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Connecticut Fisheries Division

Stream Angler Survey

Connecticut Department of Energy & Environmental Protection
Bureau of Natural Resources
Fisheries Division
79 Elm Street, Hartford, CT 06106
860-424-3474
www.ct.gov/deep/fishing
www.facebook.com/ctfishandwildlife

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

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Project: Coldwater Management
Job 2: Stream Angler Survey

Period Covered: April 1, 2016 to March 31, 2017

Report Prepared by: Neal Hagstrom and Edward Machowski

Job Personnel: Neal Hagstrom, Job Leader /Project Leader
Edward Machowski, Job Leader
Justin Davis, Primary Staff
Michael Humphreys, Primary Staff
Chris McDowell, Primary Staff
Eileen O'Donnell, Primary Staff
Timothy Barry, Program Coordinator
Robert Jacobs, Assistant Program Coordinator

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Approved by: Peter Aarrestad
Director, Fisheries Division

William Hyatt
Chief, Bureau of Natural Resources

Cover photo: Large river trout fishing in a popular pool, DEEP staff photo.

Summary

In this document, we reviewed and compared the results of 2016 rapid assessment angler surveys conducted on Opening Day (OD) of trout fishing season (2nd Saturday in April). Trout stocking sites at 68 locations around the state were visited by Fisheries staff on the morning of OD 2016. These surveys provided timely data on usage of these water bodies on OD, the busiest trout fishing day of the entire year. These data were analyzed and, where data from other years were available or where similar trout management regulations exist between different sites, trends are presented. Potential performance metrics that had been previously evaluated for the efficiency of trout stockings were used in the review. While not definitive, data appear to indicate that for ponds with predominately shore fishing access, regardless of management type and regulations, stocking higher densities of fish resulted in greater angler usage, at least on OD.

In the last report two metrics, effort/stocked trout and catch/stocked trout for the trout season were reviewed as indices of stocking efficiencies using catch/effort data from 45 past angler surveys conducted between 1988-1994 . Rapid assessment methodology is usually a short-duration endeavor and focuses on angler effort and assessing if specific angling access/stocking locations are being utilized. In most cases catch data arenot collected during rapid assessment surveys. Thus, only the effort/stocked trout metric could be calculated and used for review for the OD 2016 data. The effort/stocked trout metric value from this rapid assessment is from a single hour, the first hour (6:00AM) of OD. The last review used total effort for the entire fishing season. Additional work is needed to see if a correction factor can be developed to equate the observed effort during the first hour of the fishing season with the seasonal totals.

Background

Sound fisheries management of streams relies upon a combination of angler survey and biological data. This job provides a coordinated and standardized means of assessing recreational fishing on Connecticut's streams using accepted methodology. Angler surveys conducted under this job will expand our knowledge of the State's stream fisheries resources, and help to determine the effectiveness of current fishing regulations and trout stocking regimes. Improved fishing quality and angler satisfaction, resulting from informed management decisions, may lead to greater angler interest and participation in river and stream fishing. In

the case of the State's trout stocking program, current angler effort/catch information on stocked rivers/streams should help optimize the finite trout production from state fish hatcheries. By providing a central depository for data storage and guidance in creating statistically valid, standardized survey methods, this job will increase efficiencies for other fisheries management jobs requiring stream angler survey data.

Angler surveys can be used to collect economic information for a fishery that includes the cost to go fishing, the impact of purchases related to fishing trips on local economies and the willingness of anglers to pay for their recreation opportunities. A significant body of baseline fisheries economic data has been collected during several past studies in Connecticut: the Farmington River (Hyatt, 1986), the Housatonic River (Barry 1988), and for 60 streams across the state during the 1988-1994 stream survey (Hagstrom et al., 1996). Economic information helps managers make informed decisions. It can be used to evaluate a particular fisheries value to anglers, compare the cost-benefit of various management options and place monetary values on the deeded fishing rights of a specific water body. This report summarizes work performed during April 1, 2016 to March 31, 2017.

Objectives

- Develop and implement standard survey methods.
- Coordinate implementation for angler surveys (assessing angler effort, catch, and attitudes) on requested stream resources.
- Maintain stream angler survey databases and archive all raw data to provide technical support to management projects.
- Provide economic information to support fisheries management decision making.

Approach

Three different types of angler surveys are typically used for streams and rivers to gather quantitative estimates of angler effort (hours of fishing), catch (numbers of fish caught), harvest (number of fish taken), and catch rates (the total number of fish caught per hour) for all fish species.

- Roving angler surveys with a stratified, random design (Malvestuto et al. 1978) are best suited for streams with many access points that are easy to walk or drive between.
- Bus stop angler surveys (Pollack et al. 1994) are useful for larger rivers that have

many well defined, but widely dispersed access points.

- Rapid assessments (Orciari et al. 2011) are useful when rough estimates of fishing are desired from many places, or when staff is not available to survey for the whole season (e.g., only the period on and immediately following Opening Day (OD)). This survey method allows only a relative comparison of fishing pressure between streams where data were collected during a similar time period.

For collecting data away from stream-side, alternative survey methods such as electronic, phone, mail, and canvas surveys will be evaluated for their usefulness in collecting non-resource specific or off-site resource specific angler attitudes.

The methodology for the Roving and Bus Stop Surveys are presented in Hagstrom et al. 2016.

Rapid Assessments

The rapid assessment method is a series of counts at locations where only a relative index of angler usage is needed (Orciari et al. 2011). These data are used to assess whether stocking rates for specific streams or stocking locations match current angler usage. Generally no individual angler interviews are done with this method.

For all methods, information collected during individual angler interviews can include: angler effort, catch, expenditures, home town and angler opinions related to management activities and resource values. Depending on project needs, this information can be used to generate economic impact, and service areas. Economic impact is the monetary value that a fishery adds to local business. The Service Area analysis is used to determine the towns that are serviced by an individual resource or particular management area. It could also be used to imply how far anglers will travel based on the perceived value of the fisheries. Annual catch and effort statistics are presented in this report with more detailed analysis in individual job reports. All job specific opinion questions will be summarized in that job's report.

Field Activities

Opening Day-Rapid Assessments

Single-count Rapid Assessments were conducted Opening Day (OD) of trout season at 68 streams (or sections of streams) and ponds (April 9, 2016). See Figure 1 for the spatial distributions of locations. There were a total of 22 separate streams and 33 ponds visited. Counts were done at 16 locations for the first time in 2016, while the remaining 52 locations were sites that had been assessed on past OD's. The availability of data to compare OD locations over time is mixed. Some waterbodies have several years of data, while others have

no data or only data collected later in the day that may not be representative of site usage. For the majority of locations checked on OD the greatest angling effort occurs during the first hour (6:00-7:00 AM).

Table 1. Management category, number of ponds, lakes and stream sections surveyed for angler effort on Opening Day of Trout fishing Season 2016

Regulation Type	**Number of Waterbodies**	**Regulations**
Community Waters (CW)	8	Small urban ponds with Standard season and variable limits
Lakes	16	Standard season, 5-trout/day limit
Trout Management Lakes (TML)	2	Larger lakes, special seasons for trout fishing. Size and harvest limits vary
Trout Parks	8	Small ponds with standard season and 2-trout/day limit
Streams	28	Standard season and statewide trout regulations.
Trout Management Areas (TMA)	4	Catch and Release stream sections with Year round Seasons
Trophy Areas (TA)	2	Rivers stocked with large trout, 2-trout/day and minimum size limits
Wild Trout Management Areas (WTMA)	1	Single artificial terminal tackle, and catch and release only. Not stocked.

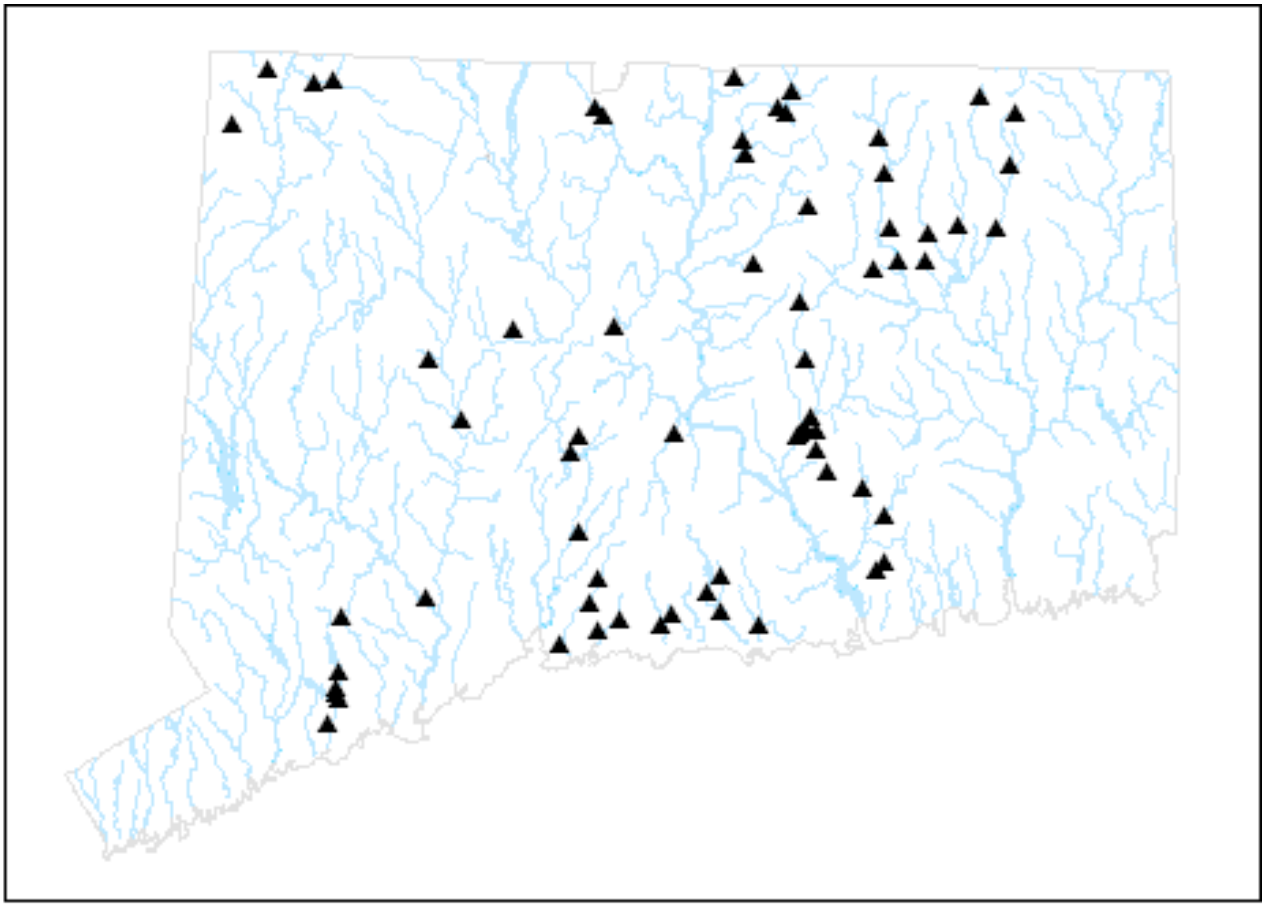

Figure 1. Distribution of Opening Day rapid assessment locations during 2016. Three locations were part of season long assessment of fishing: Moodus Reservoir, Pickerel Lake and Wangumbaug Lake. (See Lake Angler Survey job for additional details).

Opening Day counts/Rapid assessments:

These counts provide feedback on the usage of specific stocking sites as well as an overview of angler usage along individual rivers and stream systems and at ponds and lakes for our Trout Stocking Program (See Trout Distribution Report). As a result of past counts on OD, and the observed low or lack of usage by anglers, it was recommended to stop or reduce stockings at several streams or specific stocking sites on streams.

Angler usage at a site on OD is the result of weather, and in the case of streams, flow conditions, continued public access to the specific location or waterbody, the angler's past experiences and current expectations from the site, in this case specifically on OD, what information they have learned about stocking this year (was the location stocked or not?) and often on what they observe (re: visible, swimming trout) in the water. The number of anglers

at a site usually decreases during the course of OD morning. This is based on many years of observations and count data from previous OD rapid assessments. The highest counts are usually at 6:00 am and drop over the next several hours. In stocked rivers, non-uniform probabilities of use for the entire Opening Day morning period were determined for Connecticut streams by Hyatt (1986) and confirmed during Angler Surveys done during 1988-1994 (Hagstrom et al. 1996). These value could be used to correct all angler counts to a 6:00 am equivalent count.

When compared to the best available data from prior OD counts, there was a general trend of lower angler counts in the majority of stream locations (29 of 35). These declines were usually in the range of 50% lower than in past counts. Only a couple of places had an increase in usage compared to past data (Natchaug River Trout Park, Bigelow Brook and Wonoskopomuc Lake). Nine of the 33 ponds counted had lower angler counts. Weather (cold to cool air temperatures) and flow conditions were reasonably mild on OD of 2016, so it would appear that these were not factors in this observation.

Angler counts and number of trout stocked were compared across management types (Figure 2). As would be expected, a general relationship was found for both lakes and streams where more fish meant more effort (Figure 2 and 3). It was interesting to note that ponds and lakes with similar management regulations tended to cluster together. The sites that had higher effort levels were heavily used Trout Parks for ponds and the Trophy Areas (TA) on streams that are stocked with a percentage (~50%, >12 inches TL) of larger fish. Where good, shore-based fishing access, or an opportunity to potentially catch larger fish (TA's) exists it appears that denser stocking rates (on a fish/acre basis) attracts more anglers. The one very high outlier for ponds was Schreeder Pond (TP- Figure 4) which is stocked OD and where there has been an effort to cultivate angler participation as a social event. This location generated ~200 angler

hours of effort during the first hour of OD and is stocked with a moderate number of trout/acre for OD (~250 fish/acre), when compared to other locations.

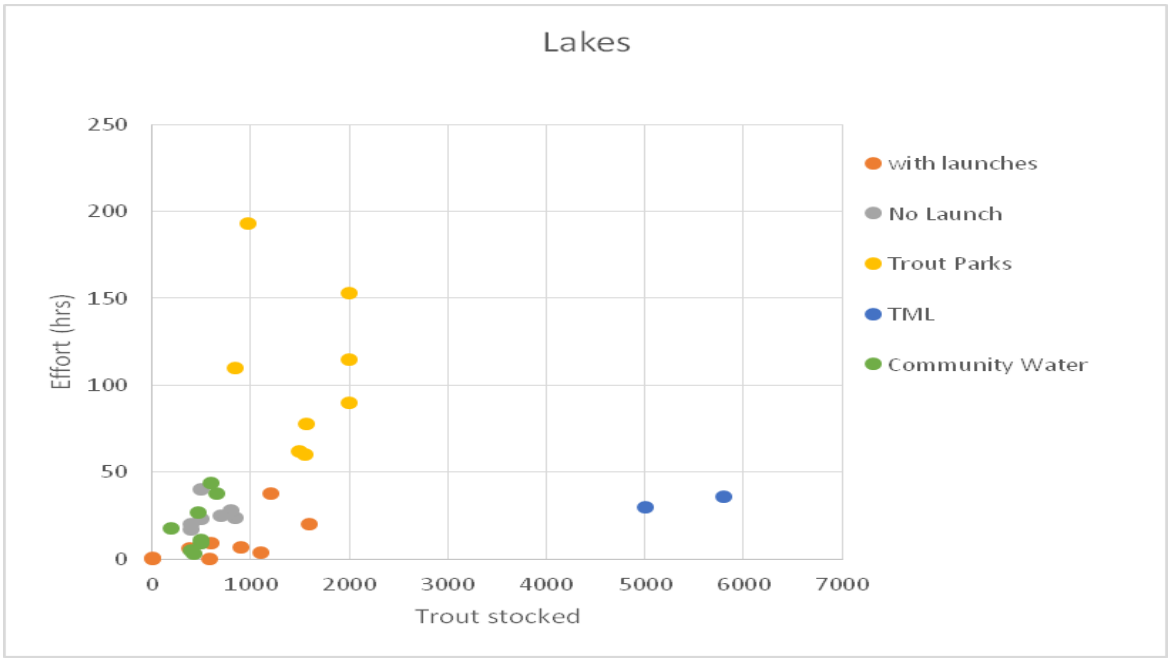

Figure 2. Number of fish stocked for Opening Day vs Anglers counted in one hour on Opening Day (effort) in selected Connecticut lakes and ponds in 2016.

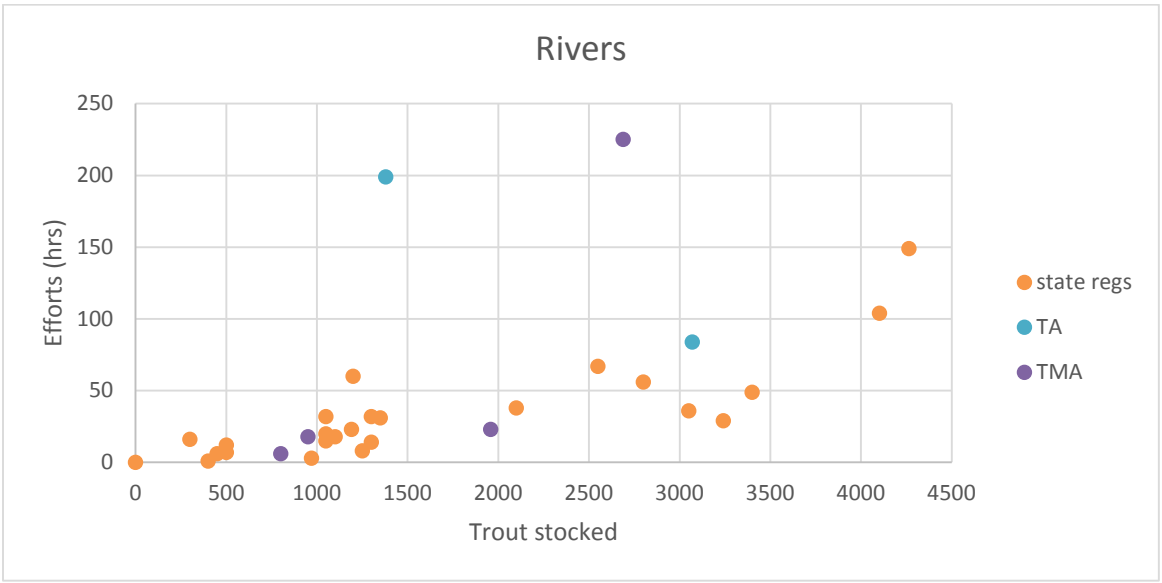

Figure 3. Angler effort vs number of trout stocked for selected Connecticut streams by management types

For ponds, when values are compared on a per acre basis, the different management types clustered together and a general effort vs stocking density relationship could be seen (Figure 4). The data in Figure 4 appear to indicate stocking smaller ponds with good shore fishing access

(i.e. ~50% or more of the shoreline is accessible for fishing) is more effective at attracting angler activity and may be more efficient from a fish distribution prospective, at least for OD

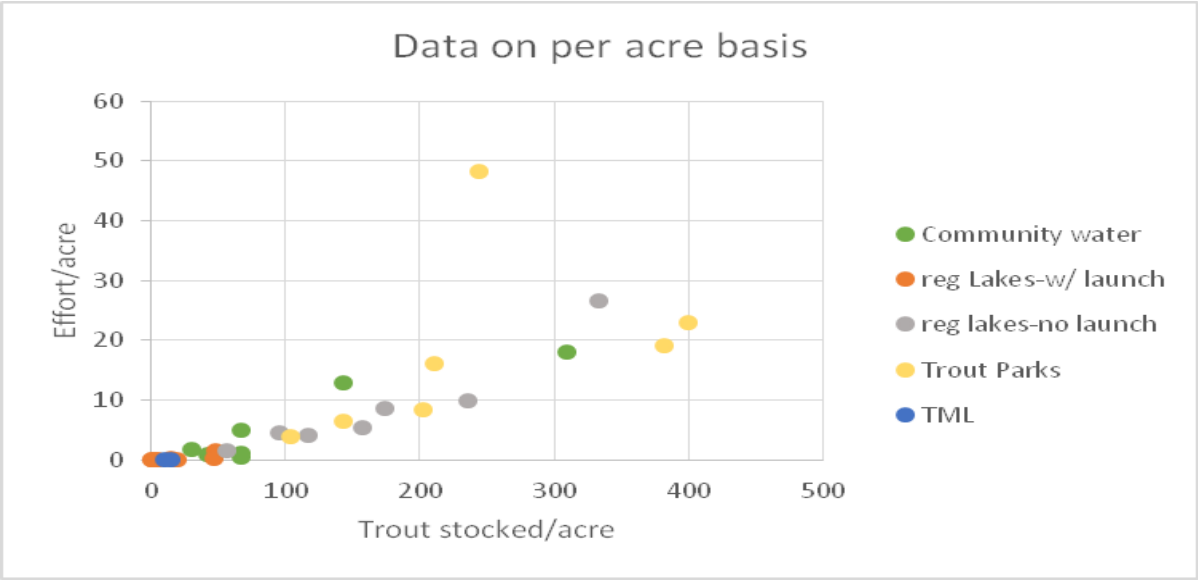

Figure 4. Number of trout/acre stocked vs Opening Day Angler count/ acre for selected Connecticut Lakes & Ponds in 2016

An attempt was made to use the performance metric as suggested in the last final report. However, those comparison metrics were derived from data collected on season or year-long angler surveys. Because the rapid assessment survey protocol only collects effort data, only the angler effort/stocked trout metric could be used for comparison purposes. The analysis for the 2016 report (Hagstrom and Machowski 2016) was done using season long effort totals, where in the current case we have only a single hourly counts (done by Fisheries staff in a number of different locations but all at the exact same start time, re: 6:00AM OD). It will be necessary to rescale the performance metrics to compare an hourly counts against seasonal effort totals. Unfortunately, there is no one-to-one correspondence between the two approaches. The same effort/acre versus trout stocked/acre metric appears to indicate that stocking more trout in streams does not result in more angler effort on OD (Figure 5). For ponds, the data indicate that more effort is gained as the density of stocking increase up to about 250 trout/acre, above which the added benefits starts to decline (Figure 6). This may represent a shoreline or boat access saturation point for these waterbodies.

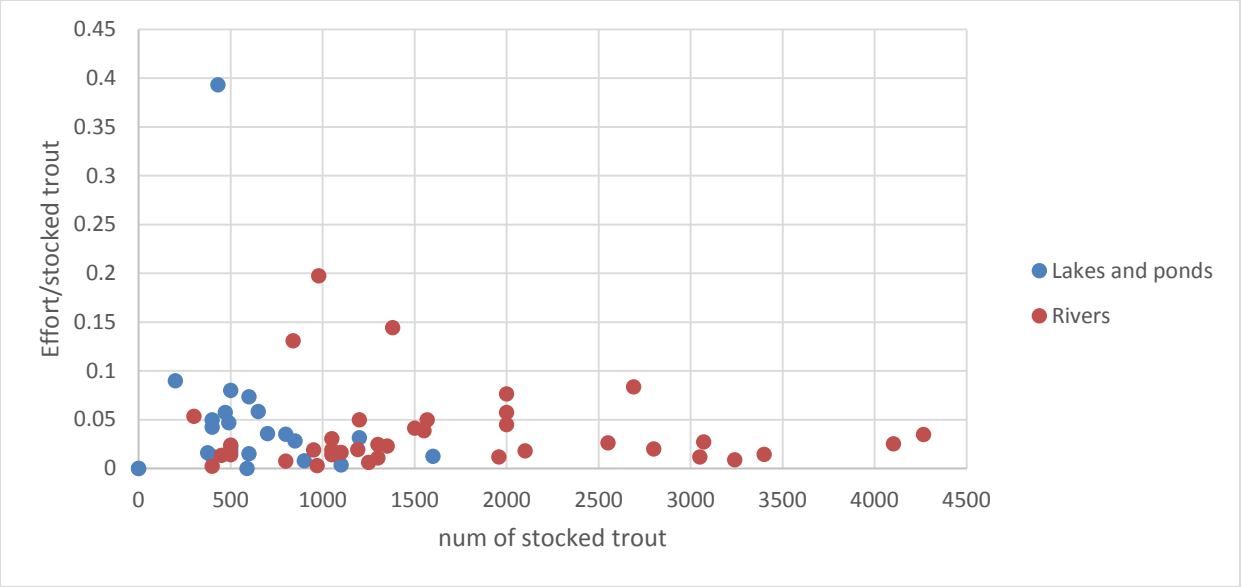

Figure 5. Stocking performance metrics compared to total trout stockings.

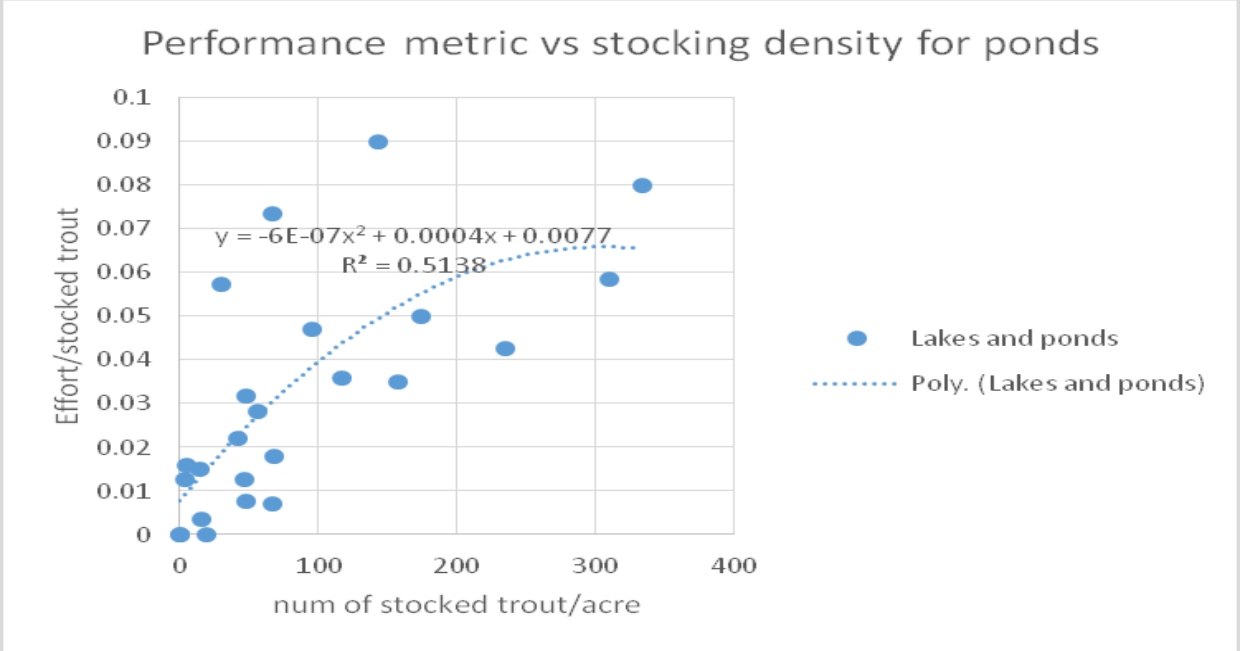

Figure 6 Angler effort generated by increased trout stocking density in Connecticut lakes and ponds

For next years' report, a similar analysis will be completed for rivers and streams by putting stocking rates on a per kilometer basis.

Recommendations

Develop set of Opening Day survey loops that can be done on a rotational basis to establish additional time series information on general usage and angler participation.

Develop more detailed metrics that use the single Opening Day count to evaluate statewide trout stocking.

Opening Day angler usage appears to be related to pond stocking density. Preliminary discussions have been initiated to examine if setting Opening Day stocking densities to optimize angler usage of available water bodies could provide better utilization of the State's limited hatchery trout production.

Expenditures

Total Cost:	$54,538
Federal Share:	$40,903
State Share:	$13,634

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