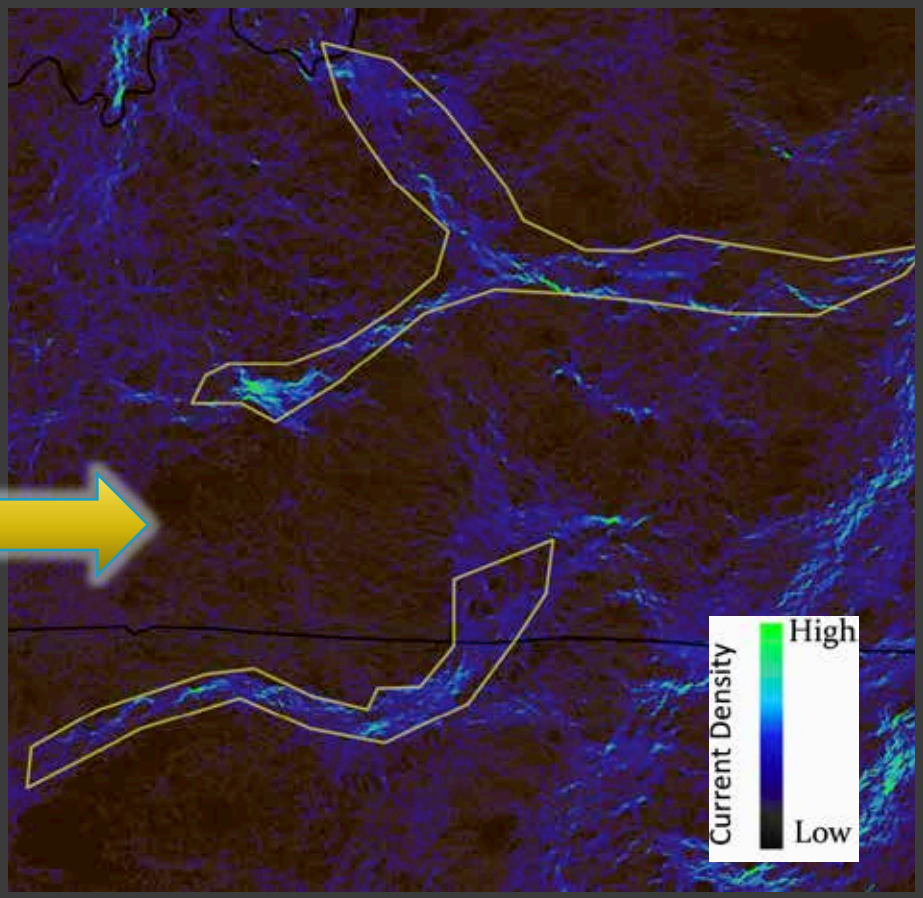
East-West Linkages

- Extensive areas of connectivity bridging Ridge and Valley topography and connecting mountains with low plateaus
- We mapped 4
  - Big South Fork-Cumberland River E-W Linkage
  - Cumberland-Interior Low Plateau E-W Linkage
  - Ohio River E-W Linkage
  - Flint Creek-Plateau Escarpment E-W Linkage

East-West Linkages



Lateral Linkages with Connectivity

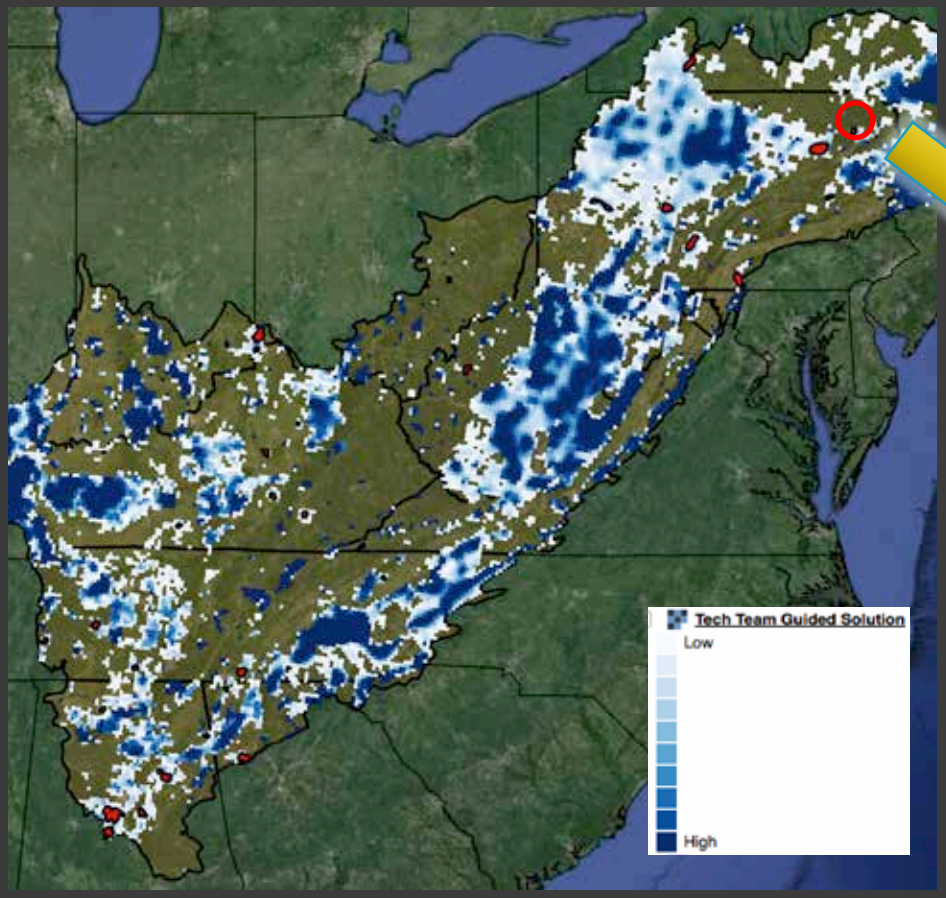


Cumberland – ILP & Big South Fork Cumberland River Linkages with Connectivity

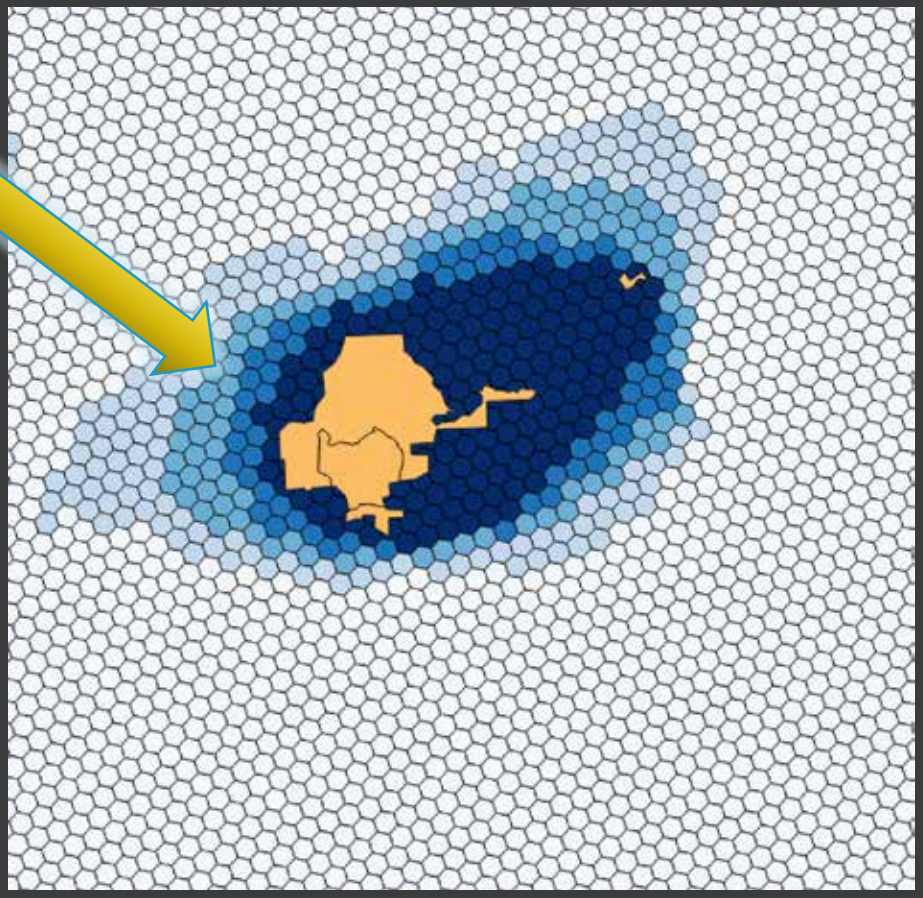
Local Built Outs

- Smaller, isolated areas seeded by a GAP 1-2 Protected Area around which Marxan added high irreplaceability, or small, local areas Marxan selected with no existing Protected Area
- We mapped 36
  - There are many and they have local importance

Local Build Out: protected type

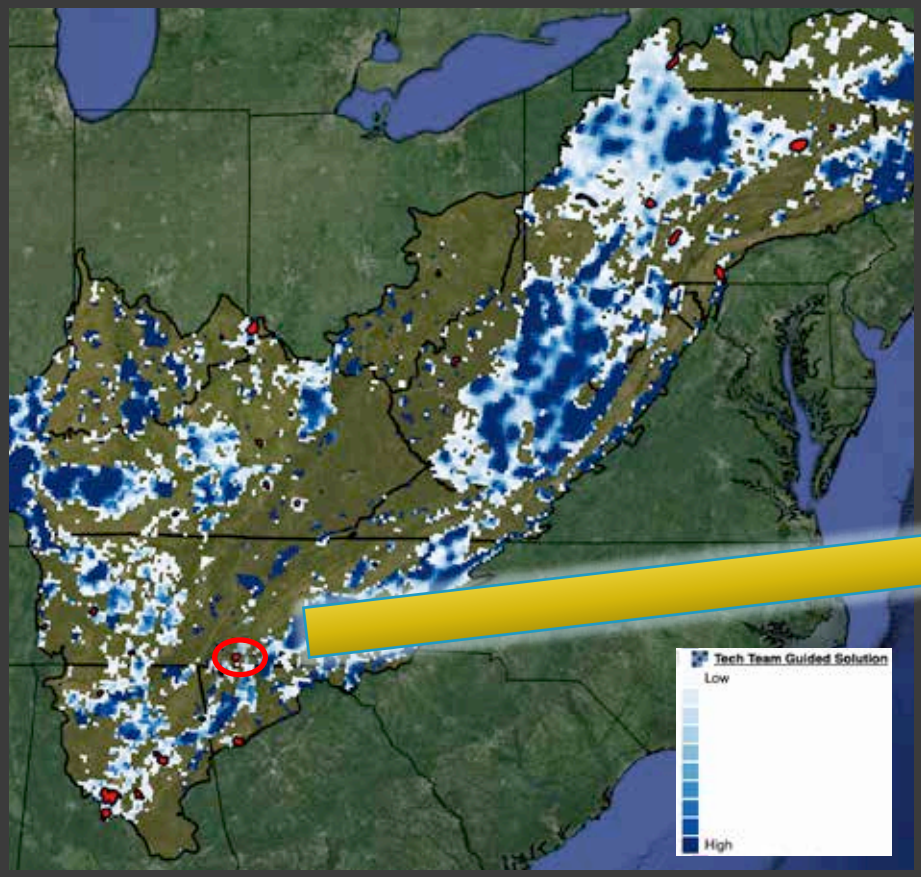


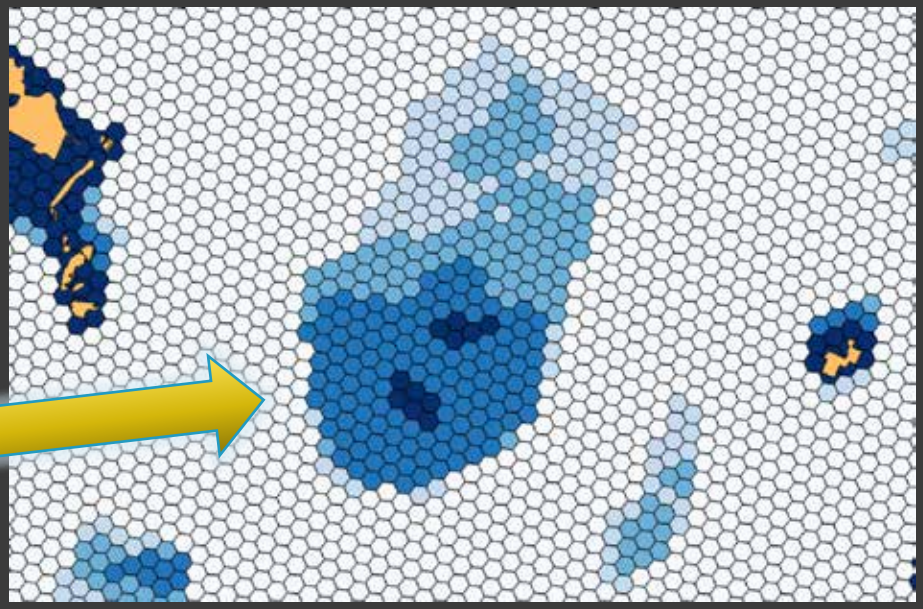
Local Build Outs around Gap status 1 or 2 PAs



Glens Natural Area with surrounding irreplaceability

Local Build Out: unprotected type

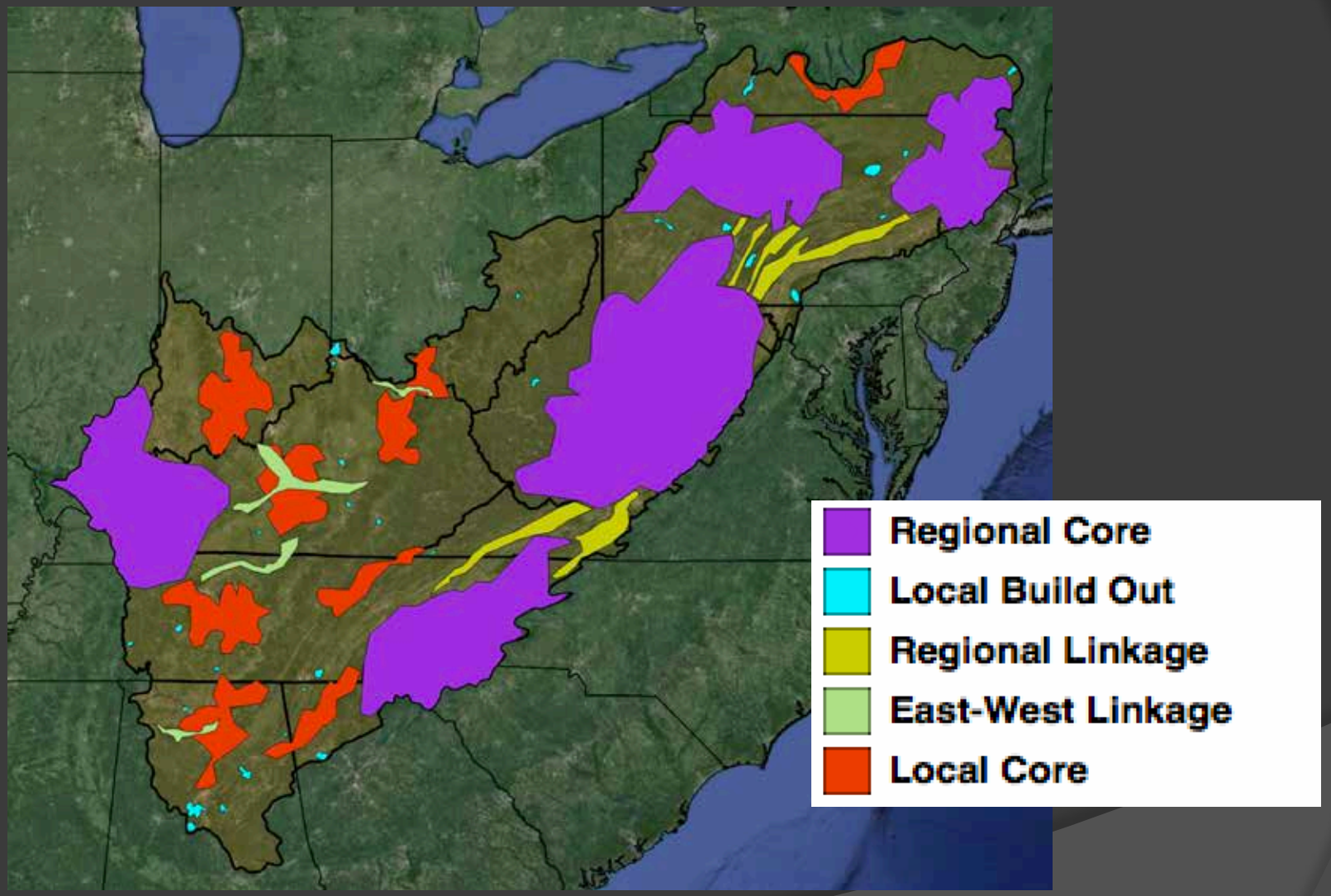




Local Build Outs: unprotected areas or areas to consider lower-level Gap status management

Irreplaceability East of Chattanooga: currently unprotected

Map of all conservation elements



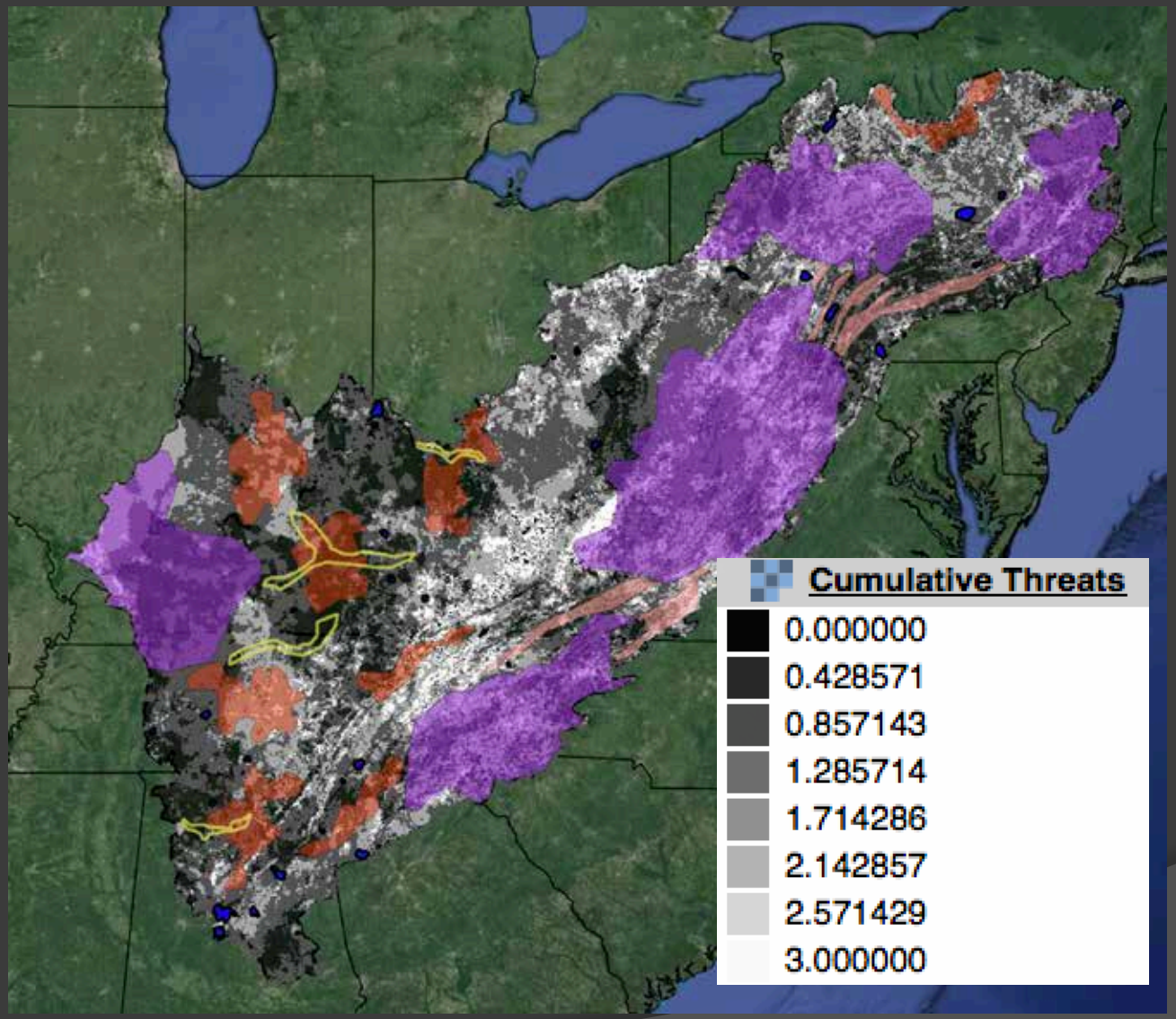
Final step in geographic prioritization – assessing threat

- We assessed level of threat to each element of the conservation design, mapped those levels of threats, and assigned the areas to a threat vs. irreplaceability matrix

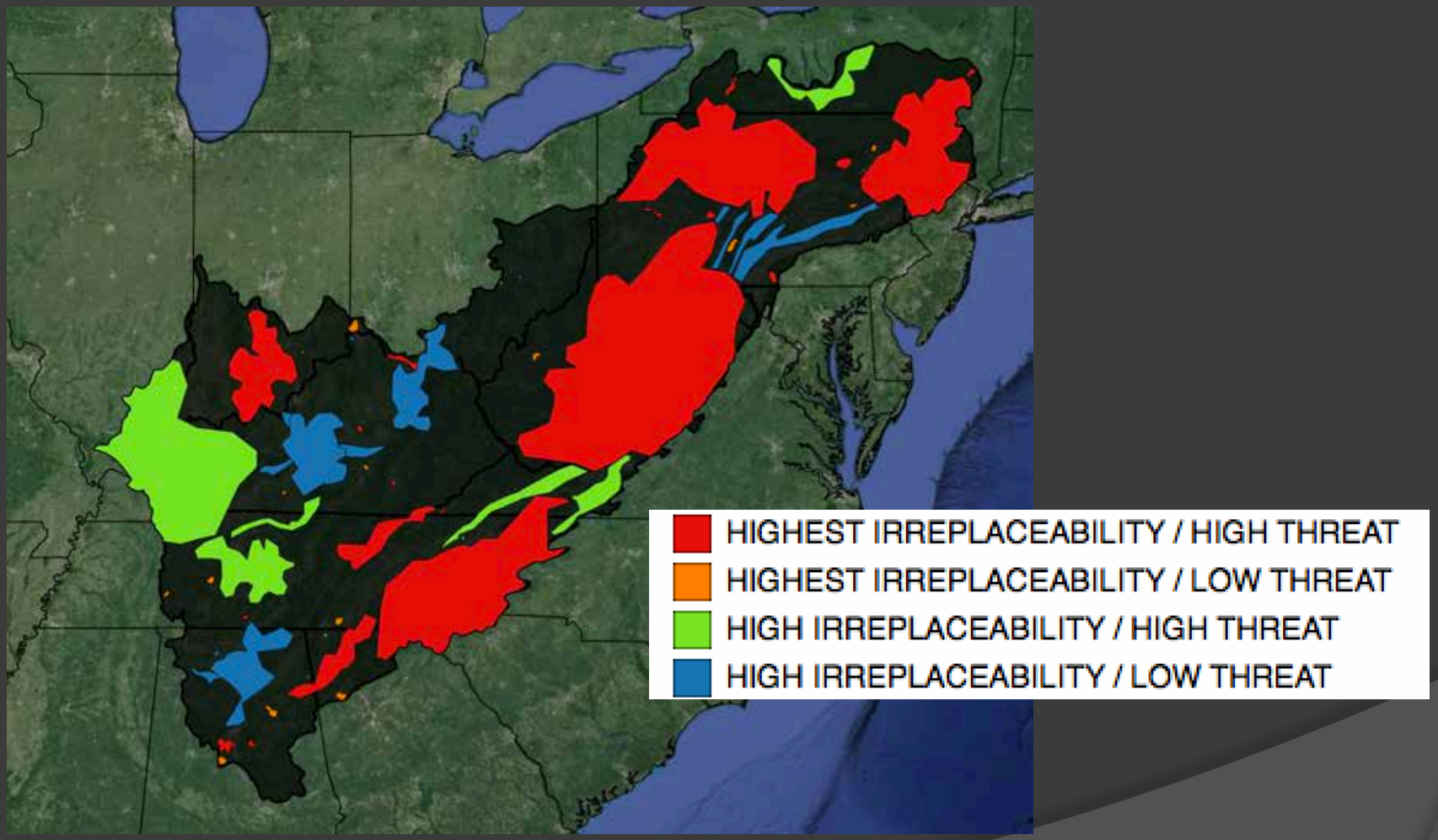
Assessing each design element by level of threat

- We made a cumulative threat index comprised of
  - **Climate Vulnerability** (Departure from Historic Baseline Variability: 2030)
  - **Housing Density** (Projected to 2030)
  - **Energy Development** (Projected to 2030)
    - Natural Gas, Wind, Coal

Design Elements vs. Threats



Relative Irreplaceability (accounting for connectivity) vs. Threats



Questions ??

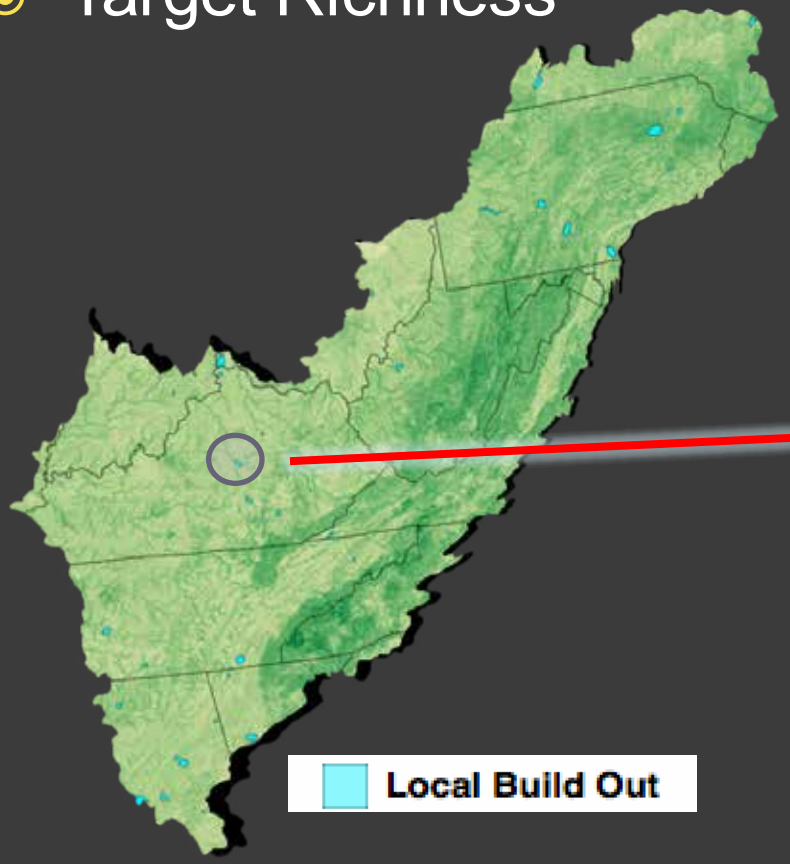
- Conceptual: Design element functions etc.
- Threats Matrix

Discussion of Threats

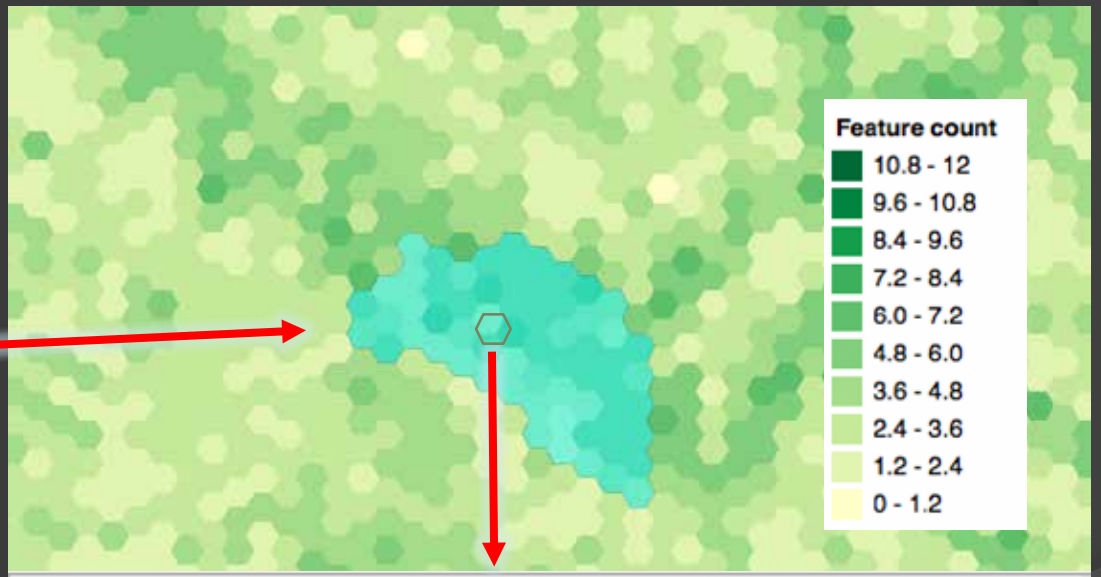
- How should cumulative threats to design elements be treated?
  - First attempt was a simple additive index
  - Should threats be assed directly to modeled target areas?
- Ideas about how to account for jurisdictional differences in regulations (e.g., gas extraction) that might modify development probability?

Scalable decision-making to 1km hexagons

- Target Richness



- Target richness by hexagon



	ID	Name	Amount	As % of total	Target	As % of target	% of target currently met
1	6	Forested_Wetlands	2789.42125	0.0 %	1770022219.0	0.0 %	150.37 %
2	8	Hellbender	1004400.0	0.0 %	12322134720.0	0.01 %	107.37 %
3	11	Lowland_Streams	129600.0	0.0 %	5775735780.0	0.0 %	99.72 %
4	12	Prarie_Warbler	226800.0	0.0 %	14132483505.0	0.0 %	323.11 %
5	14	Resilience	729000.0	0.0 %	8929356975.0	0.01 %	107.21 %

Discussion of Design Elements

- Can you identify regionally important areas not captured by design for further investigation?
- Do the design elements help you think about how the conservation plan should be interpreted/used?
- Ideas about new elements to help with partner utility in the future?
- Do names of design elements have regional cultural/natural resonance? Suggestions?

Looking forward to Phase II

- Refinement of conservation targets with new data/methods
- Refinement of design elements (both terrestrial and aquatic)
- Refinement of Threats Index