Implementing CHJV Forest and Woodland Habitat Objectives:
Recommendations for Missouri

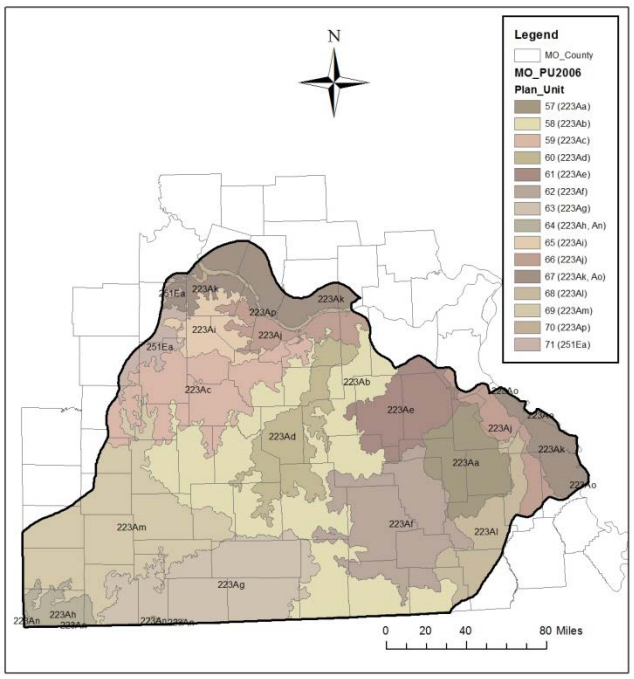
Overview

The Central Hardwoods Joint Venture (CHJV) is a partnership of state and federal government agencies and non-governmental organizations who work together to ensure the long-term viability of native bird populations within the Central Hardwoods Bird Conservation Region (CHBCR). The CHJV pursues this mission by striving towards 2 primary goals: (1) implement conservation actions based on sound science and principals of adaptive management, and (2) target landscapes with the greatest ecological and socioeconomic potential to support viable populations of priority birds. In pursuit of these goals the CHJV Staff and cooperators have developed a suite of decision support tools (DSTs) aimed at assessing habitat conditions, linking bird populations to habitat condition, forecasting potential future habitat conditions, and simulating population impacts of conservation scenarios.

CHJV partners have produced population objectives for priority forest and woodland associated bird species. CHJV staff have used the DSTs to estimate the amount of habitat restoration needed to support those populations and allocated the habitat objectives to State sub-regions and the conservation actors (i.e. agencies) within them. Uncertainty in the allocation process requires an iterative and adaptive approach to translating CHBCR objectives into an implementation plan (i.e. on-the-ground projects). This document builds off the Implementation Framework document by summarizing DST and other information to help partners within the Missouri sub-region develop the strategic (where to work) and tactical (what work to do) components of their implementation plan.

Planning Units

The CHJV uses Bailey's ecological subsections as planning units. Missouri is divided into 15 planning units (map at right). Table 1 ranks each unit relative to others within Missouri on attributes relevant to conservation planning, and each attribute is mapped in Figures 1-10. Table 2 lists the calculated habitat objectives by natural community type, along with information on forested area, proportion of public ownership and an estimate of area in condition for each community.



From a CHBCR perspective, Missouri is relatively important for the woodland, forest and riparian bird groups. Planning Units 57, 61, 62, 63, 68, and the southeastern portion of 66 (i.e. the eastern Ozarks and the White River Hills) were identified as source landscapes for Wood Thrush, Worm-eating Warblers, and Prairie Warblers by the CHJV population viability model. These areas have relatively high levels of forest and public ownership, as well as low levels of fragmentation and urbanization pressure. They also have moderate to high levels natural land cover types that are in relatively good condition compared to other areas in the BCR. The Missouri sub-region in general shows moderate levels of forest conversion, and urbanization is likely to be an increasing threat in some planning units.

Table 1. The 15 planning units (i.e. landscapes) within the Missouri sub-region and their relative rank based on attributes relevant to conservation planning. Units are ranked from “1” (best) to “15” (worst) relative to conservation perspective. A composite rank will not be calculated until partners determine which attributes are most important.

Plan Unit	Subsection	Short Name	ST	Public [a]	Natural-ness [a]	In Condition [a]	Forest Proportion [a]	GPI [a]	Forest Loss ('01-'06) [a]	Urban 2030 [a]	Ensemble Model Scores [a]		
											Woodland	Forest	Riparian
57	223Aa	St. Francois Knobs	MO	7	3	2	3	3	5	3	13	4	7
58	223Ab	Central Plateau	MO	8	12	10	10	10	11	11	1	10	11
59	223Ac	Osage River Hills	MO	6	7	9	6	7	6	12	4	6	5
60	223Ad	Gasconade River Hills	MO	5	8	1	5	5	9	4	3	3	2
61	223Ae	Meramac River Hills	MO	3	2	3	2	2	7	9	7	2	3
62	223Af	Current River Hills	MO	1	1	4	1	1	4	1	12	1	1
63	223Ag	White River Hills	MO	2	9	11	7	6	12	6	5	5	4
64	223Ah & An	Elk River Hills	MO	14	4	7	8	8	10	15	2	9	10
65	223Ai	Prairie Ozark Border	MO	15	13	13	13	13	3	5	11	13	12
66	223Aj	Inner Ozark Border	MO	11	5	5	9	9	2	13	6	8	6
67	223Ak & Ao	Outer Ozark Border	MO	10	10	8	11	11	8	10	9	11	9
68	223Al	Black River Ozark Border	MO	4	6	6	4	4	1	8	10	7	8
69	223Am	Springfield Plain	MO	9	14	14	12	12	14	14	8	12	13
70	223Ap	MO River Alluvial	MO	12	11	12	15	14	15	2	15	15	15
71	251Ea	Scarped Osage Plains	MO	13	15	15	14	15	13	7	14	14	14

[a] Attributes are defined as the quantity of protected lands (Public), overall landscape conditions (Naturalness), extant forest community conditions (In Condition), quantity of forested (i.e. restorable) lands (Forest Proportion), forest fragmentation / avian productivity (GPI), forest loss from 2001-2006 (Loss), urbanization threat (Urban 2030), and current capacity-productivity weighted ensemble model scores for suites of birds. Full definitions are available in the companion Framework document.

Table 2. CHJV Habitat Objectives (targets) by planning unit and natural community type for public lands and for the entire units, along with information on forested area, proportion of public ownership and an estimate of area in condition for each community.

Plan Unit	Acreage Estimate Class	Savanna / Barrens	Glade / Savanna Mosaic (< 20% canopy)	Oak Open Woodland (20-50% canopy)	Oak Closed Woodland (50-80% canopy)	Pine / Bluestem Open Woodland (20-50% canopy)	Pine / Oak Closed Woodland (50-80% canopy)	Forest (> 80% canopy)	Floodplain Forests	Total Area
57	Forested/Restorable	8	294,873	23,115	18,952	634	163,279	199,630	57,424	757,916
	Protected	-	60,165	3,144	4,627	101	27,779	38,793	8,507	143,116
	Plan Unit Target (10 sp)	2	211,951	1,868	963	146	12,794	23,792	8,054	259,570
	Plan Unit Target (21 sp)	5	465,355	3,887	2,207	2,048	42,034	31,042	23,315	569,893
	Public Target (10 sp)	-	60,165	1,868	963	101	12,794	23,792	8,054	107,736
	Public Target (21 sp)	-	60,165	3,144	2,207	101	27,779	31,042	8,507	132,945
	In Character/Restored	5	5,836	16,505	12,982	8	-	176,083	-	211,418
	Public In Character	-	32	1,987	2,907	1	-	31,902	-	36,829
58	Forested/Restorable	111,219	2,089	1,168,927	667,145	11,603	36,878	68,996	63,379	2,130,237
	Protected	1,503	-	64,133	37,631	838	1,068	3,619	1,887	110,679
	Plan Unit Target (10 sp)	44,740	2,638	140,386	41,504	2,217	5,557	11,274	10,697	259,013
	Plan Unit Target (21 sp)	97,857	5,792	292,172	95,103	31,026	18,258	14,710	30,968	585,885
	Public Target (10 sp)	1,503	-	64,133	37,631	838	1,068	3,619	1,887	110,679
	Public Target (21 sp)	1,503	-	64,133	37,631	838	1,068	3,619	1,887	110,679
	In Character/Restored	82,525	28	236,759	70,820	62	0	65,424	42	455,660
	Public In Character	1,034	-	15,164	2,213	16	-	3,095	0	21,523
59	Forested/Restorable	2,534	39,579	383,766	549,799	-	-	190,190	7,709	1,173,576
	Protected	51	5,833	33,859	128,919	-	-	12,346	1,755	182,763
	Plan Unit Target (10 sp)	480	28,301	33,488	32,880	-	-	24,058	1,353	120,560
	Plan Unit Target (21 sp)	1,051	62,136	69,695	75,343	-	-	31,389	3,918	243,531
	Public Target (10 sp)	51	5,833	33,488	32,880	-	-	12,346	1,353	85,951
	Public Target (21 sp)	51	5,833	33,859	75,343	-	-	12,346	1,755	129,186
	In Character/Restored	2,115	677	11,124	34,027	-	-	139,156	643	187,742
	Public In Character	32	492	106	2,634	-	-	8,118	59	11,441

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60	Forested/Restorable	1,479	-	184,111	392,314	33,201	71,598	149,316	5,387	837,407
	Protected	2	-	38,978	67,970	14,398	30,568	30,336	1,283	183,534
	Plan Unit Target (10 sp)	461	-	18,723	21,126	3,910	5,782	18,775	607	69,385
	Plan Unit Target (21 sp)	1,009	-	38,966	48,408	54,730	18,995	24,497	1,758	188,363
	Public Target (10 sp)	2	-	18,723	21,126	3,910	5,782	18,775	607	68,925
	Public Target (21 sp)	2	-	38,966	48,408	14,398	18,995	24,497	1,283	146,549
	In Character/Restored	1,468	-	57,390	60,178	1,476	12	130,552	42	251,116
	Public In Character	1	-	10,844	7,757	755	6	26,149	-	45,511
61	Forested/Restorable	5,193	668	139,318	327,453	46,190	111,275	170,753	66,964	867,814
	Protected	13	43	32,869	68,795	18,269	52,440	45,593	9,011	227,034
	Plan Unit Target (10 sp)	1,120	436	11,673	14,547	4,958	9,007	19,844	8,159	69,744
	Plan Unit Target (21 sp)	2,450	958	24,293	33,333	69,398	29,591	25,892	23,620	209,534
	Public Target (10 sp)	13	43	11,673	14,547	4,958	9,007	19,844	8,159	68,244
	Public Target (21 sp)	13	43	24,293	33,333	18,269	29,591	25,892	9,011	140,444
	In Character/Restored	4,418	0	37,783	12,626	2,219	276	154,457	5	211,785
	Public In Character	5	-	9,038	2,169	1,380	178	38,013	-	50,783
62	Forested/Restorable	3,127	15,805	19,347	237,116	230,485	661,176	453,762	106,063	1,726,881
	Protected	695	11,347	4,458	106,291	111,976	294,033	203,162	49,685	781,646
	Plan Unit Target (10 sp)	1,055	8,348	1,664	9,663	26,219	51,353	51,659	12,556	162,517
	Plan Unit Target (21 sp)	2,308	18,328	3,463	22,143	366,964	168,716	67,402	36,350	685,673
	Public Target (10 sp)	695	8,348	1,664	9,663	26,219	51,353	51,659	12,556	162,156
	Public Target (21 sp)	695	11,347	3,463	22,143	111,976	168,716	67,402	36,350	422,090
	In Character/Restored	2,390	3	2,060	4,358	7,461	312	368,574	11	385,171
	Public In Character	486	-	357	1,811	4,554	144	154,153	4	161,509

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63	Forested/Restorable	924	154,368	457,380	342,445	30,823	158,839	291,829	38,270	1,474,879
	Protected	92	42,383	103,106	132,958	16,066	43,846	86,886	13,095	438,430
	Plan Unit Target (10 sp)	244	108,048	48,333	19,763	4,030	14,911	35,373	4,493	235,195
	Plan Unit Target (21 sp)	533	237,228	100,591	45,285	56,404	48,990	46,154	13,006	548,191
	Public Target (10 sp)	92	42,383	48,333	19,763	4,030	14,911	35,373	4,493	169,378
	Public Target (21 sp)	92	42,383	100,591	45,285	16,066	43,846	46,154	13,006	307,421
	In Character/Restored	838	18,138	1,095	9,740	908	21	195,445	1,555	227,739
	Public In Character	38	2,755	337	1,296	785	13	54,827	273	60,325
64	Forested/Restorable	4,300	91	40,433	121,954	-	-	45,726	12,468	224,973
	Protected	113	0	395	5,416	-	-	2,400	254	8,578
	Plan Unit Target (10 sp)	930	69	4,706	7,162	-	-	6,315	2,760	21,942
	Plan Unit Target (21 sp)	2,035	150	9,794	16,411	-	-	8,240	7,991	44,621
	Public Target (10 sp)	113	0	395	5,416	-	-	2,400	254	8,578
	Public Target (21 sp)	113	0	395	5,416	-	-	2,400	254	8,578
	In Character/Restored	4,414	-	-	10,826	-	-	35,336	1,988	52,564
	Public In Character	106	-	-	434	-	-	1,810	42	2,392
65	Forested/Restorable	11,827	-	75,559	38,694	-	-	761	20,995	147,837
	Protected	123	-	1,798	946	-	-	241	2,935	6,044
	Plan Unit Target (10 sp)	5,217	-	14,364	5,509	-	-	503	3,984	29,576
	Plan Unit Target (21 sp)	11,410	-	29,894	12,624	-	-	656	11,533	66,117
	Public Target (10 sp)	123	-	1,798	946	-	-	241	2,935	6,044
	Public Target (21 sp)	123	-	1,798	946	-	-	241	2,935	6,044
	In Character/Restored	10,240	-	-	2,198	-	-	387	3,457	16,282
	Public In Character	68	-	-	33	-	-	5	296	401

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66	Forested/Restorable	495	14,468	32,854	282,877	24	60,553	178,218	50,589	620,078
	Protected	14	26	198	4,993	-	6,715	5,276	2,337	19,559
	Plan Unit Target (10 sp)	199	11,545	5,554	18,774	5	5,214	25,630	9,436	76,356
	Plan Unit Target (21 sp)	435	25,347	11,559	43,018	72	17,129	33,440	27,317	158,318
	Public Target (10 sp)	14	26	198	4,993	-	5,214	5,276	2,337	18,057
	Public Target (21 sp)	14	26	198	4,993	-	6,715	5,276	2,337	19,559
	In Character/Restored	423	119	6,679	21,620	-	-	149,317	5,133	183,292
	Public In Character	8	-	18	260	-	-	4,310	58	4,654
67	Forested/Restorable	14,833	1,881	80,535	335,979	-	-	159,547	86,542	679,318
	Protected	3,974	91	6,068	18,748	-	-	7,180	5,089	41,149
	Plan Unit Target (10 sp)	14,195	1,450	18,799	26,192	-	-	23,604	19,355	103,596
	Plan Unit Target (21 sp)	31,048	3,184	39,125	60,017	-	-	30,797	56,032	220,203
	Public Target (10 sp)	3,974	91	6,068	18,748	-	-	7,180	5,089	41,149
	Public Target (21 sp)	3,974	91	6,068	18,748	-	-	7,180	5,089	41,149
	In Character/Restored	5,611	-	15,121	28,919	-	-	128,097	8,755	186,504
	Public In Character	95	-	442	1,464	-	-	5,656	330	7,988
68	Forested/Restorable	10,971	302	8,076	61,238	122,309	275,503	124,805	55,670	658,874
	Protected	441	3	1,348	13,337	36,462	84,977	40,318	27,062	203,948
	Plan Unit Target (10 sp)	3,353	219	675	3,081	13,713	23,878	15,233	9,251	69,404
	Plan Unit Target (21 sp)	7,335	480	1,405	7,061	191,932	78,451	19,875	26,780	333,320
	Public Target (10 sp)	441	3	675	3,081	13,713	23,878	15,233	9,251	66,276
	Public Target (21 sp)	441	3	1,348	7,061	36,462	78,451	19,875	26,780	170,421
	In Character/Restored	5,810	-	5,288	1,928	1,567	228	117,405	12	132,238
	Public In Character	368	-	1,043	117	1,010	64	34,343	-	36,945

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69	Forested/Restorable	52,302	2,537	450,881	308,067	-	-	2,154	8,233	824,175
	Protected	1,107	-	33,075	41,772	-	-	1	1,384	77,339
	Plan Unit Target (10 sp)	22,383	3,737	76,540	34,640	-	-	346	1,509	139,156
	Plan Unit Target (21 sp)	48,957	8,206	159,296	79,376	-	-	452	4,368	300,654
	Public Target (10 sp)	1,107	-	33,075	34,640	-	-	1	1,384	70,207
	Public Target (21 sp)	1,107	-	33,075	41,772	-	-	1	1,384	77,339
	In Character/Restored	34,219	-	742	3,190	-	-	1,872	783	40,807
	Public In Character	302	-	43	191	-	-	1	104	640
70	Forested/Restorable	46	-	220	463	-	-	61	22,138	22,929
	Protected	-	-	-	11	-	-	8	17,500	17,520
	Plan Unit Target (10 sp)	64	-	93	40	-	-	14	9,947	10,158
	Plan Unit Target (21 sp)	140	-	193	91	-	-	19	28,796	29,240
	Public Target (10 sp)	-	-	-	11	-	-	8	9,947	9,967
	Public Target (21 sp)	-	-	-	11	-	-	8	17,500	17,520
	In Character/Restored	45	-	-	53	-	-	44	11,313	11,454
	Public In Character	-	-	-	3	-	-	5	4,814	4,822
71	Forested/Restorable	7,950	-	23,291	23,814	-	-	1,318	4,722	61,094
	Protected	123	-	4,775	11,205	-	-	-	13	16,116
	Plan Unit Target (10 sp)	13,075	-	4,593	4,732	-	-	334	905	23,640
	Plan Unit Target (21 sp)	28,598	-	9,559	10,844	-	-	436	2,620	52,057
	Public Target (10 sp)	123	-	4,593	4,732	-	-	-	13	9,461
	Public Target (21 sp)	123	-	4,775	10,844	-	-	-	13	15,755
	In Character/Restored	670	-	-	95	-	-	1,227	1,127	3,119
	Public In Character	17	-	-	8	-	-	-	2	26

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Total	Forested/Restorable	227,209	526,661	3,087,816	3,708,310	475,270	1,539,101	2,037,067	606,553	12,207,987
	Protected	8,250	119,891	328,204	643,619	198,109	541,425	476,157	141,797	2,457,454
	Plan Unit Target (10 sp)	107,521	376,742	381,457	240,577	55,200	128,495	256,755	103,066	1,649,812
	Plan Unit Target (21 sp)	235,173	827,165	793,891	551,260	772,574	422,163	335,002	298,371	4,235,599
	Public Target (10 sp)	8,250	116,892	226,682	209,142	53,771	124,006	195,747	68,319	1,002,809
	Public Target (21 sp)	8,250	119,891	316,106	354,140	198,109	375,160	245,932	128,091	1,745,679
	In Character/Restored	155,191	24,801	390,544	273,561	13,702	850	1,663,375	34,867	2,556,890
	Public In Character	2,559	3,279	39,379	23,297	8,502	404	362,387	5,981	445,788

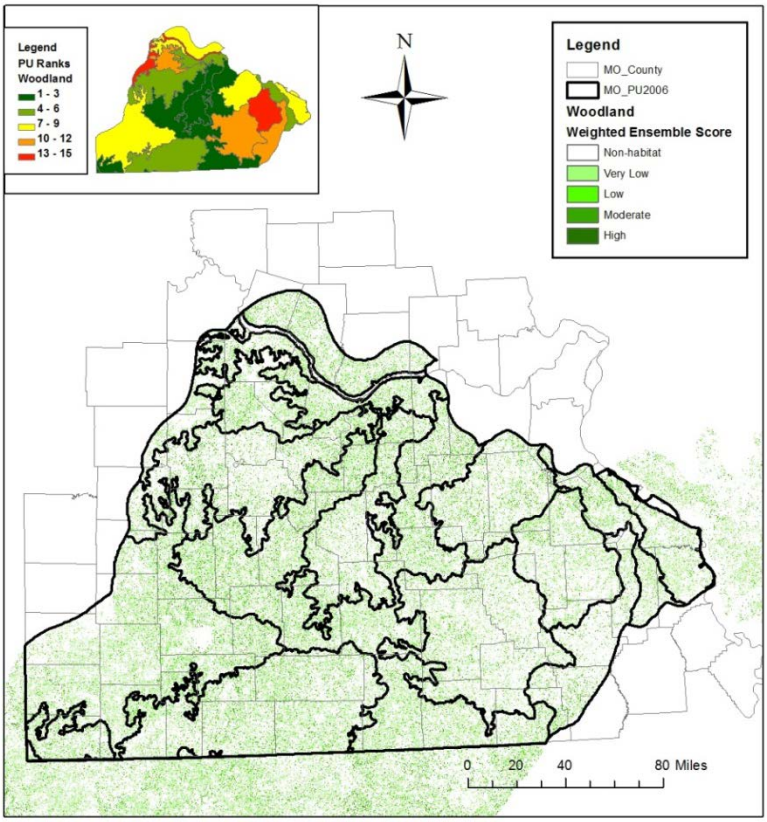

Figure 1. (Q2) Raw scores from the combination of Woodland species habitat models (n=7) weighted by the priority class of each species. Mean scores for each planning unit were used to produce ranks (inset) from high (1) to low (15).

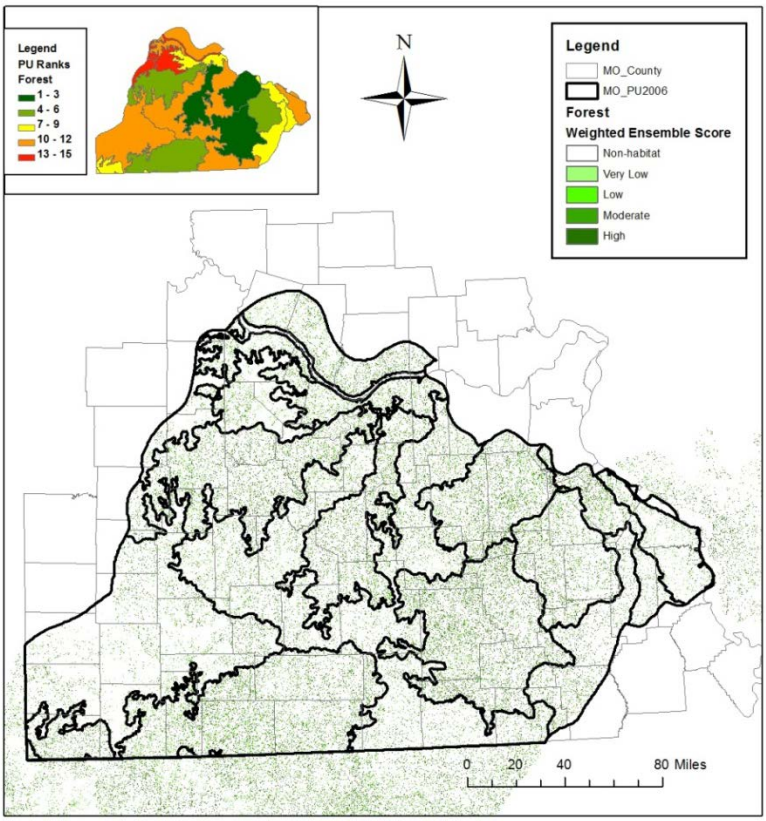

Figure 2. (Q2) Raw scores from the combination of Forest species habitat models (n=7) weighted by the priority class of each species. Mean scores for each planning unit were used to produce ranks (inset) from high (1) to low (15).

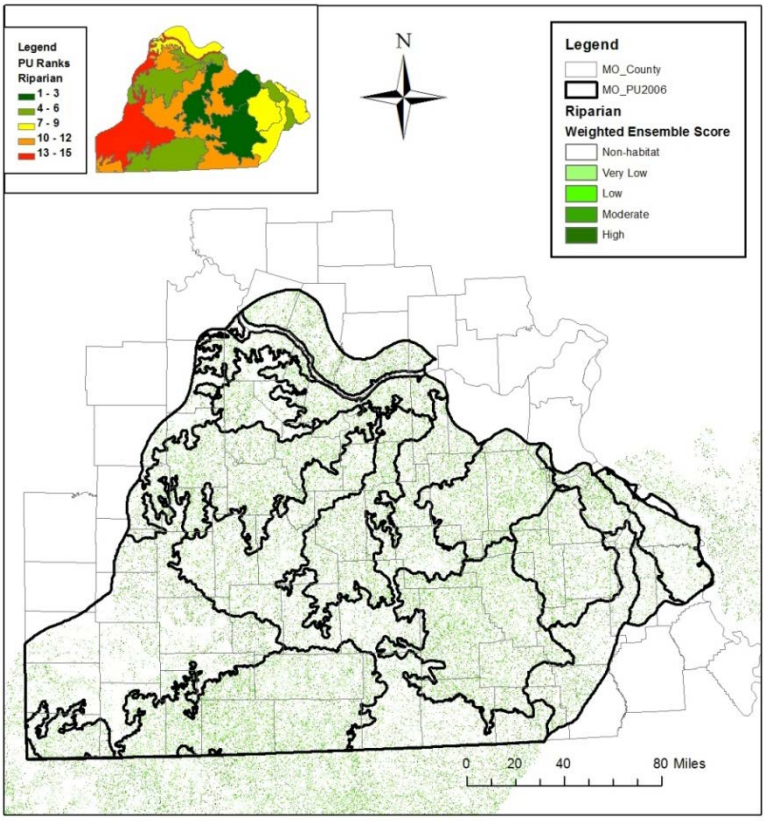

Figure 3. (Q2) Raw scores from the combination of Riparian species habitat models (n=4) weighted by the priority class of each species. Mean scores for each planning unit were used to produce ranks (inset) from high (1) to low (15).

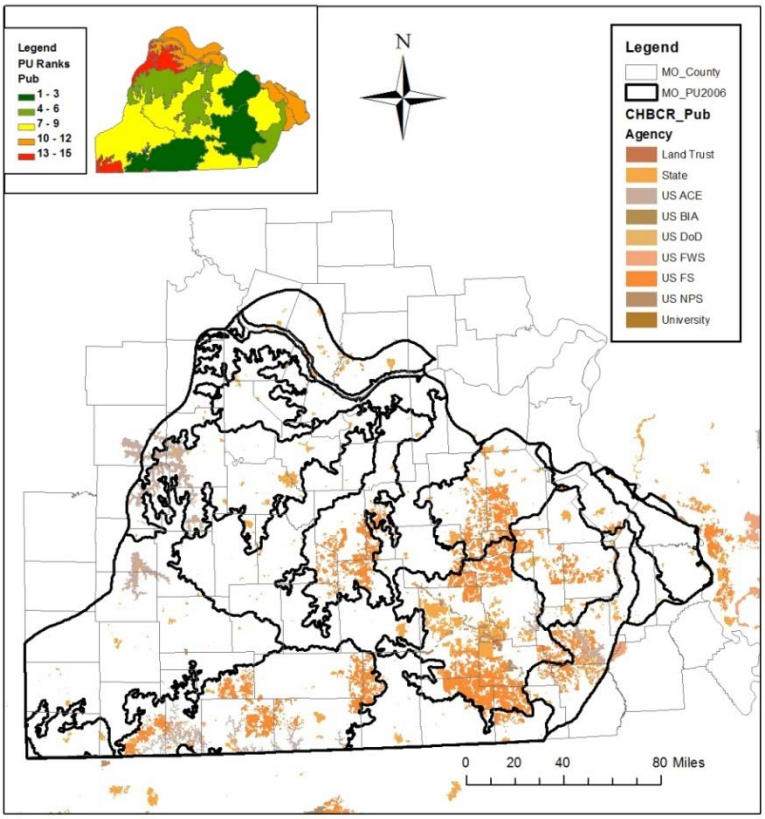

Figure 4. (Q3) Distribution of public lands within the Missouri Sub-region by agency or organization. Total area of public ownership for each planning unit was used to produce ranks (inset) from high (1) to low (15).

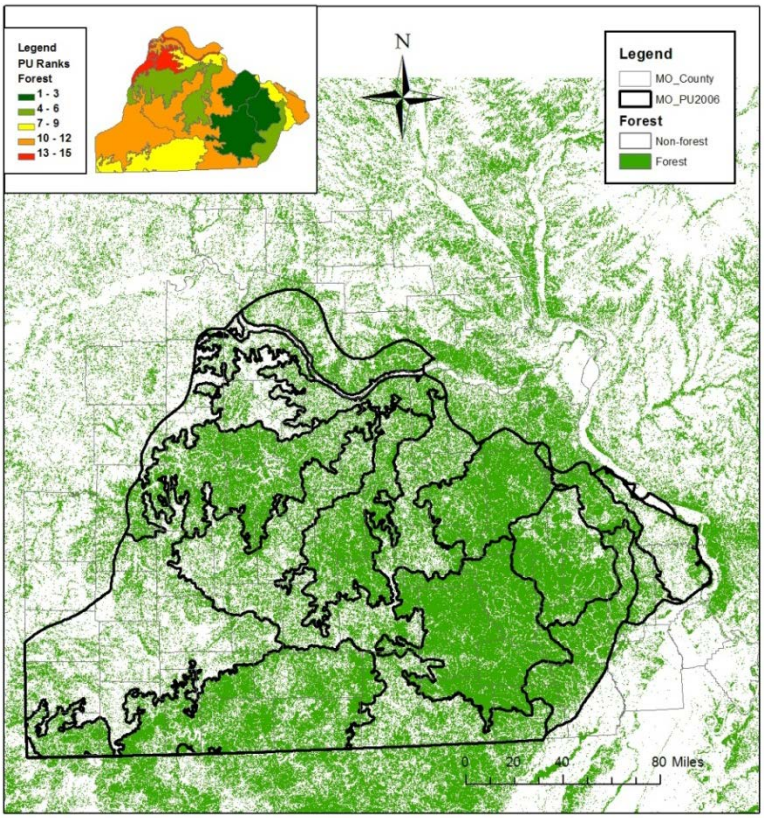

Figure 5. (Q4) Distribution of lands classified as a forested type within the Missouri Sub-region by the 2006 NLCD. Proportion of forested land for each planning unit was used to produce ranks (inset) from high (1) to low (15).

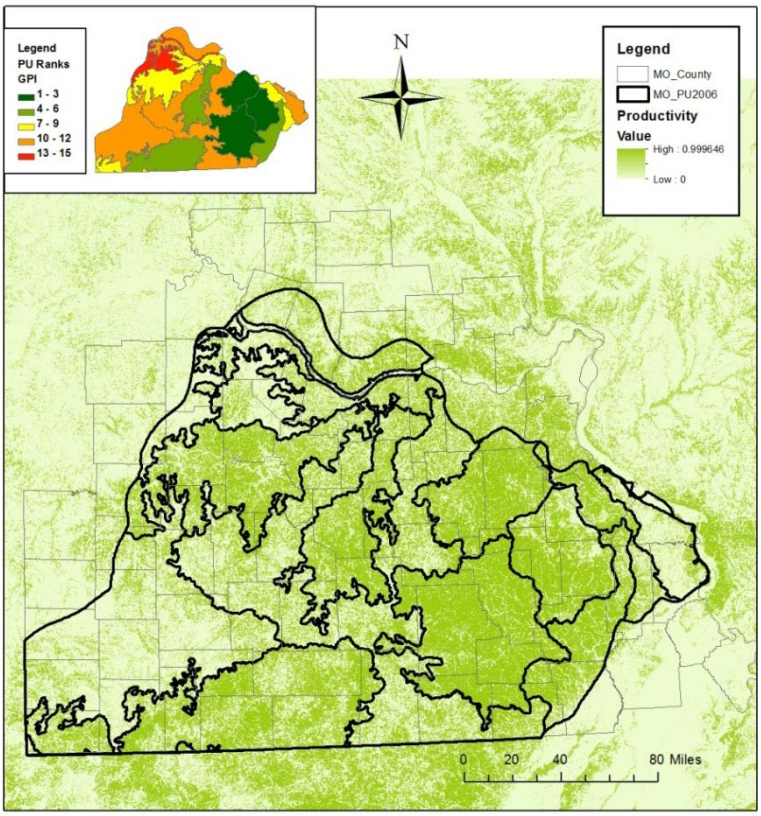

Figure 6. (Q4) Fragmentation of forested lands as measured by the General Productivity Index within the MO Sub-region. Mean index score on forested lands for each planning unit was used to produce ranks (inset) from high (1) to low (15).

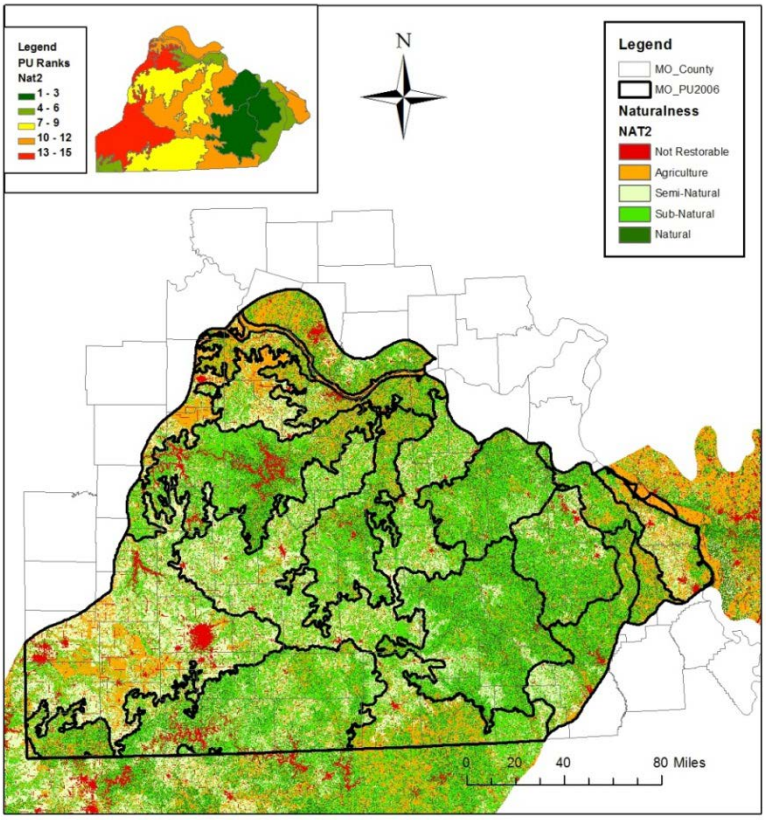

Figure 7. (Q4) Classification of the relative naturalness of lands within the Missouri Sub-region following Ferrari et al. 2008. Proportion of each planning unit in the "Natural" class was used to produce ranks (inset) from high (1) to low (15).

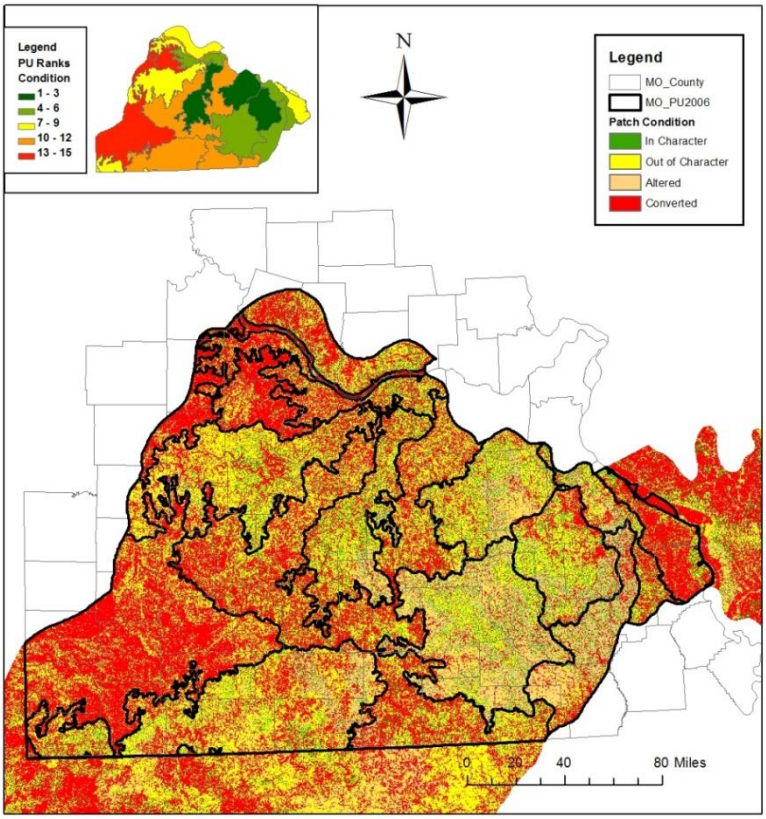

Figure 8. (Q4) Comparison between current and expected landscape patch conditions within the Missouri Sub-region. Proportion of each planning unit in the "In Character" class was used to produce ranks (inset) from high (1) to low (15).

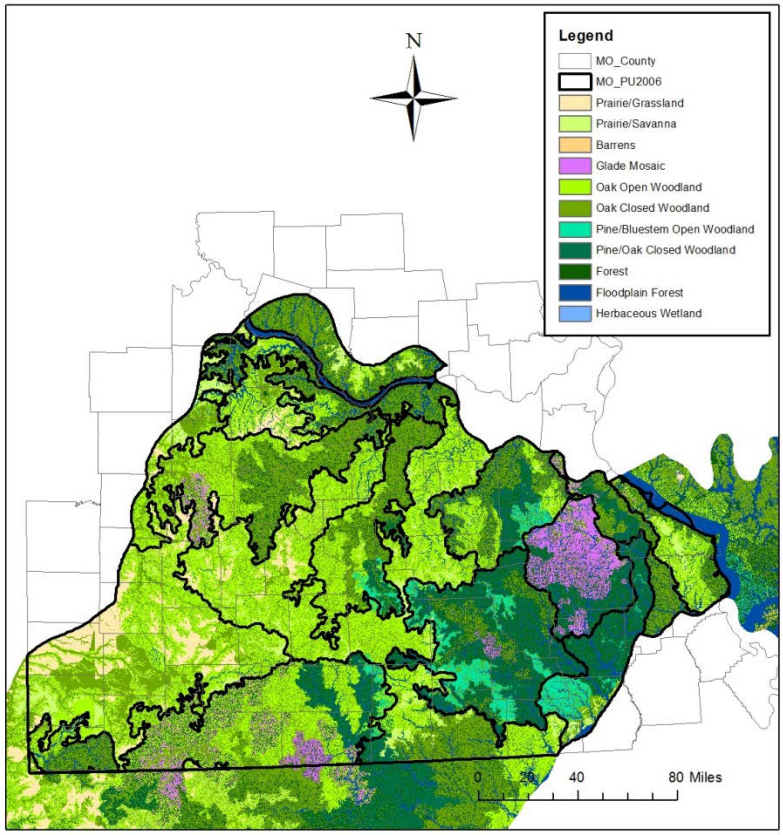

Figure 9. (Q5) The distribution of sites suitable for the restoration of broad natural communities within the MO Sub-region.

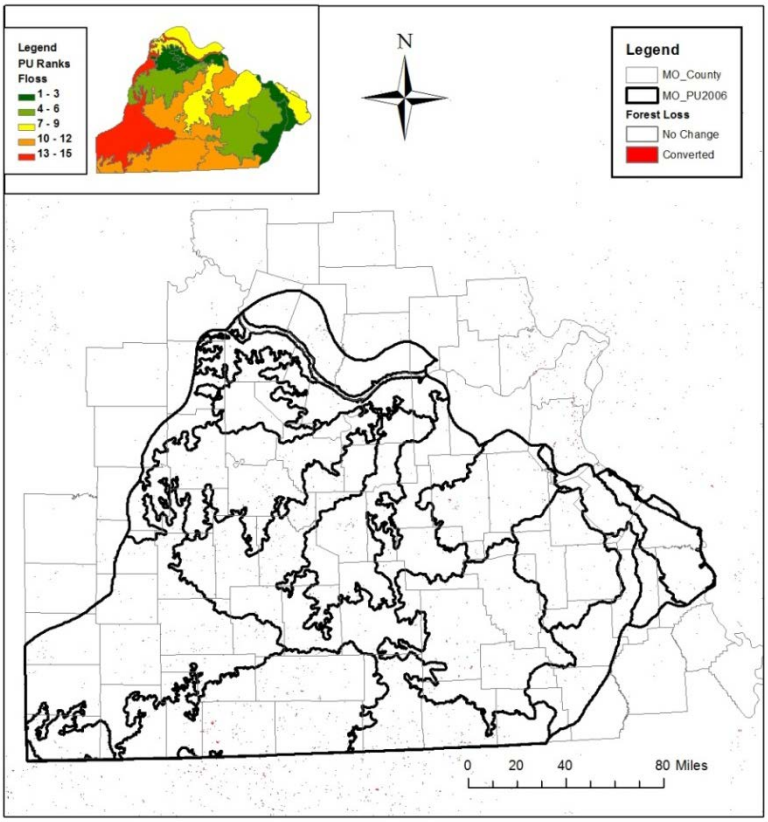

Figure 10. (Q6) Locations of cover class change from a forest type (2001) to a non-forest type (2006) within the MO Sub-region. Proportion of forest converted in each planning unit was used to produce ranks (inset) from low (1) to high (15).

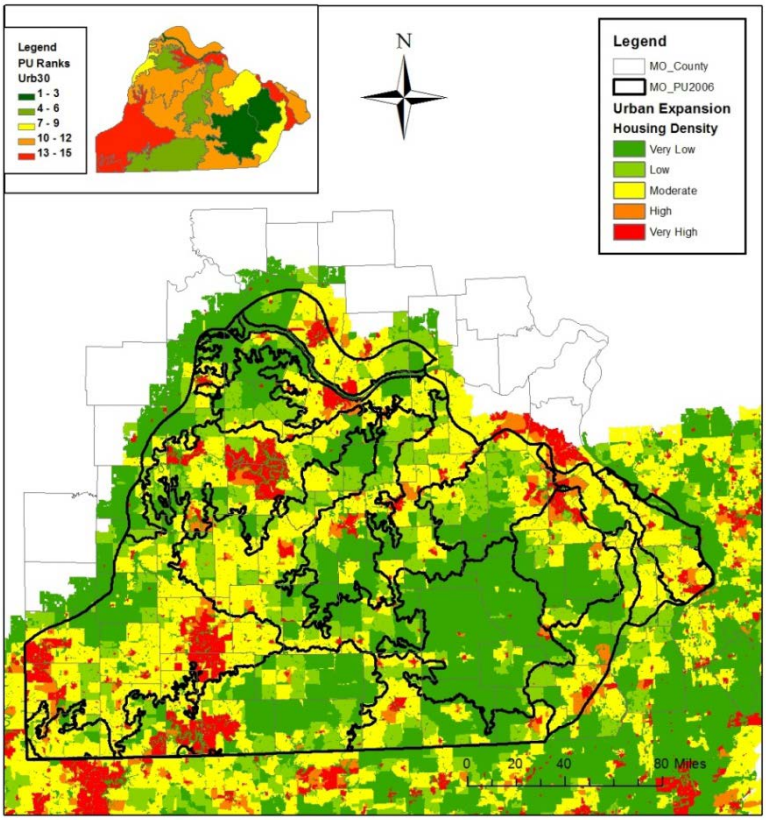

Figure 11. (Q6) The relative impact of current and projected housing density on management actions within the MO Sub-region. Proportion of each planning unit in the "Very Low" class was used to produce ranks (inset) from high (1) to low (15).