INTRODUCTION

This annual compilation and broad synthesis of long-term information on Florida's marine fisheries and resources began in 1994. That year, the commercial and recreational fisheries landings, fishing effort, and catch rates were summarized for 21 finfish species. Fisheries-independent data were also included in evaluating the condition of many of the species or groups beginning in 1995. Since then, this annual report has provided a fairly comparable evaluation of the condition of Florida's marine resources. In early 2005, we began to include trends data for fish health observations made for a limited number of species and relative abundance trends for twenty individual species or subgroups contained within the set of species or groups previously examined. The list then consisted of 135 species or groups that include finfish, shellfish, and marine life. Recently, Florida marine life species have been subject to their own trend analysis report (Trend Analysis of Marine Life Landings 2005-2017; Sharp and Sheridan 2019) which provides an improved review of information available on these species using statistical trend analysis on time series data rather than consensus opinion upon examination of catch rate information. Therefore, we have decided to remove those marine life species and taxa from trend evaluation (increasing, decreasing, stable, insufficient) within the status determination table (Table 1) and the appendix (Appendix A) here. This report now summarizes information and trend determination on 88 species or taxa within the finfish and shellfish categories, provides recent stock assessment findings in the 'Species Accounts' section, and examines trends using three primary data sources for Florida's marine resources: the commercial trip-ticket program, the Fishery-Independent Monitoring program, and the National Marine Fisheries Service's Marine Recreational Information Program (MRIP).

METHODS AND MATERIALS

Information on what individual commercial fishers land comes from the Florida Fish and Wildlife Conservation Commission's (FWC) Marine Resources Information System, commonly known as the trip-ticket program. Wholesale dealers are required to use trip tickets to report their purchase of saltwater products from commercial fishers. Conversely, commercial fishers must have Saltwater Products Licenses to sell saltwater products to licensed wholesale dealers. Commercial fishers also need additional endorsements to participate in selected fisheries such as those for spiny lobster, stone crab, blue crab, ballyhoo, and marine life. Each trip ticket includes the Saltwater Products License number, the wholesale dealer license number, the date of the sale, the gear used, trip duration (time away from the dock), area fished, depth fished, number of traps or number of sets where applicable, species landed, quantity landed, and price paid per pound. These data allow analysts to identify spatial and temporal trends and estimate catch rates using reported landings. We extracted all edited trip tickets from 1985 through 2018 (through Batch 1434, closed December 12th, 2019).

Information on the recreational fishery in Florida now comes solely from the NMFS Marine Recreational Information Program (MRIP). Since 2011, the MRIP angler interview information has been collected by FWC under contract with the Gulf States Marine Fisheries Commission using funds from the National Marine Fisheries Service. Estimates of recreational total catch, releases, and landings are developed and collected on a per trip basis through angler interviews (22,310 interviews for 2018). The

interviews include questions about what kind and how many fish are caught, angler demographics, and other trip characteristics. In July 2018, MRIP released revised estimates of recreational landings, discards, and effort to calibrate for the transition from the Coastal Household Telephone Survey (CHTS) to the Fishing Effort Survey (FES) as well as the Access Point Angler Intercept Survey (APAIS). These estimates encompass the entire timeseries dating back to 1981 and replace the prior MRFSS/MRIP calibrated estimates. Prior to this, uncalibrated MRFSS/MRIP estimates (BASE) or ratio-based ad-hoc calibrated estimates were used in stock assessments. The newly revised calibration method utilizes APAIS- and FES-calibrated estimates (FCAL) and are presented here.

The third source of information on Florida's marine resources comes from FWC's Fishery Independent Monitoring (FIM) program (FIM program staff 2018). This program uses a stratified, random design to collect information on the animal populations directly instead of through catch-rate data taken from the fishery. Strata are primarily defined by depth, shore type (overhanging or not), and bottom vegetation (seagrass or not). Information for the determination of age, growth, and reproduction, while monitoring abundance of young-of-the-year (YOY, age-0) and larger fishes is also collected. Since the prevalence of gross external abnormalities in fish is a good indicator of anthropogenic disturbance in estuaries (Sindermann 1979), the FIM Program actively examines fish and selected invertebrates larger than about three inches (75 mm) standard length or carapace length since 1999 for evidence of these abnormalities. This information is presented among the individual species accounts.

The FIM data included were collected monthly since 1996. In addition to young-of-the-year indices (the definition of young-of-the-year being all those animals below a certain species-specific length approximating the size at age 1), this report provides post-young-of-the-year indices which comprise animals greater than the critical length used to assign animals as young-of-the-year. Atlantic coast young-of-the year data included in this year's analyses were collected by 70' center-bag seine in the northern Indian River Lagoon from Melbourne Beach to north of Titusville. Atlantic coast post-young-of-the-year data were collected from 1997 onwards in 600' center-bag haul seines in the Indian River Lagoon from the Banana River south to Jupiter Inlet. Gulf coast young-of-the-year data included in this year's analyses were collected in Tampa Bay, Charlotte Harbor, and estuarine portions of associated tidal rivers (Alafia, Little Manatee, Manatee, Braden, Myakka, and Peace) by monthly 70' center-bag seining and 20' otter trawl (trawling is undertaken monthly in the rivers and during fall in the bay proper). Gulf coast post-young-of-the-year data were collected in 600' haul seines from 1996 onwards in Tampa Bay and Charlotte Harbor. These data are comparable over the period reported on in this report (1997-2018).

Data from these three sources provide information on 998 species or groups and several market categories, which are encountered by the recreational sector, commercial sector, or FIM program. Data from recreational sampling and fishery-independent sampling are most often recorded at the species level while; the commercial fisheries are frequently reported in market categories that may include more than one species. Therefore, to facilitate comparison, we aggregate the data from the recreational sector and FIM programs into the commercial categories. Ultimately, we collapsed all of the data into 88 categories. Some categories include a single species, and others, such as "Flounders," were aggregates of multiple species. Twenty species/groups included in the Appendix are currently of

limited interest to fisheries managers but are listed because of their conservation/ecological importance or possible future importance as exploited fisheries, e.g., small mojarras, large mojarras, stingrays, cownose rays, pipefishes, and hardhead catfish. However, the status of these groups was not determined or included in the 88 species/groups in Table 1.

We calculate standardized annual catch rates for the forty-eight species or species categories included in the "Species Accounts" section and a number of species/categories included in Table 1 and Appendix A. The standardization procedure uses general linear models to adjust the mean observed catch rates to account for year-to-year differences in the timing and location of the catch and changes in characteristics of the fishing trips (e.g., number of anglers, length of time fishing) for the commercial and recreational sector. Commercial landings per trip were standardized over the period 1992 through 2018 when information on fishing gear was most complete. For the recreational sector, standardized indices were based on angler intercepts where a species was caught or targeted and included data from 1982 through 2018. For the FIM data, we standardized the index using a generalized linear model to predict the proportion of sets that caught particular fish each year. Catch rates derived through the standardization process are back-transformed arithmetic means. For the remainder of the categories where we simply present average catch rates, the commercial catch rates were calculated as the landings in pounds divided by the number of trips and the recreational catch rates were calculated as the average total catches, in numbers of fish, from the trips that targeted or caught a species/group. For FIM data, we use the proportion of positive sets as a simple index of abundance of young-of-the-year (age 0 based on length) or post-young-of-the-year for most animals. However, for some of the smaller fishes caught during FIM sampling (e.g., gobies and blennies) these proportions were estimated for all fish caught.

In 1997, we started using a more objective and consistent process to evaluate the status of each species or group. The evaluation process uses the results of recent stock assessments, if available. Otherwise, linear regressions of the catch rates for the five most recent years were conducted, and the significance levels ($P < 0.10$, 0.05, and 0.01) of the regressions were used in the status evaluation. Since the patterns may be nonlinear, we also looked at the number of times that the catch rates had declined in the last three years. Any category that had declines in all three years was noted even if the regression was not significant. As a general rule, if a species or group had less than an annual average of 100 commercial trips and 100 recreational interviews and a very low fisheries-independent monitoring catch rate, it was deemed to have insufficient data to evaluate its status. If fisheries dependent data was deemed insufficient, the fishery independent monitoring data does not override fishery dependent data and was judged to not provide adequate information for potential evaluation.