

Office of Regulatory Management
Economic Review Form

Agency name	Department of Environmental Quality
Virginia Administrative Code (VAC) Chapter citation(s)	Not applicable – DEQ guidance document
VAC Chapter title(s)	Not applicable – DEQ guidance document
Action title	Not applicable – DEQ guidance document
Date this document prepared	March 26, 2024
Regulatory Stage (including Issuance of Guidance Documents)	Existing guidance – Fish Kill Investigation Guidance Second Edition – GM02-2002 being updated to Fish Kill Investigation Guidance Third Edition – GM23-2006

Cost Benefit Analysis

Complete Tables 1a and 1b for all regulatory actions. You do not need to complete Table 1c if the regulatory action is required by state statute or federal statute or regulation and leaves no discretion in its implementation.

Table 1a should provide analysis for the regulatory approach you are taking. Table 1b should provide analysis for the approach of leaving the current regulations intact (i.e., no further change is implemented). Table 1c should provide analysis for at least one alternative approach. You should not limit yourself to one alternative, however, and can add additional charts as needed.

Report both direct and indirect costs and benefits that can be monetized in Boxes 1 and 2. Report direct and indirect costs and benefits that cannot be monetized in Box 4. See the ORM Regulatory Economic Analysis Manual for additional guidance.

Table 1a: Costs and Benefits of the Proposed Changes (Primary Option)

(1) Direct & Indirect Costs & Benefits (Monetized)	<p><u>Background:</u> The Code of Virginia (State Water Control Law §62.1-44.15 (11)) requires the Department of Environmental Quality (DEQ) to investigate the large-scale killing of fish in Virginia state waters, recover the costs of such investigations, and to facilitate cost recovery for the replacement value of killed fishes from those identified as responsible. This guidance is used to provide data to the Department of Wildlife Resources (DWR) who calculate the replacement value of the fish killed for cost recovery. This document replaces the existing DEQ Guidance Memo GM02-2002 Fish Kill Guidance Manual Second Edition</p>
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completed in 2002, which will be repealed. This revised guidance provides updated instruction to DEQ biologists, water quality specialists, and other agency staff on the safe and appropriate procedures for conducting fish kill investigations. These include procedures to identify and quantify the type of fish killed, assess the condition of the killed fishes, and collecting water quality data to help determine the cause of the mortality. DEQ uses this information to assist with stopping the source of the kill and identifying responsible parties, along with communicating the investigation findings for cost recovery or other DEQ actions. Since the existing guidance is approximately 22 years old, DEQ initiated this update to clarify language and procedures to reflect current agency practices and increase the accuracy, efficiency, consistency, defensibility, and fairness of investigations and cost determinations associated with fish kills. Primarily this update:

- Expands upon existing procedures and clarifies language to ensure staff conduct complete and accurate investigations.
- Adds safety guidelines for staff during investigations.
- Adds further discussion on communicating incidents with the public and media.
- Gives additional instruction explaining techniques using American Fisheries Society national guidelines for counting dead fish in large rivers, lakes, or limited access waterways.
- Gives additional details on collecting water quality data and samples.
- Streamlines the guidance by removing internal agency instructions and forms and moves the content to an internal operating procedure.

Direct Costs: The Code of Virginia ([State Water Control Law §62.1-44.15 \(11\)](#)) requires DEQ to investigate fish kills and recover the investigative cost from those responsible. DEQ does not expect the changes between the existing Fish Kill Guidance Manual Second Edition - GM02-2002 and the Fish Kill Investigation Guidance Third Edition - GM23-2006 to increase direct costs since the changes do not add new investigation requirements or costs compared to the existing procedures. DEQ has well established fish kill investigation procedures since it has been conducting these investigations for several decades. Since the existing fish kill guidance is approximately 22 years old, DEQ undertook this update primarily to make the guidance reflect current agency policies and improve descriptions of established investigative techniques to ensure investigation quality and consistency across the state.

Direct costs primarily associated with investigating a fish kill include staff time, equipment, analysis of water or other samples collected, and other resources used for conducting investigations. The costs associated with fish kill investigations will vary widely because of the extent and

complexity of events. The costs of recent DEQ fish kill investigations, conducted under the existing guidance, should be consistent with future costs under this update, but may not account for savings expected from updated recommendations, training, and procedures that should reduce office and field time to conduct investigations. DEQ attempts to identify the cause of the fish kill and the party responsible to recover the costs associated with conducting the investigation, as well as the replacement cost of the killed fish. Importantly, DEQ only incurs these direct costs associated with fish kill investigations if they are not able to identify a responsible party who must reimburse the agency since state law allows the agency to recover investigation costs from those responsible.

Records provided by the DEQ Office of Financial Management indicated that the agency investigated 18 fish kills that occurred between 2020 and 2022 and that DEQ's investigation costs ranged from \$284 to \$6,027. These costs reflect only the fish kill investigation, not the value of the replacement fish. DEQ incurs these costs only if they do not identify the responsible party who would be required to reimburse the agency investigation costs. These past investigative costs may overestimate future costs because they do not reflect savings from procedural updates. Additionally, since fish kill events are irregular and can't be predicted, these may not reflect potential costs of future events, particularly if a large serious event were to occur.

Indirect Costs: None

Direct Benefits. The Code of Virginia ([State Water Control Law §62.1-44.15 \(11\)](#)) also requires DEQ to recover the replacement value of killed fishes from those responsible. This guidance provides consistent procedures for counting fish under different conditions, based on the American Fisheries Society methods.

Counts can be affected by debris, barriers, fish sinking or floating downstream, or other manmade or natural factors. This update expands on existing instructions to ensure that investigators can accurately and consistently count the number of dead fish. DEQ provides these fish counts to the DWR to calculate the replacement value of lost fish which the responsible party reimburses to the State. The value associated with replacement fish varies widely, because the number of fish killed depends on the incident and the value of fish depends on the species. For instance, for the 18 fish kills investigated between 2020 and 2022, DEQ recovered between \$197 and \$44,883 of fish replacement cost from responsible parties (not including any investigation costs). Virginia directly benefits because DWR uses the funds to replace the fish lost and improve fisheries.

	<p>With this more detailed and thorough update, DEQ expects reduced field time to conduct investigations, efficiencies that will reduce staff time in compiling information, and updates to cost recovery calculations that better reflect costs to the Commonwealth associated with fish kills.</p> <p>This guidance update will reduce the number of hours required to train staff on conducting fish kill investigations by updating recommendations and procedures based on 22 years of practical experience since the last guidance document was prepared. The Agency’s Water Quality Monitoring program recommends that staff assigned to fish kill investigations (approximately 14 scientists statewide) review the guidance annually. The existing guidance contains 156 pages of technical information, whereas the proposed update has been reduced to 18 pages. Assuming an average of 5 minutes per page for each staff member to read technical material, and an average cost of \$40 per hour in staff salary and benefits, the estimated cost for review of the current guidance is \$7,280 per year. The estimated annual cost for review of the proposed guidance is \$840, resulting in a net direct benefit of approximately \$6,440 annually.</p> <p><u>Indirect Benefits:</u> Indirect benefits of the guidance cannot be accurately monetized because the extent, location, and costs of fish kill investigations varies widely.</p> <p>Investigating and stopping pollution and fish kill incidents quickly and efficiently indirectly benefits the Commonwealth’s fisheries, aquatic ecosystems, recreational or other beneficial uses.</p>	
(2) Present Monetized Values	Direct & Indirect Costs	Direct & Indirect Benefits
	<p>Variable Direct cost: \$284 to \$6,027 for investigative costs per event, not reflecting expected cost savings. Plus \$840 for annual staff review</p>	<p>Variable direct benefit: \$197 to \$44,883 per event for fish cost recovery</p>
(3) Net Monetized Benefit	<p>Since the costs and benefits vary for each investigation, a net monetized benefit cannot be calculated accurately. Reduced staff time related to the review and training on the guidance document is calculated to create \$6,440 in savings annually.</p>	
(4) Other Costs & Benefits (Non-Monetized)	<p><u>Direct Benefit.</u> This guidance update supports the State Water Control Law which makes DEQ responsible for investigating fish kills (§ 62.1-44.15 (11)) and empowers the agency to facilitate recovery of investigation costs and compile data to support determining the</p>	

	<p>replacement costs of dead fish. The guidance results in more accurate, consistent, and efficient fish kill investigations, better protection of the fisheries and aquatic ecosystems of Virginia.</p> <p><u>Indirect Benefits:</u> The guidance broadly benefits the public by establishing procedures to thoroughly investigate incidents causing fish kills. Improved water quality will protect human health and aquatic life, resulting in healthier fisheries, safer and reliable public water supplies, and contribute to economic benefits from tourism, economic development, and commercial and recreational fishing industries.</p>
(5) Information Sources	<ul style="list-style-type: none"> • Current guidance: https://townhall.virginia.gov/1/ViewGDoc.cfm?gdid=1457 • §62.1-44.15(11) of the Code of Virginia https://law.lis.virginia.gov/vacode/title62.1/chapter3.1/section62.1-44.15/ • DEQ Office of Financial Management - fish kill cost recovery information

Table 1b: Costs and Benefits under the Status Quo (No change to the regulation)

(1) Direct & Indirect Costs & Benefits (Monetized)	<p><u>Direct Costs:</u> DEQ conducts fish kill investigations under the current DEQ Guidance Memo “GM02-2002 Fish Kill Guidance Manual Second Edition” completed in 2002. DEQ assumes the existing guidance document would have the similar direct costs as the update since the procedures do not deviate substantially from those described in the update. While many elements of the current guidance document remain relevant and are in the update, portions are out of date. As described earlier, records provided by the DEQ Office of Financial Management indicated that the agency investigated 18 fish kills between 2020 and 2022 using the existing guidance that ranged in cost from \$284 to \$6,027.</p> <p>Using the existing guidance to train staff is calculated to cost DEQ staff time of approximately \$7,280 per year (see table 1a above).</p> <p><u>Indirect Costs:</u> None</p> <p><u>Direct Benefits.</u> Retaining the guidance document without changes would not be beneficial because it would not update and clarify current agency practices. DEQ expects that the direct monetary benefit associated with the replacement of killed fishes would be similar to that of the update presented above. As stated earlier, for the 18 fish kills DEQ investigated between 2020 and 2022 the replacement amount recovered from responsible parties to replace the fish lost and improve fisheries, as</p>
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	<p>calculated by DWR, ranged from \$197 to \$44,883. Replacement values vary widely depending on the number and species of fish killed. Counts can be affected by multiple factors, such as debris, barriers, and fish sinking or floating downstream. While many elements of the existing guidance remain, the existing guidance does not reflect the most current procedures and updated descriptions that would ensure that staff perform accurate counts, so that investigative costs and replacement values are calculated correctly.</p> <p><u>Indirect Benefits:</u> none</p>	
(2) Present Monetized Values	Direct & Indirect Costs	Direct & Indirect Benefits
	Variable: investigative costs ranging from \$284 to \$6,027 (2020-2022) plus \$7,280 for annual staff review	Variable: replacement value recovered from responsible parties \$197 to \$44,883
(3) Net Monetized Benefit	Since the costs and benefits vary for each investigation, a net monetized benefit cannot be calculated accurately.	
(4) Other Costs & Benefits (Non-Monetized)	The existing guidance may make DEQ less effective at meeting the State Water Control Law mandate to investigate fish kills (§ 62.1-44.15 (11)), recover the costs of investigations, and the replacement costs of dead fish.	
(5) Information Sources	<ul style="list-style-type: none"> • Current guidance: https://townhall.virginia.gov/l/ViewGDoc.cfm?gdid=1457 • §62.1-44.15(11) of the Code of Virginia https://law.lis.virginia.gov/vacode/title62.1/chapter3.1/section62.1-44.15/ • DEQ Office of Financial Management - fish kill cost recovery information 	

Table 1c: Costs and Benefits under Alternative Approach(es)

(1) Direct & Indirect Costs & Benefits (Monetized)	No alternative approaches were considered because the Code of Virginia (State Water Control Law §62.1-44.15) requires the Department of Environmental Quality (DEQ) to investigate the large-scale killing of fish in Virginia State Waters and to recover the costs of such investigations and the replacement value of killed fishes from those identified as responsible.	
(2) Present Monetized Values	Direct & Indirect Costs	Direct & Indirect Benefits

	(a) NA	(b) NA
(3) Net Monetized Benefit	NA	
(4) Other Costs & Benefits (Non-Monetized)	NA	
(5) Information Sources	NA	

Impact on Local Partners

Use this chart to describe impacts on local partners. See Part 8 of the ORM Cost Impact Analysis Guidance for additional guidance.

Table 2: Impact on Local Partners

(1) Direct & Indirect Costs & Benefits (Monetized)	The guidance would not impact local partners unless they were identified as responsible parties causing a fish kill and would incur the costs associated with investigating fish kill events and the replacement value of killed fishes.	
(2) Present Monetized Values	Direct & Indirect Costs	Direct & Indirect Benefits
	(a) N/A	(b) N/A
(3) Other Costs & Benefits (Non-Monetized)	Local partners will benefit by improved protection of local waterways from DEQ investigating and stopping pollution and fish kill incidents quickly and providing transparent, accurate and consistent methods for fulfilling the agency’s requirement under State Water Control Law §62.1-44.15 to investigate fish kills. The investigations indirectly benefit localities by protecting water quality and the associated water supplies, fisheries, aquatic ecosystems, recreational or other beneficial uses.	
(4) Assistance	NA	
(5) Information Sources	§62.1-44.15(11) of the Code of Virginia https://law.lis.virginia.gov/vacode/title62.1/chapter3.1/section62.1-44.15/	

Impacts on Families

Use this chart to describe impacts on families. See Part 8 of the ORM Cost Impact Analysis Guidance for additional guidance.

Table 3: Impact on Families

(1) Direct & Indirect Costs & Benefits (Monetized)	The guidance would not impact families unless they were identified as responsible parties causing a fish kill and would incur the costs associated with investigating fish kill events and the replacement value of killed fishes.	
(2) Present Monetized Values	Direct & Indirect Costs	Direct & Indirect Benefits
	(a) N/A	(b) N/A
(3) Other Costs & Benefits (Non-Monetized)	Families and the public in general will benefit by improved protection of local waterways from DEQ investigating and stopping pollution and fish kill incidents quickly and providing transparent, accurate and consistent methods for fulfilling the agency’s requirement under State Water Control Law §62.1-44.15 to investigate fish kills. The investigations indirectly benefit families by protecting water quality and the associated water supplies, fisheries, aquatic ecosystems, recreational or other beneficial uses.	
(4) Information Sources	§62.1-44.15(11) of the Code of Virginia https://law.lis.virginia.gov/vacode/title62.1/chapter3.1/section62.1-44.15/	

Impacts on Small Businesses

Use this chart to describe impacts on small businesses. See Part 8 of the ORM Cost Impact Analysis Guidance for additional guidance.

Table 4: Impact on Small Businesses

(1) Direct & Indirect Costs & Benefits (Monetized)	The guidance would impact on Small Businesses unless they were identified as responsible parties causing a fish kill and would incur the costs associated with investigating fish kill events and the replacement value of killed fishes.	
(2) Present Monetized Values	Direct & Indirect Costs	Direct & Indirect Benefits
	(a) N/A	(b) N/A

<p>(3) Other Costs & Benefits (Non-Monetized)</p>	<p>Small businesses and the public in general will benefit by improved protection of local waterways from DEQ investigating and stopping pollution and fish kill incidents quickly and providing transparent, accurate and consistent methods for fulfilling the agency’s requirement under State Water Control Law §62.1-44.15 to investigate fish kills. The investigations indirectly benefit small businesses by protecting water quality and the associated water supplies, fisheries, aquatic ecosystems, recreational or other beneficial uses.</p>
<p>(4) Alternatives</p>	<p>No alternative approaches were considered because the Code of Virginia (State Water Control Law §62.1-44.15) requires the Department of Environmental Quality (DEQ) to investigate the large-scale killing of fish in Virginia State Waters and to recover the costs of such investigations and the replacement value of killed fishes from those identified as responsible.</p>
<p>(5) Information Sources</p>	<p>§62.1-44.15(11) of the Code of Virginia https://law.lis.virginia.gov/vacode/title62.1/chapter3.1/section62.1-44.15/</p>

Changes to Number of Regulatory Requirements

Table 5: Regulatory Reduction

For each individual action, please fill out the appropriate chart to reflect any change in regulatory requirements, costs, regulatory stringency, or the overall length of any guidance documents.

Change in Regulatory Requirements

VAC Section(s) Involved*	Authority of Change	Initial Count	Additions	Subtractions	Total Net Change in Requirements
NA Guidance	(M/A):				NA
	(D/A):				NA
	(M/R):				NA
	(D/R):				NA
				Grand Total of Changes in Requirements:	(M/A): NA
					(D/A): NA
					(M/R): NA
					(D/R): NA

Key:

Please use the following coding if change is mandatory or discretionary and whether it affects externally regulated parties or only the agency itself:

(M/A): Mandatory requirements mandated by federal and/or state statute affecting the agency itself

(D/A): Discretionary requirements affecting agency itself

(M/R): Mandatory requirements mandated by federal and/or state statute affecting external parties, including other agencies

(D/R): Discretionary requirements affecting external parties, including other agencies

Cost Reductions or Increases (if applicable)

VAC Section(s) Involved*	Description of Regulatory Requirement	Initial Cost	New Cost	Overall Cost Savings/Increases
NA Guidance				NA

Other Decreases or Increases in Regulatory Stringency (if applicable)

VAC Section(s) Involved*	Description of Regulatory Change	Overview of How It Reduces or Increases Regulatory Burden
NA Guidance		NA

Length of Guidance Documents (only applicable if guidance document is being revised)

Title of Guidance Document	Original Word Count	New Word Count	Net Change in Word Count
02-2002 Fish Kill Investigation Guidance Second Edition being replaced with Fish Kill Investigation Guidance Third Edition– GM23-2006	201 pages	27 pages	-174

*If the agency is modifying a guidance document that has regulatory requirements, it should report any change in requirements in the appropriate chart(s).