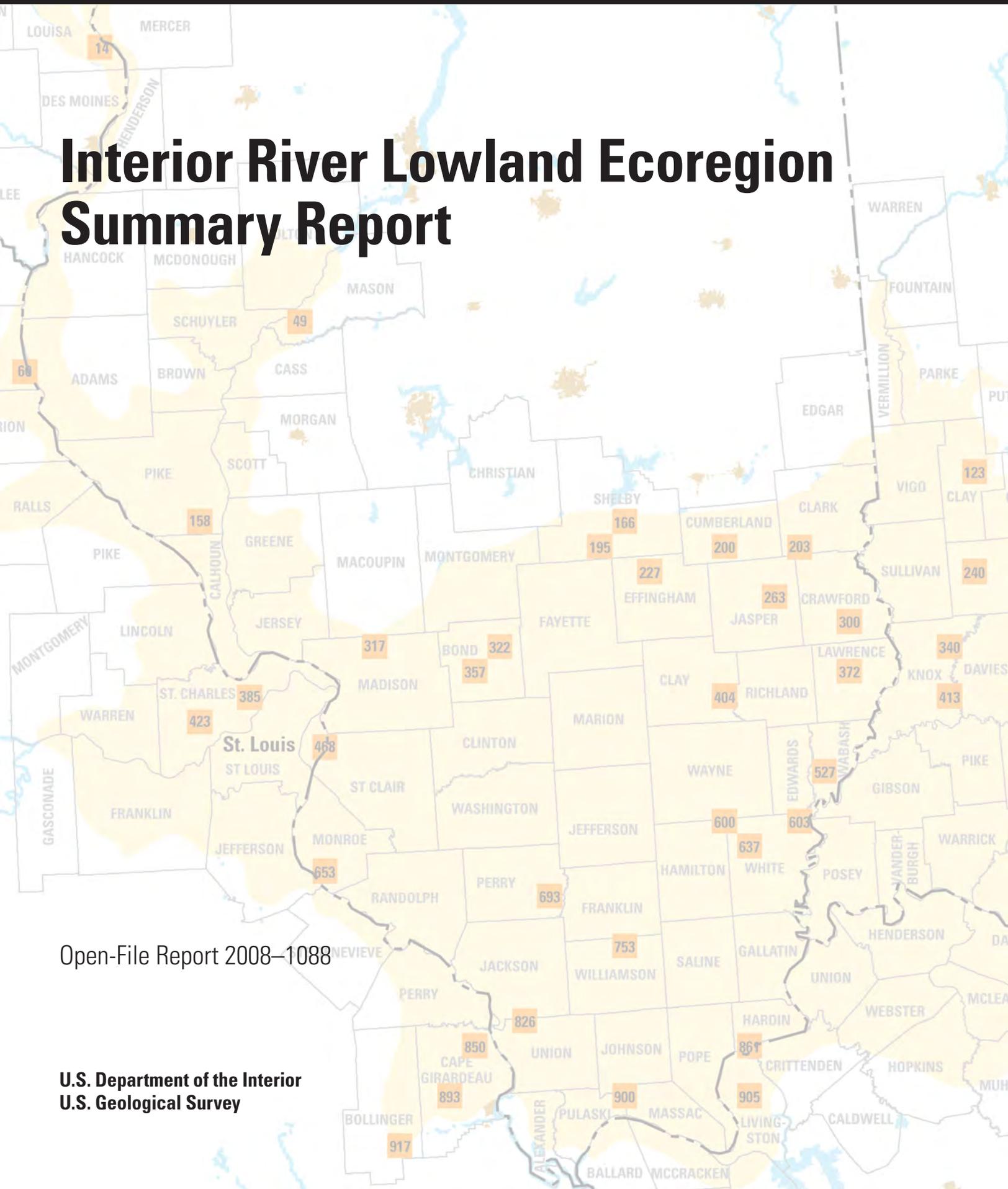


Interior River Lowland Ecoregion Summary Report



Open-File Report 2008-1088

U.S. Department of the Interior
U.S. Geological Survey

Cover. Map showing the Interior River Lowlands Ecoregion

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By Krista A. Karstensen

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**U.S. Department of the Interior
U.S. Geological Survey**

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Suggested citation:

Karstensen, K.A., 2008, Interior River Lowland Ecoregion Summary Report: U.S. Geological Survey Open-File Report 2008-1088, 5 p.

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Ecoregion Description

The Interior River Lowlands ecoregion encompasses 93,200 square kilometers (km²) across southern and western Illinois, southwest Indiana, east-central Missouri, and fractions of northwest Kentucky and southeast Iowa (fig 1). The ecoregion includes the confluence areas of the Mississippi, Missouri, Ohio, Illinois, and Wabash Rivers, and their tributaries.

This ecoregion was formed in non-resident, non-calcareous sedimentary rock (U.S. Environmental Protection Agency, 2006). The unstratified soil deposits present north of the White River in Indiana are evidence that pre-Wisconsinan ice once covered much of the Interior River Lowlands. The geomorphic characteristics of this area also include terraced valleys filled with alluvium as well as outwash, acolian, and lacustrine deposits.

Historically, agricultural land use has been a vital economic resource for this region. The drained alluvial soils are farmed for feed grains and soybeans, whereas the valley uplands also are used for forage crops, pasture, woodlots, mixed farming, and livestock (USEPA, 2006). This ecoregion provides a key component of national energy resources as it contains the second largest coal reserve in the United States, and the largest reserve of bituminous coal (Varanka and Shaver, 2007). One of the primary reasons for change in the ecoregion is urbanization.

Contemporary Land-Cover Change (1973–2000)

From 1973–2000, 5.60 percent of the total study area land cover changed at least once. This change in the ecoregion is known as the footprint. An estimated 5 percent of the ecoregion underwent change once (table 1). The percentage of the ecoregion that underwent multiple changes was low; 0.60

Table 1. The estimated overall spatial change in the Interior River Lowland Ecoregion between 1973 and 2000.

	Overall spatial change	Number of changes			
		1	2	3	4
Percent of ecoregion	5.6	5.0	0.6	0.1	0.0

percent of the area changed twice, 0.10 percent changed three times.

Annual rates of change peaked from 1973 to 1980 with 1.84 percent change and slowly declined until a slight peak from 1992 to 2000, with a 1.75 percent change (table 2). All of the change estimates have an associated margin of error of less than plus or minus 0.80 percent. The margin of error varied directly with the percent change in that it decreased with the lower amount of change from 1980 to 1986 and 1986 to 1992, and increased slightly between 1992 and 2000. When normalized to the annual rate of change, the land-cover change again declined after 1980 before increasing again between 1992 to 2000. During the study period, the conversions from forest land to agricultural land and agricultural land to developed land dominated the land-cover change.

Table 2. The total and annual rates of land-cover change for each time interval.

[+/-; plus or minus]

	Period			
	1973–1980	1980–1986	1986–1992	1992–2000
Total change (percent of ecoregion)	1.84	1.37	1.17	1.75
Margin of error (85 percent confidence level)	+/-0.706	+/-0.389	+/-0.378	+/-0.688
Average annual rate of change (percent/year)	0.48	0.27	0.26	0.47

The overall spatial land-cover change in percent of regional area between land-use categories during the study period is significant. Although agriculture is the primary land cover in this ecoregion, the analysis indicated that cropland use is intense, and urbanization is expanding, based on several economic sectors and industries (Varanka and Shaver, 2007). Agriculture is the primary land use; it comprised 65.0 percent of the ecoregion but declined marginally to 64.7 percent in 2000 (table 3). Forest was the next highest land cover-type, 22.7 percent in 1973, and 20.4 percent in 2000 (table 3). Developed land had a small, but steady gain, from 5.37 percent in 1973 to 6.98 percent in 2000.

Developed land expanded the most, with an increase of 1.61 percent between 1973 and 2000 (table 3). The largest net loss occurred in forest land cover, with net declines of 2.27 percent. Development generally decelerated during the study period (fig. 2), before peaking with the greatest rate of expan-

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Table 3. The estimated land-cover area for each land-use and land-cover class between 1973 and 2000.

[km², square kilometers; -, negative]

Land-use class	1973		1980		1986		1992		2000		Net Change 1973–2000	
	km ²	Percent	km ²	Percent								
Water	2,460	2.64	2,520	2.70	2,520	2.70	2,560	2.75	2,620	2.80	160	0.16
Developed	5,010	5.37	5,400	5.79	5,580	5.98	5,790	6.24	6,510	6.98	1,500	1.61
Mechanically disturbed	103	0.11	80.9	0.09	30.4	0.03	20.5	0.02	14.9	0.02	-88.0	-0.09
Mining	118	0.13	91.6	0.10	128	0.14	222	0.24	99.8	0.11	-18.5	-0.02
Natural Bare	15.4	0.02	15.4	0.02	15.4	0.02	17.0	0.02	22.2	0.02	6.80	0.00
Forest	21,200	22.7	20,300	21.8	19,700	21.2	19,300	20.7	19,100	20.4	-2,100	-2.27
Grass/Shrub	470	0.50	414	0.44	396	0.42	417	0.45	408	0.44	-61.6	-0.06
Agriculture	59,700	64.0	60,200	64.60	60,700	65.0	60,700	65.1	60,300	64.7	600	0.66
Wetland	4,250	4.55	4,240	4.54	4,210	4.51	4,210	4.52	4,250	4.56	0.30	0.01
Non-mechanically disturbed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

sion between 1992 and 2000, which is also the period with the second highest overall rate of ecoregion change (1.75 percent).

The five most common land cover conversions are illustrated in table 4. Overall, the greatest change during the study period was the conversion from forest to agriculture. Between 1973 and 2000, the most common conversion (2,110 km²) was from forest cover to agriculture (table 4); however, this conversion did not result in a net increase in agriculture because during the same time, agricultural lands were being converted to developed land. Conversion from agriculture to developed land was the second most common change (1,190 km²). The loss of agricultural land cover was masked by a low net amount of change (0.66 percent).

Summary and Conclusion

The study categorized the Interior River Lowland as a rich natural environment with a low to moderate demand for competing land uses, despite a relatively low population, that maintains the stability and growth of the region (Varanka and Shaver, 2007). Because of the lack of any statistical analysis of neighboring ecoregions, it is recommended that a comparative analysis to adjoining ecoregions be conducted at a later date.

References

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- United States Environmental Protection Agency, 2006, Ecoregions of Indiana and Ohio: accessed July 31, 2007, http://www.epa.gov/wed/pages/ecoregions/ohin_eco.htm
- Varanka, Dalia E., and Shaver, David K., 2007, Land-use change trends in the Interior River Lowlands Ecoregion: U.S. Geological Survey Scientific Investigations Report 2007–5145, 12 p.

Table 4. The leading land cover conversions for the four time intervals of the Interior River Lowland Ecoregion from 1973–2000.[km², square kilometers]

Period	From Class	To Class	Area changed (km ²)	Percent of all changes
1973–1980	Forest	Agriculture	856	54.0
	Agriculture	Developed	304	19.0
	Forest	Mechanically Disturbed	59.0	4.00
	Grassland/Shrubland	Forest	58.0	4.00
	Agriculture	Forest	57.0	4.00
	Other Classes	Other Classes	244	15.0
	Total		1,580	100
1980–1986	Forest	Agriculture	603	52.0
	Agriculture	Developed	138	12.0
	Wetland	Agriculture	103	9.00
	Grassland/Shrubland	Forest	65.0	5.00
	Agriculture	Wetland	48.0	4.00
	Other Classes	Other Classes	205	18.0
	Total		1,160	100
1986–1992	Forest	Agriculture	409	42.0
	Agriculture	Developed	170	14.0
	Agriculture	Mining	143	15.0
	Mining	Agriculture	43.0	4.00
	Forest	Developed	42.0	4.00
	Other Classes	Other Classes	175	18.0
	Total		982	100
1992–2000	Agriculture	Developed	574	37.0
	Forest	Agriculture	245	16.0
	Mining	Agriculture	139	9.00
	Forest	Developed	120	8.00
	Agriculture	Forest	119	8.00
	Other Classes	Other Classes	336	22.0
	Total		1,530	100
1973–2000	Forest	Agriculture	2,110	42.0
	Agriculture	Developed	1,190	24.0
	Forest	Developed	243	5.00
	Agriculture	Forest	236	5.00
	Agriculture	Mining	210	4.00
	Other Classes	Other Classes	980	20.0
	Total		4,970	100

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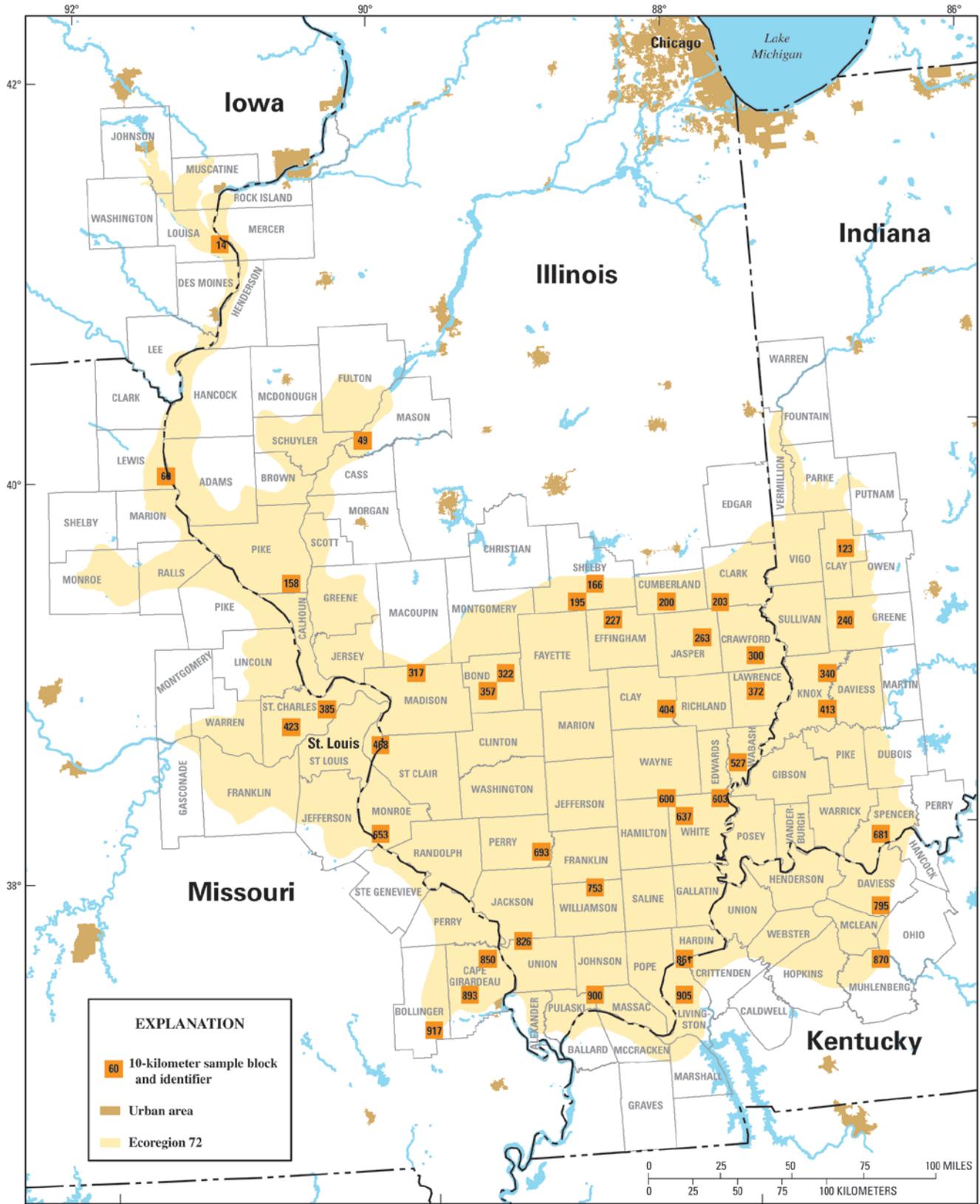


Figure 1. The Interior River Lowlands Ecoregion.

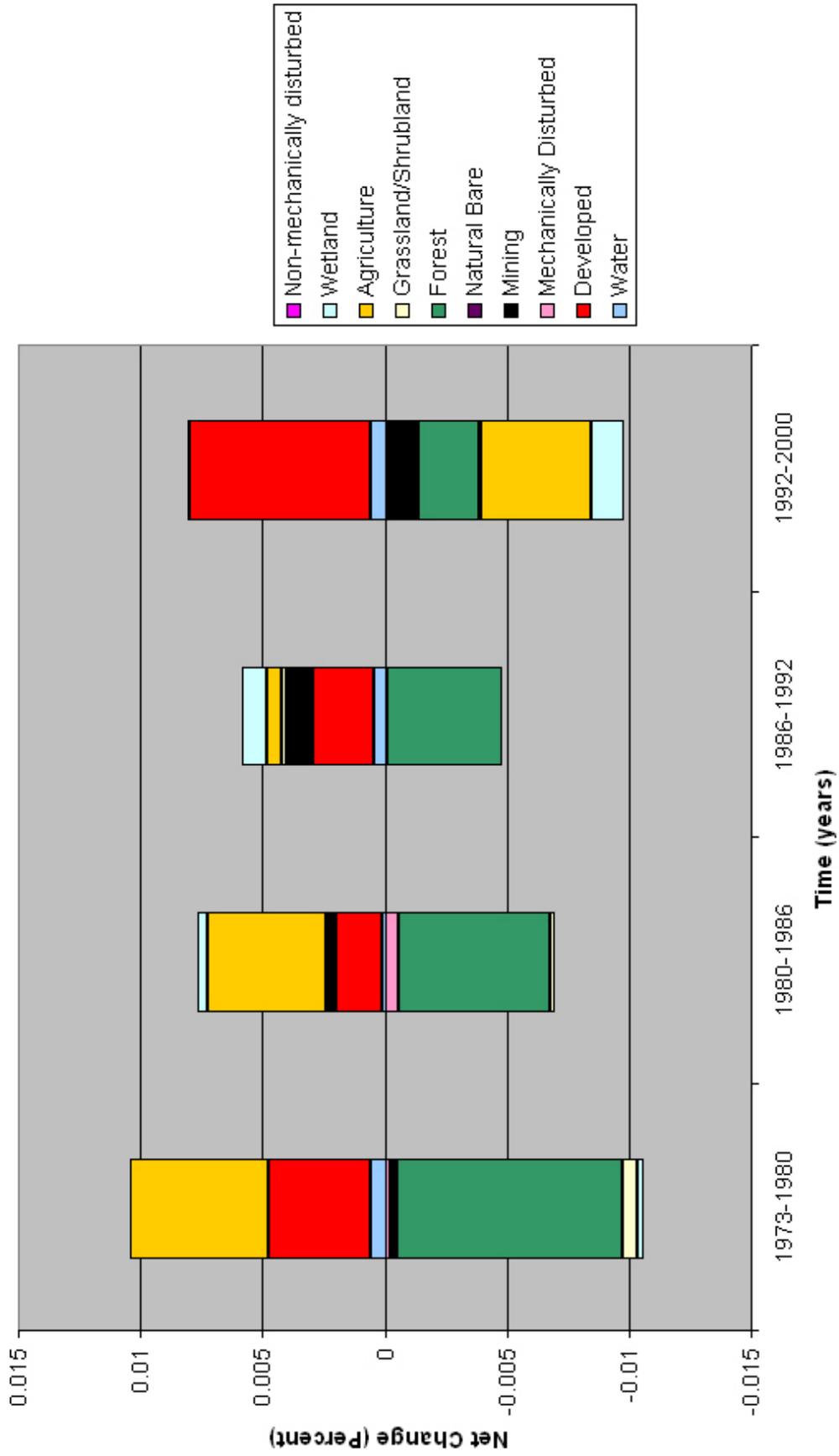


Figure 2. Net land-cover changes in the Interior River Lowlands during each time interval.

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