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Connecticut Fisheries Division

Trout Stocking



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State of Connecticut
Department of Energy and Environmental Protection
Bureau of Natural Resources
Fisheries Division



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Cover photo: A pair of beautiful Rainbow Trout and streamside fiddleheads by chashcc.

Summary

Recreational fishing is a healthy outdoor experience that is important to the quality of life for many of Connecticut's residents and is beneficial to the state's economy. Trout anglers annually enjoy over 1.2 million days fishing in Connecticut. These same anglers (approximately 109,000 adult anglers older than 16 years of age), spend roughly \$30.00/day pursuing trout, which contributes around \$36 million annually to the State's economy (U.S. Department of Interior et al. 2013 (revised 2014)). With this in mind, a major objective of the Connecticut Department of Energy and Environmental Protection's (DEEP) Fisheries Division (FD) is to enhance and diversify recreational fishing opportunities. To support high-quality fishing experiences, the FD's hatchery system stocks approximately 900,000-1.3 million salmonids (trout fry, fingerling/yearling trout, catchable size trout, Atlantic Salmon broodstock, and Kokanee Salmon fry) that are reared at three State fish hatcheries. Currently, Brown, Brook, Rainbow, and Tiger Trout (a Brown Trout X Brook Trout hybrid), along with Atlantic Salmon and Kokanee Salmon (a landlocked form of the anadromous Pacific Sockeye Salmon) are raised for stocking in waters open to public fishing. This year work continued on refining the trout stocking assessment (RASTA) protocol. Public stocking maps were updated and made available via the DEEP FD website. As part of the continuing program to update and replace the aging fleet of hatchery trucks, a fifth new stocking truck (purchased with state funded capital improvement monies) will be housed at Kensington hatchery.

Background

The primary purpose of the Trout Stocking job is to maintain and enhance Connecticut's trout fisheries in areas that are accessible to the general public. A goal of the FD is to provide reasonable accessibility and trout fishing opportunities throughout the year, in all regions of the State. This job has great importance because trout are a highly sought-after gamefish, and generate ~ 1.2 million fishing trips (days)/year in recreational activity in Connecticut (U.S. Department of Interior et al. 2013). Additionally, 109,000 trout anglers spent an average of \$30.00/day and generated over \$36 million per year to the State's economy (dollar amount based on U.S. Department of Interior et al. 2013). These estimates of fishing activity and economic value must be viewed as conservative, in that data from anglers under the age of 16 were not included.

The majority of this fishing activity can be attributed to hatchery production of trout and stocking by FD. Three species of trout (Brook (*Salvelinus fontinalis*), Brown (*Salmo trutta*), and Rainbow (*Oncorhynchus mykiss*), one hybrid trout ("Tiger" which is a Brown Trout and Brook Trout cross), and two species of salmon (Atlantic (*Salmo salar*) and Kokanee (*Oncorhynchus nerka*) – a landlocked form of the anadromous Sockeye Salmon) are raised in the hatchery system. Special strains of Brown Trout (i.e. Cortland, Iijoki, Survivor, and Seeforellen) are also

raised for specific management objectives and programs (i.e. the Coldwater Lakes Management, Farmington River, Housatonic River, Wild Trout, and Sea-run Trout Jobs). Each year, nearly 650,000 catchable-sized trout are produced, which includes approximately 2,000 broodstock trout (2 - 10 lbs. each). An additional 1,000 -1,500 broodstock Atlantic Salmon (3 - 20 lbs. each), 400 - 500 broodstock Seeforellen Brown Trout (3 - 5 lbs. each), 300,000-400,000 Brown Trout fry, and 150,000-200,000 Kokanee Salmon fry are also provided by the State's hatchery system for annual distribution. Over 400 truck-runs are required annually to stock these fish into approximately 200 rivers and streams, and 100 lakes and ponds; the vast majority of which are done within a short, three month window (March-May). Stocking of trout and salmon (Atlantic and Kokanee) requires determining proper allocation of fish, logistical planning, timely scheduling, extensive coordination, and accountability. The large commitment of personnel and high level of coordination (between fish management, hatchery, and environmental law enforcement staff) required to complete this Job has necessitated high levels of oversight and development of efficiencies. Computerization of stocking schedules, stocking location maps, annual distribution reports, and historical stocking records have further improved efficiencies and centralization of all of these components have helped to standardized the statewide process. The use of the internet and social media outlets have vastly improved the FD's ability to disseminate this information, in a timely manner, to the angling public.



Trout are transported to stream side via hatchery truck and in some instances volunteers help distribute the fish by float stocking fish throughout high quality habitat. Photo by: FD staff

Continued improvements to existing procedures for scheduling and distribution are on-going. As was reported by Orciari et al. (2011), an experimental protocol (formerly known as the CT R_x method) to quantitatively rank the relative importance of all of Connecticut's stocked waters

was developed. This ranking system, now called the “Ranking of All Stocked Trout Areas” (RASTA), is currently being refined. This tool should serve as a means for assessing current trout stocking allocations but more importantly, it should allow for making better informed allocation decisions moving forward. Additionally, it will provide a documentable means of determining future changes to trout stocking allocations at specific locations/regions around the State.

Six objectives currently exist for the Trout Stocking job:

1. Distribute trout and salmon produced at State hatcheries to areas that can support salmonids, promote fishing opportunities, and are accessible to the general public.
2. Produce the Annual Fish Distribution Report, an annual report listing the allocation of all fish stocked by location, and maintain a continual allocation record for each stocked area (Historical Stocking Record).
3. Update stocking maps and provide to public through the DEEP website.
4. Utilize angler usage data obtained from the Stream Angler Survey (F57-R35, Study 1, Job 2), and Lake Angler Survey (F57-R35, Study 2, Job 2) to make informed management decisions regarding trout allocations.
5. Develop and continually refine a quantitative means of ranking the relative importance of each stocked area, and use this to guide allocation of fish.
6. Work cooperatively with hatchery staff to ensure all coldwater/trout Fish Management objectives are met.



Atlantic salmon being stocked in the Shetucket River. Photo by: Chris McDowell

The purpose of Job 3 is to provide an accurate, historical record of trout stocking, enhance fishing opportunities by continually assessing allocations of stocked salmonids (trout, Kokanee Salmon, and broodstock Atlantic Salmon), and improve the trout distribution process statewide. This report summarizes the work involved in distributing those fish during 2016.

Approach

Trout and broodstock Atlantic Salmon stocking is planned, coordinated, and scheduled for all suitable inland waters of the State (Orciari et al. 2011). The number of broodstock Atlantic Salmon is apportioned evenly between the eastern and western halves of the state to provide a

limited, but popular recreational, sport fishery. See the Wild Trout (F57-R35, Study 1, Job 4), Coldwater Lakes Management (F57-R35, Study 1, Job 7), and Sea-run Trout Job (F50-D36 Job 4) reports for stocking practices of Brown Trout fry, Kokanee Salmon fry, and Sea-run trout, respectively. Special management areas (Figure 1) receive prescribed allocations of trout, specifics of which can be found in Orciari et al. (2011).



Trout being stocked by FD's Burlington State Fish Hatchery staff.



A nice Kensington Hatchery-raised broodstock Atlantic Salmon caught from the Shetucket River by Brandon Belair in 2013.

The annual fish distribution report is produced and made available through the DEEP FD website:

http://www.ct.gov/deep/lib/deep/fishing/general_information/fishdistributionreport.pdf

Stocking maps are updated as needed to reflect the most current stocking locations. Changes in locations and access for the general public are now available through the DEEP FD website for all river/stream locations where catchable trout are stocked (www.ct.gov/deep/troutstockingmaps).

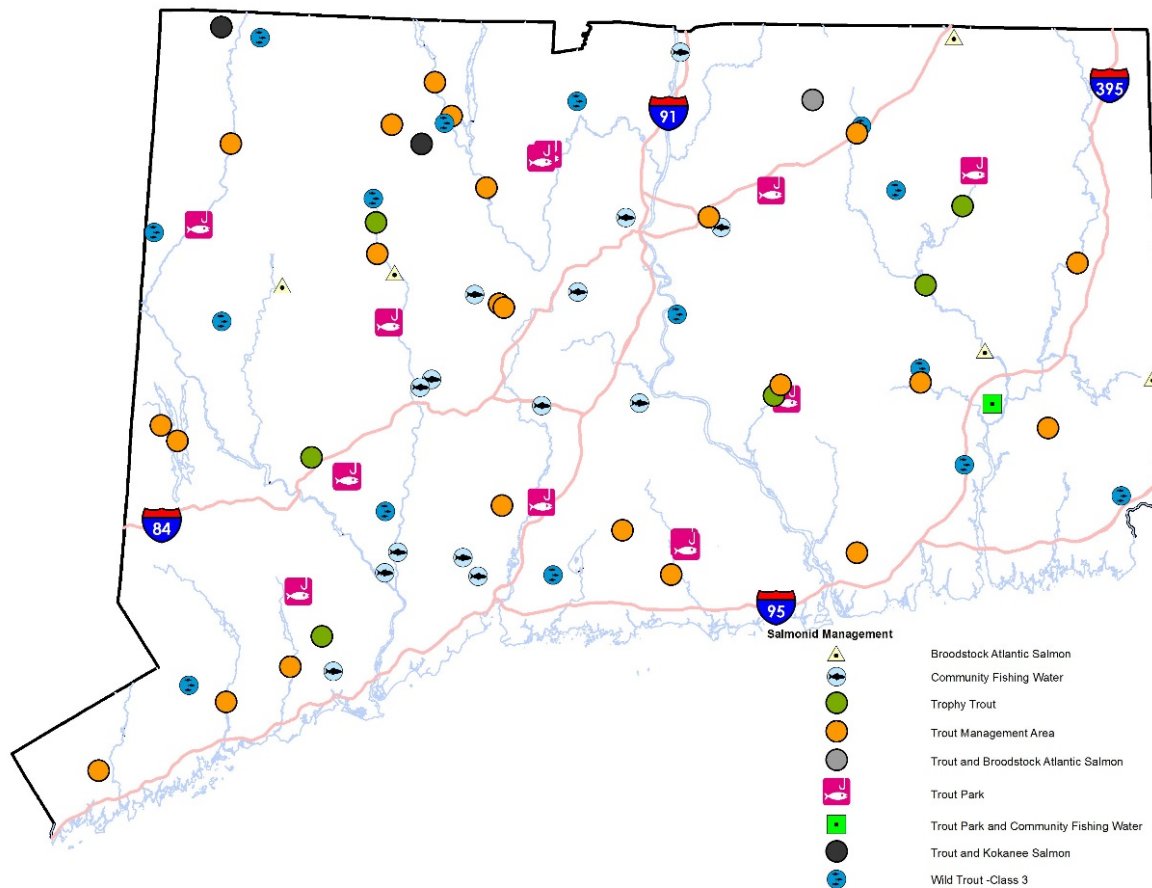


Figure 1. Locations of specialty areas stocked with trout and salmon. Refer to the 2017 Angler’s Guide for specific regulations for each area.

The RASTA system was previously developed to assess the current allocations of trout stocked in lakes and ponds, and to help determine future allocations based on quantifiable and “best professional judgment” parameters (see Orciari et al. 2011 for scoring of qualitative factors). A similar assessment was also used by Orciari et al. (2011) to evaluate trout allocations in a handful of Connecticut’s rivers and streams, but is currently being refined. Measurable parameters such as length of stream section stocked, and number of stocking points are updated using ArcGIS. Additional parameters such as census information, population density and proximity to other stocked trout resources will be evaluated and incorporated. In addition, stream trout stocking locations throughout the State were evaluated and ranked to assess fishing opportunities and angling access. Stocking sites were evaluated by visiting stocking locations with a team of fish management staff (minimum of 2) and ranking each site under the following categories: 1) Land ownership (public, open space, or private), 2) Stocking Difficulty/Safety (the ease or difficulty of physically carrying/moving nets and buckets of trout,

by staff, from the stocking truck, and safely releasing them into the water). Traffic volume/control, road crossings, bank steepness and substrate, and distance from the parking location to the edge of the stream are taken into consideration), and 3) Public Access for the fishing community (parking availability, approximate number of safe parking locations, proximity of the waterbody to parking, ease or difficulty of accessing the water or shoreline fishing area, ease or difficulty of recognition by anglers, of each individual site, as a publically accessible fishing area, FD signage designating the area for standard or special management, etc.).

Key Findings

Approximately 688,725 catchable-size (>6 inches) trout, 265,750 Brown Trout fry and 138,900 Kokanee Salmon fry were stocked in 2016 (follow the link given in the “Approach” section of this document to the 2016 Fish Distribution Report). The number of catchable trout was 4.9% lower compared to the five year average (2011-2015 average = 724,368). Of the total catchable-size trout stocked, 34% were released into lakes and ponds, and 66% were released into rivers and streams. Size composition for catchable trout was 9.5% yearlings (6-9 inches), 80.3% adults (9-12 inches), 9.7% large-size trout (>12 inches), and <1% specialty trout (i.e. broodstock >16 inches). Species composition was 48.7% Brown Trout, 35.2% Rainbow Trout, 15.4% Brook Trout, and <1% “Tiger” Trout.

Low water/flow conditions at all three state hatcheries were related to an ongoing statewide drought (which began in the fall of 2015) and reduced flow capacity in the well systems. These reduced flow conditions required calculated reductions in the production poundage capabilities and thus, a reduction in the total numbers of trout that the hatcheries were capable of safely producing. This condition precipitated an “emergency stocking” in late fall 2015 where 13 waterbodies (Appendix 1) were stocked with 30,000 adult trout (Brown and Rainbow) to reduce the total biomass at Quinebaug Hatchery. From mid-January through mid-February, a “contingency stocking” (these fish would have normally been stocked out 1-2 months later) of an additional ~ 40,000 adult trout (Brook, Brown, and Rainbow) were stocked into lakes and ponds throughout the State due to the continued low flow conditions from pumped wells at both the Kensington and Quinebaug hatcheries.

In anticipation of Opening Day (OD) 2016, the normal, pre-season trout stocking began on February 22nd in lakes and ponds. All stocking of waterbodies was completed by OD and in-season (after OD) stocking was successfully completed by May 24th. Approximately 59.1% of the 2016 catchable-size trout allotment was stocked during pre-season (January 20th to before OD; 2nd Saturday in April), 33.8% was stocked in-season (OD to end of May), and 7.1% during

late-season (June through early January); excluding fry, a total of ~ 829,000 trout were stocked in 2016. Due to the late fall “emergency stocking” and the earlier than normal “contingency stocking”, many waterbodies did not receive their typical in-season allotments. In most cases these locations received allotment numbers similar to other years, however the period or season (pre- vs. in-season) when they were stocked varied by as much as 3-4 months (mid-Jan to mid-April of May). Only one waterbody was not stocked in 2016, Bashan Lake, because the lake had yet to refill after dam repairs made in 2014-2015. Statewide, 22 waterbodies (or sections of waterbodies) were removed from the stocking list due to reduced access, reduced usage, or insufficient stream flows.

During fall 2016, 1,731 broodstock Atlantic Salmon raised at the Kensington State Fish Hatchery (Berlin, CT) were stocked into the following waterbodies: Naugatuck River (366 fish), Shetucket River from the Scotland Dam to Occum Dam (365 fish), Mount Tom Pond (500 fish), and Crystal Lake-Ellington (500 fish). Due to a prolonged drought in Connecticut, more broodstock Atlantic salmon were stocked into lakes rather than the normally stocked rivers. Low streamflow conditions during early fall, coupled with warmer than average water temperatures, required staff to make the decision to stock locations where these fish had a reasonable chance of surviving, at least for several months. Stream conditions improved enough to warrant stocking by mid-October. Also of note was the October stockings of broodstock Brook Trout (avg. weight of 3-5lbs.) into Mohawk Pond and Black Pond, Woodstock; see the Coldwater Lakes Management report (Study 1, Job 6) for more detail. For specific information regarding Brown Trout, Kokanee Salmon fry and Sea-run Trout stocking, see the reports for Wild Trout (F57-R35, Study 1, Job 4), Coldwater Lakes Management (F57-R35, Study 1, Job 6) and Sea-run Trout (F50-D36 Job 4), respectively.

In late December 2016 and early January 2017, the last of Connecticut reared broodstock Seeforellen Brown Trout (avg. weight of 3-5lbs.) were stocked equally into each of Crystal and Highland lakes; 500 total. Due to fiscal constraints, the decision was made in 2016 to discontinue production of the Seeforellen strain from the Kensington Hatchery facility. The plan is to stock the remaining Seeforellen fry (~100,000 total) into rivers and streams during spring 2017 under the direction of the Wild Trout and Stream Monitoring jobs, after which this strain will no longer be available in Connecticut. The State of Maine has received fertilized eggs from Connecticut’s Seeforellen strain with the intention of starting a production program. It is the FD’s hope that, once the State’s fiscal climate improves, the Division might potentially be in a position to re-establish production of the Seeforellen strain, with eggs supplied from the State of Maine.

The annual Fish Distribution Report was completed and was made available to the public in February 2017. This report not only includes the distribution of salmonids, but also includes information regarding the release of other fish species managed by the FD (i.e. Walleye,

Channel Catfish, Northern Pike, clupeids, Sea-run trout, and Kokanee and Atlantic Salmon) throughout the State.

Other noteworthy accomplishments during 2016 included updates to the majority of FD stocking and public stocking maps. Trout stocking coverages in ArcGIS were updated as well. All of these updates were the outcome of the recent stocking site assessments that were conducted in 2014-2015. It was found during this process that there were questions regarding ownership rights for several stocking locations. Research into those locations, where property ownership is in question, will require further property and easement reviews. In addition, work continued to refine and update the stream and lake RASTA protocol by taking a cursory look at OD angler survey data. Analysis of the OD angler survey data is on-going and it is anticipated that this information, collected over the next several years as part of the Stream Angler Survey project (Study 1, Job 2), will begin to help quantify where stocking can be improved for OD anglers and the potential to optimize the use of our hatchery production.

There is growing concern that the FD may be stocking some rivers/streams too early and that an unknown percentage of trout stocked into these waterbodies during the pre-season schedule (prior to OD) might not be available to anglers on OD (and the two week period afterwards, the minimum amount of time before most locations receive a second stocking) due to a variety of possible factors including: 1) fish leaving the system or stocking area, 2) predation, 3) natural mortality, and 4) poaching. Potential factors for fish leaving the system could be related to cold water conditions at the time of stocking, high, early-spring flood/flow events, stream pH, and/or poor trout habitat. Anecdotal evidence (phone contact, comments on fish forums, and the CT DEEP Facebook page <https://www.facebook.com/CTFishAndWildlife/>) appear to suggest that poor OD catch may be more frequent than in the past. It is recommended that the Connecticut FD develop a protocol for assessing current stocking practices to determine if we are providing the best OD and early-spring fishing opportunities available.

Finally, in 2016 another new hatchery truck was purchased. This truck was purchased using State funded capital improvement monies, and has a higher carrying capacity than the previously used 15 year old truck. The tanks have a greater holding capacity due to their larger size/weight rating, better insulation and use of a bottled oxygen aeration system. The truck was first used during fall 2016, and will be available for use during the spring 2017 stocking season. This new truck will be housed at Kensington State Fish Hatchery.

Discussion

In an effort to assess current allocations and potentially improve trout stocking and angling, the FD continued a detailed evaluation of ways to improve the process and ensure that stocked trout are distributed equitably and are accessible for all of the state's anglers. This year, the majority of public trout stocking maps were updated to address angler concerns and changes in access. Ongoing refinements to the RASTA protocol have been beneficial in improving stocking efficiencies. Results from site evaluations completed in both eastern and western CT in 2014-15 suggest that land ownership has changed substantially along some rivers and streams, especially in the lower counties of western Connecticut, and certain streams in eastern Connecticut. These changes indicate that many of these sites/locations may no longer warrant the stocking of publicly supported resources, such as trout. FD staff needs to research DEEP files for information on permanent angling easements and fishing lease agreements, and review property ownership at many of these locations. This research will help guide future decisions on whether to discontinue stocking at specific sites or in some cases along entire stretches of rivers, and whether to re-allocate stocking numbers within a given river system or to other areas.

Because of the growing concern that the FD may be stocking some streams too early prior to OD, it is recommended that the Connecticut FD develop a protocol(s) for assessing current stocking practices to determine if we are providing the best OD and early spring fishing opportunities available. This assessment could include conducting short term, but intensive angler surveys, marking/tagging fish prior to stocking and electrofishing afterwards to determine stream residency, and potentially radio-telemetry, or some combination of all three. It is also recommended that the FD review relevant literature from other states and countries to determine how other agencies have evaluated their stocking practices and what were the outcomes/management decisions developed from these studies.

Also, preliminary results from OD angler counts suggest that there is a general relationship for both lakes and streams where greater numbers of stocked fish resulted in greater fishing effort. Furthermore, effort appears to be higher in some riverine special management areas such as Trophy Trout Areas. Additional data from subsequent years will be useful in helping to determine trends and improve stocking efficiency. The FD should consolidate and review all pertinent angler data that has been collected in prior years and summarize all trout angler effort, catch, and catch rate data for each waterbody where trout are stocked. This information could be useful when determining if waterbodies are stocked appropriately and will be helpful when assessing and determining allotments for currently stocked areas.

Recommendations

- * Review DEEP files to research permanent easements and angler access lease agreements.
- * Research property ownership and public access of stocking sites where there is some level of uncertainty.



*Brook trout fishing on a quite stream in the northwest corner.
Photo submitted by: Timothy Sheffield.*

- * In selected locations, review past stocking practices along with angler survey information to determine appropriate trout stocking allocations.

- * Develop a protocol for evaluating current stocking practices and its overall effectiveness in generating the best possible fishing success.

- * Review and evaluate all individual river/stream stocking sites in both eastern and western CT once every five years.

Expenditures

Total Cost:	\$53,751
Federal Share:	\$40,313
State Share:	\$13,438

References

- Orciari, R.D., T. Barry, N. Hagstrom, G. Leonard, E. Machowski, C. McDowell, K. Vensel, and J. Bender. 2011. Study 1 Coldwater fisheries management, Job 4 Trout Stocking. Connecticut Department of Environmental Protection, Bureau of Natural Resources, Inland Fisheries Division, Hartford, CT. 50 pp.
- USFWS. 2013. 2011 national survey of fishing, hunting, and wildlife-associated recreation-Connecticut. U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Bureau of the Census. Washington, D.C. 172 pp.

Acknowledgements

Many thanks go to the hatchery staff for their efforts in producing, transporting, and stocking this important product. Additional thanks goes to all DEEP Fisheries permanent staff as well as our Seasonal Resource Assistants, and the many volunteers that assisted with the distribution of the trout.

Appendices

Appendix 1. Waterbodies “emergency” stocked* in late fall 2015.

Waterbody	Town	Number Stocked Fall 2015
Beach Pond	Voluntown	2,500
Black Pond	Middlefield, Meriden	2,500
East Twin Lake	Salisbury	3,000
Gardner Lake	Salem, Bozrah	2,500
Long Pond	N. Stonington, Ledyard	2,500
Mashapaug Lake	Union	2,500
Squantz Pond	New Fairfield	3,000
Stillwater Pond	Torrington	1,000
Tyler Pond	Goshen	1,000
Waumgumbaug Lake (aka Coventry Lake)	Coventry	2,500
West Branch Reservoir	Colebrook	3,000
West Hill Pond	Barkhamsted, New Hartford	3,000
West Side Pond	Goshen	1,000
Total		30,000

* The “emergency stocking” occurred in late fall 2015 where 13 waterbodies were stocked with 30,000 adult trout (Brown and Rainbow) to reduce the total biomass at Quinebaug State Fish Hatchery, due to low flow volumes from pumped wells.