



**NASA Langley Research Center  
Municipal Separate Storm Sewer System (MS4)  
Annual Report**

**Covering the period of July 1, 2017 – June 30, 2018**



Submitted to the Virginia Department of Environmental Quality (DEQ) in compliance with Permit No. VAR040092

## **NASA LaRC MS4 Annual Report**

The following provides a summary of permit year (PY) five (PY5) MS4 activities showcasing LaRC's compliance with the MS4 General Permit (VAR040092) and the corresponding Program Plan. An updated Program Plan covering PY1 of the new General Permit (draft) was submitted with a new registration statement on 5/31/2018. A summary of Program Plan updates can be found at the end of this Annual Report.

### **Annual Report Format:**

- Annual Reporting requirements listed in Section II E occur on pages 2 - 5.
- Annual reporting requirements on MCMs 1 – 6 occur on pages 6 - 24.
- Annual reporting requirements of Section One Special Condition / TMDL Action Plan occur on pages 25 - 27.
- MS4 Program Plan update summary and modification requests occur on page 28.
- Certification statement occurs on page 29.
- Supporting documentation for MCM 2 compliance and public comment received on outreach occurs as an appendix to this report.

**Annual Reporting Requirements  
GP Section II E (3)**

**(a) Background Information.**

- (1) The name and state permit number of the program submitting the annual report;
- (2) The annual report permit year;
- (3) Modifications to any operator's department's roles and responsibilities;
- (4) Number of new MS4 outfalls and associated acreage by HUC added during the permit year;  
and
- (5) Signed certification;

(b) The status of compliance with state permit conditions, an assessment of the appropriateness of the identified best management practices and progress towards achieving the identified measurable goals for each of the minimum control measures;

(c) Results of information collected and analyzed, including monitoring data, if any, during the reporting period;

(d) A summary of stormwater activities the operator plans to undertake during the next reporting cycle;

(e) A change in any identified best management practices or measurable goals for any of the minimum control measures including steps to be taken to address any deficiencies;

(f) Notice that the operator is relying on another government entity to satisfy some of the state permit obligations (if applicable);

(g) The approval status of any programs pursuant to Section II C (if appropriate), or the progress towards achieving full approval of these programs; and

(h) Information required for any applicable TMDL special condition contained in Section I.

**(a) Background Information:**

- (1) NASA Langley Research Center  
General Permit Registration Number VAR040092
- (2) Annual Report for PY5 covering the period of July 1, 2017 – June 30, 2018.
- (3) There have been no major modifications to any operator roles and/or responsibilities. In the current MS4 Program Plan, the Standard Practice and Environmental Engineering Branch (SPEEB) (referred to as NASA Environmental) is responsible for ensuring implementation of the MS4 Program Plan and Annual Reporting.

- (4) A total of 16 outfalls exist (shown in Figure 1). No new MS4 outfalls have been added during the PY.
- (5) The signed Certification Statement can be found on the last page of this Annual Report.
- (b) The status of compliance with state permit condition is compliant. The official assessment of the appropriateness of the identified best management practices is that the permit requirements are being adequately addressed and achieved. Additionally, the identified measurable goals for each of the minimum control measures were achieved. For specific information on these measurable goals, please see the section on MCM reporting in the remainder of the report.
- (c) No monitoring data related to the MS4 program was collected and/or analyzed. LaRC holds an individual VPDES permit (VA0024741) that requires monitoring and Discharge Monitoring Reports (DMRs). All required monitoring results associated with the VPDES permit have been submitted to the DEQ's eDMR system.
- (d,e) The following is a general overview of planned activities associated with the MS4 Program for Year 1 of the new draft General Permit:

*MCM 1* – Three new high priorities have been selected and an associated education and training plan was developed. The three priorities for Year 1 are: (1) Water Quality and Winter Precipitation: Best Management Practices; (2) Litter Prevention: Illicit Discharge Detection and Elimination; and (3) the Chesapeake Bay and Back River TMDLs Education. Planned outreach activities include educational articles, flyers, website resources, specific training classes, and promoting relevant local events. In May 2019, MS4 staff will solicit public feedback via the @LaRC announcement system on educational high priorities for Year 2 of the next permit cycle.

*MCM 2* – As required, the PY5 Annual Report will be posted to the public webpage. Previous Annual Reports are posted. LaRC will also continue to maintain an updated MS4 Program Plan online. Lastly, LaRC will participate, through promotion, sponsorship, or other involvement, in a minimum of four local events/activities. The activities shall be aimed at increasing public participation to reduce stormwater pollutant loads; improve water quality; and support local restoration and clean-up projects, programs, groups, meetings, or other opportunities for public involvement.

*MCM 3* – LaRC has a robust GIS-based MS4 map, and LaRC accomplished the requirement to have a complete and updated storm sewer system map and information table within 48 months of permit coverage. LaRC's storm sewer system map shows all conveyance channels, ditches, directions of flow, locations of MS4 outfalls with unique identifiers, required outfall information, topography, delineated drainage basins for each outfall, and the named water bodies. LaRC will continue to maintain the storm sewer map and information table. The MS4 map layer can be found at (inside firewall only):  
<https://gis-portal.ndc.nasa.gov/arcgis/home/webmap/viewer.html?webmap=3a47a3cece5543339c8ac7d47ce65e4a>

LaRC will continue to implement the existing Illicit Discharge Detection and Elimination (IDDE) Program. LaRC's IDDE Handbook is currently up-to-date, but will be reviewed for applicable changes when the final General Permit is issued. Adequate records will be kept on any illicit discharge found and eliminated to allow for accurate future annual reporting.

*MCM 4* – LaRC will continue to implement our existing DEQ-approved Annual Standards and Specifications (AS&S) for Stormwater Management (SWM) and Erosion and Sediment Control (ESC) to ensure compliance with the MS4 Permit and Virginia Stormwater Management Program (VSMP) regulations. LaRC's Annual Standards and Specifications are currently approved through 2018.

During the next PY, it is anticipated that two (2) regulated land disturbing activities will occur. Both of these activities currently have open Construction General Permits (CGPs), with one very close to termination. Environmental staff will ensure these projects remain compliant until termination, and any new projects will be compliant through plan review and inspection.

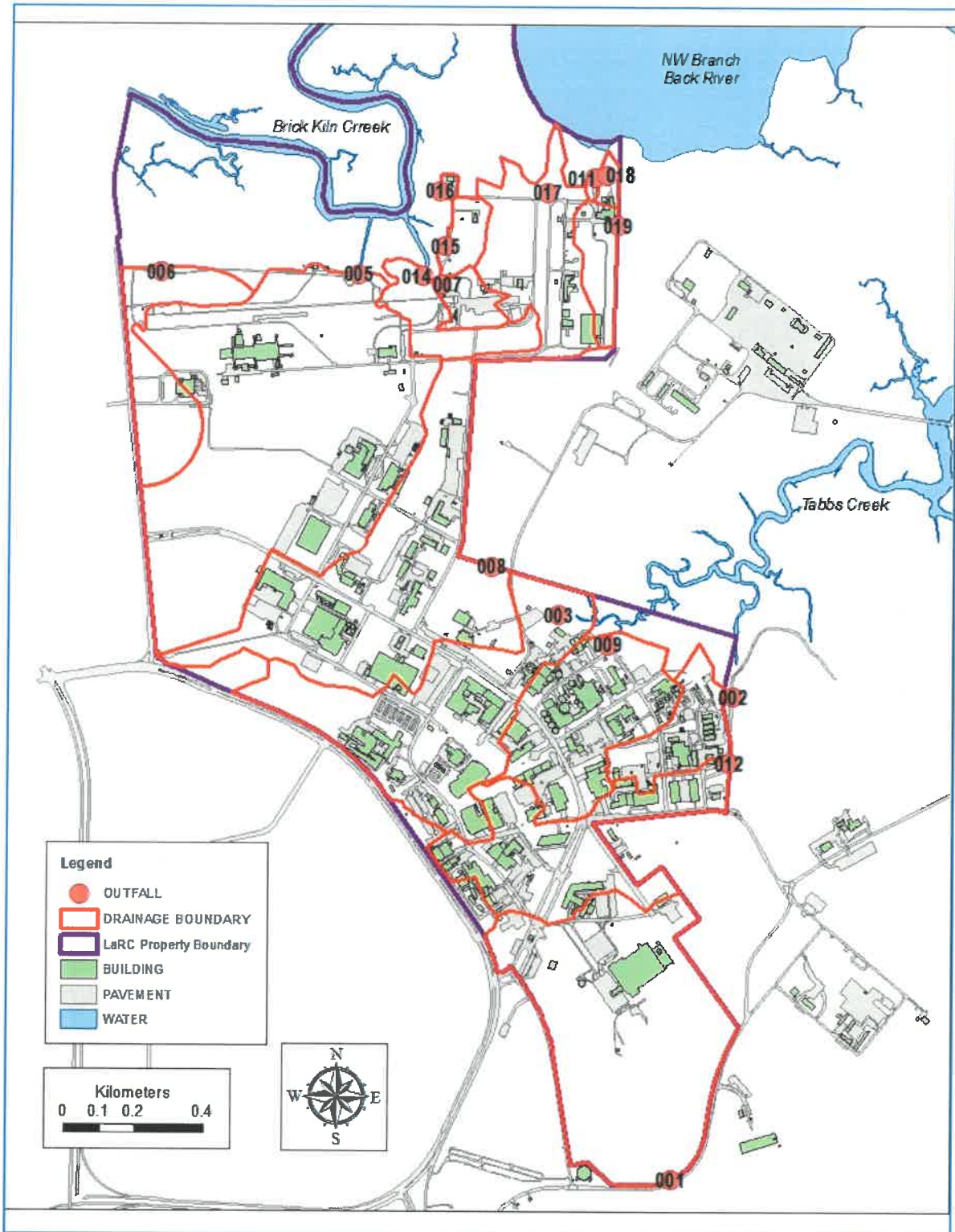
A new staff member, Ms. Jazmin Argarin, received her Dual Combined Inspector certification (expires 8/11/2021). Additionally, Mr. Peter Van Dyke renewed his Dual Combined Administrator certification during PY5. Mrs. Remington's certifications have not changed.

MCM 5 – LaRC is planning to inspect all existing SWM facilities at least once during the PY as required. Also, LaRC will continue to ensure adequate maintenance of existing SWM facilities is completed. If any new SWM facilities come online during the PY, adequate documentation and records will be maintained for proper reporting to DEQ.

MCM 6 – LaRC will continue to implement the following best management practices during the PY: street sweeping, ditch/grass channel maintenance, equipment maintenance, proper salt/brine storage, outfall maintenance, catch basin maintenance/clean outs, and leaf collection. LaRC will continue to strictly limit the use of nutrients and fertilizer application on pervious turf areas. Multi-media environmental audits will also continue, in order to ensure facilities are operating within compliance of the MS4 permit.

A new training plan and schedule was incorporated into the latest Program Plan. LaRC will implement the training plan during the PY, which is consistent with MS4 permit requirements. Training classes are offered for broad or targeted audiences, depending on the topic. Training topics include, but are not limited to, illicit discharge detection and elimination, good housekeeping, stormwater pollution prevention, and spill response. Audiences targeted for the PY include maintenance contractors, grounds/landscaping staff, janitorial staff, contractors, civil servants, etc.

- (f) Not applicable. LaRC does not rely on another government entity to satisfy some of the state permit obligations.
- (g) Not applicable. LaRC does not have any programs pursuant to Section II C.
- (h) NASA LaRC has been allocated a waste load reduction for the Back River TMDL, which was recently approved by the Environmental Protection Agency. In compliance with Part II B 1 b, NASA LaRC will develop and initiate implementation of an action plan to meet the conditions of Part II of the General Permit, no later than 30 months after the permit effective date. The action plan will be maintained and implemented by SPEEB, and a copy will be available upon request once complete.



**FIGURE 1 - LaRC OUTFALL AND OUTFALL DRAINAGE BASIN MAP**

**Minimum Control Measure One – Public Education and Outreach  
Annual Reporting Requirements – GP Section II B 1 (g)**

- (1) A list of the education and outreach activities conducted during the reporting period for each high-priority water quality issue, the estimated number of people reached, and an estimated percentage of the target audience or audiences that was reached.
- (2) A list of the education and outreach activities that will be conducted during the next reporting period for each high-priority water quality issue, the estimated number of people that will be reached, and an estimated percentage of the target audience or audiences that will be reached.

(1) The following details education and outreach activities during PY5:

High Priority 1: Fats, Oils, Grease, and Cleaning Products: Best Management Practices (BMPs)

Selected Audience: NASA LaRC employees; Facility Environmental Coordinators (FECs); janitorial staff (Approx. 3,000 people)

- An educational article, titled *Keeping the Drains Clear*, was published on 12/27/17, 12/28/17, and 12/29/17 with 18, 25, and 14 visitors (“hits”) respectively. The article discussed the importance of ensuring fats, oils, greases, and chemicals are handled and disposed of properly so that they are never washed down a sink or poured into a drain. The article also discussed how the most common accumulation of these materials often comes from every day washing processes, but can quickly add up to be a large buildup over time and lead to costly repairs. In addition, these items can have serious negative effects on our local water quality.
- An educational one-page flyer, titled *Keep It Clear*, was published on 12/27/17 to the public environmental website’s Water Program webpage for education and outreach. The flyer can be readily printed from the website, and reviews tips and reminders for personnel to prevent harmful materials from entering any drain on Center.
- A special training session, titled *Keeping Fats, Oils, Grease, and Chemicals Out of the Drain* was held on 6/6/18 with 3 attendees. This training was available for all LaRC personnel, and focused on ways to handle and properly dispose of these items so that they are never washed down a sink or poured into a drain. Attendees also learned about the problems these items can cause and methods that can be used at LaRC and at home to keep the pipes clear.
- A special training session, titled *Recognizing and Reporting Stormwater Pollution*, was held on 6/5/18 with 4 participants. This training educated personnel on how to recognize illicit discharges, including fats, oils, greases, and chemicals, and how to report an illicit discharge at NASA Langley. Attendees also learned the impact illegal dumping has on the Chesapeake Bay, and how to prevent stormwater pollution from occurring by identifying best management practices they can follow.
- FEC training was held on 7/12/17, 7/19/17, 6/12/18, and 6/14/18 with 9, 16, 7, and 28 attendees respectively. Additionally, 3 individuals who were unable to attend an in-person training viewed the FEC training course via video. The FEC training course goes into detail about stormwater pollution prevention and the importance of proper procedures for any water discharge, including preventing harmful substances from entering a sink or drain. FECs are asked to monitor their facilities for any illicit water discharge, to ensure the proper procedures are being followed by all personnel, and to report any water pollution concerns.
- Annual Waste Management and Spill Response Training was held on 7/12/17, 8/8/17, 6/5/18, and 6/6/18 with 132, 82, 196, and 233 attendees respectively. Additionally, 81 individuals who were unable to attend an in-person training viewed the training course via video. This annual

training is mandatory for all Center employees that use, handle, or request disposal of hazardous materials/chemicals, oils, or hazardous waste. Stormwater pollution prevention is covered in the training, along with spill response to prevent materials from reaching storm drains.

The total number of estimated people reached was at least 770. This represents 100% of the total targeted audience.

#### High Priority 2: Litter and Pollution: Illicit Discharge Detection and Elimination (IDDE)

Selected Audience: NASA LaRC employees, especially FECs and maintenance contractors (Approx. 3,000 people)

- An educational article, titled *Stop Litter from Getting Carried Away*, was published on 3/20/18 to the public environmental website. The article was advertised via the @LaRC web announcement on 3/26/18, 3/27/18, 3/28/18, 3/29/18, and 3/30/18 with 32, 24, 13, 13, and 7 visitors (“hits”) respectively. The article discussed the negative impacts litter has on water quality in the Chesapeake Bay.
- A special training session, titled *Recognizing and Reporting Stormwater Pollution*, was held on 6/5/18 with 4 participants. This training educated personnel on how to recognize illicit discharges, including harmful pollutants, and how to report an illicit discharge at NASA Langley. Attendees also learned the impact illegal dumping has on the Chesapeake Bay, and how to prevent stormwater pollution from occurring by identifying best management practices they can follow.
- Annual Waste Management and Spill Response Training was held on 7/12/17, 8/8/17, 6/5/18, and 6/6/18 with 132, 82, 196, and 233 attendees respectively. Additionally, 81 individuals who were unable to attend an in-person training viewed the training course via video. This annual training is mandatory for all Center employees that use, handle, or request disposal of hazardous materials, oils, or hazardous waste. Stormwater pollution prevention is covered in the training, along with spill response to prevent materials from reaching storm drains.
- FEC training was held on 7/12/17, 7/19/17, 6/12/18, and 6/14/18 with 9, 16, 7, and 28 attendees respectively. Additionally, 3 individuals who were unable to attend an in-person training viewed the FEC training course via video. The FEC training course goes into detail about stormwater pollution prevention and the importance of proper procedures for any water discharge, including preventing harmful substances from entering a sink or drain. FECs are asked to monitor their facilities for any illicit water discharge, to ensure the proper procedures are being followed by all personnel, and to report any water pollution concerns.

The total number of estimated people reached was at least 926. This represent 100% of the total targeted audience.

#### High Priority 3: Chesapeake Bay TMDL and LaRC’s TMDL Action Plan

Selected Audience: NASA LaRC employees, especially the Center Operations Directorate (COD) (Approx. 3,000 people)

- An educational article, titled *Virginia Lawn Care Tips*, was published on 9/18/17, 9/19/17, 9/20/17, 9/21/17, and 9/22/17, with 118, 44, 53, 25, and 41 visitors (“hits”) respectively. The article provided information on stormwater runoff into the Chesapeake Bay from nutrient rich sources, like lawns. It also provided guidance on reducing the pollutants, including phosphorus, eroding soil, bacteria, and toxins, from entering the Chesapeake Bay while still maintaining a healthy lawn. Tips included taking a soil test, applying fertilizer properly, selecting the recommended grass seed, and returning grass clippings to the lawn area.



- An educational article, titled *The Chesapeake Bay's "Diet"*, was published on 6/25/18, 6/26/18, 6/27/18, 6/28/18, and 6/29/18 with 67, 62, 31, 23, and 27 visitors ("hits") respectively. The article provided background on the Chesapeake Bay TMDL, and also educated personnel on the steps taken by LaRC staff to minimize sediment and pollutant runoff from demolition and construction activities at LaRC.
- Six new environmental education signs were installed around the NASA Langley property in the fall of 2017. The signs provide education on stormwater runoff and infrastructure NASA Langley has in place to reduce pollutants from entering the Chesapeake Bay and recharge groundwater, such as bio-retention gardens, pervious pavers, and tree box filters. An article describing the signs and providing photos was published on the public environmental blog, and advertised via @LaRC. The article was advertised on 10/10/17, 10/11/17, 10/12/17, and 10/13/17 with 3, 8, 24, and 14 visitors ("hits") respectively.
- The environmental website's public TMDL page was reviewed and updated twice during the last Permit Year. Both updates were a routine update. One update also included a link to the most recent Program Plan.
- A special training session, titled *Recognizing and Reporting Stormwater Pollution*, was held on 6/5/18 with 4 participants. This training educated personnel on how to recognize illicit discharges, including spills and illegal dumping, and how to report an illicit discharge at NASA Langley. Attendees also learned the major impact illegal dumping has on the Chesapeake Bay, and how to prevent stormwater pollution from occurring by identifying best management practices they can follow. An overview of how NASA LaRC is taking steps to protect local waters and improve the health of the Chesapeake Bay was given.
- FEC training was held on 7/12/17, 7/19/17, 6/12/18, and 6/14/18 with 9, 16, 7, and 28 attendees respectively. Additionally, 3 individuals who were unable to attend an in-person training viewed the FEC training course via video. The FEC training course goes into detail about stormwater pollution prevention and the importance of proper procedures for any water discharge. FECs are asked to monitor their facilities for any illicit water discharge, to ensure the proper procedures are being followed by all personnel, and to report any water pollution concerns. All water quality education is tied to the effects water pollution has on the nearby waterways and the Chesapeake Bay.

The total number of estimated people reached was at least 607. This represent 100% of the total targeted audience.

- (2) The following is a list of education and outreach activities and strategies that will be conducted during the next reporting period, including each high-priority water quality issue, the estimated number of people that will be reached, and an estimated percentage of the target audience or audiences that will be reached (in accordance with the new draft General Permit).

From 4/30/18 through 5/4/18, announcements were made for public input on selecting these education activities and high priorities. The announcements received 89 visitors ("hits"). Public comment was received from two individuals and can be found as an attachment to this annual report.

<b>High Priority</b>	<b>Target Audience</b>	<b>Outreach Strategies</b>	<b>Outreach Goal</b>	<b>Outreach Activities Planned - Permit Year 1 (July 1, 2018 – June 30, 2019)</b>
Water Quality and Winter Precipitation: Best	NASA LaRC employees FECs	Media materials	25% of audience annually	Educational Article SPEEB environmental website updates to IDDE and/or Education

<b>High Priority</b>	<b>Target Audience</b>	<b>Outreach Strategies</b>	<b>Outreach Goal</b>	<b>Outreach Activities Planned - Permit Year 1 (July 1, 2018 – June 30, 2019)</b>
Management Practices (BMPs)	Jacobs maintenance staff			and Outreach pages – Reviewed, updated, and promoted at least annually
Litter Prevention: IDDE	NASA LaRC employees FECs	Media materials; speaking engagements; training materials	25% of audience annually	Educational Article Annual trainings SPEEB environmental website's public IDDE section – Reviewed, updated, and promoted at least annually
Chesapeake Bay and Back River TMDL Education	NASA LaRC employees COD personnel	Media materials; speaking engagements; training materials	50% of audience annually	Educational Article BMP education via posted signs – 6 signs SPEEB environmental website public TMDL page – Reviewed, updated, and promoted at least annually

**Minimum Control Measure Two – Public Education and Participation**  
Annual Reporting Requirements – GP Section II B 2 (d)

- (1) A web link to the MS4 Program Plan and annual report; and
- (2) Documentation of compliance with the public participation requirements of this section.

(1) Web link to the primary public MS4 webpage where the Program Plans and Annual Reports can be viewed: <https://environmental.larc.nasa.gov/water/ms4/>

(2) Documentation of compliance with the public participation requirements of this section:

The following events were promoted on Center through promotion, sponsorship and/or involvement:

**City of Hampton Speaker – Developing Resiliency to Better Live with Water** – NASA Langley hosted officials from the City of Hampton on 4/11/18 in recognition of Earth Day 2018. Members from the City of Hampton presented on the recently completed first phase of a new coastal resilience initiative. The presentation provided a snapshot of the process and outcomes for phase one and shared what’s next for Hampton Roads. The presentation was advertised on the @LaRC page, public environmental blog, and center-wide emails. Web advertisements were posted from 4/2/18 through 4/11/18 and received 138 visitors (“hits”).

**RIVERFest 2017** – The Elizabeth River Project hosted its annual RIVERFest environmental festival on 9/17/17. The festival features free kayak paddle tours, a native plant walk, education on water quality, and more pollution prevention topics applicable to Hampton Roads. LaRC promoted this local event through advertisements on the @LaRC announcement page and public environmental blog. Advertisements were posted from 6/13/17 through 9/15/17 and received 95 visitors (“hits”).

**Newport News Tree and Shrub Giveaway** – The City of Newport News and Newport News residents organized a free bare root tree and shrub seedlings giveaway on 3/10/18. LaRC promoted this local event and provided education on the benefits of increasing tree and shrub habitat. Advertisements were posted via the @LaRC announcement page and the public environmental blog from 3/7/18 through 3/9/18 and received 255 visitors (“hits”).

**Hampton Roads 9<sup>th</sup> Go Green Expo** – The Newport News, Hampton, and York County/Poquoson Master Gardeners hosted the 9<sup>th</sup> Annual Go Green Expo on 9/9/17. The event provided education on sustainable gardening and hosted rain barrel workshops. LaRC promoted this event via the @LaRC announcement page. The announcements were posted from 6/5/17 through 9/8/17 with 437 visitors (“hits”).

**National Estuaries Week** – Governor Terry McAuliffe proclaimed September 18-25, 2017 as National Estuaries Week in the Commonwealth of Virginia. LaRC advertised this event by providing education on the vital role of estuaries, and encouraging personnel to participate in local events. These events included beach clean-ups, hikes, canoe and kayak trips, workshops, and more. LaRC promoted this event via the @LaRC announcement page. The announcements were posted from 9/18/17 through 9/22/17 with 64 visitors (“hits”).

**Chesapeake Bay Foundation Brock Environmental Center tour** – NASA Langley provided an opportunity for interested personnel to attend a tour of the Chesapeake Bay Foundation’s Brock Environmental Center on 10/18/17. The Brock Environmental Center is a net-zero, living building challenge award winner that demonstrates and provides education on the environment and how we can all help the Chesapeake Bay. The tour was advertised on @LaRC and the public environmental blog. Announcements were posted from 10/4/17 through 10/17/17 with 68 visitors (“hits”).

**Newport News Rain Barrel Workshops** – Newport News Waterworks partnered with the Newport News Master Gardeners, VA Cooperative Extension Office, and the Newport News Public Works to host several rain barrel making workshops. Rain barrel implementation has a positive effect on stormwater management and water conservation. LaRC received positive feedback on these events in the past and looks to continue supporting and promoting these workshops in the Hampton Roads community. LaRC promoted this event via posting to the @LaRC site. Announcements were posted for multiple events (September, March, April, and May) and received a total of 1,028 visitors (“hits”) respectively.

**Fall Pollution Prevention Workshops** – NASA Langley promoted two free fall workshops in October 2017. These workshops covered tips for native tree selection, stormwater basics, and a variety of pollution prevention topics. Each attendee received a free tree, and two attendees took home a free rain barrel. LaRC advertised the events on @LaRC from 10/12/17 through 10/16/16 and received 75 visitors (“hits”).

**Oyster Gardening Demonstration** – NASA Langley promoted an event organized by The Hampton City Clean Commission. Attendees were able to visit a Hampton Waterways Restoration Project oyster gardening demonstration and learn more about the benefits of oysters. Attendees also had an opportunity to help work in the oyster garden at the event. LaRC promoted this event by advertising on the @LaRC site. The announcement was posted from 2/6/18 through 2/9/18 and received 104 visitors (“hits”).

**Native Plant Walk** – NASA Langley provided an opportunity for interested personnel to attend a native plant walk fieldtrip on 4/23/18. The walk was led by a Peninsula Master Naturalist, and included information on the benefits of native plant habitats, such as reducing erosion, providing habitat for native wildlife, and recharging groundwater. The eight attendees also had an opportunity to learn about the importance of riparian buffers on the coastline. The tour was advertised on @LaRC, center-wide emails, and the public environmental blog. Advertisements were posted on from 4/17/18 through 4/23/18 with 171 visitors (“hits”) on the web announcements.

**NASA Langley’s Main Earth Day/Arbor Day Event** – LaRC held an on-Center Earth Day/Arbor Day event on 4/23/18. The event featured ten (10) environmental interactive exhibits and displays from several NASA Langley programs and local environmental groups. Exhibits featured information on Center programs for energy and water conservation, sustainable design including LaRC’s Integrated Engineering Services Building, recycling, stormwater pollution prevention, water and air quality, green purchasing, and native plants and pollinators. The event had high attendance and guests were able to network and interact with exhibitors, participate in trivia games, and take home a plant for their office or garden. Promotion of this event was done on the @LaRC page, public environmental blog, center-wide emails, and electronic displays near the front gate and in the cafeteria. The advertisements were posted throughout April 2018, and received 438 visitors (“hits”) on the web announcements.

**NASA Langley Plastic Bag Recycling** – LaRC continued its partnership with the York/Poquoson Master Gardeners to recycle plastic bags and film packaging. LaRC collected plastic bag material from Center personnel for 4 weeks during Energy Action Month 2017 in October, and for 4 weeks in observance of Earth Day and Arbor Day 2018. In total, 166 pounds of plastic material (estimated to be about 25,000 plastic bags) were collected and prevented from entering our local waterways and landfills. All plastic material was donated for a composite bench that was given to the LaRC Child Development Center. The event was

advertised on the @LaRC page and public environmental blog. Collection details and results were posted on the public environmental blog. Additionally, the events were advertised to @LaRC 37 times during PY5, with 865 visitors (“hits”) respectively.

**Annual Clean the Bay Day** – Clean the Bay Day is an annual stream and shoreline cleanup program where citizen volunteers remove litter and debris from Virginia creeks, streams, rivers, and the Chesapeake Bay. NASA LARC participated through promotion of the event via the @LaRC announcement page. The announcements were posted from 5/22/18 through 6/1/18 and received 230 visitors (“hits”).

**Additional documentation for these events can be found as an attachment to this Annual Report.**

**Minimum Control Measure Three – Illicit Discharge Detection and Elimination  
Annual Reporting – GP Section II B 3 f**

- (1) A list of any written notifications of physical interconnection given by the operator to other MS4s;
- (2) The total number of outfalls screened during the reporting period, the screening results, and detail of any follow-up actions necessitated by the screening results; and
- (3) A summary of each investigation conducted by the operator of any suspected illicit discharge. The summary must include: (i) the date that the suspected discharge was observed, reported, or both; (ii) how the investigation was resolved, including any follow-up, and (iii) resolution of the investigation and the date the investigation was closed.

- (1) Langley Air Force Base (LAFB) is the only downstream MS4 that LaRC has interconnection with. Joint Base Langley-Fort Eustis is comprised of two geographically separate entities: LAFB in Hampton and Fort Eustis in Newport News. LAFB’s MS4 permit was issued in August 2016. Fort Eustis has an MS4 permit; however, is not physically interconnected to NASA LaRC.

NASA LaRC and LAFB communicate frequently regarding projects, NEPA Environmental Assessments, interconnections, and possible project impacts. NASA LaRC also provided assistance to LAFB in preparing their MS4 permit (issued recently). LaRC shared our MS4 Program Plan and past Annual Reports with LAFB to study. LaRC has also provided feedback on MCM best management practices and an overview of our MCM 4 program.

- (2) NASA LaRC has 16 MS4 outfalls. The total number of outfalls screened during the reporting period included all 16 outfalls. Formal outfall inspection reports occurred quarterly (VPDES Permit requirement) across all 16 outfalls, and reports are stored physically and electronically with NASA Environmental. Additionally, visual outfall inspections often occur weekly for several “high risk” outfalls.

This robust screening program also ensures MS4 permit compliance as an annual MS4 outfall screening of all outfalls. The screening program utilizes a LaRC developed MS4 screening form. The generic results of the specific MS4 screening program are summarized below:

<b>Outfall ID</b>	<b>Date</b>	<b>Screening Result</b>	<b>Follow-up</b>
001	3/29/18	No issues. Normal green algae present. Minnows, frogs, and snapping turtle observed.	--
002	3/28/18	No issues. Water is clear. Minnows present.  Site had illicit discharge in Feb. No issues observed since.	Grounds Maintenance routinely removes sediment from the outfall discharge points and the concrete-lined ditch in this area. All sediment is removed and properly disposed of.
003	3/28/18	No visible sheen in the Oil Water Separator (OWS). Absorbent pads in place	Trash was removed during routine maintenance of changing absorbent pads.

<b>Outfall ID</b>	<b>Date</b>	<b>Screening Result</b>	<b>Follow-up</b>
		(VPDES requirement) and water is clear at end of OWS.  Trash present.	
005	3/28/18	Water is clear.  Many sinkholes present around outfall area.	Sinkholes were reported to the Safety office.
006	3/28/18	Pipe 90% full of sediment. Natural iron bacterial sheen present and water is stagnant.  Ditch work noted upstream. No signs of sediment in outfall flow.	Discovered intent of ditch work was to improve water flow.  Area would improve by converting to natural wetland.
007	3/28/18	Vegetation inhibiting water flow; minor flooding in ditch upstream. Minnows and frogs present.	Maintenance review recommended to improve grade and increase water flow (Low priority)
008	3/28/18	Minor orange bubbles from upstream flow – no concern. Orange color is from clay.  Many minnows present. Splash pool looks good.	Splash pool continues to be monitored for sediment and vegetation accumulation.
009	3/28/18	Absorbent pads in place (VPDES requirement). Water is clear at end of OWS. Observed grass clippings in OWS baffles.	Reminded the grounds maintenance contractor of best management practices for mowing around outfalls (blow grass clippings away from outfall).
011	3/28/18	Pipe 50% full of sediment.	The sediment has not been removed in this area yet. It is a low finding priority because this outfall is dry 99% of the time. Recommendation made to convert this area to BMP.
012	3/28/18	No issues. Minnows present.	Grounds Maintenance routinely removes sediment from the outfall discharge points and the concrete-lined ditch in this area. All sediment is removed and properly disposed of. Stream bank downstream is experiencing severe erosion – recommended repair.
014	3/28/18	No issues.	Debris removal would increase flow, but this is a low priority.
015	3/28/18	No issues.	--

<b>Outfall ID</b>	<b>Date</b>	<b>Screening Result</b>	<b>Follow-up</b>
016	3/28/18	Pipe 50% full of sediment.	The sediment has not been removed in this area yet. It is a low finding priority because this outfall is dry 99% of the time.
017	3/28/18	No issues.	--
018	3/28/18	No issues.	--
019	3/28/18	No issues.	--

3. The following is a summary of each investigation conducted by the operator of any suspected illicit discharge. The summary includes: (i) the date that the suspected discharge was observed, reported, or both; (ii) how the investigation was resolved, including any follow-up, and (iii) resolution of the investigation and the date the investigation was closed.

A total of six illicit discharges were suspected and three were found to be illicit discharges.

**Illicit Discharge Investigation #1: Stormwater Ditch Sheen**

- (i) Date observed: 8/15/2017
- (ii) How investigation was resolved, including follow-up: During a routine inspection of the Center, environmental staff observed a surface oil sheen in an open grass stormwater ditch. Staff took photos of the ditch and inspected the absorbent boom that was located about 10' downstream from the observed sheen. No sheen was observed past the boom or downstream. It was determined that the boom was saturated with dirt/debris and needed replacement. The Center's maintenance contractor (Jacobs) is responsible for maintenance of absorbent pads and booms across LaRC. The contractor was notified that the boom needed replacement. The boom was replaced by COB on 8/15/17. The sheen was not observed during the follow-up inspection.
- (iii) Resolution of the investigation: Environmental staff identified the small sheen as normal roadway use washing into the storm system after rainfall. Environmental staff walked local parking lots and roads and did not identify any abnormal conditions. The absorbent boom in the open grass ditch is always in place to capture any oily material on the surface. The investigation was closed on 8/15/17.

**Illicit Discharge Investigation #2: B1251A Roof Precipitator**

- (i) Date observed: 9/06/2017
- (ii) How investigation was resolved, including follow-up: Environmental staff were notified of an oil/tar leak on the roof of B1251A. The leak occurred when equipment was running. The oil hardened when it came into contact with the tar on the roof, and did not reach the roof drain. Environmental staff inspected the roof and leaking equipment, documented the leak with photos, and determined that there was no immediate risk of illicit discharge since the oil had hardened immediately upon coming into contact with the tar. As an extra precaution, absorbent material (quick-dry) was placed over the leak area and an absorbent boom was placed around the roof drain. The equipment was locked-out until the leak was repaired.
- (iii) Resolution of the investigation: The Facility Coordinator followed the appropriate steps for reporting a possible illicit discharge. This report was resolved on 9/06/2017 and the affected area of the roof will undergo remediation when roof repairs take place.



### **Illicit Discharge Investigation #3: B1230 Murky Water**

- (i) Date observed: 2/09/2018
- (ii) How investigation was resolved, including follow-up: Environmental staff noticed murky water flowing down a driveway and into a storm drain at B1230. It appeared personnel were working on equipment nearby and draining liquid from the equipment, but no personnel were around at the time. The maintenance crew was contacted and it was discovered that the water was cooling tower blowdown being drained from some piping work. The receiving outfall is permitted for cooling tower process water (VPDES), so the draining was not classified as an illicit discharge.
- (iii) Resolution of the investigation: The environmental staff worked with the maintenance contractor to ensure that future minor cooling tower draining is discharged to grassy areas, where feasible. If not, small amounts should be captured rather than discharged to avoid picking up any sediment, etc. The work was completed and the investigation was closed on 2/13/2018.

### **Illicit Discharge Investigation #4: Milling Machines Cutting Oil**

- (i) Date observed: 2/22/2018
- (ii) How investigation was resolved, including follow-up: During routine patrol, a security officer observed a white, milky substance in the stormwater ditch near outfall 002. The officer notified the fire department, who then notified environmental staff. The spill was traced to a scrap metal dumpster near B1172. There was excessive amounts of metal cutting fluid in a batch of metal shavings recently transported to the scrap metal yard. The metal cutting fluid leaked from the recycling dumpster and into a nearby storm drain. The storm drain connects to a storm ditch, discharges at Outfall #002 into a tidal stormwater ditch, and then into the headwaters of Tabbs Creek. It was estimated that 10 to 30 gallons of metal cutting fluid spilled on the ground. The NASA Fire Department, the Center maintenance contractor, and environmental staff responded to the spill. Oil absorbing booms were placed in the ditches, at the outfall, and across Tabbs Creek, and a berm was created near the inlet to prevent more cutting fluid from entering the storm drain. A vacuum truck service removed the cutting fluid from the creek, until all visible signs of cutting fluid were removed (about 3,000 gallons). The booms remained in place for another week as a precautionary measure. NASA LaRC notified the DEQ, the National Response Center, and Langley Air Force Base.
- (iii) Resolution of the investigation: This recycling dumpster is not normally kept near the storm drain as a best management practice, but rather in a gravel lot with limited runoff potential. Recently, work vehicles had been getting stuck in the gravel lot and the scrap metal dumpster was moved temporarily. Historically, the Center has not had issues with the scrap metal recycling program causing runoff issues. The hopper that contained the metal cutting fluid was traced back to B1225. Environmental staff spoke with B1225 facility personnel and a process change was developed. The ultimate cause of the spill was human error in putting free liquid cutting fluid into the scrap metal recycling process. A new drainable scrap metal hopper was obtained for B1225 to allow any residual free liquids to drain off the metal shavings and into a drip pan on the back of the hopper. The investigation was closed on 6/20/18 after receiving confirmation that the dumpster was delivered and the process change was working well to prevent future discharge risks.

### **Illicit Discharge Investigation #5: B1195 Concrete Cut Water**

- (i) Date observed: 4/26/2018
- (ii) How investigation was resolved, including follow-up: An employee in B1195 alerted environmental staff of an excessive amount of "concrete water" entering an unprotected drop inlet in front of B1195. The water was from cutting a concrete sidewalk in relation to

- LaRC's 22kv loop project. The contractor (Jacobs) was notified immediately via phone, and photos were emailed of the event.
- (iii) Resolution of the investigation: Inlet protection was installed the same day and the concrete cut water was cleaned up, as best as possible. The subcontractor was also reminded of best management practices to use when cutting concrete. The investigation was closed out on 4/27/2018 and the employee in B1195 followed the correct steps to report the illicit discharge.

**Illicit Discharge Investigation #6: Murky Water at Outfall 003**

- (i) Date observed: 6/5/2018
- (ii) How investigation was resolved, including follow-up: During routine maintenance, the Center's maintenance contractor (Jacobs) alerted environmental staff of murky, brown water at Outfall 003. The contractor also provided photos. Environmental staff were able to trace the source to dewatering activities at the B2104, Measurement Systems Laboratory (MSL) construction site. The MSL site project manager was immediately contacted and he located the failed dewatering event. Unfiltered muddy water was flowing directly into a drop inlet. The hose was placed over the silt fence surrounding the inlet protection. No dewatering bag was being used.
- (iii) Resolution of the investigation: The MSL site has a CGP for their construction activities. Due to the illicit discharge leaving the site, MSL was issued a Corrective Action Notice (CAN). The CAN directed MSL to place a dewatering bag on the hose, relocate the dewatering activity away from an inlet, and clean/remove sediment from the silt fence, drop inlet bag, and catch basin. Additionally, MSL was directed to review dewatering BMPs with their subcontractors. The investigation was closed on 6/5/2018 and the Center maintenance contractor followed the correct steps to report the illicit discharge.

**Minimum Control Measure Four – Construction Site Stormwater Management  
Annual Reporting – Section II B 4 (f)**

The operator shall track regulated land-disturbing activities and submit the following information in all annual reports:

- (1) Total number of regulated land-disturbing activities;
- (2) Total number of acres disturbed;
- (3) Total number of inspections conducted; and a summary of the enforcement actions taken, including the total number and type of enforcement actions taken during the reporting period.

- (1) The total number of regulated land disturbing activities (LDAs) during the reporting year was three.
  - CRF Construction – VAR10G999
  - B1275/1283 Demolitions – VAR10J007
  - MSL Construction – VAR10J220
- (2) The total number of acres disturbed was 13.42 acres.
- (3) The total number of NASA LaRC (MS4 staff) inspections conducted was 87. The following is a summary of 2 issues that rose to the level of formal enforcement actions. All issues were closed once enforcement actions were taken. It should be noted that there were numerous minor issues noted in the field during the year. Per NASA Annual Standards and Specifications, for minor deficiencies with no environmental impacts the contractor may remedy the violation immediately and avoid a formal enforcement action (such as a signed *Corrective Action Notice or contract action*) being issued. Only issues that needed formal “enforcement” are reported below:

<b>Project</b>	<b># of Enforcement Actions</b>	<b>Type of Enforcement</b>	<b>Issues Driving the Enforcement</b>
VAR10J220	2	Formal written Corrective Action Notice submitted to the contractor and project team.	Both CANs were issued due to illicit discharges of muddy water from improper dewatering activities.

**Minimum Control Measure Five – Post Construction  
Annual Reporting – Section II B 5 e**

- (1) The stormwater management facility type;
- (2) A general description of the facility's location, including the address or latitude and longitude;
- (3) The acres treated by the facility, including total acres, as well as the breakdown of pervious and impervious acres;
- (4) The date the facility was brought online (MM/YYYY). If the date is not known, the operator shall use June 30, 2005, as the date brought online for all previously existing stormwater management facilities;
- (5) The sixth order hydrologic unit code (HUC) in which the stormwater management facility is located;
- (6) The name of any impaired water segments within each HUC listed in the 2010 § 305(b)/303(d) Water Quality Assessment Integrated Report to which the stormwater management facility discharges;
- (7) Whether the stormwater management facility is operator-owned or privately-owned;
- (8) Whether a maintenance agreement exists if the stormwater management facility is privately owned; and
- (9) The most recent inspection of the stormwater management facility.

**Per Guidance from DEQ's James Davis-Martin and Bill Keeling, DEQ's BMP Warehouse application was used to meet this annual reporting requirements. NASA LaRC submitted information via the application for this year's report. The approved submission was labeled as 20180917.**

**Minimum Control Measure Six – Pollution Prevention/Good Housekeeping  
Annual Reporting – Measureable Goals – GP Section II B 6 g**

- (1) A summary report on the development and implementation of the daily operational procedures;
- (2) A summary report on the development and implementation of the required SWPPPs;
- (3) A summary report on the development and implementation of the turf and landscape nutrient management plans that includes:
  - (a) The total acreage of lands where turf and landscape nutrient management plans are required; and
  - (b) The acreage of lands upon which turf and landscape nutrient management plans have been implemented; and
- (4) A summary report on the required training, including a list of training events, the training date, the number of employees attending training and the objective of the training.

- (1) LaRC was required to complete the development and implementation of written procedures designed to minimize or prevent pollution within 24-months of permit coverage. LaRC has completed this task. Operational procedures and good housekeeping practices have been summarized in the Program Plan and written descriptions of how the work is accomplished has been included. The updated Program Plan goes into specific detail on LaRC's programs and procedures for street sweeping, ditch and outfall maintenance, equipment maintenance, salt storage, outfall maintenance (booms, pads, etc.), catch basin maintenance, leaf collection, spill containment, and application, storage, transport and disposal of pesticides, herbicides, and fertilizers.
- (2) NASA LaRC has assessed all facilities on Center for their potential of discharging pollutants. In general, LaRC has a low risk for facilities discharging pollutants due to current procedures in place and LaRC's practice of material storage with no exposure to stormwater. Additionally, many facilities that would be covered under this MCM are already covered under LaRC's VPDES Permit (#VA0024741) or LaRC's General VPDES Permit for Vehicle Wash Facilities (#VAG750198). Facilities covered under a separate VPDES permit shall adhere to the conditions established in that permit and are excluded from this requirement. LaRC identified one (1) area as high priority: the composting facility/grounds maintenance area.

The Center operates an informal composting area and landscape material storage area in the fields near B1285. The Grounds Maintenance Yard is approximately 4.5 acres, and consists of a leaf composting area, open green space, and a gravel area with storage and fueling operations. This area is primarily used for storing mulch, topsoil, and sand, as well as for composting leaves and other landscaping debris (gumballs, small branches, etc.). There is limited infrastructure in the Grounds Maintenance Yard that discharges to the storm system, but the ditches and conveyance pipes that are in the area discharge through NASA LaRC Outfall 019. This is a MS4 outfall and is only permitted for stormwater runoff. The outfall discharges to a marshy area that drains into the NW Branch of the Back River. Existing source controls in the Grounds Maintenance Yard include a posted spill plan, several spill kits, secondary containment and spill pallets, and barriers around stockpiles of landscaping debris to reduce runoff potential. Additionally, LaRC is interested in expanding its composting operation, so the risk to the MS4 could grow. LaRC developed and implemented a specific stormwater pollution prevention plan (SWPPP) for this high priority facility within 48 months of permit coverage as required by Table 1. A copy of the SWPPP is kept within

the office space of B1286. All SWPPP updates and inspections are documented and stored in the SWPPP.

(3) LaRC will continue to strictly limit the use of nutrients and fertilizer application on pervious turf areas. LaRC's policy regarding the use of pesticides, herbicides, and fertilizers is to follow Integrated Pest Management (IPM) practices whenever possible and to use the absolute minimum amount of pesticides, herbicides, and fertilizers on Center as necessary. LaRC has no applicable lands where nutrients are applied to a contiguous area of more than one (1) acre. The total acreage of lands where turf and landscape nutrient management plans apply is zero. The acreage of lands upon which turf and landscape nutrient management plans have been implemented is zero.

(4) The following is a summary of completed training during the last PY:

Training Requirement	Applicable Audience(s)	Summary
<p>Training for applicable field personnel in the recognition and reporting of illicit discharges</p>	<p>Facility Environmental Coordinators</p>	<p>FECs are asked to monitor their facilities for illicit discharge concerns and are the primary “eyes and ears” for the SPEEB. The FEC training course goes into detail about stormwater pollution prevention and the importance of LaRC’s IDDE program. It also discusses how to make proper reports to LaRC Environmental. FEC training was held on 7/12/17, 7/19/17, 6/12/18, and 6/14/18 with 9, 16, 7, and 28 attendees respectively. Additionally, 3 individuals who were unable to attend an in-person training viewed the FEC training course via video. A total of 63 FECs were trained.</p> <p>All FECs are also required to attend the Annual Waste Management and Spill Response Training. This annual training is mandatory for all Center employees that use, handle, or request disposal of hazardous materials, oils, or hazardous waste. Stormwater pollution prevention is covered in the training, along with spill response to prevent materials from reaching storm drains. The training was held on 7/12/17, 8/8/17, 6/5/18, and 6/6/18. A total of 724 personnel were trained.</p>
	<p>Standard Practice and Environmental Engineering Branch (SPEEB) employees and Jacobs (primary Center contractor) Personnel</p>	<p>A special training session, titled <i>Environmental ‘Refreshers’: Erosion, Stormwater, and Waste</i> was held on 8/21/17 with 5 attendees. This training was targeted towards the construction managers of the maintenance contract (Jacobs) at NASA Langley. The training focused how to prevent, recognize, and report illicit discharges at construction sites and facility maintenance projects. Topics covered included proper procedures for day-to-day tasks, outside storage of chemicals, secondary containment, good housekeeping, and getting proper environmental review of a project before work begins.</p>

Training Requirement	Applicable Audience(s)	Summary
		A special training session, titled <i>Recognizing and Reporting Stormwater Pollution</i> , was held on Center 6/5/18 with 4 participants. This training educated personnel on how to recognize illicit discharges, including spills and illegal dumping, and how to report an illicit discharge at NASA Langley. Attendees also learned the impact illegal dumping has on the Chesapeake Bay, and how to prevent stormwater pollution from occurring by identifying best management practices they can follow.
	Personnel who handle waste on Center.	Annual Waste Management and Spill Response Training. This annual training is mandatory for all Center employees that use, handle, or request disposal of hazardous materials, oils, or hazardous waste. Stormwater pollution prevention is covered in the training, along with spill response to prevent materials from reaching storm drains. The training was held on 7/12/17, 8/8/17, 6/5/18, and 6/6/18 with 132, 82, 196, and 233 attendees. Additionally, 81 individuals who were unable to attend an in-person training viewed the training course via video. A total of 724 personnel were trained.
Training for applicable employees in good housekeeping and pollution prevention practices that are to be employed during road, street, and parking lot maintenance	Grounds Maintenance Contractor	A specific stormwater Grounds Management Training is delivered biannually. The most recent training was held on 3/23/17 and had a total of 10 attendees. This training focused on several stormwater best management practices, including the management of grass clippings, removing debris from catch basins, and spill cleanup. Attendees were also given information on what illicit discharges might look like at LaRC, and how to report issues or concerns of water pollution to the Environmental Office. The next training will take place during PY1 of the new permit.
Training for applicable employees in good housekeeping and pollution prevention practices that are to be employed in and around maintenance and public works facilities.	Facility Environmental Coordinators	Certain FECs are employed to manage “public works-type” facilities on Center. The FEC training course goes into detail about stormwater pollution prevention and the importance of good housekeeping principles in and around facilities. FEC training was held on 7/12/17, 7/19/17, 6/12/18, and 6/14/18 with 9, 16, 7, and 28 attendees respectively. Additionally, 3 individuals who were unable to attend an in-person training viewed the FEC training course via video. A total of 63 FECs were trained.
	Jacobs (primary Center contractor) Personnel	A special training session, titled <i>Environmental 'Refreshers': Erosion, Stormwater, and Waste</i> was held on 8/21/17 with 5 attendees. This training was

Training Requirement	Applicable Audience(s)	Summary
		targeted towards the maintenance contract personnel (Jacobs) at NASA Langley. The training focused on how to prevent, recognize, and report illicit discharges at construction sites and facility maintenance projects. Topics covered included proper procedures for day-to-day tasks, outside storage of chemicals, secondary containment, good housekeeping, and getting proper environmental review of a project before work begins.
Ensure that employees, and require that contractors, who apply pesticides and herbicides are properly trained or certified in accordance with the Virginia Pesticide Control Act (§ 3.2-3900 et seq. of the Code of Virginia).	Grounds Maintenance Contractor	The Grounds Maintenance contract is responsible for the minor amounts of pesticides and herbicides applied on Center. The program is primarily need-based and done via spot treatments (e.g., someone calls in a wasp nest to be sprayed). NASA has required, through specific contract language, that the Grounds Maintenance contract operator carry all necessary state licenses. This contract language ensures that this requirement is met or the operator can't work at NASA LaRC.
Ensure that employees and contractors serving as plan reviewers, inspectors, program administrators, and construction site operators obtain the appropriate certifications as required under the Virginia Erosion and Sediment Control Law	Standard Practice and Environmental Engineering Branch (SPEEB)	<p>Mr. Peter Van Dyke serves as LaRC's Water Program Manager. Mr. Van Dyke is in charge of all ESC and SWM Plan reviews and inspection programs. Mr. Van Dyke has ESC and SWM Combined Administrator certifications.</p> <p>Dual Combined Administrator #DCA0184 (Expires 4/17/2021)</p> <p>Mrs. Ande Remington provides contract support to LaRC's Water Program Manager. Support includes plan reviews and site inspections. Mrs. Remington has ESC and SWM Combined Administrator certifications.</p> <p>Dual Combined Administrator #DCA0291 (Expires 10/29/2019)</p> <p>Ms. Jazmin Argarin provides contract support to LaRC's Water Program Manager and conducts multi-media field inspections of construction sites and maintenance tasks. Ms. Argarin is a dual combined inspector for ESC and SWM.</p> <p>Dual Combined Inspector #DIN0965 (Expires 8/11/2021)</p>
Training for applicable employees in good housekeeping and pollution prevention practices that	Facility Environmental Coordinators	LaRC has very limited recreational facilities due to our small size. There are a few ball/soccer fields and tennis court areas, but no nutrients are applied.



Training Requirement	Applicable Audience(s)	Summary
are to be employed in and around recreational facilities.		However, LaRC reviews good housekeeping and pollution prevention practices around Center, including these facilities, during annual FEC training. FEC training was held on 7/12/17, 7/19/17, 6/12/18, and 6/14/18 with 9, 16, 7, and 28 attendees respectively. Additionally, 3 individuals who were unable to attend an in-person training viewed the FEC training course via video. A total of 63 FECs were trained.
Emergency response employees shall have training in spill responses.	Waste Handling Center Personnel	Annual Waste Management and Spill Response Training was held on 7/12/17, 8/8/17, 6/5/18, and 6/6/18 with 132, 82, 196, and 233 attendees. Additionally, 81 individuals who were unable to attend an in-person training viewed the training course via video. A total of 724 personnel were trained. This annual training is mandatory for all Center employees that use, handle, or request disposal of hazardous materials, oils, or hazardous waste. Stormwater pollution prevention is covered in the training, along with spill response to prevent materials from reaching storm drains.

## TMDL Summaries

### Section One Special Condition – Chesapeake Bay TMDL

#### Annual Reporting – GP Section I C 4

- a. In accordance with Table 1, the operator shall submit the Chesapeake Bay Action Plan with the appropriate annual report.
- b. Each subsequent annual report shall include a list of control measures implemented during the reporting period and the cumulative progress toward meeting the compliance targets for nitrogen, phosphorus, and total suspended solids.
- c. Each subsequent annual report shall include a list of control measures, in an electronic format provided by the department, that were implemented during the reporting cycle and the estimated reduction achieved by the control. For stormwater management controls, the report shall include the information required in Section II B 5 e and shall include whether an existing stormwater management control was retrofitted, and if so, the existing stormwater management control type retrofit used.
- d. Each annual report shall include a list of control measures that are expected to be implemented during the next reporting period and the expected progress toward meeting the compliance targets for nitrogen, phosphorus, and total suspended solids.

- a. The Chesapeake Bay TMDL Action Plan (Phase 1) was submitted with the Year 2 Annual Report as required. The Plan was reviewed and approved by DEQ's Allan Brockenbrough in a letter dated 12/11/2015. NASA Langley's TMDL Action Plan (Phase 2) was submitted on 5/31/2018 with the registration statement for the new MS4 General Permit.
- b. The following is a list of control measures implemented during PY5 and a summary of progress:
  - The Action Plan had proposed one land-use change BMP of impervious to grass credit for the demolition of an impervious structure being returned to grass condition. Due to changes in funding, this project, totaling 0.55 acres, will be implemented during PY1 of the next permit cycle.
  - The Action Plan proposed a land-use change BMP of 2.0 acres of pervious to forest in the 2017-2018 PY (PY5). Some funding became available and this project was partially completed during the 2016-2017 PY (PY4), and the remainder was completed in PY5. A one (1) acre grass area was converted to a forested condition by planting 250 hardwood tree seedlings. This project achieved reductions of 5.18 lbs TN/yr, 0.40 lbs of TP/yr and 78.30 lbs of TSS/yr. Additionally, this project can be credited as a forest buffer and earned the efficiency credit. An additional load reduction of 3.88 lbs TN/yr, 0.46 lbs of TP/yr and 72.28 lbs of TSS/yr was achieved.

- The Action Plan proposed continuation of the street sweeping program, which is taking the annual mass load credit. This project was implemented during the PY. LaRC's annual mass load credit accounts for achieved reductions of 166.43 lbs of TN/yr, 66.57 lbs of TP/yr and 19,971 lbs of TSS/yr.

Cumulative Progress Report end of PY5:

Sub source	Pollutant	Load (lbs) Reduction Required by end of Permit	Load (lbs) Reduction Achieved at end of PY5	Total Load (lbs) Reduction Planned
Regulated Urban Impervious	TN	7.16	233.99	237.32
Regulated Urban Pervious		5.76	31.48	31.48
Regulated Urban Impervious	TP	2.63	79.93	80.57
Regulated Urban Pervious		.46	3.08	3.08
Regulated Urban Impervious	TSS	994.01	24876.45	25112.95
Regulated Urban Pervious		79.85	526.56	526.56

- c. NASA LaRC reported via DEQ's BMP Warehouse application to meet the annual reporting requirements. The approved submission was labeled as 20180917.
- d. The following is a list of control measures expected to be implemented during PY1 of the new permit and a summary of expected progress:
  - One land-use change removing 0.55 acres of impervious surface and converting to a grass condition is planned for PY1.
  - LaRC will continue the street sweeping program, annual mass load credit approach, during PY1.

Expected Cumulative Progress Report for end of PY1 (July 1, 2018 – June 30, 2019):

Sub source	Pollutant	Load (lbs) Reduction Required by end of Permit	Load (lbs) Reduction Achieved 2009 through Permit Cycle 1	Load Reductions Planned for PY1 of Permit Cycle 2	Total Load (lbs) Reduction Planned/Achieved through 6/30/2023
Regulated Urban Impervious	TN	57.28	233.99	169.76	454.78
Regulated Urban Pervious		46.04	31.48	0	49.6
Regulated Urban Impervious	TP	21.03	79.93	67.21	156.99
Regulated Urban Pervious		3.71	3.08	0	4.8
Regulated Urban Impervious	TSS	7952.08	24876.45	20207.5	48704.55
Regulated Urban Pervious		638.79	526.56	0	827.72

## Program Plan Modifications Summary

LaRC has updated the MS4 Program Plan in compliance with the new draft General Permit. This was submitted with the new registration statement on 5/31/2018. Implementation of this new Program Plan began on July 1, 2018. Below is a snapshot of Program Plan updates:

*MCM 1* – Overall, the section was updated to comply with new draft permit requirements. Three new high priorities have been selected and an associated education and training plan was developed. The three targeted priorities for Year 1 are: (1) Water Quality and Winter Precipitation: Best Management Practices; (2) Litter Prevention: Illicit Discharge Detection and Elimination; and (3) the Chesapeake Bay and Back River TMDLs Education. Prior to developing the Permit Year 1 Annual Outreach Plan, LaRC solicited public comment via the employee @LaRC announcement system. Notices ran from 4/30/18 through 5/4/18. The call asked employees what they felt were the most pressing stormwater issues the Center faced and where LaRC Environmental should focus educational efforts. Public comment was received from two individuals and suggestions were incorporated into the PY1 Program Plan.

*MCM 2* – Overall, the section was updated to comply with new draft permit requirements. Four public involvement opportunities were identified, though LaRC plans to promote and participate in many more. These four events include LaRC's Annual Earth Day and Arbor Day Expo, plastic bag recycling collection events, Clean the Bay Day, and local pollution prevention workshops.

*MCM 3* – Overall, the section was updated to comply with new draft permit requirements. LaRC has met the requirement to have a complete and updated storm sewer system map and information table, and will submit to DEQ a GIS-compatible shapefile of the MS4 map and associated table no later than December 31, 2018.

*MCM 4* – Overall, the section was updated to comply with new draft permit requirements. A new staff member was included in the Roles and Responsibilities section of MCM 4. Ms. Jazmin Argarin provides contract support to the water program and became certified as a Dual Inspector in PY1. Ms. Argarin's information was included in the Program Plan.

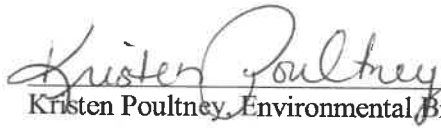
*MCM 5* – Overall, the section was updated to comply with new draft permit requirements. This section of the Program Plan had no significant changes other than updating the spreadsheet for new permanent stormwater facilities that came on-line during the PY.

*MCM 6* – Overall, the section was updated to comply with new draft permit requirements. A new training plan and schedule was incorporated into the Program Plan. Updates also included information on LaRC's High Priority Facility, the Grounds Maintenance Yard. LaRC has met the requirement to develop and implement a SWPPP for this high-priority facility and continues to monitor and inspect the facility.

*Special Condition/Chesapeake Bay TMDL Action Plan* – LaRC submitted its Phase 2 Action Plan to DEQ with the registration statement for the new General Permit. An updated plan will be submitted to the DEQ within 12 months. Additionally, LaRC has been allocated a waste load reduction for the Back River TMDL. NASA LaRC will develop and initiate implementation of an action plan to meet conditions of the Part II of the draft General Permit, no later than 30 months after the permit effective date. The action plan will be maintained and implemented by SPEEB, and a copy will be available upon request once complete.

**Signed Certification Statement**

“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.”

  
Kristen Poultney Environmental Branch Head

9/24/18  
Date

VAR040092                      NASA Langley Research Center  
Permit Number                      MS4 Name

## **Appendix A: MCM 2 Verification**




Figure 3 In observance of Earth Day and Arbor Day 2018, NASA Langley provided an opportunity for interested personnel to attend a native plant walk fieldtrip on 4/23/18. The walk was led by a Peninsula Master Naturalist and included information on the benefits of native plant habitats, such as reducing erosion, providing habitat, and recharging groundwater. Participants also learned about the importance of riparian buffers on the coastline.



## KEEP IT CLEAR

*KEEPING FATS, OILS, GREASE, AND CHEMICALS OUT OF A DRAIN*



### *Fats, Oils, and Grease*





Fats, oils, and grease, known collectively as FOG, represent a serious enemy of our sewer lines. When FOG is dumped down a drain, it forms large, thick clogs in the pipes and is also harmful to water quality. Both of these things can cause a lot of problems, so it's best to fight FOG from the start!

The Environmental Staff at LaRC work actively to prevent harmful substances like FOG from entering any drains on Center. Environmental Staff also regularly monitor the stormwater that leaves LaRC and enters local waterways to ensure it is clean and clear.


Follow these steps to fight FOG in your home and at LaRC! And remember, fats, oils, and grease should never be placed down ANY drain on Center, including sinks, floor drains, and drains found outside.

## FIGHT F.O.G.

Keep Fats, Oils, and Grease Out of Your Drain!

-  Wipe pots, pans, and work areas prior to washing to prevent grease and oil from being sent down the drain.
-  Dispose of food waste directly into the trash can instead of the garbage disposal.
-  Collect waste oil and store it for disposal or recycling. Oil and grease should never be poured into the drain.
-  Always clean floor mats inside over a utility sink, and never a place where water will run off directly into the storm drain.

### *Chemicals*



Chemicals can also be very harmful to our drains. As a convenient way to dispose of chemical lab waste, sink drains can be very tempting. Chemicals should not be disposed of in this manner for many safety and environmental reasons, since it may result in fire, chemical reactions, or corrosion within the plumbing system. Do not hesitate to ask your Facility Environmental Coordinator (FEC) how to properly dispose of any chemical waste if you are unsure.

*Please contact the [Environmental Office](#) if you have any questions about water quality or proper disposal of wastes at LaRC.*

Figure 4 Sample screenshot of the IDDE flyer published December, 2017. The flyer can be readily printed from the environmental website's water program webpage for education and outreach, and reviews tips and reminders for personnel to prevent harmful materials from entering any drain on Center.

**Stop Litter from Getting Carried Away**

**How to Reduce and Prevent Pollution from Reaching our Waterways**

**Litter isn't just ugly to look at: it can also add toxic contaminants to our waterways and be ingested by wildlife.**

Plastic bags drifting in the wind, cigarette butts tossed out a car window, beverage bottles tossed along the side of the road, and an open motor oil container left in a parking lot... we've all seen it and wondered why someone would do these things. You might also agree that these things are unappealing to look at, but not everyone realizes that litter adds up to a big water quality problem for the Chesapeake Bay.

So how does this trash end up in the Chesapeake Bay? Here at NASA Langley, it is picked up by rainwater and washed into the nearest storm drain. From there, it goes on an express ride straight into the creeks behind LaRC's property and ultimately to the Chesapeake Bay. And we all know that the Chesapeake Bay is already stressed.

Rainwater can pick up all kinds of pollution as it flows across streets, sidewalks, and lawns. Any pollutants and litter picked up along the way have big impacts on our local water bodies by smothering aquatic plants and bottom-dwelling organisms, detracting from the area's beauty, adding toxic contaminants to the water, and harming wildlife. Worst of all, litter, especially plastics, takes a long time to break down – sometimes hundreds of years.

While NASA Langley has multiple trash receptacles in convenient locations, there are still incidents of litter pollution on Center. One of the most common sources of litter on Center is cigarette butts. Changing a common behavior, like littering, can start with you. To reduce litter, properly dispose of all trash, participate in recycling, and encourage those around you to do the same. Also consider participating in a volunteer cleanup with a friend or neighbor to remove trash from local rivers, streams, or beaches.

**Although prevention is key, relying on public reporting can be effective as well. The LaRC Water Program team asks that you report any illegal dumping, pollution, or spills that could impact water quality or the environment. You can report your observations by calling Peter Van Dyke (4-7517) for non-emergencies or 911 from a Center phone (864-2222 from a cell phone) in the event of an emergency or a spill.**

**DID YOU KNOW?**

One of the biggest components of the litter waste stream is plastic: shopping bags, plastic and vinyl, tennis balls, tennis, wrapping for food and consumer goods, and plastic water bottles, cups, and can lids are all items commonly found littered and not recycled. In contrast with these items, a lot of us use disposable plastic.

A recent study from the University of Colorado estimated that a single metric ton of plastic trash enters the ocean every year. This is equivalent to putting five bags filled with plastic on every foot of coastline in the world.

Figure 5 Sample screenshot of the IDDE article published in March, 2018. The article discussed the negative impacts litter has on water quality in the Chesapeake Bay, and how NASA Langley minimizes litter pollution.



Figure 6 Six new educational signs were installed around the NASA Langley property in fall 2017. The signs provide education on stormwater runoff and infrastructure NASA Langley has in place to reduce pollutants from entering the Chesapeake Bay and recharge groundwater. Six additional signs are planned for installation in the following year.

## Stormwater Related Posts on @LaRC

All Posts by Ande Remington and Peter Van Dyke 7/1/17-6/30/18

Publish Date	Title	Approved?	Published?	Visits
6-29-2018	<a href="#">The Chesapeake Bay's "Diet"</a>	APPROVED	PUBLISHED	27
6-28-2018	<a href="#">The Chesapeake Bay's "Diet"</a>	APPROVED	PUBLISHED	23
6-27-2018	<a href="#">The Chesapeake Bay's "Diet"</a>	APPROVED	PUBLISHED	31
6-26-2018	<a href="#">The Chesapeake Bay's "Diet"</a>	APPROVED	PUBLISHED	62
6-25-2018	<a href="#">The Chesapeake Bay's "Diet"</a>	APPROVED	PUBLISHED	67
6-1-2018	<a href="#">Clean the Bay Day 2018</a>	APPROVED	PUBLISHED	11
5-31-2018	<a href="#">Clean the Bay Day 2018</a>	APPROVED	PUBLISHED	18
5-30-2018	<a href="#">Clean the Bay Day 2018</a>	APPROVED	PUBLISHED	17
5-29-2018	<a href="#">Clean the Bay Day 2018</a>	APPROVED	PUBLISHED	40
5-25-2018	<a href="#">Clean the Bay Day 2018</a>	APPROVED	PUBLISHED	19
5-24-2018	<a href="#">Clean the Bay Day 2018</a>	APPROVED	PUBLISHED	29
5-23-2018	<a href="#">Clean the Bay Day 2018</a>	APPROVED	PUBLISHED	36
5-22-2018	<a href="#">Clean the Bay Day 2018</a>	APPROVED	PUBLISHED	60
5-17-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	12
5-14-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	14
5-10-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	21
5-7-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	28
5-4-2018	<a href="#">Employee Input Needed on Outreach Development</a>	APPROVED	PUBLISHED	13
5-3-2018	<a href="#">Employee Input Needed on Outreach Development</a>	APPROVED	PUBLISHED	16
5-2-2018	<a href="#">Employee Input Needed on Outreach Development</a>	APPROVED	PUBLISHED	14
5-1-2018	<a href="#">Employee Input Needed on Outreach Development</a>	APPROVED	PUBLISHED	18
4-30-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	14
4-30-2018	<a href="#">Employee Input Needed on Outreach Development</a>	APPROVED	PUBLISHED	28
4-26-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	10
4-26-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	32
4-23-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	19
4-23-2018	<a href="#">Earth Day Expo and Poster Session - TODAY</a>	APPROVED	PUBLISHED	19
4-23-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	18
4-20-2018	<a href="#">Register Now for the Native Plant Walk 4/23</a>	APPROVED	PUBLISHED	20
4-20-2018	<a href="#">Earth Day Expo and Poster Session 4/23</a>	APPROVED	PUBLISHED	7
4-19-2018	<a href="#">Register Now for the Native Plant Walk 4/23</a>	APPROVED	PUBLISHED	22
4-19-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	17
4-19-2018	<a href="#">Earth Day Expo and Poster Session 4/23</a>	APPROVED	PUBLISHED	8
4-19-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	19
4-18-2018	<a href="#">Register Now for the Native Plant Walk 4/23</a>	APPROVED	PUBLISHED	27
4-18-2018	<a href="#">Earth Day Expo and Poster Session 4/23</a>	APPROVED	PUBLISHED	11
4-17-2018	<a href="#">Register Now for the Native Plant Walk 4/23</a>	APPROVED	PUBLISHED	26
4-17-2018	<a href="#">Earth Day Expo and Poster Session 4/23</a>	APPROVED	PUBLISHED	16
4-16-2018	<a href="#">Register Now for the Native Plant Walk 4/23</a>	APPROVED	PUBLISHED	41
4-16-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	18
4-16-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	24
4-13-2018	<a href="#">Register Now for the Native Plant Walk 4/23</a>	APPROVED	PUBLISHED	35
4-12-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	20
4-11-2018	<a href="#">Speaker: Developing Resiliency to Better Live with Water (TODAY!)</a>	APPROVED	PUBLISHED	14
4-10-2018	<a href="#">Speaker: Developing Resiliency to Better Live with Water (4/11)</a>	APPROVED	PUBLISHED	18
4-9-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	17
4-9-2018	<a href="#">Speaker: Developing Resiliency to Better Live with Water (4/11)</a>	APPROVED	PUBLISHED	13
4-6-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	11
4-6-2018	<a href="#">Speaker: Developing Resiliency to Better Live with Water (4/11)</a>	APPROVED	PUBLISHED	11
4-5-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	13
4-5-2018	<a href="#">Speaker: Developing Resiliency to Better Live with Water (4/11)</a>	APPROVED	PUBLISHED	13

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4-4-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	15
4-4-2018	<a href="#">Speaker: Developing Resiliency to Better Live with Water (4/11)</a>	APPROVED	PUBLISHED	15
4-3-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	19
4-3-2018	<a href="#">Speaker: Developing Resiliency to Better Live with Water (4/11)</a>	APPROVED	PUBLISHED	17
4-2-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	40
4-2-2018	<a href="#">Speaker: Developing Resiliency to Better Live with Water (4/11)</a>	APPROVED	PUBLISHED	37
3-30-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	41
3-30-2018	<a href="#">Water Quality Outreach: Litter Prevention</a>	APPROVED	PUBLISHED	7
3-29-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	18
3-29-2018	<a href="#">Water Quality Outreach: Litter Prevention</a>	APPROVED	PUBLISHED	13
3-28-2018	<a href="#">Plastic Bag Recycling is Back! April 2-30</a>	APPROVED	PUBLISHED	2
3-28-2018	<a href="#">Water Quality Outreach: Litter Prevention</a>	APPROVED	PUBLISHED	13
3-27-2018	<a href="#">Water Quality Outreach: Litter Prevention</a>	APPROVED	PUBLISHED	24
3-26-2018	<a href="#">Water Quality Outreach: Litter Prevention</a>	APPROVED	PUBLISHED	32
3-22-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	14
3-19-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	15
3-15-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	17
3-12-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	33
3-9-2018	<a href="#">Local Event: Tree and Shrub Giveaway 3/10</a>	APPROVED	PUBLISHED	47
3-8-2018	<a href="#">Local Event: Tree and Shrub Giveaway 3/10</a>	APPROVED	PUBLISHED	90
3-7-2018	<a href="#">Local Event: Tree and Shrub Giveaway 3/10</a>	APPROVED	PUBLISHED	118
2-22-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	32
2-19-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	17
2-15-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	40
2-12-2018	<a href="#">Upcoming Rain Barrel Workshops</a>	APPROVED	PUBLISHED	64
2-9-2018	<a href="#">Plastic Bag Recycling Results</a>	APPROVED	PUBLISHED	19
2-9-2018	<a href="#">Local Event: Oyster Gardening Demonstration</a>	APPROVED	PUBLISHED	17
2-8-2018	<a href="#">Plastic Bag Recycling Results</a>	APPROVED	PUBLISHED	28
2-8-2018	<a href="#">Local Event: Oyster Gardening Demonstration</a>	APPROVED	PUBLISHED	42
2-7-2018	<a href="#">Plastic Bag Recycling Results</a>	APPROVED	PUBLISHED	31
2-7-2018	<a href="#">Local Event: Oyster Gardening Demonstration</a>	APPROVED	PUBLISHED	33
2-6-2018	<a href="#">Local Event: Oyster Gardening Demonstration</a>	APPROVED	PUBLISHED	12
2-6-2018	<a href="#">Plastic Bag Recycling Results</a>	APPROVED	PUBLISHED	52
2-5-2018	<a href="#">Plastic Bag Recycling Results</a>	APPROVED	PUBLISHED	94
12-29-2017	<a href="#">Water Quality Outreach: Keeping the Drains Clear</a>	APPROVED	PUBLISHED	14
12-28-2017	<a href="#">Water Quality Outreach: Keeping the Drains Clear</a>	APPROVED	PUBLISHED	25
12-27-2017	<a href="#">Water Quality Outreach: Keeping the Drains Clear</a>	APPROVED	PUBLISHED	18
11-17-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	21
11-16-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	13
11-13-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	20
11-13-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	8
11-9-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	12
11-6-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	16
11-2-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	18
10-30-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	17
10-27-2017	<a href="#">Stormwater Annual Report - Now Available</a>	APPROVED	PUBLISHED	8
10-27-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	15
10-26-2017	<a href="#">Stormwater Annual Report - Now Available</a>	APPROVED	PUBLISHED	12
10-26-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	18
10-25-2017	<a href="#">Stormwater Annual Report - Now Available</a>	APPROVED	PUBLISHED	14
10-25-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	28
10-24-2017	<a href="#">Stormwater Annual Report - Now Available</a>	APPROVED	PUBLISHED	14
10-24-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	29
10-23-2017	<a href="#">Stormwater Annual Report - Now Available</a>	APPROVED	PUBLISHED	20
10-23-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	28
10-19-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	36
10-18-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	22
10-17-2017	<a href="#">External Fall Workshops (&amp; Receive a Free Tree!)</a>	APPROVED	PUBLISHED	26

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10-17-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	47
10-16-2017	<a href="#">Plastic Bag Recycling is Back! Oct 23 - Nov 17</a>	APPROVED	PUBLISHED	19
10-16-2017	<a href="#">External Fall Workshops (&amp; Receive a Free Tree!)</a>	APPROVED	PUBLISHED	14
10-13-2017	<a href="#">External Fall Workshops (&amp; Receive a Free Tree!)</a>	APPROVED	PUBLISHED	24
10-13-2017	<a href="#">New Environmental Education Signs</a>	APPROVED	PUBLISHED	14
10-12-2017	<a href="#">External Fall Workshops (&amp; Receive a Free Tree!)</a>	APPROVED	PUBLISHED	11
10-12-2017	<a href="#">New Environmental Education Signs</a>	APPROVED	PUBLISHED	24
10-11-2017	<a href="#">New Environmental Education Signs</a>	APPROVED	PUBLISHED	8
10-10-2017	<a href="#">New Environmental Education Signs</a>	APPROVED	PUBLISHED	3
9-22-2017	<a href="#">Virginia Lawn Care Tips</a>	APPROVED	PUBLISHED	41
9-22-2017	<a href="#">Happy National Estuaries Week!</a>	APPROVED	PUBLISHED	5
9-21-2017	<a href="#">Virginia Lawn Care Tips</a>	APPROVED	PUBLISHED	25
9-21-2017	<a href="#">Happy National Estuaries Week!</a>	APPROVED	PUBLISHED	9
9-20-2017	<a href="#">Virginia Lawn Care Tips</a>	APPROVED	PUBLISHED	53
9-20-2017	<a href="#">Happy National Estuaries Week!</a>	APPROVED	PUBLISHED	10
9-19-2017	<a href="#">Virginia Lawn Care Tips</a>	APPROVED	PUBLISHED	44
9-19-2017	<a href="#">Happy National Estuaries Week!</a>	APPROVED	PUBLISHED	13
9-18-2017	<a href="#">Virginia Lawn Care Tips</a>	APPROVED	PUBLISHED	118
9-18-2017	<a href="#">Happy National Estuaries Week!</a>	APPROVED	PUBLISHED	27
9-15-2017	<a href="#">Local Event: Riverfest Sunday 9/17</a>	APPROVED	PUBLISHED	32
9-14-2017	<a href="#">Local Event: Riverfest Sunday 9/17</a>	APPROVED	PUBLISHED	55
9-13-2017	<a href="#">Local Event: Riverfest Sunday 9/17</a>	APPROVED	PUBLISHED	8
9-8-2017	<a href="#">Local Event: Go Green Expo! TOMORROW</a>	APPROVED	PUBLISHED	55
9-8-2017	<a href="#">Upcoming Rain Barrel Workshop Sept 9</a>	APPROVED	PUBLISHED	47
9-7-2017	<a href="#">Local Event: Go Green Expo! Saturday 9/9</a>	APPROVED	PUBLISHED	92
9-7-2017	<a href="#">Upcoming Rain Barrel Workshop Sept 9</a>	APPROVED	PUBLISHED	90
9-6-2017	<a href="#">Local Event: Go Green Expo! Saturday 9/9</a>	APPROVED	PUBLISHED	139
9-6-2017	<a href="#">Upcoming Rain Barrel Workshop Sept 9</a>	APPROVED	PUBLISHED	130
9-5-2017	<a href="#">Local Event: Go Green Expo! Saturday 9/9</a>	APPROVED	PUBLISHED	151
9-5-2017	<a href="#">Upcoming Rain Barrel Workshop Sept 9</a>	APPROVED	PUBLISHED	180
9-4-2017	<a href="#">Upcoming Rain Barrel Workshop Sept 9</a>	APPROVED	PUBLISHED	181

Responsible NASA Official: Peter Ryan Van Dyke  
 Page Curator: Larc-dl-atlarc-help@mail.nasa.gov



Figure 1. The NASA Langley Earth Day and Arbor Day event on 4/23/18 featured 10 environmental educational and interactive exhibits. Participants were able to interact with exhibitors, play trivia games, and learn about several environmental topics, including stormwater pollution prevention.

The image is a screenshot of a NASA website page. At the top, there is a navigation bar with the NASA logo on the left and several menu items: Topics, Missions, Galleries, NASA TV, Follow NASA, Downloads, About, NASA Audiences, and Search. Below the navigation bar, the page is divided into two main columns. The left column has a 'Latest' tab selected and a 'Related' tab. Under 'Latest', there are several article teasers with their respective dates: 'Dancing' Into Deep Space (8 days ago), NASA's Pioneering Women Displayed in Art Exhibit (12 days ago), Saving the Planet One Global Concert at a Time (14 days ago), Mars Parachute Test Successfully Launched from Wallops (18 days ago), U.S. Congressman Tours NASA Langley (19 days ago), and Engineers Test Space 'Erector Set' (19 days ago). The right column features a large image at the top showing a person's legs and feet on a wooden floor. Below this image is a text block starting with 'David Imburgia, environmental and sustainability manager for the City of Hampton, Virginia, recently provided a snapshot recently of the process and outcomes for phase one of a new coastal resilience initiative.' This is followed by a sub-section titled 'How Bad is it?' which discusses sea-level rise and its impact on Hampton. Another sub-section titled 'Hampton officials visited NASA's Langley Research Center recently to update their progress...' includes a quote from David Imburgia. A smaller image of David Imburgia speaking is shown to the right of this text. The article concludes with a quote from Eric Gillard, NASA Langley Research Center, and a 'Last Updated' date of April 16, 2018.

**Latest**      **Related**

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19 days ago

[Engineers Test Space "Erector Set"](#)  
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David Imburgia, environmental and sustainability manager for the City of Hampton, Virginia, recently provided a snapshot recently of the process and outcomes for phase one of a new coastal resilience initiative.  
Credits: NASA/David C. Bowman

As rising sea levels encroach on coastal communities across the country, the city of Hampton, Virginia, has not been spared. Quite the opposite – it's in one of the most threatened areas of the U.S. thanks to being just a sandy step away from the Atlantic Ocean and Chesapeake Bay.

And like many municipalities, Hampton is preparing to weather the incoming tide.

**How Bad is it?**

Global sea-level rise is accelerating and could be 26 inches higher by 2100, according to a new study based on 25 years of NASA and European satellite data. Hampton already was prone to flooding because of its proximity to the sea. In recent years, however, the city has seen new areas impacted due to sea-level rise from climate change, and expects there's more to come.

Hampton officials visited NASA's Langley Research Center recently to update their progress. More than a dozen employees attended the discussion at the Reid Center.

"We're really trying to do this before the storm," said David Imburgia, Hampton's environmental and sustainability manager. "It's very difficult to have these conversations with your community in distress or displaced."

Along with other agencies, NASA plays a role helping Hampton and other coastal communities prepare for what lies ahead.

"With the Atmospheric Science Data Center, LaRC (Langley) is responsible for processing, archiving, and distributing NASA Earth science data about radiation, clouds, aerosols, and tropospheric compositions," according to the report. "This uniquely situates NASA Langley as a research partner for the City of Hampton, helping study climate data that could inform critical infrastructure decisions."

Hampton completed the first phase of its "coastal resilience" initiative in January. The effort culminated in a report available at Resilient Hampton that offers a look at progress made and what needs to be done next.


"We think Hampton is a pretty great place," Imburgia said. "We really want to dive into our strengths and how can we make sure our assets are working for us."

Hampton is surrounded by water and tidal influences extend deep into the city, Imburgia said. That's why it's imperative for city officials to address water-related issues and events before it's too late.

"We don't want the national story of Hampton to be, "This place floods," he said. "We've got to figure out a way to fix this."

*Eric Gillard*  
NASA Langley Research Center

Last Updated: April 16, 2018  
Editor: Eric Gillard



"We're really trying to do this before the storm," Imburgia said. "It's very difficult to have these conversations with your community in distress or displaced."  
Credits: NASA/David C. Bowman

Figure 2 NASA Langley hosted officials from the City of Hampton on 4/11/18 to present on the first phase of a new coastal resilience initiative. The presentation provided a snapshot of the process and outcomes for phase one and shared what's next for Hampton Roads.



## **Appendix B: Public Comment**

**From:** [Van Dyke, Peter R. \(LARC-D406\)](#)  
**To:** [Joyner, Elizabeth R. \(LARC-E304\)\[Science Systems & Applications, Inc.\]](#)  
**Cc:** [Remington, Ande \(LARC-D406\)\[Herndon Solutions Group\]](#)  
**Subject:** RE: Ideas  
**Date:** Friday, May 4, 2018 9:19:13 AM

---

Good morning,

Thank you very much for the input, it is very valuable. You have some great ideas! I can definitely focus on watershed education and connect to the work we are doing.

Thanks,

**Peter Van Dyke**

Environmental Protection Specialist  
National Aeronautics and Space Administration, Langley Research Center  
Standard Practice and Environmental Engineering Branch  
B1195, Room 2030  
office: (757) 864-7517  
cell: (757) 751-4308  
email: [peter.vandyke@nasa.gov](mailto:peter.vandyke@nasa.gov)

Customer satisfaction survey: <https://codnet.ndc.nasa.gov/TinyUrl.cfm?ID=8>  
Directorate Website: <http://cod.larc.nasa.gov/>

**From:** Joyner, Elizabeth R. (LARC-E304)[Science Systems & Applications, Inc.]  
**Sent:** Thursday, May 3, 2018 8:35 AM  
**To:** Van Dyke, Peter R. (LARC-D406) <[peter.vandyke@nasa.gov](mailto:peter.vandyke@nasa.gov)>  
**Subject:** Ideas

Hey Peter:

Thank you for what you are doing with our community!

As a former marine educator for the Sea Grant and the National Science Foundation/NOAA, I've done a bit with watershed outreach and I love what you are doing at NASA. A few ideas come to mind that are of interest to me as an educator at the Science Directorate, as well as a Girl Scout Mentor, and parent.

These ideas include but are not limited to the following. I realize that some of these ideas may/may not be aligned with your goals and capabilities but I thought I would capture my thoughts for you in case they seeded new ideas.

- Learning more about the watersheds in our region
- connect the work that NASA is doing with these issues
- Walking field trip here on LaRC
  - ID endemic species here
- Native plant sales here on center
- help us connect what we can do in our outreach efforts to watershed issues with things like make digital kit featuring local watershed issues and talking points so that we can

integrate them into our community outreach

- make available storm drain marking resources and trainings so that we can engage the community
- Integrate issues like sustainable seafood initiatives in the cafeteria, etc.

Please let me know if this is something that you would like to meet up on as I am happy to help bat around ideas.

Hope this helps,  
Elizabeth Joyner

-----  
Elizabeth R. Joyner  
Associate Education Coordinator, NASA LaRC  
Office (757) 864-1115

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**From:** [Van Dyke, Peter R. \(LARC-D406\)](#)  
**To:** [Eklund, Lynne W. \(LARC-B703\)\[NICS\]](#)  
**Cc:** [Remington, Ande \(LARC-D406\)\[Hemdon Solutions Group\]](#)  
**Subject:** RE: RE Environment  
**Date:** Friday, May 4, 2018 9:10:53 AM

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Lynne.

Thanks so much for the input. I really appreciate it and you gave some good ideas. We will incorporate some of these for sure!

Side notes -

We are fully off septic and with HRSD 100%.  
Drinking water is from NNWW, it is of good quality.

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-----Original Message-----

From: Lynne Eklund [<mailto:Lynne.W.Eklund@nasa.gov>]  
Sent: Thursday, May 3, 2018 9:45 AM  
To: Peter Ryan Van Dyke <[p.r.vandyke@larc.nasa.gov](mailto:p.r.vandyke@larc.nasa.gov)>; Eklund, Lynne W. (LARC-B703)[NICS] <[lynne.w eklund@nasa.gov](mailto:lynne.w eklund@nasa.gov)>  
Subject: RE Environment

You have two strengths- pride in LaRC and interest in global warming. Never mind that a bunch of scientists are your actual audience.... your info should address anything to add to the pride in LaRC but also anything to take home (literally) and implement in our own habitat.

Living in the TIDEWATER area, we all should take interest in any of the info your group has.

Storm water- what causes flooding and how LaRC tries to minimize damage- what is a bad practice (on the home front) and what is a good practice (examples at LaRC)

hurricane and Nor'easter effects- reminders early enough for home owners to implement precautions or to observe what LaRC is doing to make preparations

local city water problems/solutions/concerns- all Tidewater localities, since your employees are far-flung residents.... I'm sure we have good drinking water (unlike Flint) so brag about it! Tell folks to not flush medicines, chemicals, etc- here and at home.

does LaRC still use septic systems? are we now on city sewage? I can recall when LaRC had septic systems- which are alive- and it is doubtful people have a clue about the care and feeding of a septic system! (not to get gross, but it

is true)

education about what is "tidewater" or the Chesapeake Bay watershed or the York River watershed- and how a simple habit (not tossing trash) can impact something in a huge way. Bring the action level down to a personal involvement.

when the students (young and college) come for the day or for the summer- use their artwork for posters if possible- beyond the one day they are visible or judged.... LaRC has pro photographers, so get the permission and get the photo and use them as part of your education as eye-catchers.

have a table in the Cafe from time to time- or just put up a poster w some info

colorful mass emailings get my attention better than atlarc, however-

when I saw this, I was #9 reading the article from atlarc.

...which makes my point- although it is the required method of notification for LaRC, few people READ atlarc. But I do at least skim the email, or I wouldn't have seen this article... Since it is the official notification method, do continue to use atlarc for notices.

check the box- public input!

enough of a break- gotta get back to my real job :- )