SACO RIVER DRINKING WATER RESILIENCY PROJECT FINAL REPORT


GPCOG
GREATER PORTLAND
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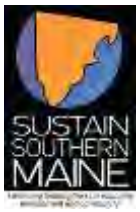

SUSTAIN
SOUTHERN
MAINE


SMPDC
SOUTHERN MAINE PLANNING & DEVELOPMENT COMMISSION


Maine Center for Disease
Control and Prevention
An Office of the
Department of Health and Human Services


MaineWater


U.S. DEPARTMENT OF
HOMELAND SECURITY

DRAFT TABLE OF CONTENTS

PROJECT BACKGROUND

The Saco River is the primary source of drinking water for much of Southern Maine. In fact, it eclipses Sebago Lake in its capacity to provide clean drinking water to the region. Recognizing the importance of the Saco River to the region, this EPA Healthy Communities Grant is an effort to inventory potential sources of contamination to this vital drinking water resource.

Recent chemical spills, such as the Elk River Spill in West Virginia (2014), and the Animas River Spill in Colorado (2015), are stark reminders of the vulnerability of some community drinking water supplies to the activities at and around surface water sources, particularly rivers and streams.

Due to its size, importance, etc. it can't be compromised as it will have a huge affect on drinking water and ecosystems. The Saco River has sufficient surplus yield to serve all the water supply needs throughout the region. Protection of this valuable resource and preservation of its capacity is essential to ensure a safe and reliable water supply for future generations. Irreplaceable.

MaineDEP's EGAD sites
Road crossings and bridges
Dams
Properties in the flood zone
Erosion
Boaters and campers

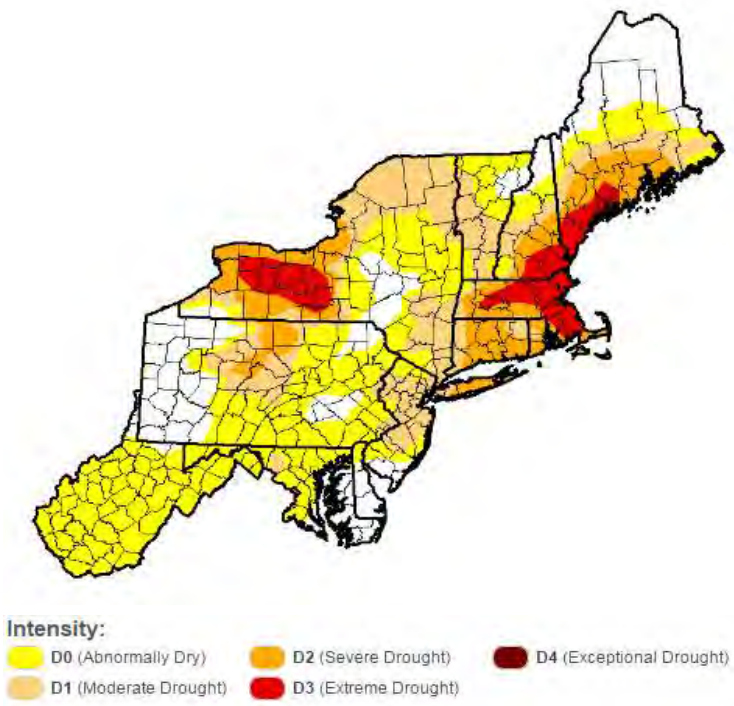
Physical Characteristics of the Saco River

Beginning in the White Mountains of New Hampshire, the Saco River flows generally south-southeast for roughly 125 miles before draining an average of 4,000 cubic feet of water per second into the Atlantic Ocean at Saco Bay in Maine. (Maine Heritage documentary). The river's watershed is the largest in southern Maine, encompassing more than 1,500 square miles. On its way to the Atlantic, the river travels through 13 Maine communities, which have benefited greatly from the river as source of recreation, transportation, irrigation, water power, and drinking water.

The Saco River as a Drinking Water Resource

The Saco River is especially valuable as a drinking water resource. This is largely due to its enormous capacity, excellent water quality, and for its established heritage and history as a public water supply. Those familiar with water resources agree that, along with Sebago Lake, the Saco River is the region's best opportunity for increased withdrawal of water for public use, while satisfying environmental concerns – recent reports estimate the yield of the Saco River and Sebago Lake may be as high as 10 times the projected need for the region. This surplus water supply could even be used to attract businesses to the Southern Maine.

Widespread impacts from the ongoing drought in New England only serve to reinforce the importance of the Saco River as an invaluable drinking water supply.



U.S. Drought Monitor: Northeast, Sept. 27, 2016

Demographics and Existing Land Uses along the River

Number of towns bordering the river, demographics, etc.

TOWN	2000	2010	2014	2030
Dayton	1,805	1,965		2,180
Denmark	1,004	1,148	1,210	1,445
Brownfield	1,251	1,597	1,261	1,421
Cornish	1,269	1,403	1,383	1,513
Baldwin	1,290	1,525	1,511	1,763
Hiram	1,423	1,620	1,711	2,040
Fryeburg	3,083	3,449	3,410	3,783
Limington	3,403	3,713	3,734	4,112
Hollis	4,114	4,281	4,343	4,604
Buxton	7,452	8,034	8,079	8,795
Standish	9,285	9,874	9,942	10,692
Saco	16,822	18,482	18,757	20,968
Biddeford	20,942	21,277	21,303	21,715
Totals	*71,338*	*76,403*	*76,644*	*82,851*

Sources: U.S. Decennial Census (2000)
American Community Survey 5-Year Estimates (2010/2014)
SMPDC projection (2030)

Presently, the majority of the river's 1,600 square-mile watershed remains undeveloped or underdeveloped. Therefore, the Saco River is one of the cleanest major rivers in New England.

Mostly rural

Impervious surfaces and development pressures are concerns.

Projected Drinking Water Demand

Water Quality: Past and Present

History of improvements to water quality

At one time, many of Maine's rivers were so polluted that their water literally peeled the paint off houses. Paper mills, textile mills, tanneries and log drives dumped waste into the rivers, driving out many of the native fish, especially the Atlantic salmon, which are highly sensitive to water quality. (NYT article)

A+ on the report card for the Maine Legislature… formerly Grade C water quality

Atlantic Sturgeon are now in the river after being gone for nearly a century.

In the heyday of the mills, the river was filthy… Tannery's effluent running straight into the river

No public sewer, sewer went right into the river

1970's Clean Water Act helped tremendously

The Saco River Corridor Commission has been gathering data since 2001. With a team of volunteers, the Commission tests 35 sites every other week from May through October each year. The baseline data gives information for comparing all future readings to., without it, we wouldn't be able to look back and see if current trends are naturally occurring due to weather or something else is happening.

Existing Public Water Utilities

Description of water providers and map of service areas?

In addition to serving the customer base of the Biddeford & Saco Water Company in the communities of Biddeford, Old Orchard Beach, Saco, and Scarborough, the Saco River is already to some extent utilized as a vital regional supply for the customers of the Kennebunk, Kennebunkport & Wells Water District, Kittery Water District and the York Water District, which can obtain water through interconnection or supply agreements for mutual aid purposes. The Saco River also serves as an emergency supply through these same interconnection agreements. The Saco River has sufficient surplus yield to serve all of the water supply needs throughout the region.

Biddeford & Saco Water Company

Communities: Biddeford, Old Orchard Beach, Saco, Scarborough

Kennebunk, Kennebunkport & Wells Water District

Communities: Kennebunk, Kennebunkport, Wells

Kittery Water District

York Water District

Organizations and Interest Groups

A list and brief description of organizations involved in Saco River water quality.

Southern Maine Regional Water Council (SMRWC)

The Southern Maine Regional Water Council (SMRWC) was originally formed in 2005 with the goal and mission of promoting regional cooperation among water utilities in southern Maine, improving customer service, and lowering the cost of water for the customer base served by the member water utilities. The SMRWC membership includes all the major water utilities serving drinking water to the public in York and Cumberland County. Combined, the SMRWC serves over 250,000 persons within 23 communities, nearly 20% of the State of Maine's total population. In addition, the public water supplies serve a much larger population in the region through businesses, public schools, and other entities which receive the benefits of public water but may not be connected to a water system as a customer.

SMRWC member systems include: Biddeford & Saco Water Company; Kennebunk, Kennebunkport & Wells Water District; Kittery Water District; Portland Water District; Sanford Water District; South Berwick Water District; and York Water District.

Saco River Corridor Commission

Formed in 1973 by order of the Maine Legislature, the Saco River Corridor Commission has been instrumental in

The Saco River Corridor Commission jurisdiction includes the Saco, Ossippee, and Little Ossipee Rivers, as well as Balch Pond in Newfield, and Lake Arrowhead in Waterboro.

Friends of the Saco

Saco River Recreational Council

Saco River Salmon Club

Saco Valley Land Trust

EPA

POTENTIAL THREATS TO DRINKING WATER QUALITY

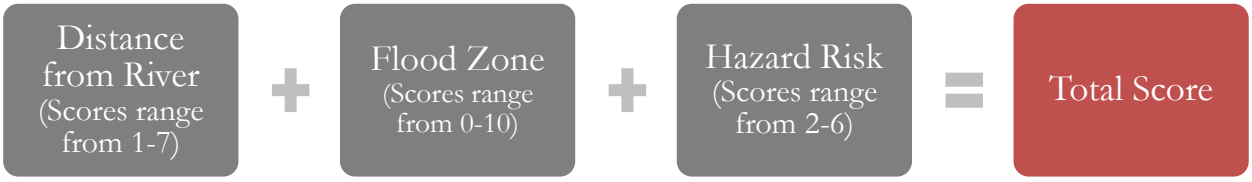
MaineDEP's EGAD Sites

The bulk of this assessment centers on site data derived from MaineDEP's Environmental and Geographic Analysis Database (EGAD). This database is a public information resource designed to store up-to-date site and water quality information for potential, and actual, sources of contamination to groundwater in Maine.

EGAD contains a broad range of data identifying physical, chemical, and biological contaminant sites, environmental monitoring sites, and sites with land use activities which are potential or actual sources of contamination. In addition to its use as a monitoring tool, the database can be used for rapid access to information for emergency response to hazardous material spills.

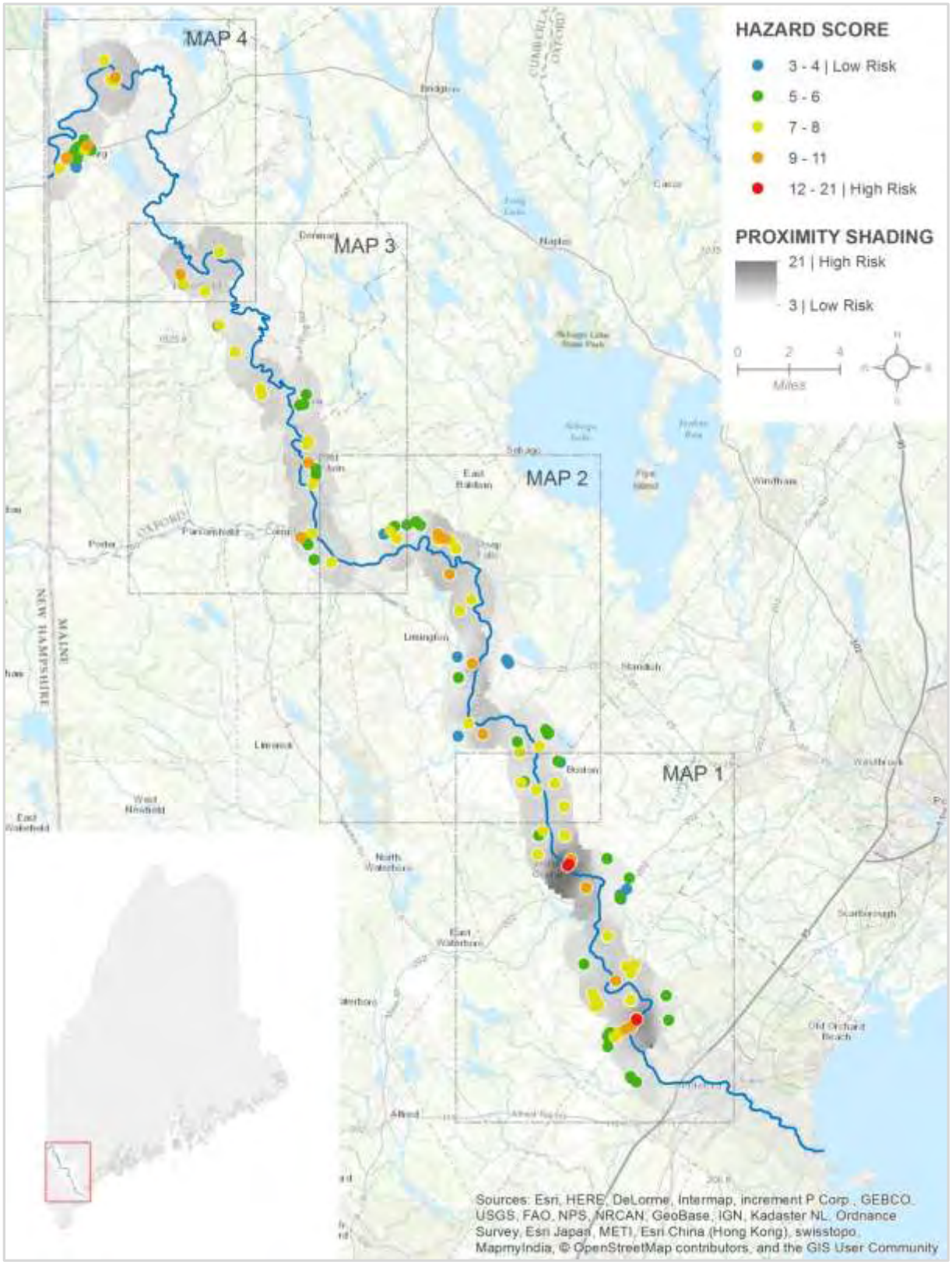
Refining and Prioritizing EGAD Sites

With guidance from the EPA, a one-mile buffer was generated from the river centerline for the portion of the Saco River in Maine. Within this buffer were a total of 720 individual EGAD sites. After reviewing the list with the Advisory Committee and eliminating sites not deemed to be a serious threat to drinking water, as well as sites below the water intake in Saco/Biddeford, the number of potential hazards was narrowed down to 176. (The process used by the project team to refine the initial number of potential hazards is documented in greater detail in the appendix). Of these remaining sites, each was then scored using the following criteria, with a low score corresponding to a low risk.

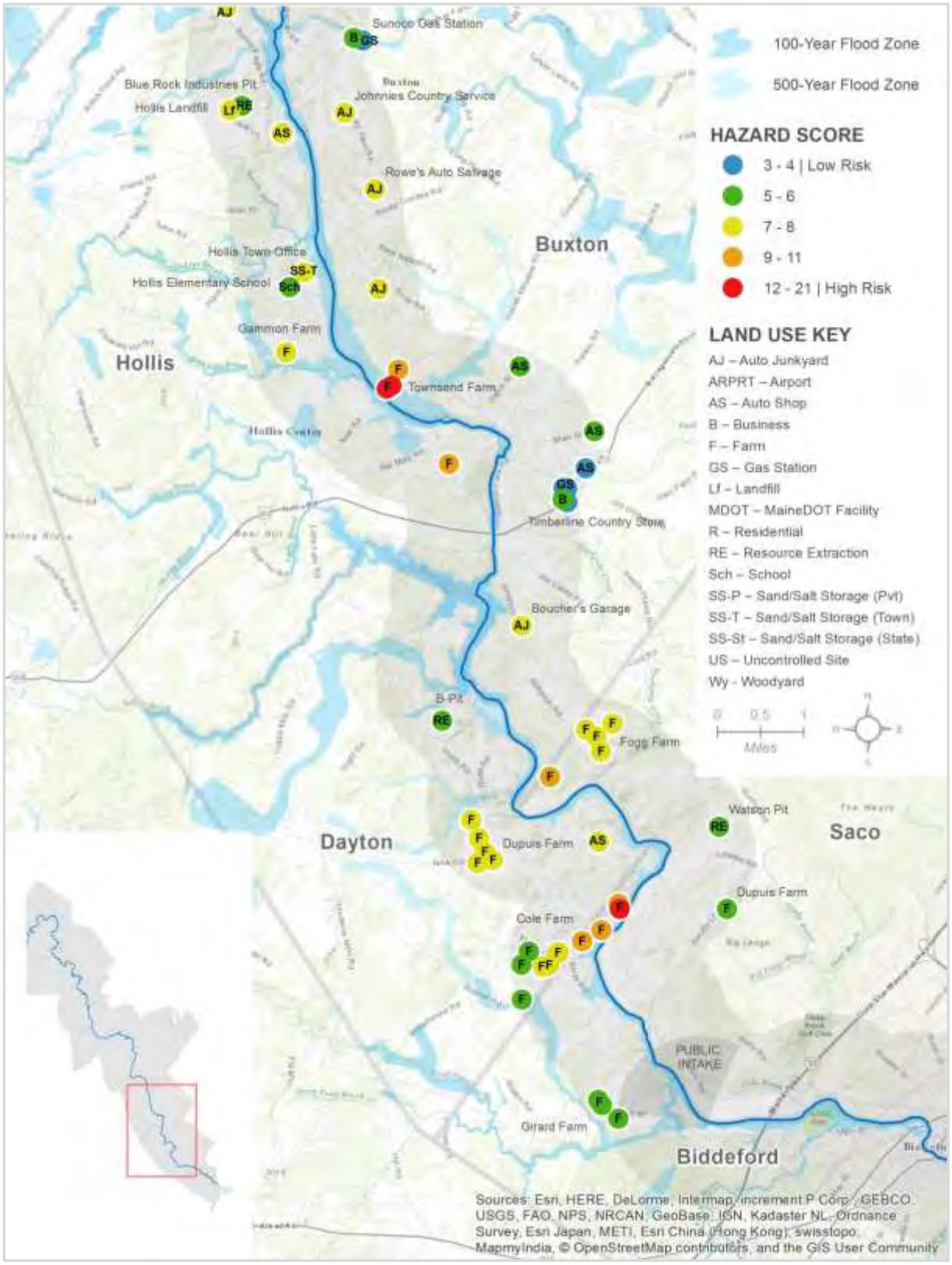


Distance from River	Determined in increments of 500 feet from the centerline, each site received a score ranging from 1 to 7 corresponding to how far it is from the river centerline.
Flood Zone	Sites within a 100-year flood zone were given a score of 10, sites within a 500-year flood zone were given a score of 5, sites outside flood zones were given a score of 0.
Hazard Risk	The project team worked with the Advisory Committee to assign each EGAD site a High (6), Medium (4), or Low (2) risk score associated with the type of hazard present at the site (i.e., chemical, petroleum, multiple, etc.).

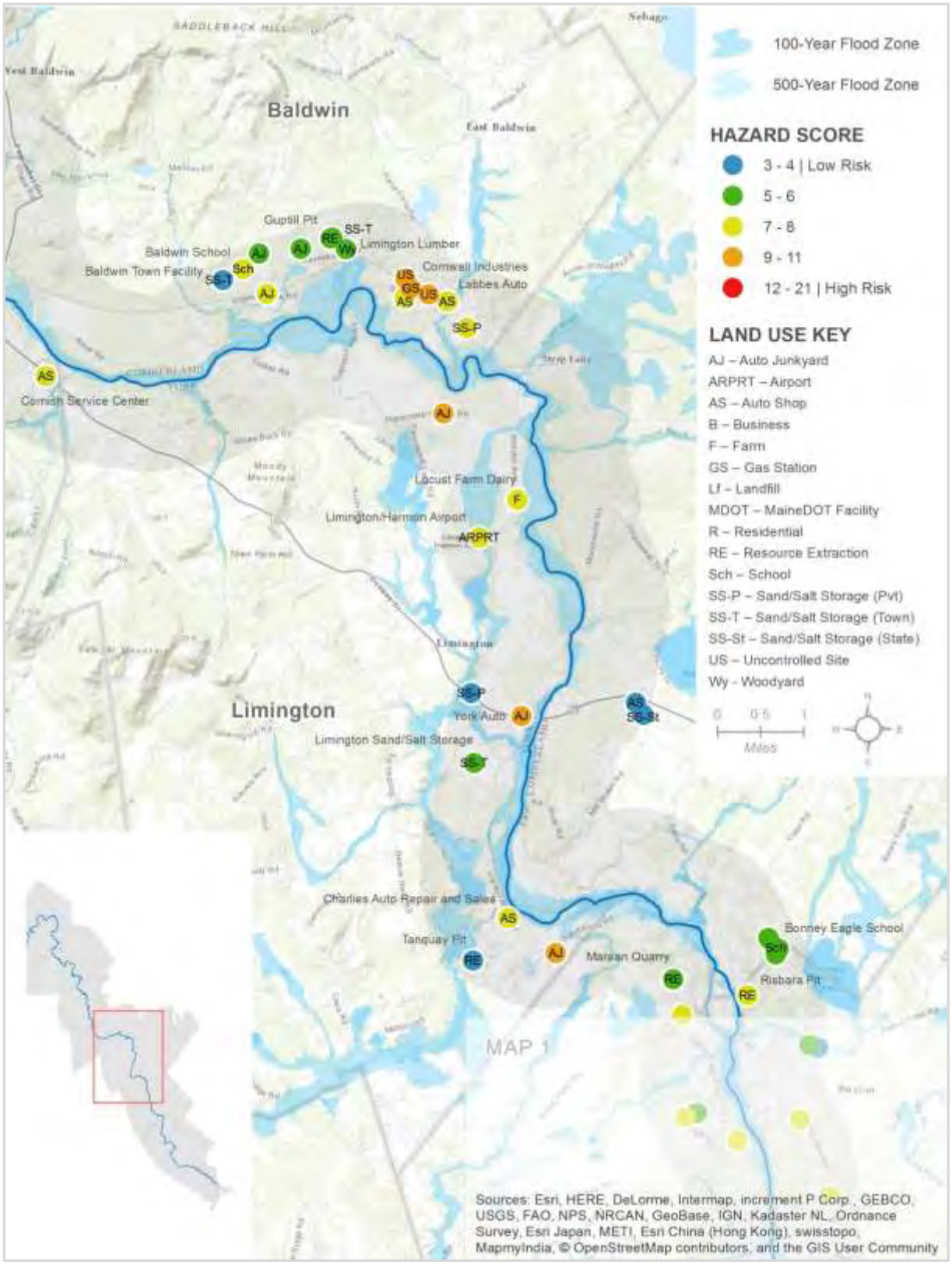
Overview Map



Map 1


Sunoco Gas Station
Blue Rock Industries Pit
Hollis Landfill
Buxton
Johnnies Country Service
Rowe's Auto Salvage
Buxton
Hollis Town Office
Hollis Elementary School
Gammon Farm
Hollis
Townsend Farm
Hollis Center
Timberline Country Store
Boucher's Garage
B-Pit
Fogg Farm
Watson Pit
Saco
Dayton
Dupuis Farm
Dupuis Farm
Cole Farm
PUBLIC INTAKE
Girard Farm
Biddeford
100-Year Flood Zone
500-Year Flood Zone
HAZARD SCORE
3 - 4 | Low Risk
5 - 6
7 - 8
9 - 11
12 - 21 | High Risk
LAND USE KEY
AJ – Auto Junkyard
ARPRT – Airport
AS – Auto Shop
B – Business
F – Farm
GS – Gas Station
Lf – Landfill
MDOT – MaineDOT Facility
R – Residential
RE – Resource Extraction
Sch – School
SS-P – Sand/Salt Storage (Pvt)
SS-T – Sand/Salt Storage (Town)
SS-St – Sand/Salt Storage (State)
US – Uncontrolled Site
Wy - Woodyard
0 0.5 1
Miles
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Map 2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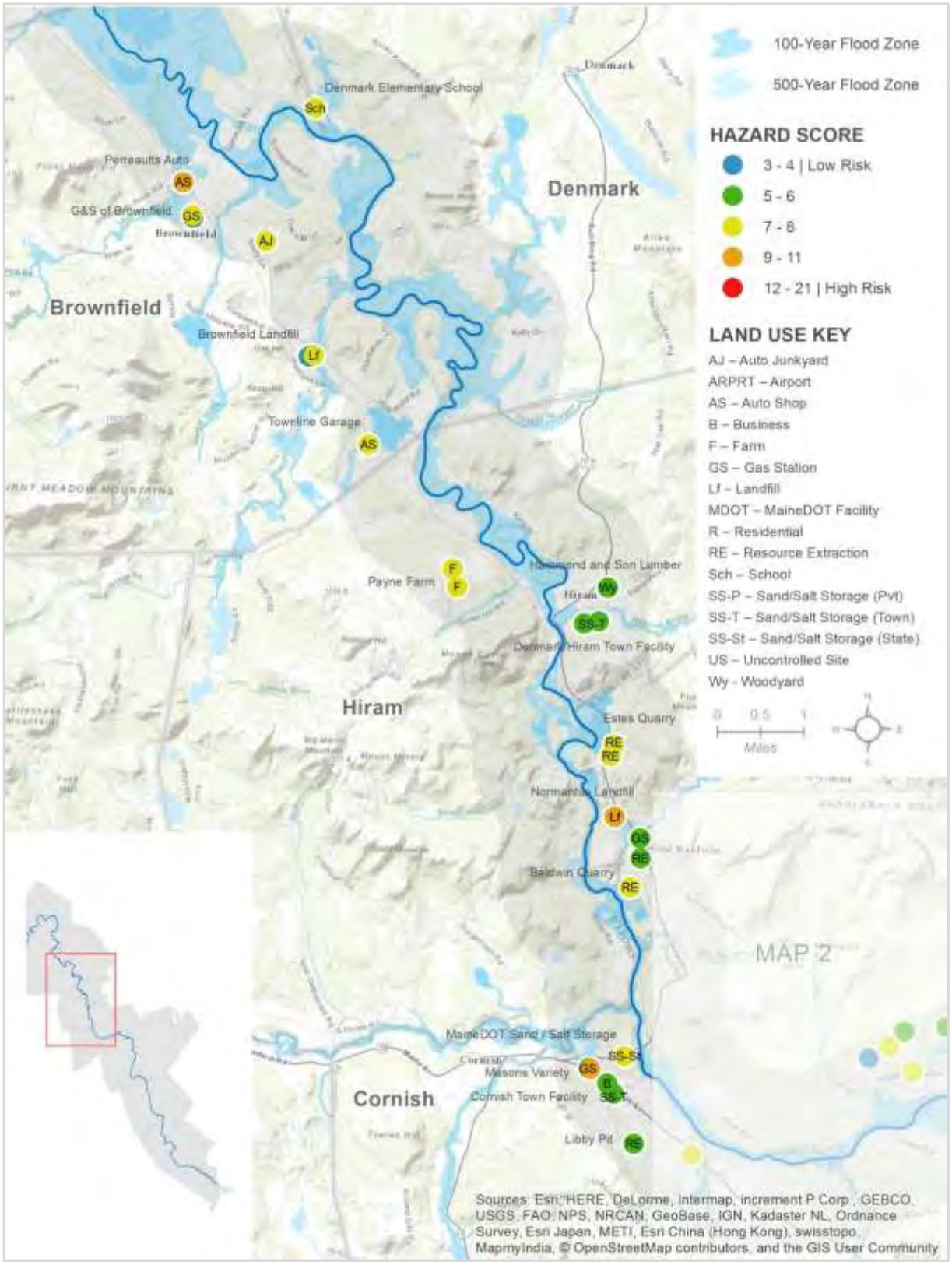
US – Uncontrolled Site
Wy - Woodyard
Miles
Baldwin
East Baldwin
Sebago
Guptill Pit
Limington Lumber
Baldwin School
Baldwin Town Facility
Cornwall Industries
Labbes Auto
Cornish Service Center
Locust Farm Dairy
Limington/Harmon Airport
Limington
York Auto
Limington Sand/Salt Storage
Charlies Auto Repair and Sales
Tanquay Pit
Maxsan Quarry
Bonney Eagle School
Risbara Pit
MAP 1
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Map 3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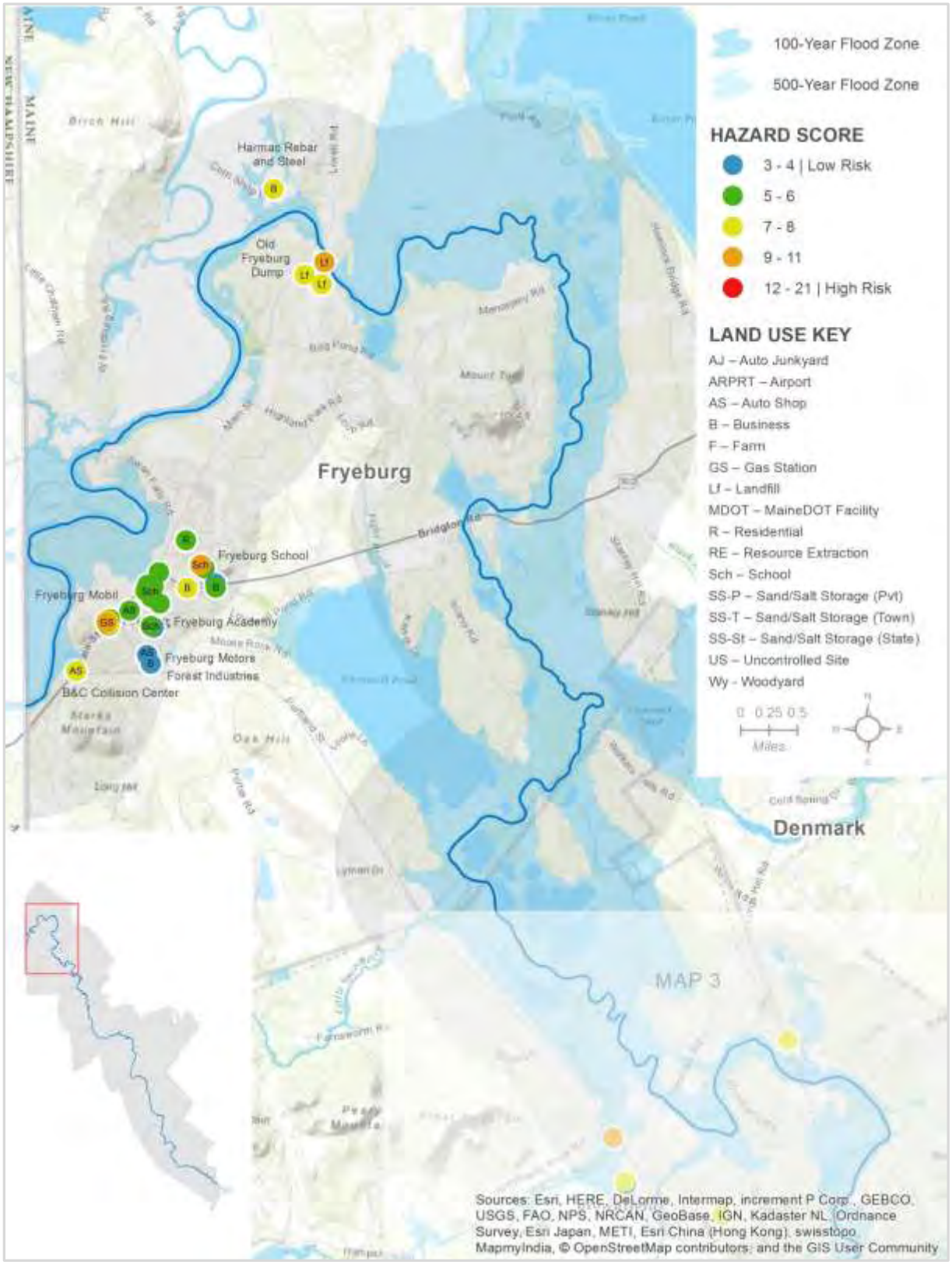
Denmark Elementary School
Denmark
Perreaults Auto
G&S of Brownfield
Brownfield
Brownfield
Brownfield Landfill
Townline Garage
Payne Farm
Hammond and Son Lumber
Denmark/Hiram Town Facility
Hiram
Estes Quarry
Normandin Landfill
Baldwin Quarry
MAP 2
Maine DOT Sand / Salt Storage
Mason's Variety
Cornish
Cornish Town Facility
Libby Pit
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Map 4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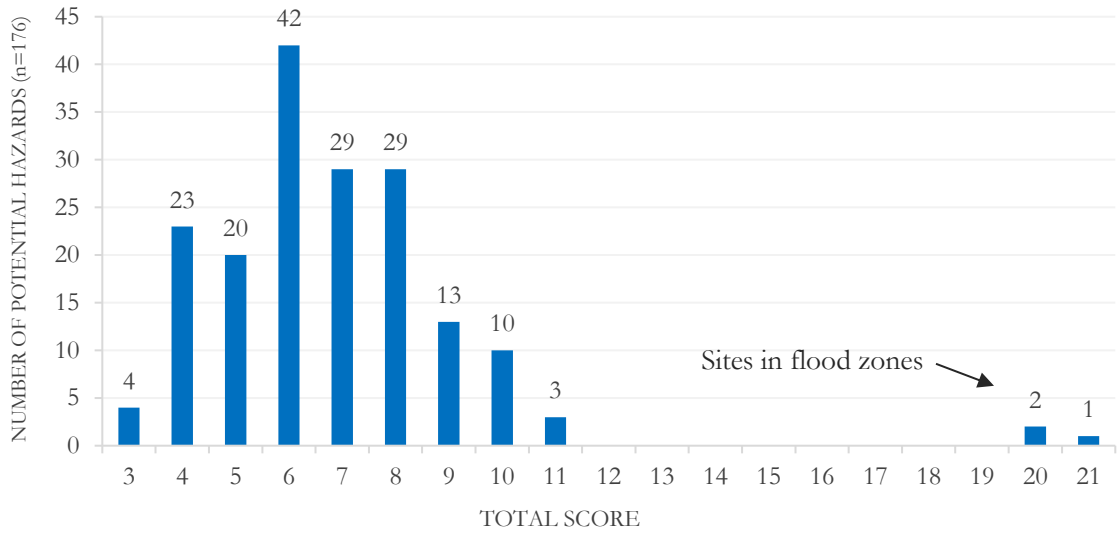
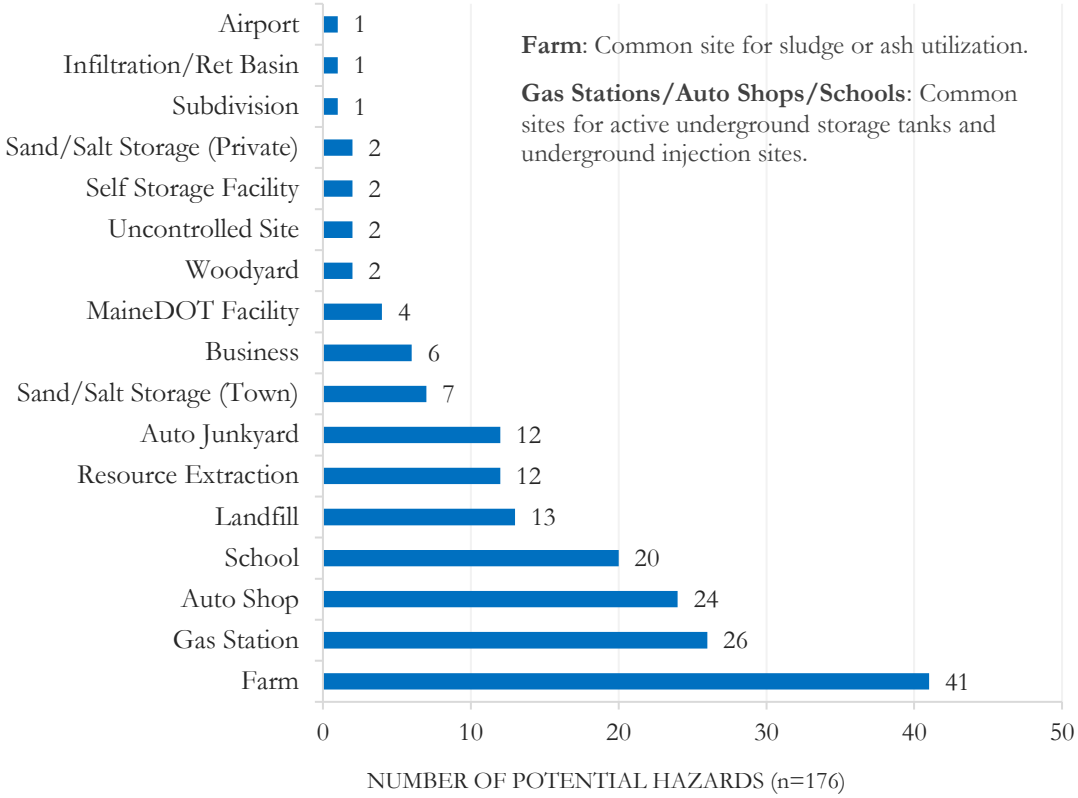
0 0.25 0.5
Miles
Fryeburg
Denmark
Harmas Rebar and Steel
Old Fryeburg Dump
Fryeburg School
Fryeburg Mobil
Fryeburg Academy
Fryeburg Motors
Forest Industries
B&C Collision Center
MAP 3
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Distribution of EGAD Sites by Total Score



The graph above shows the distribution of scores for the 176 potentially hazardous EGAD sites within a one-mile buffer of the Saco River (low scores correspond to low risk). Scores ranged from 3 to 21 with most scores falling in the 3 to 11 range. The three sites with scores of 20 and 21 were all farm fields and the only sites located within flood zones.

Distribution of EGAD Sites by Land Use Activity



The graph above shows the distribution of EGAD sites by the type of hazard posed. The most frequently identified hazard within the one-mile buffer are active underground tanks – found mostly at gas stations, schools, and auto shops. Due to the large amount of agricultural activity in the area, sludge and ash utilization sites are also quite prevalent. These are exclusively found on farms where biomass material or treated wastewater is spread on the land for fertilization purposes. Underground injection sites – sites which discharge into sources of drinking water – are also quite common and found at auto shops and gas stations. A full description of EGAD sites and their corresponding hazard scores is included in Table 1 on the following page.

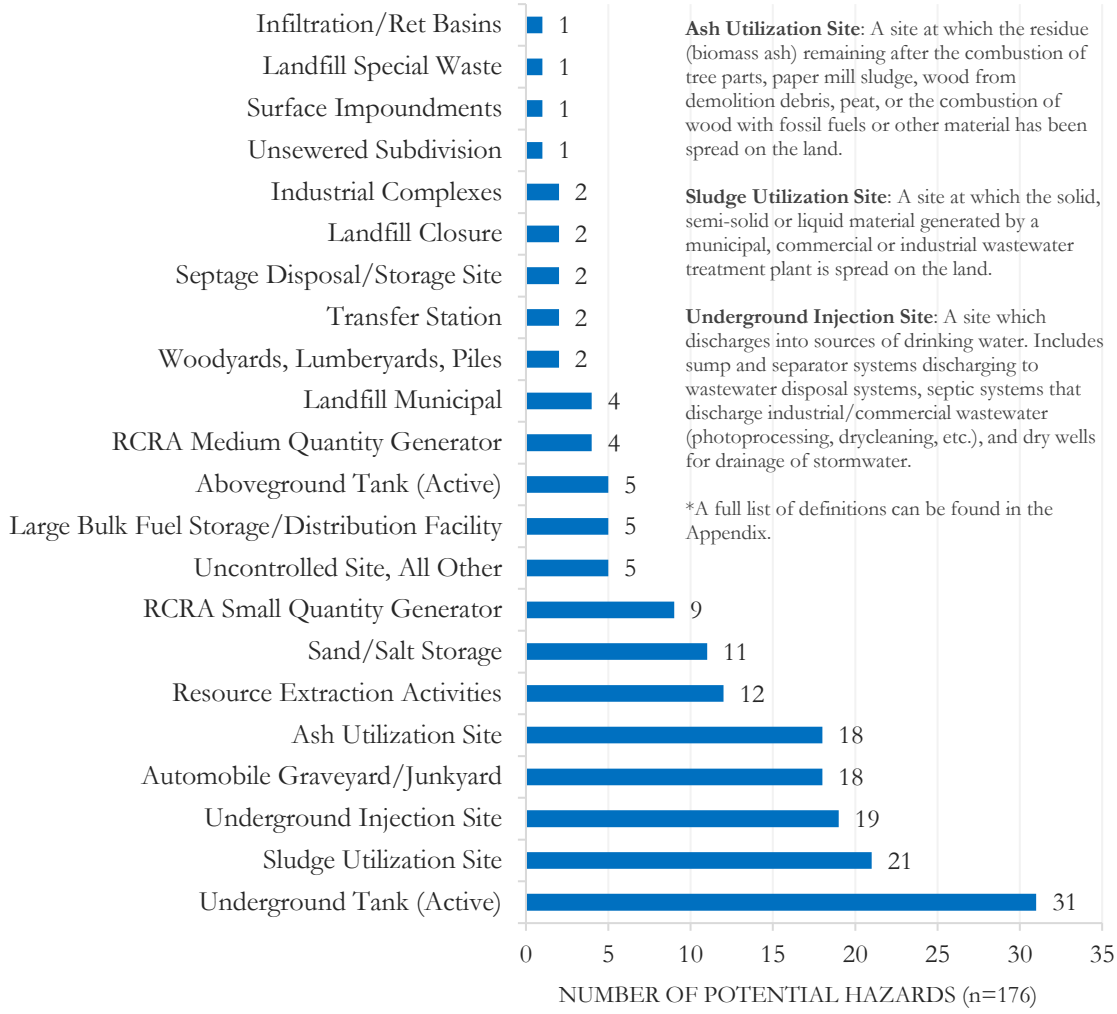
Table 1: EGAD Hazard Definitions and Scoring Matrix

**A low score corresponds to low risk.*

Description	Hazard Type	Risk (Score)	# of Hazards
Aboveground tank (active): A container, 90% or more of which is above the ground, which is used to hold oil and other petroleum derived products	Petroleum	High (6)	5
Ash utilization site: A site at which the residue (biomass ash) remaining after the combustion of tree parts, paper mill sludge, wood from demolition debris, peat, or the combustion of wood with fossil fuels or other material has been spread on the land.	Multiple	Moderate (4)	18
Automobile graveyard/junkyard: An area used to store three or more unserviceable, discarded, worn out or junked motor vehicles. Also includes an area used for automobile dismantling, salvage and recycling operations.	Multiple	Moderate (4)	18
Industrial complexes: A non-point source site where manufactured goods are produced. Runoff and infiltration of water from these sites may carry substances which can contaminate ground water.	Multiple	Moderate (4)	2
Infiltration/retention basins: A site at which run-off or other surface flow enters a property other than where it originated, and where water is held while it slowly penetrates through the ground surface into the subsurface soil.	Bacteria	Low (2)	1
Landfill (municipal): Municipally owned and operated solid landfill licensed to accept municipal solid waste (from household and normal commercial sources).	Multiple	Moderate (4)	4
Landfill closure:	Multiple	Low (2)	2
Landfill/Special waste:	Multiple	Moderate (4)	1
Large bulk fuel storage/distribution facility: A group of large above ground storage tanks (ASTs) usually used to store petroleum products, (i.e., marine terminals, petroleum distribution facilities), with a total facility volume greater than 1320 gallons (requires a Spill Prevention, Control and Countermeasure (SPCC) plan).	Petroleum	High (6)	5
RCRA small quantity generators: A Resource Conservation and Recovery Act (RCRA) generator that generates less than 100 kilograms of hazardous waste per month AND accumulates no more than 55 gallons (1 drum; ~208 kg) of hazardous waste per month.	Multiple	Low (2)	9
RCRA medium quantity generators: A Resource Conservation and Recovery Act (RCRA) generator that generates between 100 and 1000 kilograms (220-2200 lbs) of hazardous waste per month, either on average per month or exceeding 100 kg in any one month.	Multiple	Moderate (4)	4
Resource extraction activities: A site at which surface or underground mining has been or is being conducted. These sites may include gravel pits, above ground or underground metallic mineral mines, etc.	Multiple	Low (2)	12
Sand/salt storage: An area at which salt, or sand-and-salt, are stored in preparation for road and highway deicing.	Chloride	Low (2)	11
Septage disposal/storage site: A site on which a mixture of liquid and solid septage have been spread on the land, or where such waste is stored. Septage sources may be domestic or commercial.	Bacteria	Low (2)	2
Sludge utilization site: A site at which the solid, semi-solid or liquid material generated by a municipal, commercial or industrial wastewater treatment plant is spread on the land.	Multiple	Moderate (4)	21
Surface impoundments (SIA): An unlicensed site once used for the disposal of liquid wastes.	Pending	Pending	1

Description	Hazard Type	Risk (Score)	# of Hazards
Transfer station: A waste facility constructed and managed for storage, compaction and/or placement of solid waste for movement to another waste facility.	Multiple	Low (2)	2
Uncontrolled site, all other: A location at which hazardous substances came to be located, where the site poses a threat or hazard to any person or the natural environment and requires action to abate/clean-up/mitigate the threat of hazard.	Pending	High (6)	5
Underground injection sites: A site which discharges into sources of drinking water. Includes sump and separator systems discharging to wastewater disposal systems, septic systems that discharge industrial/commercial wastewater (photoprocessing, drycleaning, etc.), and dry wells for drainage of stormwater.	Bacteria	Low (2)	19
Underground tank (active):	Petroleum	Low (2)	31
Unsewered subdivisions: A high density commercial or residential subdivision, condominium, or trailer park which depends on individual subsurface wastewater disposal systems for the disposal of sanitary wastewater.	Bacteria	Low (2)	1
Woodyards, Lumberyards, Piles: Woodyards, wood fuel and woodwaste storage piles associated with power plants, lumberyards, sawmills.	Multiple	Low (2)	2
Total			176

Distribution of EGAD Sites by Type of Hazard



The graph above shows the distribution of EGAD sites by the general land use activity at the site. Since the area buffering the Saco River north of Biddeford/Saco is predominantly rural, the most common land use activity is farming and agriculture, while a number of other land uses were also present at EGAD sites – gas stations, auto shops, and schools were also particularly numerous.

Following the initial GIS assessment, staff used professional judgment and the advisory committee to desktop assessments and site visits…

Bridges and Road Crossings

There are numerous examples from across the country of incidents where tanker trucks carrying chemicals, biological waste, or some other contaminant to drinking water, crash and spill their contents into nearby water sources. This has occurred several times in the Portland area just in the past year.

In February 2017, the driver of a home delivery oil truck suffered a medical issue that likely caused him to crash and overturn his truck, spilling the entire load of home heating oil (estimated to be about 2,900 gallons) onto I-295 and into the nearby Fore River in South Portland. The incident happened during low tide conditions, which made cleanup more effective. (According to the news article the driver of the truck was in satisfactory condition following the crash).

A home heating fuel truck that overturned on I-295 in February 2017, spilling its contents into the Fore River in South Portland. (Photo courtesy of Maine State Police).

Just a few days later a similar incident occurred in the southbound lanes of I-295 on Tukey's Bridge in Portland. A large oil tanker, when forced to slow down abruptly, jackknifed blocking several lanes of traffic. Fortunately, the oil truck was empty at the time, so no fuel was spilled; but, as the picture to the right attests, the truck nearly plunged off the bridge into the Back Cove below. (No injuries were reported for this incident either).

Just a few days later, this tanker truck jackknifed and crashed in the southbound lanes of I-295 on Tukey's Bridge in Portland. The truck was empty at the time. (Photo courtesy of Jill Brady, Portland Press Herald).

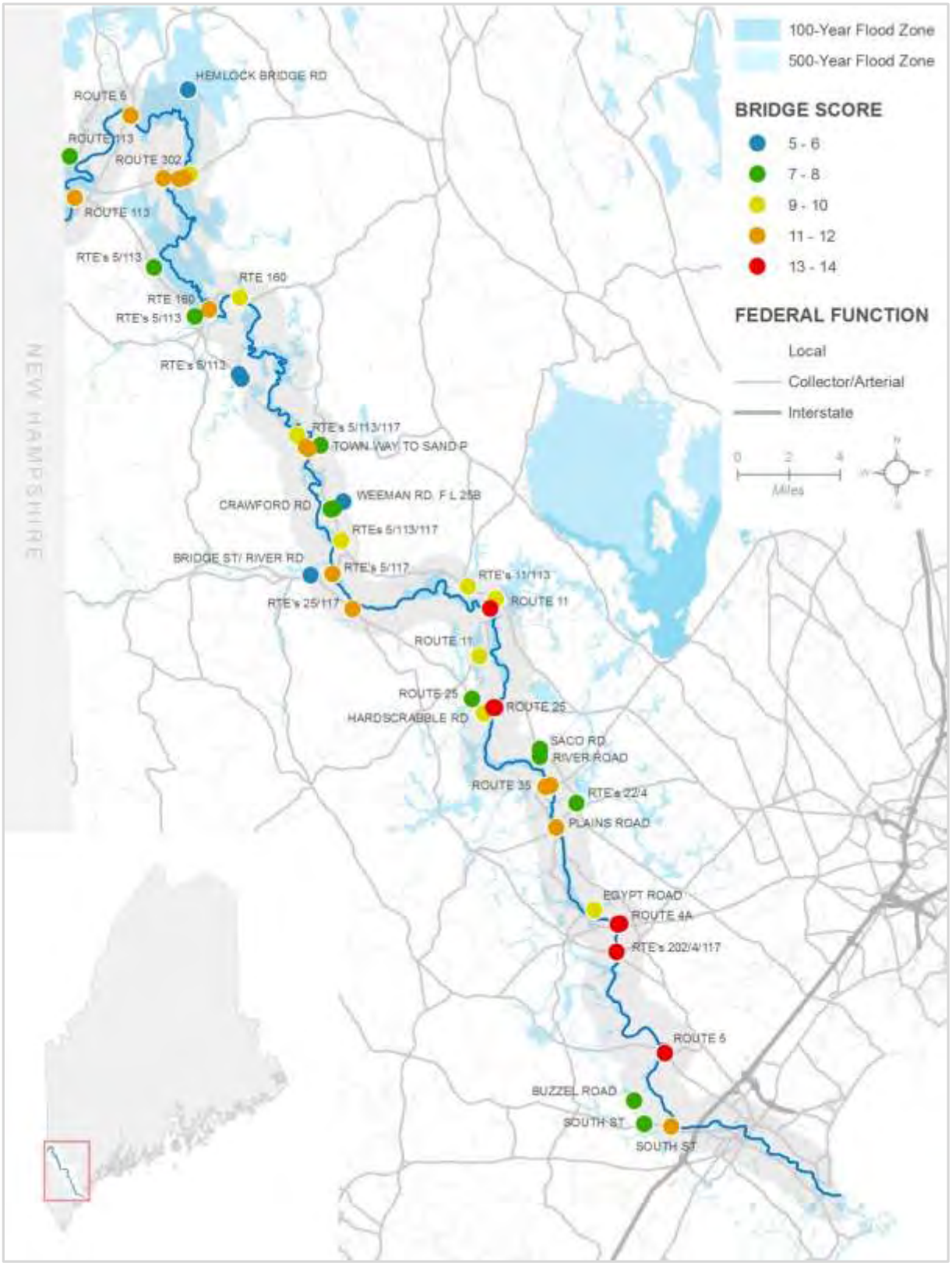
Along the portion of the Saco River in Maine 47 bridges were identified within the established one-mile buffer. While an accident (such as the ones described) could occur on any one of these bridges, it would be more likely to occur on a bridge that experiences heavier traffic volumes; a spill would also be more disruptive the closer the incident is to the public intake in Biddeford/Saco.

Risk Assessment of Bridges

Similar to the assessment conducted for MaineDEP's EGAD sites, each of the 47 bridges within the one-mile buffer were scored using the following criteria, with a low score corresponding to a low risk.

Distance from River	Determined in increments of 500 feet from the centerline, each bridge received a score ranging from 1 to 7 corresponding to how far it is from the river centerline.
Distance from Intake	A spill closest to the public intake in Biddeford/Saco presents the most risk to drinking water quality. For this reason, bridges received a score from 1-4 based on how far they are (as the crow flies) from the intake.
Road Classification	Bridges with higher traffic volumes are more likely to experience a crash. Bridges received a score from 1-3 based on the federal function of the road crossing (Local, Collector, Arterial).
Bridge Condition	Bridge condition data is available via the Maine Office of GIS. Bridges received a score from 1-2 based on its general condition as reflected in this dataset.

Bridges and Road Crossings



Dams

Aging dams / break in a dam / flooding, etc.

No new dams have been built in Maine since the 1980's, and the current trend is towards dam removal.

Dams in Maine have been built for a number of purposes including water storage, flood control, navigation, and hydropower. Generally speaking, most Maine dams are not constructed as flood control structures; however, the dams with large impoundment capacity can be useful for controlling flood discharges if their reservoirs are below capacity. Many dams in the lower reaches of Maine's rivers are run-of-river dams, and have little or no capacity to capture and hold runoff during floods (Maine Geological Survey, 2005).

The collaborative dam database indicates the Saco River Basin contains approximately 44 dams. Ten of the dams within the river basin are used for generating hydroelectric power, three are used for flood control and stormwater management, three are used for water supply, and fourteen are used for recreational use. Eleven dams are used for "other" purposes. The storage capacity of impoundments in the Saco River Basin is approximately 96,000 acre feet.

There are several major dams along the Saco River along with a fewer smaller dams…

Swans Falls Dam, Fryeburg

Hiram Dam, Hiram

Bonney Eagle Dam, Hollis

West Buxton Dam, Buxton

Bar Mills Dam, Buxton

Skelton Dam, Buxton and Dayton
The Skelton Dam is an embankment dam on the Saco River between the towns of Buxton and Dayton in York County. It is located about 7 miles northwest of Saco and Biddeford. The dam was completed in 1948 with the primary purpose of hydroelectric power generation. The largest fish lift in Maine was completed on the dam in 2001. The dam and facilities are owned by Brookfield Renewable.

Spring and Bradbury Dams, Saco

Cataract Dam, Saco

Maine currently has only one State Dam Inspector (SDI), with the Maine Emergency Management Agency (MEMA). MEMA inspects all Maine dams in a rotating fashion. Currently more than 15% of inspected dams are considered high-hazard-potential or significant-hazard-potential dams. Seventeen of the high-hazard-potential dams currently need over $12 million in repairs, demonstrating just how significant an effect aging has had on Maine's dams (American Society for Civil Engineers 2008).

Aging dams?

Properties in the Flood Zone

The Maine portion of the Saco River is mainly rural in nature.

Soil Erosion

Heavy rain events and flooding, as well as activities such as cultivation, can cause erosion along river banks. Erosion is the natural process of soil movement from higher areas to lower areas by the action of precipitation or flowing water. Factors affecting soil erosion include soil type, slope, intensity, and duration of precipitation, soil cover and management practices. When grass or pasture is not maintained, bare areas of soil can develop. Nutrients and bacteria attached to eroded soil particles can add to the pollution of surface waters. Soil can be washed from cop fields and pastures that are not protected with erosion control practices. Buffers surrounding pastures can capture nutrients and bacteria and prevent their loss into surface waters. https://njaes.rutgers.edu/animal-waste-management/ag-waste-mgmt-practices/erosion-control.pdf

The overriding fact is that dense vegetation virtually prevents soil erosion. The soil from entirely denuded areas quickly washes down the slopes and into rivers and streams. This is called accelerated erosion, as distinguished from the very slow geological erosion, which occurs naturally in geologic time on vegetated watersheds.

"On a bare area, a single storm can remove more soil than ten thousand years of geological erosion."

The function of vegetation in holding soil in place and preventing the siltation of waterbodies is absolutely essential.

Driving raindrops never hit the soil directly. They hit the leaves, stems, and dead debris and percolate into the soil. This is why runoff from a heavily forested watershed is clear. No soil particles are disturbed or moved. Secondly. The soil is held together by a mass of roots and rootlets, all interconnected to each other and to the strong main stem. The soil is held in a mesh of roots. In addition, soils under forest vegetation have much organic matter, which increases the porosity. Dead tree roots form canals which also increase percolation. Thus water percolates in these soils with great ease and normally flows slowly down the slope under the river.

https://books.google.com/books?id=HK3V1RZE4T4C&pg=PA112&lpg=PA112&dq=On+a+bare+area,+a+single+storm+can+remove+more+soil+than+ten+thousand+years+of+geological+erosion.&source=bl&ots=sg_k8lQd_n&sig=umv_60g5HSjwH5_M4SLlQAQ7keE&hl=en&sa=X&ved=0ahUKEwjJlNWxwMnRAhXDPiYKHaMFAtQQ6AEIHDAA#v=onepage&q=On%20a%20bare%20area%2C%20a%20single%20storm%20can%20remove%20more%20soil%20than%20ten%20thousand%20years%20of%20geological%20erosion.&f=false

Increased movement of sediment and other various pollutants can add contamination to drinking water.

Pollutants may be transported to the water via erosion.

Sediment is the most common pollutant, but erosion can also cause pesticides, metals, toxins, oil and grease, and phosphates to enter the water system.

http://www.maine.gov/dep/land/erosion/escbmps/esc_bmp_field.pdf

Boaters and Campers

CURRENT WATER QUALITY PROTECTIONS

Changes to zoning … avoiding incompatible development

Saco River Corridor Commission

The Saco River Commission was established in 1973 and is composed of one member from each community along the Saco River extending from Saco Bay to the New Hampshire border, the Ossipee River from its confluence with the Saco River to the New Hampshire border, and the Little Ossipee River from its confluence with the Saco River to the New Hampshire border. It regulates the lands adjacent to these rivers to a distance of 500 feet as measured on a horizontal plane from the normal or mean high water line of these rivers or to the edge of the 100-year floodplain if that extends beyond 500 feet, up to a maximum of 1,000 feet.

There are a variety of zoning districts along the corridor, including Resource Protection, limited Residential and General Development Districts. The following list of towns offers a general summery of the existing land uses and zoning districts along the Corridor.

Include map of communities abutting the river…

Biddeford

Zoning in Biddeford is by far the most complicated of any of the communities. There are 4 zones that Impact the study area within the community. All of them are rural in nature and do not encourage intense uses. Those zone are **Suburban Residential-1, Rural 1-A, Rural Farm and the Resource Protection zones.**

Saco

The City of Saco has two regulatory zones, the **Resource Protection** zone as regulated by the state shoreland zoning ordinance for the first 250 feet from the river and the and **Conservation-1** districts both of which are very rural in nature.

Buxton

A majority of the zoning in Buxton adjacent to the Saco River is **Rural** with two small areas that are zoned **Residential**. The lot size requirements are 120,000 square feet or 2.7 acres in the Residential zone and 200,000 square feet or 4.5 acres in the rural zone.

Hollis

Hollis has actually created a **Saco River** zone and a **Rural Residential** zone that stretches along the river from South to North the length of the community which boarders with Buxton. The zoning in these two communities have protected this portion of the river to a great extent.

Standish

Zoning along the Saco is mixed however all of the zoning is of a protective nature to the river. The zoning consists of **Rural Residential, Shoreland, and Resource Protection** much of the zoning along the river is to accommodate previous development that has occurred and not allow new unwanted development to find its' way to this region of the community.

Limington

Limington has very limited capabilities for the production of the zoning map SMPDC has check the zoning and found that all of the zoning the length of the river is **Rural,** a map has not been provided but the zoning uses have been in order to see that the uses have a great deal of oversight by many of them needing Planning Board approval prior to being established.

Cornish

Zoning in Cornish includes ten districts, four of which occur along the River. The districts include the Agricultural District (AD), Residential District, Commercial District, and the Resource Protection regulated under the State's Shoreland Zoning Ordinance. Most of the area is residential uses, with more commercial uses, including an auto body and a gas station heading closer to the village.

Brownfield

Brownfields zoning requires any commercial or industrial activities, other than home occupations and agriculture, to be approved by the Planning Board. The ordinance does not identify zoning districts, but does outline performance standards related to proposed industrial and commercial uses. The website also includes a map of the shoreland zones which include Resource Protection, Limited Residential, and Stream Protection. The map legend does not appear accurate but there is a buffer that is assumed to be Limited Residential in some areas, and Resource Protection in others along both sides of the Saco River. Brownfield Shoreland Zoning Map

Fryeburg

Fryeburg zoning includes several zones. The land use and Shoreland Zoning Maps are separated. The land Use map does not show any districts adjacent to the river. However, the shoreland map shows the entire rivers buffered by a Resource Protection Zone.

Shoreland Zoning Map

Land use Zoning map

Limerick

It appears that Limerick has a new website and neither the town ordinances nor the zoning map is available online. Maps were requested from the Town's Planning Board Assistant.

Dayton

The Town of Dayton zoning has a River Buffer District that reglates areas within a 250 foot buffer along both sides of the Saco River. The 250- ft. distance lies within the jurisdiction of the Saco River Commission and corresponds with Shoreland Zoning Requirements.

http://www.dayton-me.gov/vertical/Sites/%7B9C074AD7-0AAD-4319-9ED3-5BCCE3AAE138%7D/uploads/%7B03BBCA83-B3F9-49FA-BD8A-6DA9B48A9A58%7D.PDF

Baldwin

Baldwin's zoning map shows the Town has four zoning districts. The area adjacent to the Saco is zoned as a Rural District. The purpose of the rural district is to conserve the qualities of the open rural open space, including agricultural and forestry uses while encouraging low intensity development compatible with the physical capability of the land. Most uses are agricultural or residential in nature. However, automotive junkyards, and repair facilities could be allowed under a conditional use permit.

Baldwin Zoning Map

Hiram

Hirams zoning along the Saco River allows for a small area Limited Residential. The remainder of the River is zoned Resource Protection and lies within a FloodPlain Protection (100 year flood zone)area.

Zoning Map

Shoreland Zoning Map

Denmark

RECOMMENDATIONS FOR RISK MANAGEMENT

Preserving open space

RESOURCES

http://www.pressherald.com/2017/02/06/fuel-truck-crashes-closes-i-295-north/

http://www.pressherald.com/2017/02/12/tanker-truck-crash-on-295-bridge-blocks-traffic-in-portland/

Regional Water System Master Plan Study for the Southern Maine Regional Water Council. Wright Pierce. 2008.

MPBN Documentary

Maine Outdoor Heritage Fund Documentary. The Saco River Corridor: Protecting Maine's Water. http://srcc-maine.org/saco-river-video/

Seevey & Maher

Portland Press Herald Article: Maine Voices: Maine Water Co. Appreciates State's Reverence for a Critical Resource. February 28, 2013. Eric Thornburgh

http://www.pressherald.com/2013/02/28/maine-water-co_-appreciates-states-reverence-for-a-critical-resource_2013-02-28/

https://www1.maine.gov/dacf/flood/docs/maineriverbasin/maineriverbasinreport_chap6and7.pdf

https://wiki.colby.edu/display/stateofmaine2009/State+of+Rivers+and+Dams+in+Maine

http://www.nytimes.com/1988/08/07/us/maine-dams-removing-obstructions-to-salmon.html

APPENDIX

1-Mile radius

MaineDEP's EGAD sites
Road crossings and bridges
Dams
Properties in the flood zone
Erosion
Boaters and campers

MaineDEP's EGAD Sites

The majority of this assessment centers around site data derived from MaineDEP's Environmental and Geographic Analysis Database (EGAD). This database is a public information resource designed to store site and water quality information for potential and actual sources of contamination to groundwater in Maine. EGAD contains a broad range of data identifying locations of physical, chemical, and biological contaminant sites, environmental monitoring sites, and sites with land use activities which are potential and/or actual sources of contamination. The database provides up-to-date analytical data for use by state agencies and can also be used for rapid access to information for emergency response to hazardous material spills.

In order to refine this assessment project staff created a methodology with input from the advisory committee to prioritize and refine hazards.

1-mile buffer from the river centerline yielded 720 individual EGAD sites. In order to refine this list project team staff scored each site using the following criteria: Reduced this down to 176.

Professional judgment / desktop assessment

Table 2: Scoring Matrix for EGAD Sites

Distance from River	Score	# of Hazards
< 500 ft.	7	2
501-1000 ft.	6	11
1001-2000 ft.	5	27
2001-3000 ft.	4	54
3001-4000 ft.	3	36
4001-5000 ft.	2	40
> 5,000 ft.	1	6
Total		*176*

Flood Zones	Score	# of Hazards
In 100-yr. Flood Zone	10	3
In 500-yr. Flood Zone	5	0
Not in Flood Zone	0	173
Total		*176*

Hazard Risk	Score	# of Hazards
Low	2	93
Moderate	4	68
High	6	15
Total		*176*

**A low score corresponds to low risk.*

The following is a list of EGAD sites deemed not applicable to this project by project staff and the Advisory Committee. Several sites that would have been considered were not within the one-mile buffer, while others have already been dealt with by the MaineDEP and are no longer potential threats to drinking water.

- Hazardous oil spill
- Engineered subsurface wastewater disposal system
- Surface spill
- Marina/boatyard
- Mystery spill
- RCRA large quantity generator
- Sanitary and industrial wastewater treatment facility
- Surface water ambient toxics
- Golf courses
- RCRA remediation
- Uncontrolled site DOD
- Underground tank – removed
- Underground tank – out of service
- Underground tank – abandoned in place
- Underground tank – never installed
- Underground tank - leaking
- Aboveground tank – removed
- Aboveground tank – out of service
- Above ground tank – planned
- Aboveground tank – leaking

Bridges and Road Crossings

Another major area of concern are road crossings/bridges

Table 3: Bridge/Road Crossing Scoring Matrix

Distance of Bridge from River	Score	# of Bridges
< 500 ft.	7	16
501-1000 ft.	6	4
1001-2000 ft.	5	7
2001-3000 ft.	4	9
3001-4000 ft.	3	2
4001-5000 ft.	2	6
> 5,000 ft.	1	3
Total		47

Distance of Bridge from Intake	Score	# of Bridges
5 mi. or less	4	4
6-10 mi.	3	4
11-25 mi.	2	17
26-50 mi.	1	22
Total		47

Road Classification at Crossing	Score	# of Crossings
Arterial	3	9
Collector	2	27
Local	1	11
Total		47

Bridge Condition	Score	# of Bridges
Deck, Substructure, Superstructure 4 or less	2	7
Deck, Substructure, Superstructure 5 or more	1	40
Total		47

Dams

Properties in the Flood Zone

In total there are 11,057 properties in the 1-mile buffer surrounding the Saco River centerline (MEGIS property point file).

Development pressure…

Table 4: Property Scoring Matrix

Properties in Flood Zone	Score	# of Properties
Within 100-yr. Flood Zone	15	157
Within 500- yr. Flood Zone	10	27
Total		184

Properties Not in Flood Zone	Score	# of Properties
< 500 ft.	9	246
501-1000 ft.	8	1018
1001-2000 ft.	7	2832
2001-3000 ft.	6	2374
3001-4000 ft.	5	2077
4001-5000 ft.	4	1894
> 5,000 ft.	3	432
Total		10,873

**Distance from river centerline.*

Erosion

Boaters and Campers

100,000?

No facilities… Often 5,000 people over the course of a weekend at certain spots.

Arial 0,86,150

Arial 155,187,89

Arial

Garamond

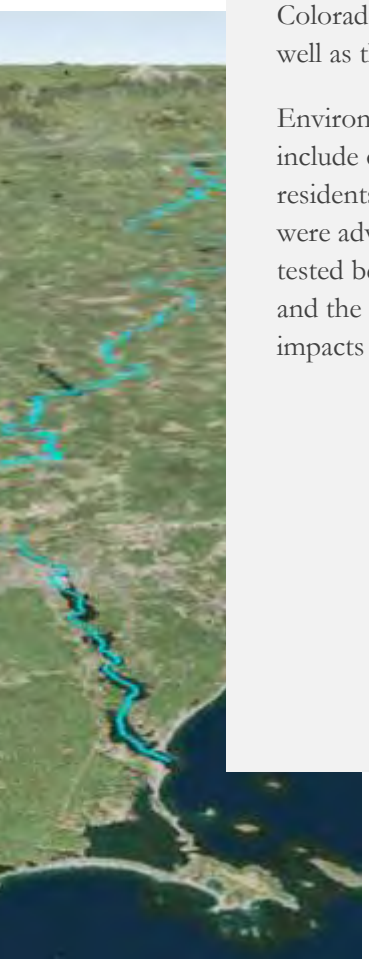
Animas River Spill

On August, 2015, EPA personnel accidentally caused the release of toxic wastewater when attempting to add a tap to the tailing pond of the Gold King Mine in Silverton, Colorado.

The maintenance by EPA was necessary because local jurisdictions had previously refused Superfund money to fully remediate the region's derelict mines, due to a fear of lost tourism.

The accident resulted in 3 million gallons of mine wastewater and tailings (heavy metals and toxic elements) into Cement Creek, a tributary of the Animas River in Colorado. The spill temporarily changed the color of the river to orange, and has affected waterways of municipalities in the states of Colorado, New Mexico, and Utah, as well as the Navajo Nation.

Environmental impacts from the spill include closing the river to recreation, residents with wells in floodplains were advised to have their water tested before drinking or bathing in it, and the spill has had devastating impacts on ecosystems.



Elk River Spill

The Elk River chemical spill occurred on January 9, 2014 when approximately 10,000 gallons of crude MCHM (a chemical foam used to wash coal) leaked from a Freedom Industries facility into the Elk River in Charleston, West Virginia.

The chemical spill occurred one mile upstream from the West Virginia American Water intake treatment and distribution center. When made aware of the chemical spill, West Virginia American Water assumed its carbon filtration system could handle it, but when the chemical began flowing through the carbon filter the company reported the problem and instructed its customers to cease using its tap water.

Following the spill, up to 300,000 residents within nine counties were without access to potable water for several weeks. Freedom Industries later disclosed to state and federal regulators that an additional chemical, PPH, spilled into the water but declared the exact substance of the chemical "proprietary."

Despite assurances from federal and state officials that the water is safe, residents and experts remain concerned as the black licorice smell characteristic of crude MCHM is still being detected in homes and schools.