

VII. Critical Natural Resources by SMPDC

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Critical Natural Resources

Topography

Wells is part of the coastal plain of the New England physiographic region, which is characterized by low relief, poorly developed drainage systems and a mantle of glacial materials in the form of till and large quantities of sand and gravel. The Town rises gently and gradually from east to west. Elevations rise from sea level to approximately 140 feet. The Tatnic Hills near the South Berwick border are the highest elevation at approximately 360 feet.

Slope

Slope affects the capability of land for development. The slope or steepness of the land is defined by the change of elevation over horizontal distance. For example, a 10 foot rise within 100 feet is a 10% slope. Slopes in the 3% to 8% range are generally considered to present the fewest restrictions to development. Typically, development costs increase with slope although slopes of 0-3% may lead to drainage problems.

Slope is important to planning purposes for several reasons. The increase in slope corresponds to the potential increase for surface runoff and erosion. Soil depth tends to be thinner as slopes increase, thereby decreasing the capacity of the land to support leach fields for private septic in areas that lack public sewer services. The Maine State Plumbing Code does not allow installation of septic systems on slopes greater than 20%. Most of Wells' land area has no town sewer availability so private septic must serve.

In Wells, like many coastal communities in Southern Maine, slope is generally between 0% and 8% in most areas. The few areas with slopes steeper than 15% primarily occur along river and stream corridors or coastal waterfronts. There are approximately 1,046 acres of steep slopes or about 3% of Wells.

Although these steep slope areas present limitations, development is likely restricted anyway because of shoreland proximity. The lack of adequate slope to promote proper drainage is of more pressing concern to development in Wells.

Soils

The soils in Wells have developed over time from the interaction of climate, vegetation, topography and surficial materials. Since much of the surface materials of Wells are underlain by marine clays and glacial till, many of the soils tend to be moist and/or stony with areas of high water table, shallow ledge or ledge outcroppings. Where there is sand and gravel or stratified drift, the soils tend to be more sandy and gravelly and better drained. Hydric soils (also referred to as wetland soils) tend to be found in low spots associated with surface water features or in areas underlain by silt and clay deposits throughout the Town. Soil types are derived from the *Soil Survey of York County* produced by the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) in 1982. The SCS identified over 36 soil series in Wells. In 1994, the SCS became the Natural Resources Conservation Service (NRCS) and still operates as an agency within the USDA.

There are six general soil associations in Wells. The general characteristics of each association are described below. It should be noted that the soil associations for Wells describe very broad geographic regions that have similar soil-landscape relationships and should only be used to gain a general idea of the nature of soils and landscapes within the Town. The smallest delineation is typically several hundred acres in size and has only minimal value for making land use decisions at the town wide level.

1. The Adams-Colton Association consists of deep, nearly level to steep, excessively drained soils. Located primarily south of Route 109, especially along sections of Route 9 and the western corner of Town near the Sanford/North Berwick borders.
2. The soils of the Naumberg-Croghan Association have a high water table in the spring and fall, and both have rapid or very rapid permeability. The high water table and rapid permeability make groundwater contamination a major concern. These soils are interspersed throughout Wells with concentrations along Route One, the railroad and the western section of Route 109.
3. The Hermon Lyman Association consists of shallow and deep, gently sloping to very steep, well, drained to somewhat excessively drained soils found in glacial till. These are scattered in areas west of the Turnpike just north and south of Route 109.
4. The Scantic-Raynham-Buxton Association consists of deep, nearly level to moderately steep and hilly, poorly drained to moderately well drained soils found in marine and lacustrine (ancient lake) sediments. These areas are mostly west of the Turnpike and associated with land adjacent to the Merriland River and a portion of Branch Brook.
5. Lyman-Rock Outcrop-Scantic Association includes Lyman soils composed of glacial till which are shallow, gently sloping to very steep, and somewhat excessively drained. Rock outcrop consists of areas with exposed bedrock. The Scantic soils are deep, nearly level and poorly drained. The shallow depth, steep slopes, bedrock exposures, and the poor drainage of this association limit its suitability for development with on site water supply and septic systems. This association tends to be located near the border with South Berwick in the Tatnic Hills area.
6. The Sulfihemists-Udipsamments Association consists of deep, level, very poorly drained Sufihemists soils formed in organic deposits associated with tidal marshes paired with deep, undulating to rolling, excessively drained to moderately well drained sandy soils that characterize stabilized dunes. Storm damage and flooding are hazards to development in areas of Udipsamments soils. This association is found east of Route One in a nearly unbroken formation from north to south.

Prime Farmland Soils

The U.S. Department of Agriculture defines prime farmland as the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to produce a sustained high yield of crops while using acceptable farming methods.

Prime farmland produces high crop yields with the least amount of external input. Prime farmland is a valuable, limited commodity not only in Wells, but in many southern Maine communities. Some of the characteristics that make these soils suitable for agriculture also make them suitable for development.

Soils rated as prime farmland soils by the NRCS in Wells include: Allagash very fine sandy loam, Becket fine sandy loam, Buxton silt loam, Colton gravelly loamy coarse sand, Elmwood fine sandy loam, Madawaska fine sandy loam, Marlow fine sandy loam, Ondawa fine sandy loam, Peru fine sandy loam, Podunk and Winooski soils and Skerry fine sandy loam.

The NRCS had also identified farmlands of statewide and local importance which have the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high-quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods.

Prime farmland soils are found in small concentrations west of Route 9A in Wells Branch and along West Brook near Bragdon Road and Perkins Brook along Perry Oliver Road. There are also small patches between the Turnpike and Route 1 along Highway 109/9. Farmland soils of statewide importance occur much more frequently in Wells. These soils are found throughout the Town but are more heavily concentrated north and west of Routes 9 and 109, along the Branch Brook corridor and on both sides of Route 1. In general, farmland soils of statewide importance wrap Wells to the east, west and north.

Prime Forestry Soils

The NRCS defines prime forest land as having soils which are capable of growing wood at the economic productive growth rate for a given tree species. Soils with a productivity rating of medium, high, or very high are considered prime forestry soils. Management problems such as erosion hazard, equipment limitations, or seedling mortality are not factored in when calculating the productivity of a soil. Productivity is based on the total yield of wood per hectare (one hectare is the equivalent of approximately 2.47 acres) of mature trees.

All of the soils identified as prime farmland in Wells are also rated as prime forestry soils. The Scio soil group has the highest tree growth productivity rating of all York County soils. Much of the land in Wells consists of prime forestry soils. The exceptions include the peat and mucky soils (Biddeford mucky peat, Chocura peat, Scao mucky silt loam, Vassalboro peat and Waskish peat), beaches and very shallow soils.

Hydric Soils

Hydric soils have very similar characteristics to those wetlands as defined by the Army Corps of Engineers. These include all poorly and very poorly drained soils often associated with marine silts and clays including muck, peat, swamps and marshes. They include such soil types as the Biddeford mucky peat, Chocorua peat, Rumney loam, Scantic silt loam and Vassalboro peat. The water table is at or near the surface 5 to 9 months of the year. Wetland soils are associated with low lying areas in Wells, such as:

- the tidal marshes east of Route One;
- large portions of the area west of 9B running northerly to the railroad;
- a large portion of the area bounded by Route 9, Route 109 and Bragdon Road, including the Heath;
- the area west of the Central Maine Power's right-of-way south of Route 109 and running to the Sanford town line; and
- along watercourses such as the Little and Webhannet Rivers.

Hydric soils in Wells comprise a large portion of the Town-15,696 acres or 43% of Wells. This abundance of hydric soils is a major limiting factor for growth and development in Wells.

Soil Suitability for Development

While it is obvious that hydric and poorly drained soils are not well-suited for development, the characteristics of an individual soil type(s) located at an individual site are important in determining suitability for various types of uses. All of the information in this section was compiled through a countywide survey and presents a general overview of soil suitability. Therefore, this information should not be used for individual site planning purposes.

WETLANDS

Wetlands are found throughout Wells, and throughout Maine. Wetlands assist in managing stormwater, recycling nutrients, filtering pollutants, and recharging ground water. They provide open space and wildlife habitat and are some of Maine's most productive areas, providing food and habitat for a wide variety of fish, animal and bird species.

Wetlands are defined by the Environmental Protection Agency (EPA), Army Corps of Engineers (COE), and the State of Maine as:

Those areas that are inundated or saturated by surface groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands usually include swamps, marshes, bogs, and similar areas. (EPA, 40CFR 230.3 and COE, 33 DFR 328.3).

Most wetlands can be identified by three characteristics: the presence of: 1) hydrophytic plants, 2) hydric soils, and 3) a very high water table for at least part of the year. Wetlands also have water present at or near the surface for one week or more during the growing season. Wetlands perform valuable natural functions and are considered a severe constraint to development since they are protected under Wells' Shoreland Zoning ordinance and the State's Mandatory Shoreland Zoning Act.

Types of Wetlands

Although there are several wetland classification systems, the State has identified and mapped wetlands utilizing the National Wetland Inventory (NWI) throughout Maine. In Wells, there are large areas of freshwater wetlands and saltwater marshes. Under the NWI system the most common types of wetlands in Wells are:

Palustrine Forested

This category is by far the largest in Wells (and in York County). These are wooded swamps that generally occur along sluggish streams, on flat uplands, and in shallow lake basins or potholes. Tree species common in Southern Maine's wooded swamps include larch, hemlock, Atlantic white cedar, black spruce, balsam fir, red maple, yellow birch and black ash. Coniferous swamp herbaceous species include ferns, sedges and mosses. Deciduous swamps often support shrubs such as blueberry, elderberry and chokeberry together with jack-in-the-pulpit, skunk cabbage, ferns and other herbaceous vegetation. These areas tend to be located south of Route 109 between the Maine Turnpike and the Sanford town line.

Palustrine Emergent

Palustrine wetlands are non-tidal marshes dominated by grass-like and/or herbaceous plants which are seasonally flooded and typically saturated at or near the surface when not flooded. Cattails, bulrushes, sedges, big-leafed arrowhead and pickerel weed are examples of this type of vegetation. Much smaller in area they tend to be adjacent to the palustrine forested wetlands.

Palustrine Scrub Shrub

This wetland type is usually characterized by woody plants less than 20 feet tall, such as winterberry, high bush blueberry, sweet gale, buttonbush, alder, willows, and silky dogwood. Shrub swamps occur primarily along sluggish streams, or as inclusions within forested wetlands. Alder and dogwood predominate in the drier areas; willow, buttonbush, and sweet gale characterize wetter sites. There is a large area comprised of this type of wetland within the Heath in Wells.

Estuarine Wetlands

This wetland type is periodically flooded by tides, dominated by salt marshes populated with grass and grass-like plants and can be very productive ecosystems. These wetlands are generally flat with often intricate drainage channels and creeks and can provide high quality habitat for many species of birds including migratory raptors, shorebirds, wading birds, gulls, terns and ducks. Estuarine wetlands are primarily located east of Route 1 in Wells.

In Maine wetlands and other natural resources are regulated under the Natural Resources Protection Act [38 MRSA, Sec. 480-A-S]. This act, which is administered by the Maine Department of Environmental Protection (MDEP), also regulates activities in or adjacent to surface water bodies, coastal sand dunes, significant wildlife habitat and fragile mountain areas. The level of regulation is based upon the amount of the resource area that may be impacted by any given activity-the more impact, the higher the level of regulatory review and scrutiny. The Town has identified various wetland areas under a Resource Protection District and defined them in the Land Use Ordinance for purpose of regulation. A more thorough documentation of wetland location, type and value would provide the basis for a more systematic approach to wetland management and protection.

Threats to Wetlands

In addition to their value for stormwater management, wildlife habitat and groundwater recharge, wetlands also filter pollutants and sediment from the environment and improve water quality. However, their filtering capacities can be exceeded when impervious surfaces increase run-off or dumping or filling of wetlands occur. Pollution and sediments discharged into productive wetlands or estuaries can have an adverse impact on wildlife habitat and shellfish beds. Since wetlands are often part of larger ecosystems, when their functional values are impacted, the effect will likely be felt in other parts of the ecosystem. In Wells, failing septic systems, storm water from impervious surfaces and non-point pollution from roads, parking lots, fertilized lawns and pet waste pose a significant threat to wetlands.

HIGH VALUE WILDLIFE AND FISHERIES HABITAT

The availability of high quality habitat for fish and wildlife is essential to maintaining an abundant and diverse population for both ecological and sporting purposes. Wells has a significant amount of land that offers quality habitat for a variety of species. The Maine Department of Inland Fisheries and Wildlife (MDIFW) is responsible for assessing the value of, and monitoring, wildlife habitats in Maine. MDIFW has identified areas of special concern because of their importance as wildlife, plant and fish habitat and publishes maps and data through the Beginning with Habitat program. Beginning with Habitat (BwH), a collaborative program of federal, state and local agencies and non-governmental organizations, is a habitat-based approach to conserving wildlife and plant habitat in Maine on a landscape scale. The BwH landscape approach to habitat conservation was initially developed by the University of Maine's Cooperative Fish and Wildlife Research Unit (CFWRU) under the direction of the MDIFW. Data on plants, natural communities, and wildlife habitats of national interest were later added by the Maine Natural Areas Program (MNAP) and the US Fish and Wildlife Service (USFWS).

Focus Areas of Statewide Ecological Importance

As defined by Maine's Beginning with Habitat (BwH) these Focus Areas are "natural areas of statewide ecological significance that contain unusually rich concentrations of at-risk species and habitats. These areas, identified by biologists from the Maine Natural Areas Program (MNAP), Maine Department of Inland Fisheries and Wildlife (MDIFW), Maine Department of Marine Resources (DMR), U.S. Fish and Wildlife Service (USFWS), The Nature Conservancy (TNC), Maine Audubon, and Maine Coast Heritage Trust (MCHT), support rare plants, animals, and natural communities, high quality common natural communities; significant wildlife habitats; and their intersections with large blocks of undeveloped habitat. BwH Focus Area boundaries are drawn based on the species and natural communities that occur within them and the supporting landscape conditions that contribute to the long-term viability of the species, habitats, and community types."

There are portions of three Focus Areas (out of total of 140 in Maine) within Wells. They are: the Wells-Ogunquit Marsh which stretches across the entire extreme eastern portion of Wells, the Kennebunk Plains – Well Barrens located in northwestern Wells and the Mount Agamenticus area in southern Wells.

Essential Wildlife Habitats

The State of Maine has two programs for the direct protection of wildlife habitat: Maine Endangered Species Act (MESA, 12 MSRA, Sec. 7751-7758) and the Natural Resources Protection Act (38 MRSA, Sec. 480-A-S). Wells has several shoreland areas that are categorized as Essential Wildlife Habitat under MESA and considered critical for the survival of two Endangered and/or Threatened species, the Piping Plover and the Least Tern. The Essential Wildlife Habitat areas include Stevens Brook, Ogunquit River, Ogunquit Beach, Laudholm Beach/Little River Area and Wells Beach/Drakes Island. These shoreland areas have been identified to provide:

- critical nesting habitat for the Least Tern
- nesting, feeding and brood-rearing habitat for the Piping Plover

MDIFW regulates all activity within Essential Wildlife Habitat areas and in the case of the species that are also covered under the U.S. Endangered and Threatened Species Act, federal oversight is also mandated. The shorebirds listed above are on both the Maine and the U.S. Endangered and Threatened Species lists.

Significant Wildlife Habitats

The Town also has Significant Wildlife Habitats, as defined by the Natural Resource Protection Act, including:

1. Candidate Deer Wintering Areas

During the winter months deer herds tend to migrate to wintering yards that are typically composed of softwood forests. Candidate Deer Wintering Areas in Wells are located in the following areas:

- northwest of Bald Hill at the Sanford town line;
- along the Webhannet River between the railroad and Route 9B west of the Turnpike;
- The Heath bounded by Bragdon Road, Swamp John Road, Route 9, and Route 109; and
- in the Coles Hill Road area parallel to the Turnpike.
- Their locations and approximate sizes are shown in the attached map. IF&W has not rated the habitat value of these yards.

2. Inland waterfowl and wading bird habitats

Waterfowl and wading bird habitat includes wetland complexes and the 250 feet of upland surrounding them. These areas are used for breeding, migration, and wintering. Nesting habitat includes dense, emergent, herbaceous or shrubby cover for seclusion, concealment, and protection from predation. Wells has four wetland areas categorized as significant inland waterfowl and wading bird habitat scattered throughout the portion of town west of I-95.

3. Tidal waterfowl/wading birds

This designation includes breeding, migration/staging and wintering areas for coastal shorebirds or breeding, feeding, roosting, loafing and wintering areas for coastal wading birds. Habitat types include aquatic beds, eelgrass, emergent wetlands and mudflats. In Wells, these areas comprise large stretches of the shore and the salt marshes beyond.

4. Shorebird areas

Shorebirds depend upon coastal habitats as feeding and staging areas to acquire fat reserves sufficient to fuel their transoceanic migrations to wintering areas. These shorebird areas can be feeding or roosting areas or both. In Wells, these areas comprise large stretches of the shore and portions of salt marsh.

5. Significant vernal pools

These habitats are characterized by pool depressions used for breeding by amphibians and other indicator species and 250 feet of critical terrestrial terrain beyond the spring or fall high water mark. These vernal pools lack predatory fish and a permanently flowing inlet or outlet and are of natural origin. There are three significant vernal pools identified in Wells and mapped by the BwH program. One is off Route 109 near the rail line, one is near the Wells Barrens, and the third is near Hobbs Crossing.

The Maine Department of Environmental Protection (MDEP) is responsible for regulating activity in or adjacent to areas that contain significant wildlife habitat.

USFWS Priority Trust Species Habitats

These habitats have been identified by the U.S. Fish and Wildlife Services within the Gulf of Maine as potentially valuable for the 91 USFWS Priority Trust Species which include birds, mammals, plants, reptiles and fisheries. These species meet the following criteria:

- Federally endangered, threatened or candidate species
- Migratory birds, sea-run fish and marine fish that show significant and persistent declining population trends or have been identified as endangered or threatened by the states within the Gulf of Maine watershed
- Species of concern as identified in the U.S. Shorebird Conservation Plan, Colonial Waterbird Plan or Partners in Flight

This program ranks four types of habitat into three categories with the top 25% of the habitat being the most important to the species which live there. The four types are:

- Saltmarsh/saltwater
- Freshwater/wetlands
- Grasslands/shrub/bare ground
- Forested, including forested wetlands

In Wells, as might be expected, the entire shoreline and the salt marshes are ranked at the top as most

important to the species that frequent that type of habitat. Parts of the Heath, wetlands located on either side of the railway along the West and Bragdon Brooks, along the Merriland River and a few other scattered freshwater wetlands within Wells are ranked at the top as most important for the freshwater/wetlands habitat type.

The top grasslands/shrub/bare ground habitat for the appropriate priority species in Wells are scattered throughout the Town along roadways but heavily concentrated in the large area between Branch Brook and Wire Road known as the Wells Barrens which is permanently protected under the ownership of The Nature Conservancy. West of Route 1, beyond the development that lines that highway, Wells is mostly forested, Much of that area is ranked of moderate importance under the forested, including forested wetlands habitat type with scattered top ranked areas located along rivers and streams and larger patches located near the Heath, on the south side of Route 9 from the Heath and between Quarry Road and the Merriland River. Knowing where these habitat types exist in Wells, can assist the Town with planning and open space conservation.

Rare ,Threatened or Endangered Wildlife and Rare or Exemplary Plants and Natural Communities

The Rare, Threatened or Endangered Wildlife habitat areas noted by the BwH program are mapped based on the species occurrence and sightings data collected by the Maine Department of Inland Fisheries and Wildlife.

The Maine Natural Areas Program (MNAP), within the Maine Department of Agriculture, Conservation and Forestry, serves Maine's citizens as the most comprehensive source on the State's important natural features. With landowner permission, the Program inventories lands that support rare and endangered plants, rare natural communities and ecosystems, and outstanding examples of more common natural communities and ecosystems. MNAP also provides objective and comprehensive information to equip decision-makers with the necessary tools to make informed and responsible decisions. The Rare Plants habitat is mapped based on field observations carried out under the Maine Natural Areas Program (MNAP) while the Exemplary Plants and Natural Communities are classified and distinguished by MNAP based on field surveys and aerial photo interpretation. MNAP has ranked all of Maine's natural communities from 1 (rare) to (5) common.

Not surprisingly, the shoreland and the extensive salt marshes in Wells are top ranked with both the programs described above. The Wells Barren area is also top ranked for both, as is the Heath. A very large area along the Wells/South Berwick border is top ranked for Rare, Threatened or Endangered Wildlife. Scattered patches of top ranking habitat under both programs are also found in the southern half of Wells. Rare or exemplary natural communities found in Wells are the Sandplain Grassland and Red Maple Swamp communities of the Wells Barrens, the Salt-Hay Saltmarsh and Coastal Dune Marsh Ecosystem communities by the shoreland,

Rare, threatened or endangered bird, reptile and mammal species found in Wells include the New England Cottontail, the Northern Black Racer snake, and the Harlequin Duck, as well as the Piping Plover and the Least Tern. Rare, threatened or endangered plants include Northern Blazing Star, Slender Blue Flag, Smooth Winterberry Holly, Mountain Laurel, Spicebush, Sassafras, Beach Plum and Sweet Pepper Bush. MNAP ecologists encourage landowners considering development in areas identified as containing rare plants to check with MNAP for more specific site locations and information, or to conduct a field survey.

Other Habitats

The Maine Department of Marine Resources has mapped economically important shellfish resource areas which are represented in the BwH program. Wells has a narrow band of this shellfish habitat that runs off-shore from just south of Moody Point to the Ogunquit town line.

SCENIC AND COASTAL AREAS

Scenic and Coastal Areas are described in two other places in the Inventory:

- Section 4, Marine Resources
- Section 8, Land Use

FLOODPLAINS

Floodplains are the low, mostly flat areas adjacent to rivers, streams, ponds and the ocean that are periodically covered by rising water or waves during periods of rain, high winds or snowmelt. Coastal flooding is generally attributed to high wind and wave action caused by storm activity. The Federal Emergency Management Agency (FEMA) has produced maps of the 100-year floodplains in Wells. Shown on the maps is the area that has a 1% chance of being flooded during any given year. Also shown are 500-year floodplains and "V" or velocity zones that are subject to ocean flooding.

Improper use, filling, and development within floodplains create the potential for property damage, increased flooding, and downstream contamination so development within a floodplain is strictly regulated and greatly constrained. Although Wells' proximity to the ocean may reduce downstream impacts from flooding, that same proximity makes Wells highly vulnerable to storm surge and wave action along its shoreline and up its tidal rivers and streams. The likelihood of severe property damage from flooding in Wells is greatest in the floodplains of the rivers and larger streams and low-lying shoreland and salt marshes.

Following is a brief description of the location and size of the floodplains or flood hazard areas in Wells as delineated on the FEMA floodplains maps. The FEMA maps show boundaries of those flood hazard areas that have been identified by detailed study and/or field observation.

Most of the Town's 100-year floodplain is east of Route 1 associated with the harbor, the beaches and the extensive salt marshes. In addition, there are ribbons and patches of floodplain associated with various rivers and streams that discharge into the Atlantic such as the Webhannet, the Merriland and Branch Brook. There are also two larger floodplain designated areas associated with wetlands within the Heath and the headwaters of West Brook near Sanford. A narrow velocity zone runs the entire length of Wells along the Atlantic shoreline.

In 2003, the Town of Wells adopted a Flood Insurance Study and its accompanying Flood Insurance Rate Map which are referenced in the Town's Floodplain Ordinance. In addition, Wells, together with the other 28 York County communities adopted the York County Hazard Mitigation Plan, an all-hazards regional plan, in 2004. An update to the plan was done in 2010. Recommendations from this plan will be considered in the Goals, Policies and Strategies of this Comprehensive Plan.

CLIMATE CHANGE

No Comprehensive Plan or update should neglect to mention the impact that climate change will have on a community's natural resources. Wells is fortunate because it has an excellent report "*Summary Climate Change Risk Assessment*" done in March of 2014 by the Massachusetts Institute of Technology Science Impact Collaborative, the Census Building Institute and the Wells National Estuarine Reserve System to refer to. While the report's main focus is how climate change will impact the built environment and the related health effects on Wells' residents, there are maps showing sea level rise and some discussion of ecosystem changes. The changes include flooding events during increasingly severe storm events which will impair waterways, damaging riparian and estuarine habitat, erosion of beaches and shoreland, inundation of existing salt marshes by the end of this century and drought which will stress wetlands, wildlife and habitat. The report is included in the Appendices of this Comprehensive Plan.

Marine Resources

Major Marine Resource Areas

Wells has approximately seven miles of coastline. The shore is undoubtedly what draws most visitors to Wells and ocean access is one of the top reasons people want to live in Wells. Wells' coastal region can be viewed as eight distinct areas with differing characteristics.

1. Laudholm Beach

This area runs from the Little River south towards Drakes Island. The area consists of undeveloped sand beach owned by the State that is incorporated into the Wells National Estuarine Research Reserve.

2. Drakes Island

This area runs southerly from Laudholm Beach to the Webhannet River and is a barrier sand dune that has been extensively developed with single-family homes on small lots.

3. Wells Beach, including Crescent Beach

This area runs from the Webhannet River to Moody Point and is also a barrier sand dune. It has been extensively developed, with many single-family homes lining the beach. In the Casino Square area, there is substantial commercial use, including motels, restaurants, and retail stores.

4. Moody Point

A rocky headland, this point separates Wells Beach and Moody Beach. It is the only area of shoreline not characterized by sand beaches. Moody Point has been extensively developed as a residential neighborhood.

5. Moody Beach

Extending from Moody Point to the Ogunquit town line, this area is a barrier beach and dune that has been extensively developed, with many homes sited between the beach and the salt marsh.

6. Webhannet Estuary

This area is an expansive salt marsh which lies behind Drakes Island and Wells Beach. The area is undeveloped, and much of it is owned by the federal government as part of the Rachel Carson National Wildlife Refuge that is now incorporated into the Wells National Estuarine Research Reserve.

7. Wells Harbor

The harbor area has upland on the west side of the Webhannet River with an adjacent mooring basin, docks and dredged channel in the Webhannet to the outlet between Drakes Island and Wells Beach. A marina, restaurant, boat launch, parking areas, and related service and storage areas are located there as well as Wells Harbor Community Park. The park has playground equipment and a gazebo which doubles as a stage along with seating for outdoor entertainment in the summer.

8. Ogunquit River Estuary

This area consists of undeveloped salt marsh lying behind Moody Point and Moody Beach. Much of it is owned by the Rachel Carson National Wildlife Refuge and is incorporated into the Wells National Estuarine Research Reserve.

Water Dependent Uses

The major water dependent use in Wells is the marina, associated facilities and mooring area located at Wells Harbor. This is the only marine service facility in Wells and the only mooring area in Wells for both commercial and pleasure boats. The Town's wharf is equipped for sport and commercial fishing operations. In addition, there is a public boat launch for both motorized and non-motorized watercraft. Wells has a small fleet of commercial fishing boats that are used primarily for lobstering, as well as access to recreational fishing and clamming.

Harbor Facilities

Wells Harbor is the only harbor in Wells and the only area suitable for a harbor since it is protected by the barrier dunes to the east. The harbor is accessible from Harbor Road to the west and via Atlantic Avenue to the east. In 1961, the U.S. Army Corps of Engineers carried out a harbor improvement program, which consisted of constructing two jetties at the mouth of the Webhannet River and the dredging of the navigation channel and mooring basin. With these improvements came the development of the current marina facilities and expanded mooring capabilities. The harbor requires periodic dredging to maintain the channel and the mooring field. In 2011, the Coast Guard installed a white light for the "WH" entrance buoy to assist boat traffic entering the harbor.

According to Wright-Pierce's *2013 Wells Harbor Management Plan*, under ideal conditions, as when newly dredged, the harbor has the capacity for about 150 moorings including slips for boats under 24 feet and moorings for larger vessels. In 2012, only about 93 moorings were in use due to sedimentation in the harbor. Typically about 75% of the moorings are allocated to recreational users. There is a waiting list for moorings managed by the Harbormaster with 168 people on it, an indication of the continued strong demand for recreational boating in Wells. Transient moorings are available for \$15 per night, 7 nights maximum. Besides the pleasure boats, the harbor is home to 15 charter vessels, 9 full-time commercial lobster boats, and 5 part-time recreational lobster boats. The charter boats are emerging as an important part of Wells' harbor-based economy – bringing tourists to fish and sight-see where once back on land, they eat, shop and stay in Wells.

The harbor's facilities include two timber piers and various associated floating docks. The western pier is shared by recreational and commercial users and hosts dockage for dinghies. There is also a bait pier, a mechanical hoist for loading/unloading, scales and tote boards for the fishing tournaments that the harbor hosts. According to the *2013 Wells Harbor Management Plan*, there are about 205 parking spaces associated with the west pier and its facilities, about 60 of which are used for boat trailers. Adjacent to the west pier is a public boat launch. The eastern pier is restricted via a locking gate and offers no marine services to the public. The Harbormaster's office is located in a two-story building near the west pier and public restrooms (open seasonally) are in a separate building between the west pier and Harbor Park.

The Town owns the land that was created by the 1961 harbor creation dredge but leases portions of it to two businesses. Located on the north side of the western pier is Lord's Harborside Restaurant and on the southern side is Webhannet River Boatyard. The boatyard services include repair, supplies, fuel,

launching/haul-out for boats up to 50 feet and seasonal storage for boats. Kayak rentals are also offered by the boatyard. The boatyard can store up to 85 boats “on the hard”.

Also located in the vicinity of the Harbormaster’s office is a small structure that is used to raise clams for “seeding” the clam flats. About 300 recreational clamming licenses are issued each year with clambers harvesting from an area within the harbor and another area that extends to Drake’s Island. Oyster aquaculture is being tried within the Webhannet River estuary on a limited basis through a lease approved by Maine Department of Marine Resources.

Recreation and Public Access

Public access to Laudholm Beach is available through the Wells Reserve and State-owned land. Visitors can park at Laudholm Farm, which serves as headquarters for the Wells Reserve and walk the trails to the beach. Access to Drakes Island Beach is unrestricted. There are a number of public rights-of-way to the beach and two parking lots on the island. Access to Wells Beach is also unrestricted. There is public access to the beach at Casino Square and at a number of public rights-of-way along the road. Public parking is available in Casino Square, in a parking lot on Mile Road, and at a large lot at the northern end of Atlantic Avenue. Additional parking is available on Gold Ribbon Drive. Moody Beach is a private beach with access restrictions that limit the public to use of Town-owned rights-of-way only.

Harbor Park is located just west of Webhannet River Boatyard. Within the 3-acre park are the Hope-Hobbs Gazebo and its associated seating which is a venue for performances during the summer, and the Well Rotary Pavilion, a covered picnic area with cookout facilities. The park has walkways, benches, nature trails, and a playground and features natural landscaping with trees and shrubs.

Wells Harbor Management Plan

In 2013, Wright Pierce completed the *Wells Harbor Management Plan* for the Town as mentioned earlier. The Plan, developed with assistance from the Wells Harbor Committee, Town staff, and community outreach includes strategies to encourage sustainable, ecologically-oriented, tourist opportunities and an active harbor capable of accommodating commercial and recreation uses. The plan designates the following overarching goals:

- Balance additional development of the Harbor with its inherent constraints, both natural (marshes, habitat, sensitive plants and wildlife) and built (access roads, limited upland area) to minimize negative environmental impacts.
- Generate revenue from commercial and recreational use of the Harbor to offset the need for investments in support of the goals of the Harbor Plan. Seek federal and state as well as private and nonprofit/foundation funds to support implementation of the Plan.
- Treat Harbor planning as a continuous process.

Beneath the overarching goals, the plan’s goals are designed to address the following elements:

- Natural Areas
- Harbor Economy and Sustainability
- Harbor Facilities and Infrastructure
- Commercial Fishing, Shellfish and Aquaculture
- Harbor Park

- Transportation and Access

The plan has two major sections: Goals and Recommendations which has four chapters including a chapter devoted to a marketing and investment plan for the harbor. Each goal listed above has actions associated with it. The second section, Findings, has nine chapters which assess and inventory different facets of the harbor.

No harbor management plan could fail to mention the impact that rising sea levels will have on shoreland and infrastructure located on shoreland. One of the recommendations of the plan is to work closely with the regional seal level rise working group (SLAWG) to increase understanding of those impacts, learn effective ways to mitigate those impacts on public and private property and to understand and mitigate the impacts the jetty has on beach erosion coupled with seal level rise.

Marsh Walk Feasibility Study and Harbor Pedestrian Bridge Study

The Town of Wells has long wanted public access, perhaps in the form of a boardwalk, over the Webhannet Marsh. In 1999, the Town hired a consultant to do a feasibility study which resulted in a list of impediments to building the boardwalk and made several recommendations of possible courses of action. In the intervening years, two of the impediments became less so and the Town centered its vision of the proposed marsh walk on Harbor Park. In 2013, with the *Harbor Management Plan* update on-going and a feasibility study of a possible pedestrian linkage across the harbor also underway, the Town engaged the services of Wright-Pierce to re-examine the possibility of the marsh walk. After careful examination, the feasibility study recommended that rather than build anything in the marshes, the Town build a sidewalk along Harbor Road which would connect to Harbor Park. Within Harbor Park, constructed marsh walk trails could link with the proposed pedestrian bridge that would span the harbor and provide access to Well Beach and the Atlantic Ocean. At the western end of Harbor Road, bike/pedestrian routes could link up to all three schools and on to the Wells Transportation Center. Two small plazas along the marsh walk within Harbor Park would provide seating, kiosks for information, trash receptacles and bike racks. Three over look platforms are suggested to provide bird and wildlife observation opportunities.

Open Space

Town-owned

The Town of Wells' Conservation Commission has taken an active role in conserving and protecting land in Wells through their desire to ensure that the Town's natural resources are conserved for future generations. More than twenty years ago, the Commission established a land bank through which the residents of Wells invest funds to purchase ecologically significant land or easements to preserve open space. The establishment and use of Town's conservation lands is codified in the Town Ordinance (#66) giving the Commission the ability to recommend the creation of Town conservation lands and act as stewards for those lands.

The Commission formally dedicated its first conservation parcel in 2001 and the Town has acquired many others since. Because the intent is to provide wildlife habitat that is shared with people, the Commission calls these properties "wildlife commons". These commons are undeveloped and open to the public for traditional outdoor recreation, wildlife habitat and environmental education. As adjoining, ecologically desirable parcels become available and/or funds are found, the Commission adds to the contiguous size of some of the properties. A list of the wildlife commons lands is below:

1. Perkinstown Commons - 288 acres, Thompson Street off Perry Oliver Road
2. Fenderson Wildlife Commons – over 600 acres, off Route 109 and Horace Mills Road
3. Tilton Homestead Commons - over 136 acres, off Route 109
4. Great Haith (or Great Heath) Commons - 346 acres, off 9A which is in the process of being established.

The Common areas are open to the public and have established trails. Trail maps are available to download from the Conservation Commission's website.

Other lands

In addition to the Town-owned conservation lands, Wells has many parcels that are held by the Kennebunk-Kennebunkport-Wells Water District (KKW), land trusts, the State and The Nature Conservancy. Among the notable conservation areas are:

- The Well Barren Preserve is 367 acres held by The Nature Conservancy
- The adjacent 175 acre parcel that includes Branch Brook headwaters area owned by KKW with a conservation easement held by The Nature Conservancy
- The Tatnic Hills Preserve is 171 acres held by The Nature Conservancy
- Great Works Regional Land Trust holds an easement on the 170-acre privately-owned Chicks Farm which currently hosts a CSA.
- Wells Reserve at Laudholm Farm is a National Estuarine Research Reserve protecting 2,250 acres of salt marsh, freshwater marsh, beach, dune and forest. The Laudholm Farm and its historic buildings serve as the Reserve's headquarters.

In the fall of 2014, Wells' residents voted to use funds from the CIP Land Bank Reserve to partially fund the purchase of an agricultural easement over the 130-acre Spiller Farm property.

Watersheds

Watersheds and the watercourses within them represent the natural drainage pattern that carries precipitation and ground water from land to the Atlantic Ocean. This natural drainage system can be affected adversely by the following:

- reduction in the ability to accommodate stormwater/runoff through filling, channelization or siltation;
- creating higher stormwater flows as the result of increased impervious surfaces;
- forcing streams underground through pipes.

In addition, watersheds can be threatened by degradation in water quality caused by both point and non-point pollution and runoff containing contaminants like fertilizers and animal waste.

Wells is divided into four major watersheds: Little River, Great Works, Webhannet, and the Ogunquit.

Little River Watershed

This watershed includes both the Branch Brook Basin and the Merriland River Basin, which drain the northern portion of Wells. Branch Brook serves as the main water supply for Kennebunk, Kennebunkport, Wells, Ogunquit, Arundel and small portions of Biddeford and York under the auspices of the Kennebunk Kennebunkport and Wells Water District. Over the past couple decades there has been residential development in this area. An 18-hole golf course and 174-unit residential development approved in the Branch Brook Basin has not been built but is still actively seeking investors. The Merriland Basin remains in low-density development, although there is continued pressure for additional residential development

Great Works Watershed

This watershed drains the west central portion of the Town, and includes Perkins Brook and West Brook, both of which are tributaries of the Great Works River in North Berwick. The Heath, a large forested wetland, and Ell Pond are part of this watershed as well as several gravel extraction sites and residential development.

Webhannet Watershed

Located entirely with Wells, this roughly fourteen square mile coastal watershed drains the east central portion of Wells through Depot Brook, Blacksmith Brook, Pope Brook and other smaller tributary watercourses. This watershed includes most of the Town's coastal marshes and is also the most intensively developed of the watersheds in Wells since it includes the Route 1, Route 109 and Route 9 Corridors. The Webhannet River originates near Bear's Den Road and continues about three miles to its estuary. A golf course and accompanying golf club community has been built that has frontage on both sides of the river.

Ogunquit Watershed

This watershed incorporates two sub-basins, the Ogunquit River and Stevens Brook and includes Green Brook and Bragdon Brook. It drains the southern portion of Wells. Much of the northerly divide is contiguous with Route 9/9B. The eastern part of the watershed is intensively developed along the Route One Corridor, while the western portion remains relatively lightly developed with mostly residential uses.

Surface Waters

The streams and rivers identified in the watershed section comprise the major freshwater surface waters in Wells. Hobbs Pond, an impoundment in the Merriland River, is the only sizeable pond solely within the Town. The Hobbs Pond dam is privately owned and the owner would legally be able to remove the dam, though there are no plans to do so. A second pond, Ell Pond, is smaller and straddles the Wells-Sanford town line.

The State of Maine has had a water quality classification system since the 1950s. Recently, in 2009 and 2011, significant changes were made to reclassify all the waters of the state. There are four freshwater river classes from Class AA (the highest water quality) to Class C (the lowest water quality). Marine and estuarine waters are classified within three categories: SA (the highest) to SC. Lakes and ponds have one class, GPA. Based upon this classification system, each designated water body is measured to see if it meets the standards for each category. Most standards support the same set of designated uses with some modest variation and all attain the minimum fishable-swimmable standards established in the federal Clean Water Act. The Maine Department of Environmental Protection (MDEP) and numerous other state agencies collect data on water quality throughout the state. Each even year, MDEP creates and posts its Integrated Water Quality Monitoring and Assessment Report to the MDEP website. The most recent report was completed in 2012.

Wells has no Class AA water bodies. The freshwater sections of the Branch Brook and Merriland River are classified as Class A, and are suitable for drinking water with proper treatment (Branch Brook is a major source of drinking water under the management of the Kennebunk-Kennebunkport-Well Water District). The remaining streams and rivers are classified as Class B including the Webhannet River, Depot and Blacksmith Brooks, Stevens and Bragdon Brooks, the Ogunquit River and its tributaries including Green Brook, Perkins Brook, West Brook and their tributaries. In the 2012 MDEP report, a section of Stevens Brook in Wells was designated as impaired based on evidence of certain pollutants. All of Wells' marine and estuarine waters are Class SB including the tidal portions of the Webhannet and Ogunquit Rivers and the Blacksmith, Depot, Stevens and Bragdon Brooks. In the 2012 report, the southern portion of the Ogunquit River and the Webhannet River are listed as impaired due to "elevated fecals" under Category 4A which means the rivers may have attained all uses for their standard but there is insufficient new data to confirm this. Many surrounding marine and estuarine waters outside of Wells are listed similarly.

To achieve the goals of the Clean Water Act, the EPA and each state have implemented a variety of programs to establish surface water quality standards, assess the condition of waters, control nonpoint source pollution, regulate point source discharges and, protect source waters, estuaries, oceans, and wetlands. The State of Maine DEP is responsible for administering the Nonpoint Source (NPS) Priority Watersheds Program that was enacted into law in 1997 (5 MSRA 3331(7)) to develop a comprehensive watershed protection program. As part of this program, DEP conducted a Unified Watershed Assessment with the National Resources Conservation Service in 1998. This assessment grouped Maine's major

watersheds into four categories: Category I-In Need of Restoration; Category II-Currently Meeting Water Quality Goals; Category III-Pristine/Sensitive Aquatic System Conditions administered by federal, state or tribal governments; or Category IV-Having Insufficient Data to Make an Assessment. The Piscataqua River Watershed, which includes the subwatersheds of Wells has been ranked as a Category 1 Watershed in part because rivers and coastal estuaries are not attaining water quality standards. The 1998 NPS priority watersheds list was updated in 2014 as part of development of the Maine NPS Management Plan. In the *Non-Point Source Management Program Plan 2015-2019* published in September of 2014 by the Maine DEP, Bureau of Land & Water Quality, Blacksmith Brook, Depot Stream, and an unnamed tributary to the Webhannet River near I-95 exit 19 in Wells are listed under DEP's Threatened Streams Priority List due to highway access and related development threats.

Based on US EPA funding, the Maine Healthy Beaches Program (MHB) was established to ensure that Maine's salt-water beaches remain safe and clean. The program brings together communities to perform standardized monitoring of beach water quality, notifying the public if health risks are detected, and educating both residents and visitors on what can be done to help keep Maine's beaches healthy. Maine has adopted the US EPA safety limit of 104 Enterococci per 100 milliliters of sample water. Enterococci, is a type of bacteria which indicates fecal contamination and the possible presence of disease-causing microorganisms. When bacteria levels exceed this limit, there's an increased probability of contracting illness from the water. Wells' beaches have their water quality posted regularly on the Maine Healthy Beaches website. Beyond routine beach monitoring, MHB has supported analysis of samples collected intermittently to assess bacteria levels in sand, seaweed and stormwater impacting Wells beaches. Each year a report is compiled and issued to the US EPA on the state of the Maine's beaches. From the *Healthy Beaches Report 2013*, enhanced monitoring in the Webhannet River in Wells was conducted, resulting in 37 samples collected in 8 locations during the beach season. Enterococci values from the samplings had a combined geometric mean of 55.7 per milliliter for all sites. MHB planned to continue support for additional monitoring in 2014.

Under MHB, Maine has established two "flagship" beaches, one of which is Wells Beach. In 2007, Wells Beach was divided into 3 separate management areas (Casino Square, Wells Beach and Wells Harbor), all of which continued to uphold all standards under policies and guidelines set forth by MHB. In 2013, Casino Square had 7 exceedances where Enterococci values rose above 104 (rate 19.4%; rainfall preceded 85.7%) Wells Beach had 6 exceedances (rate 10.2%; rainfall preceded 100%) and Wells Harbor had 10 exceedances (rate 47.6%, rainfall preceded 100%).

Groundwater Aquifers

These areas of deep sand and gravel are geologically referred to as stratified drift deposits that are capable of yielding significant quantities of water. The highest yielding aquifers identified in Wells can produce 10 to 50 gallons per minute, which are rated as moderate to good potential by the U.S. Geological Survey. There are approximately 4,977 acres of this category or almost 14% of the Town.

The most critical aquifer area in Wells is that associated with Branch Brook, the water source for the Kennebunk, Kennebunkport, and Wells Water District. The aquifer area extends from the Sanford town line almost to the Atlantic with an apparent break in the Meetinghouse Road/Route 9A area. This area has regulatory protection through the Aquifer Protection Overlay District in the Town Zoning Ordinance. It is likely that the aquifer is hydrologically connected to the brook and maintains its year-round flow. In addition to the surface water public water supply, there are also four gravel well sites and eight wells operated by the KKW Water District. Additional aquifer areas in Wells are along Route 9, in the area along Bragdon Road and near the Sanford line in the Quarry Road/Perry Oliver Road area.