

Municipality/Organization: Orleans, MA

EPA NPDES Permit Number: MAR041146

MaDEP Transmittal Number: W- 035744

**Annual Report Number
& Reporting Period:** **No. 14: May 1, 2016-April 30, 2017**

NPDES PII Small MS4 General Permit Annual Report

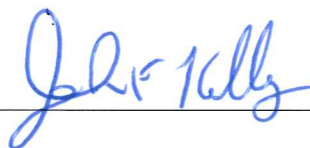
Part I. General Information

Contact Person: Frank Nichols **Title:** Manager, Public Works

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Certification:

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 gather and evaluate 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.

Signature: 

Printed Name: John F. Kelly

Title: Town Administrator

Date: 4/27/17

Part II. Self-Assessment

The Town of Orleans has completed the required self-assessment and has determined that our municipality is in compliance with all permit conditions.

Notable Accomplishments/Improvements in Permit Year 14:

Water Quality Task Force & Comprehensive Wastewater Management Plan

The Town of Orleans continues to develop significant ongoing programs to improve marine and fresh water quality and work towards the goals of the Phase II Permit and the final TMDLs for pathogens and nutrients. The efforts of the Marine and Fresh Water Quality Task Force, Orleans Pond Coalition, past and planned BMP construction projects and the development of the December 2010 Comprehensive Wastewater Management Plan (CWMP) have or will result in significant water quality and habitat improvements. The CWMP received final approval from the MA DEP on February 14, 2012. Subsequently, the Town's consultants completed an evaluation of full lifecycle costs for the CWMP and for a small pipe (STE) collection system to provide further support for recommendations in the CWMP. A year-long public engagement process culminated in the approval of a hybrid plan revision of the CWMP. This hybrid plan focuses on non-traditional methods of nitrogen removal with the addition of specific sewer systems in the Downtown and Meetinghouse Pond watershed. In 2015, the Orleans Water Quality Advisory Panel (OWQAP) approved a consensus plan and \$700K in funding was allocated to advance these approaches. A draft Amended CWMP was prepared by AECOM and remains under review. The Town funded an initial evaluation for disposal sites and this work will continue to evaluate an alternative site. \$3.7M is pending approval at the May 2017 Town Meeting for a 25% design of a sewer system for the Meetinghouse Pond watershed, additional disposal site investigations, and continuing efforts to implement demonstration projects for non-traditional methods of nitrogen removal.

In addition to the efforts to reduce nitrogen loading from septic sources, the Town of Orleans continues to implement BMPs to reduce the use of fertilizers and pesticides. The Pleasant Bay Alliance developed a fertilizer and pesticide use policy for municipal properties in April 2012. The Town developed a Fertilizer Nitrogen Control bylaw that passed at the 2014 Annual Town Meeting. The purpose of the bylaw is to restrict the use of nitrogen based fertilizers throughout Town and it includes the following provisions: no application of nitrogen between October 16 and April 14; no application before or during heavy rain; and no application within 100 feet of Resource Areas. In support of these efforts, the Orleans Pond Coalition continued a robust public education campaign in Year 14 to inform residents and businesses about the proper use of and alternatives to fertilizers. Brochures regarding proper fertilizer and pesticide use are available at the Town Hall. Orleans is one of three Massachusetts towns (Falmouth and Nantucket) to have such a bylaw.

In Year 11, a Cedar Pond Management Plan was produced by the UMASS – Dartmouth School of Marine Science and Technology (SMAST) and the Water Quality Task Force and was unanimously approved by the Board of Selectmen. In the Cedar Pond Management Plan, SMAST recommended replacing the boards in the old weir to hold back the pond and limit salt water intrusion. In Year 12, the Town began the permitting process for the reinstallation of the water control boards for Cedar Pond. In Year 13, the project was permitted, appealed and MassDEP issued a superseding Order of Conditions to require an environmental impact assessment report. The Town improved stormwater systems on Locust Road and the MassDOT improved drainage along Route 6 within the Cedar Pond watershed. The Town began working with Eversource to potentially remove the overhead electric wires that cross Cedar Pond where hundreds of cormorants congregate. An Environmental Impact Report was completed to evaluate the management of flash boards to restore historic pond salinity levels and improve habitat. Next steps for flash board management remain under review.

The Town created the Orleans Freshwater Ponds Work Group that met 10 times during Permit Year 14. The Work Group was tasked with identifying priority projects for remediation and/or protection of freshwater ponds in Orleans. The initiative resulted in the identification of remediation efforts for Uncle Harvey Pond and a request for funding is proposed for the May 2017 annual Town Meeting.

The Town completed a study in early 2016 for Town Cove at the Nauset Harbor inlet to evaluate dredging to increase tidal flushing for the Nauset Estuary. The project was determined to be feasible, but permitting will take multiple years. As part of this process, the Town is investigating dredge spoil disposal sites, which includes potential dune restoration at Nauset beach.

Orleans Water Quality Advisory Panel

In Year 14, the Orleans Water Quality Advisory Panel (OWQAP) continued to guide studies and assessments, define preferred approaches, seek consensus and build widespread community support for a customized, affordable water quality management plan for the Town of Orleans. The panel consists of stakeholder representatives (Orleans Selectmen and representatives of engaged citizen constituencies), and liaisons from key town boards and commissions, organizations, neighboring towns, and regional, state, and federal partners. It is staffed and assisted by Water Resources Associates and AECOM.

The OWQAP has met monthly during the last year and all meetings were open to the public. The OWQAP continued to evaluate various aspects of the Amended Comprehensive Wastewater Management Plan and associated Adaptive Management Plan.

Tri-Town Septage Facility

The Tri-town septage facility previously served Orleans and two other towns, Brewster and Eastham, and lower Cape for septic waste disposal by providing essential nitrate removal. The agreement between the three towns to use the facility expired on May 30, 2015. Following discussions between the three towns, a decision was made to close the plant as of June 1, 2016 and the facility will be removed, followed by site restoration. A design for demolition of the facility was completed and funding for the project will be

decided at the May 2017 Town meeting. Septic waste will be handled by hauling from individual properties to an approved out of town facility.

Pleasant Bay Resource Management Plan Update

The Pleasant Bay Resource Management Plan was updated in 2013 and the updated plan was adopted in May 2013. The plan will further the Town's ongoing effort to work collaboratively with neighboring Towns to promote the natural resource health and public enjoyment of Pleasant Bay. The plan is updated every 5 years.

Stormwater Management Planning

The Town and its consultant continued to evaluate program needs based on the draft 2014 Phase II Permit. The Town anticipates using this information and the results from other activities (e.g., CWMP, BMP projects) to develop an appropriate strategy to address the requirements related to TMDLs and impaired water bodies, as part of the Stormwater Management Plan (SWMP) development under the final permit (once issued). The Town continued to work towards development of a comprehensive SWMP to meet future regulatory requirements and water quality goals. The following key stormwater management planning activities occurred in Year 13:

- Detailed mapping of the downtown area was conducted by SMC Engineering, Inc. to identify all municipal infrastructure with an emphasis on drainage and other utilities. This effort was coordinated with Greenseal Environmental, Inc. and GHD Engineers to complete the mapping of drainage systems through the remainder of the Town. The result of these efforts is a field verified drainage map that identifies each structure, pipe and existing stormwater BMP. The mapping effort was completed and a final product was delivered by SMC Engineering Inc. in March of 2017. GHD Engineers completed an inventory of 66 existing stormwater BMPs in Town and assessed the condition to develop recommendations for maintenance and rehabilitation. The inventory was completed in July 2016 and updated in April 2017 to incorporate additional BMPs identified through mapping of the downtown area by SMC Engineering, Inc.
- The results of the above efforts were incorporated into a stormwater pollutant load analysis and dynamic planning tool by Amec Foster Wheeler and provide the following information: baseline stormwater pollutant loads; analysis of existing stormwater BMPs and benefits; delineation of every outfall catchment; and recommendations for stormwater management priorities. This work is ongoing and next steps include an evaluation of proposed BMPs, benefits and costs. This effort is anticipated to be completed by the summer of 2017. This information will be used as the basis for future capital projects to retrofit, design and install stormwater BMPs for water quality improvement.
- The above efforts were reviewed on an ongoing basis by the Stormwater Team, which consists of the DPW and Natural Resources Director, DPW Manager, Town Planner, Health Agent, Conservation Officer and the Chairperson of the Marine and Freshwater Quality Task Force.

Public Education & Involvement Activities

The Town of Orleans conducted the following major events to promote awareness of water resources and engage the community:

- Celebrate Our Waters Event: The Orleans Pond Coalition hosted a “Celebrate Our Waters” event on September 16, 17, and 18, 2016. The celebration was well attended with approximately 3,000 people and it included events in Eastham and in Brewster to highlight “shared waters”.
- Arbor Day Celebration: The Orleans Tree Department and Orleans Improvement Association teamed with Ameri-Corp Cape Cod honoring Arbor Day by conducting the following projects:
 - Bolands Pond: as discussed in the Year 12 report, efforts began to restore the Bolands Pond area, which consists of a 4.7 acre kettle pond and 9 acres of upland forest that includes both native and invasive vegetation. The activities included installation of an outdoor classroom and trail system to aid in the removal of invasive plant species. The Nauset Regional Middle School and Orleans Elementary School students assisted with the cleanup and restoration of the forest and participated in the outdoor classroom program. The property was maintained during Year 14.
 - Uncle Harvey Pond: the Town partnered with a private land owner to remove invasive species (phragmites). The first year of a 3-year program was completed in Year 14.
 - Eldridge Playground: Ameri-Corp planted nine trees and other shrubs. The Orleans Improvement Association donated money for improvements that included irrigation and drainage work to infiltrate stormwater from the tennis courts. Additional private donations were used to fund the improvements.

Barnstable County Coastal Resources Committee

Orleans has a standing member on the Barnstable County Coastal Resources Committee (BCCRC), which meets quarterly. This committee serves as a contact between towns and the County on coastal issues. The committee is the local governance committee for the Cape Cod region of the Massachusetts Bays Program.

Stormwater BMP Assessment, Design & Construction

There were several stormwater and water quality improvement projects designed and constructed in Year 14:

- Eldridge Playground Improvement Project – tree plantings and improvements were completed in April 2016 to infiltrate stormwater from the tennis courts.
- Rock Harbor Parking Lot – stormwater improvement BMPs were constructed in early 2017.
- Portanimicut Road – stormwater improvements for infiltration and erosion control were constructed in 2016.
- GHD Engineers completed an inventory of 66 existing stormwater BMPs in Town and assessed the condition to develop recommendations for maintenance and rehabilitation. The inventory was completed in July 2016 and updated in April 2017 to incorporate additional BMPs identified through mapping of the downtown area by SMC Engineering, Inc.
- Water Quality Monitoring – ongoing water quality monitoring was conducted throughout Year 14 at the creeks that enter Cape Cod Bay, Pleasant Bay (21 locations), and Nauset Bay (3 locations). The Town increased funding in 2016 to commission an

additional 12 monitoring locations in Nauset Bay to support the Massachusetts Estuary Program (MEP) update.

- Rock Harbor Road – design is ongoing for multiple locations to provide stormwater treatment (infiltration) for direct outfalls.

As discussed above, the Town continued to develop a comprehensive planning tool to evaluate priority areas for capital projects to design and install stormwater BMPs for water quality improvements. Once this information is available, the Town anticipates proceeding with the design and construction of additional priority BMPs.

Stormwater Team

In Permit Year 11, the Town of Orleans established a stormwater committee called the “Stormwater Team.” The Stormwater Team was developed to provide broader insight to evaluate stormwater projects and for the planning and prioritization of stormwater improvements. Members include the DPW Director, DPW Manager, Town Planner, Health Agent, Conservation Officer and the Chairperson of the Marine and Freshwater Quality Task Force. Various members of the Stormwater Team participated in specific planning and implementation related to water quality improvement throughout Year 14.

Part III. Summary of Minimum Control Measures

1. Public Education and Outreach

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
A.1	Develop and Broadcast Via PA CATV Storm Water Video	Frank Nichols, Public Works Manager	One per year – in conjunction with County Group	The video “After the Storm” is available through an internet media player on the DPW web page.	Broadcast other pertinent videos on local cable or other media outlets.
Revised			# website hits/views for video	The DPW Director presents to the Board of Selectmen on a quarterly basis and provides an update on stormwater management activities. These meetings are broadcast on the local cable network.	
A.2	Household Hazardous Waste Control	Frank Nichols, Public Works Manager	Annual HHW Collection	Collection days were held in Eastham and Orleans on July 16 th and September 17, 2016. A total of 201 Orleans households participated and a total of 23,495 lbs and 5,710 gallons of household hazardous waste were collected from both communities.	Continue reciprocal HHW collections with the Town of Eastham. Continue tracking resident participation and results.
Revised			# residents participating	Event organizers tracked the effectiveness of the various advertisement methods and Orleans participants heard of the events through a brochure, newspaper, signs, radio/tv, and other means. The Orleans Transfer station offers annual paint collections and offers collection of waste gasoline, waste oil and waste antifreeze free to Transfer Station ticket holders. In 2016 the Transfer Station collected and disposed of 1,200 gallons of waste oil, 660 gallons of waste gasoline and 225 gallons of waste antifreeze.	HHW Collections are planned for May, 6 th 2017 in Eastham and September 16 th , 2017 in Orleans.

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
A.3	Education Flyers	Frank Nichols, Public Works Manager	Distribute 2 per year at Transfer Station	Flyers were replaced with numerous other educational events that were held this permit year. An educational sign was developed for Priscilla Landing and was posted in May 2016.	Consider distributing educational flyers and/or other materials and track materials taken. Continue to consider alternative methods to provide public education and outreach addressing HHW collection and stormwater management concepts.
Revised			# flyers taken by residents	See also “Notable Accomplishments” section.	

1a. Additions

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
A.4	Web Page Information	Frank Nichols, Public Works Manager & Peter VanDyck, IT Coordinator	Short Article – one per year	As discussed under BMP A.1, the video “After the Storm” is linked through the Highway Department’s webpage. The webpage also links to EPA’s NPDES Stormwater Program web page and the Town’s stormwater bylaws.	Continue to maintain existing web pages related to stormwater and water quality. Evaluate additional web page links and begin tracking the number of hits. Consider short articles or topics that can be posted annually on web pages.
Revised			# website hits	Agendas, meeting minutes, and additional information are posted on a webpage for the Marine and Fresh Water Quality Task Force. The Town also maintains a webpage for reports, meeting minutes and other documents related to the CWMP. The Orleans Pond Coalition maintained and updated its website to continue to promote general awareness of water bodies in Orleans. The website integrates the Town’s efforts to protect and improve water quality through the implementation of the CWMP, fertilizer management programs and “Mutt Mitts” program for dog waste.	Evaluate methods to integrate stormwater program information and educational opportunities between the Town web pages and the website maintained by the Orleans Pond Coalition

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
A.5	Other Public Education In Year 14	Frank Nichols, Public Works Manager		Copies of “The Orleans Blue Pages” water quality protection booklet (50+ pages) developed by the Orleans Pond Coalition were made available at no cost for residents at Town Hall. Copies are also available for free download from the Orleans Pond Coalition website.	Continue existing public awareness activities and evaluate methods to track materials taken, posters, displays and audience (number) reached.
Revised	Other Public Education Activities in Year 14		# copies of “Orleans Blue Pages” taken by residents # posters displayed & handouts		
A.6	Storm Drain Stenciling	Frank Nichols, Public Works Manager	Stencil storm drains leading to critical priority outfalls.	No storm drain stenciling occurred during the permit term.	Continue storm drain stenciling activities at highly visible areas and areas that drain directly to priority outfalls and waterways. More actively solicit volunteers through the Marine and Fresh Water Quality Task Force or with schools.
Revised		Marine & Fresh Water Quality Task Force	# stenciled drains per year		

2. Public Involvement and Participation

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
B.1	Water Quality Monitoring Program	Marine & Fresh Water Quality Task Force	Ongoing	In Permit Year 14, the Marine & Fresh Water Quality Task Force performed water quality monitoring activities. Summer sampling of embayments continued and included 23 locations on Cape Cod Bay, Nauset Estuary, and Orleans' portion of Pleasant Bay. 75 volunteers collected 585 samples on five sampling days. Additional samples were taken from the Atlantic Ocean off Nauset Spit and 17 freshwater ponds in spring and late summer of 2016.	Evaluate priorities and continue monitoring water quality and tracking which program results were most effective. Use monitoring results to develop remediation plans for high priority areas. Continue to support Task Force and hold monthly meetings.
Revised		Town Administrator & Board of Selectmen	# samples collected, water bodies assessed each year & water quality improvements	<p>The Marine & Fresh Water Quality Task Force met once per month to review monitoring activities and results related to priority water bodies and potential improvement projects. The following areas are considered high priority areas in town: Cedar Pond, Meetinghouse Pond, Meetinghouse River, Town Cove, Bolands Pond, Ellis Pond, and inland ponds and estuaries.</p> <p>The Town created the Orleans Freshwater Ponds Work Group that met 10 times during Permit Year 14. The Work Group was tasked with identifying priority projects for remediation and/or protection of freshwater ponds in Orleans. The initiative resulted in the identification of remediation efforts for Uncle Harvey Pond and a request for funding is proposed for the May 2017 annual Town Meeting.</p>	

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
B.2	Estuaries Program	Director of Planning and Development	Ongoing	In 2015, the Orleans Water Quality Advisory Panel (OWQAP) approved a consensus plan and \$700K in funding was allocated to advance the CWMP.	Continue to promote the CWMP and implement recommendations and strategies. Continue to incorporate elements of the CWMP into the SWMP to meet the new permit requirements, as appropriate.
Revised	Estuaries Program & Comprehensive Wastewater Management Plan		Regulatory review of CWMP. Assessment of potential cost-saving alternatives.	<p>A draft Amended CWMP was prepared by AECOM and remains under review. The Town funded an initial evaluation for disposal sites and this work will continue to evaluate an alternative site.</p> <p>\$3.7M is pending approval at the May 2017 Town Meeting for a 25% design of a sewer system for the Meetinghouse Pond watershed, additional disposal site investigations, and continuing efforts to implement demonstration projects for non-traditional methods of nitrogen removal.</p>	

2a. Additions

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
B.3	Storm Drain Stenciling	Frank Nichols, Public Works Manager	Stencil storm drains in downtown area and other at systems leading to critical priority outfalls.	Refer to BMP A.6.	Refer to BMP A.6.
Revised		Volunteers	# stenciled drains per year & # volunteers		

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
B.4	Outfall Monitoring	Frank Nichols, Public Works Manager	Perform dry weather outfall monitoring of all outfalls that were initially observed to have flow during the GIS locating.	Highway Department staff continue to receive training on data collection and illicit discharge detection during catch basin cleaning activities. Greenseal Environmental noted dry weather flow during mapping efforts in Year 12 and documented the locations. The Town conducted additional mapping efforts in Years 13 and 14 and the town-wide map is complete. The Town plans to review dry weather flows at storm drain outfalls in accordance with the 2016 MS4 permit, once effective. The Town worked with an industrial facility to remove an unauthorized sump pump discharge and improve stormwater management.	Incorporate inspection results into the prioritization scheme for future improvement projects. Continue to support the efforts of the Marine & Fresh Water Quality Task Force and coordinate efforts with the Orleans Pond Coalition volunteers.
Revised	Volunteer Outfall Monitoring Program	Marine & Fresh Water Quality Task Force	# volunteer participants		
B.5	Maintain Animal Waste Collection Bags in Key Areas of Concern	Orleans Pond Coalition		“Mutt Mitts” animal waste collection bags were maintained by 21 volunteers from the Orleans Pond Coalition at key areas of concern for residents to properly dispose of waste. Town Departments assisted with proper waste disposal. Approximately 46,400 bags were used across 53 stations.	Continue maintenance of “Mutt Mitts” program and ensure proper disposal of wastes. Continue to track the number of bags taken and evaluate if high occurrences of improper disposal warrant a targeted education campaign.
Revised		Frank Nichols, Public Works Manager			
B.6	Water Day Celebration	Orleans Pond Coalition	List of activities & participants	The Orleans Pond Coalition hosted a “Celebrate Our Waters” event on September 16, 17 and 18, 2016. The event was well attended with approximately 3,000 people. The celebration expanded to include events in Eastham and Brewster.	Organize another “Celebrate Our Waters” event with the Orleans Pond Coalition. Incorporate stormwater education topics and activities into the event.
Revised					
B.7	Operation Orleans	Orleans Tree Dept. & Conservation Trust	List of activities & participants	The Orleans Tree Department teamed with Ameri-Corp Cape Cod honoring Arbor Day by continuing the Bolands Pond Project. Invasive species were removed at Uncle Harvey Pond as the first step in a 3 phase project. Drainage and irrigation improvements were completed at Eldridge Park. Refer to “Notable Accomplishments” for further descriptions of the events.	Continue to maintain the Bolands Pond project and evaluate other projects/opportunities for Orleans Green Week.
Revised	Orleans Green Week				

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
B.8	Shoreline Cleanup	Orleans Pond Coalition	Areas cleaned, waste collected & participants	A volunteer cleanup is held every May at Nauset Beach. The cleanup occurs along 9 miles of shoreline and the 2016 event resulted in approximately 30 cubic yards of waste collected.	Continue the volunteer cleanup at Nauset Beach.
Revised					

3. Illicit Discharge Detection and Elimination

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
C.1	Storm Water System Mapping and Database Development	Frank Nichols, Public Works Manager	Comprehensive town-wide survey by year 2 – as funding allows	Greenseal Environmental noted dry weather flow during mapping efforts in Year 12 and documented the locations. The Town conducted additional mapping efforts in Years 13 and 14 and the town-wide map is complete. The Town plans to review dry weather flows at storm drain outfalls in accordance with the 2016 MS4 permit, once effective. GHD Engineers completed a town-wide inventory of existing BMPs in July 2016 and updated the inventory updated in April 2017 to incorporate additional BMPs identified through mapping of the downtown area by SMC Engineering, Inc. The inventory evaluated 66 BMPs and the results of this work were incorporated into the Town's GIS database. The drainage catchments for all outfalls in Town were delineated. The Town is currently updating the storm drain map on the town GIS Portal.	Continue to update the drainage system base map as needed.
Revised					
C.2	Review Existing By-Laws	Director of Planning and Development	Review existing by-laws and adopt storm water ordinance FY06	As discussed in previous reports, a Floor Drain Regulation went into effect on July 1, 2010. The Illicit Discharge Bylaw was adopted at the May 2013 Town Meeting. The Bylaw addresses all illicit discharges to the MS4 and water bodies in Orleans.	Monitor and enforce the Illicit Discharge Bylaw and local requirements related to floor drains, dumping, and pet waste control.
Revised					

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
C.3	Identify and Document Illicit Connections	Frank Nichols, Public Works Manager	Review C.1 results, finalize database by Year 4	The Highway Department inspects all catch basins during cleaning operations and completes a form to document the condition and any potential illicit discharges.	Continue to inspect outfalls with previous dry weather flows to verify that an illicit discharge is not present.
Revised	Identify & Remove Illicit Connections & Discharges		# discharges identified, removed within 1 year of discovery	<p>Greenseal Environmental noted dry weather flow during mapping efforts in Year 12 and documented the locations. The Town conducted additional mapping efforts in Years 13 and 14 and the town-wide map is complete.</p> <p>The Town plans to review dry weather flows at storm drain outfalls in accordance with the 2016 MS4 permit, once effective.</p> <p>The Town worked with an industrial facility to remove an unauthorized sump pump discharge and improve stormwater management.</p>	Continue to review mapping results with catch basin, pipe cleaning and inspection information. Incorporate existing procedures into future IDDE procedures and the O&M Plan under Control Measure 6.

3a. Additions

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
C.4	Comprehensive Wastewater Management Plan	Director of Planning and Development	Progress towards a final CWMP	In Year 14, the Orleans Water Quality Advisory Panel (OWQAP) met monthly and continued to guide studies and assessments, define preferred approaches, seek consensus and build widespread community support for a customized, affordable water quality management plan for the Town of Orleans. Additional information is discussed under “Notable Accomplishments”.	Continue to monitor how elements from the CWMP or other Plans and the SWMP overlap to identify any practices that could satisfy requirements of both.
Revised					

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
C.5	Public Education for Illicit Discharges	Frank Nichols, Public Works Manager		As outlined in BMPs A.1 through A.6 and B.5, various entities have incorporated information regarding illicit discharges into existing public education and public involvement activities.	Continue to incorporate illicit discharge information into existing public education and involvement activities and evaluate results.
Revised					

4. Construction Site Stormwater Runoff Control

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
D.1	Review Existing By-Laws	Director of Planning and Development	Review existing by-laws and adopt construction ordinance	The Town previously adopted the Drainage and Erosion and Sediment control bylaw at Town meeting in May 2008.	Continue to enforce bylaws and document actions.
Revised				The Highway Department continued to inspect sites throughout Town for potential erosion issues and no issues were identified in Year 14 through inspections or calls from the public. Two issues from Year 13 were resolved in Year 14.	
D.2	Propose amendments and articles at Town Meeting	Director of Planning and Development	Spring 06	As discussed in previous reports, the Town adopted the Drainage and Erosion and Sediment control bylaw at Town meeting in May 2008. No amendments were deemed necessary at this time.	Continue to evaluate effectiveness of bylaws and amend if necessary.
Revised			Ongoing		

4a. Additions

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
D.3	Establish a Procedure for Receipt of Information by Public	Frank Nichols, Public Works Manager	# calls received & record of corrective actions	No calls were received this year, but the Town resolved outstanding issues from Year 13(refer to BMP D.2).	Continue to respond to calls regarding construction site erosion and sediment issues.
Revised					

5. Post-Construction Stormwater Management in New Development and Redevelopment

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
E.1	Review Existing By-Laws	George Meservey, Director of Planning and Development	Review existing by-laws and adopt Runoff Control Ordinance	The Town previously adopted the Drainage and Erosion and Sediment control bylaw at Town meeting in May 2008. Any plans for significant development are reviewed for compliance through the Site Plan Review committee.	Continue to enforce bylaw and review plans through Site Plan Review committee.
Revised					
E.2	Propose amendments and articles at Town Meeting	George Meservey, Director of Planning and Development		Refer to BMP E.1. No amendments were deemed necessary at this time.	Continue to evaluate effectiveness of bylaws and amend if necessary.
Revised			Ongoing		

5a. Additions (none at this time)

6. Pollution Prevention and Good Housekeeping in Municipal Operations

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
F.1	Street Sweeping	Frank Nichols, Public Works Manager	Sweep as part of annual winter cleanup and as needed	There are 54 miles of street in the Town and all streets were swept at least twice during the permit year. Additional streets are swept 2-3 times during the year including known areas of high sediment/sand accumulation, downtown areas, and paved areas that discharge to environmentally sensitive areas. In 2013, the Town purchased a new generative air sweeper to improve street sweeping operations and water quality. Approximately 406 tons of street sweepings were collected during the year and reused in accordance with the existing BUD. The Town modified the landfill Site Assignment Permit to use street sweepings and catch basin cleanings to build an area for compost operations.	Continue annual street sweeping program and focus additional sweeping efforts on needed and environmentally sensitive areas.
Revised					

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
F.2	Catch Basin Cleaning	Frank Nichols, Public Works Manager	Clean all basins in town on yearly rotating schedule	~745 basins were cleaned and all 1,539 were inspected once. Approximately 198 tons of catch basin cleanings were collected during the year. In addition, all existing stormwater BMPs were inspected and if necessary cleaned of sediment.	Continue annual catch basin cleaning Program. Consider evaluating drainage areas to prioritize cleaning efforts as appropriate.
Revised				Approximately 75 feet of storm drain pipes and 375 feet of culverts were cleaned. None of these were camera inspected due to the fact that many were culverts that were able to be visually inspected. Materials were reused in accordance with the existing BUD.	
F.3	Develop Drainage System Improvement Plan	Frank Nichols, Public Works Manager	Prepare Capital Plan Article for FY10	The Ongoing Capital Plan includes an allotment of \$169,697 for water quality related drainage improvements. A construction plan for water quality improvements projects is updated annually based on the results and input from the Marine and Fresh Water Quality Task Force.	Continue funding the drainage system components of the Capital Plan to remediate outfalls and construct stormwater BMPs.
Revised			Update Capital Plan Annually	See “Notable Accomplishments” for a more detailed description of activities and projects related to this BMP.	
F.4	Propose Amendments and Articles at Town Meeting	Frank Nichols, Public Works Manager	Spring 06	Consistent with the efforts under BMP F.3, The Town appropriated \$169,697 for the design and construction of stormwater BMPs throughout the year. This funding is now available for stormwater planning efforts to evaluate the most appropriate locations for stormwater remediation projects. The Town focused on evaluating priority stormwater remediation projects. See “Notable Accomplishments” for a more detailed description of activities and projects related to this BMP.	Continue to fund water quality improvement planning and construction projects annually.
Revised			Prepare Capital Plan Articles Annually		

6a. Additions

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
F.5 Revised	Maintain Animal Waste Collection Bags in Key Areas of Concern	Orleans Pond Coalition		<p>“Mutt Mitts” animal waste collection bags were maintained by 21 volunteers from the Orleans Pond Coalition at key areas of concern for residents to properly dispose of waste. Town Departments assisted with proper waste disposal. Approximately 46,400 bags were used across 53 stations.</p>	Continue maintenance of “Mutt Mitts” program and ensure proper disposal of wastes. Continue to track the number of bags taken and evaluate if high occurrences of improper disposal warrant a targeted education campaign.
F.6 Revised	Nutrient Loading Reductions	Frank Nichols Public Works Manager	Implement Organic Based Land Management Program	<p>As discussed under “Notable Accomplishments”, the Pleasant Bay Alliance developed a fertilizer and pesticide use policy for municipal properties in April 2012. The Town developed a Fertilizer Nitrogen Control bylaw that passed at the 2014 Annual Town Meeting.</p> <p>The Organic Based Land Management Program continued for Town properties, consistent with NOFA guidelines. The program focuses on reducing nutrient loads through the use of cultural land management practices and organic enhancements for healthy turf and native vegetation. Compost from the Transfer Station was used for turf enhancement. The Town also only uses organic fertilizer. The organic fertilizer is made from compost teas and comes in kits that contain organic components rich in microorganisms highly beneficial to plant growth and health. The fertilizer is planned to be applied in spring, summer and fall depending on staffing availability.</p> <p>Modified mowing practices continued at the Town Cove conservation viewing areas to reduce the need for rigorous turf management. The Town has used limited organic-based pesticides for the last 9 years.</p>	<p>Continue organic based land management program to minimize nutrient loading. Evaluate methods to estimate the quantity of nutrients reduced through this program.</p> <p>Continue turf and pesticide management practices at Town Cove and other locations to reduce the need for chemical applications.</p> <p>Continue implementation of the fertilizer and pesticide use policy for municipal properties.</p>

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
F.7	Trash Management	Frank Nichols, Public Works Manager & Nathan Sears, Harbormaster and Natural Resources Manager	Maintain a proactive trash collection program	Town Departments maintained the active Trash collection program at appropriate town properties with waste receptacles. A dumpster is also maintained by the Harbor Master for fishing fleet waste at the Town harbor. This dumpster was put out during the fishing season to encourage proper waste disposal. The program provides a means of waste disposal at public areas to discourage littering.	Continue to service litter sanitary waste receptacles at appropriate locations around the Town.
Revised	Trash and Waste Management			The Town provides and maintains portable toilets at Rock Harbor, Skaket Beach and Town recreation facilities.	
F.8	Inventory of BMP Locations & Needs	Frank Nichols, Highway Manager	Ongoing inventory of BMP locations and needs to address water quality issues	The locations of stormwater BMPs are maintained to develop projects for water quality improvement. This BMP supports BMPs F.3 and F.4. As discussed under “Notable Accomplishments”, the Town’s consultants completed mapping efforts and the analysis of stormwater pollutant loads to develop a better understanding of priority stormwater management and improvement areas. This will serve as the basis for future BMP projects and allow the Town to update its database for stormwater improvements.	Prioritize future BMP projects for funding.
Revised				GHD Engineers completed an inventory of 66 existing stormwater BMPs in Town and assessed the condition to develop recommendations for maintenance and rehabilitation. The inventory was completed in July 2016 and updated in April 2017 to incorporate additional BMPs.	Continue to maintain and update the BMP inventory and develop projects with the Marine & Fresh Water Quality Task Force.
				Planned and ongoing BMP projects are discussed under “Notable Accomplishments”.	

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
F.9	Stormwater Training for Highway Staff	Frank Nichols, Highway Manager	Annual training on various topics, record of training attendance & materials	Highway Department staff are trained annually for the inspection and maintenance of the drainage system, including how to identify potential illicit discharges. Additional training is planned for 2017 once the new MS4 permit is effective.	Continue to train staff annually and maintain copies of curriculum and attendance sheets. Review the stormwater training for Highway staff and update curriculum.
Revised					
F.10	Municipal Facilities Evaluation	Frank Nichols, Highway Manager	Inventory of municipal facilities & report	In Year 10, the Town evaluated municipal facilities for pollution prevention and good housekeeping practices to determine if any improvements are needed. The Town continued to implement the recommendations in Year 14. The Town began or completed the following activities in Year 14: -Began the construction of a new Police Department facility. -Increased landfill monitoring program to include nitrates and 1,4 dioxane. Additional wells were installed to develop a remedial plan. -Constructed a new fuel depot. -Funding for the construction of a new DPW facility with a wash bay to be approved in May 2017 -An environmental assessment was completed for the current DPW facility.	Implement recommendations based on the availability of funding.

7. BMPs for Meeting Total Maximum Daily Load (TMDL) Waste Load Allocations (WLA) <<if applicable>>

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 14	Planned Activities – Next Permit Term
Revised					

7a. Additions (none at this time)

7b. WLA Assessment

As discussed in this annual report, the Town of Orleans continues to develop significant ongoing programs that improve marine and fresh water quality and meet compliance responsibilities with the Phase II Permit and the pathogen and nutrient TMDLs. The efforts of the Marine and Fresh Water Quality Task Force, Orleans Pond Coalition, past and planned BMP construction projects and the efforts of the Orleans Water Quality Advisory Panel (OWQAP) have or will result in significant water quality and habitat improvements.

In 2015, the Orleans Water Quality Advisory Panel (OWQAP) approved a consensus plan and \$700K in funding was allocated to advance these approaches. A draft Amended CWMP was prepared by AECOM and remains under review. The Town funded an initial evaluation for disposal sites and this work will continue to evaluate an alternative site. \$3.7M is pending approval at the May 2017 Town Meeting for a 25% design of a sewer system for the Meetinghouse Pond watershed, additional disposal site investigations, and continuing efforts to implement demonstration projects for non-traditional methods of nitrogen removal.

The OWQAP has met monthly during the last year and all meetings were open to the public. The OWQAP continued to evaluate various aspects of the Amended Comprehensive Wastewater Management Plan and associated Adaptive Management Plan.

The Town and its consultant evaluated program needs based on the 2016 Phase II Permit. The Town anticipates using this information and the results from other activities (e.g., CWMP, BMP projects) to develop an appropriate strategy to address the requirements related to TMDLs and impaired water bodies, as part of the Stormwater Management Plan (SWMP).

Part IV. Summary of Information Collected and Analyzed

As discussed previously, numerous activities were conducted in Year 14 through several programs to improve marine and fresh water quality and work towards the goals of the Phase II Permit and the final TMDLs for pathogens and nutrients.

Part V. Program Outputs & Accomplishments (OPTIONAL)

Programmatic

Stormwater management position created/staffed	(y/n)	N
Annual program budget/expenditures	(\$)	\$169,697

Education, Involvement, and Training

Estimated number of residents reached by education program(s)	(# or %)	100%
Stormwater management committee established	(y/n)	Y
Stream teams established or supported	(# or y/n)	N
Shoreline clean-up participation or quantity of shoreline miles cleaned	(y/n or mi.)	9 mi (Nauset Beach)
Household Hazardous Waste Collection Days		
▪ days sponsored	(#)	2
▪ community participation	(%)	201 vehicles
▪ material collected	(tons or gal)	11.75 T 5,710 G
School curricula implemented	(y/n)	
Note: The Town also collected waste oil, gasoline and antifreeze at the Transfer Station that resulted in a total of 2,085 gallons.		

Legal/Regulatory

	In place prior to Phase II	Under Review	Drafted	Adopted
Regulatory Mechanism Status (indicate with "X")				
▪ Illicit Discharge Detection & Elimination				X
▪ Erosion & Sediment Control				X
▪ Post-Development Stormwater Management				X
Accompanying Regulation Status (indicate with "X")				
▪ Illicit Discharge Detection & Elimination				X
▪ Erosion & Sediment Control				X
▪ Post-Development Stormwater Management				X

Mapping and Illicit Discharges

Outfall mapping complete	(%)	100%
Estimated or actual number of outfalls	(#)	136
System-Wide mapping complete	(%)	100%
Mapping method(s)		
▪ Paper/Mylar	(%)	
▪ CADD	(%)	
▪ GIS	(%)	100%
Outfalls inspected/screened	(# or %)	100%
Illicit discharges identified	(#)	0
Illicit connections removed	(#) (est. gpd)	1
% of population on sewer	(%)	0%
% of population on septic systems	(%)	100%

Construction

Number of construction starts (>1-acre)	(#)	1
Estimated percentage of construction starts adequately regulated for erosion and sediment control	(%)	100%
Site inspections completed	(# or %)	Several
Tickets/Stop work orders issued	(# or %)	0
Fines collected	(# and \$)	0
Complaints/concerns received from public	(#)	0

Post-Development Stormwater Management

Estimated percentage of development/redevelopment projects adequately regulated for post-construction stormwater control	(%)	100%
Site inspections completed	(# or %)	0
Estimated volume of stormwater recharged	(gpy)	NA

Operations and Maintenance

Average frequency of catch basin cleaning (non-commercial/non-arterial streets)	(times/yr)	1/yr
Average frequency of catch basin cleaning (commercial/arterial or other critical streets)	(times/yr)	1-2/yr
Total number of structures cleaned /inspected	(#)	745 cleaned 1,539 inspected
Storm drain cleaned	(LF or mi.)	75 LF
Qty. of screenings/debris removed from storm sewer infrastructure	(lbs. or tons)	198 Tons
Disposal or use of sweepings (landfill, POTW, compost, recycle for sand, beneficial use, etc.)		BUD
Cost of screenings disposal	(\$)	\$0

Operations and Maintenance (con't.)

Average frequency of street sweeping (non-commercial/non-arterial streets)	(times/yr)	2/yr
Average frequency of street sweeping (commercial/arterial or other critical streets)	(times/yr)	2-3/yr
Qty. of sand/debris collected by sweeping	(lbs. or tons)	406 Tons
Disposal of sweepings (landfill, POTW, compost, beneficial use, etc.)	(location)	BUD
Cost of sweepings disposal	(\$)	~\$0
Vacuum street sweepers purchased/leased	(#)	0
Vacuum street sweepers specified in contracts	(y/n)	N

Reduction in application on public land of: (“N/A” = never used; “100%” = elimination)		
▪ Fertilizers	(lbs. or %)	100%
▪ Herbicides	(lbs. or %)	100%
▪ Pesticides	(lbs. or %)	100%

Anti-/De-Icing products and ratios	% NaCl % Sand/Salt	100% of the time None*
Pre-wetting techniques utilized	(y/n)	N (pre-treated salt)
Manual control spreaders used	(y/n)	Y
Automatic or Zero-velocity spreaders used	(y/n)	Y**
Estimated net reduction in typical year salt application	(lbs. or %)	33% (since beginning of permit)
Salt pile(s) covered in storage shed(s)	(y/n)	Y
Storage shed(s) in design or under construction	(y/n)	Y***
*Sand is occasionally used (~60 tons) for traction on some roads when temperatures are extremely low.		
**4 of 5 spreaders now have ground speed controllers.		
***Construction of a new DPW facility will begin in FY 18, pending funding.		