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Division of Sea Run Fisheries and Habitat**

**Atlantic Salmon Trap Operating and Fish-Handling
Protocols**

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ATLANTIC SALMON TRAP OPERATING AND FISH-HANDLING PROTOCOLS APRIL 2018

Introduction:

The Maine Department of Marine Resources (MDMR), Division of Sea-run Fisheries and Habitats (DSRFH) and its authorized representatives operate adult Atlantic salmon counting facilities on several rivers in Maine. Trapping facilities used to capture fish are located at dams and barrier weirs. Fish traps are operated to enumerate the spawning stock, collect biological data, procure sea-run broodstock, and exclude suspected aquaculture Atlantic salmon for each river in which salmon are trapped. Traps at the following dams/weirs are covered in this document: Mill Town Dam on the Saint Croix River, the Cherryfield Dam on the Narraguagus River, the Ellsworth Dam on the Union River, the Milford Dam on the Penobscot River, the Lockwood dam on the Kennebec River, the Benton Falls Dam on the Sebasticook River, the Brunswick, Worumbo, and Pejepscot dams on the Androscoggin river, and the Skelton Dam on the Saco River.

To standardize operations among trapping facilities, the following protocols were developed. General procedures are outlined in Chapter 1 and subsequent chapters give additional facility specific details as needed. Each chapter is organized for quick reference of special procedures unique to a trapping facility. The appendices describe the appearance of escapees from the aquaculture industry and list several illustrations of Atlantic salmon.

This document is intended to be an evolving document and therefore annual review and updating will occur prior to the start of each trapping season or when a substantial modification arises. In the future these additions will be noted below.

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CHAPTER 1 GENERAL GUIDELINES FOR TRAPPING OPERATIONS

The following general trap operating procedures and fish-handling protocols will be applied at all facilities. In conducting the activities specified below, all available measures will be taken to minimize potential injury and mortality (take) and maximize the conservation benefit of research and assessment. Please refer to Chapters 2 - 11 for additional details related to specific trapping locations.

I. Trap operating procedures:

- A. Trapping season: The general trapping season may occur from April 1 to November 30, but not to exceed 210 trap days on each river annually. The annual dates of operation may vary for each trapping location.
- B. Traps: Traps installed at dams or weirs will be operated to enumerate sea-run Atlantic salmon returns, collect broodstock, and collect biological data. Operation of upstream fish passage for other diadromous species (e.g. alewife, blueback herring, and American shad) shall not cease in order to accommodate the trapping and handling of Atlantic salmon.
- C. Disposition of Atlantic salmon: Sea-run adult Atlantic salmon captured at a trapping facility may be released back to the river, transported from the trap to an upriver location, transported from the trap to a hatchery, or turned over to an authorized Principal Investigator for the purpose of research and/or passage studies.
- D. Frequency of trap tending: All traps will be visited at least once daily and more frequently during peak migration periods.
- E. Personnel authorized to tend traps: Only persons trained in tending traps, as determined by DMR DSRFH, are authorized to conduct these activities. If no one with adequate training is available, trapping operations will be suspended.
- F. Safety: Please adhere to the safety protocols established by the trapping facility owners. Personnel working on or around boats, traps, and weirs shall wear a USCG certified Type III personal flotation device (PFD) when they are at risk of falling into the water (i.e., not behind a physical barrier).
- G. Deliverables/Reporting: Trap catch data will be reported to the regional DSRFH office on a weekly basis. These offices will then be responsible for reporting weekly trap information to the DSRFH office in Bangor for dissemination through the DSRFH website.
- H. Captured Aquaculture salmon: Commercially raised Atlantic salmon (aquaculture escape) captured at a trapping facility will not be knowingly released upriver of that facility. For information regarding Aquaculture salmon please refer to *DMR Aquaculture Suspect Protocol* (Source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).

II. Fish handling procedures:

A. Biological sampling: Biological sampling procedures are established for each river based upon population size and management objectives. See Chapters 2-11 for Site Specific Trapping Protocols.

1. Sampling generally includes measurement of fork length (mm), collection of 6-10 scale samples from the right side above lateral line posterior to pelvic fin (for determination of age and origin), tissue samples for genetics and/or fish health studies, examination of fin condition, noting wounds or injuries (including seal bites, lamprey wounds, and hooking injuries,), notation of tags or marks, as well as examination for external parasites. Minimal biological sampling will occur when river temperatures are $\geq 23.0^{\circ}\text{C}$. See Section C for water temperature considerations.

2. Genetic Samples

- Tissue samples (fin punches, usually from the adipose or caudal) collected for genetic analysis will be placed in numbered vials filled with 95% alcohol (not denatured). Lids of vials must be screwed on tightly to ensure against alcohol leakage. DSRFH experience has shown that alcohol contact with labels has a tendency to remove type on labels.
- The vials should be stored in a refrigerated environment for a minimum of 24 hours, after which they may be stored at room temperature.
- Labels will be printed for all vials with the appropriate “**JOINID**” and the label affixed. Clear tape will be placed around the entire label to help protect against alcohol degradation.

B. Marking: All adult salmon are to be marked with an adipose or caudal fin punch prior to release. This is to prevent double-counting of salmon recaptured during the same year.

C. Water temperature considerations:

1. **Biological sampling**: To minimize handling stress, scale sampling and tagging will cease when the river temperature $\geq 23.0^{\circ}\text{C}$; however, DMR would continue to measure fork length and fin punch each salmon. Any salmon suspected as an aquaculture escapee will be scaled sampled regardless of water temperature. Biological sampling will be based on biological sampling procedures established for each river (Nielsen, L.A. and D.L. Johnson. 1983. Fisheries techniques. American Fisheries Society. Bethesda, MD. and Schreck, C.B. and P.B. Moyle (eds). 1990. Methods for fish biology. American Fisheries Society. Bethesda, MD.).

Scale samples for the purpose of determining age and origin will be collected pursuant to scale collection protocols specific to each river (Nielsen and Johnson 1983, Schreck and Moyle 1990). (See **river-specific sampling Operations, Chapters 1 -5**)

2. **Broodstock collection**: (See **river-specific sampling Operations, Chapters 1-5**). DSRFH operational experience indicates that adult Atlantic salmon can be taken as brood fish at temperatures up to 24°C , as long as they are gradually introduced into cooler water temperatures prior to and/or during transport and provided the recipient water is $\leq 23.0^{\circ}\text{C}$.

Broodstock collection will be suspended at river temperatures in excess of 24 °C, except under extraordinary circumstances.

3. **Transport guidelines:** (See river-specific sampling Operations, Chapters 1-5). Fish will not be transported at temperatures exceeding 22.0 °C, except when salmon are transported to a hatchery environment. No salmon will be transported if water temperatures at the release location (river or hatchery) are greater than water temperatures at the trap location or if water temperatures at the release site are ≥ 22.0 °C. Personnel transporting fish will abide by the following guidelines: (1) When fish are being transported, transport temperatures will be maintained intermediate between the river and the receiving facility; and (2) if the difference between the transport tank and the receiving waters exceeds 3 °C, staff will temper tank water to acclimate fish to the receiving waters temperatures. A general rule is to maintain water temperature differentials between holding/transport areas to within 3 °C. For example, if river water temperatures are 21.0 °C and the recipient water temperature (final destination) is 15 °C, then the transport truck tank should be maintained at approximately 18 °C. This allows fish time to acclimate to temperature changes slowly and helps to reduce stress due to thermal shock.

Staff will monitor dissolved oxygen (DO) levels and temperature in transport tanks. DO levels will be maintained between 8 and 12 mg/L. In freshwater and at sea level; DO equal to 8 mg/L represents 100% saturation at a water temperature of 7.5 °C and DO equal to 12 mg/L represents 100% saturation at a water temperature of 26.5° C. As water temperature increase (18-22 °C), transport tank densities will be reduced from a maximum of 18 salmon per tank to 14 salmon per tank. Drivers will make at least one stop (every 30 minutes) during transportation to visually inspect fish behavior in the transport tank. If the salmon are showing signs of stress they will be released at the nearest access point on the river.

III. Classification and disposition of captured salmon: For information regarding Aquaculture salmon please refer to *DMR Aquaculture Suspect Protocol* (Source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).

- A. **Wild-origin (as determined by fin condition):** In rivers where no hatchery-reared smolts or parr are expected to return, untagged or unmarked salmon with perfectly formed fins (*fin deformity condition = 0, see figures in Appendix B*) or a dorsal fin with very slight deformity (*fin deformity condition = 1, see figures in Appendix B*) and normal length/weight ratios will be classified as wild. These fish will be biologically sampled, marked with an adipose fin punch, and released upstream of traps or collected for broodstock as necessary.
- B. **Hatchery-origin smolt or parr releases:** In rivers where returns are expected from ongoing smolt or parr stocking programs, salmon that have the appropriate tag or mark, or otherwise appear normal except for a deformed dorsal fin will be marked (typically with a fin punch) and released upstream of traps or collected for broodstock as per river-specific trap operations plans. These salmon will be biologically sampled, marked with an adipose or caudal fin punch, and released upstream of the trap.
- C. **Hatchery-origin returns to non-natal rivers (strays):** Atlantic salmon that have been positively identified (**by an external tag or mark**) as a **stray** from another river system will be biologically sampled, marked with an adipose or caudal fin punch, and released upstream of the trap. Current

DSRFH policy stipulates that only river specific stocks will be used to augment salmon populations. However, up to a 5% straying rate to non-natal rivers has been documented among Maine salmon populations (Baum and Spencer, 1987) and should not be circumvented by trapping activities. To accommodate this behavior and natural genetic exchange between rivers, the following policy change will be implemented; all hatchery origin fish, excluding suspected aquaculture escapees, will be treated as a natural population component and will be released upstream of the trap. These individuals will not be retained as brood fish and will have the opportunity to retreat and migrate back to their river of preference.

- D. Farm fish (Aquaculture escapees):** State and federal fisheries agency staff will prevent aquaculture origin escapees from passing upstream of fish traps on Maine rivers, to minimize the risks of disease transmission, genetic contamination of extant populations, or competition with wild origin salmon. Suspected aquaculture escapees will be sampled for the following purposes: fish health surveys, genetic characterization, sexual maturity assessment, and food habits studies. Collecting these samples will involve lethal sampling of the organism. Although they may be found in any Maine river, escapees are most likely to occur in the St. Croix, Dennys, East Machias, Machias, Pleasant, Narraguagus, and Union rivers, based on trap catches in recent years and the locations of salmon aquaculture sites along the eastern coast of Maine and in western New Brunswick, Canada. For more information, refer to refer to, DMR Aquaculture Suspect Protocol (source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).
- E. Other Species collected in the trap:** Occasionally other fish species are collected in the salmon traps, which include native and non-native species to the drainage. As per an agreement with the Maine Department of Marine Resources and Maine Department of Inland Fisheries and Wildlife (IF&W), all species other than Atlantic salmon collected in the trap are counted and released either upstream or downstream of the trap, or removed from the system. This agreement satisfies the drainage wide conservation plan. Species native to the drainage and ubiquitous naturalized exotic species (e.g. smallmouth bass) will be enumerated and passed upstream of the trap. Other species will either be released downstream of the trap or will be removed from the drainage (typically destroyed). See the attached river specific sections for details.
- F. Mortalities related to trapping operations:**
1. Samples will be collected for scale and genetics information and biological data recorded including length, weight, sex, and maturity. In addition, a cause of death will be noted (if possible). Each fish will be photographed, bagged, labeled, and placed in a freezer.
 2. Possible disposition of mortalities:
 - a. Distribution to local Native American Tribes for ceremonial uses
 - b. Research
 - c. Education
 - d. Food for Wildlife rehabilitation
 - e. Depending upon its condition, the carcass may be retained for up to 6 months to accommodate future needs.
 - f. If previous requests have been filed with USFWS, NMFS, or DSRFH the fish will be retained and the carcass or body parts will be transferred.

- g. If no requests are forthcoming or carcass condition is poor fish will be incinerated or composted.

**CHAPTER 2 MILFORD DAM
ATLANTIC SALMON OPERATING AND FISH-HANDLING PROTOCOLS
PENOBSCOT RIVER,
MILFORD PROJECT (FERC NO. 2354)**

Brookfield Renewable Energy Partners (BREP) own and operate the Milford Dam located on the Penobscot River in Maine and is fully responsible for operations and maintenance activities associated with the fish passage facility. This includes, but is not limited to, the operation of the main fish lift, downstream passage, and all FERC or other regulatory requirements regarding safe and timely fish passage. The USFWS, The Maine Departments of Inland Fisheries and Wildlife and Marine Resources, and PIN are responsible for carrying out any routine fishery management activities; including but not limited to counting, sorting, and trapping and trucking, that they deem appropriate and as budgets allow. MDMR is not responsible for meeting fish passage or other monitoring or reporting requirements of the facility but may incidentally, through fisheries management activities, assist in fulfillment of regulatory requirements. BREP will provide the resource agencies and PIN access to the projects and to the passage facilities for the purposes of carrying out routine fishery management activities.

DSRFH is the entity that directs the operation of the trap and sort fish lift and sorting facility which went into operation for the first time in Spring of 2014. MDMR will operate the sorting facility to maximize the effectiveness and efficiency of the facility for the collection sea-run Atlantic salmon broodstock in support of the Conservation Genetics Hatchery program and to conduct priority studies. MDMR is responsible for safe handling of fish for broodstock collection and enumeration activities undertaken by our staff. The purpose of this operation is to enumerate all Atlantic salmon utilizing the fishway and to collect biological data from returning salmon. Although procurement of sea-run Atlantic salmon broodstock is a primary goal, the capture and remove of Atlantic salmon escapees from aquaculture escapes is also an important management action. In addition, the fish lift and sorting facility are utilized for procuring river herring and American shad for ongoing and future drainage wide stocking, for biological data collection, and for culling not native, invasive, and undesired fish species.

The Milford facility consists of a main fish lift (with a hopper capacity of 4,660 gallons) located at the downstream entrance of the fishway, an exit flume (approximately 300 ft long), a second trap and sort fish lift (with a hopper capacity of 880 gallons), and a sorting facility. The two lifts work independent of one another with the main lift emptying into the flume allowing fish to move upstream to be trapped and lifted a second time in the trap and sort lift, or pass the trap and sort lift and move upstream into the Milford headpond. The trap and sort lift empties into the sorting facility which consists of three (3) round tanks; the main 12ft diameter sorting tank, a 10ft diameter alewife tank, and an 8ft diameter salmon tank. The main tank is connected to both the alewife and salmon tanks by short transfer flumes equipped with slide gates. Once the trap and sort fish lift empties into the main (12 ft) sorting tank, captured fish are sorted into their respective tanks to be counted, used for broodstock or research, released upstream through the fish return chute, or removed from the river.

This document is intended to be a “living” document and therefore annual review and updating of procedures (based on current year operations) will occur prior to the start of each trapping season. General Trap Tending Guidelines should be followed at the Milford Dam facility. Sections with additional or special considerations have been addressed. The following operating procedures and fish-handling protocols will be applied at the Milford Dam Fish lift and Sorting Facility:

I. Trap operating procedures:

A. Trapping season: The trapping season will begin April 15 and end November 1 of each year (environmental conditions permitting).

- Trap Operational Date (April 15 – November 15)
- MDMR on site from April 10 – November 20 for pre and post season preparation and shutdown
- Peak fish passage period = May – July
- Switch to daily checks August – November
- Operational Schedule is 7 days per week

- Daily Operations
 - Hours: 7 days per week
 - Routine: 0800 – 1500
 - Peak Run: 0700 – 1700
 - Daily checks: Variable, but generally mornings
 - Temperature considerations – see “below, Chapter 2, Section II, Subsection C-2 of the Maine Department of Marine Resources Adult Atlantic Salmon Trap and Fish Handling Protocol 2018”
 - 23.0 Degrees C = reduced handling
 - 24.0 Degrees C = discontinue broodstock collection

- Peak Fish Run Timing (Estimated based on 4 years of operation)
 - Atlantic Salmon May 24 – July 1
 - River Herring May 15 – June 7
 - American Shad June 1 – June 30
 - Sea Lamprey May 24 – June 7
 - Striped Bass June 10 – July 15
 - White Catfish June 1 - July 7

- Broodstock Targets and Stocking Goals
 - Atlantic Salmon
 - 650 fish
 - 325 Female, 275 Male, 50 grilse
 - Run timing is also a consideration (achieve goal early, then swap later fish for earlier fish)
 - Recent improvements to the effective population size for salmon may allow for fewer adult broodstock collections pending further discussions with USFWS.

- River Herring Stocking/Trucking
 - 20,000 to 50,000 fish annually*
 - 13 to 33 truckloads (max 1,500 fish per truck load, fewer as river temperature increases)
 - Based on current efforts. This may increase or decrease based on availability of fish, crew, available habitat to stock, number of stocking trucks, etc.
- Atlantic Salmon Broodstock Management, Collection, and Transport
 - Broodstock Management

In 2009, the State of Maine's fisheries resource management agencies (MDMR and MDIFW) finalized The Operational Plan for the Restoration of Diadromous Fishes to the Penobscot River (POP). MDMR manage Atlantic Salmon broodstock collection in the Penobscot River at the Milford fish lift and sorting facility based on this operational plan and MDMR's current management objectives for Atlantic Salmon Restoration on the Penobscot River. MDMR staff manage the collection of returning Atlantic Salmon for broodstock to be transported by USFWS staff to Craig Brook National Fish Hatchery (CBNFH) located in Orland, Maine. It is responsibility of USFWS to transport all salmon broodstock from the Milford sorting facility. Currently, a target of 650 Atlantic Salmon broodstock are collected annually to conserve genetic diversity by maintaining and/or increasing family groups while producing sufficient eggs to fulfill stocking requests received by CBNFH's for the production of fry, parr, and smolts. This number is subject to change but will remain pending further discussions with USFWS. The majority of broodstock are collected during a short window of the run, typically from mid-May through the end of June each year. However, broodstock collection is often continued throughout the entire season due to not reaching target numbers or transferring early run salmon with later arrivals, typically ending in October.

Currently, the Milford fish lift and sorting facility has limited capability to stockpile daily broodstock collections for extended periods. The facility consists of a ten-foot diameter salmon tank equipped with three screen type crowder sections and a 250 gallon Exactics tank. Both tanks have hard covers and are supplied with oxygen and river water pumped through a circulating system. The maximum safe capacity for holding salmon in the salmon tank ranges from 10-15 salmon based on daily river temperatures. The capacity of the Exactics tanks ranges from 5-10 salmon based on daily river temperature. MDMR biologists have observed that salmon being held for extended periods (more than 3-4 hours) experience undue amounts of stress that may be associated to recent broodstock mortalities at CBNFH and the Milford sorting facility. For these reasons, MDMR can safely hold broodstock for up to 3 hours until USFWS

arrives to transport. This requires USFW staff to be available for transporting broodstock multiple times throughout the day during the salmon season.

- Broodstock Collection
- Salmon broodstock are captured at sorting facility, lifted, sorted, and moved to salmon tank
- MDMR staff contact USFWS staff lead to send truck at appropriate time (typically within **3** hours of initial capture and contact with USFWS)
- MDMR PIT tag and collect biological data from salmon and leave in salmon tank or move to Exactics tank for holding
- Additional salmon are collected and handled in the same manner, until a maximum of 18 salmon is reached (maximum number for current USFWS transport trucks). When river temperatures are $>22^{\circ}\text{C}$, a maximum of 14 salmon will be transported on the USFWS trucks.
- Salmon not needed for broodstock are released upstream to the Milford headpond

- Broodstock Transport
- Broodstock transport is the sole responsibility of the USFWS
- USFWS staff drivers will have completed all BREP safety training and have appropriate safety equipment prior to entering the Milford facility, and will sign into MDMR's Job Safety Plan (JSP) prior to beginning work each visit
- Trucks will be equipped with cell phones, phone contact lists, oxygen, fresh flow pumps, salmon socks, and a calibrated dissolved oxygen meter
- USFWS staff will monitor and maintain optimum oxygen and temperature during transport
- Number of fish to be transported will be determined by USFWS on a daily basis. (historically 18 fish). Typically, as water temperature increase (18-22 °C), transport tank densities will be reduced from a maximum of 18 salmon per tank to 14 salmon per tank.

- Staffing
- MDMR Fulltime Staff, Seasonal Technicians, Interns
- **Daily:**
 - Peak salmon/river herring = 5 people minimum, 6 is better for handling
 - 1 in the window operating gates and lift
 - 2 working up/handling fish

- 1 recording data
- 2 trucking
- Peak salmon/shad = 3 people minimum, 4 is better for handling
 - 1 in the window operating gates and lift
 - 2 working up/handling fish
 - 1 recording data
- Just salmon (post river herring stocking) = 2 to 3 people
 - 3 people (>20 salmon per day)
 - 2 people (< 20 salmon per day)
- **Weekly**
 - Peak Salmon Run Staffing Scenarios

# days / wk	# hours / day	# staff / day	Total Hrs Week	FTE @ Milford
7	8	3	168	4.2
7	8	4	224	5.6
7	10	3	210	5.25
7	10	4	280	7

- Milford Fishway and River Herring Trucking = 2 additional people

# days / wk	# hours / day	# staff / day	Total Hrs Week	FTE @ Milford
7	8	5	280	7
7	8	6	336	8.4
7	10	5	350	8.75
7	10	6	420	10.5

B. Frequency of trap tending: Lift frequency will be determined cooperatively between BREP and MDMR and in compliance with FERC requirements. Lifts may range from once every couple hours in early spring and late fall to every 15 minutes during peak season. Lift frequency for the main fish lift will be set by BREP, DSRFH, and Federal fishway engineers. DSRFH will operate the trap and sort fish lift (at the sorting facility) and will operate the lift when fish are observed in the trap from the viewing window. The Milford sorting facility trap will be tended by DSRFH a minimum of once daily, and/or more frequently during peak migration (see breakdown below)

- C. Safety: All personnel working within the Milford facility will abide by policies implemented by BREP (including, but not limited to; MDMR, PIN, NOAA, USFWS, USGS, and UMO). Workers may not access areas where they are unauthorized; check with supervisor and BREP to determine authorization. All staff working at the fishway will receive yearly safety training from BREP. MDMR will attempt to consolidate training into as few sessions as possible, however multiple sessions will likely be necessary to ensure all employees get training. BREP will provide training within 72 hours of request from MDMR. If BREP cannot comply with the request the untrained employee will be allowed to work the trap under the direct supervision of a MDMR supervisor similar to BREP Policy of visitors being on site (Visitors, Tours, PIN, etc) as long as they are accompanied by a BREP Employee.
- D. Attraction Water Settings: Attraction water settings will be determined cooperatively between BREP and MDMR and in compliance with FERC requirements.
- E. Main Hopper Operation and V- Gate Settings: BREP will be responsible for operation of the main hopper. BREP will be responsible for setting v-gates. Settings will be determined cooperatively with MDMR.
- F. Milford Trap and Sort Facility Procedures: Note: Procedures and gate settings are solely subject to the discretion of the MDMR operator based on the below guidelines. The fishway is rarely operated for a single purpose and is nearly always a balancing act of goals and priorities. There is not a single procedure to meet all these needs.

Daily Startup procedure

Job Safety Plan

- Fill out Job Safety Plan and have BREP staff approve.

Datasheet & Broodstock Sheets

- Start datasheet – make sure it has previous days’ numbers record start time and temperature. Check broodstock sheet for numbers, sex, marking, and/or age are needed to be collected for the hatchery.
- Check temperature – refer to “Maine Department of Marine Resources Adult Atlantic Salmon Trap and Fish Handling Protocol 2016”.
- Record numbers from fish counter – if operating – and reset.

Trap-Sort Facility Preparation

- Inspect fishway – make sure everything appears to be as it should. Check lift pulley to make sure it is suspended vertically and cables are appropriately in the pulley block.
- Turn on pumps.
- Unpin gate 1 if pinned.
- Make sure sorting tank is ready to accept fish. Ensure that crowdors are proper position and secured such that they cannot spin around when the hopper dumps by

wedging net between shoot and crowder gate, all isolation gates are in place, and blocking plate is in upstream sluice to ensure proper water level in tanks.

Gate Settings

- Early Spring: Trap to be operated with gate 2 in the closed position, gate 3 open, gate 1 closed, alewife punch plate down.
- Alewife season: Trap to be operated with gate 3 closed, gate 2 open, trap door “gate 1” open and alewife punch plate up allowing access to counting tubes – except when lifting.
- Shad Season: Trap to be operated with gate 3 closed, gate 2 open and trap door closed to allow downstream migrant river herring and juvenile river herring passage downstream when no operator is present. When operator is present gates 2 and 3 should both be opened and trap door closed allowing passage directly into the headpond. Alewife punch plate to be in the down position.
- Salmon: Few shad – still good numbers of salmon - trap to be operated with gate 3 closed, gate 2 open and trap door closed to allow downstream migrant river herring and juvenile river herring passage downstream. Alewife punch plate to be in the down position.
- Late salmon: Few salmon per day - still good numbers of salmon - trap to be operated with gate 3 closed, gate 2 open and trap door closed to allow downstream migrant river herring and juvenile river herring passage downstream. Alewife punch plate to be in the down position.
- Late Summer/Fall: Trap to be operated with gate 3 closed, gate 2 open and trap door closed to allow downstream migrant river herring and juvenile river herring passage downstream. Alewife punch plate to be in the down position.

Daily Operating Procedure

Early Spring- From fishlift opening (April 15, conditions dependent) until salmon season total reaches 100 or heavy day trigger occurs

- Brookfield - Lower hopper runs from 04:00-20:00 hours at ~ 1-3 lifts per hour
- MDMR - standard operating day for sorting lift 7AM – 3PM
- USFWS – standard operating fish pickups 10AM – 3 PM
- Flume operation after 3PM
 - Sorting lift gates typically left in position to retain fish in flume
- Salmon season – starts when ~ 100 salmon have been counted, season runs through July;
 - Brookfield - Lower hopper runs 24 hours starting in late May at ~ 2-4 lifts per hour
 - Two operational modes for sorting facility
 - Standard Day

- Extended Day - triggered by ~ 30 salmon per day or > 300 American shad estimated in flume.
- MDMR - standard operating day for sorting lift 7AM – 3PM
- MDMR - extended operating day for sorting lift 7AM – 5PM
- USFWS – standard operating fish pickups 10AM – 3 PM
- USFWS – extended operating fish pickups 10AM – 5 PM
 - Flume operation after 3 PM or 5 PM
 - From June 1st to June 30th, sorting lift gates will be left in position to allow free swim if > 300 shad estimated to be in flume at end of the day, increased shad mortality is observed, or Atlantic salmon broodstock targets are projected to be met during standard operating day.

Sorting lift will be put in a position to retain fish in the flume ~1 hour prior to sunrise.

- Passing Fish: Sort facility to be operated with gate 2 closed and river herring punch plate down. Check window and camera for fish. Pass any fish except salmon and non-desirables upstream by trapping them between gate 2 and 3, then opening gate 2. Record numbers and species on datasheet. Salmon and non-desirables should be trapped between gate 2 and 3, trap gate (1) opened, gate 2 opened, when fish passes close gate 2, close trap gate (1) making sure not to pinch fish. Alewife punch plate to be in the down position. Lift fish per “Fish Lifting Procedure”.
- Lifted Fish: Lifted fish to be sorted by hand with the use of dip nets except salmon which will be allowed to swim into the salmon tank through the isolation gate. Non-targeted species will be identified, counted, and moved into the upstream sluice tank and sluiced upstream by removing the aluminum blocking gate and recorded on datasheet. Non-desirables will be netted euthanized, and placed in a bag with date and species recorded on bag and datasheet and will be placed into the freezer in the fishway operation room. Salmon will be processed per “Maine Department of Marine Resources Adult Atlantic Salmon Trap and Fish Handling Protocol 2016”.

Alewife Season

- Passing Fish: Sort facility to be operated with gate 2 opened and gate 1 open allowing passage into the fish trap. River herring punch plate is to be in the up position allowing passage for river herring to the counting tubes. Gate 3 may be closed or open depending on density of river herring and presence of other species. With high densities of river herring gate 3 should be left open to

facilitate passage efficiency. With lower densities of river herring and the presence of other species, gate 3 can be closed and used to separate species and allow the operator to pass other species upstream by closing trap gate 1 and opening gate 3 strategically when river herring densities are low, enumerating and identifying all species and recording on datasheet. This prevents having to lift and net sort fish above. **Note:** This operation is required in the presence of shad to get them to pass through the facility. They are very reluctant to enter the compression area and rarely swim willingly into the trap. Lifting them in the small hopper and handling them above is very stressful. Operating gates will cause them to spook and drop back in the flume – some to never try and pass again. Trapping them between gates will cause them to panic and they will literally kill themselves running into gates and walls. Care should be taken by the operator in the presence of shad to minimize any stressors to promote passage.

- Trapping River Herring for Truck Stocking: When fish are to be truck stocked the river herring punch plate should be lowered. Once lowered the numbers of river herring entering the trap should be estimated to approximately the number required. Gate 2 and trap gate (1) closed. Lift fish per “Fish Lifting Procedure”.
- Lifted fish: Lifted fish will be sorted by hand with the use of dip nets except salmon which will be allowed to swim into the salmon tank through the isolation gate. Non-targeted species will be identified, counted, and moved into the upstream sluice tank and sluiced upstream by removing the aluminum blocking gate and recorded on datasheet. Non-desirables will be netted euthanized, and placed in a bag with date and species recorded on bag and datasheet and will be placed into the freezer in the fishway operation room. Salmon will be processed per “Maine Department of Marine Resources Adult Atlantic Salmon Trap and Fish Handling Protocol 2016”. River herring that are to be truck stocked will be netted out of the sorting tank and counted into the stocking tank. Each fish will be identified such that no other species other than **Alewives** or **Blueback Herring** are loaded in the stocking truck.

Shad Season

- Passing Fish: Sort facility to be operated with gates 2 and 3 opened and trap door closed. All fish allowed to pass directly into headpond. Alewife punch plate to be in the down position. Fish passing window are to be identified and enumerated and recorded on data sheet. Operator to watch window and camera for salmon and open trap door if a salmon is observed entering the compression area. If and when shad clear the area, gate 3 can be closed to secure salmon in the compression area. When salmon passes gate 2- close gate 2, close trap gate (1) making sure not to pinch fish. Lift fish per “Fish Lifting Procedure”.

- Lifted fish: Lifted fish will be sorted by hand with the use of dip nets except salmon which will be allowed to swim into the salmon tank through the isolation gate. Non-targeted species will be identified, counted, and moved into the upstream sluice tank and sluiced upstream by removing the aluminum blocking gate and recorded on datasheet. Non-desirables will be netted euthanized, and placed in a bag with date and species recorded on bag and datasheet and will be placed into the freezer in the fishway operation room. Salmon will be processed per “Maine Department of Marine Resources Adult Atlantic Salmon Trap and Fish Handling Protocol 2016”.
- Salmon – few shad – still good numbers of salmon
 - Passing Fish: Sort facility to be operated with all gates opened allowing passage into the hopper. Alewife punch plate to be in the down position. Operator to watch window and camera for shad and other species and close trap door if a shad or other species are observed entering the compression area to be allowed to pass directly into the headpond. Fish passing window are to be identified and enumerated and recorded on data sheet. If a salmon enters the compression area, If and when shad clear the area, gate 3 can be closed to secure salmon in the compression area. When salmon passes gate 2- close gate 2, close trap gate (1) making sure not to pinch fish. Lift fish per “Fish Lifting Procedure”.
 - Lifted fish: Lifted fish will be sorted by hand with the use of dip nets except salmon which will be allowed to swim into the salmon tank through the isolation gate. Non-targeted species will be identified, counted, and moved into the upstream sluice tank and sluiced upstream by removing the aluminum blocking gate and recorded on datasheet. Non-desirables will be netted euthanized, and placed in a bag with date and species recorded on bag and datasheet and will be placed into the freezer in the fishway operation room. Salmon will be processed per “Maine Department of Marine Resources Adult Atlantic Salmon Trap and Fish Handling Protocol 2016”.
- Late Salmon - few salmon per day
 - Passing Fish: Sort facility to be operated with gate 3 closed and gates 1 and 2 opened. Alewife punch plate to be in the down position. Operator to watch camera passing all but salmon into the headpond by opening gate 3. Fish passing window are to be identified and enumerated and recorded on data sheet. If a salmon is observed trap door gate 1 should be opened and then gate 3 opened allowing salmon to swim into the trap. If a salmon enters the compression area, If and when shad clear the area, gate 3 can be closed to secure salmon in the

compression area. When salmon passes gate 2- close gate 2, close trap gate (1) making sure not to pinch fish. Lift fish per “Fish Lifting Procedure”.

- Lifted Fish: Lifted fish will be sorted by hand with the use of dip nets except salmon which will be allowed to swim into the salmon tank through the isolation gate. Non-targeted species will be identified, counted, and moved into the upstream sluice tank and sluiced upstream by removing the aluminum blocking gate and recording on datasheet. Non-desirables will be netted euthanized, and placed in a bag with date and species recorded on bag and datasheet and will be placed into the freezer in the fishway operation room. Salmon will be processed per “Maine Department of Marine Resources Adult Atlantic Salmon Trap and Fish Handling Protocol 2016”.

- Late Summer/Fall

- Passing Fish: Trap to be checked at least 1 time a daily. Alewife punch plate to be in the down position. Gates to be operated for a minimum of 15 minutes allowing any fish wishing to move upstream time to pass. Gates 2 and 3 opened and gate 1 closed to pass debris and maximum flow. All species except salmon passing window are to be identified and enumerated and recorded on data sheet. If a salmon is observed trap door gate 1 should be opened, gate 3 and 2 closed behind fish as it passes, trap door closed making sure not to pinch fish. Lift fish per “Fish Lifting Procedure”.
- Lifted fish: Lifted fish will be sorted by hand with the use of dip nets except salmon which will be allowed to swim into the salmon tank through the isolation gate. Non-targeted species will be identified, counted, and moved into the upstream sluice tank and sluiced upstream by removing the aluminum blocking gate and recorded on datasheet. Non-desirables will be netted euthanized, and placed in a bag with date and species recorded on bag and datasheet and will be placed into the freezer in the fishway operation room. Salmon will be processed per “Maine Department of Marine Resources Adult Atlantic Salmon Trap and Fish Handling Protocol 2016”.

Daily Shutdown Procedure

Early Spring

- Gate 1 should be pinned open if there is debris or high flow to prevent downstream gates from being forced open due to pressure allowing fish to escape the flume. If water levels are normal and debris is minimal gate 1 should be closed. Gate 2 should be left closed preventing fish from passing upstream. Gate

3 should be left open allowing fish to enter the window area such that they can be viewed when operator arrives. Alewife punch plate to be in the down position.

- Inspect fishway – make sure everything appears to be as it should. Check lift pulley to make sure it is suspended vertically and cables are appropriately in the pulley block, and upstairs control box door is secured closed.
- Make sure pumps are turned off.
- Make sure sorting tank is empty and there are no fish. Crowders are proper position secured such that they cannot spin around when hopper dumps by wedging net between shoot and crowder gate, all isolation gates are in place and blocking plate is in upstream sluice to ensure proper water level in tanks.
- Ensure daily data sheet and brood stock sheet is properly and completely filled out and next days data sheets are started.
- Ensure all fish sampling tools are properly stowed away in job box.

Alewife Season

- Gate 1 should be pinned open to prevent downstream gates from being forced open due to pressure from flow, debris, or impinged fish, allowing fish to escape the flume. Gate 2 should be left open allowing fish to pass into the hopper. Gate 3 should be left closed preventing fish larger than river herring to pass.
- Inspect fishway – make sure everything appears to be as it should. Check lift pulley to make sure it is suspended vertically and cables are appropriately in the pulley block, and upstairs control box door is secured closed.
- Make sure pumps are turned off. Make sure river herring punch plate is in the full down position. Make sure punch plate is up allowing passage to the counting tubes.
- Make sure sorting tank is empty and there are no fish. Crowders are proper position secured such that they cannot spin around when hopper dumps by wedging net between shoot and crowder gate, all isolation gates are in place and blocking plate is in upstream sluice to ensure proper water level in tanks.
- Ensure daily data sheet and brood stock sheet is properly and completely filled out and next days data sheets are started.
- Ensure all fish sampling tools are properly stowed away in job box.

Shad Season/ alewife counting finished

- Gate 1 should be closed. Gate 2 should be left open. Gate 3 should be left closed preventing large fish from passing. Alewife punch plate to be in the down position.

- Inspect fishway – make sure everything appears to be as it should. Check lift pulley to make sure it is suspended vertically and cables are appropriately in the pulley block, and upstairs control box door is secured closed.
- Make sure pumps are turned off.
- Make sure sorting tank is empty and there are no fish. Crowders are proper position secured such that they cannot spin around when hopper dumps by wedging net between shoot and crowder gate, all isolation gates are in place and blocking plate is in upstream sluice to ensure proper water level in tanks.
- Ensure daily data sheet and brood stock sheet is properly and completely filled out and next days data sheets are started.
- Ensure all fish sampling tools are properly stowed away in job box.

Salmon – few shad – still good numbers of salmon

- Gate 1 should be closed. Gate 2 should be left open. Gate 3 should be left closed preventing large fish from passing. Alewife punch plate to be in the down position.
- Inspect fishway – make sure everything appears to be as it should. Check lift pulley to make sure it is suspended vertically and cables are appropriately in the pulley block, and upstairs control box door is secured closed.
- Make sure pumps are turned off.
- Make sure sorting tank is empty and there are no fish. Crowders are proper position secured such that they cannot spin around when hopper dumps by wedging net between shoot and crowder gate, all isolation gates are in place and blocking plate is in upstream sluice to ensure proper water level in tanks.
- Ensure daily data sheet and brood stock sheet is properly and completely filled out and next days data sheets are started.
- Ensure all fish sampling tools are properly stowed away in job box.

Late Salmon - few salmon per day

- Gate 1 should be pinned open to prevent downstream gates from being forced open due to pressure from flow, debris, or impinged fish, allowing fish to escape the flume if flows are high or there is a concerning amount of debris present. If water levels are normal and debris is minimal gate 1 should be closed. Gate 2 should be left open. Gate 3 should be left closed preventing fish larger than river herring to pass. Alewife punch plate to be in the down position.
- Inspect fishway – make sure everything appears to be as it should. Check lift pulley to make sure it is suspended vertically and cables are appropriately in the pulley block, and upstairs control box door is secured closed.

- Make sure pumps are turned off.
- Make sure sorting tank is empty and there are no fish. Crowders are proper position secured such that they cannot spin around when hopper dumps by wedging net between shoot and crowder gate, all isolation gates are in place and blocking plate is in upstream sluice to ensure proper water level in tanks.
- Ensure daily data sheet and brood stock sheet is properly and completely filled out and next days data sheets are started.
- Ensure all fish sampling tools are properly stowed away in job box.

Late Summer/Fall

- Depending on salmon broodstock collections to date operation will be:
 - Similar to early salmon season or
 - Sorting lift typically left in position to allow free swim
- Note: Brookfield video data collection from main hopper lifts will contribute to counts of diadromous fish and will be calibrated by time-specific sorting facility data. These data will be important at all times but especially when flume is in free-swim position.
 - Gate 1 should be pinned open to prevent downstream gates from being forced open due to pressure from flow, debris, or impinged fish, allowing fish to escape the flume if flows are high or there is a concerning amount of debris present. If water levels are normal and debris is minimal gate 1 should be closed. Gate 2 should be left open. Gate 3 should be left closed preventing fish larger than river herring to pass. Alewife punch plate to be in the down position.
 - Inspect fishway – make sure everything appears to be as it should. Check lift pulley to make sure it is suspended vertically and cables are appropriately in the pulley block, and upstairs control box door is secured closed.
 - Make sure pumps are turned off.
 - Make sure sorting tank is empty and there are no fish. Crowders are proper position secured such that they cannot spin around when hopper dumps by wedging net between shoot and crowder gate, all isolation gates are in place and blocking plate is in upstream sluice to ensure proper water level in tanks.
 - Ensure daily data sheet and brood stock sheet is properly and completely filled out and next days data sheets are started.
 - Ensure all fish sampling tools are properly stowed away in job box.

Fish Lifting Procedure

During River Herring Season

- Close trap door (gate 1). Close gate 2 to ensure no fish passage unless there is an operator to remain viewing window controlling passage.

- Make sure river herring punch plate is in the full down position.
- Inspect cables and pulley block on top of hopper to ensure they are in proper position.
- Lift slowly making sure there are no fish caught on rubber flaps or in the trap fyke. If fish are stuck, lower trap back down until fish are free and properly in the hopper. Once all fish are in the hopper lift without delay as the hopper is not water tight and will drain out. Lift until lift stops on its own in the full up position and wait until all fish exit the hopper. Then return hopper to flume below. Making sure the hopper fully sets down and watching the pulley block to make sure it does not lean over.
- Raise river herring punch plate.
- Reset gates to fishing position.

During Non-River Herring Season

- Close trap door (gate 1). Close gate 2 to ensure no fish passage unless there is an operator to remain viewing window controlling passage.
- Inspect cables and pulley block on top of hopper to ensure they are in proper position.
- Make sure river herring punch plate is in the full down position.
- Lift slowly making sure there are no fish caught on rubber flaps or in the trap fyke. If fish are stuck lower trap back down until fish are free and properly in the hopper. Once all fish are in the hopper lift without delay as the hopper is not water tight and will drain out. Lift until lift stops on its own in the full up position and wait until all fish exit the hopper. Then return hopper to flume below. Making sure the hopper fully sets down and watching the pulley block to make sure it does not lean over.
- Reset gates to fishing position.

Truck Loading Procedure

- Turn off water to stock out tank.
- Isolate stock out tank from main tank with solid aluminum plate.
- Drop hose into truck making sure fish will not impact anything due to improper hose/tank alignment.
- Place perforated plate over tank outlet.
- Open knife gate on stock tank holding perforated plate in place.
- Fill truck tank appx half way – minimum.
- Drain stock out tank with fish until water is below high end floor to tank wall seam.
- Make sure there is sufficient space in truck tank for remaining water and fish.
- Remove perforated plate.
- Assist any fish that do not make it down the tube.
- Turn on water to top off stocking tank.
- Raise hose when finished.

Close truck tank – start circulation pump and turn on oxygen per MDMR protocol on truck.

- G. Other Species collected in the trap:** As per an agreement with the Maine Department of Marine Resources (DMR) and Maine Department of Inland Fisheries and Wildlife (MIFW), all species other than Atlantic salmon collected in the trap are counted and released either upstream or downstream of the trap, or removed from the system. Species native to the drainage and ubiquitous naturalized exotic species (e.g. smallmouth bass) will be enumerated and passed upstream of the trap. Other species will either be released downstream of the trap or will be removed from the drainage (typically destroyed).

- H. Shortnose and Atlantic Sturgeon:** Due to concerns regarding current conditions of downstream passage at the Milford facility, shortnose and Atlantic sturgeon will not be passed above the dam. Upon capture, DSRFH staff will notify BREP – Richard Dill (207-852-2993). BREP will remove the fish and immediately release it downstream to a designated release location (to be determined).

- I. River Herring:** A portion (based on DMR stocking recommendations) of the River herring (Alewife and Blueback herring) will be counted and trucked to predetermined stocking locations throughout the drainage.

- J. American Shad:** Currently there are no special considerations for American shad. All American shad will be counted and released upstream. However, a portion of future runs may be utilized for drainage stockings.

II. Fish handling procedures:

- A. Marking:** All adult Atlantic salmon handled are to be marked (usually with an adipose or caudal fin punch) and implanted with a PIT tag in the dorsal musculature prior to returning them to the river. This identifies salmon as having been previously captured and avoids double-counting of salmon recaptured during the same year.

- B. Biological sampling:** We rate both the dorsal and caudal fins of each Atlantic salmon based on set of ratings for fin deformities. Poor ratings are often an indication of hatchery or aquaculture origin. We use a rating scale from 0-3, with ‘0’ as perfect and ‘3’ indicating a severe deformity or stub where the fin should be. In cases where an Atlantic salmon has an injury to the fin (e.g. bird wound or seal bite), we assign a rating based on the remaining, uninjured portion of the fin.

Fin Ratings:

0 – perfect fin with uniform fin rays and feathering at fin margin.

1 – fin is virtually complete but one or more fin rays are slightly curled.

2 – about 1/3 – 2/3 of the fin is deformed, eroded or ‘missing’ (caudal fin slightly - “broom shaped”)

3 – more than 2/3 of the fin is missing; all that remains is a thickened stub. (caudal fin – clearly “broom shaped”)

- C. Broodstock Collection: DSRFH operational experience indicates that adult Atlantic salmon brood fish can be transported when river temperatures are ≤ 24.0 °C when being transferred to an environment with cooler water temperatures (e.g. a hatchery), provided extreme care, minimal handling, and gradual introduction into cooler water temperatures during transport. Broodstock collection will be suspended when river temperatures are ≥ 24.0 °C, except under extraordinary circumstances.

Size group classifications are established from historical fork length and scale sample data for Atlantic salmon from Maine rivers. Within each size group, DSRFH does **not** select for any characteristics, such as size, weight, color, etc

III. Classification and disposition of captured Atlantic salmon:

No additional considerations. See Chapter 1.

CHAPTER 3 NARRAGUAGUS DAM ATLANTIC SALMON TRAP OPERATING AND FISH HANDLING PROTOCOLS

The following trap operating procedures and fish-handling protocols will be applied at all Downeast trapping facilities:

I. Trap operating procedures:

- A. Trapping season: See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Frequency of trap tending: Minimum of once daily. During the months of July and August or when the morning water temperature is ≥ 19 °C, two tends will be performed; once in the morning and once in the afternoon.
- C. Personnel authorized to tend traps: DSRFH permanent employees or a properly trained and appointed seasonal employee will tend the traps. If no person with adequate training is available, trapping operations will be suspended.
- D. Biosecurity: Biosecurity measures must be taken during the Downeast trap tending season. A crew of one or more persons will travel from one river to the next during the daily tend. This increases the possibility of transporting pathogens from one river to the next. Each trap site is equipped with all gear required to tend that site. Field scopes, glass slides, etc. may be kept in vehicles. Equipment removed from vehicles is to be disinfected after each use. Nolvasan solution, at the concentration of 1 ounce (2 tablespoons) per gallon of water will be used to disinfect all gear.

A pair of hip boots, Type III PFD, and raingear kept at each trapping site will be worn to tend. If footwear other than those present at the trap are used, they must first be disinfected. Tending equipment is to be cleaned and returned to the storage compartment after each use. The data sheet, scale envelopes, and genetic samples are the only items removed from the trap site. Personnel will then disinfect their hands with the disinfecting gel stored in the vehicle.

II. Fish handling procedures:

- A. Biological sampling: See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Marking: All adult salmon handled in fish traps are to be marked (usually with an adipose or caudal fin punch) prior to release back into the river. This identifies salmon as having been previously captured and avoids double-counting of salmon recaptured during the same year.

C. Water temperature considerations:

1. **Biological sampling:** Caution must be used when handling salmon at water temperatures ≥ 23.0 °C. At these temperatures, trap tenders will conduct only minimal handling, defined as marking the fish (adipose or caudal fin punch), measurement of fork length, and cursory visual observation for fin clips, injuries, external parasites, and sex. Scale samples and tagging will not be conducted.
 - a) Dennys River: Due to the higher incidence of farm fish escapees in Cobscook Bay an exception to the above protocol is needed. Upon visual examination, if the fish appears to be of aquaculture origin based on fin condition and body formation, scales will be taken and read on site by a DMR biologist. The suspect fish will be held in the trap until positive identification of origin is made. If the origin is confirmed as an aquaculture escapee the salmon will be euthanized and sampled in accordance with part III, D below.
 - b) All other trapping facilities will follow the primary protocol.
2. **Broodstock collection:** Currently no salmon are taken as broodstock.
3. **Transport Guidelines:** Currently no salmon are transported as broodstock.

III. **Classification and disposition of captured salmon:**

- A. Wild-origin (as determined by fin condition): See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Hatchery-origin from intentional smolt or parr releases: See Chapter 1, general trap operating procedures and fish-handling protocols.
- C. Strays: Stray fish are wild or identified restoration salmon (not aquaculture suspect) that are determined to be from another river system. These fish will be sampled according to DSRFH protocol and released upstream.
- D. Farm fish (Aquaculture escapees): State and federal fisheries agency staff will exclude aquaculture origin escapees from passing upstream of fish traps on Maine rivers, to minimize the risks of disease transmission, genetic contamination of extant populations, and competition with wild origin salmon. For information regarding Aquaculture salmon please refer to *DMR Aquaculture Suspect Protocol* (Source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).
- E. Captured Aquaculture salmon: See Chapter 1, general trap operating procedures and fish-handling protocols

**CHAPTER 4 SKELTON DAM
ATLANTIC SALMON TRAP OPERATING AND FISH-HANDLING
PROTOCOLS
LOWER SACO RIVER, SKELTON PROJECT (FERC NO. 2527)**

Brookfield Renewable Energy Partners (BREP) owns and operates the Skelton passage facility. In cooperation with DSRFH, BREP is currently responsible for operating and enumerating all Atlantic salmon utilizing this facility. The primary objective of an Atlantic salmon trapping operation is to enumerate the spawning stock and collect biological data.

The following trap operating procedures and Atlantic salmon handling protocols will be applied at the Skelton facility:

I. Facilities Operating Procedures

- A. Trapping/Counting Season: See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Frequency of Trap Tending/Counting and Data Transfer: See Chapter 1, general trap operating procedures and fish-handling protocols.
- C. Safety: Follow BREP safety protocols and requirements.
- D. Personnel Authorized to Tend Traps: See Chapter 1, general trap operating procedures and fish-handling protocols
- E. Deliverables: See Chapter 1, general trap operating procedures and fish-handling protocols.
- F. Captured Aquaculture salmon: See Chapter 1, general trap operating procedures and fish-handling protocols

II. Fish handling procedures:

- A. Biological Sampling: See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Marking: See Chapter 1, general trap operating procedures and fish-handling protocols.
- C. Water temperature considerations:
 - 1. **Biological sampling:** See Chapter 1, general trap operating procedures and fish-handling protocols.
 - 2. **Broodstock collections:** Currently no salmon are taken as broodstock from this facility.
 - 3. **Trap and Transport Guidelines:** When Atlantic salmon are being transported from the Skelton fish passage facility to riverine release sites, the differential between river temperature

and transport temperature should not exceed 3 °C (5.5 °F). Atlantic salmon will not be transported at temperatures exceeding ≥ 22.0 °C (73.4 °F).

Since there is a limited amount of Atlantic salmon habitat (spawning requirement is six salmon) between the Skelton Project and the upriver Bar Mills Project (FERC No. 2194) and Atlantic salmon cannot be released back into the project tailrace without being physically handled, the Skelton fish passage facility will cease operating for salmon when river temperatures, measured at the Skelton Project prior to 9:00 a.m., exceed ≥ 23.0 °C (73.4 °F) for a period of five consecutive days. Should the river temperature cool below ≥ 23.0 °C (73.4 °F), measured at the Skelton Project prior to 9:00 a.m., the fish passage facility will be reopened for capturing salmon and trap operations reinstated for the remainder of the trap operation window or until river temperatures again preclude the handling of Atlantic salmon.

III. Classification and Disposition of captures Atlantic salmon and other Species:

- A. Wild-origin (as determined by fin condition): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- B. Hatchery-origin from intentional smolt or parr releases: See Chapter 1, general trap and operating procedures and fish-handling protocols.
- C. Hatchery-origin returns to non-natal rivers (strays): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- D. Farm fish (Aquaculture escapees): See Chapter 1, general trap operating procedures and fish-handling protocols. For information regarding Aquaculture salmon please refer to DMR Aquaculture Suspect Protocol (Source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).
- E. Other Species: All fish species native or found in the drainage are allowed to pass this facility except striped bass. Striped bass should be released into the tailrace.
- F. Mortalities related to trapping operations: See Chapter 1, general trap operating procedures and fish-handling protocols.

**CHAPTER 5 BRUNSWICK DAM
ATLANTIC SALMON TRAP OPERATING AND FISH-HANDLING
PROTOCOLS
ANDROSCOGGIN RIVER, BRUNSWICK PROJECT (FERC NO. 2284)**

Brookfield Renewable Energy Partners (BREP) owns and maintains the Brunswick Dam fish passage facilities. BREP in cooperation with DSRFH operates and enumerates all Atlantic salmon utilizing the facilities. The primary objective of an Atlantic salmon trapping operation is to enumerate the spawning stock and collect biological data.

The following trap operating procedures and Atlantic salmon handling protocols will be applied at the Brunswick facility:

I. Facilities Operating Procedures

- A. Trapping/Counting Season: See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Frequency of Trap Tending/Counting and Data Transfer: See Chapter 1, general trap operating procedures and fish-handling protocols.
- C. Safety: Follow BREP and the Department of Marine Resources safety protocols.
- D. Personnel Authorized to Tend Traps: See Chapter 1, general trap operating procedures and fish-handling protocols
- E. Deliverables: See Chapter 1, general trap operating procedures and fish-handling protocols.
- F. Captured Aquaculture salmon: See Chapter 1, general trap operating procedures and fish-handling protocols

II. Fish handling procedures:

- A. Biological Sampling: See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Marking: See Chapter 1, general trap operating procedures and fish-handling protocols.
- C. Water temperature considerations:
 - 1. **Biological sampling**: See Chapter 1, general trap operating procedures and fish-handling protocols.
 - 2. **Broodstock collections**: Currently no salmon are taken as broodstock from this facility

3. Transport Guidelines: See Chapter 1, general trap operating procedures and fish-handling protocols.

III. Classification and Disposition of captures Atlantic salmon and other Species:

- A. Wild-origin (as determined by fin condition): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- B. Hatchery-origin from intentional smolt or parr releases: See Chapter 1, general trap and operating procedures and fish-handling protocols.
- C. Hatchery-origin returns to non-natal rivers (strays): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- D. Farm fish (Aquaculture escapees): See Chapter 1, general trap operating procedures and fish-handling protocols. For information regarding Aquaculture salmon please refer to DMR Aquaculture Suspect Protocol (Source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).
- E. Other Species: All species native or found in the drainage are allowed to pass this facility except carp and white catfish. Carp and white catfish will be removed.
- F. Captured Aquaculture salmon: See Chapter 1, general trap operating procedures and fish-handling protocols

**CHAPTER 6 MILLTOWN DAM
ATLANTIC SALMON TRAP OPERATING AND FISH-HANDLING
PROTOCOLS
ST. CROIX RIVER, MILLTOWN DAM**

The New Brunswick Power Corporation owns and St. Croix International Waterway Commission (SCIWC) operates the Milltown fishway trap facility, which is located in New Brunswick, Canada. Under license by Fisheries & Oceans Canada (DFO) and in cooperation with the Bureau of Sea-run Fisheries and Habitats (DSRFH) and NOAA - Fisheries, SCIWC is currently responsible for operating and enumerating all Atlantic salmon utilizing this facility. The primary objective of an Atlantic salmon trapping operation is to enumerate the spawning stock and collect biological data. This trap is also operated to procure sea-run broodstock, to capture and remove aquaculture escapees and to enumerate other fish species.

The following trap operating procedures and Atlantic salmon handling protocols will be applied at the Milltown facility:

I. Facilities Operating Procedures

- A. Trapping/Counting Season: See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Frequency of Trap Tending/Counting and Data Transfer: See Chapter 1, general trap operating procedures and fish-handling protocols.
- C. Safety: Follow N.B. Power Corporation and SCIWC safety protocols.
- D. Personnel Authorized to Tend Traps: SCIWC authorized personnel.
- E. Deliverables: See Chapter 1, general trap operating procedures and fish-handling protocols. In addition, scale samples should be sent to the Jonesboro regional DSRFH office on a weekly basis.
- F. Captured Aquaculture salmon: Captures of aquaculture Atlantic salmon are to be reported as specified by DFO. For additional information regarding Aquaculture salmon please refer to DMR Aquaculture Suspect Protocol (Source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).

II. Fish handling procedures:

- A. Biological Sampling: At the discretion of DFO, this trap will follow the Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Marking: All adult salmon handled in the fish trap are tagged with a DFO Carlin tag as specified by DFO.

C. Water temperature considerations:

1. ***Biological sampling:*** At the discretion of DFO, this trap will follow the Chapter 1, general trap operating procedures and fish-handling protocols.
2. ***Broodstock collections:*** At the discretion of DFO, this trap will follow the Chapter 1, general trap operating procedures and fish-handling protocols.
3. ***Trap and Transport Guidelines:*** At the discretion of DFO, this trap will follow the Chapter 1, general trap operating procedures and fish-handling protocols.

III. Classification and Disposition of captures Atlantic salmon and other Species:

- A. Wild-origin (as determined by fin condition): At the discretion of DFO, this trap will follow the Chapter 1, general trap and operating procedures and fish-handling protocols, and marking protocol above.
- B. Hatchery-origin from intentional smolt or parr releases: At the discretion of DFO, this trap will follow the Chapter 1, general trap and operating procedures and fish-handling protocols, and marking protocol above.
- C. Hatchery-origin returns to non-natal rivers (strays): At the discretion of DFO, this trap will follow the Chapter 1, general trap and operating procedures and fish-handling protocols.
- D. Farm fish (Aquaculture escapees): The disposition of aquaculture origin fish is determined by DFO. At this time, all suspected aquaculture escapees are removed from the system and lethally sampled for fish health or other studies.
- E. Other Species: At the discretion of DFO, this trap will follow Chapter 1, general trap and operating procedures and fish-handling protocols.
- F. Mortalities related to trapping operations: At the discretion of DFO, this trap will follow Chapter 1, general trap and operating procedures and fish-handling protocols for sampling. Disposition of fish will be as specified by DFO. .

**CHAPTER 7 UNION DAM
ATLANTIC SALMON TRAP OPERATING AND FISH-HANDLING
PROTOCOLS
UNION RIVER, UNION PROJECT (FERC NO. 2727)**

Brookfield Renewable Energy Partners (BREP) operates the Ellsworth Dam and the Graham Lake Dam on the Union River in Ellsworth. BREP is currently responsible for providing upstream passage opportunity for only clupeids and Atlantic salmon (per FERC license article). Fish passage is provided via a trap and truck program at the lower (Ellsworth) dam. The trap (owned by DSRFH) resembles a “vertical slot” fishway, leading fish from the tailrace through several connected pools into a cul-de-sac where a fish trap is located. Captured salmon and clupeids are processed and trucked upstream of both dams in adherence with the following standard protocols.

I. Trap Operating Procedures:

- a. Trapping Season: Trapping for Atlantic salmon is typically conducted from May 1 - October 31; although, the trap could open earlier. Trapping operations prior to June 16 are conducted in cooperation with the City of Ellsworth’s commercial harvesting agent in conjunction with the river herring harvest and an annual property use agreement. The BREG will train the agent on approved salmon handling techniques based on DSRFH handling protocols (Chapter 1). If any Atlantic salmon are captured in conjunction with the river herring harvest, the agent will move the salmon to the on-site holding tank in accordance with DSRFH handling protocols and BREG Section 10 sub permit from DMR. When commercial harvest operations at the trap have terminated for the season (typically June 16) the agent will notify BREG and responsibility for daily trap operations will be assumed by BREG.
- b. Frequency of Trap Tending: Daily trapping operations shall be in accordance with BREG’s Section 10 sub permit from DMR.
 - i. Operational Dates: By May 1 or when river herring are present in reasonable quantities until October 31, Operated Daily
 - ii. Hours: Open 7:00 am – close 6:00 pm, or 1 hour before sunset in the spring/fall
 - iii. Tending Frequency:
 - a. May 1 – July 15 (Tentative)
 - i. Minimum of at least three times per day (9:00 am, 1:00 pm, and 6:00 pm, or 1 hour before sunset)
 - b. July 15 – October 31
 - i. Minimum or twice per day (~10:00 am & 1 hour before sunset)
 - iv. Brookfield Renewable Energy Group staff will be on site during river herring harvest and stocking operations in May/June
 - v. All persons listed on the sub permit must be familiar with the terms of our Section 10 permit, trapping protocols, and aquaculture suspect identification protocol.
 - vi. All persons listed on the sub permit who will be operating the trapping facility must participate in MDMR training on the proper handling of Atlantic salmon. This shall occur at the Milford fish lift once Atlantic salmon have begun returning
- c. Safety: Safety will be practiced in accordance with policies implemented by BREG.

- d. Personnel Authorized to Tend Traps: Person(s) trained and authorized by DSRFH and BREG staff may tend the trap in accordance with BREG's Section 10 sub permit from DMR and this adult handling protocols.
- e. Deliverables: See Chapter 1, general trap operating procedures and fish-handling protocols.
- f. Captured Aquaculture salmon: See Chapter 1, general trap operating procedures and fish-handling protocols.

II. Fish handling procedures:

- A. Biological sampling: Standard DSRFH trap sheets will be completed for each day the trap is operated. Each salmon will be examined for tags, fin clips, VIE (visible implanted elastomer), or other marks. A scale sample, fork length (mm), fin condition score, gender, and injuries data will be collected and recorded for each salmon. Salmon will be inspected and classified as wild, hatchery, or aquaculture origin based on the attached criteria.
- B. Marking: All trapped salmon will be marked with an adipose fin punch prior to returning them into the river. This identifies salmon as having been previously captured and avoids double-counting of salmon recaptured during the same year. Salmon captured with an existing adipose fin punch should receive a second punch in the upper lobe of the caudal fin.
- C. Water temperature considerations:
 - 1. **Biological sampling**: DSRFH operational experience indicates that sampling activities for adult Atlantic salmon can safely occur at temperatures up to $\geq 23.0^{\circ}\text{C}$ (73.4°F). When the water temperature is $\geq 23.0^{\circ}\text{C}$ to 25°C handling salmon will be minimized to reduce stress on the fish and no scale samples will be taken. Salmon will be visually classified as aquaculture or non-aquaculture origin.
 - 2. **Broodstock Collection**: At this time broodstock are not collected from the Ellsworth trapping facility.
 - 3. **Trap and Transport Guidelines**: At water temperatures $\leq 23.0^{\circ}\text{C}$ sea-run salmon will be marked with an adipose punch and transported using standard DSRFH trucking guidelines to the designated upriver release site (currently Goodwin's Bridge). At water temperature ($\geq 23.0^{\circ}\text{C}$ to 25°C) sea-run salmon will be adipose punched and returned immediately to the river adjacent to the trap with a minimum of handling. Atlantic salmon are not to be trucked when water temperatures exceed $\geq 22.0^{\circ}\text{C}$ (71.6°F).

III. Classification and Disposition of captured Atlantic salmon and other Species:

- A. Wild-origin (as determined by fin condition): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- B. Hatchery-origin from intentional smolt or parr releases: See Chapter 1, general trap and operating procedures and fish-handling protocols.

- C. Hatchery-origin returns to non-natal rivers (strays): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- D. Farm fish (Aquaculture escapees): State and federal fisheries agency staff will exclude aquaculture origin escapees from passing upstream of fish traps on Maine rivers, to minimize the risks of disease transmission, genetic contamination of extant populations, and competition with wild origin salmon. For information regarding Aquaculture salmon please refer to *DMR Aquaculture Suspect Protocol* (Source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).
- E. Other Species: All fish species (other than Atlantic salmon and river herring) are released back to the tailrace.
- F. Captured Aquaculture salmon: See Chapter 1, general trap operating procedures and fish-handling protocols

**CHAPTER 8 LOCKWOOD DAM
ATLANTIC SALMON TRAP OPERATING AND FISH-HANDLING
PROTOCOLS
KENNEBEC RIVER, LOCKWOOD PROJECT (FERC NO. 2574)**

Merimil Limited Partnership holds the FERC license for the Lockwood Project located on the Kennebec River in Maine. Brookfield Renewable Energy Partners (BREP) operates the Lockwood Project, including the Project's fish passage facilities. In cooperation with DSRFH, BREP is responsible for operating the passage facility and enumerating all Atlantic salmon utilizing this facility. The primary objectives of this Atlantic salmon trapping operation are to enumerate the spawning stock, collect biological data, and transportation of spawning stock to designated areas.

The following trap operating procedures and Atlantic salmon handling protocols will be applied at the Lockwood facility:

I. Facilities Operating Procedures

- A. Trapping/Counting Season: See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Frequency of Trap Tending/Counting and Data Transfer: The fish lift should be cycled at least twice daily when river temperatures are above ≥ 23.0 °C and hourly during periods of cooler river temperatures. If an Atlantic salmon is captured, DSRFH will be notified immediately so DSRFH can transport the fish to the designated release site.
- C. Safety: Follow BREP safety protocols and requirements.
- D. Personnel Authorized to Tend Traps: See Chapter 1, general trap operating procedures and fish-handling protocols.
- E. Captured Aquaculture salmon: See Chapter 1, general trap operating procedures and fish-handling protocols.

II. Fish handling procedures:

- A. Biological Sampling: See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Marking: See Chapter 1, general trap operating procedures and fish-handling protocols.
- C. Water temperature considerations:

1. Biological sampling: The Lockwood facility has a holding tank specifically designed for Atlantic salmon. Water in this tank may be cooled by the addition of ice kept in a freezer on the premises. When river water temperatures are ≥ 23.0 °C, tank water will be cooled with ice so that the tank temperature is not more than 3 °C less than the ambient river temperature. If tank water

can be cooled to <23.0 °C following these guidelines, then the DSRFH standard biological sampling protocols will be followed. If tank water cannot be cooled to <23.0 °C following these guidelines, then limited biological sampling will be conducted. See DSRFH general trap operating procedures and fish-handling protocols.

2. Broodstock collections: Currently, there are no plans to procure Atlantic salmon for broodstock from this facility.

3. Trap and Transport Guidelines: The principal release locality will be the Sandy River sub-drainage, which typically runs several degrees cooler than the mainstem Kennebec River, and has several thousand units of juvenile rearing habitat and adult spawning and holding habitat. In order to minimize stress in Atlantic salmon during transport, a general rule is to maintain water temperature differentials between holding areas and receiving waters to within 3°C. This procedure allows Atlantic salmon an opportunity to acclimate to temperature changes slowly, and helps reduce stress due to thermal shock. Fish transported from the Lockwood fish lift could experience four areas of differing water temperatures: mainstem Kennebec River, holding tank, transport tank, and Sandy River. Atlantic salmon should be allowed ample time (a minimum of 1 hour) to acclimate to each phase of temperature change prior to moving them to the next location. Atlantic salmon will not to be trucked when recipient water temperatures are ≥ 23.0 °C (73.4 °F). Atlantic salmon are not to be trucked when water temperatures cannot be cooled to ≤ 22.0 °C (71.6 °F).

III. Classification and Disposition of captured Atlantic salmon and other Species:

- A. Wild-origin (as determined by fin condition): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- B. Hatchery-origin from intentional smolt or parr releases: See Chapter 1, general trap and operating procedures and fish-handling protocols.
- C. Hatchery-origin returns to non-natal rivers (strays): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- D. Farm fish (Aquaculture escapees): See Chapter 1, general trap operating procedures and fish-handling protocols. For information regarding Aquaculture salmon please refer to DMR Aquaculture Suspect Protocol (Source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).
- E. Other Species: This facility is designed to be a passage facility only. It does not offer any opportunity to intervene and sort undesirable species.
- F. Mortalities related to trapping operations: See Chapter 1, general trap operating procedures and fish-handling protocols.

**CHAPTER 9 BENTON DAM
ATLANTIC SALMON TRAP OPERATING AND FISH-HANDLING
PROTOCOLS
SEBASTICOOK RIVER, BENTON FALLS (FERC NO. 5073)**

Essex Hydro Associates, LLC owns and maintains the Benton Falls Dam fish passage facility on the Sebasticook River in cooperation with the DSRFH operates and enumerates all Atlantic salmon utilizing the facility. The primary objective of an Atlantic salmon trapping operation is to enumerate the spawning stock and collect biological data.

The following trap operating procedures and Atlantic salmon handling protocols will be applied at the Benton Falls fish lift:

I. Facilities Operating Procedures

- A. Trapping/Counting Season: See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Frequency of Trap Tending/Counting and Data Transfer: The fish lift should be cycled at least twice daily when river temperatures are ≥ 23.0 °C and hourly during periods of cooler river temperatures. Designated personnel should check the flume no less than once a day. If a salmon is captured in the flume visual data will be taken from the viewing window and the excluder screen lifted to allow the fish to pass into the headpond. If for some unavoidable reason daily tending cannot take place, the entire lift should be shut down to prevent fish from being “trapped” in the flume for an extended period. It is undesirable to have salmon holding in the flume during periods when water temperatures are ≥ 23.0 °C.
- C. Safety: Follow Department of Marine Resources and/or project owner’s safety protocols.
- D. Personnel Authorized to Tend Traps: See Chapter 1, general trap operating procedures and fish-handling protocols
- E. Deliverables: See Chapter 1, general trap operating procedures and fish-handling protocols.
- F. Captured Aquaculture salmon: See Chapter 1, general trap operating procedures and fish-handling protocols

II. Fish handling procedures:

- A. Biological Sampling: Data collection at Benton Falls will be confined to visual observations only. In the event the facility is redeveloped with the capability to remove fish unharmed from the flume the full suite of biological data will be collected at this facility.
- B. Marking: See Chapter 1, general trap operating procedures and fish-handling protocols.
- C. Water temperature considerations:

1. **Biological sampling:** See Chapter 1, general trap operating procedures and fish-handling protocols.
2. **Broodstock collections:** Currently no salmon are taken as broodstock from this facility.
3. **Transport Guidelines:** See Chapter 1, general trap operating procedures and fish-handling protocols.

III. Classification and Disposition of captures Atlantic salmon and other Species:

- A. Wild-origin (as determined by fin condition): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- B. Hatchery-origin from intentional smolt or parr releases: See Chapter 1, general trap and operating procedures and fish-handling protocols.
- C. Hatchery-origin returns to non-natal rivers (strays): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- D. Farm fish (Aquaculture escapees): See Chapter 1, general trap operating procedures and fish-handling protocols. For information regarding Aquaculture salmon please refer to DMR Aquaculture Suspect Protocol (Source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).
- E. Other Species: This facility is designed to be a passage facility only. It does not offer any opportunity to intervene and sort undesirable species.
- F. Mortalities related to trapping operations: See Chapter 1, general trap operating procedures and fish-handling protocols.

**CHAPTER 10 PEJEPSCOT DAM
ATLANTIC SALMON TRAP OPERATING AND FISH-HANDLING
PROTOCOLS
ANDROSCOGGIN RIVER, PEJEPSCOT DAM (FERC NO. 4784)**

The Teton Power Funding, LLC owns and maintains the Pejepscot Dam fish passage facilities on the Androscoggin River in cooperation with the DSRFH operates and enumerates all Atlantic salmon utilizing the facilities. The primary objective of an Atlantic salmon trapping operation is to enumerate the spawning stock and collect biological data.

The following trap operating procedures and Atlantic salmon handling protocols will be applied at the Pejepscot facility:

I. Facilities Operating Procedures

- A. Trapping/Counting Season: See Chapter 1, general trap operating procedures and fish-handling protocols.
- B. Frequency of Trap Tending/Counting and Data Transfer: Given that this fish lift is automated, video cameras will be used to document salmon passage. The fish lift should be cycled at least twice daily when river temperatures exceed ≥ 23.0 °C and hourly during periods of cooler river temperatures. If no salmon have been documented to pass the Brunswick facility it is not necessary to operate the lift for salmon. Also if all of the salmon that have passed the Brunswick facility have been documented to pass the Pejepscot facility, the lift does not need to operate for salmon.
- C. Safety: Follow Department of Marine Resources or project owners' safety protocols.
- D. Personnel Authorized to Tend Traps: See Chapter 1, general trap operating procedures and fish-handling protocols
- E. Deliverables: See DSRFH general trap operating procedures and fish-handling protocols.
- F. Captured Aquaculture salmon: See Chapter 1, general trap operating procedures and fish-handling protocols

II. Fish handling procedures:

- A. Biological Sampling: All of the biological data is collected at the Brunswick Dam for the Androscoggin River. No data other than observed passage is recorded at this facility.
- B. Marking: See DSRFH general trap operating procedures and fish-handling protocols.
- C. Water temperature considerations:
 - 1. **Biological sampling**: See Chapter 1, general trap operating procedures and fish-handling protocols.
 - 2. **Broodstock collections**: Currently no salmon are taken as broodstock from this facility

3. ***Transport Guidelines:*** See Chapter 1, general trap operating procedures and fish-handling protocols.

III. Classification and Disposition of captures Atlantic salmon and other Species:

- A. Wild-origin (as determined by fin condition): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- B. Hatchery-origin from intentional smolt or parr releases: See Chapter 1, general trap and operating procedures and fish-handling protocols.
- C. Hatchery-origin returns to non-natal rivers (strays): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- D. *Farm fish (Aquaculture escapees): See Chapter 1, general trap operating procedures and fish-handling protocols. For information regarding Aquaculture salmon please refer to DMR Aquaculture Suspect Protocol (Source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).*
- E. Other Species: This facility is designed to be a passage facility only. It does not offer any opportunity to intervene and sort undesirable species.
- F. Mortalities related to trapping operations: See Chapter 1, general trap operating procedures and fish-handling protocols.

**CHAPTER 11 WORUMBO DAM
ATLANTIC SALMON TRAP OPERATING AND FISH-HANDLING
PROTOCOLS
ANDROSCOGGIN RIVER, WORUMBO DAM (FERC NO. 3428)**

The Miller Hydro Group owns and maintains the Worumbo Dam fish passage facilities on the Androscoggin River in cooperation with the Maine Department of Marine Resource operates and enumerates all Atlantic salmon utilizing the facilities. The primary objective of an Atlantic salmon trapping operation is to enumerate the spawning stock and collect biological data.

The following trap operating procedures and Atlantic salmon handling protocols will be applied at the Worumbo facility:

I. Facilities Operating Procedures

- A. Trapping/Counting Season: See DSRFH general trap operating procedures and fish-handling protocols.
- B. Frequency of Trap Tending/Counting and Data Transfer: Given that this fish lift is automated, video cameras will be used to document salmon passage. The fish lift should be cycled at least twice daily when river temperatures exceed ≥ 23.0 °C and hourly during periods of cooler river temperatures. If no salmon have been documented to pass either the Brunswick facility or the Pejepscot facility, it is not necessary to operate the lift for salmon. Also if all of the salmon that have passed the Pejepscot facility have been documented to pass the Worumbo facility, the lift does not need to operate for salmon.
- C. Safety: Follow Department of Marine Resources or project owner's safety protocols.
- D. Personnel Authorized to Tend Traps: See Chapter 1, general trap operating procedures and fish-handling protocols.
- E. Deliverables: See Chapter 1, general trap operating procedures and fish-handling protocols.
- F. Captured Aquaculture salmon: See Chapter 1, general trap operating procedures and fish-handling protocols.

II. Fish handling procedures:

- A. Biological Sampling: All of the biological data is collected at the Brunswick Dam for the Androscoggin River. No data other than observed passage is recorded at this facility.
- B. Marking: See Chapter 1, general trap operating procedures and fish-handling protocols.
- C. Water temperature:

1. **Biological sampling:** See Chapter 1, general trap operating procedures and fish-handling protocols.
2. **Broodstock collections:** Currently no salmon are taken as broodstock from this facility.
3. **Transport Guidelines:** See Chapter 1, general trap operating procedures and fish-handling protocols.

III. Classification and Disposition of captures Atlantic salmon and other Species:

- A. Wild-origin (as determined by fin condition): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- B. Hatchery-origin from intentional smolt or parr releases: See Chapter 1, general trap and operating procedures and fish-handling protocols.
- C. Hatchery-origin returns to non-natal rivers (strays): See Chapter 1, general trap and operating procedures and fish-handling protocols.
- D. Farm fish (Aquaculture escapees): See Chapter 1, general trap operating procedures and fish-handling protocols. For information regarding Aquaculture salmon please refer to DMR Aquaculture Suspect Protocol (Source: DMR, 2014. DMR Aquaculture Suspect Protocol. Maine Department of Marine Resources, Bangor, Maine. 17 pp.).
- E. Other Species: This facility is designed to be a passage facility only. It does not offer any opportunity to intervene and sort undesirable species.
- F. Mortalities related to trapping operations: See Chapter 1, general trap operating procedures and fish-handling protocols.