Vermont Fish and Wildlife Department

Fish Hatchery Study Report

Submitted to:

Senate Institutions

House Corrections and Institutions

Submitted by:

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Vermont Fish and Wildlife Department

December 15, 2024

Executive Summary and Recommendations

In June 2024, the Vermont legislature enacted Act 162 – *An act relating to capital construction and State bonding budget adjustment*. Section 14 of Act 162 specifically directed that a report be submitted to the House Committee on Corrections and Institutions and the Senate Committee on Institutions by December 15, 2024, with the following:

(a) The Commissioner of Fish and Wildlife shall update the July 9, 2013 Facility Modernization Discharge Requirements Feasibility Study for the Salisbury Fish Hatchery and shall, on or before December 15, 2024, report to the House Committee on Corrections and Institutions and the Senate Committee on Institutions regarding the feasibility of continuing operations at the Salisbury Fish Hatchery after December 31, 2027, of transferring the production capacity of the Salisbury Fish Hatchery to the State's hatchery system, and of alternative options for replacing the production capacity of the Salisbury Fish Hatchery.

(b) The report shall:

(1) identify the repairs, improvements, and other work necessary to enable the Salisbury Fish Hatchery to obtain any permits necessary to continue operating after December 31, 2027 and provide a detailed analysis of the associated costs and a plan for accomplishing the work;

(2) identify any repairs, improvements, and other work necessary to enable the production capacity of the Salisbury Fish Hatchery to be transferred to the State's hatchery system and provide a detailed analysis of the associated costs and a plan for accomplishing the work; and

(3) examine alternative approaches to maintaining the State's fish production capacity, including an analysis of associated costs and work necessary to successfully implement each identified alternative approach.

This report seeks to satisfy these directives while recognizing that although H.882 (which became Act 162 upon enactment) initially included an appropriation of $100,000 to fund the detailed analysis of fish culture in Vermont described above, this funding was removed before the final version of the bill was passed by the General Assembly, leaving the Department without resources to perform the detailed analysis of costs, in particular.

This report reviews the NPDES permit requirements for Salisbury Fish Culture Station (FCS) and options for closing Salisbury and transferring the production load to the Ed Weed and Roxbury FCS; water limitations at the Bennington FCS and the Bald Hill FCS prohibit expansion of these facilities at this time.

FWD currently operates five Fish Culture Stations focused on sportfish restoration and providing angling opportunities for resident and non-resident anglers. These facilities produce five species of salmonids (trout and salmon) and walleye for release into public waters statewide. Each facility plays an important role in achieving overall program goals, with production allocation based on unique water sources, locations, and production capabilities. These facilities have a significant positive impact on Vermont's fisheries programs and the state's economy.

The goals of fish stocking in Vermont are based on the guidance in the Management Request for Cultured Fish, which follows the 2018 Vermont Management Plan for Brook, Brown, and Rainbow Trout. This guidance provides the base for sport fishing and angling opportunities through restoration and recreation (put-and-take stockings) for the people of Vermont while providing and supporting an activity that has a significant economic impact on the state.

Future fish stocking goals will be developed in consideration of the available budget to support this work coupled with the input of various critical stakeholders, including Vermont anglers, Fisheries Management Biologists, and the Fish Culture Section. Any successful long-term sustainable fisheries management program should address diverse recreational opportunities concentrating on nonconsumptive and consumptive users while staying within biological limitations and the State's financial capacity.

Vermont's fish culture facilities are important to the sport fishing industry, tourism, and economy throughout Vermont; however, financial resources to maintain and update the fish culture program infrastructure have been limited over the last thirty years since the Ed Weed FCS was built. The exception is the Roxbury FCS, which underwent a near-complete facility rebuild in 2021 after being destroyed in the Tropical Storm Irene flooding in 2011. As of 2024, Vermont's five fish culture facilities, in total, have been in operation for the equivalent of 439 years, with an average age of 76.5 years, excluding the rebuilt Roxbury FCS.

The legislative study report language directed the Vermont Fish and Wildlife Department to evaluate the need for repairs and facility improvements at the Salisbury FCS to obtain any permits needed to operate after December 31, 2027. The essential permit is the NPDES permit, which is critical and focuses on reducing phosphorus in the discharge in order to meet water quality standards for aquatic biota and Vermont's obligations under the Lake Champlain Total Maximum Daily Load (or TMDL).

The Salisbury FCS outflow represents over 95% of the flow and nutrient contributions to Halnon Tributary 10. It has been stated in legislative testimony that the issuance of a permit beyond 2027 is uncertain.

Key considerations are identified in this document regarding what would be required to move the Salisbury FCS broodstock program and production fish to other hatcheries within the Vermont system while keeping fish production at current levels. Salisbury FCS currently maintains the majority of the broodstock for the Fish Culture Section and produces some yearling and trophy trout for stocking throughout the state of Vermont.

In conclusion, the directive provided in Act 162 made clear the General Assembly's desire to maintain the State's fish production capacity. As such, the following assessment lays out options for continuing current levels of fish production; this includes scenarios that require significant one-time capital expenditures as well as more modest approaches. Understanding that State of Vermont has innumerable, significant and immediate demands for its finite financial resources, it is highly recommended that an independent consultant firm with expertise in fish culture be hired to evaluate Vermont's Fish Culture program and provide a more formal evaluation of the financial and economic impacts and values of any potential facility closure discussions.

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Introduction

Project Description, Project Authorization and Scope

The Vermont Legislature directed the Vermont Fish and Wildlife Department (FWD) to report on the feasibility of continuing operations at the Salisbury Fish Hatchery after December 31, 2027, and providing alternative options for replacing the production capacity of the Salisbury Fish Culture Station (FCS) were it to be closed. The Department was required to complete its work and report its findings and recommendations to the House Committee on Corrections and Institutions and the Senate Committee on Institutions by December 15, 2024.

Fish culture stations in Vermont have been in operation for more than 130 years. According to the 2018 Vermont Management Plan for Brook, Brown, and Rainbow Trout, “It is the goal of the VT FWD to manage the state’s trout resources to support wild trout populations and a diversity of quality recreational opportunities.” The priority for this goal is to protect habitat, restoration, and harvest regulations to manage the state’s wild trout resources. The second priority for this goal is to “Utilize cultured trout where management of a recreational trout fishery is justified but cannot be sustained solely through wild trout management.” In this fashion, the Vermont Fish Culture Stations are a tool available to the Fish Management Section to manage the trout populations throughout the state.

Vermont operates five fish culture stations throughout the state (see the map on page 2). These facilities are:

- Bald Hill FCS – Newark, VT
    - Produces brown trout, landlocked Atlantic Salmon, rainbow trout, steelhead trout, and walleye, as well as maintains a captive broodstock line of landlocked Atlantic salmon
- Bennington FCS – Bennington, VT
    - Produces brook trout, brown trout, and rainbow trout
- Ed Weed FCS – Grand Isle, VT
    - Produces brown trout, lake trout, landlocked Atlantic salmon, rainbow trout, steelhead trout and walleye
- Roxbury FCS – Roxbury, VT
    - Produces brook trout, rainbow trout, and steelhead trout
- Salisbury FCS – Salisbury, VT
    - Produces brook trout, brown trout, lake trout, rainbow trout, and steelhead trout, as well as maintains multiple captive broodstock lines for brook trout, brown trout, lake trout, rainbow trout, and steelhead trout

Vermont also maintains a “Memorandum of Understanding” with the United States Fish and Wildlife Service’s two National Fish Hatcheries (NFH) in Vermont. FWD receives brook and lake trout for inland stockings from the Eisenhower NFH (located in North Chittenden) in exchange for landlocked Atlantic salmon stocked into Lake Champlain by the Ed Weed FCS. This memorandum also ensures that landlocked Atlantic salmon and lake trout broodstock are maintained at the White River NFH (located in Bethel) and made available to FWD as a backup source for future fish egg needs for Lake Champlain and inland waters stockings. The MOU is based on a programmatic change in 2006 in response to the continued threat of invasive aquatic species and diseases that could be spread to inland locations from Lake Champlain were fish reared at the Ed Weed FCS stocked out to inland waters.

Recreational sport fishing is not only a key part of Vermont's outdoor heritage but also an important part of Vermont's economy. According to the 2016 United States Fish & Wildlife Service's National Survey of Hunting, Fishing, and Wildlife-Associated Recreation, coupled with the 2020 Vermont Angler Survey, the Vermont fish culture program generates approximately $39.6M worth of annual economic benefit to the state of Vermont. Given that the fish culture program has a $4.2M yearly budget with a 60% federal match ratio ($2.5M), the State of Vermont's annual fish culture return on investment ratio is nearly 23:1. In addition to these values, a 2016 study on "The Value of Lake Champlain" by the Nelson A. Rockefeller Center at Dartmouth College showed that a value of $205M of annual economic benefit to the state of Vermont was attributed to fishing solely for Lake Champlain. If even just a quarter of the $205M fishing value for Lake Champlain was attributed directly to fish culture programs in Vermont and New York that stock a variety of sought-after game fish within the basin area, over $51M annually could be attributed directly to hatchery-reared fish.

However, financial resources to maintain and update the fish culture program infrastructure have been limited over the last thirty years since the Ed Weed FCS was built, except for the rebuilding of the Roxbury FCS after the devastation left behind by Tropical Storm Irene. As of 2024, Vermont's five fish culture facilities, in total, have been in operation for the equivalent of 439 years, with an average age of 76.5 years, excluding the rebuilt Roxbury FCS. While the aging infrastructure throughout the Fish Culture Section has weathered the years fairly well, long-standing brick-and-mortar, wood-and-plaster buildings, outdated electronics, and a long list of other items that have been well maintained for as long as possible have begun to wear down.

Modernizing the operations of these fish culture programs will be vital to ensuring the long-term viability of these facilities. Fish culture operations have advanced over the years, as have the complexity of environmental regulations, so it is crucial to ensure that any major investments made have been fully peer-reviewed and fit within a larger perspective of the long-term roadmap for fish culture.

Salisbury Fish Culture Station – Existing Conditions

The Salisbury FCS is located in Salisbury, south of Middlebury and adjacent to Route 53 on the east side of Route 7. The Salisbury FCS began operations in 1931 and is listed on the National Register of Historic Places. The site was selected based on available spring water at the time, and as fish production demands increased over time, pump-driven wells were installed in 1971 to meet the increased program needs.

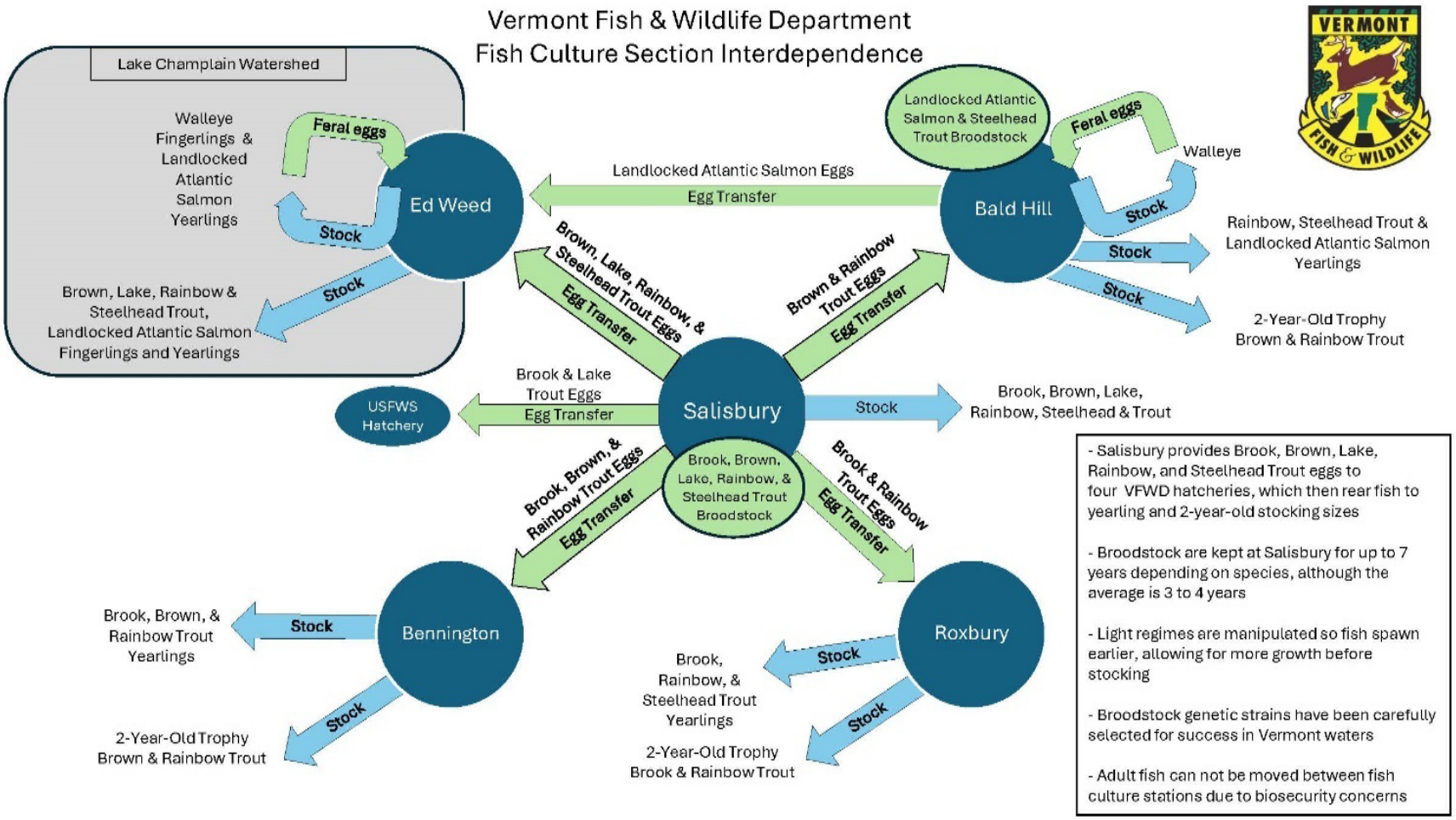
The facility is primarily a broodstock station for brook, brown, lake, rainbow, and steelhead trout. The location and water source of the facility are ideal for fish culture and, specifically, salmonid broodstock culture. As the visual diagram below shows (Page 5), Salisbury FCS is the “hub” of the Vermont fish culture working wheel with its protected water source used to produce mature trout that provide quality disease-free eggs for all the other state production facilities as well as being a biologically secure egg source for all of Vermont’s private fish culture operations. The hatchery grows and maintains approximately 42,000 pounds of coldwater fish annually and produces approximately 1.5 million trout eggs annually for all of the VT FWD state facilities, in addition to providing trout eggs to the private producers who stock trout throughout Vermont. The annual stocking program also uses a portion of broodstock replacement trout production and retired broodstock for stocking throughout the state.

Salisbury FCS receives a significant number of visitors. Prior to the 2020 Covid-19 pandemic, it hosted approximately 6,500 visitors annually. Post-pandemic, the visitation numbers have been closer to 5,000 visitors annually. Salisbury FCS has the most visitors annually of the five state-operated fish culture stations.

The Salisbury FCS infrastructure is outdated. The original construction is over 81 years old, and the more recently built south raceway construction elements are 44 years old. The fish production capabilities at Salisbury are partially limited by the water distribution process throughout the facility. The fish-rearing units are rectangular concrete raceways that are outdated and poorly designed for uniform flow distribution and waste collection and disposal. The raceways have concrete spalling, cracks, and structural problems that cause leakage.

Updates to the VT Water Quality Standards (VWQS) over the last 18 years placed Halnon Tributary 10 (or “Trib 10”) on the federal impaired waters list (303d) in 2012. Salisbury FCS discharges to Trib 10 and has not been able to meet the combined Nutrient Criteria for Aquatic Biota and Wildlife in Rivers and Streams. The in-stream concentrations of phosphorus exceed the nutrient concentrations for this stream type and due to elevated phosphorus discharge from Salisbury FCS, the stream does not meet all nutrient response conditions, namely aquatic biota (Table 2 of VWQS).

In response, FWD has reviewed options for effluent treatment at Salisbury. The chosen method has been to routinely siphon or vacuum the fish raceways to collect the uneaten feed and fish waste, hold it in a settling basin, and then haul it off-site to a neighboring farmer’s waste lagoon. This process has allowed the facility to meet its numeric discharge requirements outlined in the NPDES permit and while achieving a significant reduction in nutrients discharged to the receiving water at a modest cost; this process is inefficient and labor-intensive compared to options that could be made available with updated tanks and technology.


Vermont Fish & Wildlife Department
Fish Culture Section Interdependence
VERMONT
FISH & WILDLIFE
Lake Champlain Watershed
Walleye Fingerlings & Landlocked Atlantic Salmon Yearlings
Feral eggs
Stock
Ed Weed
Brown, Lake, Rainbow & Steelhead Trout, Landlocked Atlantic Salmon Fingerlings and Yearlings
Stock
Landlocked Atlantic Salmon & Steelhead Trout Broodstock
Feral eggs
Walleye
Landlocked Atlantic Salmon Eggs
Egg Transfer
Bald Hill
Stock
Stock
Rainbow, Steelhead Trout & Landlocked Atlantic Salmon Yearlings
Stock
2-Year-Old Trophy Brown & Rainbow Trout
Brown, Lake, Rainbow, & Steelhead Trout Eggs
Egg Transfer
Brown & Rainbow Trout Eggs
Egg Transfer
Brook & Lake Trout Eggs
Egg Transfer
USFWS Hatchery
Salisbury
Stock
Brook, Brown, Lake, Rainbow, Steelhead & Trout
Brook, Brown, Lake, Rainbow, & Steelhead Trout Broodstock
Brook, Brown, & Rainbow Trout Eggs
Egg Transfer
Brook & Rainbow Trout Eggs
Egg Transfer
Brook, Brown, & Rainbow Trout Yearlings
Stock
Bennington
Stock
2-Year-Old Trophy Brown & Rainbow Trout
Brook, Rainbow, & Steelhead Trout Yearlings
Stock
Roxbury
Stock
2-Year-Old Trophy Brook & Rainbow Trout
- Salisbury provides Brook, Brown, Lake, Rainbow, and Steelhead Trout eggs to four VFWD hatcheries, which then rear fish to yearling and 2-year-old stocking sizes
- Broodstock are kept at Salisbury for up to 7 years depending on species, although the average is 3 to 4 years
- Light regimes are manipulated so fish spawn earlier, allowing for more growth before stocking
- Broodstock genetic strains have been carefully selected for success in Vermont waters
- Adult fish can not be moved between fish culture stations due to biosecurity concerns

Required Permits to Maintain Operations

Similar to all other facilities discharging wastewater in Vermont, the Salisbury FCS needs to meet its existing National Pollution Discharge Elimination Series (NPDES) permit. It is currently operating under a permit issued in 2022 and will require a renewal of the permit in December 2027 in order to continue to discharge. Effluent data collected from January 2023 through June 2024 demonstrate the facility meeting permit requirements for listed parameters and is provided on Page 18 within the Appendices. While the facility is meeting discharge concentration permit requirements, it is uncertain if the phosphorus reductions will be sufficient to meet the in-stream nutrient response conditions (i.e., aquatic biota) as required under the VWQS to issue a new NPDES permit in 2027.

Staffing situation and need for additional staff

The Salisbury FCS has operated without a Fish Culture Supervisor since late 2022. Multiple attempts to fill the position were made in the late spring and early fall of 2023. However, a narrow pool of candidates with limited experience, as well as information that is readily available online regarding the possible closure of the Salisbury FCS in 2019 and earlier this year, has made it virtually impossible to fill the position. As a result of the inability to fill the position, it was returned to the Department's manning table to meet other staffing needs within the Department. This has impacted the existing staff and programs at the Salisbury FCS over the last year.

If the facility remains open in the future, it will be critical for a full-time Fish Culture Supervisor position to be returned to Salisbury FCS to ensure there is adequate capacity to support fish production, fish health, personnel management, and other duties.

Vermont Fish Culture Section's Current Production and Operations

The five-year average review of fish production across the entire Fish Culture Section shows that the Section has been rearing 169,230 pounds of yearling salmonids (trout and salmon), 36,635 pounds of two-year-old salmonids, also known as trophy trout, and 26,348 pounds of broodstock, or the spawning adult salmonids. These salmonid broodstock are made up of multiple strains and species and are various ages over two years old to compose the five species of salmonids that are reared by the VT FWD Fish Culture Section staff. The charts on pages 15 through 17 in the Appendix break down the various species and locations of these fish at each facility throughout Vermont.

The Salisbury FCS rears 11,800 pounds of yearling salmonids and 6,100 pounds of two-year-old "trophy trout" for stock-out annually. Salisbury FCS is also responsible for maintaining 23,800 pounds of captive broodstock. This requires a significant amount of raceway space, as the FCS holds over 20 separate lots of various strains and species of salmonids throughout the available raceway space.

Review to Continue Operations at Salisbury Fish Culture Station after 12/31/27

Water Quality Standards for Aquatic Biota/Macroinvertebrates

Salisbury FCS is required to have an NPDES permit; effluent limits in the permit are based on what is needed for the facility to comply with the VWQS. The VWQS can be met in one of two ways: by meeting the specified water quality effluent parameter levels or by meeting levels based on aquatic biota standards. Through past engineered studies (HDR/FishPro 2013 Salisbury FCS Facility Modernization Study), it has been determined that Salisbury FCS will not be able to meet the required effluent parameter levels, particularly for phosphorus, based on the applicable water quality standards and the established waste load allocations necessary to meet Vermont's obligations to the U.S. Environmental Protection Agency codified in the 2016 Lake Champlain TMDL. The other option available is to meet all in-stream nutrient response conditions which include criteria for pH, turbidity, dissolved oxygen and aquatic biota. These requirements are part of the current NPDES permit and are available in the appendix.

Since the permit was issued in January 2023, the facility has met required effluent parameter concentrations. The staff at the Salisbury FCS has worked tirelessly to implement additional procedures to reduce the amount of fish waste and uneaten feed leaving the system by vacuuming all raceways several times each week. This has reduced monitored effluent concentrations as measured by an independent lab.

As for the meeting the aquatic life use assessment required for nutrient response conditions, the facility meets two of the eight biological indices for small high gradient criteria B(2) streams and two of the ten indices for slow low gradient criteria B(2) streams. Unfortunately, the remaining aquatic biota indices for both small high gradient and slow low gradient stream types do not meet criteria. It is unclear if the reduced concentrations of phosphorus in the effluent will, over time, allow conditions in the stream to attenuate and meet water quality standards for aquatic biota criteria.

Point of Compliance Issues

Before 2006, Salisbury FCS's point of compliance was Halnon Brook (Discharge Permit Fact Sheet April 1997 File No. 01-17). DEC Staff from the Wastewater Management Division visited the Salisbury FCS in August of 2006 to "… visually inspect the discharge point and determine where it first reaches waters of the State."

As a result of this site visit and additional conversations during 2006, DEC changed the Salisbury discharge point of compliance from Halnon Brook to Halnon Brook Tributary 10, directly below the hatchery. Trib 10 was determined to be waters of the state by DEC due to three factors:

- Early maps from the late 1800s and early 1900s (prior to the construction of the hatchery) show blue stream lines up to and a little beyond the current location of the hatchery, indicating that it was a permanent stream.
- The Wainwright dam was built on Trib 10 immediately upstream of the confluence with Halnon Brook in 1805, before the wells began enhancing stream flow in 1971. A dam would only be built on a permanent stream.
- Trib 10 is a second order stream where two first order streams combine. The point of compliance was established at river mile 0.5 on Trib 10, a half mile up from its confluence with Halnon Brook. However, in-stream water samples to determine water quality and aquatic biota are measured at river mile 0.1, four tenths of mile downstream.

Moving the point of compliance from Halnon Trib 10 to Halnon Brook would provide more dilution for the FCS discharge and would require infrastructure to pipe it to the stream. Halnon Brook has been biologically degrading over time as nutrient concentrations remain high at this location. If investments are made to reduce effluent nutrient concentrations and redirect the effluent from the FCS from Trib 10 to Halnon Brook, there is ongoing uncertainty that Halnon brook would meet WQS over time.

Options for Further Phosphorus Reductions

The main source of phosphorus in the discharge from any fish culture facility is the input of fish feed. The amount of fish feed needed to produce fish at a facility can be reduced if fewer fish are cultured on-site.

FWD has been running a rainbow trout strain comparison for several years, and the results will directly impact the number of broodstock required to be kept on-site at the Salisbury FCS. Two broodstock fish lines (Erwin x Arlee strain and Eagle Lake strain) are being produced at Salisbury FCS. This is double the biomass needed to create this program's future. Decisions will be made within the Fish Division in early 2025, and it looks promising that the Erwin x Arlee line will be discontinued, allowing the Salisbury FCS to reduce half of this biomass while spawning the Eagle Lake strain of rainbow trout.

Recent studies and research on Lake Champlain have more and more natural reproduction of lake trout has been found. This is important because reduction/removal of the lake trout from the Salisbury FCS would also significantly aid in reducing the phosphorus load. At maximum capacity for lake trout, the on-site weight is approximately 5,700 pounds of fish. The reduction in phosphorus can be significant if lake trout broodstock could be removed from the facility.

A memorandum from the Lake Champlain Management Committee, dated October 16, 2024, approved a proposal for a complete end to lake trout stocking in Lake Champlain. Consequently, the VT FWD staff are in conversations with the USFWS National Fish Hatchery (NFH) system in Vermont regarding receiving eyed eggs (a fish egg containing an embryo) from the White River NFH in the future for inland lake trout stockings and altogether discontinuing the lake trout broodstock at Salisbury. It is hopeful that this decision can also be made in the next six months, which will ensure that the memorandum of understanding (MOU) with the USFWS is updated accordingly.

Annual Operating Budget

The Salisbury FCS's current anticipated operating budget would need to be increased by an additional $150,000 in order to fully support four full-time positions. Current budgeting forecasts put this number at $700,000 annually for FY26 and FY27. Personnel cost of living, step increases, and anticipated commodity and utility increases can be assumed to add a 7% annual escalation.

The current infrastructure at the Salisbury FCS is intact and already in place. Salisbury has two high-flow wells producing up to 600 gallons each, two residences, a lighthouse to control light cycles for fish spawning procedures, separate raceways for various broodstock programs, and adequate biosecurity.

It is important to note that if Salisbury FCS can be kept open and in its current configuration, this is the lowest-cost option for maintaining production capacity. Working with the DEC to revise the

macroinvertebrate indices at and below the point of compliance is the most direct path for Salisbury FCS to get another NPDES permit past 2027.

It should be noted, the Department is facing significant, structural budget problems beyond the Salisbury FCS. After a bump in fishing license fee revenue during the COVID-19 pandemic and an increase in federal funding, the Department's revenue streams are returning to their pre COVID-19 trajectories. This means that many of the Department's revenue streams - including hunting and fishing license fee revenue, federal funds, motor fuel tax revenue, timber sale revenue, and more - are stagnant or declining. The stagnant and declining revenues coupled with inflationary pressures each year have created a compounding and growing gap between revenues and expenditures.

The state fiscal year 2025 (SFY25) Governor's Recommended Budget exemplifies this situation. The SFY25 budget originally identified $1.5 million in upward pressures from staffing costs that were offset by: a $550,000 reduction in staff and operating costs associated the closure of the Salisbury FCS; a $360,000 reduction in temporary staffing, vehicles, equipment, marketing, and subgrants; and a $540,000 increase in the Department's General Funda allocation (which is roughly 7.5%).

The final "as passed" versions of the SFY25 budget it included an additional $550,000 of General Fund to support the continued operation of the Salisbury FCS, bringing the year-over-year General Fund increase to $1.1 million or 15%. However, this still left $360,000 in base operating reductions and did not address any of the structural budget problems. The Department's budget is in a cycle of large increases in base operating costs and stagnant, declining revenues that result in large budget deficits. Addressing this through substantial budget reductions and large increases of General Fund on an annual basis is not a sustainable path.

Infrastructure Review

Regardless of whether the Salisbury FCS is able to acquire an NPDES permit after 2027 under its current operating regime, several improvements would benefit the Salisbury FCS, potentially improving the fish culture programs and discharge quality in the near term.

Specifically, two deep wells supply the water supply for the Salisbury FCS. These wells are functioning appropriately at this time. One area of improvement regarding the water supply is the dissolved gas concerns. In order to raise fish, dissolved gases (particularly nitrogen) should be below 100 percent saturation. Salisbury's dissolved gas levels have routinely been at 105%+, which degrades fish production. By installing degassing towers on the incoming well water, fish production, health, and quality would potentially be improved.

It is also important to note that an independent contracted study should be funded to provide an accurate statewide review of the Vermont Fish Culture System's infrastructure status and an accurate cost analysis.

Review to Cease Operations after 12/31/27 at Salisbury FCS and Move Production Internally to Other Facilities

If Salisbury FCS were to be decommissioned, significant expenditures would be required from a capital and operational perspective. To maintain the current levels of production, a plan has been developed to move broodstock production (Note- NOT the actual broodstock fish as previously mentioned, based on biosecurity concerns) typically conducted at Salisbury FCS to Roxbury FCS while moving the yearling and 2-year-old production of catchable trout that would usually be produced at both Roxbury FCS and Salisbury FCS a combined weight of 59,000 lbs. to Ed Weed FCS.

Moving Production Programs from the Salisbury FCS and Roxbury FCS to the Ed Weed FCS

Ed Weed FCS currently produces landlocked Atlantic salmon, brown trout, lake trout, steelhead rainbow trout, and walleye for distribution into the Lake Champlain basin and its tributaries to the first barrier impassable to fish. The restriction of producing and distributing fish to this area exclusively is due to Viral Hemorrhagic Septicemia (VHS) that is present throughout the Great Lakes drainage. Lake Champlain is connected in the south by the Champlain Canal to the Hudson River and flows north to the Richelieu River and eventually into the Saint Lawerence River, providing direct connectivity to the outlet of the Great Lakes.

To produce fish that would be distributed outside the immediate Lake Champlain basin by the Ed Weed FCS would require a particular set of culture systems. These systems would incorporate technologies and components to ensure the highest level of biosecurity to prevent the spread of diseases such as VHS and many invasive species present in Lake Champlain throughout Vermont waters. The undertaking of the full design concept to include engineering, bioplanning, site assessment etc. for a high level of projection accuracy would require significant time and cost to prepare.

Moving Broodstock Programs from the Salisbury FCS to the Roxbury FCS

The Roxbury FCS currently produces brook trout, rainbow trout, and steelhead. The facility was rebuilt in 2020 after sustaining heavy damage from Tropical Storm Irene in 2011. During the design phase, the facility was planned as a production facility with a capacity of 25,000 pounds. However, additional infrastructure will be required to function as the section's brood facility. Some of the facility's current infrastructure can be used, but extra equipment and tanks will be needed to establish a successful brood program.

The following sections of this report provide additional information regarding what fish stocking changes would be necessary if Salisbury FCS is closed and Ed Weed FCS is not upgraded to replace the lost stocking capacity.

Anticipated fish stocking changes if Salisbury FCS is closed and Ed Weed FCS is <u>not</u> upgraded to replace lost stocking capacity.

These estimated stocking changes are based on the current rearing capacities of the fish culture stations listed in the table below. Salisbury FCS currently holds approximately 23,515 pounds of broodstock for eggs, 11,713 pounds of yearling fish for stocking, and 6,003 pounds of two-year-old fish for stocking, totaling 41,231 pounds of fish.

If Salisbury FCS is closed, we will be reduced to four fish culture stations, and we will not add capacity by building new infrastructure at Ed Weed FCS. We anticipate the following changes and reductions in fish stocking.

All broodstock programs would be moved from Salisbury FCS to Roxbury FCS (23,515 pounds). Roxbury FCS has the capacity to raise approximately 29,488 pounds of fish, so 5,973 pounds of fish could still be raised for stocking.

The loss of 41,231 pounds of production capacity from Salisbury FCS would result in equivalent cuts to yearling and two-year-old stocking previously done by Salisbury FCS and Roxbury FCS. If we maintain the current ratio of yearlings and two-year-olds at 2.8:1 (2.8 yearlings to 1 two-year-old), the remaining stocking would be 4,401 pounds of yearlings and 1,572 pounds of two-year-olds.

The total stocking reduction would be 30,492 fewer pounds of yearlings and 10,739 fewer pounds of two-year-olds. For the number of stocked fish, these poundage reductions would equate to 86,136 fewer yearlings and 8,044 fewer two-year-olds.

These are rough estimates. Every attempt would be made to parse these stocking reductions across the state, and some trade-offs may be made, such as cutting more yearlings to maintain more of the popular two-year-old stockings. In addition, we would continue our efforts to reduce the amount of broodstock we hold, which would allow us to grow fish for stocking instead.

Average Annual Pounds of Salmonids Produced by VT Fish Culture Stations						
Vermont Fish Culture Stations (VT FCS)	**Yearlings Pounds Stocked**	**Two-Year-Old Trophy Trout Pounds Stocked**	**Broodstock Pounds On-Site**	**Total Pounds**	**Annual Budget FY22**	**Cost per pound**
Bald Hill FCS	9,937	3,421	2,833	16,191	**$509,979**	**$31.50**
Bennington FCS	64,401	18,287	0	82,688	**$645,669**	**$7.81**
Ed Weed FCS	49,451	0	0	49,451	**$1,407,290**	**$28.46**
Roxbury FCS	23,180	6,308	0	29,488	**$503,231**	**$17.07**
Salisbury FCS	11,713	6,003	23,515	41,231	**$605,638**	**$14.69**
Total Annual Pounds of VT FCS Salmonids				**219,049**	**$3,671,807**	**$16.76**

Capital Expenditures Considerations

Along with expected costs of infrastructure such as site preparation, building envelope(s), piping, electrical, HVAC, etc., there will need to be additional aspects of consideration that will be required to ensure that the highest quality eggs can be produced to support the Fish Culture Section. Below are some processes and procedures that will need to be implemented (additional processes and procedures may need to be added as the project's development becomes more defined):

- Construction of a grow-out facility
- Upgrade influent treatment to include biofiltration for RAS systems
- To have biosecure buildings, equipment will need to be purchased for each building to avoid movement from hatch house, grow out, and broodstock buildings. This will require multiple pieces of the same equipment, such as nets, crowders, brushes, etc.

Operational Expenditure Considerations

The cost to operate and maintain the broodstock facility will be significantly more than the current operational costs (excluding personnel costs) due to advanced technological processes and the level of biosecurity required. Roxbury FCS's entire production would transfer to Ed Weed FCS, and Roxbury FCS would be converted into a broodstock station.

Conclusions and Next Steps

The Department needs to have a full understanding of its changing financial picture and operational priorities to determine the best strategic decisions going forward. The state's fish culture stations and operations are a part of this, but a broader, Department-wide context is needed, so the overall mission and operations are maximized. The Department needs both time and flexibility to achieve success with this effort. The current legislative directive to maintain or increase current fish stocking capacity limits the Department's decision-making ability and could have unintended consequences in future budget cycles such as the loss of federal funds or even less optimal budget reduction proposals.

In addition, Vermont's five state fish culture stations are a significant infrastructure investment, and most are over 100 years old; the newest is the Ed Weed FCS in Grand Isle which is over 30 years old. Fish culture technology has advanced in recent decades, and so have environmental regulations. Vermont is at a crossroads, similar to most northeast states, in deciding whether to rebuild, expand or close fish culture stations. Rebuilding a fish culture station can cost well over $100M so it is critical to maintain what we have, and make well informed decisions on any closures, rebuilds or expansions. Key considerations include the regulatory landscape, cost drivers, angler preferences and how best to maintain fishing opportunities and license sales, while being as cost conservative and efficient as possible.

In light of this, the Department has requested one-time funding to:

- Conduct an infrastructure needs assessment of department owned lands and facilities to understand the needs and capital investment across the Department, including each of the state's fish culture stations to understand the needs and capital investment of each facility.
- Complete a five-year financial forecast of both annual operating revenues and expenditures to understand the budget deficit in out years.
- Review previous studies and reports on possible funding ideas. Identify ideas that have been executed and prioritize any other viable ideas.
- Complete a prioritization of department programs, both existing and future requirements such as those associated with Act 59.

Appendices

Sec. 12. FISH HATCHERY FEASIBILITY STUDY

(a) On or before December 15, 2024, the Commissioner of Fish and Wildlife shall report to the House Committee on Corrections and Institutions and the Senate Committee on Institutions regarding the feasibility of continuing operations at the Salisbury Fish Hatchery after December 31, 2027, of transferring the production capacity of the Salisbury Fish Hatchery to the Ed Weed Fish Hatchery in Grand Isle, and of alternative options for replacing the production capacity of the Salisbury Fish Hatchery.

(b) The report shall:

(1) identify the repairs, improvements, and other work necessary to enable Salisbury Fish Hatchery to obtain any permits necessary to continue operating after December 31, 2027, and provide a detailed analysis of the associated costs and a plan for accomplishing the work;

(2) identify any repairs, improvements, and other work necessary to enable the production capacity of the Salisbury Fish Hatchery to be transferred to the Ed Weed Fish Hatchery and provide a detailed analysis of the associated costs and a plan for accomplishing the work; and

(3) examine alternative approaches to maintaining the State's fish production capacity, including an analysis of associated costs and work necessary to successfully implement each identified alternative approach.

*** Buildings and General Services***

Statewide Fish Production Results- Actual FY19-FY23

VT FWD Average Annual Pounds of Salmonids (2019 – 2023)				
Vermont Fish Culture Stations (VT FCS)	**Yearlings Pounds Stocked**	**Two-Year-Old Trophy Trout Pounds Stocked**	**Broodstock Pounds On-Site**	**Total Pounds**
Bald Hill FCS	9,937	3,421	2,833	16,191
Bennington FCS	64,401	18,287	0	82,688
Ed Weed FCS	49,451	0	0	49,451
Roxbury FCS	23,180	6,308	0	29,488
Salisbury FCS	11,713	6,003	23,515	41,232
			Total Annual Pounds of Salmonids Cultured at VT FCS=	**219,049**
Assistance from Eisenhower NFH	10,549	2,616	0	13,165
	Total Salmonid Pounds Reared by VT FCS and Eisenhower NFH for VT Stockings and Broodstock=			**232,215**

VT FWD Average Annual Pounds of Walleye Fingerlings (2019 – 2023)				
Vermont Fish Culture Stations	**Fingerling Pounds Stocked**	**Number of Fingerlings**	**Broodstock Pounds On-Site**	**Total Pounds**
Bald Hill FCS	47	40,524	0	47
Ed Weed FCS	293	147,564	0	293
			Total Annual Pounds of Walleye at VT FCS=	**340**

			Total Fish Production Pounds of all Fish Reared for VT Stockings and Broodstock=	**232,555**

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VT FWD FCS Production Status 5-Year Review 2023 Detail Summary

Location	Species	Vermont Fish Culture Stations Number, Pounds, and Average Size (Inches) per Species per Year Stocked and Broodstock Kept on Station										
		Fingerling		Yearling			Trophy Trout			Broodstock		
		Number	Pounds	Number	Pounds	Average Size (In.)	Number	Pounds	Average Size (In.)	Number	Pounds	
Bald Hill	***2019-2023 Five-Year Average***											
	Brown Trout	N/A	N/A	9,586	2,666	9.04	641	752	13.58	N/A	N/A	
	Landlocked Atlantic Salmon	N/A	N/A	21,749	1,967	6.64	1,140	367	10.43	2,255	2,833	
	Rainbow Trout	N/A	N/A	12,990	4,908	9.84	1,248	2,054	15.26	N/A	N/A	
	Steelhead Trout	N/A	N/A	10,180	395	3.64	2,600	249	7.07	N/A	N/A	
	Walleye	N/A	N/A	40,524	47	1.32	N/A	N/A	N/A	N/A	N/A	
	Total Average Pounds On-Site				9,984			3,421			2,833	
						Overall Average Annual Total Pounds On-Site at Bald Hill FCS=						**16,238**
Bennington	***2019-2023 Five-Year Average***											
	Brook Trout	N/A	N/A	24,921	11,003	9.78	841	1,290	14.68	N/A	N/A	
	Brown Trout	N/A	N/A	43,685	18,266	9.82	1,189	2,060	15.25	N/A	N/A	
	Rainbow Trout	N/A	N/A	64,540	35,132	11.12	7,750	14,938	16.15	N/A	N/A	
	Total Average Pounds On-Site				64,401			18,287			0	
						Overall Average Annual Total Pounds On-Site at Bennington FCS=						**82,688**
Ed Weed	***2019-2023 Five-Year Average***									*FRY*	*FRY*	
	Brown Trout	N/A	N/A	52,919	13,402	8.708	N/A	N/A	N/A	N/A	N/A	
	Rainbow Trout	N/A	N/A	1,949	774	10.09	N/A	N/A	N/A	N/A	N/A	
	Lake Trout	N/A	N/A	59,614	6,524	7.344	N/A	N/A	N/A	N/A	N/A	
	Landlocked Atlantic Salmon	N/A	N/A	147,724	19,083	7.336	N/A	N/A	N/A	N/A	N/A	
	Steelhead Trout	N/A	N/A	59,142	9,668	7.92	N/A	N/A	N/A	N/A	N/A	
	Walleye	N/A	N/A	147,564	293	2.072	N/A	N/A	N/A	*266,475*	*0.25*	
	Total Average Pounds On-Site				49,744			0			*0*	
						Overall Average Annual Total Pounds On-Site at Ed Weed FCS=						**49,744**
(Page 1 of 2)												

Location	Species	Vermont Fish Culture Stations Number, Pounds, and Average Size (Inches) per Species per Year Stocked and Broodstock Kept on Station										
		Fingerling		Yearling			Trophy Trout			Broodstock		
		Number	Pounds	Number	Pounds	Average Size (In.)	Number	Pounds	Average Size (In.)	Number	Pounds	
Roxbury	*Note- Due to Tropical Storm Irene and the 10-year shutdown, 2010-2023 Average*						*Roxbury's data reflects 2010-2011 and 2021-2023*					
	Brook Trout	4,780	376	35,268	9,745	9.00	4,773	4,494	14.48			
	Rainbow Trout	N/A	N/A	30,331	13,059	10.12	900	1,814	16.80			
	Total Average Pounds On-Site		376		22,804			6,308			0	
						Overall Average Annual Total Pounds On-Site at Roxbury FCS=						**29,488**
Salisbury	*2019-2023 Five-Year Average*											
	Brook Trout	N/A	N/A	13,694	6,276	10.422	297	396	14.16	2,793	4,062	
	Brown Trout	N/A	N/A	4,887	1,892	10.325	795	1,234	14.94	3,486	3,763	
	Lake Trout	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,760	5,658	
	Rainbow Trout	N/A	N/A	8,406	3,257	10.258	2,763	4,374	15.3	7,033	5,424	
	Steelhead Trout	N/A	N/A	1,992	289	8.03	N/A	N/A	N/A	4,415	4,610	
	Total Average Pounds On-Site				11,713			6,003			23,515	
						Overall Average Annual Total Pounds On-Site at Salisbury FCS=						**41,232**
Eisenhower NFH	*2019-2023 Five-Year Average*											
	Brook Trout	23,600	70	18,742	7,136	8.668	1,320	1,805	12.83	N/A	N/A	
	Landlocked Atlantic Salmon	N/A	N/A	32,198	3,343	6.928	1,357	811	13.49	N/A	N/A	
	Lake Trout	N/A	N/A	5,817	546	6.71	N/A	N/A	N/A	N/A	N/A	
Total Average Pounds of VT Reared Fish On-Site			70		10,479			2,616			0	
						Overall Average Annual Total Pounds On-Site at Eisenhower NFH=						**13,165**
(Page 2 of 2)						**Overall Average Annual Total Pounds of all VT Stocked Fish =**						**232,555**

Salisbury FCS NPDES Permit Monthly Data Results

Salisbury Wastewater Discharge Results															
	Flow Million Gallons per Day (MGD)	Biological Oxygen Demand (5-Day)	Chlorine Total Residual	Formalin	Nitrite Plus Nitrogen Total	Total Ammonia Nitrogen	Total Kjeldahl Nitrogen	Total Nitrogen		pH	Total Suspended Solids	Phosphorus			
Date	(MGD)	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	lbs/day	Standard Unit (s.u.)	mg/l	mg/l	lbs/month	lbs/year	% of Yrly Total
Permit Monitor	1.31 Max	Monitor	0.02 Monthly	3.6 Monthly	Monitor	Monitor	Monitor	Monitor	Monitor	6.5 - 8.5	5.0 Monthly	0.8	Varies	152	N/A
or Max Level →			0.02 Daily	7.2 Daily							15.0 Daily				
Jan-23	0.800	N/A	N/A	N/A	0.920	0.330	0.490	1.41	9.41	7.45	N/A	0.05	10.34	49.17	12.32
Feb-23	0.800	N/A	N/A	N/A	0.930	0.380	0.590	1.52	10.41	7.79	N/A	0.05	9.34	48.63	12.19
Mar-23	0.800	N/A	N/A	N/A	0.9	0.29	0.5	1.4	9.34	8.02	N/A	0.06	12.41	61.04	15.3
Apr-23	0.800	N/A	N/A	N/A	0.66	0.19	0.21	0.87	5.8	7.73	1	0.07	14.01	75.06	18.81
May-23	0.400	N/A	N/A	N/A	0.77	0.5	1.1	1.87	6.24	8.21	3	0.06	6.2	70.12	17.57
Jun-23	0.500	N/A	N/A	N/A	0.82	0.5	1.1	1.92	8.01	7.53	2	0.06	8.76	78.88	19.7
Jul-23	0.800	N/A	N/A	N/A	0.88	0.5	0.8	1.68	11.21	7.68	1	0.045	10.34	89.22	22.36
Aug-23	0.800	N/A	N/A	N/A	0.78	0.33	0.6	1.38	9.21	7.73	-	0.055	12.41	101.63	25.47
Sep-23	0.800	1.2	N/A	N/A	0.76	0.15	0.27	1.03	6.87	7.67	1	0.055	12.01	104.43	26.17
Oct-23	0.800	N/A	N/A	N/A	1	0.28	0.49	1.49	9.94	7.69	1	0.049	10.03	114.46	28.68
Nov-23	0.800	N/A	N/A	N/A	0.81	0.18	0.31	1.12	7.47	N/A	N/A	0.03	6	111.86	28.03
Dec-23	0.800	4.2	N/A	N/A	0.78	0.14	0.4	1.18	7.87	N/A	2	0.03	6.2	118.07	29.59
Jan-24	0.800	N/A	N/A	N/A	0.710	0.170	0.340	1.05	7.01	N/A	N/A	0.03	6.2	113.93	28.55
Feb-24	0.800	N/A	N/A	N/A	0.730	0.310	0.590	1.32	8.81	N/A	N/A	0.06	11.61	116.2	29.12
Mar-24	0.800	N/A	N/A	N/A	0.77	0.26	0.5	1.27	8.47	N/A	N/A	0.03	6.2	109.99	27.56
Apr-24	0.800	N/A	N/A	N/A	0.74	0.15	0.41	1.15	7.67	7.76	1	0.05	10.01	105.99	26.56
May-24	0.800	N/A	N/A	N/A	0.69	0.19	0.24	0.93	6.2	7.78	1	0.03	6.2	105.99	26.56
Jun-24	0.800	N/A	N/A	N/A	0.77	0.2	0.33	1.1	7.34	7.67	1	0.02	4	101.24	25.37
Jul-24	0.800	N/A	N/A	N/A	0.7	0.12	0.5	0.95	6.34	7.46	2	0.015	3.1	94	23.56
Aug-24	0.800	N/A	N/A	N/A	0.56	0.27	0.5	1.06	7.07	7.52	7	0.042	8.69	90.28	22.62

VERMONT

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Memorandum

TO: Fisheries Division, Vermont Fish and Wildlife Department

FROM: Lee Simard, Fisheries Biologist, Trout Team Chair

DATE: August 21, 2020 (updated February 4, 2022)

SUBJECT: VT FWD Salmonid Brood Stocking Policy

An important aspect of the Vermont Fish and Wildlife Department's Fish Culture Section is its brood stock management program. Brood fish raised at the Salisbury Fish Culture Station and Bald Hill Fish Culture Station provide the egg supply for brook trout, brown trout, rainbow trout, lake trout, and steelhead stocking throughout the state as well as landlocked Atlantic salmon stockings conducted outside of Lake Champlain. Following spawning, brood fish are generally available to be stocked to provide additional fishing opportunities.

Previously, specific waterbodies were identified as annual brood stocking locations. However, concerns were raised about the impact these large fish, stocked in addition to the regularly requested stockings, could have on the forage base of a lake after being stocked for multiple years. The size of stocked brood fish also prompted staff to question whether these fish could be better utilized for outreach or to provide additional fishing opportunities for a greater number of people.

To address these points, the timing and number of brood fish available for stocking, specific concerns associated with using brood fish, and the objectives desired by stocking brood were identified. These factors were used to determine the number of brood fish and specific waterbodies that will be stocked in future years.

Brood Availability

Based on hatchery practices meant to optimize the number of brood needed for genetic considerations and to eliminate holding "extra" fish on station, Salisbury FCS and Bald Hill FCS expect to have a consistent number of brood available each year as outlined in the following table:

Culture Station	Species	Age (months)	Length (in)	Weight (lbs)	Quantity	Time available	Notes
Salisbury	BNT	49	18	3.0	740	Fall	
Salisbury	BKT	36	15	1.6	480	Fall	
Salisbury	RBT	35	18	2.8	630	Fall	
Salisbury	STT - CC	7	7	0.1	1000	Fall	Odd years only (2021, 2023, etc.)
Salisbury	STT-Magog	12	7	0.1	1000	Spring	
Bald Hill	LAS	60-72	20-28	4-8	100-500*	Fall	

*The actual number typically varies from year to year

Brood Stocking Concerns

- Stocking logistics: The distance from the source hatchery and ease of access to the waterbody by hatchery trucks, both of which impact the amount of staff time required to complete stockings, should be considered.

- Ecological impacts: Overstocking a waterbody may result in impacts to its forage base impacting the condition of holdover trout and other species present in the waterbody. The large size of brood fish when stocked increases their potential impact on forage. However, stocked brood are typically very susceptible to fishing and may be caught and harvested soon after stocking, thus limiting their impact.

- Genetic introgression: All brood released will be diploid and could result in genetic introgression if wild, spawning populations are present and individuals survive and successfully spawn. Particular concern should be directed toward brook trout given all other brook trout stocked in the state are triploid.

- Unrealistic angler expectations: Creating fisheries reliant on brood fish may create unrealistic expectations about the size of trout that is typically caught decreasing the value of stocked yearling or wild trout or other smaller fish species. Eliminating or sporadically stocking brood in a waterbody without associated outreach may cause anglers to voice concerns about the decline of the fishery. Stocking a particular species of brood where that species is not already present may result in angler confusion or the underuse of stocked fish if they are not known to be present and thus not targeted by anglers.

- Availability to angler: Stocking location should consider the timing of when brood are available to be stocked, the regulations on the waterbody during that period, and the condition of access to the waterbody during that period to ensure the fish are available to be caught after stocking.

- Aesthetics: Some level of fin wear is to be expected on brood fish due to the long duration they are held in raceways, but fish may occasionally have excessive sores, abrasions, or other disfigurations that could draw concern by members of the public if caught in the wild.

- Extreme size: Although uncommon, brood fish may have the potential to reach extremely large sizes that could challenge existing state record weights.

- Wasteful to cull: Although stocking brood could result in some negative consequences, culling these fish after spawning would not make full use of the resources invested into these fish given the value many anglers place on fish of this size.

Brood Stocking Objectives

- Stock waterbodies that can support large, diploid trout: Given the number and size of fish available, stocking should be limited to larger waterbodies that can, at least temporarily, support the influx of large fish without having detrimental consequences on the forage base or other species and where genetic introgression with wild populations is not a concern.

- Promote and enhance existing winter fishing opportunities: Given brood are typically available in the fall, brood stocking should be used to create novel opportunities on waterbodies where trout ice fisheries already exist to ensure the brood are targeted and caught. Stocking should be limited to waterbodies that allow winter harvest of trout and are already stocked with the same trout species.

- Do not stock any fish that are at or are approaching the state record size for that species: Large fish should be individually assessed and disposed of if they are near the state record size.

- Do not stock any fish with excessive sores, growths or deformities: The appearance of stocked fish should not cause extreme concern among anglers if caught

- Inform anglers: Outreach efforts should highlight where brood stocking locations to promote and encourage utilization. To manage angler expectations, messaging should also indicate that although brood stocking occurs annually, it may not necessarily occur in the same waterbody each year.

- Consistency in stocking location: Specific waterbodies should be selected to allow hatcheries to effectively plan and allocate staff time. When possible, brood stocking locations should be clustered in similar areas in a given year to reduce the staff time required to create these opportunities. Waterbodies may change from year to year but should be on a pre-planned rotating schedule rather than being selected each year to allow effective planning by managers, culture, and outreach staff.

Selected waterbodies

To best address the identified concerns and objectives, the following waterbodies were selected. Waterbodies are intended to be stocked in the same order on a rotating basis after 2024.

Species	Timing	Waterbody	Town	Number	Notes
Brown trout	Fall, 2022	Lake Bomoseen	Castleton	370	
	Fall, 2022	Lake St Catherine	Poultney	370	
	Fall, 2023	Waterbury Reservoir	Waterbury	370	
	Fall, 2023	Marshfield Reservoir	Marshfield	370	
	Fall, 2024	Lake Fairlee	Fairlee	370	
	Fall, 2024	Lake Dunmore	Leicester-Salisbury	370	

Species	Timing	Waterbody	Town	Number	Notes
Rainbow trout	Fall, 2022	Glen Lake	Castleton-Fair Haven	315	
	Fall, 2022	Sunset Lake	Benson	315	
	Fall, 2023	Harveys Lake	Barnet	315	
	Fall, 2023	Joe's Pond	Danville	315	
	Fall, 2024	Shadow Lake	Glover	210	
	Fall, 2024	Crystal Lake	Baron	210	
	Fall, 2024	Nelson Pond	Calais-Woodbury	210	
Brook trout	Annually	Harriman Reservoir	Whitingham-Wilmington	480	
Steelhead - Chambers Creek	Odd years (2023, 2025, etc.) in fall	Lake Champlain	Ferrisburgh	1000	
Steelhead - Magog	Annually each spring	Willoughby River	Barton-Coventry	1000	LV
Landlocked Atlantic salmon	Annually each fall (as available)	Lake Willoughby	Westmore	Split between waterbodies	
		Lake Seymour	Morgan		

Ongoing Needs

Although waterbody selection is a critical component of the brood stocking program, additional steps should continue to be taken annually to ensure brood stockings occur successfully and are best utilized to their greatest potential.

- Include brood stocking numbers in MRCF requests: Given the increased predictability in the number of brood that will be available for stocking in future years, numbers should be included in the annual Management Request for Cultured Fish (MRCF). Doing so will allow biologists to adjust typical stocking requests if necessary and will provide a clear way to communicate changes in brood stocking location over time. It will be fully understood that these "requests" will not impact brood stock management strategies or the number of fish available.

- Communicate when stocking occurs: Fish Culture Stations should communicate with the appropriate district biologist and outreach staff when stocking is expected to occur or soon after it is completed so that angler inquiries can be accurately addressed and promotional effort can be undertaken.

- Input brood stockings into the stocking database: All brood stocking should be documented in the stocking database to facilitate tracking over time and assist outreach efforts.

- Develop and implement outreach around brood stocking opportunities: Share with the public where brood fish originate from, where and when stocking occurs, and that stocking locations will change each year