

Age Distribution and Permit Status of Septic Systems in Logan and Old Town Three Forks, Montana

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ABSTRACT

Septic systems are a necessity and requirement for many homeowners. It is common for older homes to have older systems that may or may not be maintained regularly. It is also possible that older systems may not be permitted. The purpose of this research was to determine the age distribution of septic systems and the percentage of non-permit systems in Logan and Old Town Three Forks, Montana. A properly constructed and maintained septic system is important for protecting the health of homeowners, neighbors, pets, and livestock. Failing or improperly constructed septic systems can cause contamination of groundwater which can then adversely affect private wells throughout a community. The Gallatin County Interactive Map and the Gallatin County Wastewater Permit Records Database were used to collect data on the age distribution of permits, the permit status of known septic systems, and the age of structures on parcels containing non-permitted systems. Analysis of the data collected showed that 57% of systems in Old Town did not have permits associated with them and 33% of found permits were issued over 30 years ago. In Logan, 61% of systems were non-permitted and 23% of found permits were issued over 30 years ago. The age of dwelling structures sharing a parcel with a non-permitted septic system in both neighborhoods, ranges from 12 to 129 years old. Therefore, the data suggests that several septic systems in both neighborhoods may be reaching the end of their life if not already failing.

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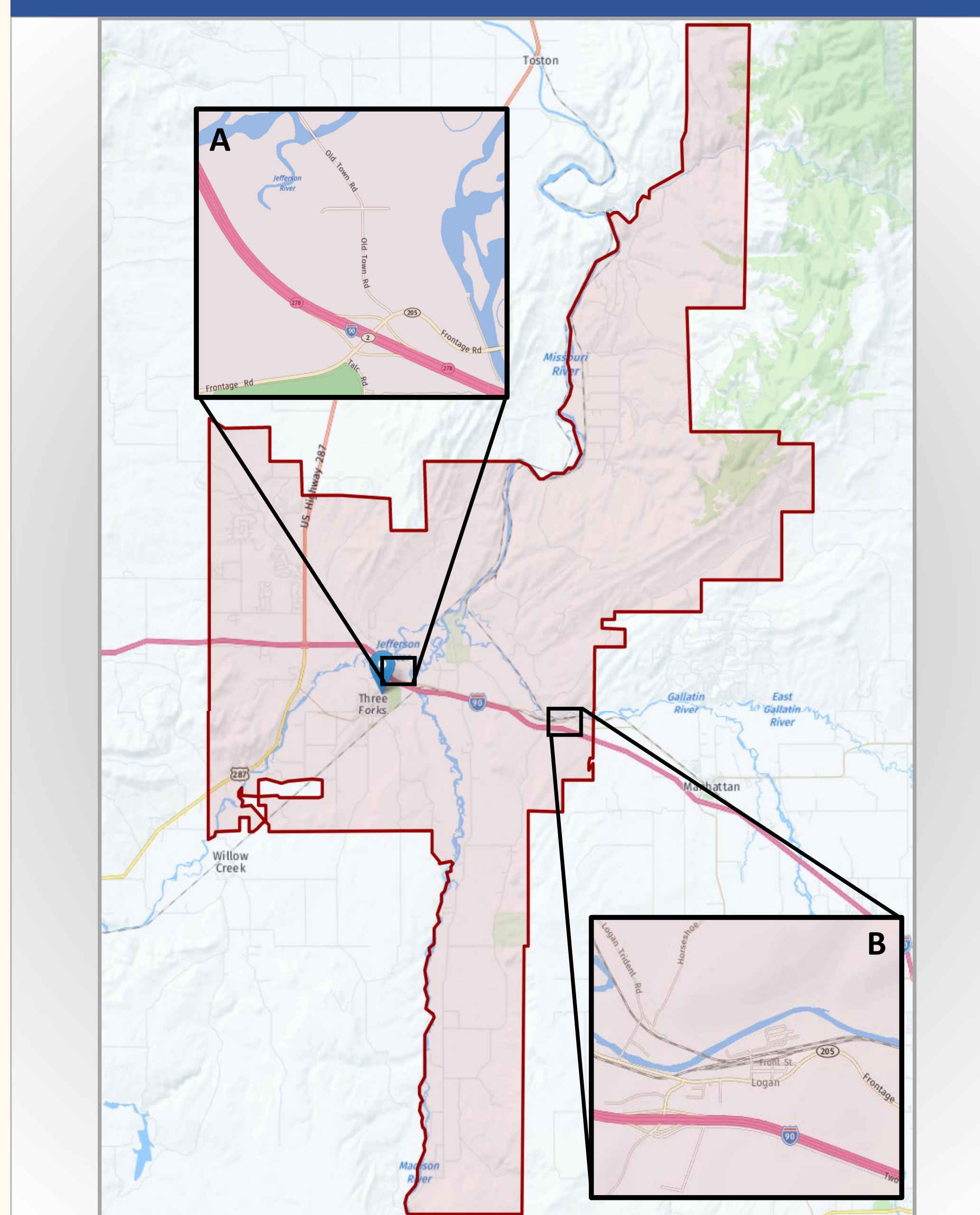
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INTRODUCTION

Montana State University and Three Forks High School worked together to provide education and free testing on private wells in the Three Forks School District. Arsenic was a primary focus due to the recent reports of unsafe levels in drinking water. Arsenic testing was offered to those who had private wells located within the Three Forks School District. Samples were also tested for the presence of Coliform and E. coli which could suggest contamination from different sources. One source of Coliform and E. coli contamination is a failing septic system. Failing systems can contaminate water found in private wells, creeks and rivers. Severe situations can even cause the contamination of groundwater. In a study done in 2005, biochemical fingerprinting methods were used to identify fecal indicator bacteria in failing systems and local creek water. Lack of maintenance and/or improper design of septic tanks and/or absorption fields lead to the failure of absorption fields which were found to be the most common cause of system failure¹.

In the United States, more than one in five households are not connected to a public sewer system and must depend on non-septic systems to treat and remove wastewater from their home². Placement, installation, and maintenance are important for the health and longevity of septic systems. In 1966, Environmental Health Services (EHS) began regulating septic system planning and installation by issuing Wastewater Treatment Permits³. These permits are required before the installation of a system and help to regulate the design and placement location of septic systems. Unfortunately, maintenance is not regulated despite the importance it has on the lifespan of a septic system. The average lifespan of modern septic systems is 15 to 40 years. With proper placement, installation, and maintenance a septic system may last longer than 40 years.

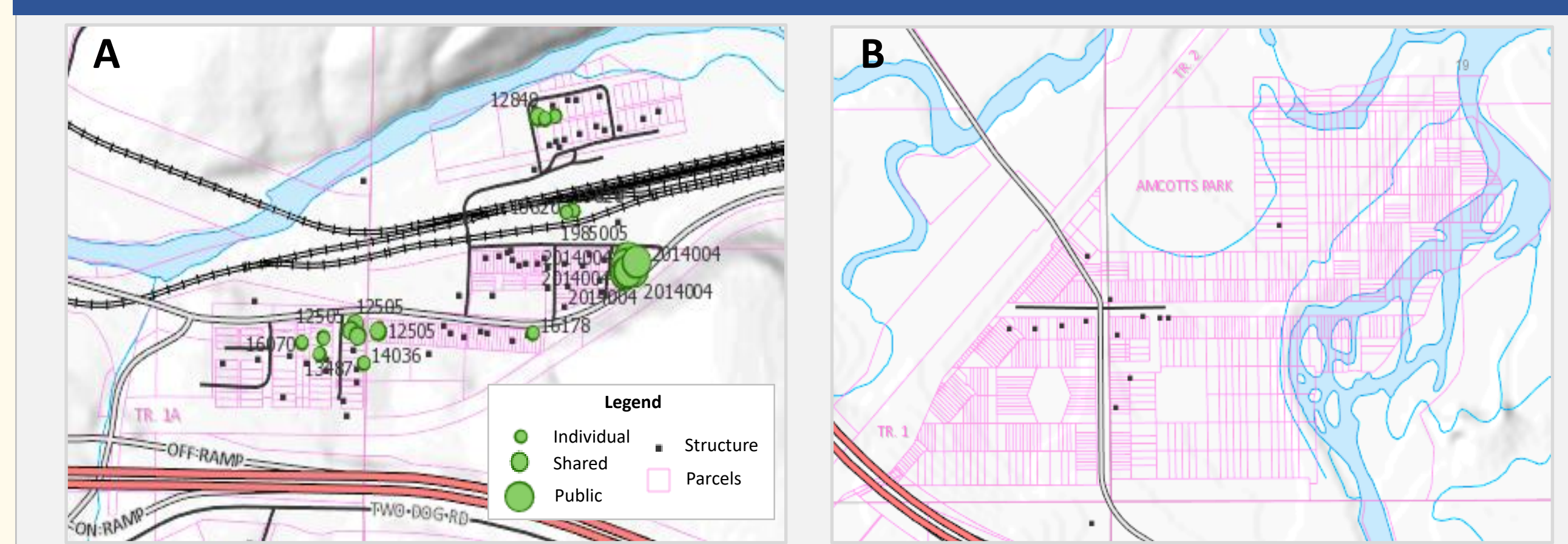
Old Town Three Forks and Logan are neighborhoods located in the Three Forks School District. Both neighborhoods were established in the 1800's and still have dwellings over a century old. Discovering if these structures have septic systems is important for preventing the contamination of water supplies. The purpose of this research was to determine the age distribution of septic system permits and the percentage of non-permitted septic systems in two of the oldest neighborhoods in the Three Forks School District. The results will provide insight on the amount of systems that may require an inspection and/or replacement.



Map 1. Three Forks School District Map. (A) Old Town Three Forks. (B) Logan.

METHODS AND MATERIALS

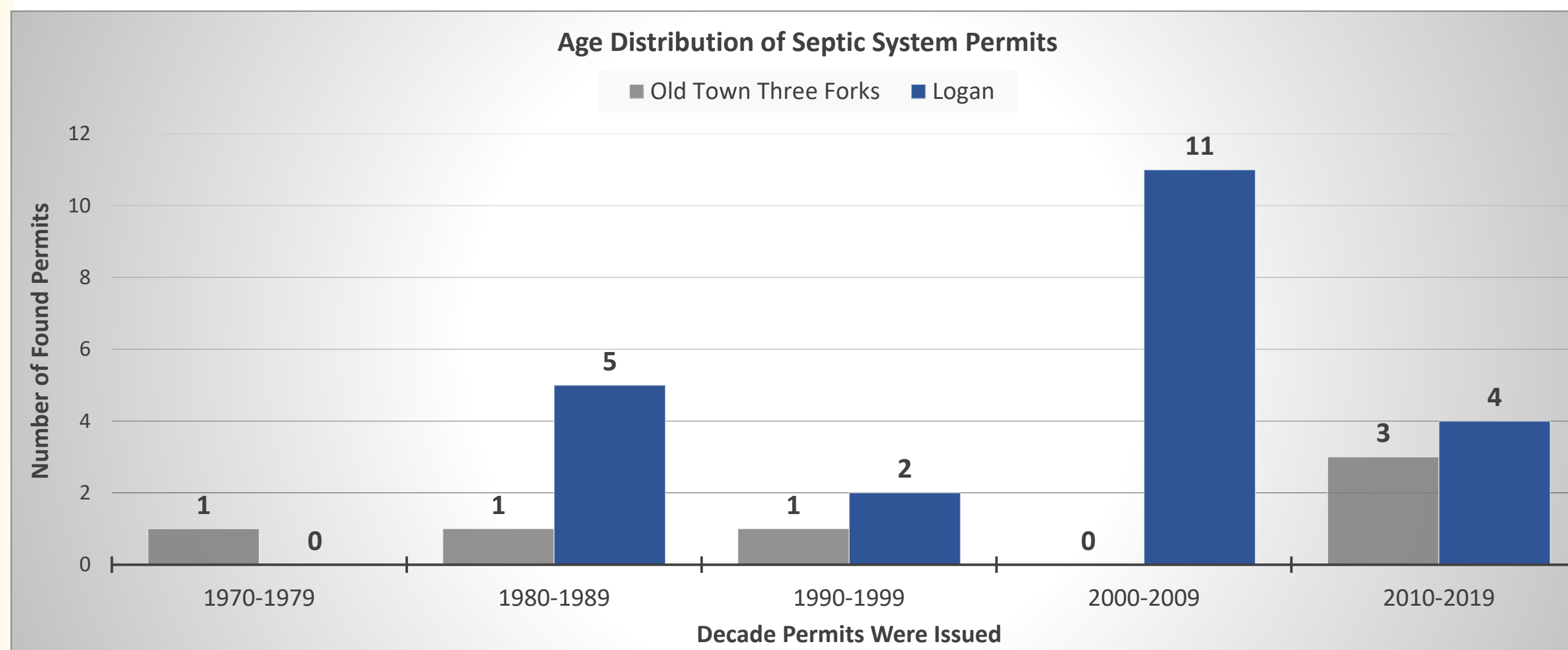
The Gallatin County Interactive Map was used to find septic systems in Old Town Three Forks and Logan, Montana. Green dots marked wastewater treatment systems that were mapped in the Environmental Health Services (EHS) Map Viewer section and had permits that were accounted for. These permits were accessed using the Gallatin County Wastewater Permit Records Search to determine the year they were issued. Black squares represented structures on properties that have unmapped septic systems with unknown permit statuses. Each unmapped septic system had information including an address, owner's name(s), and structures on the property. The address and owner's name(s) were cross referenced in the permit records search to determine if the property had a septic permit associated with it. Spreadsheets were used to organize septic systems into 3 categories for each neighborhood; EHS mapped permits, found permits, and no permits attached. Data from the EHS mapped permits and found permits were used to determine the age distribution of issued permits. Data from found permits and systems with no permit attached were used to determine the percentage of permit statuses. Data collected from parcels, with structures that had non-permitted systems, was used to determine the age distribution of dwelling structures on those properties.



Map 2. (A) Structures and septic systems in Logan, Montana. Green dots represent mapped septic systems with permits linked to them. Black dots represent structures with unmapped septic systems and unknown permit statuses. There are several mapped septic systems in Logan, including systems that are shared between multiple dwellings. (B) Structures in Old Town Three Forks. Only data of structures with unmapped septic systems was available.

RESULTS

The Gallatin County Interactive Map reported 14 properties with septic systems in Old Town Three Forks Montana. Permits for 6 septic systems were found on the permit records database. No permits were found for the remaining 8 systems. In Logan, 56 structures with septic systems were reported on the interactive map. Twenty-two permits were found on the database. No permits were found for the remaining 34 systems. For both neighborhoods, a total of 42 out of 70 septic systems did not have permits associated to them.



Graph 1. The age distribution of septic system permits found in the Gallatin County Wastewater Permit Records Database for both neighborhoods. Six permits were found for septic systems in Old Town. The oldest permit was issued in the 70's and dated over 40 years old. Twenty-two permits were found for septic systems in Logan. The oldest permits were issued in the 80's and dated over 30 years old. The greatest number of septic system permits in Logan were issued in the last 20 years.

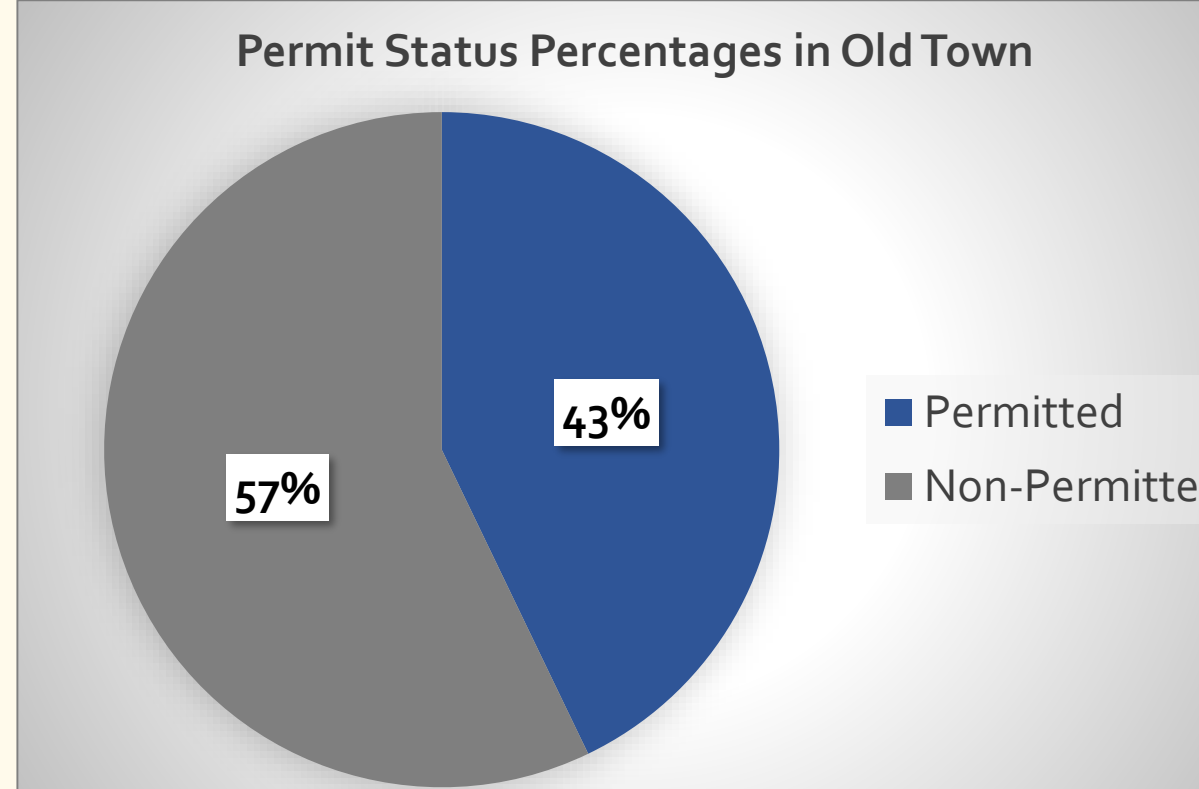


Figure 1. The percentage of septic permit statuses in Old Town Three Forks. Of the properties located in Old Town, 43% had septic systems with valid permits. Permits could not be found for the remaining 57% of systems.

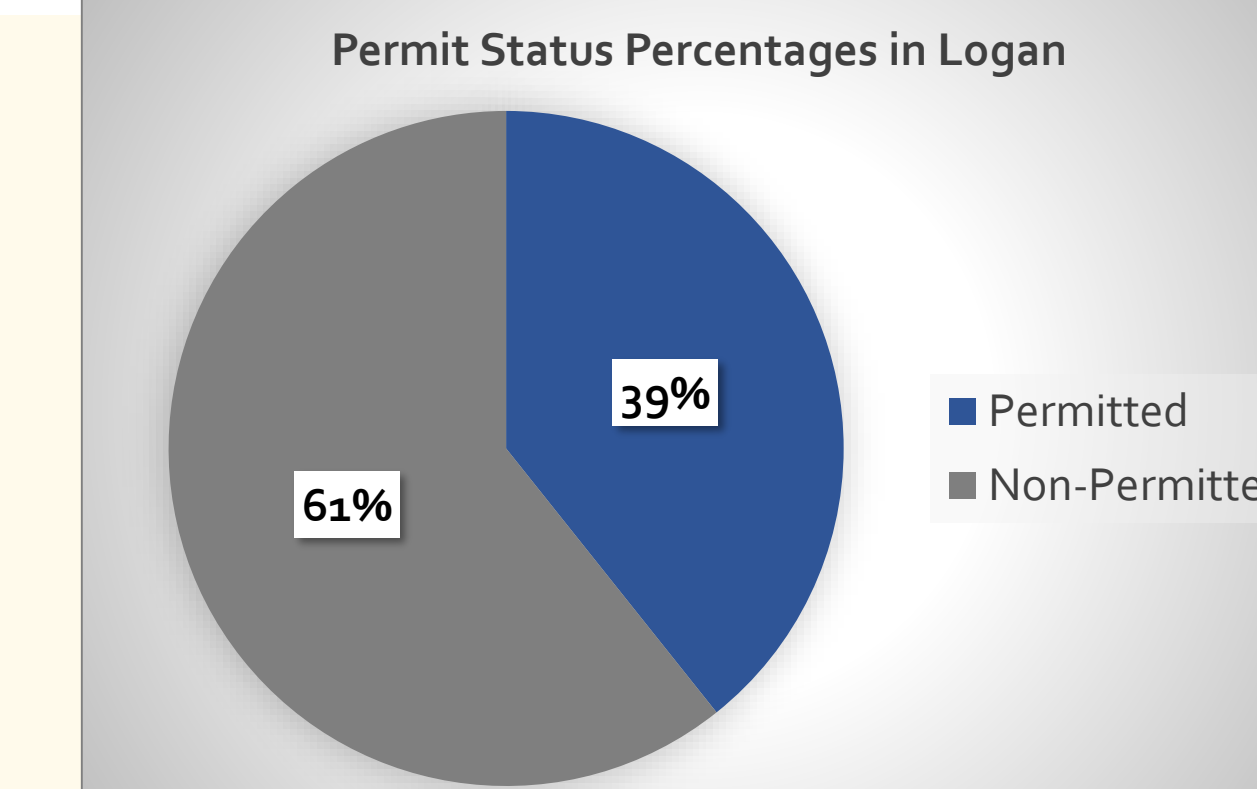
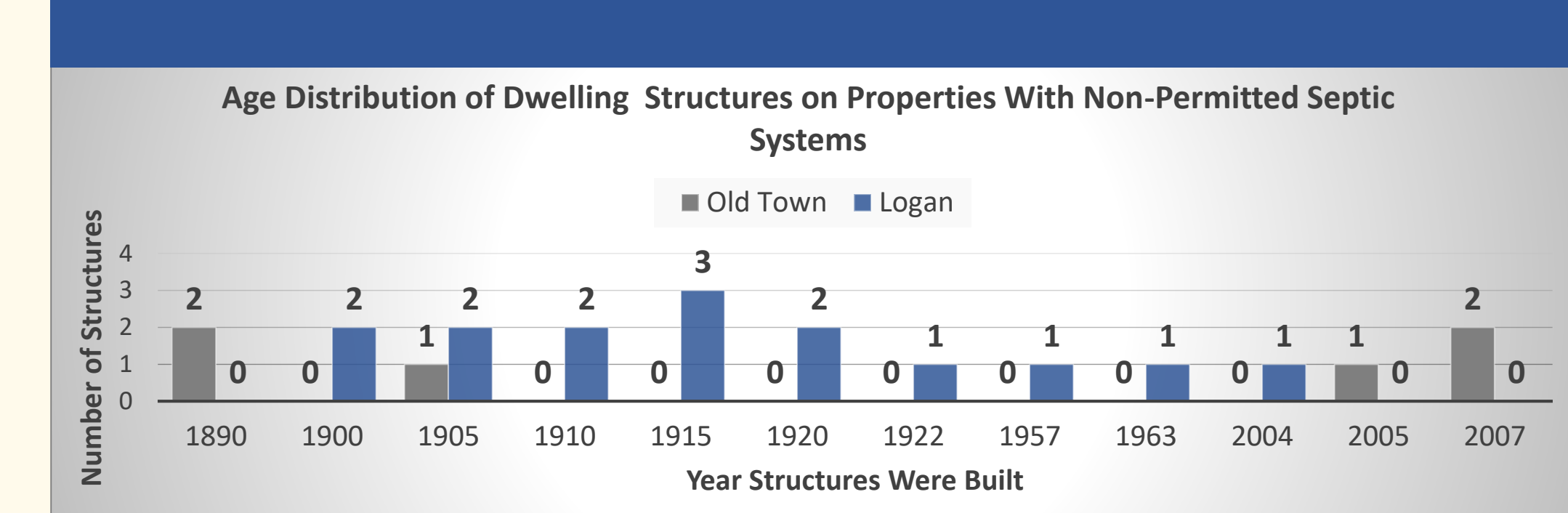


Figure 2. The percentage of septic permit statuses in Logan. Of the properties located in Logan, 39% had septic systems with valid permits. Permits could not be found for the remaining 61% of systems.



Graph 2. The age distribution of dwelling structures on properties with non-permitted septic systems. The 'year built' was found for structures located on properties with a non-permitted septic system. In Old Town, 50% of structures with non-permitted septic systems were built over 110 years old. In Logan, 60% of structures with non-permitted septic systems were built over 104 years ago.

DISCUSSION

Septic systems have an average lifespan of 15-40 years. Regular maintenance can extend the life of systems, however, there are no regulations for the proper maintenance of septic systems. With no documentation on maintenance, it is difficult to determine the quality of septic systems in Logan and Old Town Three Forks that have permits issued to them over 30 years ago. An article written in 2014 discussed the issues surrounding the lack of regulations for long-term maintenance⁴. The article states that septic systems built before permits were required may not be designed up to date or be regularly maintained. Their data showed that a lack of adequate design, installation and maintenance has great potential to compromise water quality. The EPA's *New Homeowner's Guide to Septic Systems* contains useful information for homeowners and potential home buyers⁵. It discusses the lifespan of septic systems and the long-term maintenance required to extend the life of the system. It also describes the design and function of a typical septic system in a way that is understandable.

For the 42 septic systems from both neighborhoods that have no permit associated with them, the risk of system failure is even greater. This is due to not knowing the age of the system or how it was installed. The Circular DEQ 4 which documents the Montana standards for planning and development of septic systems includes important site evaluations that determine where and how a system should be installed. These evaluations include soil profiling, percolation tests, and determining land slope⁶. These are not only mandatory but are important for preventing problems in the future. It is reasonable to assume that non-permitted systems may have been installed without the appropriate evaluations being performed first.

CONCLUSIONS

The purpose of this study was to determine the age distribution and permit status of septic systems in Old Town Three Forks and Logan, Montana. It was determined that permits were not found for 57% of systems in Old Town and 61% of systems in Logan. Of the permits found in Old Town, 30% were issued over 30 years ago. In Logan, 23% were issued over 30 years ago. Dwellings on parcels with non-permitted have 'year built' dates that range from 12 to 129 years old. It would be beneficial to the community to determine the quality of septic tanks on these properties. It is recommended that a program be developed to assist in affordable inspections and septic system repair or replacement for non-abandoned homes that were built before 1966.

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