

Appendix A4: Recreational Fishery Monitoring Programs

Recreational Harvest and Releases

Information on harvest and release numbers, harvest weights, and sizes of harvested bass come from the National Marine Fisheries Service's Marine Recreational Fisheries Statistics Survey (MRFSS). The MRFSS data collection consists of a stratified intercept survey of anglers at fishing access sites that obtains numbers of fish harvested and released per angler trip, and a telephone survey that derives numbers of angler trips. Estimates of harvest and release numbers are derived on a bi-monthly basis. For detailed descriptions of the MRFSS program, see <http://www.st.nmfs.gov/st1/recreational/overview/overview.html>.

Recreational Length-Frequencies of Harvested Fish

Most states use the length frequency distributions of harvested striped bass measured by the MRFSS. The MRFSS measurements are converted from fork length (inches) to total length (inches) using conversion equations. Proportions-at-length are calculated and multiplied by the MRFSS harvest numbers to obtain total number harvest-at-length. The sample sizes of harvested bass measured by MRFSS may be inadequate for estimation of length frequencies; therefore, some states use length data from other sources (e.g., volunteer angler programs) to increase sample sizes. Descriptions of these programs are below.

Maine

A volunteer angler program targets avid striped bass fishermen as a means of collecting additional length data. Though this has increased the sample size of the MRFSS, it still overlooks lengths and weights on sub-legal or released stripers. Because many anglers opt for catch and release, field interviewers actually see limited numbers of fish. An angler using the Volunteer Angler Logbook (VAL) records information about fish harvested or released during each trip for themselves and any fishing companions. Information about each trip is also recorded, including time spent fishing, area fished, number of anglers, and target species. At the end of the season each angler mails his/her logbook to the Department of Marine Resources (DMR), which is then copied and sent back to the angler.

Massachusetts

For released and harvested fish, volunteer recreational anglers are solicited to collect length and scale samples from striped bass that they captured each month (May-October). Each person is asked to collect a minimum of 5 scales from at least 10 fish per month, place the scales in marked coin envelopes, and record the disposition of each fish (released or harvested), fishing mode (boat or shore-based fishing), and location. Over 2,200 samples are received each year from over 100 anglers. Starting in 2005, DMF began using the MRFSS length data and the volunteer angler harvest length data to estimate the length structure of harvested fish. This is done by first generating the percentages-at-length from MRFSS and volunteer program by fishing mode and then averaging the proportions-at-length across programs. DMF then estimates the harvest by fishing mode and applies the numbers to the correct proportions-at-length to get harvest numbers at length and fishing mode, and then sums across modes to get total numbers harvested-at-length. The volunteer angler data adds about 200-400 extra measurements to estimate harvest length distributions.

Connecticut

The Volunteer Angler Survey (VAS) is designed to collect fishing trip and catch information from marine recreational (hook and line) anglers who volunteer to record their angling activities via a logbook. VAS anglers contribute valuable fisheries-specific information concerning striped bass, fluke, bluefish, scup, tautog, and other important finfish species used in monitoring and assessing fish populations inhabiting Connecticut marine waters. The survey logbook is easy to fill out. Each participating angler is assigned a personal code number for confidentiality. Recording instructions are provided on the inside cover of the logbook. Upon completion, anglers tape the pre-postage paid logbook shut and drop it off in the mail. Anglers that send in logbooks are rewarded with a VAS cooler and updated results of the program. After all the logbooks are computer entered and error checked, the logbooks are returned to each participant for their own records. The CT Fisheries Division has annually supplemented the MRFSS survey with about 2,000-3,000 length measurements from the angler survey.

New York

The MRFSS length data are not used in any fashion. Instead, the American Littoral Society's (ALS) release data are used to estimate length distribution of both harvested fish (>28") and released fish (B2 sub-legal <28"). The sample sizes are about 5,000 fish each year.

New Jersey

New Jersey collects information on harvested fish through the Striped Bass Bonus Program (SBBP). NJ's historical commercial quota forms the basis of this program where a recreational angler can harvest one additional striped bass per day measuring not less than 28 inches. Any striped bass taken under the provision of the SBBP are to be transported to the nearest authorized fish checking station by the person who caught the fish on the day it was harvested. The angler is also required to fill out a non-transferable card to be filled out immediately upon harvesting the fish with the following information: date, location caught, and length. Once the fish is taken to a check station, the check stations may also record the weight (lbs) and take scale samples. Party and charter boat captains who participate in the program (this allows for a patron of the boat to harvest a 3rd fish) will also record the data mentioned above and collect scale samples from all harvested Bonus fish. All of this information, both individual and P/C boats harvest, is turned in (mandatory harvest reporting) to the NJ Bureau of Marine Fisheries for monitoring, entry, and analysis.

Maryland

There are two additional sources for size frequency data: a volunteer angler survey and the DNR creel survey during the spring trophy season. Neither of the additional surveys employ statistical design. The volunteer angler survey is described in the next MD section. The DNR creel survey was initiated in 2002. The survey samples access sites (docks and marinas) with the largest volume of recreational angler traffic during the spring trophy season (mid-April to mid-May). The number of intercepted boats has varied from 137 to 181, number of anglers from 180 to 461, and the number of examined fish from 460 to 510. Biological data collected during the survey includes total length, weight, sex, spawning condition, and age (both scales and otoliths are collected). Other fishing statistics are collected, such as number of hours fished, number of lines fished, boat type, number of anglers per boat, number of fish kept, and number of fish released.

Recreational Length-Frequencies of Released Fish

Data on sizes of released striped bass come mostly from state-specific sampling programs. Proportions-at-length are calculated and multiplied by the MRFSS dead discard numbers to obtain total number released dead-at-length. Descriptions of these programs are below.

Maine

Release data are collected through the Volunteer Angler Survey, as described in the previous Maine section. DMR has annually supplemented the MRFSS survey with about 5000-8000 length measurements from the Volunteer Angler Survey.

New Hampshire

The Fish and Game Department (FGD) uses a striped bass volunteer angler survey for anglers fishing in New Hampshire. Roughly 45-50 volunteer anglers per year report information about each striped bass fishing trip they take that originates in NH. They are asked to measure every striped bass they catch (both harvested and released fish) to the nearest inch. Volunteers report on roughly 1000-1700 trips each year and provide usable measurements on 3500-7000 fish each year. About 95% of the measured fish are released (87% sub-legal size and 8% legal size).

Massachusetts

For released and harvested fish, volunteer recreational anglers are solicited to collect length and scale samples from striped bass that they captured each month (May-October). Each person is asked to collect a minimum of 5 scales from at least 10 fish per month, place the scales in marked coin envelopes, and record the disposition of the each fish (released or harvested), and fishing mode. Over 2,200 samples are received each year from over 100 anglers. Approximately 1,000-1,500 lengths of released striped bass are reported each year.

Rhode Island

The size structure of striped bass released from Rhode Island's recreational fishery is based on the American Littoral Society's (ALS) release data for Rhode Island by year.

Connecticut

Release data come from the Volunteer Angler Survey, as described in the previous Connecticut section. About 2000-3000 length measurements of released fishes are obtained each year.

New York

The ALS release data are used to estimate length distribution. The ALS tags are released all around the marine district of New York all year long. Because fish can be tagged at any size, the Bureau of Marine Resources gets both legal and sub-legal length distributions, both within and outside NY's open recreational season. Thus, the length distribution for harvested fish is from the fish >28 in, and the length distribution for the released fish is from the sub-legal (i.e., <28).

New Jersey

Lengths of released striped bass are collected through a volunteer angler survey (VAS), as described in the previous New Jersey section. It is important to note that, although the VAS is primarily administered through the SBBP, the VAS and the SBBP are independent data sources.

Someone does not need to harvest a Bonus fish or have the Bonus cards in order to participate in, fill out, and submit their logbooks. There is a broad range of participant avidity and apparent skill level – from someone that fishes once or twice a year and does not catch/harvest a single bass to someone that fishes 100 days of the year. The only ‘screening/removal’ of logbooks for analysis the Bureau of Marine Fisheries conducts is to ensure the logbooks are filled out correctly and contain the proper information. Information on the size composition of harvested and released fish as well as effort (by trip and even hours), CPUE and fishing mode are available by region. (The state is broken down into 30 different regions and each location provided by the fisherman is assigned to one of those areas.) The VAS survey was initiated in 1990 when the NJ Fish and Wildlife initiated the SBBP. VAS provides about 500-1500 length measurements on released fish per year.

In addition to the VAS, length information is also collected through Party/Charter Boat Logbooks, administered through the SBBBP. Each boat that signs up to participate in the SBBP is mailed a logbook as well as the instructions on how to fill it out properly. A Private/Charter boat does not need to use or harvest any SBBP fish to fill out or participate in the logbook survey but they do need to be a participant in the SBBP. Boat owners are asked to fill out a daily trip logbook for each trip they take when targeting striped bass, even if no striped bass are caught; they are not asked to record striped bass information when they are making trips targeting other species. They are asked to record the date, location fished, number of patrons, number of hours fished, lengths of released fish (longest length to the nearest inch), number of released fish, lengths of harvested fish, and number of harvested fish. Logbooks must be completed even if no Bonus Cards are used or all bonus cards have been used for the year. All logbooks are returned by the end of the season. Private/Charter Boat Logbooks were first collected in 1997 and have continued ever since. Much of this data has never been looked at closely or analyzed but all of the information has been entered, checked, and screened for incorrect information.

Delaware

The American Littoral Society’s release length data for New Jersey are used. About 50 to 300 length measurements are available each year.

Maryland

There are two additional sources for size frequency data: a volunteer angler survey and the DNR creel survey during the spring trophy season. Neither of the additional surveys employs statistical design. The DNR creel survey is described in the previous MD section. Maryland DNR has conducted a volunteer angler survey to obtain information on size structure of kept and released striped bass in the recreational fishery since 2000. The areas and time periods covered are defined by the number of responses received from anglers. Anglers are asked to provide information on the date of fishing, number of hours fished, number of anglers in the party, and method of fishing. Anglers also record the total number of striped bass kept and the total number of striped bass released and measure and record the length for the first twenty striped bass caught. A separate form is filled for each trip even if no fish are caught. If more than one survey participant is fishing on the same boat, only one designated individual is asked to fill out the survey form for the group for that day to avoid duplication. The data are submitted to MD DNR either on paper forms or via internet entry. Participation varies from year to year, which is reflected in the total number of entries. The number of reported trips varies between 200 and 300 and the total number of measured fish varies approximately from 600 to 2000 per year. Volunteer angler survey data are combined with the MRFSS information and MD DNR Spring Trophy Survey to characterize size frequency distribution of recreational

harvest by wave. Volunteer survey data are the only source for the characterization of the discards. The volunteer survey does not provide age information.

Virginia

Data on releases are derived from the MD DNR Volunteer Logbook Survey described above.

North Carolina

North Carolina does not collect information on size of releases. Usually, release length frequency data that reflect the release sizes in NC are borrowed from other states.

Recreational Age Data

Many states collect scale samples during state sampling programs designed to collect information on harvest and released striped bass from the recreational fishery (described above). For those states that do not collect scale samples, age-length keys are usually borrowed from neighboring states. Detailed descriptions of how age samples are collected are given below.

Massachusetts

For released and harvested fish, volunteer recreational anglers are solicited to collect length and scale samples from striped bass that they capture each month (May-October). Each person is asked to collect a minimum of 5 scales from at least 10 fish per month and record the disposition of the each fish (released or harvested) and fishing mode. Over 2,200 samples are received each year from over 100 anglers. The size frequency of released fishes by mode are used to allocate MRFSS release numbers by mode among size classes. A sub-sample of all scale samples collected (about 450-520 fish/yr) are aged and combined with commercial samples (250 fish/yr) and tagging samples (about 150-300 fish/yr) to produce an age-length key used to convert the MRFSS size distribution into age classes. Recreational scale samples are selected using a weighted random design based on the total number of striped bass caught in each wave and mode stratum (as determined by MRFSS).

New York

An age-length key is created using data from NY's combined projects: the cooperative angler survey, western Long Island beach seine survey, and a Fall ocean haul seine survey. The cooperative angler (fishery-dependent) data is from both kept and released fish, but the geographical distribution of the samples are biased towards the Western Long Island Sound. Samples are at the pleasure of the cooperating fishers, collected pretty much all year long. Each year, anglers contribute anywhere from 500 to 5,000 samples, over a fairly wide range of sizes. The beach seine survey is a multi-species, fishery-independent survey conducted at fixed sampling sites in bays around the north and south shores of Long Island. Most of the samples are of small juvenile fish, but some larger adult fish are caught. Each year the beach seine survey contributes approximately 1,000 length/age samples collected over the months of April through November. The Fall ocean haul seine survey is a fishery-independent survey conducted at fixed survey sites. The geographic distribution of sampling is biased towards the eastern South Shore of Long Island, during the months of September through December. Each year, about 1,000 to 2,500 samples are collected. The survey samples the adult coastal migratory mixed striped bass stocks. The age-length key created is applied to both legal and sub-legal fish (assumed harvest and discards), broken down into two six-month seasonal keys.

New Jersey

New Jersey collects age (scale) samples from harvested fish through the Striped Bass Bonus Program (SBBP), described in previous NJ sections. Once a harvested fish taken under the provision of the SBBP is taken to the nearest authorized check station, the check station may record the weight (lbs) and take scale samples, to augment the non-transferable card, which collects date, location caught, and length information, filed out immediately after harvest by the angler. Party and charter boat captains who participate in the program, allowing for a patron of the boat to harvest a 3rd fish, will also record the data mentioned above and collect scale samples from all harvested Bonus fish. All of this information, both individual and Party/Charter boat harvest, is turned in (mandatory harvest reporting) to the NJ Bureau of Marine Fisheries for monitoring, entry, and analysis.

Maryland

Direct age data are available from the creel survey of the trophy fishery only. Both scales and otoliths are collected from the fish examined in creel survey. For periods not covered by the creel survey, an age-length key developed from the samples of commercially harvested fish is applied to recreational length frequency to characterize age structure of the recreational harvest.

Virginia

Most age data are collected from the commercial fishery. The sampling group will sometimes sample from one or more recreational tournaments, but not in every year. In 2004, there were two length and age samples; no sampling of tournaments occurred in 2005.

Recreational Harvest-At-Age

Recreational harvest-at-age is usually estimated by applying corresponding length-frequency distributions expanded to total numbers of harvest-at-length and age-length keys to the MRFSS number of fish harvested by the recreational anglers in each state. State-specific descriptions of the estimation procedures are below.

Maine

DMR uses age-length data collected by MA DMF. The age-length key is applied to the Volunteer Angler Survey lengths, which is then applied to MRFSS estimates of harvested fish.

New Hampshire

FGD uses age-length data collected by MA DMF. The age-length key is applied to the Volunteer Angler Survey lengths, which is then applied to MRFSS estimates of harvested fish.

Massachusetts

Harvest numbers-at-age are generated by applying total numbers of harvested fish by length to the age-length key as described above.

Rhode Island

Age-length data collected by NY DEC and MA DMF are combined to create annual age-length keys. The combined NY-MA age-length key is applied to the expanded length frequencies from RI's recreational fishery to estimate recreational harvest-at-age on an annual basis.

Connecticut

The Fisheries Division uses age-length keys from Long Island Sound provided by NY DEC and applies the numbers-at-length obtained from the volunteer angler survey.

New York

The MRFSS numbers of harvest and releases by wave are disaggregated by the ALS length frequency distribution (calculated by wave). The numbers at length are added by wave together into two seasonal length distributions. The seasonal length distributions are multiplied by the seasonal length/age keys created (see above) for legal (i.e., >28 inches, harvest) and sub-legal (i.e., <28 inches, releases) fish. The length distributions are adjusted, due to the conversion of ALS data from fork length to total length and the “gaps” which result, by averaging the values before and after the interval with no observed frequency. Next, the numbers are added for each season. Occasionally there is a need to re-adjust for the actual numbers of harvest or releases from MRFSS due to the adjustments and rounding.

New Jersey

New Jersey uses the length frequency information gained from the Striped Bass Volunteer Angler Survey to characterize the length structure of NJ’s recreational harvest of striped bass and the MRFSS harvest data by season (fall and spring) to expand the length frequency data. A variety of age sources are then used to develop NJ’s age-length key by season. For the spring key, age data from NJ’s Delaware Bay Striped Bass Tagging Survey (occurs in March – May), NJ’s April cruise of the Ocean Trawl Survey, and spring harvested striped bass from the SBBP are used. To develop NJ’s fall age-length key, age data from the October cruise of the Ocean Trawl Survey and fall harvested fish from the SBBP are utilized. The appropriate seasonal age-length key is then expanded to the length frequency information to develop NJ’s striped bass harvest by age and season.

Delaware

For the first half of the year, DFW uses age-length data from the spring spawning stock survey on the Delaware River (electrofishing), plus age-length data from the sample of commercial harvest in spring (gill net). This sums to several hundred fish. For the second half of year, data are limited to a small sample from the fall commercial fishery, plus a score or so of research survey catches, thus New Jersey’s age-length data from the SBBP is used.

Potomac River Fisheries Commission (DC)

Length and age data collected from the commercial fisheries are used to generate recreational numbers-at-age.

Maryland

Length frequency of recreational harvest is characterized using MRFSS, VAS, and creel survey length data. The age-length key derived from the spring spawning survey is applied to length frequency for waves 2 and 3. For waves 4–6, an age length key derived from samples of commercial harvest is used.

Virginia

A catch-at-age matrix is developed, starting with an age-length key from the commercial samples of length and weight and proportions of harvested striped bass at length from MRFSS.

North Carolina

The NY age-length key is used along with length frequencies to apportion harvest numbers into age classes.

Recreational Dead Discards-at-Age

The number of dead discards-at-age is usually estimated by applying corresponding total numbers of dead discards-at-length to age-length keys. State-specific descriptions of the estimation procedures are below.

Maine

DMR uses age-length data collected by MA DMF. These data are applied to the Volunteer Angler Survey lengths, which is then applied to the dead discard estimates.

New Hampshire

FGD uses age-length data collected by MA DMF. These data are applied to the Volunteer Angler Survey lengths, which is then applied to the dead discard estimates.

Massachusetts

Dead discards-at-age are generated by applying total numbers of discards-at-length to the age-length key described above.

Rhode Island

Age-length data collected by NY DEC and MA DMF are combined to create annual age-length keys. The combined NY-MA age-length key is applied to the expanded length frequencies from Rhode Island's recreational fishery to estimate recreational releases-at-age on an annual basis.

Connecticut

The Fisheries Division uses age-length keys from Long Island Sound provided by NY DEC and applies the dead discards numbers-at-length.

New York

The MRFSS numbers of harvest and releases by wave are disaggregate by the ALS length frequency distribution (calculated by wave). The numbers at length are added by wave together into two seasonal length distributions. The seasonal length distributions are multiplied by the seasonal age-length keys created (see previous NY section) for legal (i.e., >28 inches, harvest) and sub-legal (i.e., <28 inches, releases) fish. The length distributions are adjusted, due to the conversion of ALS data from fork length to total length and the "gaps" which result, by averaging the values before and after the interval with no observed frequency. Once complete, the numbers are added for each season. Occasionally there is a need to re-adjust for the actual numbers of harvest or releases from MRFSS due to the adjustments and rounding.

New Jersey

New Jersey uses the length frequency information gained from the Striped Bass Volunteer Angler Survey to characterize the length structure of NJ's recreational released striped bass and the MRFSS release data by season (fall and spring) to expand the length frequency data. A variety of age sources are used to develop NJ's age-length key by season. For the spring key, age data from NJ's Delaware Bay Striped Bass Tagging Survey (occurs in March – May), NJ's April cruise of the Ocean Trawl Survey, and spring harvested striped bass from the SBBP are used. To develop NJ's fall age-length key, age data from the October cruise of the Ocean Trawl Survey and fall harvested fish from the SBBP are utilized. The appropriate seasonal age-length key is then expanded to the length frequency information to develop NJ's striped bass dead discards by age and season.

Delaware

For the first half of the year, DFW uses the age-length data from the spring spawning stock survey on the Delaware River (electrofishing), plus age-length data from the sample of commercial harvest in spring (gill net). This sums to several hundred fish. For the second half of year, data are limited to a small sample from the fall commercial fishery, plus a score or so of research survey catches, thus New Jersey's age-length data from the SBBP are used.

Potomac River Fisheries Commission (DC)

Length and age data collected from the commercial fisheries are used to generate recreational numbers-at-age.

Maryland

Length frequency of recreational releases is characterized using MRFSS, VAS, and creel survey length data. The age-length key derived from the spring spawning survey is applied to length frequency for waves 2 and 3. For waves 4–6, an age-length key derived from samples of commercial harvest is used.

Virginia

Release numbers (discards from the recreational fishery by spring (Waves 2,3) and summer-fall (Waves 4,5,6)) are apportioned to age classes, using the MD DNR Volunteer Angler Survey proportion of discards-at-age and proportion of discards-at-length, expanded according to seasonal harvest in numbers.

North Carolina

The NY age-length key is used, along with length frequencies, to apportion release numbers into age classes.