Title: Drinking Water, Wastewater, and Stormwater Needs, a survey of Indiana Local Health Departments

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Background: The Indiana Finance Authority's ("IFA") State Revolving Fund Loan Program provides financial assistance to utilities for drinking water, wastewater, and stormwater infrastructure needs.

The IFA can also work with utilities to assist small "areas of need" such as pockets of homes located in unincorporated areas, neighborhoods, subdivisions, or mobile home parks that have no service or are under-served by water infrastructure.

To identify these areas, the IFA partnered with the Indiana University School of Public Health ("IU SPH") to survey Indiana County Environmental Health Specialists. The survey responses were received from November 2022 – March 2023.

Results: The IFA received 73 survey responses from 68 study participants, representing 65 of the 92 counties. For the remaining 27 counties, four declined to participate, eight did not respond, and 15 partially completed the survey without submitting it. A total of 304 "areas of need" were submitted.

Table 1 illustrates the number of areas submitted for each county. Marion County submitted the most areas of need (41/304). Other counties that submitted numerous areas of need included Putnam (29/304), Allen (26/304), Floyd (19/304), and Whitley (14/304). Three counties submitted a survey response and indicated no areas of need: Ohio, Rush, and Starke Counties. Counties that did not submit a survey response were assigned "NR" for "No Response."

Wastewater needs were most frequently reported (264/304, 86.8%), followed by stormwater needs (104/304, 34.2%), and then drinking water needs (75/304, 24.7%). "Other" needs (3/304, 1.0%) were often related to wastewater, e.g., small lots and septic systems, as well as aging systems. Small lots refer to the space needed to comply with new installations of septic systems. For Indiana, septic systems must be at least 50 feet away from private wells and at least 10 feet away from the home (Indiana State Department of Health, 2014). For characteristics of areas of need, failing/inadequate septic was the most frequently reported for wastewater and overall (226/304, 74.3%). For drinking water, contaminated wells were the most frequently reported (22/304, 7.2%). The characteristic of being too far to connect to municipal sewer system and water supply related to both wastewater and drinking water was reported in approximately half of the areas of need (159/304, 52.3%). For stormwater, there was only one characteristic, which was failing/inadequate stormwater infrastructure (89/304, 29.3%). For public health, low-income was the most frequent characteristic (148/304, 48.7%). Public health concerns, which were only selected for 11 areas, included human cases of West Nile, Blue Baby syndrome, gastrointestinal disease, and Hepatitis.

Table 1: Survey areas of need by county

County	Areas (%)	County	Areas (%)	County	Areas (%)	County	Areas (%)
Adams	NR* (0.0%)	Gibson	3 (1.0%)	Martin	NR (0.0%)	Steuben	2 (0.7%)
Allen	26 (8.6%)	Grant	3 (1.0%)	Miami	6 (2.0%)	Sullivan	1 (0.3%)
Bartholomew	3 (1.0%)	Greene	NR (0.0%)	Monroe	NR (0.0%)	Switzerland	3 (1.0%)
Benton	NR (0.0)	Hamilton	3 (1.0%)	Montgomery	4 (1.3%)	Tippecanoe	5 (1.6%)
Blackford	3 (1.0%)	Hancock	5 (1.6%)	Morgan	NR (0.0%)	Tipton	3 (1.0%)
Boone	1 (0.3%)	Harrison	5 (1.6%)	Newton	4 (1.3%)	Union	3 (1.0%)
Brown	NR (0.0%)	Hendricks	NR (0.0%)	Noble	2 (0.7%)	Vanderburgh	NR (0.0%)
Carroll	12 (3.9%)	Henry	3 (1.0%)	Ohio	0 (0.0%)	Vermillion	3 (1.0%)
Cass	NR (0.0%)	Howard	3 (1.0%)	Orange	NR (0.0%)	Vigo	NR (0.0%)
Clark	3 (1.0%)	Huntington	NR (0.0%)	Owen	3 (1.0%)	Wabash	NR (0.0%)
Clay	5 (1.6%)	Jackson	3 (1.0%)	Parke	2 (0.7%)	Warren	NR (0.0%)
Clinton	3 (1.0%)	Jasper	NR (0.0%)	Perry	NR (0.0%)	Warrick	3 (1.0%)
Crawford	1 (0.3%)	Jay	3 (1.0%)	Pike	5 (1.6%)	Washington	3 (1.0%)
Daviess	3 (1.0%)	Jefferson	3 (1.0%)	Porter	3 (1.0%)	Wayne	3 (1.0%)
Dearborn	7 (2.3%)	Jennings	NR (0.0%)	Posey	1 (0.3%)	Wells	3 (1.0%)
Decatur	4 (1.3%)	Johnson	1 (0.3%)	Pulaski	1 (0.3%)	White	1 (0.3%)
DeKalb	NR (0.0%)	Knox	1 (0.3%)	Putnam	29 (9.5%)	Whitley	14 (4.6%)
Delaware	NR (0.0%)	Kosciusko	NR (0.0%)	Randolph	NR (0.0%)		
Dubois	3 (1.0%)	LaGrange	1 (0.3%)	Ripley	1 (0.3%)		
Elkhart	3 (1.0%)	Lake	NR (0.0%)	Rush	0 (0.0%)		
Fayette	1 (0.3%)	LaPorte	4 (1.3%)	St. Joseph	NR (0.0%)		
Floyd	19 (6.3%)	Lawrence	3 (1.0%)	Scott	NR (0.0%)		
Fountain	NR (0.0%)	Madison	3 (1.0%)	Shelby	2 (0.7%)		
Franklin	6 (2.0%)	Marion	41 (13.5%)	Spencer	NR (0.0%)		
Fulton	3 (1.0%)	Marshall	1 (0.3%)	Starke	0 (0.0%)		

Note. NR = no response. % based on 304 areas of need.

Additionally, areas of need were most frequently classified as unincorporated areas (190/304, 62.5%), followed by subdivisions/neighborhoods (133/304, 43.8%), mobile/manufactured home parks (34/304, 11.2%), incorporated areas (20/304, 6.6%), and regional sewer/water districts (2, 0.7%). Conservancy districts were not reported at all. “Other” types of areas (11/304, 3.6%) included proposed RV campgrounds, homes and cabins around a lake, whole counties, etc.

Tables 2, 3, and 4 summarize the main characteristics of submitted areas of need. Table 2 outlines infrastructure need types and area classifications, Table 3 specifies the characteristics of areas of need, and Table 4 covers public health and other reported characteristics. For each area of need, survey respondents were requested to put an estimate for the number of occupied houses in the area, if known. When survey respondents left this blank, this information was sought on-line from the U.S. Census Bureau, but often, this data was not available. The range of occupied houses went from zero to 16,990, where the former represented a proposed RV campground and the latter an entire county. A range of 11 to 50 households and 51 to 150 households were most common, representing 24.3% (74/304) and 22.0% (67/304), respectively. These ranges support

the finding that areas of need are often small in population size. Figure 1 shows the range of occupied houses in areas of need.

Table 2: Types of infrastructure needs and areas (N = 304)

Characteristic	Frequency (%)
Type of Infrastructure Need	
Wastewater	264 (86.8%)
Stormwater	104 (34.2%)
Drinking water	75 (24.7%)
Other	3 (1.0%)
Area Description	
Unincorporated	190 (62.5%)
Subdivision/neighborhood	133 (43.8%)
Mobile/manufactured home park	34 (11.2%)
Incorporated area	20 (6.6%)
Regional sewer/water district	2 (0.7 %)
Conservancy district	0 (0.0%)
Other	11 (3.6%)

Table 3: Descriptions of needs by infrastructure type (N = 304)

Need Classification	Frequency (%)
Wastewater	
Failing/inadequate septic systems	226 (74.3%)
Compliance difficulties for wastewater	139 (45.7%)
Failing/inadequate sewer collection system or wastewater treatment plant	65 (21.4%)
Wastewater and Drinking Water	
Too far to connect to city water or sewer	159 (52.3%)
Drinking Water	
Contaminated wells	22 (7.2%)
Residents relying on bottled water for consumption	12 (3.9%)
Failing/inadequate wells	10 (3.3%)
Compliance difficulties for drinking water	7 (2.3%)
Residents relying on hauled water	6 (2.0%)
Stormwater	
Failing/inadequate stormwater infrastructure	89 (29.3%)

Table 4: Descriptions of public health and other characteristics (N = 304)

Characteristic	Frequency (%)
Public Health Characteristics	
Low-income levels	148 (48.7%)
Violations/enforcements	69 (22.7%)
High mosquito population	65 (21.4%)
Public health concerns	11 (3.6%)
Industrial contaminants present	5 (1.6%)
Cases of GI illness	4 (1.3%)
Other Characteristics	
Other (e.g., small lots, aging systems, etc.)	14 (4.6%)

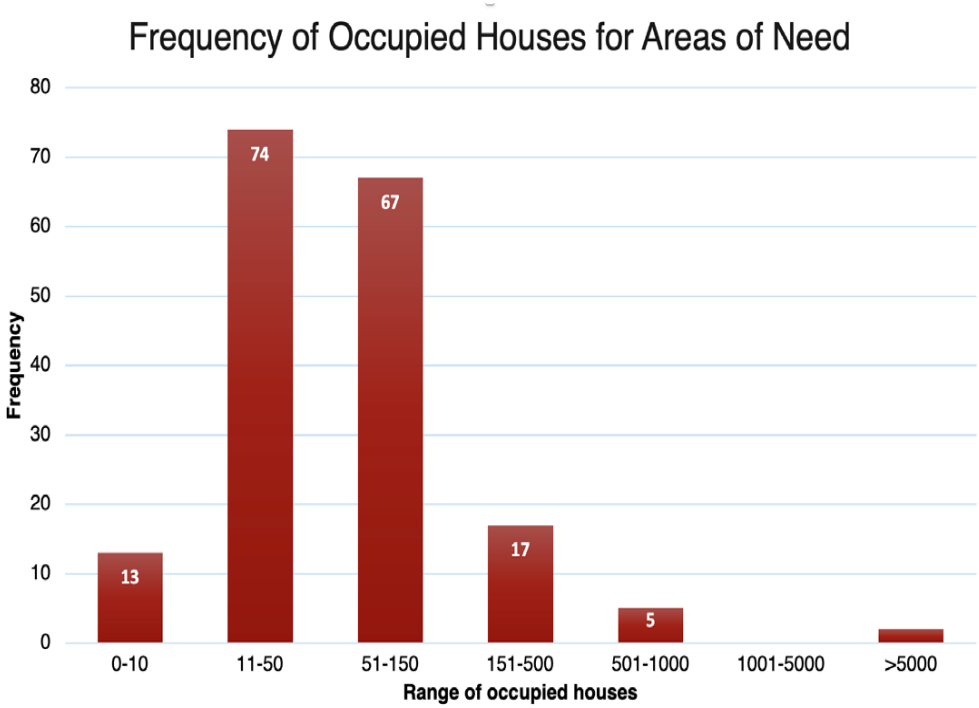

Figure 1: Range of occupied houses in areas of need (N = 304). Note. Not all survey respondents submitted the number of occupied houses, which is why the total in this graph is 178.

Conclusions: Wastewater needs were most frequently identified, followed by stormwater needs, and then drinking water needs. The characteristics of failing/ inadequate septic systems, being too far to connect to city water or sewer, contaminated wells, failing/in-adequate stormwater infrastructure, and low-income, were most frequently reported. Areas were often categorized as being unincorporated areas or subdivisions. Though this study also aimed to examine the incidence of water- and vector-borne diseases and other public health outcomes relating to

infrastructure in areas of need, most respondents were not familiar with the incidence or prevalence of water- and vector-borne diseases, nor of other public health concerns related to infrastructure. This is likely related to the difficulty of monitoring diseases and symptoms related to water- or vector-borne diseases.

For assistance with infrastructure needs, please visit: https://www.in.gov/ifa/srf/

References:

Indiana State Department of Health. (2014). Residential On-Site Sewage Systems Rule 410 IAC 6-8.3. Indiana State Department of Health. https://www.in.gov/localhealth/marshallcounty/files/residential-onsite-sewage-systems-rule-410-iac-6-8.3.pdf