SEPTIC SYSTEM DATABASE | MEMORANDUM

TO: Tom Fortier, Town of Ogunquit; Phil Pickering, Ogunquit Sewer District; Bill Baker, Ogunquit Conservation Commission; Jon Carter, Town of Wells; Leslie Hinz, Town of York; Perry Ellsworth, Town of South Berwick; Doug Major, Great Works Regional Land Trust

FROM: Lauren Bizzari, FB Environmental Associates

SUBJECT: Septic System Database for the Ogunquit River Watershed

DATE: June 2, 2016

CC: Laura Diemer, Forrest Bell, FB Environmental Associates

INTRODUCTION

This memo provides information for the Towns of Ogunquit, South Berwick, Wells, and York, Maine on the Ogunquit River watershed septic system database created by FB Environmental Associates. The overall goal of the septic database is to facilitate municipal management of septic systems by ranking systems according to their risk of pollution to the Ogunquit River. The database will assist town departments in ensuring that septic systems are properly maintained and will act as a starting point for further action. Recommended next steps are also provided.

The database lists parcels in order of highest to lowest priority for ensuring that septic systems are maintained and functioning properly. Parcels located within the Ogunquit River watershed are divided into six categories. and prioritized based on both infrastructure risk factors (e.g., septic system age, pump out history) and soil and environmental risk factors (e.g., soil permeability, depth to bedrock, distance to nearest waterbody).

Although there is a thorough State-level permitting (Subsurface Wastewater Disposal permit, coordinated by Maine Division of Environmental Health, ME DEH) and inspection process to ensure that new septic systems are properly designed and built, there is no program that checks whether a system continues to function properly over its long service life of approximately 30 years. Research and real-world experience shows that systems of all ages sometimes malfunction for a wide variety of reasons, including poor maintenance, excessive loading with fats or solids, overloading due to water supply leaks, damage from tree roots or vehicles, old age, and even occasional errors in the design and/or installation. Sometimes malfunctions may persist for years with or without the homeowner's knowledge, potentially releasing untreated wastewater laden with fecal matter and excess nutrients to nearby waterbodies. It is impractical to check all systems in a town or watershed at one time. Therefore, a prioritized list was created to direct resources in an orderly and efficient manner to provide the greatest benefit to both public and watershed health.

HOW THE DATABASE WAS CREATED

The most up-to-date Geographic Information Systems (GIS) shapefile for each town's parcels was clipped to only include parcels located within the Ogunquit River watershed. Specific sources for shapefiles are listed in the database metadata. The parcel list and any associated address and owner data (if available) were exported from GIS to an Excel spreadsheet. Right-of-way, road, and open water/marsh parcels were removed from the lists, if easily identified within the parcel data.

A total of 3,219 parcels were included in the Ogunquit River Watershed Septic System Database (Table 1). Additional parcels exist in the watershed such as roadways, right of ways, and federally-owned coastal marsh,

but these were excluded from the database. Information on wastewater treatment type could not be determined for a large number of parcels in the Town of Wells. This was due to the much larger number of parcels overall and available resources. As the Wells parcels have been matched to town sewer records, these remaining unknown parcels are assumed to be vacant land or homes with septic systems.

TABLE 1. Summary of wastewater treatment types in the Ogunquit River Watershed.

	Wastewater Treatment Type (# of Parcels)				
Town	**Septic**	**Public Sewer**	**Vacant/no plumbing**	**Unknown**	**TOTAL**
Ogunquit	237	567	130	7	941
South Berwick	56	0	40	21	117
Wells	119	812	272	810	2013
York	70	0	77	1	148
TOTAL	**482**	**1379**	**519**	**839**	**3219**

INFRASTRUCTURE RISK FACTORS

Certain infrastructure factors carry a higher risk of septic system failure: these include design suitability, installation quality, maintenance history, and age of system (typical system lifespan often considered 30 years). The best proxy for these infrastructure issues is septic permit date.

Buildings with water supplies for which there is no wastewater system record (permit or approval) on file with either the town or the State suggest that one or more of these risk factors is present. If a septic system is present, but has no permit of any kind on file, it may pre-date the modern permitting and inspection procedures, or it could have been installed without a permit or supervision.

Permit history was collected from the Code Enforcement and/or Land Use offices of each town, whether from paper permits, scanned copies, or an existing electronic source. Given the large number of parcels in the watershed, permit searches were prioritized by building age (if known, oldest to newest; parcels built after 2006 were not searched) and/or distance to waterbody (within 250 ft of a water resource). Building age was obtained from Town Assessor data (e.g., Vision Government Solutions Online Assessment) for as many parcels as available resources allowed to help identify systems that were likely 30 years or older.

Additional information and clarification were obtained from the towns' Sewer Districts. Discrepancies between different town files regarding wastewater status (septic or sewer) were noted. Other discrepancies between parcel identification numbers (Map Block Lot Unit, or MBLU) from GIS shapefiles and those available from Town Assessor data (Vision database or other source) were resolved by using the Assessor data as the final authority.

SOIL AND ENVIRONMENTAL RISK FACTORS

Soil and environmental risk factors refer to the sensitivity to septic failure in various areas of the watershed. Higher risk factors indicate a greater risk to health and safety if a septic system should fail because fecal contamination and excess nutrients will have a more direct route to nearby waterbodies and swimming areas. These risk factors were determined using GIS (computer mapping), along with publicly-available data. An outline of the data used to determine the risk factor and each data source follows.

1. **Natural Resources Conservation Service Soils Data.** Each of the soil limitation factors below was assigned a value from 0 to 1 by NRCS, representing the degree of limitation within each soil component.

    a. **Filtering capacity**: The saturated hydraulic conductivity of soil, known as KSat, is an important physical property that influences the capacity of the soil to retain and transport water. The soil horizon with the maximum Ksat governs the leaching and seepage potential (or filtering capacity) of the soil. When this rate is high, transmission of fluids through the soil is unimpeded, and leaching and seepage may become an environmental, health, and performance concern.

    b. **Flooding**: Flooding has the potential to transport agricultural waste off site and pollute surface waters. Flooding also limits building, recreational, and sanitary facility use and management of these soils.

    c. **Ponding**: Ponding is the condition where standing water is on the soil surface for a given period of time. Soils that pond have restrictions that limit the installation and function of most land use applications. Soil features considered are ponding duration and frequency.

    d. **Depth to bedrock**: The depth to bedrock restricts the construction, installation, and functioning of septic tank adsorption fields and other site applications. Shallow soils have limited adsorptive capacity and biologically active zones through which waste materials can percolate. These soils may pose environmental and health risks when used as filter fields.

    e. **Slope**: Absorption fields cannot be located too close to cuts or on steep slopes as there is a danger that sewage can seep laterally out of the slope or cut before it has a chance to be fully treated. Septic systems can also cause slope failures if located in unstable slopes.

    f. **Depth to saturated zone**: Soils with shallow depth to a water table may become waterlogged during periods of heavy precipitation and are slow to drain. These soils have the potential to contaminate groundwater, which may create health and environmental hazards.

    g. **Seepage**: The soil's bottom layer Ksat (saturated hydraulic conductivity) governs the leaching and seepage potential of the soil. When this rate is high, transmission of fluids through the soil and underlying materials is unimpeded, and leaching and seepage may become an environmental, health, and performance concern.

    h. **Restricted permeability**: The soil horizon with the minimum Ksat governs the rate of water movement through the whole soil. When this rate is low, transmission of fluids into and through the soil is impeded, and runoff, infiltration, and percolation of pollutants may result in environmental, health, and performance concerns.

    i. **Too Steep:** For non-rated "rock outcrop" soil types, a risk score of five (which was the highest score among all soil types) was manually assigned on the basis that rock outcrops are extremely

unsuitable for septic systems. For non-rated "urban land" soil types, the risk factor similar to surrounding rated soils was chosen. Generally, the highest score was chosen if there were multiple surrounding soil units (excluding waterbodies). The reason for choosing the highest of the scores is the proximity to properties and people, which elevates risk of harm if there is a wastewater failure.

2. **Wetlands:** Using National Hydrography Dataset (NHD) data, all wetland areas received a risk factor of one.

3. **Within 100 ft. Stream Buffer:** Using NHD data, all areas within 100 feet of streams received a risk factor of one.

4. **Flood Zones:** Using FEMA flood zones data, all areas within zones A, AE, AO, and VE received a risk factor of one.

All the above risk factors were assessed and displayed geographically as a map of risk to the environment if septic systems fail. Each risk factor category had a max rating of 1, and the map indicates the sum of risk factor categories, ranging from 0 to 12. Though a risk factor of 12 is possible, risk factors in this case did not exceed a total of 8. The larger the value, the greater the potential limitation and risk to the environment in case of septic system failure. This map does not alter the need for onsite septic investigations on all properties, as appropriate; the map shows **only** the risk from natural soil and landscape factors and does not consider the age of existing septic systems (Figure 1).

Septic Risk by Parcel Map: Septic risks by parcel were spatially analyzed using the "Polygon in Polygon" component of Hawths Analysis package in ArcMap 9.2 to calculate an area-weighted rank for each parcel based on the underlying soil and environmental risk factors located within each individual parcel. The result (Figures 2-6) is that each parcel has an associated environmental risk factor for potential septic system failures. The total risk factor value for each parcel is listed in column C of the septic system database spreadsheet for each town.

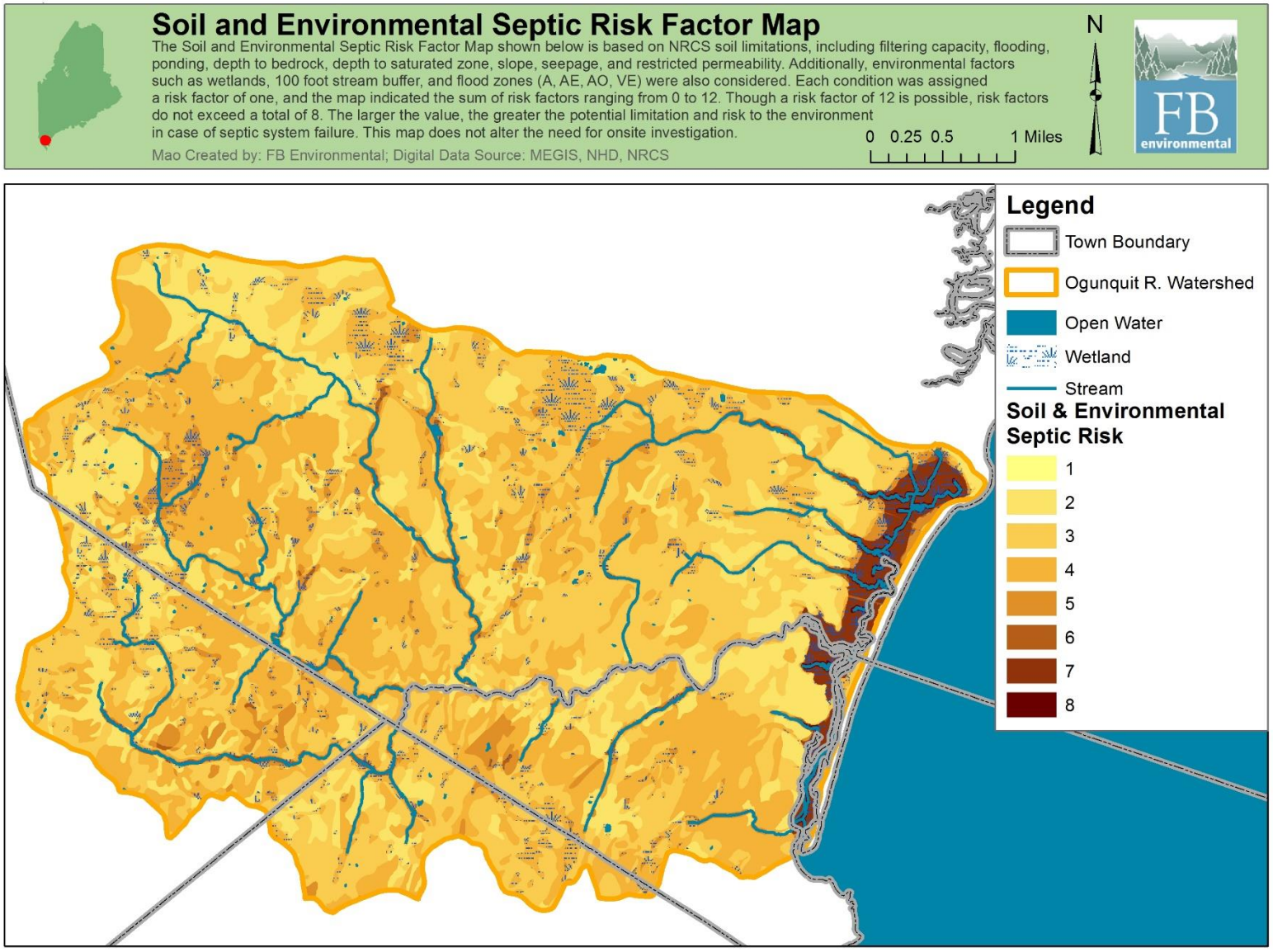

Figure 1. Soil and Environmental Septic Risk Factor map for the Ogunquit River watershed.

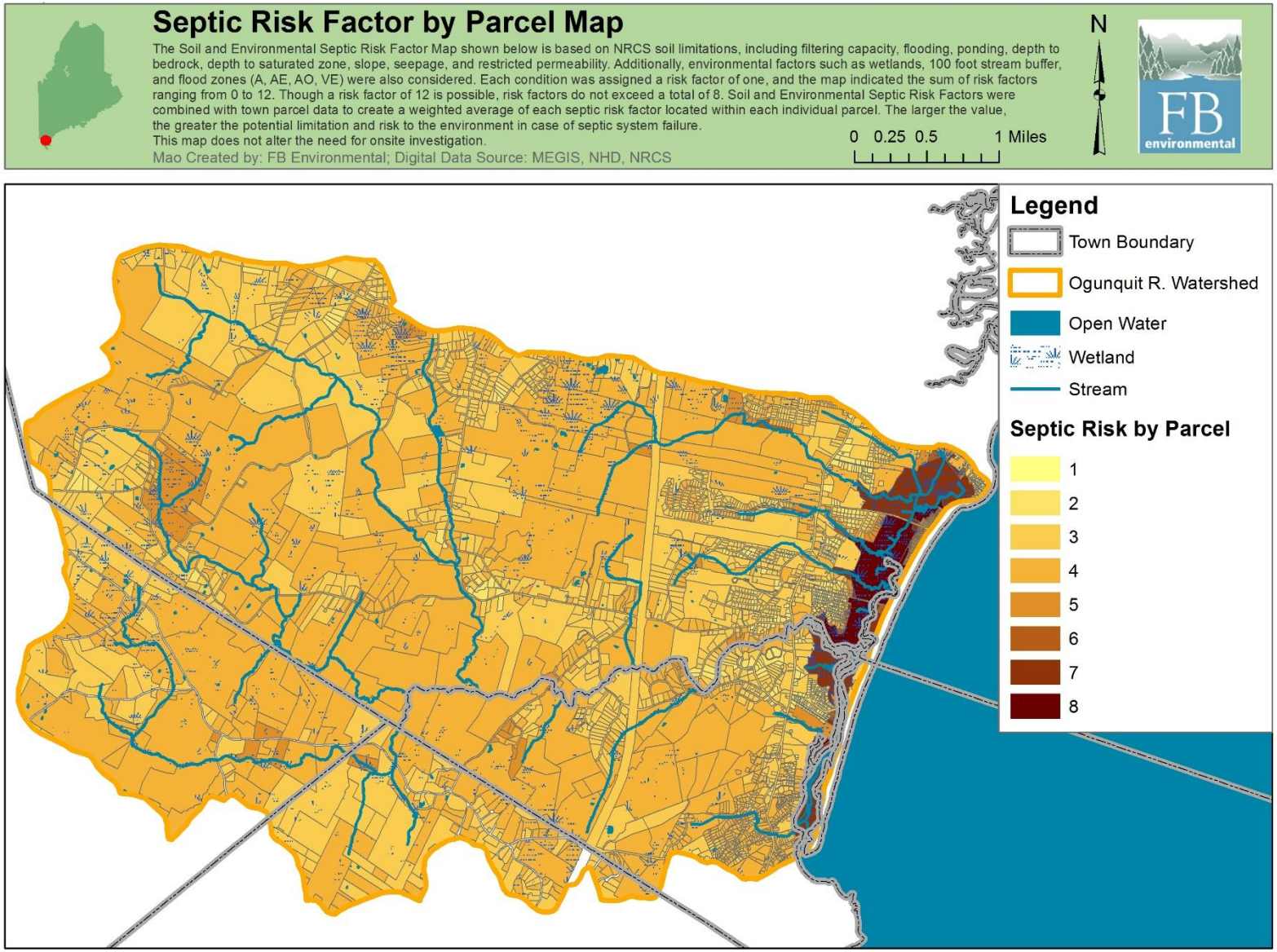

Figure 2. Septic Risk by Parcel map for the Ogunquit River watershed.

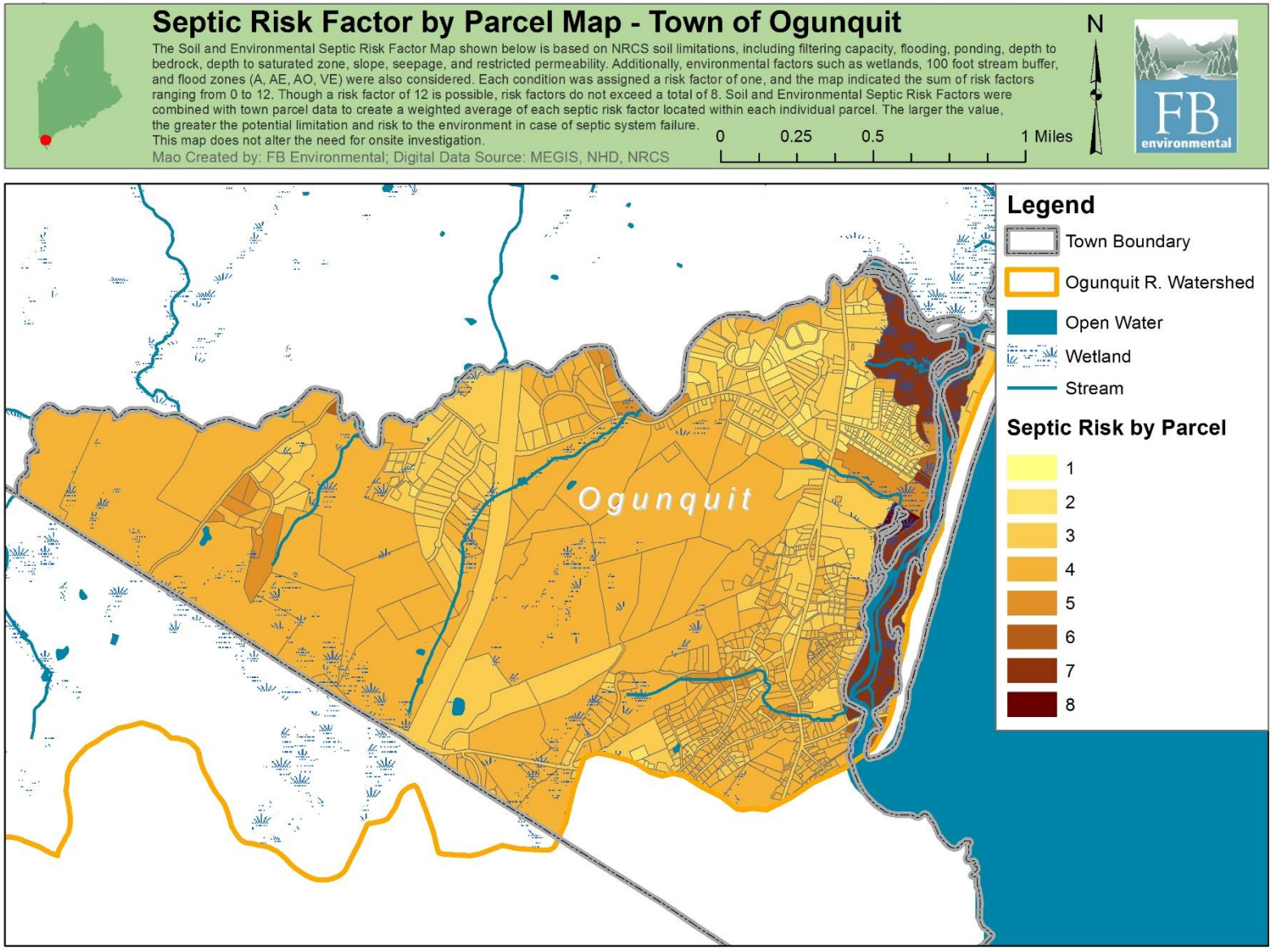

Figure 3. Septic Risk Factor by Parcel map for the Town of Ogunquit.

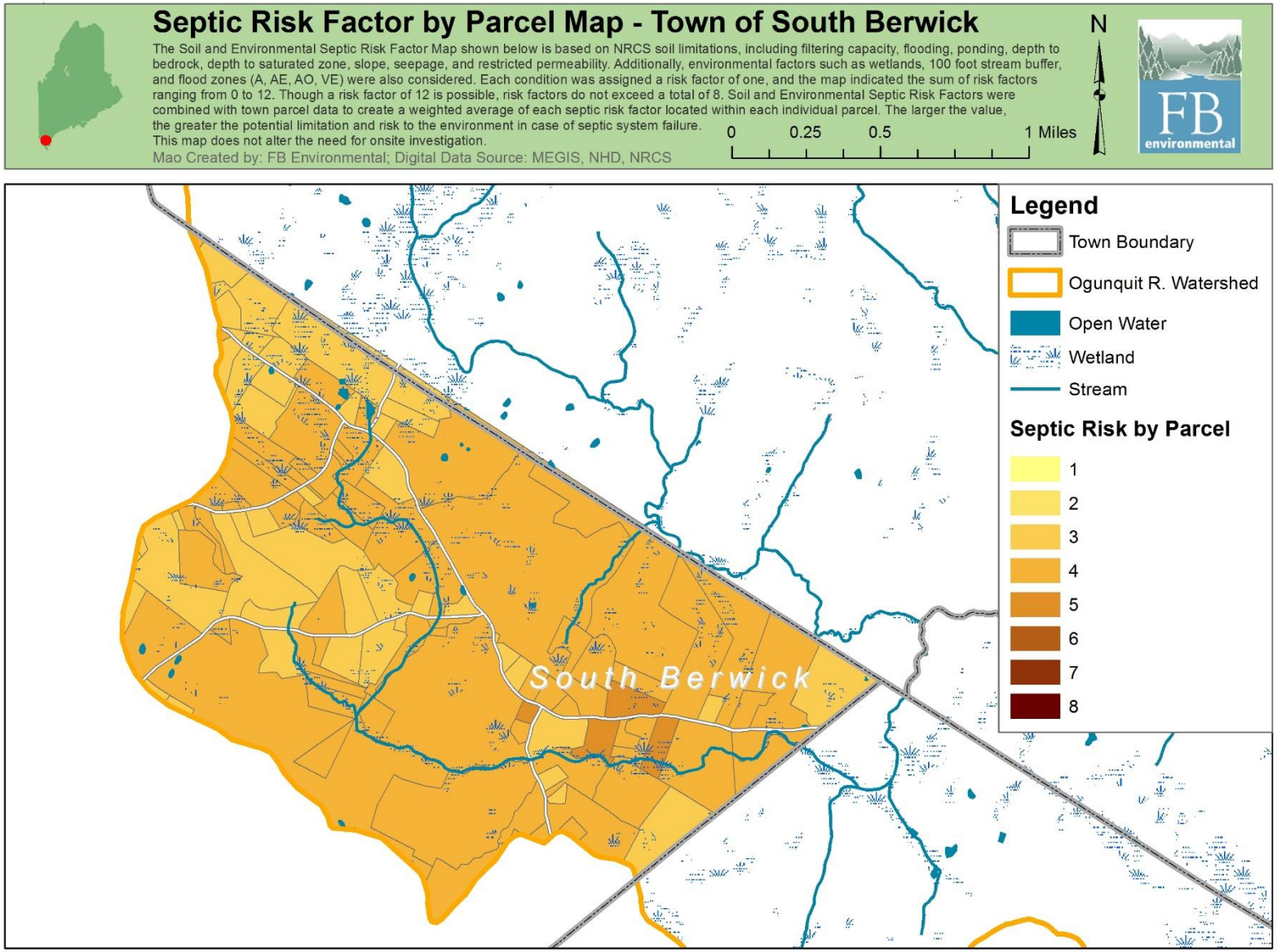

Figure 4. Septic Risk Factor by Parcel map for the Town of South Berwick.

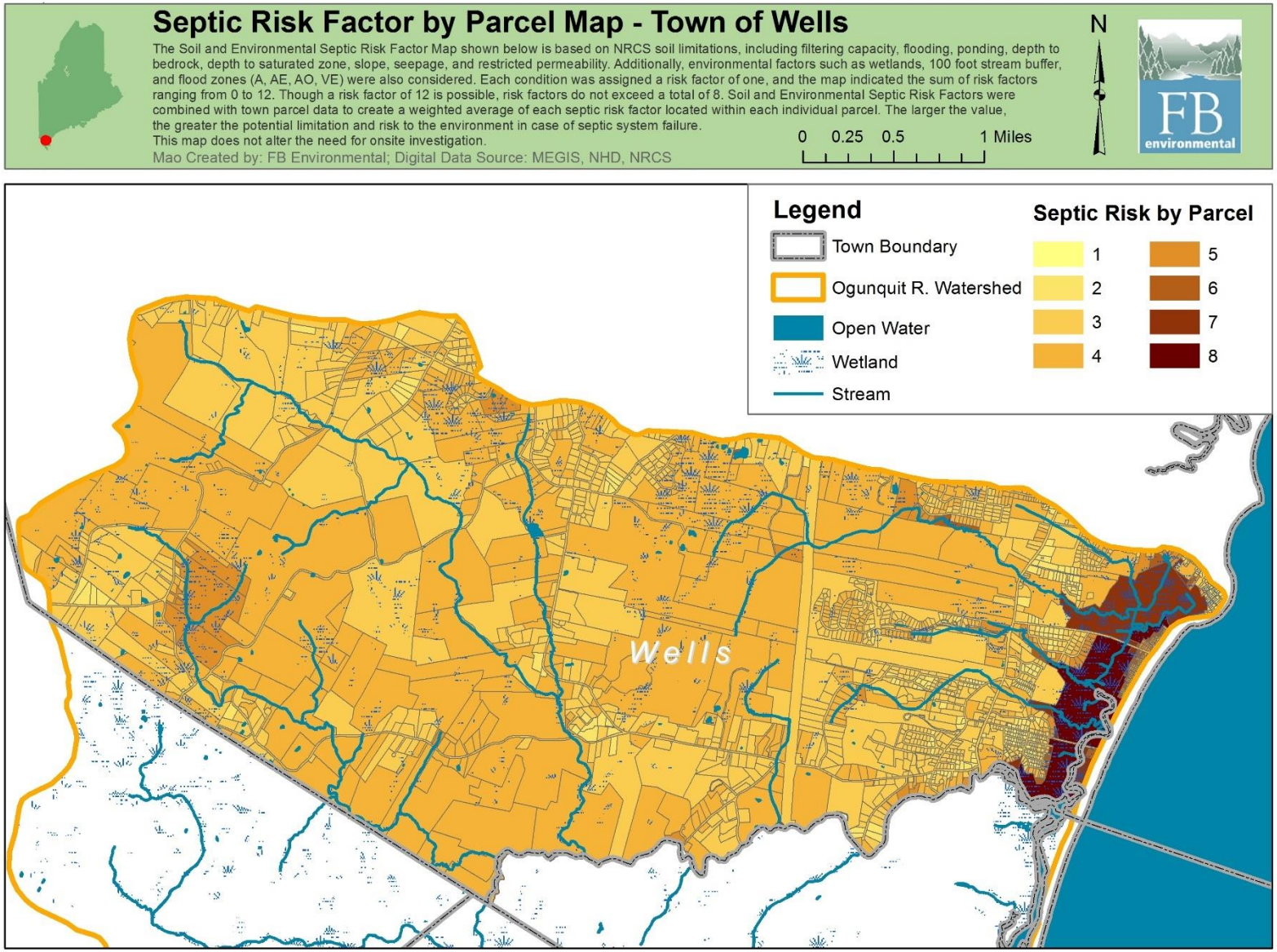

Figure 5. Septic Risk Factor by Parcel map for the Town of Wells.

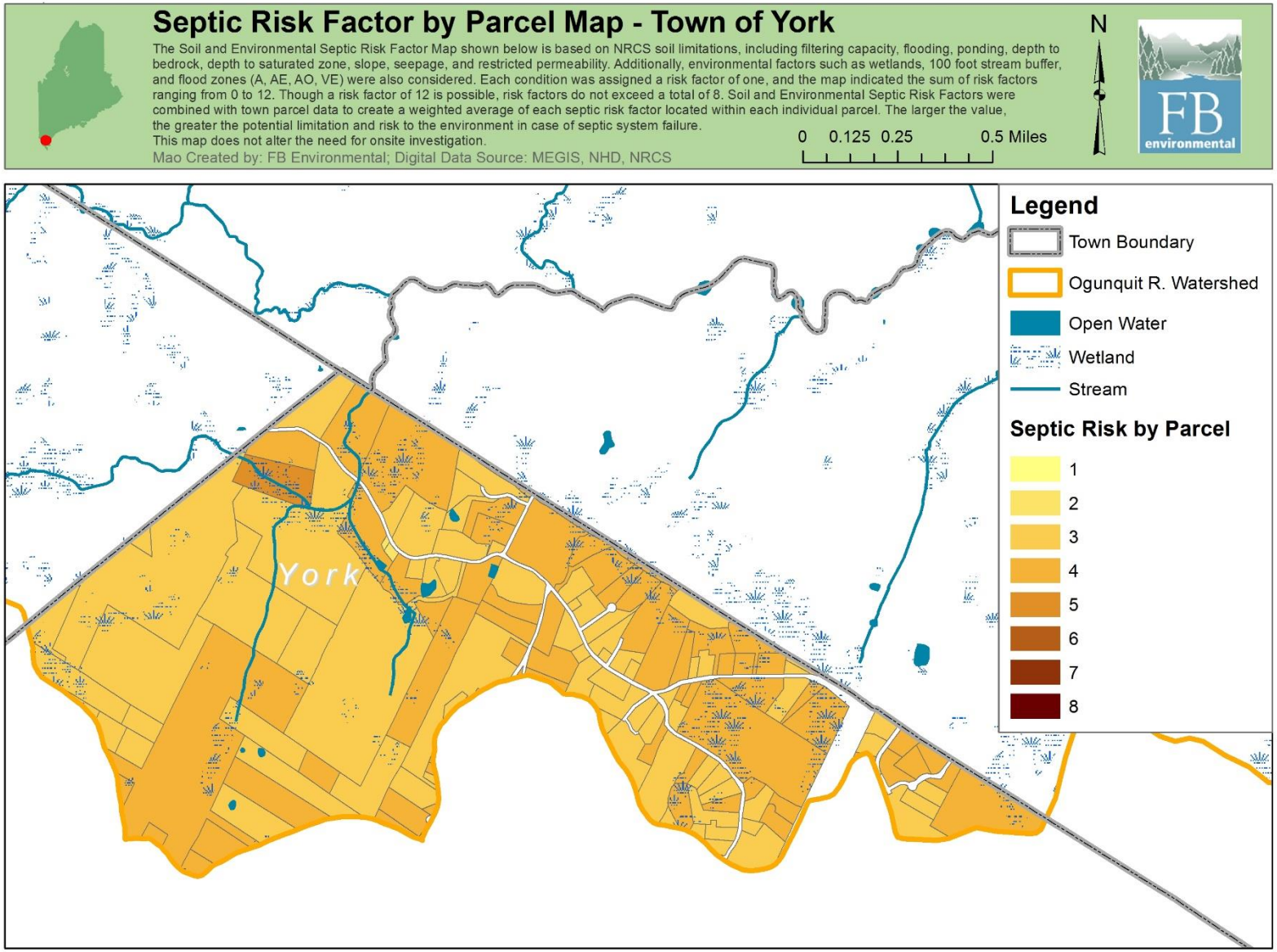

Figure 6. Septic Risk by Parcel map for the Town of York.

SEPTIC DATABASE SPREADSHEET

The resulting septic system database is a prioritized list of all parcels (built and unbuilt lots) within the Ogunquit River watershed. The spreadsheet contains a list of tax parcels which have been ranked according to order of priority. The priority is as follows:

1. Category 1, top priority parcels: Septic parcels WITHOUT a Subsurface Wastewater Disposal permit on file with the town (i.e., there is no clear record of septic system approval), and parcels with unknown status (unknown if on private septic, public sewer system, or other). If build year is known, building is older than 2006. Parcels are ranked by risk to surface water in case of a system failure by Soil and Environmental Risk Factor (higher risk factor = higher priority/ranking). If septic maintenance (pump out) history is available, category 1 is further subdivided:
    a. **1A:** system NOT serviced within last 5 years (2010 – present); for Wells data (no pump out history available), parcel is within 250 ft of waterbody
    b. **1B:** system serviced within last 5 years (2010 – present); for Wells data, parcel is › 250 ft of waterbody
2. Category 2, second priority parcels: Septic parcels WITH a Subsurface Wastewater Disposal permit on file with the town that is more than 30 years old (1985 and older). Parcels are ranked by risk to surface water in case of a system failure by Soil and Environmental Risk Factor (higher risk factor = higher priority/ranking). If septic maintenance (pump out) history is available, category 2 is further subdivided:
    a. **2A:** system NOT serviced within last 5 years (2010 – present); for Wells data (no pump out history available), parcel is within 250 ft of waterbody
    b. **2B:** system serviced within last 5 years (2010 – present); for Wells data, parcel is › 250 ft of waterbody
3. Category 3, third priority parcels: Septic parcels WITH a Subsurface Wastewater Disposal permit on file with the town that is less than 30 years old (1986 – 2005). Parcels are ranked by risk to surface water in case of a system failure by Soil and Environmental Risk Factor (higher risk factor = higher priority/ranking). If septic maintenance (pump out) history is available, category 3 is further subdivided:
    a. **3A:** system NOT serviced within last 5 years (2010 – present); for Wells data (no pump out history available), parcel is within 250 ft of waterbody
    b. **3B:** system serviced within last 5 years (2010 – present); for Wells data, parcel is › 250 ft of waterbody
4. Category 4, Fourth priority parcels: Septic parcels built within the last 10 years (2006 – present). Permits for most of these parcels were not searched given their recent build dates. Parcels are ranked by risk to surface water in case of a system failure by Soil and Environmental Risk Factor (higher risk factor = higher priority/ranking). If septic maintenance (pump out) history is available, category 4 is further subdivided:
    a. **4A:** system NOT serviced within last 5 years (2010 – present); for Wells data (no pump out history available), parcel is within 250 ft of waterbody
    b. **4B:** system serviced within last 5 years (2010 – present); for Wells data, parcel is › 250 ft of waterbody
5. Category 5, Fifth priority parcels: Parcels connected to the public sewer system. Parcels are ranked by risk to surface water in case of a sewer line leak by Soil and Environmental Risk Factor (higher risk factor = higher priority/ranking).

6. Category 6, Low priority parcels: Vacant land and parcels with accessory buildings lacking plumbing. Parcels are ranked by risk to surface water in case of a system failure by Soil and Environmental Risk Factor (higher risk factor = higher priority/ranking) should a system be installed on that land in the future.

RECOMMENDATIONS FOR NEXT STEPS

The septic system database is a tool for protecting public health and safety in the Ogunquit River watershed, but in order to be effective, follow-up action is needed. Below are recommendations for using the database effectively.

WATERSHED-WIDE RECOMMENDATIONS

- **Identify the status of Category 1 parcels**
  - Consult town records to determine if "UNKNOWN" parcels are on private septic or public sewer. See individual town recommendations below for additional details on what is needed to address Category 1 parcels.
  - Attempt to locate and estimate age of septic systems with no permit on record. For buildings with no septic system permits, it is likely that some of these buildings have systems, but their permits have either been misfiled or pre-date current State or town databases. A community task force to examine these options is recommended.
- **Implement a schedule for updating the septic and sewer database regularly.** It will be important for the database to be visited at least annually to add newly created parcels and incorporate the most recent pump out information.
- **Provide MEGIS with a copy of the most up-to-date shapefile of town parcels so that they may update their parcel layer.** During database creation, it was discovered that some of the publically available shapefiles on MEGIS were several years out of date. The updated shapefile should also include the most up-to-date owner and address information, if available.
- **Implement a septic system maintenance ordinance (e.g., minimum pump-out intervals) if one does not yet exist in your town.** Neighborhoods within the Ogunquit River watershed should be prioritized for this effort.
- **Host "septic socials" in areas with a high density of septic systems.** A septic social is a fun, casual event where a local resident hosts a get-together for their friends and neighbors to learn about septic system maintenance. Septic socials should be held in known "hotspot" areas of bacteria and in areas where there are many homes with septic systems. While a local resident will provide the meeting space and the attendees, the town or consultants should provide the educational material.

Additionally, it is recommended that the towns within the Ogunquit River watershed **continue to meet regularly to discuss important changes to wastewater treatment within the watershed** (e.g., sewer treatment upgrades, sewer line expansion and private septic removal, discovery of failed septic systems, etc.). It is important for the towns to continue open communications about changes within their service area that may affect the Ogunquit River and possibly other towns further downstream. These meetings should also involve regional partners such as the ME Department of Marine Resources (DMR) and Maine Healthy Beaches (MHB), which both regularly conduct shoreline surveys and beach testing to monitor and track bacteria. Also, the Piscataqua Region Estuaries Partnership (PREP) tracks a suite of water quality indicators across the region, including those related to septic systems. Inviting these regional partners to continue their participation in an Ogunquit community task force on septic system management is recommended.

TOWN-SPECIFIC RECOMMENDATIONS

As each town is unique, individual recommendations for enhancing and using the septic system database are provided below.

- **Ogunquit**
  - **For Category 1 parcels, attempt to locate the septic permit or approximate age of the septic system.** There are 95 Category 1 parcels in Ogunquit. An effort should be made to age the system if no permit was found in the town records. This may involve requesting permits directly from the State.
  - **Continue to track septic service history (pump-out) within the Ogunquit River watershed and send annual follow-up letters.** Follow-up letters were sent in fall 2015 to properties identified as not having septic system maintenance within the last 3 years (as required for properties within the shoreland zone). The database has been updated to include responses from these letters, but another round of reminder letters should be mailed this summer.
  - **Follow-up with two properties on Grasshopper Lane that were confirmed as connected to sewer during 2014 smoke tests, but were not on the town sewer list.** Update the septic system database and notify the Ogunquit Sewer District of the final determination of wastewater treatment type for these properties.

- **South Berwick**
  - **For Category 1 parcels, determine the wastewater treatment type.** There are 24 Category 1 parcels in South Berwick. The part of town that falls within the Ogunquit River watershed is very rural part of town, and some of these parcels may be cabins with an alternative system (e.g., outhouse). Septic parcels should be identified and an effort made to age the system if no permit was found in the town records. This may involve requesting permits from the State.
  - **Begin tracking septic system maintenance history for parcels within the Ogunquit River watershed.** The town can work with local septic system maintenance companies to request information on where maintenance has been performed. These updates should be completed at regular intervals (e.g., quarterly or annually), and the information can be input directly to the septic database.

- **Wells**
  - **For Category 1 parcels, determine the wastewater treatment type.** There are 838 Category 1 parcels in Wells, and it is assumed that these are all on private septic (if built) or vacant land. The Town Code Enforcement Office is currently working on scanning and organizing septic permit information to make it more accessible. Once this effort is complete, it will be an easier task to update the information for this large number of parcels. After the septic parcels are identified, an effort made to age the system if no permit is found in the town records. This may involve requesting permits from the State.
  - **Update database to include all owner and address information, when available from Assessor's Office.** This information is not part of the GIS shapefile of parcels maintained by the Town's GIS vendor. It is provided by the Assessor's Office and then linked to the GIS shapefile. The current septic system database only includes sparse owner and address information as was

available from the Wells Sanitary District or from the Town's online GIS (i.e., if the parcel's MBLU was searched online). Additional owner and address information should be added to the database as time and resources allow.

- **Begin tracking septic system maintenance history for parcels within the Ogunquit River watershed.** The town can work with local septic system maintenance companies to request information on where maintenance has been performed. These updates should be completed at regular intervals (e.g., quarterly or annually), and the information can be input directly into the septic database.

- York
  - **For Category 1 parcels, attempt to locate the septic permit or approximate age of the septic system.** There are 10 Category 1 parcels in York. An effort should be made to age the system if no permit was found in the town records. This may involve requesting permits directly from the State.
  - **Expand septic system mapping efforts beyond the MS4 area.** Septic systems within the MS4-area have been mapped and their install dates identifies. As time and resources allow, the Town is planning to expand this effort outside of the MS4-area. Properties identified as being within the Ogunquit River watershed should be prioritized within that effort.
  - **Send follow-up letters to parcels with "no pumping record" requesting the most recent pump out information.** The follow-up letter should contain information on septic system maintenance and a reminder about the recommended (or required) pump-out interval.