

County Zoning Ordinances for Commercial Solar Compared to Indiana's Solar Energy Ready Community Standards

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The Indiana General Assembly passed Senate Bill 411 in the spring of 2022, creating voluntary commercial solar regulation standards. Communities that adopt these voluntary standards or have less restrictive standards regulating commercial solar development can qualify as a solar energy ready community. The legislation lays out nine categories of standards, including

- setbacks, height, and buffers
- ground cover
- fencing
- underground cables and aboveground infrastructure
- glare minimization
- signal interference
- sound level limitations
- drainage repair
- decommissioning, abandonment, and "force majeure event"

Scope of this study

This study compares Indiana counties' current zoning ordinances to the voluntary standards for commercial solar development outlined in SB 411 and enacted in Indiana Code 8-1-42. The study is limited to use standards or overlay district standards specific to commercial solar within the zoning ordinance governing the county's unincorporated area. It does not look extensively at the permitting process, such as whether commercial solar is a permitted use or special exception and in what districts, whether an amendment to the zoning map would be required, or permit fees. Because each county could permit commercial solar projects in many districts, the study also does not consider the zoning district standards which apply to all developments within a district. Finally, this report is not a definitive answer as to whether a county's regulations meet the requirements of this legislation to be considered a solar energy ready community. It should be used for informational purposes only. The information is not intended to provide specific recommendations for policies or decisions.

IC 8-1-42-9 from this legislation reads

Sec. 9. (a) A permit authority for a unit described in section 1(a) of this chapter is responsible for enforcing compliance with any standards set forth in sections 10 through 16 of this chapter that apply in the unit under section 1(a) of this chapter.

(b) A unit may:

(1) adopt and enforce a commercial solar regulation that includes standards that:

(A) concern the permitting, construction, installation, siting, modification, operation, or decommissioning of CSE systems in the unit; and

(B) are less restrictive than the standards set forth in this chapter;

(2) waive or make less restrictive any standard set forth in this chapter with respect to any particular:

(A) CSE system; or

(B) project to install one (1) or more CSE systems in the unit; or

(3) waive or make less restrictive any standard that is not set forth in this chapter but that is included in a commercial solar regulation adopted by the unit with respect to any particular:

(A) CSE system; or

(B) project to install one (1) or more CSE systems in the unit.

(c) This chapter does not affect a unit's planning and zoning powers under [IC 36-7](#) with respect to the permitting, construction, installation, or siting of one (1) or more CSE systems in the unit.

For this study, section 9 is interpreted as precluding any county with a standard more stringent than those listed in sections 10-20 or any additional standard required for commercial solar development but not included in sections 10-20 from being considered a solar energy ready community. Some additional standards may be regarded as industry standards or requirements replicated from other agencies, which developers or communities may not interpret as more restrictive. This study highlights some of these nuances and provides an opportunity for discussion among policymakers, planners, land use attorneys, and commercial solar developers.

Methodology

Data from the Indiana Renewable Energy Community Planning Survey and Ordinance Inventory Summary (Ogle & Salazar, 2021) and updated ordinances collected from county planning offices were evaluated using the categories from the legislation. The study did not focus on collecting ordinances, but updated ordinances were incorporated if the researcher was aware of revisions from news articles or colleagues. The analysis does not include counties without planning and zoning or zoning standards specific to commercial solar development. Fifty-four counties in Indiana have land use regulations specific to commercial solar projects. The ordinances of these counties were then analyzed to ascertain whether they met the standards in the nine categories from the legislation: setbacks, height, and buffers; ground cover; fencing; underground cables and aboveground infrastructure; glare minimization; signal interference; sound level limitations; drainage repair; and decommissioning, abandonment, and "force majeure event." Two additional categories were added to indicate whether the ordinance had setbacks from additional uses and any other additional use standards or requirements. Finally, a score of zero through eleven was assigned to each county based on the number of categories where their standards met or were less restrictive than the standards in the legislation.

Findings

The study found 54 counties with commercial solar energy defined as a use in their zoning ordinance. None of the counties meet all 11 categories from IC 8-1-42 and this study. Ripley County meets ten categories with no commercial solar use standards except for requiring the project to be certified by an

engineer. This is likely an industry standard or required by other agencies. Still, because it is in addition to the standards listed in the IC 8-1-42, it was considered not to meet the criteria of no additional standards or requirements. Putnam County also met ten of the eleven categories. They adopted much of the language from IC 8-1-42 in 2022 but also included standards for warning signage, a safety and security plan, certification by an engineer, and may consider mitigation for using prime soil. Figure 1. shows how many categories each county met. Appendix A has a detailed table of the categories met by each county. The following sections will highlight some conflicts between current ordinances and the standards in the legislation for each category.

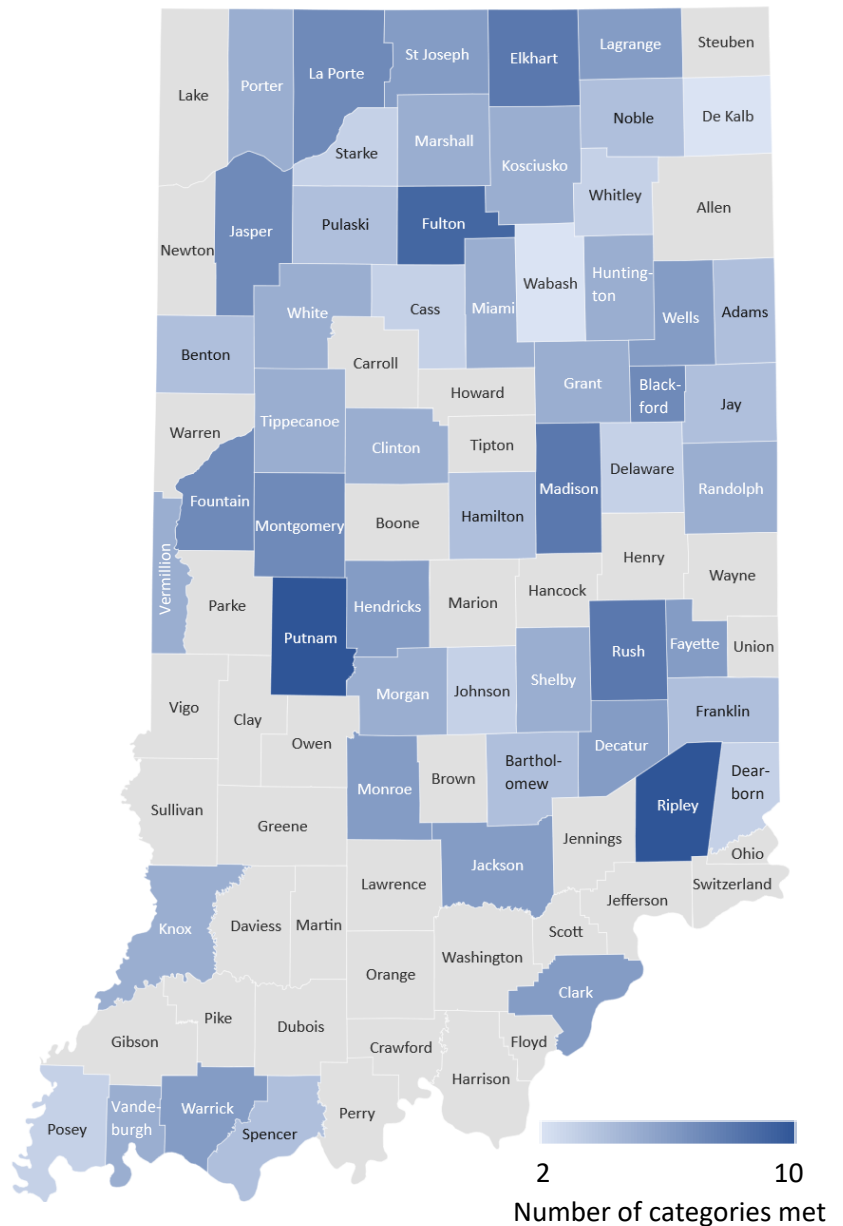
Setbacks and Height Restrictions

IC 8-1-42-10 sets standards for solar panel setbacks and height. Counties can require solar panels to adhere to the following setbacks summarized from the legislation:

- 40 ft from the nearest edge of the right-of-way of a federal, state, or county highway
- 30 ft from the nearest edge of the right-of-way from a collector road
- 10 ft from the nearest edge of the right-of-way from a local road
- 50 ft from a nonparticipating property line
- 250 ft from a nonparticipating dwelling unless a landscape buffer is installed

The landscaped buffer is only required if the solar panels are less than 250 ft from a dwelling on a nonparticipating property. The buffer cannot be located on nonparticipating property, and the county can require a plan to be submitted. The legislation does not present the reduced setback as an option for counties to adopt but rather as a required standard that a county must meet or be less restrictive.

Figure 1. Number of categories in IC 8-1-42 analysis met by counties' commercial solar zoning ordinance



For this study, if the county included a setback from a nonparticipating dwelling without the landscape buffer language, it is considered more restrictive than IC 8-1-42-10.

This section also states that the setback from a nonparticipating dwelling or property line may be waived by the affected owner. The study interpreted this as an option for counties because the term "may" instead of "shall" is used. Counties without these waivers were not excluded from being considered as meeting section 10 of the legislation. Sometimes the setbacks from a property line or dwelling include all property lines or dwellings with a waiver option for all or participating owners. These ordinances were also not excluded from being considered as meeting this category.

Additionally, section 10 requires the maximum height restriction for solar panels to be no less than 25 ft. It also does not allow a county to regulate the ground clearance or distance between the ground and the bottom of the panel.

The study found six counties that meet or are less restrictive than these standards. Five counties do not have use-specific setbacks or height restrictions for commercial solar; Putnam County has adopted the setbacks and height restriction from the legislation. Jasper County also meets the setbacks and height restrictions but does not allow for an exemption from the setback for a dwelling if a landscaped buffer is used. It is critical to note that four of these counties specifically state commercial solar projects must follow the zoning district's setbacks or height restrictions. This is generally true of all uses, whether expressly stated or not unless an exemption is listed for that use from zoning district standards. For commercial solar, this could cause a particular issue with the setback from roads. IC 8-1-42-10 states that the solar panels cannot be required to be setback more than 10 feet from the right-of-way of a local road or street. Many zoning districts likely have a more significant front yard setback than 10 ft. Considering fencing around solar panels would need to be far enough from the panel to provide access and avoid electrification that could place the fence on or nearly on the edge of the right-of-way. If taking into account zoning district standards, it may be possible that no counties meet the setbacks from roads listed in the legislation.

Twenty-seven counties had a more restrictive maximum height standard. These ranged from 12 to 22.5 ft. IC 8-1-42-10 also prohibits setting a minimum ground clearance. Two counties (Tippecanoe and Whitley counties) require 36 inches from the ground to the panel. Marshall County recommends this but does not require it.

Additional Setbacks

The study provided a separate category for setbacks from additional uses. If the ordinance requires a setback from any use, zoning district, or right-of-way not listed in section 10, it did not meet this category. Thirty-two counties include a setback from a use not listed in section 10. Table 1 shows some common use categories for these

Table 1. Common setbacks from uses not listed in IC 8-1-42-10

	No. of Counties
Drainage ditch, tile, stormwater conveyance	11
Public or institutional use, including schools and religious institutions	9
Public recreational area	5
Participating residence	5
Residential district	5
All principal structures	4
Municipality	4

additional setbacks. The specific use buffered varies. For example, if a county names a setback from schools, it is included in the public or institutional use category in Table 1.

Ground Cover

IC 8-1-42-11 sets a standard for the ground cover around and under the solar panels and in buffer areas. Counties may require a perennial vegetated ground cover. Pollinator-friendly seed mixes can be encouraged. The county can require a vegetation plan with the following specifications:

- (1) is compatible with each CSE system on the project site;*
- (2) provides for the planting of noninvasive species and the use of native or naturalized species if the planting and use of noninvasive and native or naturalized species are:
 - (A) appropriate to the region;*
 - (B) economically feasible; and*
 - (C) agreed to by the landowner;*in order to reduce storm water runoff and erosion at the site and to provide habitat for wildlife and insects; and*
- (3) provides for site preparation and maintenance practices designed to control invasive species and noxious weeds (as defined in IC 15-16-7-2).*

The study considered an ordinance not to meet this category if it required native or naturalized species without the exceptions listed in the legislation. The study did not exclude counties that prohibit invasive species from being planted as part of the plan without these exceptions because it is not legal to transport or introduce these plants under Indiana's Terrestrial Plant Rule (312 IAC 18-3-25).

Twenty-nine counties meet the ground cover category, with 18 not including ground cover standards in their ordinance. Eighteen counties require pollinator-friendly ground cover, and sixteen require native or naturalized species without the exceptions listed in the legislation. Some counties specify that ground cover should include grasses and forbs or a diverse mix of species. Also, several counties prohibit the use of insecticides except in specific areas. The study did not preclude these counties from meeting this category.

Fencing

IC 8-1-42-12 allows counties to require a commercial solar energy system to be enclosed with a fence at least 6 ft tall. The study found 22 counties met this category, with seven of those counties having no requirements for fencing specific to commercial solar. Thirty-two of these counties have standards the study considered more restrictive. Some had a higher minimum height, such as 7 to 8 ft. Others placed a maximum height on fencing. For example, Benton County requires the fence to be between 5.5 and 6 ft, potentially preventing the project owner from putting in a fence high enough for their purposes. Another issue that arose when looking at fencing standards was materials. Many of the ordinances excluded the use of barbed wire or razor wire. Others required a specific type of fence.

Cabling

IC 8-1-42-13 allows counties to set a standard for cables and lines the same or less restrictive than the standard listed below,

Sec 13. [...] all cables of up to thirty-four and one-half (34.5) kilovolts that are located between inverter locations and project substations shall be located and maintained underground, as feasible. Other solar infrastructure, such as module-to-module collection cables, transmission lines, substations, junction boxes, and other typical aboveground infrastructure may be located and maintained above ground. Buried cables shall be at a depth of at least thirty-six (36) inches below grade or, if necessitated by onsite conditions, at a greater depth. Cables and lines located outside of the CSE system project site may:

(1) be located above ground; or

(2) in the case of cables or lines of up to thirty-four and one-half (34.5) kilovolts, be buried underground at:

(A) a depth of at least forty-eight (48) inches below grade, so as to not interfere with drainage tile or ditch repairs; or

(B) another depth, as necessitated by conditions;

as determined in consultation with the landowner.

Putnam county is the only county that uses the exact language from the legislation. Because no other counties quantify the cable voltage in their standards, the research looked for ordinances that only require cabling to be underground from inverters to project substations at a depth of at least 36 inches or similar language. Some counties may use language that could be interpreted differently by someone with expertise in electrical engineering or solar development. Regardless, changing this category's score of any particular county would not affect whether a county meets the standards in the legislation since every county had at least one other category they did not meet.

Twenty-four of the 54 counties meet the standards for cabling, including eleven with no cabling standards. The other 30 counties required at least some components to be underground besides those allowed by section 13.

Glare

IC 8-1-42-14 allows a county to include regulations that require a commercial solar project to "be designed and constructed to (1) minimize glare on adjacent properties and roadways; and (2) not interfere with vehicular traffic, including air traffic." The language in both the legislation and the ordinances is broad. The study looked for more restrictive language like "eliminate" or "at no time shall create." Counties that use less absolute language, such as "minimize" or "constructed to prevent," were deemed to meet this category. Eleven counties require a glare analysis, especially if the project will be close to an airport. This was not considered more restrictive as it may be necessary to "minimize" glare and ensure it doesn't interfere with traffic. Forty-seven counties meet or are less stringent than those listed in this section, with 26 counties not including standards for glare.

Signal Interference

IC 8-1-42-15 allows a county to set interference standards to minimize or mitigate impacts on various radar and communication signals. Twenty-two of the 44 counties include language about interference. Like the glare standard, the language in both the legislation and the ordinance is broad. The study categorized ordinances that use wording such as "constructed, so it does not interfere" and "shall not be installed where it would cause interference" as more restrictive than "minimized or mitigated." Fifteen counties used language that was considered more restrictive. The study did not consider requiring a communications study as being more restrictive as it can demonstrate compliance with the standard.

Sound level Limit

IC 8-1-42-16 sets the following maximum for noise limiting standards:

"a project owner may not install or locate a CSE system in a unit unless the project owner demonstrates to the permit authority that the CSE system will operate in a manner such that the sound attributable to the CSE system will not exceed an hourly average sound level of fifty (50) A-weighted decibels, as modeled at the outer wall of a dwelling located on an adjacent nonparticipating property."

Several components are necessary for a county ordinance to align with this section. The study looked at the actual sound limit, where and how sound is measured, and if any other uses were included. Thirty-one counties met all of these components, with 28 of those counties not requiring sound level limitation standards. Most counties do not use an hourly average, and many limit noise at the property line. Some counties use an unweighted decibel scale, making it more difficult to ascertain whether they are more or less restrictive than 50 dBA. Eighteen counties include another use in the limit besides nonparticipating dwellings.

This section also allows counties to offer a waiver of this standard with written consent from each adjacent nonparticipating property owner. This study did not consider the absence of a waiver as being more restrictive. It also does not treat the requirement of a sound study as more stringent, as this would likely be the tool used to demonstrate sound levels of the commercial solar project.

Drainage Repair

IC 8-1-42-17 is applicable for commercial solar projects installed after June 30, 2022. It provides that a county can require a project owner to repair or remedy any damage to drainage infrastructure from construction, installation, or maintenance. All 54 counties meet this section. Thirty-eight require a drainage plan or agreement, and 26 have language about drainage repair in their ordinance.

Decommissioning, Abandonment, and "Force Majeure Event"

Sections 18 through 20 of IC 8-1-42 provide default standards for decommissioning and site restoration, including situations of abandonment and a "force majeure event." The study looked at the following aspects of decommissioning checking to make sure ordinances were no more restrictive than

- Requiring a decommissioning plan
- Requiring a surety bond or equivalent
 - at 100% of decommissioning costs net estimated salvage value
 - allowed to be posted in increments per section 18
- Site restoration of at least 36" below grade
- Written notice from the project owner to the county of intent to decommission no later than 60 days before commencing
- Defining abandonment as 18 consecutive months or 540 days of not generating electricity
- Decommissioning must be completed within one year

The legislation also defines a "force majeure event" (IC 8-1-42-20) and provides a timeline and process for repairing and resuming operation. This study did not consider the lack of this language in the ordinance to indicate it was more restrictive. While this section provided leniency for demonstrating reasonable effort towards resuming operations, the timeline for both notification and abandonment in a "force majeure event" is more restrictive than the general abandonment defined in section 19.

These three sections are very detailed, and additional language in a county's ordinance may conflict with these sections. The study found ten counties that meet sections 18 through 20. Three counties do not require a decommissioning plan or standards regulating decommissioning of commercial solar projects. Five counties require a decommissioning plan but do not mention a surety bond or define any specific decommissioning requirements. Elkhart County states that a decommissioning plan may be required, and Putnam County adopted the language from sections 18-20 in its ordinance.

Forty-four counties were deemed more restrictive in their decommissioning and abandonment standards. Thirty-eight counties required a more stringent surety bond or financial equivalent requirement. Some of these counties required a bond over 100% of the cost to cover incidentals. Some did not take into account salvage value. All 38 counties did not provide for the bond to be posted in the increments outlined in section 18.

Seventeen counties require the site to be restored to a depth greater than 36 inches. Depths range from 48 to 72 inches, with the majority (11 counties) requiring site restoration to 48 inches. Most counties with a decommissioning plan do not require notice to be given to the county before discontinuation. All of the counties met the standard of "not later than 60 days before" or were less restrictive.

The legislation defined abandonment as 18 consecutive months of not producing electricity, with the date of abandonment 540 days after the last day of generating electricity. Only two counties (Putnam and Whitley) use this definition. Of the other 36 counties that define abandonment, 27 use one year, 12 months, or 365 days and nine use six months or 180 days. Most counties provide at least one year for removal. Eight counties require decommissioning to be completed in less than a year.

Other Additional Standards and Requirements

Elkhart County is the only county that does not require additional standards or plans for commercial solar projects. However, their ordinance states that they may require maintenance, emergency, and

road impact plans. The other fifty-three counties require additional standards, plans, or requirements beyond what is listed in sections 10-20 of IC 8-1-42. These counties were considered more restrictive than the legislation's definition of a solar energy ready community. Table 2 lists common additional

Table 2 Common additional standards or requirements

	No. of Counties
<i>Standards</i>	
Warning signs	37
Landscaped buffer/screening	37
Color/finish	11
Minimum lot size	10
<i>Other requirements</i>	
Transportation/road use plan or agreement	38
Proof of liability insurance	26
Emergency/safety plan	25
Certificate of design compliance or certified by an engineer	24
Maintenance plan	23
Economic development agreement	21

standards and requirements. Landscaped buffers and screen standards are included as additional standards if the requirements are beyond what is listed in IC 8-1-42-10. Some additional requirements might not be considered more restrictive by project owners as they may currently be required by other governmental agencies or utility companies or are industry standards. Other less common additional standards include construction standards such as dust control and waste management, top soil preservation, and design standards for driveways and emergency access. Economic development agreements, erosion control plans,

landscape/screening plans, property value guarantees, environmental analysis, and construction bonds are some less frequently incorporated additional requirements.

Permitting process, zoning districts, and other potential conflicts

This legislation does not limit the process requirements or restrictions of zoning districts in which commercial solar must be permitted to be considered a wind energy ready community. Zoning districts are a primary tool for regulating the siting of any use. Additionally, the board of zoning appeals may apply additional standards or restrictions for a project during the special exception process for counties that permit commercial by special exception. This tool allows communities the flexibility to work with project owners and neighbors for specific projects or locations. The trade-off is that it can make it more difficult for community members and project owners to understand the requirements of developing commercial solar from the onset.

A final consideration is whether the ordinance exempts commercial solar from specific district standards that would create a conflict, such as impervious lot coverage. While this exemption could be listed elsewhere in the zoning ordinance, this study found 13 counties that specified in their use standards for commercial solar that it is exempt from the district's impervious lot coverage standards. Some qualified this exemption with a requirement for vegetated ground cover under the panel. On the other hand, while meeting many of the categories in this study, Fulton County states that a commercial project cannot exceed impervious lot standards. There could be district standards like this that are

unduly restrictive for commercial solar as a use or, while not overly strict, conflict with the use standards in IC 8-1-42.

Because commercial solar may be permitted in several districts with varying district standards and a different permitting process (i.e., permitted use, special exception) may apply in various districts, it can be challenging to gather and synthesize all of these requirements across the state. Therefore, it may be more pertinent to focus on how greenfield commercial solar is regulated in a specific type of zoning district where projects are most likely to be located.

Additionally, this study did not look at definitions in each county's ordinance. Definitions for nonparticipating land owners or dwellings may differ from the legislation, potentially changing the number of categories met for some counties.

Conclusion

Because of the specificity of language in IC 8-1-42 and the variance of local ordinances' standards and how they are organized and enforced, it is complicated to ascertain which counties' pre-existing ordinances meet the definition of a solar energy ready community. This study finds that counties that don't have any additional use standards or adopt the language directly from the legislation are the most likely to meet standards outlined in IC 8-1-42. There are likely other counties that have worked or are currently working with commercial solar developers with more restrictive or additional standards than those in the legislation.

For additional information on renewable energy ordinances in Indiana, including land use definitions, see Indiana Renewable Energy Community Planning Survey and Ordinance Inventory Summary at www.cdext.purdue.edu/land-use.

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Appendix A. Categories met for each county

	Setbacks & Height	Ground cover	Fencing	Cabling	Glare minimization	Signal interference	Sound level limit	Drainage repair	Decommissioning	No add'l setbacks	No add'l standards or plans	Number of categories met
Adams												4
Bartholomew												4
Benton												4
Blackford												7
Cass												3
Clark												6
Clinton												5
Dearborn												3
Decatur												6
DeKalb												2
Delaware												3
Elkhart												8
Fayette												6
Fountain												7
Franklin												4
Fulton												9
Grant												5
Hamilton												4
Hendricks												6
Huntington												5
Jackson												7
Jasper												6
Jay												4
Johnson												3

	Setbacks & Height	Ground cover	Fencing	Cabing	Glare minimization	Signal interference	Sound level limit	Drainage repair	Decommissioning	No add'l setbacks	No add'l standards or plans	Number of categories met
Knox												5
Kosciusko												5
LaGrange												6
LaPorte												7
Madison												8
Marshall												5
Miami												5
Monroe												6
Montgomery												7
Morgan												5
Noble												4
Porter												5
Posey												3
Pulaski												4
Putnam												10
Randolph												5
Ripley												10
Rush												8
St. Joseph												6
Shelby												5
Spencer												4
Starke												3
Tippecanoe												5
Vanderburgh												5
Vermillion												5
Wabash												2
Warrick												6
Wells												6
White												5
Whitley												3