

# NRCS 2011 State Resource Assessment Project Report - Indiana

## Introduction

This report provides the overall processes and analyses used to complete the initial NRCS national State Resource Assessment (SRA) in Indiana. All analyzed resource concerns are covered in this report.

NRCS Indiana recognizes that the assessments can be improved with input from partners in regards to additional data, methods, and expertise to further refine and tailor the state resource assessment into a tool that can have many uses across the Indiana Conservation Partnership and to minimize duplication. **NRCS Indiana will coordinate meetings in the coming months with our interested partners to discuss the SRA and how best to expand the analyses and coordinate efforts and uses across the Indiana Conservation Partnership.**

### Background

A NRCS national effort directed each state to complete a geospatial SRA for relevant resource concerns, by land use, to determine acres at risk, at risk acres still needing treatment, and acres proposed to be treated by the states for Federal fiscal years 2012-2014. Each analyzed resource concern, by land use, was also given a priority rank.

Some criteria were provided to the states from the national level for this initial effort, but to ensure nationwide consistency, we expect more guidance in future efforts. The initial project had a very compressed time frame of two months. Indiana NRCS completed the minimum assessments internally and focused on using existing resources, knowledge, and previously identified state priorities and analyses by NRCS and partners to generate the assessment for 2011.

As required for the national effort, NRCS used the new resource concern matrix of 9 broad resource concern categories, with a total of 31 specific resource concerns within those categories. The new resource concerns matrix is on the final pages of this report. States could omit resource concerns determined to be not applicable, or those for which sufficient data resources did not already exist to perform a geospatial analysis. Such data shortfalls can help identify future data development needs for NRCS and partners.

The project evaluated the chosen concerns on Crop, Range (not applicable to Indiana), Pasture, Forest, and Other Associated Ag (farmsteads/ headquarters, wildlife, shrub/scrub, and herbaceous wetlands). The analyses were all associated to a land use layer, with land classifications from that data described on page 2 of this report. In some cases, the land use layer was a limiting factor to performing a given analysis. No weighting of input data sets was used in this first year of the project.

Finally, based on the assessments and other inputs, priority areas for treating a resource concern were to be identified within each state for each resource concern's land use. For example, a priority area to treat excessive sediment was determined for crop land and a priority area for the same concern was identified for pasture, and so on. The priority areas may or may not have overlapped because each resource concern/land use combination was analyzed separately. The same categories of acres (at risk acres, acres still needing treatment, and acres proposed to treat in 2012-2014) were determined within these priority areas.

Land Use Data and Analyses

The 2006 National Land Cover Dataset (NLCD) from USGS was the primary land use layer used for this project, as recommended by the NRCS national guidance for multi-state consistency on the project. NLCD 2006 has a 30 meter pixel resolution, which is acceptable for state and regional scales. As previously mentioned, the resolution and the land classification can limit some of the interpretations and analysis for a given resource concern or land use, particularly for features comprising of small or narrow land areas.

Updated roads from Dynamap 2008 data were cut into the land use layer to further refine it. Also, because NRCS works on private lands, land from DNR Managed Lands and the USGS national public lands layer were subtracted from the statewide land use layer. The state resource assessment classification of NLCD lands and the final land use table are presented here.

**NLCD 2006 Reclassification Guide for State Resource Assessment 2011**

Indiana SRA Land Use

Water (Not analyzed)  
 Developed, Open/Low/Med/High (Not analyzed)  
 Range (Not analyzed in Indiana)  
 Barren Land (Quarries, bare rock, etc...; Not analyzed)  
 Forest  
 Pasture  
 Crop  
 Other Associated Ag Land

NLCD Land Use Classes

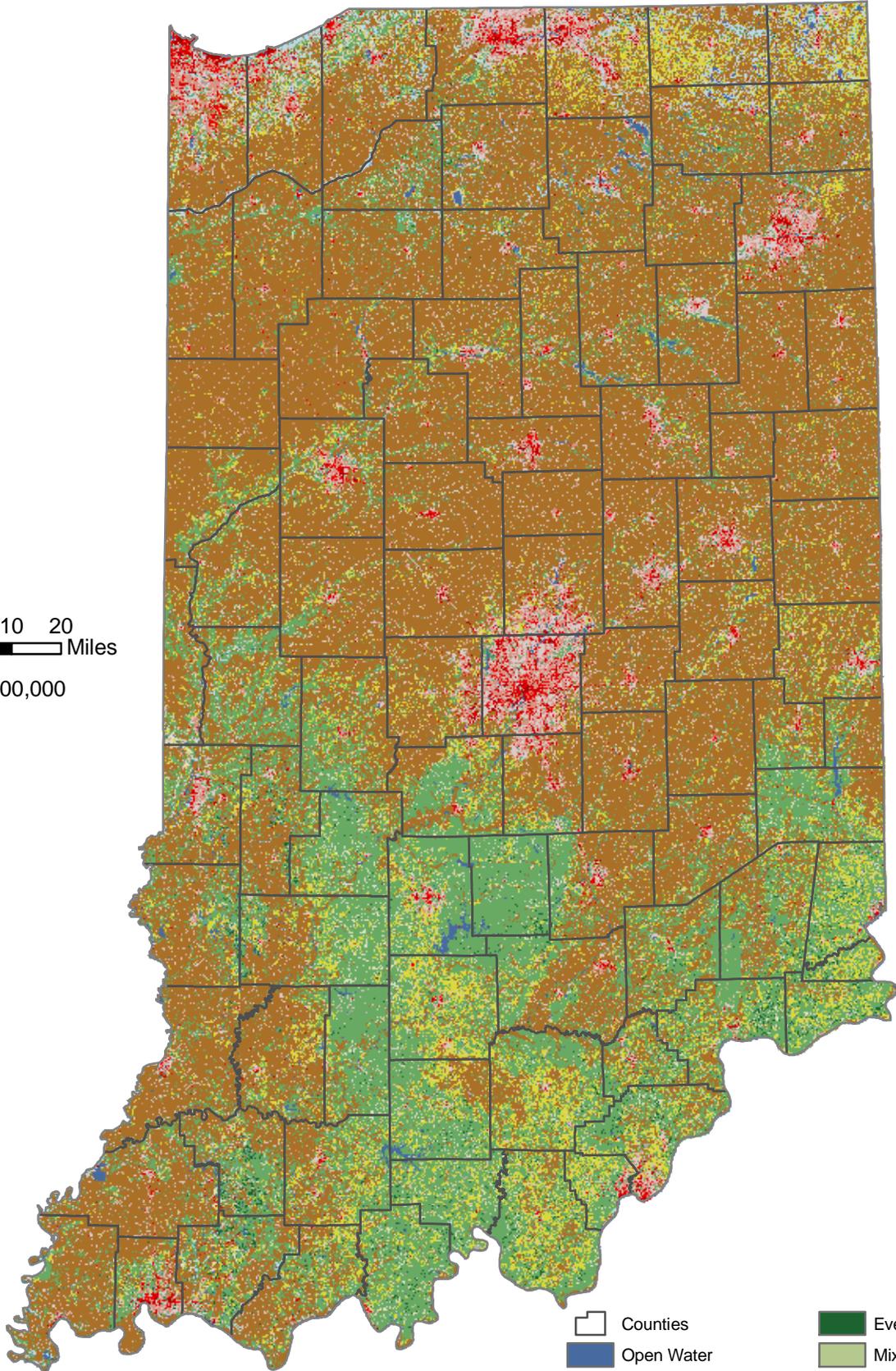
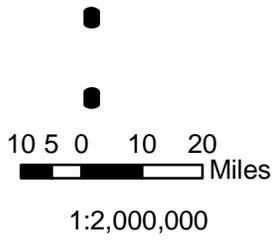
Open Water  
 Urban  
 (Varied by state)  
 Barren Land (Rock/Sand/Clay)  
 Dec/Evergreen/Mixed Forest, Woody Wetlands  
 Grassland/Herbaceous, Pasture/Hay  
 Cultivated Crops  
 Shrub/Scrub, Emergent Herbaceous Wetlands

**NLCD 2006 Land Use Acres for Indiana\*  
 (After Reclassification and Data Treatment)**

VALUE	Name	Acres
11	Water	200,273
21	Urban	2,703,540
31	Barren	15,734
41	Forest	4,406,476
71	Pasture	1,898,333
82	Crop	12,427,941
91	Associated Ag	109,674
		21,761,971

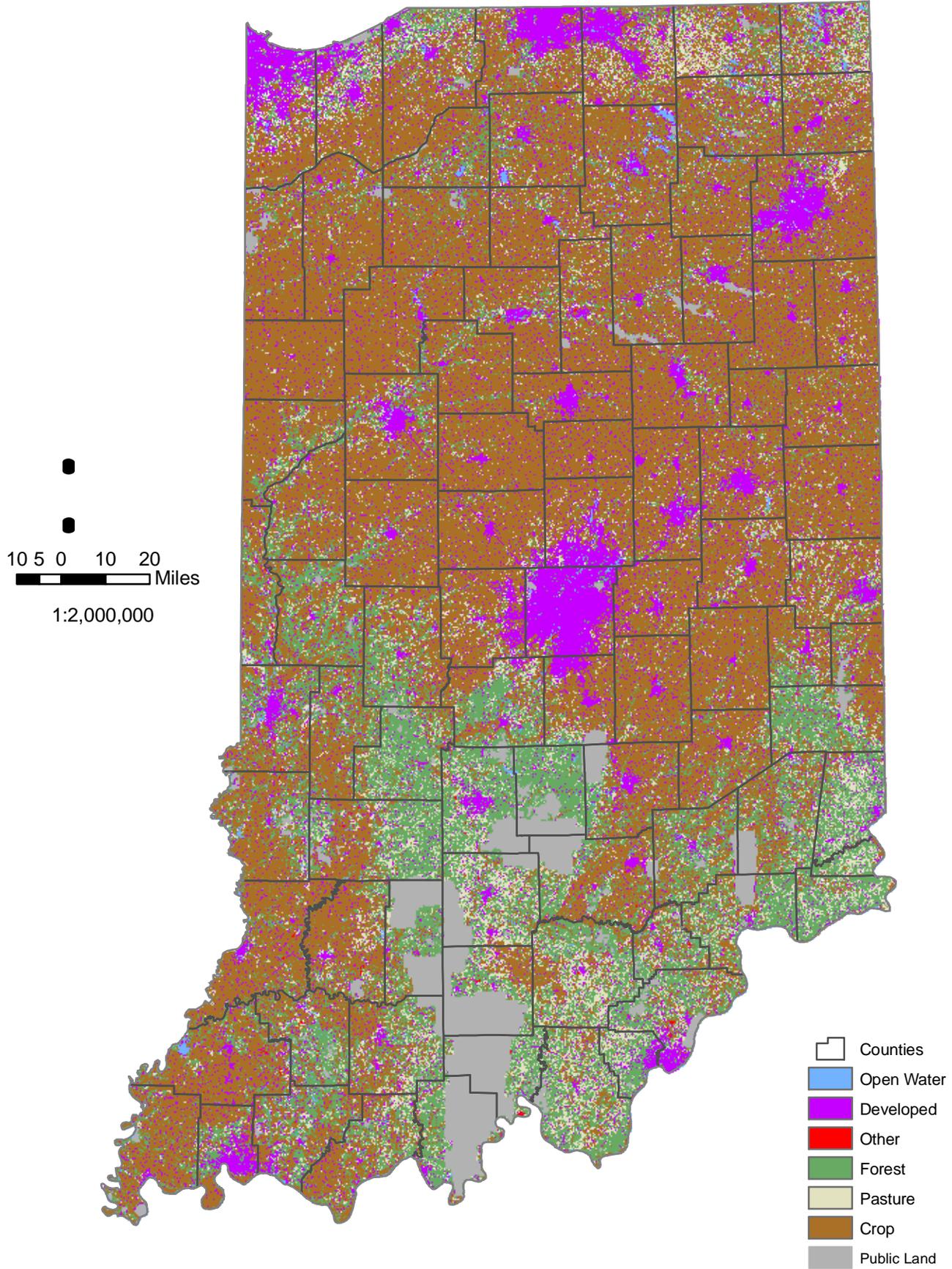
\*This is the final table of land use acres for IN derived from adding Dynamap roads to urban, subtracting public lands, and reclassifying NLCD 2006 per national guidance (except to change shrub to associated ag instead of range and woody wetlands to forest instead of associated ag).

# 2006 NLCD



- |                          |                              |
|--------------------------|------------------------------|
| Counties                 | Evergreen Forest             |
| Open Water               | Mixed Forest                 |
| Developed, Open Space    | Shrub/Scrub                  |
| Low Intensity Developed  | Grassland/Herbaceous         |
| Med Intensity Developed  | Pasture/Hay                  |
| High Intensity Developed | Cultivated Crops             |
| Barren/Pits/Quarries     | Woody Wetlands               |
| Deciduous Forest         | Emergent Herbaceous Wetlands |
|                          | Public Land                  |

# 2006 NLCD (Reclassified for SRA 2011)



Analysis Methodology

Each selected resource concern/land use combination was analyzed for the acres of that land use type “at risk”. These acres were then analyzed against NRCS’s installed-applicable practices data which resulted in a layer representing “acres needing treatment”. The acres still needing treatment were tabulated by county or watershed, and in some cases evaluated against existing priority areas identified through other assessments in Indiana (such as IDNR Division of Forestry’s *Indiana Statewide Forest Assessment – 2010*; and others). The tabulated data for each county or watershed was then ranked either by simple quantity or a land use area weighted percentage, depending on the resource concern. The top ranking counties or watersheds were then selected as “priority areas for treatment”. In some cases, the selected areas from this process were combined with existing priority areas already identified by NRCS and partners in Indiana to create a final priority area for any given concern.

The methods of analysis for any given resource concern varied; therefore the following sections will cover each resource concern and land use in greater detail. Following is the template for presenting the analysis methodology for each resource concern, with definitions of what each section of the template will cover.

*Resource Category*

*Resource Concern*

*Land Use*

*Priority Rank by Land Use*

*At Risk Acres*

The method used to determine acres at risk.

*Acres Needing Treatment*

The method used to determine acres still needing treatment. Typically, this section will simply list NRCS practices applied within the last 10 years which were used to deduct areas from the at risk analysis layer. When considering the applied practice data, please understand that the data is aggregated at the farm field level and that some practices are management practices. As such, the management practices do not necessarily represent permanent adoption on the ground.

*Priority Areas*

The method used to determine priority areas.

*Results*

A table of results with the following categories:

*Statewide Acres*

*At Risk*

*Needing Treatment*

*Proposed to treat 2012-2014\**

*Priority Zone Acres*

*At Risk (same analysis, just in the priority zone)*

*Needing Treatment (same analysis, just in the priority zone)*

*Proposed to treat 2012-2014\*\**

<*Data Layers Used in Analysis*>

<*Priority Zone Map*>

\*The acres proposed to treat statewide were typically equivalent to last 10 years of statewide performance in the selected practices for the concern, adjusted higher or lower based on priority rank.

\*\*The acres proposed to treat in the priority zones were typically equivalent to 40% of the statewide value for acres proposed to treat.

### Additional Land Use Divisions for Future Assessments

Headquarters/Farmstead Layer – Can headquarters/farmstead sites somehow be developed from parcel data? Is parcel data for all counties available and is there a way to identify farms from other parcels (zoning overlay layer?)? Note: The FSA CLU layer often does not separate the farmstead from other contiguous land uses that are not crop or pasture, such as forest, wildlife, and field edge/ditch areas and is therefore not suitable for our purpose in this project. If such a layer could be developed, it could be used in vector form as well as converted to raster for integration to the land use layer.

### Resource Concerns for Potential Analysis in Future Assessments

This is a table of resource concern and land use combinations that were not analyzed in the initial 2011 project. Some of the following concerns were not analyzed at all in 2011 while others were analyzed on land uses other than those listed here. Challenges to analyses lie either in the existence of needed input data or the methods to analyze existing data sets. Also note that the presence of possible inputs does not guarantee an analysis can be done because both the suitability and usability of the data and the method for using the data would also need to be determined. Finally, the list of possible analyses is not comprehensive. The presence or absence of any particular layer neither indicates enough data exists to perform an analysis nor that an analysis would be done by using only the listed inputs.

Resource Category	Resource Concern	Land Use	Possible Analysis Inputs	Method Defined?
Air Quality	Greenhouse Gas Emissions	Crop	Tillage Transect	No
Air Quality	Greenhouse Gas Emissions	Pasture	?	No
Air Quality	Greenhouse Gas Emissions	Other	?	No
Air Quality	Ozone Precursor Emissions	Crop	Tillage Transect	No
Air Quality	Ozone Precursor Emissions	Pasture	?	No
Air Quality	Ozone Precursor Emissions	Other	?	No
Air Quality	Particulate Matter Emissions	Crop	EPA PM	No
Air Quality	Particulate Matter Emissions	Pasture	EPA PM	No
Air Quality	Particulate Matter Emissions	Other	EPA PM	No
Plant Condition	Inadequate Structure & Composition	Crop	NASS CDL (across many years)	No
Plant Condition	Undesirable Productivity & Health	Crop	Soils, <i>NASS Production</i>	No
Plant Condition	Undesirable Productivity & Health	Pasture	Soils, <i>NASS Production</i>	No
Soil Erosion	Concentrated Flow	Crop	Soils, Water, Slope, <i>Vegetation</i>	No
Soil Erosion	Sheet, Rill, and Wind	Pasture	Soils, ORI, Tillage Transect	Possibly
Soil Erosion	Sheet, Rill, and Wind	Forest	Soils, ORI, Tillage Transect	Possibly
Soil Erosion	Sheet, Rill, and Wind	Other	Soils, ORI, Tillage Transect	No
Soil Quality	Compaction	Pasture	Soils	Possibly
Water Quality	Excess Nutrients Surface & Ground H <sub>2</sub> O	Other	?	No
Water Quality	Excess Pathogens from bio sources	Crop	Karst	No
Water Quality	Excess Pathogens from bio sources	Pasture	Water	No
Water Quality	Excess Pathogens from bio sources	Other	CFO	No
Water Quality	Pesticides to Surface & Ground H <sub>2</sub> O	Crop	Soil, 303d	No
Water Quality	Pesticides to Surface & Ground H <sub>2</sub> O	Pasture	Karst, Floodplain, 303d	No
Water Quality	Pesticides to Surface & Ground H <sub>2</sub> O	Other	?	No
Water Quantity	Inefficient moisture management	Crop	?	No
Water Quantity	Inefficient use of irrigation H <sub>2</sub> O	Crop	NASS Livestock by County	No

*Layers in italics are either not known to exist or are not known to exist with suitable data content or sufficient accuracy for statewide analysis. Also the data may not exist at a suitable scale or extent for statewide analysis.*

Possible Future Analysis Extents

New and repeat analyses in the future could be run at the 10- or 12-digit HUC level for watershed based issues to refine the geographical extents in need of treatment. Also, suggestions for areas smaller than the county level for use with county based analyses are welcomed. Finally, future efforts at NRCS may include multi-state analysis which could include standardized procedures for the work at statewide scales.

Possible Future Analysis Methods or Components

New and repeat analyses may include factors for assigning varying weights to data inputs. Also, additions to any particular analysis may be enhanced if suitable data at a statewide or significant extent can be incorporated such as land use and management factors when determining soil erosion risks.





2011 State Resource Assessment

STATE: Indiana

Values with an entry of zero were not analyzed in Indiana due to being not applicable or having insufficient data. Greyed out boxes were concerns considered not applicable to the land use by National NRCS.

Major Resource Concerns	Natural Resource Concerns	CROP			PASTURE			FOREST			OTHER ASSOCIATED AG LAND							
		Potential At Risk Acres	Acres Needing Treatment	Priority Rank (1 = Highest)	Priority Treatment Acres	Potential At Risk Acres	Acres Needing Treatment	Priority Rank (1 = Highest)	Priority Treatment Acres	Potential At Risk Acres	Acres Needing Treatment	Priority Rank (1 = Highest)	Priority Treatment Acres					
DEGRADED PLANT CONDITION	DEGRADED PLANT CONDITION - Undesirable plant productivity and health	0	0	0	0	0	0	0	0	0	0	0	0	0				
	DEGRADED PLANT CONDITION - Inadequate structure and composition																	
	DEGRADED PLANT CONDITION - Excessive plant pest pressure	32,372	32,372	11	2,800	20,606	20,606	4	200	4,406,476	4,377,660	1	31,700	109,674	109,120	7	500	
INADEQUATE HABITAT FOR FISH AND WILDLIFE	INADEQUATE HABITAT FOR FISH AND WILDLIFE - Wildfire hazard, excessive biomass accumulation																	
	INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation	12,427,941	11,000,000	8	1,356,500	1,898,333	1,864,000	6	33,500	4,406,476	4,405,000	3	1,500	109,674	103,000	6	6,300	
LIVESTOCK PRODUCTION LIMITATION	LIVESTOCK PRODUCTION LIMITATION - Inadequate feed and forage	0	0	0	0	490,614	477,143	5	13,500	0	0	0	0					
	LIVESTOCK PRODUCTION LIMITATION - Inadequate livestock shelter	0	0	0	0	0	0	0	0	0	0	0	0					
	LIVESTOCK PRODUCTION LIMITATION - Inadequate livestock water	0	0	0	0	0	0	0	0	0	0	0	0					



### Input Data Set Descriptions

This section will list the name of each input data set used in the individual resource concern sub-reports and a short description of the data set. Each data set is also tagged to indicate if it is public data or sensitive data due to licensing or protection of personally identifiable information.

1. *USGS NLCD 2006 (modified)* – This is the NLCD 2006 data set, as adjusted for this project. A full description of the implementation of this data as the land use base for the SRA can be found on page 2 of this report. [Public data]
2. *USGS Federal Lands* – This map layer consists of federally owned or administered lands of the United States, Puerto Rico, and the U.S. Virgin Islands. Only areas of 640 acres or more are included. There may be private holdings within the boundaries of Federal lands in this map layer. This is a revised version of the January 2005 map layer. This layer was used to remove federal public lands from the NLCD 2006 data. [Public data]
3. *Indiana DNR Managed Lands* – Managed land areas in Indiana as of September, 2010. This layer was used to remove additional public lands from the NLCD 2006 data. [Public data]
4. *Tele Atlas Dynamap Transportation v. 18.3, 2008* – Streets data obtained by USDA NRCS under license from Tele Atlas Dynamap. This layer was used to update the NLCD 2006 data. [Licensed data, not for release]
5. *NRCS SSURGO Data* – The soil survey map units and their attributes were used in numerous analyses within the SRA. The most recent published digital soil surveys for all Indiana counties were downloaded and combined into one statewide feature class (size = 1 GB). Tabular data was then queried from NASIS by an NRCS Soil Scientist and then joined to the spatial data via MUKEY by the GIS Specialist for use in the SRA. Any given analysis typically involved a calculation or query of one or more attributes from the tabular data. [Public data]
6. *NRCS Planned Land Units* – This is an internal data set used by NRCS to track and manage the fields where conservation plans and Farm Bill program practices are located. Fields selected by practices relevant to each resource concern were used in this project to erase areas considered treated for each resource concern. Dates of practices used ranged from January 1, 2000, to April 1, 2011. [Personally Identifiable Information in data, not for release]
7. *Indiana Offsite Risk Index Tool, August 2004* – The Indiana ORI is initially used to evaluate inherent site and soil characteristics for potential N, P and sediment loss based on initial planned crop rotations and associated tillage practices. This document is posted at the NRCS Indiana FOTG under Section II, Water Quality and Quantity Interpretations, Offsite Risk Index (ORI):  
[http://efotg.sc.egov.usda.gov/references/public/IN/590\\_Offsite\\_Risk\\_Index.pdf](http://efotg.sc.egov.usda.gov/references/public/IN/590_Offsite_Risk_Index.pdf)  
 [Public document]
8. *NRCS Karst Region, October 2000* – This is an internal data set developed by the NRCS State Geologist from October, 2000, which estimates the extent of the karst landscape in Indiana. [Internal data, non for release]
9. *Indiana Tillage Transect, 2009* – Indiana report by counties for 2009 Corn Ranked by No-Till Acres  
[http://www.in.gov/isda/files/2009\\_Corn\\_Ranked\\_by\\_No-till\\_Acres.pdf](http://www.in.gov/isda/files/2009_Corn_Ranked_by_No-till_Acres.pdf)
10. *NASS CDL 2010* – This is the crop data layer published annually by NASS. The use in this project was to geolocate estimated extents for a particular crop type, when needed for an analysis. [Public data]
11. *NASS 2007 Census, Livestock by County* – Livestock population data from the 2007 NASS census.
12. *NASS 2007 Census, Large Farms by County* – Query from NASS 2007 for farms of 500 acres and larger in Indiana, tabulated by county.

13. *Indiana Healthy Rivers Initiative Areas* – Extents for Healthy Rivers Initiative project boundary. More information on this project can be found at:  
<http://www.in.gov/dnr/6498.htm>
14. *DNR Pheasant Priority/Quail Priority Areas* – DNR defined priority areas to provide landowners standardized habitat development/management payments and one-time incentive payments for enrolling lands in the Conservation Reserve Program (CRP) and for voluntarily enrolling existing CRP lands into Mid-Contract Management activities designed to increase habitat quality for pheasants and quail.
15. *DNR DOF 2010 Assessment* – This is the 2010 Indiana Statewide Forestry Assessment from the DNR. A number of data sets were obtained through DNR to utilize in the 2011 SRA project, including:
  - a. *Ruffed Grouse Distribution (p. 72)* – This map was geo-referenced and heads-up digitized for generally estimated critical habitat extent of ruffed grouse in this project. Critically imperiled, imperiled, and vulnerable categories were used.
  - b. *Potential to Prevent Invasive Species (p. 36)* – Data projecting invasive species risk based on statewide survey locations of known invasives, forest corridor dispersal and overlapping high forest and high home density areas.
  - c. *Composite Forest Priority Areas (p. 56)* – This data combined the individual composite issue maps throughout the DNR forestry assessment report to generally score all areas for importance of identified forest stakeholder issues.
  - d. *Emerald Ash Borer, Gypsy Moth, and Kudzu Locations (p. 33)* – Data from this map and analysis was used to pinpoint recorded locations and estimated extents for Emerald Ash Borer and Kudzu in the state. Gypsy Moth extent was not examined in the SRA.
16. *NRCS HFRP Copperbelly Area (St Joseph [Erie] Sub-Basin)* – 8-digit watershed based on the habitat range of existing and historical Copperbelly Watersnake populations in Indiana.
17. *IDNR Heritage Data for Select Aquatics (buffered)* – Data managed by IDNR for monitoring threatened and endangered species and utilized under agreement by NRCS for determining potential impacts to species in the course of NRCS field activities; August, 2010, version. The data used in this project was for a subset of aquatic species and that selection was buffered by a 0.5 mile radius. [Licensed data, not for release]
18. *IDEM CFO, 2010* – This data is point data that contains confined feeding operation facility locations in Indiana, provided by personnel of Indiana Department of Environmental Management, Office of Land Quality, updated as of April, 2010. [Public data]
19. *USGS NHD, High Resolution* – The national hydrography dataset. Water features from the high resolution version of the NHD were used in this project to buffer distance to water and those buffers were subsequently used in certain analyses.

Version History:

*0.50* – Imported initial report's text and modified for final version

*0.95* – Added report page for all resource concerns analyzed, with inset maps

*0.96* – Added *Input Data Sets* to all resource concerns and a glossary further describe each input data set

*1.0* – Assembled full report and transferred to PDF format; created sub-reports by land use and resource concern

*1.01* – Added map for original NLCD 2006 classification and map for NLCD 2006 reclassification for the SRA project; corrected minor typos in the introduction section.