Land Use Implications of Wastewater Treatment Technologies:
Lessons from the Great Lakes Region

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November 24, 2009

The Great Lakes Region

Public policies often are revised in response to new technologies and, in some cases, to unintended consequences. The State of Wisconsin, like other states in the Great Lakes region, has regulated private wastewater treatment for decades. Prior to 1969, when Wisconsin's plumbing code had weak siting standards for private on-site wastewater treatment systems, about 200,000 conventional on-site systems were installed in the state. But septic systems on sites with less than 24 inches (61 cm) of suitable soil were failing and polluting nearby lakes and groundwater. After 1969, 36 inches (91.4 cm) of soil was required for on-site treatment to mitigate the public health impacts.

Alternative wastewater treatment technologies were developed to replace failing conventional on-site systems in areas not served by municipal treatment facilities. Although intended, at first, to replace existing conventional treatment systems, alternative systems eventually facilitated new single-family housing development in previously undevelopable locations. A major revision of Wisconsin's plumbing code – changing it in the 1990s from a prescriptive code to a performance code – was contentious. Environmental and smart growth interests were pitted against property rights advocates and the housing and real estate industries. A lawsuit filed by the League of Wisconsin Municipalities, the Wisconsin Alliance of Cities, and 1,000 Friends of Wisconsin challenged the new plumbing code for its potential land use and ecological impacts. The Wisconsin Realtors Association and other industry interests hired legal counsel to defend against the lawsuit. Ultimately, the State Supreme Court upheld the revised plumbing code which went into effect in 2001.

Plumbing Code or Stealth Land Use Policy?

Most communities in Wisconsin rely on ground water as their sole source of drinking water. And yet Wisconsin's state plumbing code allows – unless prohibited by local ordinances – the installation of newer alternative treatment systems on sites with just six inches (15.2 cm) of native soil above bedrock or the seasonal water table. Because more than half of Wisconsin's land area is unsuitable for conventional soil absorption treatment systems, this *de facto* land use policy significantly increases the rural land area in the state that could be converted to residential development.

Coincident with Wisconsin's plumbing code revision, the State enacted the Comprehensive Planning Act (1999). This statute requires Wisconsin towns, cities, villages and counties to develop comprehensive plans by 2010 to support local zoning and land division decisions. The Comprehensive or "Smart Growth" Planning Act was passed, in part, because of concerns about

the land use impacts of the new plumbing code. Yet nearly a decade after the Act's passage, a state inventory of land use planning and policy in the state's 1,923 counties, cities, villages, and towns revealed only partial compliance:

> *"As of April 2008, 740 local governments had adopted comprehensive plans and an additional estimated 660 had a planning process underway. Another 120 units of local government are estimated to be in the preliminary stages of a planning process. Many of the remaining units of local government do not exercise zoning, subdivision regulations, official mapping, or shoreland/wetland zoning."*

Land use planning in the United States is highly decentralized, with development decisions made largely at the local level by part-time legislative bodies with limited resources to assess the positive and negative impacts of their land use and infrastructure decisions. A community's geology and the sources, sinks, and water balance of its aquifer system should be assessed to inform land use planning and development policies that will protect water supplies, human health, and aquatic ecosystems under present as well as future climate conditions. When rural land use policies do not respond to intrinsic landscape patterns and processes, alternative wastewater technologies – like conventional technologies – can facilitate urban sprawl.

Protecting Environmentally Sensitive Areas

Rural sites with shallow bedrock or a shallow water table are poorly suited for cost-effective, low-impact residential development. These "difficult" sites increase the excavation and construction costs for basements, building foundations, and site drainage. These sites may also perform valuable ecological and hydrologic functions. The U.S. Environmental Protection Agency cautions:

> *"In deciding whether to use onsite systems, it is important to consider the risks they might pose to the environment and public health. There may be cases where onsite systems are not appropriate because of the environmental sensitivity or public health concerns of an area."*

Environmentally sensitive areas are defined by Wisconsin's Department of Natural Resources as areas that *"…include but are not limited to wetlands, shorelands, floodways and floodplains, steep slopes, highly erodible soils and other limiting soil types, groundwater recharge areas, and other such physical constraints."* These areas typically are excluded from municipal sewer service areas because of potential adverse water quality impacts from both point and nonpoint pollution sources. And yet in too many rural communities, alternative wastewater treatment systems serve residential development in environmentally sensitive areas. County and town zoning codes may also contribute to low-density sprawl by requiring large minimum lots sizes (often 2 acres or more) for new single-family residences.

Environmental planners and landscape architects who "design with nature" do not view floodplains, storm surge zones, and other natural site constraints as design challenges to be overcome with engineering technology. Instead, these professionals understand that some locations are better left undeveloped.

Sources:

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Credit line:

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N.B. This essay appeared in *Landscape Planning*, 5th ed. (2010, Wiley & Sons), by William M. Marsh.