NHDES Wetlands Bureau Annual Report to U.S. EPA Region 1 for Calendar Year 2017

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

April 2018

R-WD-18-04

NHDES Wetlands Bureau Annual Report to U.S. EPA Region 1 for Calendar Year 2017

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April 2018

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INTRODUCTION

This report has been prepared for EPA to provide a summary of the New Hampshire Department of Environmental Services (NHDES) Wetlands Bureau regulatory trends, activities, and updates on EPA grant-funded projects as part of NHDES' priority and partnership agreement with EPA. The NHDES Wetlands Bureau operates under the authority of the New Hampshire Revised Statutes Annotated (RSA) 482-A, the wetlands dredge and fill statute. The Wetlands Bureau oversees NHDES' regulation of impacts to freshwater and coastal wetlands, surface waters and their banks, dunes, the tidal buffer zone, and areas adjacent to designated prime wetlands. The Wetlands Bureau also administers RSA 483-B, the Shoreland Water Quality Protection Act (SWQPA). Permitting and compliance activities for SWQPA are also reported on within this report. The regulation of impacts is accomplished primarily through the permitting process.

The mission statement of the Wetlands Bureau is "*to protect, maintain and enhance the environmental quality in New Hampshire through the powers set forth in RSA 482-A to regulate impacts to those areas "wherever the tide ebbs and flows" or "freshwater flows or stands*."

EPA GRANT UPDATES

2013 Grant #1: Advancing Wetland Assessment in New Hampshire (CD98179201)

Under this grant, the major goals are as follows:

1. Evaluate the applicability of Maine's macroinvertebrate protocols and model for wetland assessment in New Hampshire.

2. Develop criteria and classification information to support wetland assessment and wetland conservation status and apply new tools on existing data to improve knowledge of resources.

3. Improve the requirements for and technical review of wetland permit applications.

4. Develop new Memorandums of Agreement (MOAs) with sister programs and agencies.

Task 1: Apply Maine's biomonitoring methods and statistical modeling for aquatic macroinvertebrates to New Hampshire.

The protocols involve:

- Sampling benthic macroinvertebrates using a dip-net from a canoe or by wading (collecting three "replicate" samples).
- Taking instantaneous measurements of field parameters including dissolved oxygen, pH, turbidity, specific conductance, and water temperature.
- Collecting grab samples that are analyzed for nutrients (nitrate-nitrite, total Kjeldahl nitrogen, total phosphorus), chloride, chlorophyll-*a*, dissolved organic carbon, and alkalinity.
- Collecting information on physical habitat parameters (land use, terrain, plant species and substrate composition).

- Applying Maine's landscape-based Wetland Human Disturbance Assessment, a rapid assessment, which evaluates the landscape around a wetland and its watershed.
- Applying the New Hampshire Ecological Integrity Assessment (EIA) developed by the New Hampshire Natural Heritage Bureau (NHB), which also includes a GIS-based landscape analysis, stressor evaluation, as well as vegetation-based surveys that can support application of Floristic Quality Assessment and may inform the macroinvertebrate assessment results.

Field work under this task was completed in 2014 and 2015 after each field season. NHDES provided the macroinvertebrate samples for 24 sites to the taxonomic contractor, ESS Group, for sorting, identification and enumeration. The ESS Group provided the taxonomic results and NHDES reviewed them and sent them to the Maine Department of Environmental Protection (DEP) Biomonitoring Program for review and input through Maine's predictive model for wetland water quality.

After the 2015 sampling results for 18 wetlands were run through Maine's model in 2016, for 11 wetlands, no attainment class could be assigned due to the macroinvertebrate samples not meeting the total abundance threshold (too few macroinvertebrates) or not meeting the generic richness threshold (lower diversity). For 5 sites, the significant amount of organic material collected and the subsequent sub-sampling may have affected the results. One of the 5 sites had been sampled because it had been considered a reference site by the NHB. Since the counts were close to the model thresholds, the entire sample was processed by the taxonomic contractor and the taxonomic results of that 2015 sample was rerun a year later (2017). The resulting Maine model-derived attainment class for the reference site was a C.

NHDES staff member Sandy Crystall submitted an abstract and presented "Adapting Protocols and Models to Assess Wetland Condition in New Hampshire" based on preliminary results, at the New England Association of Environmental Biologists (NEAEB) 2017 annual conference in Hartford, Connecticut.

Task 7: Develop new Memorandums of Agreement (MOAs) with sister programs and agencies

The new MOA was approved by all parties (NHDES, NH Fish and Game (F&G) and NHB) and submitted to EPA in January 2017. As part of this MOA, NHDES reviewed the current practice of screening wildlife and plant community and exemplary natural communities through the NHB DataCheck tool. The purpose of the MOA is to establish policy and procedures for the NHB, F&G data for NHDES wetland, shoreland, and alteration of terrain permitting and compliance reviews.

Task 8: Grant management

Two no-cost time extensions were requested and approved to 1) Allow additional time for analysis of data, especially with the unanticipated model results as described above, and 2) Complete additional analyses (which involve coordination with Maine biomonitoring staff for information related to their model and sites), allow time for review and comment by expert NHDES staff and others, and allow time for internal editing by NHDES, so the document may be posted on the NHDES website upon its completion. This work (analyses and report) will provide a foundation for upcoming analyses of 2016 and 2017 data generated under the subsequent grant that applied the same protocols. Therefore time invested at this point in time is valuable. The end date for deliverables is now June 30, 2018.

2015 Grant #1: Wetland Biocriteria and Outreach tools in New Hampshire (CD00A00014).

Under this grant, the major goals are as follows:

1a. Investigate development of numeric biocriteria thresholds for aquatic life use support in fringing and emergent wetlands.

1b. Develop and test aquatic vegetation sampling protocols with Maine to use with the standard wetland biomonitoring protocols being used by New Hampshire and Maine.

2. Evaluate and document historical exemplary wetland systems so they can be reliably used for environmental reviews and conservation planning (NHB).

3. Develop thresholds for interpreting Floristic Quality Assessment (FQA) scores that are specific to New Hampshire wetland types (NHB).

5. Update the New Hampshire Wetlands Program Plan for 2017-2023 timeframe.

6. Develop resources for new Wetlands Mitigation Pre-application Coordination Resources web page.

7. Develop new wetlands message and outreach tools that incorporate new published research and eLearning methods and tools for the public.

7. Grant Administration, Quality Assurance, Outreach and Reporting.

Task 1a: Investigate development of numeric biocriteria thresholds for aquatic life use support in fringing and emergent wetlands

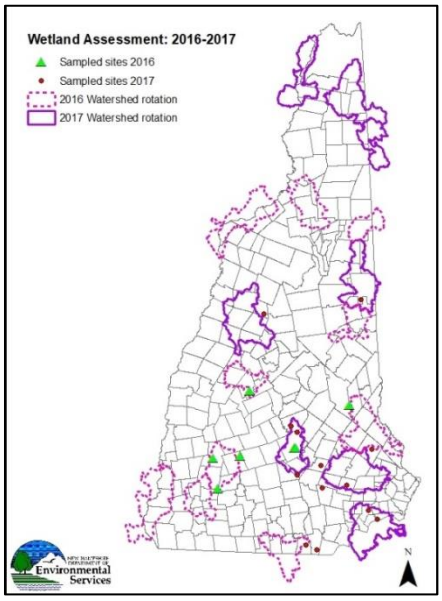
In preparation for the field season in June 2017, NHDES coordinated a training session in and with Maine DEP wetland biomonitoring staff to review the draft vegetation sampling protocols with the sampling team which included a new intern.

NHDES first identified wetlands to sample and then conducted reconnaissance of the potential wetland sampling locations to ensure that the sites would meet the required criteria – type, water depth and accessibility (including landowner permission).

NHDES began sampling wetlands in late June 2017 and completed sampling of 13 wetlands by mid-August for a total of 20 sites under the grant. Of the 13 sites sampled, for one site NHDES needed and successfully obtained landowner permission to sample it. At several other sites, we notified the landowner (municipal or state) that we would be sampling at a specific location. For one site we wanted to sample, we did not receive any response when landowner permission was requested by mail. The 13 wetlands sampled are listed in Table 1 and depicted in Figure 1. Two of the wetlands* had been sampled previously (in 2015) and no attainment class was able to be generated from the sampling data. It is hoped that the resampling may better represent the macroinvertebrate communities and enable development of attainment class by Maine's model.

Table 1 and Figure 1: Wetlands Sampled by NHDES in 2017 (Task 1).

Town	Wetland	HUC8 Watershed
Allenstown	Catamount Brook wetland	Merrimack River
Auburn	Clark Pond	Merrimack River
Barrington	Richardson Pond	Piscataqua-Salmon Falls River
Bow	Purgatory Brook wetland	Merrimack River
Canterbury	Kimball Pond	Merrimack River
Concord	Hoit Marsh	Merrimack River
Conway	Dollof Pond	Saco River
Ellsworth	Ellsworth Pond	Pemigewasset River
Hudson*	Musquash Pond	Merrimack River
Kingston	Powwow River	Merrimack River
Nashua*	Fields Grove- Salmon Brook	Merrimack River
Raymond	Lamprey River wetland	Piscataqua-Salmon Falls River
South Hampton	Tuxbury Pond wetland	Merrimack River



The macroinvertebrate samples were provided to the taxonomic contractor for processing and identification in the fall of 2017 and the data are expected in late March 2018. After review, the data will be sent to Maine DEP for processing by the predictive model.

Task 1b: Develop and test aquatic vegetation sampling protocols with Maine to use with the standard wetland biomonitoring protocols being used by New Hampshire and Maine

NHDES conducted research on aquatic vegetation sampling protocols and shared with Maine DEP Biomonitoring staff. We developed a draft SOP for aquatic vegetation sampling protocols to use during the 2017 field season.

During the June training session with Maine DEP wetland biomonitoring staff, the New Hampshire wetland sampling team demonstrated the current vegetation sampling protocol being used alongside Maine's macroinvertebrate protocols.

Task 2 (NHB): Evaluate and document historical exemplary wetland systems so they can be reliably used for environmental reviews and conservation planning

NHB evaluated 266 exemplary wetland community records in the NH Natural Heritage Bureau database that were a one-to-one crosswalk to a wetland system type (enabling application of the Level 2 (L2) Ecological Integrity Assessment to the crosswalked wetland systems). The results of the L2 EIA evaluation on the 266 wetland communities include:

- 182 of 266 communities (68%) remain exemplary.

  Of the 84 remaining communities (32%), 69 communities (26%) were determined not to be exemplary and 15 communities (6%) are categorized as "may not be exemplary" and require resurveys.

In addition to the 15 sites categorized as “may not be exemplary” and in need of surveys, 65 of the 182 exemplary communities need to be resurveyed as well, due to:

- Last surveyed 20 years ago or more.
- Currently unrankable with existing field data.
- The need to reevaluate condition to improve accuracy of overall rank.
- Potential issues with classification of wetland.
- The need to more accurately determine extent of community that can’t otherwise be determined remotely with aerials, NWI, etc.

The reasons that 69 wetland communities are no longer considered exemplary largely relate to either:

- Changes in wetland condition and the surrounding landscape since the wetlands were last evaluated (majority of the wetlands last surveyed in the 1990s or earlier). OR
- Resources and assessment methods now utilized were either not available when the wetlands were last surveyed or they were in various stages of development. Compared to 20+ years ago, we are now able to reference or use:
    - Standardized evaluation method (L2 EIA), reducing variability in surveyor scoring.
    - GIS data layers including high resolution aerial photography.
    - Land cover data to calculate the Land Use Index in GIS for each site (index modified as needed after reviewing 2015 aerials).
    - GPS units (with improved accuracy over the years).
    - System and natural community classifications.
    - Newly developed wetland system rank specifications (Nichols, 2015).
    - Updated conservation status ranks (S-ranks) using recently improved protocols incorporating threats (including those posed by climate change), short and long term trends, and additional rarity factors (Nichols, 2015).
    - Updated ecological delimitation guidelines.

In addition to Level 2 EIA evaluations of the 266 exemplary wetland community records, we reassessed the two EIA size metrics using 2017 standards for 301 wetland system records. These 301 additional records were originally evaluated using L2 EIA in 2014 and 2015 as part of previous WPDG projects. Once reevaluated, we re-ran the EIA calculator to update the overall EIA rank for each of the 301 records. Once the evaluations for all three datasets were completed, we combined the datasets into one database with 567 wetland records. A total of 92 wetlands (including the 69 from above) do not meet current standards for being considered exemplary. With the remaining 475 records, NHB then identified least-impacted wetland systems with overall ranks of A, A-, or B+ for development of reference condition FQA thresholds.

Task 3: Develop thresholds for interpreting Floristic Quality Assessment (FQA) scores that are specific to NH wetland types

NHB reviewed existing relevé (plant plot) data and searched through hundreds of digital and hardcopy folders to review thousands of plots to identify those related to least-impacted examples of the 14 targeted system types.

NHB identified wetland types for which new field surveys need to be conducted. For potential survey sites of least-impacted system types with limited plot data, NHB reviewed all existing hardcopy field forms from past NHB wetland surveys and several leads and occurrence updates in the backlog (see floodplain forest and peatland examples below).

NHB reviewed leads and updates in the backlog for floodplain forests, for both the major river silver maple floodplain system and temperate minor river floodplain system. Based on GIS data and existing field data from many of the sites, none of the floodplain forests would be ranked as A, A-, or B+.

NHB also reviewed several leads and occurrence updates in the backlog for potential survey sites of least-impacted open peatlands (i.e., kettle hole bog system, medium level fen system, and poor level fen/bog system). Based on GIS data and existing field data from many of the sites, these records 1) contributed new information to previously known high quality peatlands; were new to the NHB data base and least-impacted examples but not a type in need of additional plot data, or 3) were determined not to be least-impacted examples (ranked A, A-, or B+). After reviewing the leads above and number of A to B+ sites with existing plot data for the 14 selected wetland system types, NHB identified that there was a lack of quality survey sites. To increase efficiency in the outputs for this project, NHB searched additional existing plot data.

NHB conducted field surveys to collect relevé data for wetland systems that will best inform the establishment of FQA benchmark thresholds. These two sites were chosen due to their likelihood of being very high quality sites (perhaps A-). This system type otherwise has sufficient plot data for establishing least impacted FQA thresholds.

- Temperate minerotrophic swamp system: Tavern Hill, Nottingham; 2 relevé plots completed.
- Attempted to access two additional sites but unsuccessful after trying 3-4 potential points of entry down logging roads at each site. These sites were:

  Drainage marsh - shrub swamp system: Mollidgewock Brook, Cambridge.

  Drainage marsh - shrub swamp system: Bog Brook, Cambridge.

NHB had data exchanges with NatureServe and extensive discussions to determine how the EcoObs database could be utilized to calculate FQA indices for this project by minimally customizing it for use in NH. NHB work conducted in late 2017 was to prepare that data for the EcoObs which will be used to analyze data for FQA threshold values.

Task 4: Update NH Wetland Program Plan for 2017-2023 timeframe

NHDES worked with program partners to update the NH Wetland Program Plan. NHDES met with staff from the Watershed Management Bureau, the NH Coastal Program, and the NH Geological Survey. NHDES incorporated suggestions from the Department of Natural and Cultural Resources (DNCR)-NHB, (formerly known as the Department of Resources and Economic Development). NHDES completed the Wetland Program Plan update in March 2017 and published the approved Wetland Program Plan on the NHDES website in April 2017.

Task 5: Develop resources for new Wetlands Mitigation pre-application coordination resources web page

A new Wetland Mitigation Pre- application Process webpage was created in 2016 to accommodate the NHDES Wetland mitigation rule change. The NHDES website was updated to reference pre-application materials and resource information.

Task 6: **Develop new wetlands message and outreach tools that incorporate new published research and eLearning methods and tools for the public**

NHDES Wetlands Bureau and the Public Information Office staff interviewed and filmed a Certified Wetland Scientist at a wetland and river system. The film has been edited and circulated for review. Editing of the video was almost completed by the end of 2017. The video is scheduled to be released on World Wetlands Day, (February 2, 2018). Additionally, NHDES has worked with the Public Information and Permitting Office to incorporate Twitter "tweets" to increase public awareness of wetlands and important events and information.

NHDES has included new customer survey questions to identify suggestions for improving guidance and the website overall.

2015 Grant (Track 2): Building Climate Change Resiliency in New Hampshire by Prioritizing Wetland and Stream Mitigation Opportunities (CD 00A00016)

Task 1: Update of NWI Mapping

NHDES contracted with Virginia Tech (VT) to update and provide enhanced National Wetlands Inventory (NWI) maps for the Merrimack River and Salmon Falls River watersheds. Mapping updates were initiated in the first quarter of 2016 and during the summer of 2016. VT conducted field verification in different areas of the watersheds. Updates to the map include:

- Wetlands and deepwater habitat classified according to the Cowardin wetland classification system with the most recent high-resolution photography and complies with the U.S. Fish and Wildlife Service (FWS) data collection guidelines for inclusion in the NWI master geodatabase.
- Mapping completed at a minimum scale of 1:8,000 and a target mapping unit (TMU) of 0.25 acres.
- Application of the NWI+ Wetland Classification system developed by FWS (Tiner, 2011) to provide a landscape-level assessment of the wetland which includes landscape position, landform, water-flow path and water-body type descriptors (LLWW), followed by the assignment of wetland function.

The NWI updates were integrated to the FWS NWI Mapper and the LLWW information was added to the New Hampshire's Statewide Geographic Information System (GIS) Clearinghouse, NH GRANIT in the fall of

2017. The data are available as a data download and added to the NH Coastal Viewer and GRANITView. The NH Coastal Viewer is an online mapping tool that offers users access to spatial data describing NH's coastal resources and coastal hazards. It was developed and is managed by NH GRANIT in partnership with the NH Department of Environmental Services Coastal Program, and provides access to a suite of GRANIT data layers as well as data sets and map services published by project partners and other state, regional, and federal organizations. The data are organized into a series of functional categories, with each category containing multiple data layers that can be displayed and queried by the user. The GRANITView web mapping application provides access to key NH GRANIT data layers, along with a suite of tools to navigate and interact with those data layers.

Task 2: Re-establish statewide stream crossing technical advisory committee

In early 2016 the State Multi-agency Stream Crossing Steering Team was established. This committee is chaired by Shane Csiki of the New Hampshire Geological Survey at NHDES. The team is comprised of members from the NHDES Wetlands Bureau, New Hampshire Department of Transportation (NHDOT), Homeland Security and Emergency Management (HSEM), and NHFG. While the core of the team consists of State entities, other partner agencies including UNH, Trout Unlimited, consulting firms and regional planning commissions are consulted as necessary. In 2017 five meetings were held to coordinate efforts on the state stream crossing initiative.

The mission of the New Hampshire Stream Crossing Initiative is to inventory stream crossings throughout the state to inform data-driven decisions on culvert replacement and stream restoration. In summary the objectives of the committee are:

- To document transportation and environmental concerns.
- To clarify individual agency responsibilities on specific objectives.
- To ensure field assessments are coordinated and minimize duplication of effort.
- To provide consistent messaging to the public on data outputs and scoring.

Meetings were conducted in January, April and May to coordinate and plan for the 2017 field season. Items addressed included assessment parameter reduction and reconfiguration to streamline the process. A significant update was also completed to the Assessment and Training Protocol manual to address on-going questions and provide better guidance to generate more consistent data and reduce the QA/QC process. This process included: 1) Subcommittee report and proposal for parameter reduction and reconfiguration, 2) Discussion on proposed protocol revisions, 3) Agreement by team members on proposed protocol revisions, and 4) Final draft protocol review and discussion. The committee met again in October and December to discuss and review the 2017 field season results, database updates, the Stream Passage Improvement Program, Hydraulic Modeling, and summer 2018 field plans.

Task 3: Collection of stream crossing field data

Based on feedback from local communities (See Task 4), a second field season of stream crossing assessments was conducted as part of this grant. Because the number of stream crossings within a watershed (or town) exceeds the number that can actually be surveyed in a field season, an approach was developed to direct field efforts to those stream crossings that are most likely to be candidates for stream mitigation. In a Geographic Information System (GIS) NHGS conducted an intersection analysis of the most recent road (NHDOT) and stream (NHD Flowline) networks to identify all of the potential stream crossings in New Hampshire. A GIS model was developed to conduct a spatial analysis to identify those crossings that met the following criteria:

- Were within a town that is expected to have large stream impacts within the next 10 years based on development projections.
- Provided critical linkages between conservation parcels.
- On a waterbody that has been designated as important fishery habitat by NH Fish and Game fishery biologists.
- Within an area that has been identified by a town's Hazard Mitigation Plan as a high risk for road flooding.

We have excluded those intersecting large interstate highways that are unsurveyable. Using a targeted survey approach has allowed NHGS and NHDES to maximize the limited time and resources we have during our summer field season to visit those sites that will yield the most usable data.

Four NHDES interns funded by the Wetlands Bureau visited 604 potential stream crossing sites between May 31 and August, 24 2017. The interns identified 33 of these sites as not having a stream crossing present and thus these sites were removed from further analysis and future field visits. In addition, 25 potential crossings were identified as being disconnected from a perennial or intermittent stream, or other permanent waterbody, and classified as stormwater drainage. While these structures are important to document for understanding runoff contributions into local waterbodies; they are not assessed for stream restoration potential. An additional 132 sites were unsurveyable due to landowner restrictions (private property and other site access issues) by documenting these sites in the geodatabase, future visits and duplication of efforts are avoided.

Four hundred and fourteen (414) crossings associated with a perennial or intermittent waterbody (stream, wetland, or surface-water) were assessed for stream and wetland restoration potential. There are a total of 4,153 predicted stream crossings present in the Merrimack River watershed, in the 2017 field season NHDES surveyed 343 (8%) sites, contributing to the overall 3,031 (73%) that have been surveyed in this watershed to date. In the Piscataqua-Salmon Falls River watershed, there are a predicted 2,187stream crossings with the team visiting 118 (5%) in the summer field season contributing to the overall 1,875 (86%) surveyed in this watershed to date.

Table 2: Wetland Crossing Types Surveyed in 2017 by Watershed

Crossing Type	Merrimack	Piscataqua	Other Watersheds to Support Program	Total
Stream	164	37	99	300
Surface	14	8	3	25
Wetland	53	29	7	89
Waterbody Crossings Total	**231**	**74**	**109**	**414**
Drainage	14	8	3	25
Not Surveyable	81	30	21	132
No Crossing Present	17	6	10	33
All Surveys Total	**343**	**118**	**143**	**604**

The NHDES, Geological Survey Department (NHGS), is responsible for the Quality Assurance and Control Program (QAQC) for all stream crossing data submitted to the statewide geodatabase. Other state agencies, Regional Planning Commissions, and contractors submitted an additional 1,124 stream crossing surveys via the online geodatabase for the 2017 field season. Stream staff completed the data review process for 779 crossings and provided an initial screening of 387 of the data records.

In addition, NHDES completed a contractor selection process to conduct approximately and additional 256 stream crossing assessments. A request for qualifications (RFQ) was posted by NHDES to the department web page, and in the Union Leader newspaper on May 22, 2017. A total of 9 proposals were received in response to the RFQ. From that group, six contractors were selected to interview, and four (4) were selected to be retained, for eligibility to be invited to bid on assessment opportunities. The retained contractors were invited to bid on the stream crossing assessment on July 7, 2017. Trout Unlimited was the lowest bid and was chosen to complete the work. Work began on this task in November 2017; however, assessments were suspended as a result of the arrival of winter weather conditions in December. As such, NHDES requested a no-cost time extension so this work could be completed in the spring and summer of 2018. This request was granted by EPA on December 18, 2017. NHDES submitted a revised milestone / schedule to EPA along with the extension request.

Task 5: Culvert prioritization model

Based on feedback from communities and regional planning commissions during several meetings and outreach sessions, it was determined that culvert replacement decisions are based on a variety of factors that may vary from town to town, and region to region. The grantees agreed that it was more important to focus efforts on completing more stream assessments to generate the data necessary for municipalities to prioritize crossings in need of replacement based on comparable information.

Task 6: Update conservation layers -post 2006

NHDES developed a GIS layer of all ARM-funded projects in collaboration with New Hampshire Fish and Game. During development of the spatial layer, all sites were reviewed with the New Hampshire Conservation / Public Lands data layer (CONSNH) provided by NH GRANIT. A comparison of these two layers identified 4 of 60 projects funded through 2015 that were not in the CONSNH layer. NHDES will follow-up with the grantees for these projects to ensure they are included in future updates to the CONSNH data.

Task 7: Conduct outreach of updated information

Outreach continued with presentations conducted to regional planning commission directors to convey information about the stream crossing assessment initiative and its role in the ARM Fund grant process. The outreach committee also developed a brochure outlining the role of stream crossings in public safety, infrastructure resilience and aquatic habitat restoration. NHDOT printed the pamphlet which was made available during outreach sessions by project partners across the state and is also available for download[1]. Initial planning and dates were scheduled for four outreach sessions to be completed in the first quarter of 2018.

Task 8: Cross training permitting staff

During the spring of 2017 the Wetlands Bureau provided training on stream crossings to all technical permitting and alteration of terrain staff. NHDES wetland permitting and mitigation staff provided classroom style training on "Stream Crossings – Level 1" which included an overview of terms, basic stream functions, goals of a proper crossing, data collection, rules, and putting it all together. Dr. Shane Csiki, fluvial geomorphologist with the NHDES Geological Survey provided training on "Geomorphic Compatibility and NHGS Stream Crossing Assessments." NH Fish and Game Department fish habitat biologist, John Magee provided training on "Fish Passage at Stream Crossings." These trainings fostered excellent discussions

[1] https://www.des.nh.gov/organization/commissioner/pip/publications/documents/stream-crossings.pdf

among staff and the presenters. Follow-up competency quizzes of the attendees ensured consistent understanding and interpretation of the materials provided. NHDES supervisors and managers noted increased confidence and consistent interpretation of terms and rules following the training. Follow-up field stream assessment trainings were also held for key wetland bureau technical staff. Future training and discussions on review of work products under the EPA grant are being planned for 2018.

During the summer of 2017, four wetlands and shoreland staff were field trained on the NH Stream Crossing Protocol by NHGS to better understand what data is collected, and how this data may be used during application review and wetlands permitting. This allowed staff to receive field training on parameters they often review during permit or compliance review.

A summary of the trainings are listed in Table 3 below.

Table 3: Stream Crossing Trainings in 2017

Date	Topic	Presenters
02/23/2017	Stream Crossings – Level 1	Karl Benedict, Mindy Bubier, Stefanie Giallongo
03/16/2017	Geomorphology and Aquatic Organism Passage	Dr. Shane Csiki (Geology Unit), John Magee (NH Fish & Game)
03/20/2017	Advanced – Sizing of Crossings	Dr. Tom Ballestero (UNH)

2017 Grant (Track 2): Enhancing Wetland Mapping and Assessment Tools for Wetlands Protection in New Hampshire

Task 1: Update and enhance NWI maps and publish through USFWS and NH GRANIT (Years 1 and 2)

NHDES has been working with a potential NWI mapping contractor to identify spatial coverage and deliverables. The original grant workplan included in its scope the *statewide* update of NWI (the remaining area of the state that had not been updated under the previous grant). With the award of reduced funding, the work plan was scaled back to less-than-entire coverage of the state. However, with contributions from two other water programs and additional funding by the wetlands program, NHDES intends to update the remainder of the state, which is above and beyond the scope of the workplan. Working through the technical aspects and costs has extended the process. We expect to have approval and start in May 2018.

Task 2: Develop High Value Wetlands Criteria, Map High value wetlands and Scope update of Water Quality and Wetland Assessment base layer (Year 2)

Baseline scientific literature, NHANRS report review, legislative flood study commission, and threats to sensitive wetland resources were carried out. In 2018, NHDES will identify scientists and experts to serve on the Steering committee to review proposed criteria.

Task 3 (NHB): Evaluate and document outdated exemplary wetland systems so they can be reliably used for environmental reviews and conservation planning

NHB compiled a draft list for the remaining least-impacted wetland systems with overall ranks of A, A-, or B+ as evaluated using L2 EIA during Wetland Program Development Grant projects in 2014, 2015, and 2017. These ranks require reevaluation using current L2 EIA standards. Once reevaluated, we will then search for digital and hardcopy plot data associated with examples of the least-impacted wetland systems.

Table 4: Draft list of Least-Impacted Wetland Systems with Rank As Evaluated Using L2 EIA During Wetland Program Development Grant Projects in 2014, 2015, and 2017. These ranks require reevaluation using current L2 EIA standards. Bill Nichols, NH Natural Heritage Bureau

System Survey Site	Rank	EO ID	Location	Comments
Alpine / Subalpine Bog System				
Cannon Mountain	A	5214	Franconia	
Bald Cap Bog	A-	67	Success	
Imp Mountain	A-	48	Beans Purchase	
Kenduskeag Trail East (Condition B)	A-	4706	Shelburne	
Mt. Eisenhower	B+	4435	Chandlers Purchase	
Mt. Jackson, North of (Condition B)	B+	1858	Beans Grant	
Mt. Moosilauke	B+	3080	Benton	
Mt. Moriah (Condition B)	B+	478	Beans Purchase	
Mt. Success (Condition B)	B+	950	Success	
North Bald Cap Fen	B+	1742	Success	
Oakes Gulf	B+	1914	Sargents Purchase	
Shelburne-Moriah Mountain (Condition B)	B+	5383	Shelburne	
Brackish Riverbank Marsh System				
All examples with no better than C rank after being evaluated using L2 EIA.				
Coastal Salt Pond Marsh System				
Odiorne Point State Park (Condition C)	B-	270	Rye	
High-Gradient Rocky Riverbank System				
Hell Gate	AB	5694	Atkinson, Gilmanton	
Wild River	AB	4679	Beans Purchase	
Diamond Gorge	B+	4441	Second College	
Peabody River (Condition B)	B+	273	Gorham	
Moose River, Gorham (Condition B)	B	3839	Gorham	
Wild Ammonoosuc River (Condition B)	B	4108	Landaff	
Blackwater River (Condition B based on floodplain rank)	B+	113	Salisbury	Site newly added to list during search for existing plot data.
Bog Brook	??	5225	Cambridge	Reclassified from an exemplary low-gradient silty-sandy riverbank system to an exemplary drainage marsh - shrub swamp system but the silty-sandy riverbank system may be exemplary here as well – SURVEY.
Mollidgewock Brook	??	5227	Errol	Reclassified from an exemplary low-gradient silty-sandy riverbank system to an exemplary drainage marsh - shrub swamp system but the silty-sandy riverbank system may be exemplary here as well.
Pine River	AB	7811	Effingham	
Gordon Pond Brook	A	1629	Woodstock	
Albany Intervale	B+	3131	Albany	
Bog Branch	B+	5681	Pittsburg Clarksville	Site newly added to list during search for existing plot data.
Indian River	Likely B+ or better		Second College	2017: Check for plot data associated with the riverbank system; this system would have a rank of B+ or better.

System Survey Site	Rank	EO ID	Location	Comments
Dead Diamond River	NR (likely B+ or better)	5696	Second College	2017: Check for plot data associated with the riverbank system; this system would have a rank of B+ or better. If lacking data, see montane/near-boreal floodplain system folder. 2015: This system was originally entered into the database as an upper perennial riparian system, which was then crosswalked to the moderate-gradient sandy-cobbly riverbank system. As it is mapped, this EO likely includes components of three different systems: 1) drainage marsh - shrub swamp system; 2) montane/near-boreal floodplain system; and 3) moderate-gradient sandy-cobbly riverbank system. It is unclear at this time which of these systems is exemplary, and will require research and potentially field work to answer this question.
Pine River, East of Lost Ponds	Likely B	NR	Ossipee	Site newly added to list during search for existing plot data. The exemplary hemlock - cinnamon fern forest surrounding the system has a rank of B.
Swift Diamond River	NR (likely B+ or better)	5695	Second College	2017: Check for plot data associated with the riverbank system; this system would have a rank of B+ or better. 2015: This system was originally entered into the database as an upper perennial riparian system, which was then crosswalked to the moderate-gradient sandy-cobbly riverbank system. As it is mapped, this EO likely includes components of three different systems: 1) drainage marsh - shrub swamp system; 2) montane/near-boreal floodplain system; and 3) moderate-gradient sandy-cobbly riverbank system. It is unclear at this time which of these systems is exemplary, and will require research and potentially field work to answer this question.
Ammonoosuc Floodplain Barren and Esker (Condition B)	B	4323	Carroll	
Ashuelot River (Condition Probably B)	Probabl y B		Surry	Site newly added to list during search for existing plot data.
Hart Island (Condition BC)	B	8789	Plainfield	
Plainfield Sanctuary, West of (Condition AB)	B	8825	Plainfield	
Big Bend (Condition B)	B+	490	Bartlett	Saco River.
Bog Brook	B+	5681	Pittsburg/Clarksville	Added later in process; likely best example of community type in NH.
Dead Diamond River	B+	5697	Second College	
Magalloway River (Condition B)	B	526	Wentworths Location	Portions of this EO supporting balsam fir floodplain/silt plain were moved here from the major river silver maple floodplain system type. Evaluate to determine if the silver maple - false nettle - sensitive fern floodplain forest belongs here as well.
Indian Stream (Condition B-)	B	20	Pittsburg	Condition B- due to logging history in lowland area, inferred impact of Indian Stream Road near east side of floodplain, and managed water levels (to a degree) associated with concrete dam 800 m upstream to NW. This system EO includes the balsam fir floodplain/silt plain EO (1489).
Patterned Fen System				
South Bay Bog	A	553	Pittsburg	
Borderline Fen	A-	5182	Errol	
East Inlet	A-	3329	Pittsburg	

System Survey Site	Rank	EO ID	Location	Comments
Sand Plain Basin Marsh System				
Sugarloaf	A-	4888	Albany	
Shingle Pond	AB	4028	Chatham	
Hart Ledge West (Condition B)	B+	2950	Harts Location	
Bragdon Ledge (Condition AB)	B	956	Albany	
Duck Pond (Condition B)	B	3145	Merrimack	
Maddening Ponds, North of (Condition B)	B	7796	New Boston	
Grassy Pond (condition B)	B-	4365	Litchfield	
Willand Pond Basin Marsh (Condition Unknown)	B-	5875	Somersworth	
Sandy Pond Shore System				
Gentian Pond	AB	3761	Success	This is close to North Bald Cap Fen. Resurvey both?
Ossipee Lake Beach (Condition BC)	B	366	Freedom	
Shaw Pond (Condition B)	B	5877	Freedom	
Willand Pond (Condition BC)	B	5876	Somersworth	
Salt Marsh System				
All examples with no better than C rank after being evaluated using L2 EIA.				For plot data to develop "hypothetical" FQA thresholds.
Berry's Brook (Condition C)	C+	7620	Rye	
Great Bay (Condition C)	C+	7606	Greenland	
Hampton Harbor (Condition C-)	C+	7614	Hampton	

Task 4 (NHB): Develop thresholds for wetland systems of high ecological value using vegetation data (Year 2)

NHB compiled a draft list for the remaining least-impacted wetland systems with overall ranks of A, A-, or B+ as evaluated using L2 EIA during earlier Wetland Program Development Grant projects. These ranks require reevaluation using current L2 EIA standards. Once reevaluated, we will then search for digital and hardcopy plot data associated with examples of the least-impacted wetland systems. The NHDES-DNCR Memorandum of Agreement to provide funds to NHB is anticipated to be reviewed and approved by Governor and the Executive Council in April 2018.

Task 5: Grant administration, Quality Assurance, Outreach and Reporting (ongoing)

Given the longer timeframe needed (than originally identified) to update the NWI maps, NHDES anticipates requesting a no-cost time extension in May 2018.

PERMITTING ACTIVITIES

Applications Received

The number of standard dredge and fill permit applications received by the Wetlands Bureau has remained relatively stable. In 2017, the Wetlands Bureau received approximately 2% less standard dredge and fill permits than in 2016. This is illustrated in Table 5 and Figure 2.

Table 5: 10-Year Trend of Wetland Standard Dredge and Fill Applications Received (2008-2017)

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
602	539	514	485	501	501	581	527	581	572

Overall in 2017, the Wetlands Bureau received 6% less notifications and applications than in 2016. This is illustrated in Table 6 below.

Table 6: 10-Year Trend of All Wetland Permit Applications and Notifications Received (2008-2017)

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2,109	2,006	2,383	2,287	2,158	2,159	2,255	2,048	2,211	2,075

The number of Standard Shoreland permit applications received (including notifications) by the Wetlands Bureau has fluctuated over time. In 2017, the Wetlands Bureau received 1% less standard Shoreland permit applications than in 2016. This is illustrated in Table 7 and Figure 3.

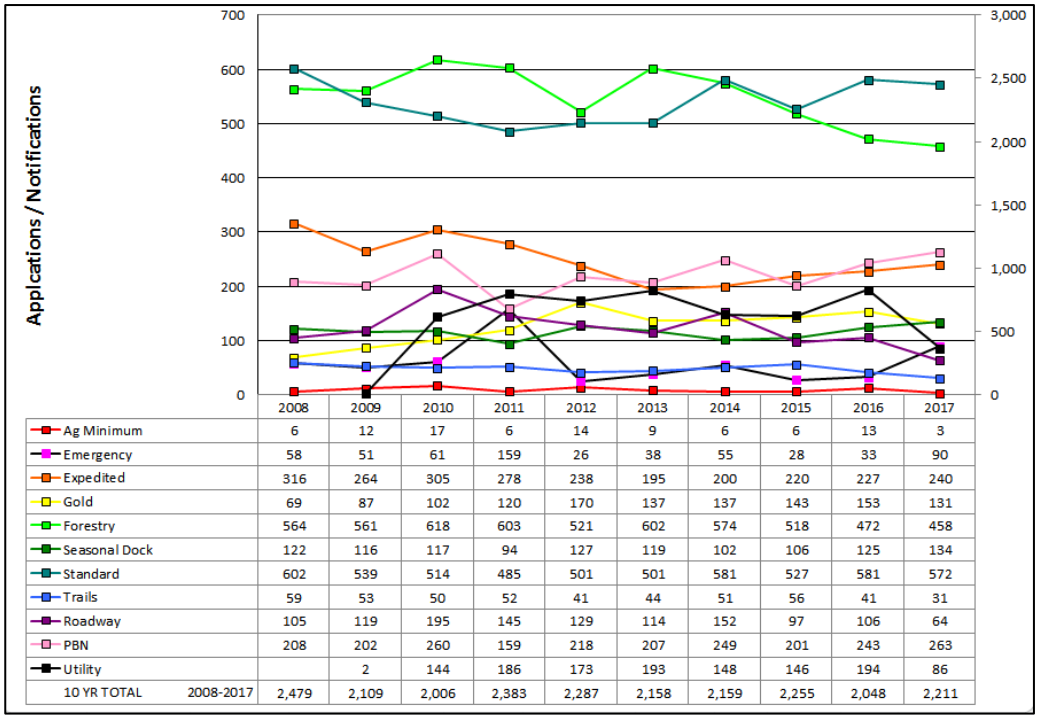
Table 7: 10-Year Trend of Standard Shoreland Permit Applications Received (2008 – 2017)

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
381	797	817	626	466	546	518	605	621	613

Similarly, the total number of all Shoreland permit applications received (including notifications) by the Wetlands Bureau also fluctuated. In 2017, the Wetlands Bureau received 7% more Shoreland applications than in 2016. This is illustrated in Table 8 and Figure 3.

Table 8: 10-Year Trend of All Shoreland Permit Applications Received (2008 – 2017)

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
449	802	823	781	915	1075	1086	1196	1167	1,250



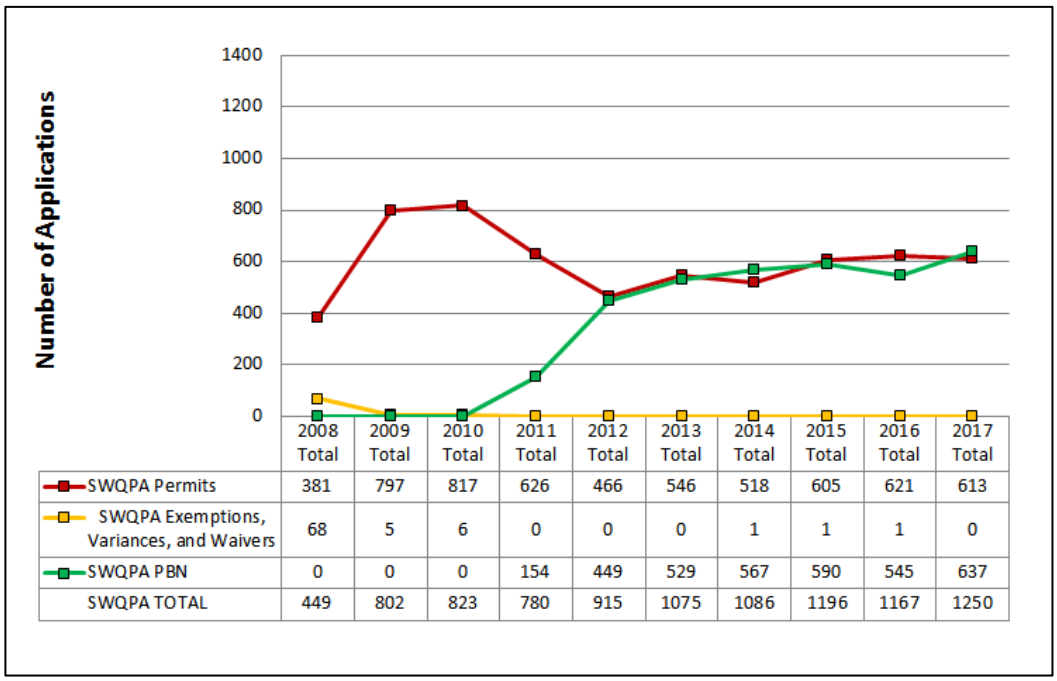
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Ag Minimum	6	12	17	6	14	9	6	6	13	3
Emergency	58	51	61	159	26	38	55	28	33	90
Expedited	316	264	305	278	238	195	200	220	227	240
Gold	69	87	102	120	170	137	137	143	153	131
Forestry	564	561	618	603	521	602	574	518	472	458
Seasonal Dock	122	116	117	94	127	119	102	106	125	134
Standard	602	539	514	485	501	501	581	527	581	572
Trails	59	53	50	52	41	44	51	56	41	31
Roadway	105	119	195	145	129	114	152	97	106	64
PBN	208	202	260	159	218	207	249	201	243	263
Utility		2	144	186	173	193	148	146	194	86
10 YR TOTAL 2008-2017	2,479	2,109	2,006	2,383	2,287	2,158	2,159	2,255	2,048	2,211

Figure 2: 10-Year Trend of All Wetland Permit Applications Received (2008 – 2017)

Review of the 10-year trend of all wetland applications over the last eight years reveals that the total applications all 10% of the total. Within the last year that was a 10% increase in applications overall. Because of two significant storm events in July and October, permit staff was all hands on deck providing emergency response and follow-up. Emergency authorizations increased by almost three -fold from 33 to 90 authorizations. Additionally, NHDES coordinated with NHDOT on the many bridge repairs, road washouts, and other related work. This was the result of two significant storm events in 2017.

Standard dredge and fill applications numbers have ranged from a high of 602 to a low of 485 in the last 10 years. Last year NHDES received 572 standard applications.

Figure 3 illustrates the nine-year trend for three categories of applications. In 2011, the Wetlands Bureau stopped issuing Shoreland exemptions, variances, and waivers per changes in the statute.



	2008 Total	2009 Total	2010 Total	2011 Total	2012 Total	2013 Total	2014 Total	2015 Total	2016 Total	2017 Total
SWQPA Permits	381	797	817	626	466	546	518	605	621	613
SWQPA Exemptions, Variances, and Waivers	68	5	6	0	0	0	1	1	1	0
SWQPA PBN	0	0	0	154	449	529	567	590	545	637
SWQPA TOTAL	449	802	823	780	915	1075	1086	1196	1167	1250

Figure 3: 10-Year Trend of All Shoreland Permits Received (2008 – 2017)

Pre-Application Meetings

The Wetlands Bureau provides technical assistance to applicants by providing pre-application review of proposed projects. The pre-application review process accomplishes the following:

- Provides clear and consistent direction to applicants.
- Improves communications between state / federal agencies and local entities.
- Ensures openness of the process.
- Reduces rework by all parties saving time and money.
- Promotes environmentally-sensitive land use planning.
- Provides an efficient process that serves as an incentive for applicants to pursue "environmentally-superior" designs.

Over the last year, the technical staff participated in approximately 549 pre-application meetings. Of these 549 meetings, 55 were associated with NHDOT projects.

Table 9 illustrates the amount of impacts permitted based on project type for 2017. Over the last two years there was a significant increase in impact in the percentage of road access projects (19 to 32%) and an increase in lot development up 8% (an increase from 11 to 19%). Restoration and dredge projects have decreased. Overall NHDES permitted a significant increase in wetland impacts from 50 acres to 72 acres.

Table 9: Permitted Permanent Wetland Impacts by Project Type for Calendar Years 2016 and 2017

Project Type	2016 Acres	2016 Square Feet	Project Type Percent	2017 Acres	2017 Square Feet	Project Type Percent
Restoration / Enhancement	17.9	777,697*	36%	15.1	658,215	21%
Maintenance						
Dredge	12.2	531,355**	24%	10.4	455,038	14%
Road Access/ Bridge/ Stream Crossings	9.4	407,351	19%	22.9	997,697	**32%**
Lot Development/ Commercial / Residential	5.5	239,310	11%	13.8	602,089	19%
Bank Stabilization	2.5	108.912	5%	1.8	77,310	2%
Other / Fill	1.7	72,202	3.34%	7.0	306,591	10%
Shoreline Structures	1.2	51,286	2%	1.4	59,677	2%
Total	**50.4**	**2,079,310**	**100%**	**72.4**	**3,467,100**	**100%**

The total permitted impacts by wetland type are shown in Figure 4. Non-tidal wetlands are subject to the greatest loss at 44.7 acres or 76%. The tidal impacts are the lowest at .2 acre of the permitted impacts. Surface water impacts are 24% of the total impacts.

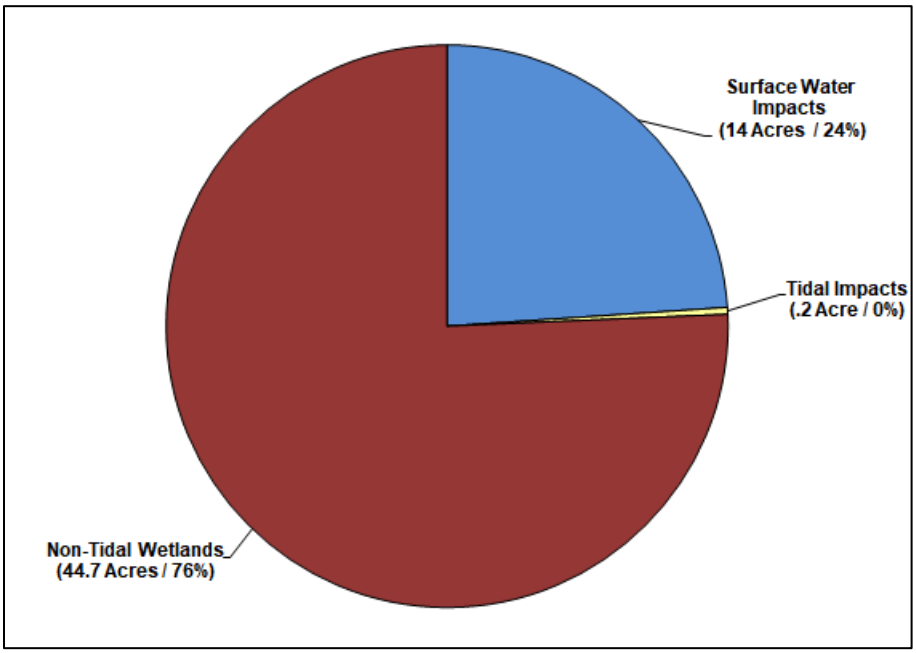


Figure 4: Permitted Wetland Impacts by Wetland Type for 2017

Figure 5 illustrates permanent impacts, by Cowardin wetland type, which required payment into the ARM Fund in 2017. The total amount of permanent wetland impacts which required mitigation was 7.5 acres, down from 13.4 acres in 2016[2]. In addition, there were approximately 12.8 acres of temporary impacts and 4.31 acres of conversion impacts associated with projects that paid into the ARM Fund. These projects are generally linear utility upgrade projects that use matting for access across wetlands or convert forested wetlands to scrub-shrub wetlands. In addition, one vernal pool, 923 linear feet of stream bank or channel, 1.0 acre of riparian buffer and 0.9 acre of vernal pool buffer were impacted.

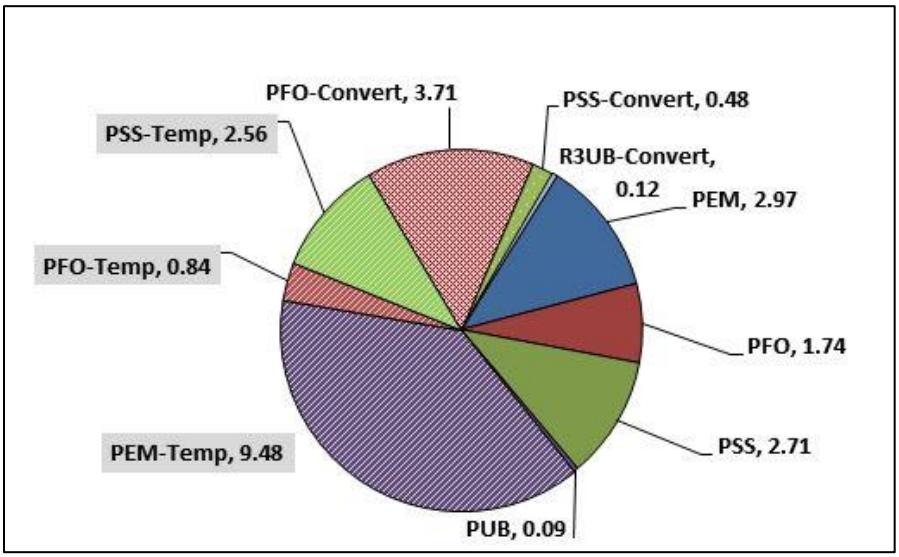


Figure 5: Types of Wetland Impacts in Acres That Required Payment into the ARM Fund in 2017

Figure 6 illustrates the large percentage of municipal and highway projects which contribute to over half of the ARM Fund payments. (Impacts depicted in acres.)

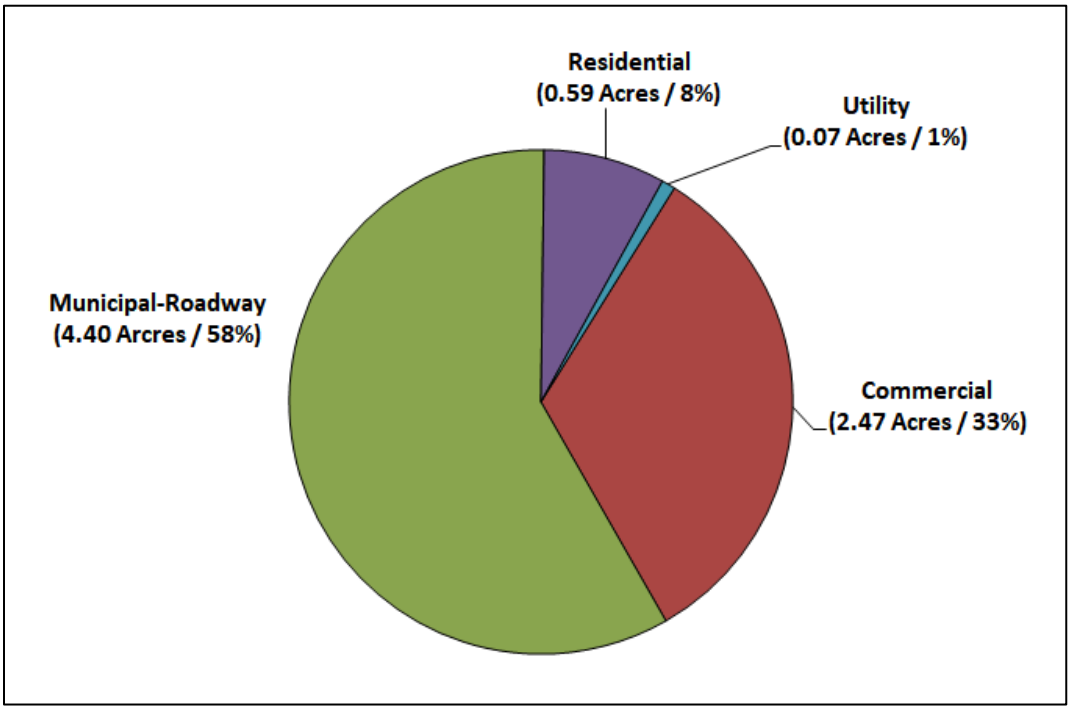


Figure 6: Summary of 2017 Wetland Impacts Requiring ARM Fund Payment by Project Type

Permit Program Improvements

In 2017, the Wetlands Bureau continued to hold monthly permit meetings to review permit files and to provide presentations on new guidance and tools. The Wetlands Bureau technical staff participated in 12 cross-trainings. These trainings covered topics on drafting findings, permit conditions, stream bank stabilization and bioengineering, stream crossing designs and standards, aquatic organism passage, mitigation, Natural Heritage Bureau (NHB) environmental review process, designated rivers review process, individual plan development, and LRM website features. Most of these trainings included required competency quizzes. These cross-trainings fostered consistency in interpretations among supervisors and staff, and the training PowerPoint library and associated quizzes are now used to train incoming staff.

Additionally, over the last year many key permit staff were involved in the review of draft wetland rules. Staff reviewed proposed definitions, standards and compared internal drafts with current practice and policy. Staff also selected original and final permit plan examples used to illustrate project by project avoidance and minimization measures for a new BMP to support the draft rules.

The conversion to a new database increased the functionality in the import and export of information and reports which eliminated the previously-required scanning steps for documents and permits (see Program Improvements section for more information). With the new online permit questionnaire tool, NHDES staff are now able to email a link to applicants along with a PDF of the permit. Review of the incoming questionnaire responses has already identified suggestions for website improvement.

With the increasing number of complex and large scale projects, the Wetlands Bureau started a permit team approach. The goal of the team approach is to ensure that complex and or large-scale application and plan reviews are conducted by a team of reviewers. On one complex project a permit team was comprised of an engineer, a wetland scientist, biologist, a fluvial geomorphologist, and a manager.

COMPLIANCE ACTIVITIES

Complaints Received

In 2017, the Wetlands Bureau received 214 written complaints. Approximately half were for alleged violations of wetlands (RSA 482-A), almost a quarter for Shoreland (SWQPA), and the balance were for other alleged violations of dock, shoreline, alteration of terrain or water quality laws.

Of the 150 complaints alleging violations of RSA 482-A, 103 (48.1 percent) related to the dredge / fill of wetlands, 27 complaints (12.6%) related to docking structures, 13 complaints (6.1%) related to beaches or retaining walls, and five complaints (2.3%) related to forestry and logging operations. Table 10 and Figure 7, below, includes a breakdown by percentage:

Table 10: Number and Percentage of Complaints by Type for Calendar Year 2017

Category	Description	Number	Percentage
WET	Wetlands (Dredge and Fill)	103	48.13%
SWQPA	Shoreland Water Quality Protection Act	48	22.43%
DOCK	Dock	27	12.62%
AOT	Alteration of Terrain	16	7.48%
SHORE	Shoreline: Beaches, Retaining Walls	13	6.07%
FORESTRY	Forestry / Logging	05	2.34%
WQ	Water Quality	02	0.93%
		214	**100%**

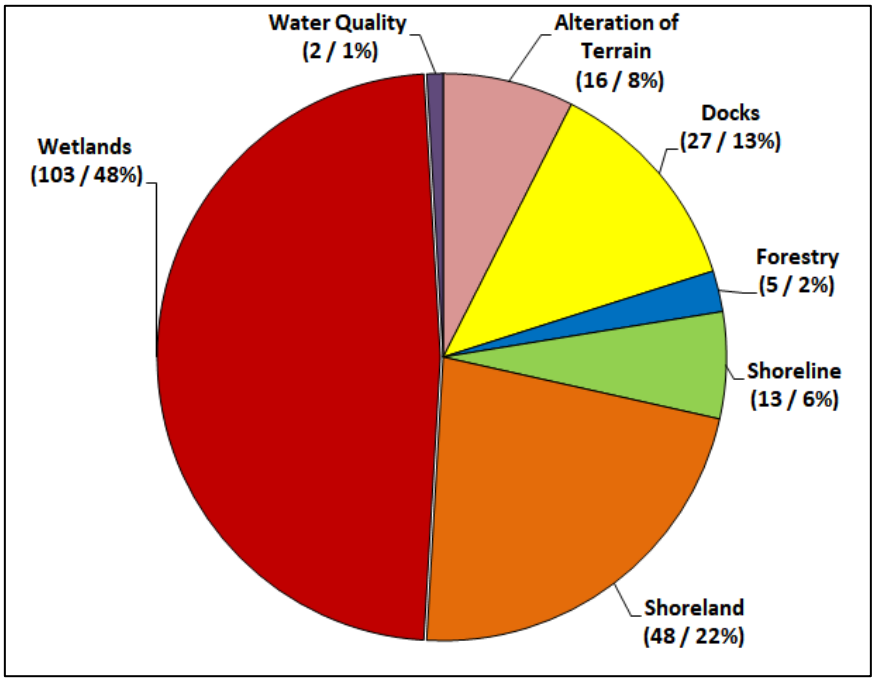


Figure 7: Number and Percent of Complaints by Type for Calendar Year 2017

The number of complaints received over the past 10 years decreased from 2008 through 2010 but since has remained relatively stable over the past seven years as depicted in Figure 8 below.

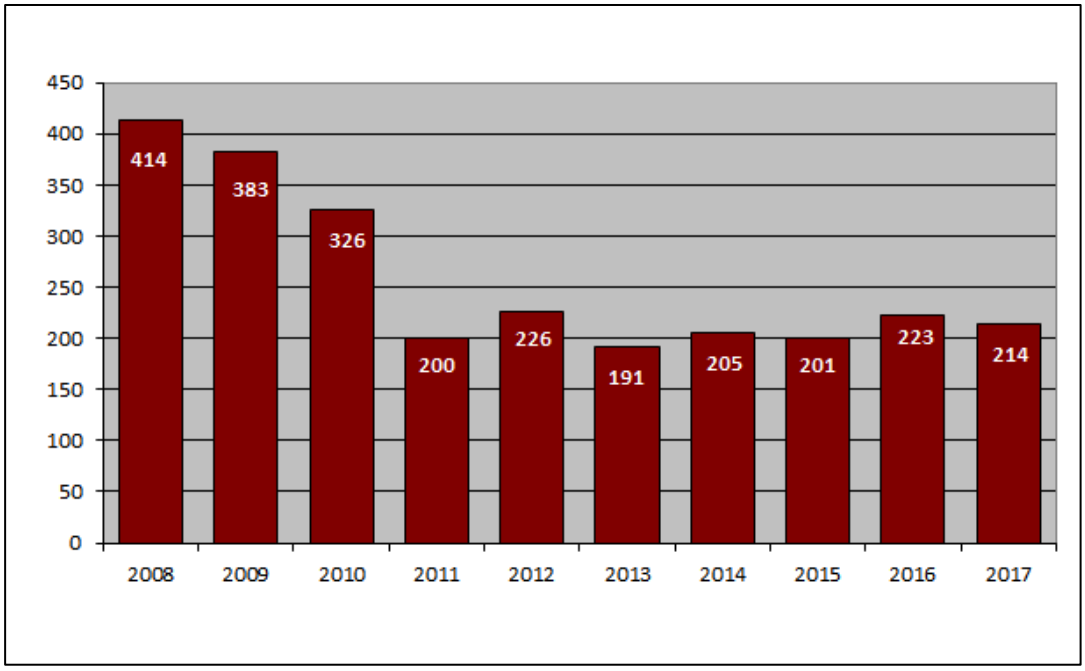


Figure 8: **10-Year Trend of Number of Complaints Received (2008 - 2017)**

The number of complaints received in 2017 by month tends to follow the seasons. Complaints received typically increase in the spring after snowmelt when construction season begins, peak during the summer months, subside during the autumn, and drop off significantly over the winter months as depicted in Figure 9 below.

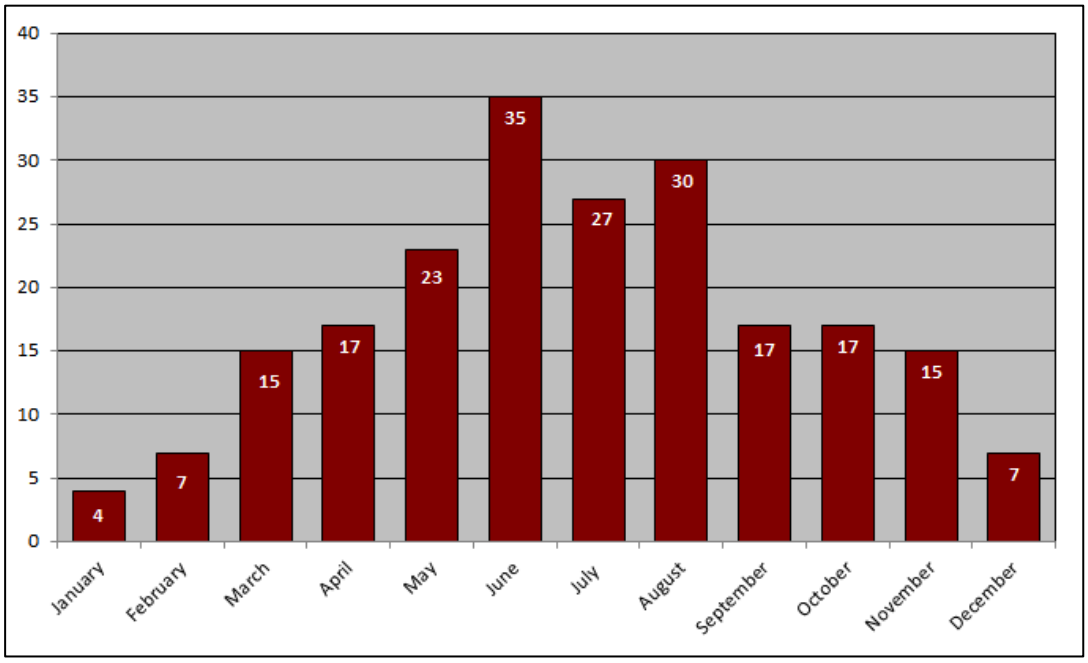


Figure 9: **Complaints Received in 2017 by Month (Total: 214)**

The type of complaint also tends to follow the seasons with wetlands (WET) complaints peaking in June, shoreland (SWQPA) complaints peaking in August, and dock (DOCK) complaints peaking in July. Alteration of Terrain (AOT) complaints peaked in March and August, while shoreline (beaches, retaining walls / SHORE) complaints also peaking in June and July. Water quality (WQ) and forestry complaints typically follow intense weather events. This is depicted in Figure 10 below.

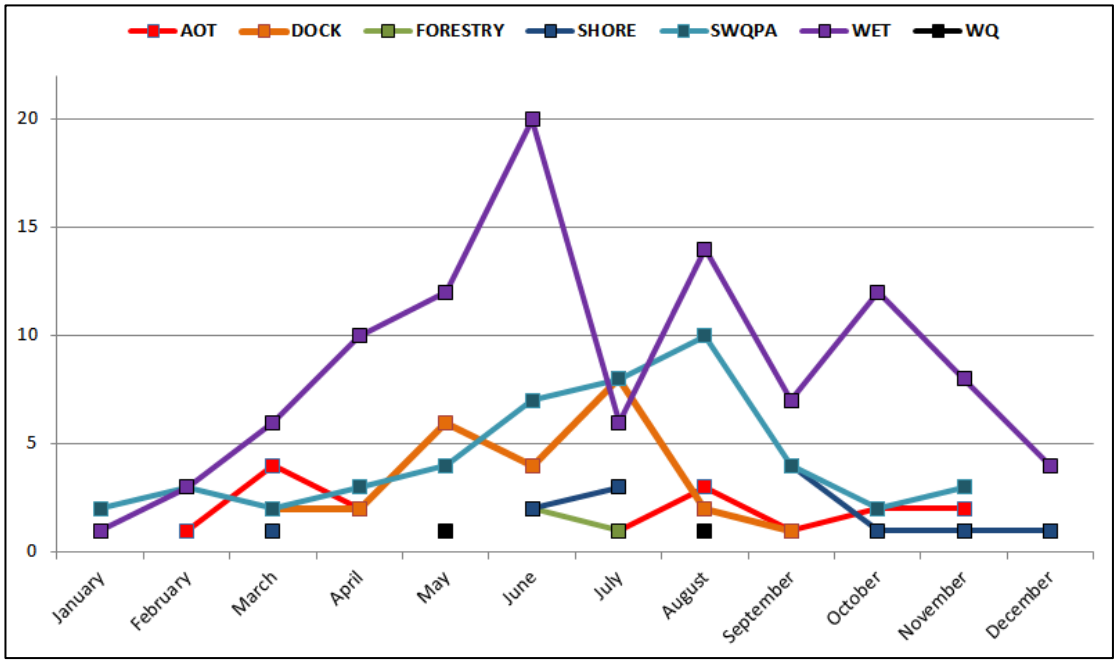


Figure 10: **Complaints Received in 2017 by Type and by Month (Total: 214)**

Compliance Actions Taken

When possible, the Wetlands Bureau attempts to resolve minimal violations during or immediately following a site inspection through informal means by issuing an on-site restoration request or by issuing a Letter of Deficiency. In cases where the impact is larger or more environmentally damaging, where the violator has a prior enforcement history, or if the violator is unwilling to work cooperatively with the Wetlands Bureau to correct the deficiencies, more formal action(s) may be taken in the form of an Administrative Order, referral to the Department of Justice, or imposition of administrative or civil penalties. A 10-year trend of wetland compliance actions by type is illustrated in Table 11.

Table 11: 10-Year Trend of Wetland Compliance Action by Type (2008-2017)

Compliance Action Type	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Complaints Received	414	383	326	200	226	191	205	201	223	214
Informal Actions / Requests	65	50	41	40	20	22	265	337	276	273
Notices of Past Violations	06	19	05	12	07	58	49	20	07	07
Letters of Deficiency	99	92	55	28	34	27	44	42	52	59
Proposed Administrative Fines	05	07	11	09	04	01	03	02	03	-
Administrative Orders	16	19	14	18	04	03	17	06	03	07
Referrals to the Department of Justice	07	06	05	03	01	02	05	09	05	03
TOTALS	**612**	**576**	**457**	**310**	**296**	**304**	**588**	**617**	**559**	**563**

The Wetlands Bureau will also seek fines consistent with its statutory authority and the Compliance Assurance Response Policy (CARP). In 2017, the Wetlands Bureau collected approximately $29,250 in administrative fines and civil penalties. The reduction in money collected can be attributed to receiving fewer complaints than in the past and a reduction in compliance staff to perform inspections of permitted sites. Civil penalties and administrative fines collected for violations of RSA 482-A are illustrated in Figure 11.

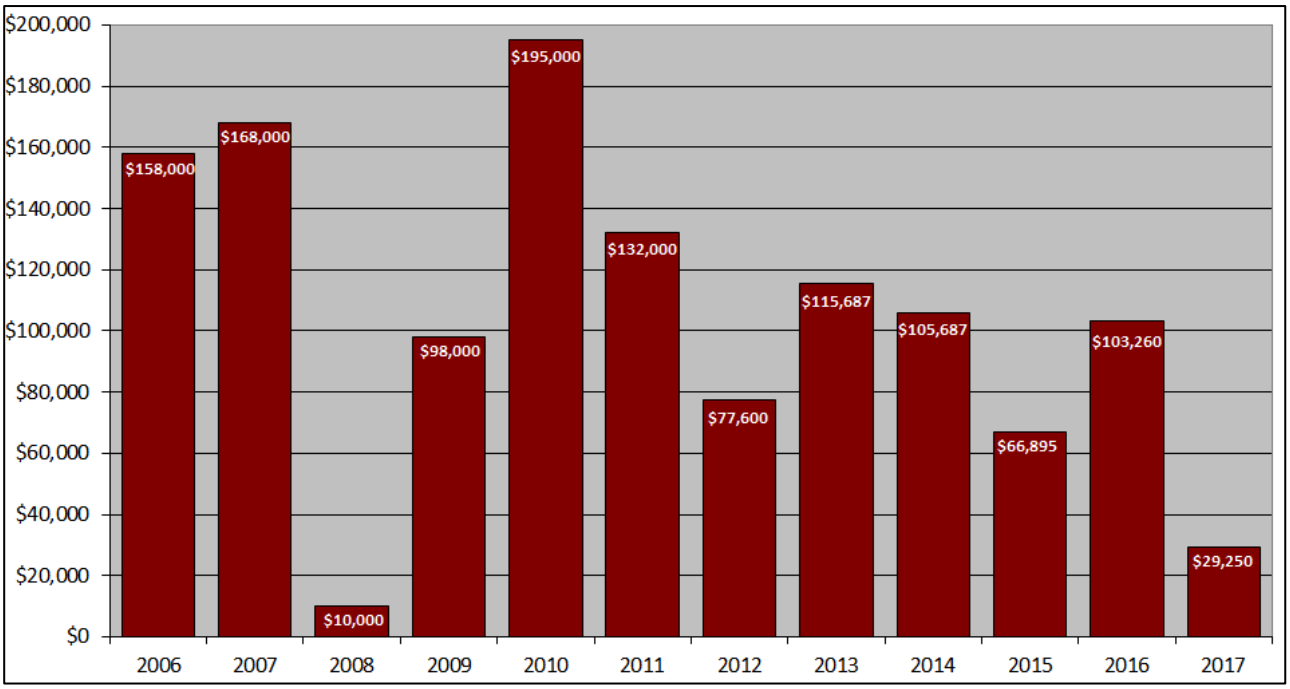


Figure 11: Civil Penalties and Administrative Fines Collected for Violations of RSA 482-A

2017 Permit Compliance Initiative

The compliance section has historically relied on the public to report suspected wetland violations. This "complaint-based" system, while effective, has resulted in a "reactive" approach to compliance. In response to new initiatives within the Land Resources Management Program, the compliance section has begun to conduct inspections of various permitted projects in 2016. Conducting field inspections of permitted projects allows NHDES regional compliance inspectors to establish and maintain a stronger field presence with a more proactive approach, ensuring that projects adhere to the conditions specified in the corresponding permit.

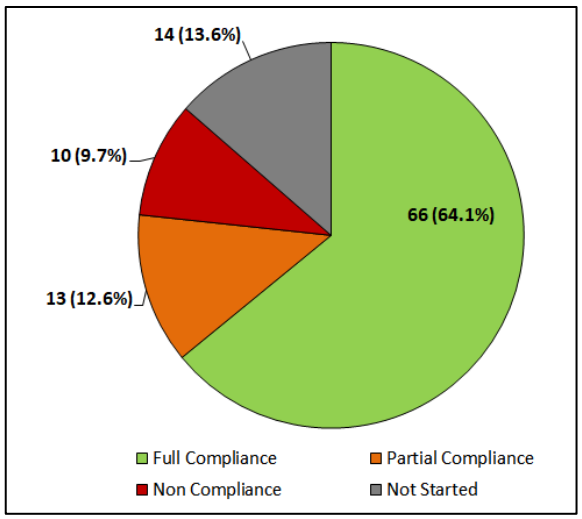
Thus, in addition to performing inspections of files associated with complaints, in 2017 the Alteration of Terrain and Wetlands programs conducted inspections of permitted projects. The purpose of these inspections was to ensure compliance with permits and permit conditions, perform inspections that are not solely complaint `based, and respond to stakeholder comments. A cross-section of permit types (notifications, standards, etc.) and towns were selected. During the inspections, staff used program-specific checklists to determine whether the completed projects were consistent with the approved plan, consistent with permit conditions, and therefore in compliance with the permit.

One staff and two interns performed 103 inspections of approved / issued Wetlands notifications / permits. Of those 103, 66 (64.1%) were in full compliance, 13 (12.6%) were in partial compliance, 10 (9.7%) were in non-compliance, and 14 projects (13.6%) had not been started.

Two interns also performed 28 inspections of approved / issued Shoreland notifications / permits. Of those 28, 17 (60.7%) were in full compliance, 6 (21.4%) were in partial compliance, 3 (10.7%) were in non-compliance, and 2 projects (7.1%).

Lastly, two interns performed 119 inspections of Alteration of Terrain permits. Of those 119 inspections, 83 (69.7%) were in full compliance, 19 (16.0%) were in partial compliance, 0 (0.0%) were in non-compliance, and 17 projects (14.3%) were not started.

In total, 250 projects associated with Wetlands, Shoreland, and Alteration of Terrain permits were inspected in 2017 to which 166 (66.4%) were in full compliance, 38 (15.2%) were in partial compliance, 13 (5.2%) were in non-compliance, and 33 projects (13.2%) were not started.



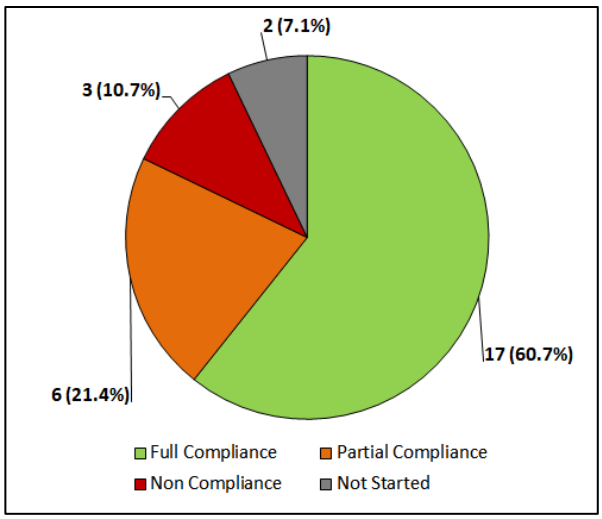
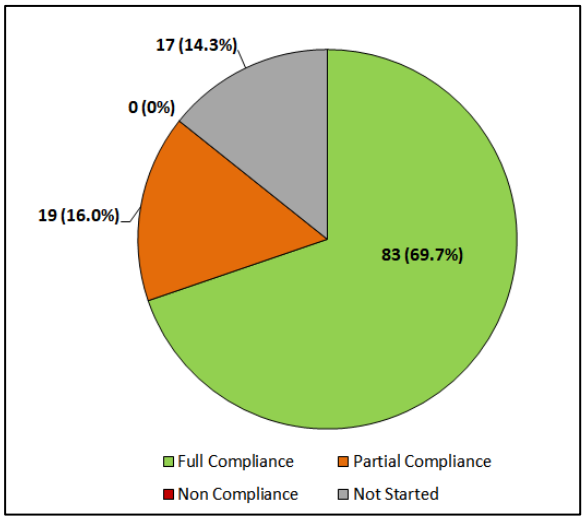


Figure 12 (Above Left): Summary of 2017 Wetland Compliance Inspections of Permitted Projects (With Compliance Status). Figure 13 (Above Right): Summary of 2017 Shoreland Compliance Inspections of Permitted Projects (With Compliance Status).



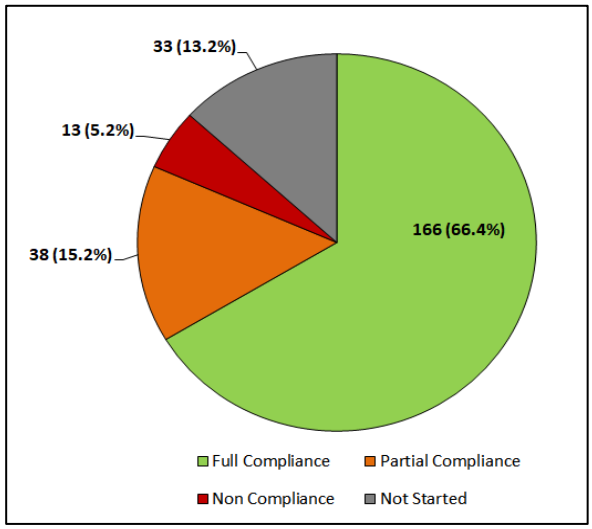


Figure 14 (Above Left): Summary of 2017 Alteration of Terrain Compliance Inspections of Permitted Projects (With Compliance Status). Figure 15 (Above Right): Summary of All Compliance Inspections of Permitted Projects (Wetland, Shoreland, Alteration of Terrain) (With Compliance Status).

AQUATIC RESOURCE MITIGATION FUND PROGRAM

Since the ARM Fund was established in 2006, 156 applicants have used this form of compensatory mitigation and these funds have been used to support projects that restore, enhance, and preserve aquatic resources and associated upland buffers. The program has been very successful for grant applicants and has resulted in approximately 16,026 acres of land conservation, 100 acres of wetland restoration / enhancement, 15 acres of tidal restoration/enhancement, and approximately 50 miles of stream passage improvements. The ARM Fund in-lieu fee option has become a good option for applicants needing to provide compensatory mitigation. The total funds collected since the program was established totals $15,776,000 and has funded 80 projects.

In State FY 2017 (07/01/2016 through 06/30/2017), 20 permits involving a payment were issued that resulted in 13 acres of wetland loss, 853 linear feet of stream loss, and 12.5 acres of temporary impacts including secondary impacts due to conversion of forest wetlands to emergent or scrub shrub wetlands. The ARM Fund received approximately $1.8 million in the payments collected. During this time frame, ARM Fund grants were awarded to restore 11 acres of floodplain forest wetlands, provide 18.4 miles of restored stream connectivity, and preserve an additional 3,751 acres. For the total funds collected in fiscal year 2017, over $8.7 million of additional funds were leveraged to complete the grant projects.

The 2012 Instrument establishes guidelines, responsibilities, and standards for the establishment, use, operation and maintenance of the ARM Fund. The signatories to this instrument recognized that cooperation between and among the Army Corps, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and NHDES is critical to the continued development of a high-quality mitigation program and share a commitment to continue efforts that have been on-going since adoption of the ARM Fund program. As a five year update, the Instrument was amended and signed. A five year status and trends summary is also being prepared and will be available on the web page upon completion. A 10- year amended Instrument will be formally updated in 2022.

Program Improvements (July 1, 2016 through June 30, 2017)

The 2016 ARM Fund grant round resulted in 20 awards to projects ranging from land protection, culvert replacements and one dam removal. During State fiscal year 2016-2017, the program did not advertise grant funds therefore there are no updated numbers for ARM Fund wetland conservation and restoration. During the fiscal year a number of 2015 grants were still in progress, and several restoration projects from previous years were being completed. The Site Selection Committee decided not to hold a 2017 grant round in order for funds to accumulate and focus on several program improvement initiatives to enhance, update and streamline the grant program.

In addition to completing outstanding projects and initiating a number of program improvements, the Wetlands Bureau was also awarded a program development grant in 2015 which focused on enhancing our knowledge, resources and outreach materials relative to stream crossings. This work was under way in 2017 and supported several of the program initiatives which included:

- Increasing data and knowledge regarding undersized stream crossings and their impact on the environment including enhancing field data relative to aquatic organism passage and geomorphic compatibility, coordinating with the New Hampshire Fish and Game Department regarding new GIS

data layers related to aquatic organism habitat priority areas, and utilizing Flood Risk GIS data developed from hazard mitigation plans compiled by the New Hampshire Geologic Survey.

- Working with the NHDOT on a stream passage improvement program to assist in evaluating stream mitigation alternatives and work closer with towns on identifying priority stream crossing upgrades.

- Conducting outreach on stream crossing data and the ARM Fund.

Work on these initiatives also paralleled a process to update and inform the program selection criteria for ARM Fund grants. Through these efforts staff developed an Aquatic Restoration Mapper for the general public and potential grant applicants to use to identify priority resources to maintain, preserve and restore aquatic resources.

The Aquatic Resource Mapper was the focus of four outreach sessions held in early 2018. Once these initiatives are complete, the Application Materials for the 2018 grant round will be updated to reflect the stream crossing information and the Aquatic Resource Mapper. It is anticipated the ARM Mapper will facilitate more complete and streamlined applications making preparation easier for the applicants, and simplify the review for the Site Selection Committee.

FY 2017 Permits Issued with ARM Fund as Compensatory Mitigation Component

In FY 2017, 20 permits involving an ARM Fund payment were issued that resulted in 12.98 acres of wetland loss, 853 linear feet of stream loss or impacts, and 12.47 acres of temporary impacts including secondary impacts due to conversion of forested wetlands to emergent or scrub shrub wetlands. Table 12 provides a list of the projects permitted from July 1, 2016 to June 30, 2017 where the wetland permit holders selected payment to the ARM Fund to satisfy mitigation requirements.

Table 12: Wetland Permits Issued in FY 2017 Using ARM Funds (07/01/2016 – 06/30/2017)

NHDES File # Town	Service Area	Wetlands Loss		Stream Impacts (Linear Feet)	Temporary Impacts		ARM Fund Revenue
		Square Feet	Acres		Square Feet	Acres	
2016-00123 **Barnstead**	Merrimack	31,136	0.71	112			$145,005.29
2007-02429 **Berlin**	Androscoggin						$1,000.00
2016-00147 **Chichester**	Merrimack	889	0.02	178	2965		$42,720.00
2016-00495 **Concord**	Merrimack			170			$40,800.00
2015-03065 **Dover**	Salmon Falls-Piscataqua	24,454	0.56				$118,047.29
2016-00524 **Epping**	Salmon Falls-Piscataqua	21,419	0.49				$76,308.54
2016-00790 **Gilford**	Pemigewasset-Winnipesaukee			134			$27,360.00
2016-02506 **Gorham**	Androscoggin			80			$19,603.20

NHDES File # Town	Service Area	Wetlands Loss		Stream Impacts (Linear Feet)	Temporary Impacts		ARM Fund Revenue
		Square Feet	Acres		Square Feet	Acres	
2016-03357 **Goffstown Weare**	Merrimack	157,135	3.61				$15,550.70
2015-03344 **Hampton**	Salmon Falls-Piscataqua	21,218	0.49				$102,426.08
2016-00603 **Hampton**	Salmon Falls-Piscataqua	2,128	0.05				$20,545.07
2012-03271 **Hooksett**	Merrimack	212,137	4.87				$180,000.00
2017-00270 **Keene**	Lower CT	34,810	0.80				$77,378.61
2014-02959 **Newington**	Salmon Falls-Piscataqua	34,487	0.79				$151,269.89
2015-02336 **Pelham Windham Hudson Londonderry**	Merrimack	4,428	0.10	17	385,896		$646,875.40
2015-01595 **Portsmouth**	Salmon Falls-Piscataqua	938	0.02				$4,975.88
2016-01493 **Stewartstown**	Upper CT			95			$22,800.00
2016-01701 **Stratham**	Salmon Falls-Piscataqua	20,327	0.47				$102,828.70
2016-01465 **Thornton**	Pemigewasset-Winnipesaukee			21			$5,040.00
2016-01817 **Weare**	Merrimack			66			$15,840.00
Totals		**408,371**	**12.98**	**853**	**543,031**		**$1,568,112.60**

ARM Fund Disbursements in FY 2017

The ARM Fund program grants funds to projects involving wetland or stream restoration, wetland enhancement, preservation of upland buffers associated with high quality aquatic resources. The projects that were provided payment during FY 2017 are noted in Table 12 as well as active projects with encumbered funds to be spent in the coming year.

Table 13: ARM Fund Disbursements for Projects in FY 2017 and Active Projects

Project Name: Town of Milan Community Forest			
Applicant: Town of Milan	**Watershed:** Androscoggin	**Town:** Milan	
ARM Funds Disbursed in FY 2017: $61,000.00	**Total ARM Fund Grant Awarded in 2015:** $61,000.00	**ARM Fund Amount Spent to Date:** $61,000.00	**Remaining Amount Encumbered:** $0.00
Description: The town of Milan used funds to permanently protect 6.6 acres of land to add to the Milan Community Forest which will be conserved through a conservation easement. The proposed acquisition is located on the Androscoggin River with approximately 420 feet of river frontage. Approximately 13 percent of the parcel is in the 100-year flood plain. A conservation management plan will be written with an objective for habitat protection.			
Project Name: Lake Wicwas Conservation Project			
Applicant: Lakes Region Conservation Trust	**Watershed:** Pemigewasset-Winnipesaukee	**Town:** Meredith	
ARM Funds Disbursed in FY 2017: $64,236.00	**Total ARM Fund Grant Awarded in 2014:** $64,236.00	**ARM Fund Amount Spent to Date:** $64,236.00	**Remaining Amount Encumbered:** $0.00
Description: The Lakes Region Conservation Trust and Lake Wicwas Association used funds to permanently protect four separate parcels in the northeast part of the lake. A total of 27.44 acres of land and one mile of shoreline on Lake Wicwas in Meredith was included in the acquisitions. The parcels protected include four potential vernal pools, an island, and the largest marsh area (12.5 acres) within the lake that provides habitat for the only nesting loon pair in the area.			
Project Name: Isinglass River Floodplain Project			
Applicant: Southeast Land Trust	**Watershed:** Salmon Falls-Piscataqua	**Town:** Barrington	
ARM Funds Disbursed in FY 2017: $61,545.00	**Total ARM Fund Grant Awarded in 2016:** $61,545.00	**ARM Fund Amount Spent to Date:** $61,545.00	**Remaining Amount Encumbered:** $0.00
Description: Located on the north side of Seavey Bridge Road, the Isinglass River conservation easement encompasses approximately 53 acres in Barrington and abuts approximately 327 acres of contiguous conservation land. The property includes nearly six acres of important high value wetlands and one documented functioning vernal pool and two probable vernal pools. This parcel creates a contiguous block of 380 acres of conservation land, all of which is located just down river from the 300 acre Calef Forest project completed a few years ago by the Town of Barrington and the Trust for Public Land. In addition, the conservation easement will ensure that the approximately three mile long "Barrington Trail," which extends along the property's Isinglass River frontage all the way to the Town ball fields on Smoke Street, remains open to public access. The property will be permanently conserved through a Southeast Land Trust held conservation easement with an Executory Interest to the Town of Barrington. The property is located within a 1,200-acre unfragmented forest block.			
Project Name: Great Dam Removal			
Applicant: Town of Exeter	**Watershed:** Salmon Falls-Piscataqua	**Town:** Exeter	
ARM Funds Disbursed in FY 2017: $100,000.00	**Total ARM Fund Grant Awarded in 2015:** $100,000.00	**ARM Fund Amount Spent to Date:** $100,000.00	**Remaining Amount Encumbered:** $0.00
Description: The Town of Exeter used funds to remove the Great Dam in downtown Exeter. The project benefited the diadromous fish populations in the Exeter River and the wider Great Bay Estuary, enhanced the natural and human ecosystem by improving water quality, and reduced Exeter's vulnerability to the growing risk of flooding. The removal project restored approximately 15 miles of the Exeter River and its tributaries to a free-flowing condition, eliminating a barrier to migrating anadromous fish and improving water quality. The project eliminated the following structures from the river: the reinforced concrete run-of-river dam consisting of a spillway, a fish ladder, and a small lower dam (or weir) structure; a low-level outlet; and a penstock. The project also included reshaping the river channel within the footprint of the existing dam and the area immediately upstream and downstream using a natural channel design approach based on sound fluvial geomorphic principles. The location is within the historic community center that is under town ownership.			

Project Name: Multi-Habitat Restoration in Cutts Cove			
Applicant: UNH/Jackson Estuarine Laboratory	**Watershed:** Salmon Falls-Piscataqua	**Town:** Portsmouth	
ARM Fund Disbursed in FY 2017: $61,557.95	**Total ARM Fund Grant Awarded in 2015:** $134,736.00	**ARM Fund Amount Spent to Date:** $61,557.95	**Remaining Amount Encumbered:** $73,178.05
Description: The project proposes to restore a suite of tidal marsh habitats that reflects the current distribution of low marsh, high marsh, and tidal buffer zone relative to the tidal regime at the site, and will provide shoreline resiliency in the face of sea level rise for decades to come. Restoration includes portions of Cutts Cove with habitats that are absent or poorly functioning by: 1) enhancing the diversity and quality of 90,000 square feet of mudflat habitat through addition of native shell substrate, 2) creating a living shoreline of rock sill with shellfish and expanding a remnant patch of existing salt marsh by 40,500 square feet and creating a vegetated tidal buffer zone, 3) removal of 700 linear feet of armoring along the Cutts Cove shoreline, and 4) improving an area of Tidal Buffer Zone with functional connections to marsh and upland along 700 feet of artificial shoreline providing for habitat migration in the future.			
Project Name: Powder Major's – Goss Farm			
Applicant: Society for the Protection of NH Forests	**Watershed:** Salmon Falls-Piscataqua	**Town:** Durham, Madbury and Lee	
ARM Fund Disbursed in FY 2017: $148,000.00	**Total ARM Fund Grant Awarded in 2015:** $148,000.00	**ARM Fund Amount Spent to Date:** $148,000.00	**Remaining Amount Encumbered:** $0.00
Description: The Forest Society used funds to purchase 195 acres of land in fee from three separate entities, and create a new forest reservation open to the public. The three towns in which the project is located hold conservation easements on their respective portions of the project in exchange for town funding to the project. The Goss parcel contains 84 acres of wetlands, 5,100 feet of frontage on the Oyster River which is the drinking water source for the Town of Durham and UNH, 800 feet of frontage on Dube Brook, and overlies an aquifer. Three confirmed vernal pools are on the parcel with several rare plants as well as documentation for Blanding's turtles and American eel with 12 other occurrences of rare and threatened wildlife within the Oyster River corridor. The property is entirely within the focus area of The Nature Conservancy's Land Conservation Plan for NH Coastal Watersheds and is part of a larger, three-town greenbelt conservation initiative. It abuts and enlarges other conservation lands including tow town-owned conservation easements, and wraps around a newly acquired 87 acre town property.			
Project Name: Berry's Brook Conservation Project			
Applicant: Town of Rye Conservation Commission	**Watershed:** Salmon Falls - Piscataqua	**Town:** Rye	
ARM Funds Disbursed in FY 2017: $121,000.00	**Total ARM Fund Grant Awarded in 2014:** $121,000.00	**ARM Fund Amount Spent to Date:** $121,000.00	**Remaining Amount Encumbered:** $0.00
Description: The Rye Conservation Commission purchased and permanently protected approximately 73 acres of the former Rand Lumber Yard property located on Wallis Road in Rye. This parcel will contribute to existing protected lands, as it located within a large contiguous block of open lands. A significant wildlife corridor extends easterly toward the Bellyhack Bog and tidal estuary that is within a mile. The wetlands found on site are mainly forested with several potential vernal pools. The upland buffers will protect Berry's Brook and designated prime wetlands in Portsmouth. The Natural Heritage Bureau DataCheck results indicated that the Needham's Skimmer and Spotted Turtle are all located in close proximity. The property provides public access.			
Project Name: Oyster Reef Restoration			
Applicant: The Nature Conservancy	**Watershed:** Salmon Falls - Piscataqua	**Town:** Greenland	
ARM Funds Disbursed in FY 2017: $0.00	**Total ARM Fund Grant Awarded in 2015:** $190,500.00	**ARM Fund Amount Spent to Date:** $0.00	**Remaining Amount Encumbered:** $190,500.00
Description: The Nature Conservancy proposes to use funds to restore five acres of oyster reef to improve water quality in the Great Bay Estuary. Secondary goals and benefits will restore fish and aquatic habitat, ecological integrity, and wetland dependent wildlife habitat. The two tracts will be located adjacent to existing restoration areas, creating a contiguous 12-acre reef block in the Great Bay Estuary in Greenland. In fall 2016, UNH will conduct a post-construction underwater video assessment to verify surf-clam coverage across the new reef. They will also use a fixed-area benthic sampler to retrieve surf-clam and spat-on-shell to estimate annual natural recruitment and initial density of live oysters for the reef. Each fall for the next five consecutive years (2017-2021), UNH will use the benthic sampler for retrieval of reef material to determine annual recruitment rates and live density estimates.			

Project Name: Rollins Brook Headwaters Project			
Applicant: Southeast Land Trust of NH	**Watershed:** Salmon Falls – Piscataqua	**Town:** Nottingham	
ARM Funds Disbursed in FY 2017: $0.00	**Total ARM Fund Grant Awarded in 2016:** $48,240.00	**ARM Fund Amount Spent to Date:** $0.00	**Remaining Amount Encumbered:** $48,240.00
Description: The Rollins Brook Headwaters Project is located in Nottingham and the Southeast Land Trust proposes to protect approximately 70 acres of forest and 17 acres of wetland habitat, including a 13-acre beaver impoundment. The property's aquatic resources serve as the headwaters for Rollins Brook, a tributary to the North River, Lamprey River, and the Great Bay Estuary. The property also has three confirmed vernal pools, 1,000 feet of headwater stream (currently impounded by beaver dam), and 52 acres of associated upland habitat. The proposed project will restore and enhance critical wildlife habitat, with a particular focus on the state endangered Blanding's turtle, which is known to occupy this parcel. This property connects to more than 2,000 acres of protected lands east of Pawtuckaway State Park, including the soon-to-be protected Harvey Forest at Kennard Hill, one of South East Land Trust's "crown jewels" with more than 1,100 acres of open space. The proposed project will protect the property from future residential development.			

Project Name: Musquash Conservation Area			
Applicant: NH Fish & Game Department	**Watershed:** Merrimack	**Town:** Londonderry	
ARM Funds Disbursed in FY 2017: $400,000.00	**Total ARM Fund Grant Awarded in 2016:** $400,000.00	**ARM Fund Amount Spent to Date:** $400,000.00	**Remaining Amount Encumbered:** $0.00
Description: The proposed project permanently conserves two parcels containing approximately 149 acres adjacent to the Musquash Conservation Area in Londonderry belonging to the Mathes Family Limited Partnership through a partnership between Southeast Land Trust and the NH Fish and Game Department. Parcel #1 is approximately 140 acres with 18.7 acres of wetlands including a large wetland system located in the north and west of the property and nine documented and five potential vernal pools found in the eastern and southern portion of the property. These features are a part of the large Musquash Swamp wetland system. Parcel #2 is 10 acres located northeast of Parcel #1 and also abutting the Musquash Swamp Conservation Area with one acre of wetland. NHFG biologists documented the nine vernal pools with either wood frog and / or spotted salamander egg masses. Five additional pools were inventoried but indicator species were not found during the site visit. A recent timber harvest on the parcel has impacted the landscape surrounding the pools. Future management will include 200 foot wetland buffers to protect the functions and values of these areas. A stewardship plan will address recreational development, forest management, and wildlife habitat and water quality protection. The property is also located in a focus area identified for recovery of the New England cottontail, a state endangered species. Parcel #1 has the potential for the creation of high quality habitat for the species through management in the upland forest present on the property.			

Project Name: McQuesten Brook Restoration Project			
Applicant: NH Rivers Council and Town of Bedford	**Watershed:** Merrimack	**Town:** Bedford	
ARM Funds Disbursed in FY 2017: $328,070.00	**Total ARM Fund Grant Awarded in 2015:** $345,000	**ARM Fund Amount Spent to Date:** $328,070.00	**Remaining Amount Encumbered:** $16,930.00
Description: The McQuesten Brook watershed covers 563 acres in Bedford and Manchester. McQuesten Brook originates in Bedford, flows into Manchester, collects outlet waters from McQuesten Pond before flowing under Second Street, through the Eastman Avenue and Wathen Road wetland complex in Bedford and under the Everett Turnpike to meet the Merrimack River. The two stream crossings that carry McQuesten Brook through the Eastman Avenue and Wathen Road wetland complex are severely undersized and listed in the *2012 305(b)/303(d) Surface Water Quality Assessment* for failure to support aquatic life due to insufficient dissolved oxygen concentration and saturation and for excessive chlorides. These impairments threaten the survival of the naturally reproducing population of Eastern Brook Trout that currently thrive in portions of McQuesten Brook. In addition, McQuesten Brook has also been impacted by hydrologic and habitat modification resulting from the presence of these under-sized stream crossings. The project included the installation of an appropriately sized (14-foot width) stream crossing at Eastman Avenue and fully daylighting McQuesten Brook at Wathen Road through culvert and road fill removal to increase hydraulic and sediment transport capacity throughout the reach. Restoring full aquatic organism passage at both Eastman Avenue and Wathen Road will increase access to about 1,950 feet of McQuesten Brook between I-293 and South Main Street. It will remove barriers and re-connect 2.57 acres of wetland habitat within this reach of McQuesten Brook.			

Project Name: Austin Parcel			
Applicant: Town of Brookline Conservation Commission	**Watershed:** Merrimack	**Town:** Brookline	
ARM Funds Disbursed in FY 2017: $89,000.00	**Total ARM Fund Grant Awarded in 2016:** $89,000.00	**ARM Fund Amount Spent to Date:** $89,000.00	**Remaining Amount Encumbered:** $0.00
Description: The Brookline Conservation Commission used funds to acquire the Austin Parcel which has 3,000 linear feet of riparian frontage along the Nissitissit River. The Town placed a conservation easement on the property which is held by the Piscataquog Land Conservancy. The parcel contains a riverine complex that has intermittent streambed with an unconsolidated bottom along with palustrine forested, emergent, and scrub-shrub wetland habitat. Protection of the frontage and upland buffer is a high priority in the region and this is one of the last large sections of the river that has not been protected or developed in New Hampshire. This area of the river offers an impressive Eastern Brook Trout fishery and both NH Fish & Game and Trout Unlimited have expressed interest in seeing it protected. The Wildlife Action Plan depicts the property as being a combination of Highest Ranked Habitat in NH and Highest Ranked Habitat in Biological Region. The area is open to the public.			

Project Name: McQuesten Pond Dam Removals			
Applicant: NH Rivers Council	**Watershed:** Merrimack	**Town:** Manchester	
ARM Funds Disbursed in FY 2017: $30,050.00	**Total ARM Fund Grant Awarded in 2013:** $65,400.00	**ARM Fund Amount Spent to Date:** $21,200.00	**Remaining Amount Encumbered:** $14,150.00
Description: McQuesten Brook is listed as impaired for failure to support aquatic life due to insufficient dissolved oxygen concentration and saturation. The brook is also impaired for excessive chlorides. McQuesten Pond fails to support aquatic life due to insufficient dissolved oxygen content and fails to support primary contact recreation due to excessive concentrations of Chlorophyll-a. The presence of two dams within McQuesten Pond have interrupted hydraulic connectivity, stream geomorphology, and wetland functions, and are one of the primary sources of impairment along with stormwater runoff. The ultimate goals of this project are to develop removal plans for two obsolete stream barriers in a portion of McQuesten Brook that has been artificially impounded to form McQuesten Pond, and then remove both barriers to restore stream and wetland functions. The completed project will provide an additional 1,500 linear feet of trout habitat once the restored channel has stabilized and a riparian buffer is established for shading and cooling stream temperatures.			

Project Name: Haller Farm			
Applicant: City of Concord	**Watershed:** Merrimack	**Town:** Concord	
ARM Funds Disbursed in FY 2017: $0.00	**Total ARM Fund Grant Awarded in 2015:** $300,000.00	**ARM Fund Amount Spent to Date:** $0.00	**Remaining Amount Encumbered:** $300,000.00
Description: The city of Concord was awarded funds for the acquisition of two parcels totaling approximately 100 acres located off of Lakeview Road and West Parish Road in the Penacook Lake watershed. Penacook Lake is the city of Concord's primary source of drinking water and is designated as a class "A" water body. The majority of the Haller Farm property consists of forested upland, with sloping hills that drain toward the lake, and contains palustrine wetlands, intermittent and perennial streams, and vernal pools. Acquisition of the Haller land will link other protected land in the area, adding to a block of approximately 900 acres of conservation land within the Penacook Lake watershed. Public access is provided.			

Project Name: Brennan Brook Confluence Project			
Applicant: Francestown Land Trust	**Watershed:** Merrimack	**Town:** Francestown	
ARM Funds Disbursed in FY 2017: $0.00	**Total ARM Fund Grant Awarded in 2016:** $83,850.00	**ARM Fund Amount Spent to Date:** $0.00	**Remaining Amount Encumbered:** $83,850.00
Description: The Francestown Land Trust proposes to purchase a 7.6 acre property along the South Branch of the Piscataquog River and protect an additional 33 acres of land with conservation easements donated by abutting landowners in support of this project. The Piscataquog Land Conservancy will hold the conservation easement for the 7.6 acre property. The project will permanently protect 2,155 feet of the South Branch of the Piscataquog River, its associated riparian and upland forest as well as eight acres of wetlands at the confluence of Brennan Brook. Approximately 10.5 acres in this project area is classified by the Wildlife Action Plan as highest ranked habitat (Tier 1), 17 acres is considered Tier 2 habitat, and 4.5 acres is ranked as supporting landscape (Tier 3). According the Natural Heritage Bureau report, the endangered Blanding's turtle, and two species of special concern – smooth green snake and wood turtle, have been found in the area. The Brennan Brook-South Branch Confluence Project connects to and enhances the ecological function of over 4,500 acres of biologically diverse protected land. Public access is provided.			

Project Name: Hitchiner Town Forest			
Applicant: Town of Milford Conservation Commission	**Watershed:** Merrimack	**Town:** Milford	
ARM Funds Disbursed in FY 2017: $0.00	**Total ARM Fund Grant Awarded in 2016:** $8,260.00	**ARM Fund Amount Spent to Date:** $0.00	**Remaining Amount Encumbered:** $8,260.00
Description: The Milford Conservation Commission was awarded $8,260 for the Hitchiner Town Forest Project. The Milford Conservation Commission will permanently protect Hitchiner Town Forest and the natural resources on the property with a conservation easement to be held by the New England Forestry Foundation. Management is being guided by a forest management plan which was updated in 2008 and a field management plan created in 2012. As part of the project the Milford Conservation Commission will conduct a wetland assessment of the stream and wetland system located on the southwest portion of the site. The upland on the property is considered of "Highest Ranked Habitat in the Biological Region" in the Wildlife Action Plan. A chestnut oak forest / woodland occupies approximately 30 acres on the upper slopes of Milford's Hitchiner Town Forest property. This forest type reaches the northern extent of its range in New Hampshire, and is ranked imperiled/critically imperiled in the state. Much of the land surrounding the Town Forest is under residential development and placing an easement on the property will sustain the natural landscape.			

Project Name: Upper North Branch River Property			
Applicant: Southeast Land Trust of NH	**Watershed:** Merrimack	**Town:** Candia	
ARM Funds Disbursed in FY 2017: $0.00	**Total ARM Fund Grant Awarded in 2016:** $30,000.00	**ARM Fund Amount Spent to Date:** $0.00	**Remaining Amount Encumbered:** $30,000.00
Description: The proposed project will protect approximately 14.85 acres of wetland including eight large vernal pools, nearly 900 feet of river / stream shoreline, and approximately 102 acres of upland buffer in the regionally significant Upper North Branch River Core Focus Area (as identified by the Land Conservation Plan for NH's Coastal Watersheds). The property will be protected by an easement held by Southeast Land Trust that excludes a small area around the existing house. As part of a large unfragmented block over 5,000 acres in size, the property contains 88 acres of Tier 1 habitat and 33 acres of Tier 2 habitat. A Natural Heritage Bureau report shows that the property has a population of the state threatened (S2) Appalachian barren-strawberry within the proposed conservation easement area. The property is within a Blanding's turtle priority conservation area identified by NHFG. This site ranks second out of the top 10 focus areas in NH and connects the property's habitat to an existing 388 acre block of conservation land.			

Project Name: Beaver Brook Restoration Project			
Applicant: City of Keene	**Watershed:** Lower Connecticut River	**City:** Keene	
ARM Funds Disbursed in FY 2017: $198,898.00	**Total ARM Fund Grant Awarded in 2012:** $277,707.00	**ARM Fund Amount Spent to Date:** $240,897.85	**Remaining Amount Encumbered:** $36,809.15
Description: The proposed project includes restoration of approximately one acre of historically filled wetlands within the Beaver Brook watershed in the city of Keene. The proposed restoration will advance the ongoing effort to restore Beaver Brook, augment flood storage in this area of the city, and create additional scientific and educational opportunities that complement ongoing projects within the Watershed. The proposed restoration parcel is contiguous with Robin Hood Park, which is a 110 acre conservation parcel. Invasive species will be removed; mainly a large Japanese knotweed colony. Research of the parcel deed and two abutting parcels is also proposed to potentially protect the park area in perpetuity.			
Project Name: Falls Brook Stream Restoration			
Applicant: Cheshire County Conservation District	**Watershed:** Lower CT River	**Town:** Swanzey	
ARM Funds Disbursed in FY 2017: $139,743.08	**Total ARM Fund Grant Awarded in 2014:** $165,000.00	**ARM Fund Amount Spent to Date:** $165,000.00	**Remaining Amount Encumbered:** $0.00
Description: The Cheshire County Conservation District with assistance from Trout Unlimited used funds to improve aquatic organism passage, particularly for brook trout, in the Falls Brook culvert located on Hale Hill Road which is two and one quarter miles upstream of the confluence with the Ashuelot River. The Falls Brook subwatershed was identified as the second highest priority subwatershed due to the amount of high quality cold water headwaters habitat throughout this stream network. The majority of Falls Brook consists of excellent brook trout thermal refugia and spawning habitat. The anticipated restoration will replace an undersized culvert, potentially hazardous to community infrastructure and stream geomorphology during extreme storm events, whereby protecting the long term viability of local wetlands. The new structure is a steel stringer bridge design allowing for full passage of all organisms as well as the stream flows related to the one hundred year storm event.			
Project Name: Ashuelot River Floodplain Protection and Restoration Project			
Applicant: Monadnock Conservancy and The Nature Conservancy	**Watershed:** Lower CT River	**Town:** Swanzey	
ARM Funds Disbursed in FY 2017: $60,000.00	**Total ARM Fund Grant Awarded in 2015:** $147,615.00	**ARM Fund Amount Spent to Date:** $60,000.00	**Remaining Amount Encumbered:** $87,615.00
Description: Over 29 acres of floodplain forest, hayfield, and high quality oxbow wetlands was permanently protected by a conservation easement in Swanzey, along 1,500 feet of the state designated Ashuelot River. 11 acres of riparian wetland area will be restored, which are currently hayfield, adjacent to the Ashuelot River and areas surrounding 5.5 acres of oxbow wetlands, will be restored back to floodplain forest habitat. Located in the Lower Basin Aquifer in southern Keene and northern Swanzey, the project area is described in a 2004 aquifer study that notes the water-bearing capacity of this property as "highly favorable for groundwater supply development based on excellent water quality and yield" (*Results of Hydrogeologic Investigations Lower Ashuelot River Basin*, Keene, NH 2004). The Wildlife Action Plan ranks the majority of the project area as Tier 1, top ranked habitat in the State. The project is particularly valuable to wildlife movement in the area as it connects the 1,500-acre Mount Cresson - Town of Swanzey conservation land and Yale-Toumey Forest west of Matthews Road to the Ashuelot River valley and specifically the Town of Swanzey Conservation Land just south of the property and on the east side of the river (tract not shown in *NH Granit*).			

Project Name: Smith Pond Shaker Forest			
Applicant: Upper Valley Land Trust	**Watershed:** Lower CT River	**Town:** Enfield	
ARM Funds Disbursed in FY 2017: $0.00	**Total ARM Fund Grant Awarded in 2015:** $362,385.00	**ARM Fund Amount Spent to Date:** $0.00	**Remaining Amount Encumbered:** $362,385.00
Description: The Upper Valley Land Trust was awarded funds for fee acquisition of 995 acres of the Smith Pond Shaker Forest property in Enfield. The property contains 114.5 acres of wetlands, 16,900 feet of perennial stream and 13,100 feet of intermittent streams. This represents almost six miles of stream habitat and 5.2 miles of streambank on perennial streams. The remote 68 acre Smith Pond is the stunning wetland centerpiece of the property, and it is surrounded by other high quality wetlands and mature forest. It has a total of 17,560 feet of pond shoreline habitat and encompasses over 15 different types of wetlands including a large pond, forested wetland, high-gradient streams with pools, medium-gradient stream with associate riparian wetlands in some meanders, emergent marsh, vernal pools, and even two beautiful waterfalls. Intact forested buffers will cover at least 370 acres of the property and over the long term should provide the highest quality context for all of the wetlands and streams, particularly as natural levels of course woody debris are added to the various ecosystems. Restoration opportunities exist in areas impacted by previous logging operations.			
Project Name: Ticknor Woodlands Addition			
Applicant: Upper Valley Land Trust	**Watershed:** Lower CT River	**Town:** Lebanon	
ARM Funds Disbursed in FY 2017: $0.00	**Total ARM Fund Grant Awarded in 2016:** $168,500.00	**ARM Fund Amount Spent to Date:** $0.00	**Remaining Amount Encumbered:** $168,500.00
Description: The Upper Valley Land Trust proposes to purchase 110 acres of forested property in Lebanon and place a permanent conservation easement on it, and convey it to the city in a simultaneous transaction with the seller. Long-term management and stewardship will be the responsibility of Upper Valley Land Trust and the City. This project will protect 18.7 acres of wetlands, 1,300 linear feet of perennial stream, 855 feet of Mascoma River frontage, as well as an additional 2,400 linear feet of intermittent stream. The parcel lies north and adjacent to the 76 acre, permanently protected "Ticknor Woodland" property, owned by the city of Lebanon and protected with a Upper Valley Land Trust-held conservation easement. The conservation easement will also ensure and provide for continued public access for low-impact activities consistent with overall aquatic resource protection. Following the purchase of the property, the City will engage in preparing a management plan for the property that will incorporate a resource inventory and restoration activities into the first two years of the plan.			
Project Name: Brown Addition to Black Mountain Reservation			
Applicant: Society for the Protection of NH Forests	**Watershed:** Contoocook	**Town:** Sutton	
ARM Funds Disbursed in FY 2017: $150,000.00	**Total ARM Fund Grant Awarded in 2015:** $150,000.00	**ARM Fund Amount Spent to Date:** $150,000.00	**Remaining Amount Encumbered:** $0.00
Description: The Forest Society purchased and permanently protected the 236 acre Brown property in Sutton. The Brown tract directly abuts the Forest Society's 1,054 acre Black Mountain Forest, which was conserved in 2010. The Black Mountain Forest in turn abuts the 4,565 acre Mt. Kearsage State Forest and several other conservation parcels to create a block of over 9,000 acres of contiguous conservation land. One of the primary goals of this conservation project is the protection 2,100 feet of both sides of an un-named perennial stream which drains off the property through the existing Black Mountain Forest and finally into Stevens Brook, a tributary to the Warner River. The NH Fish & Game's Inland Fisheries Division is in the process of completing a Fisheries Management Plan for the Lower Warner River Watershed to conserve and restore wild brook trout in the watershed. Through that effort they identified the stream on the Brown tract as having the highest documented wild brook trout density of all the streams in the Lower Warner River watershed. The Brown parcel contains very high quality wildlife habitat including 63 acres of Tier 1 (the highest quality habitat in the state), and 46 acres of Tier 2 (highest ranked habitat in the region) wildlife habitat according to the state's WAP. The property contains at least three state rare plants: early coralroot (*Corallorhiza trifida*), whitetinge sedge (*Carex albicans var. albicans*), and MacKay's brittle fern (*Cystopteris tenuis*). Stevens Brook also overlies a stratified drift aquifer. An existing trail provides easy public access to this property, and the adjacent Kearsarge Regional High School provides exceptional educational opportunities.			

Project Name: Shumway Forest Conservation Project			
Applicant: Hanover Conservancy	**Watershed:** Middle Connecticut River	**Town:** Hanover	
ARM Funds Disbursed in FY 2017: $249,740.00	**Total ARM Fund Grant Awarded in 2016:** $249,740.00	**ARM Fund Amount Spent to Date:** $249,740.00	**Remaining Amount Encumbered:** $0.00
Description: The Shumway Forest conservation project protected a total of 313 acres on Moose Mountain, including 23.5 acres of wetland and 10,900 linear feet of riparian corridor, through acquisition of a permanent conservation easement by the Hanover Conservancy. On the Shumway property, 45 of the 313 acres are already protected by federal easements. This project adds another 268 acres to the existing contiguous 2,353 acres of federal, local, and private conservation lands north of Mill Pond, and 1,177 acres of local and private conservation lands on the south side of the pond. This would result in a total of nearly 3,800 acres on Moose Mountain that are either permanently protected or managed by Hanover's Conservation Commission strictly for conservation purposes. The property includes the presence of Tier 1 and Tier 2 wildlife habitat and supporting landscape; highest elevation unprotected wildlife habitat in the town; and the presence of recreational foot trails, including the Appalachian Trail. The wetland assessment identified at least ten types of valuable wetlands on this property along with intermittent and perennial 1st, 2nd, and 3rd order streams and their floodplains, pond and pond edge, shrub / moss fen, red spruce swamp, and probable vernal pools.			
Project Name: Brebner Property			
Applicant: Ammonoosuc Conservation Trust	**Watershed:** Middle CT River	**Town:** Bethlehem	
ARM Funds Disbursed in FY 2017: $0.00	**Total ARM Fund Grant Awarded in 2015:** $100,000.00	**ARM Fund Amount Spent to Date:** $0.00	**Remaining Amount Encumbered:** $100,000.00
Description: The Ammonoosuc Conservation Trust proposes to conserve 203 acres of forest land, 4,327 linear feet of frontage on the Ammonoosuc River, a designated river, and over 7,500 linear feet of streams that drain across the site and into the Ammonoosuc. The property includes Black Brook and Barrett Brook, which are Order 1 and Order 2 streams, and a Palustrine emergent / scrub shrub wetland with a history of beaver activity. Forested wetlands surround Barrett Brook with ¾ of a mile along the Ammonoosuc River. This section of the river represents the beginning of the upper section of the Ammonoosuc River which is extremely bouldery with rapids and is an excellent fresh water fishery. The site is located upstream from municipal water sources at Lisbon and Woodsville and nearly the entire area is within either the "Highest Ranked Habitat in the Biological Region" or supporting area.			
Project Name: Aquatic Habitat Restoration and Brook Trout Connectivity at Nash Steam Forest			
Applicant: Trout Unlimited	**Watershed:** Upper Connecticut	**Town:** Odell and Stratford	
ARM Funds Disbursed in FY 2017: $5,000.00	**Total ARM Fund Grant Awarded in 2015:** $5,000.00	**ARM Fund Amount Spent to Date:** $5,000.00	**Remaining Amount Encumbered:** $0.00
Description: Trout Unlimited, in partnership with the NH Fish & Game and NH Division of Forest and Lands, completed aquatic restoration work in the Nash Stream watershed. The Nash Stream Restoration Project is a phased, multi-year effort to restore channel processes and habitat quality / connectivity so that the watershed supports an intact aquatic ecosystem. In the first phase Trout Unlimited restored over two miles of instream and riparian habitat that was damaged by a catastrophic dam break and subsequent channel alteration and completed up to 13,580 linear feet (2.6 miles) of tributary wood replenishment in the East Branch. In this second phase of tributary wood replenishment, Trout Unlimited proposes to add wood to the channel and restore up to 3.2 miles of instream and riparian habitat that was impaired by historic logging activities. ARM funds will support wood replenishment in the East Branch and Long Mountain Brook which are direct tributaries to Nash Stream. The project ultimately will restore over nine miles of main stem and ten miles of tributary habitat, and reconnect over six miles of tributaries. The Nash Stream Restoration Project is located entirely within the publicly-owned Nash Stream Forest, which prioritizes permanent protection of the restored aquatic resources that provide lasting public benefit.			

ARM Fund Awards Announced in December 2016

NHDES announced the availability of funds in nine service areas in March 2016. The amount of funding available in the nine service areas is noted in Figure 16.

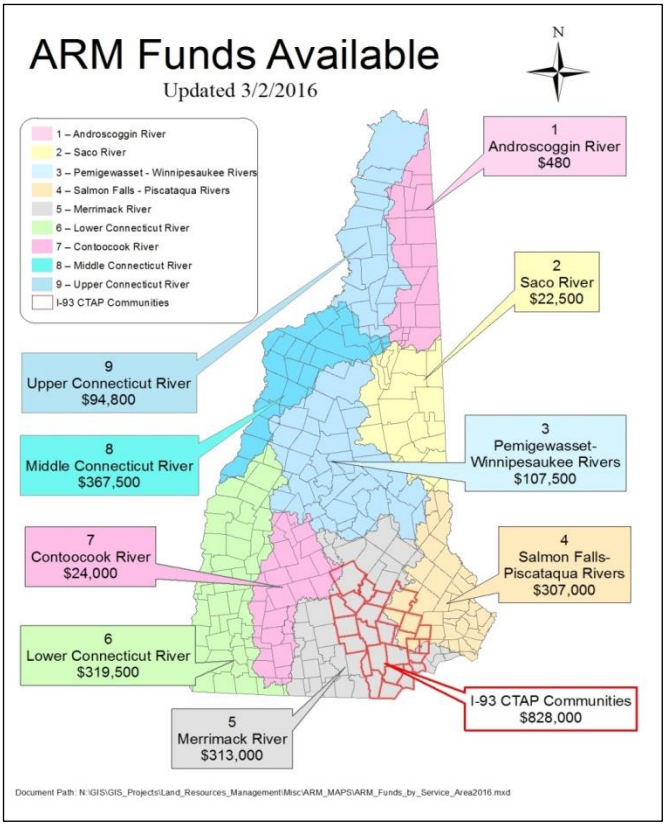


Figure 16: ARM Fund Monies Available by Service Area in 2016

Thirty-nine pre-proposals were submitted and reviewed by NHDES and the Committee and feedback was provided. Twenty-five full application submittals were received August 31, 2016. No applications were submitted for the Saco and Androscoggin River service areas. The funds in those service areas will be advertised in 2018.

The members of the Site Selection Committee, representatives from the Corps, EPA, Natural Resources Conservation Service and NHDES staff visited the sites on September 23, 28, 29, October 4 and 6. On October 24, 2016 the Committee and federal agency representatives convened to evaluate and rank the applications and determined funding amounts for the projects. The Committee's recommendations were approved by the Corps and the Wetland Council. The following summaries provide details of the awards announced by the Committee and a brief description of the gain in resources from each project awarded funds according to the service areas.

Pemigewasset-Winnipesaukee River Service Area:

- **Meredith: $107,500.** Permanently protect approximately 206 acres of land on Meredith Neck with direct frontage on Page Pond. The Town of Meredith, acting through its Conservation Commission, will be the long-term landowner and land manager. The proposed acquisition includes areas of prime wetlands, 330 linear feet of Page Brook and 2,875 linear feet of an unnamed brook that flows directly into Lake Winnipesaukee. This project builds connectivity across Meredith Neck to create a large block of conserved land.

Salmon Falls to Piscataqua River Service Area:

- **Candia: $40,000.** Protect approximately 117 acres of land in Candia including 8 large vernal pools, nearly 900 feet of river/stream shoreline in the regionally significant Upper North Branch River Core Focus Area (as identified by the Land Conservation Plan for NH's Coastal Watersheds). The property will be protected by an easement held by Southeast Land Trust and is within a Blanding's turtle priority conservation area identified by NHFG known as the Bear Brook site. This site ranks second out of the top 10 focus areas in NH and connects the property's habitat to an existing 388-acre block of conservation land.

- **Fremont: $85,000.** Acquire approximately 343 acres of land including 4,107 linear feet of Brown Brook which is a tributary to the Piscassic River. The property also includes several streams that flow into Brown Brook and 3,135 linear feet of an unnamed tributary to the Exeter River. The subject Property includes nearly 71.5-acres of high value wetlands, including portions of 5 Prime Wetlands, and 29 probable vernal pools. The Property is almost entirely ranked as "Highest Ranking Habitat in the State" in the WAP. In addition, the Property is within a "High Priority" site for Blanding's turtles identified in the "Conservation Plan for Blanding's Turtle and Associated Species of Conservation Need in the Northeastern United States."

- **Barrington: $61,545.** Purchase a conservation easement on 53 acres of land located along the Isinglass River which abuts approximately 327 acres of contiguous conservation land. The property includes nearly six acres of important high value wetlands, one confirmed vernal pool and two probable vernal pools. Conserving this parcel will create a contiguous block of 380-acres of conservation land, all of which is located just down river from the 300-acre Calef Forest. In addition, the conservation easement will ensure that the approximately 3 mile long "Barrington Trail," which extends along the property's Isinglass River frontage, remains open to public access.

- **Dover: $149,805.** Provide funds to assist in the Sawyer Mill Dam Removal Project located on the Bellamy River in Dover. The goals of the Sawyer Mill Dam Removal Project are to restore fish passage; improve fish and wildlife habitat; improve water quality; and reduce flood hazards. Removal of the two Sawyer Mill Dams will significantly improve access for American eels and restore passage for alewife, blueback herring and sea lamprey, which are identified as species of "special concern" and "species of greatest conservation need" by NHFG. The project will reconnect 11.2 miles of main-stem riverine habitat to Great Bay.

- **Barrington: $50,000.** Provide funds for the Upper Oyster River Passage Project that will replace the highest priority road/stream crossing culvert in the Oyster River watershed to restore natural stream channel dynamics and function on an impacted reach of the Oyster River. The project proposes to restore full fish passage to approximately four miles of upstream riverine habitat in the headwaters of the Oyster River and its tributary streams for the benefit of American Brook Lamprey (state endangered species), Eastern Brook Trout, American Eel, and other important aquatic species. The project includes the permanent protection, through a deed restriction, of approximately 12 acres of undeveloped land adjacent to the Oyster River and the 1,528-acre Samuel A. Tamposi Water Supply Reserve land.

- **Nottingham: $38,240.** Permanently protect 87 acres of land which are the headwaters for Rollins Brook, a tributary to the North River, Lamprey River, and the Great Bay Estuary in Nottingham. This property includes a 13-acre beaver impoundment and 3 confirmed vernal pools. The project proposes to restore and enhance critical wildlife habitat, with a particular focus on the state endangered Blanding's turtle, which is known to occupy this parcel. This property connects to more than 2,000 acres of protected lands east of Pawtuckaway State Park, including the soon-to-be-protected Harvey Forest at Kennard Hill, one of SELT's "crown jewels" with more than 1,100 acres of open space.

Merrimack River Service Area:

- **Concord: $100,000.** Provide funds for the Portsmouth Street Stream Restoration Project. This project will restore Mill Brook and improve the floodplain connectivity to the Merrimack River, and restore the stream channel so it is similar to natural conditions upstream. The project will replace an undersized culvert with a 16 foot x 3 foot three-sided culvert that will pass the 100-year storm. This increase in crossing size will restore Merrimack River floodwater access to approximately 4.7 acres of wetlands upstream of Portsmouth Street.

- **Hooksett and Candia: $400,000.** Conserve 1,870 +/- acres of land including Tower Hill Pond in Hooksett and Candia. The project will permanently conserve 45 separate wetlands encompassing 280-acres, over 2 miles of undeveloped shoreline of Tower Hill Pond, 6.3 miles of perennial streams, 1.6 miles of intermittent streams, 74 vernal pools and 1,590 acres of upland and lowland forest. The land contains a portion of the 8,000 acres owned and managed by Manchester Water Works that provides clean drinking water to the over 160,000 residents of the City of Manchester and surrounding towns.

- **Londonderry: $400,000.** Conserve two parcels of land totaling 149+/- acres adjacent to the Musquash Conservation Area in Londonderry. This project is a partnership between Southeast Land Trust which will hold the easement on the property and NHFG which will own the property. The property is located in a focus area identified for recovery of the New England cottontail (NEC), a state endangered species. Parcel #1 has the potential for the creation of high quality habitat for the species through management in the upland forest present on the property. Nearly the entire property is identified as either Tier 1 or 2 in the WAP. Both parcels are located in an area of dense residential development and could easily be developed.

- **Salem: $150,000.** Acquire a conservation easement on approximately 100 acres of land along the Hittytity Brook which abuts the 206 acre Salem Town Forest. Conserving this parcel will create a contiguous block of 345 acres of conservation land in Salem. After the acquisition is complete the Town plans to make improvements to several stream and wetland crossings on the Property that are currently impeding flow and potentially impeding aquatic passage. The property includes approximately 22.5 acres of a high transmissivity aquifer that is located in the area of Hittytity Brook. This aquifer has been considered as a potential water supply by the Town due to its productivity. Conserving this property will help preserve this potential future public water supply.

- **Brookline: $89,000.** Acquire a 22 acre parcel of land located along the Nissitissit River. A conservation easement will be placed on the property to be held by the Piscataquog Land Conservancy. Protection of the frontage and upland buffer is a high priority in the region since this is one of the last large sections of the river that has not been protected and it contains an impressive eastern brook trout fishery. The WAP depicts the property as being a combination of Tier 1 and 2 habitats.

- **Francestown: $83,850.** Purchase a 7.6-acre property along the South Branch of the Piscataquog River, and protect 33 acres with conservation easements donated by abutting landowners in support of this project. The project will permanently protect 2,155 linear feet of the South Branch of the Piscataquog River, its associated riparian and upland forest as well as eight acres of wetlands at the confluence of Brennan Brook. The Brennan Brook-South Branch Confluence Project connects to and enhances the ecological function of over 4,500 acres of biologically diverse protected land.

- **Milford: $8,260.** Permanently protect the Hitchiner Town Forest in Milford with a conservation easement to be held by the New England Forestry Foundation (NEFF). The upland on the property is considered of "Highest Ranked Habitat in the Biological Region" in the WAP. A chestnut oak forest/woodland occupies approximately 30 acres on the upper slopes of Milford's Hitchiner Town Forest property. This forest type reaches the northern extent of its range in New Hampshire, and is ranked S1/S2 (imperiled / critically imperiled) in the state. Much of the land surrounding the Town Forest is under residential development and placing an easement on the property will sustain the natural landscape.

Lower Connecticut River Service Area:

- **Fitzwilliam: $105,000.** Acquire the 72-acre Chamberlain property located on the southern shore of Sip Pond. The predominant feature of the property is the wetland, which is part of the 352-acre Sip Pond Peatland Complex. The parcel has 2,200 feet of frontage on Sip Pond and 2,100 feet of frontage along Sip Pond Brook. The property is within two wellhead protection areas and ninety-five percent (68.6 acres) of the property overlies a stratified drift aquifer. This wetland complex represents one of the highest quality wetlands in Fitzwilliam, if not the region.

- **Lebanon: $168,500.** Purchase 110 acres of forested property in Lebanon and place a permanent conservation easement on it, and convey it to the City in a simultaneous transaction with the seller. This project will protect 18.7 acres of wetlands, 1,300 linear feet of perennial stream, 855 feet of Mascoma River frontage, as well as an additional 2,400 linear feet of intermittent stream. The parcel lies north and adjacent to the approximately 76 acre, permanently protected "Ticknor Woodland" property, owned by the City of Lebanon. The conservation easement will also ensure and provide for continued public access for low-impact activities consistent with overall aquatic resource protection.

Contoocook River Service Area:

- **Henniker: $24,000.** Provide funds to install stormwater management structures to improve water quality and minimize stormwater erosion along the bank of the Contoocook River at Azalea Park. Azalea Park is a historical landmark in downtown Henniker, located along the Contoocook River. The focus of this phase of the project is to manage the upland stormwater runoff which has been directed into a wetland in the park, causing erosion of the park entrance path and adding sediments and salt into the wetland. Managing the upland stormwater runoff and controlling the water flow into the river after storm events will help decrease the sediment washing into the river.

Middle Connecticut River Service Area:

- **Hanover: $252,240.** Purchase a conservation easement on the Shumway Forest, a 313-acre parcel on Moose Mountain in Hanover. The property includes the presence of headwater streams and a diversity of other valuable wetlands, presence of Tier 1 and 2 wildlife habitat and supporting landscape, the highest elevation unprotected wildlife habitat in the town, and a section of the Appalachian National Scenic Trail. The parcel provides conservation linkages within a large block of unfragmented forest on Moose Mountain in the Quabbin-to- Cardigan region.

Upper Connecticut River Service Area:

- **Colebrook, $79,800.** Protect and restore 71.57 acres of high conservation-value riverine habitat, floodplain forest and farmland along 1.6 miles of the Connecticut River. The Nature Conservancy will acquire the fee interest in the Brunault tract and subsequently transfer ownership to NHFG. The project will result in the permanent protection of 3.4 contiguous miles of Connecticut River shoreline on the New Hampshire side. The protection of the Brunault property will contribute to a 970-acre block of protected conservation land on both sides of the river. Restoration of the parcel's floodplains will create a more resilient ecosystem, ensuring dynamic river processes, such as channel migration that creates oxbows and sandbars for pioneer species recruitment. It will also help ensure the protection of four state-listed endangered plants found on the property. The floodplain forest on the Brunault tract is also part of a rare natural community.

- **Stratford and Odell, $15,000.** Provide funds for aquatic restoration work in the Nash Stream watershed. The project is a phased, multi-year effort to restore channel processes and habitat quality / connectivity so that the watershed supports an intact aquatic ecosystem, including native coldwater fishery. In this second phase of tributary wood replenishment, Trout Unlimited proposes to add wood to the channel and restore up to 3.2 miles of instream and riparian habitat that was impaired by historic logging activities in the East Branch and Long Mountain Brook which are direct tributaries to Nash Stream. The project ultimately will restore over nine miles of main stem and 10 miles of tributary habitat, and reconnect over six miles of tributaries.

Status of the ARM Fund Account

The State FY 2017 ended with all nine ARM Fund service areas having a positive balance. Table 14 describes revenues, expenses, encumbered funds and a balance for each service area.

Table 14: Status of ARM Fund Accounts According to Service Areas

Service Areas	Beginning Balance (07/01/2016)	Revenues	Expenses	Encumbered	Interest Earned	Ending Balance (06/30/2017)
Androscoggin River	$61,480.00	$17,336.00	$61,000.00	$0.00	$0.00	$17,816.00
Saco River	$22,947.16	$0.00	$0.00	$0.00	$0.00	$22,947.16
Pemigewasset to Winnipesaukee Rivers	$194,932.26	$27,000.00	$64,236.00	$0.00	$467.60	$158,163.86
Salmon Falls to Piscataqua Rivers	$972,683.62	$486,492.46	$492,102.95	$311,918.05	$1,769.29	$656,924.37
Merrimack River	$3,092,949.97	$953,801.98	$847,120.00	$453,190.00	$26,070.24	$2,772,512.19
Lower Connecticut River	$1,216,190.01	$64,482.17	$398,641.08	$655,309.15	$2,197.58	$228,919.53
Contoocook River	$174,056.08	$0.00	$150,000.00	$0.00	$0.00	$24,056.08
Middle Connecticut River	$432,838.71	$0.00	$249,740.00	$100,000.00	$2,948.27	$86,046.98
Upper Connecticut River	$99,800.00	$19,000.00	$5,000.00	$0.00	$1,205.59	$115,005.59
Total All Watersheds	**$6,267,877.81**	**$1,568,112.61**	**$2,267,840.03**	**$1,520,417.20**	**$34,658.56**	**$4,082,391.75**

Status of Administrative Assessment Account

One component of an ARM Fund payment is an administrative assessment established by RSA 482-A:30, III and RSA 482-A:30-1,II. The status of the account is noted in Table 15. The balance is high from previous years due to a payment from a large project in FY 2016. Given the increased volume of mitigation award and tracking needs, NHDES is planning to develop a mitigation database to enhance efficiency, impact tracking, and address additional reporting requirements.

Table 15: Status of Administrative Assessment Account

Beginning Balance (7/1/2016)	Revenues	Expenses	2017 Fiscal Year Ending Balance
$422,932.34	$263,812.74	$109,816.65	$576,928.43

LEGISLATION AND RULEMAKING

Legislation

The Wetlands bureau had a busy year in the legislature. The 2017 legislation is listed below:

- **HB 195:** Established a committee to study temporary seasonal docks. The duties of the committee are to "explore the impact of seasonal temporary dock regulations." The committee shall also explore the issues "surrounding required setbacks, including safety concerns, protecting individual property rights, how setbacks and the permitting of seasonal docks affects state agencies involved in the enforcement of such regulations, and the long-term effect of such regulations on property owners' rights."
- **HB 591:** Prohibited suction dredging for minerals (gold), found to be inexpedient to legislate. (ITL)
- **HB 376**: Developed rules for testing sediments prior to dredging in estuarine waters. This is inexpedient to legislate (ITL).
- **SB 30**: Sought to clarify the requirements for maintaining vegetation within the woodland buffer by splitting the term "natural woodland buffer" into two terms: "woodland buffer" which defines the area in which vegetation is to be maintained and "natural woodland" which describes the state in which vegetation is to be maintained. The previous term "natural woodland buffer" was used to define both the space and the state of the vegetation. The dual use of the term had created confusion.
- **SB 118**: Created the new definition "pervious surface," meaning any surface, whether natural, man-made, or modified, that can effectively absorb or infiltrate water including, but not limited to, vegetated surface, such as woodlands, planted beds, and lawns, and those pavements specifically designed and maintained to effectively absorb and infiltrate water.

Rulemaking

The Wetlands Bureau spent the year drafting, revising, and facilitating discussions on internal drafts and preparation for the next phase of rules effort. The Wetlands Bureau participated in almost monthly Senior Rules Team meetings to review draft rules and propose changes. Final program draft rules were provided to the Legal Unit in 2017. The Wetlands Bureau also held the following meetings on the rules.

Table 16: Rules Workgroup, Work Sessions, and Stakeholder Meetings for Calendar Year 2017

Date	Topic	Stakeholder	Location
05/24/17	Stream Crossing Rules	NH Department of Transportation	Concord
08/24/17	Top of Bank Definition	New Hampshire Association of Natural Resources Scientists	Concord
10/16/17	Top of Bank Definition	NHANRS and NH Department of Transportation	Concord
10/27/17	Top of Bank Definition	Wetlands Bureau, Alteration of Terrain Program, Geologic Survey	Concord

The Wetlands Bureau completed the draft Wetlands Best Management Practice Techniques for Avoidance and Minimization. Application plan examples, graphics, photographs and narrative were used to develop many of the project examples for this new BMP manual. The Wetlands Bureau also worked with the Department of Natural and Cultural Resources (DNCR) – Trails Bureau to seek updates to the BMP for Trails Construction. The Wetlands Bureau also worked with partners to obtain edits to the Utility Maintenance BMP Manual, the NHDOT BMP for Routine Roadway Maintenance Activities, and the Agricultural BMP Manual. Each of these revised or new BMP manuals are referenced in the draft wetland rules.

COMMUNICATIONS AND OUTREACH / EDUCATION

Wetlands and Shoreland staff presented at 30 events around the state reaching several hundred attendees. Topics included changes to RSA 482-A, the NH Wetlands Law, changes to RSA 483-B, the Shoreland Water Quality Protection Act, wetlands and shoreland permitting changes, best management practices, routine roadway and culvert replacement procedures, timber harvesting using BMPs in wetlands, vegetation maintenance within the protected shoreland, landscaping at the water's edge, among others. Table 17 below lists the date, event and location in which staff gave presentations in 2017.

Table 17: Wetlands and Shoreland Presentations for Calendar Year 2017

Date	Event	Location
01/10/17	Buffers on the Bay – EPA Grant team	Greenland
01/27/17	NH Association of Natural Resources Scientists Annual Conference	Concord
02/14/17	NH Department of Agriculture - Pesticide Applicator Training & Certification - Foresters	Concord
02/15/17	NH Department of Agriculture - Pesticide Applicator Training & Certification - Landscapers	Concord
03/23/17	Land Trust Coalition Meeting / Workshop	Concord
03/23/17	Land Trust Coalition	Concord
03/24/17	NH Water and Watershed Conference	Plymouth
03/24/17	Wetland Science Buffer Workgroup	Concord
03/28/17	EPA Annual Meeting	Concord
03/30/17	Franconia and Bethlehem Conservation Commissions	Franconia
03/31/17	Landscapers of the NH Lakes Region	Moultonborough
04/13/17	Regional Planning Commissions Directors Meeting	Concord
04/16/17	NH Appraisers and Assessors – Shoreland and Wetland law	Concord
04/18/17	NH Timber Harvesting Law Workshop	Hillsborough
04/20/17	NH Timber Harvesting Law Workshop	Wentworth
05/08/17	NEIWPCC Buffer Meeting	Chelmsford, MA
05/16/17	Real Estate Appraisers and Assessors	Concord
05/28/17	Trout Unlimited and NH Fish & Game Warner River Watershed Meeting	Warner
05/31/17	Trout Unlimited Androscoggin Watershed Meeting	Littleton
06/27/17	Southern NH Regional Planning Commission Meeting	Keene
06/28/17	Stream Crossing Assessment Group	Warner
08/19/17	Beaver Lake Association Annual Meeting	Derry
08/20/17	Country Pond Lake Association Annual Meeting	Kingston
09/29/17	Gravel Road Maintainer Workshop	Gilford
10/17/17	NH Timber Harvesting Law Workshop	Colebrook
10/19/17	NH Timber Harvesting Law Workshop	Hillsborough
10/27/17	Rockingham Regional Planning Commission Meeting	Exeter
11/04/17	NH Association of Conservation Commissions Annual Meeting	Pembroke
11/18/17	NH Association of Snowmobilers Annual Meeting	Bartlett
12/08/17	NH Land Surveyors Association Annual Meeting	Concord

Wetlands Bureau, Shoreland Program, Alteration of Terrain, and Subsurface staff also participated in several internal cross-trainings. Follow-up competency quizzes of the attendees ensured consistent understanding and interpretation of the materials provided. Program supervisors and managers noted increased confidence and more consistent interpretation of terms and rules following the training. These trainings, along with the 2016 cross-trainings are now used for new employees to ensure consistent understanding of all programs.

Table 18: Wetlands Bureau Cross-Training Events for Calendar Year 2017

Date	Topic	Location
01/17/17	Tidal Resources: Minimum Impact Projects	NHDES
01/17/17	LRM website and Inspector of the Day (IOD) and Reviewer of the Day (ROD)	NHDES
01/23/17	Wetlands / Shoreland: Request For More Information, Decisions, Findings, and Permit Conditions	NHDES
01/30/17	NHDES Wetland Mitigation and Aquatic Resource Mitigation Fund Program	NHDES
01/30/17	Tools and Technology	NHDES
02/06/17	Business Writing (HR Presenter)	NHDES
02/13/17	Natural Heritage Bureau Environmental Review (NHB Presenter)	NHDES
02/13/17	Wildlife Action Plan and Fish and Game reviews (Fish & Game)	NHDES
02/15/17	Assisting IOD Callers - LRM Websites	NHDES
02/21/17	Creating Individual Development Plans (HR Presenter)	NHDES
02/23/17	Stream Crossings and Rules	NHDES
02/27/17	Enforcement	NHDES
03/09/17	Bioengineered Streambank Stabilization and In-Stream Wood Addition Projects	NHDES
03/09/17	Permitting Projects Along NH's Designated Rivers	NHDES
03/16/17	Geomorphic Compatibility and Stream Crossing Assessment	NHDES
03/16/17	Fish Passage at Stream Crossings (Fish & Game)	NHDES
03/20/17	Hydrologic and Hydraulic Design Aspects for Stream Crossings (UNH)	NHDES
07/23/17	Wetland Delineation	Steuben, ME
09/19/17	Stream Restoration Conference	Baltimore, MD
09/27/17	Aerial Mapping	Portsmouth
09/29/17	Drones for Disaster Response	Portsmouth
10/17/17	Merrimack Country Conservation District: Soil Field Day	Concord
10/19/17	UNH Hydric Soils of New England	Auburn
10/26/17	Living Shoreline Workshop	Portsmouth
10/27/17	NHANRS: Good Forestry Workshop	Bartlett
11/08/17	UNH Wetlands Classification	Portsmouth
11/16/17	Stormwater Hydrology	Durham
12/08/17	PREP: State of Our Estuaries	Portsmouth
12/08/17	SSSNNE Soils Workshop	Concord
12/2017	Shoreline Structures Training (Twice a Week)	NHDES

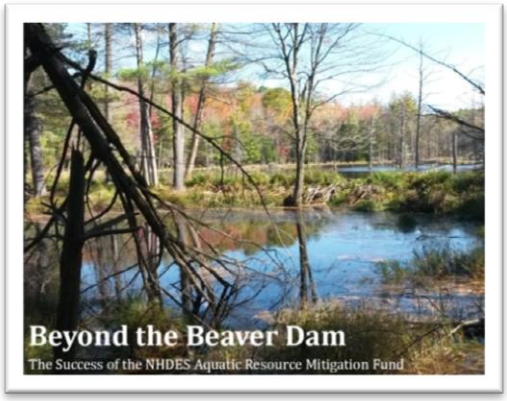
PROGRAM IMPROVEMENTS

The Wetlands Bureau had a very busy year implementing several program improvements.

Database Conversion

On January 21, 2017, the conversion from the old FoxPro database to an Oracle database was completed. The new Oracle database is now supported by in-house programming staff and provides increased functionality including: use of digital signatures, conversion of word documents to PDF, export of data to Excel for future tracking, insertion of inspection reports and photos. Additionally, the conversion brings NHDES one step closer to electronic permitting and flexibility to provide modern upgrades.

ARM Fund Program



In March 2017, the ARM Program published and distributed a 10-year anniversary book titled, *Beyond the Beaver Dam – The Success of the NHDES Aquatic Resource Mitigation Fund*. This book was distributed to all New Hampshire municipalities and program partners.

Lean Events

The NHDES / NHDOT identified an opportunity to analyze the NHDES Request for More Information (RFMI) review and NHDOT response process between the two agencies.

To address this, the Wetlands RFMI Team (comprised of NHDES and NHDOT key staff) performed a Lean analysis to attempt to streamline the use of RFMI letters when gathering all pertinent information to support a "complete application" as part of the wetland permit application review process.

The team implemented its charter to ensure that the agencies met the statutory deadlines for wetland permits with improved communications between the agencies. Once team members understood the current state, they brainstormed on ways to clarify and improve the process.

As a result of the Lean event, the team implemented several strategies to clarify and standardize the process. Among other findings, they:

- Established different responses for different "tiers" of RFMIs.
- Created checklists for application review.
- Created a standard application template with a prescribed order of attachments.
- Hired a part-time NHDOT program aide to review applications.
- Created a website where wetland permits and information was available to all online.

The ability to improve communications and the process will serve to streamline both jurisdictional needs well into the future.

NHDES Lean Project Team Members: Collis Adams, Gino Infascelli, and Jocelyn Degler. NHDOT Lean Project Members: Kevin Nyhan, Matt Urban, Steve Johnson, Dan Prehemo, Chris Carucci, and James McMahon. Project Data Managers: Wanda Bowers (NHDOS), and Meli Dube (NHDOT). Project Co-Sponsors: Clark Freise (NHDES), and Chris Waszczuk (NHDOT). "Fresh Eyes:" Joanna Bailey (NH Courts). Facilitators: Roberta Witham (NHDOS), and Candice Weingartner (NHDoIT).

GIS Team

In 2017, the Wetlands Bureau GIS Analyst (Ram Chhetri) created a multi-disciplinary LRM GIS Team as part of his Individual Development Plan. Team Members include: Pauline LaBelle, Mary Ann Tilton, Darlene Forst, Mindy Bubier, Ben Giorgi, Eben Lewis, Bethann McCarthy, Gino Infascelli, Craig Rennie, Stefanie Giallongo, and Dave Rosengarten.

The goals of the LRM GIS team are to share GIS data, information and projects, to increase use of GIS tools across LRM, to ensure coordination on GIS applications and training, and to encourage development of consistent GIS data processes.

The LRM GIS team held meetings on September 26, 2017 and November 21, 2017. During the September Kick off meeting LRM staff shared ongoing GIS projects and activities. The team brainstormed ways staff could increase knowledge and use of GIS in LRM. The following GIS projects were discussed:

- Ram Chhetri reviewed the current GIS digitizing methods and approaches for Wetlands, Shoreland, and Alteration of Terrain permit applications and complaints.
- Stefanie Giallongo reviewed the lessons learned from the summer of 2017 field season. She discussed future plans to improve the iPad digital field collection methods and planned multi-media data collection methods for LRM.
- David Rosengarten presented the use of Google+ and the Mosaic parcel data and how he combined information for Shoreland permit application reviews.
- Mindy Bubier sought a subcommittee to discuss SADES GIS data collection to create unique SADES identifiers to be linked to permit files or stream crossing assessment information.
- Ben Giorgi discussed future plans for the Subsurface Bureau to locate septic systems during operation approval inspections.

The GIS Team decided a GIS survey should be developed to assess LRM training needs for GIS.

At the November 2017 meeting the LRM GIS team heard a presentation from the NHDES GIS team, reviewed the draft LRM needs-assessment survey, and discussed next steps. Distribution of a survey is planned for 2018. The chair of the NHDES GIS Team noted that LRM is a model for NHDES in GIS project development, SOPs, and collaboration.

On-line Applicant Permit Survey Tool

In January 2017, to enhance accessibility and increase applicant response, NHDES replaced its paper questionnaire, and posted a new online permit questionnaire tool. This on-line customer satisfaction survey is sought from each NHDES wetlands permit decision. The responses of the surveys are used to measure customer satisfaction of NHDES response, guidance, and website tools. This tool now seeks more

input on NHDES web guidance and suggestions for program improvements. The Wetlands Bureau received many more on-line applicant responses than the paper questionnaire.

Assumable Waters Subcommittee Report

EPA formed the Assumable Waters Subcommittee under the auspices of the National Advisory Council for Environmental Policy and Technology (NACEPT) to provide advice and develop recommendations for NACEPT on how the EPA can best clarify for which waters a state or tribe may assume Clean Water Act (CWA) Section 404 permit responsibilities and for which waters the US Army Corps of Engineers (ACOE) retains CWA section 404 responsibility under an approved state or tribal program. The Wetlands Bureau Administrator (Collis Adams) served as one of 22 members representing states and tribes, agencies, and other stakeholders. The final report represents the results of the subcommittee's work from October 2015 to April 2017. The majority recommendation except the ACOE representative asks that EPA develop guidance or regulations to clarify that when a state or tribe assumes the 404 program, the ACOE must retain authority over waters included on lists of waters regulated under Sec 10 of the Rivers and Harbors Act.

Recognitions

National ELI Wetland Award State Government Award

On May 18, 2017, Wetlands Bureau Administrator Collis Adams was recognized by the Environmental Law Institute (ELI) for the State, Tribal, and Local Program Development award. The ELI award states that "since 2000, he has been responsible for streamlining the state's wetland permit application review process and improving the state's enforcement response processes." Collis Adams served as chair of the Association of State Wetland Managers, during which he helped create several capacity-building projects serving states and tribes in wetland regulation, restoration, monitoring and assessment, and development of wetland water quality standards. Collis Adams is an active member of the NHDES "Silver Jackets," an incident and recovery response team that works to increase awareness, reduce flood risk, and facilitate partnerships related to mitigating and recovering from flooding events." Collis Adams stated in his opening remarks at the awards ceremony that "Developing a wetland program cannot be accomplished through the efforts of one person. It takes a team of dedicated and passionate professionals, and I am fortunate enough to be team captain."

EPA Recognition for Program Excellence

In 2017, EPA recognized the NHDES ARM Program. The ARM Program also amended its In-Lieu Fee Program Instrument with the ACOE.

Award for Outstanding Lean Management Process

On December 7, 2017, at the NHDES annual awards ceremony, Collis Adams (Wetlands Bureau Administrator), and Gino Infascelli (Public Highway Supervisor) were recognized along with NHDOT partners, as members of the Wetlands Request for More Information (RFMI) Lean Project Team to receive the 2017 Continuous Process Improvement Award. See Lean Events section above for more details.

Award for Excellence in Compliance Assurance and Field Services

On December 7, 2017, at the NHDES annual awards ceremony, Jeffrey Blecharczyk (Compliance Supervisor) was recognized as the recipient for the 2017 Excellence in Compliance Assurance and Field Services award.

NHDES Employee of Year Candidate Recognition

On December 7, 2017, at the NHDES annual awards ceremony, Lori Sommer (Mitigation Program Coordinator) was recognized as a candidate for the NHDES 2017 Employee of the Year Award. “As manager of the Wetland Mitigation Program, Lori Sommer has worked to build a recognized, award-winning program that delivers positive environmental outcomes, while also streamlining and improving government processes.” Lori was recognized for work in building a partnership with NHDOT as part of the Stream Crossing Initiative, invaluable support to mentoring younger employees readily and with integrity. “Through Lori’s vision, New Hampshire is further on its path of interagency collaboration to address the public policy challenge of aging and environmentally incompatible infrastructure.”

Balanced Score Card

Working with stakeholders, the Wetlands Bureau worked on developing a Balanced Score Card. The Balanced Score Card provides a management system to measure progress and activities toward four-program goal categories: 1) Customer Satisfaction, 2) Performance Mission, 3) Operational Processes, and 4) Employee Development and Organizational Capacity. A key customer satisfaction measure is to provide timely reviews and receive positive feedback from customer surveys. In 2017, the Wetlands Bureau developed new reports to track the number of days to first review of applications and an online permit questionnaire. Key measures of performance are to: 1) increase the number of permits inspected, 2) increase the number of permitted projects that achieve permit compliance, and 3) facilitate early coordination by increasing the number of pre-application meetings. These measures are tracked through the permitting and compliance programs and have helped facilitate increased efficiencies in operational processes.

CONCLUSION

In 2017, the NHDES Wetlands Bureau made significant progress in achieving milestones under its Wetland Program Plan (2017 – 2023). EPA grant projects supported updates to national wetland inventory maps in two watersheds (Merrimack River and the Piscataqua-Salmon Falls River Watersheds). The Stream Crossing Steering Committee made great progress in refining its protocol, development of a training manual, increasing stream crossing assessments, and providing training on stream crossings to all technical staff.

Emergent wetland in Madison, NH
Photo courtesy of Amy Hudnor

From March 14 – 16, 2017, at the 2017 annual New England Association of Environmental Biologists (NEAEB) conference in Hartford, Connecticut, NHDES presented preliminary results on "Adapting Protocols and Models to Assess Wetland Conditions in New Hampshire."

In 2017, as part of first complete major rewrite of the rules since 1991, the wetlands bureau finalized work on the program draft. The Wetlands Bureau also finalized work on six Best Management Practices manuals. One of these manuals is a new Wetlands Best Management Practice Techniques for Avoidance and Minimization to guide applicants based on project type.

In 2017, permitting staff dedicated significant time participating in over 549 pre-application meetings, providing technical review guidance to provide clear and consistent direction to applicants, improving communications between state / federal agencies and the applicants. Permitting staff also dedicated significant resources to emergency response to address the July and October storm events.

In 2017, the Wetlands Bureau received national recognitions from ELI and EPA. Wetlands Bureau staff were also recognized by the NHDES Commissioner in several areas at the annual NHDES awards ceremony.