



MORE THAN 11,000 WASTEWATER FAILURES REPORTED IN INDIANA'S UNSEWERED COMMUNITIES

*Financial Needs for Water and Wastewater Infrastructure in Indiana (2015–2034)*¹ identified septic system remediation as one of five categories of capital water infrastructure needs. Unsewered communities are concentrations of residences and businesses with septic systems—and sometimes with incomplete wastewater systems. When a substantial number of failures occur, these areas often need collective infrastructure solutions such as sewers.

The 2016–17 Indiana Survey of Unsewered Communities was a collaborative effort of the Indiana Rural Community Assistance Program (RCAP) and the Indiana Advisory Commission on Intergovernmental Relations designed to provide information about these communities to policymakers. Preliminary findings were presented to the Indiana Water Infrastructure Task Force in fall 2018.

The survey was administered to county health department officials between August 2016 and March 2017. Unsewered communities were defined formally as contiguous geographical areas containing at least 25 homes and/or businesses that are not served by sewers. The survey included information about community location, size, site conditions, drinking water supply, wastewater disposal, the extent of wastewater failure, actions taken to address problems, and barriers to finding solutions. Eighty-eight counties provided responses; all but one county indicated having at least one unsewered community.²

UNSEWERED COMMUNITIES

Among the 88 counties that responded, local health department officials identified 444 unsewered communities containing 58,782 residences and 2,091 businesses (Table 1).³ Excluding Marion County, the

KEY FINDINGS

The 2016–17 Indiana Survey of Unsewered Communities revealed:

- The state has 444 unsewered communities containing more than 60,000 residential and business structures and located primarily in unincorporated areas and small towns.
- Almost 200 of these communities have 25 percent or more failing wastewater treatment systems and collectively at least 11,000 individual failing wastewater systems.
- Communities with substantial failures face a variety of site challenges that limit the installation of replacement septic systems—small lot sizes, poor soils, poor drainage, lack of a subsurface drain outlet, a location near a body of water or in a floodplain, seasonal malfunctions, and well locations.
- These communities also face challenges that affect the economics of installing sewers or community solutions—low resident incomes, small community size, long distance from a wastewater treatment plant, and lack of funding
- Resident and local official support are critical to implementing collective solutions.
- Many of these communities will need technical and financial assistance to navigate successfully the process from problem identification to infrastructure installation and financing.

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TABLE 1. Unsewered communities by county

County	Unsewered communities	Residences	Businesses	County	Unsewered communities	Residences	Businesses
Statewide	444	58,782	2,091	Lawrence	9	608	44
Adams	2	300	10	Madison	3	250	5
Allen	2	105	7	Marion	1	17,000	1,000
Bartholomew	4	241	0	Marshall	5	160	0
Benton	4	320	8	Martin	5	110	0
Blackford	2	39	0	Miami	11	683	13
Boone	8	216	24	Monroe	2	90	7
Brown	11	1,563	7	Montgomery	10	1,055	13
Carroll	1	NR	NR	Morgan	7	1,750	17
Cass	6	359	35	Newton	6	5,000	49
Clark	3	249	7	Noble	12	1,121	35
Clay	2	160	6	Ohio	2	57	2
Clinton	11	626	38	Orange	1	150	1
Crawford	4	272	7	Owen	9	1,419	24
Daviess	NR	NR	NR	Parke	1	0	7
Dearborn	1	25	2	Perry	1	40	4
Decatur	1	35	1	Pike	7	115	12
DeKalb	2	105	1	Porter	20	2,230	104
Delaware	10	620	9	Posey	6	425	11
Dubois	1	132	16	Pulaski	2	200	3
Elkhart	2	75	9	Putnam	1	NR	NR
Fayette	18	747	9	Randolph	2	0	8
Floyd	10	485	20	Ripley	1	100	4
Fountain	7	294	0	Rush	NR	NR	NR
Franklin	3	75	6	Scott	2	70	2
Fulton	NR	NR	NR	Shelby	1	1,000	10
Gibson	9	916	16	Spencer	1	250	10
Grant	10	718	14	St. Joseph	6	2,600	66
Greene	7	608	25	Starke	1	175	5
Hamilton	1	25	0	Steuben	14	1,033	3
Hancock	6	570	14	Sullivan	8	530	14
Harrison	1	100	0	Switzerland	4	395	3
Hendricks	13	1,253	12	Tippecanoe	5	387	18
Henry	7	505	3	Tipton	1	NR	NR
Howard	1	50	2	Union	10	193	2
Huntington	4	111	6	Vanderburgh	1	50	0
Jackson	1	166	13	Vermillion	NR	NR	NR
Jasper	1	75	0	Vigo	NR	NR	NR
Jay	1	40	0	Wabash	3	85	0
Jefferson	4	155	9	Warren	7	295	7
Jennings	19	960	28	Warrick	1	NR	NR
Johnson	5	380	17	Washington	1	96	10
Knox	7	497	13	Wayne	10	787	51
Kosciusko	1	150	5	Wells	0	NR	NR
LaPorte	4	2,172	17	White	NR	NR	NR
LaGrange	5	625	68	Whitley	14	558	18
Lake	8	596	25				

average number of structures per unsewered community is 97. Eighty-five percent of unsewered communities are located in unincorporated areas. The remainder are within cities and towns or have a combination of incorporated and unincorporated land.⁴ About two-fifths of these unsewered communities are organized as subdivisions.

UNSEWERED COMMUNITIES EXPERIENCING WASTEWATER FAILURE

Officials identified 192 unsewered communities in which at least 25 percent of the individual wastewater treatment systems were failing. These communities contain 23,260 residential and business structures, with at least 11,066 having failing wastewater systems. These numbers likely are conservative because responses about failures were not available for all unsewered communities.

Eighty-seven percent of these communities have structures built predominantly prior to 1976 and before the adoption of state septic system regulations. These structures, unless updated, often do not have the elements necessary to provide adequate treatment. For example, these structures may have a tank, but not a leach field that delivers the liquid waste to a soil bed where microbes digest the contaminants. Instead, these systems may drain directly to a drainage tile, ditch, or stream.

The methods of wastewater disposal in these communities vary. Almost two-thirds have failing on-site systems. More than half have drains directly from structures to ditches, streams, or tiles, while one-fifth utilize town drains for disposal. A few communities have failing shared or community decentralized systems. In some cases, communities have multiple methods of disposal (Figure 2).

FIGURE 1. Estimated number of failing wastewater systems in unsewered communities with 25 percent or more wastewater failures by county

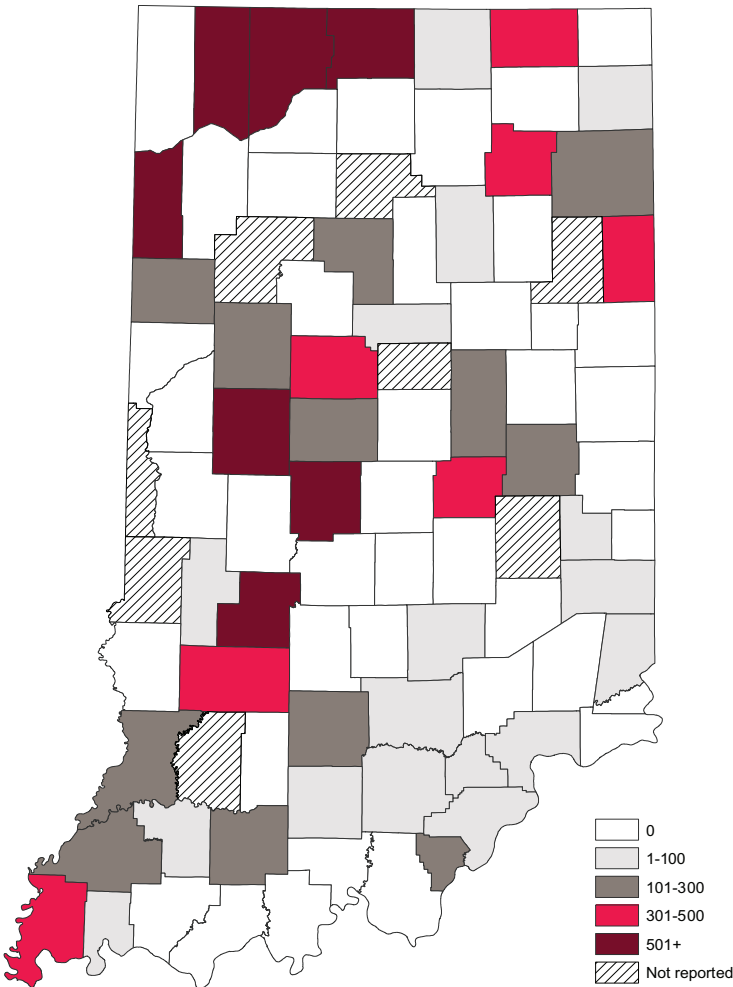
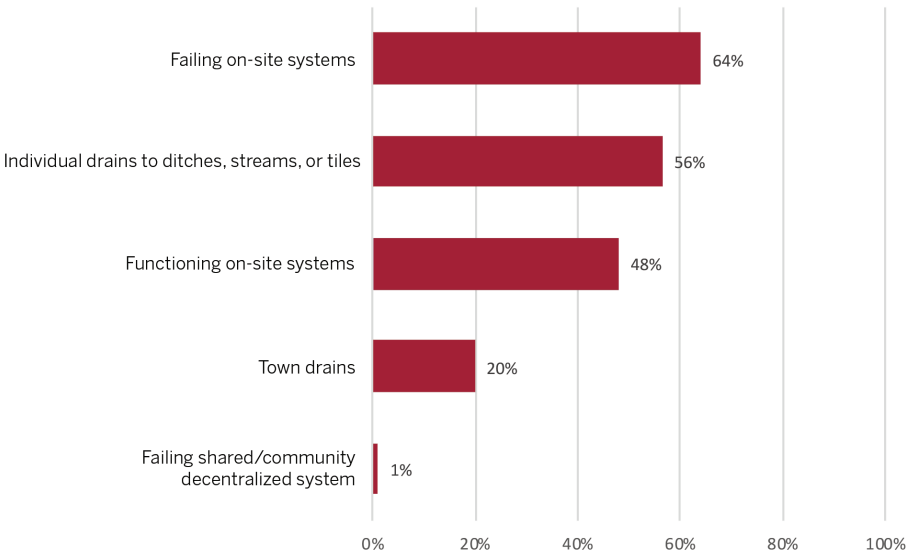


FIGURE 2. Methods of disposal in unsewered communities with 25 percent or more wastewater failure (N=186)*



*Some communities have multiple methods of disposal.

Two-thirds of these communities also have individual drinking water wells. Failing wastewater systems can pose a risk of contamination to nearby wells.

Actions to address wastewater failures

Health department officials reported a number of actions taken to address the wastewater failures in these communities. When wastewater issues are identified, health departments investigate to document the problem. About one-third of these communities were investigated using dye tests to identify wastewater discharges and surface water tests to identify coliform. In some cases, drinking water wells also were tested for contamination. In almost half of these communities, the investigations resulted in enforcement actions.

Officials indicated working with individual homeowners to solve these problems in 83 percent of communities. When problems were more widespread, they sometimes hosted community meetings and meetings with local elected and agency leaders to educate these stakeholders about the problems and to consider community-level solutions.

In a few cases, respondents indicated that communities received assistance from the RCAP. Responses suggest that about 1 in 10 communities had progressed to beginning or completing engineering studies, and a few communities had begun repairs (Figure 3).

SOLUTIONS AND BARRIERS

Solutions vary based on the specific circumstances in each community. The success of one of these community solutions rests on a variety of factors, which include the feasibility of installation, the cost, and the affordability for

residents and businesses. In some cases, the most cost-effective solution is to replace the individual failing septic systems. In cases when the obstacles to replacing septic systems are too great, communities must rely on the installation of cluster systems or sewers.

Officials identified a variety of challenges that unsewered communities with wastewater failure face when considering solutions. These barriers fall into three general categories: site-specific issues, project economics, and project support. Site issues include small lot sizes, poor soils, challenges identifying the exact problem, inadequate site drainage, location in floodplains, and well locations. Project economics include low resident incomes, small community size, long distances from the nearest wastewater treatment facility, and a lack of funding. Project support includes both community apathy and a lack of support from local officials and agencies (Figure 4). Each of the challenges is described in more detail below.

Site-specific issues

Small lot sizes: Public health officials identified lot sizes as a barrier to solving wastewater problems for more than three-quarters of unsewered communities with significant failures. Almost all these communities predominantly have lots that are less than 1 acre, and in most cases less than a half-acre. While replacement septic systems often are the preferred solution to failure, small lots typically do not have enough land area to install a second septic system in undisturbed soil. Similarly, these small-lot communities sometimes also do not have enough nearby land available to install a cluster system, thereby requiring the connection to a sewer system (Figure 4).

FIGURE 3. Action taken to address failures in unsewered communities (N=190)

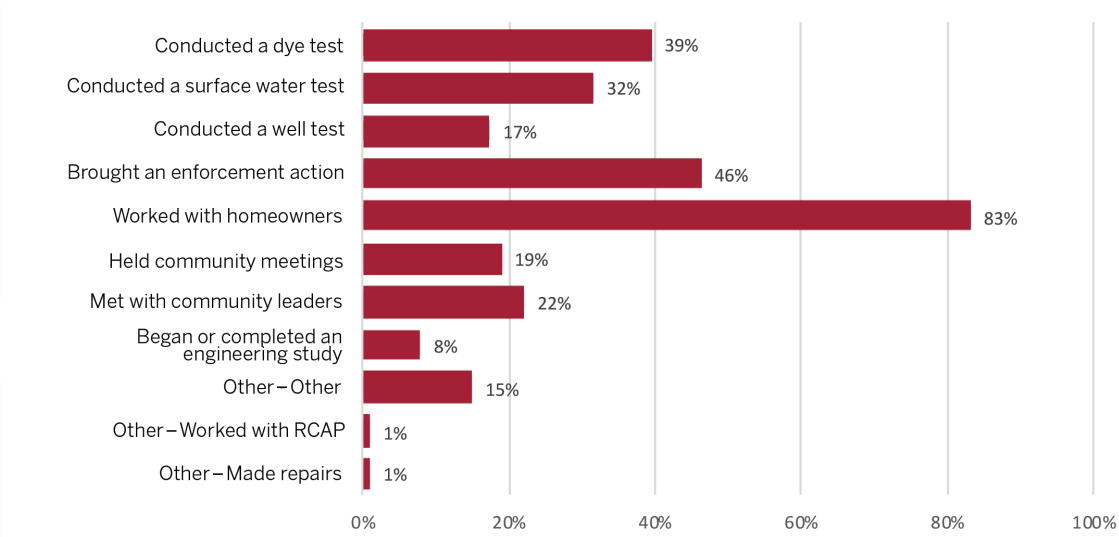


FIGURE 4. Community challenges to solving wastewater treatment failures—small lot sizes (N=192)

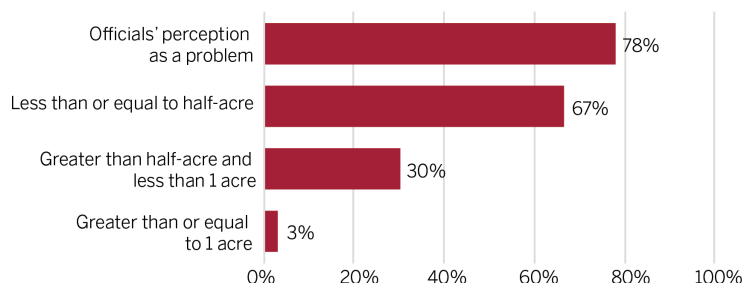
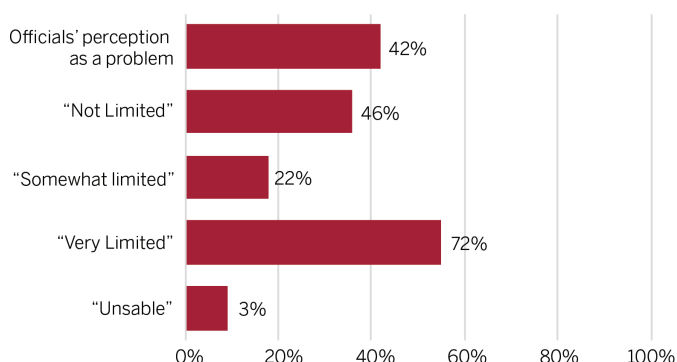


FIGURE 5. Community challenges to solving wastewater treatment failures—poor soils (N=192,150)



*Respondents chose up to two soils per community.

Poor soils: Officials identified poor soils as a barrier in 42 percent of these communities. Almost three-quarters of these communities have predominant soils that are "very limited" or "unusable" for traditional septic systems.⁵ A few officials identified slopes, a consideration in rating soils, as a barrier. Traditional septic systems—whether initial or replacement systems—installed in these areas have a high likelihood of failure. Other system designs may work in these areas but are typically more expensive (Figure 5).

Other site-specific barriers: Officials identified a number of barriers affecting at least 1 percent of these unsewered communities. Occasionally, health departments struggle to identify the exact nature of the wastewater problem. Additional barriers limit the ability to solve wastewater issues by replacing individual septic systems, such as poor drainage, lack of a subsurface drain outlet, a location near a body of water or in a floodplain, seasonal malfunctions, and well locations.

Project economics

Low resident incomes: Officials pinpointed income level as the biggest challenge (82 percent) to solving wastewater

FIGURE 6. Community challenges to solving wastewater treatment failures—low resident incomes (N=192,134)

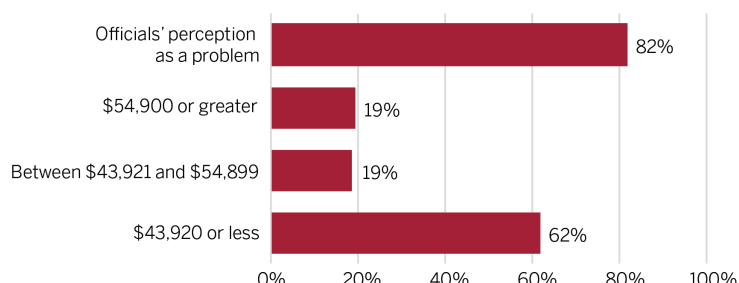
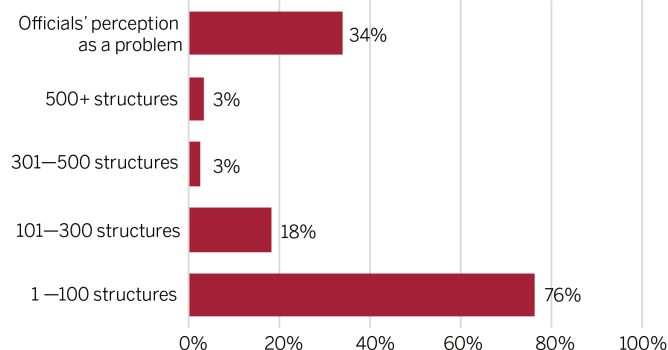


FIGURE 7. Community challenges to solving wastewater failures—small community size (N=192,188)



failures in unsewered communities. Respondents reported that 62 percent of communities have average household incomes of \$43,920 or less⁶, and 19 percent have incomes between \$43,921 and \$54,899. These households are less able to afford the cost of construction and the operation and maintenance of replacement septic systems, cluster systems, or sewers (Figure 6).

Lack of funding: Officials identified a lack of funding as a barrier to implementing solutions for 70 percent of unsewered communities with significant failures. Only a few sources exist to assist individual owners with repairing or replacing septic systems. Community projects often are funded with a combination of loan financing and grant funds from the Indiana Finance Authority State Revolving Fund Program, the Office of Community and Rural Affairs Wastewater and Drinking Water Program, and/or U.S. Department of Agriculture Rural Development Waste and Waste Disposal Loan and Grant Program. Communities must be able to repay project loans. Grant funds are quite limited and in some cases competitive.

Long distance from a wastewater treatment facility:

Officials selected the distance from a wastewater treatment facility as a barrier for 58 percent of these communities. The nearest wastewater facility may be owned by a municipality, a regional sewer district, or a conservancy district. Connecting to a distant system raises the cost to residents and businesses, and in some cases the cost is prohibitive.

Small community size: Officials identified community size as an obstacle to solving wastewater failures in one-third of these unsewered communities. Almost all (97 percent) of unsewered communities with 25 percent or more failures have fewer than 500 structures. Sewers and other solutions can be expensive. When a large cost is borne by a small number of customers, the cost per customer can become unaffordable, particularly for low-income households (Figure 7).

Project support

Community apathy: Officials identified the community's lack of desire for a solution as a barrier for half of these communities. Solving wastewater issues requires the sustained support of the affected residents through what often can be a protracted process. Without it, infrastructure projects often do not move forward.

Lack of support from local officials and agencies:

County health officials selected a lack of support from other local officials and agencies as a barrier in about one-fifth of these communities. The support of local officials is critical to successful problem-solving. Local officials wield significant influence over local opinion; their support or opposition can make or break a project. Local officials also set local budget priorities and allocate local resources. Funding agencies also typically require that a borrower for loan financing or a grant recipient be a local government.

POLICY IMPLICATIONS

The experiences of these communities as revealed in the survey by local health officials suggest the following policy considerations:

- 1. Prudent local septic system policy is the most cost-effective solution to failures.**

The data presented here show the many challenges unsewered communities face in addressing failures. To prevent failures in the future, counties must take these lessons very seriously when establishing the areas in which new septic systems are allowed and when creating specific regulations for system installation and maintenance. On-site waste management districts are a promising tool that ensure systems are monitored regularly and maintained properly.⁷

CASE STUDY: MACY WASTEWATER PROJECT

Macy is a small, incorporated town of approximately 100 homes located in Miami County. More than three-quarters of the population is low-to-moderate income.

Macy consistently appeared in RCAP's Unsewered Communities Database. The town had both on-site septic systems and non-systems discharging to a common drain. Many homes had no recorded septic system on file with the health department. All home sites had individual drinking water wells.

In 2006, construction work damaged a drain tile revealing high levels of E. coli bacteria in local ditches and outfalls. The Miami County Health Department made the town aware of the problem. No official enforcement action was issued because the town took appropriate action to find a solution.

RCAP helped guide the town through the complex process of addressing a wastewater failure. This process included evaluating alternatives, procuring professionals such as engineers and rate consultants, and completing loan and grant applications. Septic system installation and replacement was not a feasible solution due to small lots, slowly permeable soils, poor stormwater drainage, and other common site constraints. Among the identified community-wide alternatives, town officials determined the most cost-effective option was the construction of a collection system connected to the Mud Creek-Nyona Lake Conservancy District treatment plant.

The town received approximately \$2 million in grants and loan financing from USDA Rural Development, including grant funds from the 2009 federal economic stimulus. The grant support was sufficient to keep the monthly user fees reasonable and to help homeowners living in poverty connect to the system.

Construction began in November 2010 and was completed in 2012. Today, Macy remains in compliance with the Clean Water Act.

2. **Communities need continued access to technical assistance.**

The process from problem identification to building community buy-in to project implementation can last several years and be very intimidating for small communities. Organizations such as RCAP provide comprehensive hands-on technical assistance at no cost to communities. On-going financial support for this assistance is critical to solving these public health and environmental problems.

3. **A menu of options is needed to serve the varied circumstances in these communities.**

Many of these communities struggle to find feasible solutions due to community size, distance from other wastewater systems, and other factors. Regionalization and privatization can be solutions under the right circumstances, but not in all cases. Communities also need a variety of additional available technologies that are appropriately sized, environmentally sound, and affordable.

4. **Unsewered community data can be useful for future prioritization.**

In late 2018, the Indiana Water Infrastructure Task Force recommended developing a priority system for funding infrastructure projects.⁸ The Indiana American Council of Engineering Companies/American Water Works Association Risk Consequence Model was presented as an option for prioritization. This model identified failing septic systems as the second-highest investment priority. Regardless of which method is chosen, tracking unsewered communities and the actions to address failing wastewater systems in them over time can be useful to assessing progress.

5. **Additional grant funds are needed to address the problems for communities facing the greatest challenges.**

For many communities, finding solutions requires additional support to make projects feasible and keep utility rates affordable. Currently, limited grant funding is available. Additional federal and state grant funds would allow funders to assist more of the substantially-challenged communities.

Endnotes

¹Palmer, J. & Schmidt, K. (2015). Financial needs for water and wastewater infrastructure in Indiana (2015–2034). Indianapolis, IN; Indiana Advisory Commission on Intergovernmental Relations.

²Complete data were not provided for all communities. Each graphic shows the number of communities for which particular data were available.

³Marion and Putnam counties did not separate septic systems into communities. All septic systems reported within each county are treated as a single community.

⁴Four communities (1 percent) contained both incorporated and unincorporated land.

⁵The USDA Natural Resources Conservation Service (NRCS) maintains state soil surveys (www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=IN). This is a generalized resource. The installation of individual septic systems requires a site specific soil evaluation. Soils are rated as “not limited,” “slightly limited,” “moderately limited,” “very limited,” and “unusable.” “Very limited indicates that the soil has one or more features that are generally unfavorable for the specified use. Unusable indicates that the soil has some features that could prevent the [use].”

⁶\$43,920 approximates the 2016 CDBG program's three-person family statewide low-moderate income limit (80 percent of median income) for Indiana.

⁷IC 36-11 sets the parameters for the establishment of a county onsite waste maintenance district. This statute provides the flexibility for communities to tailor a local program to local circumstances.

⁸Indiana Water Infrastructure Task Force. (2018, Nov). Final report [PDF file]. Indianapolis: Indiana General Assembly. Retrieved from iga.in.gov/static-documents/2/9/b/5/29b5fd5e/water-infrastructure-task-force-final-reportmerged-copy.pdf



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INDIANA ADVISORY COMMISSION ON INTERGOVERNMENTAL RELATIONS

The Indiana Advisory Commission on Intergovernmental Relations (IACIR) was established by the General Assembly in 1995.

The 24-member commission includes: state legislators, state administration officials, local government officials (county, township, city and town, and regional), and citizens. The IACIR's mission is to create effective communication, cooperation, and partnerships between the federal, state, and local units of government to improve the delivery of services to the citizens of Indiana.



The Indiana Rural Community Assistance Program has provided technical assistance on water, wastewater, and solid waste issues to rural communities across Indiana since 1981. RCAP works with communities with population 10,000 or less. They facilitate at no cost the lengthy and often complicated processes involved in the implementation of water, wastewater, and solid waste improvements. They provide small utility board training and have administered multiple Unsewered Communities surveys.

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