Stormwater Management Program

Harwich, Massachusetts

June 2019

Prepared by:

AECOM

Harwich, Ma Stormwater Management Plan (SWMP)
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Harwich, MA Compliance with US EPA/MassDEP 2016 MS4 Permit - July 2019

Minimum Control Measures (MCM) Tasks and Implementation Schedule

Tasks	FY 2019 July 1, 2018 to June 30, 2019	FY 2020 July 1, 2019 to June 30, 2020	FY 2021 July 1, 2020 to June 30, 2021	FY 2022 July 1, 2021 to June 30, 2022	FY 2023 July 1, 2022 to June 30, 2023
MCM 1: Education and Outreach	J A S O N D J F M A M J	J A S O N D J F M A M J	J A S O N D J F M A M J	J A S O N D J F M A M J	J A S O N D J F M A M J
1.1 Residential Hazardous Waste Day Flyers	Efforts are ongoing				
1.2 Preventing Stormwater Pollution Publication	Efforts are ongoing				
1.3 Outreach Links for Businesses					
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1.6 Stormwater Education for Developers					
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1.8 Industrial Outreach Materials					
1.9 Proper Management of Pet Waste					
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1.12 Brochures and Pamphlets for Residents		1 2 3	1 2 3	1 2 3	1 2 3
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MCM 2: Public Review of Stormwater Management Program					
2.1 Make the updated SWMP available for review online and at Town Hall					
2.2 Public Participation in Stormwater Program Development and Stormwater Meetings	Some efforts are ongoing				
2.3 Participate in Beach clean-ups	Efforts are ongoing				
2.4 Public Participation in Hazardous Waste Disposal Days	Efforts are ongoing				
2.5 Oil and Antifreeze Collection and Recycling	Efforts are ongoing				
MCM 3: IDDE Program					
3.2 Sanitary Sewer Overflow (SSO) Inventory					
3.3 MS4 mapping Phase I with catchment delineations, open conveyances, and structural BMPs				Phase II due on FY 202 --->	
3.4 Create written IDDE Program	**Complete**				
3.5 Train applicable employees on IDDE program implementation annually (time flexible)					
3.6 Implement catchment investigation procedures on FY 2020 (All catchments due on FY 2028)					--->
3.7 Dry weather outfall inspection (sample if flow present)					
3.8 Wet weather sampling at outfalls of catchments with Vulnerability Factors (if needed)				Due on FY 202	--->
MCM 4: Construction Site Runoff Control					
4.2 Develop written procedure for site plan review and inspection/enforcement	**Complete**				
4.3 Develop written procedure for construction sediment/erosion control site inspections/enforcement	**Complete**				
4.4 Update regulations to include control of wastes	**Complete**				
MCM 5: Post Construction Stormwater Management					
5.1 Update Stormwater Management Ordinance					
5.2 Evaluate and report on street and parking design					
5.3 Evaluate and report on local regs for feasibility of Green Stormwater Infastructure					
5.4 Identify 5 Town-owned properties that could be retrofitted with BMPs					
5.5 Develop procedures to require submission of As-built plans of BMPs and O&M Procedures		Partially complete			
MCM 6: Good Housekeeping & Pollution Prevention					
6.1a, 6.2a, & 6.3a Inventory all Town owned facilities and equipment (parks, buildings, vehicles, etc.)					
6.1b Prepare operation and maintenance (O&M) plans for parks and open space					
6.2b Prepare O&M plans for Town owned buildings and facilities					
6.3b Prepare O&M plans for Town vehicles and equipment					
6.4 Prepare written procedures for O&M of stormwater infrastructure		Partially complete			
6.5 Catch Basin Cleaning Program	**Complete**				
6.6 Street Sweeping Program	**Complete**				
6.7 Winter Road Maintenance Program	**Complete**				
6.8 Stormwater Treatment Structures Inspection and Maintenance Procedures	**Complete**				
6.9 Develop SWPPPs for DPW yard and the Fire/Police station parcel					
OTHER TASKS:					
Complete Annual Reports Summarizing Progress; Submit by **Sept 30th** Each Year; Update SWMP					

Stormwater Management Program (SWMP)

Harwich, MA June, 2019

732 Main Street, Harwich, MA 02645

EPA NPDES Permit Number : MAR041120

Certification

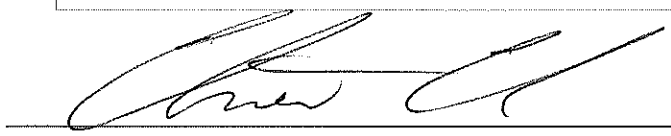
Authorized Representative (Optional): All reports, including SWPPPs, inspection reports, annual reports, monitoring reports, reports on training and other information required by this permit must be signed by a person described in Appendix B, Subsection 11.A or by a duly authorized representative of that person in accordance with Appendix B, Subsection 11.B. If there is an authorized representative to sign MS4 reports, there must be a signed and dated written authorization.
The authorization letter is:

☐ Attached to this document (document name listed below)

☐ Publicly available at the website below

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Printed Name: Christopher Clark

Signature: 

Date: 7/1/2019

Click Here for Revisions

Background

Stormwater Regulation

The Stormwater Phase II Final Rule was promulgated in 1999 and was the next step after the 1987 Phase I Rule in EPA's effort to preserve, protect, and improve the Nation's water resources from polluted stormwater runoff. The Phase II program expands the Phase I program by requiring additional operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted stormwater runoff. Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of stormwater discharges that have the greatest likelihood of causing continued environmental degradation. Under the Phase II rule all MS4s with stormwater discharges from Census designated Urbanized Area are required to seek NPDES permit coverage for those stormwater discharges.

Permit Program Background

On May 1, 2003, EPA Region 1 issued its Final General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (2003 small MS4 permit) consistent with the Phase II rule. The 2003 small MS4 permit covered "traditional" (i.e., cities and towns) and "non-traditional" (i.e., Federal and state agencies) MS4 Operators located in the states of Massachusetts and New Hampshire. This permit expired on May 1, 2008 but remained in effect until operators were authorized under the 2016 MS4 general permit, which became effective on July 1, 2018.

Stormwater Management Program (SWMP)

The SWMP describes and details the activities and measures that will be implemented to meet the terms and conditions of the permit. The SWMP accurately describes the permittees plans and activities. The document should be updated and/or modified during the permit term as the permittee's activities are modified, changed or updated to meet permit conditions during the permit term. The main elements of the stormwater management program are (1) a public education program in order to affect public behavior causing stormwater pollution, (2) an opportunity for the public to participate and provide comments on the stormwater program (3) a program to effectively find and eliminate illicit discharges within the MS4 (4) a program to effectively control construction site stormwater discharges to the MS4 (5) a program to ensure that stormwater from development projects entering the MS4 is adequately controlled by the construction of stormwater controls, and (6) a good housekeeping program to ensure that stormwater pollution sources on municipal properties and from municipal operations are minimized.

Town Specific MS4 Background (optional)

The Town of Harwich's stormwater discharges were authorized under the 2003 MS4 Permit, and on September 26, 2018 a Notice of Intent (NOI) was submitted to US EPA to request coverage under the 2016 MS4 Permit. Due to its previous permit coverage, the Town currently implements many BMPs to demonstrate compliance with the six minimum control measures. This SWMP identifies enhancements to existing and new BMPs to demonstrate compliance with the 2016 MS4 Permit. Existing mapping identifies known outfalls, and will be updated as needed to address 2016 MS4 Permit requirements. In addition to information included per the US EPA SWMP Template, Attachments are included to provide additional explanatory information where appropriate.

The Engineering Department has developed stormwater regulations to achieve compliance witht he MS4 Permit, and the IDDE authority has been adopted. Town staff continue to record observations of new, previously unknown discharges when conducting regular operation and maintenance inspections. In addition,

staff records observations of any dry weather flows or signs of illicit discharges (such as unusual color or odor) when conducting regular operation and maintenance activities. Any signs of an illicit discharge would be investigated following the established IDDE framework. To date, no illicit discharges have been identified.

Small MS4 Authorization

The NOI was submitted on Sep 26, 2018

The NOI can be found at the following (document name or web address):

https://www3.epa.gov/region1/npdes/stormwater/ma/tms4noi/harwich.pdf

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Authorization to Discharge was granted on Feb 14, 2019

The Authorization Letter can be found (document name or web address):

https://www3.epa.gov/region1/npdes/stormwater/ma/tms4noi/harwich-auth.pdf

Stormwater Management Program Team

SWMP Team Coordinator

Name	Griffin Ryder, PE	Title	Town Engineer
Department	Engineering		
Phone Number	(508) 430-7508	Email	gryder@town.harwich.ma
Responsibilities	Responsible for oversight and design of projects for maintenance and repair of town owned infrastructure. The Town Engineer is the SWMP Team Coordinator that oversees the completion of tasks associated with the SWMP. Other more specific responsibilities within this program include execution or oversight of: the IDDE program and development of the BMPs for construction and post-construction stormwater. Note: Responsibilities in this SWMP represent a team effort and are shared among team members. For more detail on responsibilities refer to the department listed in each BMP description.		

SWMP Team

Name	Lincoln Hooper	Title	Director- Highways and Maintenance
Department	Highways and Maintenance		
Phone Number	(508) 430-7555	Email	lhooper@harwichdpw.com
Responsibilities	Responsible for oversight of projects for maintenance and repair of town owned roads and associated infrastructure. The Highways and Maintenance Director's main responsibilities within this program include execution or oversight of: public education and outreach, public participation and review of the SWMP, hazardous waste and oil collection, and the IDDE program.		

Name	Charleen Greenhalgh	Title	Town Planner
Department	Planning		
Phone Number	(508) 430-7511	Email	cgreenhalgh@town.harwich.ma
Responsibilities	Responsibilities within this program include execution or oversight of: applicable portions of the public education and outreach requirements and the BMPs for construction and post-construction stormwater within MCM 4 and 5.		

Name	Eric Beebe	Title	Recreation Director
Department	Recreation		
Phone Number	(508) 430-7553	Email	ebeebe@town.harwich.ma
Responsibilities	Responsibilities within this program include execution or oversight of the recreation portion of the permittee owned facilities operations and management plan.		

Name	Raymond Chesley	Title	Building Commissioner
Department	Building		
Phone Number	(508) 430-7514	Email	rchesley@town.harwich.ma
Responsibilities	Responsibilities within this program include execution or oversight of: applicable portions of the public education and outreach requirements and the BMPs for construction and post-construction stormwater within MCM 4 and 5.		

Name	Amy Usowski	Title	Conservation Agent
Department	Conservation		
Phone Number	(508) 430-7538	Email	ausowski@town.harwich.ma
Responsibilities	Responsibilities within this program include execution or oversight of: portions of the public education and outreach requirements applicable to the Conservation Department's mission, the beach clean-up program, and a portion of the construction site runoff control MCM.		

Name	Meggan Eldredge	Title	Health Director
Department	Health		
Phone Number	(508) 430-7509	Email	health@town.harwich.ma.us
Responsibilities	Responsibilities within this program include execution or oversight of: portions of the public education and outreach requirements, IDDE, and other areas that pertain to septic systems, sewage, or general health.		

Name		Title	
Department			
Phone Number		Email	
Responsibilities			

Add SWMP Member

Receiving Waters

The following table lists all receiving waters, impairments and number of outfalls discharging to each waterbody segment.

OR

The information can be found in the following document or at the following web address:

https://www3.epa.gov/region1/npdes/stormwater/ma/tms4noi/harwich.pdf

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
Atlantic Ocean	5	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Herring River (MA96-22)	4	☐	☐	☐	☒	☐	☐	☐	☐	☐	*TMDLs for Fecal Coliform
Wychmere Harbor (MA96-96)	3	☐	☐	☐	☒	☐	☐	☐	☐	☐	
Saquatucket Harbor (MA96-23)	3	☐	☐	☐	☒	☐	☐	☐	☐	☐	*TMDLs for Fecal Coliform
Carding Brook	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Outlet stream from Skinequit Pond	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Grass Pond Bog	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
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Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
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Eligibility: Endangered Species and Historic Properties

*Reminder: The proper consultations and updates to the SWMP must be conducted for construction projects related to your permit compliance where Construction General Permit (CGP) coverage, which requires its own endangered species and history preservation determination, is NOT being obtained.

Attachments:

- ☒ The results of Appendix C U.S. Fish and Wildlife Service endangered species screening determination
- ☐ The results of the Appendix D historic property screening investigations
- ☐ If applicable, any documents from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), or other Tribal representative to mitigate effects

These attachments are required within one year of the permit effective date and are:

- ☒ Attached to this document (document names listed below)

  Attachment A - Endangered Species

- ☐ Publicly available at the website listed below

Under what criterion did permittee determine eligibility for ESA?

☐ Criterion A ☒ Criterion B ☐ Criterion C

Under what criterion did permittee determine eligibility for Historic Properties?

☒ Criterion A ☐ Criterion B ☐ Criterion C ☐ Criterion D (NH only)

Below add any additional measures for structural controls that you're required to do through consultation with U.S. Fish and Wildlife Service (if applicable):

Harwich was not required to do any additional measures for structural controls as a result of consultation with USFWS.

Below add any additional measures taken to avoid or minimize adverse impacts on places listed, or eligible for listing, on the NRHP, including any conditions imposed by the SHPO or THPO (if applicable):

Harwich's MS4 is covered under the 2003 Permit eligibility with the National Historic Preservation Act was previously determined. There is no expansion planned to the MS4 as part of this permit. Therefore Harwich is covered under Criterion A. No additional measures were required in order to protect historical properties.

MCM 1
Public Education and Outreach
Permit Part 2.3.2

Objective: The permittee shall implement an education program that includes educational goals based on stormwater issues of significance within the MS4 area. The ultimate objective of a public education program is to increase knowledge and change behavior of the public so that the pollutants in stormwater are reduced.

Examples and Templates:
EPA's Stormwater Education Toolbox
MassDEP's Stormwater Outreach Materials

Other templates relevant to MCM 1 can be found here: https://www.epa.gov/npdes-permits/stormwater-tools-new-england#peo

BMP: Residential Hazardous Waste Day Flyers

BMP Number (Optional) **1.1**

Document Name and/or Web Address: Brochures and Pamphlets for Town Residents

Description:

Distribute flyers and mailers, prepared for residents, in advance of the six (6) scheduled town Hazardous Waste Days annually. These materials provide townspeople with information on the program including types of materials accepted, scheduled days, etc.

Targeted Audience: Residents

Responsible Department/Parties: Highways and Maintenance Department

Measurable Goal(s):

Continue to distribute flyers and mailers to residents.

Message Date(s): Increase in number of residents disposing of hazardous materials appropriately.

BMP: Preventing Stormwater Pollution Publication

BMP Number (Optional) **1.2**

Document Name and/or Web Address: https://www.harwich-ma.gov/highways-and-maintenance/pages/storm-water-guide

Description:

Published "Storm Water Guide: What can you do about Storm Water Pollution?" on the town web site.

Targeted Audience: Residents

Responsible Department/Parties: Highways and Maintenance; Conservation; Planning; Building

Measurable Goal(s):

Observed decrease of grass clippings and litter dumped into receiving waters.

Message Date(s): 2018 and beyond

BMP: Outreach Links for Businesses

BMP Number (Optional) **1.3**

Document Name and/or Web Address: Town Website

Description:

Use outreach materials and guidance from various sources (Think Blue Massachusetts, MassDEP, Cape Cod Stormwater) for posting online.
This will implement outreach for relevant impairments town wide. See: https://www.thinkbluemassachusetts.org/for-businesses.

Targeted Audience: Businesses, institutions and commercial facilities

Responsible Department/Parties: Conservation; Planning; Building; Highways and Maintenance

Measurable Goal(s):

Observed decrease of grass clippings and litter dumped into receiving waters.

Message Date(s): 2019

BMP: Brochures for Businesses

BMP Number (Optional) **1.4**

Document Name and/or Web Address:

Description:

Use Think Blue Massachusetts outreach materials and guidance.
This will implement outreach for relevant impairments town wide. Example: https://www thinkbluemassachusetts.org/for-businesses.

Targeted Audience: Businesses, institutions and commercial facilities

Responsible Department/Parties: Conservation; Planning; Building; Highways and Maintenance

Measurable Goal(s):

Observed decrease of grass clippings and litter dumped into receiving waters.

Message Date(s): 2020

BMP: Web Page for Developers

BMP Number (Optional) **1.5**

Document Name and/or Web Address: Town Website

Description:

A web page containing stormwater education materials posted on the Town webpage marked as "Important Stormwater Management Information for Developers" – with a collection of links to relevant educational material.

Targeted Audience: Developers (construction)

Responsible Department/Parties: Conservation; Planning; Highways and Maintenance; Building

Measurable Goal(s):

Observed improvement in management of construction stormwater runoff, and decreased erosion/ sedimentation on construction sites.

Message Date(s): 2019

BMP: Stormwater Education for Developers

BMP Number (Optional) **1.6**

Document Name and/or Web Address:

Description:

Provide education on recommended stormwater / erosion control practices by providing fact sheets and diagrams and through meeting with applicants.

Targeted Audience: Developers (construction)

Responsible Department/Parties: Conservation; Planning; Highways and Maintenance; Building

Measurable Goal(s):

Observed improvement in management of construction stormwater runoff, and decreased erosion/ sedimentation on construction sites.

Message Date(s): 2020

BMP: Websites for Industrial

BMP Number (Optional) **1.7**

Document Name and/or Web Address: Town Website

Description:

Post web links and guidance from various sources (Think Blue Massachusetts, MassDEP, Cape Cod Stormwater, etc.) specific to industrial facilities to the town website.

Targeted Audience: Industrial facilities

Responsible Department/Parties: Conservation; Planning; Highways and Maintenance; Building

Measurable Goal(s):

Observed increase in proper storage of industrial materials and decreased runoff of sediment-laden stormwater from industrial sites.

Message Date(s): 2019

BMP: Industrial Outreach Materials

BMP Number (Optional) **1.8**

Document Name and/or Web Address:

Description:

Use outreach materials and guidance from various web sources (Think Blue Massachusetts, MassDEP, Cape Cod Stormwater) to develop brochures to distribute to industrial facilities in Town.
Example: https://www.thinkbluemassachusetts.org/for-industry

Targeted Audience: Industrial facilities

Responsible Department/Parties: Conservation; Planning; Highways and Maintenance; Building

Measurable Goal(s):

Observed increase in proper storage of industrial materials and decreased runoff of sediment-laden stormwater from industrial sites.

Message Date(s): 2020

BMP: Proper Management of Pet Waste

BMP Number (Optional) **1.9**

Document Name and/or Web Address: On Town Website or in a pamphlet

Description:

Annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate. This meets the requirements for the Herring River and Saquatucket Harbor TMDLs. The outreach could include the contact information for pet waste management companies in the area that pick up the waste for residents.

Targeted Audience: Residents

Responsible Department/Parties: Town Clerk; Health Department; Conservation

Measurable Goal(s):

Observed decrease in pet waste along roads and trails.

Message Date(s): Annually beginning in 2019

BMP: Guidance on Proper Septic System Care

BMP Number (Optional) **1.10**

Document Name and/or Web Address: https://www.harwich-ma.gov/health/pages/septic-systems-title-5

Description:

A website that provides information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria. This meets the requirements for the Herring River and Saquatucket Harbor TMDLs.

Targeted Audience: Residents

Responsible Department/Parties: Health Department

Measurable Goal(s):

Decrease in numbers of failing septic systems and resulting improved water quality.

Message Date(s): 2018 and beyond.

BMP: Dog License Educational Material

BMP Number (Optional) **1.11**

Document Name and/or Web Address:

Description:

Permittee or its agents disseminate educational material to dog owners at the time of issuance or annual renewal of dog license. Educational materials shall describe the detrimental impacts of improper management of pet waste, requirements for waste collection and disposal, and penalties for non-compliance. This meets the requirements for the Herring River and Saquatucket Harbor TMDLs.

Targeted Audience: Residents

Responsible Department/Parties: Town Clerk; Conservation; Health

Measurable Goal(s):

Observed decrease in pet waste along roads and trails.

Message Date(s): Annually beginning in 2019.

BMP: Brochures and Pamphlets for Residents

BMP Number (Optional) **1.12**

Document Name and/or Web Address: Brochures and Pamphlets for Town Resident

Description:

Continue to distribute flyers and mailers to residents for the purpose of providing information to homeowners regarding lawn maintenance activities and proper disposal of household and pet waste. There will be three messages distributed annually. A grass clippings message will be delivered annually in April or May. It will include messages encouraging the proper use and disposal of grass clippings and the proper use of slow release fertilizers. An annual message will be distributed in June or July that encourages the proper disposal of pet waste. An annual message will be distributed in the August - October timeframe that encourages the proper disposal of leaf litter.

Targeted Audience: Residents

Responsible Department/Parties: Health; Conservation; Town Clerk

Measurable Goal(s):

Observed decrease in pet waste along roads and trails, as well as decrease in grass clippings/leaf litter dumped in wetlands.

Message Date(s): Annually beginning in 2019

BMP: Brochures/Pamphlets for Businesses

BMP Number (Optional) **1.13**

Document Name and/or Web Address:

Description:

Brochures that pertain to the role that businesses can take to reduce impacts from stormwater will be made available at public buildings including the Town Hall, Library, and Transfer Station. There will be three (3) messages distributed annually. A grass clippings message will be delivered annually in April or May. It will include messages encouraging the proper use and disposal of grass clippings and the proper use of slow release fertilizers. An annual message will be distributed in June or July that encourages the proper disposal of pet waste. An annual message will be distributed in the August - October timeframe that encourages the

proper disposal of leaf litter.

Targeted Audience: Businesses, Institutions and Commercial Facilities

Responsible Department/Parties: Conservation, Planning

Measurable Goal(s):

Observed decrease in pet waste along roads and trails, as well as decrease in grass clippings/leaf litter dumped in wetlands.

Message Date(s): Annually beginning in 2019

Add BMP

MCM 2
Public Involvement and Participation
Permit Part 2.3.3

Objective: The permittee shall provide opportunities to engage the public to participate in the review and implementation of the permittee's SWMP.

BMP: Public Review of Stormwater Management Program

BMP Number (Optional) **2.1**

Location of Plan and/or Web Address: Town Hall and *website TBD*

Responsible Department/Parties: Planning; Highways and Maintenance; Building

Measurable Goal(s):

The Stormwater Management Program is publicly available for review online and at Town Hall beginning in year 2 of the permit (FY 2020).

BMP: Public Participation in Stormwater Management Program Development

BMP Number (Optional) **2.2**

Description:

The SWMP will be presented or communicated online to the public with opportunity for comment by email or meeting. Public meetings are held where rules and regulations are reviewed for compliance with stormwater regulations. Meeting minutes will record public comments that are presented at the meeting.

Responsible Department/Parties: Planning; Building; Highways and Maintenance

Measurable Goal(s):

Allow public to comment on the Harwich Stormwater Management Program annually by the end of Year 2 (FY 2020). Continue to hold meetings where stormwater management is discussed.

BMP: Public Participation in Beach Clean-Up Program

BMP Number (Optional) **2.3**

Document Name and/or Web Address: Beach Clean-Up Program

Description:

The objective of the beach cleanup program is to clean two (2) miles of town beach annually. Local nonprofits work together with the Conservation Commission to organize and execute the cleanup.

Responsible Department/Parties: Great Sand Lakes Association, Harwich Conservation Trust, Conservation

Measurable Goal(s):

Continue beach clean-up activity.

BMP: Public Participation in Hazardous Waste Disposal Days

BMP Number (Optional) **2.4**

Document Name and/or Web Address: http://www.harwichwater.com/water-protection/household-hazardous-waste.html

Description:

The Town provides for household hazardous waste disposal six (6) days per year. Information and collection days are at the webpage above. Harwich is also a sponsor.

Responsible Department/Parties: Highways and Maintenance

Measurable Goal(s):

Continue to annually provide specific dates/times for Harwich residents to properly dispose of household hazardous waste.

BMP: Oil and Antifreeze Collection and Recycling

BMP Number (Optional) **2.5**

Document Name and/or Web Address: Schedule available on Town Web Site (http://www.harwichhighway.com/Departments/DisposalArea/tabid/79/Default.aspx)

Description:

The Town collects and recycles oil and antifreeze at the transfer station at multiple times throughout the year.

Responsible Department/Parties: Highways and Maintenance

Measurable Goal(s):

Continue to annually provide specific dates/times for Harwich residents to properly dispose of oil and antifreeze.

Add BMP

MCM 3
Illicit Discharge Detection and Elimination (IDDE) Program

Permit Part 2.3.4

Objective: The permittee shall implement an IDDE program to systematically find and eliminate illicit sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges.

Examples and Templates:
IDDE Program Template and SOPs

Other templates relevant to IDDE can be found here: https://www.epa.gov/npdes-permits/stormwater-tools-new-england#idde

BMP: IDDE Legal Authority

BMP Number (Optional) **3.1** **Completed** (by May 1, 2008) ☒

Ordinances Link or Reference: An IDDE Authority was adopted by the Board of Selectmen on October 9th, 2018.

Department Responsible for Enforcement: Engineering; Conservation; Highways and Maintenance; Planning

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BMP: Sanitary Sewer Overflow (SSO) Inventory

BMP Number (Optional) **3.2** **Completed** (by year 1) ☒

Document Name and/or Web Address: This is part of the IDDE Program (Attachment B)

Description:

There are currently no sanitary sewers in Harwich, however sewer construction in a portion of the east side of town is anticipated to begin in 2019. Construction is anticipated to end in 2021. This represents a small portion of the town with 690 parcels served, but will have lasting impacts on the improvement of water quality in the area. Future phases of sewer construction are anticipated to cover the more populated areas of town. Sanitary sewer overflows are less likely in newly constructed sewers, however Harwich will continue to monitor for these events.

Responsible Department/Parties: Engineering, Health

Measurable Goal(s):

This is complete. Maintain an inventory of sanitary sewer overflows in the IDDE plan along with the annual report.

SSO Reporting:

In the event of an overflow or bypass, a notification must be reported within 24 hours by phone to MassDEP, EPA, and other relevant parties. Follow up the verbal notification with a written report following MassDEP's Sanitary Sewer Overflow (SSO)/Bypass notification form within 5 calendar days of the time you become aware of the overflow, bypass, or backup.

The MassDEP contact is: Southeast Region (508) 946-2750 20 Riverside Drive Lakeville, MA 02347	The EPA contact is: EPA New England (617) 918-1510 5 Post Office Square Boston, MA 02109

BMP: Map of Storm Sewer System

BMP Number (Optional) **3.3** **Phase I Completed** (by year 2) ☐ **Phase II Completed** (by year 10) ☐

Document Location and/or Web Address: https://www3.epa.gov/region1/npdes/stormwater/ma/tms4noi/harwich.pdf

Description:

Update MS4 map during IDDE program completion. Currently all outfalls are mapped. Additional requirements are needed as described below. There are no interconnections with another entity's MS4s as required for Phase I.

Responsible Department/Parties: Engineering; Consultant; Highways and Maintenance

Measurable Goal(s):

Phase I-
By June 30, 2020, update the MS4 map to include: open channel conveyances, municipally-owned stormwater treatment structures, and initial catchment delineations. There are no interconnections with stormwater structures owned by other entities in Harwich.

Phase II-
By June 30, 2028, update MS4 map to include: outfall spatial locations (lat/long +/- 30 feet accuracy), pipes, manholes, catch basins, and refined catchment delineations.

BMP: IDDE Program

BMP Number (Optional) **3.4** **Written Document Completed** (by year 1) ☒

Document Name and/or Web Address: Illicit Discharge Detection and Elimination (IDDE) program is in Attachment B.

Description:

Harwich has created an updated written IDDE program using the guidance in 2.3.4.6 through 2.3.4.8 and EPA provided templates. The IDDE document includes assessment and ranking of outfalls and interconnections, written procedures for catchment investigations, and written procedures describing sampling protocols. See BMPs 3.6 - 3.8 below for more details on the IDDE Program.

Responsible Department/Parties: Engineering; Consultant; Highways and Maintenance

Measurable Goal(s):

This is complete. Harwich has completed a written document describing Illicit Discharge Detection and Elimination (IDDE) procedures and incorporated it into the SWMP.

The outfall/interconnection inventory and initial ranking and the dry weather outfall and interconnection screening and sampling results can be found:

This information is in Attachment B of this SWMP as part of the IDDE Program document.

BMP: Employee Training

BMP Number (Optional) **3.5**

Description:

Develop and implement a program to train municipal employees involved in the IDDE program. Training shall include discussions of how to recognize illicit discharges. Frequency and type of training shall be reported in the annual report.

Responsible Department/Parties: Engineering; Consultant; Highways and Maintenance

Measurable Goal(s):

Training occurs annually starting in 2019 and is recorded in each annual report.

BMP: Implement Catchment Investigations Portion of IDDE Program

BMP Number (Optional) **3.6** **Completed** ☐

Document Name and/or Web Address: Illicit Discharge Detection and Elimination (IDDE) program is in Attachment B.

Description:

Implement catchment investigations using the procedures outlined in the written IDDE Plan. Investigations shall include inspection of junction manholes for evidence of connections with sanitary system and visual/ olfactory signs of sewage and/or other illicit connections. Review catchments for System Vulnerability Factors (SVF) which would indicate higher potential for illicit connections to sanitary sewers. Catchments with one (1) or more SVF must be further evaluated with wet weather sampling at the catchment outfall (see BMP 3.8 below). For any illicit discharges identified during the catchment investigation procedure, identify the source of illicit discharge and eliminate the illicit source. Harwich does not currently have any known SVF at this time due to the fact that the Town does not have sanitary sewers. There are also no known Problem outfalls (outfalls where there was illicit discharge in the past).

Responsible Department/Parties: Engineering; Consultant; Highways and Maintenance

Measurable Goal(s):

Use the written catchment investigation procedure in the IDDE program to implement catchment investigations by FY2020. Low and high priority catchment investigations must be completed by June 30, 2028.

BMP: Conduct Dry Weather Screening

BMP Number (Optional) **3.7** **Completed** ☐

Document Name and/or Web Address: Illicit Discharge Detection and Elimination (IDDE) program is in Attachment B.

Description:

Conduct dry weather screening of High and Low Priority Outfalls using the procedures outlined in the written IDDE program.

Responsible Department/Parties: Engineering; Consultant; Highways and Maintenance

Measurable Goal(s):

Complete dry weather screening by the end of FY 2021 (June 30, 2021).

BMP: Conduct Wet Weather Screening

BMP Number (Optional) **3.8** **Completed** ☐

Document Name and/or Web Address: The Illicit Discharge Detection and Elimination (IDDE) program is in Attachment B.

Description:

Wet weather screening shall be conducted for all outfall catchments with one (1) SVF or more. If required, conduct outfall sampling using the procedures outlined in the written IDDE program and permit conditions. Harwich does not currently have any SVF identified since the Town currently does not have sanitary sewers. Wet weather screening is not likely to be needed.

Responsible Department/Parties: Engineering; Consultant; Highways and Maintenance

Measurable Goal(s):

If an SVF has been identified in an outfall catchment, Harwich will complete wet weather screening in accordance with the catchment investigation schedule identified above under BMP 3.6. Required wet weather screening must be complete by the end of FY 2028 (June 30, 2028).

BMP:

BMP Number (Optional) **Completed** ☐

Document Name and/or Web Address:

Description:

Responsible Department/Parties:

Measurable Goal(s):

Add BMP

MCM 4
Construction Site Stormwater Runoff Control
Permit Part 2.3.5

Objective: The objective of an effective construction stormwater runoff control program is to minimize or eliminate erosion and maintain sediment on site so that it is not transported in stormwater and allowed to discharge to a water of the U.S. through the permittee's MS4.

Examples and Templates:
Examples and templates relevant to MCM 4, including model ordinances and site inspection templates, can be found here: https://www.epa.gov/npdes-permits/stormwater-tools-new-england#csrc

BMP: Sediment and Erosion Control Ordinance

BMP Number (Optional) **4.1** **Completed** (by May 1, 2008) ☒

Ordinances Link or Reference: Town of Harwich, MA, Chapter 400 Subdivision of Land and Site Plan Special Permits
https://ecode360.com/12264120

Department Responsible for Enforcement: Planning Department; Conservation Commission

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BMP: Site Plan Review Procedures

BMP Number (Optional) **4.2** **Written procedures completed** (by year 1) ☒

Document Name and/or Web Address: Town of Harwich, MA, Chapter 400 Subdivision of Land and Site Plan Special Permits
https://ecode360.com/12264120

Description:

Site Plan procedures in Harwich are described in the citations above. Procedures follow requirements in permit part 2.3.5.c.v. Infiltration of all stormwater to the ground is required in Harwich, with no discharge allowed to surface waters. This is enforced through review of pre-construction site design, planned operations at the construction site, and planned BMPs during every phase of the project. Water quality impact and public input are also considered. The transmissive soils on Cape Cod allow for unique opportunities for low impact and green infrastructure; these are considered in the review process. Site reviews will be tracked and included in the annual report.

Responsible Department/Parties: Planning Department; Conservation; Building

Measurable Goal(s):

This is complete. Site Plan review procedures are implemented such that review of 100% of projects greater than one acre in size are conducted according to these procedures.

BMP: Site Inspections and Enforcement of Sediment and Erosion Control Measures Procedures

BMP Number (Optional) **4.3** **Completed** (by year 1) ☒

Document Name and/or Web Address: Town of Harwich, MA, Chapter 400 Subdivision of Land and Site Plan Special Permits
https://ecode360.com/12264120

Description:

Site inspections and enforcement in Harwich are described in the citations above. Procedures follow requirements in permit part 2.3.5.c.v. There are written procedures for these inspections. Site inspections will occur during and after the construction of stormwater BMPs. Inspections and enforcement actions will be

tracked and included in the annual report. The permeable soils in Harwich make construction of infiltration BMPs a relatively straightforward task, hence the inspections of BMPs is also simplified.

Responsible Department/Parties: Planning Department; Conservation; Building

Measurable Goal(s):

Procedures have been completed for site inspection and enforcement of ESC control measures.

BMP: Waste Control

BMP Number (Optional) **4.4** **Completed** ☒

Document Name and/or Web Address: Chapter 247 of the Harwich Bylaws (https://ecode360.com/12492605)

Description:

Harwich has adopted requirements to control wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes.

Responsible Department/Parties: Planning Department; Conservation; Building

Measurable Goal(s):

This goal is complete.

Add BMP

MCM 5
Post Construction Stormwater Management in New Development and Redevelopment

Permit Part 2.3.6

Objective: The objective of an effective post construction stormwater management program is to reduce the discharge of pollutants found in stormwater to the MS4 through the retention or treatment of stormwater after construction on new or redeveloped sites and to ensure proper maintenance of installed stormwater controls.

Examples and Templates:
Examples and templates relevant to MCM 5, including model ordinances and bylaw review templates and guidance can be found here: https://www.epa.gov/npdes-permits/stormwater-tools-new-england#pcsm

BMP: Post-Construction Ordinance

BMP Number (Optional) **5.1** **Completed** (by year 2) ☐

Town Ordinances Link or Reference: A Post-Construction Ordinance that focuses on low impact development and related metrics will be incorporated into: Chapter 400 Subdivision of Land and Site Plan Special Permits (https://ecode360.com/12264120.) The Nitrogen TMDLs that pertain to Harwich also require that text is added so that development and redevelopment stormwater management BMPs are required to be optimized for nitrogen removal.

Department Responsible for Enforcement: Planning Department; Building

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BMP: Street Design and Parking Lot Guidelines Report

BMP Number (Optional) **5.2** **Completed** (by year 4) ☐

Document Name and/or Web Address: To be provided once complete

Description:

Develop a report assessing municipal requirements that affect the creation of impervious cover. The assessment will help determine if changes to design standards for streets and parking lots can be modified to support low impact design options.

Responsible Department/Parties: Planning Department; Building

Measurable Goal(s):

Recommendations are implemented as outlined in schedule of report with progress reported annually.

BMP: Green Infrastructure Report

BMP Number (Optional) **5.3** **Completed** (by year 4) ☐

Document Name and/or Web Address: To be provided once complete

Description:

Develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist.

Responsible Department/Parties: Planning; Building

Measurable Goal(s):

Recommendations are implemented as outlined in the schedule of the report. Progress on implementing Green Infrastructure will be reported in the annual report after the report is finished.

BMP: List of Municipal Retrofit Opportunities

BMP Number (Optional) **5.4** **Completed** (by year 4) ☐

Document Name and/or Web Address: To be provided once available.

Description:

Identify at least five permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious areas and update annually. Prioritization should include consideration of BMPs that reduce nitrogen discharges due to TMDL requirements. A listing of planned structural BMPs and a plan and schedule for implementation will also be included. More details are in permit part 2.3.6.1.d.

Responsible Department/Parties: Planning; Building

Measurable Goal(s):

The list will be completed by June 30, 2022 and updated as needed.

BMP:As-built plans for on-site stormwater control

BMP Number (Optional) **5.5** **Completed** ☒

Document Name and/or Web Address: Chapter 400 Subdivision of Land and Site Plan Special Permits part 11.F.2 (https://ecode360.com/12264120.)

Description:

Procedures to require submission of as-built drawings of on-site stormwater controls and procedures to ensure long term operation and maintenance. Report on progress with this will be in the annual report.

Responsible Department/Parties: Building; Planning

Measurable Goal(s):

The requirement for the submission of as-built plans has been fulfilled. Procedures to ensure long term operation and maintenance of these structures needs to be added to the regulations.

Add BMP

MCM 6
Good Housekeeping and Pollution Prevention for Permittee Owned Operations

Permit Part 2.3.7

Objective: The permittee shall implement an operations and maintenance program for permittee-owned operations that has a goal of preventing or reducing pollutant runoff and protecting water quality from all permittee-owned operations.

Examples and Templates:
Examples and templates relevant to MCM 6, including SOP templates for catch basin cleaning, street sweeping, vehicle maintenance, parks and open space management, winter deicing, and Stormwater Pollutoin Prevention Plans can be found here: https://www.epa.gov/npdes-permits/stormwater-tools-new-england#gh

PERMITTEE OWNED FACILITIES

BMP: Parks and Open Spaces Operations and Maintenance Procedures

BMP Number (Optional) **6.1** **Written Document Completed** (by year 2) ☐

Document Name and/or Web Address: To be provided in Attachment C once completed

Description:

Develop an inventory for all permittee-owned parks and open spaces. Create and implement written O&M procedures for these facilities including all requirements contained in 2.3.7.a.ii.1 of the permit. Written O&M procedures will include the following:
>Procedures to address the proper use, storage, and disposal of pesticides, herbicides, and fertilizers including minimizing the use of these products and using only in accordance manufacturer's instruction.
>Evaluation of lawn maintenance and landscaping activities to ensure practices are protective of water quality. Additional protective practices will include: reduced mowing frequencies, proper disposal of lawn clippings, and use of alternative landscaping materials (e.g., drought resistant planting).
>Slow release fertilizers are required at all Town owned properties that use fertilizer.
>Procedures to address erosion or poor vegetative cover when the permittee becomes aware of it; especially if the erosion is within 50 feet of a surface water.
>Pet waste handling collection and disposal locations at all parks and open space where pets are permitted, including the placing of proper signage concerning the proper collection and disposal of pet waste.
>Procedures to address large waterfowl congregation areas to reduce waterfowl droppings from entering the MS4.
>Procedures for management of trash containers at parks and open space.
>Establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces.

Responsible Department/Parties: Conservation; Highways and Maintenance; Recreation

Measurable Goal(s):

Complete O&M procedures by the end of Year 2 (FY 2020) and implement the SOP listed above on 100% of town parks and open spaces.

Properties List (Optional)**:**

BMP: Buildings and Facilities Operations and Maintenance Procedures

BMP Number (Optional) **6.2** **Written Document Completed** (by year 2) ☐

Document Name and/or Web Address: To be provided in Attachment C once completed

Description:

Inventory all Town owned buildings and facilities where pollutants are exposed to stormwater runoff. This can include schools, town offices, police, and fire stations, municipal pools and parking garages and other Town owned or operated buildings or facilities. Create written O&M procedures including all requirements

contained in 2.3.7.a.ii.2 of the permit. Written O&M procedures will include the following:
>Evaluate the use, storage, and disposal of petroleum products and other potential stormwater pollutants.
>Provide employee training as necessary so that those responsible for handling these products know proper procedures.
>Ensure that Spill Prevention Plans are in place, if applicable, and coordinate with the fire department as necessary.
>Develop management procedures for dumpsters and other waste management equipment.
>Sweep parking lots and keep areas surrounding the facilities clean to reduce runoff of pollutants.
>Slow release fertilizers are required at all Town owned properties that use fertilizer.
>Establish procedures to properly manage grass cuttings and leaf litter on Town property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces.

Responsible Department/Parties: Highways and Maintenance; Buildings

Measurable Goal(s):

Complete O&M procedures by the end of Year 2 (FY 2020) and implement the SOP on Town buildings and facilities.

Properties List (Optional)**:**

BMP: Vehicles and Equipment Operations and Maintenance Procedures

BMP Number (Optional) **6.3** **Written Document Completed** (by year 2) ☐

Document Name and/or Web Address: To be provided in Attachment C once completed

Description:

Inventory all permittee owned vehicles and equipment. Implement the following procedures for vehicles and equipment:
>Establish procedures for the storage of vehicles so that vehicles with fluid leaks shall be stored indoors or containment shall be provided until repaired.
>Evaluate fueling areas owned or operated by the Town. If possible, fueling areas will be placed under cover in order to minimize exposure.
>Establish procedures to ensure that vehicle wash waters are not discharged to the municipal storm sewer system or to surface waters. This permit does not authorize such discharges. See Attachment C for vehicle wash waters procedures.

Responsible Department/Parties: Highways and Maintenance; Engineering

Measurable Goal(s):

Complete O&M procedures by the end of Year 2 (FY 2020) and implement the SOP listed above for Town vehicles and equipment according to the above document.

Properties List (Optional)**:**

INFRASTRUCTURE

BMP: Infrastructure Operations and Maintenance Procedures

BMP Number (Optional) **6.4** **Written Procedure Completed** (by year 2) ☐

Document Name and/or Web Address: Infrastructure Operations and Management plan in Attachment D

Description:

Harwich has established a program for repair and rehabilitation of MS4 infrastructure. The written program details the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4. This program has begun development and is included in Attachment D; more details about asset planning and management will need to be added to satisfy permit requirements by the end of Year 2 (FY 2020) .

Responsible Department/Parties: Highways and Maintenance

Measurable Goal(s):

100% of infrastructure is maintained to ensure proper function in accordance with the procedures above. Complete O&M procedures by the end of Year 2 (FY 2020).

BMP: Catch Basin Cleaning Program

BMP Number (Optional) **6.5** **Written Procedure Completed** (by year 1) ☒

Document Name and/or Web Address: Infrastructure Operations and Management plan in Attachment D

Description:

The DPW keeps a daily log of all operations, including catch basin cleaning, and maintenance. Catch basins are inspected on a rotating schedule each year. Cleaning is completed as needed during inspection events. To comply with the permit, Harwich has established a schedule for catch basin cleaning with the specific target, such that each catch basin is no more than 50% full and will clean catch basins on that schedule. It should be noted that almost all catch basins in Harwich are infiltrating catch basins, so cleaning is less of a priority for TSS removal. Catch basins that ultimately discharge to outfalls will be prioritized for cleaning.

Responsible Department/Parties: Highways and Maintenance

Measurable Goal(s):

All catch basins are cleaned in accordance with the program described above such that no catch basin is more than 50% full at any given time. Document the number of catch basins inspected/cleaned and the volume removed in the annual report. This is completed.

BMP: Street Sweeping Program

BMP Number (Optional) **6.6** **Written Procedure Completed** (by year 1) ☒

Document Name and/or Web Address: Infrastructure Operations and Management Plan in Attachment D

Description:

Harwich will sweep all streets and Town owned parking lots in accordance with permit conditions, except for rural uncurbed roads or limited access highways. Roads should generally be swept twice per year, once in the spring and once in the fall. Targeted areas that have the potential to reduce pollutant loads to waterbodies should be swept more often as needed. Targeted areas generally output a high level of sediment, have a potential for pollutant discharge, or discharge to impaired waters. This will represent an increase in sweeping frequency from once per year to twice per year.

Responsible Department/Parties: Highways and Maintenance

Measurable Goal(s):

Harwich will increase street sweeping to two (2) times per year on all Town streets and Town parking lots in the regulated area, and increase sweeping in targeted areas.

BMP: Winter Road Maintenance Program

BMP Number (Optional) **6.7** **Written Procedure Completed** (by year 1) ☒

Document Name and/or Web Address: Infrastructure Operations and Management Plan in Attachment D

Description:

Harwich has established and implement procedures for winter road maintenance. Procedures include the use and storage of sand and salts, prevention of snow disposal to waterways, the evaluation of alternative methods, and minimization of chloride containing materials.

Responsible Department/Parties: Highways and Maintenance

Measurable Goal(s):

Harwich will continue to implement salt use optimization during deicing season and evaluate at least one salt/ chloride alternative for use in the municipality.

BMP: Stormwater Treatment Structures Inspection and Maintenance Procedures

BMP Number (Optional) **6.8** **Completed** (by year 1) ☒

Document Name and/or Web Address: Infrastructure Operations and Management Plan in Attachment D

Description:

Establish and implement inspection and maintenance procedures and frequencies for stormwater treatment structures such as water quality swales, retention/detention basins, infiltration structures, proprietary treatment devices, or other similar structures.

Responsible Department/Parties: Highways and Maintenance

Measurable Goal(s):

Harwich will inspect and maintain 100% of town owned treatment structures at least annually to ensure proper function.

BMP: SWPPP

BMP Number (Optional) **6.9** **Completed** (by year 2) ☐

Document Name and/or Web Address: To be provided in Attachment E once completed

Description:

Create SWPPP's for maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater in accordance with the permit requirements in 2.3.7.b.iii. In Harwich, this will comprise SWPPPs for two areas; one SWPPP for the Fire/Police Station parcel and one SWPPP for the DPW Yard/Transfer Station.

Responsible Department/Parties: Highways and Maintenance

Measurable Goal(s):

Develop and implement SWPPPs for 100% of facilities listed above by the end of Year 2 (FY 2020).

BMP:

BMP Number (Optional) **Completed** ☐

Document Name and/or Web Address:

Description:

Responsible Department/Parties:

Measurable Goal(s):

BMP:

BMP Number (Optional) _____ **Completed** ☐

Document Name and/or Web Address:

Description:

Responsible Department/Parties:

Measurable Goal(s):

Add BMP

Annual Evaluation

Year 1 Annual Report

Document Name and/or Web Address:

Year 2 Annual Report

Document Name and/or Web Address:

Year 3 Annual Report

Document Name and/or Web Address:

Year 4 Annual Report

Document Name and/or Web Address:

Year 5 Annual Report

Document Name and/or Web Address:

Year X Annual Report

Document Name and/or Web Address:

Add a Year

TMDLs and Water Quality Limited Waters

Select the applicable Impairment(s) and/or TMDL(s).

Impairment(s)

☐ Bacteria/Pathogens ☐ Chloride ☐ Nitrogen ☐ Phosphorus

☐ Solids/oil/grease (hydrocarbons)/metals

TMDL(s)

In State:

☐ Assabet River Phosphorus ☒ Bacteria and Pathogen ☒ Cape Cod Nitrogen

☐ Charles River Watershed Phosphorus ☐ Lake and Pond Phosphorus

Out of State:

☐ Bacteria and Pathogen ☐ Metals ☐ Nitrogen ☐ Phosphorus

Clear Impairments and TMDLs

Bacteria/Pathogens

Combination of Impaired Waters Requirements and TMDL Requirements as Applicable

Applicable Receiving Waterbody(ies)	TMDL Name (if applicable)	Add/Delete Row
Herring River (MA96-22)	Pathogen TMDL for Cape Cod	+ -
Saquatucket Harbor (MA96-23)	Pathogen TMDL for Cape Cod	+ -

Annual Requirements Beginning Year 1

Rank outfalls to these receiving waters as high priority for IDDE implementation in the initial outfall ranking

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMPs 3.4, 3.6, 3.7
In implementation of the IDDE plan, catchments will be ranked as High Priority Outfalls.

Public Education and Outreach

(Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information))

Annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMP 1.9

Permittee or its agents disseminate educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMP 1.11

Provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMP 1.10

Nitrogen

Combination of Impaired Waters Requirements and TMDL Requirements as Applicable

Applicable Receiving Waterbody(ies)	TMDL Name (if applicable)	Add/Delete Row
Herring River (MA96-22)	Herring River TMDL For Total Nitrogen	+ -
Wychmere Harbor (MA96-96)	Allen, Wychmere, and Saquatucket Harbors Embayment Systems Total Maximum Daily Loads For Total Nitrogen	+ -
Saquatucket Harbor (MA96-23)	Allen, Wychmere, and Saquatucket Harbors Embayment Systems Total Maximum Daily Loads For Total Nitrogen	+ -

Annual Requirements Beginning Year 1

Rank outfalls to these receiving waters as high priority for IDDE implementation in the initial outfall ranking

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

Outfalls that discharge to the waters listed above do not have to be listed as high priority, this is an error in the EPA template.

Public Education and Outreach

(Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information))

Distribute an annual message in the spring (April/May) that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release fertilizers

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMPs 1.12, 1.13

Distribute an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMPs 1.12, 1.13

Distribute an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMPs 1.12, 1.13

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

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Establish requirements for the use of slow release fertilizers on permittee owned property currently using fertilizer, in addition to reducing and managing fertilizer use as provided in part 2.3.7.1

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMPs 6.1, 6.2

Establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMPs 6.1, 6.2

Increase street sweeping frequency of all municipal owned streets and parking lots subject to Permit part 2.3.7.a.iii.(c) to a minimum of two times per year (spring and fall)

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMP 6.6

Requirements Due by Year 2

Stormwater Management in New Development and Redevelopment

The requirement for adoption/amendment of the permittee's ordinance or other regulatory mechanism shall include a requirement that new development and redevelopment stormwater management BMPs be optimized for nitrogen removal

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMP 5.1

Requirements Due by Year 4

Stormwater Management in New Development and Redevelopment

Retrofit inventory and priority ranking under 2.3.6.1.b. shall include consideration of BMPs to reduce nitrogen discharges

The relevant BMP number(s) listed above in the Stormwater Management Program OR the description of implementation actions and document location(s) are:

BMP 5.4
Note: The text above should reference permit part 2.3.6.1.d rather than 2.3.6.1.b.

List of Attachments

Attachment A- Endangered Species

- **Official IPaC Species list**
- **Project Review Request**
- **USFWS Determination Letter**

Attachment B- IDDE Program and Appendices
(Includes the Outfall Map and SSO monitoring)

Attachment C- O&M Procedures for Facilities (Year 2 requirement)

- **Parks**
- **Buildings and Facilities**
- **Vehicles and Equipment**

Attachment D- O&M for Infrastructure

- **Infrastructure (Year 2 requirement)**
- **Catch Basin Cleaning**
- **Street Sweeping**
- **Winter Road Maintenance**
- **Stormwater Treatment Structures**

Attachment E- SWPPPs (Year 2 requirement)

- **Fire/Police Station**
- **DPW Yard/Transfer Station**

Attachment A- <u>Endangered Species</u>

- **Official IPaC Species list**
- **Project Review Request**
- **USFWS Determination Letter**

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To:
Consultation Code: 05E1NE00-2018-SLI-2473
Event Code: 05E1NE00-2018-E-05740
Project Name: Harwich MS4 NOI

July 20, 2018

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2018-SLI-2473

Event Code: 05E1NE00-2018-E-05740

Project Name: Harwich MS4 NOI

Project Type: Regulation Promulgation

Project Description: This consultation is for the regulated discharges from the stormwater system in Harwich, MA in support of their 2018 MS4 NOI appplication. The location of this project is the rough extent of the town. The stormwater outfalls in this area are previously existing. The actual action areas are downstream from these discharge points but a larger area has been selected to be conservative. The map that is maintained by MassDEP/NHESP was also consulted (address: https://mass-eoeea.maps.arcgis.com/apps/Viewer/index.html?appid=de59364ebbb348a9b0de55f6febdfd52). There are no documented Northern Long-eared Bat Maternity roost sites or winter hibernacula in or near the project area. No illicit discharges have been found to these outfalls. Roost trees, hibernaculum, and other trees would not be significantly affected by the stormwater discharge. It is Harwich's opinion that there are no effects to Northern Long-eared Bats from these discharges.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/41.69206387828316N70.07881502437796W

Counties: Barnstable, MA

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Birds

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Roseate Tern *Sterna dougallii dougallii* Population: northeast U.S. nesting pop. No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2083	Endangered

Insects

NAME	STATUS
Rusty Patched Bumble Bee *Bombus affinis*	Endangered

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/9383

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

AECOM
250 Apollo Drive
Chelmsford, MA 01824
aecom.com

Sean Maxwell
AECOM
250 Apollo Dr.
Chelmsford, Ma 01824

U.S. Fish and Wildlife Service
Attn: David Simmons
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301

July 20, 2018

Re: Project Review Request, Harwich MS4 NOI, Bourne, MA, 05E1NE00-2018-SLI-2473

We have reviewed the referenced project using the Environmental Protection Agency's (EPA) project review process for our Municipal Separate Storm Sewer System (MS4) and have followed provided guidance and instructions in completing the review. We completed our review on July 20, 2018 and are submitting our project package in accordance with the instructions for further review. The U.S. Fish and Wildlife Service's (Service) Information for Planning and Consultation (IPaC) species list indicated these species may be present in the project area: northern long-eared bat (*Myotis septentrionalis*), piping plover (*Charadrius melodus*), roseate tern (*Sterna dougallii dougallii*), red knot (*Calidris canutus rufa*), and rusty patched bumble bee (*Bombus affinis*). We are submitting this letter as a non-Federal representative of the EPA pursuant to the requirements of the EPA's process for NPDES/MS4 permits.

Our proposed action consists of: permitting of stormwater utilities and associated allowable discharges, improved stormwater management through: public outreach and participation, illicit discharge detection and elimination, construction site erosion and sedimentation control, post construction stormwater management, good housekeeping, and actions to reduce pollutants to impaired waters.

The location action area is identified on the enclosed locus map. The Action area is the area within the Town of Harwich that is regulated under the Massachusetts 2016 Small MS4 permit.

Permit implementation will begin in the fall of 2018 and the permit has an expiration date of June 30, 2022.

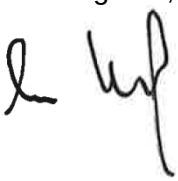
This is a request for review by the Service pursuant to section 7 of the Endangered Species Act. EPA has determined that our proposed action will have no effect on the northern long-eared bat because clearing trees is not part of Harwich's stormwater program. EPA has also determined that our proposed action will have no effect on the rusty patched bumble bee because Harwich's stormwater program will not have any measureable effect on the bee or its grassland habitat. We determined that the project may affect, but is not likely to adversely affect the other above listed species, because:

- Discharges from the project may reach the estuarine and shoreline environments used by the piping plover. However, the project will implement BMPs to reduce pollutants to the extent that the discharges are not known to have measureable impacts on piping plover, their habitat, or the food they eat.
- Although discharges from the project may reach the marine environment used by the roseate tern, the project will implement BMPs to reduce pollutants to the extent that the discharges are not known to have measureable impacts on roseate terns, their habitat, or the fish they eat.
- Discharges from the project may reach the estuarine and shoreline environments used by red knot. However, the project will implement BMPs to reduce pollutants to the extent that the discharges are not known to have measureable impacts on red knot, their habitat, or the food they eat.

The enclosed project package provides the information about the species considered in our review, and we identified our determinations for the resources that may be affected by the project. We request you concur with our determination that the project may affect, but is not likely to adversely affect the species described above.

For additional information, please contact Sean Maxwell at the address listed above, by phone at (603) 674-0625, or Sean.Maxwell@aecom.com.

Kind regards,



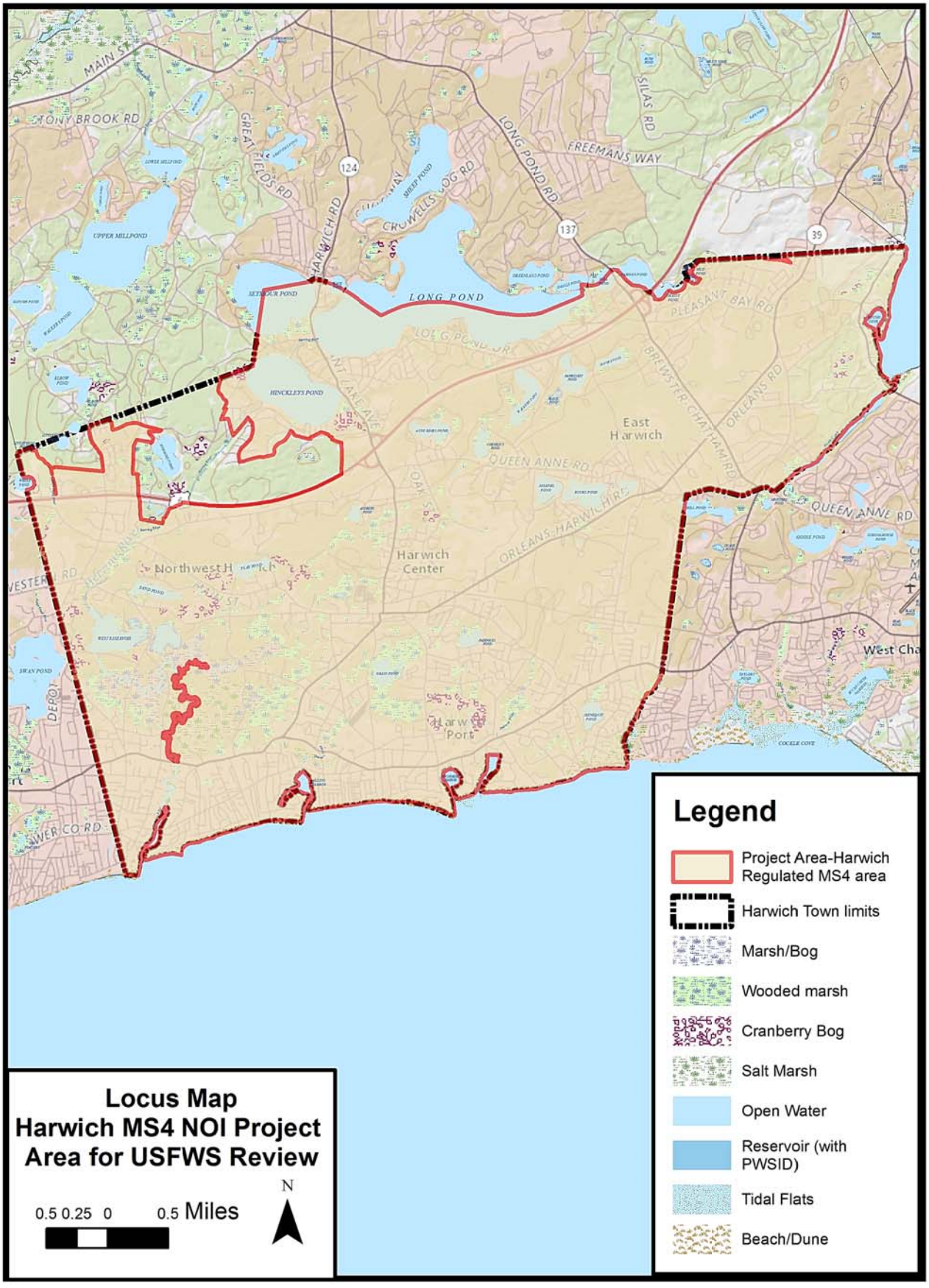
Sean Maxwell
Environmental Scientist IV
AECOM
T: 978-905-3141
M: 603-674-0625
E: Sean.Maxwell@aecom.com

Enclosures:

1) Locus Map of Action Area

2) IPaC Official Species List

3) Species information for listed species


Legend
Project Area-Harwich Regulated MS4 area
Harwich Town limits
Marsh/Bog
Wooded marsh
Cranberry Bog
Salt Marsh
Open Water
Reservoir (with PWSID)
Tidal Flats
Beach/Dune
Locus Map
Harwich MS4 NOI Project Area for USFWS Review
0.5 0.25 0 0.5 Miles
N
MAIN ST
TONY BROOK RD
GREAT FIELDS RD
HARWICH RD
124
CROWELLS BOG RD
LONG POND RD
FREEMANS WAY
SILAS RD
137
39
UPPER MILLPOND
SEYMOUR POND
LONG POND
HINCKLEYS POND
PLEASANT BAY RD
LONG POND DR
BREWSTER CHATHAM RD
ORLEANS RD
East Harwich
QUEEN ANNE RD
OAK ST
ORLEANS-HARWICH RD
Harwich Center
Northwest Harwich
DEPOT
COCKLE COVE

Official Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
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Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To:
Consultation Code: 05E1NE00-2018-SLI-2473
Event Code: 05E1NE00-2018-E-05740
Project Name: Harwich MS4 NOI

July 20, 2018

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

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This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2018-SLI-2473

Event Code: 05E1NE00-2018-E-05740

Project Name: Harwich MS4 NOI

Project Type: Regulation Promulgation

Project Description: This consultation is for the regulated discharges from the stormwater system in Harwich, MA in support of their 2018 MS4 NOI appplication. The location of this project is the rough extent of the town. The stormwater outfalls in this area are previously existing. The actual action areas are downstream from these discharge points but a larger area has been selected to be conservative. The map that is maintained by MassDEP/NHESP was also consulted (address: https://mass-eoeea.maps.arcgis.com/apps/Viewer/index.html?appid=de59364ebbb348a9b0de55f6febdfd52). There are no documented Northern Long-eared Bat Maternity roost sites or winter hibernacula in or near the project area. No illicit discharges have been found to these outfalls. Roost trees, hibernaculum, and other trees would not be significantly affected by the stormwater discharge. It is Harwich's opinion that there are no effects to Northern Long-eared Bats from these discharges.

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Endangered Species Act Species

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---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Birds

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Roseate Tern *Sterna dougallii dougallii* Population: northeast U.S. nesting pop. No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2083	Endangered

Insects

NAME	STATUS
Rusty Patched Bumble Bee *Bombus affinis*	Endangered

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/9383

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Piping Plover ECOS Profile & Fact Sheet

U.S. Fish & Wildlife Service

ECOS

ECOS / Species Profile for Piping Plover (Charadrius melodus)

Piping Plover (Charadrius melodus)

Range Information | Federal Register | Recovery | Critical Habitat | Conservation Plans | Petitions | Life History

Taxonomy: View taxonomy in ITIS

Listing Status: **Endangered** and **Threatened**

General Information

Size: 18 cm (7.25 in) in length. Color: Breeding season: Pale brown above, lighter below; black band across forehead; bill orange with black tip; legs orange; white rump. Male: Complete or incomplete black band encircles the body at the breast. Female: Paler head band; incomplete breast band. Winter coloration: Bill black; all birds lack breast band and head band.

The species historical range included Alabama, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Puerto Rico, Rhode Island, South Carolina, South Dakota, Texas, Virginia, Virgin Islands, Wisconsin, Wyoming. See below for information about where the species is known or believed to occur.

Population detail

The FWS is currently monitoring the following populations of the Piping Plover

Current Listing Status Summary

Status	Date Listed	Lead Region	Where Listed
Endangered	12/11/1985	Great Lakes-Big Rivers Region (Region 3)	[Great Lakes watershed DPS] - Great Lakes, watershed in States of IL, IN, MI, MN, NY, OH, PA, and WI and Canada (Ont.)
Threatened	12/11/1985	Northeast Region (Region 5)	[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.

» Range Information

Current Range

☑ *[Great Lakes watershed DPS] - Great Lakes, watershed in States of IL, IN, MI, MN, NY, OH, PA, and WI and Canada (Ont.)*

☑ *[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.*

Zoom in! Some species' locations may be small and hard to see from a wide perspective. To narrow-in on locations, check the state and county lists (below) and then use the zoom tool.

Want the FWS's current range for all species? Click here to download a zip file containing all individual shapefiles and metadata for all species.

- **[Great Lakes watershed DPS] - Great Lakes, watershed in States of IL, IN, MI, MN, NY, OH, PA, and WI and Canada (Ont.)**

  Listing status: Endangered

  - **States/US Territories** in which this population is known to or is believed to occur: Illinois , Indiana , Michigan , Minnesota , New York , Ohio , Pennsylvania , Wisconsin
  - **US Counties** in which this population is known to or is believed to occur: View All
  - **USFWS Refuges** in which this population is known to occur: Blackbeard Island National Wildlife Refuge, Cabo Rojo National Wildlife Refuge, Fergus Falls Wetland Management District, ... Show All Refuges
  - **Countries** in which this population is known to occur: Canada, United States

- **[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.**

  Listing status: Threatened

  - **States/US Territories** in which this population is known to or is believed to occur: Alabama , Arkansas , Colorado , Delaware , Florida , Georgia , Iowa , Kansas , Louisiana , Maine , Maryland , Mississippi , Montana , Nebraska , New Jersey , New Mexico , New York , North Carolina , North Dakota , Oklahoma , Rhode Island , South Carolina , South Dakota , Texas , Virginia , Wyoming
  - **US Counties** in which this population is known to or is believed to occur: View All
  - **USFWS Refuges** in which this population is known to occur: Amagansett National Wildlife Refuge, Anahuac National Wildlife Refuge, Aransas National Wildlife Refuge, ... Show All Refuges
  - **Countries** in which this population is known to occur: Canada, Mexico, United States

» Federal Register Documents

Federal Register Documents

Show 10 entries

Date	Citation Page	Title
03/16/2016	81 FR 14121 14122	ETWP; Draft Revised Recovery Plan for the I
01/21/2016	81 FR 3450	Draft Environmental Assessment, Habitat Co Piping Plover, Massachusetts Division of Fish
07/08/2014	79 FR 38560 38562	Initiation of 5-Year Status Reviews of Nine Li
09/08/2011	76 FR 55638 55641	90-Day Finding on a Petition To List the Snov
05/19/2009	74 FR 23476 23600	Revised Designation of Critical Habitat for the Texas
10/21/2008	73 FR 62816 62841	Revised Designation of Critical Habitat for the North Carolina; Final Rule
09/30/2008	73 FR 56860 56862	Endangered and Threatened Wildlife and Pla information on the piping plover (Charadrius
06/09/2008	73 FR 32629	Correction to Revised Designation of Critical melodus) in Texas
05/20/2008	73 FR 29294 29321	Revised Designation of Critical Habitat for the

Showing 1 to 10 of 32 entries ‹ Previous 1 2 3 4 Next ›

» Recovery

- Recovery Plan Information Search
- Information Search FAQs

Current Recovery Plan(s)

Show 10 entries

Date	Title
03/16/2016	Volume II: Draft revised recovery plan for the wintering range of the piping plover (Charadrius melodus) and Comprehensive conservatio piping plover (Charadrius melodus) in its coastal migration and winte continental United States.
03/16/2016	Volume I: Draft Revised Recovery Plan for the Northern Great Plain (Charadrius melodus)
09/08/2003	Recovery Plan for the Great Lakes population of Piping Plovers
05/02/1996	Piping Plover Atlantic Coast Population Revised Recovery Plan

Showing 1 to 4 of 4 entries ‹ Previous 1 Next ›

Other Recovery Documents

Show 10 entries

Date	Citation Page	Title
03/16/2016	81 FR 14121 14122	ETWP; Draft Revised Recovery Plan for the I
07/08/2014	79 FR 38560 38562	Initiation of 5-Year Status Reviews of Nine Li Species
09/30/2008	73 FR 56860 56862	Endangered and Threatened Wildlife and Pla review; request for information on the piping
09/16/2003	68 FR 54241 54242	Approved Recovery Plan for the Great Lakes

Showing 1 to 8 of 8 entries

‹ Previous 1 Next ›

Five Year Review

Show 10 entries

Date	Title
09/29/2009	Piping Plover (Charadrius melodus) 5-Year Revie

Showing 1 to 1 of 1 entries

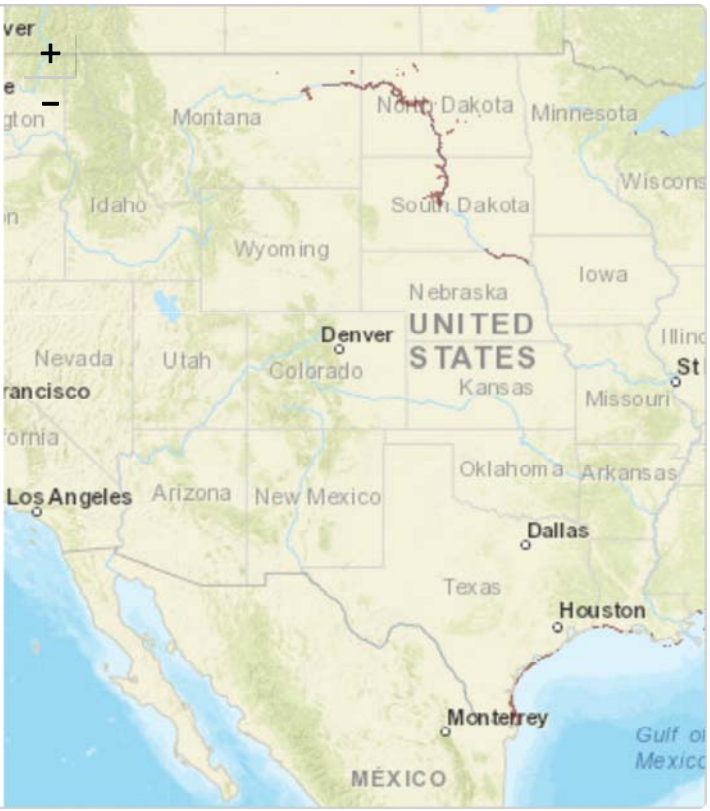
‹ Previous 1 Next ›

» Critical Habitat

Critical Habitat Spatial Extents

Population(s)

- [x] *[Great Lakes watershed DPS] - Great Lakes, watershed in States of IL, IN, MI, MN, NY, OH, PA, and WI and Canada (Ont.)*
- [x] *[Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.*



Show 10 entries

Date	Citation Page	Title

05/19/2009	74 FR 23476 23600	Revised Designation of Critical Habitat for the Plover (Charadrius melodus) in Texas
10/21/2008	73 FR 62816 62841	Revised Designation of Critical Habitat for the Plover (Charadrius melodus) in North Carolin
05/20/2008	73 FR 29294 29321	Revised Designation of Critical Habitat for the Plover (Charadrius melodus) in Texas: Propo
09/11/2002	67 FR 57638 57717	Endangered and Threatened Wildlife and Pla for the Northern Great Plains Breeding Popul
12/28/2001	66 FR 67165 67166	ETWP; Proposed Designation of Critical Hab Breeding Population of the Piping Plover; Re and Notice of Availability of Draft Economic A
07/10/2001	66 FR 36137 36143	ETWP; Final Determination of Critical Habitat 36137-36143)

Showing 1 to 10 of 12 entries

< Previous 1 2 Next >

To learn more about critical habitat please see http://ecos.fws.gov/crithab

» Conservation Plans

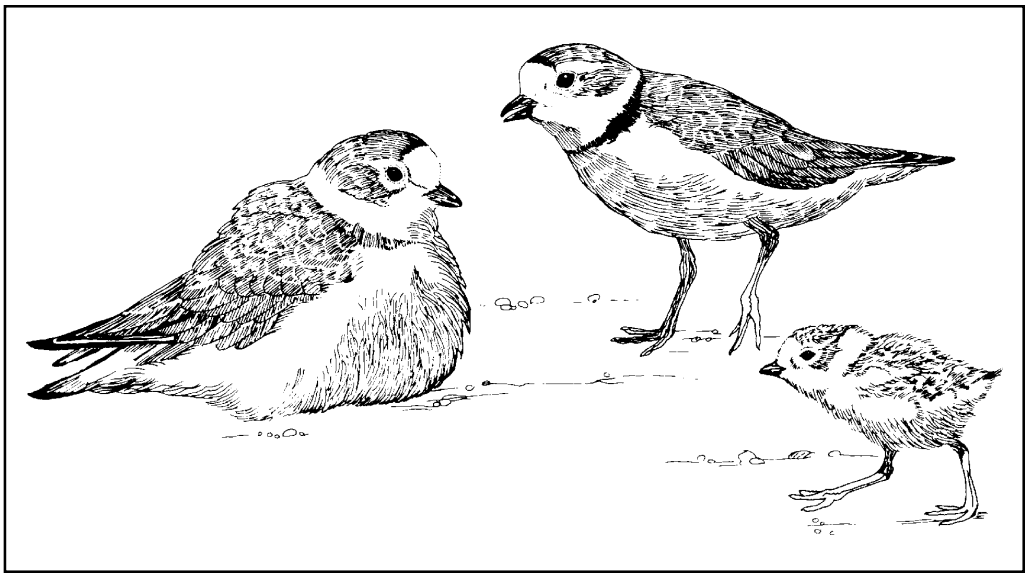
Habitat Conservation Plans (HCP) (learn more)

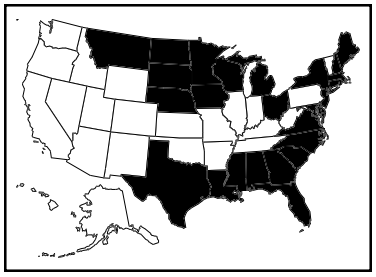
Show 10 entries

HCP Plan Summaries
Volusia Beaches
Town of Orlean's Plover Low Effect HCP
Piping Plover HCP (State of Massachusetts)
Magic Carpet Woods Association
Escambia County Beaches

U.S. Fish & Wildlife Service

Endangered Species Facts





States in which the piping plover is found. This map includes both summer and winter locations.

Piping Plover

The piping plover in the Great Lakes area is an *endangered species*. Endangered species are animals and plants that are in danger of becoming extinct. The Northern Great Plains and Atlantic Coast piping plovers are *threatened species.* Threatened species are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting, and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's endangered species program.

What is the Piping Plover?

Scientific Name - *Charadrius melodus*

Appearance - These small, stocky shorebirds have a sand-colored upper body, a white underside, and orange legs. During the breeding season, adults have a black forehead, a black breast band, and an orange bill.

Habitat - Piping plovers use wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include small creeks or wetlands.

Reproduction - The female lays four eggs in its small, shallow nest lined with pebbles or broken shells. Both parents care for the eggs and chicks. When the chicks hatch, they are able to run about and feed themselves within hours.

Feeding Habits - The plovers eat insects, spiders, and crustaceans.

Range - Piping plovers are migratory birds. In the spring and summer they breed in the northern United States and Canada. There are three locations where piping plovers nest in North America: the shorelines of the Great Lakes, the shores of rivers and lakes in the Northern Great Plains, and along the Atlantic Coast. Their nesting range has become smaller over the years, especially in the Great Lakes area. In the fall, plovers migrate south and winter along the Gulf Coast or other southern locations.

The Great Lakes population of the piping plover is at a perilously low level. Since 1983, the number of nesting pairs has ranged from 12 to 32. In 2000, all of the Great Lakes pairs nested in Michigan.

Why is the piping plover endangered?

Habitat Loss or Degradation - Many of the coastal beaches traditionally used by piping plovers for nesting have been lost to commercial, residential, and recreational developments. Through the use of dams or other water control structures, humans are able to raise and lower the water levels of many lakes and rivers of plover inland nest sites. Too much water in the spring floods the plovers' nests. Too little water over a long period of time allows grasses and other vegetation to grow on the prime nesting beaches, making these sites unsuitable for successful nesting.

Nest Disturbance and Predation - Piping plovers are very sensitive to the presence of humans. Too much disturbance causes the parent birds to abandon their nest. People (either on foot or in a vehicle) using the beaches where the birds nest sometimes accidentally crush eggs or young birds. Dogs and cats often harass and kill the birds. Other animals, such as fox, gulls, and crows, prey on the young plovers or eggs.

What is being done to prevent extinction of the piping plover?

Listing - The Great Lakes population of the piping plover was listed as an endangered species in 1986, and the Northern Great Plains and Atlantic Coast populations were listed as threatened species that same year.

Recovery Plans - The U.S. Fish and Wildlife Service developed recovery plans that describe actions that need to be taken to help the bird survive and recover.

Research - Several cooperative research groups have been set up among federal and state agencies, university and private research centers, and the Canadian Wildlife Service. Studies are being conducted to determine where plovers breed and winter, estimate numbers, and monitor long-term changes in populations.

Habitat Protection - Measures to protect the bird's habitat are conducted each year (often by volunteers), including controlling human access to nesting areas, nest monitoring and protection, limiting residential and industrial development, and properly managing water flow. In Michigan, several landowners have formally agreed to protect plover nesting habitat.

Public Education - Many states and private agencies are running successful public information campaigns to raise awareness of the plover's plight. In Michigan, residents of coastal communities where the birds nest have been contacted by an “ambassador” and provided with information about the plight of the plover.

What can I do to prevent the extinction of species?

Learn - Learn more about the piping plover and other endangered and threatened species. Understand how the destruction of habitat leads to loss of endangered and threatened species and our nation's plant and animal diversity. Tell others about what you have learned.

Volunteer - If piping plovers live near you, join the “Plover Patrol” (information about the “Plover Patrol” is on the website to the right). Or volunteer your time at a nearby Nature Center, Wildlife Sanctuary or National Wildlife Refuge. Make sure you control pets, and always remove litter on beaches. Encourage others to do the same.

U.S. Fish & Wildlife Service
1 Federal Drive
Fort Snelling, Minnesota 55111
612/713-5337
http://midwest.fws.gov/eco_serv/endangrd

Roseate Tern ECOS Profile & Fact Sheet

Endangered Species

Endangered, Threatened and Special Concern Species in Connecticut

Species Fact Sheets

About NDDB Maps

Review/Data Requests

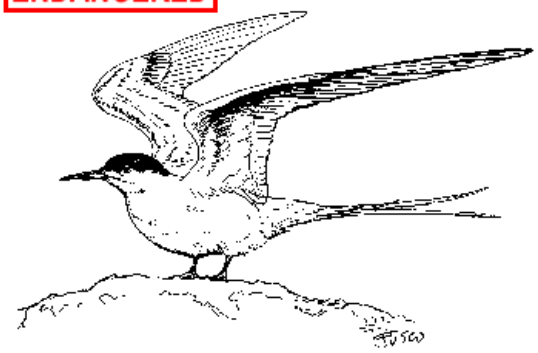
Contributing Data

Endangered Species Main Page

Main Menu

ROSEATE TERN
Sterna dougallii

ENDANGERED



Habitat: Strictly saltwater coastlines; almost never seen inland.
Weight: Approximately 4 ounces.
Length: 14-17 inches.
Wingspan: 30 inches.
Life Expectancy: Banding indicates 9 years of age.
Food: Small fish, occasionally mollusks.
Status: Federally and state endangered.

Identification: Adults have a white body and black head cap. The deeply forked tail measures 6 to 8 inches in length. The black bill is red at the base, varying with the season and the age of the bird; as the breeding season progresses from incubation to the care and feeding of chicks, more and more of the base turns pinkish-red. The rosy tint on the breast is rarely visible in summer, but the bird's bright orange-red legs and feet are easy to distinguish. Both sexes are similar. Chicks and fledglings have black bills, legs and feet. The voice is a high-pitched, rasping "aaak" and soft "chivy."

Range: Roseate terns nest in colonies on sand/gravel beaches or pebbly/rocky offshore islands along the Atlantic coast from Nova Scotia south to Long Island, New York, and on the southern tip of Florida. Roseates that nest in the northeastern United States appear to winter primarily in the waters off Trinidad and northern South America from the Pacific coast of Columbia to eastern Brazil.

Reproduction: Roseate terns arrive in Connecticut in late April and early May. The first eggs are laid by the third week of May in shallow scrapes, or depressions, sometimes lined with dried vegetation. Nests are often concealed by vegetation or rocks. The 1 to 2 eggs are pale buff with small dots of brown. The adults take turns incubating the eggs and bringing small fish to the chicks. The eggs hatch in 23 to 24 days, and the young fledge about 26 to 30 days after hatching. Birds that lose their nests or young will produce new nests into late July and occasionally into early August. Roseate terns usually breed and nest at 3 years of age.

Reason for Decline: Historically, the roseate tern population suffered losses due to the millinery trade. Roseate tern productivity has also been affected by increased human recreation and disturbance in coastal areas, as well as by predation by great black-backed and herring gulls, owls and nocturnal-feeding mammals. Increasing numbers of gulls and human activity on or near coastal barrier islands have greatly reduced available nesting habitat for the roseate tern population in northeastern North America. Many traditional nesting sites in southern New England were abandoned during the 1940s and 1950s when great black-backed and herring gulls rapidly expanded their nesting ranges. These large, aggressive gulls stake out nesting territories in early spring before the terns return from their wintering areas. Gulls have taken over most of the outer islands preferred by nesting terns.

History in Connecticut: In the late 1800s, unrestricted market hunting for the millinery trade devastated the roseate tern population on the Atlantic coast. After harvest for commercial purposes was prohibited by law, the population recovered and at times equaled the number of common terns. Roseate tern numbers declined again in the 1970s and 1980s when gull populations increased.

The third largest roseate tern colony in North America exists in Connecticut at Falkner Island, which is now part of the Stewart B. McKinney National Wildlife Refuge. Approximately 175 to 200 pairs of terns breed there every year. This population has been studied in detail since 1978. Other colony sites that have been used in

Connecticut during 1989 include Tuxis Island near Madison and Duck Island near Clinton. Several small islands in the New London area were occupied by roseate terns in the 1970s.

Approximately one-fourth of the roseate tern breeding population in a given year at Falkner Island does not return the following year. Presently, it is not known if this loss is due to mortality or emigration to other colony sites.

Interesting Facts: According to the U.S. Fish and Wildlife Service (USFWS), islands with manned lighthouses were favorite nesting areas for roseates because the human presence deterred large gulls from nesting. Since the automation of almost all lighthouses, gulls have moved in and displaced the terns. The USFWS officially listed the northeastern breeding population of the roseate tern as endangered in December, 1987.

Adult terns are mainly preyed on by avian species such as owls, gulls and raptors. Eggs and young are also vulnerable to predation, as well as to adverse weather conditions and disturbance. Predation may completely wipe out production in a given colony. The combination of adult mortality, delayed maturity and low productivity can, in a short time, result in serious population declines unless they are offset by subsequent years of high productivity.

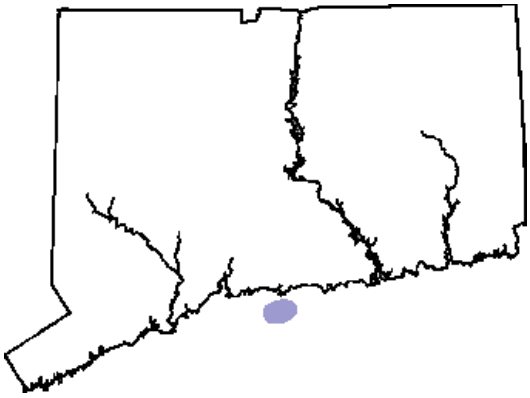
Roseate terns catch their prey by diving headfirst into the water. Their diet of small fish may have led to the alias mackerel gull, which also reflects their membership in the gull family. Graceful tern was another common name given to this adept flier.

In 1975, studies on Gull Island, New York, reported the hybridization of common terns and roseate terns. Similar crosses have not been documented since.

Protective Legislation: *Federal* - Endangered Species Act of 1973, Migratory Bird Treaty Act of 1918. *State* - Connecticut General Statutes Sec. 26-311.

What You Can Do: Respect all roseate tern nesting areas that are fenced or posted for the birds' protection. Do not approach or linger near roseate terns or their nests. Avoid landing vessels at offshore islands inhabited by terns.

Connecticut Range



The production of this Endangered and Threatened Species Fact Sheet Series is made possible by donations to the Endangered Species-Wildlife Income Tax Checkoff Fund.
(rev. 12/99)

Printable Version

79 Elm Street, Hartford, CT 06106-5127 / Phone: 860-424-3000

Red Knot ECOS Profile & Fact Sheet

U.S. Fish & Wildlife Service

Search ECOS

ECOS Environmental Conservation Online System

Conserving the Nature of America

Red knot (Calidris canutus rufa)

Range Information | Federal Register | Recovery | Critical Habitat | Conservation Plans | Petitions | Life History

Taxonomy: View taxonomy in ITIS

Listing Status: Threatened

Where Listed: WHEREVER FOUND

General Information

Length: 25-28 cm. Adults in spring: Above finely mottled with grays, black and light ochre, running into stripes on crown; throat, breast and sides of head cinnamon-brown; dark gray line through eye; abdomen and undertail coverts white; uppertail coverts white, barred with black. Adults in winter: Pale ashy gray above, from crown to rump, with feathers on back narrowly edged with white; underparts white, the breast lightly streaked and speckled, and the flanks narrowly barred with gray. Adults in autumn: Underparts of some individuals show traces of the "red" of spring.

The species historical range included Alabama, Arkansas, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Puerto Rico, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Vermont, Virginia, Virgin Islands, West Virginia, Wisconsin, Wyoming. See below for information about where the species is known or believed to occur.

Current Listing Status Summary

Status	Date Listed	Lead Region	Where Listed
Threatened	01/12/2015	Northeast Region (Region 5)	Wherever found Additional species information

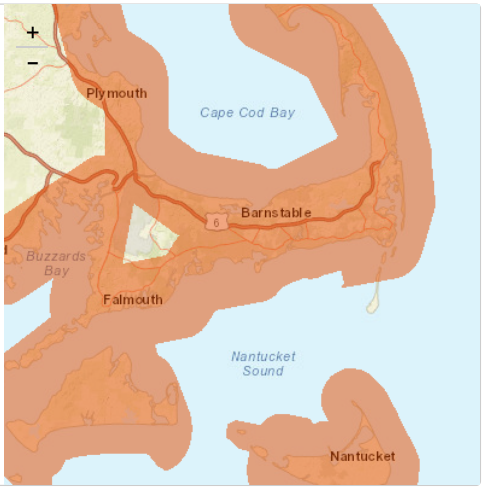
» Range Information

Current Range

Wherever found

Zoom in! Some species' locations may be small and hard to see from a wide perspective. To narrow-in on locations, check the state and county lists (below) and then use the zoom tool.

Want the FWS's current range for all species? Click here to download a zip file containing all individual shapefiles and metadata for all species.



- **Wherever found**

  Listing status: Threatened

- **States/US Territories** in which this population is known to or is believed to occur: Alabama , Arkansas , Connecticut , Delaware , Florida , Georgia , Illinois , Indiana , Kansas , Louisiana , Maine , Maryland , Massachusetts , Michigan , Minnesota , Mississippi , Missouri , Montana , Nebraska , New Hampshire , New Jersey , New York , North Carolina , North Dakota , Ohio , Oklahoma , Pennsylvania , Rhode Island , South Carolina , South Dakota , Texas , Virginia , West Virginia , Wisconsin
- **US Counties** in which this population is known to or is believed to occur: View All
- **USFWS Refuges** in which this population is known to occur: Amagansett National Wildlife Refuge, Back Bay National Wildlife Refuge, Big Boggy National Wildlife Refuge, ... Show All Refuges
- **Countries** in which this population is known to occur: Argentina, Aruba, Bahamas, Barbados, Belize, Brazil, British Virgin Islands, Canada, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, El Salvador, French Guiana, Guadeloupe, Guatemala, Guyana, Haiti, Jamaica, Mexico, Panama, Paraguay, Suriname, Trinidad and Tobago, United States, Uruguay, U.S. Virgin Islands, Venezuela

» Federal Register Documents

Federal Register Documents

Show 10 entries

Date	Citation Page	Title
12/11/2014	79 FR 73705 73748	Threatened Species Status for the Rufa Red Knot
05/14/2014	79 FR 27548 27550	Proposed Threatened Status for the Rufa Red Knot (Ca
04/04/2014	79 FR 18869 18870	Proposed Threatened Status for the Rufa Red Knot (Ca
09/30/2013	78 FR 60023 60098	Proposed Threatened Status for the Rufa Red Knot (Ca
11/21/2012	77 FR 69993 70060	Review of Native Species That Are Candidates for Listir on Resubmitted Petitions; Annual Description of Progre
10/26/2011	76 FR 66370 66439	Review of Native Species That Are Candidates for Listir on Resubmitted Petitions; Annual Description of Progre
11/10/2010	75 FR 69222 69294	Review of Native Species That Are Candidates for Listir on Resubmitted Petitions; Annual Description of Progre
11/09/2009	74 FR 57804 57878	Review of Native Species That Are Candidates for Listir on Resubmitted Petitions; Annual Description of Progre
12/10/2008	73 FR 75176 75244	Review of Native Species That Are Candidates for Listir on Resubmitted Petitions; Annual Description of Progre

Showing 1 to 10 of 11 entries ‹ Previous 1 2 Next ›

» Recovery

- Recovery Plan Information Search
- Information Search FAQs

No recovery information is available for the Red Knot.

» Critical Habitat

No critical habitat rules have been published for the Red Knot.

» Conservation Plans

Candidate Conservation Agreements (CCA): (learn more)

Show 10 entries

CCA Plan Summaries
Red Knot Cooperative Agreement

Showing 1 to 1 of 1 entries ‹ Previous 1 Next ›

» Petitions

Show 10 entries

Showing 1 to 4 of 4 entries

‹ Previous 1 Next ›

» Life History

No Life History information has been entered into this system for this species.

» Other Resources

NatureServe Explorer Species Reports -- NatureServe Explorer is a source for authoritative conservation information on more than 50,000 plants, animals and ecological communtities of the U.S and Canada. NatureServe Explorer provides in-depth information on rare and endangered species, but includes common plants and animals too. NatureServe Explorer is a product of NatureServe in collaboration with the Natural Heritage Network.

ITIS Reports -- ITIS (the Integrated Taxonomic Information System) is a source for authoritative taxonomic information on plants, animals, fungi, and microbes of North America and the world.

FWS Digital Media Library -- The U.S. Fish and Wildlife Service's National Digital Library is a searchable collection of selected images, historical artifacts, audio clips, publications, and video.

U.S. Fish & Wildlife Service

Red knot

Calidris canutus rufa

Skilled aviator Rear Admiral Richard E. Byrd flew over both the North and South poles. But what this renowned man accomplished with the help of sled dogs, ships and airplanes, a little shorebird weighing less than a cup of coffee completes every year of its life. The red knot is truly a master of long-distance aviation.

On wingspans of 20 inches, red knots fly more than 9,300 miles from south to north every spring and repeat the trip in reverse every autumn, making this bird one of the longest-distance migrants in the animal kingdom. About 9 inches long, red knots are among the largest of the small sandpipers. Biologists have identified five races of red knot, three of them living in the Western Hemisphere: *C.c. islandica*, *C.c. rogersi*, and *C.c. rufa*. This last, the red knot known as rufa, winters at the tip of South America in Tierra del Fuego and breeds on the mainland and islands above the Arctic Circle.

Surveys of wintering knots along the coasts of southern Chile and Argentina and during spring migration in Delaware Bay on the U.S. coast indicate a serious population decline. Biologists from the U.S. Fish and Wildlife Service, state natural resource agencies, and non-profit organizations all share a concern for this race of red knot and are pooling efforts to identify what needs to be done to prevent further losses.

A red knot banded in May 1987 was seen on Delaware Bay in May 2000. During those 13 years, the bird had flown about 242,350 miles, a distance farther than from the earth to the moon.

Strength in numbers

Red knots migrate in larger flocks than do most other shorebirds. They break their spring and fall migrations into non-stop segments of 1,500 miles and more, ending at stopover sites called staging areas. Flocks of red knots converge on staging areas along the entire Atlantic coast. Red knots are faithful to these specific sites, stopping at the same location year after year.

While we can guess at some of the benefits of traveling in large flocks, we can also see the downside - susceptibility to habitat change and loss, susceptibility to toxins and diseases, and susceptibility to hunting. Red knots were heavily hunted in the early 20th century, and have never recovered in eastern Canada. They are still hunted in Barbados, the Guianas and other regions in South America. When wintering, the flocking of red knots may protect them from attack by birds of prey. Red knots under attack from falcons perform evasive maneuvers in dense flocks. These flock movements provide very successful protection for individual birds.

Eating like a bird

In order to endure their long journeys, red knots undergo extensive physiological changes. Flight muscle mass increases, while leg muscle mass decreases. Stomach and gizzard masses decrease, while fat mass increases by more than 50 percent. For much of the year red knots eat small mussels and other mollusks, shell and all. When red knots stop to eat during their migration, they eat fewer hard foods because of their shrunken gizzards, and in spring they seek the soft eggs of the horseshoe crab. In fact, the birds' spring migration is timed with the release of horseshoe crab eggs, the perfect food for a traveling red knot. The abundance of these nutritious eggs also makes them a quick and easily found food, saving the birds' energy. Red knots arrive at staging areas very thin, sometimes emaciated. They eat constantly to increase their fat mass to continue the trip, gaining up to 10 percent of their body weight each day and essentially doubling their body weight during their stopover stay.

Red knots often arrive in their arctic breeding areas before the snow cover has melted, and before insects are active and available to eat. The birds then eat plant seeds, grass shoots and other vegetable foods. Once insects hatch, chicks eat them almost exclusively, and adult red knots increase their consumption of insects along with plant materials.

Requirements for survival

Red knots' unique and impressive life history depends for its success, and the species' survival, on certain conditions. One of the most important is the continued availability of billions of horseshoe crab eggs at major North Atlantic staging areas, notably the Delaware Bay and Cape May peninsula. The increase in taking of horseshoe crabs for bait in commercial fisheries that occurred in the 1990s may be a major factor in the decline in red knots. Another necessary condition for red knots' survival is the continued existence of middle- and high-arctic habitat for breeding. Red knots could be particularly affected by global climate change, which may be greatest at the latitudes where this species breeds and winters.

Red knots fascinate biologists, bird watchers and people who appreciate the complex beauty of the natural world. Together with these partners, the U.S. Fish and Wildlife Service is dedicated to working to conserve this extraordinary bird.

Northeast Region
U.S. Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035
413/253 8200
http://northeast.fws.gov

Federal Relay Service
for the deaf and hard-of-hearing
1 800/877 8339

U.S. Fish and Wildlife Service
http://www.fws.gov
1 800/344 WILD

August 2005

Rusty Patched Bumble Bee ECOS Profile & Fact Sheet

Rusty patched bumble bee (Bombus affinis)

Range Information | Federal Register | Recovery | Critical Habitat | Conservation Plans | Petitions | Life History

Taxonomy: View taxonomy in ITIS

Listing Status: Endangered

Where Listed: WHEREVER FOUND

General Information

Historically, the rusty patched bumble bee was broadly distributed across the eastern United States, Upper Midwest, and southern Quebec and Ontario in Canada. Since 2000, this bumble bee has been reported from only 13 states and 1 Canadian province: Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Minnesota, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, Wisconsin and Ontario, Canada.

Rusty patched bumble bees live in colonies that include a single queen and female workers. The colony produces males and new queens in late summer. Queens are the largest bees in the colony, and workers are the smallest. All rusty patched bumble bees have entirely black heads, but only workers and males have a rusty reddish patch centrally located on the back.

See www.fws.gov/midwest/endangered/insects/rpbb for more.

The species historical range included Connecticut, Delaware, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin. See below for information about where the species is known or believed to occur.

Current Listing Status Summary

Status	Date Listed	Lead Region	Where Listed
Endangered	03/21/2017	Great Lakes-Big Rivers Region (Region 3)	Wherever found Additional species information

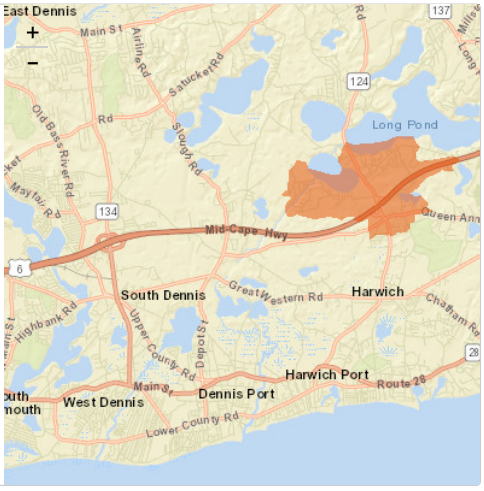
» Range Information

Current Range

Wherever found

Zoom in! Some species' locations may be small and hard to see from a wide perspective. To narrow-in on locations, check the state and county lists (below) and then use the zoom tool.

Want the FWS's current range for all species? Click here to download a zip file containing all individual shapefiles and metadata for all species.



- **Wherever found**

Listing status: Endangered

- **States/US Territories** in which this population is known to or is believed to occur: Illinois , Indiana , Iowa , Maine , Massachusetts , Minnesota , Ohio , Virginia , West Virginia , Wisconsin
- **US Counties** in which this population is known to or is believed to occur: View All

» Federal Register Documents

Federal Register Documents

Show 10 entries

Date	Citation Page	Title
02/10/2017	82 FR 10285 10286	Endangered Species Status for Rusty Patched Bu
01/11/2017	82 FR 3186 3209	Endangered Species Status for Rusty Patched Bu
09/22/2016	81 FR 65324 65334	Endangered Species Status for Rusty Patched Bu
09/18/2015	80 FR 56423 56432	Endangered and Threatened Wildlife and Plants;

Showing 1 to 4 of 4 entries ‹ Previous 1 Next ›

» Recovery

- Recovery Plan Information Search
- Information Search FAQs

No recovery information is available for the Rusty patched bumble bee.

» Critical Habitat

No critical habitat rules have been published for the Rusty patched bumble bee.

» Conservation Plans

No conservation plans have been created for Rusty patched bumble bee.

» Petitions

Show 10 entries

Showing 1 to 1 of 1 entries ‹ Previous 1 Next ›

» Life History

Habitat Requirements

Rusty patched bumble bees once occupied grasslands and tallgrass prairies of the Upper Midwest and Northeast, but most grasslands and prairies have been lost, degraded, or fragmented by conversion to other uses. Bumble bees need areas that provide nectar and pollen from flowers, nesting sites (underground and abandoned rodent cavities or clumps of grasses), and overwintering sites for hibernating queens (undisturbed soil).

Food Habits

Bumble bees gather pollen and nectar from a variety of flowering plants. The rusty patched emerges early in spring and is one of the last species to go into hibernation. It needs a constant supply and diversity of flowers blooming throughout the colony's long life, April through September.

Reproductive Strategy

Rusty patched bumble bee colonies have an annual cycle. In spring, solitary queens emerge and find nest sites, collect nectar and pollen from flowers and begin laying eggs, which are fertilized by sperm stored since mating the previous fall. Workers hatch from these first eggs and colonies grow as workers collect food, defend the colony, and care for young. Queens remain within the nests and continue laying eggs. In late summer, new queens and males also hatch from eggs. Males disperse to mate with new queens from other colonies. In fall, founding queens, workers and males die. Only new queens go into diapause (a form of hibernation) over winter - and the cycle begins again in spring.

» Other Resources

NatureServe Explorer Species Reports -- NatureServe Explorer is a source for authoritative conservation information on more than 50,000 plants, animals and ecological communtities of the U.S and Canada. NatureServe Explorer provides in-depth information on rare and endangered species, but includes common plants and animals too. NatureServe Explorer is a product of NatureServe in collaboration with the Natural Heritage Network.

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FWS Digital Media Library -- The U.S. Fish and Wildlife Service's National Digital Library is a searchable collection of selected images, historical artifacts, audio clips, publications, and video.

U.S. Fish & Wildlife Service

Rusty Patched Bumble Bee
Bombus affinis

The U.S. Fish and Wildlife Service listed the rusty patched bumble bee as endangered under the Endangered Species Act. Endangered species are animals and plants that are in danger of becoming extinct. Identifying, protecting and recovering endangered species is a primary objective of the U.S. Fish and Wildlife Service's endangered species program.

What is a rusty patched bumble bee?

Appearance: Rusty patched bumble bees live in colonies that include a single queen and female workers. The colony produces males and new queens in late summer. Queens are the largest bees in the colony, and workers are the smallest. All rusty patched bumble bees have entirely black heads, but only workers and males have a rusty reddish patch centrally located on the back.

Habitat: Rusty patched bumble bees once occupied grasslands and tallgrass prairies of the Upper Midwest and Northeast, but most grasslands and prairies have been lost, degraded, or fragmented by conversion to other uses. Bumble bees need areas that provide nectar and pollen from flowers, nesting sites (underground and abandoned rodent cavities or clumps of grasses), and overwintering sites for hibernating queens (undisturbed soil).

Illustrations of a rusty patched bumble bee queen (left), worker (center), and male (right) by Elaine Evans, The Xerces Society.

Photo courtesy of Christy Stewart

Reproduction: Rusty patched bumble bee colonies have an annual cycle. In spring, solitary queens emerge and find nest sites, collect nectar and pollen from flowers and begin laying eggs, which are fertilized by sperm stored since mating the previous fall. Workers hatch from these first eggs and colonies grow as workers collect food, defend the colony, and care for young. Queens remain within the nests and continue laying eggs. In late summer, new queens and males also hatch from eggs. Males disperse to mate with new queens from other colonies. In fall, founding queens, workers and males die. Only new queens go into diapause (a form of hibernation) over winter - and the cycle begins again in spring.

Feeding Habits: Bumble bees gather pollen and nectar from a variety of flowering plants. The rusty patched emerges early in spring and is one of the last species to go into hibernation.

Why conserve rusty patched bumble bees?

As pollinators, rusty patched bumble bees contribute to our food security and the healthy functioning of our ecosystems. Bumble bees are keystone species in most ecosystems, necessary not only for native wildflower reproduction, but also for creating seeds and fruits that feed wildlife as diverse as songbirds and grizzly bears.

Bumble bees are among the most important pollinators of crops such as blueberries, cranberries, and clover and almost the only insect pollinators of tomatoes. Bumble bees are more effective pollinators than honey bees for some crops because of their ability to "buzz pollinate." The economic value of pollination services provided by native insects (mostly bees) is estimated at $3 billion per year in the United States.

It needs a constant supply and diversity of flowers blooming throughout the colony's long life, April through September.

Range: Historically, the rusty patched bumble bee was broadly distributed across the eastern United States and Upper Midwest, from Maine in the U.S. and southern Quebec and Ontario in Canada, south to the northeast corner of Georgia, reaching west to the eastern edges of North and South Dakota. Its range included 28 states, the District of Columbia and 2 provinces in Canada. Since 2000, this bumble bee has been reported from only 13 states and 1 province: Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Minnesota, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, Wisconsin – and Ontario, Canada.

Why is the rusty patched bumble bee declining?

Habitat loss and degradation: Most prairies and grasslands of the Upper Midwest and Northeast have been converted to monoculture farms or developed areas, such as cities and roads. Grasslands that remain tend to be small and isolated.

Intensive farming: Increases in farm size and technology advances improved the operating efficiency of farms but have led to practices that harm bumble bees: increased use of pesticides, loss of crop diversity resulting in flowering crops being available for only a short time, loss of hedgerows with flowering plants, and loss of legume pastures.

Disease: Pathogens and parasites may pose a threat, although their prevalence and effects in North American bumble bees are not well understood.

Pesticides: The rusty patched bumble bee may be vulnerable to pesticides. Pesticides are used widely on farms and in cities and have both lethal and sublethal toxic effects. Bumble bees can absorb toxins directly through their exoskeleton and through contaminated nectar and pollen. Rusty patched bumble bees nest in the ground and may be susceptible to pesticides that persist in agricultural soils, lawns and turf.

Global climate change: Climate changes that may harm bumble bees include increased temperature and precipitation extremes, increased drought, early snow melt and late frost events. These changes may lead to more exposure to or susceptibility to disease, fewer flowering plants, fewer places for queens to hibernate and nest, less time for foraging due to high temperatures, and asynchronous flowering plant and bumble bee spring emergence.

What is being done to conserve rusty patched bumble bees?

U.S. Fish and Wildlife Service: Several Service programs work to assess, protect, and restore pollinators and their habitats. Also, the Service works with partners to recover endangered and threatened pollinators and pollinator-dependent plants. Concern about pollinator declines prompted formation of the North American Pollinator Protection Campaign, a collaboration of people dedicated to pollinator conservation and education. The Service has a Memorandum of Understanding with the Pollinator Partnership to work together on those goals. The Service is a natural collaborator because our mission is to work with others to conserve, fish, wildlife, and plants and their habitats.

Other Efforts: Trusts, conservancies, restoration groups and partnerships are supporting pollinator initiatives and incorporating native plants that support bees and other pollinators into their current activities. For example, the USDA Natural Resource Conservation Service is working with landowners in Michigan, Minnesota, Montana, North Dakota, South Dakota, and Wisconsin to make bee-friendly conservation improvements to their land. Improvements include the practices of planting cover crops, wildflowers, or native grasses and improved management on grazing lands.

Research: Researchers are studying and monitoring the impacts of GMO crops and certain pesticides on pollinators. Efforts by citizen scientists and researchers to determine the status of declining bee species are underway throughout the United States.

What can I do to help conserve the rusty patched bumble bee?

Garden: Grow a garden or add a flowering tree or shrub to your yard. Even small areas or containers on patios can provide nectar and pollen for native bees.

Native plants: Use native plants in your yard such as lupines, asters, bee balm, native prairie plants and spring ephemerals. Don't forget spring blooming shrubs like ninebark and pussy willow! Avoid invasive non-native plants and remove them if they invade your yard. For more information on attracting native pollinators, visit www.fws.gov/pollinators/pdfs/PollinatorBookletFinalrevWeb.pdf.

Natural landscapes: Provide natural areas - many bumble bees build nests in undisturbed soil, abandoned rodent burrows or grasss clumps. Keep some unmowed, brushy areas and tolerate bumble bee nests if you find them. Reduce tilling soil and mowing where bumble bees might nest. Support natural areas in your community, county and state.

Minimize: Limit the use of pesticides and chemical fertilizer whenever possible or avoid them entirely. Pesticides cause lethal and sublethal effects to bees and other pollinators.

Northern Long-eared Bat Fact Sheet

Northern Long-Eared Bat

Myotis septentrionalis

The northern long-eared bat is federally listed as a threatened species under the Endangered Species Act. ***Endangered*** species are animals and plants that are in danger of becoming extinct. ***Threatened*** species are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's Endangered Species Program.

Photo by Steve Taylor, University of Illinois

This northern long-eared bat, observed during an Illinois mine survey, shows visible symptoms of white-nose syndrome.

What is the northern long-eared bat?

Appearance: The northern long-eared bat is a medium-sized bat with a body length of 3 to 3.7 inches and a wingspan of 9 to 10 inches. Their fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. As its name suggests, this bat is distinguished by its long ears, particularly as compared to other bats in its genus, *Myotis*.

Winter Habitat: Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. Within hibernacula, surveyors find them hibernating most often in small crevices or cracks, often with only the nose and ears visible.

Summer Habitat: During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). Males and non-reproductive females may also roost in cooler places, like caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. They rarely roost in human structures like barns and sheds.

Reproduction: Breeding begins in late summer or early fall when males begin to swarm near hibernacula. After copulation, females store sperm during hibernation until spring. In spring, females emerge from their hibernacula, ovulate and the stored sperm fertilizes an egg. This strategy is called delayed fertilization.

After fertilization, pregnant bats migrate to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies of females and young generally have 30 to 60 bats at the beginning of the summer, although larger maternity colonies have also been observed. Numbers of bats in roosts typically decrease from the time of pregnancy to post-lactation. Most bats within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth. Maximum lifespan for the northern long-eared bat is estimated to be up to 18.5 years.

Feeding Habits: Like most bats, northern long-eared bats emerge at dusk to feed. They primarily fly through the understory of forested areas feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation or by gleaning motionless insects from vegetation.

Range: The northern long-eared bat's range includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. The species' range includes 37 States and the District of Columbia: Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming.

Why is the northern long-eared bat in trouble?

White-nose Syndrome: No other threat is as severe and immediate as

this. If this disease had not emerged, it is unlikely that northern long-eared bat populations would be experiencing such dramatic declines. Since symptoms were first observed in New York in 2006, white-nose syndrome has spread rapidly from the Northeast to the Midwest and Southeast; an area that includes the core of the northern long-eared bat's range, where it was most common before this disease. Numbers of northern long-eared bats (from hibernacula counts) have declined by up to 99 percent in the Northeast. Although there is uncertainty about the rate that white-nose syndrome will spread throughout the species' range, it is expected to continue to spread throughout the United States in the foreseeable future.

Other Sources of Mortality:
Although no significant population declines have been observed due to the sources of mortality listed below, they may now be important factors affecting this bat's viability until we find ways to address WNS.

Impacts to Hibernacula: Gates or other structures intended to exclude people from caves and mines not only restrict bat flight and movement, but also change airflow and microclimates. A change of even a few degrees can make a cave unsuitable for hibernating bats. Also, cave-dwelling bats are vulnerable to human disturbance while hibernating. Arousal during hibernation causes bats to use up their energy stores, which may lead to bats not surviving through winter.

Loss or Degradation of Summer Habitat: Highway construction, commercial development, surface mining, and wind facility construction permanently remove habitat and are activities prevalent in many areas of this bat's range. Many forest management activities benefit bats by keeping areas forested rather than converted to other uses. But, depending on type and timing, some forest management activities can cause mortality and temporarily remove or degrade roosting and foraging habitat.

Wind Farm Operation: Wind turbines kill bats, and, depending on the species, in very large numbers. Mortality from windmills has been documented for northern long-eared bats, although a small number have been found to date. However, there are many wind projects within a large portion of the bat's range and many more are planned.

What Is Being Done to Help the Northern Long-Eared Bat?

Disease Management: Actions have been taken to try to reduce or slow the spread of white-nose syndrome through human transmission of the fungus into caves (e.g. cave and mine closures and advisories; national decontamination protocols). A national plan was prepared by the Service and other state and federal agencies that details actions needed to investigate and manage white-nose syndrome. Many state and federal agencies, universities and non-governmental organizations are researching this disease to try to control its spread and address its affect. See www.whitenosesyndrome.org/ for more.

Addressing Wind Turbine Mortality: The Service and others are working to minimize bat mortality from wind turbines on several fronts. We fund and conduct research to determine why bats are susceptible to turbines, how to operate turbines to minimize mortality and where important bird and bat migration routes are located. The Service, state natural resource agencies, and the wind energy industry are developing a Midwest Wind Energy Habitat Conservation Plan, which will provide wind farms a mechanism to continue operating legally while minimizing and mitigating listed bat mortality.

Listing: The northern long-eared bat is listed as a threatened species under the federal Endangered Species Act. Listing a species affords it the protections of the Act and also increases the priority of the species for funds, grants, and recovery opportunities.

Hibernacula Protection: Many federal and state natural resource agencies and conservation organizations have protected caves and mines that are important hibernacula for cave-dwelling bats.

What Can I Do?

Do Not Disturb Hibernating Bats: To protect bats and their habitats, comply with all cave and mine closures, advisories, and regulations. In areas without a cave and mine closure policy, follow approved decontamination protocols (see http://whitenosesyndrome.org/topics/decontamination). Under no circumstances should clothing, footwear, or equipment that was used in a white-nose syndrome affected state or region be used in unaffected states or regions.

Leave Dead and Dying Trees Standing: Like most eastern bats, the northern long-eared bat roosts in trees during summer. Where possible and not a safety hazard, leave dead or dying trees on your property. Northern long-eared bats and many other animals use these trees.

Install a Bat Box: Dead and dying trees are usually not left standing, so trees suitable for roosting may be in short supply and bat boxes may provide additional roost sites. Bat boxes are especially needed from April to August when females look for safe and quiet places to give birth and raise their pups.

Support Sustainability: Support efforts in your community, county and state to ensure that sustainability is a development goal. Only through sustainable living will we provide rare and declining species, like the northern long-eared bat, the habitat and resources they need to survive alongside us.

Spread the Word: Understanding the important ecological role that bats play is a key to conserving the northern long-eared and other bats. Helping people learn more about the northern long-eared bat and other endangered species can lead to more effective recovery efforts. For more information, visit www.fws.gov/midwest/nleb and www.whitenosesyndrome.org

Join and Volunteer: Join a conservation group; many have local chapters. Volunteer at a local nature center, zoo, or national wildlife refuge. Many state natural resource agencies benefit greatly from citizen involvement in monitoring wildlife. Check your state agency websites and get involved in citizen science efforts in your area.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial St, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

September 24, 2018

To whom it may concern:

The U.S. Fish and Wildlife Service (USFWS) reviewed the stormwater discharge activities associated with the 2016 National Pollutant Discharge and Elimination System (NPDES) Massachusetts (MA) Small Municipal Separate Storm Sewer System (MS4) general permit (MA MS4 General Permit) issued by the Environmental Protection Agency (EPA). We determined those activities may affect, but are not likely to adversely affect, certain species listed under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) when specific conditions are met. When these conditions are met, we do not need to review individual projects. These comments are provided in accordance with section 7 of the ESA and complement existing 2016 MA MS4 General Permit Appendix C Guidance. We understand the applicant is acting as a non-Federal representative of the EPA for the purpose of consultation under section 7. **This letter provides additional guidance for meeting Criterion B and should be submitted as part of your application package to the EPA.**

If the USFWS Information for Planning and Consultation website (https://ecos.fws.gov/ipac/) indicates your MA MS4 General Permit project action area may contain one or more of the following federally listed endangered species: roseate tern (*Sterna dougallii*), northern red-bellied cooter (*Pseudemys rubriventris*), dwarf wedgemussel (*Alasmidonta heterodon*), rusty patched bumble bee (*Bombus affinis*), northeastern bulrush (*Scirpus ancistrochaetus*), or American chaffseed (*Schwalbea americana*); threatened species: piping plover (*Charadrius melodus*), bog turtle (*Glyptemys muhlenbergii*), Puritan tiger beetle (*Cicindela puritana*), northeastern beach tiger beetle (*Cicindela dorsalis*), or red knot (*Calidris canutus rufa*); or their federally designated critical habitat; and the specific conditions listed below are met, you may submit this letter to complete the **MA MS4 General Permit Appendix C: Step 4** in place of a concurrence letter for informal consultation as documentation of ESA eligibility for **USFWS Criterion B.**

In addition, this letter also satisfies the requirement in the **MA MS4 General Permit Appendix C: Step 2 (3)** to contact the USFWS and obtain a concurrence letter, if you have not yet done so. If your project action area includes one or more of the above-listed species *and* one or more of the

species listed under **Criterion C,**[1] you may still use this letter to certify under **Criterion B**. All existing guidance regarding requirements for certifying eligibility according to the USFWS Criterion A, B, or C for coverage by the 2016 MS4 Permit (see MA MS4 General Permit Appendix C – Endangered Species Guidance) remains unchanged.

We have determined that proposed stormwater discharge activities covered under the 2016 MS4 Permit *may affect, but are not likely to adversely affect*, the above-listed species and the species' critical habitat when the following are true:

1. all stormwater discharges are pre-existing or previously permitted by EPA;
2. any planned operations and maintenance work covered by this permit will only affect previously disturbed areas where stormwater controls are already installed. In these situations the chance of encountering any of the subject species is discountable;
3. the project implements EPA MS4 Best Management Practices (BMPs) and meets Clean Water Act and Massachusetts Water Quality Standards. Although permitted discharges may reach the environment used by these species, BMPs reduce pollutants to the extent that discharges are not known to have measurable impacts on these species or their habitat;
4. no new construction or structural BMPs are proposed under this permit at this time; and
5. you agree that if, during the course of the permit term, you plan to install a structural BMP not identified in the Notice of Intent (NOI), you will re-initiate consultation with the USFWS as necessary (see **MA MS4 General Permit Appendix C: Step 2 (5)**).

If the above criteria are met, further consultation with the USFWS under section 7 of the ESA is not required at this time; however, if the proposed action changes in any way such that it may affect a listed species in a manner not previously analyzed or if new information reveals the presence of additional listed species that may be affected by the project, the applicant or the EPA should contact us immediately and suspend activities that may affect those species until the appropriate level of consultation is completed with our office. Thank you for your cooperation, and please contact David Simmons of this office at (603) 227-6425 if you have questions or need further assistance.

Sincerely yours,

Thomas R Chapman
Supervisor
New England Field Office

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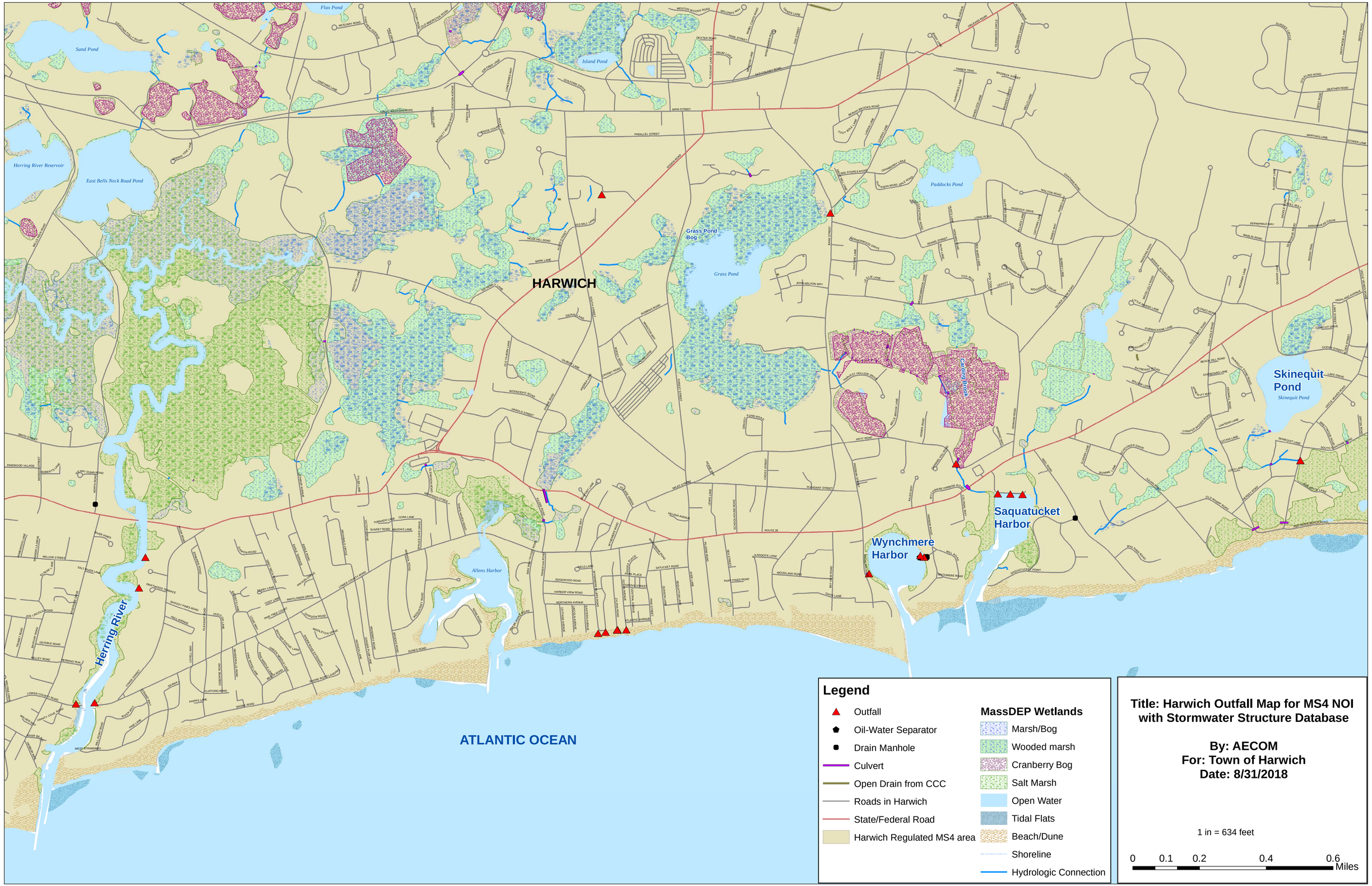
[1] Criterion C includes guidance for project action areas that may contain species for which EPA has already made a determination. These species include the northern long-eared bat (*Myotis septentrionalis*), sandplain gerardia (*Agalinis acuta*), small whorled pogonia (*Isotria medeoloides*), and/or American burying beetle (*Nicrophorus americanus*) (MA MS4 General Permit Appendix C: Step 3 – Determine if You Can Meet Eligibility USFWS Criterion C).

Attachment B- IDDE Program and Appendices
(Includes the Outfall Map and SSO monitoring)


HARWICH
ATLANTIC OCEAN
Grass Pond Bog
Grass Pond
Paddocks Pond
Island Pond
Flax Pond
Sand Pond
Herring River Reservoir
East Bells Neck Road Pond
Allens Harbor
Herring River
Carding Brook
Skinequit Pond
Skinequit Pond
Saquatucket Harbor
Wynchmere Harbor
Legend
Outfall
Oil-Water Separator
Drain Manhole
Culvert
Open Drain from CCC
Roads in Harwich
State/Federal Road
Harwich Regulated MS4 area
MassDEP Wetlands
Marsh/Bog
Wooded marsh
Cranberry Bog
Salt Marsh
Open Water
Tidal Flats
Beach/Dune
Shoreline
Hydrologic Connection
Title: Harwich Outfall Map for MS4 NOI with Stormwater Structure Database
By: AECOM
For: Town of Harwich
Date: 8/31/2018
1 in = 634 feet
0 0.1 0.2 0.4 0.6 Miles

Attachment C- <u>O&M Procedures for Facilities</u>

- **Parks**
- **Buildings and Facilities**
- **Vehicles and Equipment**

Attachment D- <u>O&M Procedures for Infrastructure</u>

- **Infrastructure**
- **Catch Basin Cleaning**
- **Street Sweeping**
- **Winter Road Maintenance**
- **Stormwater Treatment Structures**

AECOM

Municipal Stormwater Infrastructure Operation and Maintenance Plan

Harwich, Massachusetts

2019

Table of Contents

Municipal Stormwater Infrastructure Operation and Maintenance Plan

Appendices

Introduction

This Operation and Maintenance (O&M) Plan has been prepared by Harwich to address stormwater infrastructure O&M requirements[1] of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit" or "MS4 Permit." This Plan and attached Standard Operating Procedures (SOPs) are based on a template provided by Central Massachusetts Stormwater Coalition that was created with grant funding for use in municipalities across the state.

This O&M Plan addresses Minimum Control Measure 6, Good Housekeeping and Pollution Prevention for Permittee Owned Operations, by describing the activities and procedures the Town will implement so that the MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4. The O&M Plan outlines inspection and maintenance procedures for catch basins, municipally-owned streets and parking lots, and structural stormwater Best Management Practices (BMPs).

The Highways and Maintenance Department is responsible for inspection and maintenance of the stormwater infrastructure. A map of the existing stormwater infrastructure in Harwich is provided in **Appendix A**.

Applicable Operations

The O&M Plan covers the following Town operations:

- Planning considerations, procedures, storage and disposal, reuse options, and log for catch basin cleanings.
- Planning considerations, procedures, storage and disposal, reuse operations, and log for street sweeping.
- Planning considerations, procedures, alternative materials, storage and disposal for winter road maintenance. Winter road maintenance includes snow disposal and salt/sand operations and disposal.
- Procedures for frequency of type of maintenance for all types of BMP's, BMP waste disposal, and inspection log for BMP's.

[1] See Part 2.3.7.a.iii of the 2016 MS4 Permit for Infrastructure Operation and Maintenance program requirements.

Catch Basins

The Highways and Maintenance Department performs routine inspections, cleaning, and maintenance of the catch basins that are located within the MS4 regulated area. The Town will implement the following catch basin inspection and cleaning procedures to reduce the discharge of pollutants from the MS4:

- Routine inspection and cleaning of catch basins. Catch basins should be cleaned such that they are no more than 50 percent full[2] at any time. The Town will initially inspect all catch basins within the regulated area to evaluate sediment or debris accumulation and establish optimal inspection and maintenance frequencies to meet the "50 percent" goal. A catch basin inspection/cleaning procedure, inspection form, and log of catch basins cleaned or inspected are included in **Appendix B**.

- If a catch basin sump is more than 50 percent full during two consecutive routine inspections or cleaning events, the finding will be documented, the contributing drainage area will be investigated for sources of excessive sediment loading, and to the extent practicable, contributing sources will be addressed. If no contributing sources are found, the inspection and cleaning frequency will be increased.

- Catch basins located near construction activities (roadway construction, residential, commercial, or industrial development or redevelopment) will be inspected and cleaned more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings (i.e., catch basins more than 50 percent full). Priority will also be given to catch basins that discharge to impaired waters.

- The following information will be included in each annual report:
    - Any action taken in response to excessive sediment or debris loadings
    - Total number of catch basins
    - Number of catch basins inspected
    - Number of catch basins cleaned
    - Total volume or mass of material removed from catch basins.

Streets and Parking Lot Sweeping

Streets and municipally-owned parking lots are swept twice annually. Harwich has established and implemented street sweeping procedures that are adapted to reduce

[2] A catch basin sump is more than 50 percent full if the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin

pollutants to waterways. Street sweeping of roadways in the regulated area is performed by Town staff at least twice yearly, in the spring and fall, and when necessary after storm events. Sweeping at least two times annually is mandated by the TMDLs for Nitrogen. This regulates MS4 areas that are in watersheds that discharge to the waters impaired for Nitrogen. The operation plan includes a focus on roads that have drainage infrastructure that discharges near or directly to waterways.

The Town will implement the following street and parking lot sweeping procedures to reduce the discharge of pollutants from the MS4:

- All streets and municipally owned parking lots with the exception of rural uncurbed roads with no catch basins or high speed limited access highways will be swept and/or cleaned a minimum of twice per year. The pavement will be swept in these locations once in the spring (following winter activities such as sanding) and once in the fall following the times when most leaves have fallen. The fall sweeping will occur no later than December 1st of each year.

- More frequent sweeping will be considered for targeted areas based on pollutant load reduction potential, inspections, pollutant loads, catch basin cleaning or inspection results, land use, impaired waters, or other factors.

- For rural uncurbed roadways with no catch basins and limited access highways, the Town will either meet the minimum frequencies above, or develop and implement an inspection, documentation, and targeted sweeping plan outlining reduced frequencies within two (2) years of the effective date of the permit, and submit such plan with its year one annual report.

- It is recommended to sweep in the range of 3 to 7 mph, depending on specific conditions.

- It is recommended to implement and enforce parking restrictions where parked cars are making it difficult to reach the curb.

- The following information will be included in each annual report:
    - Number of miles cleaned or the volume or mass of material removed (see sweeping log in **Appendix C**).

Catch Basin Cleanings and Street Sweepings

Catch basin cleanings (i.e., solid materials such as leaves, sand and twigs removed from stormwater collection systems during cleaning operations) and street sweepings will be managed in compliance with current Massachusetts Department of Environmental Protection policies:

- Catch Basin Cleanings

http://www.mass.gov/eea/agencies/massdep/recycle/regulations/management-of-catch-basin-cleanings.html

- Street Sweepings
  http://www.mass.gov/eea/docs/dep/recycle/laws/stsweep.pdf

Prior to disposal or reuse, catch basin cleanings and street sweepings will be stored indoors or using proper controls such that they do not discharge to receiving waters. Sweepings may be disposed in either lined or unlined permitted solid waste landfills without prior approval from the department. The following sections describe procedures for storage of street sweepings prior to either reuse or disposal.
Temporary storage sites include sites that are used for less than one year, unless the MassDEP regional office in the region where the sweepings are stored grants a written extension. The following conditions must be met in order for sweepings to be temporarily stored:

- Storage must be at a site where the sweepings are generated or at a location, including the Highways and Maintenance Department yard, which is under the control of a governmental entity which is doing or has contracted the sweeping.
- The sweepings shall be protected from wind and rain to the extent necessary to prevent dust, erosion and off-site migration.
- The sweepings should not be stored within the 100-foot buffer zone of a wetland or wetland resource area, including bordering vegetative wetlands and riverfront area.
- The sweepings should not be stored within 500-feet of a ground or surface drinking water supply.
- Storage should incorporate good management practice and result in no public nuisance.

Sweepings that are not reused should be stored in a permanent solid waste disposal facility and inside a building or have a tarp covering the pile. It is recommended that a barrier or berm be used to contain stormwater runoff.

Sweeping and Catch Basin Cleaning Reuse
The following section reviews possibilities for reuse of catch basin cleanings in Massachusetts.

Preparation
Solid waste, such as trash and paper, should be removed from the sweepings prior to use. Leaves and other organic matter should also be removed when good engineering practice indicates it is necessary to produce a material that is suitable for the intended use.

Testing
It has been shown that sweepings from all areas, excluding urban center roads, had main pollutants of concern including total petroleum hydrocarbons (TPH) and polynuclear aromatic hydrocarbons (PAHs). These test results indicated that sweepings contain levels or contamination that is unsuitable for unrestricted use. However, not including

urban center roads, the levels of contamination were consistent and low enough to allow the use of sweepings in restricted applications without requiring testing or pre-approval as long as certain conditions were met. Also, because sweepings from urban center roads are not approved for all uses, they should be kept separate from other sweepings if the intended purpose is for reuse.

Uses

Landfills: Street sweepings may be used for daily cover at lined and unlined permitted solid waste landfills and do not need MassDEP approval if the sweepings satisfy requirements for daily cover material specified at 310 CMR 19.130(15).

Additive to Restricted Use Compost: Street sweepings shall be used as an additive to compost without prior MassDEP approval only if the conditions and restrictions listed below are followed:

- The sweepings have not been collected from urban center roads.
- The compost is only used in public ways.
- The compost is not used in residential areas.
- The compost is kept above the groundwater level.
- The compost is not used in designated "No Salt Areas".
- The compost is not used within the 100-foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas.
- The compost is not used within 500-feet of a ground or surface water drinking supply.

Fill in Public Ways: Street sweepings can be used for fill in public ways without prior MassDEP approval only if the conditions and restrictions listed below are followed:

- The sweepings have not been collected from urban center roads.
- The sweepings are used under the road surface or as fill along the side of the road within the public way.
- The sweepings are not used in residential areas.
- The sweepings are kept above the level of the groundwater.
- The sweepings are not used in designated "No Salt Areas".
- The sweepings are not used within the 100-foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas.
- The sweepings are not used within 500-feet of a ground or surface water drinking supply.

Other Uses: Any use not pre-approved in the preceding section requires MassDEP approval under the Beneficial Use provisions of the Solid Waste Management Facility Regulations at 310 CMR 19.060. A Beneficial Use Determination (BUD) can be made after the submission of an application characterizing the waste and describing the proposed beneficial use.

Winter Road Maintenance

The Town performs a variety of maintenance activities to ensure safe winter driving conditions on its roads and parking lots. The Highways and Maintenance Department

uses approximately 50% sand and 50% NaCl in road treatment. Manual control and zero-velocity spreaders are used. All of the salt is kept in a storage shed.

The Town will implement the following winter maintenance procedures to reduce the discharge of pollutants from the MS4:

- Minimize the use and optimize the application of sodium chloride and other salt[3] (while maintaining public safety) and consider opportunities for use of alternative materials.

- Provide training for municipal employees on winter roadway maintenance procedures.

- Optimize sand and/or chemical application rates through the use, where practicable, of automated application equipment (e.g., zero velocity spreaders), anti-icing and pre-wetting techniques, implementation of pavement management systems, and alternate chemicals. Maintain records of the application of sand, anti-icing and/or de-icing chemicals to document the reduction of chemicals to meet established goals.

- Prevent exposure of deicing product (salt, sand, or alternative products) storage piles to precipitation by enclosing or covering the storage piles. Implement good housekeeping, diversions, containment or other measures to minimize exposure resulting from adding to or removing materials from the pile. Store piles in such a manner as not to impact surface water resources, groundwater resources, recharge areas, and wells.

- The MS4 Permit prohibits snow disposal into waters of the United States. Snow disposal activities, including selection of appropriate snow disposal sites, will adhere to the Massachusetts Department of Environmental Protection Snow Disposal Guidance, Guideline No. BWR G2015-01 (Effective Date: December 21, 2015), located at: http://www.mass.gov/eea/agencies/massdep/water/regulations/snow-disposal-guidance.html

Winter Road Maintenance Procedures

The following section describes SOPs and recommendations for BMPs to be used during winter maintenance activities, including plowing and sand/salt application.

Snow Plowing

[3] For purposes of the MS4 Permit, salt means any chloride-containing material used to treat paved surfaces for deicing, including sodium chloride, calcium chloride, magnesium chloride, and brine solutions.

- Identify snow storage areas prior to plowing. As previously discussed, areas should be selected based on availability of impervious surfaces and location of the 100-year floodplain, for protection against surface water contamination.
- Avoid plowing, pushing, blowing, or storing excess snow or other debris into storm drains. Do not hose down sidewalks or parking lots except where wash water will only enter grassy or graveled areas where it can infiltrate into the ground.
- Avoid plowing, pushing, blowing, or storing excess snow or other debris into storm drains.

Sanding

- Only use clean sand for winter road maintenance.
- Use the lowest possible application rate that will be effective.
- Make sure to sweep roads and parking lots after winter sanding operations.

Salt/Deicer Application

- Hand apply salt and/or chemical deicers only on sidewalks where required for pedestrian safety.
- Use the lowest amount of product that will be effective.
- Avoid applying salt and/or chemical deicers near storm drains where possible.
- Be aware of Low salt/No salt areas; sensitive watershed areas.

Alternative Materials

Salt and sand are the most common and cheapest methods for winter road maintenance. However, there are alternative products that can be used to better manage the roadways during the winter months. Table 4-1 presents a few options, and list the cost and general characteristics of the product. Use of these products should be considered prior to performing winter road maintenance.

Table 1. Deicing Alternatives

Substance	Cost	Characteristics
Calcium Chloride ($CaCl_2$)	Flake $290/ton, pellet $340/ton	Melts ice at temperatures of -25 ° F If used as recommended, will not harm vegetation
Magnesium Chloride ($MgCl_2$)	Flake $260/ton, pellet $300/ton	Lowest practical temperature: 5 ° F If used as recommended, will not harm vegetation; however, $MgCl_2$, on a percentage basis, contains 17-56% more chloride ion than other salt-type deicers
Potassium Chloride (KCl)	$240/ton	Lowest practical temperature: 12 ° F Will not harm vegetation
Urea	$280/ton	Lowest practical temperature: 15 ° F Will not harm vegetation

Substance	Cost	Characteristics
Calcium Magnesium Acetate (CMA)	$2,000/ton	Will work below 0 ° F Low toxicity and biodegradable

Source: Keating, Janis. (2004). Stormwater. Deicing Salt: Still on the Table. Retrieved from: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=106&minmeasure=61

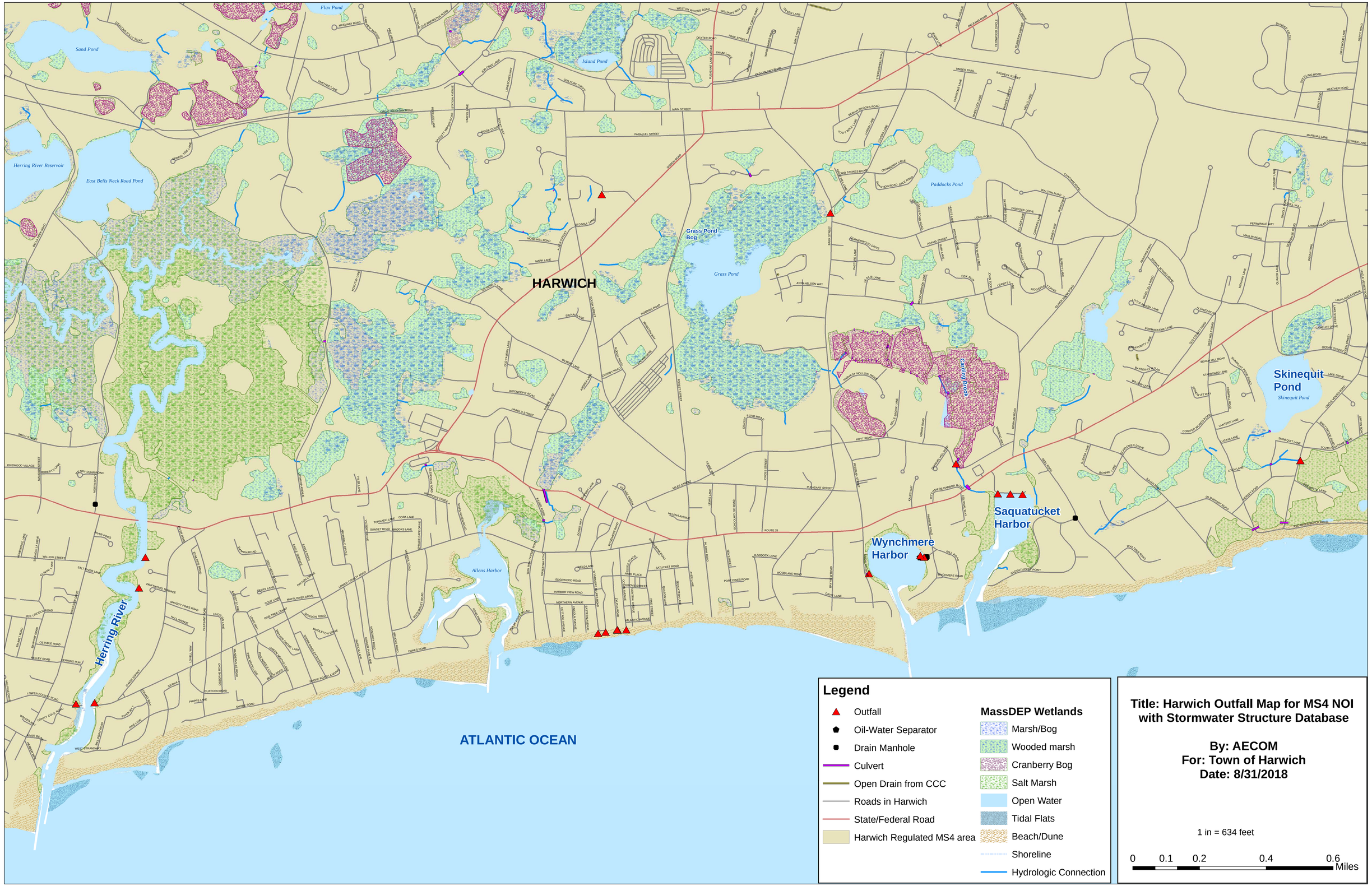
Structural Stormwater BMPs

Harwich will assess all of its structural stormwater Best Management Practices (BMPs). An inventory of structural BMPs owned and/or maintained by the Town will be provided in **Appendix D** when BMPs are assessed with the required Phase I mapping update by the end of year 2 (FY2020). The stormwater infrastructure map in **Appendix A** (and in Appendix B of the IDDE Program) will show the locations of the structural BMPs.

Structural stormwater BMPs will be inspected annually at a minimum. In anticipation of constructed BMPs, recommended inspection procedures and checklists have been provided for typical BMPs in **Appendix E**.

Appendix A

Stormwater Infrastructure Map


HARWICH
ATLANTIC OCEAN
Grass Pond Bog
Grass Pond
Paddocks Pond
Island Pond
Flax Pond
Sand Pond
Herring River Reservoir
East Bells Neck Road Pond
Allens Harbor
Herring River
Carding Brook
Skinequit Pond
Skinequit Pond
Saquatucket Harbor
Wynchmere Harbor
Legend
Outfall
Oil-Water Separator
Drain Manhole
Culvert
Open Drain from CCC
Roads in Harwich
State/Federal Road
Harwich Regulated MS4 area
MassDEP Wetlands
Marsh/Bog
Wooded marsh
Cranberry Bog
Salt Marsh
Open Water
Tidal Flats
Beach/Dune
Shoreline
Hydrologic Connection
Title: Harwich Outfall Map for MS4 NOI with Stormwater Structure Database
By: AECOM
For: Town of Harwich
Date: 8/31/2018
1 in = 634 feet
0 0.1 0.2 0.4 0.6 Miles

Appendix B

Catch Basin Inspection and Cleaning Procedure
Catch Basin Inspection Form
Catch Basin Cleaning Log

CATCH BASIN INSPECTION AND CLEANING STANDARD OPERATING PROCEDURE

Introduction

Catch basins help minimize flooding and protect water quality by removing trash, sediment, decaying debris, and other solids from stormwater runoff. These materials are retained in a sump below the invert of the outlet pipe. Catch basin cleaning reduces foul odors, prevents clogs in the storm drain system, and reduces the loading of suspended solids, nutrients, and bacteria to receiving waters.

During regular cleaning and inspection procedures, data can be gathered related to the condition of the physical basin structure and its frame and grate and the quality of stormwater conveyed by the structure. Observations such as the following can indicate sources of pollution within the storm drain system:

- Oil sheen
- Discoloration
- Trash and debris

Both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by an oil will remain intact and move in a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial sheen is not a pollutant, but should be noted.

Observations such as the following can indicate a potential connection of a sanitary sewer to the storm drain system, which is an illicit discharge.

- Indications of sanitary sewage, including fecal matter or sewage odors
- Foaming, such as from detergent
- Optical enhancers, fluorescent dye added to laundry detergent

Each catch basin should be cleaned and inspected at least annually. Catch basins in high-use areas may require more frequent cleaning. Performing street sweeping on an appropriate schedule will reduce the amount of sediment, debris, and organic matter entering the catch basins, which will in turn reduce the frequency with which structures need to be cleaned.

Cleaning Procedure

Catch basin inspection cleaning procedures should address both the grate opening and the basin's sump. Document any and all observations about the condition of the catch basin structure and water quality on the Catch Basin Inspection Form (attached).

An excessive sediment or debris loading is assumed to be a catch basin sump more than 50 percent full. A catch basin sump is more than 50 percent full if the contents within the sump exceed one half of the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin.

Catch basin inspection and cleaning procedures include the following:

1. Work upstream to downstream.
2. Clean sediment and trash off grate.
3. Visually inspect the outside of the grate.
4. Visually inspect the inside of the catch basin to determine cleaning needs.
5. Inspect catch basin for structural integrity.
6. Determine the most appropriate equipment and method for cleaning each catch basin.
    a. Manually use a shovel to remove accumulated sediments, or
    b. Use a bucket loader to remove accumulated sediments, or
    c. Use a high pressure washer to clean any remaining material out of catch basin while capturing the slurry with a vacuum.
    d. If necessary, after the catch basin is clean, use the rodder of the vacuum truck to clean downstream pipe and pull back sediment that might have entered downstream pipe.
7. If contamination is suspected, chemical analysis will be required to determine if the materials comply with the Massachusetts DEP Hazardous Waste Regulations, 310 CMR 30.000 (http://www.mass.gov/dep/service/regulations/310cmr30.pdf). Chemical analysis required will depend on suspected contaminants. Note the identification number of the catch basin on the sample label, and note sample collection on the Catch Basin Inspection Form.
8. Properly dispose of collected sediments. See the following section for guidance.
9. If fluids collected during catch basin cleaning are not being handled and disposed of by a third party, dispose of these fluids to a sanitary sewer system, with permission of the system operator.
10. If illicit discharges are observed or suspected, notify the appropriate Department (see the IDDE Plan for procedures).
11. At the end of each day, document location and number of catch basins cleaned, amount of waste collected, and disposal method for all screenings.
12. Report additional maintenance or repair needs to the appropriate department.

Disposal of Screenings

The discharge of decant wastewater and/or any other wastewater associated with catch basin maintenance to a watercourse or wetland, or returned to a catch basin or storm drain

system, is prohibited. However, catch basin cleanings from storm water-only drainage systems may be disposed at any landfill that is permitted by MassDEP to accept solid waste. MassDEP usually does not require stormwater-only catch basin cleanings to be tested before disposal, unless there is evidence of contamination. Contaminated catch basin cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as Hazardous Waste if appropriate. Any cleanings from combined sewers may be required to be tested before disposal

Screenings may need to be placed in a drying bed to allow water to evaporate before proper disposal. In this case, ensure that the screenings are managed to prevent pollution.

In Massachusetts, the only option for reuse of catch basin cleanings is at landfills. As discussed previously, catch basin cleanings must be sufficiently dry and free of decant liquid prior to re-use. Otherwise, the material will need to undergo a Paint Filter Liquids Test. This test consists of placing a predetermined amount of material in a paint filter, and if any material passes through the filter within a five minute period, the material is considered to contain free liquids (EPA, 2004). Once catch basin cleanings are sufficiently dry or have passed the Paint Filter Liquids Test, they may be used as grading and shaping material at landfills undergoing closure. Catch basin cleanings may also be used as a daily cover or grading material at active landfills, but only with specific MassDEP approval of the proposed use.

MassDEP 310 CMR19.130 (7) prohibits Massachusetts landfills from accepting materials with free draining liquids. The agency will generally be satisfied that the material is sufficiently dry if there is no free water in a truck used to transport the catch basin cleanings. Otherwise, the material will need to undergo a Paint Filter Liquids Test. However, catch basin cleanings can be used as grading and shaping material at landfills undergoing closure. The cleanings may be used as a daily cover or grading material at active landfills only with specific MassDEP approval of the proposed use.

Attachments

1. Catch Basin Inspection Form

Note: This SOP and form are based on a template that was created by Central Massachusetts Regional Stormwater Coalition for use in municipalities across the state.

Job No.: _____ **Town:** _____

Inspector: _____ **Date:** _____

CATCH BASIN INSPECTION FORM

Catch Basin I.D.	_____	**Final Discharge from Structure?** Yes ☐ No ☐ **If Yes, Discharge to Outfall No:**_____	
Catch Basin Label:	**Stencil** ☐ **Ground Inset** ☐ **Sign** ☐ **None** ☐ **Other**_____		
Basin Material:	Concrete ☐ Corrugated metal ☐ Stone ☐ Brick ☐ Other: _____ ☐	**Catch Basin Condition:**	Good ☐ Poor ☐ Fair ☐ Crumbling ☐
Pipe Material:	Concrete ☐ HDPE ☐ PVC ☐ Clay Tile ☐ Other:_____	**Pipe Measurements:**	Inlet Dia. (in): d= ____ Outlet Dia. (in): D= ____

Required Maintenance/ Problems (check all that apply):

- ☐ Tree Work Required
- ☐ New Grate is Required
- ☐ Pipe is Blocked
- ☐ Frame Maintenance is Required
- ☐ Remove Accumulated Sediment
- ☐ Pipe Maintenance is Required
- ☐ Basin Undermined or Bypassed
- ☐ Cannot Remove Cover
- ☐ Ditch Work
- ☐ Corrosion at Structure
- ☐ Erosion Around Structure
- ☐ Remove Trash & Debris
- ☐ Need Cement Around Grate

Other: _____

Catch Basin Grate Type :	**Sediment Buildup Depth :**	**Description of Flow:**	**Street Name/ Structure Location:**
Bar: ☐ Cascade: ☐ Other:_____ Properly Aligned: Yes ☐ No ☐	0-6 (in): ____ 6-12(in): ____ 12-18 (in): ____ 18-24 (in): ____ 24 + (in): ____	Heavy ☐ Moderate ☐ Slight ☐ Trickling ☐	

***If the outlet is submerged check yes and indicate approximate height of water above the outlet invert.** h above invert (in):__ Yes ☐ No ☐

☐ **Flow** ☐ **Standing Water** **(check one or both)**	**Observations:**	Color:	
		Odor:	
Weather Conditions :		Dry > 24 hours ☐	Wet ☐

Sample of Screenings Collected for Analysis? Yes ☐ No ☐

Comments:

Circle those present:

Foam	Oil Sheen
Sanitary Waste	Bacterial Sheen
Orange Staining	Floatables
Excessive sediment	Pet Waste
Other:_____	Optical Enhancers

Appendix C

Street and Parking Lot Sweeping Log

Street and Parking Lot Sweeping Log

Page #_____

Date	Operator	Weather Conditions	Streets/parking lots swept	Number of miles swept	Volume or mass of material removed	Corrective action taken or recommended

Appendix D

Inventory of Structural Stormwater Best Management Practices

Inventory of Structural Stormwater Best Management Practices (BMPs)
Harwich, Massachusetts

BMP ID or Description	Location	BMP Type	Inspection Frequency	Date of Last Inspection	Additional Notes

Appendix E

Structural Stormwater BMP Inspection Procedures and Checklists

STANDARD OPERATING PROCEDURE FOR INSPECTING CONSTRUCTED BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) are policies, procedures and structures designed to reduce stormwater pollution, prevent contaminant discharges to natural water bodies, and reduce stormwater facility maintenance costs. Constructed BMPs are permanent site features designed to treat stormwater before infiltrating it to the subsurface or discharging it to a surface water body.

This Standard Operating Procedure (SOP) provides a general summary of inspection procedures for eight common constructed BMPs, including:

1. Bioretention Areas and Rain Gardens
2. Constructed Stormwater Wetlands
3. Extended Dry Detention Basins
4. Proprietary Media Filters
5. Sand and Organic Filters
6. Wet Basins
7. Dry Wells
8. Infiltration Basins

This SOP and attached inspection forms are based on a template that was created by Central Massachusetts Regional Stormwater Coalition for use in municipalities across the state. This SOP is based on the Massachusetts Stormwater Handbook and is not intended to replace that document. This SOP is also not intended to replace the Stormwater BMP Operation and Maintenance (O&M) Plan required by the Massachusetts Wetlands Protection Act, Order of Conditions.

Bioretention Areas and Rain Gardens

Bioretention areas and rain gardens are shallow depressions filled with sandy soil, topped with a thick layer of mulch and planted with dense native vegetation. There are two types of bioretention cells:

1. Filtering bioretention area: Areas that are designed solely as an organic filter; and
2. Exfiltration bioretention area: Areas that are configured to recharge groundwater in addition to acting as a filter.

Inspection & Maintenance

Regular inspection and maintenance are important to prevent against premature failure of bioretention areas or rain gardens. Regular inspection and maintenance of pretreatment devices and bioretention cells for sediment buildup, structural damage and standing water can extend the life of the soil media.

Maintenance Schedule: Bioretention Areas and Rain Gardens

Activity	Time of Year	Frequency
Inspect for soil erosion and repair	Year round	Monthly
Inspect for invasive species and remove if present	Year round	Monthly
Remove trash	Year round	Monthly
Mulch Void Areas	Spring	Annually
Remove dead vegetation	Fall and Spring	Bi-Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace all media and vegetation	Late Spring/Early Summer	As Needed

When failure is discovered, excavate the bioretention area, scarify the bottom and sides, replace the filter fabric and soil, replant vegetation and mulch the surface.

Never store snow within a bioretention area or rain garden. This would prevent required water quality treatment and the recharge of groundwater.

Constructed Stormwater Wetlands

Constructed stormwater wetlands maximize the pollutant removal from stormwater through the use of wetland vegetation uptake, retention and settling. Constructed storm water wetlands must be used in conjunction with other BMPs, such as sediment forebays.

Inspection & Maintenance

Regular inspection and maintenance are important to prevent against premature failure of bioretention areas or rain gardens. Regular inspection and maintenance of pretreatment devices and bioretention cells for sediment buildup, structural damage and standing water can extend the life of the soil media.

Maintenance Schedule, Constructed Stormwater Wetlands: Years 0-3

Activity	Time of Year	Frequency
Inspect for invasive species and remove if present	Year round	Monthly
Record and Map:	Year round	Annually
Types and distribution of dominant wetland plants	Year round	Bi-Annually
Presence and distribution of planted wetland species	Spring	Annually
Presence and distribution of invasive species	Fall and Spring	Bi-Annually
Indications other species are replacing planted wetland species	Spring	Annually
Percent of standing water that is not vegetated	Spring or Fall	Annually
Replace all media and vegetation	Late Spring/Early Summer	As Needed
Stability of original depth zones and micro-topographic features		
Accumulation of sediment in the forebay and micropool and survival rate of plants		

Maintenance Schedule, Constructed Stormwater Wetlands: Years 4-Lifetime

Activity	Time of Year	Frequency
Inspect for invasive species and remove if present	Year round	Monthly
Clean forebays	Year round	Annually
Clean sediment in basin/wetland system	Year round	Once every 10 years
Mulch Void Areas	Spring	Annually
Remove dead vegetation	Fall and Spring	Bi-Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace all media and vegetation	Late Spring/Early Summer	As Needed

When failure is discovered, excavate the bioretention area, scarify the bottom and sides, replace the filter fabric and soil, replant vegetation and mulch the surface.

Never store snow within a constructed stormwater wetland. This would prevent required water quality treatment and the recharge of groundwater.

Extended Dry Detention Basins

Extended dry detention basins are designed to control both stormwater quantity and quality. These BMPs are designed to hold stormwater for at least 24 hours, allowing solids to settle and to reduce local and downstream flooding. Pretreatment is required to reduce the potential for overflow clogging. The outflow may be designed as either fixed or adjustable. Additional nutrient removal may be achieved by a micropool or shallow marsh.

Inspection & Maintenance

Annual inspection of extended dry detention basins is required to ensure that the basins are operating properly. Potential problems include: erosion within the basin and banks, tree growth on the embankment, damage to the emergency spillway and sediment accumulation around the outlet. Should any of these problems be encountered, necessary repairs should be made immediately.

Maintenance Schedule: Extended Dry Detention Basins

Activity	Time of Year	Frequency
Inspect basins	Spring and Fall	Bi-Annually, and during and after major storms
Examine outlet structure for clogging or high outflow release velocities	Spring and Fall	Bi-Annually
Mow upper stage, side slopes, embankment and emergency spillway	Spring through Fall	Bi-Annually
Remove trash and debris	Spring	Bi-Annually
Remove sediment from basin	Year round	At least once every 5 years

Proprietary Media Filters

Media Filters are designed to reduce total suspended solids and other target pollutants, such as organics, heavy metals or nutrients, which are absorbed onto the filter media, which is contained in a concrete structure. The substrate used as filter media depends on the target pollutants, and may consist of leaf compost, pleated fabric, activated charcoal, perlite, amended sand in combination with perlite, and zeolite. Two types of Media Filters are manufactured: Dry Media Filters, which are designed to dewater within 72 hours; and Wet Media Filters, which maintain a permanent pool of water as part of the treatment system.

Inspection & Maintenance

Maintenance in accordance with the manufacturer's requirements is necessary to ensure stormwater treatment. Inspection or maintenance of the concrete structure may require OSHA confined space training. Dry Media Filters are required to dewater in 72 hours, thus preventing mosquito and other insect breeding. Proper maintenance is essential to prevent clogging. Wet Media Filters require tight fitting seals to keep mosquitoes and other insects from entering and breeding in the permanent pools. Required maintenance includes routine inspection and treatment.

Maintenance Schedule: Proprietary Media Filters

Activity	Time of Year	Frequency
Inspect for standing water, trash, sediment and clogging	Per manufacturer's schedule	Bi-Annually (minimum)
Remove trash and debris	N/A	Each Inspection
Examine to determine if system drains in 72 hours	Spring, after large storm	Annually
Inspect filtering media for clogging	Per manufacturer's schedule	Per manufacturer's schedule

Sand and Organic Filters

Sand and organic filters, also known as filtration basins, are intended for quality control rather than quantity control. These filters improve water quality by removing pollutants through a filtering media and settling pollutants on top of the sand bed and/or in a pretreatment basin. Pretreatment is required to prevent filter media from clogging. Runoff from the filters is typically discharged to another BMP for additional treatment.

Inspection & Maintenance

If properly maintained, sand and organic filters have a long design life. Maintenance requirements include raking the sand and removing sediment, trash and debris from the surface of the BMP. Over time, fine sediments will penetrate deep into the sand requiring replacement of several inches or the entire sand layer. Discolored sand is an indicator of the presence of fine sediments, suggesting that replacement of the sand should be completed.

Maintenance Schedule: Proprietary Media Filters

Activity	Frequency
Inspect filters and remove debris	After every major storm for the first 3 months after construction completion. Every 6 months thereafter.

Wet Basins

Wet basins are intended to treat stormwater quality through the removal of sediments and soluble pollutants. A permanent pool of water allows sediments to settle and removes the soluble pollutants, including some metals and nutrients. Additional dry storage is required to control peak discharges

during large storm events, and if properly designed and maintained wet basins can add fire protection, wildlife habitat and aesthetic values to a property.

Inspection & Maintenance

To ensure proper operation, wet basin outfalls should be inspected for evidence of clogging or excessive outfall releases. Potential problems to investigate include erosion within the basin and banks, damage to the emergency spillway, tree growth on the embankment, sediment accumulation around the outlet and the emergence of invasive species. Should any of these problems be encountered, perform repairs immediately. An on-site sediment disposal area will reduce sediment removal costs.

Maintenance Schedule: Wet Basins

Activity	Time of Year	Frequency
Inspect wet basins	Spring and/or Fall	Annually (Minimum)
Mow upper stage, side slopes, embankment and emergency spillway	Spring through Fall	Bi-Annually (Minimum)
Remove sediment, trash and debris	Spring through Fall	Bi-Annually (Minimum)
Remove sediment from basin	Year round	As required, but at least once every 10 years

Dry Wells

Dry wells are used to infiltrate uncontaminated runoff. These BMPs should never be used to infiltrate stormwater or runoff that has the potential to be contaminated with sediment and other pollutants. Dry wells provide groundwater recharge and can reduce the size and cost required of downstream BMPs or storm drains. However, they are only applicable in drainage areas of less than one acre and may experience high failure rates due to clogging.

Inspection & Maintenance

Proper dry well function depends on regular inspection. Clogging has the potential to cause high failure rates. The water depth in the observation well should be measured at 24 and 48 hour intervals after a storm and the clearance rate calculated. The clearance rate is calculated by dividing the drop in water level (inches) by the time elapsed (hours).

Maintenance Schedule: Dry Wells

Activity	Frequency
Inspect dry wells	After every major storm for the first 3 months after construction completion. Annually thereafter.

Infiltration Basins

Infiltration basins are designed to contain stormwater quantity and provide groundwater recharge. Pollution prevention and pretreatment are required to ensure that contaminated stormwater is not infiltrated. Infiltration basins reduce local flooding and preserve the natural water balance of the site, however high failure rates often occur due to improper siting, inadequate pretreatment, poor design and lack of maintenance.

Inspection & Maintenance

Regular maintenance is required to prevent clogging, which results in infiltration basin failure. Clogging may be due to upland sediment erosion, excessive soil compaction or low spots. Inspections should include signs of differential settlement, cracking, erosion, leakage in the embankments, tree growth on the embankments, riprap condition, sediment accumulation and turf health.

Maintenance Schedule: Infiltration Basins

Activity	Time of Year	Frequency
Preventative maintenance	Spring and Fall	Bi-Annually
Inspection	Spring and Fall	After every major storm for the first 3 months after construction completion. Bi-annually thereafter and discharges through the high outlet orifice.
Mow/rake buffer area, side slopes and basin bottom	Spring and Fall	Bi-Annually
Remove trash, debris and organic matter	Spring and Fall	Bi-Annually

INSPECTION OF BIORETENTION AREAS / RAIN GARDENS

General Information

BMP Description	Bioretention Area / Rain Garden		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for soil erosion and repair	Monthly	Yes ☐ No ☐	
Inspect for invasive species and remove if present	Monthly	Yes ☐ No ☐	
Remove trash	Monthly	Yes ☐ No ☐	
Mulch void areas	Annually	Yes ☐ No ☐	
Remove dead vegetation	Bi-Annually	Yes ☐ No ☐	
Replace dead vegetation	Annually	Yes ☐ No ☐	
Prune	Annually	Yes ☐ No ☐	
Replace all media and vegetation	As Needed	Yes ☐ No ☐	

INSPECTION OF CONSTRUCTED STORMWATER WETLANDS
Years 0-3 of Operation

General Information

BMP Description	Constructed Stormwater Wetland		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for invasive species and remove if present	Monthly	Yes ☐ No ☐	
Replace all media and vegetation	As Needed	Yes ☐ No ☐	

In addition, the following information should be recorded and mapped at least once per year:

- Types and distribution of dominant wetland plants
- Presence and distribution of planted wetland species
- Presence and distribution of invasive species
- Indications other species are replacing planted wetland species
- Percent of standing water that is not vegetated
- Replace all media and vegetation
- Stability of original depth zones and micro-topographic features
- Accumulation of sediment in the forebay and micropool and survival rate of plants

INSPECTION OF CONSTRUCTED STORMWATER WETLANDS
Year 4 - Lifetime of Operation

General Information

BMP Description	Constructed Stormwater Wetland		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for invasive species and remove if present	Monthly	Yes ☐ No ☐	
Clean forebays	Annually	Yes ☐ No ☐	
Clean sediment in basin/wetland system	Once every 10 years	Yes ☐ No ☐	
Mulch void areas	Annually	Yes ☐ No ☐	
Remove dead vegetation	Bi-Annually	Yes ☐ No ☐	
Replace dead vegetation	Annually	Yes ☐ No ☐	
Prune	Annually	Yes ☐ No ☐	
Replace all media and vegetation	As Needed	Yes ☐ No ☐	

INSPECTION OF EXTENDED DRY DETENTION BASINS

Inspections should be conducted bi-annually, and during and after major storm events.

General Information

BMP Description	Extended Dry Detention Basin		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Examine outlet structure for clogging or high outflow release velocities	Bi-Annually	Yes ☐ No ☐	
Mow upper stage, side slopes, embankment and emergency spillway	Bi-Annually	Yes ☐ No ☐	
Remove trash and debris	Bi-Annually	Yes ☐ No ☐	
Remove sediment from basin	At least once every 5 years	Yes ☐ No ☐	

INSPECTION OF PROPRIETARY MEDIA FILTERS

General Information

BMP Description	Media Filter		
BMP Location			
Media Type			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for standing water, trash, sediment and clogging	Bi-Annually (minimum)	Yes ☐ No ☐	
Remove trash and debris	Each Inspection	Yes ☐ No ☐	
Examine to determine if system drains in 72 hours	Annually	Yes ☐ No ☐	
Inspect filtering media for clogging	Per manufacturer's schedule	Yes ☐ No ☐	

INSPECTION OF SAND AND ORGANIC FILTERS

Inspections should be conducted after every major storm event for the first 3 months following completion, then every 6 months thereafter.

General Information

BMP Description	Sand/Organic Filter		
BMP Location			
Media Type			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Remove sediment, trash, and debris	Every 6 months	Yes ☐ No ☐	
Rake sand	Every 6 months	Yes ☐ No ☐	

INSPECTION OF DRY WELLS

Regular inspections should be conducted after every major storm event for the first 3 months following completion, then annually thereafter.

General Information

BMP Description	Dry Well		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			
Describe condition of dry well at time of inspection			

After a major storm event, the water depth in the observation well should be measured at 24 and 48 hour intervals and the clearance rate calculated.

INSPECTION OF WET BASINS

Inspections should be conducted after every major storm event for the first 3 months following completion, then biannually thereafter.

General Information

BMP Description	Wet Basin		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			
Describe condition of wet basin at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Preventative maintenance	Bi-Annually	Yes ☐ No ☐	
Mow/rake buffer area, side slopes and basin bottom	Bi-Annually	Yes ☐ No ☐	
Remove trash, debris and organic matter	Bi-Annually	Yes ☐ No ☐	
Inspect and clean pretreatment devices	Every other month and after every major storm event	Yes ☐ No ☐	

INSPECTION OF OTHER BMP

General Information

BMP Description			
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular ☐ Pre-Storm Event ☐ During Storm Event ☐ Post-Storm Event ☐			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	
		Yes ☐ No ☐	

Attachment E- <u>SWPPPs (Year 2 requirement)</u>

- **Fire/Police Station**
- **DPW Yard/Transfer Station**