

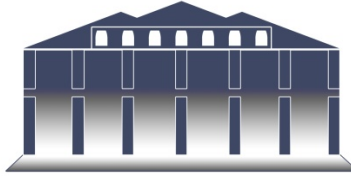
**DEQ Working to Improve Organizational Structure  
and Permit Processes, But Targeted Adjustments  
and a Permit Performance Management System  
Are Still Needed**



**Final Report to the Joint Legislative  
Program Evaluation Oversight Committee**

**Report Number 2019-09**

**November 20, 2019**



Program Evaluation Division  
North Carolina General Assembly  
Legislative Office Building, Suite 100  
300 North Salisbury Street  
Raleigh, NC 27603-5925  
919-301-1404  
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**NORTH CAROLINA GENERAL ASSEMBLY**  
Legislative Services Office

Paul Coble, Legislative Services Officer

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*Program Evaluation Division*  
300 N. Salisbury Street, Suite 100  
Raleigh, NC 27603-5925  
Tel. 919-301-1404 Fax 919-301-1406

*John W. Turcotte*  
Director

November 20, 2019

Senator Brent Jackson, Co-Chair, Joint Legislative Program Evaluation Oversight Committee  
Representative Craig Horn, Co-Chair, Joint Legislative Program Evaluation Oversight Committee

North Carolina General Assembly  
Legislative Building  
16 West Jones Street  
Raleigh, NC 27601

Honorable Co-Chairs:

The Joint Legislative Program Evaluation Oversight Committee's 2019–20 Work Plan directed the Program Evaluation Division to examine spans of control and organizational layers in the Department of Environmental Quality (DEQ) and additionally examine the levels of approval required when processing complex industrial and/or agricultural permits.

I am pleased to report that the Department of Environmental Quality cooperated with us fully and was at all times courteous to our evaluators during the evaluation.

Sincerely,

A handwritten signature in black ink, appearing to read "John W. Turcotte".

John W. Turcotte  
Director

## Mandatory Evaluation Components

### Report: 2019-09: DEQ Working to Improve Organizational Structure and Permit Processes, But Targeted Adjustments and a Permit Performance Management System Are Still Needed

N.C. Gen. § 120-36.14 requires the Program Evaluation Division to include certain components in each of its evaluation reports, unless exempted by the Joint Legislative Program Evaluation Oversight Committee. The table below fulfills this requirement and, when applicable, provides a reference to the page numbers(s) where the component is discussed in the report.

N.C. Gen. § 120-36.14 Specific Provision	Component	Program Evaluation Division Determination	Report Page
(b)(1)	Findings concerning the merits of the program or activity based on whether the program or activity		
(b)(1)(a)	Is efficient	<p>Span of control refers to the number of employees a supervisor oversees; organizational layers refers to the number of levels in an organization's hierarchy. Narrow spans of control, wherein one supervisor oversees three or fewer employees, create more layers in an organization, which leads to greater costs and can potentially encourage over-involvement or under-involvement by managers. <b>In 2016 and 2019, the Department of Environmental Quality (DEQ) exceeded the Office of State Budget and Management's (OSBM's) recommended number of organizational layers (seven) by three and four additional layers, respectively.</b> Further, from 2016 to 2019, the agency increased its percentage of narrow spans from 30% to 32%. However, during the same period DEQ also increased its percentage of supervisors overseeing the recommended eight staff members from 24% to 27% and decreased the concentration of staff beyond the 7th layer from 35% to 15%. <b>Overall, these counteracting positive and negative structural changes resulted in DEQ's 2019 agency-wide levels of narrow spans and organizational layers remaining similar to 2016 levels.</b> The Program Evaluation Division further examined the individual organizational units within the agency and found <b>five units contain particularly high percentages of narrow spans, indicating these units are the most likely to demonstrate structural efficiency issues. The Marine Fisheries unit contains the majority of these potential issues.</b></p>	12-21
(b)(1)(b)	Is effective	<p>DEQ grants individual organizational units autonomy to structure staff as they see fit and meet agency goals within the bounds of legal and budgetary limits; however, <b>without a central oversight system to track permitting activities, determining structural effectiveness is challenging.</b> The agency uses a "cascading approach" by calibrating unit activities to the mission and vision set by the Secretary and Governor. Although this approach may be appropriate to meet the diverse demands within the organization, DEQ lacks a central performance management system for permitting that could methodically collect data and compare it against goals. As a result, standardized data does not exist that could demonstrate whether the agency is effective.</p>	1, 15
(b)(1)(c)	Aligns with entity mission	<p>DEQ's mission is to provide science-based environmental stewardship for the health and prosperity of all North Carolinians. <b>DEQ structures each of its units to meet this mission.</b></p>	7, 15

(b)(1)(d)	Operates in accordance with law	This evaluation focused on DEQ's organizational structure and processing of complex industrial and agricultural permits. <b>DEQ adheres to legal and budgetary directives regarding its structure and administers its permits according to each permit's legal parameters.</b>	20, 21
(b)(1)(e)	Does not duplicate another program or activity	DEQ is the only state agency that processes complex industrial and agricultural permits. <b>Therefore, duplication does not exist.</b>	7
(b)(1a)	Quantitative indicators used to determine whether the program or activity		
(b)(1a)(a)	Is efficient	The Program Evaluation division measured structural efficiency by examining the agency's organizational layers and spans of control at the agency level and the unit level within the agency.	12, 13
(b)(1a)(b)	Is effective	The Program Evaluation Division sought to measure the effectiveness of DEQ's organizational structure, but the data that would allow for this analysis does not exist and would be prohibitively time-consuming to collect. Implementation of a performance management system for permitting and fulfillment of the goals set forth by the Permitting Transformation Project offer the possibility that the intersection of permitting activities and organizational structure can be assessed in the future.	
(b)(1b)	Cost of the program or activity broken out by activities performed	The activity related to this evaluation is processing complex industrial and agricultural permits. Performing activity-based costing for the processing of permits as it relates to the structure of the organization was not possible because budget codes track whether an employee worked on a type of permit (e.g. Animal Waste permit) but not the specific permit itself. Therefore, budgetary data cannot be examined against the data the Program Evaluation Division collected on levels of approval or staff and entities involved in permitting because that data is organized per permit and not by permit type.	
(b)(2)	Recommendations for making the program or activity more efficient or effective	The Program Evaluation Division Recommended the General Assembly should direct DEQ to <ul style="list-style-type: none"> <li>• examine narrow spans in five identified divisions in an effort to establish whether some spans could be collapsed and/or if some spans may not be needed if a technical expertise track was available;</li> <li>• develop a formal business plan for the Permit Transformation Project; and</li> <li>• develop a performance management plan for permit processes including performance measures, goals, and a system to help track these items systematically over time.</li> </ul>	33, 34
(b)(2a)	Recommendations for eliminating any duplication	The Program Evaluation Division <b>did not find evidence of duplication</b> in DEQ's processing of complex industrial and agricultural permits.	21, 26
(b)(4)	Estimated costs or savings from implementing recommendations	Studying the narrow spans in the five units identified in the report <b>could enable DEQ to collapse certain spans and save money over time in consideration of the fact that narrower spans and increased numbers of layers lead to greater supervisory-related costs.</b> However, it has not yet been determined which spans are essential, and therefore a cost savings cannot yet be calculated.	33



# PROGRAM EVALUATION DIVISION

## NORTH CAROLINA GENERAL ASSEMBLY

November 2019

Report No. 2019-09

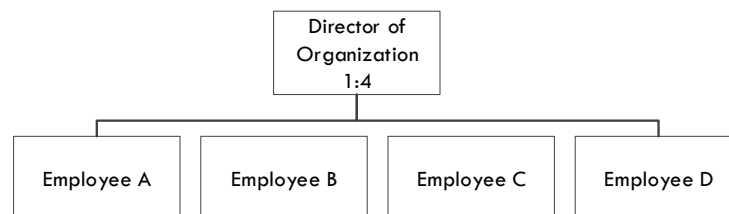
## DEQ Working to Improve Organizational Structure and Permit Processes, But Targeted Adjustments and a Permit Performance Management System Are Still Needed

### Highlights

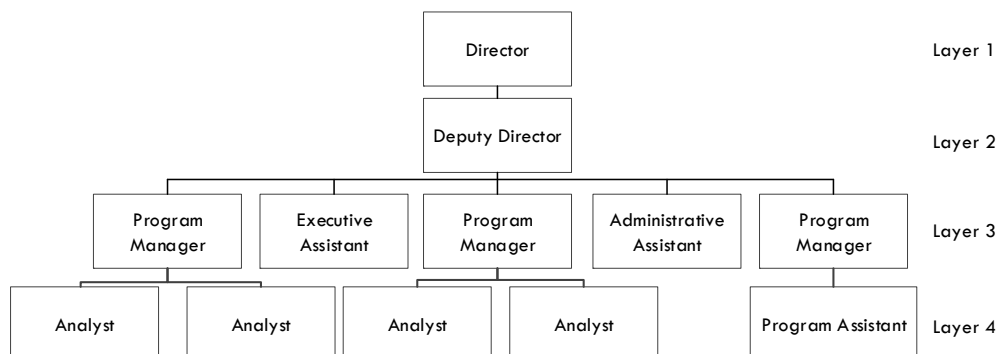
**IN BRIEF:** At the agency level, the Department of Environmental Quality's (DEQ's) average span of control and total organizational layers in 2019 remain similar to 2016 levels. Five of DEQ's 20 organizational units contain higher levels of narrow spans and more organizational layers than recommended, with the Division of Marine Fisheries presenting the greatest potential for structural issues. Although decentralization of permit processing enables units to meet varied permit requirements, granting such autonomy absent a permit performance management system limits DEQ's ability to ensure processes are efficient and effective. DEQ's Permitting Transformation Project offers a way to build such a system.

**Background:** The Joint Legislative Program Evaluation Oversight Committee directed the Program Evaluation Division (PED) to examine DEQ's spans of control and organizational layers as a follow-up to a 2016 PED study, which found DEQ exceeded recommended levels. The directive also tasked PED with examining the levels of approval required for processing complex industrial and/or agricultural permits.

Span of control is a ratio that refers to the number of employees a supervisor oversees. The span of control in the example below is 1:4.



Organizational layers refer to the number of levels in an organization's hierarchy from top to bottom. The organization below has four layers.



## Highlights

**DEQ's agency-wide span of control and number of organizational layers in 2019 remain similar to 2016 levels.** From 2016 to 2019, concentration of DEQ staff among the organization's layers shifted towards the center, indicating the department is making progress towards reaching the OSBM-recommended seven layers. The percentage of spans of control that met the OSBM-recommended 1:8 ratio increased from 24% to 27% during this period, but the rate of narrow spans also increased, from 30% to 32%. The net result of these positive and negative structural changes is that agency-level figures remain similar. As a result, PED examined individual units within DEQ.

**Five units maintain organizational structures such that narrow spans of control account for 50% or more of all spans in the unit.**

Narrow spans can lead to situations in which managers are over-involved or under-involved. Further, they create more organizational layers, which bring additional costs to the agency. PED conducted a regression analysis and found DEQ supervisors make \$9,905 more per year, on average, for every organizational layer they ascend.

**Five DEQ Units Contain Potential Structural Inefficiencies**

DEQ Unit	Staff Size	Percentage of Spans that Are Narrow	Total Layers of Unit	Potential for Structural Inefficiencies
Public Affairs	23	60	5	Likely
Mitigation Services	30	73	6	Likely
HR	33	73	6	Likely
CFO	36	58	6	Likely
Marine Fisheries	324	53	11	Very Likely

The Division of Marine Fisheries maintains the lowest average span of control within the agency at 1:3.8. Eighty-five percent of its employees work in the unit's lowest five layers whereas only 15% work in the top six layers. This bottom-heavy structure indicates the top of the unit is management-heavy.

**Recommendation:**

The General Assembly should direct DEQ to study narrow spans in the five identified units and justify their presence or suggest ways to adjust the spans.

**PED identified 22 complex industrial and/or agricultural permits that vary in requirements and processes; variation in permit processes is not inherently problematic, but the lack of a central permit performance management system raises oversight concerns.** DEQ's recently launched Permitting Transformation Project represents an opportunity to address these deficiencies but needs adjustments.

**Recommendation:**

The General Assembly should direct DEQ to develop 1) a return-on-investment measure for the Permitting Transformation Project and 2) a formalized permit performance management plan, including goals, performance measures, and assessment tools to review all permit processes.

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## Purpose and Scope

The Joint Legislative Program Evaluation Oversight Committee's (JLPEOC) 2019–20 Work Plan directed the Program Evaluation Division to examine spans of control and organizational layers in the Department of Environmental Quality (DEQ) by conducting a bottom-up review of all supervisory, managerial, and executive positions. The directive also required the Division to assess the levels of approval required for issuing complex industrial and/or agricultural permits. The spans and layers portion of the study represents a follow-up to a 2016 Division report that evaluated all state agencies. The study found that DEQ's average span of control (1:5.5) exceeded the statewide standard of 1:8, though only one state agency actually met the standard. The study also found that DEQ contained 10 organizational layers, which exceeded the statewide standard of seven layers and was fifth largest among 21 principal departments.<sup>1</sup>

The permit portion of this evaluation assesses the extent to which complex industrial and/or agricultural permit processes administered by DEQ require levels of approval and adhere to best practices.

This evaluation addressed six research questions:

1. How do DEQ's current spans of control and organizational layers compare to 2016 levels?
2. How do spans of control and organizational layers compare among DEQ units?
3. What factors guide how DEQ structures its spans of control and organizational layers?
4. Which DEQ permits are related to complex industrial and/or agricultural projects and what factors contribute to their complexity?
5. How many people and which entities are involved in processing and approving the identified complex agricultural and/or industrial permits?
6. To what extent does DEQ adhere to permitting best practices when processing the identified complex agricultural and/or industrial permits?

The Program Evaluation Division collected data from several sources including

- review of DEQ data including salaries and supervisory relationships from BEACON as of June 2, 2016 and June 30, 2019;<sup>2</sup>
- survey of DEQ division/organizational unit directors regarding structural and organizational decision making;
- survey and query of DEQ division/organizational unit directors regarding the processing of 22 identified complex industrial and/or agricultural permits;

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<sup>1</sup> Program Evaluation Division. (2016, December). *Most departments' spans of control and number of organizational layers do not meet recommended levels*. Report to the Joint Legislative Program Evaluation Oversight Committee. Raleigh, NC: General Assembly.

<sup>2</sup> BEACON (Building Enterprise Access for North Carolina's Core Operation Needs) is the State's human resources and payroll infrastructure system. Analyses within this report include Temporary Solutions staff.



- interviews with central DEQ and Office of State Human Resources staff; and
- review of academic and practitioner literature on spans of control, organizational layers, and best practices in processing permits.

The evaluation examines the structure and management of 20 organizational units within DEQ.<sup>3</sup> The report uses the term “unit” to describe subgroups within the agency that are often referred to as divisions.

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## Background

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**North Carolina passed the Executive Organization Act in 1971 and established a state environmental agency, the Department of Natural and Economic Resources.** Prior to the 1960s, state governments and the federal government of the United States did not make environmental policies or regulate environment-related activities. With the passage of the National Environmental Policy Act of 1970 and the establishment of the Environmental Protection Agency, states began establishing their own environmental agencies.

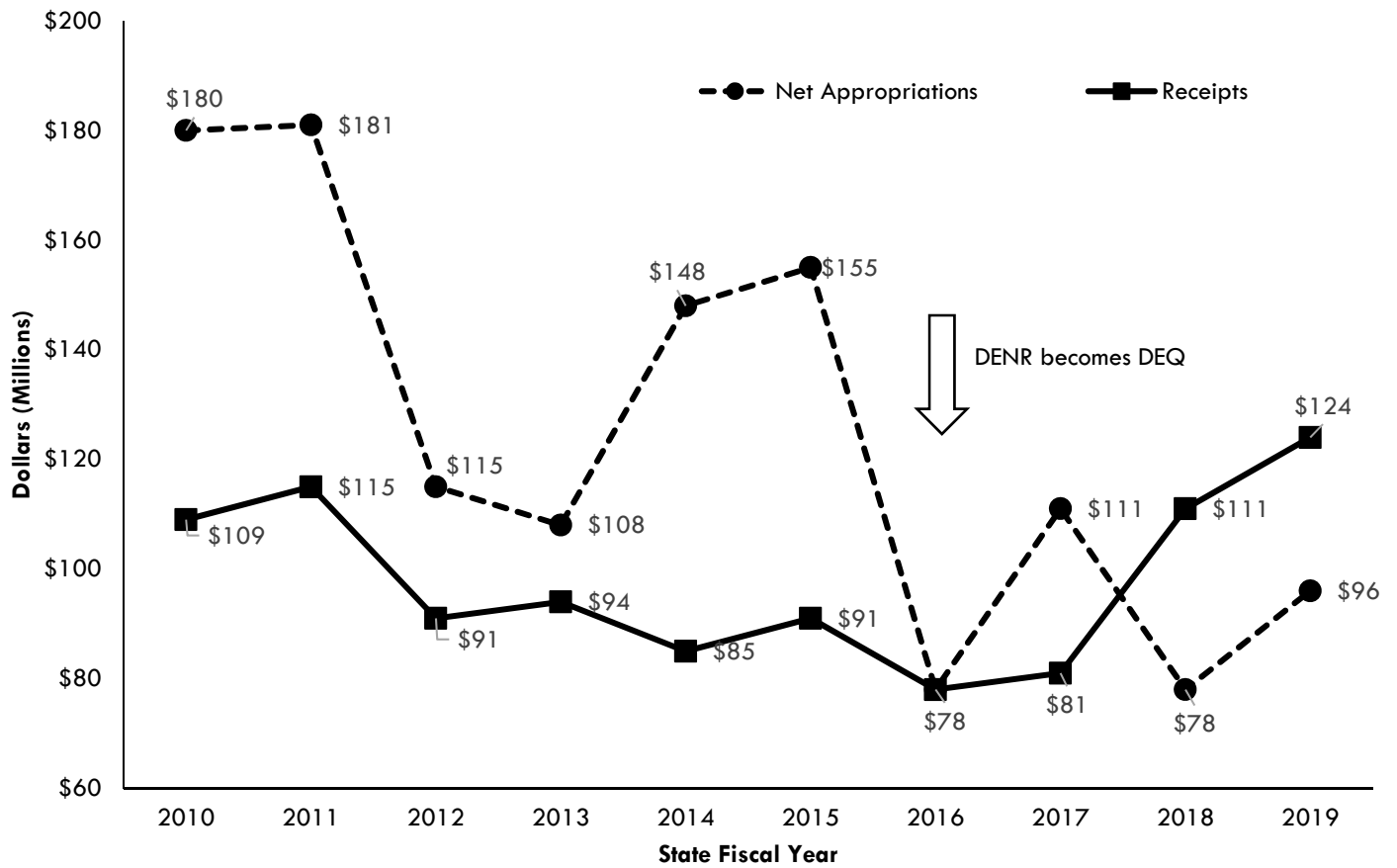
**North Carolina’s environment-oriented organizations have undergone several changes since 1971, with the most recent changes occurring within the last five years.** In 2015, the General Assembly changed the name of the agency to the Department of Environmental Quality (DEQ) and altered its mission to focus on environmental protection and regulation. That same year, N.C. Session Law 2015-241 transferred the State’s natural resources attractions (aquariums, state parks, the Museum of Natural Sciences, and the Zoo), the Clean Water Management Trust Fund, and the Natural Heritage Program from DEQ to the Department of Natural and Cultural Resources (DNCR).

With the transfer of the above-mentioned organizational activities, DEQ’s overall budget decreased; in particular, general fund net appropriations declined 62% between State Fiscal Year 2014–15 and 2018–19, from \$155 to \$96 million. Exhibit 1 shows the changes in DEQ’s net general funding and receipts during the past decade.

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<sup>3</sup> This evaluation did not examine one unit within DEQ, the Office of the Chief Information Officer. This unit is funded by the Department of Information Technology instead of DEQ.

### Exhibit 1: DEQ Funding Decreased from 2015 to 2016 Following Legislative Changes to Agency Activities, Structure, and Mission



Note: DENR stands for the Department of Environmental and Natural Resources. DEQ stands for the Department of Environmental Quality

Source: Program Evaluation Division based on data from the North Carolina Accounting System.

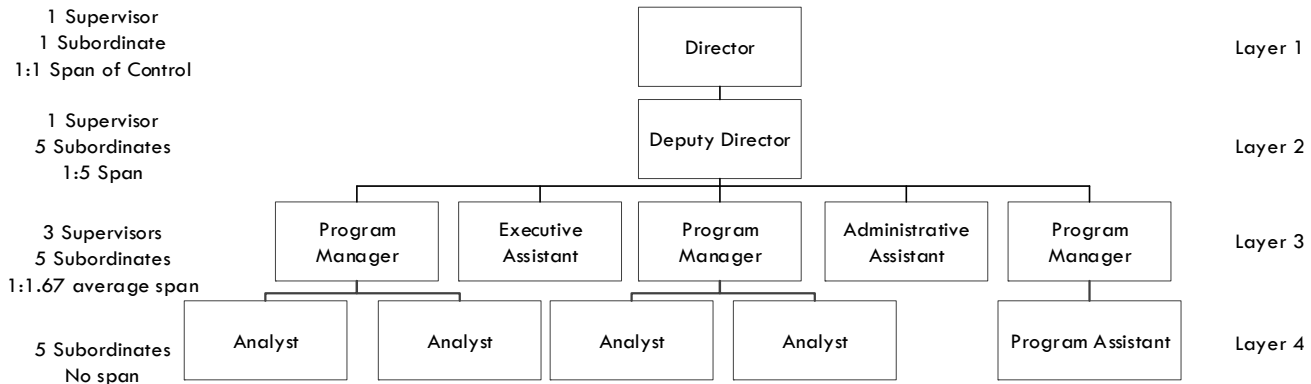
**This evaluation's directive tasked the Program Evaluation Division (PED) with examining DEQ's spans of control and layers as a follow-up to a 2016 PED study that examined the same components.** Span of control and organizational layers are defined as follows:

- **Span of control** refers to the number of employees a supervisor oversees. For example, a supervisor overseeing three people has a span of 1:3. Oversight activities include, by state definition, approving employee timesheets and conducting employee performance evaluations.
- **Organizational layers** refer to the number of levels that constitute an organization's hierarchy, from its highest to lowest position.

**Spans of control and organizational layers directly relate to each other.** The supervisor to whom an employee reports occupies the layer above that employee, whereas the employees a supervisor oversees work in the layer below. Ideally, an organization's structure enables effective and efficient

flow of communication. Exhibit 2 illustrates the relationship between span of control and layers.

### Exhibit 2: Sample Deputy Director with Span of Control of 1:5 and 4 Layers



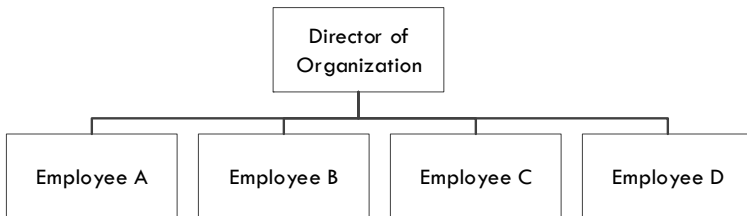
Source: Program Evaluation Division.

**Different span of control configurations can lead to greater or fewer organizational layers.** Broader or larger spans, in which supervisors oversee many employees, result in fewer organizational layers. Conversely, narrow spans, defined as those in which a supervisor oversees three or fewer subordinates, create more layers. Exhibit 3 depicts the relationship between span size and number of layers.

### Exhibit 3: Smaller Spans of Control Create Additional Organizational Layers

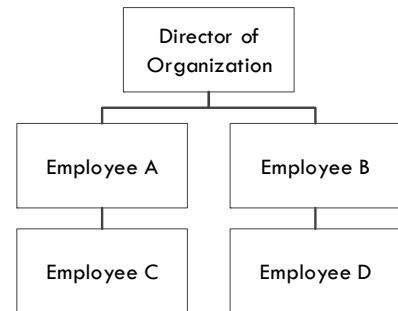
#### Scenario 1: Broad Span

Head of an organization with five employees chooses to have a span of 1:4, resulting in two layers. All employees report to the head of the organization.



#### Scenario 2: Narrow Spans

Head of an organization with five employees chooses to have a span of 1:2, resulting in three layers. Employees A and B report to the head of the organization. Employee C reports to Employee A, and Employee D reports to Employee B.



Source: Program Evaluation Division.

**Most factors that contribute to determining appropriate spans of control or number of organizational layers fit within three broad categories.**

These categories are

- diversification and complexity of the organization’s activities,
- the element of time, and
- the element of space or geographic proximity.

The relative weight of each factor differs depending on the type of work supervisors and their subordinates undertake. Generally, organizations executing highly technical work that is prone to frequent changes or subject to tight deadlines need closer levels of staff supervision and therefore smaller spans of control. In contrast, an organization undertaking routine, steadily-paced work in a stable environment requires less oversight and fewer managers, lending itself to larger spans of control and fewer layers.

**Academic and practitioner literature lacks consensus on a recommended standard for span of control or organizational layers.** Exhibit 4 compiles suggested spans of control, organizational layers, and definitions of narrow spans from various sources.

#### Exhibit 4: OSBM and OSHR's Suggested Spans and Layers are Average-to-Lenient Compared to Other Organizations

Source	Year	Organization	Suggested Minimum Span	Suggested Level for Narrow Span	Suggested Organizational Layers
Boston Consulting Group	2008	Any Organization	1:6-8	1:3	6
Iowa Legislation	1992	State Government	1:15		
Kodak Company	1993	Private Organization			5
Oregon Legislation	2011	State Government	1:11		
National Performance Review	1994	Federal Government	1:14	1:3	
NC OSBM	1996	State Government	1:8	1:3	7
NC OSHR	2019	State Government		1:3	
Texas Legislation	1997 to present	State Government	1:11		
Western Management Consultants	2014	Any Government Entity		1:5	

Notes: OSBM stands for the Office of State Budget and Management. OSHR stands for the Office of State Human Resources

Source: Program Evaluation Division.

**This evaluation used benchmarks suggested by North Carolina's Office of State Budget and Management.** OSBM's suggested minimum span of control is 1:8, its threshold for a narrow span of control is 1:3 or lower, and it recommends an organization contain seven or fewer layers. Further, the Office of State Human Resources currently uses 1:3 as an industry guide for defining the minimum ratio for a supervisor-to-subordinate ratio, supporting the selection of 1:3 to guide narrow span of control analysis.

The Program Evaluation Division selected these benchmarks to allow for direct comparison between the Division's 2016 study and this study, and

because the measures presented by OSBM and OSHR are average or conservative compared to other suggested parameters.

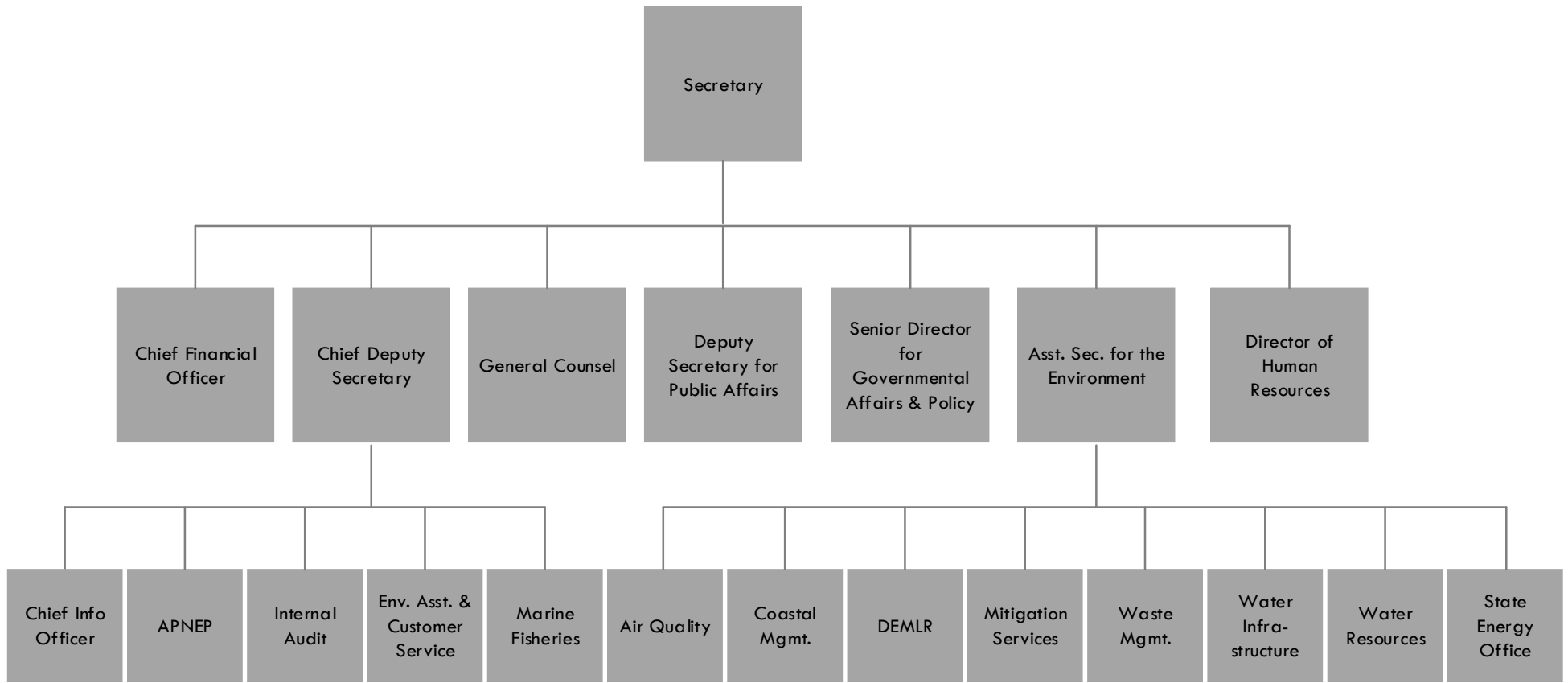
**DEQ currently employs a total of 1,778 full-time equivalent (FTE) positions (1,605 FTE permanent positions and 173 FTE temporary positions) to achieve its mission.**<sup>4</sup> DEQ defines its mission as “providing science-based environmental stewardship for the health and prosperity of all North Carolinians.”

**The Secretary occupies the top layer of DEQ; the agency’s 20 constituent units are housed two layers below.** Exhibit 5 shows the structural relationship of DEQ’s three highest organizational layers. Seven unit directors report directly to the Secretary and the remaining 13 unit directors report to either the Chief Deputy Secretary or the Assistant Secretary of the Environment.

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<sup>4</sup> Temporary intern staff positions were excluded from the counts and analysis. Temporary staff positions without a supervisor at DEQ were also excluded.

## Exhibit 5: DEQ Current Organizational Structure, Layers, and Span of Control for Directors of Units/Divisions



Notes: The Chief Information Office is included in the chart but not in this report's analysis because it is funded outside of DEQ. APNEP stands for the Albemarle-Pamlico National Estuary Partnership. DEMLR stands for the Division of Energy, Mineral, and Land Resources.

Source: Program Evaluation Division based on BEACON data from June 30, 2019.

**Operational requirements and activities of staff within the 20 units of DEQ fall within these general categories:**

- administration of environmental permits and programs,
- provision of technical assistance to citizens and businesses,
- provision of environmental education, and
- advancement of energy strategies in the State.

A description of each unit's specific activities, number of staff, and average staff salary is provided in Exhibit 6.

**Exhibit 6: Activity Description, Staff Size, and Average Salary for Each DEQ Unit**

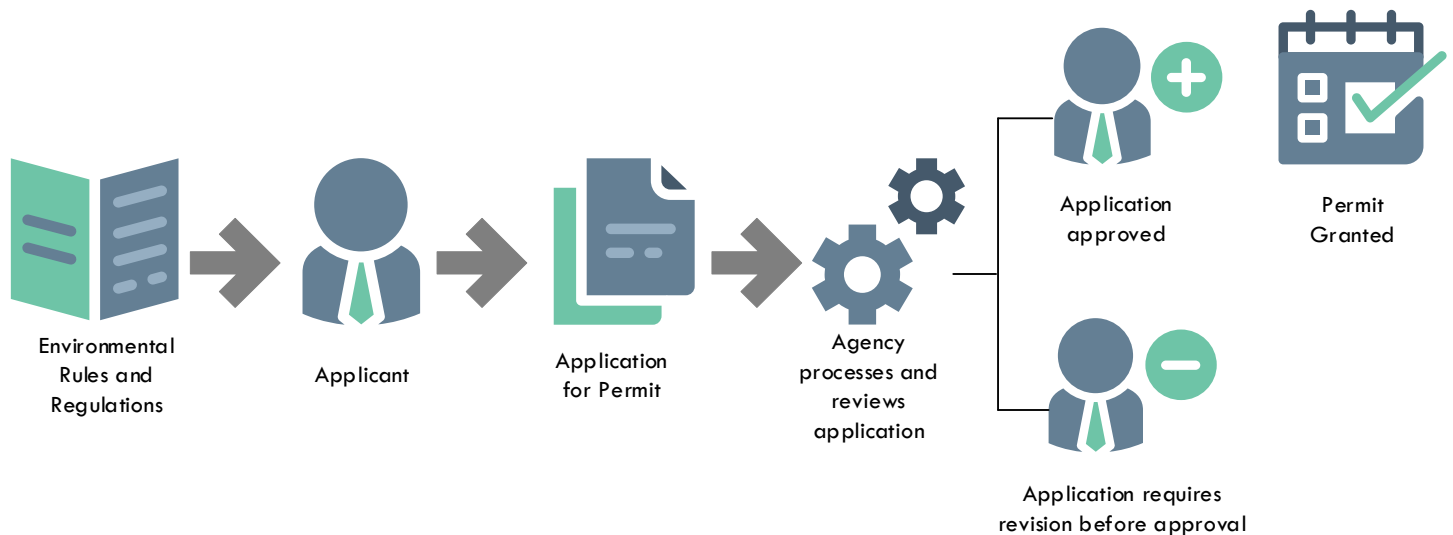
Unit Name	Unit Activity Description	Full-Time Equivalent Count	Unit Average Salary
Internal Audit	Provides independent assurance & consulting to improve operations	3	\$ 72,731
Secretary's Office	Leads DEQ in providing science-based environmental stewardship	3	109,875
Chief Deputy	Coordinates efforts in executing DEQ's mission & Secretary's goals	4	43,922
Government Affairs & Policy	Provides guidance & support to DEQ on legislation & policy	6	56,212
Asst. Sec. of the Environment	Oversees 8 divisions. Manages regulatory policy initiatives & programs	7	95,196
APNEP	Identifies, protects, & restores resources in Albemarle-Pamlico estuarine	11	45,432
General Counsel	Manages litigation & rulemaking, ethics, & public records laws compliance	13	74,992
Public Affairs	Provides public information & engagement, & media relations	23	43,747
State Energy Office	Provides technical assistance, services, & funding to enhance energy security, advance energy initiatives, & ensure sustainable energy future	26	35,220
Mitigation Services	Provides mitigation alternatives to unavoidable environmental impacts by restoring stream, wetland, & riparian buffers	30	66,503
Human Resources	Interprets, monitors, & assists with federal & state HR compliance	33	48,148
Chief Financial Office	Oversees budget, accounting functions, federal grant admin., procurement & service contracts, commodity & service purchasing, construction, acquisition of real property, & risk management	36	51,030
Water Infrastructure	Provides financial help for water quality projects: sewer collection, drinking water, treatment plants, storm water management, & stream restoration	47	58,746
Coastal Management	Protects, conserves, & manages coastal resources	53	46,139
Env. Asst & Customer Service	Protects environment, supports economic growth, & customer service	65	38,342
DEMLR	Regulates & provides technical assistance related to mining, dams, sediment & erosion control & storm water management	126	48,675
Air Quality	Protects & improves outdoor or ambient air quality	218	55,115
Waste Management	Protects public health & environment through management of solid & hazardous wastes and underground storage tanks, as well as cleaning up contamination	284	53,152
Marine Fisheries	Ensures sustainable marine & estuarine fisheries & habitats	324	33,851
Water Resources	Ensures safe drinking water in accordance with federal law, issues pollution control permits, monitors permit compliance, evaluates environmental water quantity & quality, & carries out enforcement	466	48,345
<b>Department-Wide</b>		<b>1,778</b>	<b>\$ 56,269</b>

Note: Position counts include both permanent and temporary budgeted positions.

Source: Program Evaluation Division based on BEACON data from June 30, 2019. DEQ provided unit activity descriptions.

**As shown in Exhibit 6, permit processing is a major activity undertaken by several DEQ units.** Certain activities are permissible only if a citizen or business applies for the appropriate permit. Both the federal government and state governments make laws and rules to protect the environment and human health from potentially harmful activities of citizens or businesses. To that end, DEQ processes over 200 types of permits. Requiring an applicant to undergo a permitting process allows the permitting agency to better understand what the would-be permittee intends to do and subsequently approve or reject the proposed project/activity. Exhibit 7 broadly illustrates the general steps of the permitting process, though DEQ administers permits with varying numbers of steps, levels of approval, legislated requirements, and degrees of complexity.

### Exhibit 7: General Permit Application Process



Source: Program Evaluation Division

**The Joint Legislative Program Evaluation Division Oversight Committee’s 2019–20 Work Plan required the Program Evaluation Division to examine the levels of approval required for issuance of complex industrial and/or agricultural permits.** Based on data provided by DEQ, the Program Evaluation Division determined 22 of the department’s permits involve complex industrial and/or agricultural projects. Selected permits met the following criteria:

1. The permit is highly related to industrial projects; **and/or**
2. The permit is highly related to agricultural projects; **and**
3. The permit itself is difficult to process **and** is related to complex projects.

Exhibit 8 shows the 22 permits selected for this evaluation, the respective DEQ unit administering the permit, and whether the permit is agricultural and/or industrial in nature. Three DEQ units administer the 22 identified permits: the Division of Air Quality, Division of Energy, Mineral and Land Resources (DEMLR), and Division of Water Resources.



## Exhibit 8: Twenty-Two Complex Industrial and/or Agricultural Permits Were Identified for Evaluation

DEQ Division	Permit Name	Agricultural	Industrial
<b>Division of Air Quality</b>	Construction & Operation (Greenfield)	√*	√
	New Source Review Air Permit/Prevention of Significant Deterioration (PSD)	√*	√
	Small/Synthetic Minor	√*	√
	Title V Permit Modification	√*	√
<b>Division of Energy, Mineral, and Land Resources</b>	Erosion & Sediment COA		√
	Erosion & Sediment COA - Express		√
	Exploration for Uranium		√
	Geophysical Exploration		√
	Mining		√
	NPDES (National Pollutant Discharge Elimination System) Stormwater		√
	Oil or Gas Well Permit		√
	State Stormwater (Individual & General)		√
	State Stormwater (Individual & General) - Express		√
<b>Division of Water Resources</b>	Animal Waste NPDES	√	
	Animal Waste STATE	√	
	Central Coastal Plain Capacity Use Area	√	√
	Industrial User Pretreatment		√
	In-situ Groundwater Remediation		√
	NPDES (National Pollutant Discharge Elimination System) Wastewater		√
	Reclaimed Water Systems (Wastewater Treatment)		√
	Wastewater Irrigation Systems (Wastewater Treatment)		√
	Wastewater/Groundwater Laboratory Certification		√

Notes: Asterisk indicates the permit is sometimes related to the given category, but not always. Erosion & Sediment Certificate of Approval and State Stormwater (Individual & General) have express options as well as a traditional option.

Source: Program Evaluation Division based on data from DEQ.

In summary, the Joint Legislative Program Evaluation Oversight Committee's 2019-20 Work Plan directed the Program Evaluation Division to examine the structure of DEQ as well as one of its activities, the issuance of complex industrial and/or agricultural permits. The structural component of this evaluation represents a follow-up to a 2016 study in which the Division found DEQ's average span of control and total number of organizational layers exceeded recommended levels. This evaluation also seeks to pinpoint where some of the more problematic or at-risk areas of structural

deficiency exist within the department at the unit level. Finally, the evaluation assesses 22 complex industrial and/or agricultural permits in terms of the levels of approval required and adherence to best practices.

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## Findings

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### **Finding 1. At the agency level, the Department of Environmental Quality's average span of control and total organizational layers in 2019 remain similar to 2016 levels.**

As discussed in the Background, span of control refers to the number of employees a supervisor oversees, whereas organizational layers refer to the number of levels in an organization's hierarchy from its highest to lowest position. Literature differs regarding the ideal span of control and number of layers, but the Program Evaluation Division used the same Office of State Budget and Management (OSBM) benchmarks for this study of the Department of Environmental Quality (DEQ) as it did for its 2016 evaluation of all principal state agencies. OSBM recommends a minimum 1:8 span of control and seven layers as well as a 1:3 threshold for narrow spans of control.

### **DEQ's agency-wide span of control improved slightly from 2016 to 2019 (1:5.5 to 1:5.6), but its percentage of narrow spans also increased.**

The slight increase in DEQ's agency-wide span of control indicates that some supervisors are overseeing more employees in 2019 than in 2016. As shown in Exhibit 9, the number of DEQ supervisors overseeing the OSBM-recommended standard of eight staff increased by three percentage points, from 24% to 27%. However, as also shown in Exhibit 9, the percentage of supervisors with narrow spans, in which a supervisor oversees three or fewer employees, increased from 30% to 32%. This inverse relationship indicates some spans expanded but some contracted, which results in the agency's overall span of control ratio in 2019 (1:5.6) remaining similar to its ratio in 2016 (1:5.5).

## Exhibit 9

Increase in Broad Spans  
Since 2016 Offsets  
Increase in Number of  
Supervisors with Narrow  
Spans at the Agency Level

Broad Spans of Control Ratio	Percentage of DEQ Supervisors	
	2016	2019
1:8	24%	27%

Narrow Spans of Control	Percentage of DEQ Supervisors	
	2016	2019
1:1	10%	11%
1:2	11	10
1:3	9	11
<b>Total</b>	<b>30%</b>	<b>32%</b>

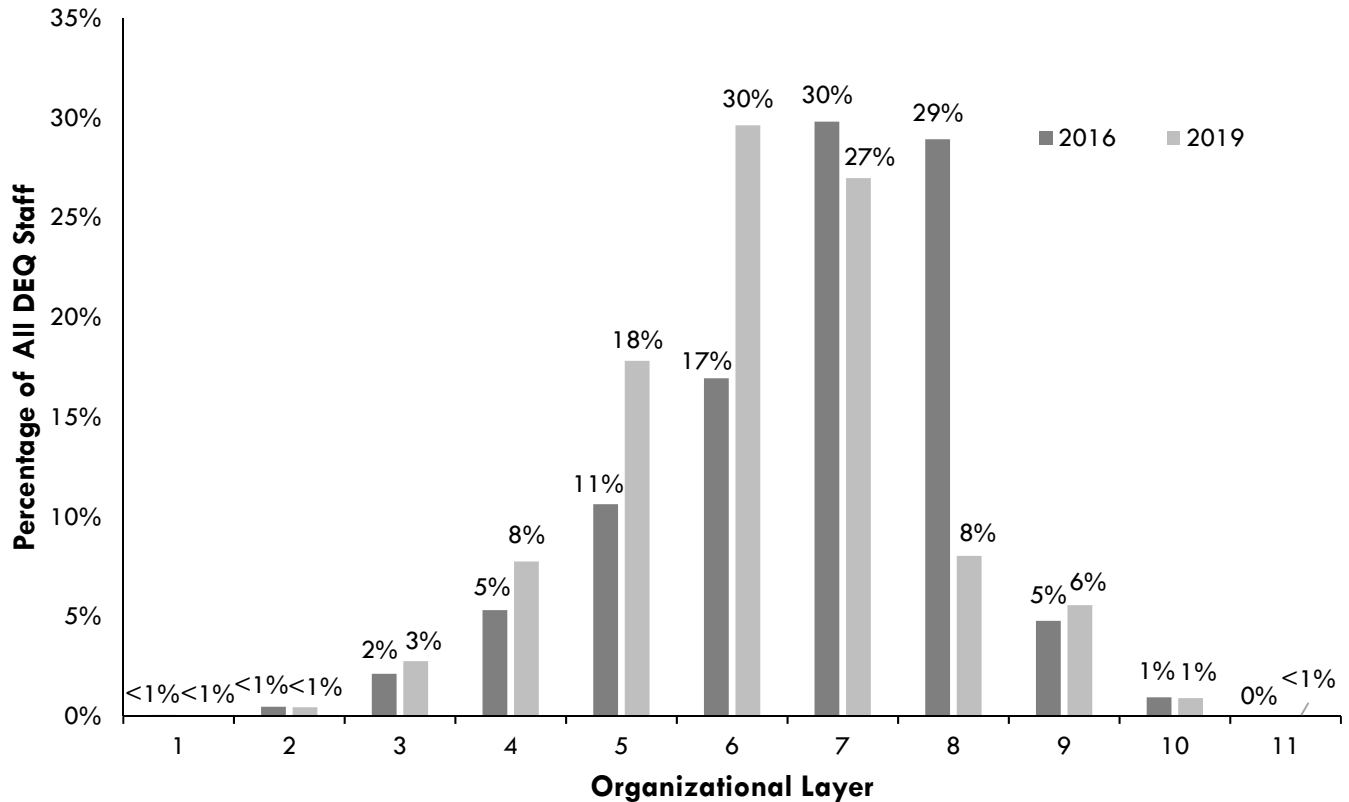
Source: Program Evaluation Division based on BEACON data from 2016 and 2019.

**Although narrow spans are sometimes necessary for highly complex or technical work, they can create structural inefficiencies in organizations.** Common concerns related to narrow spans include deterring the flow of information across organizational layers, thereby challenging accountability, and creating an environment in which supervisors over-engage or under-engage in management tasks.

**Narrow spans create more organizational layers, and additional layers generate additional costs for agencies.** The Program Evaluation Division conducted a regression analysis with BEACON data and found that the average DEQ supervisor makes \$9,905 more per year than a supervisor in the layer below. The analysis confirms that more layers create more cost.

**DEQ's total number of organizational layers increased slightly, but the distribution of staff among layers shifted centrally, signaling positive organizational change.** As shown in Exhibit 10, although the total number of organizational layers within DEQ increased from 10 to 11 between 2016 and 2019, only one position resides in the 11<sup>th</sup> layer and it is currently vacant. Furthermore, the concentration of staff beyond the 7<sup>th</sup> layer (the cut-off point in OSBM's 1996 recommendation) decreased from 35% to 15% during this time period. This decrease signals a shift of staff towards the recommended seven layers.

**Exhibit 10: DEQ’s Organizational Layers Increased from 2016 to 2019, But Shift of Staff Towards Center Indicates Progress Towards Achieving Recommended Seven Layers**



Source: Program Evaluation Division based on BEACON data as of June 2016 and June 2019.

In summary, DEQ’s average agency-wide span of control and number of organizational layers in 2019 remain similar to 2016 levels even though the agency has made changes in staff structure during this time period. DEQ’s percentage of broad spans of control increased, from 24% to 27%, as did its percentage of narrow spans, from 30% to 32%. The counteracting nature of these two shifts means that changes in spans of control at the broader agency level are virtually imperceptible. Another change that is not readily apparent at the agency level is the movement of staff during the past three years from the lowest layers of the organization towards the center, which indicates DEQ is shifting positively towards the recommended seven layers. Examining the department at a more granular level by assessing the spans and layers of individual organizational units allows for a more detailed identification of potentially problematic areas; this analysis is provided in Finding 2.

**Finding 2. Five of DEQ’s 20 organizational units contain more organizational layers and a higher percentage of narrow spans of control than recommended levels, with the Marine Fisheries Division presenting the greatest potential for structural issues.**

As discussed in Finding , DEQ's agency-wide average span of control did not meet the OSBM-recommended ratio of 1:8 in either study year (2016 or 2019), and nearly one-third of all department spans are narrow as of 2019. As a whole, DEQ also exceeded OSBM's recommended maximum of seven organizational layers. A closer examination of individual units within DEQ highlights the specific sources of potential structural inefficiencies.

**Like many state agencies, DEQ retains discretion in determining its organizational structure within the bounds of legislation and budgetary parameters.**<sup>5</sup> Within the agency itself, unit leaders determine the most appropriate structural arrangements to accomplish their work. Unit responsibilities and activities require different types of technical expertise and processes. As such, central staff and unit directors described DEQ's approach to staffing structure as decentralized but collaborative. The Human Resource Deputy Director stated,

“We use the cascading approach. Our mission and vision are set by the Secretary and Governor and the unit directors set their goals to that and then each unit determines how they can contribute to those goals.”

Unit directors echoed this approach in responses to a Program Evaluation Division survey. Regarding staffing decisions, directors described balancing the “top-down” strategic guidance of agency leaders with the “bottom-up” operational requirements of their specific units.

**In some instances, legislation and other funding requirements constrain DEQ unit directors' discretion in making staffing decisions.** Although DEQ generally follows the unit-level structuring approach outlined above, some specific positions or activities are restricted by legislation or funding source. For example, legislation for the Shallow Draft Navigation Channel Dredging and Aquatic Weed Fund requires that a project manager with a specified salary oversee certain activities. As such, unit directors do not have complete control over all staffing decisions.

**Eleven of DEQ's 13 medium and large organizational units fell short of OSBM's recommended minimum span of control ratio of 1:8.** Units differ in average span of control even when their size is taken into consideration. Exhibit 11 shows DEQ units that have been grouped by size into medium and large categories. Absent natural size breaks, the Program Evaluation Division divided the agency's 20 units by three to account for differences in unit size and scope of work for structural analysis.<sup>6</sup> Of DEQ's 13 medium and large organizational units, only the State Energy Office and Water Resources Division met the recommended 1:8 minimum span of control ratio. It is important to note that the State Energy Office contains 26 employees

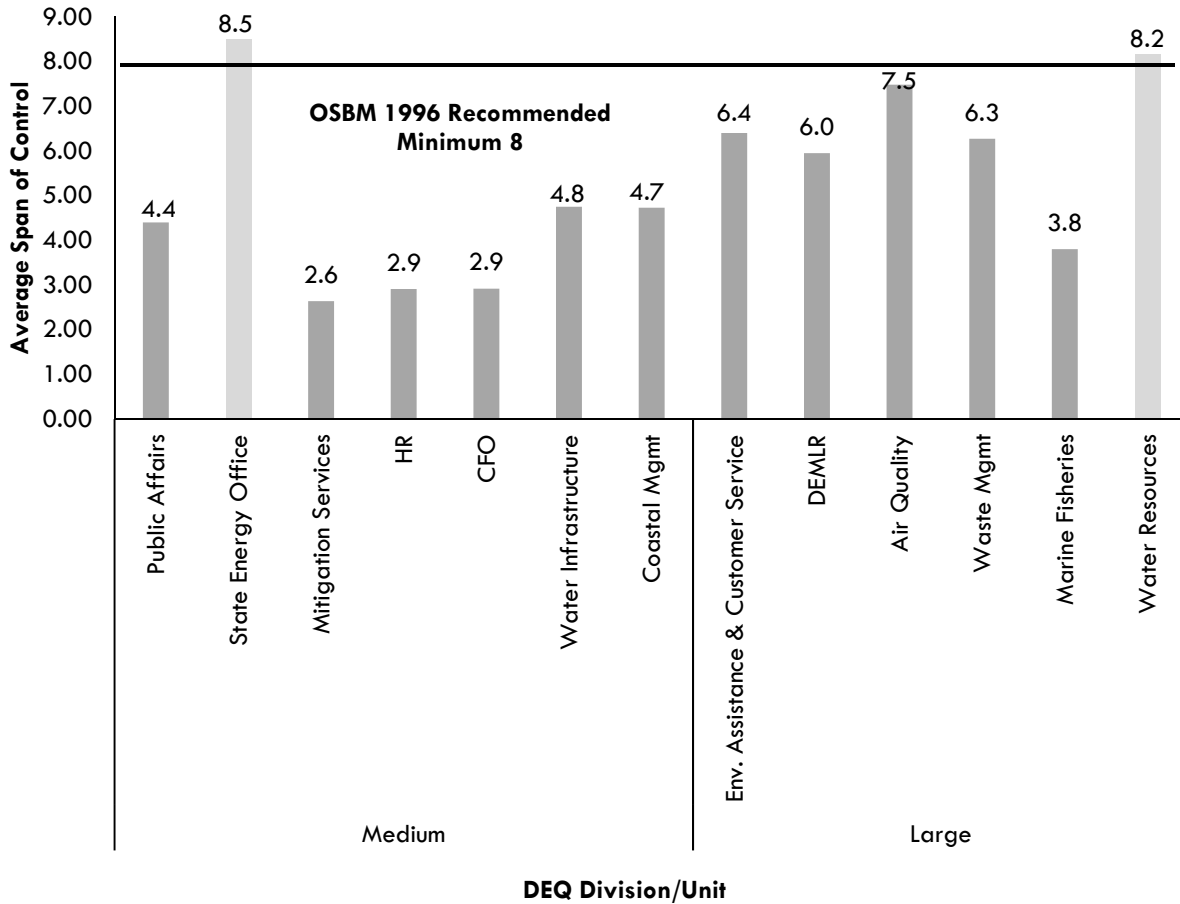
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<sup>5</sup> Although state agencies retain broad authority over structural decisions, some positions within agencies do not have delegated authority status. The agency must consult the Office of State Human Resources when making decisions about these positions.

<sup>6</sup> The smallest seven units are in the small group, the next largest seven units are in the medium group, and the remaining six units are in the large group. DEQ's smallest units, which each contain fewer than 20 employees, were excluded from the unit-level analysis because structural staffing options are more limited in these units. Further, all but one of these small units primarily provide support services to the agency as opposed to direct services to the public.

whereas the Division of Water Resources employs 466 workers, demonstrating that both units with modest and large staff sizes can achieve the recommended span of control.

**Exhibit 11: Two of DEQ’s 13 Medium and Large Organizational Units Meet OSBM’s Recommendation of Supervisors Overseeing At Least Eight Employees**



Note: Units are listed from smallest to largest left to right.

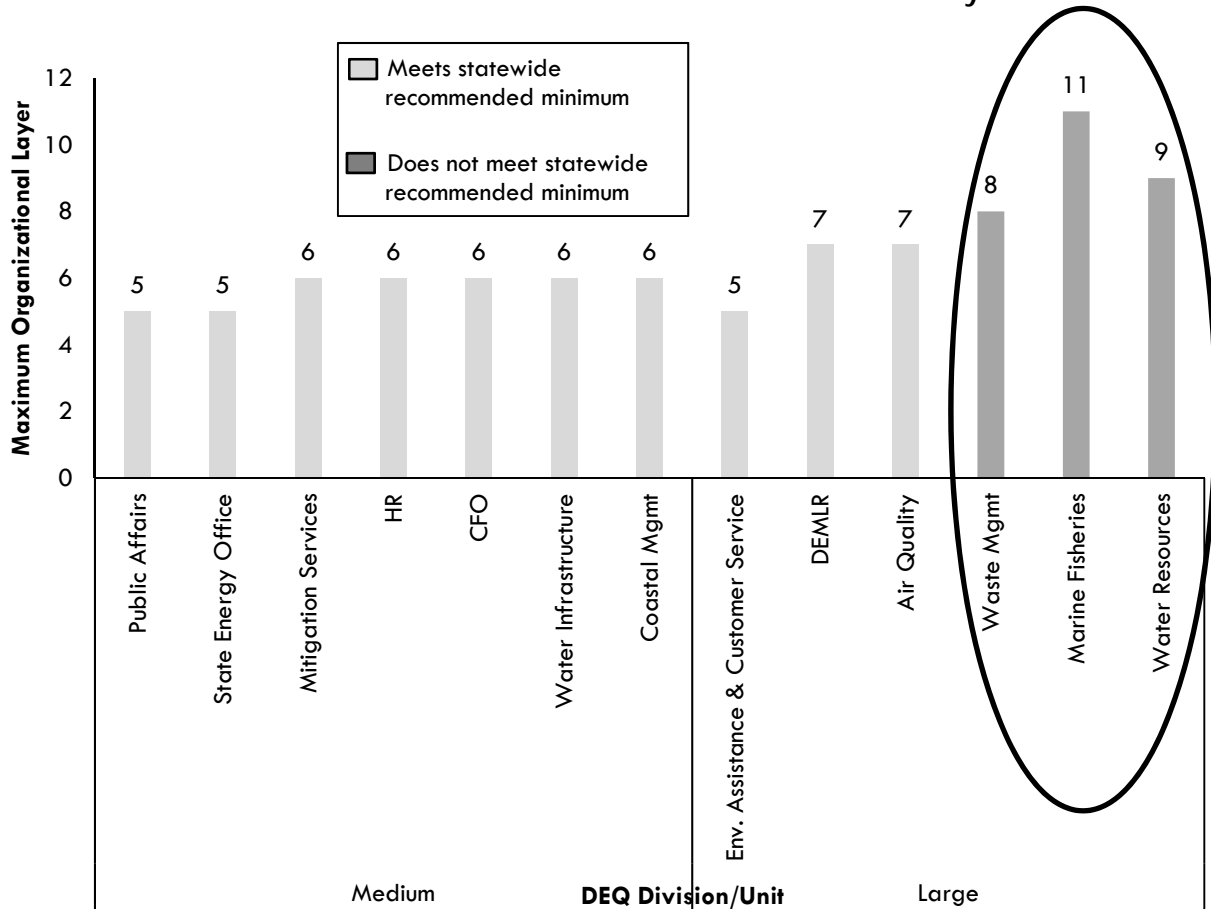
Source: Program Evaluation Division based on BEACON data as of June 2019.

As Exhibit 11 also shows, the Marine Fisheries unit, one of DEQ’s six large divisions, reported a notably low average span of control (1:3.8), roughly half the average span of other like-sized units in the department. In other words, supervisors in other large DEQ units oversee roughly twice as many subordinates as Marine Fisheries supervisors.

**DEQ’s three largest units exceed OSBM’s recommended seven organizational layers.** These units are Waste Management, Marine Fisheries, and Water Resources. Although Waste Management and Water Resources only exceed the maximum recommended number of layers by one and two layers, respectively, Marine Fisheries contains 11 layers. Eleven layers represents the largest number of organizational layers within DEQ and is four layers more than OSBM’s recommendation. As Exhibit 12

shows, compared to its similarly-sized unit peers, Marine Fisheries is a structural outlier.

Exhibit 12: Three DEQ Units Have More Than the Recommended Seven Layers



Source: Program Evaluation Division based on BEACON data as of June 2019.

**Accounting for both span of control and organizational layers, five of DEQ's units present potential structural issues.** Exhibit 13 lists the number of positions per DEQ unit, each unit's average span of control, its percentage of supervisors with narrow spans of control, and its number of organizational layers. The Program Evaluation Division used the following criteria to identify DEQ units with potential structural issues:

- the unit contains at least 20 employees **and**
- the unit-wide average span of control is 1:3 or fewer, meaning most of the spans of control in the unit reflect a supervisor overseeing three or fewer subordinates, **and/or**
- narrow spans of control represent 50% or more of all supervisory relationships in the unit.

## Exhibit 13: Five DEQ Units Contain Potential Structural Inefficiencies

Unit Size	DEQ Unit	Staff Size	Average Span of Control	Percentage of Narrow Spans	Total Layers of Unit	Potential for Structural Inefficiencies
Medium	Public Affairs	23	4.4	60	5	Likely
	State Energy Office	26	8.5	0	5	Not Likely
	Mitigation Services	30	2.6	73	6	Likely
	HR	33	2.91	73	6	Likely
	CFO	36	2.9	58	6	Likely
	Water Infrastructure	47	4.8	38	6	Not Likely
	Coastal Mgmt.	53	4.7	36	6	Not Likely
Large	Env. Assistance & Customer Service	65	6.4	20	5	Not Likely
	DEMLR	126	6	24	7	Not Likely
	Air Quality	218	7.5	7	7	Not Likely
	Waste Mgmt.	284	6.3	7	8	Not Likely
	Marine Fisheries	324	3.8	53	11	Very Likely
	Water Resources	466	8.2	14	9	Not Likely

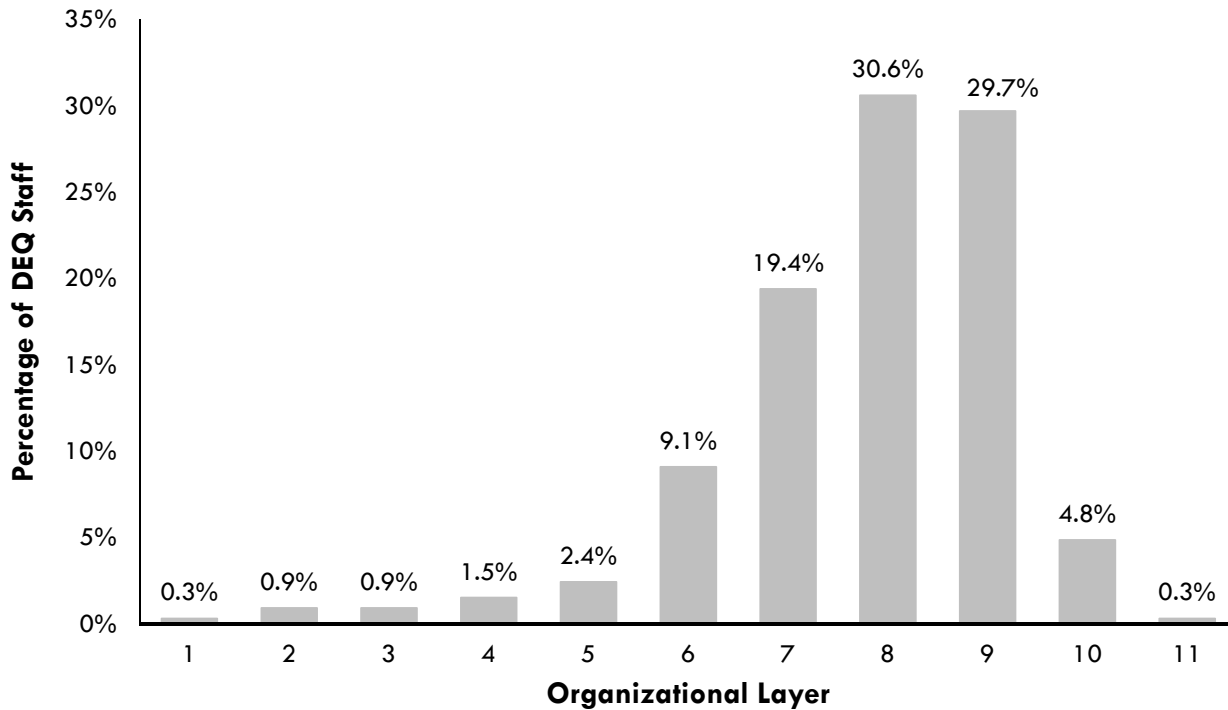
Source: Program Evaluation Division based on BEACON data as of June 2019.

Although they each contain more than seven layers, Waste Management and Water Resources were not flagged as potentially problematic because their average span of control was not below 1:3 nor was their percentage of narrow spans greater than 50%.

**Marine Fisheries merits specific focus as a source of potential structural issues given its low average span of control, high percentage of narrow spans, and the fact that it is the unit with the largest number of layers within DEQ.** As shown in Exhibit 14, 66% of Marine Fisheries staff reside in the unit's lowest four layers and 85% of staff occupy its lowest five layers. The concentration of Marine Fisheries staff within lower layers counteracts the overall encouraging shift of staff towards the center of DEQ at the agency level. Appendix A displays the structural organizational chart for the Marine Fisheries unit. The unit director reports to the Chief Deputy, who in turn reports to the Secretary of Environmental Quality. Below the unit's director, seven sub-units exist within Marine Fisheries.



**Exhibit 14: Nearly Two-Thirds of Marine Fisheries Staff Occupy the Unit’s Lowest Four Layers**

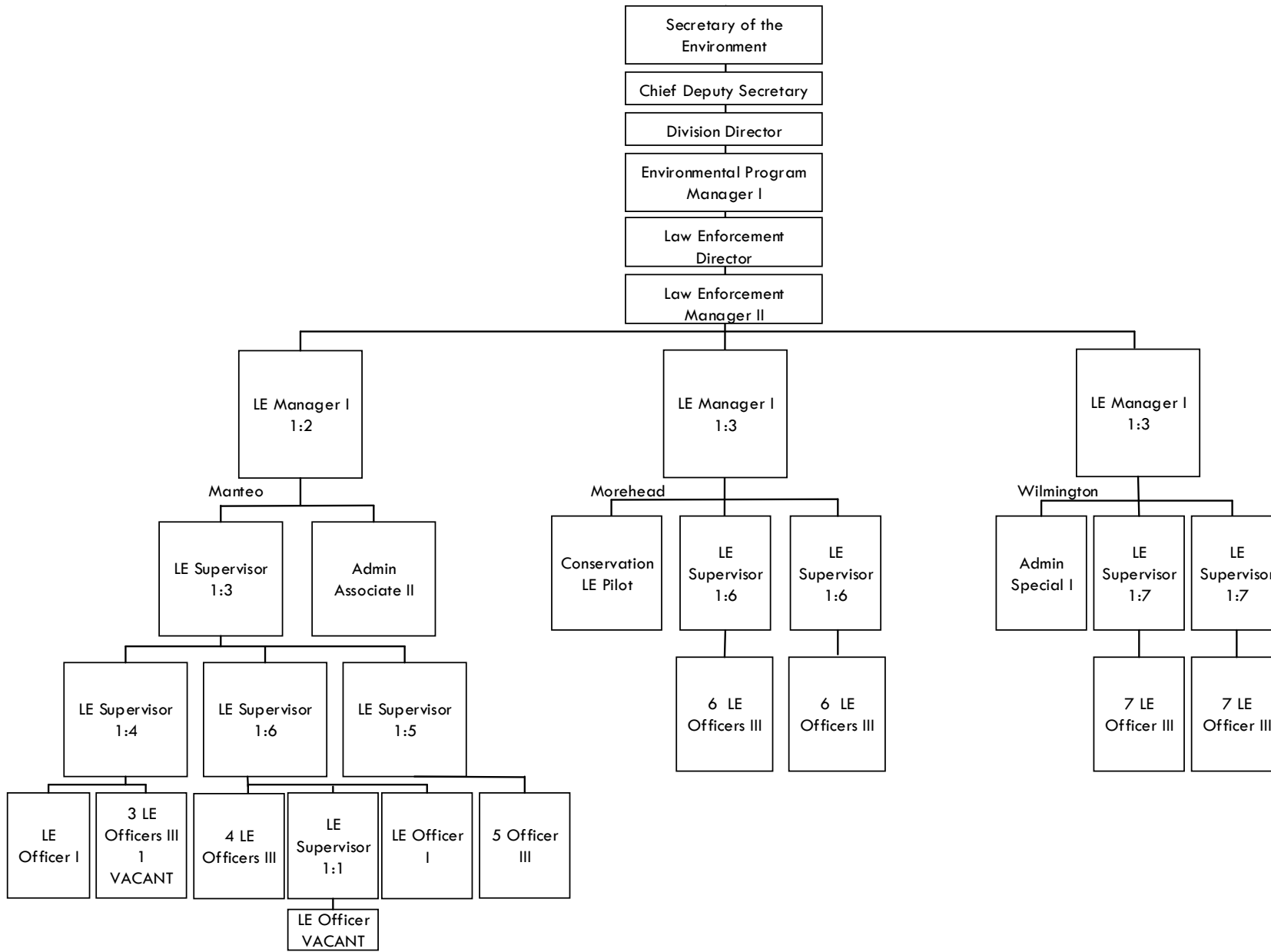


Source: Program Evaluation Division based on BEACON data as of June 2019.

**Structural abnormalities exist in the sub-units of Marine Fisheries.** For example, within the Law Enforcement sub-unit of Marine Fisheries, the Manteo office contains two more layers than the Morehead and Wilmington offices. DEQ pointed to geographic dispersion and laws related to law enforcement and research vessels as reasons for this sub-unit’s structure. That explanation provides a rationale for the existence of three different geographic offices in Manteo, Morehead, and Wilmington, yet it does not explain why two of the offices are structured similarly whereas the third office differs.

Exhibit 15 details the three Law Enforcement offices and demonstrates how they differ. The Manteo office contains 22 employees and five layers extending downward from the Law Enforcement Officer 1 to the lowest officer position, which is currently vacant. The Morehead and Wilmington offices contain 16 and 18 employees, respectively, both within only three layers each. It is unclear why the Manteo office contains more employees and two additional layers. Structural differences like those present in these offices offer starting points to assess narrow spans and potentially extraneous layers.

# Exhibit 15: Marine Fisheries Law Enforcement Units Differ Geographically



Source: Program Evaluation Division based on information from the Division of Marine Fisheries.

Other sub-unit structural abnormalities in Marine Fisheries are present:

- in the Shellfish Office and the Licensure Office, some supervisors hold the same title as subordinates and
- the Management Chief Office unit director has three direct subordinates that hold administrative titles.

In summary, examining organizational units within DEQ allowed the Program Evaluation Division to identify areas of potential structural inefficiency. Various units fall short on different measures, but the Division determined that five units likely contain structural inefficiencies. Of these five units, Marine Fisheries possesses the lowest span of control for a unit of its size, an especially high percentage of narrow spans, and the largest number of layers in the agency.

**Finding 3. Federal and state law, administrative rule, and policy impose restrictions on and parameters for DEQ's management of its permits; as a result, the structure of permit processing varies.**

Each permit administered by DEQ addresses the protection of a general resource in a specific way or in an explicit setting. In general, each of the department's permits involve protecting the natural resources associated with the primary function of a given unit. For example, permits processed by the Division of Water Resources focus on protecting water quality. However, the purpose of each permit is unique. Animal Waste permits, for example, protect water sources from animal waste runoff wherever it occurs, whereas the Central Coastal Plain Capacity Use Area permit protects water in a specific geographic region with an aquifer. Typically, permit laws or policies detail some of the following items:

- what resource is to be protected and how,
- timeliness requirements for processing permits,
- how long permits are valid,
- related costs for permits,
- which entities must participate in the permit approval process, and
- oversight requirements, including reporting, for permits.

**DEQ detailed characteristics of the 22 complex industrial and/or agricultural permits identified for this study that cause them to be more complex than other permits.** As described in the Background, the Joint Legislative Program Evaluation Division Oversight Committee's 2019–20 Work Plan required the Program Evaluation Division to examine the levels of approval required for issuance of complex industrial and/or agricultural permits. Circumstances that make a permit complex include:

- a licensed professional such as an engineer, geologist, landscape architect, or multiple professionals must review the permit;
- a general framework for processing a given permit cannot be made because each permit varies so widely; **and/or**
- sophisticated technology or equipment is needed to generate studies or models to check permit applications.

In some instances, permits exist solely to address complex situations. Exhibit 16 provides a brief description of the purpose of each of the 22 permits as identified in law or rule, though these descriptions are not exhaustive. For example, the purpose description in the exhibit for the Central Coastal Plain Capacity Use Area permit states that it helps regulate water use in a specified area related to an aquifer. However, the full rules associated with this permit specify the counties to which the permit applies and the extent of water usage that triggers use of this permit.

## Exhibit 16: Definitions, Reporting Requirements, and Sources of Complexity for the 22 Identified Complex Agricultural and/or Industrial DEQ Permits

Permit Name	Purpose	Report Required?	Reason Permit is Complex
Animal Waste NPDES	Protect water from specified animal waste per federal standards		Requires licensed professional(s)
Animal Waste STATE	Protect water from specified animal waste per state standards		Requires licensed professional(s)
Central Coastal Plain Capacity Use Area	Regulate water use in Central Coastal Plain area where aquifers are being used at unsustainable rates	✓	All applications vary
Construction & Operation (Greenfield)	Reduce adverse effects of industrial activities on air quality	✓	All applications vary
Erosion & Sediment COA	Protect vulnerable areas from man-made erosion & sedimentation damage resulting from development	✓	Requires licensed professional(s)
Erosion & Sediment COA Xpress	See Erosion & Sediment COA above	✓	Same as above
Exploration for Uranium	Prevent the improper and unregulated exploration of uranium		Requires licensed professional(s)
Geophysical Exploration	Allow DEQ to monitor and limit geophysical exploration when appropriate		Requires licensed professional(s)
Industrial User Pretreatment	Protect Publicly Owned Treatment Works (POTWs)		Application of complex federal requirements
In-situ Groundwater Remediation	Remediate contaminated groundwater in the subsurface		Requires licensed professional(s)
Mining	Reduce adverse effects of mining on natural resources		Requires licensed professional(s)
New Source Review Air Permit/Prevention of Significant Deterioration	Prevent significant deterioration of air quality in areas attaining the national ambient air quality standards or those trying to attain it	✓	Exists only for the most complex projects
NPDES State Stormwater	Protect stormwater runoff from construction activities	✓	Requires licensed professional(s)
NPDES State Stormwater Xpress	See State Stormwater above	✓	Same as above
NPDES Storm water	Manage & oversee discharged pollution into storm water		Requires complex technology
NPDES Wastewater	Manage compliance with state and federal water quality laws regarding direct discharges of wastewater		Requires complex technology
Oil or Gas Well Permit	Regulate site activities of oil and gas wells		Requires licensed professional(s)
Reclaimed Water Systems	Alleviate drought effects and increase beneficial use of non-potable water	✓	Requires complex technology
Small/Synthetic Minor	Reduce adverse effects of specified industrial activities on air quality	✓	Requires complex technology
Title V Permit Modification	Comply with Title V of the Clean Air Act Amendment of 1990		All applications vary
Wastewater Irrigation Systems	Provide alternative to discharging treated water into surface waters	✓	Application of complex rules of pollution
Wastewater/Groundwater Laboratory Certification	Ensure the use of quality data and analytic information about water		Requires complex technology

Source: Program Evaluation Division based on information from DEQ

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**Due to the unique nature of each permit's purpose and specifications, DEQ allows its units to process each of its permits in the manner they deem best to address its requirements.** Organizational structure provides a blueprint for the sanctioned actions and activities within an organization. As such, each DEQ unit independently structures the way it processes its permits in order to meet legal requirements and deal with permit complexities.

**The number of staff and entities involved in processing a complex permit stems from the specific requirements of each permit and decisions made by the relevant DEQ unit regarding how to structure the permit process.** Exhibit 17 compares each permit in terms of these items:

1. The legislated timeliness requirement of the permit.
2. The actual time it takes to process the permit.
3. The number of entities involved in the permit, which includes the DEQ unit responsible for the permit. Other entities potentially involved include other DEQ units or commissions, local government entities, other state agencies, federal entities, and utility companies.
4. The number of DEQ staff that process the permit.
5. The number of DEQ staff that sign off on or approve the permit.
6. The method used to track the timeliness and trajectory of a permit application.

## Exhibit 17: DEQ Complex Agricultural and/or Industrial Permit Processes Vary in the Extent of Staff and Entity Involvement

Permit Name	Timeliness		Number Entities Involved	DEQ Processing Approach		
	Legislated Process Time (Days)	Process Time (Days)		Number Staff Involved	Number Staff Approve	Permit Time Tracking Method
Erosion & Sediment COA Xpress	10	3-5	1	2	1	Paper & IBEAM
Erosion & Sediment COA	30	21-30	3	2	1	Paper & IBEAM
State Stormwater– Xpress	30	25	1	3	1	BIMS
Industrial User Pretreatment	30	30-180	1	1	1	Private vendor
Exploration for Uranium	60	N/A	3	7	3	Paper records
Mining	60	30-35 per involved entity	5	10	3	In-house Access
State Stormwater	60	45	2	3	1	BIMS
Oil or Gas Well Permit	60-90	10 per involved entity	8	5	7	Paper records
Construction & Operation (Greenfield)	90	127	3	7	3	IBEAM & Public Dashboard
Small/Synthetic Minor	90	38	2	3	2	IBEAM & Public Dashboard
Animal Waste NPDES	90	90	1	5	3	Private vendor
Animal Waste STATE	90	90	1	5	3	Private vendor
In-situ Groundwater Remediation	90	60	1	2	2	Private vendor
Reclaimed Water Systems	90	49	1	5	2	Electronic, in-house
Wastewater Irrigation Systems	90	73	1	5	2	Electronic, in-house
New Source Review Air Permit/ Prevention of Significant Deterioration	365	270	3	7	3	IBEAM & Public Dashboard
Title V Permit Modification	App Dependent	260	3	7	3	IBEAM & Public Dashboard
Wastewater/Groundwater Laboratory Certification	None	5-15	1	2	2	Single Person
Geophysical Exploration	None	2-15 per involved entity	3	1	1	Single Person
Central Coastal Plain Capacity Use Area	None	45	1	2	2	Electronic, in-house
NPDES Stormwater: 3 types	None	75, 180, 2	1	3	1	Laserfiche & BIMS
NPDES Wastewater	None	330	1	3	1	Electronic, in-house

Note: IBEAM, Laserfiche, BIMS, and Access are all electronic, program management or information management systems.

Source: Program Evaluation Division based on information from DEQ.

On average, four DEQ staff are involved in processing the 22 identified permits though the range of staff involved varies from 1 to 10. One to seven DEQ staff provide approval for the 22 permits with the average number of staff being two. Entities involved in permit processing include the

DEQ unit responsible for the permit and any of the following: other DEQ units or commissions, local government entities, other state agencies, federal entities, and utility companies. For the 22 permits, the number of entities involved averaged two and ranged from one to eight.

**The methods DEQ units use to track the timeliness of each permit through the application process varies, even within the same unit.** Units use paper records, various types of in-house electronic tracking systems, dashboards, and private vendors to oversee the timeliness of the 22 identified permits as they are being processed. Although it makes sense that staff and entity involvement and unit-level structuring would vary according to each permit's unique legislative or administrative requirements, it is not clear why permits could not all be tracked in the same manner within a given unit or across all of DEQ.

In summary, permits vary across several dimensions. Because of the complexities of the permits DEQ administers, the department grants discretion to unit staff in determining the structural configuration of their offices in processing permits. Such autonomy is necessary because it ensures a level of technical expertise sufficient to administer permits involving several steps and crossing division and agency boundaries. However, this decentralized approach to structuring processes and tracking them also creates problems that are detailed in the next finding.

**Finding 4. Although decentralization of permit processing enables units to meet varied permit requirements, granting such autonomy absent a central performance management system limits DEQ's ability to ensure processes are efficient and effective.**

Academic and practitioner literature suggests implementation of certain practices benefits both the applicant and the entity managing the permit. The Program Evaluation Division (PED) identified three domains wherein implementing a centralized performance management system could improve permit processes:

- customer service orientation,
- use of technology, and
- internal management practices.<sup>7</sup>

Each of these domains was subdivided into components assessed per permit. PED rated 20 identified complex agricultural and/or industrial permits<sup>8</sup> in terms of the extent to which they meet these various components. Ratings are based on responses DEQ staff provided to a PED survey distributed for this evaluation. Exhibit 18 depicts the results, and the following sections discuss DEQ's performance on each permit per domain and component.

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<sup>7</sup> Sources include the Environmental Council of the States, Environmental Protection Agency, and academic journals such as *Publius: The Journal of Federalism*.

<sup>8</sup> The permits related to exploring uranium and oil and gas wells were excluded from best practice research analysis as the agency has not received applications for these permits.



## Exhibit 18: Identified Permits Meet Recommended Components of Best Practices to Different Extents

DEQ Unit	DEQ Permit	Customer Service		Use of Technology		Internal Management				Overall Score
		Flow charts & checklists prior to applying	Single point of contact*	Permit tracking dashboard	Electronic submit app	Has timeliness standard	Allows revision of incomplete apps	Formal feedback mechanism for applicants	Formal Review of Permit Process	
Air Quality (DAQ)	Construction and Operation (Greenfield)	◐	●	●	○	●	●	○	○	56%
	New Source Review Air /Prevention of Significant Deterioration (PSD)	●	●	●	○	●	●	○	○	63
	Small/Synthetic Minor	◐	●	●	○	●	●	○	○	56
	Title V Modification	◐	●	●	○	●	●	○	●	69
Energy, Mineral, and Land Resources (DEMLR)	Erosion & Sediment Control COA	●	●	○	○	●	●	●	○	63
	Erosion & Sediment Control COA-Express	●	●	○	○	●	●	●	○	63
	Geophysical Exploration	●	●	○	●	○	●	○	○	50
	Mining	●	●	○	N/A	●	●	●	○	71
	NPDES Stormwater	◐	●	●	●	○	●	●	○	69
	State Stormwater (Indiv. & General)	◐	●	●	○	●	●	●	○	69
	State Stormwater (Indiv. & General) - Express	◐	●	●	N/A	●	●	●	○	79
Water Resources (DWR)	Animal Waste (NPDES)	○	○	○	●	●	●	●	○	50
	Animal Waste (State)	○	○	○	●	●	●	●	○	50
	Central Coastal Plain Capacity Use Area/ Registration	◐	●	●	●	○	●	●	○	69
	Industrial User Pretreatment	○	●	○	○	●	●	●	○	50
	In-situ Groundwater Remediation	○	○	●	○	●	●	●	○	50
	NPDES Wastewater	◐	●	●	○	○	●	●	●	69
	Reclaimed Water Systems (Wastewater)	●	○	●	●	●	●	●	○	75
	Wastewater Irrigation Systems (Wastewater)	●	○	●	●	●	●	●	●	88
	Wastewater/Groundwater Lab. Cert.	◐	○	○	●	○	●	●	○	44

● = Fully meets   ◐ = Partially meets   ○ = Does not meet

Notes: COA is certificate of approval. CRT is certification. NPDES is the National Pollutant Discharge Elimination System. N/A in relation to electronic submission represents the fact that legislation requires these permits to be submitted in hard-copy. Total score is adjusted for permits without timeliness standards.

\*All units provide points of contact for permit applicants; however, this variable measures whether a specific point person per permit exists.

Source: Program Evaluation Division based on academic and practitioner literature and data from DEQ.

**Domain 1: Customer service orientation.** Research suggests permit processes should place the least burden possible on applicants. Components of customer service best practices in permit processing include

- **developing and providing flow charts and checklists** to applicants prior to the application process in order to clarify roles and steps;
  - 7 (35%) of the permits examined provide flow charts and checklists to applicants prior to the application process or early on in the process.
- **having a single point of contact for applicants** to use to direct questions or concerns throughout the application process, thereby limiting confusion and maximizing participants' time and adherence to deadlines.
  - All 20 (100%) of the permits maintain a point of contact but only 15 (75%) have permit-specific points of contact.

**Domain 2: Information systems.** Research suggests that using information systems for processing permits offers numerous benefits both for customers and the administering agency. Such systems provide a one-stop shop where applicants can conduct all activities related to permitting. Centrally housing all information also makes it easier for administering organizations to collect data to inform decision making, a best practice discussed as part of the internal management domain.

For the purposes of this evaluation, the ability of applicants to apply online and track the progress of their permit applications through an online dashboard or portal represent the only two components of information systems best practices analyzed. However, a fully realized information system would enable all steps of the permit process to take place online both from the applicant's and agency's perspective. Further, a high-functioning system also would contain mechanisms allowing the agency to measure and assess permit processing efficiency and effectiveness. DEQ does not yet have such a system in place.

Components of customer service best practices related to permit processing include

- **allowing applicants to track the progress of their permit application online;**
  - 12 (60%) of the permits examined allow applicants to track the status of their application through an online dashboard.
- **allowing applicants to electronically submit permit applications and supporting materials,** which reduces processing time and creates financial efficiencies for the applicant and the administering entity.
  - 8 (44%) of the permits examined allow applicants to electronically submit applications. Two applications cannot be submitted electronically by law. Further, until two years ago legislation prohibited Division of Water Resource applications from being electronically submitted.

**Domain 3: Internal management processes.** Organizations administering permits should strive to promote efficiency and effectiveness. Efforts targeted at achieving efficiency and effectiveness include minimizing costs to both taxpayers and permittees and including mechanisms to uncover and correct performance-related issues. These efforts are aided by the usage of performance measures as part of a performance management and oversight system.

Components related to internal management processes for permitting include

- **having timeliness standards per permit**, which represent a type of performance measure that helps promote communication of expectations between the agency and the applicant and ensures efficient processing of applications;
  - 16 (80%) of the permits examined have timeliness standards.
- **reducing administrative complexities**, particularly by allowing applicants to revise their applications during the process when deficiencies are discovered rather than beginning the process again;
  - All (100%) of the permits examined reduce unnecessary administrative effort by allowing applicants to revise incomplete or initially denied applications without having to begin the entire permit process anew.
- **having formal and systematic collection of feedback** from applicants on ways the permit process could be improved;
  - 15 (75%) of the permits examined contain formal mechanisms to systematically collect feedback from permittees on ways the process can be improved.
- **having a formal system in place to review permit processes**, which identifies inefficiencies and areas for improvement.
  - Three (15%) of the permits have a formal system in place to periodically review permit processes.

Periodic assessment of processes encourages the identification of areas where improvements could be made and where efficiencies could be gained and is a standard component of well-designed and well-implemented performance management systems. Such assessments often include a step-by-step analysis of the role and necessity of all individuals and entities involved and often incorporate performance data to inform process improvement. Ideally, identification of performance deficiencies informs data-driven decisions on internal management changes needed to improve the efficiency and effectiveness of the permitting process.

**Across DEQ, variation in adherence to best practice components is likely due in part to the differing requirements of each permit but also due to the lack of a centralized performance management system that could ensure all permits meet certain goals.** Establishment of a permit performance management system would allow DEQ to improve permit processing. The Program Evaluation Division expected each DEQ permit

identified for analysis would undergo some type of formal, periodic, systematic review, but only 3 of the 22 complex permits include a mechanism for performing a formal audit of the application and approval process. In addition, a review of DEQ's internal audit plan reveals no process improvement audits have been conducted on these permits. Failure to centrally, systematically, and periodically review permit processes represents a significant missed opportunity to identify areas affecting efficiency and effectiveness that could be improved in a data-driven way.

**DEQ collects limited information towards incorporating customer and/or staff feedback on permit processing.** Well-designed performance management systems promote a culture of data-driven decision making that seeks to enhance the efficiency and effectiveness of operations. Such systems collect information across separate organizational units, or across activities such as permit processing, and compile this information to inform decision making. An additional important component of well-designed performance management systems is a mechanism whereby those individuals or entities being served by an organization or activity, such as a permit applicant, can provide feedback regarding their level of satisfaction with the process and their perception of potential areas for improvement.

In summary, decentralization of permit process structuring leads to variation in the 22 complex industrial and/or agricultural permits' adherence to best practices. The three units that administer these permits vary in their adherence to the three best practice domain areas identified by the Program Evaluation Division: customer service, internal management, and use of technology. Overall, DEQ lacks a central performance management system for permit processing and an electronic system to support processing and oversight of permitting goals.

**Finding 5. The Permitting Transformation Project offers a means of remedying the need for a performance management system to address permit processing, but the project must formalize several components to maximize effectiveness.**

In 2017, the Secretary of Environmental Quality launched the Permitting Transformation Project (PTP) after engaging internal and external stakeholders who provided feedback on how interactions with DEQ could be improved. Based on this feedback, DEQ leadership identified five goals for PTP.

1. **Online permitting interface.** Create a web-based portal to apply, track, and pay for permit applications.
2. **Online searchable database.** Develop a web-based searchable data "warehouse" for permit details, compliance issues, and enforcement actions.
3. **Streamline permitting process.** Ensure a consistent and efficient permitting process throughout DEQ.

4. **Reduce and prevent backlog.** Improve processes and identify efficiencies.
5. **Improve communication and transparency.** Develop outreach efforts to maintain an open dialogue between DEQ and all stakeholders.

**DEQ prioritized building an online permitting interface aided by the Department of Information Technology (DIT).** Staff from both agencies used Microsoft CRM, an add-on to the state-purchased software package, to build the platform. According to DEQ, this strategy avoided larger licensing, updating, and maintenance costs and avoided delays that accompany the purchase of an external system. However, DEQ did not conduct a cost comparison detailing how the chosen approach compares to contracting out construction and management of the platform over a given period of time.

**In 2018, DEQ allocated \$2 million in nonrecurring funds to DIT to implement DEQ's 21st Century Goals, including development of the online platform.** DEQ's Chief Information Officer anticipates operating costs of the platform will be \$350,000 annually, including staff time for support and maintenance, licensing, and software costs. Operational costs should be roughly \$190,000 per year (assuming personnel costs remain the same) and are expected to decrease by \$125,000 annually as servers for legacy applications are retired. There will be additional unspecified cost savings from retired databases, software, and licenses associated with the legacy systems. DEQ requested funds to support PTP efforts in the 2017–2019 and 2019–2021 budgets but did not receive funds for these purposes.

**The PTP lacks a formal business plan or a mechanism to conduct a systematic review of its return on investment; as a result, DEQ cannot longitudinally demonstrate the value of its approach.** DEQ cannot show that PTP efforts to date provide organizational gains and savings, even though both may be occurring. DEQ staff consulted with other states that have modernized their permitting systems in recent years such as South Carolina, Massachusetts, Minnesota, Washington, Wyoming, and Delaware. Those conversations supported DEQ's decision to develop a program in-house. However, neither a formal cost comparison of approaches nor an estimate of savings over time has occurred. For example, a 2017 study assessing South Carolina's efforts to automate and streamline environmental permitting estimated a 40% reduction in permit processing time as well as corresponding cost savings.

**The PTP plan includes use of the Six Sigma "LEAN" approach to assess permit processes, but the use of this tool must be formalized, repeated, and documented.** The LEAN system is a process management tool originally designed for the manufacturing industry. It aims to improve effectiveness while identifying and eliminating unnecessary steps or actors. According to the Lean Enterprise Institute, LEAN is a specific strategy for "creating more value for customers with fewer resources." The process consists of five basic principles:

1. Specify the value desired by the customer.
2. Identify the value stream for each product providing that value and challenge all of the wasted steps currently necessary to provide it.
3. Make the product flow continuously through the remaining value-added steps.
4. Introduce pull between all steps where continuous flow is possible.
5. Manage toward perfection so that the number of steps and the amount of time and information needed to serve the customer continually falls.

The LEAN approach allows DEQ to analyze permit processes in a structured format. Select DEQ staff are undergoing Six Sigma LEAN training to help them assess permit processes, which holds promise for improving the effectiveness and efficiency of the permits. However, use of the LEAN approach to review all permit processes must be documented, catalogued over time, and assessed. Further, developing a centralized performance management system for permitting processes and using LEAN to assess the extent to which permits meet those goals would maximize the use of LEAN. A fully developed online system will enable DEQ to track all permit processes, use the LEAN process to assess and adjust them, and track progress over time.

**Although DEQ has begun the process of streamlining and automating some permits, the lack of a performance management system to aid in setting goals, conducting periodic reviews, and adjusting permit processes may hinder DEQ when it seeks to demonstrate improvements.** DEQ and DIT staff discussed assessing permits on a step-by-step basis, including which staff handle the permit and why, during the process of transferring permits to the new online system. Although DEQ stated that improvements were made to some permit processes during onboarding to the platform, records of these improvements do not exist. Detailed evaluation methodologies, clear progress metrics, detailed plans of execution and timelines, and regular performance assessments are all necessary to demonstrate the effectiveness and efficiency of this streamlined approach. Furthermore, the establishment of a clear, specific, detailed, and data-driven ROI with alternative funding scenarios could strengthen support for the project. It is unclear whether the department has devised an effective strategy for securing and maintaining external support for the PTP.

In summary, the PTP offers a vehicle to centrally analyze and improve permit processes in adherence to best practice and DEQ goals. However, the effort lacks a business case plan or return on investment analysis to quantify benefits of the approach and demonstrate cost savings. Further, the plan lacks a systematic approach for assessing permits and a framework for evaluating PTP efforts.

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## Recommendations

**Recommendation 1. The General Assembly should direct DEQ to study the narrow spans of five organizational units identified as potentially problematic and report to the Joint Legislative Oversight Committee on Agricultural and Economic Resources regarding justification for narrow spans.**

As discussed in Finding 2, five DEQ units contain high levels of narrow spans of control, defined as a supervisor overseeing three or fewer subordinates. For the five units—Public Affairs, Mitigation Services, Human Resources, Chief Financial Office, and Marine Fisheries, DEQ should be directed to report on the following items:

1. For all narrow spans, provide detailed justification of all positions involved including job activities, roles, and responsibilities for each employee in the narrow span including the supervisor and subordinates.
2. Identify any narrow spans that could be combined or collapsed into other spans.
3. Identify any spans that could be combined if DEQ offered a technical expertise compensation track to reward high levels of institutional knowledge and retain employees without making them supervisors.

DEQ should provide a detailed report on the above-listed items to the Joint Legislative Oversight Committee on Agricultural and Economic Resources by May 1, 2020.

**Recommendations 2. The General Assembly should direct DEQ to develop and report on 1) a formal business plan for the Permitting Transformation Project including return on investment and 2) a performance management plan for permit processes and the accompanying data management system to oversee it.**

The formalized business plan and return on investment analysis for the Permitting Transformation Project should include the following:

- data-driven analyses of costs and anticipated benefits of the current approach as well as an implementation timeline;
- comparison of the current approach to an off-the-shelf and/or customized system from a private vendor; and
- summary comparison of the current approach to other states' approaches.

The performance management system for the Permitting Transformation Project should include, but not be limited to, the following:

- the method for establishing permit processing performance measures and benchmarks and
- a plan for collecting permit processing data over time to longitudinally assess performance.

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DEQ should consider working in consultation with relevant management staff at the Office of State Budget and Management to develop the components of the abovementioned plan. DEQ should report on these efforts to the Joint Legislative Oversight Committee on Agricultural and Economic Resources by May 1, 2020.

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## Appendices

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Appendix A: Marine Fisheries Organizational Chart

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## Agency Response

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A draft of this report was submitted to the Department of Environmental Quality for review. Its response is provided following the appendices.

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## Program Evaluation Division Contact and Acknowledgments

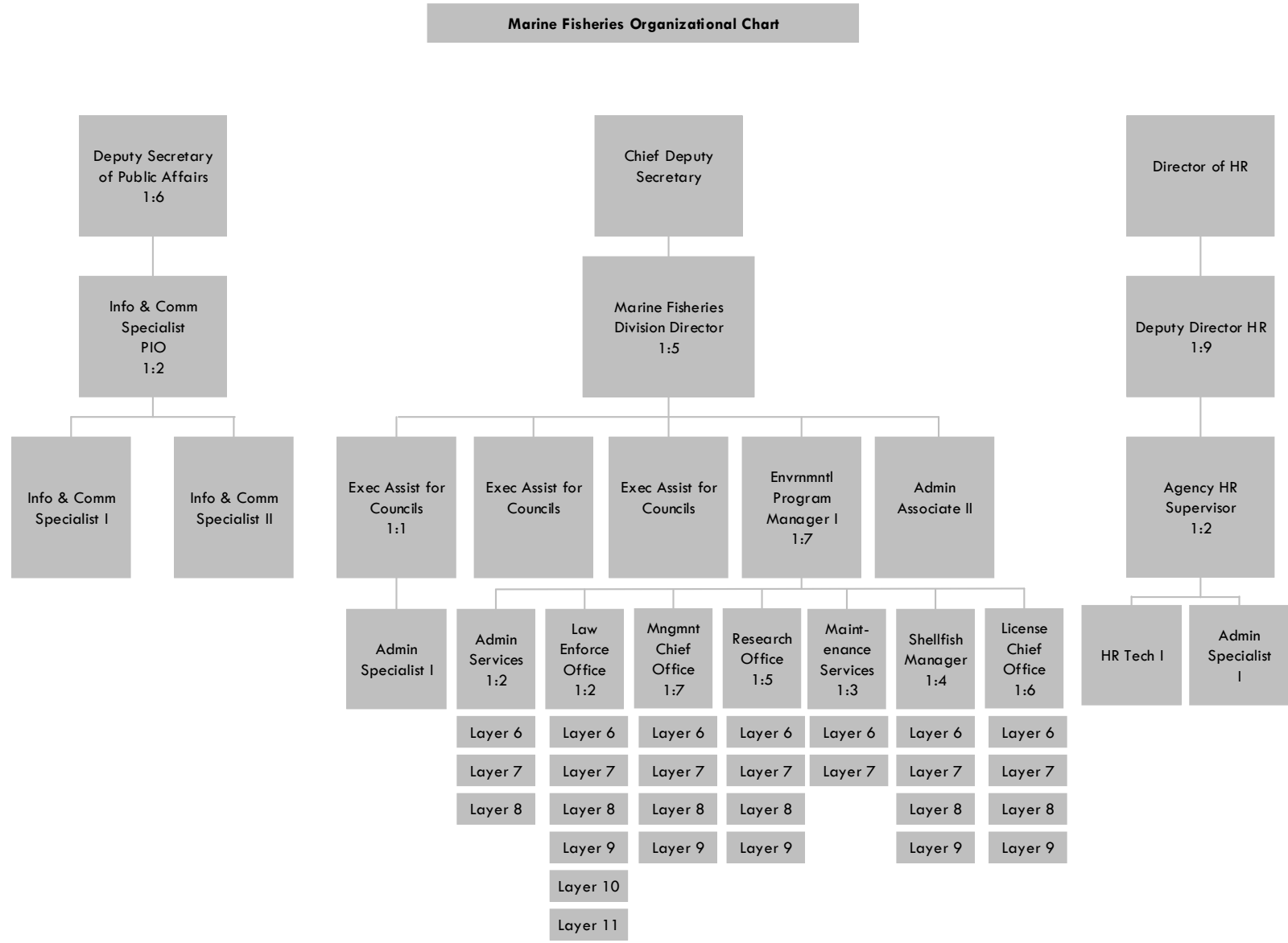
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For more information on this report, please contact the lead evaluator, Emily B. McCarthy, at [emily.mccartha@ncleg.net](mailto:emily.mccartha@ncleg.net).

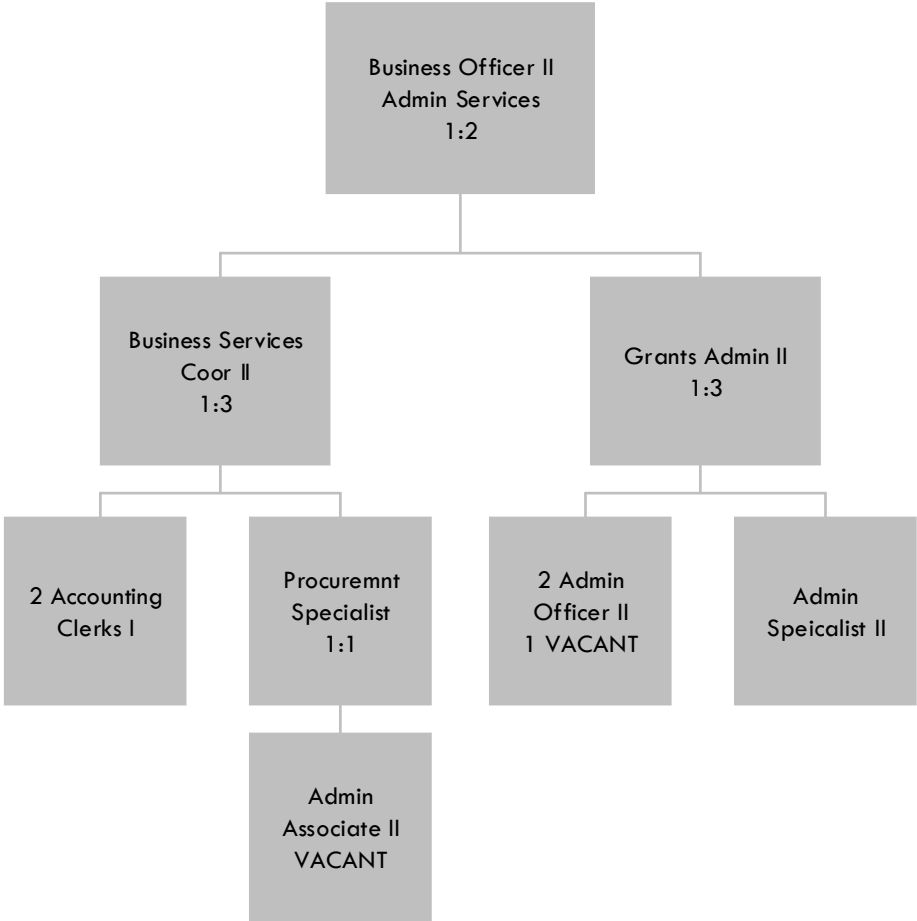
Staff members who made key contributions to this report include Natalie Garrett and Brent Lucas. John W. Turcotte is the director of the Program Evaluation Division.

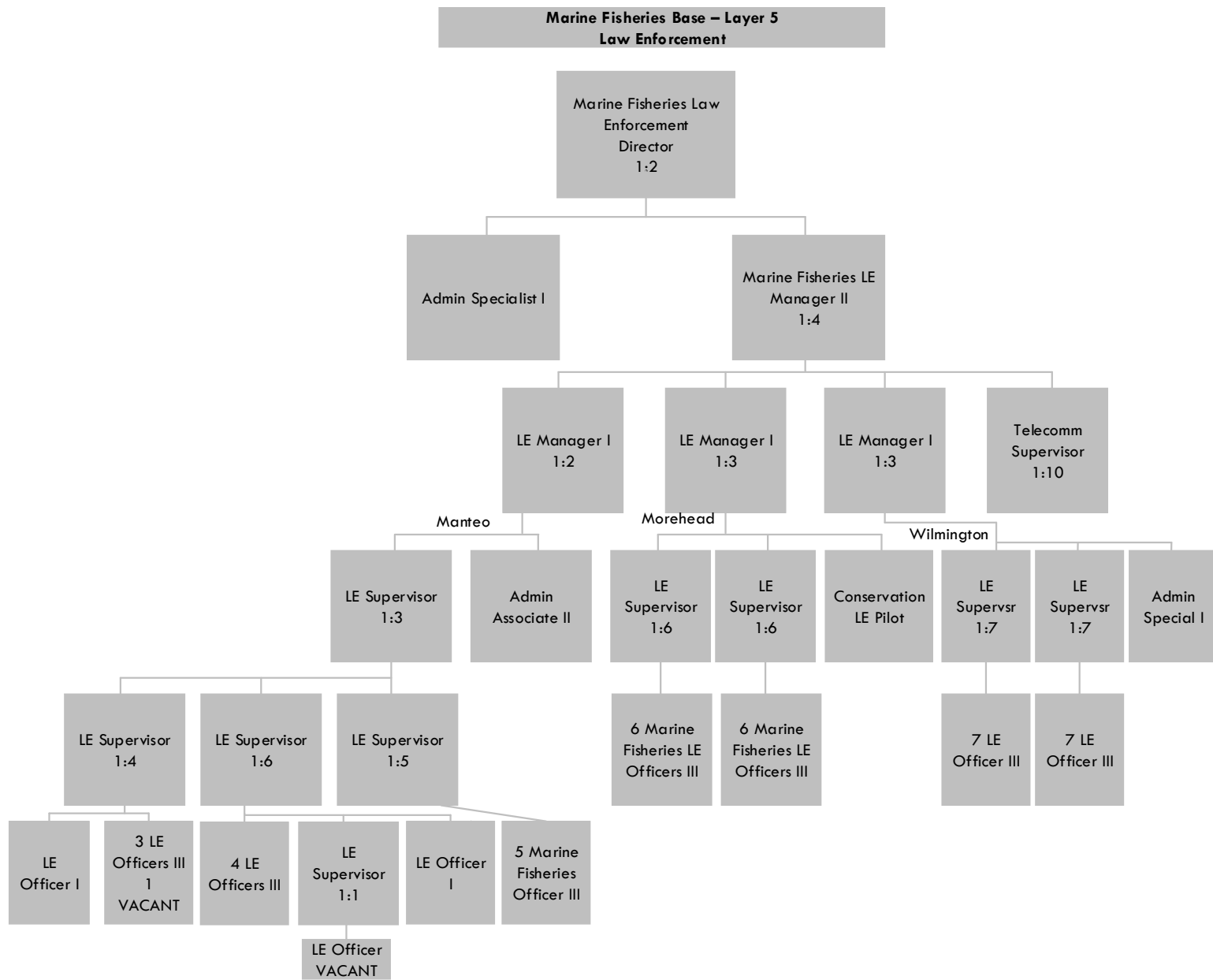


# Appendix A: Marine Fisheries Organizational Chart

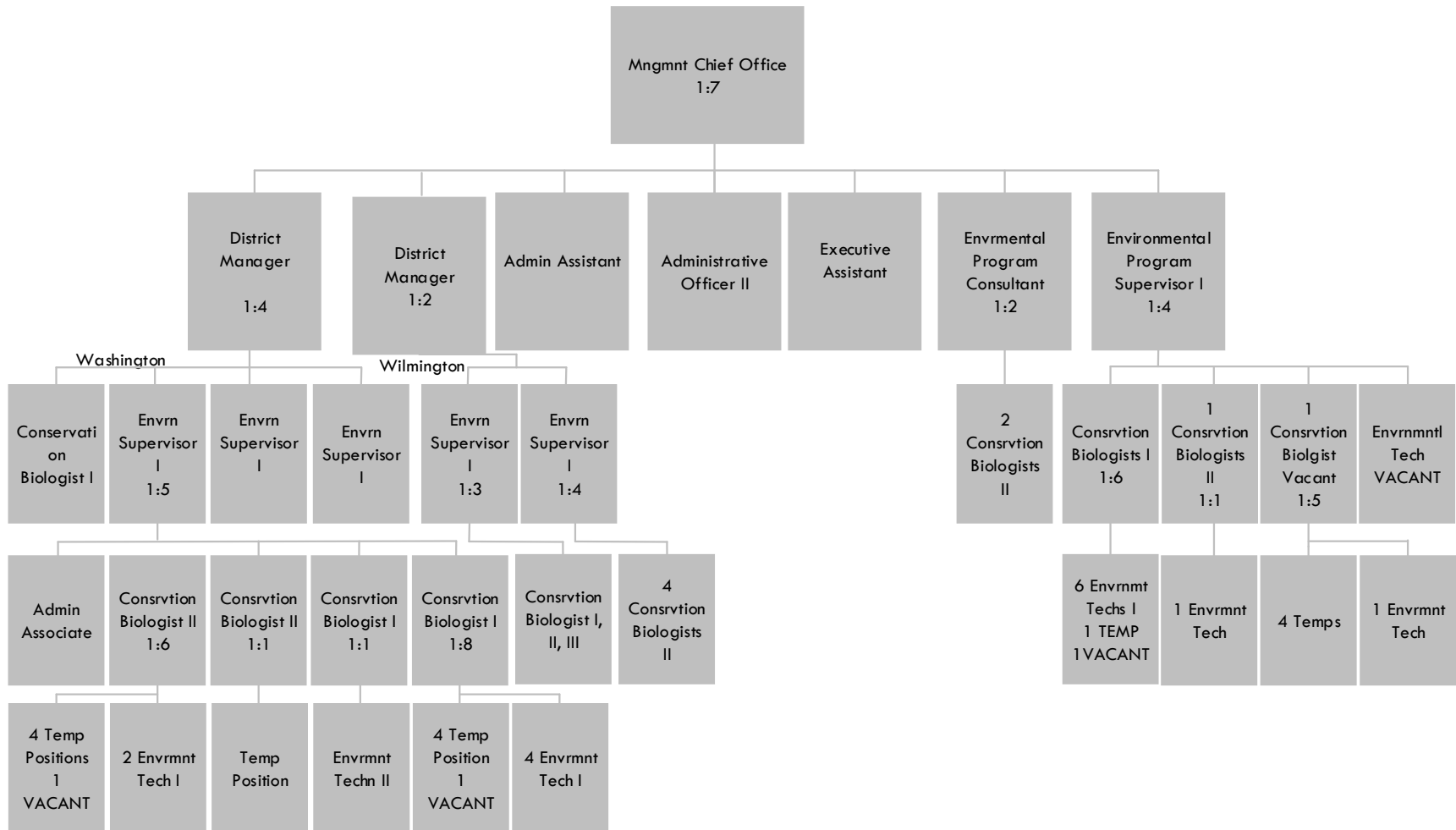


**Marine Fisheries Base – Layer 5 Admin Services**

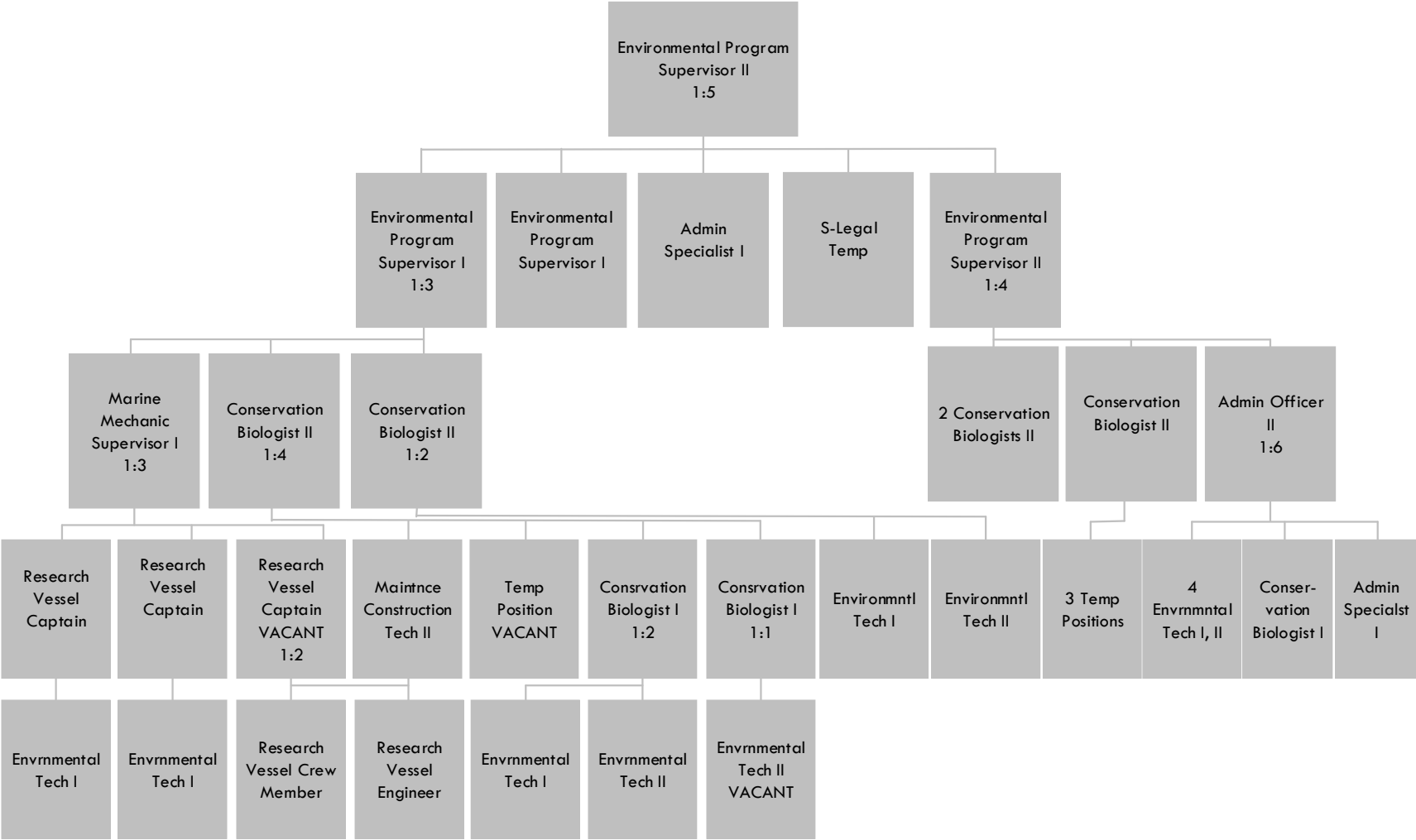




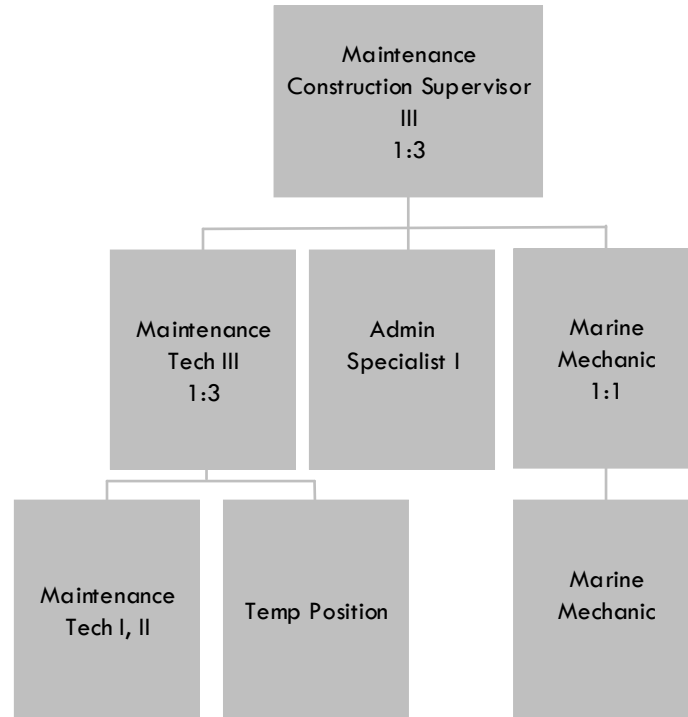
Management Chief Office – Layer 5



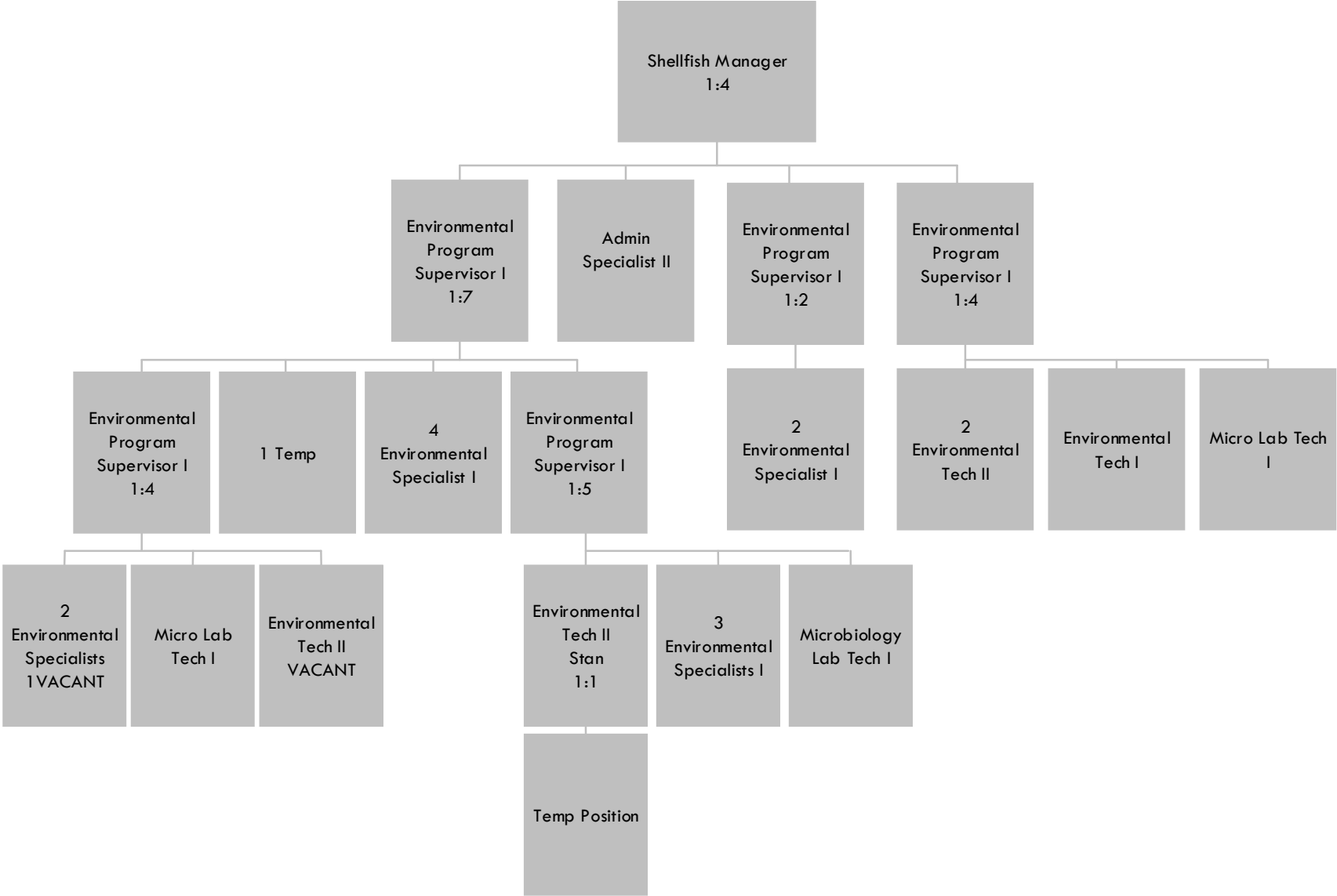
**Marine Fisheries Base – Layer 5 Research Office**



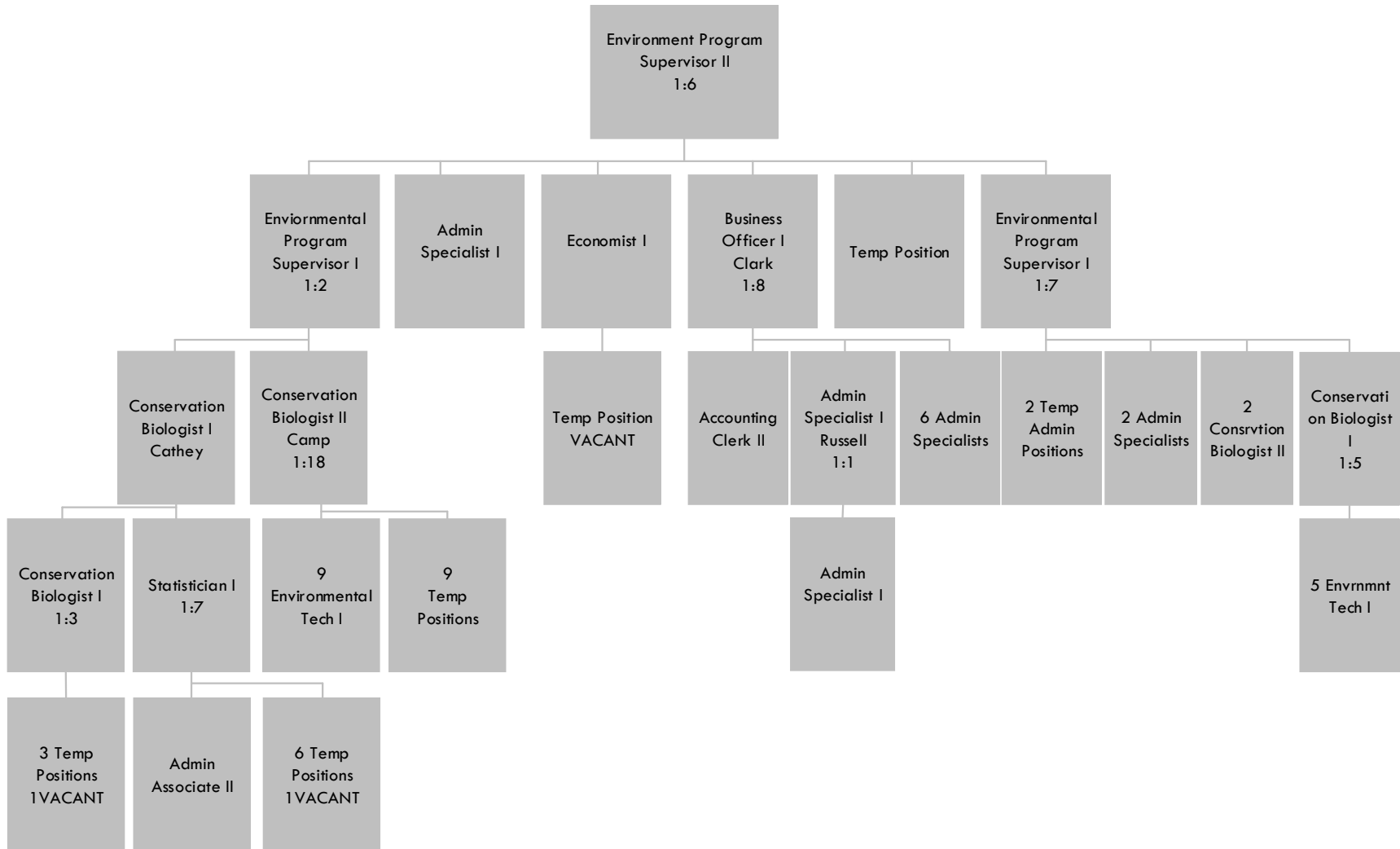
**Marine Fisheries Base – Layer 5 Maintenance Office**



**Marine Fisheries Base – Layer 5 Shellfish Office**



Marine Fisheries Base – Layer 5 Licensure Office







NORTH CAROLINA  
Environmental Quality

ROY COOPER  
Governor

MICHAEL S. REGAN  
Secretary

November 8, 2019

John W. Turcotte, Director  
Program Evaluation Division  
300 N. Salisbury Street, Suite 100  
Raleigh, NC 27603-5925

Subject: DEQ's Response to Report 2019-11, Organizational Structure and Permit Processes

Mr. Turcotte:

The Department of Environmental Quality (DEQ) has appreciated the opportunity to work with your Program Evaluators on this study, and submits the following agency response to the findings and recommendations of the report entitled "*DEQ Working to Improve Organizational Structure and Permit Processes, But Targeted Adjustments and a Performance Management System Are Still Needed.*" Although the Department was one of ten agencies that exceeded the standard of seven organizational layers in PED Report 2016-12, being chosen as the lone agency for follow-up has given us the opportunity to further examine our operations as we continue to strive for efficiency in both management and in our permitting processes.

DEQ's response is divided into two sections: (1) Organizational Structure and (2) Permit Processes.

### Organizational Structure

**Finding 1: At the agency level, DEQ's average span of control and total organizational layers in 2019 remain similar to 2016 levels.**

DEQ agrees with this finding but would like to emphasize several points contained within the report. DEQ has experienced significant reorganization since 2016, which makes a comparison to the previous report difficult. For example, the Appropriations Act of 2017 mandated that DEQ undergo a Reorganization through Reduction (RTR) and reduced the agency's budget. Additionally, the 2016 report utilizes different parameters. One of the biggest differences is that it excludes full-time temporary employees, which the 2019 report includes. The 2016 report also focused on a comparison of Executive Offices, but this evaluation delved into 20 "constituent units" – a mixture of programs and divisions to determine managerial criteria, again making a comparison to the 2016 report difficult. Whereas previously the Executive Office encapsulated the Secretary, Chief Deputy Secretary, and the Assistant Secretary for the Environment, these positions were evaluated independently as three separate units – but did not reflect all of their



direct reports in the total count. This last point can be best demonstrated by Exhibit 5 and Exhibit 6, which reflect discrepancies in the direct reports listed for these offices.

DEQ would like to emphasize that, as stated on page 13 of the report, the percentage of staff beyond the 7<sup>th</sup> layer decreased from 35% to 15%, demonstrating a shift towards the OSBM recommended seven layers. In fact, as the report notes, the one additional layer gained between the two evaluations is comprised of only one position that is currently vacant and will be eliminated by January 1<sup>st</sup>, 2020.

**Finding 2: Five of DEQ's 20 organizational units contain more organizational layers and a higher percentage of narrow spans of control than recommended levels, with the Marine Fisheries Division presenting the greatest potential for structural issues.**

DEQ agrees with this finding, but again would like to emphasize several points contained within the report. The report notes on page 5 that the factors that determine appropriate span of control or organizational layers include both complexity of the organization's activities and the element of geographic proximity. "Generally, organizations executing highly technical work that is prone to frequent changes or subject to tight deadlines need closer levels of staff supervision and therefore small spans of control." Also, legislation and other funding requirements have directed some of the agency's staffing decisions. As DEQ is tasked with providing highly-technical environmental oversight statewide, across multiple regulatory programs, all three factors have impacted the number of organizational layers and span of control.

The report acknowledges that the Division of Marine Fisheries (DMF) is a structural outlier in terms of span of control and organizational layers. DMF is unique in the Department as it has law enforcement duties and its operations are spread out geographically along the coast. It is the 2<sup>nd</sup> largest Division within DEQ, but has the lowest average salary and experiences high turnover. Organizational structure decisions consider highly technical expertise, funding source, geography and safety requirements. As an example, the report notes a larger staff and more organizational layers occur at the Manteo office – a factor reflective of the fishing and law enforcement activity for the area as well as the remoteness of the Outer Banks, both requiring more staff. Although constrained by these requirements, DEQ along with the DMF will continue to evaluate the organizational structure to eliminate any potential structural inefficiencies.

**Recommendation 1: The General Assembly should direct DEQ to study the narrow spans of five organizational units identified as potentially problematic and report to the Joint Legislative Oversight Committee on Agricultural and Economic Resources regarding justification for narrow spans.**

DEQ has acknowledged to the Program Evaluation Division its intentions to address identified narrow spans of control in DMF which will be effective as of Jan. 1, 2020. DEQ would not recommend further study at this time.



## Permit Processes

**Finding 3. Federal and state law, administrative rule, and policy impose restrictions on and parameters for DEQ's management of its permits; as a result, the structure of permit processing varies.**

DEQ agrees with this finding and appreciates that PED elaborated on why variations in permit processes exist. As noted in the report, only 22 out of the over 200 types of permits administered by DEQ were evaluated. Working within the regulatory framework, DEQ processes over 20,000 permits each year, excluding DMF. By itself, DMF processes close to 25,000 permits and licenses annually. Within the bounds of the legal requirements surrounding each permit, DEQ has sought feedback from the regulated community to improve communication and efficiency.

**Finding 4. Although decentralization of permit processing enables units to meet varied permit requirements, granting such autonomy absent a central performance management system limits DEQ's ability to ensure processes are efficient and effective.**

DEQ agrees with this finding, but would like to emphasize that within each permit process at the Division level, DEQ does its best to ensure efficiency and efficacy. Every division has made efforts over the past few years to ensure timeliness and provide technical assistance to applicants, and the Permitting Transformation Project (PTP), started around two years ago, is intended to increase centralization where applicable. DEQ appreciates PED's acknowledgement of the importance of the PTP in Finding 5 and agrees that centralization to a single database would improve efficiency and efficacy.

DEQ would like to emphasize a few points about Exhibit 19:

- A permit tracking dashboard is a key outcome for the PTP.
- Some of the permits did not have statutory authorization for electronic submittal until two years ago. DEQ intends to establish an electronic submittal system for all permits, but it is not a quick and easy process. A significant amount of time is needed to identify the appropriate workflows and develop the technology for electronic submittal, while still ensuring compliance with state and federal reporting requirements.
- Even if a formal feedback mechanism does not exist for all permits, staff are in frequent communication with applicants throughout the application process.

**Finding 5: The Permitting Transformation Project offers a means of remedying the need for a performance management system to address permit processing, but the project must formalize several components to maximize effectiveness.**

DEQ appreciates PED's acknowledgement of the positive impact potential of the PTP, and is proud of the work that has gone into it so far. It is important to note that while it is true that a formalized business plan and return of investment (ROI) analysis were not conducted at the outset, decisions about starting the PTP were not made arbitrarily and several factors were



considered, including the experience of other states and the prior experiences of DEQ and DIT staff. Getting this project off the ground was a high priority for DEQ because of the department's commitment to providing excellent customer service. As an example to highlight what DEQ learned from other states, Arizona has spent \$19 million on an in-house custom code solution, similar to what PTP is working on, and their estimated economic impact to the state is \$124 million.

The time it would have taken to create a formalized business plan and ROI would have delayed the progress of the PTP significantly. Instead, elements of a business plan and ROI are being created in parallel with the PTP's ongoing activities. That said, a project plan was created with goals and milestones before any work got started, and most of the elements of a business plan do already exist – just not in a formalized way as recommended in this report.

**Recommendation 2: The General Assembly should direct DEQ to develop and report on 1) a formal business plan for the Permitting Transformation Project including return on investment and 2) a performance management plan for permit processes and the accompanying data management system to oversee it.**

Many of these items are already in progress at DEQ, though they may not have been completed yet. Additionally, DEQ is currently in the process of hiring a Project Manager to oversee the business side of the PTP and develop both a formalized business plan and a performance management system, as the report recommends. DEQ recognizes the importance of having these items and is committed to their ongoing development, but notes that unlike many other states, no additional resources have been provided for this purpose.

DEQ appreciates the opportunity to comment on this report and is committed to the continued improvement of its organizational structure and permit processes.

Sincerely,



Sheila Holman  
Assistant Secretary for the Environment  
NC Department of Environmental Quality

