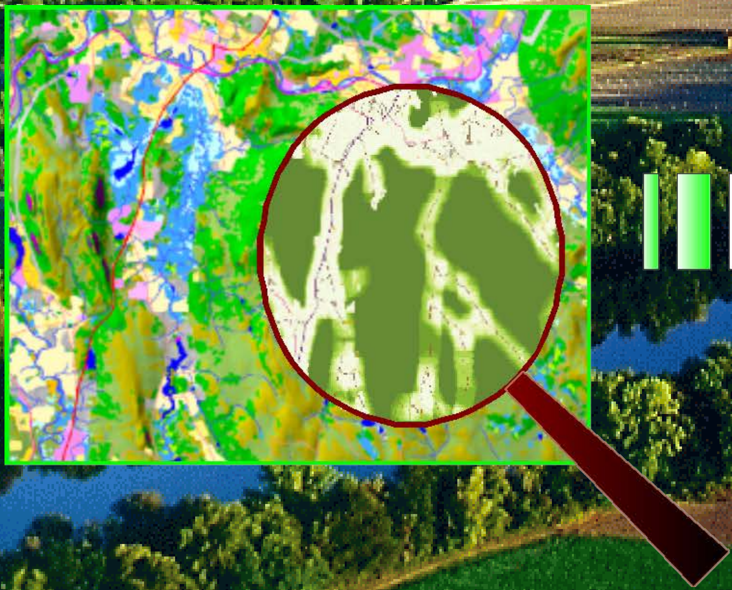
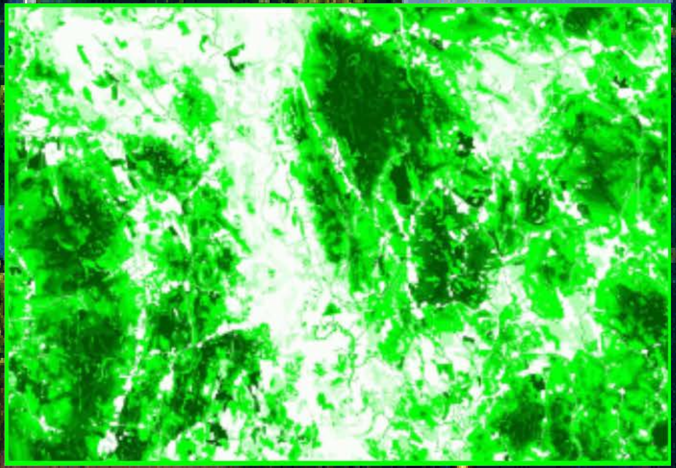
Designing Sustainable Landscapes in the Northeast

A project of the North Atlantic Landscape Conservation Cooperative & Northeast Climate Science Center

Landscape Conservation Design

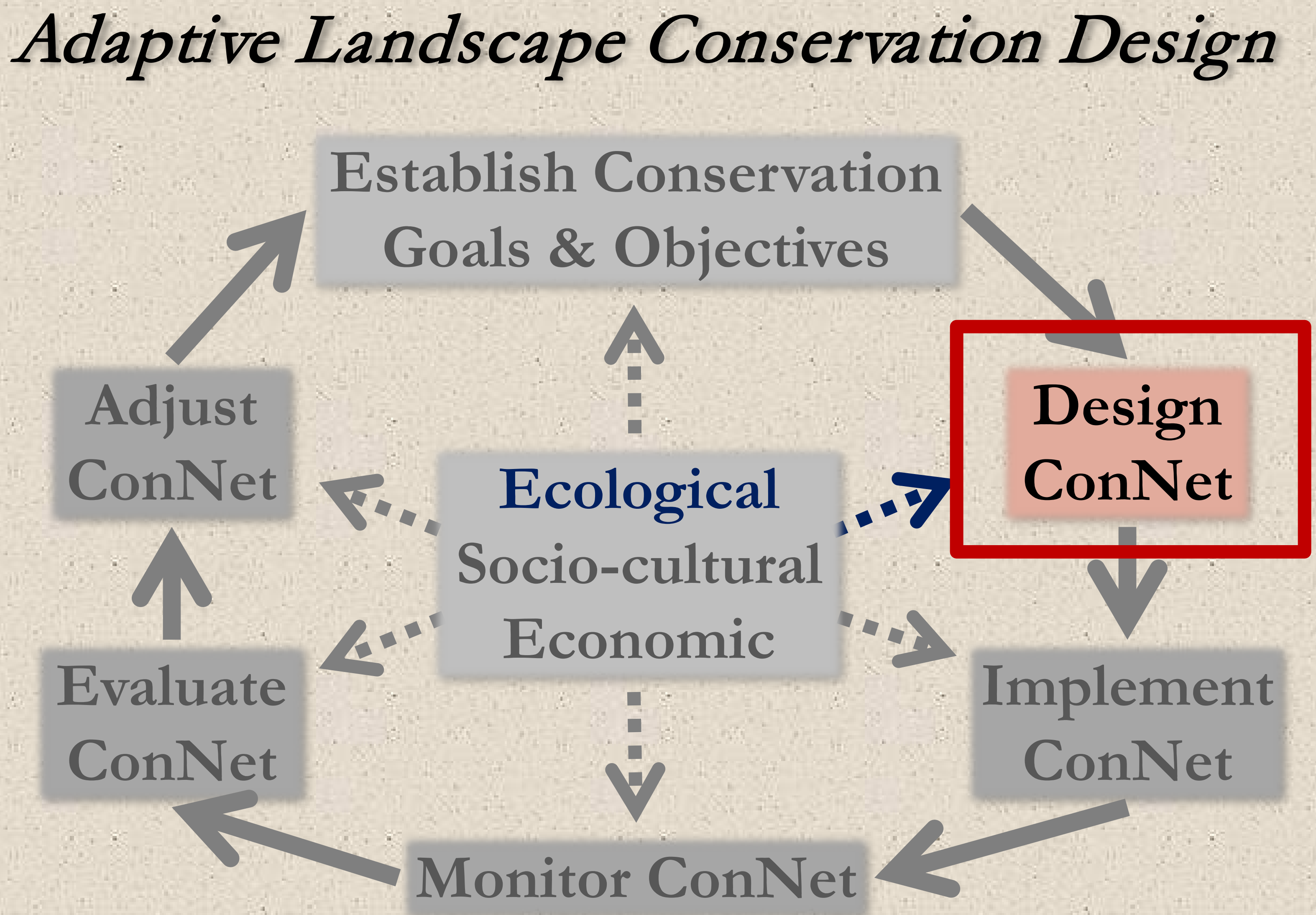
August, 2014





Landscape Conservation Design

Step 2: Design Conservation Network



Landscape Conservation Design

Step 2: Design Conservation Network

Design Steps:

1. Select (tiered) *core* areas
2. Create core area *buffers*
3. Prioritize <u>within</u> buffered cores

Review

4. Assess *connectivity* among cores
5. Prioritize <u>among</u> core areas
6. Prioritize <u>among</u> linkages
7. Prioritize <u>within</u> linkages

Current focus

8. Identify *restoration* opportunities
9. Determine *management* needs

- Field verification at all steps
- Socio-cultural and economic considerations at all steps

Landscape Conservation Design

Step 2: Design Conservation Network

4. Assess connectivity among core areas

Core area scenarios:

- Ecosystem approach (coarse filter)… based solely on ecosystem conditions

  Current focus

- Species approach… based solely on focal species considerations
- Combined ecosystem-species approach… based on the complement of ecosystems and focal species

Landscape Conservation Design

Step 2: Design Conservation Network

1-3. Create terrestrial (buffered) core areas

- Weighted vs Unweighted selection index
- CTR- vs HUC8- vs Hybrid-scaled selection index
- With vs Without rare communities in selection index
- 20% vs 25% vs 30% of landscape included in cores
- Fewer/larger vs More/smaller cores

• Altogether, 24 alternatives considered

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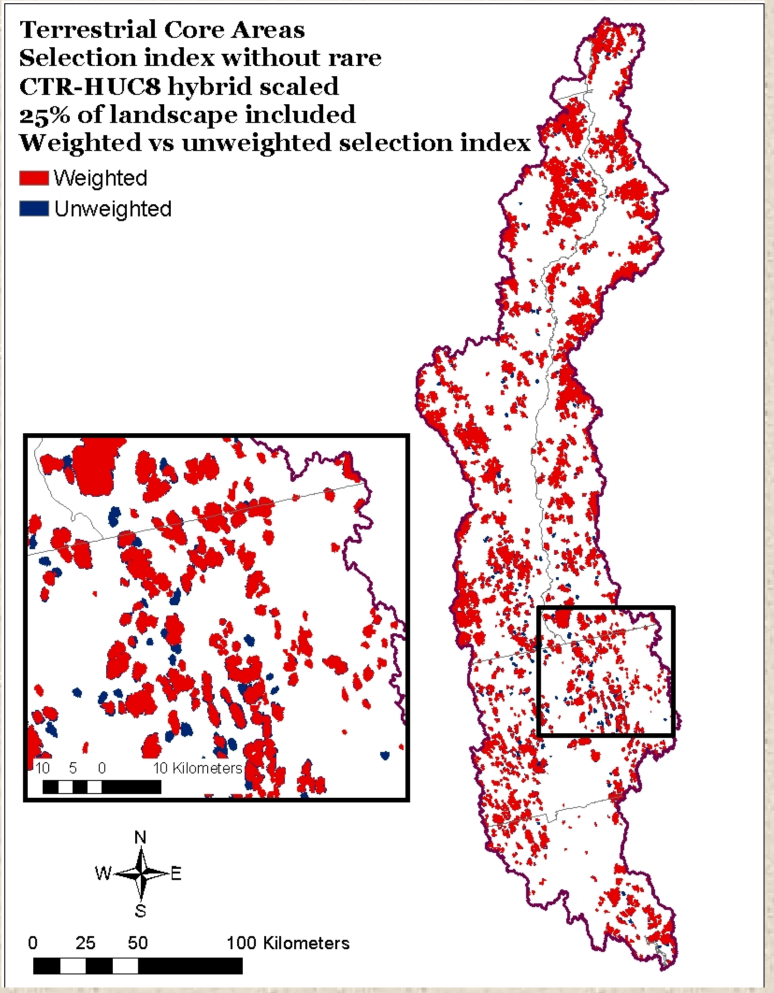
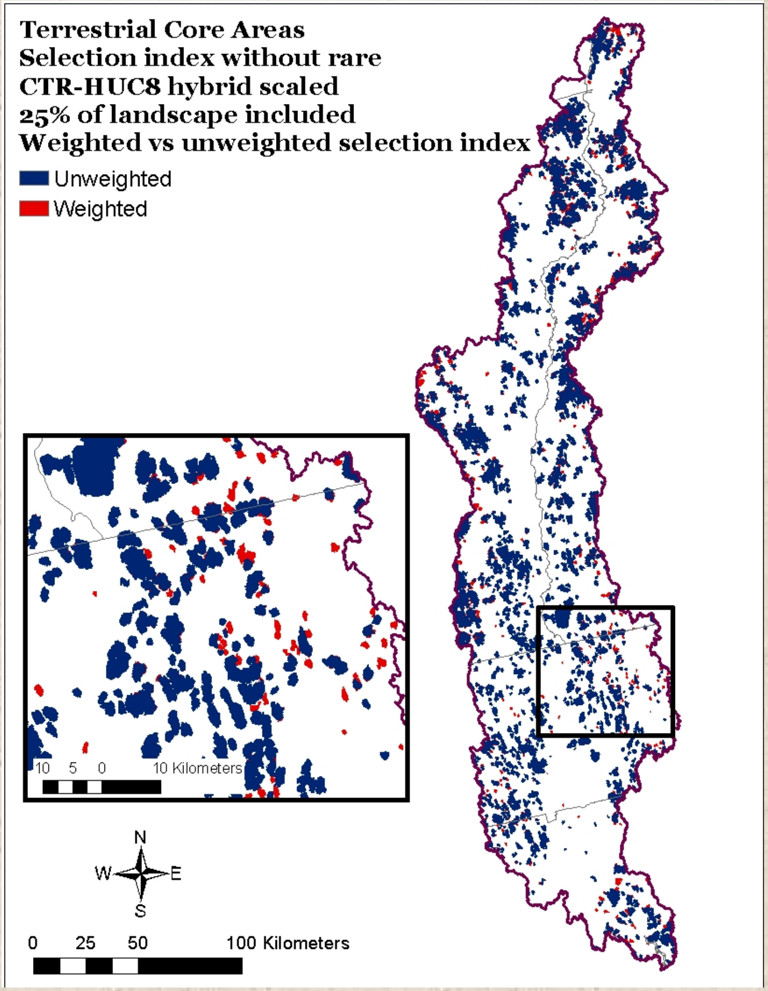
Step 2: Design Conservation Network

- Weighted vs Unweighted selection index





Landscape Conservation Design

Step 2: Design Conservation Network

- **Weighted vs Unweighted selection index**

Macrogroup	Weight	Area (ha)	Unweighted % in Cores	Weighted % in Cores
Alpine	**3**	**553**	**8.90**	**27.32**
Cliff & Talus	1-3	16,505	34.23	34.53
Glade & Barren & Savanna	1	680	58.41	51.16
Outcrop & Summit Scrub	1-3	21,155	50.91	55.35
Ruderal Shrubland & Grassland	1	10,205	17.18	16.46
Coastal Grassland & Shrubland	**3**	**22**	**33.20**	**33.20**
Boreal Upland Forest	**3**	**168,630**	**32.00**	**40.89**
Central Oak-Pine	1-3	145,586	33.47	34.10
Northern Hardwood & Conifer	1	1,749,969	30.75	30.02
Central Hardwood Swamp	1	4,800	12.81	15.48
Coastal Plain Peat Swamp	1	78	25.12	25.00
Northeastern Floodplain Forest	**3**	**469**	**6.54**	**6.81**
Northern Swamp	1-3	80,673	21.47	23.50
Emergent Marsh	**3**	**10,267**	**24.31**	**32.27**
Ruderal Shrub Swamp	1	505	8.65	10.17
Wet Meadow / Shrub Marsh	**3**	**20,960**	**18.74**	**27.17**
Northern Peatland & Fens	**3**	**3,044**	**30.19**	**37.86**
Total		**2,884,737**	**25.10**	**25.31**

Landscape Conservation Design

Step 2: Design Conservation Network

- Weighted vs Unweighted selection index

Macrogroup	System	Weight	Area (ha)	Unweighted % in Cores	Weighted % in Cores
Cliff & Talus	Laurentian-Acadian Acidic Cliff and Talus	1	5427	43.17	47.14
	Laurentian-Acadian Calcareous Cliff and Talus	**3**	**4076**	**36.87**	**39.69**
	North-Central Appalachian Acidic Cliff and Talus	1	3678	28.06	23.02
	North-Central Appalachian Circumneutral Cliff and Talus	1	3325	23.2	20.39
Outcrop & Summit Scrub	**Laurentian-Acadian Calcareous Rocky Outcrop**	**3**	**5567**	**42.63**	**44.43**
	Northern Appalachian-Acadian Rocky Heath Outcrop	1	15588	53.87	59.25
Central Oak-Pine	Central Appalachian Dry Oak-Pine Forest	1	16570	46.95	42.75
	Central Appalachian Pine-Oak Rocky Woodland	1	5549	43.08	38.88
	North Atlantic Coastal Plain Hardwood Forest	1	11833	41.23	36.66
	North Atlantic Coastal Plain Maritime Forest	1	36	10.47	10.22
	Northeastern Interior Dry-Mesic Oak Forest: moist-cool	1	10548	20.72	23.67
	Northeastern Interior Dry-Mesic Oak Forest: typic	1	100416	31.35	33.42
	Northeastern Interior Pine Barrens	**3**	**634**	**0.06**	**0.64**

Contrary results due to integrated selection index

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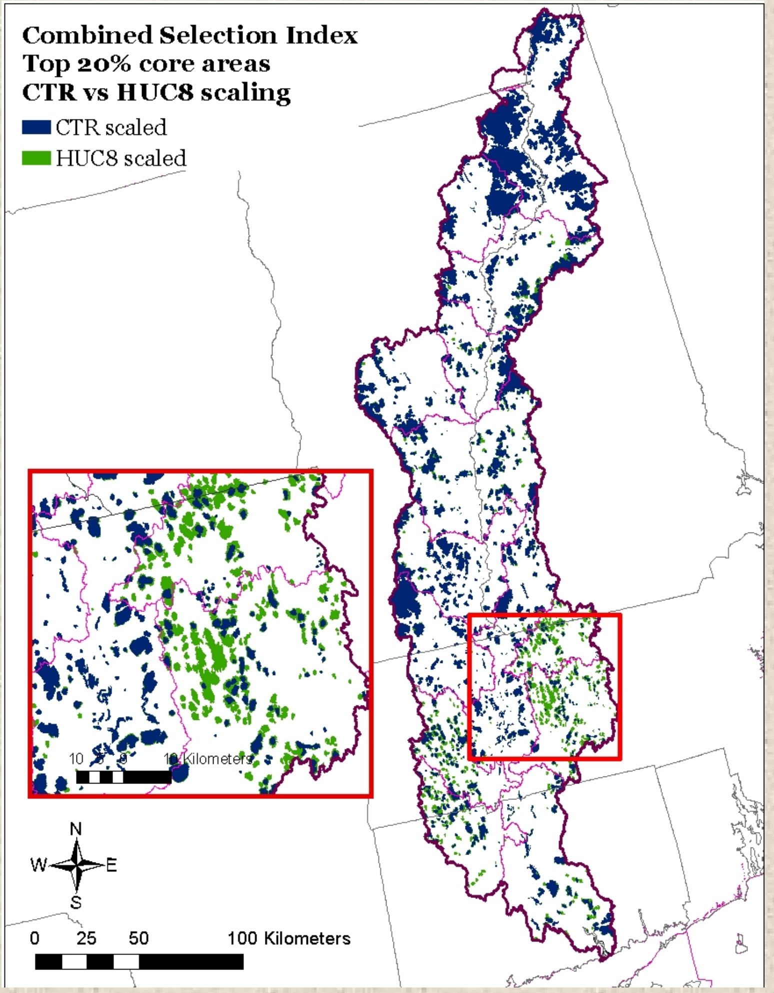
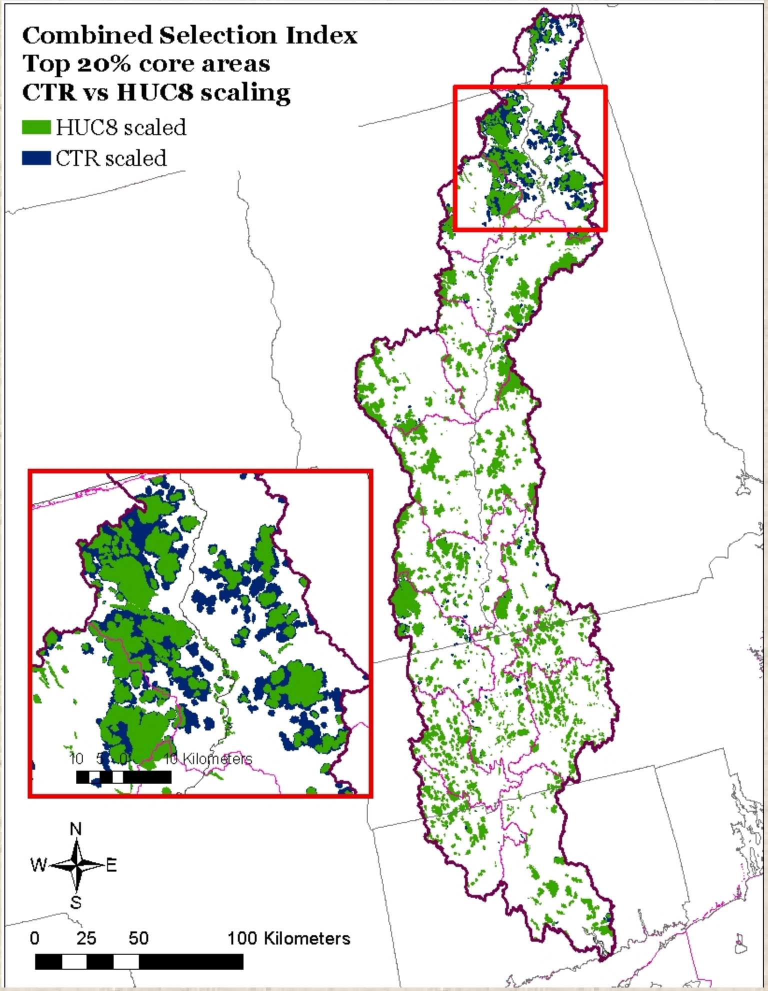
Step 2: Design Conservation Network

- CTR- vs HUC8-scaled selection index





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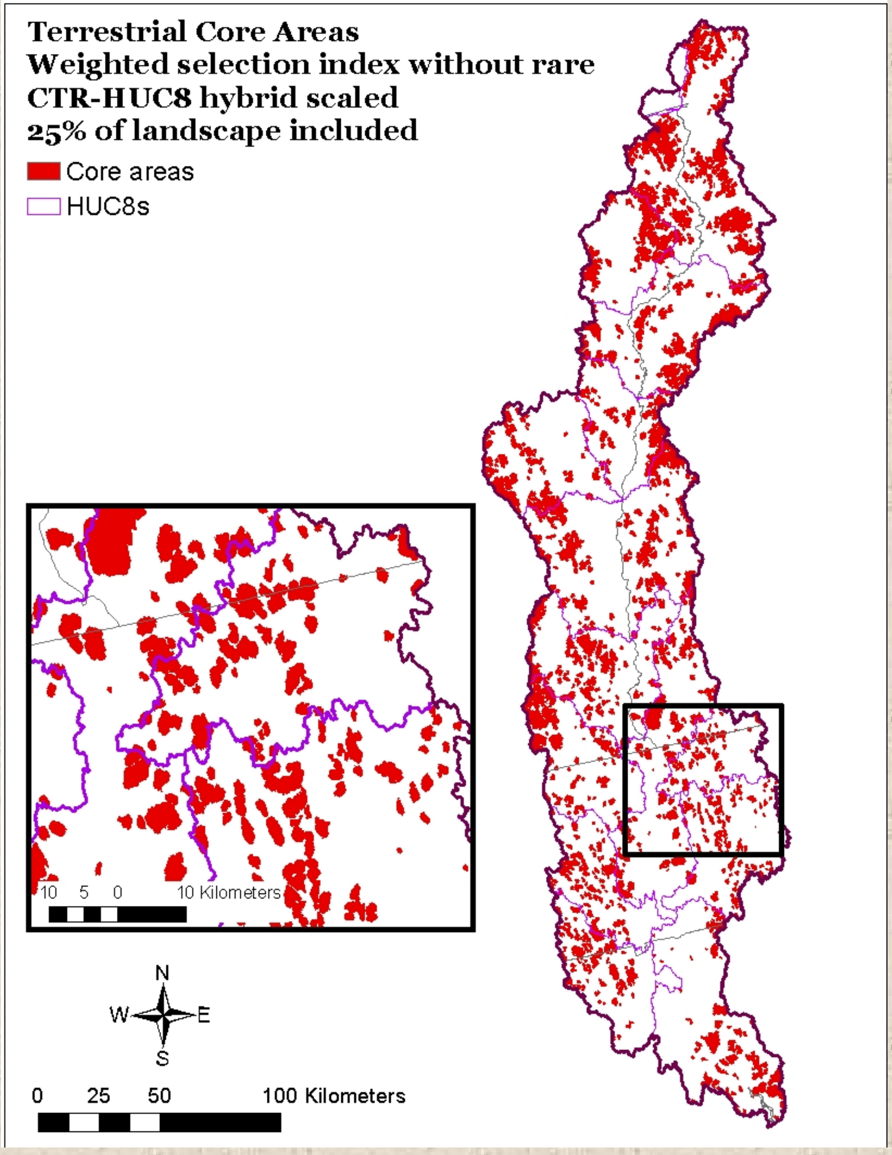
Step 2: Design Conservation Network

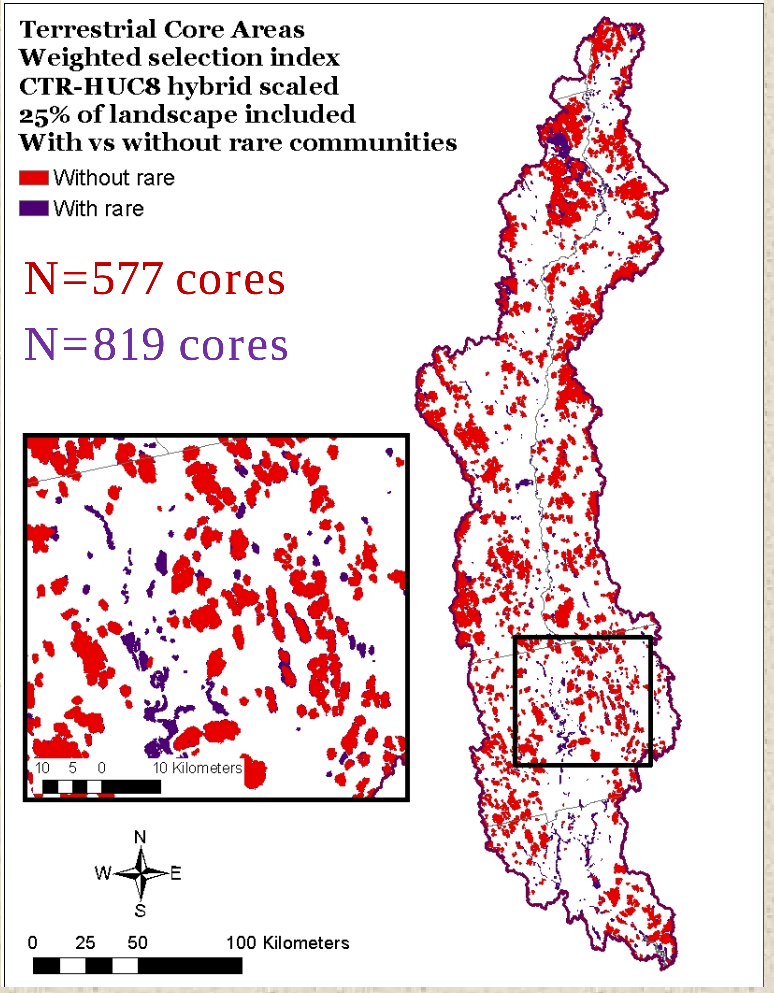
- **CTR-HUC8 Hybrid-scaled selection index**

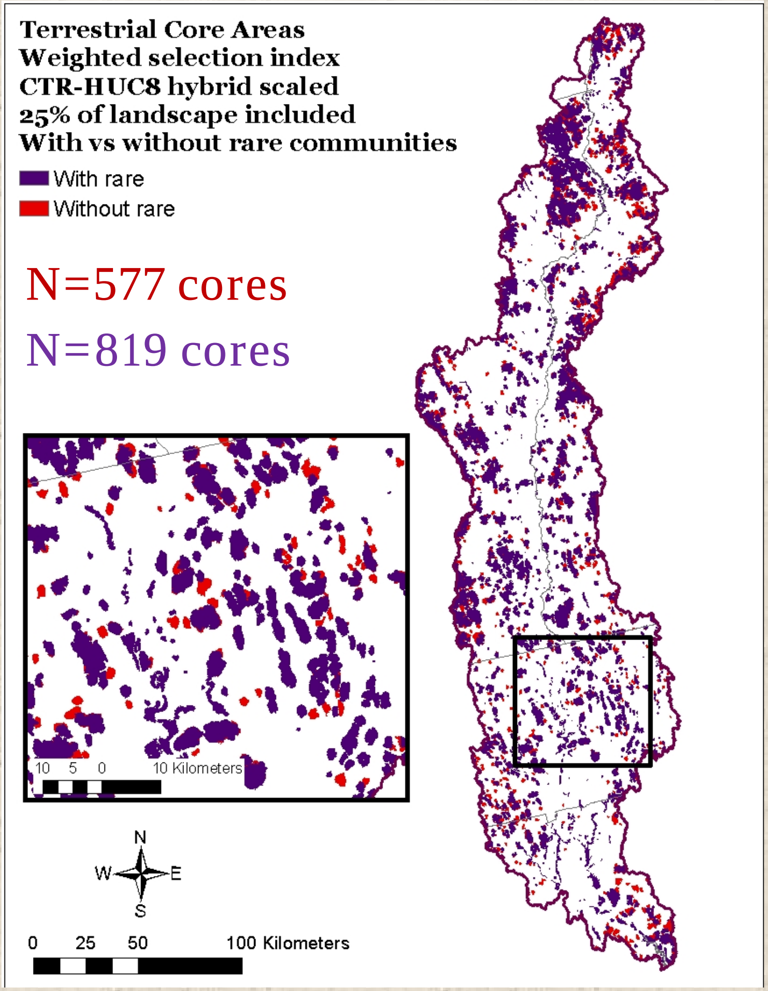


Landscape Conservation Design

Step 2: Design Conservation Network

- With vs Without rare communities





Landscape Conservation Design

Step 2: Design Conservation Network

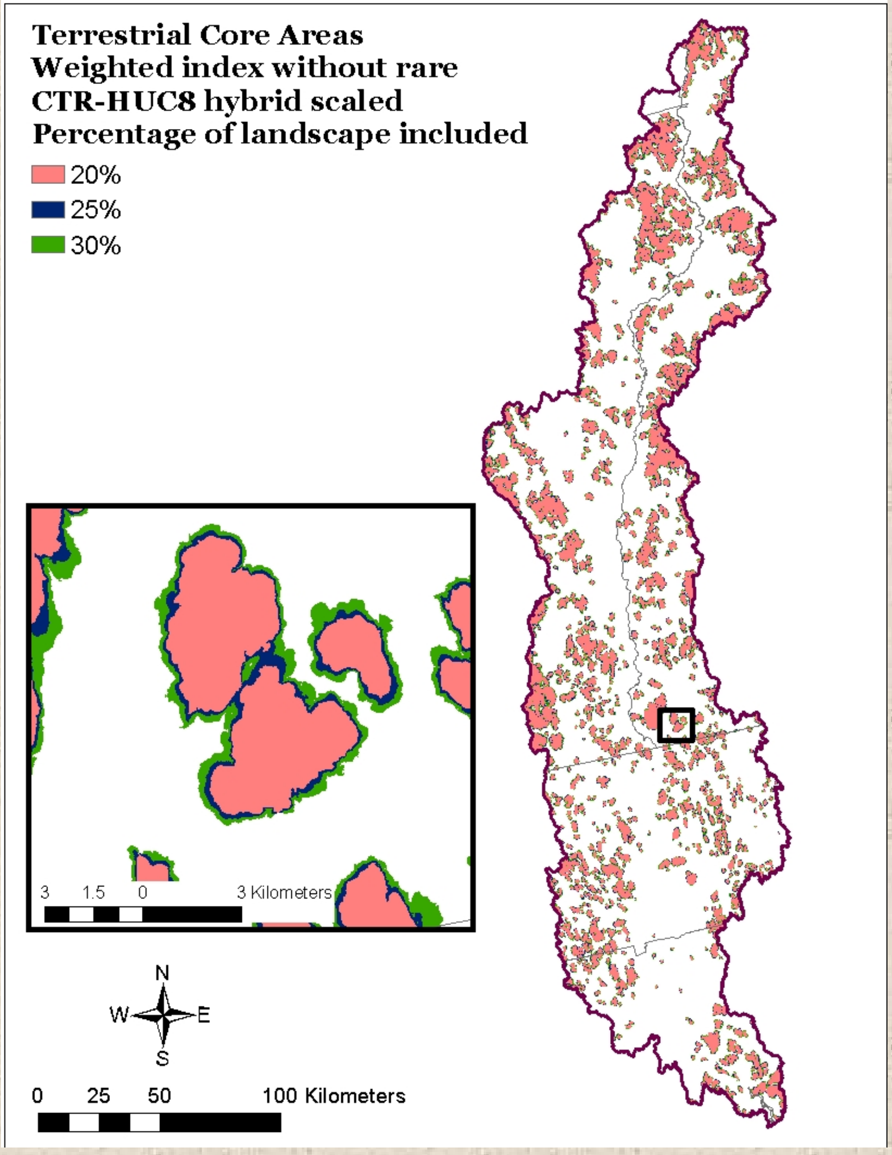
- With vs Without rare communities

Macrogroup	Area (ha)	Without Rare % in Cores	With Rare % in Cores
Alpine	**553**	**27.32**	**100.00**
Cliff & Talus	16,505	34.53	39.01
Glade & Barren & Savanna	680	51.16	50.21
Outcrop & Summit Scrub	21,155	55.35	48.90
Ruderal Shrubland & Grassland	10,205	16.46	16.65
Coastal Grassland & Shrubland	22	33.20	33.20
Boreal Upland Forest	168,630	40.89	36.15
Central Oak-Pine	145,586	34.10	26.71
Northern Hardwood & Conifer	1,749,969	30.02	27.13
Central Hardwood Swamp	**4,800**	**15.48**	**37.86**
Coastal Plain Peat Swamp	**78**	**25.00**	**100.00**
Northeastern Floodplain Forest	**469**	**6.81**	**47.69**
Northern Swamp	80,673	23.50	27.94
Emergent Marsh	10,267	32.27	31.72
Ruderal Shrub Swamp	505	10.17	21.80
Wet Meadow / Shrub Marsh	20,960	27.17	26.48
Northern Peatland & Fens	**3,044**	**37.86**	**57.16**
Total	**2,884,737**	**25.31**	**23.88**

Landscape Conservation Design

Step 2: Design Conservation Network

- 20% vs 25% vs 30% of landscape included in cores



Landscape Conservation Design

Step 2: Design Conservation Network

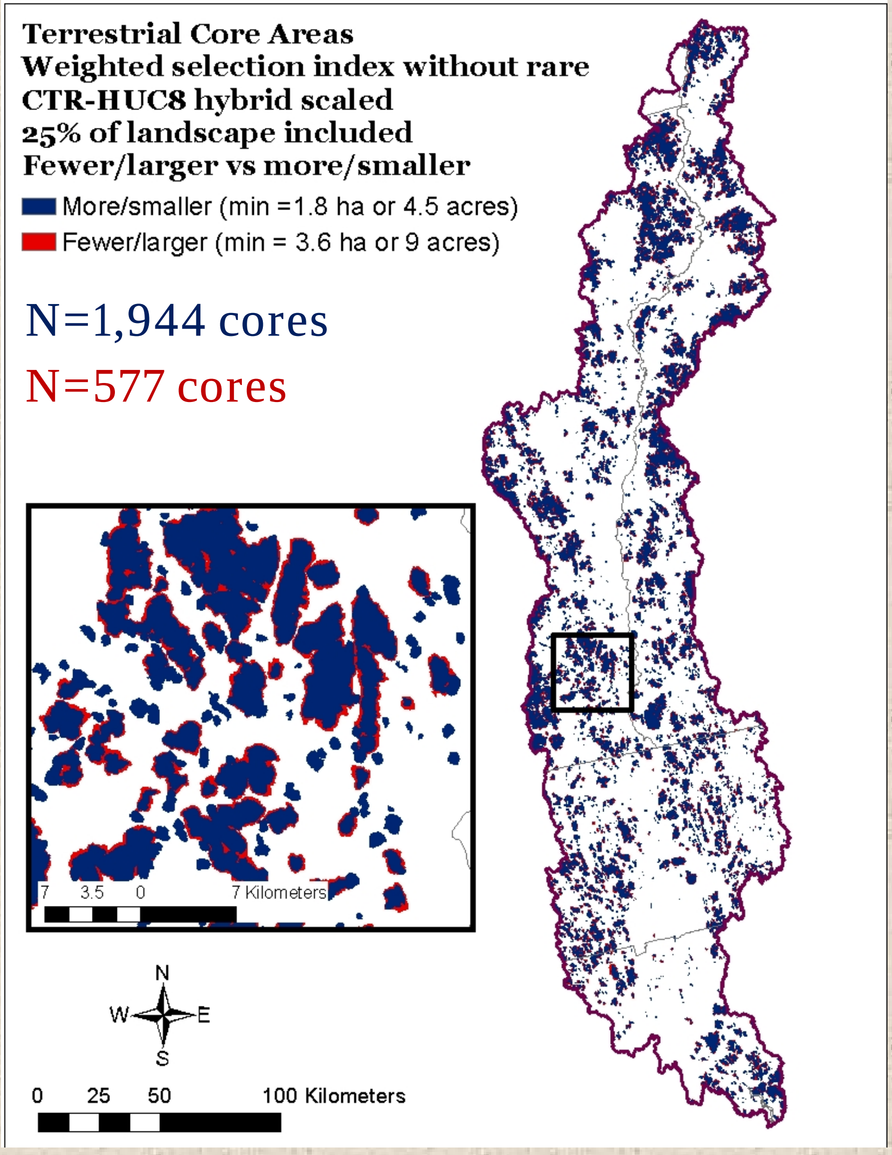
- 20% vs 25% vs 30% of landscape included in cores

		% in Cores		
Macrogroup	**Area (ha)**	**20%**	**25%**	**30%**
Alpine	553	19.15	27.32	41.13
Cliff & Talus	16,505	29.58	34.53	40.46
Glade & Barren & Savanna	680	46.86	51.16	55.78
Outcrop & Summit Scrub	21,155	48.59	55.35	62.26
Ruderal Shrubland & Grassland	10,205	12.98	16.46	20.88
Coastal Grassland & Shrubland	22	33.20	33.20	34.43
Boreal Upland Forest	168,630	35.80	40.89	46.65
Central Oak-Pine	145,586	30.29	34.10	39.15
Northern Hardwood & Conifer	1,749,969	25.31	30.02	36.08
Central Hardwood Swamp	4,800	14.35	15.48	16.99
Coastal Plain Peat Swamp	78	21.54	25.00	25.23
Northeastern Floodplain Forest	469	6.52	6.81	6.81
Northern Swamp	80,673	20.29	23.50	27.82
Emergent Marsh	10,267	29.30	32.27	36.07
Ruderal Shrub Swamp	505	7.71	10.17	12.02
Wet Meadow / Shrub Marsh	20,960	23.95	27.17	31.64
Northern Peatland & Fens	3,044	32.89	37.86	43.58
Total	**2,884,737**	**21.35**	**25.31**	**30.47**

Landscape Conservation Design

Step 2: Design Conservation Network

- Fewer/larger vs More/smaller cores



Landscape Conservation Design

Step 2: Design Conservation Network

- **Fewer/larger vs More/smaller cores**

		% in Cores	
Macrogroup	**Area (ha)**	**Fewer/larger**	**More/smaller**
Alpine	553	**27.32**	15.67
Cliff & Talus	16,505	34.53	34.45
Glade & Barren & Savanna	680	51.16	50.07
Outcrop & Summit Scrub	21,155	**55.35**	50.89
Ruderal Shrubland & Grassland	10,205	16.46	16.76
Coastal Grassland & Shrubland	22	**33.20**	29.92
Boreal Upland Forest	168,630	**40.89**	38.07
Central Oak-Pine	145,586	34.10	**36.59**
Northern Hardwood & Conifer	1,749,969	30.02	29.07
Central Hardwood Swamp	4,800	15.48	**23.89**
Coastal Plain Peat Swamp	78	25.00	**55.41**
Northeastern Floodplain Forest	469	6.81	**9.74**
Northern Swamp	80,673	23.50	**27.67**
Emergent Marsh	10,267	32.27	**42.52**
Ruderal Shrub Swamp	505	10.17	**11.31**
Wet Meadow / Shrub Marsh	20,960	27.17	**37.96**
Northern Peatland & Fens	3,044	37.86	**43.03**
Total	**2,884,737**	**25.31**	**24.58**

Step 2: Design Conservation Network

Key Decisions regarding <u>terrestrial</u> core areas:

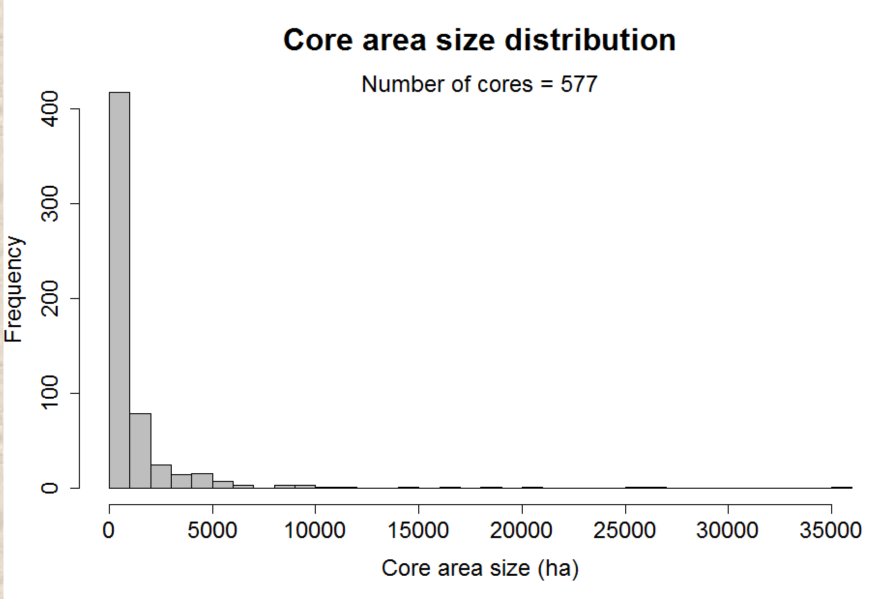
- <u>Weighted</u> or unweighted selection index?
- CTR-, HUC8-, or <u>Hybrid</u>-scaled selection index?
- With or <u>without</u> rare communities?
- 20%, <u>25%</u> or 30% of landscape included in cores?
- <u>Fewer/larger</u> or more/smaller cores?

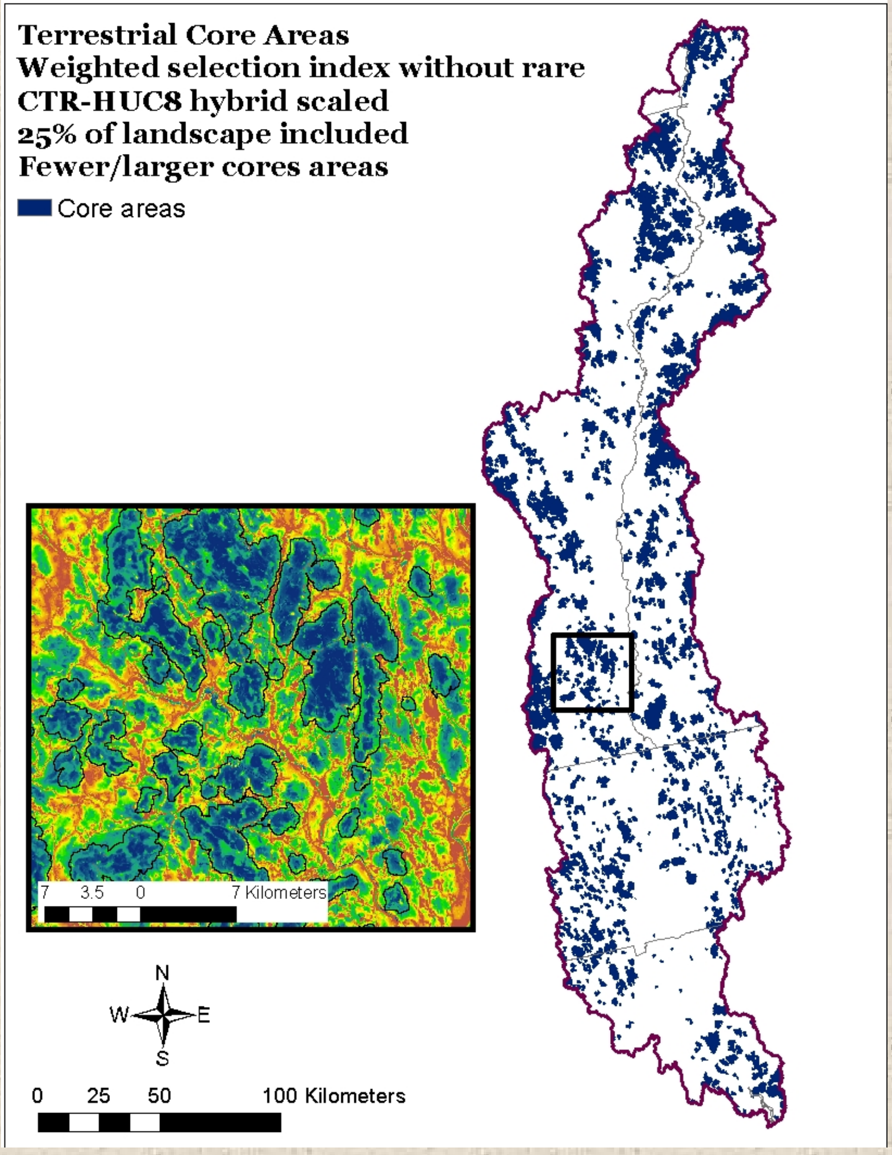
Landscape Conservation Design

Step 2: Design Conservation Network

What does this core area network look like?

- 577 core areas
- Min size = 53 ha (130 ac)
- Max size = 35,294 ha (87,177 ac)



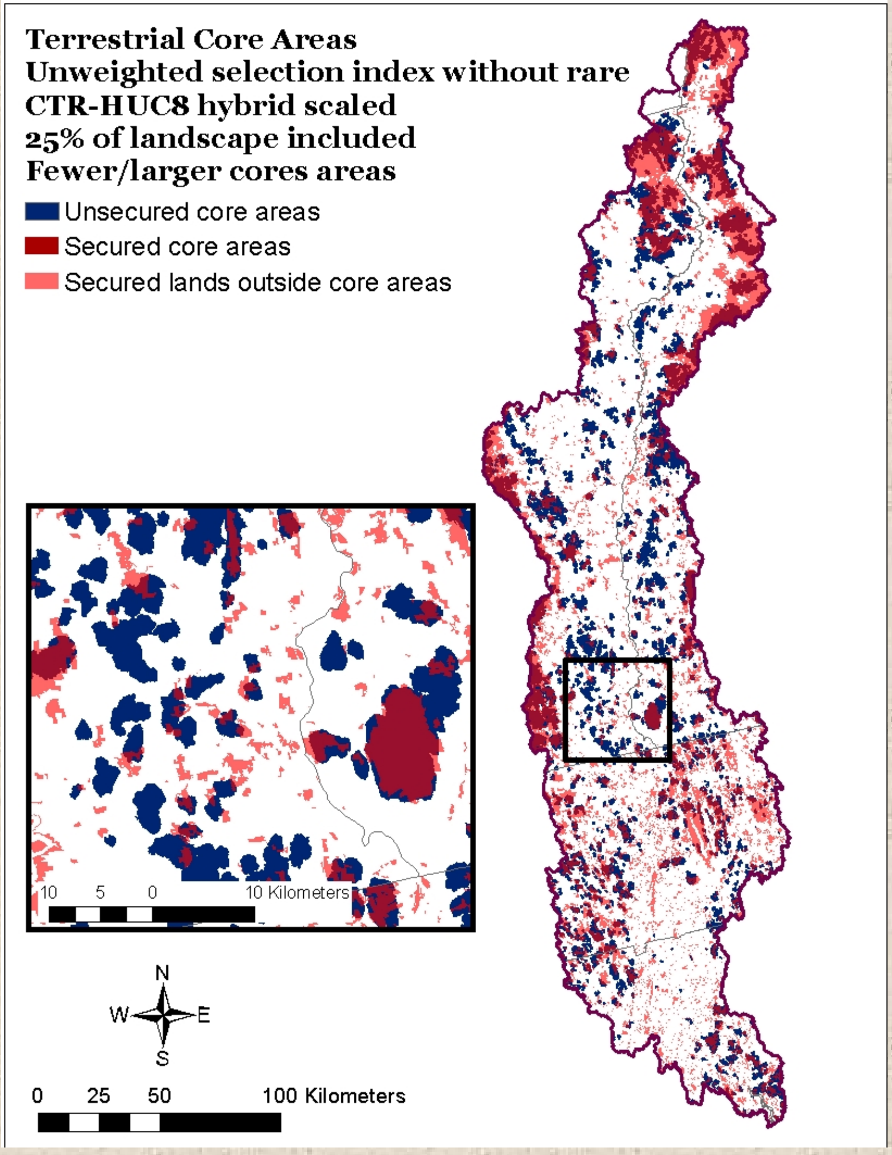


Landscape Conservation Design

Step 2: Design Conservation Network

What does this core area network look like?

- 50% of the core area is already secured



Landscape Conservation Design

Step 2: Design Conservation Network

1-3. Create aquatic (buffered) core areas

- Weighted vs Unweighted selection index
- HUC- vs Seed-based core areas

HUC-based:

- HUC8-, 10-, vs 12-level
- Nested vs Non-nested hierarchy across HUC levels

Seed-based:

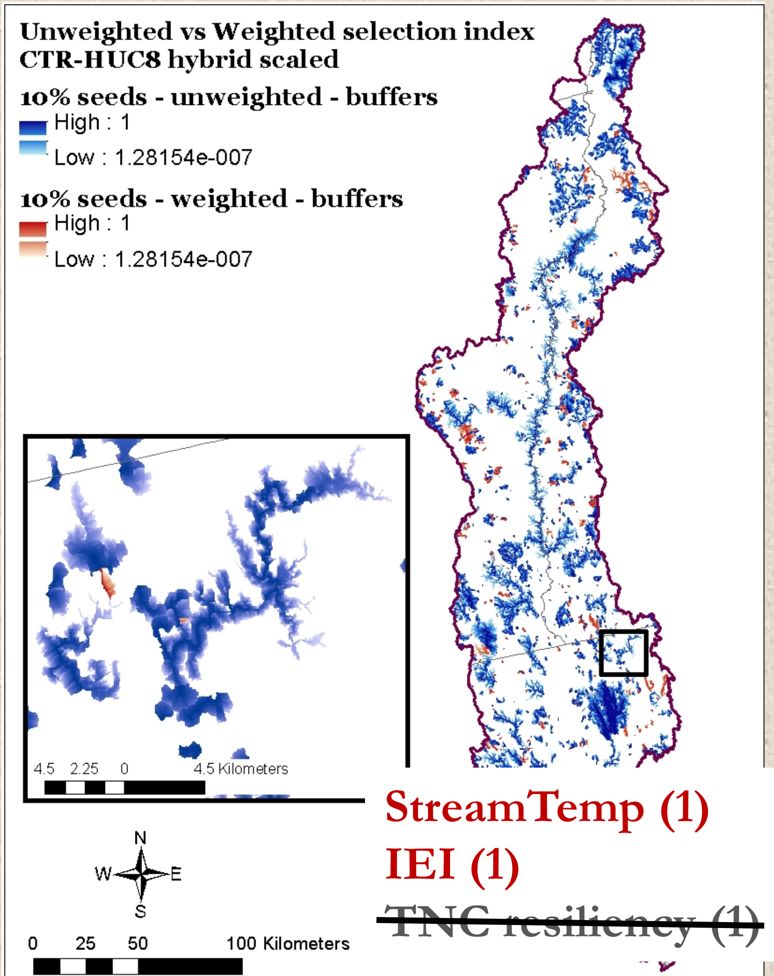
- CTR- vs HUC8- vs Hybrid-scaled selection index
- Seeds- vs Extended seeds
- Minimum core area size (~150 m vs ~1 km)
- Percentage of landscape (5%, 10%, 20% seeds)

- Altogether, 74 alternatives considered

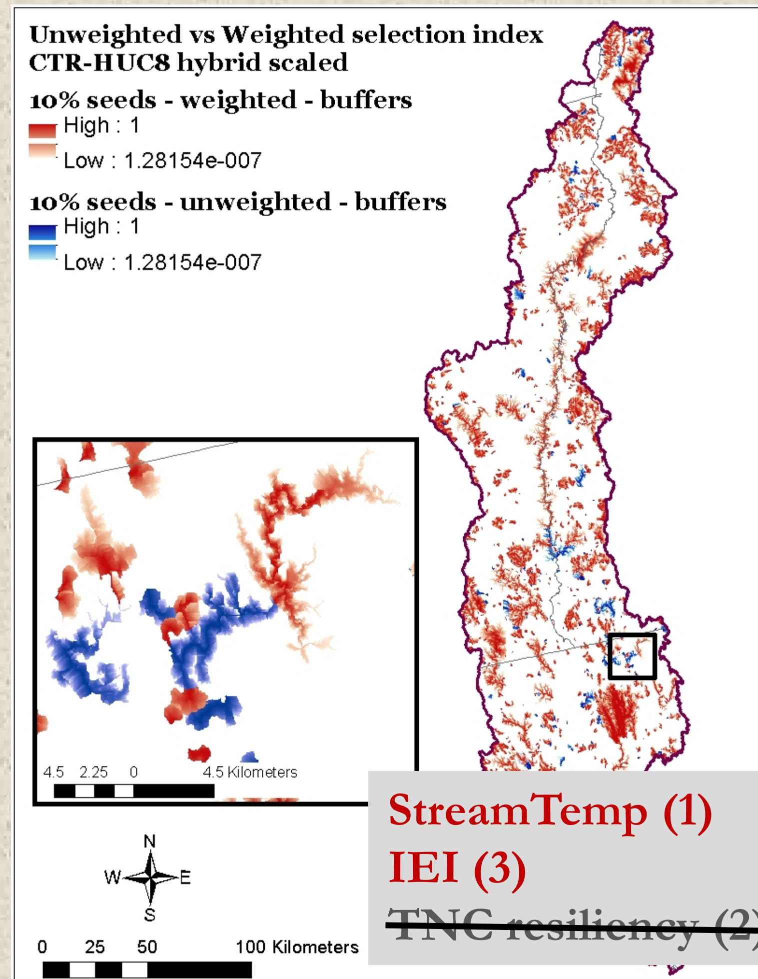
Landscape Conservation Design

Step 2: Design Conservation Network

- Weighted vs Unweighted selection index



StreamTemp (1)
IEI (1)
~~TNC resiliency (1)~~

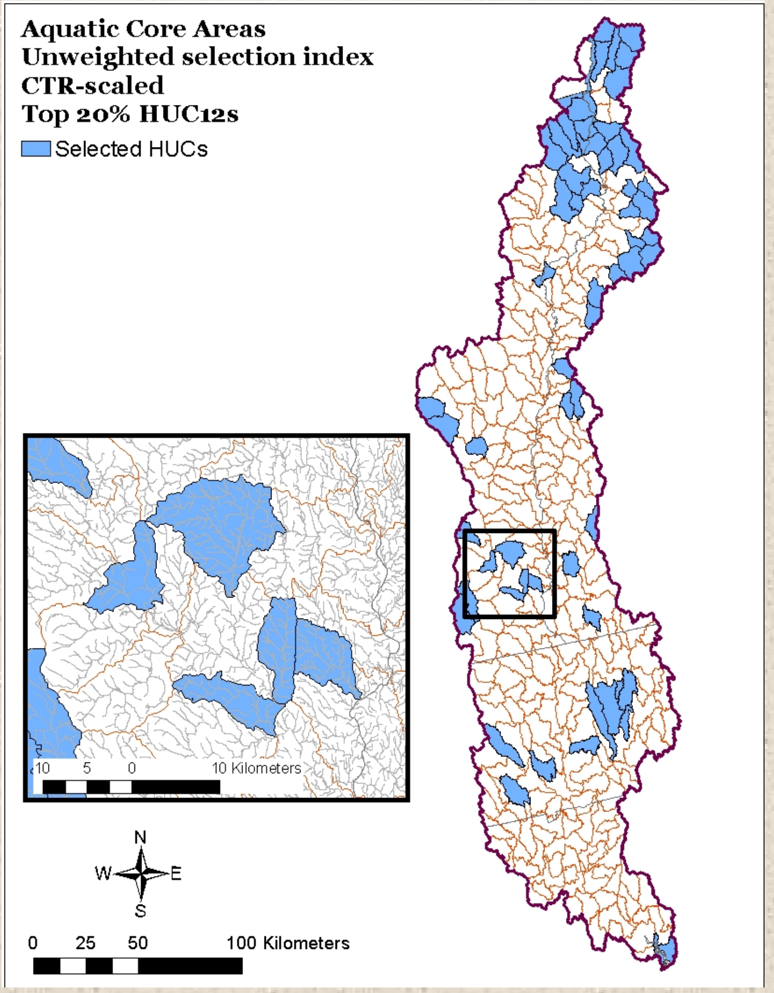


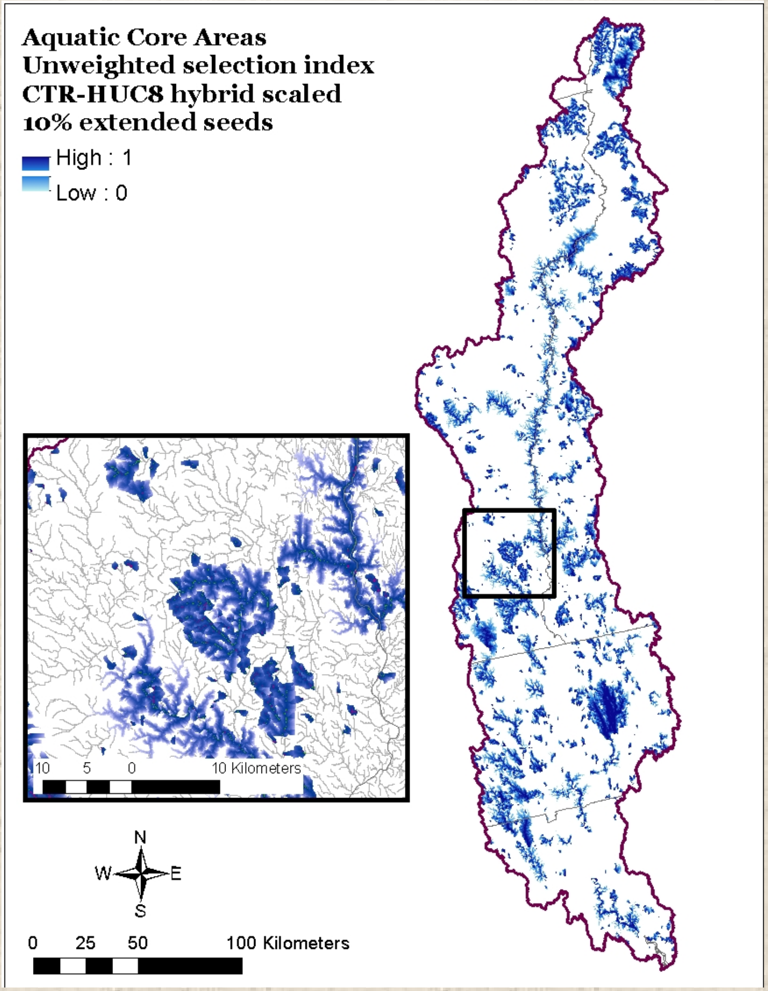
StreamTemp (1)
IEI (3)
~~TNC resiliency (2)~~

Landscape Conservation Design

Step 2: Design Conservation Network

- HUC- vs Seed-based core areas





Landscape Conservation Design

Step 2: Design Conservation Network

- **HUC- vs Seed-based core areas**

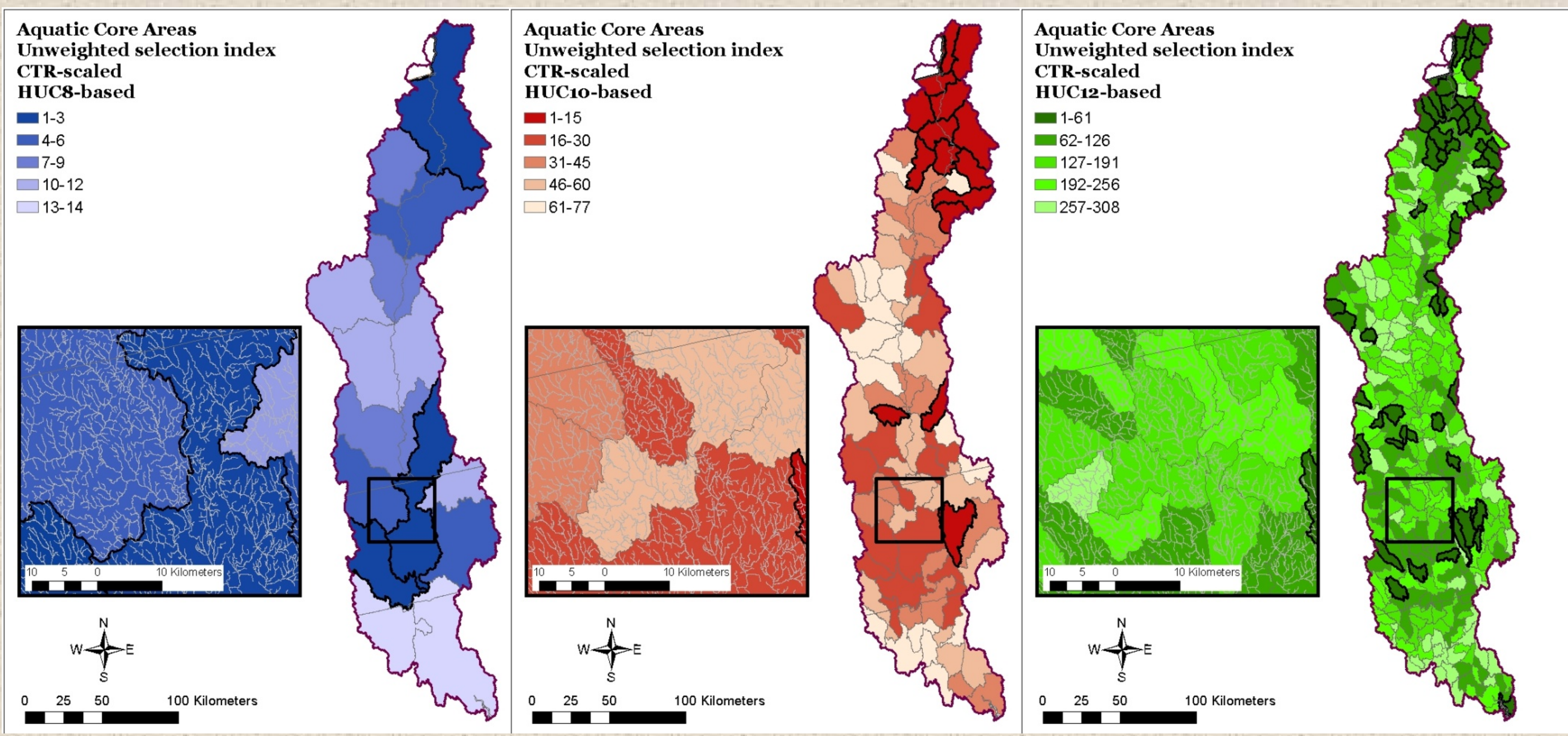
Macrogroup/System	Stream Length (KM)	% in Cores	
		HUC12	Extended Seeds
Stream (headwater/creek) cold low	1,105	11.63%	5.89%
Stream (headwater/creek) cold moderate	3,227	15.99%	8.67%
Stream (headwater/creek) cold high	13,120	20.01%	10.23%
Stream (headwater/creek) cool low	896	4.50%	4.40%
Stream (headwater/creek) cool moderate	662	6.62%	5.74%
Stream (headwater/creek) cool high	798	7.88%	7.13%
Stream (headwa			**10.97%**
Stream (headwa			**6.36%**
Stream (headwa			**6.91%**
Stream (small) c			10.98%
Stream (small) c			14.09%
Stream (small) c			**32.92%**
Stream (small) c			**42.88%**
Stream (medium) cold	103	**38.41%**	0.00%
Stream (medium) cool	399	1.24%	**33.39%**
Stream (medium) warm	118	2.47%	**30.65%**
Stream (large) cool	390	2.78%	**49.77%**
Stream (large) warm	21	0.00%	**59.66%**
Freshwater tidal	131	0.00%	**50.77%**
Total	**22,395**	**16.18%**	**11.64%**

- Note, these results will change somewhat if we use the CTR-HUC8 Hybrid scaled selection index for the HUC-based analysis

Landscape Conservation Design

Step 2: Design Conservation Network

- HUC8-, 10-, vs 12-level



Landscape Conservation Design

Step 2: Design Conservation Network

- **HUC8-, 10-, vs 12-level**

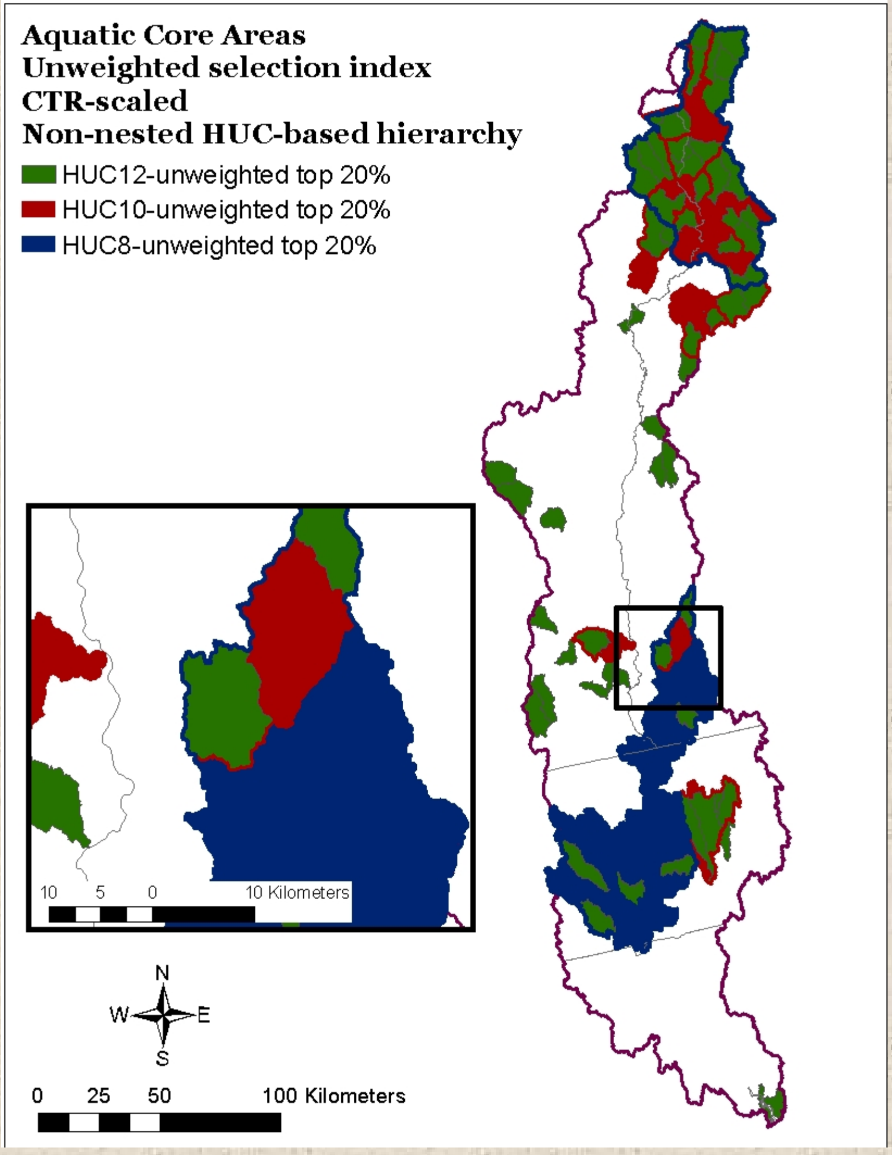
Macrogroup/System	Stream Length (km)	% in Cores HUC8	% in Cores HUC10	% in Cores HUC12
Stream (headwater/creek) cold low	1,105	22.48%	12.97%	11.63%
Stream (headwater/creek) cold moderate	3,227	24.88%	15.91%	15.99%
Stream (headwater/creek) cold high	13,120	22.82%	19.20%	20.01%
Stream (headwater/creek) cool low	896	19.98%	**1.55%**	**4.50%**
Stream (headwater/creek) cool moderate	662	24.18%	**2.30%**	**6.62%**
Stream (headwa[illegible]	[illegible]	[illegible]	**[illegible]%**	**7.88%**
Stream (headwa[illegible]	[illegible]	[illegible]	**[illegible]%**	**1.33%**
Stream (headwa[illegible]	[illegible]	[illegible]	**[illegible]%**	**0.58%**
Stream (headwa[illegible]	[illegible]	[illegible]	**[illegible]%**	**0.32%**
Stream (small) [illegible]	[illegible]	[illegible]	[illegible]%	14.70%
Stream (small) [illegible]	[illegible]	[illegible]	[illegible]%	20.35%
Stream (small) [illegible]	[illegible]	[illegible]	**[illegible]%**	**4.18%**
Stream (small) [illegible]	[illegible]	[illegible]	**[illegible]%**	**4.72%**
Stream (medium) cold	103	84.56%	84.59%	38.41%
Stream (medium) cool	399	17.31%	**0.03%**	**1.24%**
Stream (medium) warm	118	13.10%	**2.47%**	**2.47%**
Stream (large) cool	390	39.91%	8.79%	2.78%
Stream (large) warm	21	0.00%	0.00%	0.00%
Freshwater tidal	131	0.00%	0.00%	0.00%
Total	**22,395**	**23.19%**	**16.24%**	**16.18%**

- Note, these results will change somewhat if we use the CTR-HUC8 Hybrid scaled selection index for the HUC-based analysis

Landscape Conservation Design

Step 2: Design Conservation Network

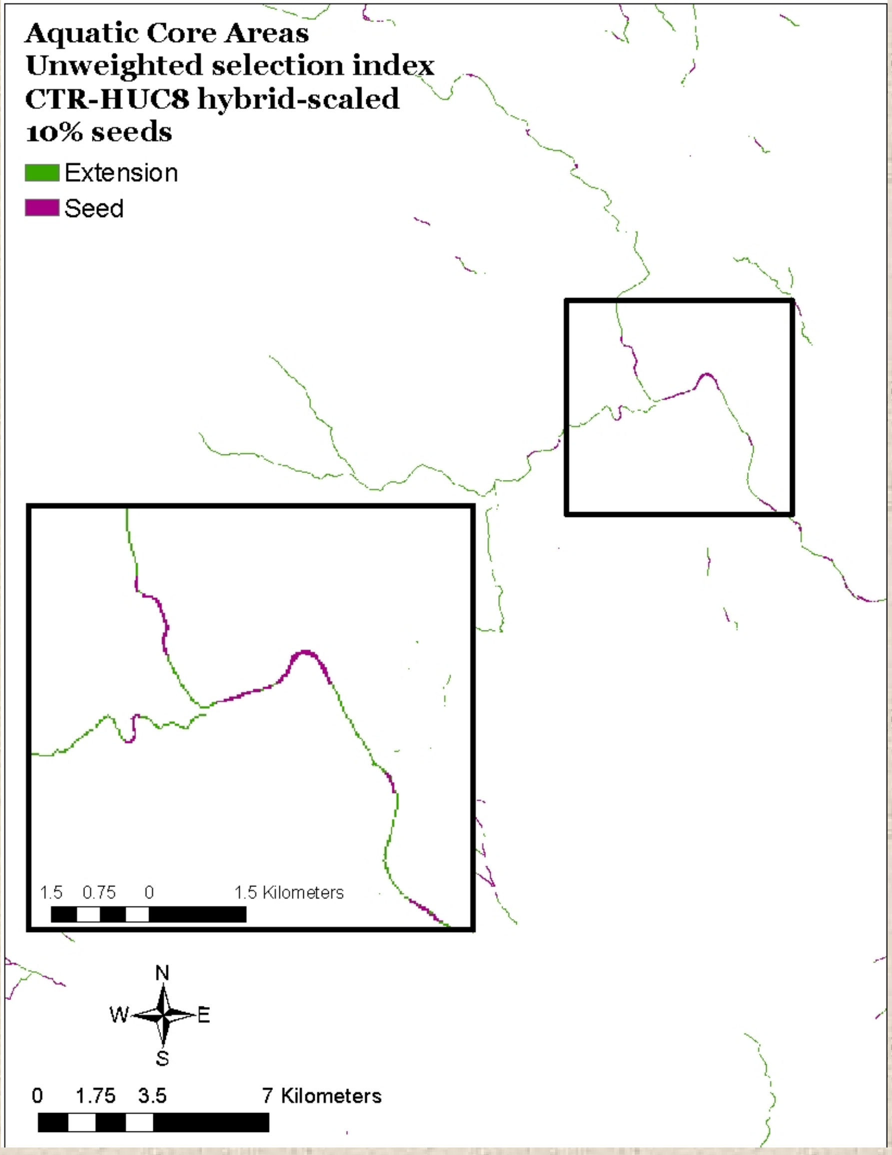
- Nested vs Non-nested hierarchy across HUC levels



Landscape Conservation Design

Step 2: Design Conservation Network

- Seeds- vs Extended seeds



Landscape Conservation Design

Step 2: Design Conservation Network

- **Seeds- vs Extended seeds**

Macrogroup/System	Stream Length (km)	Lgth (km) in Cores		% in Cores	
		Seeds	Ext Seeds	Seeds	Ext Seeds
Stream (headwater/creek) cold low	1,105	20.49	65.10	1.85%	5.89%
Stream (headwater/creek) cold moderate	3,227	89.52	279.75	2.77%	8.67%
Stream (headwater/creek) cold high	13,120	465.03	1,342.44	3.54%	10.23%
Stream (headwater/creek) cool low	896	18.15	39.42	2.03%	4.40%
Stream (headwater/creek) cool moderate	662	17.13	37.95	2.59%	5.74%
Stream (headwater/creek) cool high	798	29.55	56.94	3.70%	7.13%
Stream (headwater/creek) warm low	77	5.01	8.40	6.54%	10.97%
Stream (headwater/creek) warm moderate	36	1.32	2.31	3.64%	6.36%
Stream (headwater/creek) warm high	46	1.26	3.21	2.71%	6.91%
Stream (small) cold low	176	2.07	19.35	1.18%	10.98%
Stream (small) cold moderate	455	8.70	64.11	1.91%	14.09%
Stream (small) cool low	266	21.45	87.51	8.07%	32.92%
Stream (small) cool moderate	370	28.62	158.52	7.74%	42.88%
Stream (medium) cold	103	-	-	0.00%	0.00%
Stream (medium) cool	399	17.22	133.08	4.32%	33.39%
Stream (medium) warm	118	8.04	36.09	6.83%	30.65%
Stream (large) cool	390	54.15	194.13	13.88%	49.77%
Stream (large) warm	21	4.44	12.60	21.02%	59.66%
Freshwater tidal	131	20.40	66.51	15.57%	50.77%
Total	**22,395**	**812.55**	**2,607.42**	**3.63%**	**11.64%**

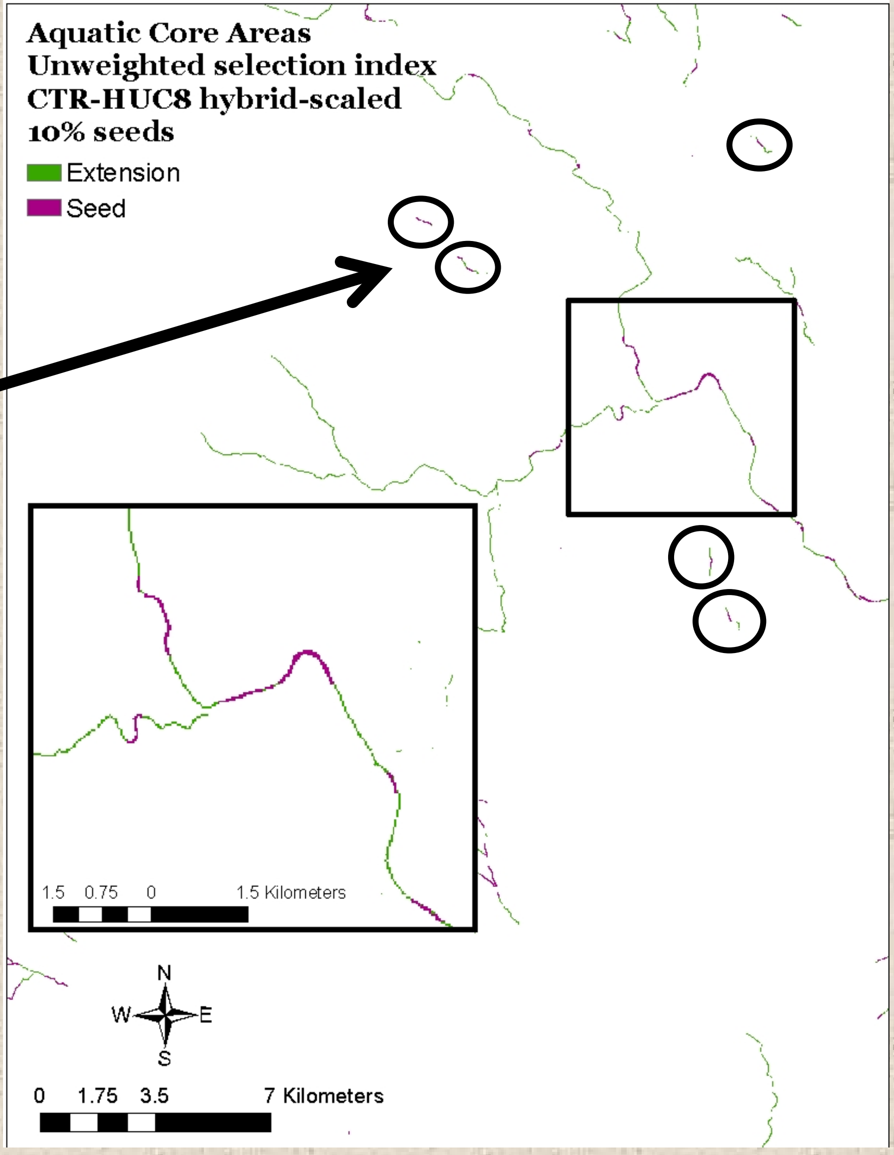
Landscape Conservation Design

Step 2: Design Conservation Network

- **Minimum core area size (~150 m vs ~1 km)**

Drop seeds < ~150 m
and extended seeds < ~1 km

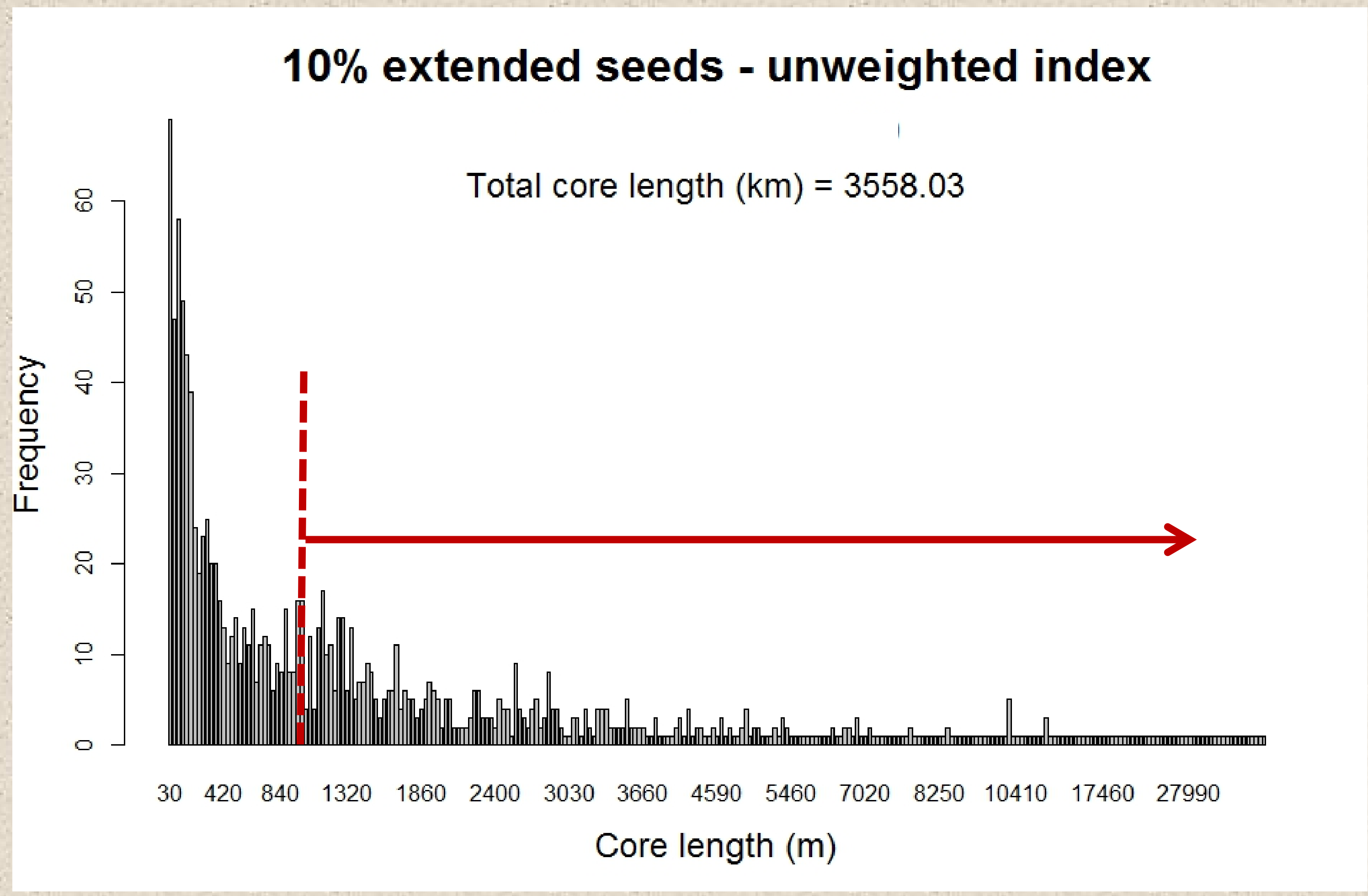
?



Landscape Conservation Design

Step 2: Design Conservation Network

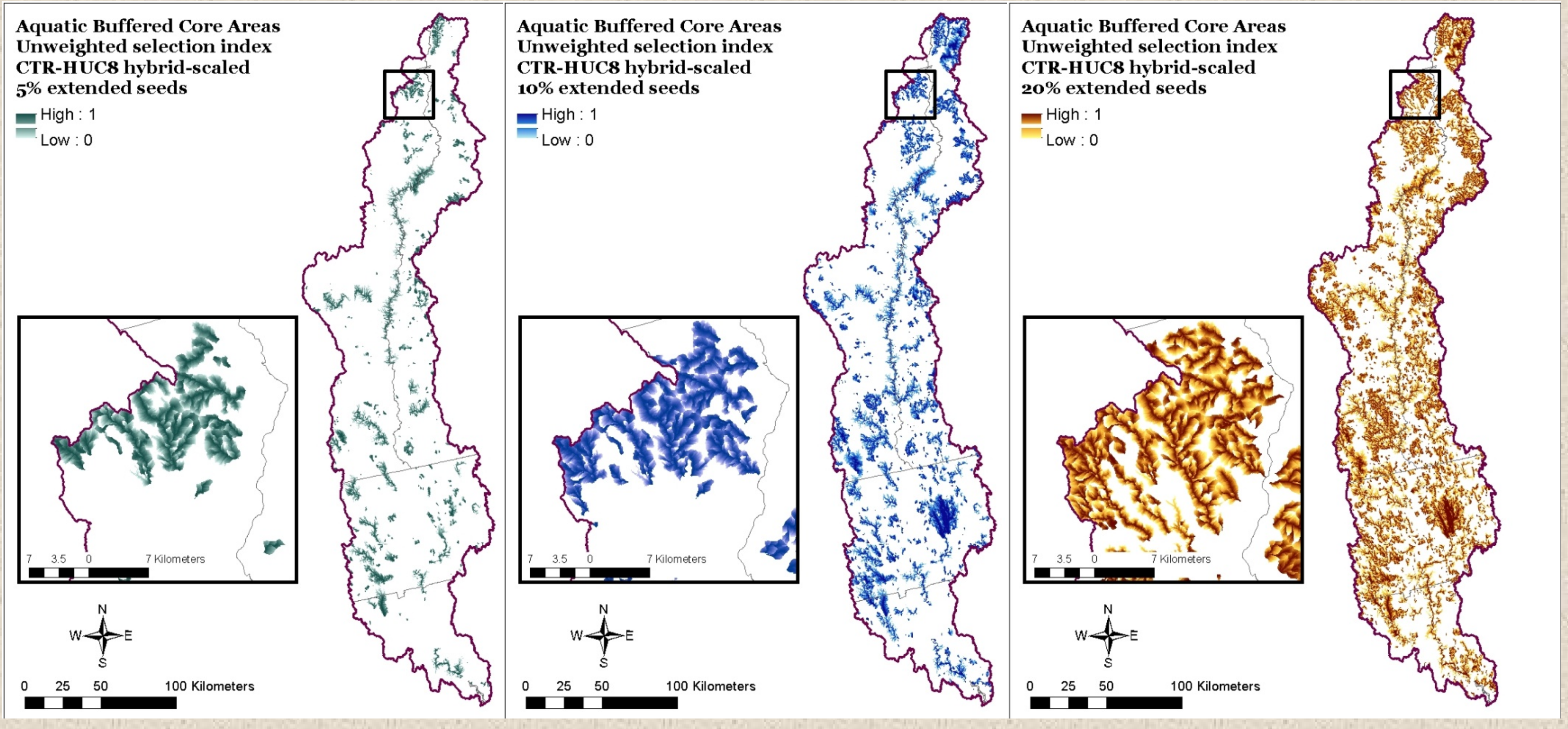
- Minimum core area size (~150 m vs ~1 km)



Landscape Conservation Design

Step 2: Design Conservation Network

- Percentage of landscape (5%, 10%, 20% seeds)



Landscape Conservation Design

Step 2: Design Conservation Network

- Percentage of landscape (5%, 10%, 20% seeds)

Macrogroup/System	Strm Lngth (km)	XSeeds Strm Lngth (km)			% in Cores		
		5%	10%	20%	5%	10%	20%
Stream (headwater/creek) cold low	65	26.07	65.1	176.70	2.36%	5.89%	15.99%
Stream (headwater/creek) cold moderate	280	103.32	279.75	695.55	3.20%	8.67%	21.55%
Stream (headwater/creek) cold high	1,342	387.36	1342.44	3,655.59	2.95%	10.23%	27.86%
Stream (headwater/creek) cool low	39	9.36	39.42	137.22	1.04%	4.40%	15.32%
Stream (headwater/creek) cool moderate	38	11.13	37.95	118.20	1.68%	5.74%	17.87%
Stream (headwater/creek) cool high	57	19.53	56.94	156.84	2.45%	7.13%	19.65%
Stream (headwater/creek) warm low	8	2.85	8.4	14.40	3.72%	10.97%	18.80%
Stream (headwater/creek) warm moderate	2	0.21	2.31	5.10	0.58%	6.36%	14.05%
Stream (headwater/creek) warm high	3	1.14	3.21	8.85	2.45%	6.91%	19.06%
Stream (small) cold low	19	15.39	19.35	55.86	8.74%	10.98%	31.71%
Stream (small) cold moderate	64	36.24	64.11	178.65	7.96%	14.09%	39.26%
Stream (small) cool low	88	51.60	87.51	163.05	19.41%	32.92%	61.34%
Stream (small) cool moderate	159	99.96	158.52	246.36	27.04%	42.88%	66.63%
Stream (medium) cold	-	-	0	2.40	0.00%	0.00%	2.34%
Stream (medium) cool	133	88.20	133.08	229.74	22.13%	33.39%	57.64%
Stream (medium) warm	36	13.50	36.09	76.62	11.46%	30.65%	65.07%
Stream (large) cool	194	137.25	194.13	260.37	35.19%	49.77%	66.76%
Stream (large) warm	13	12.57	12.6	20.94	59.52%	59.66%	99.15%
Freshwater tidal	67	42.06	66.51	102.99	32.10%	50.77%	78.61%
Total	**2,607**	**1,057.74**	**2607.42**	**6,305.43**	**4.72%**	**11.64%**	**28.16%**

Landscape Conservation Design

Step 2: Design Conservation Network

Key Decisions regarding <u>aquatic</u> core areas:

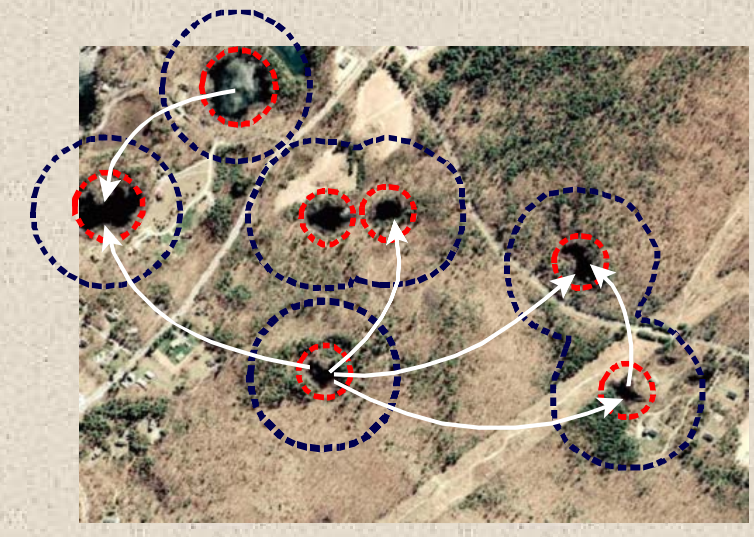
- Weighted or <u>Unweighted</u> selection index?
- HUC- or <u>Seed-based</u> core areas?
- CTR-, HUC8-, or <u>Hybrid-scaled</u> selection index?
- Seed- or <u>Extended seed</u>-based cores?
- Minimum core area size?
- Percentage of landscape?

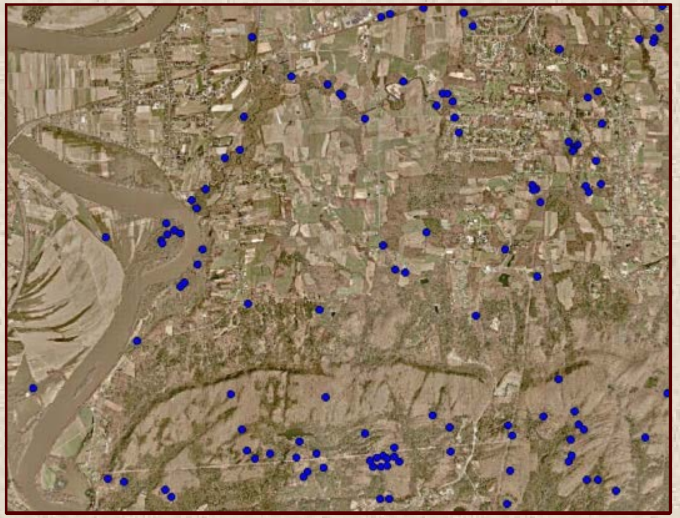
Landscape Conservation Design

Step 2: Design Conservation Network

4. Assess connectivity

- Local connectivity refers to the spatial scale at which individual organisms interact directly with the landscape via demographic processes such as dispersal and home range movements
- Regional connectivity refers to the scale at which populations through time indirectly interact with the landscape (e.g., through gene flow over multiple generations)





Landscape Conservation Design

Step 2: Design Conservation Network

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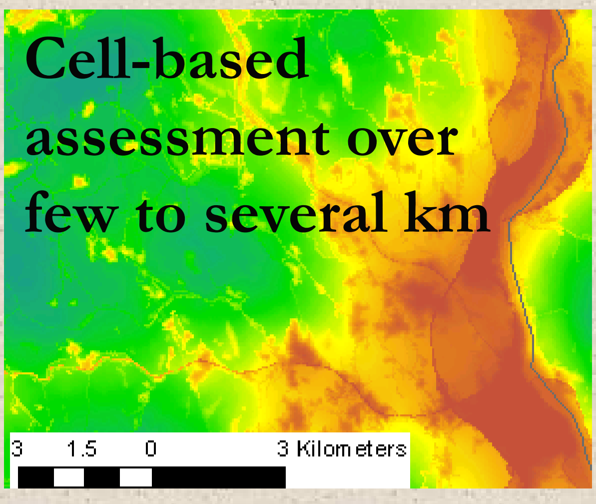
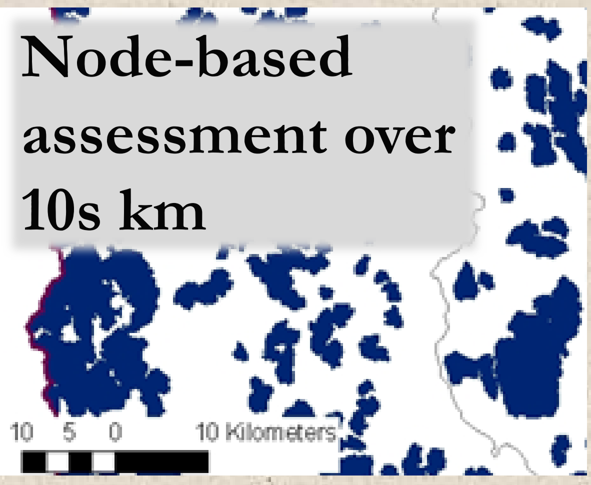


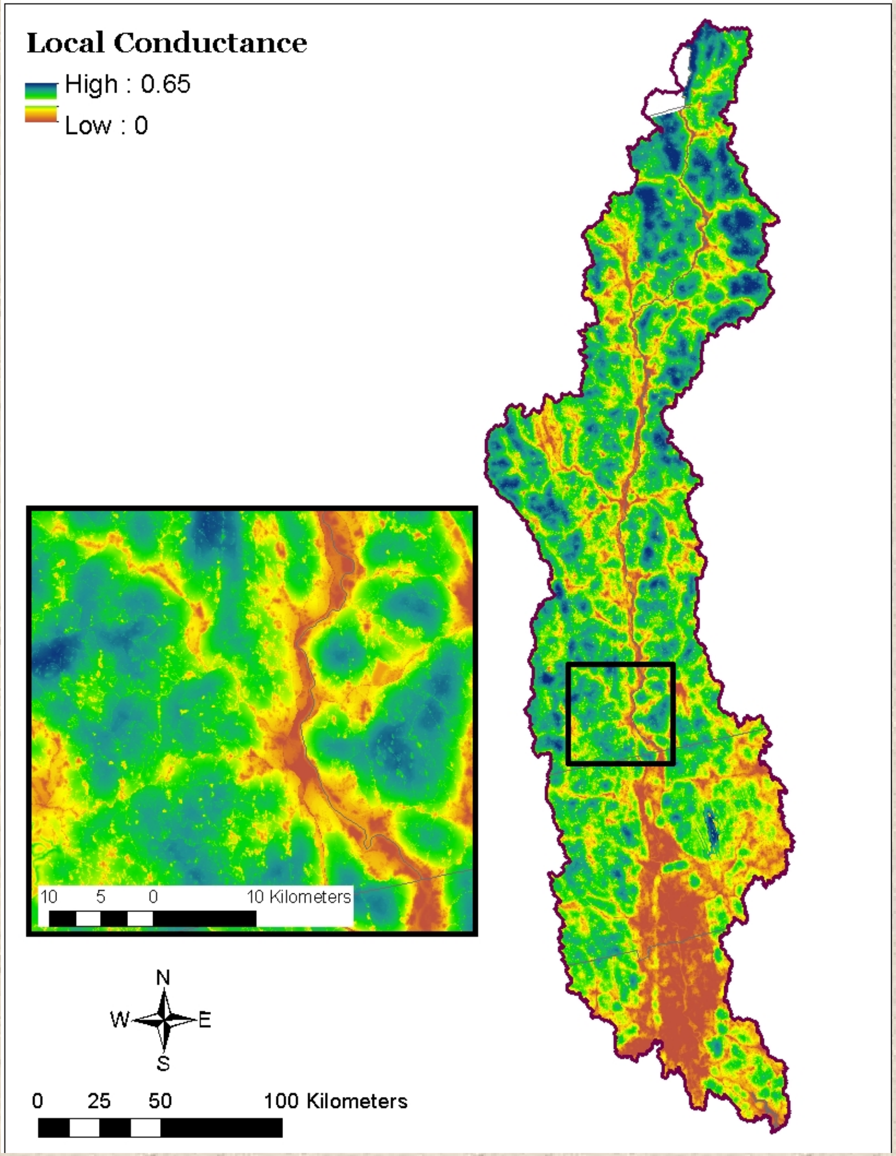


Landscape Conservation Design

Step 2: Design Conservation Network

4. Assess local connectivity
   - Local conductance
   - Local vulnerability

- Relative probability of flow through a cell from nearby cells (function of local resistance)

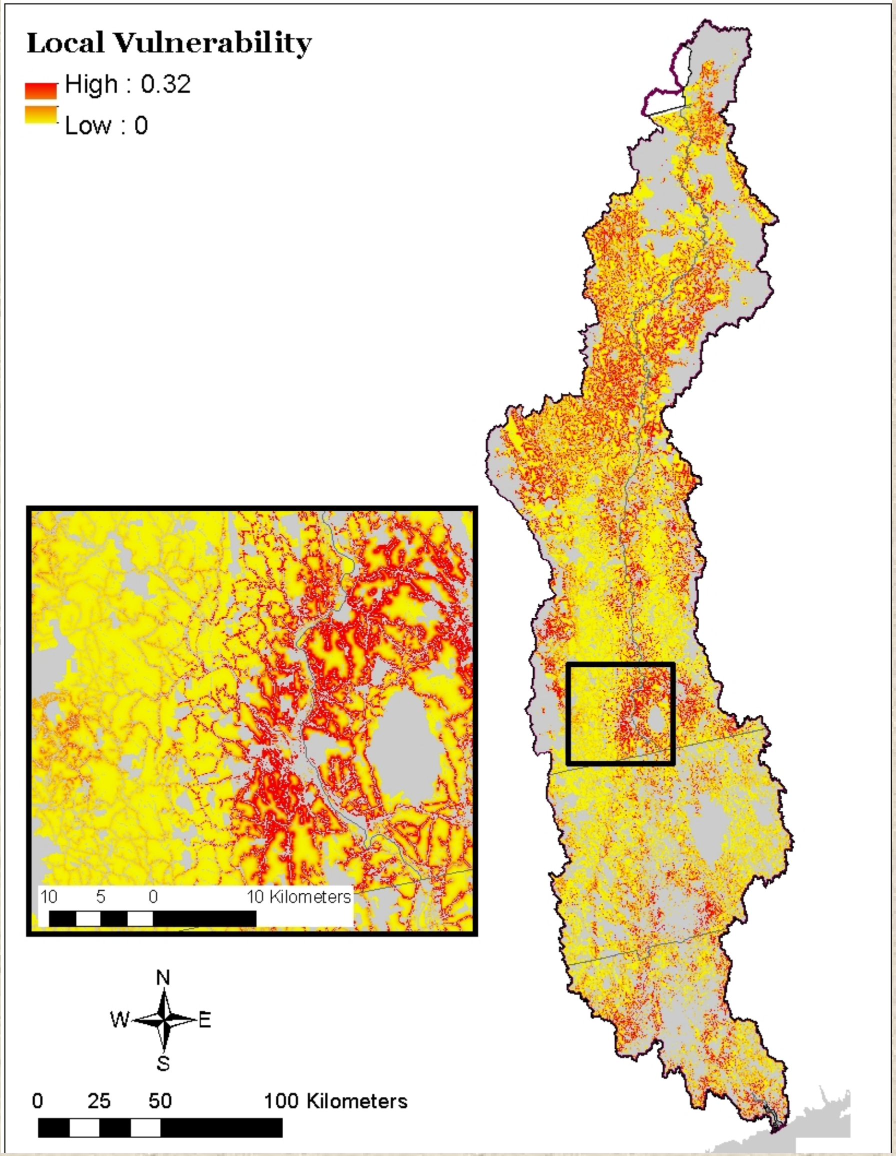


Landscape Conservation Design

Step 2: Design Conservation Network

4. Assess local connectivity
   - Local conductance
   - Local vulnerability

- Relative probability of developing a cell with high local conductance

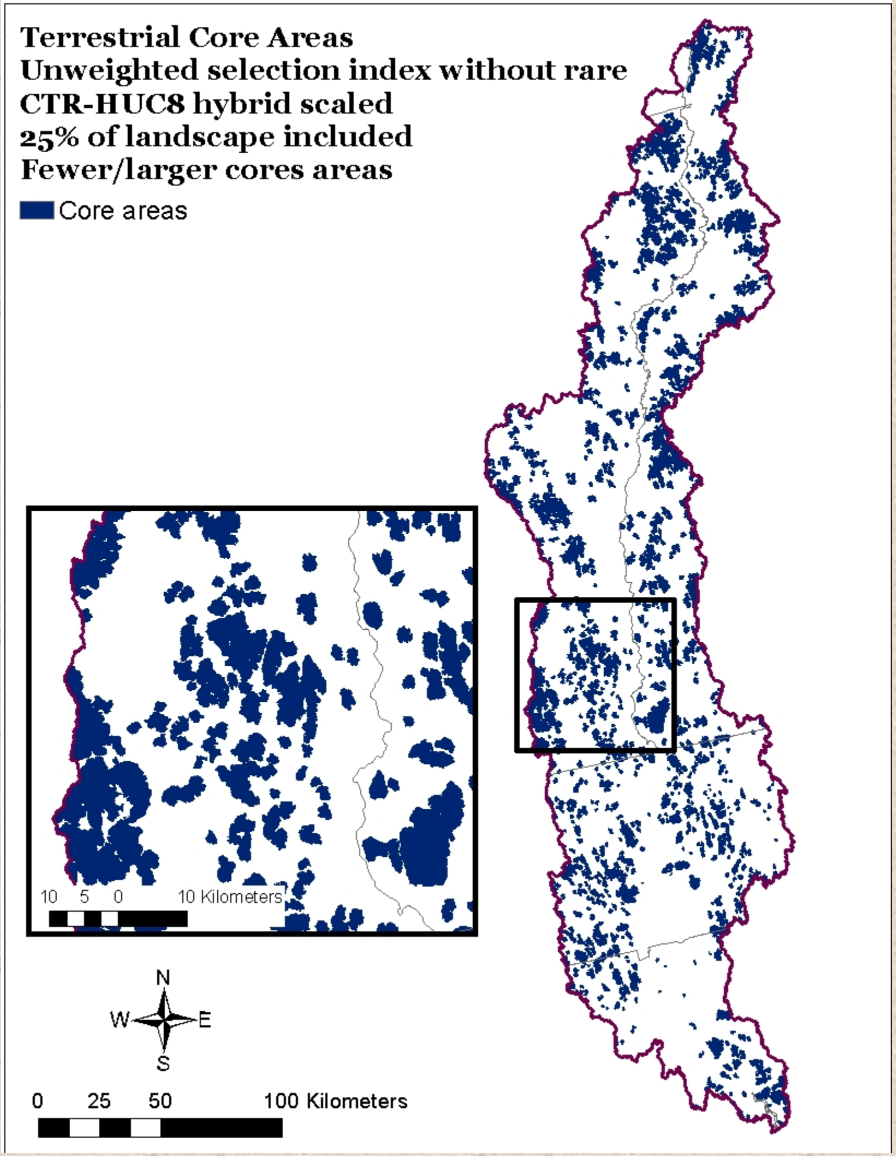


Landscape Conservation Design

Step 2: Design Conservation Network

4. Assess regional connectivity among terrestrial core areas

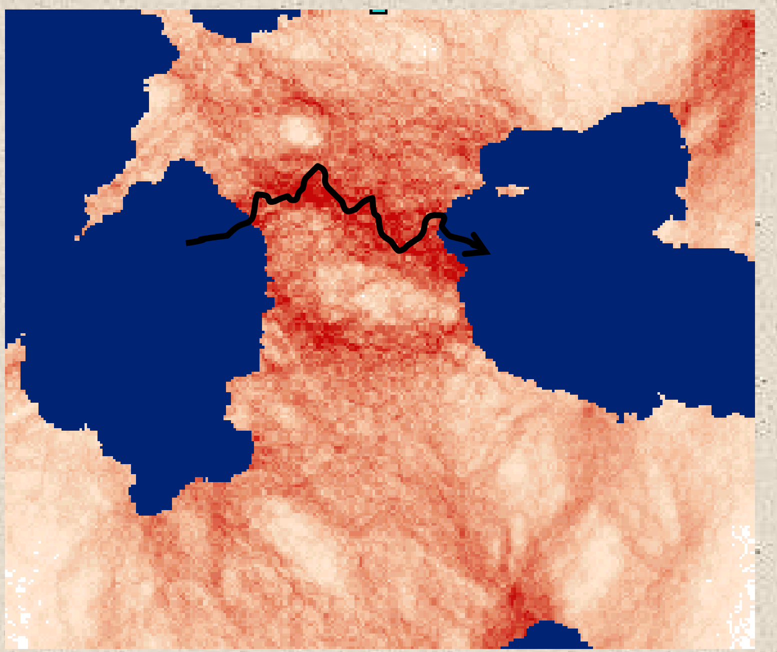
- Connectivity is based on a designated core area network

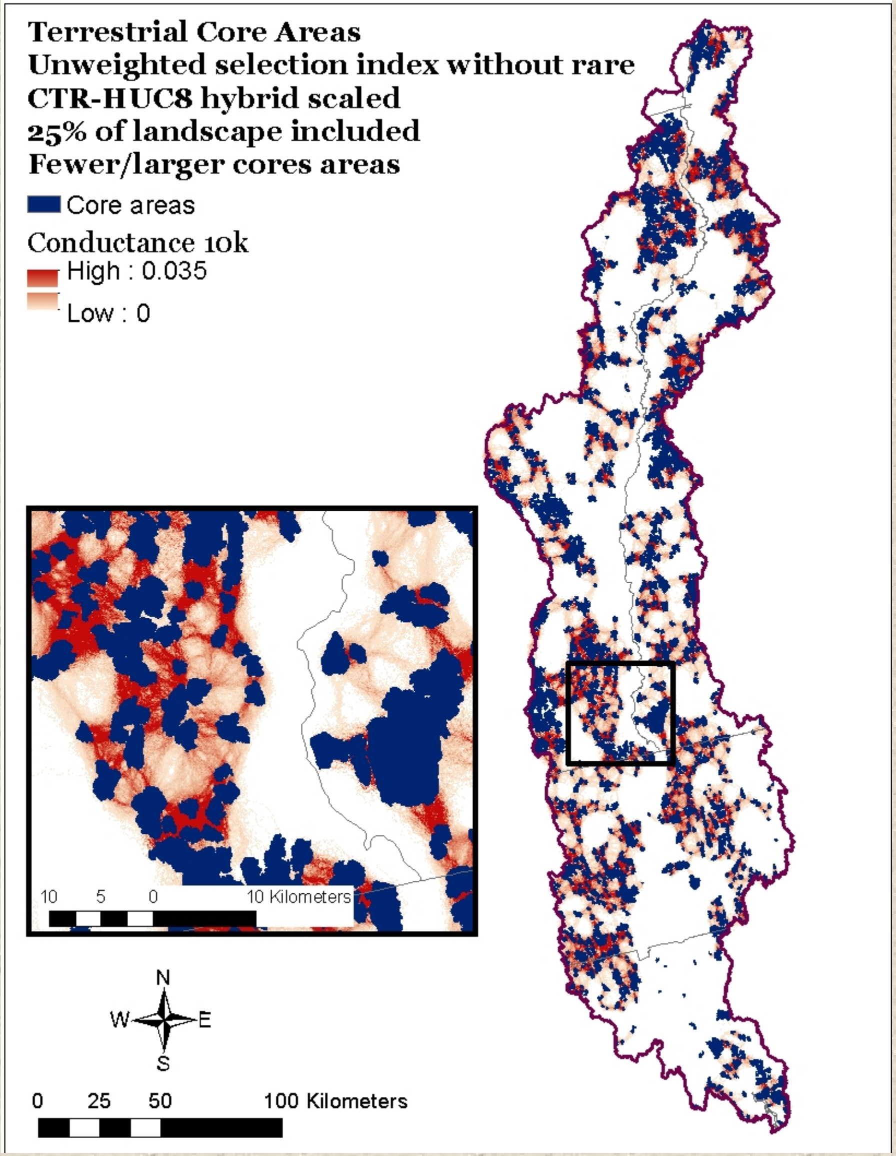


Landscape Conservation Design

Step 2: Design Conservation Network

4. Assess regional connectivity among core areas
   a) Build random low cost paths between cores



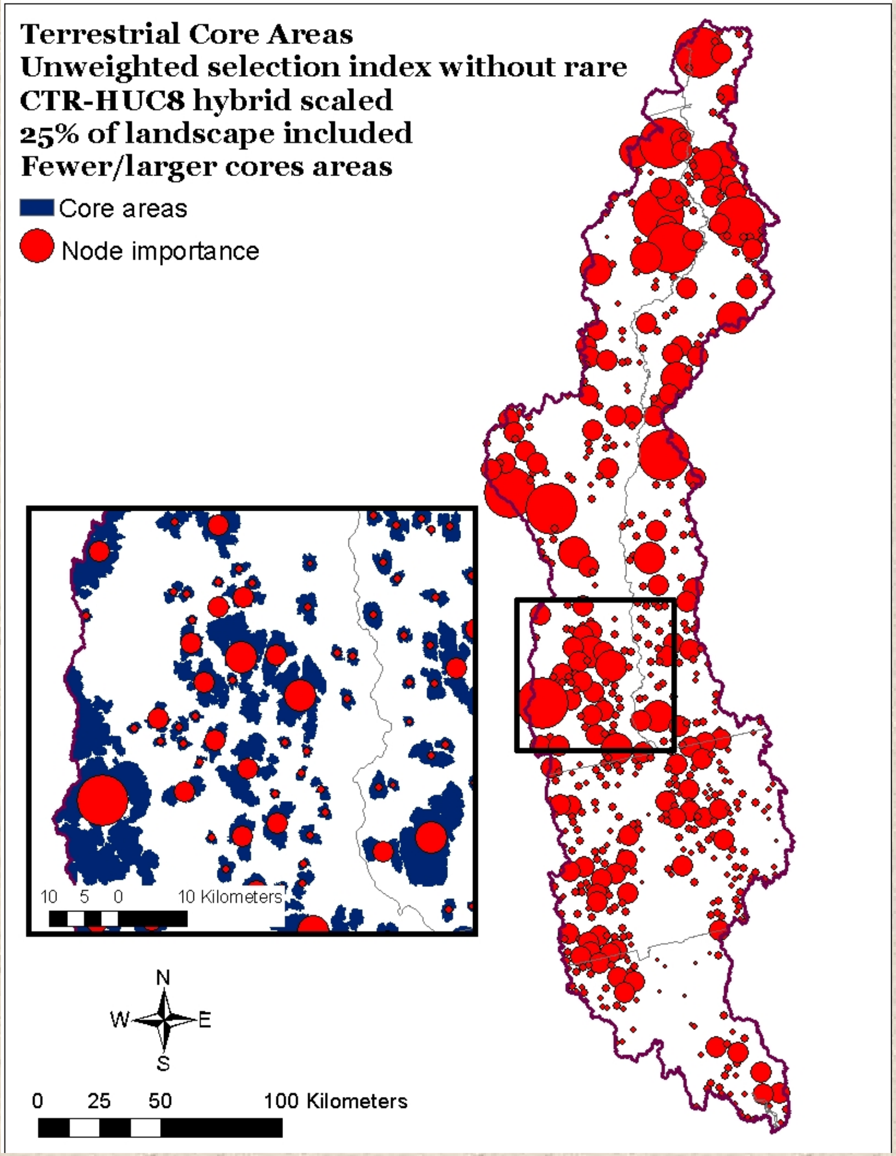


Landscape Conservation Design

Step 2: Design Conservation Network

5. **Prioritize among core areas**

- *Node* importance index
    - Based on node contribution to the probability of connectivity (PC) of the network

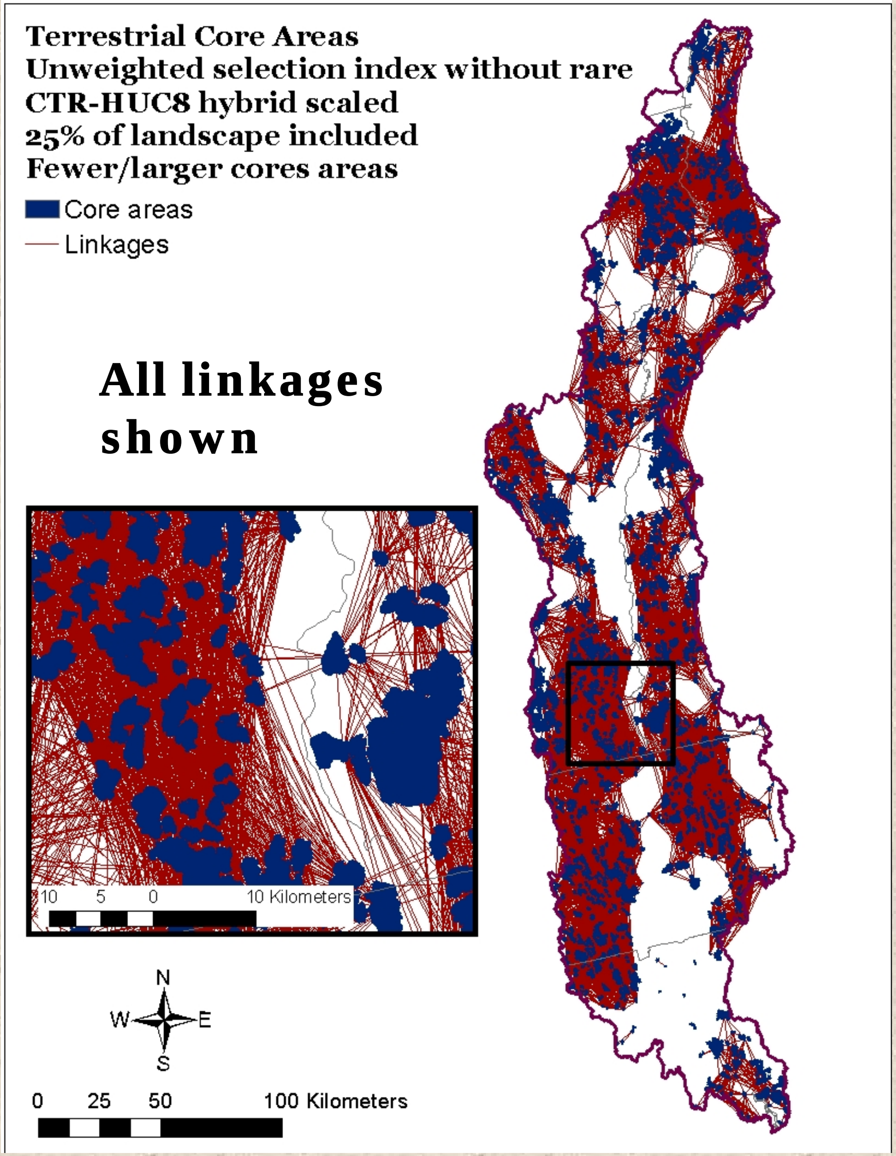


Landscape Conservation Design

Step 2: Design Conservation Network

6. Prioritize among linkages

- *Link* importance index
  - Based on link contribution to the probability of connectivity (PC) of the network

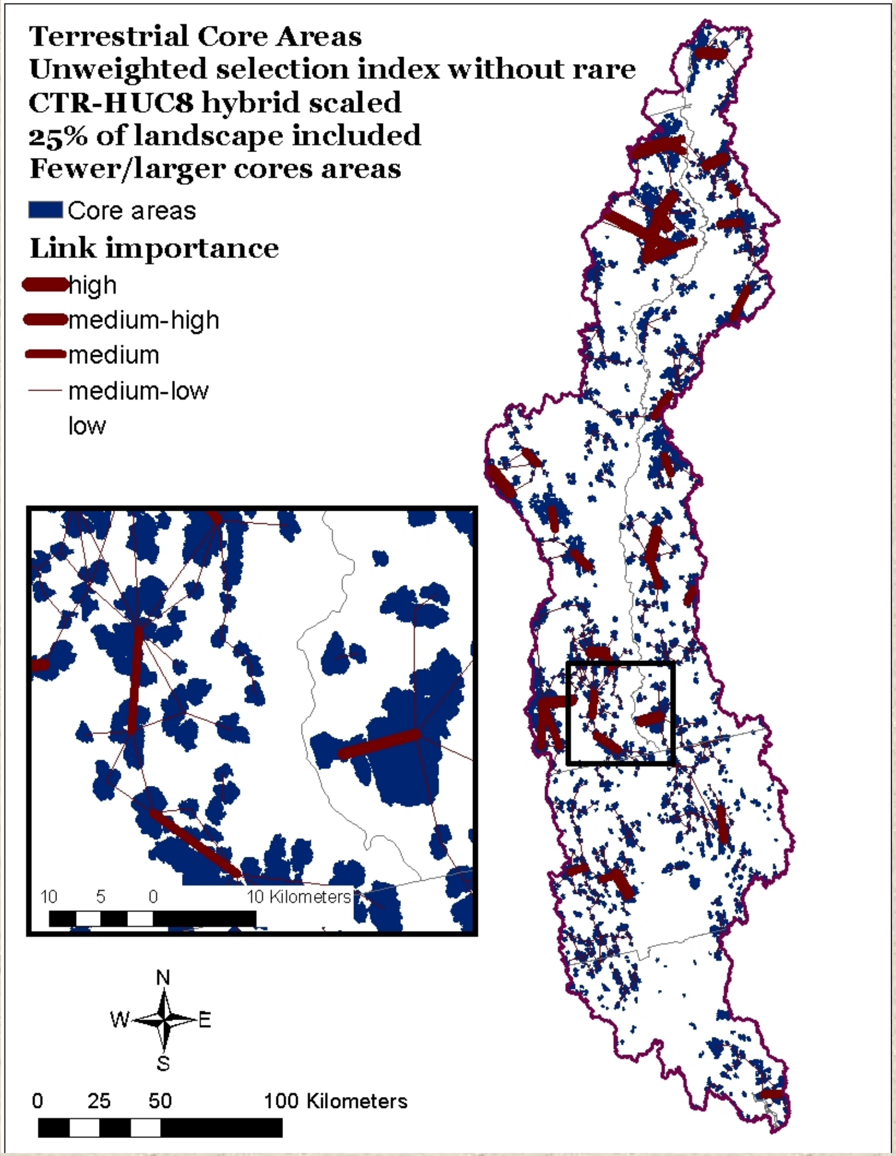


Landscape Conservation Design

Step 2: Design Conservation Network

6. Prioritize among linkages

- *Link* importance index
  - Based on link contribution to the probability of connectivity (PC) of the network



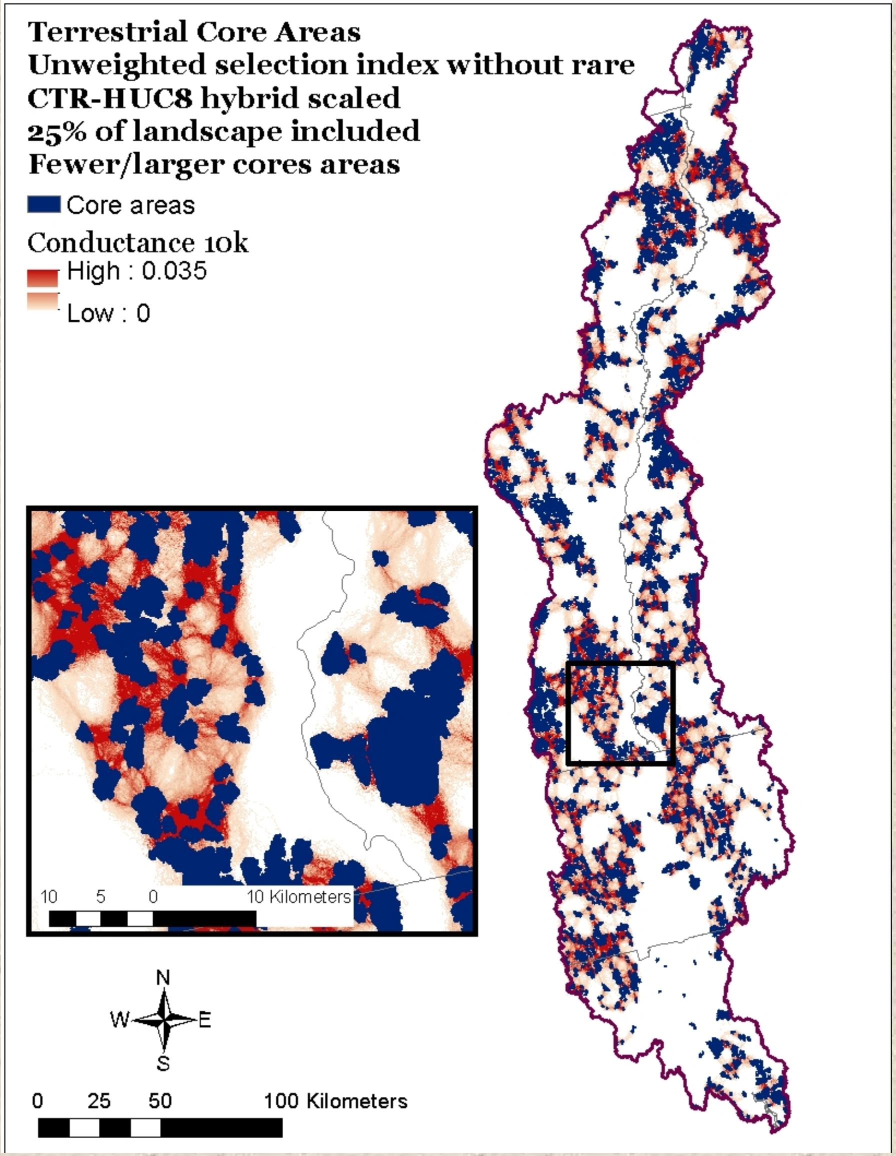
Landscape Conservation Design

Step 2: Design Conservation Network

7. Prioritize within linkages

- Regional conductance
- Irreplaceability
- Regional vulnerability

- Relative probability of flow through a cell (function of local resistance, node size, quality and proximity)

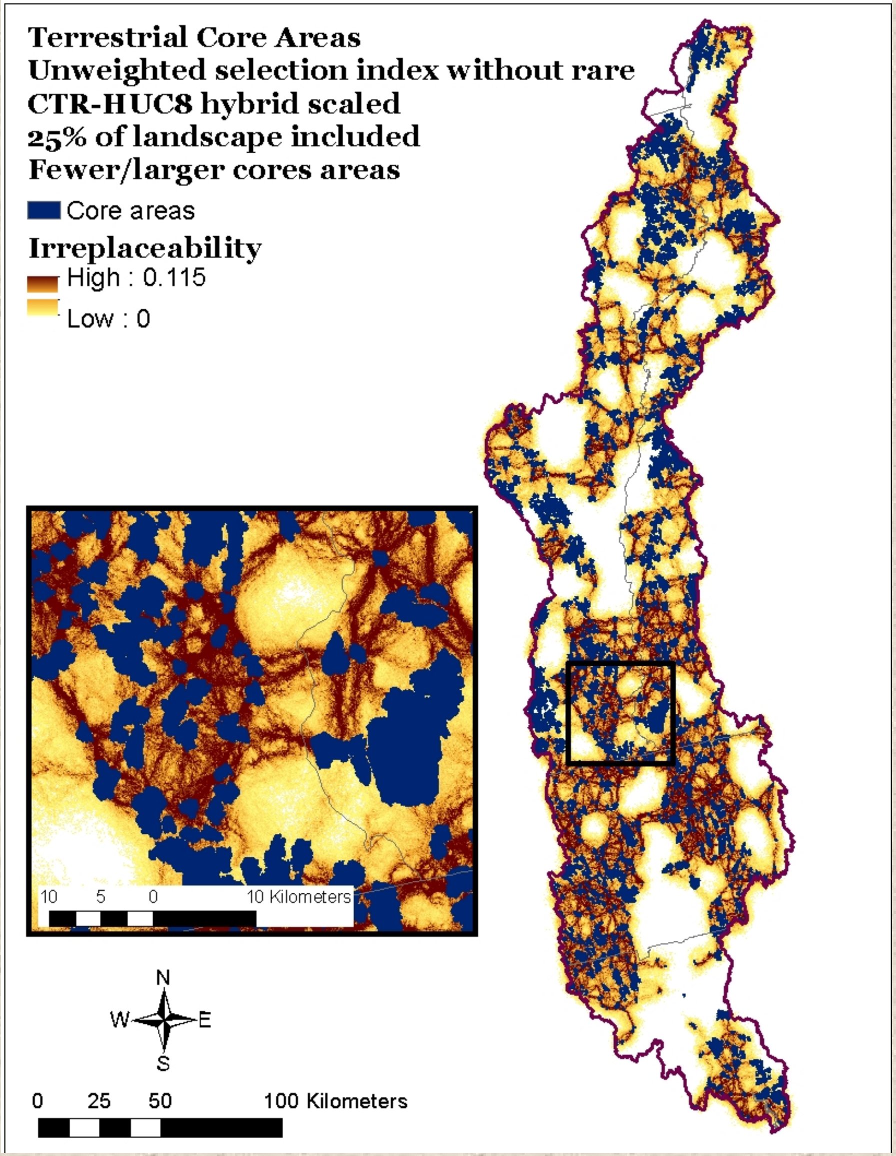


Step 2: Design Conservation Network

7. Prioritize within linkages

- Regional conductance
- Irreplaceability
- Regional vulnerability

- Relative concentration of paths through a cell (function of local resistance and path irreplaceability)



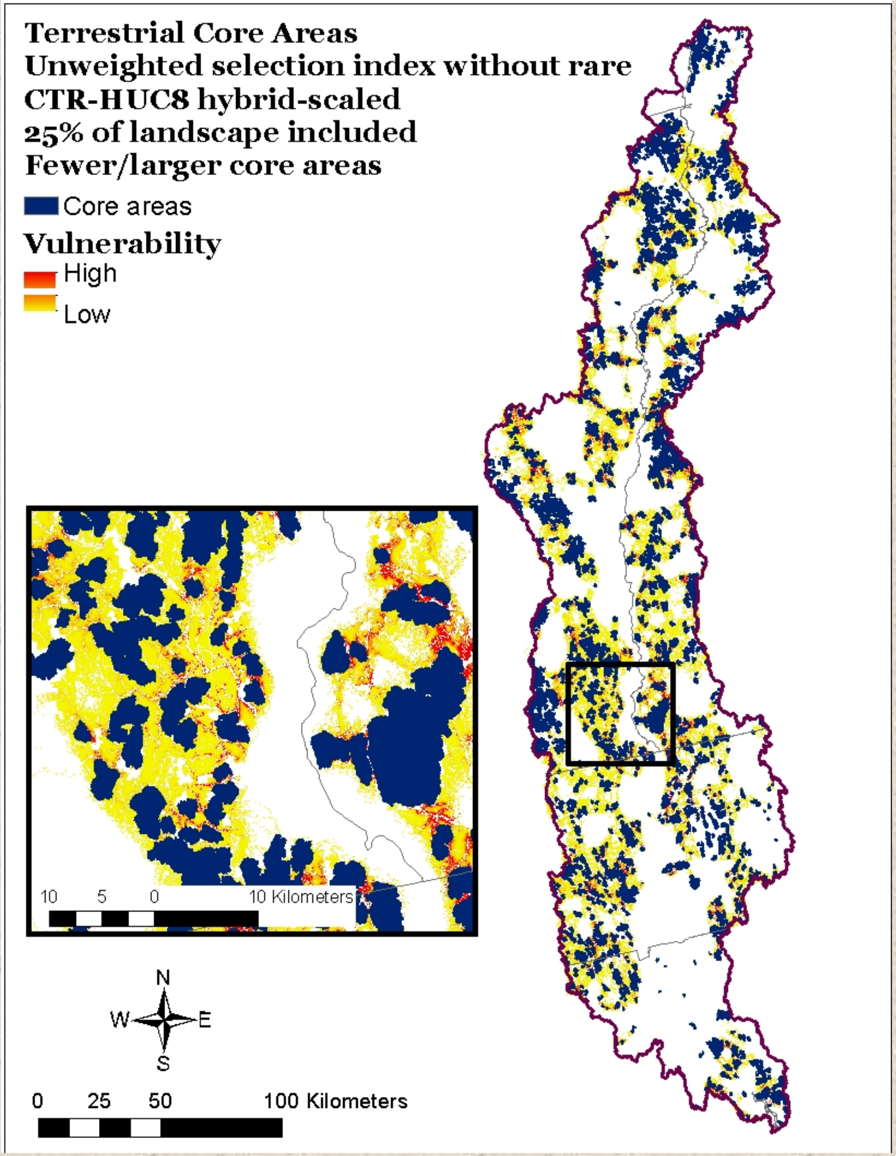
Landscape Conservation Design

Step 2: Design Conservation Network

7. Prioritize within linkages

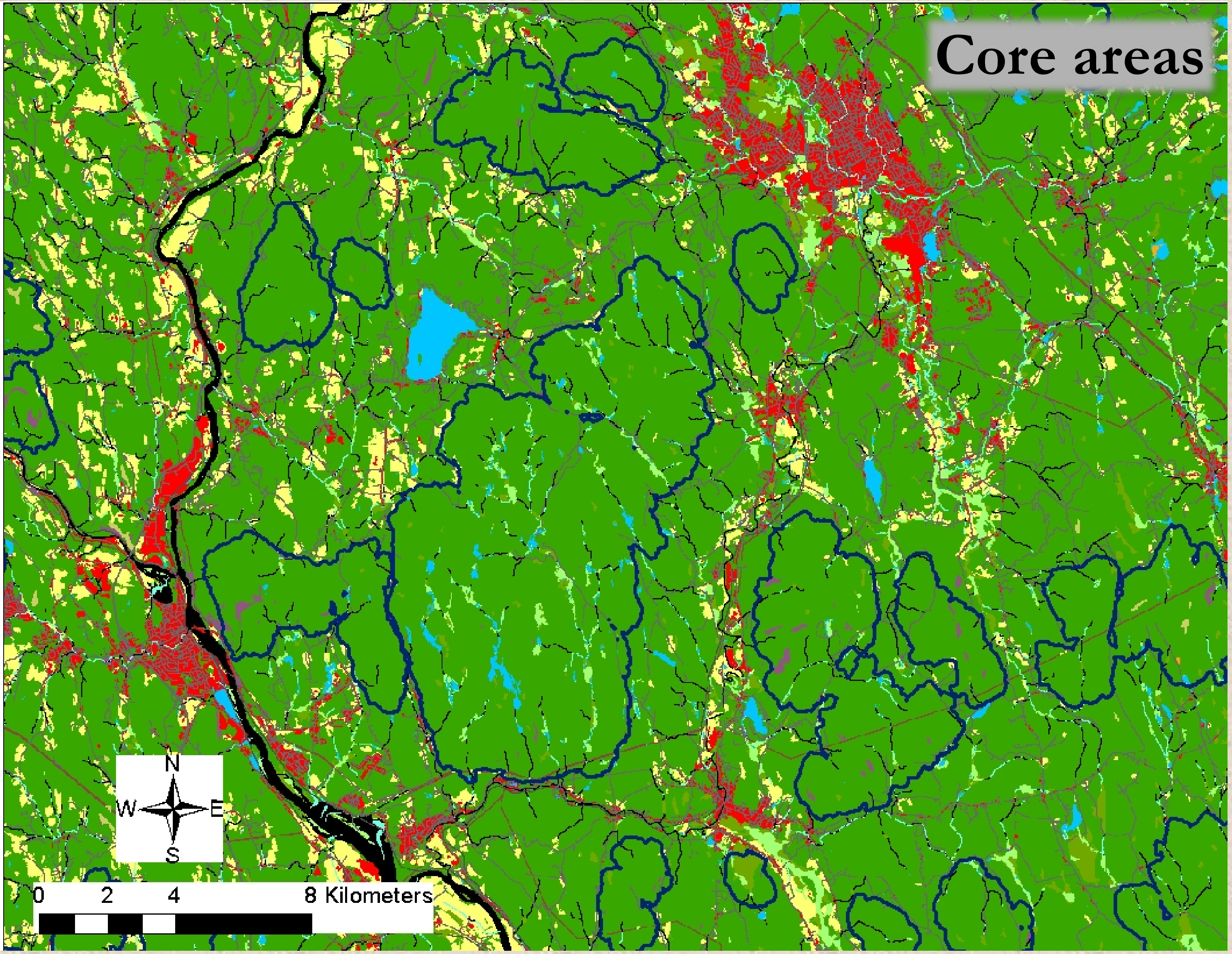
- Regional conductance
- Irreplaceability
- Regional vulnerability

- Relative probability of developing an irreplaceable cell that has a high relative probability of use



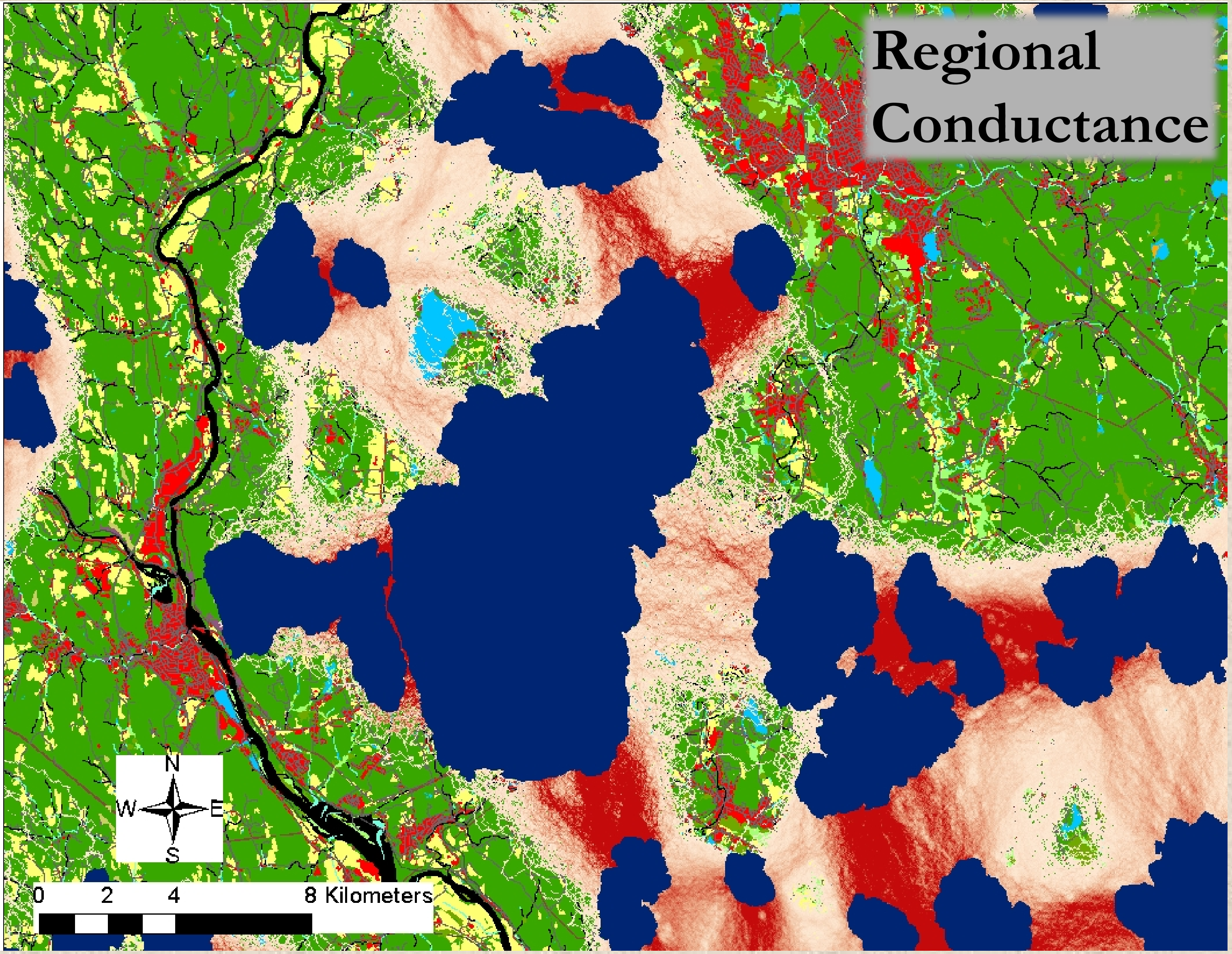
Landscape Conservation Design

Step 2: Design Conservation Network



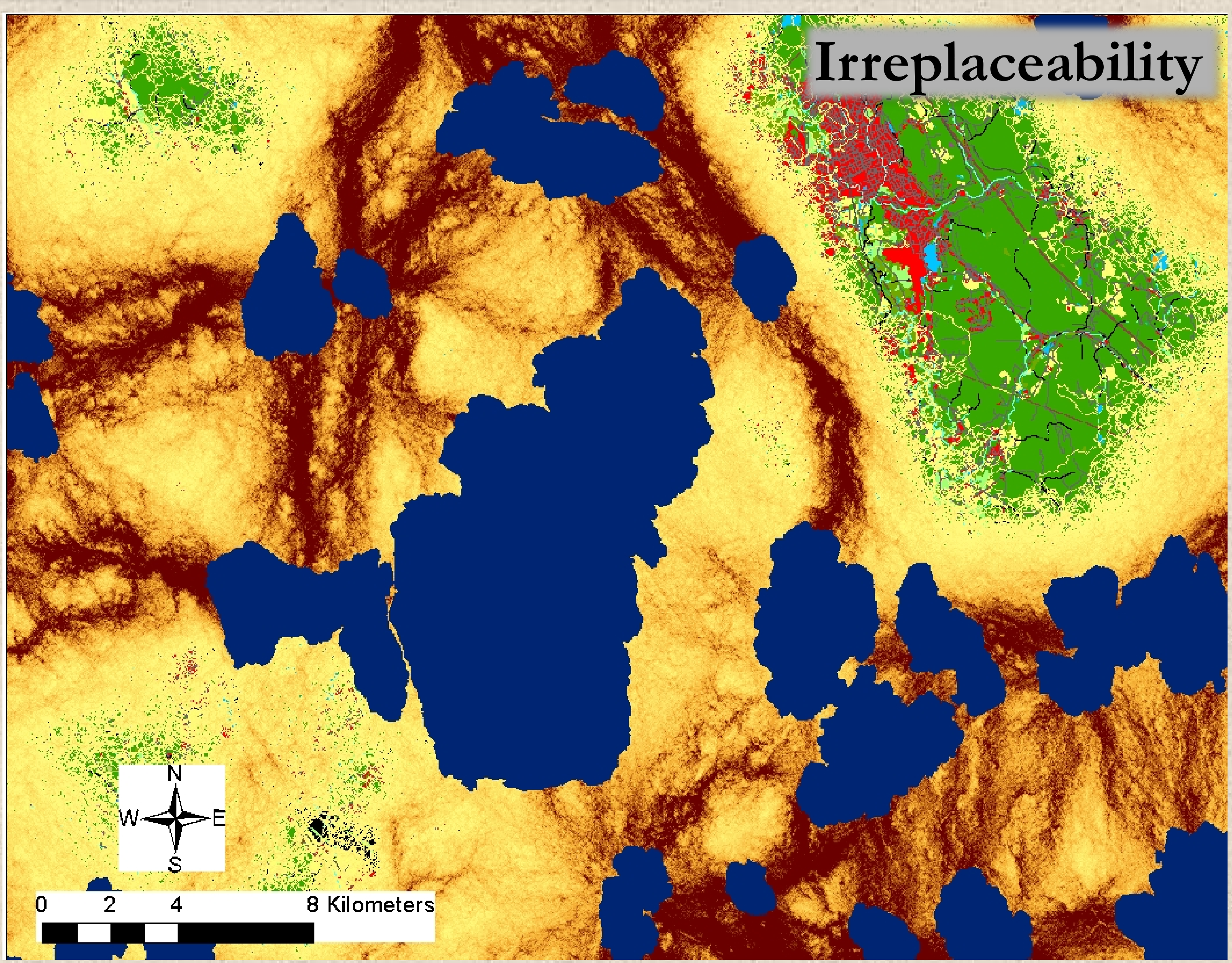
Landscape Conservation Design

Step 2: Design Conservation Network



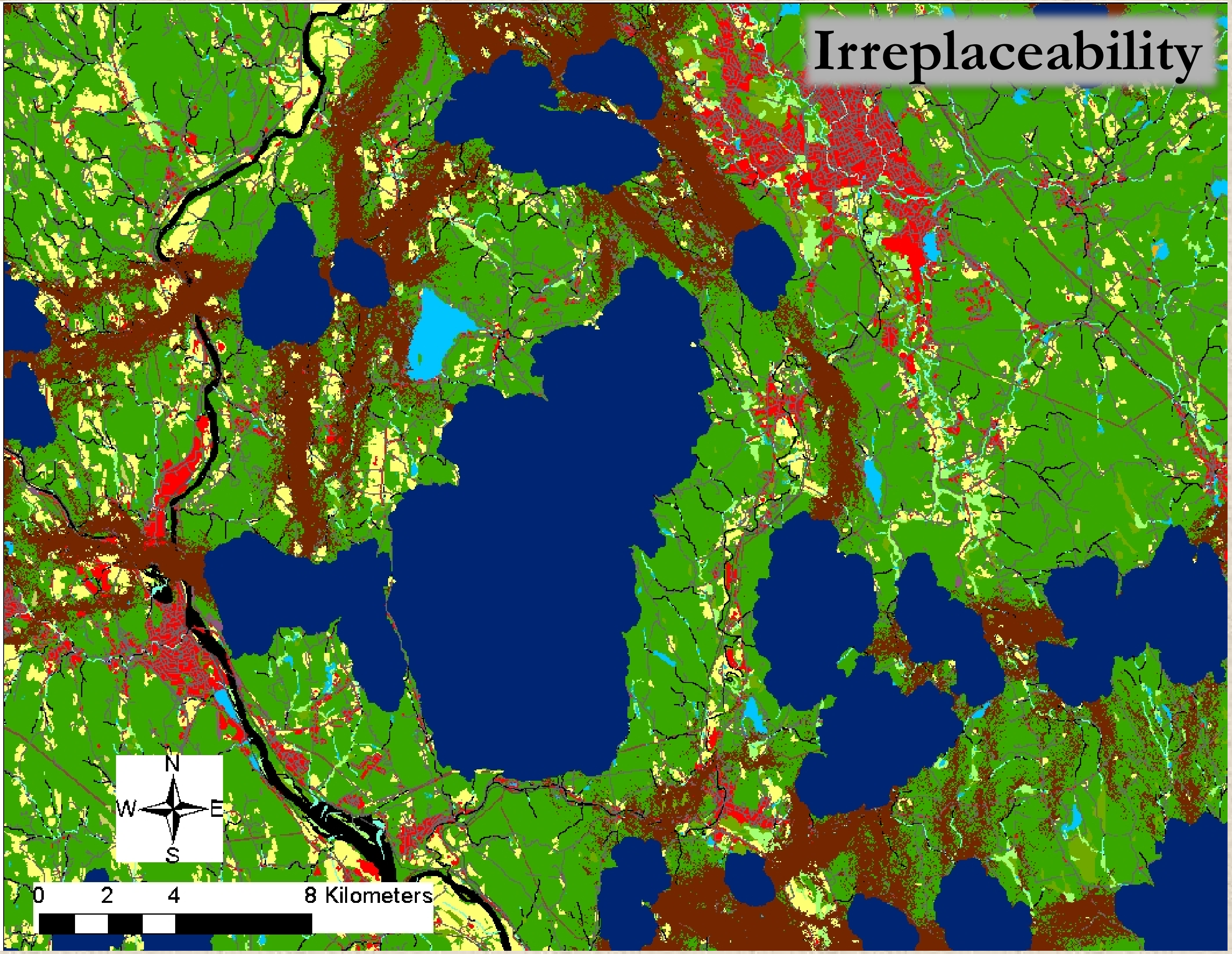
Landscape Conservation Design

Step 2: Design Conservation Network



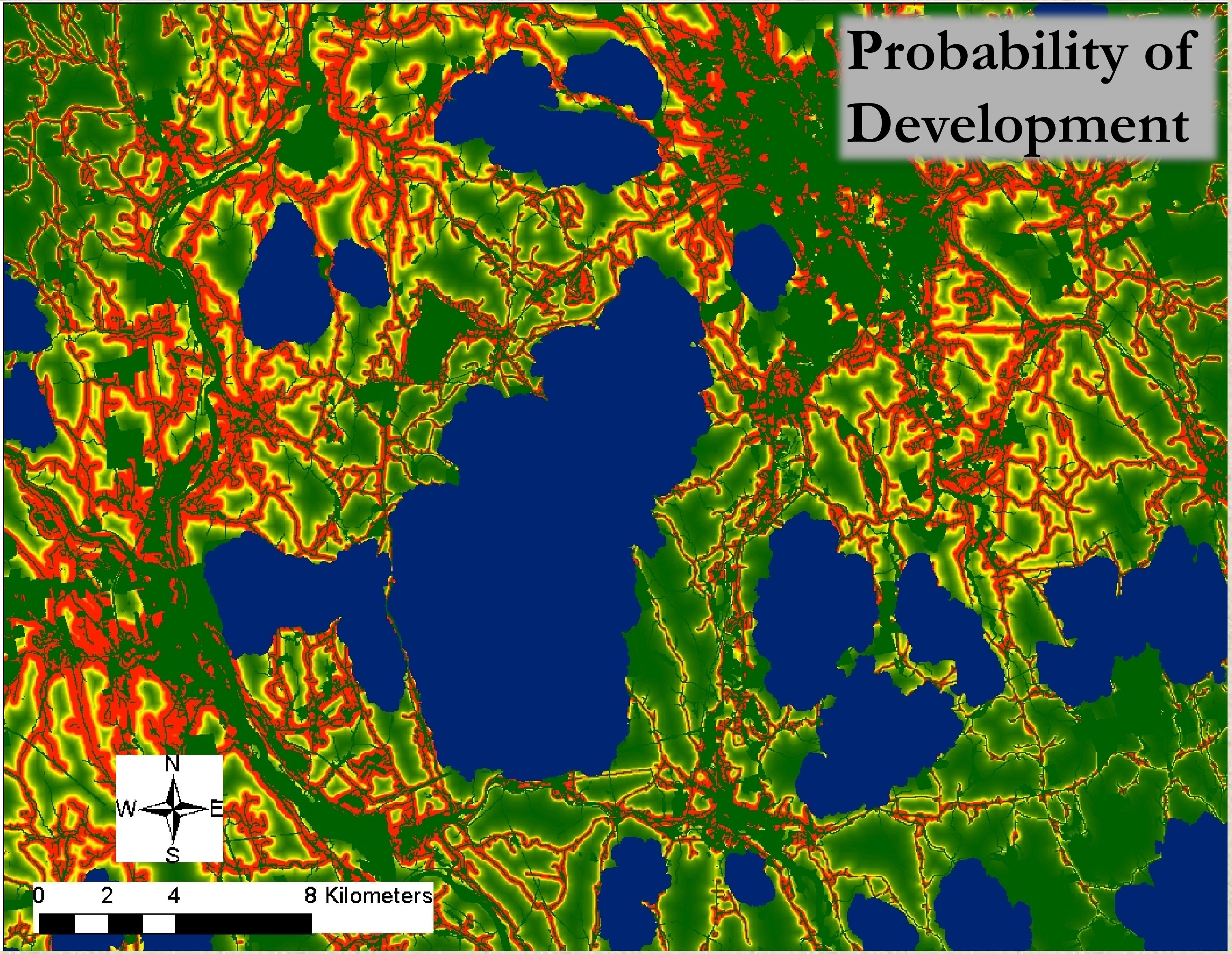
Landscape Conservation Design

Step 2: Design Conservation Network



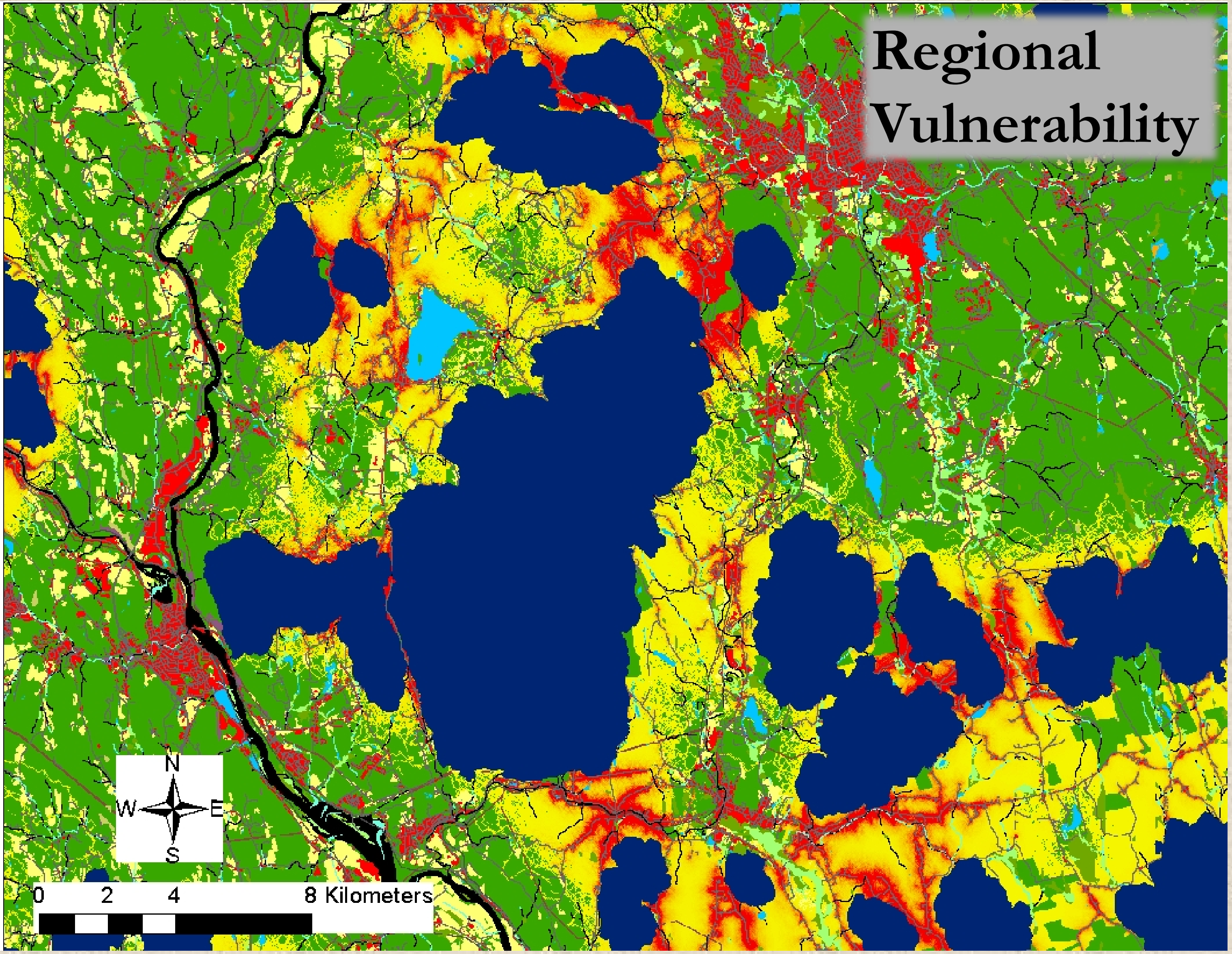
Landscape Conservation Design

Step 2: Design Conservation Network



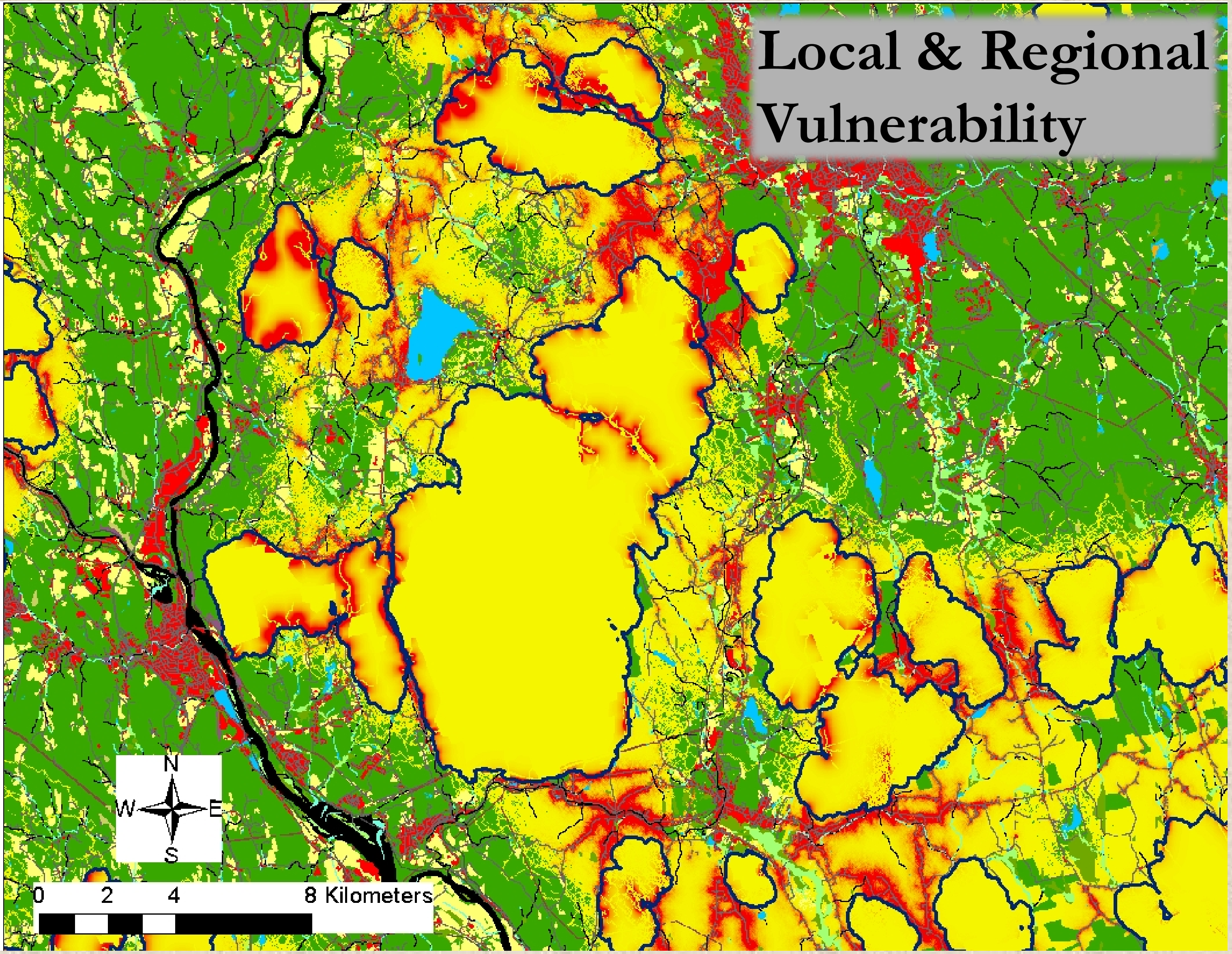
Landscape Conservation Design

Step 2: Design Conservation Network



Landscape Conservation Design

Step 2: Design Conservation Network



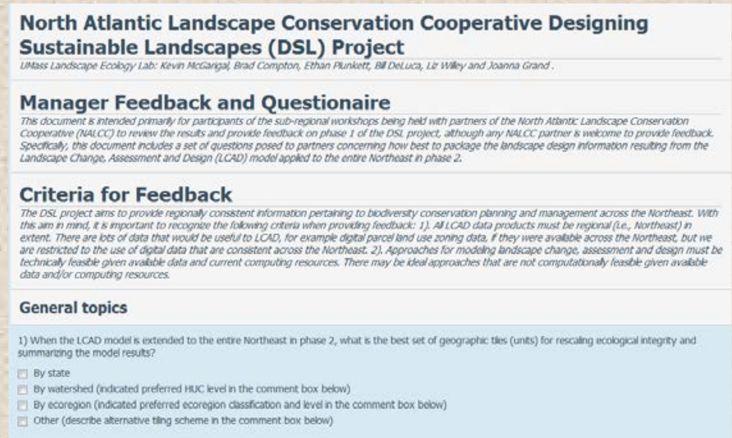
For More Information

- Project website:

  www.umass.edu/landeco/research/dsl/dsl.html

Feedback:

- Manager online survey



North Atlantic Landscape Conservation Cooperative Designing Sustainable Landscapes (DSL) Project

UMass Landscape Ecology Lab: Kevin McGarigal, Brad Compton, Ethan Plunkett, Bill DeLuca, Liz Willey and Joanna Grand .

Manager Feedback and Questionaire

This document is intended primarily for participants of the sub-regional workshops being held with partners of the North Atlantic Landscape Conservation Cooperative (NALCC) to review the results and provide feedback on phase 1 of the DSL project, although any NALCC partner is welcome to provide feedback. Specifically, this document includes a set of questions posed to partners concerning how best to package the landscape design information resulting from the Landscape Change, Assessment and Design (LCAD) model applied to the entire Northeast in phase 2.

Criteria for Feedback

The DSL project aims to provide regionally consistent information pertaining to biodiversity conservation planning and management across the Northeast. With this aim in mind, it is important to recognize the following criteria when providing feedback: 1). All LCAD data products must be regional (i.e., Northeast) in extent. There are lots of data that would be useful to LCAD, for example digital parcel land use zoning data, if they were available across the Northeast, but we are restricted to the use of digital data that are consistent across the Northeast. 2). Approaches for modeling landscape change, assessment and design must be technically feasible given available data and current computing resources. There may be ideal approaches that are not computationally feasible given available data and/or computing resources.

General topics

1) When the LCAD model is extended to the entire Northeast in phase 2, what is the best set of geographic tiles (units) for rescaling ecological integrity and summarizing the model results?

- [ ] By state
- [ ] By watershed (indicated preferred HUC level in the comment box below)
- [ ] By ecoregion (indicated preferred ecoregion classification and level in the comment box below)
- [ ] Other (describe alternative tiling scheme in the comment box below)

Links to products:

- Overview
- Technical docs
- Presentations
- Results

- Personal contact: mcgarigalk@eco.umass.edu 413-577-0655