Headboat Data Evaluation

National Marine Fisheries Service – Southeast Fishery Science Center
Beaufort Laboratory

SEDAR41-DW46

Submitted: 20 July 2015

This information is distributed solely for the purpose of pre-dissemination peer review. It does not represent and should not be construed to represent any agency determination or policy.

Please cite this document as:

National Marine Fisheries Service, Southeast Fishery Science Center, Beaufort Laboratory. 2015. Headboat Data Evaluation. SEDAR41-DW46. SEDAR, North Charleston, SC. 686 pp.

Headboat Data Evaluation

SEDAR 41-DW 46

National Marine Fisheries Service

Southeast Fishery Science Center

Beaufort Laboratory

Executive summary

The Southeast Region Headboat Survey (SRHS), administered by the NMFS Southeast Fisheries Science Center (SEFSC), has operated along the southeast coast of the U.S. (hereafter South Atlantic) since 1972 and in the Gulf of Mexico since 1986. For South Atlantic waters, the survey is the longest continuous time series of recreational fisheries data, and SRHS data are used in stock assessments for a suite of reef-associated and pelagic species managed by the South Atlantic Fishery Management Council. For many stocks in the South Atlantic, the SRHS CPUE index is the only source of abundance information before 1992, covering a critical time period in the exploitation history of those species. The SRHS involves industry-reported catch and effort data submitted to headboat personnel (referred to as "logbooks", "catch records", or "trip reports", currently required for all trips), as well as catch, effort and biological data collected at the docks by SRHS port samplers (a subset of trips).

The SEDAR 41 Data Workshop (DW) for South Atlantic Red Snapper and Gray Triggerfish was held on 4-8 August 2014, during which SRHS data were discussed and were anticipated to be an important data source for both assessments. On 27 August 2014, several industry representatives submitted a SEDAR working document that questioned the previous DW decisions (Nelson et al. 2014, SEDAR41-DW40). SEDAR41-DW40 asserted that SRHS data prior to 1992 were unreliable and should not be used in the assessments, because of (1) errors in industry-reported data in the 1970s and 1980s (e.g., late, intermittent, or fabricated reporting in addition to any recall bias), and (2) regulatory changes over time in the red snapper fishery. These assertions have the potential to affect all stock assessments that use SRHS data. In response to SEDAR41-DW40, the SEDAR41 process was put on hold to allow the SEFSC time to investigate the assertions in the working paper, and ultimately to correct the database if any misreporting was found.

This document describes a comprehensive evaluation of the SRHS program and South Atlantic data in response to the SEDAR41-DW40 assertion of industry-reported data errors, with resulting recommendations for the use of SRHS data in support of South Atlantic stock assessments. *This document is a smaller version of a larger report that contains the full evaluation of the confidential database for all species and vessels over all areas and years. The*

larger report cannot legally be made publically available, because of the confidential data it contains; however, this document reports the findings without compromising the confidentiality of the SRHS data.

The potential effect of regulatory changes over time on the quality and utility of SRHS data is not an issue with the data collection program, but rather pertains to the use of the data (e.g., making inferences about factors underlying changes in CPUE over time). That issue should be addressed during SEDAR data workshops (as it was in SEDAR41), and therefore is not addressed in this document.

We found no evidence of chronic misreporting by vessels, no evidence of apparent temporal trends in potentially misreported data, and minimal spatial trends in potentially misreported data. We identified minimal obvious erroneous data (161 extreme outliers), all of which have been corrected or removed from the database. Data filtering for use in index standardization has removed erroneous data in the past, but removing the extreme outliers from the database will prevent any potential inclusion of those data in the future. Relatively few data outliers (potentially erroneous data, rather than extreme outliers) were identified, nearly all of which were explained upon further investigation. There were no apparent temporal trends in the outliers or underreporting identified. From a spatial perspective, while small in scale, the majority of issues were observed in South Florida data, but do not come from any vessel in particular.
We recommend continuing to apply standard data filtering methods when creating a species-specific index of abundance index. The Recommendations section below provides tools to improve the SRHS data program and data use based on the analyses contained in this report. Following those recommendations will ensure the best collection and use of the SRHS data.

The larger, confidential report was reviewed by five scientists external to the Beaufort Laboratory who had no involvement in creating the report. The external reviewers included one scientist from within the Southeast Fisheries Science Center (but from a different laboratory), two scientists from the Northeast Fisheries Science Center, and two scientists from the Marine

Recreational Information Program. The summary conclusions of those reviewers stated that the larger report met its objectives and that the conclusions were supported by the analyses.

1. Background and Introduction

The Southeast Region Headboat Survey (SRHS) is administered by the NMFS Southeast Fisheries Science Center (SEFSC) and has operated along the southeast coast of the United States (hereafter South Atlantic) since 1972 and in the Gulf of Mexico since 1986. The survey is the longest continuous time series of recreational fisheries data for South Atlantic waters. SRHS data are frequently used in stock assessments for a suite of reef-associated and pelagic species managed by the South Atlantic Fishery Management Council. For many stocks in the South Atlantic, the index of relative abundance computed from SRHS data is the only source of abundance information prior to 1992, covering a critical time period in the exploitation history of those species. The SRHS is composed of industry-reported catch and effort data (referred to as “logbooks,” “catch records,” or “trip reports”) for all headboat trips, as well as catch, effort and biological data collected dockside by SRHS port samplers for a subset of trips.

The SEDAR 41 Data Workshop (DW) for South Atlantic Red Snapper and Gray Triggerfish was held on 4-8 August 2014, during which SRHS data were discussed and were anticipated to be an important data source for both assessments. On 27 August 2014, several industry representatives submitted a SEDAR working document that questioned the previous DW decisions (Nelson et al. 2014, SEDAR41-DW40). SEDAR41-DW40 asserted that SRHS data were unreliable prior to 1992 and should not be used in the assessments due to (1) errors in industry-reported data in the 1970s and 1980s (e.g., late, intermittent, or fabricated reporting in addition to recall bias), and (2) regulatory changes over time in the red snapper fishery. Because the assertions had the potential to affect all stock assessments that use SRHS data, SEDAR41 was suspended until a thorough investigation of the assertions and the SRHS database could be conducted, and any errors corrected.

This document describes a comprehensive SRHS programmatic evaluation and data assessment for South Atlantic waters, with resulting recommendations for the use of SRHS data in support of stock assessments. The potential effect of regulatory changes over time (2 above) on the quality and utility of SRHS data is not related to the actual data collection program, but pertains to the use of the data for particular stock assessments (e.g., computing and interpreting indices of relative abundance). Because regulatory changes are ongoing and are specific to particular stocks, they should be addressed during SEDAR data workshops (as was done during SEDAR41), and therefore are not addressed in this report. This report focuses on identifying widespread and chronic misreporting (1 above) that would potentially bias stock assessment inputs that are computed from those data (e.g., landings, indices of abundance), as well as identifying otherwise erroneous data in the SRHS database.

2. Methods

Both programmatic and analytical approaches were pursued in evaluating the SRHS sampling methodology and database. The programmatic component involved an assessment of SRHS sampling protocols and policies relevant to data quality control and the ability to detect misreported or otherwise erroneous data. The analytical component involved a suite of quantitative approaches designed to identify "outlier" data and to compare industry-reported and port sampler-collected data over time and space. Both programmatic and analytical components are described in more detail below. A third option was also considered: a scientific survey of SRHS headboat captains to assess the extent and nature of potential misreporting. Inquiries with two experts in the field of social science indicated that such a survey would not be productive due to multiple factors, including recall bias (which would require re-collections over decades), difficulty in developing a statistically valid sampling design (e.g., many of the captains from the 1970s and 1980s are deceased), and competing incentives to respond honestly or dishonestly to survey questions about misreporting. Thus, a survey option was not pursued.

2.1 Programmatic Component - *Description and History of the NMFS SEFSC Southeast Region Headboat Survey*

2.1.1 Overview

The Southeast Region Headboat Survey (SRHS), administered by National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC) personnel based at the Beaufort, NC NOAA Laboratory has operated along the South Atlantic coast since 1972 and along the

U.S. Gulf of Mexico coast since 1986. The survey is the longest continuous time series of recreational fisheries data from federal waters on the U.S. east coast, and the second longest time series for the U.S. Gulf of Mexico coast (behind the NMFS Marine Recreational Fisheries Statistics Survey / Marine Recreational Information Program, initiated along the Gulf Coast in 1981).

The SRHS provides multiple products to fishery managers through its data collection programs. For example, annual SRHS landings estimates by species, area and month are generated for all species encountered in the survey. These landings estimates are an important data source for stock assessments of federally managed fishery species in South Atlantic and Gulf of Mexico waters. SRHS logbook data are used to develop species-specific indices of relative abundance for use in stock assessments. Additionally, lengths, otoliths (for ages), and gonads (for maturity and reproductive parameters) collected by SRHS port agents are used as inputs to stock assessment models and in life history studies.

2.1.2 Development of the headboat fishery

Headboats (also referred to as "party boats") are defined by the SRHS program as vessels that carry more than six passengers, charge a per-angler ("by the head") fee, and target reef fish and coastal migratory pelagic species. The headboat fishery developed in the South Atlantic and Gulf of Mexico in the 1920s and 1930s. Headboat operations were located in coastal areas such as Morehead City and Carolina Beach, NC; Little River, Murrells Inlet, and Charleston, SC; Mayport, St. Augustine, Ponce Inlet, Jupiter, Miami, Key West, Cortez, and Panama City, FL; and Galveston, TX. During this early period, headboat captains often fished commercially during times when tourist activity was low, and operated headboat trips during periods of high tourist activity. Most vessels were wooden and fished within sight of land (i.e., close to shore). Following World War II (1939-1945), U.S. Navy PT boats and other similar vessels became available as surplus that could be purchased by the public. These vessels were technologically advanced for this time period, with significant horsepower and steel hulls that were capable of carrying many passengers. From the 1940s through the 1960s the headboat fishery steadily developed, expanding geographically and in the number of vessels participating in the fishery. Ellis (1958) estimated that in 1955 there were 164 headboats operating in Florida waters, 83 on the east (Atlantic) coast of Florida and 81 on the west (Gulf of Mexico) coast of Florida. Huntsman (1976) reported that ~ 25 headboats operated from Cape Hatteras, NC to Charleston, SC from 1972 to 1973. Estimates of the annual number of headboats operating in the South Atlantic have fluctuated since the early 1970s (see next section and Table 1). A decline in the number of headboats began in the early 2000s, likely due to multiple factors, including declining fish stocks, more restrictive regulations, and other economic factors (i.e., high operational costs, increases in the number of private fishing vessels).

2.1.3 History of the Southeast Region Headboat Survey

Prior to 1970, exploration of the continental shelf off of North Carolina and South Carolina was oriented to the discovery of commercially fishable concentrations of demersal fishes and usually avoided areas with bottom that was not amenable to commercial trawl gear (Huntsman 1976). Dr. Gene R. Huntsman, a scientist (now retired) with the NMFS SEFSC, recognized that the recreational headboat fishery accounted for significant landings of a variety of species (e.g., 1.6 million pounds of marketable fish landed in 1973 from the Carolinas; Huntsman 1976), and that sampling the fishery was an excellent opportunity to collect catch data of species such as snappers (*Lutjanidae*), groupers (*Serranidae*), grunts (*Haemulidae*), porgies (*Sparidae*) and jacks (*Carangidae*). As a result, Dr. Huntsman initiated the SRHS in 1972 in North Carolina and South Carolina. The survey expanded to Georgia and northeast Florida (Nassau-Indian River counties) in 1976, and then to southeast Florida (St. Lucie-Monroe counties) in 1978. The number of headboats participating in the SRHS by year for South Atlantic waters is listed in Table 1. The SRHS extended to the Gulf of Mexico in 1986, with sampling from Naples, FL to South Padre Island, TX. In recent years the number of headboats has been relatively constant in both the South Atlantic and Gulf of Mexico, with approximately 70-80 vessels operating in each region.

The original SRHS survey design incorporated both logbook reporting by headboat personnel and dockside sampling by NMFS SEFSC port agents, the same general approach currently used. After Dr. Huntsman's departure as SRHS coordinator in 1995, the SRHS was coordinated by Bob Dixon (1995-2006) and then by Ken Brennan (2006-present).

2.1.4 Survey design and data collection

The SRHS is divided into discrete geographic/statistical areas to which headboat trips and associated catches are assigned (Figure 1). SRHS port agents are responsible for sampling headboats operating in single or multiple statistical areas. The main components of the survey are a dockside intercept sampling program (DISP), the logbook or trip report, and the headboat activity report (HAR).

2.1.4.1 Dockside Intercept Sampling Program (DISP)

The DISP is used to obtain length and weight data from landings to determine the size distribution and mean size of species landed in the headboat fishery. Port agents also collect otoliths and gonads to characterize the age distributions, sex ratios, and reproductive parameters of species landed in the fishery. Port agents may collect other biological samples (e.g., stomachs, fin clips) in support of research or management needs (e.g., trophic interactions and stock structure studies). The SRHS has been a primary source of fishery-dependent data for age and growth studies that are used as inputs for stock assessments in the southeast U.S. During 1972-1991 the SRHS was the only fishery-dependent source of age and growth samples for life history studies in the South Atlantic (sampling of the commercial sector began in 1992). The dataset containing data collected from the DISP is referred to as the bioprofile (BP) dataset.

The survey design for the DISP can best be described as a systematic opportunistic design. Each port agent assigned to a particular area is required to sample all headboats within their area of responsibility in a systematic rotation, ideally sampling each vessel at least once each month during periods of operation. In some areas, headboat trips occur year-round, while in other areas there are periods (typically winter) during which no trips occur. There is considerable variation in the operational schedules of individual vessels and it is rare that agents are able to sample vessels in an exact and repeatable rotation. Consequently, SRHS port agents have the latitude to adjust their sampling schedules to ensure sampling of all vessels approximately the same number of times each month during periods of operation.

When conducting dockside intercept sampling, port agents are instructed to identify themselves as NMFS port agents conducting a survey of headboat fishing. They are further instructed to identify and select anglers with unusual, uncommon or rare fishes in their catches (on stringers, in coolers, etc.). The rationale for this approach is that if catches with uncommon fishes are selected, sufficient numbers of more common species will likely be obtained as well. Port agents are instructed to measure and weigh all fishes from selected catches. However, once they have measured 10 fish of a given species, they are not required to (but may if time allows) measure additional individuals of that species from additional catches sampled from that trip. This approach allows port agents to spend more time collecting information on less common species while collecting sufficient information on more common species.

Upon obtaining an angler's catch for sampling, the port agent measures and weighs individual fish using an electronic fish measuring board connected to an electronic balance. All measurements are recorded into computer memory for later download and editing. While sampling, the port agent often performs education and outreach functions by answering bystanders' questions about the SRHS, fish biology and ecology, and fisheries regulations and management.

2.1.4.2 Logbooks

The second component of the SRHS is the logbook, commonly called the catch record or trip report. The logbook component was originally designed to be a census, but fluctuations in reporting cooperation have resulted in changes in methodology over time (e.g., addition of corrections for non-reporting). The survey has always asked or required (see below) vessel personnel to complete self-reported trip reports of catch and effort for each trip. From 1972-2012, the mechanism used by captains and crew to report catch and effort was a single-page, paper logbook form. The paper form originally (in 1972) used in NC and SC listed several of the most commonly caught species in NC and SC (Appendices 1 and 2). As the survey expanded in the South Atlantic and later into the Gulf of Mexico, the logbook form was altered to reflect the species typically caught in specific geographic areas. Unique forms were created for North Carolina to northeast Florida, southeast Florida, southwest Florida, northwest Florida, Alabama, Louisiana, and Texas. Due to the limited amount of space, the form for each geographic area reflected only those species that were most likely to be caught in that area. The area-specific forms changed several times to accommodate additional data elements (Appendix 1 and 2). The most recent change in 2004 included the addition of fields for the number of anglers who fished on a particular trip, the number of fish released alive, and the number of fish released dead.

In 2009 the SRHS conducted a pilot project, “Phase I: Implementation of Electronic Logbooks on Headboats Operating in the U.S. South Atlantic,” to test the feasibility of developing an electronic logbook reporting system. The PC-based software was installed on eight vessels in the South Atlantic; two in NC, two in SC, one in GA, and three in FL. The project was concluded in November 2010. The results from this project and feedback from captains were favorable regarding the application and ease of use of the electronic logbooks. Project results indicated that electronic reporting would streamline data collection and facilitate the timely completion of data analysis and provision of results to support stock assessments and fishery management.

The SRHS received fiscal year 2012 funding from the Marine Recreational Information Program Operations (MRIP) Team to continue the electronic reporting pilot project with a project entitled “Phase II: Survey-Wide Implementation of Electronic Logbook (eLog) Reporting on Headboats Operating in the U.S. South Atlantic and Gulf of Mexico.” The objective of this project was to develop and implement a Web-based portal and mobile application for electronic logbook data entry in the South Atlantic and Gulf of Mexico headboat sector. This project included software development by a contractor to include additional features of the web-based data form that would be useful to users and scientists (e.g., depth, geographic location, maps). The software contractor and SRHS staff provided technical support to all participants during each stage of the transition process. These procedures were tested for the first 60 days of the project and implemented on January 1, 2013.

Since implementation in 2013, the eLog has been updated several times, and most updates have been minor adjustments on the “back end” of the program that did not affect the user. The most significant update that did impact the user was in August 2014, when four socioeconomic fields were added; number of paying passengers, number of crew, fuel used and price per gallon of fuel. Currently the eLog requires the following fields to be completed for each trip; date(s) and duration of the fishing trip; vessel and captain’s name; number of anglers and number of paying passengers; number of crew, number of gallons of fuel used and price per gallon of fuel; geographic location of fishing activity in latitude and longitude (optional point and click maps); minimum, maximum and primary depth fished; number of individuals of each caught species that were kept; and number of individuals of each caught species that were released either alive or dead (Appendix 2).

2.1.4.3 Headboat Activity Report

The third component of the SRHS is the headboat activity report (HAR). Port agents record all known information about a vessel's activity (trip date, trip type, and number of anglers) on the headboat activity report (HAR), regardless of whether a trip was sampled under the DISP. These observations are used to track compliance and to correct for misreporting. HAR observations are collected by multiple methods, including direct observation, contacting the ticket office to confirm activity, observations made by samplers from other surveys (ex: MRIP samplers), and in recent years by checking websites for fishing trips.

2.1.5 Reporting and Compliance

During 1972-1995 logbook reporting was voluntary for headboats participating in the SRHS. Starting in 1972, as part of the strategy to encourage captains to report, participating vessels in the South Atlantic were paid for reporting. The amount of payment was related to the length of a trip, which in turn affected the size and complexity of the catch. Vessel personnel were paid $1.50 for each record of a "full day" trip, $1.25 for a "three-quarter" day trip and $1.00 for a "half" day trip (Dixon and Huntsman unpublished). When the survey began in the Gulf of Mexico (1986), this strategy was never initiated, and so captains submitted logbooks strictly on a voluntary basis. Payment for participation in the South Atlantic survey continued until logbook reporting became mandatory in 1995 with Amendment 7 to the Snapper-Grouper Fishery Management Plan (Code of Federal Regulations 646.4). This amendment required charter vessels and headboats to be in possession of a permit in order to fish for snapper and grouper. As a condition of this permit, the reporting requirements (FR 622.5) state "charter vessel/headboat owners and operators that if selected to report by the Science and Research Director (SRD), must maintain a fishing record for each trip." The rule further states that headboats are required to report on a monthly basis by submitting trip reports within seven days of the end of each month.

Although the reporting requirements established in CFR 646.4 clearly state that reporting is mandatory, enforcement has been difficult. Since the implementation of these requirements, SRHS staff has consistently worked with headboat captains and vessel staff to collect trip reports before any enforcement action is taken. Under CFR 622.5, reporting compliance is required in order to possess a charter vessel/headboat permit. As a consequence for non-reporting, a vessel's permit renewal can be placed on hold until all delinquent records are submitted. This measure was not strictly enforced until 2008, when SRHS staff worked with NOAA General Counsel and the NMFS Southeast Regional Office (SERO) Permit Office to develop specific protocols for holding vessel owners/captains accountable for non-reporting. This approach included drafting a selection letter to inform vessel owners that their vessel was selected to participate in the SRHS. These letters are sent by certified mail to each headboat owner in the southeast region on an annual basis. If the certified letter is not picked up at the post office, it is hand delivered by the port agent. A second measure that improved compliance was to develop a system for "flagging" vessels that are not compliant with the Permit Office. This mechanism enables Permit Office staff to identify headboats that are non-compliant and effectively restrict the renewal of federal permits for those vessels. These efforts had a noticeable effect on reporting compliance in recent years (Table 2; Figure 2).

The South Atlantic has "open access permits," which allows charter\headboat owners to apply for a permit for a new vessel or a renewal if their current permit expires. This allows owners considerable flexibility to enter or leave the charter or headboat fishery at any time. Consequently, this reduces the leverage the SRHS has on non-compliant vessels in the South Atlantic, as they are able to exit and enter the fishery by other means.

From 1995 to 2013 reporting requirements were unchanged. On December 27, 2013 and February 3, 2014, NOAA published a final rule for the For-Hire Reporting Amendment which modified headboat reporting requirements for the South Atlantic and Gulf of Mexico respectively (50 CFR Part 622 Federal Register / Vol. 78, No. 249 / Friday, December 27, 2013 and Federal Register / Vol. 79, No. 22 / Monday, February 3, 2014 / Rules and Regulations). The notable changes include when and how to report. By January 27, 2014 and March 5, 2014 the legal framework was completed by the South Atlantic and Gulf of Mexico Fishery Management Councils, respectively; this ensured that electronic logbook reporting is the accepted procedure, as well as to ensure that timely and complete reporting is required to possess and maintain a for-hire permit in the applicable fisheries. The rule (1) requires headboat personnel to submit fishing records to the Southeast Fisheries Science Center (SEFSC) on a weekly basis, or at intervals shorter than a week if notified by the SRD, (2) changes the method of submitting paper forms by mail to submitting electronically (i.e., internet), and (3) prohibits headboat owners and operators who are delinquent in submitting reports from continuing to harvest or possess snapper grouper, dolphin, wahoo, reef fish, and coastal migratory pelagic species until they have submitted the required reports.

2.1.6 Data Management

2.1.6.1 Database formats

Data management practices from the early years of the survey are not well documented. Survey trip reports (logbook), bioprofiles (from DISP surveys), and HAR information were recorded on paper forms. All landings estimates, angler effort estimates, and correction factors were calculated manually. From 1972 to the late 1980s all SRHS data were entered into a dBase database (see http://www.dbase.com/) by SRHS staff.

Beginning in the late 1980s the trip reports were sent to a data entry contractor. The trip report data were entered into two files, the MASTER file which contained the trip information and the CATCH file which contained the trips' catch information. These files were returned to the SRHS, at which point dBase was used to merge the MASTER and CATCH files into the catch record (CR) database files. While the trip reports were sent to the data entry contractor, data from the DISP (which comprised the bioprofile (BP) database) continued to be processed in-house by the SEFSC.

Port agents in most areas began using electronic fish measuring boards (FMBs) for DISP surveys in 1986. Those port agents that did not use FMBs recorded bioprofile data on paper forms which were sent to Beaufort, NC for entry into electronic format by SRHS staff. FMB data files were downloaded and copied onto minitapes (1986-87) or 3.5mm floppy discs (1987-early 2000s) which were mailed to SRHS staff in Beaufort. In the early 2000s the FMB text files were emailed directly to SRHS staff in Beaufort. A CLIPPER (MS DOS-based programming language) program was used to extract the FMB data into the current BP file format, which was managed using dBase. In 2011 a SAS program was developed to extract the data from the FMB files into the proper BP structure and format to replace the CLIPPER program, which was no longer compatible with MS Windows.

The HAR information is used to estimate angler effort and calculate correction factors for landings estimates. In the early years of the survey this information was calculated manually and the correction factors were entered into dBase (see "Data Products / Effort Estimates section below). The actual raw HAR data were not entered into electronic format until 2012. In 2012 an MS Access HAR database was implemented. In 2013, the HAR was transferred from MS Access to the Southeast Region Headboat (SRH) Oracle data management system, and the historical (1974-2011) HAR data are currently being entered into MS Access for eventual loading into the new SRH Oracle system.

Through June 2012, all bioprofile, catch record, and correction-factor file data were stored in delimited files and accessed using dBase. In July 2012, the SRHS transitioned to a fully relational Oracle system. This system addressed deficiencies in the storage and accessibility of historical and current headboat logbook data. The system is integrated into the SEFSC Data Warehouse, which employs a modern underlying architecture and technology supporting a database with increased access efficiency and data security, as well as improved capabilities for reporting, analysis, and integration with other data sources. The Oracle system, known as the SRH, incorporates trip report data (both historical and transferred from the electronic logbook), headboat activity reports, bioprofiles, vessel directory, validation data, vessel reporting compliance, quality assurance/quality control, and data query. The trip reports, bioprofiles, vessel directory, headboat activity reports, and vessel reporting compliance functions (as well as data queries associated with those components) became available in April 2013. Other components of the system are currently under development.

2.1.6.2 Data quality assurance/quality control (QA/QC) protocols

While QA/QC protocols have been in place for the duration of the SRHS, those procedures were not well documented in the early years of the survey. They are described below for the various facets of the SRHS.

2.1.6.2.1 Logbooks

Prior to the initiation of electronic reporting, logbooks underwent multiple layers of QA/QC checks. When initially collected from vessel personnel by the port agent, each form was reviewed to ensure there were no species identification issues (e.g., unusual species, species counts, or misidentified species). Port agents were instructed to pay particular attention to logbooks collected for days they sampled (DISP) to ensure that species and numbers of fish recorded were comparable to what they encountered during the DISP sampling event. Compliance in submitting trip reports was tracked by the local port agent. Port agents encouraged all vessel operators to submit their trip reports in a timely fashion and to submit any late trip reports. However, reporting was not mandatory until 1995. For trip reports submitted substantially late there was a general policy to use data related to effort and reporting compliance, but not to use data related to landings and discards in order to limit the effects of recall bias. For such cases, landings and discards data were subsequently estimated (see "Data products" section below). However, the specific policy defining "substantially late" was not documented, and decisions may have been made on a case-by-case basis based on guidance from the local port agent. Once the logbooks were received at the Beaufort laboratory, survey personnel checked them again to ensure there were no obvious errors (e.g., trips made on April 31; or issues with local common names, such as black grouper for gag, or gray snapper for white grunt). Data entry contractors used key entry verification procedures (data was entered twice, and the two datasets compared to one another) to ensure that data were entered correctly.

2.1.6.2.2 Bioprofile samples

As with logbooks, the initial QA/QC checks for bioprofiles was done by the port agents, who were instructed to finalize their data for submission within a day of collecting it, in order to minimize recall errors. This included insuring species codes were accurate, lengths and weights were within reasonable limits for given species, and that pertinent biological information was recorded on any samples collected (i.e., otolith envelopes). When the data were received at the Beaufort Laboratory, survey personnel perform QA/QC checks on the data to ensure that species coding were accurate, length type (e.g., fork length, total length) was properly assigned, and biological samples were recorded if collected. In 2013 port agents began loading their own data into the SRH Oracle system, and QA/QC checks are now performed by Beaufort SRHS staff after entry to the Oracle system.

2.1.6.2.3 Headboat activity reports

HARs themselves are a quality assurance/compliance tracking tool used to verify the accuracy and completeness of the submitted logbooks. These reports are filled out by individual port agents and checked for accuracy by SRHS staff at the Beaufort Laboratory. HARs were compared to the submitted logbooks on a weekly (by the local port agent, 1973-2012) and later twice-weekly basis (by Beaufort SRHS staff, 2013-present). Any discrepancies between the HAR and the submitted logbooks were investigated by the port agent. If necessary, enforcement measures were taken in order to compel a vessel operator to submit missing logbook entries. Any logbooks submitted substantially late (see “Logbooks” section) were recorded for compliance purposes but the catch data were not recorded. The trip (date, type, number of anglers) would be recorded on the HAR but the catch data were estimated later (see “Data products” section below).

2.1.6.2.4 eLog QA

The eLog system has many parameters in place to limit data entry errors by system users. These include: minimum and maximum values for the number of anglers on a trip, the number of paying passengers and crew, the amount of fuel used and price per gallon, minimum and maximum depth fished and a requirement that primary depth fished fall between the minimum and the maximum, the maximum number of fish kept and released, parameters set on the location information entered based on a given vessel’s fishing area, parameters set to prevent trip date/time conflicts, and trip types assigned by the eLog system based on discrete definitions rather than assigned by survey staff in order to limit differences in interpretation. Port agents are instructed to review every trip report in the eLog system for errors in all fields, including species identification and number of fish, trip date and time, angler numbers, etc. If necessary the port agents correct any errors.

2.1.6.2.5 Oracle system QA

The quality assurance procedures within the Oracle system are focused mainly on the bioprofile (BP) data. Port agents load BP data directly from the FMB text files into the SRH Oracle system. Those that do not use FMBs enter the data directly into the SRH Oracle system through a data entry form. The FMB text files contain various delimiters. The Oracle upload system checks that these delimiters are in place and are valid; if any delimiters are entered incorrectly the upload is rejected. The Oracle system also rejects any upload where the alpha and numeric portions of the species code do not match. Once the data are loaded, the port agents are instructed to review each collection for accuracy/completeness.

The SRH Oracle system "Angler Counts Report" directly compares the HAR data (entered into the system by port agents) with all trip report data. Any discrepancies can be viewed within the Oracle system by all port agents at any time. This enables port agents and SRHS staff to track compliance and review the trip reports for completeness and correctness. For example, if a port agent records a half-day trip but the vessel operator makes an error that records that trip as a full day trip in the eLog, this error will display on the Angler Counts Report. The Angler Counts Report is reviewed twice weekly by SRHS staff and compared to the eLog itself. Any errors or missing trip reports are emailed to the port agents for closer inspection and review with vessel operators.

2.1.6.2.6 Error check programs

Error check programs have been written in SAS and used since the mid-2000s that check for duplicate collection numbers, invalid catch information, etc. The scope of these error-checking programs has been expanded over time. In the bioprofile data these programs check for errors in length (TL<FL, extremely high values), invalid values (dates, species codes, sex or biological samples, invalid vessel numbers and incorrect vessel areas) as well as duplicate collection numbers and sample identification numbers. In the catch record files these programs check for trips with zero catch (a possibly valid circumstance that must be verified by the port agent),

unusually high catch numbers, commonly misidentified species, and invalid values (dates, species codes, trip types, vessel numbers/areas, etc.). Once identified, these errors are corrected or validated (in the case of trips with zero catch and possible species identification errors), and corrections are made to the eLog.

2.1.6.2.7 Catch estimates

Once the annual estimates are generated, a comprehensive review of species caught in each area is performed by senior SRHS personnel. During this process the landings of each species by area are compared to landings estimates from past years in order to isolate any significant increases or decreases in species landed, or unexplained changes in fishing activity. Any logbook records identified as questionable are re-examined and corrected if necessary.

2.1.7 Data products

2.1.7.1Effort estimates

Reported effort is summed by month and vessel after converting number of anglers to angler days. An “angler day” is the amount of effort expended by one angler, using rod and reel, on a full day fishing trip (usually 10-12 hours), and includes travel time to and from the fishing grounds (e.g., 40 anglers on a half-day trip would yield 40 * 0.5 = 20 angler days). This conversion is done to standardize effort for CPUE calculations. In order to adjust for incomplete reporting, information summarized on HARs is used to calculate total estimated effort. Total estimated effort is then divided by reported effort to calculate a correction factor to adjust reported landings.

2.1.7.2 Landings and discard estimates

Landings estimates are provided by species, area, and month. Effort correction factors are calculated by month and vessel to adjust for misreporting as described above. These correction factors are applied to the reported landings by species-vessel-month combinations to generate total estimated numbers of fish landed. These numbers are then multiplied by mean weights of fish calculated from the bioprofile data by species-area-month combinations to generate a total weight of fish landed for each species-vessel-month combination.

2.2 Analytical component

The analytical component focused on the entire SRHS time series (1972 to 2013, with 2013 representing the latest year for which full data were available when analyses began) and involved two main sub-components: (1) analysis of industry-reported logbooks (catch records) to identify "outlier" data, which might be indicative of misreporting, and (2) comparison of trip-level catch records with data collected by SRHS port samplers ("bioprofiles") during Dockside Intercept Sampling Program surveys. Both sub-components are described in detail below.

2.2.1 Logbook (catch record) analyses

The self-reported catch records (CRs) were investigated using two approaches. The first approach focused on the landings of individual species reported in the catch records, and the second approach focused on the species composition of reported trips. For both of these approaches, comparisons were made among vessels from similar geographic locations that would be expected to fish in similar areas and, therefore, show similar trends in landings. In addition, comparisons were made within distinct time periods, to account for changes in fleet dynamics over time. These area-time comparisons were used to define common patterns in catches, and to identify individual vessels that deviated from the common patterns (i.e., outlier vessels) for further investigation. Outlier vessels were further investigated to determine whether deviations in catch could be explained by unique characteristics of particular vessels, or whether misreporting was a more likely explanation. Data were pooled across trip types (i.e., half-day, 3/4-day, full-day) to ensure sufficient sample sizes for analyses.

2.2.1.1 Data filtering

Data provided by the SRHS program are often filtered to ensure the data are free of anomalies or other errors. Prior to conducting the analyses reported here, if reported catch for an individual species was 15 times greater than the 95th percentile, that trip was classified as a potential error and further investigated. Trips identified as a potential error were then either verified or removed from the database. After exploring multiple approaches (5, 10 and 15 times the 90th and 95th percentile), the most conservative approach (removing fewest trips) was chosen to identify "extreme" outliers thought to be erroneous records for a single trip (e.g., one trip reported > 8,000 red porgy caught). This criterion identified 161 extreme outliers for further investigation (see Results Section 3.2.1.1), all of which were excluded from subsequent analyses in this report.

Most species were reported in numbers caught throughout the time series, and therefore our analyses were based on the numbers reported. Black Sea Bass and bank sea bass were removed from all but two of the analyses conducted (see Section 2.2.1.4.2) due to changes in reporting methodologies. In the early years of the survey, Black Sea Bass catch was reported in weight, then beginning in 1992, was reported in both numbers and weight. However, estimates of the average weight of Black Sea Bass were not available prior to 1992, so that the number of Black Sea Bass caught per trip could not be estimated. SRHS data have been used to develop an index of relative abundance for Black Sea Bass stock assessments, but that index was based on weight per unit effort and did not rely on the actual number of fish caught. Also, in the earlier years of the survey, Bank Sea Bass were sometimes reported as Black Sea Bass. Since the proportion of mixing between Black and Bank Sea Bass was unknown, Bank Sea Bass were also removed from the analyses.

2.2.1.2 Strata

Fifteen area-time blocks were developed based on multivariate statistical techniques and regulatory changes in the fishery (detailed below). Using area-time blocks prevented the misidentification of potential outliers due to spatial or temporal dynamics within the fishery, which might occur, for example, because species exhibit uneven distributions of abundance or because of management regulations. The are-time blocks permitted a more meaningful evaluation of potential outliers.

2.2.1.2.1 Spatial strata

Spatial strata were developed based on analysis of thirty-two inlets throughout the South Atlantic region (Figure 3). Nonmetric multidimensional scaling (NMDS) with the Bray-Curtis measure of distance was used to identify inlets with similar species catch compositions, following the methods described in Shertzer et al. (2009). Prior to analysis, the data were filtered to include the top 40 species for which at least one individual was caught at each inlet. The mean catch rate by inlet and species was arranged into a matrix, where rows represented unique inlets and columns represented the species' catch rates. Before computing the Bray-Curtis measure of distance, data were transformed with the fourth-root transformation to moderate the influence of abundant species (McCune and Grace 2002). In addition to NMDS, nonhierarchical cluster analysis was used to partition inlets into groups (Kaufman and Rousseeuw 1990). Both methods identified the inlets within the Carolinas as similar, areas off Georgia and north Florida (GA-nFL) as similar, and areas off south Florida (sFL) as similar (Figures 3, 4 & 5). These three broad geographic regions (Carolinas, GA-nFL, and sFL) were used in subsequent analyses as area blocks.

2.2.1.2.2 Temporal strata

Temporal strata were developed to account for various regulatory changes in the fishery over time. Years when important regulations were implemented were used to delineate appropriate time blocks. In 1984, the snapper-grouper fishery management plan (FMP) was implemented. In 1992 various regulations were implemented for high-profile species. In 2001 the red porgy bag limit was implemented (red porgy are a dominant species in headboat catches). In 2010 the red snapper closure occurred, potentially affecting fishing behavior to avoid red snapper. Therefore, five time blocks were chosen; 1973-1983, 1984-1991, 1992-2000, 2001-2009 and 2010-2013.

2.2.1.3 Species selection

Species that were present in at least 15% of headboat trips in at least one of these 15 area-time blocks were included in the analysis (Table 3). In some cases, a species was rare in one area and common in another because of changes in species assemblage structure with latitude (Shertzer et al. 2009).

2.2.1.4 Metrics

For both reported landings of individual species and species catch composition, analyses were conducted to identify individual vessels within each area-time block combination (N = 15) that were 'outlier vessels' and, therefore, potentially misreported (N = 637 vessel-area-time block combinations). A single vessel could be identified as an outlier vessel in multiple area-time blocks. These analyses relied on 62 metrics designed to flag different types of potential misreporting. Fifty of these metrics focused on the reported landings of individual species (number caught and catch rate for each of the 25 species excluding black and bank sea bass in Table 3), and twelve focused on metrics describing species compositions (Table 4). With 637 vessel-area-time block combinations and 62 metrics, there were 39,494 metrics that could potentially be flagged. Initially, an individual vessel's mean for a given metric (e.g., total number of fish caught) was compared to the mean for the fleet, but with the inclusion of so many metrics (62), a more standardized approach was needed (modified z-score). This approach is detailed below.

2.2.1.4.1. Species-specific metrics

2.2.1.4.1.1 Total catch and catch rates

For each of the 25 species listed in Table 3, two metrics (*species*.m and *species*.v; see Table 4) were used to quantify individual vessel's reported catch and reported catch rate (catch/anglers*hours fished) relative to that of other vessels in each area-time block. Values were transformed to a modified z-score so that all metrics were on a similar scale. Iglewicz and Hoaglin (1993) recommended using a modified z-score computed as,

$$z = (0.65\ (x_i - x) / \mathrm{MAD})$$

where MAD denotes the median absolute deviation, x_i is the value of a particular metric for vessel *I*, and x is the median of that particular metric for all vessels in a particular area-time block. Based on Iglewicz and Hoaglin (1993), a modified z-score was defined as an outlier if $|z| > 3.5$.

2.2.1.4.1.2 Rounding and heaping

Rounding is defined as increasing or decreasing the actual amount of catch, usually to a common whole number (e.g., 10, 25, 50, 100). Assuming an even distribution of reported catches ending in the digits zero through nine, one would expect 20% of reported catch to end with either the digit 0 or 5 (e.g., 10, 25, 50, 100). However, if a significant amount of rounding occurs, a higher than expected proportion of reported catches would end in 0 or 5. For each vessel within each area-time block, the proportion of trips for which rounding occurred (catch entries where the final digit was a 0 or a 5) was calculated. Some rounding is expected for this type of data reporting and may not result in bias if the value is a best-guess estimate of the actual catch. Thus, to identify extreme cases of rounding, vessels that rounded more than 80% of the trips within an area-time block were investigated further.

Heaping is when a vessel repeatedly reports the same number of fish caught for a specific species. Heaping could be evidence of misreporting if, for example, the same catch is repeated across multiple trips (e.g., 10 red snapper for all trips). To determine the prevalence of heaping, the coefficient of variation (CV) of catch was computed for each species. Reporting the same catch value across multiple trips would result in a relatively low CV potentially indicative of misreporting.

2.2.1.4.2 Species composition metrics

The second approach applied to the catch records was to investigate variation in species composition of the catch among vessels within each area-time block. Twelve metrics were developed to quantify the reported species composition of individual trips (Table 4). The first eight metrics were the total number of fish reported on a trip, the overall catch rate, total number of unique species caught (species richness), species diversity (Shannon-Weiner diversity index), and the associated variances of each of these metrics. The intent of these metrics was to isolate specific types of misreporting. For example, a vessel that always reported the same number of fish, or the same three to four species, or much higher catches than the other vessels would be flagged for further investigation. Once identified, a flagged metric (outlier) and the trip level data from that vessel were explored by examining in detail the trip type, mean number of anglers, fishing area, and other metrics to determine whether misreporting had occurred.

Nonmetric multidimensional scaling (NMDS) was used to create four additional metrics to characterize vessels within each area-time block. The first NMDS metric used the mean species-specific catch rates of all species by vessel arranged into a matrix, where rows represented unique vessels and columns represented the species' catch rates. The second NMDS metric was similar to the first, but used only a subset of species (species present in > 15% of trips for one or more area-time blocks; see Table 3). The third NMDS metric explored dissimilarities among vessels using presence/absence (instead of catch rate) for all the species. The fourth NMDS metric explored dissimilarities among vessels using presence/absence (instead of catch rates) for the subset of species noted above. Black Sea Bass and Bank Sea Bass were only included in the two presence-absence analyses and were excluded from all other analyses (See *Data filtering* above).

NMDS was applied in three dimensional Euclidean space (McCune and Grace 2002). Given a vessel's location (coordinates) in the three-dimensional space, Euclidean distance was calculated as a metric to rank a vessel's distance from the origin. Then, these distance metrics were transformed to modified z-scores to identify outlier vessels. Thus, the definition of an outlier depends on the distribution of results using each metric. A flagged metric (outlier) indicates a significant deviation from the mean, whether the mean is the mean number of fish caught, the mean number of anglers, the species composition in that area-time block, etc.

2.2.1.5 Preliminary Analysis

Several preliminary methods were explored that helped refine the analysis as well as provide a detailed understanding of the data. Metrics were converted to modified z-scores using the approach described by Iglewicz and Hoaglin (1993). A vessel whose metric(s) with an absolute value (modified z-score) greater than 3.5 was classified as an outlier. This approach is conservative, and so a less restrictive criterion for identifying outliers was also considered. This less restrictive approach considered the full distribution of each metric and flagged 10% of vessels in the tail(s) of the distribution. For metrics that were two-sided (i.e. outliers could be small or large values), the upper and lower tails of the distribution were considered; outliers were defined as those values < 5^{th} percentile and > 95^{th} percentile. For metrics that were one-sided, such as variance measures where small values were of primary interest, outliers were defined as those in the < 10^{th} percentile.

2.2.1.6 Methods summary

We first identified and excluded from further analyses 161 trips (from a total of 369,260 trips) that reported catch for at least one species that was an extreme outlier (> 15 times greater than the 95th percentile). We then used the flagging approach of Iglewicz and Hoaglin (1993) to identify outlier vessels based on modified z-scores of multiple metrics characterizing the reported catches. Additionally, we explored vessels having metrics with absolute modified z-scores greater than 3.0 and greater than 2.5, rather than 3.5. Percent rounding and coefficient of variation (CV) for the 25 species were also examined to identify rounding and heaping in reported catches. To aid further investigation of outlier vessels, descriptive statistics for all vessels were generated for several species that exhibited rounding higher than 80%. Vessels were highlighted / noted if percent rounded was above 80% for any species, trips were fewer than 100, or the vessel's mean catch was significantly greater than the fleet's mean catch.

2.2.2 Logbook (catch records) – bioprofile comparisons

The Biological Profiles (bioprofiles or BPs) collected dockside by port samplers (DISP, see Section *2.1.4.1*) at the completion of headboat trips were compared with the catch records (CRs) from those same trips to determine if discrepancies existed that might be indicative of catch misreporting. First, an Exploratory Data Analysis (EDA) was conducted to characterize spatial and temporal patterns in fishing effort, sampling effort, the number of species sampled, and the number of fish sampled and measured per trip. Second, criteria were developed to uniquely identify individual headboat trips and the type of trip (e.g., half-day, full-day, etc.). Third, the BPs for individual trips were matched to the CR data for the same trip. Spatial and temporal patterns in multiple response variables developed from the BPs were compared to similar response variables developed from the CRs to determine if the two datasets were congruent. Lack of congruence might indicate misreporting in the CRs.

The BP database contained six types of collections: (1) dockside sampling of headboat vessels by port samplers, (2) research collections, (3) commercial collections, (4) charter collections, (5) market collections, and (6) unknown. Only records designated as type (1) were included in the analysis (99.3% of all records). The same area-time blocks used for the analysis of CRs were used to summarize and visualize the BP data.

2.2.2.1 Defining a trip – Matching BPs to CRs

There is no single unique identifier associated with headboat trips throughout the entire SRHS database (1972-present). This posed a problem when trying to match BPs to CRs. After assessing multiple potential approaches to creating a unique identifier, vessel number and date, both of which are recorded on CRs and BPs, were used to identify individual trips. A limitation of this approach is that some vessels can make more than one trip in a single day. Therefore, the matching analysis was constrained to trips on dates for which the vessels reported a single trip, based on information provided in the CR. This constraint limited the available data set to 15,748 trips out of a total 369,260 trips over all years, areas, and trip types (4.3% of all trips). Because the proportion of alternative trip types (e.g., half-day, ¾-day, full-day, etc.) differs for headboats operating in different regions of the South Atlantic, the subsample represents a varying proportion of the total headboat fishing effort across regions. For example, half-day and full-day trips occur with about equal frequency off the Carolinas, full-day trips are more common in Georgia-north Florida, and half-day trips are more common in south Florida waters.

2.2.2.2. Proportion of missed observations

For all matched (BP with CR) trips, the number of fish (all species combined and by individual species) measured in the BPs was compared to the number of fish reported caught in the CRs. Because the BPs are a sample of the total catch on a trip, the number of fish measured in the BP should always be equal to or less than the number of fish reported in the matched CR. If the number of fish measured in the BP is greater than the number reported caught in the CR, then an error necessarily exists in the BP or the CR. The BP data were assumed to be accurate for these matched BP-CR comparisons. The sum of CR reported number of fish landed was compared to the sum of the number of fish measured on the BPs for all matched trips for all vessels to determine if discrepancies (e.g., chronic underreporting) were specific to particular vessels. Similar analyses were conducted for individual species to determine whether particular species, or suites of species, were more likely to be underreported in the CRs. The analysis was conducted for the three regions (Carolinas, Georgia-north Florida, and south Florida) as specified above, and for two matched trip types, half-day trips and "other" trips (predominantly full-day trips but including ¾-day trips).

2.2.2.3. Matching landings

We compared temporal trends in the CR-reported landings (number caught) with trends in the number of fish measured on the matched BPs. The DISP protocol recommends limiting the number of length measurements recorded all the BPs to 10 individuals per species, but frequently additional lengths were recorded (e.g., when there were few other species caught or when a majority of the fish caught on a trip were a particular species). Additionally, in some years biological collections were prioritized for specific species as a result of special project or research needs, resulting in a large number of BP-measured fish for that species. Thus, the number of species-specific length measurements recorded on the BPs has often exceeded 10.

We assessed the degree of correlation between the species-specific number of fish measured on the BPs to those reported caught on the CRs using Spearman rank correlation analysis. Discrepancies between the BP and CR data may be indicative of misreporting of catch. We would expect a poor relationship in the number of fish measured and the number caught for uncommon species likely to be missed (or misidentified) by port samplers, especially on trips for which there were a large number of anglers. Therefore, we limited comparisons to species with combined annual estimated landings greater than 50,000 fish, and scaled the landings and the number of length measurements to their respective means to compare trends from the two datasets over time.

3. Results

3.1. Programmatic component

Until recently, SRHS protocols related to data quality assurance and quality control (QA/QC) were sparsely documented. Thus, an assessment of historical SRHS data protocols and their relevance to data QA/QC was not possible. Some obvious outliers were found in the database, as described below.

3.2 Analytical component

3.2.1 Logbook (catch record) analyses

3.2.1.1 Data Filtering

A total of 161 "extreme outlier" trips (0.04% of the total 369,260 trips) were identified that included reported catch for a particular species that was > 15 times larger than the 95th percentile (Table 5; Appendix 3 and 5). These extreme outliers were considered to be erroneous data. Nearly 50% of the 161 outliers occurred in the south Florida region prior to 2000. Only 15.1% of these outliers (0.006% of the total number of trips) occurred in the Ga-nFL region prior to 1992.

3.2.1.2 Total catch, catch rates, and species composition

Seventy-four vessels (11.6% of the 637 vessel-area-time block combinations in the SRHS database) had at least one flagged metric with an absolute modified z-score greater than 3.5. Across all metrics, 97 of the potential 39,494 vessel-area-time block metrics were flagged (0.25%). Seven species-specific metrics were flagged (Yellowtail Snapper, Vermilion Snapper, Tomtate, Mutton Snapper, White Grunt, Key West Porgy, and Sand Perch) and three NMDS metrics were flagged (Tables 9-11, & Appendix 5). Table 6 shows the modified z-score that caused the flag (in the case of the two Yellowtail Snapper flagged, it was -4.6) and Table 7 provides information regarding what caused the flag (in the case of the Yellowtail Snapper the numbers reported caught was considerably different from that of the other vessels in the area-time block). Twenty-one additional vessels (3.2 %) were flagged based on similar metrics with a modified z-score outside ±3 (Appendix 6), and forty-six additional vessels (7.2%) were flagged with a modified z-score outside ±2.5 (Appendix 7). Among the 74 vessels with flagged metrics outside ±3.5, 51 vessels had fewer than 100 total trips within their time-area block, and all but one of those vessels were flagged using the NMDS metrics. Similarly, the majority of outlier metrics in the sensitivity analysis (outside ±3 and outside ±2 .5) occurred for vessels having fewer than 100 total trips. Fifteen percent (N = 11) of the 74 vessels with at least one flagged metric occurred in the south Florida region during the 1972-1983 time block (Figure 6). The percentage of the 74 vessels with at least one flagged metric was < 10% in all other area-time blocks (Figure 6).

Of the 74 vessels that had at least one flag (using ±3.5 threshold), 23 vessels had more than 100 total trips, and 10 vessels were flagged by the NMDS analysis based on species composition (Appendices 8 and 9). The remaining 13 vessels were flagged based on species-specific metrics. Four of those vessels had very few positive trips for the species in question (two Vermilion

Snapper, one Tomtate, and one Sand Perch, respectively; Appendices 10 and 11). The remaining nine vessels had larger sample sizes and were flagged based on species metrics with above average catches. Those nine vessels required further (trip-by-trip) evaluation to identify a reason for their outlier status (see bullets below and Table 8). Seven of the nine vessels were from the Carolinas region, one from the Georgia-north Florida region, and two from the south Florida region (Table 8). (In the bulleted list below, vessel names are listed as '#########' to protect confidentiality.)

- '#########' reported very few species (90% of trips reported exclusively Black Sea Bass) (Appendix 11, p.2; Appendix 13, p.314).
- '#########' took 26 trips in area 1 in end of the 1972-1983 time period and might have moved to ##############. Common species reported were Gag, Red Porgy, Tomtate, and White Grunt. Two NMDS metrics flagged for this vessel (Appendix 11, p.947-948).
- '#########' reported very few species in two time periods (1984-1991 and 1992-2000) (99% of all trips exclusively Black Sea Bass) (Appendix 9, p.7 and p. 12; Appendix 11, p.371 - 372).
- '#########' reported very few species (91% of all trips exclusively Black Sea Bass) (Appendix 9, p.8; Appendix 11, p.94 - 95).
- '#########' frequently reported Spanish mackerel, king mackerel, cobia and barracuda. The mean number of anglers was 6.6. (Appendix 9, p.11-13; Appendix 11, p.738 - 739).
- '#########' frequently reported exactly 10 anglers (98.9%) and a maximum of 4 species (Black Sea Bass, Gag, Red Snapper, and Vermilion Snapper). (Appendix 9, p.37; Appendix 10, p.637-638).
- '#########' reported very few species (exclusively reported Black Sea Bass, Atlantic Sharpnose Shark, and Tomtate) (Appendix 9, p.22; Appendix 11, p.920 - 921).
- '#########' reported a species composition that was much different from the surrounding fleet. Common species reported include Atlantic Croaker, Bluefish, Weakfish, Spotted Sea Trout, and Kingfishes (whiting). (Appendix 9, p.22; Appendix 11, p.920 - 921).
- '#########' reported very few species (exclusively reported Almaco jack, Vermilion Snapper, and Yellowtail Snapper) (Appendix 9, p.73; Appendix 11, p.928 - 929).

Appendix 12 (vessel report card) provides box plots of all the metrics for unique vessels relative to other vessels in the area-time blocks.

3.2.1.3. Rounding and variance of reported catch

Rounding on the 5's and 10's was prevalent for reported high catches. By itself rounding may not be an indicator of misreporting, but the combination of high rounding with low variance in reported catch suggests that a vessel consistently reported the same value.

Tables for Gray Triggerfish, Red Porgy, Red Snapper, Vermillion Snapper, White Grunt, Tomtate, Scamp, Mutton Snapper, and Yellowtail Snapper show similar patterns (Tables 9 – 17; Appendix 13). Vessels with a higher rounding percentage typically had above average catches or very few trips. Vessels with a relatively low coefficient of variation of catch typically had fewer than 100 reported trips.

3.2.2. Logbook (catch record) – bioprofile comparisons

3.2.2.1. EDA Results

The average number of fish (pooled across species) measured per trip by year (x-axis) and by area (3 panels) is shown in Figure 7. The median number of fish measured per trip ranged from 9 to 46.5 and was typically higher in the Carolinas (range: 15 to 46.5) than in Georgia-north Florida (range: 10 to 31) and south Florida (range: 9 to 23). There were no obvious temporal trends or substantive regional differences in the median number of fish measured. However, we observed generally higher variation among trips in the total number of fish measured in the Carolinas compared to the other two regions, as well as higher maximum numbers of fish measured in the Carolinas during the mid-1990s and in south Florida during the mid- to late-2000s. Overall, the total number of fish measured has been relatively consistent across regions and through time.

The average number of species sampled on a trip ranged from 3 to 8 and was slightly higher in the 1980s and 1990s in the Carolinas compared to the other two regions (Figure 8). The maximum number of species sampled also appeared to be high in the 1980s and 1990s, particularly in the Carolinas and in Georgia-north Florida, while the maximum number of species sampled was also high throughout the 2000s in south Florida. While there do not appear to be consistent temporal or regional patterns in the number of species sampled, there are series of consecutive years within each region where the number of species sampled is nearly identical. For example, the number of species sampled in the Carolinas was nearly identical between 1996 and 1998 and then again between 2008 and 2010. South Florida, in particular, showed several consecutive years (e.g., 1997-2001, 2005-2008) where the distribution of species sampled was nearly identical.

Typically, about 10 fish per species were measured on a trip, and this has been consistent throughout the time series and across regions (Figure 9). Though this number has centered around 10 for the entire time series, there has been significant variation in the number of fish sampled by species. This variation is likely due to the opportunistic nature of the BP sampling.

3.2.2.2. Matching Records

The CR trip field categorically identifies trip length (Table 18 and Figures 10 to 12). There are about equal numbers of single-trip and multi-trip days off the Carolinas, while single-trip days are the most common trip type in Georgia-north Florida, and multi-trip days are most common in South Florida (Figures 10, 11 and 12). Of the multi-trip days in the Carolinas and Georgia/North Florida, there were rarely more than two trips in a day, while three trips per day was fairly common in South Florida, particularly in the half-day category. All analyses were limited to the single-trip days for matched BP and CR records (see Figures 13, 14, and 15). There is a predominance of full-day trips in the Carolinas and Georgia-north Florida (Figures 13 and 14). Although the overall (across all regions) number of matched trips is relatively small, it is fairly consistent through time and across vessels. In south Florida, there is a predominance of half-day trips and very few single-trip days. Also, the tenure of vessels in the south Florida region is shorter and more sporadic than in the other two regions (Figure 15).

3.2.2.3. Proportion of Missed Observations

Across regions, underreporting (fewer fish reported caught on CRs than reported measured on matched BPs) was evident for only a small proportion of vessels. When underreporting was observed, the number of "missed fish" (i.e., greater numbers of fish measured on BPs than reported caught on matched CRs) was very small across years for vessels in the Carolinas and in Georgia-north Florida (Figures 16 and 17). For half-day trips in south Florida, there is evidence of more missed fish than observed fish for a few vessels (Figure 18), for which there were very few matched trips. Those vessels were not determined to be chronic mis-reporters based on other analyses in this report as well as the low sample sizes for matched trips in south Florida.

3.2.2.3.1 By-Species Comparison

The above analysis was repeated across individual species to determine if BP-CR discrepancies (underreporting on CRs) varied by species. Red Snapper and Gray Triggerfish had relatively few and small discrepancies between the BPs and CRs (Figures 19 and 20), while Littlehead Porgy and Ocean Triggerfish had more frequent and relatively large discrepancies between the BPs and CRs (Figures 21 and 22). For Red Snapper and Gray Triggerfish, the number of fish missed (underreported) on the CRs (based on comparison to the BPs) was a very small proportion of the reported catch, and those instances occurred sporadically across the time series and the three regions. For rarer species such as Littlehead Porgy and Ocean Triggerfish, the proportion of missed fish in the Carolinas and Georgia-north Florida was relatively low and similar to that for well-sampled species in those areas. However, in south Florida there tended to be more missed fish for less common species or species that were difficult to identify to species (e.g., species within the porgy complex). All other species-specific plots are included in Appendix 14.

3.2.2.4. Matched Landings

Species-specific correlations between reported landings and numbers sampled on the BPs were typically highest in regions where the focal species occurs in highest abundance (and therefore is most commonly caught). Species-specific trends in landings and numbers sampled in BPs were generally consistent through time, area, and by species (for example, see Figure 23 for Red Porgy, Figure 24 for Red Snapper and Figure 25 for Gray Triggerfish), although correlations between reported landings and numbers sampled in BPs tended to be weaker in the south Florida region than in the Carolinas and Georgia-north Florida (Figures 23, 24 and 25 and Appendix 15). These results were consistent even for rarer species such as Littlehead Porgy. Landings and number of fish sampled were well correlated after 1990 for Black Sea Bass, but under-sampling of the landings occurred prior to 1990 (Figure 26), likely due to the fact that Black Sea Bass were reported in weight (not numbers) in catch records and in numbers in the BPs prior to 1992. This problem was apparent in the Carolinas, but does not seem to compromise the overall trends for Black Sea Bass ($\rho = 0.77$). The remaining species plots can be found in Appendix 15.

3.3 *Caveats to the Analyses*

- Because data collection by the SRHS program is based on self-reporting by headboat personnel and is not independently validated, instances of potential misreporting could only be identified by outlier analysis. The methods used here would not detect misreported data that were reasonably consistent with valid self-reported data. However, this type of misreporting would likely have negligible effects on resulting data products (e.g., indices of abundance).
- For the logbook (catch record) analyses, the identification of outliers was based on the modified z-score methodology of Iglewicz and Hoaglin (1993). Other approaches were considered but were not pursued as they appeared to identify large portions of seemingly accurate data (e.g., consistent with other data from the same area-time blocks) as outliers. Other methods of outlier analysis could potentially lead to more or less conservative detection.
- The detection of outliers and patterns in the computed metrics was likely dependent to some extent on the choice of spatial and temporal strata. Our choice of strata seems rational to us, with spatial strata based on multivariate statistical analyses and temporal strata based on major regulatory changes. However, we recognize that other choices could potentially lead to different results.
- The analyses that used DISP data were limited to a subsample of trips for which BP data could be matched to logbook (catch record) data. It was only possible to match BP and CR data for single-day trips (i.e., trips on days when the vessel made only one trip, regardless of trip type). This was a reasonable subsample of trips in the Carolinas and in Georgia-north Florida because single day trips are common in these regions. In contrast, the matched trips were only a small proportion of the total trips in the south Florida because there are very few single day trips in this region. Additionally, because there are few single day trips in south Florida, it is possible that the single day trips that do occur

are atypical in some way. For example, a vessel might make only one trip in a day if inclement weather or a mechanical issue prevented subsequent trips, both of which could affect fishing success (e.g., landings reported on the logbook report). Thus, results from matched-trip analyses for the south Florida region should be interpreted with caution given the relatively small sample sizes and the potential inclusion of atypical trips.

- For the comparison of catch records (CRs) with biological profiles (BPs):
  - The number of fish (all species combined and by individual species) measured in the BP data were compared to the number of fish that were reported caught on the CRs for matched trips. Because the BPs are a sample of the total catch on a trip, the number of fish measured in the BP should always be equal to or less than the number of fish reported in the CR. If the number of fish measured in the BP is greater than the number reported caught in the CR, then this suggests an error necessarily exists in either the CR-reported catch or in the BP data. We assumed accuracy in the BP data and that any discrepancy was due to error (under-reporting) in the CR.
  - All comparisons of CRs and BPs were conducted at the level of individual vessels. For example, the total number of a species landed by a vessel was compared to the total number reported in the BPs across all matched trips for that vessel. It is possible that underreporting could have occurred at the level of individual trips for specific vessels that would not necessarily have been identified with this approach. The method used would identify chronic misreported or isolated but very large incidents of misreporting.
  - The utility of the analysis may have been limited to some extent by changes over time in protocols determining the number of individuals of each species that *should* be measured in BP samples or in consistency in carrying out those protocols. The generally observed consistency and degree of correlation between CR-reported landings and number of fish sampled on the BPs suggests that the approach used was robust to this potential source of error.

4. Discussion

The objective of this report was to perform a comprehensive evaluation of the SRHS program and South Atlantic data, with a focus on identifying potentially misreported data. As noted above, without some independent source of validation, it is generally not possible to determine whether self-reported data that are consistent with others in the dataset are accurate. Therefore, our approach relied on outlier analysis to identify instances of potential misreporting, followed by detailed investigation of identified records to determine whether a plausible explanation existed or misreporting was likely. A primary assumption of this approach is that, if misreporting were prevalent, it was not done in collusion with others to misreport all in the same fashion. Even though some misreporting could remain undetected by outlier analysis, it is likely to have negligible effects on resulting data products (e.g., abundance indices), because misreported data would be similar to average self-reported data. Efforts were focused on identifying potentially erroneous data based on outlier analysis, discrepancies in landings information, and trends over space and time. This multi-pronged approach provided a thorough assessment of SRHS data, a mechanism to detect and correct incidents of misreporting, and recommendations to strengthen the data and its use in stock assessments and other activities.

We note that the analyses conducted here are a second-tier investigation. The first tier of detecting outliers or otherwise misreported data is conducted routinely as part of the QA/QC protocol. Since the inception of the SRHS, port samplers have inspected all catch records visually. If gross misreporting were detected, those records would be corrected before being keyed into the database. Database managers would make obvious corrections themselves, but if clarification were needed, port agents would ask the headboat captain who submitted the record in question. Although the QA/QC protocol could not catch all instances of misreporting, it is highly unlikely that consistent or intentional misreporting would have gone unnoticed by program personnel.

4.1 Logbook (catch record) analyses

A total of 161 extreme outliers were identified in the SRHS data set. About 15% of those outliers occurred in the Georgia-north Florida region and prior to 1992, consistent with allegations of misreporting in this area and time period. However, they comprised only 0.04% of the 369,260 trips in the SRHS database (Appendix 4). These extreme outliers could also be due to data entry or other types of errors in addition to misreporting. Development of abundance indices routinely applies filters to remove extreme outliers from the data set, and thus previously computed indices are unlikely to have been affected by these values. Potential data errors may be corrected following subsequent investigation and evaluation (see Recommendations section below).

Only 0.25% (N = 97) of the 39,494 vessel-area-time block values considered were flagged as outliers (potentially erroneous data targeted for subsequent investigation). Those flagged outliers were associated with 74 vessel-area-time blocks, representing a relatively small percentage (11.6%) of the total 637 vessel-area-time block combinations in the SRHS database. This suggests there is little evidence to support widespread and chronic misreporting in the SRHS database. No spatial or temporal trends in the occurrence of outliers were observed, with the exception of the south Florida region during the 1972-1983 time block. This is inconsistent with claims of widespread misreporting prior to 1992 in the Georgia-north Florida region. Upon further examination, it was determined that nearly all of the outliers could be explained by factors such as (1) different vessel fishing behavior (e.g., some vessels consistently fish in nearshore waters targeting nearshore species such as Spot and Croaker); (2) different number of anglers (e.g., some vessels consistently carried relatively small numbers of fishers resulting in lower total landings per trip); and (3) likely misidentification of species by either the captain or the port sampler. Thus, results from the outlier analyses provided no evidence for systematic misreporting by vessel for any area-time block combination.

Single species metrics were generally less informative than the multivariate NMDS metrics for identifying outliers. Over-reporters (vessels that tended to report “high” catch) were more easily detected than under-reporters using the modified z-score approach (Iglewicz and Hoaglin 1993). That approach identified outliers based on a distribution of each metric which was generally skewed to the right, with under-reporters generally contained in the left tail and over-reporters in the right tail.

4.2 Logbook (catch record) - bioprofile comparisons

Because the BPs are a subsample of the total catch of a particular trip, they can be used to detect under-reporting but not over-reporting. No temporal patterns in under-reporting or correlations between CR-reported landings and number of fish sampled in BPs were observed. Underreporting and relatively low correlations between landings and the number of fish sampled were most frequent in the south Florida region, and appeared to be driven by species identification issues (e.g., the suite of multiple porgy species). Species identification issues may be due to a lack of agreement in species identification by the vessel crew, a discrepancy between the common and colloquial name of particular species, or failure to observe the catch of all rare species. The port sampler is directed to sample stringers with rare species first, thus, the Dockside Intercept Sampling Program (DISP) data may be more accurate for the rarer species than the catch records, particularly on vessels with many anglers. No changes in the response variables were apparent near years when major changes in regulations were implemented (e.g., 1992).

For the “missed-fish” analyses, chronic misreporting would have been characterized by a relatively high proportion of missed (under-reported) individuals and species per observed trip. The frequency of vessels with “missed fish” (all species combined) was very small in each of the regions. Species-specific analyses indicated under-reporting in catch records for multiple species, many of which were likely driven by species identification issues in the CR reports (e.g., species within the porgy complex, Ocean Triggerfish, several species of grunts). Very little to no underreporting was apparent for major, well-recognized species (e.g., Black Sea Bass, Red Porgy, Vermilion Snapper, Red Snapper), particularly in the Carolinas and Georgia-north Florida regions. In combination, these results provide no evidence for chronic misreporting, and no evidence for temporal or spatial trends in under-reporting, with the exception of potentially higher levels of under-reporting for some species in the south Florida region.

For the “matched landings” analyses, consistent trends over time between CR-reported landings and numbers sampled in BPs would be indicative of consistent sampling coverage through time, by area and by species. Correlations between catch record-reported landings and numbers sampled in BPs indicate the degree to which the proportion of landed fish sampled has remained consistent over time, with higher correlations indicative of greater consistency. We found that species-specific trends in CR-reported landings and numbers sampled in BPs were generally consistent through time, area and by species, but tended to be weaker in the south Florida region than in the Carolinas and in Georgia-north Florida. For each species, correlations also tended to be higher in regions where the species is most abundant (e.g., Red Porgy in the Carolinas region), and lower in regions where the species is more rare (e.g., Red Porgy in the south Florida region; Figure 23). There was evidence of "under-sampling" (smaller than typical proportions of fish sampled) in south Florida, particularly from 1981 to 1997. Such under-sampling could have been a result of over-reporting in the catch records, species misidentifications, the potential "atypical" nature of matched trips in the south Florida region (see "Caveats" section), or some combination thereof. For several species, under-sampling appeared to occur for relatively short time periods (e.g., Sand Perch in the Carolinas and Georgia-north Florida regions in the late 1980s; Almaco Jack in the Carolinas in the mid-2000s; Appendix 15); however, such periods were not consistent across species, areas, or time periods, providing no evidence for chronic misreporting.

4.3 Summary

In summary, the analyses indicated no evidence of chronic, widespread misreporting, no evidence of an apparent temporal pattern in potentially misreported data, and minimal spatial patterns in potentially misreported data. We identified relatively few obviously erroneous data (161 extreme outliers), all of which will be corrected or removed from the database (note that data filtering for use in index standardization has removed erroneous data in the past, but removing the extreme outliers from the database will prevent any potential inclusion of those data in the future). No vessels were identified that consistently had data outliers or under-reported landings. Relatively few data outliers (potentially erroneous data targeted for further investigation) were identified, nearly all of which were explained upon further investigation. There were no apparent temporal trends in outliers or in under-reporting. From a spatial perspective, while small in scale, the majority of data issues were observed in the South Florida area; however, no vessels were flagged as "problem vessels" by both the catch records and the bioprofile analyses.

5. Recommendations

5.1 Procedural Improvements:

- Continue to evaluate and improve QA/QC procedures for SRHS data. As discussed in this report and in the "Data quality assurance/quality control (QA/QC) protocols" section of Appendix 1, historical SRHS QA/QC procedures are not well documented. Current QA/QC procedures (particularly those implemented with electronic reporting) are extensive (see "Electronic QA/QC" section of Appendix 1) but should be regularly evaluated and strengthened where possible.
- Consider re-estimating landings based on the extent and magnitude of error corrections.
- Employ a systematic, consistent method to link catch records (CRs) to bioprofiles (BPs). The definition of a trip needs to be improved for the BPs. A time stamp from the electronic measuring boards used to collect BP data could be used to link the BP data to the related CR and allow for a better analysis of trip level samples in the future. The number of anglers sampled and trip type should also be reported as part of the BP.
- Develop a method to combine concurrent collection numbers when they apply to the same trip. In some instances when large numbers of fish were sampled in the BP, BP data from a single trip are *listed* under two collection numbers, with no indication that those collection numbers are associated with the same trip. Since 1990, this issue has occurred when more than 99 fish were measured in a BP.
- Digitize Headboat Activity Records (HARs, historical documents that contain information about trip type and effort) and make them available for analysis.
- Use HARs to create a single unique identifier that identifies individual headboat trips throughout the historical years of the database in a way that is consistent with modern trip identifiers.
- Consider species identification issues, particularly in south Florida, when creating correction factors (k factors; see Appendix 1) for landings estimation.
- The SRHS program should maintain a living document describing all details of the program procedures and changes in those procedures over time. Procedures and protocols are not well documented for the early years of the survey. SRHS personnel should document when sampling effort intensifies for special collections. Unexplained increases in sampling effort in the historical data are often due to a special collection effort that was communicated by word of mouth among SRHS staff.

- Provide a categorical grouping of the vessels by type (# of anglers, location of fishing, etc.) to facilitate evaluation of whether the vessels are representative of the headboat fishery. In the analyses described in this report, some vessels were flagged that seemed to operate more like a charterboat (e.g., carried a small number of anglers.
- Increase efforts to verify data through observer programs and/or whole-haul sampling dockside.

5.2 Logbook (Catch Records) Data:

- Examine the cause of the 161 extreme outliers and correct if possible or remove from the database. This may not require removing the entire trip in which the extreme outlier was reported, but removing the outlier species entry for that trip. All data outliers from the historical time period should be explored. Some of these outliers may be transcription errors that could be corrected by examining the paper data sheets.
- Consider using a minimum cutoff of number of trips made by a vessel for inclusion in a species-specific index of abundance.
- Identify and filter vessels or trips that fall outside the range of those relevant for analyses of interest. For example, a vessel entirely making inshore trips could be identified and excluded from analyses focused on an offshore-caught species. Many of the methods described in this report could be used to identify outlier trips and vessels at the species level.

5.3 Bioprofile data:

- The bioprofile analyses described in this report should be investigated when the SRHS data are used for a new species assessment. Each species investigated shows different patterns in reporting by region. If BPs do not match CRs for a particular species, caution should be used when developing an index of abundance for that species.

6. Literature Cited

Iglewicz, B. and D. Hoaglin. 1993. "Volume 16: How to Detect and Handle Outliers", The ASQC Basic References in Quality Control: Statistical Techniques, Edward F. Mykytka, Ph.D., Editor.

Kaufman, L., and P.J. Rousseeuw. 1990. Finding groups in data: an introduction to cluster analysis, 319 p. John Wiley and Sons, Inc., New York, NY.

McCune, B., Grace, J.B. 2002. Analysis of ecological communities. MjM Software Design, Gleneden Beach Oregon.

Shertzer, KW, EH Williams, and JC Taylor. 2009. Spatial structure and temporal patterns in a large marine ecosystem: Exploited reef fishes of the southeast United States. *Fisheries Research* 100:126−133.

Table 1. Number of South Atlantic Southeast Region Headboat Survey vessels, 1972-2013.

Year	Number of vessels
1972	34
1973	34
1974	33
1975	32
1976	40
1977	42
1978	46
1979	73
1980	90
1981	87
1982	88
1983	86
1984	90
1985	89
1986	94
1987	94
1988	94
1989	96
1990	93
1991	94
1992	99
1993	94
1994	96
1995	89
1996	91
1997	92
1998	89
1999	86
2000	91
2001	85
2002	77
2003	67
2004	81
2005	76
2006	76
2007	78
2008	83
2009	83
2010	80
2011	77
2012	78
2013	76

Table 2. Number of reported trips, estimated trips and reporting compliance from the Southeast Region Headboat Survey, 1980-2013. The number of reported and estimated trips are not available in electronic format prior to 1980.

	South Atlantic		
Year	Reported Trips	Estimated Trips	Compliance
1980	11,435	24,724	0.46
1981	11,395	24,134	0.47
1982	12,353	25,520	0.48
1983	12,195	24,534	0.50
1984	11,280	22,871	0.49
1985	11,187	22,630	0.49
1986	13,990	24,128	0.58
1987	14,152	25,123	0.56
1988	12,103	23,457	0.52
1989	10,982	23,853	0.46
1990	11,432	24,624	0.46
1991	10,844	25,382	0.43
1992	15,154	22,377	0.68
1993	14,011	20,009	0.70
1994	12,708	21,412	0.59
1995	12,405	19,595	0.63
1996	9,200	19,270	0.48
1997	6,429	16,559	0.39
1998	9,372	15,237	0.62
1999	7,746	15,831	0.49
2000	7,865	16,980	0.46
2001	7,002	14,917	0.47
2002	5,779	13,323	0.43
2003	5,752	12,086	0.48
2004	6,509	15,090	0.43
2005	5,857	14,876	0.39
2006	6,162	15,363	0.40
2007	6,608	14,451	0.46
2008	9,492	11,627	0.82
2009	10,718	11,670	0.92
2010	11,489	12,090	0.95
2011	11,537	12,018	0.96
2012	12,423	13,222	0.94
2013	13,764	14,708	0.94

Table 3. Proportion of trips with at least one species recorded within time-area blocks. The year listed is the last year in that time block (i.e., 1983 refers to the 1972 to 1983 time block, 1991 refers to the 1984-1991 time block, 2000 refers to the 1992 to 2000 time block, 2009 refers to the 2001-2009 time block, and 2013 refers to the 2010 to 2013 time block). Shaded values represent species encountered at least 15% of trips. Excluding Black Sea Bass and Bank Sea Bass, the species in this table were used for the species-specific catch record analyses.

	NC/SC					GA-nFL					sFL				
Species	1983	1991	2000	2009	2013	1983	1991	2000	2009	2013	1983	1991	2000	2009	2013
BLACK.SEABASS	79.4	86.6	75.7	70.6	59.7	78.4	82.3	59.4	66.6	66.0	4.8	9.3	11.3	20.9	11.4
VERMILION.SNAPPER	31.4	29.9	41.6	32.7	20.8	82.5	90.6	54.1	83.0	58.8	20.7	23.7	11.5	12.3	10.8
GRAY.TRIGGERFISH	30.6	22.4	43.0	34.5	29.5	51.2	52.6	50.9	59.7	71.3	19.6	26.4	21.9	26.4	31.5
TOMTATE	33.6	46.3	46.0	24.6	28.4	57.3	86.7	44.2	17.0	25.2	8.7	16.6	9.0	8.0	8.9
GAG	24.0	25.4	23.9	19.6	14.8	49.7	43.1	50.7	33.1	18.3	10.6	9.4	12.1	12.5	2.6
KING.MACKEREL	1.2	12.7	21.8	19.0	8.6	21.0	18.9	16.6	17.0	5.6	51.3	45.8	34.9	31.6	28.3
GRAY.SNAPPER	0.1	0.3	1.2	2.6	0.4	21.5	29.2	45.4	42.8	29.2	17.9	25.2	39.3	41.7	35.4
RED.SNAPPER	16.0	15.4	12.8	10.8	0.4	70.0	52.4	46.5	72.3	2.2	5.0	5.6	5.5	13.1	0.4
WHITE.GRUNT	26.1	26.8	44.1	38.5	34.6	0.6	2.5	7.6	4.2	5.3	10.9	18.5	28.9	36.6	31.6
WHITEBONE.PORGY	10.3	18.4	31.1	14.0	6.4	21.2	51.8	43.1	33.5	45.9	1.6	3.5	4.0	5.9	9.2
YELLOWTAIL.SNAPPER	0.1	0.3	0.6	0.8	0.2	5.2	11.4	2.2	10.9	2.1	50.8	48.2	54.2	52.2	54.3
RED.PORGY	44.0	34.2	31.0	25.6	16.3	42.6	24.4	9.8	11.1	5.7	6.4	6.6	1.3	0.7	1.7
ATLANTIC.SHARPNOSE.SHARK	0.0	0.3	14.3	22.3	36.1	0.0	4.5	44.7	53.1	48.0	0.0	0.1	3.5	11.9	7.4
GREATER.AMBERJACK	13.0	17.7	17.3	14.6	11.0	41.1	30.0	27.5	29.2	21.8	8.4	6.2	3.1	3.5	1.6
LANE.SNAPPER	0.0	0.0	0.1	0.0	0.0	11.6	15.2	35.8	40.8	19.4	10.3	22.3	29.1	28.5	19.4
MUTTON.SNAPPER	0.1	0.0	0.1	0.1	0.2	3.2	3.9	7.5	8.6	5.1	44.3	36.4	31.3	31.9	30.0
LITTLE.TUNNY	0.1	4.3	7.3	4.5	5.4	4.4	23.9	15.7	7.1	6.8	10.1	32.0	20.7	15.0	24.2
SCAMP	22.4	25.7	28.7	22.3	11.4	5.6	7.2	19.6	16.8	4.7	4.4	3.6	3.1	3.2	0.6
BLUE.RUNNER	0.4	1.3	1.6	1.4	0.6	1.0	4.3	1.4	2.2	1.4	29.1	31.2	22.0	16.9	25.8
SPOTTAIL.PINFISH	12.5	17.3	19.2	23.0	28.9	0.5	10.9	13.0	6.1	5.9	0.1	0.0	0.1	0.3	0.1
COBIA	0.5	2.4	4.4	4.4	3.3	7.7	18.4	19.7	26.1	21.7	4.7	4.5	6.0	5.8	7.2
RED.GROUPER	3.5	2.8	12.1	10.4	3.2	15.8	8.0	7.8	7.5	1.6	13.0	10.5	16.5	17.8	6.1
KEY.WEST.PORGY	10.4	17.9	22.1	9.8	2.8	2.0	1.5	0.6	0.5	0.3	9.3	10.8	9.3	14.6	11.2
BANK.SEABASS	0.0	13.5	21.5	15.0	12.6	0.0	26.3	11.1	9.1	9.4	0.0	0.1	0.2	0.2	0.2
GREAT.BARRACUDA	0.2	2.9	4.1	2.8	1.3	2.8	10.6	17.5	15.8	14.2	16.3	8.9	8.5	3.5	1.6
SAND.PERCH	0.3	11.4	6.3	4.5	3.3	0.9	21.9	4.2	1.6	1.5	0.1	0.5	0.3	0.6	0.8
ATLANTIC.BONITO	0.0	1.1	0.3	0.2	0.3	9.3	0.0	0.0	0.0	1.5	20.4	0.0	0.0	0.0	2.0

Table 4. List and description of metrics developed to identify misreporting.

z-score metric	n	Type of potential misreporting	Flagging criteria (modified z score)	Description
num.m	1	consistently report high or low number of total caught	>abs(3.5)	relative ranking of the mean of reported caught among vessels by area & time period
catrate.m	1	consistently report high or low catch rates	>abs(3.5)	relative ranking of the mean of reported(CPUE) among vessels by area & time period
spcount.m	1	consistently report high or low number of species	>abs(3.5)	relative ranking of the mean of reported count of all species among vessels by area & time period
sw.m	1	consistently report very few species or many species	>abs(3.5)	relative ranking of the mean of the Shannon-Wiener index value among vessels by area & time period
"species.m"	25	vessels that consistently report low or high numbers of species 'x'	>abs(3.5)	relative ranking of the mean species.X 'caught' for the 27 various species* among vessels by area & time period
num.v	1	vessels that consistently report the same number of indiviuals	>abs(3.5)	relative ranking of the variance of reported caught among vessels by area & time period
catrate.v	1	vessels that consistently report the same catch rates	>abs(3.5)	relative ranking of the variance of reported(CPUE) among vessels by area & time period
spcount.cv	1	vessels that consistently report the same number of species	>abs(3.5)	relative ranking of the coeffient of variation of reported count of all species among vessels by area & time period
sw.cv	1	vessels that consistently report the same level of species diversity at the trip level (similar to spcount.cv)	>abs(3.5)	relative ranking of the coeffient of variation of theShannon-Wiener index value among vessels by area & time period
"species.v"	25	consistently report simliar catch rates for species 'x'	>abs(3.5)	relative ranking of the variation species.X 'CPUE' for the 27 various species* among vessels by area & time period
"MDS.species"	1	vessel reporting species' that are much different than similar vessels fishing in similar habitat	>abs(3.5)	Non-Metric Multi-dimensional scaling (isoMDS) - presence/absence of 27 species
"MDS.species"	1	vessel reporting species' catch rates that are much different than similar vessels fishing in similar habitat	>abs(3.5)	Non-Metric Multi-dimensional scaling (isoMDS) - CPUE of 27 species
*27 Species- Present in at least 15% of trips for at least one area-time block				
*abbreviated species: yts=yellowtail snapper, vs=vermillion snapper, rs =red snapper, atlsharpnose= Atlantic sharpnose shark,tom=tomtate, gtf=gray triggerfish, wbp= whitebone porgy, ms=mutton snapper, grsnp= gray snapper, gag=gag, wg=white grunt, rp=red porgy, kmack=king mackerel, gaj=greater amberjack, lns=lane snapper,blrun=blue runner, scamp=scamp, spotpin=spottail pinfish, littun=little tunny, sdprch=sand perch, cobia=cobia, kwporgy=key west porgy, rg=red grouper, cuda=barracuda				

Table 5. Percentage of 161 extreme outliers occurring in each area and time block.

	Area		
Time blocks	Carolinas	Ga-nFL	sFL
1972-1983	4.2%	11.4%	13.3%
1984-1991	4.8%	3.6%	23.5%
1992-2000	7.2%	0.0%	12.7%
2001-2009	7.8%	0.0%	2.4%
2010-2013	1.2%	0.0%	7.8%
Grand Total	25.3%	15.1%	59.6%

Table 6. Flagged metrics by z-score. The trend for flagged metrics relative to sample size is displayed (4th column; note that metrics that were not flagged are not included in the table). Column designations are: Region (1=Carolinas, 2=Ga-nFL, 3=sFL), n.trips=Number of trips, yts.m=Yellowtail Snapper, vs.m=Vermilion Snapper, tom=Tomtate, ms.m=Mutton Snapper, wg.m=White Grunt, kwporgy.m=Key West Porgy, sdprch.v=Sand Perch variance, z_sp_27=NMDS presence/absence top 27 species, z_sp_all= NMDS presence/absence all species, z_cpue_all= NMDS catch rate all species. *('.m' represents mean number caught).

Year	Region	vessel	n.trips	yts.m	vs.m	tom.m	ms.m	wg.m	kwporgy.m	sdprch.v	z_sp_27	z_sp_all	z_cpue_all
1972-1983	1	[redacted]	1								4.5	2.5	2.2
1972-1983	1	[redacted]	1					0.1			4.6	2.7	1.9
1972-1983	2	[redacted]	1		0.1						4.2	2.5	1.2
1972-1983	3	[redacted]	1	1.1		1.1	0.5		1.5		4.1	3.1	2.0
1972-1983	3	[redacted]	1			0.1	-0.2				4.8	2.8	1.3
1972-1983	3	[redacted]	1					0.3			6.3	4.0	2.5
1972-1983	3	[redacted]	1		0.7						5.5	4.1	1.5
1992-2000	3	[redacted]	1	-1.5			-0.6				5.9	6.8	3.4
1972-1983	2	[redacted]	2								6.3	4.0	2.4
1984-1991	3	[redacted]	2				0.9				7.0	4.0	2.5
1992-2000	1	[redacted]	2								5.1	4.4	1.9
1984-1991	3	[redacted]	3		-0.7	0.3					4.6	3.0	1.8
2001-2009	1	[redacted]	3								7.1	5.6	3.2
2001-2009	2	[redacted]	3		0.2						7.9	5.0	2.7
2010-2013	2	[redacted]	3		-1.2						304.1	4.1	4.8
2010-2013	2	[redacted]	3				0.2				303.9	4.5	3.5
1984-1991	3	[redacted]	4	-0.3			-0.4				3.9	1.2	1.6
1984-1991	3	[redacted]	5	0.2			1.2				4.0	1.9	1.0
1984-1991	3	[redacted]	6	0.1		0.2	0.2	0.0			3.6	2.2	1.6
1972-1983	3	[redacted]	7								8.2	4.8	3.1
1972-1983	3	[redacted]	7				0.2				5.7	3.3	2.1
1984-1991	3	[redacted]	7	0.9		-1.0	0.4	-1.0			4.0	2.5	1.6
1992-2000	2	[redacted]	7			0.4					5.6	7.3	3.4
1992-2000	3	[redacted]	7	0.3							6.2	7.0	2.1
2010-2013	2	[redacted]	7				-0.3				304.7	4.1	3.0
1972-1983	3	[redacted]	8		-0.5			-0.4			4.0	1.7	1.7
2010-2013	2	[redacted]	8								658.8	10.3	4.9
1992-2000	1	[redacted]	9								5.3	4.0	1.8
2001-2009	3	[redacted]	9	0.6			0.3	-0.8			6.0	4.6	0.9
2001-2009	3	[redacted]	9	0.1			-0.4	0.2	0.7		4.2	5.1	1.0
1972-1983	3	[redacted]	10		0.1		-0.1		0.0		5.7	3.3	1.9
2010-2013	3	[redacted]	10	0.2	0.8		0.4				7.2	2.8	1.3
2001-2009	2	[redacted]	12					-0.7			7.6	3.1	1.8
2010-2013	3	[redacted]	12	-1.1			-0.7				11.9	6.1	4.7
1984-1991	2	[redacted]	14		-1.6	-0.8					4.8	1.4	1.6
2001-2009	1	[redacted]	15								3.5	2.2	2.4
1984-1991	2	[redacted]	16		-0.5	0.0				0.3	5.1	1.6	0.8
1992-2000	2	[redacted]	16		0.1	-1.0		-0.1			3.9	5.0	3.2
2001-2009	2	[redacted]	16		0.4			-0.8			4.1	3.2	1.0
1984-1991	1	[redacted]	17							-0.4	6.5	3.2	2.2
1984-1991	3	[redacted]	25	0.3			-0.7	-1.5	-0.3		3.6	2.0	0.4
1972-1983	3	[redacted]	26			0.0		0.1	-0.6		4.6	3.4	1.0
1972-1983	3	[redacted]	33	-0.7			-0.9	-0.3	0.2		3.5	1.4	0.6
2010-2013	2	[redacted]	35			-1.1		0.4			303.3	3.0	2.4
2001-2009	1	[redacted]	40								3.8	2.6	1.0
1972-1983	1	[redacted]	57								4.5	2.5	2.2
2001-2009	1	[redacted]	62								5.8	3.4	1.5
1992-2000	1	[redacted]	78								3.6	2.5	0.6
1972-1983	2	[redacted]	82		-0.3	0.3			3.8		0.3	0.4	-0.7
1992-2000	1	[redacted]	92								4.9	3.1	1.0
2010-2013	1	[redacted]	95			-0.7		0.1			3.7	3.2	0.9
2010-2013	3	[redacted]	126	-0.2	0.1		0.4				5.7	2.1	1.5
2010-2013	1	[redacted]	128		-4.2						2.4	2.7	0.2
1984-1991	2	[redacted]	132	0.7	0.5	0.8	0.6	4.6	0.4	0.8	-0.4	-0.2	-0.5
2010-2013	1	[redacted]	153								3.7	4.0	1.2
1992-2000	1	[redacted]	163		-0.2		3.6	0.6	0.7		0.0	-0.1	-0.4
1984-1991	1	[redacted]	213			-0.7					4.8	1.8	0.1
2001-2009	1	[redacted]	263								3.6	2.3	0.8
2010-2013	1	[redacted]	272		-4.6	-0.6		0.1	-0.5	0.4	-0.4	-0.2	-0.5
1992-2000	2	[redacted]	289		0.6						2.5	4.0	1.0
1984-1991	1	[redacted]	298			-1.3					7.8	3.0	3.9
1992-2000	1	[redacted]	299		1.4						3.6	2.6	0.5
1972-1983	3	[redacted]	362	0.3	0.4	0.7	0.1	0.1	0.5	-5.5	0.0	0.2	-0.7
1984-1991	2	[redacted]	377	0.1	-0.3	0.2	1.7	5.0	0.0	0.6	-0.8	-0.7	-0.5
2010-2013	1	[redacted]	387	4.6	-0.6	-0.1		0.0	0.0		0.0	-0.1	-0.6
2010-2013	1	[redacted]	406	4.6	-0.5	0.5	2.0	0.2	0.3	0.0	0.0	-0.4	-1.2
2010-2013	1	[redacted]	455					0.0			5.3	5.1	1.2
1984-1991	2	[redacted]	459	-0.3	0.1	-0.3	-0.4	3.8	-0.3	1.6	-0.4	-0.3	-0.2
2010-2013	3	[redacted]	542	0.0			-0.4	0.5	0.3		4.0	0.8	0.2
1984-1991	1	[redacted]	823		-2.1	-1.5	4.6	-1.0	-1.2	0.0	-0.5	0.3	0.0
2001-2009	1	[redacted]	968	0.7	0.1	1.3	7.0	0.4	0.4	1.1	0.0	-0.4	-0.6
2001-2009	2	[redacted]	1696	0.3	-0.7	-0.7	0.5	0.0	3.8		-0.4	-0.6	-0.4
1984-1991	2	[redacted]	2141	0.0	-0.7	-3.6	-0.2		0.0		0.4	-0.1	0.2
1984-1991	1	[redacted]	2143		-0.3	0.7		-1.6			6.4	2.9	0.3

Table 7. **Redacted for confidentiality**. Summary of trip level data for each vessel flagged. Metric flagged, NMDS=nonmetric multidimensional scaling, ms=Mutton Snapper, wg=White Grunt, tom=Tomtate, vs=Vermilion Snapper, yts=Yellowtail Snapper.

Table 8. **Redacted for confidentiality**. List of vessels examined in the EDA plots including sample size (n.trips), metric flagged, description of trip level data and list of concerns/recommendations. Region 1 – Carolinas, Region 2 = GA-nFL, Region 3 = sFL.

Table 9. Rounding and variance for Gray Triggerfish for all year blocks from the Carolinas region. Ves=Vessel number, cv=coefficient of variation, sd=standard deviation, %rnd=percent rounding, trips=number of trips, max=maximum reported, mean=mean number reported. The red shaded blocks indicate vessels with percent rounding higher than 80% and/or less than 100 trips and/or vessel mean reported was higher than total mean reported.

yr	ves	cv	sd	%rnd	trips	max	mean
1972-1983	[redacted]	0.9	16.2	69.7	309	100	17.4
1972-1983	[redacted]	1.0	24.9	64.8	931	300	25.1
1972-1983	[redacted]	1.1	26.4	60.2	209	202	24.2
1972-1983	[redacted]	0.9	10.8	39.8	313	75	12.4
1972-1983	[redacted]	0.8	6.4	39.1	70	25	7.6
1972-1983	[redacted]	1.2	24.2	37.9	40	100	19.5
1972-1983	[redacted]	0.6	4.6	35.0	392	30	7.3
1972-1983	[redacted]	1.3	23.5	34.2	457	150	18.1
1972-1983	[redacted]	1.3	15.4	34.1	284	150	11.6
1972-1983	[redacted]	1.9	17.9	33.2	797	329	9.3
1972-1983	[redacted]	1.1	9.9	30.0	31	45	9.4
1972-1983	[redacted]	1.0	27.5	29.0	571	200	27.4
1972-1983	[redacted]	0.4	24.7	28.7	77	156	55.9
1972-1983	[redacted]	2.7	39.5	28.2	689	600	14.5
1972-1983	[redacted]	1.1	10.1	27.0	247	75	9.0
1972-1983	[redacted]	2.0	41.9	25.2	188	250	21.2
1972-1983	[redacted]	1.0	29.6	25.0	43	100	29.3
1972-1983	[redacted]	1.1	10.7	18.4	91	100	9.5
1972-1983	[redacted]	1.0	5.4	13.6	13	20	5.6
1972-1983	[redacted]	0.9	28.6	13.3	486	212	33.2
1972-1983	[redacted]	1.2	19.1	12.1	7	45	15.6
1972-1983	[redacted]	3.7	27.1	11.4	126	300	7.3
1972-1983	[redacted]	4.2	29.5	6.8	207	304	7.0
1972-1983	[redacted]	0.8	7.1	6.3	3	15	8.7
1972-1983	[redacted]	0.9	21.0	5.1	57	100	24.5
1972-1983	[redacted]	1.3	15.4	4.3	83	100	12.1
1972-1983	[redacted]	0.7	3.8	3.6	6	10	5.3
1972-1983	[redacted]	1.0	4.2	2.8	88	30	4.2
1972-1983	[redacted]	1.9	5.4	2.7	53	40	2.8
1972-1983	[redacted]	1.3	12.1	2.4	16	50	9.0
1972-1983	[redacted]	2.0	10.6	1.2	49	50	5.3
1972-1983	[redacted]	0.9	3.2	1.1	72	18	3.6
1972-1983	[redacted]	0.5	1.0	1.0	29	5	2.0
1972-1983	[redacted]	1.1	3.6	1.0	125	25	3.4
1972-1983	[redacted]	1.0	2.5	0.9	94	12	2.5
1972-1983	[redacted]	2.6	99.9	0.6	25	500	38.0
1972-1983	[redacted]	0.9	1.7	0.6	47	10	1.9
1972-1983	[redacted]	0.6	3.3	0.3	4	10	5.3
1972-1983	[redacted]	1.0	3.6	0.1	5	10	3.8

yr	ves	cv	sd	%rnd	trips	max	mean
1984-1991	[redacted]	2.1	89.7	48.5	235	900	42.9
1984-1991	[redacted]	1.0	11.4	42.6	779	130	11.1
1984-1991	[redacted]	1.4	15.9	41.6	617	225	11.0
1984-1991	[redacted]	0.9	10.2	35.7	204	75	11.0
1984-1991	[redacted]	1.4	16.6	29.6	363	200	11.9
1984-1991	[redacted]	1.0	7.9	28.6	312	50	8.0
1984-1991	[redacted]	1.7	35.5	27.1	243	300	20.8
1984-1991	[redacted]	1.8	37.5	23.0	85	200	21.3
1984-1991	[redacted]	1.0	7.7	13.0	265	50	7.9
1984-1991	[redacted]	0.8	4.8	12.2	35	30	6.0
1984-1991	[redacted]	0.8	6.7	8.8	105	30	8.2
1984-1991	[redacted]	0.6	2.2	7.4	41	10	3.7
1984-1991	[redacted]	0.9	3.0	5.4	51	15	3.2
1984-1991	[redacted]	1.3	9.5	2.8	95	60	7.1
1984-1991	[redacted]	0.6	1.1	1.7	19	5	1.8
1984-1991	[redacted]	1.5	54.4	1.5	3	100	37.3
1984-1991	[redacted]	0.5	1.0	1.4	64	5	1.9
1984-1991	[redacted]	1.2	2.6	1.1	86	20	2.1
1984-1991	[redacted]	0.7	1.6	1.0	24	6	2.3
1984-1991	[redacted]	1.0	5.1	0.9	24	20	5.2
1984-1991	[redacted]	1.2	3.2	0.8	42	15	2.8
1984-1991	[redacted]	0.7	1.2	0.7	44	6	1.8
1984-1991	[redacted]	0.9	2.0	0.4	92	15	2.2
1984-1991	[redacted]	0.7	1.3	0.4	171	8	1.8
1984-1991	[redacted]	1.6	19.6	0.2	3	35	12.3

yr	ves	cv	sd	%rnd	trips	max	mean
1992-2000	[redacted]	**1.1**	**108.3**	**85.9**	**1053**	**700**	**103.0**
1992-2000	[redacted]	**0.8**	**25.6**	**85.4**	**1176**	**250**	**30.7**
1992-2000	[redacted]	1.1	14.7	71.4	22	60	13.9
1992-2000	[redacted]	1.1	110.4	70.8	777	700	99.5
1992-2000	[redacted]	1.4	45.8	67.5	818	450	33.7
1992-2000	[redacted]	0.8	14.1	64.4	240	100	16.9
1992-2000	[redacted]	1.1	137.5	64.0	696	700	125.5
1992-2000	[redacted]	1.5	69.8	50.1	948	550	47.4
1992-2000	[redacted]	1.2	134.2	36.5	377	750	112.6
1992-2000	[redacted]	1.1	9.4	27.1	269	50	8.6
1992-2000	[redacted]	1.2	12.1	22.7	157	100	10.2
1992-2000	[redacted]	1.2	19.9	21.8	425	250	16.8
1992-2000	[redacted]	0.2	28.9	18.8	3	150	116.7
1992-2000	[redacted]	0.7	3.8	17.7	83	21	5.2
1992-2000	[redacted]	0.5	3.4	16.7	4	10	6.5
1992-2000	[redacted]	1.5	16.2	16.6	93	100	10.5
1992-2000	[redacted]	0.9	2.9	13.3	9	10	3.3
1992-2000	[redacted]	2.1	15.1	11.0	219	115	7.2
1992-2000	[redacted]	0.9	9.0	10.9	76	40	10.4
1992-2000	[redacted]	1.2	6.3	8.4	157	50	5.3
1992-2000	[redacted]	3.0	40.2	7.4	24	200	13.4
1992-2000	[redacted]	0.8	7.5	5.2	21	30	9.1
1992-2000	[redacted]	0.9	3.0	4.9	459	30	3.4
1992-2000	[redacted]	1.5	22.1	4.8	29	100	15.2
1992-2000	[redacted]	0.8	2.1	4.5	55	10	2.6
1992-2000	[redacted]	1.0	3.6	4.0	23	15	3.7
1992-2000	[redacted]	1.3	4.6	3.1	272	25	3.5
1992-2000	[redacted]	0.9	2.4	2.7	204	25	2.7
1992-2000	[redacted]	1.0	4.3	1.9	31	21	4.4
1992-2000	[redacted]	0.9	2.1	1.8	34	10	2.4
1992-2000	[redacted]	3.2	12.3	1.7	83	112	3.8
1992-2000	[redacted]	1.0	2.2	1.6	16	10	2.3
1992-2000	[redacted]	0.6	1.3	1.4	18	5	2.0
1992-2000	[redacted]	1.4	6.7	1.3	203	54	4.9
1992-2000	[redacted]	0.6	1.1	1.1	18	5	1.7
1992-2000	[redacted]	1.3	14.2	1.1	7	39	10.6
1992-2000	[redacted]	2.0	8.6	1.0	23	42	4.3
1992-2000	[redacted]	0.7	1.4	0.8	482	17	2.0
1992-2000	[redacted]	1.1	2.1	0.3	132	20	2.0
1992-2000	[redacted]	1.3	3.7	0.2	103	22	2.9
1992-2000	[redacted]	0.9	1.4	0.1	71	11	1.6

yr	ves	cv	sd	%rnd	trips	max	mean
2001-2009	[redacted]	**0.6**	**11.3**	**93.7**	**104**	**50**	**20.0**
2001-2009	[redacted]	**0.6**	**16.0**	**91.6**	**695**	**130**	**24.7**
2001-2009	[redacted]	1.4	92.8	78.4	450	750	67.3
2001-2009	[redacted]	1.2	105.4	68.5	522	800	86.3
2001-2009	[redacted]	1.1	10.7	66.7	20	40	10.1
2001-2009	[redacted]	1.3	106.8	65.8	711	600	80.5
2001-2009	[redacted]	1.1	11.3	52.5	195	80	10.2
2001-2009	[redacted]	1.4	19.0	51.6	22	80	13.5
2001-2009	[redacted]	1.4	54.1	50.4	203	350	37.7
2001-2009	[redacted]	1.1	84.6	48.0	666	400	80.1
2001-2009	[redacted]	1.0	22.4	46.6	340	175	23.3
2001-2009	[redacted]	1.9	77.8	36.4	515	600	41.9
2001-2009	[redacted]	0.8	18.3	33.6	194	100	22.7
2001-2009	[redacted]	1.2	27.4	32.0	35	100	22.5
2001-2009	[redacted]	0.9	42.1	31.3	26	155	45.2
2001-2009	[redacted]	1.2	10.7	23.7	452	100	8.9
2001-2009	[redacted]	1.1	17.8	15.1	112	85	16.1
2001-2009	[redacted]	0.7	7.0	10.5	10	25	10.3
2001-2009	[redacted]	2.2	27.6	10.1	429	300	12.7
2001-2009	[redacted]	0.8	8.4	9.8	107	50	10.8
2001-2009	[redacted]	0.6	3.4	6.7	5	12	6.2
2001-2009	[redacted]	0.9	9.6	6.6	145	45	10.2
2001-2009	[redacted]	0.8	5.2	5.4	21	20	6.4
2001-2009	[redacted]	1.0	9.1	5.2	130	60	8.7
2001-2009	[redacted]	0.6	36.2	5.0	7	110	59.7
2001-2009	[redacted]	1.9	9.3	5.0	96	75	4.9
2001-2009	[redacted]	1.2	4.1	3.5	58	20	3.6
2001-2009	[redacted]	0.8	2.9	3.3	8	10	3.9
2001-2009	[redacted]	1.0	3.7	2.9	5	10	3.6
2001-2009	[redacted]	0.6	1.6	1.9	9	5	2.6
2001-2009	[redacted]	1.2	2.9	1.5	13	11	2.5
2001-2009	[redacted]	1.3	3.6	1.3	168	20	2.8
2001-2009	[redacted]	0.8	1.9	1.1	106	10	2.5
2001-2009	[redacted]	0.8	3.0	1.0	128	18	3.8
2001-2009	[redacted]	1.0	3.2	1.0	16	10	3.2
2001-2009	[redacted]	1.1	4.9	0.8	378	41	4.6
2001-2009	[redacted]	1.5	3.1	0.6	309	25	2.0
2001-2009	[redacted]	1.0	1.7	0.4	32	10	1.8
2001-2009	[redacted]	0.8	4.0	0.1	3	10	5.3

yr	ves	cv	sd	%rnd	trips	max	mean
2010-2013	[redacted]	**0.7**	**32.1**	**80.6**	**203**	**250**	**42.9**
2010-2013	[redacted]	1.1	99.1	74.0	100	500	87.1
2010-2013	[redacted]	1.4	63.6	70.4	431	400	46.5
2010-2013	[redacted]	1.2	123.2	58.3	405	750	101.7
2010-2013	[redacted]	0.7	34.3	36.9	203	240	50.0
2010-2013	[redacted]	1.3	80.7	33.3	317	470	60.9
2010-2013	[redacted]	1.1	60.2	32.7	227	400	53.9
2010-2013	[redacted]	4.3	62.2	21.5	77	550	14.5
2010-2013	[redacted]	0.8	5.9	11.9	75	30	7.2
2010-2013	[redacted]	1.5	16.1	10.5	280	78	10.6
2010-2013	[redacted]	1.2	7.8	9.4	30	30	6.8
2010-2013	[redacted]	0.9	7.8	6.5	129	51	8.6
2010-2013	[redacted]	0.7	27.9	6.3	45	112	40.8
2010-2013	[redacted]	1.0	11.0	4.4	111	80	11.1
2010-2013	[redacted]	0.6	5.5	2.3	73	35	8.6
2010-2013	[redacted]	0.0	0.0	1.8	2	10	10.0
2010-2013	[redacted]	1.2	8.2	1.8	93	42	6.7
2010-2013	[redacted]	1.1	9.6	1.7	58	42	8.7
2010-2013	[redacted]	1.9	12.3	1.7	37	60	6.6
2010-2013	[redacted]	1.1	5.1	1.2	166	30	4.4
2010-2013	[redacted]	0.7	3.5	1.1	56	13	5.3
2010-2013	[redacted]	2.1	6.6	0.9	49	45	3.2
2010-2013	[redacted]	0.3	40.5	0.7	8	208	129.0
2010-2013	[redacted]	0.7	1.3	0.4	94	7	1.8
2010-2013	[redacted]	0.9	4.6	0.4	10	15	4.9
2010-2013	[redacted]	0.7	0.9	0.4	60	6	1.4
2010-2013	[redacted]	0.5	1.1	0.2	30	5	2.2
2010-2013	[redacted]	1.0	1.3	0.1	163	11	1.4

Table 10. Rounding and variance for Red Porgy for all year blocks from the Carolinas region. Ves=Vessel number, cv=coefficient of variation, sd=standard deviation, %rnd=percent rounding, trips=number of trips, max=maximum reported, mean=mean number reported. The red shaded blocks indicate vessels with percent rounding higher than 80% and/or less than 100 trips and/or vessel mean reported was higher than total mean reported.

yr	ves	cv	sd	%rnd	trips	max	mean
1972-1983	[redacted]	0.6	146.6	98.6	1276.0	1200.0	242.7
1972-1983	[redacted]	1.0	199.7	98.3	523.0	1200.0	210.1
1972-1983	[redacted]	0.8	103.5	98.3	58.0	600.0	135.6
1972-1983	[redacted]	0.9	108.2	96.3	1012.0	1000.0	122.7
1972-1983	[redacted]	0.9	91.0	95.5	1122.0	1000.0	102.7
1972-1983	[redacted]	0.7	54.0	95.5	22.0	200.0	79.0
1972-1983	[redacted]	0.5	99.8	94.7	637.0	799.0	195.3
1972-1983	[redacted]	0.9	109.6	94.5	391.0	965.0	120.2
1972-1983	[redacted]	0.8	134.8	93.6	327.0	800.0	158.6
1972-1983	[redacted]	0.8	127.3	93.2	427.0	600.0	155.2
1972-1983	[redacted]	0.8	80.1	86.6	240.0	500.0	106.1
1972-1983	[redacted]	1.1	66.2	85.6	211.0	385.0	61.4
1972-1983	[redacted]	0.6	46.2	85.2	110.0	200.0	76.0
1972-1983	[redacted]	0.5	47.9	85.0	38.0	230.0	96.1
1972-1983	[redacted]	0.8	24.7	81.3	15.0	100.0	31.0
1972-1983	[redacted]	1.1	74.2	75.2	327.0	500.0	68.6
1972-1983	[redacted]	0.9	114.2	73.8	449.0	545.0	126.2
1972-1983	[redacted]	0.8	122.0	73.6	192.0	500.0	147.4
1972-1983	[redacted]	0.8	46.5	66.9	131.0	500.0	57.1
1972-1983	[redacted]	1.3	90.2	66.7	619.0	600.0	71.5
1972-1983	[redacted]	0.7	26.3	64.1	71.0	200.0	38.6
1972-1983	[redacted]	1.0	17.5	55.1	160.0	100.0	18.3
1972-1983	[redacted]	0.6	111.0	54.0	680.0	1000.0	180.7
1972-1983	[redacted]	1.1	103.8	53.6	35.0	500.0	94.5
1972-1983	[redacted]	0.9	75.8	41.7	23.0	350.0	85.5
1972-1983	[redacted]	0.9	177.4	39.2	47.0	800.0	203.6
1972-1983	[redacted]	0.9	65.2	36.4	12.0	200.0	72.5
1972-1983	[redacted]	1.0	31.5	35.0	14.0	100.0	32.4
1972-1983	[redacted]	0.5	60.0	32.5	608.0	400.0	121.2
1972-1983	[redacted]	0.6	16.7	31.7	65.0	80.0	26.4
1972-1983	[redacted]	0.7	24.6	21.9	9.0	70.0	35.1
1972-1983	[redacted]	0.6	46.7	21.8	54.0	215.0	83.6
1972-1983	[redacted]	1.0	63.5	14.2	106.0	400.0	65.0
1972-1983	[redacted]	1.4	50.4	11.1	118.0	250.0	35.3
1972-1983	[redacted]	0.6	2.8	8.8	199.0	20.0	4.4
1972-1983	[redacted]	0.9	67.0	7.6	86.0	300.0	70.6
1972-1983	[redacted]	1.6	37.1	4.8	54.0	200.0	22.6
1972-1983	[redacted]	0.6	13.4	1.8	8.0	50.0	22.5
1972-1983	[redacted]	1.3	285.2	1.1	29.0	1000.0	212.9
1972-1983	[redacted]	NA	NA	0.4	1.0	10.0	10.0
1972-1983	[redacted]	1.4	36.0	0.4	8.0	100.0	25.5
1972-1983	[redacted]	1.7	12.0	0.1	4.0	25.0	7.0

yr	ves	cv	sd	%rnd	trips	max	mean
1984-1991	[redacted]	0.5	13.0	100.0	7.0	50.0	24.3
1984-1991	[redacted]	0.6	100.8	93.9	490.0	700.0	160.6
1984-1991	[redacted]	0.7	137.3	93.7	1026.0	1000.0	196.3
1984-1991	[redacted]	0.9	115.4	91.0	480.0	680.0	134.7
1984-1991	[redacted]	0.8	94.6	88.2	284.0	700.0	115.9
1984-1991	[redacted]	0.8	78.7	85.6	729.0	500.0	94.0
1984-1991	[redacted]	0.8	65.7	81.4	446.0	600.0	85.7
1984-1991	[redacted]	0.8	31.6	80.3	143.0	200.0	37.5
1984-1991	[redacted]	0.8	33.0	79.7	65.0	150.0	41.2
1984-1991	[redacted]	1.1	105.9	78.5	451.0	1000.0	93.7
1984-1991	[redacted]	0.8	54.9	75.7	118.0	450.0	64.8
1984-1991	[redacted]	0.9	43.9	73.8	128.0	250.0	48.9
1984-1991	[redacted]	1.0	168.5	66.0	258.0	1000.0	160.9
1984-1991	[redacted]	0.9	57.6	57.4	117.0	300.0	61.2
1984-1991	[redacted]	0.9	22.6	52.8	50.0	100.0	24.2
1984-1991	[redacted]	0.5	15.0	50.5	49.0	80.0	33.0
1984-1991	[redacted]	0.7	20.0	50.0	66.0	90.0	26.8
1984-1991	[redacted]	0.9	138.1	47.1	425.0	900.0	149.7
1984-1991	[redacted]	0.8	12.0	30.7	233.0	50.0	14.3
1984-1991	[redacted]	1.0	29.8	25.6	187.0	200.0	30.2
1984-1991	[redacted]	0.9	17.9	22.2	46.0	75.0	19.5
1984-1991	[redacted]	0.7	27.3	14.8	123.0	150.0	37.6
1984-1991	[redacted]	1.1	22.7	13.1	20.0	100.0	20.0
1984-1991	[redacted]	0.9	38.0	12.3	119.0	350.0	43.6
1984-1991	[redacted]	1.0	39.6	9.8	14.0	150.0	40.5
1984-1991	[redacted]	0.7	24.5	7.5	107.0	180.0	36.3
1984-1991	[redacted]	1.0	57.3	5.3	42.0	200.0	57.6
1984-1991	[redacted]	0.5	12.8	4.3	6.0	50.0	27.0
1984-1991	[redacted]	2.2	25.6	1.7	33.0	125.0	11.5
1984-1991	[redacted]	0.5	16.3	1.5	16.0	75.0	29.8
1984-1991	[redacted]	0.9	3.8	1.2	38.0	14.0	4.4

yr	ves	cv	sd	%rnd	trips	max	mean
1992-2000	[redacted]	0.9	72.6	85.0	1114.0	500.0	81.5
1992-2000	[redacted]	1.6	68.6	79.5	114.0	650.0	42.9
1992-2000	[redacted]	0.8	27.9	73.5	214.0	200.0	36.4
1992-2000	[redacted]	1.1	61.2	68.6	710.0	490.0	56.4
1992-2000	[redacted]	0.8	68.2	61.2	609.0	400.0	83.0
1992-2000	[redacted]	1.0	73.5	59.6	738.0	500.0	71.2
1992-2000	[redacted]	0.8	57.5	56.7	343.0	300.0	70.9
1992-2000	[redacted]	0.4	8.1	53.6	15.0	40.0	20.3
1992-2000	[redacted]	1.4	48.1	49.9	821.0	700.0	35.4
1992-2000	[redacted]	1.4	111.8	46.5	467.0	1200.0	80.8
1992-2000	[redacted]	0.7	23.3	46.3	27.0	100.0	35.3
1992-2000	[redacted]	0.4	8.8	45.5	10.0	41.0	24.0
1992-2000	[redacted]	1.0	47.8	39.4	108.0	217.0	50.1
1992-2000	[redacted]	0.7	16.7	37.4	87.0	75.0	23.9
1992-2000	[redacted]	1.1	19.8	37.2	138.0	125.0	18.2
1992-2000	[redacted]	0.8	20.1	34.1	139.0	125.0	23.9
1992-2000	[redacted]	0.7	11.6	32.6	520.0	75.0	16.2
1992-2000	[redacted]	1.2	31.5	29.4	157.0	200.0	27.2
1992-2000	[redacted]	0.7	8.3	26.7	8.0	25.0	11.6
1992-2000	[redacted]	1.6	48.2	25.1	276.0	500.0	29.3
1992-2000	[redacted]	0.7	14.7	18.7	17.0	65.0	22.6
1992-2000	[redacted]	0.3	7.1	12.5	2.0	30.0	25.0
1992-2000	[redacted]	0.8	13.2	12.5	5.0	30.0	15.8
1992-2000	[redacted]	0.8	16.8	11.3	173.0	100.0	19.9
1992-2000	[redacted]	0.9	11.1	9.1	4.0	27.0	12.5
1992-2000	[redacted]	1.6	19.4	8.9	61.0	150.0	12.4
1992-2000	[redacted]	0.4	4.6	3.6	3.0	15.0	12.3
1992-2000	[redacted]	1.0	54.3	3.5	25.0	200.0	51.8
1992-2000	[redacted]	0.5	4.7	2.8	16.0	15.0	8.9
1992-2000	[redacted]	0.8	11.6	2.4	9.0	35.0	15.1
1992-2000	[redacted]	0.6	7.6	2.2	37.0	30.0	13.6
1992-2000	[redacted]	0.6	5.0	2.2	13.0	24.0	8.2
1992-2000	[redacted]	1.0	60.4	2.1	7.0	150.0	62.6
1992-2000	[redacted]	0.9	3.7	2.1	16.0	15.0	4.0
1992-2000	[redacted]	NA	NA	1.6	1.0	240.0	240.0
1992-2000	[redacted]	1.2	9.0	1.1	87.0	65.0	7.8
1992-2000	[redacted]	0.6	1.8	0.3	4.0	5.0	3.0
1992-2000	[redacted]	0.5	1.2	0.2	48.0	5.0	2.4
1992-2000	[redacted]	1.7	8.1	0.2	22.0	40.0	4.7
1992-2000	[redacted]	0.7	3.7	0.1	8.0	10.0	5.3
1992-2000	[redacted]	1.2	6.4	0.1	2.0	10.0	5.5

yr	ves	cv	sd	%rnd	trips	max	mean
2001-2009	[redacted]	0.9	93.2	100.0	111.0	500.0	105.0
2001-2009	[redacted]	0.8	91.8	91.2	735.0	600.0	108.6
2001-2009	[redacted]	0.6	14.8	74.2	26.0	60.0	25.6
2001-2009	[redacted]	0.7	34.1	71.8	242.0	200.0	51.4
2001-2009	[redacted]	0.5	19.6	70.8	19.0	70.0	36.1
2001-2009	[redacted]	0.0	0.0	66.7	2.0	20.0	20.0
2001-2009	[redacted]	1.2	31.6	51.5	345.0	360.0	27.4
2001-2009	[redacted]	0.7	14.9	42.6	281.0	100.0	22.4
2001-2009	[redacted]	1.4	51.0	41.1	174.0	640.0	36.7
2001-2009	[redacted]	0.4	10.3	40.0	40.0	57.0	29.5
2001-2009	[redacted]	1.2	38.0	36.1	417.0	264.0	31.6
2001-2009	[redacted]	0.9	41.8	30.2	555.0	700.0	44.9
2001-2009	[redacted]	0.6	16.9	28.5	124.0	100.0	26.5
2001-2009	[redacted]	0.8	39.3	25.4	212.0	200.0	49.7
2001-2009	[redacted]	0.5	4.5	20.9	412.0	35.0	9.2
2001-2009	[redacted]	0.7	9.1	15.4	611.0	50.0	13.0
2001-2009	[redacted]	0.7	23.4	14.6	218.0	123.0	35.6
2001-2009	[redacted]	0.8	39.0	11.4	174.0	210.0	47.5
2001-2009	[redacted]	0.9	8.5	9.2	132.0	60.0	9.2
2001-2009	[redacted]	0.9	6.8	7.7	27.0	25.0	7.8
2001-2009	[redacted]	0.8	9.1	7.5	208.0	55.0	11.2
2001-2009	[redacted]	1.2	13.2	6.5	108.0	100.0	11.1
2001-2009	[redacted]	0.8	6.6	4.7	44.0	25.0	8.5
2001-2009	[redacted]	0.6	8.6	2.2	29.0	40.0	13.9
2001-2009	[redacted]	0.8	9.9	1.7	39.0	41.0	12.9
2001-2009	[redacted]	0.7	3.2	1.1	259.0	17.0	4.5
2001-2009	[redacted]	0.6	6.6	1.0	10.0	20.0	10.2
2001-2009	[redacted]	0.3	1.2	1.0	3.0	5.0	3.7
2001-2009	[redacted]	0.5	15.4	0.6	10.0	50.0	28.7
2001-2009	[redacted]	0.4	6.6	0.6	6.0	23.0	14.8
2001-2009	[redacted]	0.7	2.4	0.3	61.0	10.0	3.7

yr	ves	cv	sd	%rnd	trips	max	mean
2010-2013	[redacted]	0.7	39.1	95.1	143.0	195.0	56.2
2010-2013	[redacted]	0.6	20.5	70.6	179.0	177.0	31.7
2010-2013	[redacted]	0.4	12.1	35.6	163.0	65.0	31.7
2010-2013	[redacted]	0.6	52.4	35.0	50.0	200.0	82.9
2010-2013	[redacted]	0.8	59.7	30.4	197.0	210.0	75.9
2010-2013	[redacted]	0.7	61.0	27.3	153.0	300.0	91.6
2010-2013	[redacted]	0.7	45.1	16.7	137.0	215.0	67.8
2010-2013	[redacted]	0.7	6.6	11.4	62.0	30.0	9.3
2010-2013	[redacted]	0.7	21.3	11.2	91.0	100.0	28.8
2010-2013	[redacted]	0.5	11.1	10.9	180.0	51.0	20.2
2010-2013	[redacted]	0.7	10.8	7.8	17.0	36.0	14.8
2010-2013	[redacted]	0.8	25.3	7.7	98.0	127.0	30.2
2010-2013	[redacted]	0.9	12.8	6.9	102.0	70.0	14.8
2010-2013	[redacted]	0.4	4.5	4.6	28.0	23.0	11.8
2010-2013	[redacted]	1.4	23.8	3.6	26.0	100.0	17.3
2010-2013	[redacted]	1.0	7.4	2.4	120.0	30.0	7.6
2010-2013	[redacted]	0.7	3.2	2.4	26.0	15.0	4.4
2010-2013	[redacted]	1.1	8.3	2.1	55.0	45.0	7.8
2010-2013	[redacted]	0.9	6.3	1.5	75.0	30.0	7.4
2010-2013	[redacted]	0.7	9.7	0.8	5.0	28.0	14.2
2010-2013	[redacted]	0.8	5.1	0.7	64.0	33.0	6.2
2010-2013	[redacted]	1.0	19.2	0.4	6.0	45.0	19.3
2010-2013	[redacted]	1.0	2.7	0.2	16.0	10.0	2.6

Table 11. Rounding and variance for Red Snapper for the first time block from the Georgia-north Florida region. Ves=Vessel number, cv=coefficient of variation, sd=standard deviation, %rnd=percent rounding, trips=number of trips, max=maximum reported, mean=mean number

reported. The red shaded blocks indicate vessels with percent rounding higher than 80% and/or less than 100 trips and/or vessel mean reported was higher than total mean reported.

yr	ves	cv	sd	%rnd	trips	max	mean
1972-1983	[redacted]	**NA**	**NA**	**100.0**	**1**	**55**	**55.0**
1972-1983	[redacted]	1.1	74.2	75.5	52	325	69.0
1972-1983	[redacted]	0.9	18.1	71.8	1270	200	19.8
1972-1983	[redacted]	1.3	77.9	66.7	3	150	60.7
1972-1983	[redacted]	0.9	17.1	53.8	13	60	18.6
1972-1983	[redacted]	1.0	14.6	49.6	310	100	14.6
1972-1983	[redacted]	1.1	23.3	47.4	205	200	20.3
1972-1983	[redacted]	1.2	19.8	45.0	95	85	16.8
1972-1983	[redacted]	1.4	49.3	43.7	732	500	35.3
1972-1983	[redacted]	1.1	49.8	39.5	77	275	44.4
1972-1983	[redacted]	1.6	49.5	37.7	166	300	31.7
1972-1983	[redacted]	1.0	25.9	37.4	1182	200	26.5
1972-1983	[redacted]	1.3	12.9	36.4	9	40	9.7
1972-1983	[redacted]	1.6	19.2	30.5	1059	400	12.0
1972-1983	[redacted]	0.8	19.3	30.4	84	76	24.2
1972-1983	[redacted]	1.0	7.0	29.9	57	40	7.0
1972-1983	[redacted]	0.8	8.5	29.4	15	30	10.1
1972-1983	[redacted]	1.8	22.0	26.7	91	200	12.2
1972-1983	[redacted]	1.3	18.0	23.2	914	100	13.9
1972-1983	[redacted]	1.8	20.6	21.9	111	200	11.4
1972-1983	[redacted]	2.1	30.2	21.5	772	300	14.2
1972-1983	[redacted]	0.7	21.3	21.4	10	71	29.2
1972-1983	[redacted]	1.5	44.2	17.9	107	317	29.5
1972-1983	[redacted]	0.9	6.6	14.6	28	27	7.3
1972-1983	[redacted]	1.2	15.7	13.5	38	70	13.0
1972-1983	[redacted]	1.3	9.0	13.3	176	67	6.7
1972-1983	[redacted]	1.9	20.0	12.8	650	225	10.6
1972-1983	[redacted]	1.0	6.3	11.1	6	18	6.5
1972-1983	[redacted]	1.1	7.1	8.5	63	30	6.7
1972-1983	[redacted]	0.9	5.0	2.6	19	16	5.8
1972-1983	[redacted]	2.1	10.0	1.1	49	68	4.7

Table 12a. Rounding and variance for Vermilion Snapper for all year blocks from the Carolinas region. Ves=Vessel number, cv=coefficient of variation, sd=standard deviation, %rnd=percent rounding, trips=number of trips, max=maximum reported, mean=mean number reported. The red shaded blocks indicate vessels with percent rounding higher than 80% and/or less than 100 trips and/or vessel mean reported was higher than total mean reported.

yr	ves	cv	sd	%rnd	trips	maz	mean
1972-1983	[redacted]	NA	NA	100.0	1	250	250.0
1972-1983	[redacted]	1.0	63.6	93.8	16	200	63.9
1972-1983	[redacted]	1.1	108.4	85.0	1288	900	101.0
1972-1983	[redacted]	1.2	107.1	75.7	115	1000	91.3
1972-1983	[redacted]	0.7	33.8	72.1	134	300	45.9
1972-1983	[redacted]	0.9	48.0	67.2	58	160	56.3
1972-1983	[redacted]	1.8	250.4	65.2	528	1500	140.4
1972-1983	[redacted]	0.7	39.4	65.0	39	150	53.6
1972-1983	[redacted]	1.1	69.7	62.7	1141	600	64.4
1972-1983	[redacted]	1.5	86.4	57.4	1024	1200	57.8
1972-1983	[redacted]	1.2	87.4	55.3	704	600	71.7
1972-1983	[redacted]	1.3	89.3	52.0	440	600	68.4
1972-1983	[redacted]	1.4	53.1	48.6	403	300	39.0
1972-1983	[redacted]	0.5	15.5	45.7	88	90	30.2
1972-1983	[redacted]	0.9	189.9	44.7	694	1200	215.1
1972-1983	[redacted]	1.1	85.8	43.8	201	603	80.1
1972-1983	[redacted]	1.0	283.2	43.7	87	1200	278.3
1972-1983	[redacted]	1.6	84.9	40.9	22	350	54.0
1972-1983	[redacted]	1.2	26.2	40.6	330	200	21.7
1972-1983	[redacted]	1.1	70.4	39.9	641	600	64.7
1972-1983	[redacted]	1.5	24.7	34.8	178	200	16.3
1972-1983	[redacted]	1.0	40.7	34.2	99	200	39.0
1972-1983	[redacted]	0.9	331.2	33.0	401	1500	353.8
1972-1983	[redacted]	0.9	67.4	30.4	616	650	76.0
1972-1983	[redacted]	1.3	39.2	30.1	244	210	30.9
1972-1983	[redacted]	0.9	12.9	26.1	222	60	13.8
1972-1983	[redacted]	1.2	40.6	24.2	13	100	33.9
1972-1983	[redacted]	0.7	29.6	21.9	19	100	42.8
1972-1983	[redacted]	0.9	31.1	21.4	402	175	34.1
1972-1983	[redacted]	0.9	35.8	20.8	24	150	38.2
1972-1983	[redacted]	1.3	28.0	15.8	96	145	20.8
1972-1983	[redacted]	2.5	74.5	14.3	39	300	29.5
1972-1983	[redacted]	1.2	34.7	9.8	459	200	28.4
1972-1983	[redacted]	0.8	32.7	7.4	220	160	39.4
1972-1983	[redacted]	1.0	46.3	6.7	1046	200	46.7
1972-1983	[redacted]	2.0	29.1	6.6	215	150	14.8
1972-1983	[redacted]	0.9	30.0	6.0	432	120	34.4
1972-1983	[redacted]	1.1	82.3	6.0	428	450	76.9
1972-1983	[redacted]	0.8	164.8	5.2	46	500	195.0
1972-1983	[redacted]	1.9	36.8	3.6	244	225	19.7
1972-1983	[redacted]	0.4	15.7	2.4	369	60	38.9
1972-1983	[redacted]	0.9	103.2	1.3	124	400	112.5
1972-1983	[redacted]	0.9	22.3	1.1	892	90	26.3
1972-1983	[redacted]	1.3	8.5	1.0	256	30	6.6
1972-1983	[redacted]	1.1	16.4	0.5	209	50	14.9

yr	ves	cv	sd	%rnd	trips	maz	mean
1984-1991	[redacted]	0.7	169.3	93.3	506	1400	249.4
1984-1991	[redacted]	0.7	160.2	91.5	1078	1200	217.9
1984-1991	[redacted]	1.0	296.5	85.7	820	2500	303.2
1984-1991	[redacted]	1.0	172.0	84.1	514	1000	164.0
1984-1991	[redacted]	0.7	46.2	74.3	74	250	67.9
1984-1991	[redacted]	1.1	71.6	72.5	148	500	66.9
1984-1991	[redacted]	1.0	200.3	72.5	305	1200	190.8
1984-1991	[redacted]	0.8	307.9	68.6	347	2000	407.3
1984-1991	[redacted]	1.0	51.2	65.7	140	300	50.7
1984-1991	[redacted]	1.0	41.4	63.2	152	300	40.2
1984-1991	[redacted]	1.1	187.3	59.3	508	1000	178.0
1984-1991	[redacted]	1.2	200.6	58.8	148	1000	162.4
1984-1991	[redacted]	0.4	16.5	53.7	94	80	37.2
1984-1991	[redacted]	1.1	64.3	52.8	53	250	58.0
1984-1991	[redacted]	0.8	122.4	50.3	471	750	153.9
1984-1991	[redacted]	0.8	21.1	28.6	7	50	27.7
1984-1991	[redacted]	1.1	50.7	25.0	461	400	44.1
1984-1991	[redacted]	0.8	48.5	22.2	115	200	59.8
1984-1991	[redacted]	0.7	30.7	20.8	595	175	44.4
1984-1991	[redacted]	1.3	41.0	20.4	535	200	30.5
1984-1991	[redacted]	0.8	16.7	19.4	98	75	21.9
1984-1991	[redacted]	0.9	39.0	15.2	24	150	43.1
1984-1991	[redacted]	1.2	107.6	12.4	708	601	89.0
1984-1991	[redacted]	0.9	7.0	8.1	413	30	7.6
1984-1991	[redacted]	0.8	49.7	8.1	1260	300	61.3
1984-1991	[redacted]	1.0	126.4	7.5	35	400	127.5
1984-1991	[redacted]	0.9	60.9	5.8	376	250	70.0
1984-1991	[redacted]	1.3	44.5	1.7	19	100	34.0
1984-1991	[redacted]	0.8	43.3	1.5	214	150	53.0
1984-1991	[redacted]	1.2	4.4	0.1	593	10	3.5
1984-1991	[redacted]	NA	NA	0.0	190	150	150.0

yr	ves	cv	sd	%rnd	trips	maz	mean
1992-2000	[redacted]	0.4	12.5	100.0	6	50	33.3
1992-2000	[redacted]	0.4	196.0	97.9	889	1220	472.7
1992-2000	[redacted]	0.4	176.6	96.6	261	800	468.4
1992-2000	[redacted]	0.4	180.1	96.2	1268	1380	408.9
1992-2000	[redacted]	1.0	112.9	92.9	28	350	118.7
1992-2000	[redacted]	0.8	155.7	89.8	1119	1000	205.7
1992-2000	[redacted]	0.9	65.6	84.8	132	350	72.3
1992-2000	[redacted]	0.8	153.7	83.6	924	800	198.7
1992-2000	[redacted]	0.7	176.4	76.6	1111	850	253.1
1992-2000	[redacted]	1.0	140.9	76.1	905	950	147.4
1992-2000	[redacted]	0.9	119.7	71.1	402	800	128.5
1992-2000	[redacted]	1.0	57.0	66.4	327	410	56.1
1992-2000	[redacted]	0.6	24.8	62.0	156	130	40.5
1992-2000	[redacted]	0.5	34.9	57.4	275	170	71.5
1992-2000	[redacted]	0.9	284.3	52.2	748	3600	333.8
1992-2000	[redacted]	1.3	143.5	50.0	51	500	113.6
1992-2000	[redacted]	0.9	34.9	45.4	1025	160	38.7
1992-2000	[redacted]	1.6	70.5	41.6	173	580	43.6
1992-2000	[redacted]	1.3	52.7	39.1	56	270	41.0
1992-2000	[redacted]	0.8	180.1	31.7	1188	650	222.6
1992-2000	[redacted]	0.5	33.4	28.7	244	180	70.7
1992-2000	[redacted]	0.9	20.9	28.3	324	130	23.8
1992-2000	[redacted]	0.7	31.4	27.2	92	120	47.4
1992-2000	[redacted]	1.1	80.7	26.7	72	300	71.5
1992-2000	[redacted]	0.5	12.0	25.0	23	40	22.3
1992-2000	[redacted]	0.7	53.2	20.3	72	180	72.3
1992-2000	[redacted]	1.0	10.1	20.0	15	25	10.4
1992-2000	[redacted]	0.7	31.8	18.8	16	80	43.3
1992-2000	[redacted]	0.3	8.2	18.2	11	40	23.7
1992-2000	[redacted]	0.6	10.3	18.2	9	31	16.2
1992-2000	[redacted]	1.2	14.7	16.1	56	75	12.2
1992-2000	[redacted]	0.6	8.4	13.5	92	30	14.1
1992-2000	[redacted]	0.8	46.9	12.5	1127	200	60.4
1992-2000	[redacted]	0.6	11.6	11.5	190	60	19.3
1992-2000	[redacted]	1.0	30.7	10.3	428	150	31.8
1992-2000	[redacted]	0.6	28.4	9.3	343	120	45.7
1992-2000	[redacted]	1.1	37.7	6.4	196	163	35.6
1992-2000	[redacted]	0.6	55.9	6.4	1272	270	96.4
1992-2000	[redacted]	1.3	71.9	0.6	1678	250	54.1
1992-2000	[redacted]	2.6	18.6	0.2	474	60	7.2
1992-2000	[redacted]	1.7	48.0	0.1	1134	100	28.3

yr	ves	cv	sd	%rnd	trips	max	mean
2001-2009	[redacted]	0.6	25.2	100.0	3	70	43.3
2001-2009	[redacted]	0.4	184.5	100.0	111	1000	487.2
2001-2009	[redacted]	0.4	264.9	98.8	738	2000	695.8
2001-2009	[redacted]	0.5	191.9	93.3	74	800	356.6
2001-2009	[redacted]	1.4	134.8	90.6	254	880	99.7
2001-2009	[redacted]	1.2	194.5	90.3	31	900	160.7
2001-2009	[redacted]	1.0	246.7	87.5	24	700	255.6
2001-2009	[redacted]	1.0	207.9	85.2	498	1600	214.0
2001-2009	[redacted]	0.8	215.1	84.2	650	1000	261.1
2001-2009	[redacted]	0.7	196.2	69.4	242	670	297.3
2001-2009	[redacted]	0.7	130.8	68.6	1012	700	195.9
2001-2009	[redacted]	0.6	173.2	53.8	606	660	308.3
2001-2009	[redacted]	1.0	71.0	51.4	788	1320	71.7
2001-2009	[redacted]	0.7	129.9	50.6	285	750	189.0
2001-2009	[redacted]	0.7	44.4	46.6	981	600	66.6
2001-2009	[redacted]	0.7	211.8	46.1	819	1260	287.3
2001-2009	[redacted]	0.7	116.8	31.0	937	600	174.8
2001-2009	[redacted]	0.5	40.8	27.7	889	200	86.3
2001-2009	[redacted]	0.4	28.9	26.4	763	190	65.4
2001-2009	[redacted]	0.9	27.2	24.8	372	230	28.7
2001-2009	[redacted]	0.4	25.8	22.8	57	120	61.2
2001-2009	[redacted]	0.6	23.9	21.5	125	100	39.1
2001-2009	[redacted]	0.5	9.6	15.8	38	40	19.9
2001-2009	[redacted]	0.4	14.6	15.5	97	60	33.9
2001-2009	[redacted]	0.7	173.1	13.8	1256	850	253.8
2001-2009	[redacted]	1.0	53.7	12.0	260	295	51.7
2001-2009	[redacted]	1.1	30.0	10.6	445	181	26.4
2001-2009	[redacted]	0.7	45.5	10.5	1359	210	69.9
2001-2009	[redacted]	0.6	25.5	9.8	941	100	41.3
2001-2009	[redacted]	0.9	48.6	7.8	81	130	56.8
2001-2009	[redacted]	1.0	58.1	6.7	26	120	60.8
2001-2009	[redacted]	1.3	20.7	6.3	32	54	15.8
2001-2009	[redacted]	0.6	31.8	5.9	32	75	52.5
2001-2009	[redacted]	1.1	30.8	5.6	301	125	29.0
2001-2009	[redacted]	0.4	10.7	5.6	172	50	27.0
2001-2009	[redacted]	0.5	100.6	5.3	1346	500	215.8
2001-2009	[redacted]	1.1	50.7	4.7	246	150	45.3
2001-2009	[redacted]	1.3	40.4	3.6	165	132	31.2
2001-2009	[redacted]	0.6	16.1	2.0	224	50	28.6
2001-2009	[redacted]	0.9	127.2	0.8	1390	400	139.2

yr	ves	cv	sd	%rnd	trips	max	mean
2010-2013	[redacted]	0.5	129.9	79.7	122	700	240.7
2010-2013	[redacted]	0.4	74.8	79.4	247	400	203.8
2010-2013	[redacted]	1.1	84.1	76.4	144	390	74.1
2010-2013	[redacted]	0.6	118.0	68.4	508	600	193.1
2010-2013	[redacted]	0.4	56.5	47.2	435	289	126.2
2010-2013	[redacted]	0.6	122.0	38.1	523	750	197.5
2010-2013	[redacted]	0.4	63.8	35.2	458	350	162.2
2010-2013	[redacted]	0.7	12.0	28.1	60	50	16.9
2010-2013	[redacted]	0.6	18.8	26.9	383	80	29.2
2010-2013	[redacted]	0.7	24.4	25.0	174	100	33.4
2010-2013	[redacted]	0.3	12.9	20.7	479	120	36.9
2010-2013	[redacted]	0.9	55.6	17.8	461	250	64.0
2010-2013	[redacted]	0.5	19.3	17.2	399	90	36.6
2010-2013	[redacted]	0.4	70.6	14.0	708	400	188.9
2010-2013	[redacted]	0.7	23.9	12.9	280	75	35.5
2010-2013	[redacted]	0.6	24.5	12.0	788	110	42.0
2010-2013	[redacted]	0.5	19.9	7.0	454	93	38.9
2010-2013	[redacted]	0.6	13.2	6.8	272	50	22.9
2010-2013	[redacted]	0.7	13.6	6.6	403	60	20.0
2010-2013	[redacted]	0.9	59.2	5.1	540	185	66.5
2010-2013	[redacted]	0.4	8.4	4.5	104	30	22.0
2010-2013	[redacted]	1.8	37.4	4.4	272	230	20.3
2010-2013	[redacted]	0.7	30.2	1.7	486	120	44.8
2010-2013	[redacted]	0.7	8.5	0.9	536	25	12.7

Table 12b. Rounding and variance for Vermilion Snapper for all year blocks from the Georgia-north Florida region. Ves=Vessel number, cv=coefficient of variation, sd=standard deviation, %rnd=percent rounding, trips=number of trips, max=maximum reported, mean=mean number reported. The red shaded blocks indicate vessels with percent rounding higher than 80% and/or less than 100 trips and/or vessel mean reported was higher than total mean reported.

yr	ves	cv	sd	%rnd	trips	max	mean
1972-1983	[redacted]	0.5	132.5	100.0	13	500	244.6
1972-1983	[redacted]	NA	NA	100.0	1	150	150.0
1972-1983	[redacted]	0.7	165.8	96.5	224	1000	222.5
1972-1983	[redacted]	0.9	76.7	93.8	77	325	84.2
1972-1983	[redacted]	0.8	115.8	91.7	104	600	154.2
1972-1983	[redacted]	0.7	98.6	90.5	315	800	149.1
1972-1983	[redacted]	0.7	31.2	88.1	61	200	46.3
1972-1983	[redacted]	1.1	126.7	86.0	249	700	118.2
1972-1983	[redacted]	0.6	54.3	85.3	102	250	96.3
1972-1983	[redacted]	1.0	97.4	84.9	191	575	99.9
1972-1983	[redacted]	0.9	131.5	84.2	1317	1000	142.8
1972-1983	[redacted]	1.1	118.6	80.6	1432	1257	111.3
1972-1983	[redacted]	1.0	93.9	77.3	1077	600	93.9
1972-1983	[redacted]	0.7	76.3	75.8	103	400	108.0
1972-1983	[redacted]	0.7	114.1	74.2	1112	800	155.8
1972-1983	[redacted]	0.9	21.9	72.7	10	70	25.5
1972-1983	[redacted]	0.9	48.2	71.7	40	225	53.5
1972-1983	[redacted]	1.0	95.2	71.4	11	300	93.9
1972-1983	[redacted]	0.9	84.2	70.7	86	400	89.0
1972-1983	[redacted]	1.1	77.6	69.5	63	500	70.7
1972-1983	[redacted]	1.1	54.8	63.5	943	775	51.0
1972-1983	[redacted]	1.0	91.3	60.0	115	400	94.2
1972-1983	[redacted]	0.9	167.1	56.0	703	1000	185.6
1972-1983	[redacted]	0.9	66.3	51.1	58	250	73.2
1972-1983	[redacted]	1.0	28.9	47.1	14	104	28.4
1972-1983	[redacted]	1.3	59.5	41.8	865	500	47.6
1972-1983	[redacted]	0.7	17.9	34.6	28	70	26.1
1972-1983	[redacted]	0.8	14.3	33.3	15	50	17.1
1972-1983	[redacted]	1.1	41.0	33.3	2	65	36.0
1972-1983	[redacted]	1.8	71.3	22.2	7	200	40.0
1972-1983	[redacted]	0.8	10.9	18.4	23	35	13.0
1972-1983	[redacted]	0.8	7.3	16.7	20	30	9.3

yr	ves	cv	sd	%rnd	trips	max	mean
1984-1991	[redacted]	0.6	116.2	97.2	669	900	192.8
1984-1991	[redacted]	0.6	80.2	94.7	180	400	138.8
1984-1991	[redacted]	0.9	86.7	93.5	2046	600	101.1
1984-1991	[redacted]	0.9	152.0	93.5	442	1000	167.2
1984-1991	[redacted]	1.2	221.9	93.2	128	1500	190.2
1984-1991	[redacted]	0.6	57.2	92.7	181	300	88.8
1984-1991	[redacted]	0.6	103.7	92.2	795	500	160.2
1984-1991	[redacted]	0.8	93.8	90.0	260	600	121.2
1984-1991	[redacted]	1.0	173.8	89.9	1993	1200	176.8
1984-1991	[redacted]	0.9	87.1	88.9	344	500	93.2
1984-1991	[redacted]	0.6	13.6	83.6	53	60	24.5
1984-1991	[redacted]	0.9	61.0	83.5	157	300	66.7
1984-1991	[redacted]	1.0	76.1	81.3	15	250	75.1
1984-1991	[redacted]	1.2	85.0	80.9	501	600	73.1
1984-1991	[redacted]	1.0	87.2	71.0	1100	500	85.6
1984-1991	[redacted]	1.1	29.1	67.0	152	150	27.3
1984-1991	[redacted]	0.7	131.1	66.2	228	720	201.3
1984-1991	[redacted]	0.7	14.9	65.9	1198	100	22.4
1984-1991	[redacted]	1.1	26.0	61.1	149	150	23.4
1984-1991	[redacted]	1.5	47.9	58.9	163	500	31.3
1984-1991	[redacted]	1.7	60.8	49.6	254	500	35.2
1984-1991	[redacted]	1.2	28.7	45.5	47	193	23.2
1984-1991	[redacted]	0.8	7.4	26.1	56	37	9.0
1984-1991	[redacted]	1.1	114.2	18.7	165	900	108.1
1984-1991	[redacted]	0.3	2.2	14.3	6	10	7.2
1984-1991	[redacted]	0.5	32.9	12.0	263	175	59.9
1984-1991	[redacted]	0.4	4.1	2.6	5	15	10.6

yr	ves	cv	sd	%rnd	trips	max	mean
1992-2000	[redacted]	0.3	69.3	96.9	312	320	200.1
1992-2000	[redacted]	0.8	41.0	87.9	855	350	48.8
1992-2000	[redacted]	1.2	99.5	64.5	461	750	80.0
1992-2000	[redacted]	1.1	56.2	54.4	667	250	49.1
1992-2000	[redacted]	0.8	55.2	49.5	645	240	70.8
1992-2000	[redacted]	0.5	12.3	47.4	248	100	22.6
1992-2000	[redacted]	0.7	66.4	44.4	8	216	99.6
1992-2000	[redacted]	1.0	37.7	35.1	668	301	38.6
1992-2000	[redacted]	0.9	11.7	23.4	317	60	13.3
1992-2000	[redacted]	1.2	12.2	18.7	740	150	10.3
1992-2000	[redacted]	0.7	9.6	18.0	399	70	13.1
1992-2000	[redacted]	1.2	10.8	15.0	589	100	8.9
1992-2000	[redacted]	0.7	19.5	13.8	60	100	27.4
1992-2000	[redacted]	0.7	4.9	12.3	42	20	6.9
1992-2000	[redacted]	1.4	18.4	12.0	274	100	13.0
1992-2000	[redacted]	1.1	12.0	11.7	202	40	11.4
1992-2000	[redacted]	1.2	14.1	10.4	217	70	11.6
1992-2000	[redacted]	0.7	12.1	8.0	3	30	17.0
1992-2000	[redacted]	1.6	10.3	2.4	135	100	6.5
1992-2000	[redacted]	1.0	11.6	1.6	36	50	11.2
1992-2000	[redacted]	0.7	5.0	1.5	41	20	7.3
1992-2000	[redacted]	1.2	3.4	1.4	8	10	2.9
1992-2000	[redacted]	1.3	4.4	1.0	81	25	3.5
1992-2000	[redacted]	0.6	1.7	0.9	4	5	2.8

yr	ves	cv	sd	%rnd	trips	max	mean
2001-2009	[redacted]	0.5	95.9	95.8	1299	450	185.4
2001-2009	[redacted]	0.7	71.8	95.0	793	1150	99.0
2001-2009	[redacted]	0.7	73.8	91.6	133	310	98.9
2001-2009	[redacted]	1.2	42.0	67.7	299	220	34.1
2001-2009	[redacted]	0.9	64.5	67.7	617	350	71.7
2001-2009	[redacted]	0.9	121.8	67.5	599	550	130.9
2001-2009	[redacted]	0.6	7.3	49.2	42	30	12.5
2001-2009	[redacted]	1.1	26.4	47.9	1121	215	24.2
2001-2009	[redacted]	0.7	63.4	45.7	1076	230	87.0
2001-2009	[redacted]	0.7	25.6	43.8	16	80	34.1
2001-2009	[redacted]	1.3	18.3	40.3	958	300	14.3
2001-2009	[redacted]	0.4	5.7	33.3	2	18	14.0
2001-2009	[redacted]	0.9	69.9	31.6	49	405	74.2
2001-2009	[redacted]	0.7	16.3	22.4	24	60	23.5
2001-2009	[redacted]	0.9	9.7	22.3	1248	150	11.2
2001-2009	[redacted]	0.8	8.2	17.4	29	30	9.8
2001-2009	[redacted]	2.2	26.4	15.4	335	460	11.9
2001-2009	[redacted]	0.7	4.1	5.5	30	15	5.9
2001-2009	[redacted]	0.8	26.9	4.3	2	53	34.0
2001-2009	[redacted]	0.7	2.9	3.9	43	12	4.0
2001-2009	[redacted]	1.3	6.3	3.5	264	40	5.0
2001-2009	[redacted]	1.4	5.9	1.7	217	45	4.3
2001-2009	[redacted]	1.4	9.2	1.3	19	36	6.7
2001-2009	[redacted]	0.9	3.3	0.2	52	15	3.7
2001-2009	[redacted]	0.8	1.7	NA	17	6	2.1

yr	ves	cv	sd	%rnd	trips	max	mean
2010-2013	[redacted]	0.6	48.0	81.5	375	220	85.8
2010-2013	[redacted]	0.5	56.5	75.2	361	215	110.0
2010-2013	[redacted]	0.7	34.8	59.3	378	220	47.0
2010-2013	[redacted]	0.8	66.4	42.5	99	250	79.2
2010-2013	[redacted]	0.7	33.3	32.2	192	160	46.7
2010-2013	[redacted]	0.8	23.4	25.2	278	95	31.1
2010-2013	[redacted]	0.9	18.0	22.4	315	112	19.7
2010-2013	[redacted]	0.8	7.5	21.7	57	30	9.0
2010-2013	[redacted]	1.1	22.5	13.4	318	200	21.3
2010-2013	[redacted]	0.7	16.3	7.3	44	61	24.4
2010-2013	[redacted]	1.1	9.3	7.0	34	50	8.8
2010-2013	[redacted]	0.8	3.4	2.7	107	17	4.2
2010-2013	[redacted]	1.3	7.6	2.6	134	68	5.7
2010-2013	[redacted]	2.2	10.6	2.1	160	130	4.8
2010-2013	[redacted]	0.4	0.5	NA	11	2	1.5
2010-2013	[redacted]	NA	NA	NA	1	2	2.0

Table 13a. Rounding and variance for White Grunt for all year blocks from the Carolinas region. Ves=Vessel number, cv=coefficient of variation, sd=standard deviation, %rnd=percent rounding, trips=number of trips, max=maximum reported, mean=mean number reported. The red shaded blocks indicate vessels with percent rounding higher than 80% and/or less than 100 trips and/or vessel mean reported was higher than total mean reported.

yr	ves	cv	sd	%rnd	trips	max	mean	yr	ves	cv	sd	%rnd	trips	max	mean	yr	ves	cv	sd	%rnd	trips	max	mean	yr	ves	cv	sd	%rnd	trips	max	mean	yr	ves	cv	sd	%rnd	trips	max	mean
1972-1983	[redacted]	NA	NA	100.0	1	50	50.0	1984-1991	[redacted]	0.5	15.0	100.0	7	50	30.0	1992-2000	[redacted]	0.6	87.1	100.0	28	350	136.1	2001-2009	[redacted]	0.7	68.6	100.0	24	250	104.6	2010-2013	[redacted]	0.6	77.1	92.4	144	510	134.2
1972-1983	[redacted]	0.8	116.9	97.3	403	1000	148.6	1984-1991	[redacted]	1.0	71.2	88.0	535	500	71.7	1992-2000	[redacted]	0.6	86.7	97.0	132	480	138.9	2001-2009	[redacted]	0.3	15.3	100.0	3	60	46.7	2010-2013	[redacted]	0.8	47.7	82.3	247	400	59.0
1972-1983	[redacted]	0.8	76.2	92.1	330	400	90.0	1984-1991	[redacted]	0.7	53.6	87.9	148	300	80.2	1992-2000	[redacted]	0.9	84.8	77.3	196	479	95.3	2001-2009	[redacted]	0.5	79.7	98.8	254	500	147.1	2010-2013	[redacted]	1.0	106.4	70.7	122	500	109.8
1972-1983	[redacted]	0.8	62.9	90.9	22	200	83.7	1984-1991	[redacted]	0.9	83.7	87.5	152	600	97.1	1992-2000	[redacted]	0.9	53.6	74.0	327	350	62.6	2001-2009	[redacted]	0.8	108.2	93.5	31	500	129.0	2010-2013	[redacted]	0.7	30.9	41.5	174	150	41.6
1972-1983	[redacted]	0.5	76.4	90.2	641	600	152.2	1984-1991	[redacted]	0.6	72.7	82.9	140	400	118.2	1992-2000	[redacted]	1.0	39.2	71.9	56	150	39.5	2001-2009	[redacted]	1.0	16.8	67.1	738	200	16.5	2010-2013	[redacted]	1.0	13.7	41.4	523	100	13.2
1972-1983	[redacted]	1.1	76.4	89.2	222	425	68.5	1984-1991	[redacted]	0.9	71.0	77.4	53	300	83.3	1992-2000	[redacted]	0.6	99.7	71.6	402	700	162.4	2001-2009	[redacted]	1.1	133.0	64.7	498	800	119.4	2010-2013	[redacted]	0.9	110.2	38.3	508	500	126.9
1972-1983	[redacted]	0.9	30.0	87.5	16	100	33.3	1984-1991	[redacted]	1.3	80.4	75.6	820	700	62.5	1992-2000	[redacted]	0.7	35.7	69.3	156	200	53.9	2001-2009	[redacted]	1.0	108.2	60.3	606	500	103.2	2010-2013	[redacted]	1.4	64.2	37.8	458	360	44.9
1972-1983	[redacted]	0.7	52.1	79.7	244	300	71.4	1984-1991	[redacted]	1.2	79.1	74.1	514	750	66.7	1992-2000	[redacted]	1.3	48.9	62.4	1111	500	36.7	2001-2009	[redacted]	1.0	133.6	52.3	285	650	135.3	2010-2013	[redacted]	1.1	106.1	26.6	435	600	96.0
1972-1983	[redacted]	0.5	17.0	72.8	88	100	33.9	1984-1991	[redacted]	1.1	133.6	66.4	508	800	126.8	1992-2000	[redacted]	0.9	107.4	61.1	1119	750	115.3	2001-2009	[redacted]	1.6	62.4	51.3	819	500	39.2	2010-2013	[redacted]	1.7	33.0	21.6	708	150	19.7
1972-1983	[redacted]	0.6	71.2	72.2	115	425	118.6	1984-1991	[redacted]	1.3	108.3	65.1	347	1000	83.8	1992-2000	[redacted]	1.0	39.9	57.4	51	200	38.0	2001-2009	[redacted]	1.2	44.4	48.2	165	450	36.9	2010-2013	[redacted]	0.9	26.2	21.0	272	200	28.7
1972-1983	[redacted]	1.0	48.0	68.0	459	500	47.3	1984-1991	[redacted]	0.4	22.9	57.9	94	105	54.4	1992-2000	[redacted]	0.8	37.4	57.3	1025	200	44.6	2001-2009	[redacted]	0.8	159.2	46.4	1012	1000	198.6	2010-2013	[redacted]	0.9	12.8	16.5	127	66	13.8
1972-1983	[redacted]	0.8	16.9	68.0	178	100	21.2	1984-1991	[redacted]	0.8	13.1	55.4	74	80	16.8	1992-2000	[redacted]	0.8	151.9	54.5	924	700	183.8	2001-2009	[redacted]	0.7	9.7	46.0	242	60	14.8	2010-2013	[redacted]	0.5	12.3	14.9	479	75	22.6
1972-1983	[redacted]	1.0	82.0	63.2	201	800	78.7	1984-1991	[redacted]	1.2	155.8	49.5	305	800	134.5	1992-2000	[redacted]	0.7	41.7	51.4	173	260	58.8	2001-2009	[redacted]	1.0	180.6	41.4	650	1000	184.7	2010-2013	[redacted]	1.0	25.8	12.8	272	125	25.3
1972-1983	[redacted]	1.5	253.5	57.6	528	1500	173.8	1984-1991	[redacted]	1.1	179.0	47.3	148	1000	158.8	1992-2000	[redacted]	0.9	20.3	50.0	6	50	22.8	2001-2009	[redacted]	0.6	5.9	36.0	111	30	9.3	2010-2013	[redacted]	1.0	6.6	8.5	383	36	6.9
1972-1983	[redacted]	1.1	39.1	55.0	1141	240	35.0	1984-1991	[redacted]	0.8	9.1	32.8	413	50	11.7	1992-2000	[redacted]	2.3	126.2	45.1	748	1500	55.9	2001-2009	[redacted]	1.4	16.5	35.3	32	75	12.0	2010-2013	[redacted]	0.9	15.0	8.4	788	85	16.7
1972-1983	[redacted]	0.9	60.6	40.5	704	350	68.0	1984-1991	[redacted]	1.1	19.7	26.5	98	100	17.8	1992-2000	[redacted]	0.9	125.9	41.7	905	800	147.0	2001-2009	[redacted]	1.4	63.9	33.9	445	1120	44.8	2010-2013	[redacted]	1.0	14.2	6.9	399	70	14.6
1972-1983	[redacted]	0.6	58.7	37.5	24	266	91.0	1984-1991	[redacted]	1.1	10.9	26.0	1078	150	10.2	1992-2000	[redacted]	0.6	33.9	36.4	11	150	56.7	2001-2009	[redacted]	2.0	37.1	24.5	1256	300	18.2	2010-2013	[redacted]	0.9	3.1	6.3	60	12	3.5
1972-1983	[redacted]	0.8	48.7	36.7	99	250	61.8	1984-1991	[redacted]	0.9	31.9	17.9	595	200	34.9	1992-2000	[redacted]	0.8	25.3	33.3	23	75	29.8	2001-2009	[redacted]	0.6	14.7	23.7	38	70	25.2	2010-2013	[redacted]	0.4	13.5	6.3	104	50	31.4
1972-1983	[redacted]	1.2	23.8	35.7	401	150	20.7	1984-1991	[redacted]	0.8	58.2	12.1	708	376	68.8	1992-2000	[redacted]	1.0	16.1	32.4	72	70	16.4	2001-2009	[redacted]	0.9	26.3	19.8	889	150	29.3	2010-2013	[redacted]	0.2	2.7	5.3	94	15	13.0
1972-1983	[redacted]	0.9	55.7	26.3	1024	250	60.4	1984-1991	[redacted]	1.9	27.1	10.7	506	300	13.9	1992-2000	[redacted]	0.7	18.1	30.7	275	80	27.7	2001-2009	[redacted]	0.3	12.1	19.3	57	60	37.3	2010-2013	[redacted]	0.9	12.7	5.2	280	53	13.9
1972-1983	[redacted]	0.7	11.7	18.4	134	60	16.1	1984-1991	[redacted]	1.7	30.9	9.9	471	250	18.6	1992-2000	[redacted]	1.1	52.1	29.6	1188	300	48.4	2001-2009	[redacted]	1.4	36.4	18.8	260	150	25.6	2010-2013	[redacted]	0.7	13.1	5.0	403	50	18.3
1972-1983	[redacted]	0.3	7.6	17.9	39	36	21.9	1984-1991	[redacted]	1.3	36.3	9.4	1260	200	28.6	1992-2000	[redacted]	0.8	18.2	28.6	56	74	21.6	2001-2009	[redacted]	0.8	44.5	16.8	788	200	55.7	2010-2013	[redacted]	1.5	7.2	4.7	540	45	4.6
1972-1983	[redacted]	1.3	32.2	17.5	440	200	25.1	1984-1991	[redacted]	0.6	9.5	9.1	24	30	16.8	1992-2000	[redacted]	1.6	12.2	28.5	1268	300	7.7	2001-2009	[redacted]	0.7	9.9	15.4	125	40	13.9	2010-2013	[redacted]	2.3	31.9	3.1	486	200	13.6
1972-1983	[redacted]	0.9	15.6	15.8	96	60	17.4	1984-1991	[redacted]	1.4	50.6	7.5	376	200	37.1	1992-2000	[redacted]	1.3	15.3	27.9	889	120	11.7	2001-2009	[redacted]	0.8	11.3	12.3	981	75	13.8	2010-2013	[redacted]	1.0	26.1	2.8	536	75	27.4
1972-1983	[redacted]	1.6	13.9	14.3	1288	200	8.9	1984-1991	[redacted]	1.4	4.8	5.2	58	25	3.4	1992-2000	[redacted]	0.4	16.3	25.9	244	100	36.9	2001-2009	[redacted]	0.9	6.0	9.2	65	31	6.8	2010-2013	[redacted]	1.4	4.2	1.8	279	20	3.0
1972-1983	[redacted]	0.6	44.3	13.5	209	250	70.1	1984-1991	[redacted]	0.8	36.6	3.4	19	100	48.8	1992-2000	[redacted]	1.2	12.4	25.8	261	100	9.9	2001-2009	[redacted]	1.1	34.0	8.0	74	100	30.1	2010-2013	[redacted]	1.3	11.8	1.5	454	53	8.9
1972-1983	[redacted]	1.1	31.9	12.1	13	75	30.0	1984-1991	[redacted]	0.7	10.0	2.7	214	40	14.1	1992-2000	[redacted]	0.9	30.8	22.7	72	100	33.5	2001-2009	[redacted]	0.5	33.2	7.8	172	150	64.2	2010-2013	[redacted]	2.0	5.1	0.8	692	30	2.6
1972-1983	[redacted]	0.7	46.8	11.2	616	227	67.4	1984-1991	[redacted]	2.1	16.9	1.6	593	100	8.1	1992-2000	[redacted]	0.6	3.4	20.0	15	10	5.9	2001-2009	[redacted]	1.8	9.8	6.8	1390	200	5.4	2010-2013	[redacted]	1.0	1.6	0.2	404	12	1.6
1972-1983	[redacted]	1.0	115.1	11.0	694	466	115.1	1984-1991	[redacted]	0.4	1.0	1.0	104	5	2.5	1992-2000	[redacted]	1.0	22.3	14.8	190	90	23.3	2001-2009	[redacted]	2.0	54.5	6.7	26	200	26.8	2010-2013	[redacted]	0.6	5.4	0.2	444	18	9.5
1972-1983	[redacted]	1.2	6.4	9.2	402	80	5.2	1984-1991	[redacted]	1.1	4.2	0.8	115	10	3.8	1992-2000	[redacted]	0.9	6.9	11.1	474	45	7.3	2001-2009	[redacted]	2.2	61.2	6.0	1346	600	28.1								
1972-1983	[redacted]	1.3	187.6	8.4	428	1500	147.2	1984-1991	[redacted]	0.5	32.1	0.6	461	100	63.3	1992-2000	[redacted]	0.8	3.1	10.4	92	16	4.1	2001-2009	[redacted]	0.9	10.3	6.0	301	50	11.1								
1972-1983	[redacted]	1.0	62.9	8.4	244	300	64.4	1984-1991	[redacted]	0.6	3.3	0.5	305	11	6.0	1992-2000	[redacted]	1.3	35.4	8.2	1127	250	27.5	2001-2009	[redacted]	1.7	24.5	5.7	224	130	14.3								
1972-1983	[redacted]	0.2	3.5	6.3	19	20	17.5	1984-1991	[redacted]	1.2	4.9	0.3	100	15	4.1	1992-2000	[redacted]	1.4	45.6	8.1	1272	250	33.7	2001-2009	[redacted]	1.3	21.3	5.5	1359	150	16.2								
1972-1983	[redacted]	1.5	43.6	3.4	87	100	29.0	1984-1991	[redacted]	NA	NA	0.1	107	75	75.0	1992-2000	[redacted]	1.0	23.3	7.0	343	118	23.1	2001-2009	[redacted]	0.6	22.6	5.4	763	100	40.5								
1972-1983	[redacted]	2.0	11.7	1.7	58	35	6.0									1992-2000	[redacted]	1.9	8.3	5.5	1678	120	4.4	2001-2009	[redacted]	1.0	4.3	5.2	372	30	4.2								
1972-1983	[redacted]	1.7	16.4	1.1	193	60	9.6									1992-2000	[redacted]	2.8	18.8	4.7	1134	275	6.8	2001-2009	[redacted]	1.3	31.0	4.5	941	251	24.4								
1972-1983	[redacted]	0.7	2.8	1.1	215	10	3.9									1992-2000	[redacted]	1.5	41.0	4.7	55	100	27.6	2001-2009	[redacted]	3.1	49.5	4.3	246	300	16.2								
1972-1983	[redacted]	1.0	14.0	0.9	220	40	13.8									1992-2000	[redacted]	1.5	6.5	4.5	85	37	4.3	2001-2009	[redacted]	0.6	2.1	3.2	19	5	3.5								
1972-1983	[redacted]	0.1	7.1	0.7	46	60	55.0									1992-2000	[redacted]	0.8	6.5	4.3	92	29	8.2	2001-2009	[redacted]	1.0	59.3	2.1	937	200	58.2								
1972-1983	[redacted]	1.5	6.8	0.5	256	30	4.6									1992-2000	[redacted]	2.2	27.4	3.0	428	150	12.4	2001-2009	[redacted]	0.7	14.1	1.9	97	30	20.0								
1972-1983	[redacted]	4.4	31.8	0.4	1046	250	7.3									1992-2000	[redacted]	0.7	3.2	2.9	324	15	4.4	2001-2009	[redacted]	0.8	8.7	1.3	695	30	10.3								
1972-1983	[redacted]	0.7	26.6	0.3	124	75	38.4									1992-2000	[redacted]	2.0	7.5	2.7	173	40	3.8	2001-2009	[redacted]	0.2	1.4	1.1	81	10	9.0								
1972-1983	[redacted]	0.8	19.8	0.2	403	40	26.0									1992-2000	[redacted]	0.7	2.4	1.3	267	10	3.3																
1972-1983	[redacted]	NA	NA	0.1	892	100	100.0																																

Table 13b. Rounding and variance for White Grunt for all year blocks from the south Florida region. Ves=Vessel number, cv=coefficient of variation, sd=standard deviation, %rnd=percent rounding, trips=number of trips, max=maximum reported, mean=mean number reported. The red shaded blocks indicate vessels with percent rounding higher than 80% and/or less than 100 trips and/or vessel mean reported was higher than total mean reported.

yr	ves	cv	sd	%rnd	trips	max	mean
1972-1983	[redacted]	NA	NA	100.0	1	15	15.0
1972-1983	[redacted]	0.8	37.1	84.6	23	125	45.3
1972-1983	[redacted]	1.0	74.0	84.3	81	450	77.4
1972-1983	[redacted]	0.9	87.3	63.6	18	300	94.6
1972-1983	[redacted]	0.7	48.8	63.3	557	250	65.9
1972-1983	[redacted]	1.7	23.2	36.7	127	250	13.8
1972-1983	[redacted]	0.5	16.2	31.9	71	80	33.7
1972-1983	[redacted]	0.7	30.5	31.6	65	170	44.7
1972-1983	[redacted]	1.0	26.9	28.9	293	200	26.8
1972-1983	[redacted]	0.7	38.3	27.8	36	150	56.9
1972-1983	[redacted]	0.5	3.4	27.8	9	10	7.2
1972-1983	[redacted]	0.9	6.6	25.6	25	25	7.6
1972-1983	[redacted]	0.8	24.7	25.0	2	50	32.5
1972-1983	[redacted]	0.7	24.1	20.5	125	100	32.3
1972-1983	[redacted]	0.6	23.9	20.1	35	104	38.5
1972-1983	[redacted]	0.9	20.7	19.6	501	120	22.2
1972-1983	[redacted]	0.9	18.6	19.4	11	50	21.1
1972-1983	[redacted]	1.3	26.4	16.0	117	160	19.6
1972-1983	[redacted]	0.7	12.2	14.2	170	100	17.7
1972-1983	[redacted]	0.6	43.8	8.6	18	191	69.1
1972-1983	[redacted]	0.6	3.9	6.7	9	12	6.1
1972-1983	[redacted]	1.0	6.2	5.7	60	35	6.5
1972-1983	[redacted]	0.7	4.6	5.2	28	20	6.4
1972-1983	[redacted]	1.3	23.3	3.8	2	35	18.5
1972-1983	[redacted]	0.7	13.9	3.0	4	40	20.5
1972-1983	[redacted]	0.8	3.9	2.6	540	35	4.6
1972-1983	[redacted]	1.3	47.9	2.4	16	200	37.2
1972-1983	[redacted]	0.5	1.7	2.4	5	5	3.4
1972-1983	[redacted]	1.2	8.0	1.0	14	25	6.8
1972-1983	[redacted]	1.2	4.4	1.0	4	10	3.5
1972-1983	[redacted]	1.1	9.9	0.7	32	40	8.8
1972-1983	[redacted]	0.7	2.0	0.7	23	10	2.9
1972-1983	[redacted]	1.1	7.0	0.5	72	40	6.6
1972-1983	[redacted]	1.5	6.5	0.5	141	50	4.4
1972-1983	[redacted]	0.9	7.2	0.4	29	30	8.1
1972-1983	[redacted]	1.4	4.8	0.4	128	20	3.5
1972-1983	[redacted]	1.0	3.9	0.4	35	16	4.0
1972-1983	[redacted]	NA	NA	0.4	1	25	25.0
1972-1983	[redacted]	0.6	1.5	0.4	31	7	2.6
1972-1983	[redacted]	1.3	5.2	0.2	3	10	4.0
1972-1983	[redacted]	0.9	2.1	0.1	171	13	2.4
1972-1983	[redacted]	0.7	1.3	0.1	60	6	1.8
1972-1983	[redacted]	0.7	1.3	0.1	14	5	1.8

yr	ves	cv	sd	%rnd	trips	max	mean
1984-1991	[redacted]	0.7	112.7	98.3	896	700	164.9
1984-1991	[redacted]	0.8	47.7	87.5	747	230	63.6
1984-1991	[redacted]	0.7	47.0	84.9	1744	400	66.4
1984-1991	[redacted]	1.0	61.4	82.9	179	300	63.2
1984-1991	[redacted]	0.6	59.1	81.8	10	200	94.6
1984-1991	[redacted]	0.6	39.2	78.4	120	175	61.9
1984-1991	[redacted]	0.6	39.5	78.1	880	250	63.3
1984-1991	[redacted]	0.7	52.6	56.0	43	200	75.7
1984-1991	[redacted]	0.7	12.7	52.8	3264	136	18.1
1984-1991	[redacted]	1.4	351.4	43.1	81	1450	251.5
1984-1991	[redacted]	0.9	38.8	40.6	14	100	41.3
1984-1991	[redacted]	1.0	29.3	29.6	1108	250	28.8
1984-1991	[redacted]	1.1	49.5	26.0	34	200	45.2
1984-1991	[redacted]	1.0	24.2	25.6	787	300	24.3
1984-1991	[redacted]	NA	NA	16.7	1	15	15.0
1984-1991	[redacted]	0.5	31.0	13.2	33	121	57.6
1984-1991	[redacted]	0.5	6.6	12.4	116	40	12.9
1984-1991	[redacted]	0.6	8.9	10.2	89	40	16.0
1984-1991	[redacted]	1.0	18.1	10.0	42	100	17.5
1984-1991	[redacted]	1.2	26.9	9.4	20	95	23.1
1984-1991	[redacted]	0.3	1.4	8.3	6	6	4.7
1984-1991	[redacted]	0.7	6.4	7.3	5	20	9.8
1984-1991	[redacted]	1.0	11.1	5.5	14	42	11.1
1984-1991	[redacted]	0.8	3.4	4.5	164	35	4.5
1984-1991	[redacted]	1.2	5.2	4.0	6	15	4.3
1984-1991	[redacted]	0.8	3.2	2.2	75	19	4.2
1984-1991	[redacted]	1.9	25.1	1.6	121	180	13.5
1984-1991	[redacted]	0.8	6.5	1.4	205	50	7.6
1984-1991	[redacted]	0.7	5.4	1.3	5	15	7.2
1984-1991	[redacted]	0.2	2.3	1.0	11	12	10.4
1984-1991	[redacted]	1.0	3.4	1.0	171	25	3.2
1984-1991	[redacted]	1.0	4.9	0.8	26	21	5.0
1984-1991	[redacted]	0.9	16.3	0.8	2	30	18.5
1984-1991	[redacted]	1.2	4.1	0.8	452	55	3.5
1984-1991	[redacted]	1.7	15.0	0.7	49	100	8.8
1984-1991	[redacted]	0.9	3.2	0.7	347	30	3.6
1984-1991	[redacted]	0.5	7.0	0.6	28	30	14.0
1984-1991	[redacted]	0.8	3.8	0.1	29	15	4.6
1984-1991	[redacted]	1.1	14.9	0.1	3	30	13.0
1984-1991	[redacted]	0.7	2.0	0.1	47	8	3.0
1984-1991	[redacted]	1.1	6.4	0.0	4	15	6.0

yr	ves	cv	sd	%rnd	trips	max	mean
1992-2000	[redacted]	0.8	81.2	98.9	844	500	106.8
1992-2000	[redacted]	0.4	73.5	97.9	1505	750	164.9
1992-2000	[redacted]	0.6	42.1	92.4	3101	510	68.8
1992-2000	[redacted]	1.0	57.5	87.5	7	175	55.7
1992-2000	[redacted]	1.0	99.5	84.1	136	1000	102.9
1992-2000	[redacted]	0.8	41.6	82.8	923	270	55.1
1992-2000	[redacted]	1.1	70.7	80.1	181	500	64.5
1992-2000	[redacted]	1.0	31.1	63.9	834	250	31.5
1992-2000	[redacted]	0.7	15.1	63.3	898	140	20.2
1992-2000	[redacted]	0.8	27.5	53.8	35	150	33.7
1992-2000	[redacted]	1.0	35.7	52.6	587	250	37.2
1992-2000	[redacted]	0.8	12.6	48.7	1260	125	15.1
1992-2000	[redacted]	0.6	13.0	48.0	17	50	21.3
1992-2000	[redacted]	0.8	38.9	40.6	946	250	51.1
1992-2000	[redacted]	0.5	63.8	34.0	17	240	124.7
1992-2000	[redacted]	0.8	5.8	31.6	12	20	7.3
1992-2000	[redacted]	1.2	31.5	31.1	722	305	25.6
1992-2000	[redacted]	1.0	22.7	26.6	294	208	22.4
1992-2000	[redacted]	0.8	8.4	22.5	716	60	10.7
1992-2000	[redacted]	0.7	8.7	17.9	176	40	12.5
1992-2000	[redacted]	0.9	7.1	13.7	88	50	8.0
1992-2000	[redacted]	1.1	12.0	12.6	237	150	10.9
1992-2000	[redacted]	0.9	19.3	12.3	112	126	21.6
1992-2000	[redacted]	0.6	6.8	10.4	196	30	11.5
1992-2000	[redacted]	0.8	20.0	10.3	105	120	26.3
1992-2000	[redacted]	0.9	159.4	9.2	15	700	181.6
1992-2000	[redacted]	0.7	10.3	8.7	98	50	14.2
1992-2000	[redacted]	0.8	3.4	8.4	193	20	4.4
1992-2000	[redacted]	1.0	20.9	7.7	371	198	21.8
1992-2000	[redacted]	1.1	16.5	7.1	274	150	14.4
1992-2000	[redacted]	1.1	14.3	7.0	136	100	12.8
1992-2000	[redacted]	0.9	5.9	6.4	358	50	6.5
1992-2000	[redacted]	0.7	9.9	5.9	337	60	14.3
1992-2000	[redacted]	0.8	2.9	5.6	13	10	3.6
1992-2000	[redacted]	1.3	9.6	4.9	198	50	7.1
1992-2000	[redacted]	0.7	12.3	4.8	27	50	18.6
1992-2000	[redacted]	0.8	9.4	4.5	12	30	11.1
1992-2000	[redacted]	0.5	8.4	3.6	5	30	18.0
1992-2000	[redacted]	1.6	47.2	3.1	28	240	29.5
1992-2000	[redacted]	0.9	3.9	3.0	64	20	4.4
1992-2000	[redacted]	0.8	10.3	2.8	35	50	13.1
1992-2000	[redacted]	0.9	28.3	2.8	2	50	30.0
1992-2000	[redacted]	0.8	7.8	2.6	111	40	9.2
1992-2000	[redacted]	0.9	5.7	2.3	194	35	6.6
1992-2000	[redacted]	0.9	5.7	2.2	2	10	6.0
1992-2000	[redacted]	1.1	4.4	1.7	254	42	3.9
1992-2000	[redacted]	0.6	5.0	1.7	52	20	7.7
1992-2000	[redacted]	0.6	4.6	1.1	3	10	7.3
1992-2000	[redacted]	0.7	2.4	0.9	41	12	3.2
1992-2000	[redacted]	0.6	9.4	0.7	9	30	15.0
1992-2000	[redacted]	0.7	7.2	0.2	7	20	10.3
1992-2000	[redacted]	1.1	2.6	0.1	12	10	2.3
1992-2000	[redacted]	0.5	1.4	NA	2	4	3.0
1992-2000	[redacted]	0.5	0.7	NA	2	2	1.5
1992-2000	[redacted]	0.6	1.6	NA	13	6	2.5
1992-2000	[redacted]	0.4	1.0	NA	6	4	2.3
1992-2000	[redacted]	NA	NA	NA	1	8	8.0
1992-2000	[redacted]	0.8	2.2	NA	37	8	2.9

yr	ves	cv	sd	%rnd	trips	max	mean
2001-2009	[redacted]	0.6	41.9	97.3	520	400	65.0
2001-2009	[redacted]	0.6	55.3	94.6	2292	500	85.8
2001-2009	[redacted]	0.5	56.6	90.8	1021	400	121.2
2001-2009	[redacted]	0.7	24.0	69.8	117	150	32.2
2001-2009	[redacted]	0.3	25.2	67.6	25	150	94.0
2001-2009	[redacted]	0.7	12.6	54.6	447	75	17.2
2001-2009	[redacted]	0.8	35.4	54.3	734	248	46.9
2001-2009	[redacted]	0.5	6.8	53.3	793	80	13.9
2001-2009	[redacted]	1.0	53.7	47.2	1245	411	53.7
2001-2009	[redacted]	0.7	11.1	45.5	2103	123	16.1
2001-2009	[redacted]	0.7	15.7	44.6	222	100	22.9
2001-2009	[redacted]	0.2	7.7	22.2	9	46	37.4
2001-2009	[redacted]	0.6	10.4	9.9	45	50	17.8
2001-2009	[redacted]	0.9	13.1	8.1	133	75	14.9
2001-2009	[redacted]	1.0	14.5	7.5	93	63	15.3
2001-2009	[redacted]	0.6	19.7	7.4	63	82	32.5
2001-2009	[redacted]	0.8	4.2	7.2	138	25	5.6
2001-2009	[redacted]	0.9	9.5	7.0	93	75	11.1
2001-2009	[redacted]	0.7	2.5	6.1	197	14	3.4
2001-2009	[redacted]	1.1	8.4	5.9	140	70	7.3
2001-2009	[redacted]	0.7	3.8	5.9	21	12	5.6
2001-2009	[redacted]	0.5	3.1	5.3	3	10	6.7
2001-2009	[redacted]	0.7	2.7	4.6	81	15	3.7
2001-2009	[redacted]	0.9	7.8	4.5	50	40	8.6
2001-2009	[redacted]	0.8	8.0	2.9	50	40	10.6
2001-2009	[redacted]	0.9	5.6	2.6	22	20	6.0
2001-2009	[redacted]	1.1	20.5	2.5	29	100	19.4
2001-2009	[redacted]	0.7	3.0	2.0	28	12	4.5
2001-2009	[redacted]	0.7	8.6	1.7	36	40	13.0
2001-2009	[redacted]	0.8	56.3	1.5	13	160	67.2
2001-2009	[redacted]	0.9	5.9	0.8	20	20	6.3
2001-2009	[redacted]	0.7	2.2	0.8	82	11	3.1
2001-2009	[redacted]	2.3	13.8	0.6	8	40	5.9
2001-2009	[redacted]	2.3	51.3	0.3	18	168	21.8
2001-2009	[redacted]	0.8	13.8	0.1	4	32	17.5
2001-2009	[redacted]	0.9	8.5	NA	3	19	10.0
2001-2009	[redacted]	NA	NA	NA	1	6	6.0
2001-2009	[redacted]	0.9	5.4	NA	7	16	6.1

yr	ves	cv	sd	%rnd	trips	max	mean
2010-2013	[redacted]	0.6	56.3	93.9	1458	720	96.7
2010-2013	[redacted]	0.5	42.1	92.6	507	350	77.9
2010-2013	[redacted]	0.8	45.2	81.1	1863	350	56.9
2010-2013	[redacted]	0.7	14.3	74.5	1284	100	20.5
2010-2013	[redacted]	0.9	18.4	64.9	523	150	21.2
2010-2013	[redacted]	0.6	25.5	63.7	518	150	44.5
2010-2013	[redacted]	0.4	6.5	46.2	14	30	17.2
2010-2013	[redacted]	0.5	16.9	24.3	477	150	31.6
2010-2013	[redacted]	0.9	19.4	17.9	185	105	21.7
2010-2013	[redacted]	0.8	10.9	15.9	32	50	14.3
2010-2013	[redacted]	0.7	6.1	8.5	112	30	8.4
2010-2013	[redacted]	1.1	32.3	7.0	17	100	28.8
2010-2013	[redacted]	0.9	5.0	6.4	662	40	5.6
2010-2013	[redacted]	0.6	6.2	5.1	56	30	10.7
2010-2013	[redacted]	1.0	9.8	4.7	117	50	9.9
2010-2013	[redacted]	0.7	4.3	4.7	288	24	6.0
2010-2013	[redacted]	0.8	3.4	4.7	203	20	4.3
2010-2013	[redacted]	0.8	4.3	4.6	397	26	5.7
2010-2013	[redacted]	0.4	7.4	3.9	27	30	18.0
2010-2013	[redacted]	0.7	2.8	3.7	297	20	4.0
2010-2013	[redacted]	0.8	3.5	3.0	111	25	4.5
2010-2013	[redacted]	0.9	9.0	2.5	201	50	9.6
2010-2013	[redacted]	1.7	23.0	1.8	73	112	13.4
2010-2013	[redacted]	1.1	7.2	1.5	68	26	6.6
2010-2013	[redacted]	1.3	3.7	0.8	75	24	2.8
2010-2013	[redacted]	1.3	8.6	0.8	78	50	6.7
2010-2013	[redacted]	0.7	9.4	0.5	27	48	13.7
2010-2013	[redacted]	0.7	2.9	0.4	7	10	4.0
2010-2013	[redacted]	1.0	12.4	NA	10	36	12.6
2010-2013	[redacted]	1.5	4.5	NA	25	23	3.0
2010-2013	[redacted]	1.2	17.1	NA	5	44	14.0

Table 14. Rounding and variance for Tomtate for two year blocks from the Georgia-north Florida region. Ves=Vessel number, cv=coefficient of variation, sd=standard deviation, %rnd=percent rounding, trips=number of trips, max=maximum reported, mean=mean number reported. The red shaded blocks indicate vessels with percent rounding higher than 80% and/or less than 100 trips and/or vessel mean reported was higher than total mean reported.

yr	ves	cv	sd	%rnd	trips	max	mean	yr	ves	cv	sd	%rnd	trips	max	mean
1972-1983	[redacted]	0.5	41.9	100.0	13	200	89.2	1992-2000	[redacted]	0.4	54.8	97.5	312	300	156.1
1972-1983	[redacted]	0.5	90.6	98.8	343	500	179.2	1992-2000	[redacted]	0.7	153.4	97.2	72	700	214.8
1972-1983	[redacted]	0.4	13.4	95.5	64	100	34.8	1992-2000	[redacted]	0.5	12.4	81.0	1140	200	23.7
1972-1983	[redacted]	0.6	68.1	94.5	105	325	113.0	1992-2000	[redacted]	0.9	59.6	78.6	476	400	67.6
1972-1983	[redacted]	0.8	138.0	94.3	219	1000	176.0	1992-2000	[redacted]	0.7	42.0	76.7	1420	200	58.4
1972-1983	[redacted]	0.6	51.9	92.7	80	250	80.4	1992-2000	[redacted]	0.9	26.1	56.8	617	200	30.4
1972-1983	[redacted]	0.7	91.1	92.2	120	500	126.3	1992-2000	[redacted]	1.0	29.7	39.6	893	240	31.2
1972-1983	[redacted]	0.5	67.6	91.4	108	300	124.7	1992-2000	[redacted]	0.6	16.2	32.9	71	61	25.7
1972-1983	[redacted]	0.4	36.6	90.6	52	200	89.0	1992-2000	[redacted]	0.8	23.5	30.6	334	150	31.3
1972-1983	[redacted]	0.4	44.2	88.9	72	200	98.7	1992-2000	[redacted]	0.6	13.4	28.6	6	40	20.8
1972-1983	[redacted]	0.6	7.9	85.7	7	25	13.3	1992-2000	[redacted]	0.8	21.8	23.3	580	161	28.2
1972-1983	[redacted]	0.8	42.8	68.3	205	200	51.2	1992-2000	[redacted]	0.5	13.5	22.6	95	70	29.3
1972-1983	[redacted]	0.7	54.9	64.7	11	200	81.8	1992-2000	[redacted]	0.4	9.8	20.6	390	80	23.0
1972-1983	[redacted]	0.8	36.7	64.1	852	400	44.5	1992-2000	[redacted]	0.5	6.9	20.0	6	25	13.5
1972-1983	[redacted]	0.4	39.8	64.0	918	300	90.2	1992-2000	[redacted]	0.5	14.4	14.3	4	48	27.0
1972-1983	[redacted]	0.8	34.4	57.1	11	100	44.7	1992-2000	[redacted]	0.5	13.7	13.8	131	75	28.3
1972-1983	[redacted]	0.8	42.9	53.8	126	300	52.7	1992-2000	[redacted]	0.5	13.3	11.2	92	80	27.7
1972-1983	[redacted]	0.7	32.2	52.8	812	200	49.1	1992-2000	[redacted]	0.7	16.0	10.4	95	100	22.9
1972-1983	[redacted]	1.2	40.8	52.6	32	200	33.6	1992-2000	[redacted]	0.5	3.0	2.8	6	10	6.5
1972-1983	[redacted]	0.7	23.1	52.1	26	100	33.1	1992-2000	[redacted]	1.0	22.1	2.2	29	100	21.3
1972-1983	[redacted]	0.5	15.3	43.3	14	50	28.7	1992-2000	[redacted]	0.7	19.4	1.7	39	50	27.1
1972-1983	[redacted]	0.9	23.1	42.4	874	175	24.8	1992-2000	[redacted]	0.6	24.6	0.7	9	100	43.0
1972-1983	[redacted]	0.6	13.3	40.4	31	50	24.2	1992-2000	[redacted]	NA	NA	0.1	1	40	40.0
1972-1983	[redacted]	0.2	5.8	36.4	4	30	25.0	1992-2000	[redacted]	0.8	6.4	NA	2	12	7.5
1972-1983	[redacted]	1.1	33.2	35.9	62	200	29.3								
1972-1983	[redacted]	1.0	29.1	30.7	37	130	28.9								
1972-1983	[redacted]	1.0	32.6	23.9	511	250	32.0								
1972-1983	[redacted]	0.6	18.7	17.2	63	82	30.7								
1972-1983	[redacted]	0.8	71.1	14.0	154	383	89.7								
1972-1983	[redacted]	0.5	18.1	3.0	72	125	37.1								
1972-1983	[redacted]	1.9	205.5	NA	5	473	105.6								

Table 15. Rounding and variance for Scamp for two year blocks from the Carolinas region. Ves=Vessel number, cv=coefficient of variation, sd=standard deviation, %rnd=percent rounding, trips=number of trips, max=maximum reported, mean=mean number reported. The red shaded blocks indicate vessels with percent rounding higher than 80% and/or less than 100 trips and/or vessel mean reported was higher than total mean reported.

yr	ves	cv	sd	%rnd	trips	max	mean	yr	ves	cv	sd	%rnd	trips	max	mean
1992-2000	[redacted]	0.8	27.1	80.3	251	160	32.7	2001-2009	[redacted]	0.7	17.9	93.7	107	100	25.7
1992-2000	[redacted]	1.1	25.6	67.9	1150	250	24.3	2001-2009	[redacted]	0.9	37.2	92.0	714	500	40.8
1992-2000	[redacted]	1.1	31.9	63.9	851	310	30.2	2001-2009	[redacted]	0.9	6.1	45.8	23	30	6.5
1992-2000	[redacted]	0.6	7.8	30.3	170	40	12.8	2001-2009	[redacted]	0.9	15.3	37.7	324	130	16.5
1992-2000	[redacted]	0.9	5.4	28.6	26	30	6.1	2001-2009	[redacted]	0.8	5.3	29.8	212	28	6.5
1992-2000	[redacted]	1.5	15.0	20.4	371	200	9.9	2001-2009	[redacted]	0.5	12.6	21.3	214	60	22.8
1992-2000	[redacted]	0.9	8.7	18.8	3	20	10.0	2001-2009	[redacted]	1.2	9.5	17.2	367	100	7.9
1992-2000	[redacted]	0.6	14.5	17.5	82	60	24.0	2001-2009	[redacted]	0.9	5.5	16.0	43	25	6.4
1992-2000	[redacted]	0.9	14.8	17.5	382	160	15.7	2001-2009	[redacted]	1.1	8.4	15.7	132	45	7.8
1992-2000	[redacted]	0.8	4.2	16.9	316	30	5.0	2001-2009	[redacted]	0.6	4.7	13.5	396	30	7.4
1992-2000	[redacted]	1.0	8.1	15.8	784	60	7.9	2001-2009	[redacted]	0.8	6.7	8.9	221	45	7.9
1992-2000	[redacted]	0.9	6.9	13.2	465	40	7.5	2001-2009	[redacted]	1.0	7.2	8.4	427	41	7.0
1992-2000	[redacted]	0.8	4.0	9.3	18	15	4.8	2001-2009	[redacted]	0.8	9.9	8.1	251	80	11.9
1992-2000	[redacted]	2.5	18.1	8.3	316	300	7.2	2001-2009	[redacted]	1.1	5.4	7.0	258	35	4.9
1992-2000	[redacted]	0.6	3.0	6.7	13	10	5.0	2001-2009	[redacted]	0.8	4.2	6.8	154	20	5.3
1992-2000	[redacted]	1.3	7.7	5.9	588	63	5.8	2001-2009	[redacted]	0.5	2.8	6.5	30	12	5.1
1992-2000	[redacted]	1.0	4.5	5.7	92	20	4.7	2001-2009	[redacted]	1.1	4.4	3.3	130	36	4.1
1992-2000	[redacted]	0.8	2.4	3.5	75	11	3.0	2001-2009	[redacted]	1.4	5.1	2.9	144	30	3.8
1992-2000	[redacted]	1.0	4.2	3.3	26	15	4.2	2001-2009	[redacted]	0.8	5.8	2.5	140	35	7.2
1992-2000	[redacted]	1.0	8.1	2.8	161	38	8.4	2001-2009	[redacted]	0.9	11.0	2.5	82	60	12.6
1992-2000	[redacted]	0.9	3.0	2.4	130	17	3.1	2001-2009	[redacted]	0.8	5.4	2.4	120	25	6.4
1992-2000	[redacted]	0.8	7.2	2.2	79	30	8.8	2001-2009	[redacted]	0.8	4.6	2.3	22	21	5.6
1992-2000	[redacted]	1.3	9.9	2.0	27	50	7.8	2001-2009	[redacted]	1.0	4.2	2.0	65	23	4.2
1992-2000	[redacted]	1.7	7.3	1.8	117	60	4.3	2001-2009	[redacted]	0.7	4.5	1.6	255	29	6.0
1992-2000	[redacted]	0.6	1.2	0.8	35	5	1.9	2001-2009	[redacted]	0.5	1.7	1.1	4	5	3.3
1992-2000	[redacted]	0.8	1.4	0.6	46	7	1.7	2001-2009	[redacted]	0.5	1.4	0.6	7	5	2.7
1992-2000	[redacted]	0.8	1.5	0.5	6	5	2.0	2001-2009	[redacted]	0.8	2.6	0.3	9	8	3.1
1992-2000	[redacted]	1.1	4.4	0.1	9	15	3.9	2001-2009	[redacted]	1.0	1.9	0.1	19	8	1.8
1992-2000	[redacted]	NA	NA	NA	1	1	1.0	2001-2009	[redacted]	0.2	0.5	NA	4	3	2.3
1992-2000	[redacted]	NA	NA	NA	1	7	7.0	2001-2009	[redacted]	NA	NA	NA	1	1	1.0
1992-2000	[redacted]	0.3	0.5	NA	5	2	1.6	2001-2009	[redacted]	0.5	0.6	NA	15	3	1.3
1992-2000	[redacted]	0.6	1.0	NA	21	4	1.7	2001-2009	[redacted]	NA	NA	NA	1	1	1.0
1992-2000	[redacted]	0.0	0.0	NA	2	1	1.0	2001-2009	[redacted]	0.2	0.5	NA	4	3	2.3
1992-2000	[redacted]	0.0	0.0	NA	2	3	3.0	2001-2009	[redacted]	0.6	0.9	NA	5	3	1.6
1992-2000	[redacted]	0.3	0.7	NA	2	3	2.5	2001-2009	[redacted]	0.7	2.8	NA	2	6	4.0
1992-2000	[redacted]	NA	NA	NA	1	2	2.0	2001-2009	[redacted]	0.4	2.0	NA	4	8	5.0
1992-2000	[redacted]	0.4	0.5	NA	4	2	1.3	2001-2009	[redacted]	0.5	0.9	NA	10	4	1.8
1992-2000	[redacted]	0.4	0.4	NA	5	2	1.2	2001-2009	[redacted]	0.5	2.1	NA	10	8	4.1
1992-2000	[redacted]	0.4	0.4	NA	5	2	1.2								
1992-2000	[redacted]	0.4	0.9	NA	9	4	2.3								
1992-2000	[redacted]	NA	NA	NA	1	1	1.0								

Table 16. Rounding and variance for Mutton Snapper for all year blocks from the south Florida region. Ves=Vessel number, cv=coefficient of variation, sd=standard deviation, %rnd=percent rounding, trips=number of trips, max=maximum reported, mean=mean number reported. The red shaded blocks indicate vessels with percent rounding higher than 80% and/or less than 100 trips and/or vessel mean reported was higher than total mean reported.

yr	ves	cv	sd	%rnd	trips	max	mean
1972-1983	[redacted]	0.6	58.5	95.5	22	250	93.0
1972-1983	[redacted]	0.6	62.9	87.5	8	180	102.6
1972-1983	[redacted]	1.1	54.7	83.2	95	267	48.6
1972-1983	[redacted]	0.8	7.3	40.7	176	48	9.2
1972-1983	[redacted]	0.7	5.3	23.2	101	25	7.3
1972-1983	[redacted]	0.9	4.8	16.7	92	25	5.5
1972-1983	[redacted]	0.9	3.4	10.7	40	20	3.6
1972-1983	[redacted]	1.4	8.5	9.4	96	80	6.1
1972-1983	[redacted]	1.0	4.2	8.8	129	21	4.4
1972-1983	[redacted]	0.9	6.4	8.7	230	37	7.2
1972-1983	[redacted]	1.0	4.5	8.3	160	40	4.4
1972-1983	[redacted]	1.7	7.8	8.2	691	150	4.7
1972-1983	[redacted]	0.7	3.5	8.0	11	13	4.9
1972-1983	[redacted]	1.0	4.9	7.7	1152	38	5.1
1972-1983	[redacted]	1.1	4.3	7.0	25	19	3.8
1972-1983	[redacted]	0.9	3.0	6.8	1438	25	3.3
1972-1983	[redacted]	1.3	5.6	6.5	134	40	4.4
1972-1983	[redacted]	1.1	5.2	6.2	132	37	4.7
1972-1983	[redacted]	0.8	3.3	5.6	62	17	4.0
1972-1983	[redacted]	1.0	3.1	5.0	1730	34	3.2
1972-1983	[redacted]	1.0	3.3	4.0	1762	40	3.2
1972-1983	[redacted]	0.8	3.0	3.9	131	18	3.5
1972-1983	[redacted]	1.1	3.4	3.9	686	25	3.2
1972-1983	[redacted]	1.2	4.5	3.3	541	50	3.7
1972-1983	[redacted]	1.4	4.9	3.2	740	58	3.5
1972-1983	[redacted]	0.8	2.1	3.0	604	12	2.7
1972-1983	[redacted]	0.8	1.8	3.0	18	8	2.3
1972-1983	[redacted]	0.9	2.5	2.9	31	13	2.7
1972-1983	[redacted]	1.1	4.2	2.6	149	23	3.7
1972-1983	[redacted]	1.0	2.6	2.5	725	31	2.7
1972-1983	[redacted]	0.9	2.6	2.2	321	16	3.1
1972-1983	[redacted]	1.1	3.0	2.1	281	23	2.8
1972-1983	[redacted]	0.9	2.2	1.8	223	14	2.5
1972-1983	[redacted]	0.8	2.2	1.7	69	12	2.8
1972-1983	[redacted]	0.9	1.6	1.6	643	16	1.8
1972-1983	[redacted]	0.8	1.7	1.6	1269	18	2.0
1972-1983	[redacted]	0.8	1.5	1.5	757	14	1.9
1972-1983	[redacted]	1.2	3.6	1.4	72	20	2.9
1972-1983	[redacted]	1.0	3.6	0.6	50	17	3.5
1972-1983	[redacted]	0.8	1.5	0.4	649	15	1.9
1972-1983	[redacted]	0.7	1.1	0.1	137	8	1.6
1972-1983	[redacted]	NA	NA	NA	1	1	1.0
1972-1983	[redacted]	0.9	1.5	NA	23	7	1.6
1972-1983	[redacted]	0.7	1.0	NA	27	6	1.4
1972-1983	[redacted]	0.0	0.0	NA	2	1	1.0
1972-1983	[redacted]	0.8	1.3	NA	9	4	1.7
1972-1983	[redacted]	0.5	1.0	NA	8	3	1.9
1972-1983	[redacted]	0.5	0.8	NA	8	3	1.5
1972-1983	[redacted]	0.5	1.1	NA	11	4	2.0
1972-1983	[redacted]	0.5	1.0	NA	4	3	1.8
1972-1983	[redacted]	NA	NA	NA	1	2	2.0
1972-1983	[redacted]	NA	NA	NA	1	33	33.0
1972-1983	[redacted]	0.0	0.0	NA	2	4	4.0
1972-1983	[redacted]	1.6	8.0	NA	16	28	4.9
1972-1983	[redacted]	0.9	1.7	NA	17	6	2.0
1972-1983	[redacted]	0.9	4.7	NA	6	14	5.0
1972-1983	[redacted]	0.0	0.0	NA	2	1	1.0
1972-1983	[redacted]	NA	NA	NA	1	4	4.0
1972-1983	[redacted]	0.7	1.5	NA	4	4	2.3

yr	ves	cv	sd	%rnd	trips	max	mean
1984-1991	[redacted]	0.5	15.6	100.0	11	70	32.7
1984-1991	[redacted]	1.1	108.5	81.3	114	800	97.0
1984-1991	[redacted]	0.8	14.2	65.6	30	78	16.7
1984-1991	[redacted]	0.9	18.3	64.0	70	120	21.0
1984-1991	[redacted]	0.2	2.1	40.0	4	15	12.3
1984-1991	[redacted]	1.0	26.0	24.1	107	186	25.9
1984-1991	[redacted]	0.7	3.0	20.0	12	12	4.3
1984-1991	[redacted]	0.8	4.6	17.0	83	25	5.6
1984-1991	[redacted]	2.0	79.3	13.2	62	528	40.5
1984-1991	[redacted]	0.6	4.9	11.1	2	12	8.5
1984-1991	[redacted]	0.9	3.3	8.3	36	14	3.7
1984-1991	[redacted]	1.0	3.0	5.7	1017	21	3.1
1984-1991	[redacted]	0.7	1.9	5.6	46	10	2.8
1984-1991	[redacted]	1.2	3.8	5.3	1061	42	3.2
1984-1991	[redacted]	1.2	5.1	5.3	944	70	4.2
1984-1991	[redacted]	0.9	2.6	5.2	541	15	3.0
1984-1991	[redacted]	1.1	3.4	5.1	2294	51	3.2
1984-1991	[redacted]	1.1	3.2	4.6	455	40	3.0
1984-1991	[redacted]	0.9	3.0	4.0	92	15	3.5
1984-1991	[redacted]	0.7	2.7	3.3	81	12	4.0
1984-1991	[redacted]	1.7	4.8	3.3	1829	100	2.9
1984-1991	[redacted]	0.8	2.0	3.3	476	15	2.4
1984-1991	[redacted]	1.2	4.0	3.2	1838	102	3.4
1984-1991	[redacted]	0.9	2.3	3.2	252	23	2.4
1984-1991	[redacted]	0.9	3.8	3.1	57	18	4.4
1984-1991	[redacted]	1.1	2.7	3.1	11	10	2.4
1984-1991	[redacted]	1.1	3.2	2.7	2244	60	2.8
1984-1991	[redacted]	0.8	1.6	2.7	308	10	2.1
1984-1991	[redacted]	1.0	3.5	2.6	274	32	3.5
1984-1991	[redacted]	0.7	1.8	2.6	204	11	2.4
1984-1991	[redacted]	1.2	3.3	2.6	1318	41	2.7
1984-1991	[redacted]	1.1	3.7	2.2	279	24	3.4
1984-1991	[redacted]	1.0	2.6	1.9	274	17	2.6
1984-1991	[redacted]	1.1	3.8	1.6	354	40	3.5
1984-1991	[redacted]	1.3	3.7	1.6	600	44	2.8
1984-1991	[redacted]	0.8	2.1	1.5	47	9	2.7
1984-1991	[redacted]	3.3	14.5	1.4	196	200	4.4
1984-1991	[redacted]	1.1	2.9	1.2	447	21	2.8
1984-1991	[redacted]	1.3	2.7	1.1	1943	41	2.0
1984-1991	[redacted]	0.8	1.5	0.9	1358	12	1.9
1984-1991	[redacted]	1.6	3.9	0.6	843	49	2.4
1984-1991	[redacted]	1.2	2.6	0.4	347	34	2.2
1984-1991	[redacted]	0.7	1.1	0.1	637	9	1.6
1984-1991	[redacted]	0.9	1.7	NA	3	4	2.0
1984-1991	[redacted]	0.8	2.0	NA	25	8	2.4
1984-1991	[redacted]	0.7	1.4	NA	2	3	2.0
1984-1991	[redacted]	1.0	2.6	NA	5	7	2.6
1984-1991	[redacted]	0.7	1.2	NA	3	3	1.7
1984-1991	[redacted]	NA	NA	NA	1	3	3.0
1984-1991	[redacted]	0.8	1.9	NA	14	7	2.4
1984-1991	[redacted]	0.7	1.1	NA	15	4	1.6
1984-1991	[redacted]	0.3	0.6	NA	3	2	1.7
1984-1991	[redacted]	0.4	1.2	NA	3	4	2.7
1984-1991	[redacted]	0.5	0.7	NA	8	3	1.4

yr	ves	cv	sd	%rnd	trips	max	mean
1992-2000	[redacted]	0.6	13.3	87.5	8	50	21.5
1992-2000	[redacted]	0.7	52.5	85.4	138	300	74.7
1992-2000	[redacted]	1.1	25.2	56.5	200	200	23.2
1992-2000	[redacted]	0.7	4.3	20.8	64	20	5.9
1992-2000	[redacted]	0.8	3.2	18.2	7	10	4.0
1992-2000	[redacted]	0.5	2.6	10.3	167	12	5.0
1992-2000	[redacted]	0.7	2.4	9.5	668	20	3.3
1992-2000	[redacted]	1.7	6.9	7.2	504	80	4.1
1992-2000	[redacted]	1.1	3.9	6.9	625	30	3.4
1992-2000	[redacted]	1.7	8.8	4.9	373	85	5.3
1992-2000	[redacted]	1.4	4.7	4.5	91	37	3.2
1992-2000	[redacted]	0.9	4.9	4.3	32	20	5.6
1992-2000	[redacted]	1.4	4.5	4.3	345	45	3.3
1992-2000	[redacted]	1.1	5.4	4.0	20	20	5.1
1992-2000	[redacted]	2.1	8.0	3.9	518	101	3.9
1992-2000	[redacted]	0.9	2.5	3.8	763	25	2.7
1992-2000	[redacted]	1.1	4.0	3.6	231	29	3.6
1992-2000	[redacted]	0.7	1.7	3.6	49	10	2.3
1992-2000	[redacted]	1.6	5.7	3.1	922	70	3.5
1992-2000	[redacted]	0.9	2.3	2.8	44	15	2.5
1992-2000	[redacted]	2.0	5.5	2.3	1352	100	2.7
1992-2000	[redacted]	1.1	6.6	2.2	159	44	5.8
1992-2000	[redacted]	1.1	2.6	2.1	454	21	2.4
1992-2000	[redacted]	0.6	1.4	2.1	173	7	2.2
1992-2000	[redacted]	1.1	3.5	2.1	581	35	3.3
1992-2000	[redacted]	1.5	3.7	2.0	1456	50	2.6
1992-2000	[redacted]	2.9	12.8	1.9	177	110	4.5
1992-2000	[redacted]	1.0	2.3	1.8	792	18	2.3
1992-2000	[redacted]	1.3	5.1	1.6	148	29	3.9
1992-2000	[redacted]	1.1	2.6	1.6	304	21	2.4
1992-2000	[redacted]	3.3	15.8	1.5	696	174	4.8
1992-2000	[redacted]	1.0	4.9	1.5	249	28	4.9
1992-2000	[redacted]	1.1	2.3	1.4	345	25	2.1
1992-2000	[redacted]	1.7	4.3	1.2	627	80	2.5
1992-2000	[redacted]	0.8	1.5	1.2	591	11	1.9
1992-2000	[redacted]	0.8	1.4	1.1	229	10	1.7
1992-2000	[redacted]	1.6	4.2	1.0	622	75	2.7
1992-2000	[redacted]	0.9	1.4	0.7	265	14	1.6
1992-2000	[redacted]	0.8	1.6	0.6	171	11	2.1
1992-2000	[redacted]	0.9	1.6	0.6	453	20	1.8
1992-2000	[redacted]	1.4	2.5	0.6	208	30	1.8
1992-2000	[redacted]	1.4	3.4	0.6	210	40	2.3
1992-2000	[redacted]	0.7	1.2	0.5	631	20	1.6
1992-2000	[redacted]	1.7	3.3	0.4	200	34	2.0
1992-2000	[redacted]	2.0	3.7	0.4	177	49	1.8
1992-2000	[redacted]	0.9	1.4	0.3	76	11	1.6
1992-2000	[redacted]	0.9	1.4	0.3	177	10	1.6
1992-2000	[redacted]	0.3	0.5	NA	7	2	1.6
1992-2000	[redacted]	0.4	0.5	NA	73	3	1.2
1992-2000	[redacted]	NA	NA	NA	1	1	1.0
1992-2000	[redacted]	0.7	1.6	NA	11	6	2.2
1992-2000	[redacted]	0.5	0.7	NA	64	4	1.4
1992-2000	[redacted]	0.4	0.8	NA	11	3	1.8
1992-2000	[redacted]	0.8	2.7	NA	18	11	3.2
1992-2000	[redacted]	0.0	0.0	NA	2	1	1.0
1992-2000	[redacted]	0.4	0.5	NA	5	2	1.4
1992-2000	[redacted]	0.7	0.9	NA	126	7	1.3
1992-2000	[redacted]	NA	NA	NA	1	1	1.0
1992-2000	[redacted]	0.5	0.7	NA	14	3	1.4
1992-2000	[redacted]	0.3	0.6	NA	3	2	1.7
1992-2000	[redacted]	0.7	1.0	NA	4	3	1.5

yr	ves	cv	sd	%rnd	trips	max	mean
2001-2009	[redacted]	1.0	121.9	94.6	37	700	126.6
2001-2009	[redacted]	1.0	47.0	43.8	363	250	44.8
2001-2009	[redacted]	0.8	5.7	17.6	46	25	7.5
2001-2009	[redacted]	0.9	5.3	14.5	168	27	6.2
2001-2009	[redacted]	0.8	3.4	12.7	435	20	4.2
2001-2009	[redacted]	0.8	2.9	8.7	513	18	3.7
2001-2009	[redacted]	0.7	3.2	6.9	72	12	4.4
2001-2009	[redacted]	0.8	2.8	6.8	309	20	3.6
2001-2009	[redacted]	1.3	6.7	6.3	461	52	5.0
2001-2009	[redacted]	0.8	2.3	4.9	383	16	2.8
2001-2009	[redacted]	0.7	2.1	4.6	26	10	3.2
2001-2009	[redacted]	1.1	3.2	4.6	155	30	3.0
2001-2009	[redacted]	0.8	2.1	3.6	195	15	2.5
2001-2009	[redacted]	0.8	2.8	2.8	101	14	3.5
2001-2009	[redacted]	0.9	2.3	2.6	524	20	2.6
2001-2009	[redacted]	1.7	4.9	2.3	435	75	2.9
2001-2009	[redacted]	1.0	6.2	2.0	263	42	6.3
2001-2009	[redacted]	0.8	2.1	1.8	328	15	2.7
2001-2009	[redacted]	1.0	2.2	1.8	187	17	2.3
2001-2009	[redacted]	1.4	3.6	1.7	525	60	2.6
2001-2009	[redacted]	0.8	1.8	1.6	40	10	2.3
2001-2009	[redacted]	3.5	14.5	1.6	249	187	4.1
2001-2009	[redacted]	1.0	2.5	1.6	45	15	2.5
2001-2009	[redacted]	1.7	5.7	1.1	30	31	3.4
2001-2009	[redacted]	0.7	1.5	0.9	29	7	2.2
2001-2009	[redacted]	1.0	1.8	0.9	610	16	1.9
2001-2009	[redacted]	0.9	1.8	0.8	311	15	2.0
2001-2009	[redacted]	5.0	12.5	0.8	812	290	2.5
2001-2009	[redacted]	1.0	1.9	0.8	209	20	1.8
2001-2009	[redacted]	1.4	3.4	0.5	40	21	2.6
2001-2009	[redacted]	0.9	1.5	0.5	136	12	1.6
2001-2009	[redacted]	0.8	1.5	0.3	166	11	1.9
2001-2009	[redacted]	0.7	1.1	0.3	623	8	1.6
2001-2009	[redacted]	0.5	0.6	0.2	101	5	1.3
2001-2009	[redacted]	0.9	1.5	0.1	206	16	1.7
2001-2009	[redacted]	0.7	1.0	NA	32	6	1.5
2001-2009	[redacted]	NA	NA	NA	1	2	2.0
2001-2009	[redacted]	NA	NA	NA	1	1	1.0
2001-2009	[redacted]	0.5	0.8	NA	6	3	1.7
2001-2009	[redacted]	2.1	15.0	NA	8	44	7.1

yr	ves	cv	sd	%rnd	trips	max	mean
2010-2013	[redacted]	0.5	53.0	90.5	156	300	103.4
2010-2013	[redacted]	0.8	70.4	50.0	26	385	84.8
2010-2013	[redacted]	0.9	4.3	8.4	422	40	4.6
2010-2013	[redacted]	1.3	7.6	8.0	406	57	5.7
2010-2013	[redacted]	1.2	6.3	7.5	653	50	5.2
2010-2013	[redacted]	1.0	4.4	6.6	544	42	4.4
2010-2013	[redacted]	1.0	2.8	4.3	329	27	2.7
2010-2013	[redacted]	1.8	7.1	3.7	58	48	4.0
2010-2013	[redacted]	1.2	3.1	3.3	662	46	2.7
2010-2013	[redacted]	2.1	14.0	3.1	119	100	6.8
2010-2013	[redacted]	0.9	2.4	2.9	816	24	2.7
2010-2013	[redacted]	0.9	10.4	1.7	41	42	11.4
2010-2013	[redacted]	0.8	2.2	1.6	40	11	2.6
2010-2013	[redacted]	0.9	2.1	1.4	131	15	2.3
2010-2013	[redacted]	0.8	1.7	1.4	358	12	2.2
2010-2013	[redacted]	0.8	2.0	1.3	142	15	2.4
2010-2013	[redacted]	0.8	1.6	1.2	211	11	2.0
2010-2013	[redacted]	1.1	2.7	1.0	155	15	2.5
2010-2013	[redacted]	0.9	1.8	0.9	457	20	2.0
2010-2013	[redacted]	0.8	1.6	0.9	684	16	1.9
2010-2013	[redacted]	0.9	1.7	0.8	359	13	2.0
2010-2013	[redacted]	0.7	1.3	0.8	121	9	1.8
2010-2013	[redacted]	0.7	1.2	0.7	179	8	1.7
2010-2013	[redacted]	0.7	1.3	0.7	338	10	1.7
2010-2013	[redacted]	1.0	2.6	0.6	98	14	2.7
2010-2013	[redacted]	2.4	5.4	0.5	364	60	2.3
2010-2013	[redacted]	0.8	1.5	0.4	152	10	1.9
2010-2013	[redacted]	0.6	1.3	0.4	312	13	2.1
2010-2013	[redacted]	0.5	0.8	0.1	414	6	1.5
2010-2013	[redacted]	1.0	2.0	0.1	90	16	1.9
2010-2013	[redacted]	0.9	1.5	NA	105	9	1.8
2010-2013	[redacted]	0.9	1.3	NA	43	9	1.5
2010-2013	[redacted]	1.3	15.3	NA	5	37	11.4
2010-2013	[redacted]	NA	NA	NA	1	1	1.0

Table 17. Rounding and variance for Yellowtail Snapper for all year blocks from the south Florida region. Ves=Vessel number, cv=coefficient of variation, d=standard deviation, %rnd=percent rounding, trips=number of trips, max=maximum reported, mean=mean number reported. The red shaded blocks indicate vessels with percent rounding higher than 80% and/or less than 100 trips and/or vessel mean reported was higher than total mean reported.

yr	ves	cv	sd	%rnd	trips	max	mean
1972-1983	[redacted]	0.5	301.3	91.6	88	1700	597.6
1972-1983	[redacted]	0.7	198.5	90.9	21	750	282.0
1972-1983	[redacted]	0.4	107.4	75.0	7	400	301.1
1972-1983	[redacted]	1.1	33.0	69.0	220	200	30.0
1972-1983	[redacted]	0.7	18.8	53.3	666	150	27.6
1972-1983	[redacted]	1.1	55.9	48.5	787	405	49.5
1972-1983	[redacted]	0.9	18.6	48.4	95	100	20.5
1972-1983	[redacted]	0.8	15.0	45.0	134	90	18.0
1972-1983	[redacted]	0.8	15.6	42.7	81	100	18.9
1972-1983	[redacted]	1.0	33.8	33.6	322	206	34.8
1972-1983	[redacted]	1.0	25.5	30.3	177	155	26.0
1972-1983	[redacted]	1.0	23.3	28.3	499	200	23.1
1972-1983	[redacted]	1.2	9.4	26.0	129	50	8.1
1972-1983	[redacted]	0.9	10.5	23.2	1379	75	11.5
1972-1983	[redacted]	1.1	14.3	19.9	138	78	13.0
1972-1983	[redacted]	1.4	20.6	16.0	131	150	14.3
1972-1983	[redacted]	1.3	33.1	15.3	403	300	25.4
1972-1983	[redacted]	1.3	13.5	14.4	947	125	10.3
1972-1983	[redacted]	1.2	18.7	13.3	2302	158	15.4
1972-1983	[redacted]	0.7	5.9	13.2	60	25	8.4
1972-1983	[redacted]	0.6	3.4	12.1	24	13	5.4
1972-1983	[redacted]	0.8	10.3	11.4	101	84	12.5
1972-1983	[redacted]	0.7	2.9	11.3	30	14	4.4
1972-1983	[redacted]	0.6	18.6	11.1	13	67	31.5
1972-1983	[redacted]	0.8	4.0	10.7	38	15	4.7
1972-1983	[redacted]	1.4	12.8	9.7	740	123	9.1
1972-1983	[redacted]	1.0	5.6	9.6	45	25	5.9
1972-1983	[redacted]	1.1	7.2	8.8	1652	80	6.5
1972-1983	[redacted]	1.1	38.3	8.6	47	160	36.3
1972-1983	[redacted]	1.9	70.5	8.6	60	400	36.5
1972-1983	[redacted]	1.1	13.7	8.4	145	82	12.8
1972-1983	[redacted]	0.9	3.7	8.0	823	30	4.0
1972-1983	[redacted]	1.4	11.9	7.8	750	120	8.6
1972-1983	[redacted]	1.6	9.0	7.6	293	108	5.8
1972-1983	[redacted]	0.6	10.2	6.7	4	30	18.5
1972-1983	[redacted]	1.4	8.6	6.4	1730	88	6.0
1972-1983	[redacted]	1.4	11.0	6.1	868	111	8.0
1972-1983	[redacted]	1.1	5.4	5.7	816	48	5.1
1972-1983	[redacted]	0.9	2.8	4.6	606	38	3.0
1972-1983	[redacted]	0.8	3.7	4.4	87	18	4.7
1972-1983	[redacted]	0.7	1.8	3.8	6	5	2.5
1972-1983	[redacted]	0.8	1.9	3.8	4	5	2.3
1972-1983	[redacted]	0.9	3.2	3.6	15	10	3.7
1972-1983	[redacted]	1.0	5.8	3.5	27	20	5.7
1972-1983	[redacted]	0.7	4.1	3.4	4	10	5.5
1972-1983	[redacted]	0.6	2.9	3.2	4	8	5.0
1972-1983	[redacted]	1.4	6.8	2.8	1027	61	4.8
1972-1983	[redacted]	0.8	3.0	2.4	143	19	3.9
1972-1983	[redacted]	0.8	3.5	2.3	16	12	4.2
1972-1983	[redacted]	2.5	13.5	0.9	40	80	5.4
1972-1983	[redacted]	0.6	5.2	NA	6	16	9.0
1972-1983	[redacted]	0.6	3.5	NA	2	8	5.5
1972-1983	[redacted]	NA	NA	NA	1	1	1.0
1972-1983	[redacted]	NA	NA	NA	1	32	32.0
1972-1983	[redacted]	2.2	11.0	NA	10	36	4.9

yr	ves	cv	sd	%rnd	trips	max	mean
1984-1991	[redacted]	0.7	80.1	100.0	32	300	122.5
1984-1991	[redacted]	0.7	256.9	100.0	11	800	350.5
1984-1991	[redacted]	0.7	290.4	96.0	72	1600	393.6
1984-1991	[redacted]	0.7	136.2	93.5	119	700	201.8
1984-1991	[redacted]	0.9	36.1	84.2	1056	325	39.0
1984-1991	[redacted]	0.6	24.4	84.0	25	100	40.4
1984-1991	[redacted]	1.0	33.5	79.1	135	200	34.3
1984-1991	[redacted]	0.8	21.6	75.5	788	150	26.4
1984-1991	[redacted]	0.8	26.9	74.8	181	150	31.8
1984-1991	[redacted]	1.0	26.7	73.4	1784	280	27.5
1984-1991	[redacted]	0.9	1039.3	72.4	113	4488	1180.7
1984-1991	[redacted]	0.6	1128.1	63.2	66	5862	1836.1
1984-1991	[redacted]	0.7	8.3	60.0	14	35	12.1
1984-1991	[redacted]	0.8	11.5	52.9	846	75	14.6
1984-1991	[redacted]	1.0	8.6	50.0	4	20	8.5
1984-1991	[redacted]	1.0	21.4	40.0	4	40	21.5
1984-1991	[redacted]	0.8	37.0	36.3	174	200	44.6
1984-1991	[redacted]	0.4	3.5	33.3	3	10	8.0
1984-1991	[redacted]	0.9	42.2	28.8	1553	290	48.1
1984-1991	[redacted]	1.5	34.4	22.7	1914	400	22.6
1984-1991	[redacted]	1.1	12.7	22.4	1162	100	11.3
1984-1991	[redacted]	1.1	9.7	17.2	2797	114	8.5
1984-1991	[redacted]	0.8	5.5	16.9	232	25	6.6
1984-1991	[redacted]	0.7	13.7	16.7	73	67	19.0
1984-1991	[redacted]	0.9	10.2	16.2	2107	203	11.4
1984-1991	[redacted]	1.1	33.1	14.5	362	197	30.7
1984-1991	[redacted]	0.2	5.7	14.3	2	30	26.0
1984-1991	[redacted]	1.2	9.8	13.2	1930	123	8.2
1984-1991	[redacted]	1.0	7.6	12.2	400	44	7.5
1984-1991	[redacted]	1.1	15.8	11.9	39	65	14.9
1984-1991	[redacted]	1.2	10.9	11.3	917	85	8.8
1984-1991	[redacted]	1.4	8.1	11.1	3	15	5.7
1984-1991	[redacted]	1.0	4.2	10.7	3324	58	4.3
1984-1991	[redacted]	1.2	18.9	9.7	683	126	16.1
1984-1991	[redacted]	0.9	5.7	9.5	345	38	6.2
1984-1991	[redacted]	1.1	7.9	8.8	50	37	7.5
1984-1991	[redacted]	1.5	10.0	8.6	231	80	6.7
1984-1991	[redacted]	1.0	6.7	7.9	285	40	6.7
1984-1991	[redacted]	1.1	14.9	6.7	233	120	13.4
1984-1991	[redacted]	1.0	5.8	6.3	1911	60	5.9
1984-1991	[redacted]	1.0	7.8	6.3	38	33	7.7
1984-1991	[redacted]	1.2	9.7	6.3	22	41	8.1
1984-1991	[redacted]	1.2	7.4	5.5	32	28	6.0
1984-1991	[redacted]	1.3	9.8	5.1	553	170	7.6
1984-1991	[redacted]	0.9	3.8	4.8	1667	31	4.1
1984-1991	[redacted]	0.9	4.0	4.6	1048	42	4.2
1984-1991	[redacted]	1.0	5.5	3.4	1039	50	5.4
1984-1991	[redacted]	1.0	3.6	0.6	8	10	3.5
1984-1991	[redacted]	0.8	1.4	0.1	179	12	1.8
1984-1991	[redacted]	0.9	7.8	NA	4	18	9.0
1984-1991	[redacted]	1.3	3.5	NA	4	8	2.8
1984-1991	[redacted]	0.6	0.8	NA	7	3	1.4
1984-1991	[redacted]	0.5	12.7	NA	2	34	25.0

yr	ves	cv	sd	%rnd	trips	max	mean
1992-2000	[redacted]	0.3	186.3	100.0	8	750	537.5
1992-2000	[redacted]	0.6	225.0	99.1	216	1500	354.6
1992-2000	[redacted]	0.6	101.9	96.8	154	700	167.9
1992-2000	[redacted]	0.9	41.8	90.6	1085	250	46.1
1992-2000	[redacted]	0.7	35.0	88.8	798	250	51.9
1992-2000	[redacted]	0.6	18.3	84.5	1497	250	28.8
1992-2000	[redacted]	1.0	28.7	83.2	3274	200	29.9
1992-2000	[redacted]	0.5	42.0	83.1	1132	440	78.5
1992-2000	[redacted]	1.0	37.7	82.7	797	200	39.0
1992-2000	[redacted]	0.7	35.2	82.7	358	250	54.0
1992-2000	[redacted]	0.8	43.3	82.1	134	200	54.2
1992-2000	[redacted]	0.4	15.5	71.4	7	55	39.7
1992-2000	[redacted]	0.7	21.1	60.0	47	100	29.5
1992-2000	[redacted]	0.4	8.9	59.6	185	60	19.8
1992-2000	[redacted]	0.9	18.6	50.0	11	50	21.5
1992-2000	[redacted]	0.6	6.2	47.4	32	20	9.7
1992-2000	[redacted]	0.9	11.9	46.4	1436	125	13.4
1992-2000	[redacted]	0.7	41.4	39.2	536	200	63.2
1992-2000	[redacted]	0.8	11.4	37.0	39	45	14.5
1992-2000	[redacted]	0.9	13.4	35.7	1426	110	14.9
1992-2000	[redacted]	0.7	7.4	31.7	71	40	10.2
1992-2000	[redacted]	0.8	48.3	30.3	1538	298	57.1
1992-2000	[redacted]	0.6	15.9	29.3	922	89	28.8
1992-2000	[redacted]	0.8	11.0	29.2	113	55	14.2
1992-2000	[redacted]	0.8	7.7	28.9	789	60	9.9
1992-2000	[redacted]	0.8	12.6	28.0	586	125	15.2
1992-2000	[redacted]	0.9	22.6	27.9	1030	202	25.0
1992-2000	[redacted]	1.5	24.5	27.3	7	70	16.0
1992-2000	[redacted]	1.2	27.9	27.1	2133	250	23.8
1992-2000	[redacted]	1.0	30.8	26.1	403	196	30.0
1992-2000	[redacted]	1.1	19.4	24.0	19	70	17.3
1992-2000	[redacted]	0.8	8.6	20.8	602	60	10.6
1992-2000	[redacted]	1.1	8.6	20.7	759	100	7.6
1992-2000	[redacted]	1.0	9.1	20.3	1051	75	8.7
1992-2000	[redacted]	0.8	6.7	18.6	1287	50	7.9
1992-2000	[redacted]	1.1	11.9	15.4	317	90	11.3
1992-2000	[redacted]	1.2	14.6	15.4	321	118	12.0
1992-2000	[redacted]	2.3	20.1	12.5	56	150	8.8
1992-2000	[redacted]	1.0	5.9	10.7	606	52	6.2
1992-2000	[redacted]	1.2	17.3	10.7	1400	180	14.1
1992-2000	[redacted]	1.3	9.9	10.5	1327	131	7.6
1992-2000	[redacted]	1.2	13.9	10.2	671	125	11.5
1992-2000	[redacted]	1.6	22.7	7.9	800	201	13.8
1992-2000	[redacted]	1.4	15.1	7.8	204	120	10.7
1992-2000	[redacted]	1.1	8.3	7.6	321	72	7.8
1992-2000	[redacted]	1.1	28.4	7.1	179	154	26.0
1992-2000	[redacted]	1.0	4.7	7.0	214	35	4.6
1992-2000	[redacted]	0.5	3.2	6.3	3	10	6.3
1992-2000	[redacted]	1.2	23.1	5.3	8	67	18.6
1992-2000	[redacted]	1.9	11.7	3.9	198	85	6.3
1992-2000	[redacted]	1.2	4.4	3.6	21	15	3.6
1992-2000	[redacted]	0.9	3.2	3.3	488	27	3.4
1992-2000	[redacted]	0.8	2.0	2.8	8	6	2.4
1992-2000	[redacted]	0.9	2.8	2.1	117	12	3.1
1992-2000	[redacted]	1.7	8.8	2.0	59	45	5.2
1992-2000	[redacted]	1.3	9.0	1.8	123	50	6.8
1992-2000	[redacted]	0.9	4.4	1.8	135	32	4.7
1992-2000	[redacted]	1.5	4.6	0.5	85	27	3.0
1992-2000	[redacted]	NA	NA	NA	1	1	1.0
1992-2000	[redacted]	NA	NA	NA	1	3	3.0
1992-2000	[redacted]	NA	NA	NA	1	2	2.0
1992-2000	[redacted]	0.9	5.0	NA	19	24	5.4

yr	ves	cv	sd	%rnd	trips	max	mean
2001-2009	[redacted]	0.5	83.6	89.2	33	400	159.8
2001-2009	[redacted]	0.6	33.1	87.0	755	225	58.0
2001-2009	[redacted]	0.9	32.0	86.6	2344	250	34.6
2001-2009	[redacted]	0.6	136.6	85.6	362	760	226.2
2001-2009	[redacted]	0.8	47.1	77.5	124	205	55.6
2001-2009	[redacted]	0.7	54.2	70.0	1031	490	79.3
2001-2009	[redacted]	0.7	27.3	67.8	875	160	37.6
2001-2009	[redacted]	0.9	51.5	66.7	8	130	59.5
2001-2009	[redacted]	0.9	11.8	45.3	491	60	13.1
2001-2009	[redacted]	0.4	7.0	44.4	8	26	17.1
2001-2009	[redacted]	0.9	38.2	44.4	1567	300	40.5
2001-2009	[redacted]	0.9	24.9	42.6	686	240	28.9
2001-2009	[redacted]	0.9	11.4	39.2	426	80	12.6
2001-2009	[redacted]	0.9	9.6	29.9	455	75	10.9
2001-2009	[redacted]	0.8	8.6	24.6	181	41	10.6
2001-2009	[redacted]	0.8	5.9	23.5	36	25	7.8
2001-2009	[redacted]	1.0	11.7	23.0	2590	115	11.6
2001-2009	[redacted]	0.6	6.8	22.8	457	50	11.4
2001-2009	[redacted]	1.0	38.4	21.9	241	200	37.4
2001-2009	[redacted]	0.7	8.0	18.4	24	31	10.9
2001-2009	[redacted]	0.9	18.0	16.1	353	120	19.7
2001-2009	[redacted]	1.1	8.5	14.8	424	75	7.6
2001-2009	[redacted]	1.3	20.3	14.7	261	170	15.4
2001-2009	[redacted]	1.0	5.3	10.8	395	30	5.3
2001-2009	[redacted]	1.1	17.1	10.5	7	40	15.3
2001-2009	[redacted]	1.2	12.3	9.4	109	61	10.3
2001-2009	[redacted]	0.9	6.7	8.3	159	31	7.4
2001-2009	[redacted]	1.3	14.4	6.7	186	110	10.7
2001-2009	[redacted]	1.1	6.4	5.7	52	36	5.8
2001-2009	[redacted]	1.7	20.6	5.4	189	140	12.2
2001-2009	[redacted]	1.0	8.1	4.9	63	41	8.1
2001-2009	[redacted]	0.7	3.4	3.3	79	13	5.2
2001-2009	[redacted]	0.7	2.0	3.1	18	6	2.7
2001-2009	[redacted]	1.1	8.9	2.5	201	50	7.8
2001-2009	[redacted]	1.6	10.3	2.2	92	55	6.5
2001-2009	[redacted]	0.9	2.1	0.4	35	13	2.2
2001-2009	[redacted]	1.3	3.0	0.1	36	18	2.4
2001-2009	[redacted]	0.7	2.5	NA	18	9	3.6
2001-2009	[redacted]	0.7	2.2	NA	4	6	3.0

yr	ves	cv	sd	%rnd	trips	max	mean
2010-2013	[redacted]	0.6	29.5	89.2	641	230	53.3
2010-2013	[redacted]	0.7	100.2	82.3	141	650	144.0
2010-2013	[redacted]	0.6	141.1	76.9	26	608	238.4
2010-2013	[redacted]	0.7	58.1	76.3	653	300	86.4
2010-2013	[redacted]	0.9	18.7	73.2	504	150	20.4
2010-2013	[redacted]	1.0	18.2	72.7	1420	200	19.1
2010-2013	[redacted]	0.8	78.7	71.0	96	290	99.9
2010-2013	[redacted]	0.9	25.4	60.6	1841	210	27.2
2010-2013	[redacted]	0.8	23.5	60.4	580	150	30.7
2010-2013	[redacted]	1.0	22.3	59.8	1360	250	22.1
2010-2013	[redacted]	0.8	12.9	36.3	460	75	16.4
2010-2013	[redacted]	0.6	6.5	28.2	289	50	11.1
2010-2013	[redacted]	0.9	39.9	27.4	790	230	42.8
2010-2013	[redacted]	1.0	10.8	27.0	1315	87	11.3
2010-2013	[redacted]	0.9	12.0	25.3	748	80	13.2
2010-2013	[redacted]	1.0	12.9	19.0	694	100	13.0
2010-2013	[redacted]	1.2	26.7	18.4	222	150	22.4
2010-2013	[redacted]	0.8	11.8	17.4	318	73	15.7
2010-2013	[redacted]	1.0	15.2	14.6	448	139	15.1
2010-2013	[redacted]	1.1	8.1	13.9	1275	65	7.3
2010-2013	[redacted]	1.2	9.1	12.6	501	70	7.7
2010-2013	[redacted]	1.0	12.0	11.5	583	71	12.4
2010-2013	[redacted]	1.1	12.3	11.1	209	80	10.7
2010-2013	[redacted]	1.4	17.6	9.3	799	173	12.2
2010-2013	[redacted]	1.4	12.7	7.9	26	60	9.2
2010-2013	[redacted]	1.0	8.1	6.8	221	51	7.9
2010-2013	[redacted]	1.2	9.0	4.9	193	47	7.5
2010-2013	[redacted]	1.2	6.2	2.5	24	30	5.2
2010-2013	[redacted]	1.6	9.0	1.2	64	60	5.5
2010-2013	[redacted]	1.0	4.0	1.0	136	25	4.0
2010-2013	[redacted]	1.0	2.9	0.2	20	11	2.8
2010-2013	[redacted]	0.4	0.4	NA	18	2	1.2
2010-2013	[redacted]	0.9	42.3	NA	6	103	48.0
2010-2013	[redacted]	0.7	1.4	NA	2	3	2.0

Table 18. Trip types in the headboat logbook database (CR files) and associated EDA naming and groupings.

Definition	Hours	Plot Category	Plot Name	Analysis
Half day AM	4-6	Half	Halfday1	half
Halfday PM	4-6	Half	Halfday2	half
Halfday night	4-6	Half	Halfnight1	half
Halfday night second trip	4-6	Half	Halfnight2	half
¾ day	6-8	Halfplus	.75day1	other
¾ day second trip	6-8	Halfplus	.75day2	other
Full day	8-12	Full	Fullday	other
Overnight	8-12	Full	Fullnight	other
1.5 days	18	Multi	1.5day	other
Two days	24	Multi	2day	other
Three days	36	Multi	3day	other
Four days	48	Multi	4day	other
Five days	60	Multi	5day	other
Six days	72	Multi	6day	other
Seven days	84	Multi	7day	other

Figures

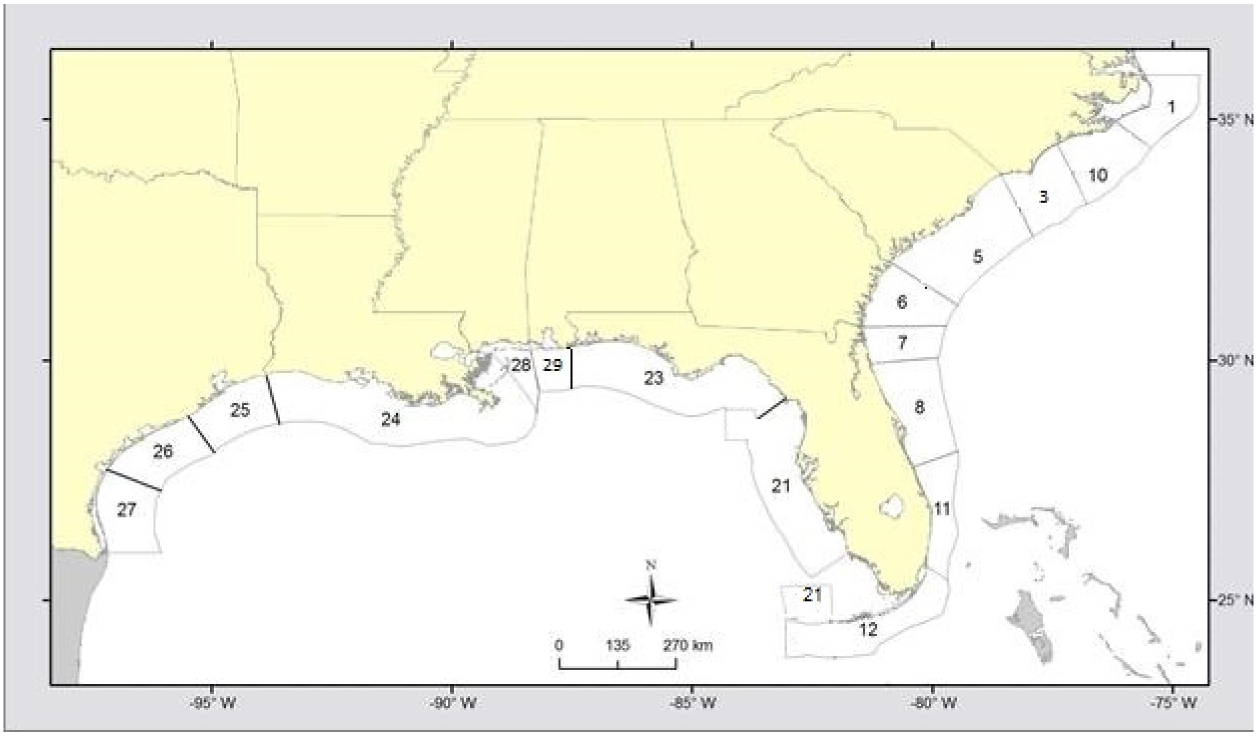


Figure 1. Southeast Region Headboat Survey statistical reporting areas.

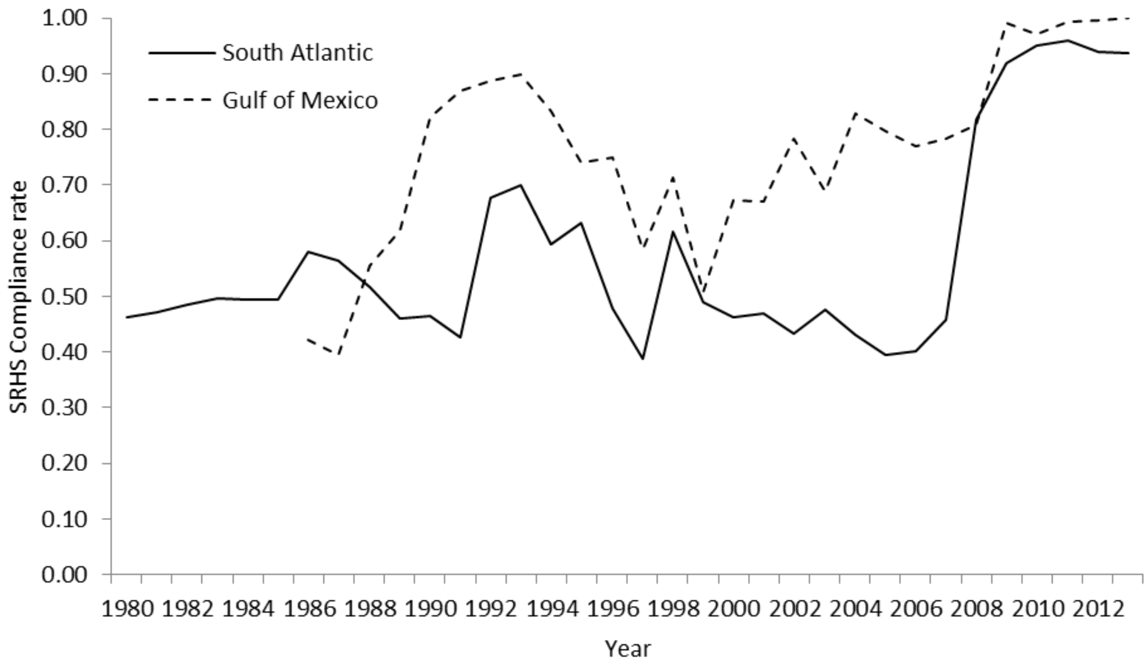


Figure 2. Reporting compliance rates in the South Atlantic and Gulf of Mexico, 1980-2013.

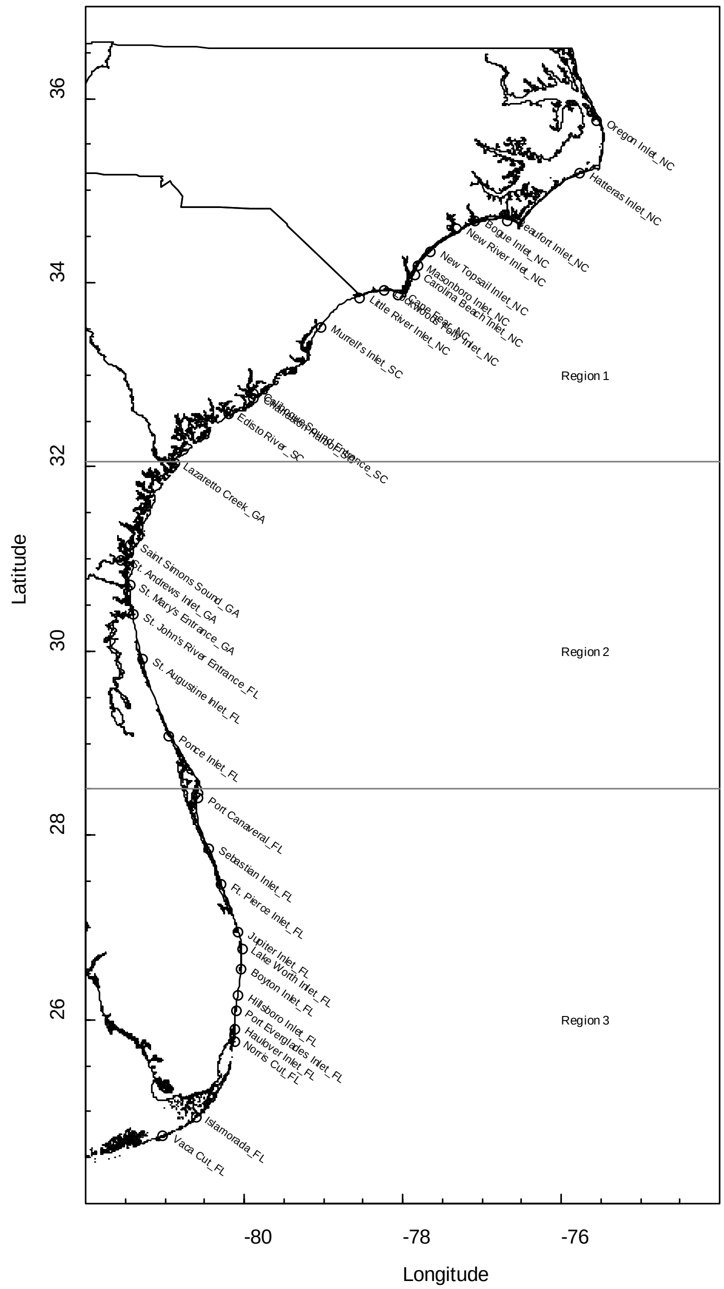


Figure 3. Common fishing inlets in the Carolinas, Georgia-north Florida, and south Florida regions.

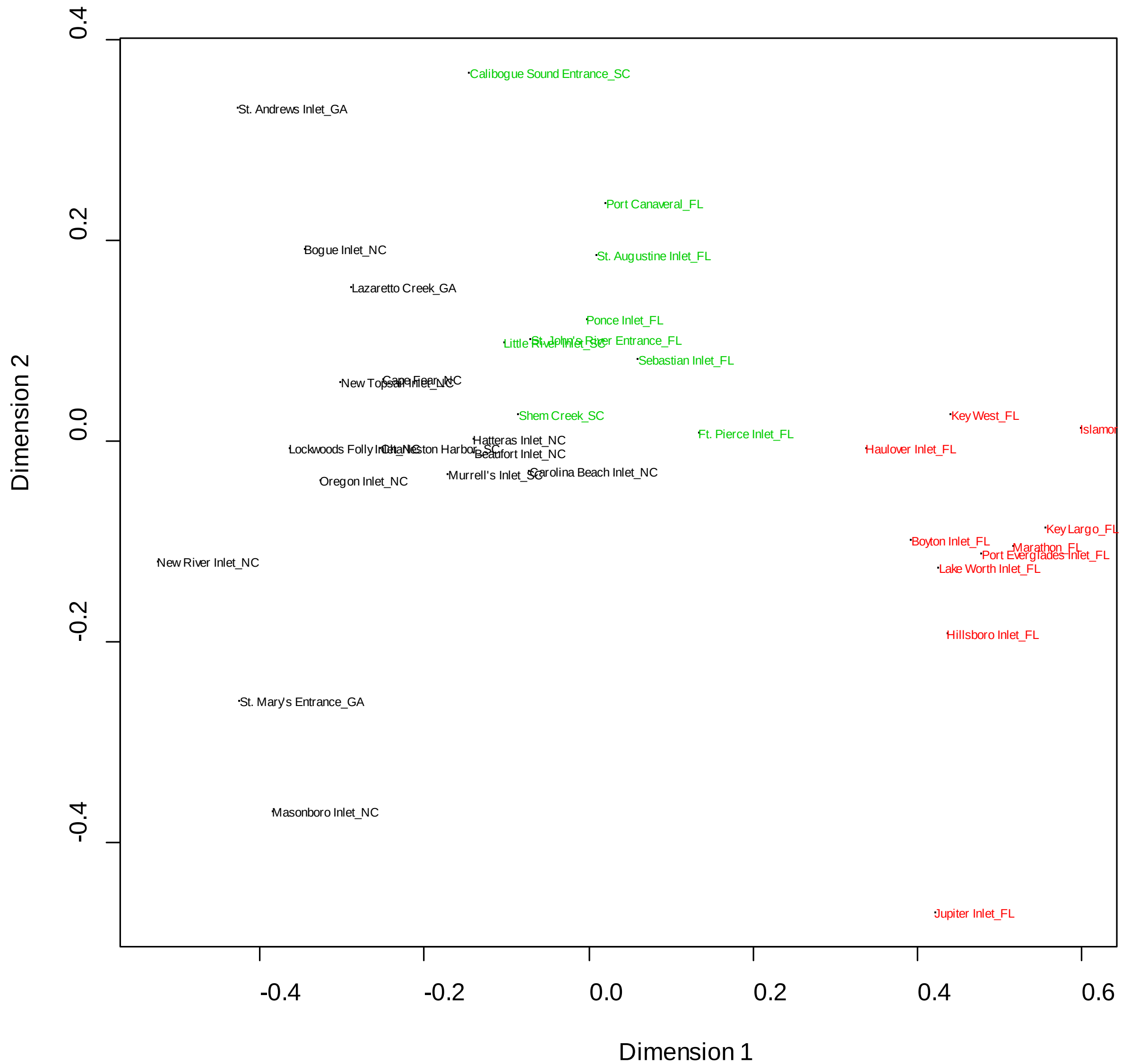


Figure 4. Results from multi-dimensional scaling to assign common fishing areas using inlet and catch per unit effort. Each color represents a different fishing area that was common among inlets within those areas. Black represents the Carolinas. Green represents Georgia-north Florida and red represents south Florida.

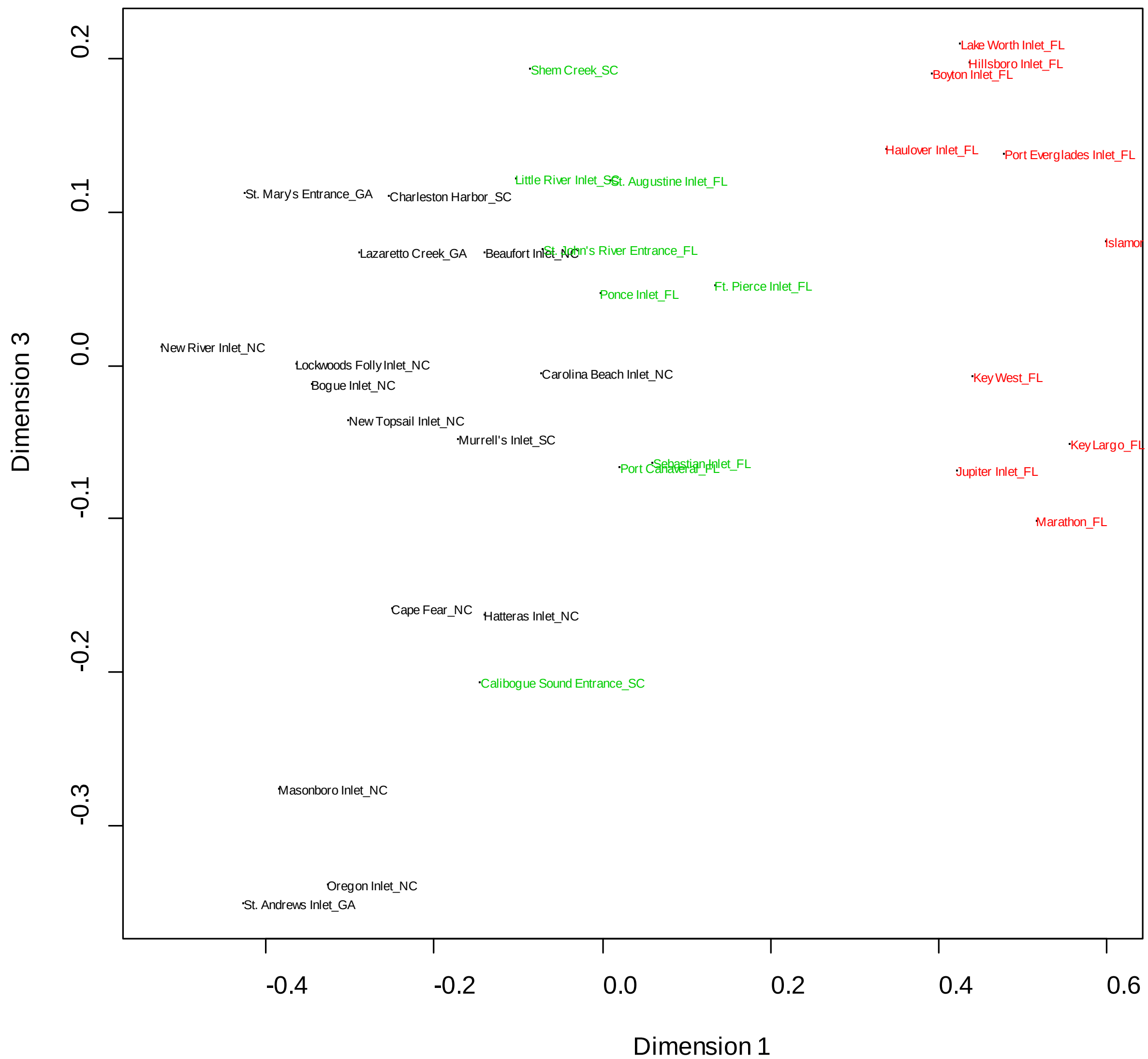


Figure 4. continued.

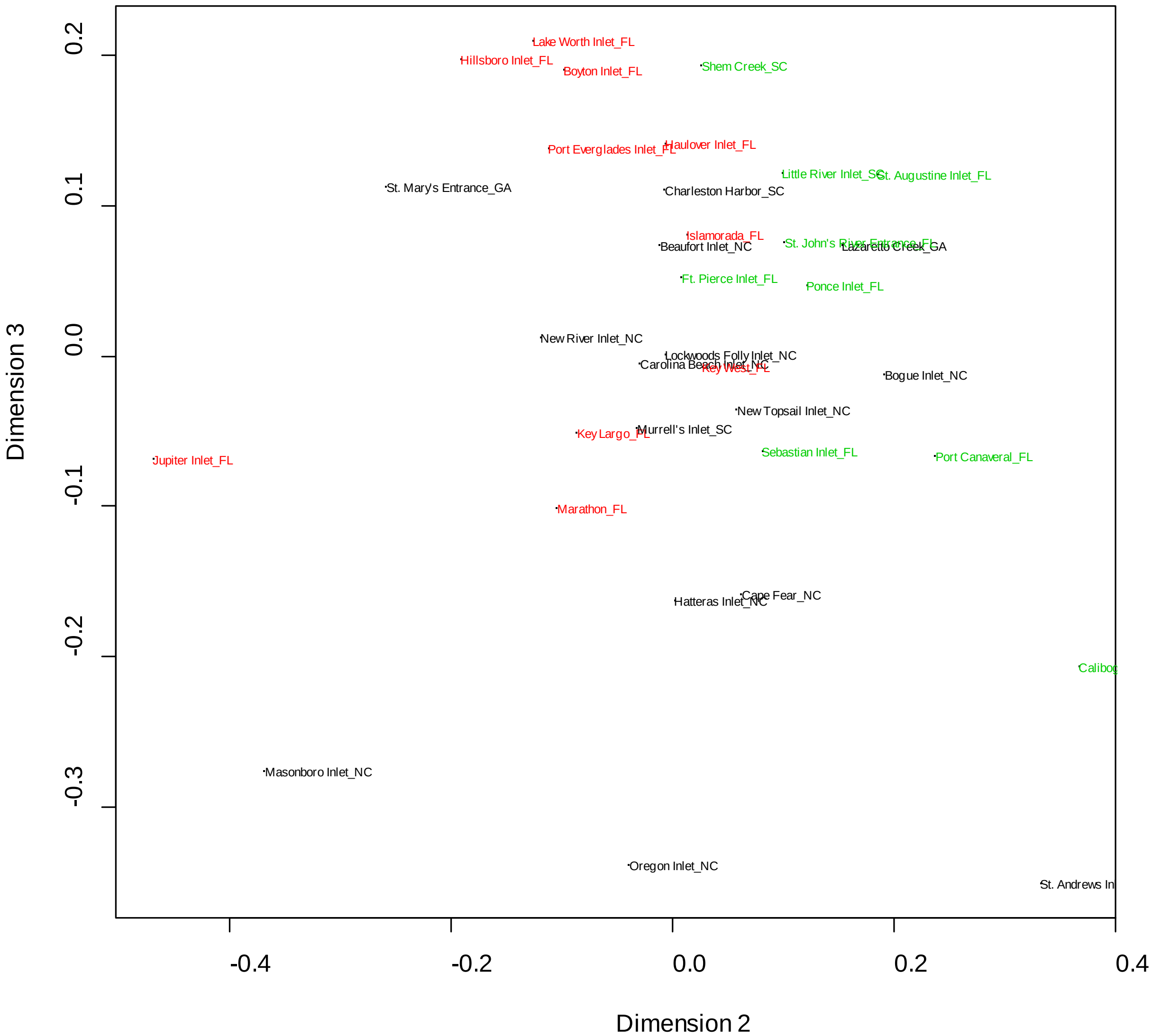


Figure 4. continued.

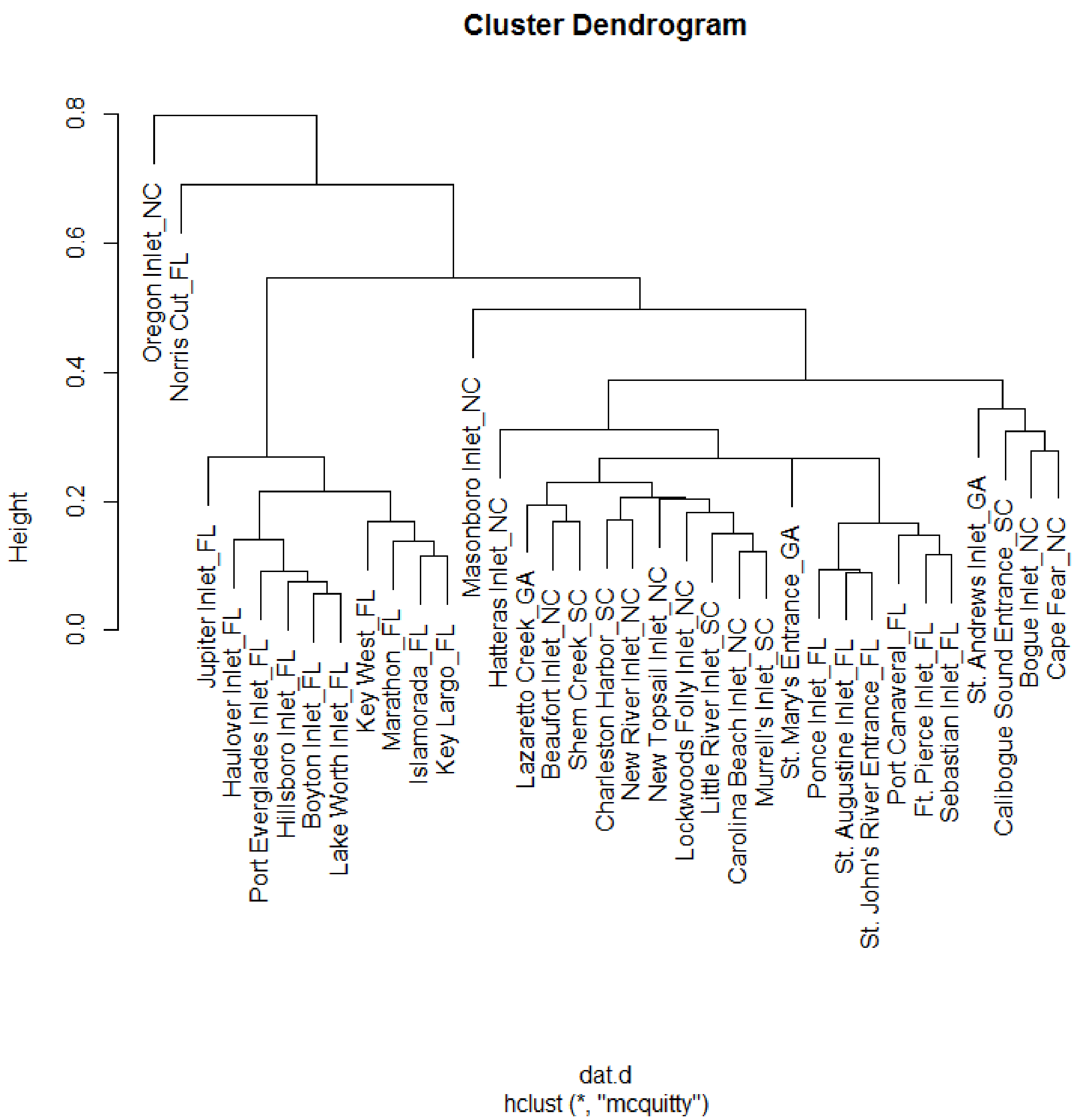


Figure 5. Results from cluster analysis to assign common fishing areas using inlet and catch per unit effort.

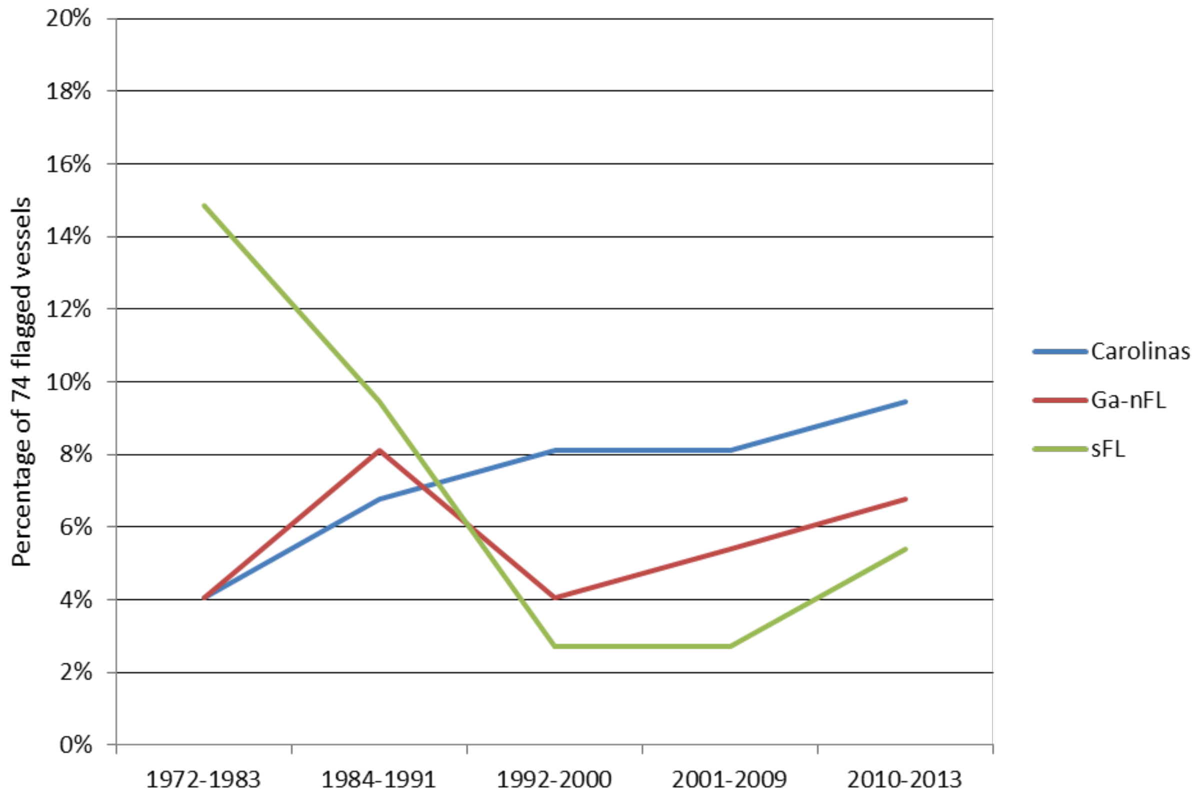


Figure 6: Percentage of the 74 vessels with at least one flagged metric occurring within each time block, by region.

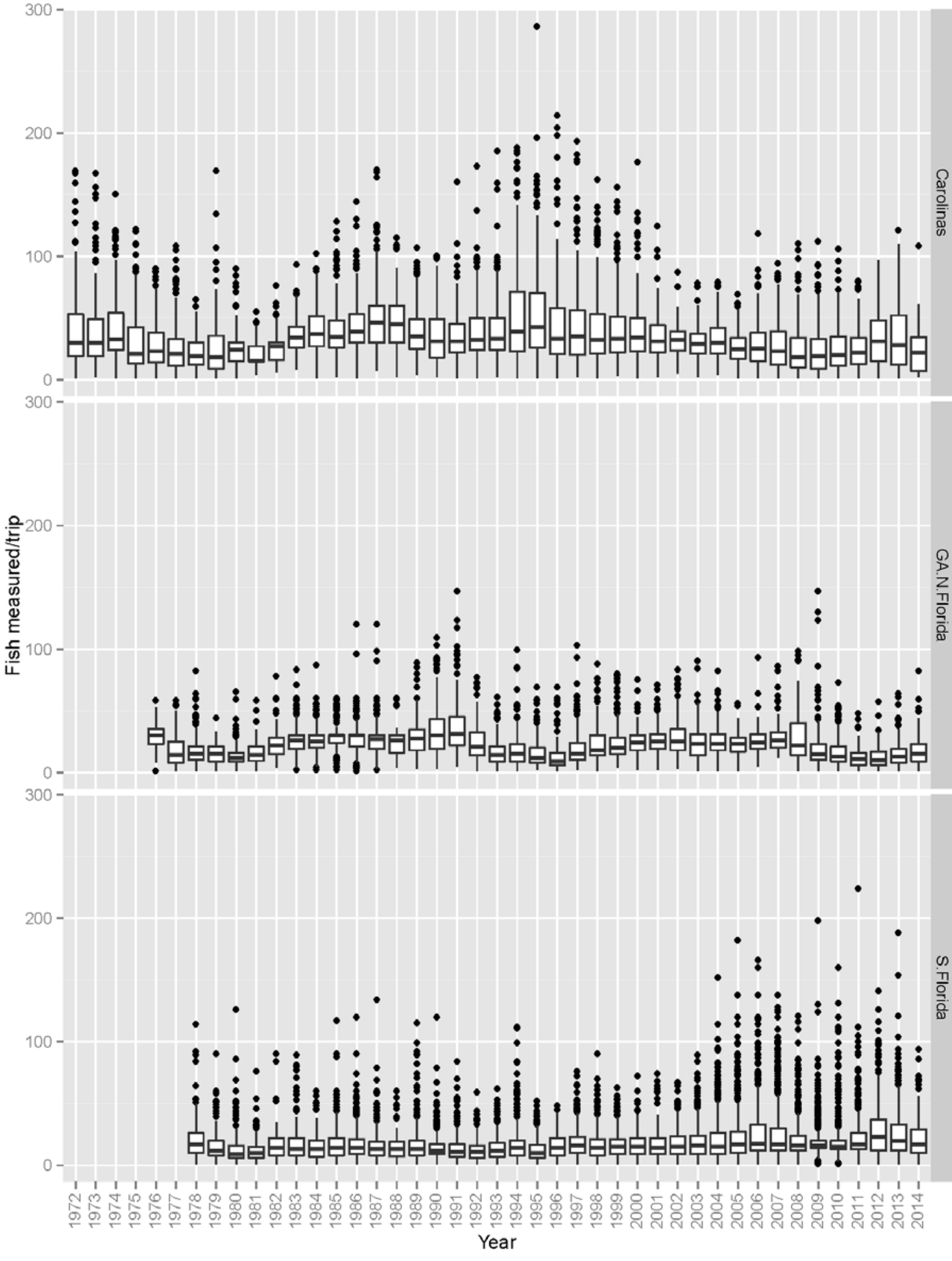


Figure 7. Box plots of fish (pooled across species) measured/trip by region and year. The box is the interquartile region and the dots indicate outliers of the 25th and 75th percentiles.

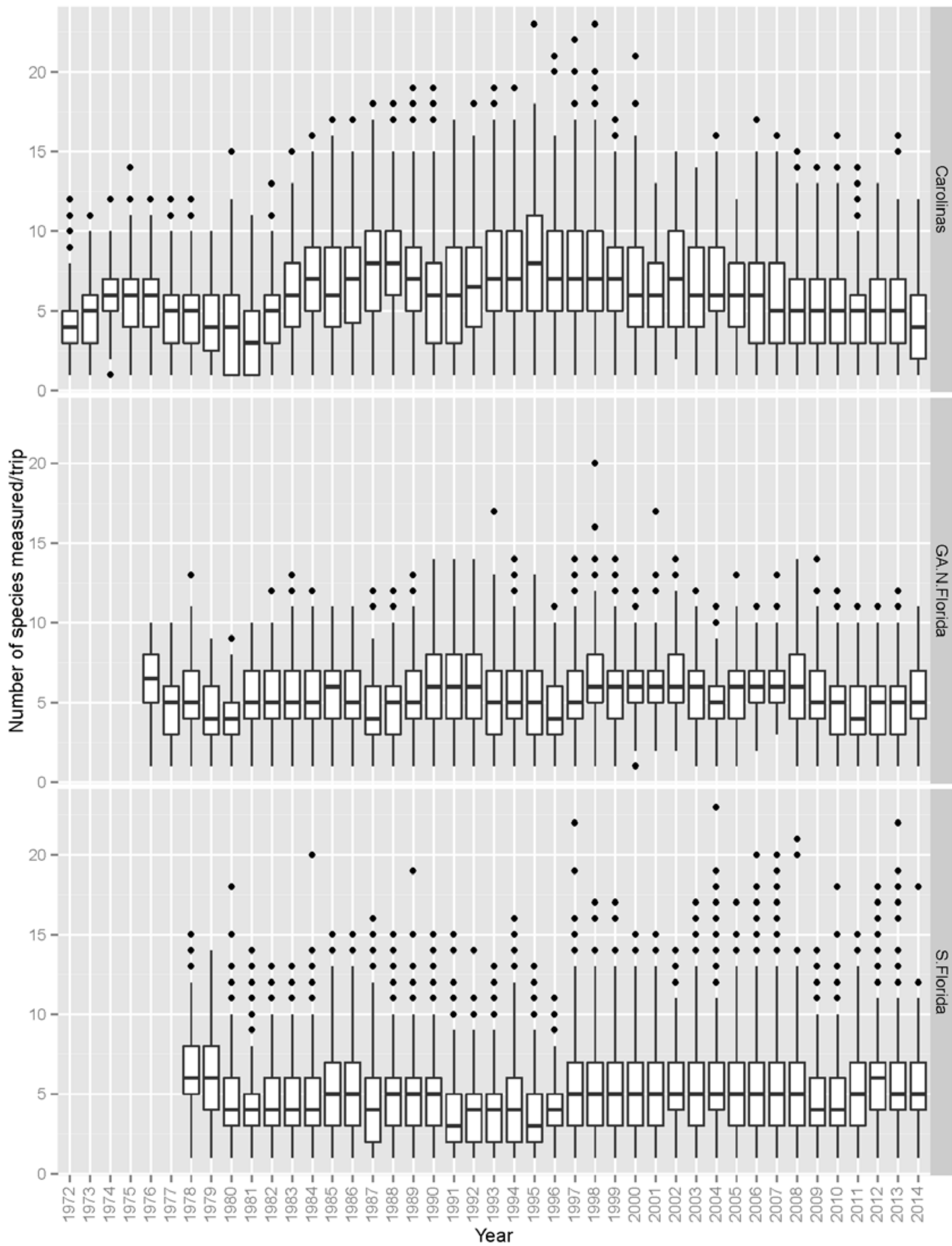


Figure 8. Box plots of average number of species measured by region and year. The box is the interquartile region and the dots indicate outliers of the 25th and 75th percentiles.

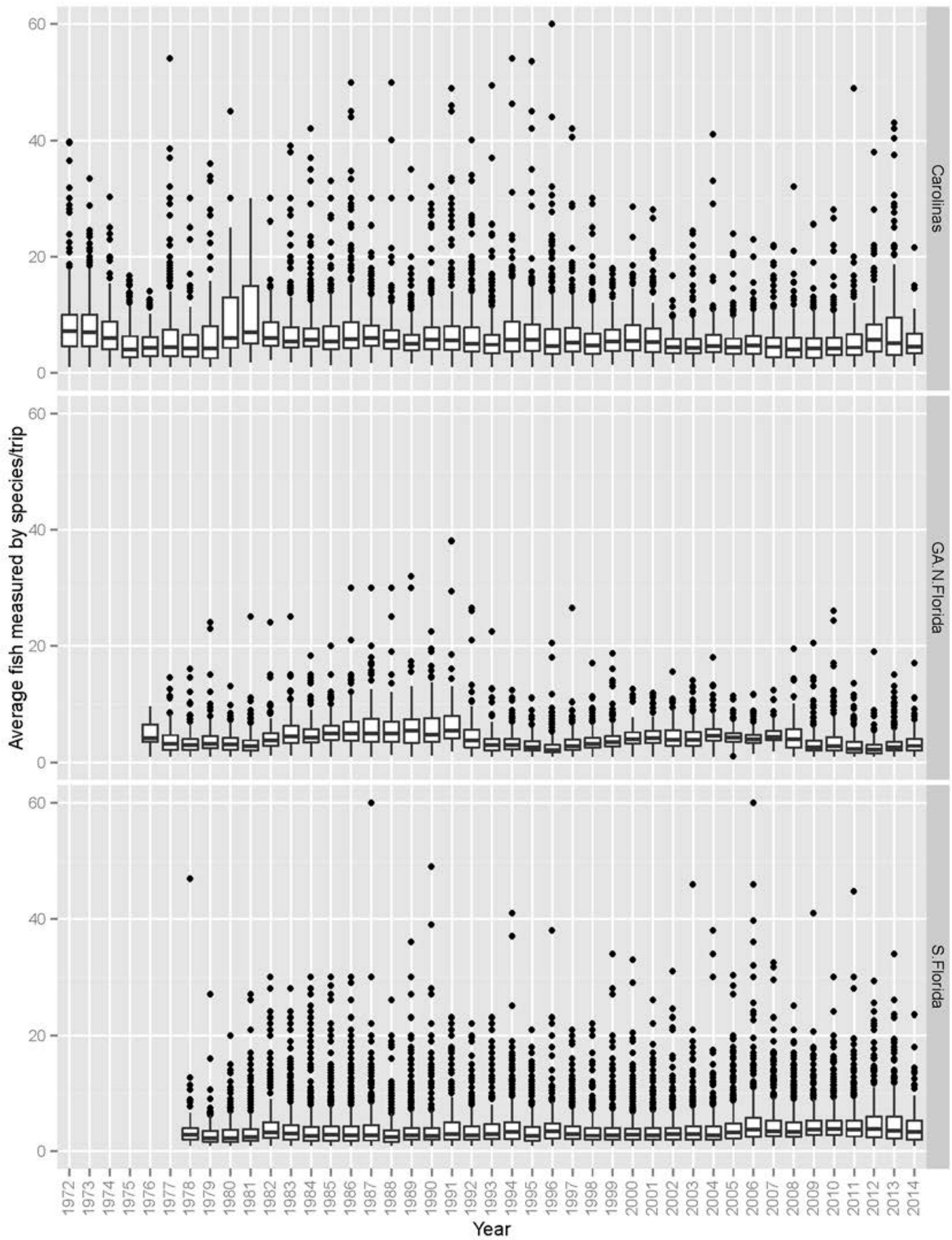


Figure 9. Box plots of the average number of fish of each species measured per trip by region and year. The box is the interquartile region and the dots indicate outliers of the 25th and 75th percentiles.

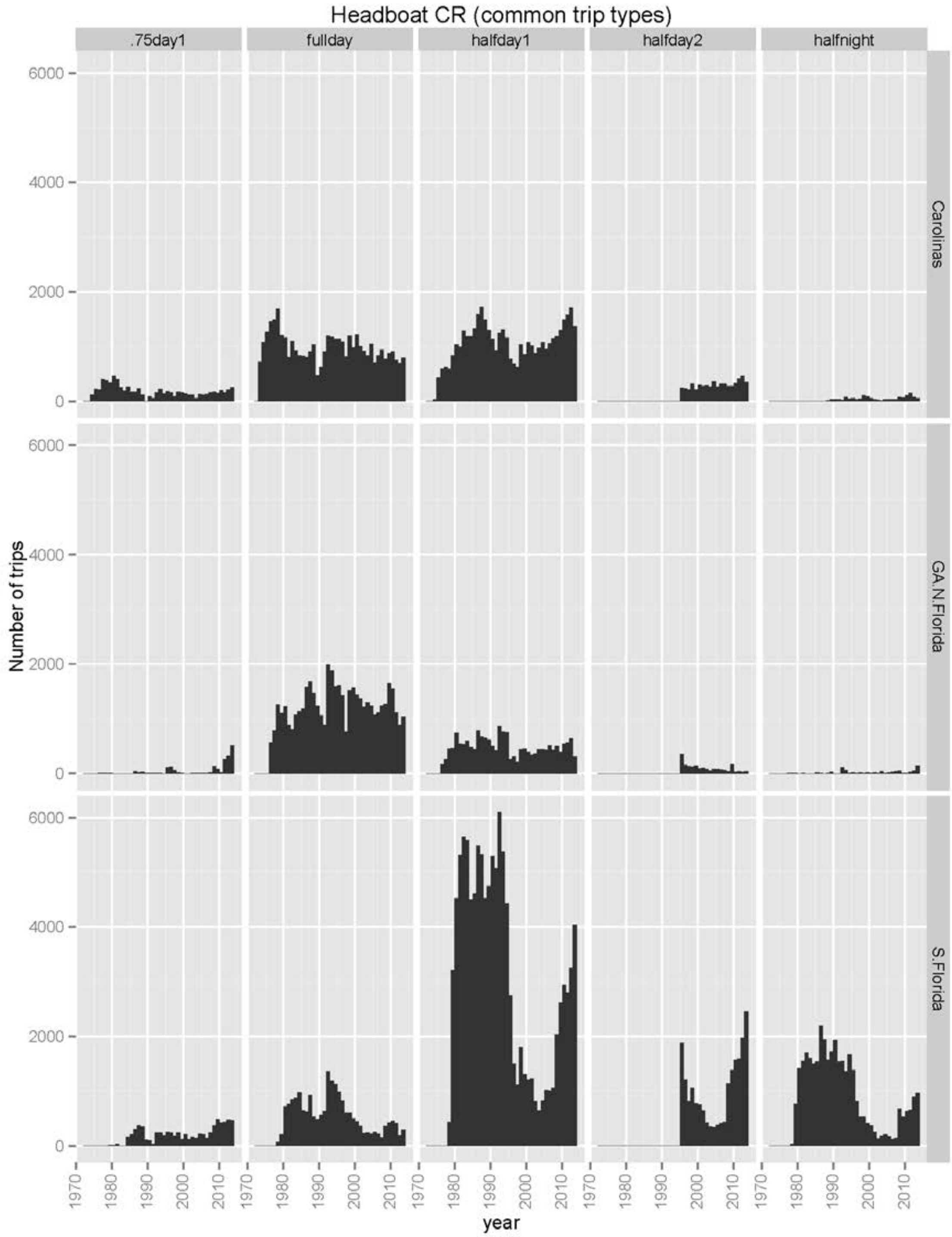


Figure 10. Number of common (5) trip types in the CRs by year, region and trip type.

Figure 11. (**Redacted for confidentiality)** Number of uncommon trip types in the CRs by year, region and trip type.

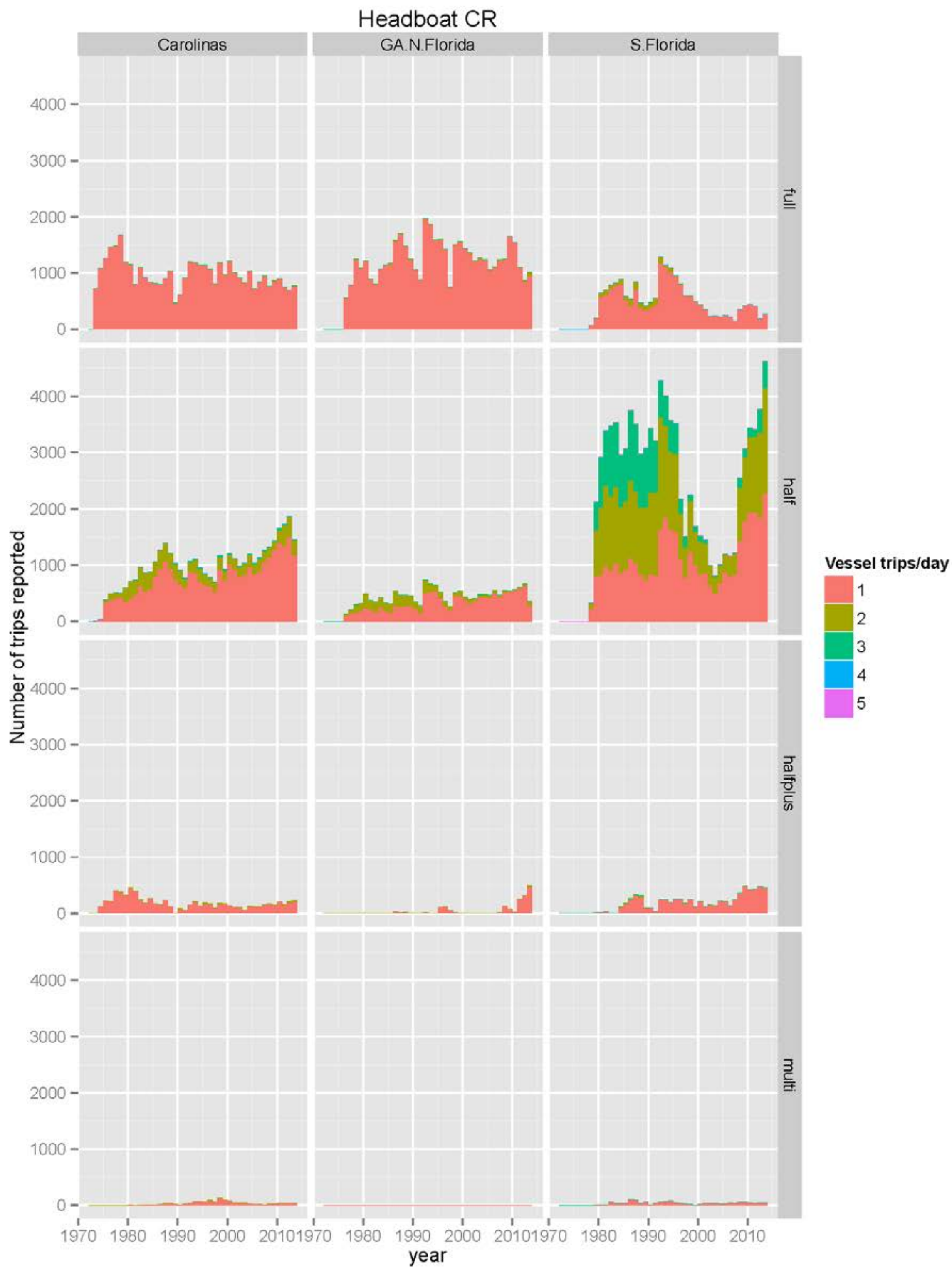


Figure 12. Number of all trip types in the CRs by year and region (7).

Figure 13. **(Redacted for confidentiality)** Bubble plot of matched records. The size of the bubbles indicates the number of trips. The blue bubbles indicate all trips in the CR, the orange bubble indicates of those how many had only one trip in a day, and the green bubble is the matched BP to the CR with only one trip in a day in the Carolinas.

Figure 14. **(Redacted for confidentiality)** Bubble plot of matched records. The size of the bubbles indicates the number of trips. The blue bubbles indicate all trips in the CR, the orange bubble indicates of those how many had only one trip in a day, and the green bubble is the matched BP to the CR with only one trip in a day in GA/N.Florida.

Figure 15. **(Redacted for confidentiality)** Bubble plot of matched records. The size of the bubbles indicates the number of trips. The blue bubbles indicate all trips in the CR, the orange bubble indicates of those how many had only one trip in a day, and the green bubble is the matched BP to the CR with only one trip in a day in S.Florida.

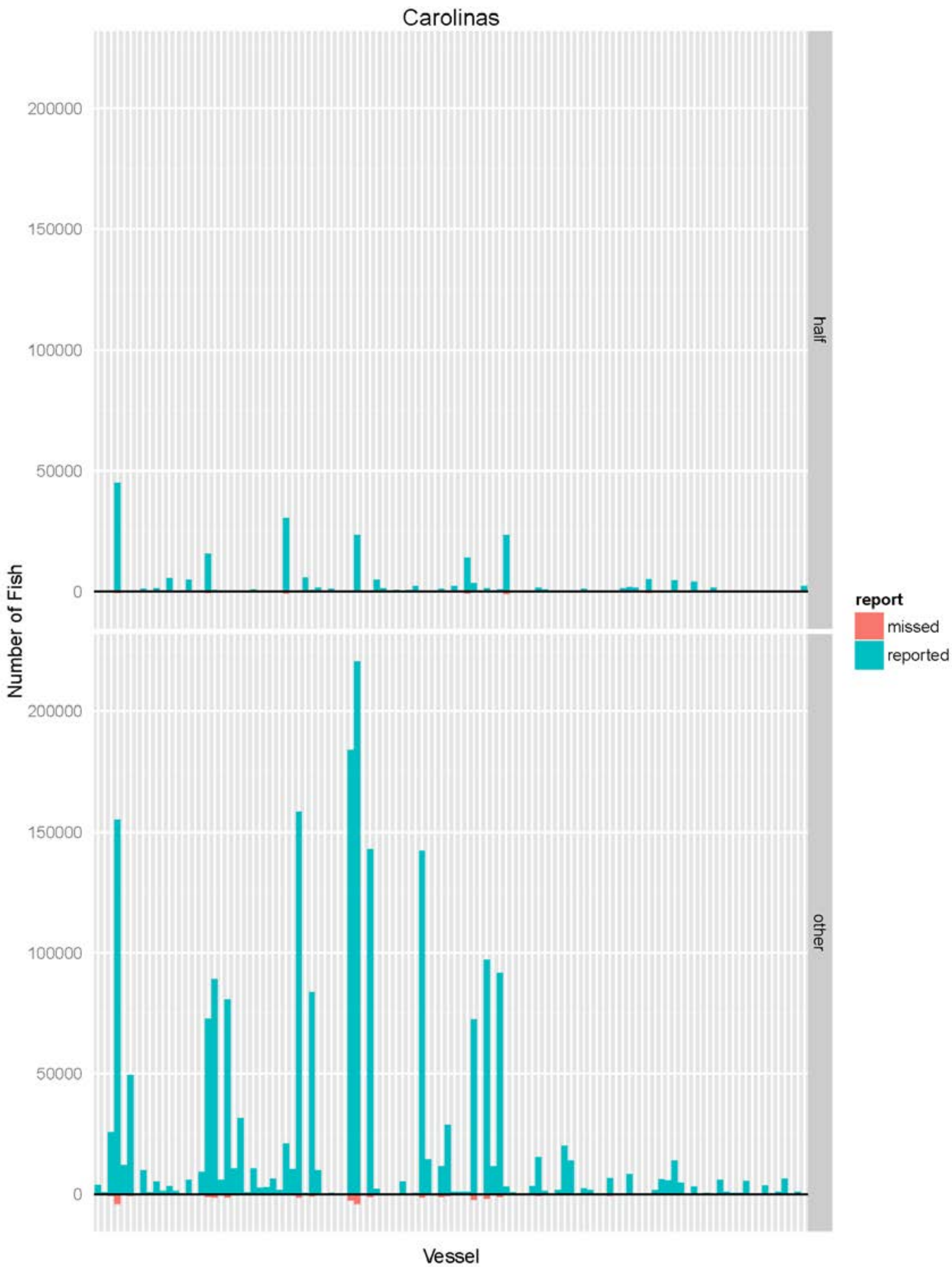


Figure 16. Number of missed fish reported in the Carolinas, by vessel, using matched trips over all years. The teal bar is the quantity of fish of all species reported on the CR for the matched trips. The orange bar is the difference between the number of fish reported on the BP and the number of fish reported on the CR for the matched trips. For confidentiality vessels are unidentified.

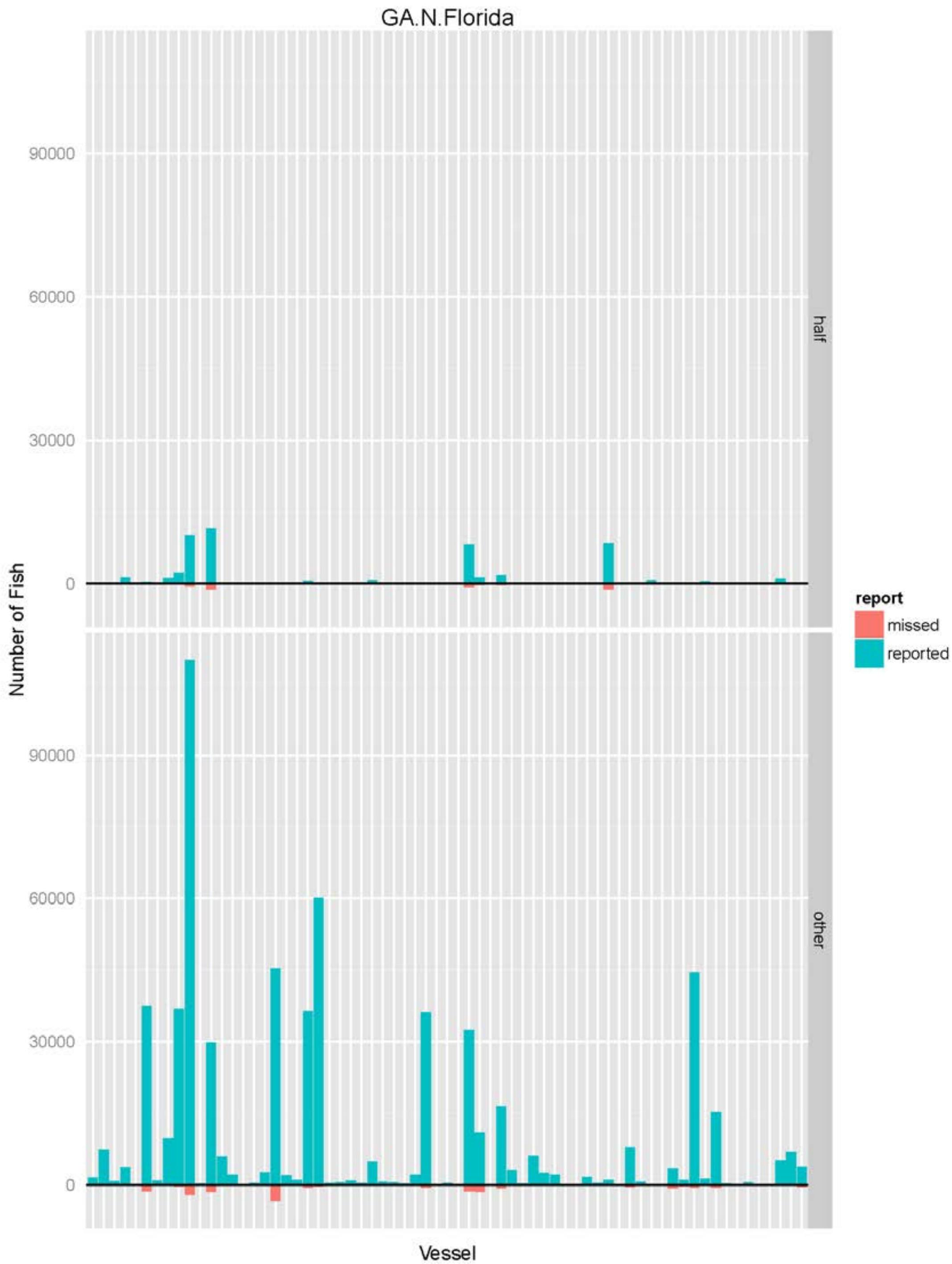


Figure 17. Number of missed fish reported in GA/N. Florida by vessel using matched trips over all years. The teal bar is the quantity of fish of all species reported by the vessel for the matched trips. The orange bar represents the difference between the number of fish reported on the BP and the number of fish reported on the CR for the matched trips for the that vessel over all years. For confidentiality vessels are unidentified.

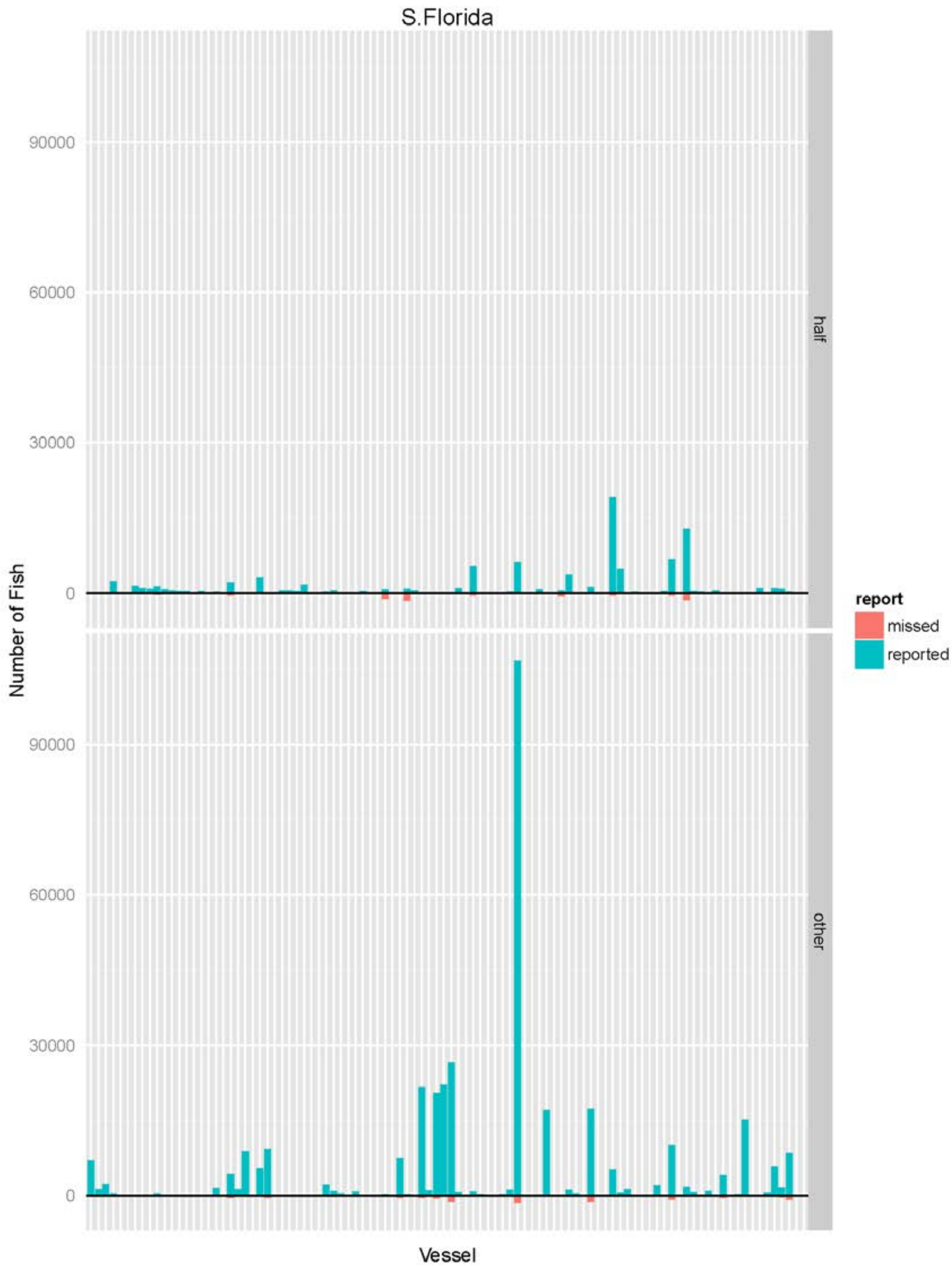


Figure 18. Number of missed fish reported in S. Florida by vessel using matched trips over all years. The teal bar is the quantity of fish of all species reported by the vessel for the matched trips. The orange bar represents the difference between the number of fish reported on the BP and the number of fish reported on the CR for the matched trips for the that vessel over all years. For confidentiality vessels are unidentified.

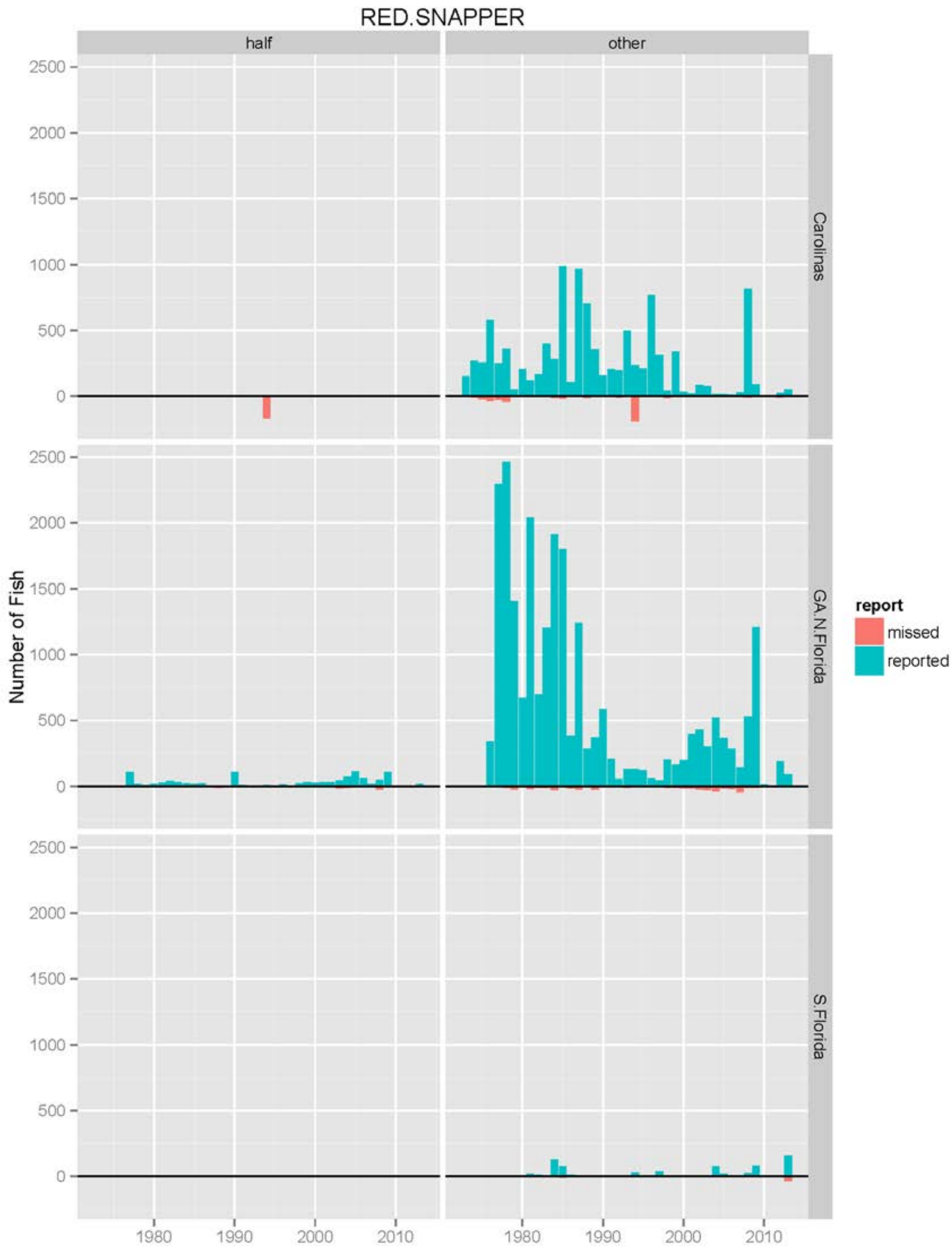


Figure 19. The number of missed Red Snapper reported by year in each region by all vessels using matched trips. The teal bar is the quantity of fish of reported by the vessel for the matched trips. The orange bar represents the difference between the number of fish reported on the BP and the number of fish reported on the CR for the matched trips for that year over all vessels.

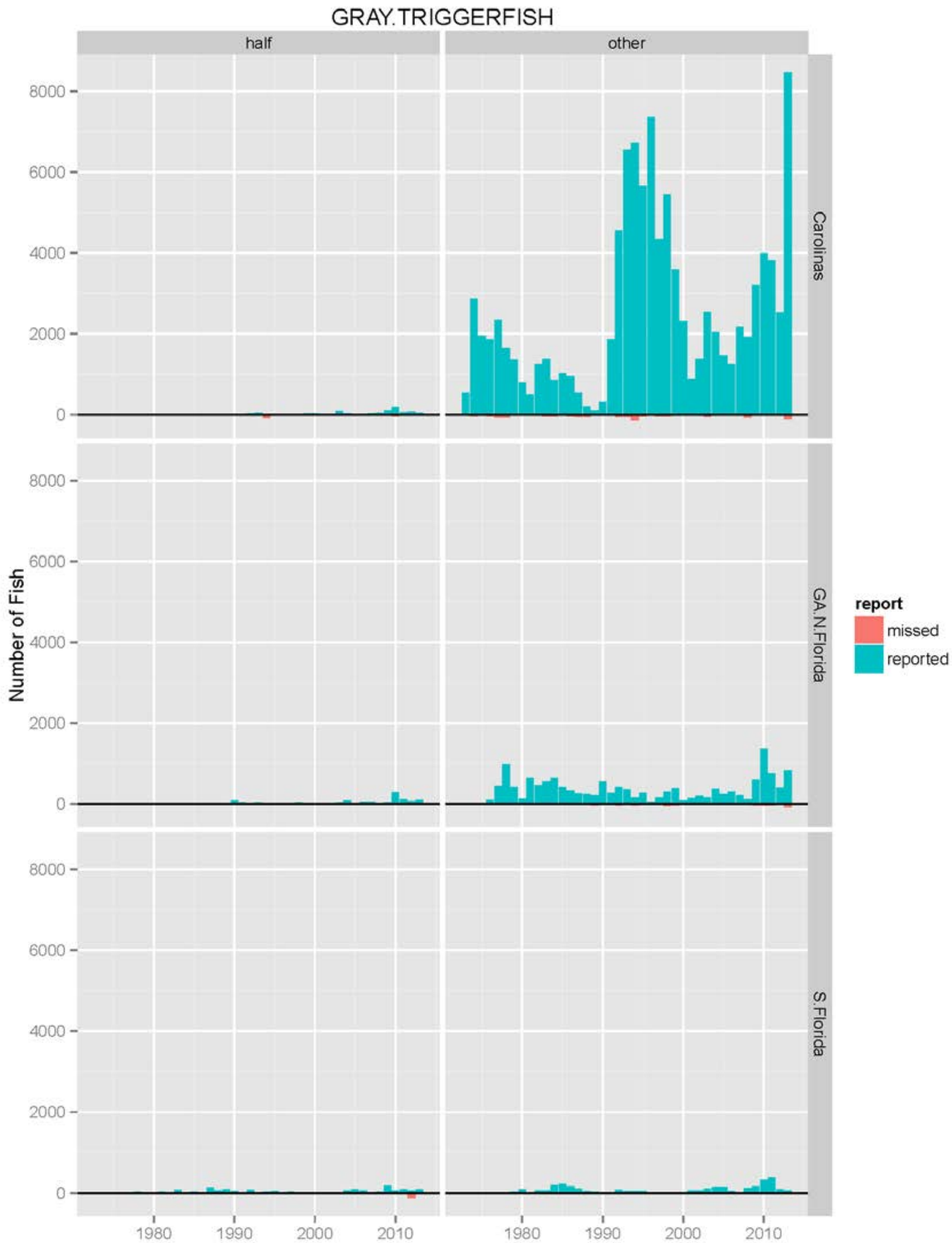


Figure 20. The number of missed Gray Triggerfish reported by year in each region by all vessels using matched trips. The teal bar is the quantity of fish of reported by the vessel for the matched trips. The orange bar represents the difference between the number of fish reported on the BP and the number of fish reported on the CR for the matched trips for that year over all vessels.

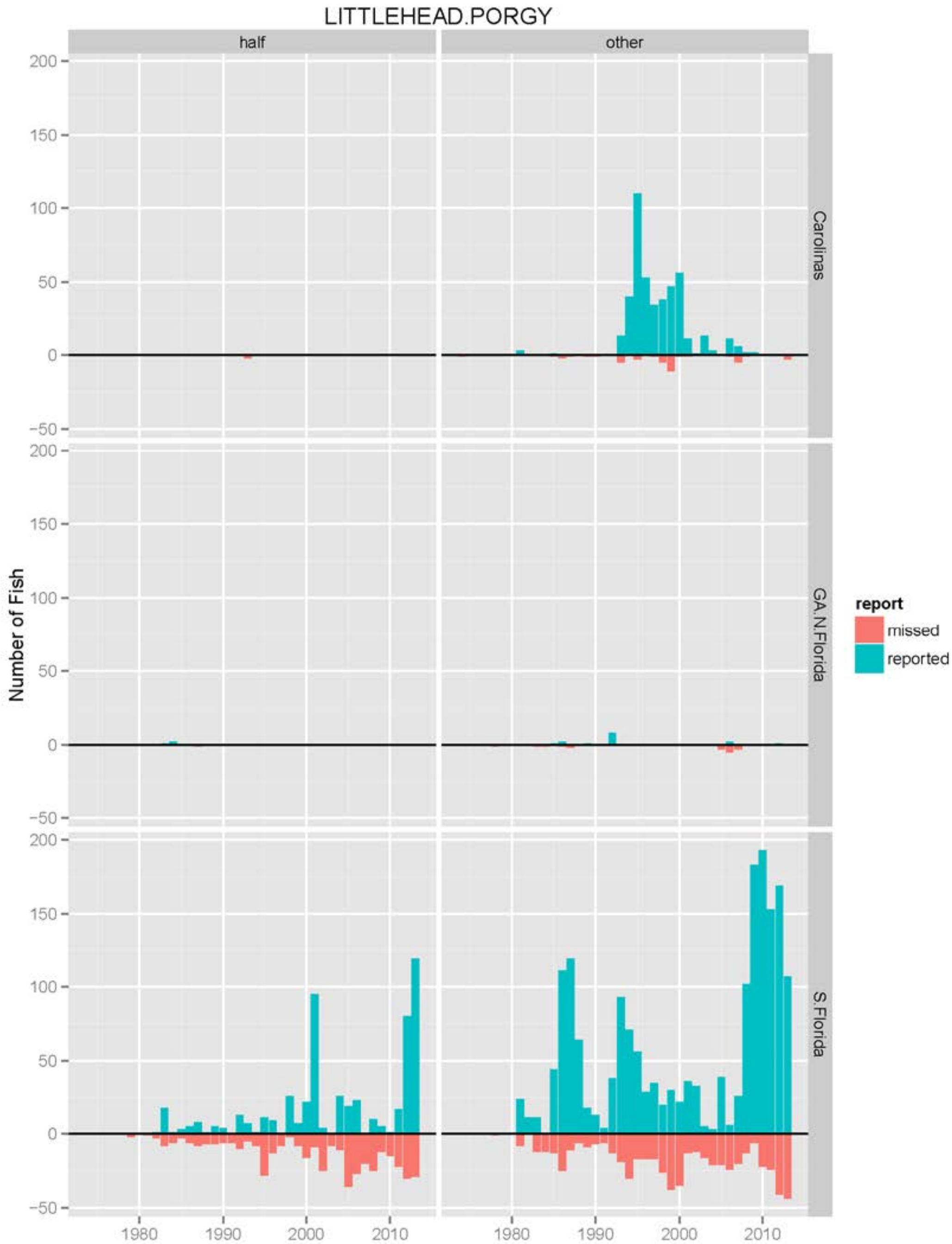


Figure 21. The number of missed Littlehead Porgy reported by year in each region by all vessels using matched trips. The teal bar is the quantity of fish of reported by the vessel for the matched trips. The orange bar represents the difference between the number of fish reported on the BP and the number of fish reported on the CR for the matched trips for that year over all vessels.

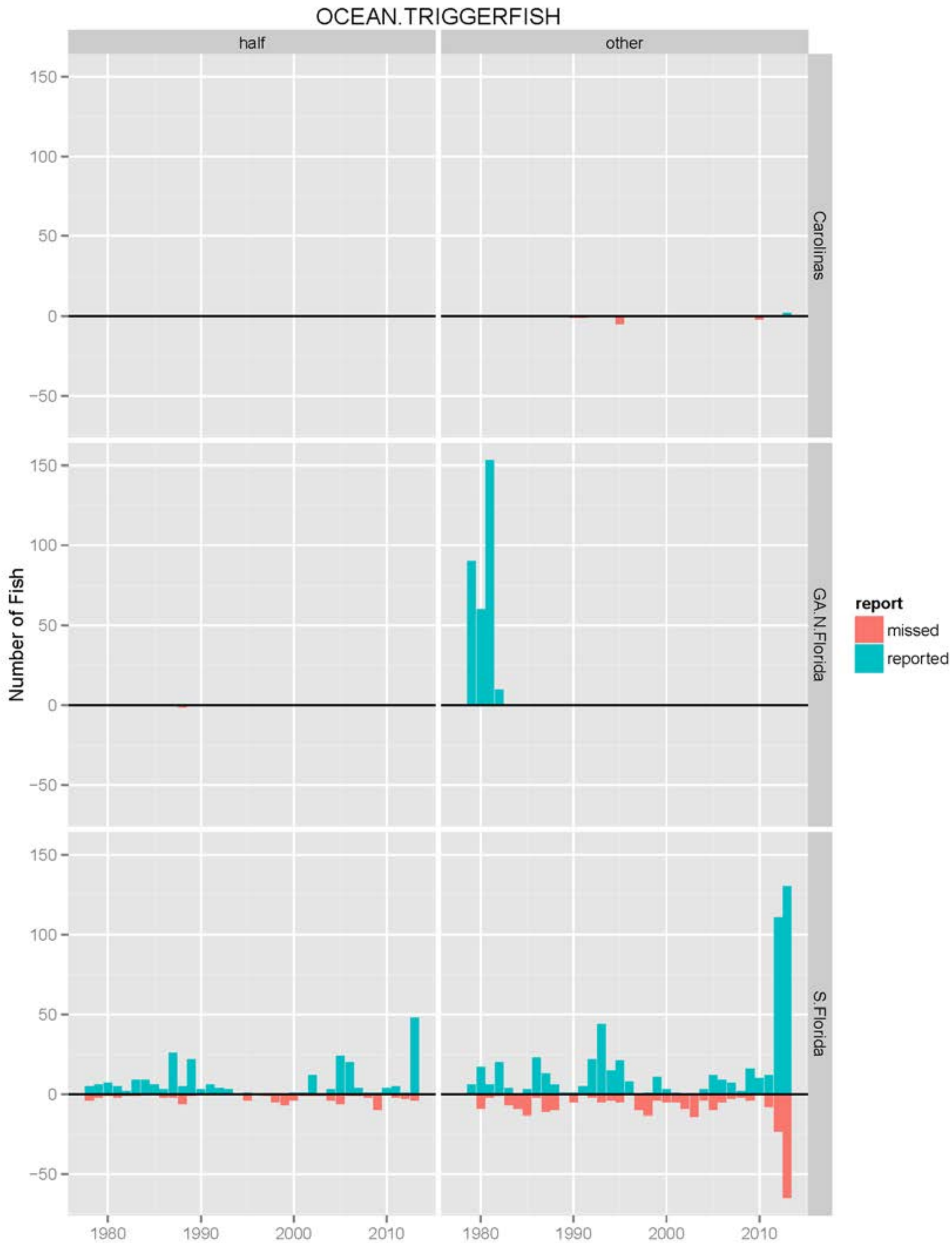


Figure 22. The number of missed Ocean Triggerfish reported by year in each region by all vessels using matched trips. The teal bar is the quantity of fish of reported by the vessel for the matched trips. The orange bar represents the difference between the number of fish reported on the BP and the number of fish reported on the CR for the matched trips for that year over all vessels.

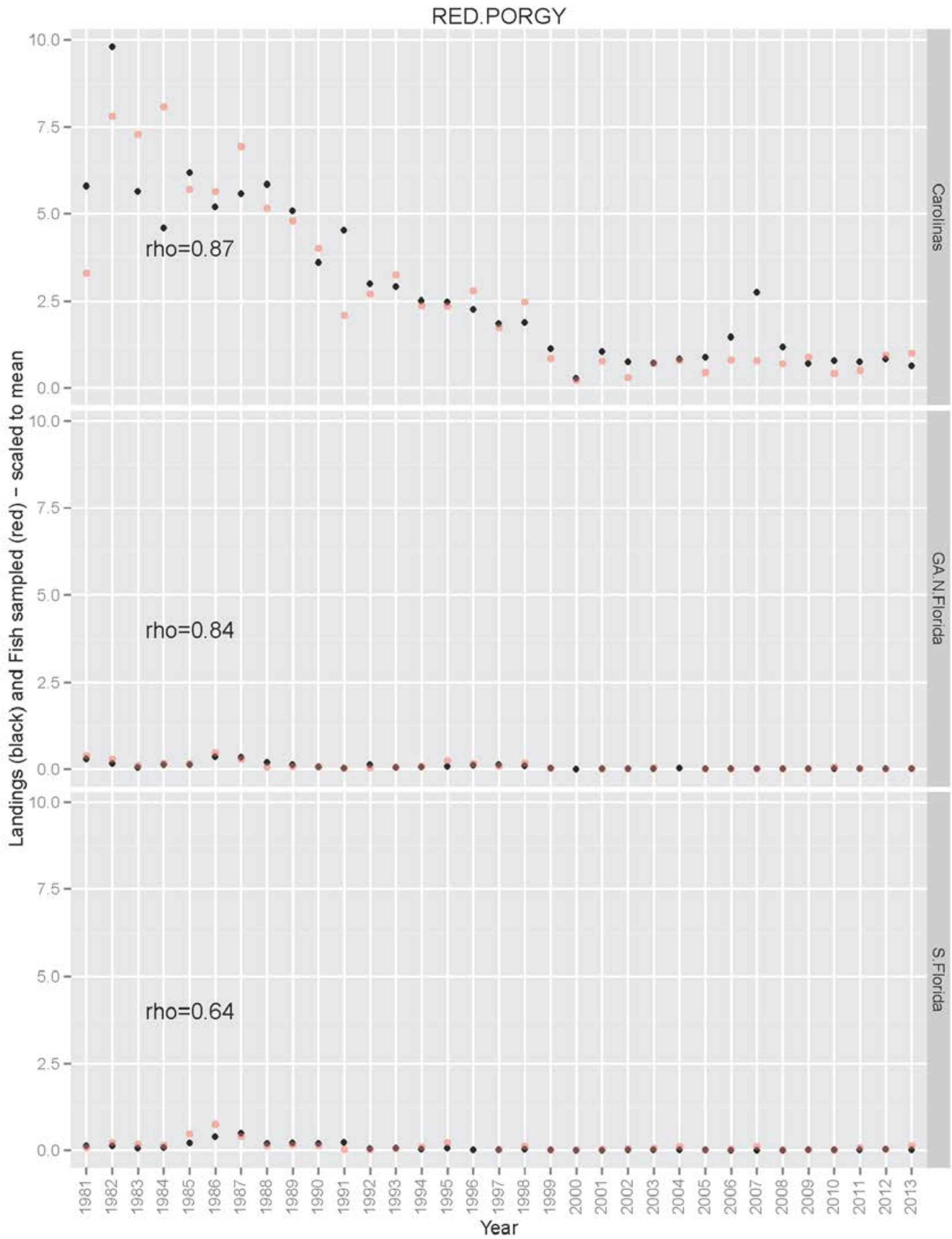


Figure 23. The number of Red Porgy landed of versus the number sampled by year and region. The landings and fish sampled are scaled to their means to make them comparable, and the Spearman rank correlation coefficient ρ values are provided in each region panel.

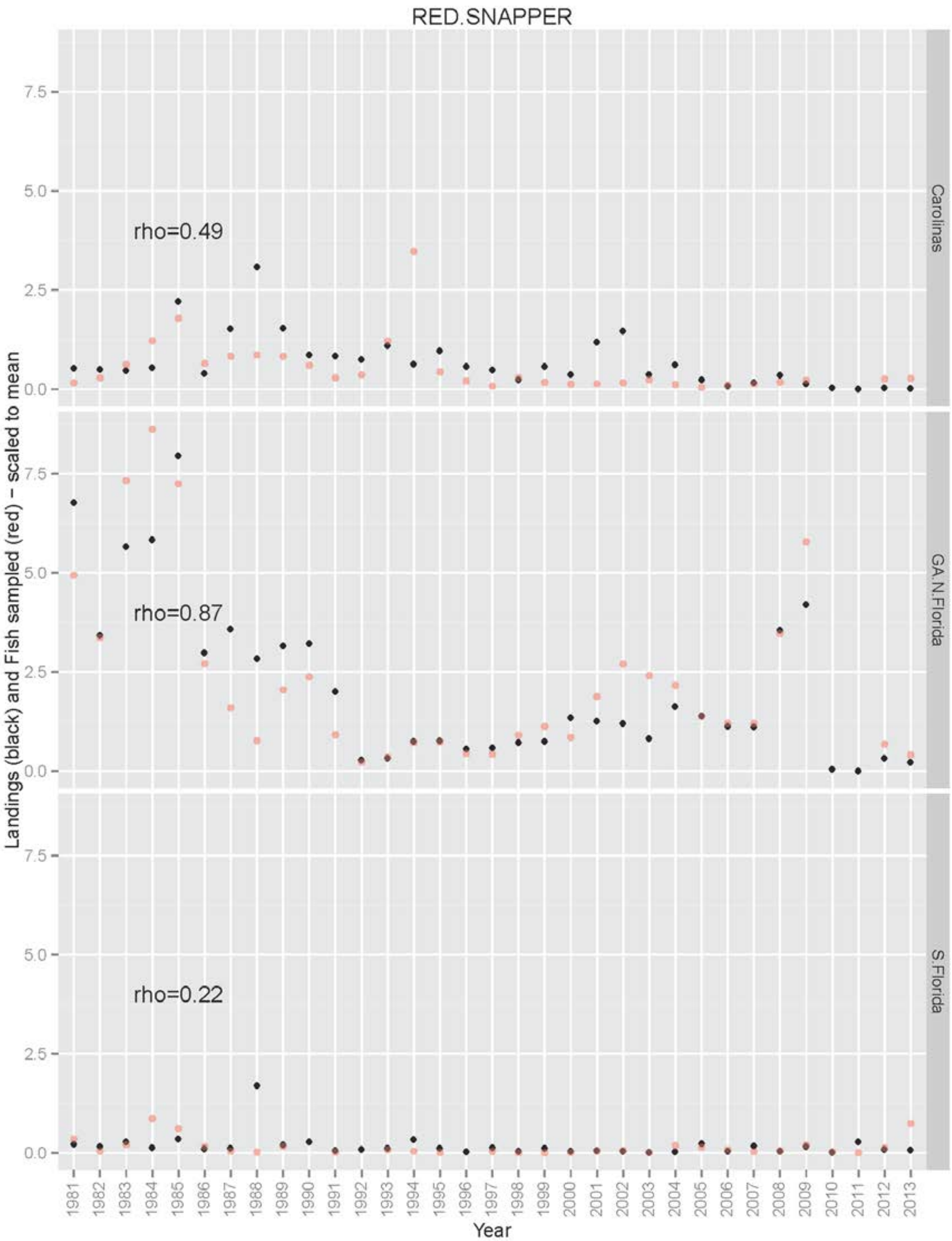


Figure 24. The number of Red Snapper landed versus the number sampled by year and region. The landings and fish sampled are scaled to their means to make them comparable, and the Spearman rank correlation coefficient ρ values are provided in each region panel.

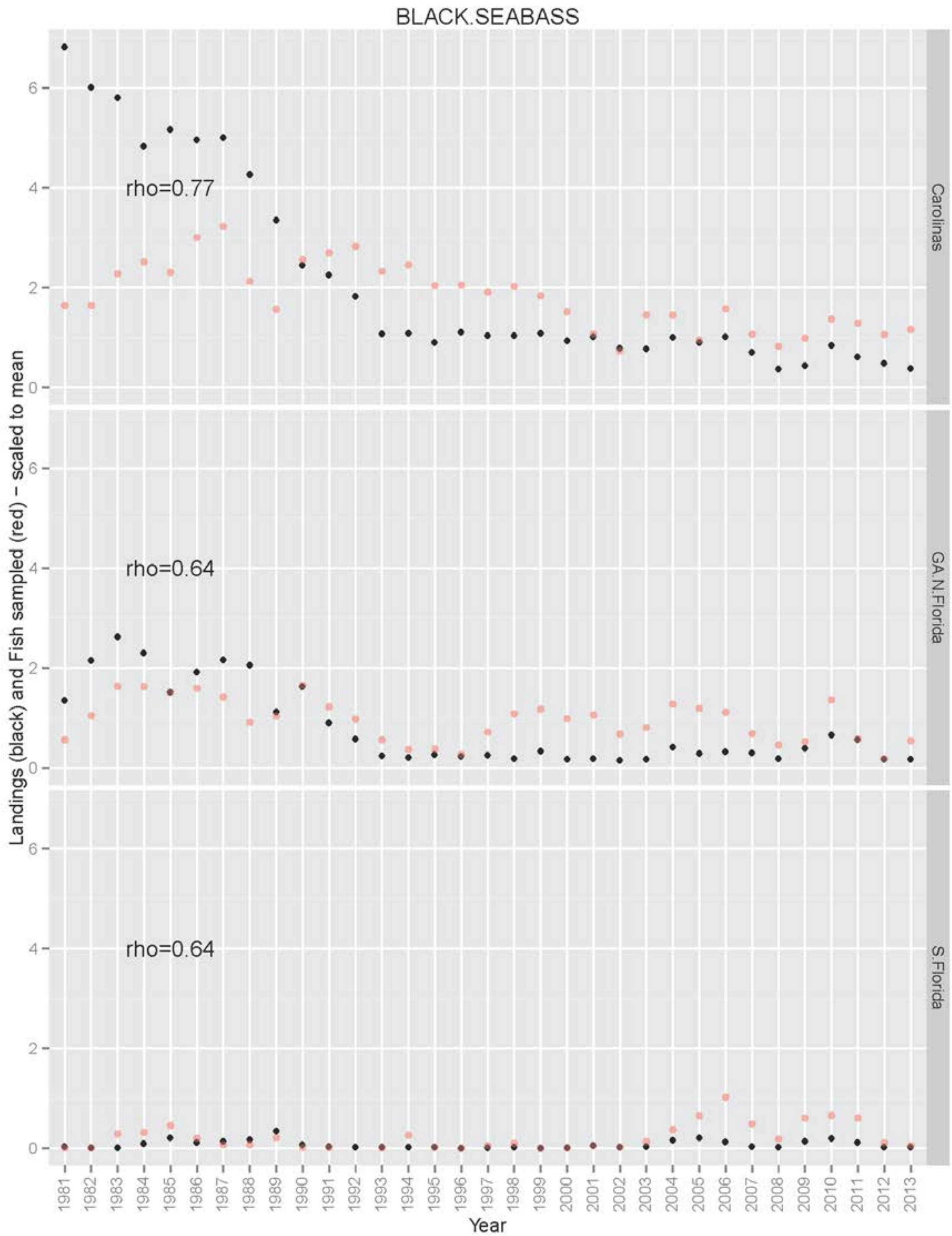


Figure 25. The number of Grey Triggerfish landed versus number sampled by year and region. The landings and fish sampled are scaled to their means to make them comparable, and the Spearman rank correlation coefficient ρ values are provided in each region panel.

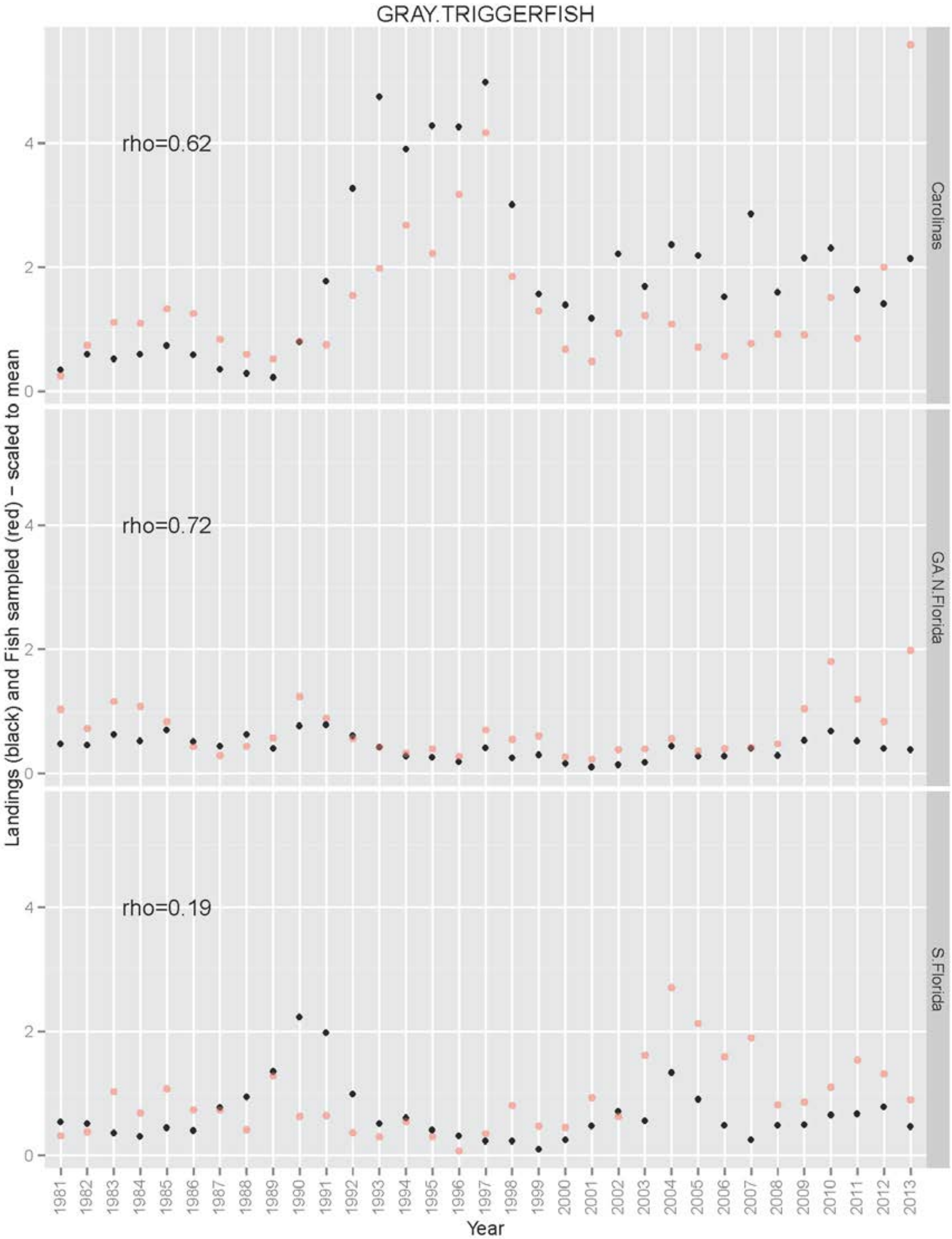


Figure 26. The number of black sea bass landed versus number sampled by year and region. The landings and fish sampled are scaled to their means to make them comparable, and the Spearman rank correlation coefficient ρ values are provided in each region panel.

Appendices

Appendix 1: Changes in Southeast Region Headboat Survey logbook forms

The Headboat Survey Trip Report forms were investigated to provide historical documentation of the major changes such as the addition of species on the form and trip information. In order to document form changes consistently through time, forms from three vessels were investigated from NC, SC, and FL that have been involved in the Headboat fishery since 1973. Along with these three vessels, forms were observed from additional vessels within each state to validate consistent changes within each year.

Sixteen form changes occurred from 1973 to 2005 with subtle changes occurring more frequently in the late 1970s and major changes occurring in 1980, 1984, 1992 and 2004 (Appendix 1). All form changes were documented from these three vessels but only major form changes are summarized below such as species added and changes to the “header information” (Table 1A). Table 2A and 3A summarize forms used by year and species present on forms.

Table 1A. Summary of headboat form changes by year.

Year	Form #	Number of Species	black sea bass (units)	Discards	Additions to Header/Master information and other major changes
1973	1	24	Number of 100 lb. boxes	n/a	Number Captured vessel, date, Number of Anglers aboard
1976	3,4,5	(NC/SC) - 35 (GA/FL) - 32	Number of 100 lb. boxes	n/a	(Florida Added), Location, Full, 1/2 and 3/4 day
1978	4,5,6,7	(NC/SC) - 35 (GA/FL) - 31	Pounds	n/a	a.m., p.m.
1980	8,9	(NC/SC) - 36 (GA/FL) - 67	Pounds	hand written by species, inconsistent	night, overnight, Captain signature
1984	10,11	(NC/SC) - 62 (GA/FL) - 71	Pounds	hand written by species, inconsistent	Number Captured changed to Number Caught, Night (1st, 2nd), Departure Time, agency use only section
1986	12,13	(NC/SC) - 64 (GA/FL) - 74	Pounds	hand written by species, inconsistent	King Mackerel, Spanish Mackerel, Cero, Dolphin, Cobia, Little Tunny above bold black line with mandatory reporting statement "It is unlawful to falsify or fail to report..". Added in July, deleted in October.
1992	14,15	69	Number & Weight (SC-released on few forms)	SC only - very few vessels, released ('92-'03), released alive and dead ('00-'02)	Same as above
2004	16	69	Number, Weight, Released Alive, Released Dead	released alive and dead standard on all forms and areas	Distance from shore, pay type, number of anglers who fished

Table 2A. Headboat form changes by year and number of species present for each form.

Year	Form 1	Form 2	Form 3	Form 4 (NC/SC)	Form 5 (GA/FL)	Form 6 (NC/SC)	Form 7 (GA/FL)	Form 8 (NC/SC)	Form 9 (FL)	Form 10 (NC/SC)	Form 11 (FL/GA)	Form 12 (NC/SC)	Form 13 (FL)	Form 14 (NC/GA/FL)	Form 15 (SC only)*	Form 16
Number of Species	24	26	30	35	32	35	31	36	67	62	71	65	74	69	69	69
1973	x															
1974	x	x														
1975		x	x													
1976			x	x	x											
1977				x	x	x	x									
1978						x	x									
1979						x	x									
1980								x	x							
1981								x	x							
1982						x			x							
1983						x			x							
1984										x	x					
1985										x	x					
1986										x	x	x	x			
1987												x	x			
1988												x	x			
1989												x	x			
1990												x	x			
1991												x	x			
1992														x	x	
1993														x	x	
1994														x	x	
1995														x	x	
1996														x	x	
1997														x	x	
1998														x	x	
1999														x	x	
2000														x	x	
2001														x	x	
2002														x	x	
2003														x	x	
2004																x
2005																x
2006																x
2007																x
2008																x
2009																x
2010																x

*'Number Released' added, but variable from vessel to vessel (possibly a pilot program through SC) ('Released Alive', 'Released Dead' from 2000 -2002)

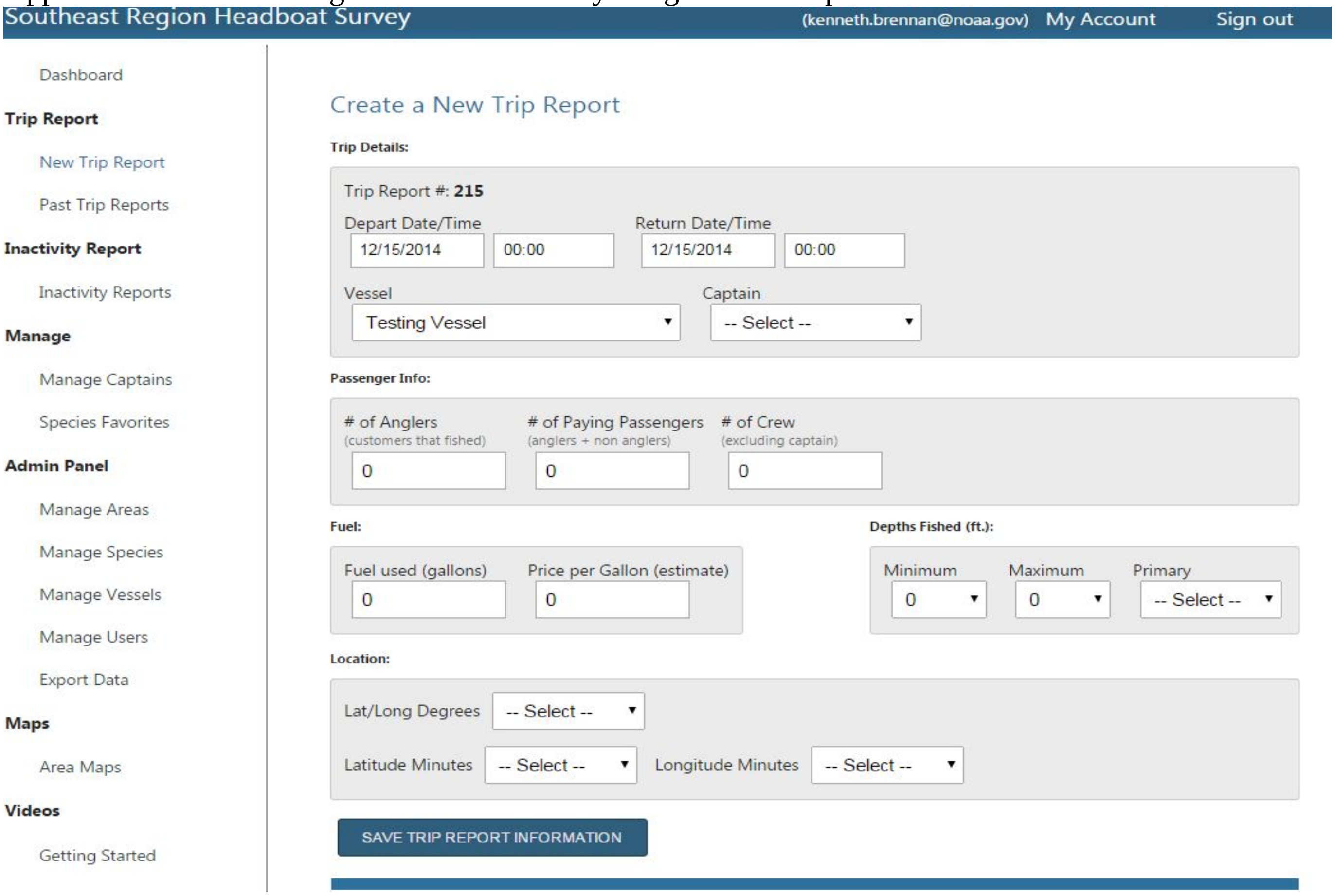
Table 3A. List of species present on Headboat Survey Trip Report for each form change from 1973 to 2005.

Species	Form 1	Form 2	Form 3	Form 4 (NC/SC)	Form 5 (GA/FL)	Form 6 (NC/SC)	Form 7 (GA/FL)	Form 8 (NC/SC)	Form 9 (GA/FL)	Form 10 (NC/SC)	Form 11 (GA/FL)	Form 12 (NC/SC)	Form 13 (GA/FL)	Form 14 , 15,16
Number of Species	24	26	30	35	32	35	31	36	67	62	71	65	74	69
Years Used ('YY-'YY)	73-74	74-75	75-76	76-77	76-77	77-83	77-79	80-81	80-83	84-86	84-86	86-91	86-91	92-04
Stawberry Grouper (Kitty Mitchell)	x	x	x	x	x	x	x	x	x	x	x	x	x	
Warsaw Grouper	x	x	x	x	x	x		x		x		x		x
Red Grouper	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Gag	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Scamp	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Black Grouper	x	x	x	x	x	x	x	x	x	x	x	x	x	
Yellowfin Grouper	x	x	x	x		x		x	x	x	x	x	x	x
Snowy Grouper	x	x	x	x		x		x		x		x		x
Other Groupers	x	x	x	x		x		x		x		x		
Red Snapper	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Yelloweye Snapper	x	x		x		x		x		x		x		x
Vermillion Snapper	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Yellowtail Snapper	x				x		x		x		x		x	
Other Snapper	x	x	x	x		x		x		x		x		
White Grunt (Margate)	x	x	x	x		x		x	x	x	x	x	x	x
Other Grunts	x	x	x	x	x	x	x	x	x	x	x	x	x	
Red Porgy (Silver Snapper)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Other Porgies	x	x	x	x	x	x	x	x	x	x	x	x	x	
Tilefish	x	x	x	x		x		x		x		x		
Amberjack	x		x	x	x	x	x	x	x	x	x	x	x	x
Triggerfish	x	x	x	x	x	x	x	x	x	x	x	x	x	
Dolphin	x									x	x	x	x	x
Others	x	x	x	x		x		x		x		x		
Boxes of Sea Bass	x	x	x	x	x									
Rock hind		x	x	x	x	x	x	x	x	x	x	x	x	x
Red hind		x	x	x	x	x	x	x	x	x	x	x	x	x
Tomtate		x	x	x	x	x	x	x	x	x	x	x	x	x
Knobbed Porgy (Key West)		x	x	x	x	x	x	x	x	x	x	x	x	x
Other Porgies (Spot Tail Bream, Scup, etc.)		x	x	x		x		x		x		x		
Bream (Spot-tail Porgy)			x	x	x	x	x	x	x	x	x	x	x	x
Scup (Northern Porgy)			x	x		x		x		x		x		x
Whitebone Porgy (Chocolate Porgy)			x	x	x	x	x	x	x	x	x	x	x	x
Squirrelfish			x	x	x	x	x	x	x	x	x	x	x	x
Yellowedge Grouper				x		x		x		x		x		
Other Groupers (Marbled, Yellowfin)				x		x		x		x		x		
Other Snappers (Mutton, etc.)				x		x		x		x		x		
Longspine Porgy				x	x	x	x	x	x	x	x	x	x	
Nassau Grouper					x		x		x		x		x	
Other Grouper (Chocolate, etc.)					x		x							
Gray Snapper					x		x		x		x		x	x
Lane Snapper					x		x		x		x		x	x
Mutton Snapper					x		x		x		x		x	x
Other Snappers (Cubera, Schoolmaster, Silk)					x		x							
Porkfish					x		x		x		x		x	
Amberina					x		x		x		x		x	
Angelfish					x		x		x		x		x	x
Pounds of Black Sea Bass						x	x	x	x	x	x	x	x	
Almaco Jack								x	x	x	x	x	x	x
Graysby									x	x	x	x	x	x
Coney									x	x	x	x	x	
Yellowmouth Grouper									x	x	x	x	x	x
Yellowfin chocolate (Yellowedge)									x		x		x	
Jewfish									x		x		x	

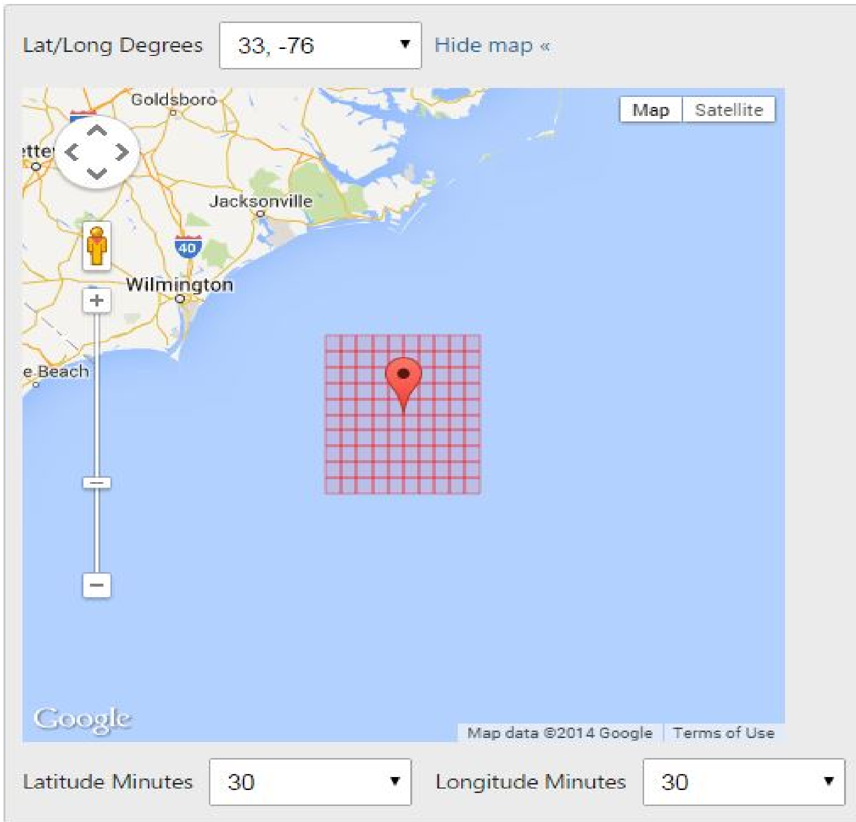
Table 3A. Continued.

Species	Form 1	Form 2	Form 3	Form 4 (NC/SC)	Form 5 (GA/FL)	Form 6 (NC/SC)	Form 7 (GA/FL)	Form 8 (NC/SC)	Form 9 (GA/FL)	Form 10 (NC/SC)	Form 11 (GA/FL)	Form 12 (NC/SC)	Form 13 (GA/FL)	Form 14 , 15,16
Number of Species	24	26	30	35	32	35	31	36	67	62	71	65	74	69
Years Used ('YY-'YY)	73-74	74-75	75-76	76-77	76-77	77-83	77-79	80-81	80-83	84-86	84-86	86-91	86-91	92-04
Sailor's choice									x		x		x	
Black margate									x		x		x	
French Grunt									x		x		x	
Bluestripe grunt									x		x		x	x
Littlehead porgy									x		x	x	x	x
Saucereye porgy									x		x		x	
Sheepshead porgy									x	x	x	x	x	
Jolthead porgy									x		x		x	x
Blackfin snapper									x	x	x	x	x	x
Cubera snapper									x		x		x	x
Schoolmaster snapper									x		x		x	
Silk snapper									x		x		x	x
Black snapper									x		x		x	
Queen triggerfish									x	x	x	x	x	x
Gray triggerfish									x	x	x	x	x	x
Ocean triggerfish									x		x		x	
Gray tilefish (Blueline)									x	x	x	x	x	x
Sand tilefish (Sand eel)									x	x	x	x	x	x
African pompano									x	x	x	x	x	x
Blue runner									x	x	x	x	x	x
Rainbow runner									x		x		x	x
King Mackerel									x	x	x	x	x	x
Spanish Mackerel									x	x	x	x	x	x
Cero									x	x	x	x	x	
Bluefish									x	x	x	x	x	x
Bigeye (Toro)									x	x	x	x	x	x
Bonito									x	x	x	x	x	x
Barracuda									x	x	x	x	x	x
Cobia									x	x	x	x	x	x
Marbled Grouper										x		x		
Dog Snapper											x		x	
Hogfish (Hog snapper)										x	x	x	x	x
Pigfish										x		x		
Spadefish										x	x	x	x	x
Sand perch										x		x	x	x
Wahoo										x		x		
Bank Sea Bass												x	x	x
spottail pinfish												x	x	x
Black Sea bass (# and weight)														x
Pinfish														x
Sharpnose Shark														x
Sandbar Shark														x
Blacktip Shark														x
Smooth Dogfish														x
Nurse Shark														x
Dusky Shark														x
Remora														x
Banded Rudderfish														x
Yellowfin Tuna														x
Short Bigeye														x
Spotted Soapfish														x
Tattler														x
Inshore Lizardfish														x

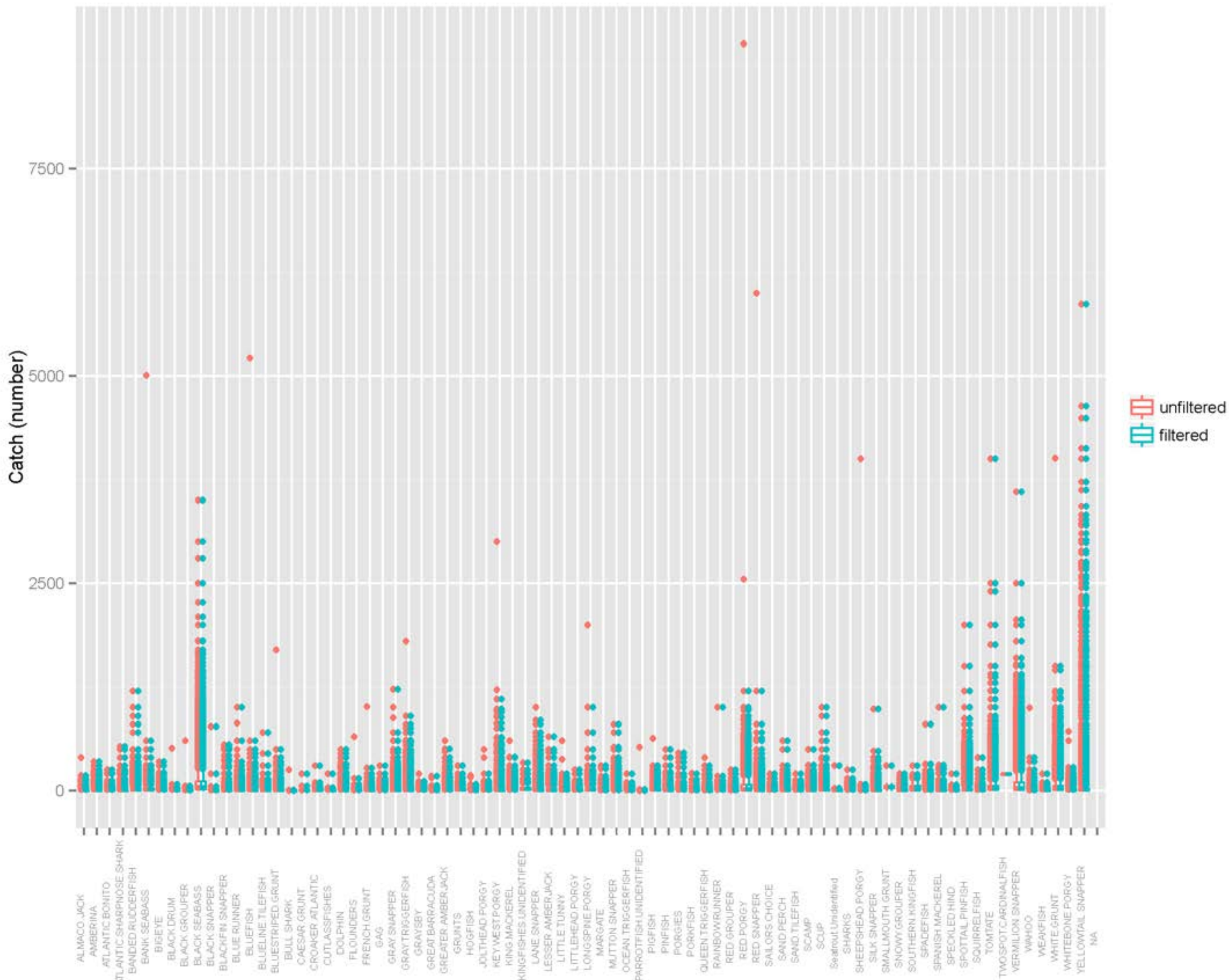
Appendix 2. Southeast Region Headboat Survey eLog web based portal.



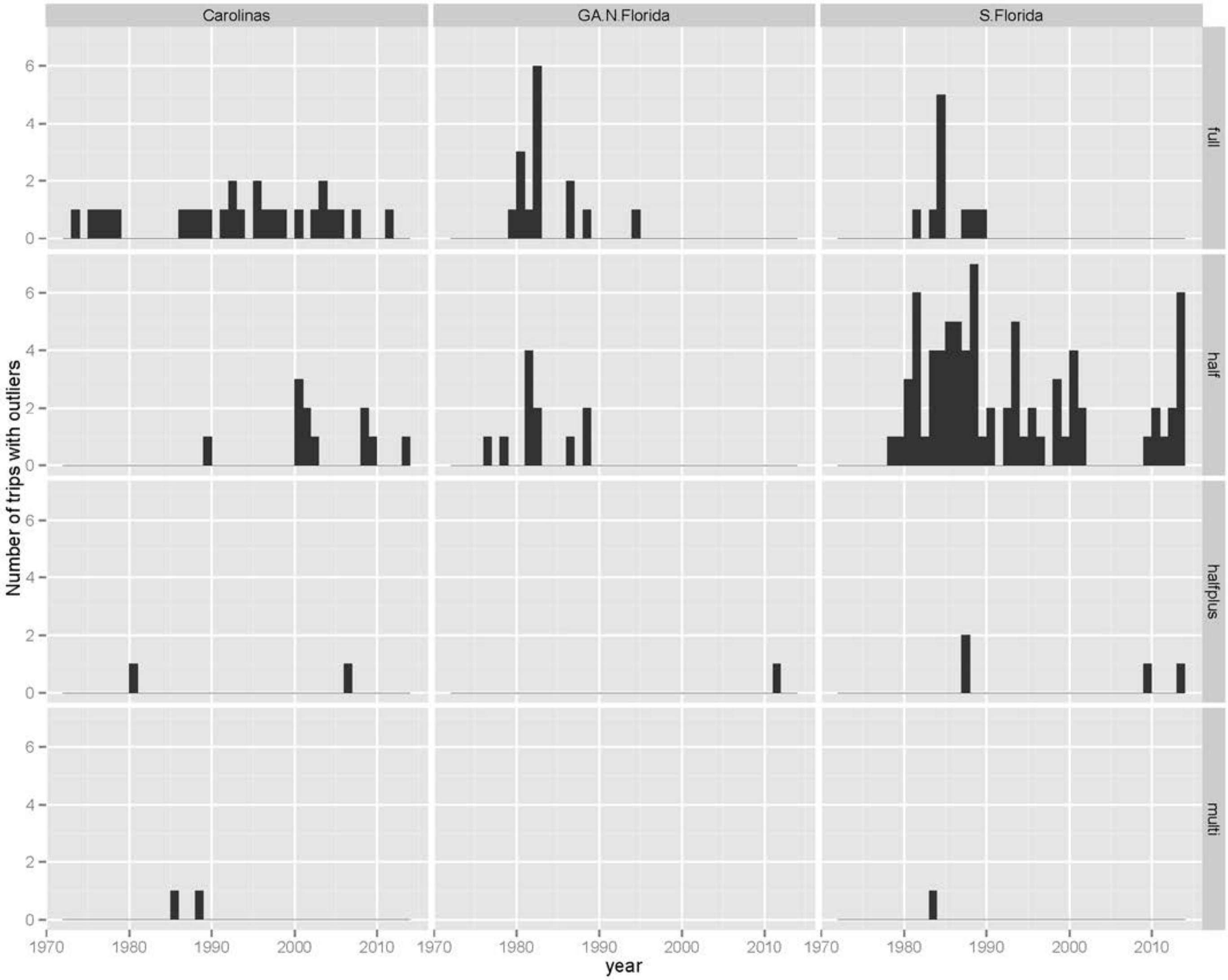
Location:


Lat/Long Degrees
33, -76
Hide map «
Map
Satellite
Goldsboro
Jacksonville
40
Wilmington
e Beach
Google
Map data ©2014 Google
Terms of Use
Latitude Minutes
30
Longitude Minutes
30

Appendix 3. Reported catch per trip, by species (pink dots). Catches represented by pink dots without an adjacent blue dot were identified as extreme outliers. Species were not plotted if they were reported on < 250 trips.



Appendix 4. Number of extreme outliers (N = 161) by region, trip type and year.



Appendix 5. Vessels with flagged metrics (modified z-score > absolute value (3.5) in red).

Year	Region	vessel	num.m	catrate.m	spcount.m	sw.m	yts.m	vs.m	rs.m	atlsharpnose.m	tom.m	gtf.m	wbp.m	ms.m	grsnp.m	gag.m	vg.m	rp.m	kmack.m	gaj.m	lns.m	blrun.m	scamp.m	spotpin.m	littun.m	sdprch.m	cobia.m	atlbon.m	kwporgy.m	rg.m	cuda.m	num.v	catrate.v	spcount.cv	sw.cv	yts.v	vs.v	rs.v	atlsharpnose.v	tom.v	gtf.v	wbp.v	ms.v	grsnp.v	gag.v	vg.v	rp.v	kmack.v	gaj.v	lns.v	blrun.v	scamp.v	spotpin.v	littun.v	sdprch.v	cobia.v	atlbon.v	kwporgy.v	rg.v	cuda.v	z_sp_27	z_sp_all	z_cpue_27	z_cpue_all
1972-1983	1	[redacted]	-2	-2	-1	-1																												-1	-1	-2	-1																											4	2	-1	2
1972-1983	1	[redacted]	-1	1																																																										4	3	0	2
1972-1983	1	[redacted]	-1	-1													0																																														5	3	-1	2
1972-1983	2	[redacted]	0	0	0	0		0	0		0	-1	0		-1	0			0	0		-1		1	0		0		4	0	0	0	0	0	0		0	0		0	0	-1		-1	0			-1	0		-1		0	0		0			4	0	0	0	0	-1
1972-1983	2	[redacted]	-2	-2	-1	0																			0						0																															6	4	0	2
1972-1983	2	[redacted]	0	0	0	0		0	1			0																		0																																4	3	-1	1
1972-1983	3	[redacted]	-1	0	-1	0		0				0		0				1		0										0			3	4	-1	-2		1				-1						0											0			6	3	1	2
1972-1983	3	[redacted]	-2	-1	-1	-1													0	0												1		-1														-1														8	5	1	3
1972-1983	3	[redacted]	0	0	0	0		-1				0					0		0	2		0						0		1	0	0	0	1	1		-1									-1		-1			1						2				4	2	0	2
1972-1983	3	[redacted]	1	2	1	1	1				1	1		0	0					0	0								1	1																															4	3	0	2
1972-1983	3	[redacted]	2	0	1	1					0			0				0		0	0	-2	0				-2																																					5	3	0	1
1972-1983	3	[redacted]	0	0	0	0	0	0	0		1	1	0	0	0	0	0	1	0	0	0	0	0		0	1	0	0	0	0	1	3	1	0	0	3	1			0	1	0	0	1	2	1	0	0	1	1	1	1		0	-5	4	0	0	1	1	0	0	0	-1
1972-1983	3	[redacted]	0	1	0	1									0	0	0				0										1																																6	4	0	2
1972-1983	3	[redacted]	-1	0	-1	0						1		0		1		1	0												3	-1	0	0	0								-2		-1		1	-1												-1	6	3	0	2
1972-1983	3	[redacted]	1	0	0	0	-1		0				0	-1	-1	-1	0				0		0							0	0		-1	-1	-2	-1	-1								-1	-1	-1	-1				0									0	0		4	1	0	1
1972-1983	3	[redacted]	2	0	1	0		1	1			0				-2		0			-1										-2																																	6	4	0	2
1972-1983	3	[redacted]	1	0	0	-1			-1		0	-1				0	0	2		-1			0	0							-1			2	1	-1	1			-1		0	0				1	0	1					5	0							1			5	3	-1	1
1984-1991	1	[redacted]	-1	-1	-1	-1					-1		-1														2						0	-1	1	1																													8	3	-1	4
1984-1991	1	[redacted]	-1	-1	0	0		-2	0		-2	0	-1	5		0	-1	-2	0	0	0	0	0	0	0	0	1		-1		0	0	1	1	1		0	-1		0	0	0			-1	0		0	1		0	-1	0		0	0				0	-1	0	0	0
1984-1991	1	[redacted]	-1	-1	-1	0			0				0							1				0		0					-1	0	0	0							-1							-1						-1		0						7	3	1	2
1984-1991	1	[redacted]	0	0	-1	0		0			1		-1				-2	0															0	0	-1	-1					0																								6	3	0	0
1984-1991	1	[redacted]	-1	-1	-1	-1					-1		-1						0	0		-1		-1		-1	1					0	0	0	0					0		-1								-1				-1				1					5	2	0	0
1984-1991	2	[redacted]	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	0	0	0	-1	0	0	0	0	-1	0		0	0	0	0	0	0	0	0	0	1		0	1	0	0	1	1		2	0	1	0	0	0	1	0	2	1		0	0	0	0	0	-1	0
1984-1991	2	[redacted]	0	0	0	-1		0	-1		0	-1	0			0				0	0				-1	0	1				0	0	0	0	0		2	-1		2		1			-1			-1	0					0	0						-1	5	2	0	1
1984-1991	2	[redacted]	-1	-1	0	0		-2	0		-1	-1			0	-1		1	0	0	2				1		0				0	-1	-1	0	0		-1	-1		-2	-1			0	-1		-2	-2	0						1		-1				0	5	1	0	2
1984-1991	2	[redacted]	0	0	0	0	0	0	0		0	-1	-1	2	0	0	5	0	0	0	0	0	0	0	0	0	0		0	0	0	0	1	0	-1	1	0	0		0	0	0	12	0	1		0	1	0	4	0	0	0	0	1	0			0	3	-1	-1	0	0
1984-1991	2	[redacted]	0	1	-1	0	1	1	0	0	1	0	1	1	0	0	5	0	0	0	0	0	1	0	1	0	0		0	0	0	0	0	1	0	2	0	1	0	0	1	1		0	1	-1	0	3	0	0	-1	-1	0	1	1	0		0			0	0	0	-1
1984-1991	2	[redacted]	-1	-1	0	0	0	-1	0		-4	0	-1	0	0	0		0	0	0	0	0	0		0		0		0	0	0	-1	0	-1	0	0	-1	-1			-1	-1	0	-1	0		0	0	0	0	-1	0		0		0		2	0	0	0	0	0	0
1984-1991	3	[redacted]	0	0	1	2	0					-1		0	0				-1		-1	-1			0					1	0	-1	-1	-1	-1	1					-1		0	-1							-1				0					-1	-1	4	1	0	2
1984-1991	3	[redacted]	0	0	0	0	0				0	0		0	0		0		0		0	0			0						1		0	0	2	0	-1				-1				0								0									-1		4	2	0	2
1984-1991	3	[redacted]	0	0	0	0	1		1		-1			0	0		-1	-1	0		0	0			0	0						0	1	0	0	-1							1	-1				-2		-1	-1			-1							4	2	0	2
1984-1991	3	[redacted]	0	0	0	0						0		1					0			0			1						2	-1	-1	-2	-2																					-1							7	4	1	3
1984-1991	3	[redacted]	0	0	0	0	0						-1	0		-1		0	-1	0	0					0		0	0		0	0	0	1	-1						-1	-1		1			-1	-1									-1	-1		4	2	1	0
1984-1991	3	[redacted]	0	0	1	1	0					0		1						0	0		-1			1		0			0	0	4	2	0	-2	1							-3						1	-1						-1		-1			0	-1	4	2	0	1
1984-1991	3	[redacted]	0	0	0	0		-1	0		0	0	0		-1	0		0			-1				-1	1				-1		-1	-1	-1	0			2		-1	-1			-1	0																		5	3	-1	2
1992-2000	1	[redacted]	-1	-1	-1	-1		1															1				2					3	6	0	4																													4	3	1	1
1992-2000	1	[redacted]	-1	-1	-1	-1						0	1					0						0								0	0	-1	0						-1	-1												-1									4	2	0	1
1992-2000	1	[redacted]	0	0	0	0		0	0	0		0	0	4	1	0	1	0	1	1			0		1		1		1	0	1	0	0	-1	0		-1	-1	0		1	-1		0	-1	0	0	1	-1			0		0				0	0	-1	0	0	-1	0
1992-2000	1	[redacted]		-2	-1	-1													0																																														5.1	4	-2	2
1992-2000	1	[redacted]	-1	-0	-1	-1													1								2				2	-0	-0	-1	-0													-0								-1				1	4.9	3	1	1
1992-2000	1	[redacted]	-1	-2	-1	-1																					1					-1	-1	0	-0																													5.3	4	0	2
1992-2000	2	[redacted]	-0	1	-1	-1					0	2						1														-0	-1	1	0					-1	1																					5.6	7	0	3
1992-2000	2	[redacted]	-1	-0	-1	-1		1	1			1				1		1	1	1			1		1		1				1	1	1	0	3		-0	-0			1				-0		0	-1	-0			-0		-2		-1				-1	2.5	4	0	1
1992-2000	2	[redacted]	-1	-1	-1	-0		0	0		-1				-0		-0				0						0					1	3	2	0			-1		2				1		0				1						-0					3.9	5	-3	3
1992-2000	3	[redacted]	0	-0	0	-0	-2							-1					-0		1						-0				0																															5.9	7	-0	3
1992-2000	3	[redacted]	0	-0	-1	-1	0						-1			-0			-0								-0			0		-1	-1	0	4	-1																										6.2	7	-1	2
2001-2009	1	[redacted]	-1	-1	-1	-0				0									-0								1					-0	0	-1	-1				0									-1								-1					5.8	3	-1	2
2001-2009	1	[redacted]	-0	0	-0	-0	1	0	1	1	1	0	1	7	-2	0	0	-0	1	0		2	1	0	1	1	1	0	0	0	1	1	0	1	1	-0	-0	1	0	0	0	1			0	0	0	1	-0		0	0	-0	1	1	0	-0	0	-0	2	-0	-0	0	-1
2001-2009	1	[redacted]	-1	-1	-1	-0													1												1	-1	0															0														7.1	6	2	3
2001-2009	1	[redacted]	-1	-0	-1	-0				1									0	0		1					1				1	-1	-1	-0	-0				-1									-0			-1					-1				-0	3.6	2	-0	1
2001-2009	1	[redacted]	-1	-1	-0	-0				-0									0								-0	0				0	-0	0	0	0													-0														3.5	2	1	2
2001-2009	1	[redacted]	0	-0	-0	-0				-1		1								-0				-1									-1	-0	-0	-0						-0								-0													3.8	3	0	1
2001-2009	2	[redacted]	-1	-0	-1	-0	0	-1	-0	0	-1	0	0	0	0	0	-0	0	1	0	0	1	0	0	1	-0	0		4	1	0	-0	1	0	1	0	-0	-0	1	2	0	0	0	0	0	3	1	1	0	1	0	0		1		0			1	0	-0	-1	1	-0
2001-2009	2	[redacted]	0	1	-1	-1		0	1	0		1				1	-1	0	1	0			1							1		-0	-0	-1	0		0	-2			1				-3	-0	0		-2			-0										4.1	3	-1	1
2001-2009	2	[redacted]	-0	-0	-0	-0			1	0		-0					-1				-1						-0	0					1	3	-0	-1			4			-1					-0				-2												7.6	3	0	2
2001-2009	2	[redacted]	-0	-0	-1	-0		0	0			-0												0		1		1					-1	-1	1	2		-2																			-1							7.9	5	0	3
2001-2009	3	[redacted]	0	0	-0	-1	1					-0		0	1		-1					-0											1	2	2	8	4								4		-0																	6	5	1	1
2001-2009	3	[redacted]	0	0	0	0	0							-0	-0	0	0				1								1	0	0	-1	-1	-0	-1	-1								1		-2				-2								1	0		4.2	5	-1	1
2010-2018	1	[redacted]	-0	-0	-0	-1				0							-0					0											0	1	-0	0				3							0					-0									5.3	5	-1	1
2010-2018	1	[redacted]	-0	0	0	0	5	-1	0	0	-0	0	0		-0	1	-0	1	1	1			1	1	0		1		0	0	0	0	-0	-0	-0	0	0	-0	-0	4	0	0			1	0	0	1	0			1	0	0		0		0	-0	0	-0	-0	-0	-1
2010-2018	1	[redacted]	0	0	0	0		-5		-0	-1	-1	0		0	0	0	-0	-0	-0		-1	-0	0	-1	-0	-0		-0	0	-2	-1	-1	-1	-1		1		1	3	-0	1		-0	1	0	2	-1	-0			1	2	-0	0	-1		0	2	-1	-0	-0	1	-0
2010-2018	1	[redacted]	0	-0	-0	-0						1						-1		-0				-1	-1							-1	-1	-0	-1						-1								-1				-1	-1							3.7	4	0	1
2010-2018	1	[redacted]	0	0	-0	-0		-4				1	0			0		0	1	0		-0			-0						0		0	1	0	0		1				1	-0					2		2		-0			0					-0		2.4	3	-2	0
2010-2018	1	[redacted]	-0	0	0	0	5	-1		0	1	0	1	2	0	0	0	0	0	0			0	1	0	0	1	0	0	0	-0	1	1	1	0		-0		-0	0	0	-1			0	0	-0	1	0			-0	-0	1	0	0	-0	0	1	1	0	-0	0	-1
2010-2018	1	[redacted]	-1	-1	-0	-0				-0	-1	-1	-1				0															-1	-0	-0	-1				-0	-0	-1	-1				-1																3.7	3	-1	1
2010-2018	2	[redacted]	-0	0	-0	0				1		1	1	-0	0					1				-0								-0	-1	-1	-3				-1		-1	-1		-1						4												305	4	-0	3
2010-2018	2	[redacted]	-1	-0	0	-0		-1		-0		-0			-0	0			0	-1			-1				0						-2	-0	0	-1				1		-0				-1				-1												304	4	-0	5
2010-2018	2	[redacted]	-0	-0	-0	-0			-0	1	-1	-0				1	0		1					1		1	1				1	0	1	1	0				-2	3	-0				5	-0								-0			0				0	303	3	0	2
2010-2018	2	[redacted]	0	0	0	0			-1	0		1		0	1						1										1	1	-0	0				-2		1			8						4												304	5	-1	4
2010-2018	2	[redacted]	-1	-0	-1	-1						1															1					-1	-1									-1															-1					659	10	-0	5
2010-2018	3	[redacted]	1	1	0	0	-0					-1	-0	-0	-0	0	1		-1		0	-1					-0		0	0		-1	-1	-1	-1	0					-1		-1	1	0	-0		-1		1	-0					-0		-0	-1		4	1	1	0
2010-2018	3	[redacted]	-1	-1	-1	-0	-0	0				-0		0	0	1			0	0		-1			-0			1		0		0	0	0	-0	1	-1				-1		1	0	-1				-0			-2			-1			0		-1		5.7	2	-0	1
2010-2018	3	[redacted]	1	0	-0	-0	0	1				1		0	0	1				-1	1	0					-1	-0				2	1	1	2	3	-1						0	-0							-1											7.2	3	1	1
2010-2018	3	[redacted]	-1	-2	-1	-0	-1		0			-0		-1							-1	-1			0					-0			-1	0	-0	-0	-2					-0									-1	-1									-2		12	6	-2	5

Appendix 6. Vessels with flagged metrics (modified z score between 3.0 & 3.5 in red).

Year	Region	vessel	num.m	catrate.m	spcount.m	aw.m	yts.m	vs.m	rs.m	atlsharpnose.m	tom.m	grt.m	vbp.m	ms.m	grsnp.m	gag.m	vg.m	rp.m	kmack.m	gaj.m	lns.m	blrun.m	scamp.m	spotpin.m	littun.m	sdproh.m	cobia.m	atlbon.m	kwporgy.m	rg.m	cuda.m
1972-1983	1	[redacted]	-0.9	-0.9	-0.7	-0.5					-0.1																				
1972-1983	1	[redacted]	-1.0	-1.1	-0.7	-0.6					-0.2																				
1972-1983	1	[redacted]	-0.2	0.2	0.2	0.2			1.3							2.2							0.1								
1972-1983	3	[redacted]	-0.6	-0.3	-0.7	-0.4		-0.4						0.8			-0.2		0.4	0.1		0.5					1.3	0.3		0.1	0.2
1984-1991	1	[redacted]	-0.5	-0.8	-0.8	-0.7					-0.5		-0.4				0.5	-0.4	0.2	0.5				-0.9		0.0	0.7				-0.1
1984-1991	2	[redacted]	-0.3	-0.6	-0.4	0.3		-0.9	0.0		-0.6	-0.1	-0.4	0.1	-0.1	-0.4			-0.4	-0.4		-0.1	-0.4		0.6		0.0			0.1	0.2
1984-1991	3	[redacted]	-0.3	-0.2	-0.3	0.1	0.0		0.3		0.6	0.0		0.2	0.5	0.1			0.2		-1.1	0.1			0.2						0.7
1992-2000	1	[redacted]	-0.5	-0.9	-0.9	-0.6					-0.4	-0.9	-0.8				-0.2														
1992-2000	1	[redacted]	0.5	0.4	0.5	0.5	-0.7	-0.2	-0.2	0.0	0.1	0.5	-0.1	-0.1	0.0	0.3	0.3	0.0	-0.3	0.0	3.3	-0.2	-0.5	0.4	0.0	-0.4	0.1		-0.2	0.0	0.0
1992-2000	1	[redacted]	-0.9	-1.3	-0.3	0.2						-0.8	-0.6			0.5								-0.5			0.7				
1992-2000	2	[redacted]	0.2	0.7	0.1	0.4		-0.1	0.3	0.8	0.1	0.5	0.8	0.1	0.1	1.7		0.6			0.3		1.6	0.2		0.6	0.9			0.5	
1992-2000	2	[redacted]	0.8	0.7	-0.2	-1.1		0.9	0.8	-0.2		0.0	0.1		-0.4	0.4	-0.3		0.4	0.2		0.8	0.5						-0.2		0.4
1992-2000	3	[redacted]	1.5	0.1	1.6	1.1	-0.1	-1.0	-0.8		-3.3	-1.8	-1.5	0.7	-0.4	-2.0	-0.8	-1.6	-0.3	-0.8	-0.4	-0.1	-0.5	-3.0	-1.4		-2.0		-0.6	-0.4	-2.1
1992-2000	3	[redacted]	1.7	0.1	1.1	0.3	0.5					-1.1		-0.3	-0.1		-1.4		-0.7	-0.7	-0.7		-0.1						-0.1	-0.3	
1992-2000	3	[redacted]	-0.1	-0.3	-0.9	-0.7	-0.8	0.3	0.1			0.4	1.0	0.2	-0.3	0.7	0.8	0.7	-0.2		0.7		0.3				0.0			0.2	
1992-2000	3	[redacted]	-0.7	-0.3	-0.9	-0.6	-0.2							0.4	0.1	1.4			0.5	1.3	1.5	1.1			0.5		0.3			0.5	1.1
1992-2000	3	[redacted]	-0.1	-0.1	-0.2	-0.1	-0.3					-0.2		0.6	0.3	0.6	-0.9		0.3	-0.2		-0.3			1.0					0.1	-0.3
2001-2009	1	[redacted]	-0.1	-0.6	-0.2	-0.2	-0.3	-0.8	-0.7	-0.7	-0.2	-0.6	-0.3		-3.0	-0.8	-0.4	-0.5	-0.6	-0.5		-0.6	-0.5	0.0	-0.6	-0.3	-0.4		-0.4	-0.6	-0.7
2001-2009	2	[redacted]	-0.6	-0.4	-0.8	-0.1		0.1	0.0	-0.1	-0.1	0.2			0.0	0.6			0.9					0.9			0.7				0.8
2010-2013	1	[redacted]	0.0	-0.3	0.0	0.0				-0.3	0.1	-0.9					-0.8							0.0		-0.5	-0.1				
2010-2013	1	[redacted]	1.0	0.2	0.7	0.5		-3.1	-1.1	-0.2	-0.7	-0.6	0.3			-0.8	0.4	0.0	-0.4	-0.7		-0.3	-0.5	-0.2	-0.6	0.4	-0.3	-0.9	0.0	-0.2	-1.9

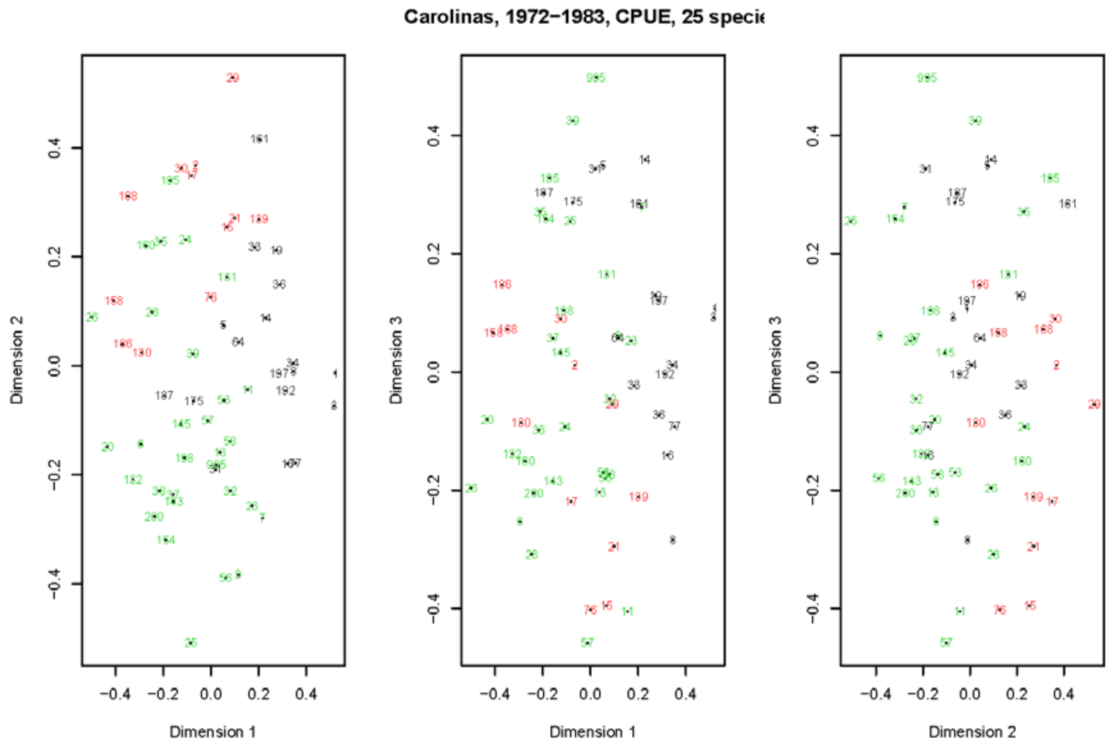
Year	Region	num.v	catrate.v	spcount.cv	aw.cv	yts.v	vs.v	rs.v	atlsharpnose.v	tom.v	grt.v	vbp.v	ms.v	grsnp.v	gag.v	vg.v	rp.v	kmack.v	gaj.v	lns.v	blrun.v	scamp.v	spotpin.v	littun.v	sdproh.v	cobia.v	atlbon.v	kwporgy.v	rg.v	cuda.v	z_sp_27	z_sp_all	z_cpue_27	z_cpue_all
1972-1983	1	0.7	0.4	0.0	0.6					-0.7																					3.5	1.6	0.0	0.9
1972-1983	1	1.0	0.0	0.0	0.1					-1.1																					3.5	1.7	-1.4	1.0
1972-1983	1																														3.1	1.4	0.1	1.8
1972-1983	3	0.3	0.4	0.8	0.6		-0.3									-0.9		-0.8	-1.3								0.0		-1.7		3.4	2.3	0.5	1.6
1984-1991	1	0.1	0.6	0.0	0.6					-0.6		5.8					-0.7	-0.9	5.4				0.4		0.3	2.9					3.1	1.1	1.1	0.1
1984-1991	2	-0.6	-1.0	-0.1	-1.2		-0.9	-1.4		-1.4	-0.2	-1.0		-0.3	-0.6			-0.2	-1.3			-1.3		-0.1		-0.5					3.0	0.9	0.9	0.5
1984-1991	3	0.8	-0.4	-0.3	-1.4	-0.7		-0.3		-0.9	-0.9		0.5	0.1				-1.9						-0.6						-0.4	3.2	1.7	-0.4	1.2
1992-2000	1	0.2	0.1	0.1	-0.3					0.3	-0.8	-0.6				1.4															3.1	1.9	0.3	0.0
1992-2000	1	-0.5	-0.8	-0.6	-0.3	-0.7	0.1	-0.1	0.3	-0.6	2.4	0.0	0.0	1.9	0.6	1.5	1.0	0.2	1.1		0.0	0.4	0.7	0.0	-0.4	1.4		0.4	0.7	0.8	-0.2	-0.1	-0.5	0.6
1992-2000	1	-0.7	-0.2	-0.4	-0.7							-1.1			-1.0								-0.1			-0.8					3.2	2.5	-0.5	1.2
1992-2000	2	-0.5	-1.2	-0.7	-1.4		-0.2	-1.0	-1.1	-0.6	6.3	0.2			-1.5					-1.2		-3.4			-1.3	-0.3					1.2	2.9	0.1	2.6
1992-2000	2	-0.4	3.4	0.4	2.0		1.2	-1.1	1.1		0.5	-0.5			-1.5			-1.5	-0.6			0.1								-0.4	1.1	3.2	0.6	2.0
1992-2000	3	-0.9	-1.0	-1.6	-1.1	-0.8	0.1	2.0			2.9		-0.2	1.1	0.7	-0.1	0.7	0.3	2.6	1.0	0.0	1.7		1.4		1.1		1.1	2.2	0.5	-0.2	-0.4	0.6	-0.2
1992-2000	3	-1.0	-0.8	-1.7	-1.1	-1.1					0.3		-0.5	-0.3		1.5		-0.5	0.0	-0.6		0.7						-0.3	0.0		1.9	3.3	0.1	0.0
1992-2000	3	1.1	1.0	-0.1	1.0		-0.9	-0.3			-1.1	2.6	-1.2	-0.1	-0.2	1.6	-0.7	-1.3		-0.5						0.0			0.0		1.3	3.1	-0.1	0.5
1992-2000	3	0.0	0.2	0.5	0.6	-0.4							1.2	-1.4				0.4						1.1						3.0	2.5	3.3	0.1	2.0
1992-2000	3	0.8	0.1	0.0	-0.4	1.6							0.8					-0.2			-1.1			-1.0					-1.1	0.3	2.5	3.2	0.0	1.9
2001-2009	1	0.9	0.6	0.3	0.4	1.9	0.2	0.0	-0.3	-0.5	1.4	0.4		0.0	-0.1	0.2	0.0	0.5	0.3		-0.4	0.0	-0.2	0.2	0.0	0.3		0.0	-0.7	-1.2	-0.3	-0.4	0.9	0.0
2001-2009	2	0.8	0.6	0.6	0.1		-0.3	-0.4		4.6	0.0			-0.6	-1.6			-0.4					-0.1			0.7				-0.4	3.1	1.4	0.1	1.4
2010-2013	1	-0.6	-0.4	-0.3	-0.5				0.1	-0.8	-0.3					-0.3							-0.4		0.0	-1.1					3.0	2.5	-0.2	0.1
2010-2013	1	-1.1	-0.8	-1.0	-0.9		0.5			-1.4	0.4	0.3			-0.6	-0.6	-0.3	-0.4	0.3			-0.4	-0.7	-0.2	-1.2	0.8	-0.7	-0.2	0.5	-0.7	-0.5	-0.4	-0.4	-0.2

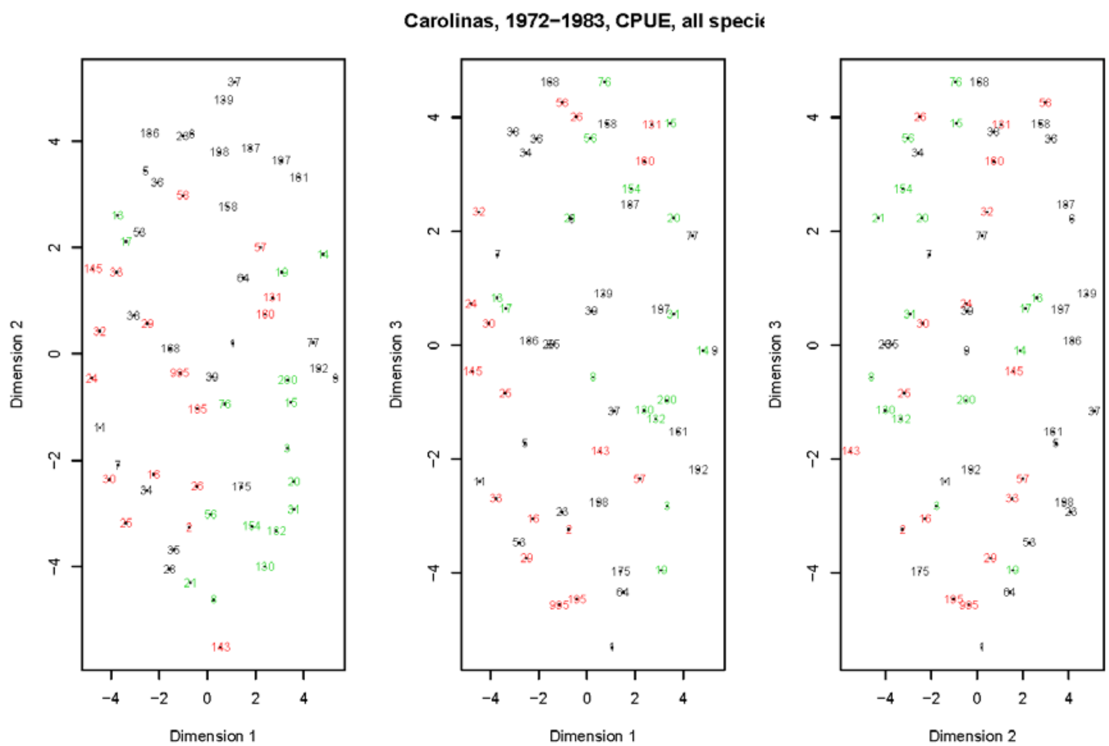
Appendix 7. Vessels with flagged metrics (modified z score between 2.5 & 3.0 in red).

Year	Region	vessel	num.m	catrate.m	spcount.m	sw.m	yts.m	vs.m	rs.m	atlsharpnose.m	tom.m	gtf.m	wbp.m	ms.m	grsnp.m	gag.m	wg.m	rp.m	kmack.m	gaj.m	lns.m	blrun.m	scamp.m	spotpin.m	littun.m	sdprch.m	cobia.m	atlbon.m	kwporgy.m	rg.m	cuda.m
1972-1983	1	[redacted]	-0.64	-0.51	-0.46	-0.21	2.08				0.07	-0.92	-0.18				-0.27	-2.61						0.10							
1972-1983	1	[redacted]	-0.84	-0.29	-0.45	0.01					0.21													-0.19							
1972-1983	2	[redacted]	0.19	0.15	-0.16	0.04		-0.05	-0.23		0.43	-0.73	0.55	2.54	-0.35	-0.06		-0.08	-0.35	-0.17		0.26	-0.55	0.41		0.95	-0.11	-0.49	1.23	0.33	0.76
1972-1983	3	[redacted]	2.39	0.56	1.63	1.02	0.58	-0.69	0.33					0.83	-0.16	-1.74	-0.55		-1.69	-1.09	-0.90	-0.46	0.55		-1.26		-2.25		-0.33	0.49	-1.99
1972-1983	3	[redacted]	2.54	0.62	1.96	0.97	0.42	-1.86	-1.07		-1.21	-1.13	-0.18	0.66	-0.75	-1.54	-0.34		-1.06	-1.01	-0.97	-0.87	0.19		-1.06		-2.48	-1.70	-0.10	-0.58	-2.59
1972-1983	3	[redacted]	2.58	0.87	1.83	0.15	0.98	-2.08	-0.95			-1.28		0.19	-0.39	-2.04	-0.44	0.86	-1.83	-1.26	-1.26	-1.01	-0.36		-1.01		-2.10	-1.06	-0.09	-0.59	-2.41
1984-1991	1	[redacted]	-0.74	-0.96	-0.81	-0.59					-0.48		-0.43				-0.75	-1.95	-0.15	-0.31			-0.99	-0.90			0.27		-0.72		
1984-1991	1	[redacted]	-0.63	-0.83	-0.69	-0.63					-0.54	-0.86	-0.48				-1.62		0.00	-0.37				-0.43		-1.49	0.35		0.23		0.08
1984-1991	1	[redacted]	-0.01	-0.07	0.20	0.15		-1.03	-0.47		-0.44		-0.03			-0.20	0.09	-0.55		-0.53		-1.02	-0.44	-0.30					-0.08		
1984-1991	2	[redacted]	-0.43	-0.49	-0.26	0.23	1.41	-1.44	0.28		-0.38	0.07	-0.32	-0.21	-0.01	-0.10			0.34	-0.45	-0.19	0.38	0.12		0.56		0.29			-0.24	
1984-1991	2	[redacted]	-1.16	-1.57	-1.17	-0.94		-1.29	-0.19		-0.50	0.14	-0.45	0.70	-0.02	0.51		-0.31		-0.47	-0.22		0.39	-0.02	-0.65	-0.66	-0.17			0.38	
1984-1991	2	[redacted]	-0.26	-0.18	-0.62	-0.40	0.51	0.03	0.30		-0.36	0.14	0.63		0.55	0.67	2.83	0.79	1.29	0.55	-0.13	0.63	1.00	0.26	0.59	0.59	1.25			0.63	1.12
1984-1991	3	[redacted]	-0.34	-0.31	-0.34	-0.04	-0.27					-0.68		0.10		0.22	-0.42		-0.45	-0.17	-0.38	-0.47	0.09						0.34	0.10	0.05
1984-1991	3	[redacted]	1.60	0.00	1.34	0.71	0.14	-1.87	-1.05		-0.84	-1.09		0.54	-0.47	-2.35	-1.40	-1.44	-1.69	-1.35	-0.78	-0.44	-0.38		-1.69		-2.51		-0.38	-0.12	-2.54
1984-1991	3	[redacted]	2.19	0.67	1.33	0.06	0.95	-1.81	-1.70		-0.56	-1.03		-0.29	-0.47	-1.99	-0.70	-0.38	-1.88	-1.47	-1.11	-1.06	-0.50		-1.73		-2.04		0.78	-0.52	-2.52
1984-1991	3	[redacted]	2.34	0.73	0.88	-0.76	1.20	-2.09	-1.64		-0.65	-1.99		-0.29	-0.52	-1.84	-1.16		-1.95	-1.55	-0.99	-1.04	-1.16		-1.37		-2.84		-0.01	-1.21	-2.46
1984-1991	3	[redacted]	0.48	0.35	1.30	1.15	0.05					-0.68		0.27	-0.41				-0.54	0.12	-0.91	-0.48			0.77		0.45			0.69	-0.16
1984-1991	3	[redacted]	1.85	0.15	1.92	0.87	0.34					-1.36		-0.15	-1.14	-2.10	-0.95		-1.31	-1.79	-1.37	-1.05	-0.58		-1.20		-2.96		-0.03	-0.17	-2.95
1992-2000	1	[redacted]	-0.53	-1.11	-0.56	-0.41		-2.78		-0.89	-0.81	-1.01	-0.73				-0.85						-0.88	-1.01		-1.18	-0.23		1.11		
1992-2000	1	[redacted]	-0.48	-0.31	-0.20	0.17		-1.39	0.79	0.53	-0.34	-0.19	0.93			0.92	-0.10	0.02	1.01	0.74			-0.10		0.94	0.54					2.62
1992-2000	1	[redacted]	-0.81	-0.31	-0.23	-0.34				0.77	-0.20		0.38				-0.29		0.71					-0.39							
1992-2000	1	[redacted]	-0.72	-0.28	-0.66	-0.35					-0.74		-0.18			0.09	0.14		1.23					0.84							
1992-2000	1	[redacted]	-0.27	0.26	-0.63	-0.33		0.24	0.56	1.39		0.30				0.95	0.56	0.98	1.44	0.78			1.18		2.57		2.16			1.07	
1992-2000	2	[redacted]	-0.77	-0.23	-1.03	-0.67		-0.19	0.22	-0.24	-0.18	-0.07	0.70		-1.43	-0.14	0.66	0.57	1.02	0.23				0.61			0.59				1.14
1992-2000	2	[redacted]	0.02	0.28	-0.41	-0.19	0.85	-0.28	0.18	0.06	0.13	0.23	0.60	0.59	0.00	0.07	0.62		0.36	-0.11	0.20	0.70	0.04		0.28		0.49		1.07	0.24	0.45
1992-2000	2	[redacted]	0.40	0.74	-0.30	-0.46	-0.07	0.81	0.78	0.44	1.03	1.43	1.54	0.89	-0.51	0.81	0.26	0.55	0.61	0.51		0.66	1.31	1.76	0.52		0.63		2.78	0.63	0.67
1992-2000	3	[redacted]	0.02	-0.11	0.19	0.30	-0.11	0.40				0.10		-0.32	-0.61		-1.37	1.44	0.06		-0.70	0.10			0.02					-0.30	0.01
1992-2000	3	[redacted]	0.57	0.18	-0.04	0.45	-0.14	0.25				1.03		0.49			-0.56		0.80		0.80	0.28			0.01	0.54				1.24	
1992-2000	3	[redacted]	0.32	0.11	1.38	1.20	-1.18	-0.86		-0.95	-0.02	-0.15	-0.54	-0.67	0.07	0.01			-0.86		-0.79	-0.65	0.28	0.09		-0.16	-0.35			-0.40	-0.67
1992-2000	3	[redacted]	-0.12	-0.02	0.00	0.19	-0.03	-0.36	0.44		-0.28	-0.14	-0.11	0.09	0.11	0.39	-0.29	-0.14	-0.22	0.53	-0.04	-0.16	0.54	2.67	-0.22	-0.20	0.49		0.22	0.81	0.12
2001-2009	1	[redacted]	0.17	-0.46	0.05	-0.15	-0.58	-0.81	-0.74	-0.66	-0.84	-0.22	-0.25	-0.31	-2.91	-0.82	-0.22	-1.24	-0.55	-0.60		-0.35	-0.58	-0.34	-0.60	-1.33	-0.47		-0.85	-0.75	-0.68
2001-2009	1	[redacted]	-0.88	-1.26	-0.61	-1.02				-0.25		-0.87					-0.34			-0.42				-0.85		-1.36					
2001-2009	1	[redacted]	-0.31	-0.47	-0.75	-0.49				0.09	-0.31	0.01					-0.10		-0.25			0.15		0.02							
2001-2009	1	[redacted]	0.74	0.29	0.82	0.53	-0.57	-1.16	-0.57	-0.44	-0.47	-0.46	0.20		-3.00	-0.99	0.37	-0.60	-0.60	-0.72		0.69	-0.49	-0.16	-0.09		-0.45		-0.21	-0.26	-0.50
2001-2009	1	[redacted]	0.04	-0.19	0.10	0.16		-2.90	-0.54	-0.52	-0.76	-0.75	0.21			-0.10	0.25	-0.04	-0.44	-0.37		-0.62	-0.48	-0.02	-0.37	-0.89	-0.01		-0.46	0.56	-0.33
2001-2009	1	[redacted]	-0.51	-0.76	-0.31	-0.09		-2.16	-0.54	-0.11	-0.41	-0.67	-0.20		-2.07	-0.29	-0.25	-2.53	-0.25	-0.22		-0.17	-0.77	-0.54	-0.40	-0.83	0.03		-1.07		
2001-2009	1	[redacted]	-0.16	0.12	-0.30	-0.35		-2.66				0.92							0.22	0.98				-0.04	0.57		0.58				0.35
2001-2009	1	[redacted]	0.66	0.19	0.90	0.83	-0.52	-2.17	-0.87	-0.61	-0.61	-0.46	0.23	0.69	-2.60	-0.83	0.47	-0.32	-0.43	-0.60		-0.45	-0.52	-0.16	-0.05		-0.61		-0.26	-0.16	-0.56
2001-2009	2	[redacted]	0.32	0.82	-0.47	-0.26			-0.04	0.64	1.07	0.80	0.78	0.89	0.44	0.90			0.85		1.53	1.78					1.17			1.44	
2001-2009	3	[redacted]	1.04	-0.04	1.53	0.71	0.18	-1.52	-0.48		-1.97	-1.09	-1.07	0.35	-0.41	-1.66	-1.42	-0.99	-0.58	-0.68	-0.94	-0.86	-0.39		-1.16		-1.58		-1.25	-0.65	-1.31
2001-2009	3	[redacted]	-0.26	-0.47	-0.51	-0.26		0.22	0.47	1.40	0.39	0.27	0.31	-0.16	-0.62	-0.32		0.77	-0.79		0.13		-0.11			-0.98	-0.46			-0.30	
2001-2009	3	[redacted]	-0.31	-0.39	-0.28	-0.05	-0.36	-0.48	2.96	-0.16	-0.92	-0.55	-0.18	-0.25	-0.37	0.46	-0.42	0.88	-0.49	0.26	-0.33	-0.44	0.44	-0.23	-0.42		0.12		-0.26	0.23	0.21
2010-2018	1	[redacted]	-0.78	-1.23	-0.27	-0.26				-0.16		-0.47				0.21	-0.75	-1.14	0.00							-0.63	0.21		2.71		-0.80
2010-2018	1	[redacted]	-0.31	0.20	-0.42	-0.52		-2.52		0.60	0.28	-0.01	0.42			0.51	0.46		0.97	0.86			-0.06		0.64	0.63	0.62	0.03	-0.42		0.23
2010-2018	1	[redacted]	-0.40	-0.14	-0.45	-0.64		-0.06		0.58		0.40				1.11	0.82						1.29		0.63		0.71				
2010-2018	3	[redacted]	0.33	0.48	-0.20	0.02	0.40	0.66	-0.19	2.53	0.14	1.00	1.38	0.18	0.53	0.37	0.17	0.44	0.25	0.44	0.51	0.37	-0.19		0.11	-0.16	-0.07	-0.18		0.47	0.62

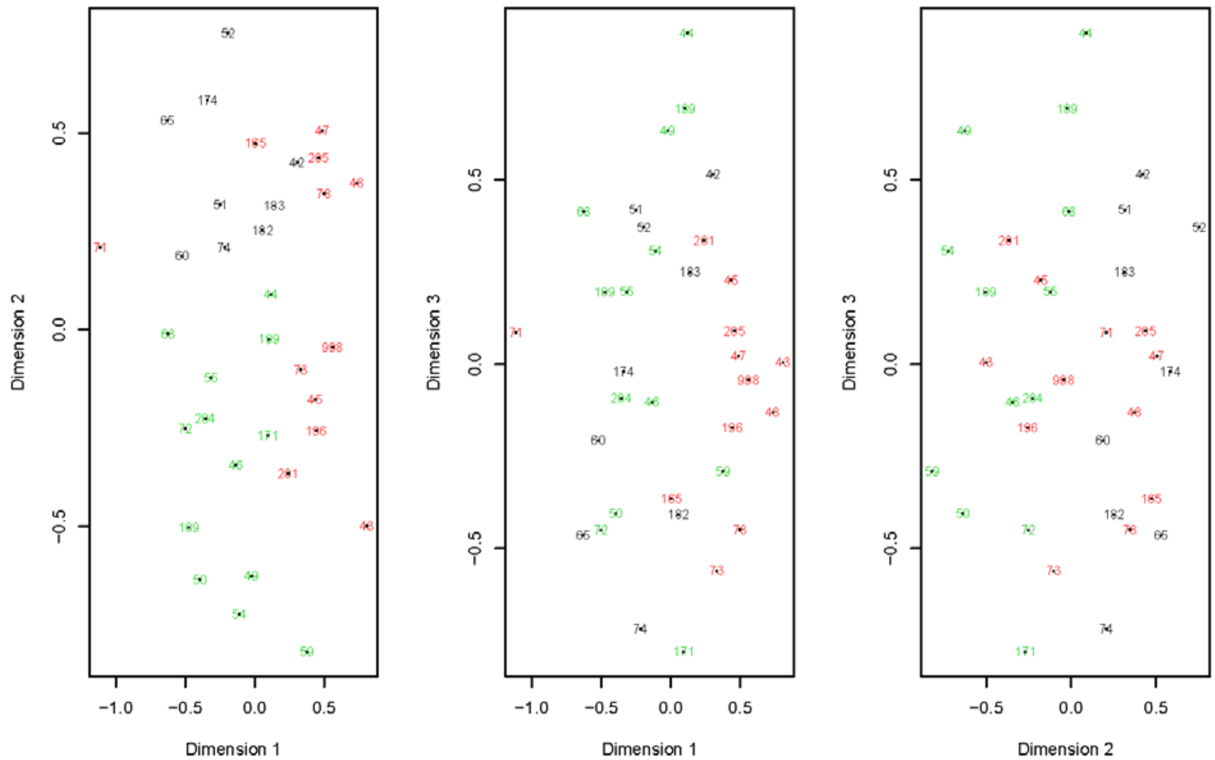
Year	Region	vessel	num.v	catrate.v	spcount.cv	sw.cv	yts.v	vs.v	rs.v	atlsharpnose.v	tom.v	gtf.v	wbp.v	ms.v	grsnp.v	gag.v	wg.v	rp.v	kmack.v	gaj.v	lns.v	blrun.v	scamp.v	spotpin.v	littun.v	sdprch.v	cobia.v	atlbon.v	kwporgy.v	rg.v	cuda.v	z_sp_27	z_sp_all	z_cpue_27	z_cpue_all
1972-1983	1	[redacted]	-0.19	-0.07	0.52	0.23					-0.61		0.36				-0.55							-0.51								1.36	0.47	1.06	0.07
1972-1983	1	[redacted]	-0.50	-0.32	0.50	-0.11					-0.53																					2.88	1.28	0.33	1.00
1972-1983	2	[redacted]	0.52	0.20	-0.06	-0.37		-0.14	-0.06		0.02	-0.31	0.07	1.05	0.16	0.37		0.04	-0.99	-0.52			-0.44	0.70			-1.08	-0.52	0.00	0.71	5.24	-0.22	-0.24	-1.55	-0.65
1972-1983	3	[redacted]	-1.16	-1.41	-2.65	-2.54	-1.51							-0.54	-0.11	3.43	-0.75		0.10	0.48	-0.61	-0.25	-0.48		0.20				-0.88	-0.73	0.36	0.58	0.41	0.69	-0.31
1972-1983	3	[redacted]	-1.53	-1.10	-2.45	-1.64	-0.39		0.09			-0.63		-0.63	2.61	1.41	0.60		8.60	1.25	3.46	-0.02	1.23		0.81		0.25	0.20	-0.34	1.40	0.65	-0.20	-0.86	-0.46	-0.44
1972-1983	3	[redacted]	-1.23	-1.17	-1.77	-0.32	-1.29	-0.87	0.55			2.82		1.52	-0.28	0.46	-0.51	-1.30	-0.76	1.06	-0.07	-0.09	2.11		-0.31		1.32	-1.21	-0.29	1.40	0.62	-0.32	-0.61	0.25	0.58
1984-1991	1	[redacted]	0.68	0.97	0.28	0.54					0.56		-0.41				-0.21	0.47						0.21					-0.89			2.69	0.72	0.42	0.30
1984-1991	1	[redacted]	-0.34	0.01	0.35	0.73					-0.03	-1.10	-0.29						-0.78					0.08		-0.51	-0.06				-0.81	2.64	0.52	1.13	-0.21
1984-1991	1	[redacted]	-0.90	-0.77	-0.74	-0.46		0.25	-0.36		0.07		-0.46			1.56	-0.89	-0.55					0.35	-1.01								2.72	0.81	0.31	1.05
1984-1991	2	[redacted]	0.06	-0.31	0.10	-0.59		-0.16	-0.62		-0.71	1.43	0.35		-0.78	-0.47			0.70	-1.56	0.48	-0.87	-0.20		1.79		1.25			-0.74		2.64	1.03	0.23	0.53
1984-1991	2	[redacted]	-0.02	0.01	1.67	2.78		-0.74	-1.63		-1.51	-0.74			0.42	-0.32		-2.14		-1.23	-0.47		1.39			-0.45	-0.75			1.17		2.80	0.70	0.00	1.21
1984-1991	2	[redacted]	1.16	0.61	1.72	1.83	0.33	0.32	0.12		-0.28	-0.77	-0.60		0.19	-0.27	1.69	-0.26	0.81	-0.52		0.62	0.84	0.05	-1.14	-0.45	-0.66				-0.12	0.07	0.00	0.20	-0.50
1984-1991	3	[redacted]	-0.23	-0.43	0.61	0.16	0.06					-0.53		-0.60			-0.29		-2.35	-1.09		-1.12							-0.72	-0.80	-1.20	2.67	0.70	0.71	0.72
1984-1991	3	[redacted]	-0.33	-0.40	-0.93	-0.87	0.02	-0.41	0.54		1.16	0.47		-0.01	1.61	-0.69	0.85	0.72	1.16	0.04	0.01	0.15	0.14		-0.21		-0.16		-0.44	0.41	-0.22	-1.01	-0.86	-1.27	-0.36
1984-1991	3	[redacted]	1.13	0.38	-0.79	0.71	0.05	0.10	-0.53		7.01	2.09		-0.51	-0.06	-0.17	4.28	8.71	-0.34	-0.59	0.06	0.48	0.91		-0.09		1.10		4.01	3.28	1.56	-1.01	-0.77	-0.10	0.42
1984-1991	3	[redacted]	0.51	-0.02	-0.31	3.61	-0.34	-0.52	-0.39		0.38	-1.07		-0.03	-0.48	-0.66	-1.02		-1.03	-0.74	0.00	0.65	0.48		0.63		-0.79		-0.35	2.27	0.24	-0.59	-0.74	-0.79	0.37
1984-1991	3	[redacted]	-1.04	-1.09	-1.06	-1.46	-0.61					-0.16		-0.53	-0.60				-1.55	1.44	-0.77	-0.61			-0.37				-0.40	-0.44		2.77	0.62	0.35	0.62
1984-1991	3	[redacted]	-0.97	-0.64	-1.52	-0.69	-0.14					-0.75		-1.42	-0.72	0.20	-0.54		2.84	-0.35	-0.76	-0.81	0.07		-0.12		-0.72		-0.55	-1.21	-0.04	0.94	-0.16	0.08	-0.48
1992-2000	1	[redacted]	-0.18	-0.01	-0.18	0.02				-0.46	-0.17	-0.68	-0.09				-0.03							-0.28		0.50						1.31	0.88	-0.82	-0.12
1992-2000	1	[redacted]	-0.12	-0.29	0.19	0.27		1.39	1.10	-1.10	-0.36	0.17	0.01			2.68	0.00	-0.83		-0.16			-1.14		3.36	-0.47						0.00	0.09	-0.32	0.21
1992-2000	1	[redacted]	-0.86	-1.18	-0.24	0.78				0.16	0.56																					2.72	2.49	0.29	1.40
1992-2000	1	[redacted]	0.12	-0.38	1.16	0.71													5.03													2.68	2.23	-0.17	0.99
1992-2000	1	[redacted]	0.44	0.25	0.59	0.94		-1.01	-0.46	-0.16		0.32				0.62	-1.09	0.18	2.63	0.98			-0.15				14.77			3.57		0.47	0.26	0.36	-0.36
1992-2000	2	[redacted]	0.74	-0.06	1.24	0.31		-1.27				0.04	-0.47	5.89		-0.45		-0.49		-0.12							0.54				-0.21	0.89	2.82	-0.03	2.60
1992-2000	2	[redacted]	-0.38	-0.12	-0.17	-0.66	0.95	-0.39	-0.66	0.09	-0.61	-0.78	0.18	-0.46	-0.44	-0.73	-0.66		-0.29	-1.09	-0.40	0.45	-2.54		-1.91		-0.40			-0.22	-0.41	0.31	-0.29	-0.09	-0.06
1992-2000	2	[redacted]	0.85	0.97	-0.02	0.66	-1.21	-0.29	0.76	0.00		0.07	-0.08		-1.53	0.88	-0.44	0.48	0.00	0.11		1.38	4.65	0.04	-0.06		-0.36		2.12	0.16	1.93	0.04	-0.54	0.03	0.48
1992-2000	3	[redacted]	-0.08	-0.58	-0.21	-0.45	0.38					-0.80		-1.26	-0.90		-2.07		-0.29		-0.85	-0.15			0.06						-0.45	2.19	2.97	0.76	1.53
1992-2000	3	[redacted]	0.54	-0.02	0.41	-0.32	-0.62	-0.97				-0.40		-0.70			-0.74		0.33		-0.31	-1.81			-1.12	-0.40						2.72	1.85	-0.34	1.61
1992-2000	3	[redacted]	-0.29	-0.45	-1.81	-2.24		0.42		0.37	-0.01	0.56	-0.76		0.58	0.07					-1.28	-0.83	-0.32	-0.81		-0.61	-1.31			-1.25		1.75	2.58	1.34	2.16
1992-2000	3	[redacted]	0.07	0.30	-0.33	-0.39	0.02	-0.18	0.98		0.61	-0.41	-0.32	-0.54	0.72	0.03	0.15	-0.02	-0.83	1.22	0.20	0.00	-0.50		-0.30		0.12		0.86	1.52	-0.35	-0.29	0.15	0.57	-0.27
2001-2009	1	[redacted]	3.35	2.53	0.48	0.64	-0.20	0.55	0.16	1.16	1.82	2.67	2.16	-0.54	-0.66	0.20	0.93	1.51	0.02	0.60		0.28	0.84	0.08	-0.06	1.62	-0.21		0.30	0.30	0.08	-0.17	-0.38	-0.78	0.42
2001-2009	1	[redacted]	-0.21	-0.17	0.56	2.45				-0.54							-0.32									-0.88						3.00	1.93	-0.82	1.90
2001-2009	1	[redacted]	0.26	0.32	-0.50	-0.24				1.07	0.16	-0.71					0.17					0.97										2.57	2.20	0.21	1.17
2001-2009	1	[redacted]	-0.64	-0.59	-1.22	-0.56		1.35	0.10	2.10	-1.31	0.10	0.39			-0.75	-0.43	0.00	-1.08	-0.53			-0.29	0.00	-0.50				-0.35	0.01		-0.17	-0.42	1.16	-1.28
2001-2009	1	[redacted]	0.35	-0.06	-0.09	-0.11		0.48	-0.34	-0.56	0.64	-0.56	0.71			1.00	-0.01	0.27	-0.79	-0.48			0.21	0.32	-0.45	2.04	-0.12		0.11	0.69		-0.55	-0.76	-0.35	-0.66
2001-2009	1	[redacted]	0.33	0.50	0.18	0.06		0.80	-0.51	0.39	3.14	-0.58	-1.05		0.62	0.01	0.67	-1.52	-0.84	-0.12			-0.55	0.35	-0.58	0.14	-0.39		-0.76			-0.20	-0.46	-0.68	-0.83
2001-2009	1	[redacted]	0.28	-0.16	-0.17	0.24		1.95				1.90							-1.21	-1.10												2.31	1.26	-0.68	0.22
2001-2009	1	[redacted]	-0.69	-0.59	-1.14	-1.07	-0.39	0.41	-0.52	0.20	0.21	-0.29	-0.23		-0.02	-0.01	-0.65	-0.07	-0.16	0.31		0.08	-0.05	-0.47	0.58		-0.50		-0.16	0.56	-0.34	-0.05	-0.18	-0.04	-0.09
2001-2009	2	[redacted]	-0.30	0.27	-0.28	-0.55			-1.82	-0.30	0.00	-0.37	-0.52	-0.50	1.29	-0.37					0.51	-0.45					2.04			-1.14		2.86	1.73	0.52	0.47
2001-2009	3	[redacted]	-0.73	-0.63	-2.62	-1.33	-0.58	-0.16	0.84		-0.76	0.49	-0.50	2.40	0.45	-0.18	-0.68	0.19	0.40	0.63	-0.51	0.07	0.54		-0.53		-0.05		-0.02	0.24	0.88	-0.56	-0.64	0.71	0.58
2001-2009	3	[redacted]	-0.15	0.03	-0.57	-0.25		-1.35	2.59		-1.18	-0.42	-0.05	0.44	-0.28	0.42		-0.08	-0.28		-1.35		-0.78				-0.60			-0.12		2.02	2.65	0.97	0.22
2001-2009	3	[redacted]	0.05	-0.03	-0.16	-0.24	-0.08	4.85		0.48	-0.18	-0.37	0.00	-1.01	-0.41	1.07	-0.38	11.34	-1.16	-0.12	0.14	-0.40	0.15		-0.41		-0.18		0.00	0.50	-0.45	-0.38	-0.37	0.57	0.46
2010-2018	1	[redacted]	-0.42	0.32	0.56	0.85				0.46		-0.44				3.51	-1.00	-0.56								0.00	0.02				0.41	1.89	2.23	0.57	1.00
2010-2018	1	[redacted]	0.02	0.33	0.34	0.30		0.98		-1.02	-0.85	-0.06	-0.45			-0.64	0.06		1.09	0.00			-1.75		0.00	-0.03	0.45	0.12			0.07	0.39	-0.03	0.88	-0.02
2010-2018	1	[redacted]	-0.02	0.86	0.04	1.06		-0.52		-1.12		-1.16				-1.00																2.95	2.37	0.09	0.44
2010-2018	3	[redacted]	0.47	0.06	-0.41	-0.14	1.58	-0.47			5.12	0.50	-1.51	0.12	-0.47	-0.78	-0.72	0.16	0.58	0.25	0.57	0.00			0.52	-0.29	-0.18	-0.58		-0.16	-0.62	-0.02	-0.13	0.25	0.29

Appendix 8. Non metric multidimensional scaling (NMDS) results for time-area blocks from analysis using CPUE of the top 25 species and all species. The three colors represent the default number of medoids (clusters) used prior to final NMDS analysis (k=3).

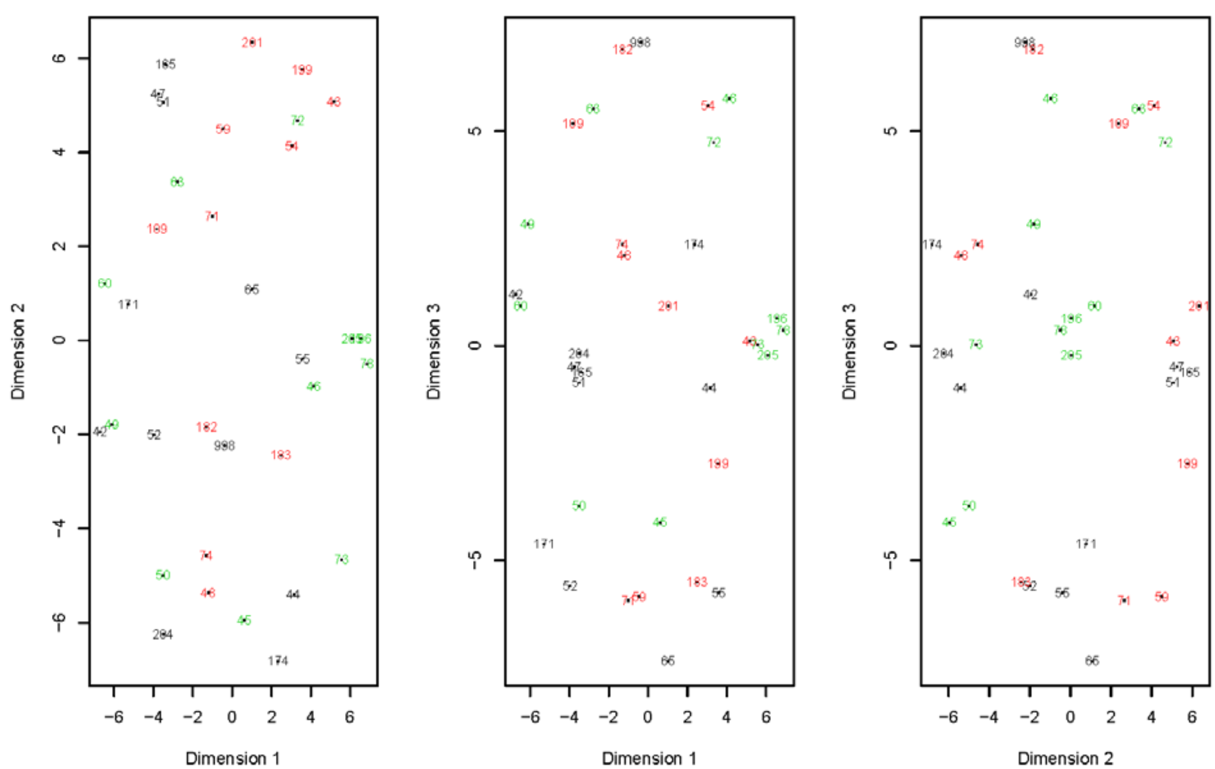




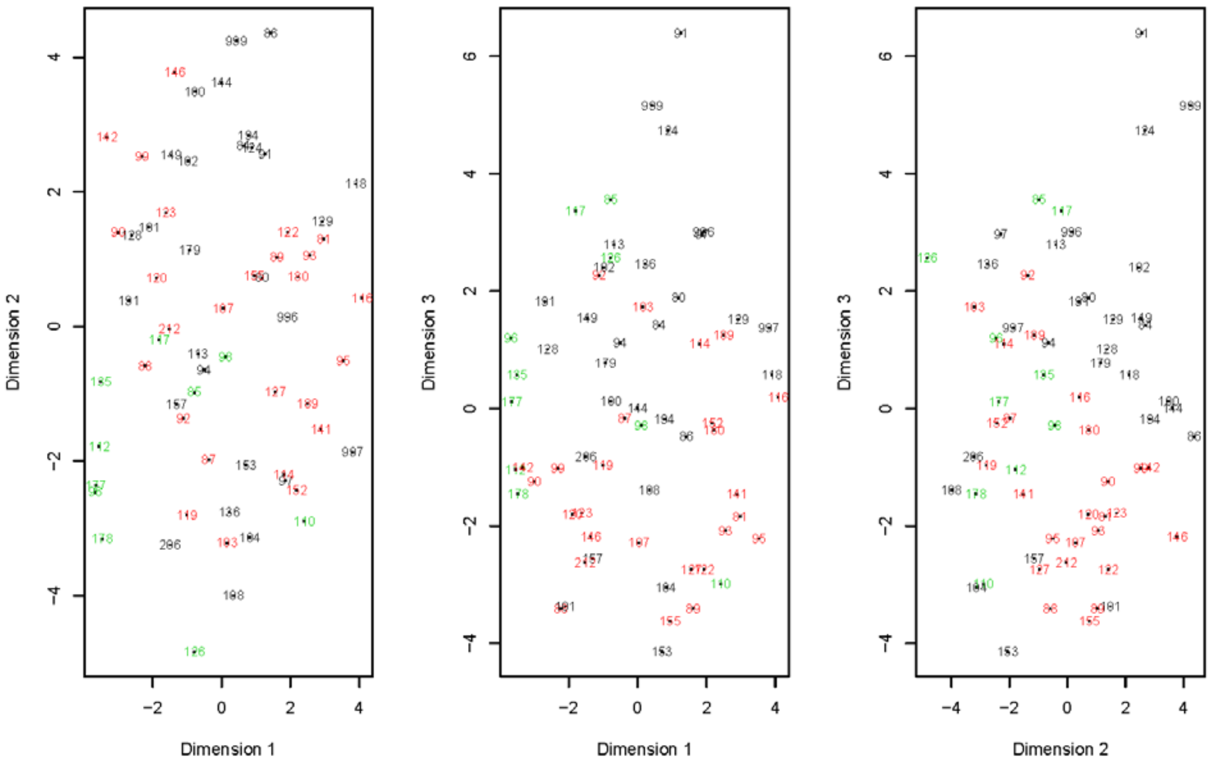
GA−nFL, 1972−1983, CPUE, 25 specie



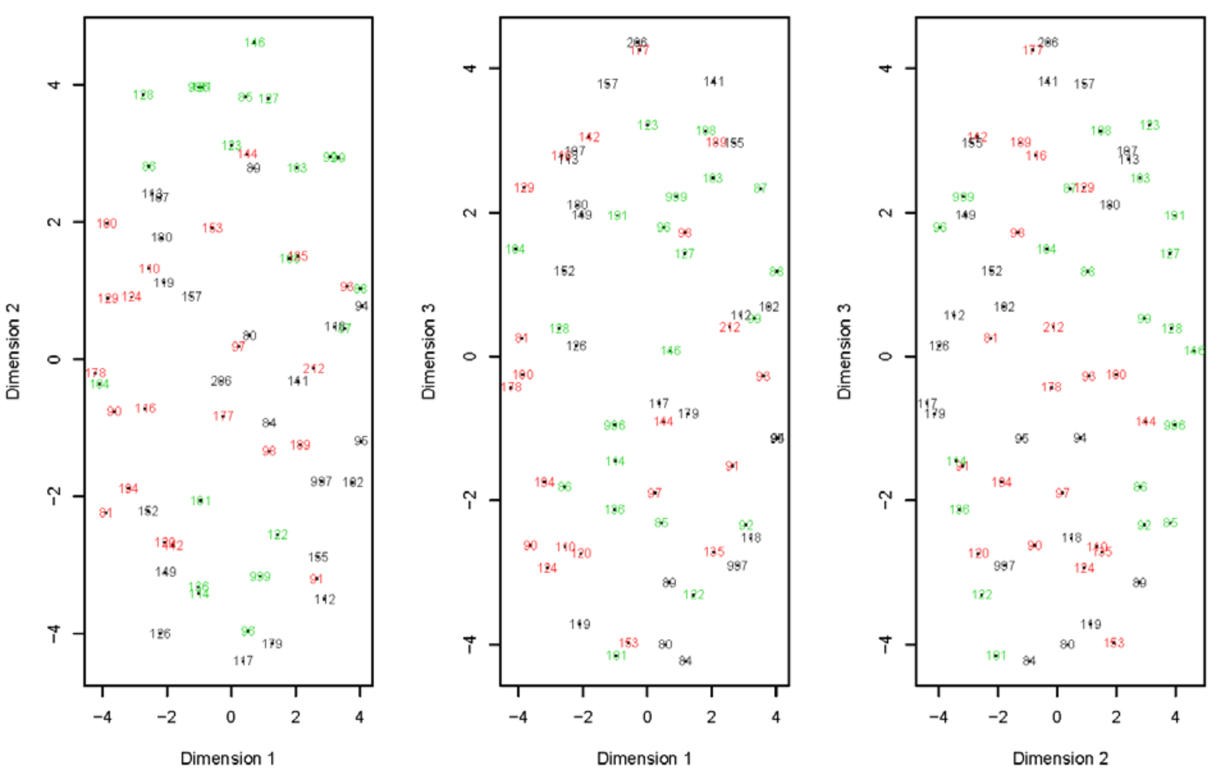
Ga−nFL, 1972−1983, CPUE, all specie



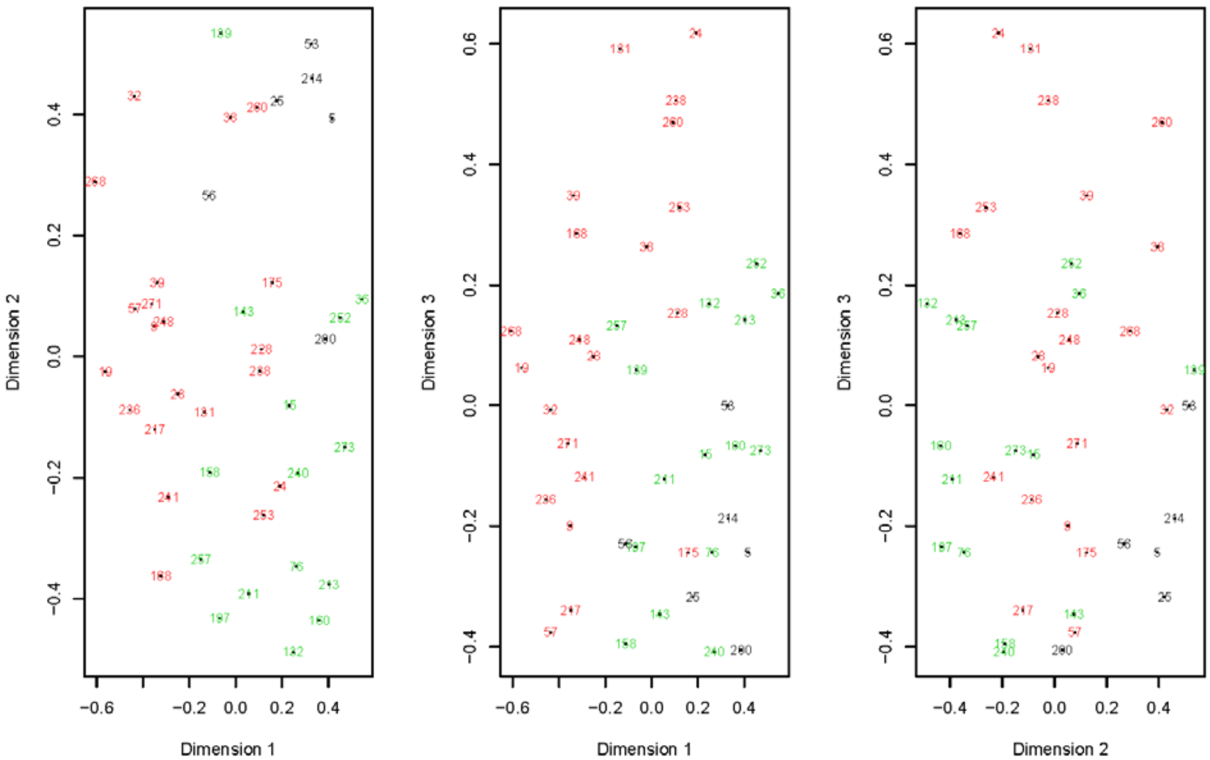
sFL, 1972−1983, CPUE, 25 species



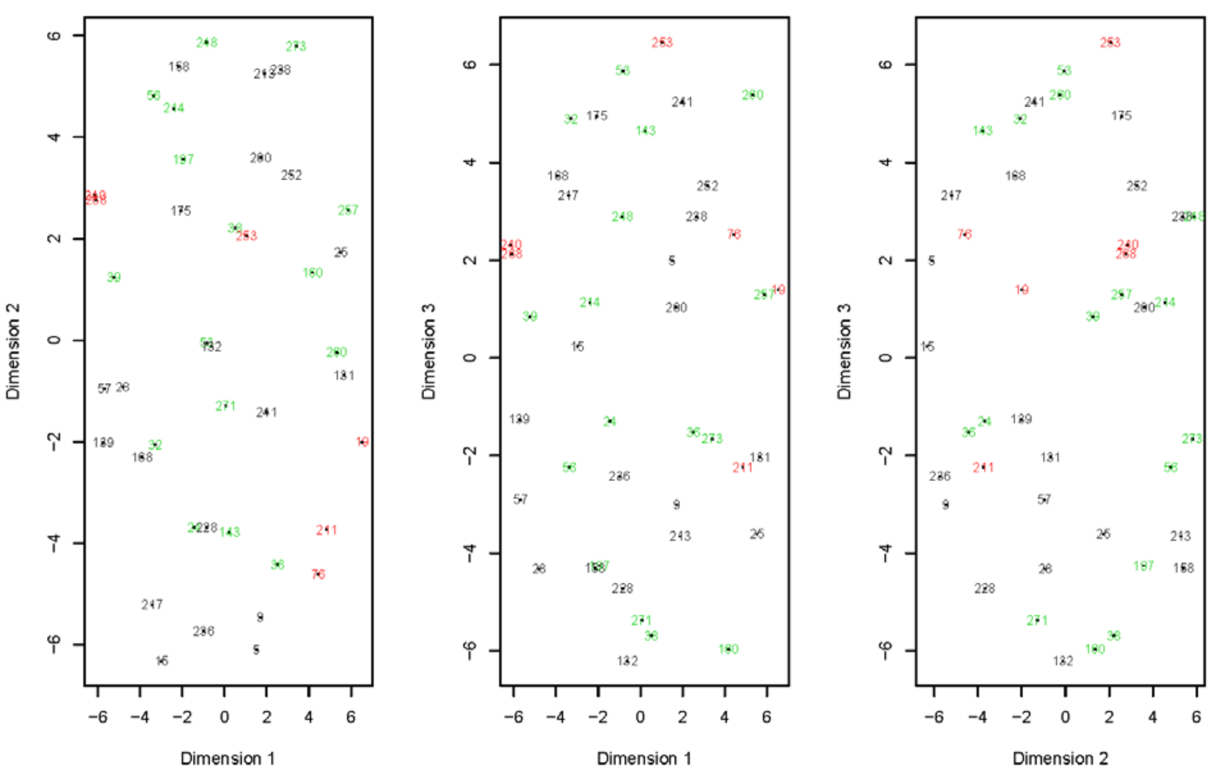
sFL, 1972−1983, CPUE, all species

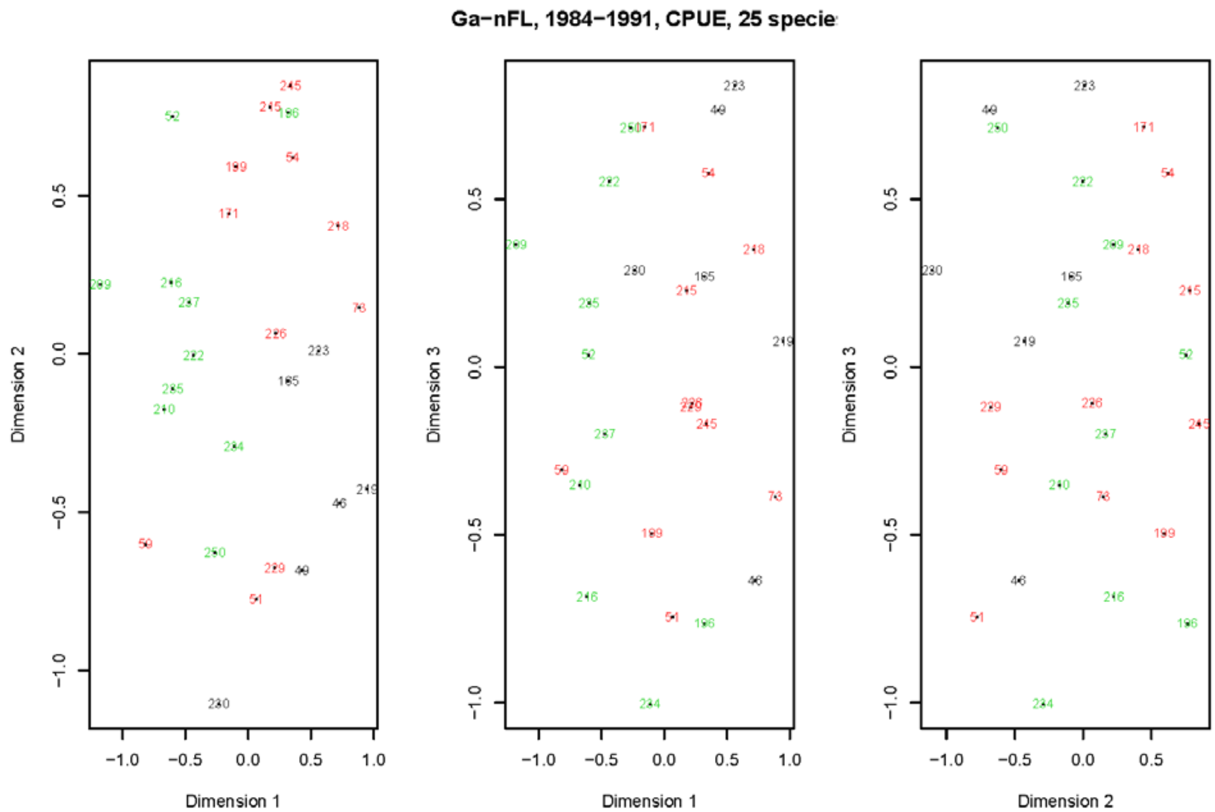


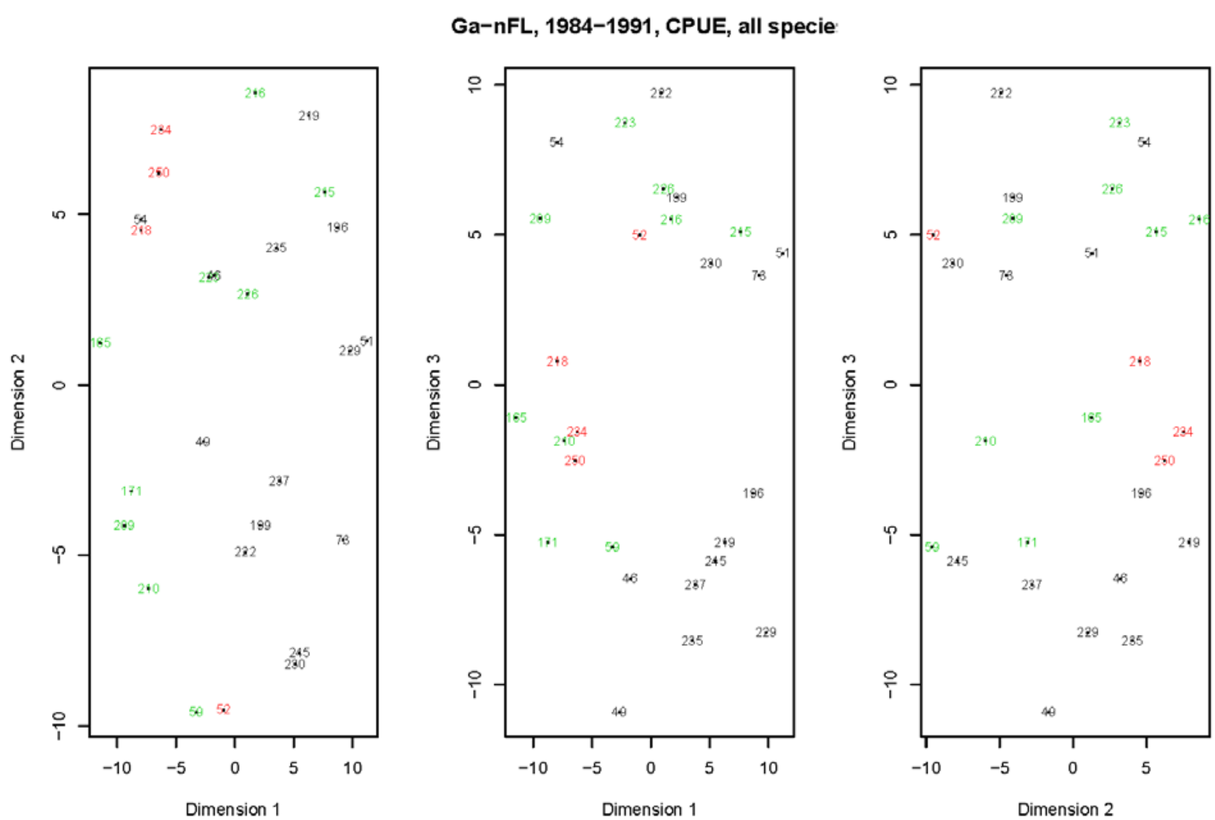
Carolinas, 1984−1991, CPUE, 25 specie



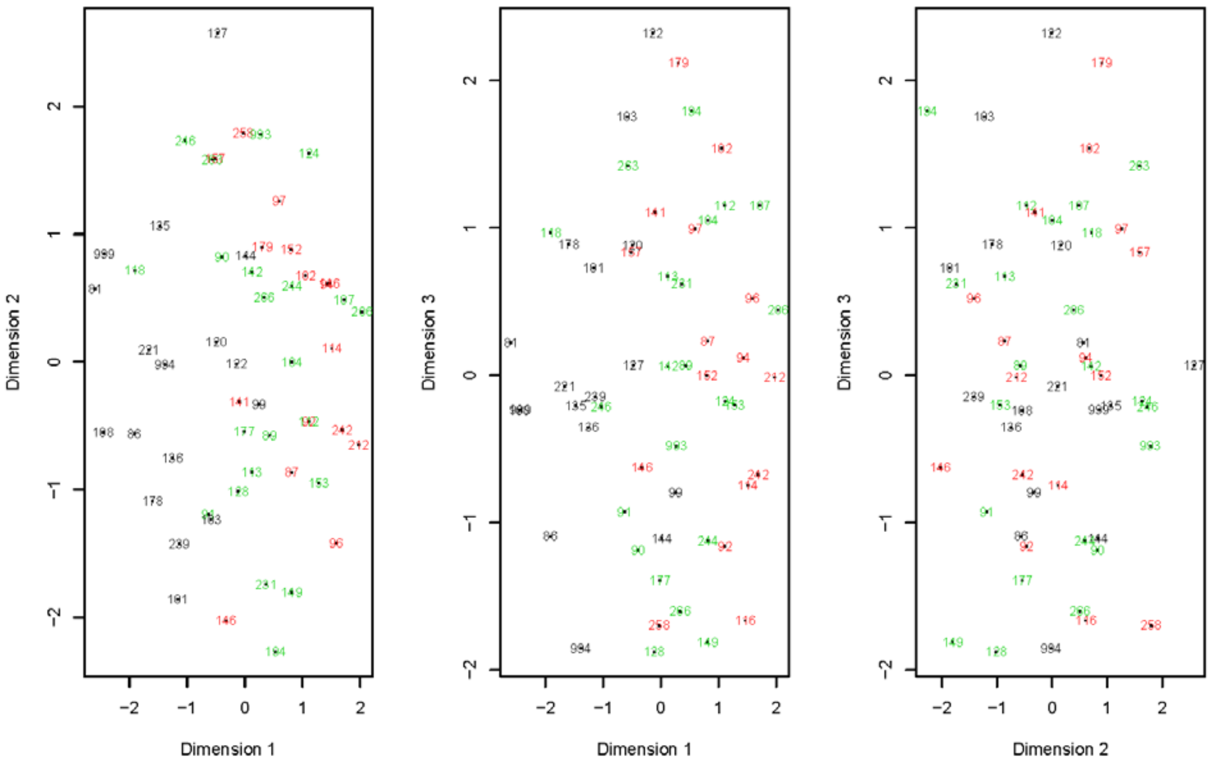
Carolinas, 1984−1991, CPUE, all specie



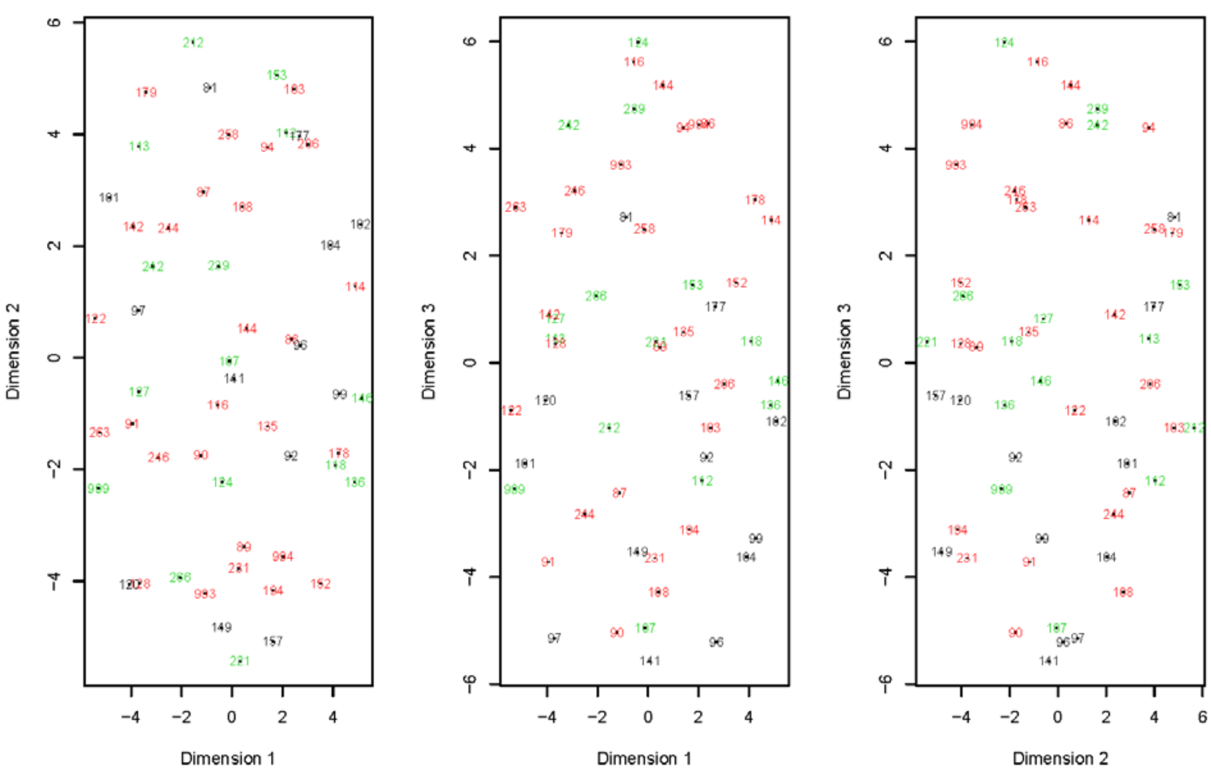

Ga−nFL, 1984−1991, CPUE, 25 specie
Dimension 1
Dimension 2
Dimension 1
Dimension 3
Dimension 2
Dimension 3


Ga−nFL, 1984−1991, CPUE, all specie
Dimension 1
Dimension 2
Dimension 1
Dimension 3
Dimension 2
Dimension 3

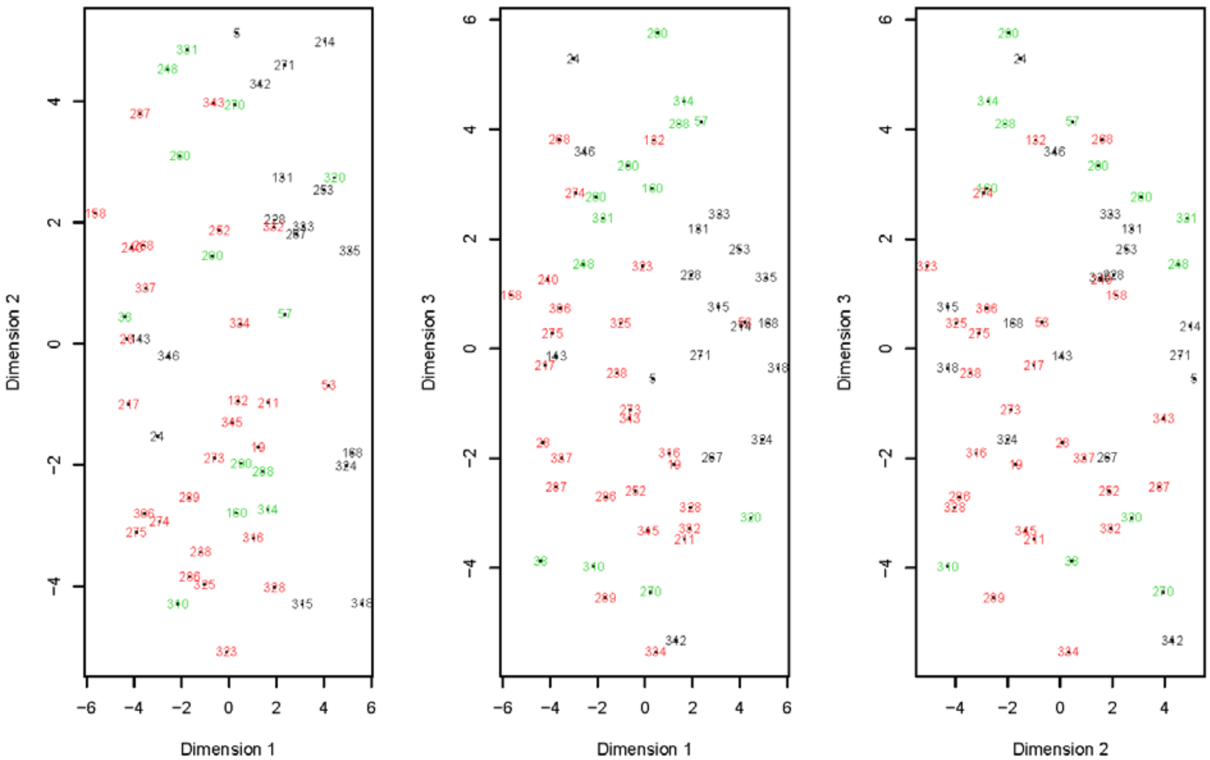
sFL, 1984−1991, CPUE, 25 species



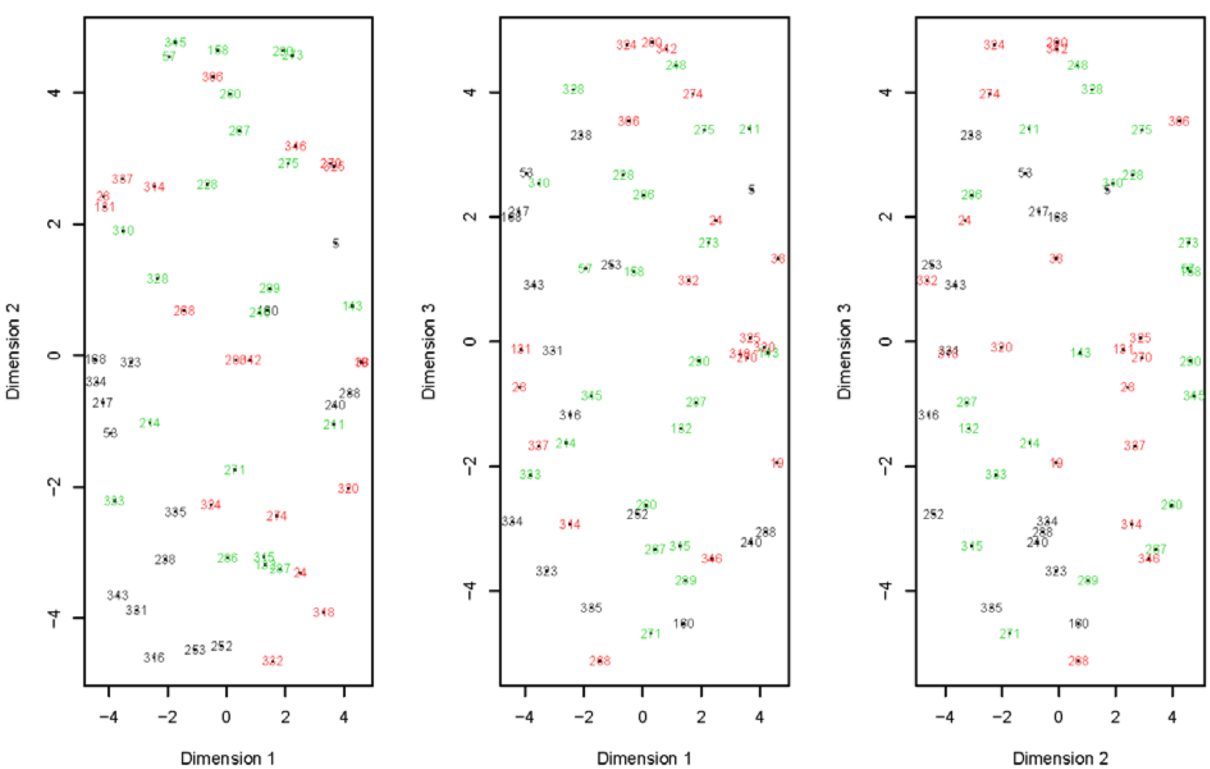
sFL, 1984−1991, CPUE, all species



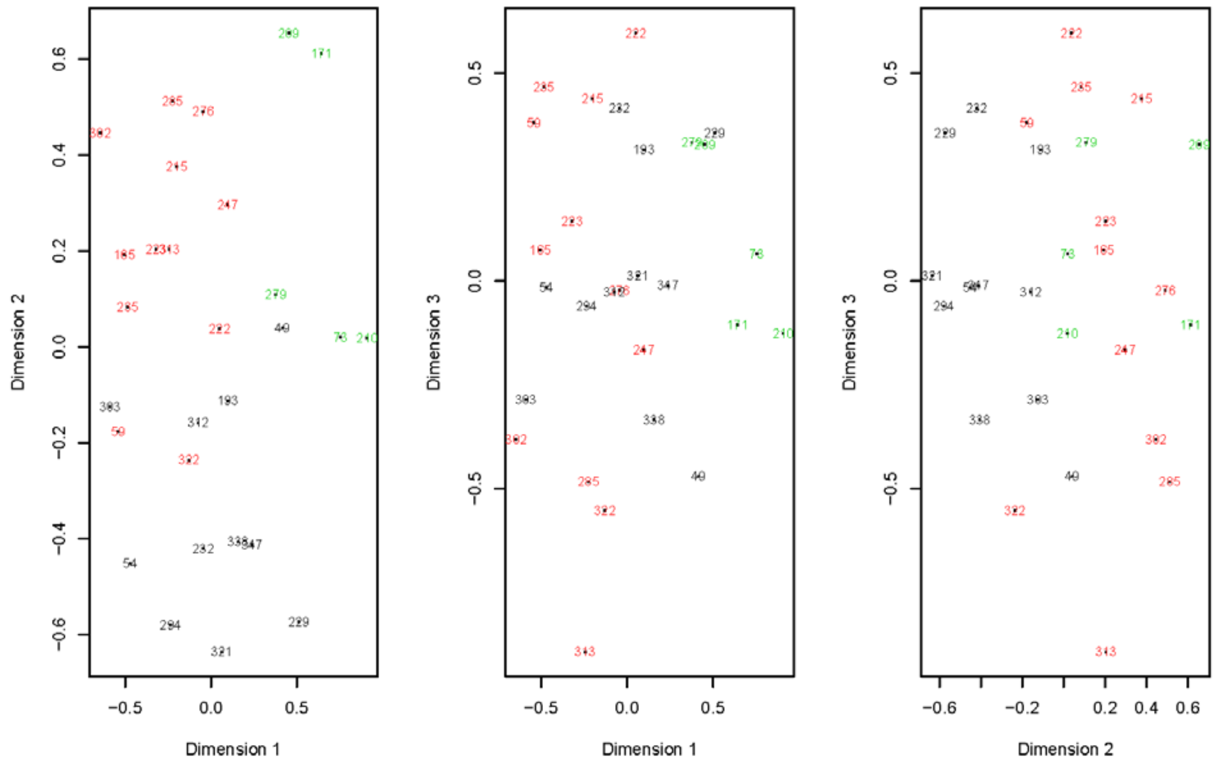
Carolinas, 1992−2000, CPUE, 25 specie



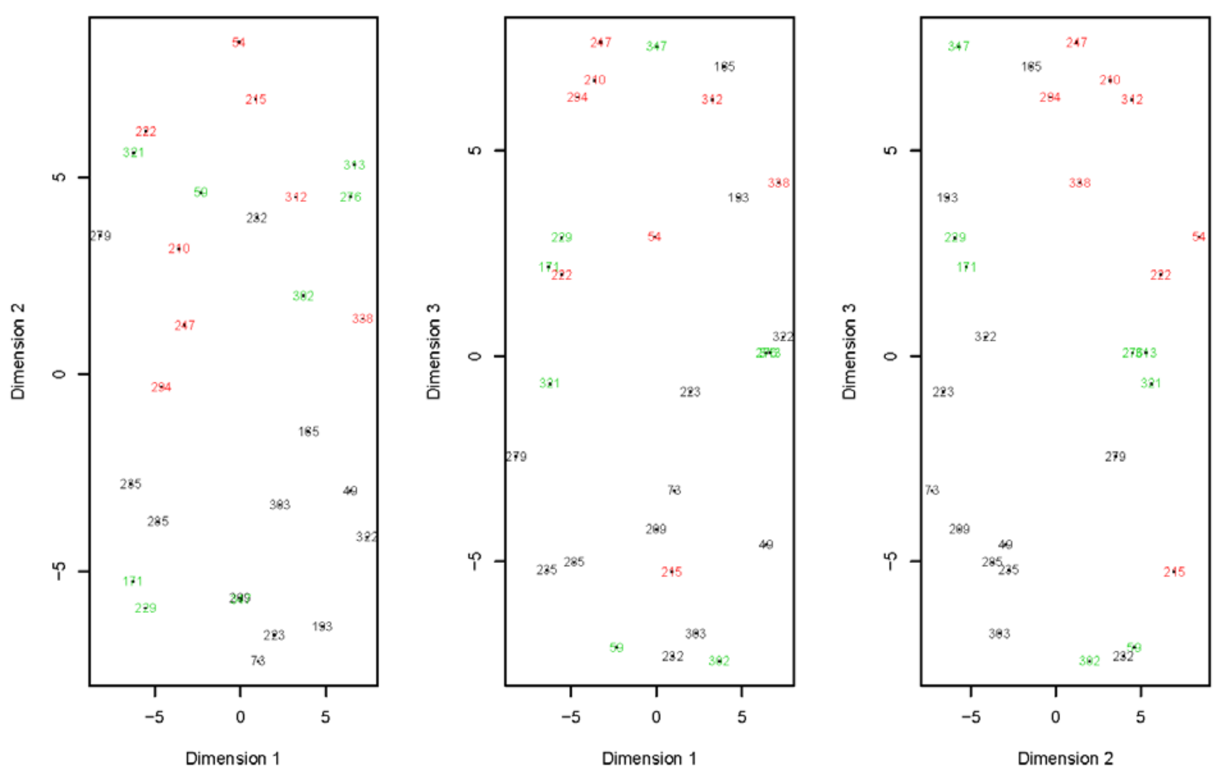
Carolinas, 1992−2000, CPUE, all specie



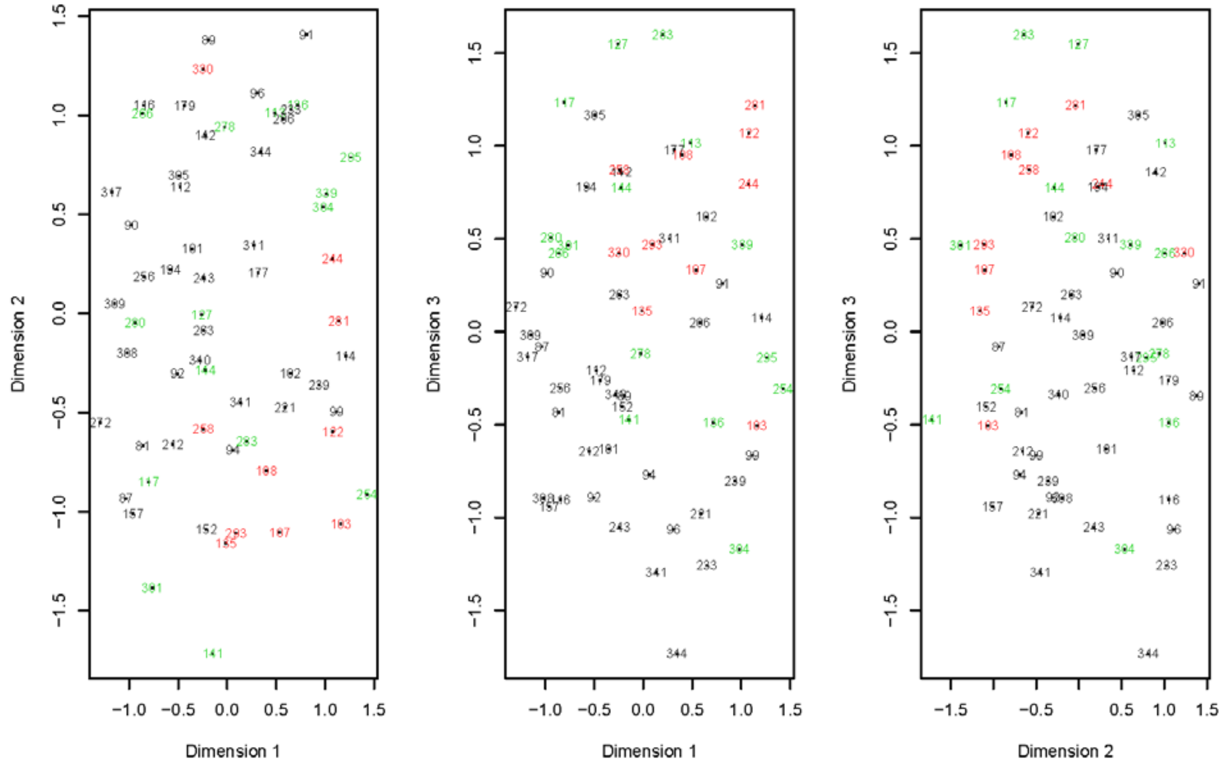
Ga−nFL, 1992−2000, CPUE, 25 specie



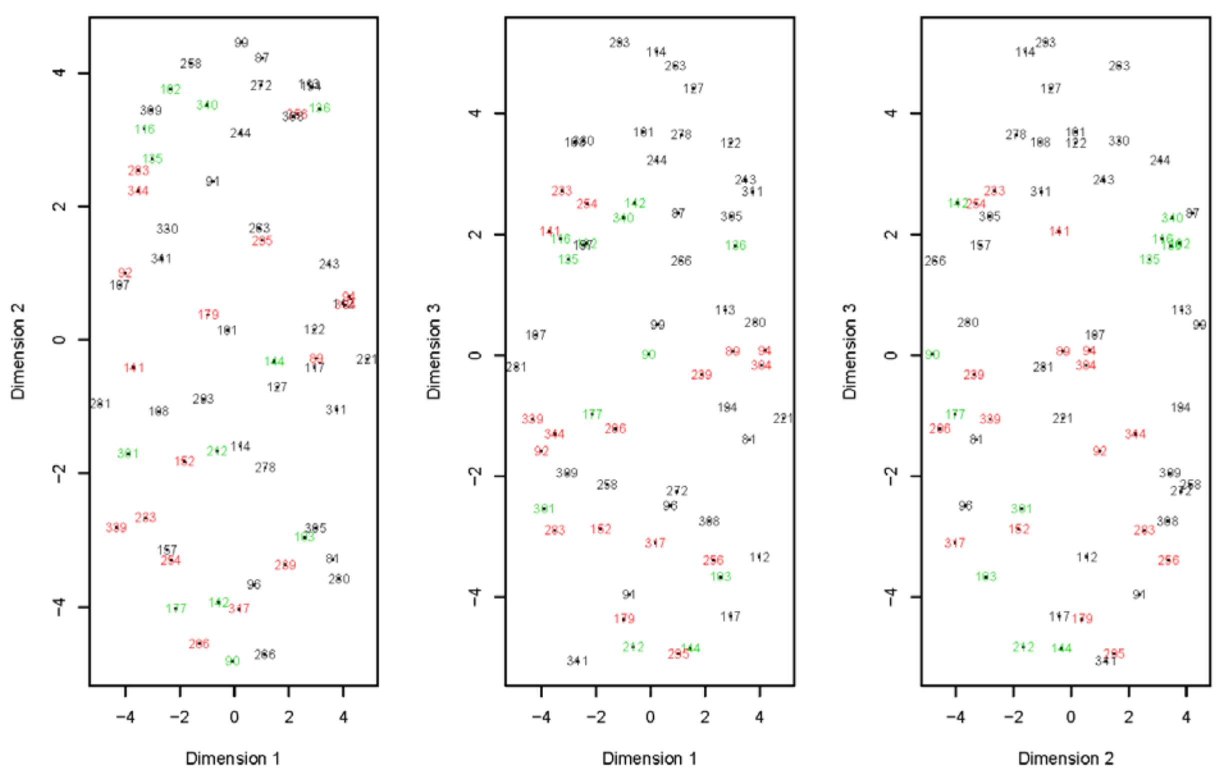
Ga−nFL, 1992−2000, CPUE, all specie



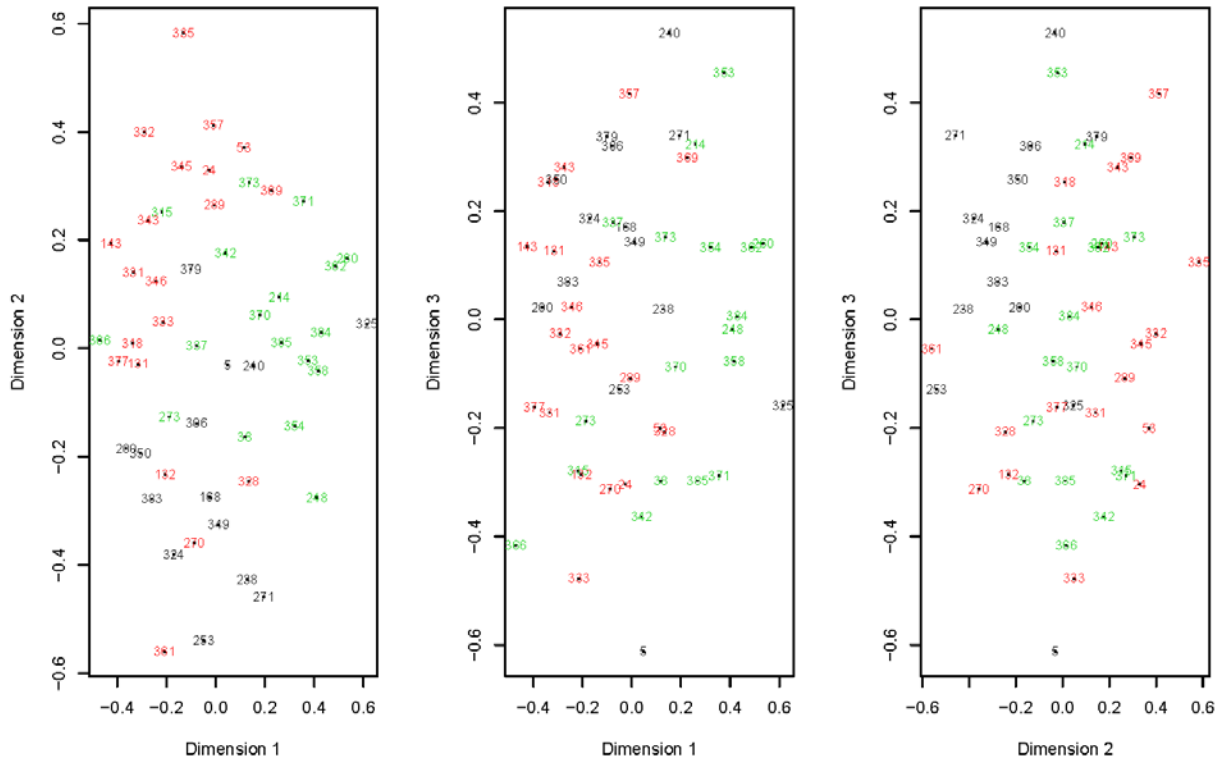
sFL, 1992−2000, CPUE, 25 species



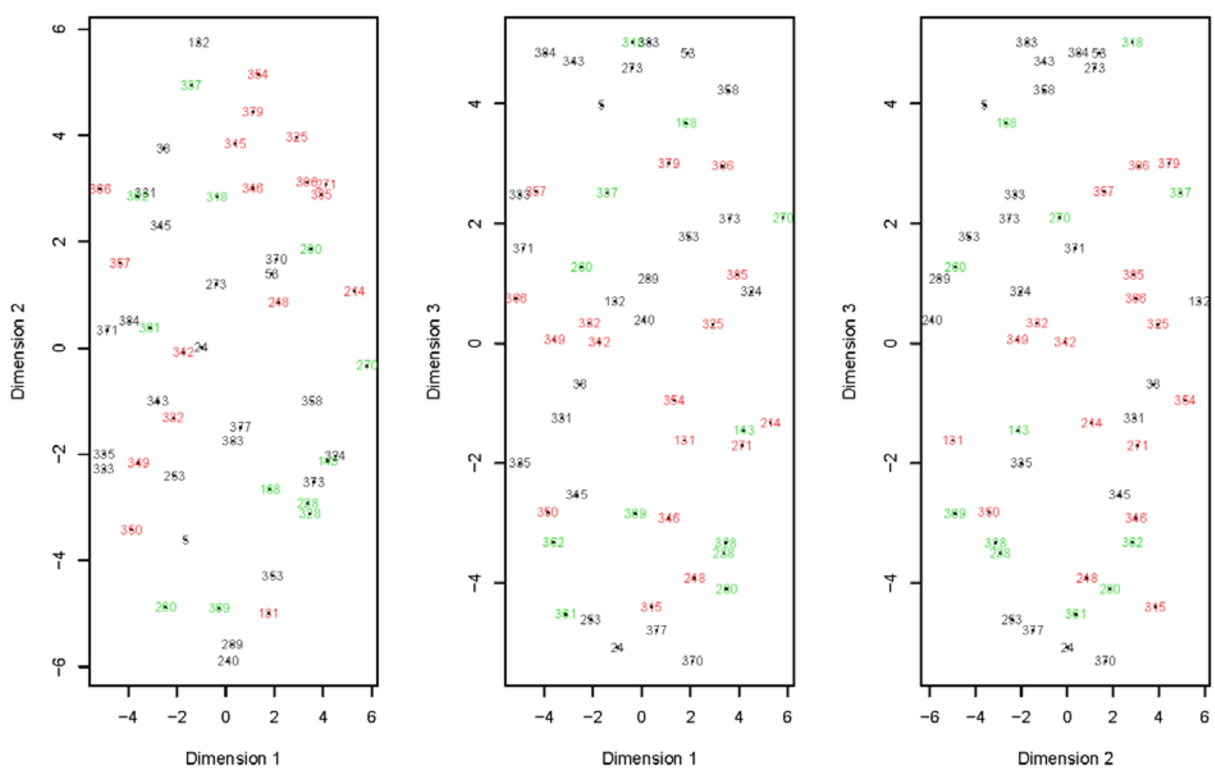
sFL, 1992−2000, CPUE, all species



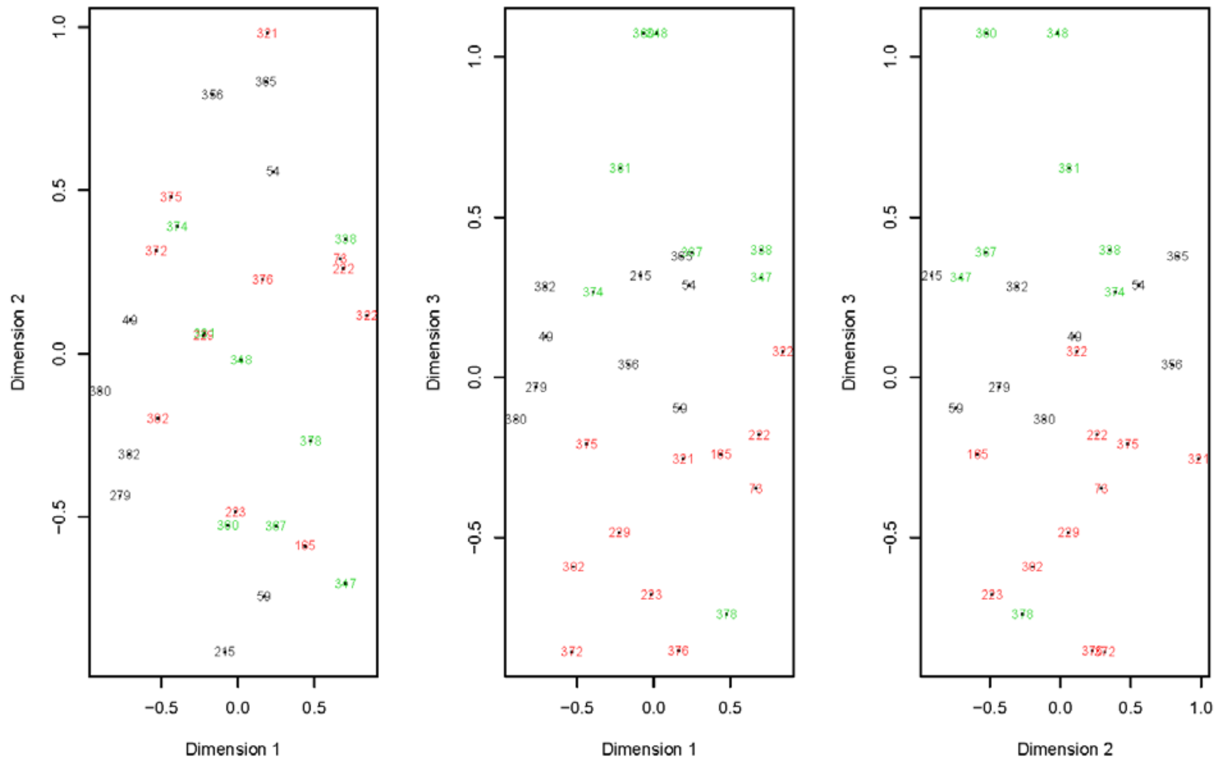
Carolinas, 2001−2009, CPUE, 25 specie



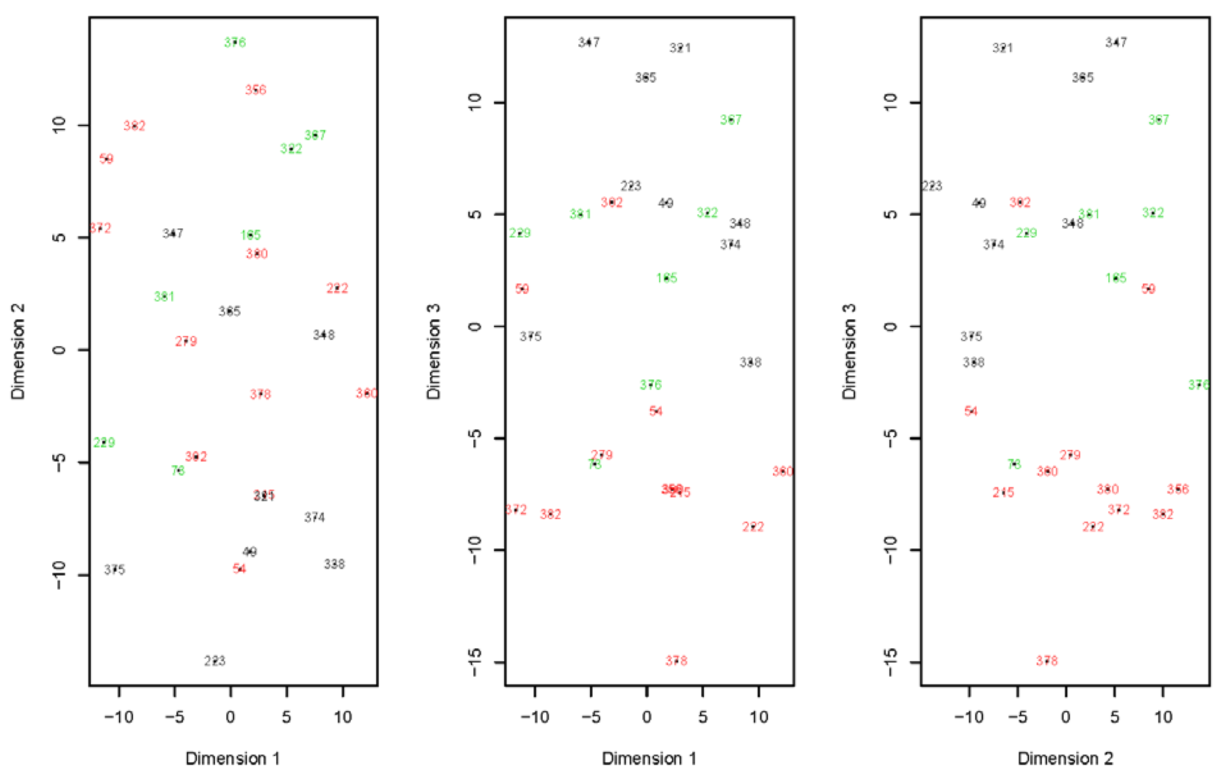
Carolinas, 2001−2009, CPUE, all specie



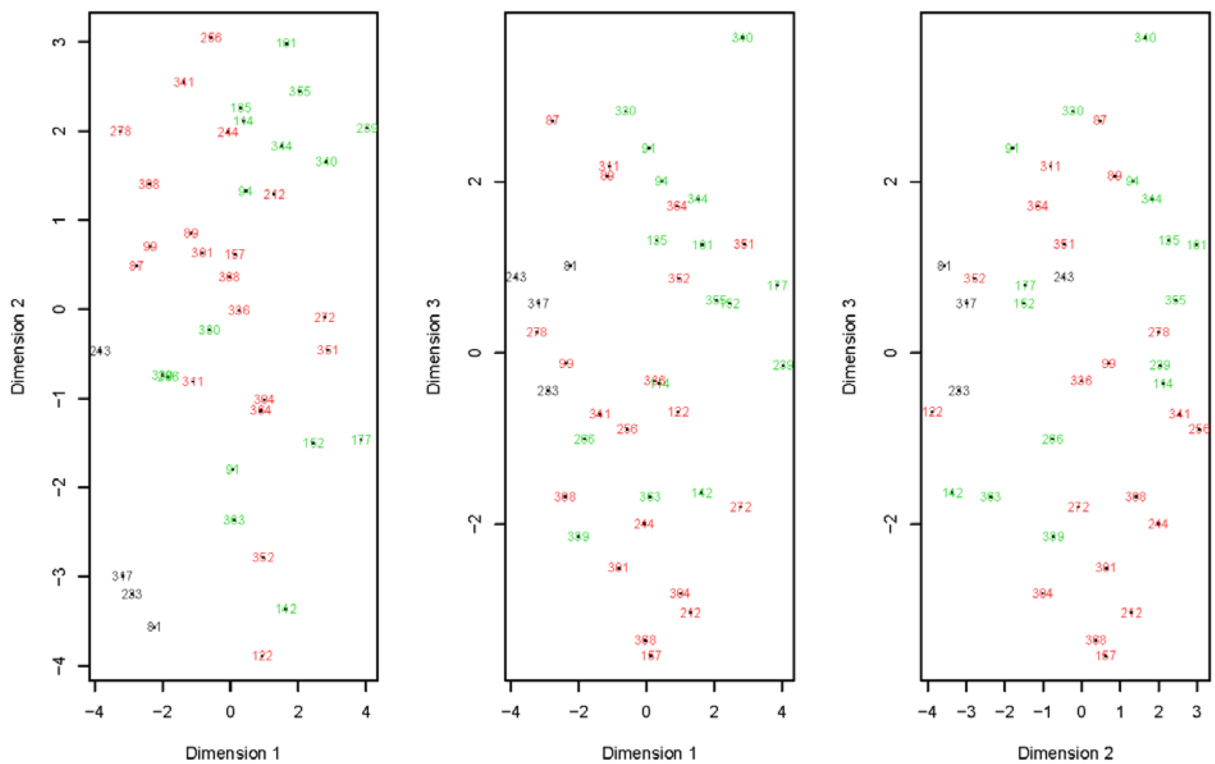
Ga−nFL, 2001−2009, CPUE, 25 specie



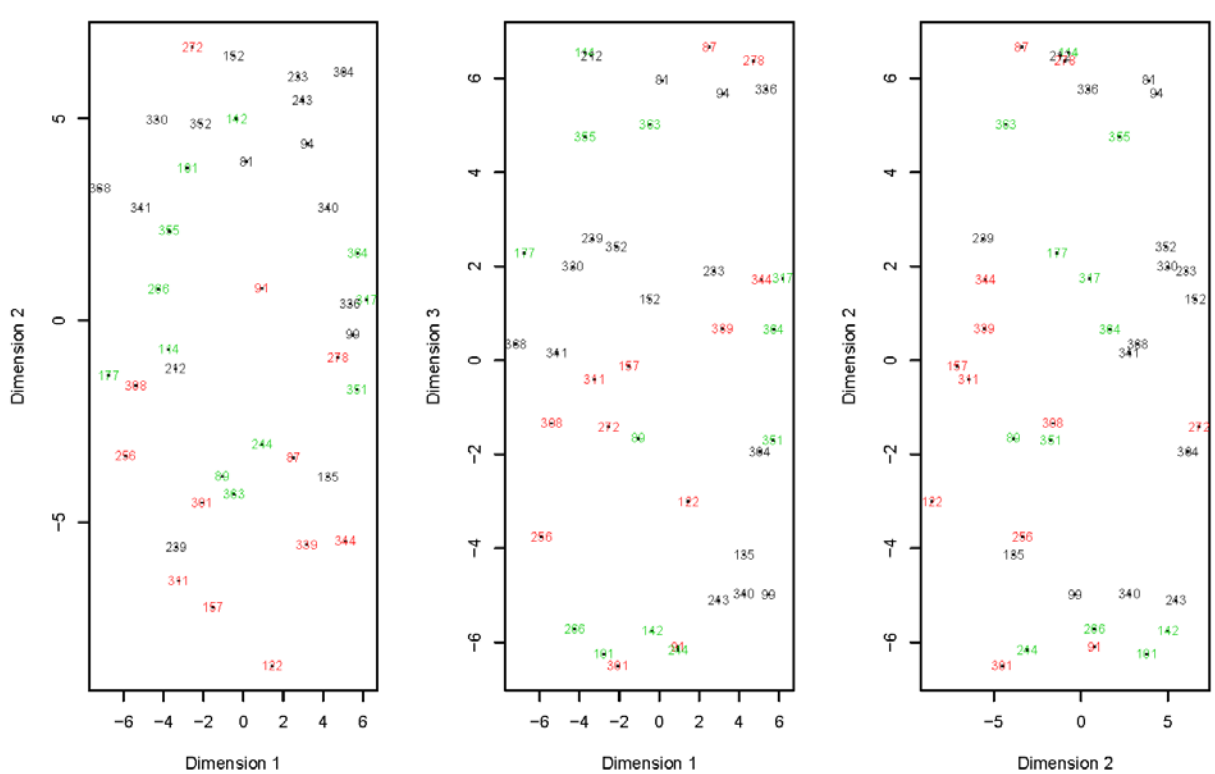
Ga−nFL, 2001−2009, CPUE, all specie



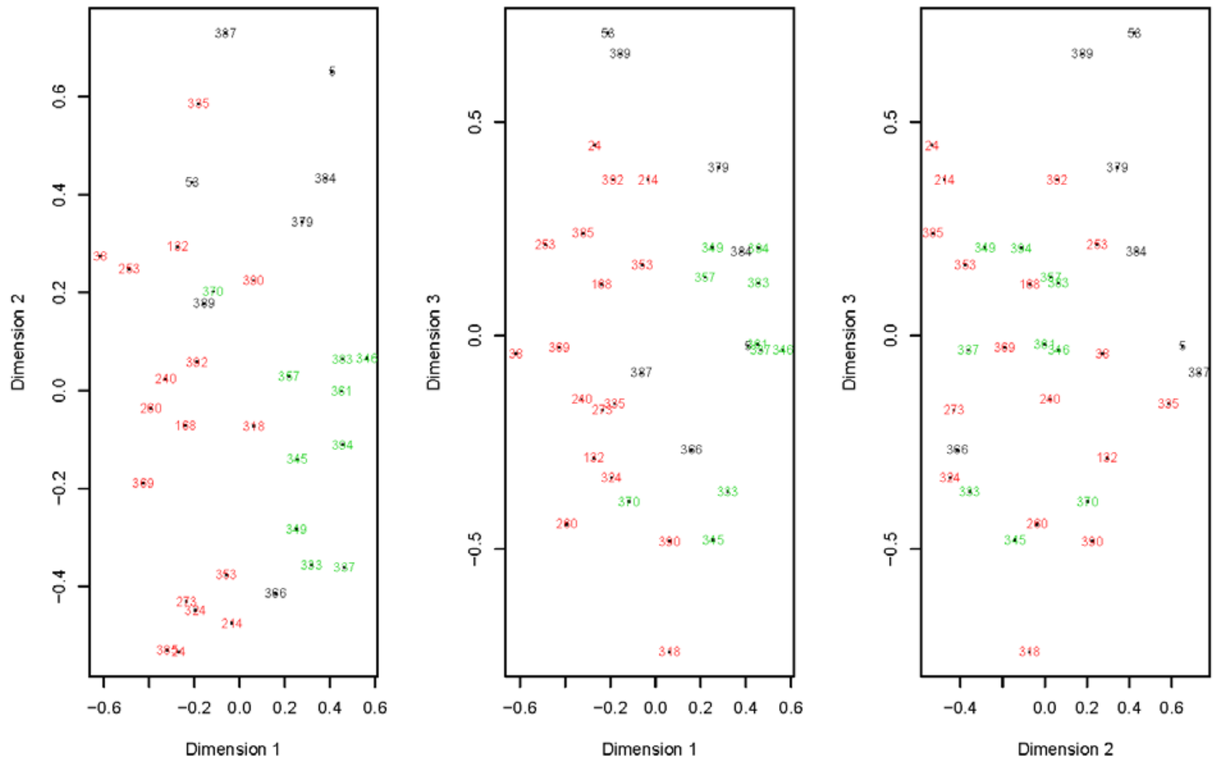
sFL, 2001−2009, CPUE, 25 species



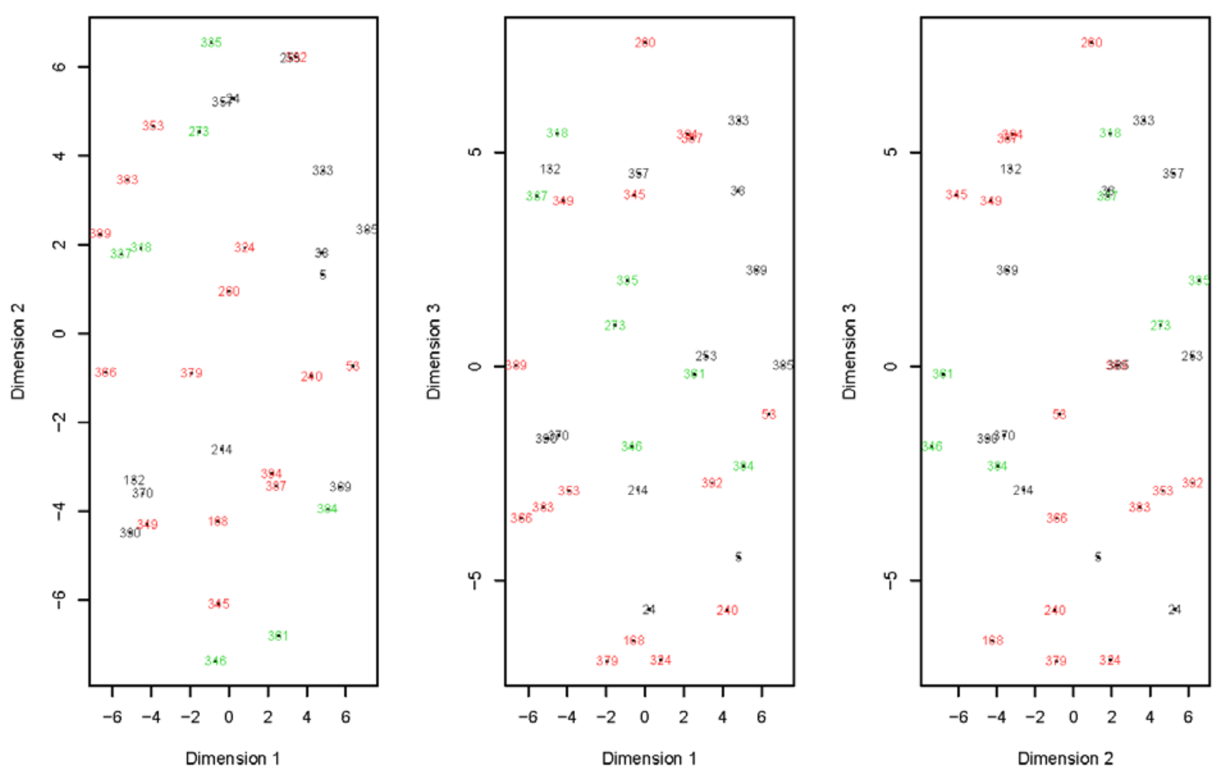
sFL, 2001−2009, CPUE, all species

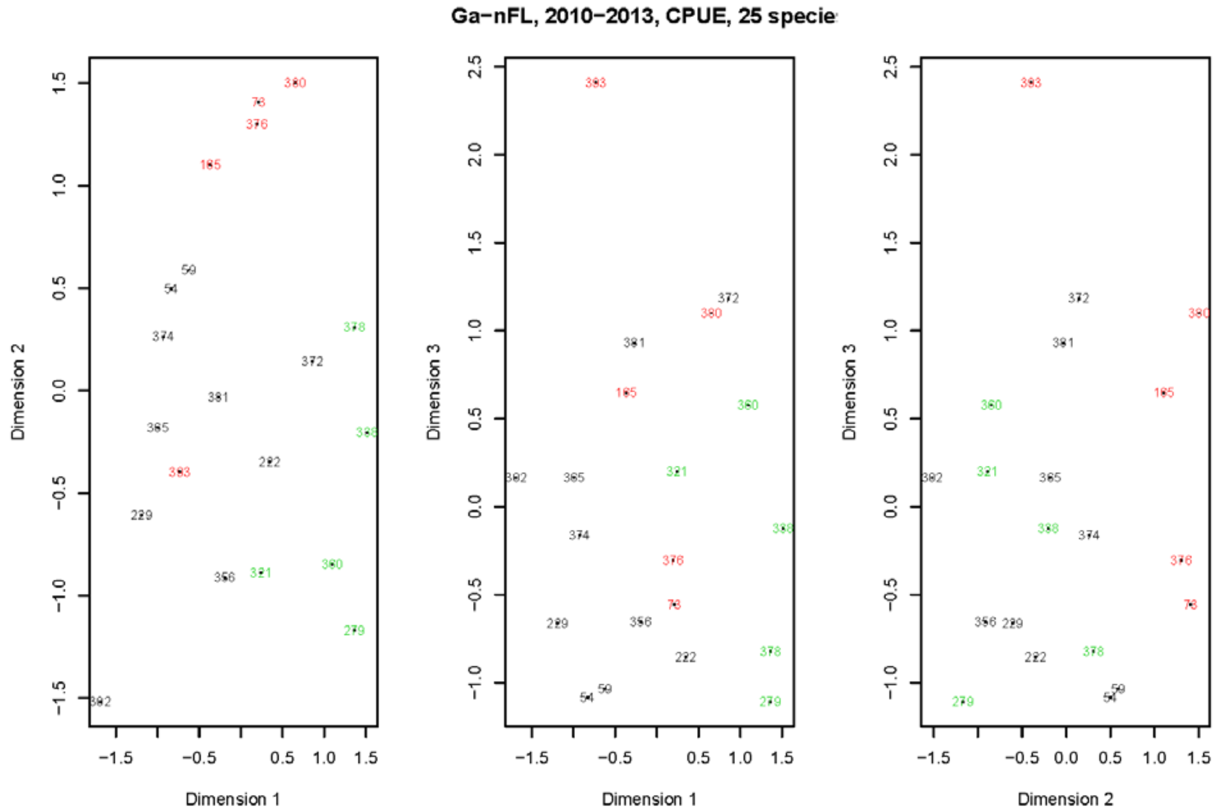


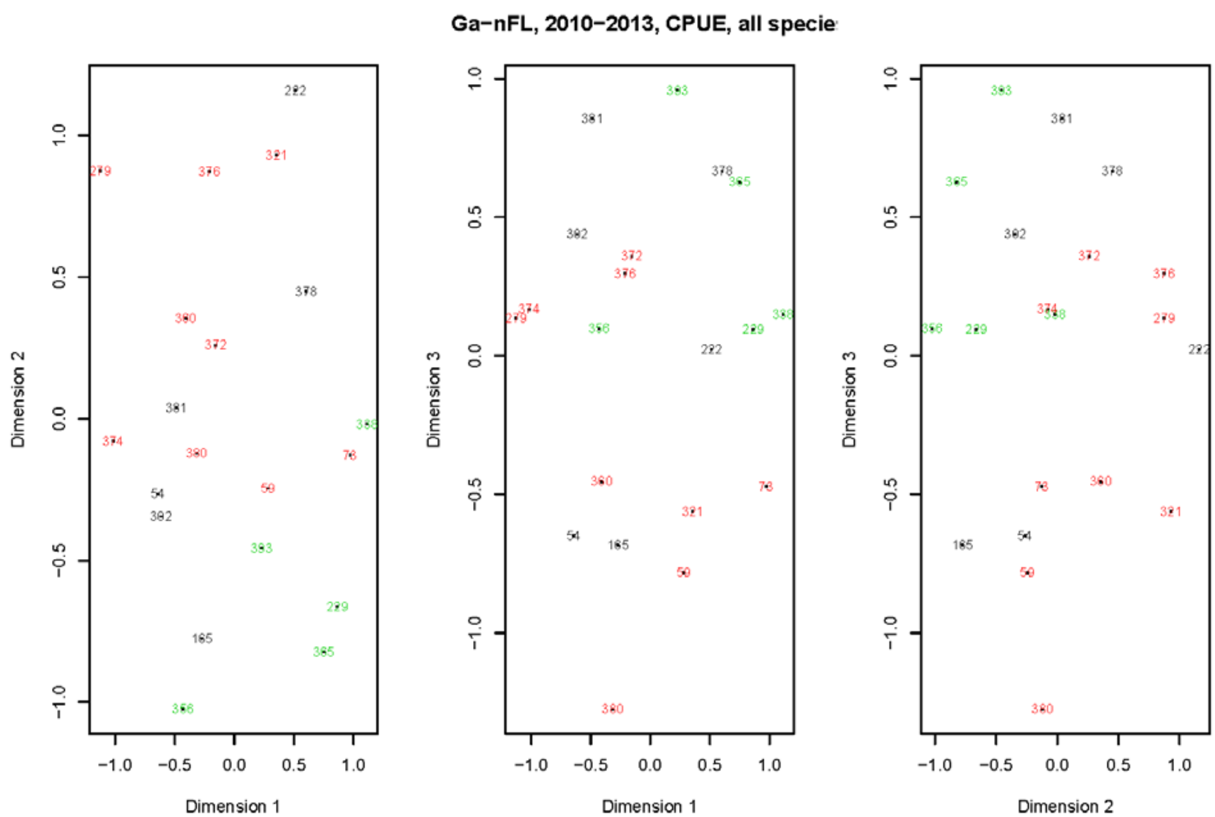
Carolinas, 2010−2013, CPUE, 25 specie



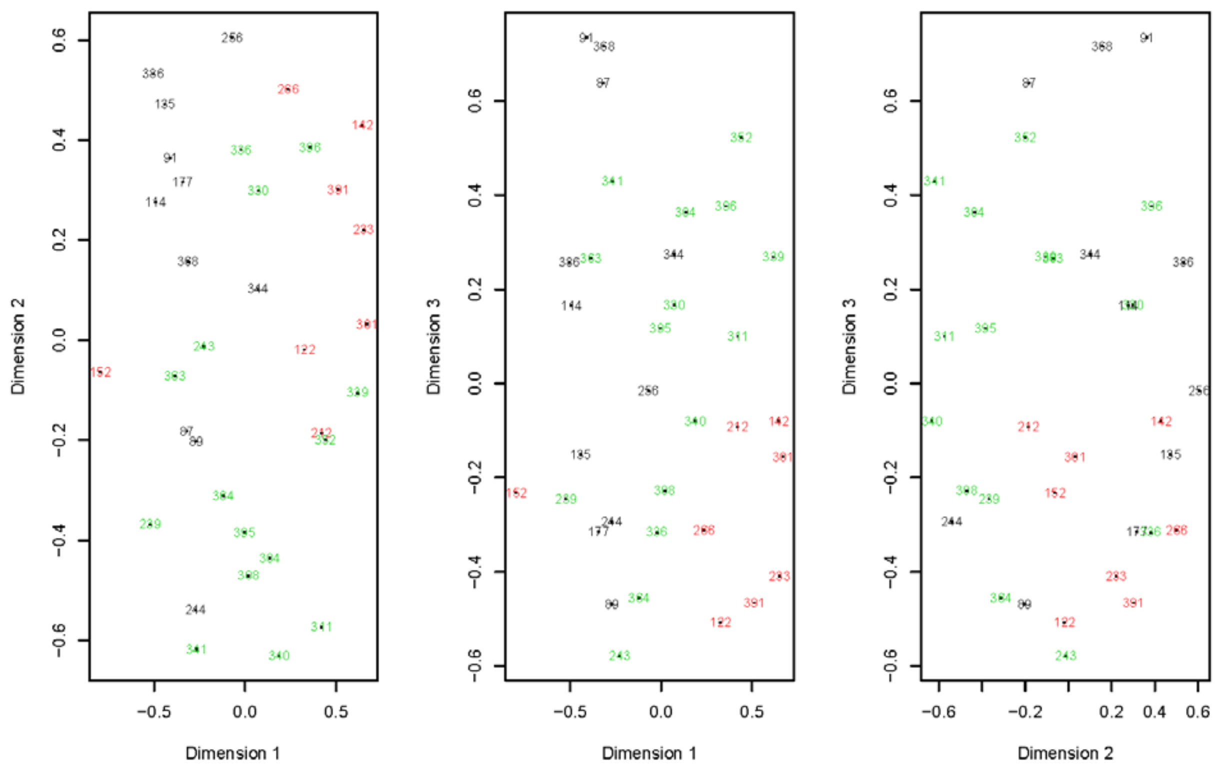
Carolinas, 2010−2013, CPUE, all specie



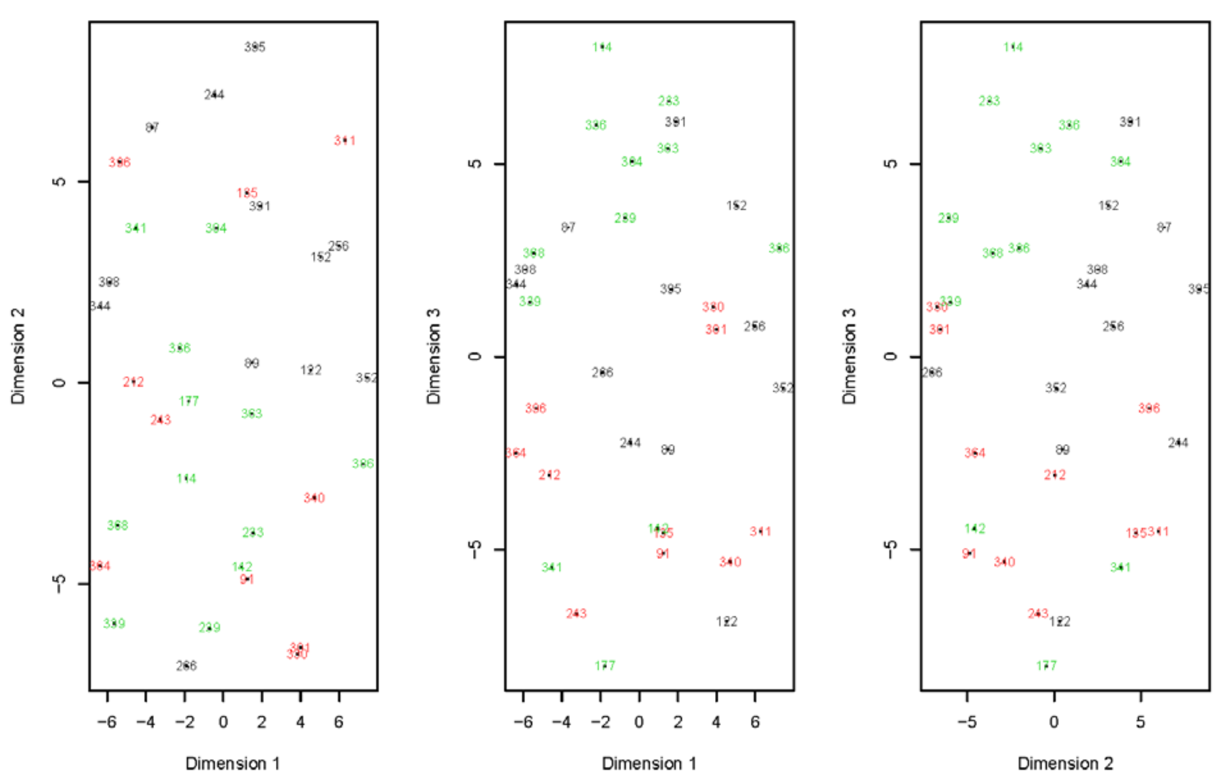

Ga−nFL, 2010−2013, CPUE, 25 specie
Dimension 1
Dimension 2
Dimension 1
Dimension 3
Dimension 2
Dimension 3


Ga−nFL, 2010−2013, CPUE, all specie
Dimension 1
Dimension 2
Dimension 1
Dimension 3
Dimension 2
Dimension 3

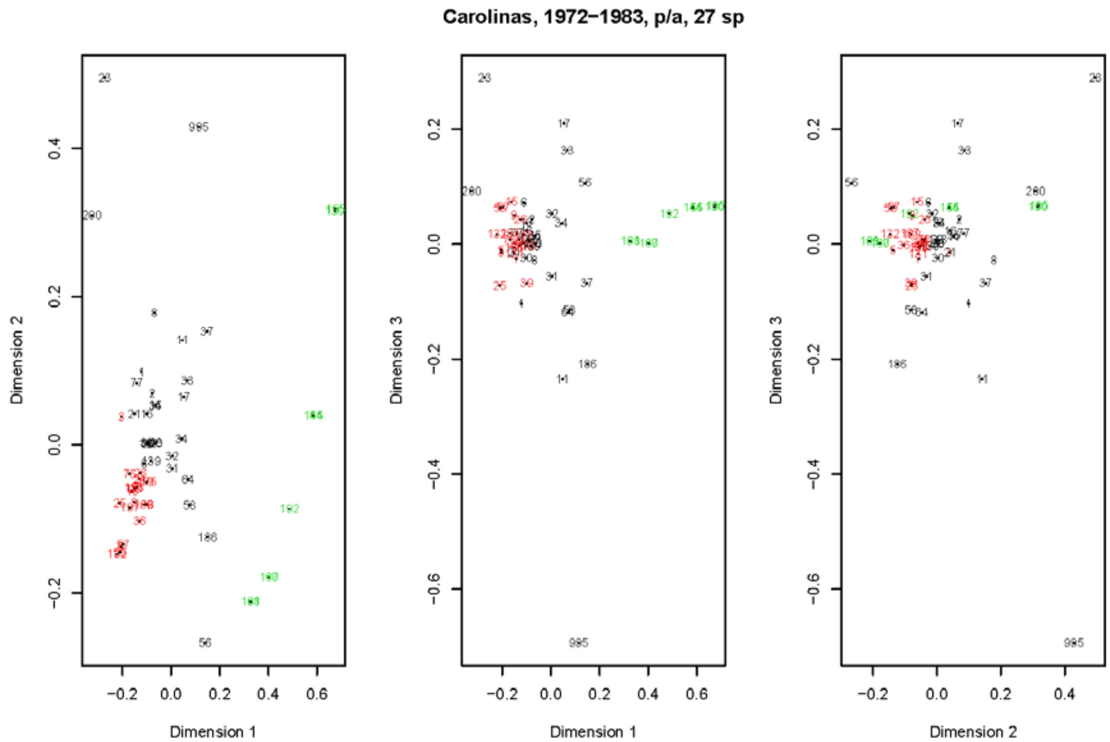
sFL, 2010–2013, CPUE, 25 species

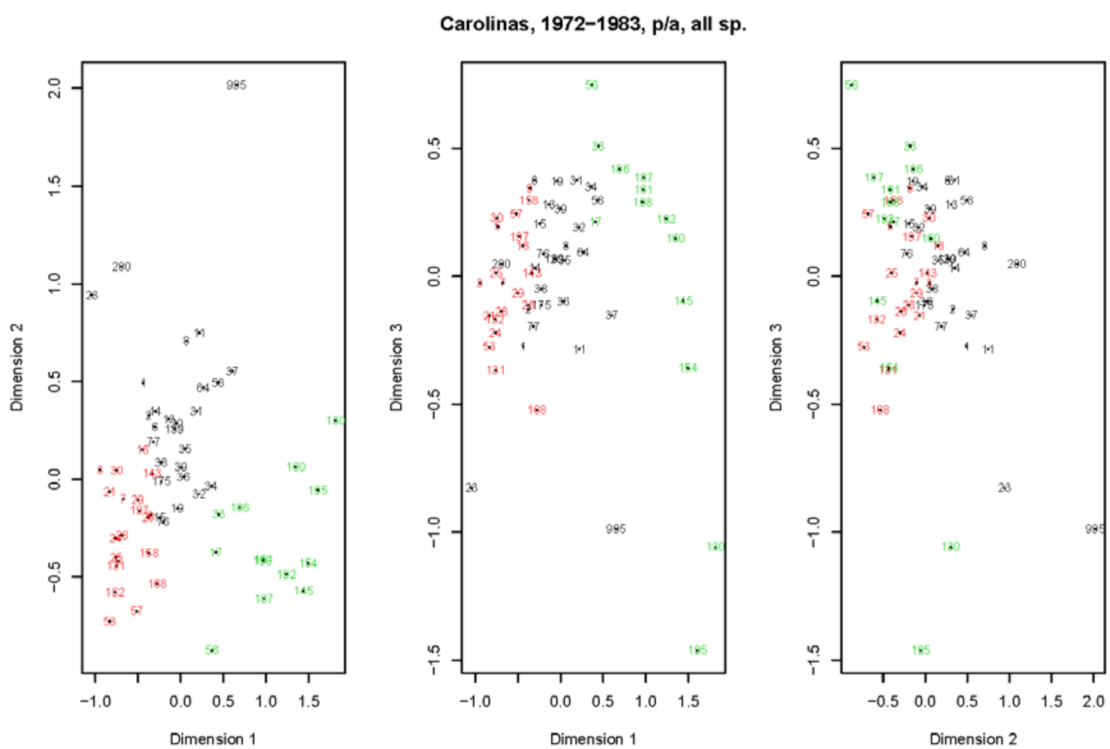


sFL, 2010–2013, CPUE, all species

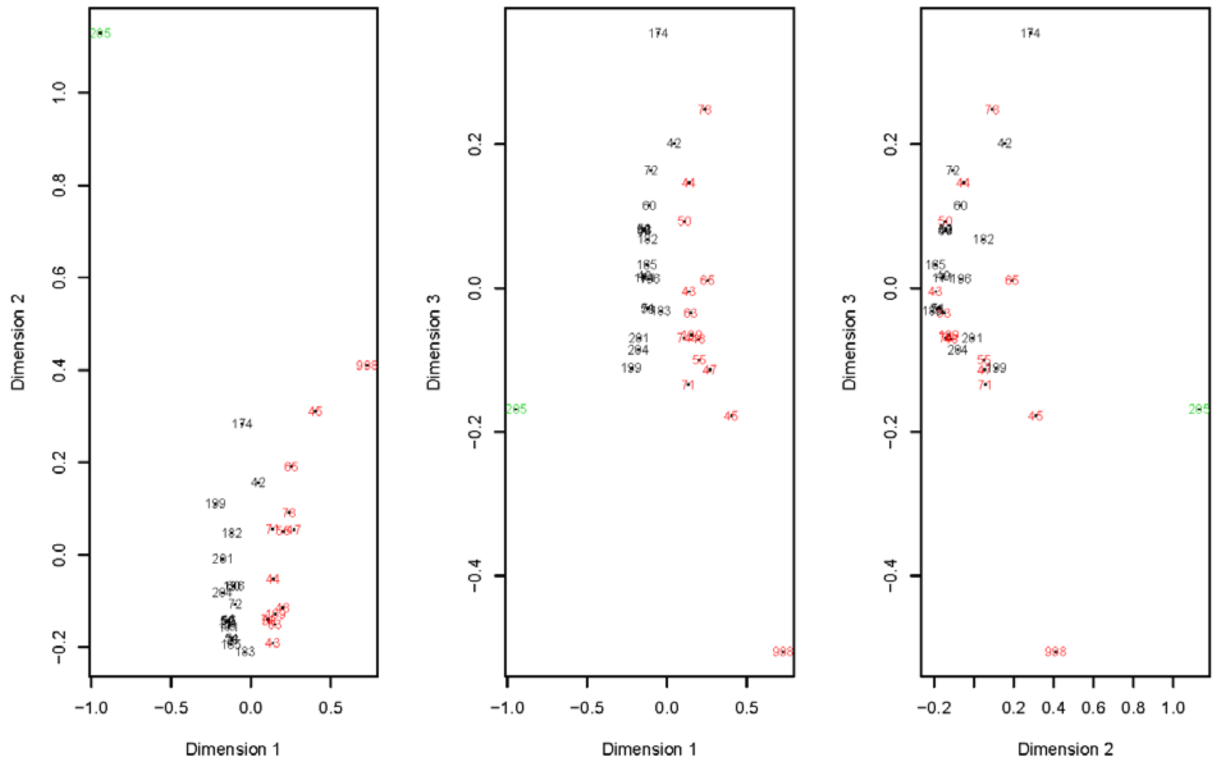


Appendix 9. Non metric multidimensional scaling (NMDS) results for time-area blocks from analysis using presence/absence (p/a) of the top 27 species and all species. The three colors represent the default number of medoids (clusters) used prior to final NMDS analysis (k=3).

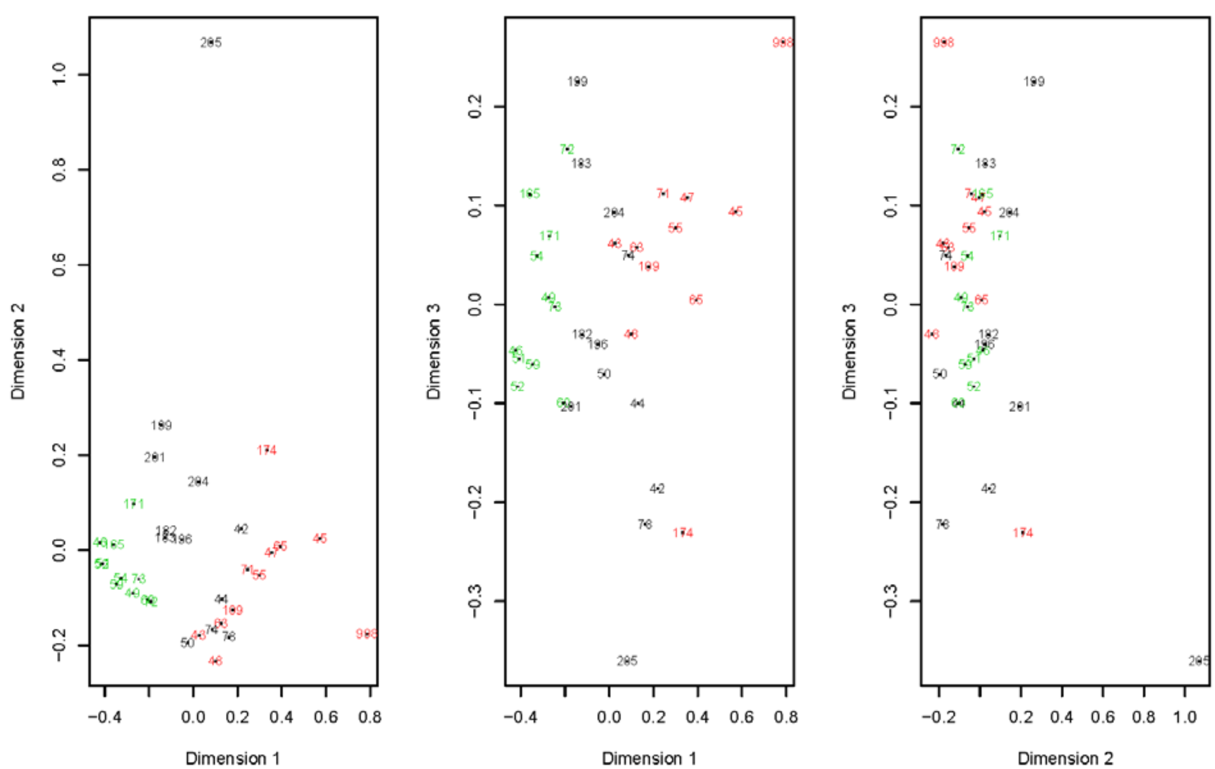




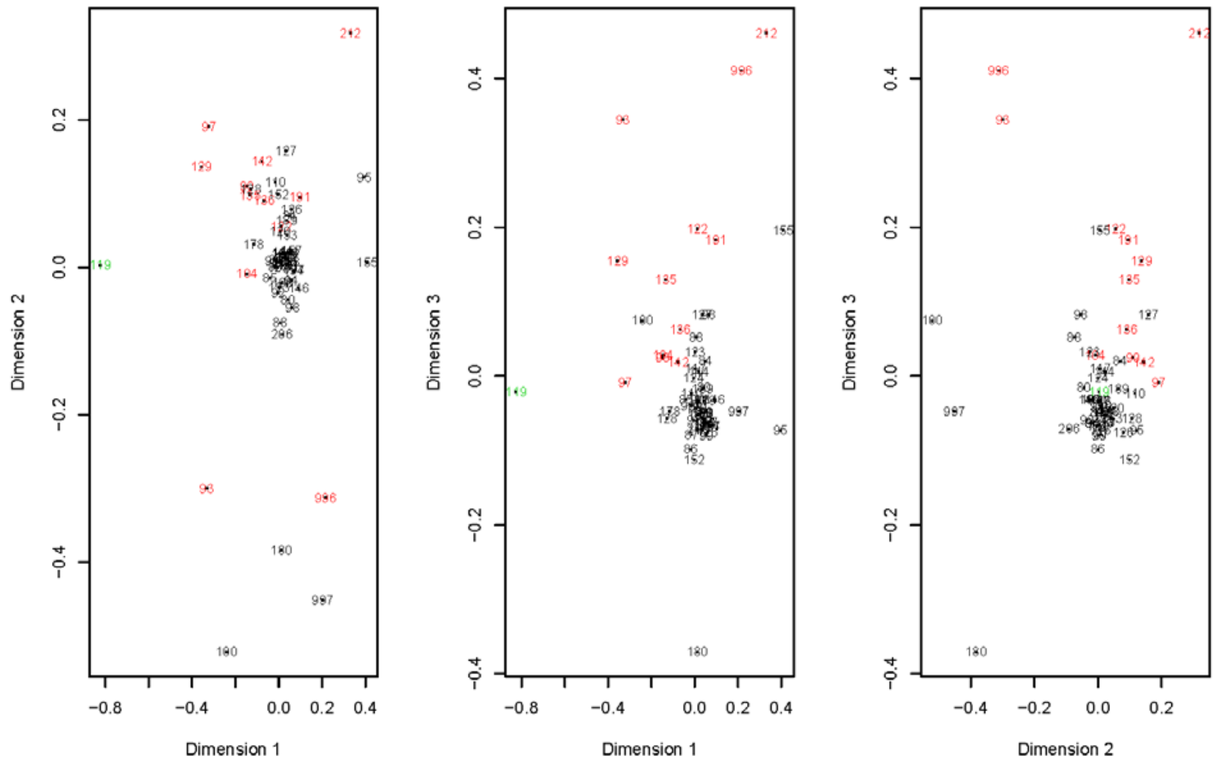
Ga−nFL, 1972−1983, p/a, 27 sp.



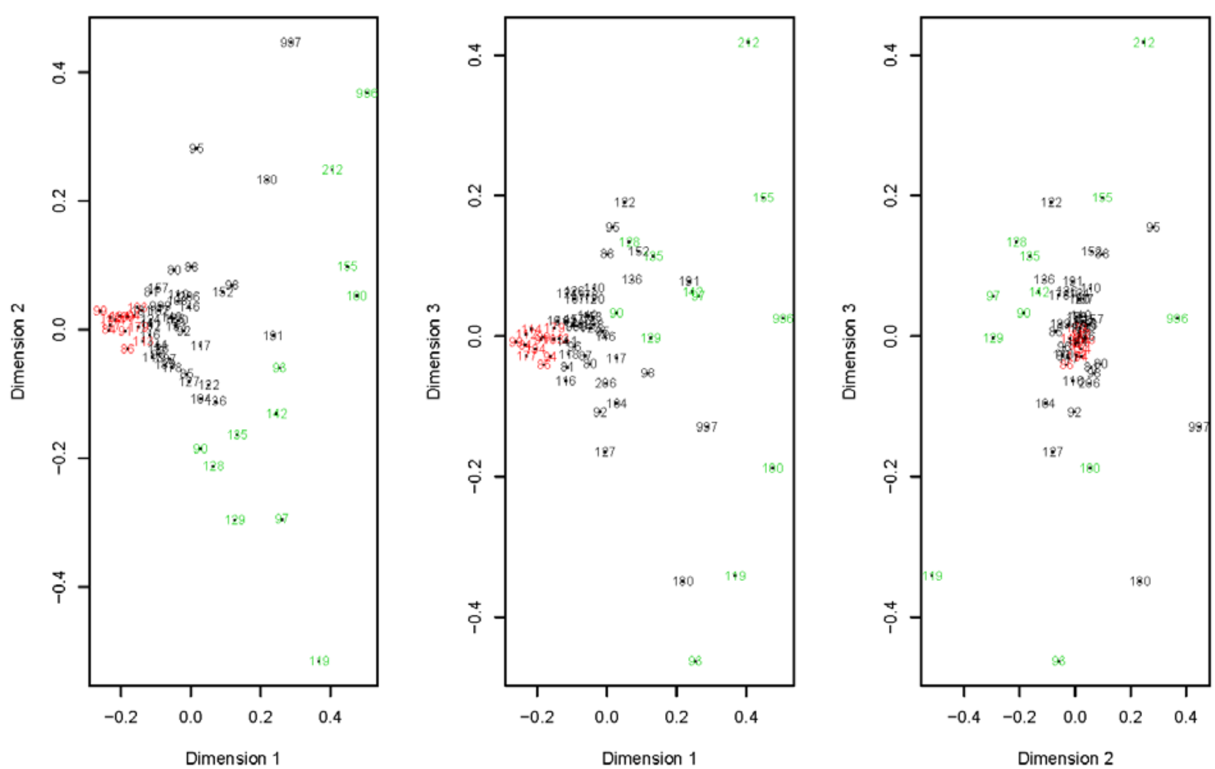
Ga−nFL, 1972−1983, p/a, all sp.



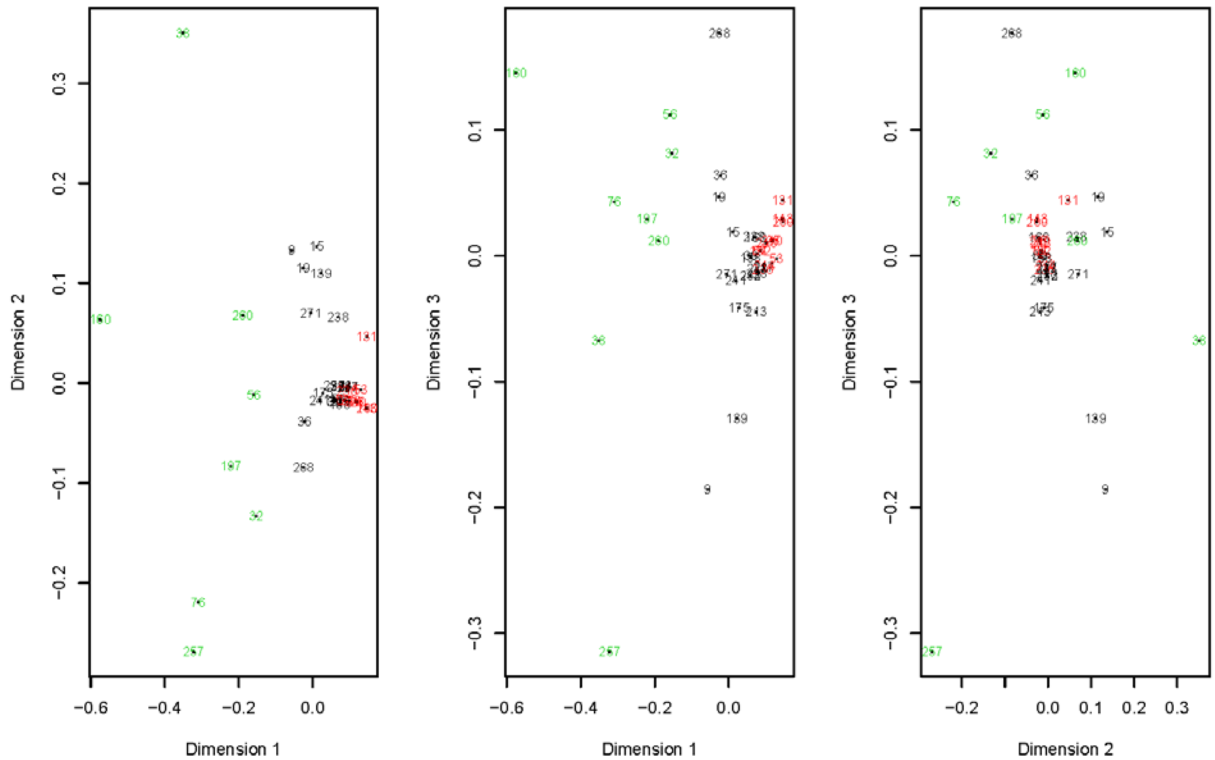
sFL, 1972−1983, p/a, 27 sp.



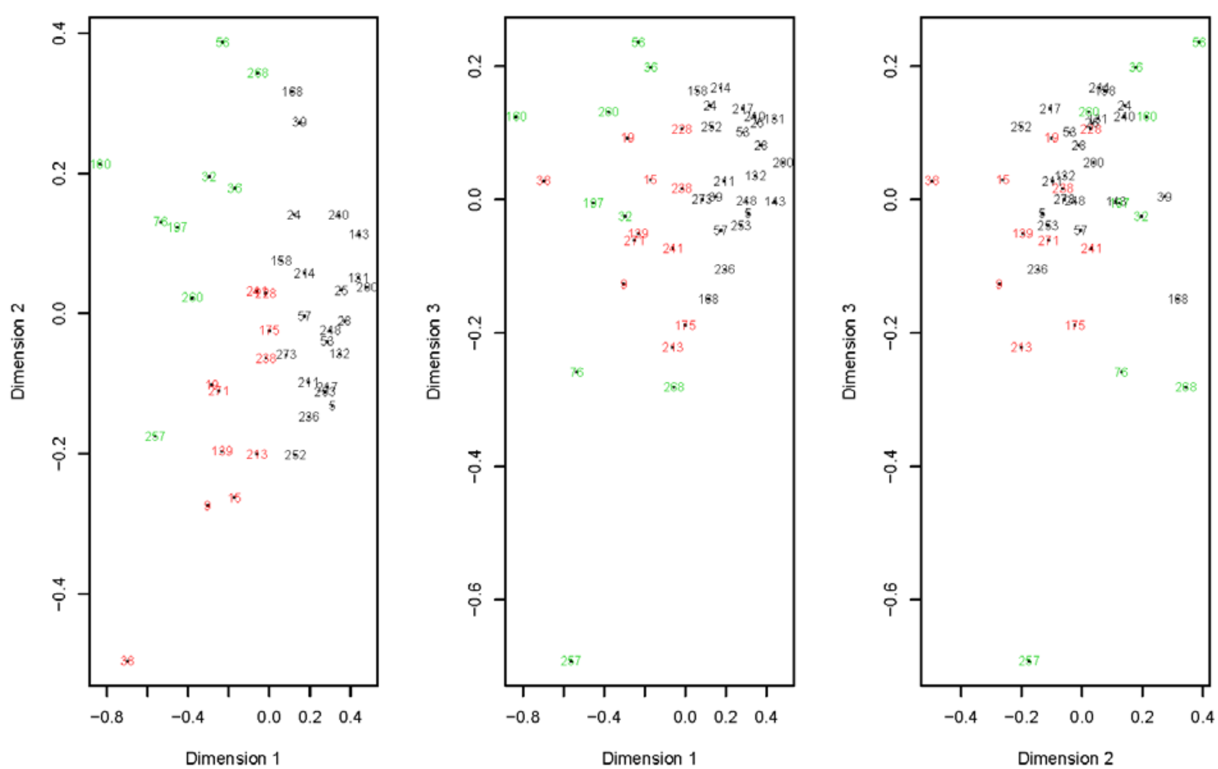
sFL, 1972−1983, p/a, all sp.



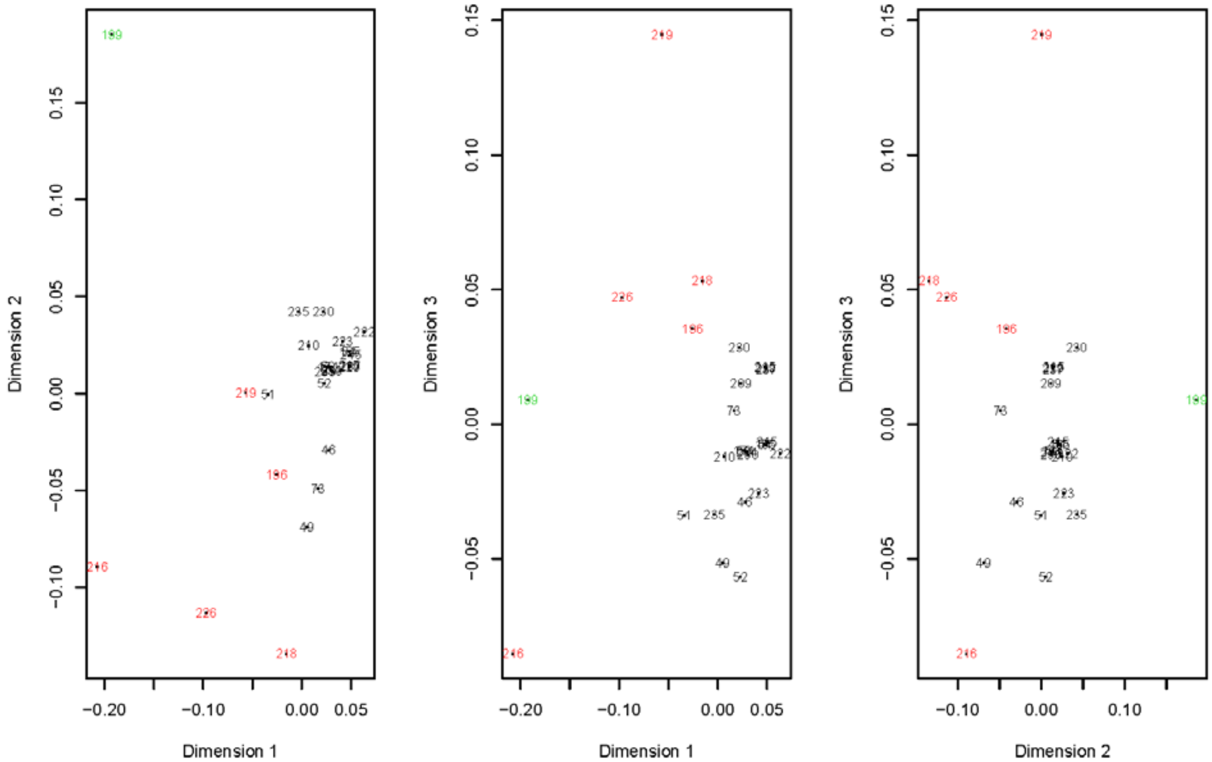
Carolinas, 1984−1991, p/a, 27 sp.



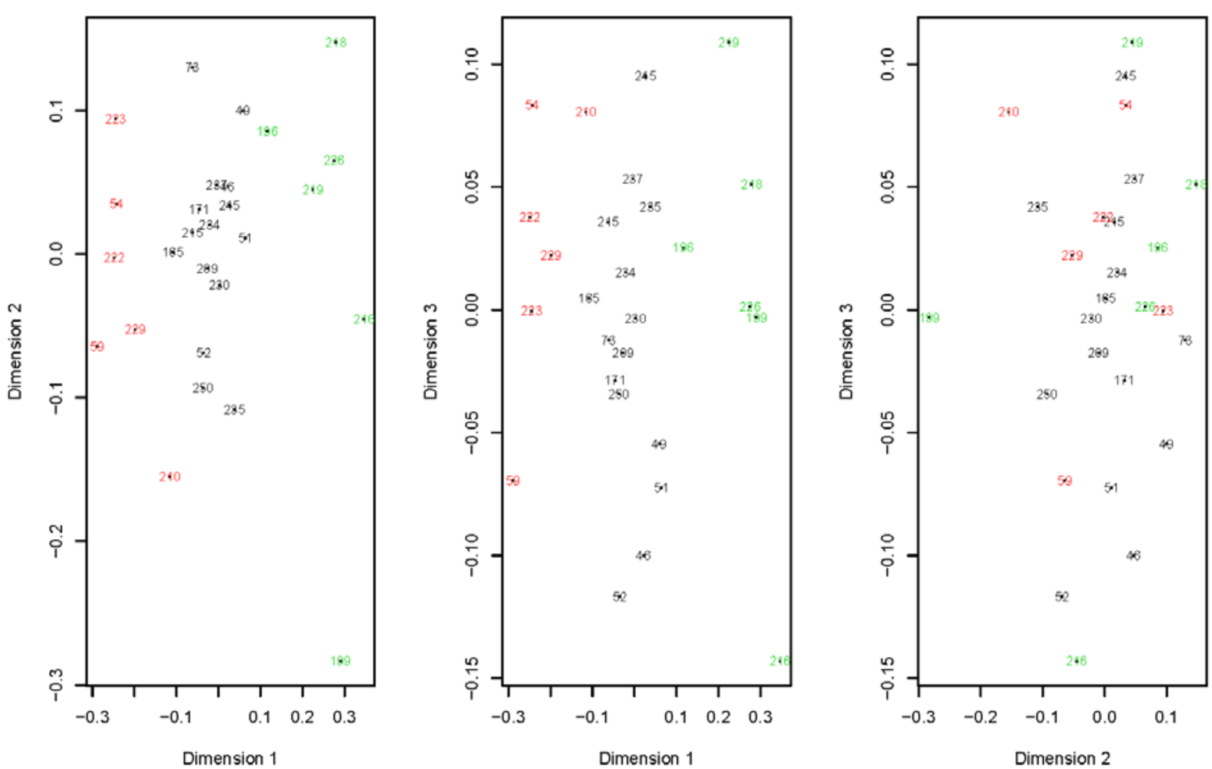
Carolinas, 1984−1991, p/a, all sp.



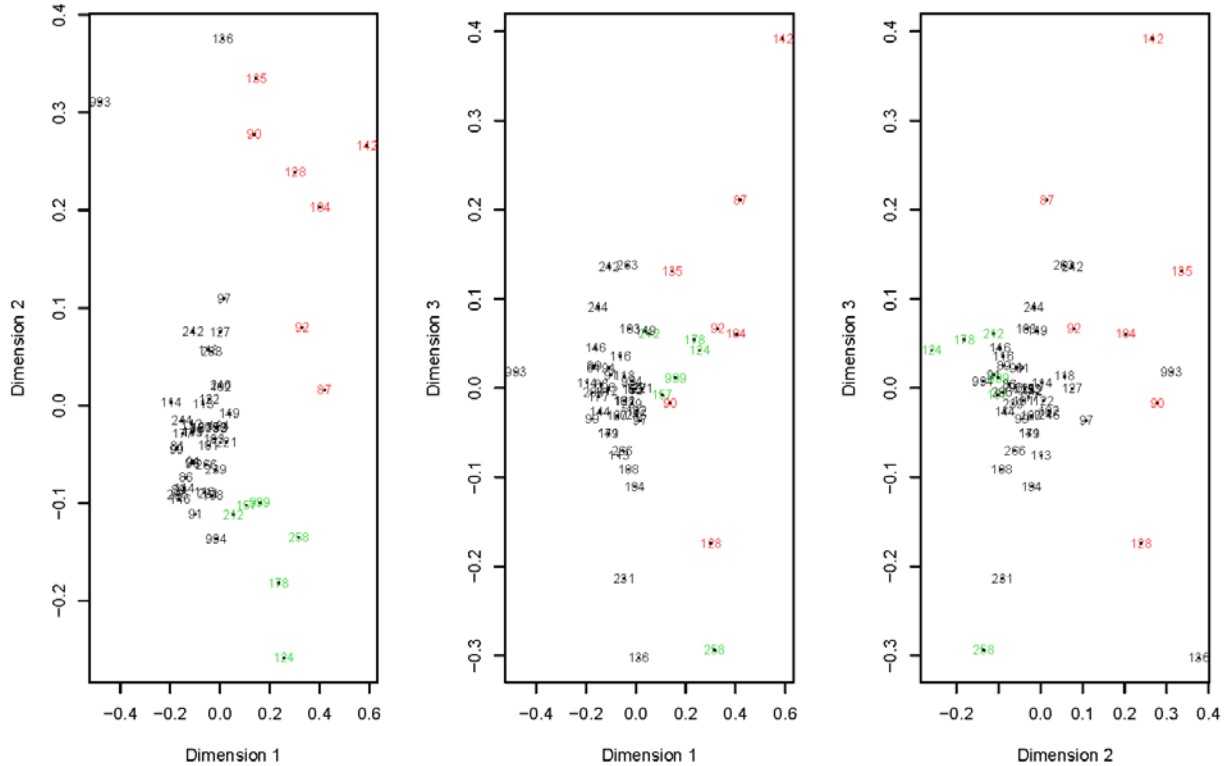
Ga−nFL, 1984−1991, p/a, 27 sp.



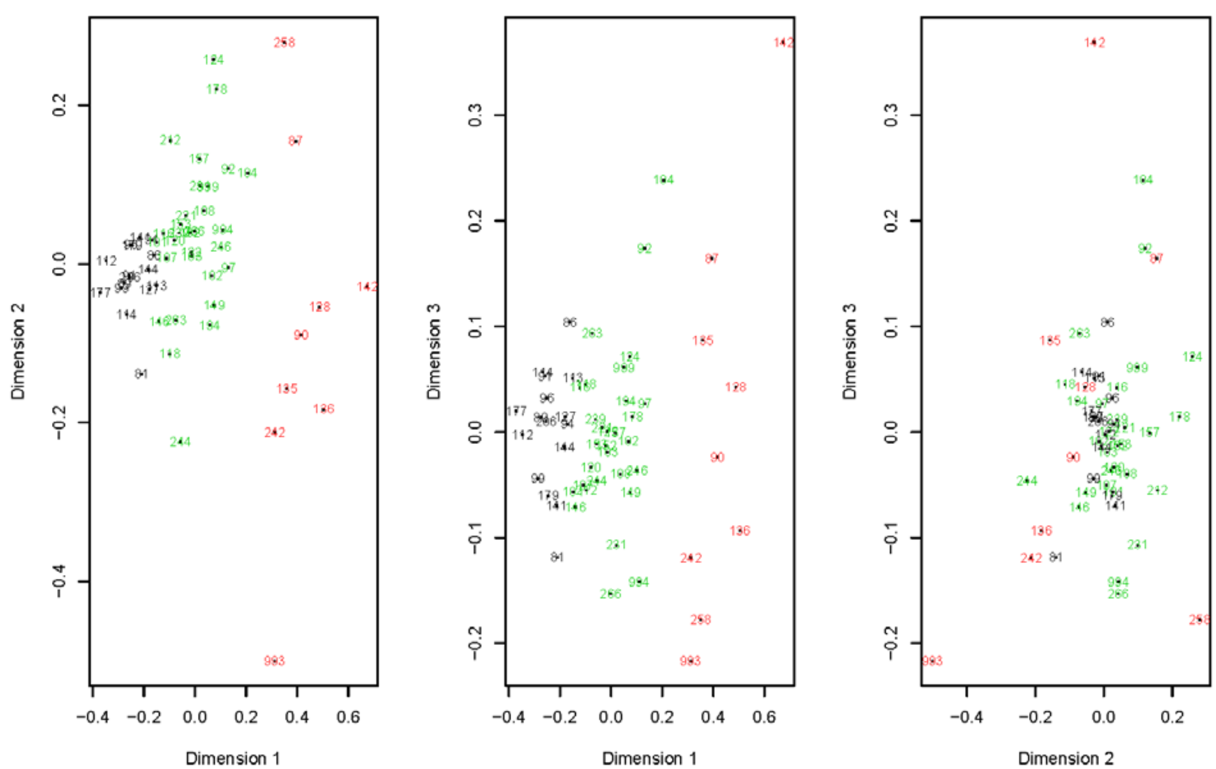
Ga−nFL, 1984−1991, p/a, all sp.



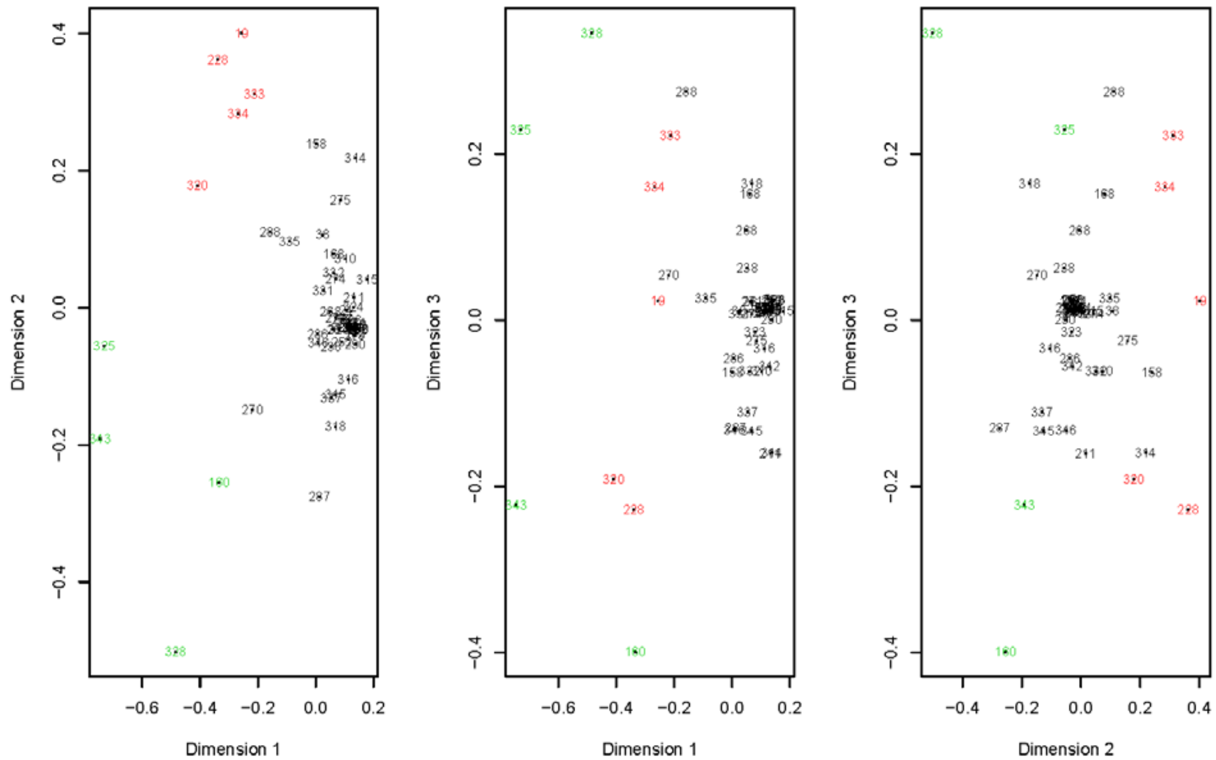
sFL, 1984−1991, p/a, 27 sp.



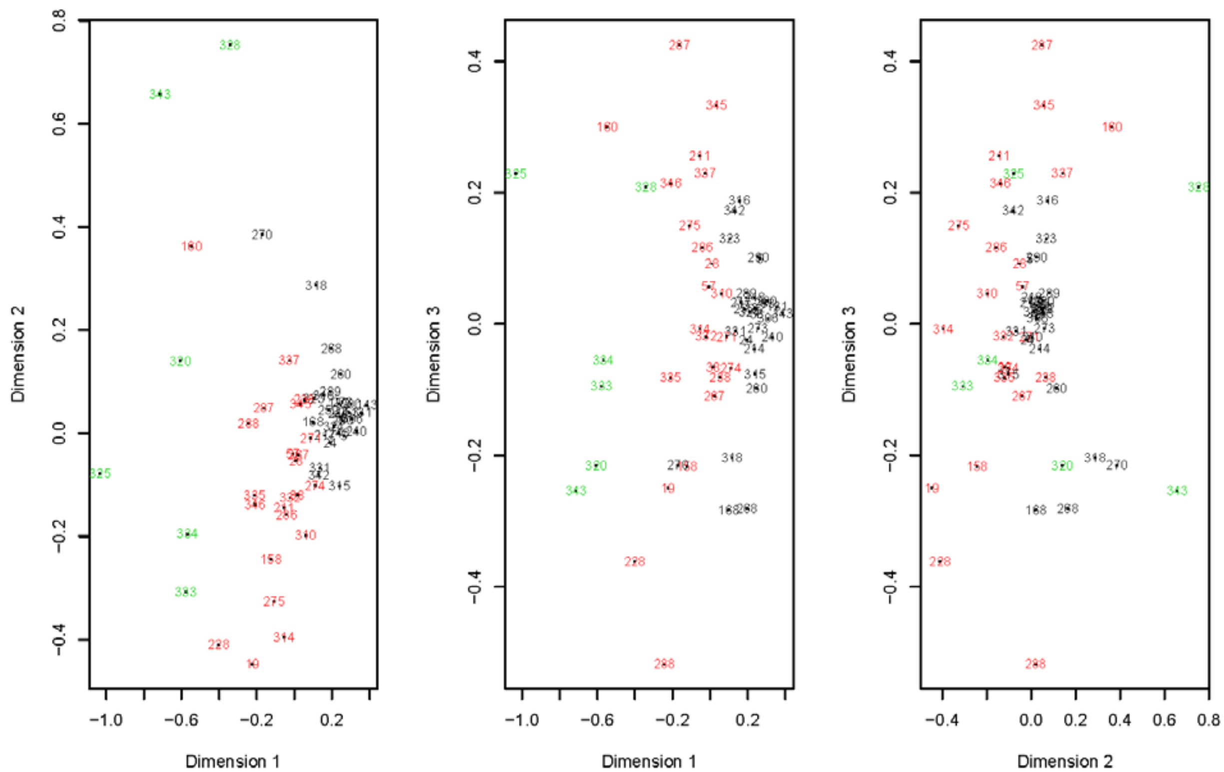
sFL, 1984−1991, p/a, all sp



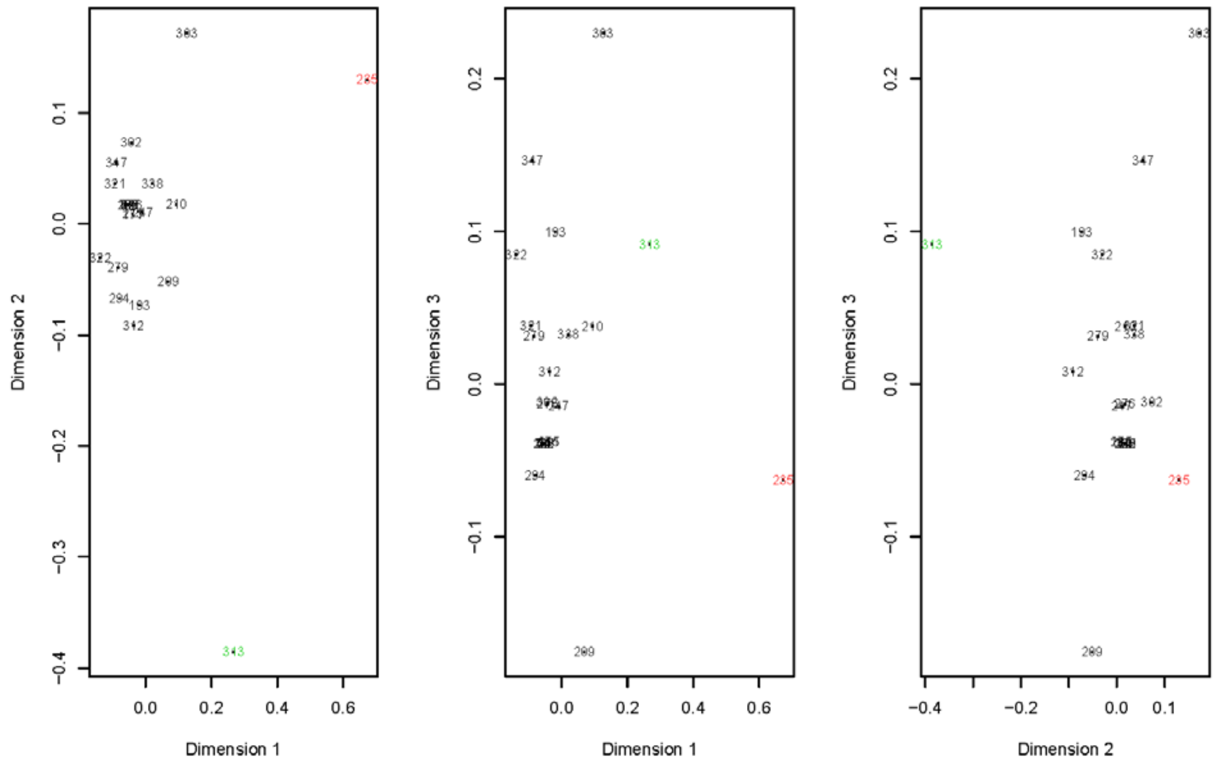
Carolinas, 1992−2000, p/a, 27 sp



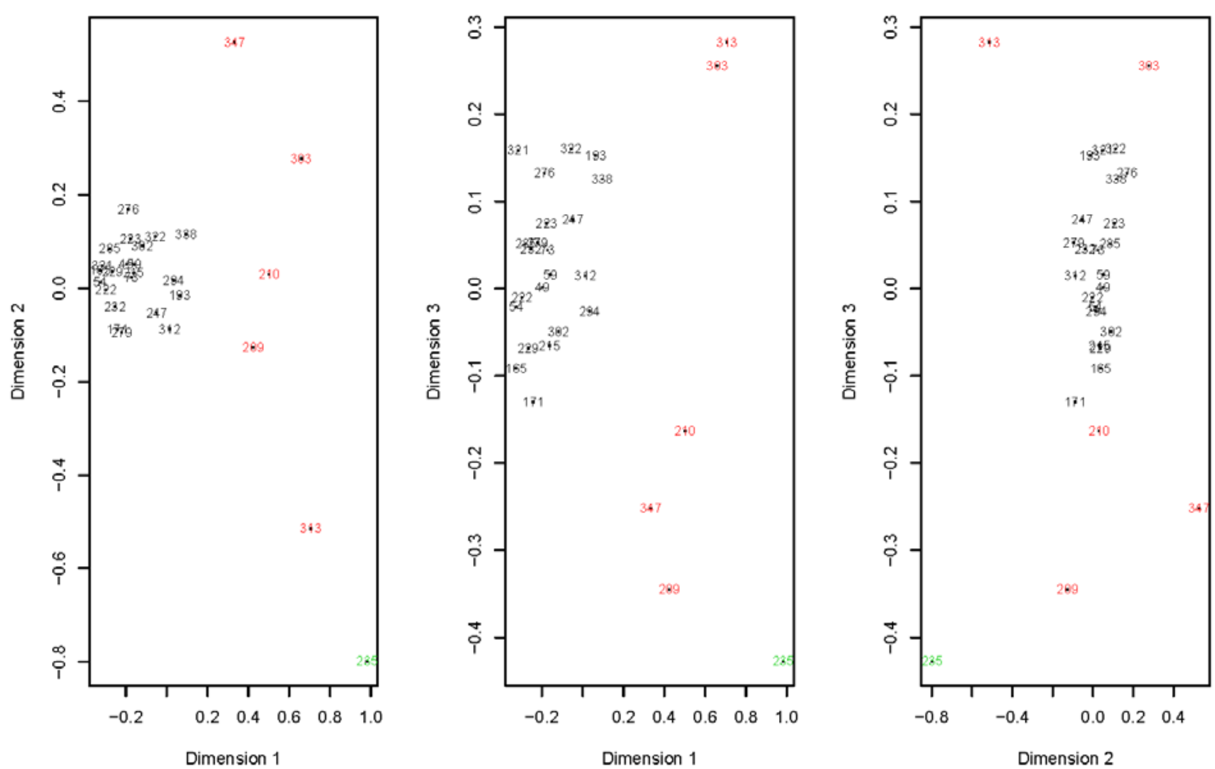
Carolinas, 1992−2000, p/a, all sp



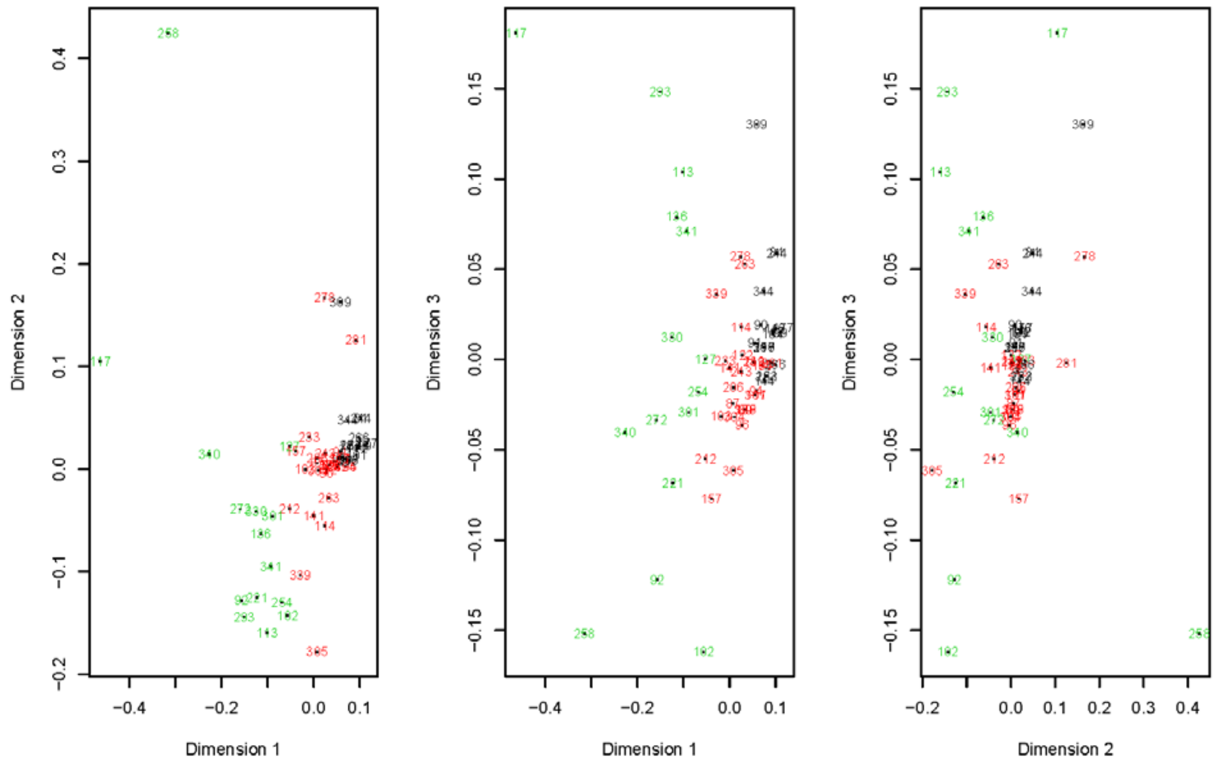
Ga−nFL, 1992−2000, p/a, 27 sp



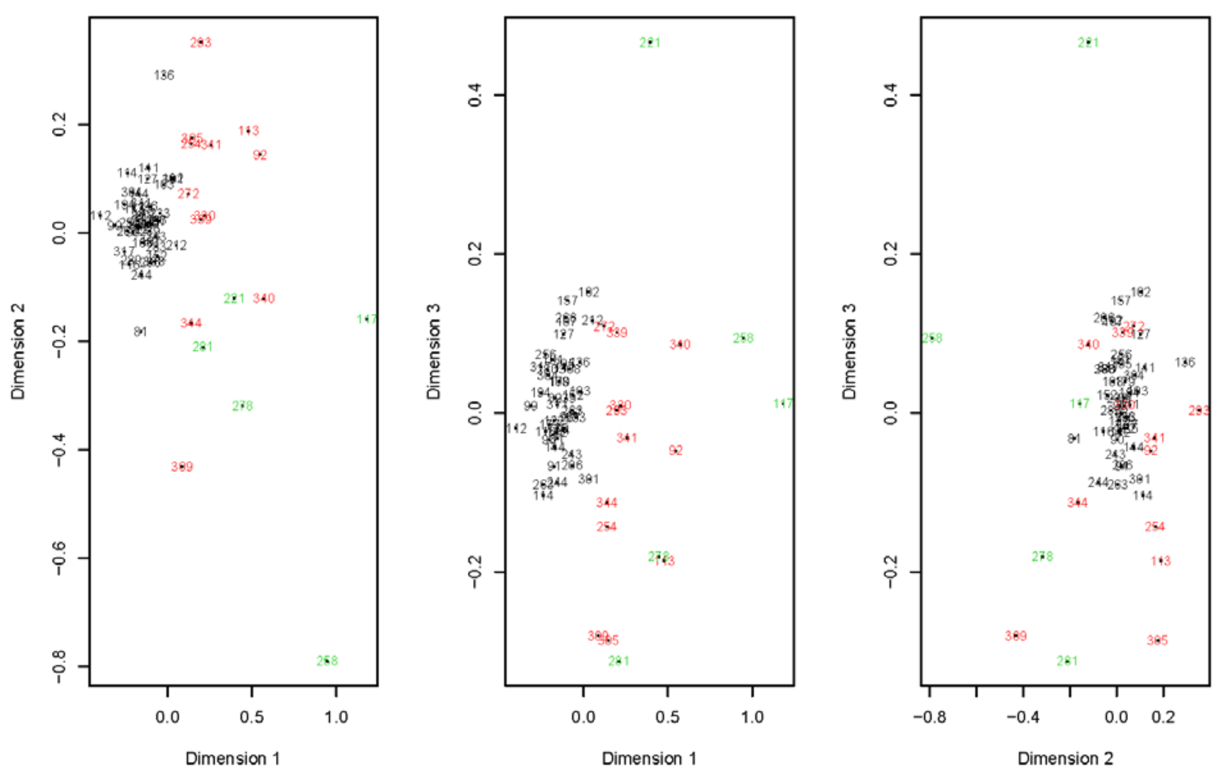
Ga−nFL, 1992−2000, p/a, all sp



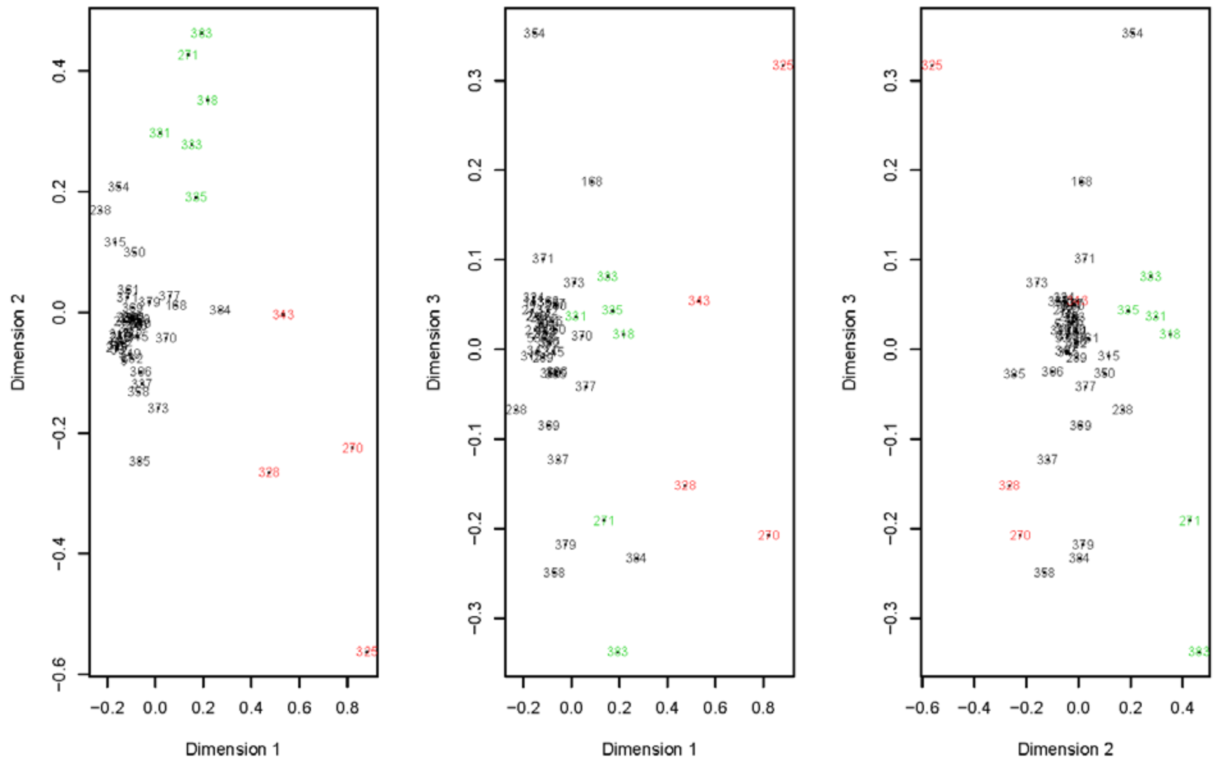
sFL, 1992−2000, p/a, 27 sp



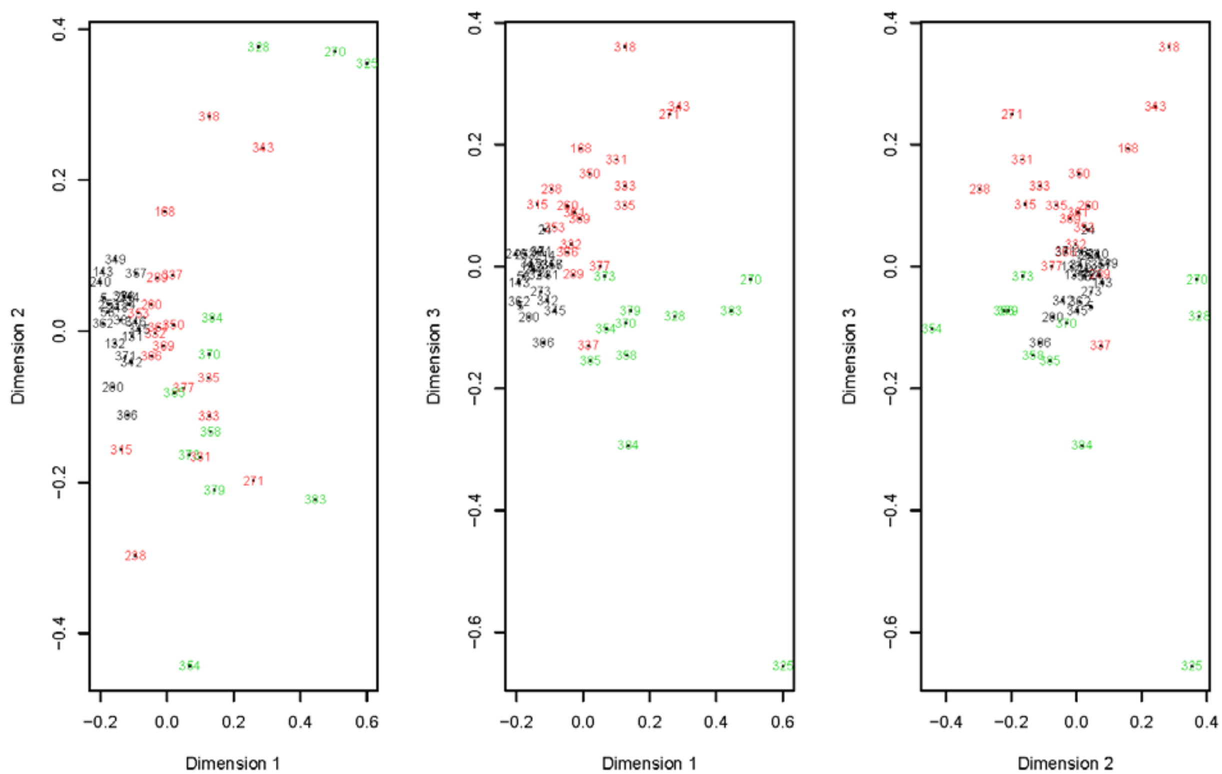
sFL, 1992−2000, p/a, all sp



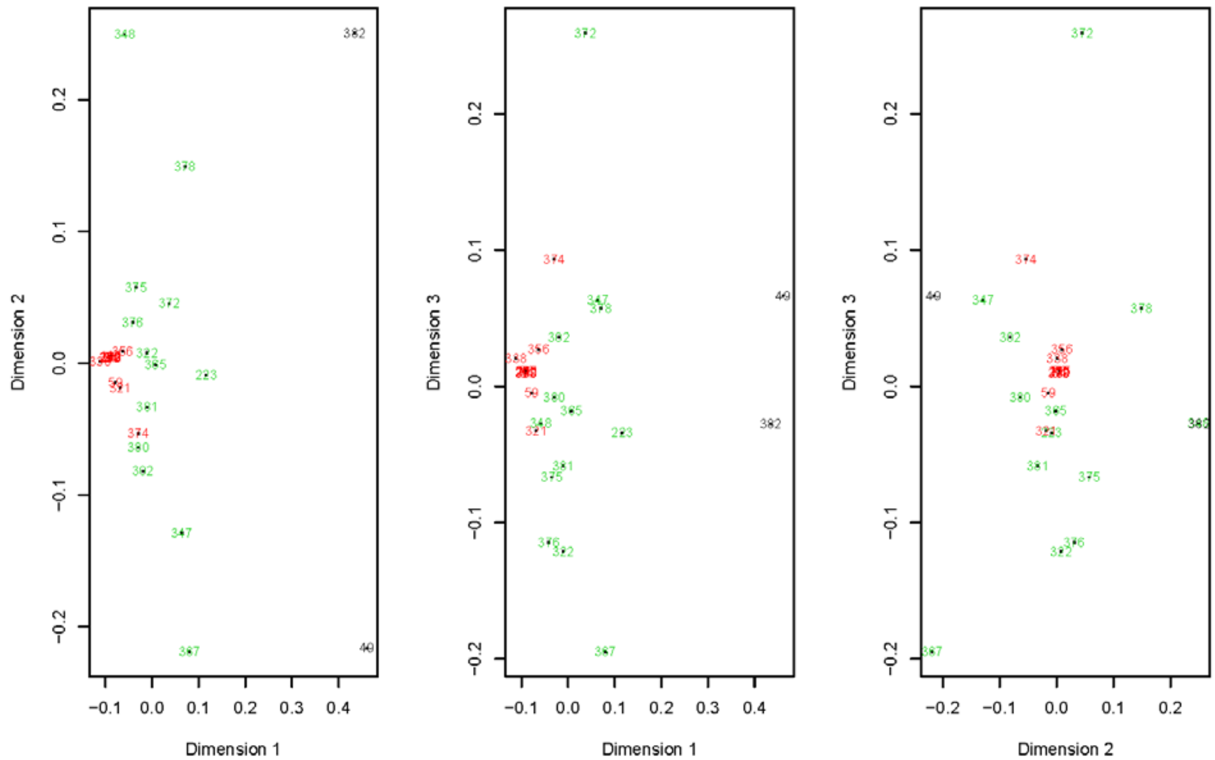
Carolinas, 2001−2009, p/a, 27 sp



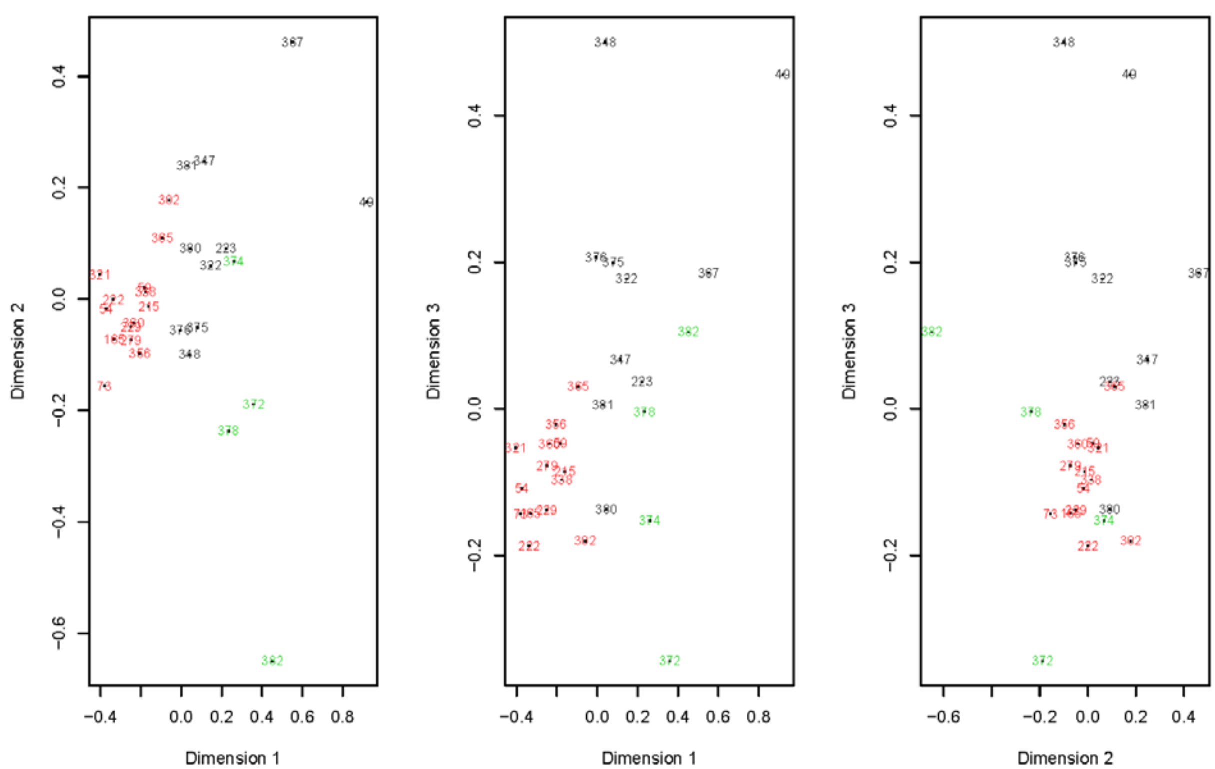
Carolinas, 2001−2009, p/a, all sp



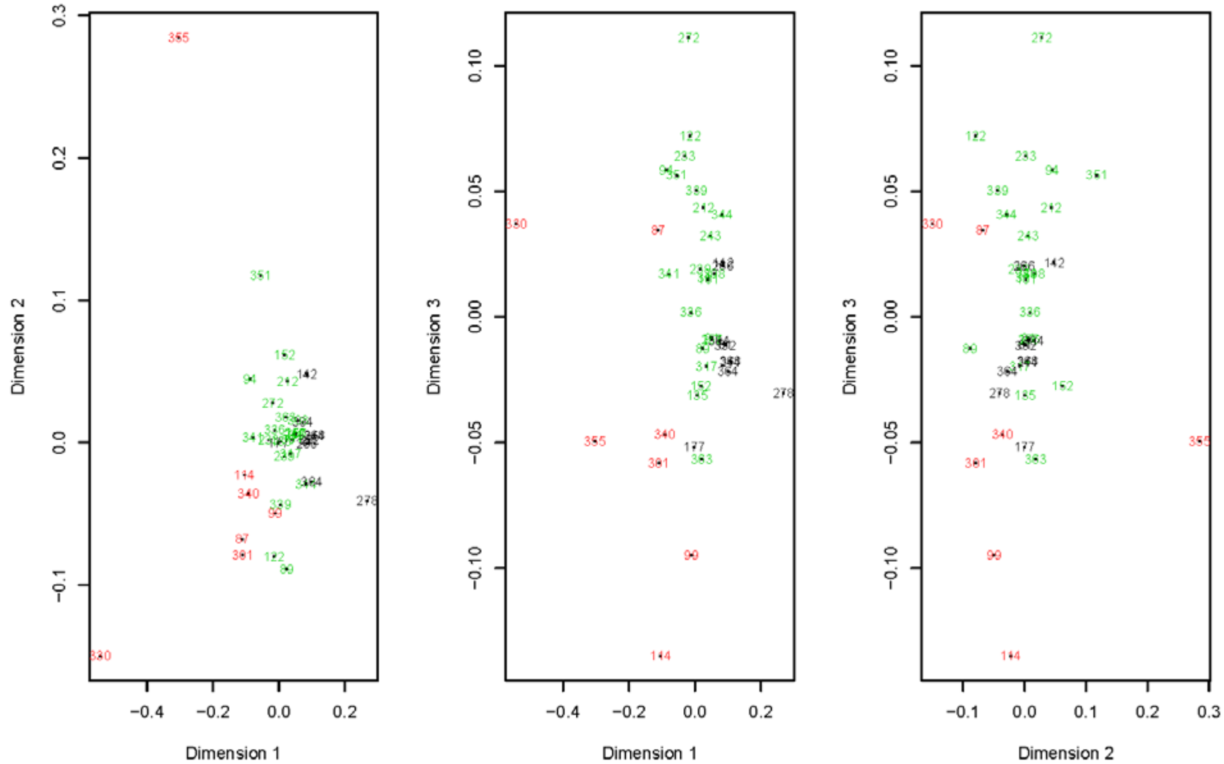
Ga−nFL, 2001−2009, p/a, 27 sp



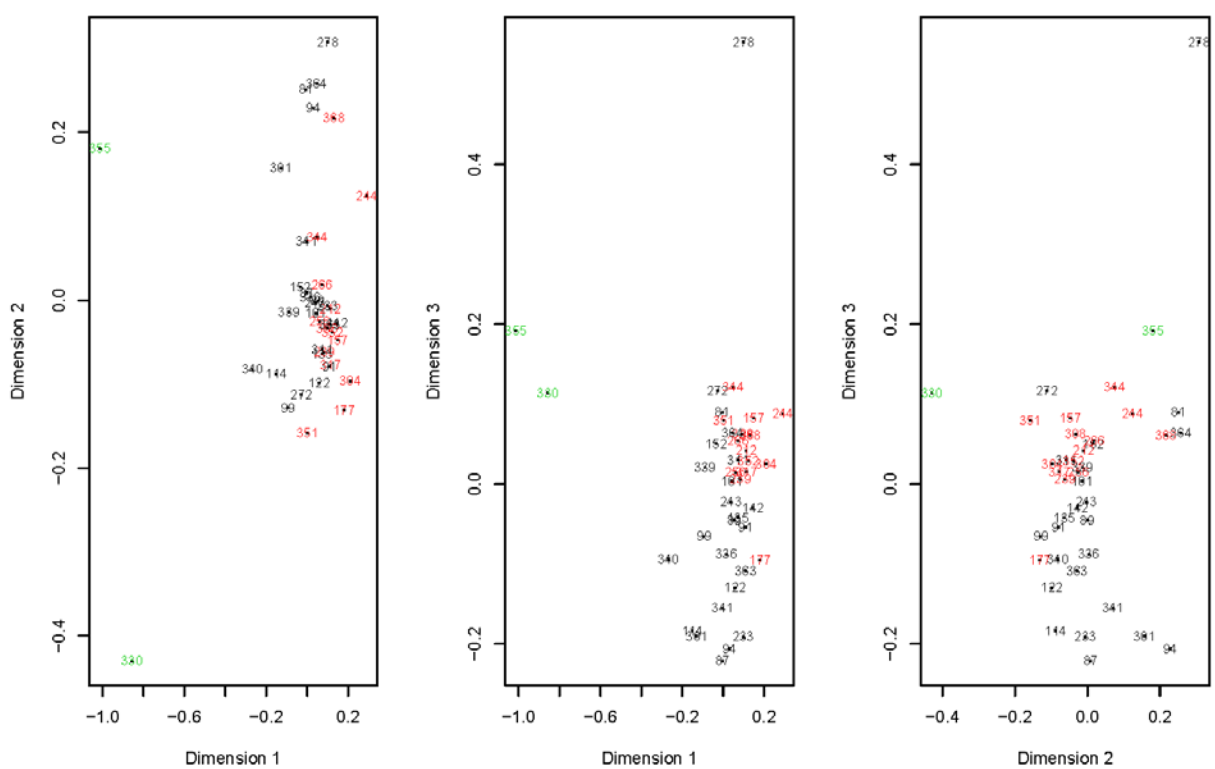
Ga−nFL, 2001−2009, p/a, all sp



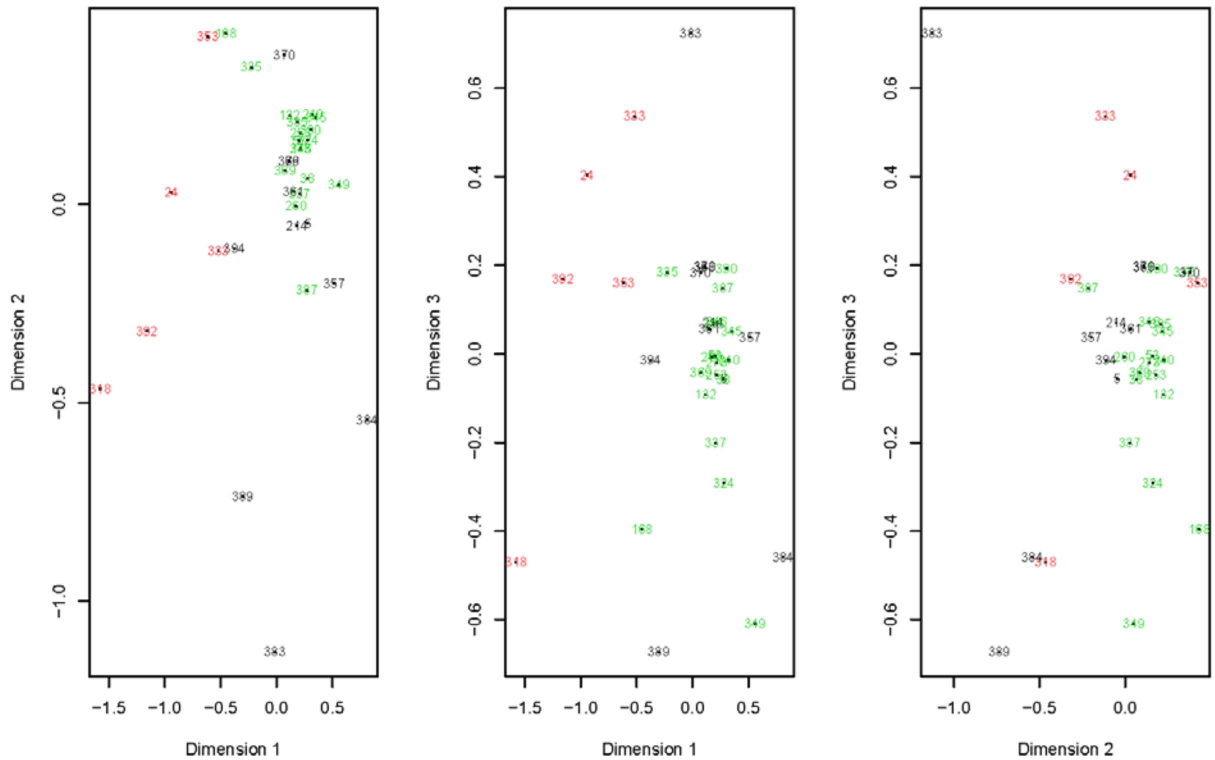
sFL, 2001−2009, p/a, 27 sp



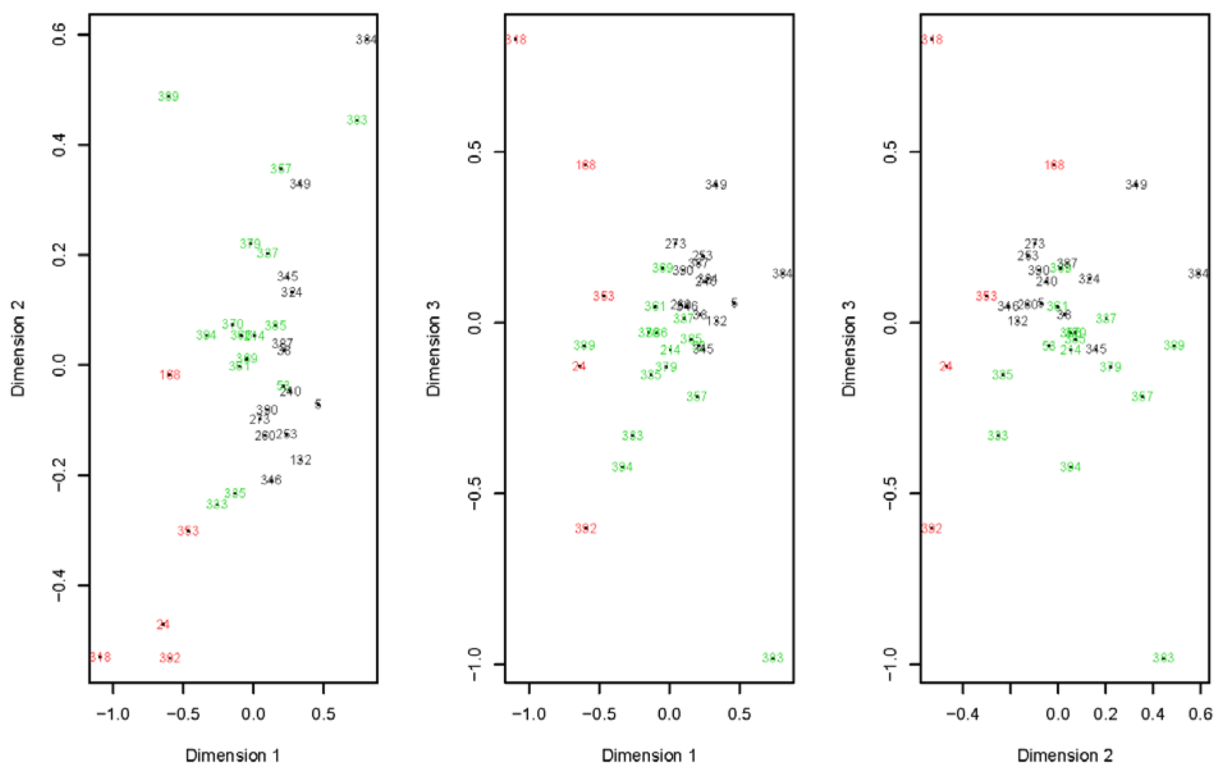
sFL, 2001−2009, p/a, 27 sp

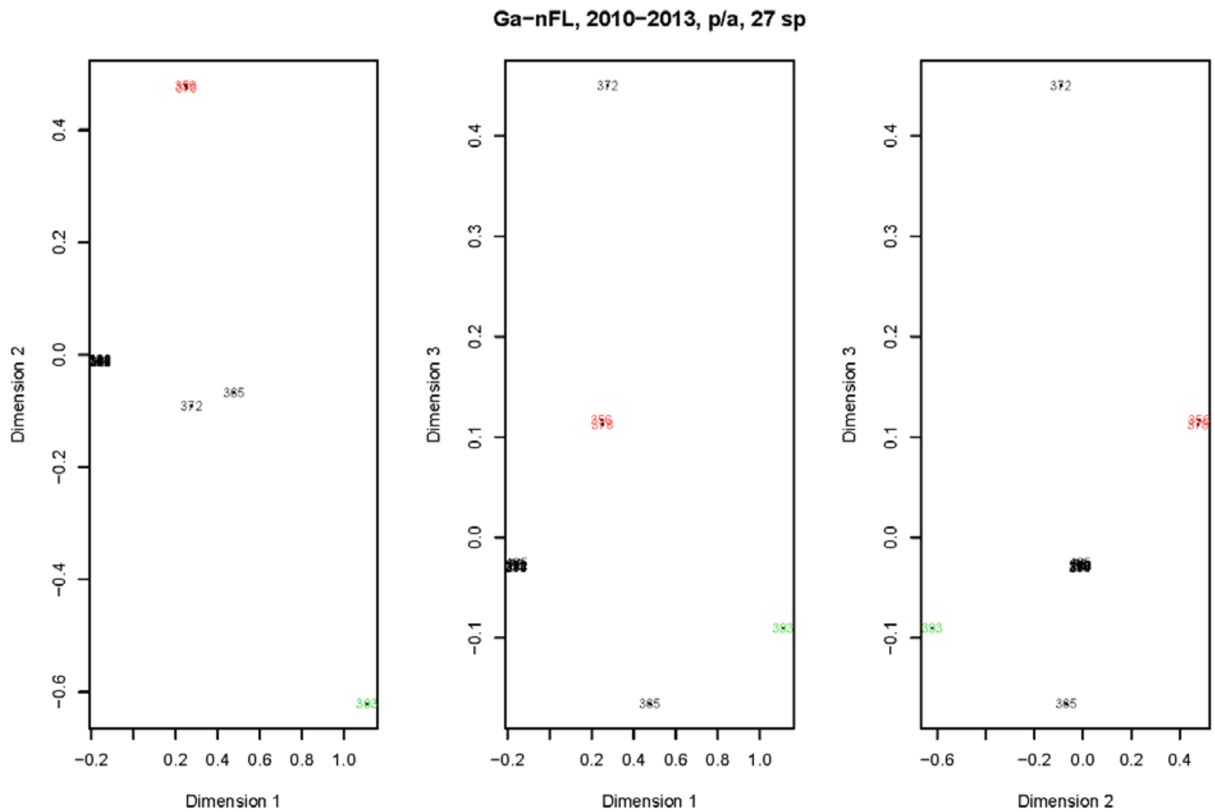


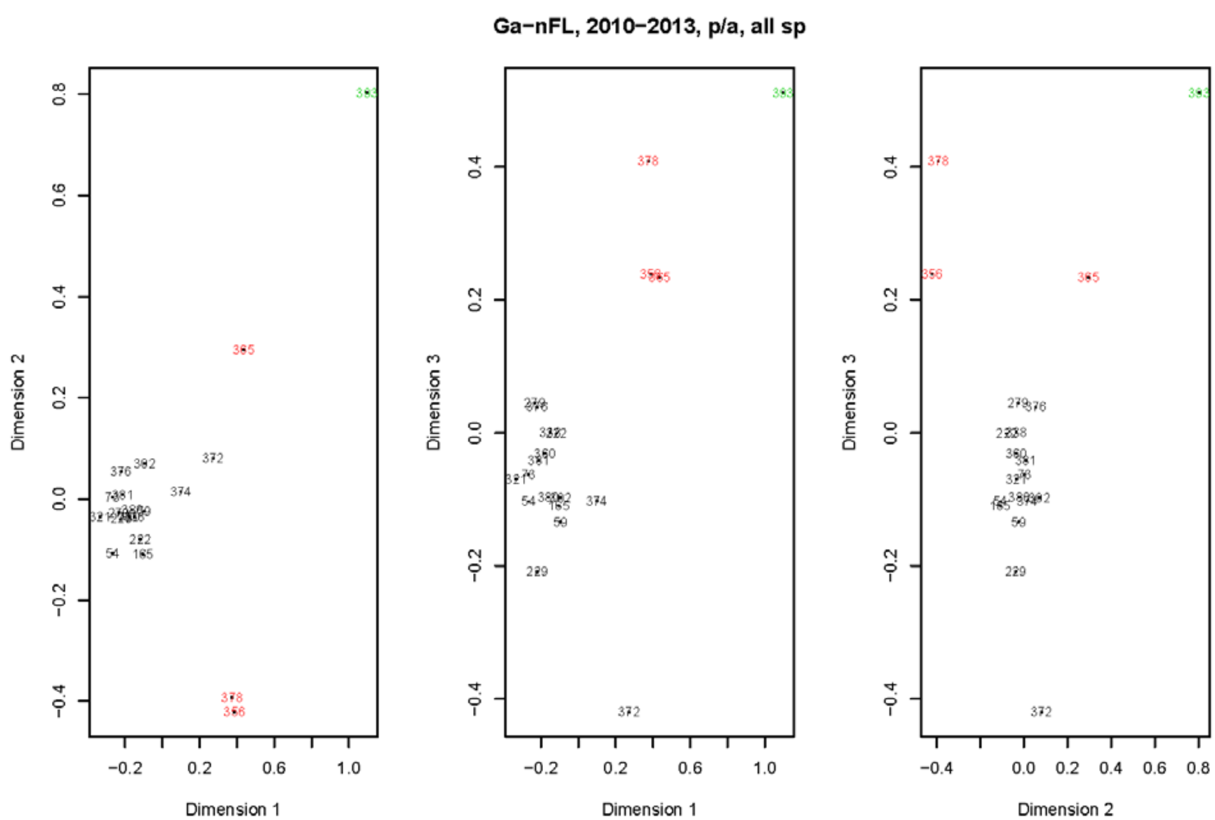
Carolinas, 2010−2013, p/a, 27 sp



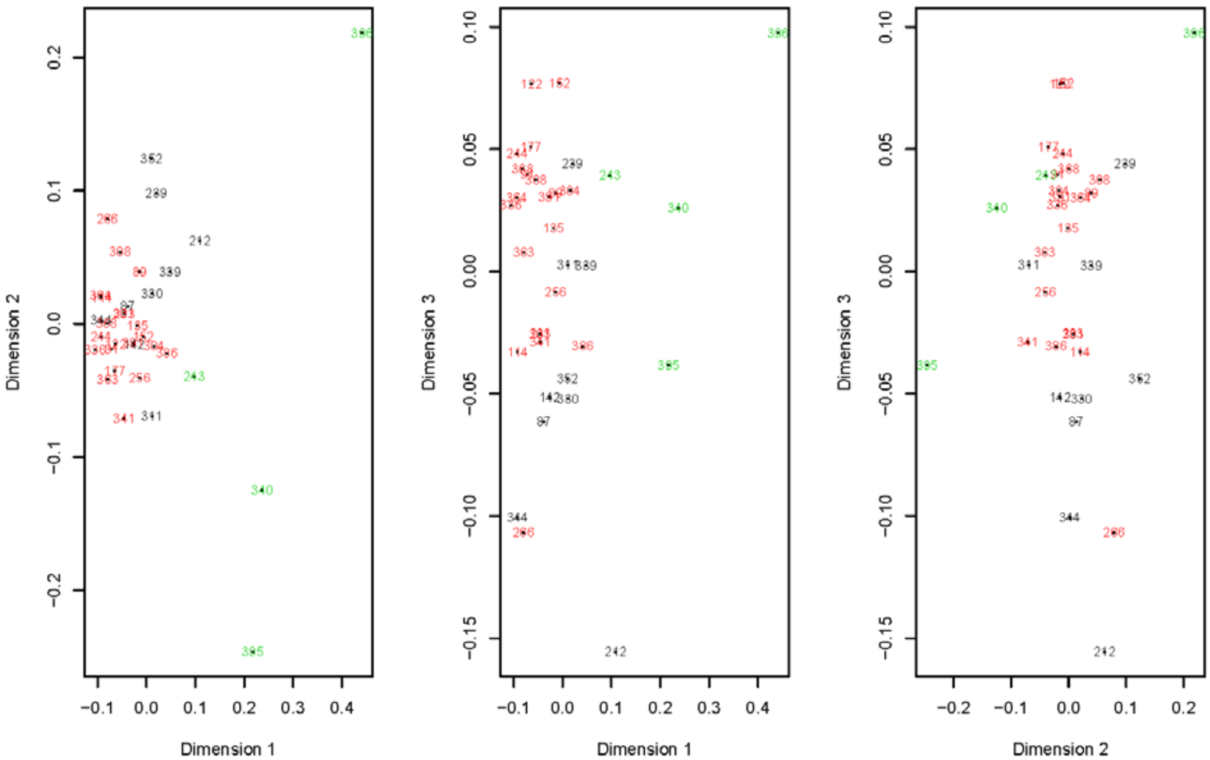
Carolinas, 2010−2013, p/a, all sp



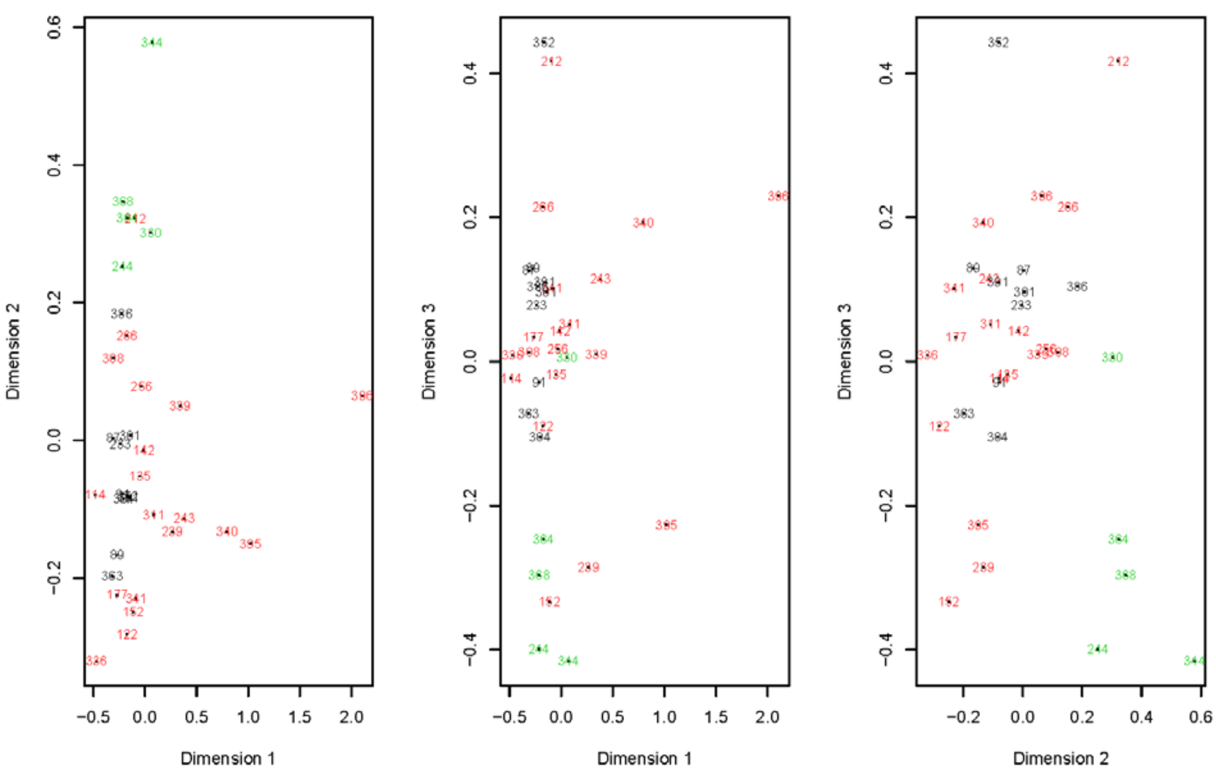

Ga−nFL, 2010−2013, p/a, 27 sp
Dimension 1
Dimension 2
Dimension 1
Dimension 3
Dimension 2
Dimension 3


Ga−nFL, 2010−2013, p/a, all sp
Dimension 1
Dimension 2
Dimension 1
Dimension 3
Dimension 2
Dimension 3

sFL, 2010−2013, p/a, 27 sp

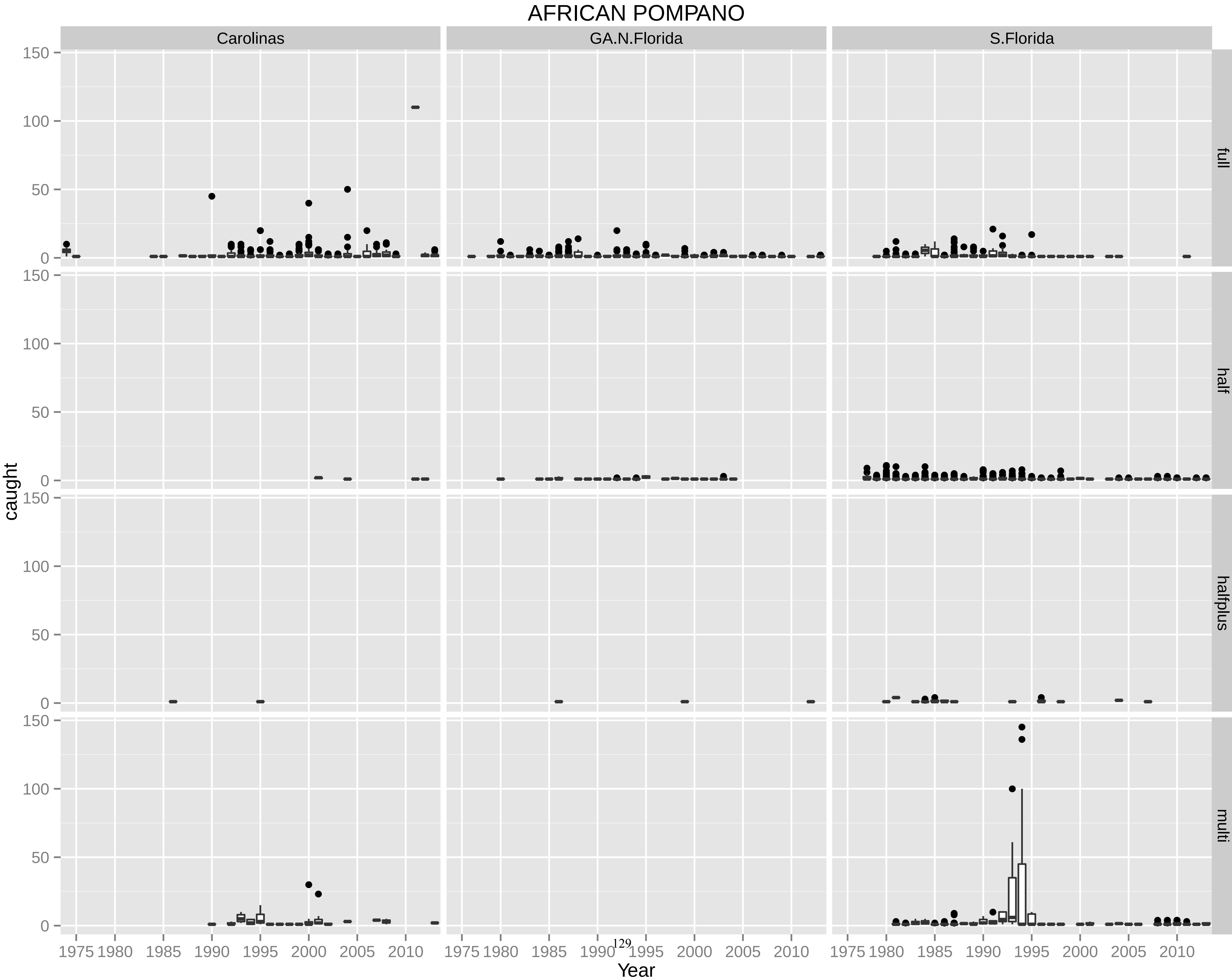


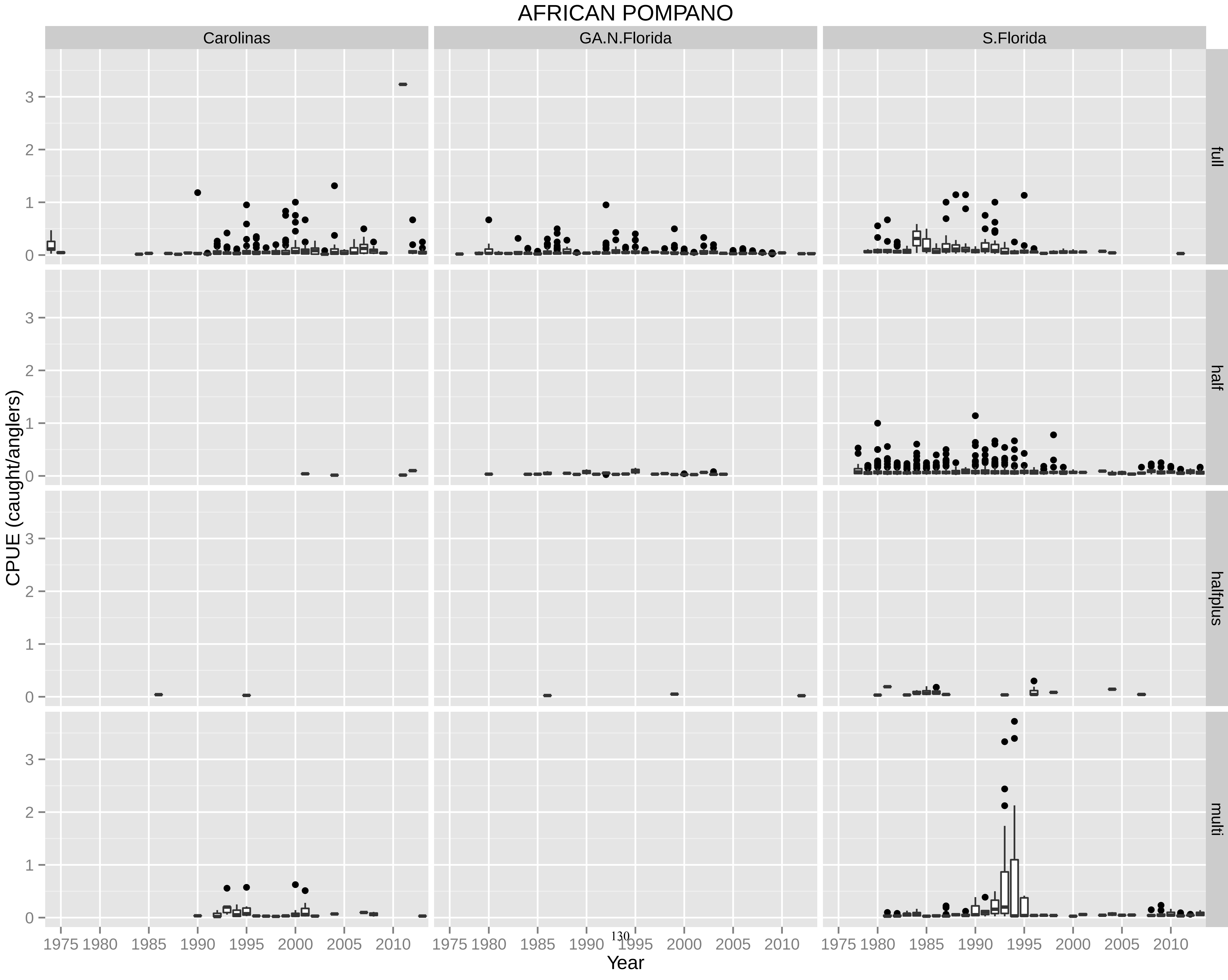
sFL, 2010−2013, p/a, all sp

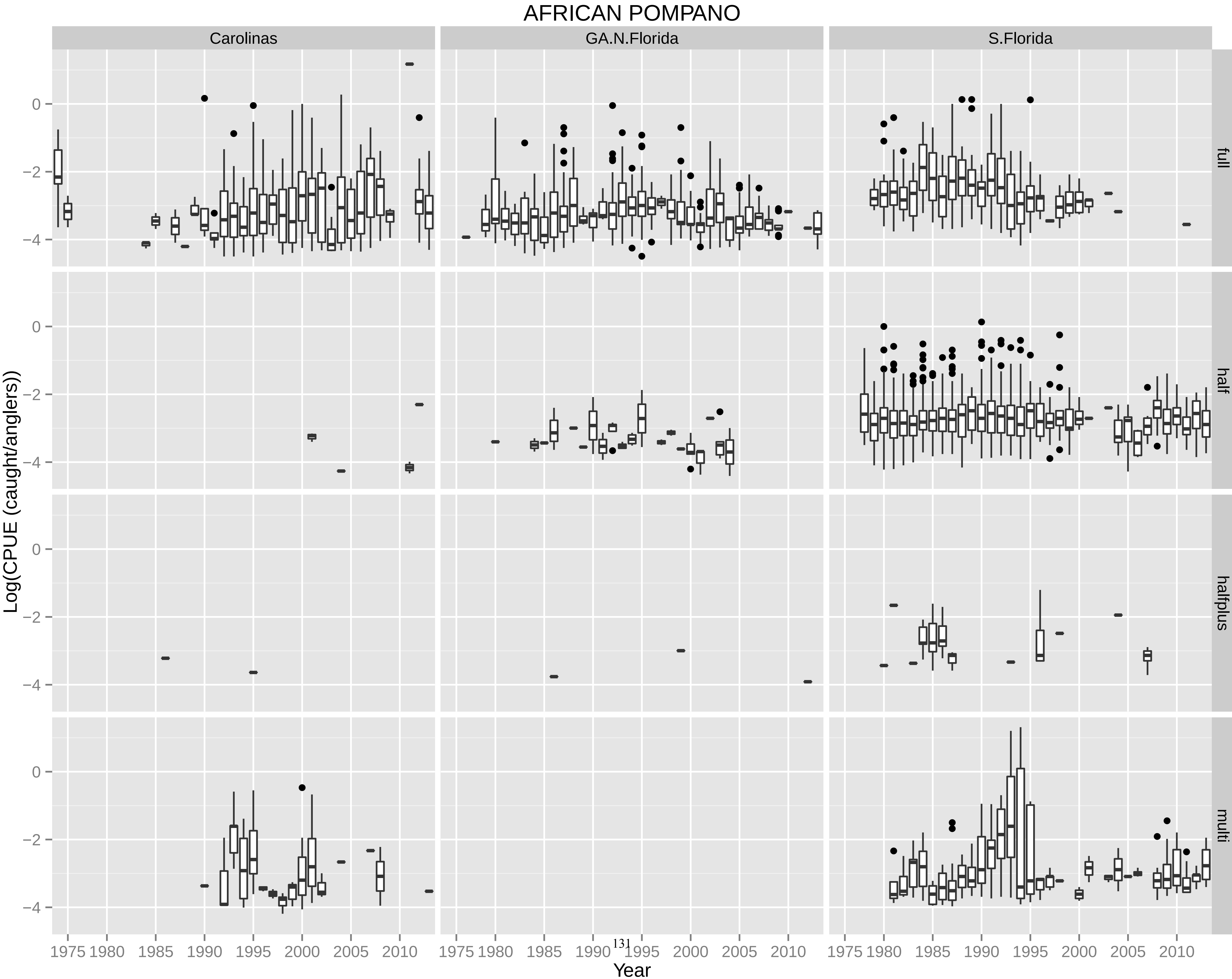


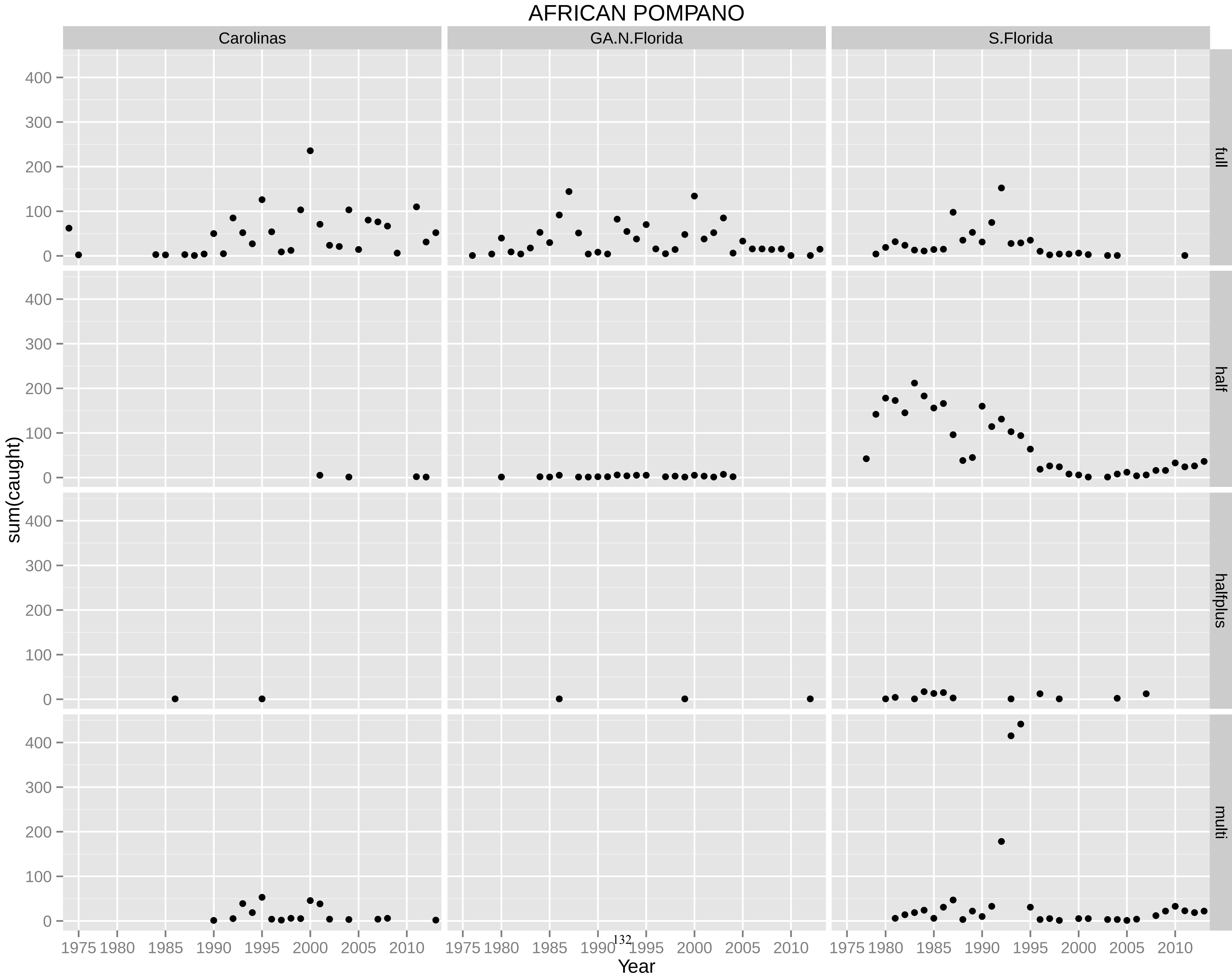
Appendix 10. **Redacted for confidentiality -** General vessel summary and trip type, boxplots for each vessel's reported number of anglers, species count, reported total number fish caught, cpue and log (cpue) were plotted against the dark green line (overall mean) and shaded area (inner quartile range).

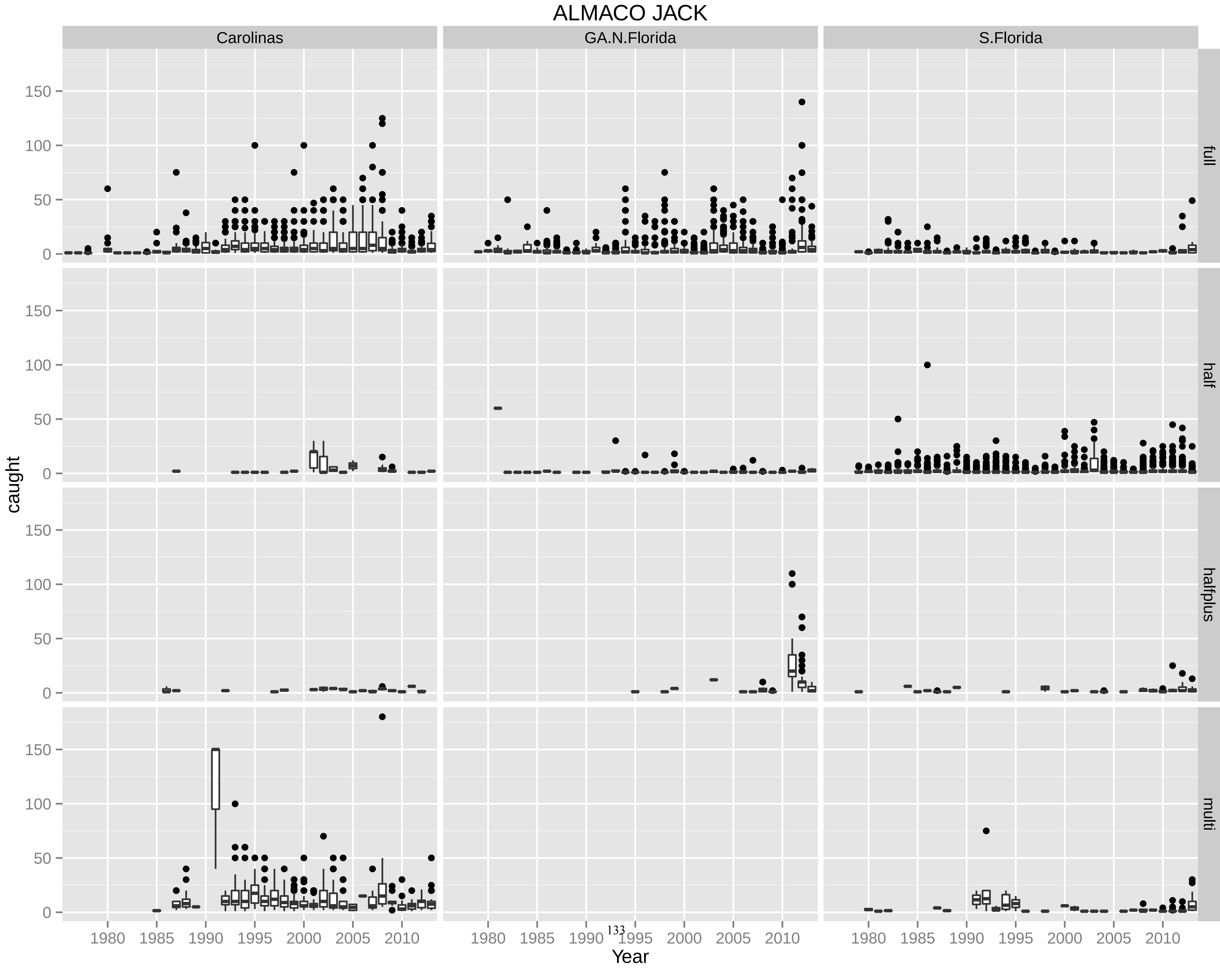
Appendix 11. **Partially Redacted for confidentiality -** Species summaries. For each species, 49 EDA plots explore numbers caught, cpue, log (cpue) and sum(caught) by vessel for each time-area block.


AFRICAN POMPANO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
1975
1980
1985
1990
1995
2000
2005
2010

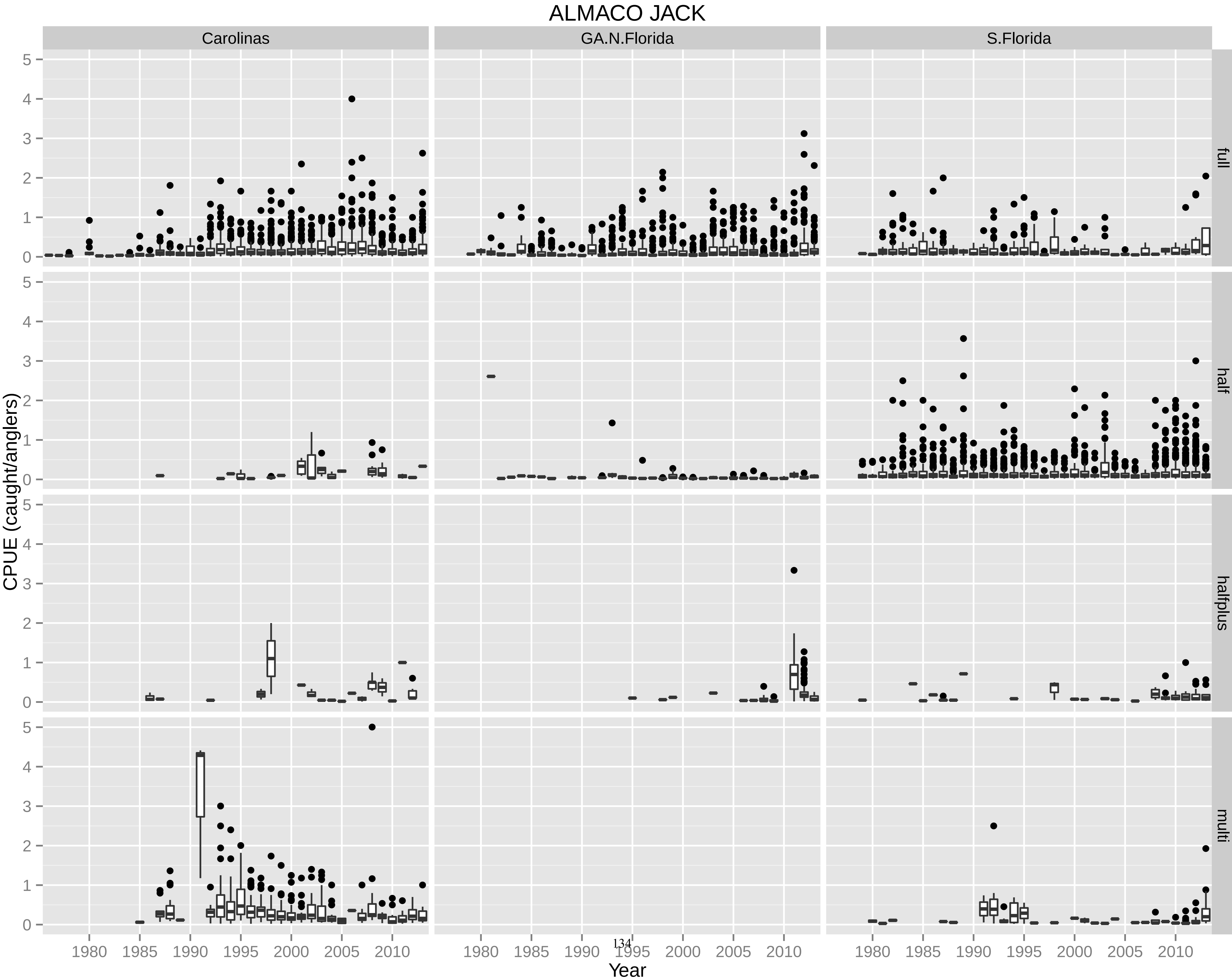

AFRICAN POMPANO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
1975
1980
1985
1990
1995
2000
2005
2010

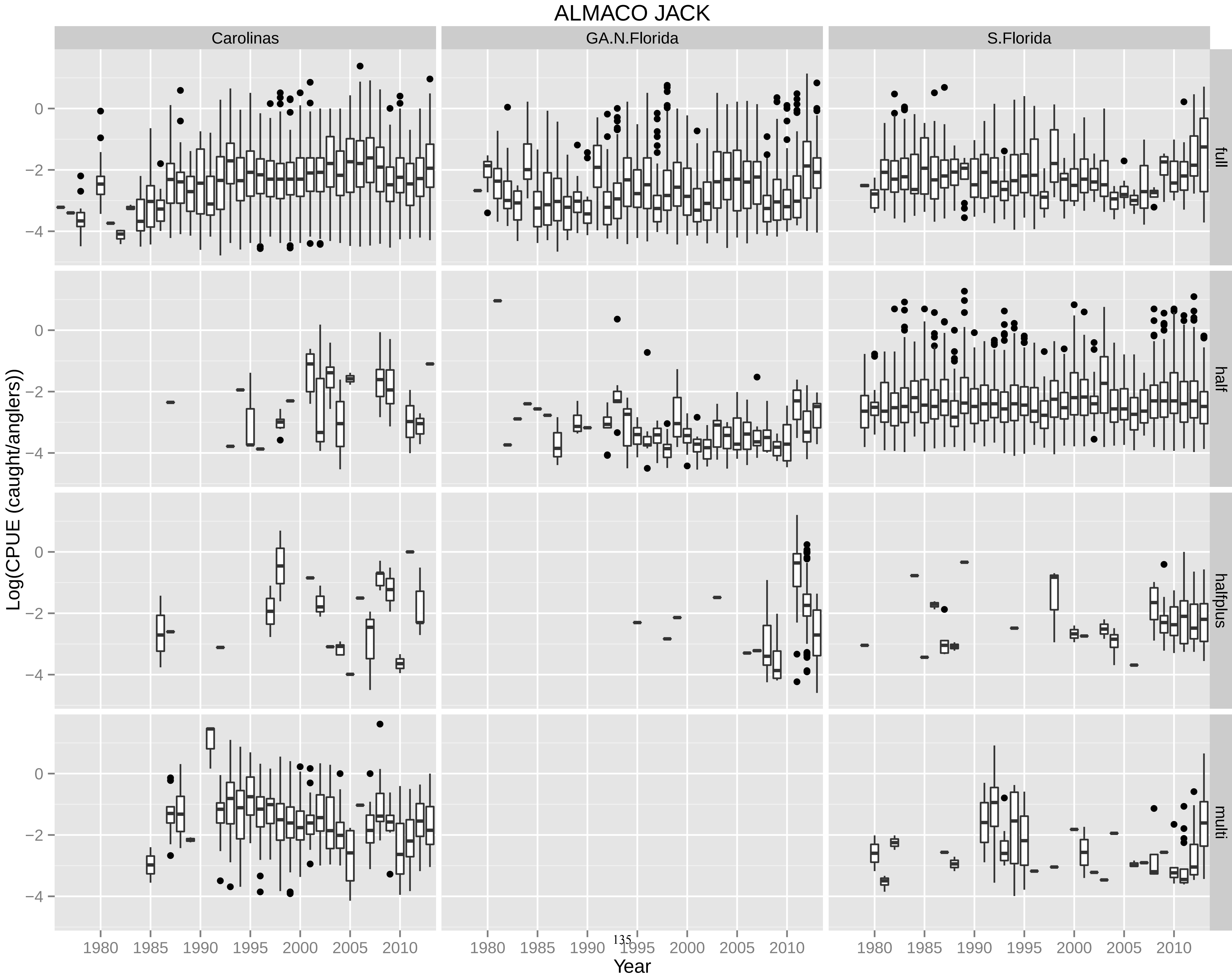

AFRICAN POMPANO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−2
−4
1975 1980 1985 1990 1995 2000 2005 2010

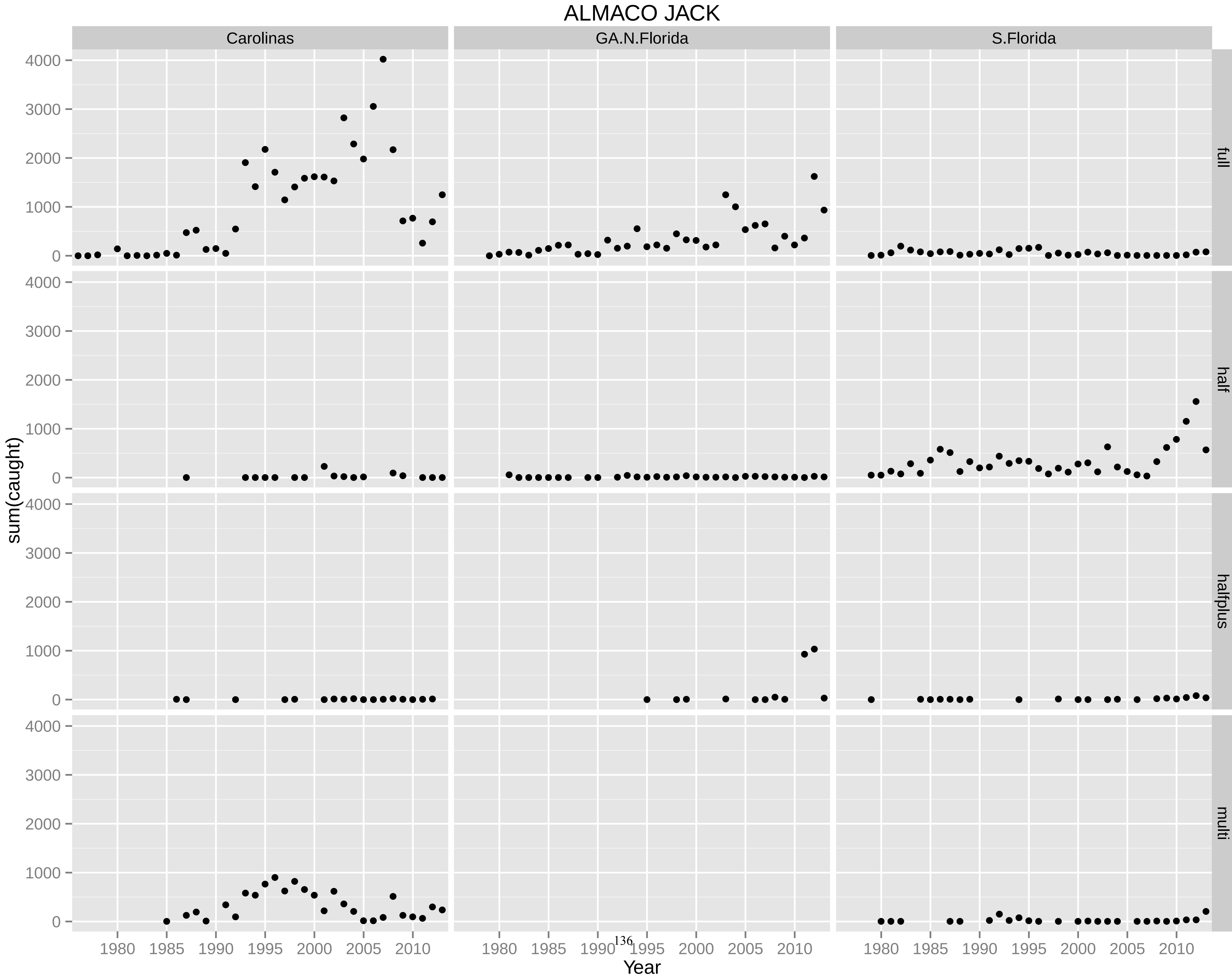

AFRICAN POMPANO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
100
200
300
400
1975
1980
1985
1990
1995
2000
2005
2010
Year

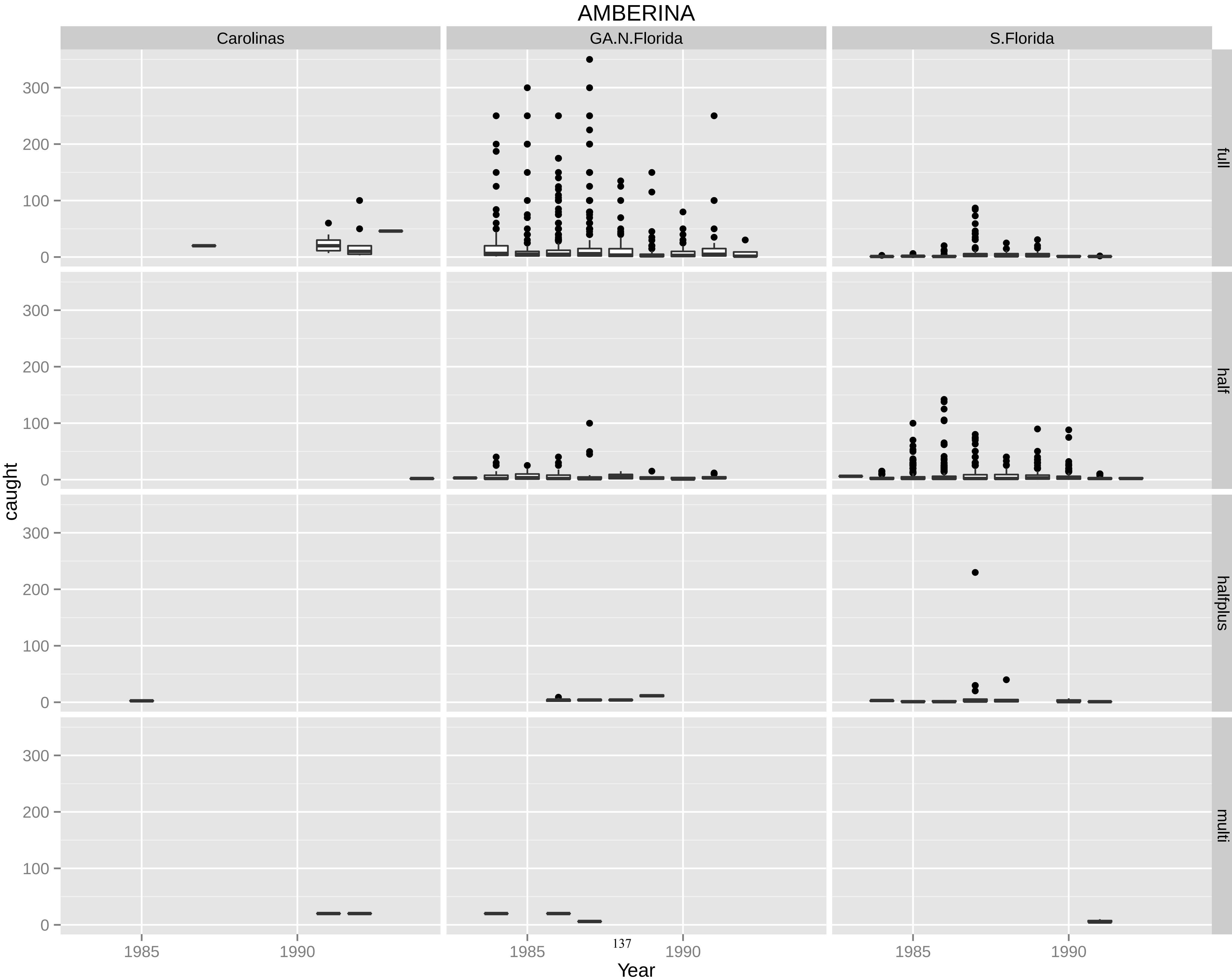


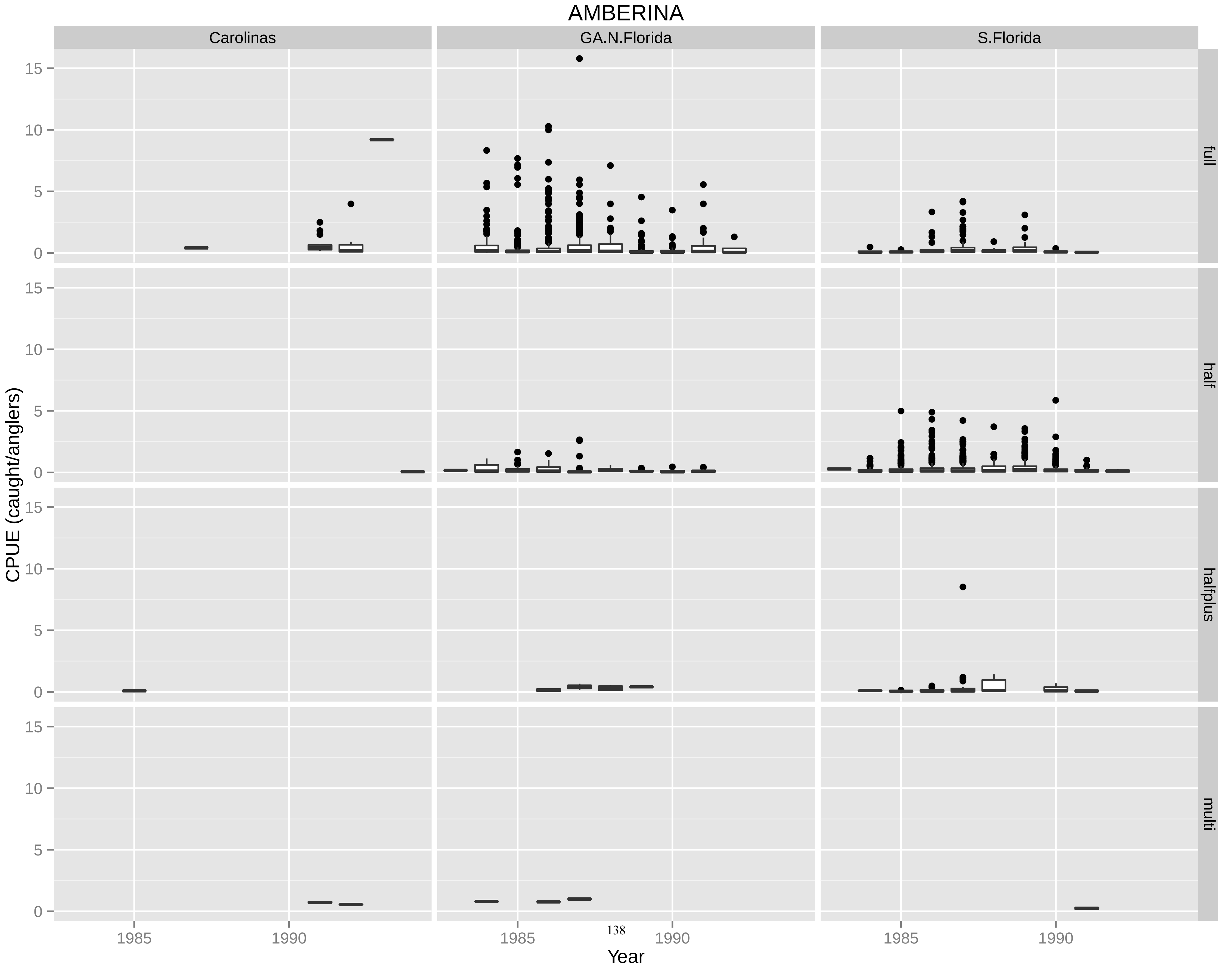
ALMACO JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
0
50
100
150
1980
1985
1990
1995
2000
2005
2010
Year


ALMACO JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
4
5
1980
1985
1990
1995
2000
2005
2010

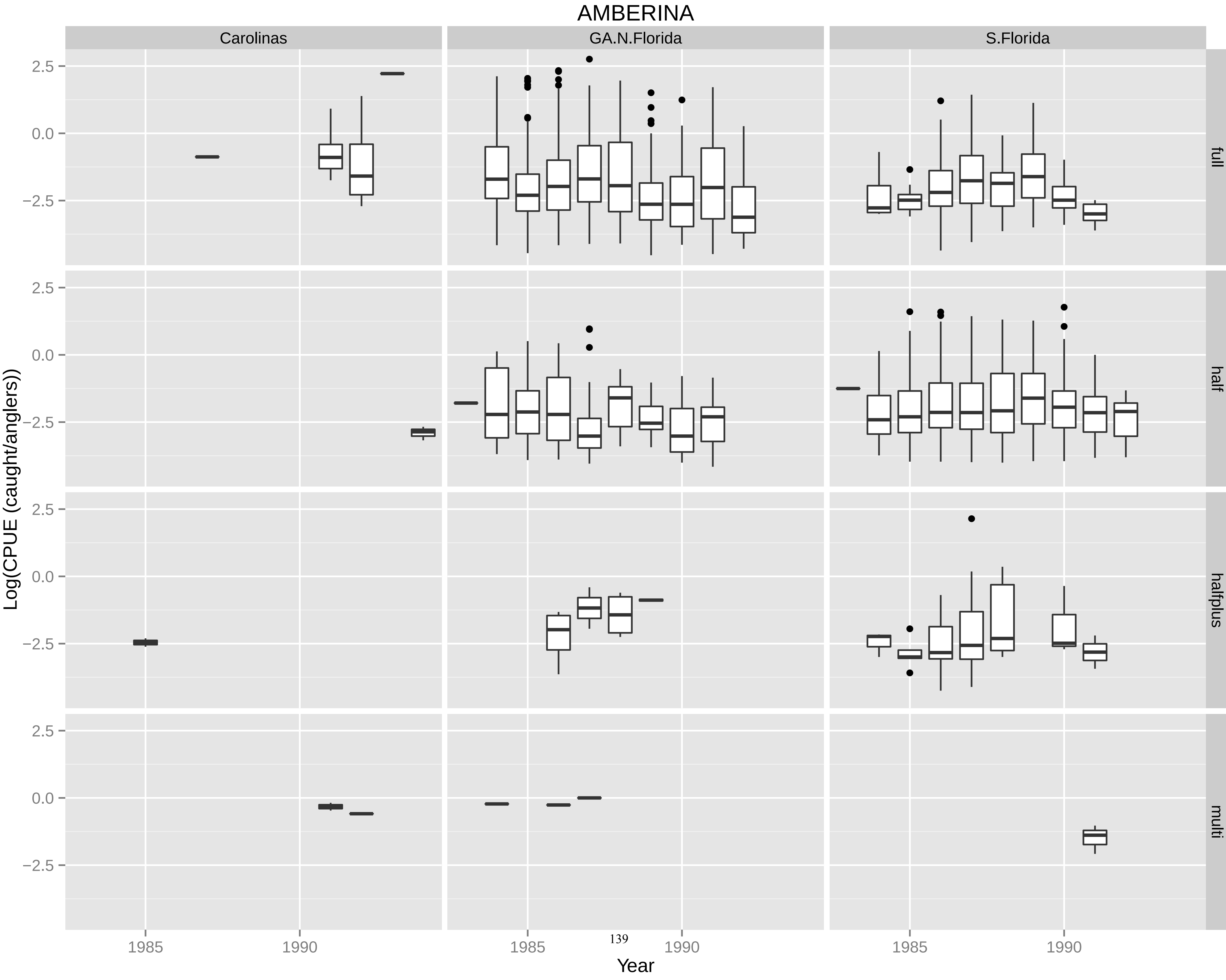

ALMACO JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
0
−2
−4
1980
1985
1990
1995
2000
2005
2010
Year

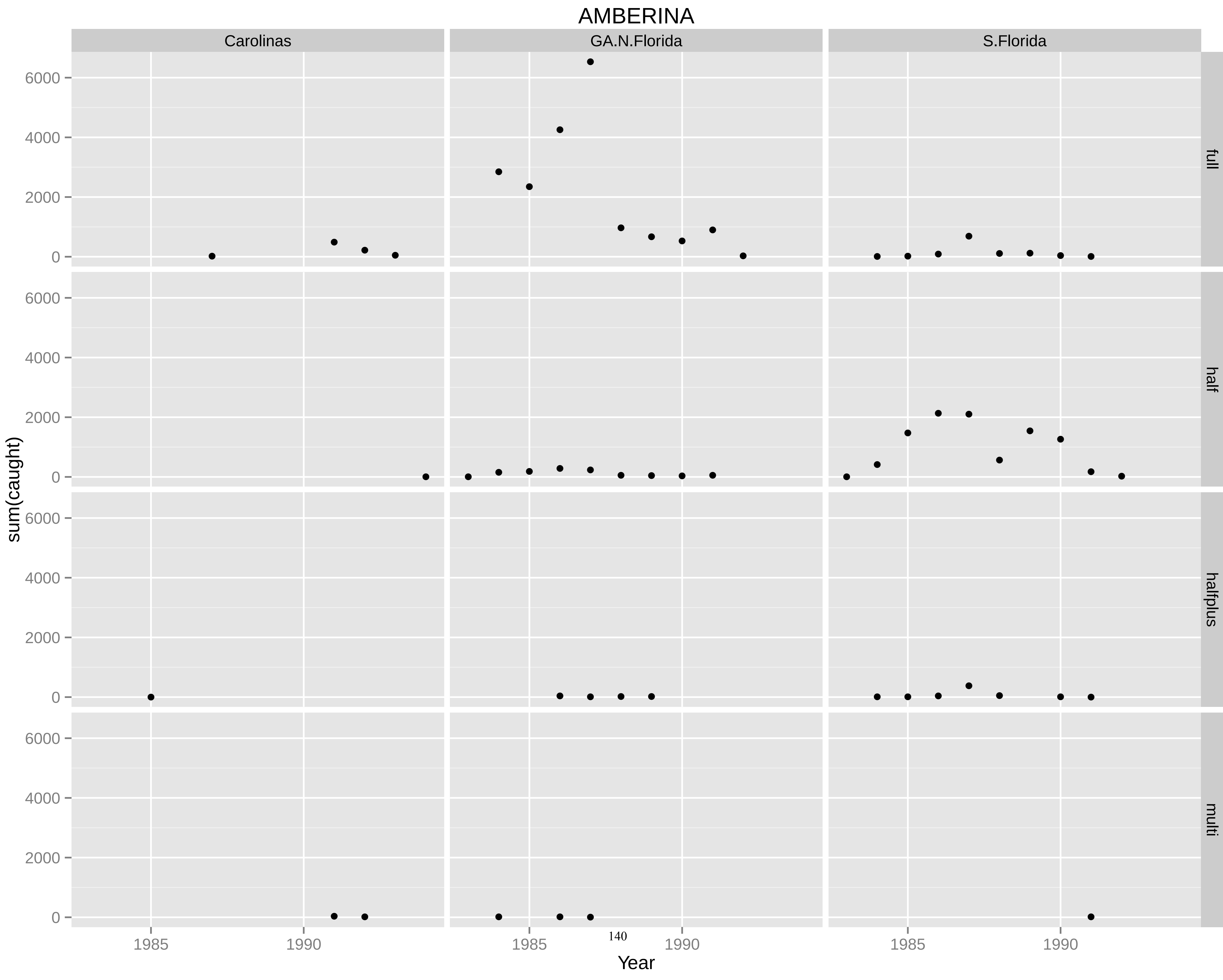

ALMACO JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
1000
2000
3000
4000
1980
1985
1990
1995
2000
2005
2010

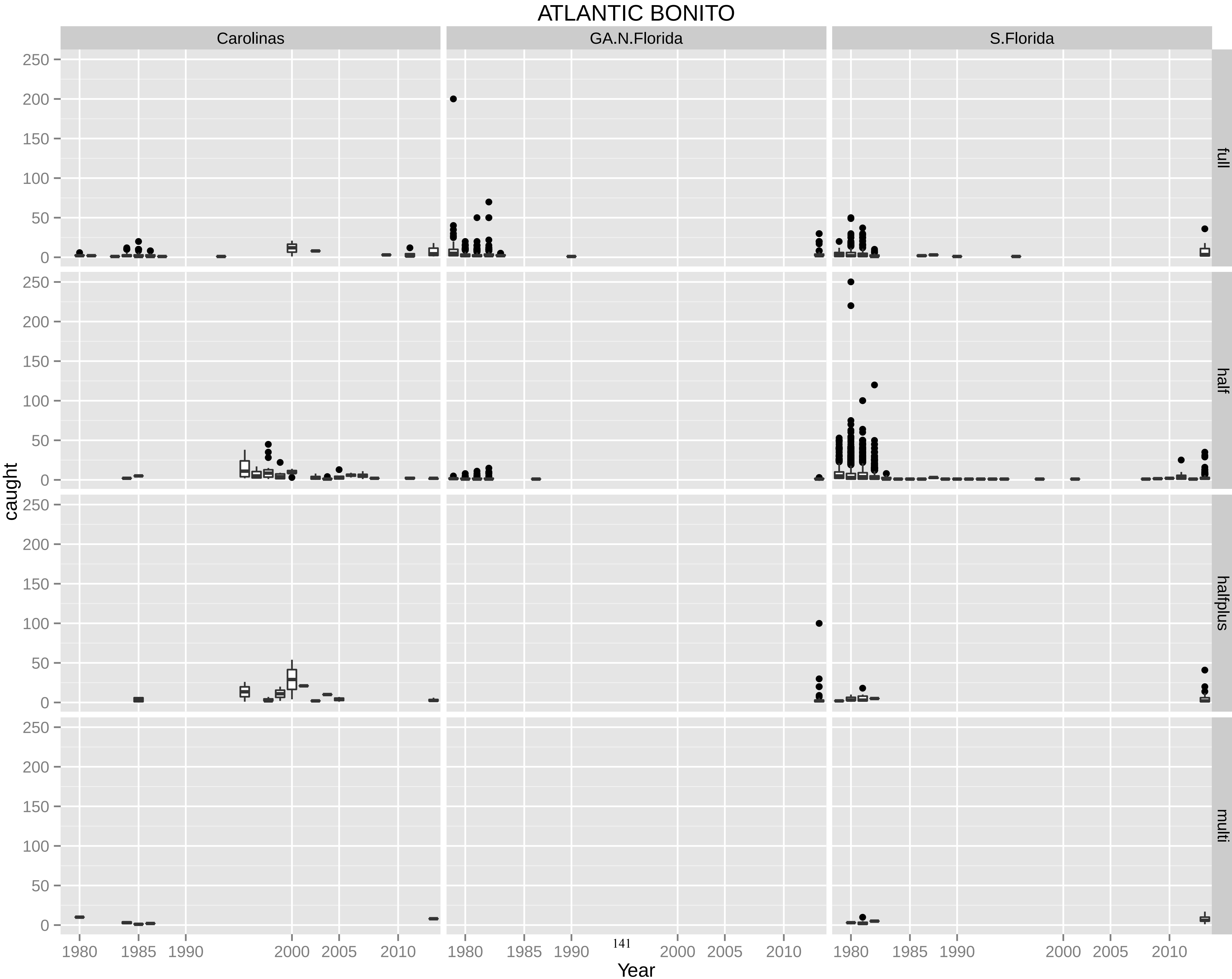

AMBERINA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
300
200
100
0
1985
1990
Year

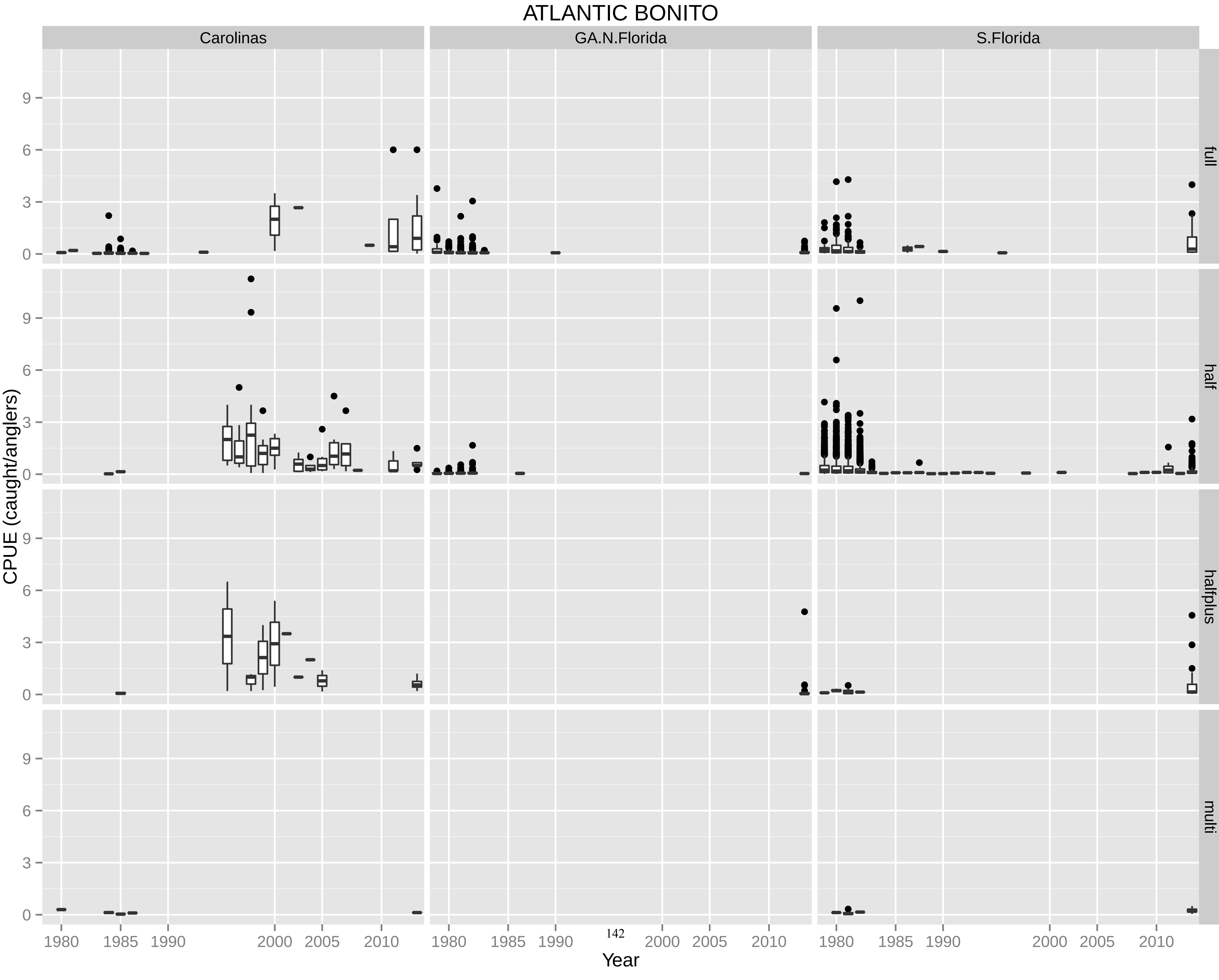


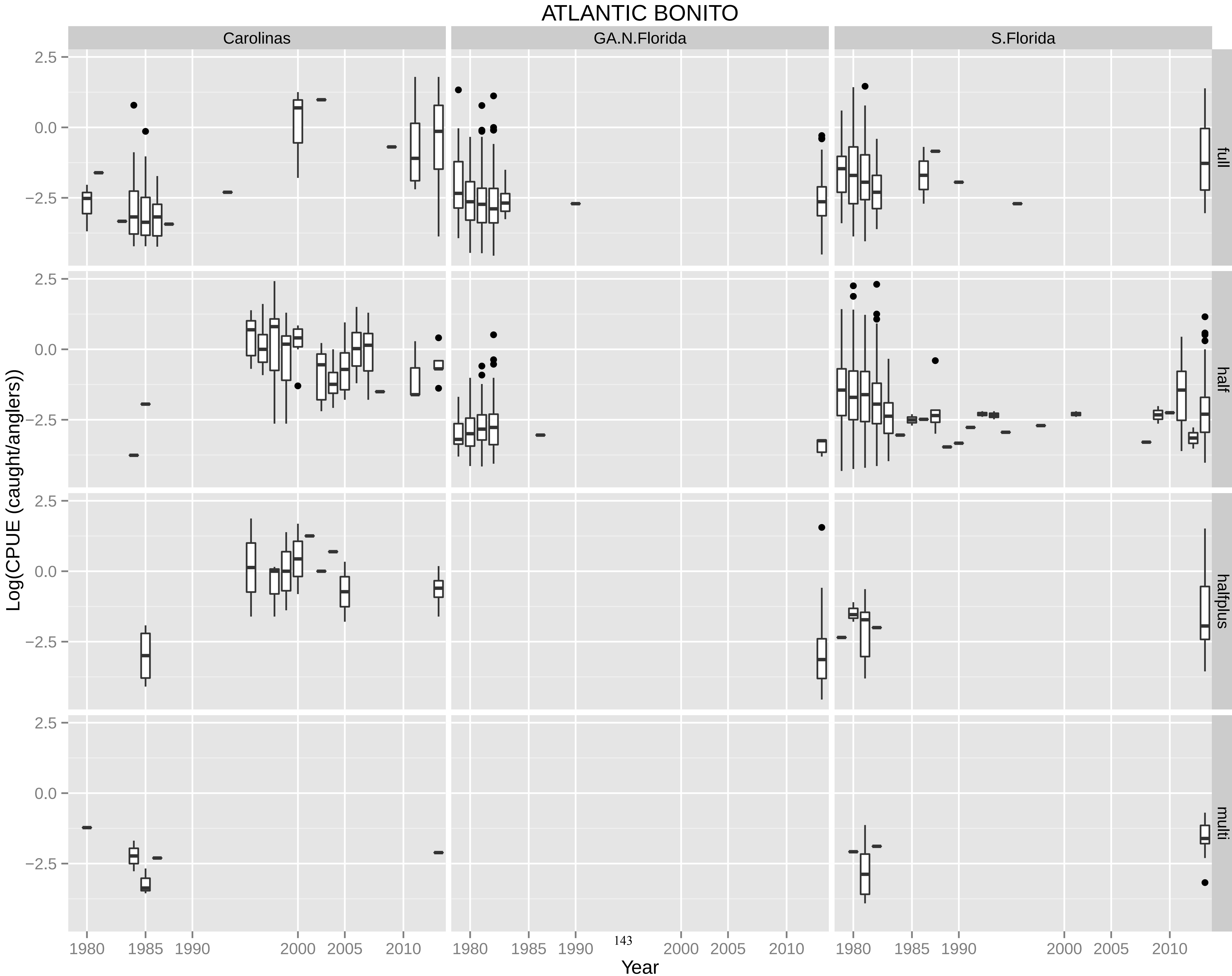
AMBERINA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
1985
1990

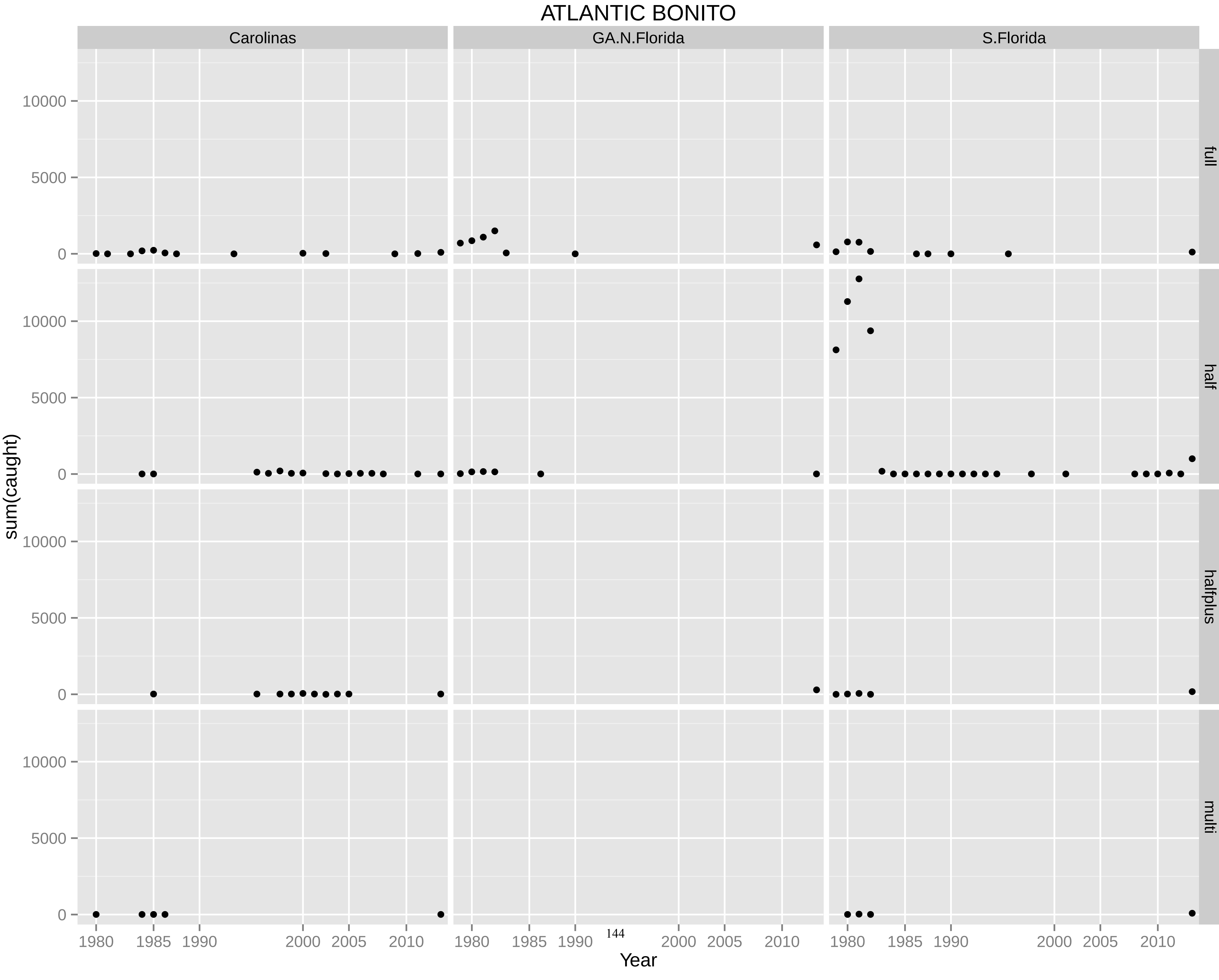

AMBERINA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
2.5
0.0
−2.5
Log(CPUE (caught/anglers))
1985
1990
Year

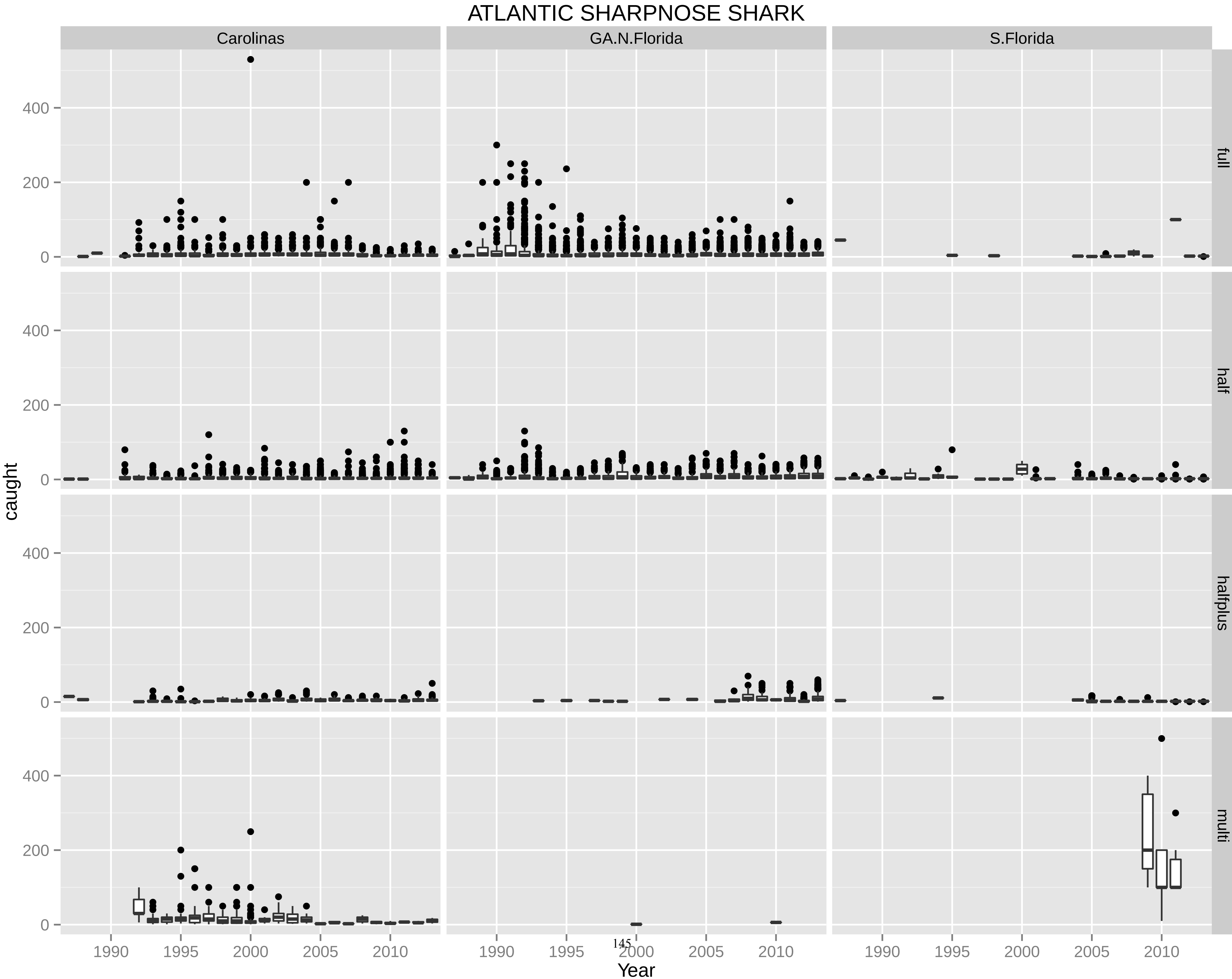

AMBERINA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
2000
4000
6000
1985
1990
Year

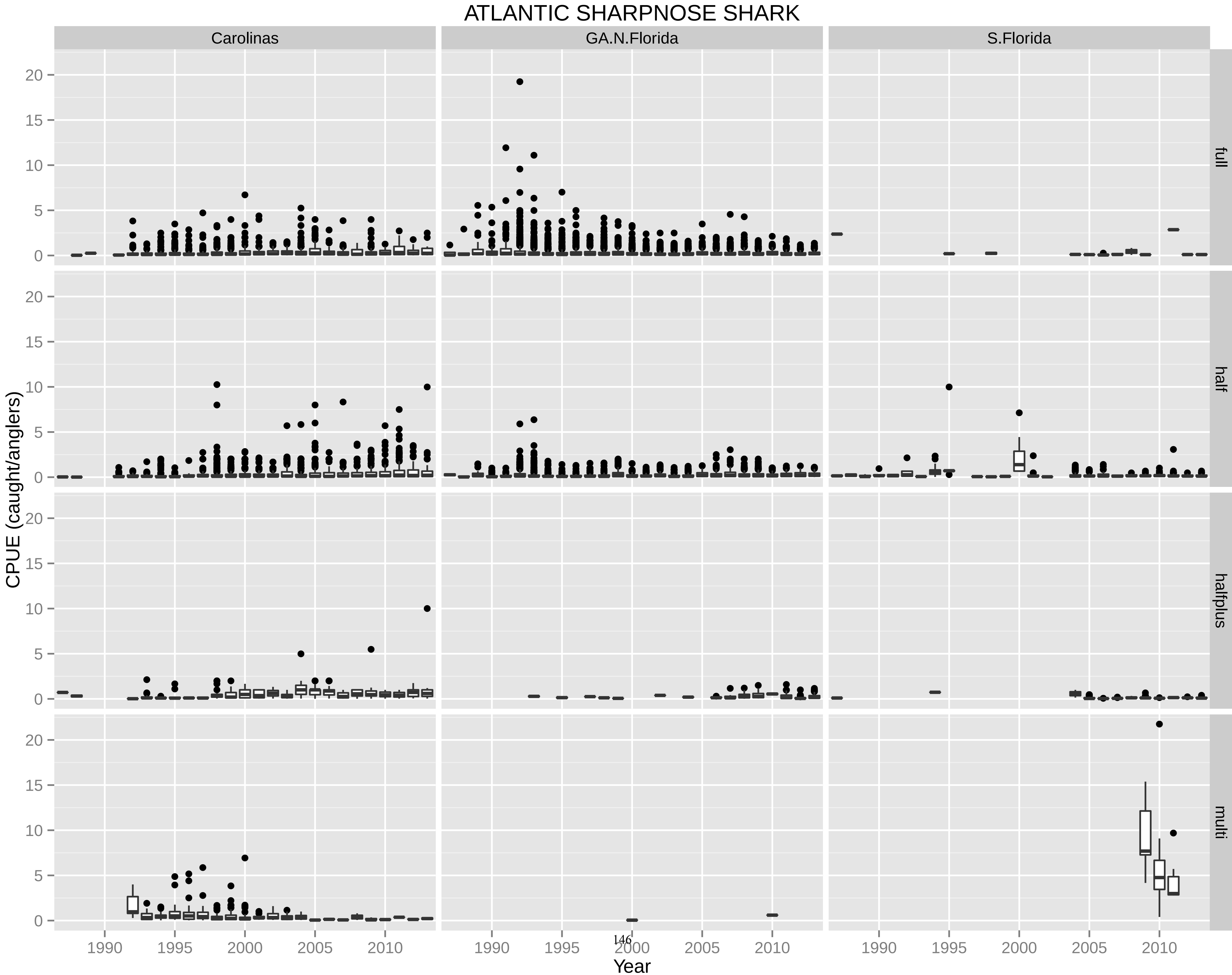

ATLANTIC BONITO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
200
250
1980
1985
1990
2000
2005
2010

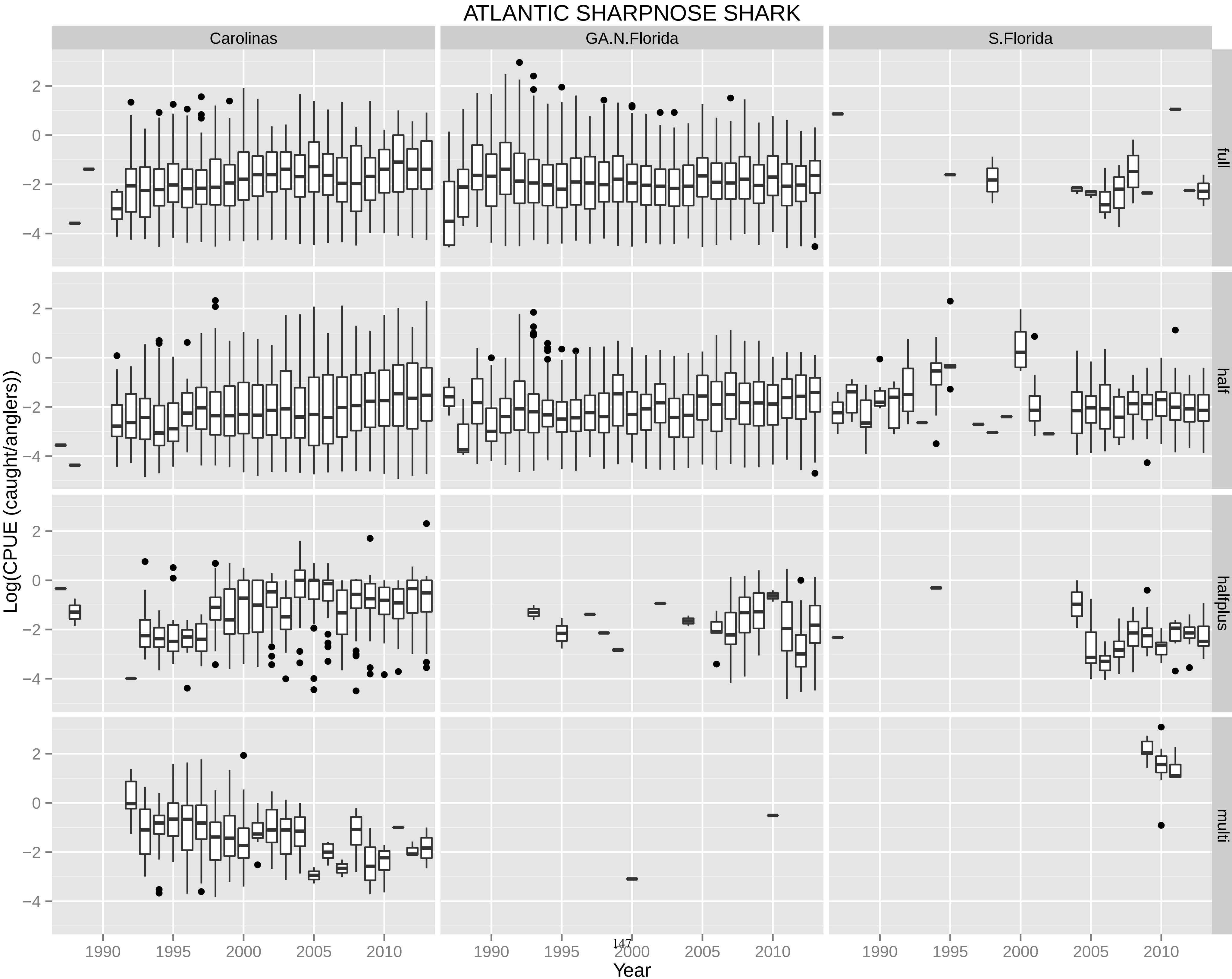

ATLANTIC BONITO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
3
6
9
1980
1985
1990
2000
2005
2010

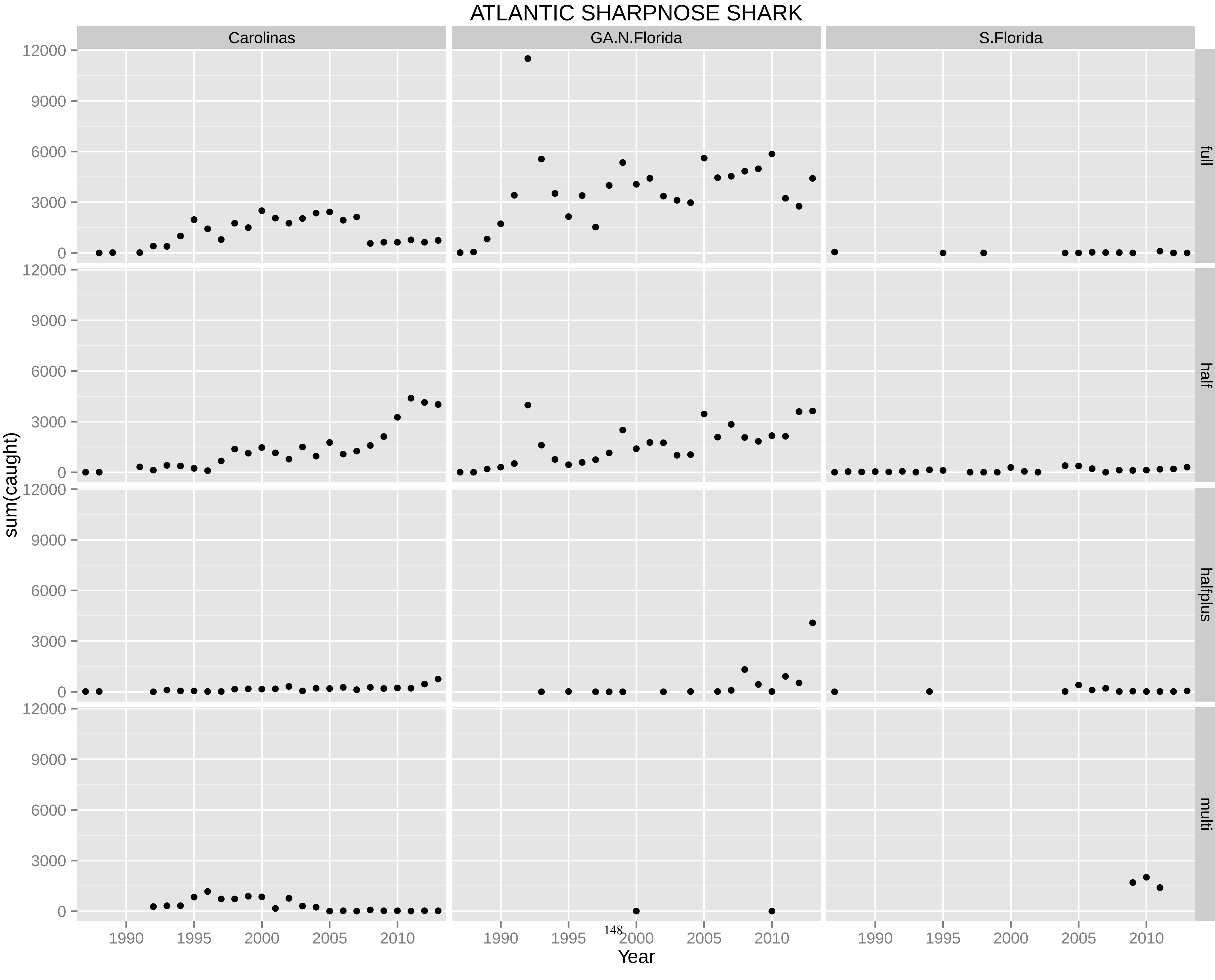

ATLANTIC BONITO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
2.5
0.0
−2.5
1980
1985
1990
2000
2005
2010
Log(CPUE (caught/anglers))
Year

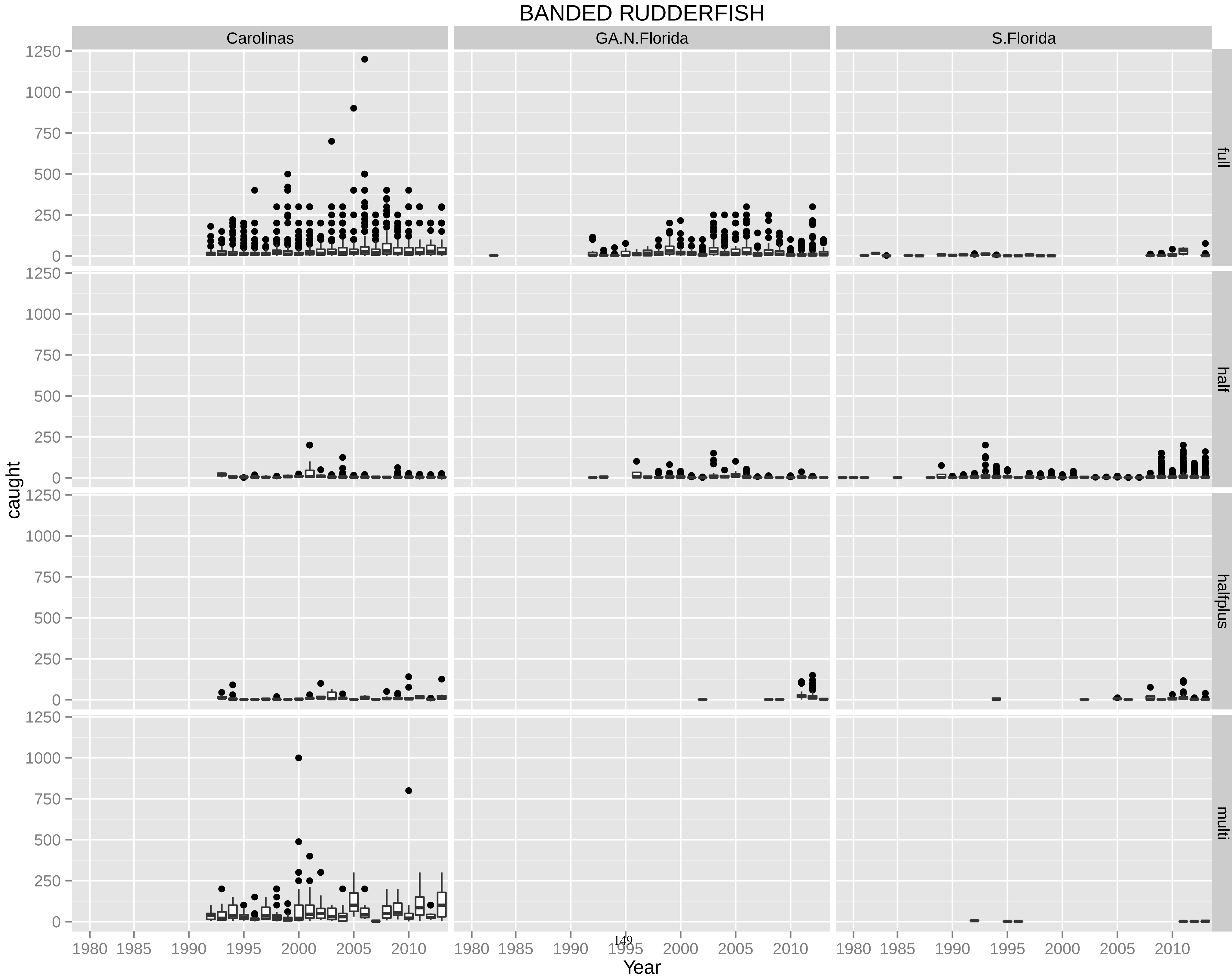

ATLANTIC BONITO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
10000
5000
0
1980
1985
1990
2000
2005
2010

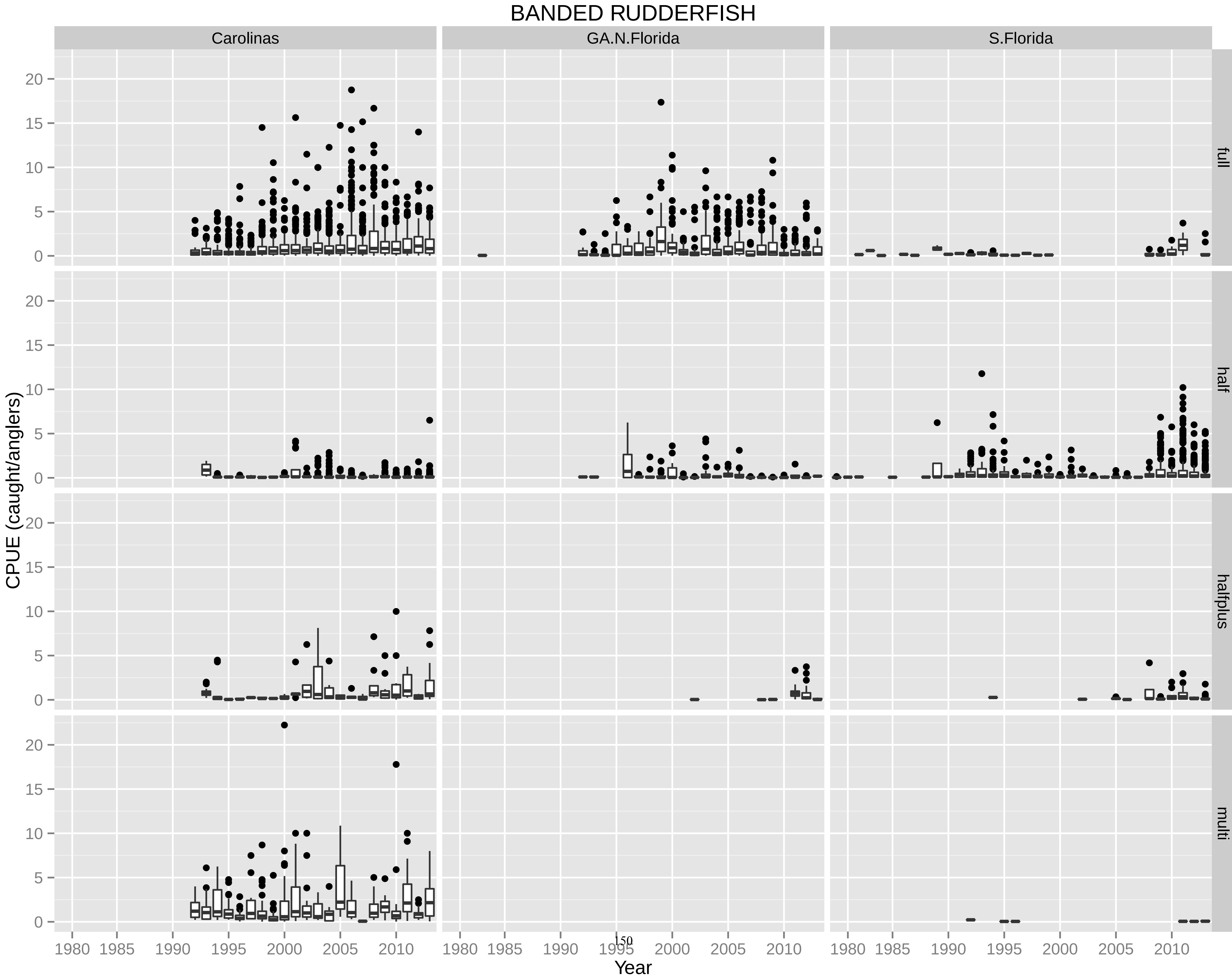

ATLANTIC SHARPNOSE SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
200
400
1990
1995
2000
2005
2010


ATLANTIC SHARPNOSE SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
20
1990
1995
2000
2005
2010

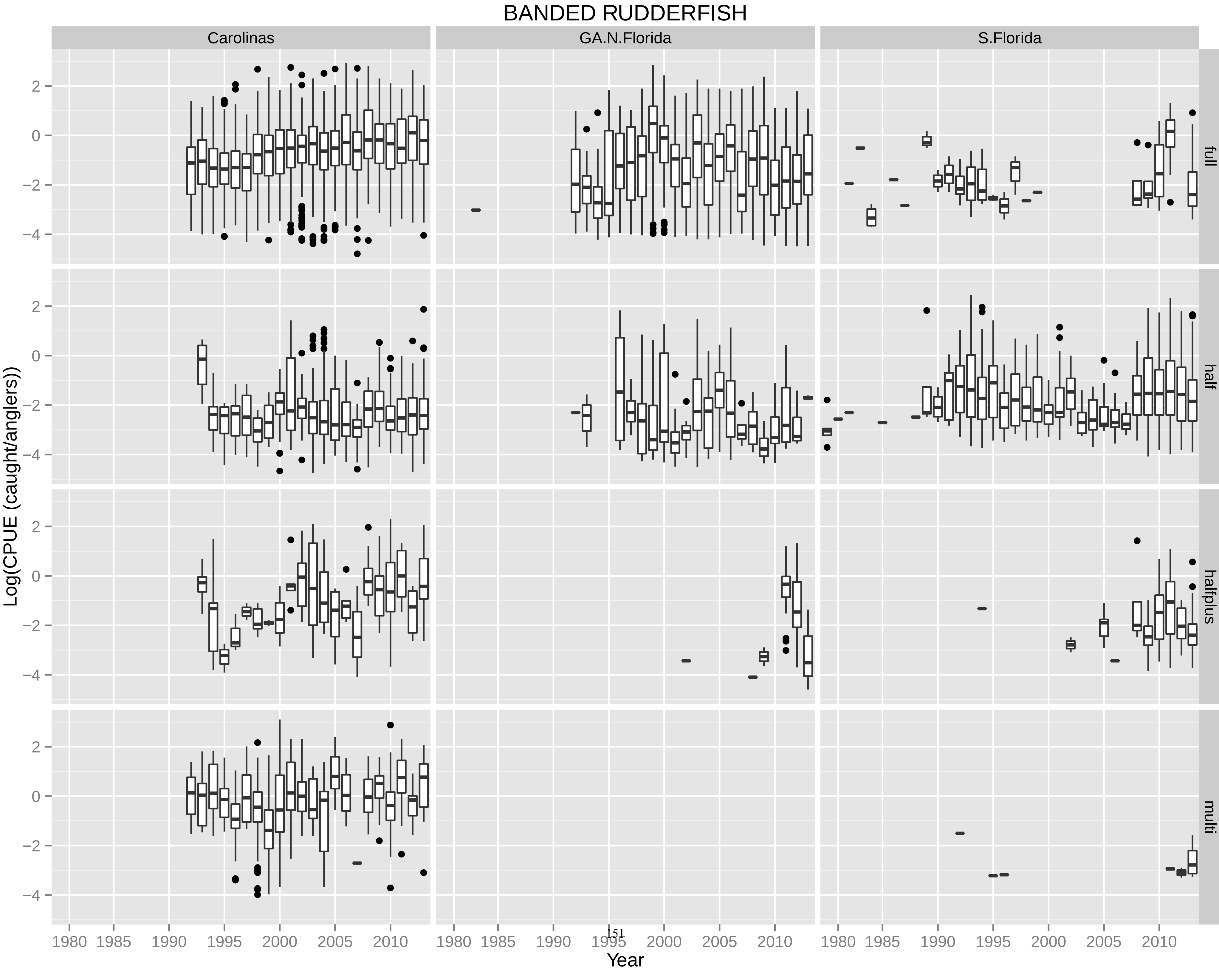

ATLANTIC SHARPNOSE SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
1990
1995
2000
2005
2010
2
0
−2
−4

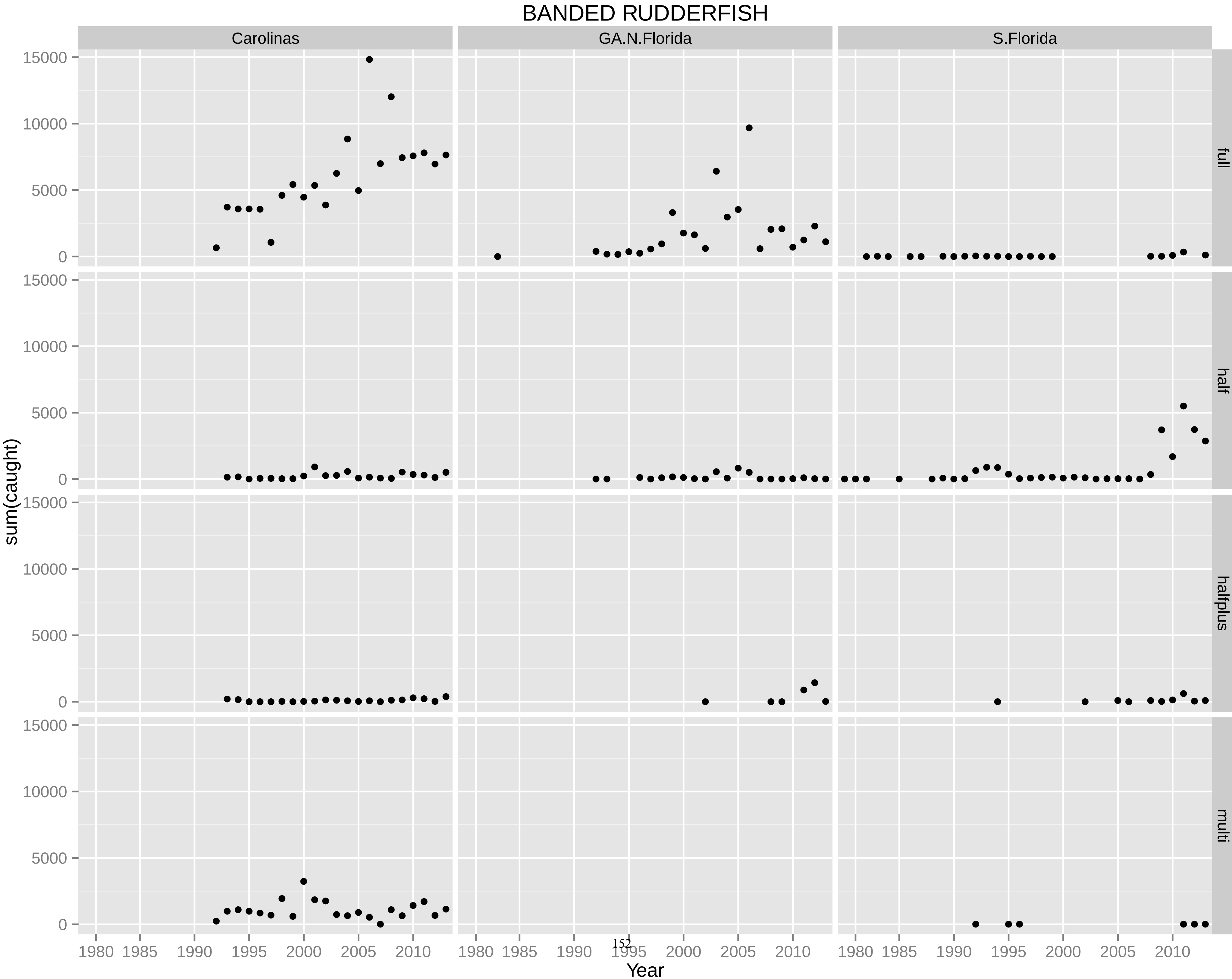

ATLANTIC SHARPNOSE SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
3000
6000
9000
12000
1990
1995
2000
2005
2010

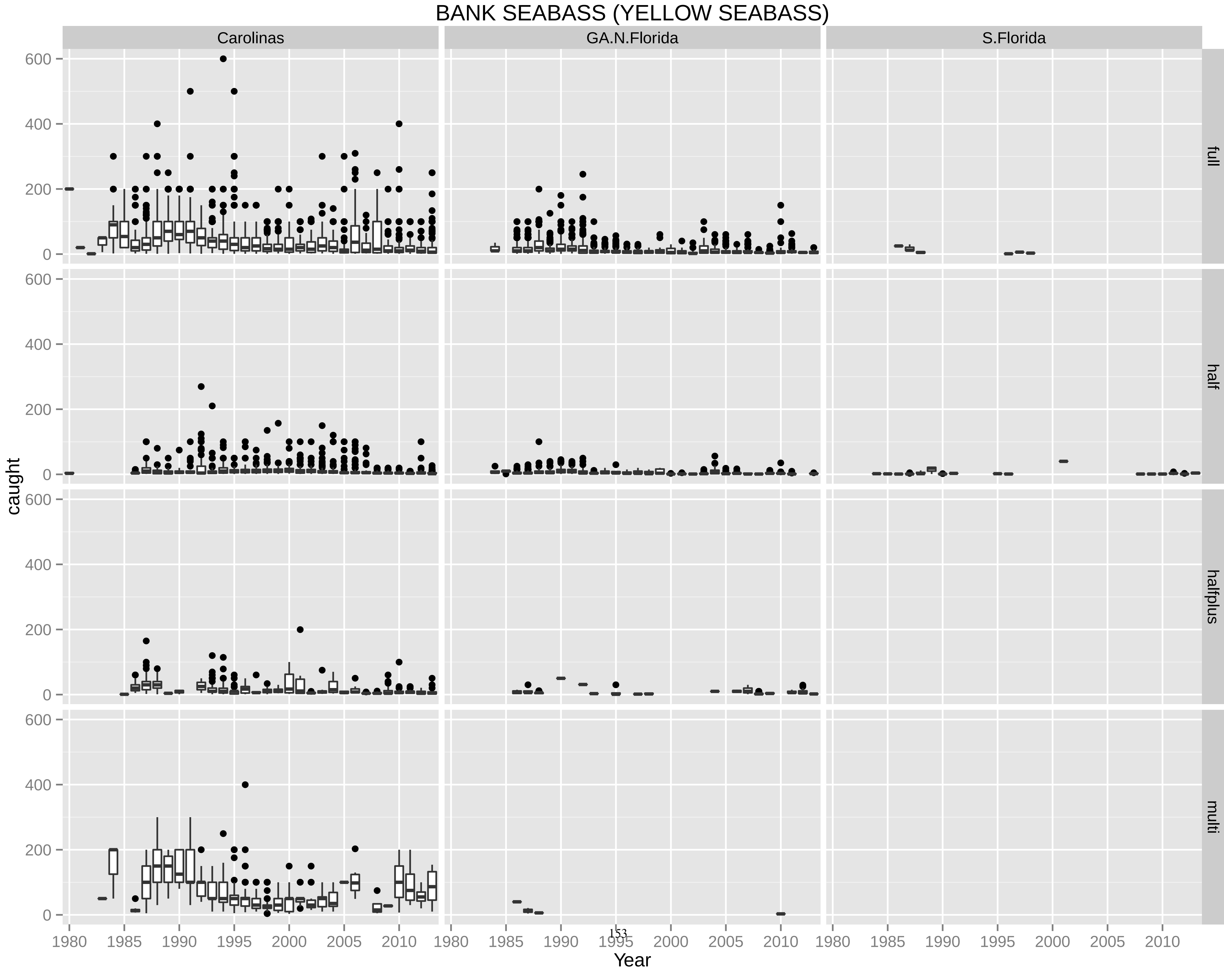

BANDED RUDDERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
250
500
750
1000
1250
1980
1985
1990
1995
2000
2005
2010

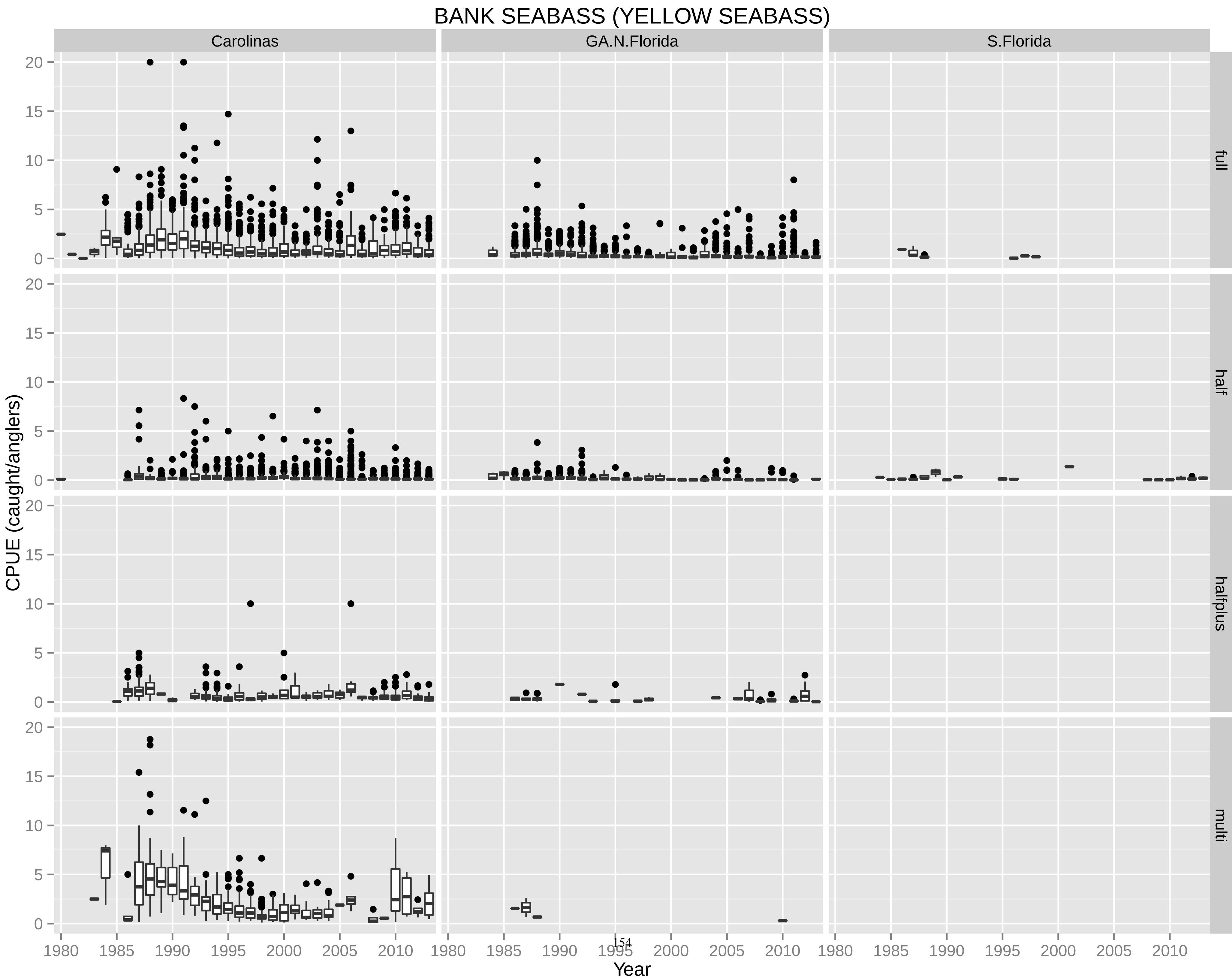


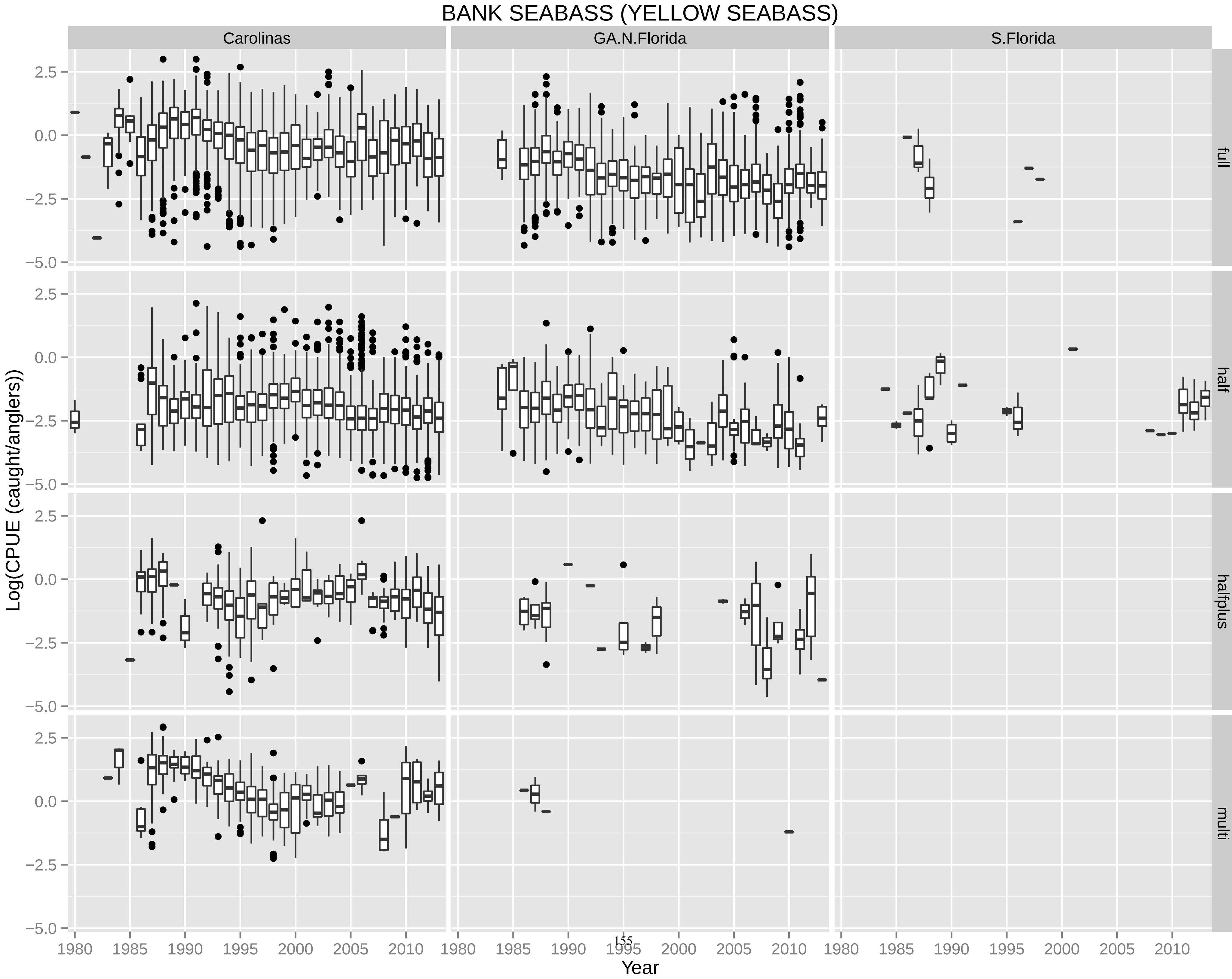
BANDED RUDDERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
20
1980
1985
1990
1995
2000
2005
2010


BANDED RUDDERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

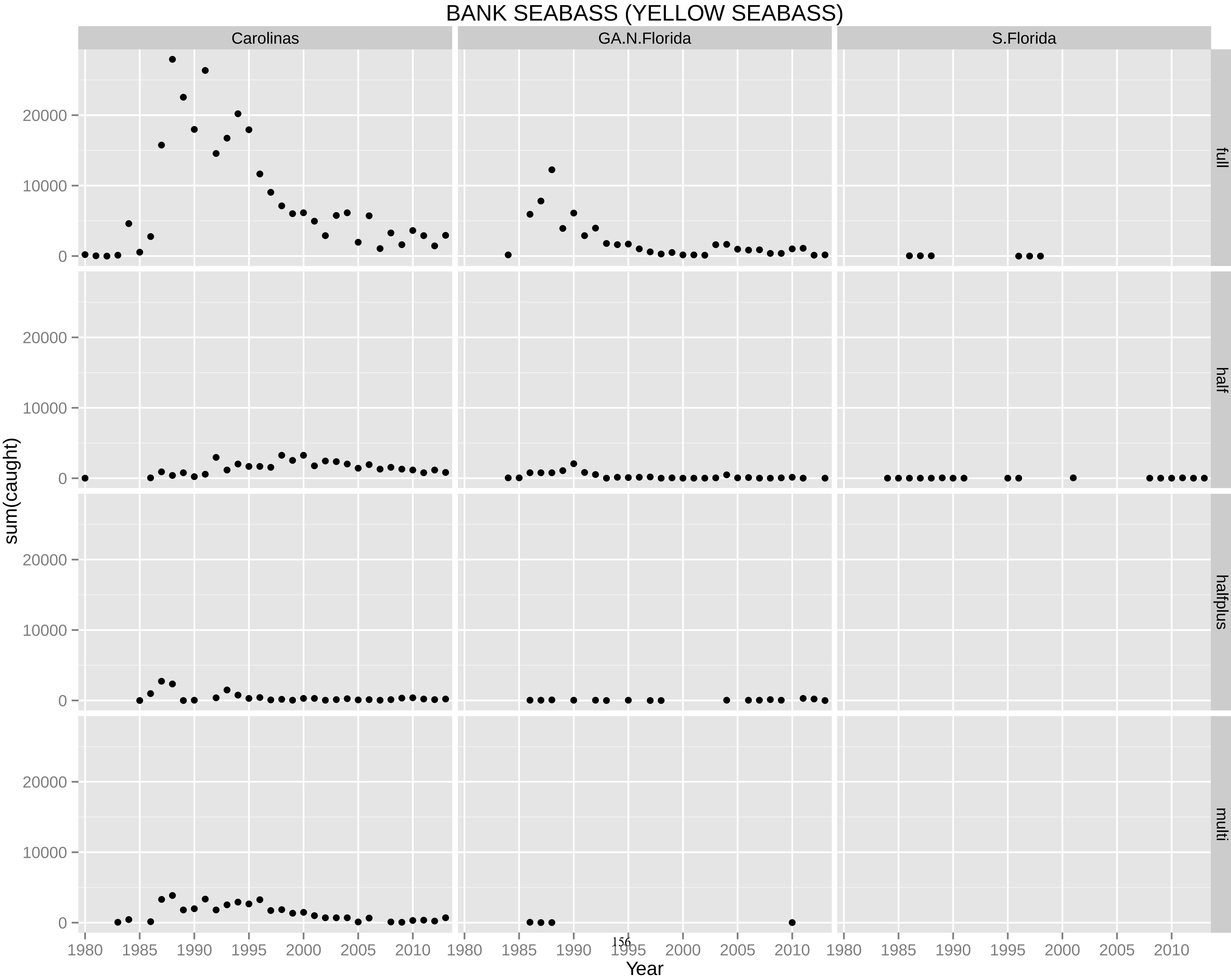

BANDED RUDDERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
15000
10000
5000
0
1980
1985
1990
1995
2000
2005
2010

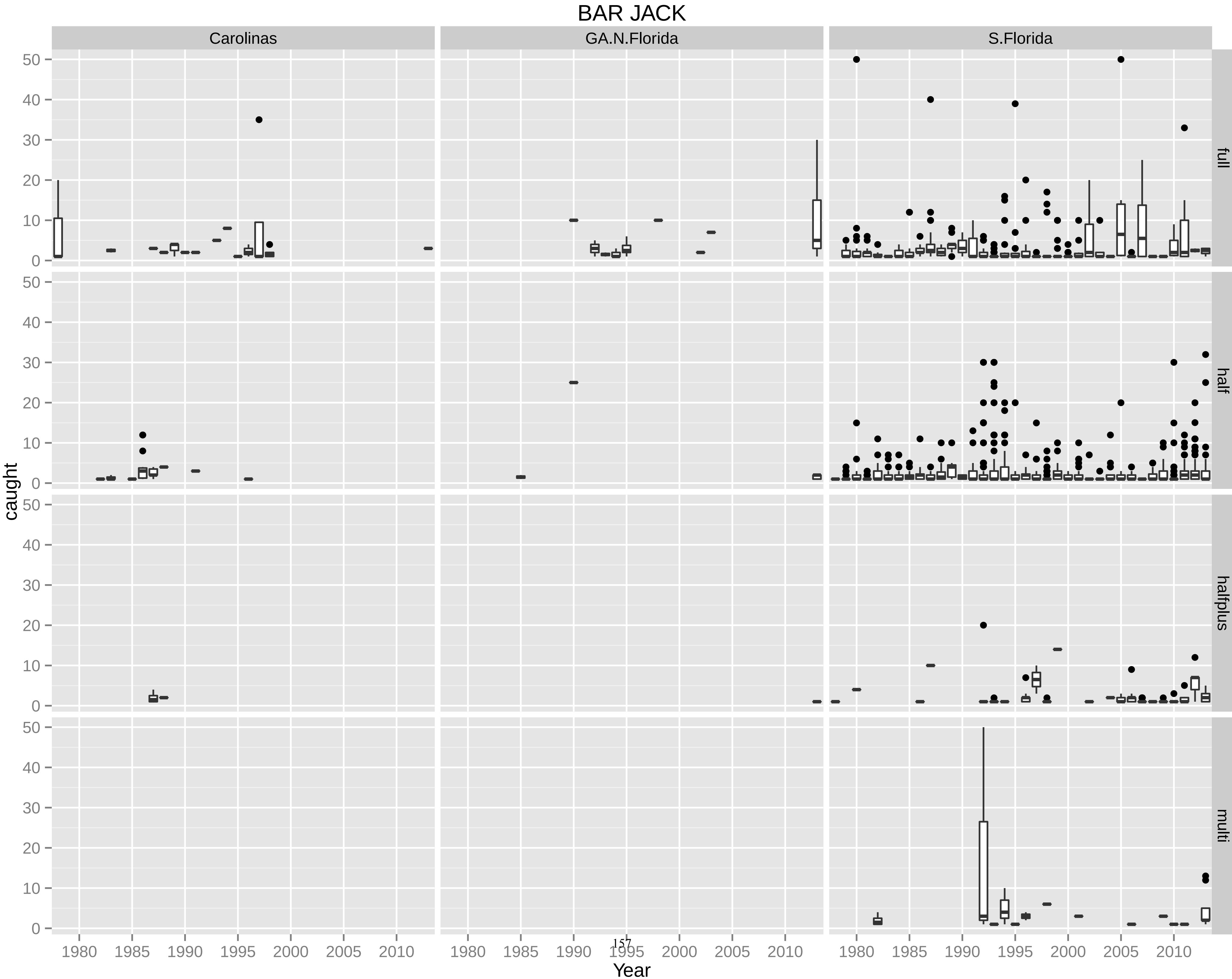

BANK SEABASS (YELLOW SEABASS)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
200
400
600
1980
1985
1990
1995
2000
2005
2010

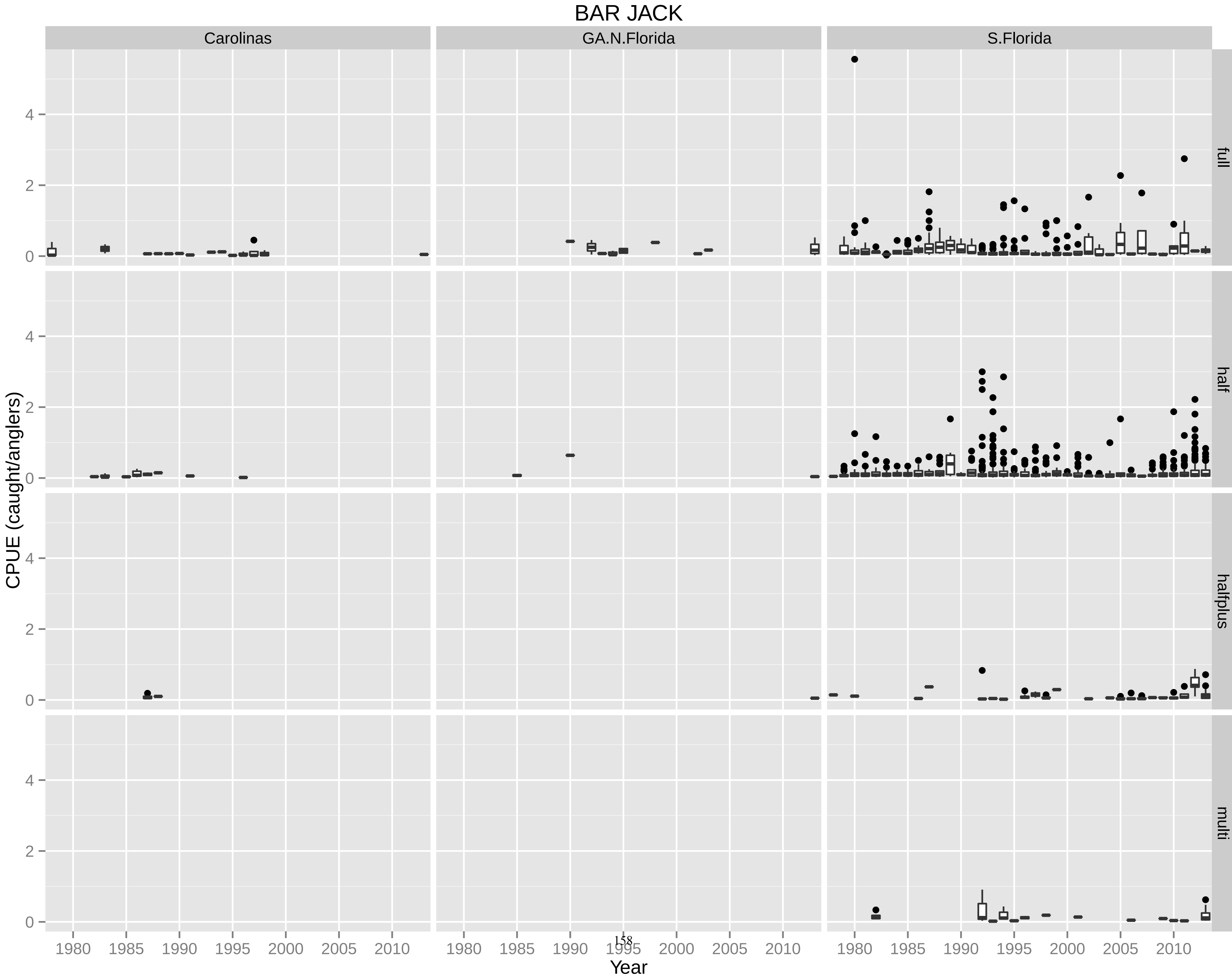

BANK SEABASS (YELLOW SEABASS)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
20
1980
1985
1990
1995
2000
2005
2010

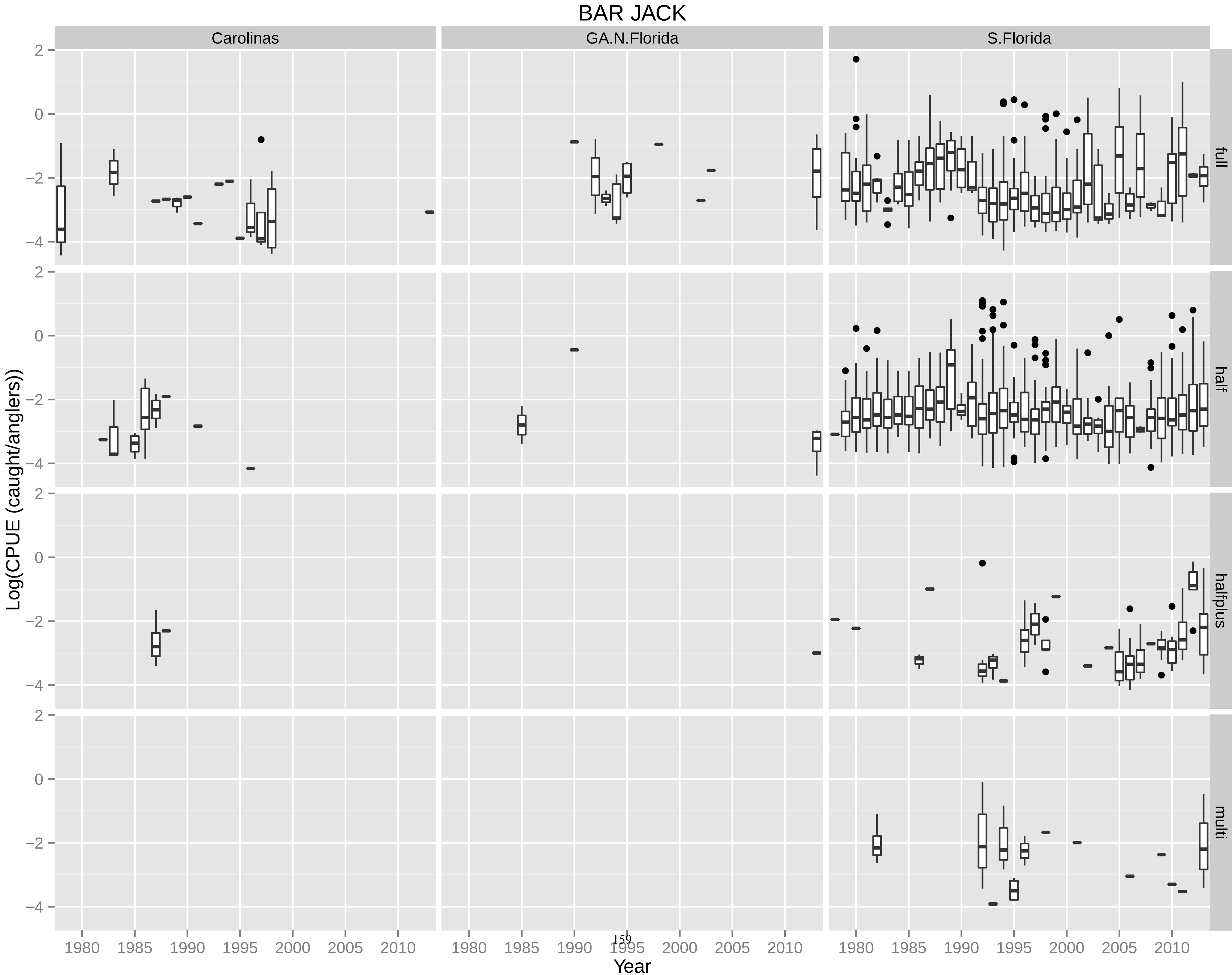


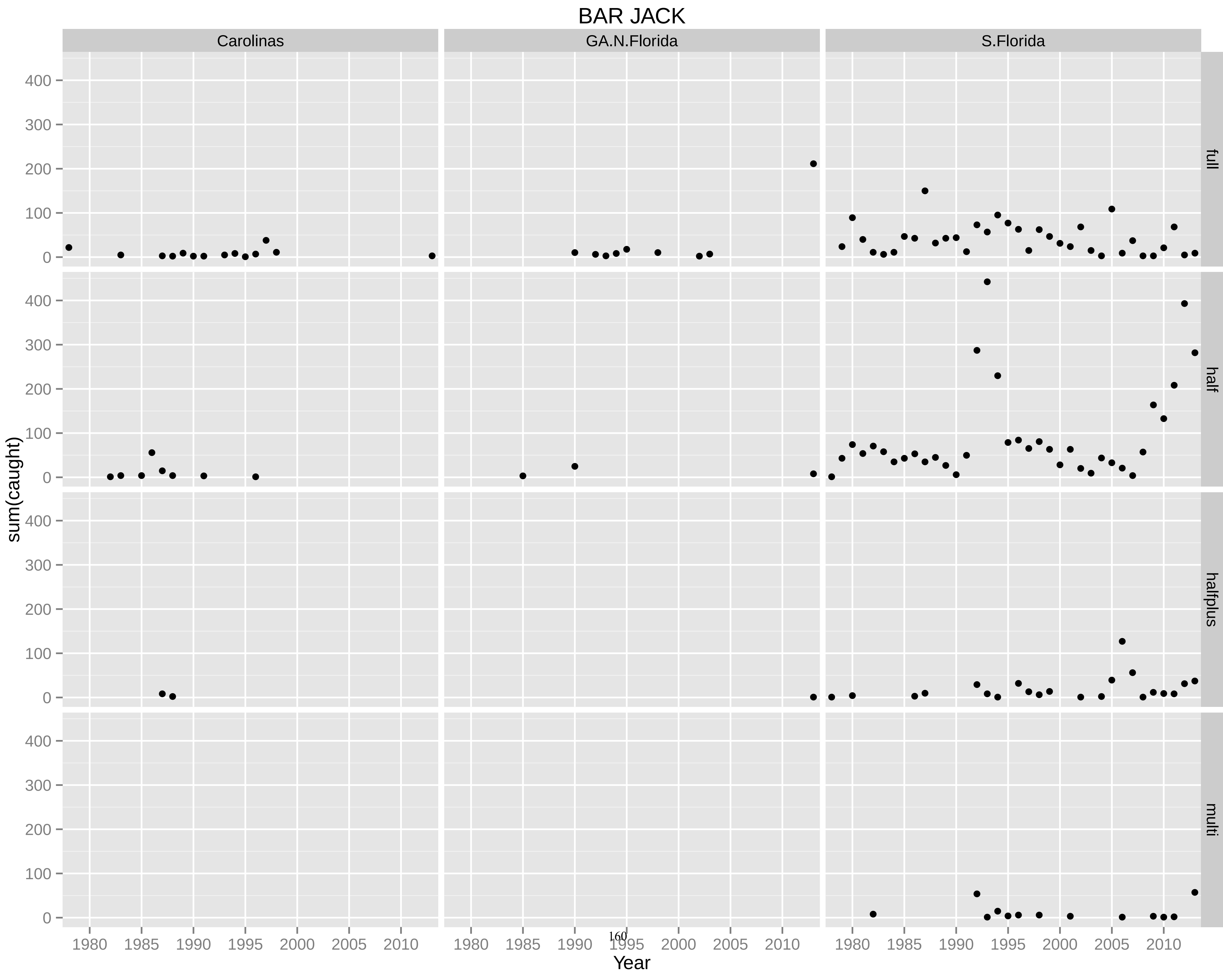
BANK SEABASS (YELLOW SEABASS)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1980
1985
1990
1995
2000
2005
2010

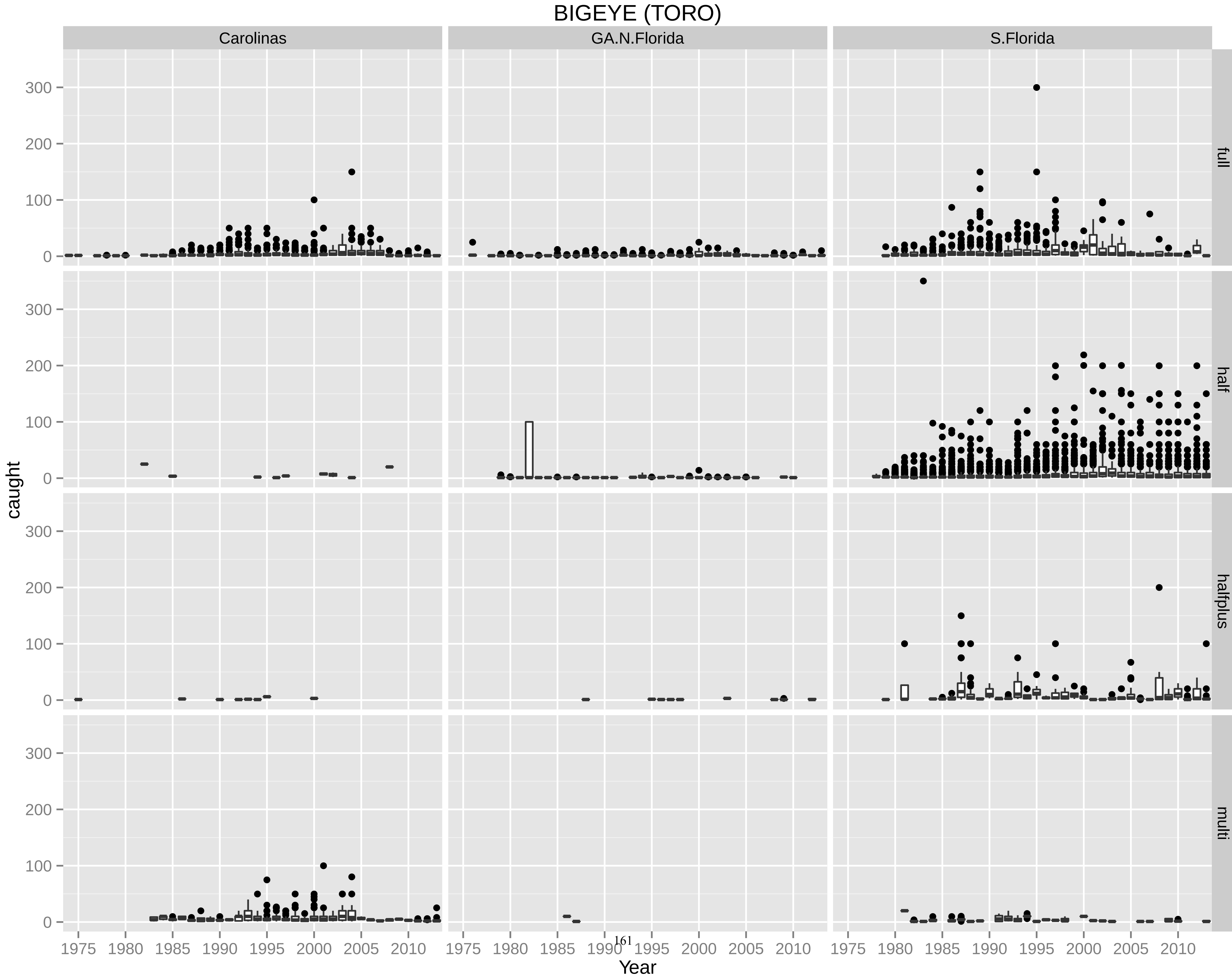

BANK SEABASS (YELLOW SEABASS)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
10000
20000
1980
1985
1990
1995
2000
2005
2010

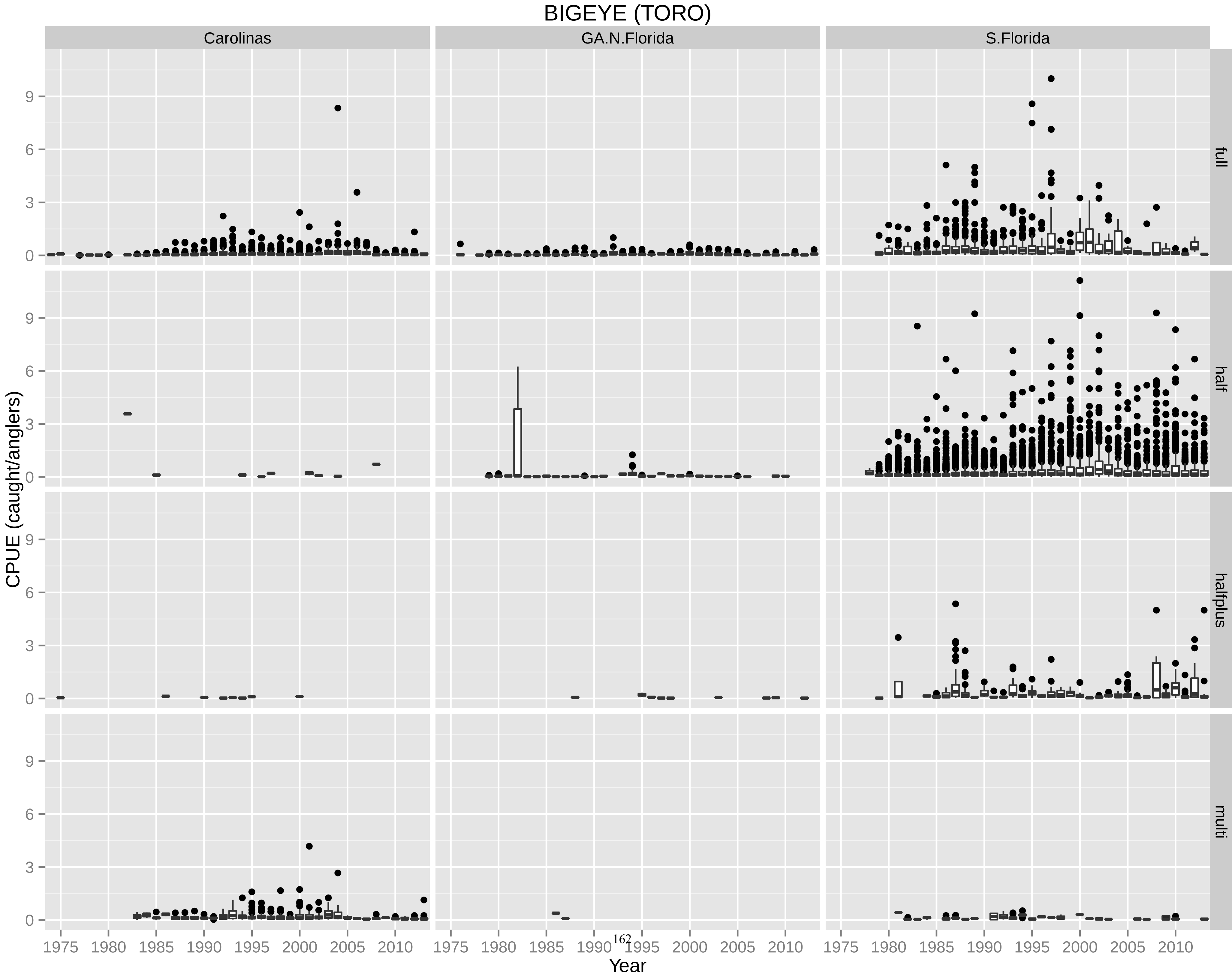

BAR JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
10
20
30
40
50
1980
1985
1990
1995
2000
2005
2010


BAR JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
2
4
1980
1985
1990
1995
2000
2005
2010

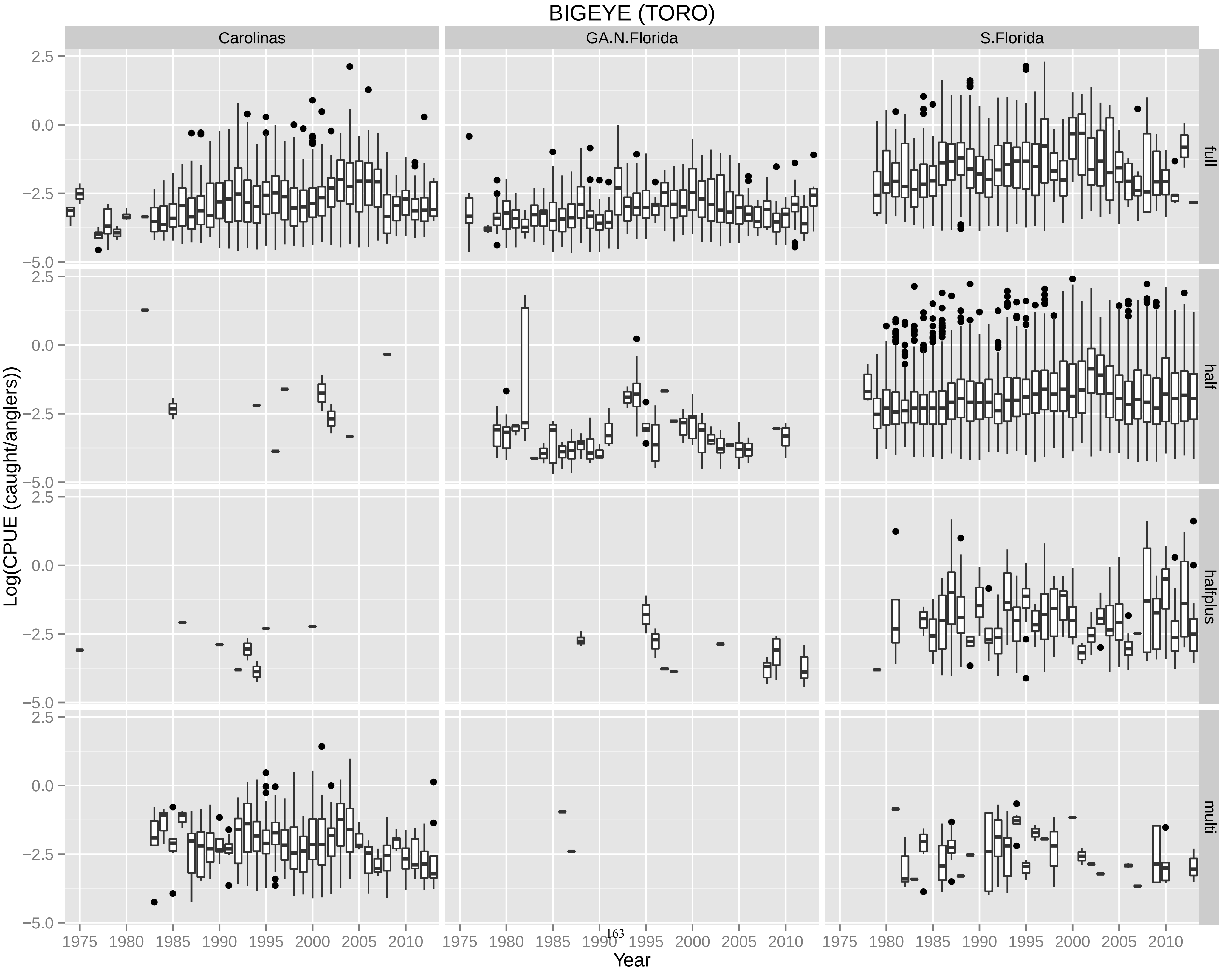

BAR JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

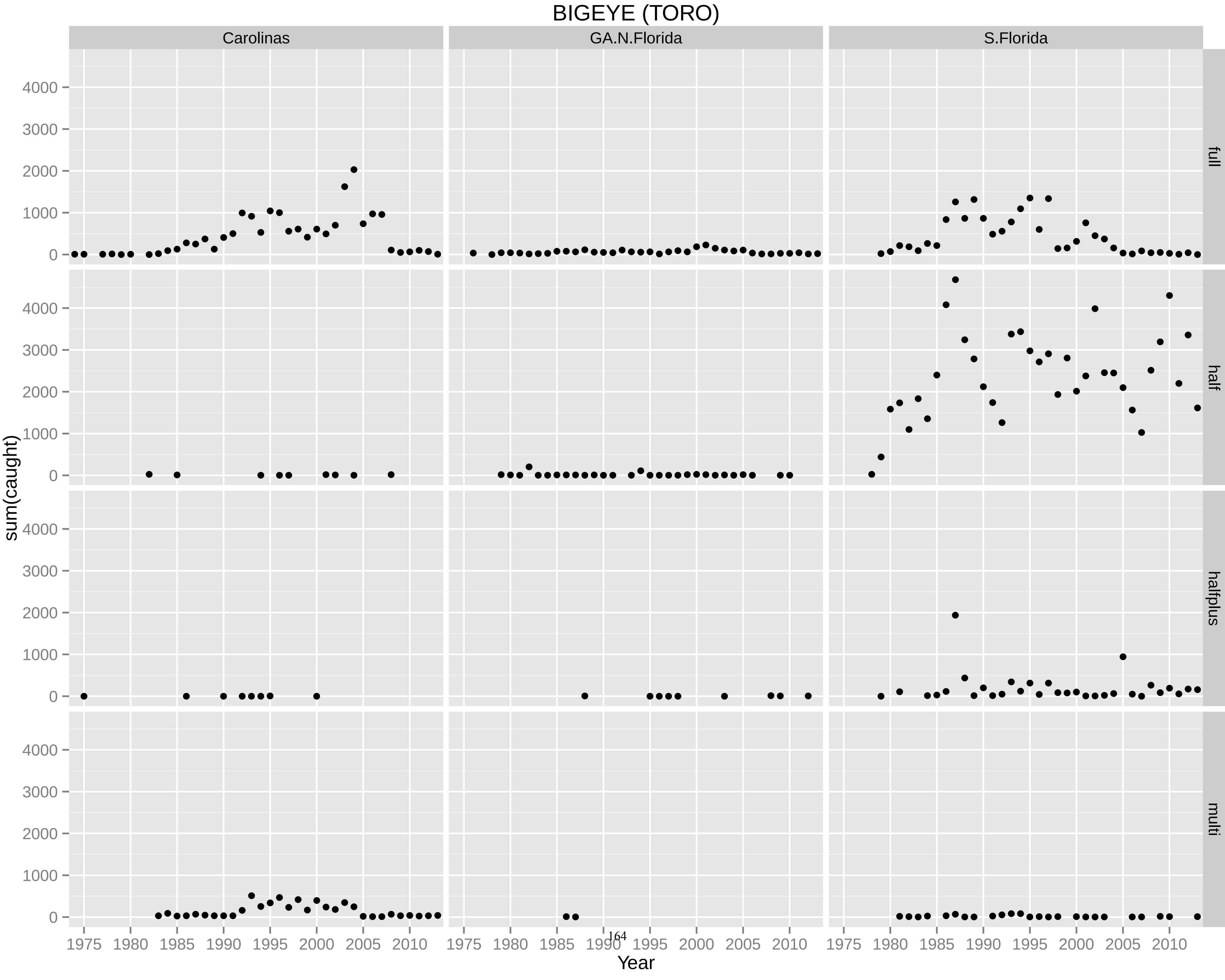

BAR JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
100
200
300
400
1980
1985
1990
1995
2000
2005
2010

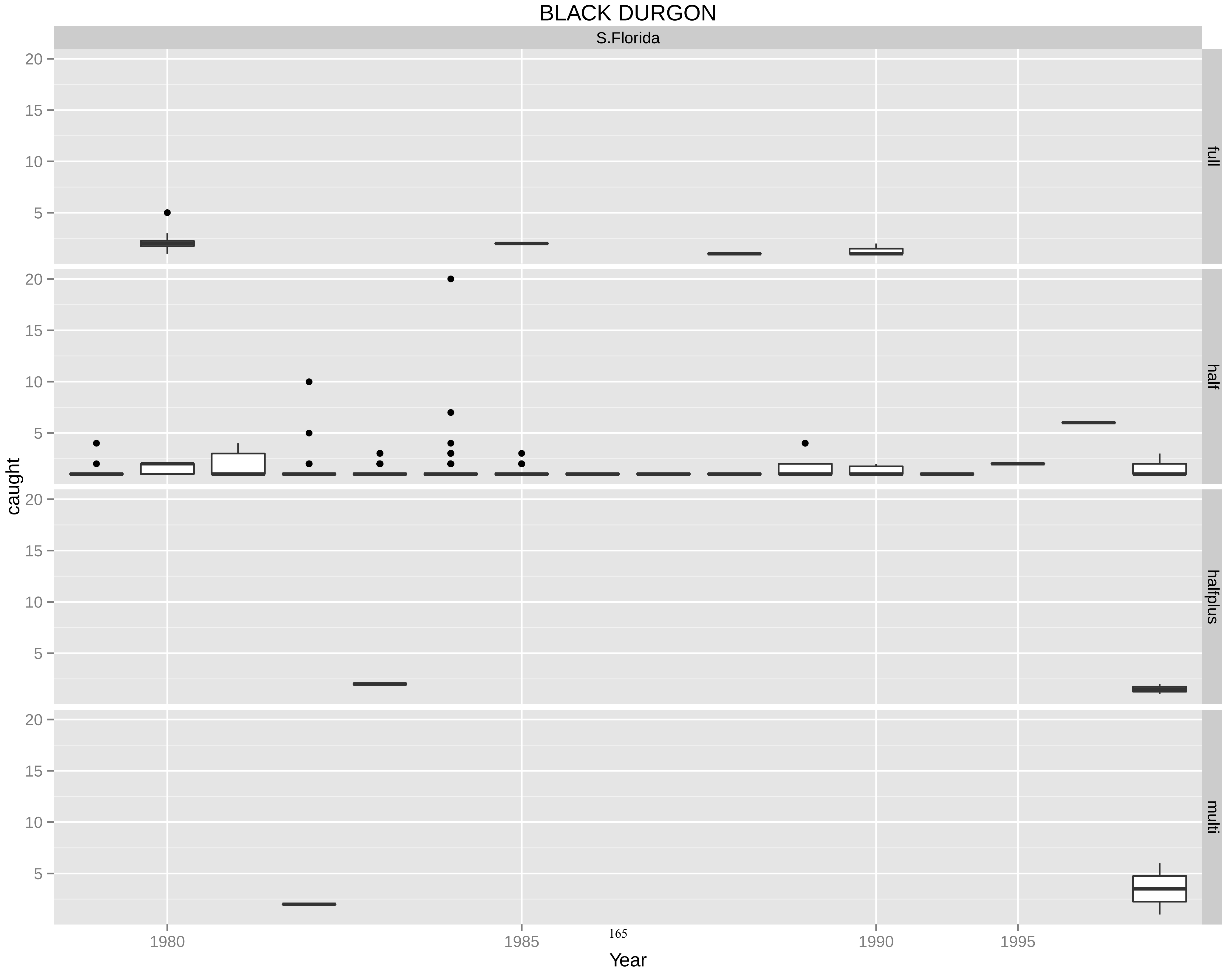

BIGEYE (TORO)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
1975
1980
1985
1990
1995
2000
2005
2010



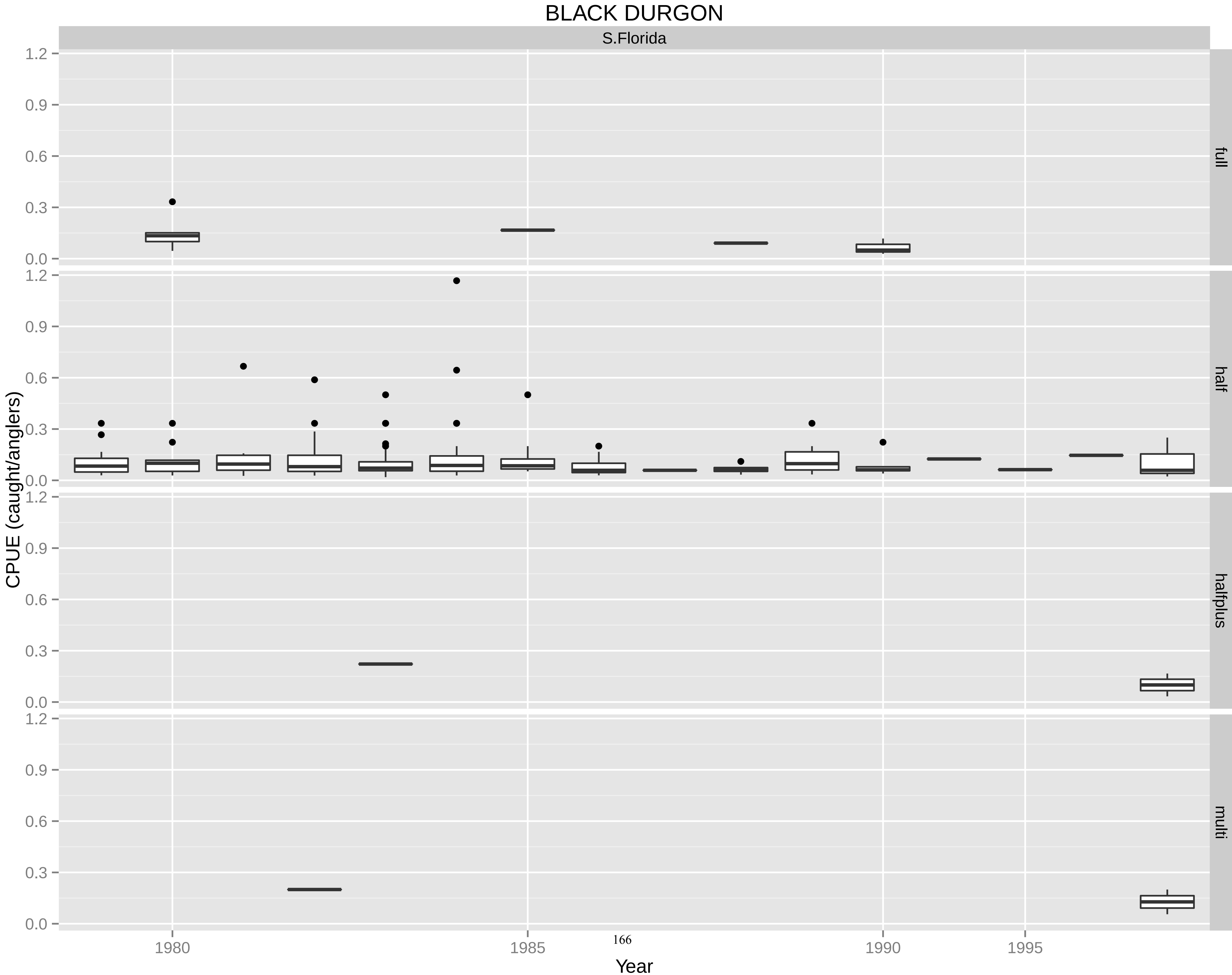
BIGEYE (TORO)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0
3
6
9
1975
1980
1985
1990
1995
2000
2005
2010
Year


BIGEYE (TORO)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
2.5
0.0
−2.5
−5.0
Log(CPUE (caught/anglers))
1975
1980
1985
1990
1995
2000
2005
2010
Year

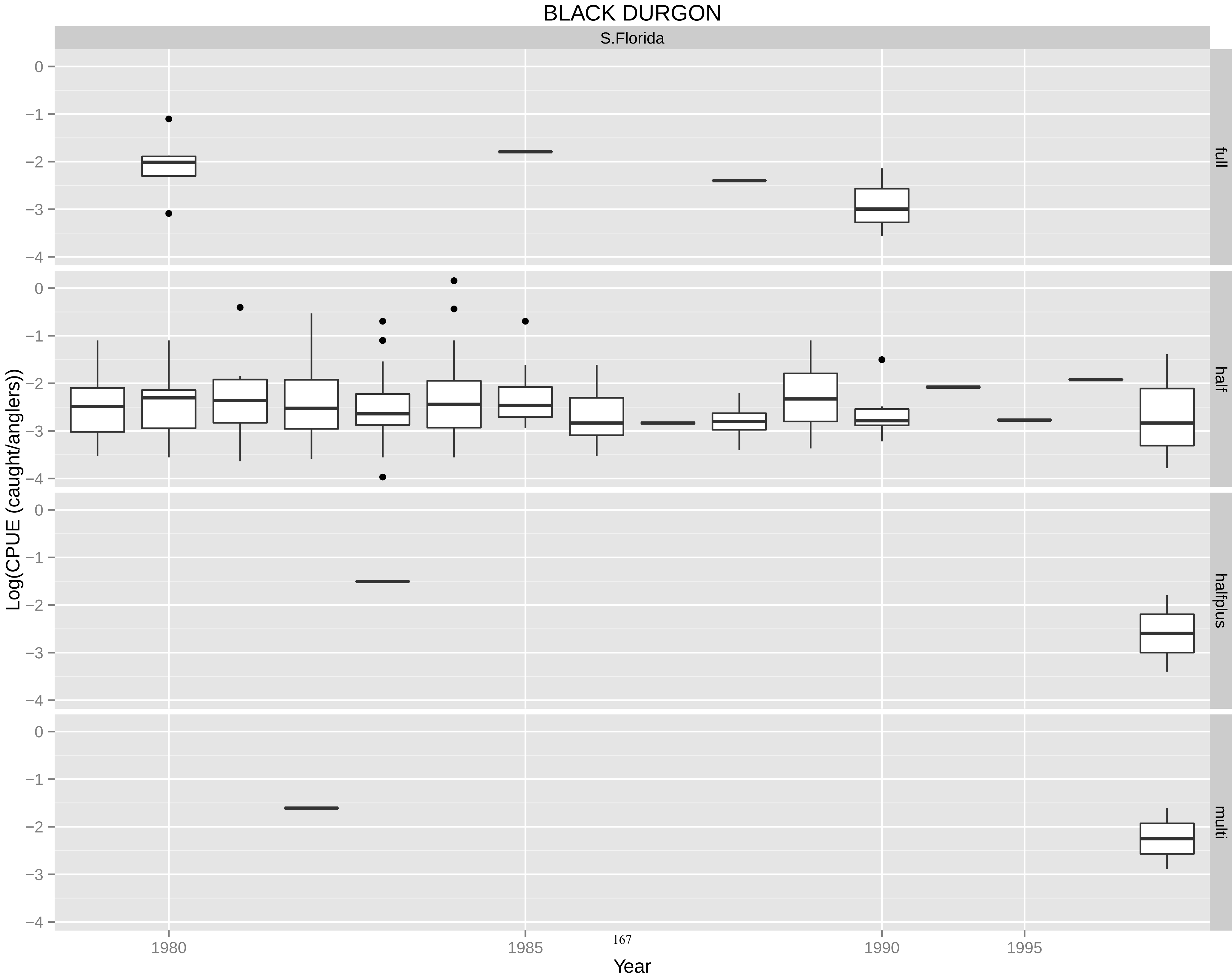

BIGEYE (TORO)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
1000
2000
3000
4000
1975
1980
1985
1990
1995
2000
2005
2010

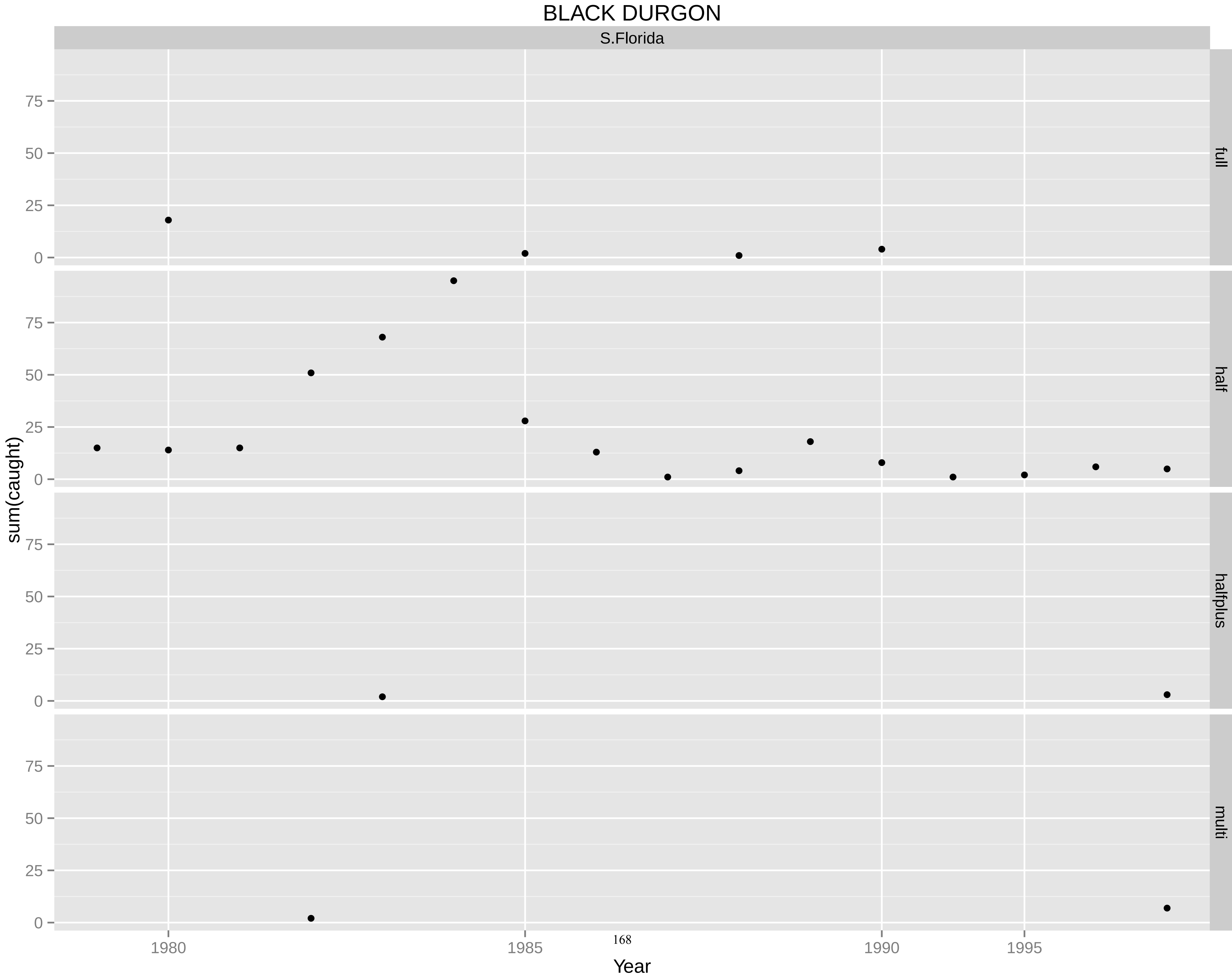


BLACK DURGON
S.Florida
full
half
halfplus
multi
caught
20
15
10
5
1980
1985
1990
1995
Year

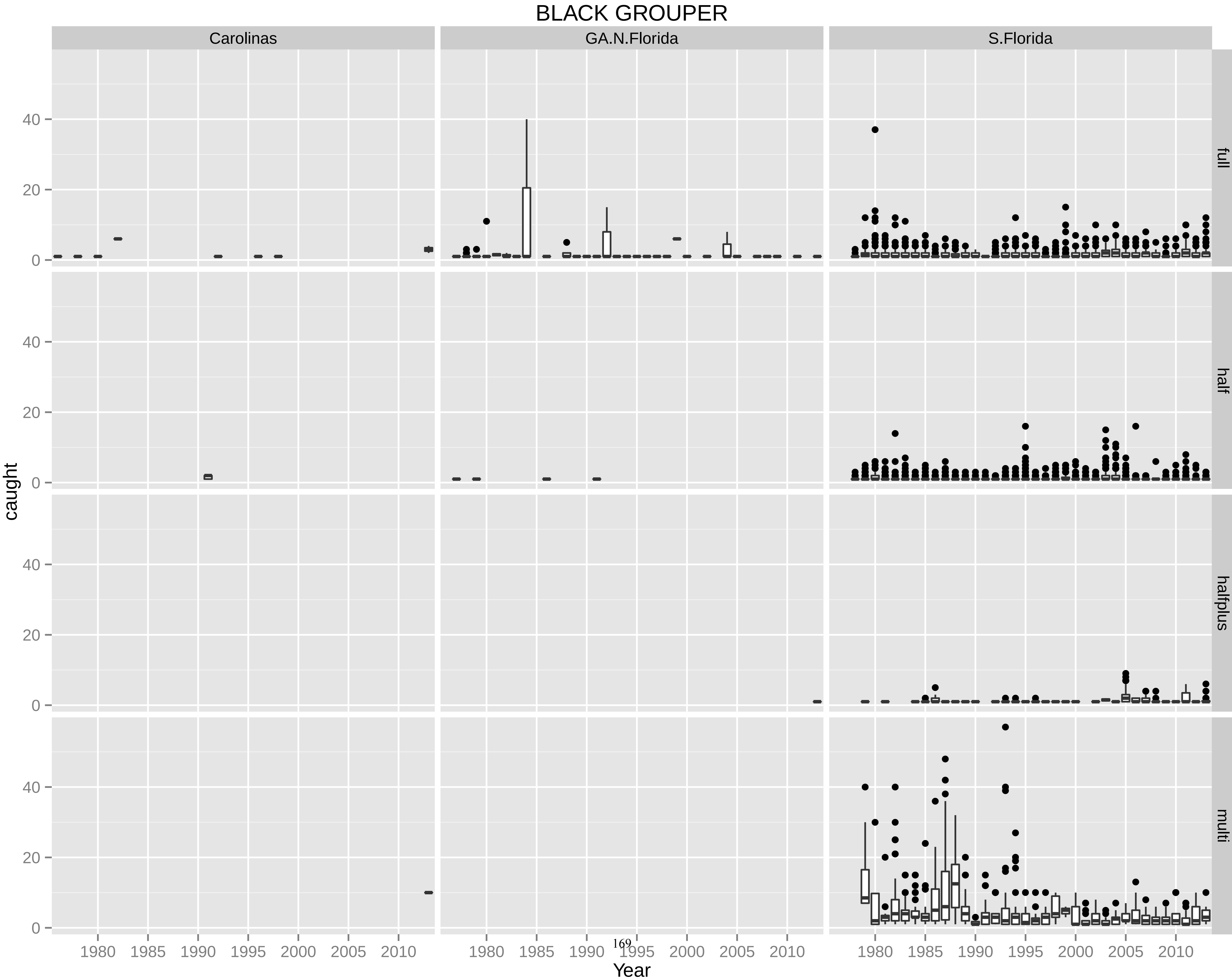


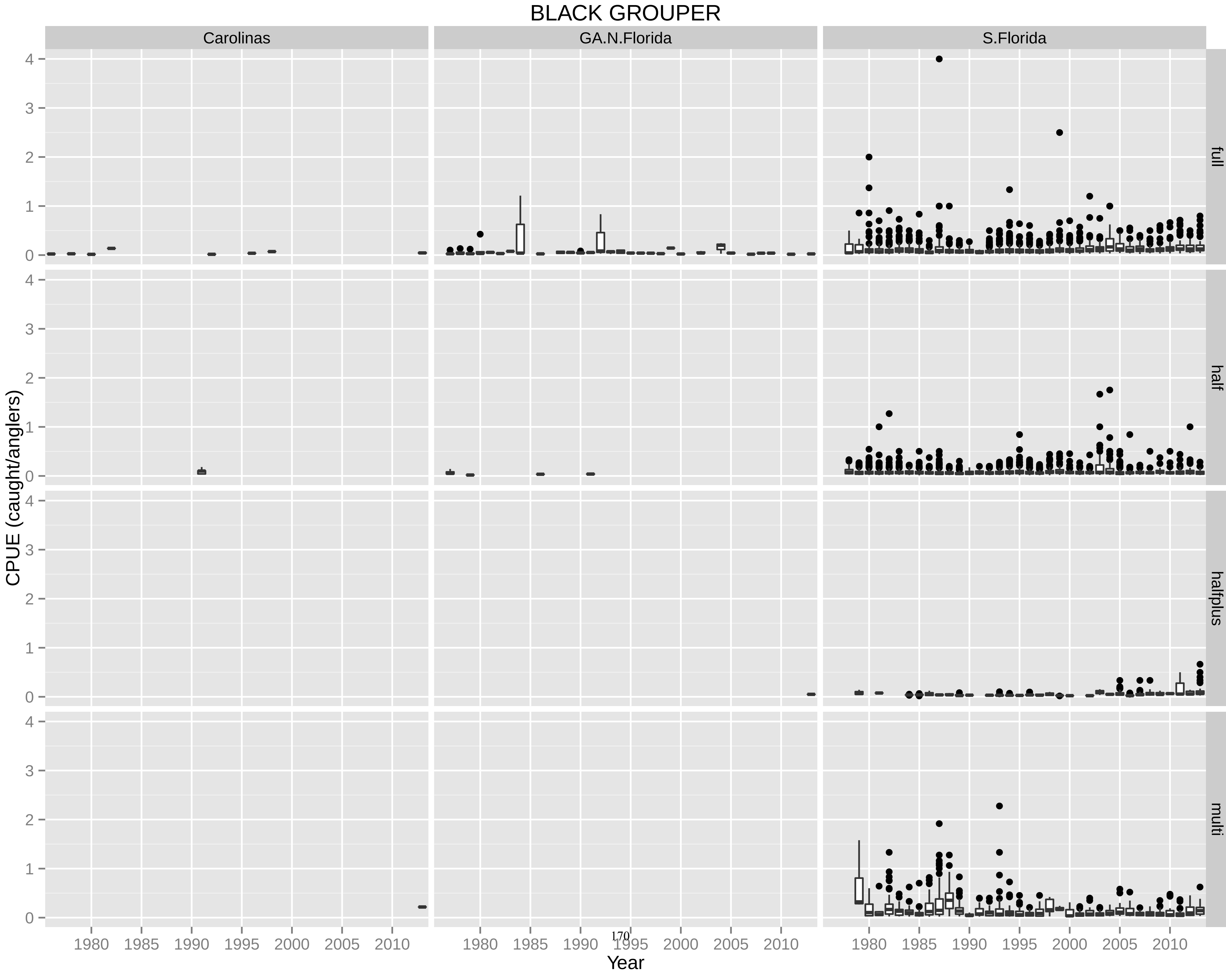
BLACK DURGON
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
1.2
0.9
0.6
0.3
0.0
1980
1985
1990
1995
Year

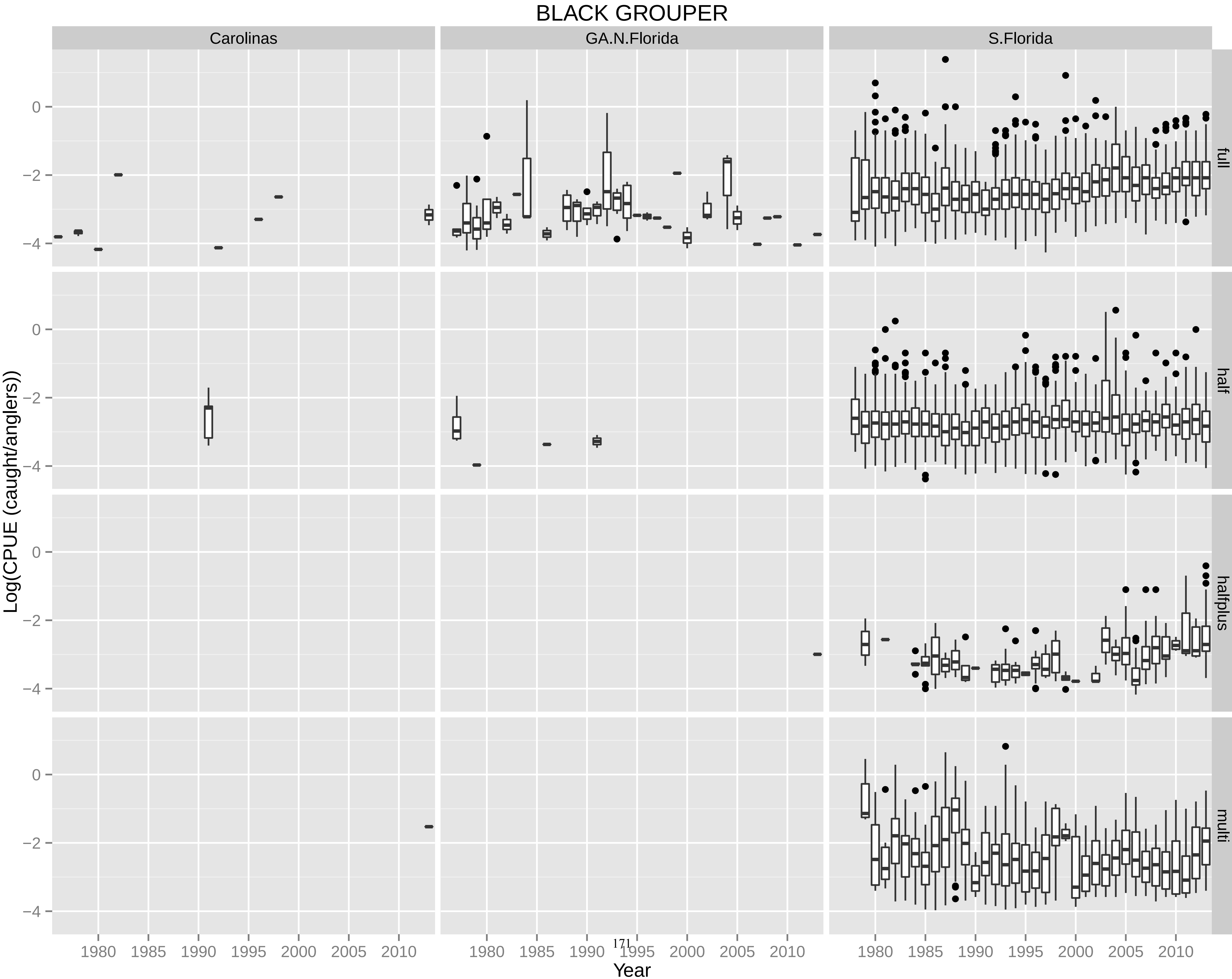

BLACK DURGON
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−1
−2
−3
−4
1980
1985
1990
1995

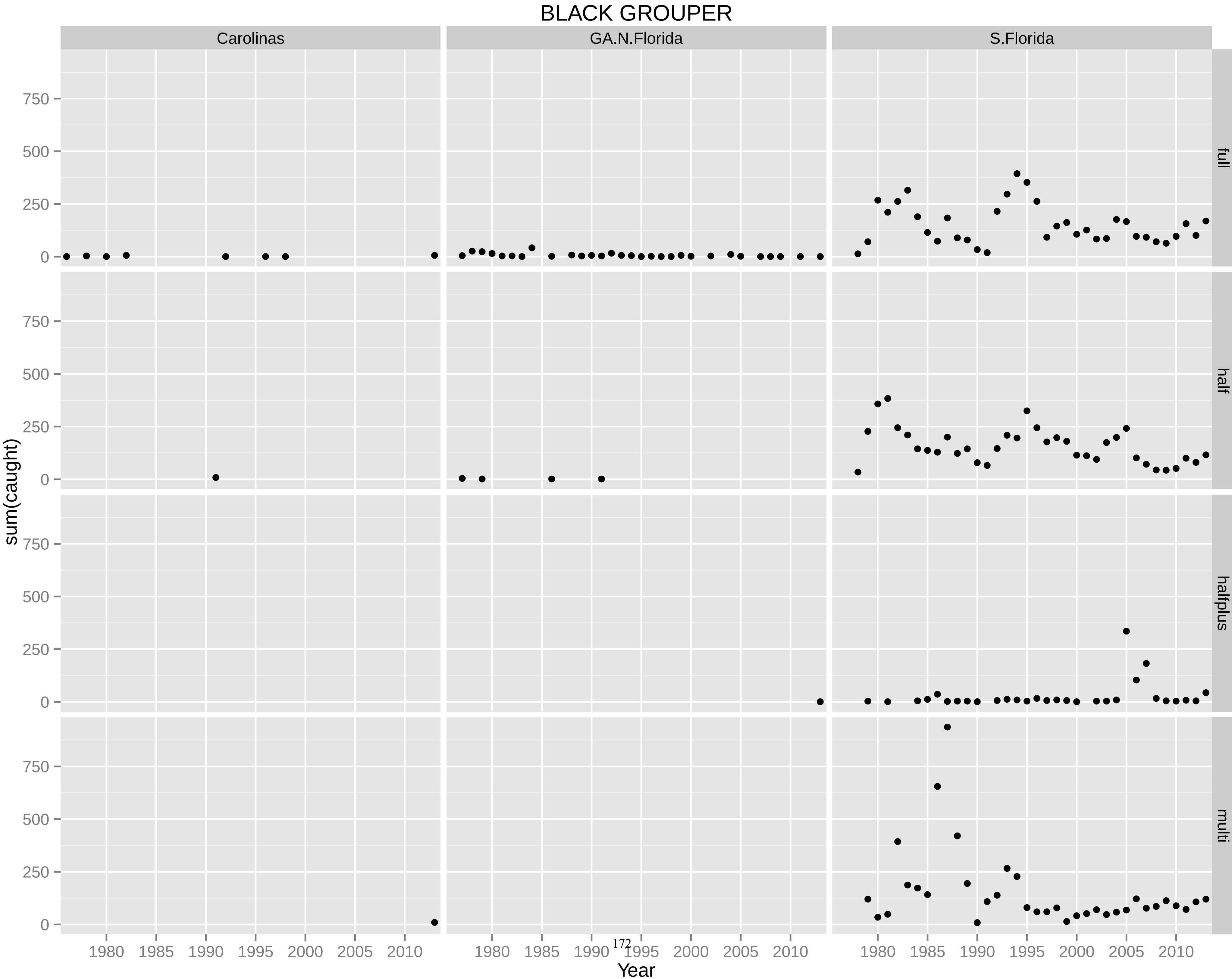


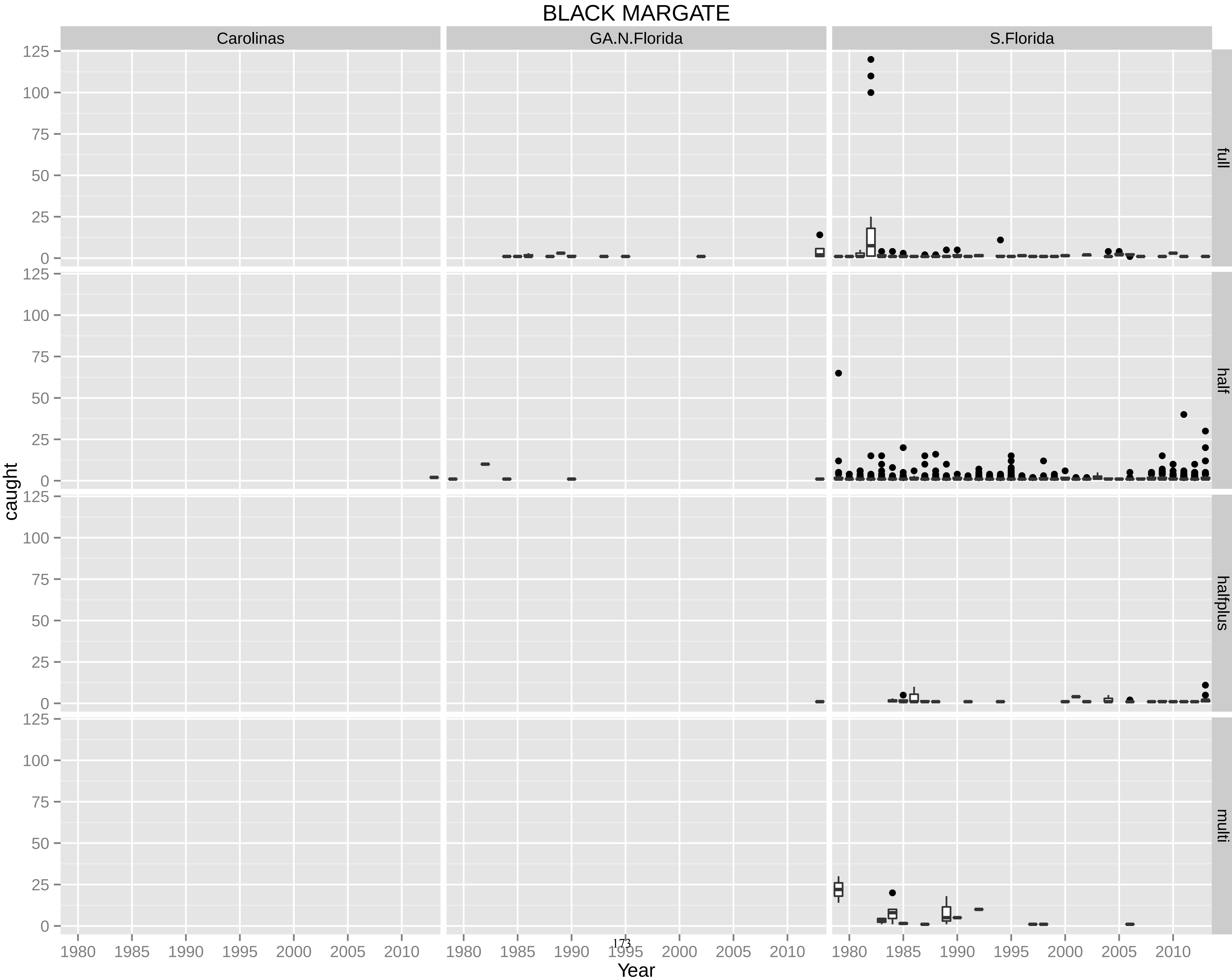
BLACK DURGON
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
25
50
75
1980
1985
1990
1995

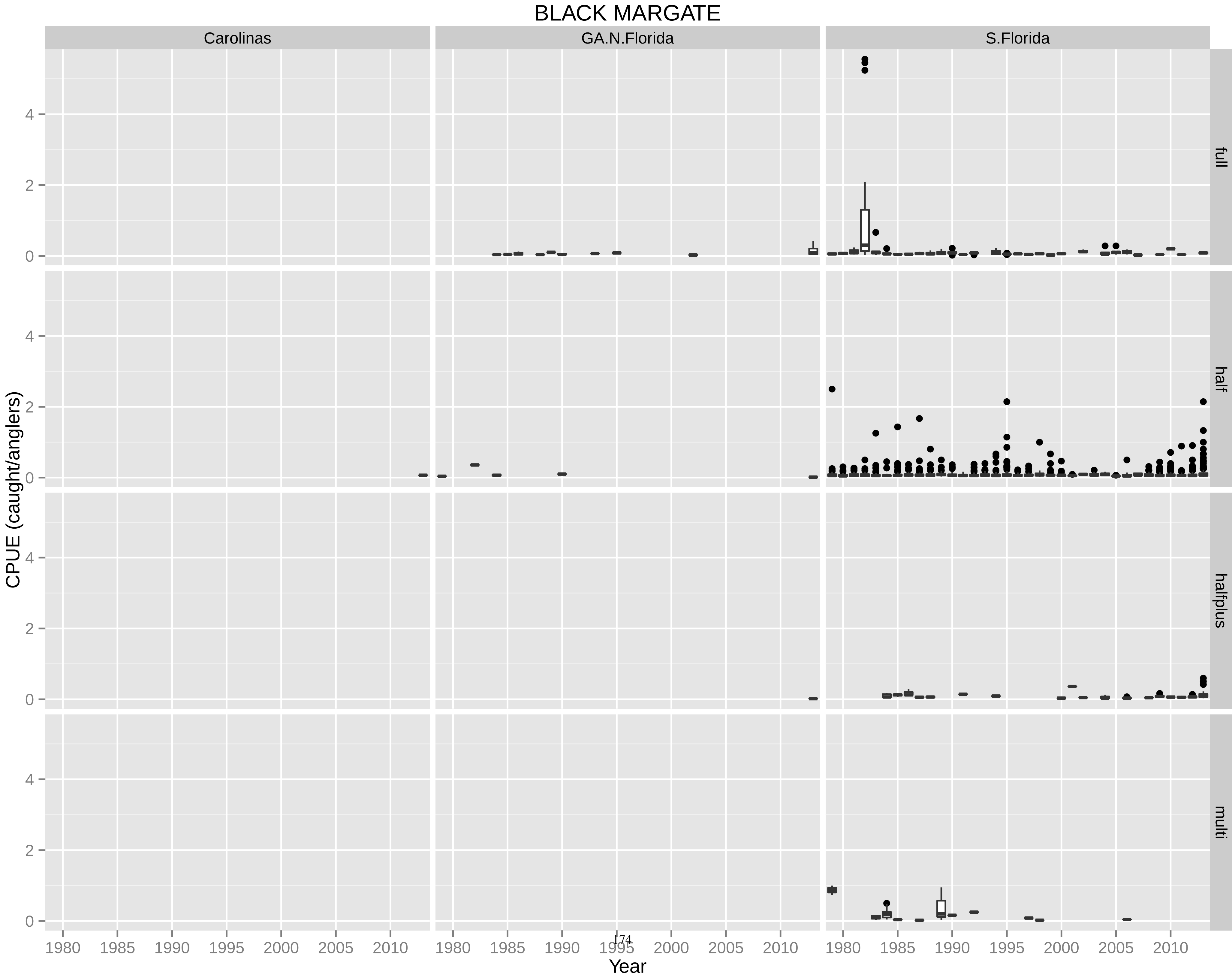

BLACK GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
20
40
1980
1985
1990
1995
2000
2005
2010

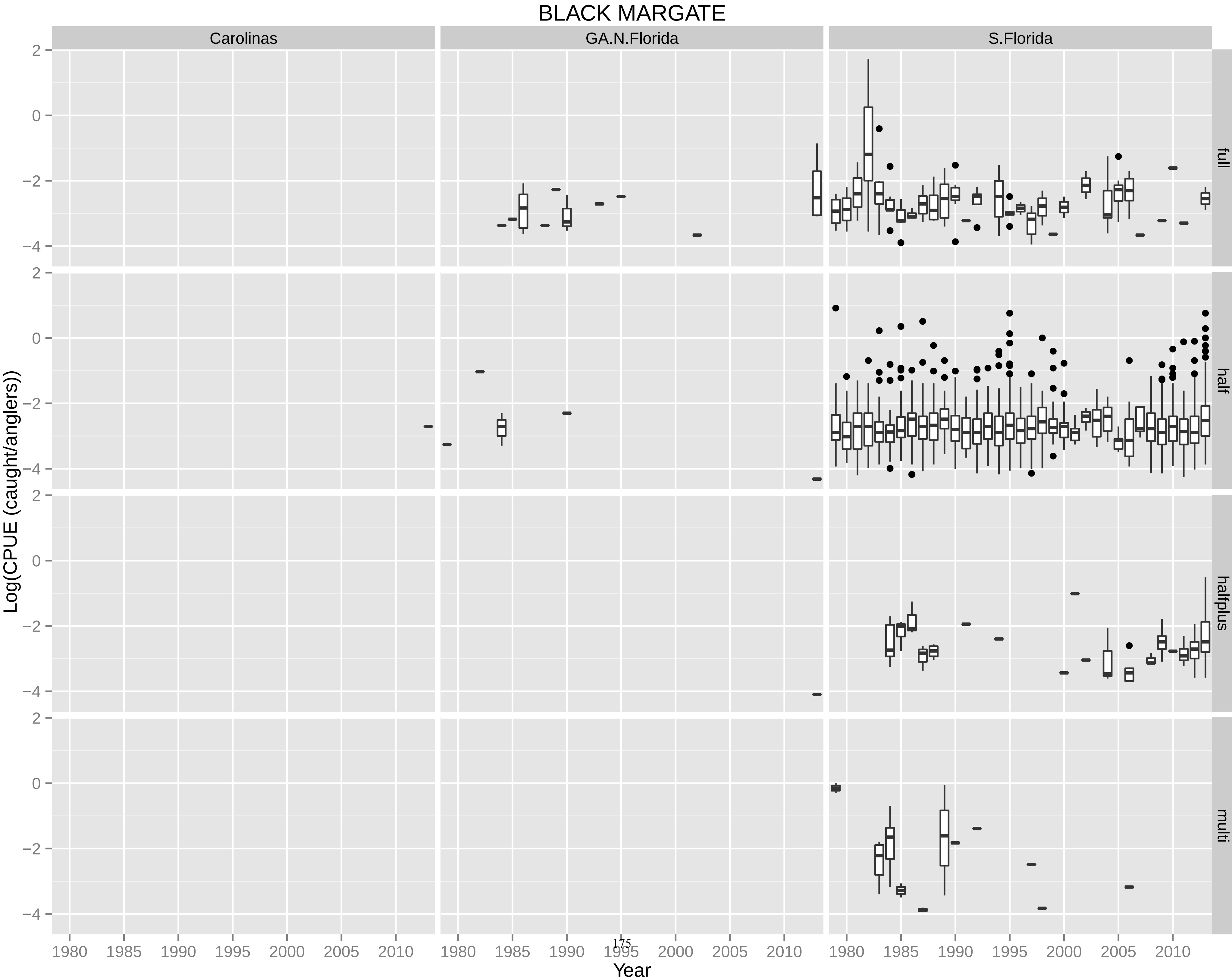

BLACK GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
4
1980
1985
1990
1995
2000
2005
2010

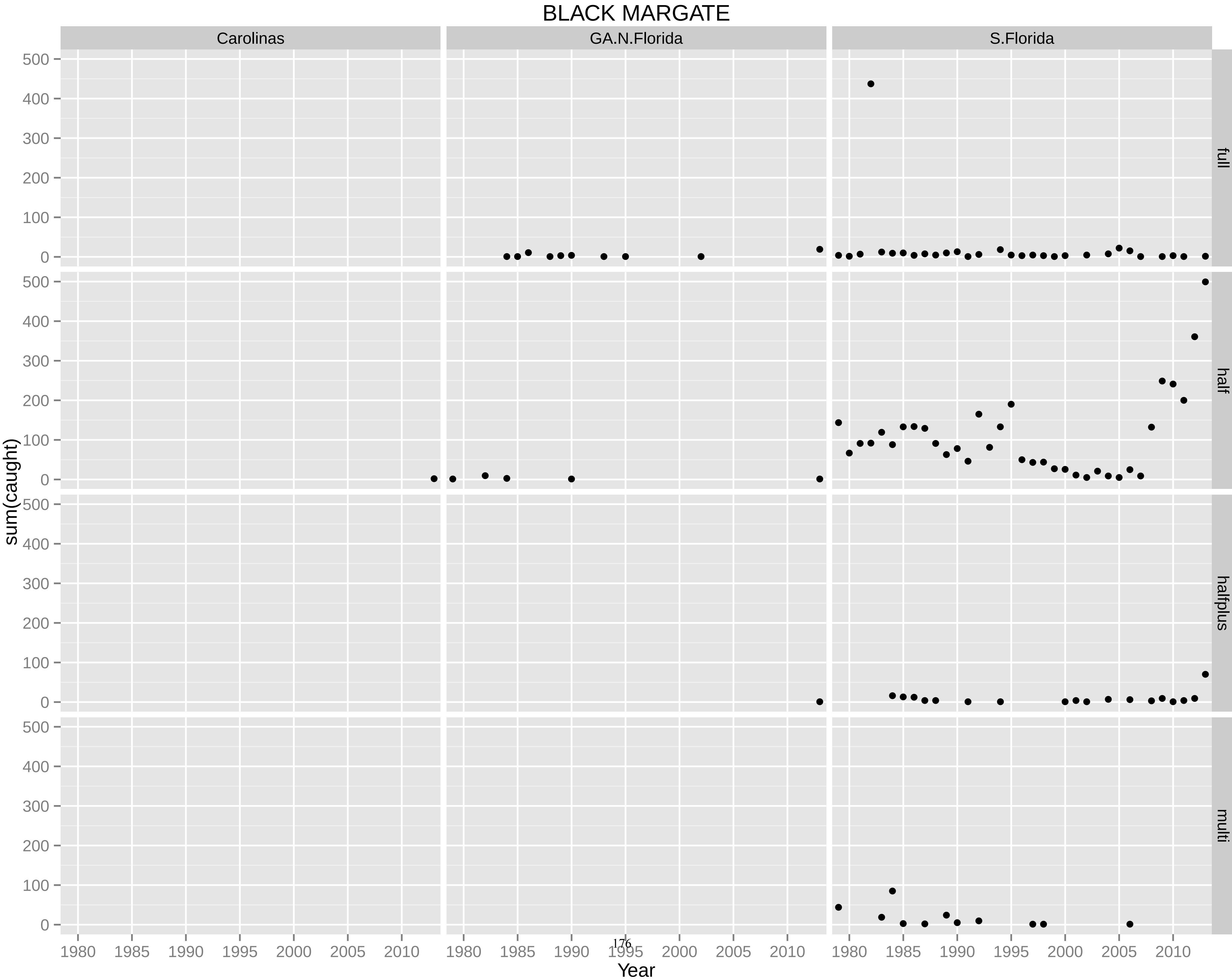

BLACK GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

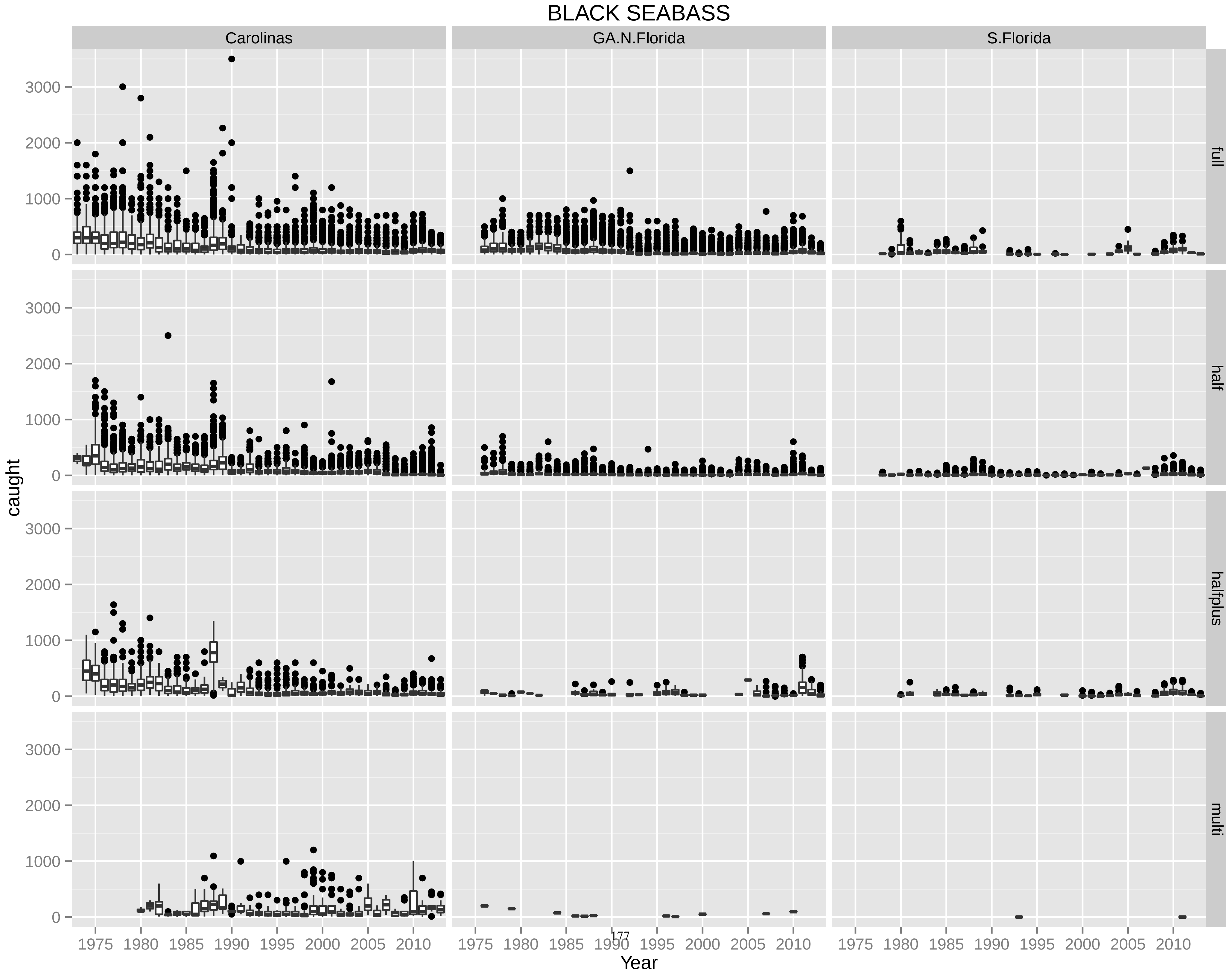

BLACK GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
250
500
750
1980
1985
1990
1995
2000
2005
2010


BLACK MARGATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
25
50
75
100
125
1980
1985
1990
1995
2000
2005
2010

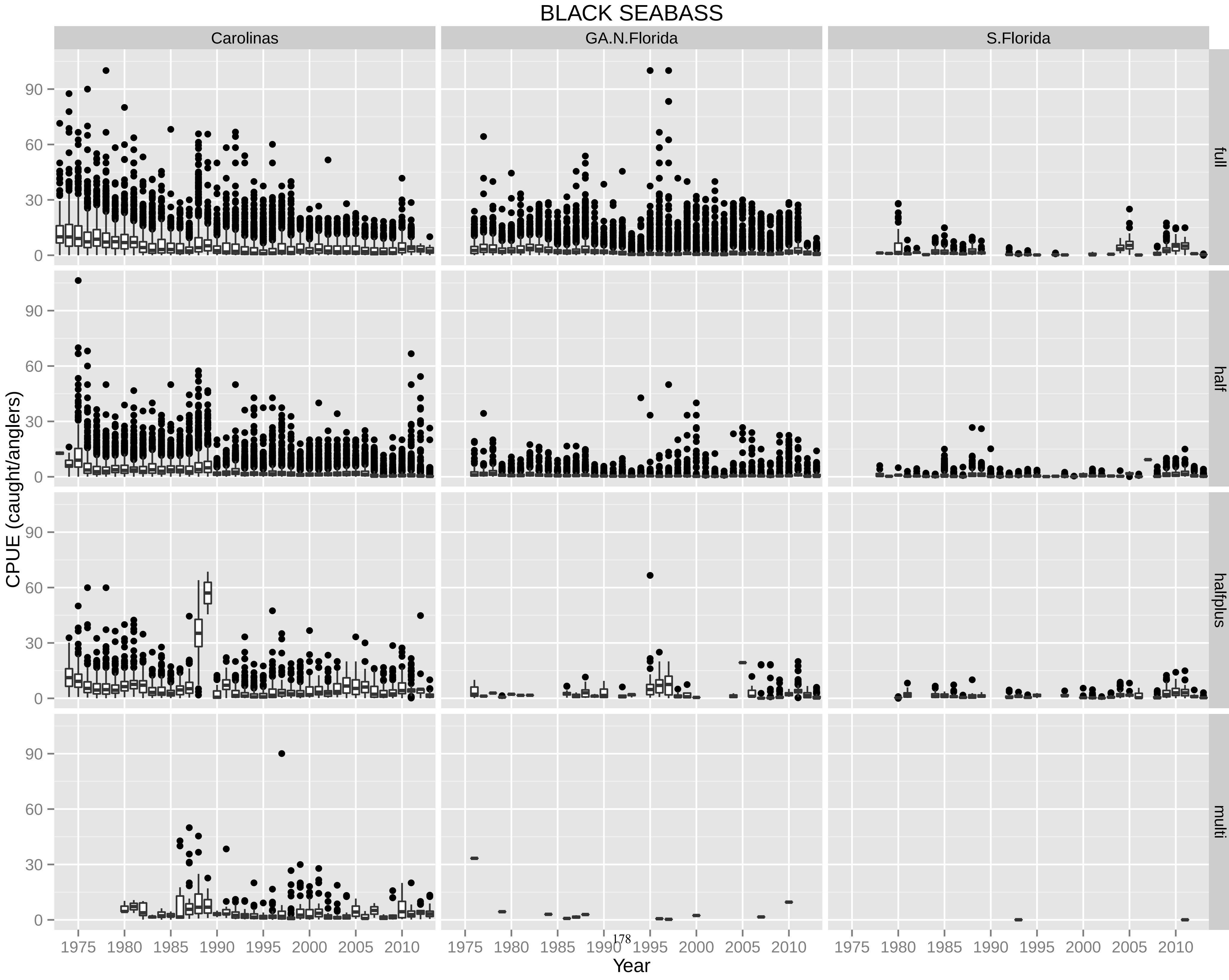

BLACK MARGATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0
2
4
1980
1985
1990
1995
2000
2005
2010
Year

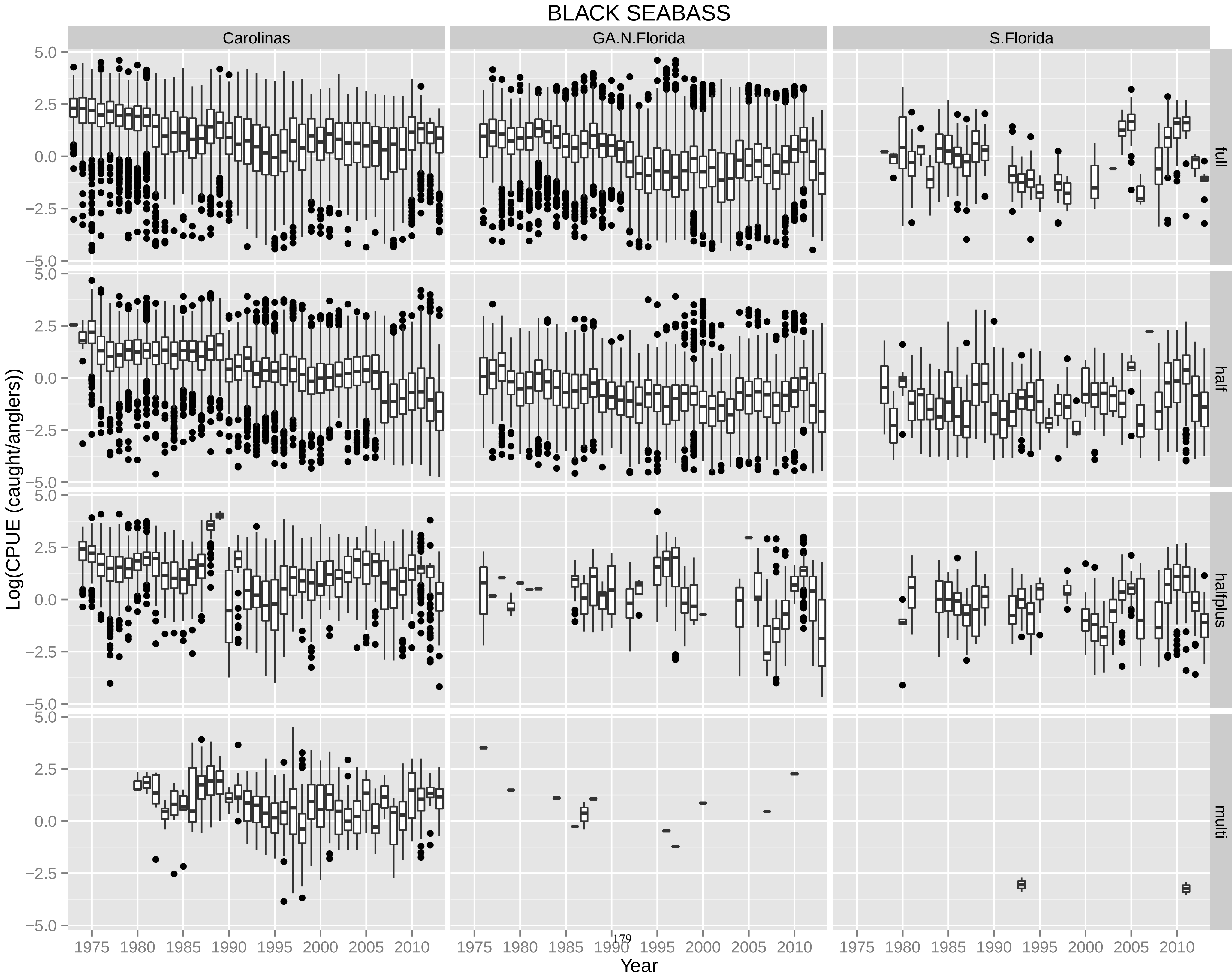

BLACK MARGATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

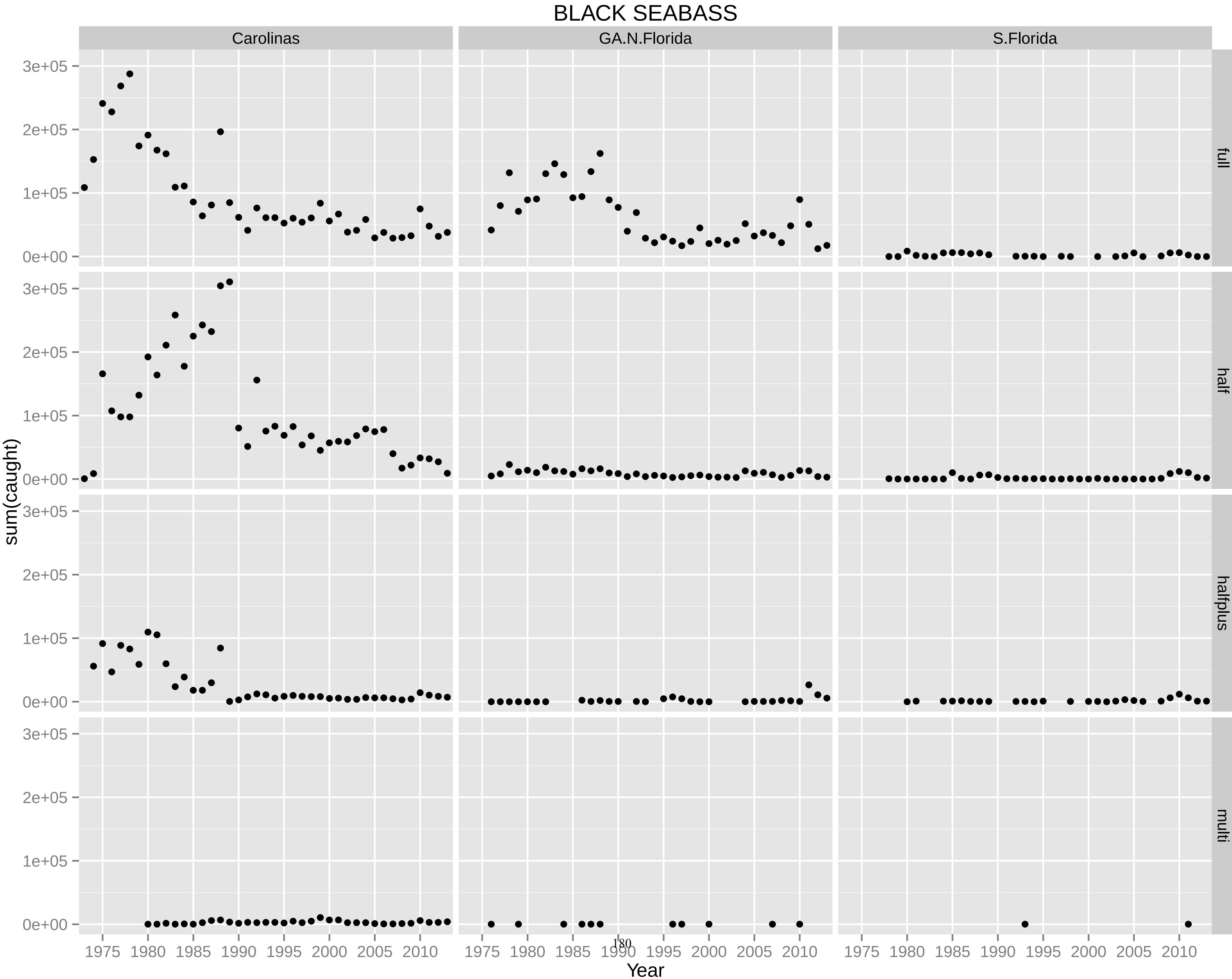

BLACK MARGATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
100
200
300
400
500
1980
1985
1990
1995
2000
2005
2010

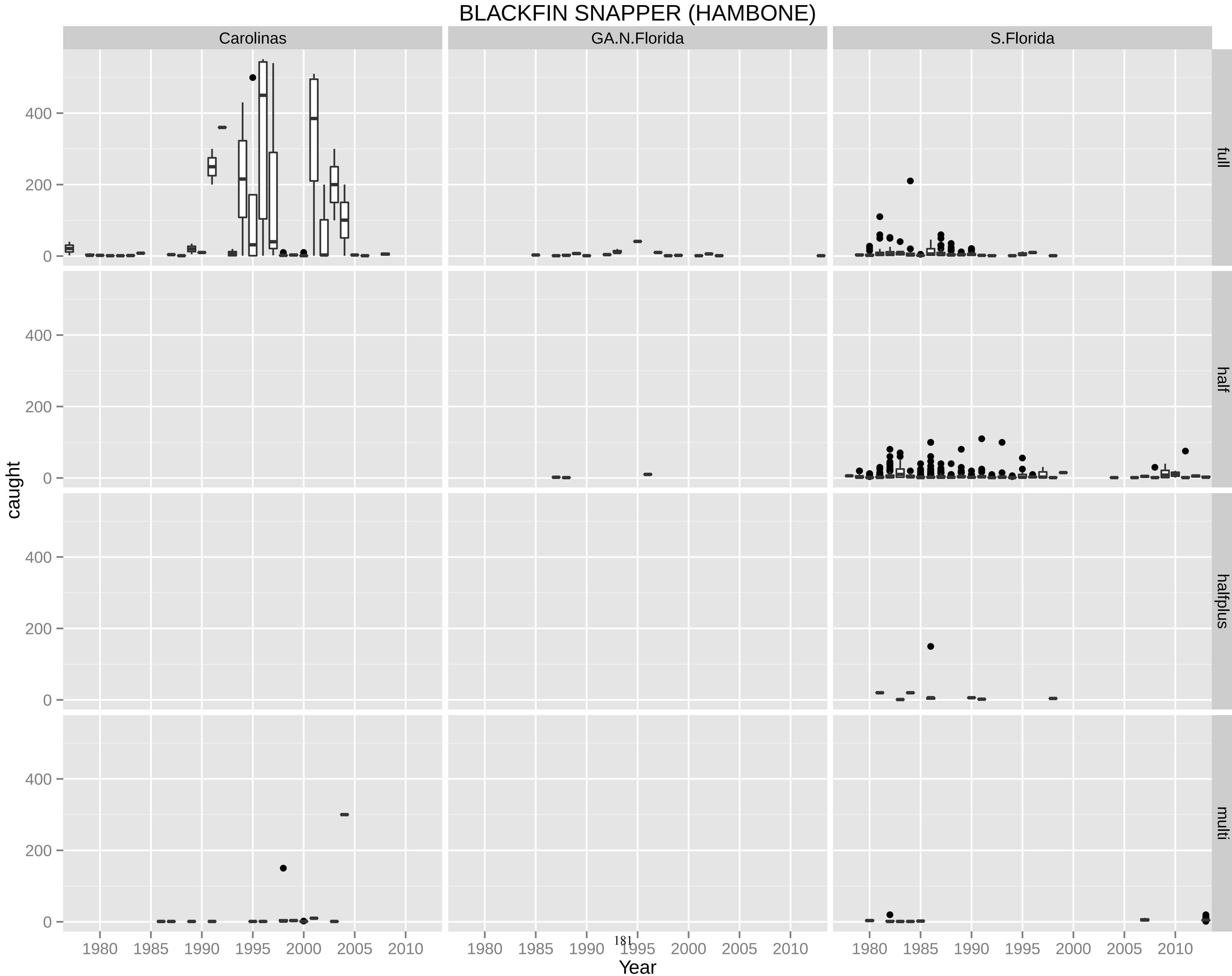


BLACK SEABASS
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
0
1000
2000
3000
1975
1980
1985
1990
1995
2000
2005
2010
Year

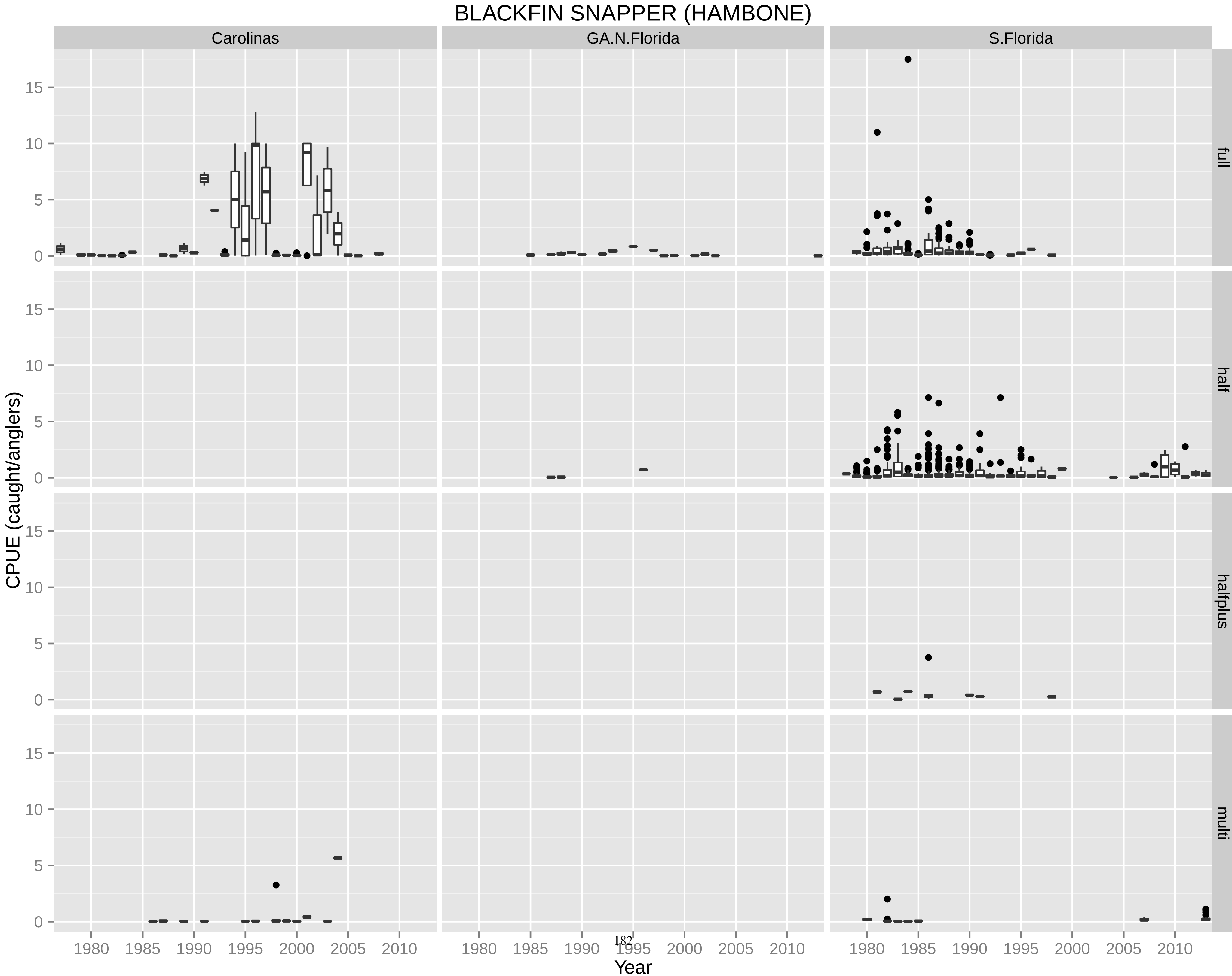

BLACK SEABASS
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
30
60
90
1975
1980
1985
1990
1995
2000
2005
2010

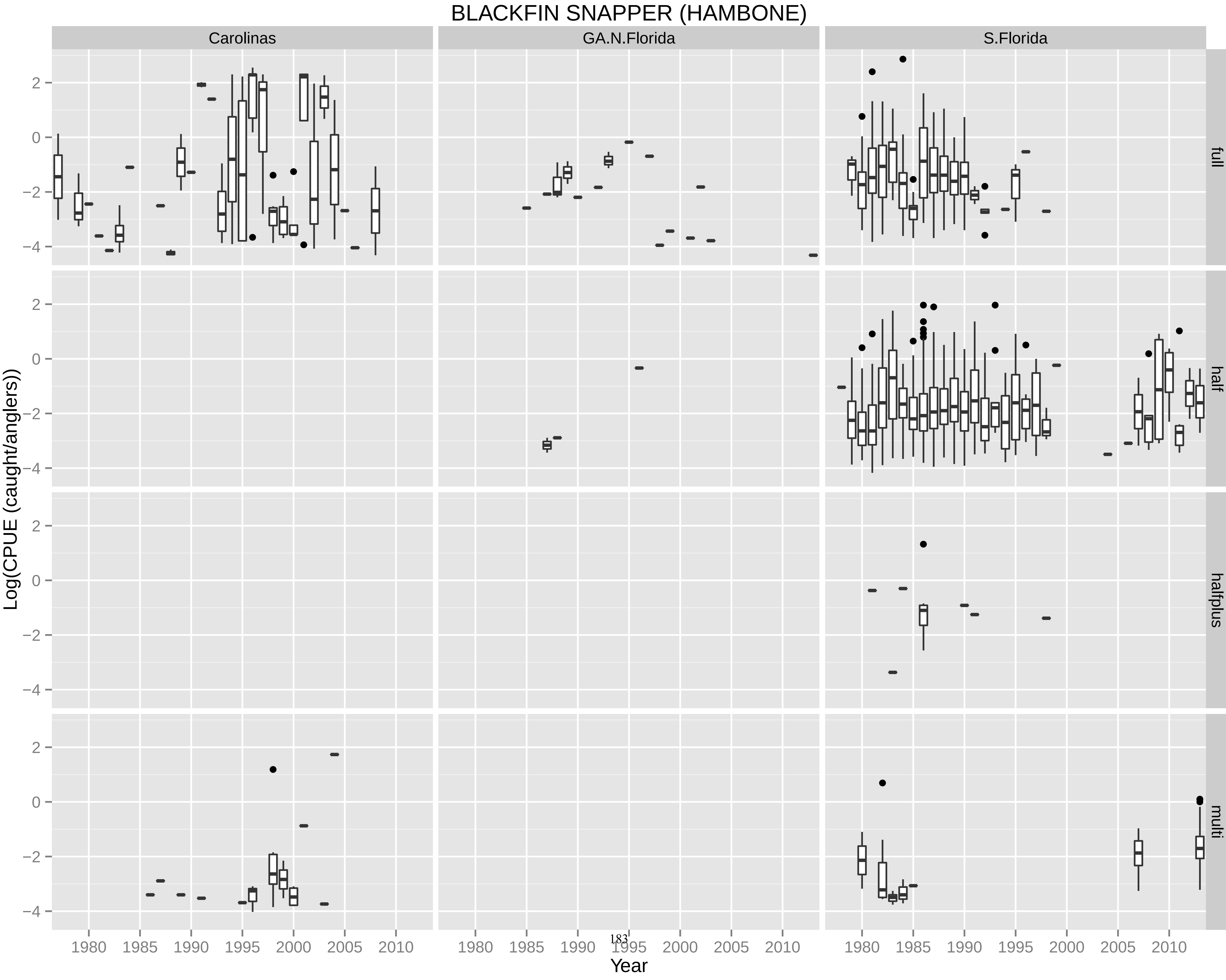

BLACK SEABASS
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
5.0
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010

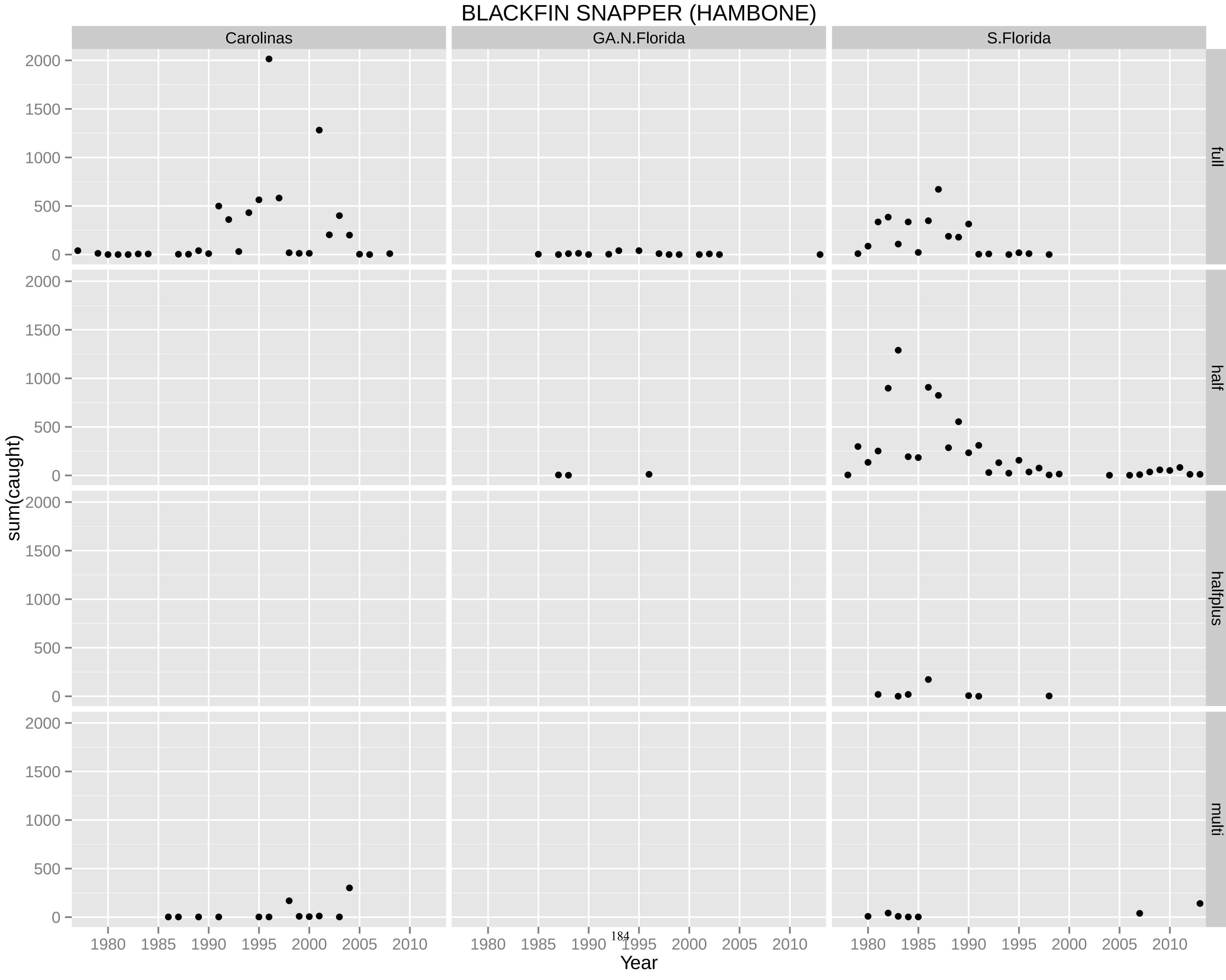

BLACK SEABASS
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0e+00
1e+05
2e+05
3e+05
1975
1980
1985
1990
1995
2000
2005
2010
Year

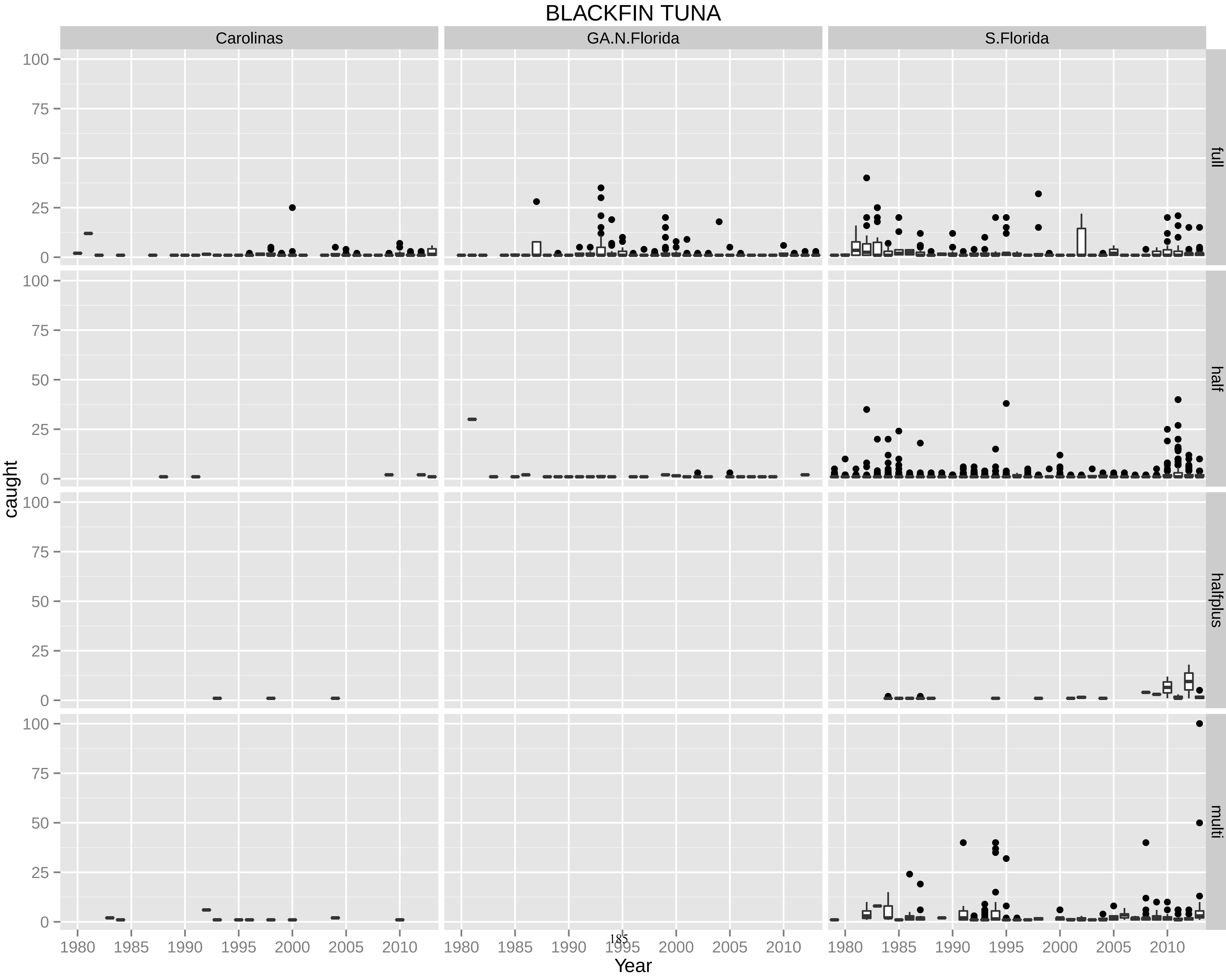


BLACKFIN SNAPPER (HAMBONE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
200
400
1980
1985
1990
1995
2000
2005
2010

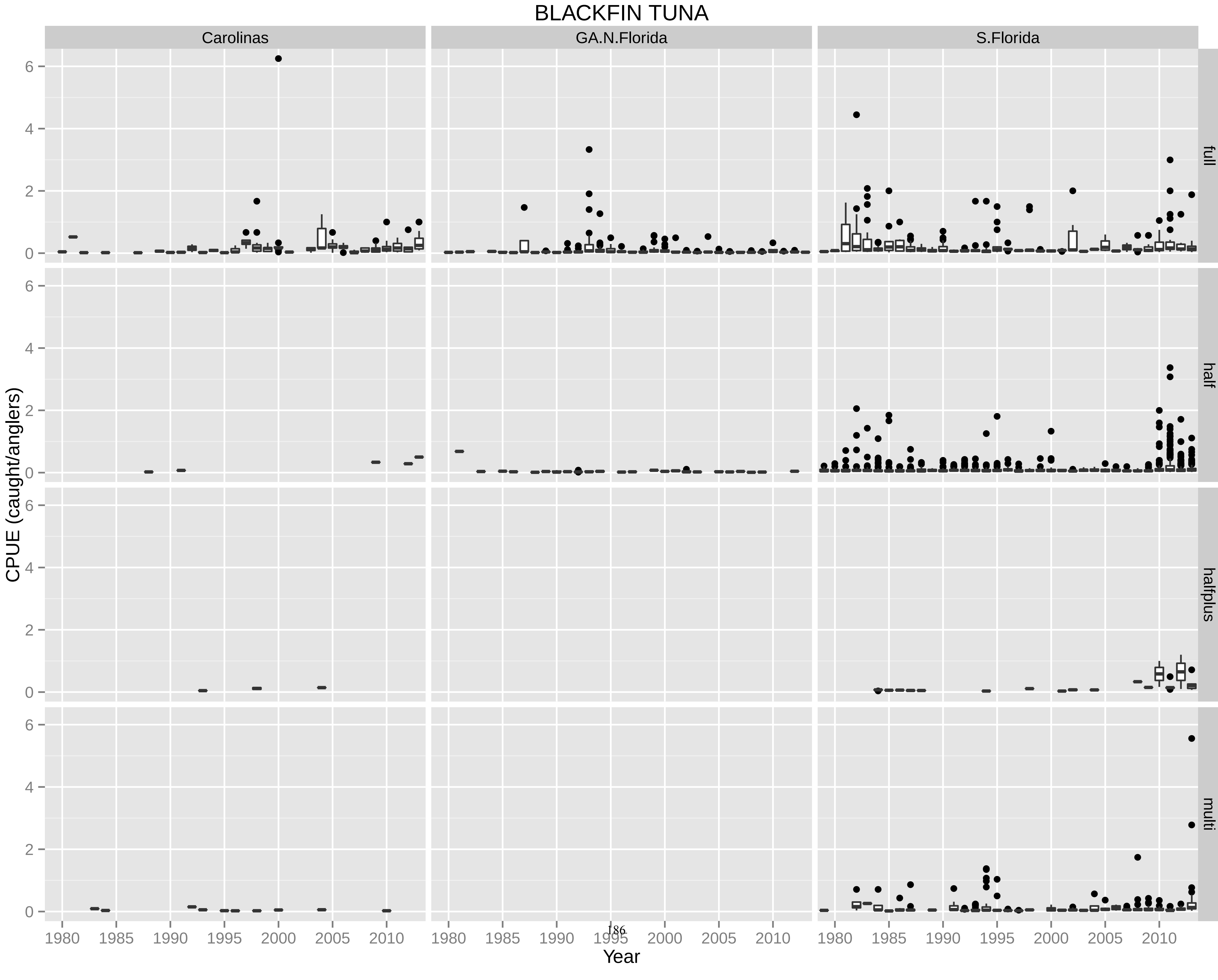

BLACKFIN SNAPPER (HAMBONE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
1980
1985
1990
1995
2000
2005
2010

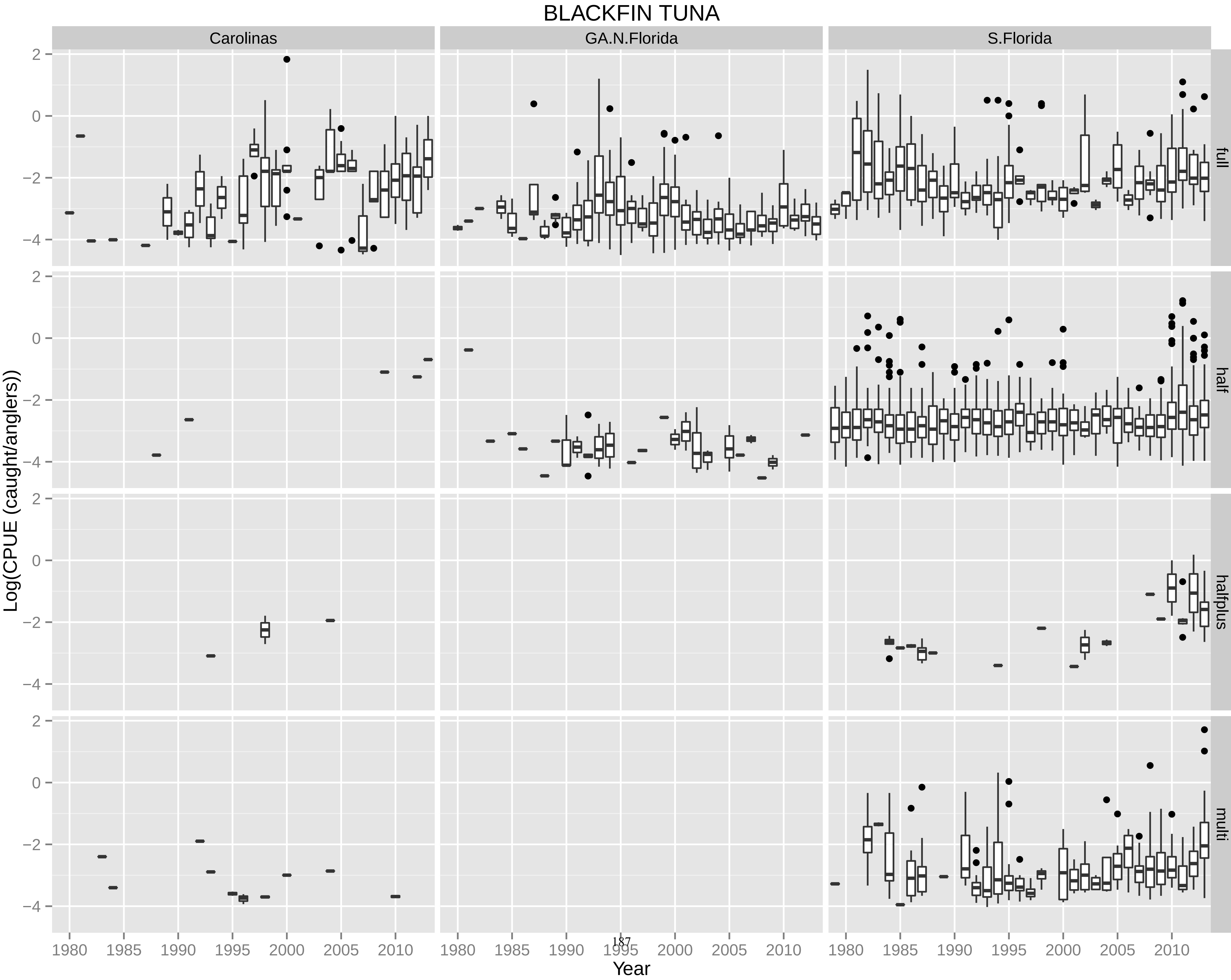

BLACKFIN SNAPPER (HAMBONE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

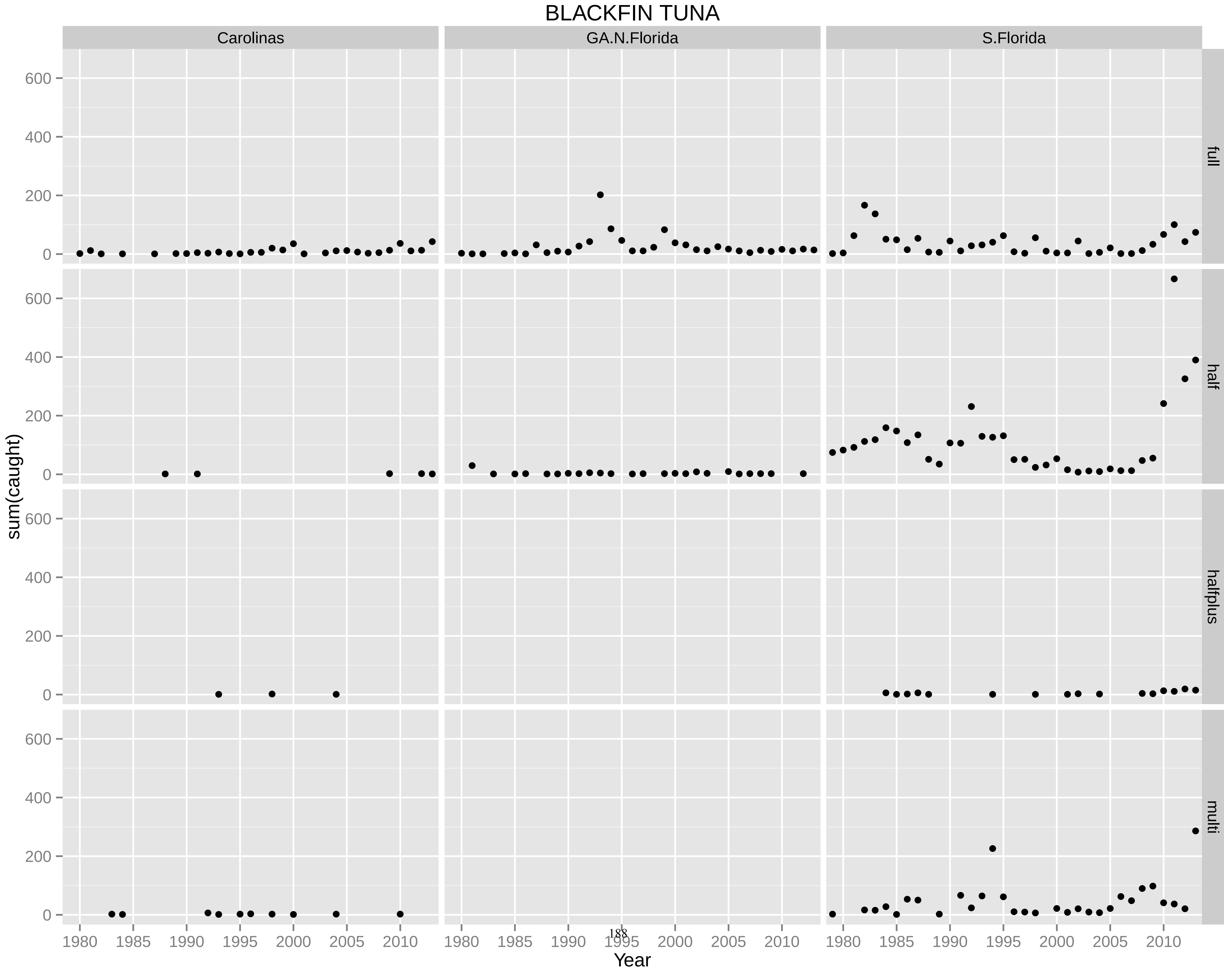

BLACKFIN SNAPPER (HAMBONE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
2000
1980
1985
1990
1995
2000
2005
2010

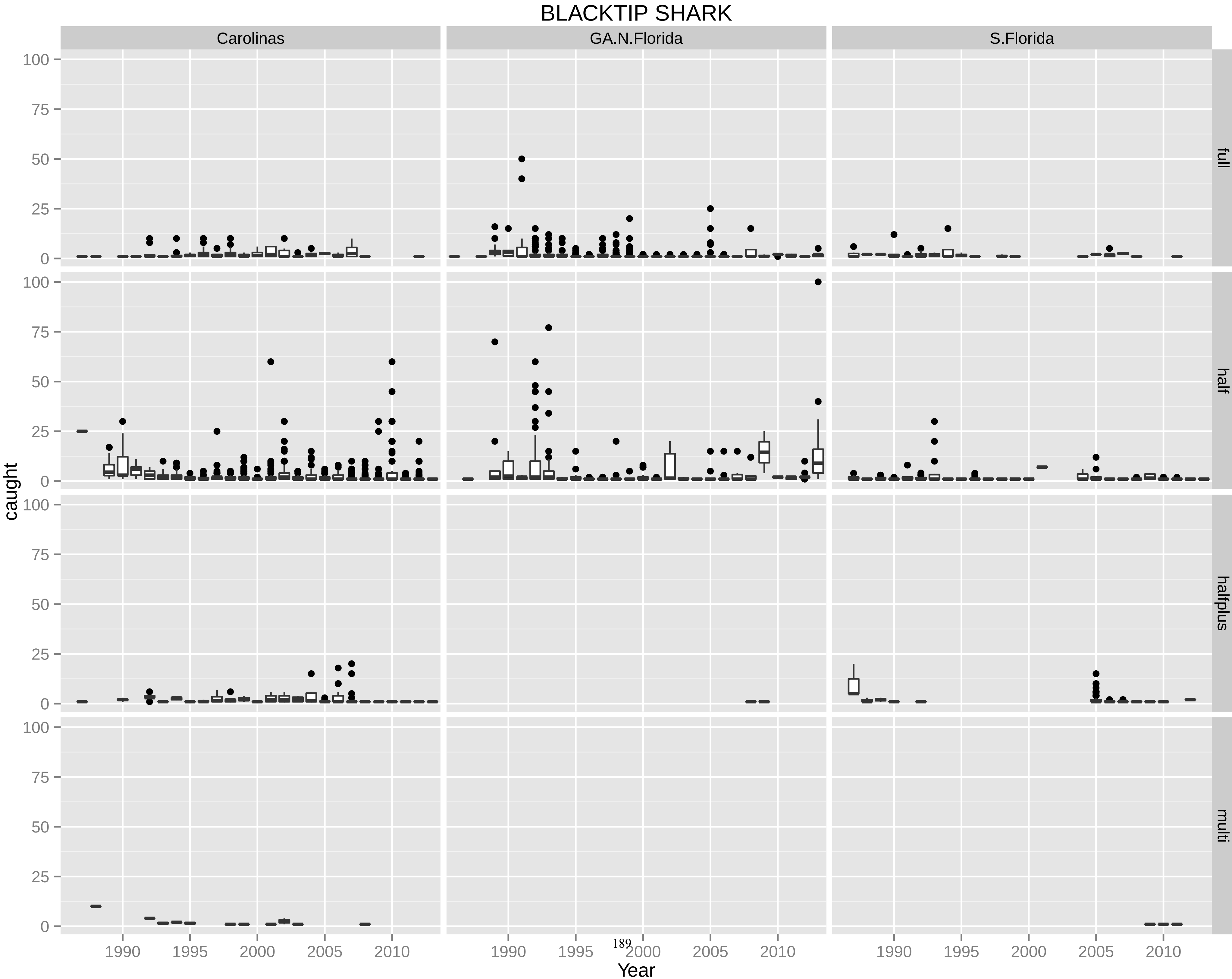


BLACKFIN TUNA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
25
50
75
100
1980
1985
1990
1995
2000
2005
2010

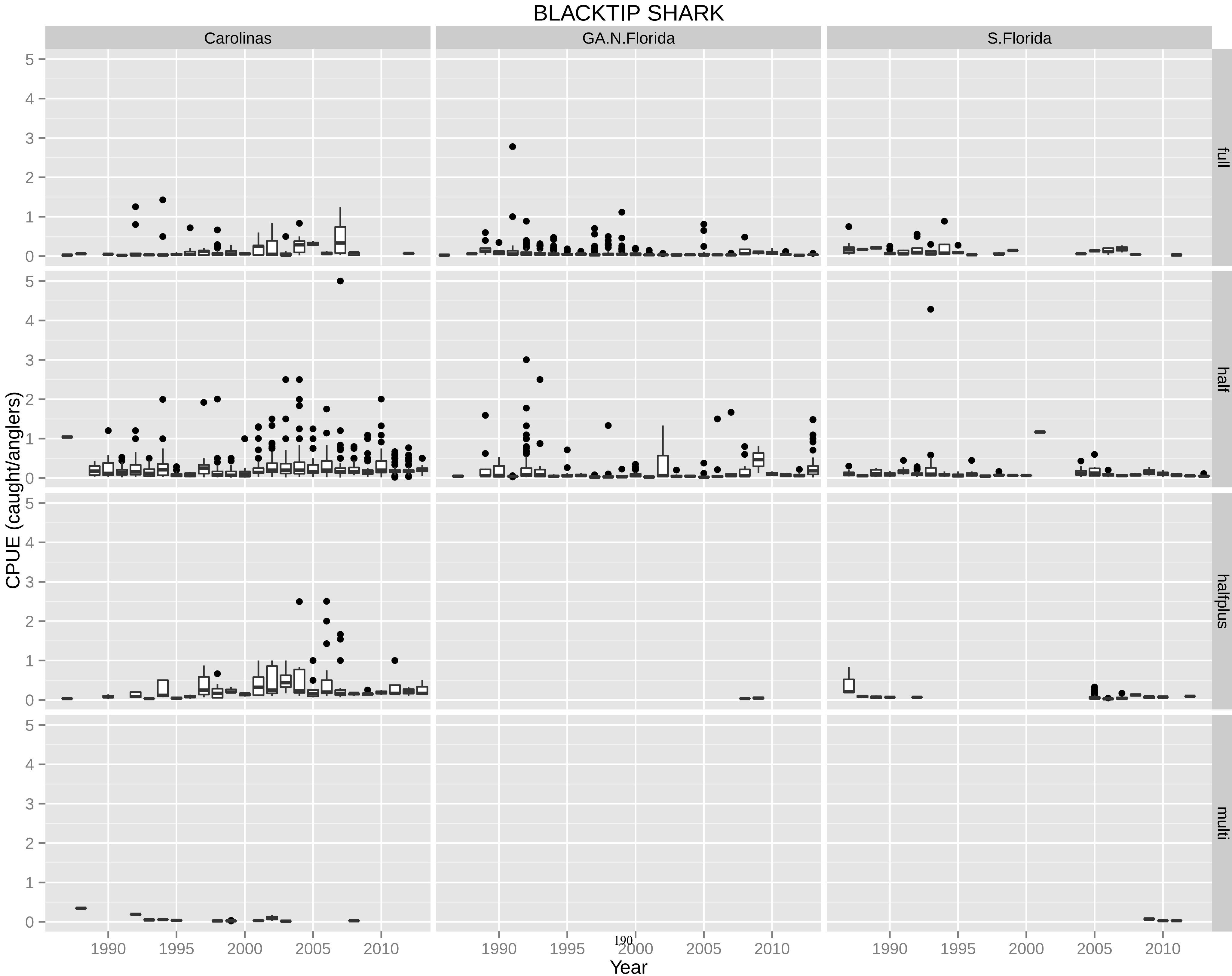

BLACKFIN TUNA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
2
4
6
1980
1985
1990
1995
2000
2005
2010

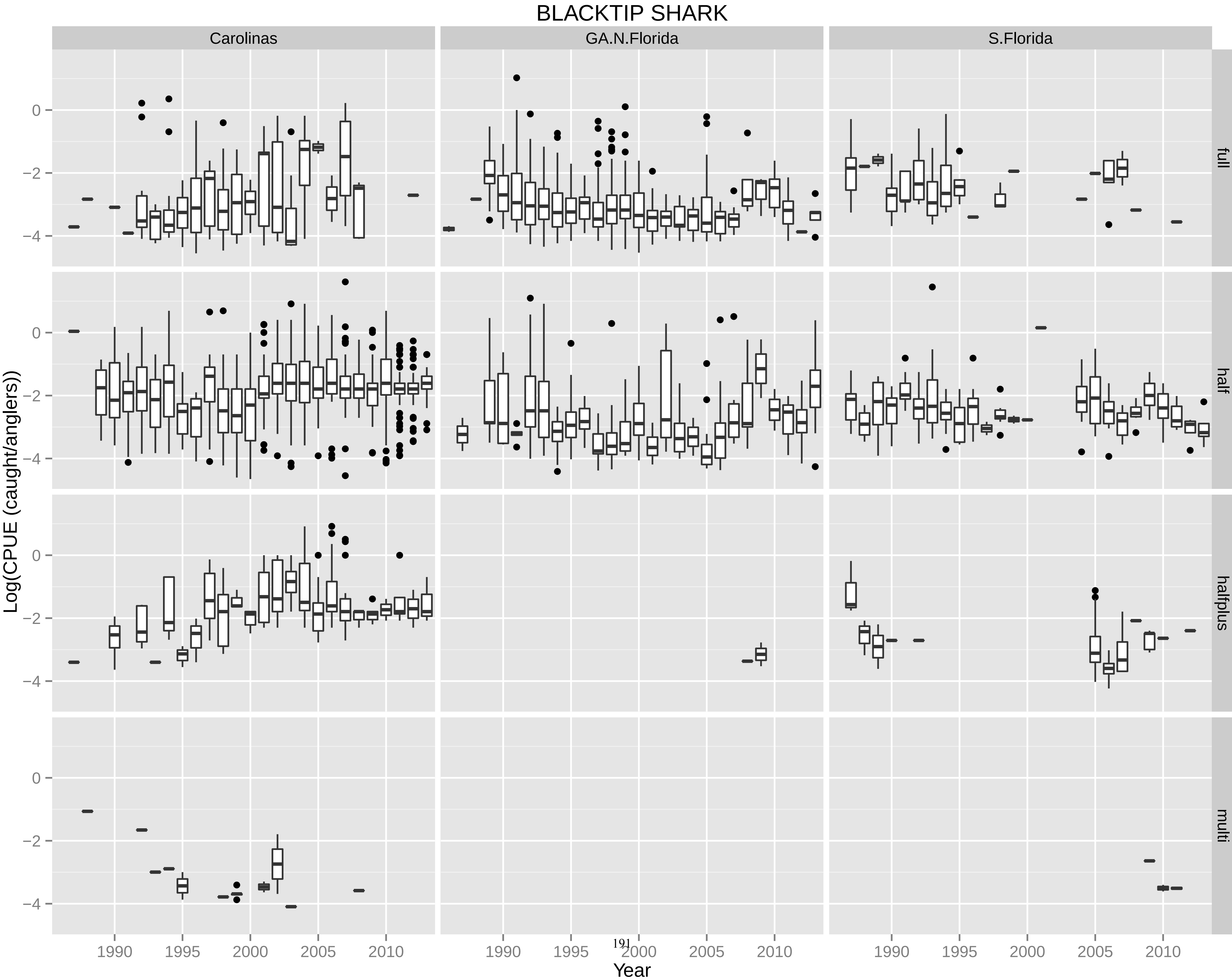

BLACKFIN TUNA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

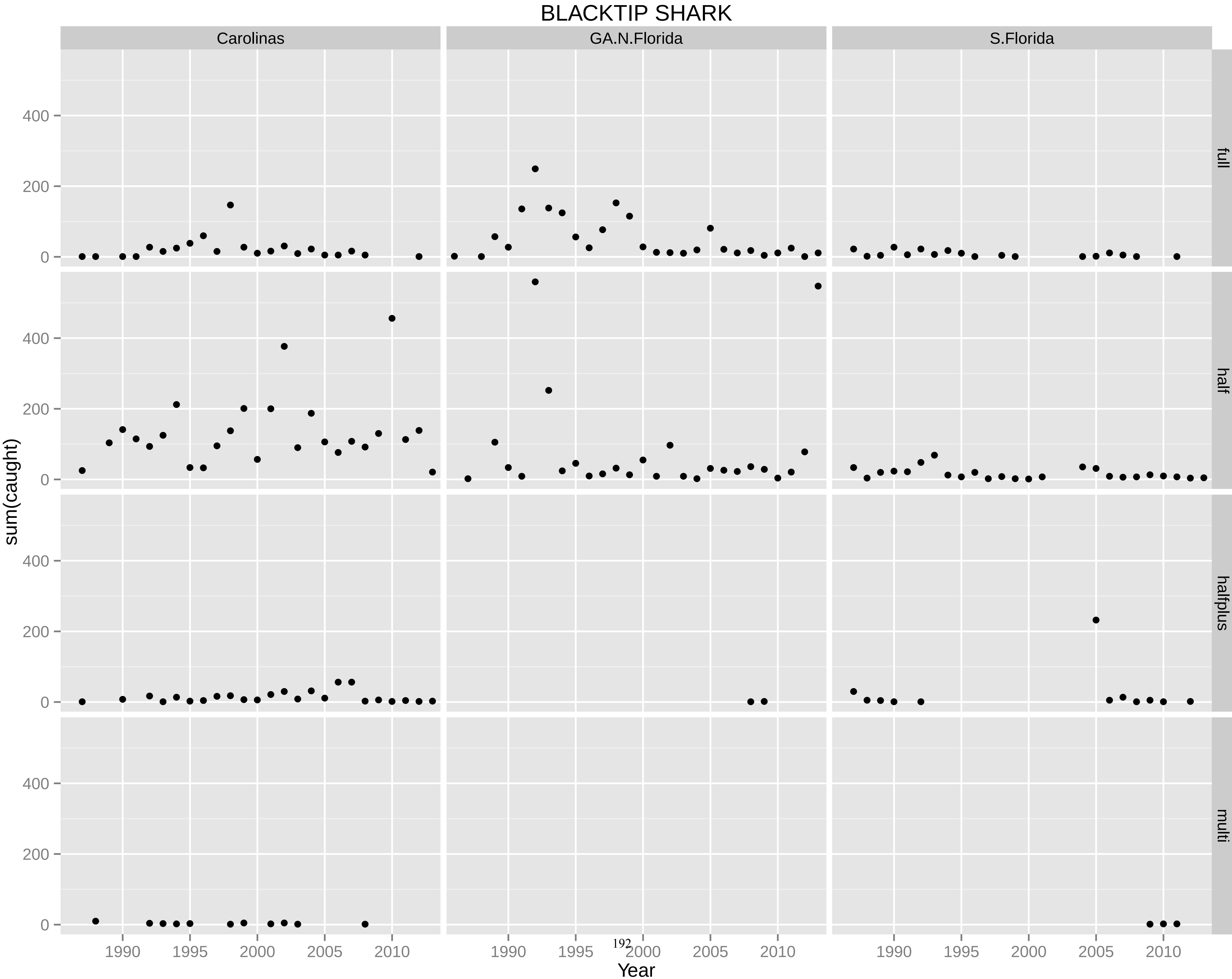

BLACKFIN TUNA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
200
400
600
1980
1985
1990
1995
2000
2005
2010
Year

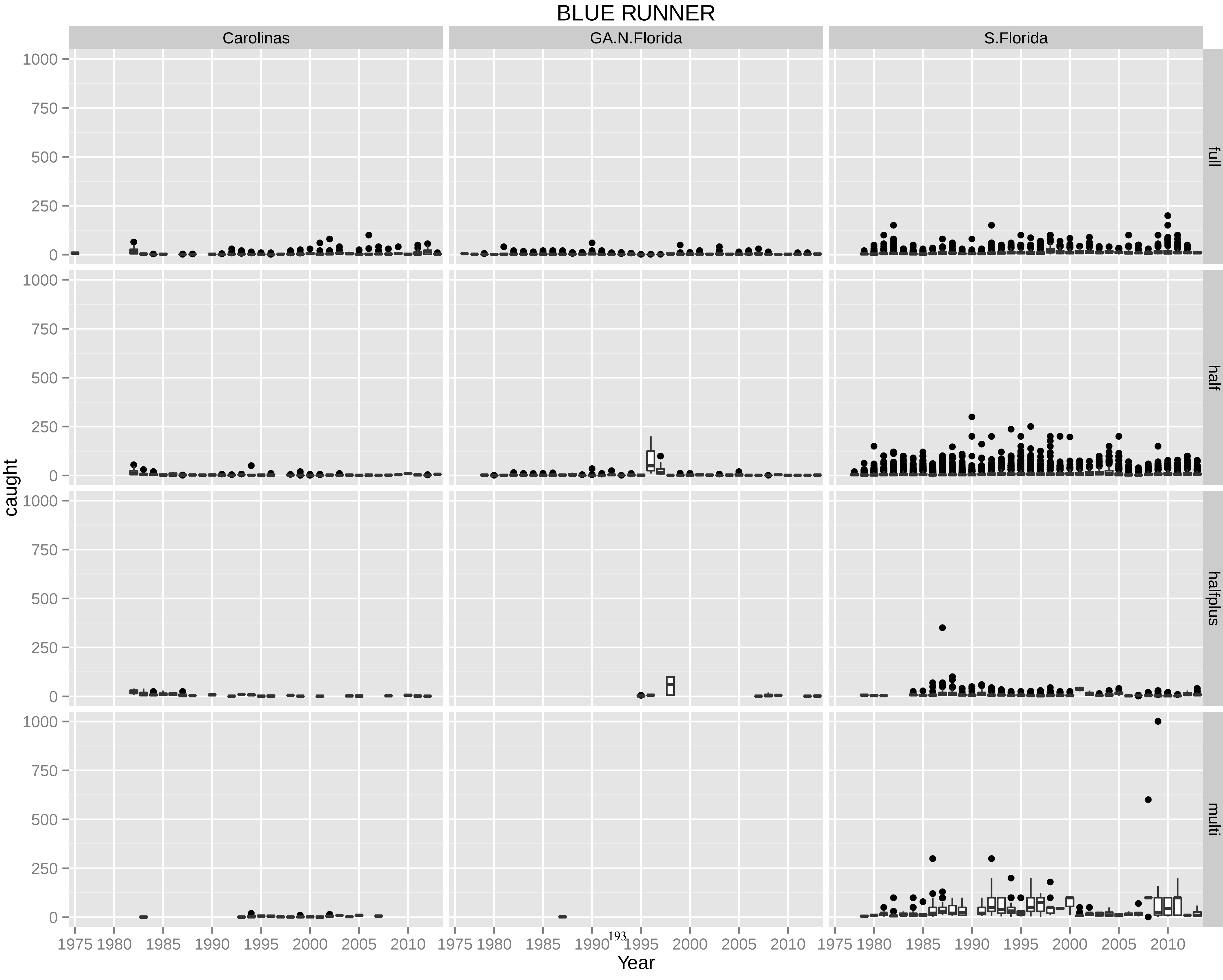


BLACKTIP SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
25
50
75
100
1990
1995
2000
2005
2010

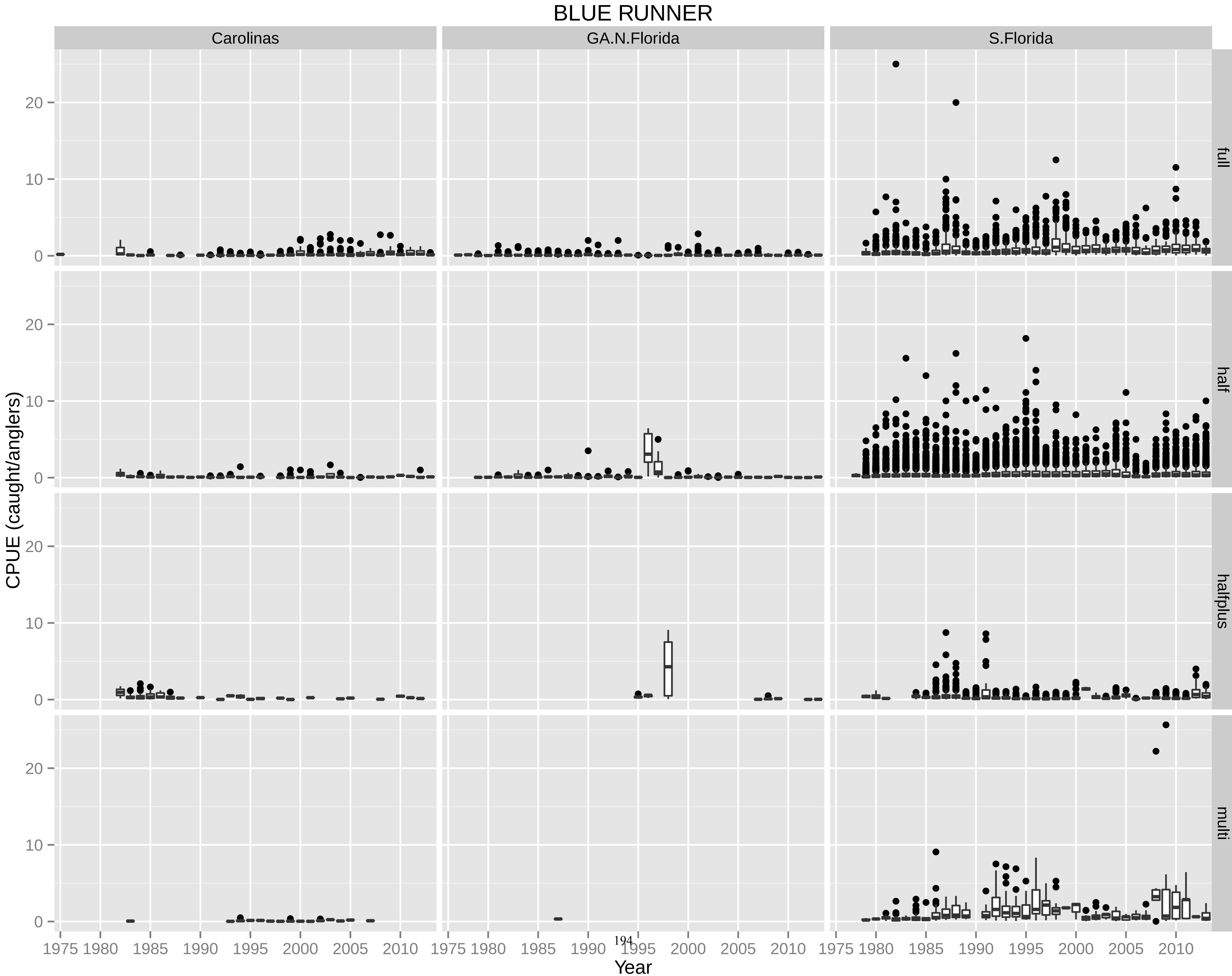

BLACKTIP SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
4
5
1990
1995
2000
2005
2010

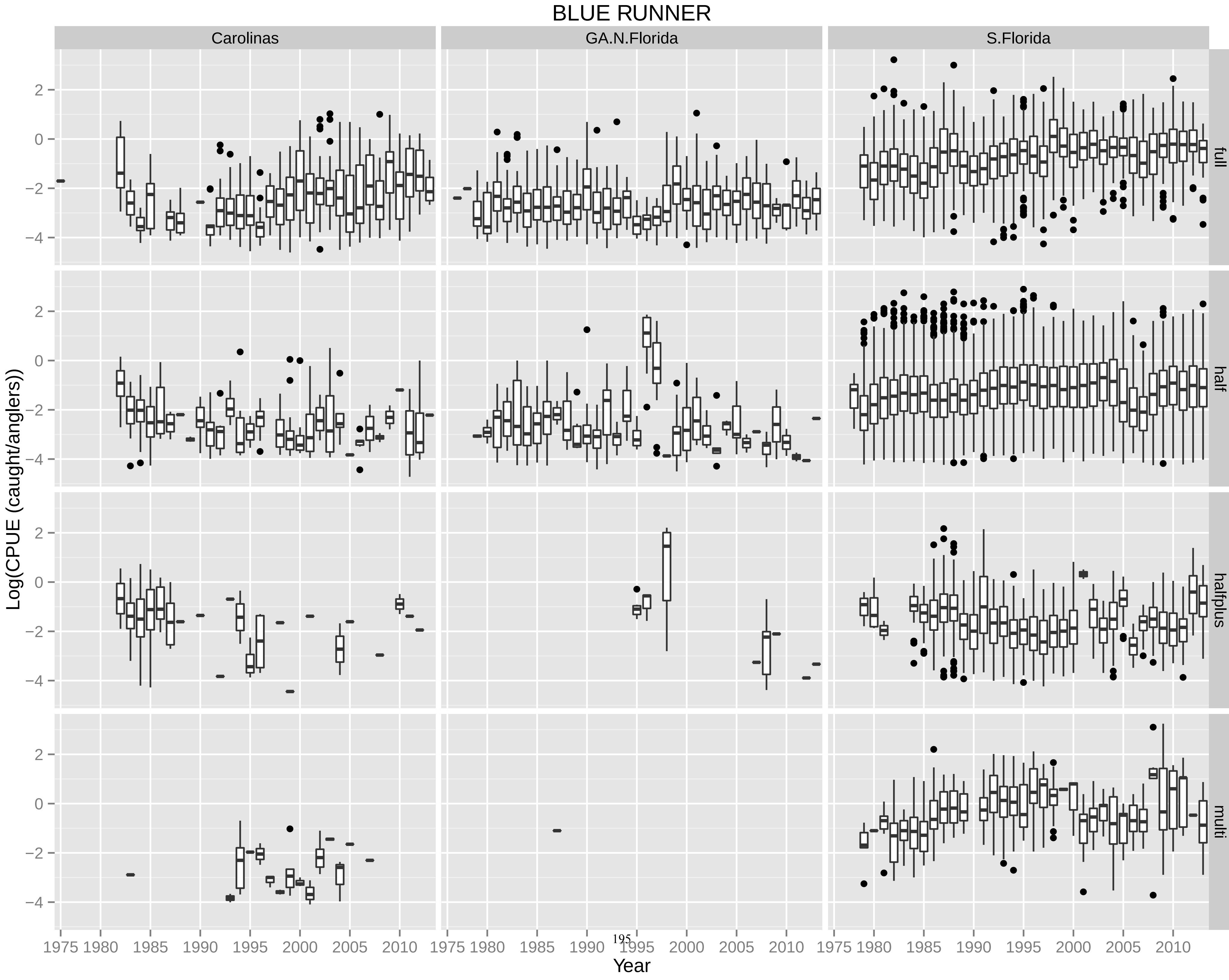

BLACKTIP SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
0
−2
−4
1990
1995
2000
2005
2010
Year

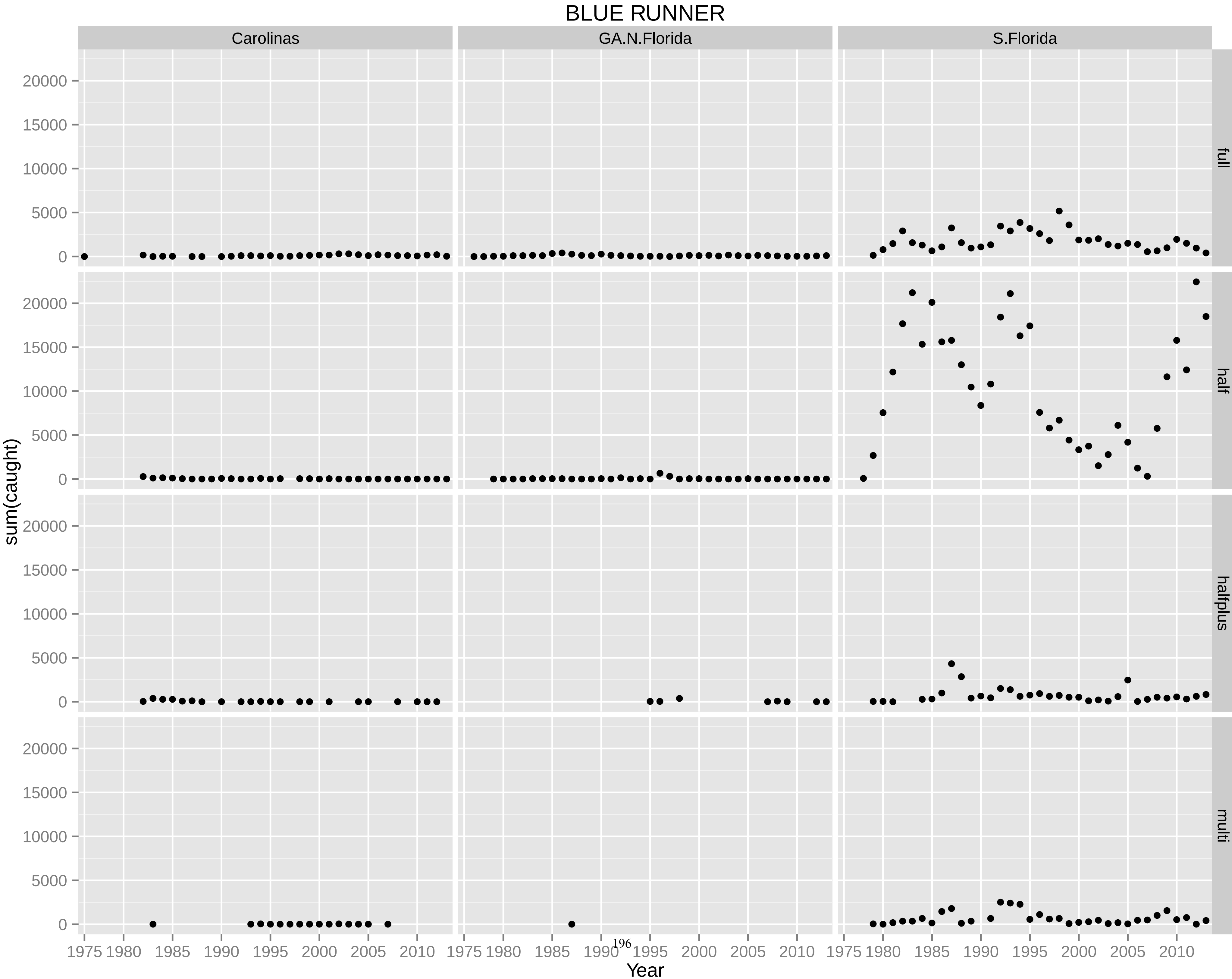

BLACKTIP SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
200
400
1990
1995
2000
2005
2010
Year



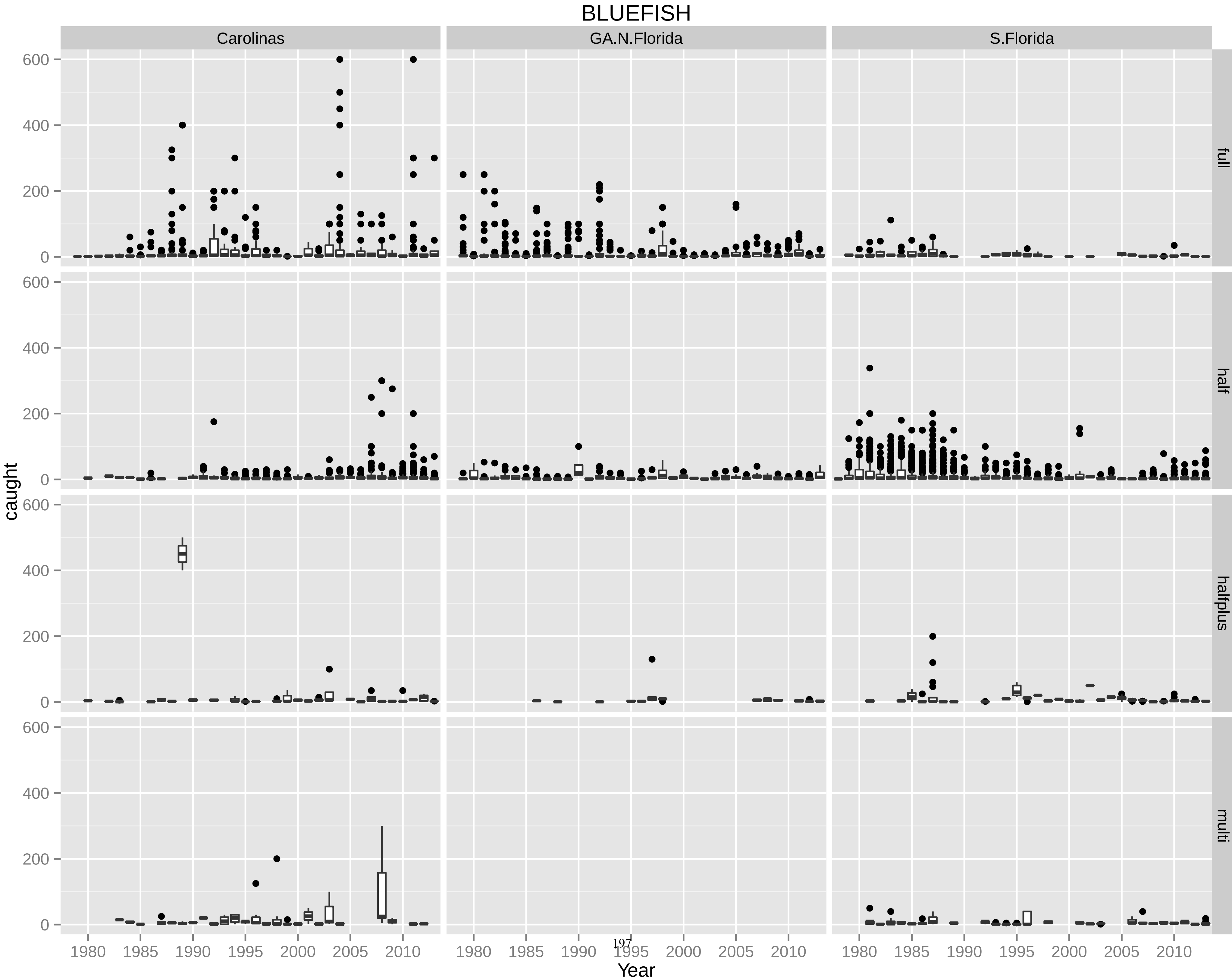
BLUE RUNNER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
0
250
500
750
1000
1975
1980
1985
1990
1995
2000
2005
2010
Year

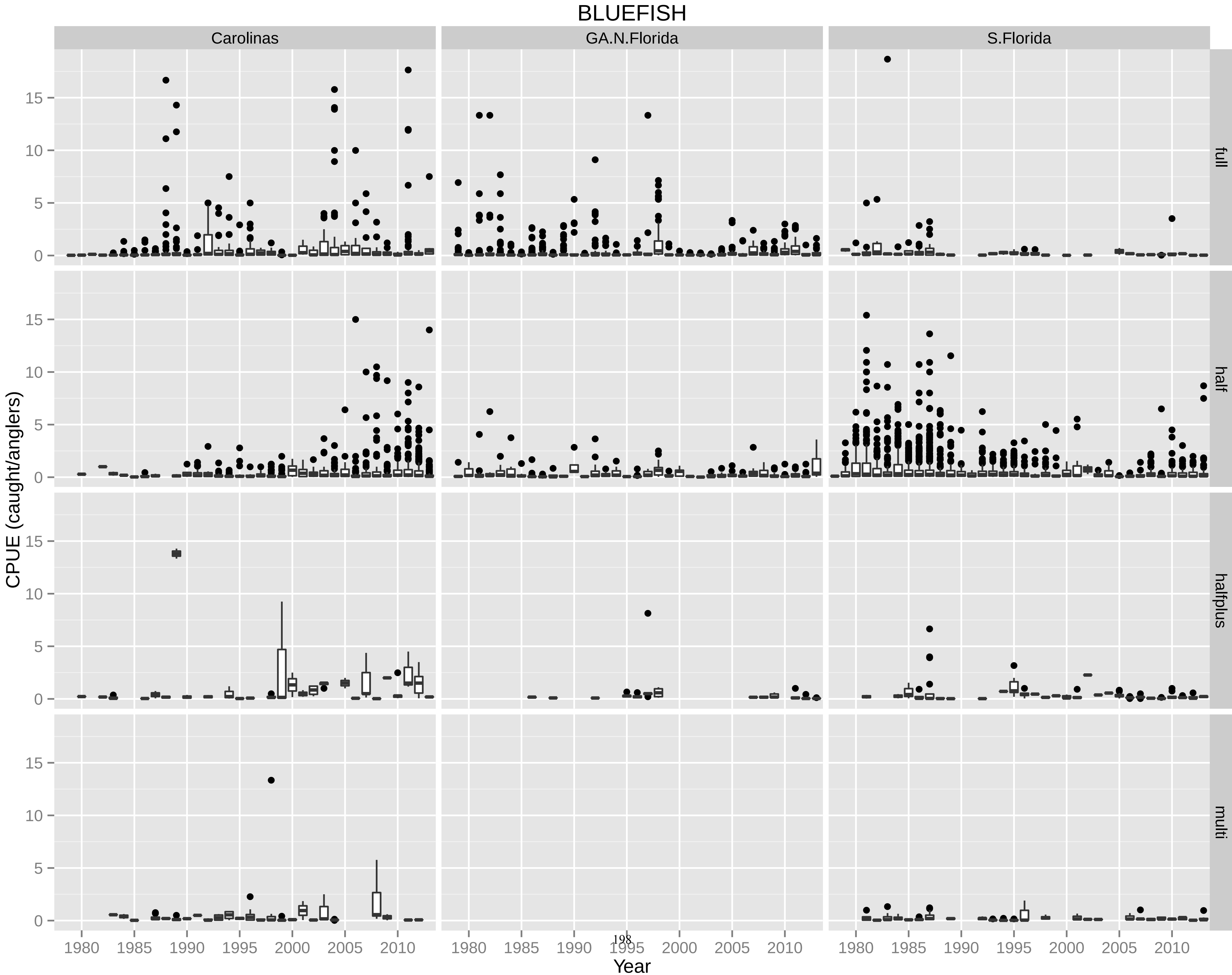

BLUE RUNNER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
10
20
1975 1980 1985 1990 1995 2000 2005 2010

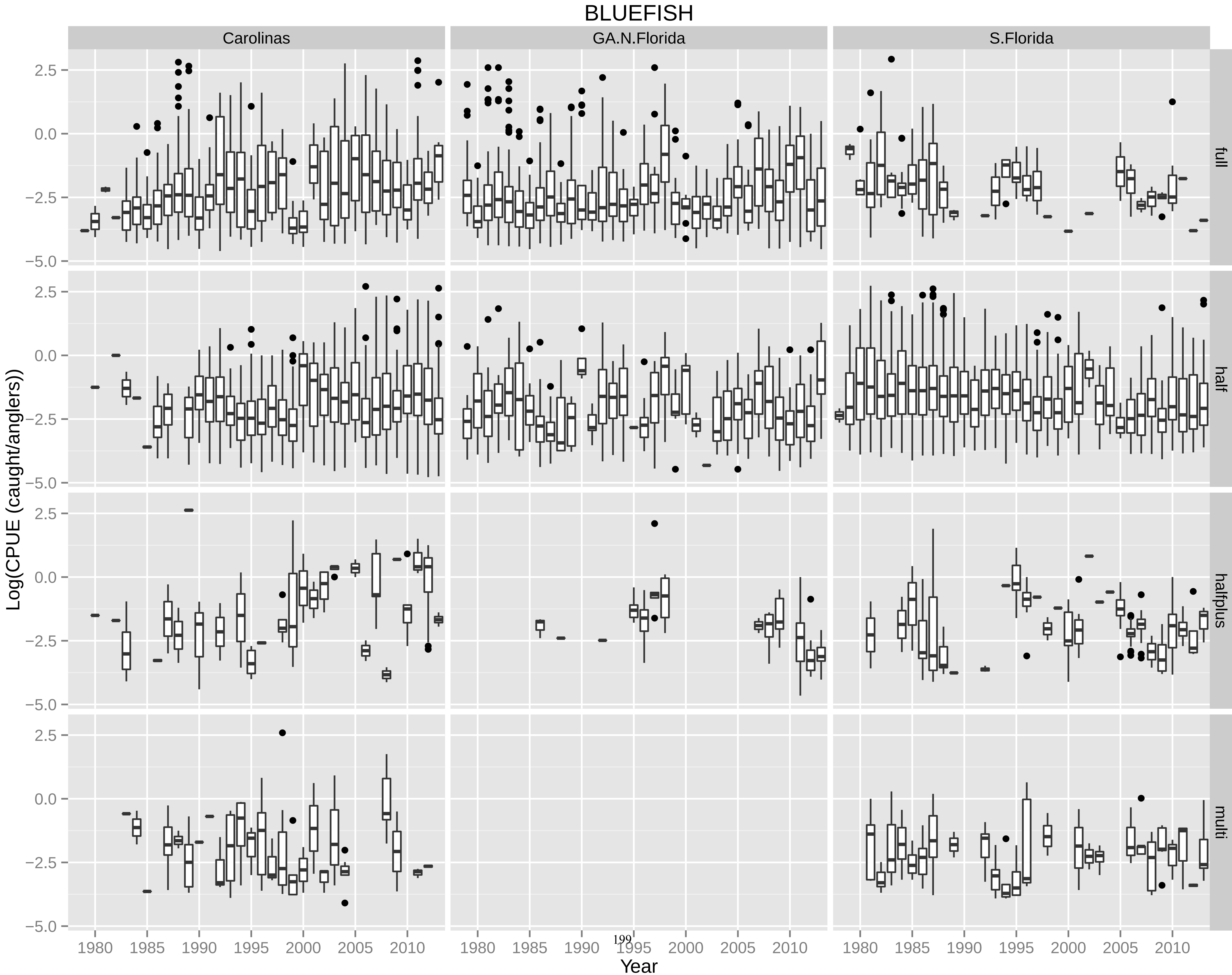

BLUE RUNNER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

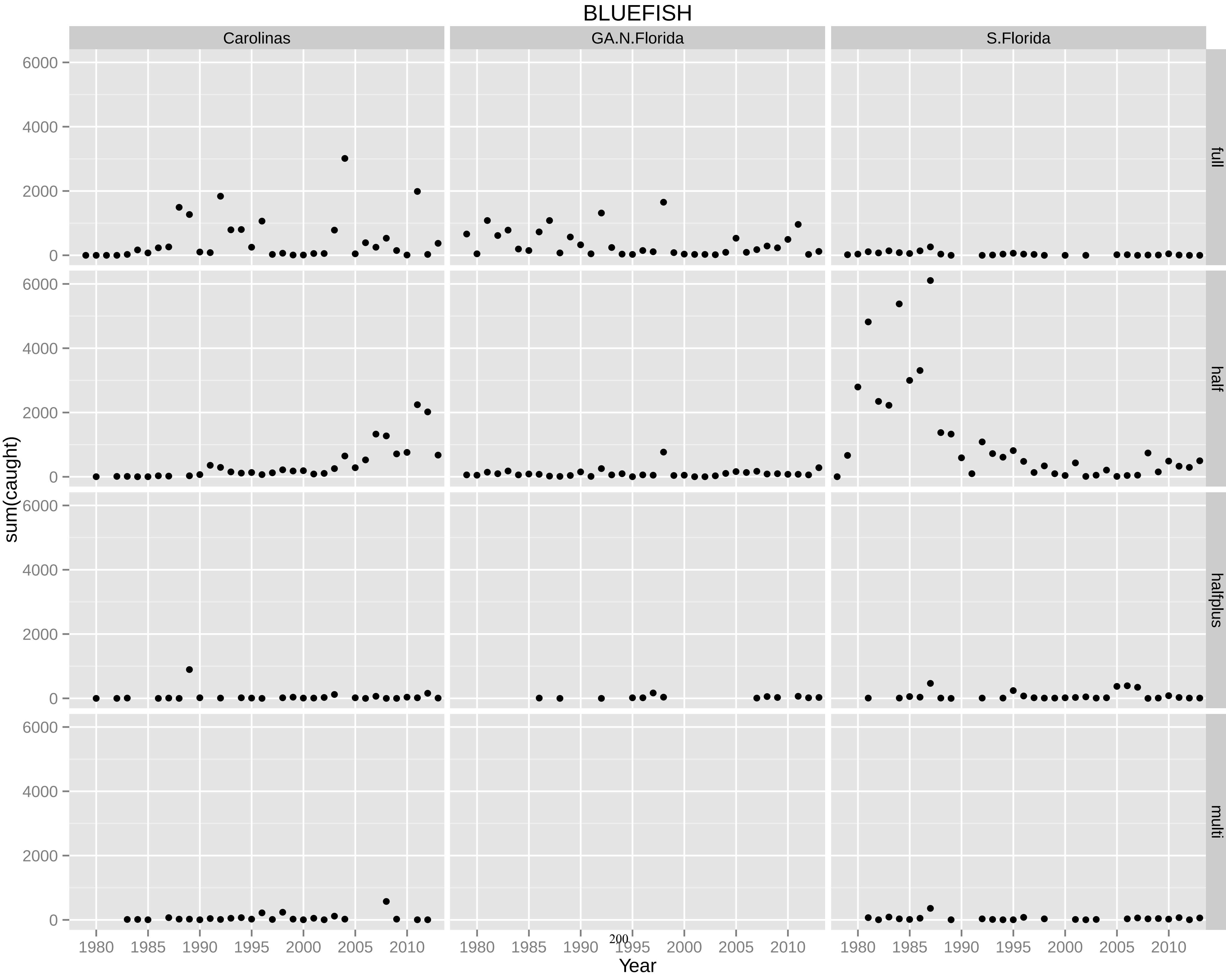


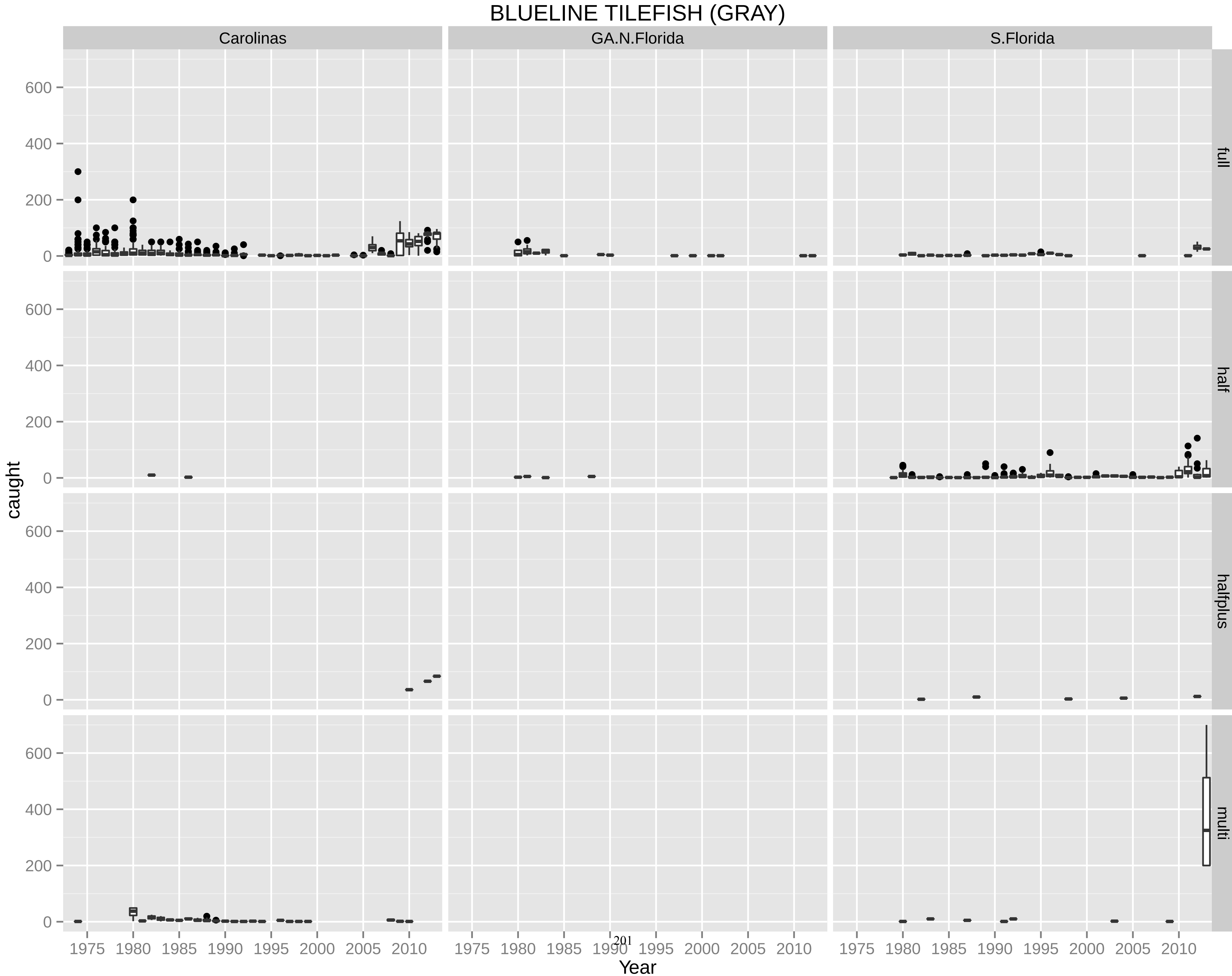
BLUE RUNNER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
5000
10000
15000
20000
1975 1980 1985 1990 1995 2000 2005 2010

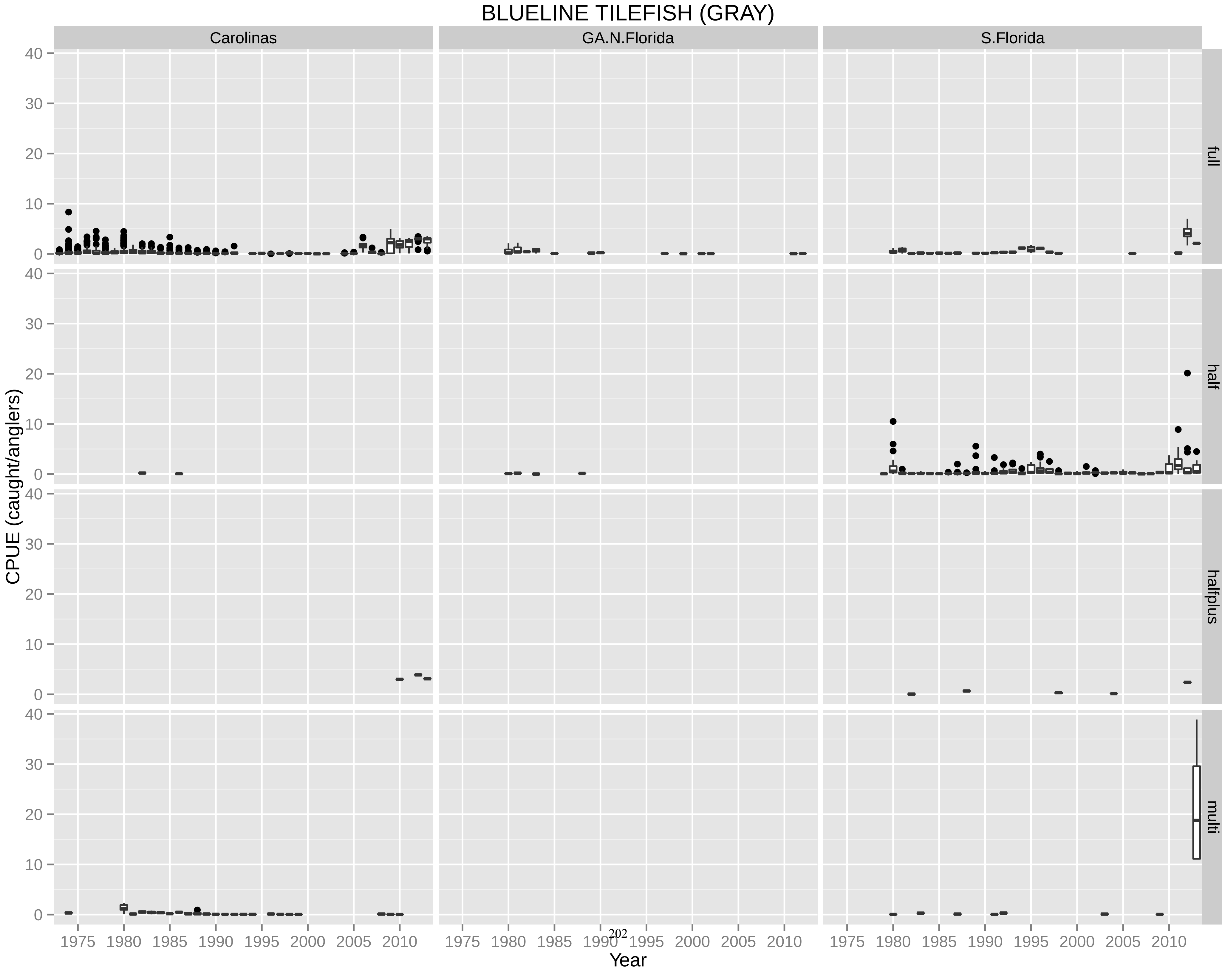

BLUEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
0
200
400
600
1980
1985
1990
1995
2000
2005
2010
Year

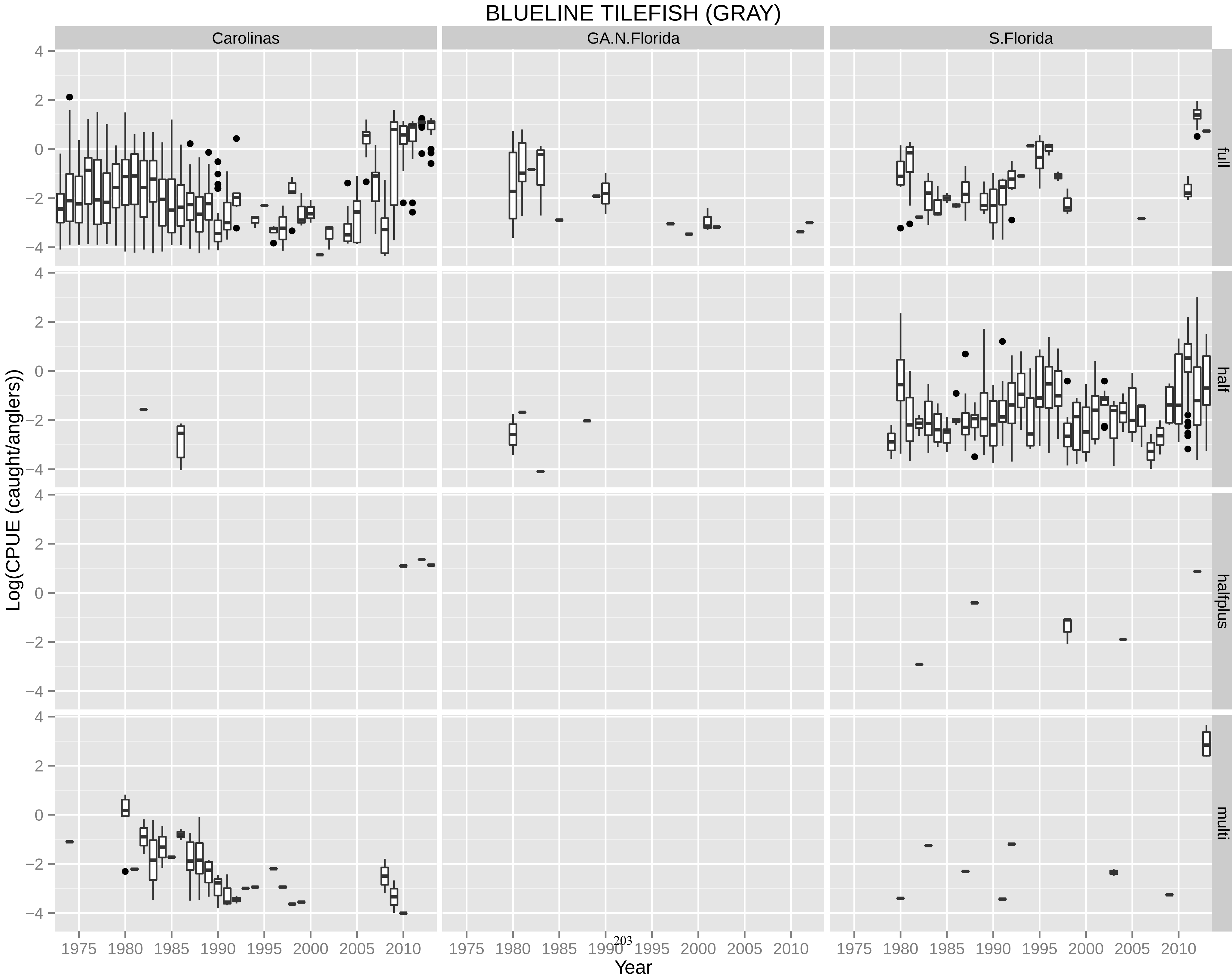

BLUEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
1980
1985
1990
1995
2000
2005
2010


BLUEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
2.5
0.0
−2.5
−5.0
1980
1985
1990
1995
2000
2005
2010
Year

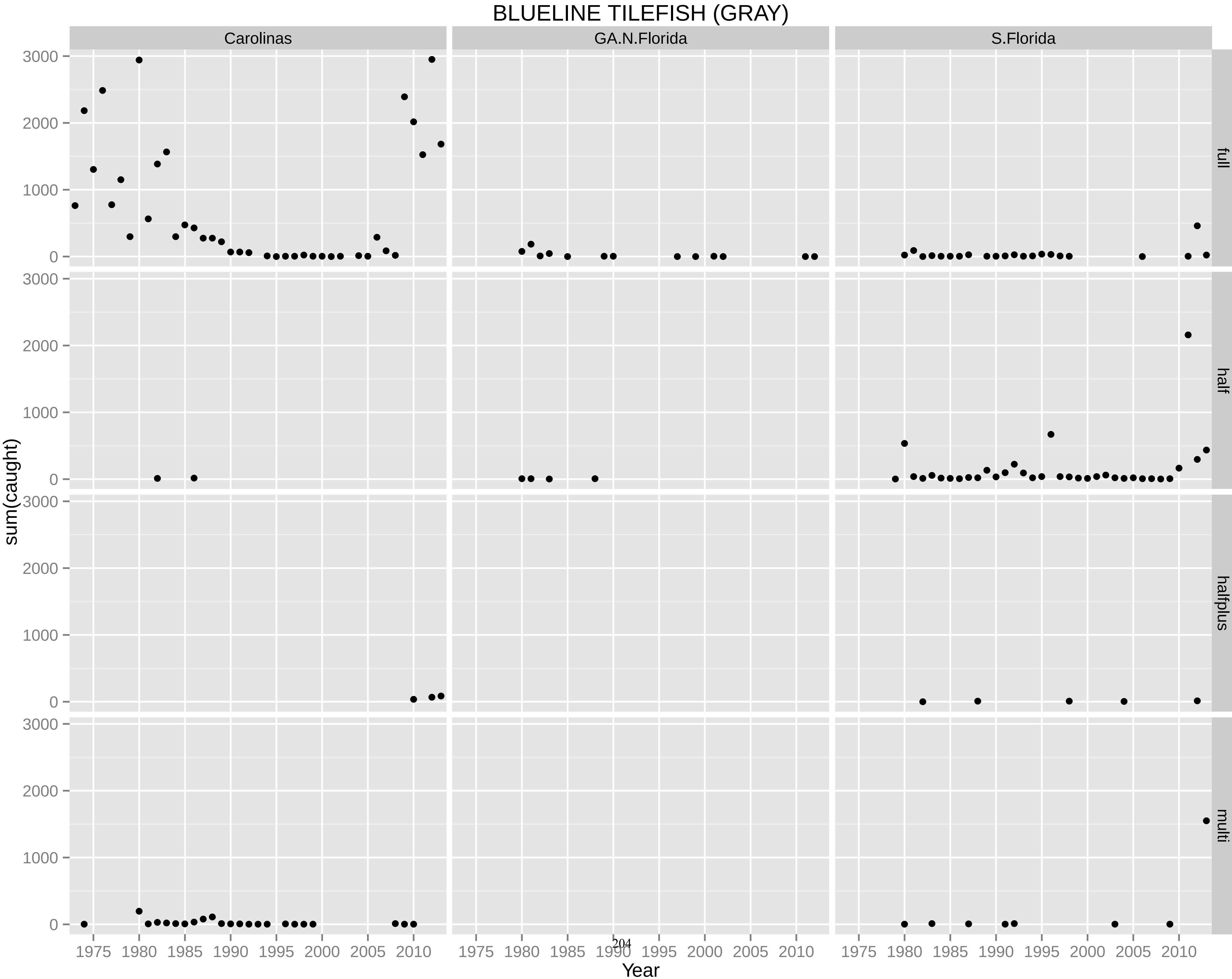

BLUEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
2000
4000
6000
1980
1985
1990
1995
2000
2005
2010

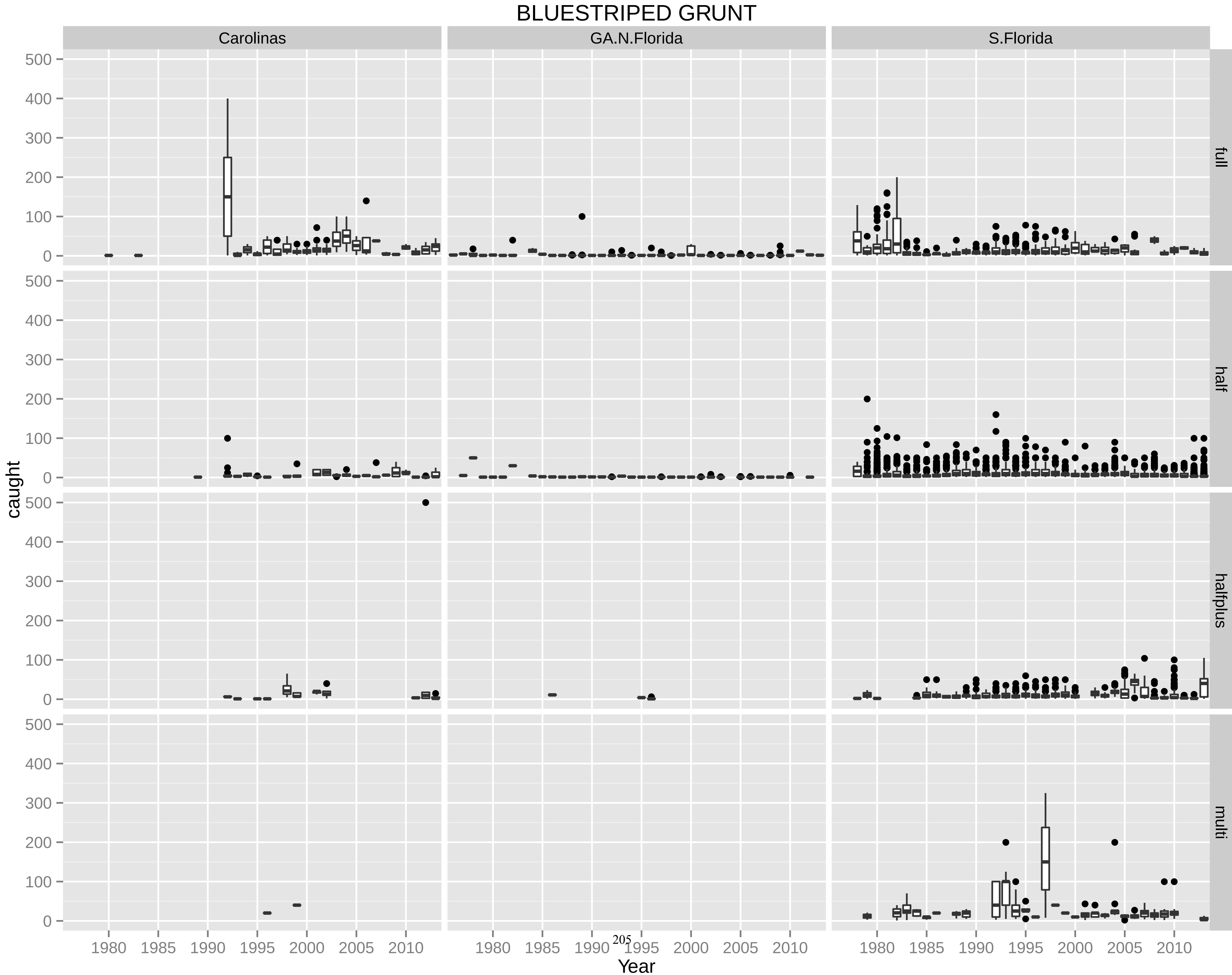

BLUELINE TILEFISH (GRAY)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
0
200
400
600
1975
1980
1985
1990
1995
2000
2005
2010
Year

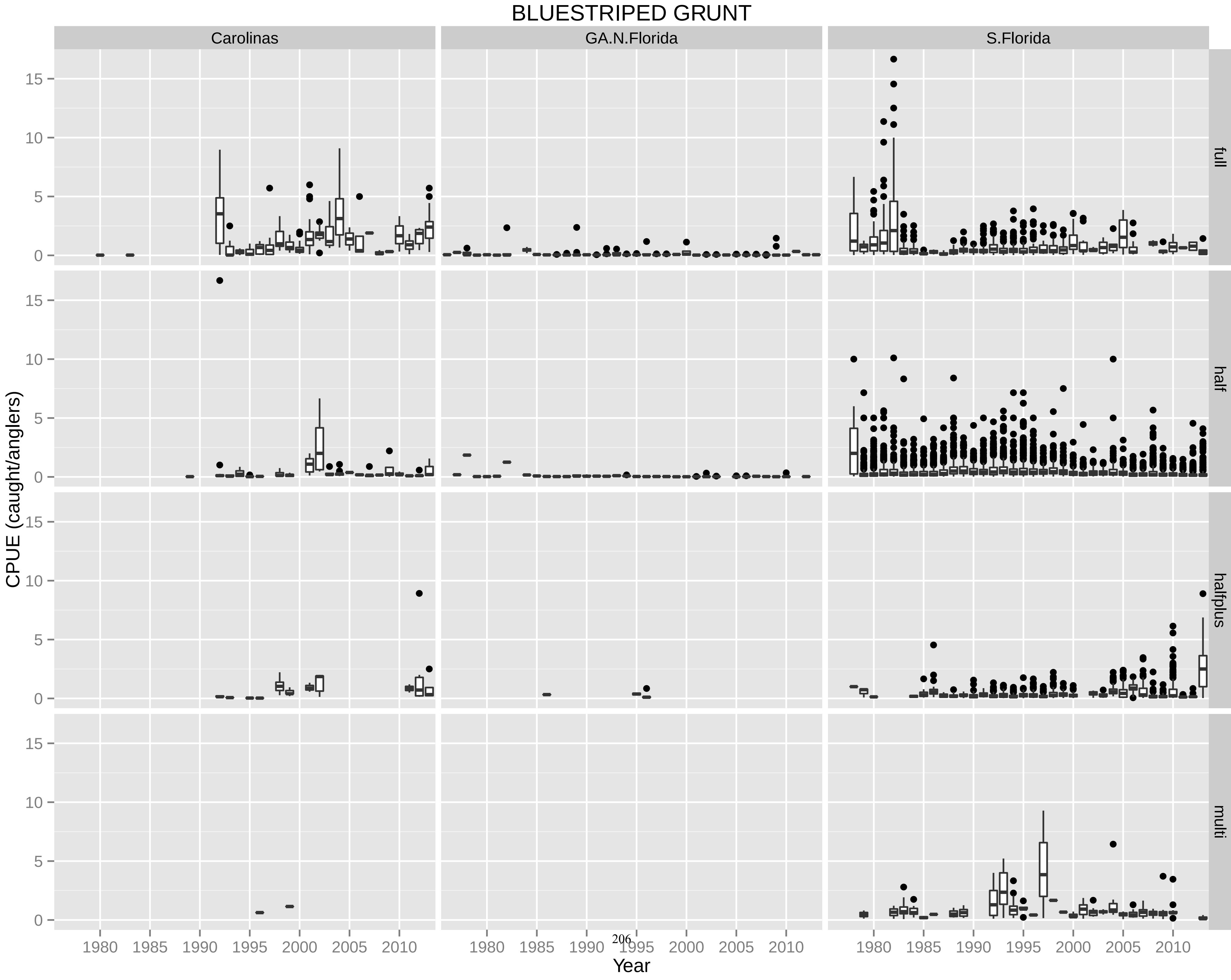

BLUELINE TILEFISH (GRAY)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0
10
20
30
40
1975
1980
1985
1990
1995
2000
2005
2010
Year

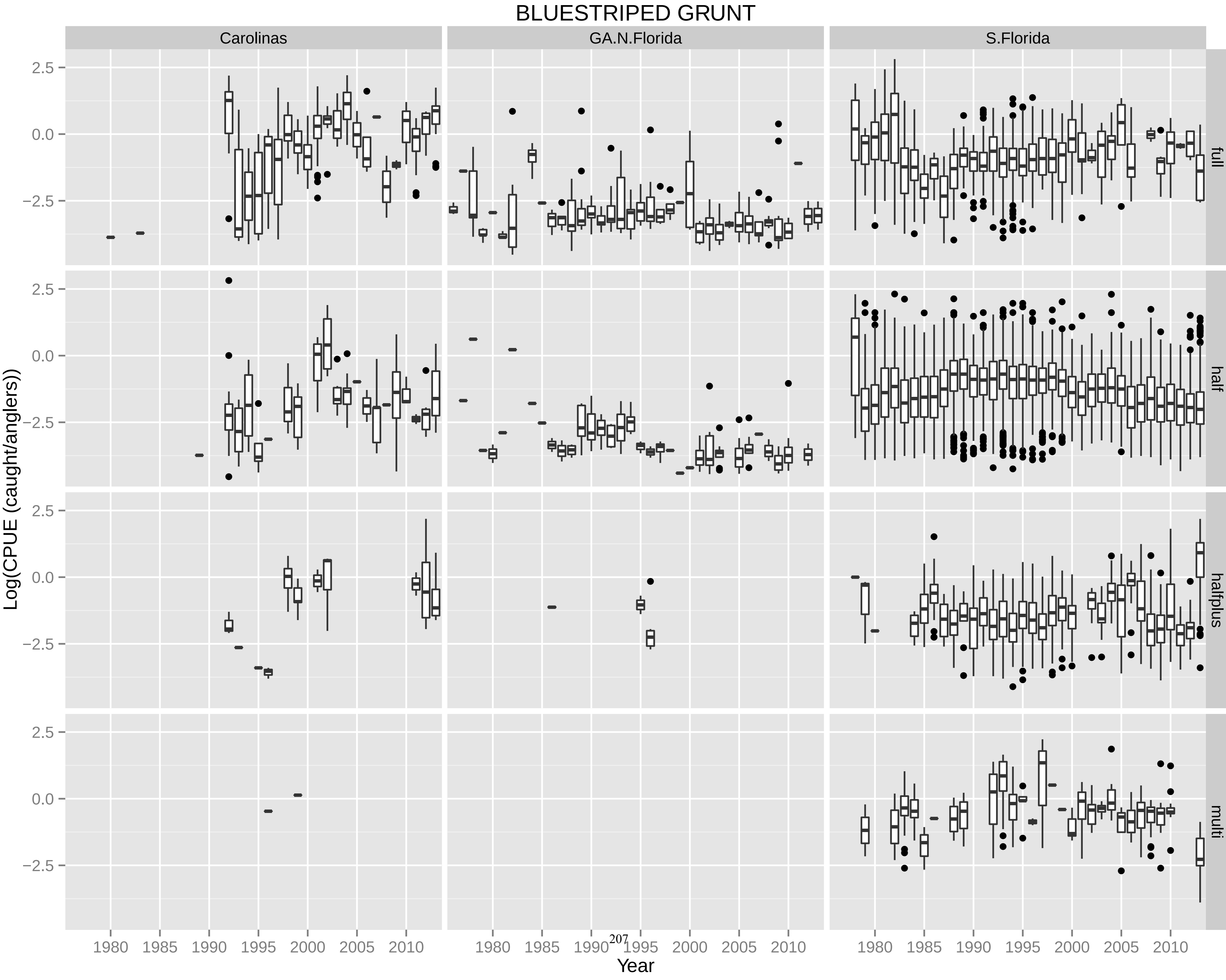


BLUELINE TILEFISH (GRAY)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
4
2
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

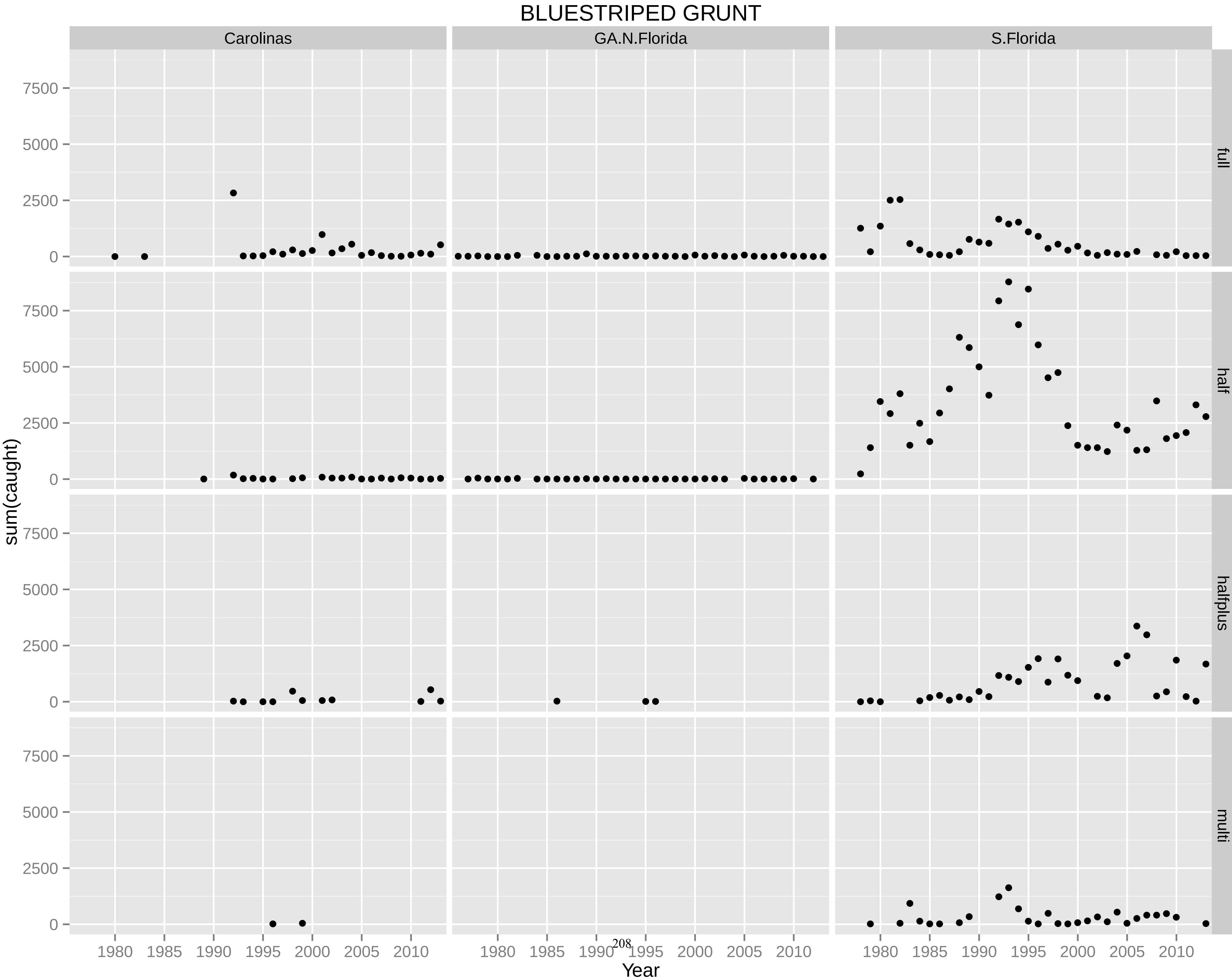

BLUELINE TILEFISH (GRAY)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
1000
2000
3000
1975
1980
1985
1990
1995
2000
2005
2010


BLUESTRIPED GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
400
500
1980
1985
1990
1995
2000
2005
2010

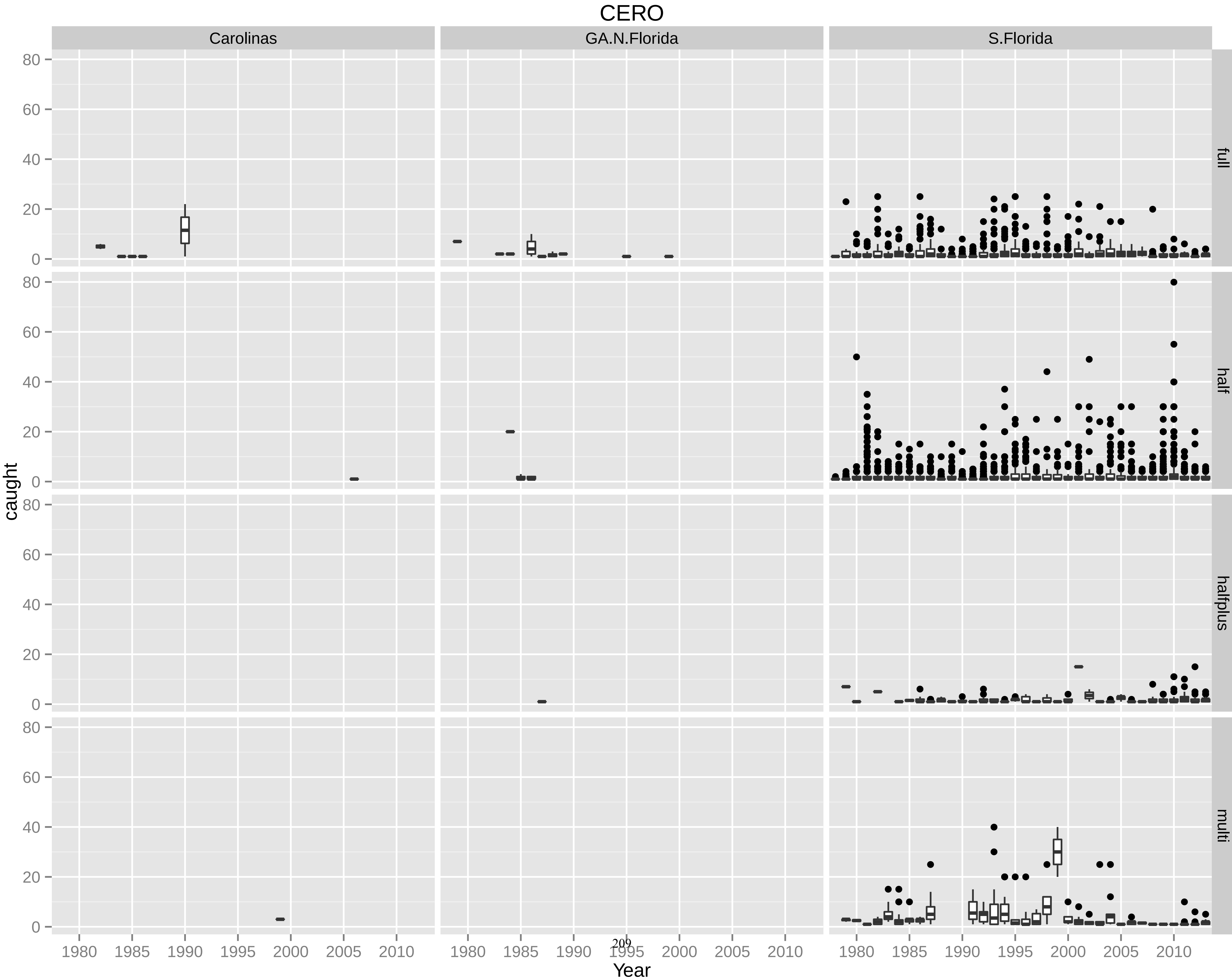

BLUESTRIPED GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
1980
1985
1990
1995
2000
2005
2010

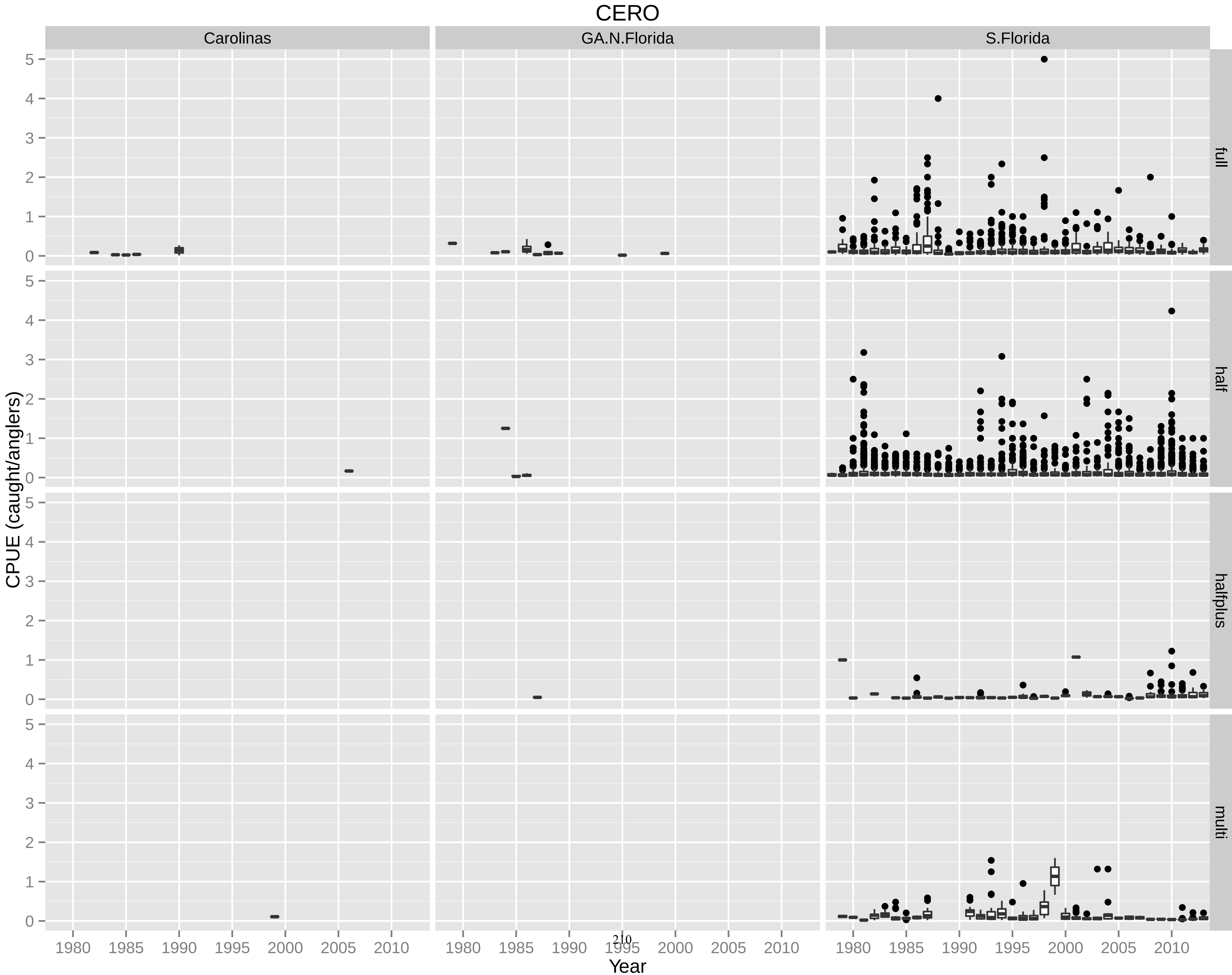


BLUESTRIPED GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
1980
1985
1990
1995
2000
2005
2010

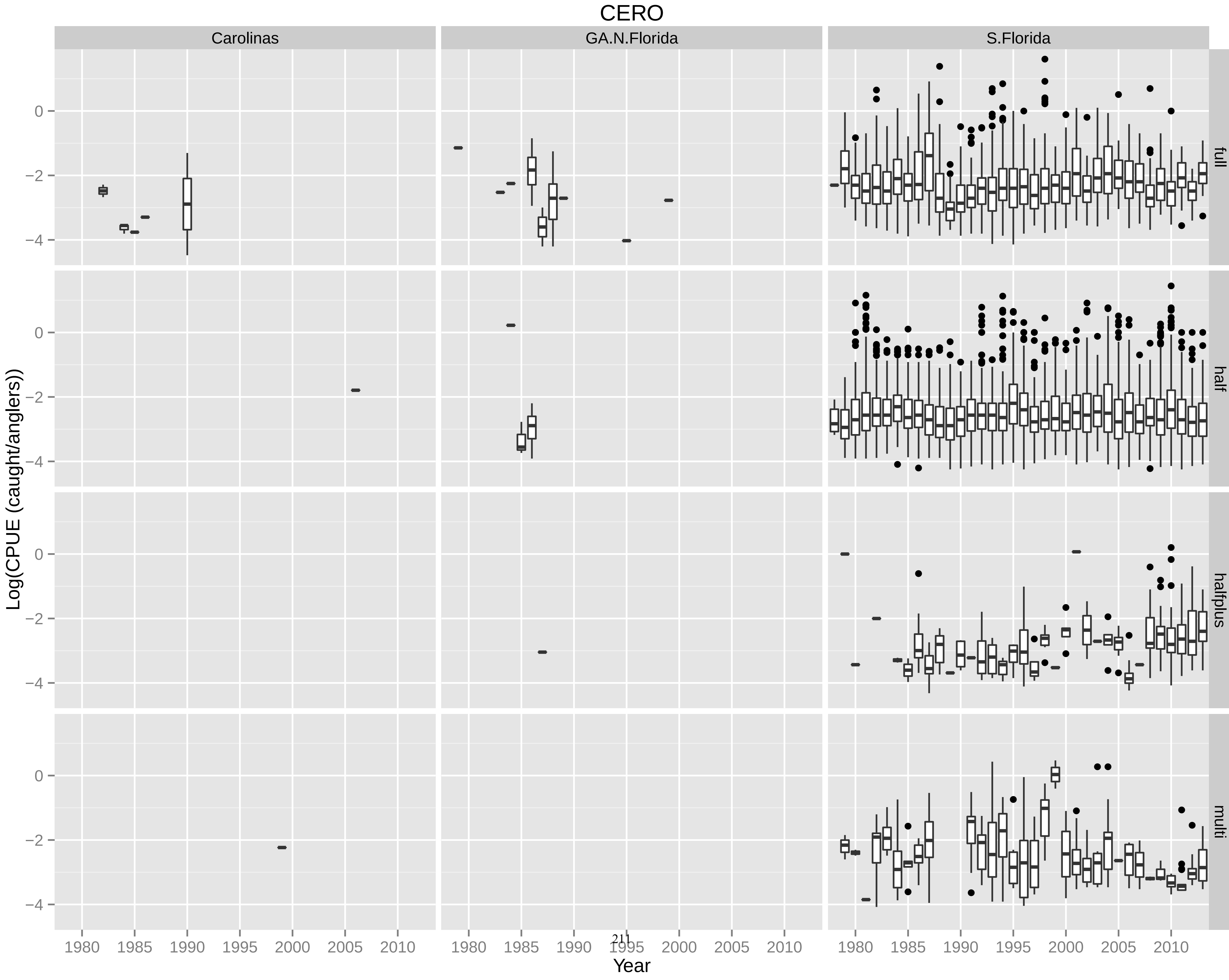


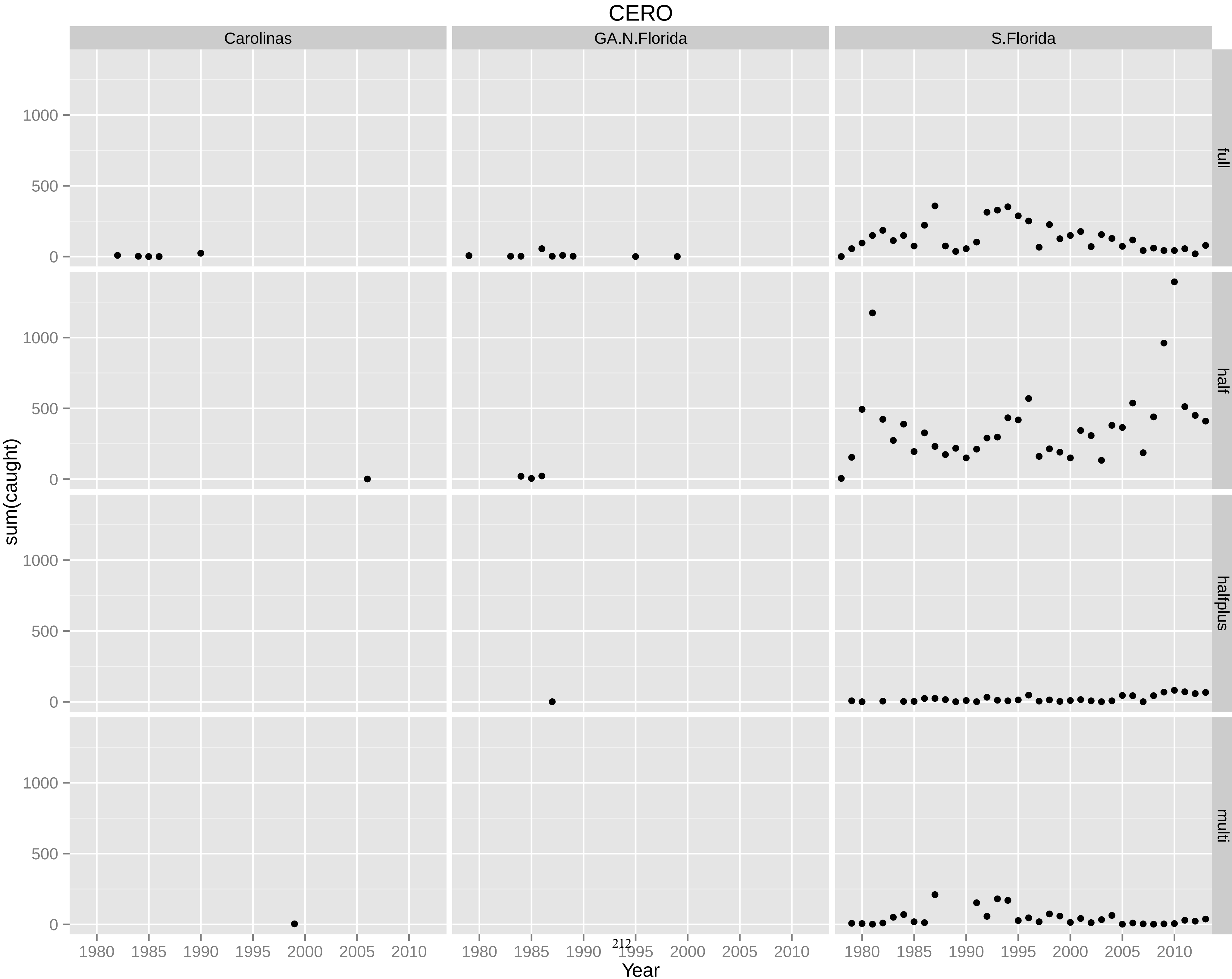
BLUESTRIPED GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
2500
5000
7500
1980
1985
1990
1995
2000
2005
2010
Year


CERO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
20
40
60
80
1980
1985
1990
1995
2000
2005
2010

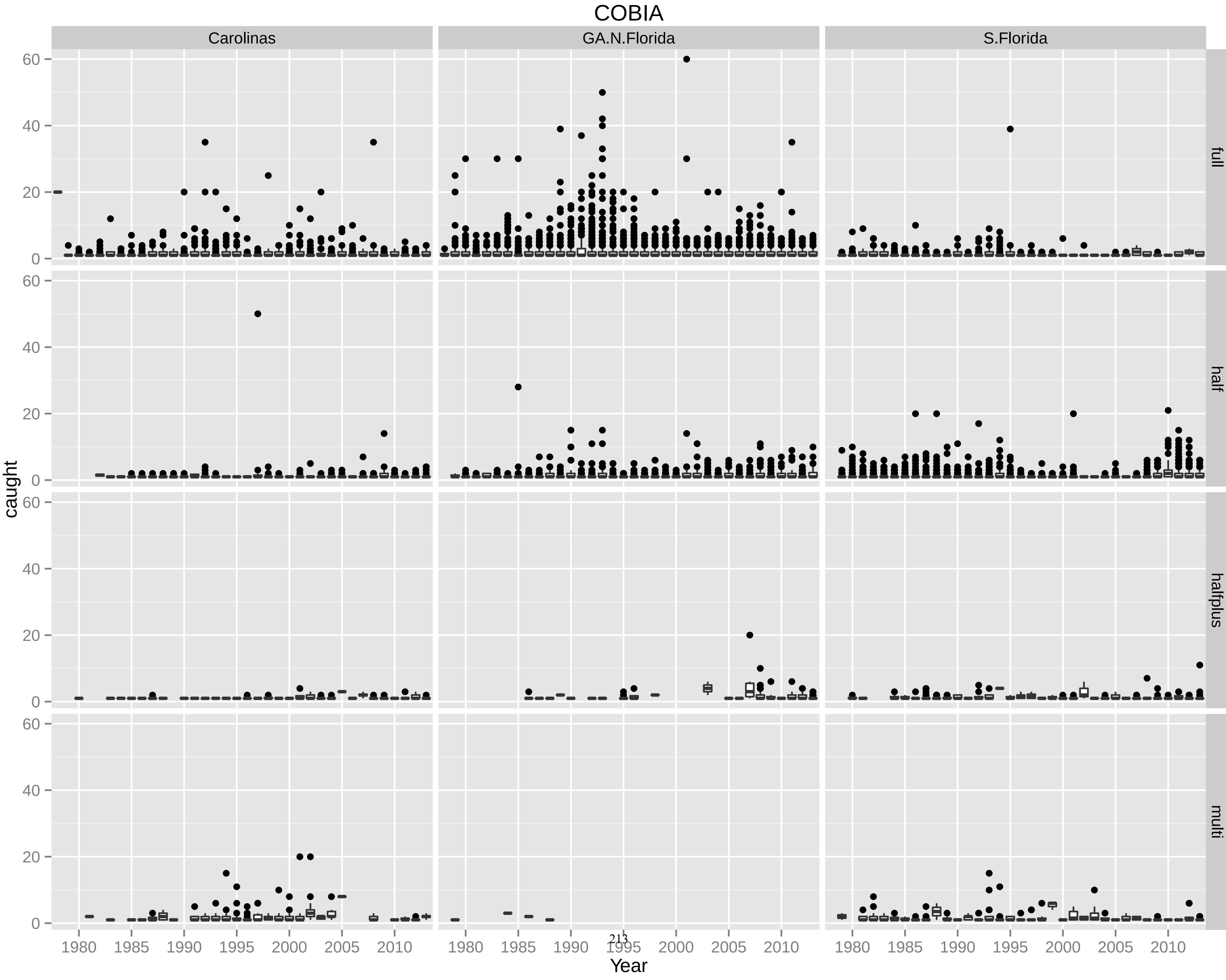


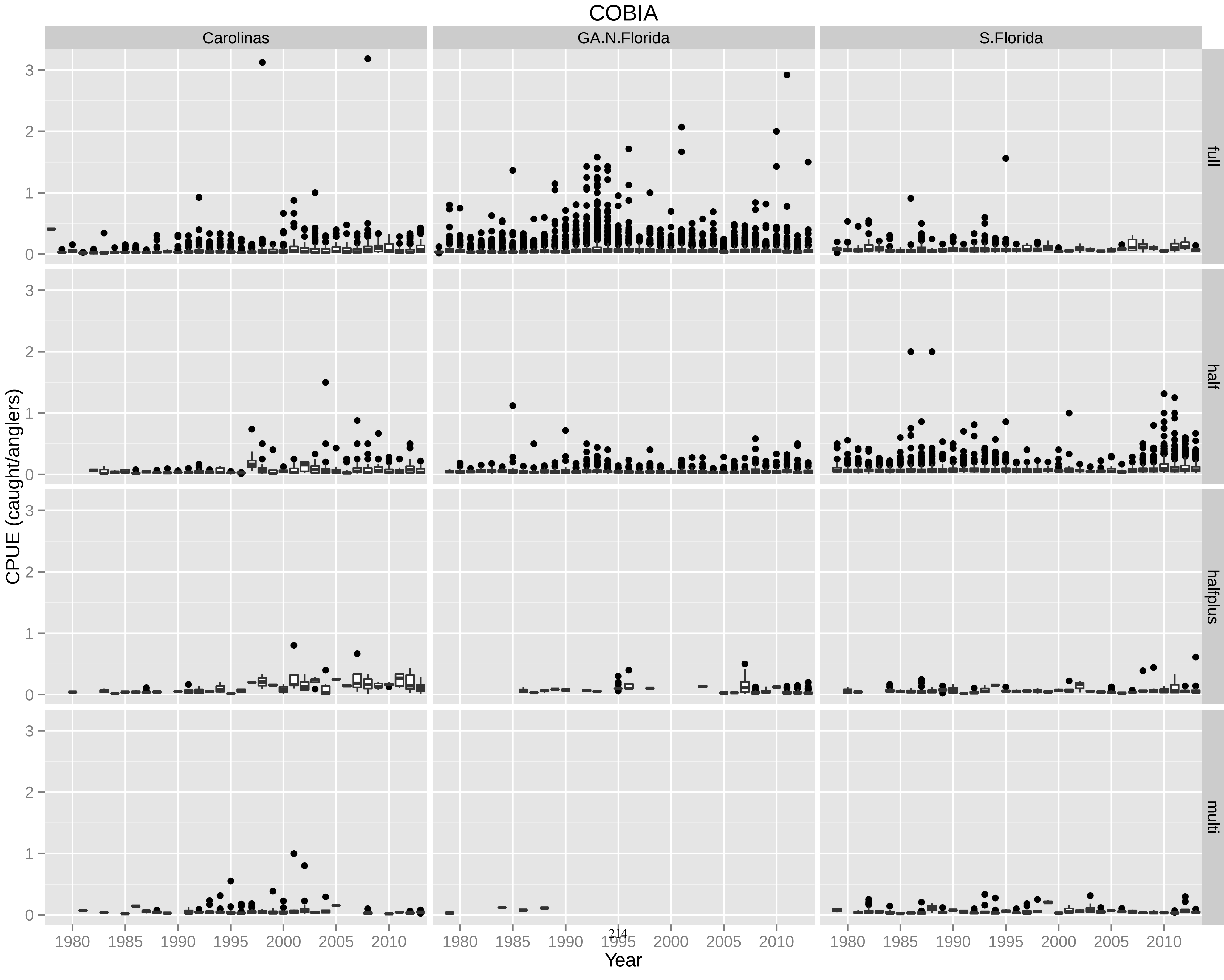
CERO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
4
5
1980
1985
1990
1995
2000
2005
2010

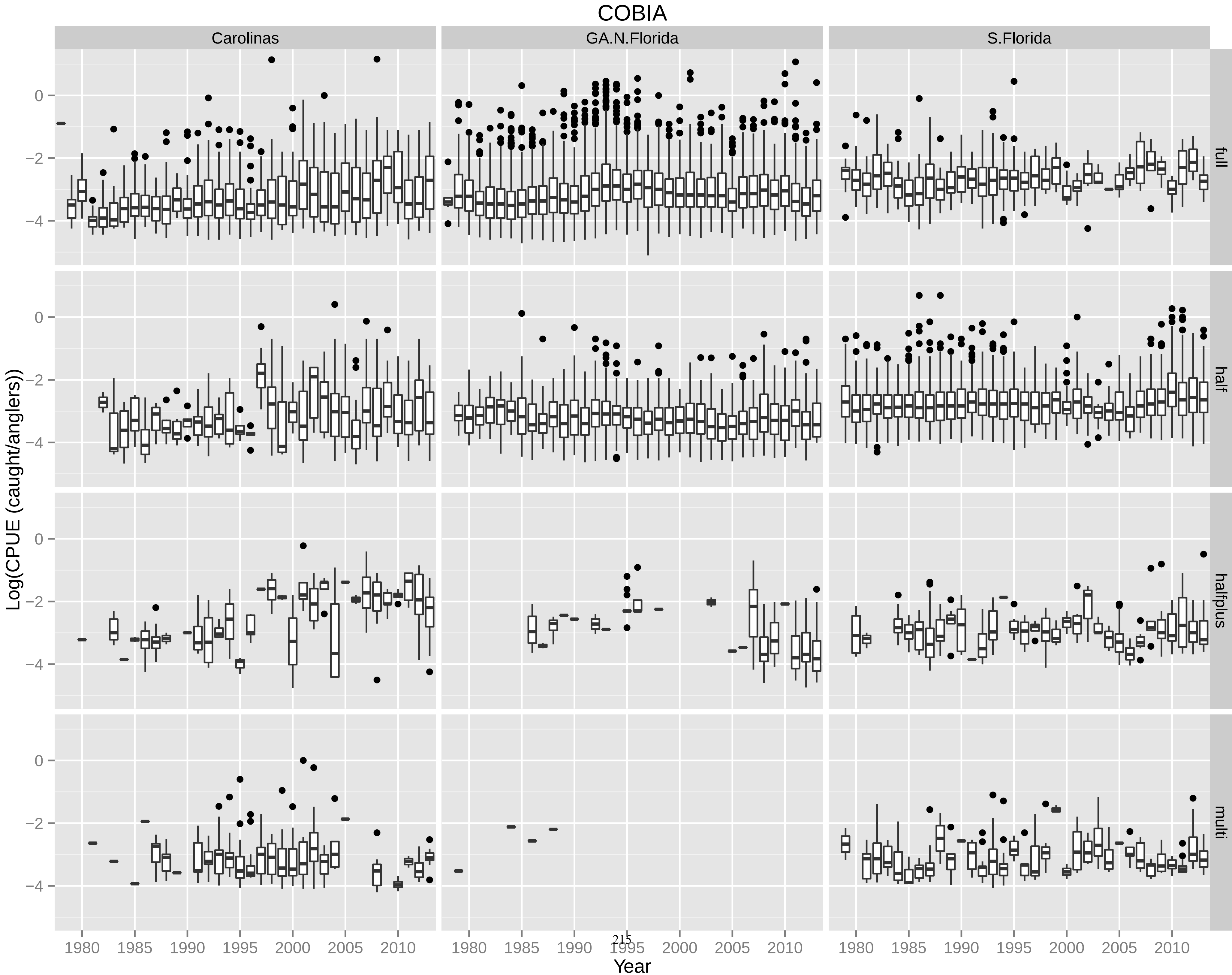

CERO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

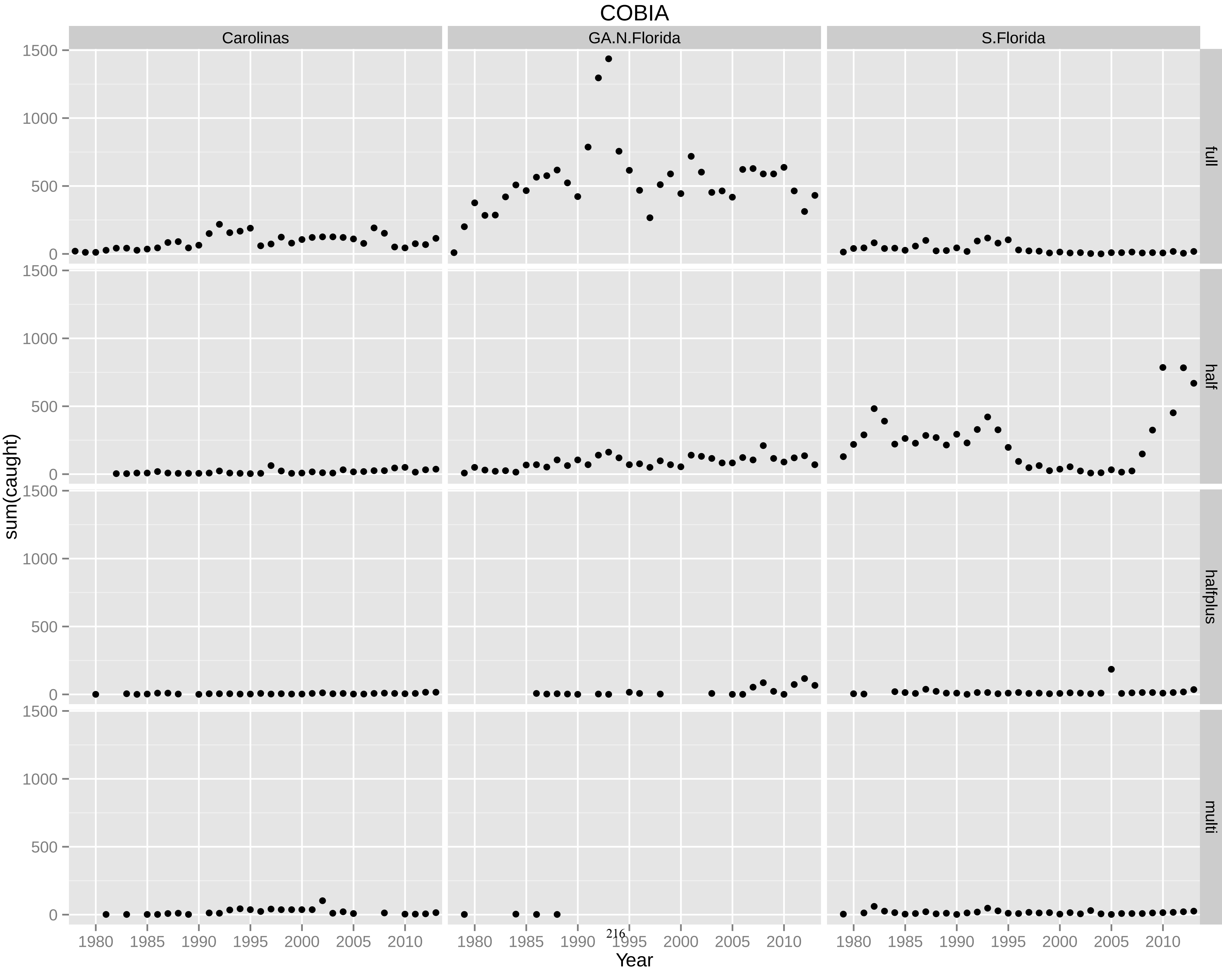


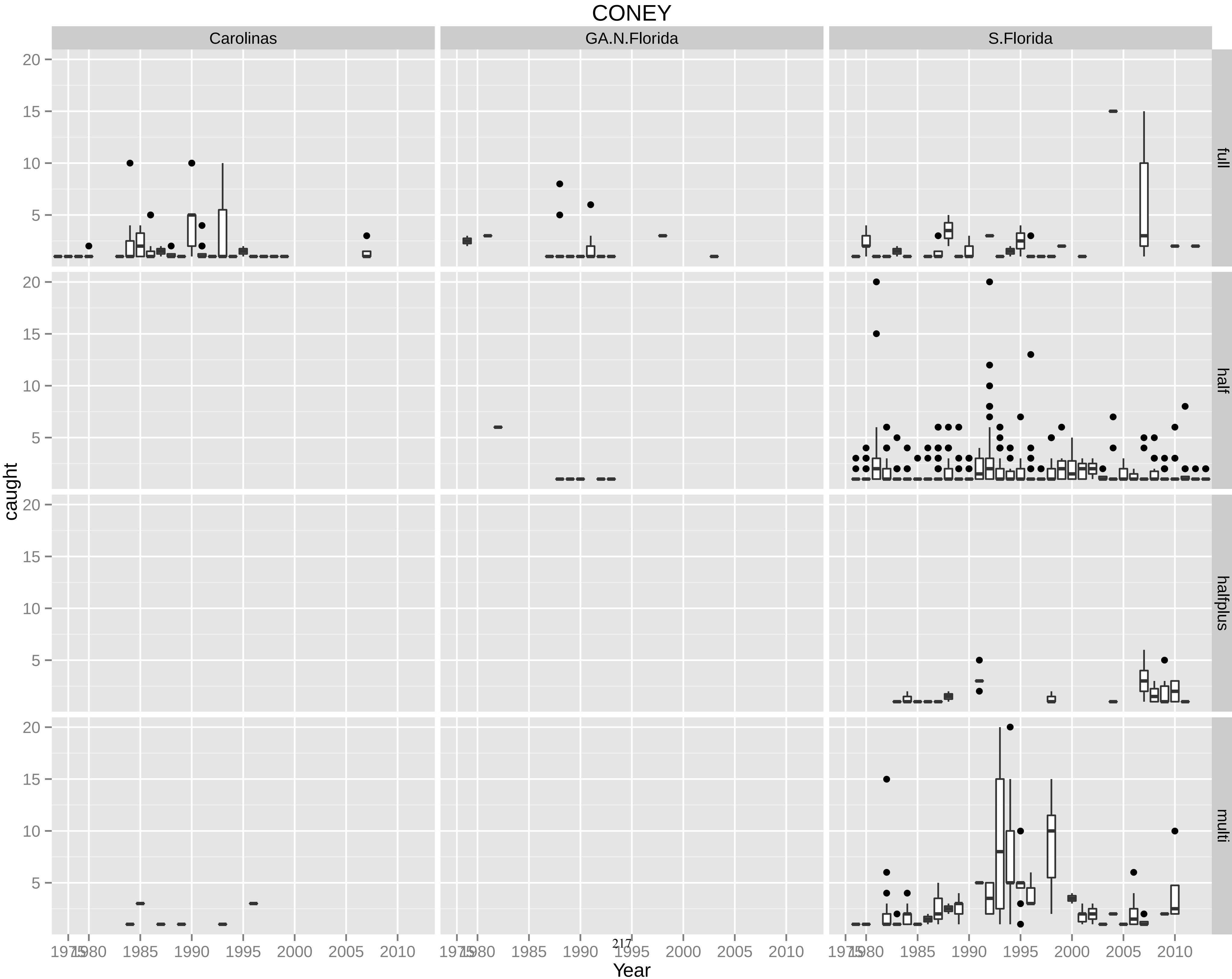
CERO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
500
1000
1980
1985
1990
1995
2000
2005
2010
Year

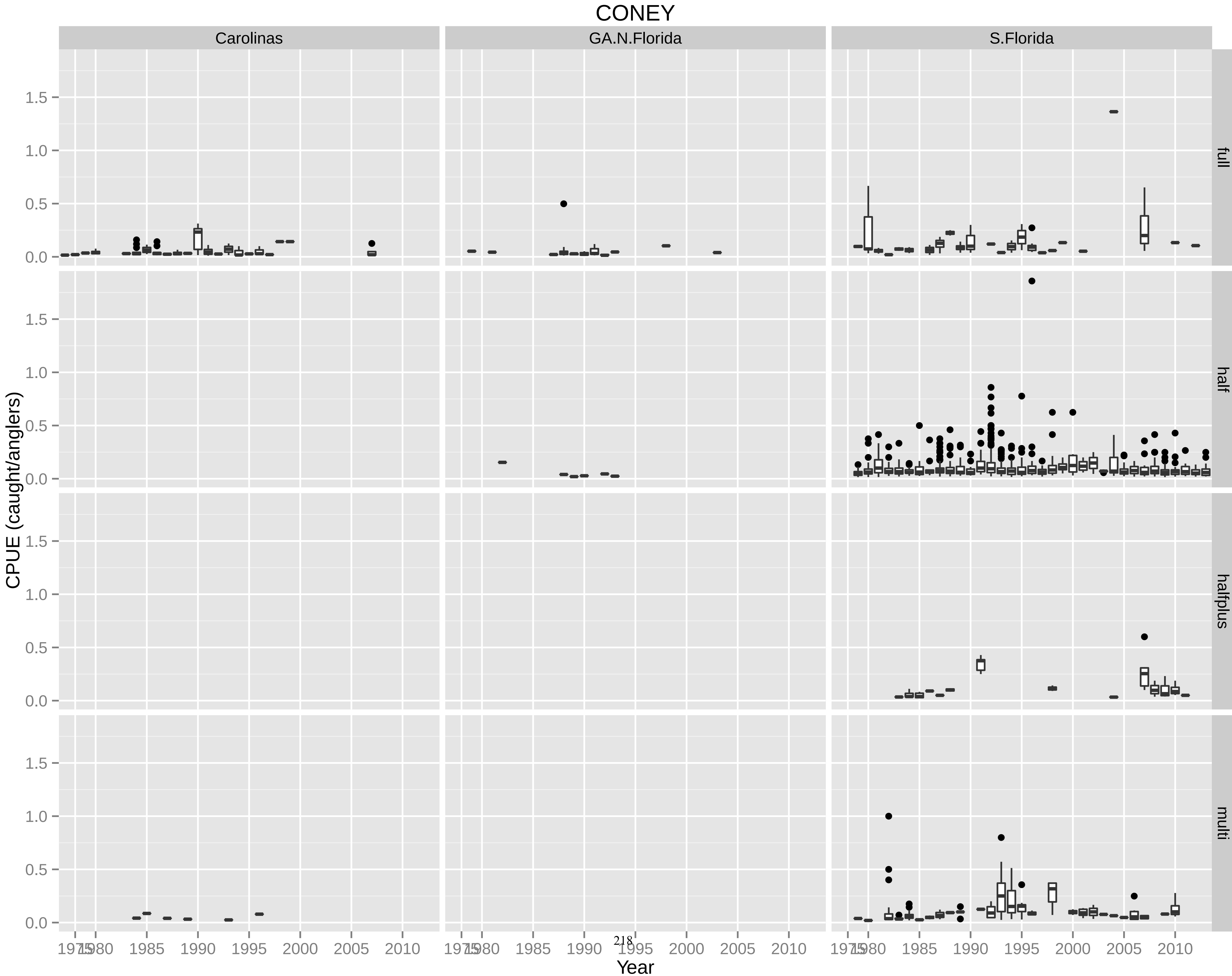

COBIA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
20
40
60
1980
1985
1990
1995
2000
2005
2010


COBIA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
1980
1985
1990
1995
2000
2005
2010

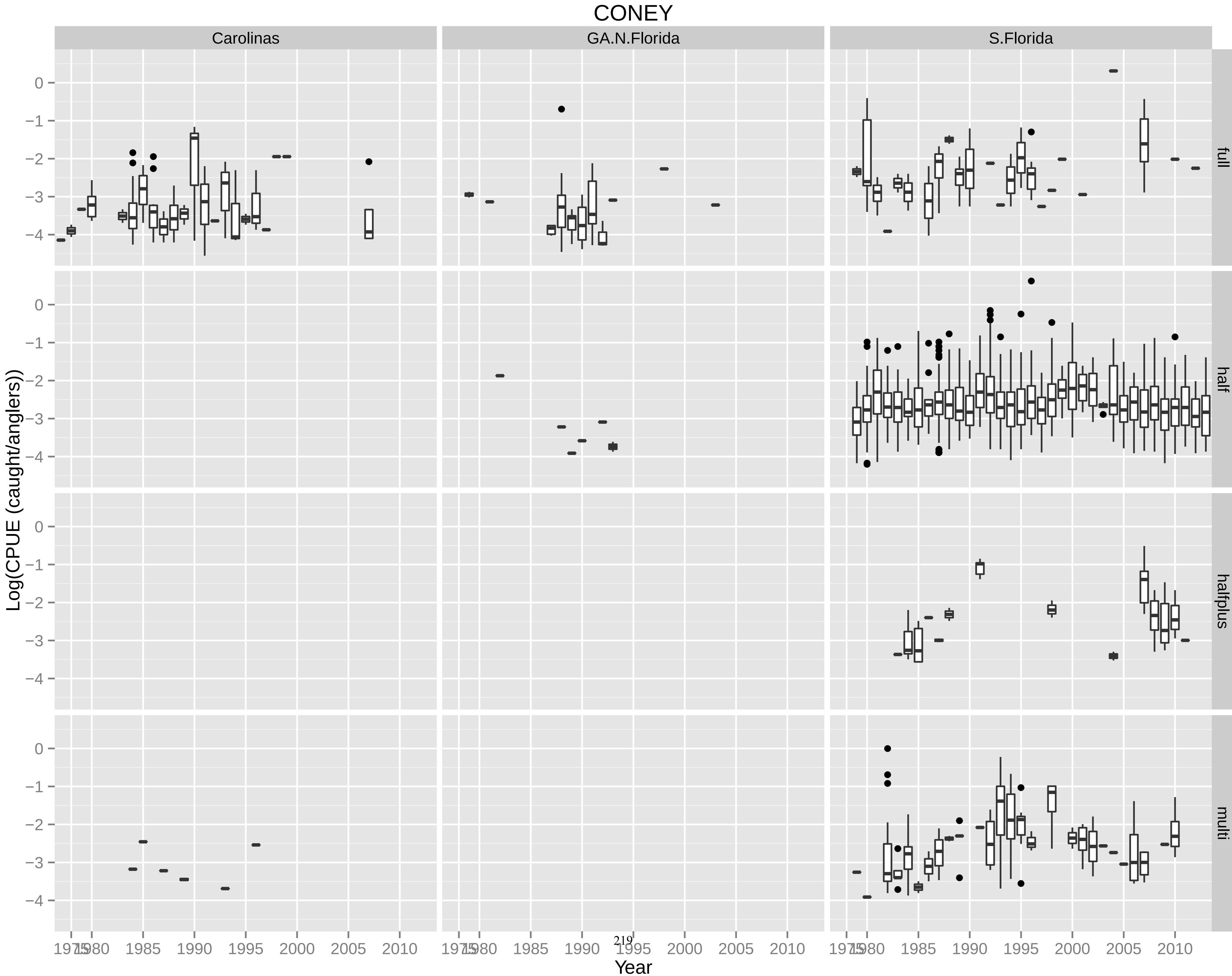

COBIA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

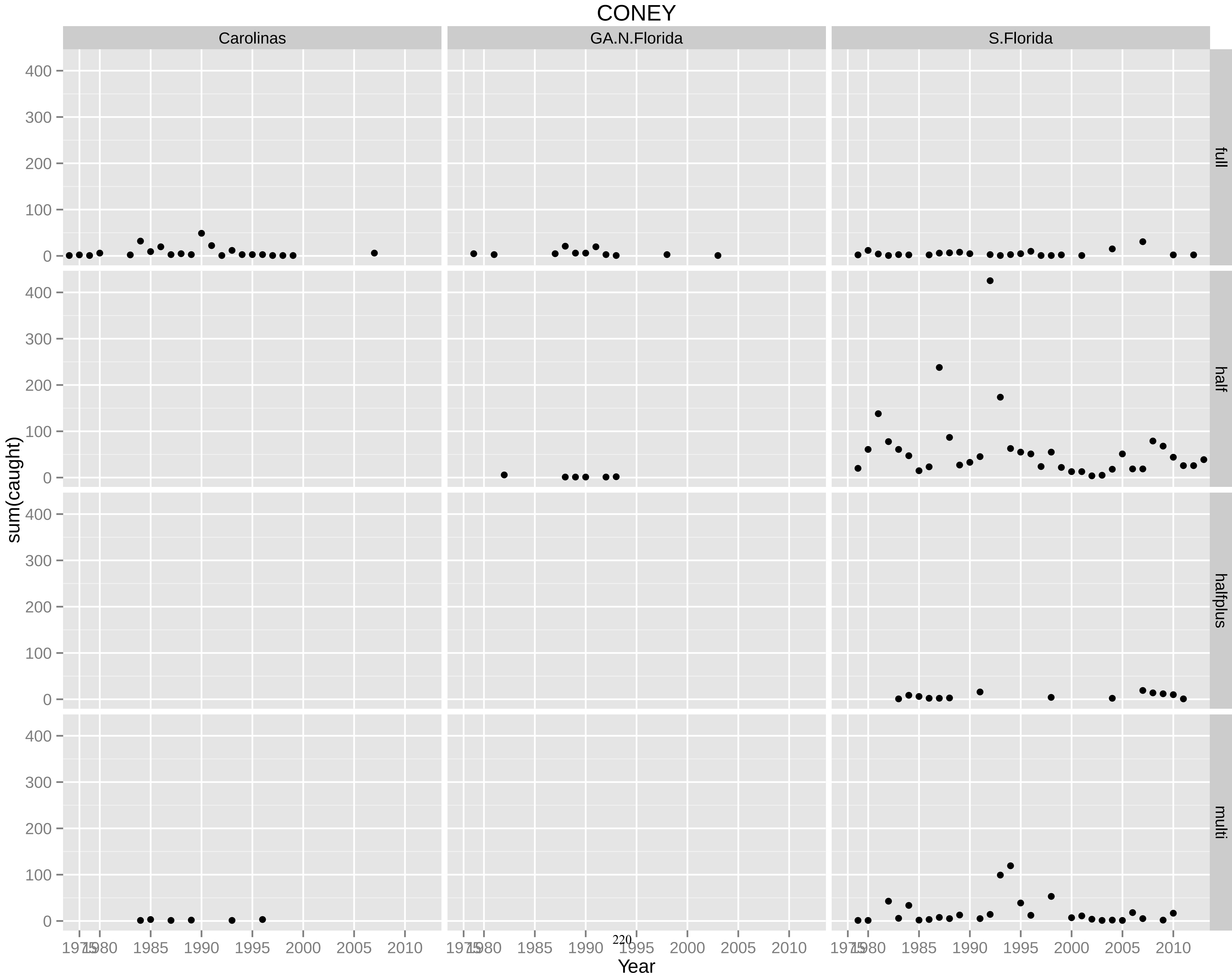

COBIA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
1500
1000
500
0
1980
1985
1990
1995
2000
2005
2010


CONEY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
5
10
15
20
1975
1980
1985
1990
1995
2000
2005
2010

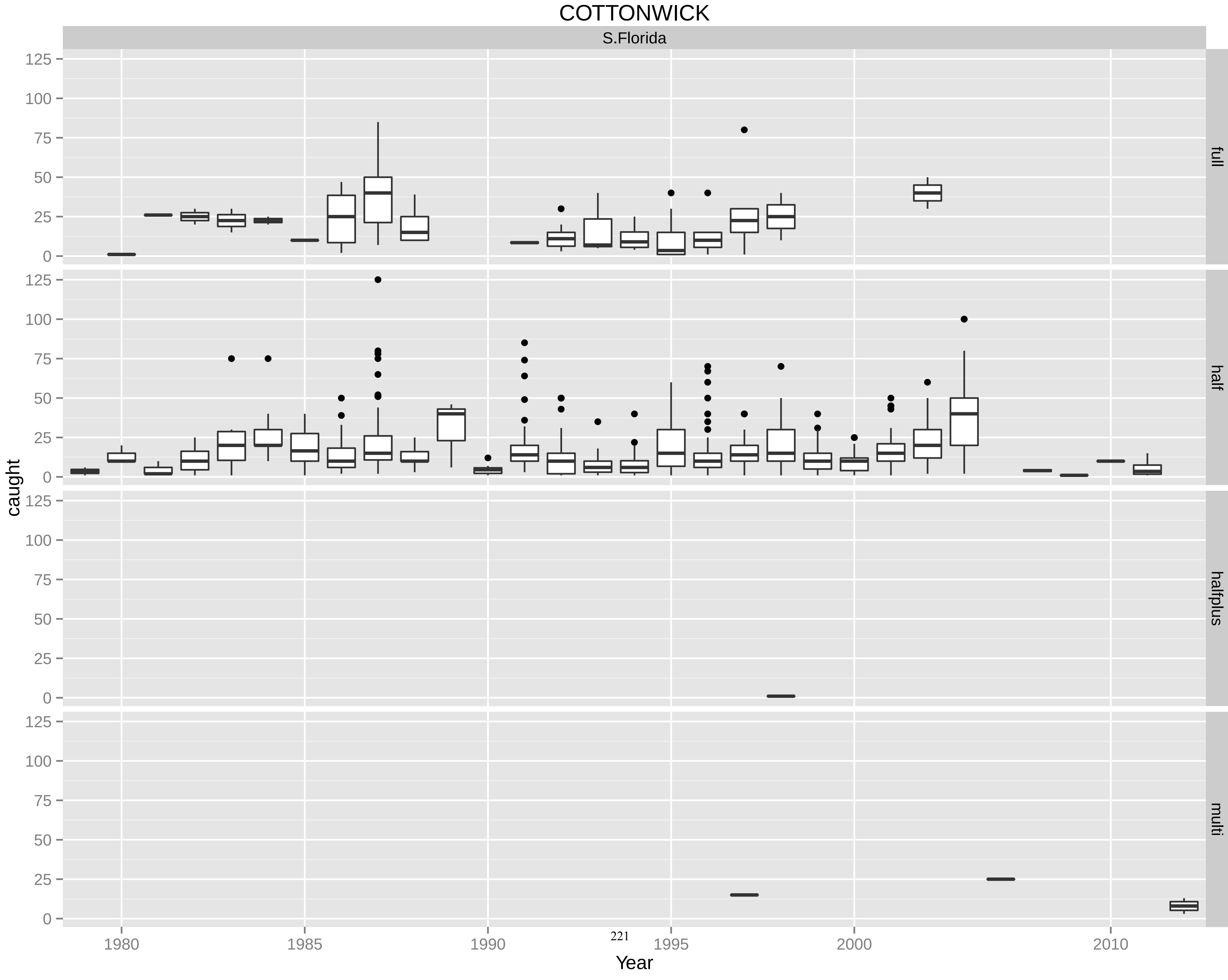


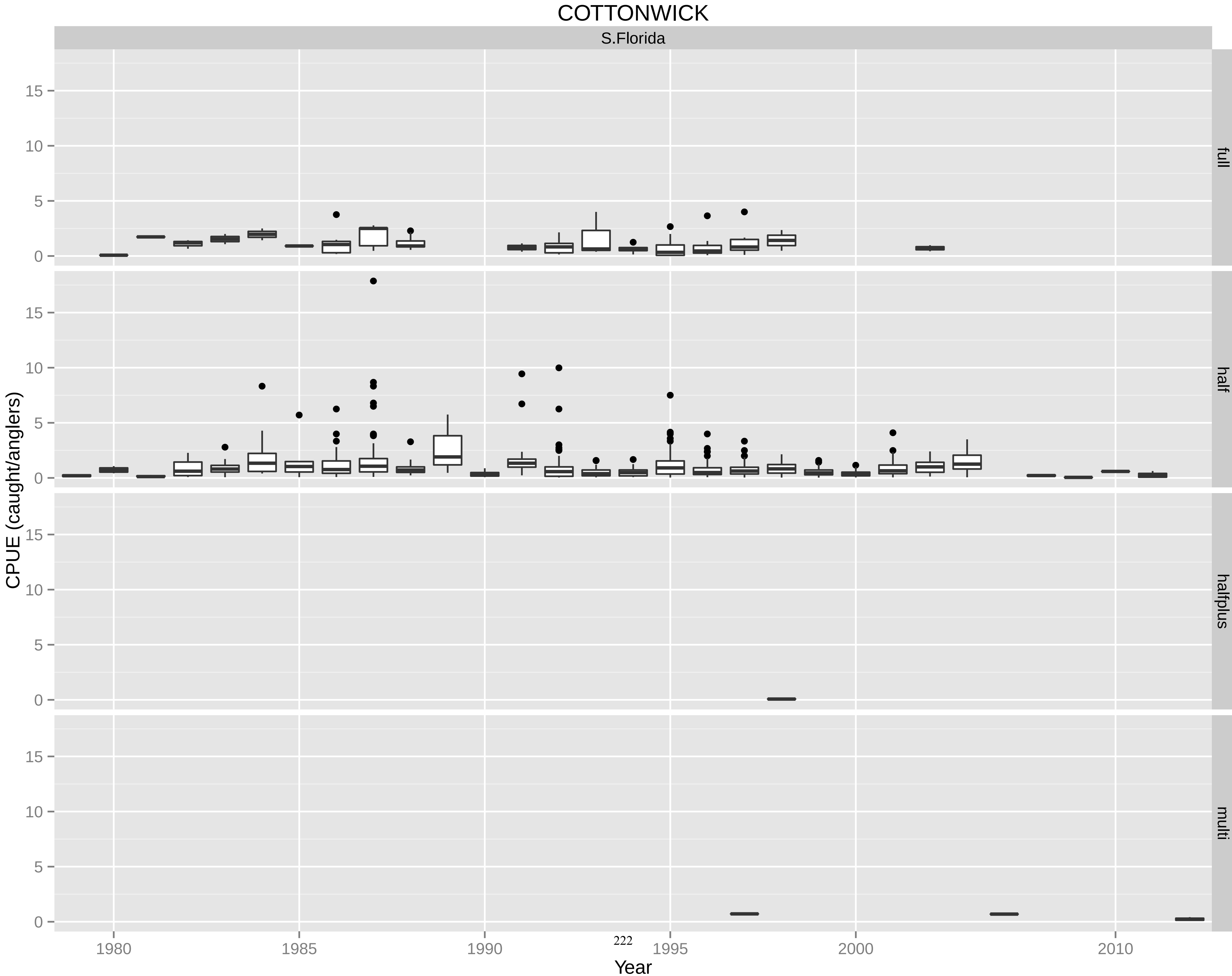
CONEY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
0.5
1.0
1.5
1975
1980
1985
1990
1995
2000
2005
2010

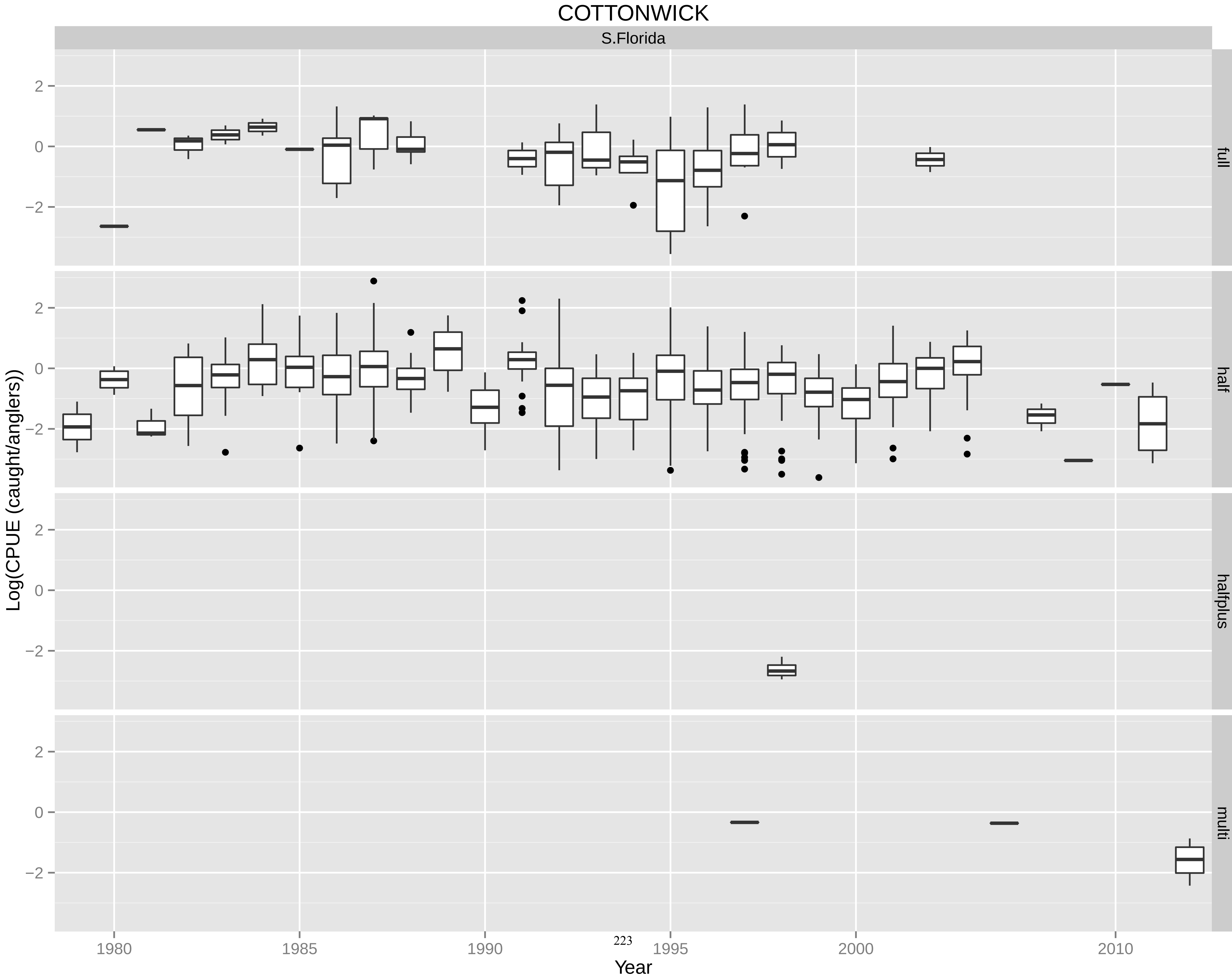

CONEY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−1
−2
−3
−4
1975
1980
1985
1990
1995
2000
2005
2010

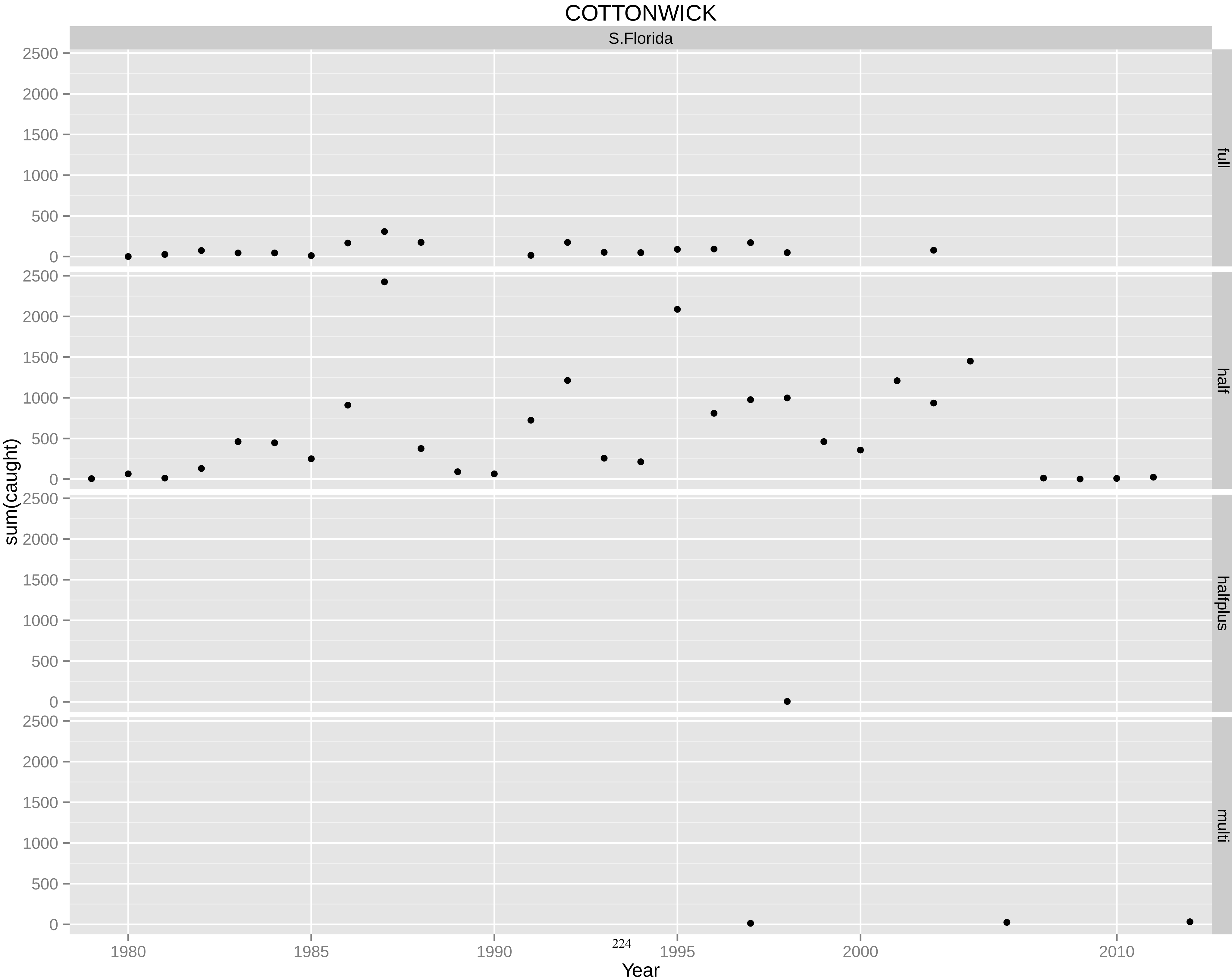

CONEY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
100
200
300
400
1975
1980
1985
1990
1995
2000
2005
2010

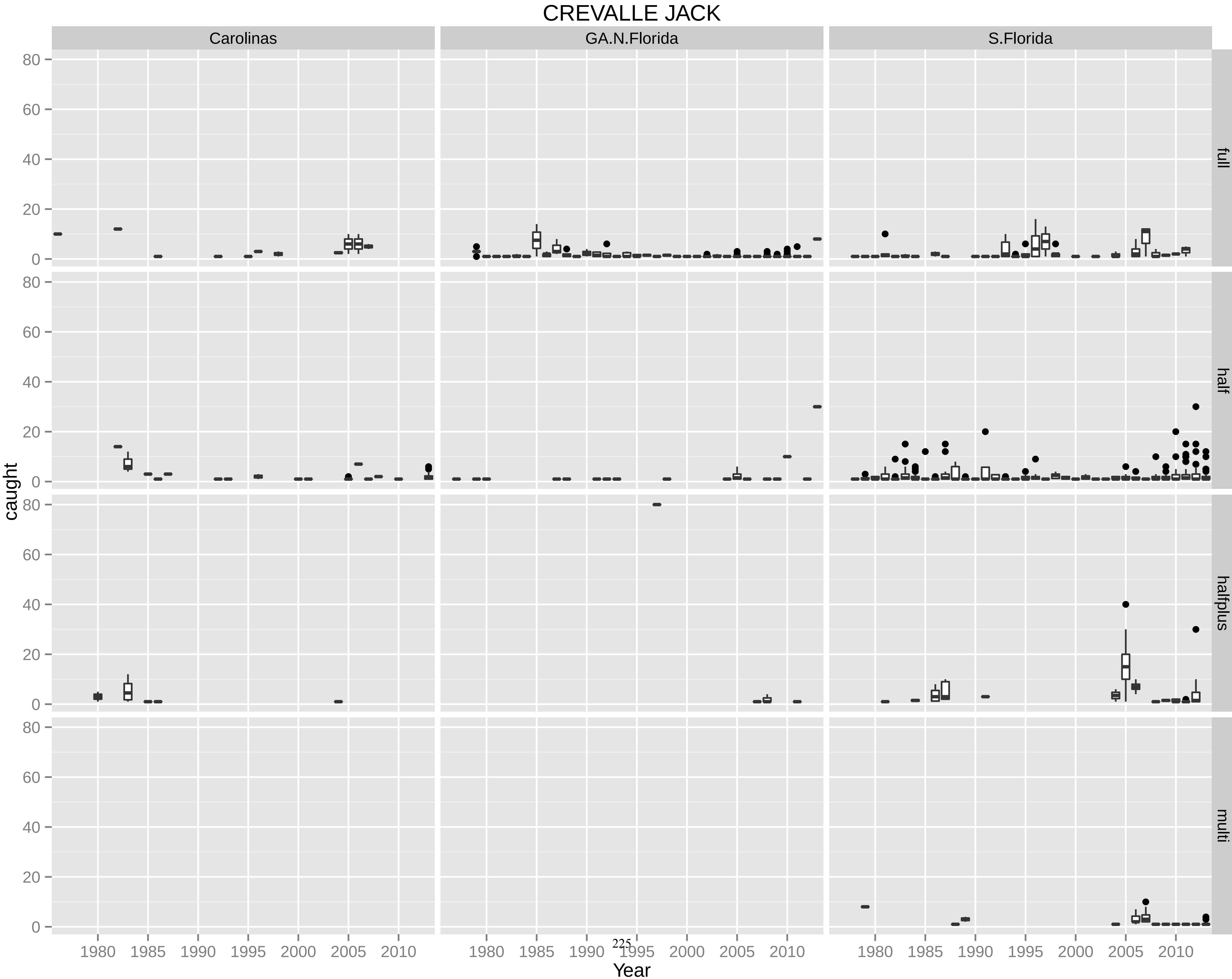
220

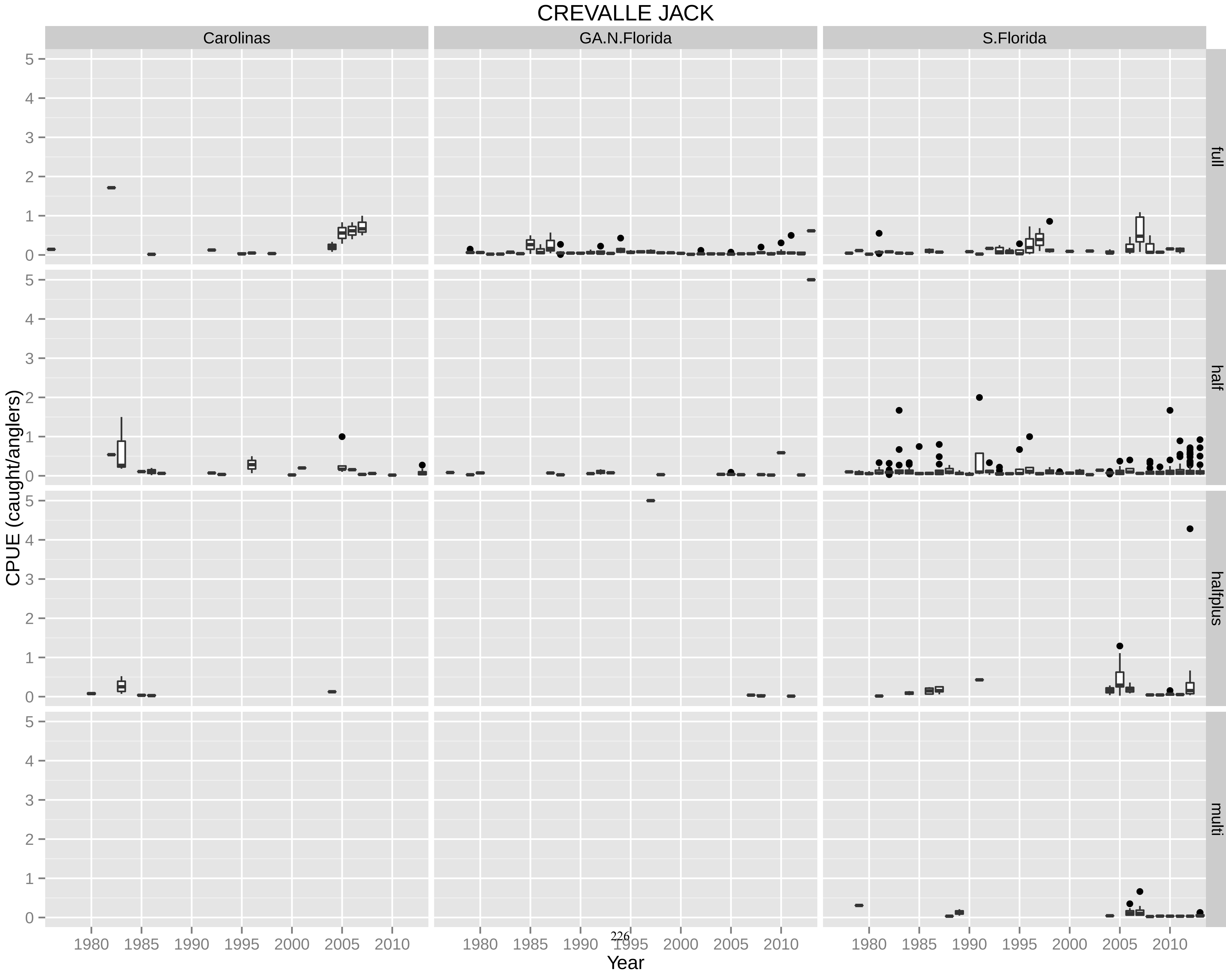

COTTONWICK
S.Florida
full
half
halfplus
multi
caught
Year
0
25
50
75
100
125
1980
1985
1990
1995
2000
2010

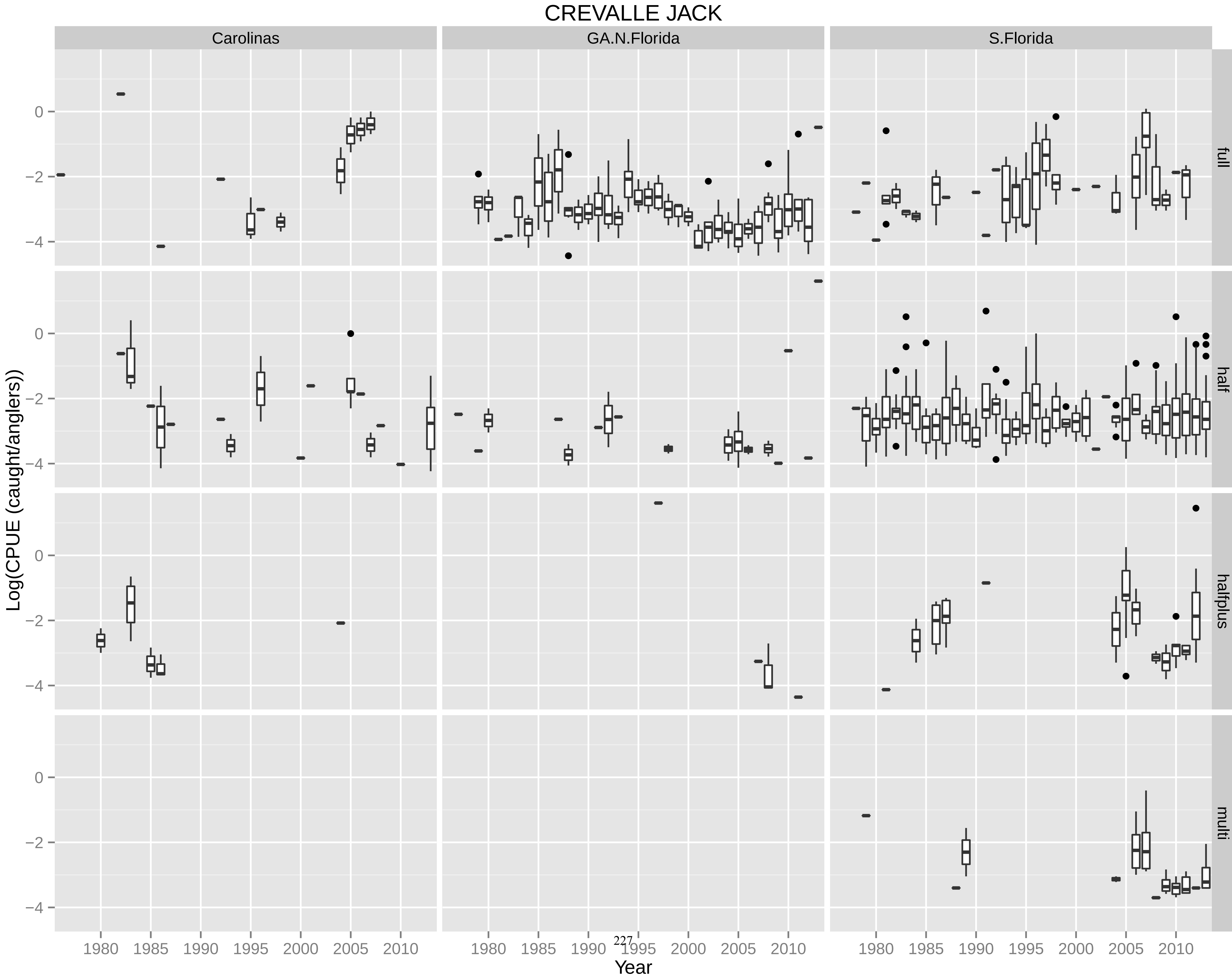

COTTONWICK
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0
5
10
15
1980
1985
1990
1995
2000
2010
Year


COTTONWICK
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
2
0
−2
1980
1985
1990
1995
2000
2010
Year

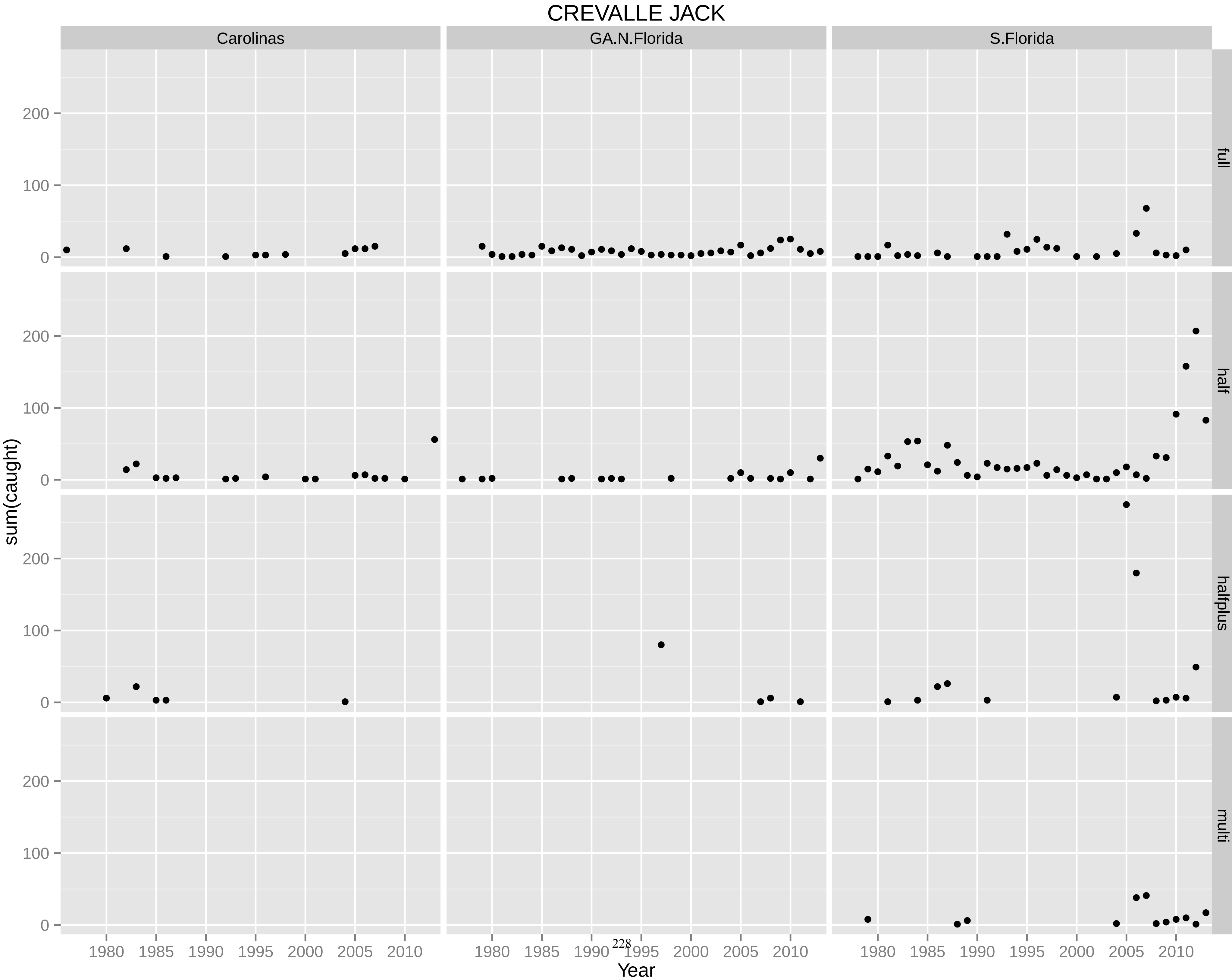

COTTONWICK
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
2000
2500
1980
1985
1990
1995
2000
2010

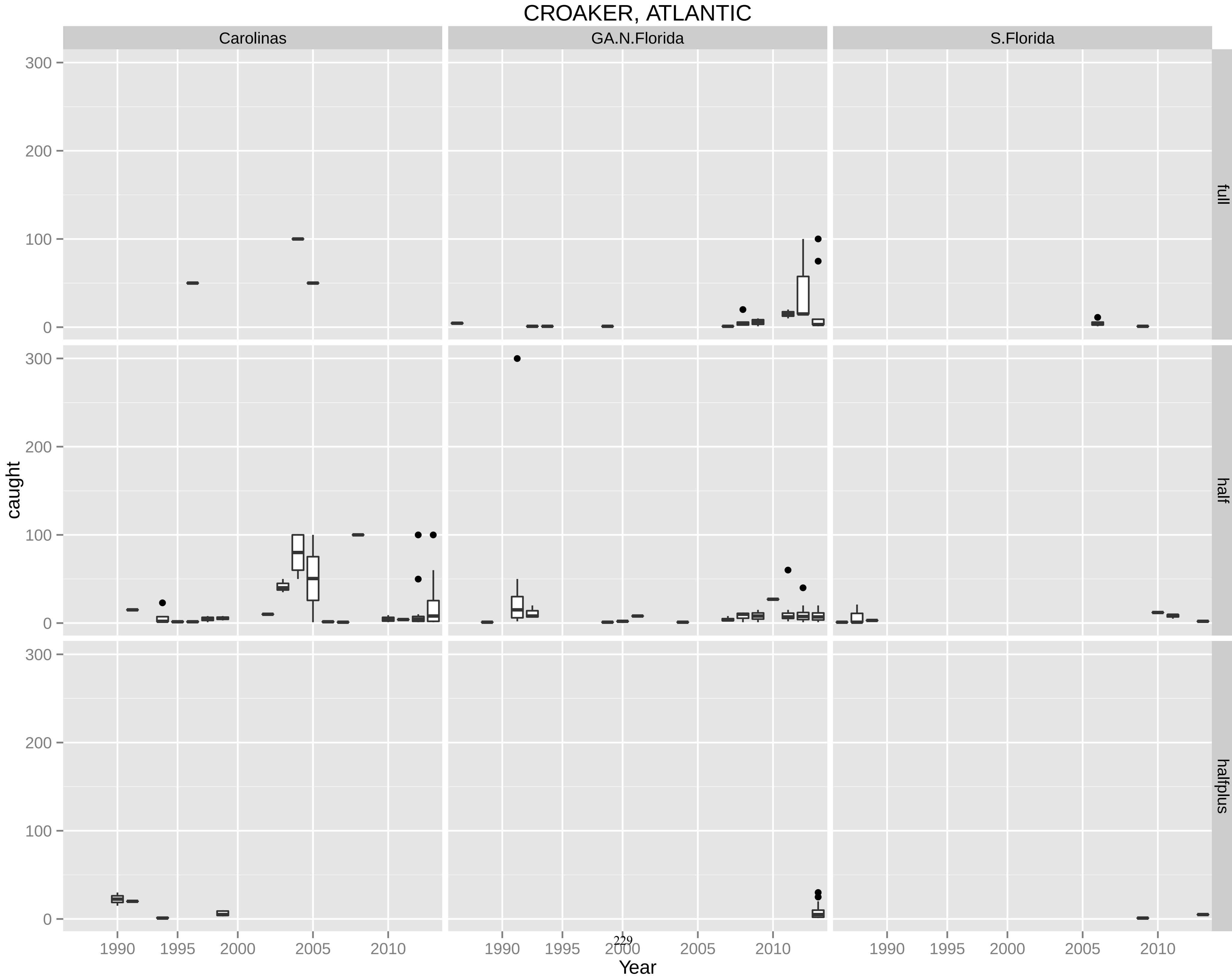

CREVALLE JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
20
40
60
80
1980
1985
1990
1995
2000
2005
2010

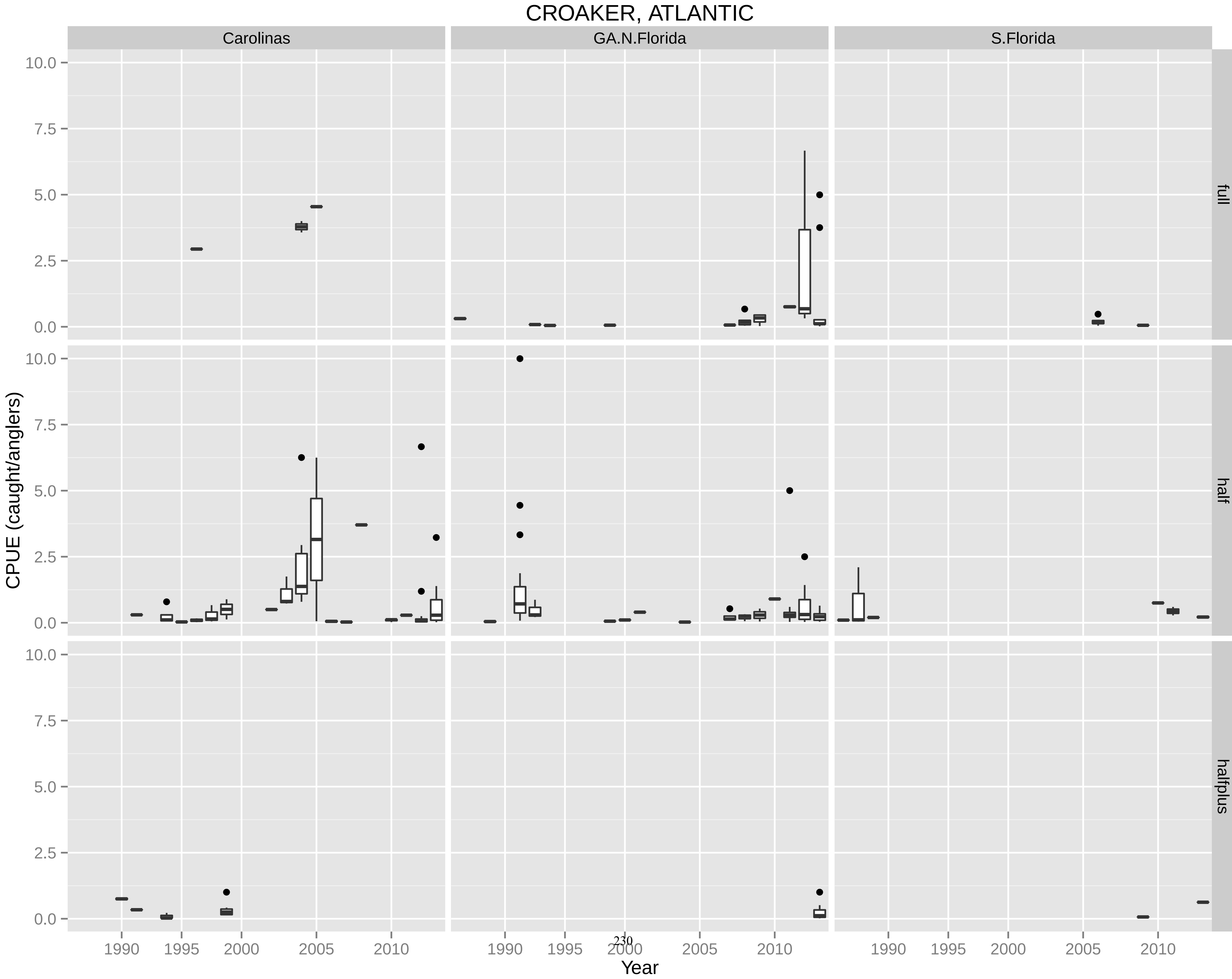

CREVALLE JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
4
5
1980
1985
1990
1995
2000
2005
2010

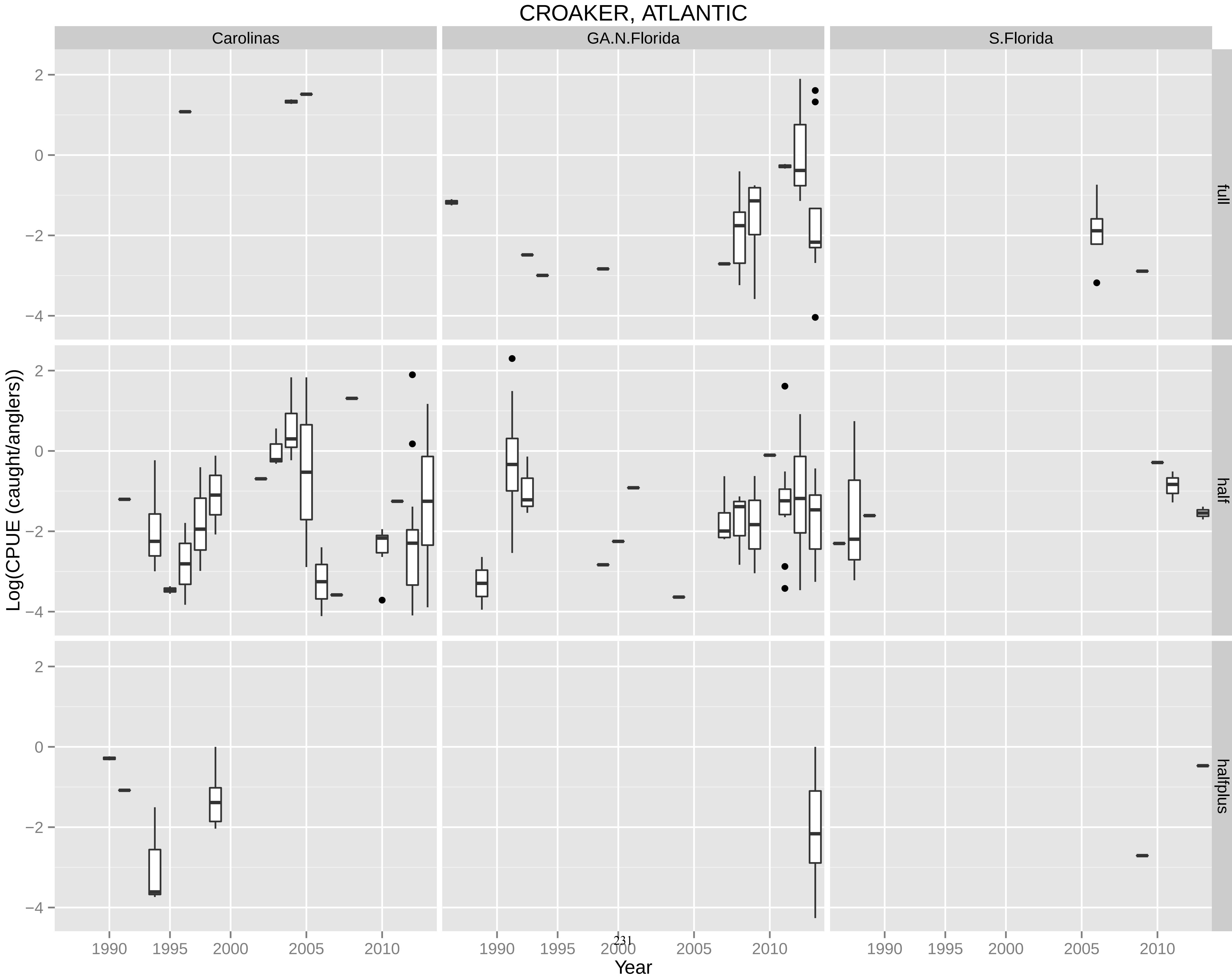


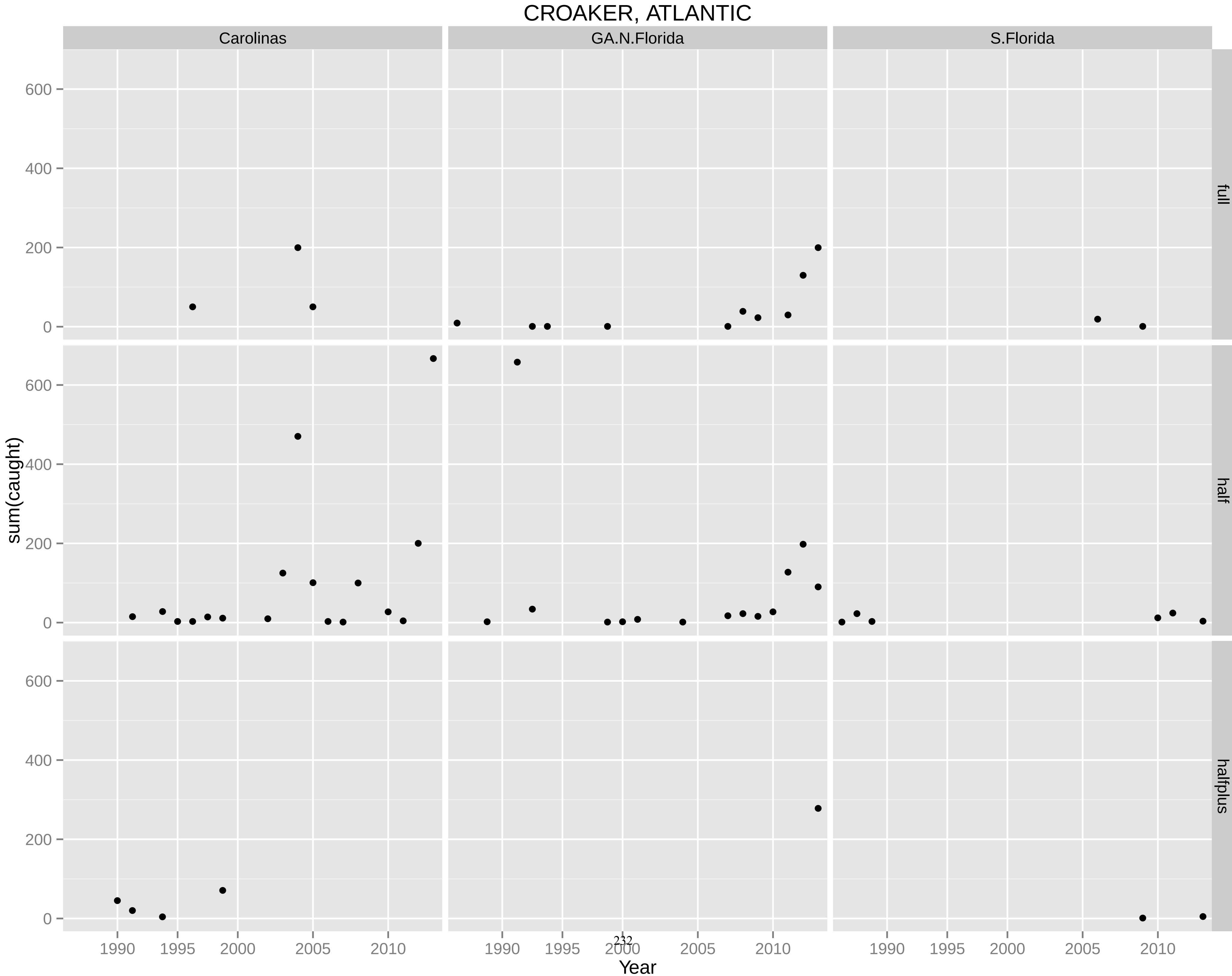
CREVALLE JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

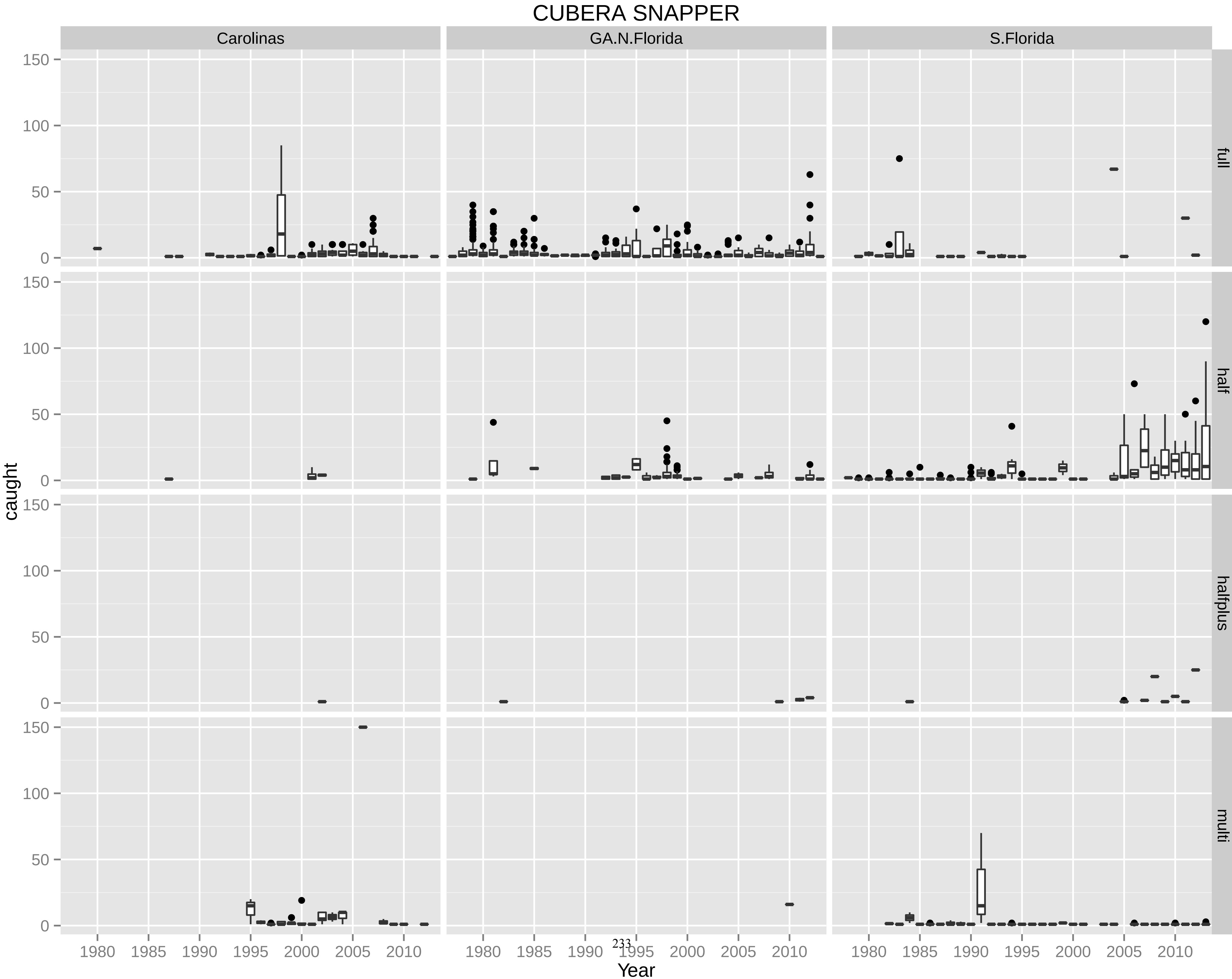

CREVALLE JACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
100
200
1980
1985
1990
1995
2000
2005
2010

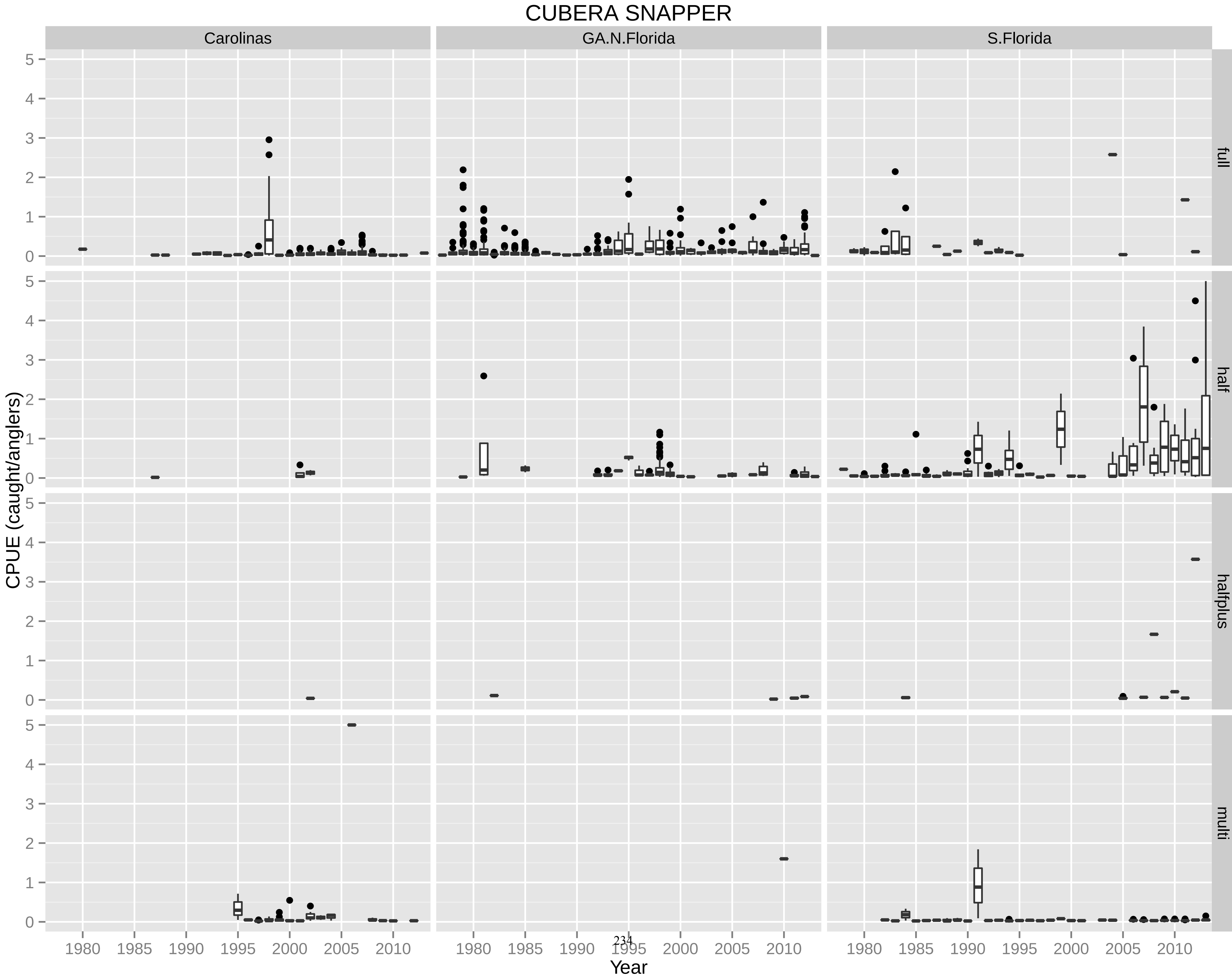

CROAKER, ATLANTIC
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
caught
Year
0
100
200
300
1990
1995
2000
2005
2010

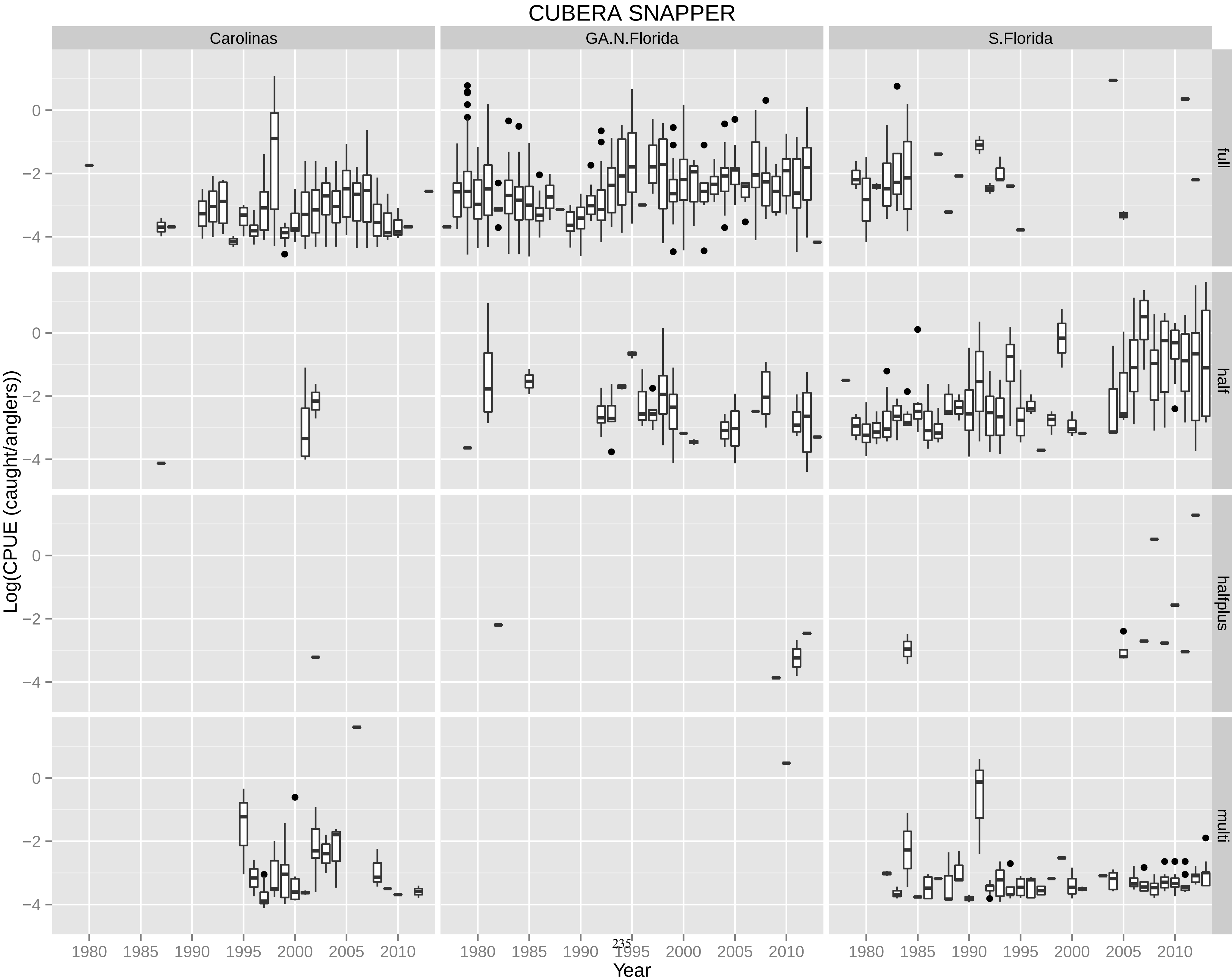

CROAKER, ATLANTIC
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
CPUE (caught/anglers)
Year
0.0
2.5
5.0
7.5
10.0
1990
1995
2000
2005
2010


CROAKER, ATLANTIC
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1990
1995
2000
2005
2010

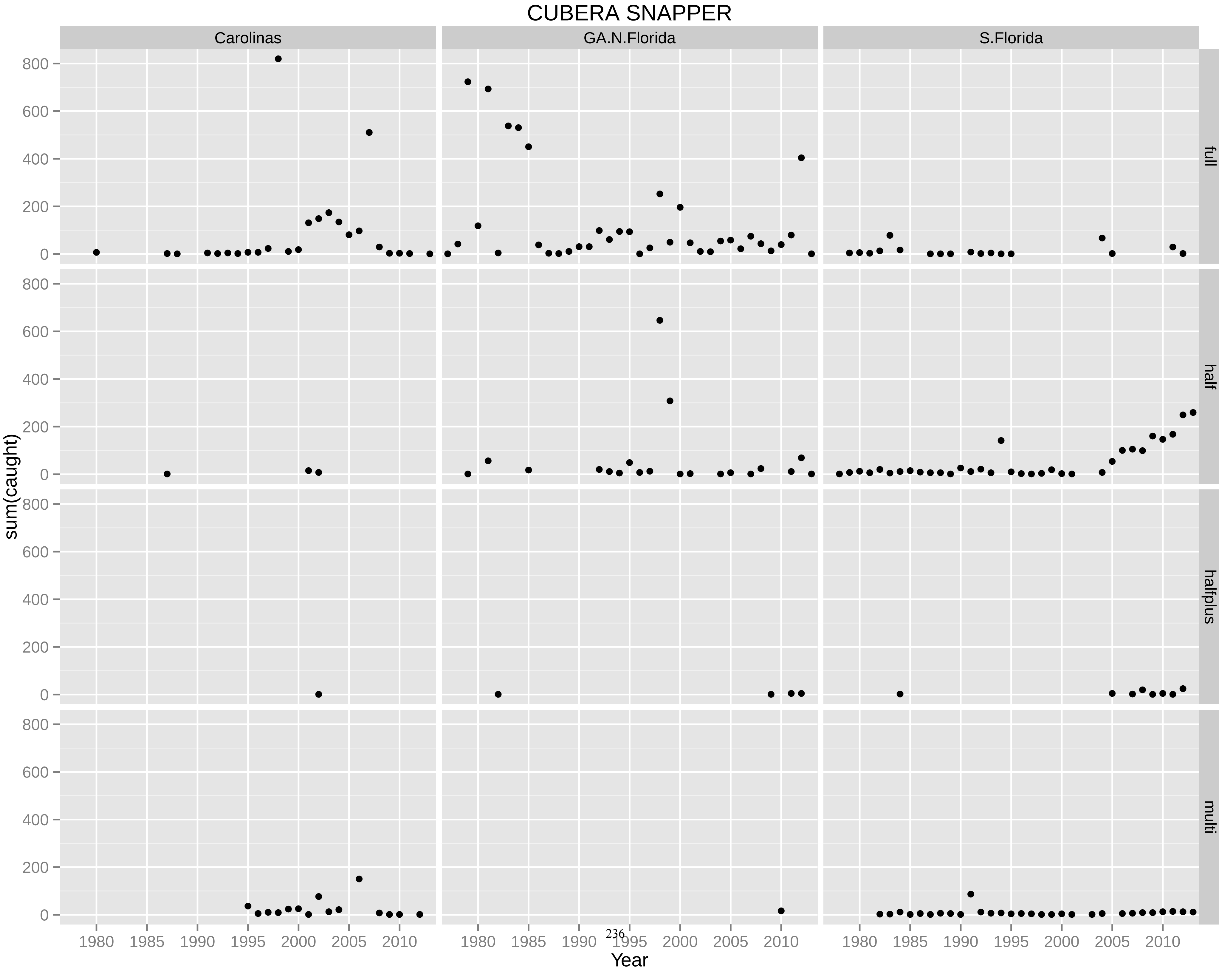

CROAKER, ATLANTIC
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
sum(caught)
Year
0
200
400
600
1990
1995
2000
2005
2010

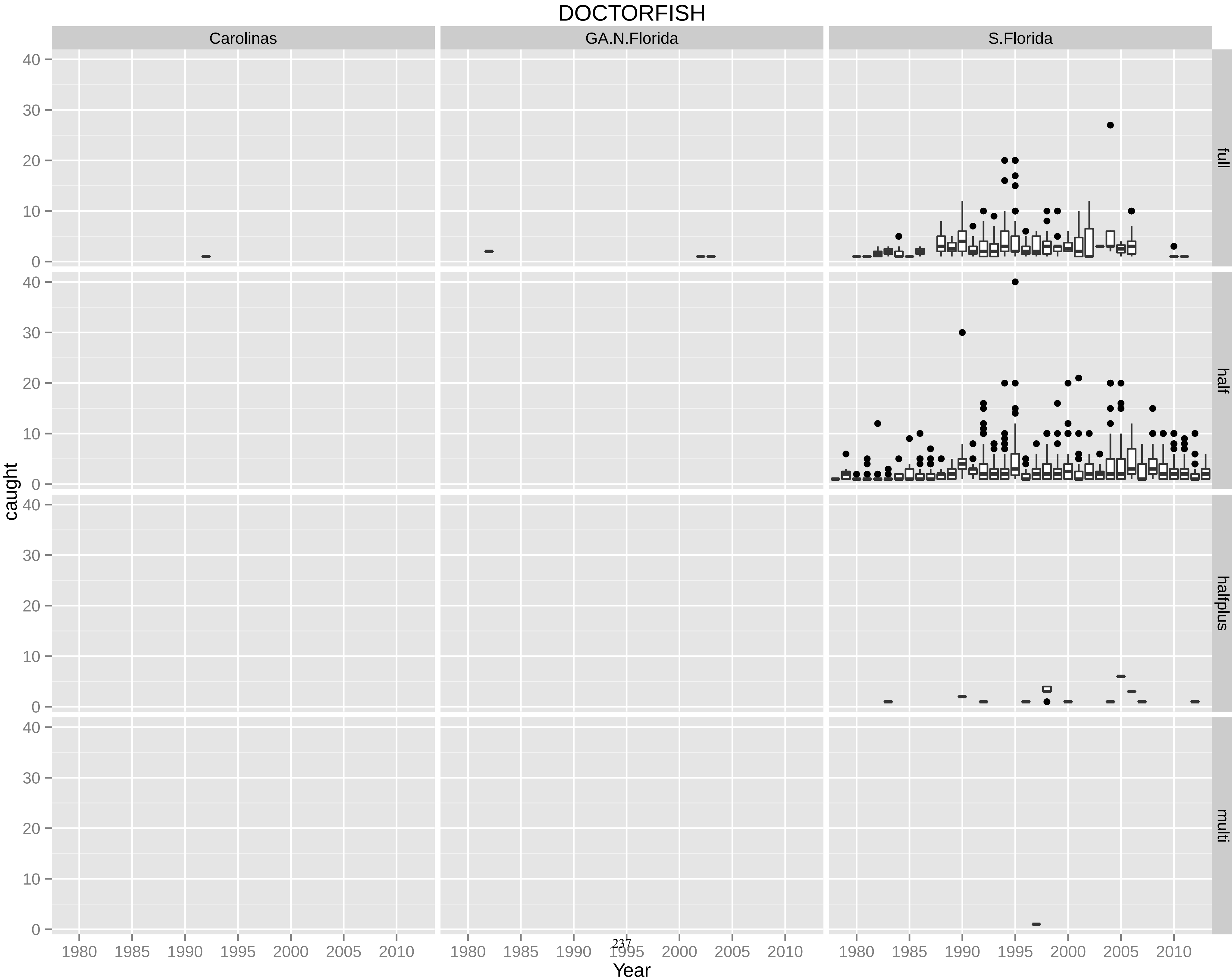

CUBERA SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
1980
1985
1990
1995
2000
2005
2010

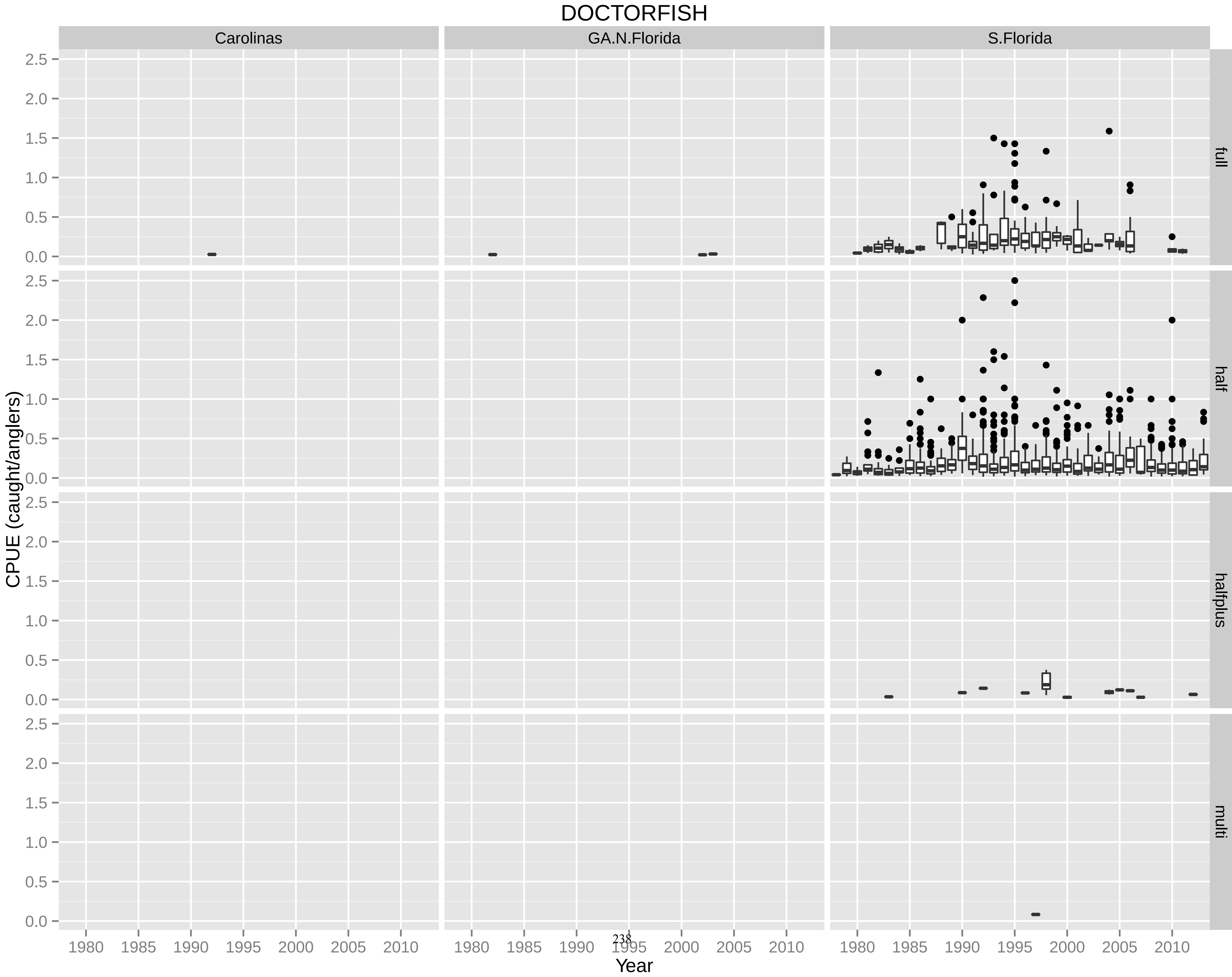

CUBERA SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
4
5
1980
1985
1990
1995
2000
2005
2010

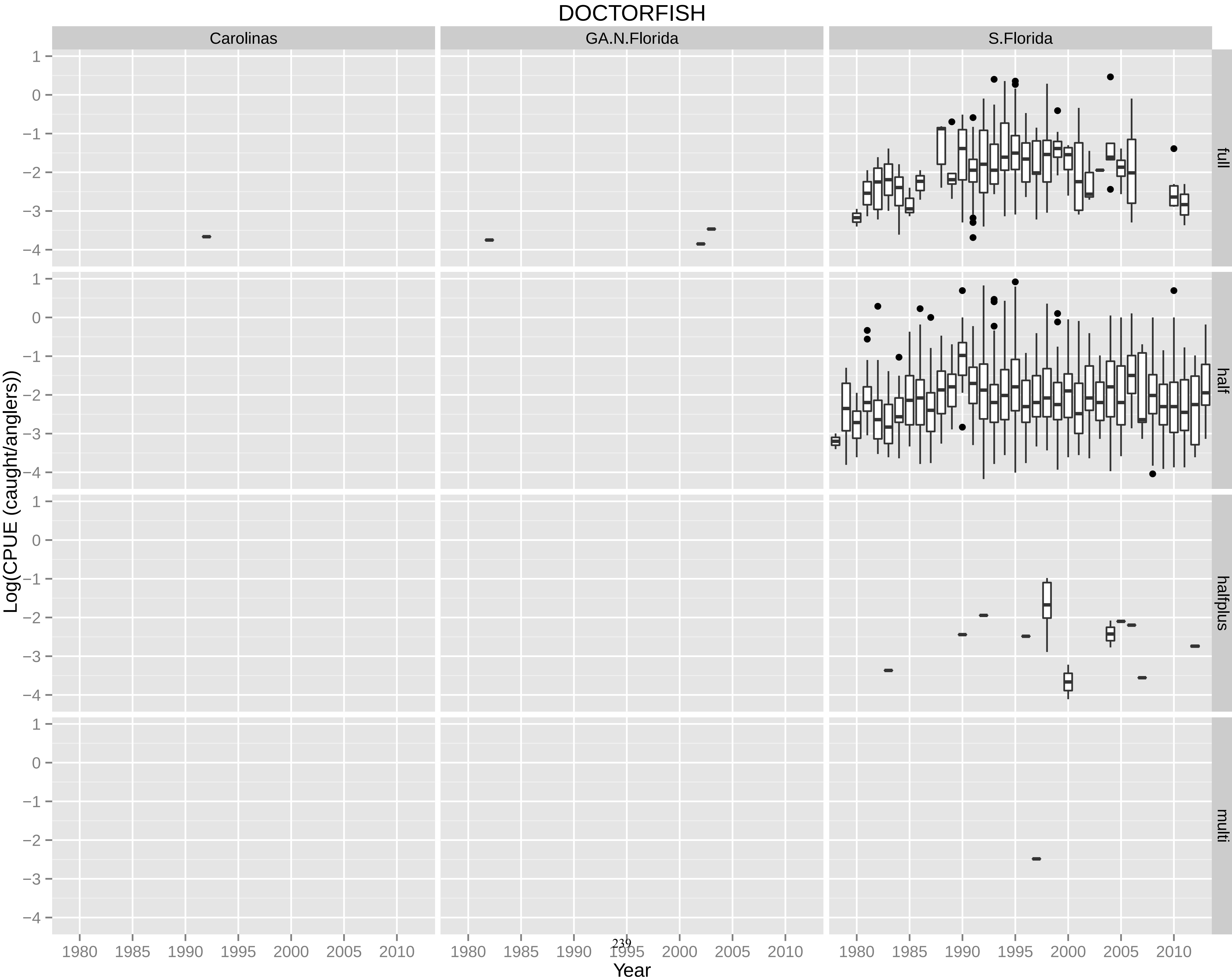


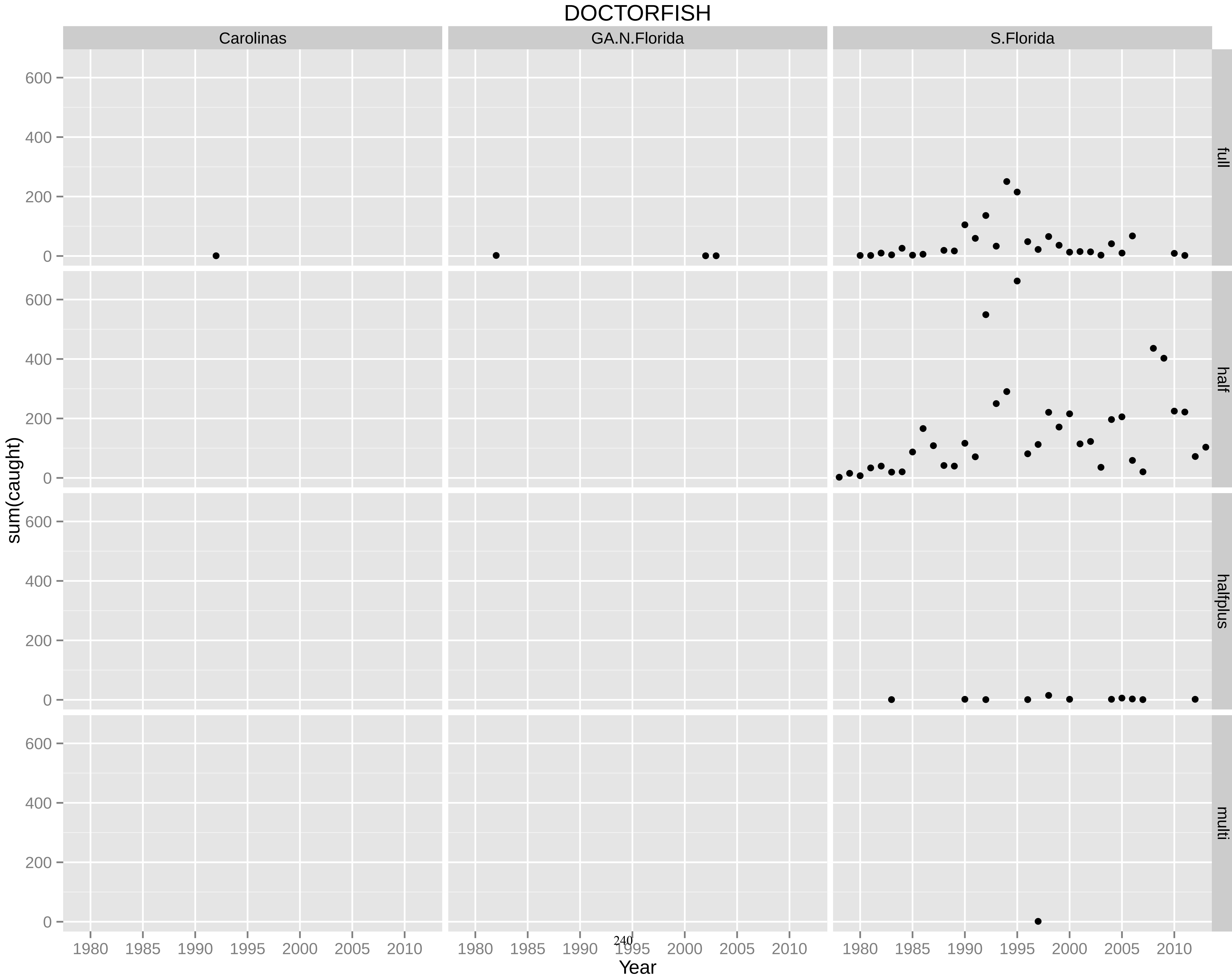
CUBERA SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

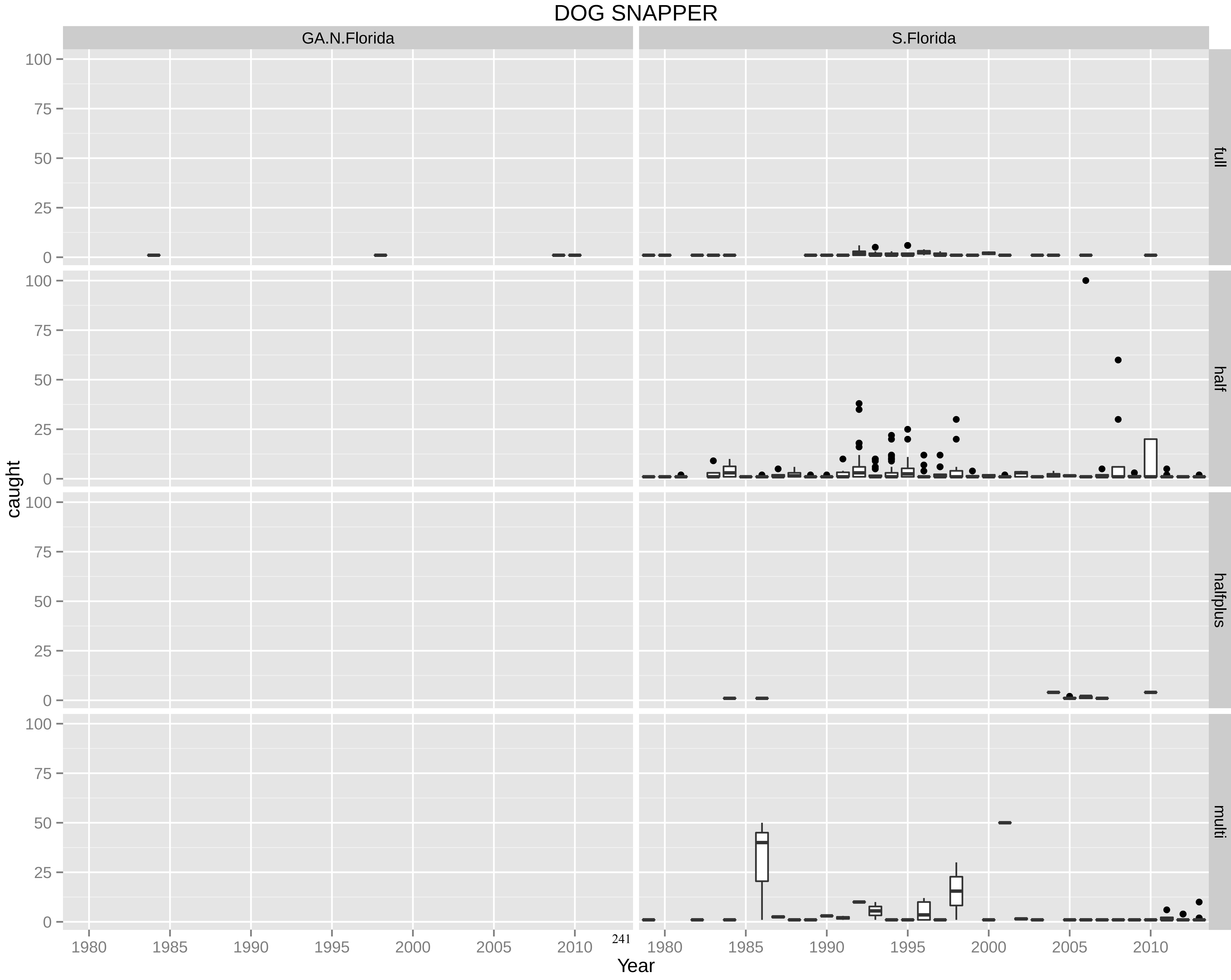

CUBERA SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
200
400
600
800
1980
1985
1990
1995
2000
2005
2010

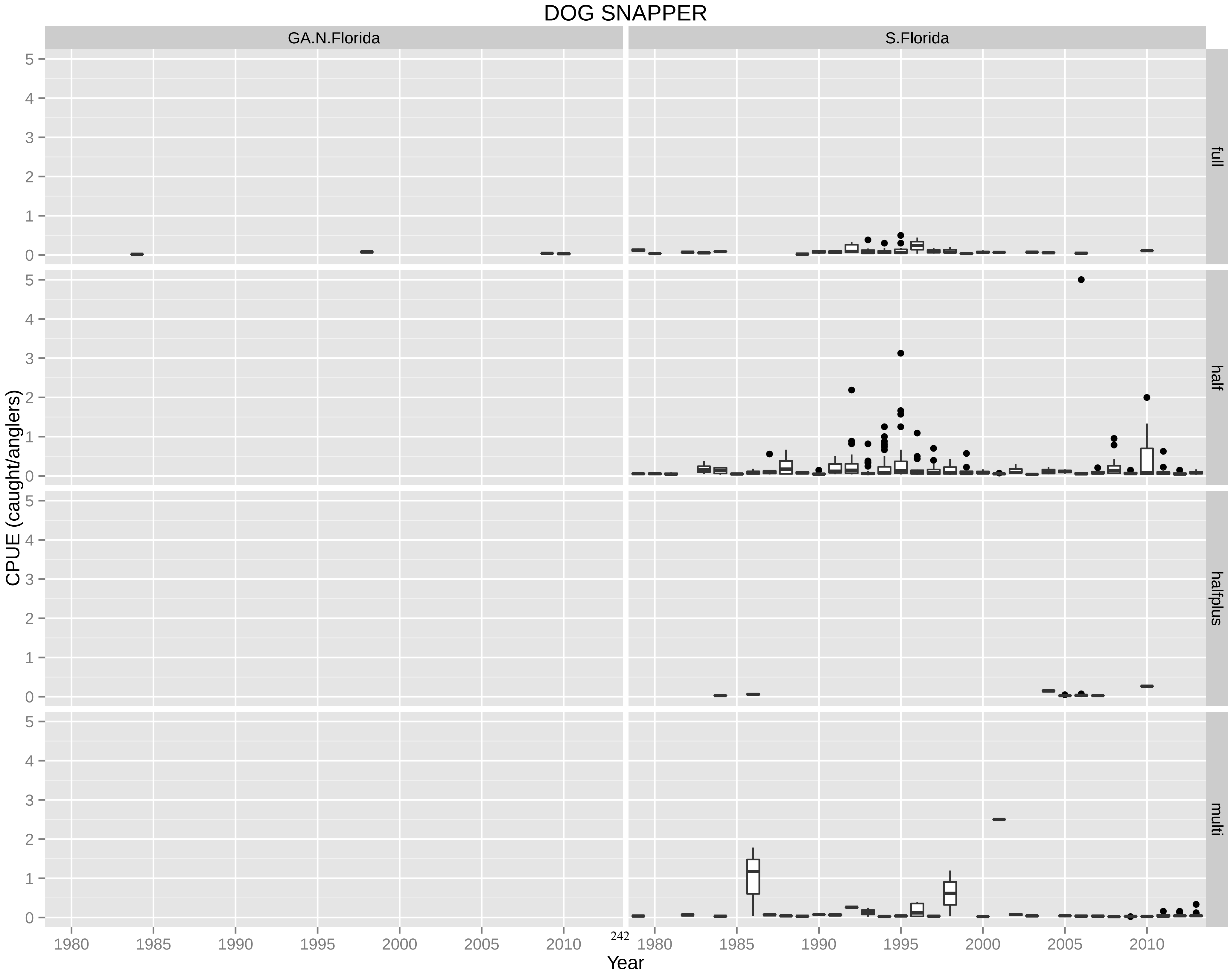

DOCTORFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
10
20
30
40
1980
1985
1990
1995
2000
2005
2010

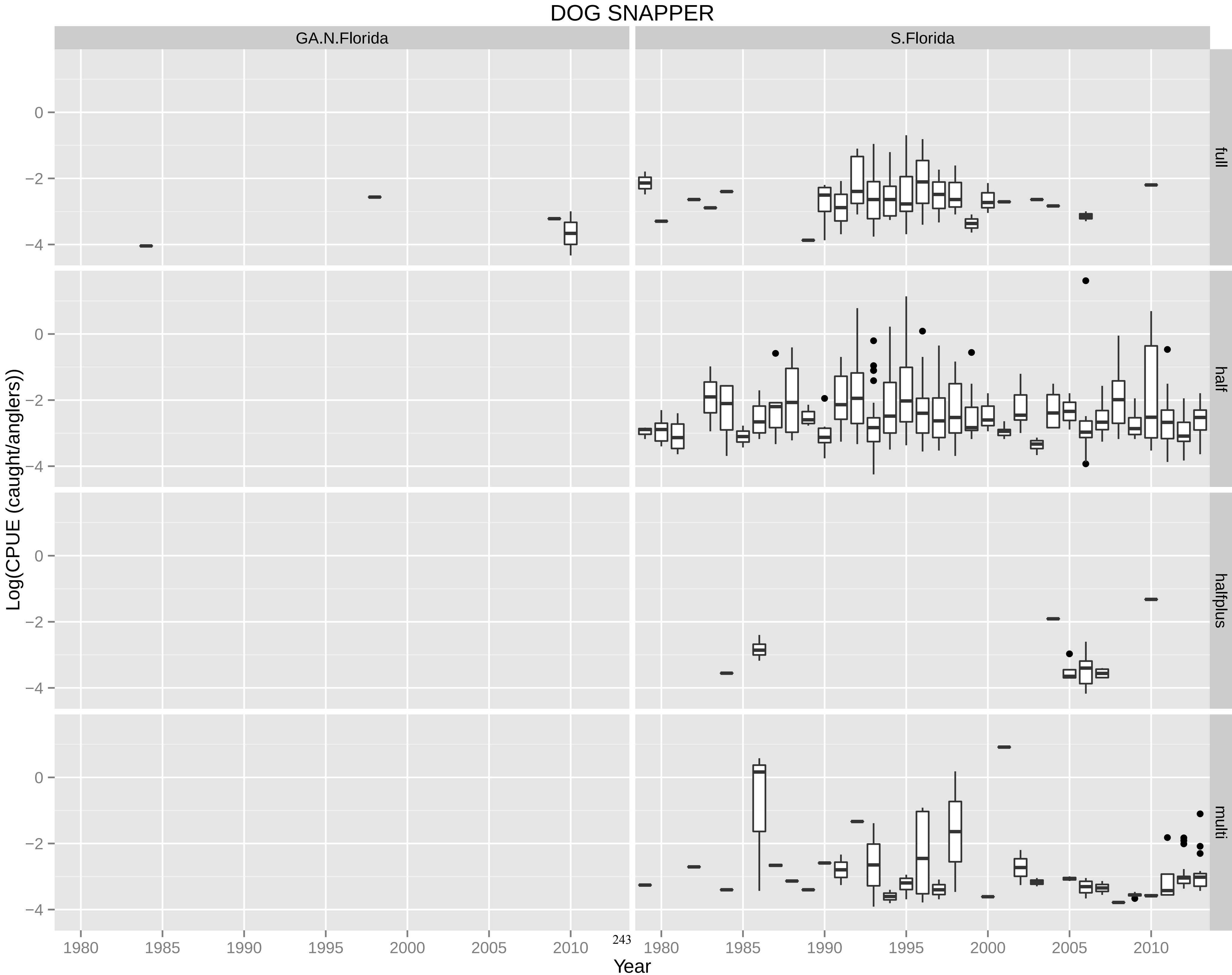

DOCTORFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
0.5
1.0
1.5
2.0
2.5
1980
1985
1990
1995
2000
2005
2010

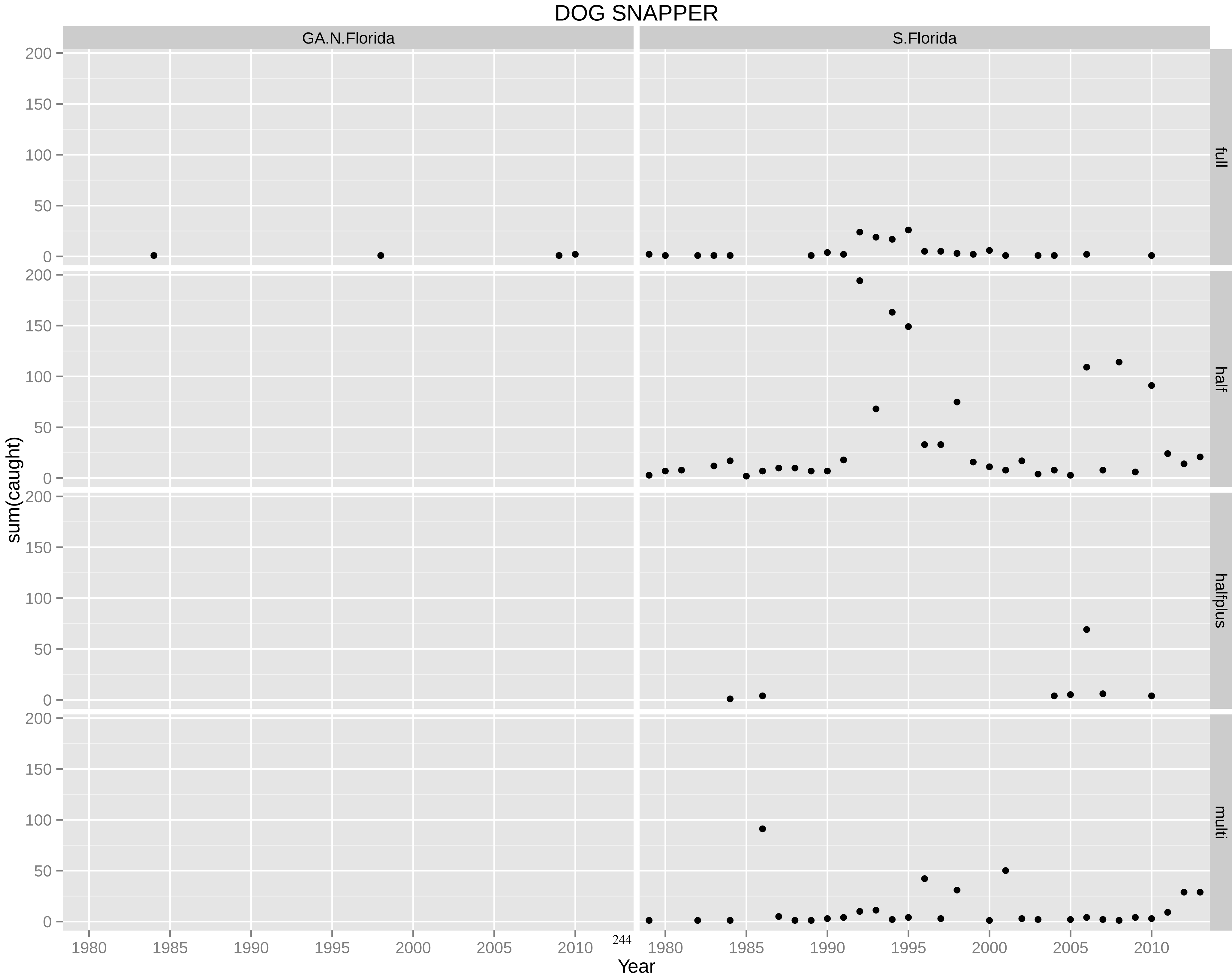

DOCTORFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
1980
1985
1990
1995
2000
2005
2010
1
0
−1
−2
−3
−4

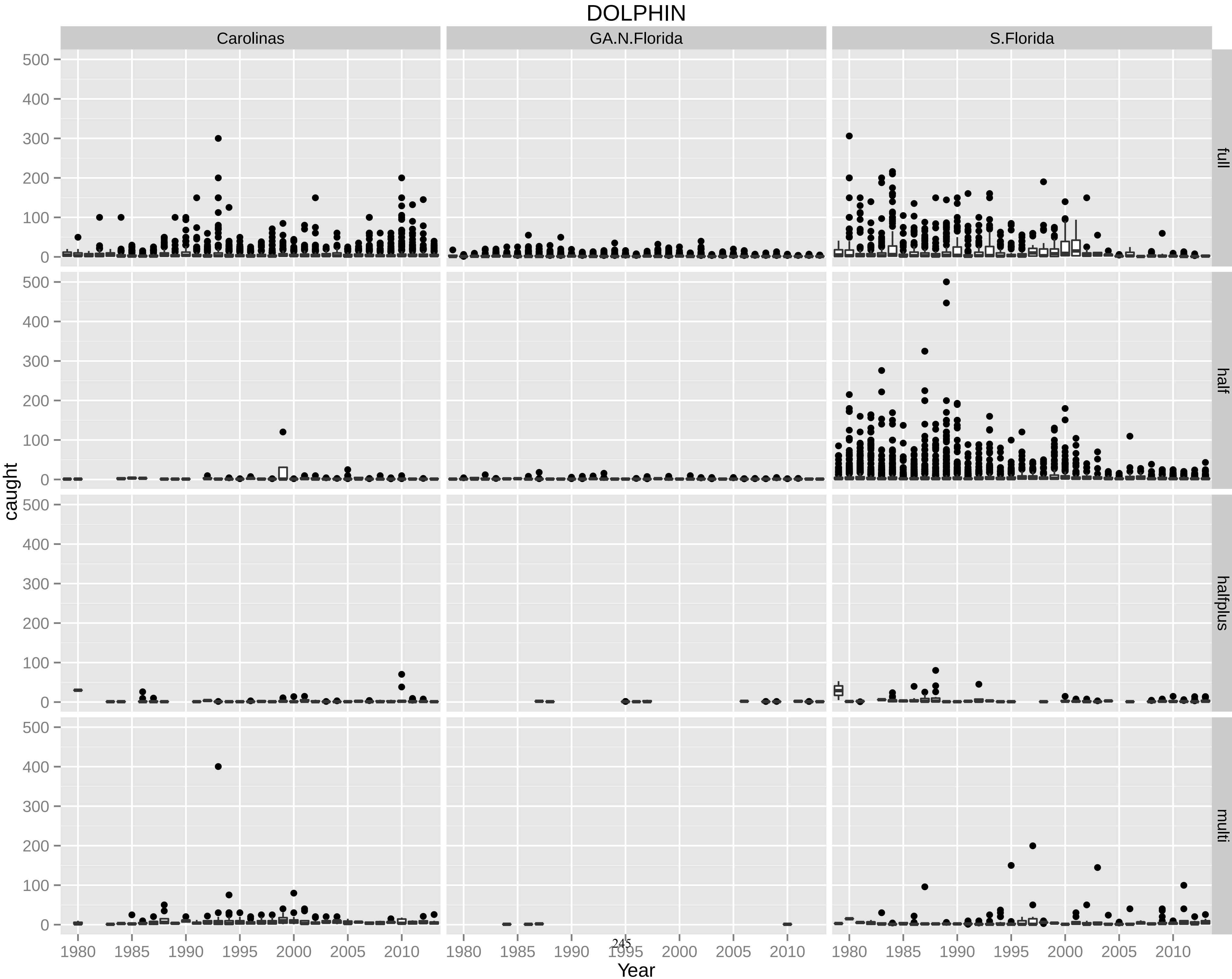

DOCTORFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
200
400
600
1980
1985
1990
1995
2000
2005
2010

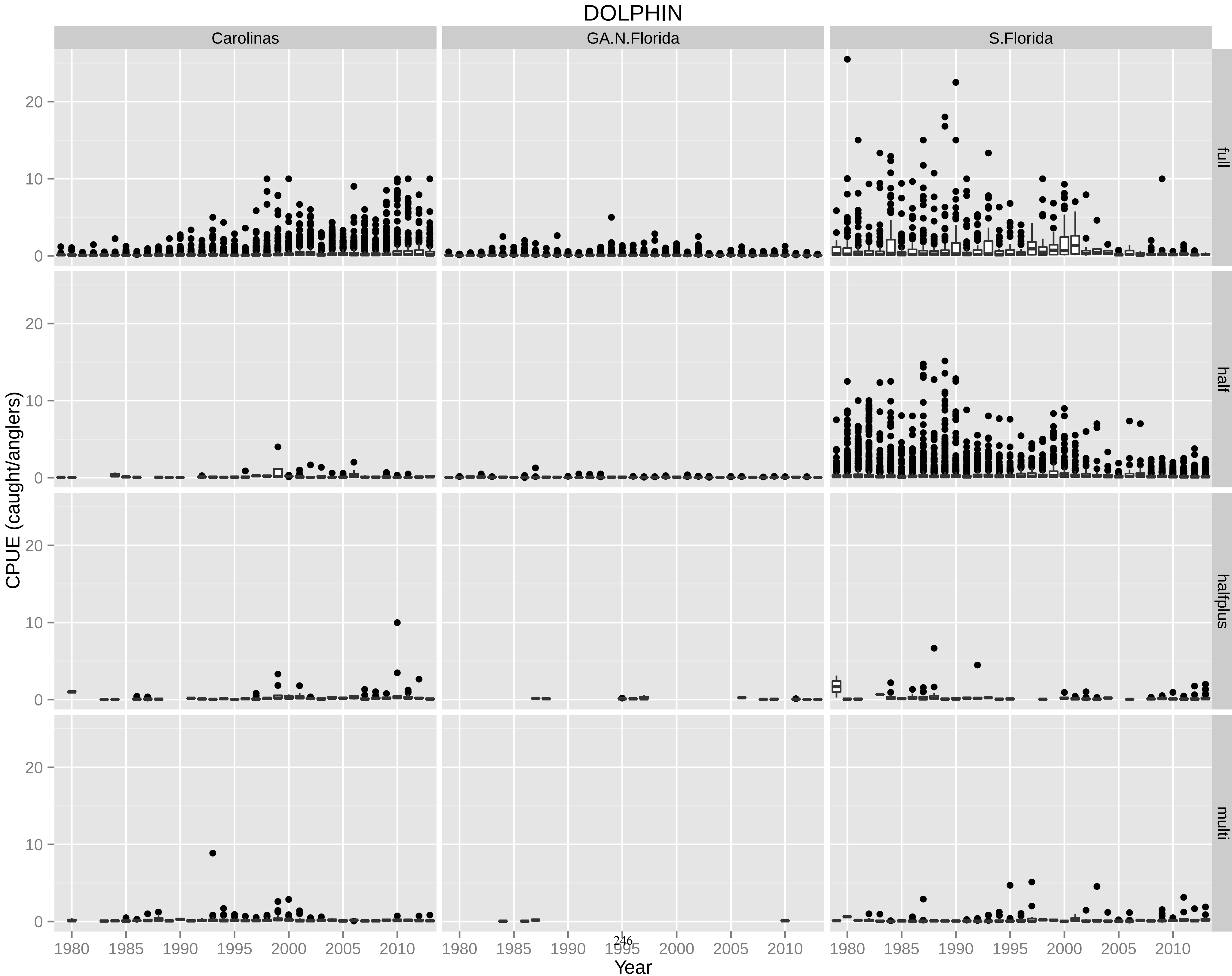

DOG SNAPPER
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
25
50
75
100
1980
1985
1990
1995
2000
2005
2010

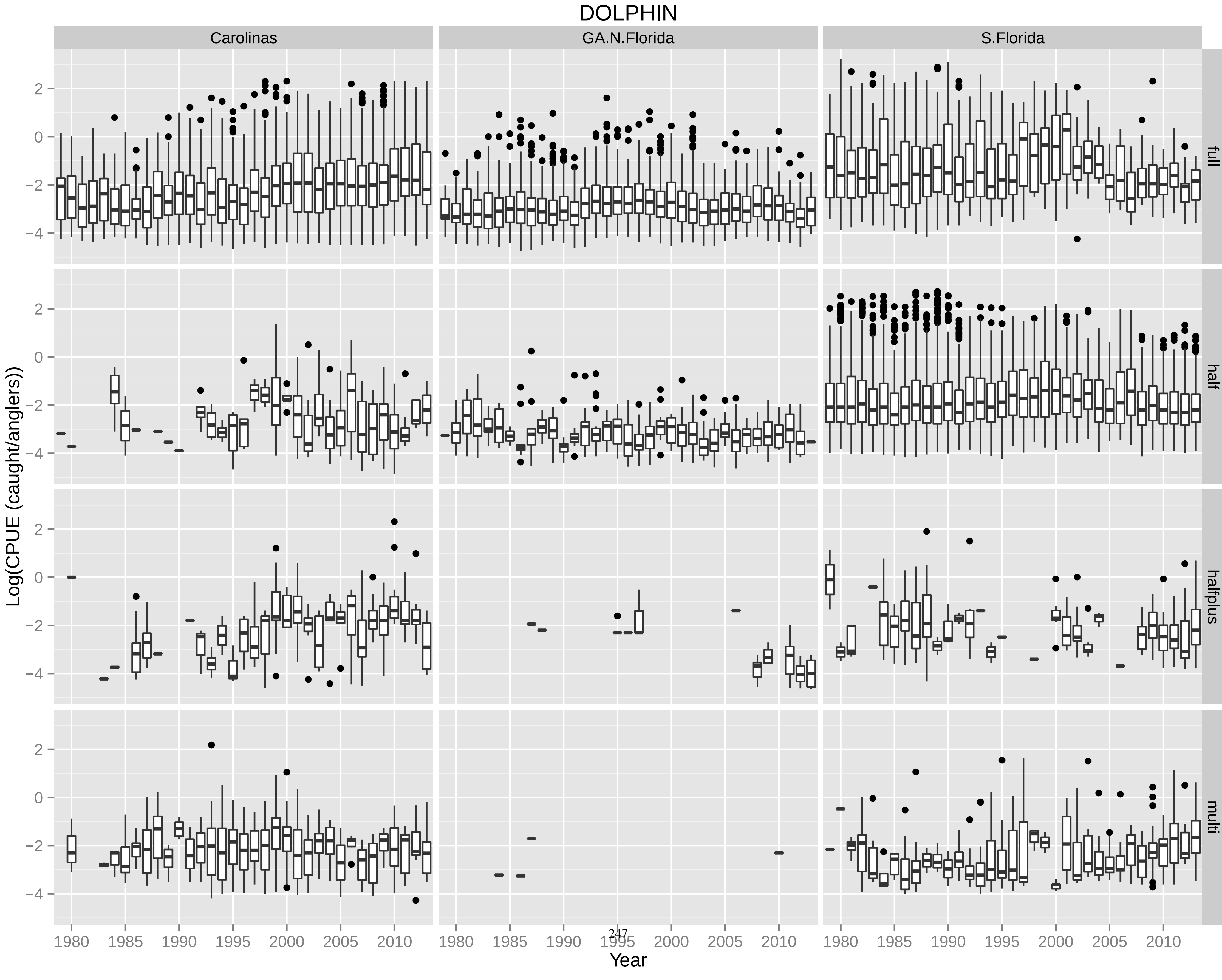

DOG SNAPPER
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
4
5
1980
1985
1990
1995
2000
2005
2010

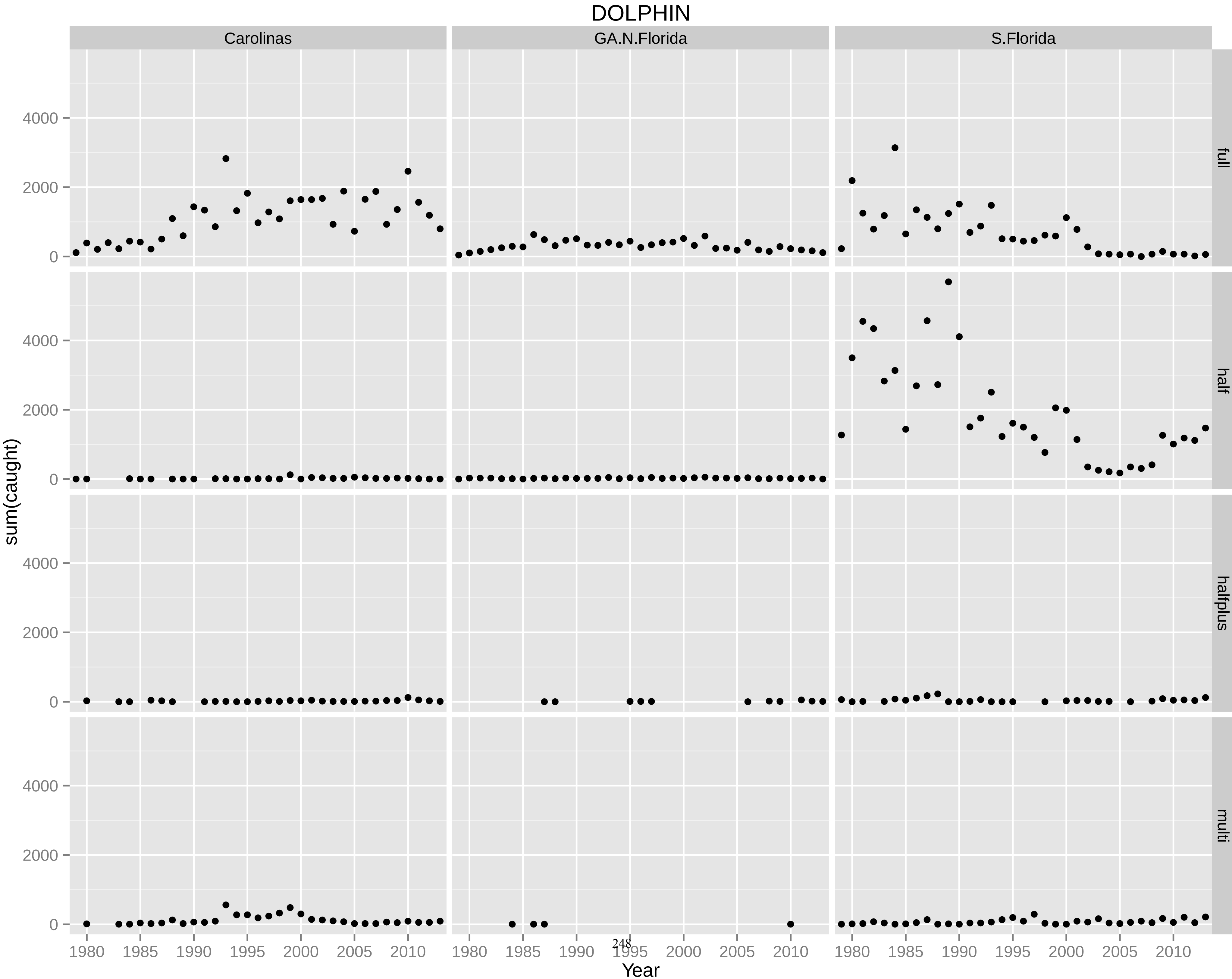

DOG SNAPPER
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

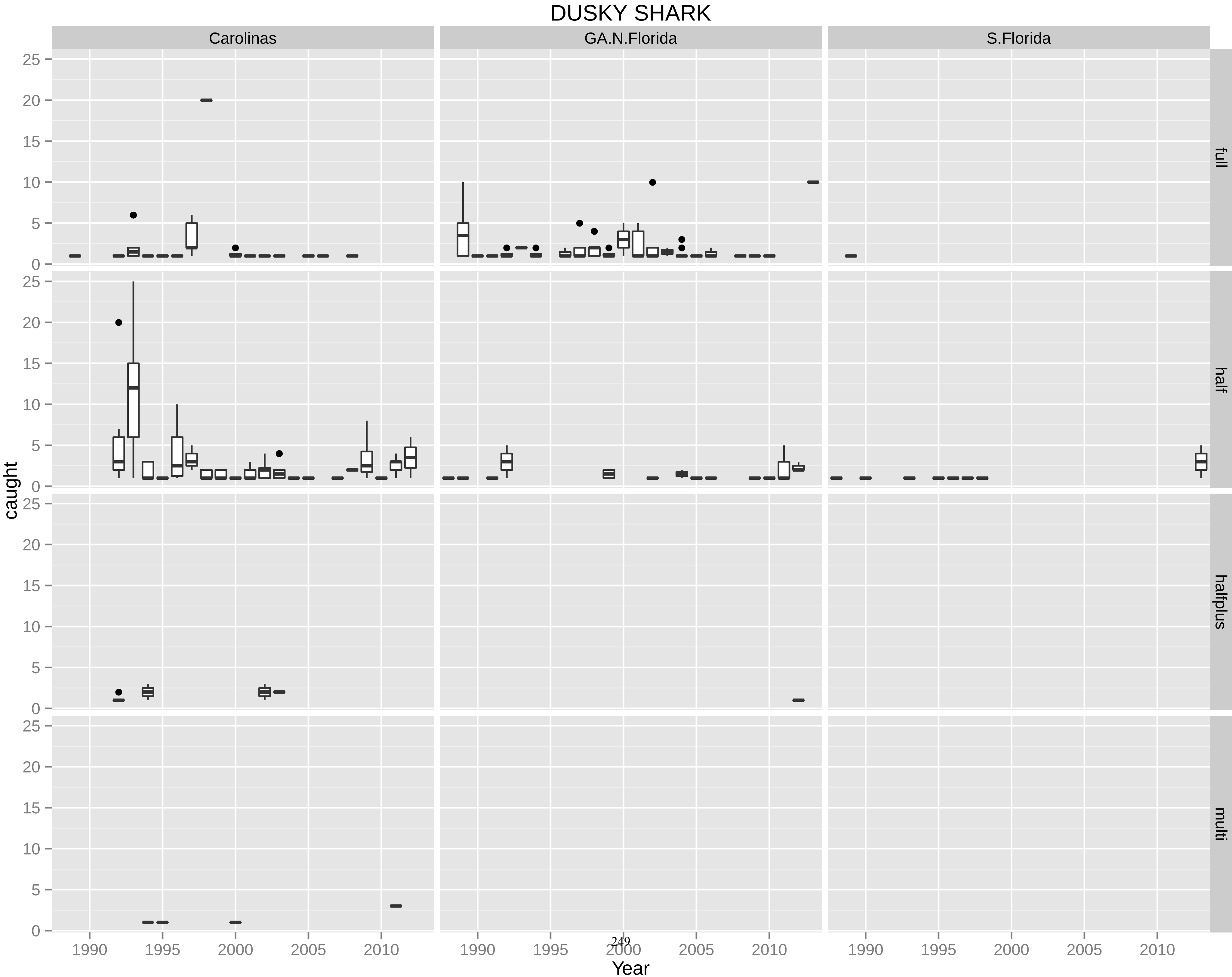

DOG SNAPPER
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
50
100
150
200
1980
1985
1990
1995
2000
2005
2010

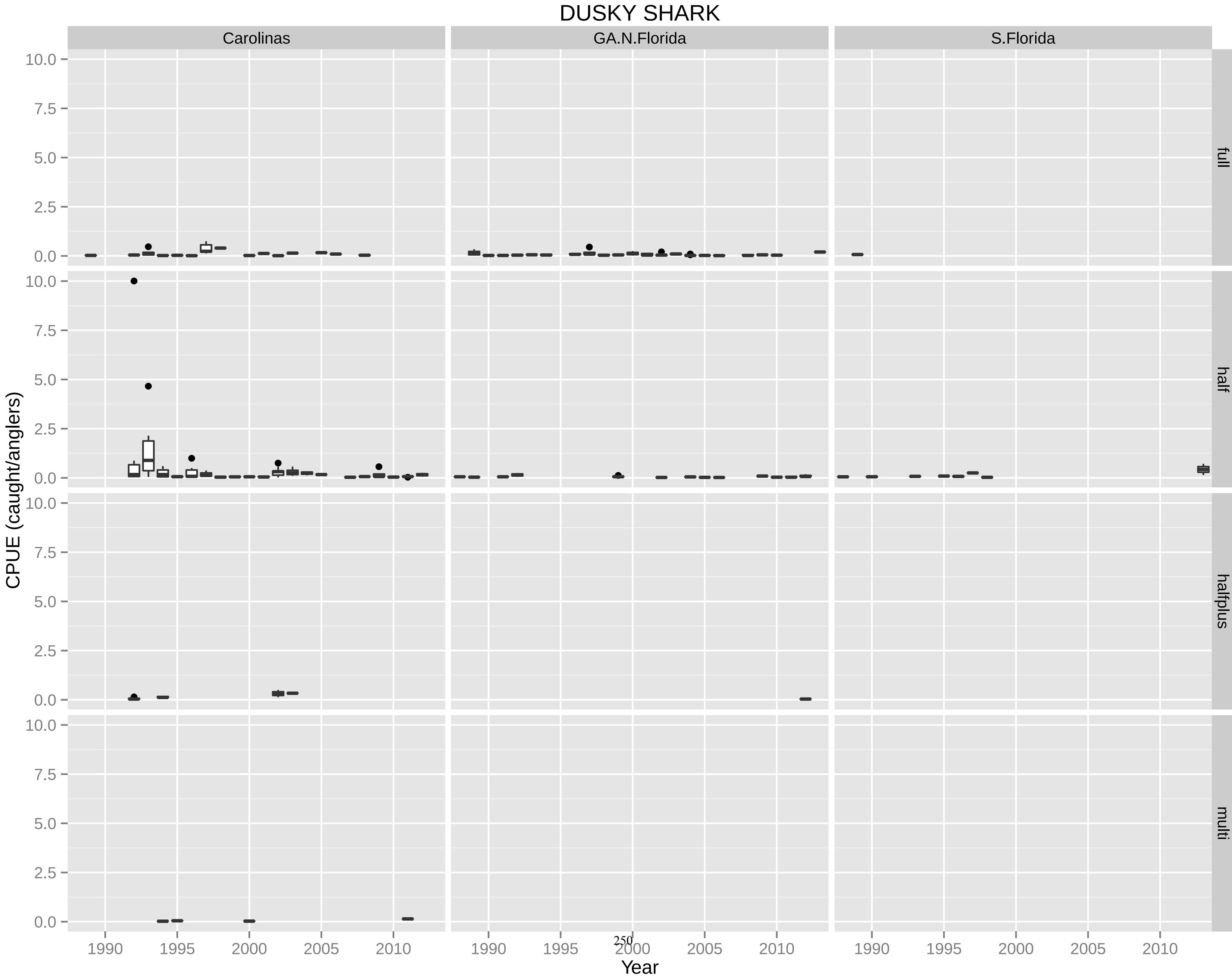

DOLPHIN
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
400
500
1980
1985
1990
1995
2000
2005
2010

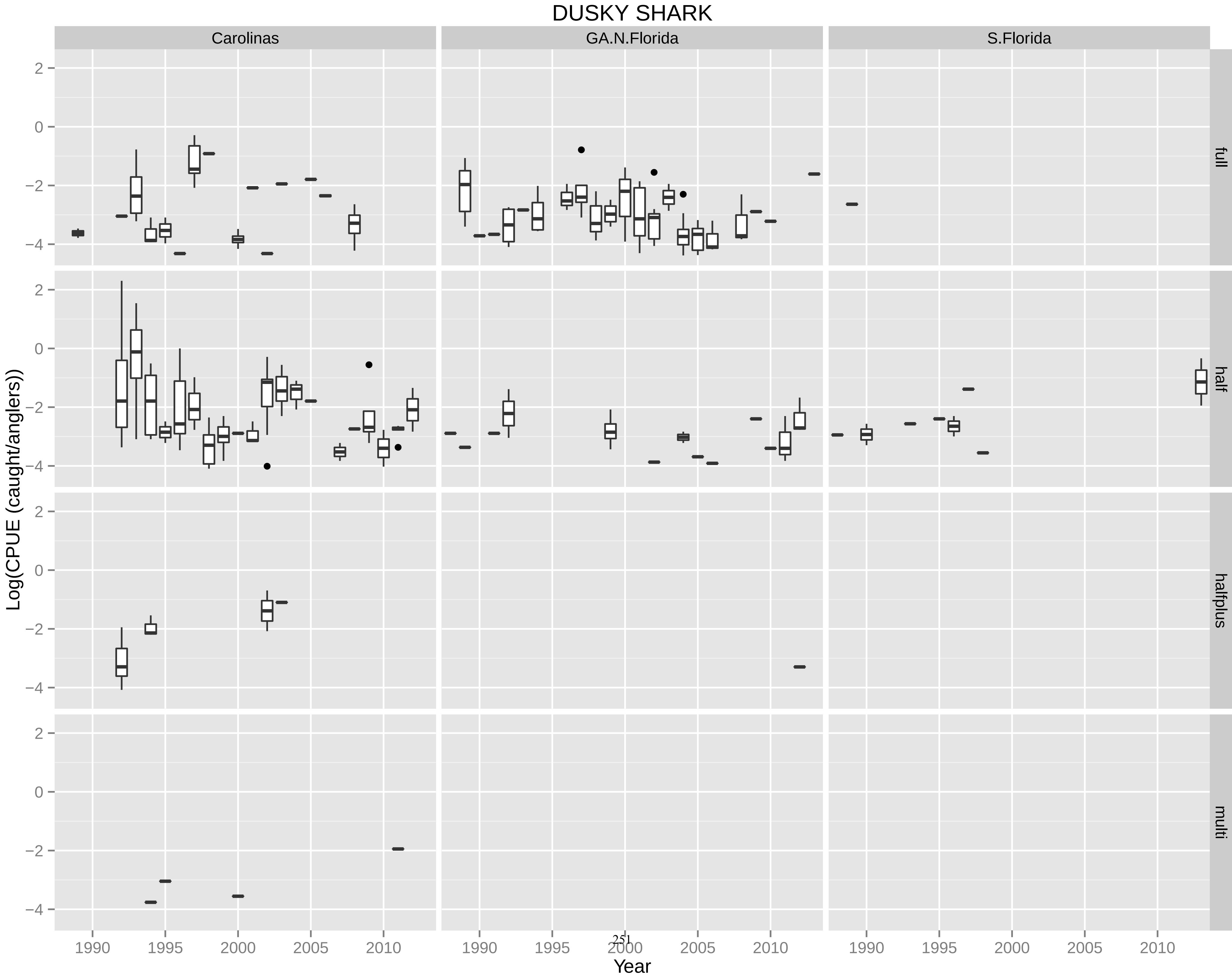

DOLPHIN
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
10
20
1980
1985
1990
1995
2000
2005
2010

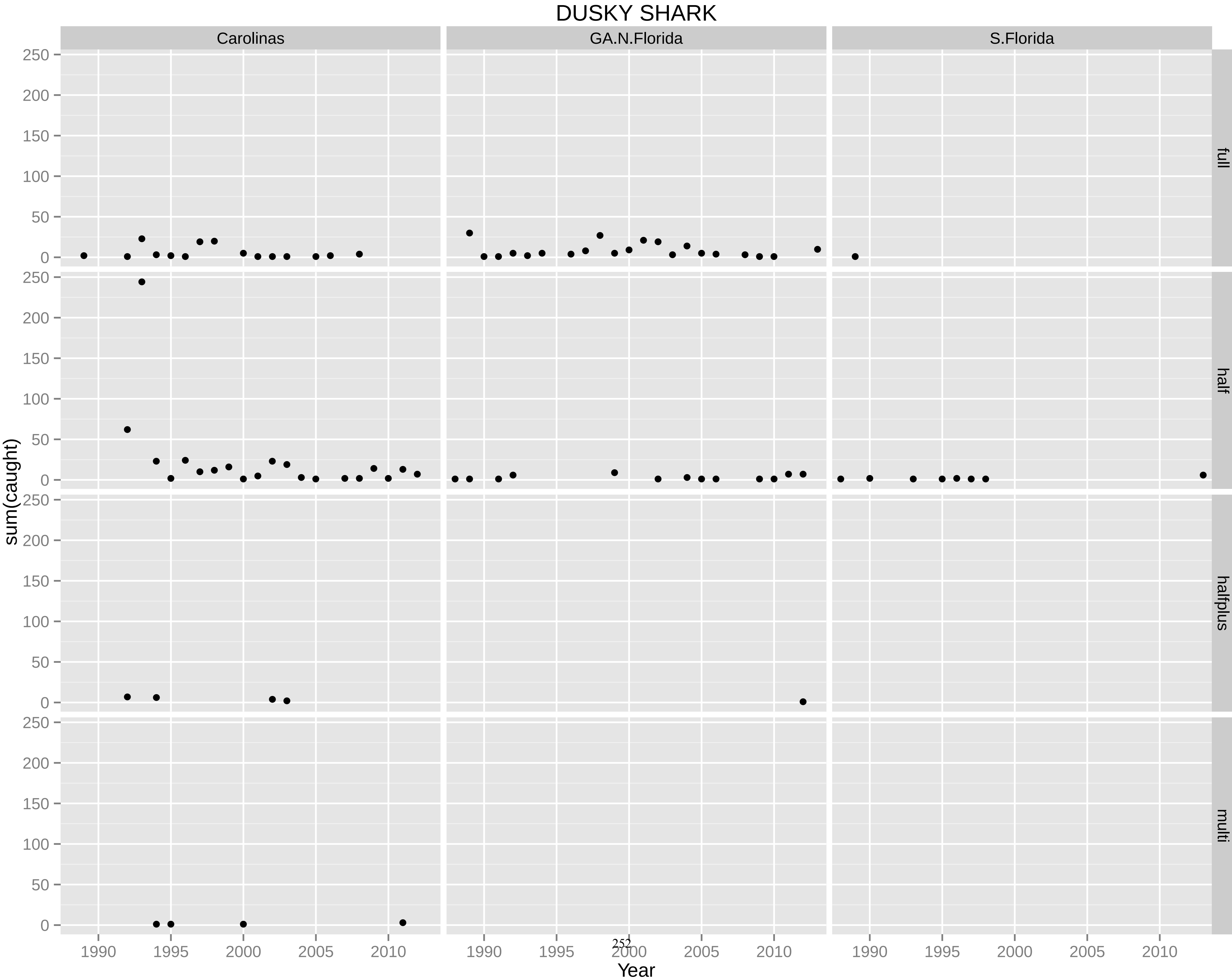

DOLPHIN
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
1980
1985
1990
1995
2000
2005
2010
2
0
−2
−4


DOLPHIN
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
2000
4000
1980
1985
1990
1995
2000
2005
2010
Year

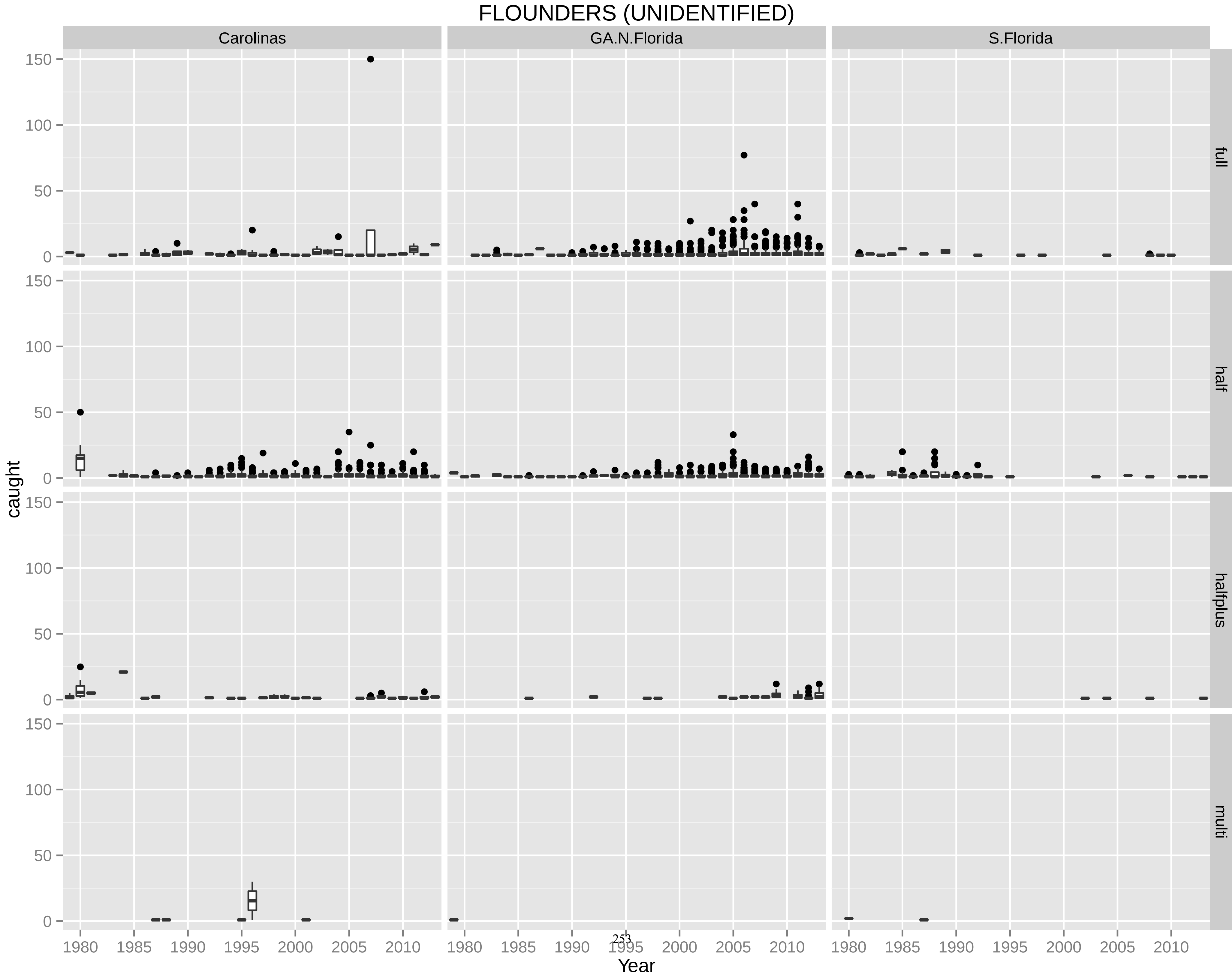

DUSKY SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
5
10
15
20
25
1990
1995
2000
2005
2010

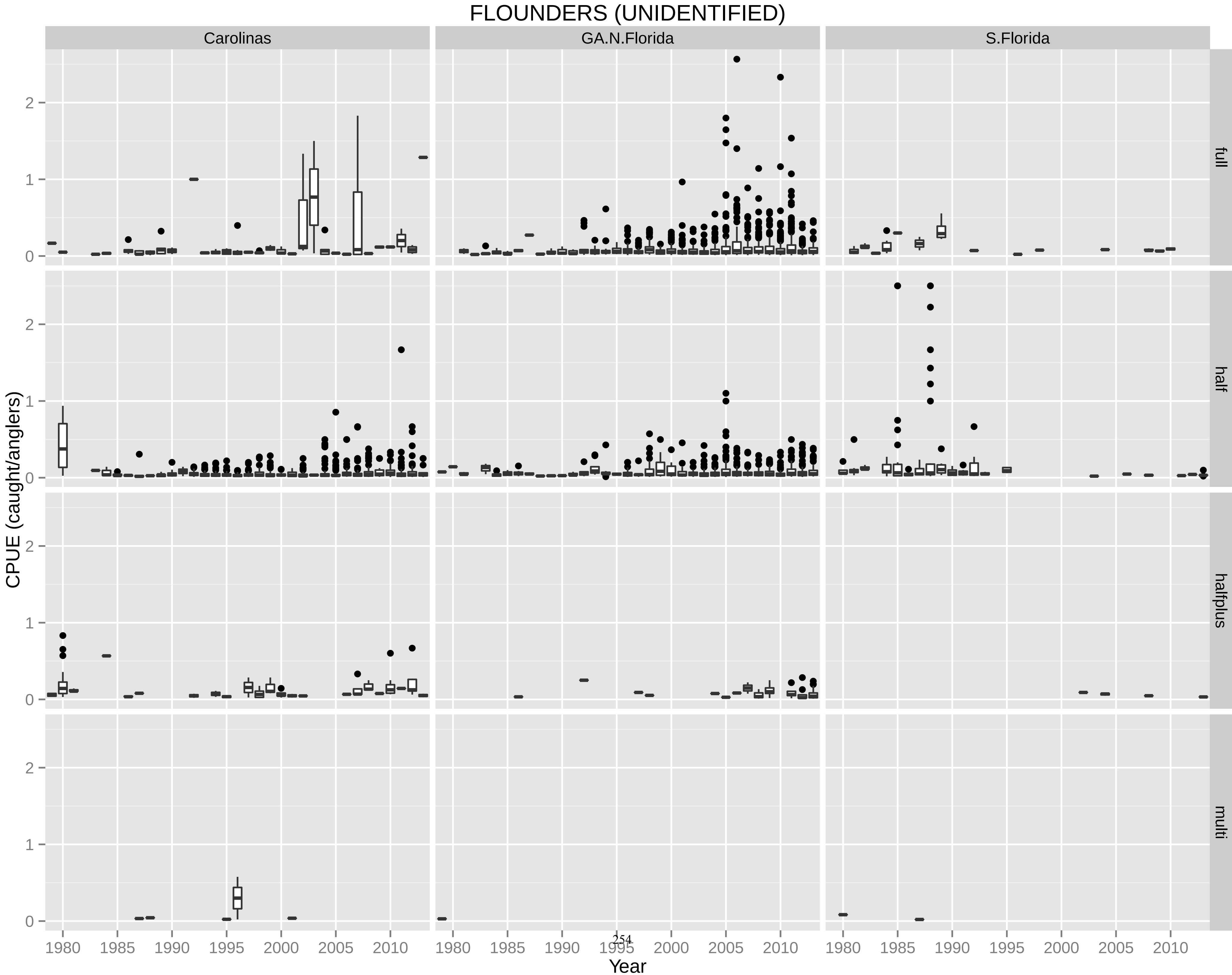

DUSKY SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
2.5
5.0
7.5
10.0
1990
1995
2000
2005
2010


DUSKY SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1990
1995
2000
2005
2010

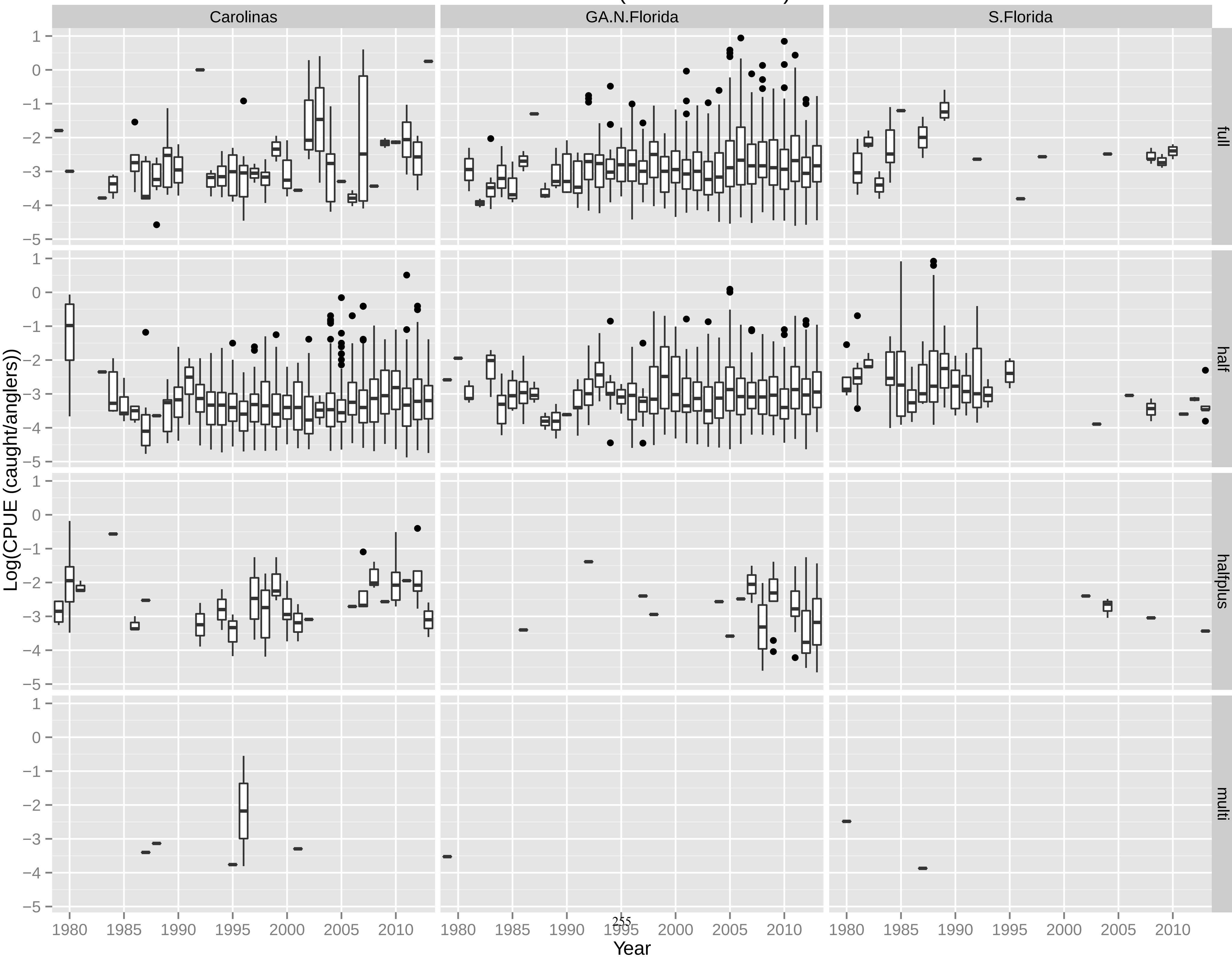


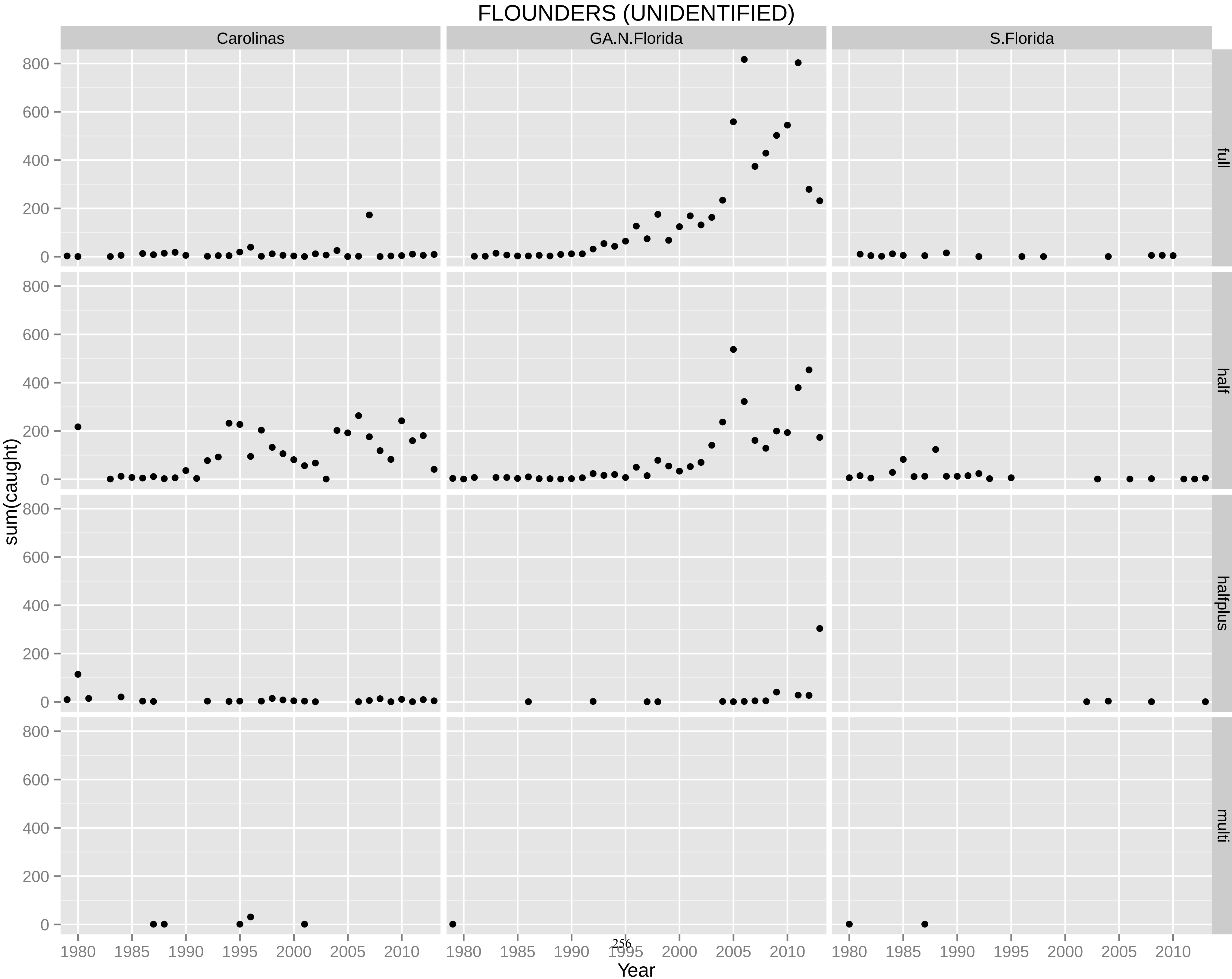
DUSKY SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year

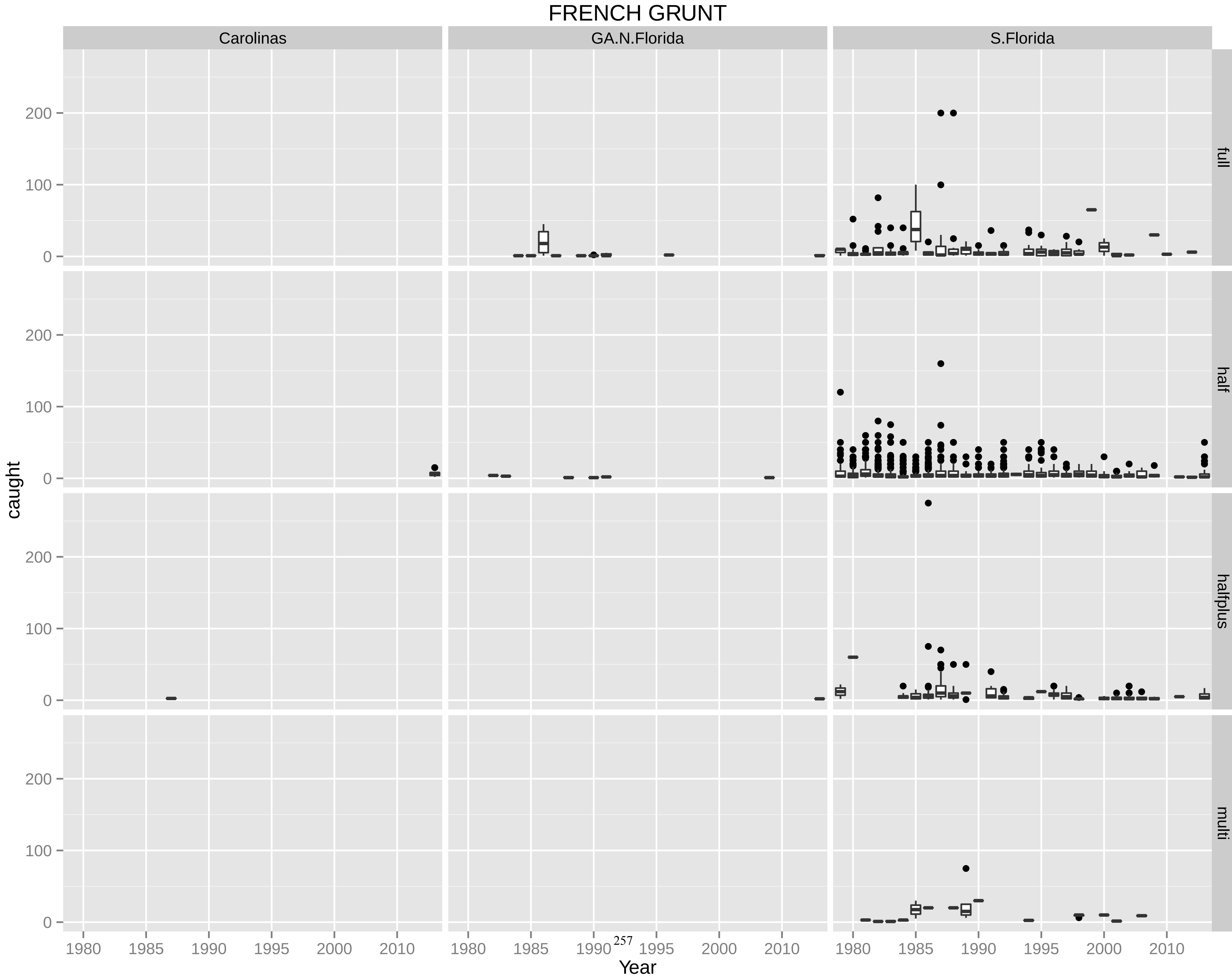

FLOUNDERS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
1980
1985
1990
1995
2000
2005
2010

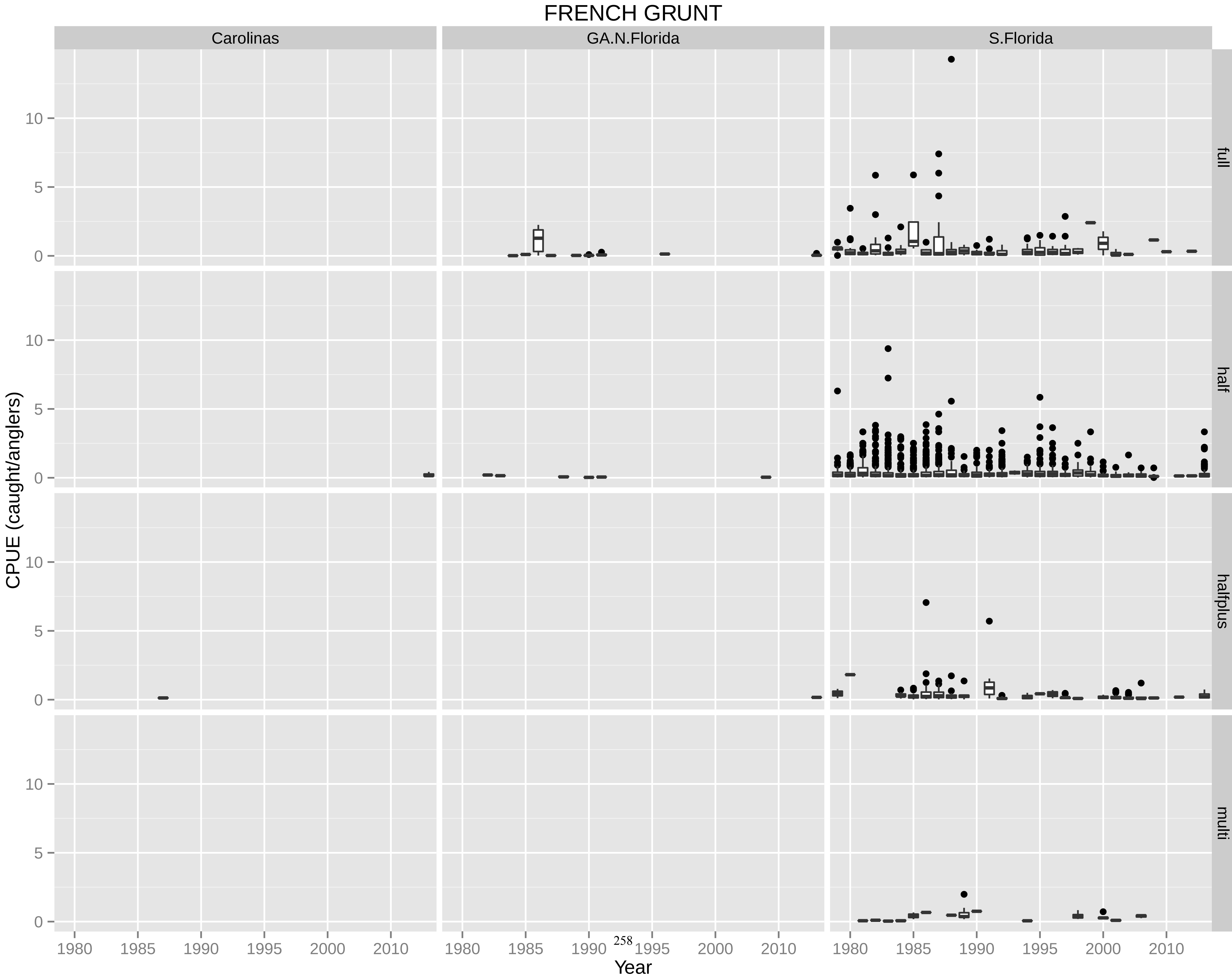

FLOUNDERS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
1980
1985
1990
1995
2000
2005
2010

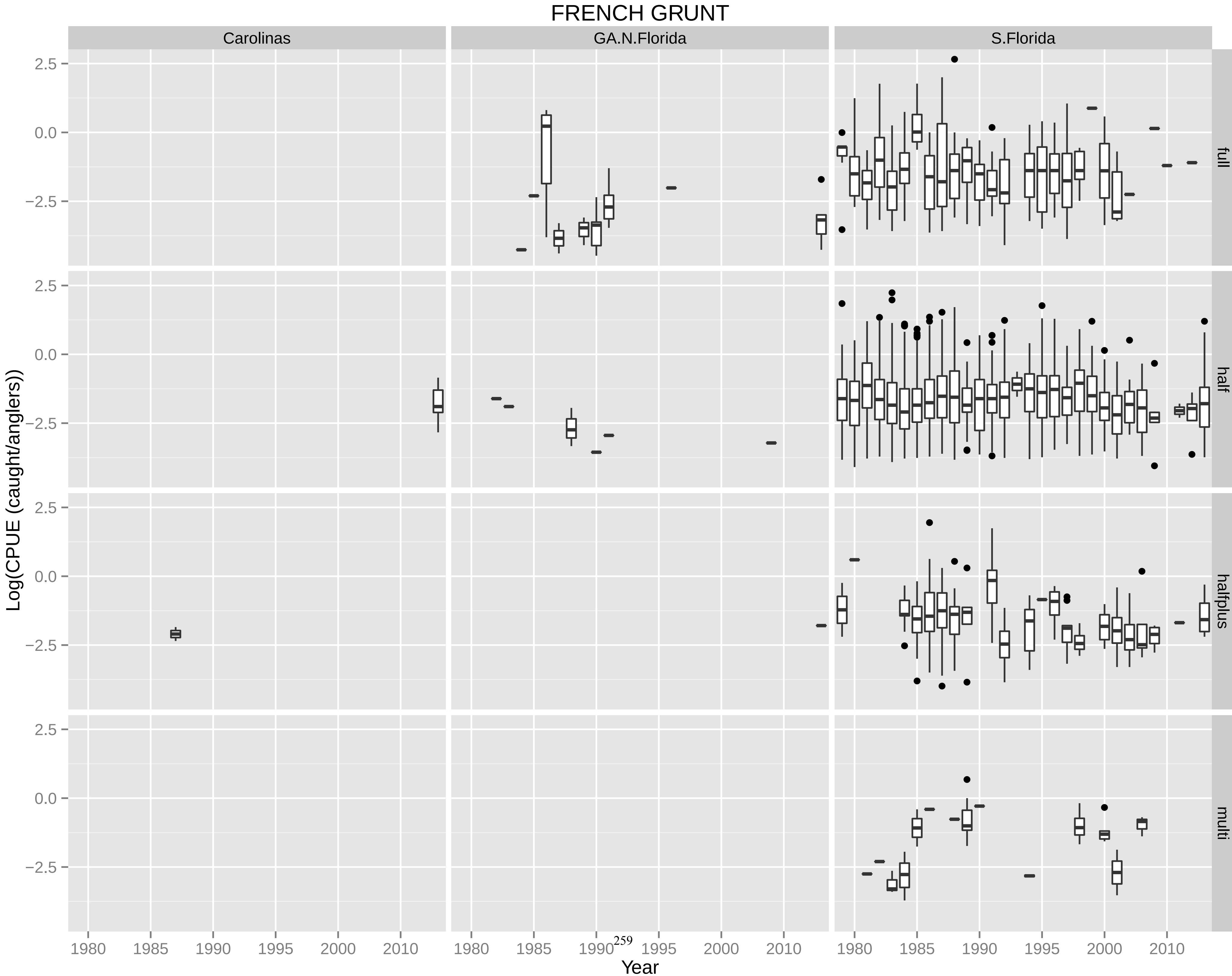
FLOUNDERS (UNIDENTIFIED)

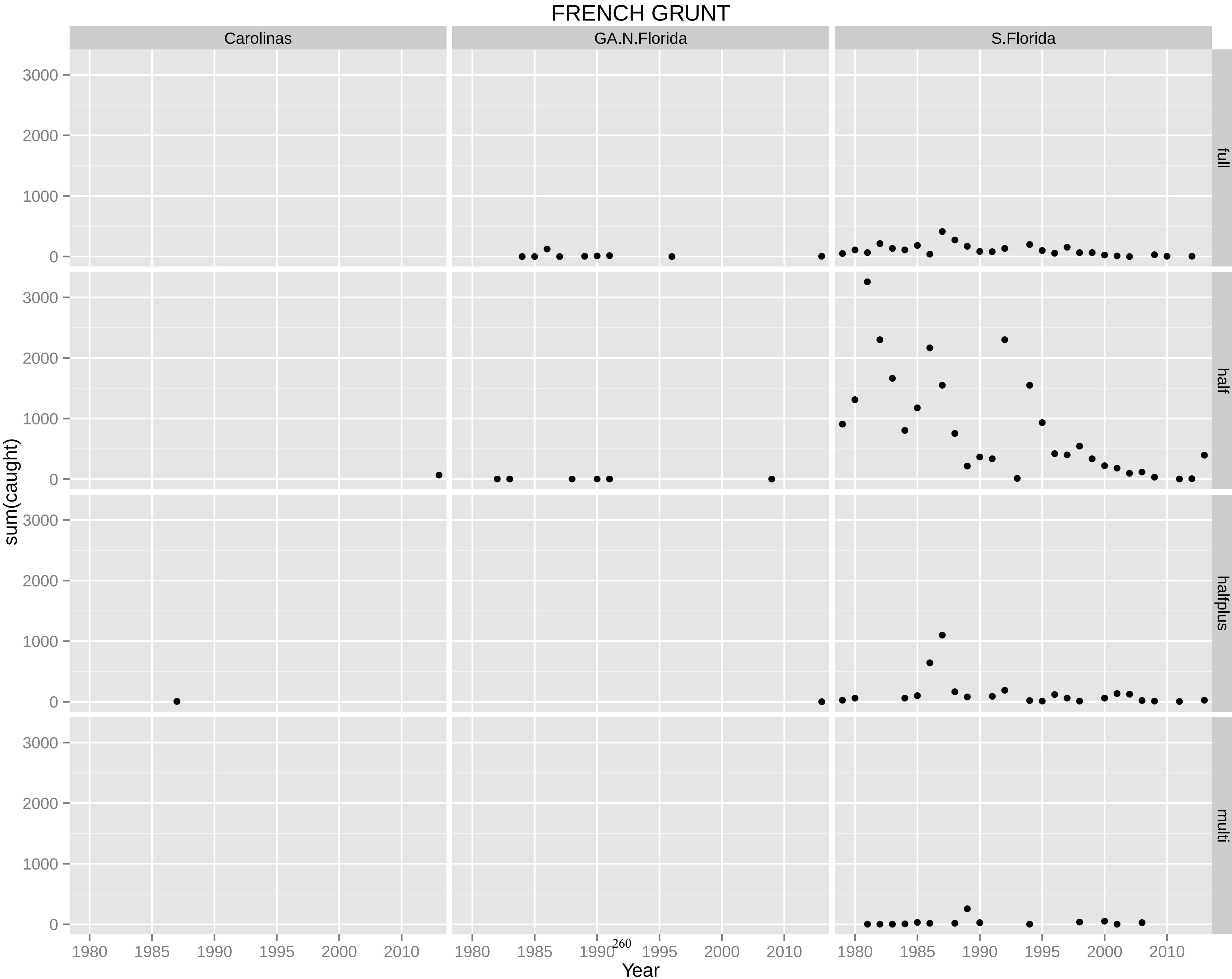


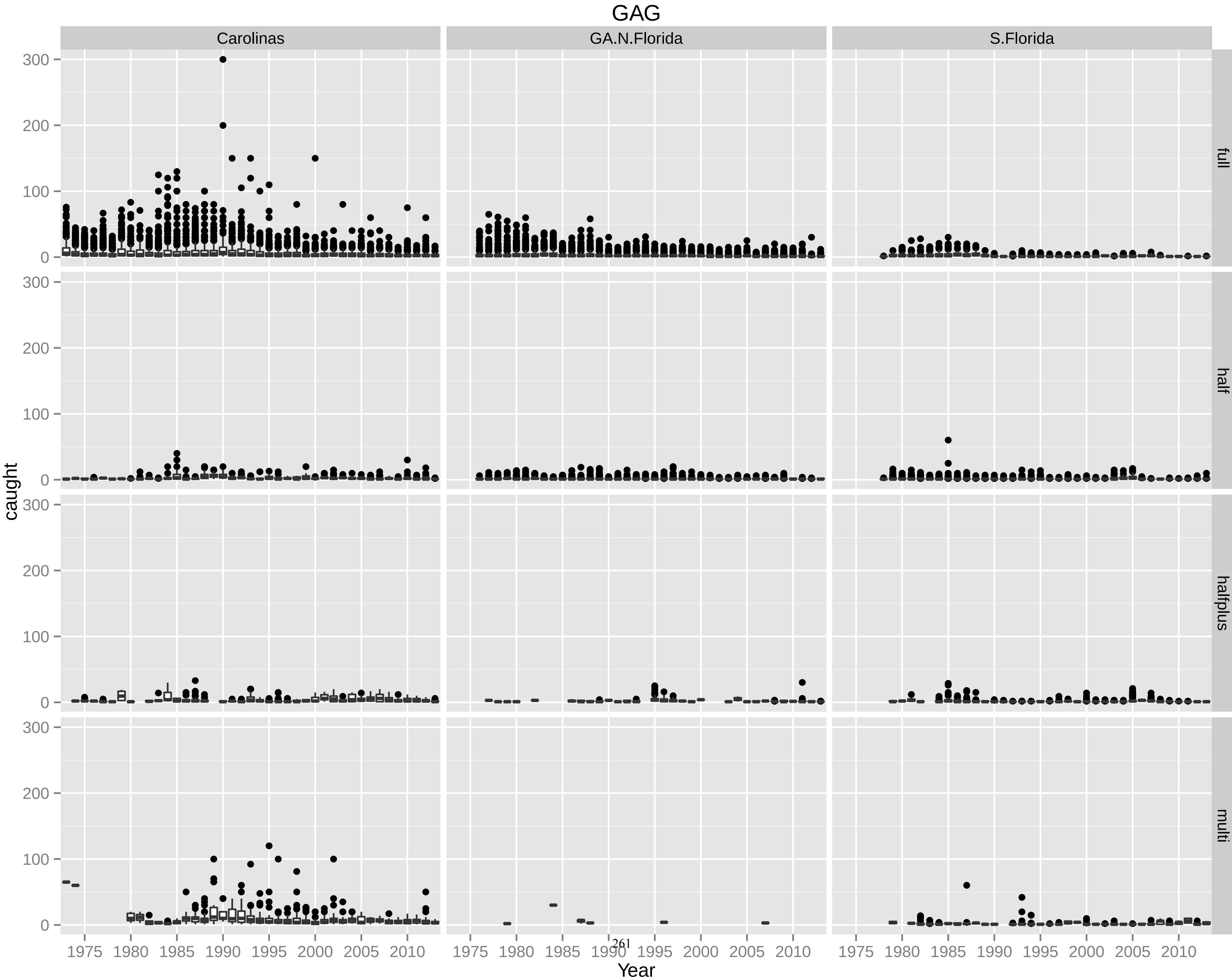

FLOUNDERS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
200
400
600
800
1980
1985
1990
1995
2000
2005
2010


FRENCH GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
1980
1985
1990
1995
2000
2010

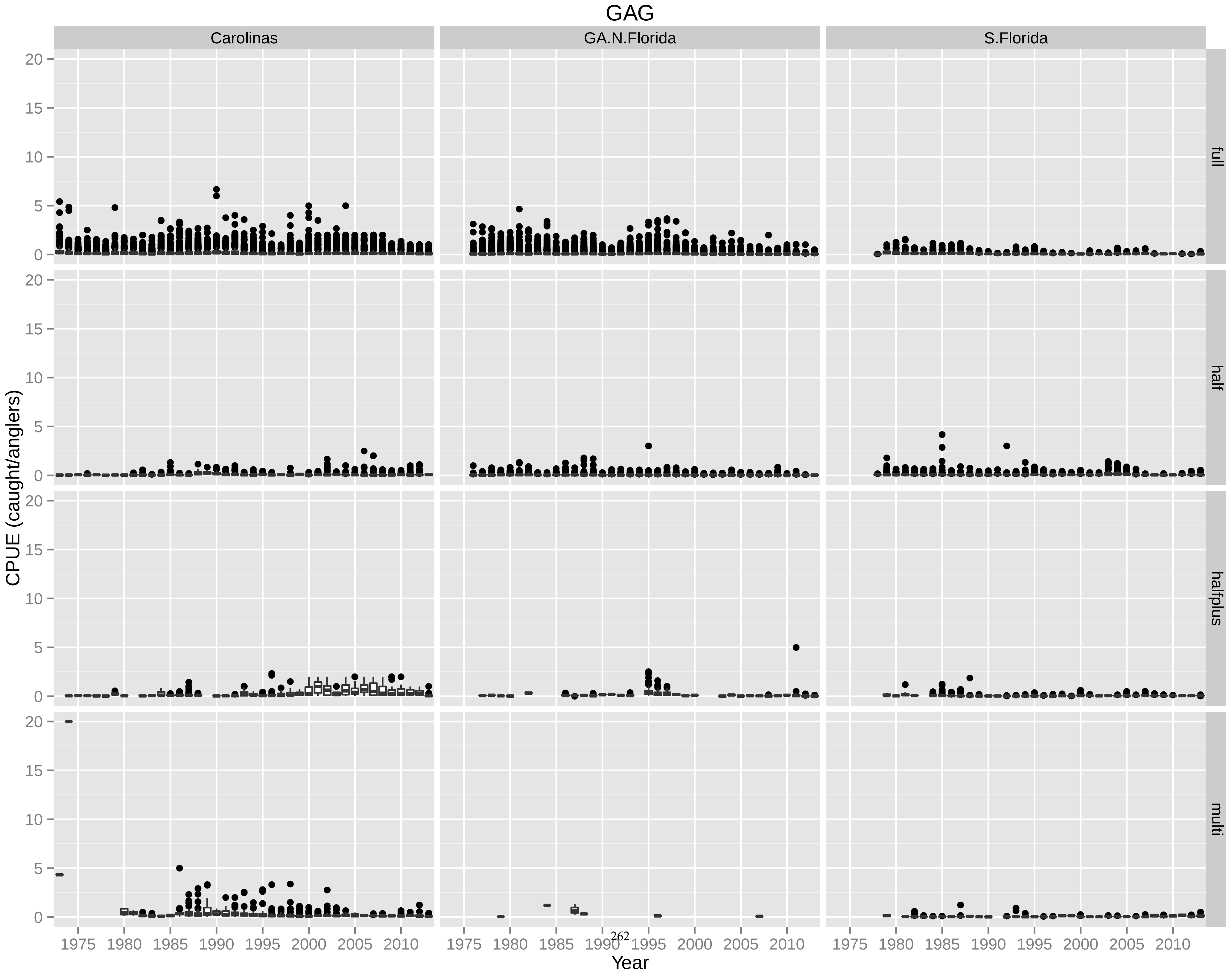

FRENCH GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
1980
1985
1990
1995
2000
2010

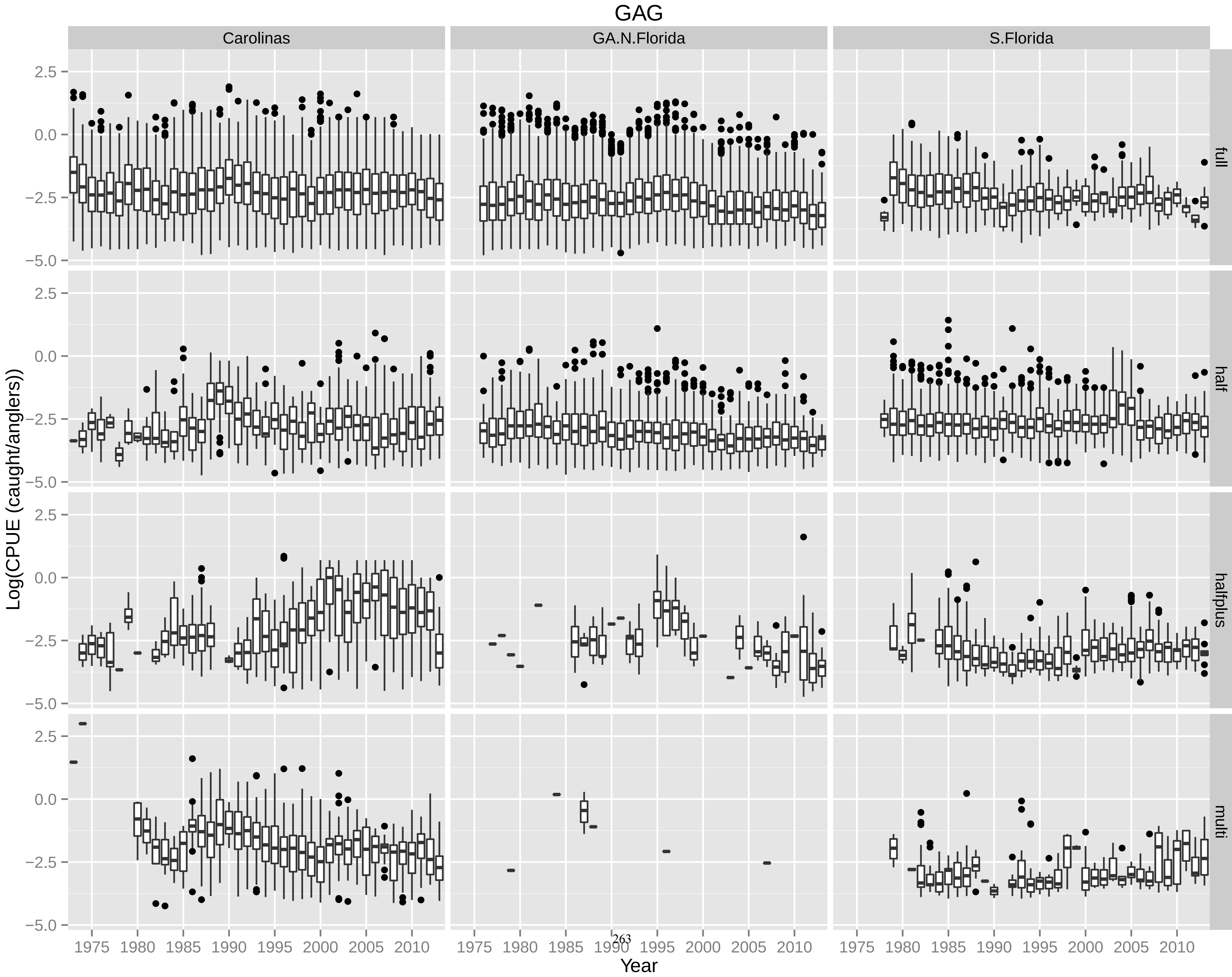

FRENCH GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
2.5
0.0
−2.5
1980
1985
1990
1995
2000
2010
Year

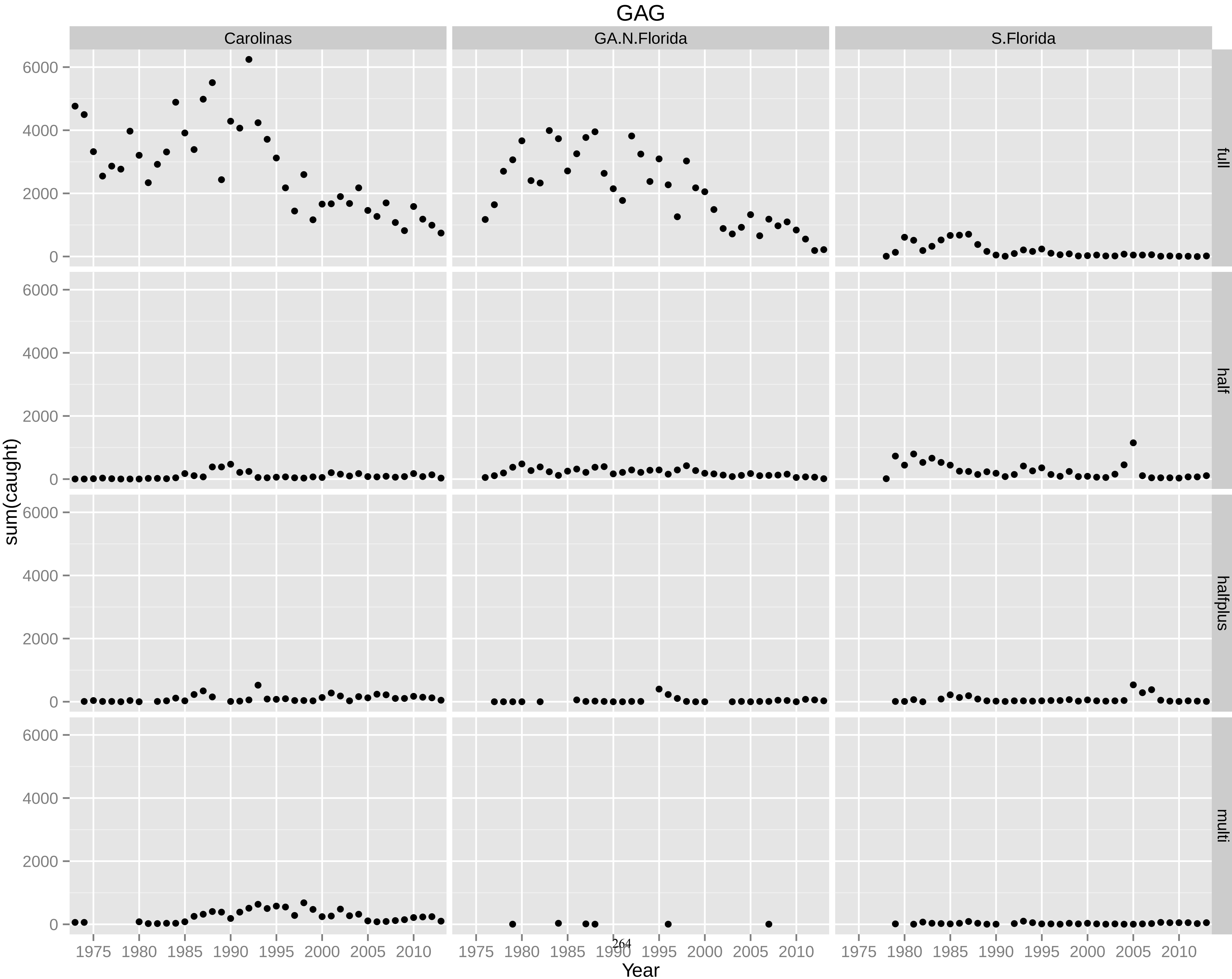

FRENCH GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
3000
2000
1000
0
1980
1985
1990
1995
2000
2010
Year

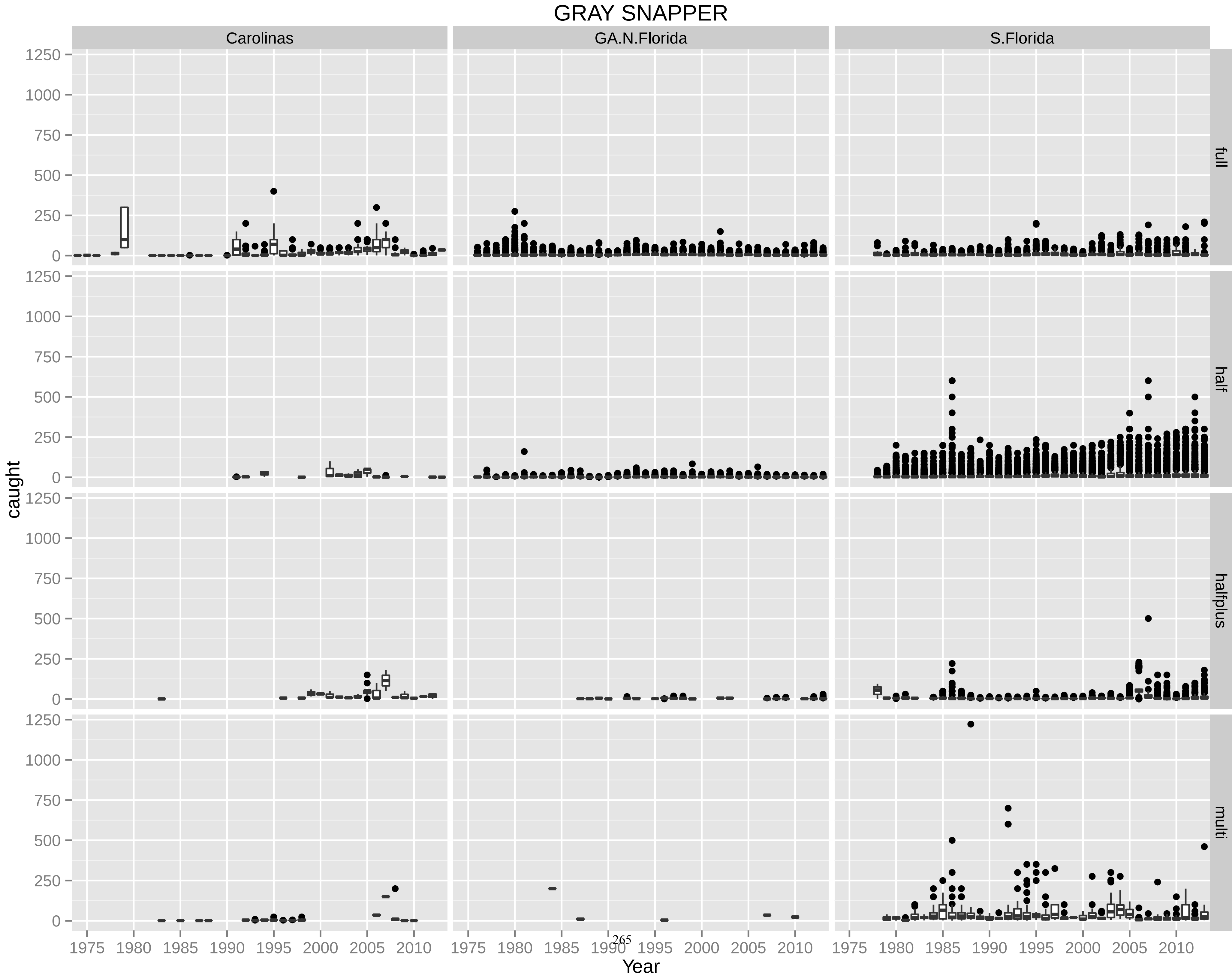


GAG
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
1975
1980
1985
1990
1995
2000
2005
2010

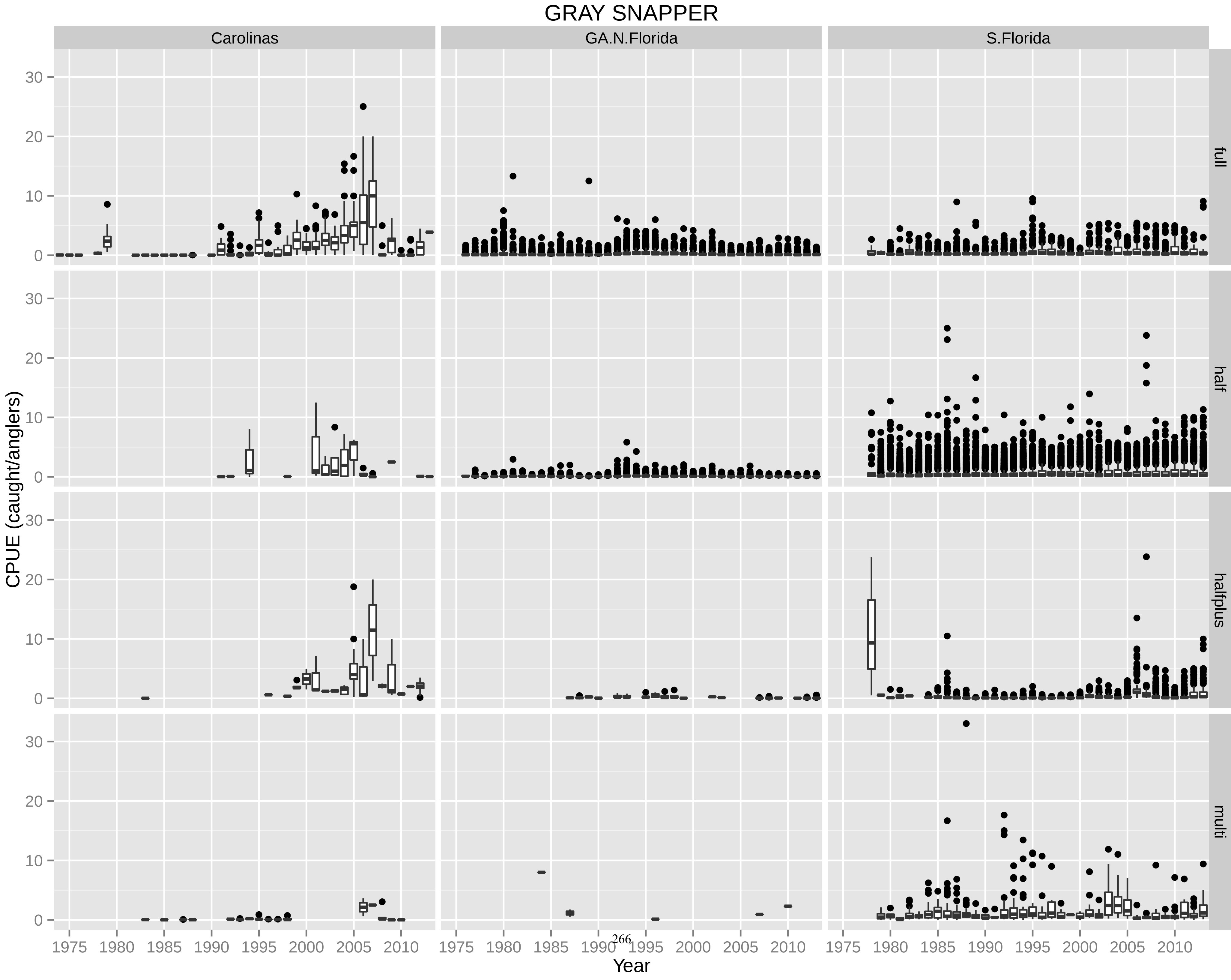

GAG
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
20
1975
1980
1985
1990
1995
2000
2005
2010

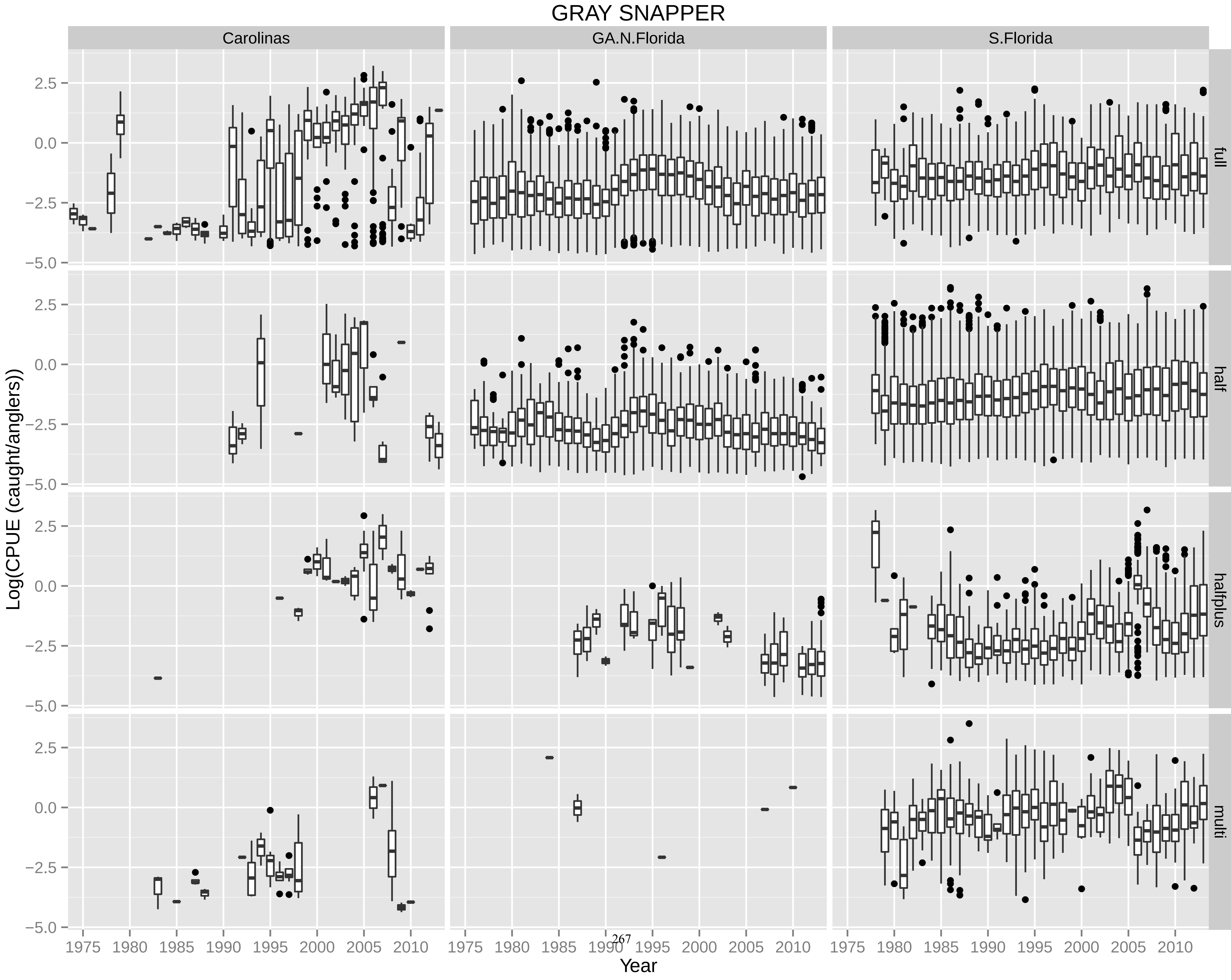

GAG
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
2.5
0.0
−2.5
−5.0
Log(CPUE (caught/anglers))
1975
1980
1985
1990
1995
2000
2005
2010
Year

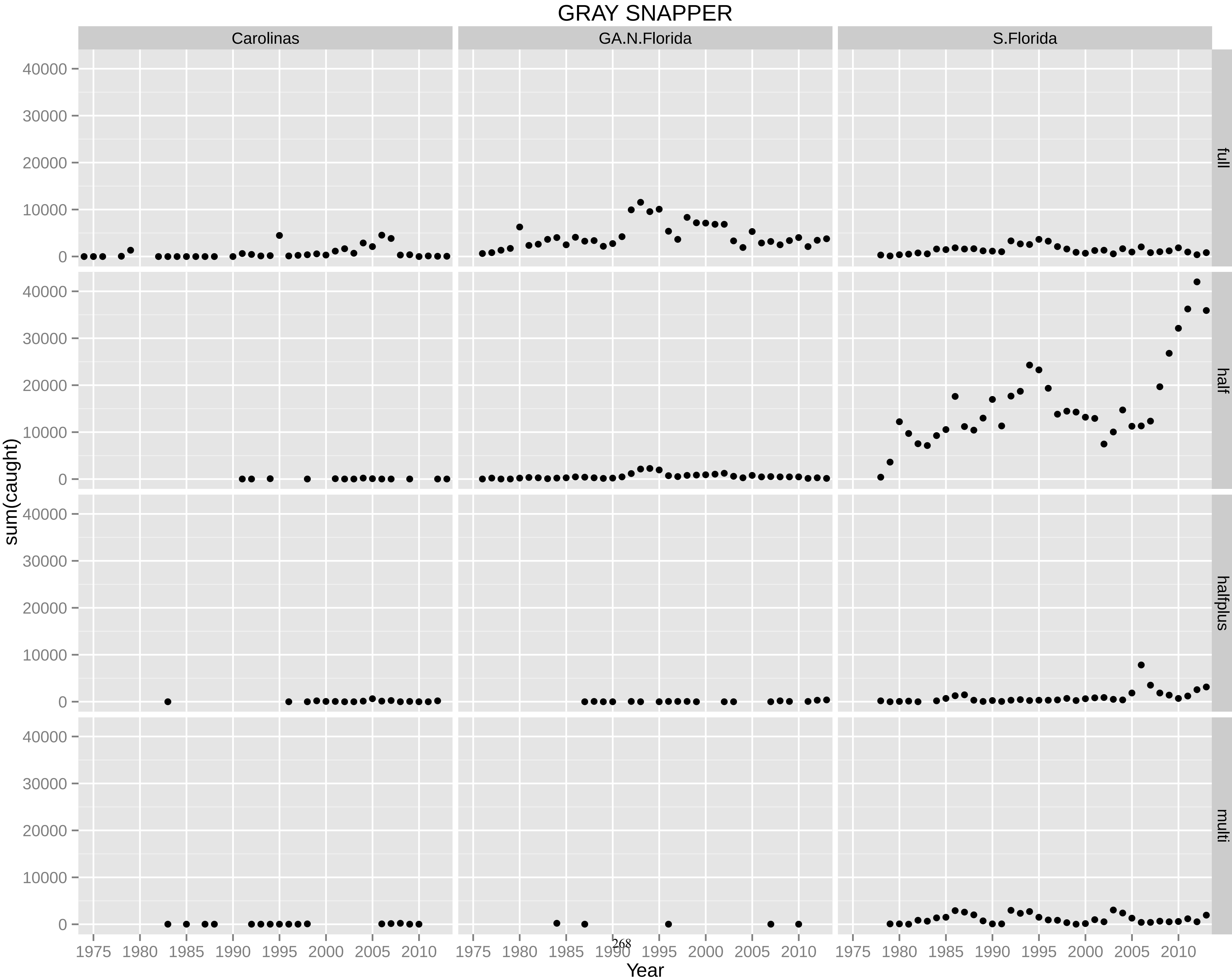

GAG
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
6000
4000
2000
0
1975
1980
1985
1990
1995
2000
2005
2010

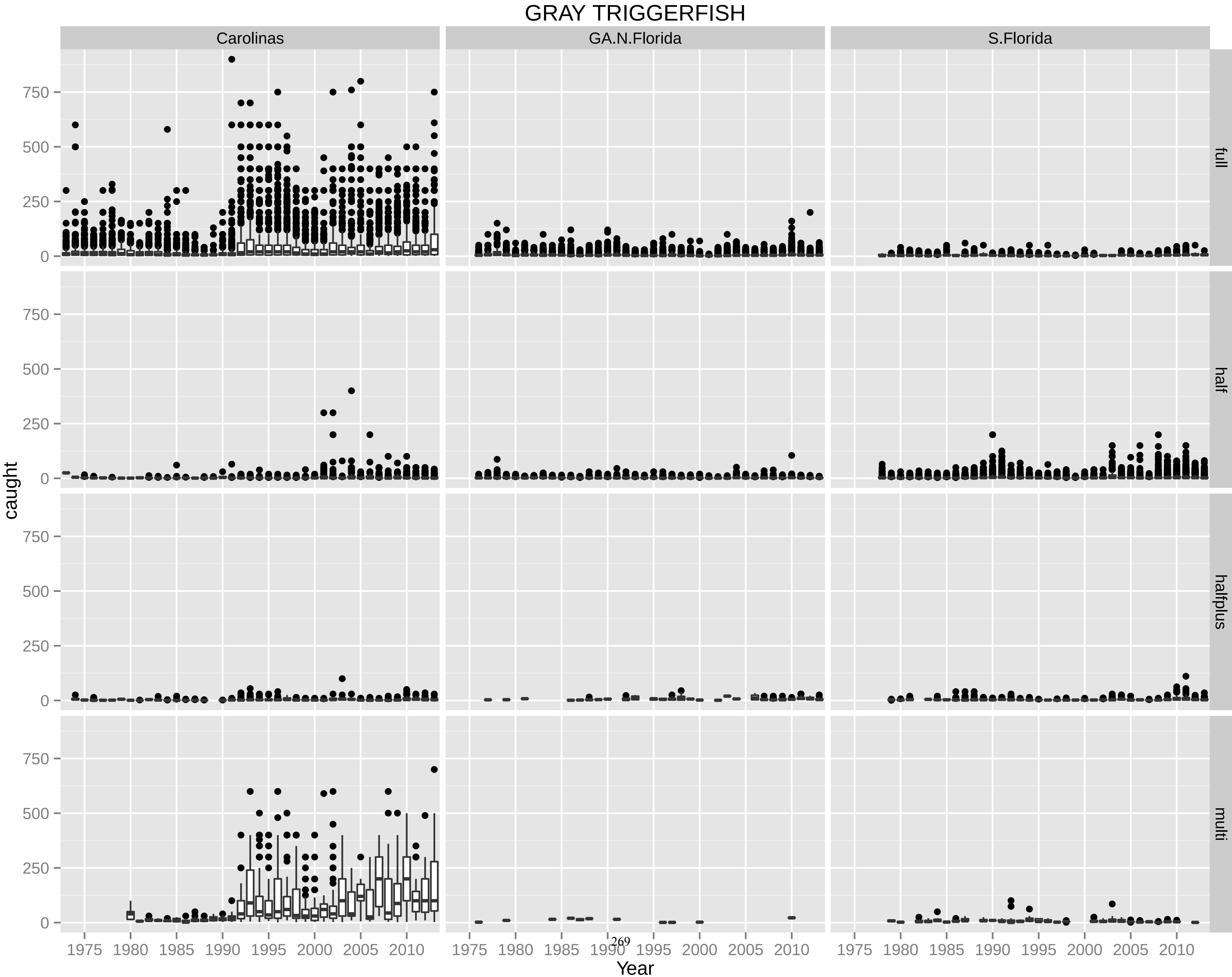


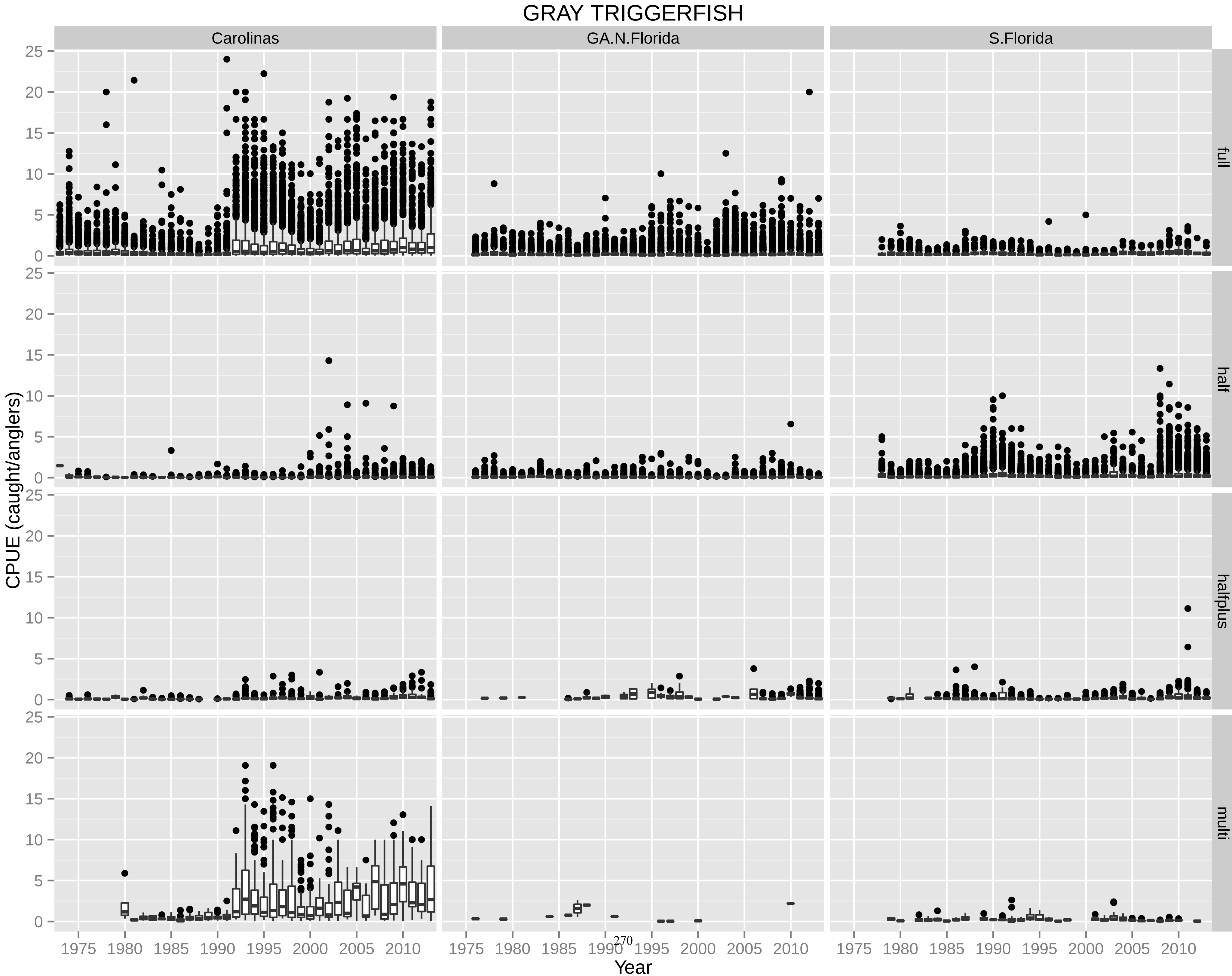
GRAY SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
1250
1000
750
500
250
0
1975
1980
1985
1990
1995
2000
2005
2010


GRAY SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
10
20
30
1975
1980
1985
1990
1995
2000
2005
2010

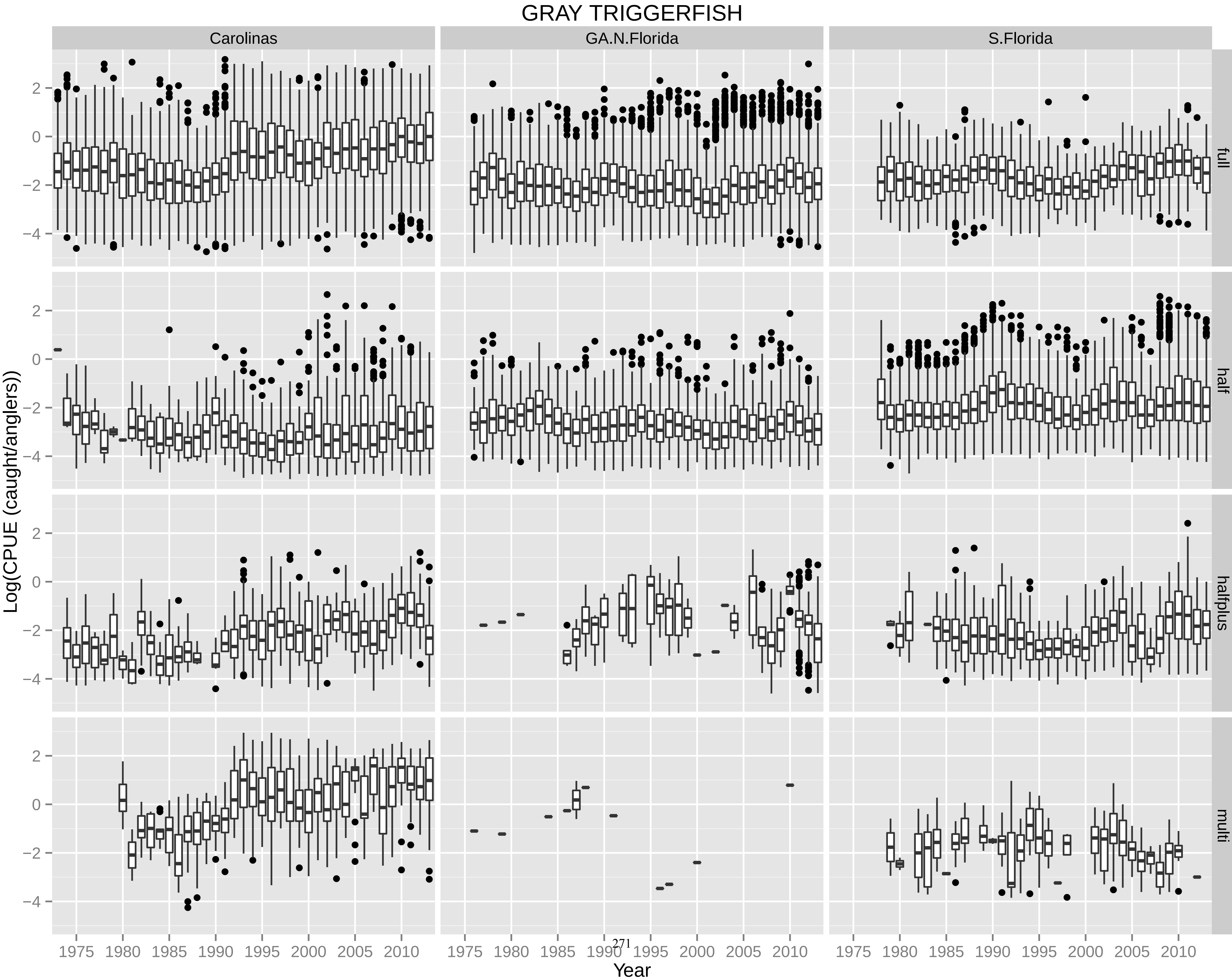

GRAY SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010

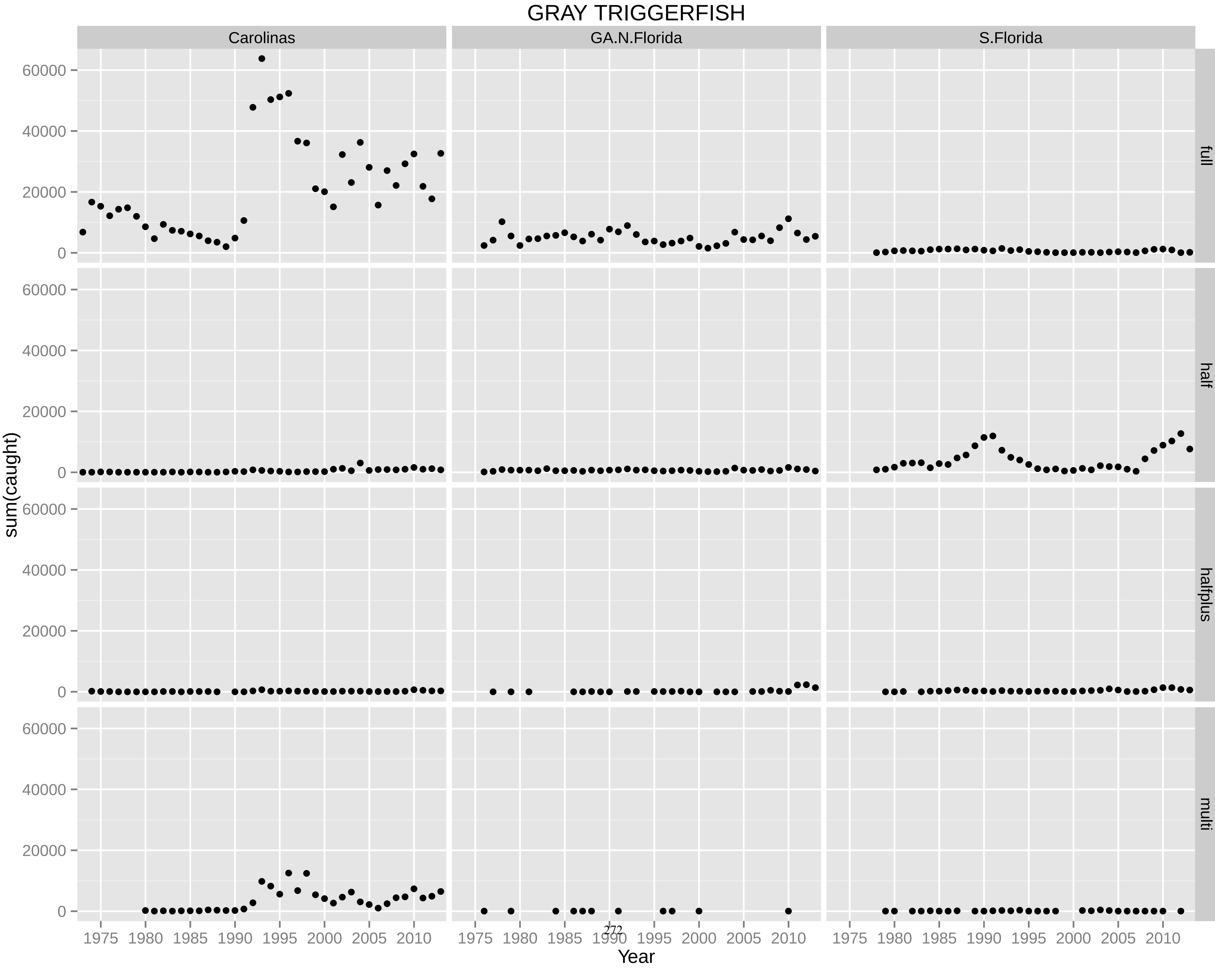

GRAY SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
10000
20000
30000
40000
1975 1980 1985 1990 1995 2000 2005 2010


GRAY TRIGGERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
250
500
750
1975
1980
1985
1990
1995
2000
2005
2010

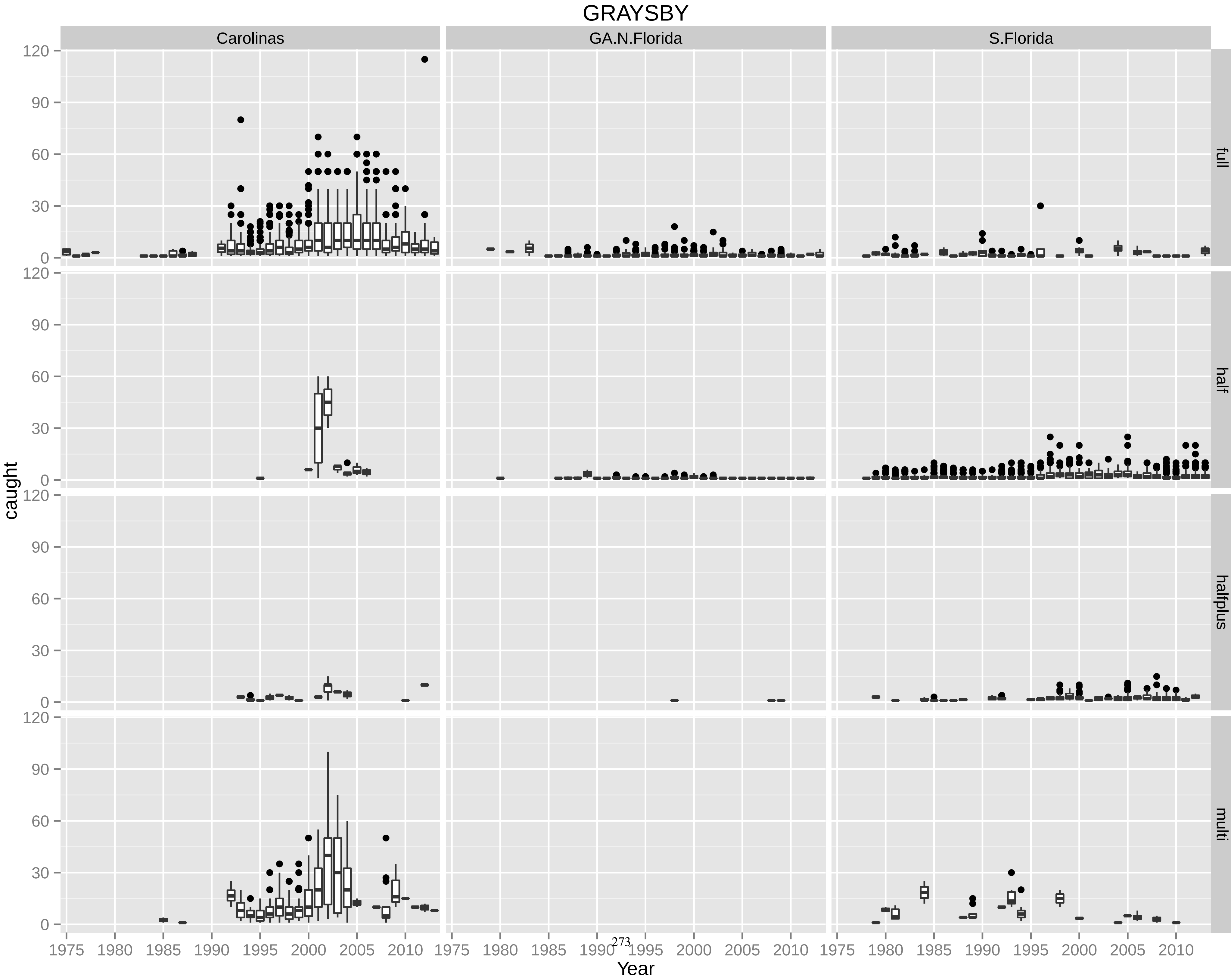


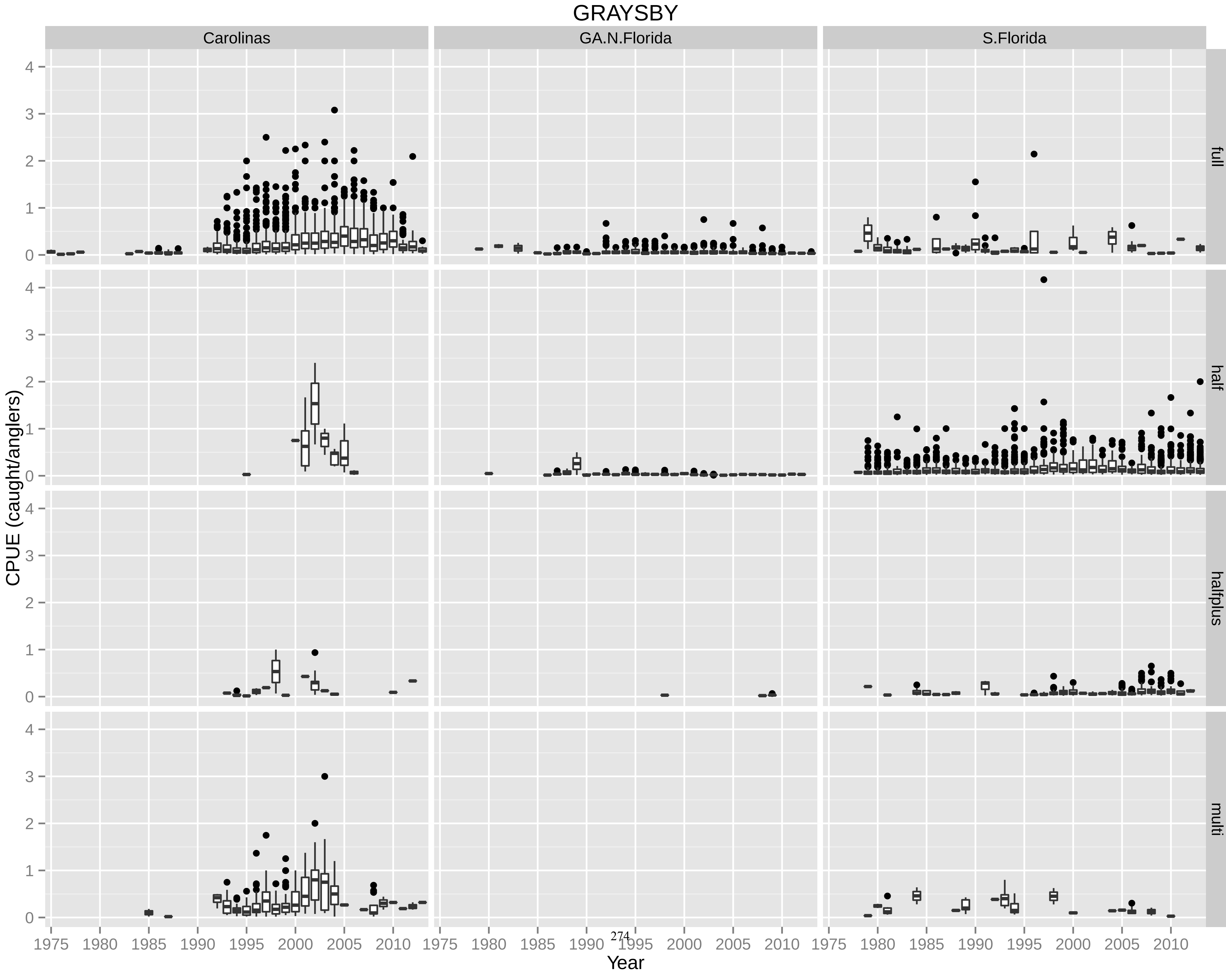
GRAY TRIGGERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0
5
10
15
20
25
1975
1980
1985
1990
1995
2000
2005
2010
Year


GRAY TRIGGERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

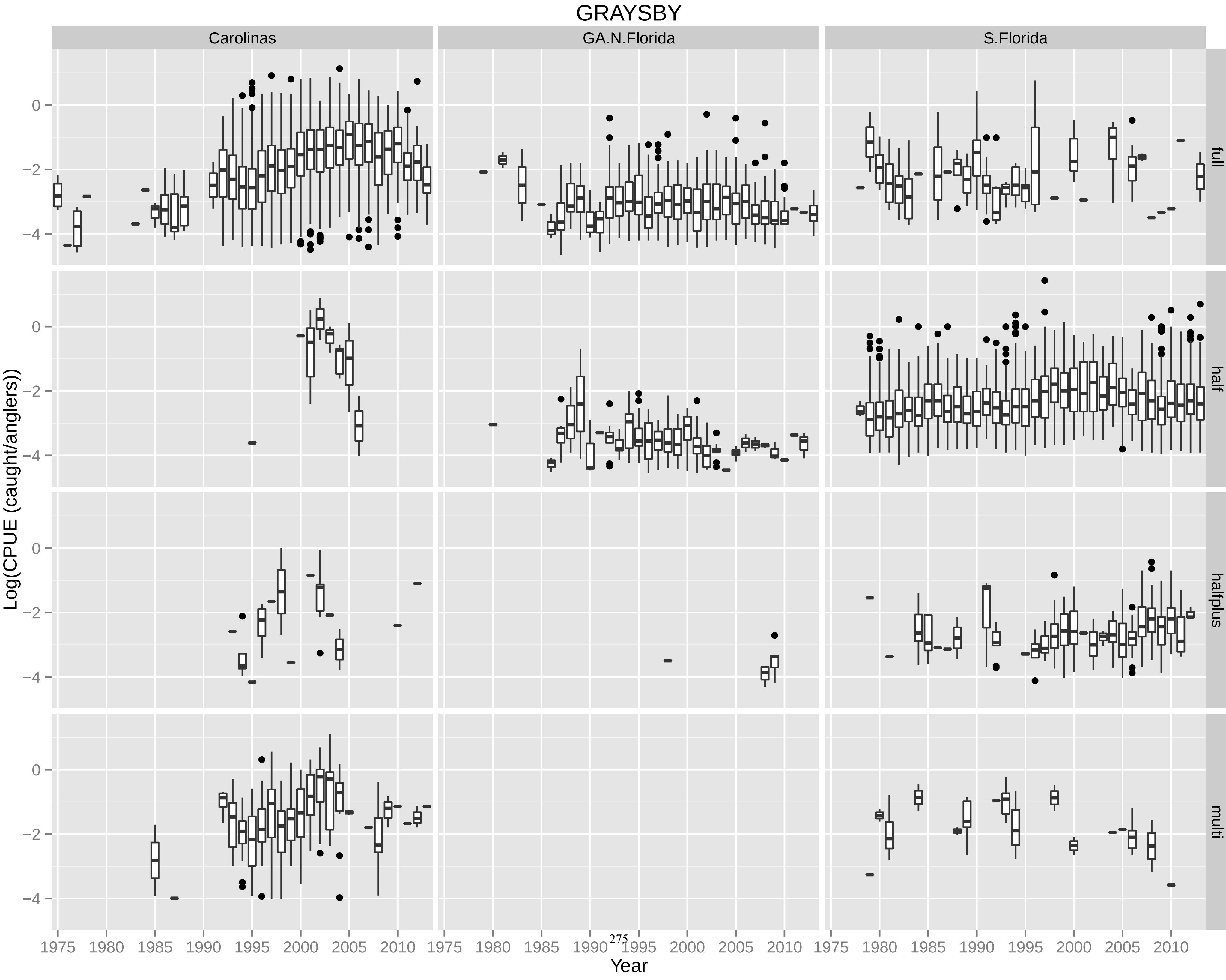


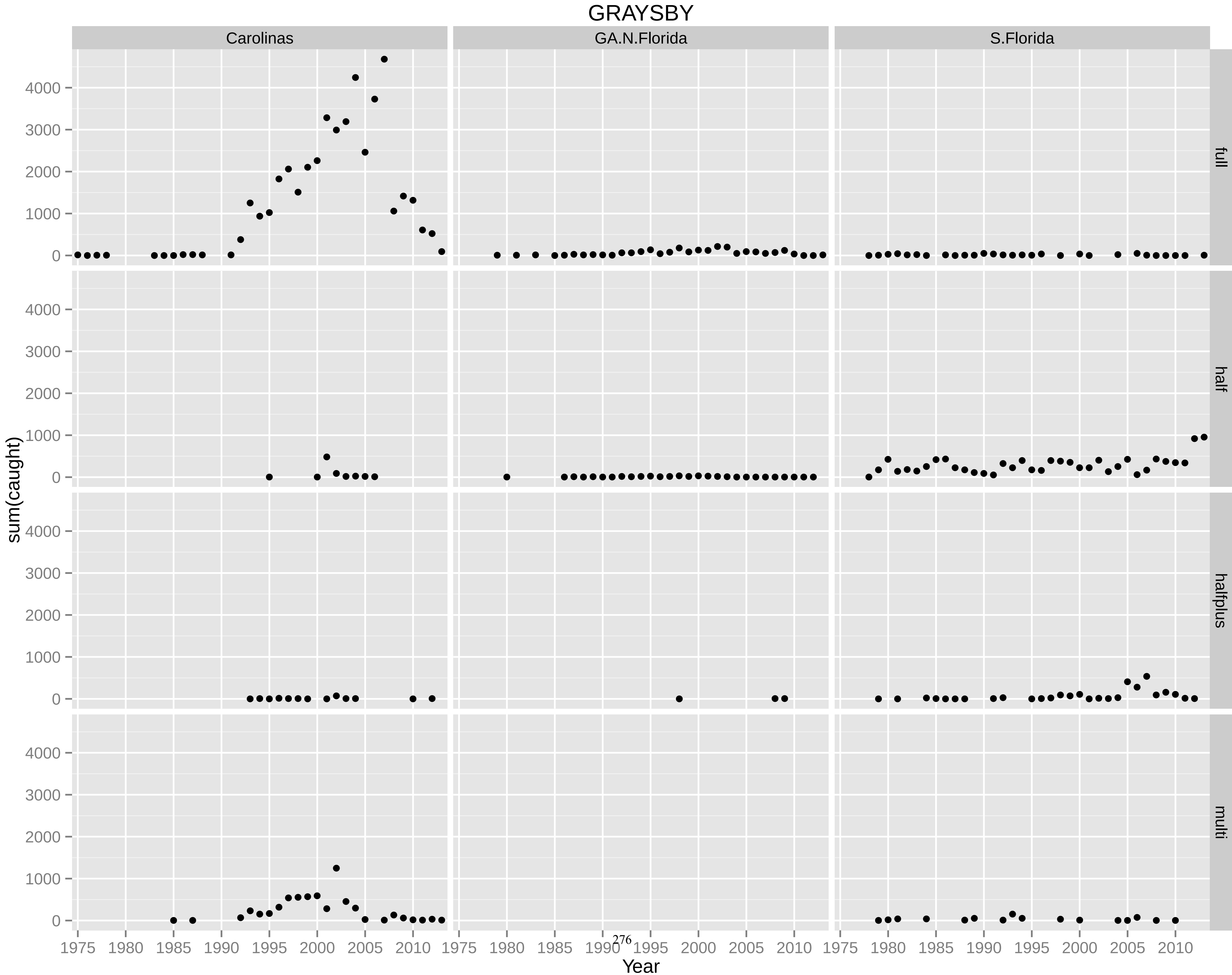
GRAY TRIGGERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
60000
40000
20000
0
1975
1980
1985
1990
1995
2000
2005
2010

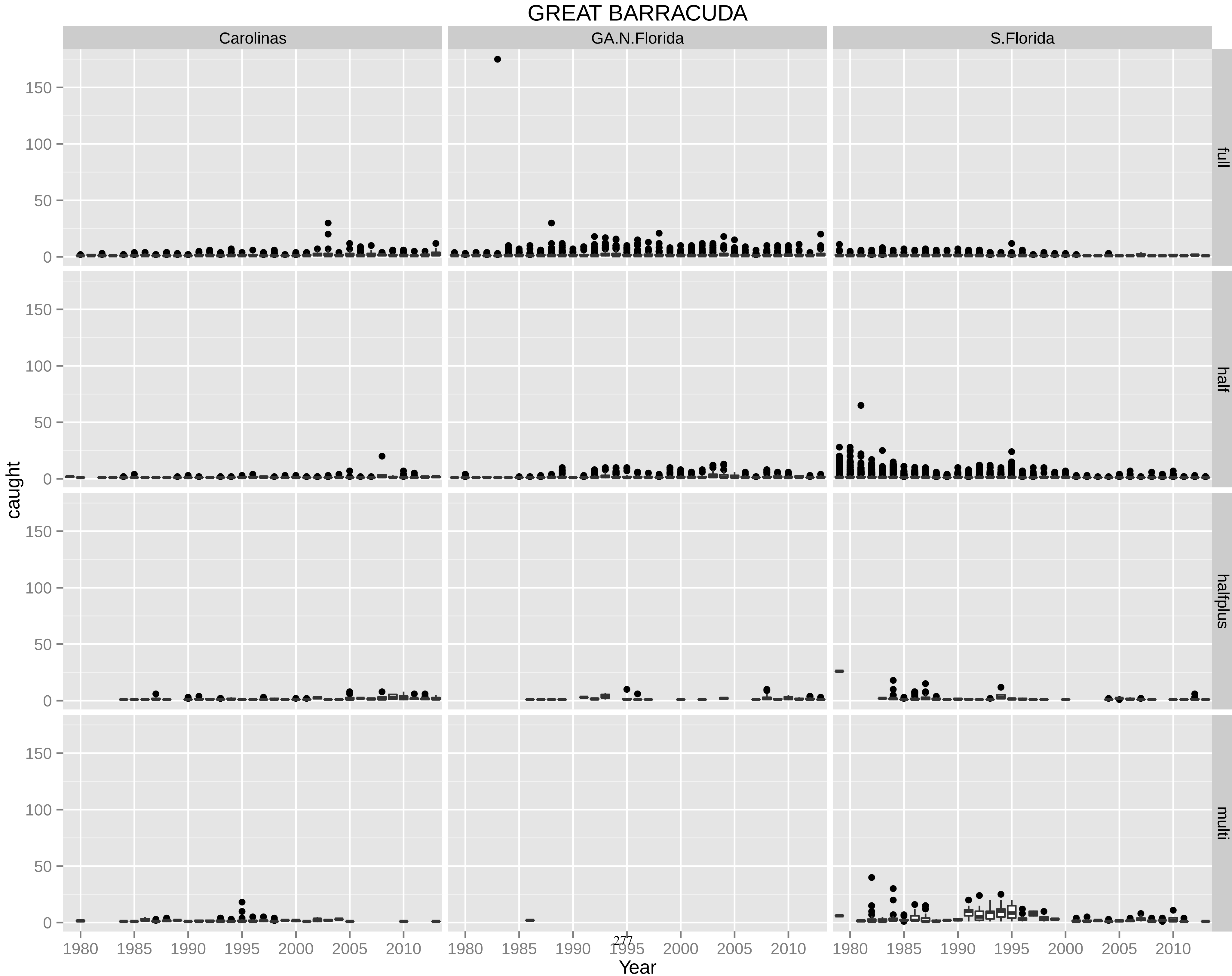

GRAYSBY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
30
60
90
120
1975
1980
1985
1990
1995
2000
2005
2010

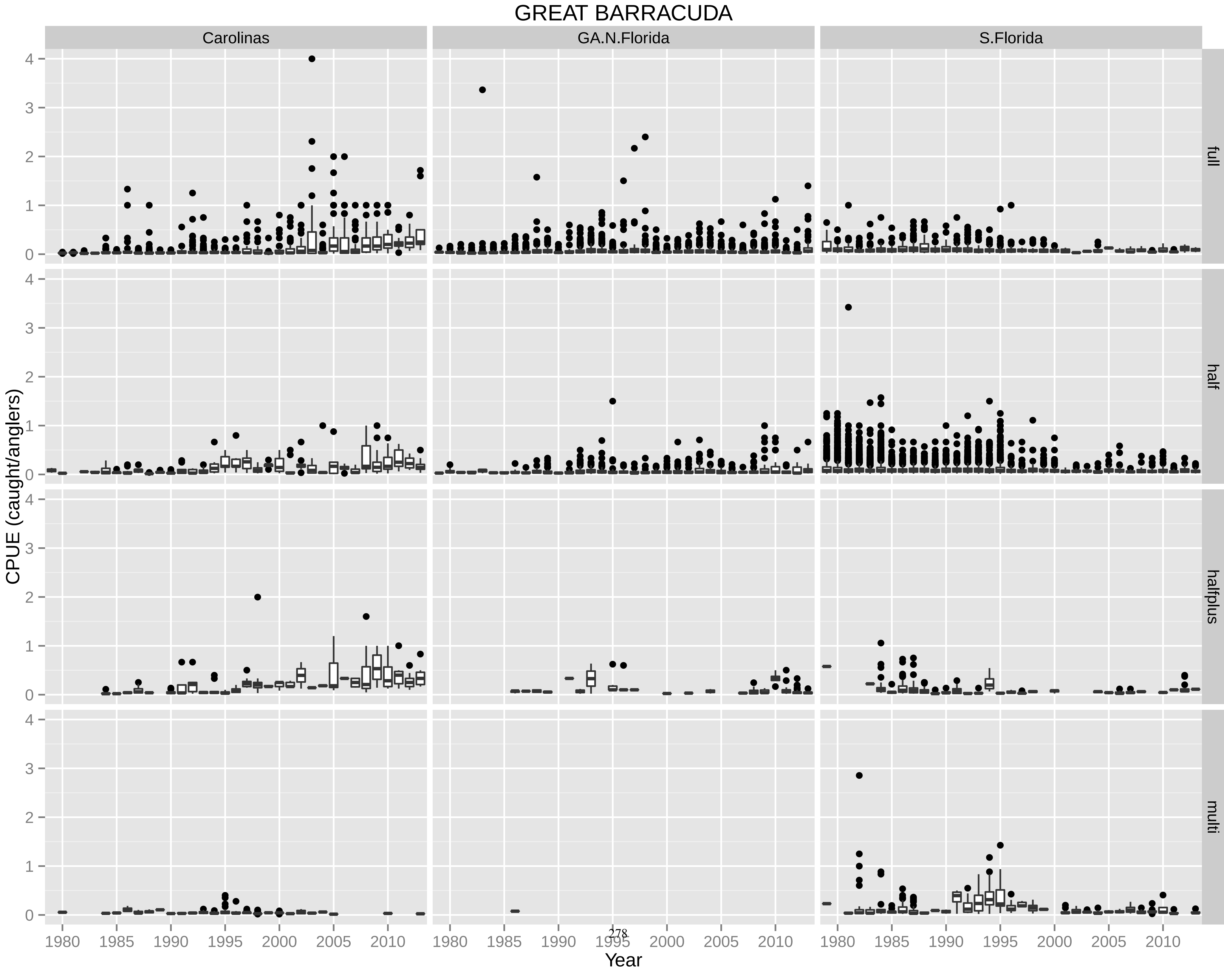


GRAYSBY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
4
1975
1980
1985
1990
1995
2000
2005
2010

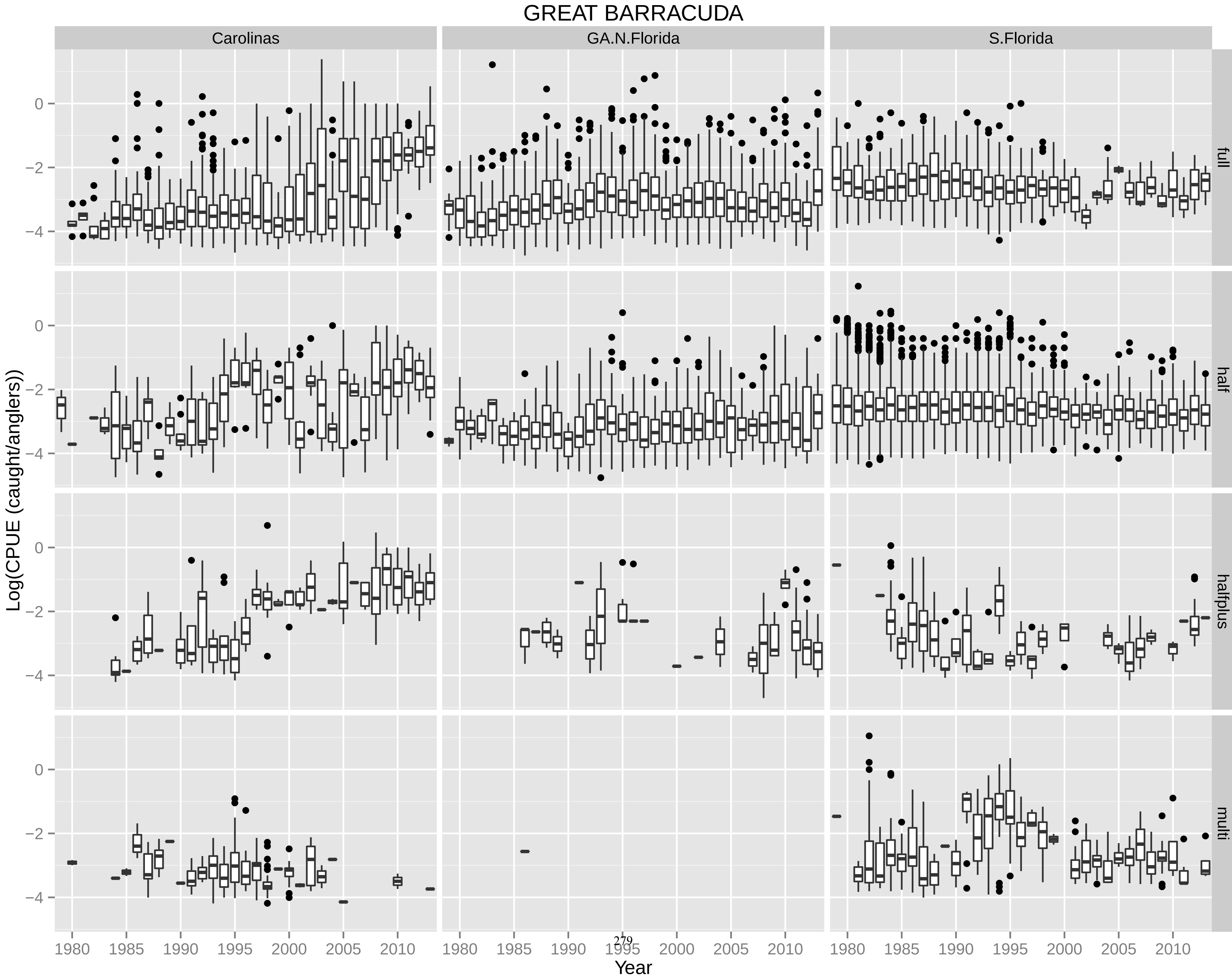

GRAYSBY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

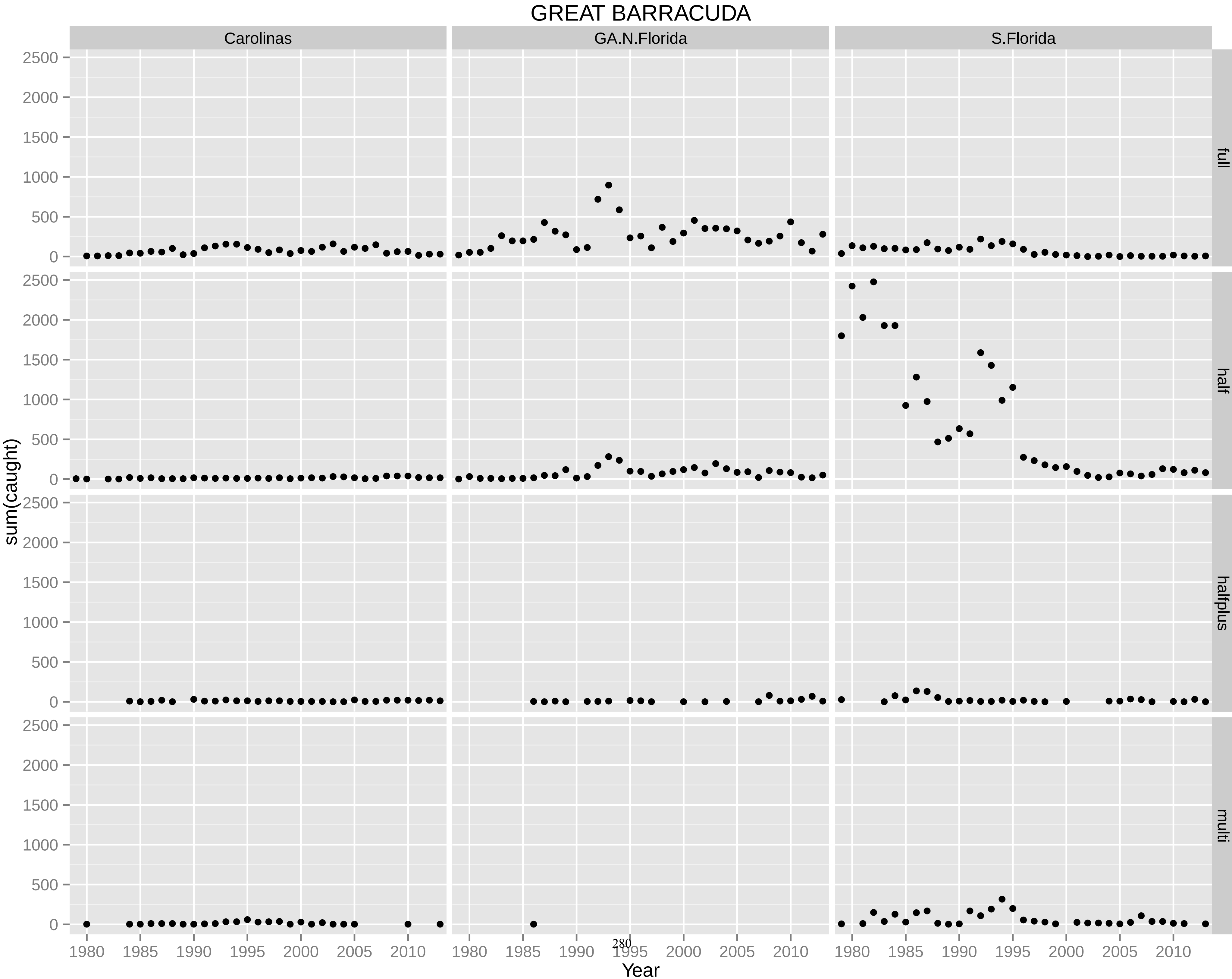

GRAYSBY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
1000
2000
3000
4000
1975
1980
1985
1990
1995
2000
2005
2010


GREAT BARRACUDA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
1980
1985
1990
1995
2000
2005
2010

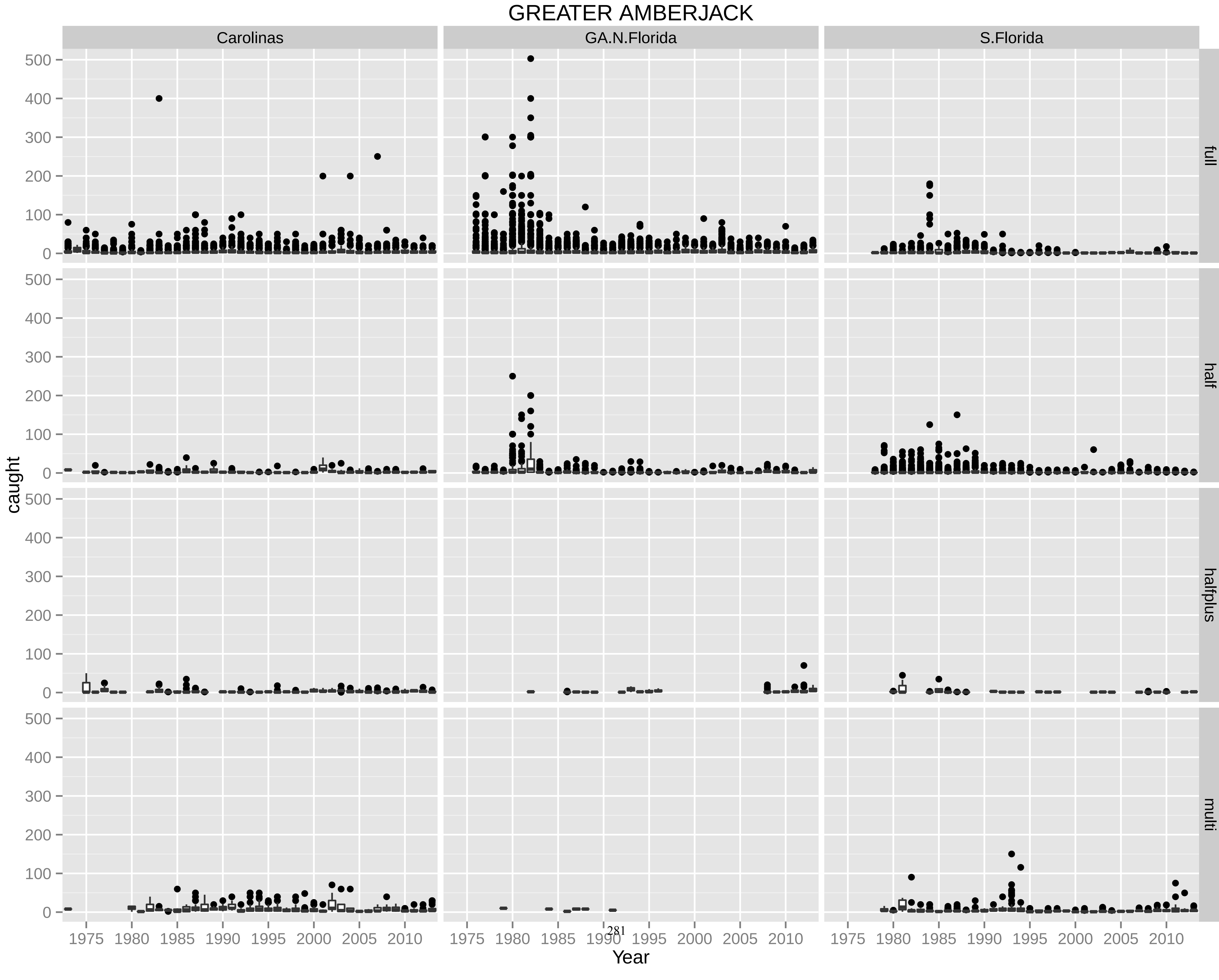


GREAT BARRACUDA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
4
1980
1985
1990
1995
2000
2005
2010

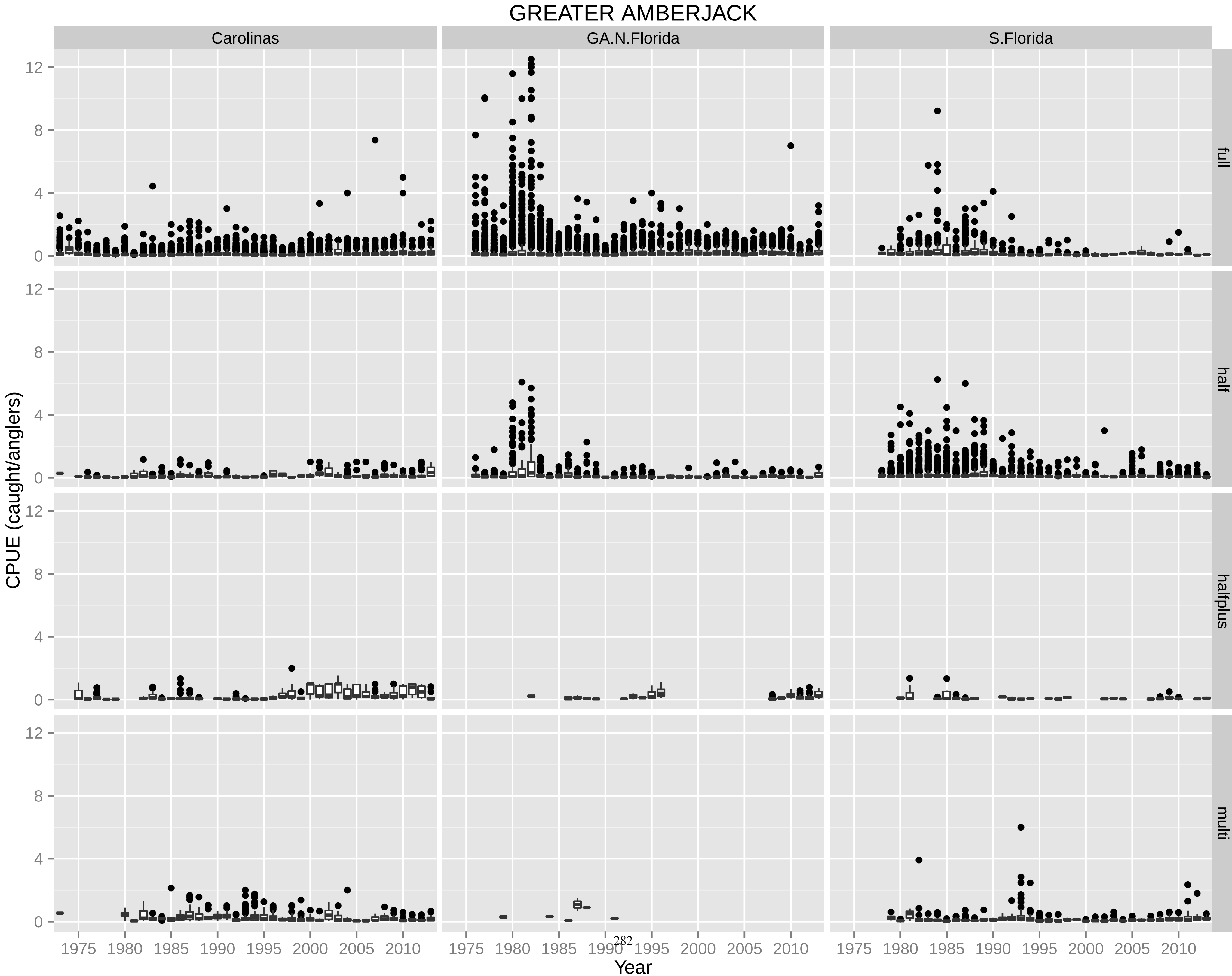

GREAT BARRACUDA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

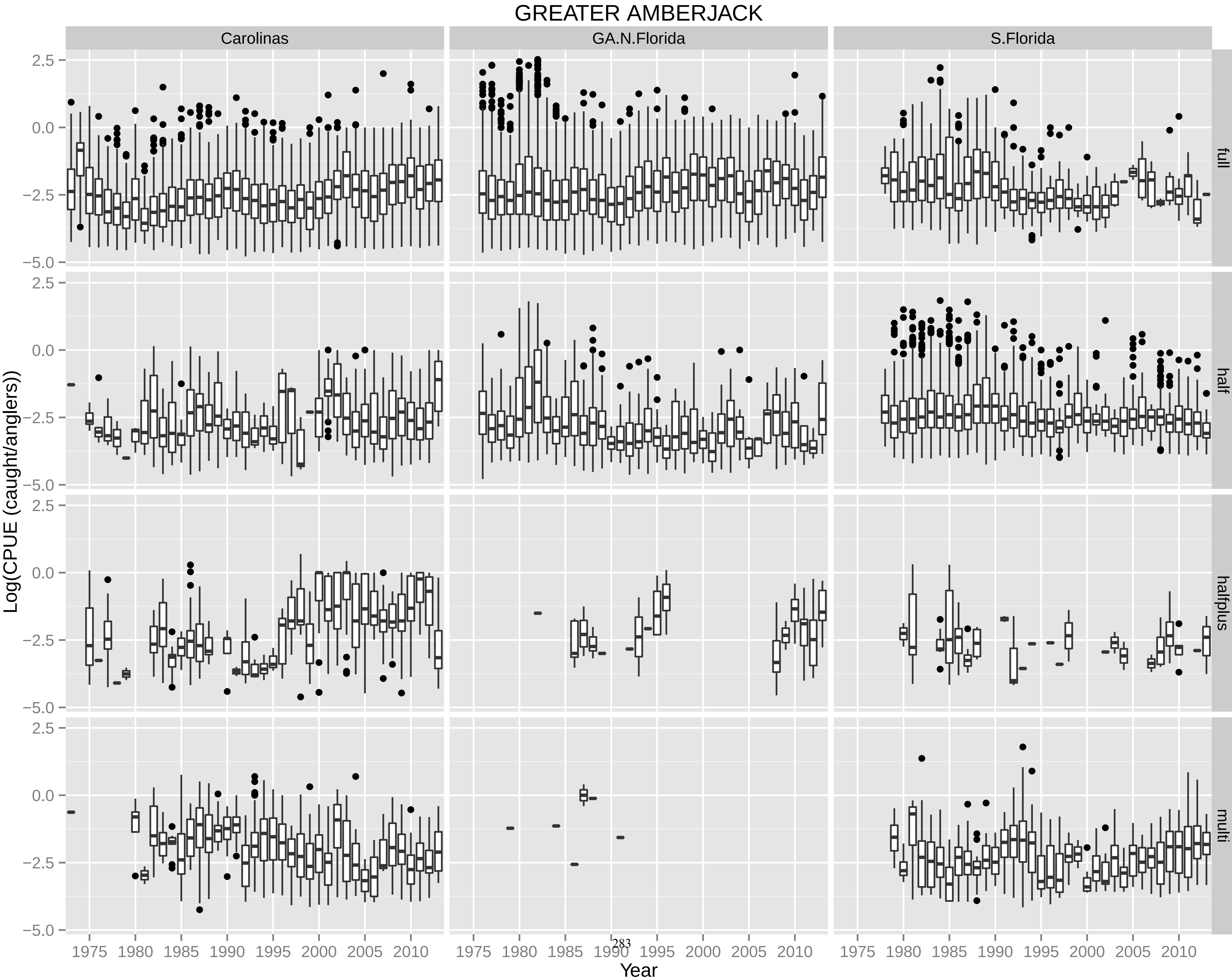


GREAT BARRACUDA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year

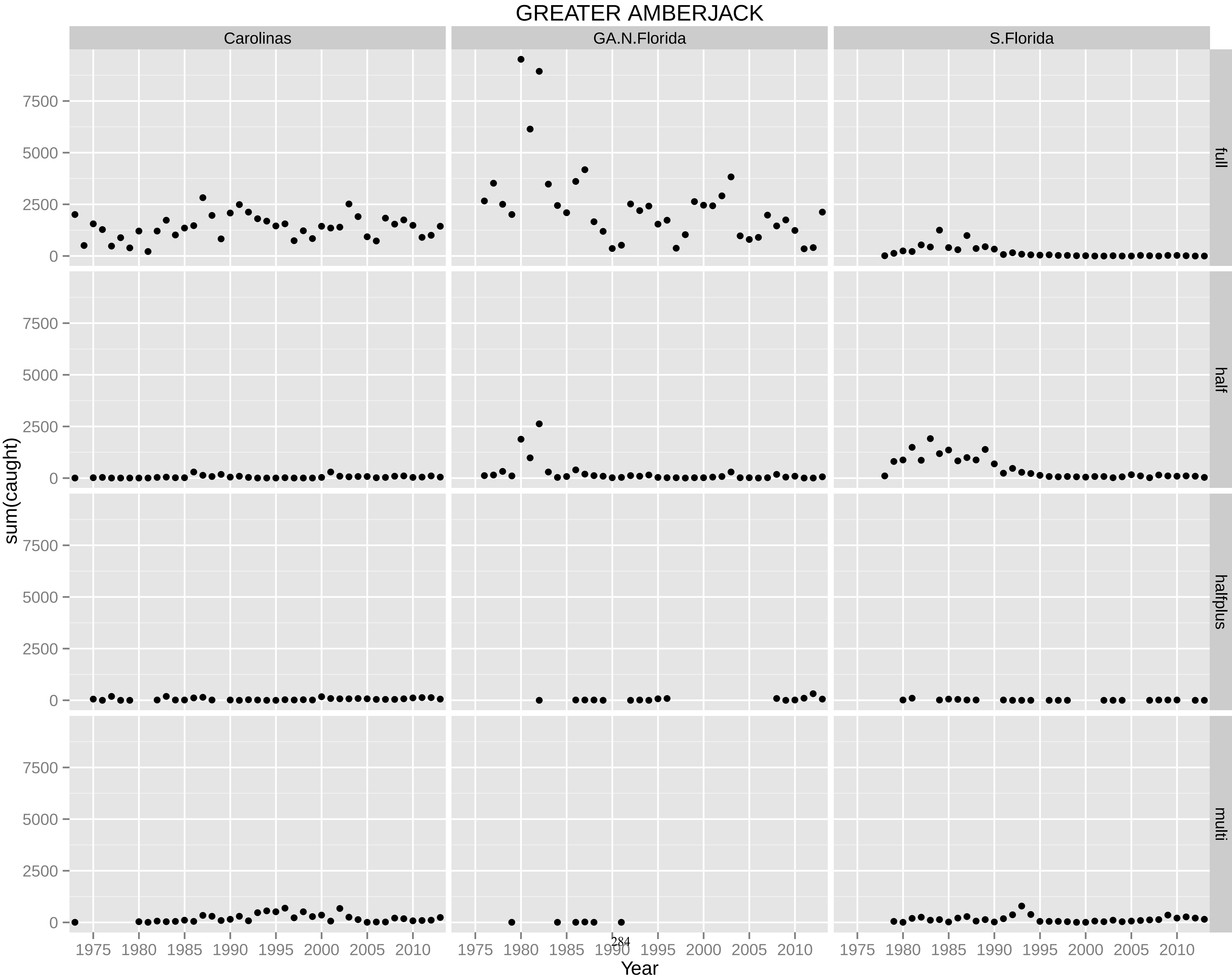


GREATER AMBERJACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
400
500
1975
1980
1985
1990
1995
2000
2005
2010

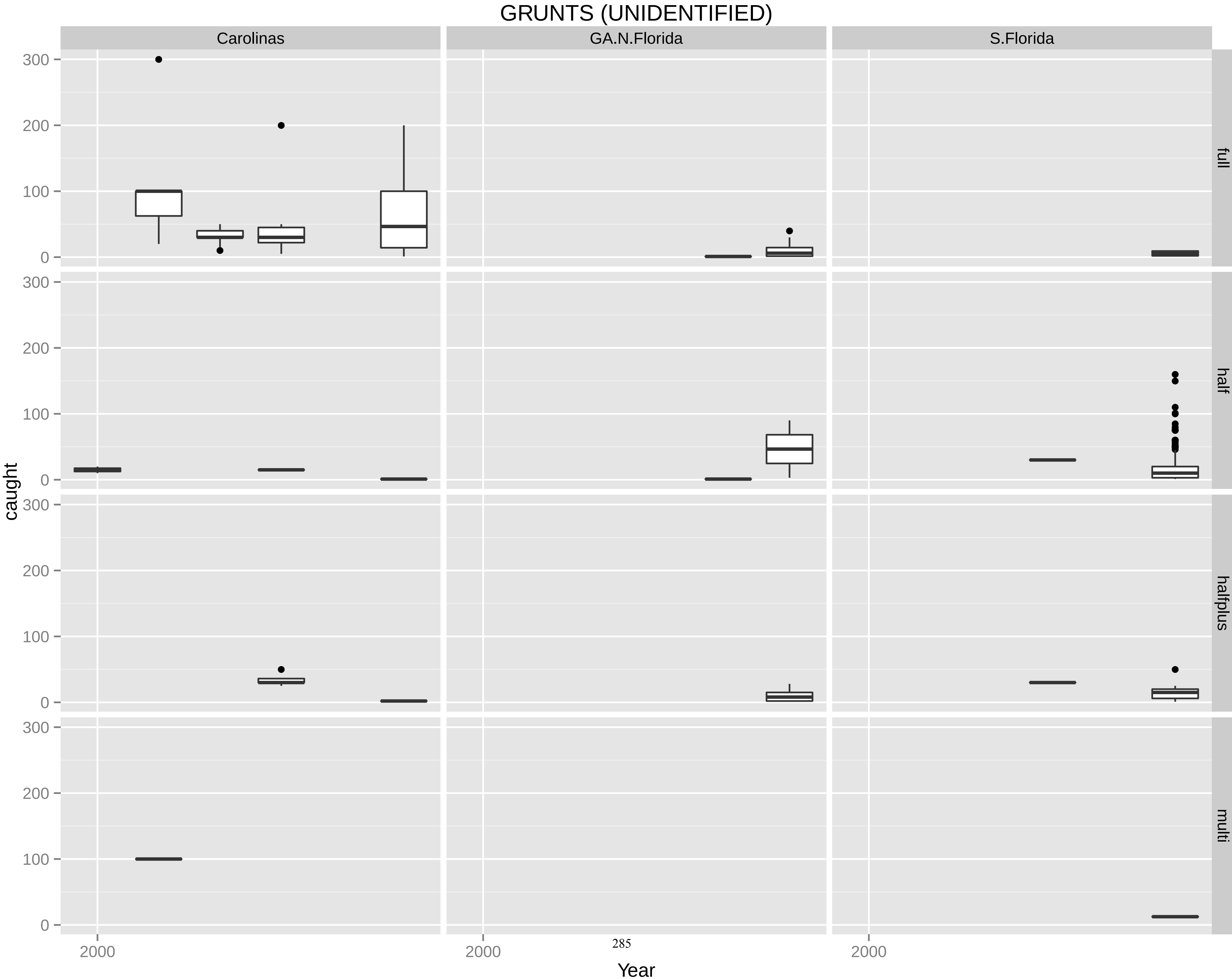

GREATER AMBERJACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
4
8
12
1975
1980
1985
1990
1995
2000
2005
2010

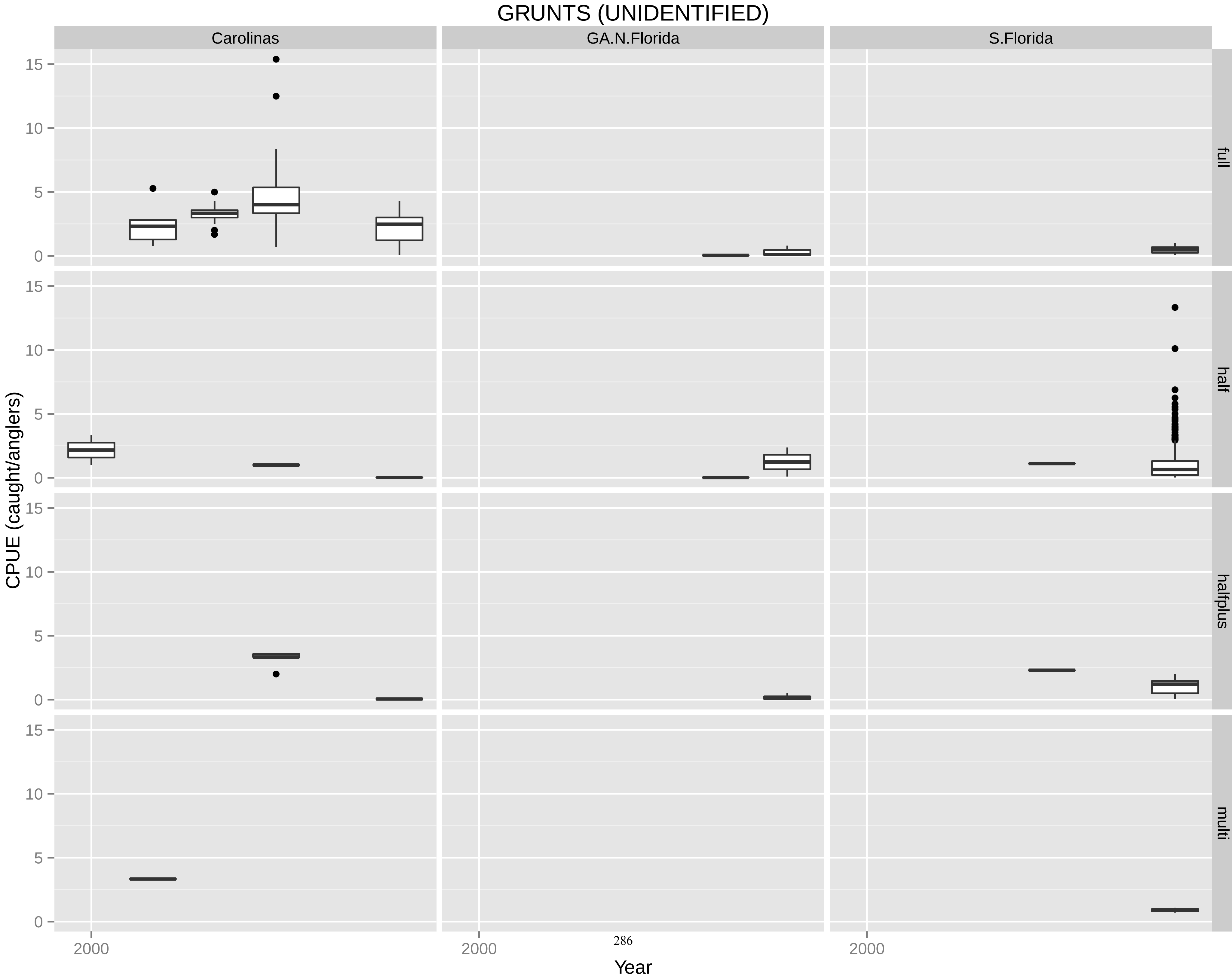


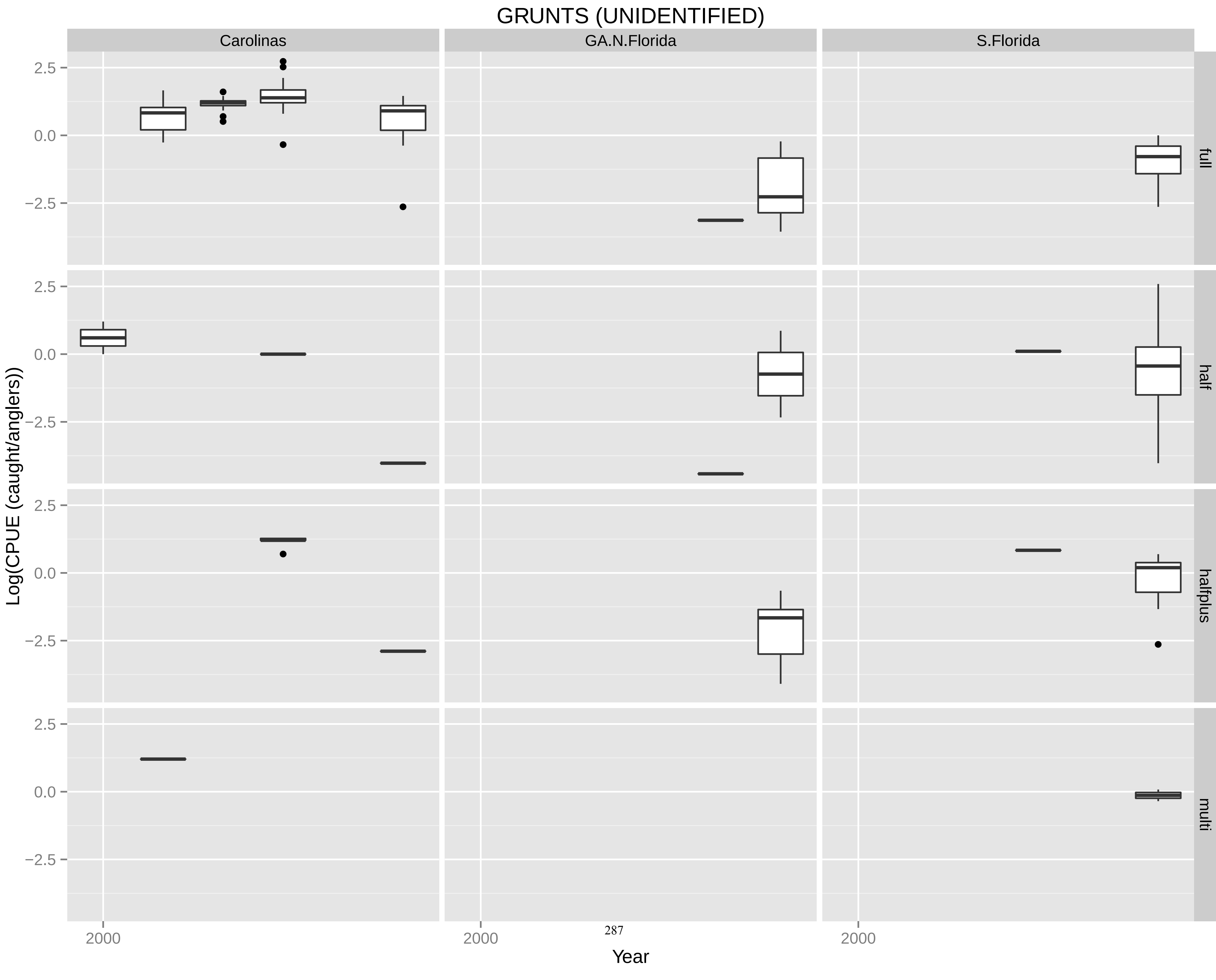
GREATER AMBERJACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010

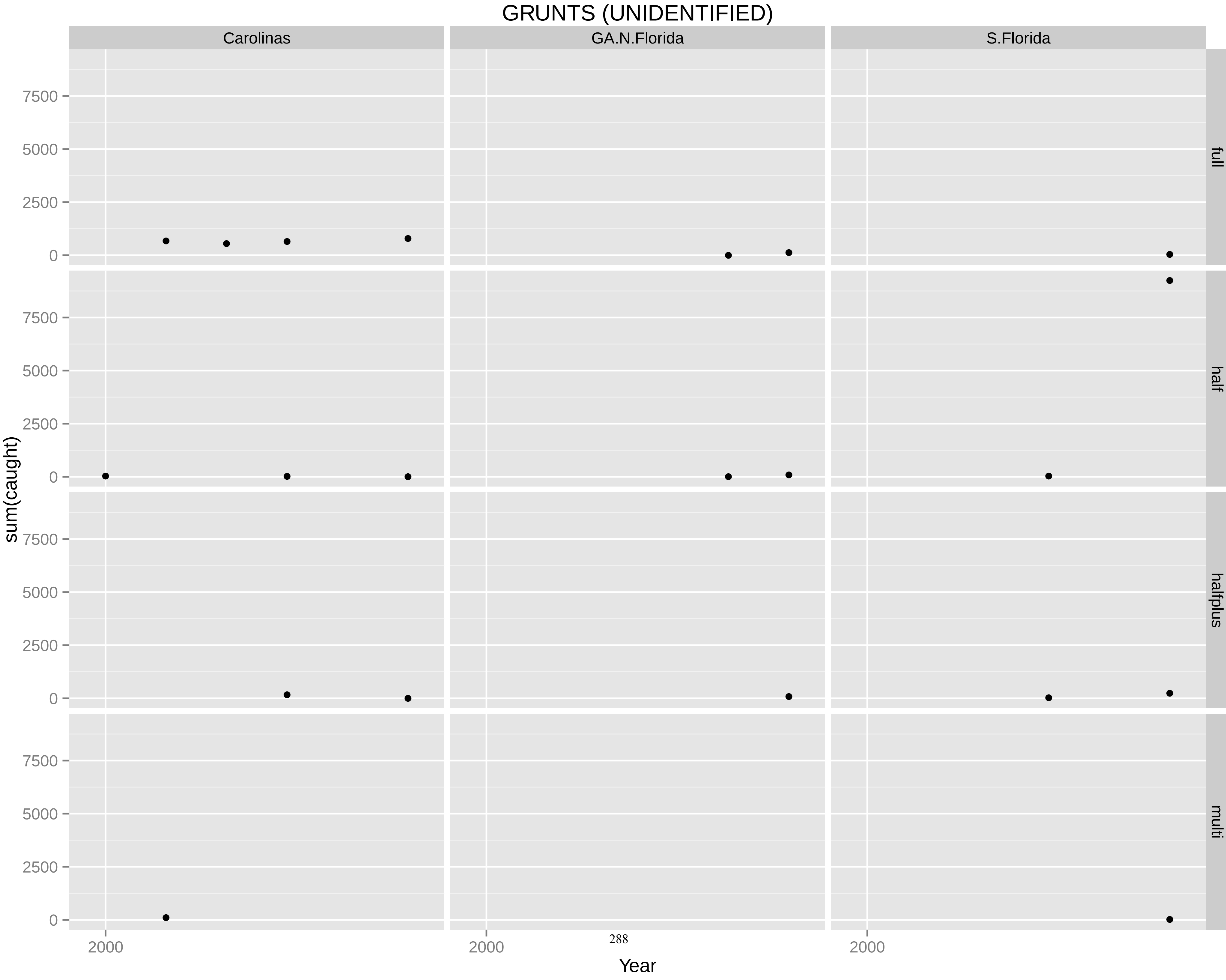


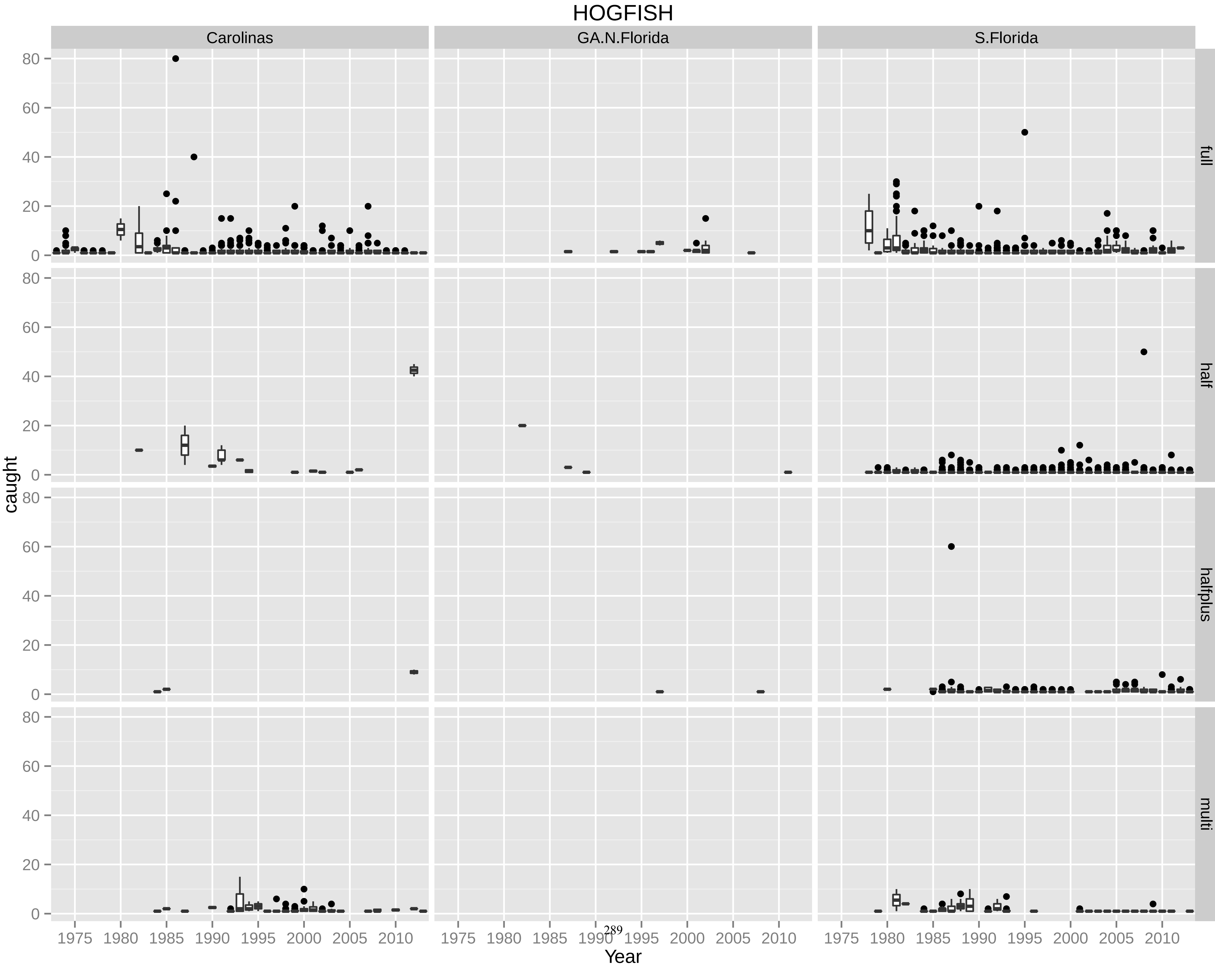
GREATER AMBERJACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
2500
5000
7500
1975
1980
1985
1990
1995
2000
2005
2010

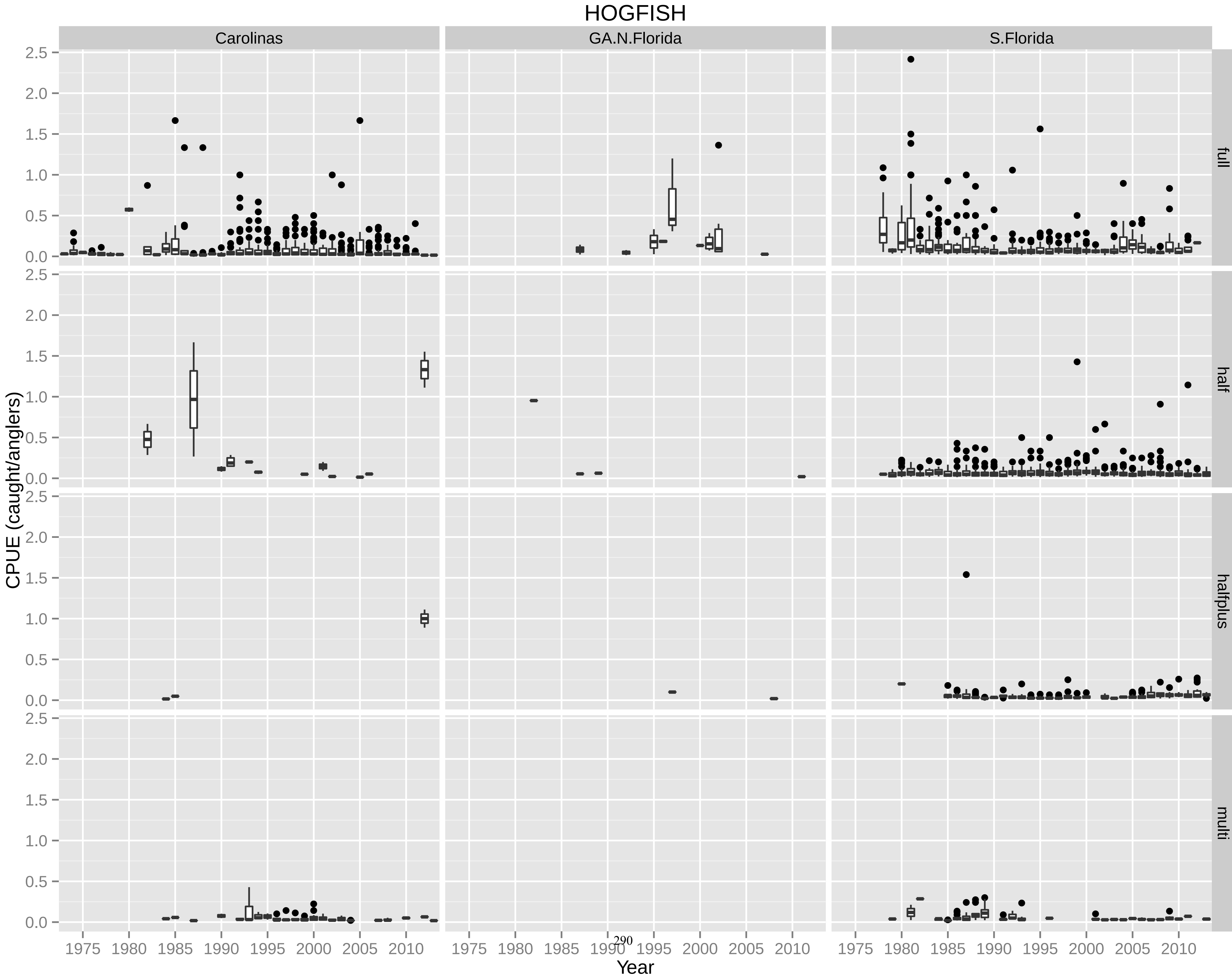

GRUNTS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
2000

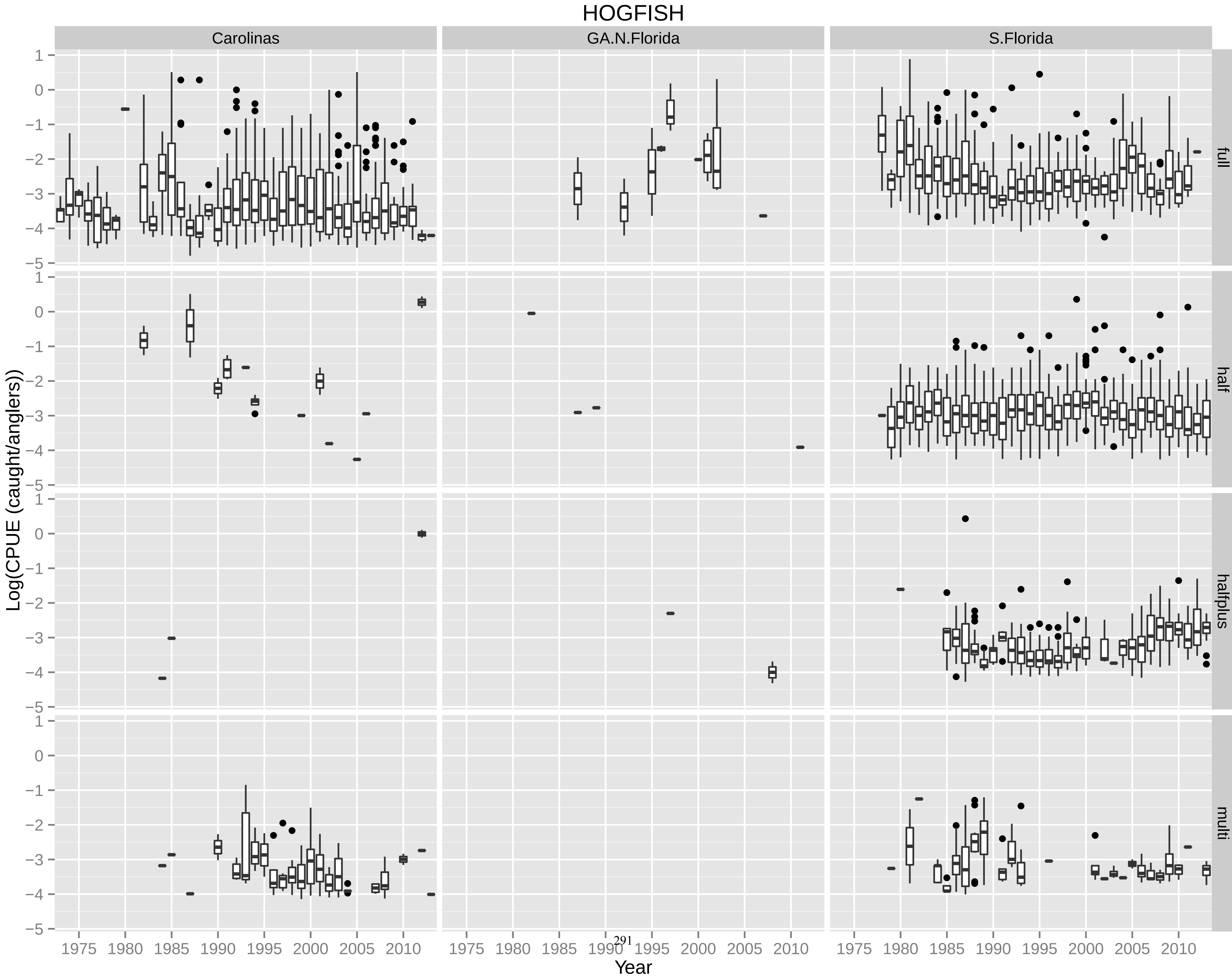

GRUNTS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
2000


GRUNTS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
2.5
0.0
−2.5
Log(CPUE (caught/anglers))
2000
Year

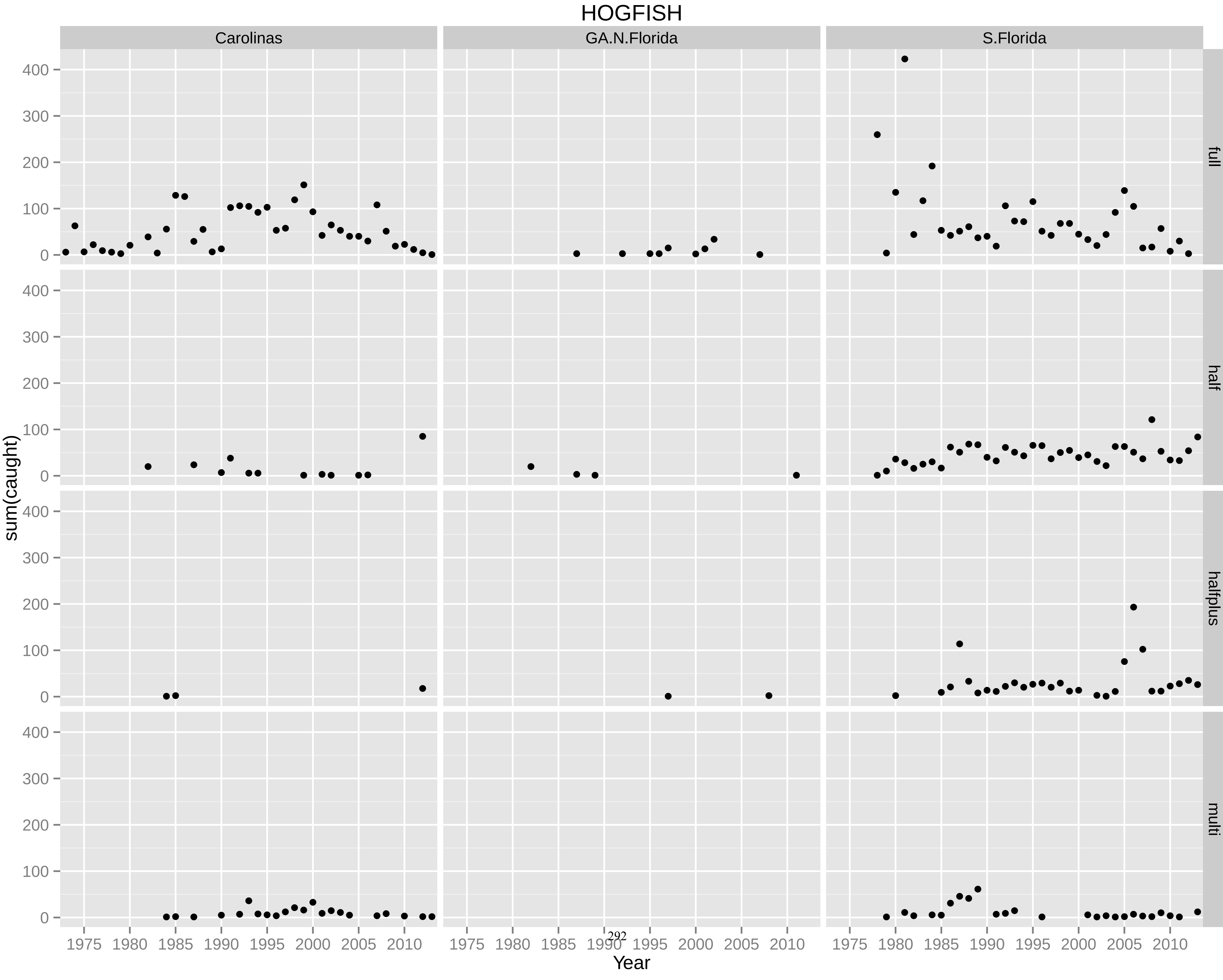

GRUNTS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
2500
5000
7500
2000
Year

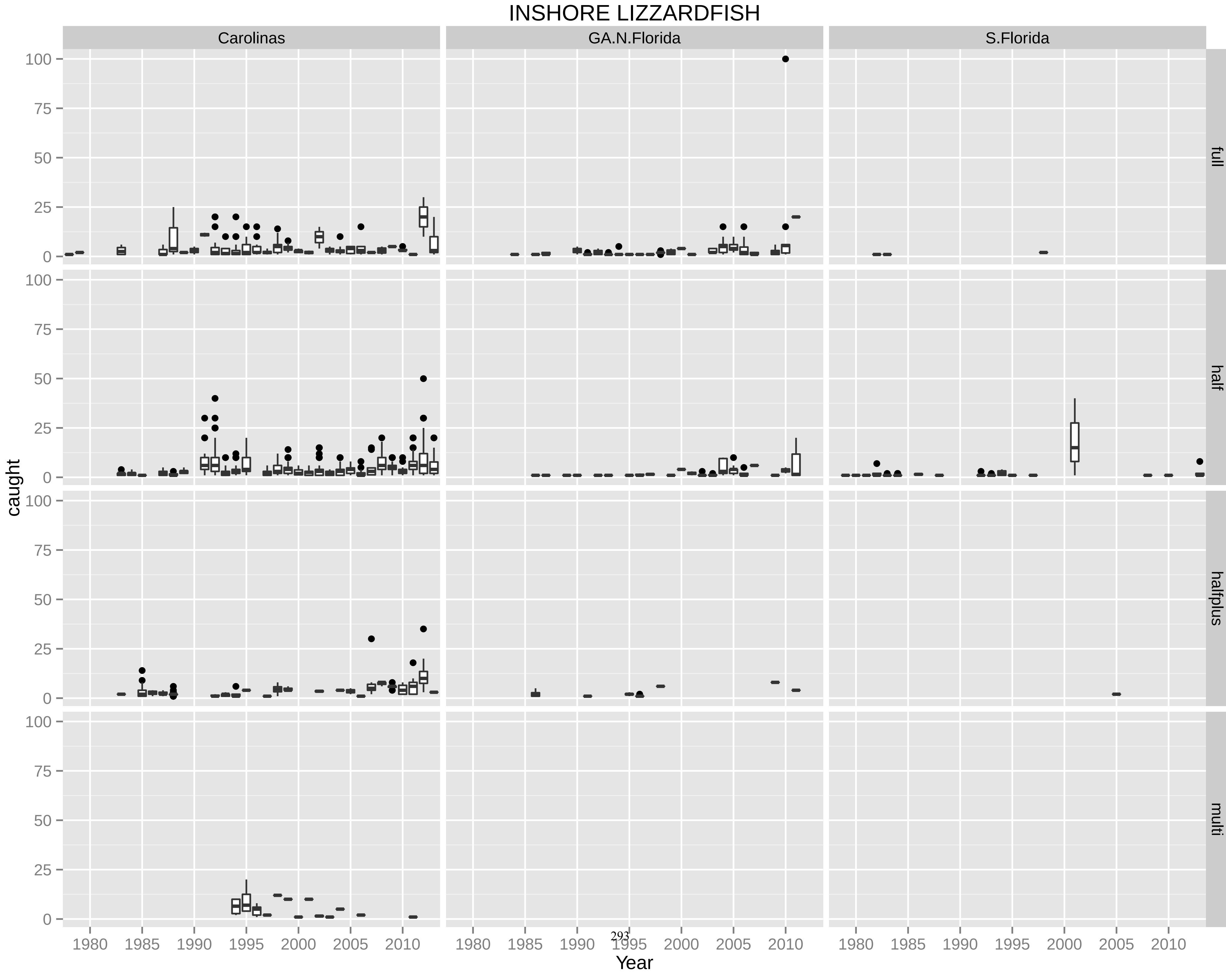

HOGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
20
40
60
80
1975
1980
1985
1990
1995
2000
2005
2010

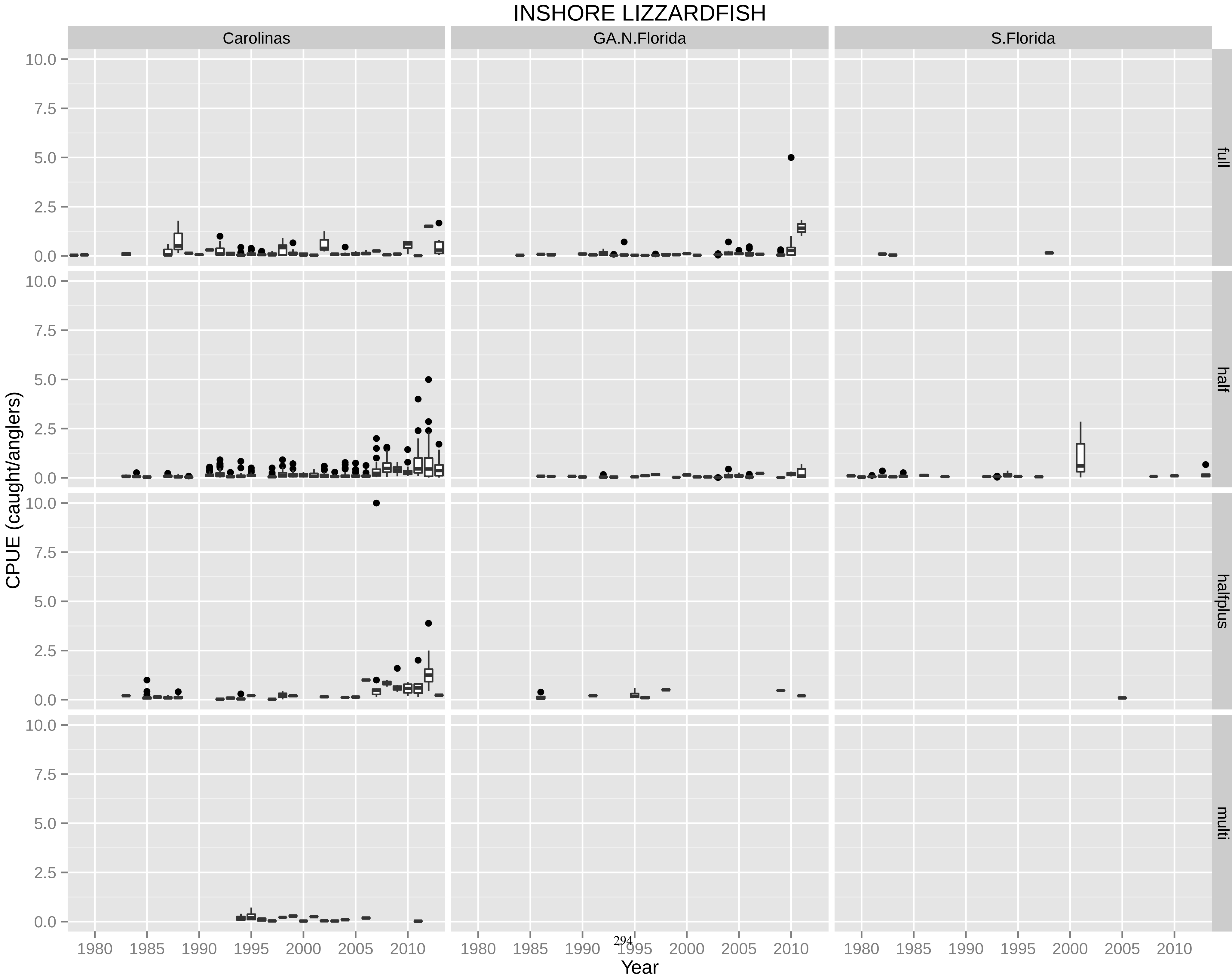

HOGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
0.5
1.0
1.5
2.0
2.5
1975
1980
1985
1990
1995
2000
2005
2010

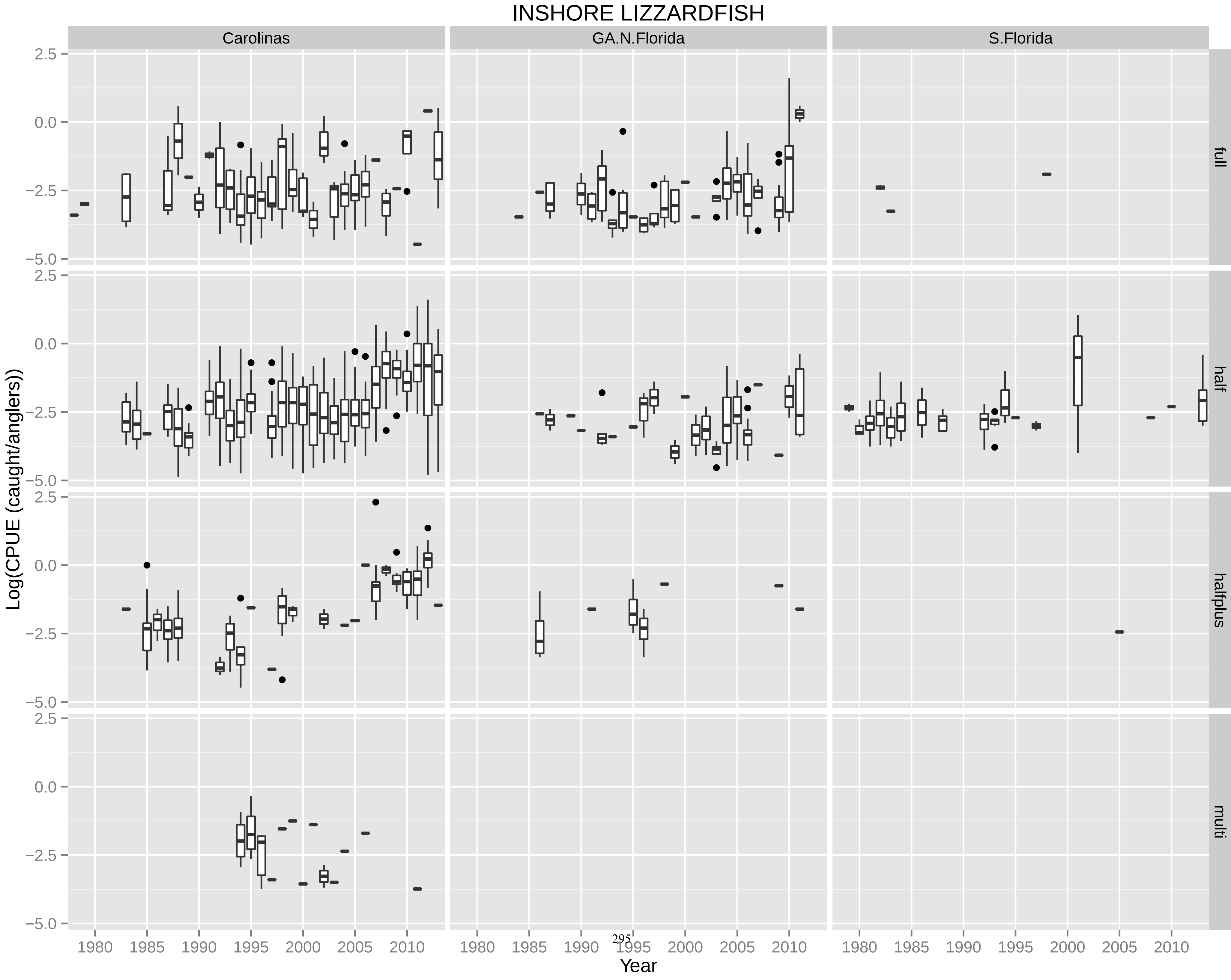


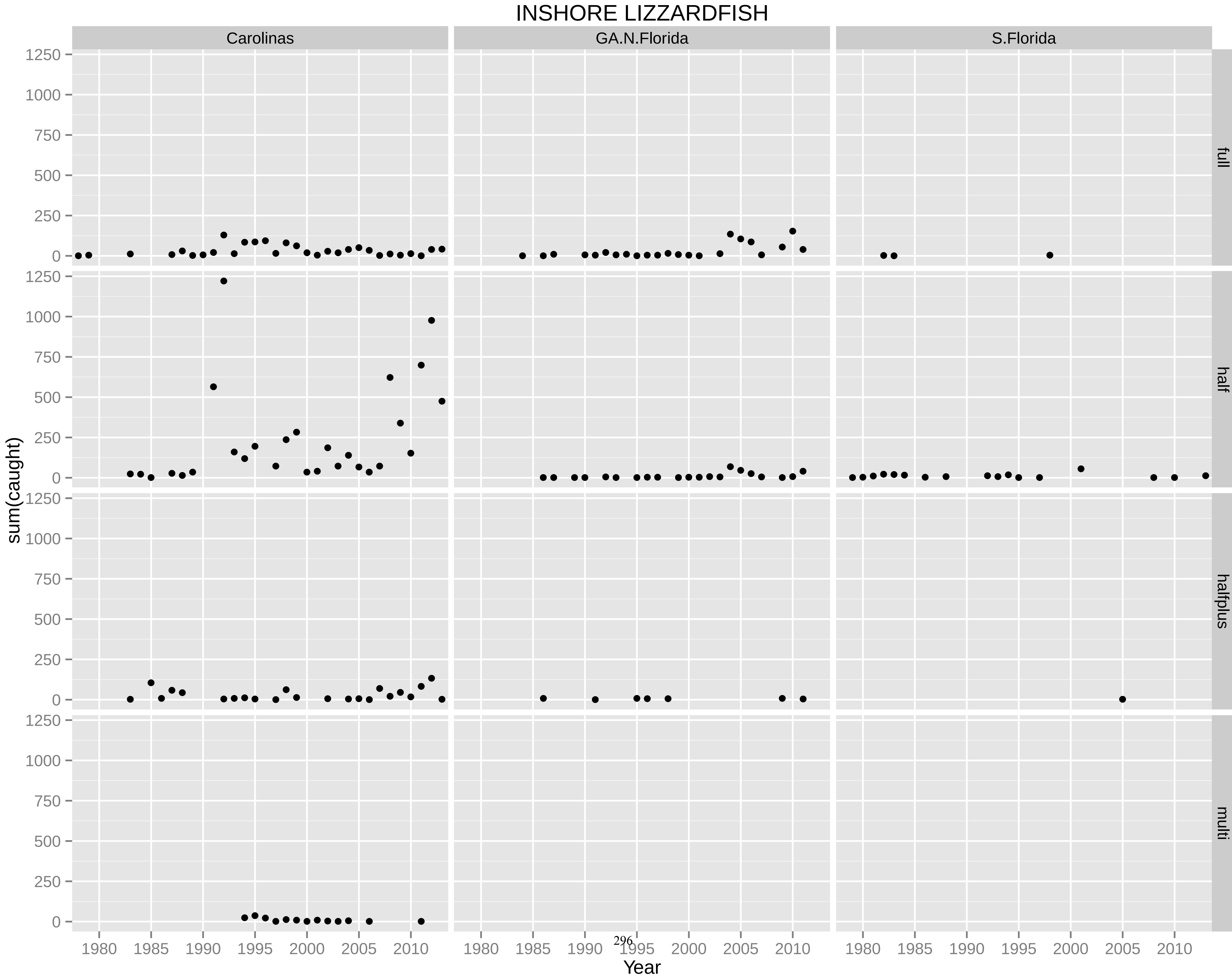
HOGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
1
0
−1
−2
−3
−4
−5
1975
1980
1985
1990
1995
2000
2005
2010

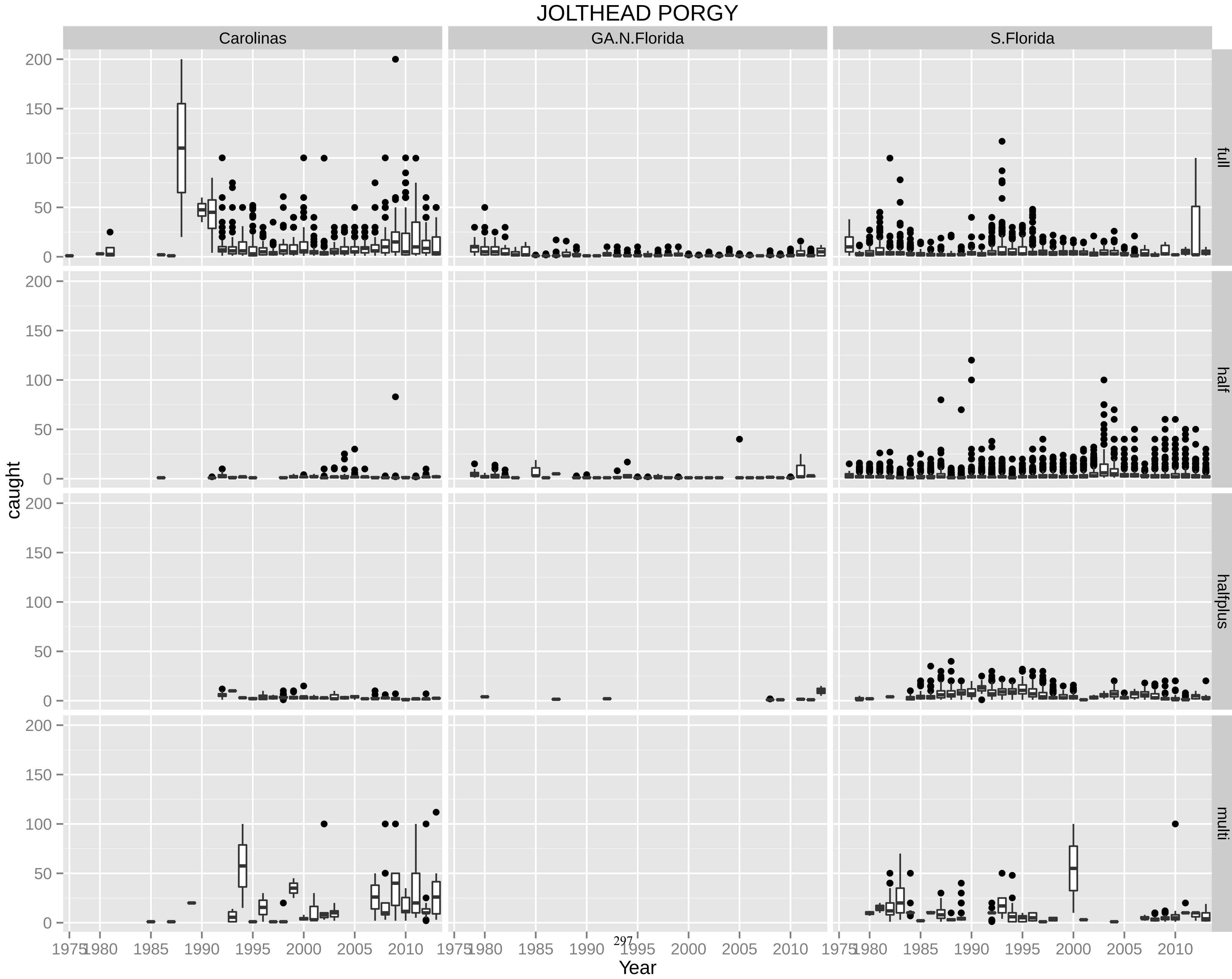

HOGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
100
200
300
400
1975
1980
1985
1990
1995
2000
2005
2010

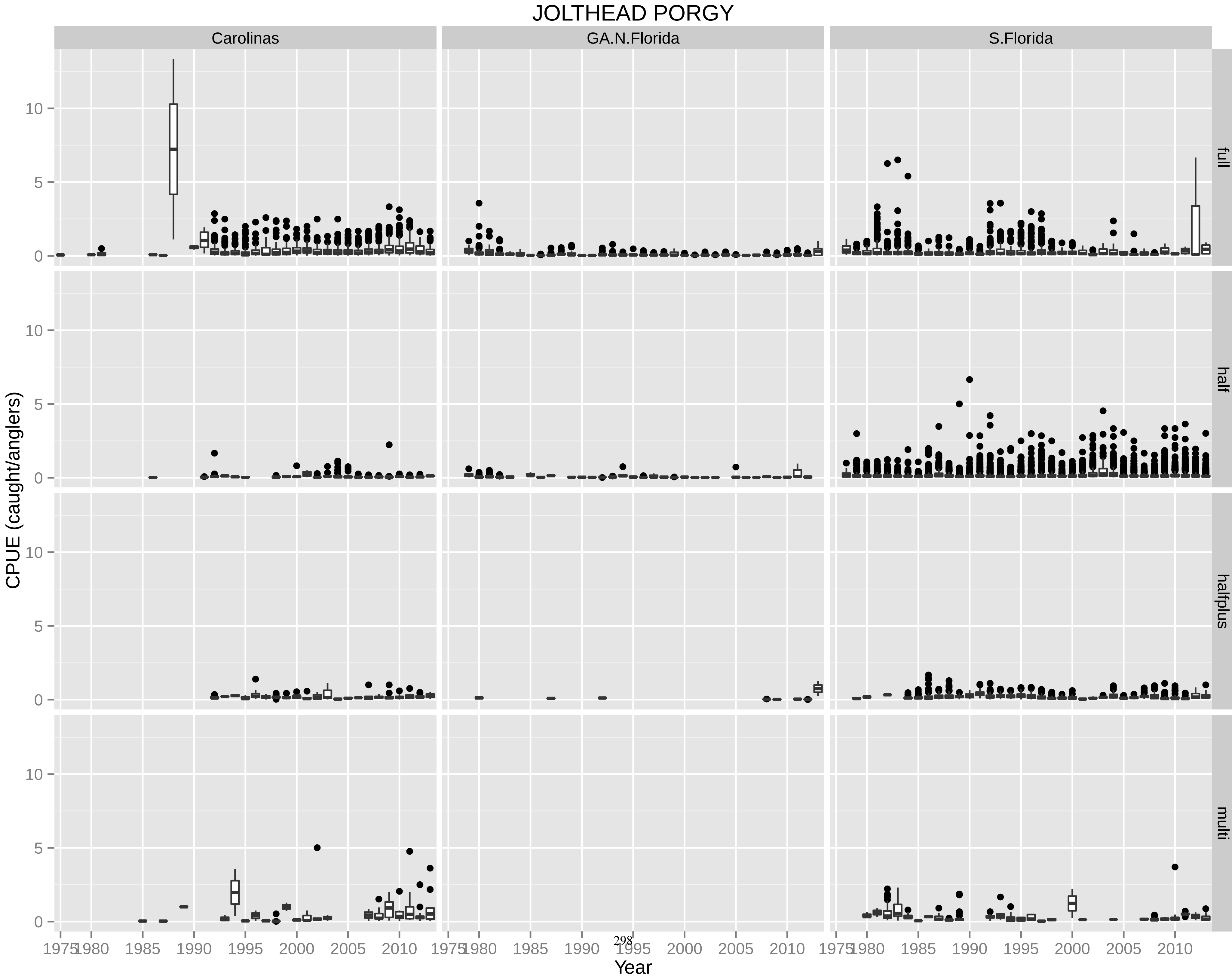

INSHORE LIZZARDFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
25
50
75
100
1980
1985
1990
1995
2000
2005
2010


INSHORE LIZZARDFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
2.5
5.0
7.5
10.0
1980
1985
1990
1995
2000
2005
2010

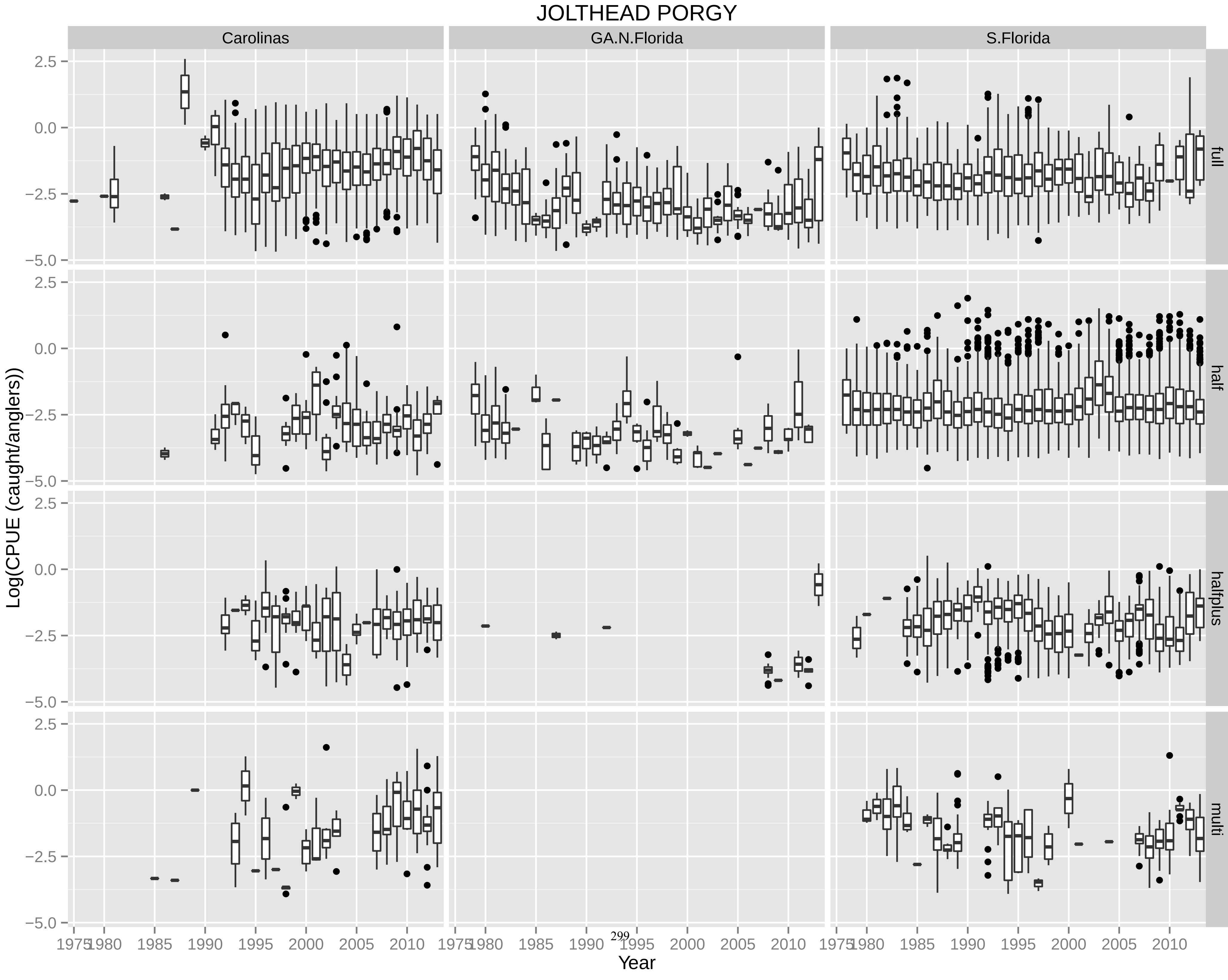

INSHORE LIZZARDFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1980
1985
1990
1995
2000
2005
2010


INSHORE LIZZARDFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
250
500
750
1000
1250
1980
1985
1990
1995
2000
2005
2010

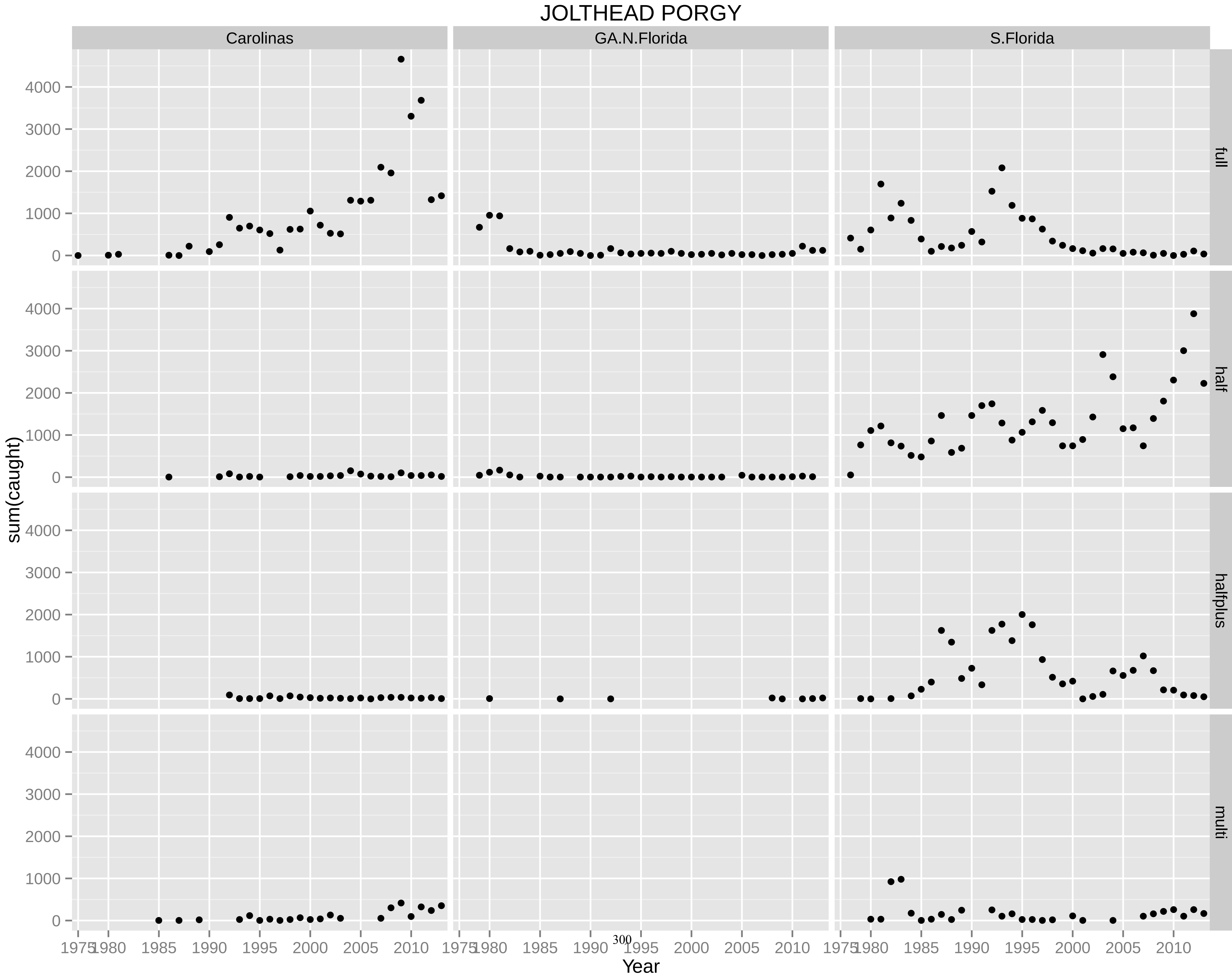

JOLTHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
200
1975
1980
1985
1990
1995
2000
2005
2010



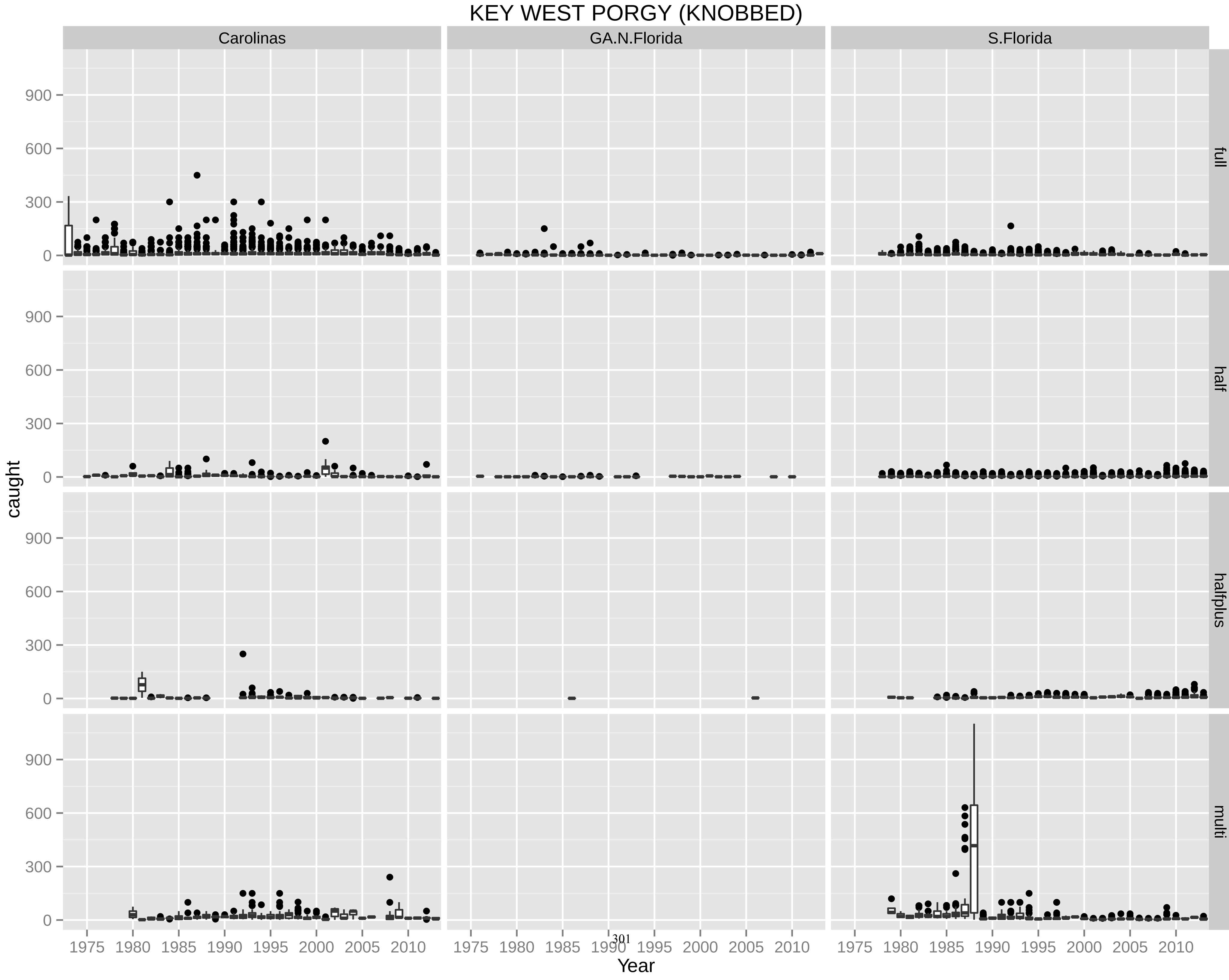
JOLTHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
1975
1980
1985
1990
1995
2000
2005
2010

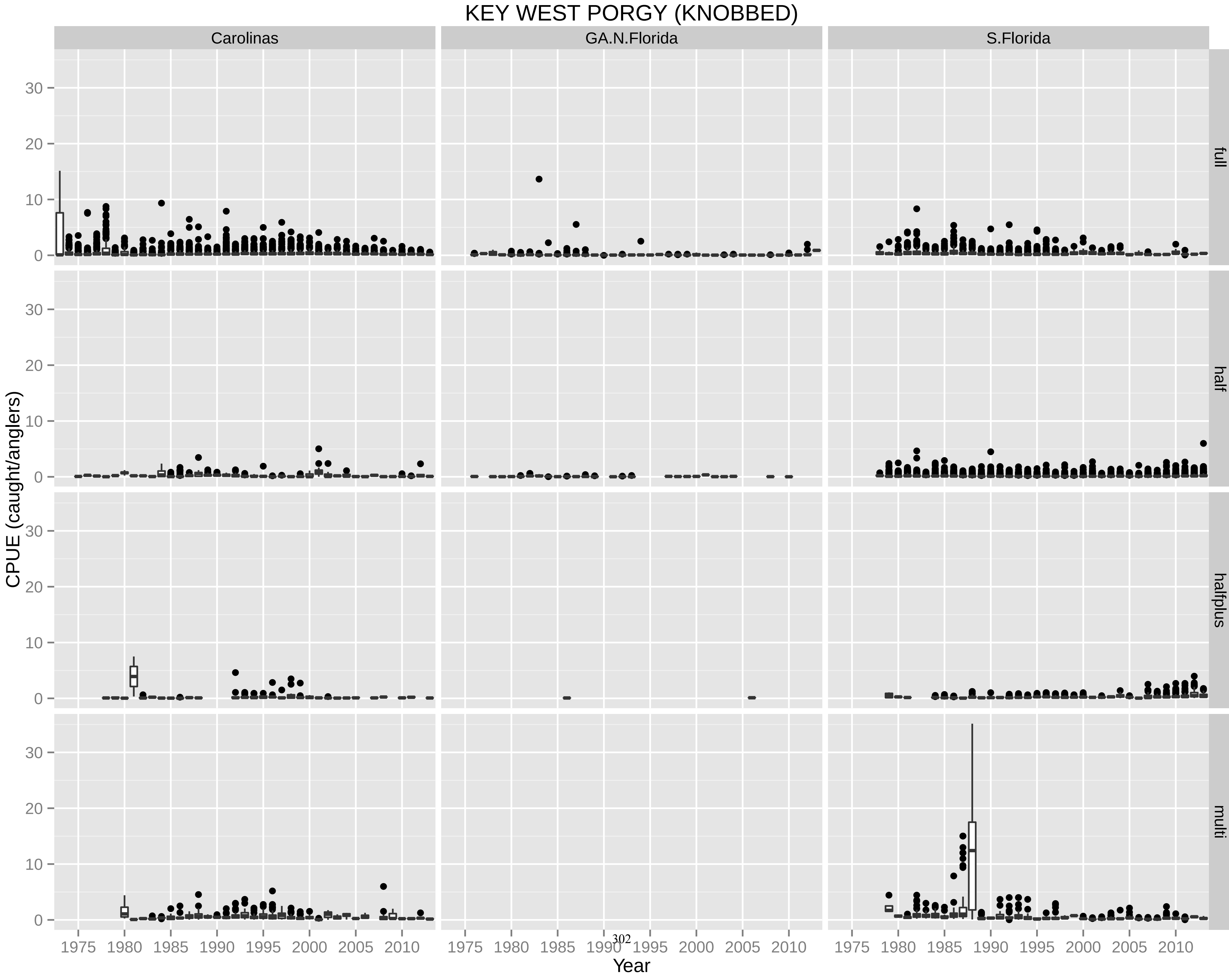


JOLTHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
2.5
0.0
−2.5
−5.0
Log(CPUE (caught/anglers))
1975
1980
1985
1990
1995
2000
2005
2010
Year

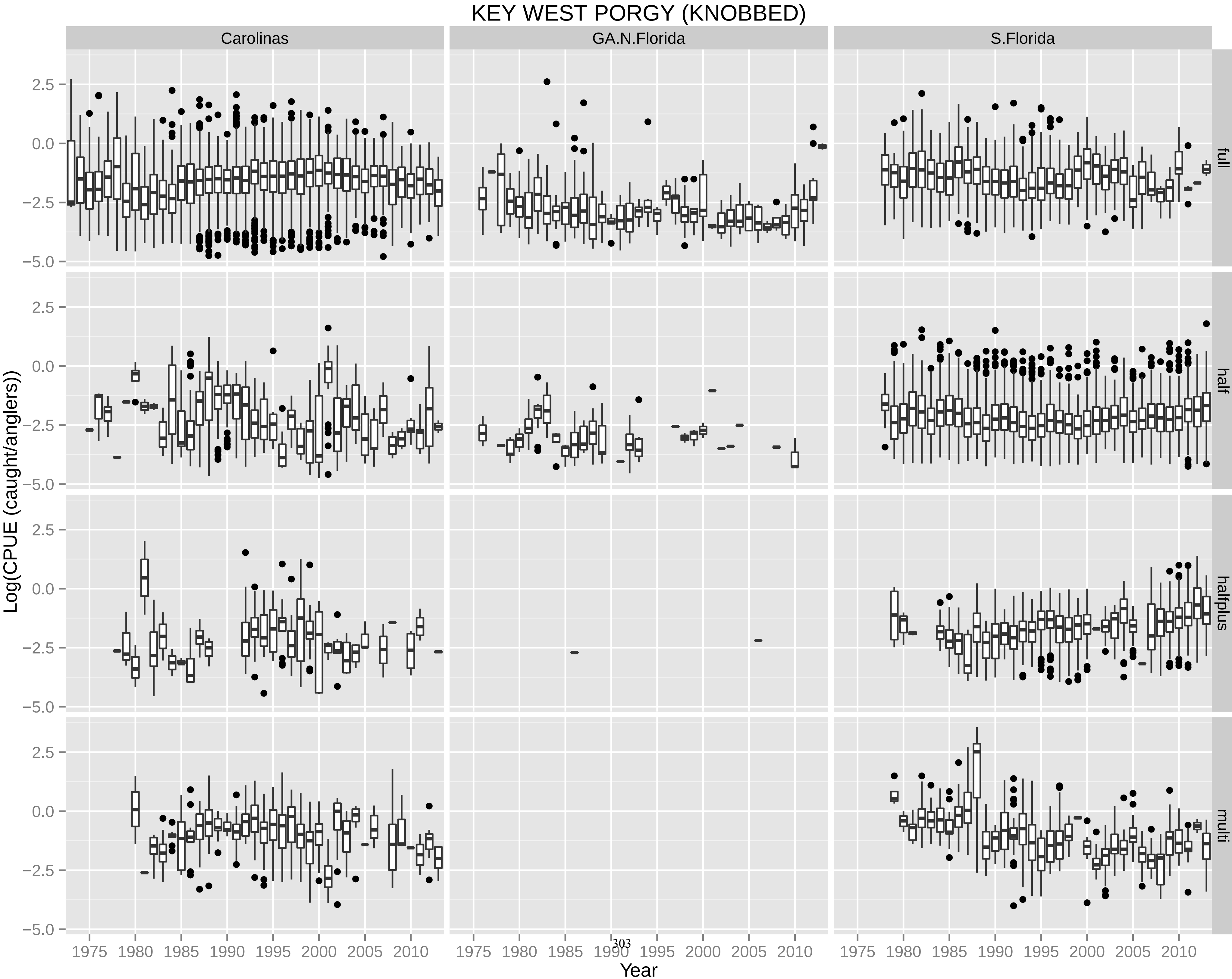


JOLTHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
1000
2000
3000
4000
1975
1980
1985
1990
1995
2000
2005
2010

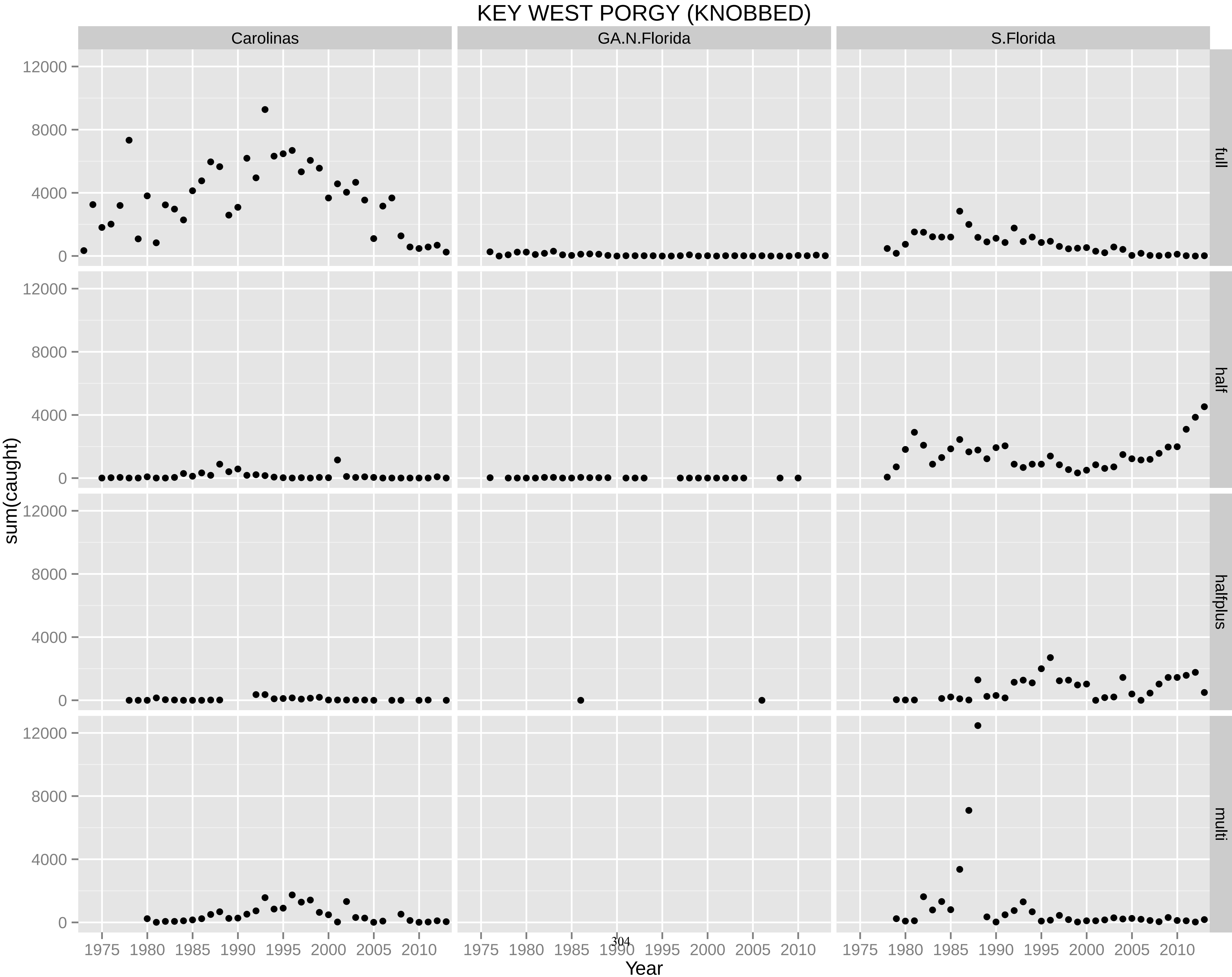

KEY WEST PORGY (KNOBBED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
0
300
600
900
1975
1980
1985
1990
1995
2000
2005
2010
Year

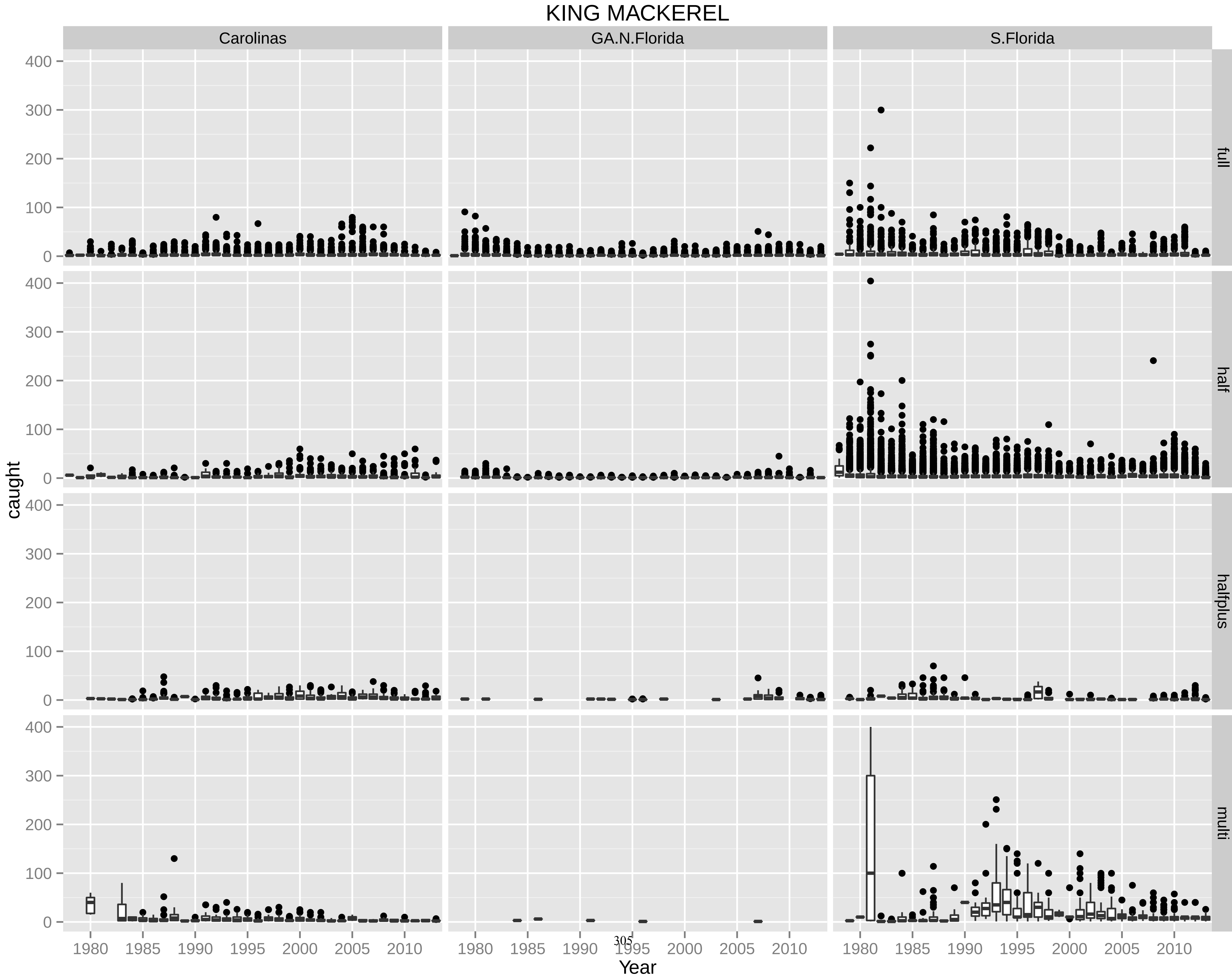


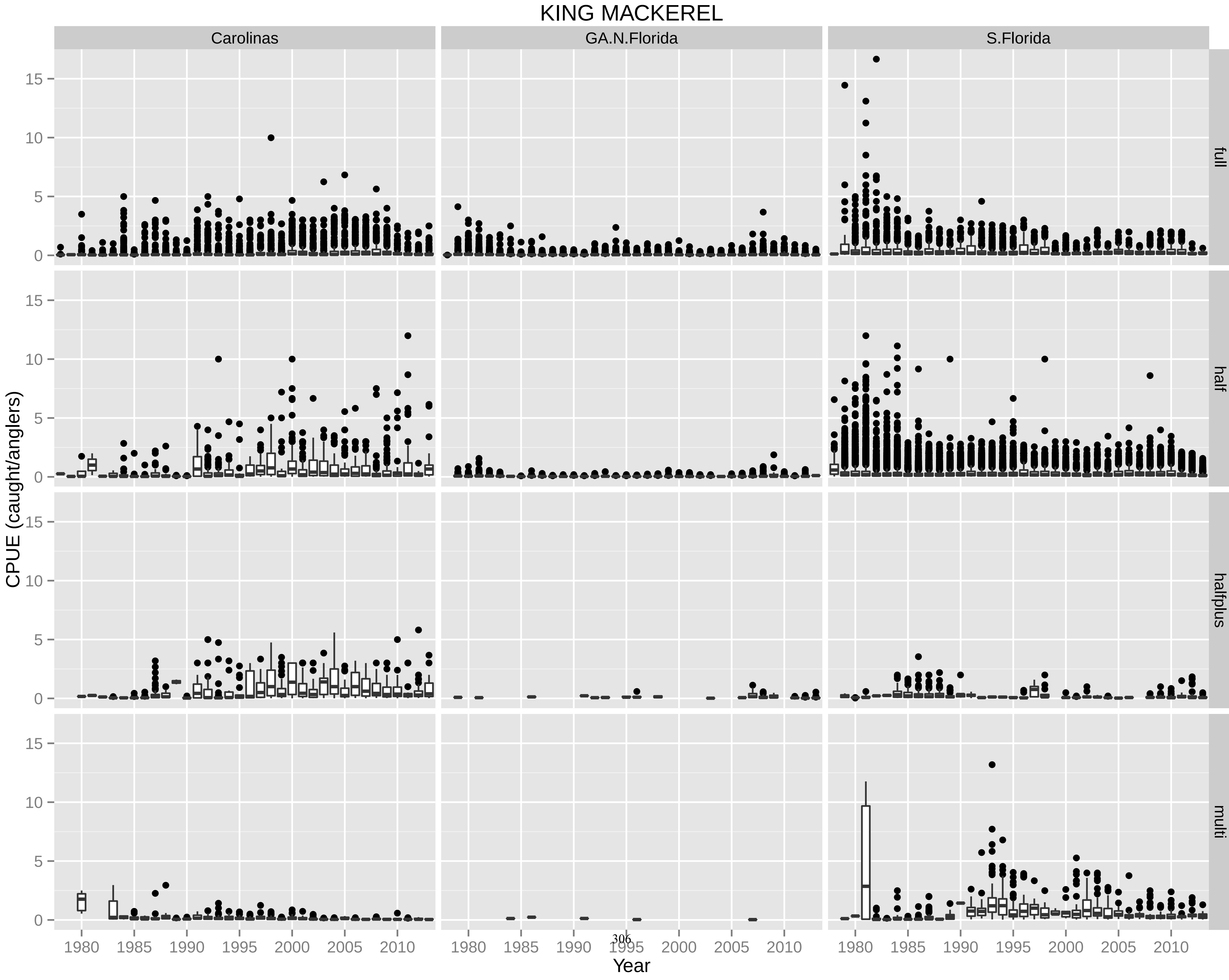
KEY WEST PORGY (KNOBBED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0
10
20
30
1975
1980
1985
1990
1995
2000
2005
2010
Year

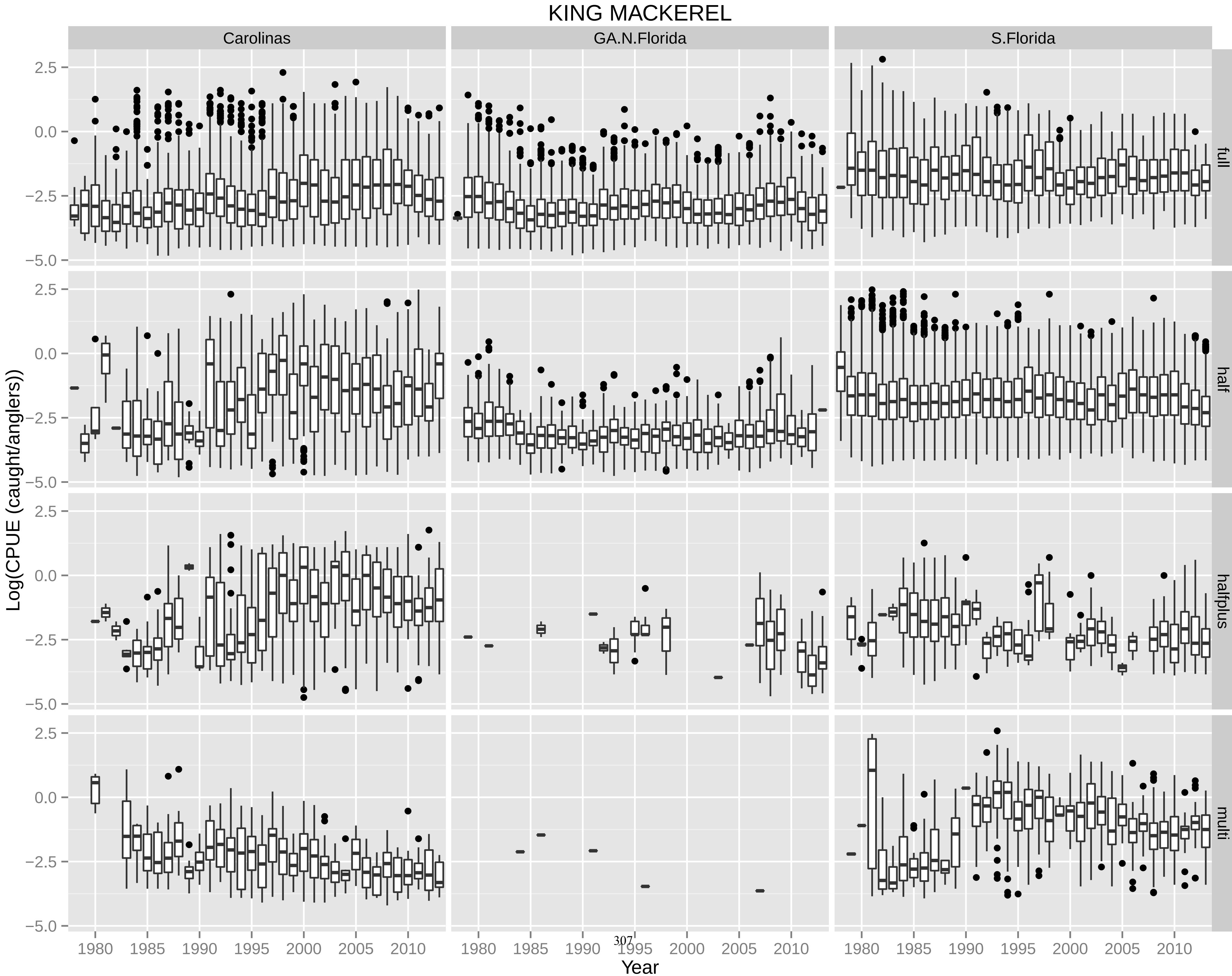


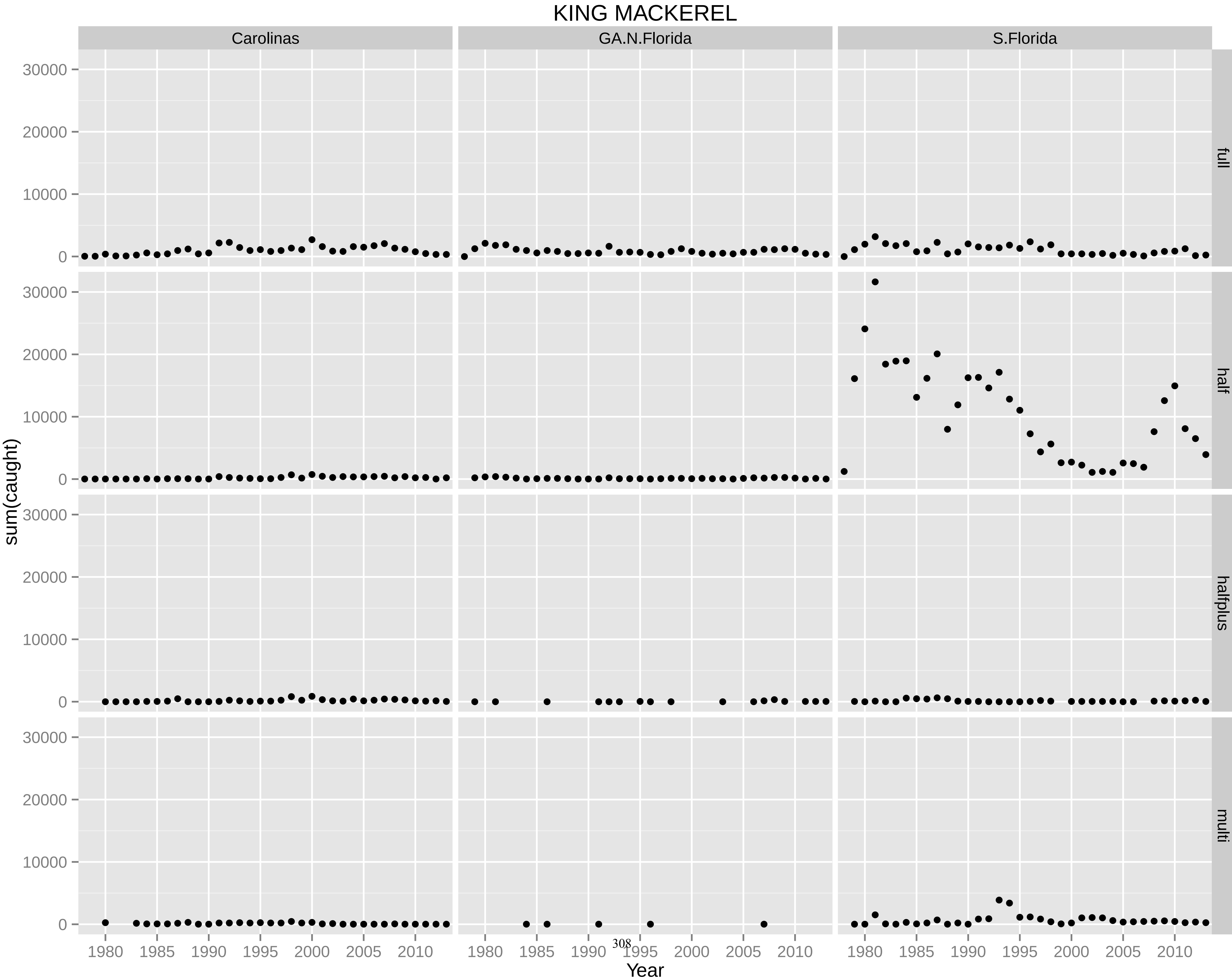
KEY WEST PORGY (KNOBBED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010

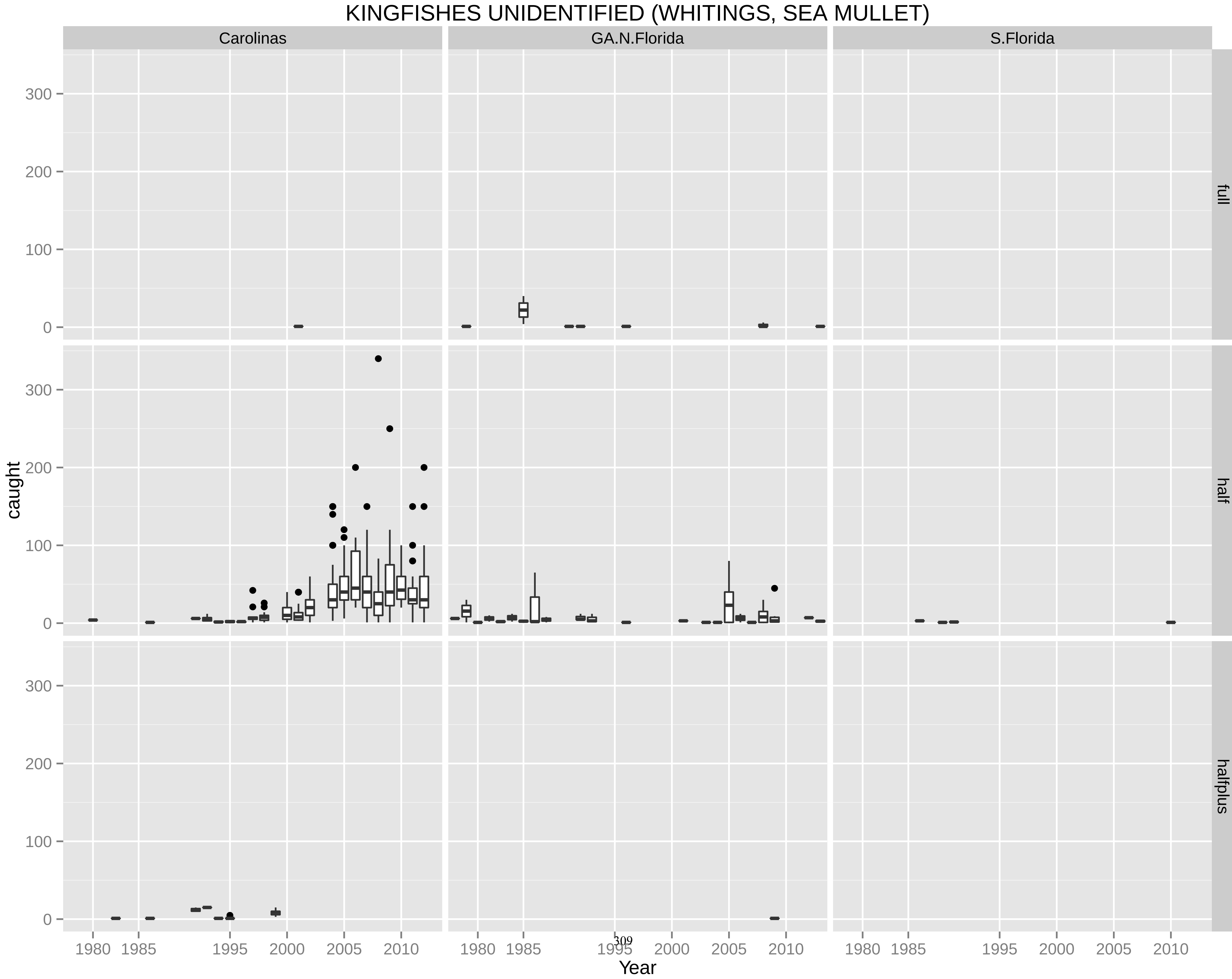

KEY WEST PORGY (KNOBBED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
4000
8000
12000
1975
1980
1985
1990
1995
2000
2005
2010

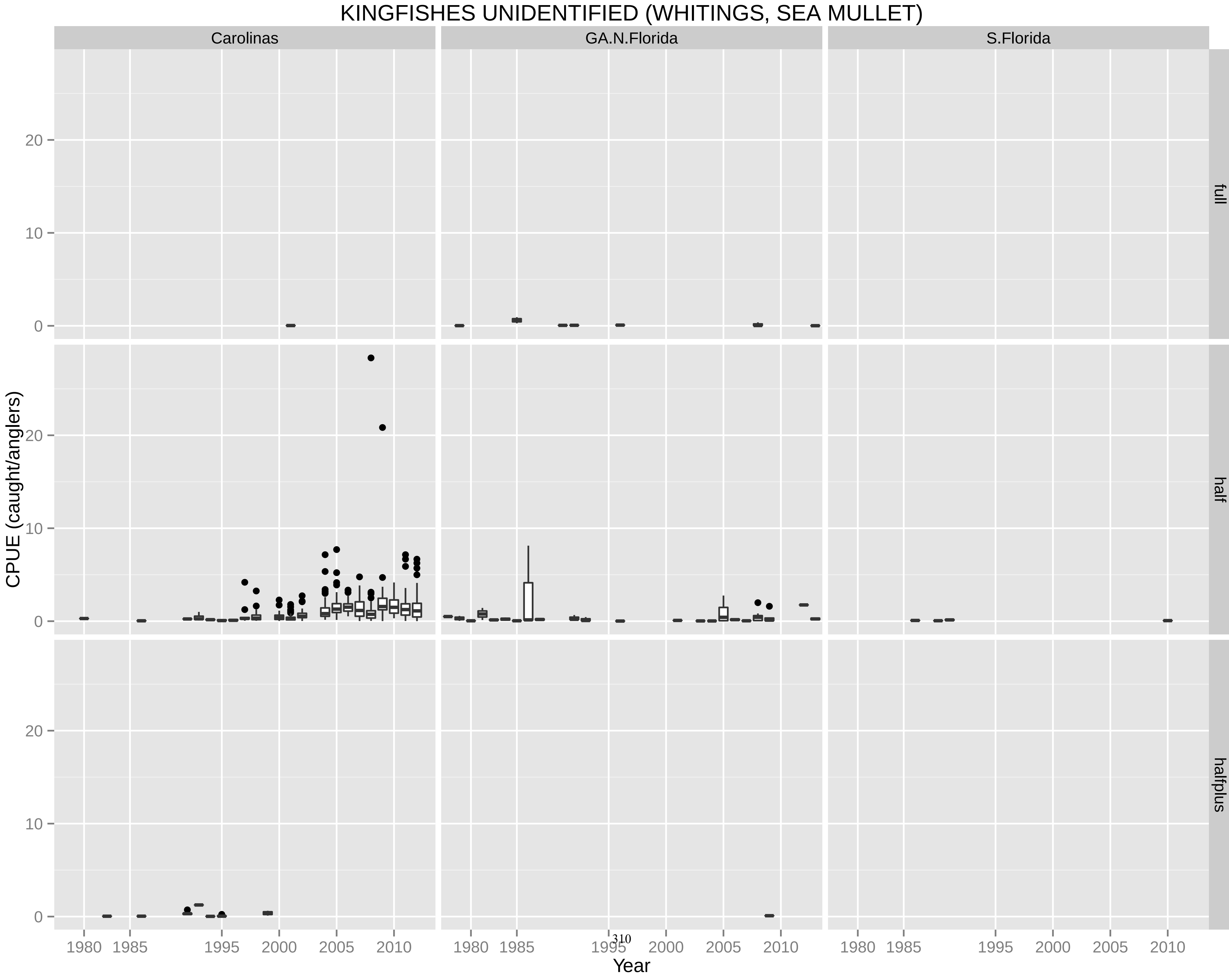

KING MACKEREL
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
400
1980
1985
1990
1995
2000
2005
2010

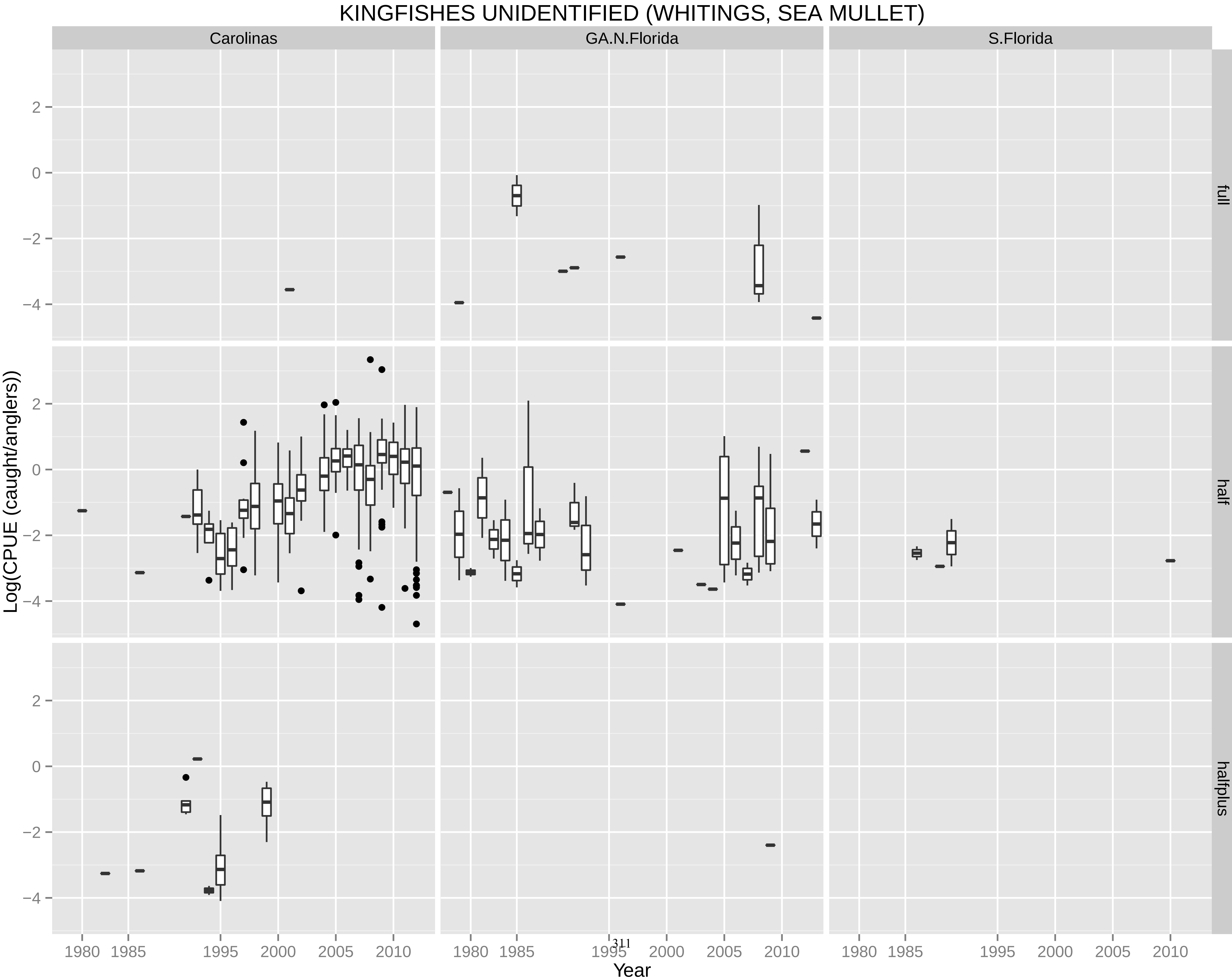

KING MACKEREL
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
1980
1985
1990
1995
2000
2005
2010

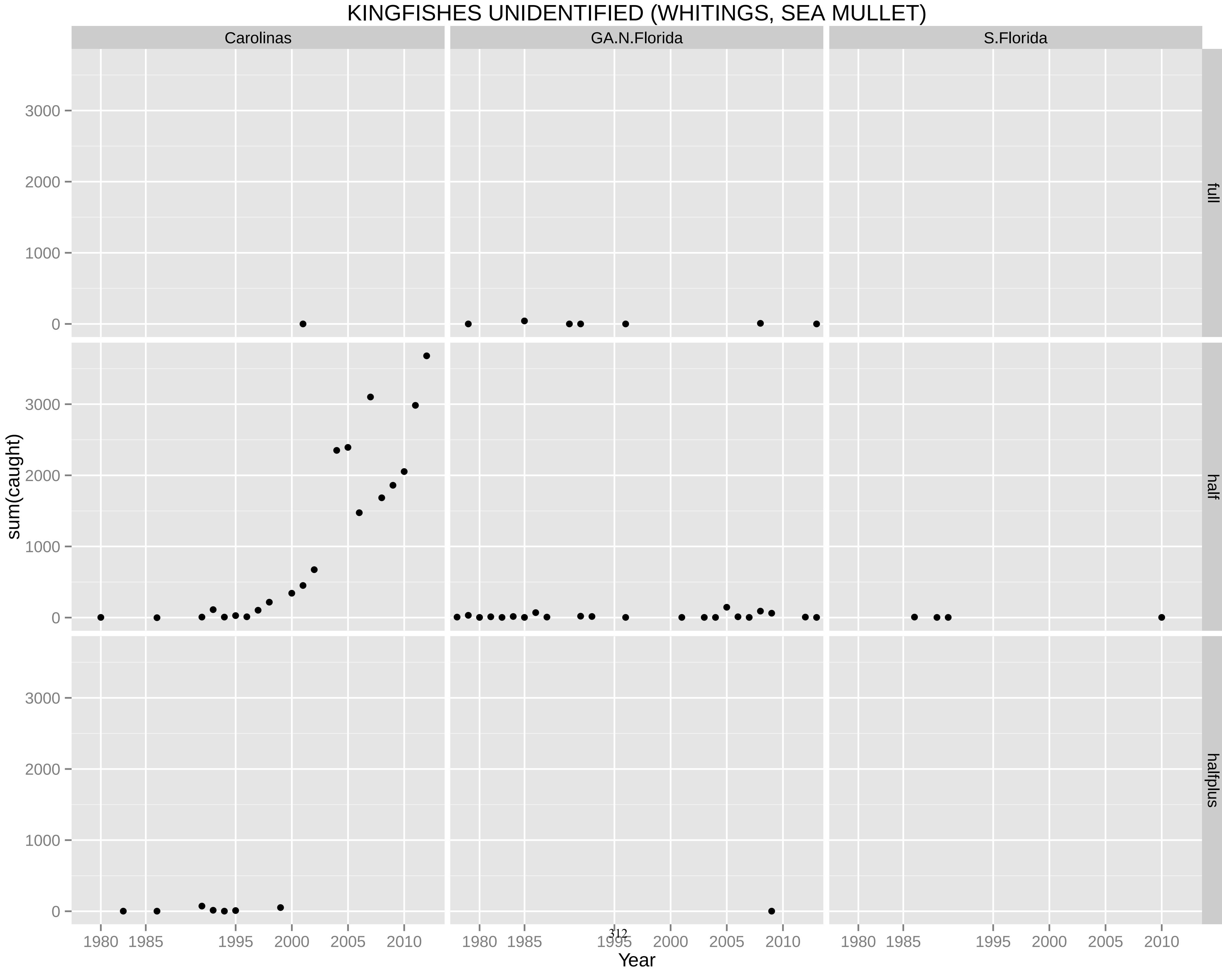

KING MACKEREL
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
2.5
0.0
−2.5
−5.0
Log(CPUE (caught/anglers))
1980
1985
1990
1995
2000
2005
2010
Year

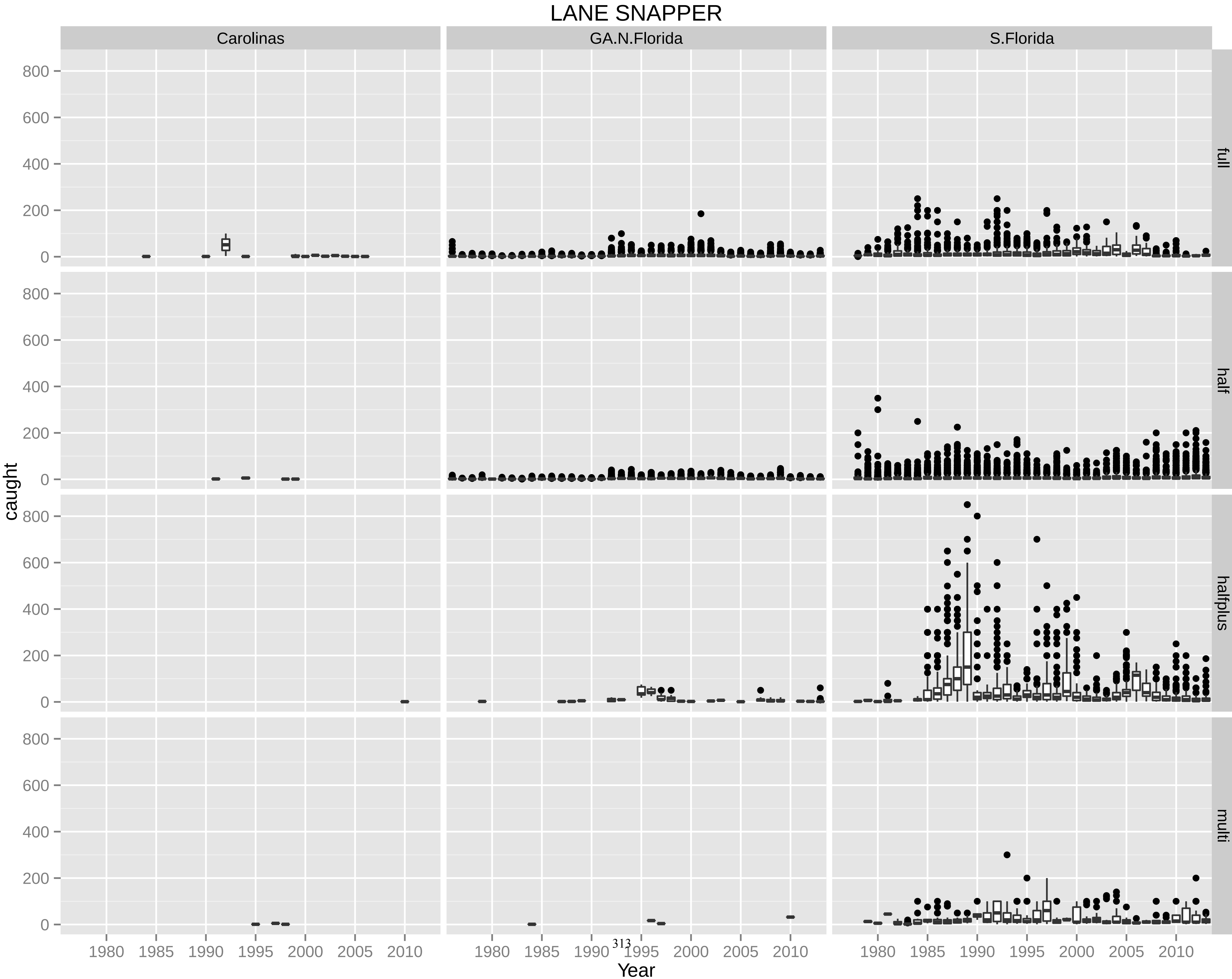

KING MACKEREL
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
30000
20000
10000
0
1980
1985
1990
1995
2000
2005
2010


KINGFISHES UNIDENTIFIED (WHITINGS, SEA MULLET)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
caught
Year
0
100
200
300
1980
1985
1995
2000
2005
2010

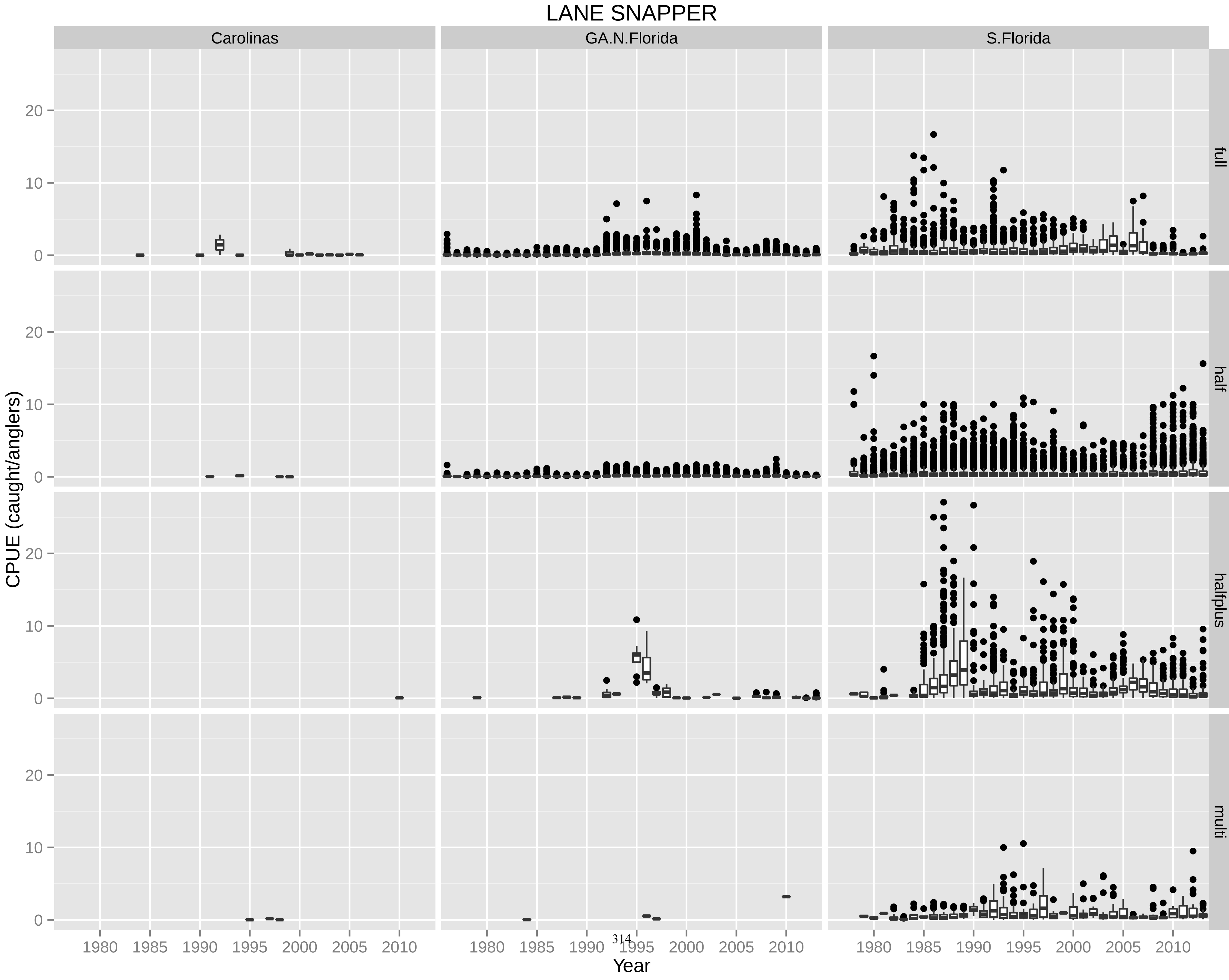

KINGFISHES UNIDENTIFIED (WHITINGS, SEA MULLET)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
CPUE (caught/anglers)
0
10
20
1980
1985
1995
2000
2005
2010
Year

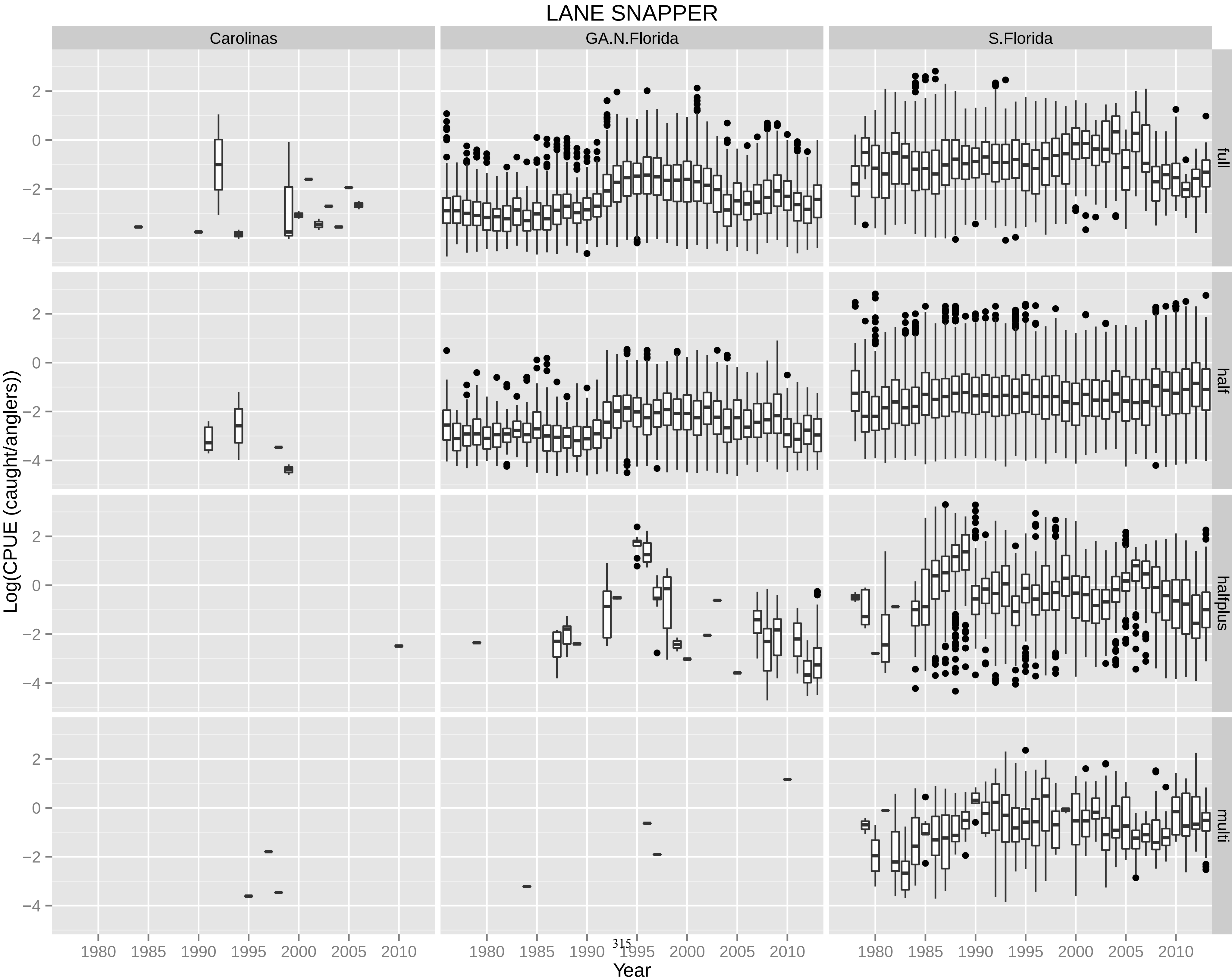

KINGFISHES UNIDENTIFIED (WHITINGS, SEA MULLET)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1980
1985
1995
2000
2005
2010


KINGFISHES UNIDENTIFIED (WHITINGS, SEA MULLET)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
sum(caught)
0
1000
2000
3000
1980
1985
1995
2000
2005
2010
Year

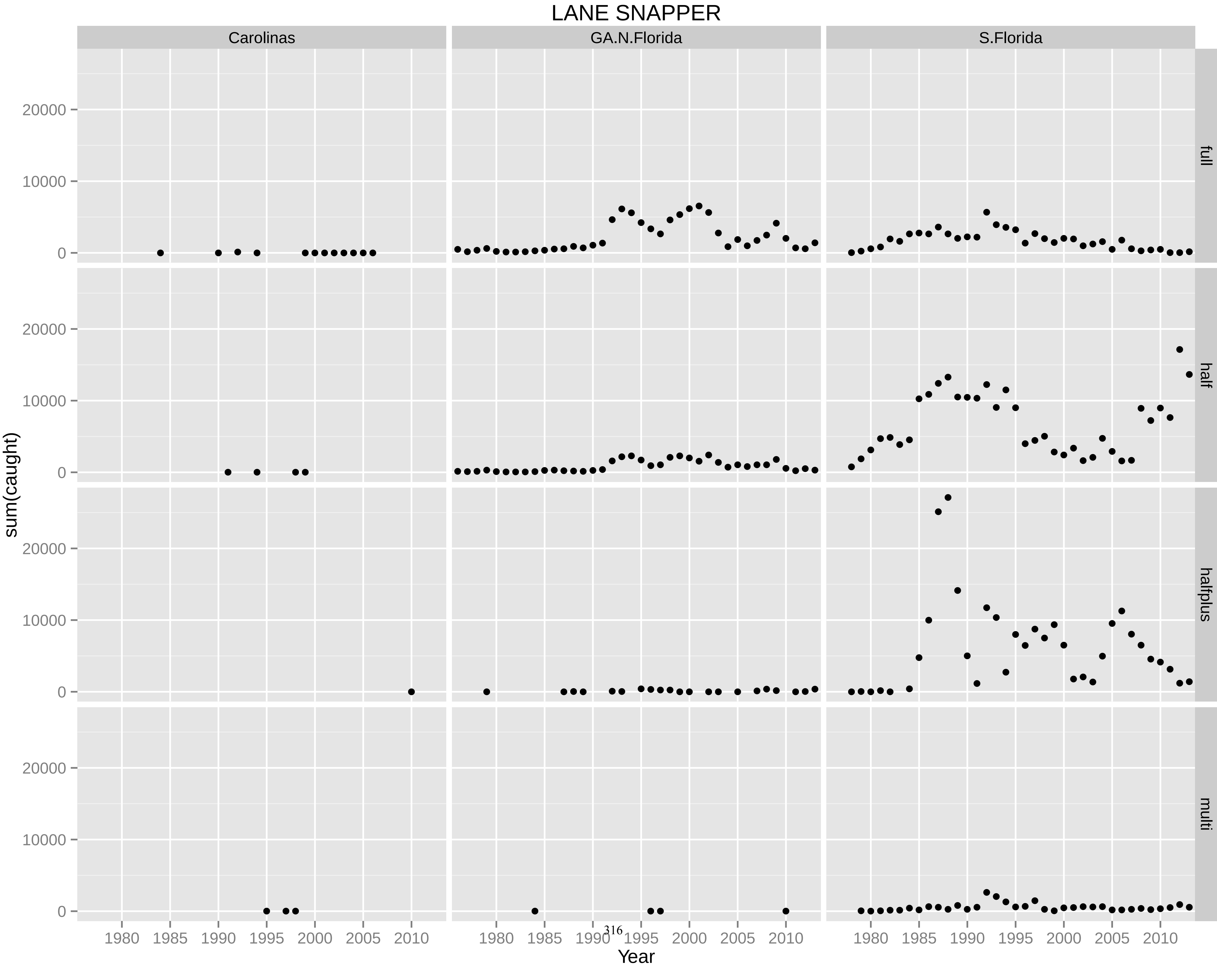


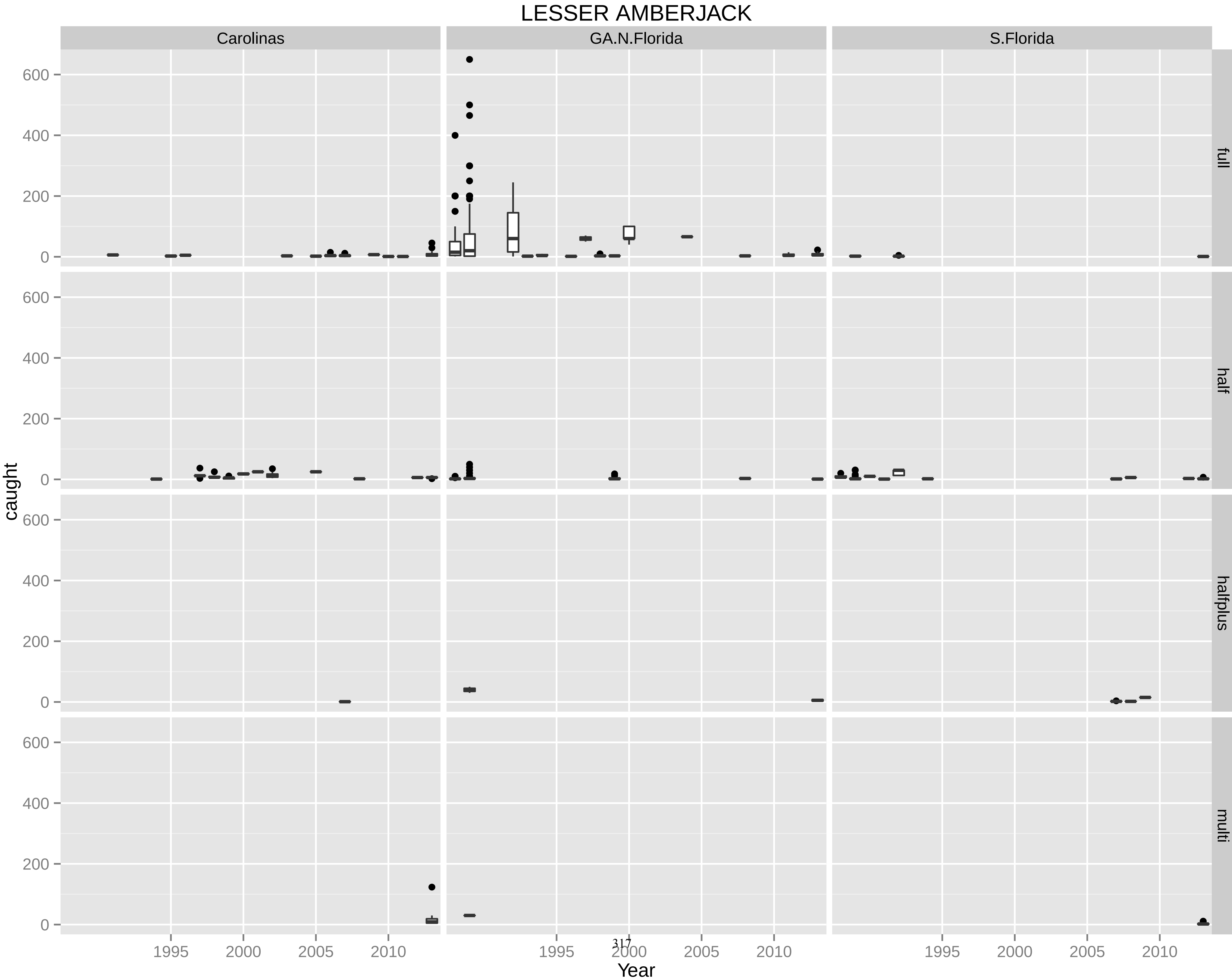
LANE SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
0
200
400
600
800
1980
1985
1990
1995
2000
2005
2010
Year

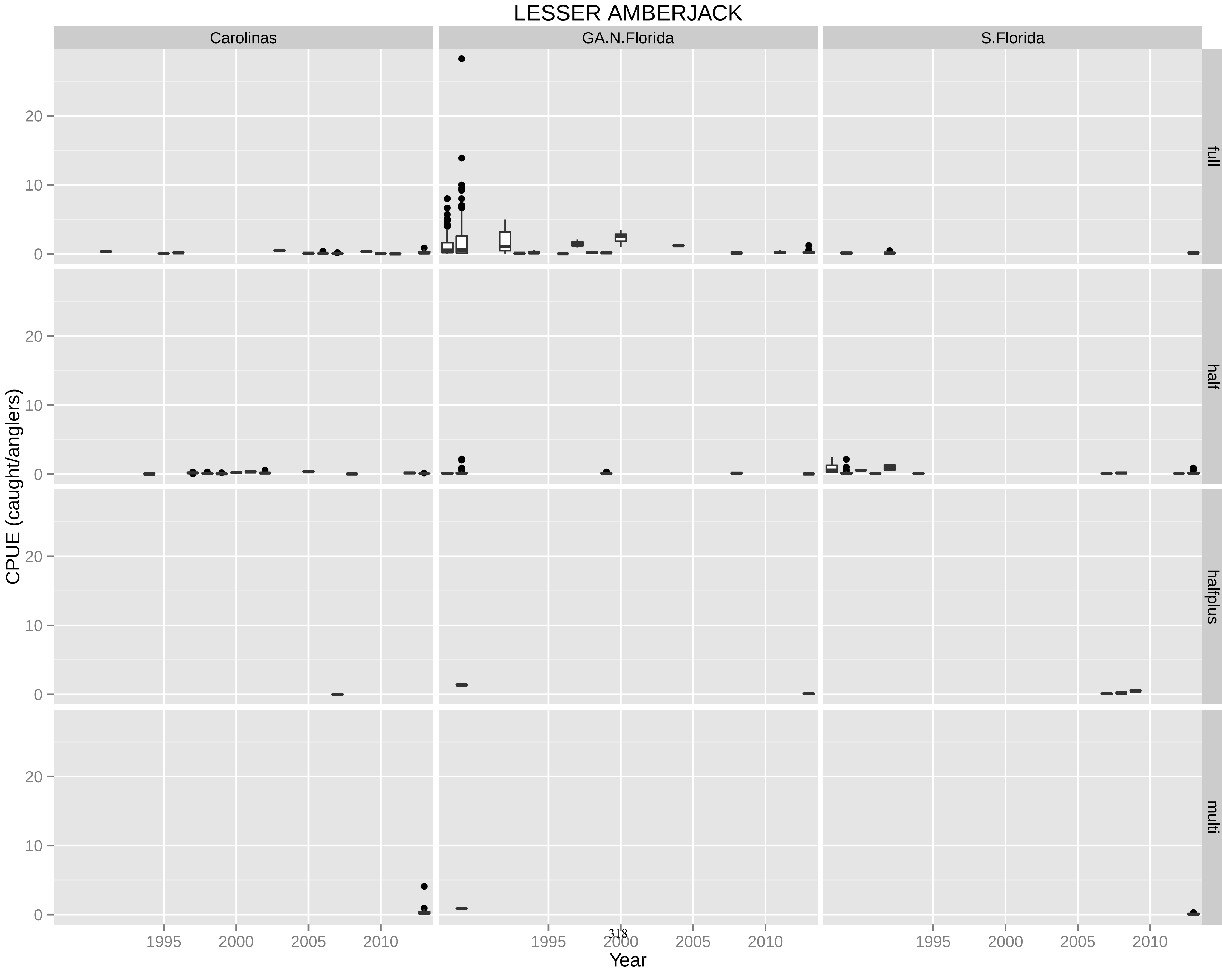

LANE SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
10
20
1980
1985
1990
1995
2000
2005
2010

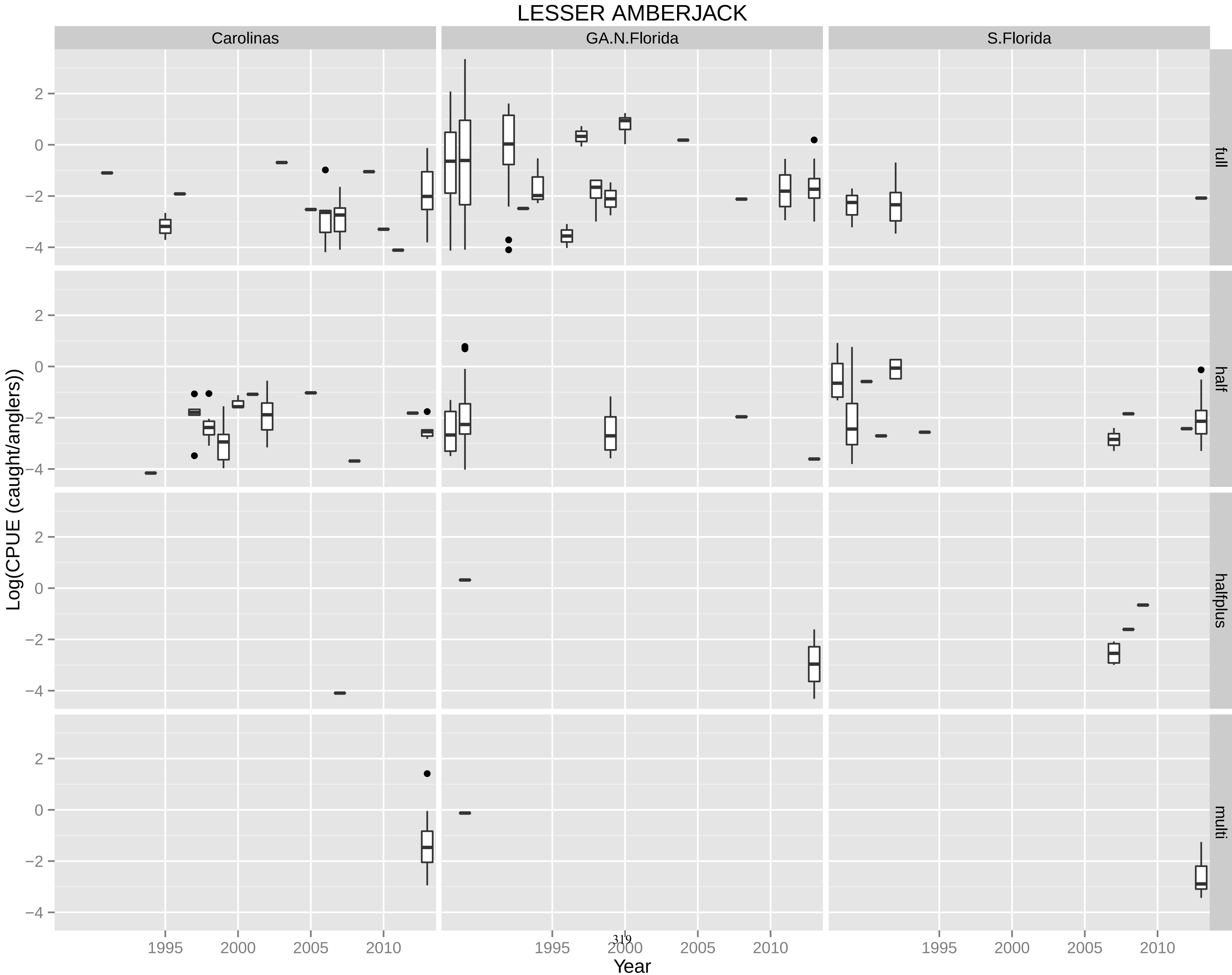


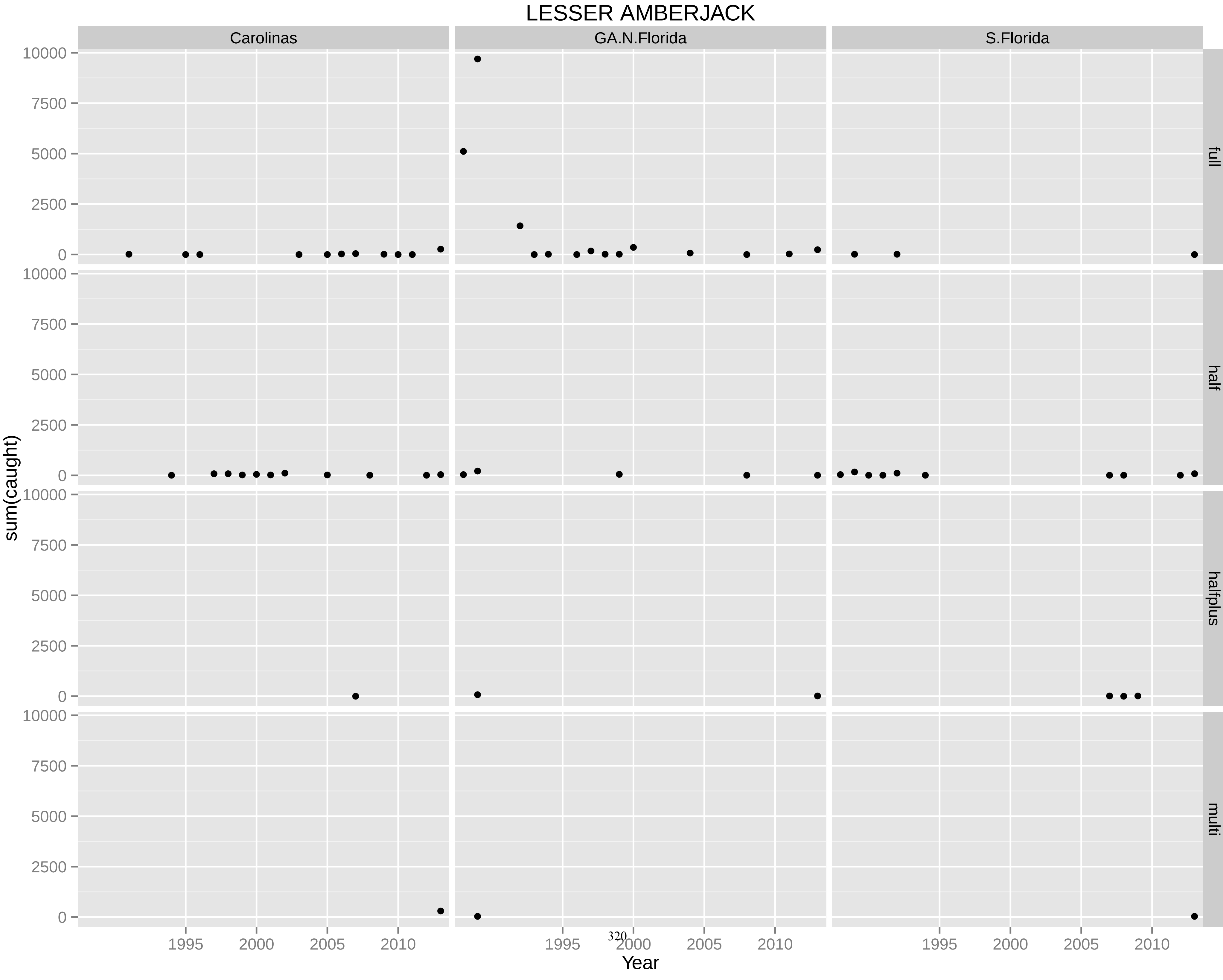
LANE SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year


LANE SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
10000
20000
1980
1985
1990
1995
2000
2005
2010

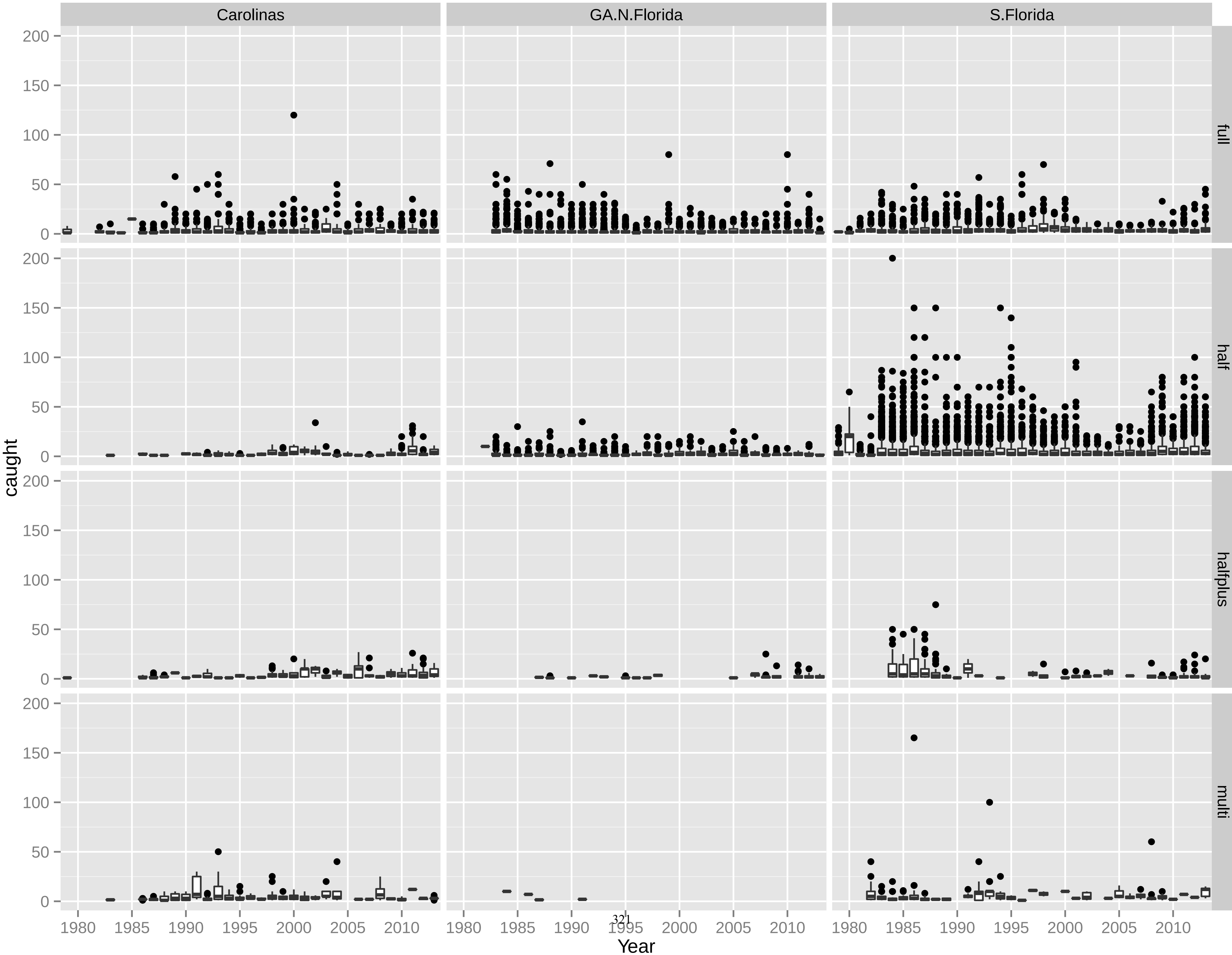

LESSER AMBERJACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
0
200
400
600
1995
2000
2005
2010
Year

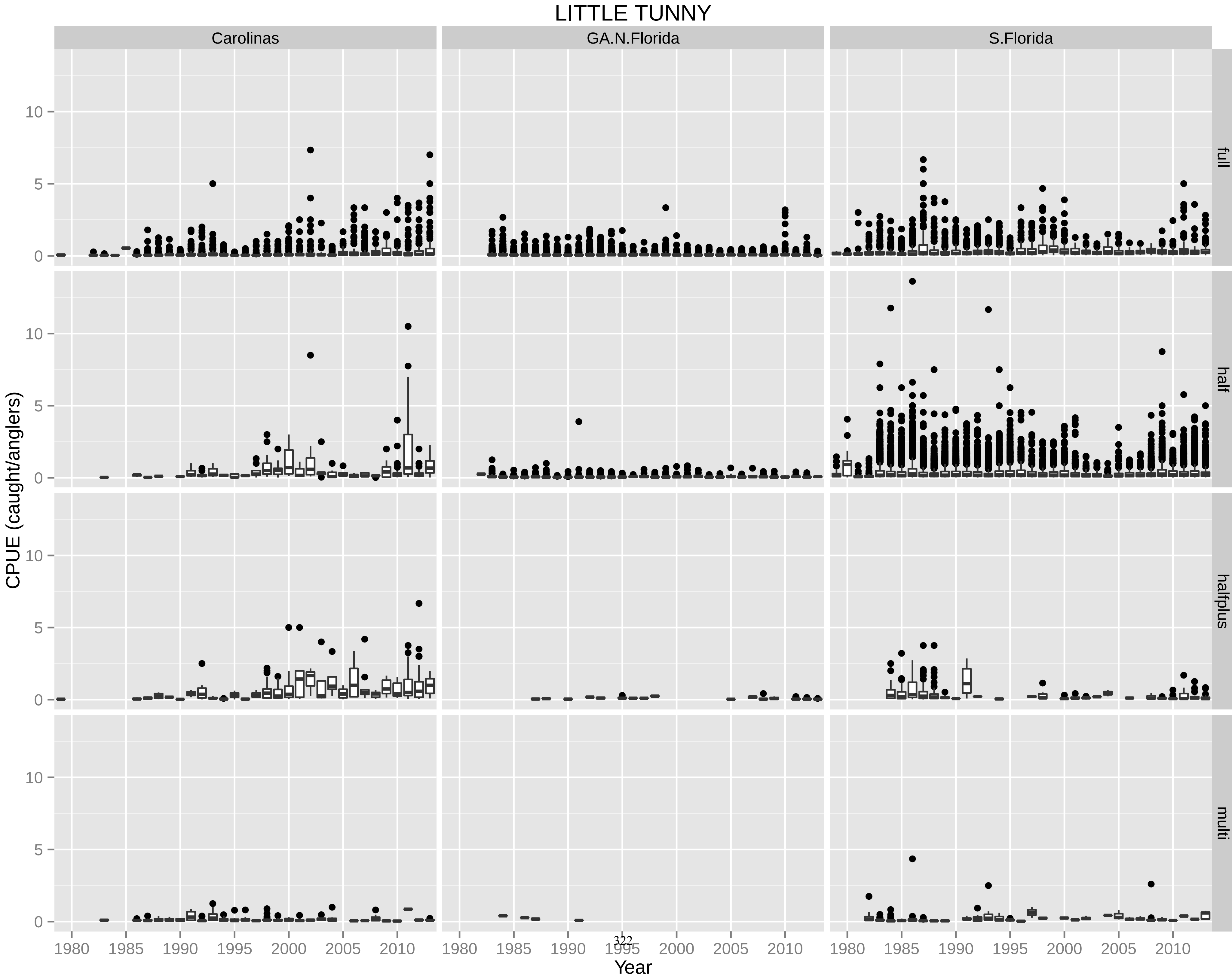

LESSER AMBERJACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
10
20
1995
2000
2005
2010

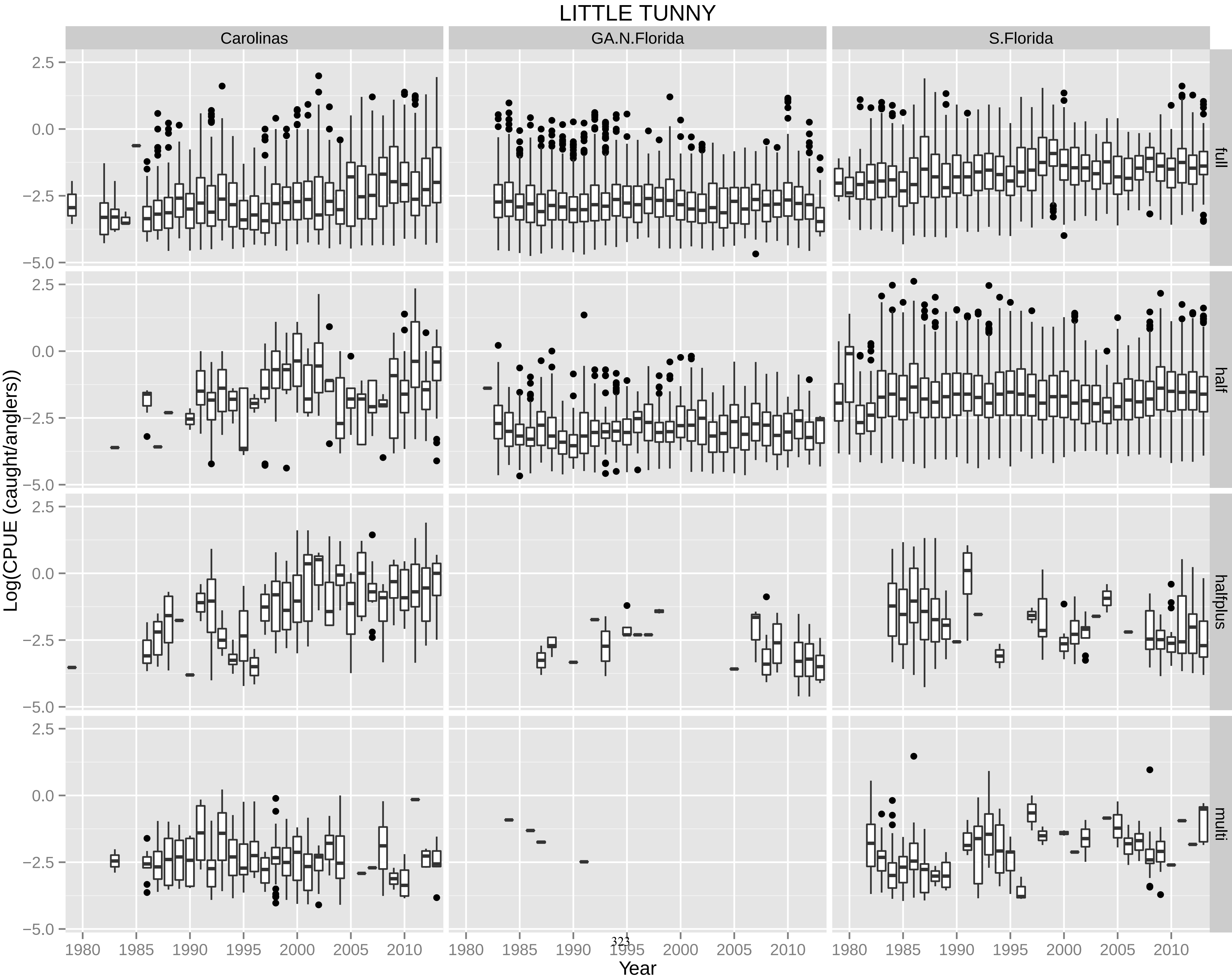

LESSER AMBERJACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1995
2000
2005
2010

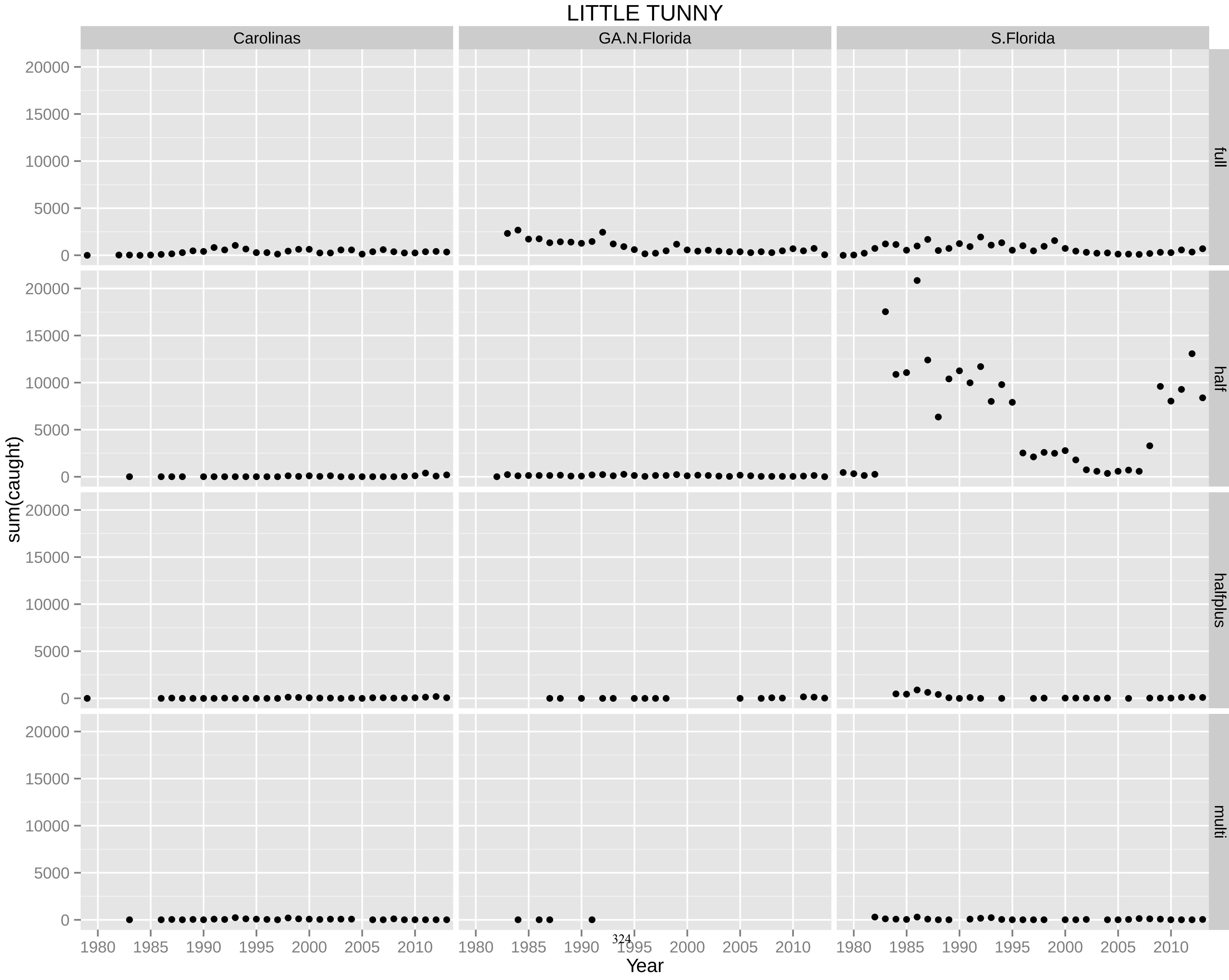

LESSER AMBERJACK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
10000
7500
5000
2500
0
1995
2000
2005
2010
Year

LITTLE TUNNY

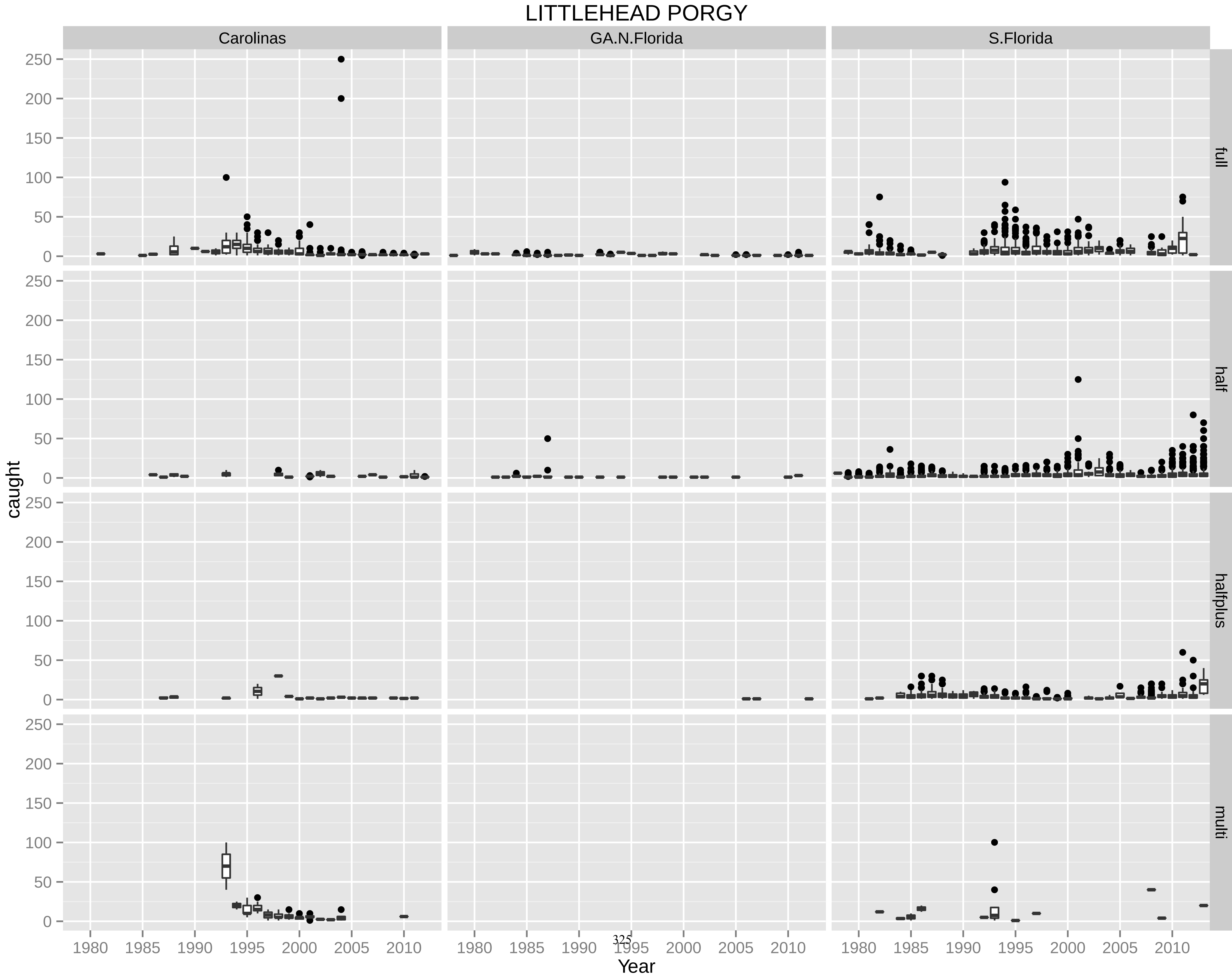


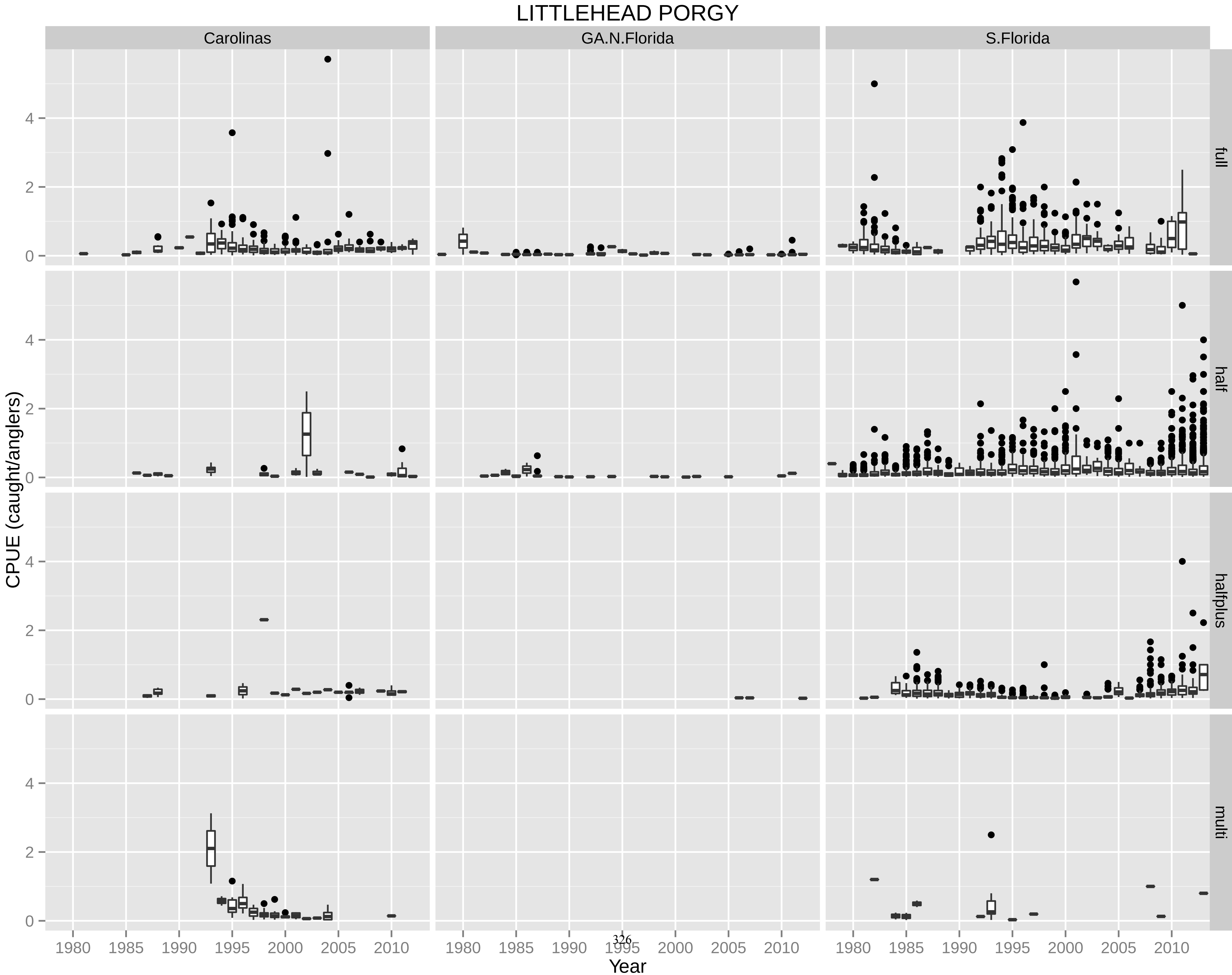

LITTLE TUNNY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
1980
1985
1990
1995
2000
2005
2010

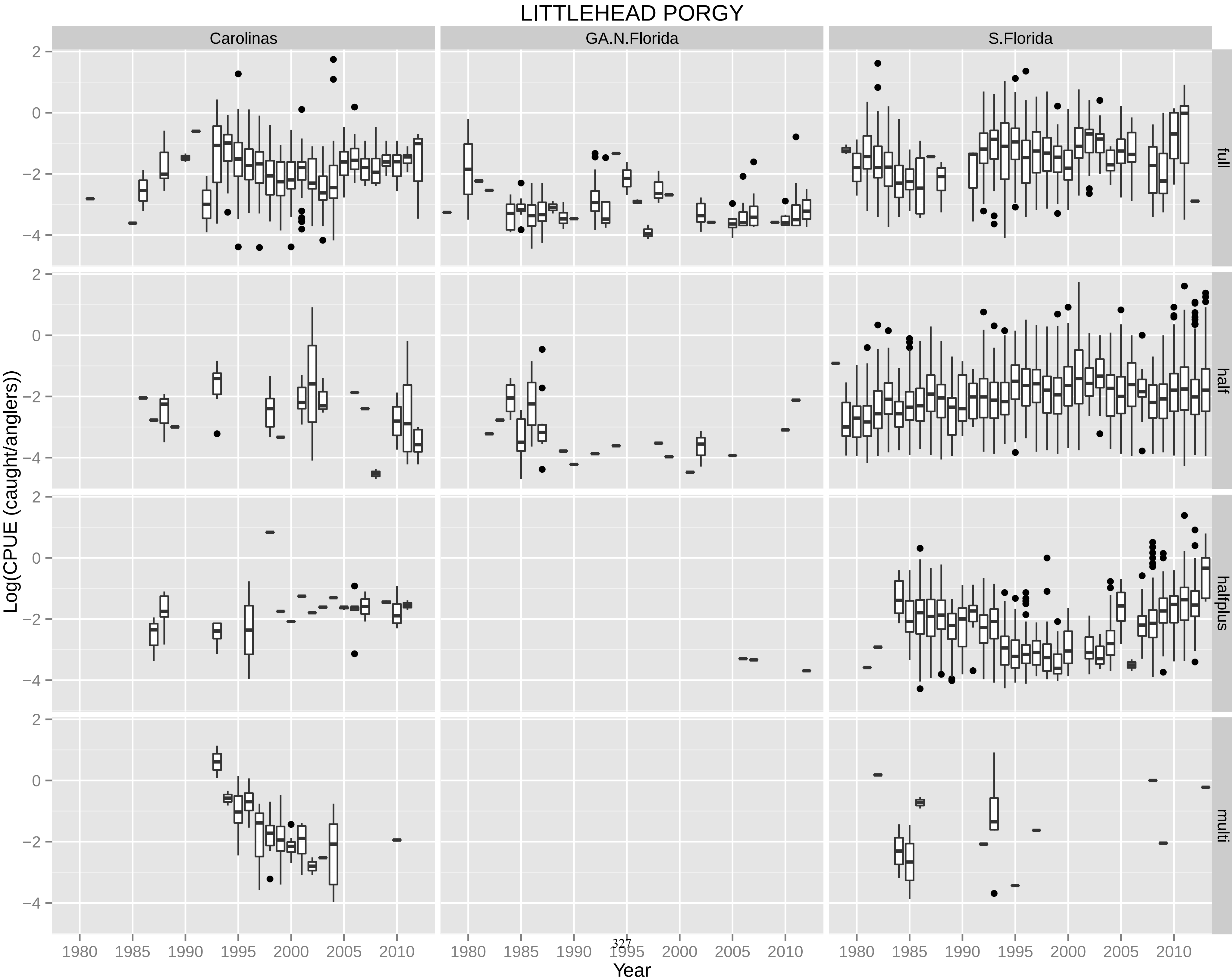

LITTLE TUNNY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1980
1985
1990
1995
2000
2005
2010

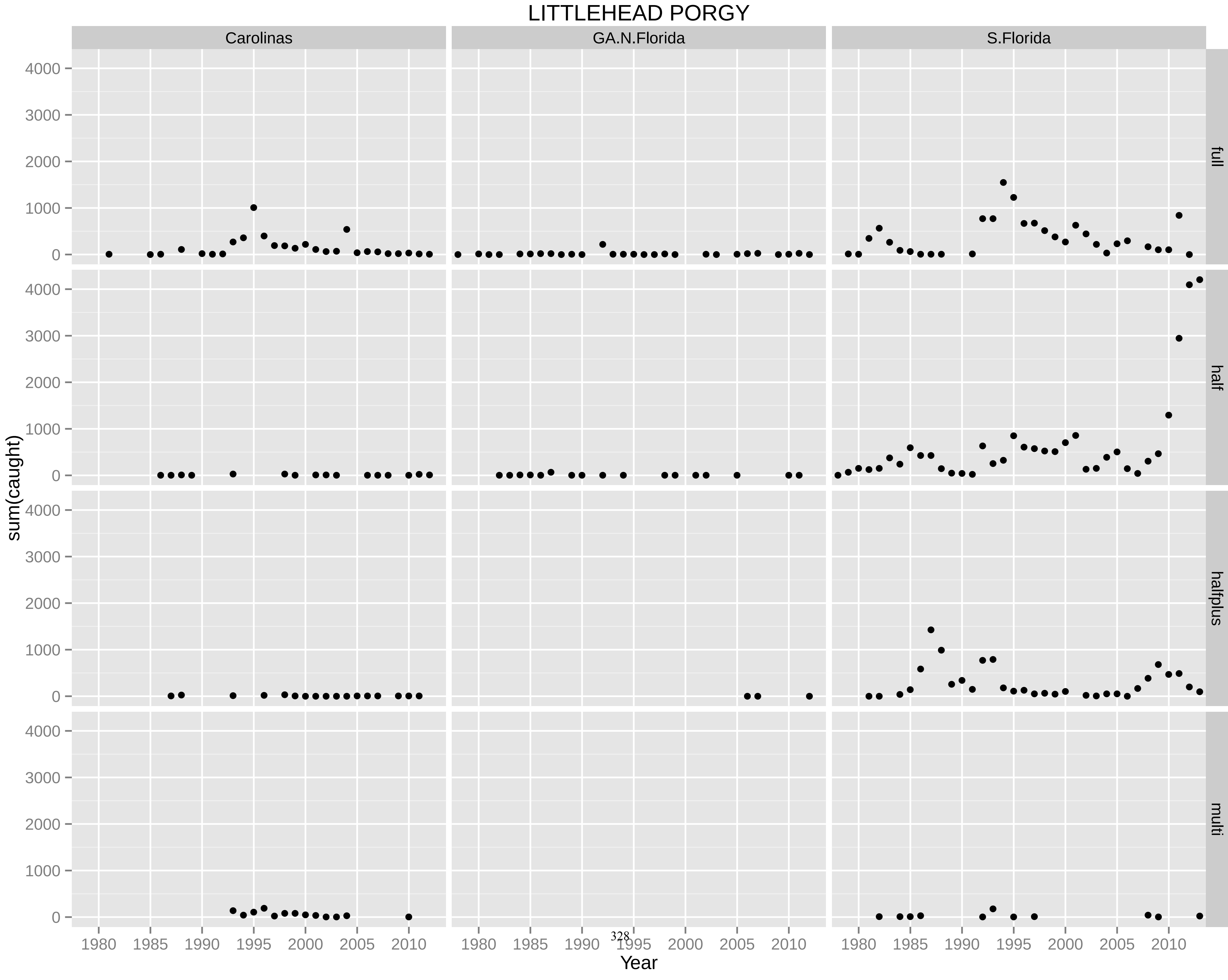


LITTLE TUNNY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
5000
10000
15000
20000
1980
1985
1990
1995
2000
2005
2010

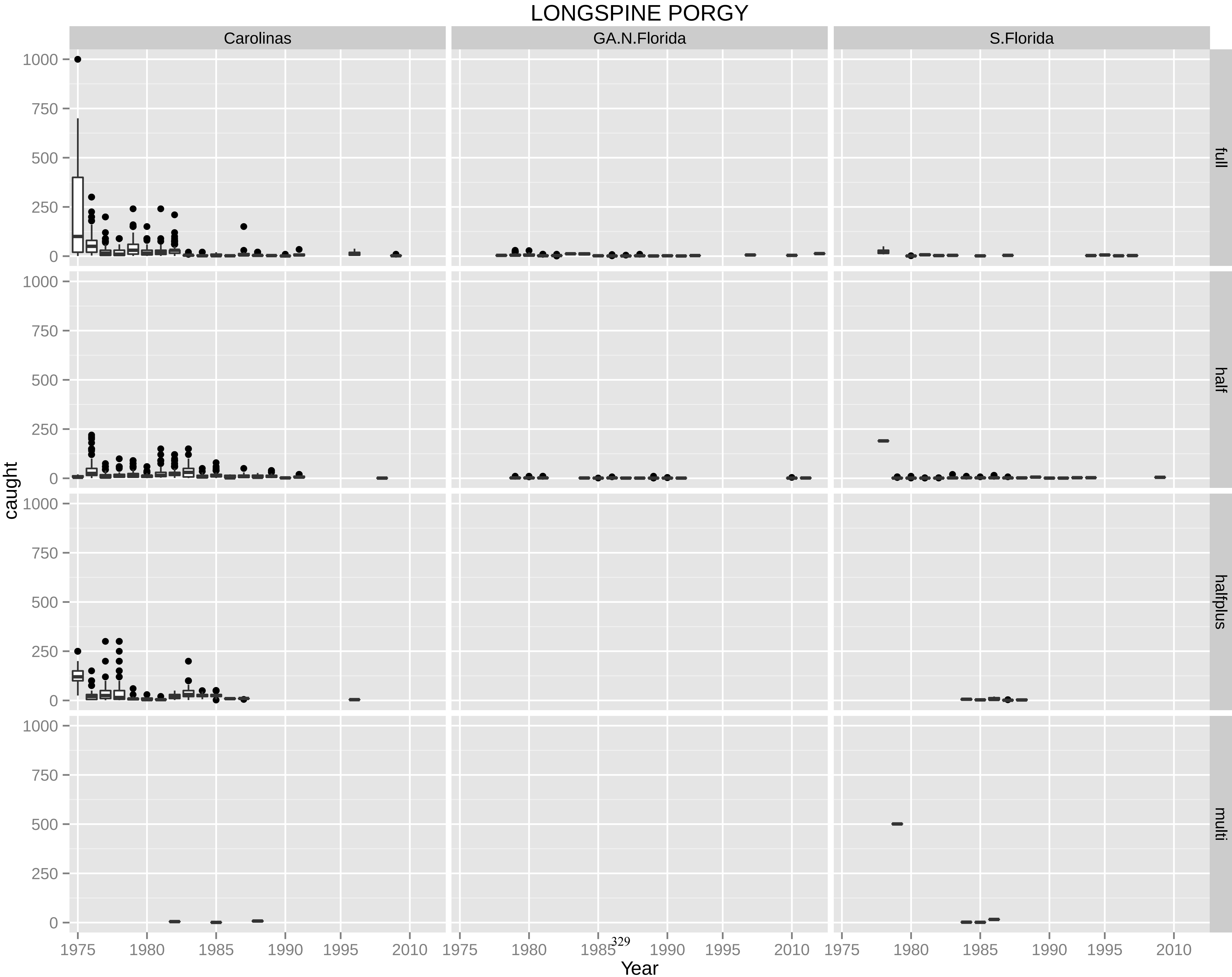

LITTLEHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
200
250
1980
1985
1990
1995
2000
2005
2010

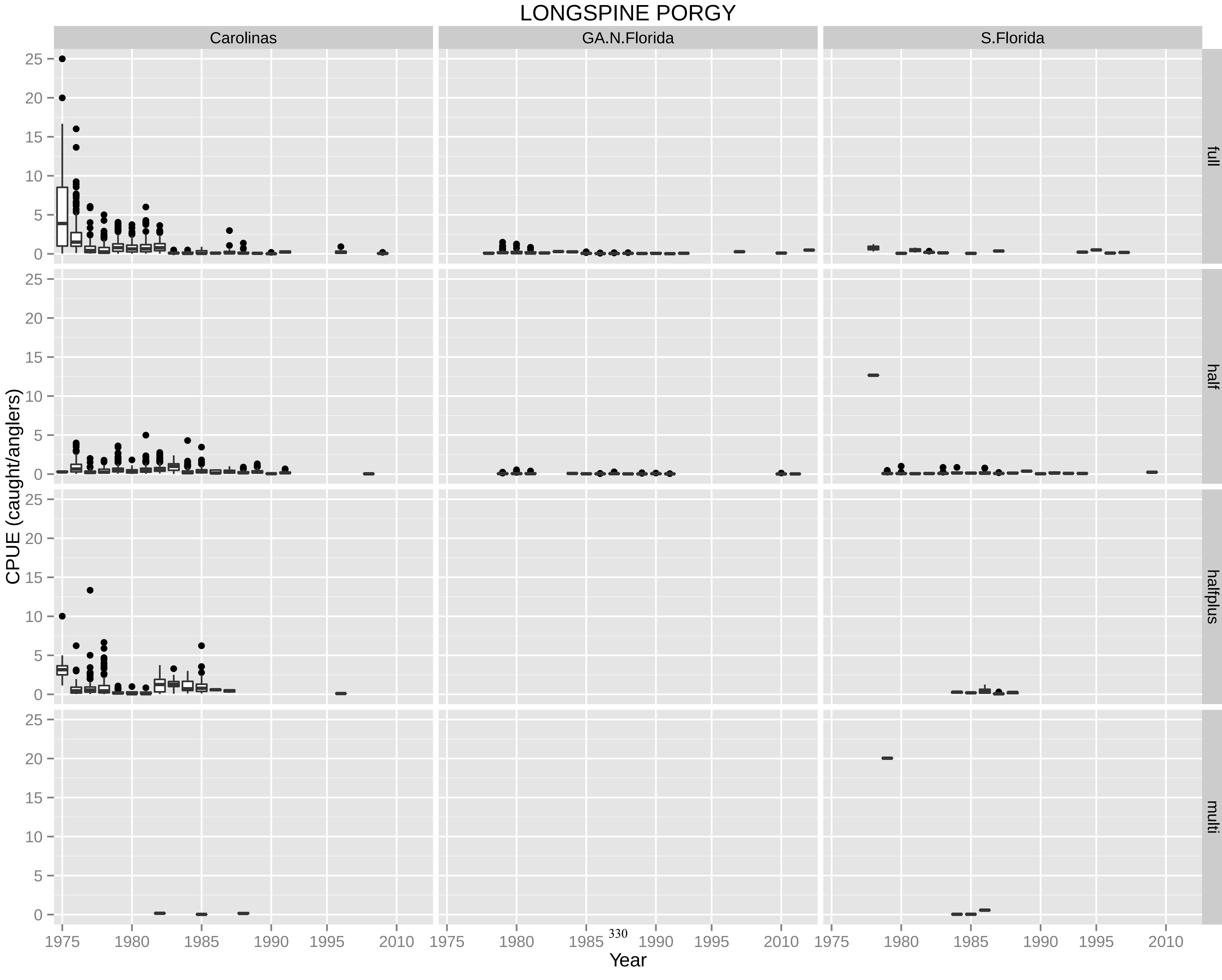

LITTLEHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
2
4
1980
1985
1990
1995
2000
2005
2010

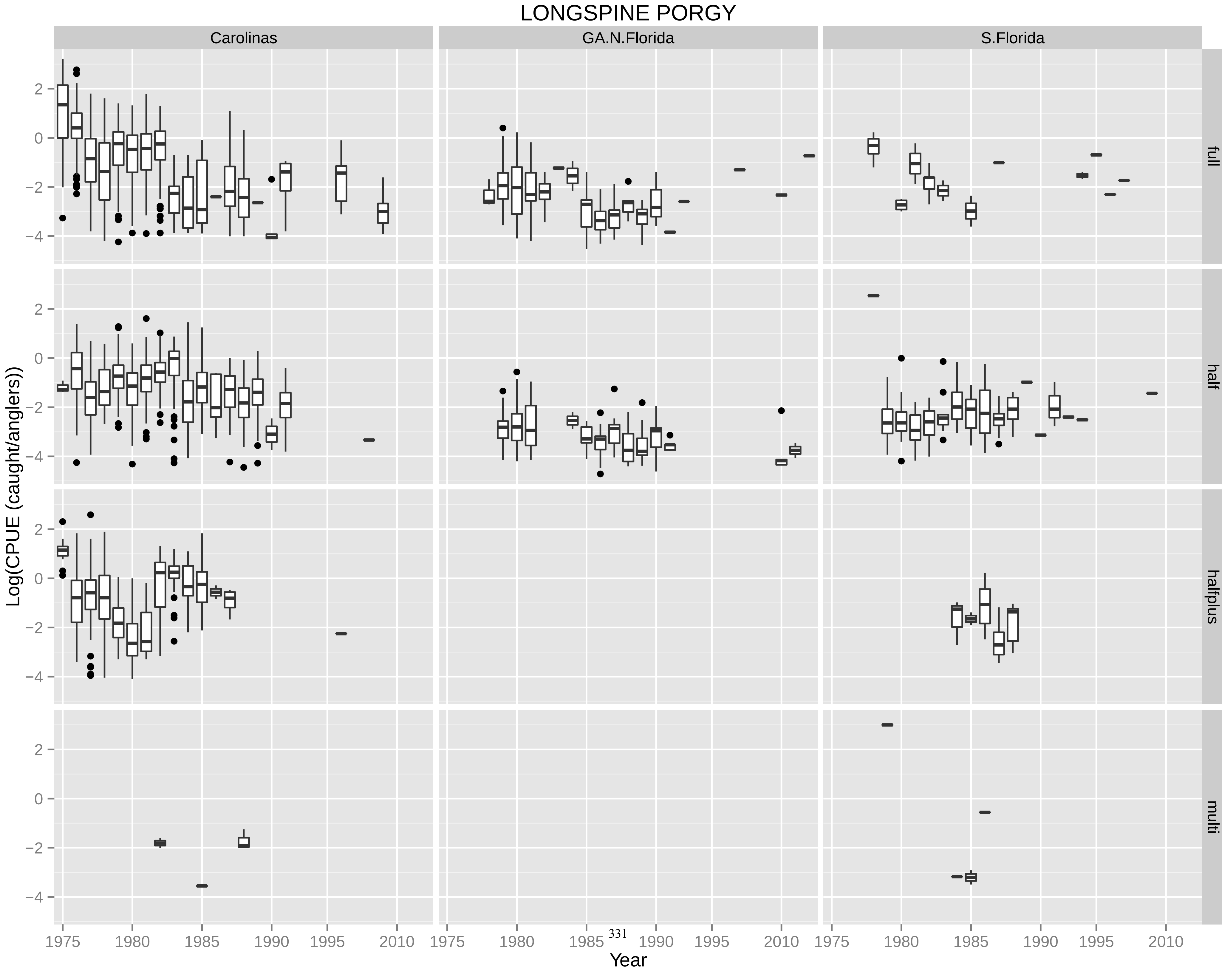

LITTLEHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

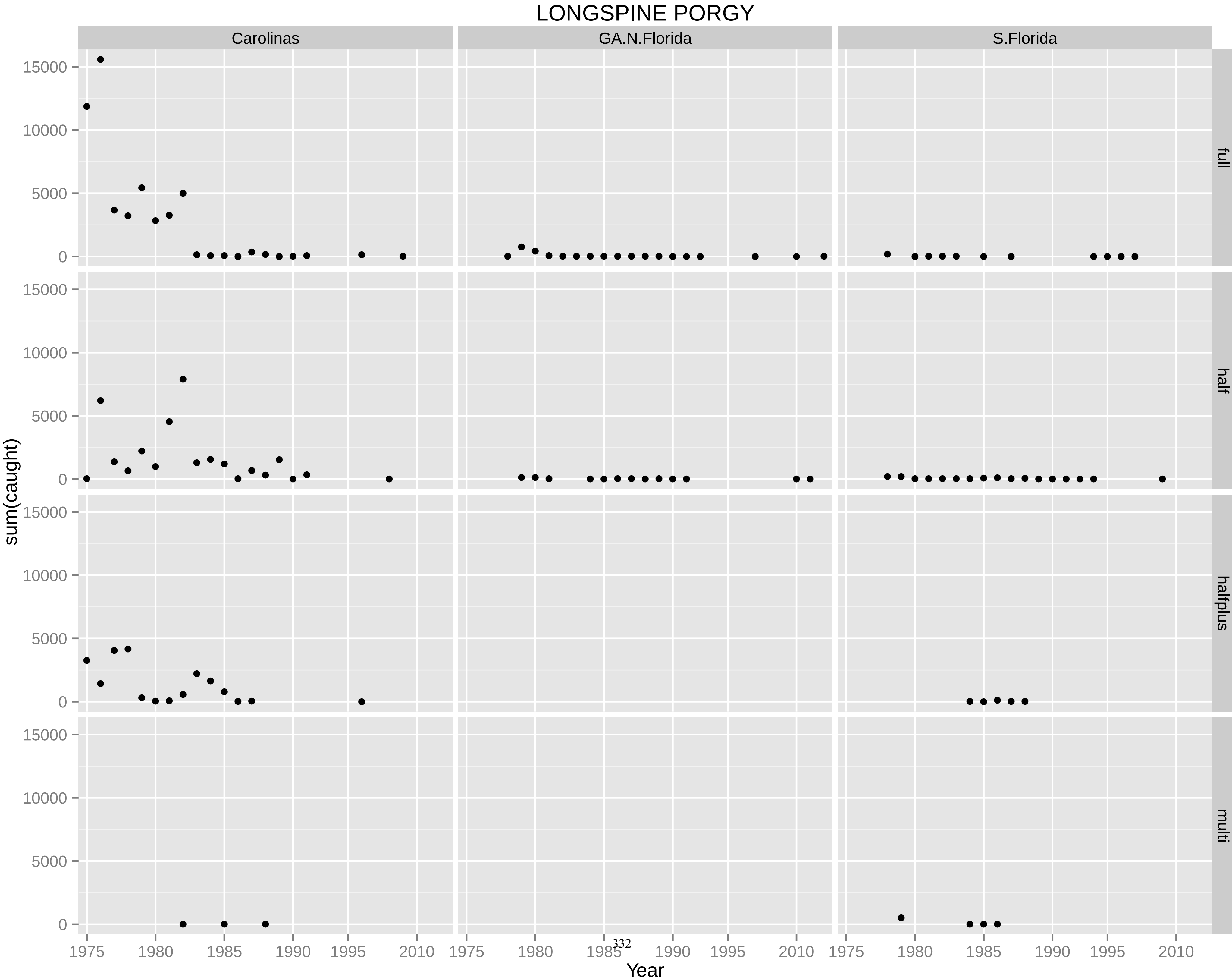


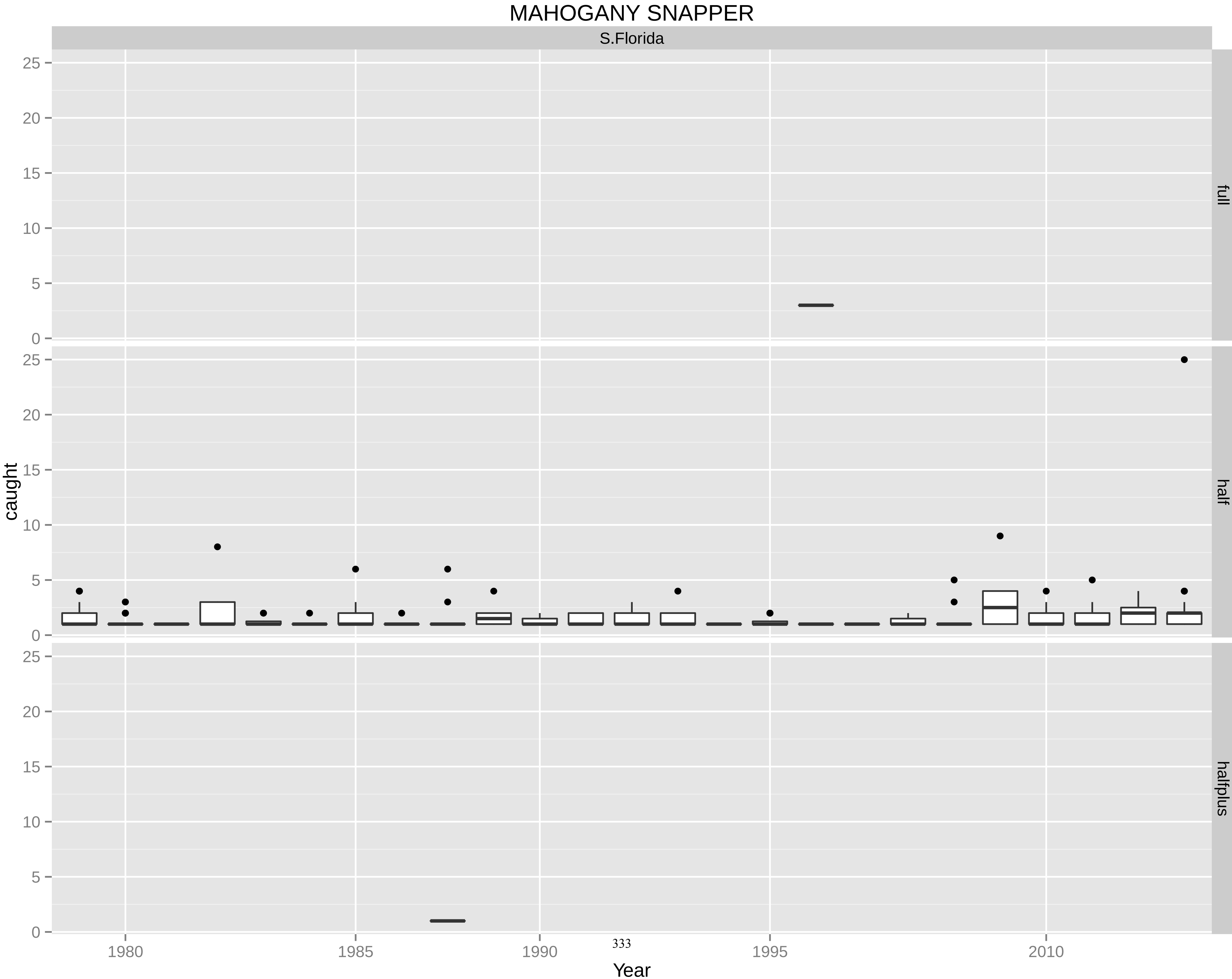
LITTLEHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
1000
2000
3000
4000
1980
1985
1990
1995
2000
2005
2010

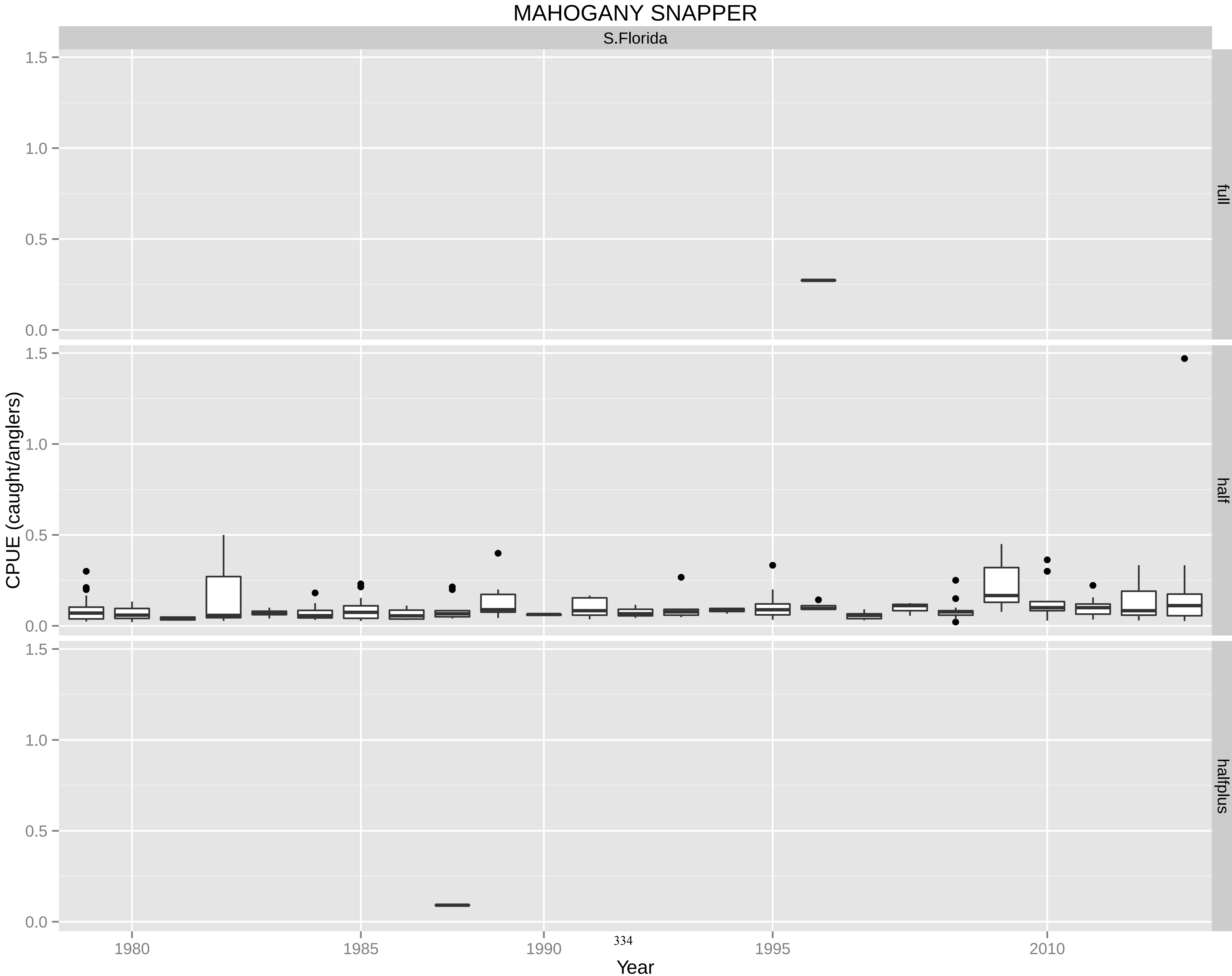

LONGSPINE PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
250
500
750
1000
1975
1980
1985
1990
1995
2010

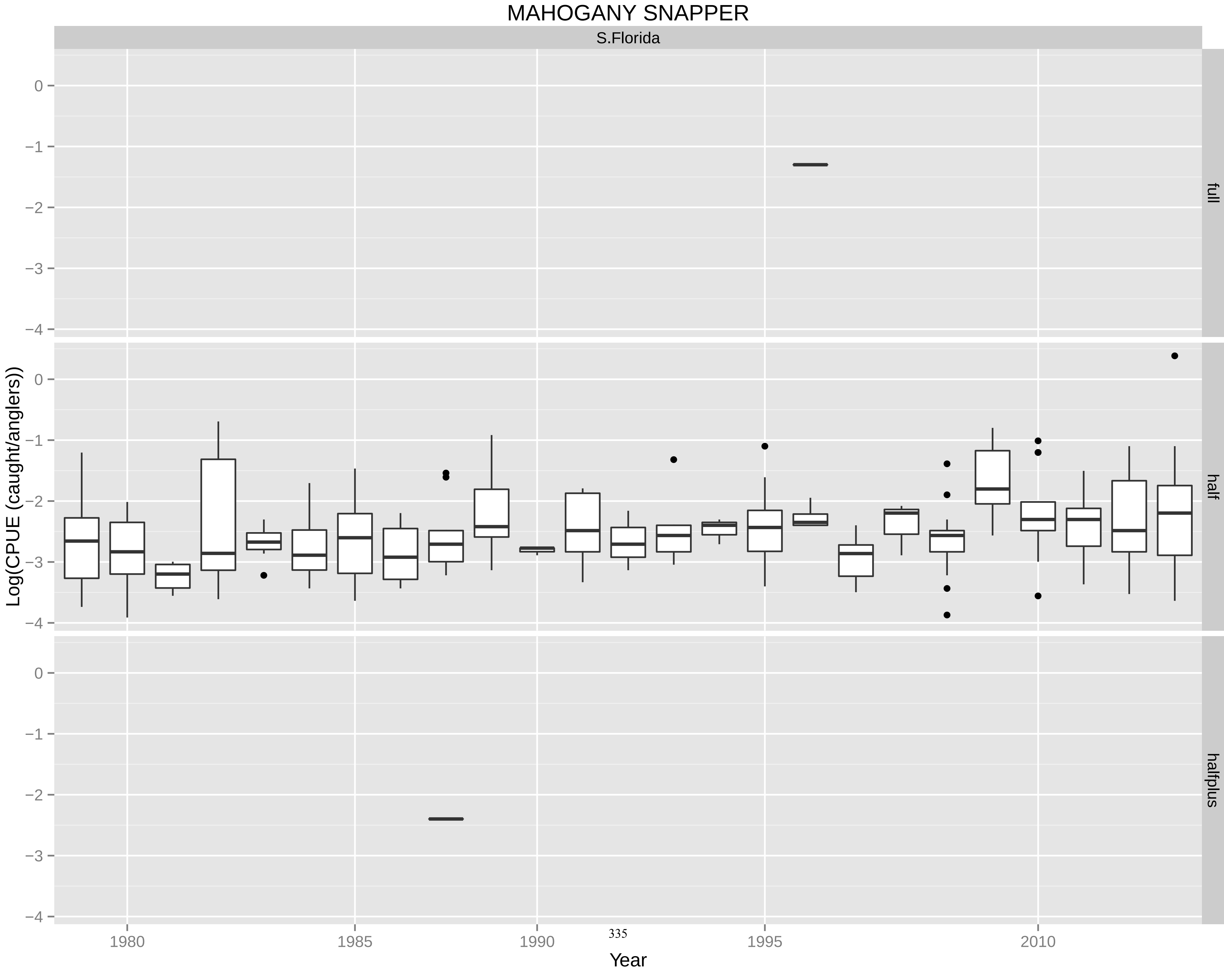

LONGSPINE PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
20
25
1975
1980
1985
1990
1995
2010

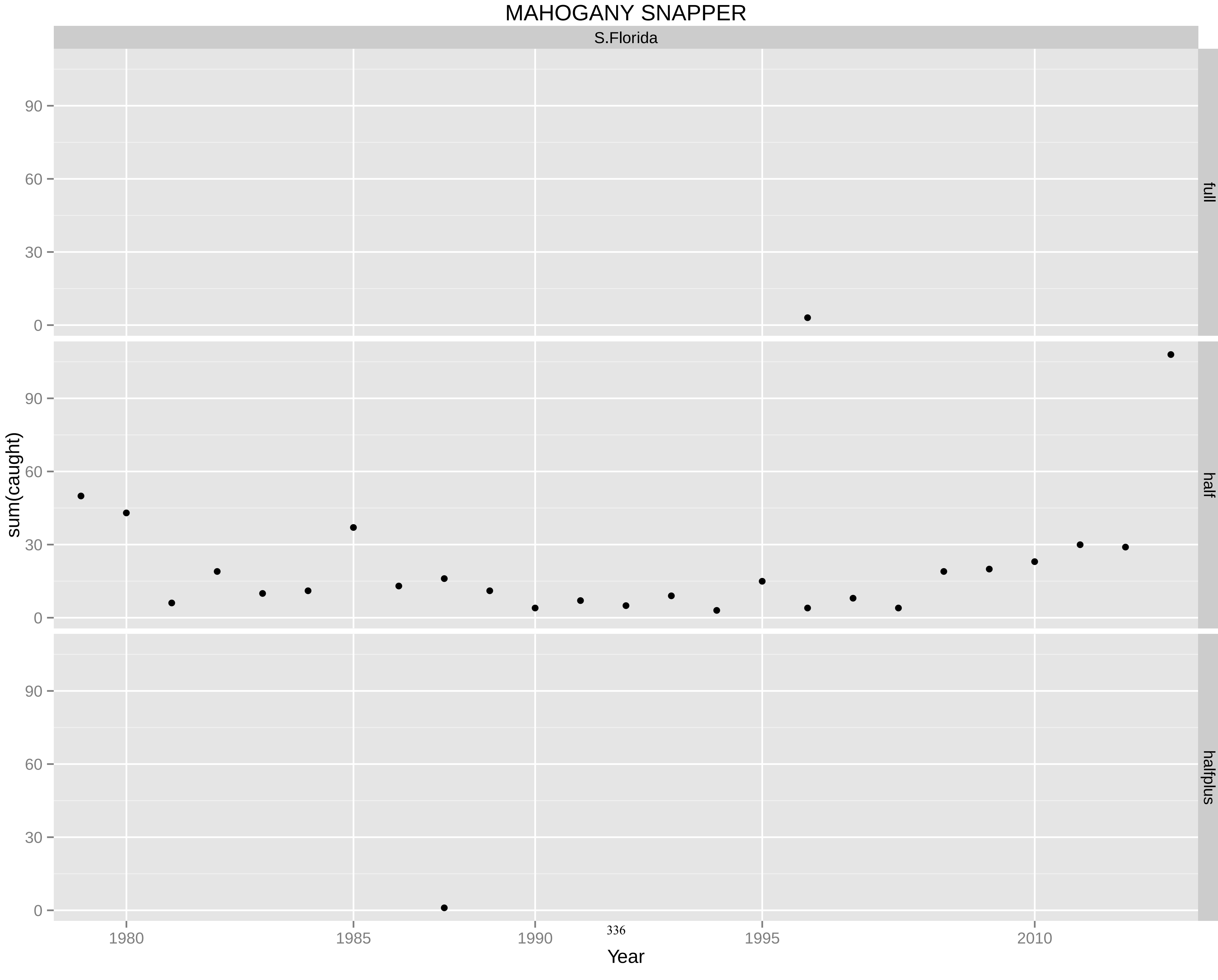

LONGSPINE PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1975
1980
1985
1990
1995
2010

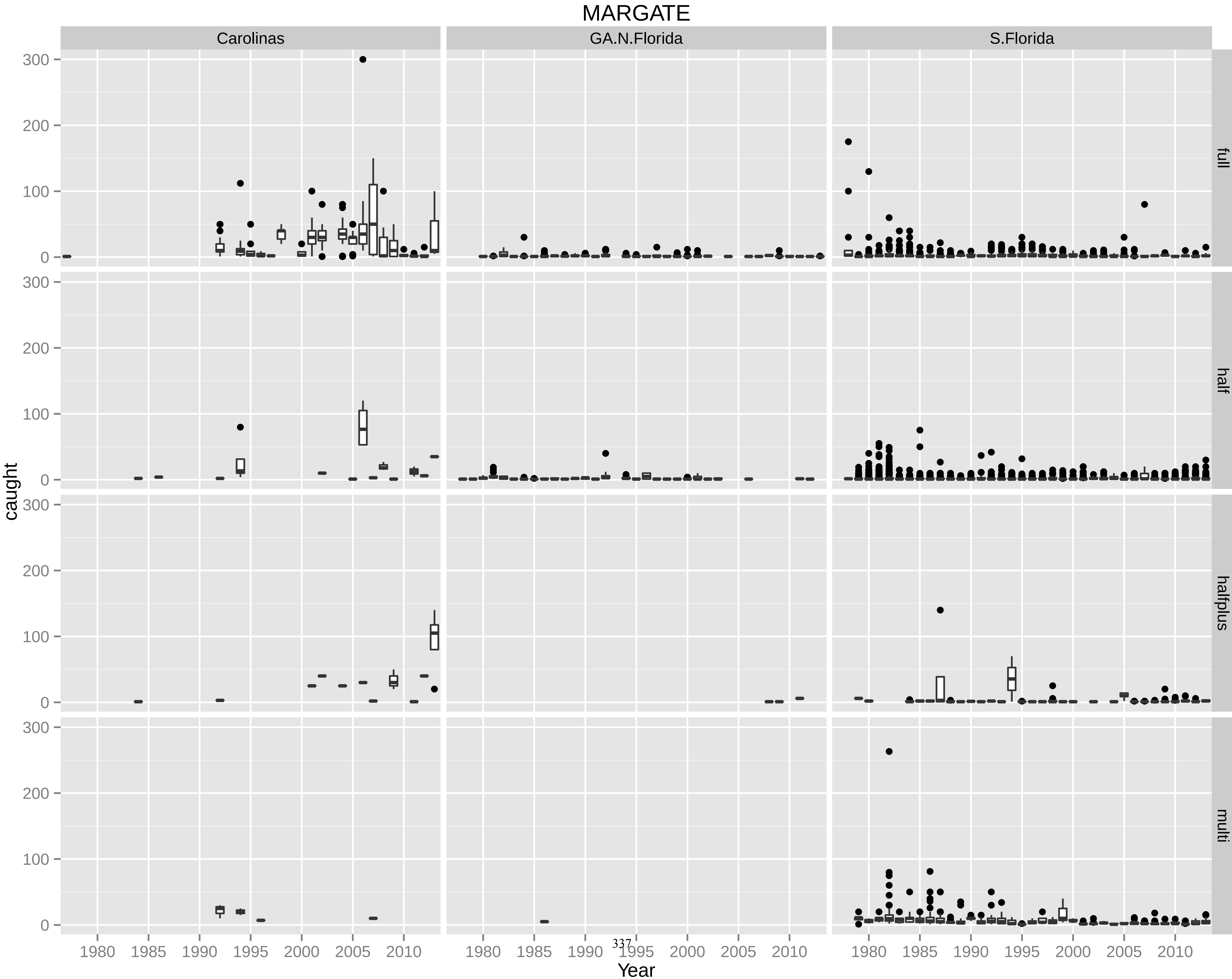

LONGSPINE PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
5000
10000
15000
1975
1980
1985
1990
1995
2010


MAHOGANY SNAPPER
S.Florida
full
half
halfplus
caught
Year
0
5
10
15
20
25
1980
1985
1990
1995
2010

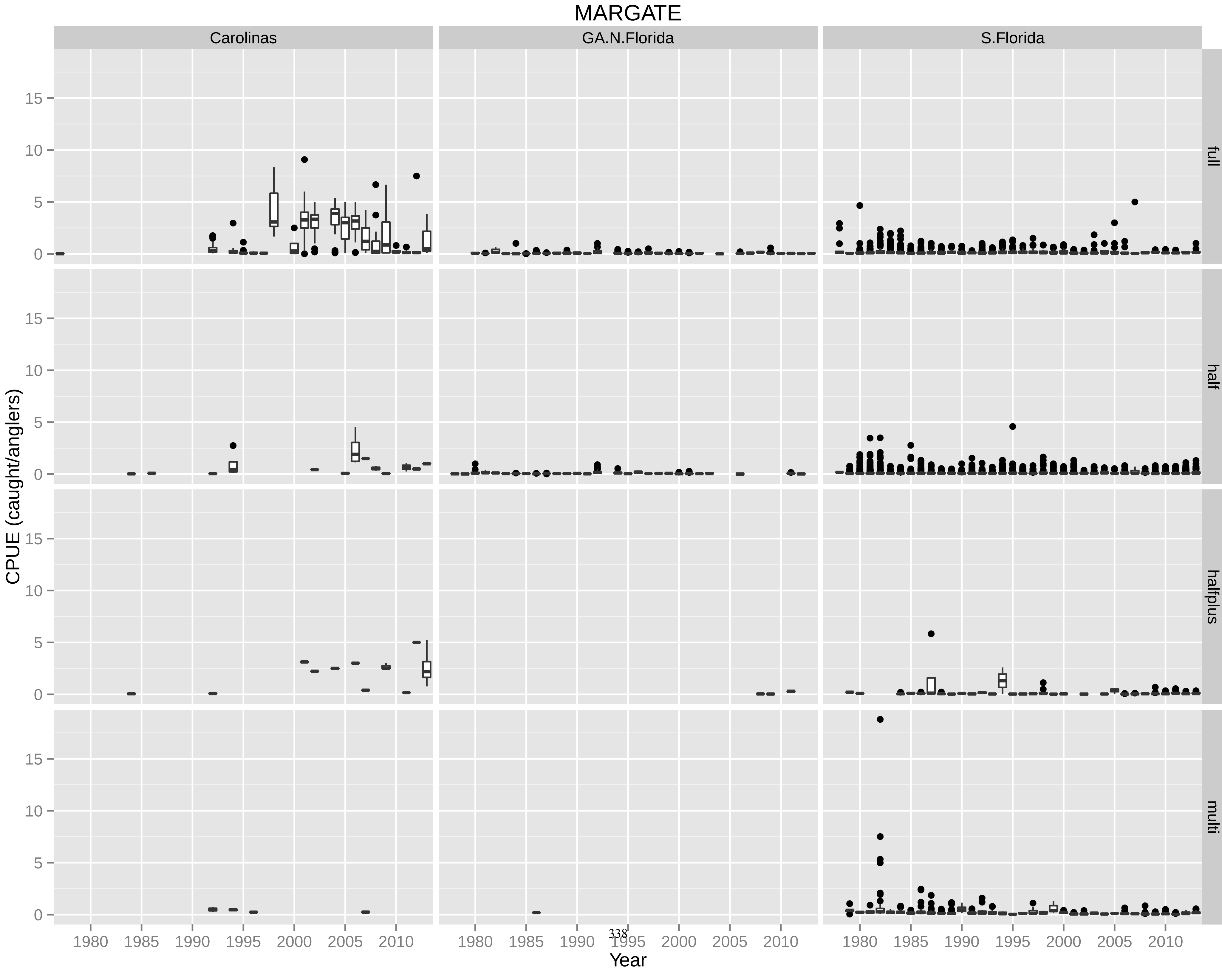

MAHOGANY SNAPPER
S.Florida
full
half
halfplus
CPUE (caught/anglers)
0.0
0.5
1.0
1.5
1980
1985
1990
1995
2010
Year

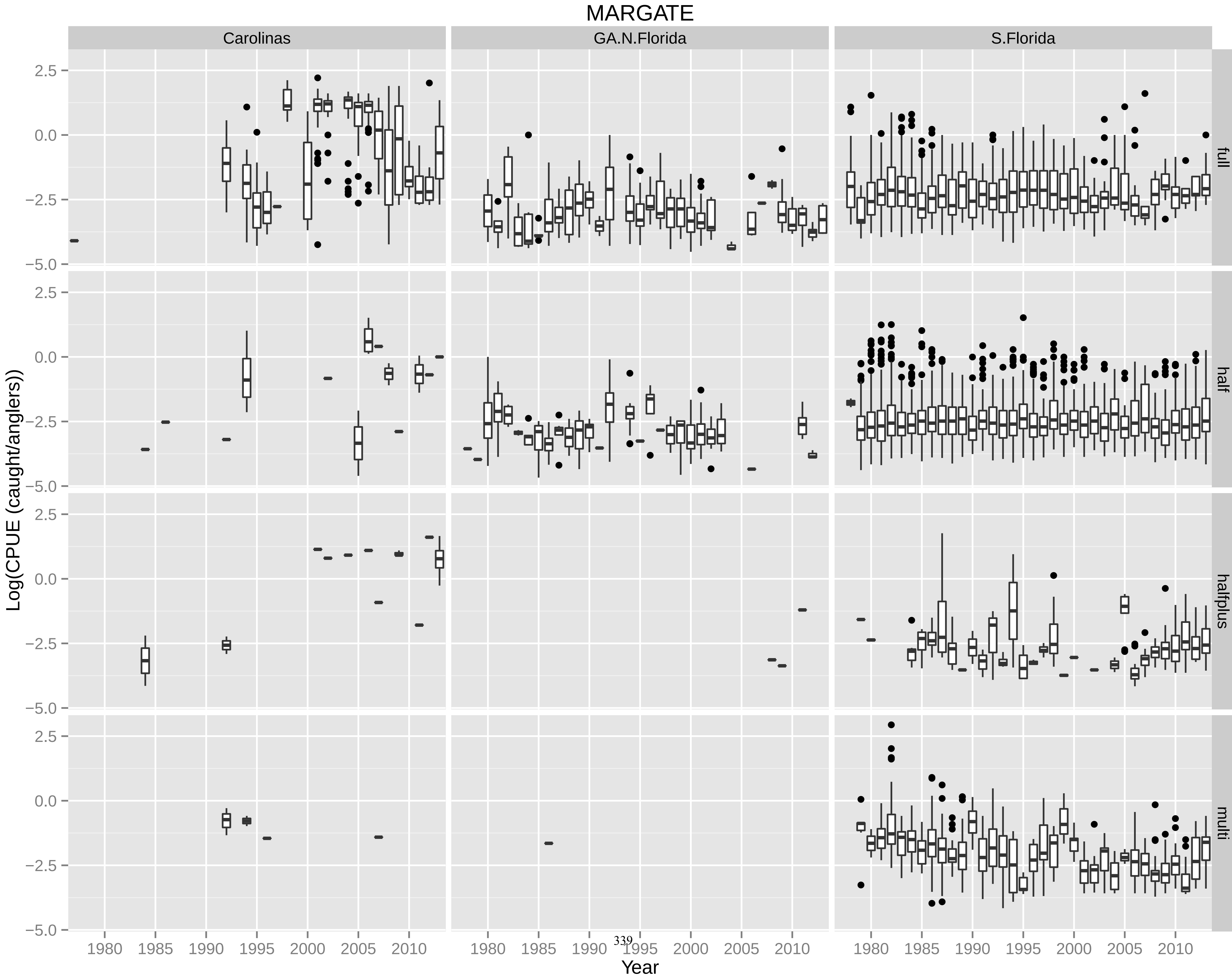

MAHOGANY SNAPPER
S.Florida
full
half
halfplus
Log(CPUE (caught/anglers))
0
−1
−2
−3
−4
1980
1985
1990
1995
2010
Year


MAHOGANY SNAPPER
S.Florida
full
half
halfplus
sum(caught)
90
60
30
0
1980
1985
1990
1995
2010
Year

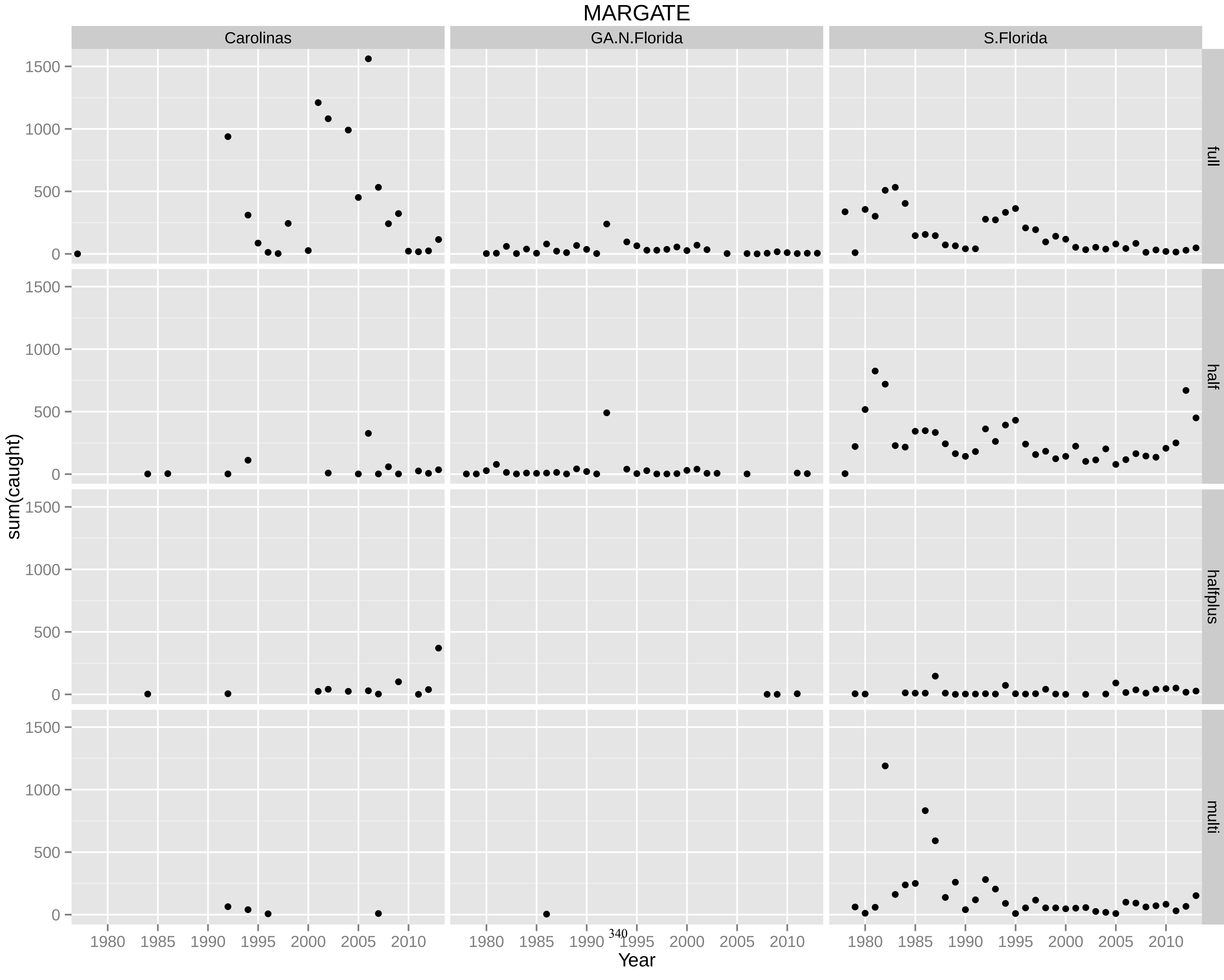


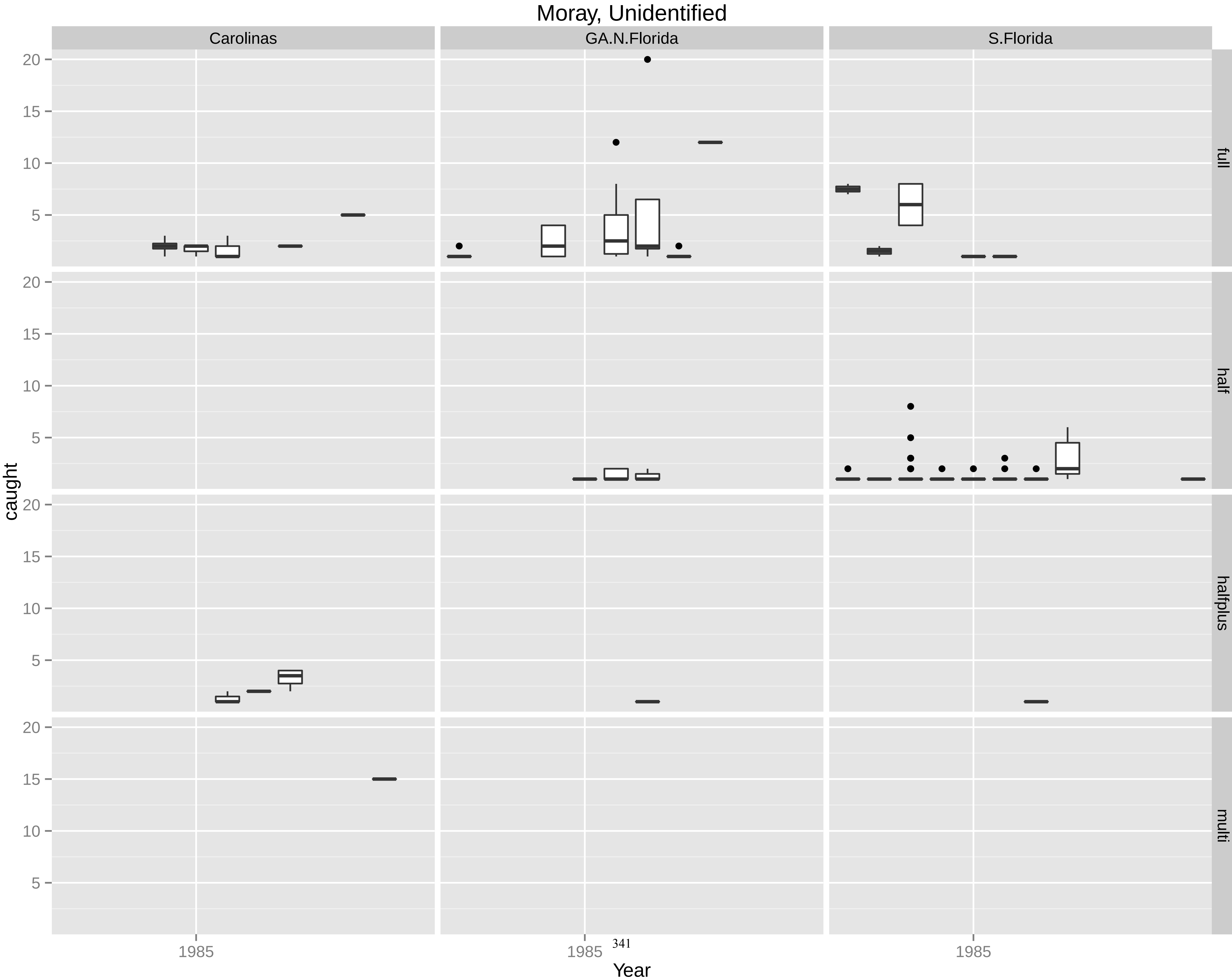
MARGATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
1980
1985
1990
1995
2000
2005
2010

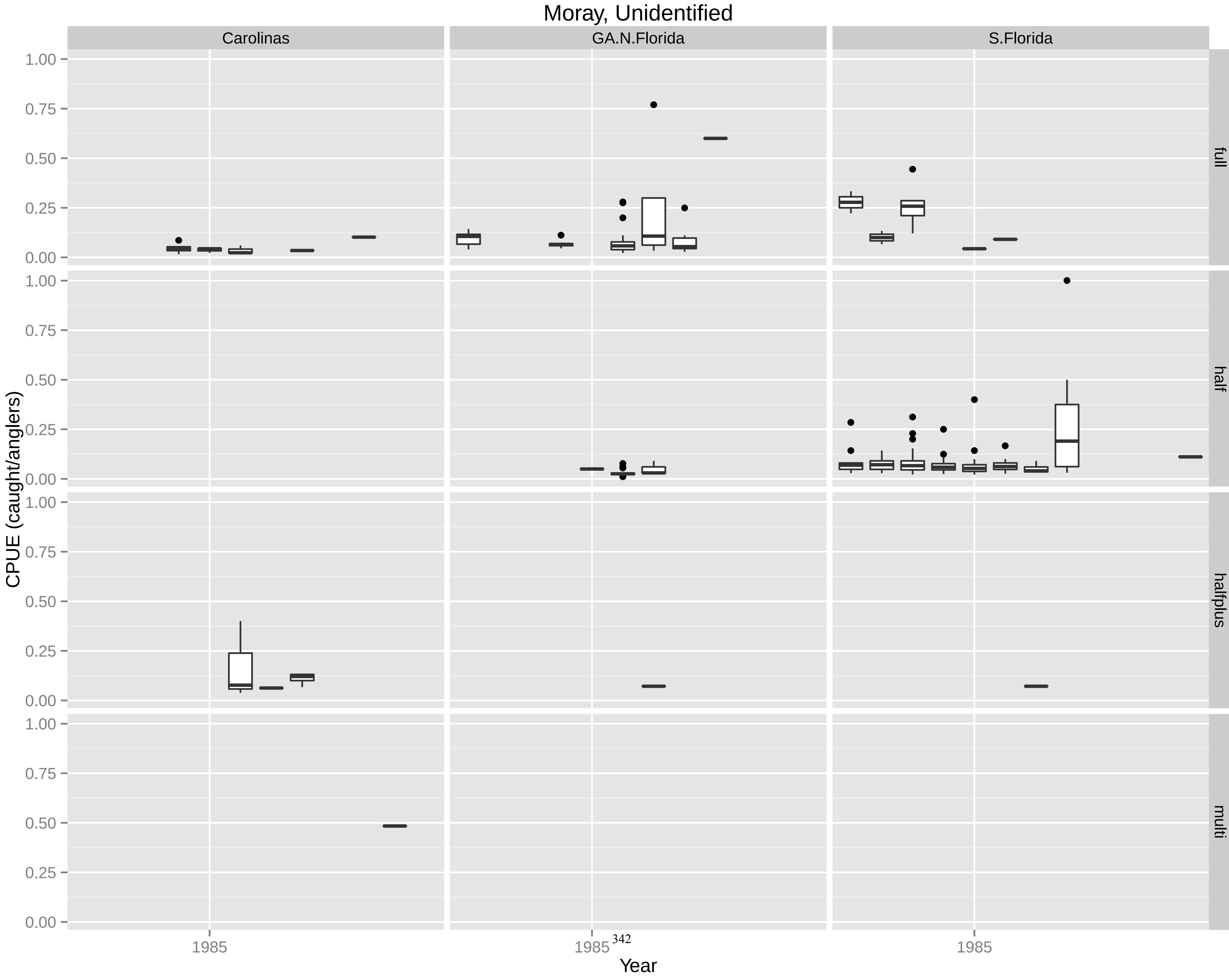

MARGATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
1980
1985
1990
1995
2000
2005
2010

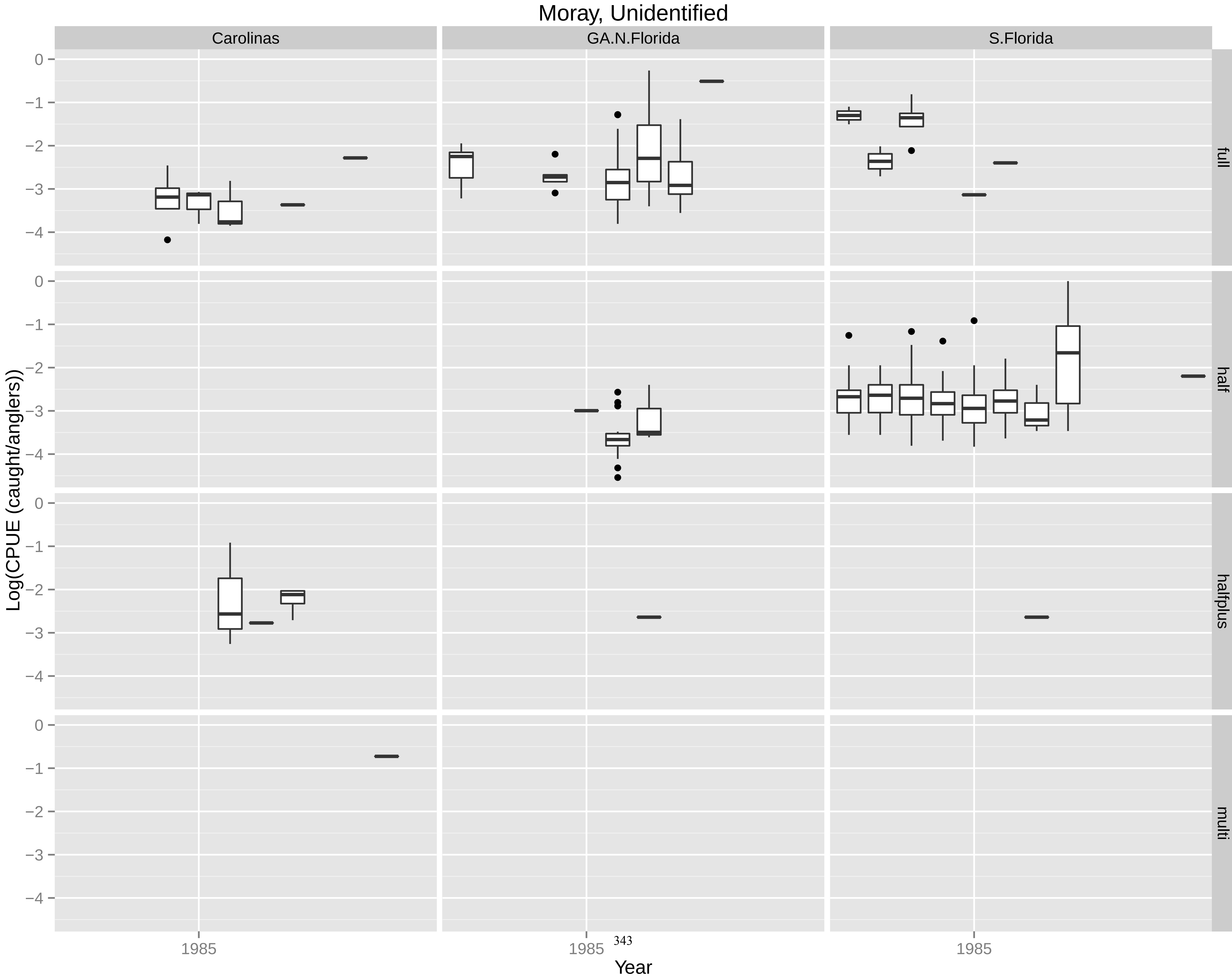


MARGATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1980
1985
1990
1995
2000
2005
2010

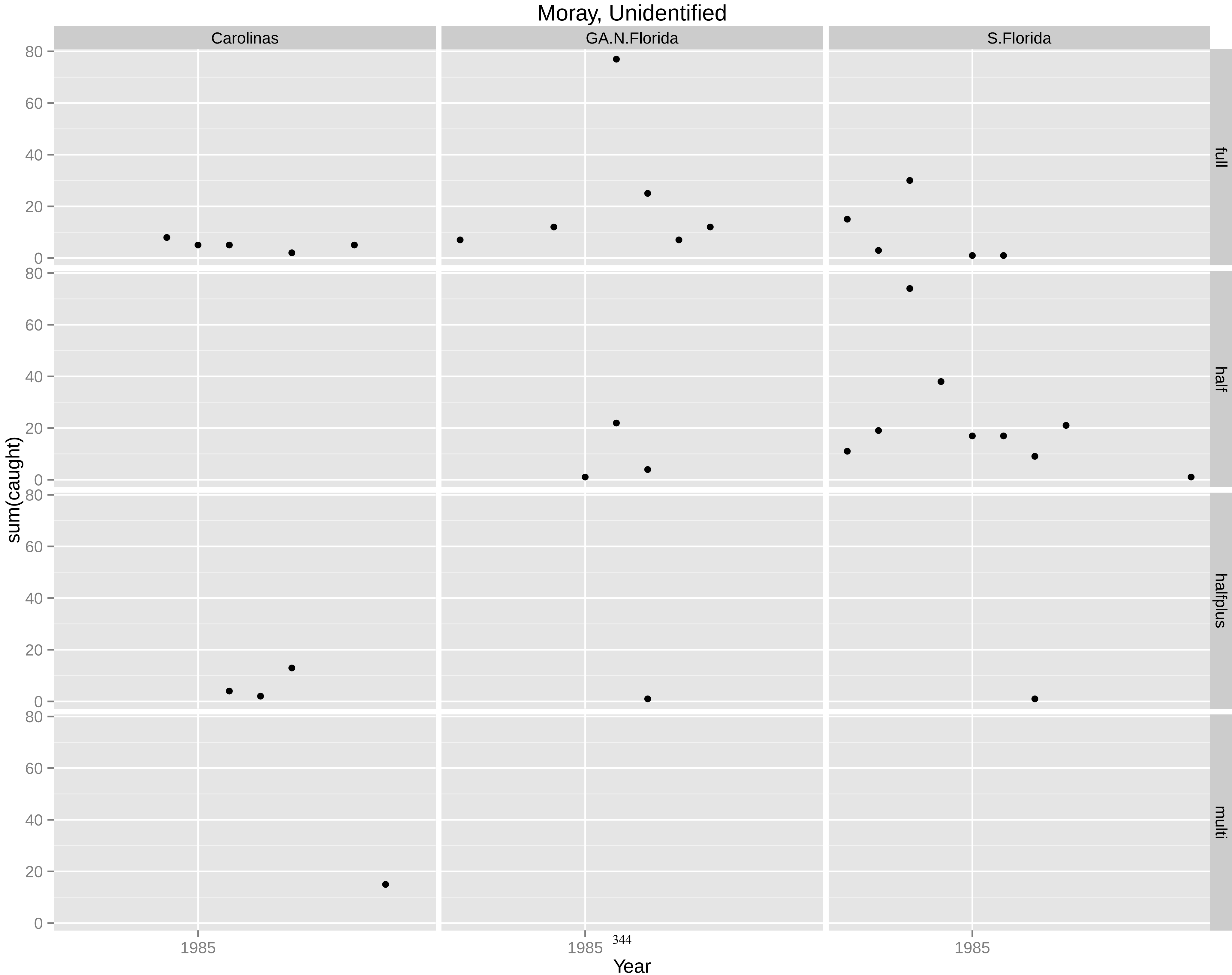

MARGATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
1500
1000
500
0
1980
1985
1990
1995
2000
2005
2010

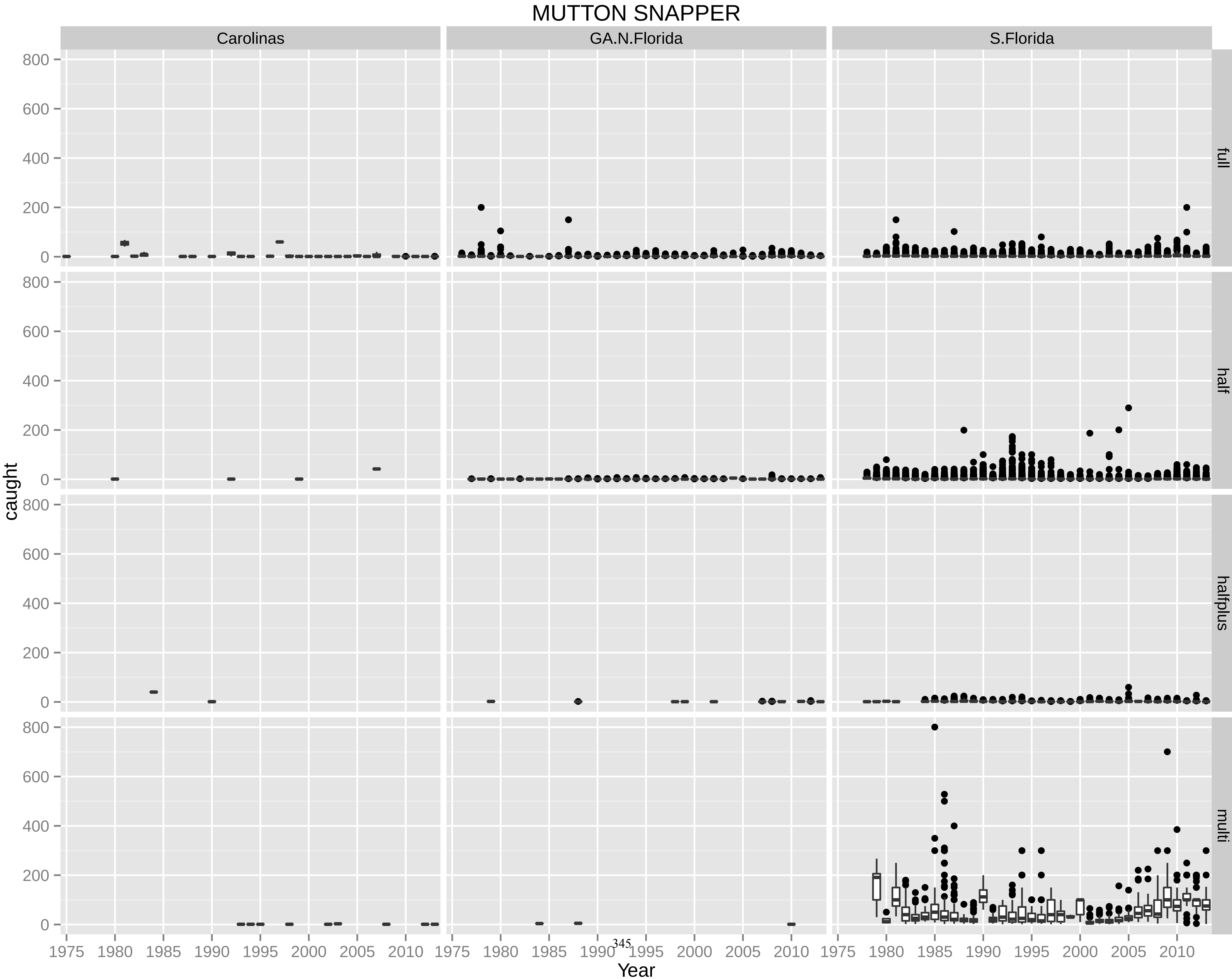

Moray, Unidentified
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
20
15
10
5
1985
Year

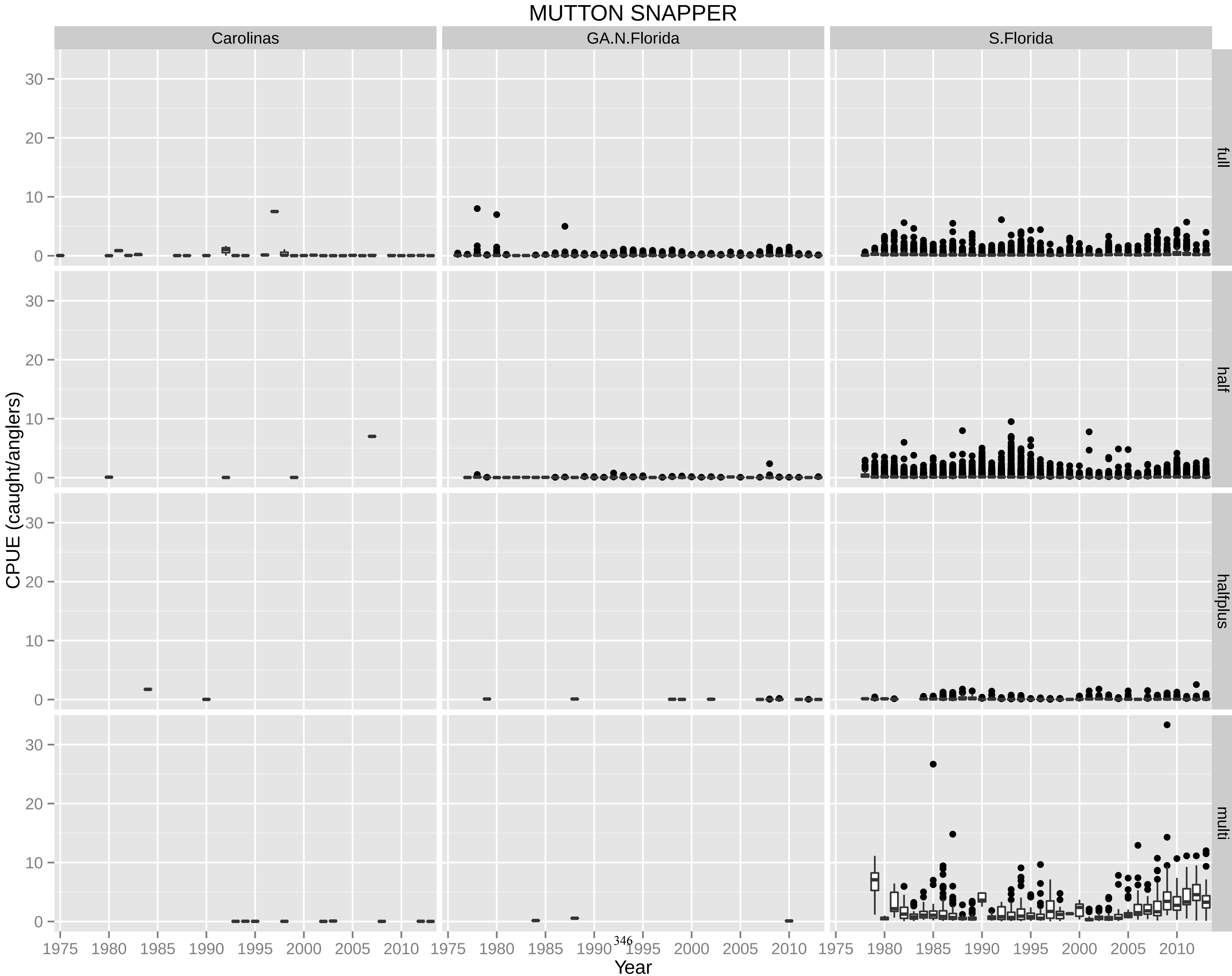

Moray, Unidentified
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
1985
0.00
0.25
0.50
0.75
1.00



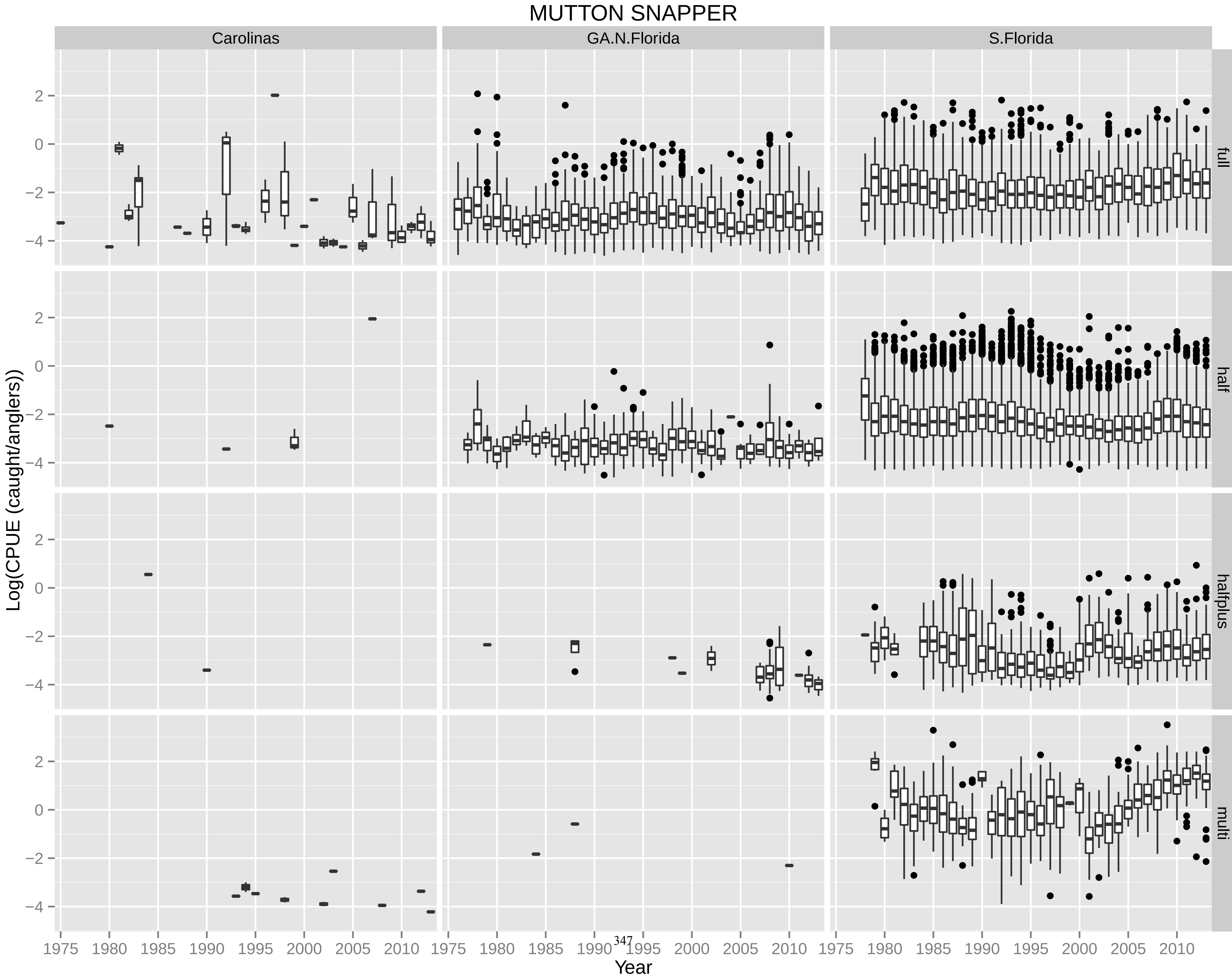
Moray, Unidentified
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
0
−1
−2
−3
−4
1985
Year

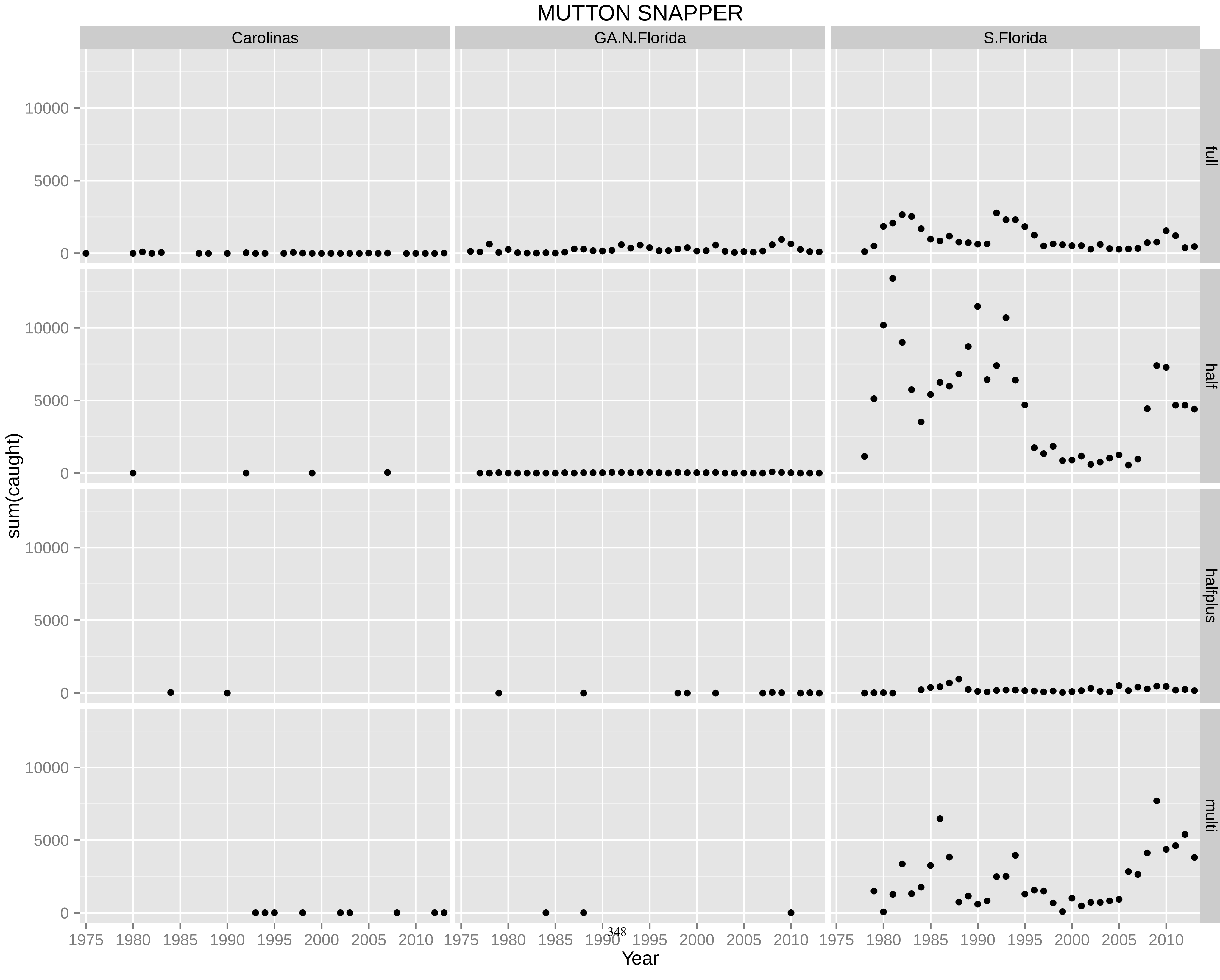

Moray, Unidentified
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
20
40
60
80
1985

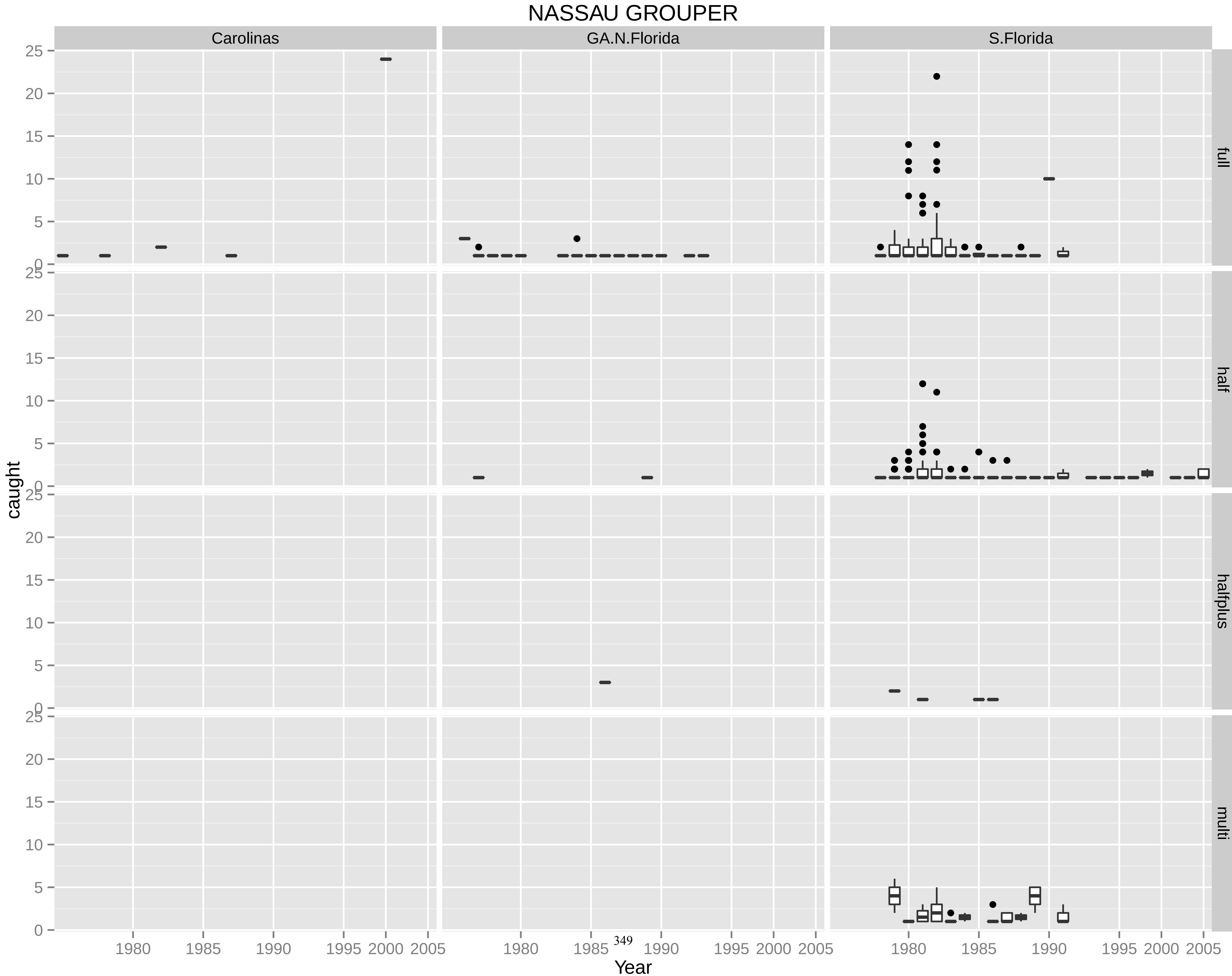

MUTTON SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
200
400
600
800
1975
1980
1985
1990
1995
2000
2005
2010

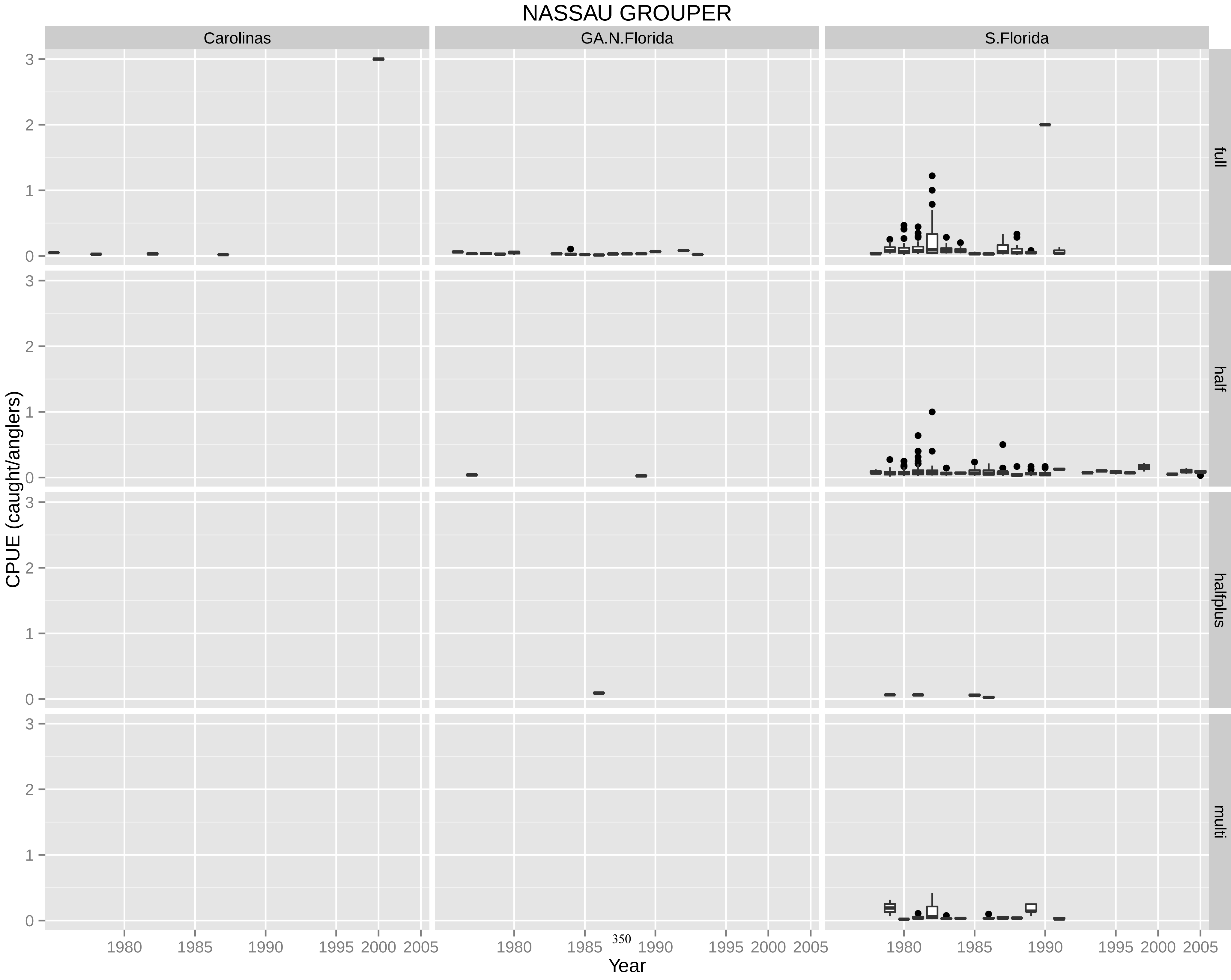


MUTTON SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
10
20
30
1975
1980
1985
1990
1995
2000
2005
2010

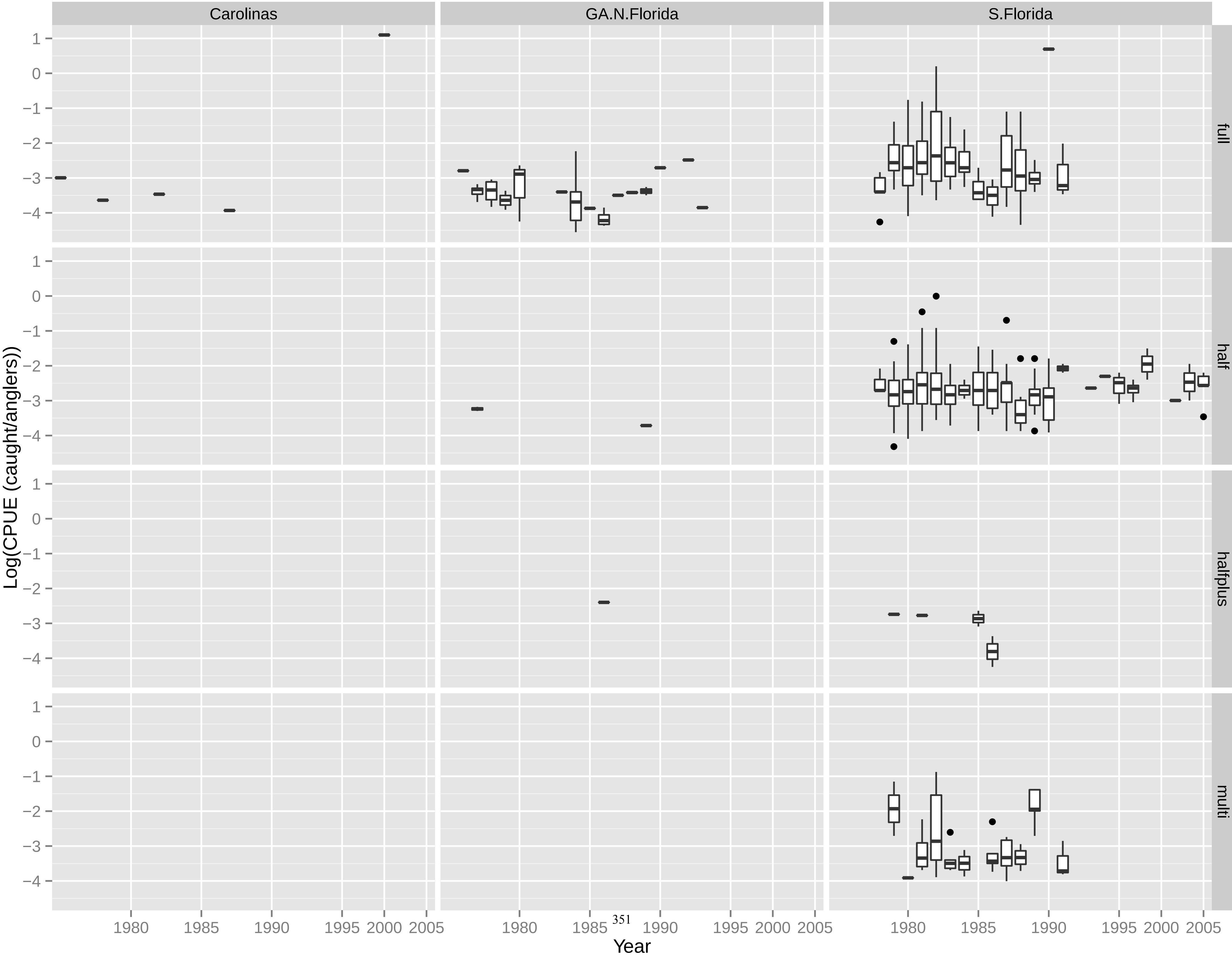

MUTTON SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

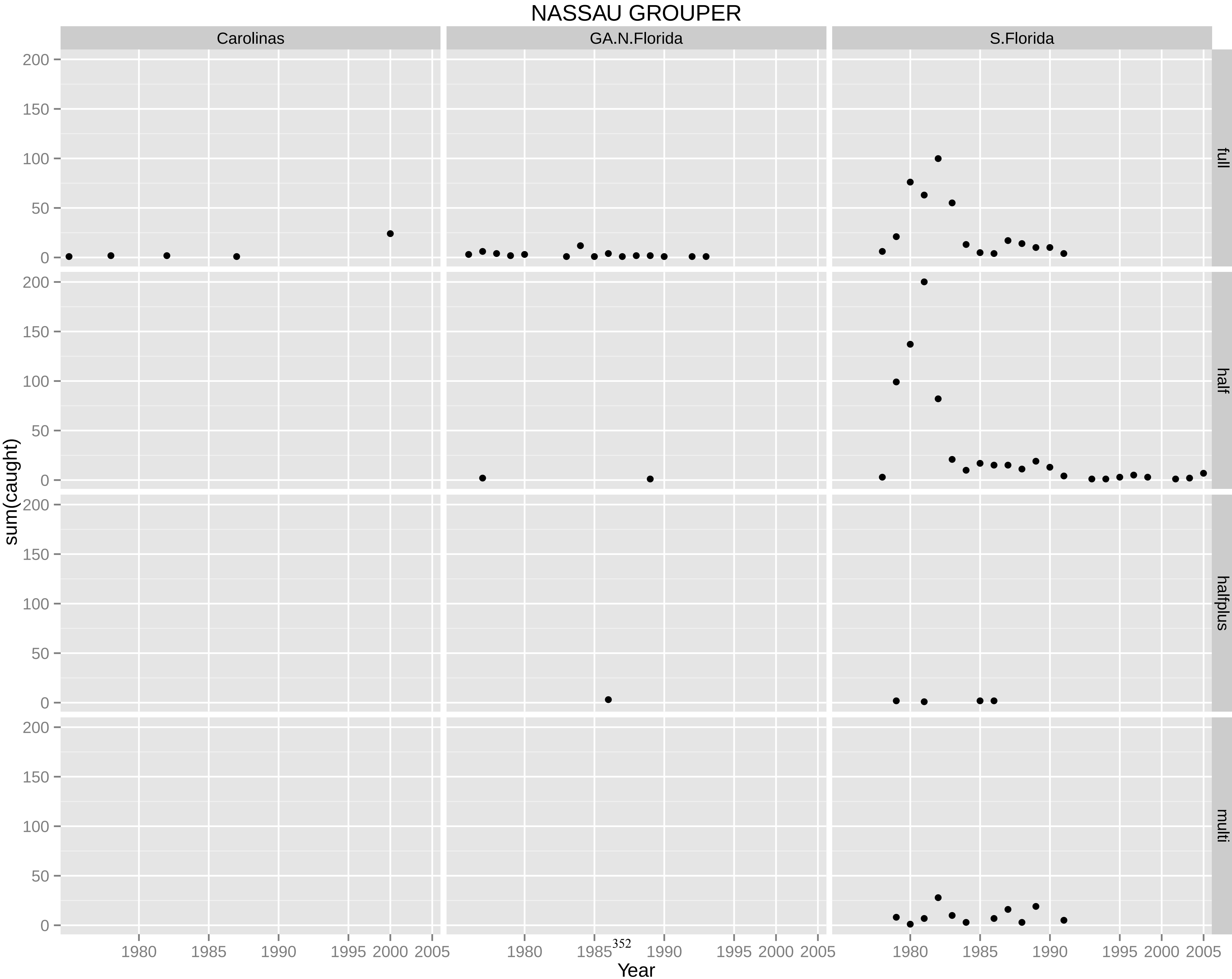

MUTTON SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
10000
5000
0
1975
1980
1985
1990
1995
2000
2005
2010

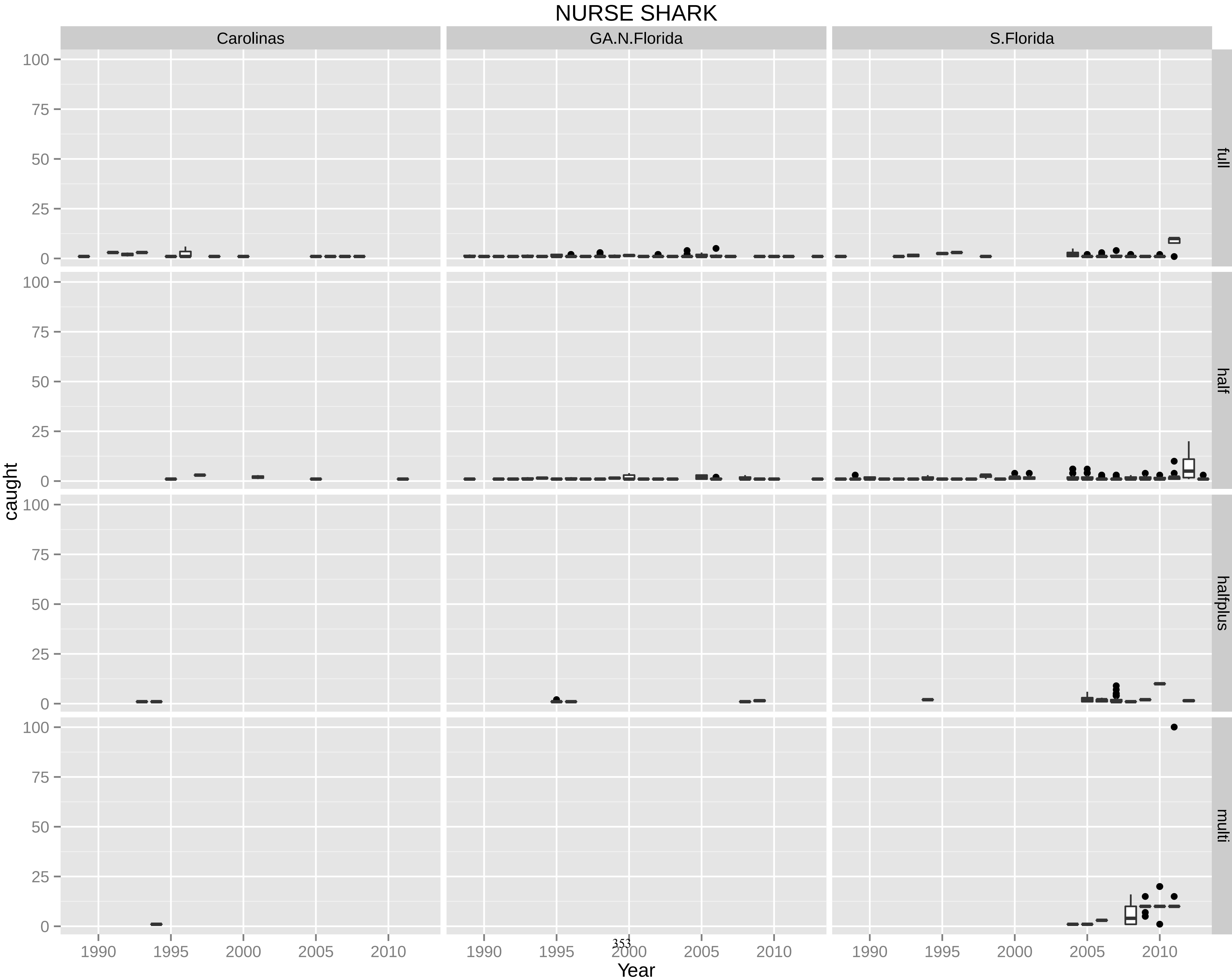

NASSAU GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
5
10
15
20
25
1980
1985
1990
1995
2000
2005

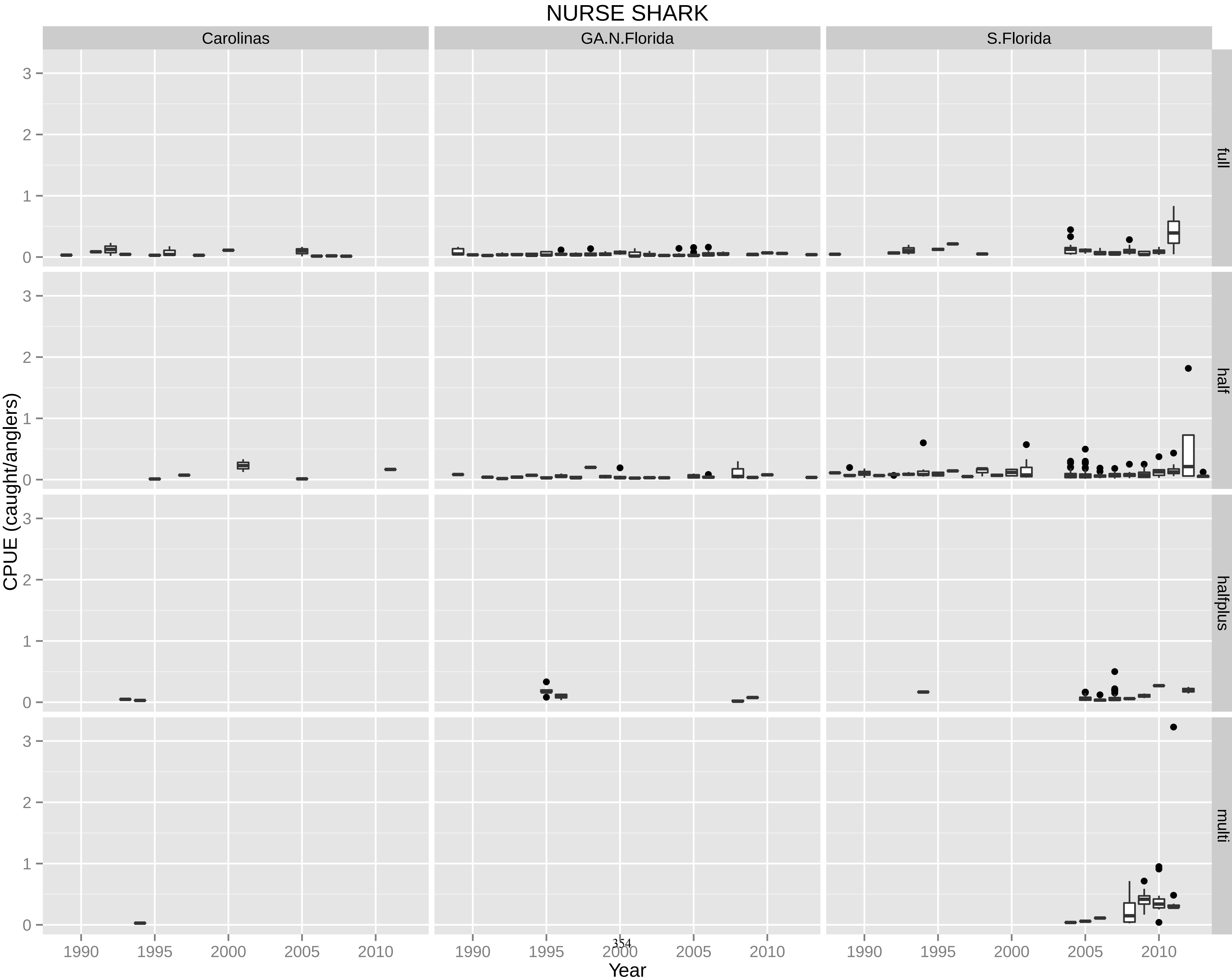

NASSAU GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
1980
1985
1990
1995
2000
2005

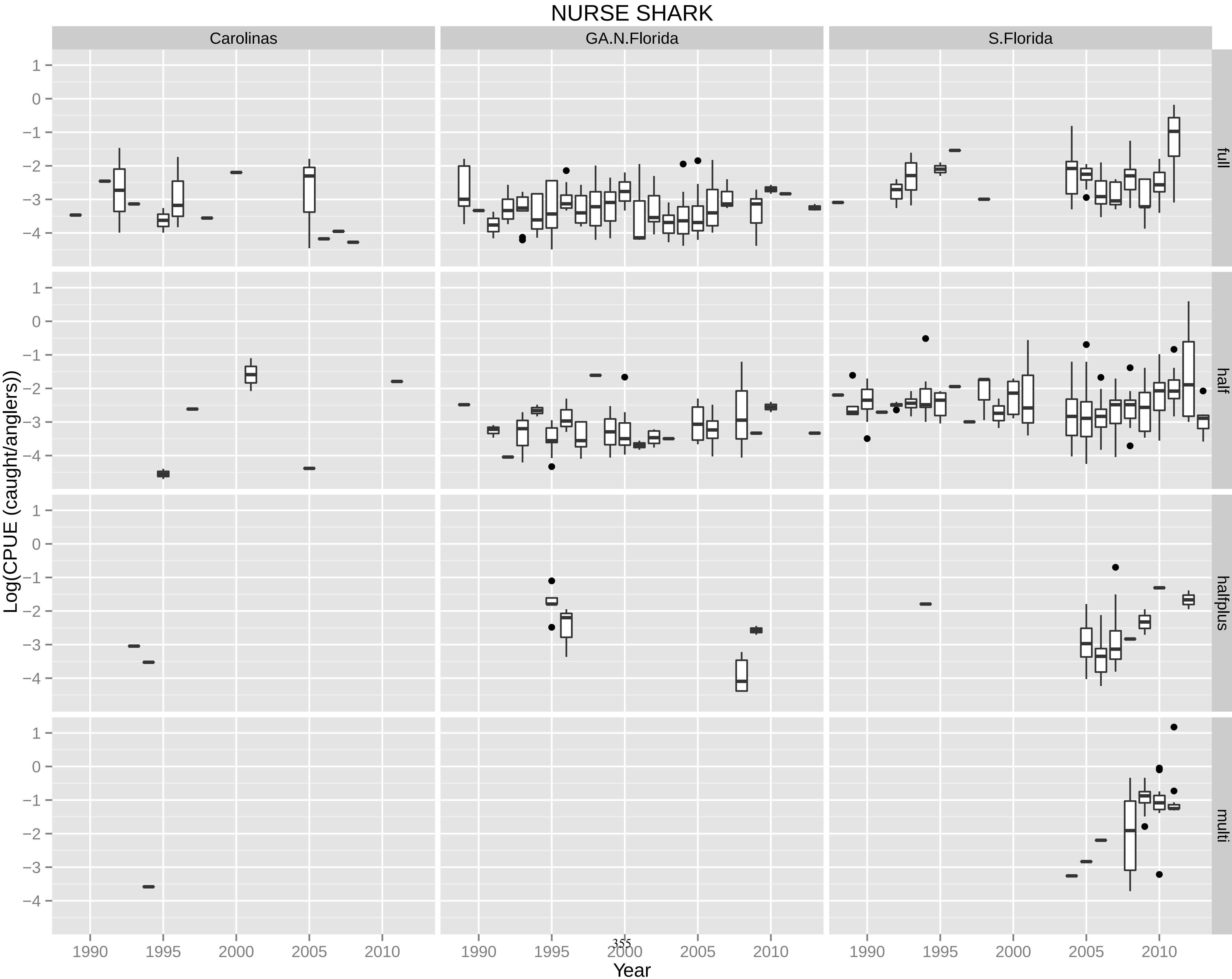
NASSAU GROUPER



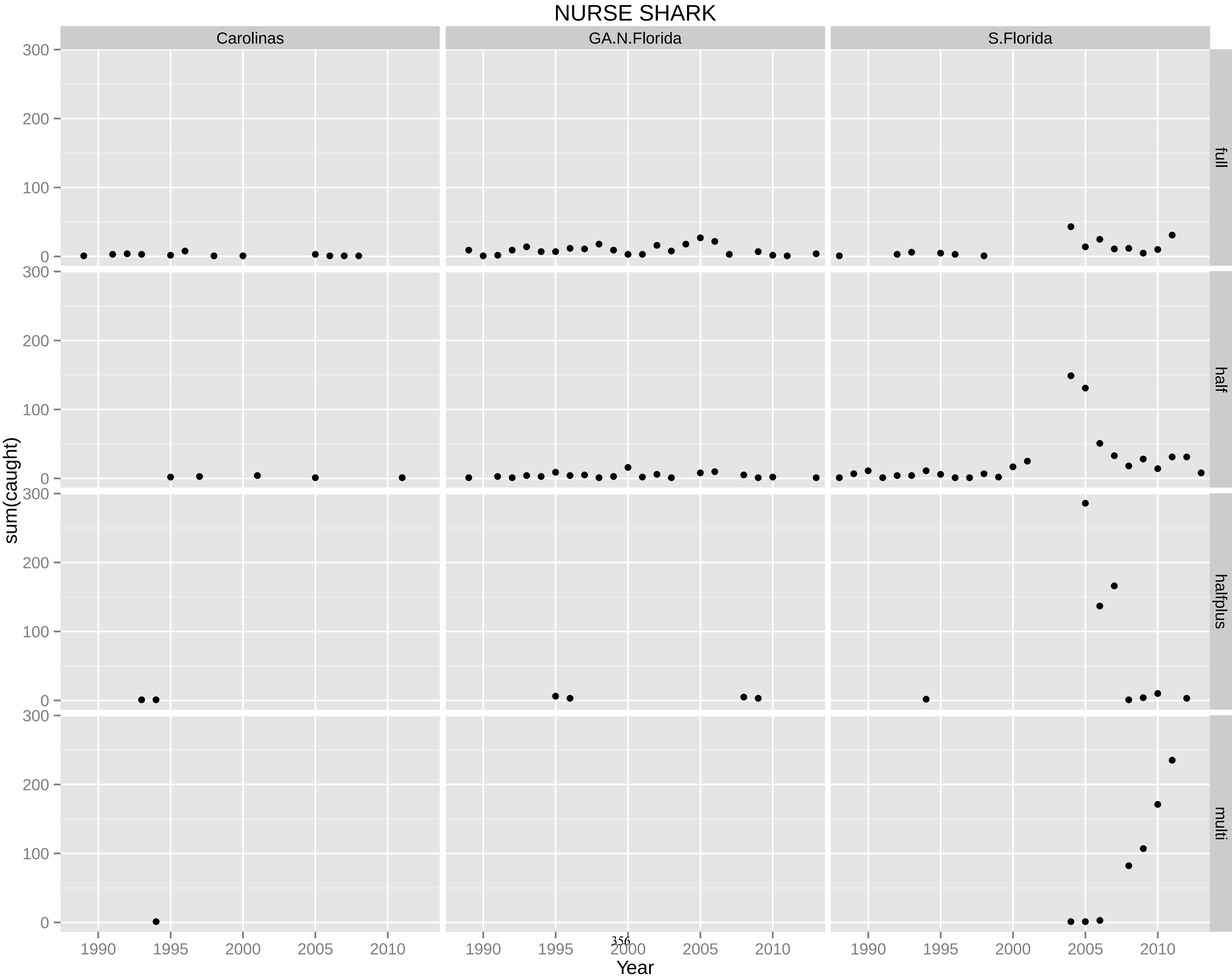

NASSAU GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
50
100
150
200
1980
1985
1990
1995
2000
2005

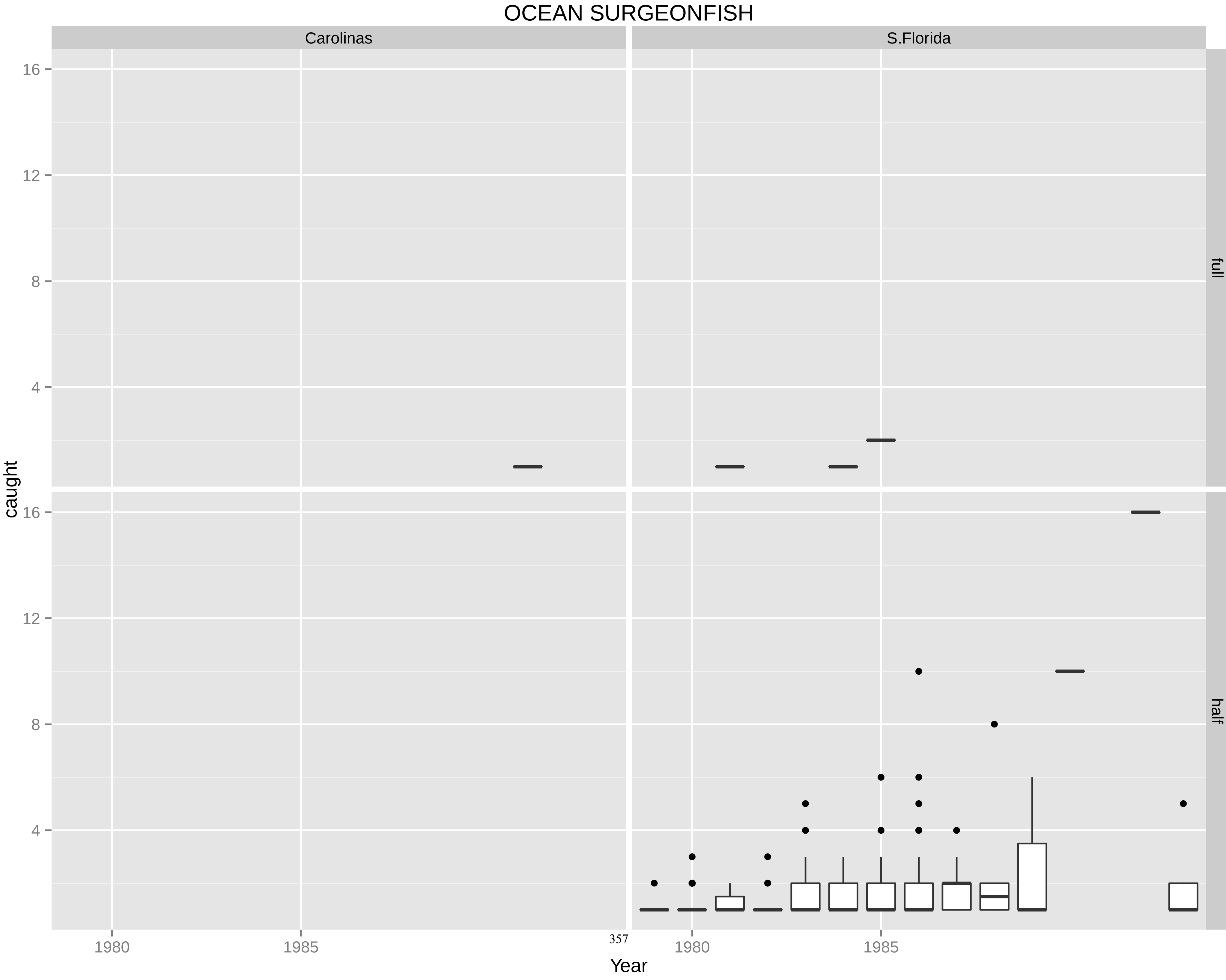

NURSE SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
25
50
75
100
1990
1995
2000
2005
2010


NURSE SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
1990
1995
2000
2005
2010

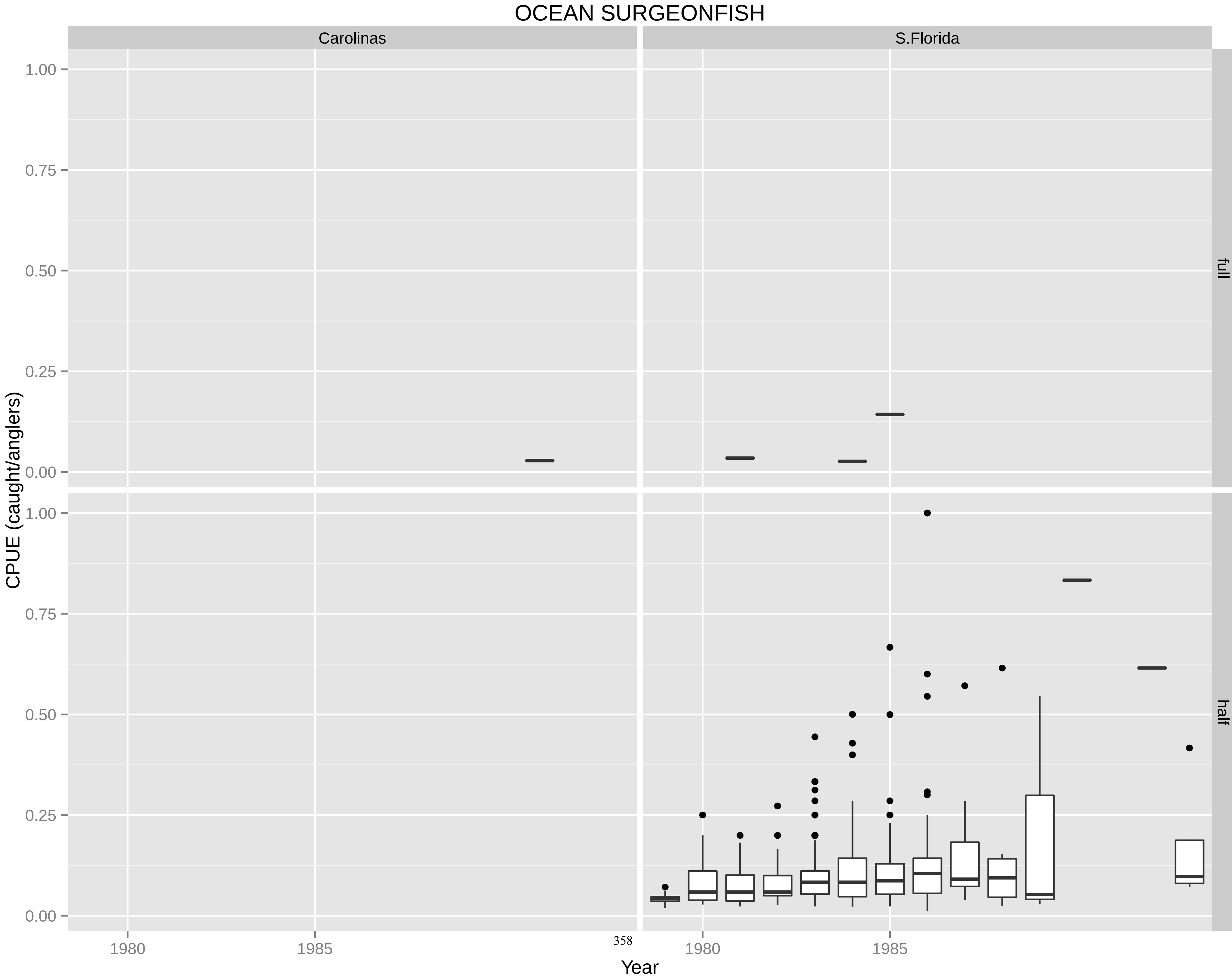


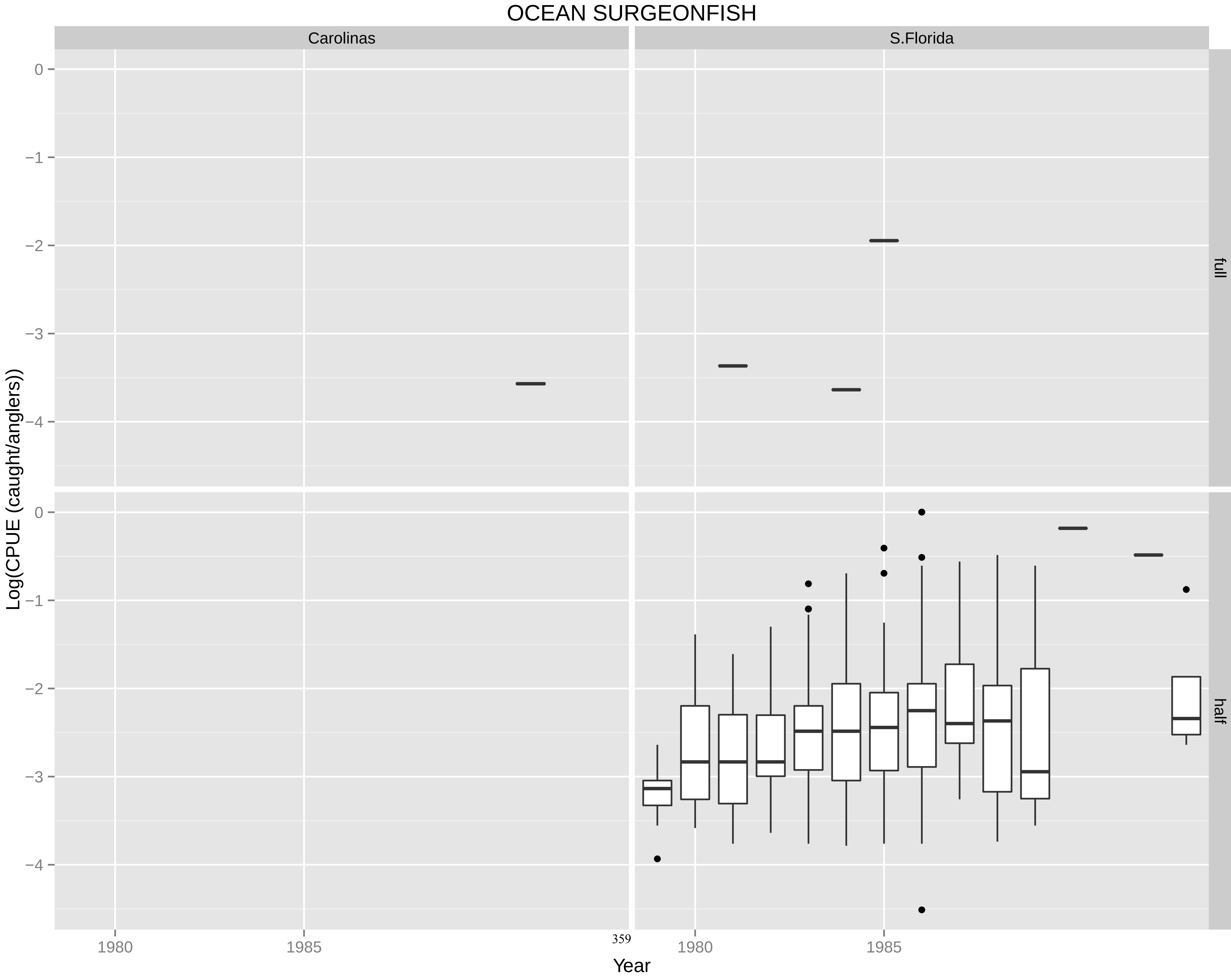
NURSE SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
1
0
−1
−2
−3
−4
1990
1995
2000
2005
2010
Year

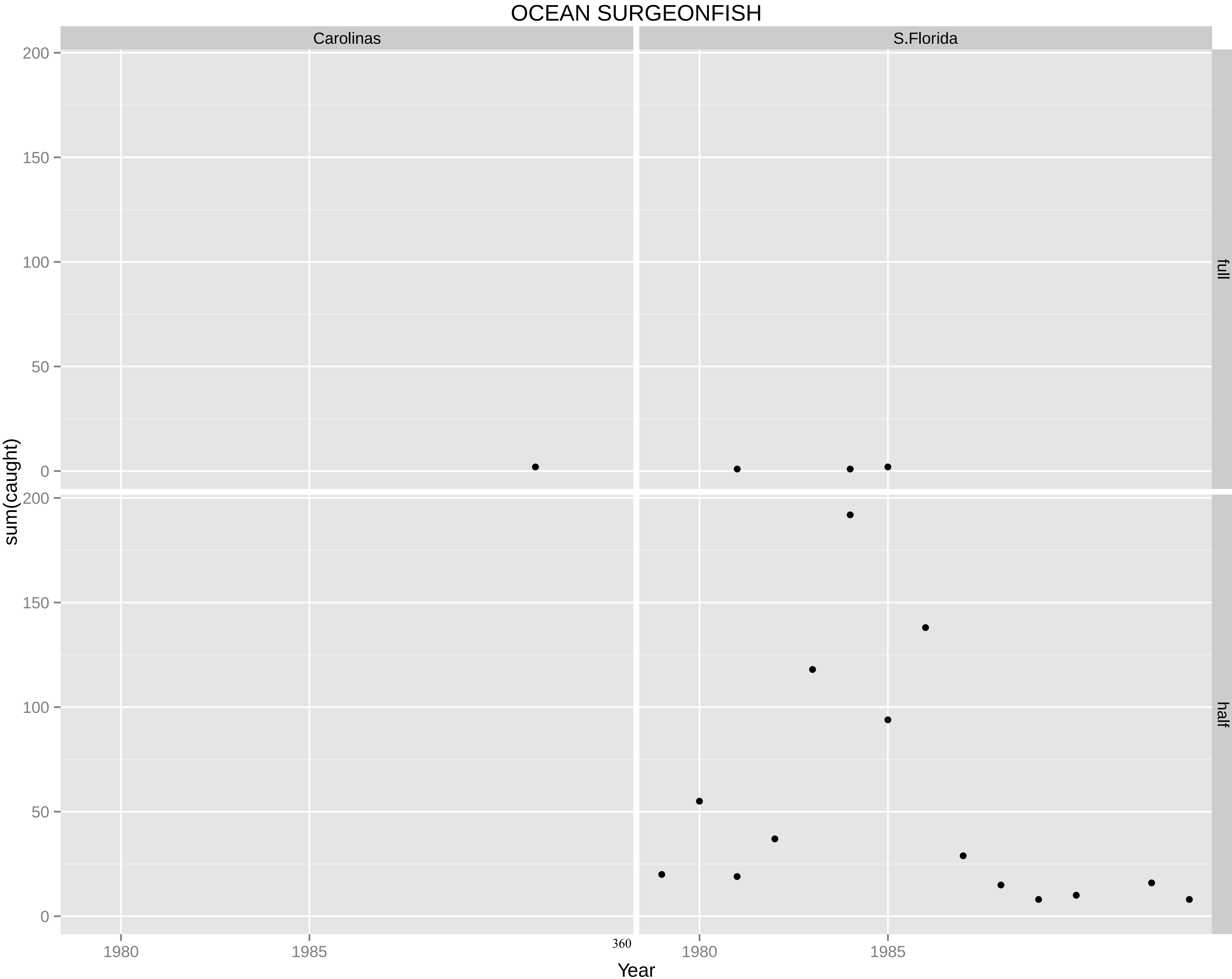

NURSE SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
100
200
300
1990
1995
2000
2005
2010

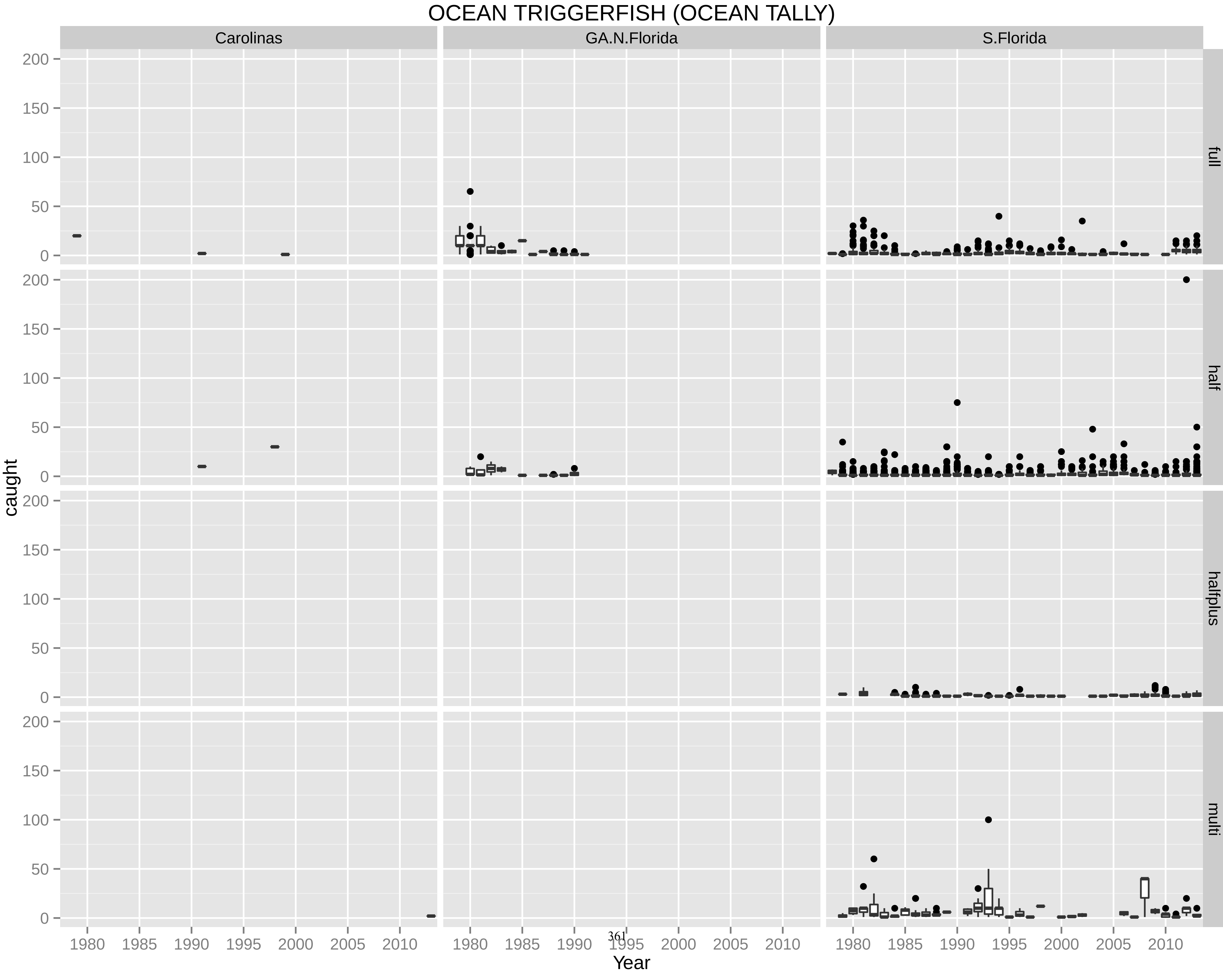


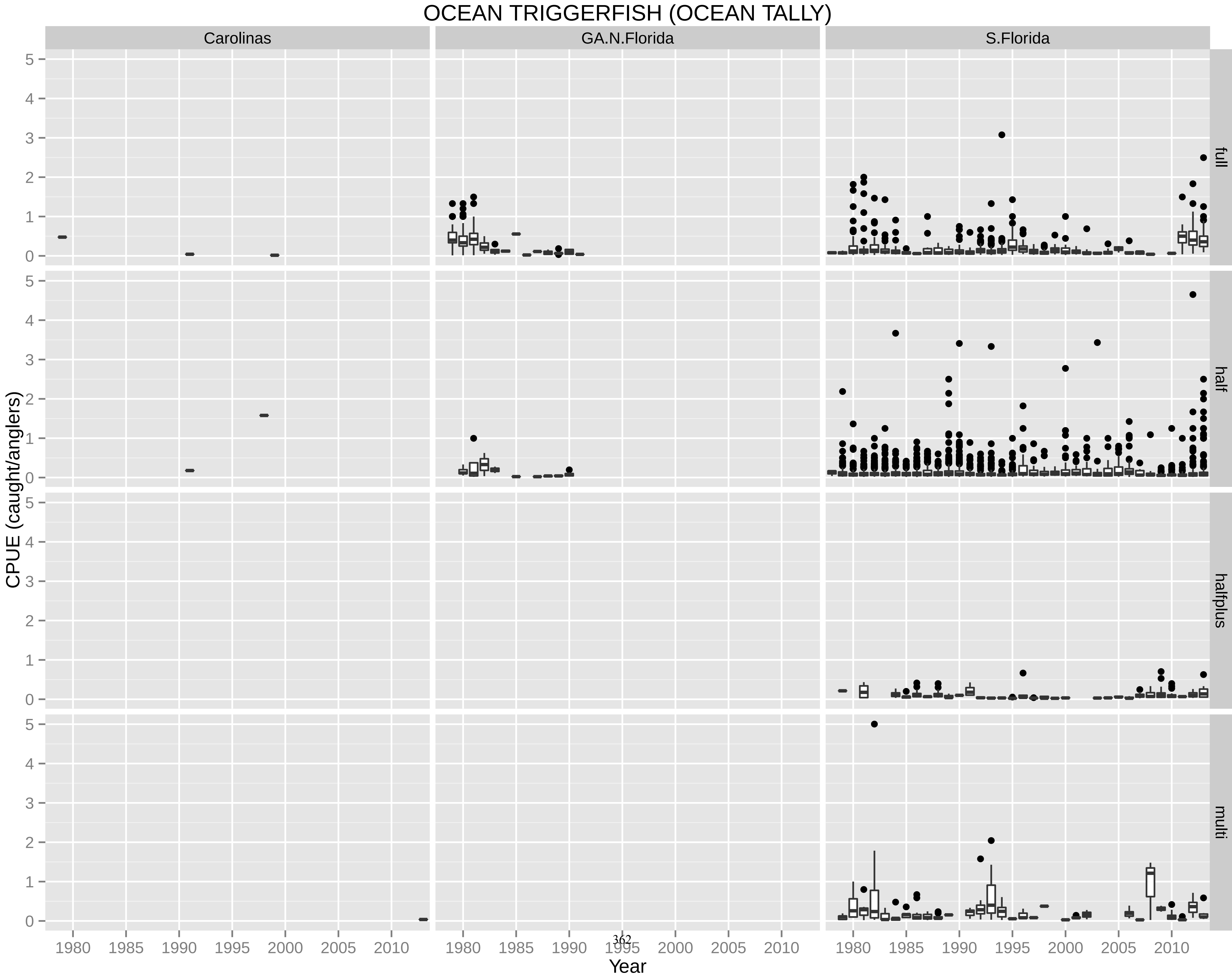
OCEAN SURGEONFISH
Carolinas
S.Florida
full
half
caught
16
12
8
4
1980
1985
Year

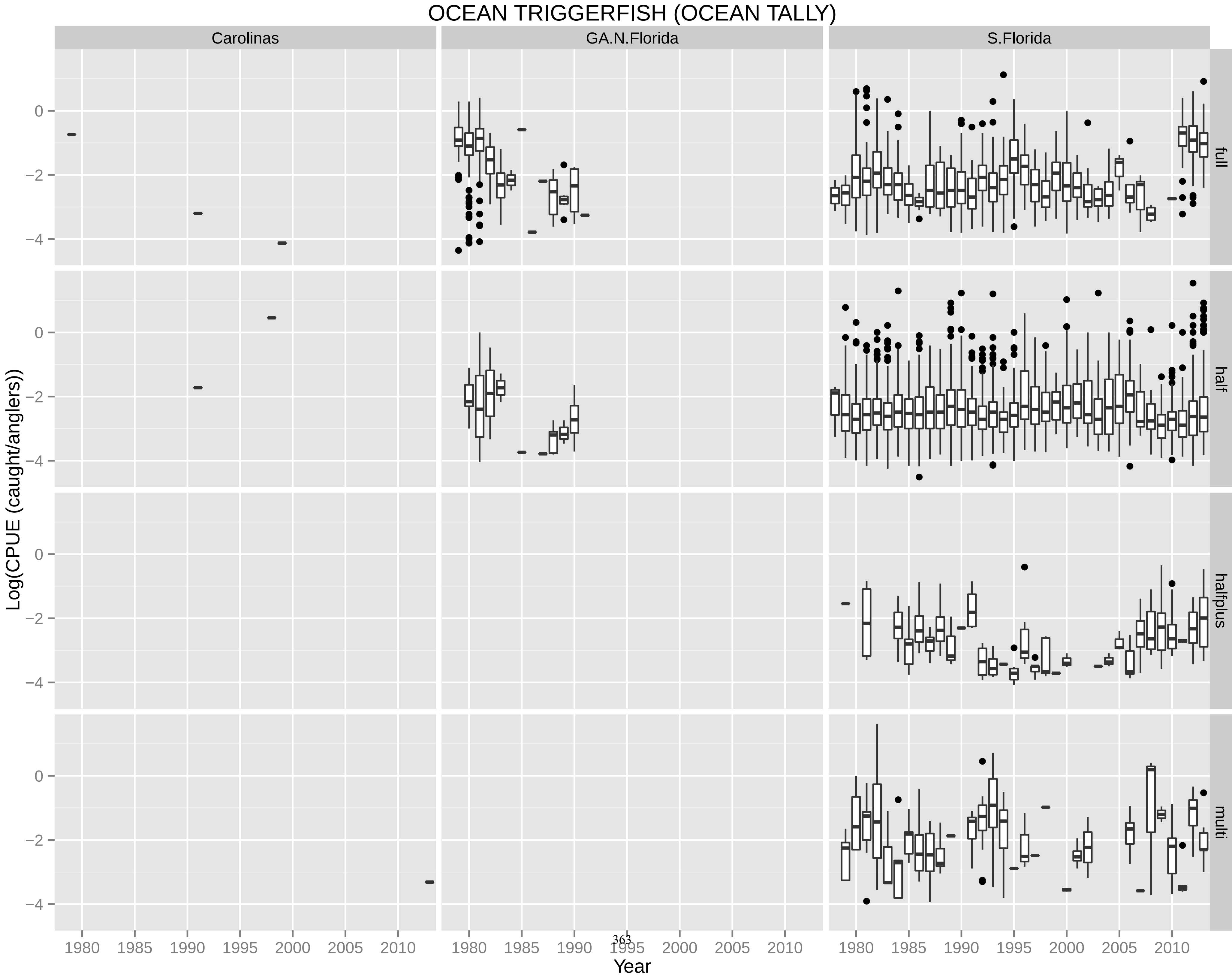

OCEAN SURGEONFISH
Carolinas
S.Florida
full
half
CPUE (caught/anglers)
1.00
0.75
0.50
0.25
0.00
1980
1985
Year

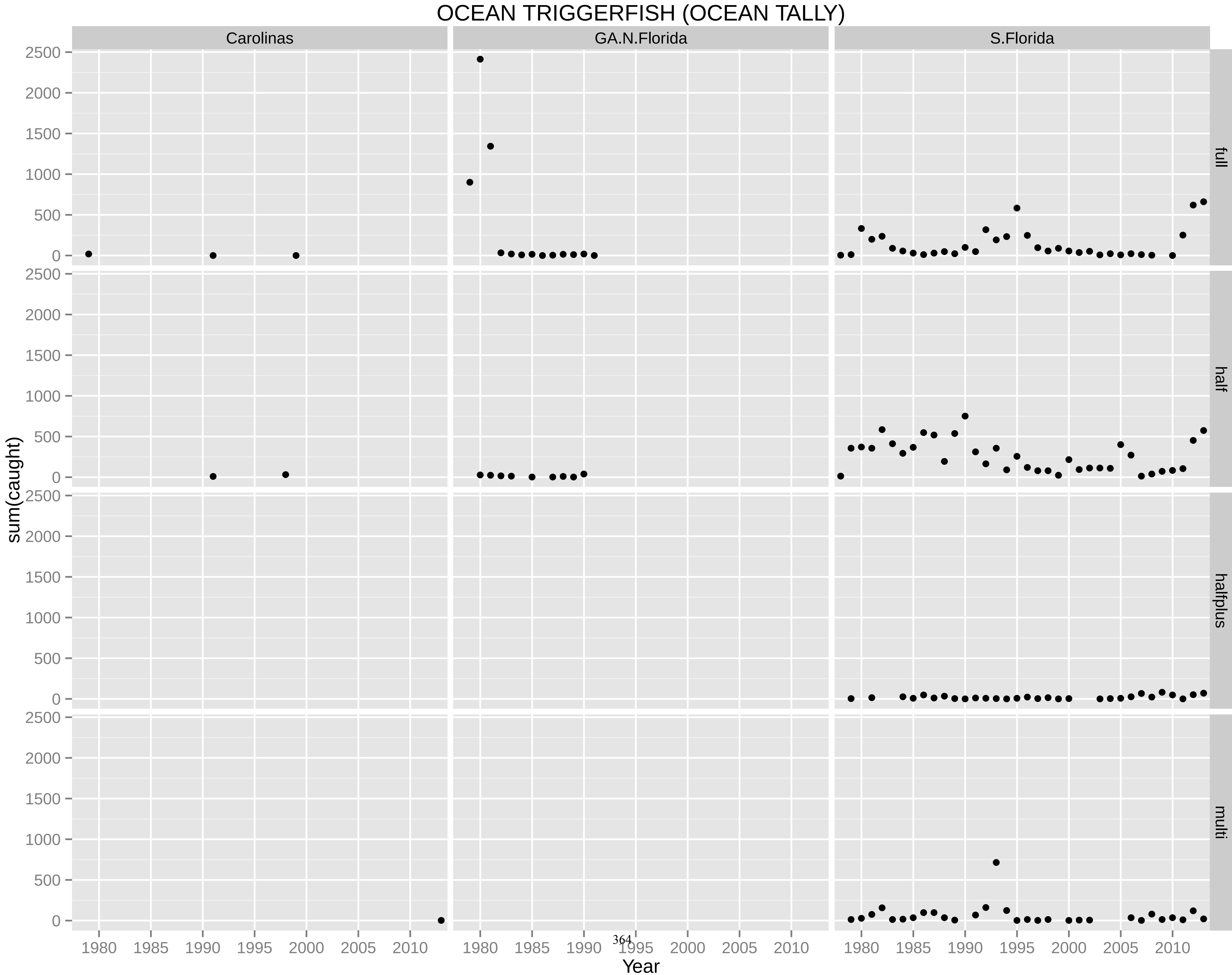

OCEAN SURGEONFISH
Carolinas
S.Florida
full
half
Log(CPUE (caught/anglers))
0
−1
−2
−3
−4
1980
1985
Year

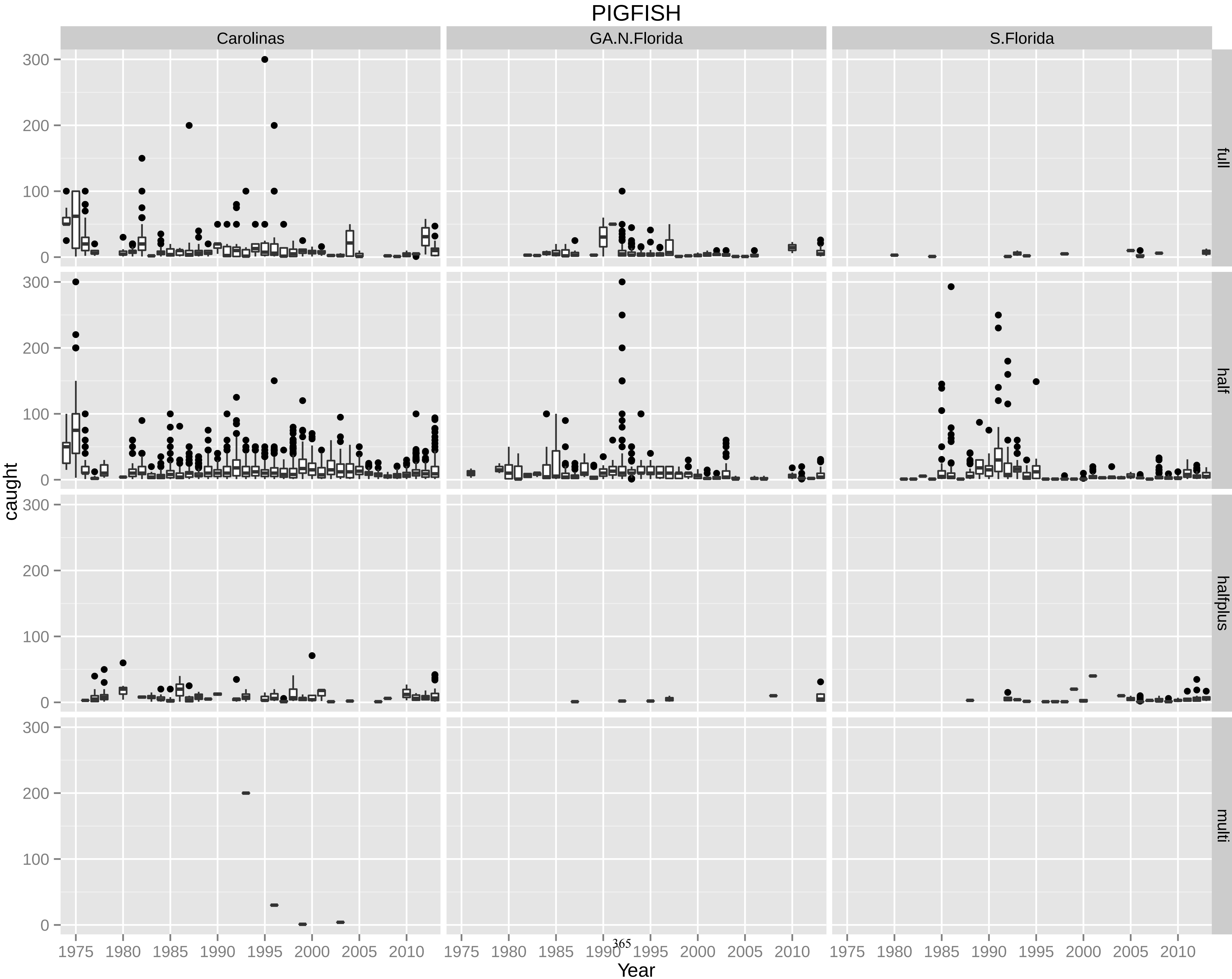

OCEAN SURGEONFISH
Carolinas
S.Florida
full
half
sum(caught)
Year
0
50
100
150
200
1980
1985

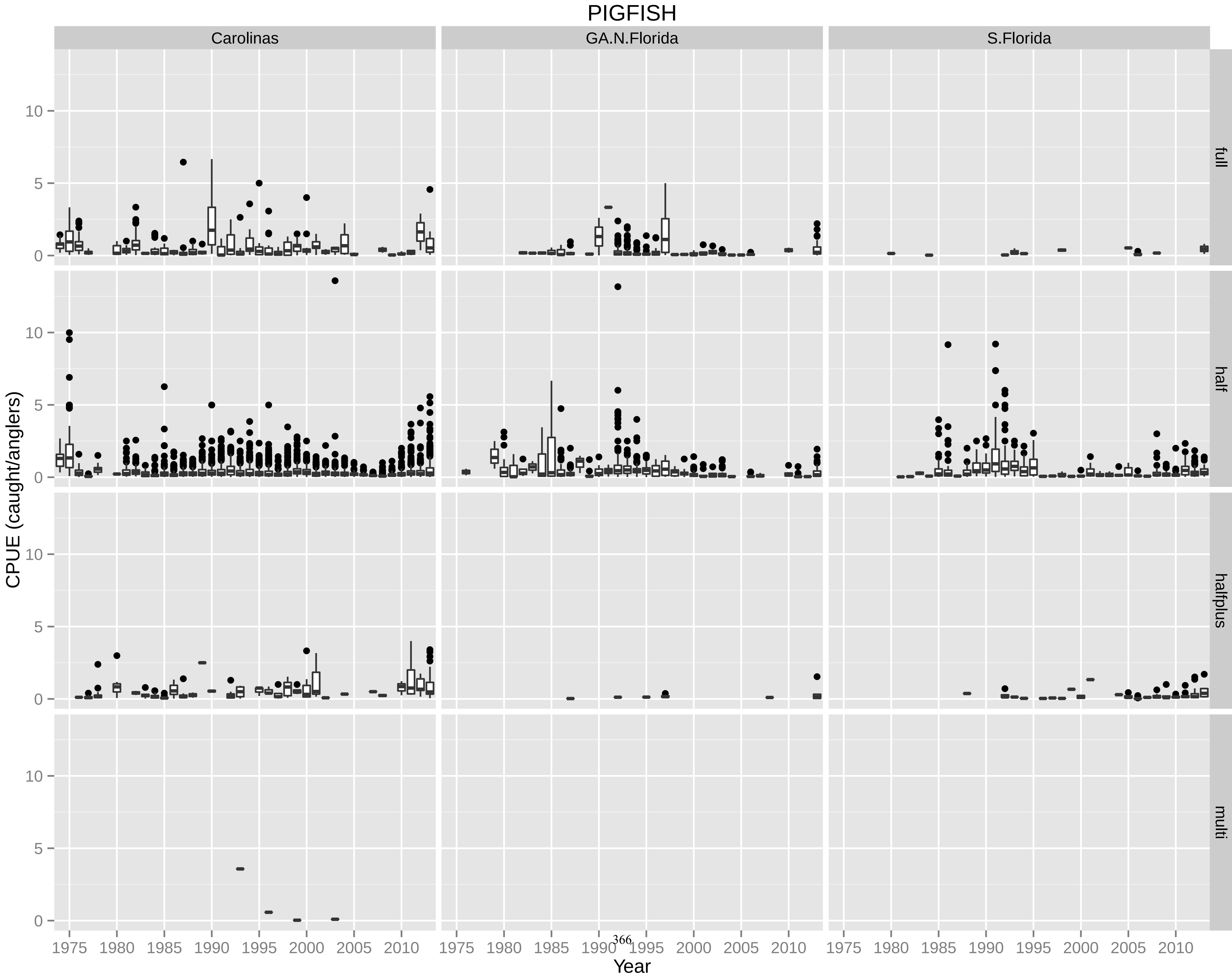

OCEAN TRIGGERFISH (OCEAN TALLY)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
200
1980
1985
1990
1995
2000
2005
2010

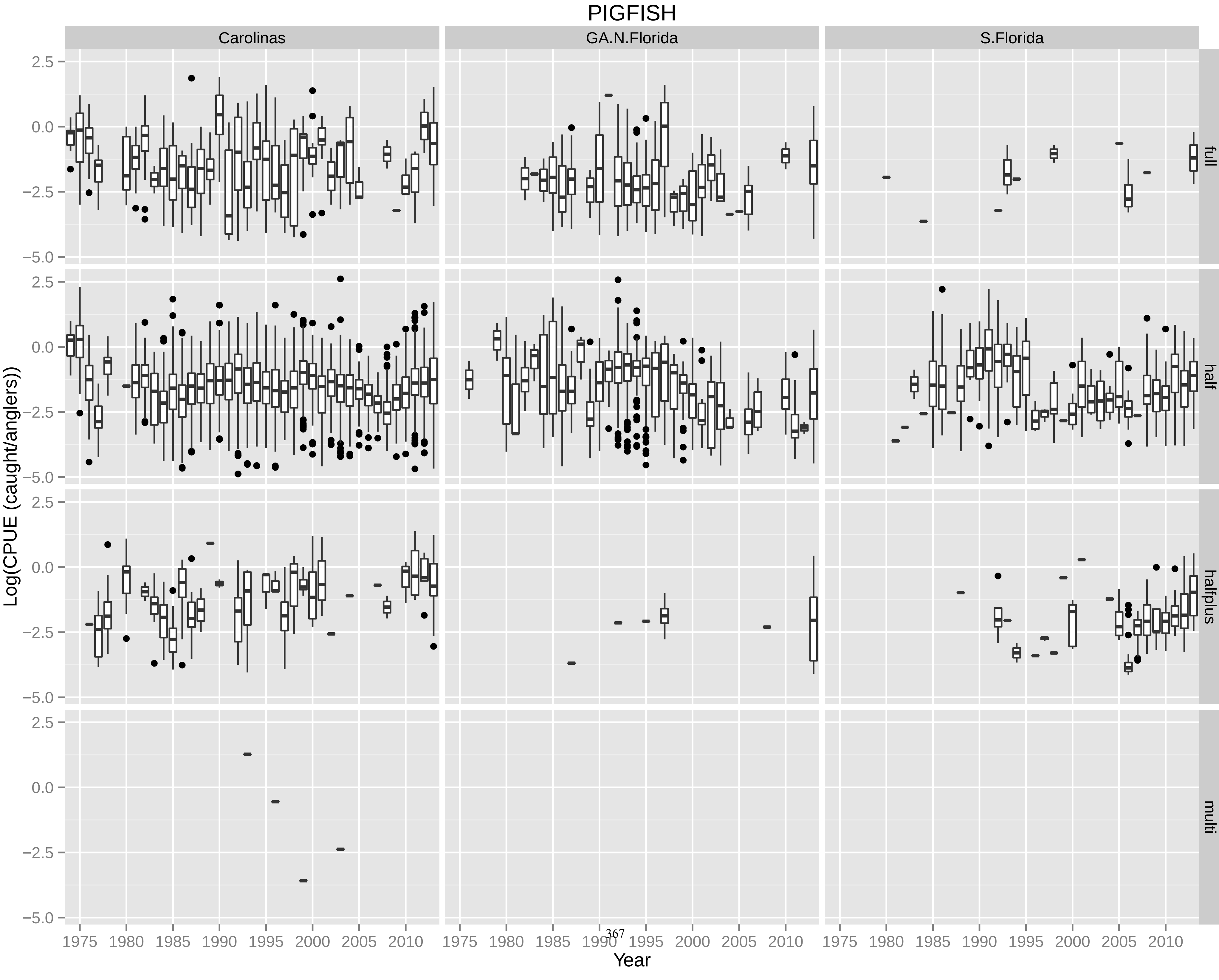

OCEAN TRIGGERFISH (OCEAN TALLY)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
4
5
1980
1985
1990
1995
2000
2005
2010

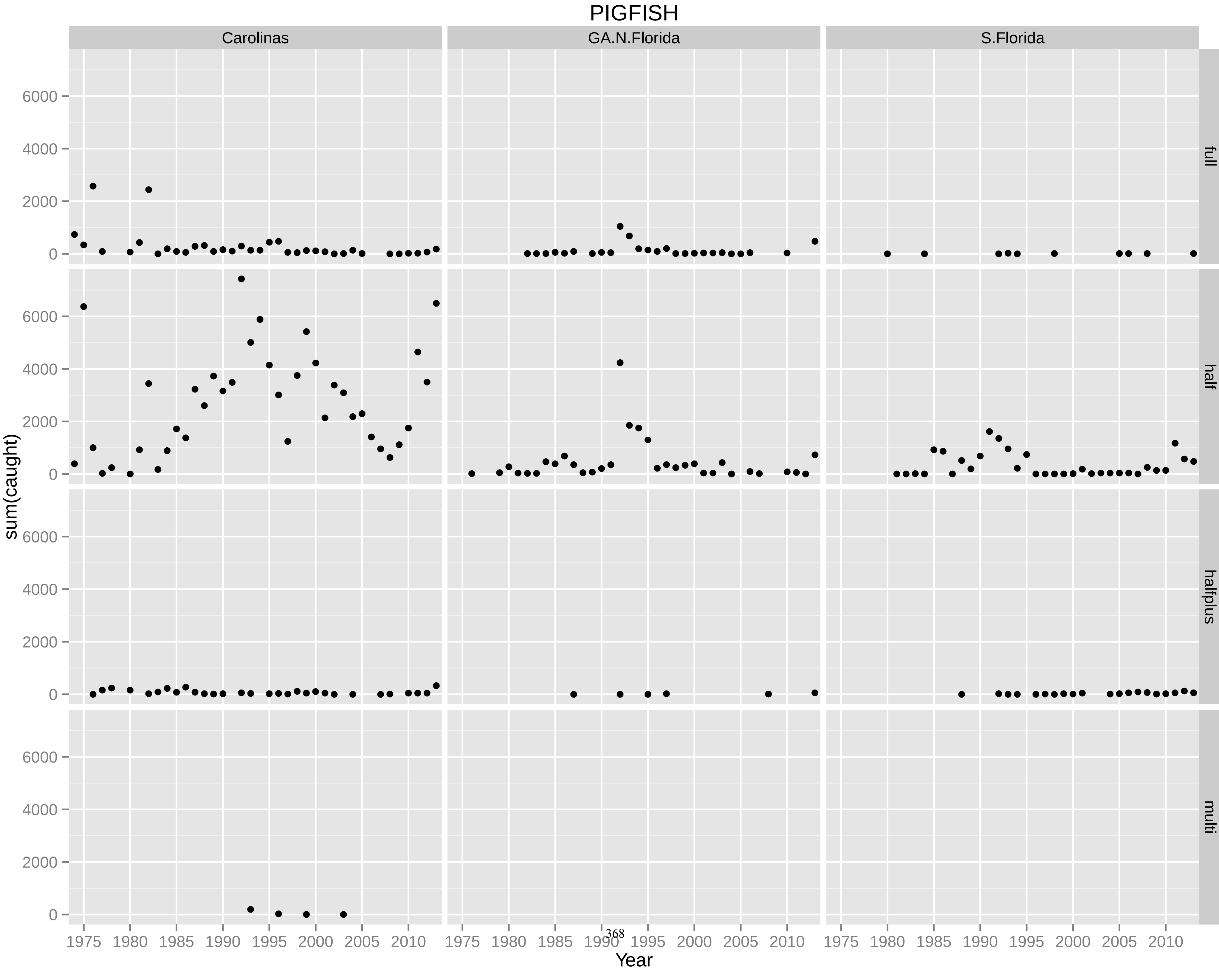

OCEAN TRIGGERFISH (OCEAN TALLY)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−2
−4
1980
1985
1990
1995
2000
2005
2010

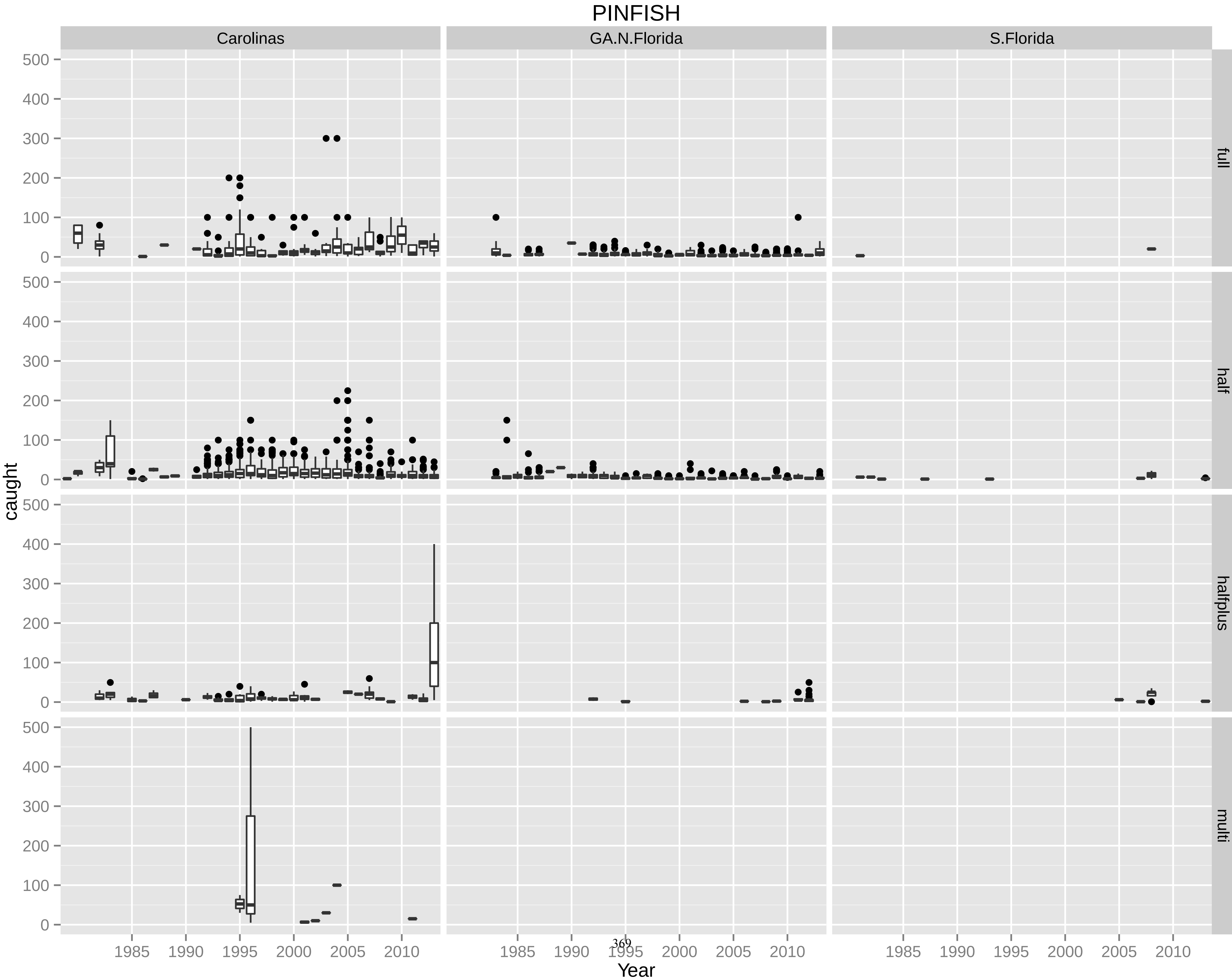

OCEAN TRIGGERFISH (OCEAN TALLY)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
2000
2500
1980
1985
1990
1995
2000
2005
2010

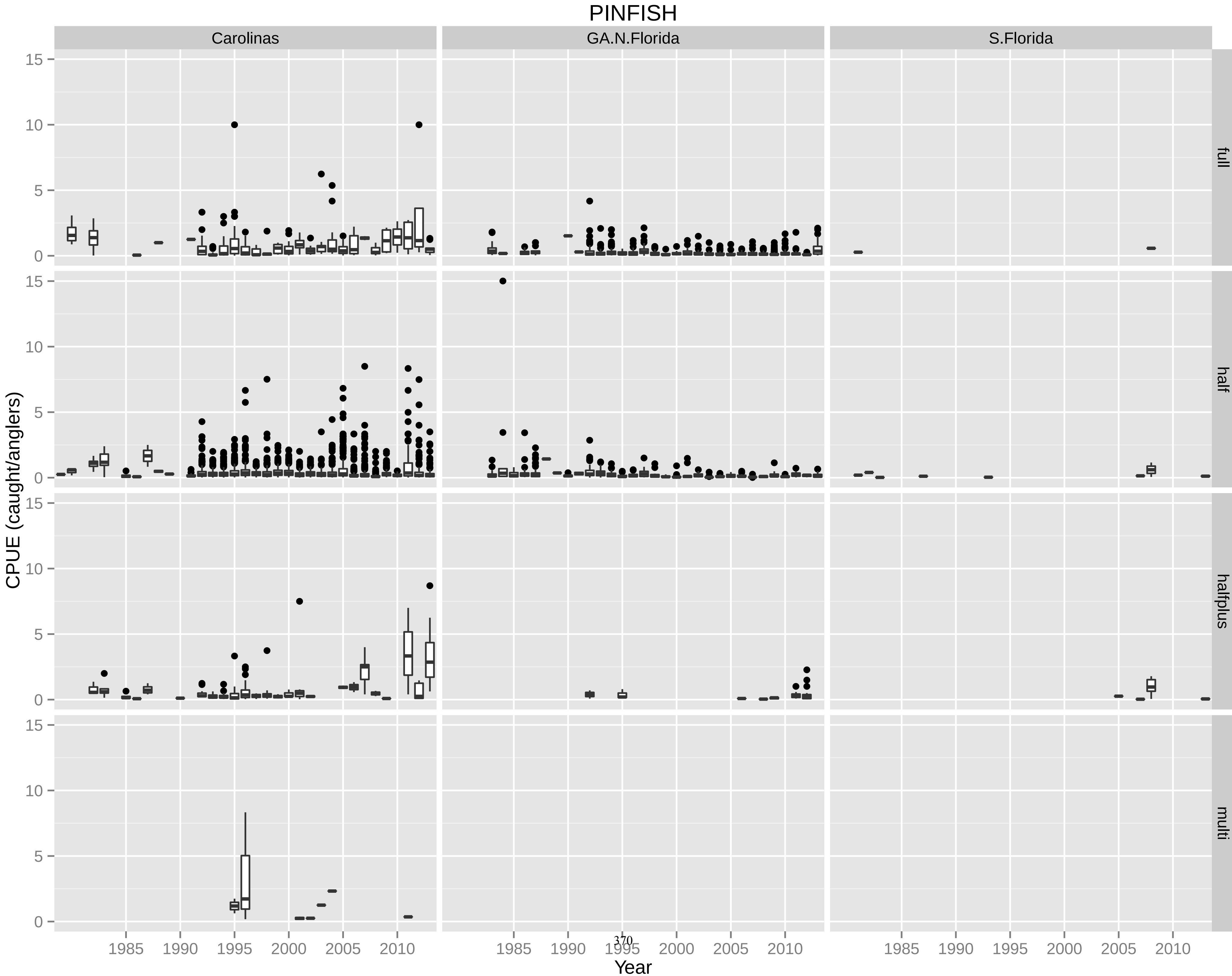

PIGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
1975
1980
1985
1990
1995
2000
2005
2010

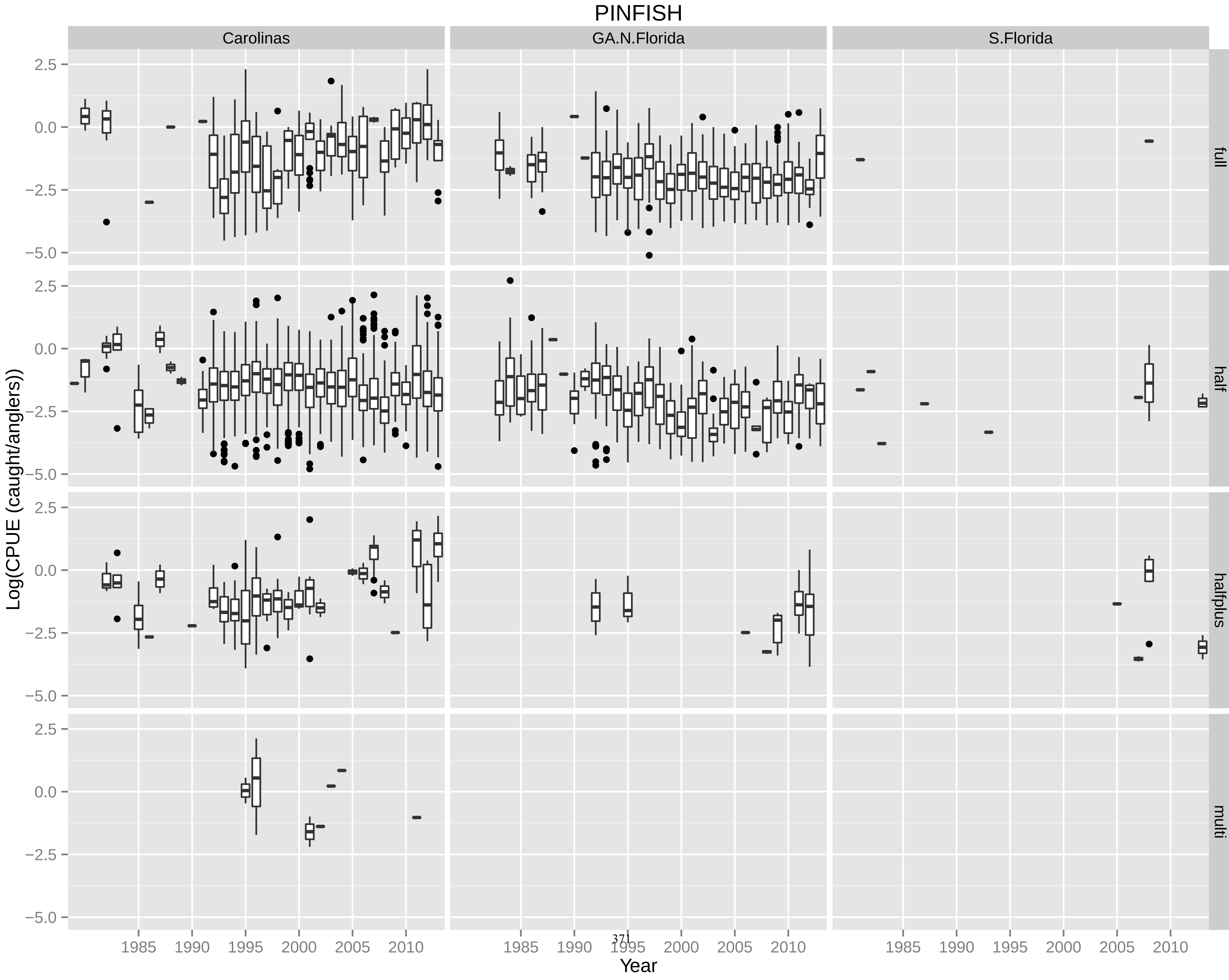

PIGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
1975
1980
1985
1990
1995
2000
2005
2010

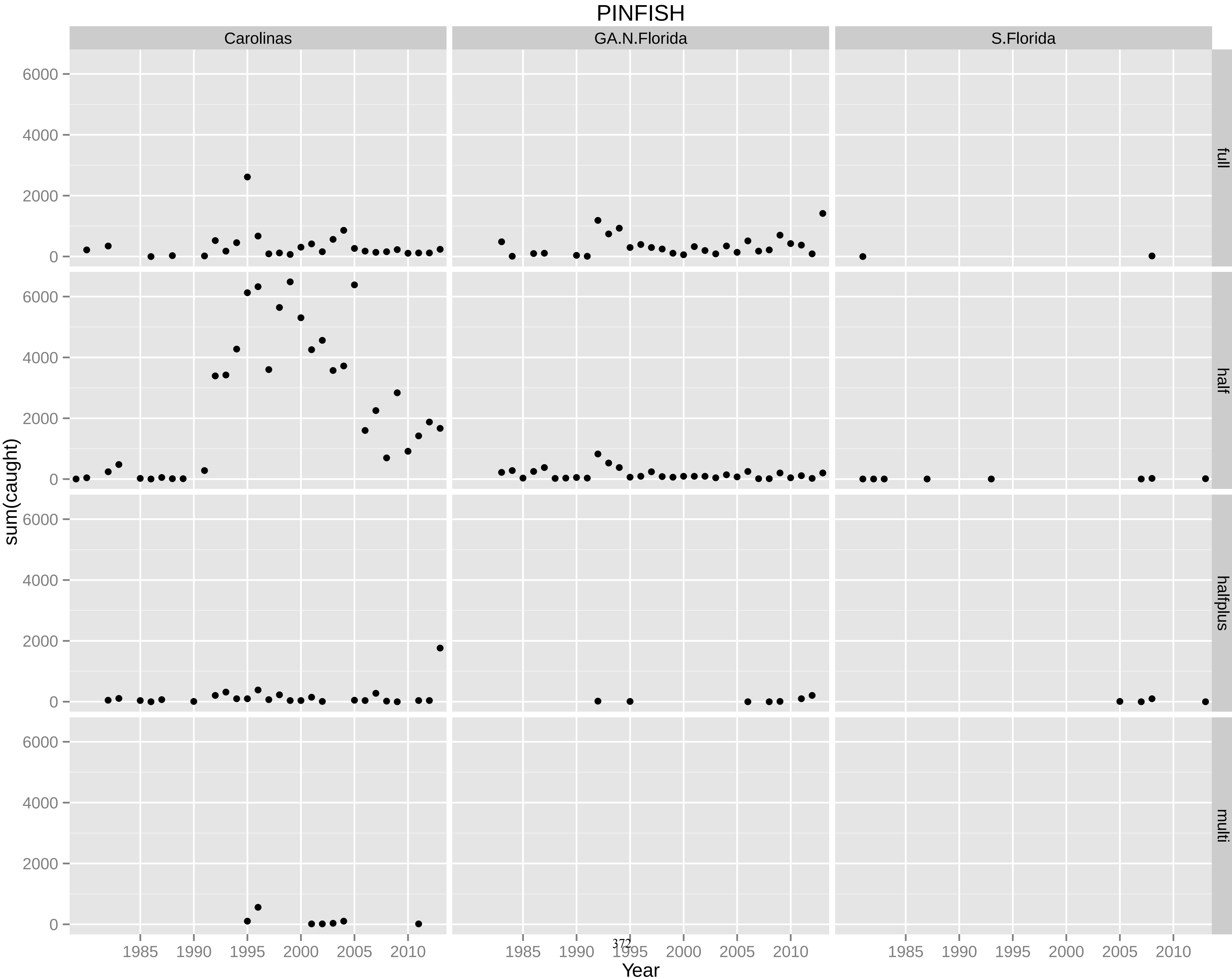

PIGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010
Year

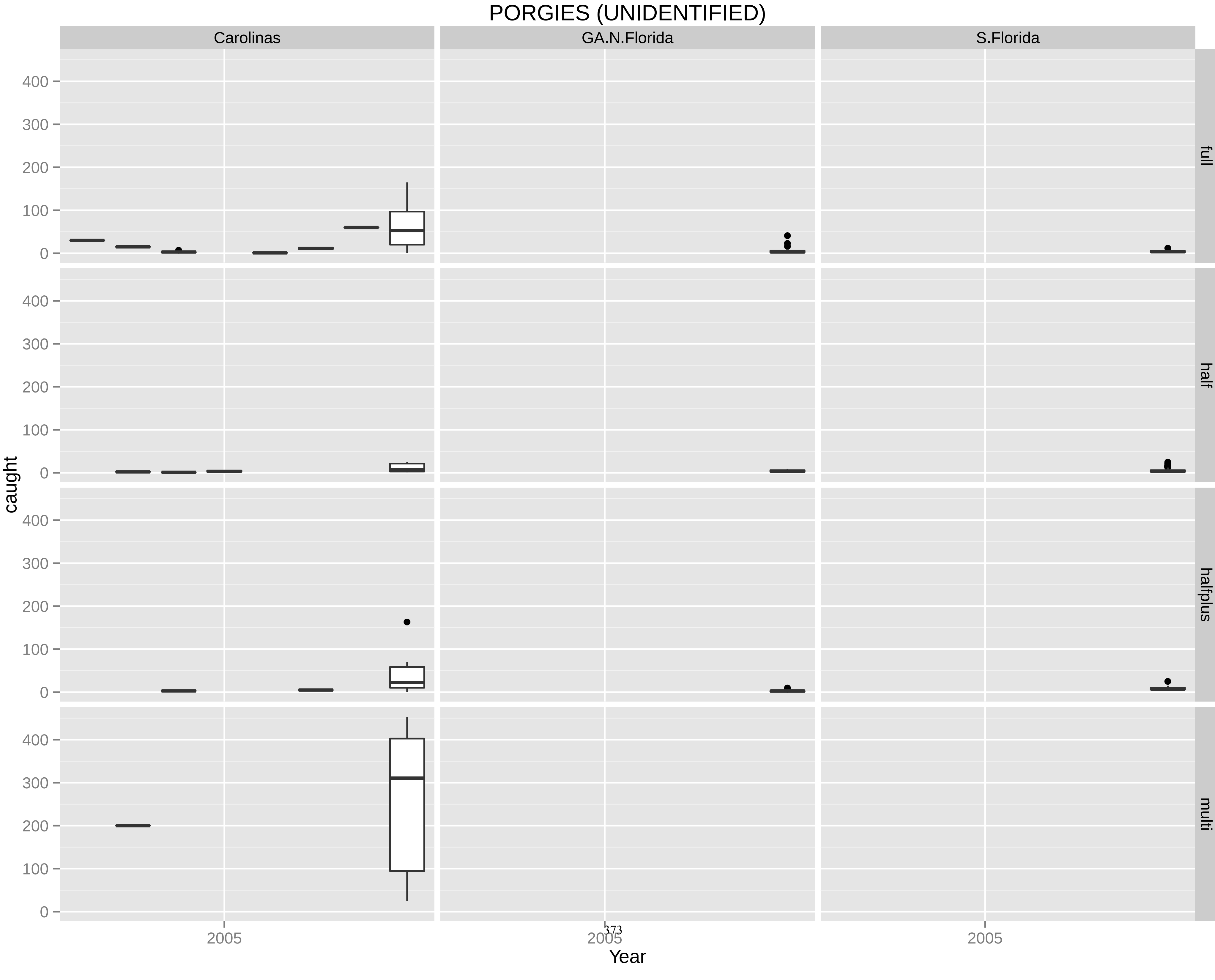

PIGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
2000
4000
6000
1975
1980
1985
1990
1995
2000
2005
2010


PINFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
400
500
1985
1990
1995
2000
2005
2010

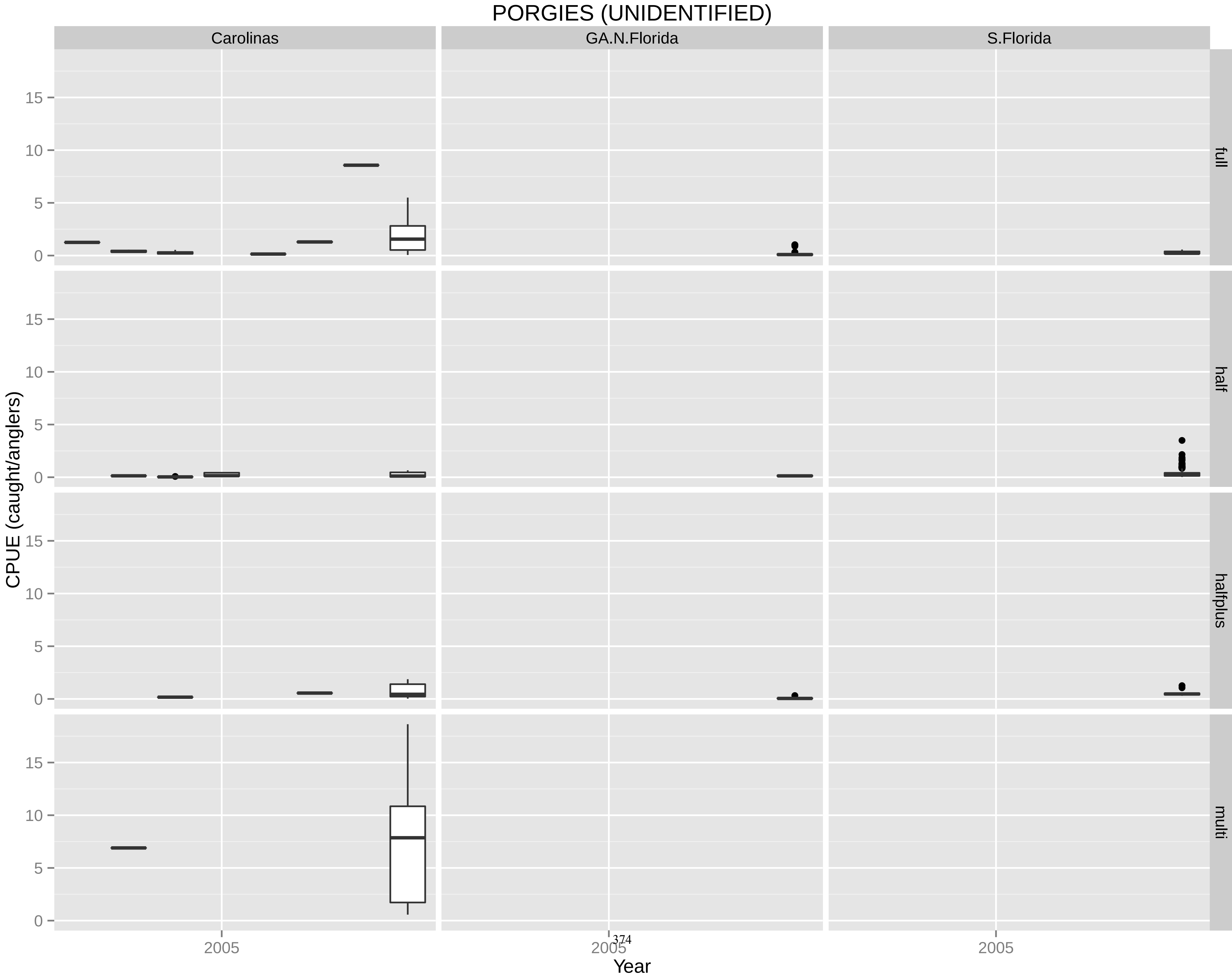

PINFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
1985
1990
1995
2000
2005
2010

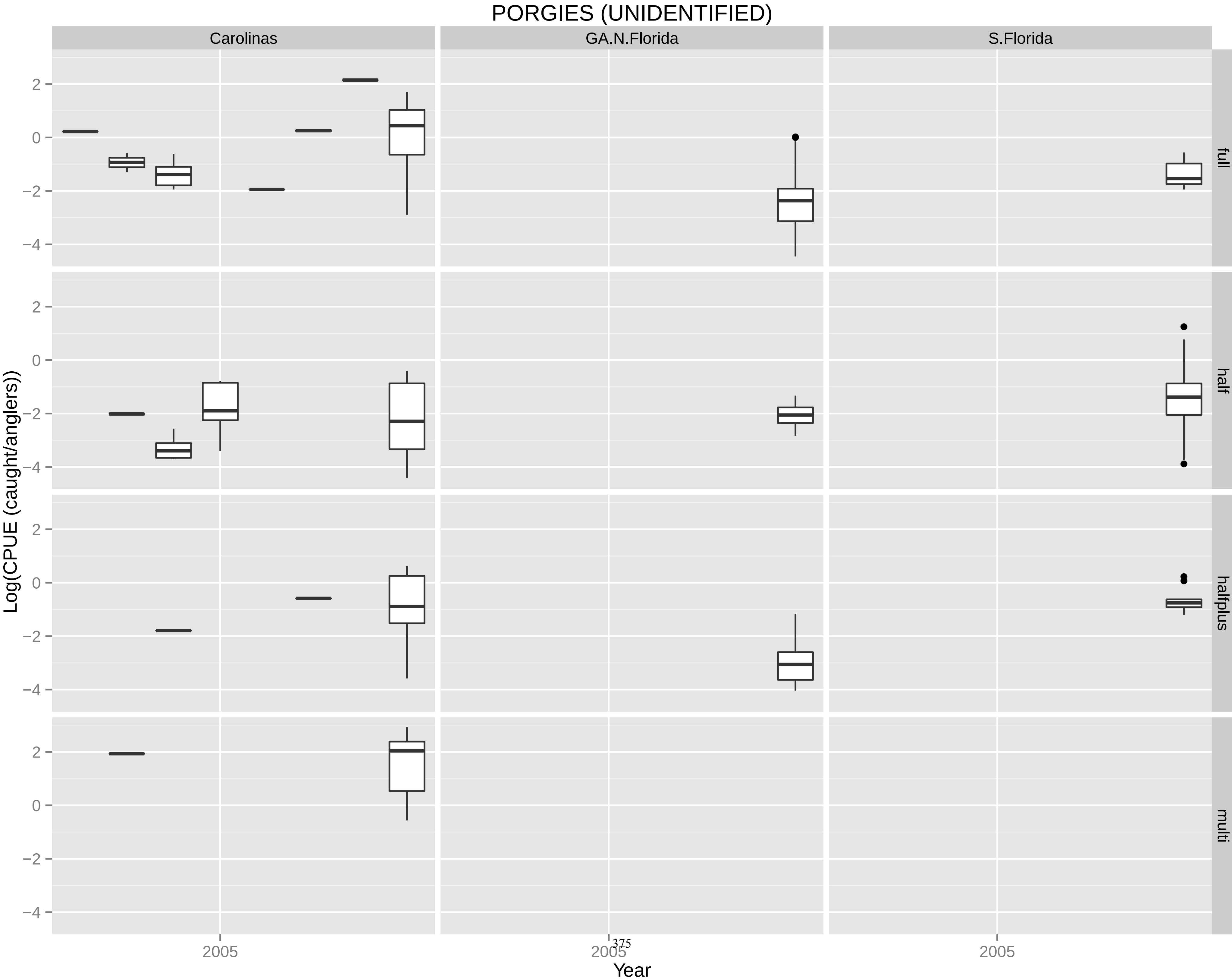

PINFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1985
1990
1995
2000
2005
2010

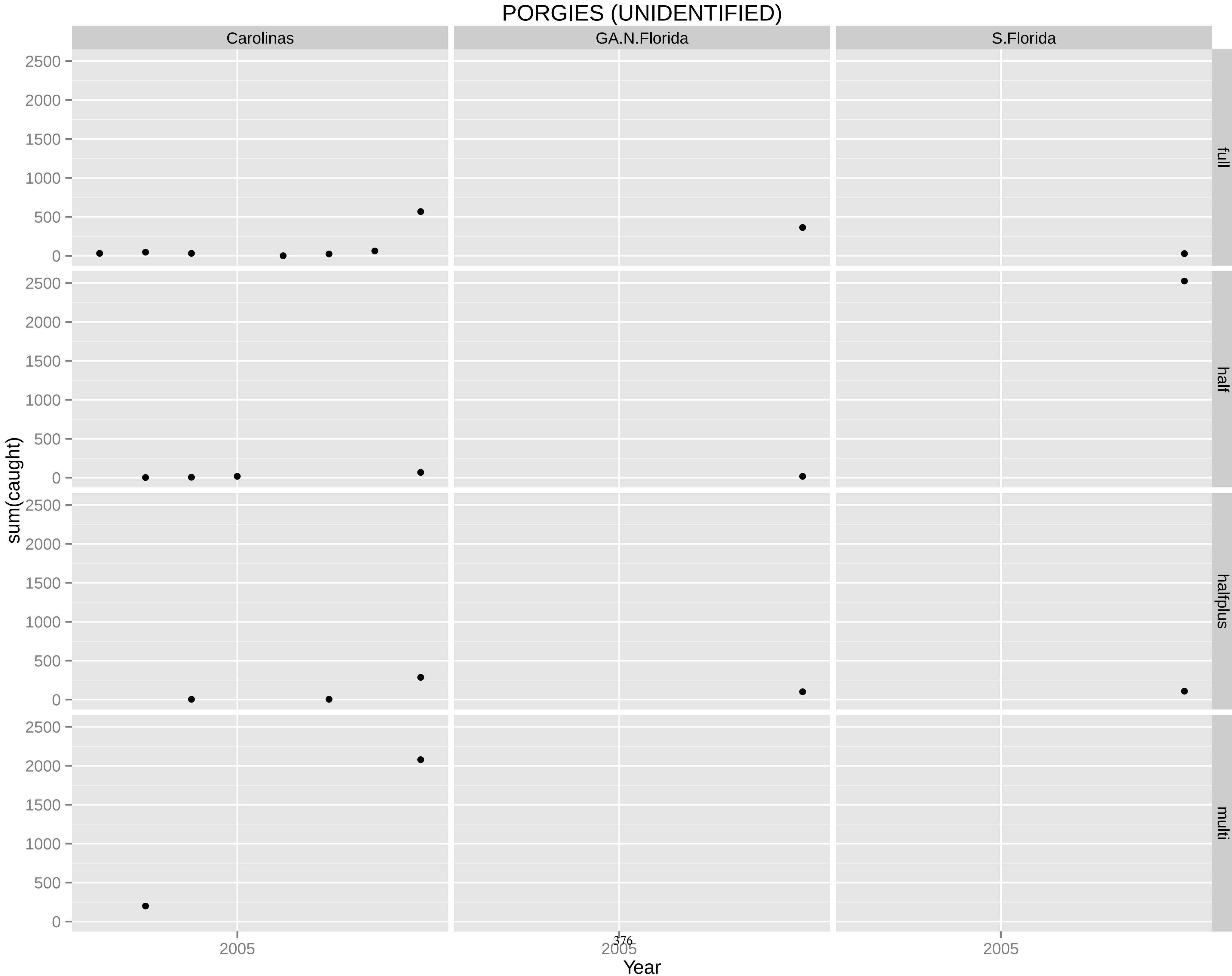

PINFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
2000
4000
6000
1985
1990
1995
2000
2005
2010



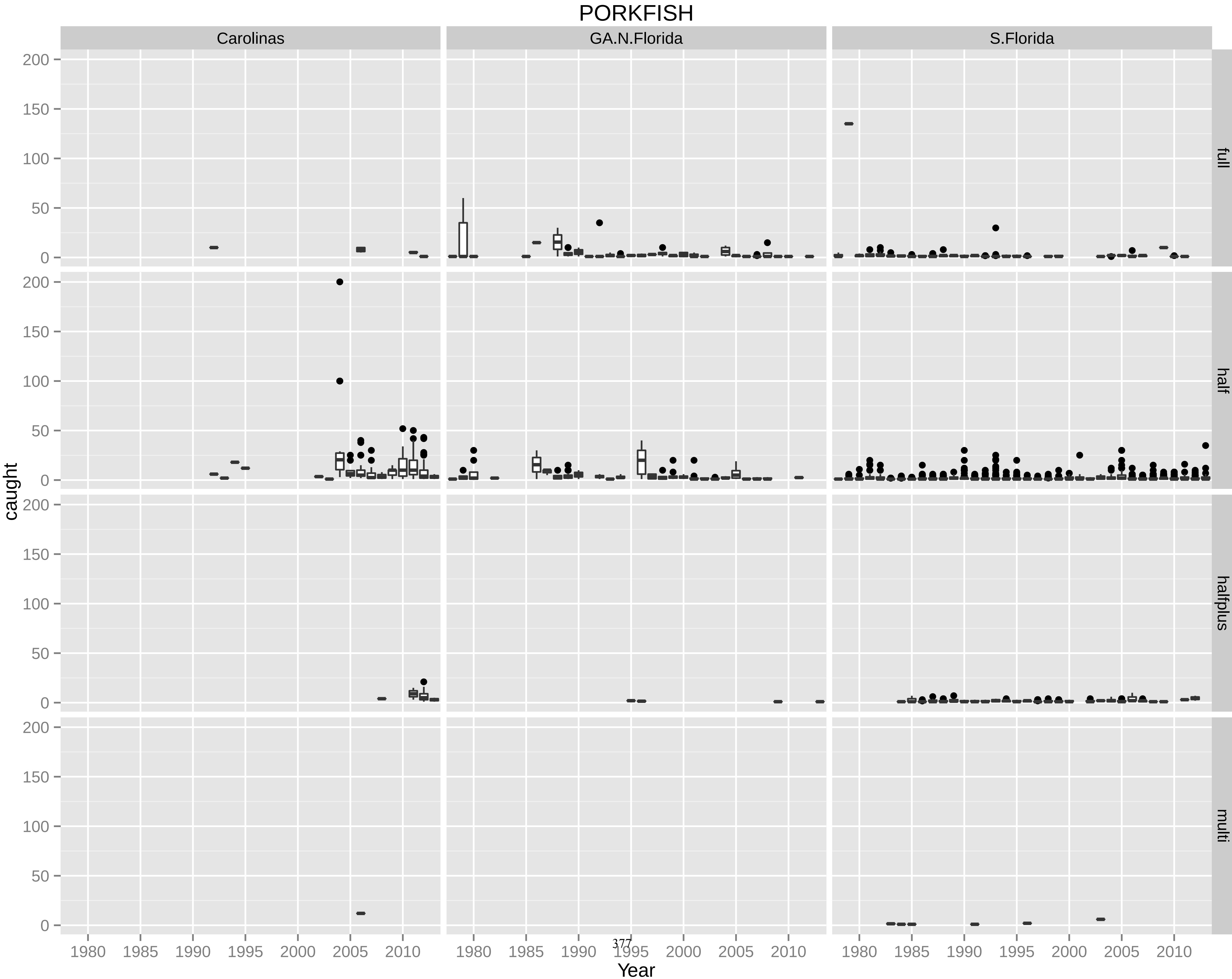
PORGIES (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
400
300
200
100
0
2005
Year


PORGIES (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0
5
10
15
2005
Year

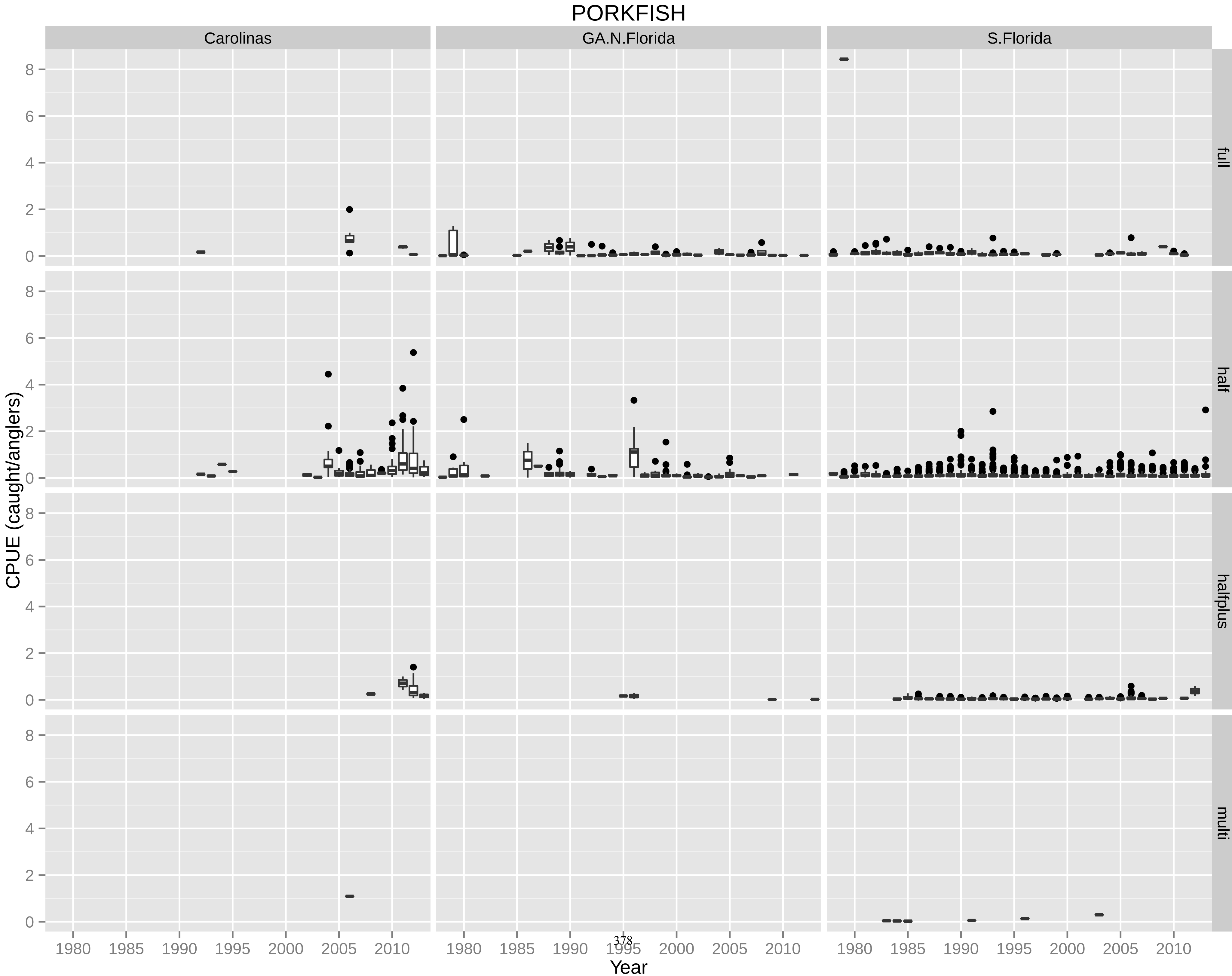

PORGIES (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
2
0
−2
−4
2005
Year

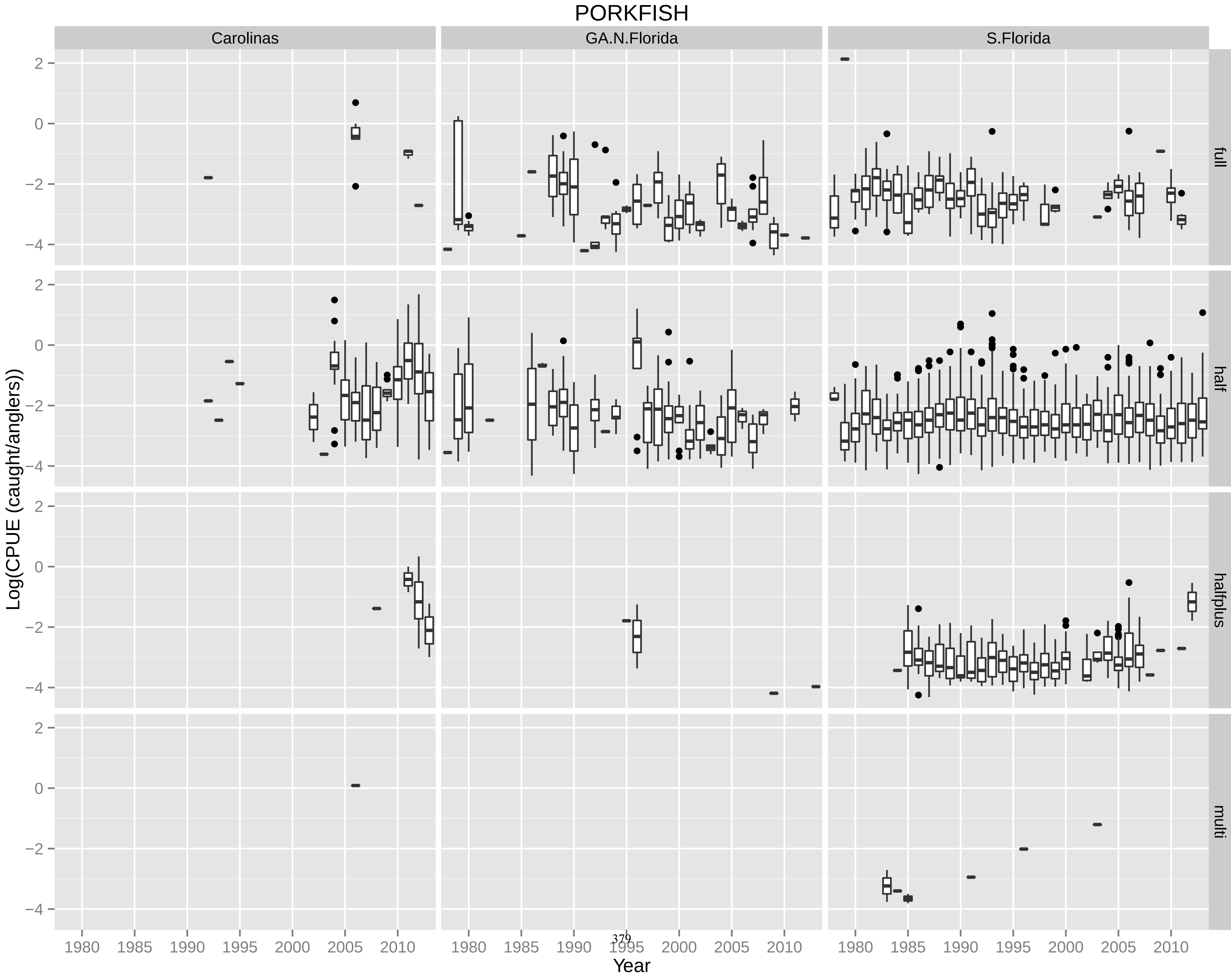


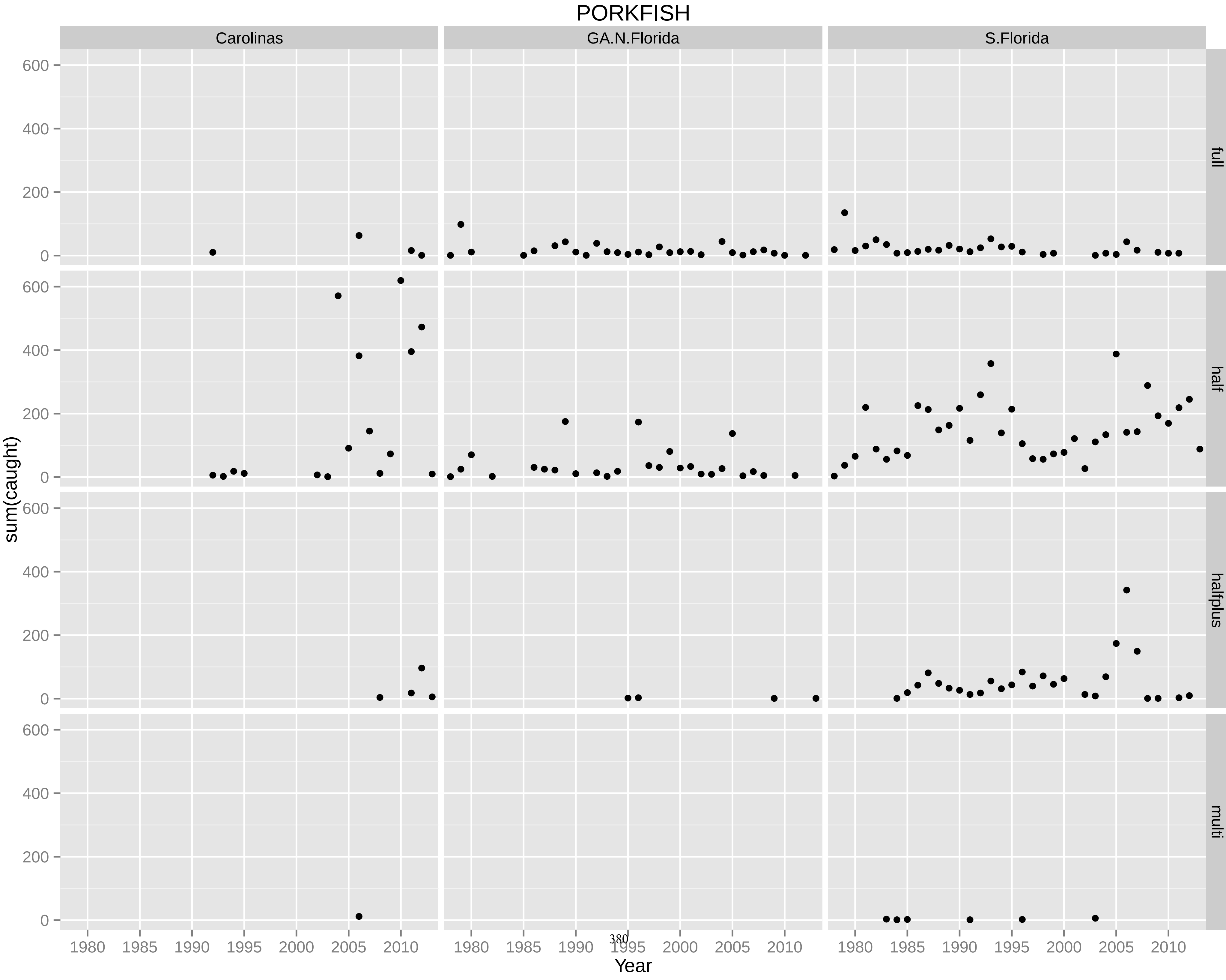
PORGIES (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
500
1000
1500
2000
2500
2005
Year



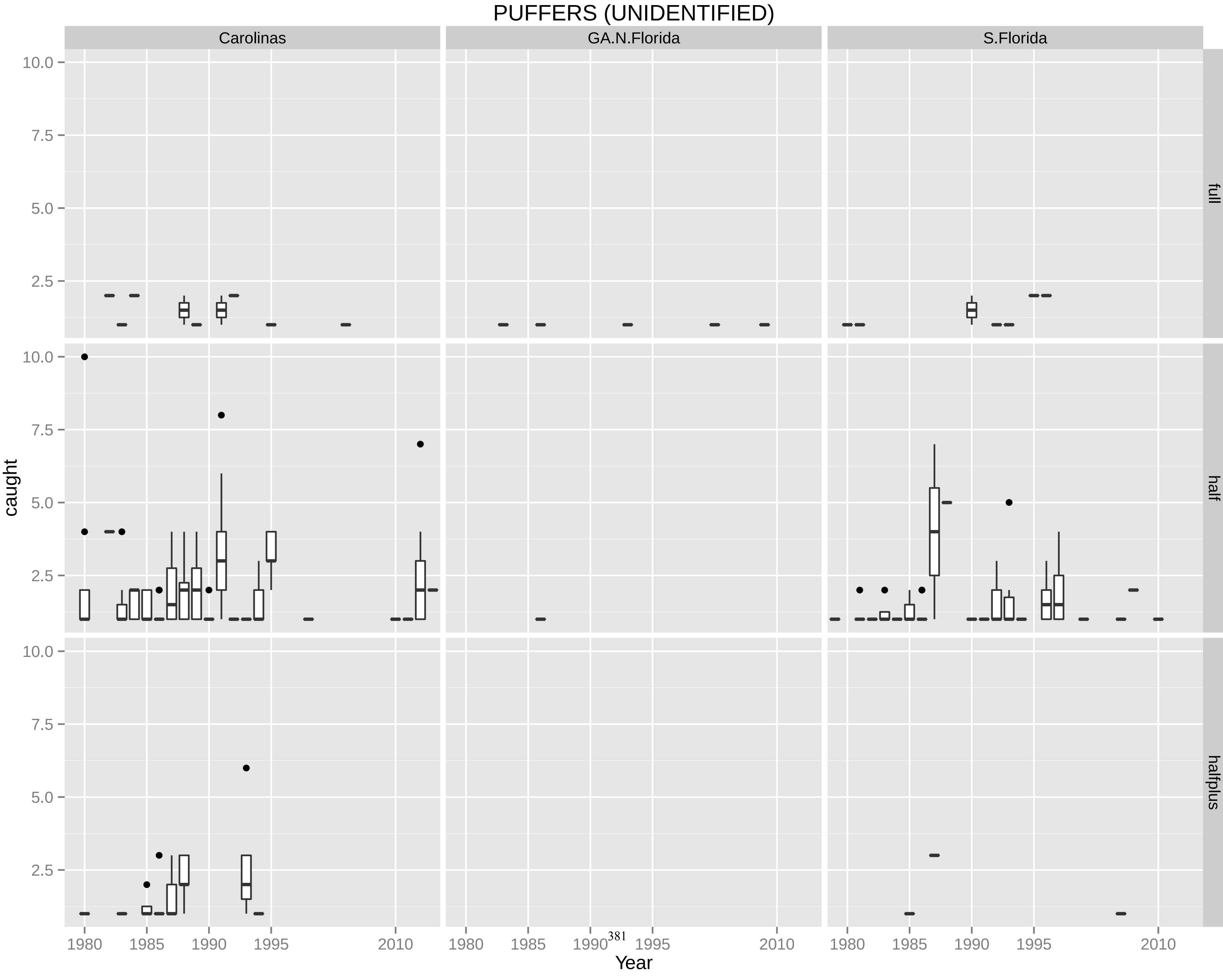
PORKFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
200
150
100
50
0
1980
1985
1990
1995
2000
2005
2010


PORKFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
2
4
6
8
1980
1985
1990
1995
2000
2005
2010

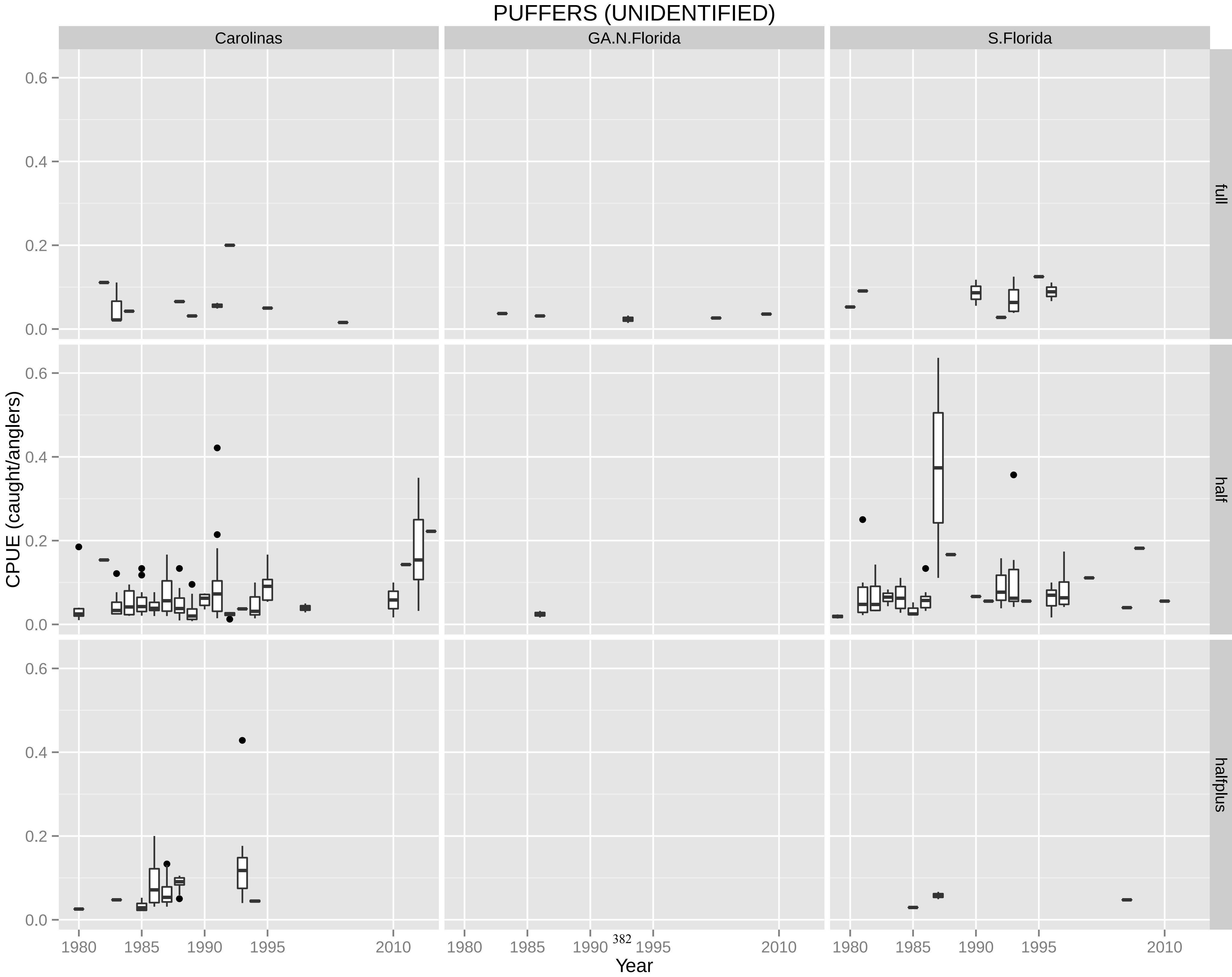

PORKFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
1980
1985
1990
1995
2000
2005
2010
2
0
−2
−4

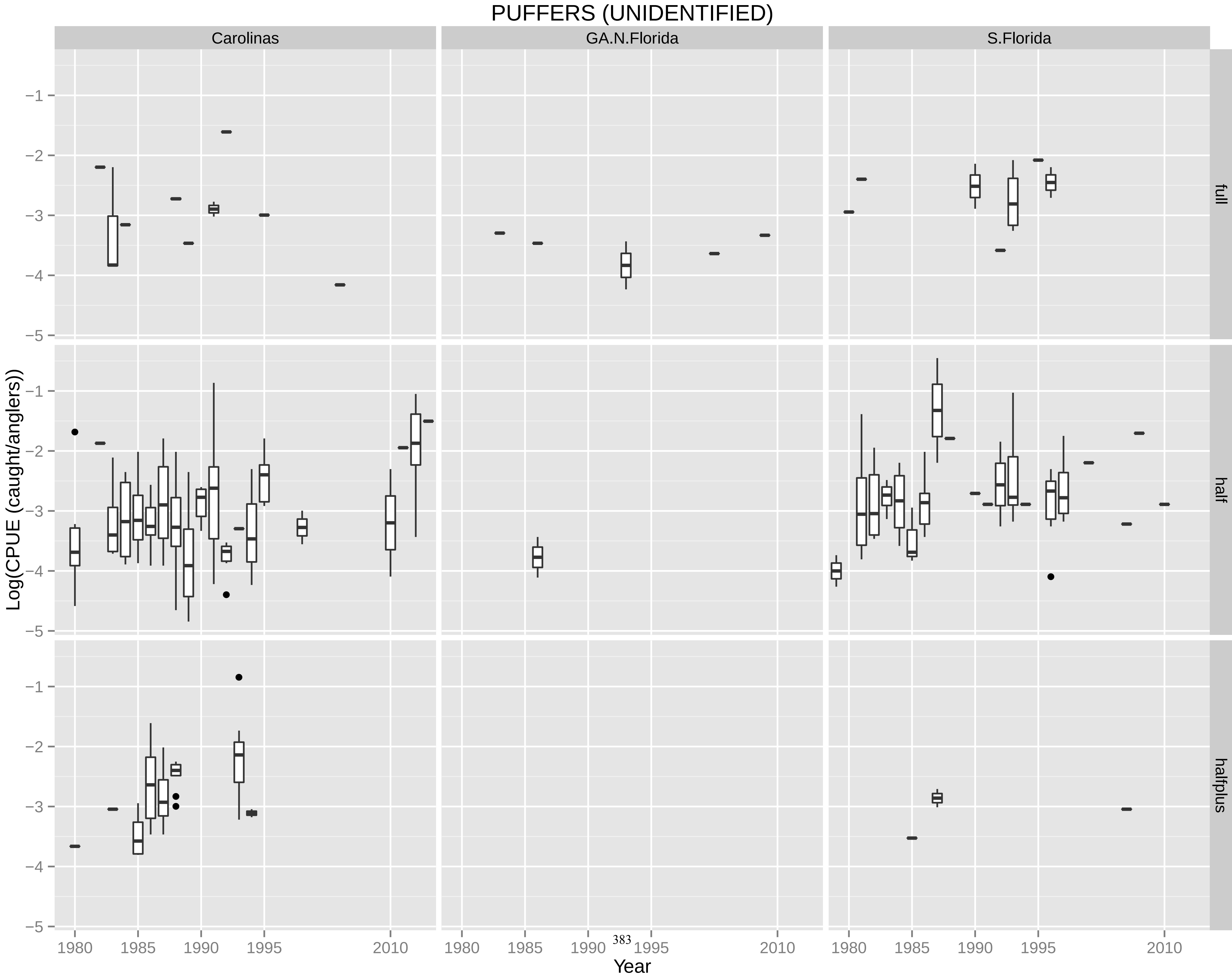


PORKFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
200
400
600
1980
1985
1990
1995
2000
2005
2010

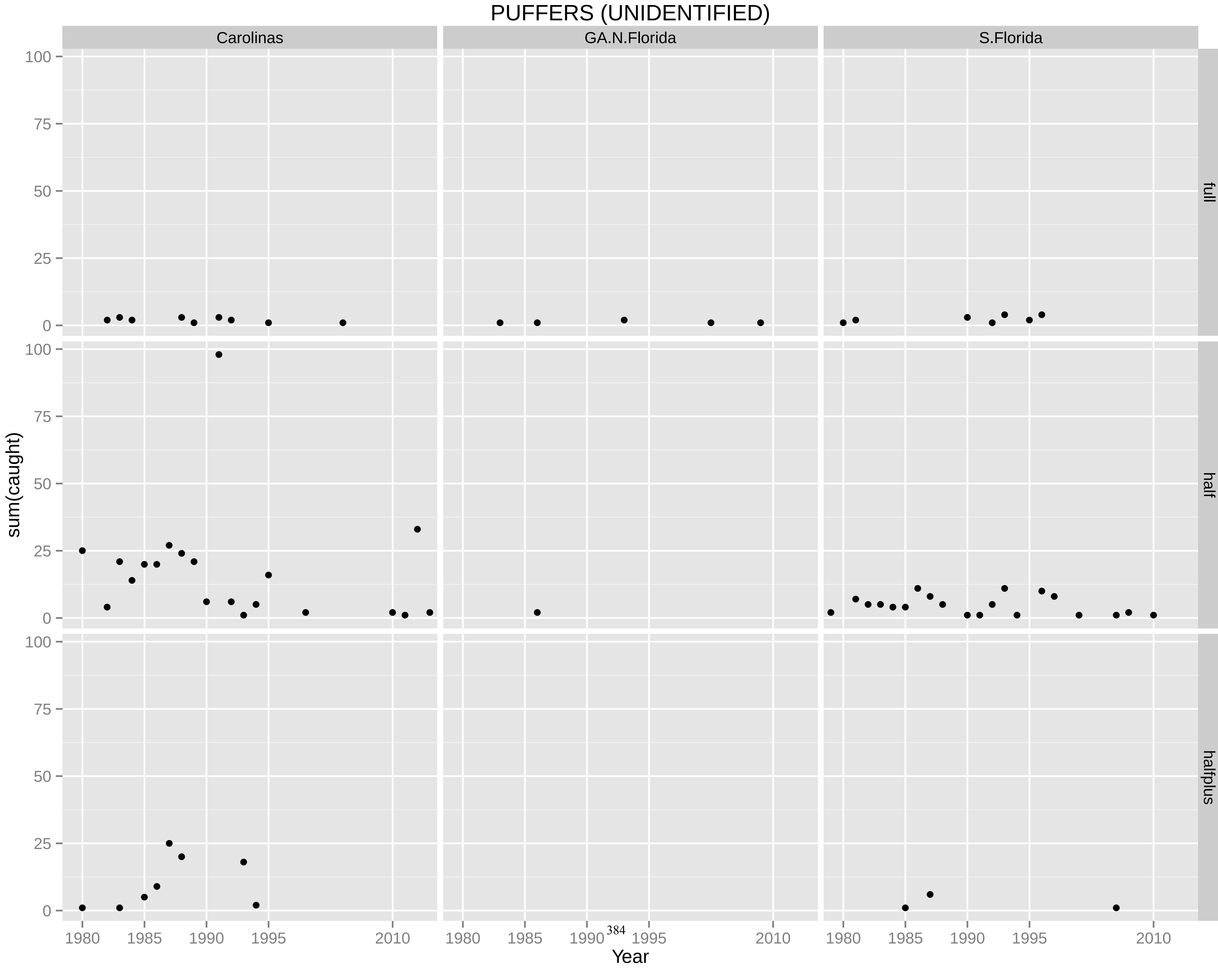


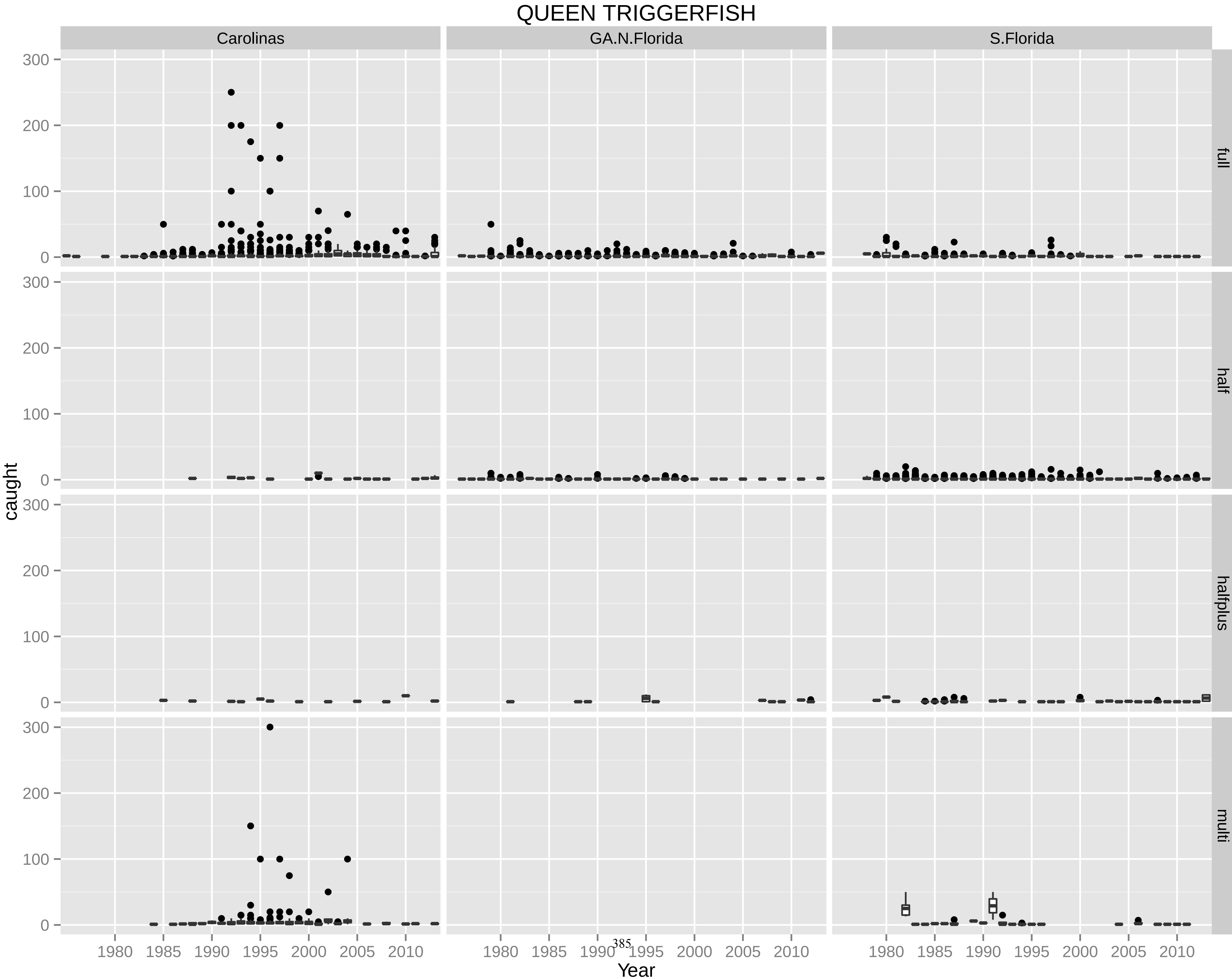
PUFFERS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
caught
Year
10.0
7.5
5.0
2.5
1980
1985
1990
1995
2010


PUFFERS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
CPUE (caught/anglers)
Year
0.0
0.2
0.4
0.6
1980
1985
1990
1995
2010

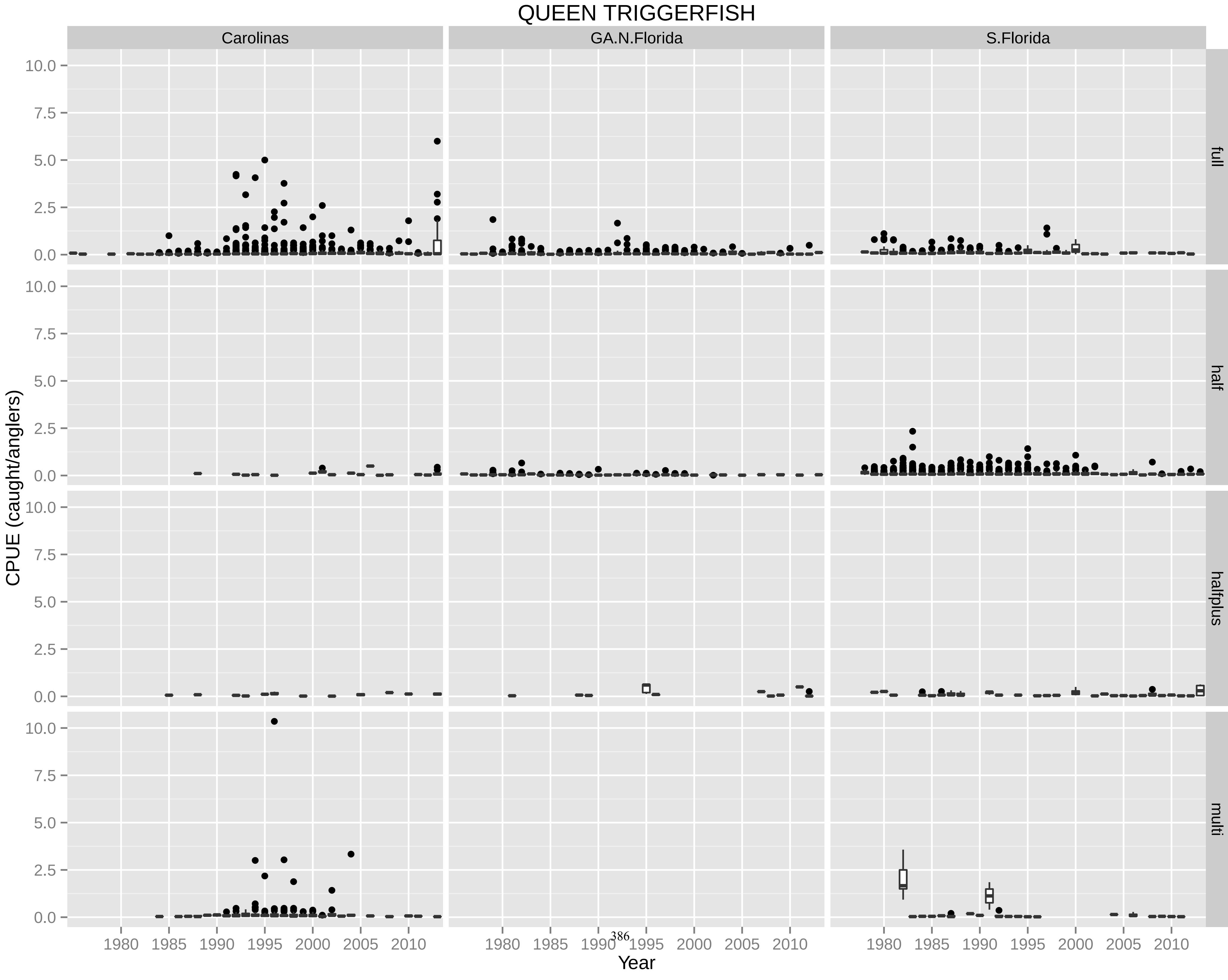


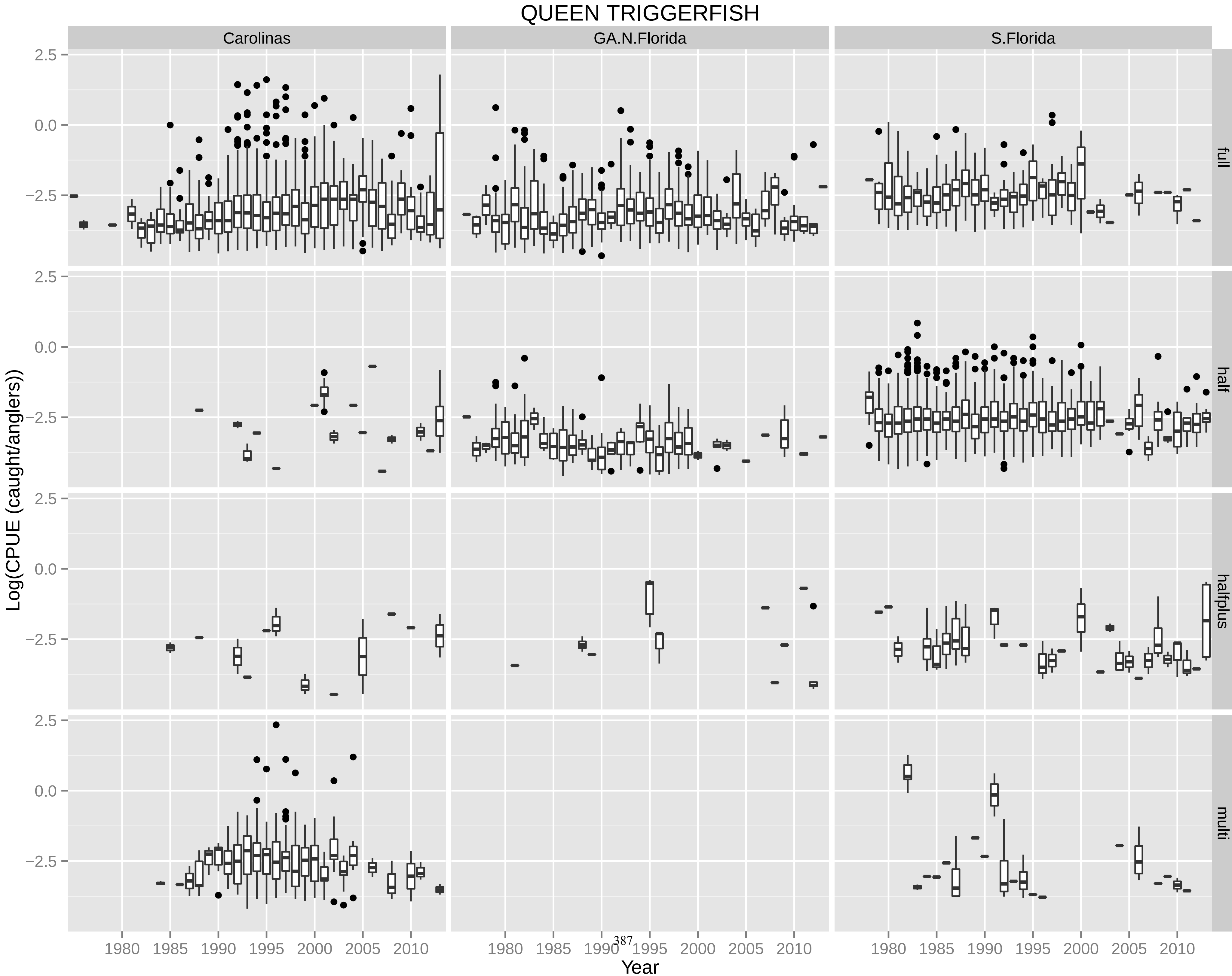
PUFFERS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
Log(CPUE (caught/anglers))
−1
−2
−3
−4
−5
1980
1985
1990
1995
2010
Year

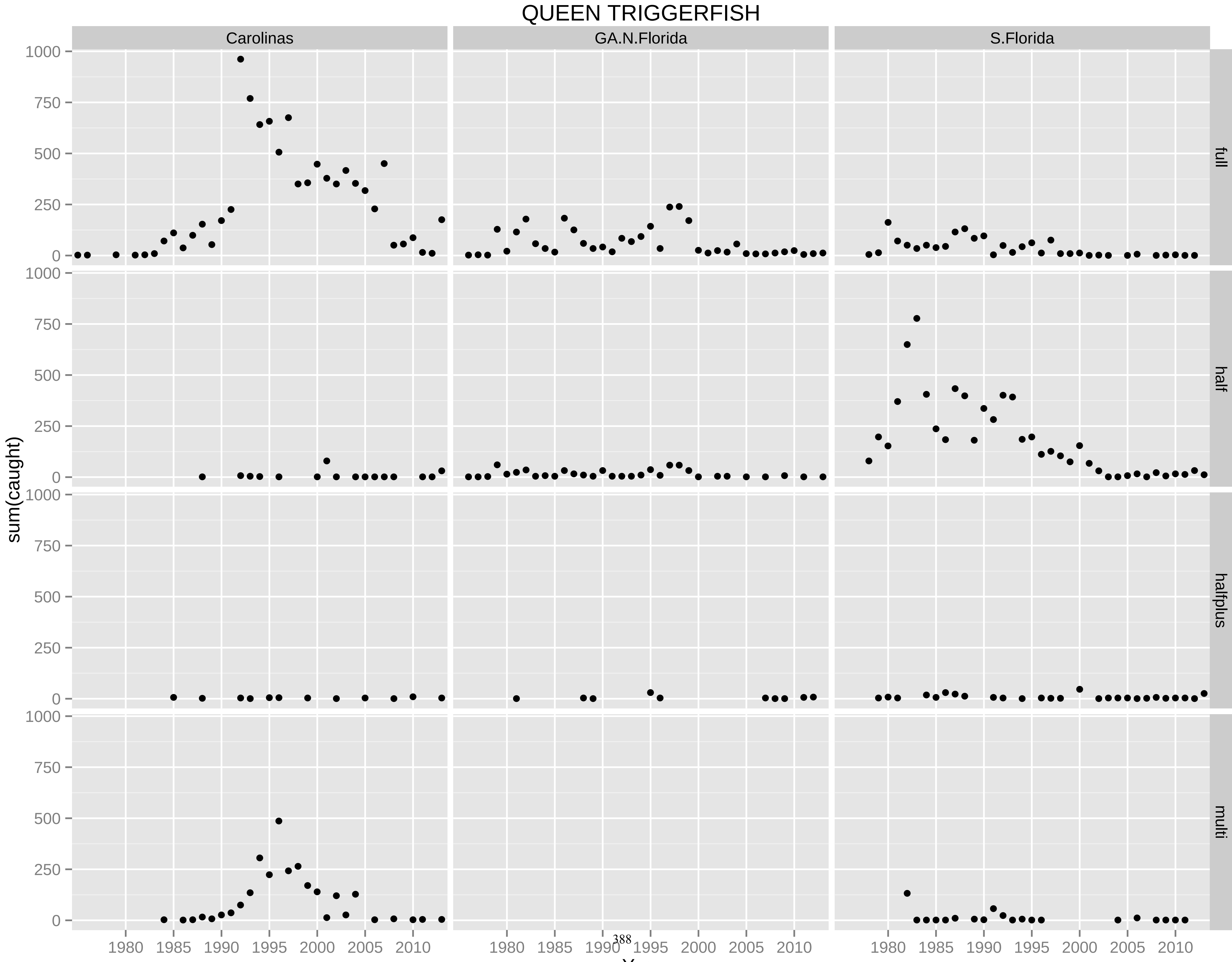

PUFFERS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
sum(caught)
Year
0
25
50
75
100
1980
1985
1990
1995
2010

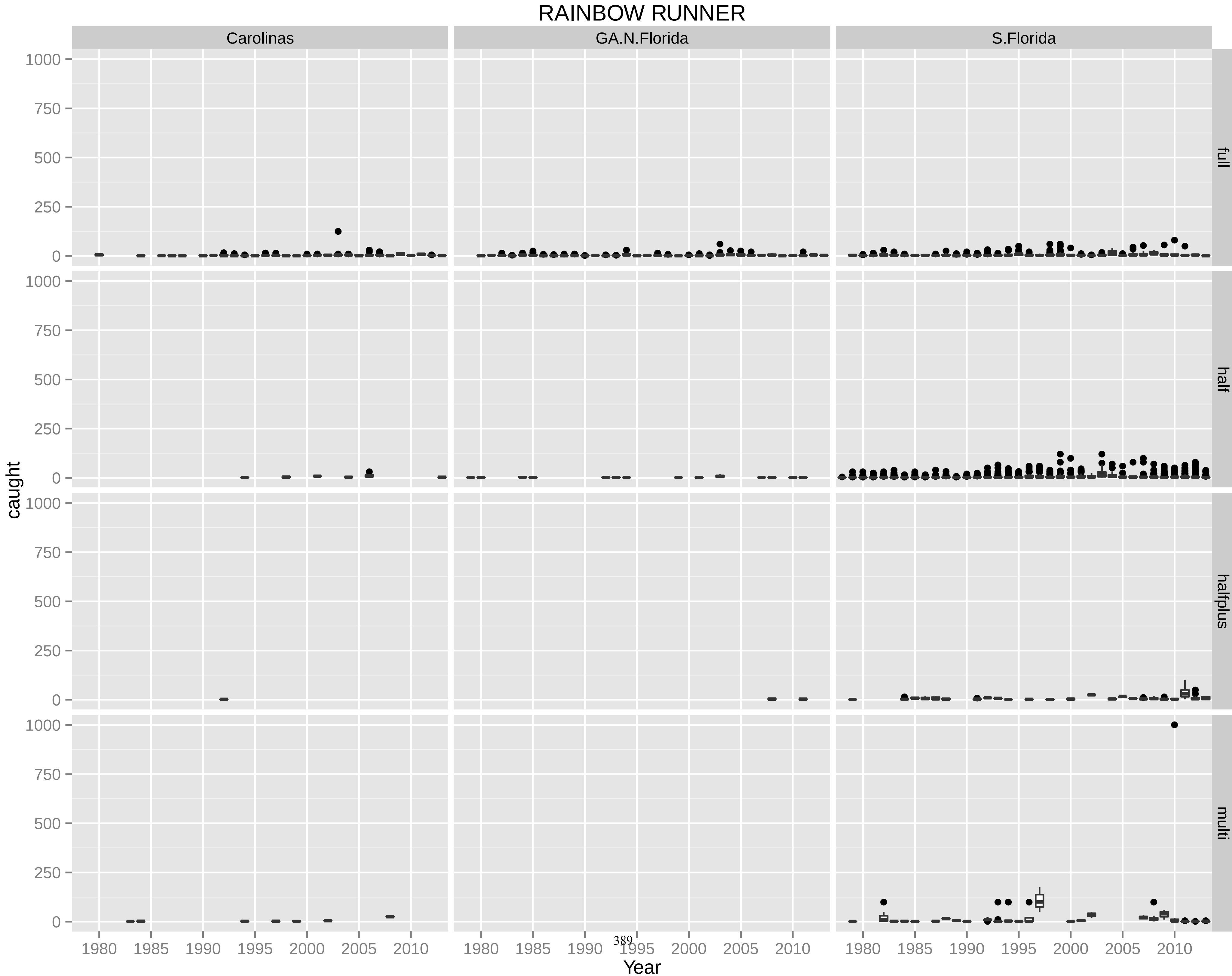


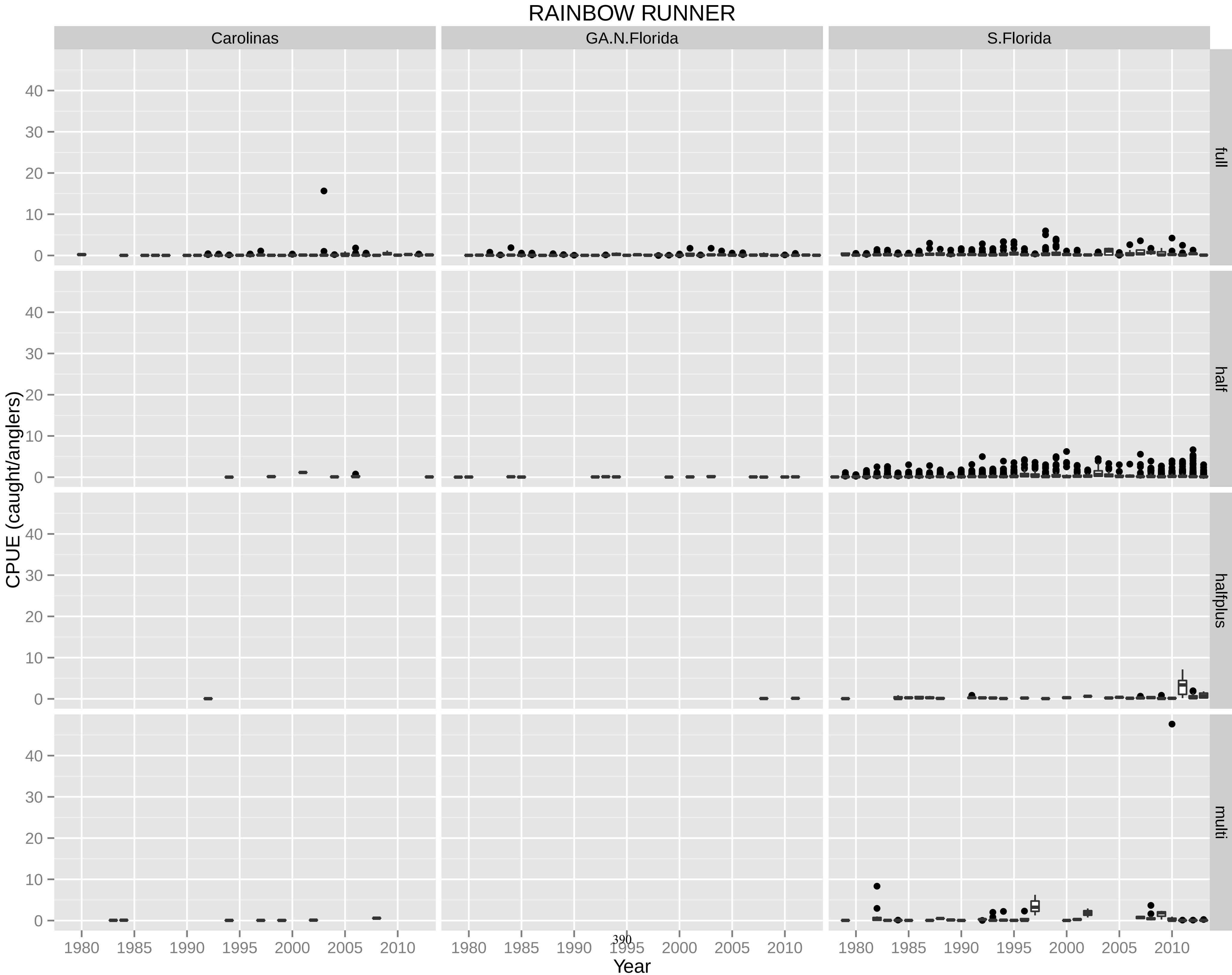
QUEEN TRIGGERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
300
200
100
0
1980
1985
1990
1995
2000
2005
2010
Year


QUEEN TRIGGERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
2.5
5.0
7.5
10.0
1980
1985
1990
1995
2000
2005
2010

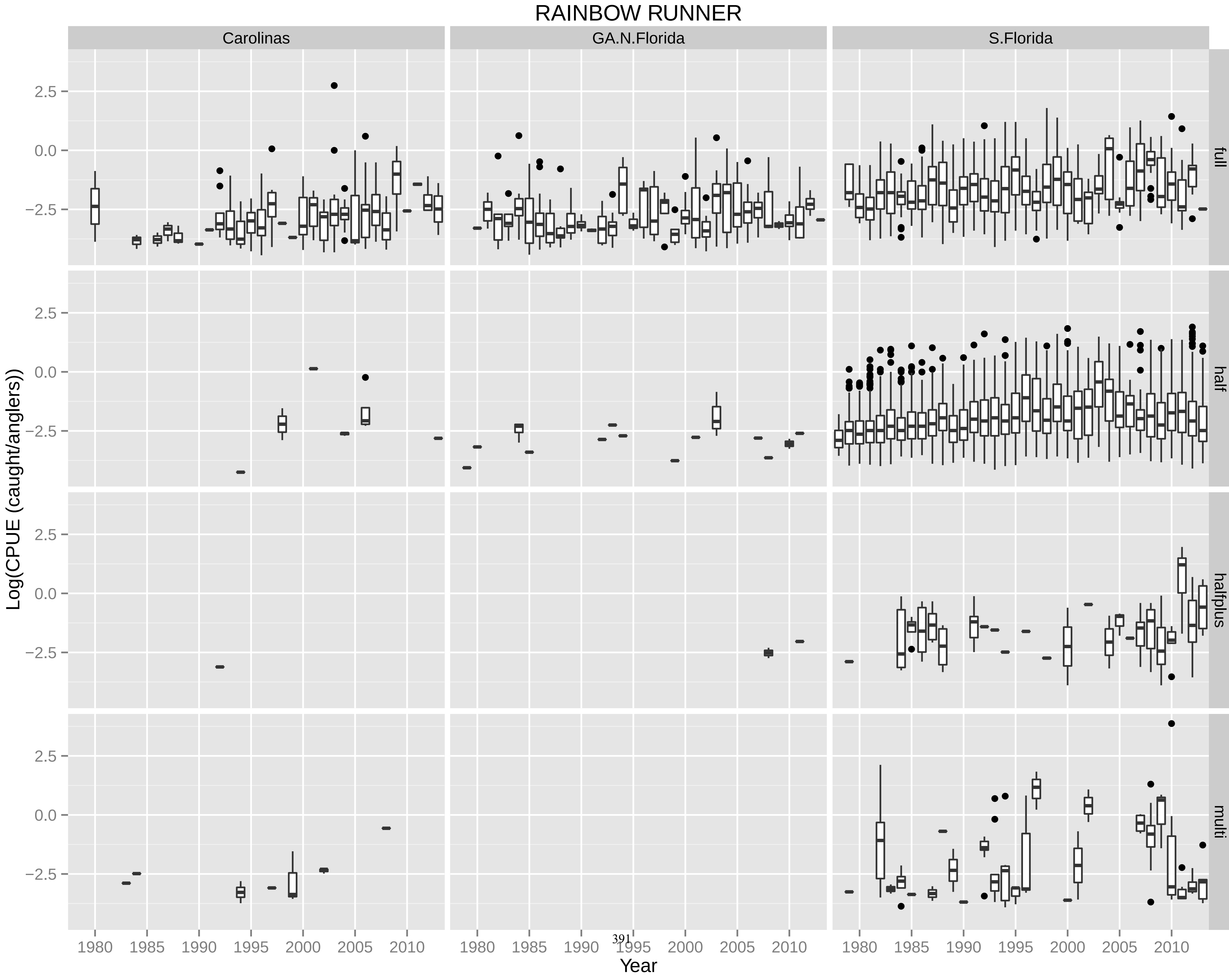

QUEEN TRIGGERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
1980
1985
1990
1995
2000
2005
2010


QUEEN TRIGGERFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
250
500
750
1000
1980
1985
1990
1995
2000
2005
2010

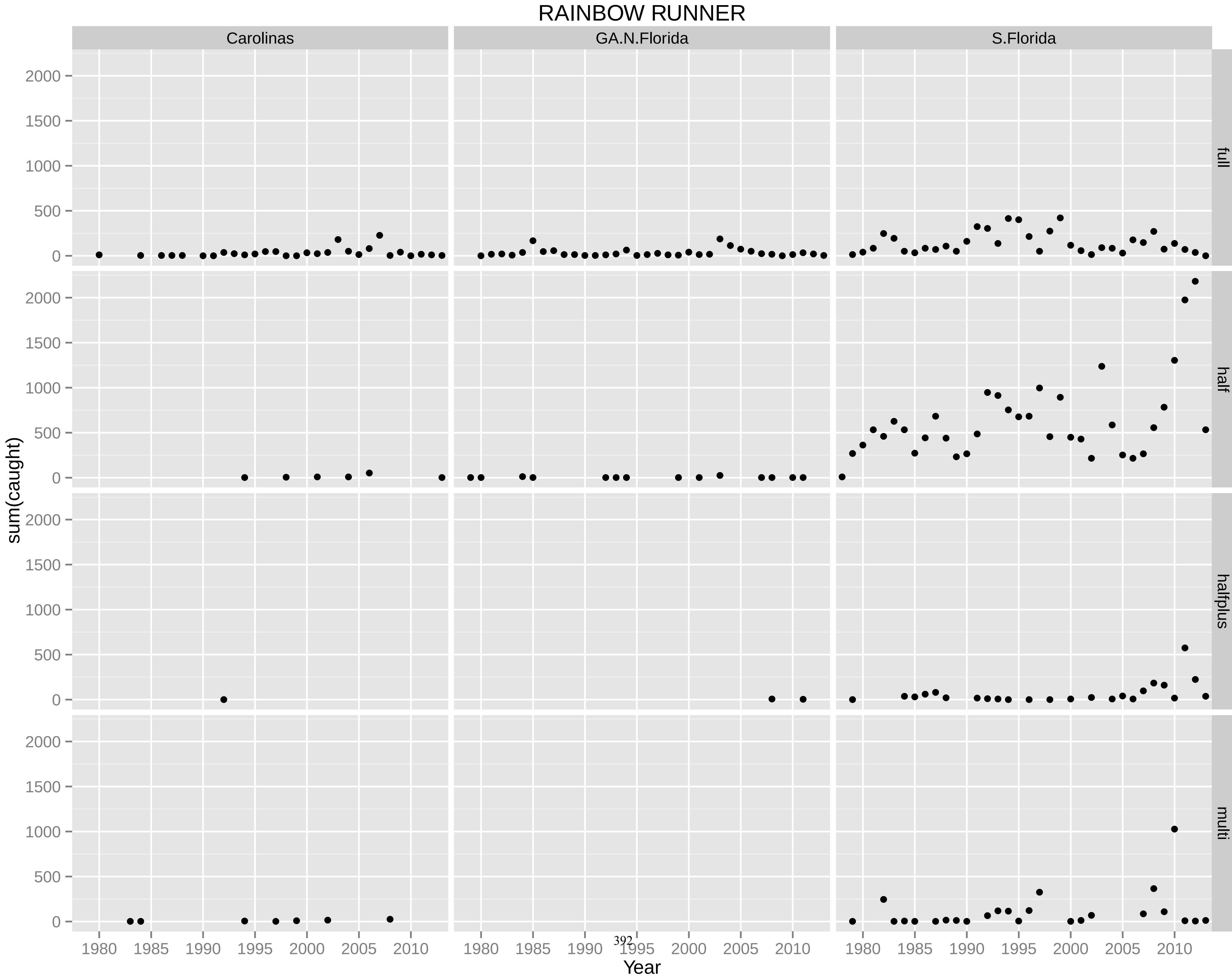

RAINBOW RUNNER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
250
500
750
1000
1980
1985
1990
1995
2000
2005
2010

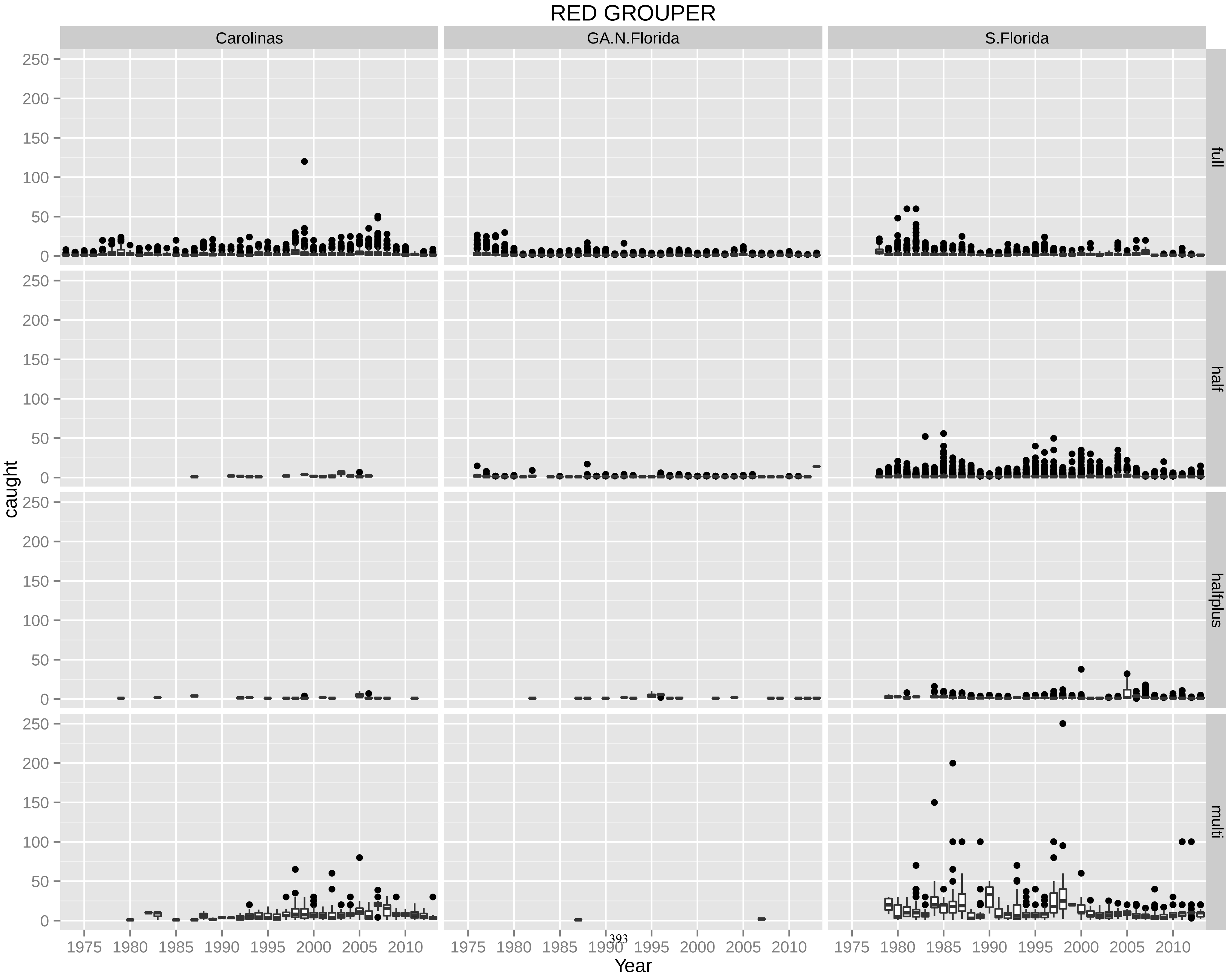


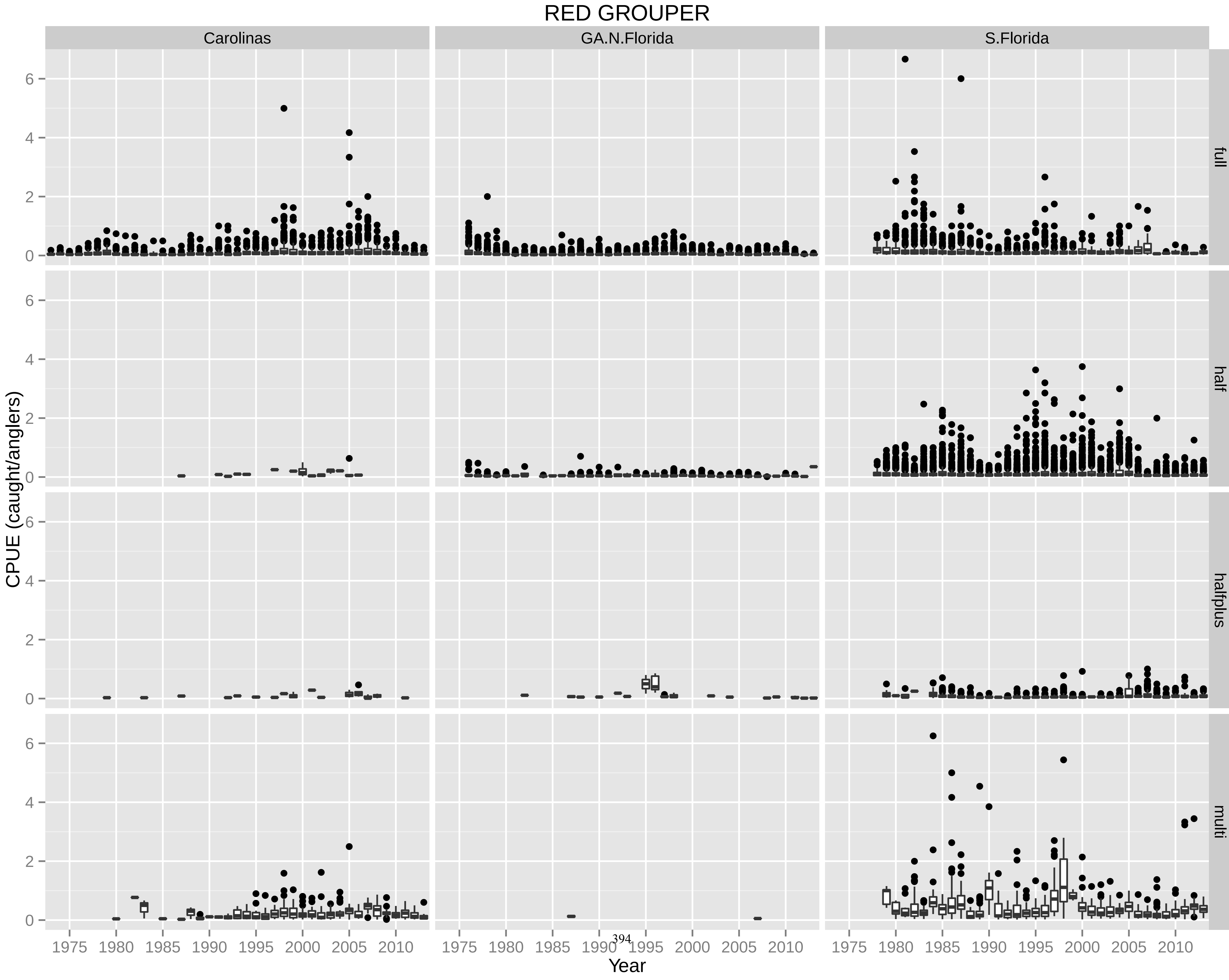
RAINBOW RUNNER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
10
20
30
40
1980
1985
1990
1995
2000
2005
2010



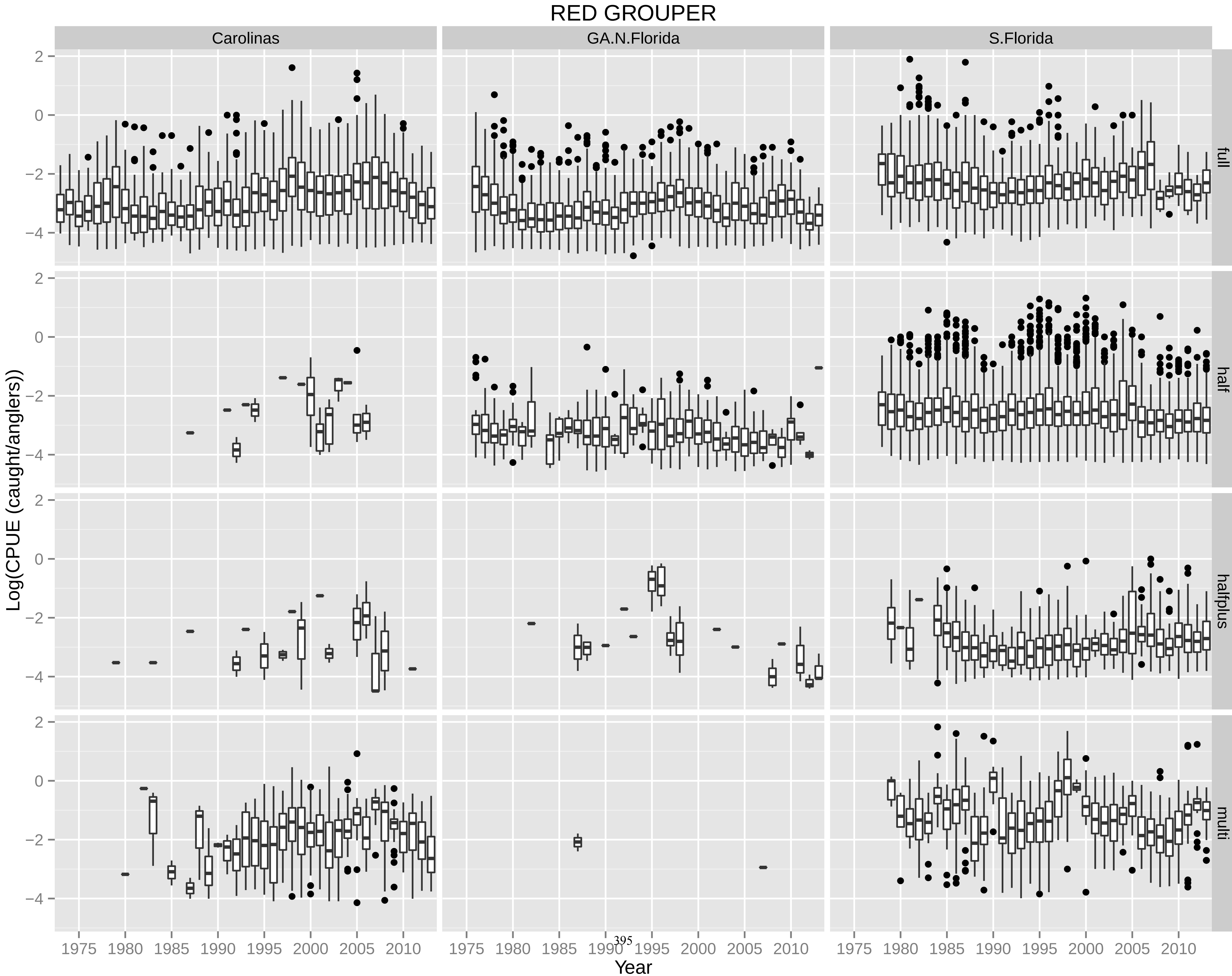
RAINBOW RUNNER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
1980
1985
1990
1995
2000
2005
2010

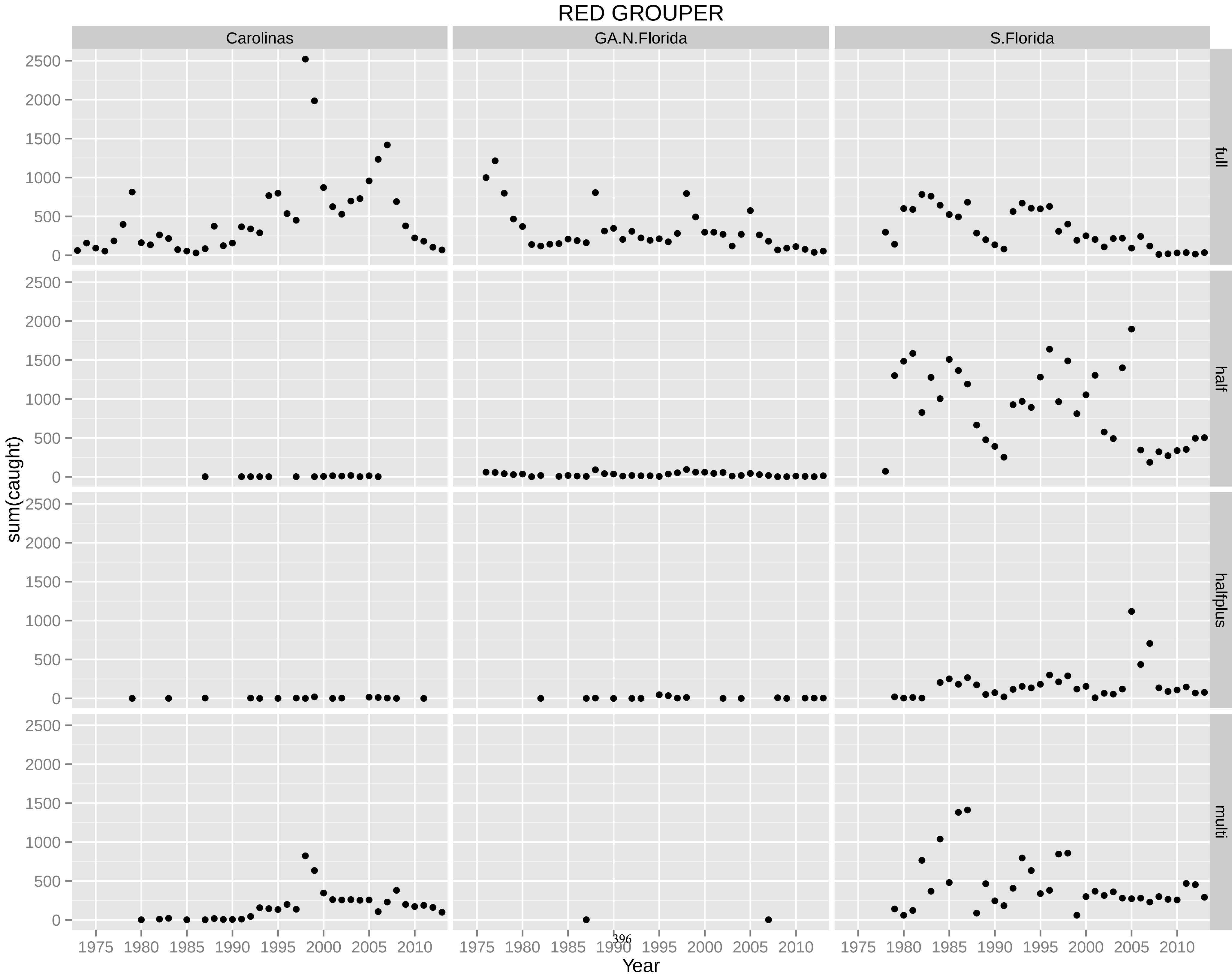

RAINBOW RUNNER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
2000
1980
1985
1990
1995
2000
2005
2010

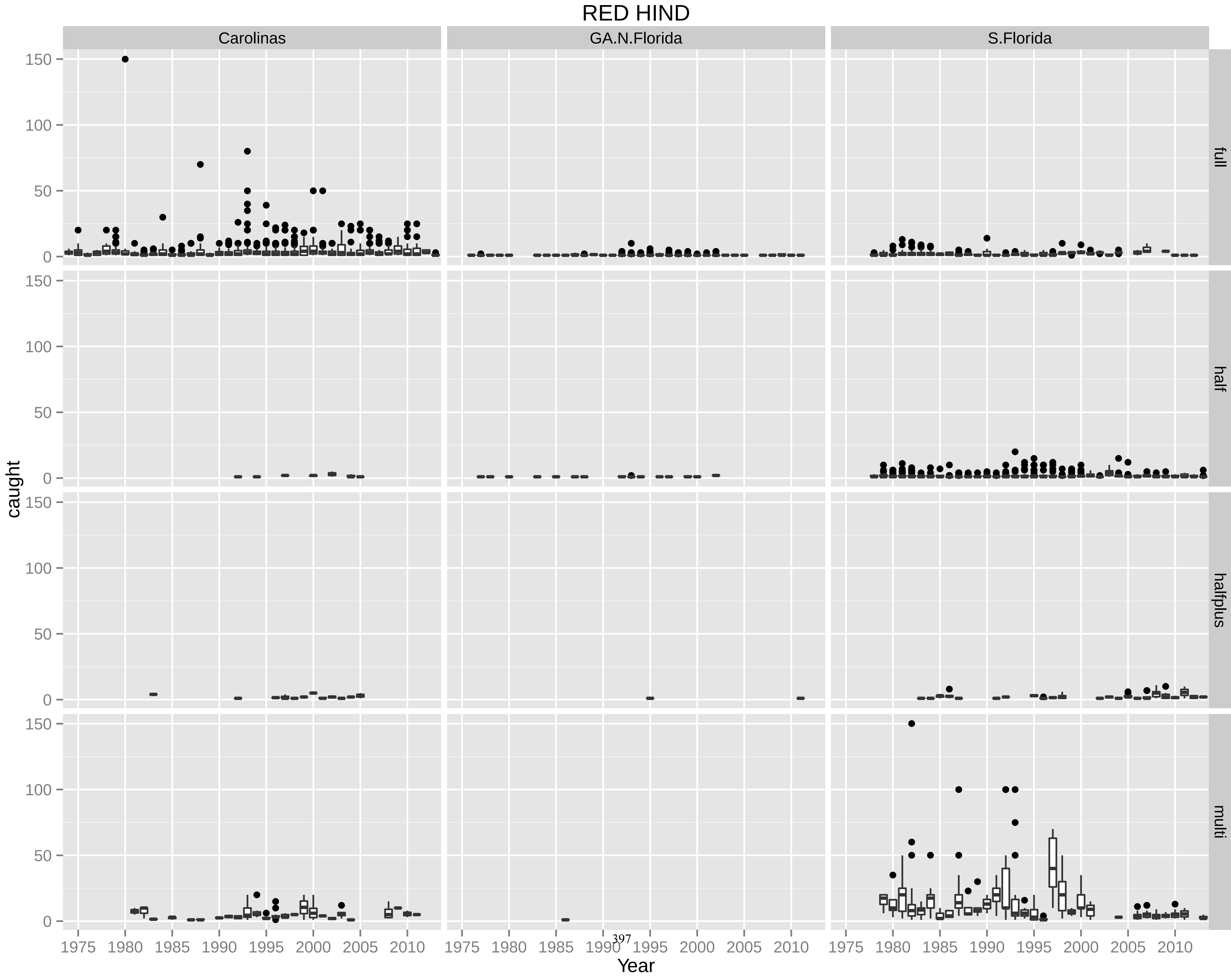

RED GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
200
250
1975
1980
1985
1990
1995
2000
2005
2010

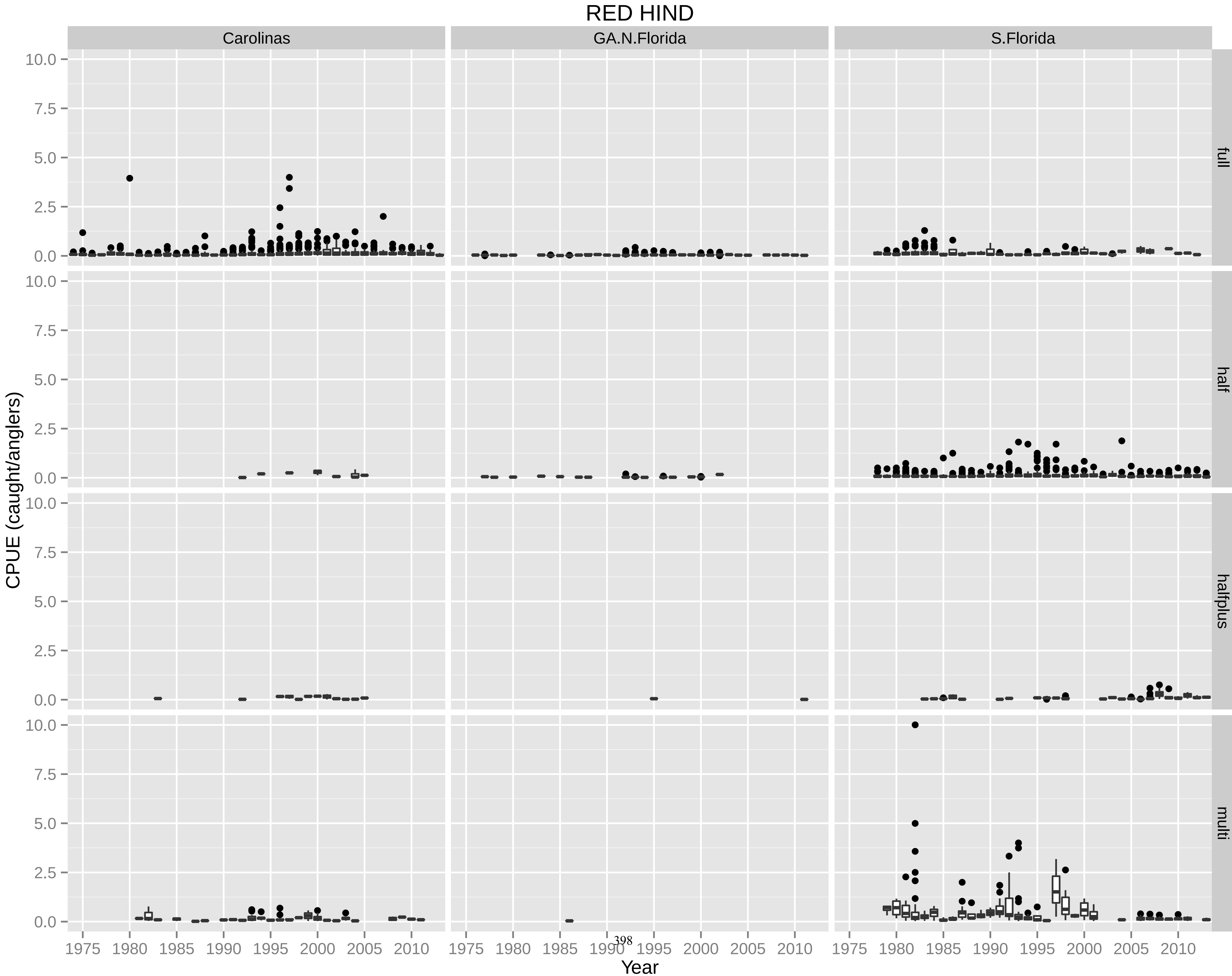


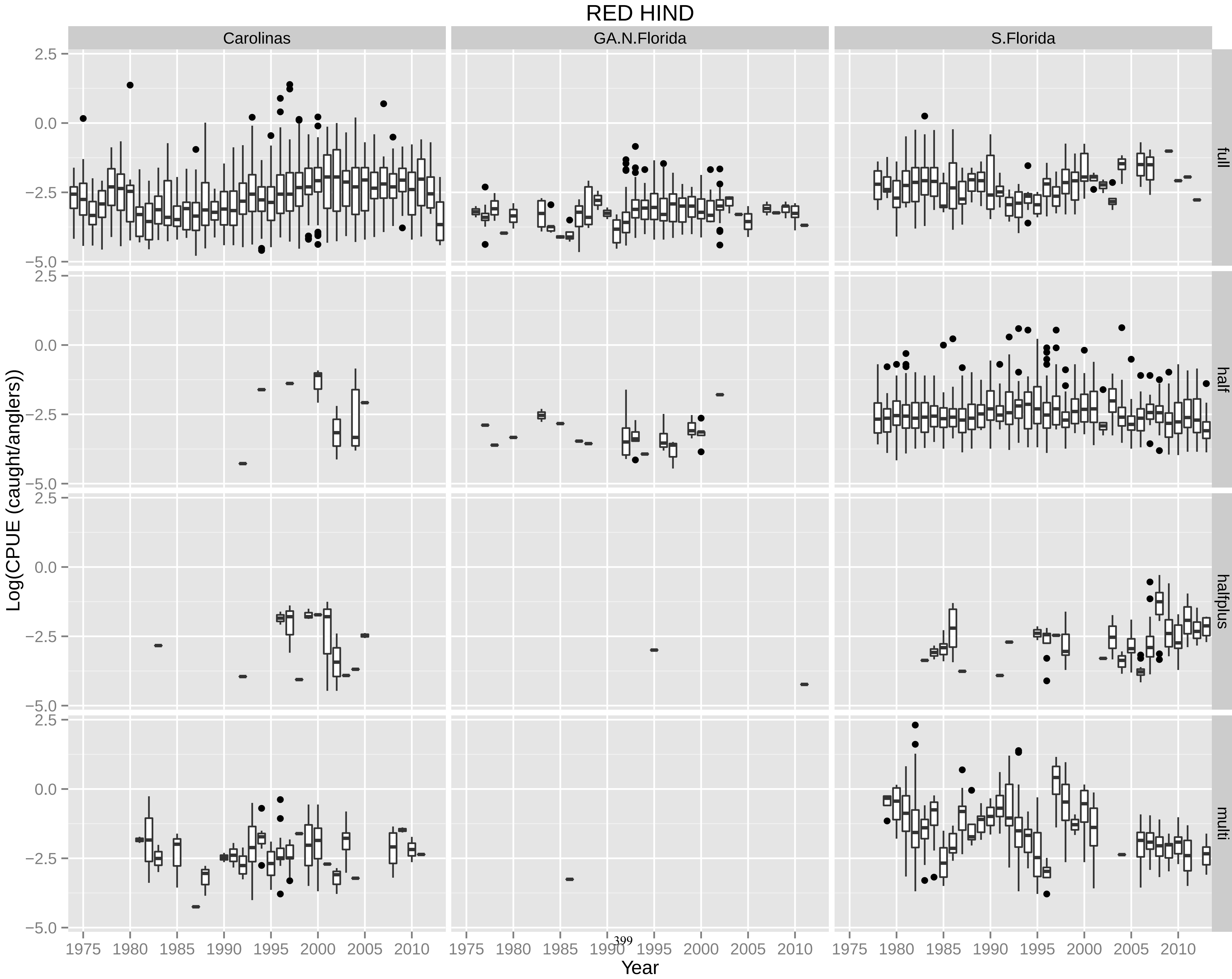
RED GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
2
4
6
1975
1980
1985
1990
1995
2000
2005
2010

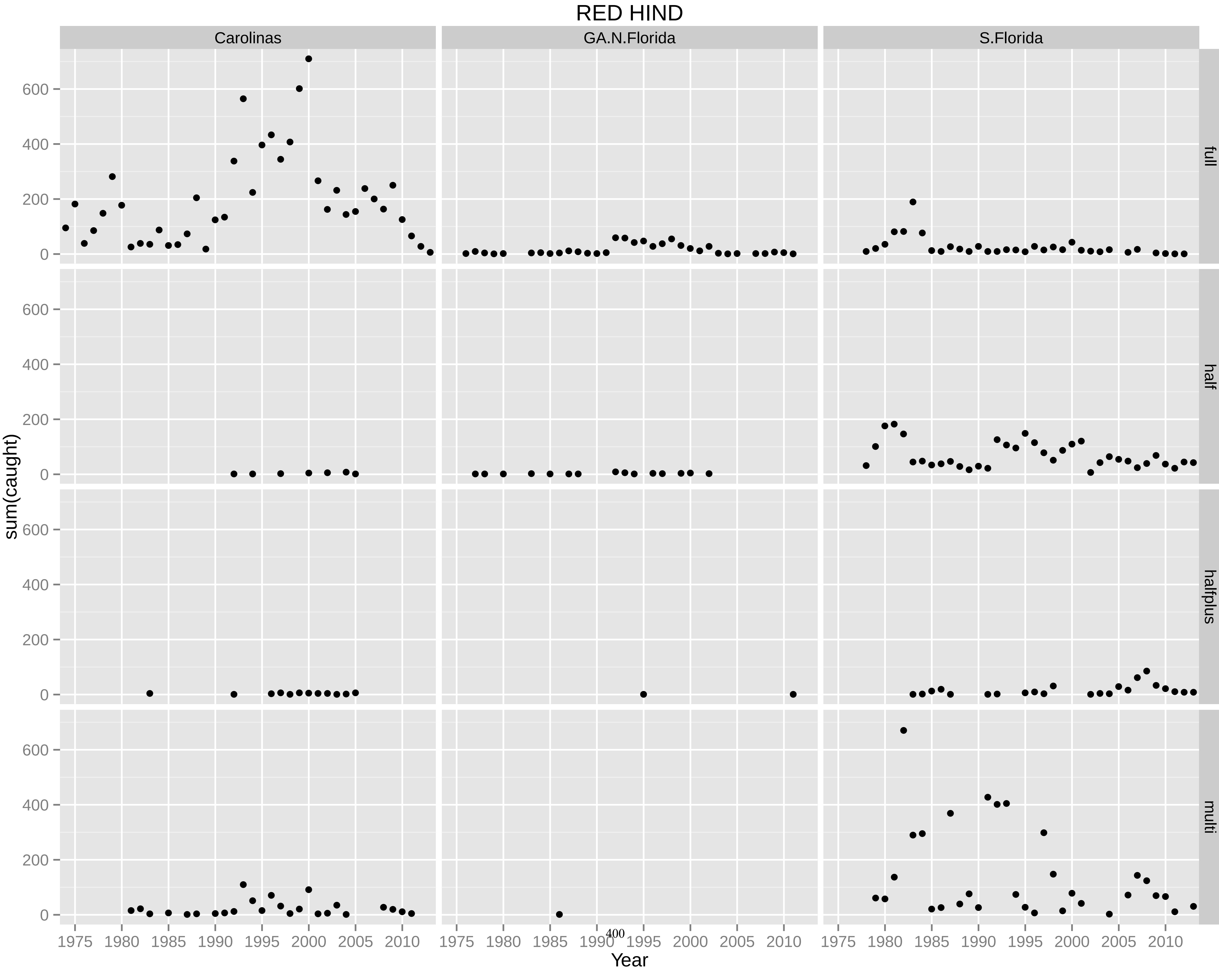

RED GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
1975
1980
1985
1990
1995
2000
2005
2010

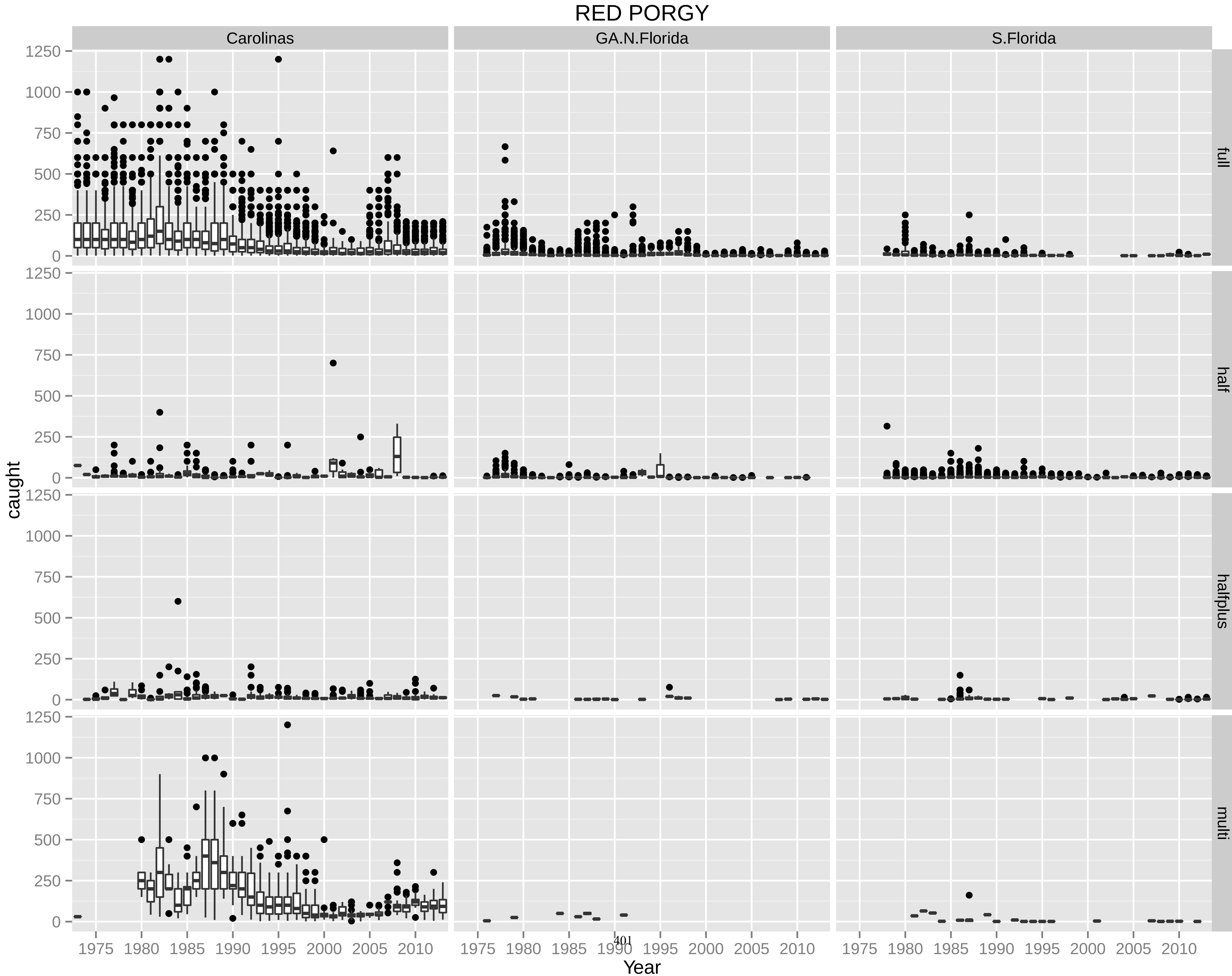

RED GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
2000
2500
1975
1980
1985
1990
1995
2000
2005
2010

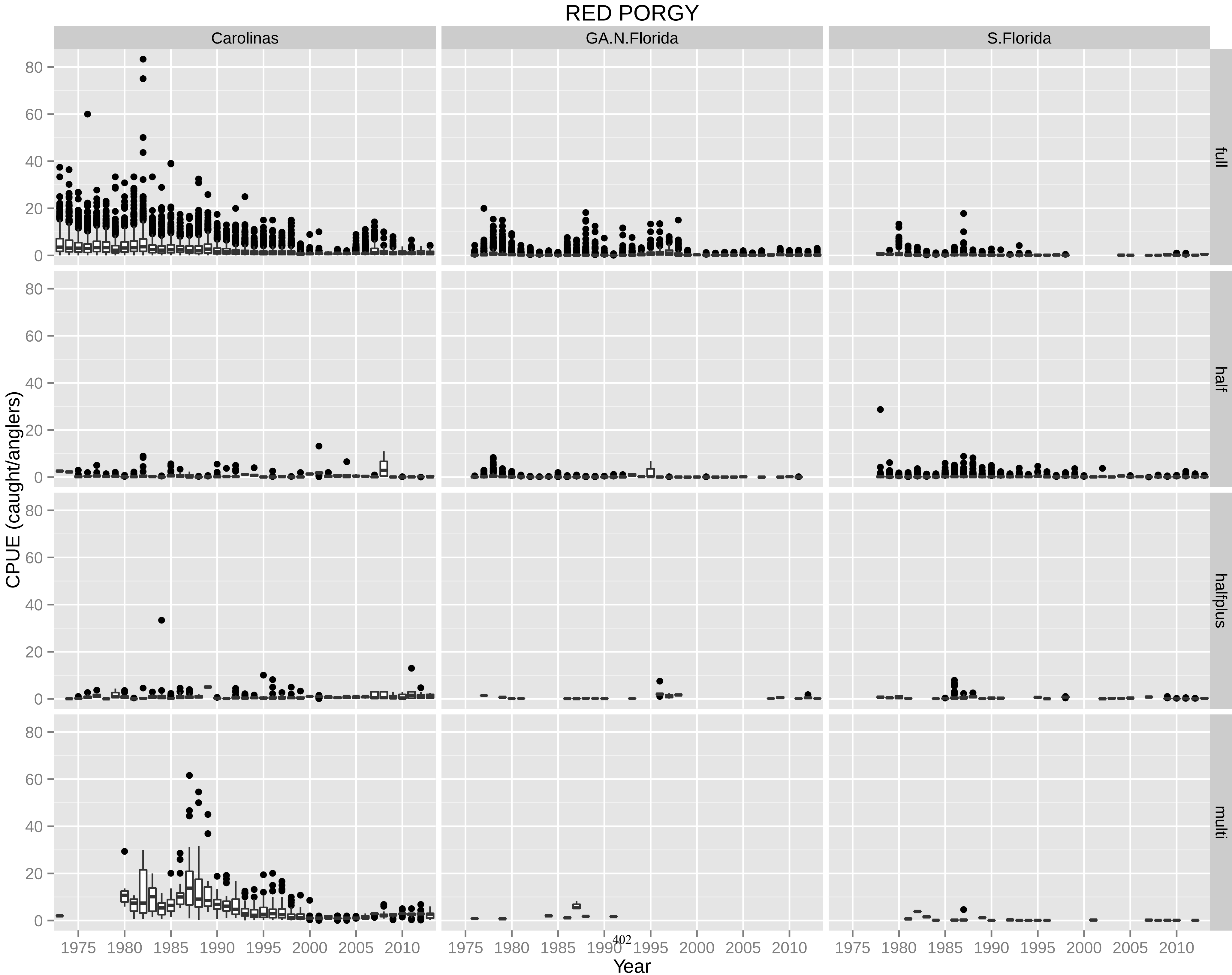

RED HIND
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
1975
1980
1985
1990
1995
2000
2005
2010


RED HIND
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
2.5
5.0
7.5
10.0
1975
1980
1985
1990
1995
2000
2005
2010

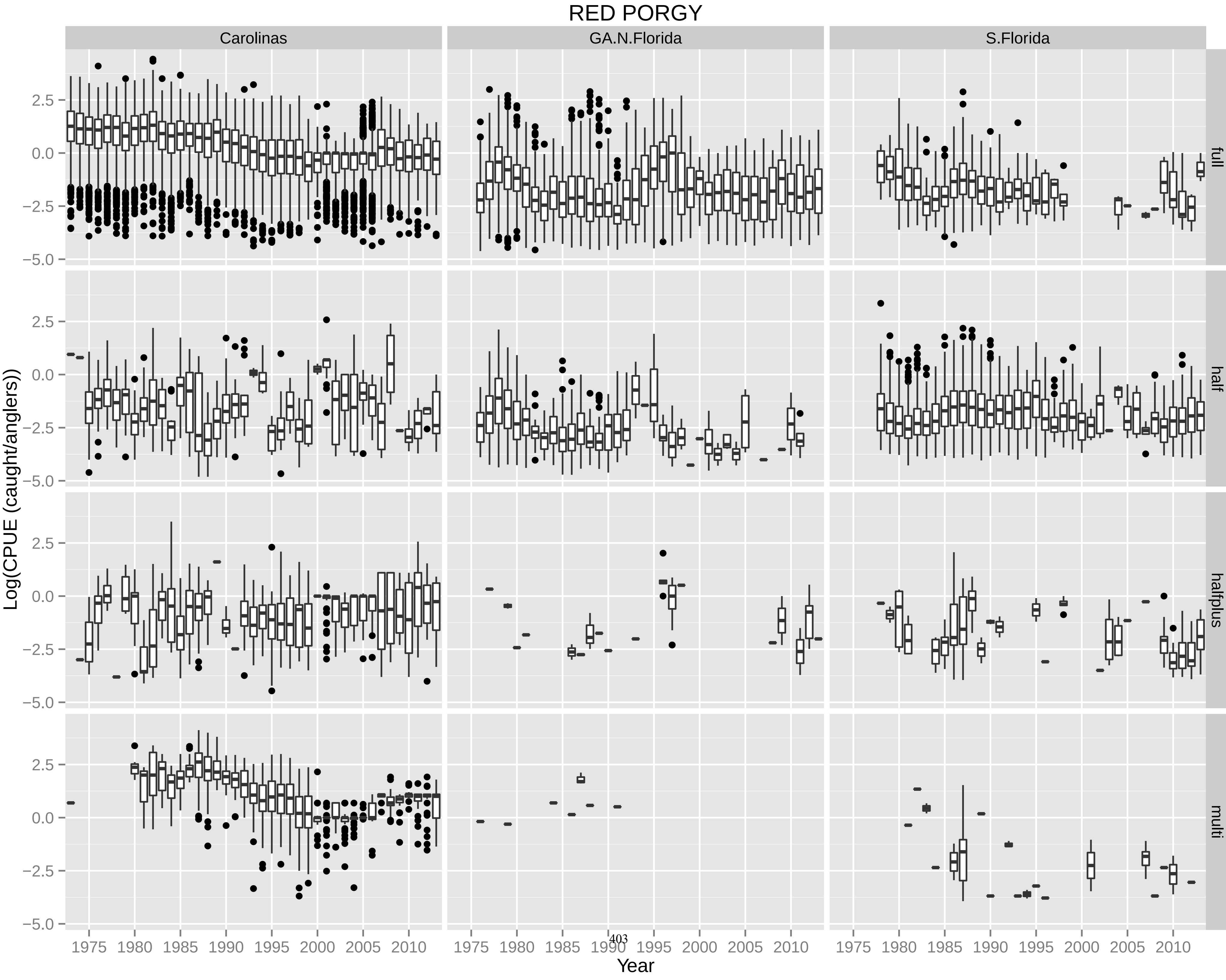

RED HIND
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010

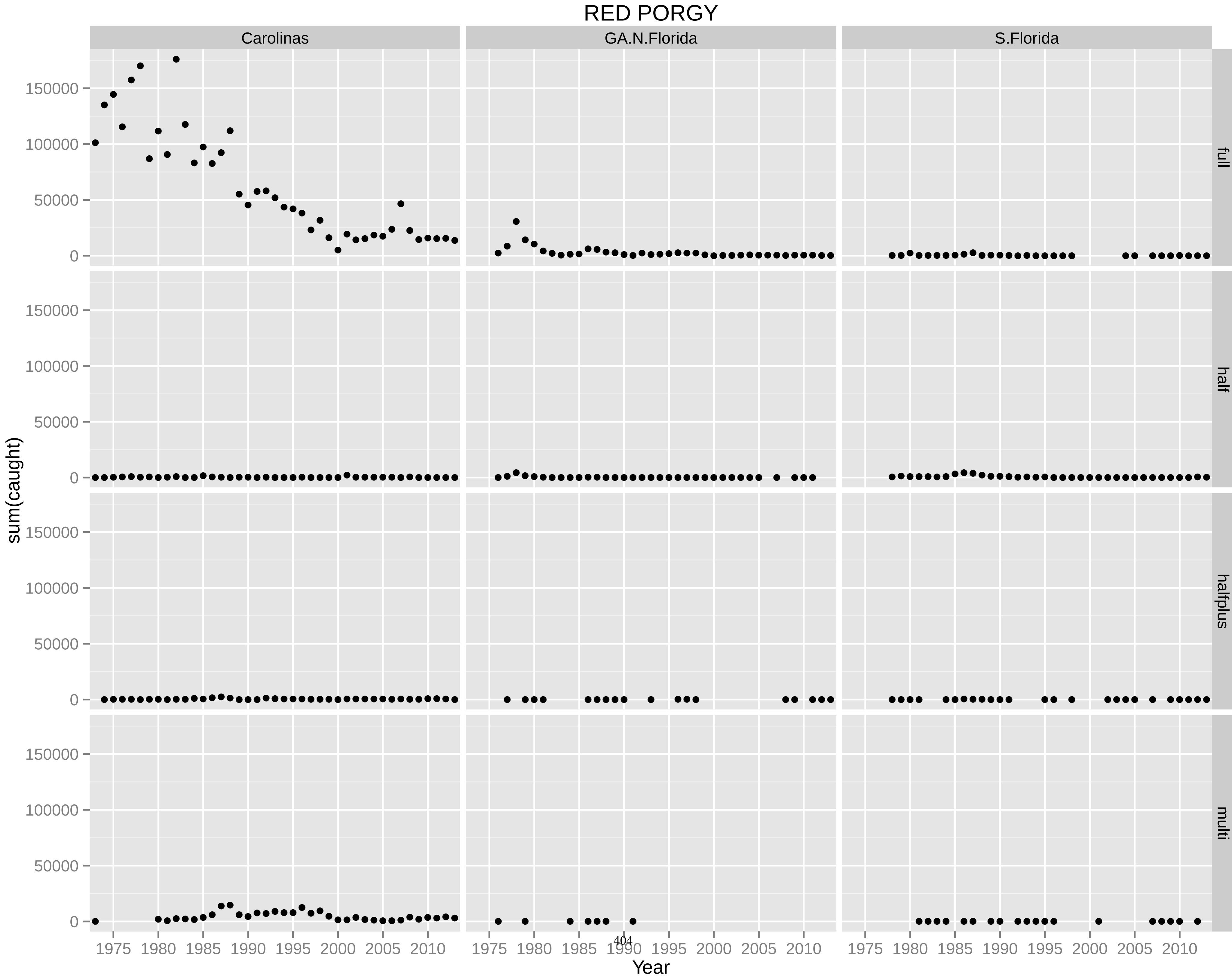

RED HIND
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
200
400
600
1975
1980
1985
1990
1995
2000
2005
2010

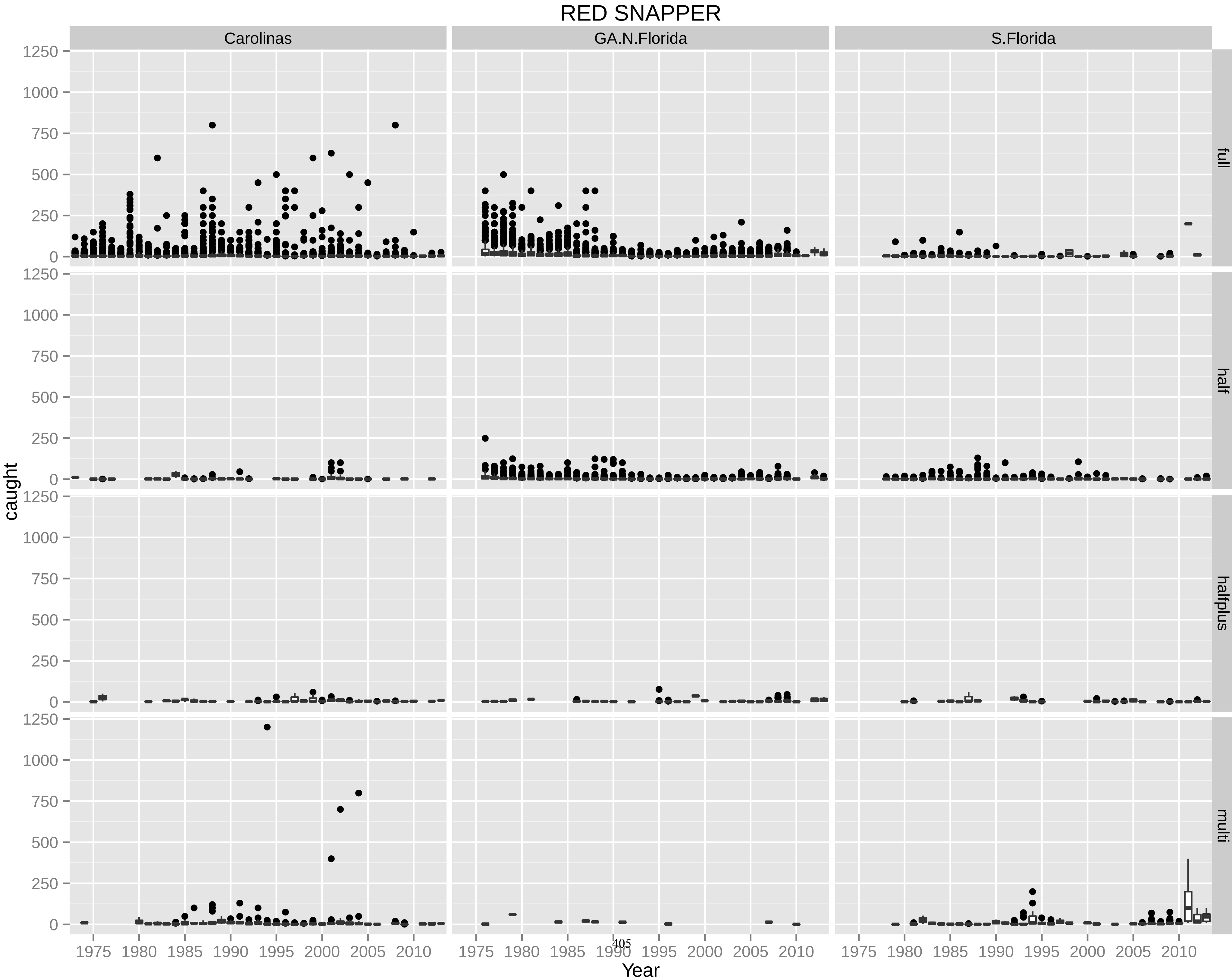

RED PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
250
500
750
1000
1250
1975
1980
1985
1990
1995
2000
2005
2010

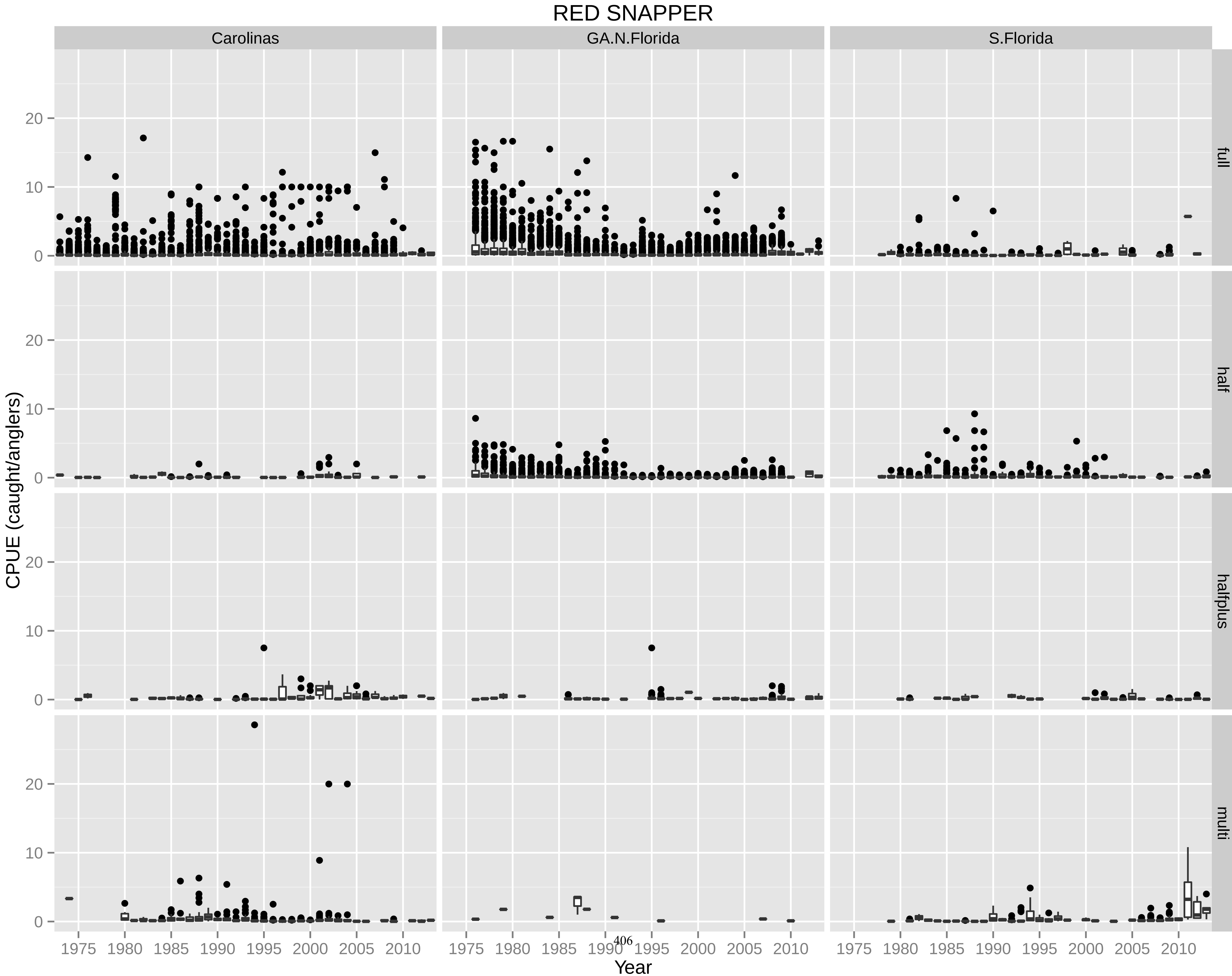


RED PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
20
40
60
80
1975
1980
1985
1990
1995
2000
2005
2010

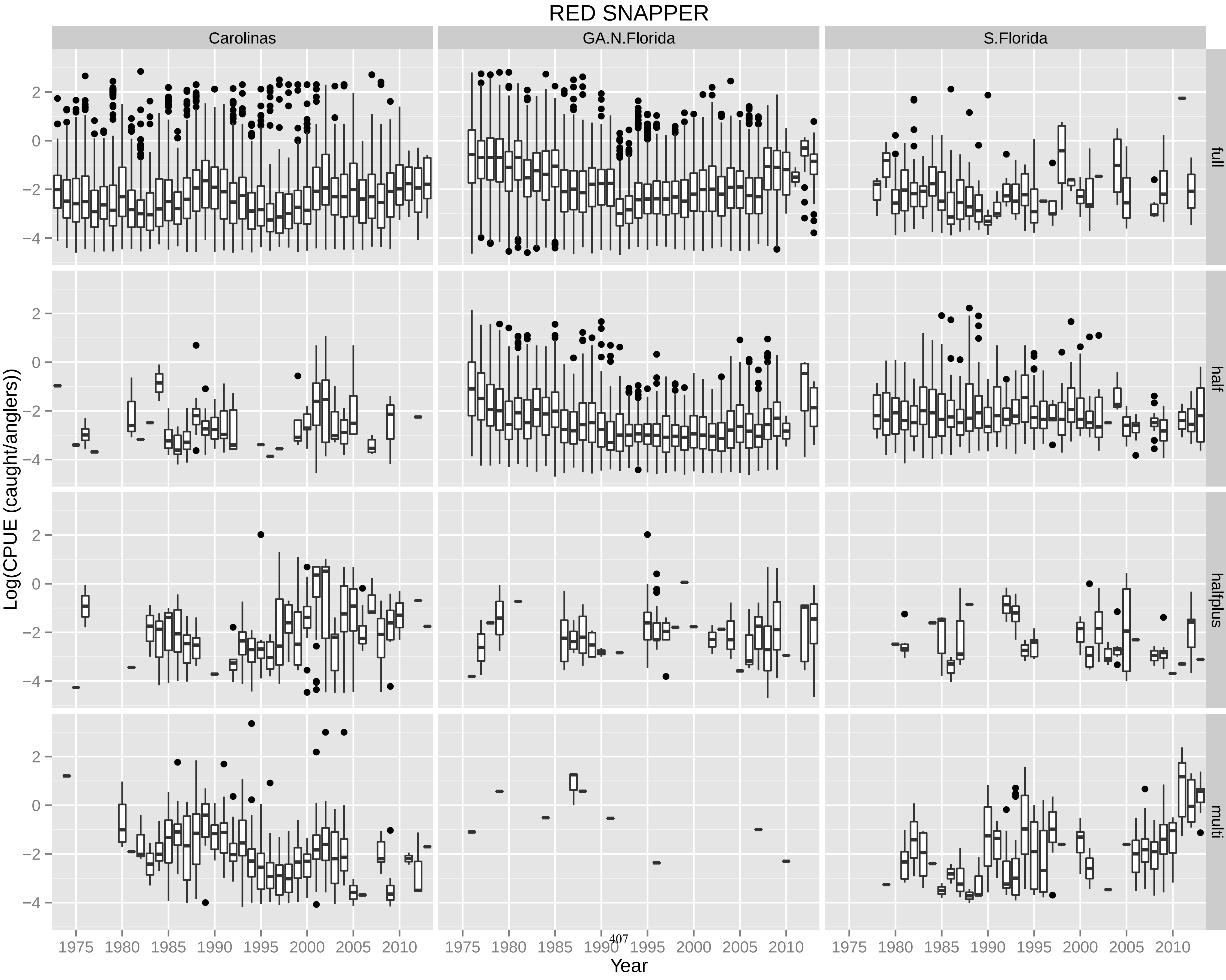

RED PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010


RED PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
150000
100000
50000
0
1975
1980
1985
1990
1995
2000
2005
2010

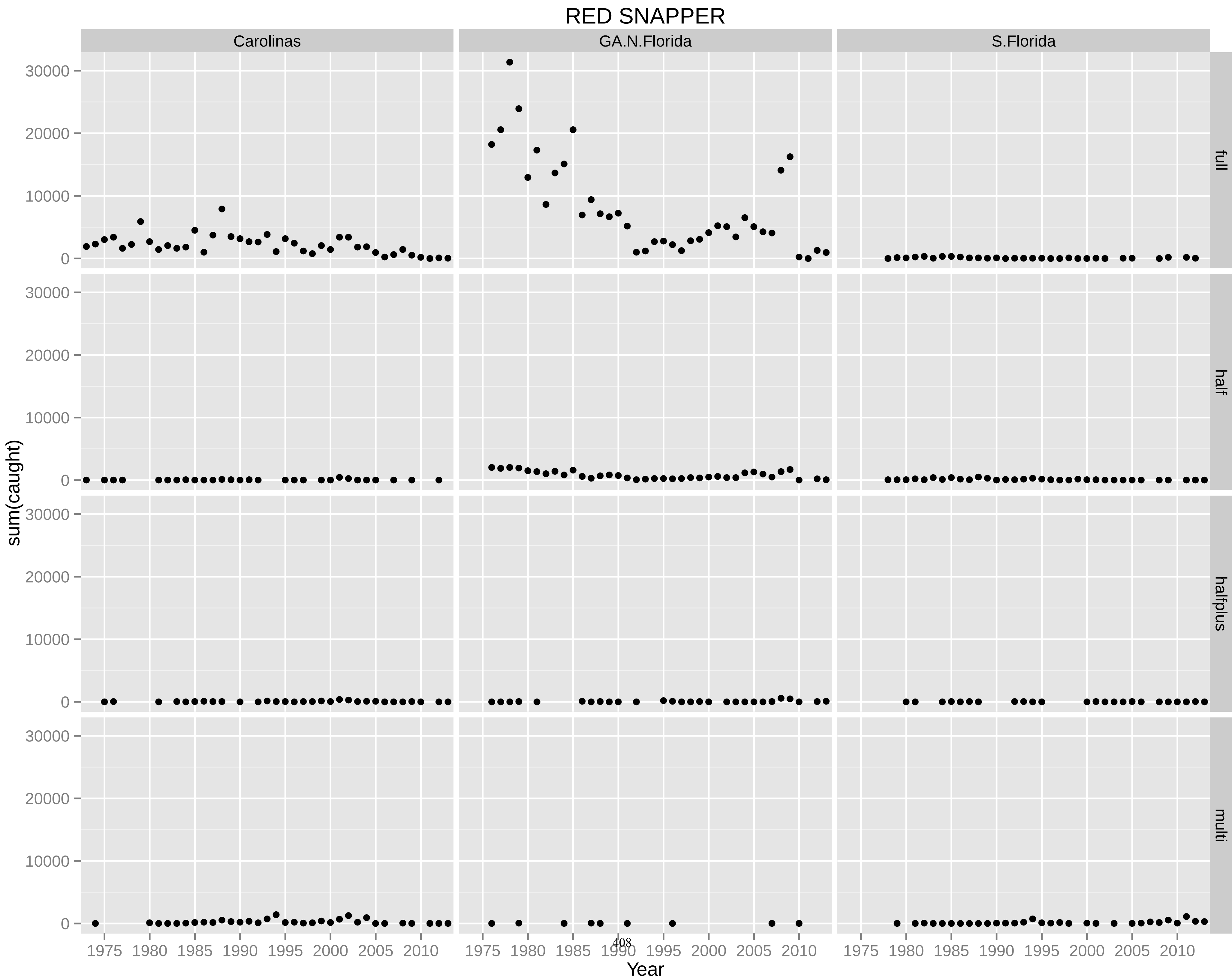

RED SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
250
500
750
1000
1250
1975
1980
1985
1990
1995
2000
2005
2010

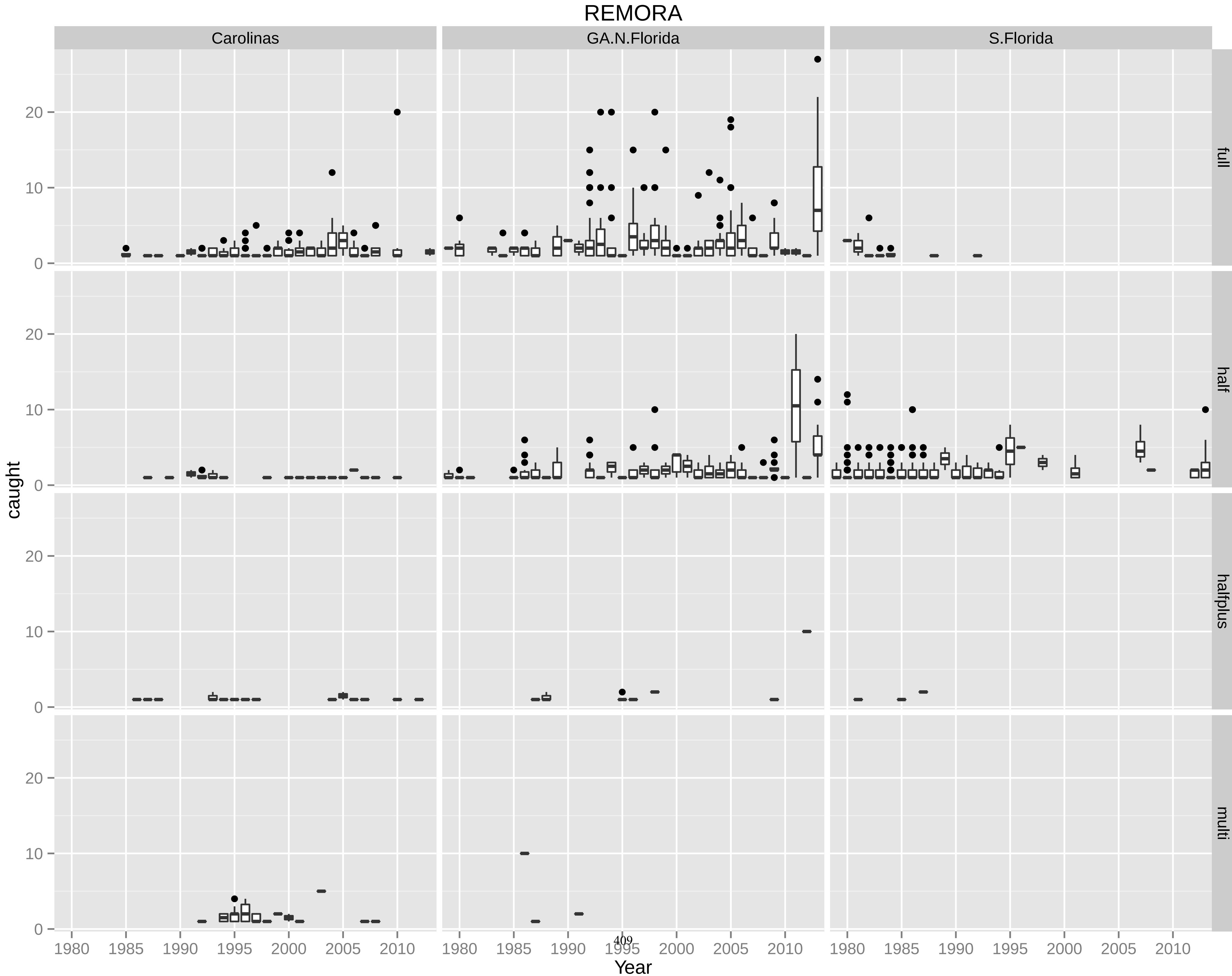


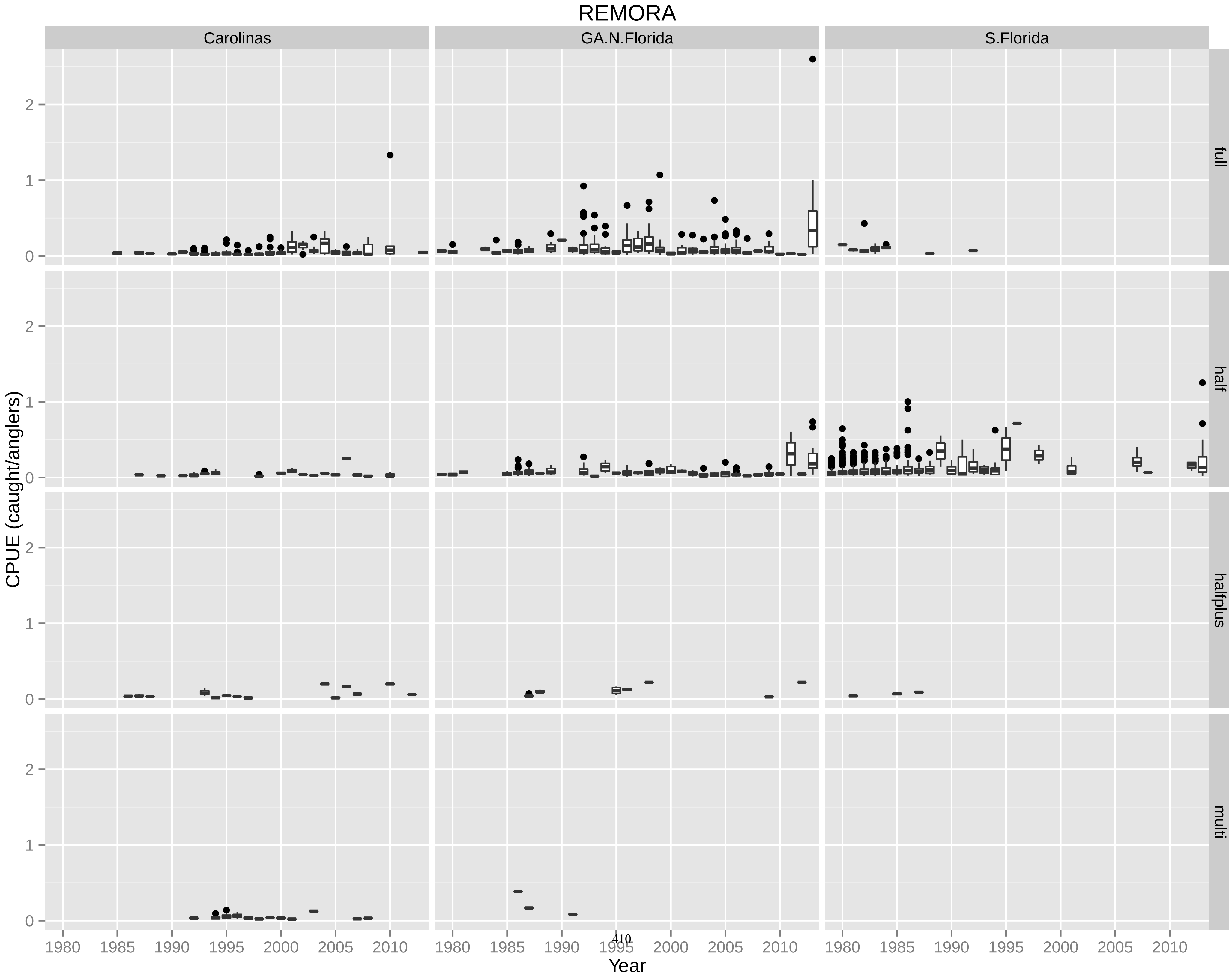
RED SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
10
20
1975
1980
1985
1990
1995
2000
2005
2010

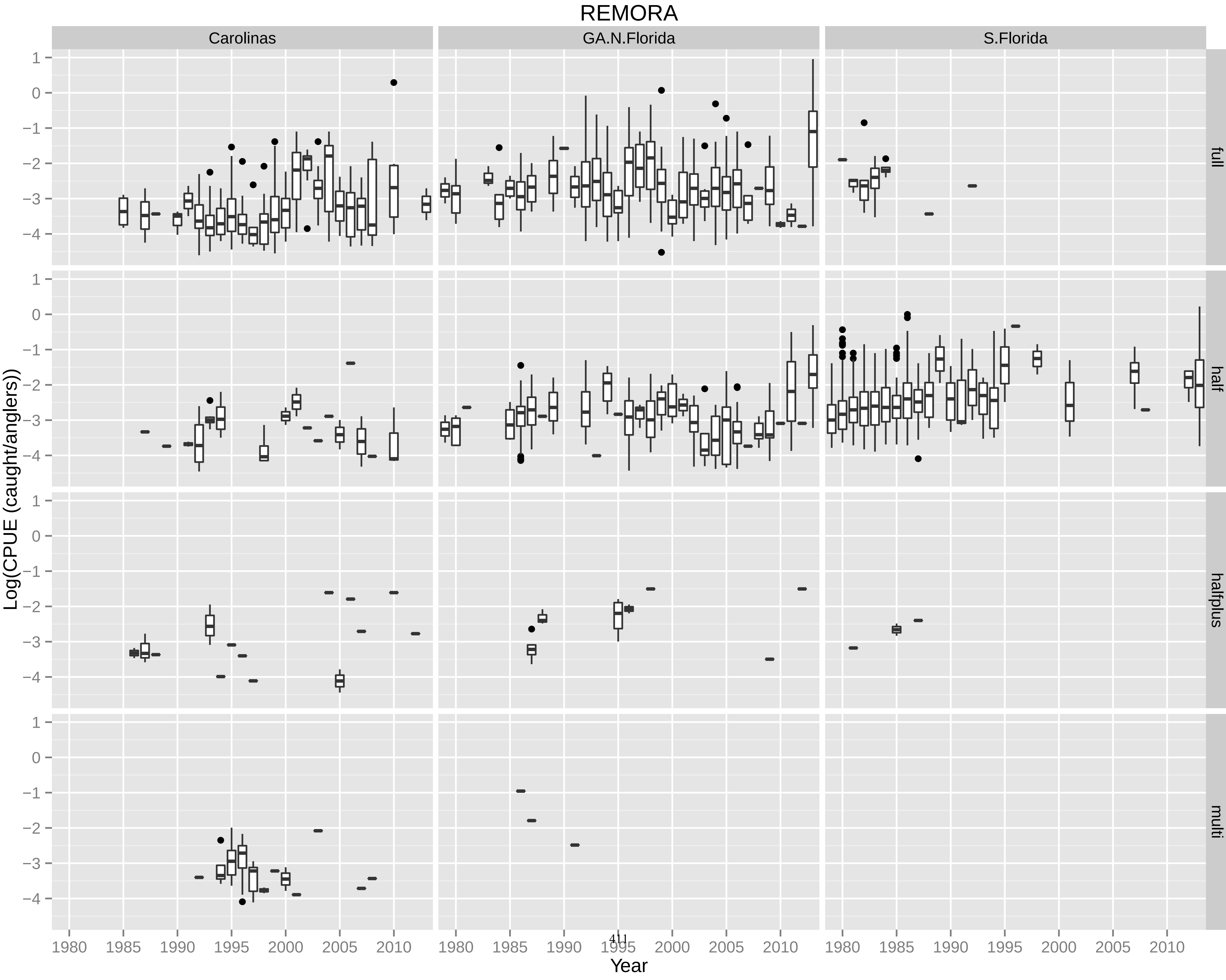


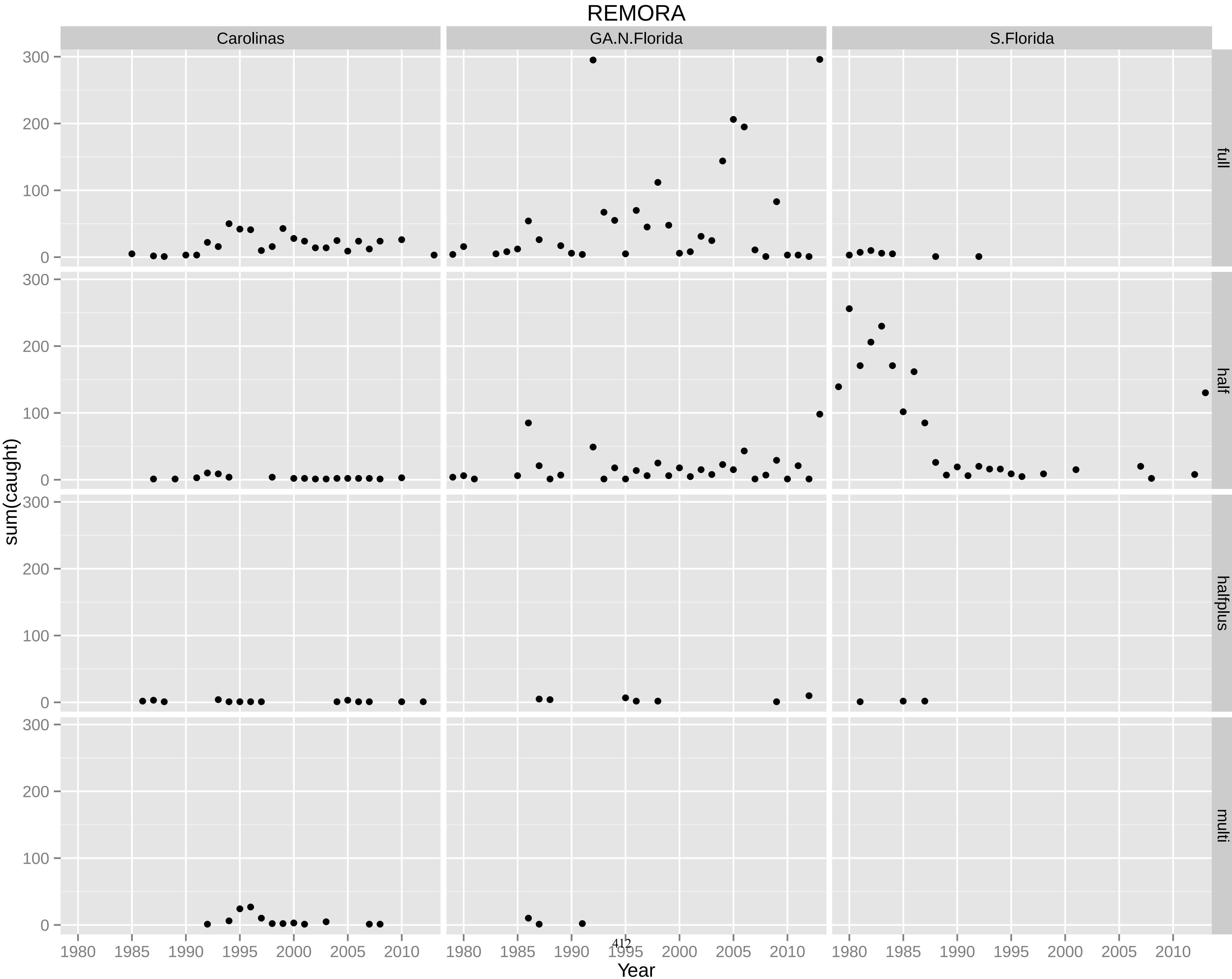
RED SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
1975
1980
1985
1990
1995
2000
2005
2010
2
0
−2
−4

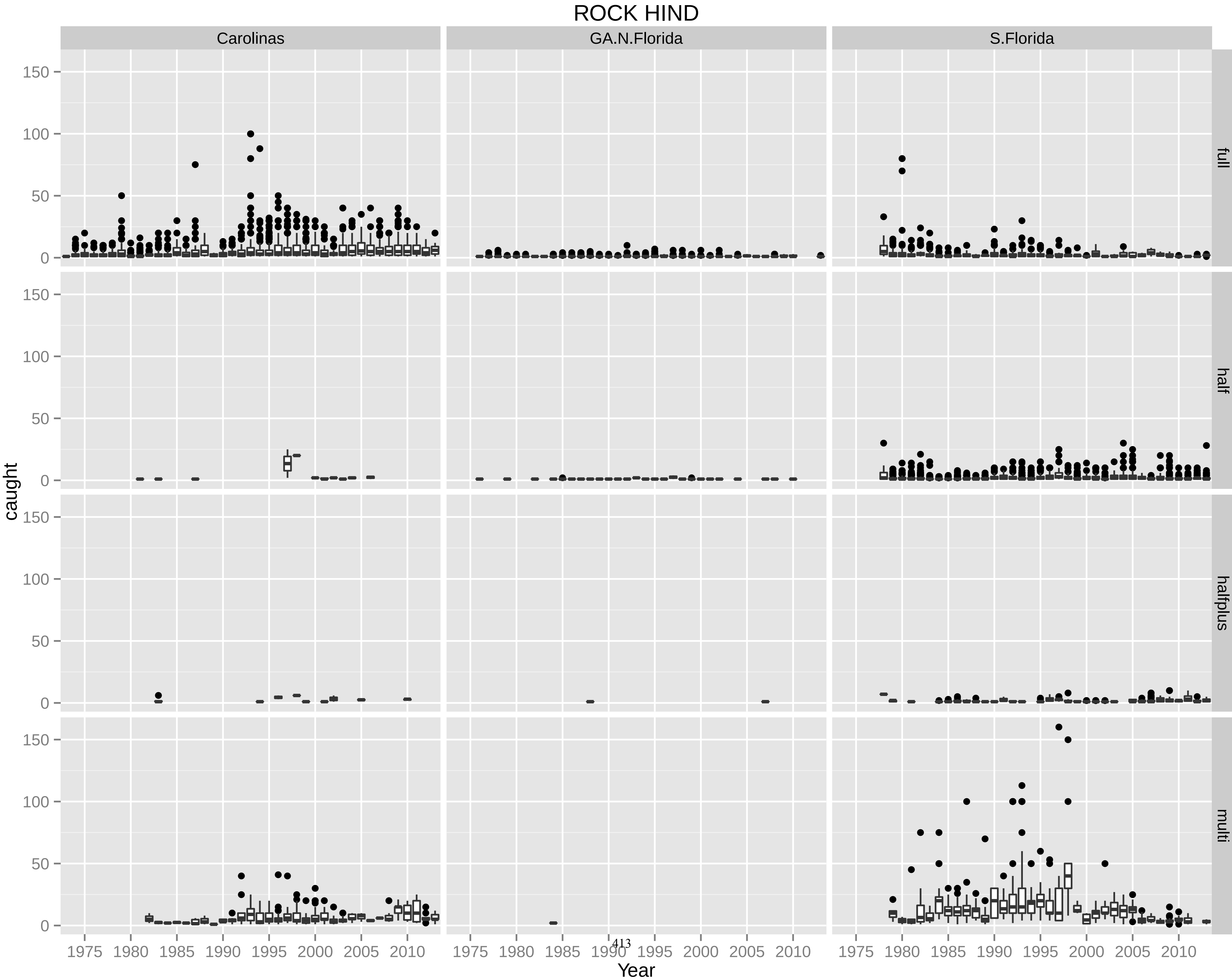

RED SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
30000
20000
10000
0
1975
1980
1985
1990
1995
2000
2005
2010

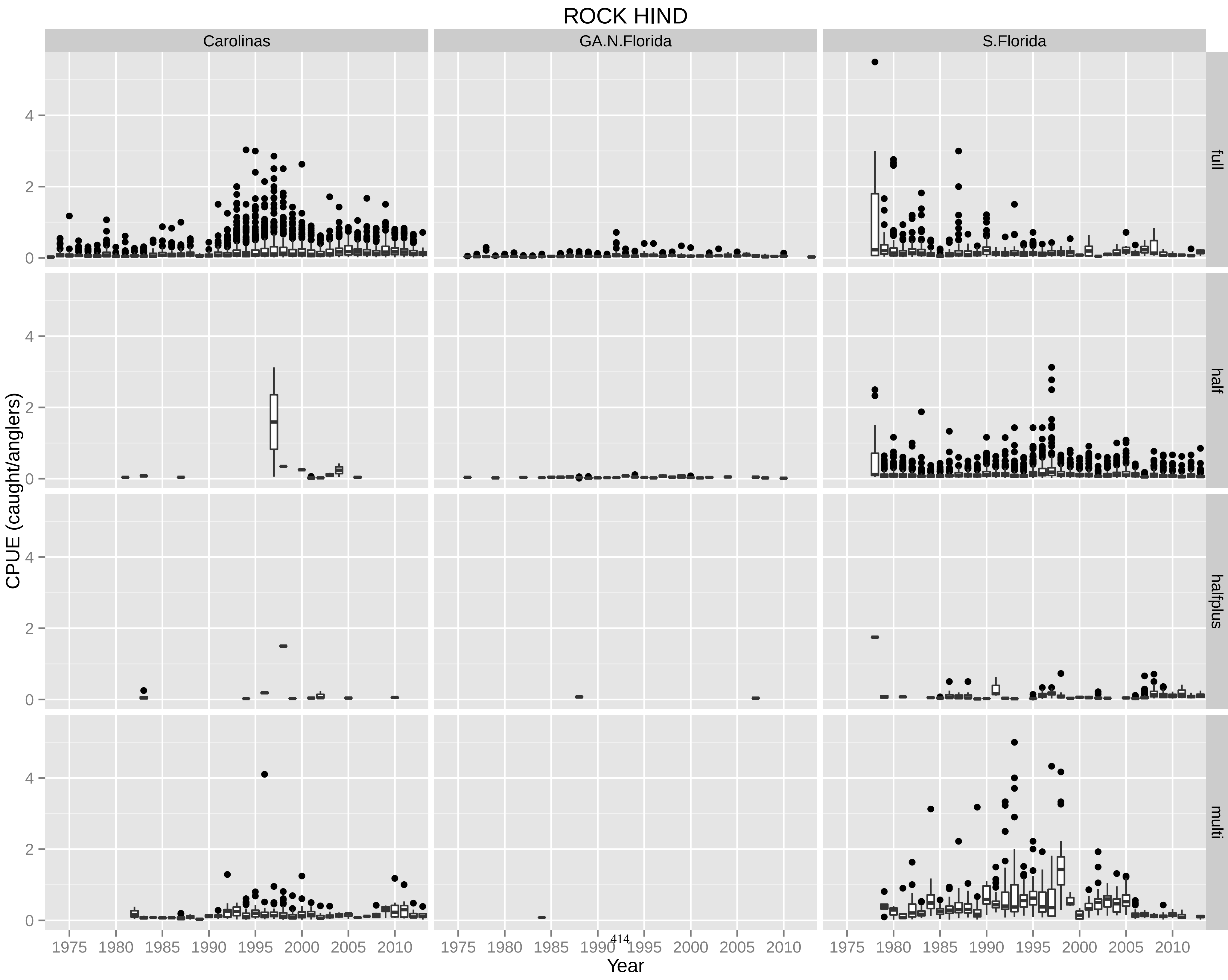

REMORA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
10
20
1980
1985
1990
1995
2000
2005
2010

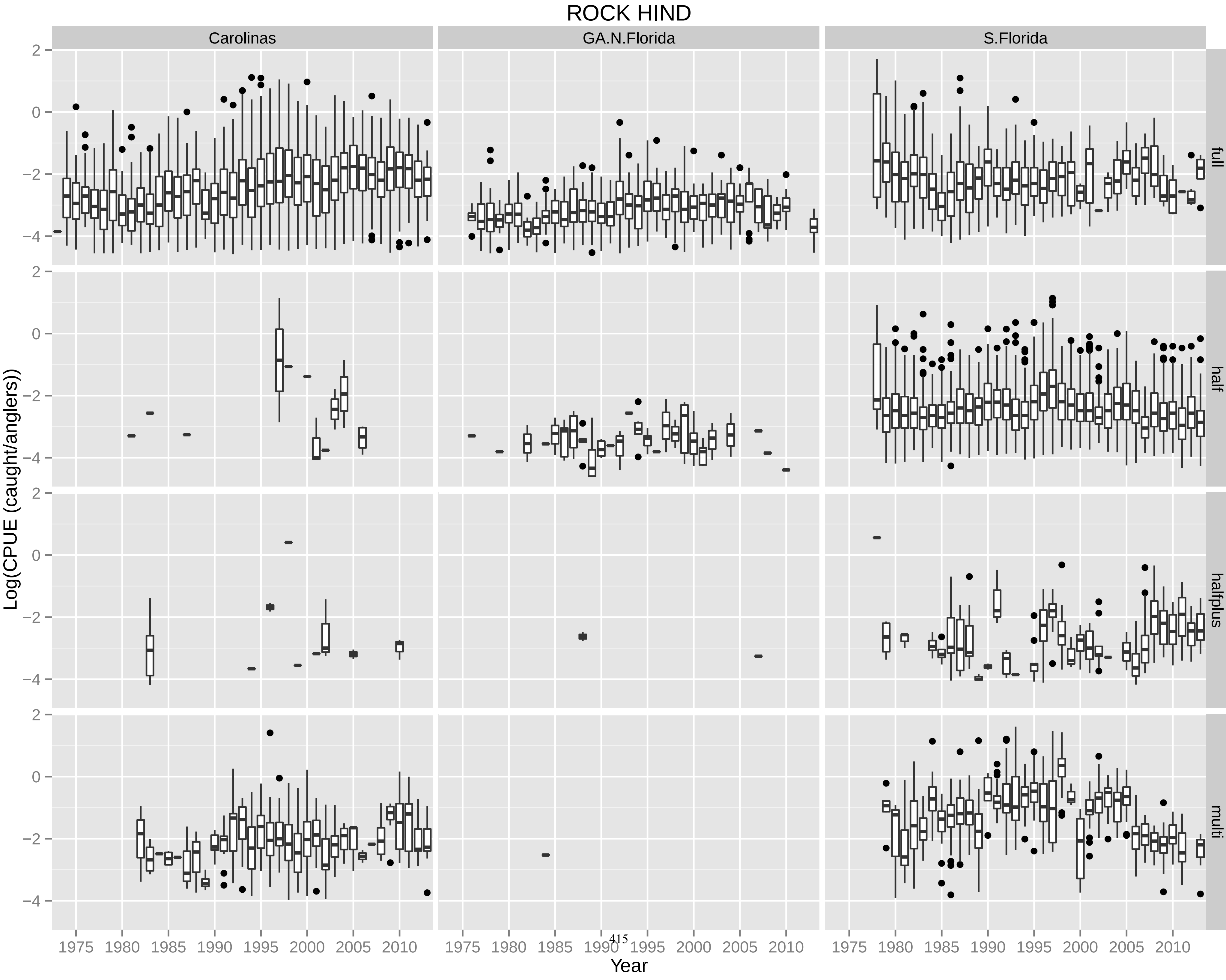

REMORA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year


REMORA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
1
0
−1
−2
−3
−4
1980
1985
1990
1995
2000
2005
2010
Year

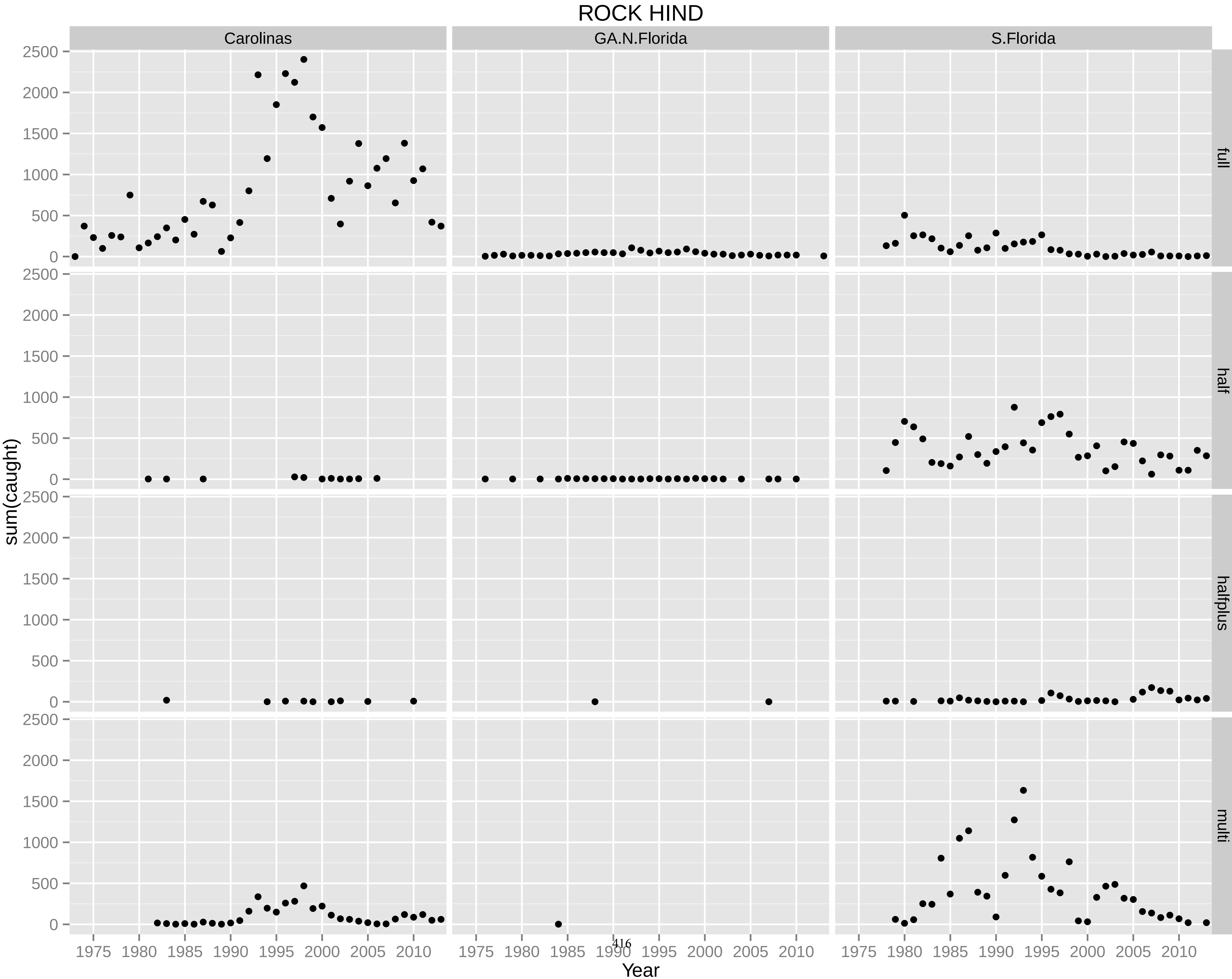

REMORA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
100
200
300
1980
1985
1990
1995
2000
2005
2010

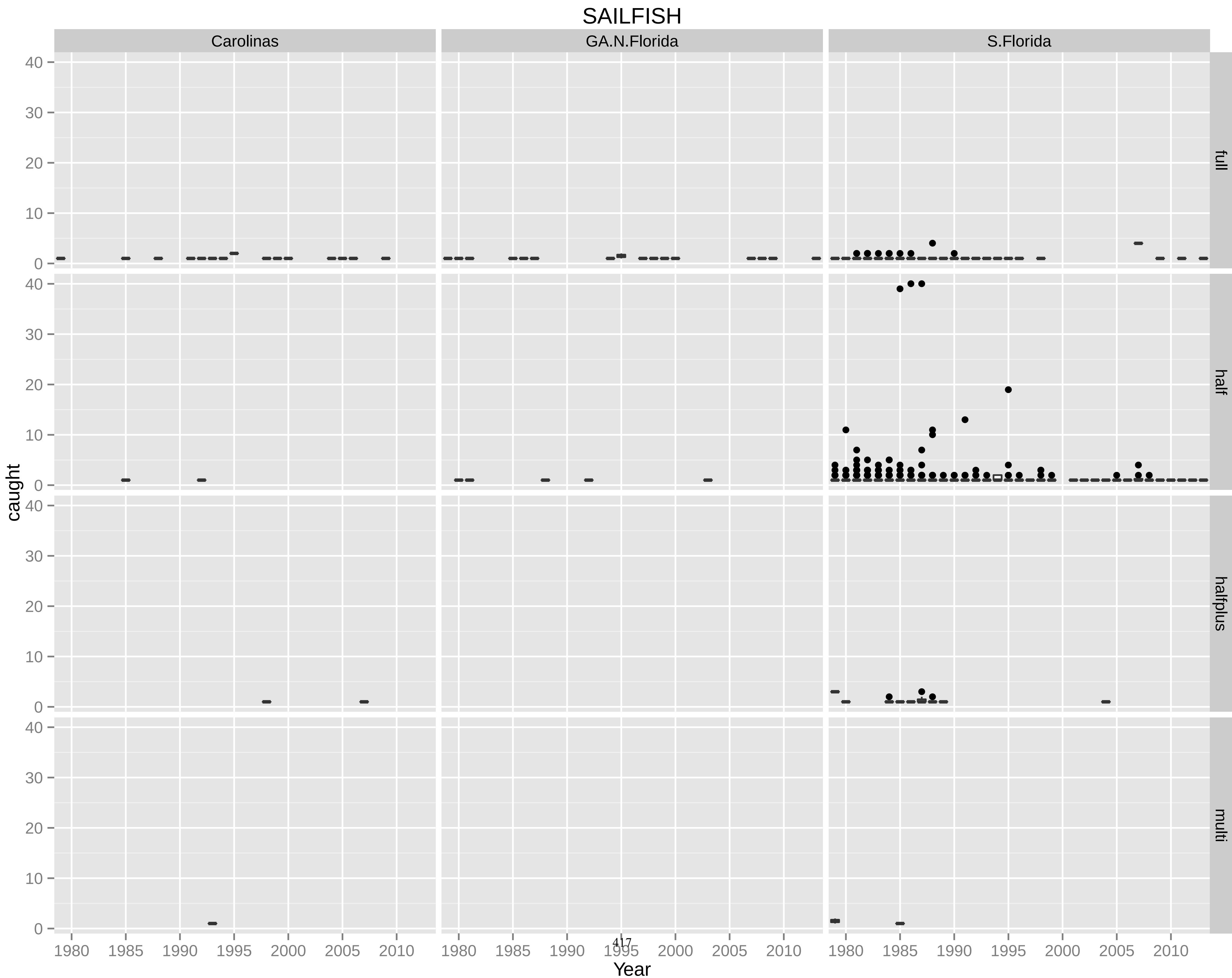

ROCK HIND
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
1975
1980
1985
1990
1995
2000
2005
2010

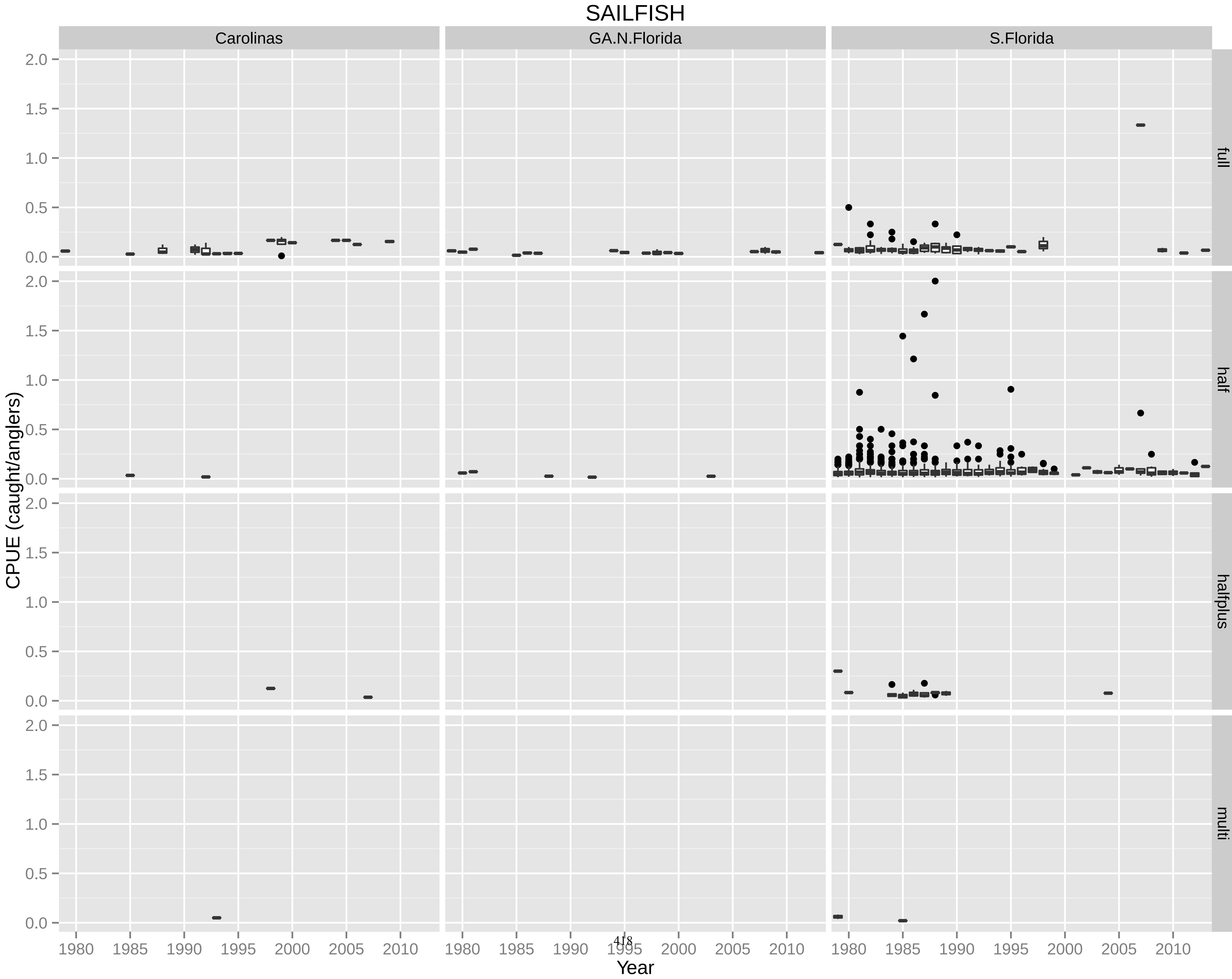

ROCK HIND
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
2
4
1975
1980
1985
1990
1995
2000
2005
2010



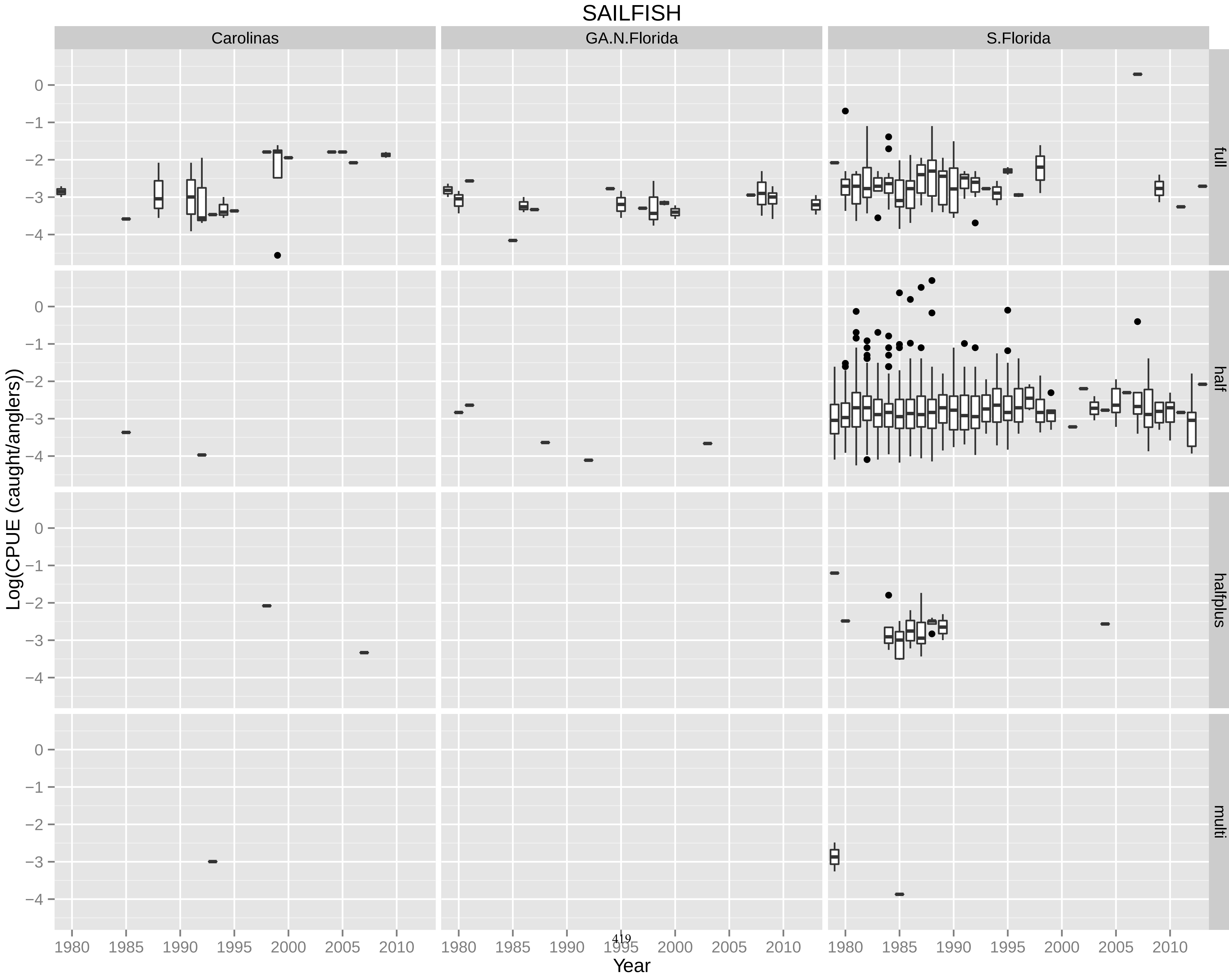
ROCK HIND
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
1975
1980
1985
1990
1995
2000
2005
2010
2
0
−2
−4


ROCK HIND
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
2000
2500
1975
1980
1985
1990
1995
2000
2005
2010

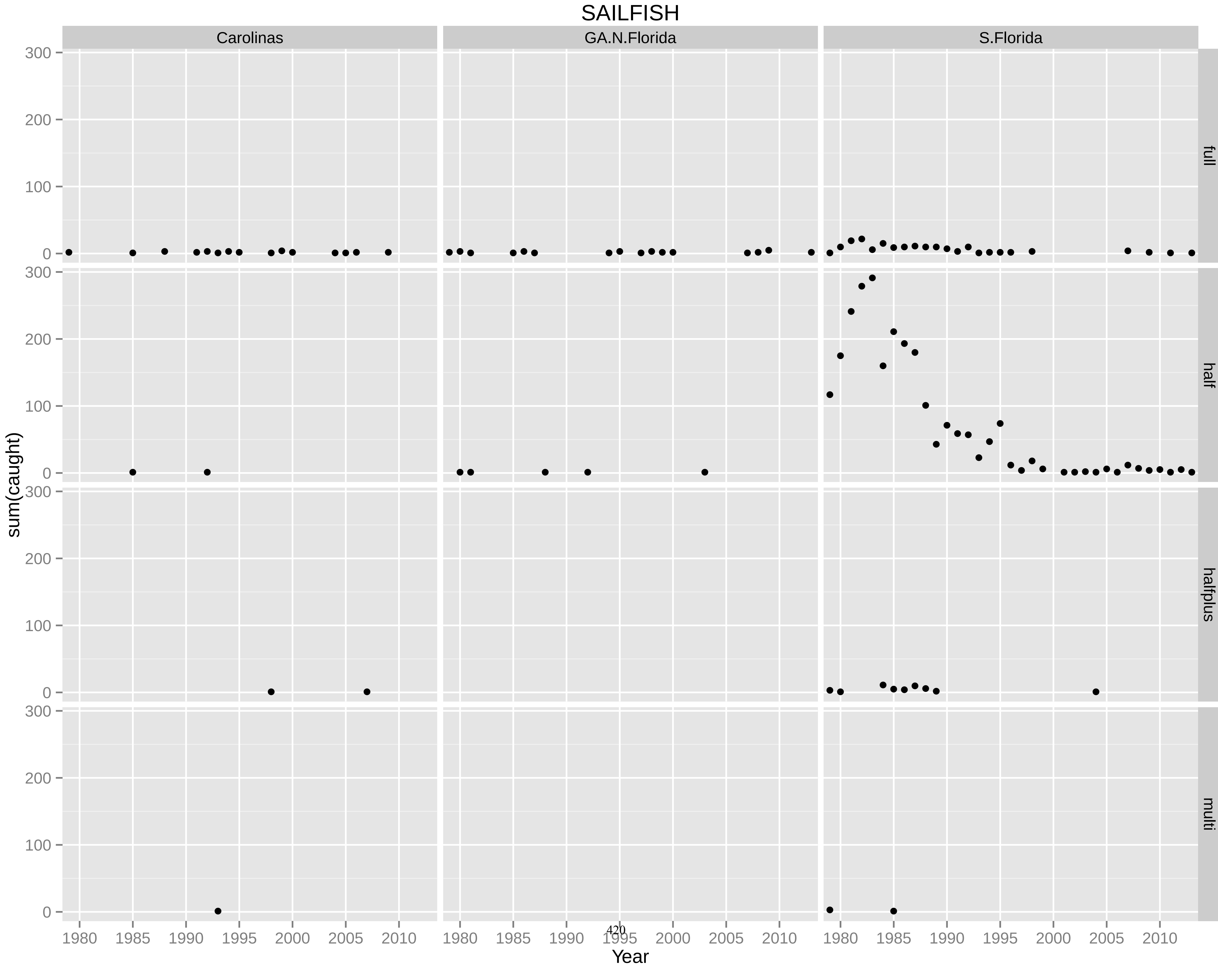

SAILFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
10
20
30
40
1980
1985
1990
1995
2000
2005
2010

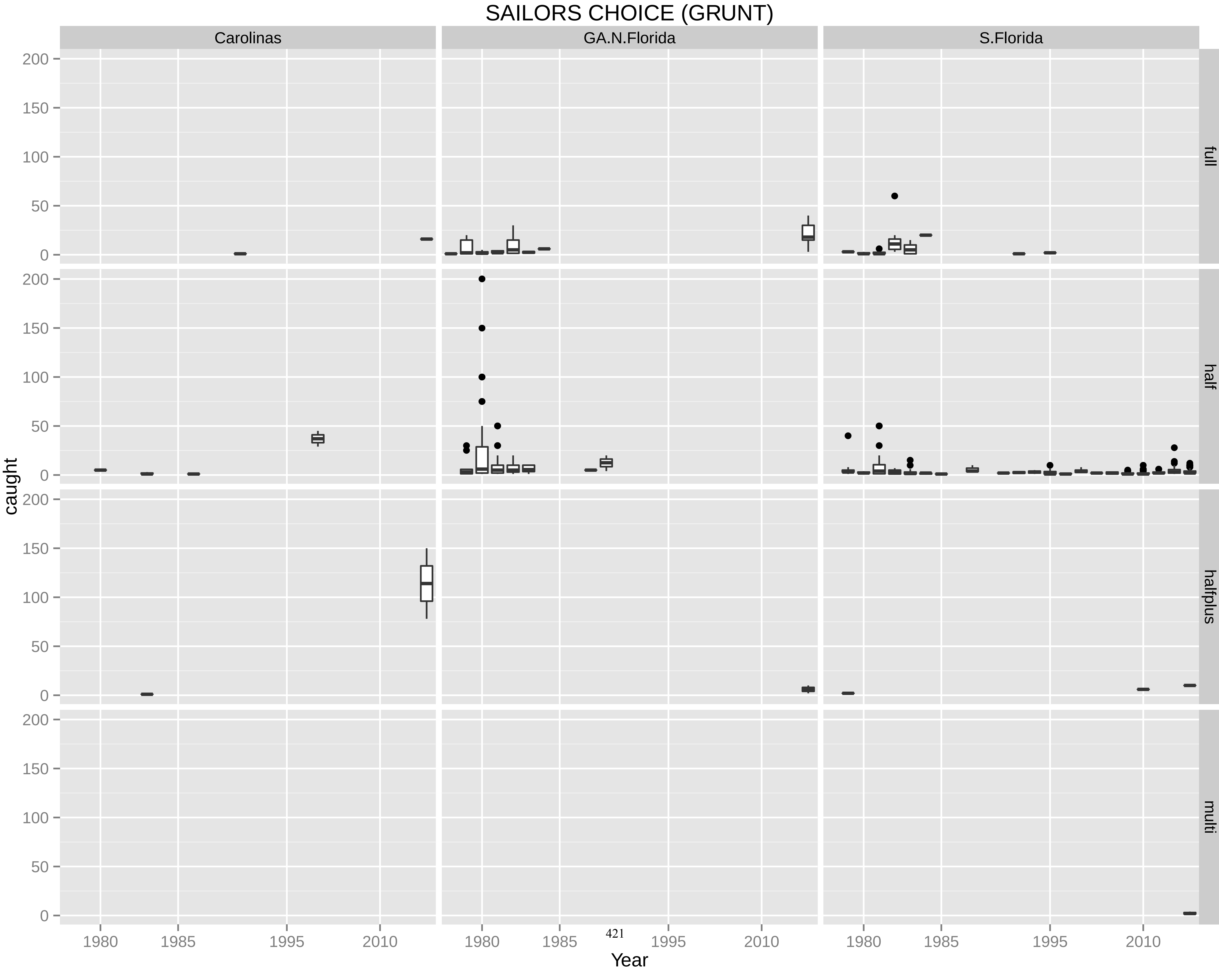


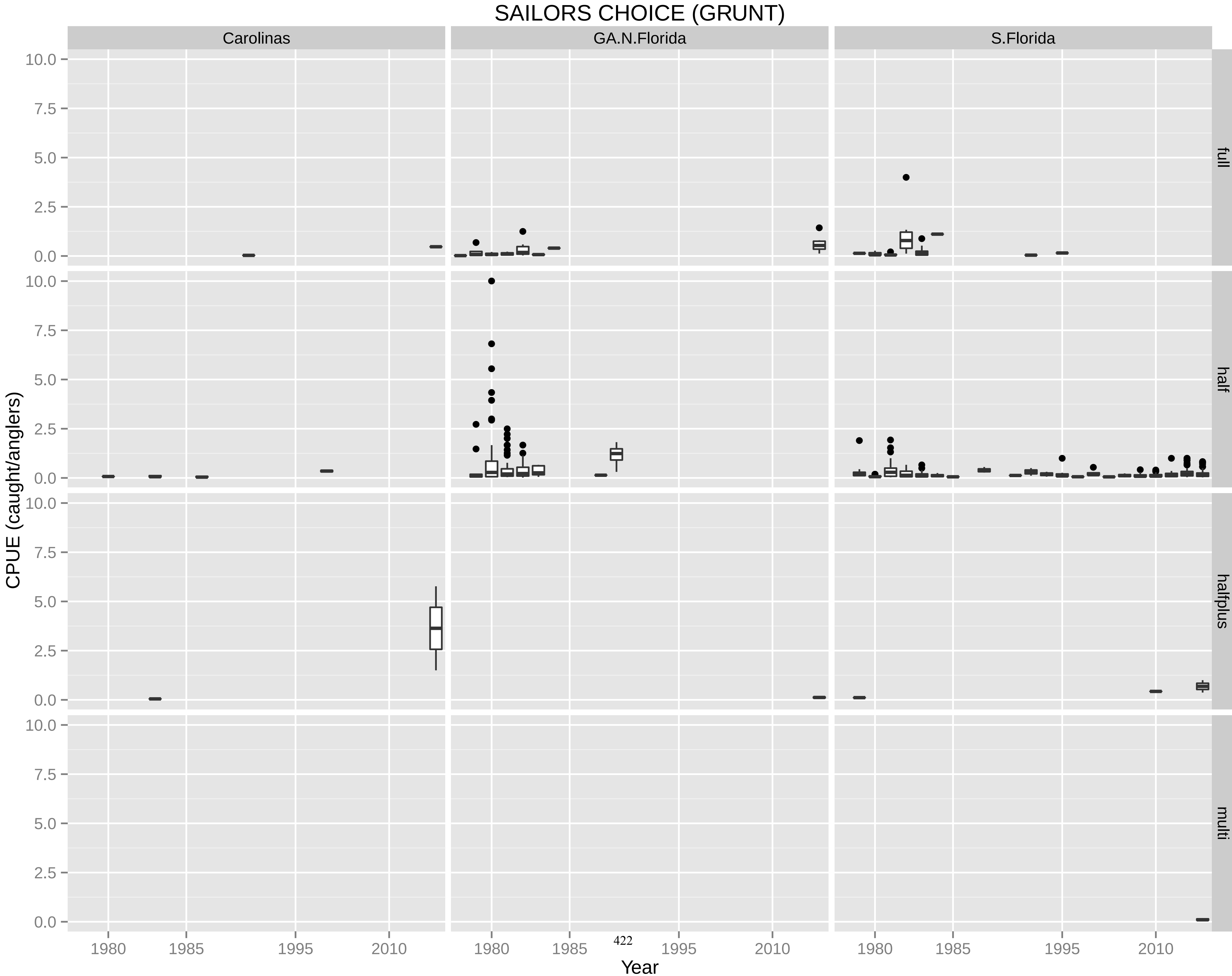
SAILFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
0.5
1.0
1.5
2.0
1980
1985
1990
1995
2000
2005
2010

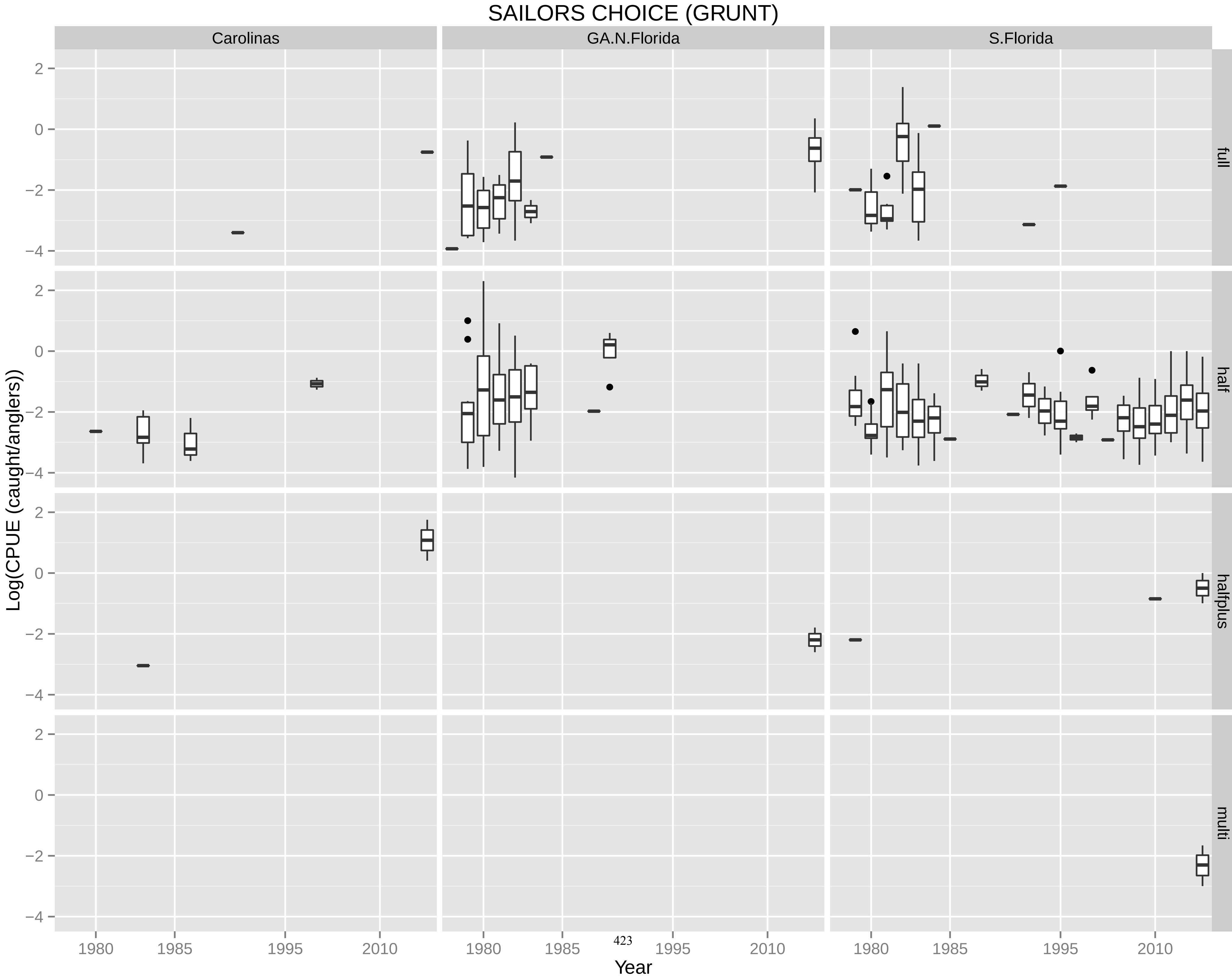


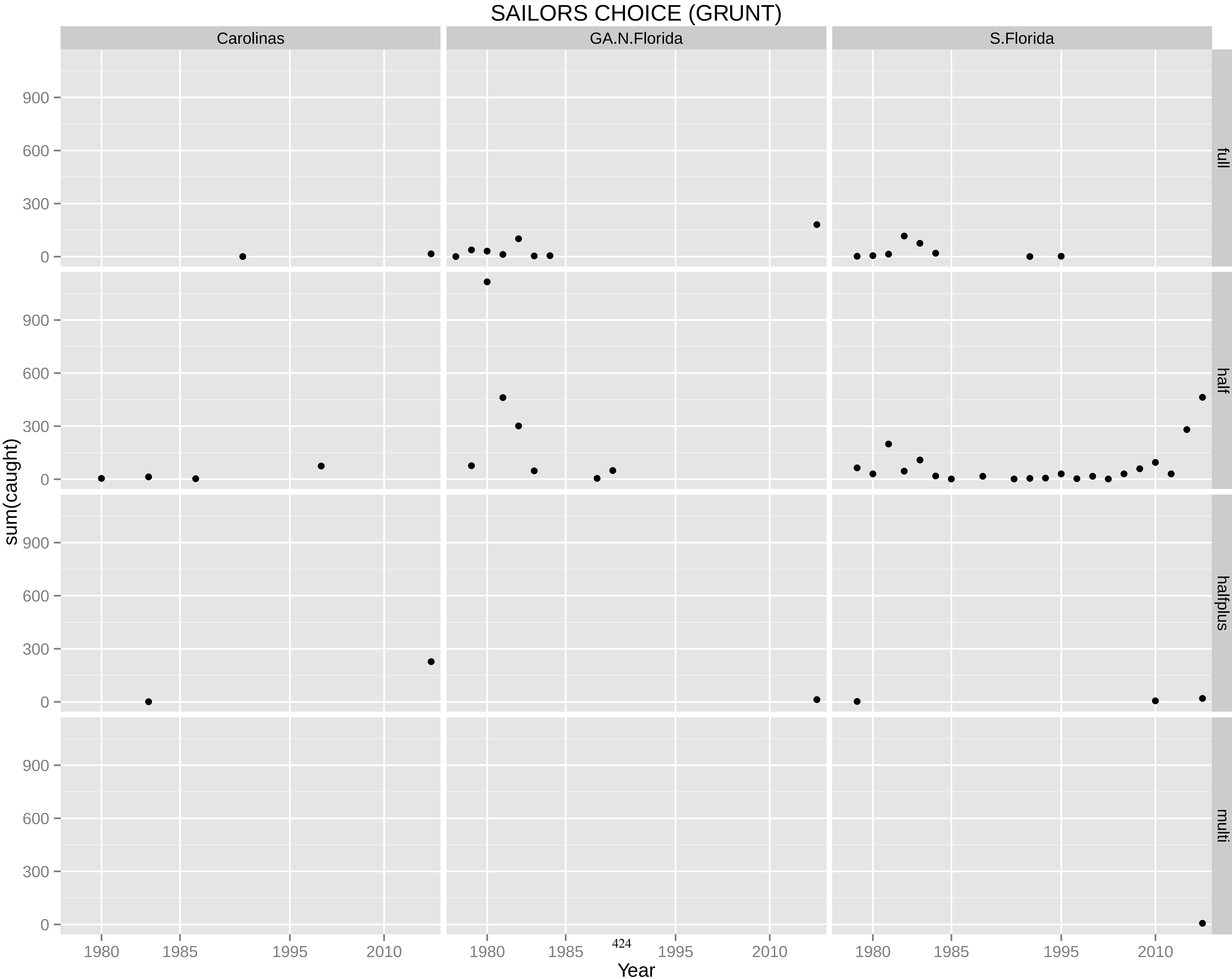
SAILFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
0
−1
−2
−3
−4
1980
1985
1990
1995
2000
2005
2010
Log(CPUE (caught/anglers))
Year

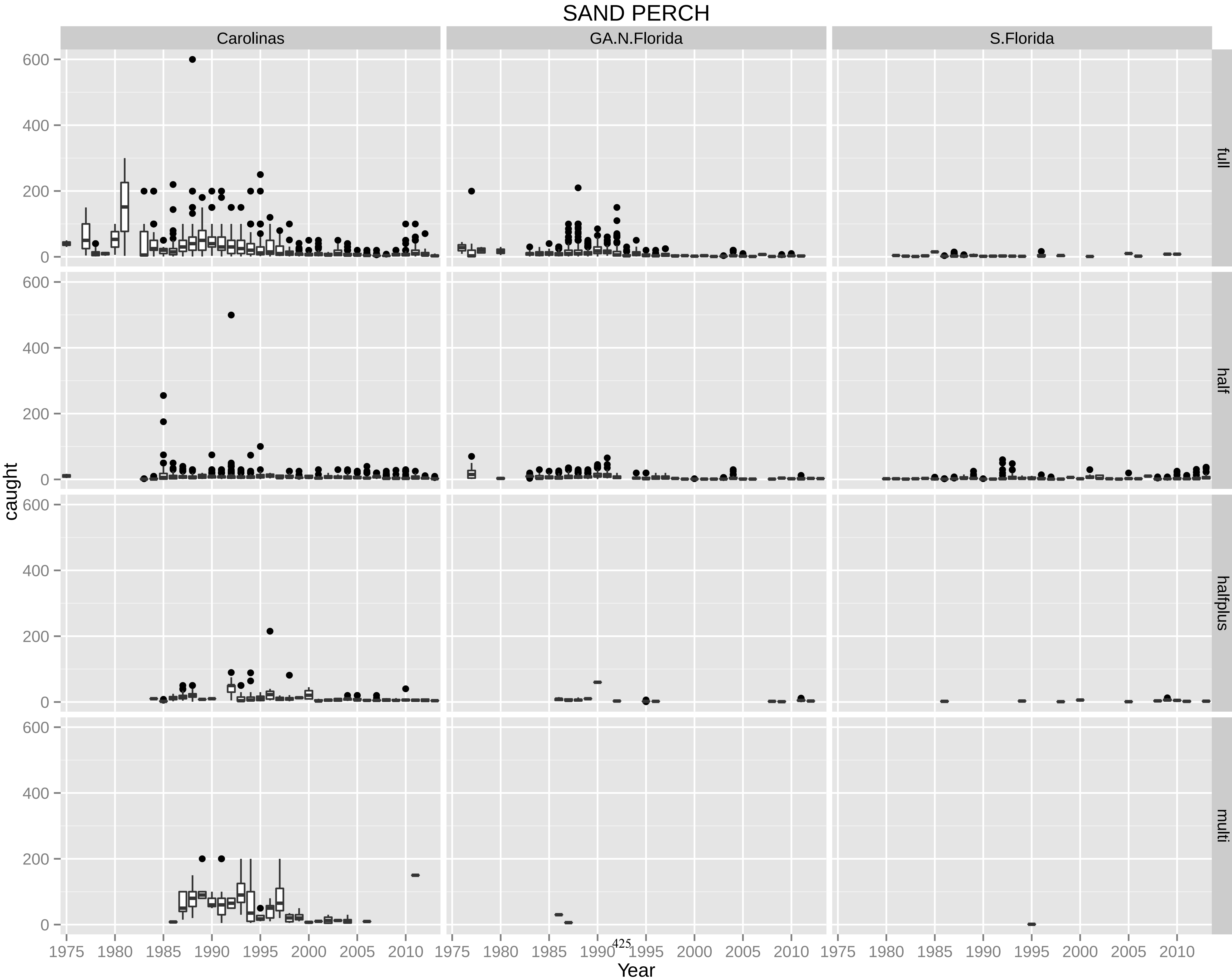

SAILFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
100
200
300
1980
1985
1990
1995
2000
2005
2010
Year

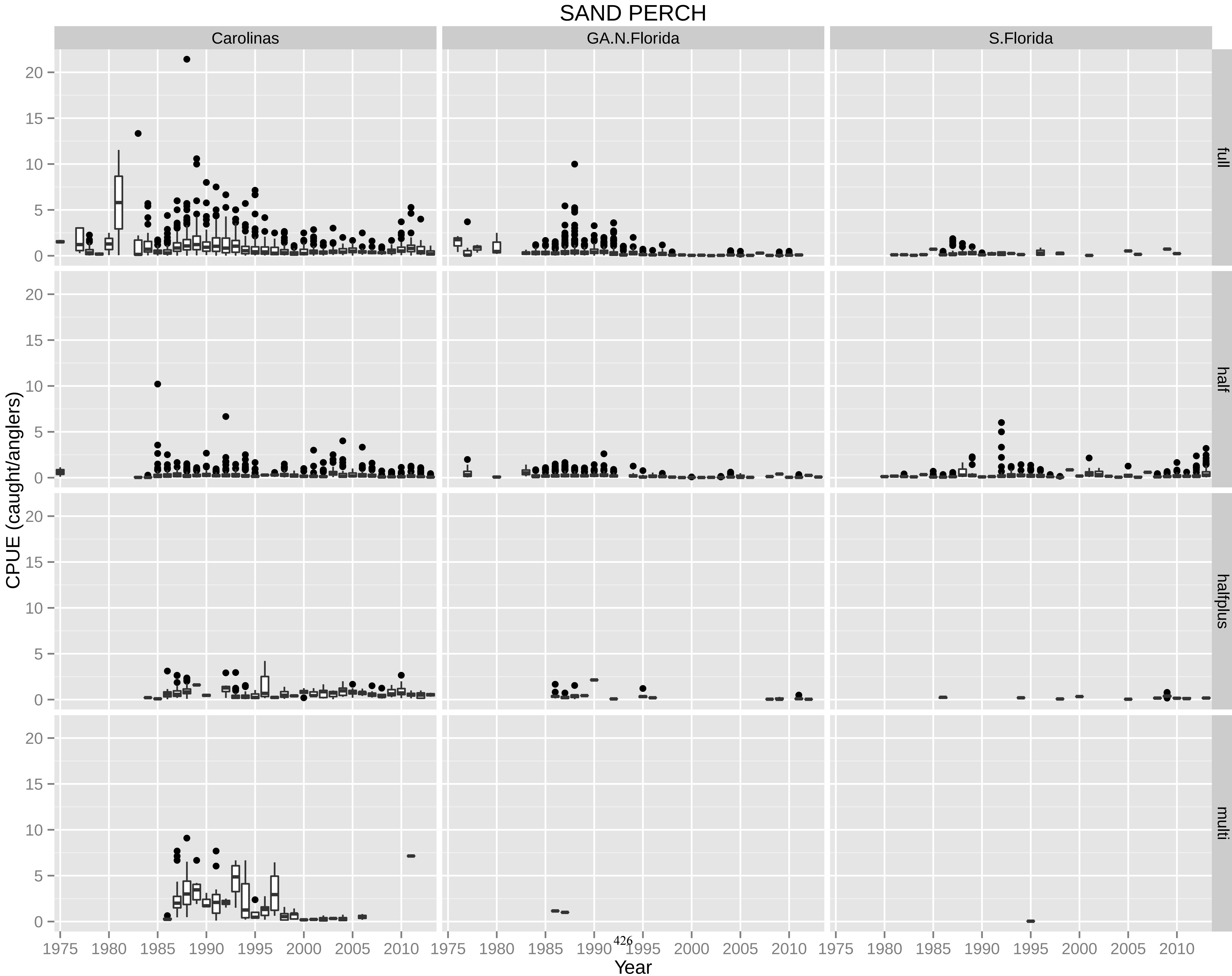

SAILORS CHOICE (GRUNT)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
0
50
100
150
200
1980
1985
1995
2010
Year

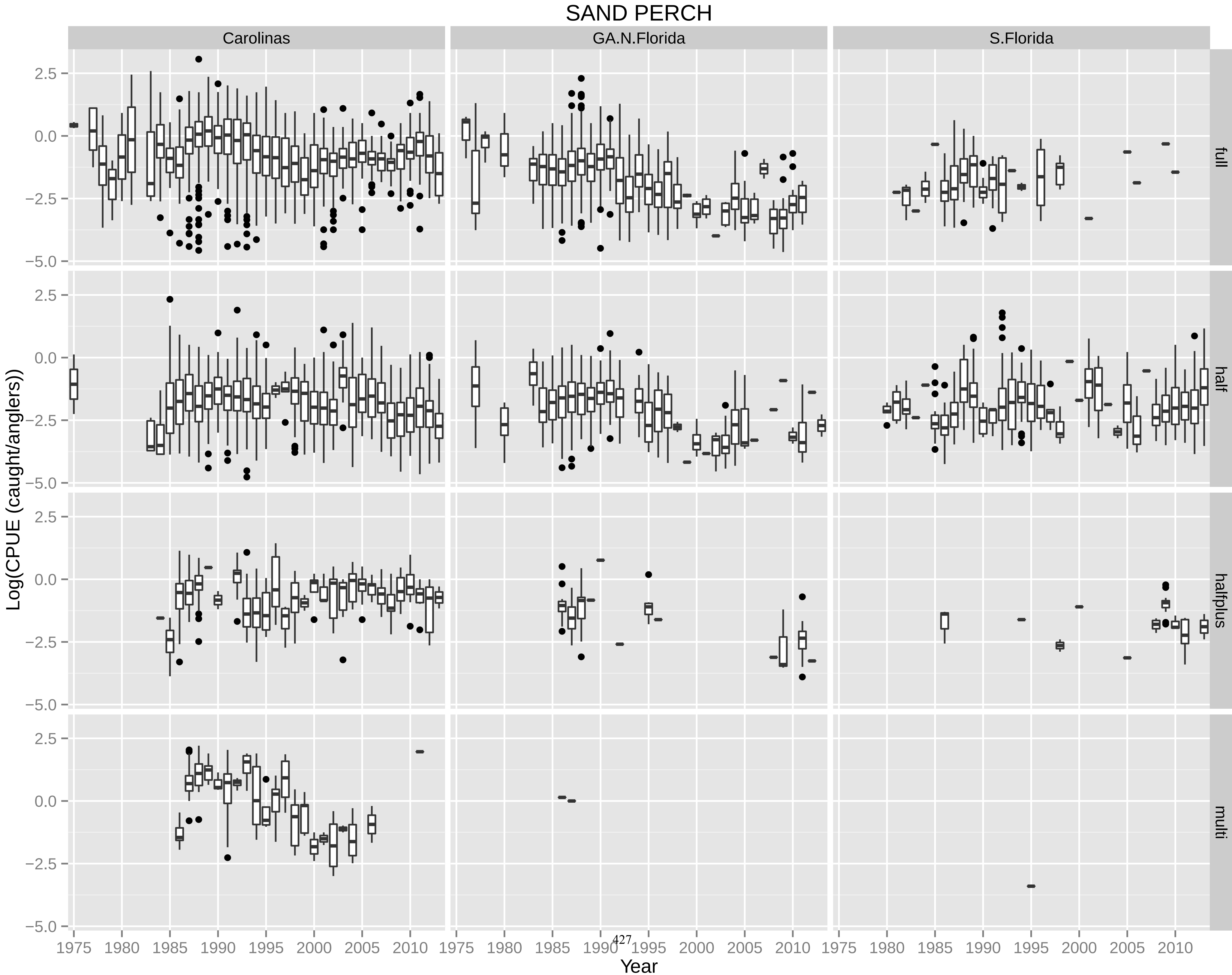

SAILORS CHOICE (GRUNT)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
10.0
7.5
5.0
2.5
0.0
1980
1985
1995
2010

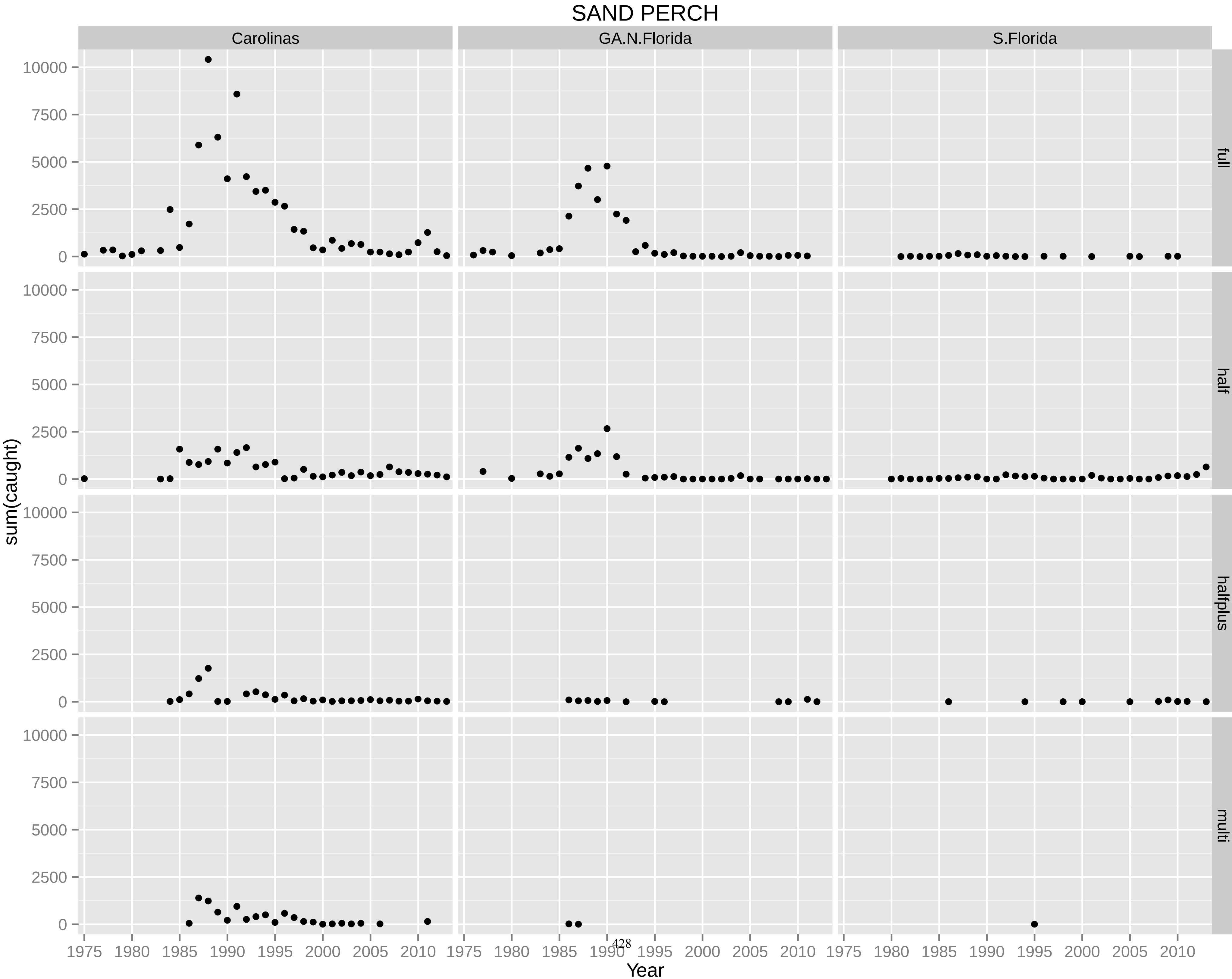

SAILORS CHOICE (GRUNT)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1980
1985
1995
2010

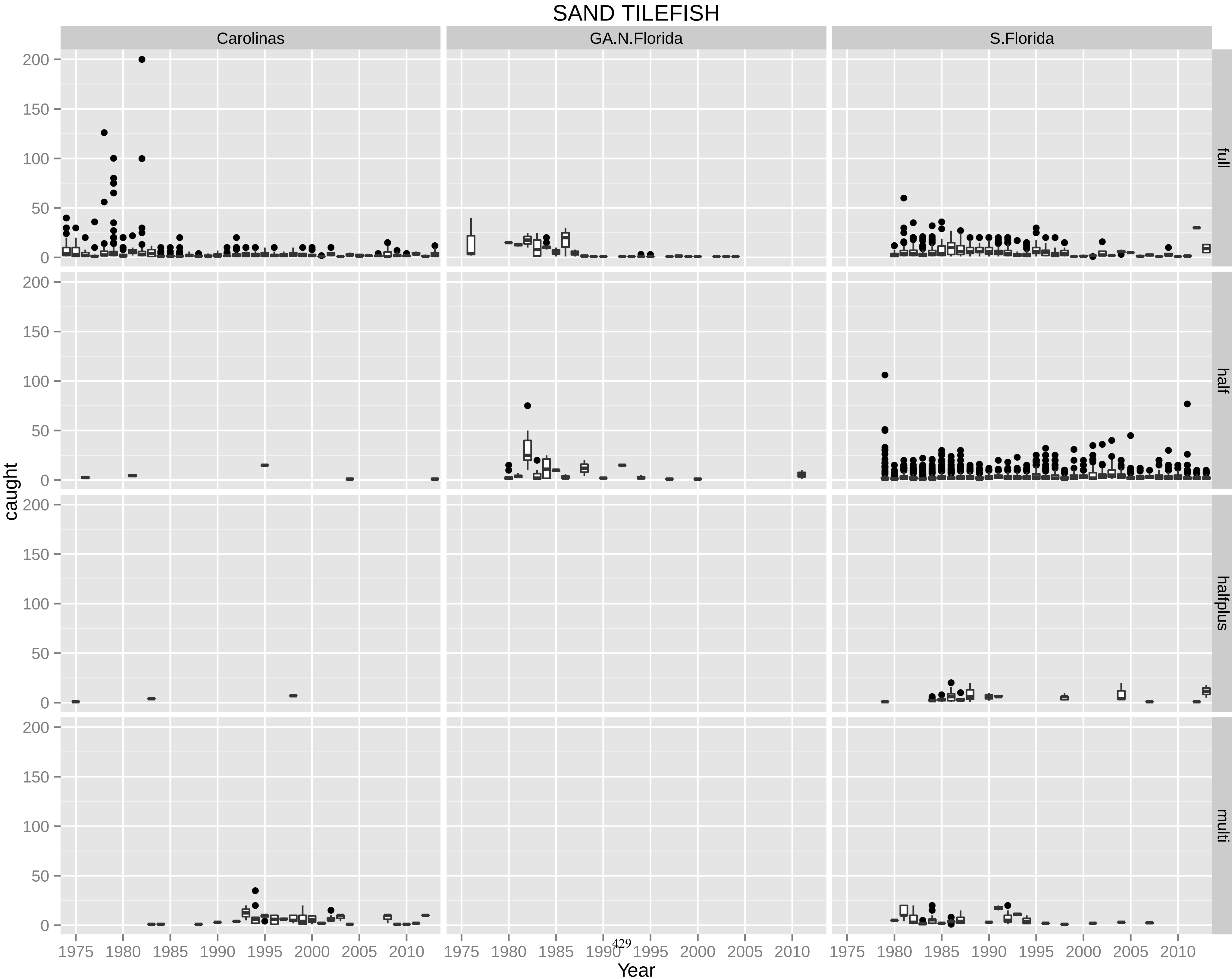

SAILORS CHOICE (GRUNT)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
900
600
300
0
1980
1985
1995
2010
Year

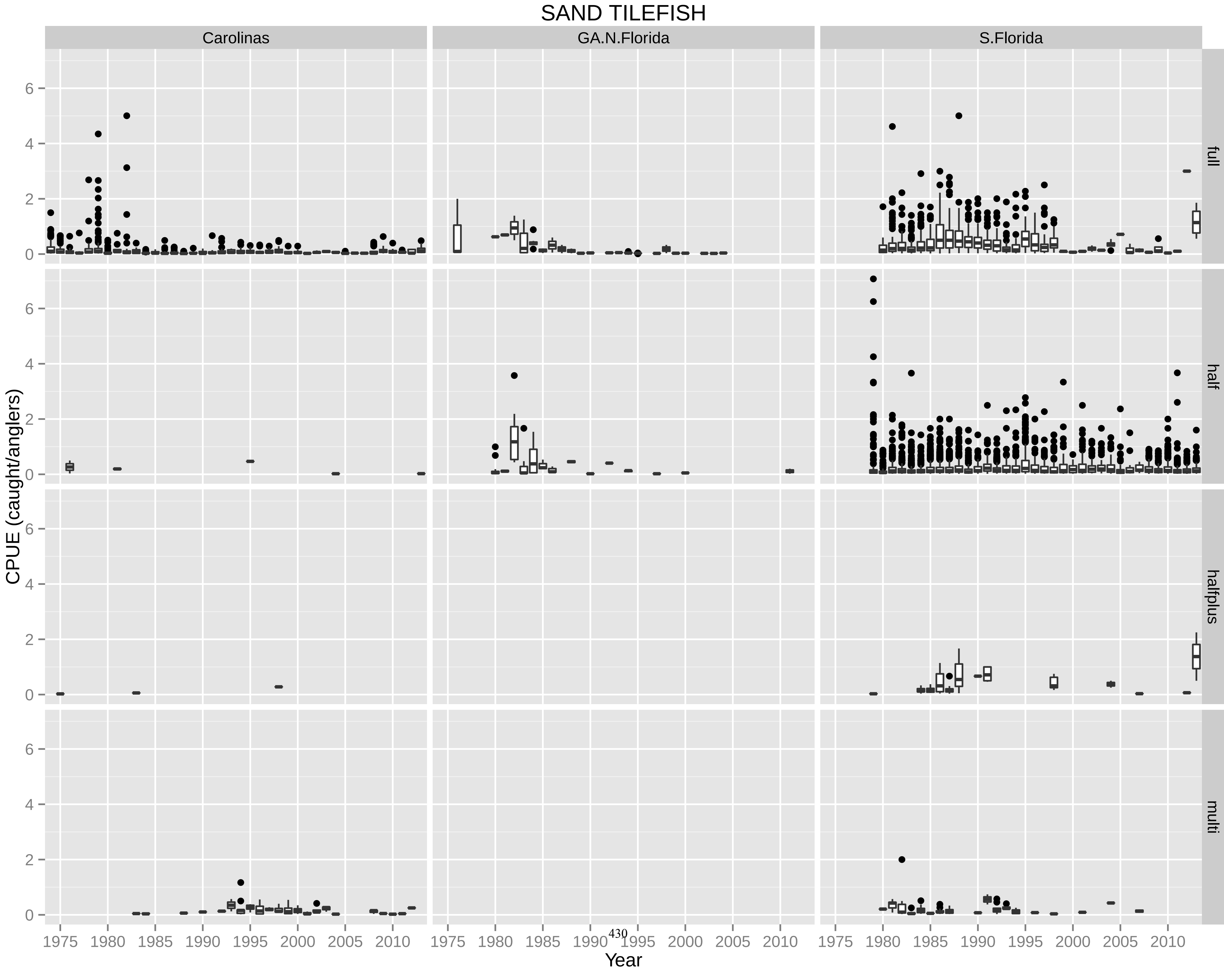

SAND PERCH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
200
400
600
1975
1980
1985
1990
1995
2000
2005
2010

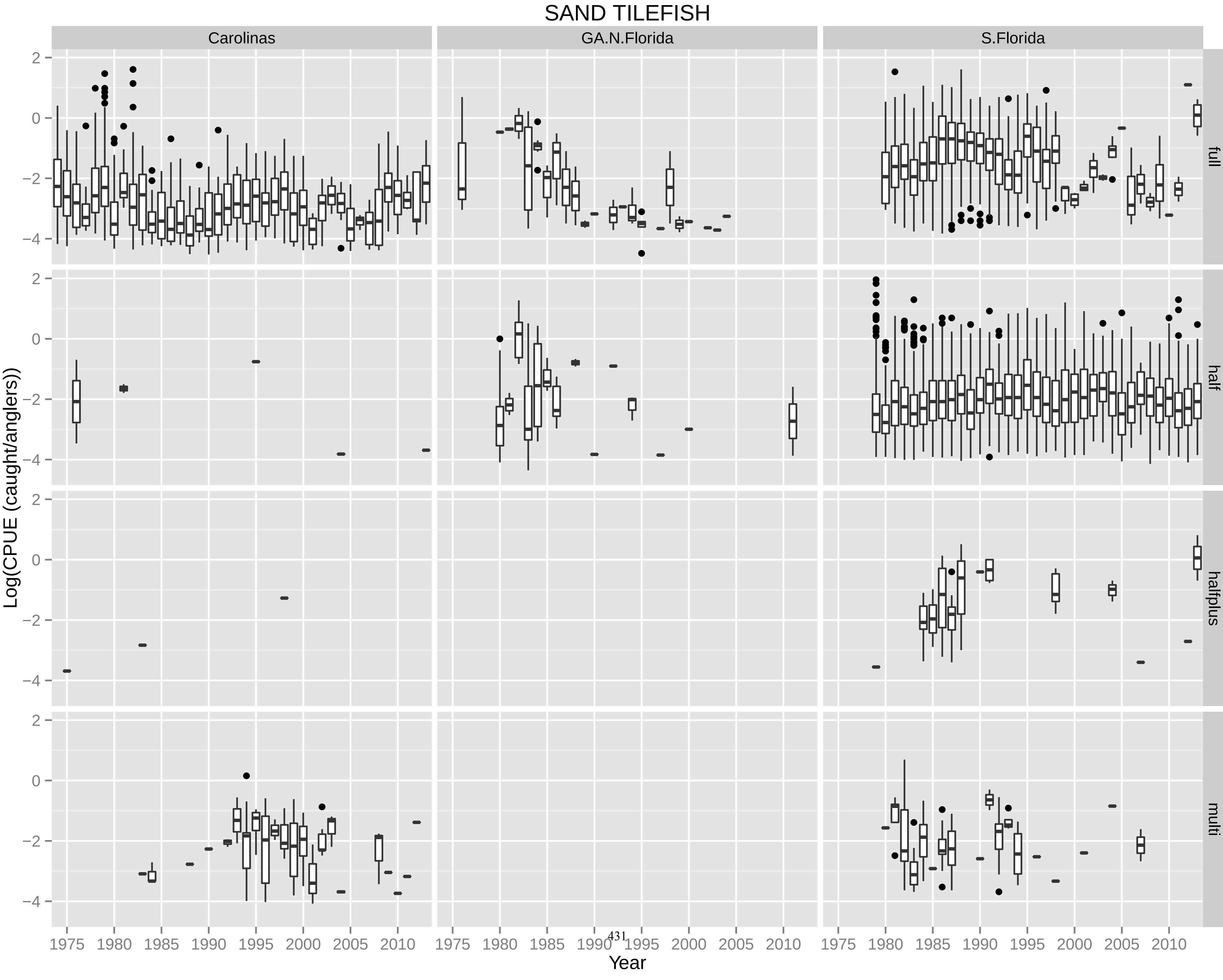

SAND PERCH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
15
20
1975
1980
1985
1990
1995
2000
2005
2010


SAND PERCH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010
Year

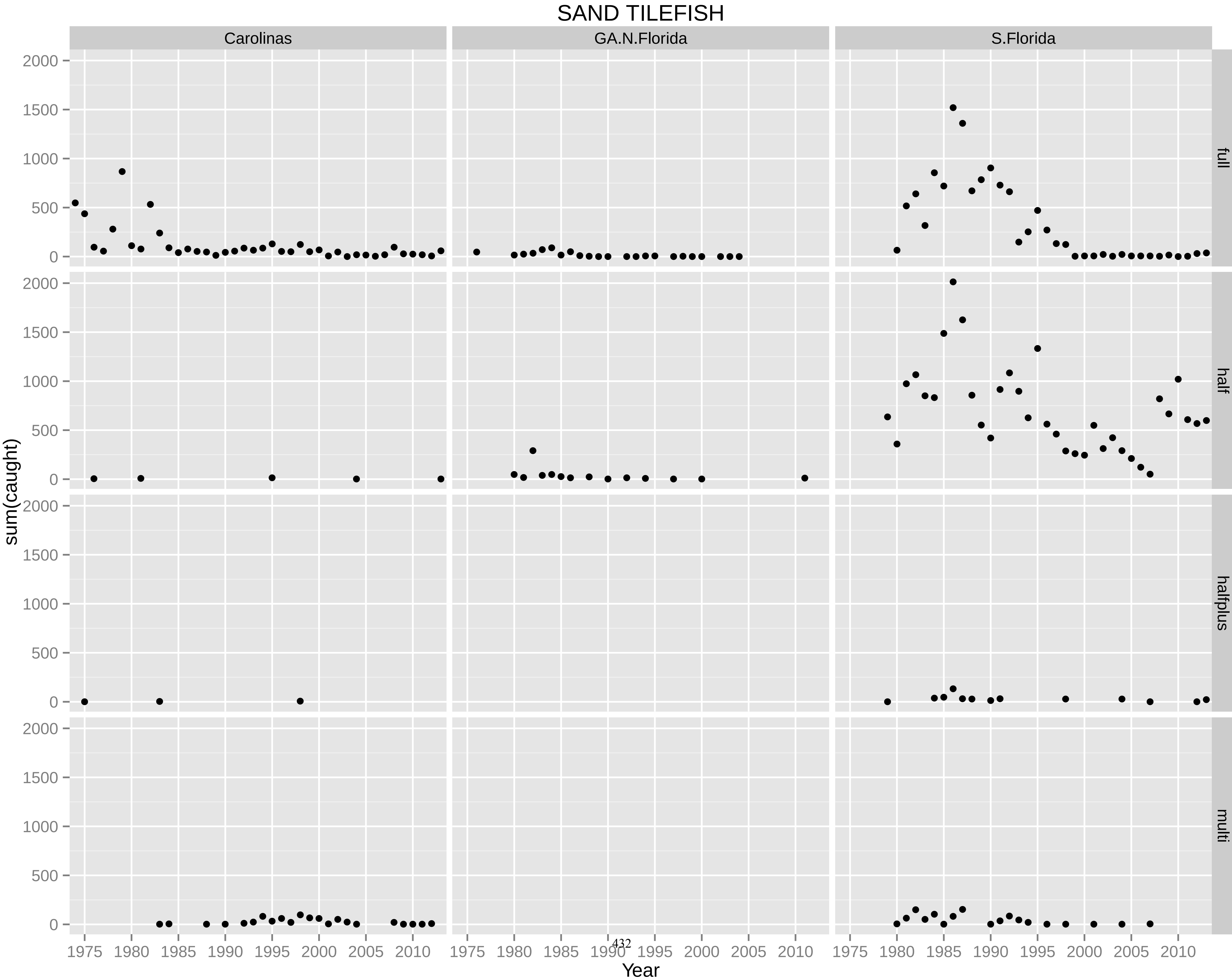

SAND PERCH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
10000
7500
5000
2500
0
1975
1980
1985
1990
1995
2000
2005
2010


SAND TILEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
200
1975
1980
1985
1990
1995
2000
2005
2010

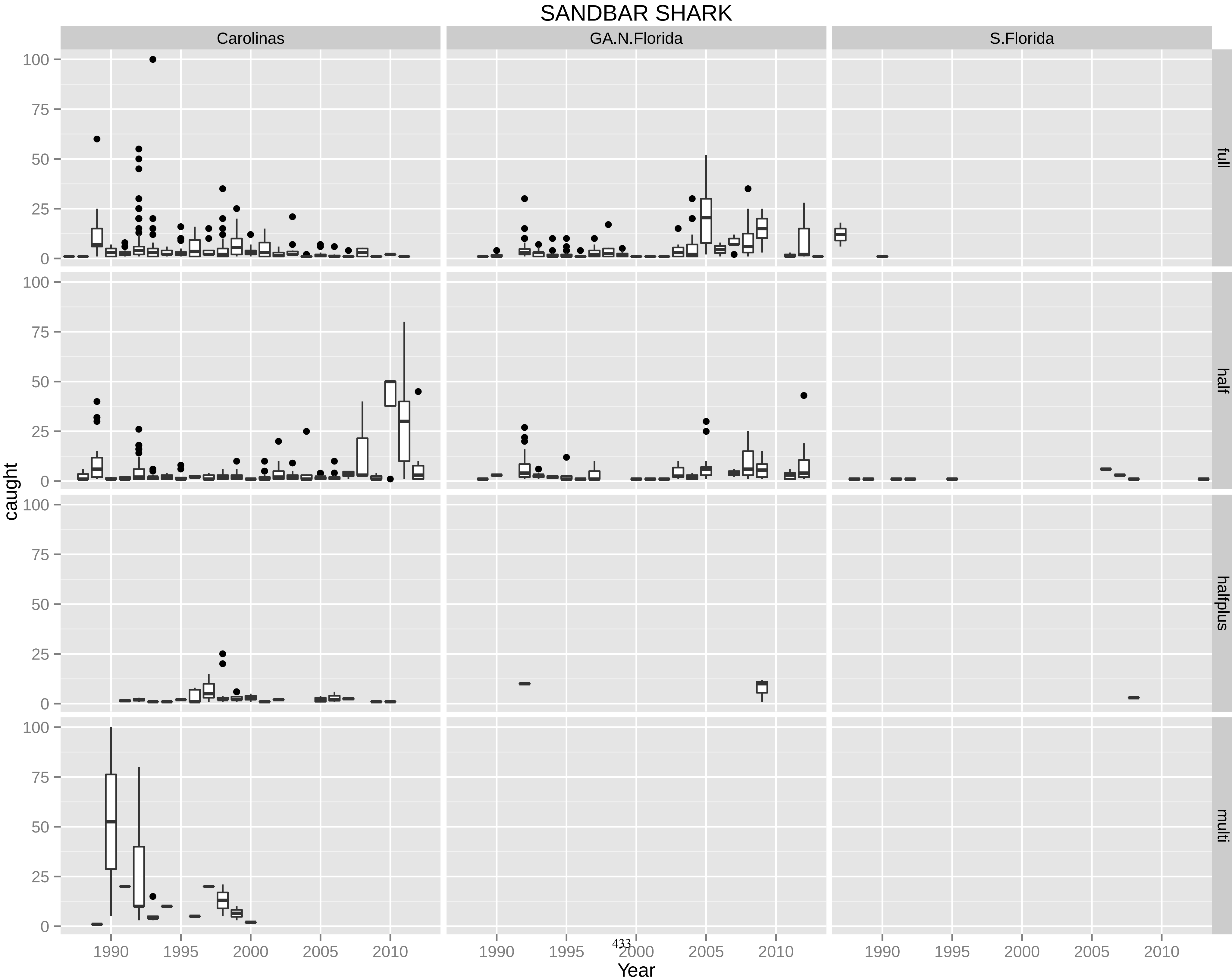

SAND TILEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
2
4
6
1975
1980
1985
1990
1995
2000
2005
2010

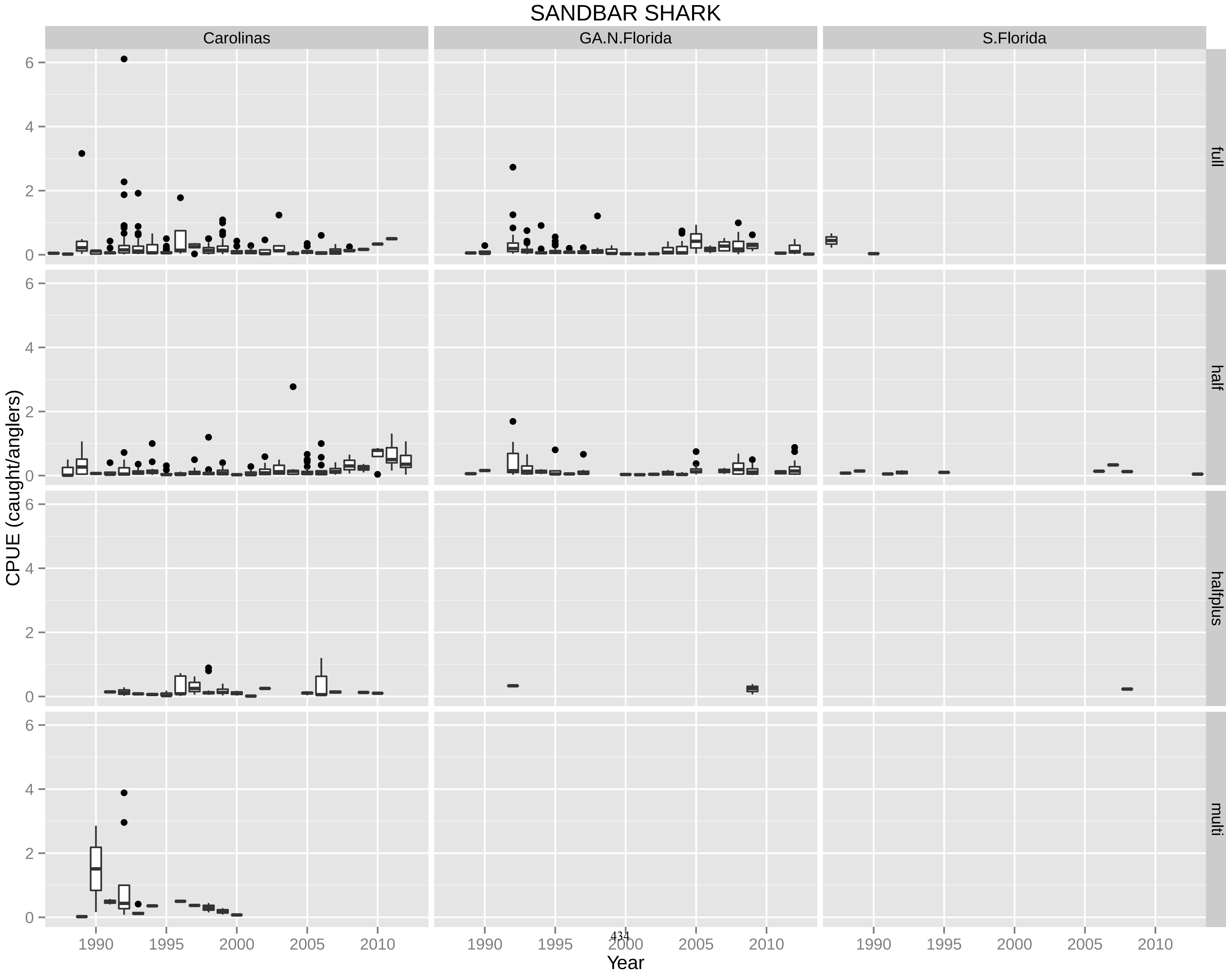


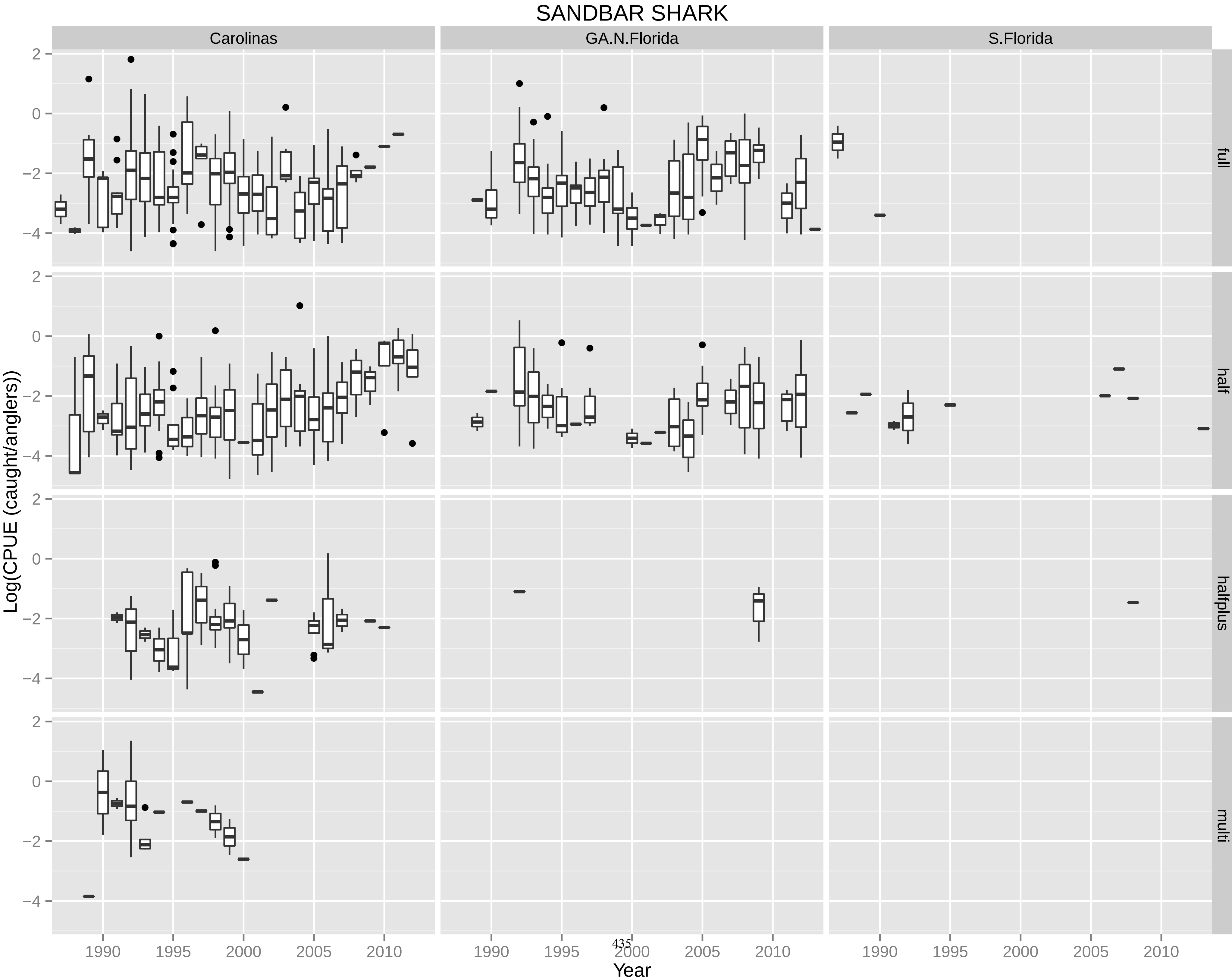
SAND TILEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

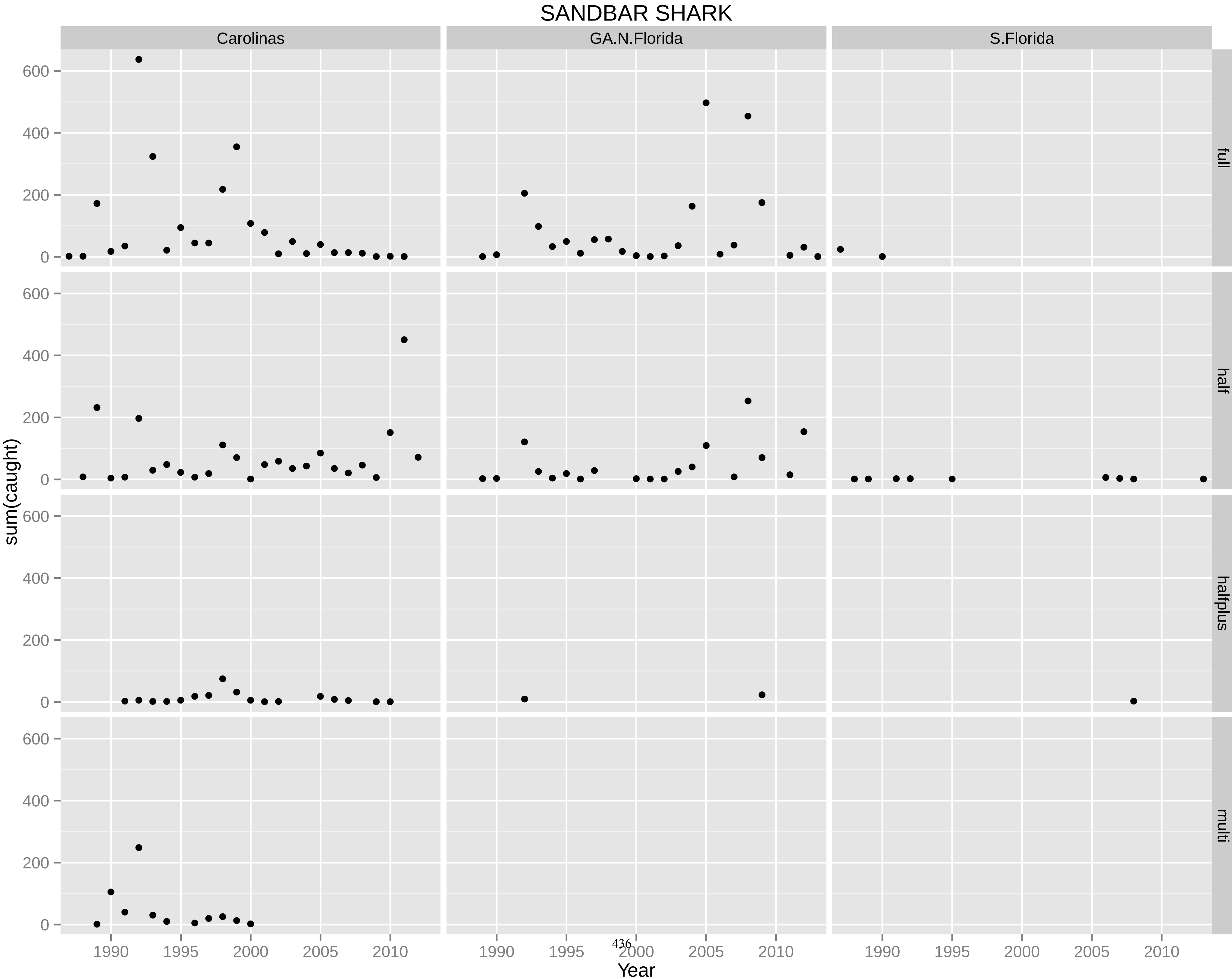


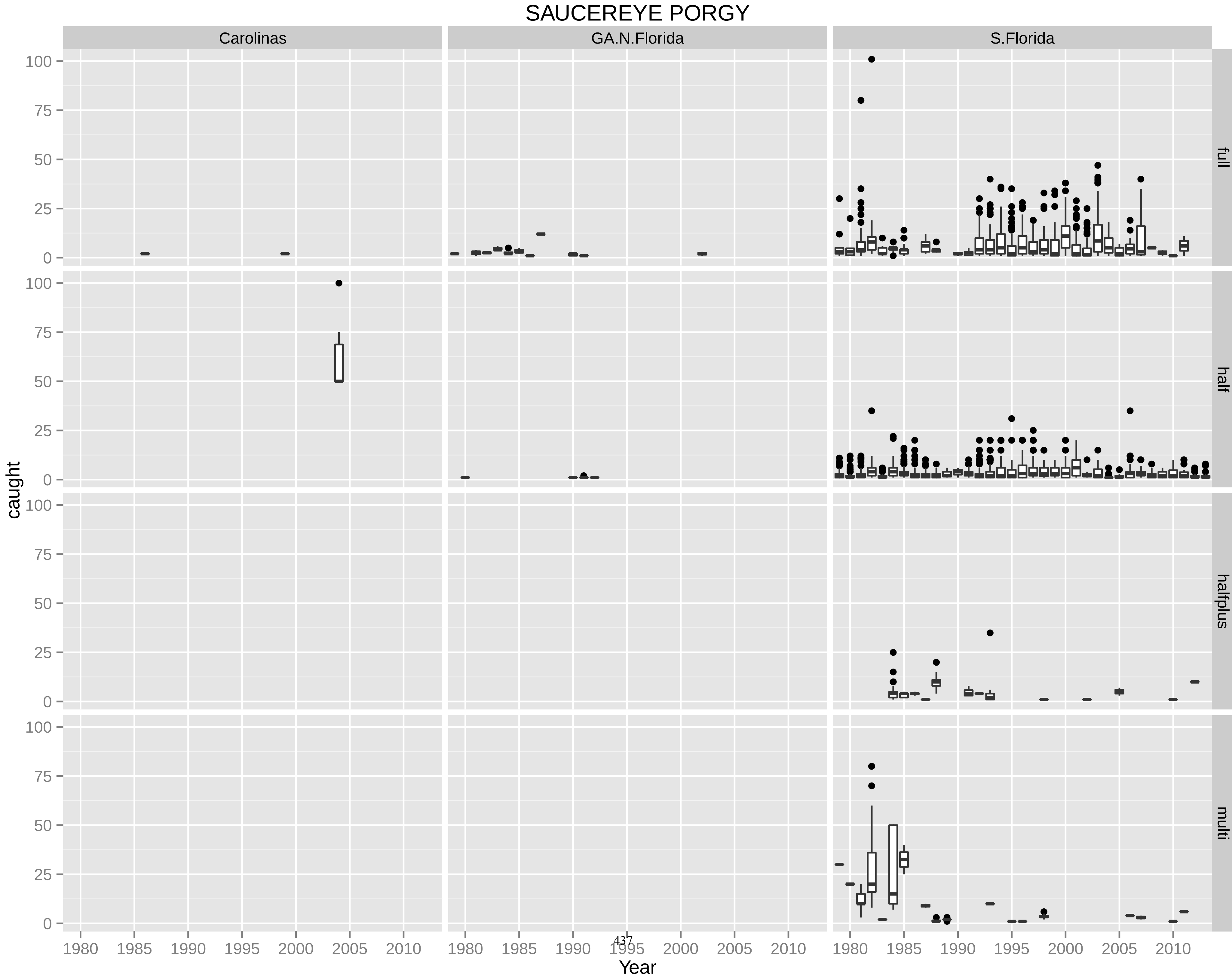
SAND TILEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
2000
1975
1980
1985
1990
1995
2000
2005
2010

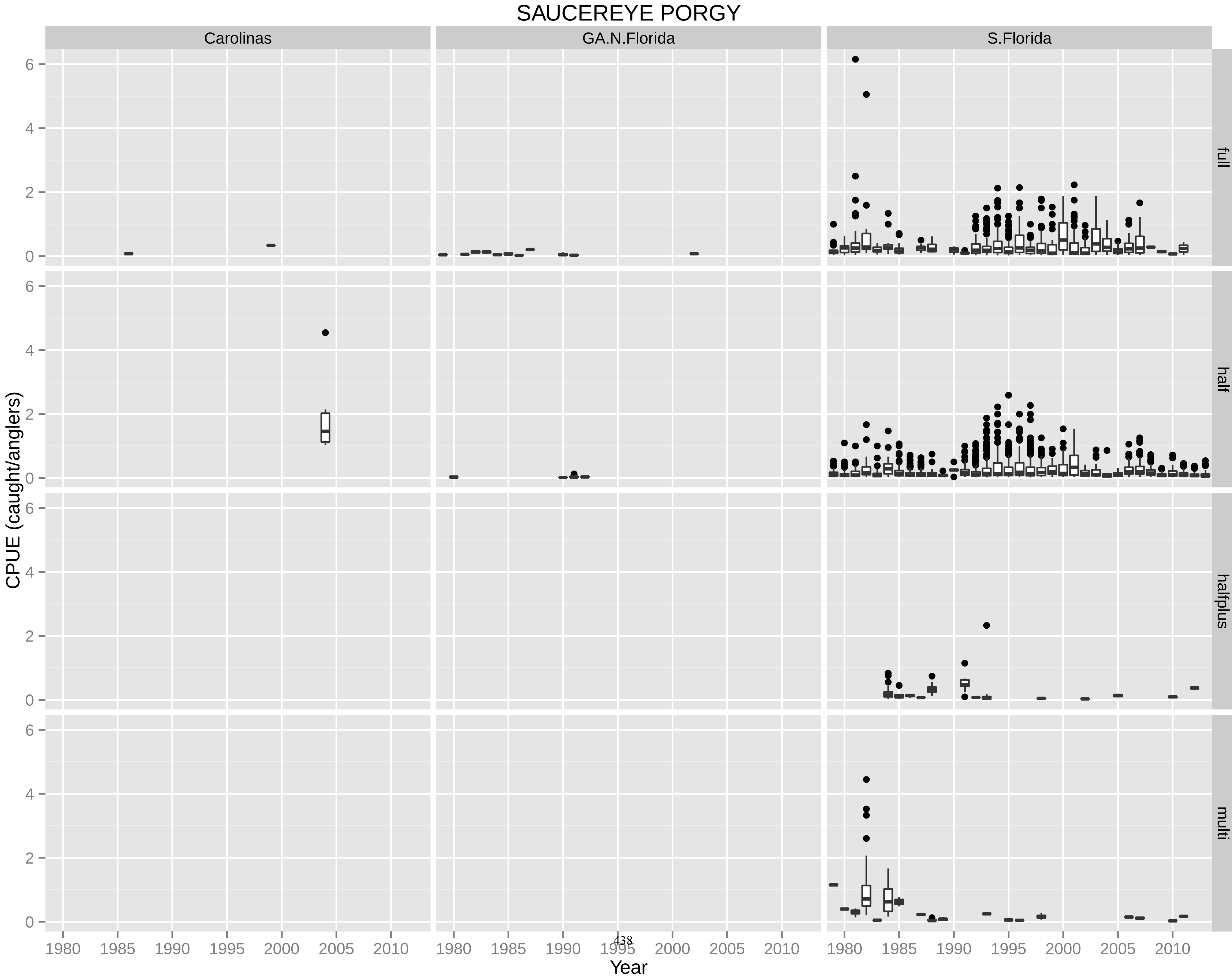

SANDBAR SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
100
75
50
25
0
1990
1995
2000
2005
2010

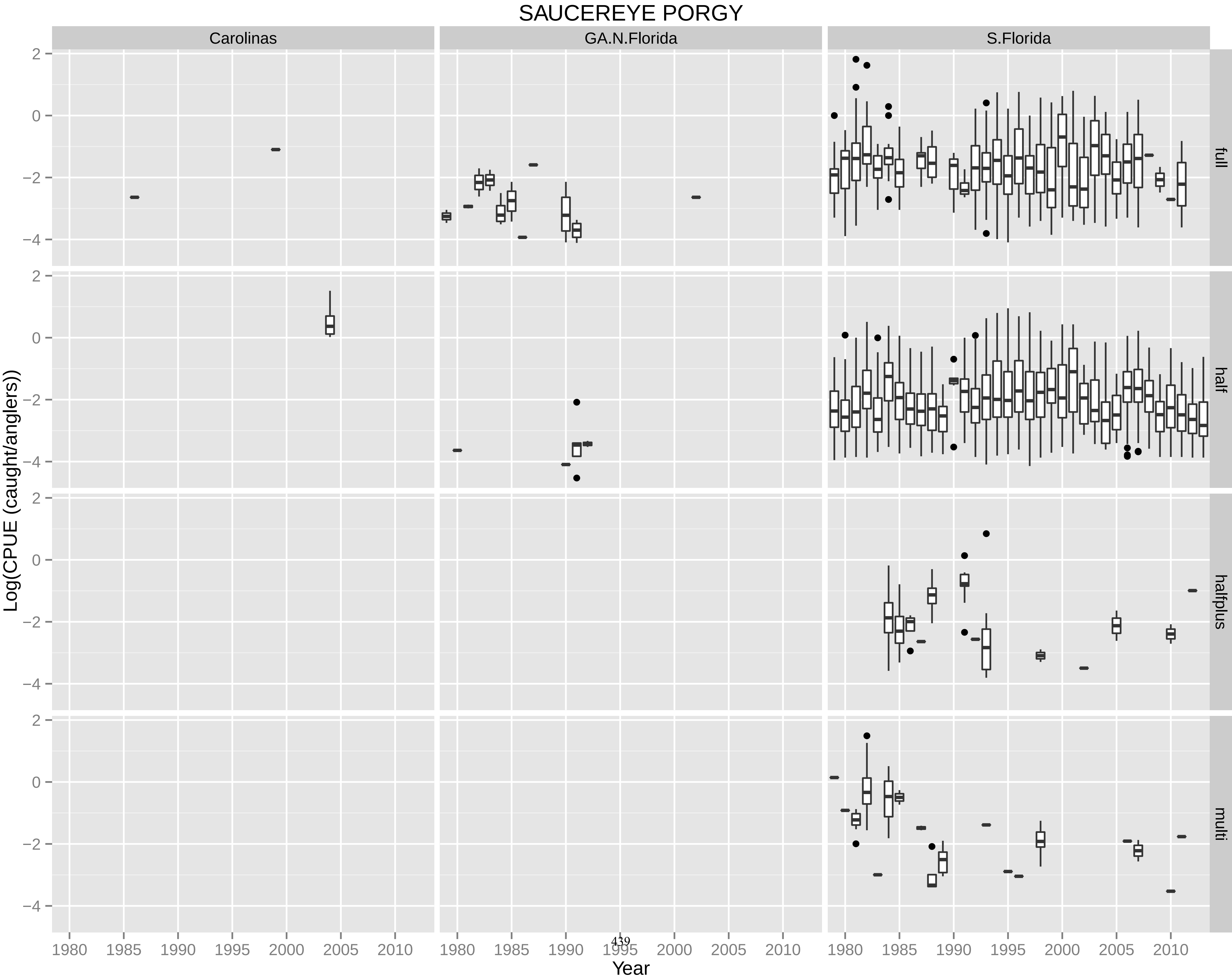

SANDBAR SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
2
4
6
1990
1995
2000
2005
2010

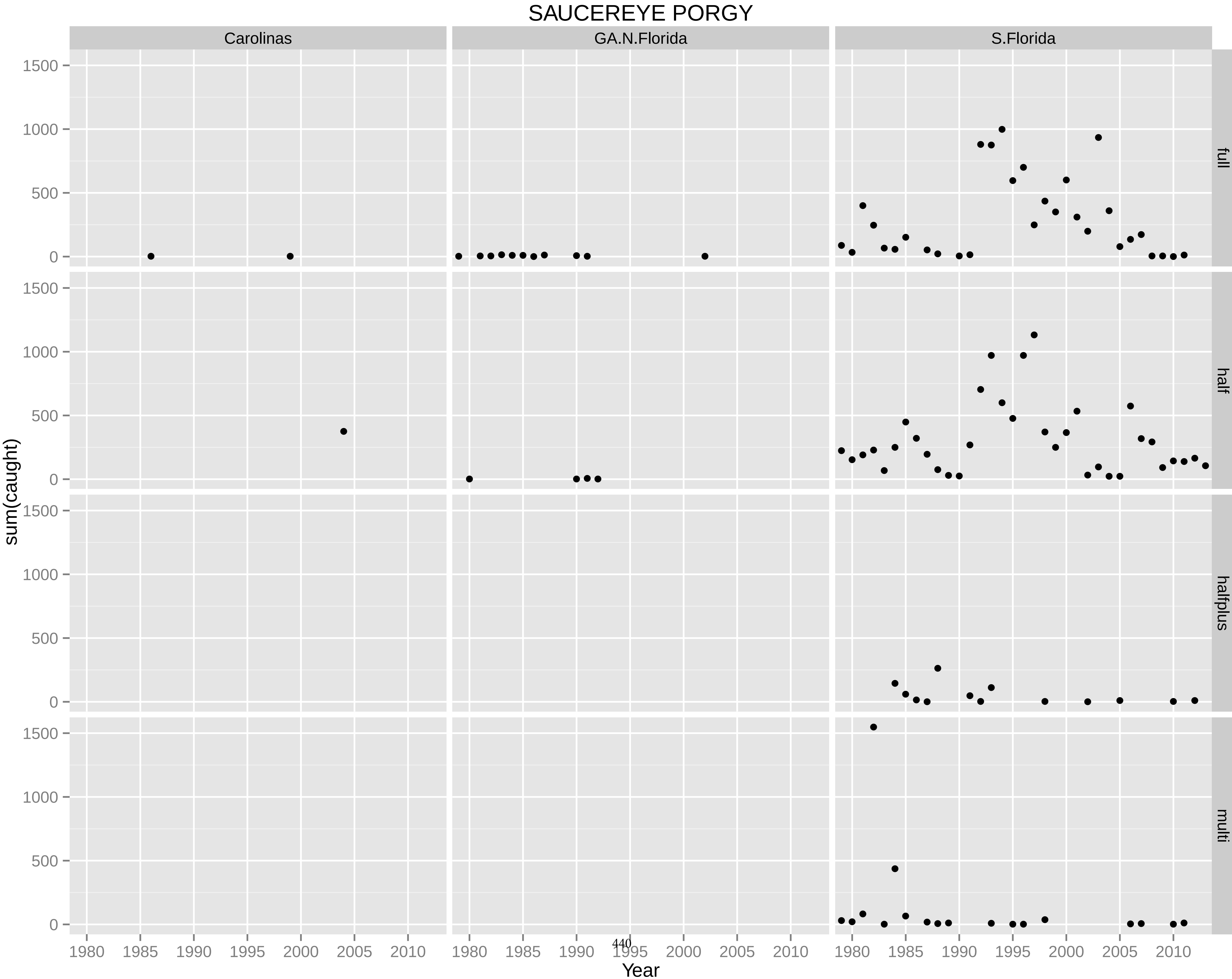

SANDBAR SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1990
1995
2000
2005
2010

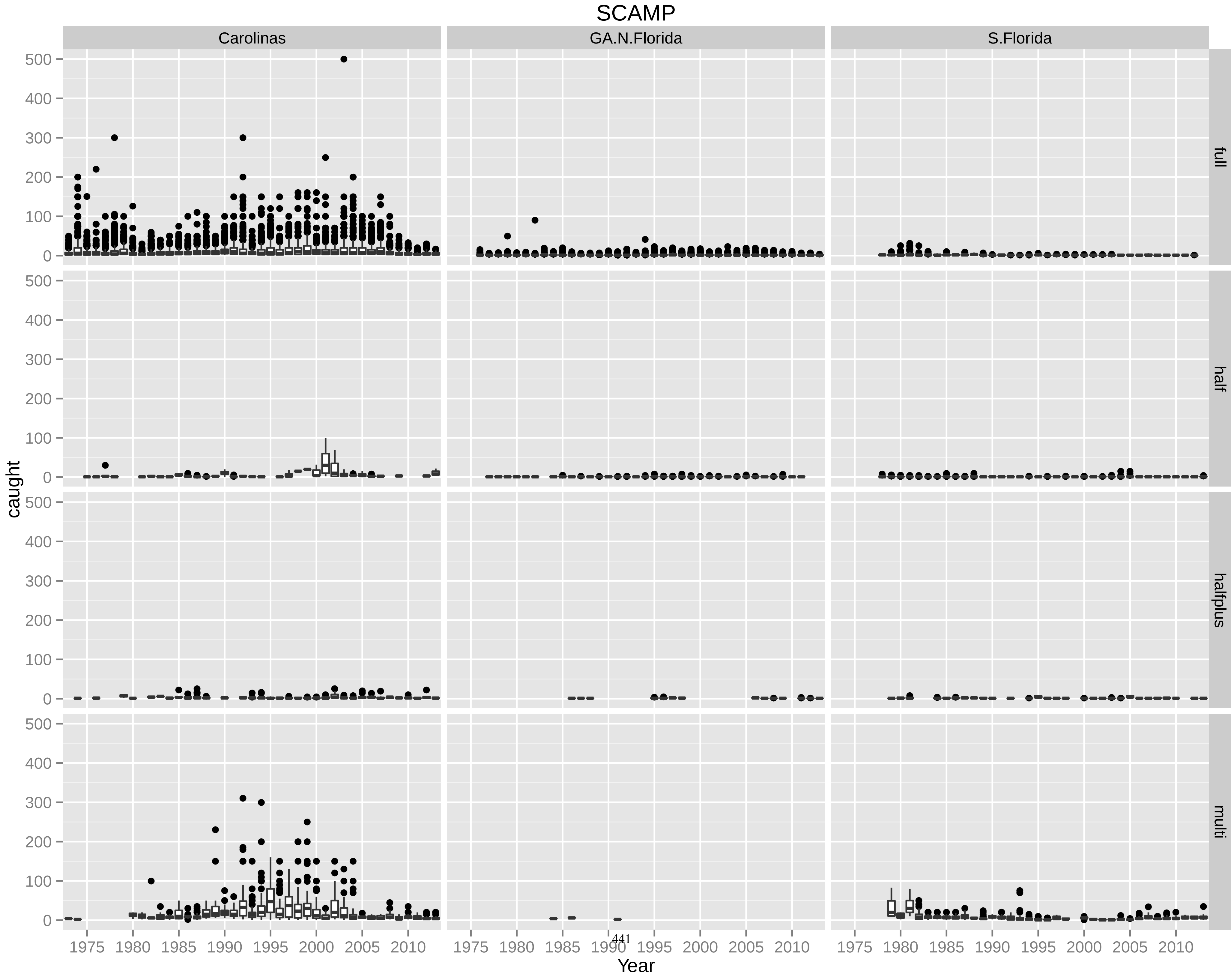

SANDBAR SHARK
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
200
400
600
1990
1995
2000
2005
2010

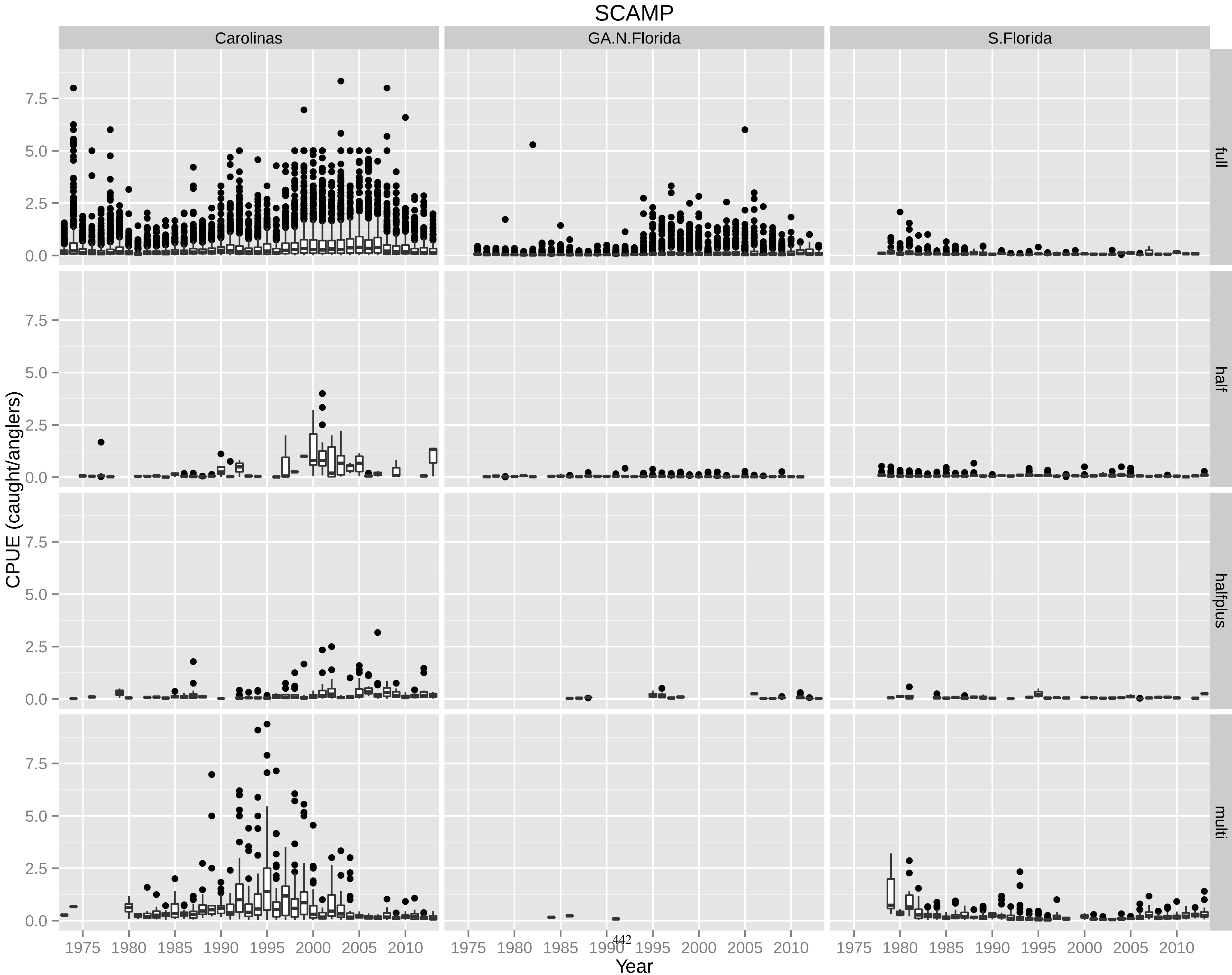

SAUCEREYE PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
25
50
75
100
1980
1985
1990
1995
2000
2005
2010


SAUCEREYE PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
2
4
6
1980
1985
1990
1995
2000
2005
2010

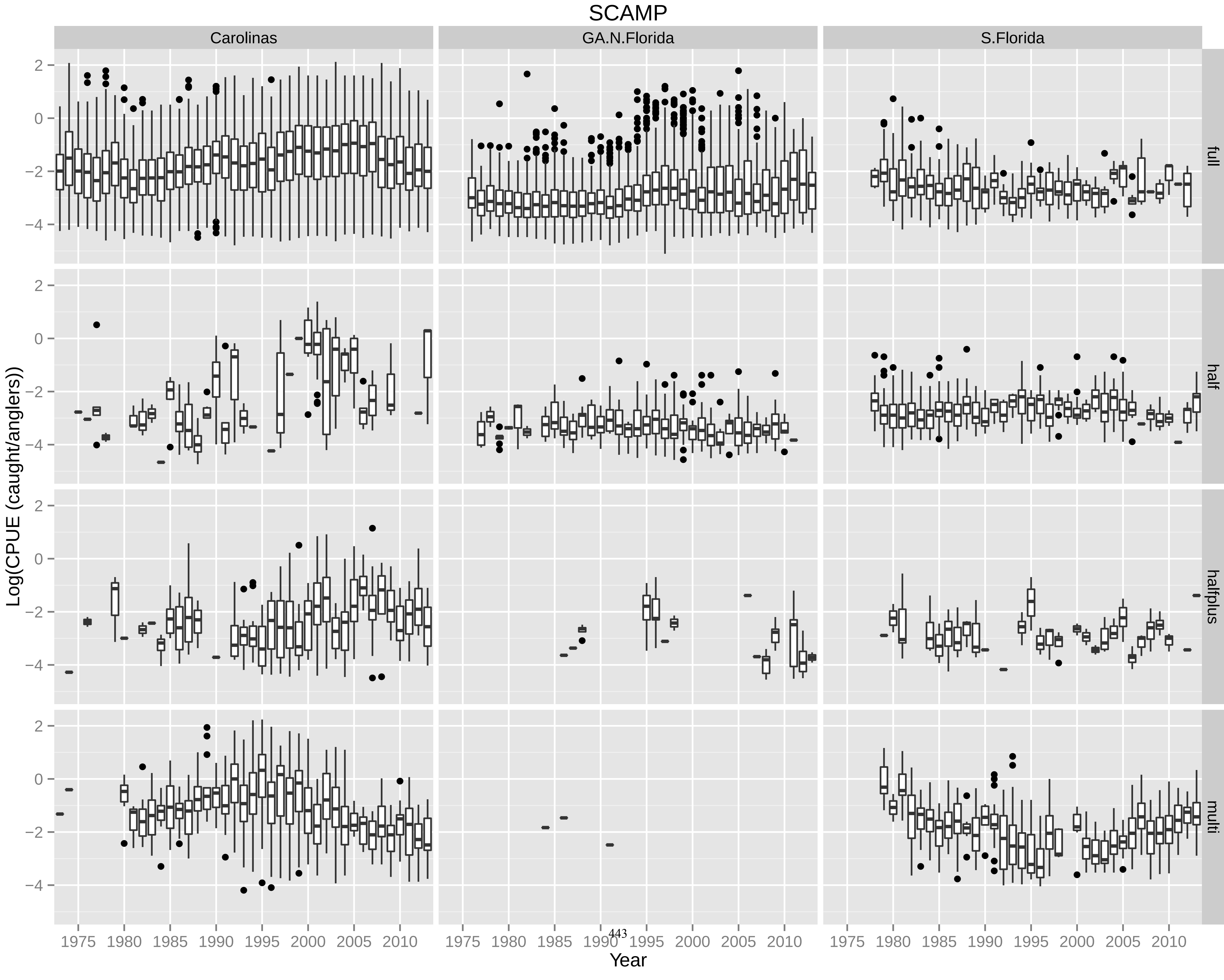

SAUCEREYE PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1980
1985
1990
1995
2000
2005
2010


SAUCEREYE PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
1980
1985
1990
1995
2000
2005
2010

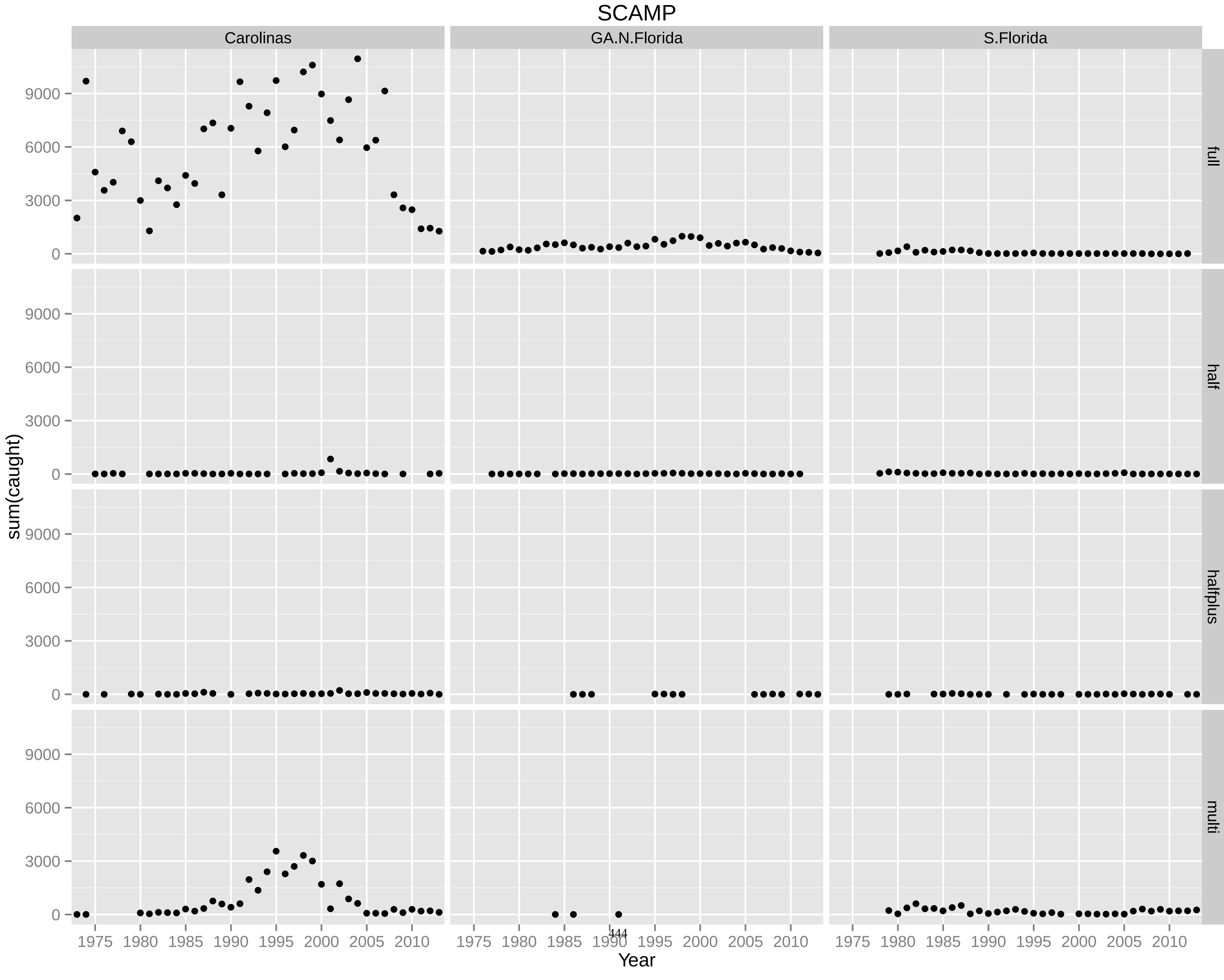

SCAMP
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
400
500
1975
1980
1985
1990
1995
2000
2005
2010

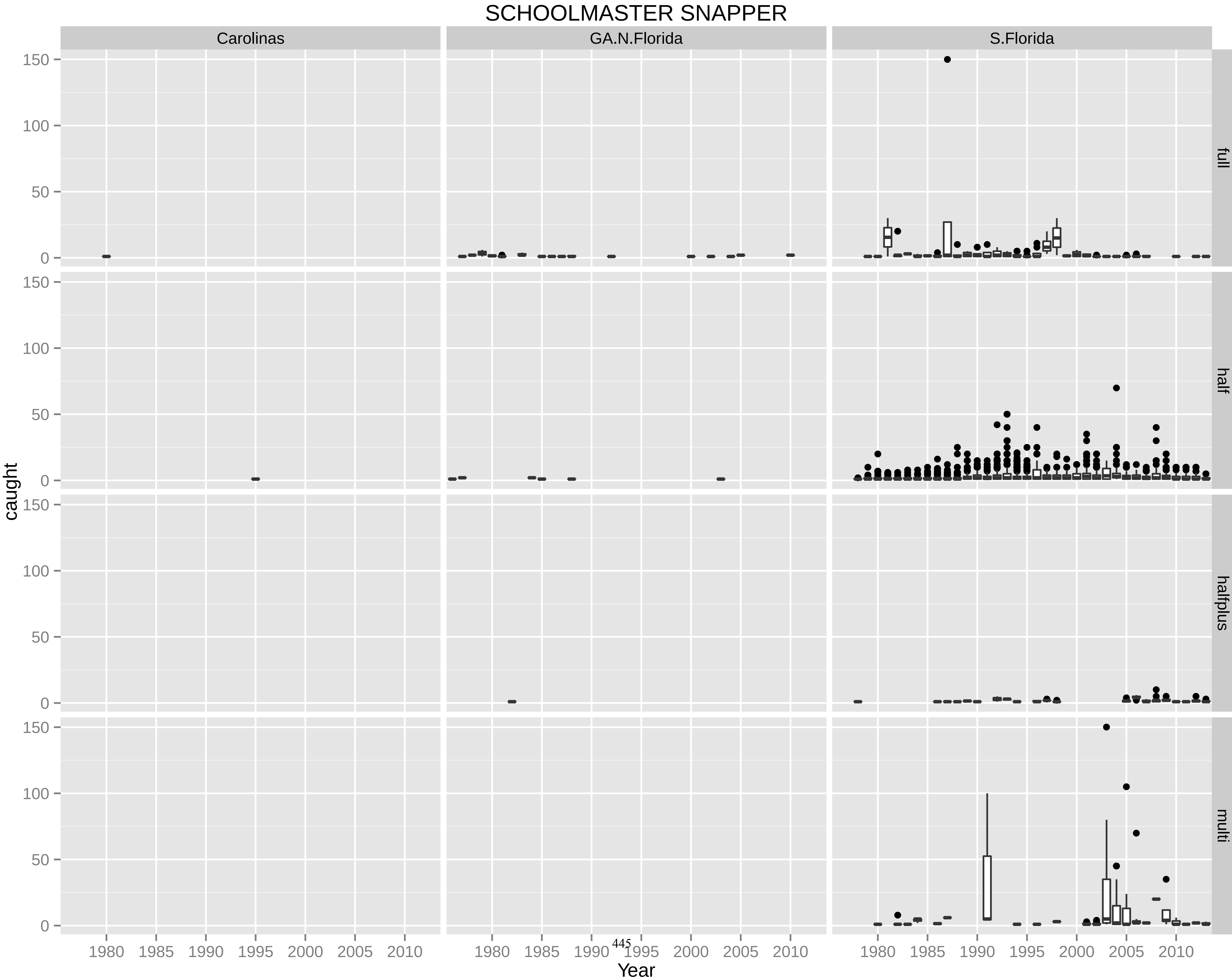


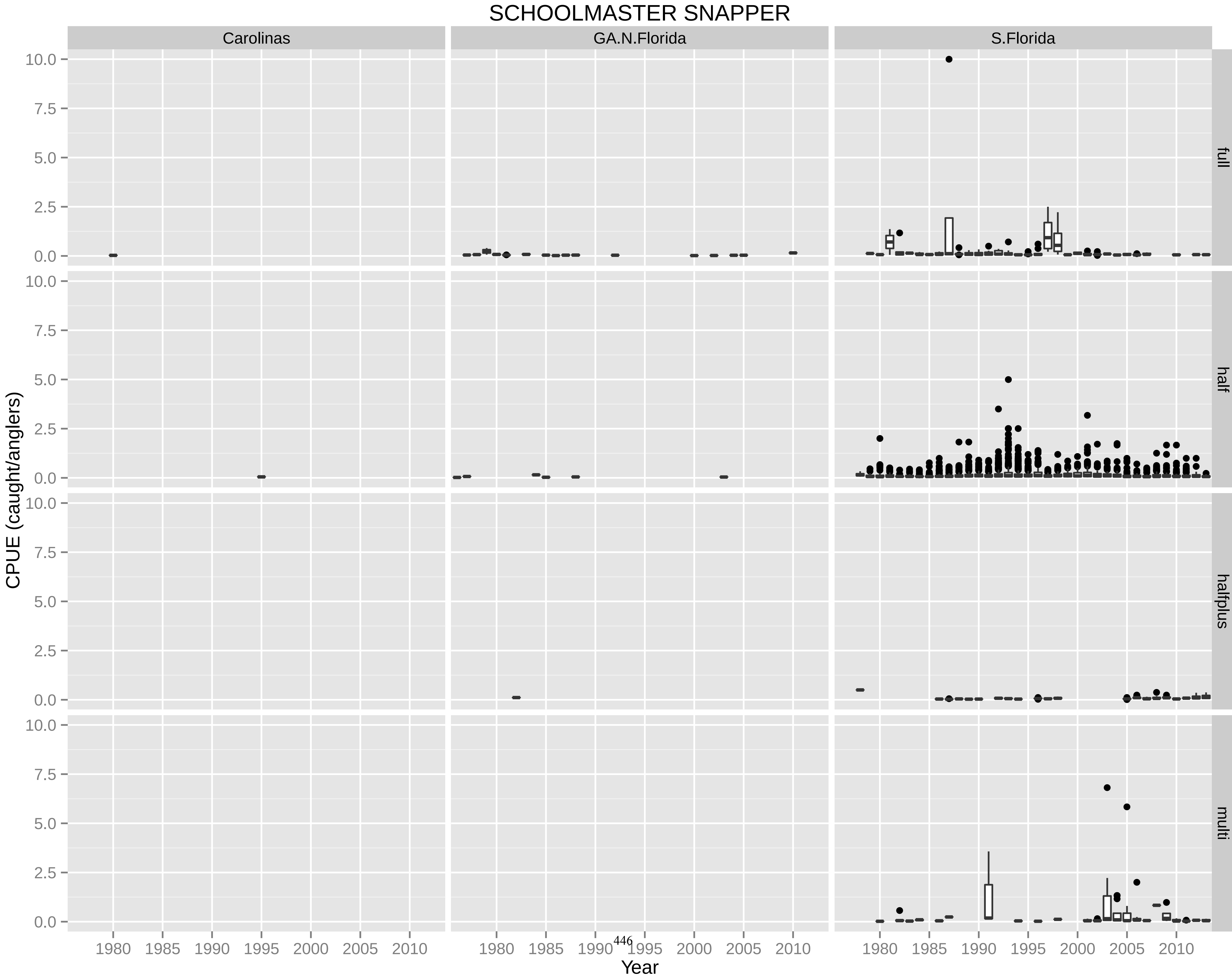
SCAMP
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0.0
2.5
5.0
7.5
1975
1980
1985
1990
1995
2000
2005
2010
Year

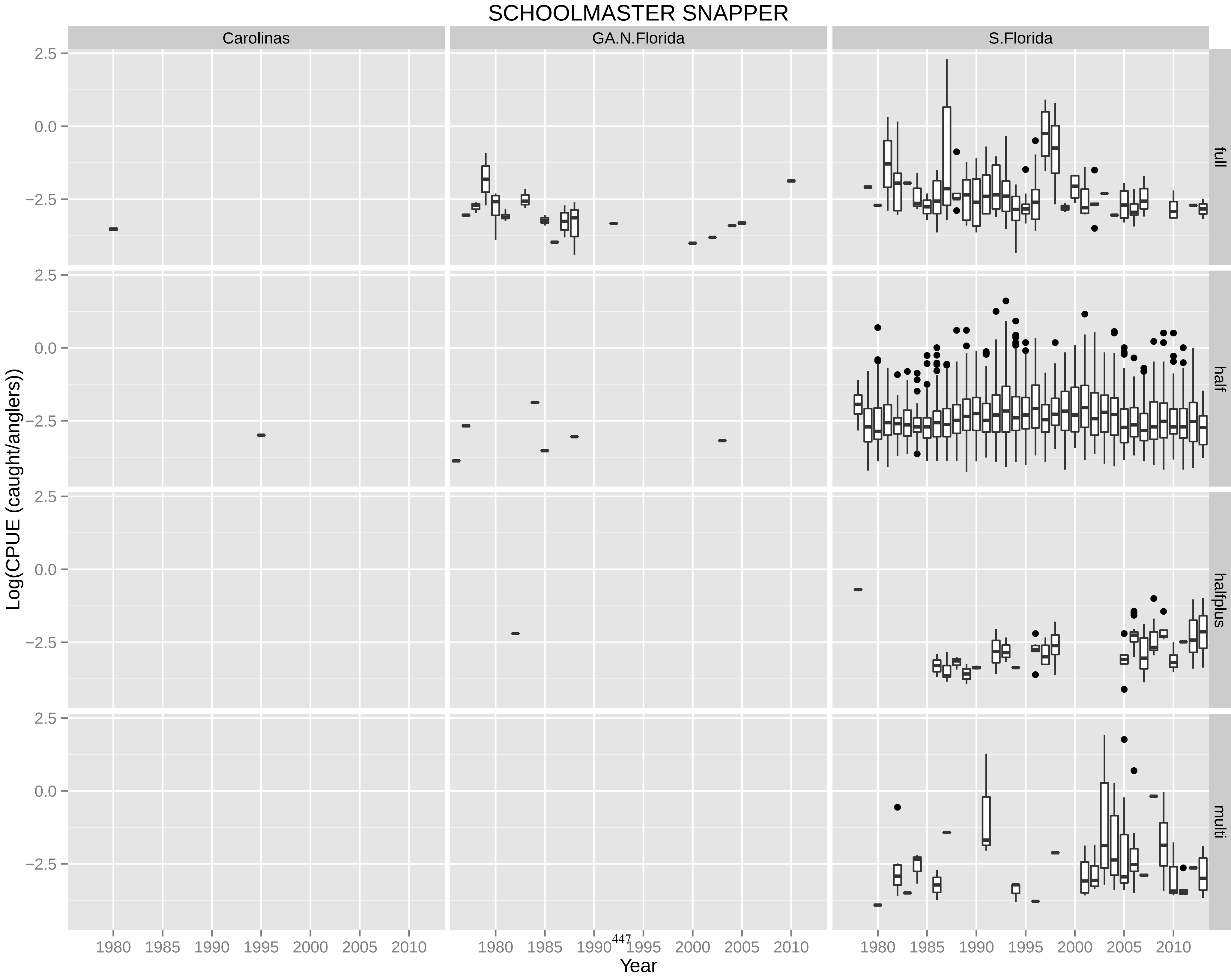


SCAMP
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

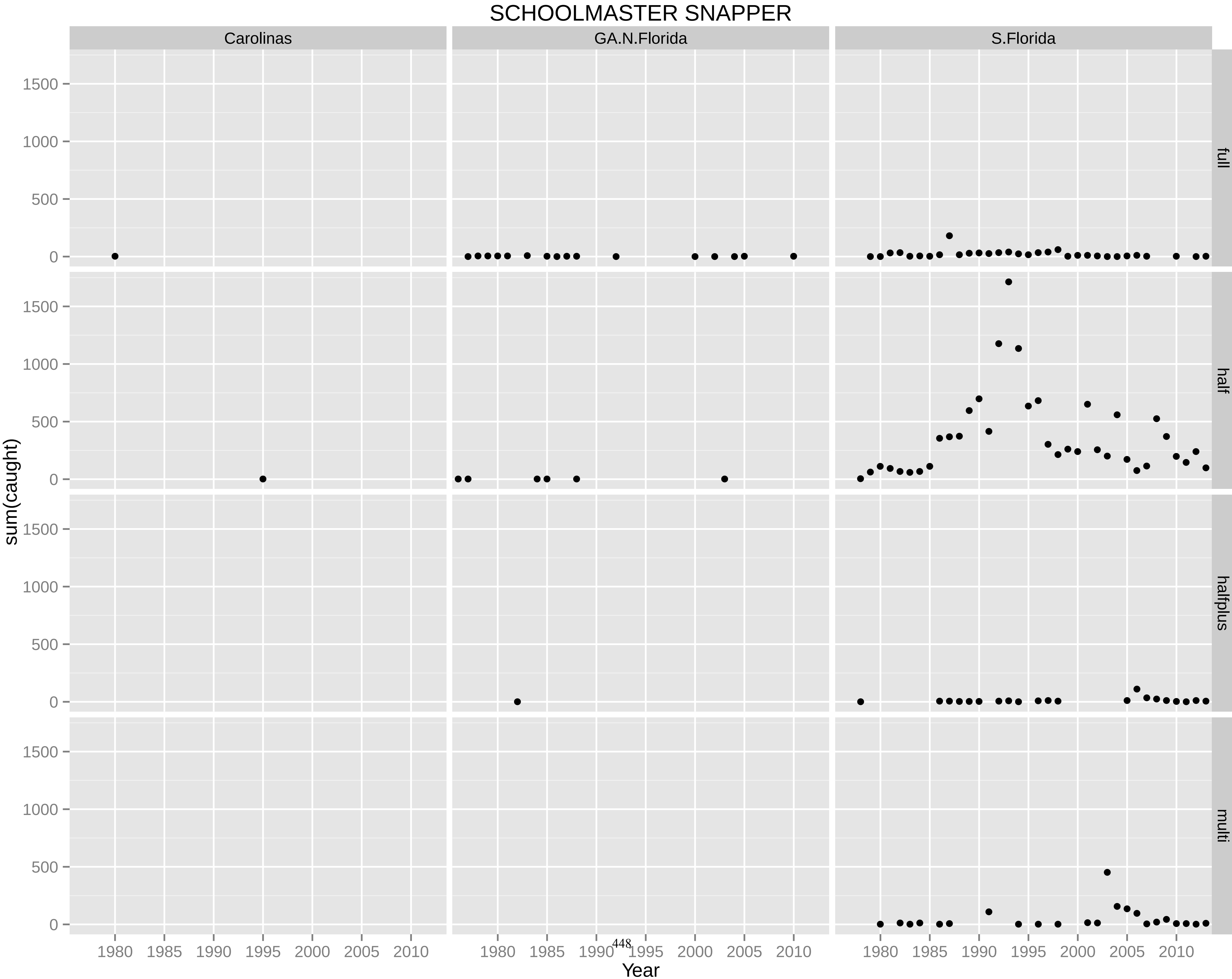

SCAMP
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
3000
6000
9000
1975
1980
1985
1990
1995
2000
2005
2010

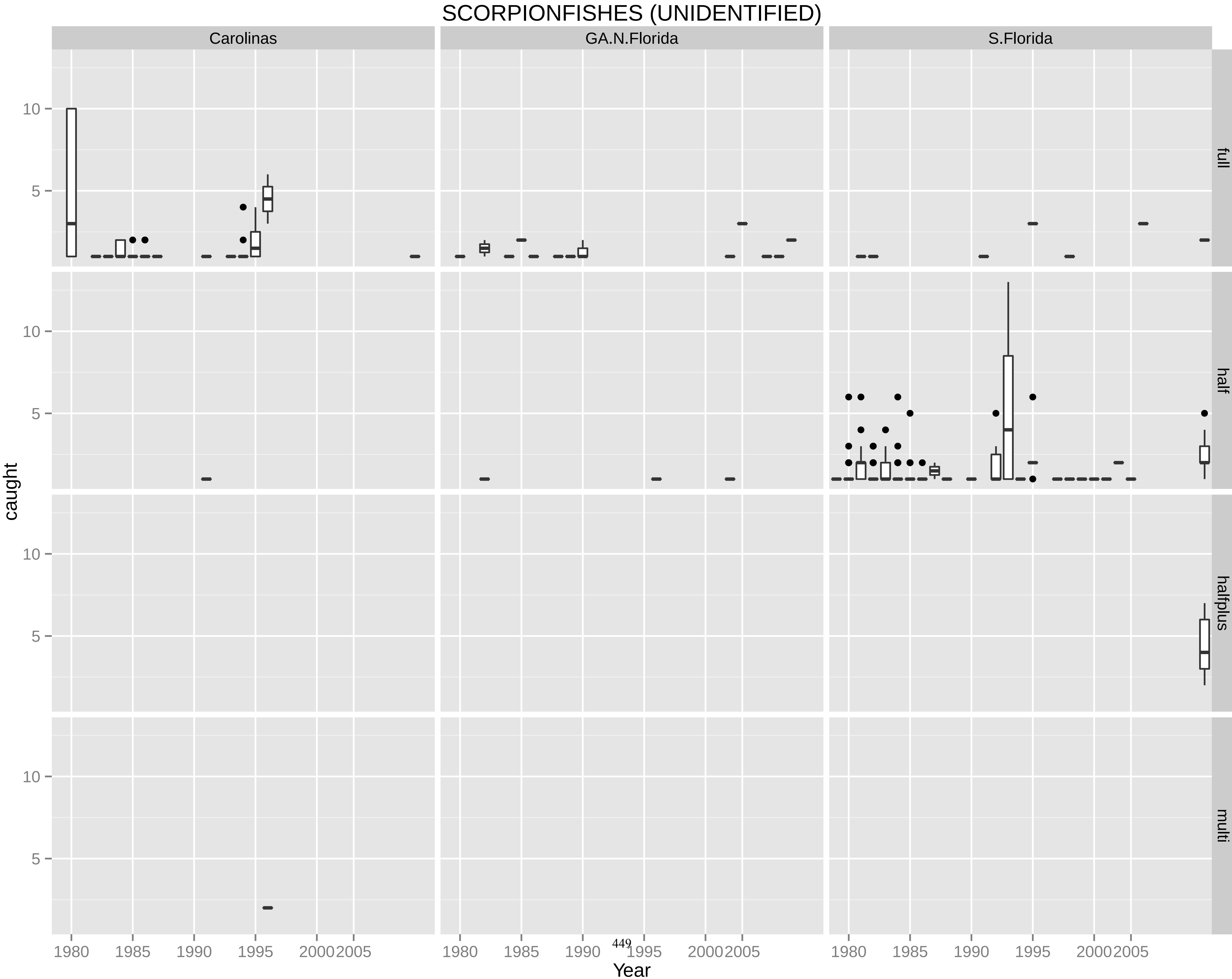

SCHOOLMASTER SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
1980
1985
1990
1995
2000
2005
2010

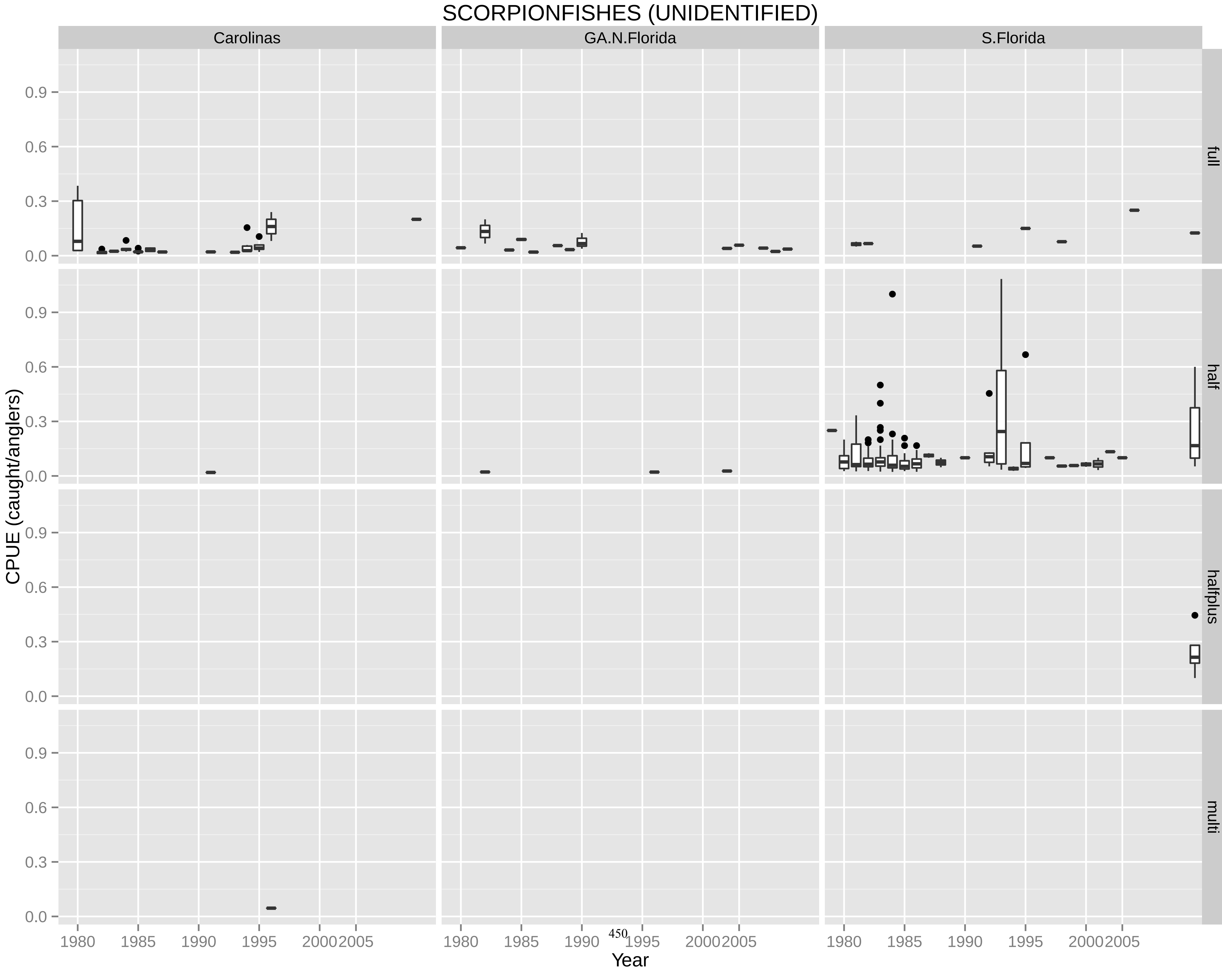

SCHOOLMASTER SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
2.5
5.0
7.5
10.0
1980
1985
1990
1995
2000
2005
2010

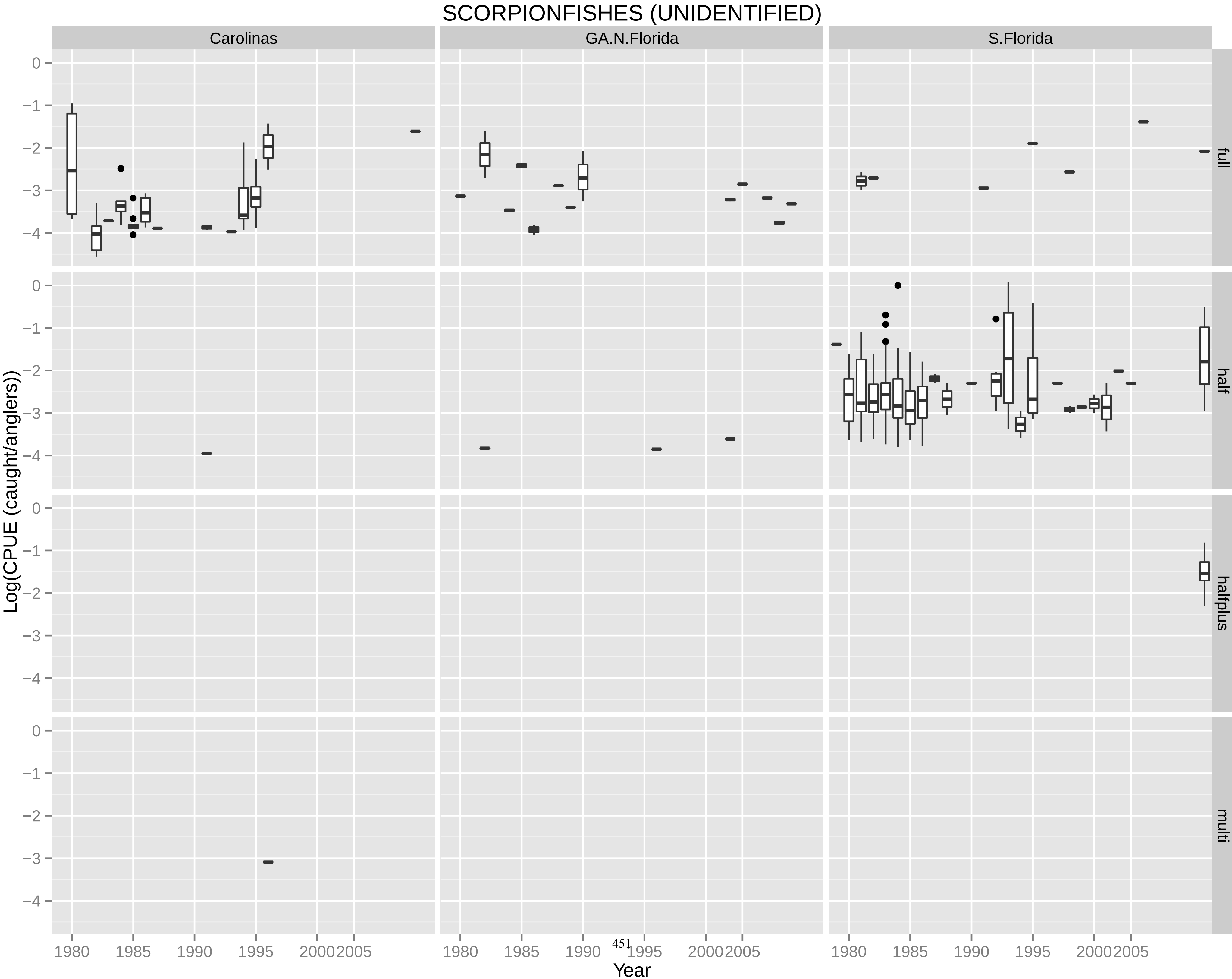


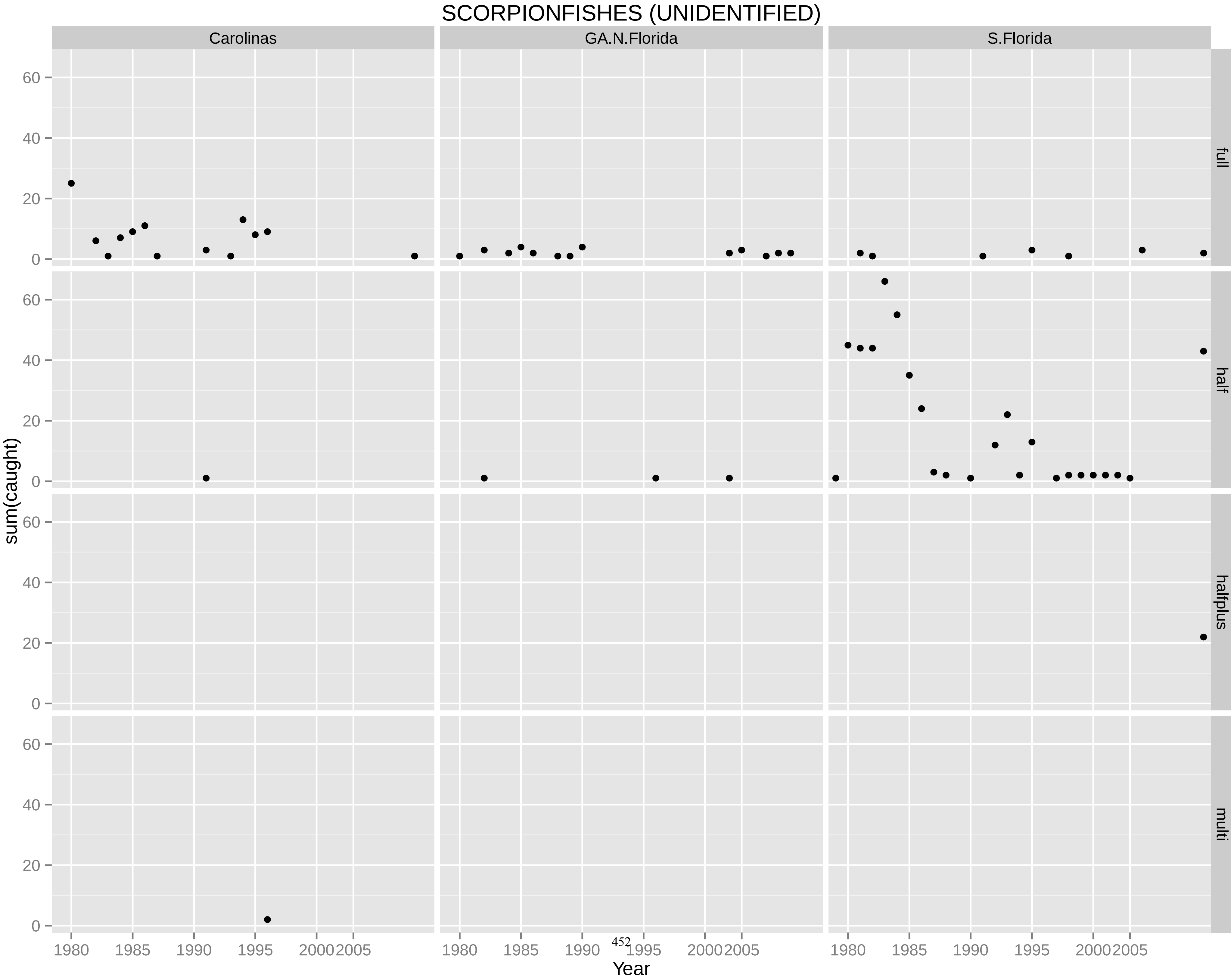
SCHOOLMASTER SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
1980
1985
1990
1995
2000
2005
2010

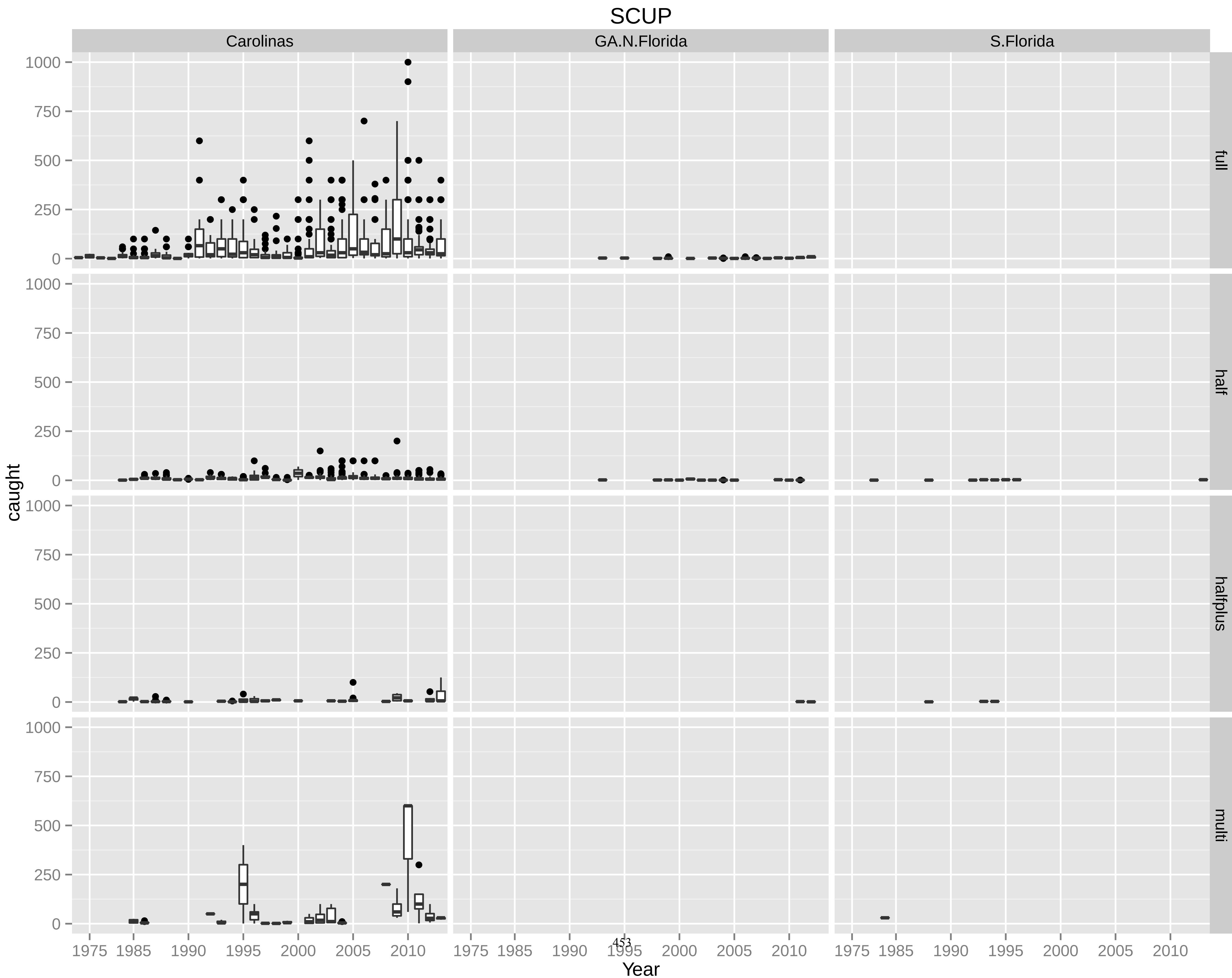

SCHOOLMASTER SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
1980
1985
1990
1995
2000
2005
2010

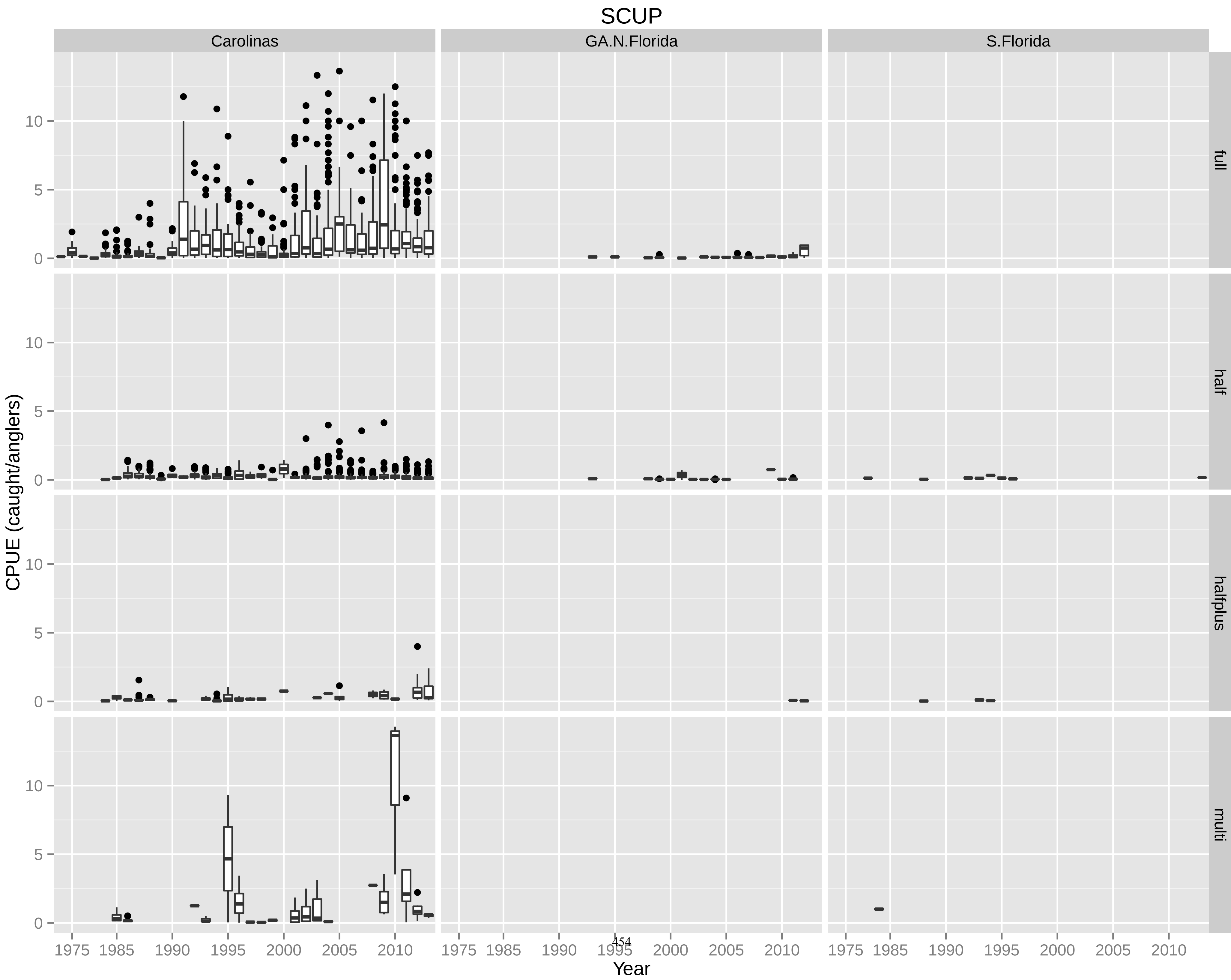

SCORPIONFISHES (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
10
5
Year
1980
1985
1990
1995
2000
2005

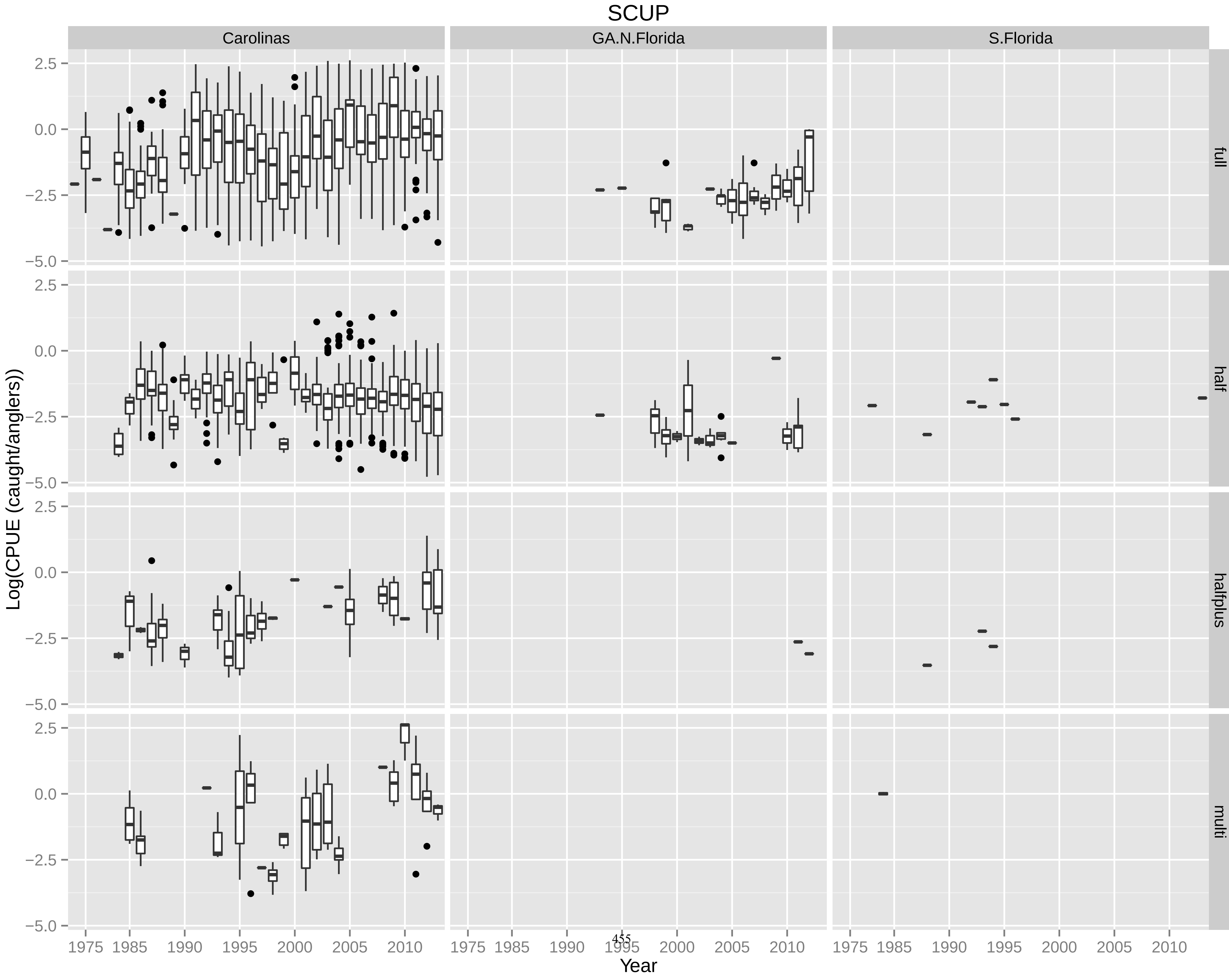

SCORPIONFISHES (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0.0
0.3
0.6
0.9
1980
1985
1990
1995
2000
2005
Year

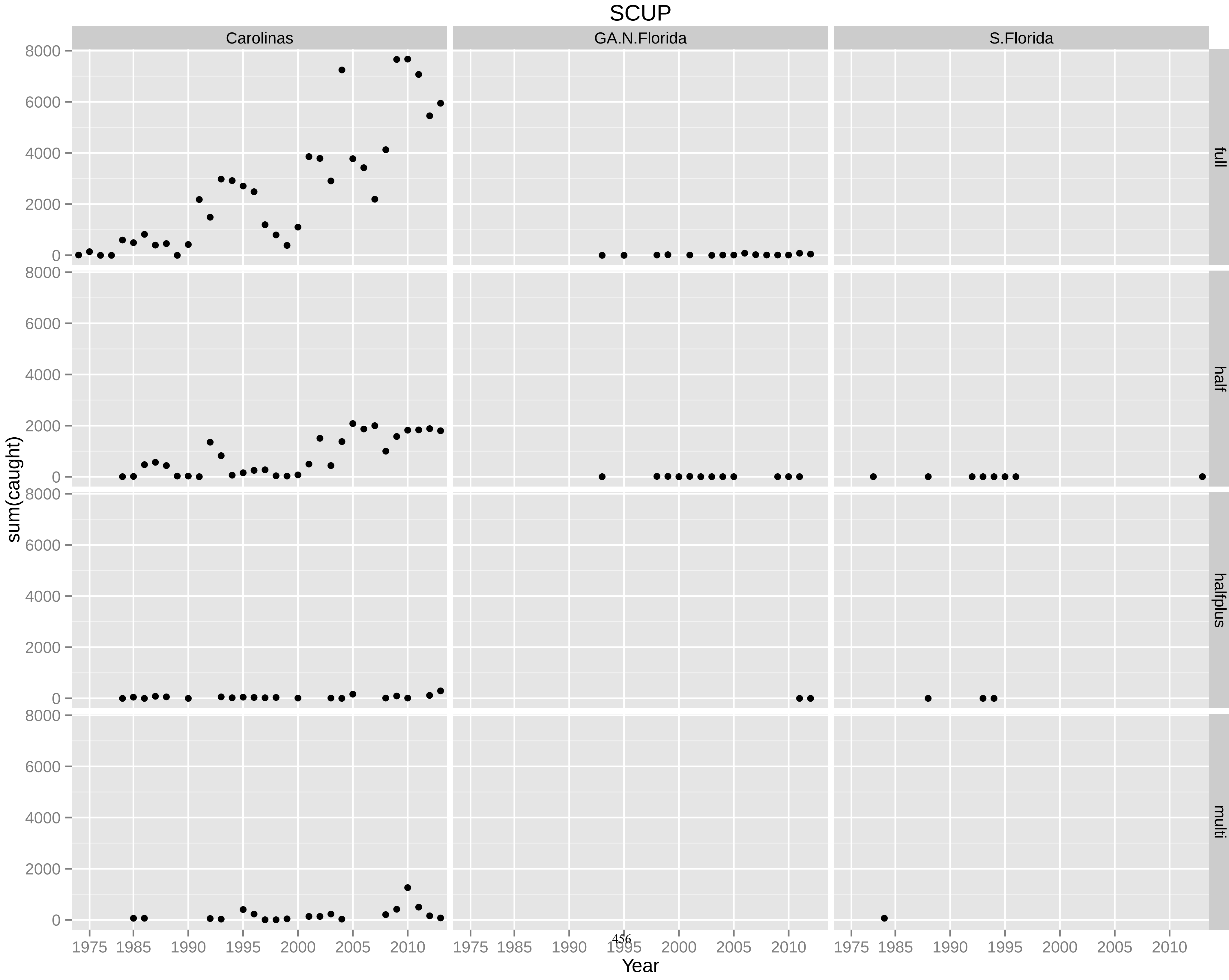

SCORPIONFISHES (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−1
−2
−3
−4
1980
1985
1990
1995
2000
2005


SCORPIONFISHES (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
20
40
60
1980
1985
1990
1995
2000
2005

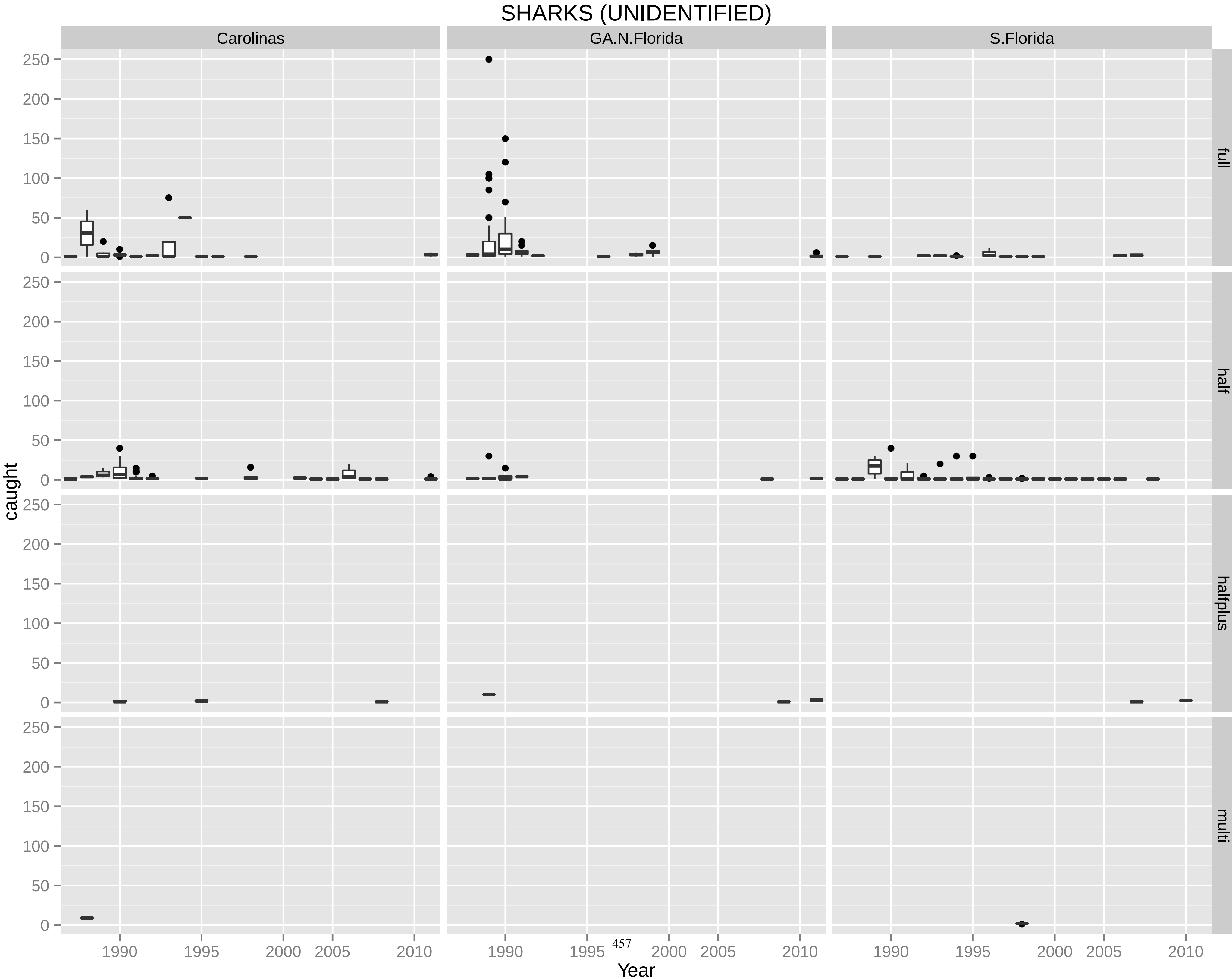

SCUP
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
250
500
750
1000
1975
1985
1990
1995
2000
2005
2010


SCUP
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
5
10
1975
1985
1990
1995
2000
2005
2010

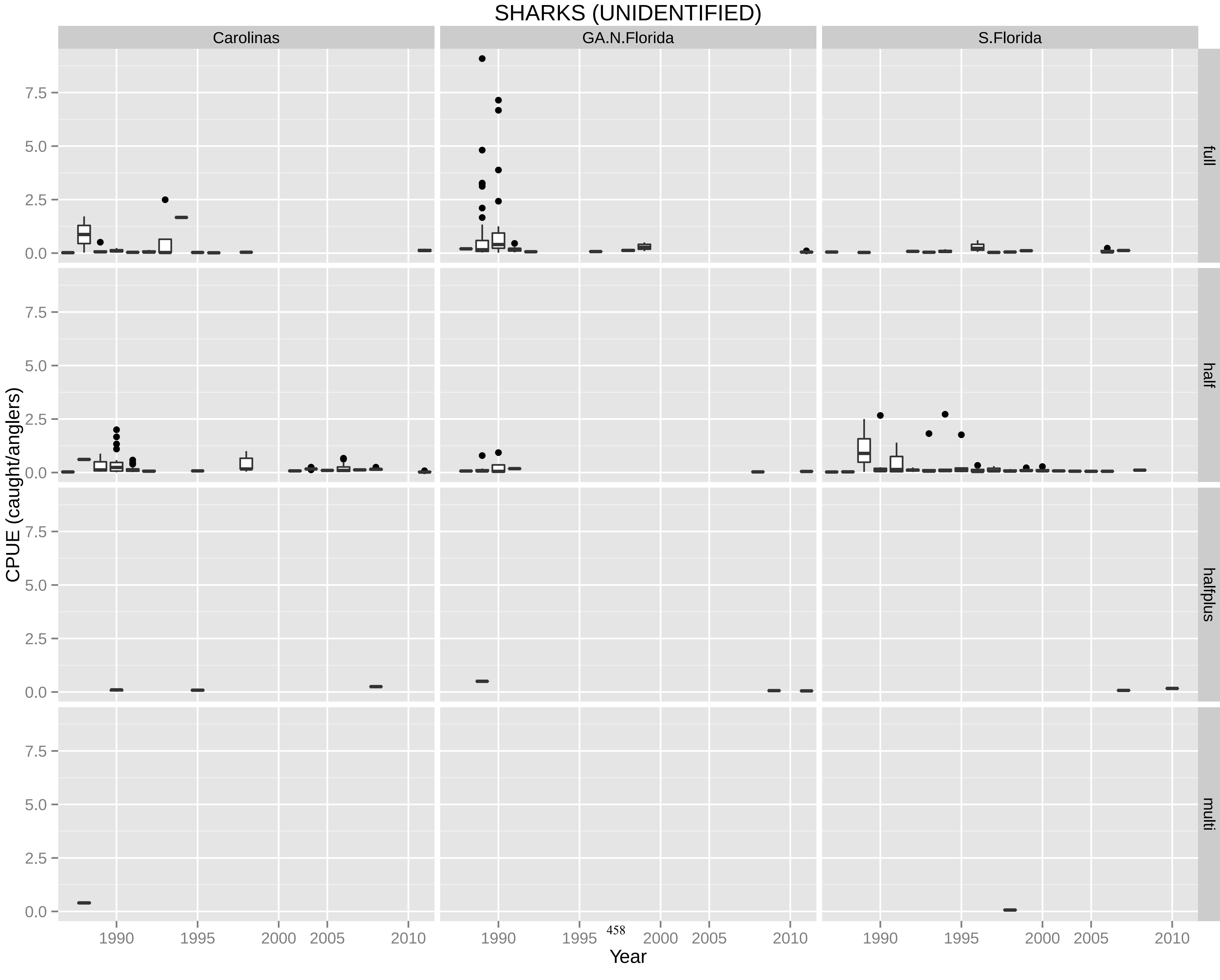

SCUP
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1975
1985
1990
1995
2000
2005
2010

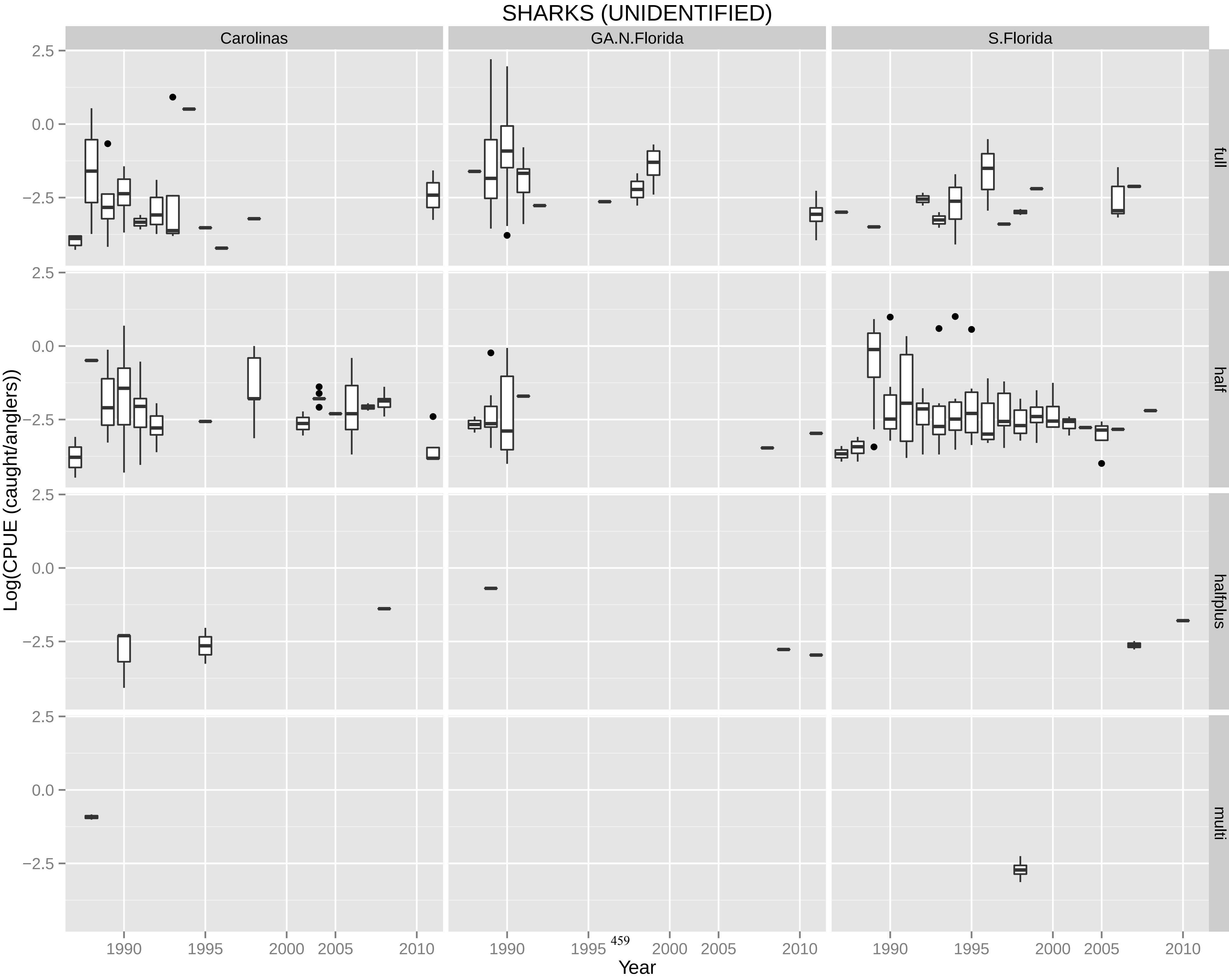


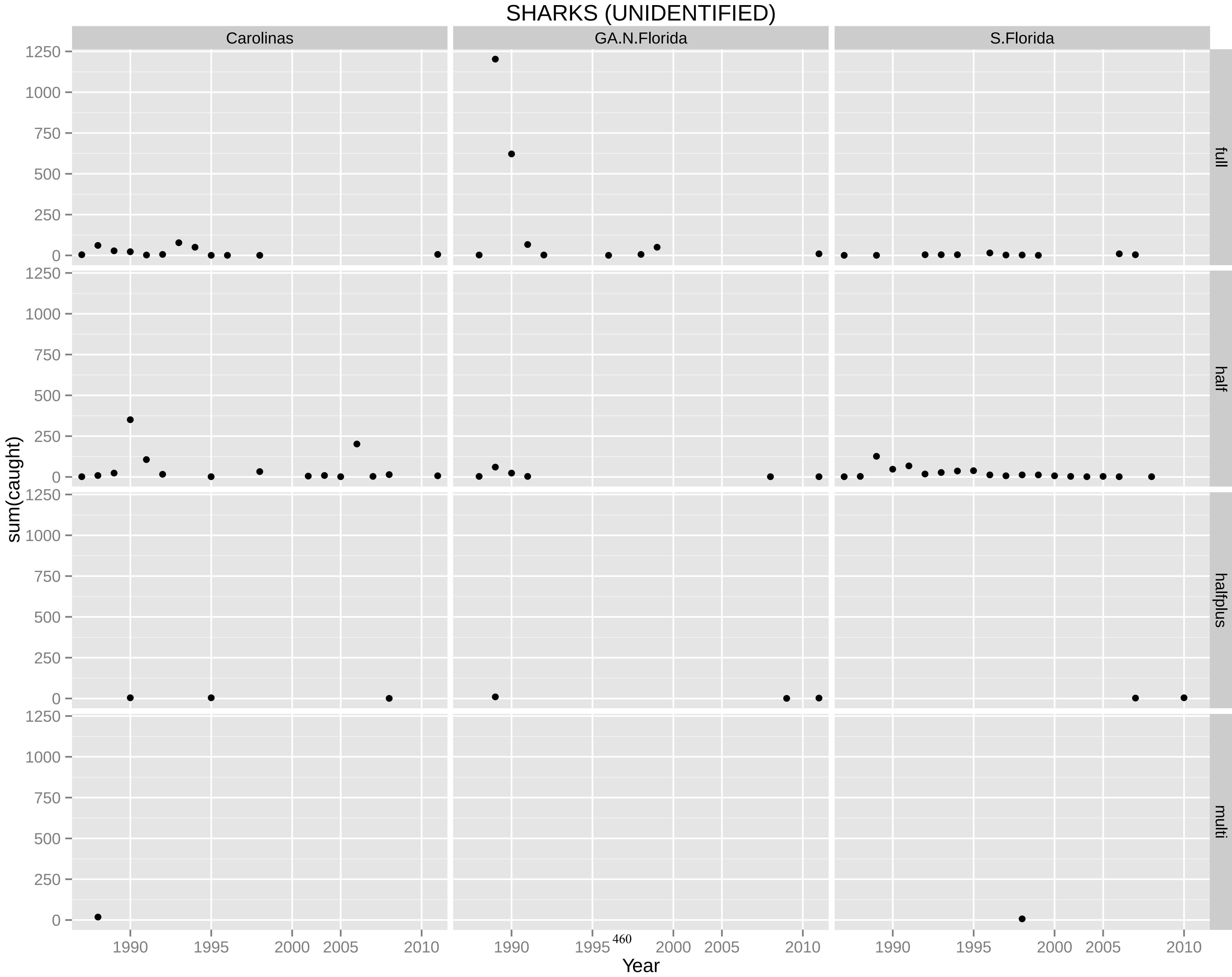
SCUP
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
2000
4000
6000
8000
1975 1985 1990 1995 2000 2005 2010
Year

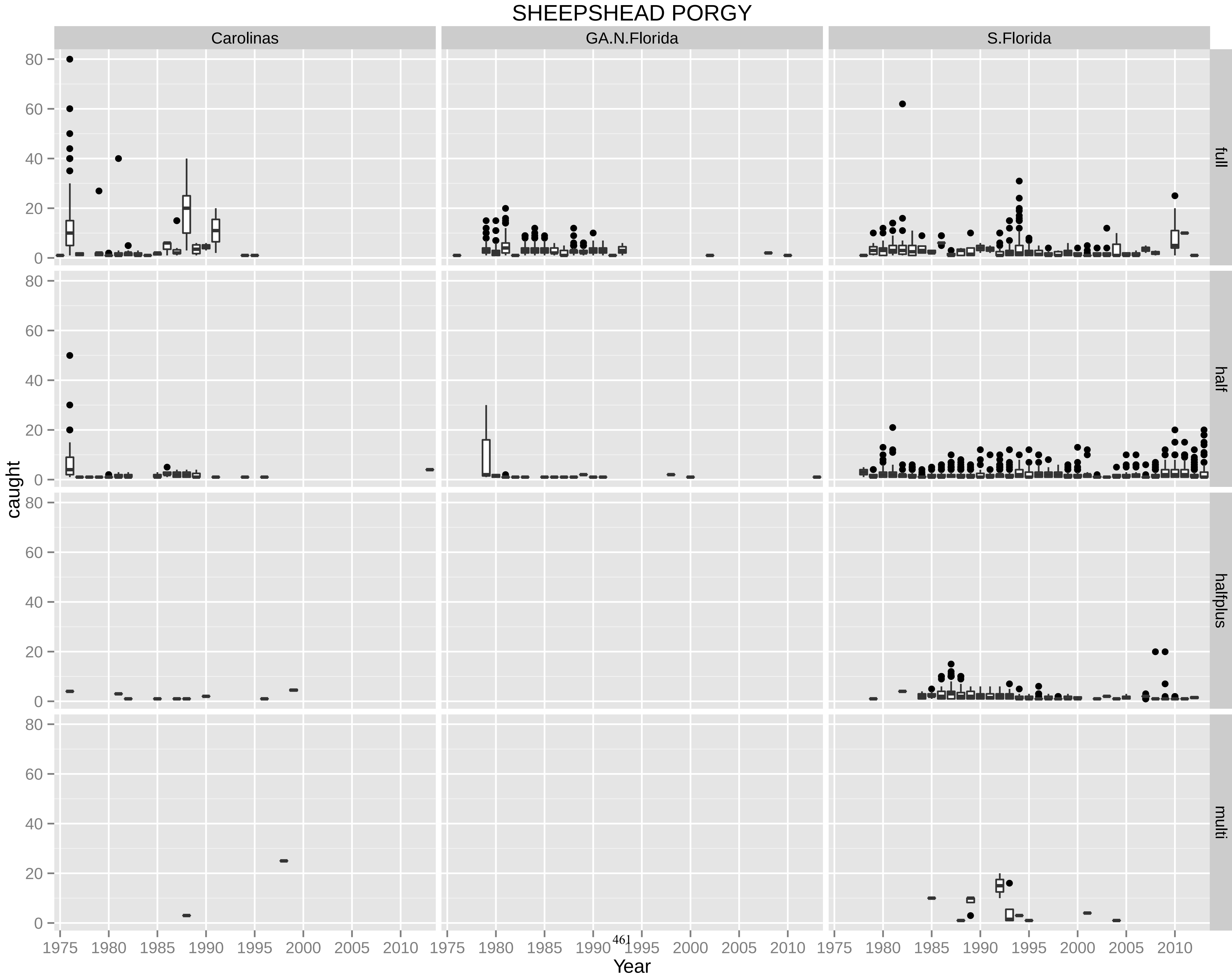


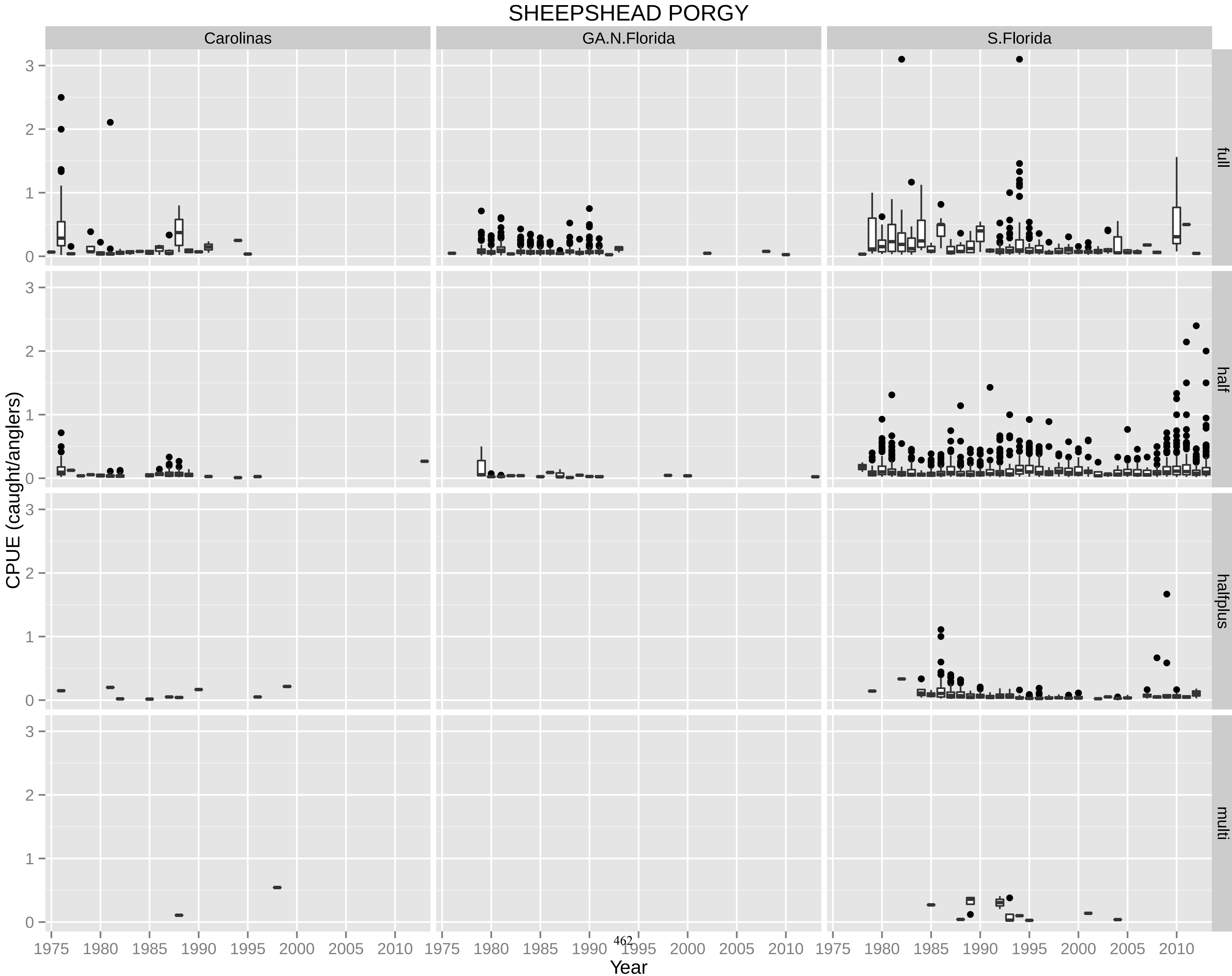
SHARKS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
250
200
150
100
50
0
1990
1995
2000
2005
2010
Year


SHARKS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0.0
2.5
5.0
7.5
1990
1995
2000
2005
2010
Year

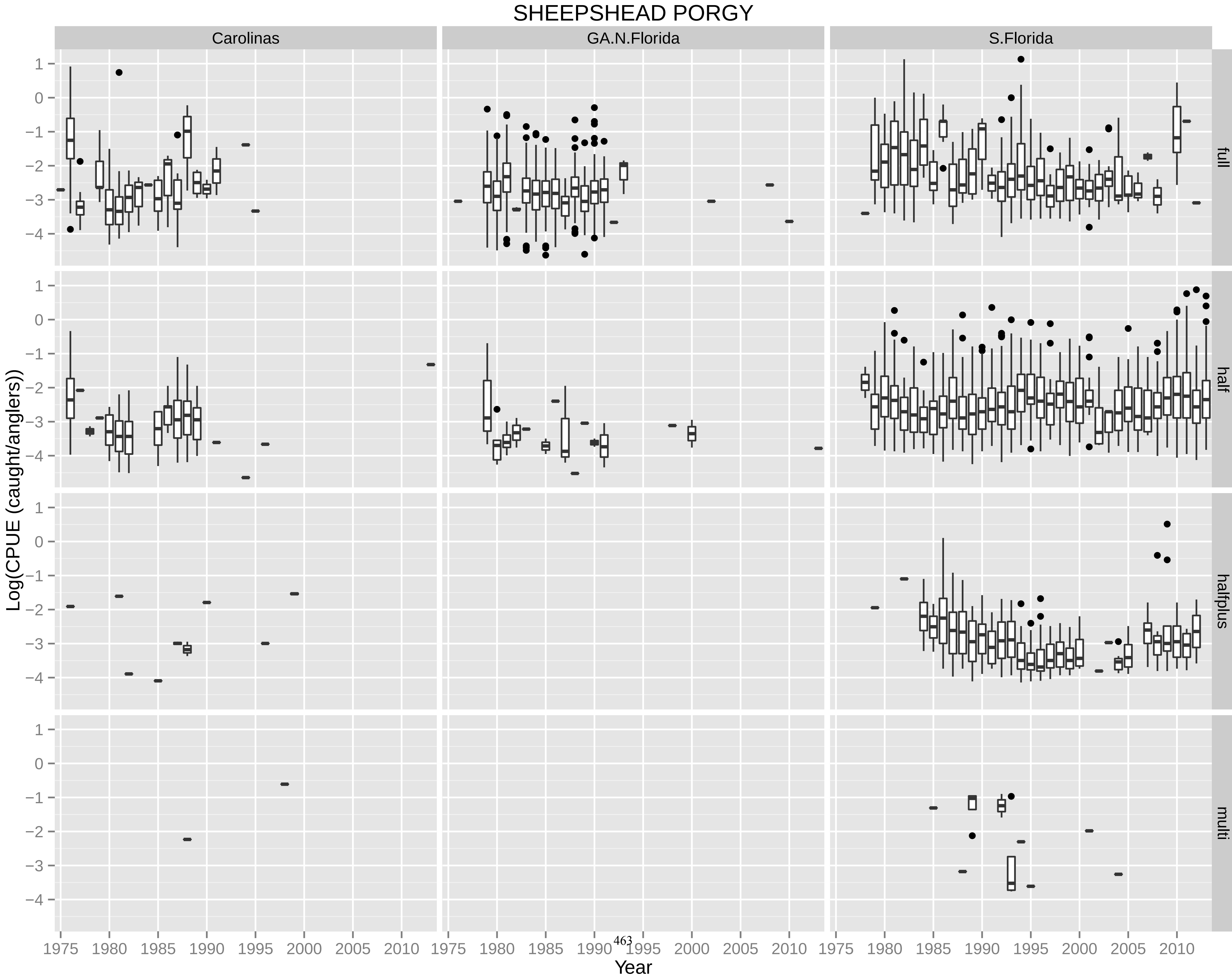

SHARKS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
2.5
0.0
−2.5
Log(CPUE (caught/anglers))
1990
1995
2000
2005
2010
Year


SHARKS (UNIDENTIFIED)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
250
500
750
1000
1250
1990
1995
2000
2005
2010

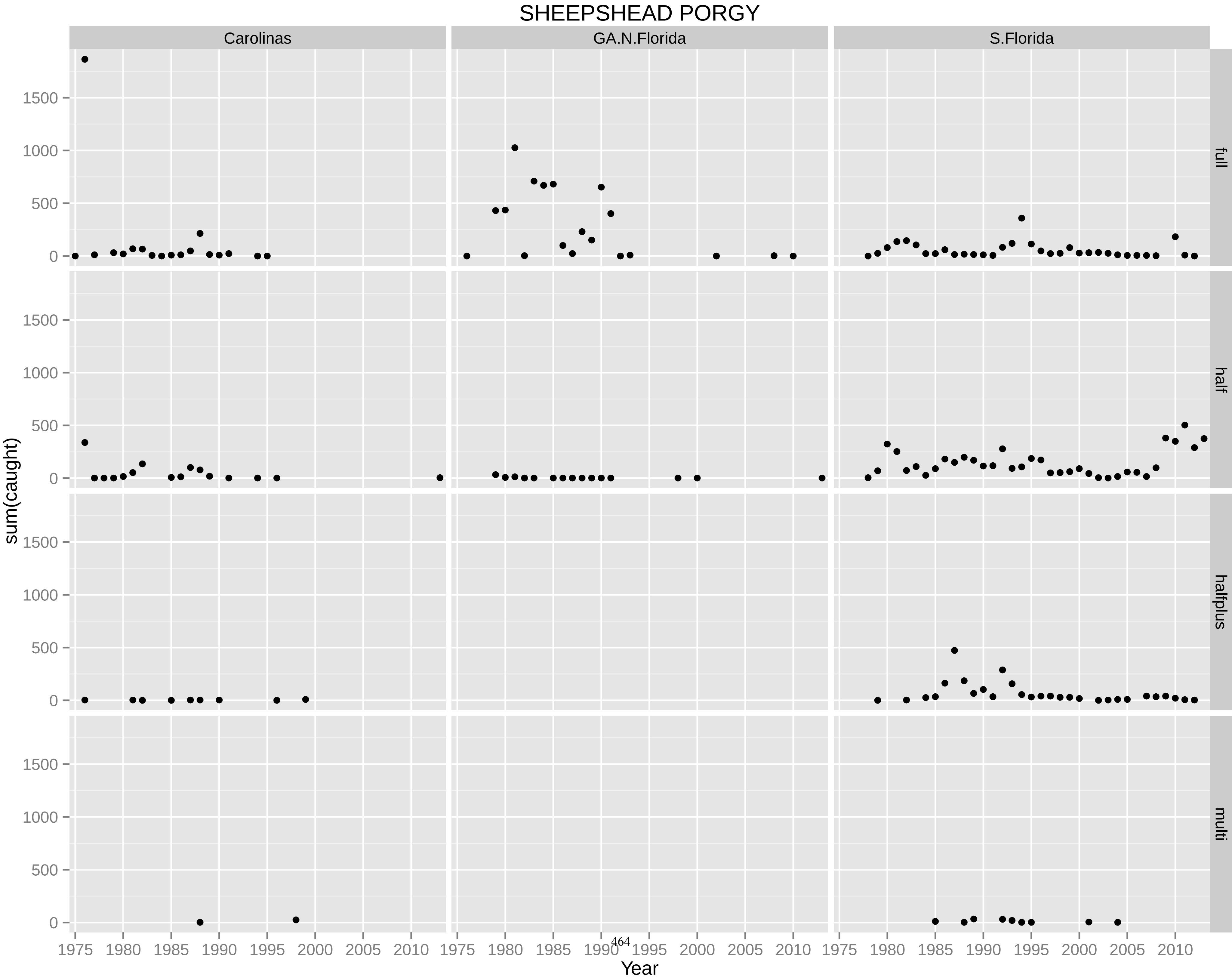

SHEEPSHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
20
40
60
80
1975
1980
1985
1990
1995
2000
2005
2010

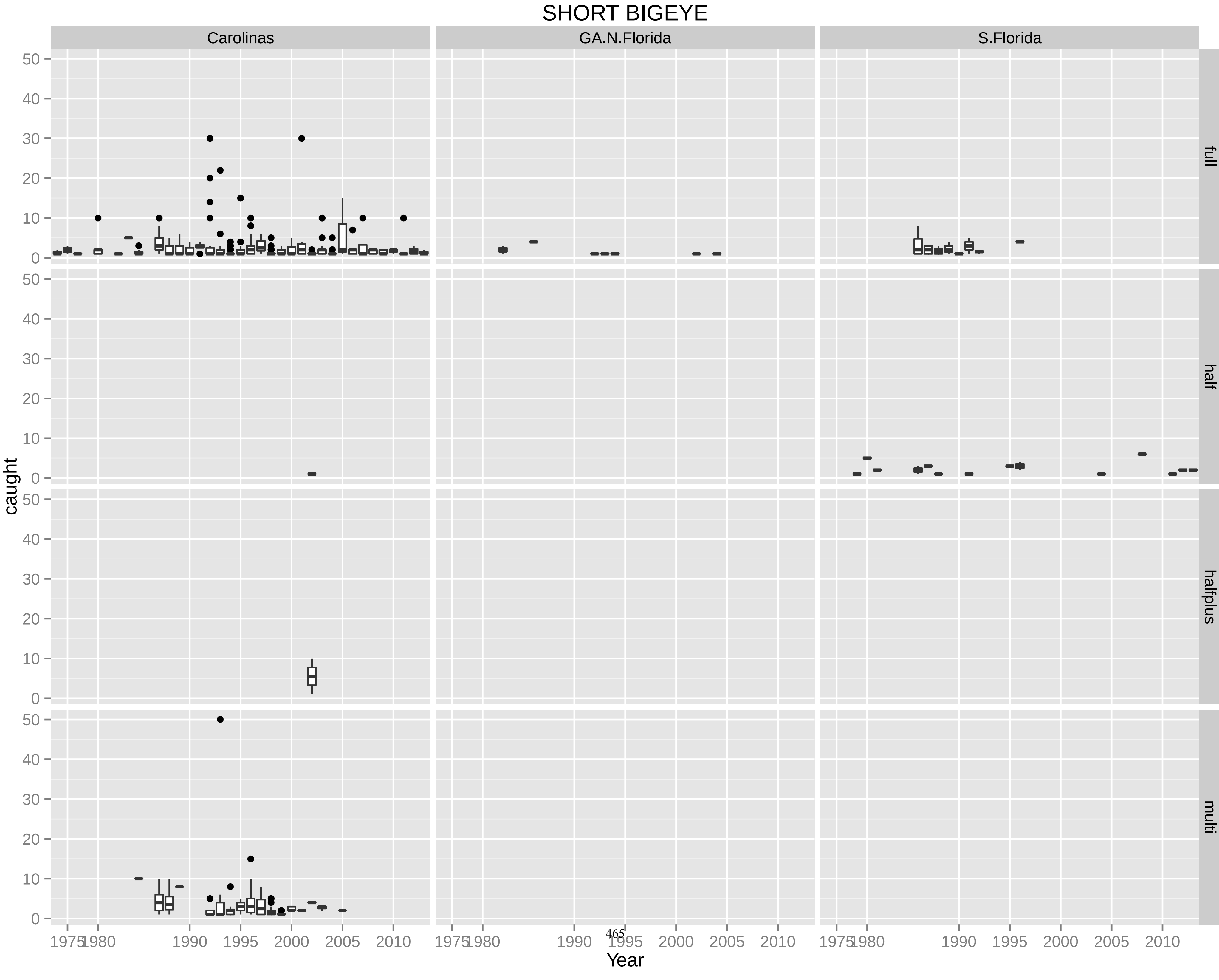


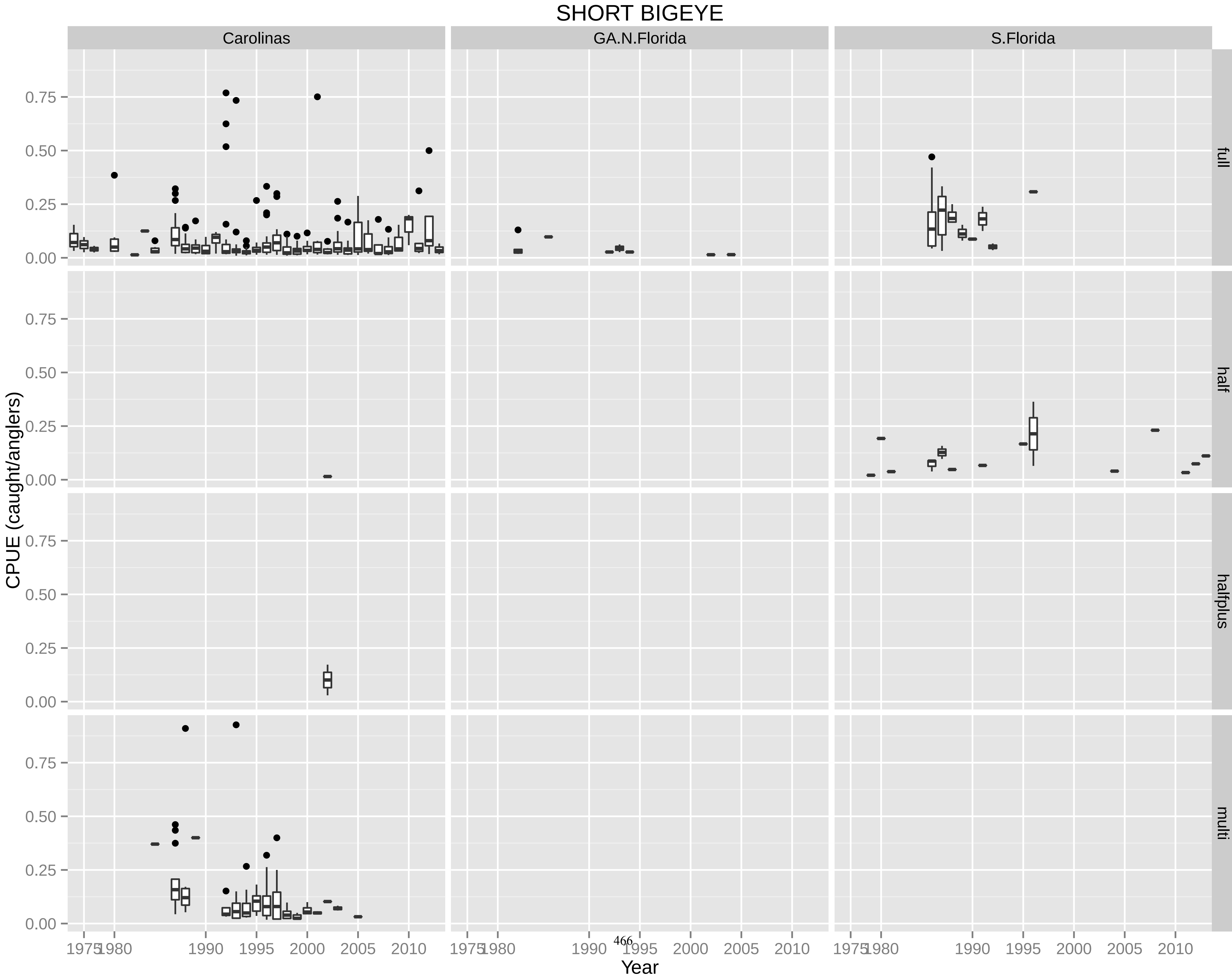
SHEEPSHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
1975
1980
1985
1990
1995
2000
2005
2010

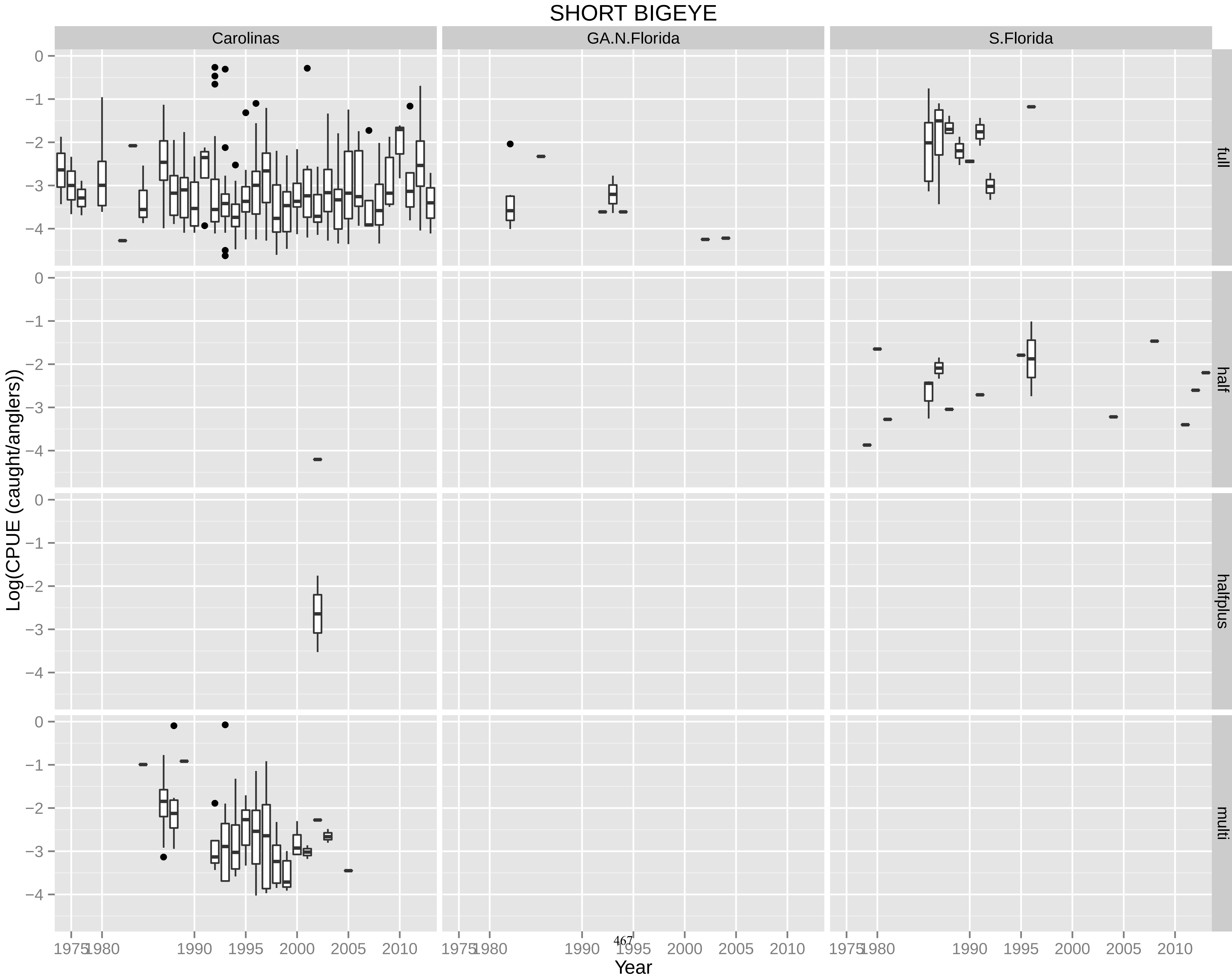


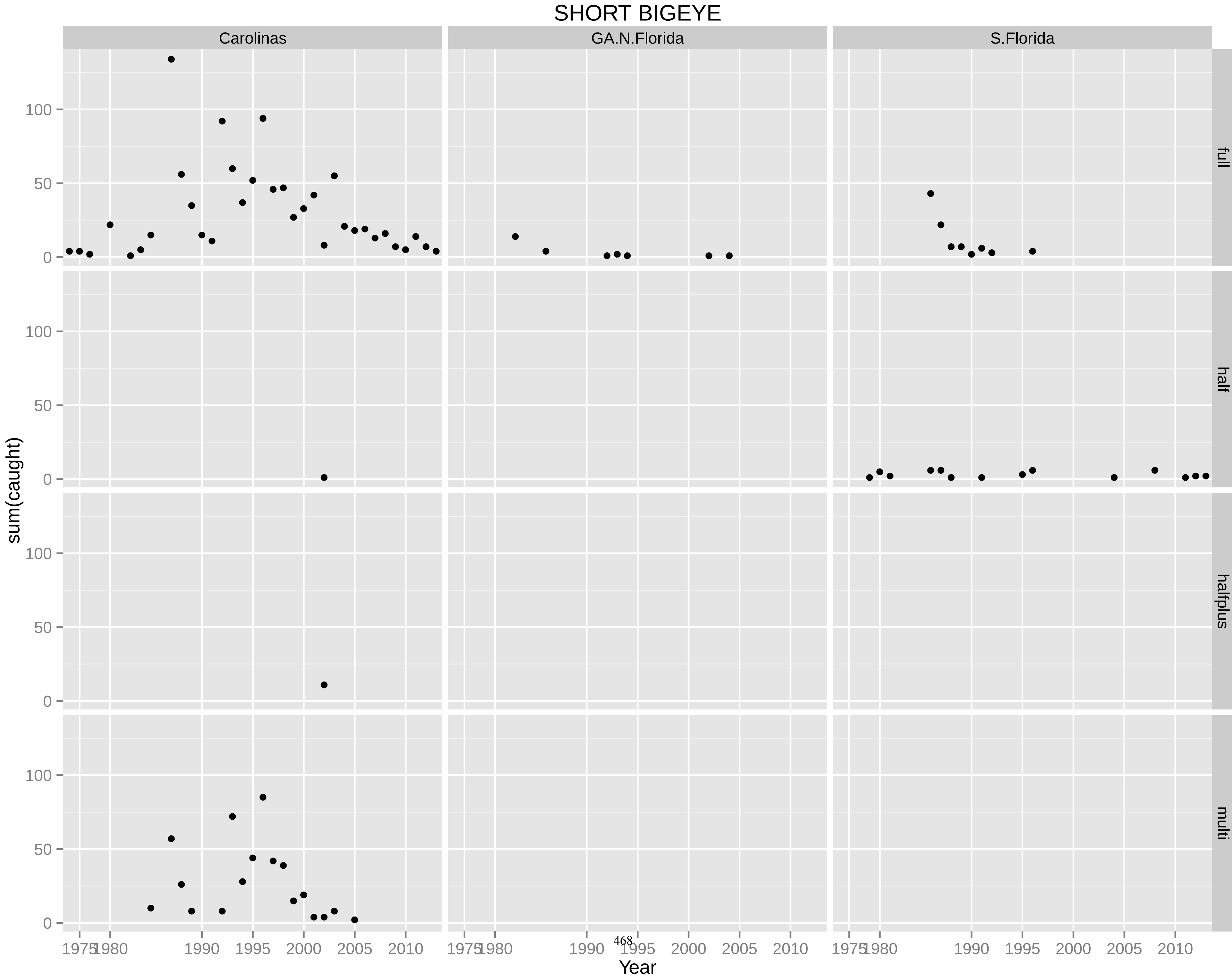
SHEEPSHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
1975
1980
1985
1990
1995
2000
2005
2010
1
0
−1
−2
−3
−4


SHEEPSHEAD PORGY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
1975
1980
1985
1990
1995
2000
2005
2010

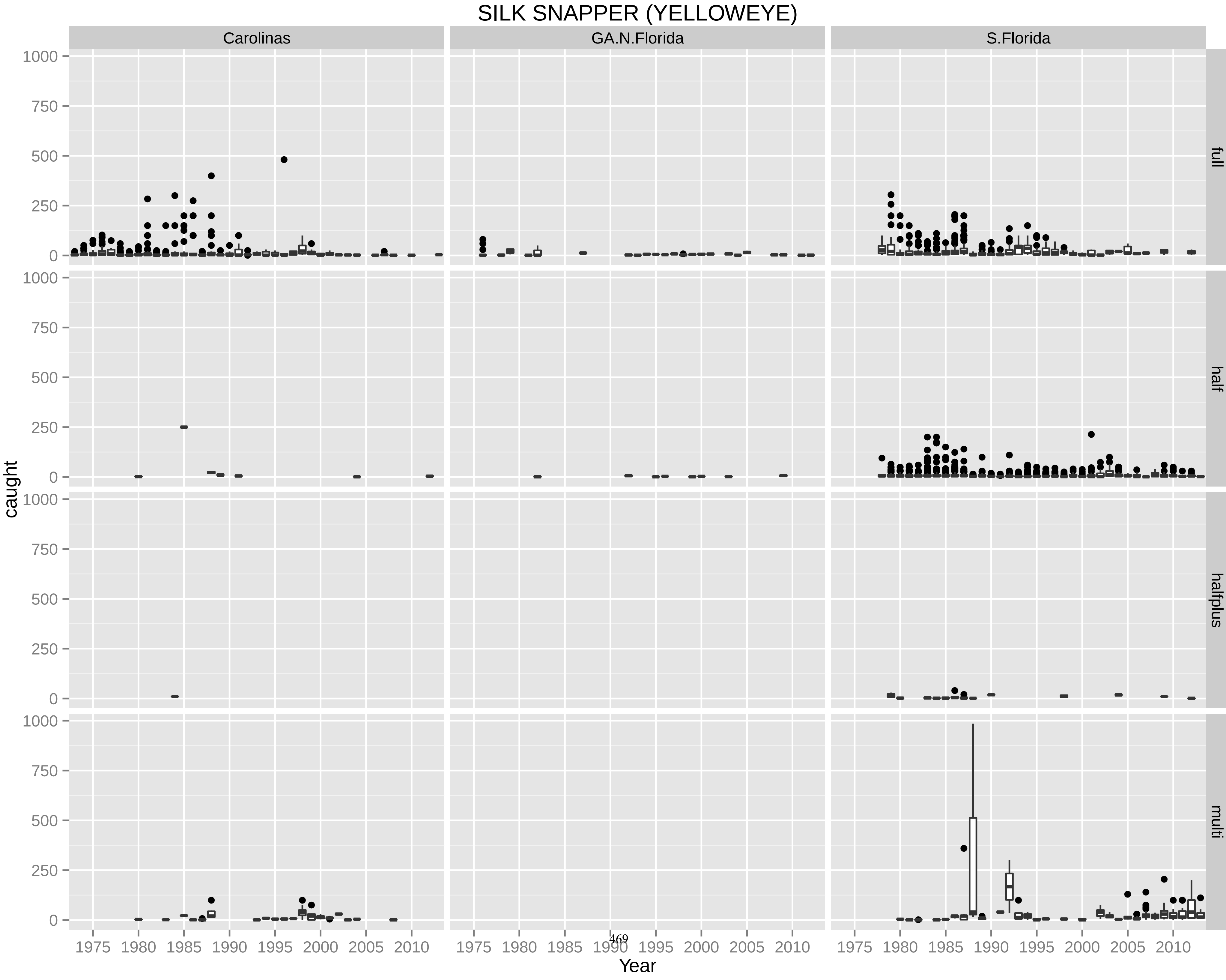

SHORT BIGEYE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
10
20
30
40
50
1975
1980
1990
1995
2000
2005
2010

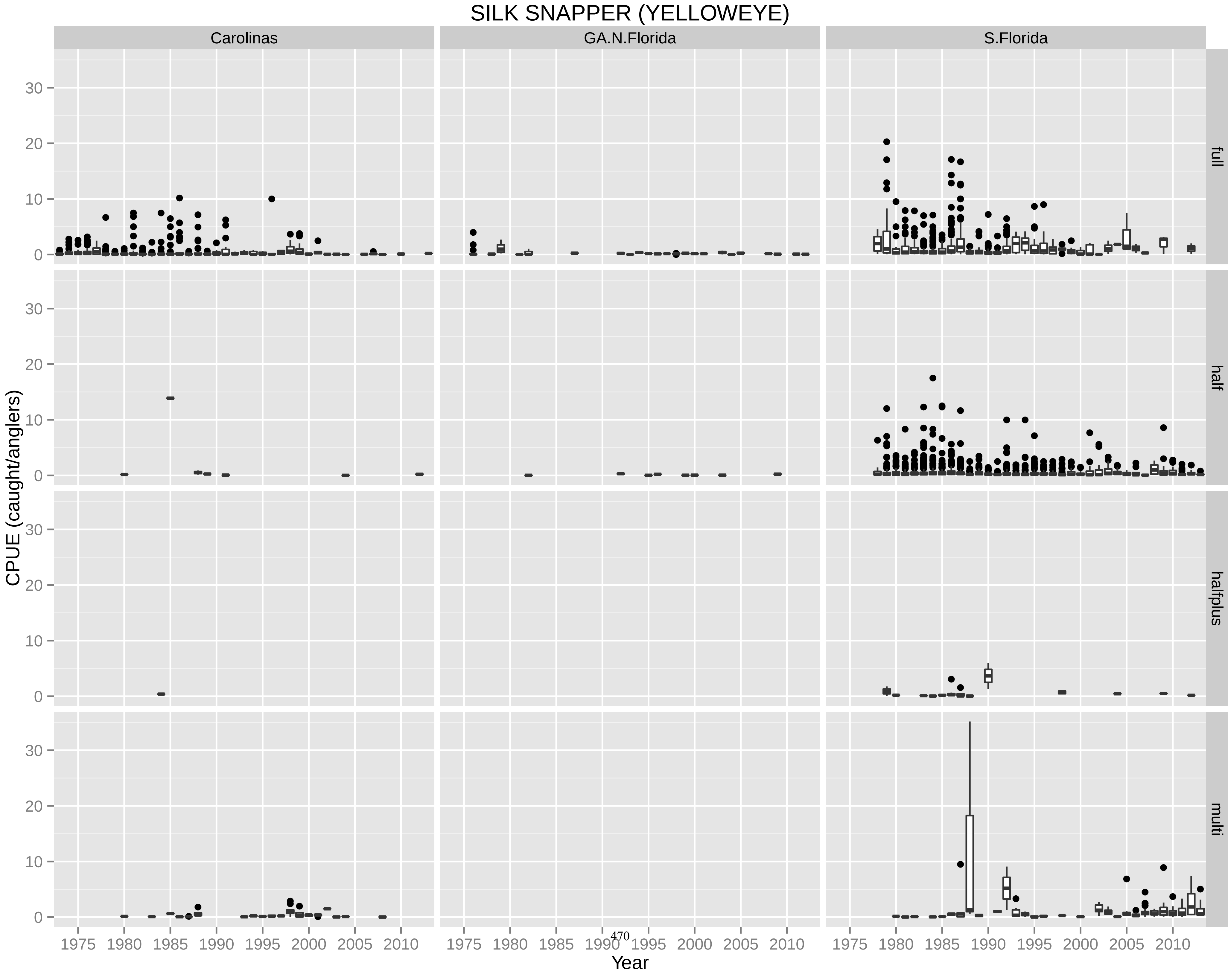

SHORT BIGEYE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0.00
0.25
0.50
0.75
1975
1980
1990
1995
2000
2005
2010
Year


SHORT BIGEYE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
0
−1
−2
−3
−4
1975
1980
1990
1995
2000
2005
2010

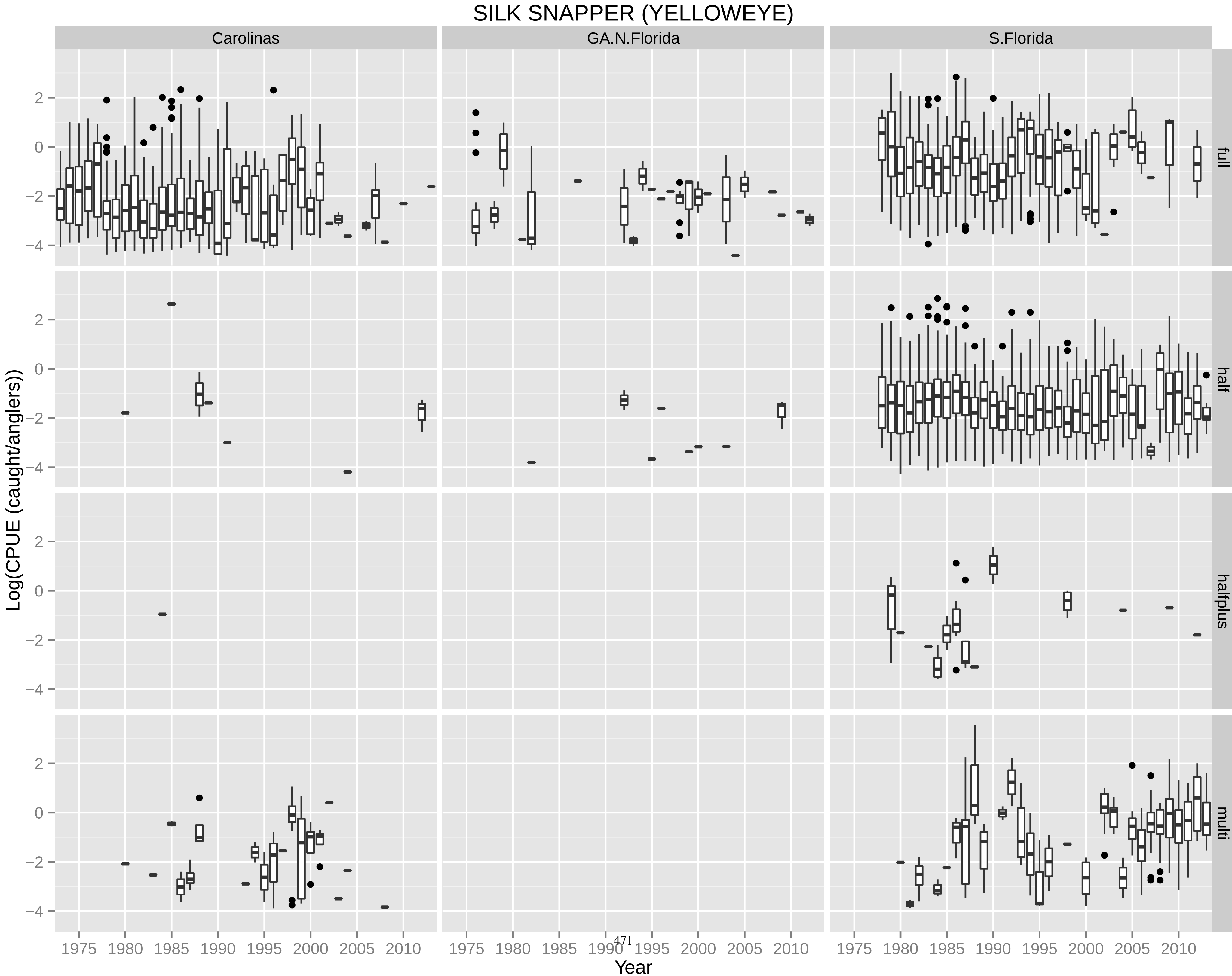


SHORT BIGEYE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
50
100
1975
1980
1990
1995
2000
2005
2010

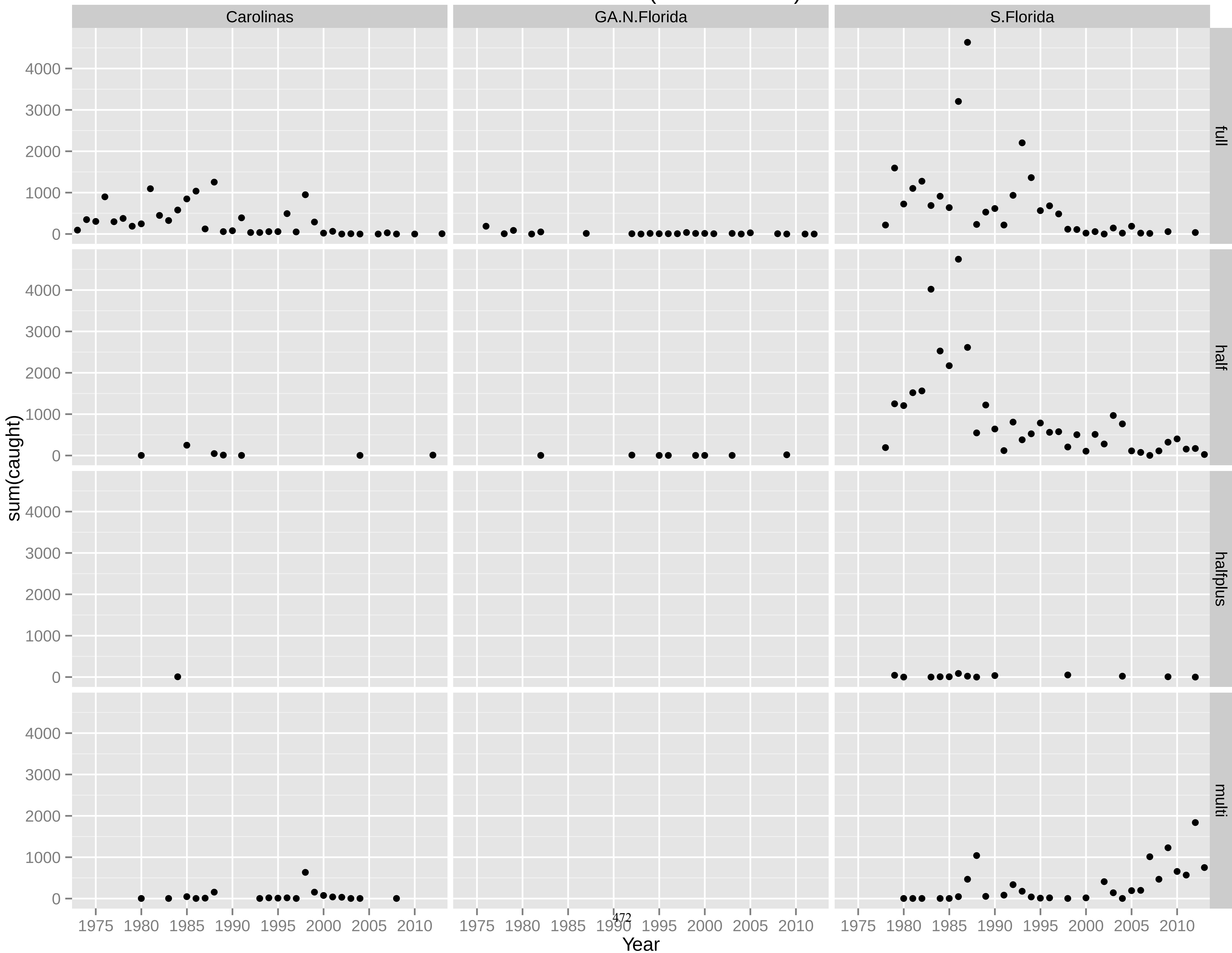

SILK SNAPPER (YELLOWEYE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
250
500
750
1000
1975
1980
1985
1990
1995
2000
2005
2010

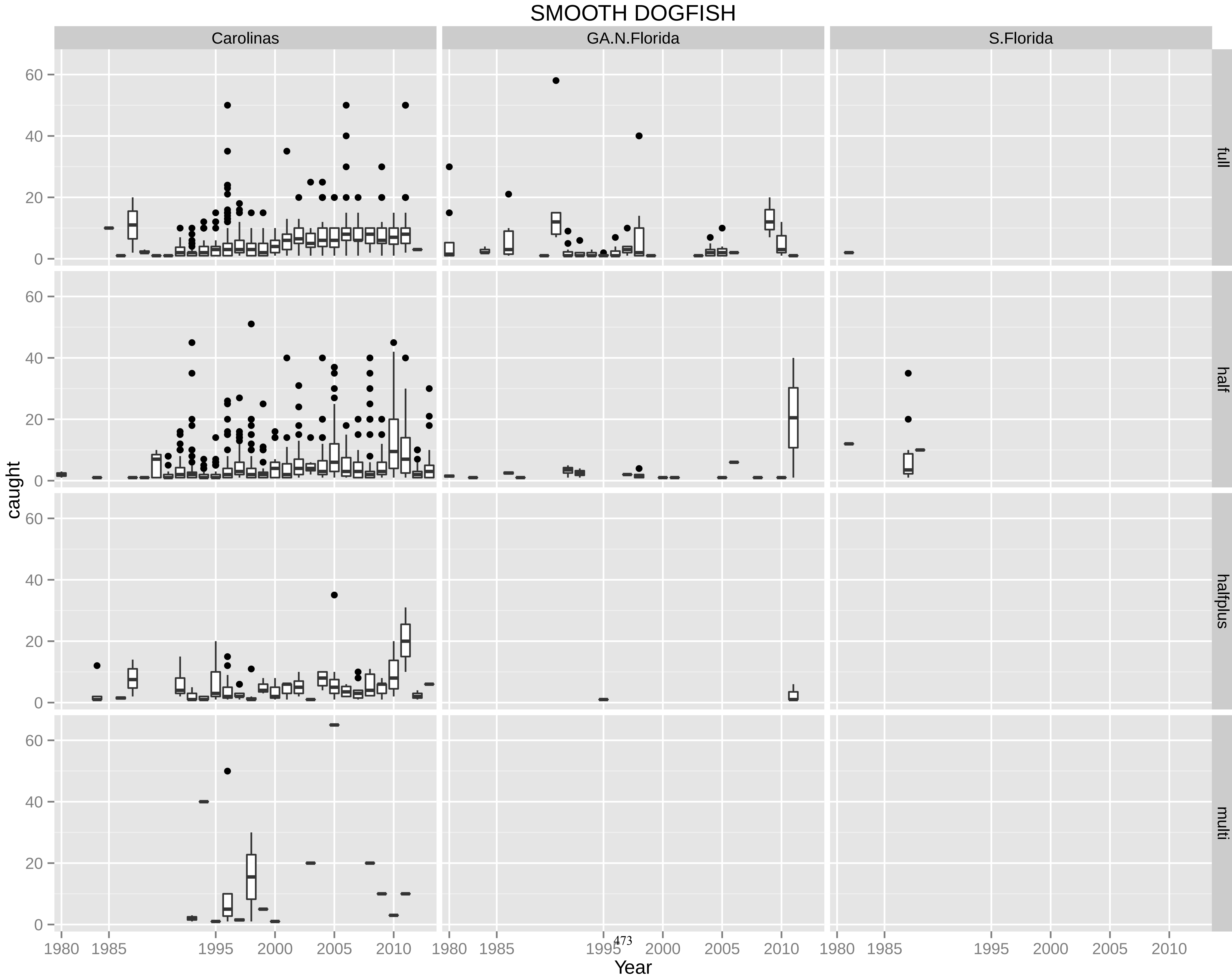


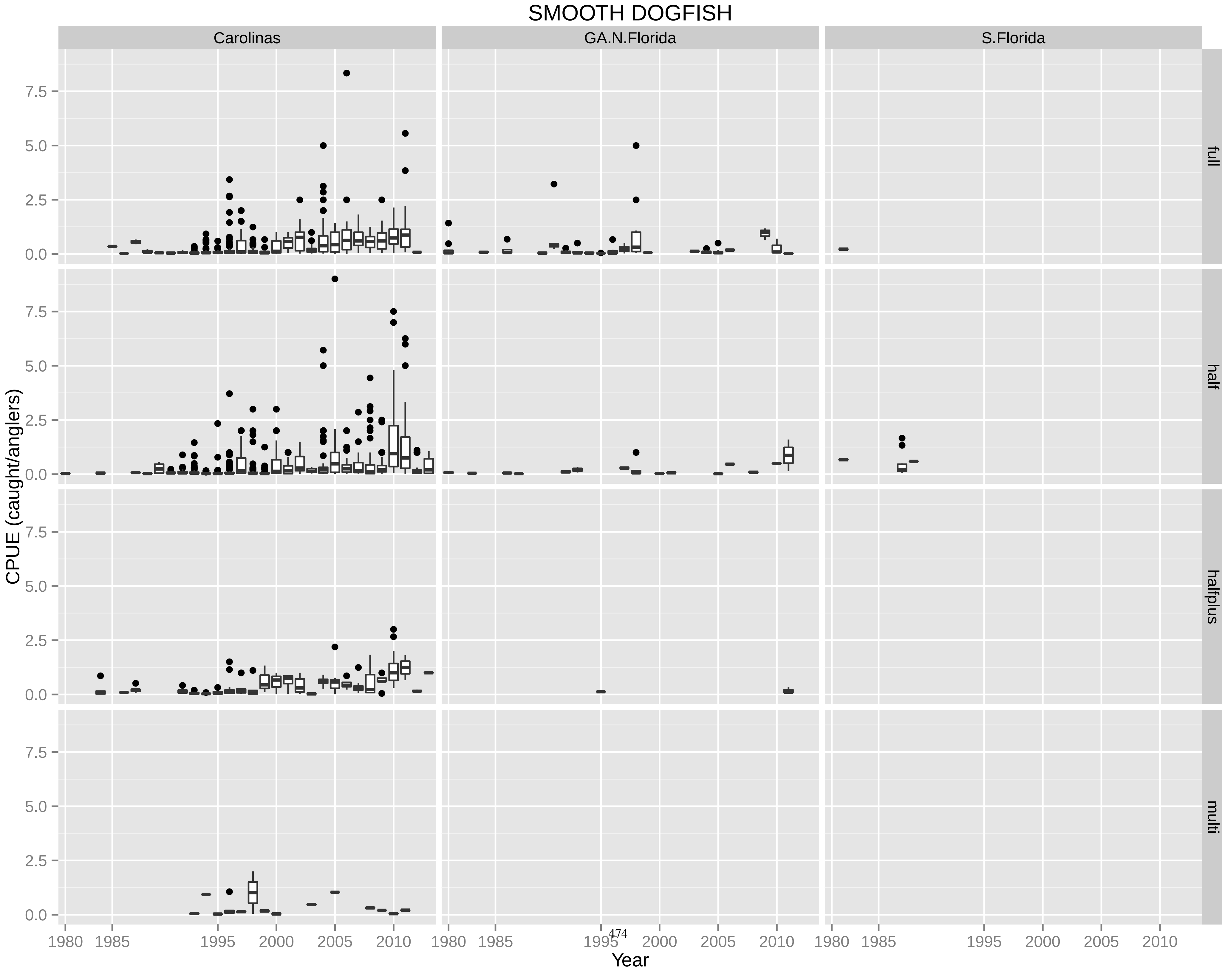
SILK SNAPPER (YELLOWEYE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
10
20
30
1975
1980
1985
1990
1995
2000
2005
2010

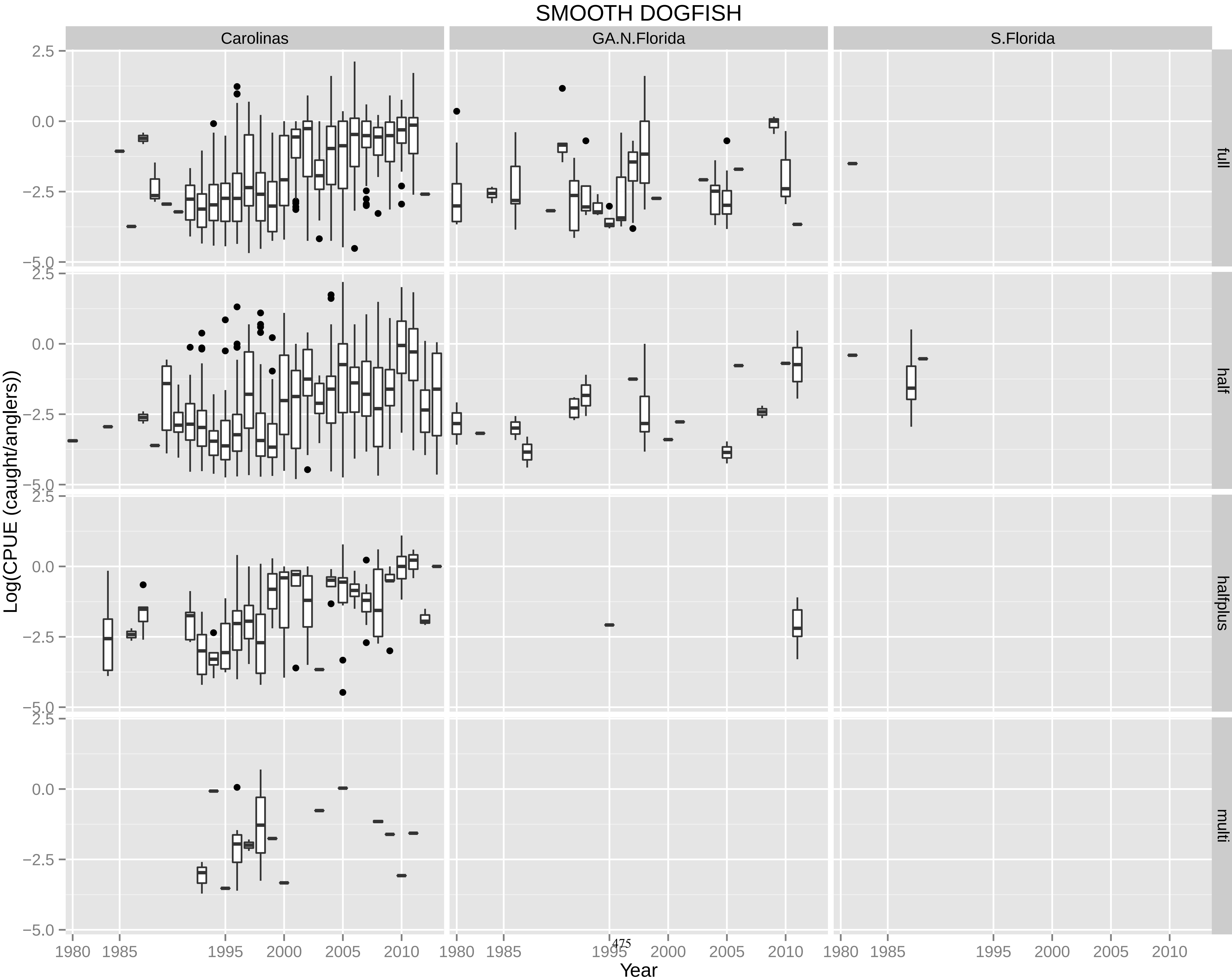

SILK SNAPPER (YELLOWEYE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

SILK SNAPPER (YELLOWEYE)

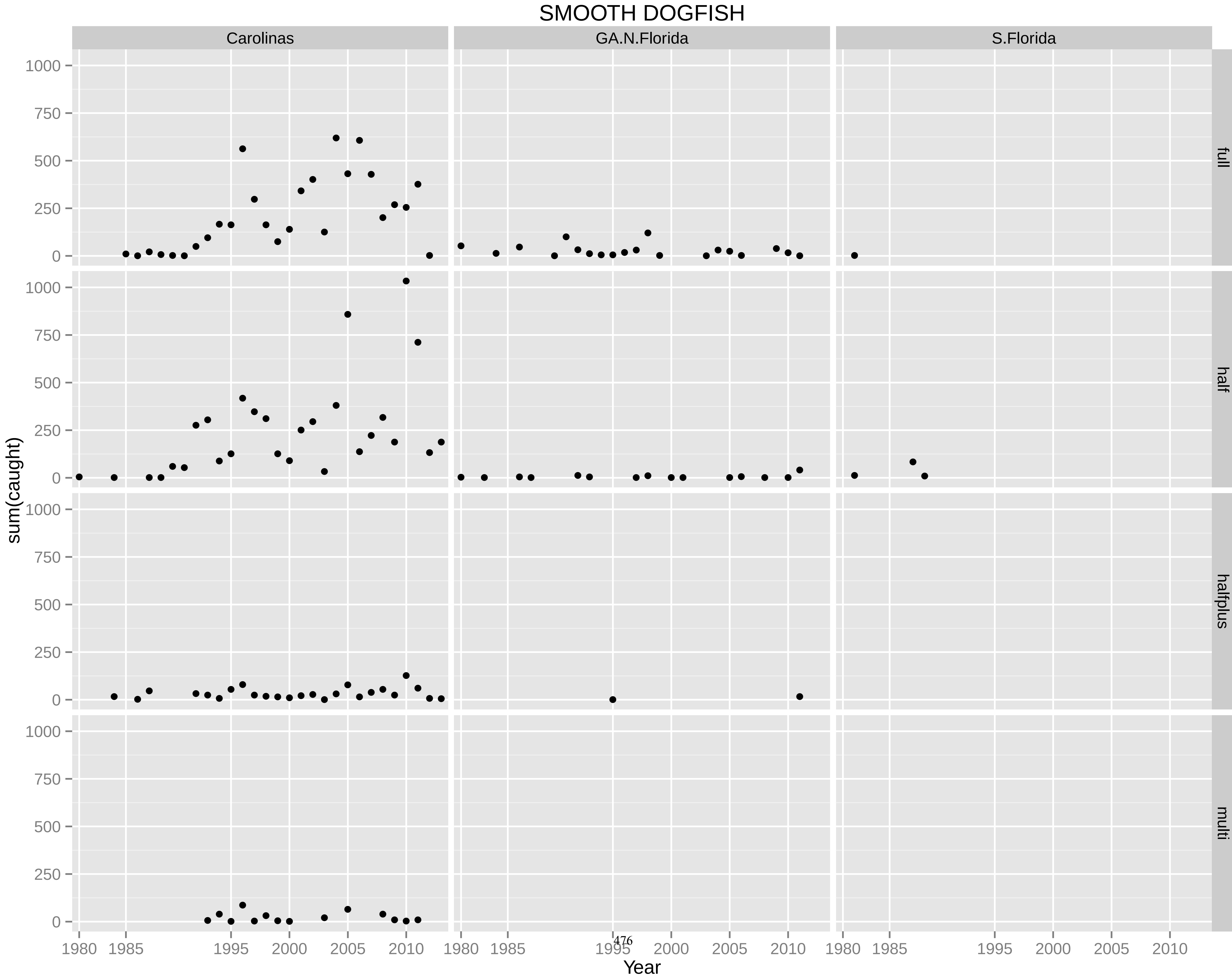


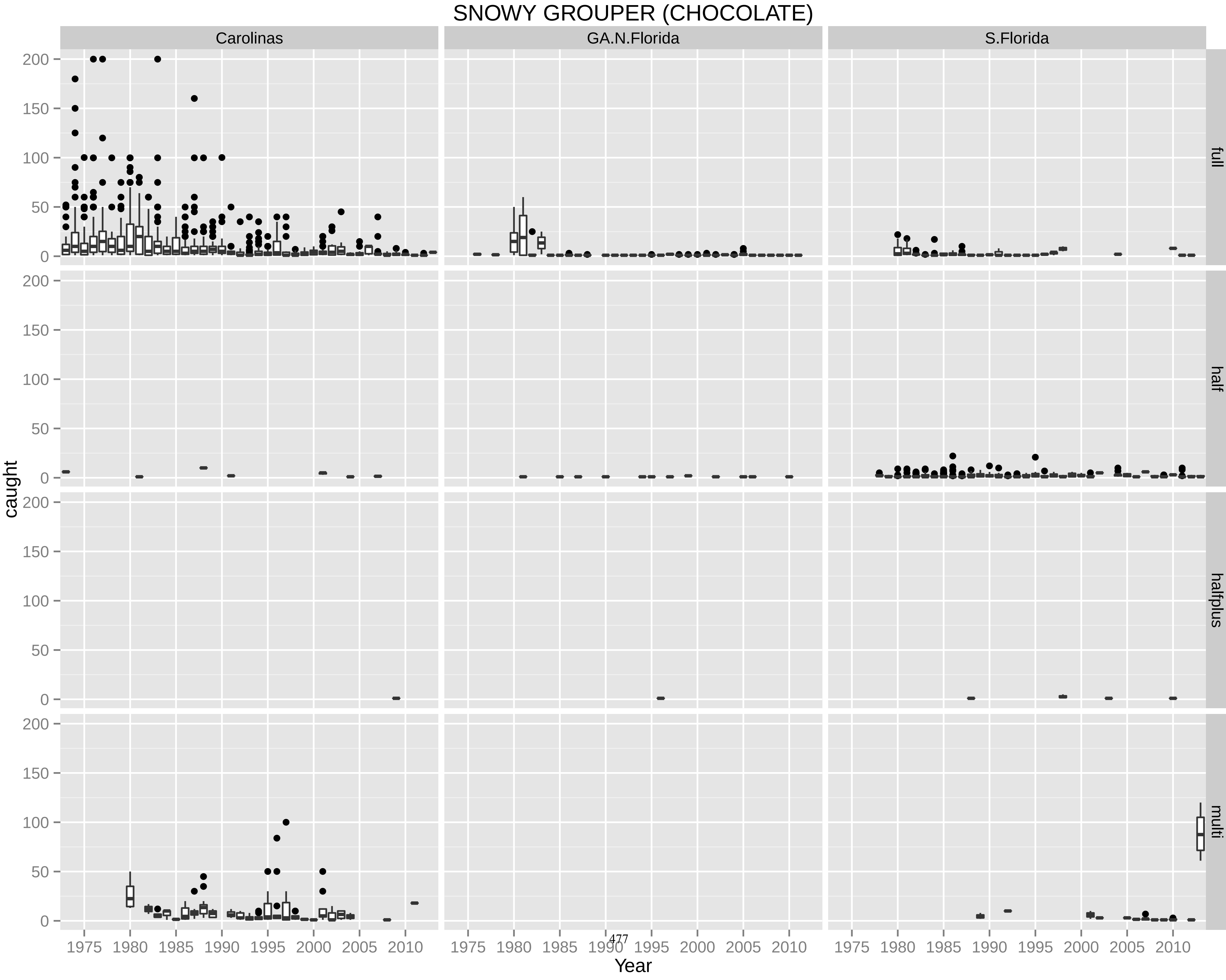

SMOOTH DOGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
20
40
60
1980
1985
1995
2000
2005
2010

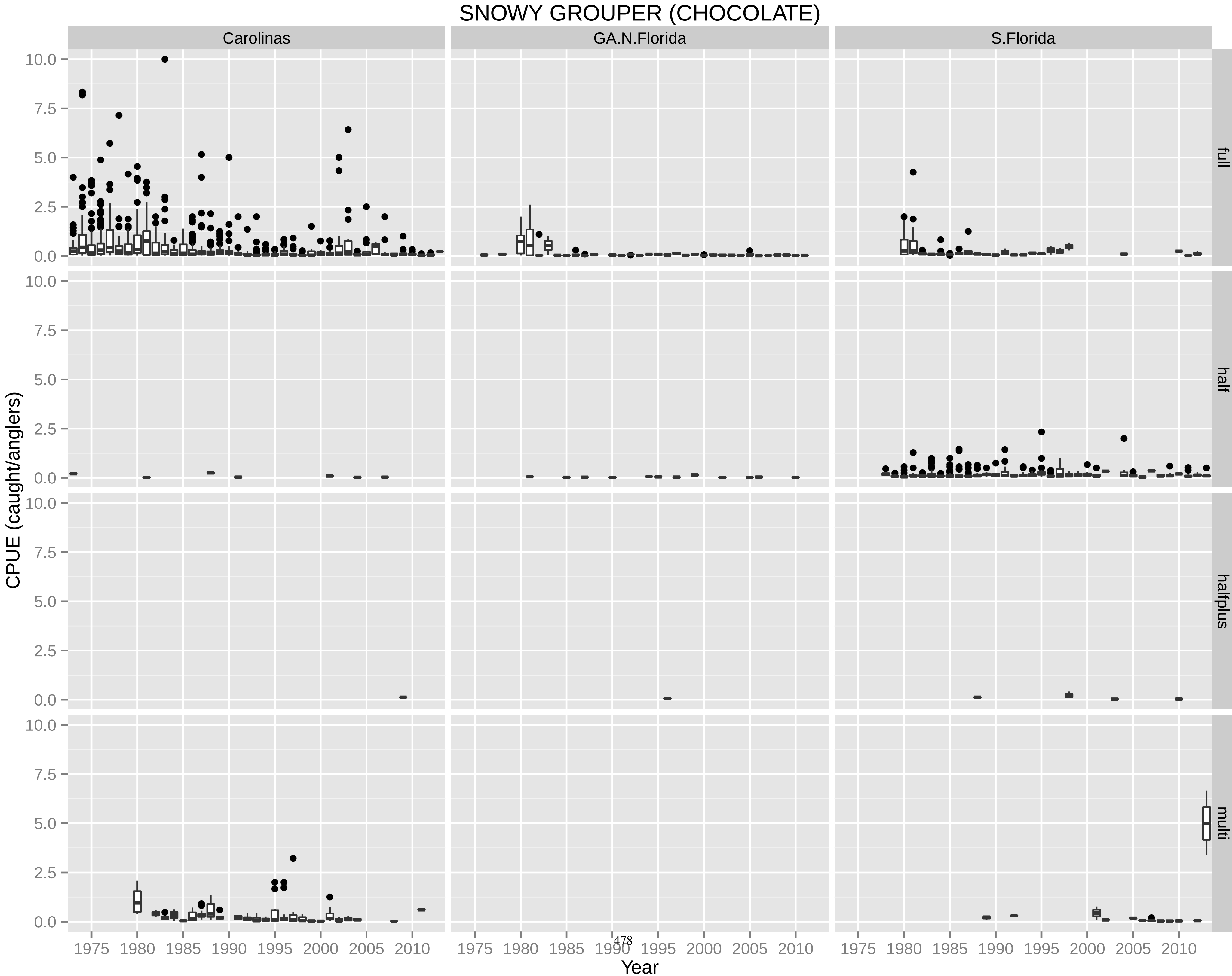

SMOOTH DOGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
2.5
5.0
7.5
1980
1985
1995
2000
2005
2010

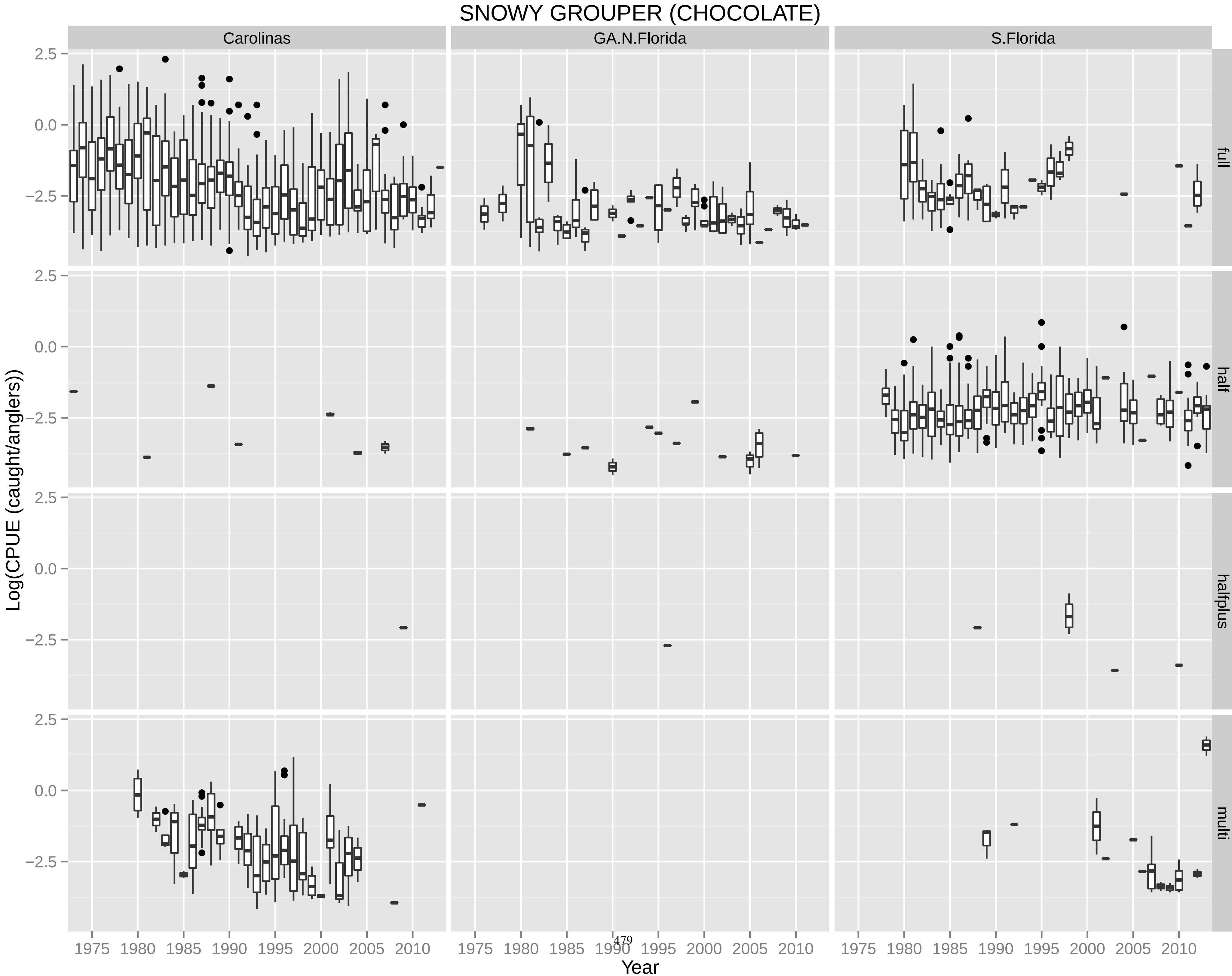


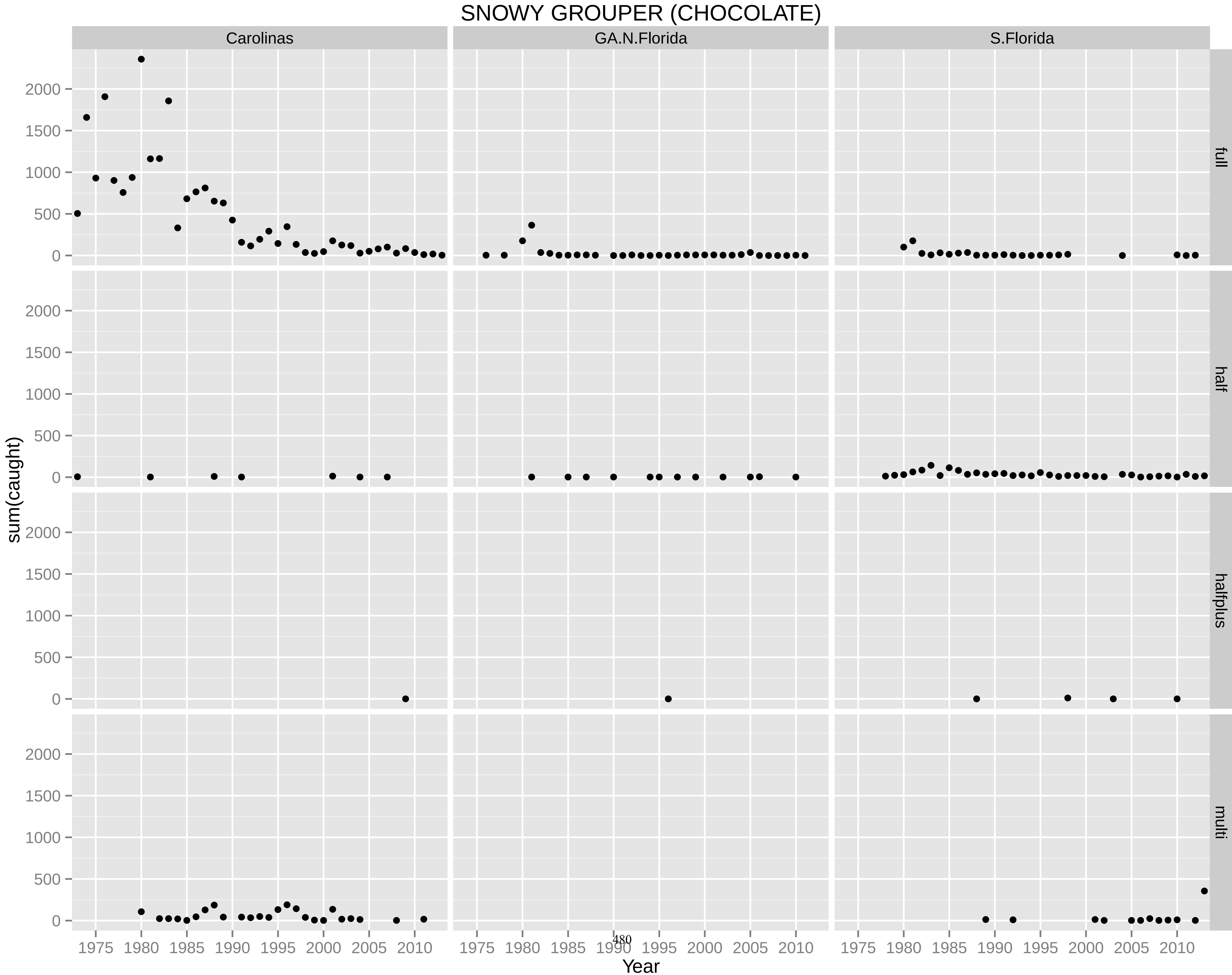
SMOOTH DOGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1980
1985
1995
2000
2005
2010

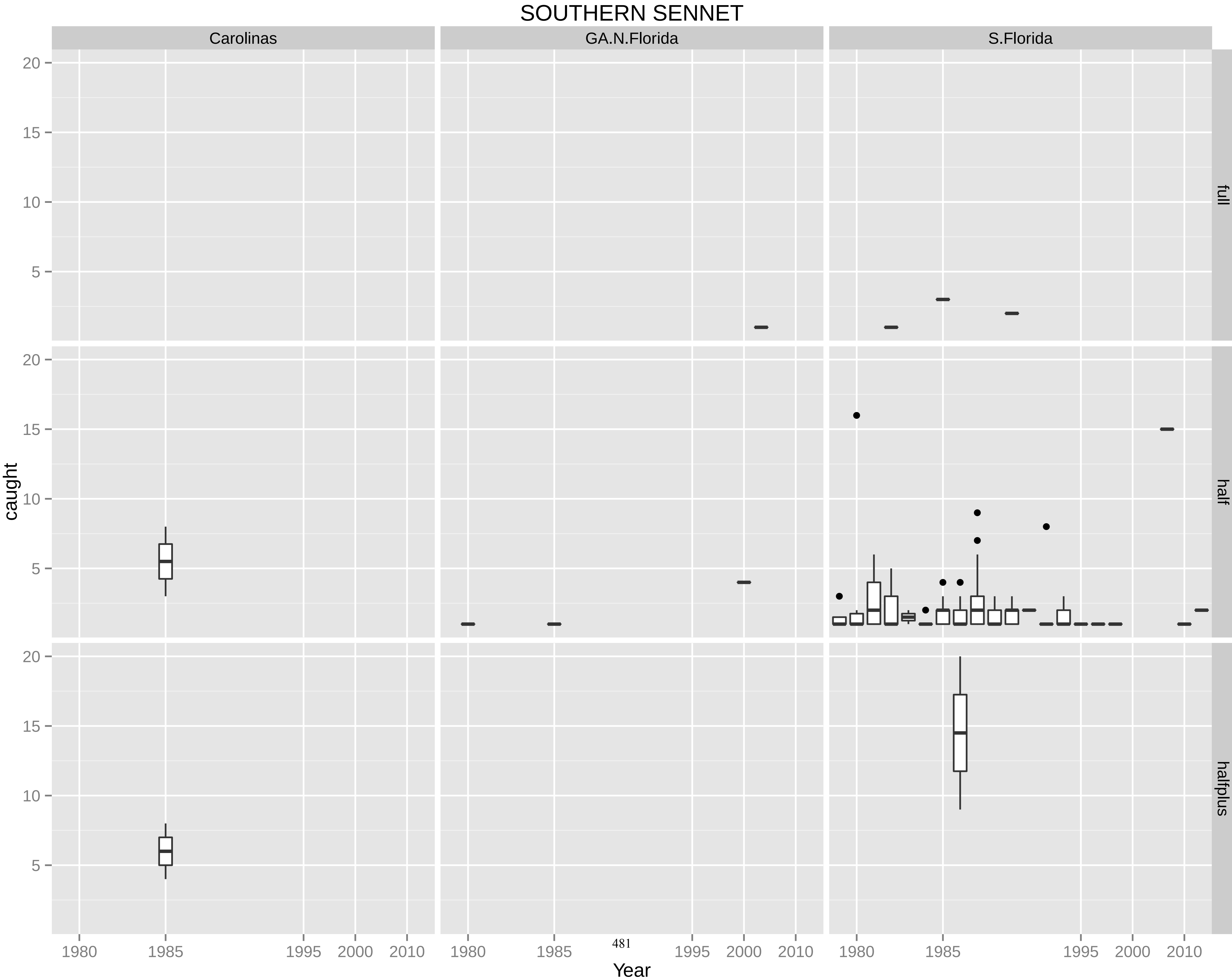

SMOOTH DOGFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
1000
750
500
250
0
1980
1985
1995
2000
2005
2010

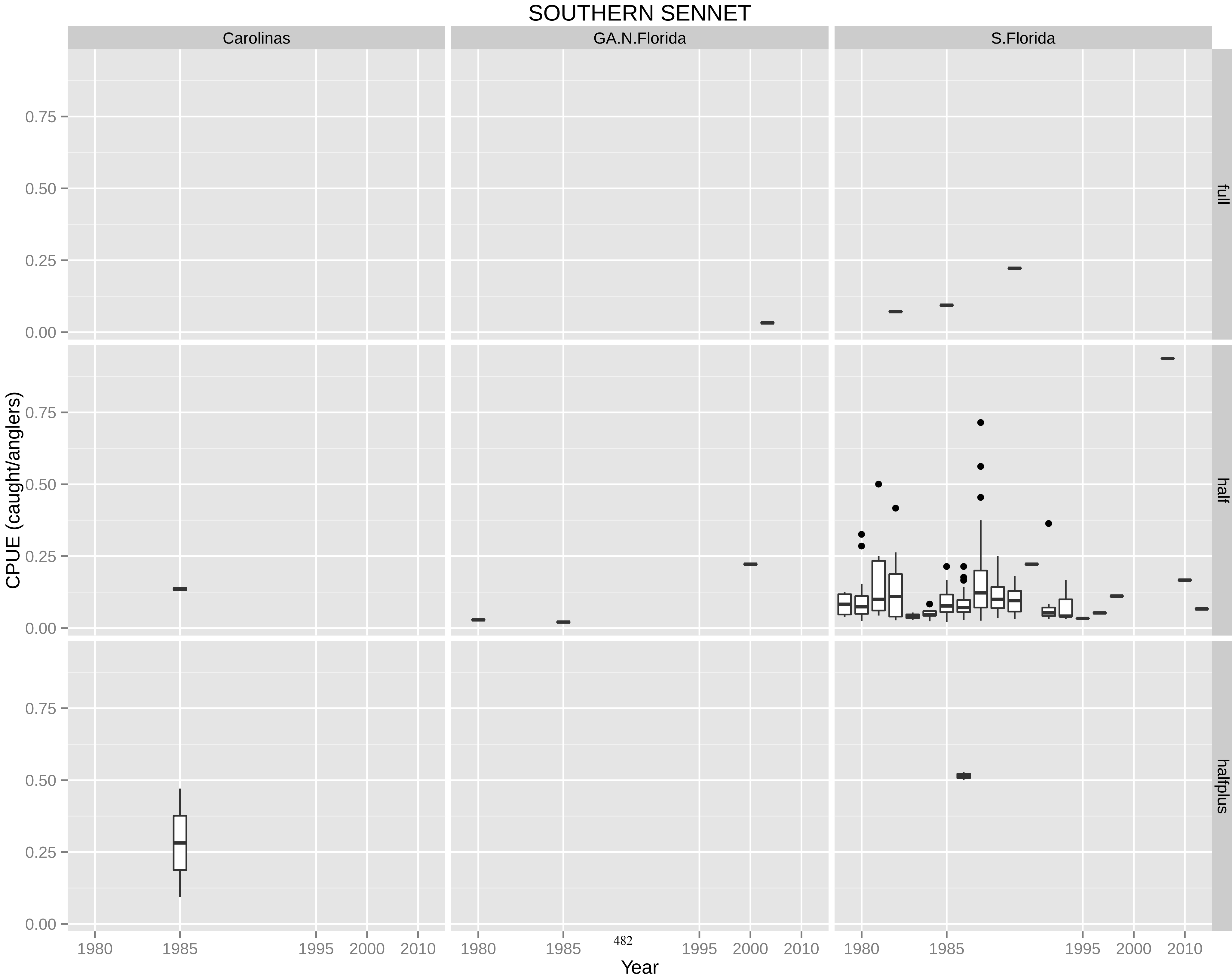

SNOWY GROUPER (CHOCOLATE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
0
50
100
150
200
1975
1980
1985
1990
1995
2000
2005
2010
Year

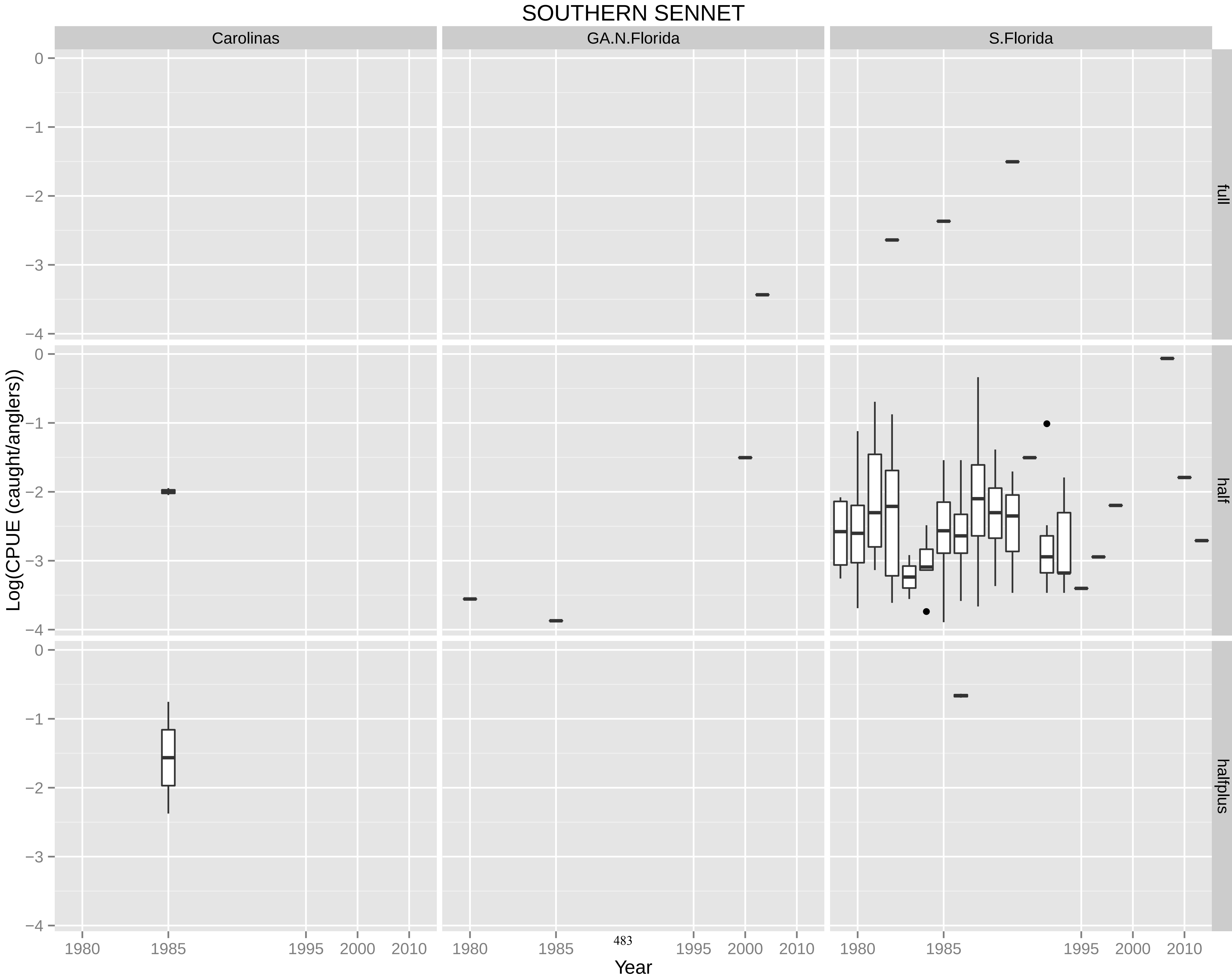

SNOWY GROUPER (CHOCOLATE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
2.5
5.0
7.5
10.0
1975
1980
1985
1990
1995
2000
2005
2010

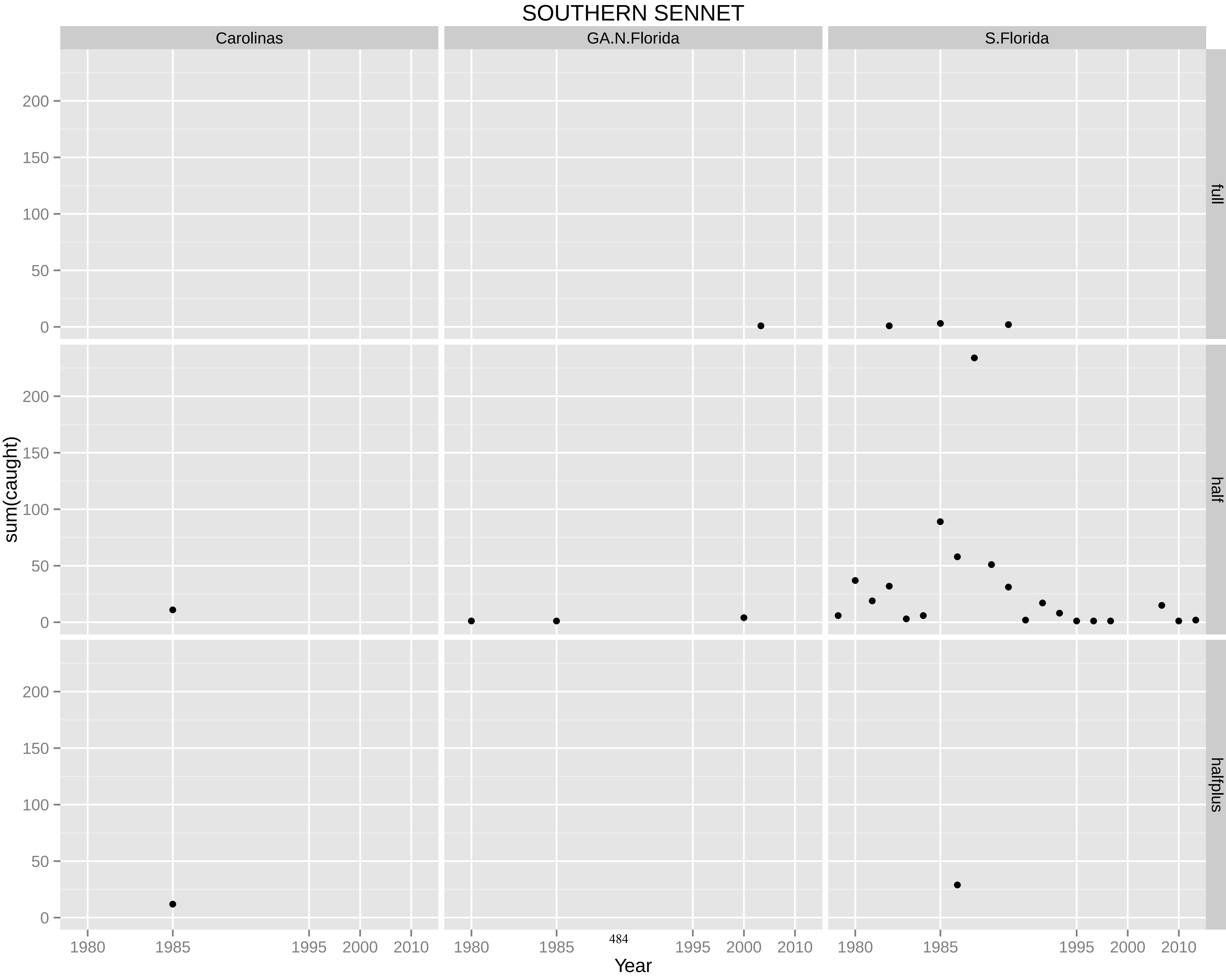

SNOWY GROUPER (CHOCOLATE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
1975
1980
1985
1990
1995
2000
2005
2010

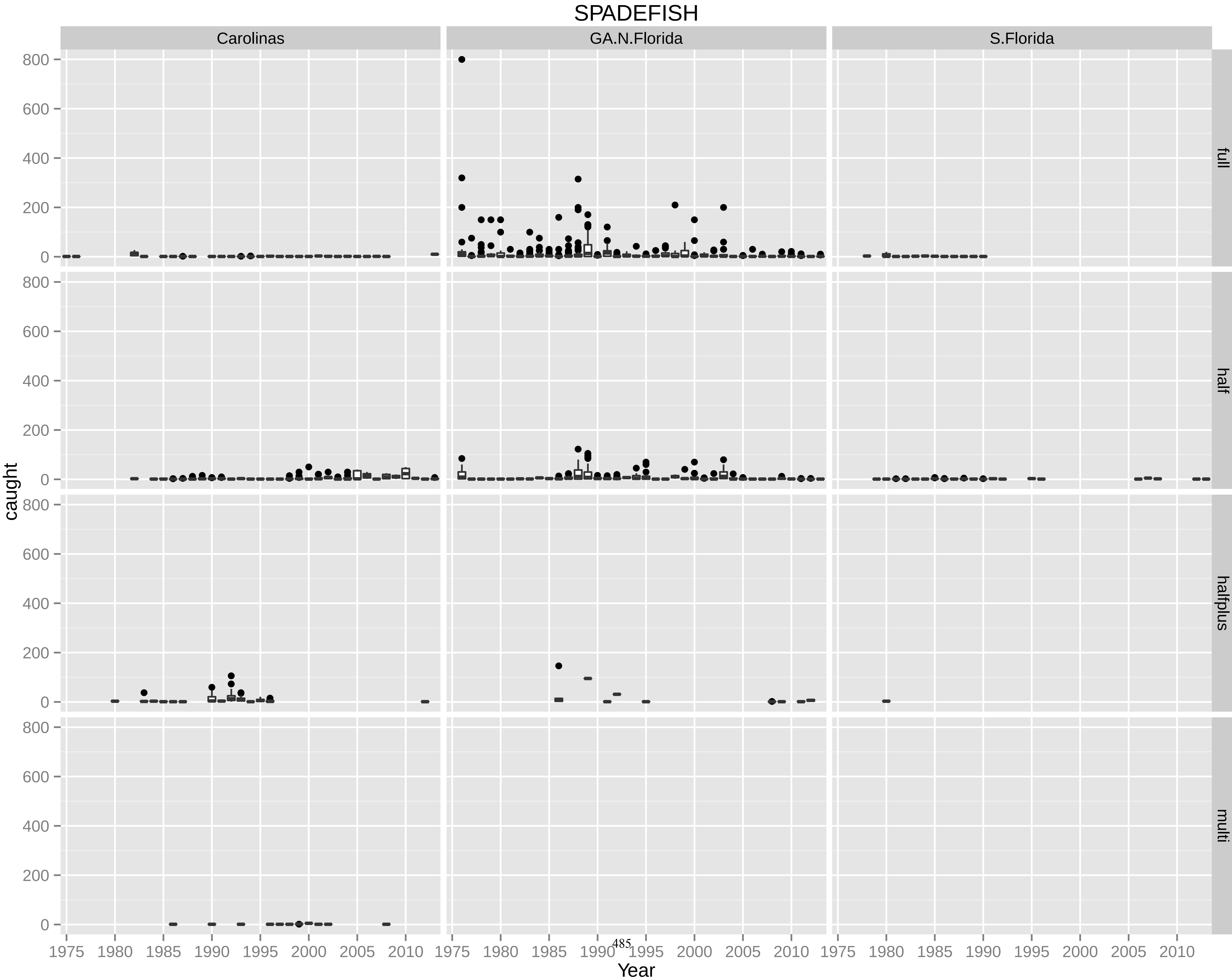

SNOWY GROUPER (CHOCOLATE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
2000
1975
1980
1985
1990
1995
2000
2005
2010

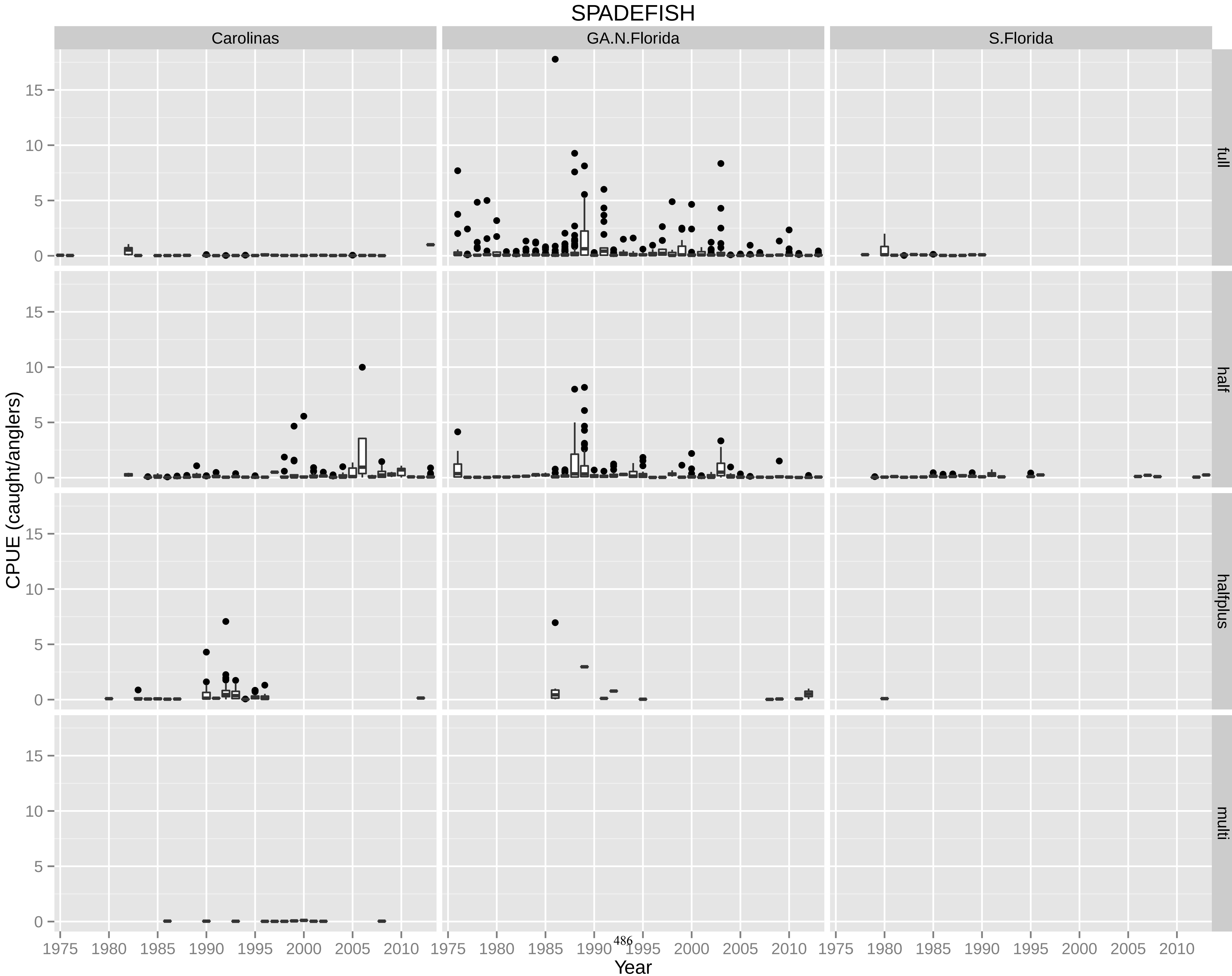

SOUTHERN SENNET
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
caught
Year
20
15
10
5
1980
1985
1995
2000
2010

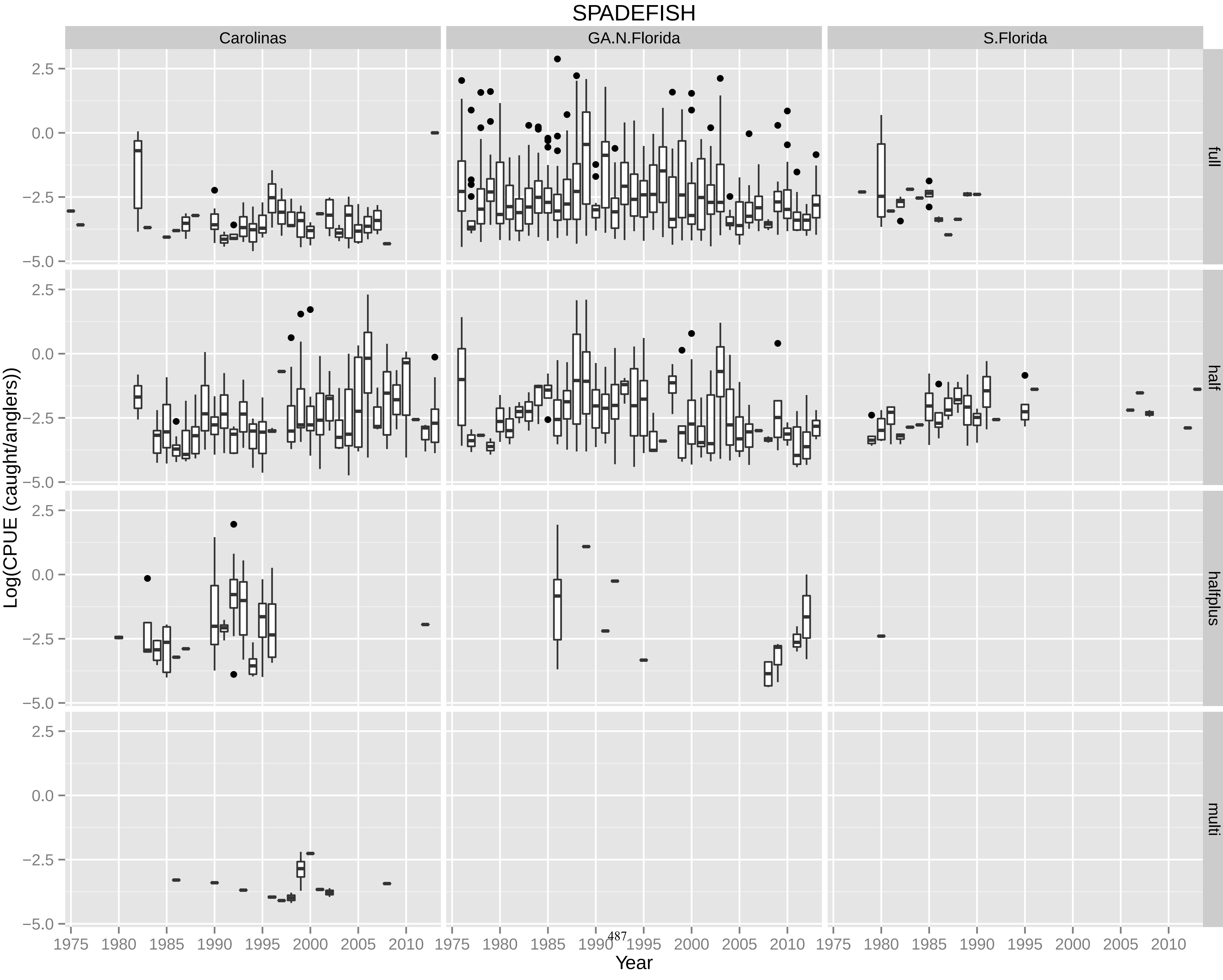

SOUTHERN SENNET
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
CPUE (caught/anglers)
0.00
0.25
0.50
0.75
1980
1985
1995
2000
2010
Year

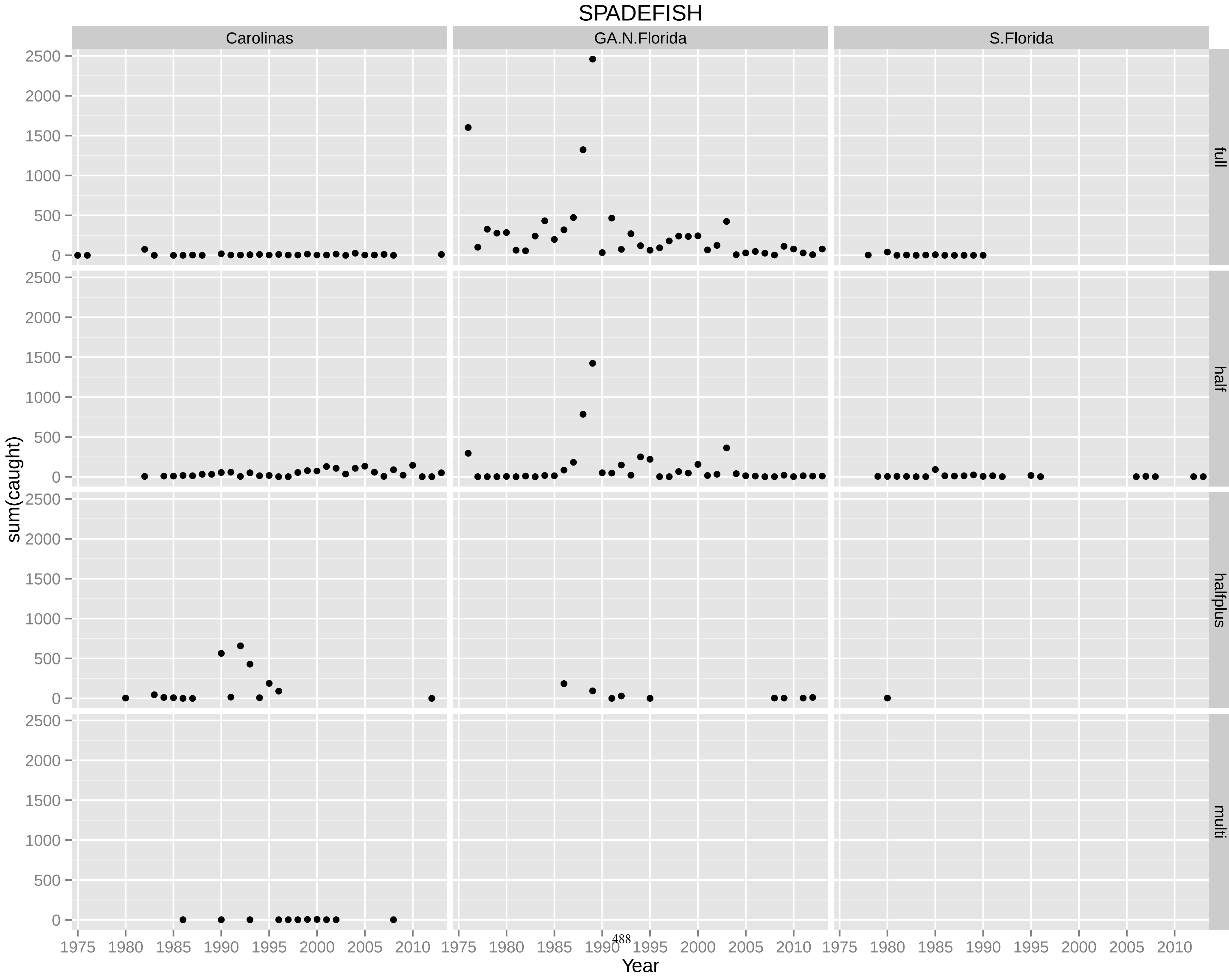

SOUTHERN SENNET
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
Log(CPUE (caught/anglers))
Year
0
−1
−2
−3
−4
1980
1985
1995
2000
2010

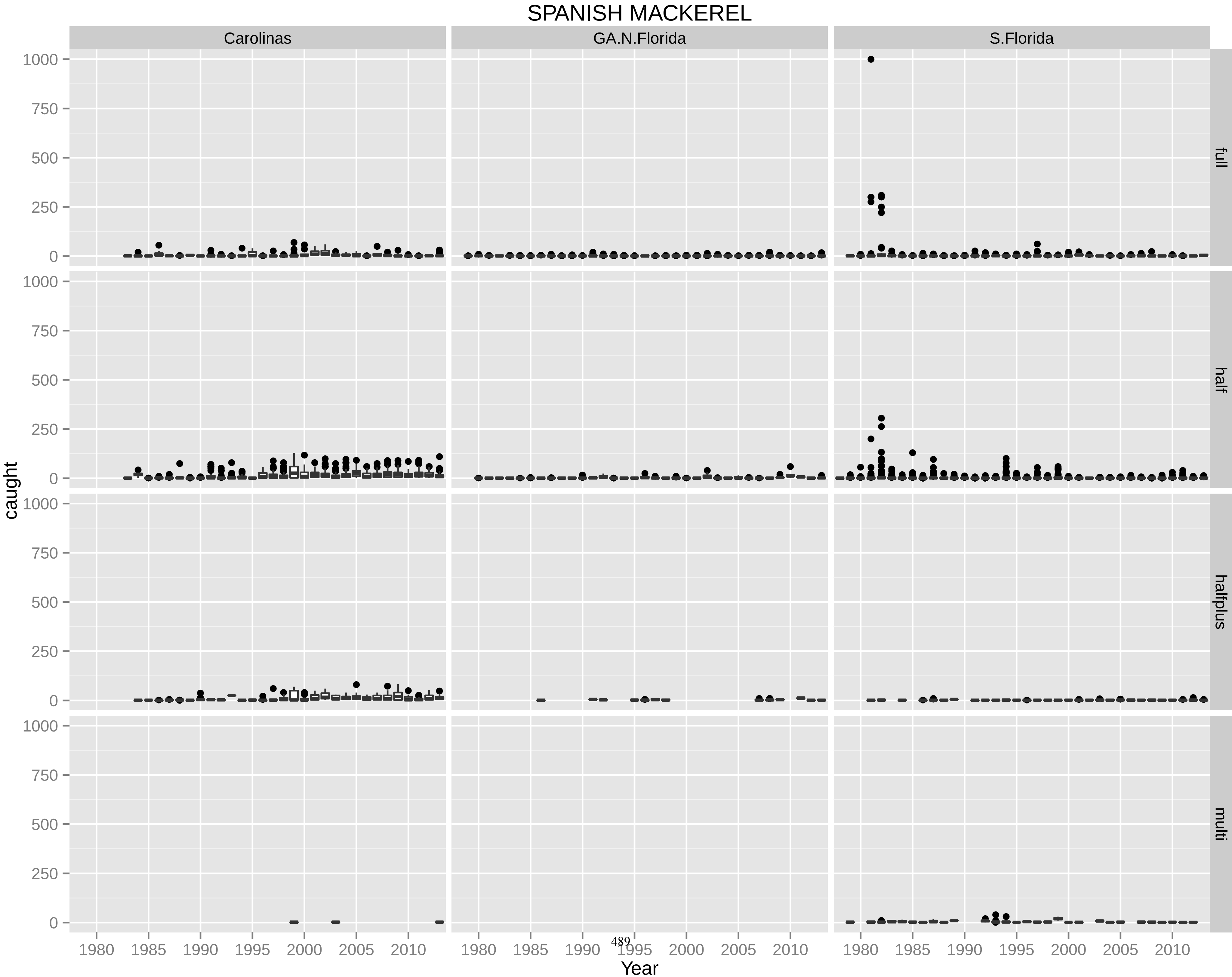

SOUTHERN SENNET
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
sum(caught)
0
50
100
150
200
1980
1985
1995
2000
2010
Year

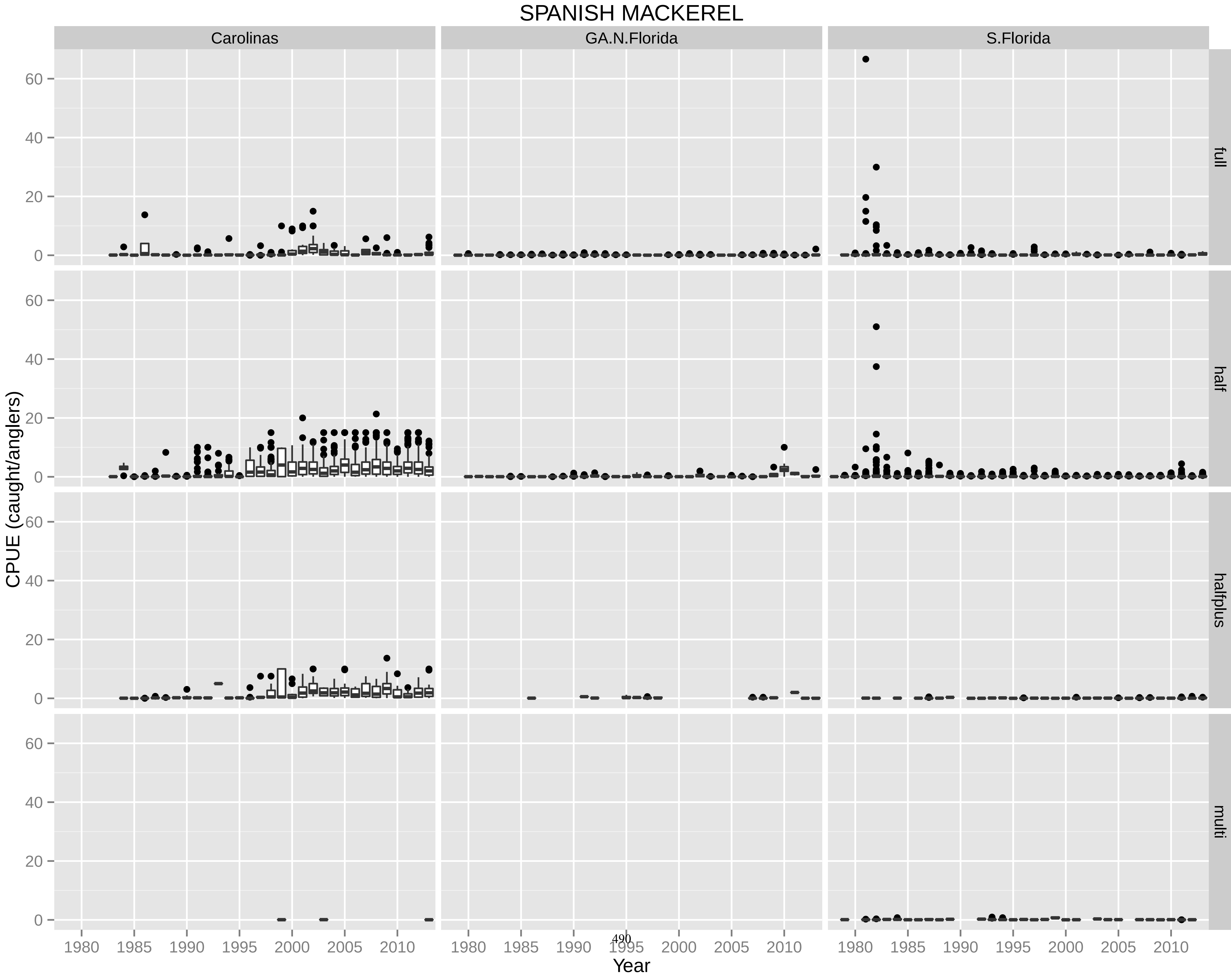

SPADEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
200
400
600
800
1975
1980
1985
1990
1995
2000
2005
2010

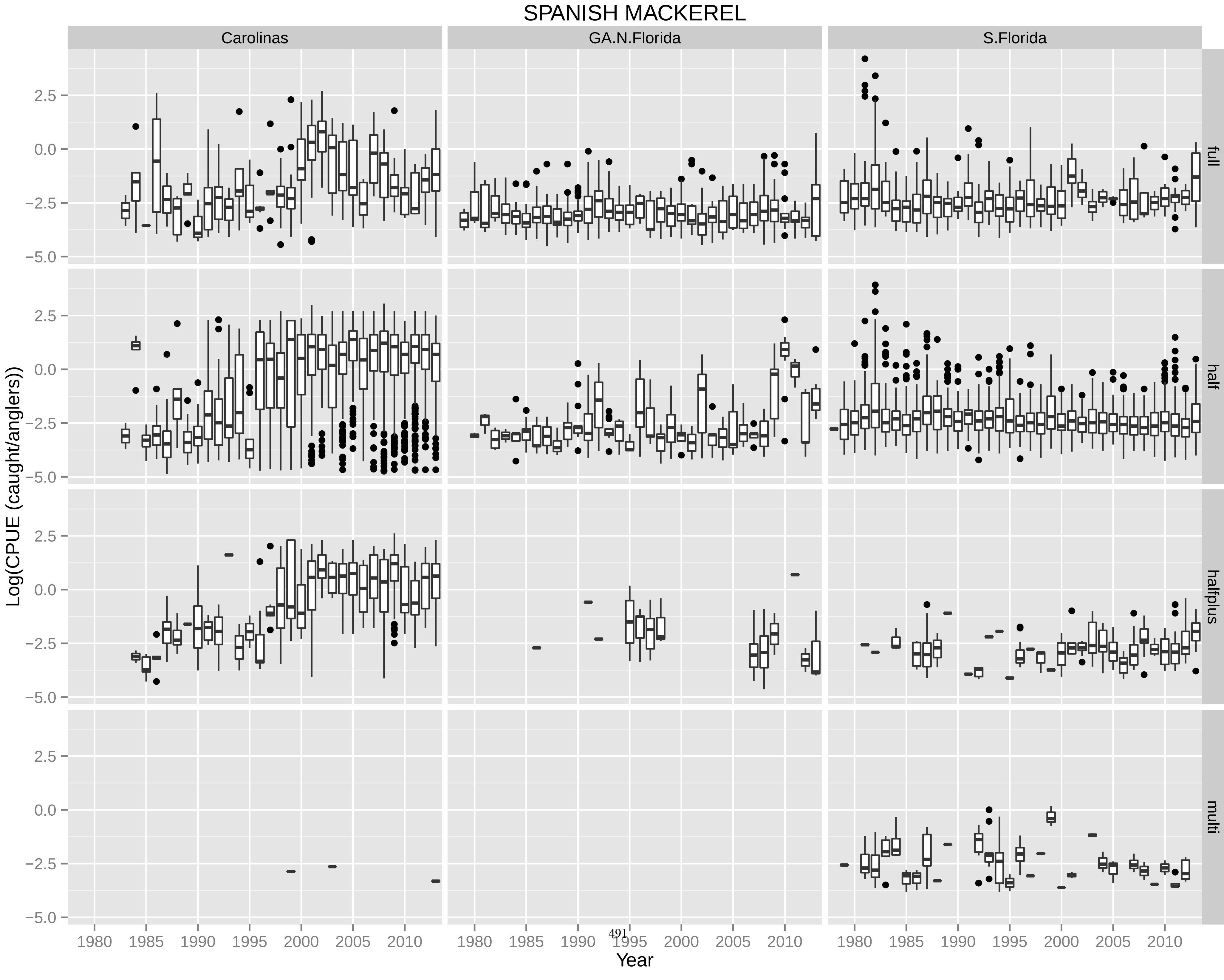

SPADEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0
5
10
15
1975
1980
1985
1990
1995
2000
2005
2010
Year

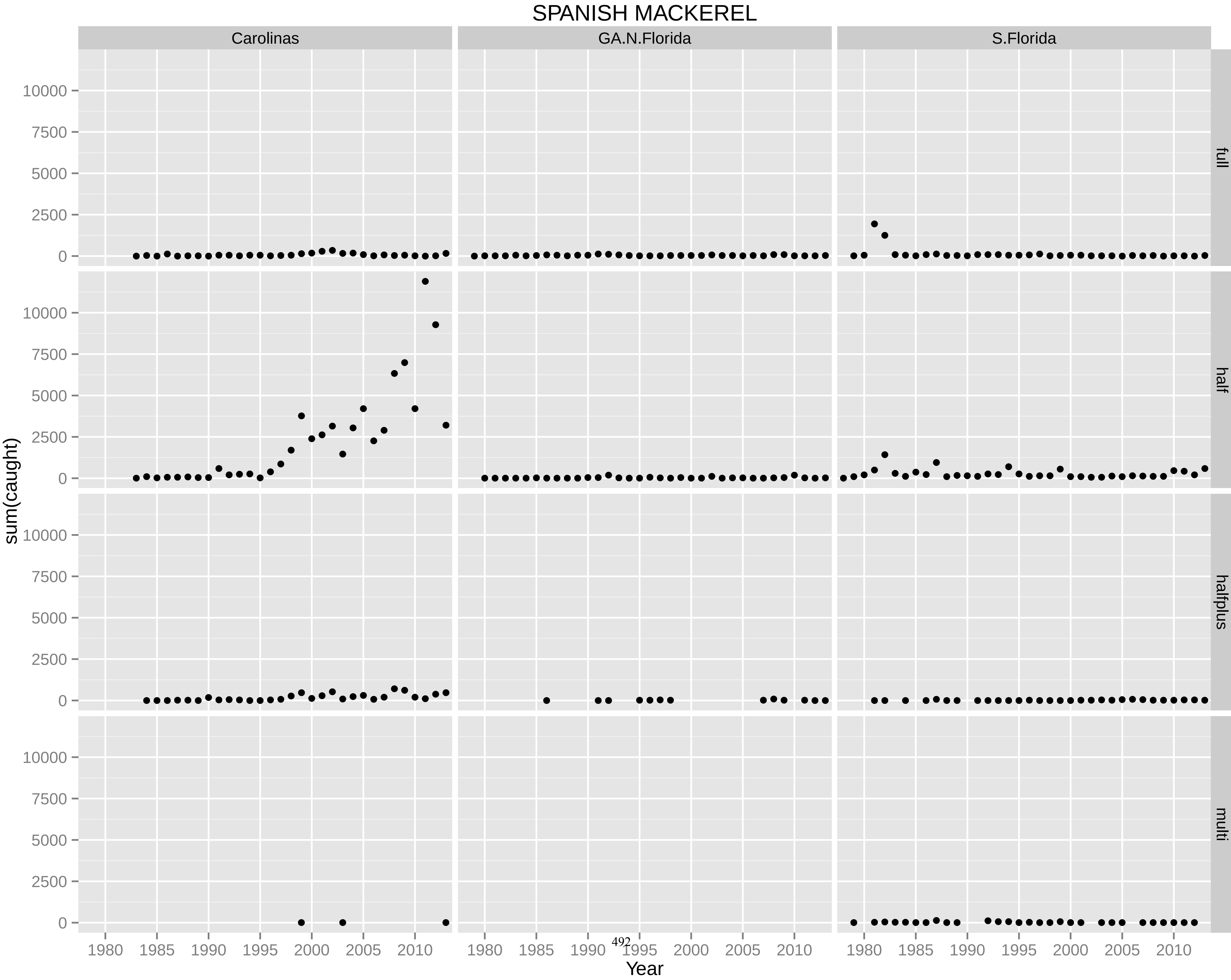

SPADEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
2.5
0.0
−2.5
−5.0
Log(CPUE (caught/anglers))
1975
1980
1985
1990
1995
2000
2005
2010
Year

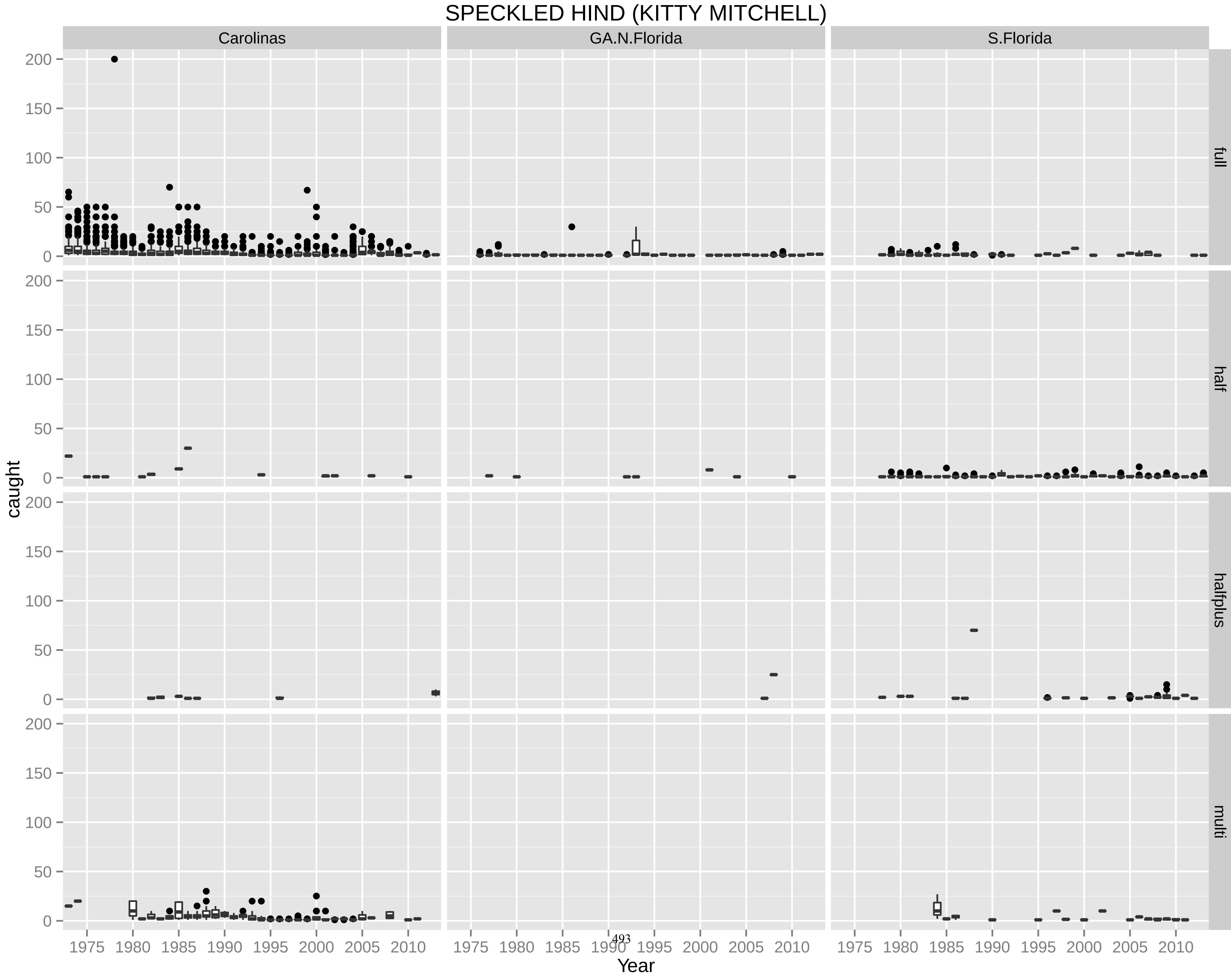

SPADEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
500
1000
1500
2000
2500
1975
1980
1985
1990
1995
2000
2005
2010


SPANISH MACKEREL
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
250
500
750
1000
1980
1985
1990
1995
2000
2005
2010

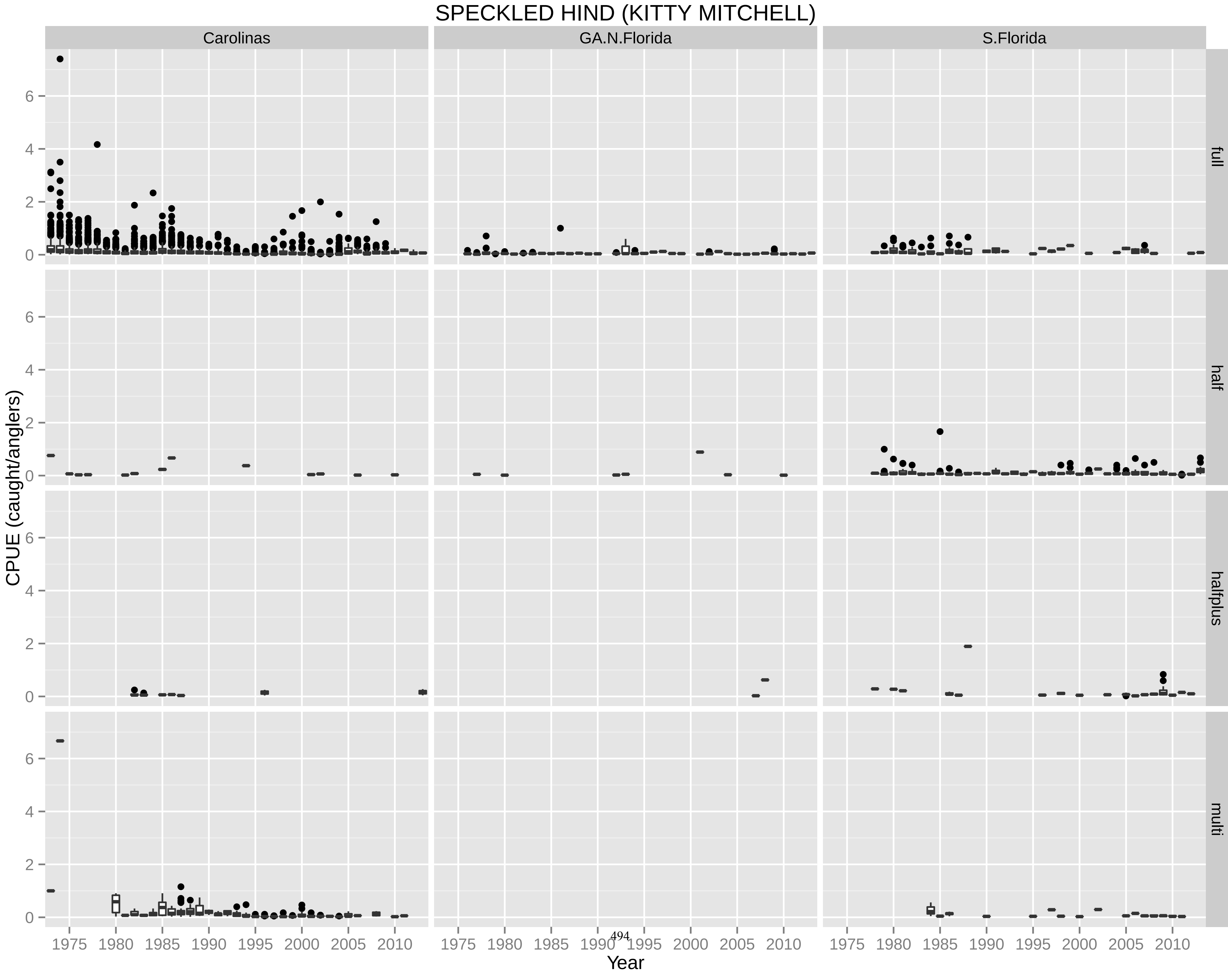

SPANISH MACKEREL
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
20
40
60
1980
1985
1990
1995
2000
2005
2010

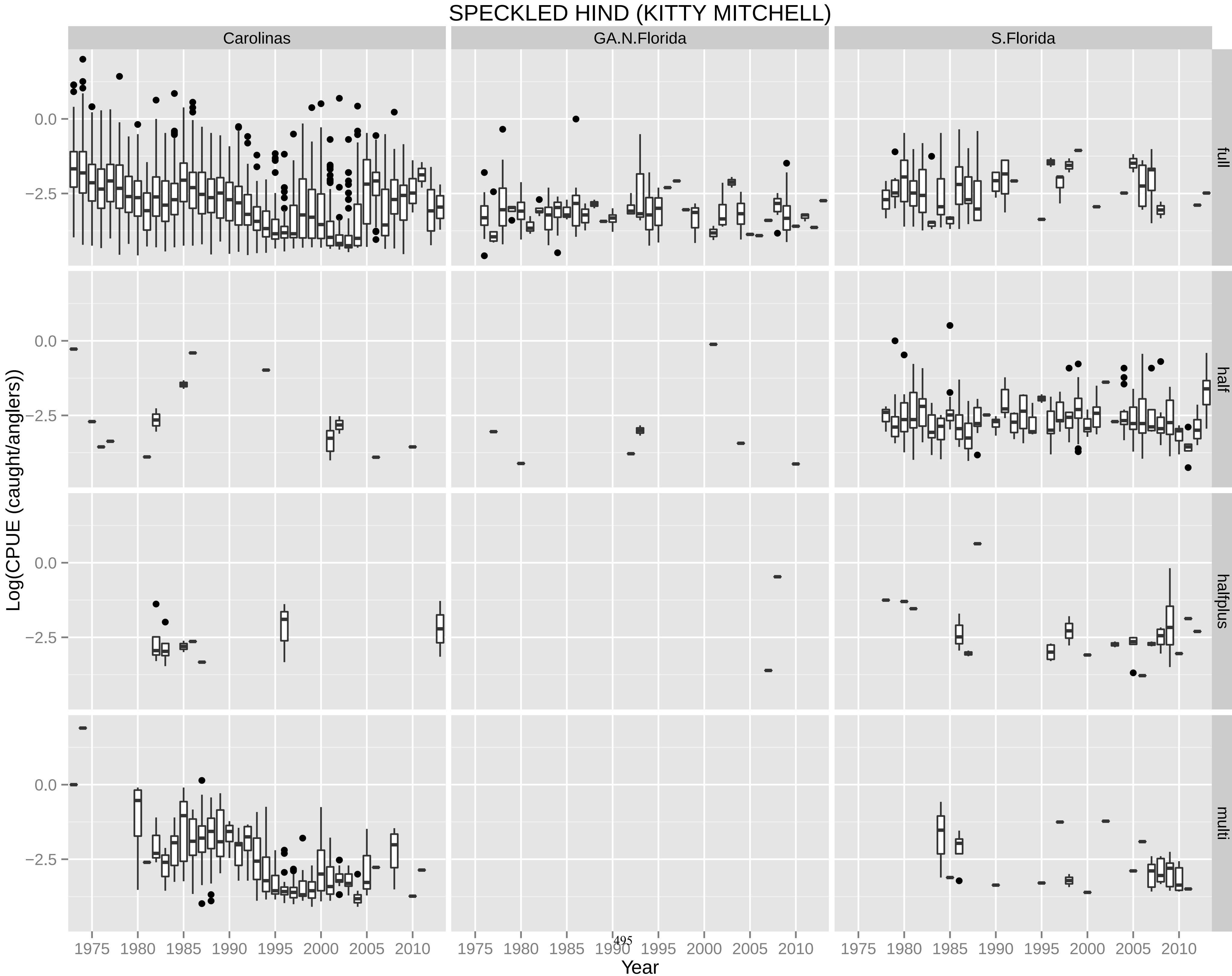

SPANISH MACKEREL
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1980
1985
1990
1995
2000
2005
2010

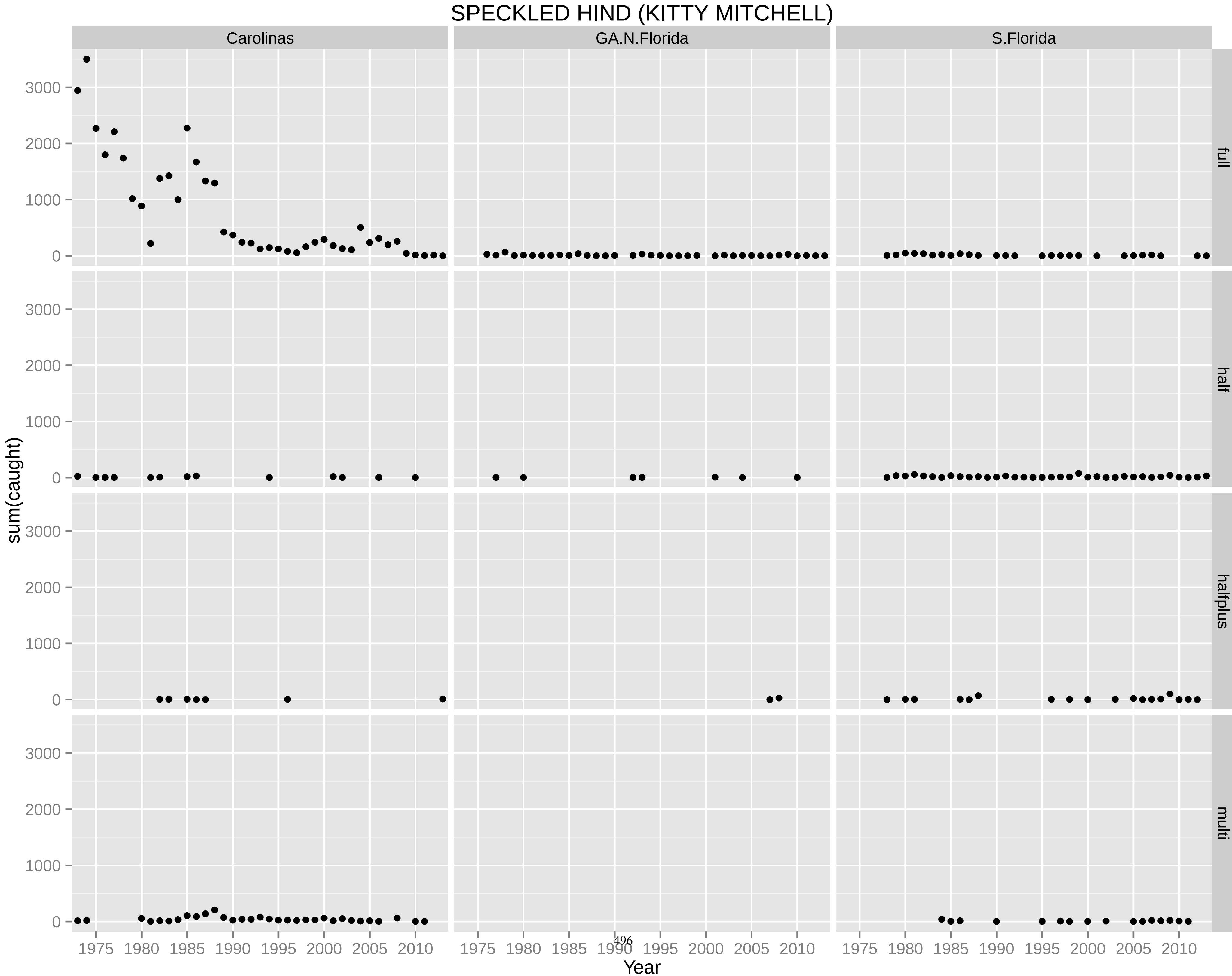

SPANISH MACKEREL
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
2500
5000
7500
10000
1980
1985
1990
1995
2000
2005
2010

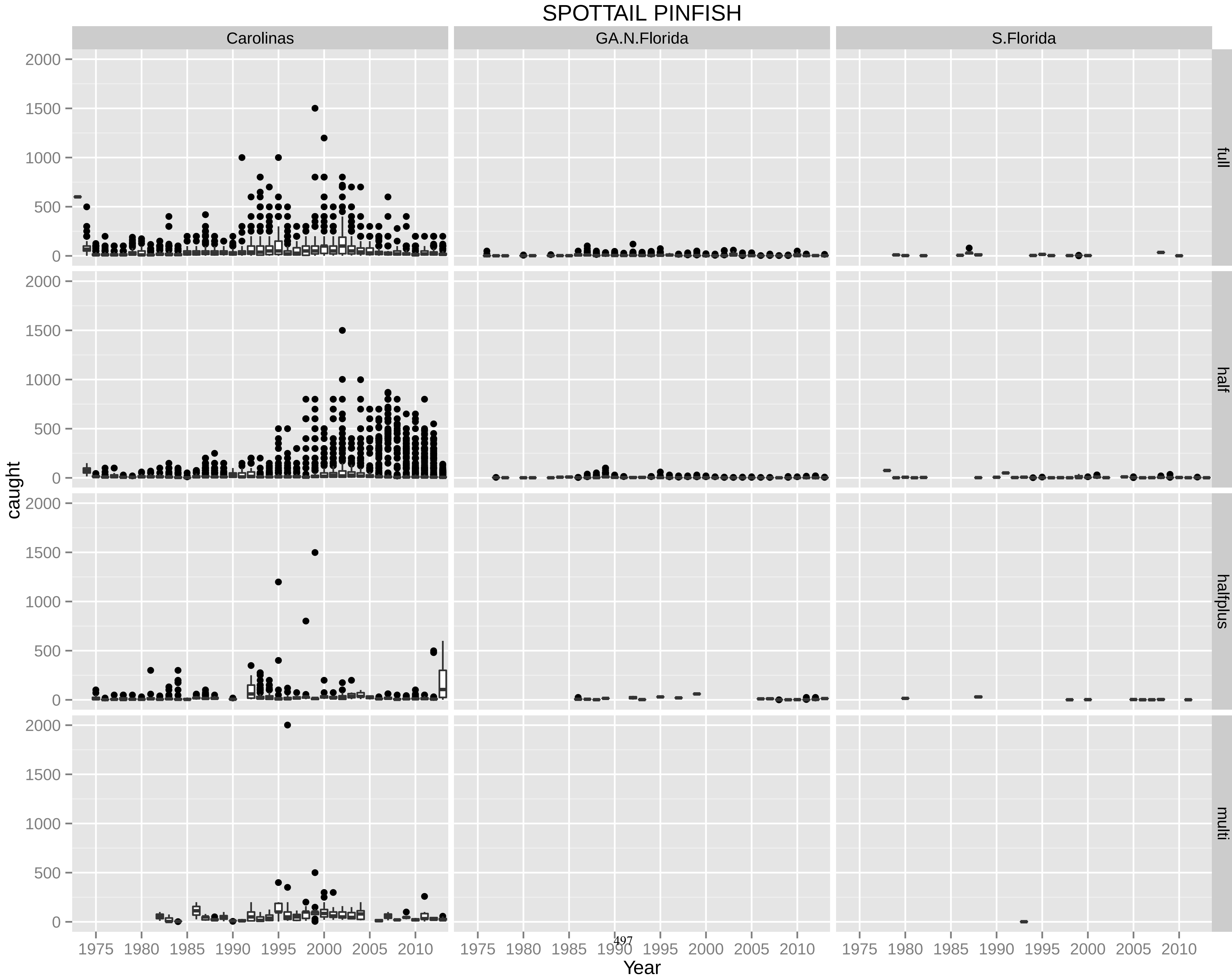


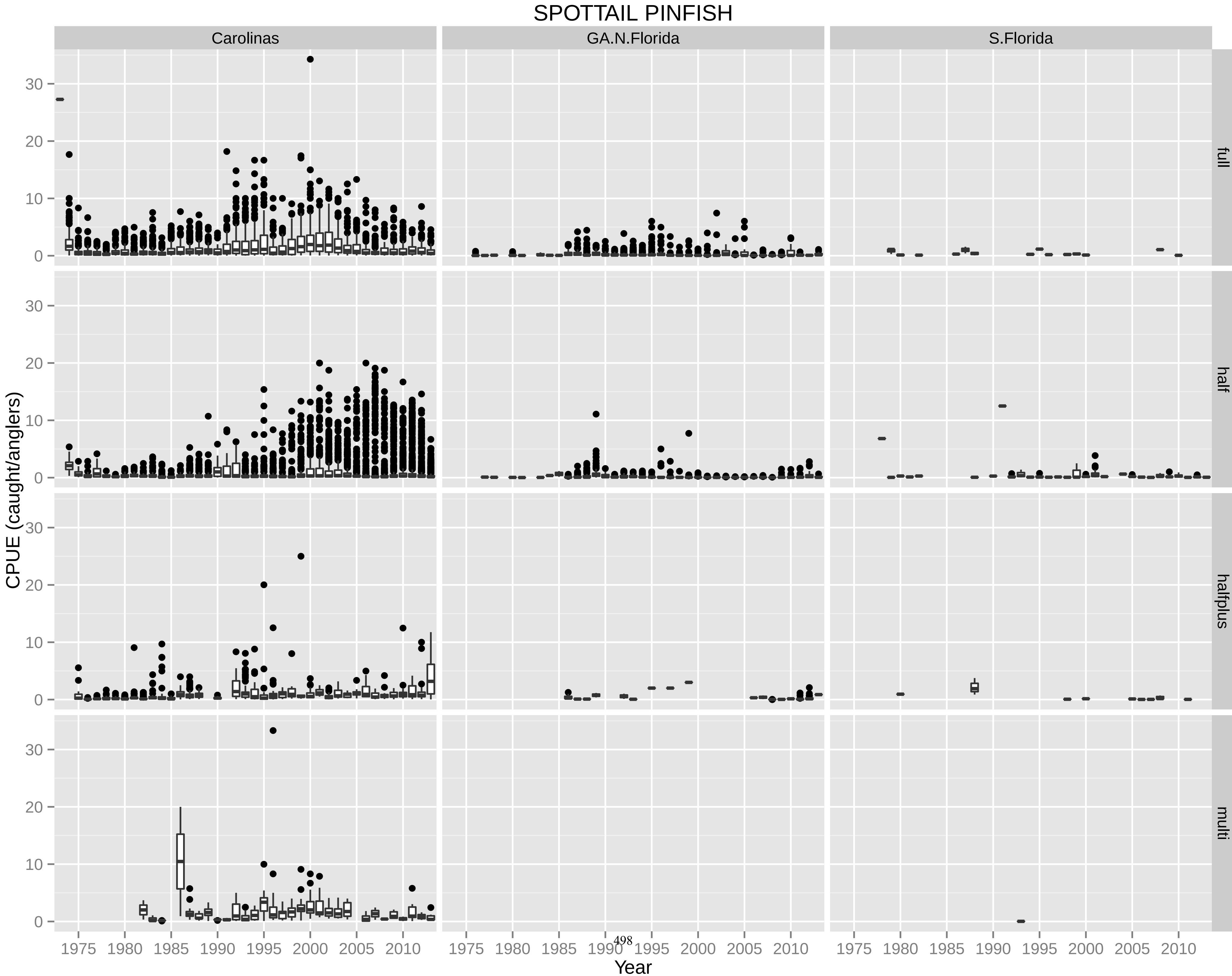
SPECKLED HIND (KITTY MITCHELL)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
50
100
150
200
1975
1980
1985
1990
1995
2000
2005
2010

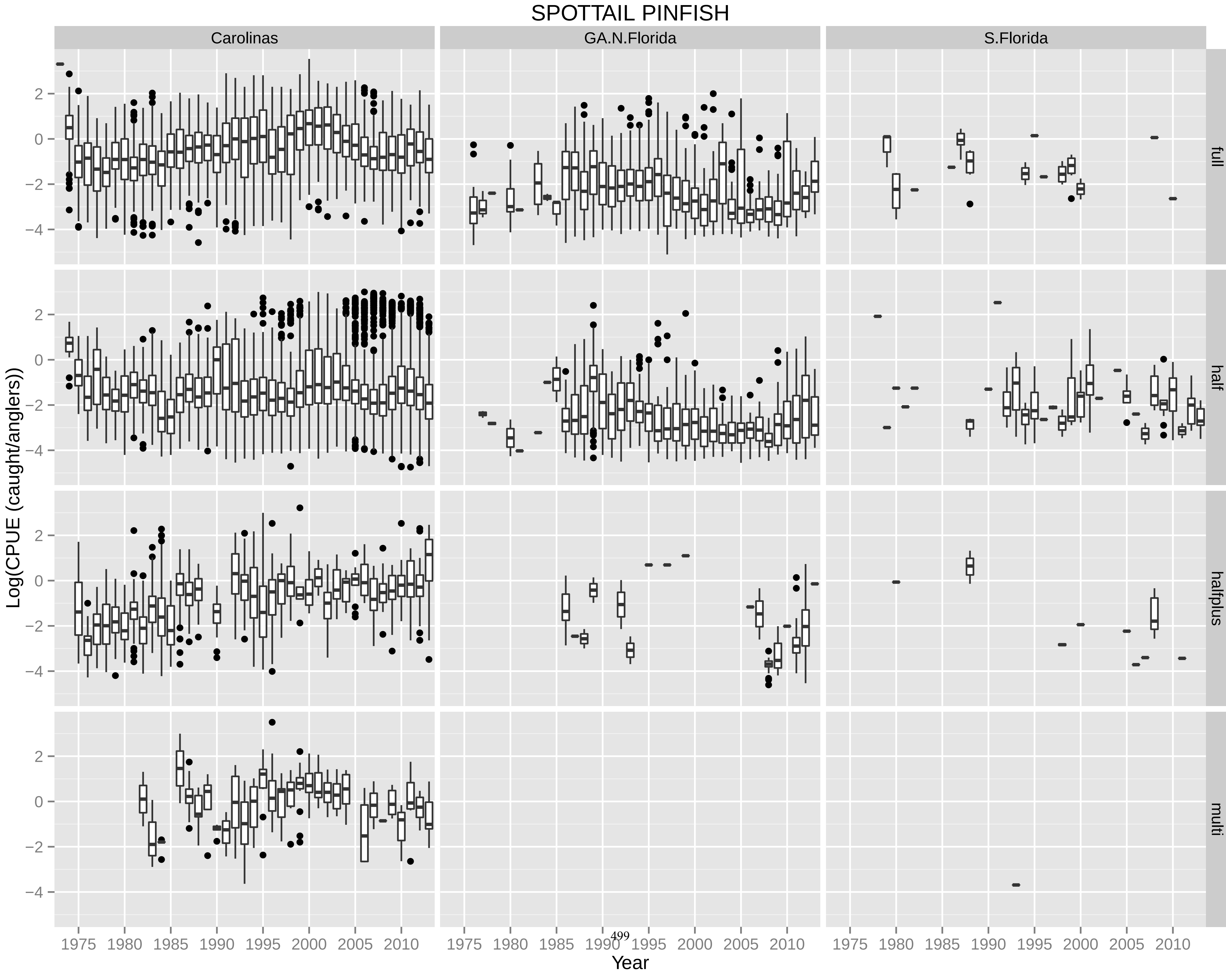

SPECKLED HIND (KITTY MITCHELL)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
2
4
6
1975
1980
1985
1990
1995
2000
2005
2010

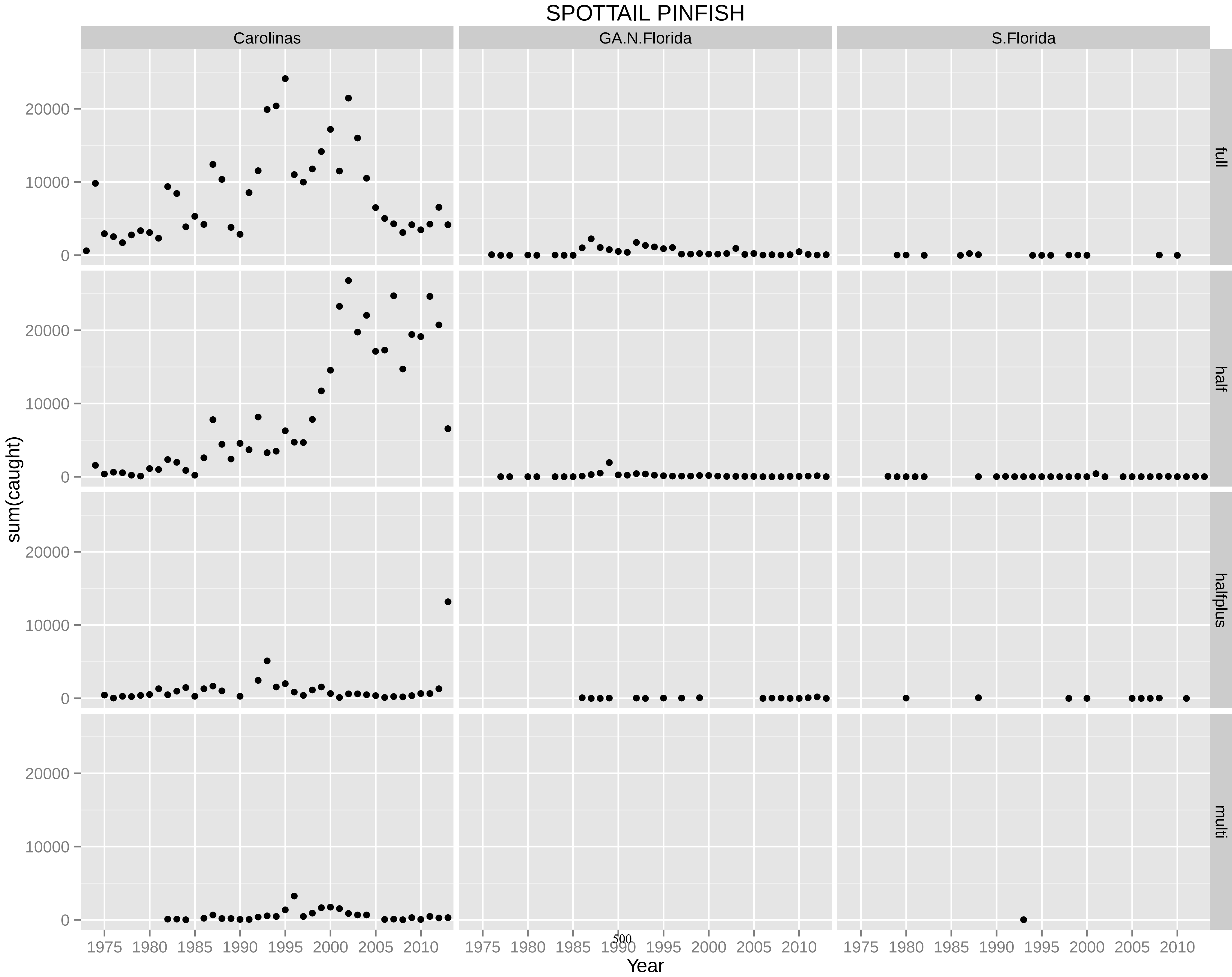

SPECKLED HIND (KITTY MITCHELL)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
0.0
−2.5
1975
1980
1985
1990
1995
2000
2005
2010
Year

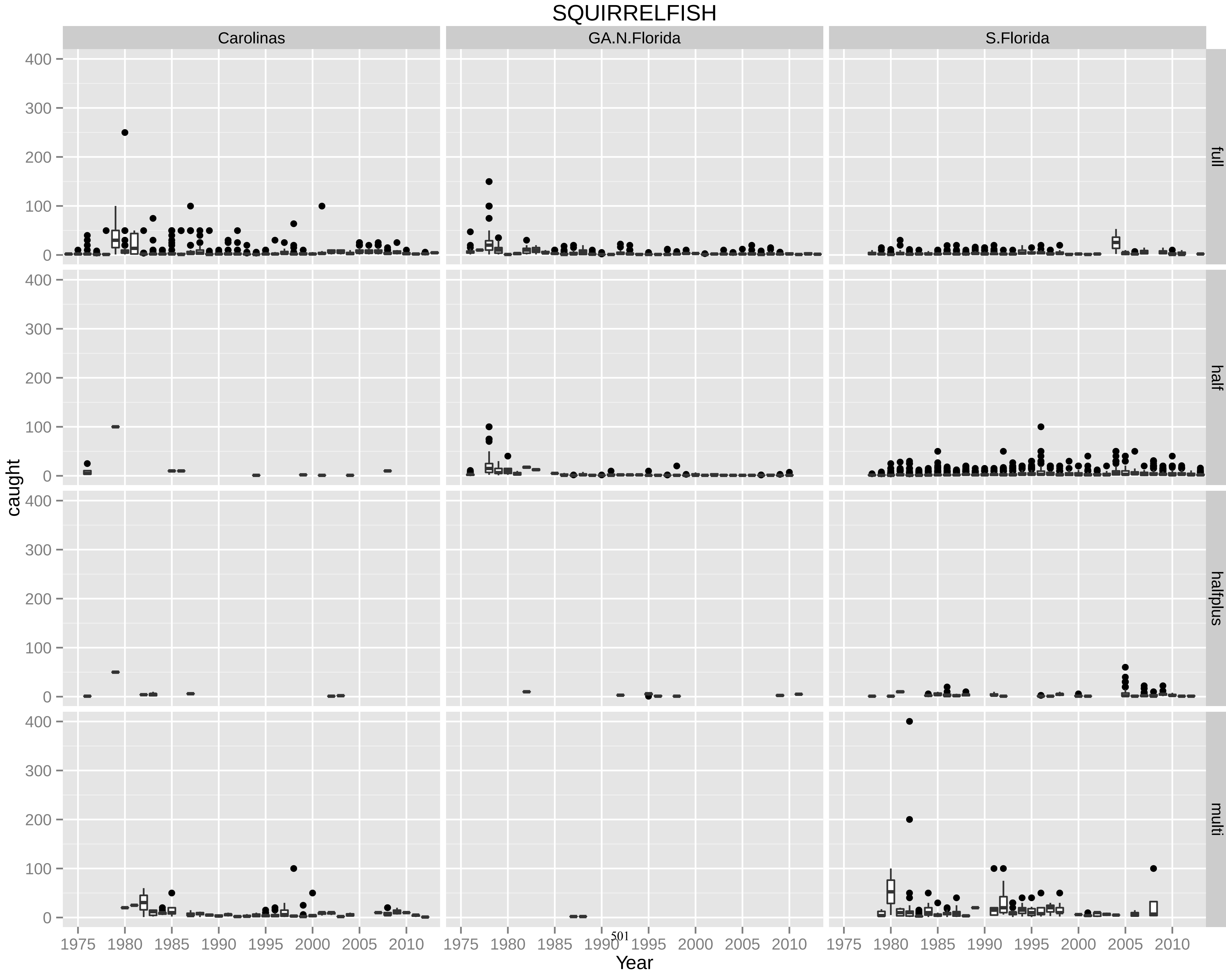

SPECKLED HIND (KITTY MITCHELL)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
1000
2000
3000
1975
1980
1985
1990
1995
2000
2005
2010

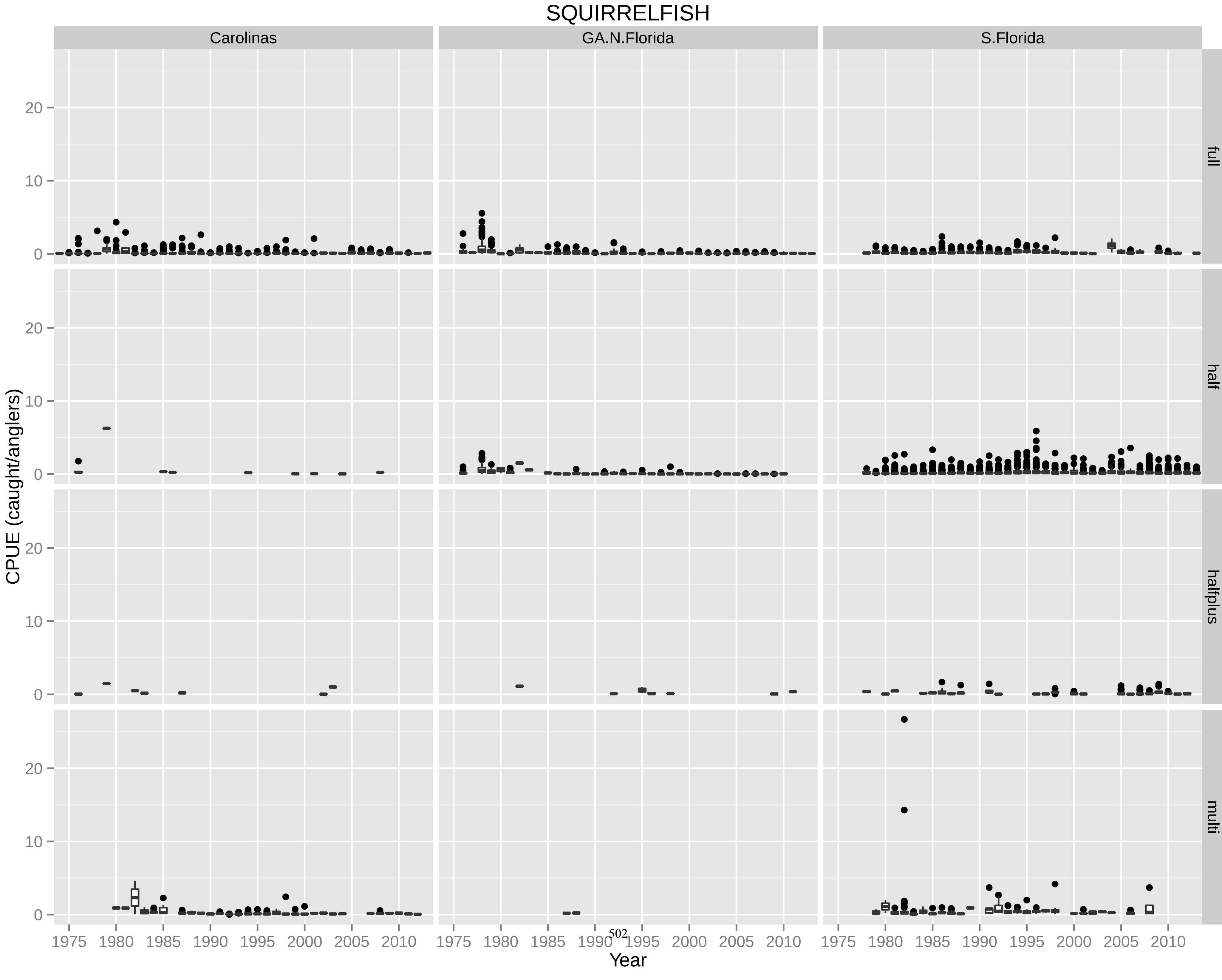

SPOTTAIL PINFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
500
1000
1500
2000
1975
1980
1985
1990
1995
2000
2005
2010

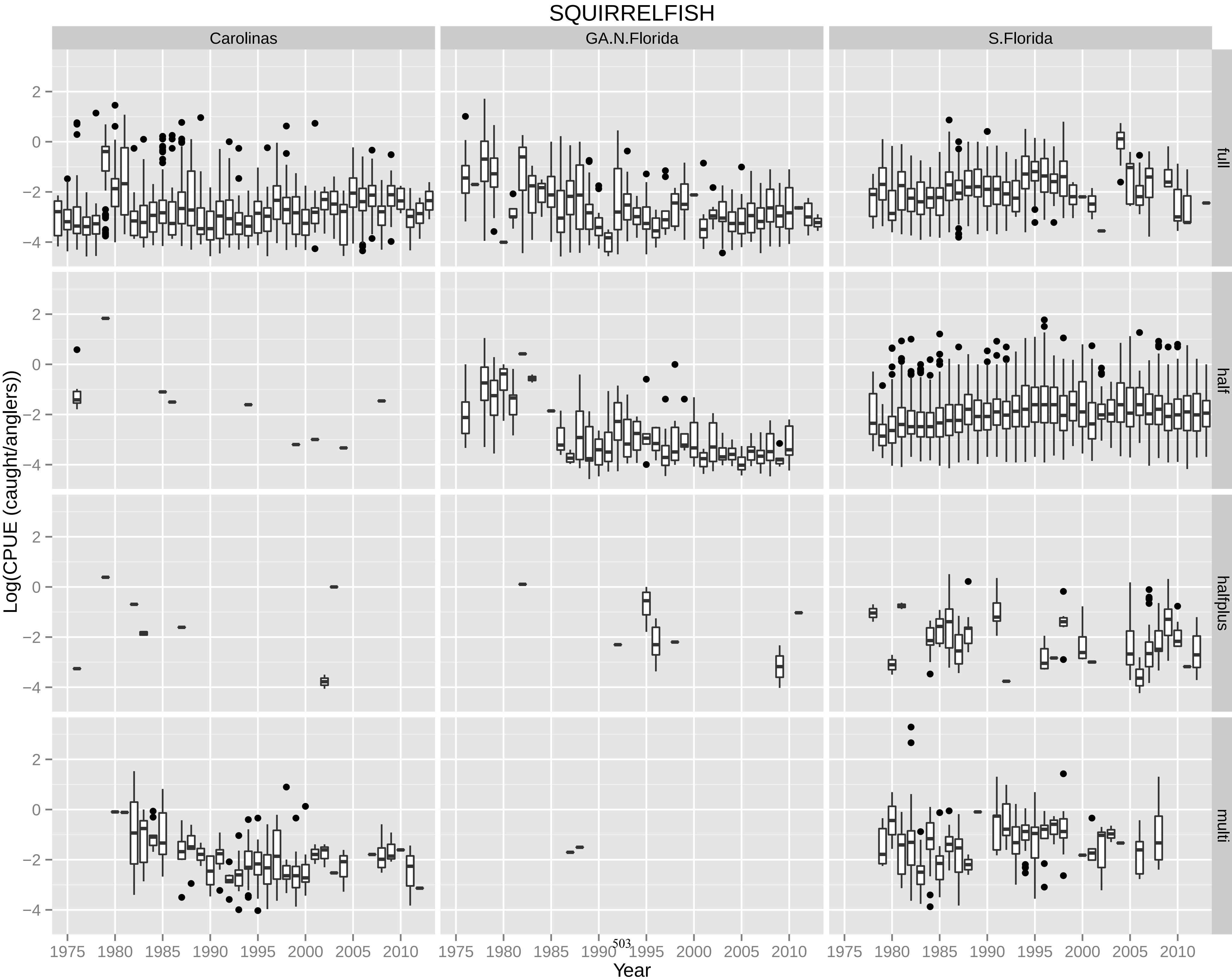

SPOTTAIL PINFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
10
20
30
1975
1980
1985
1990
1995
2000
2005
2010

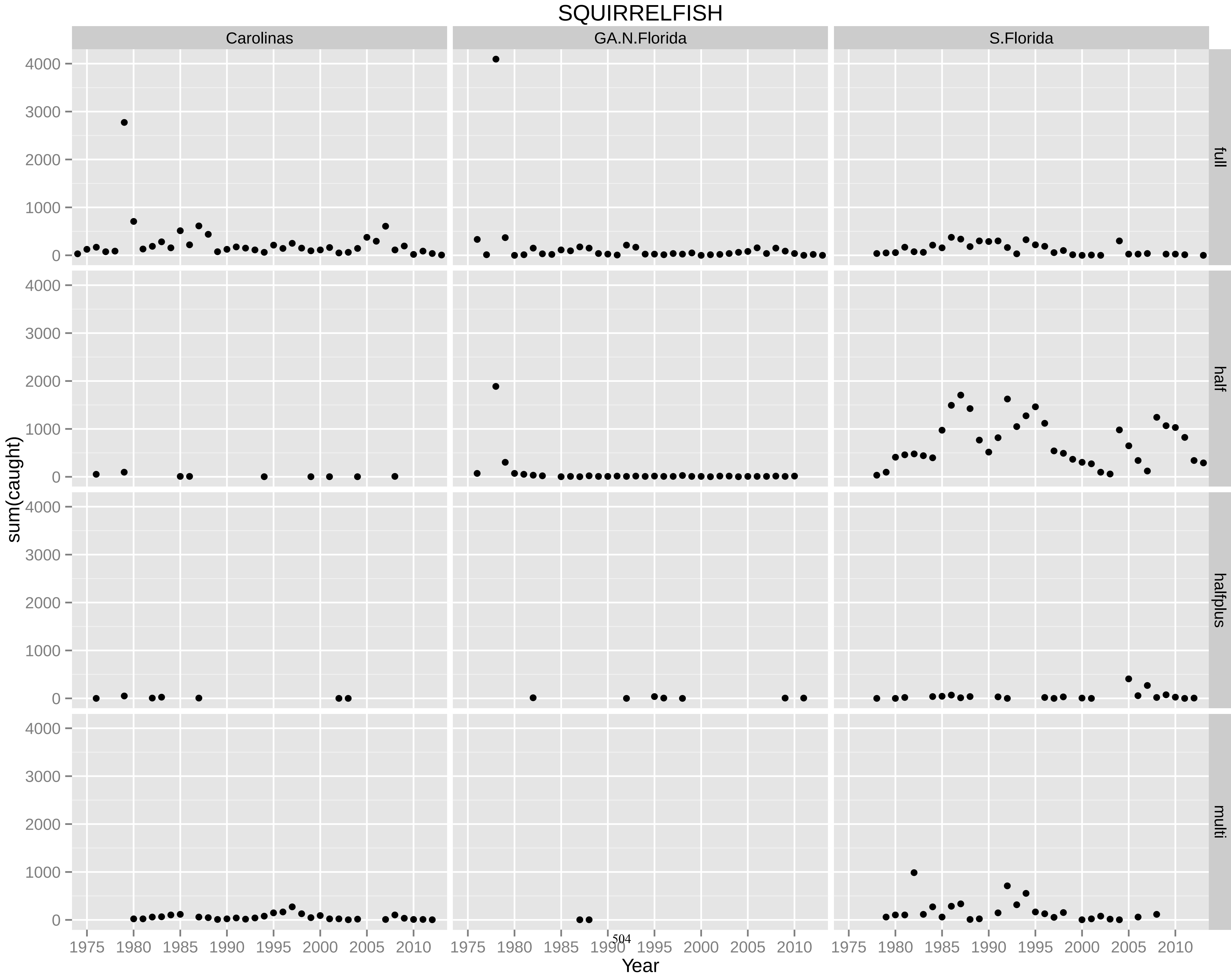

SPOTTAIL PINFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

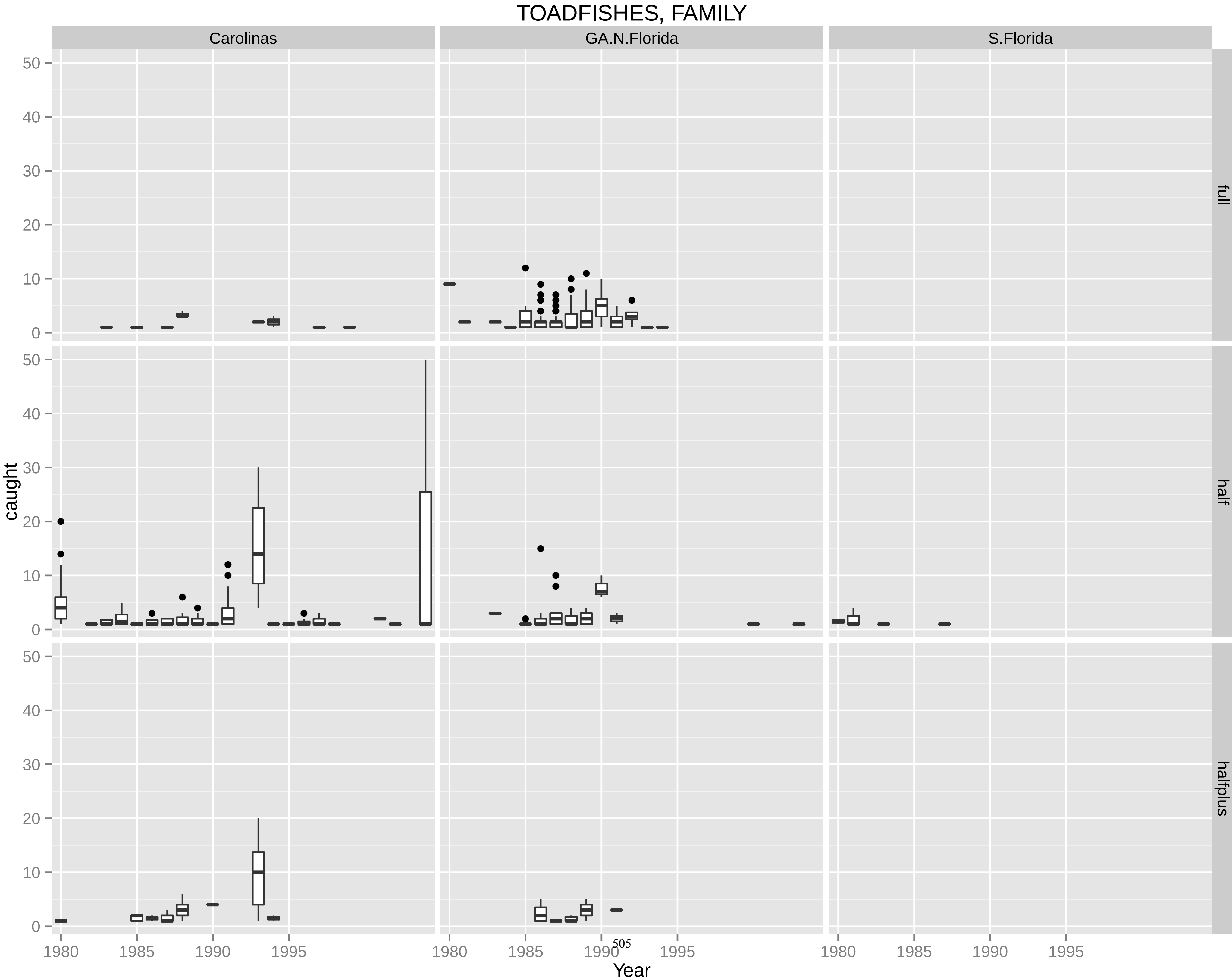

SPOTTAIL PINFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
10000
20000
1975
1980
1985
1990
1995
2000
2005
2010
Year

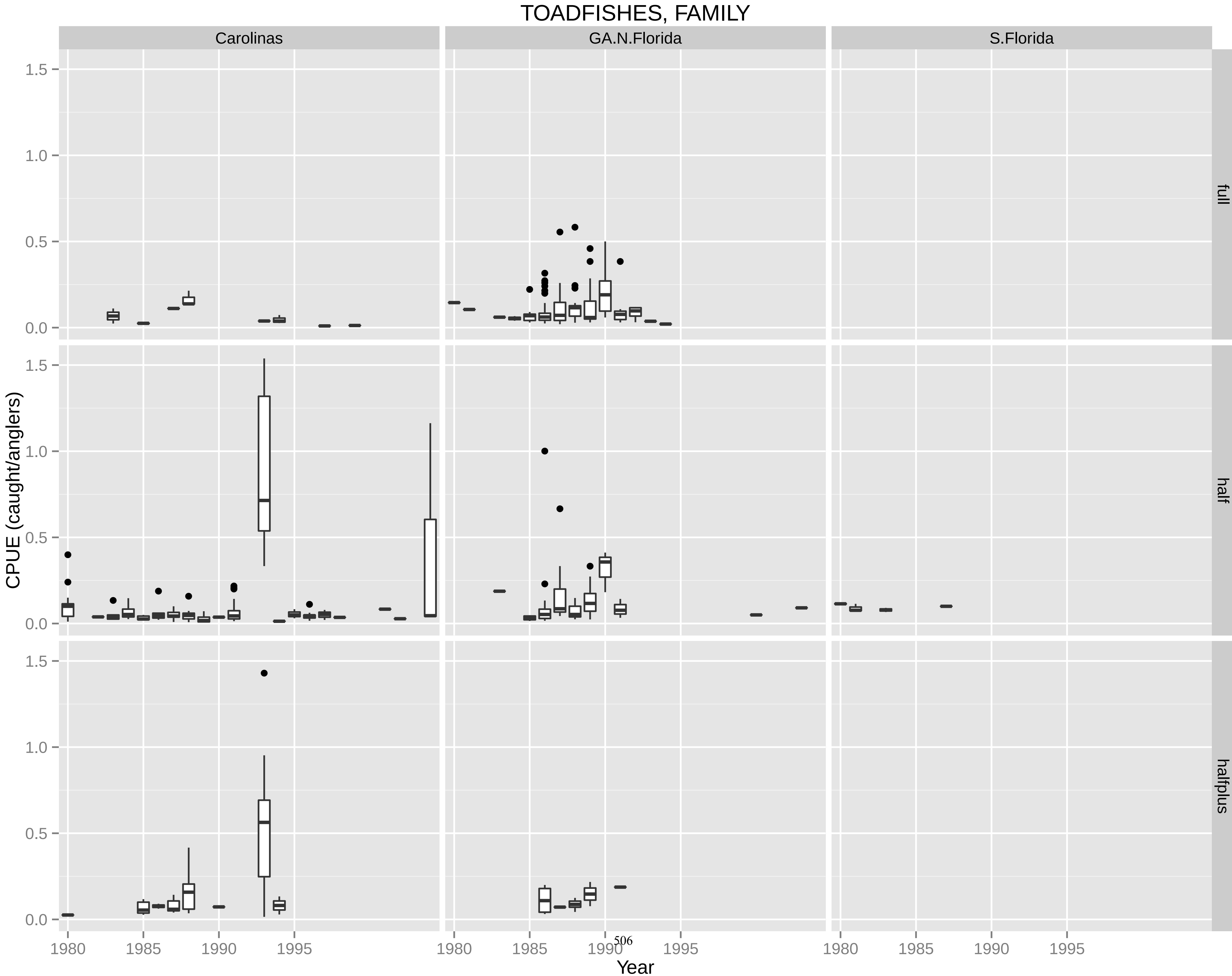

SQUIRRELFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
400
1975
1980
1985
1990
1995
2000
2005
2010

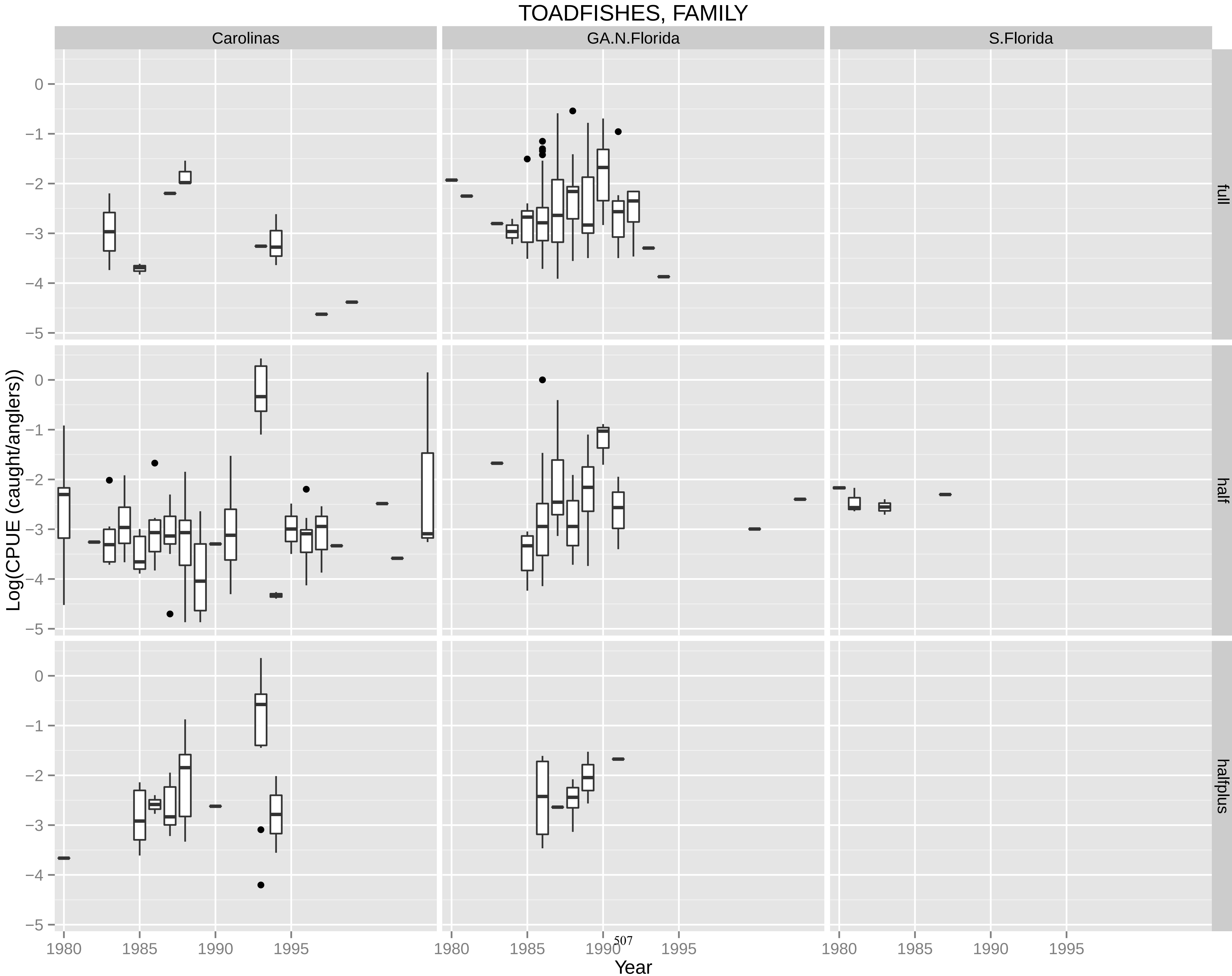

SQUIRRELFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0
10
20
1975
1980
1985
1990
1995
2000
2005
2010
Year

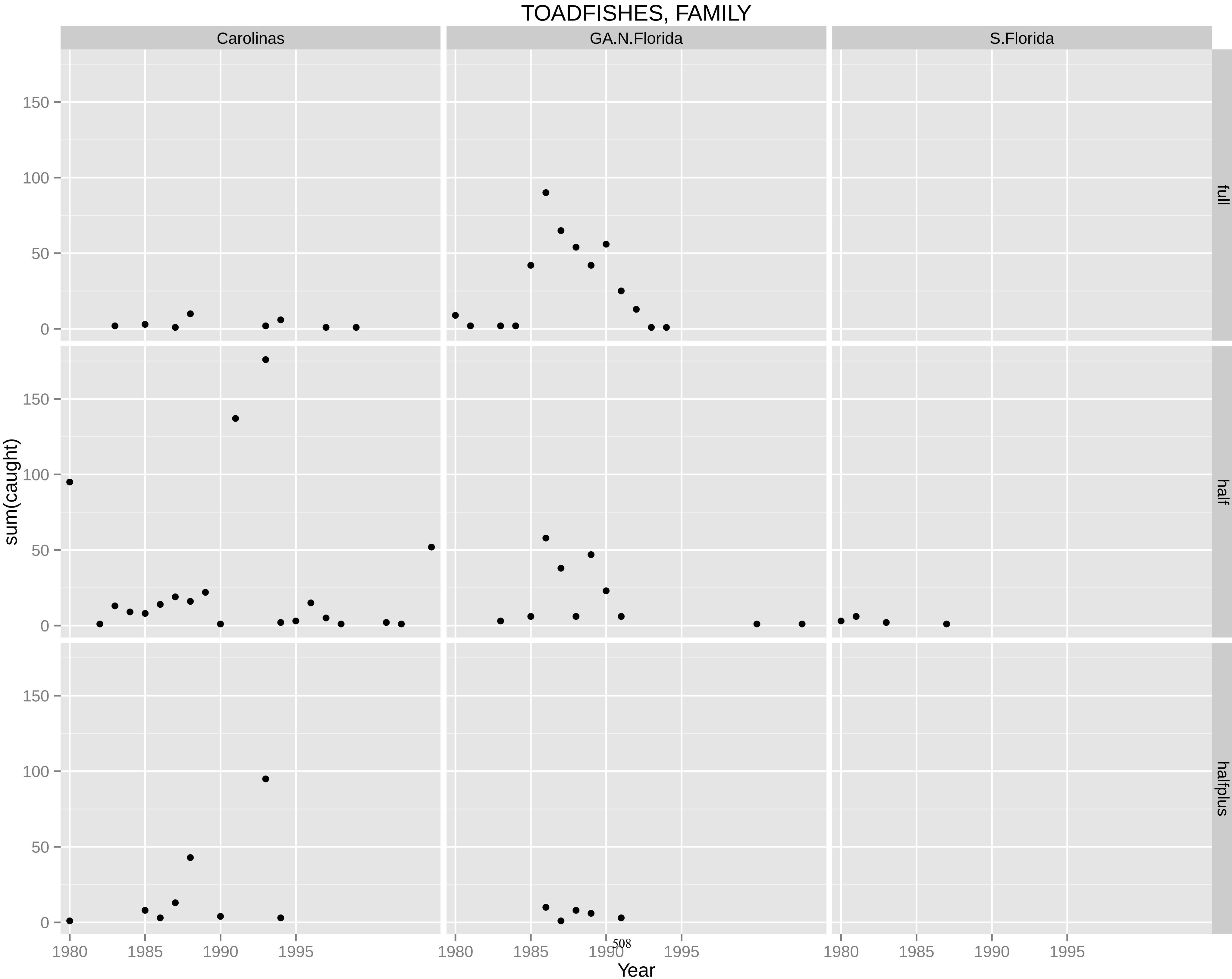

SQUIRRELFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

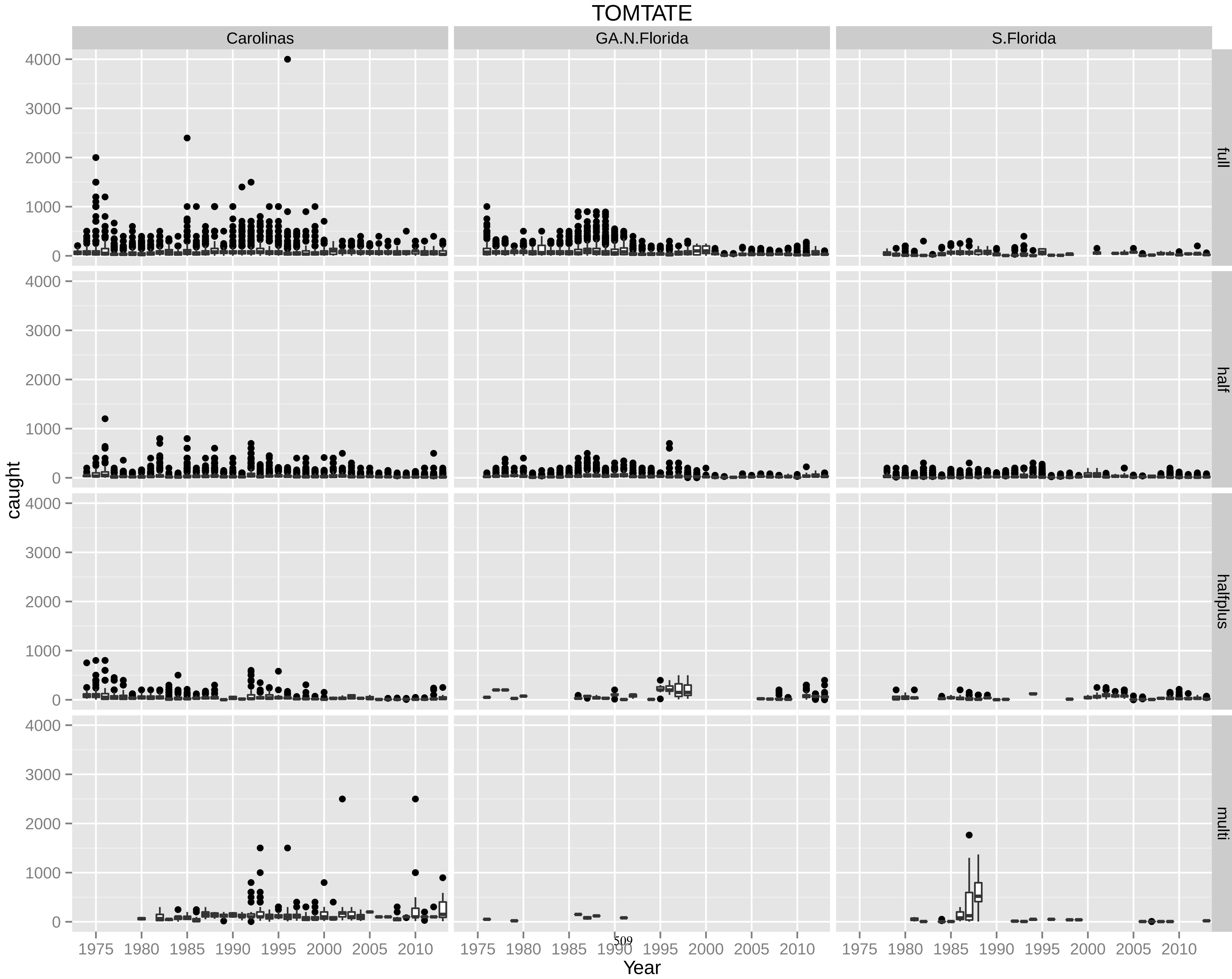

SQUIRRELFISH
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
1000
2000
3000
4000
1975
1980
1985
1990
1995
2000
2005
2010

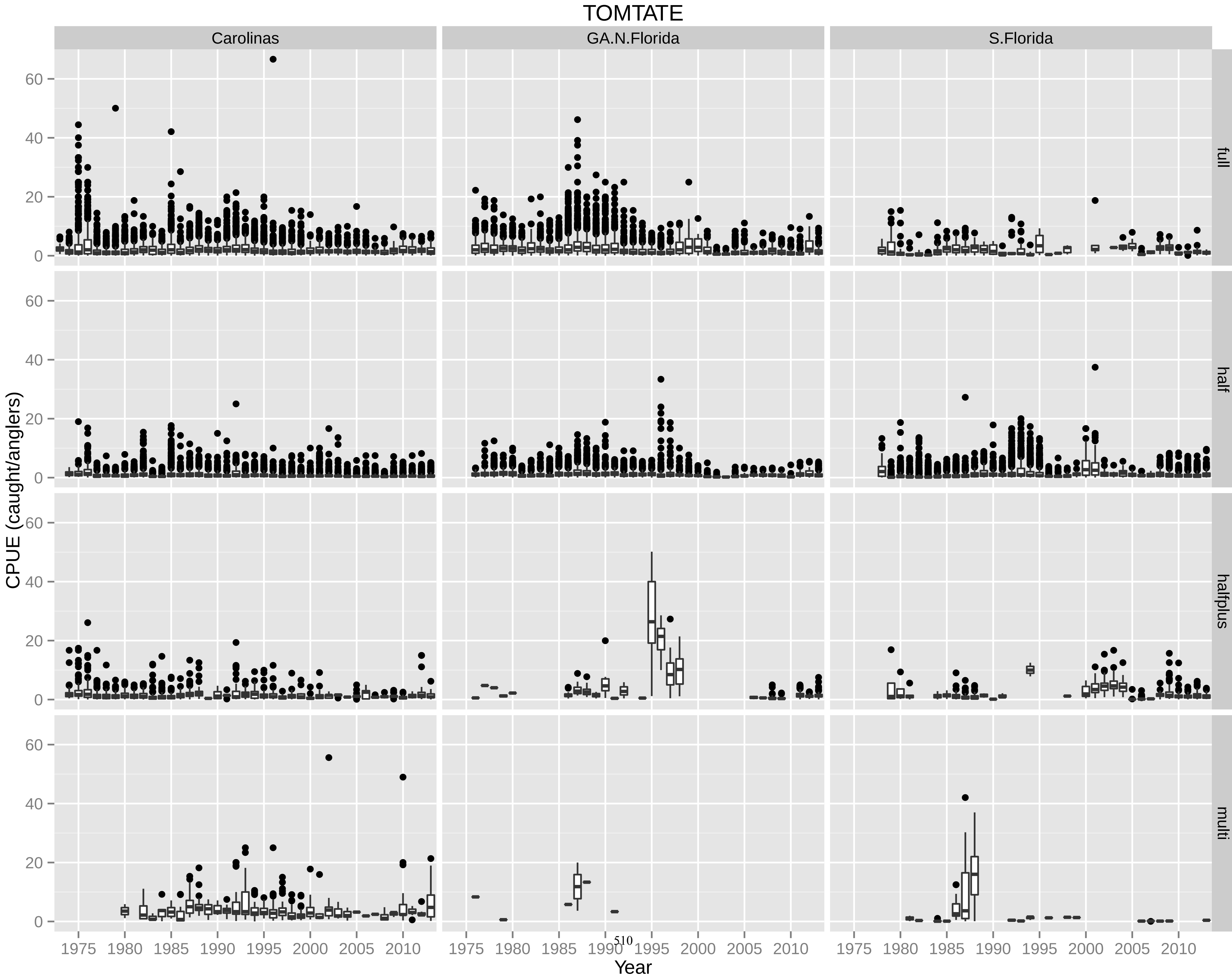

TOADFISHES, FAMILY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
caught
Year
0
10
20
30
40
50
1980
1985
1990
1995


TOADFISHES, FAMILY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
CPUE (caught/anglers)
Year
0.0
0.5
1.0
1.5
1980
1985
1990
1995

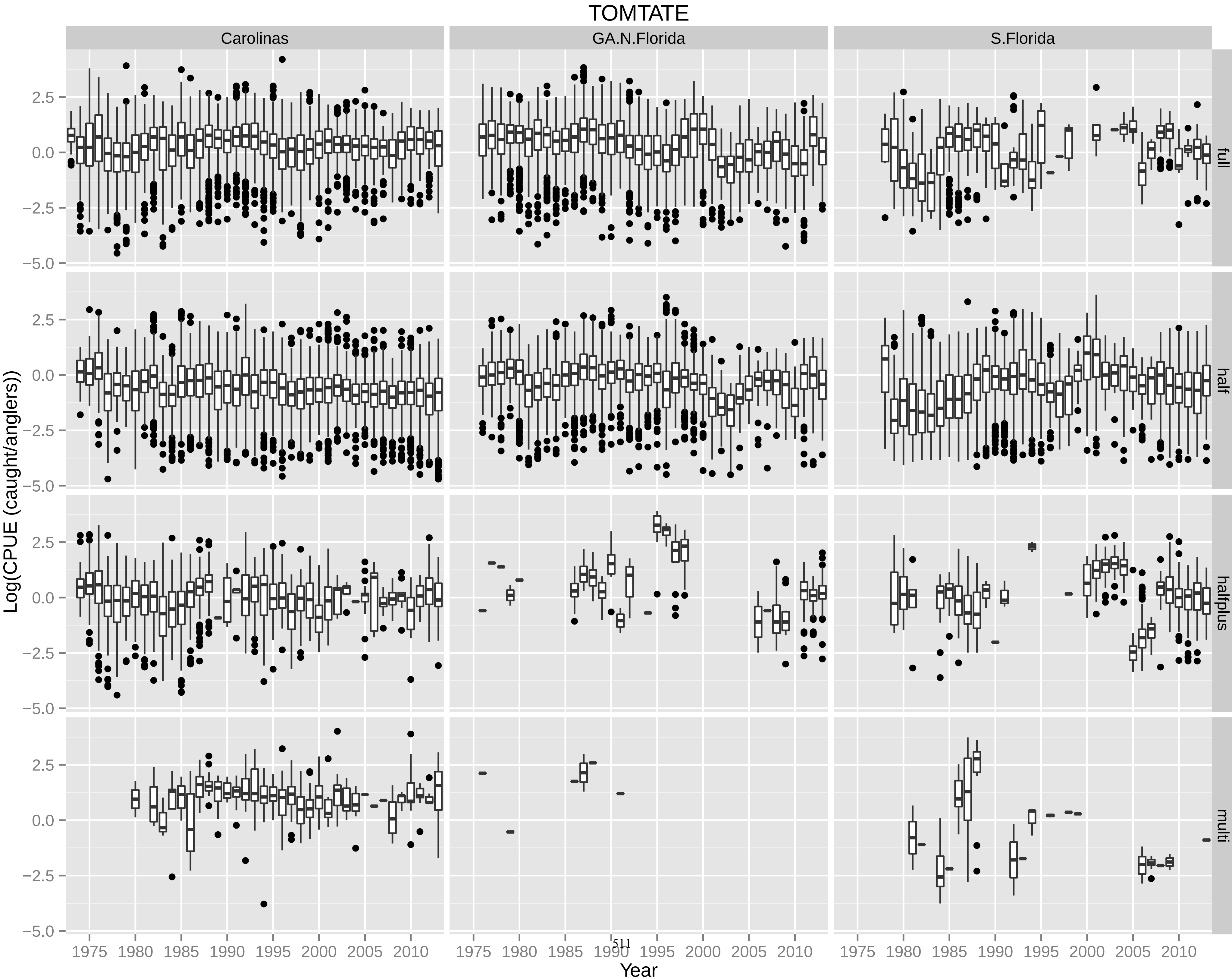

TOADFISHES, FAMILY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
Log(CPUE (caught/anglers))
0
−1
−2
−3
−4
−5
1980
1985
1990
1995
Year


TOADFISHES, FAMILY
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
sum(caught)
Year
0
50
100
150
1980
1985
1990
1995

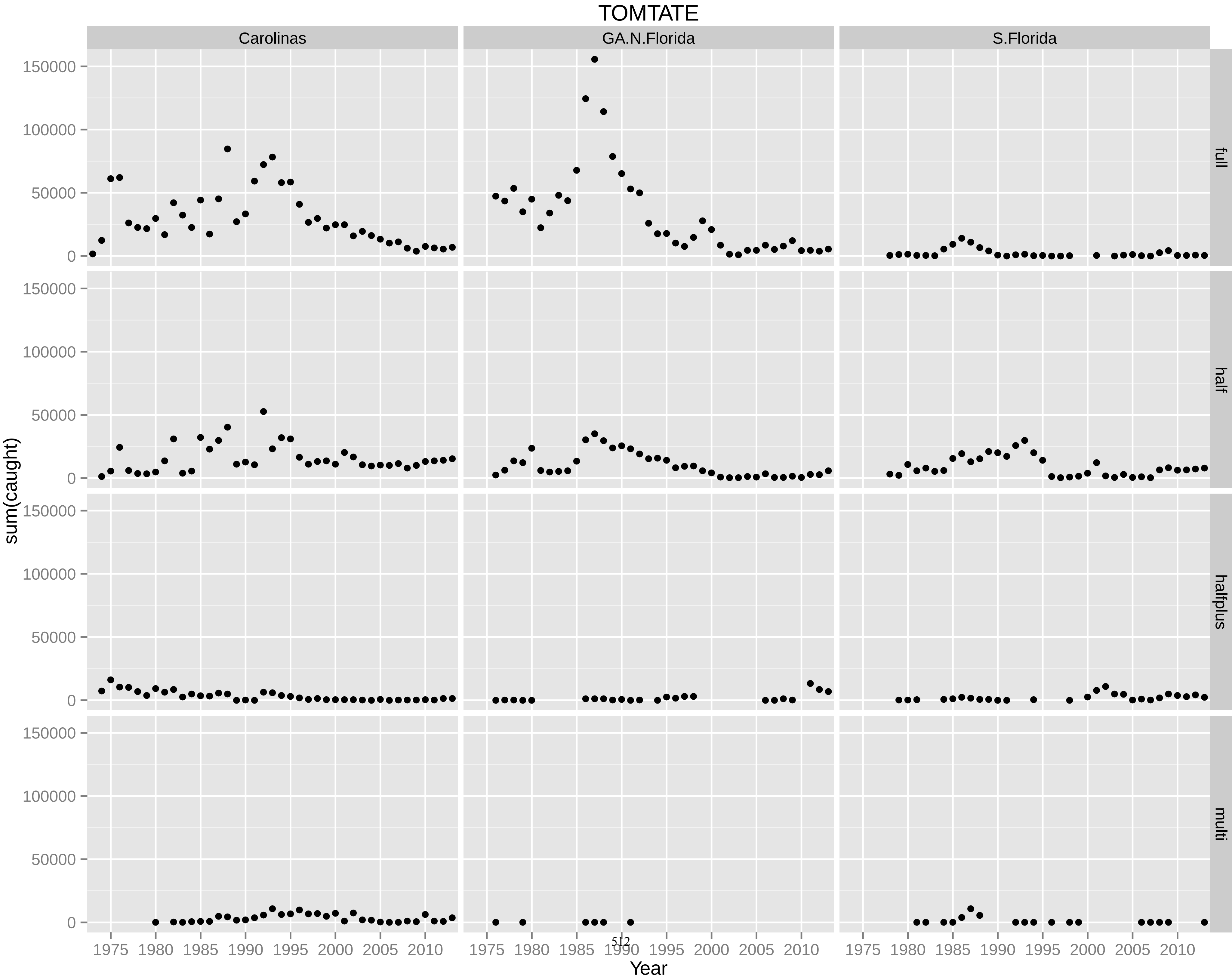

TOMTATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
1000
2000
3000
4000
1975
1980
1985
1990
1995
2000
2005
2010

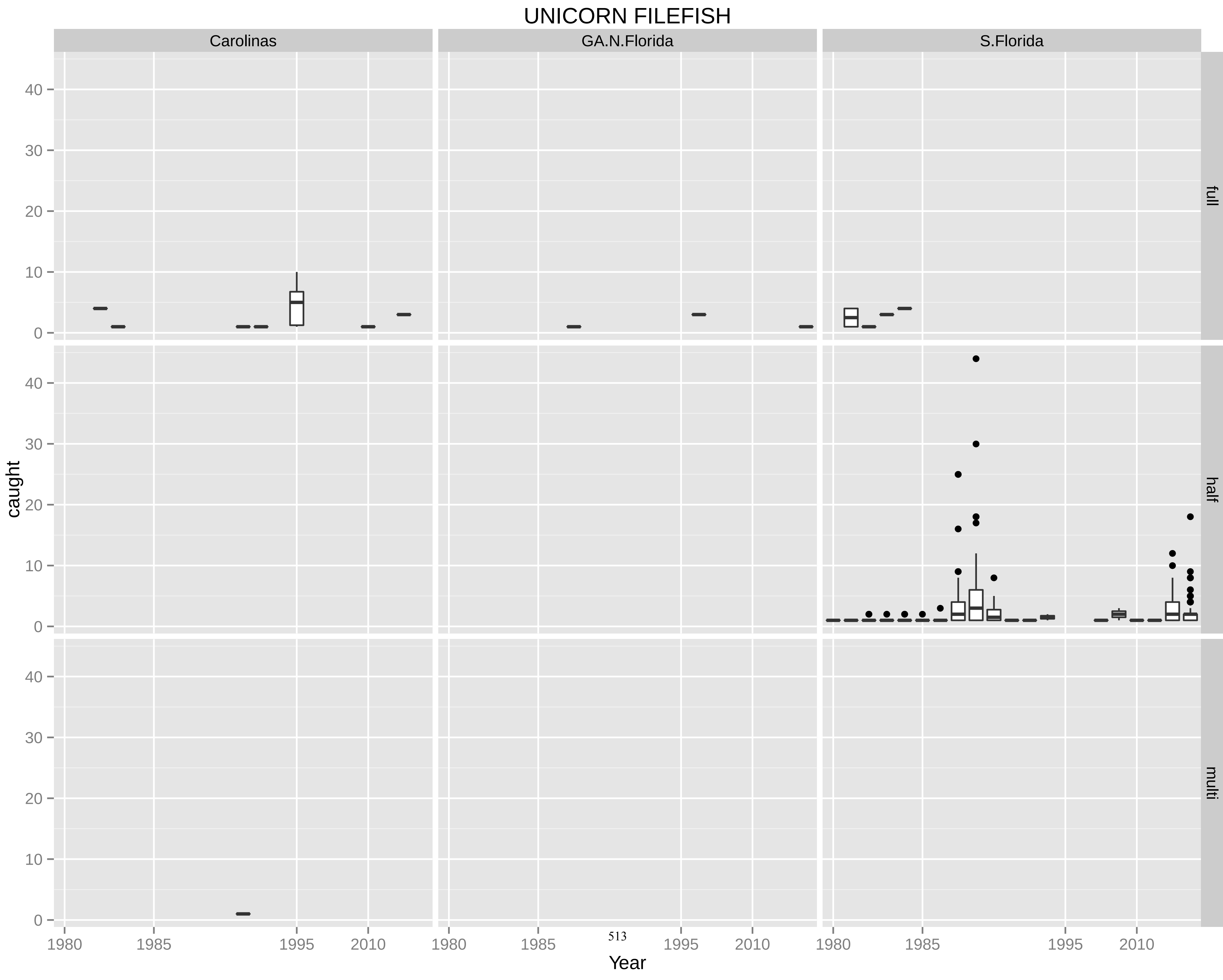


TOMTATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
20
40
60
1975
1980
1985
1990
1995
2000
2005
2010

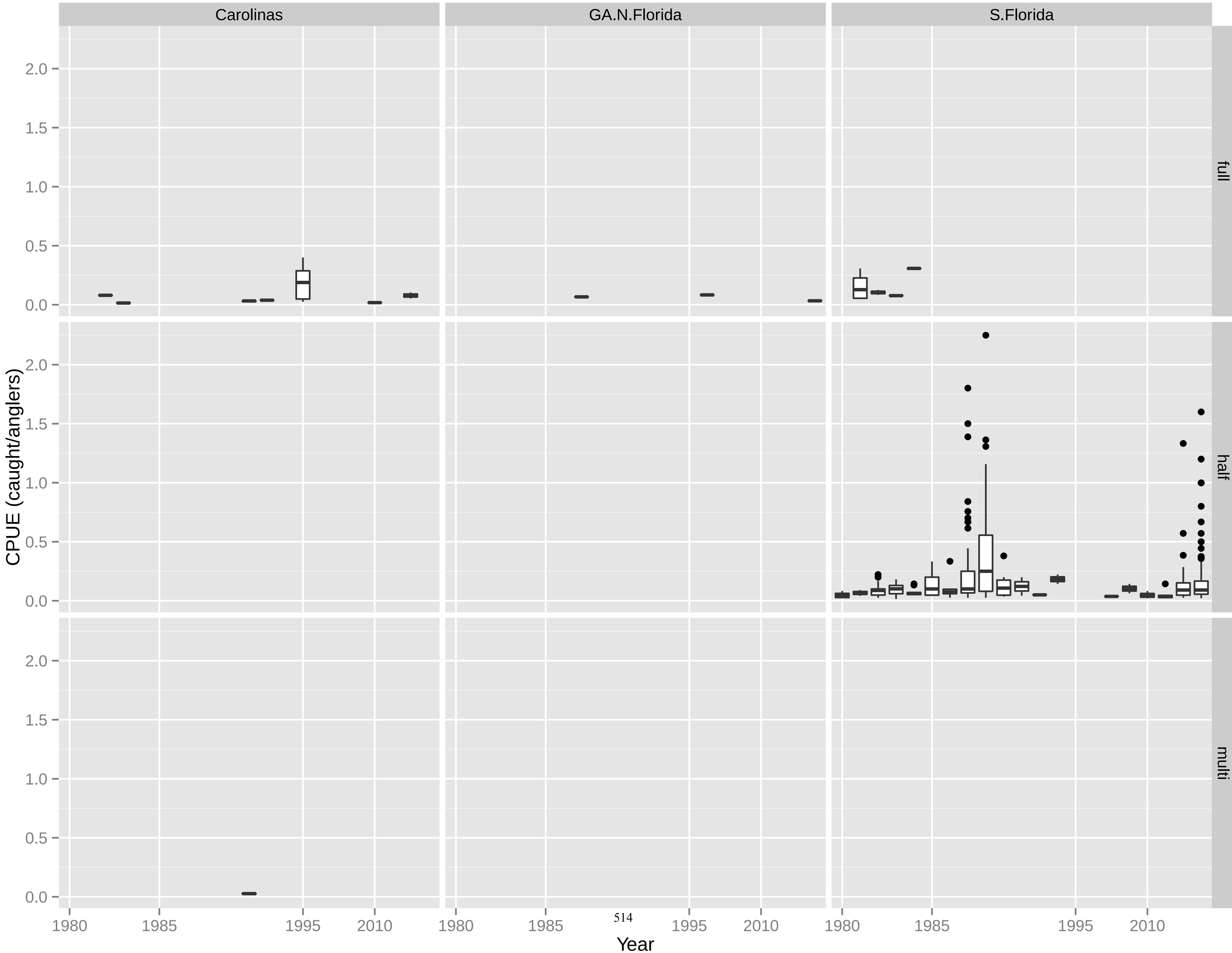


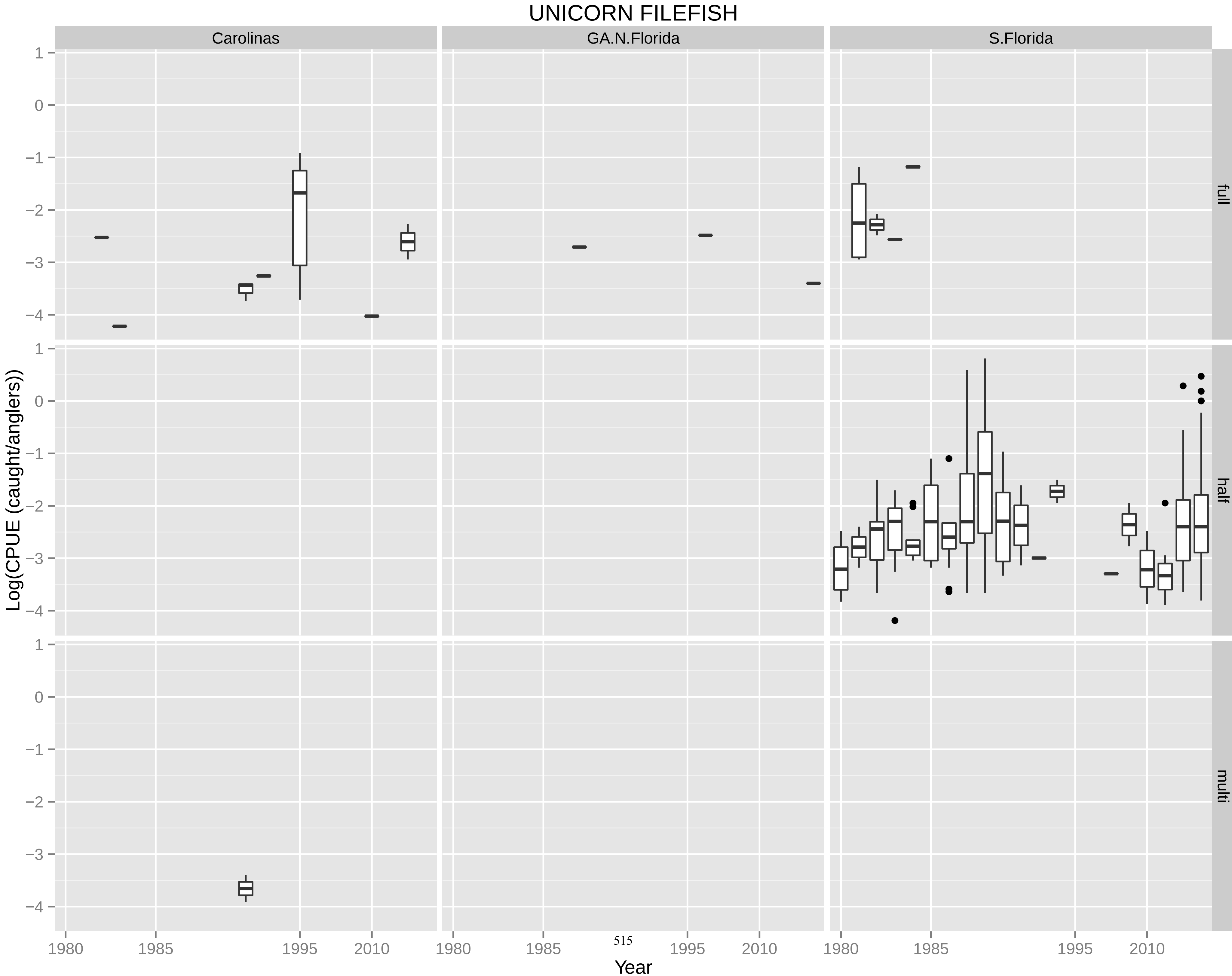
TOMTATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010


TOMTATE
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
150000
100000
50000
0
1975
1980
1985
1990
1995
2000
2005
2010
Year

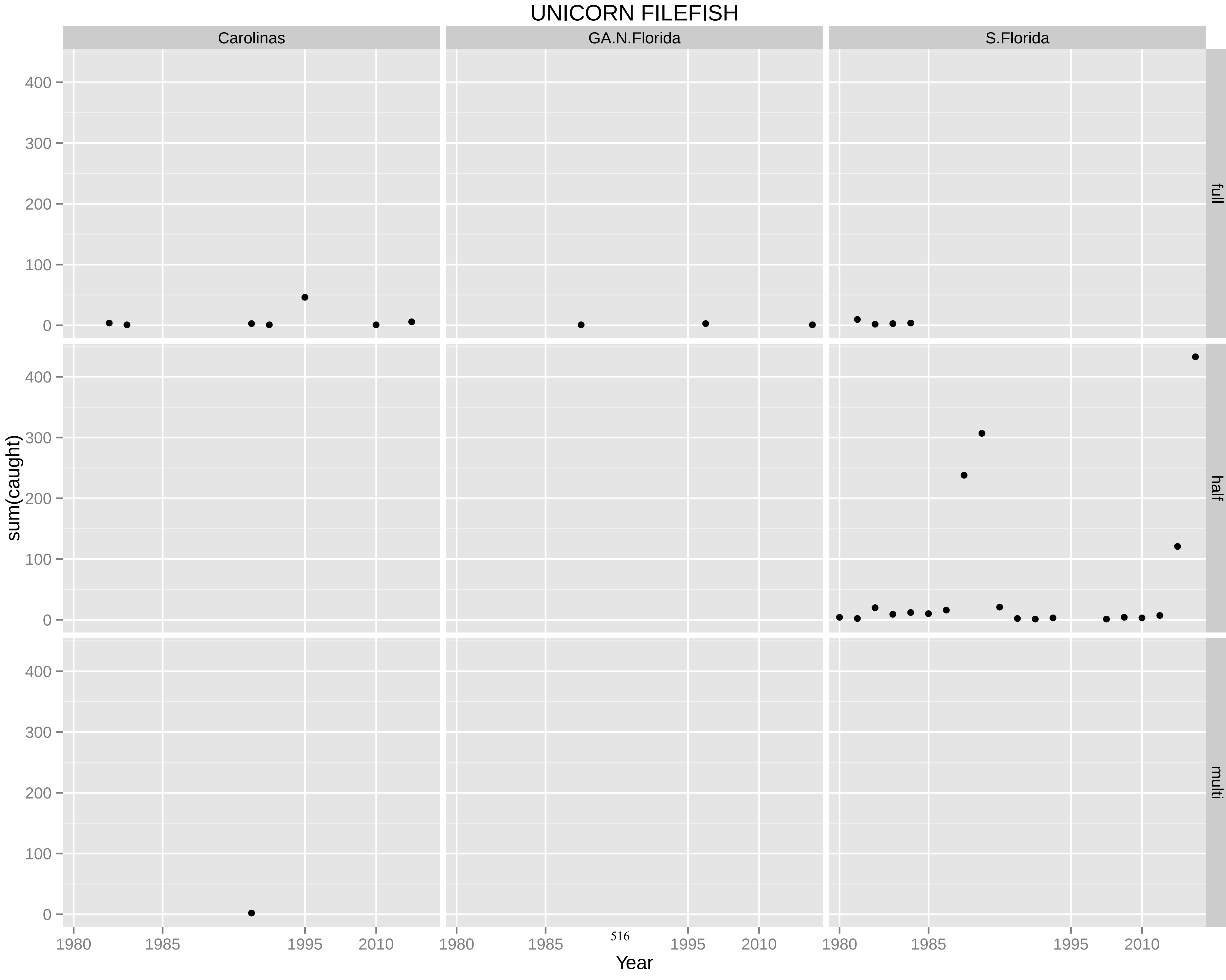

UNICORN FILEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
multi
caught
Year
0
10
20
30
40
1980
1985
1995
2010

UNICORN FILEFISH

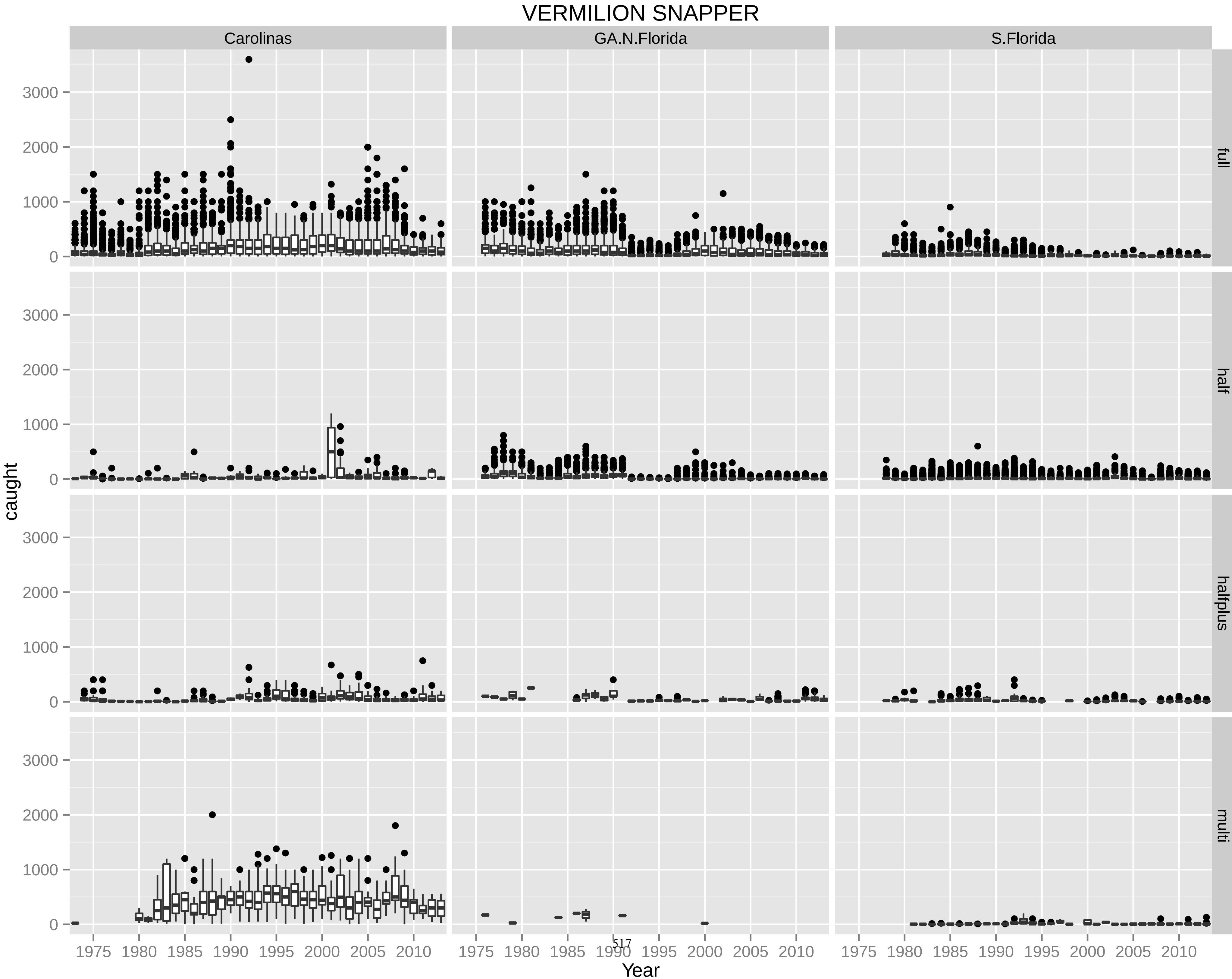


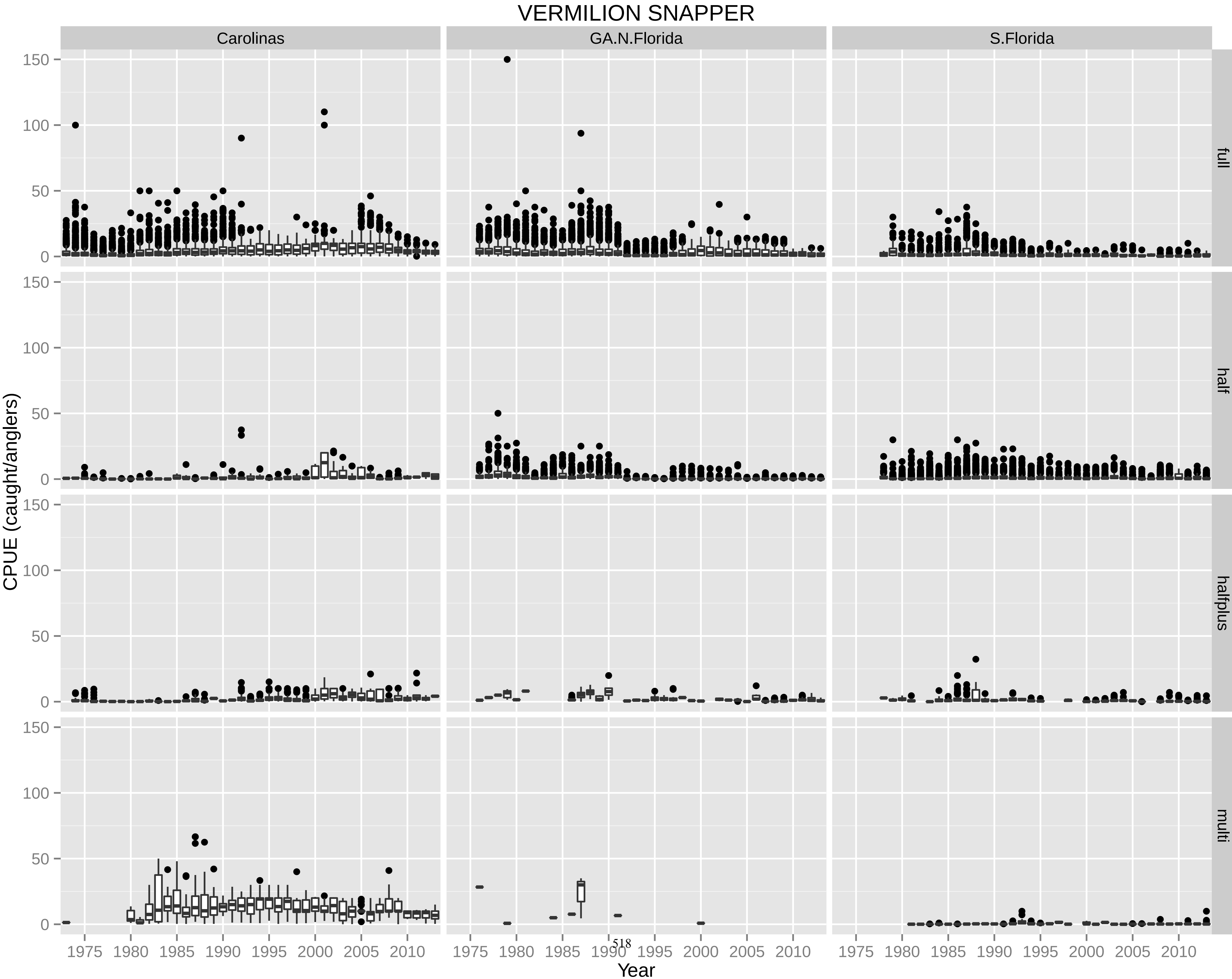


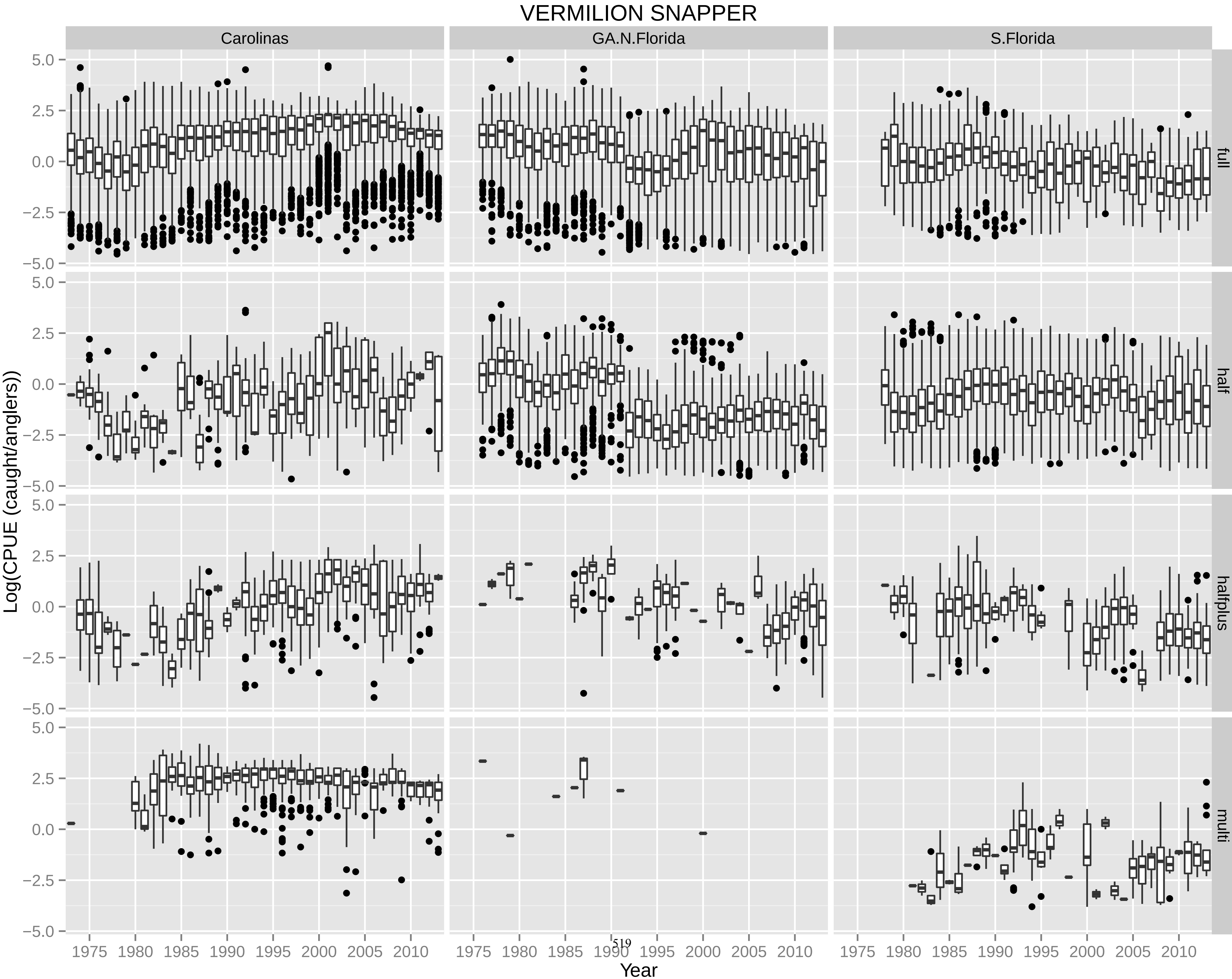
UNICORN FILEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
multi
Log(CPUE (caught/anglers))
1
0
−1
−2
−3
−4
1980
1985
1995
2010
Year

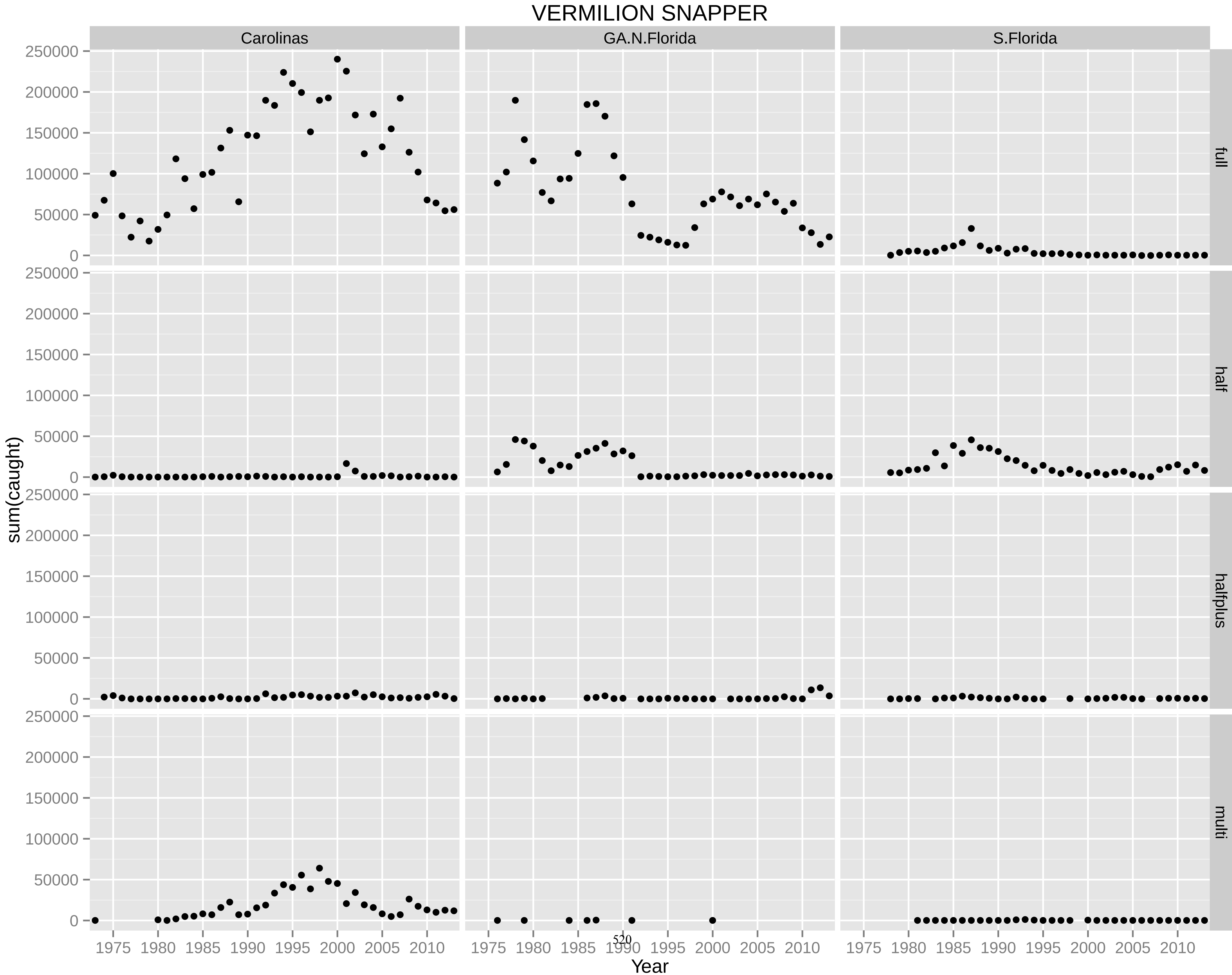


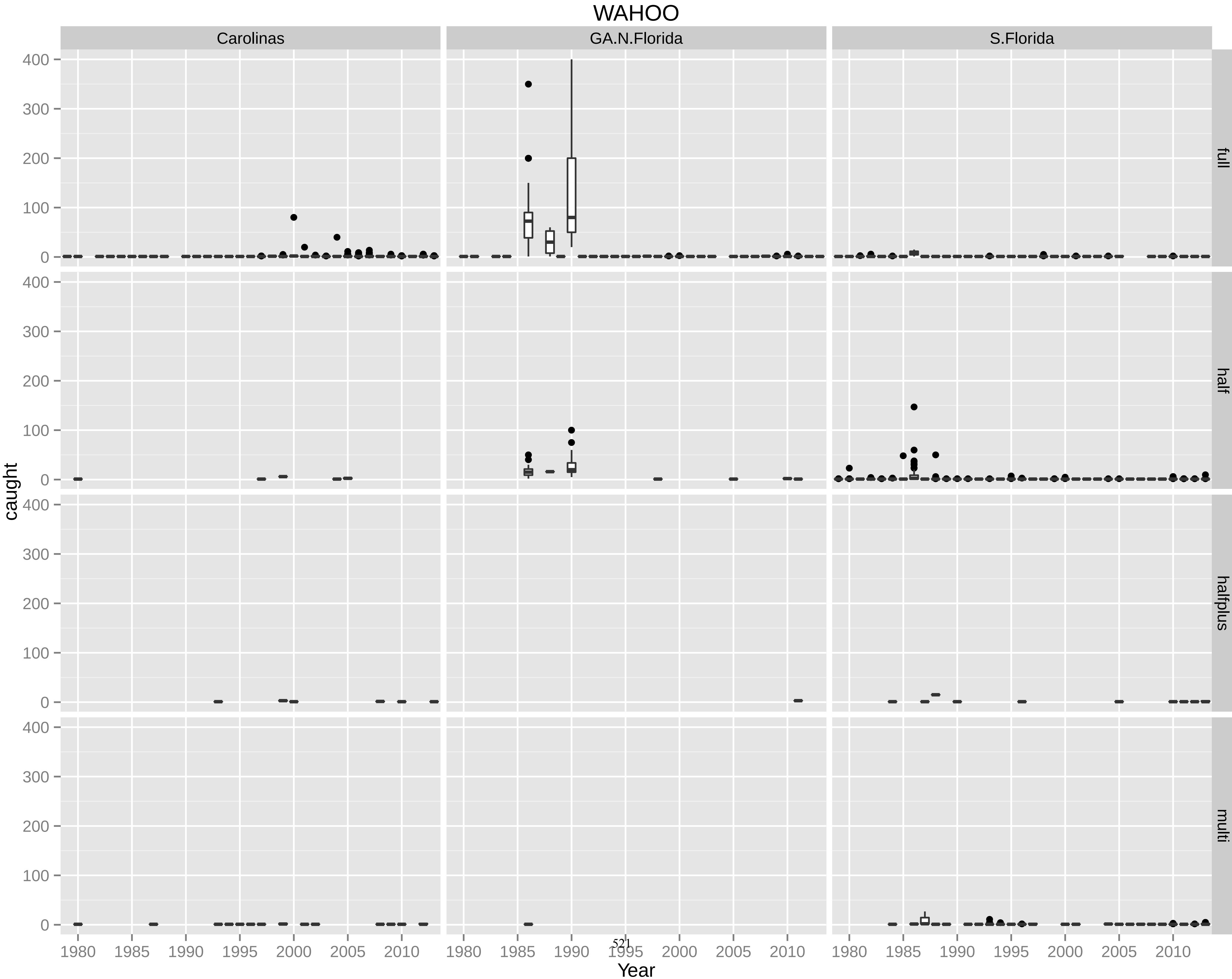
UNICORN FILEFISH
Carolinas
GA.N.Florida
S.Florida
full
half
multi
sum(caught)
400
300
200
100
0
1980
1985
1995
2010
Year

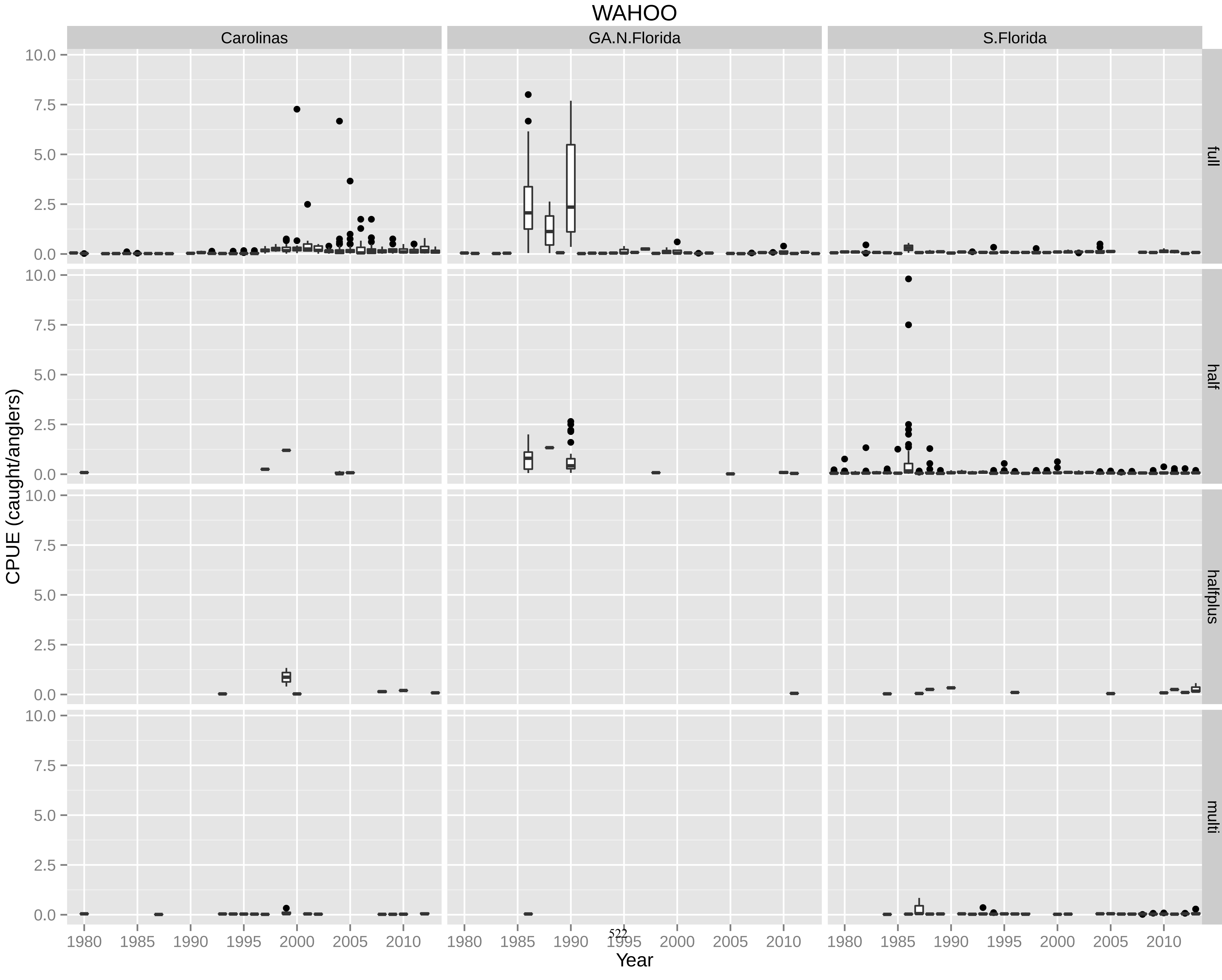

VERMILION SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
1000
2000
3000
1975
1980
1985
1990
1995
2000
2005
2010

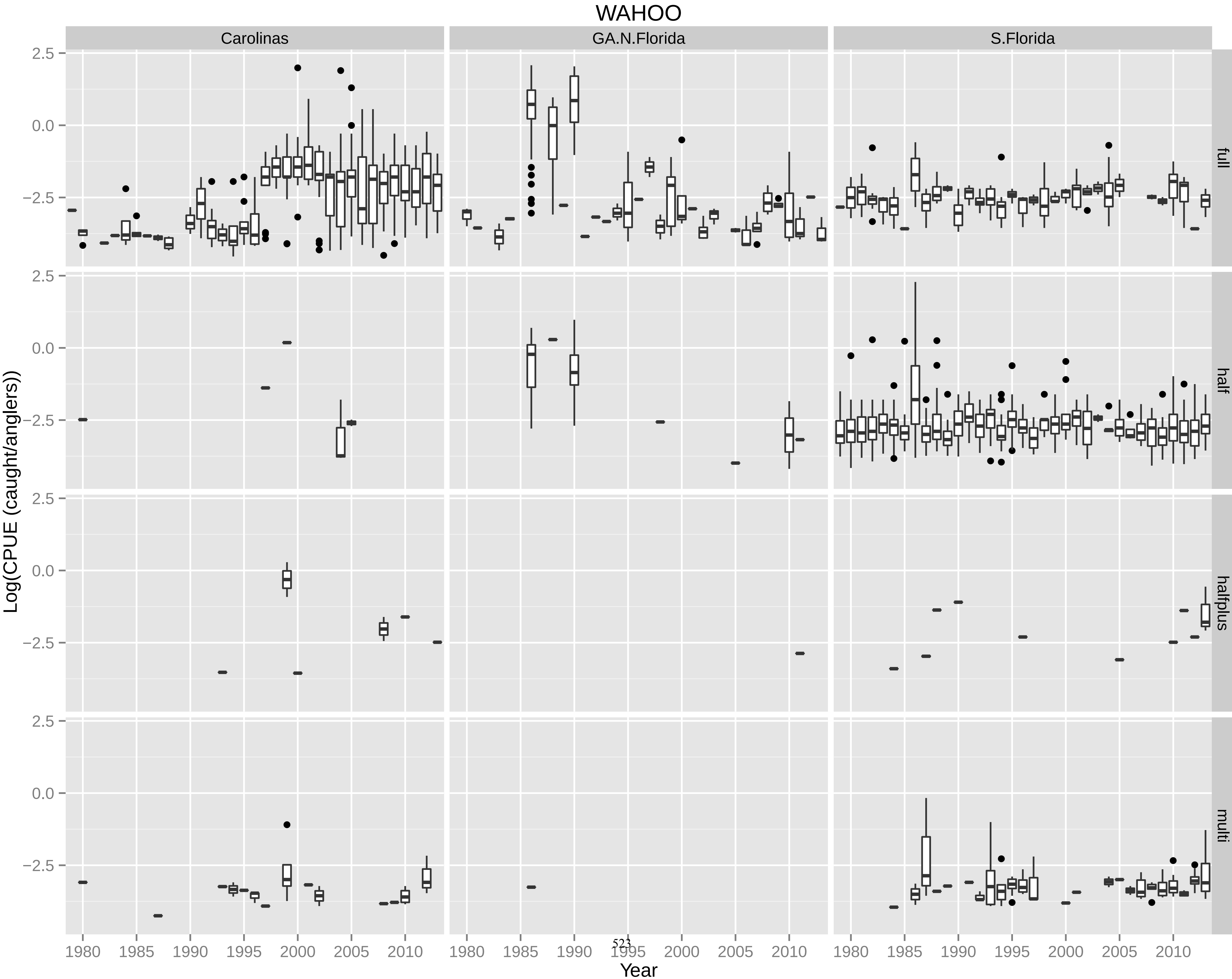

VERMILION SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0
50
100
150
1975
1980
1985
1990
1995
2000
2005
2010
Year

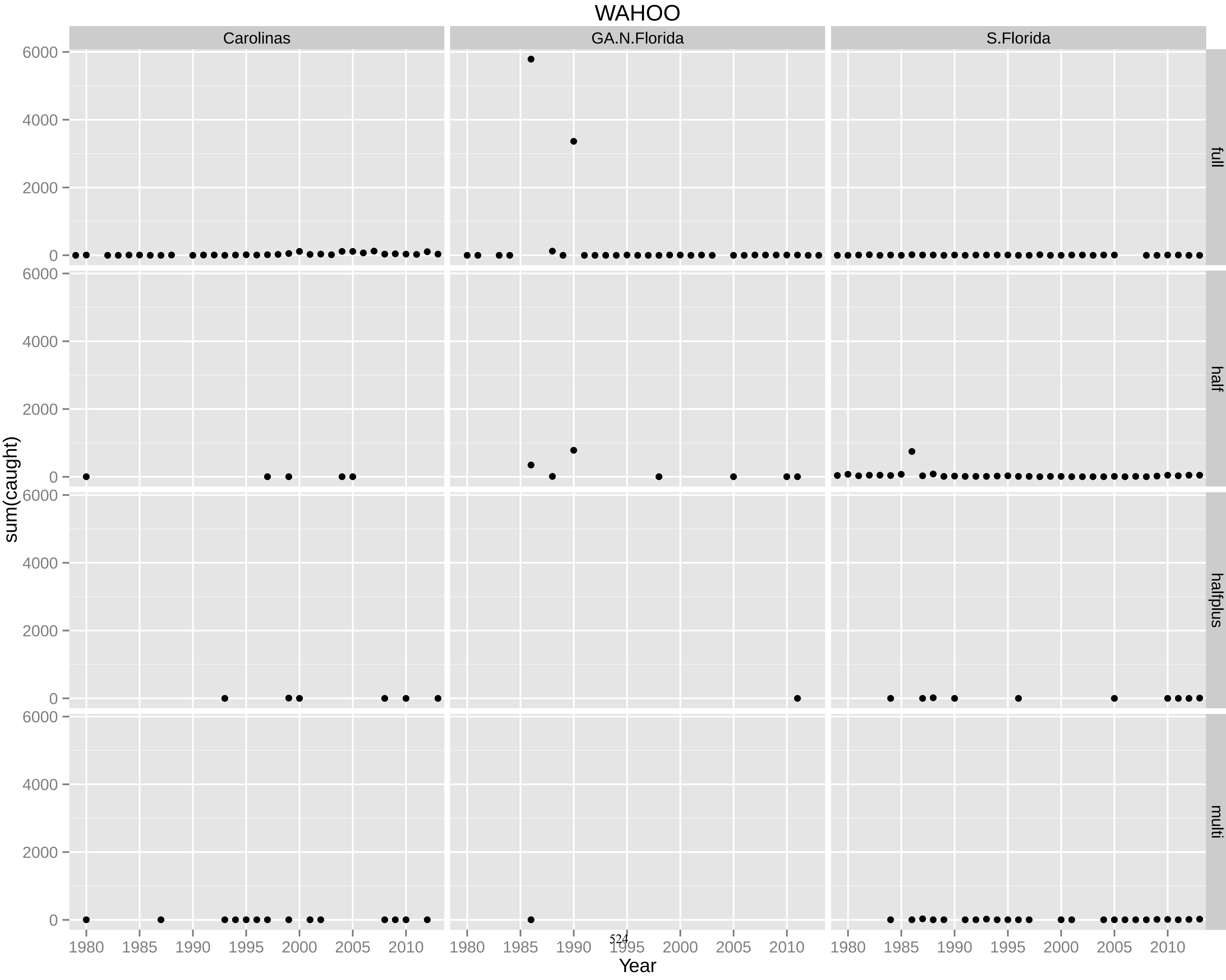

VERMILION SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
5.0
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010
Year

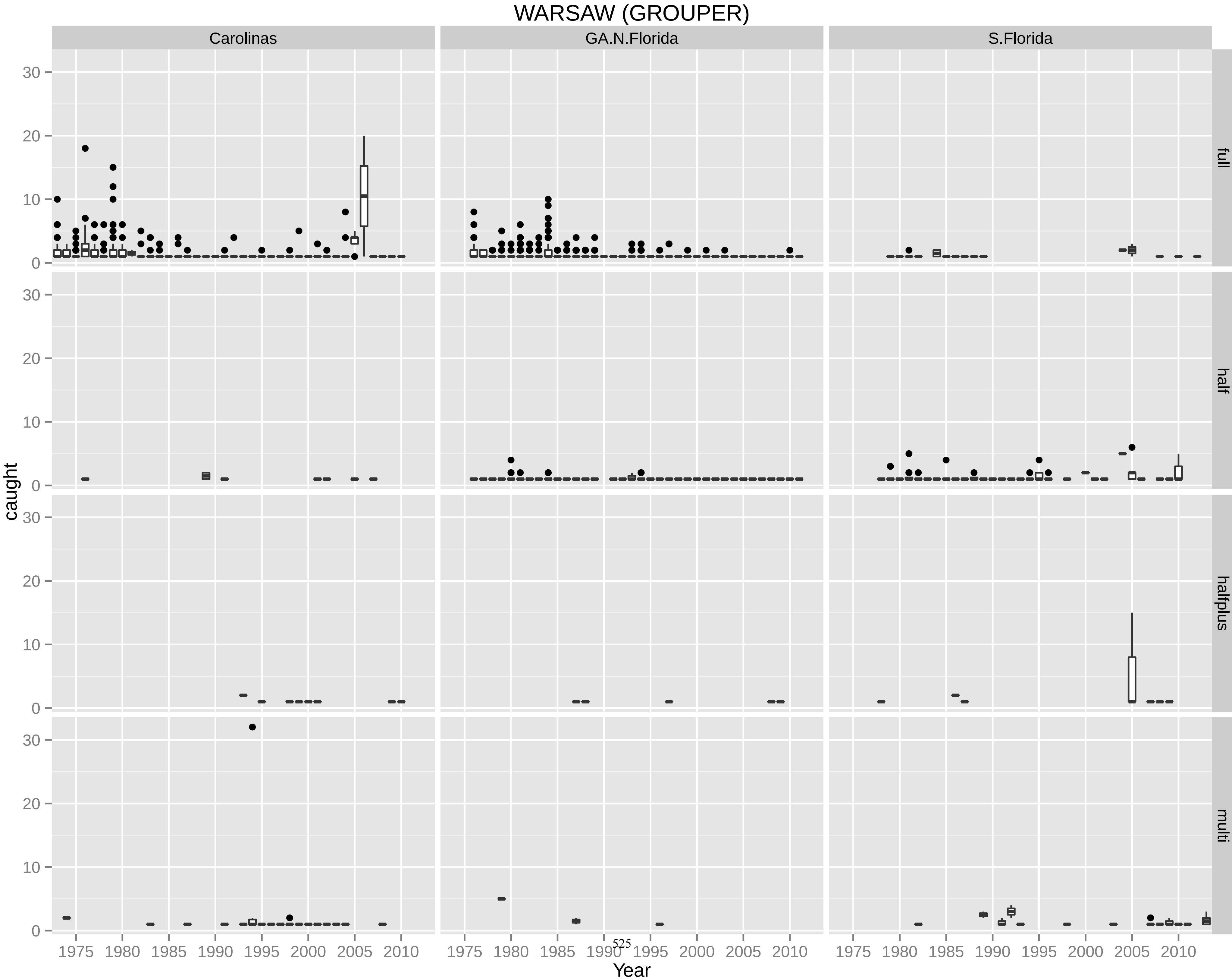

VERMILION SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
250000
200000
150000
100000
50000
0
1975
1980
1985
1990
1995
2000
2005
2010

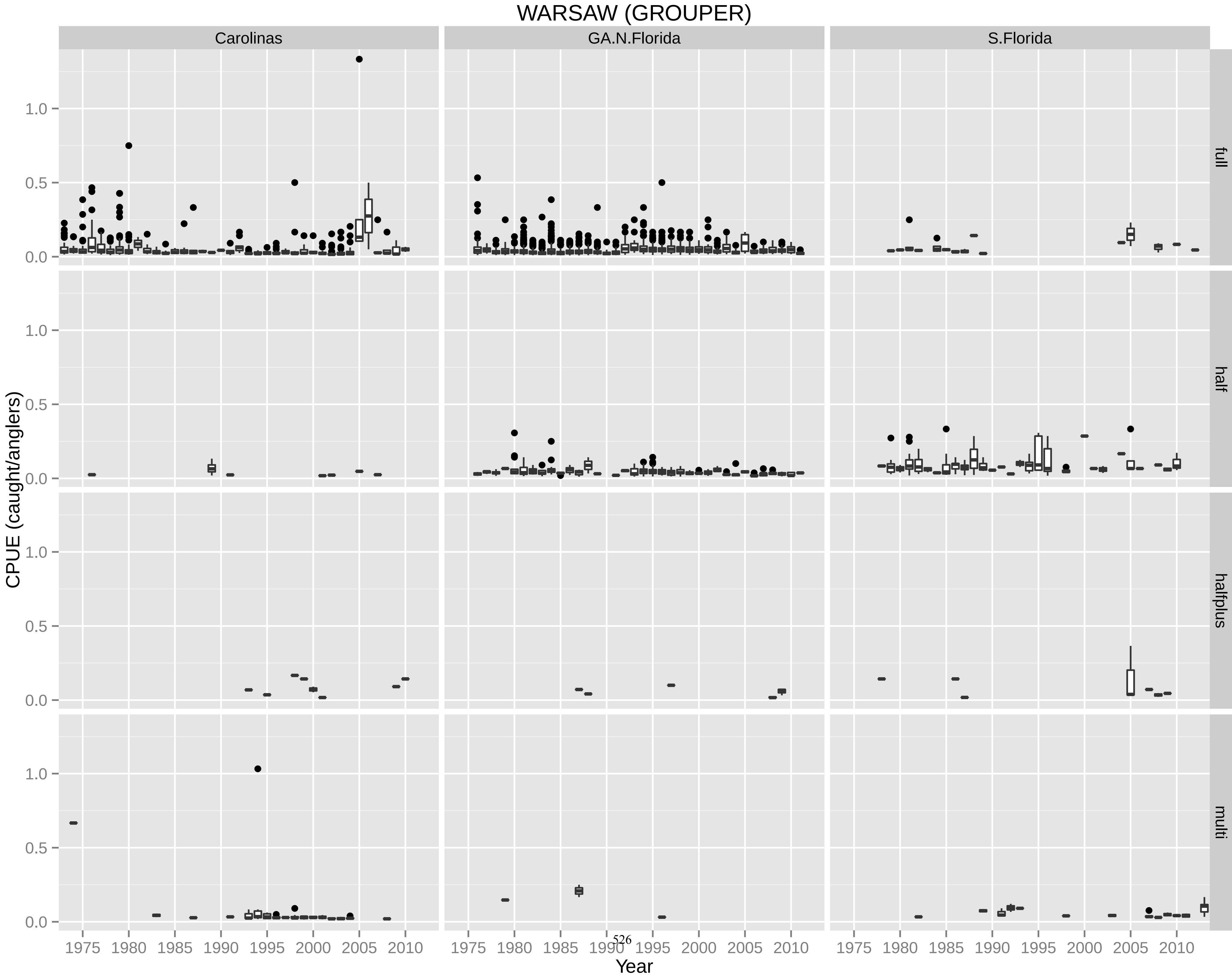

WAHOO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
300
400
1980
1985
1990
1995
2000
2005
2010

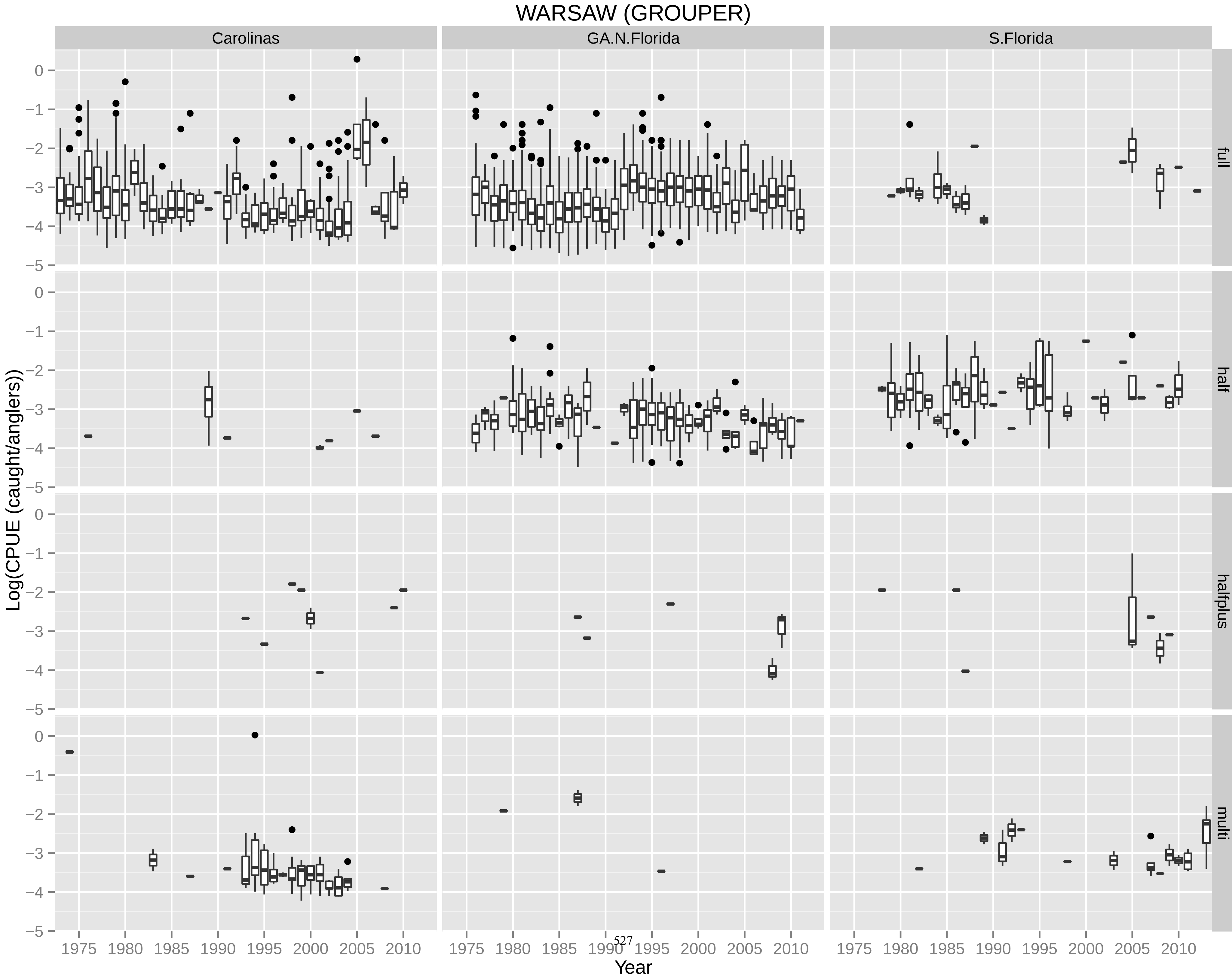

WAHOO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
2.5
5.0
7.5
10.0
1980
1985
1990
1995
2000
2005
2010

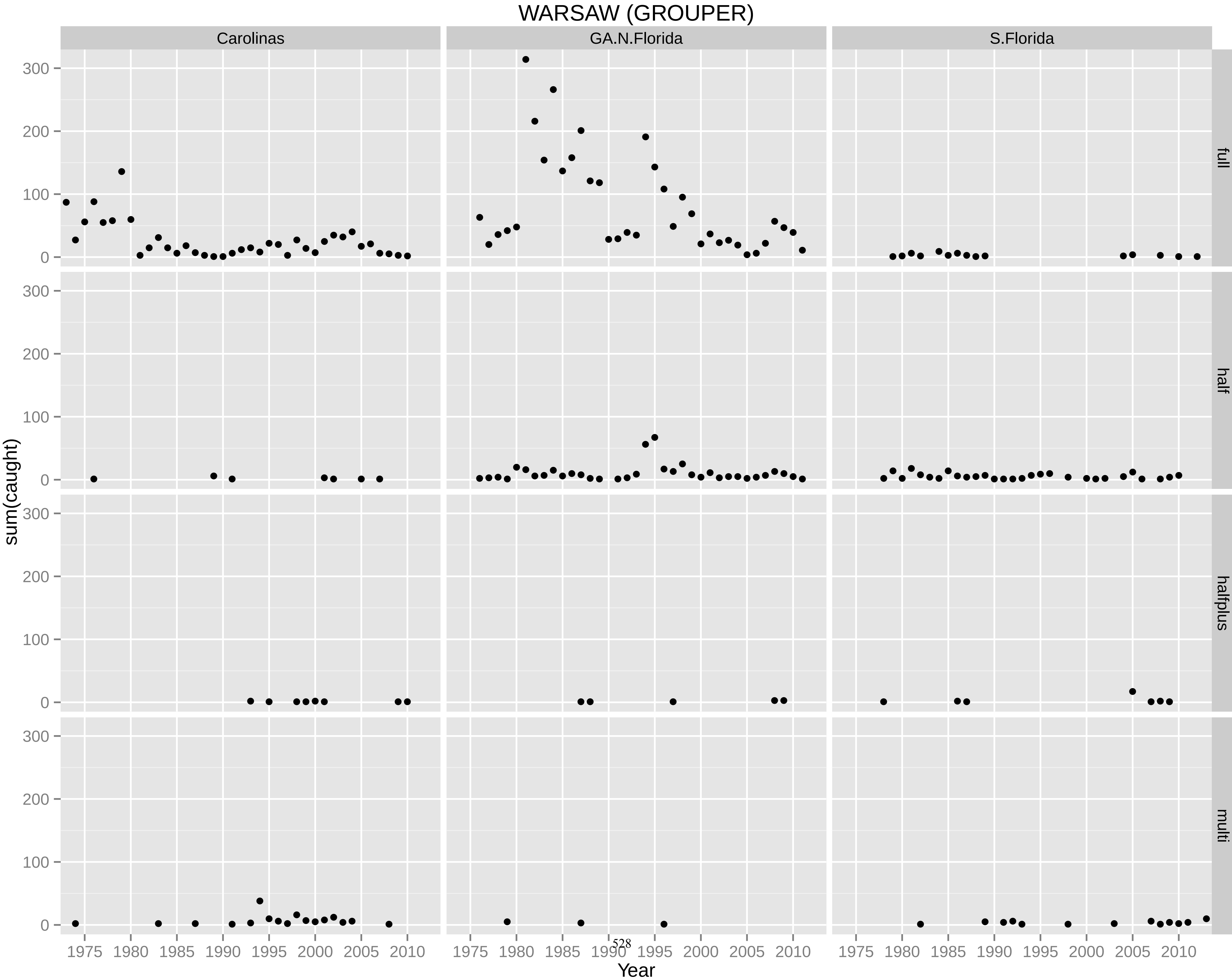

WAHOO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
1980
1985
1990
1995
2000
2005
2010

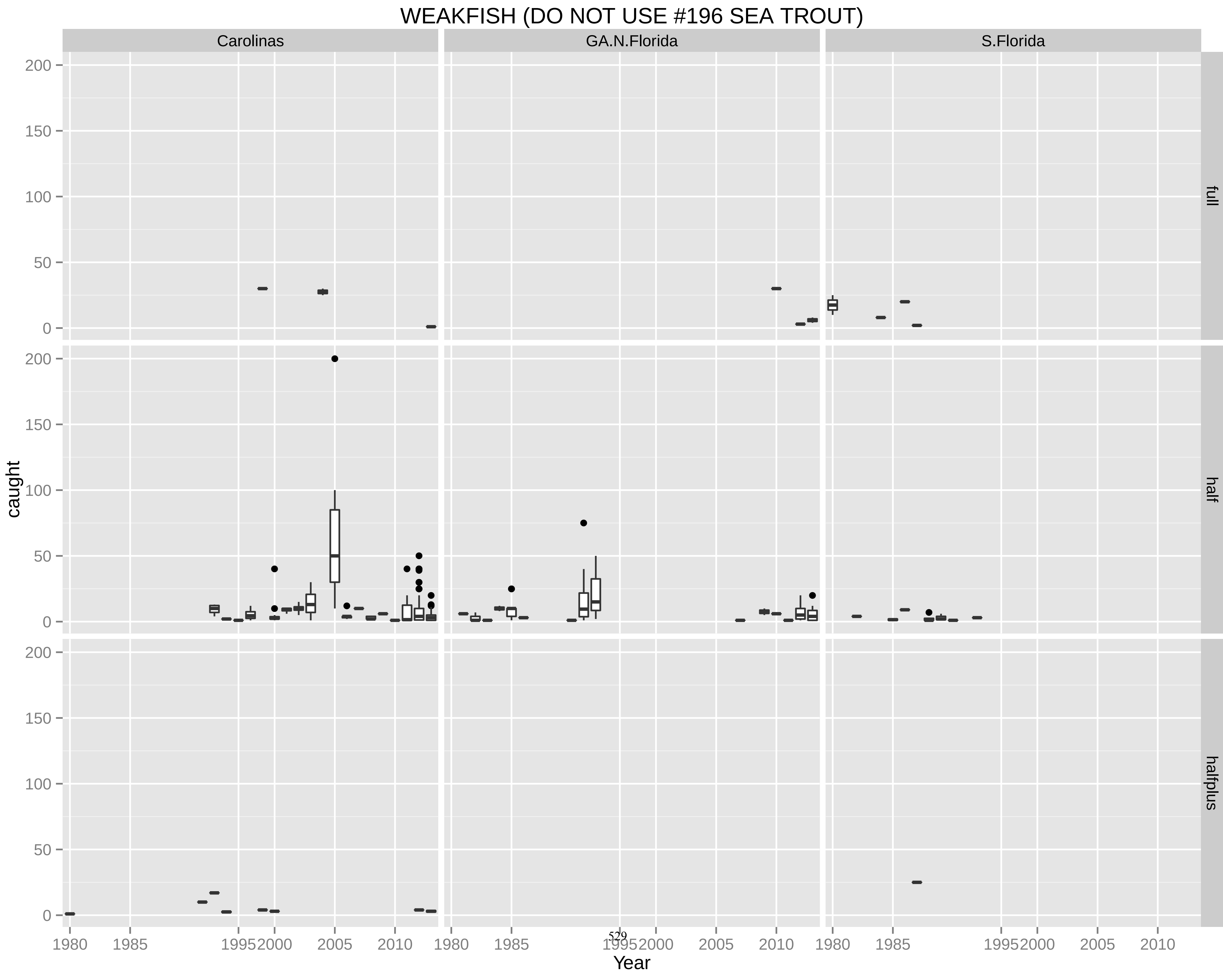

WAHOO
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
2000
4000
6000
1980
1985
1990
1995
2000
2005
2010

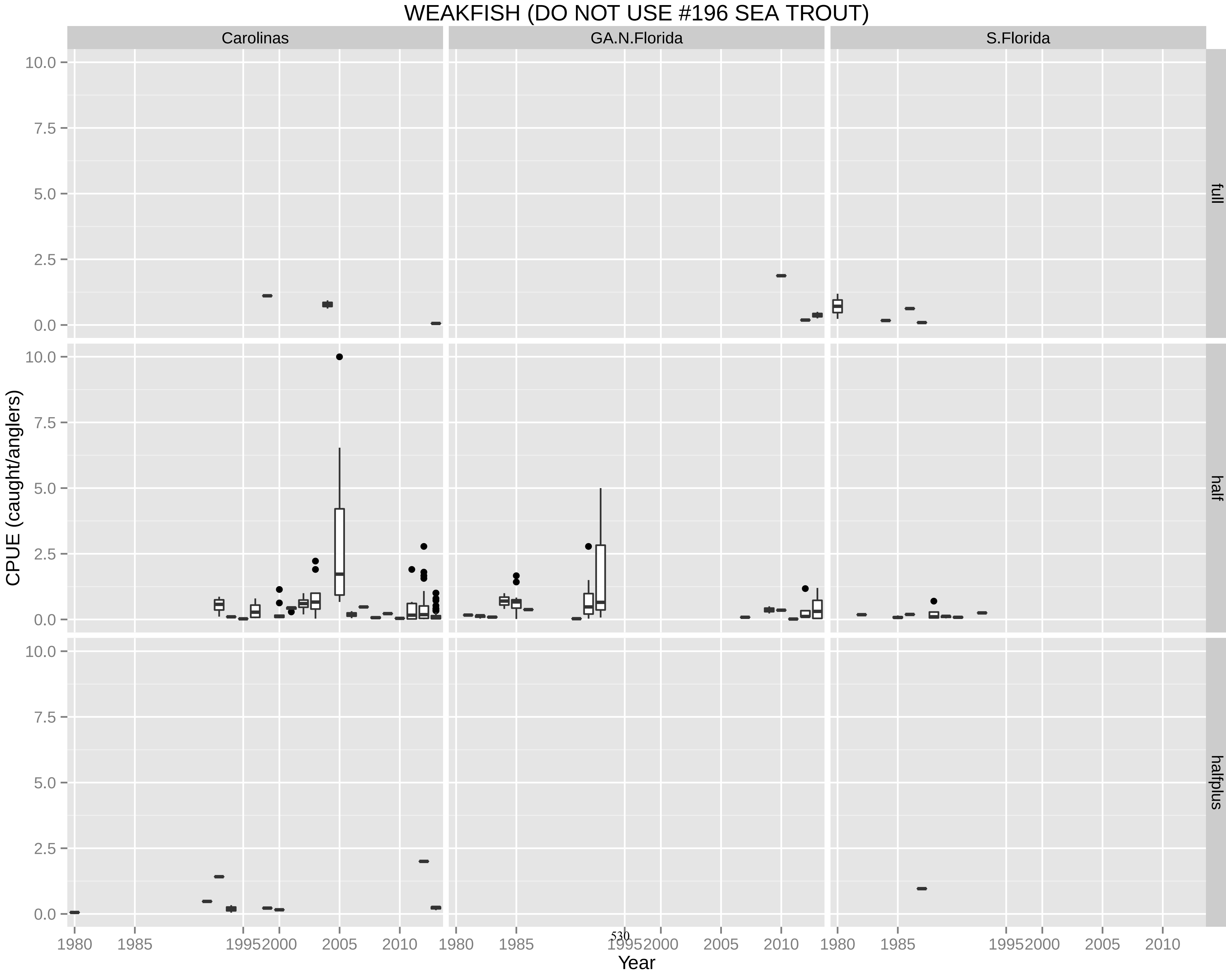

WARSAW (GROUPER)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
10
20
30
1975
1980
1985
1990
1995
2000
2005
2010

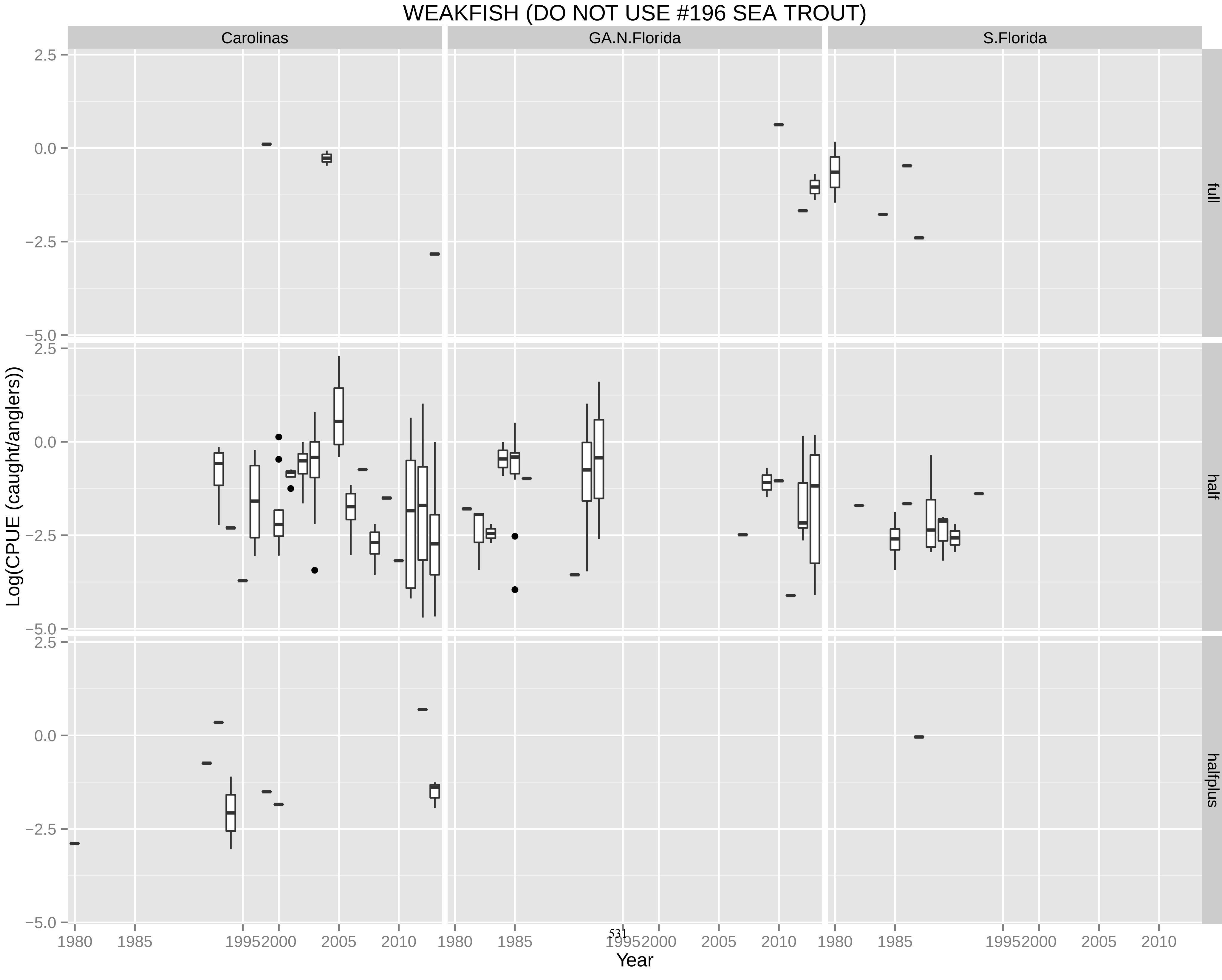

WARSAW (GROUPER)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0.0
0.5
1.0
1975
1980
1985
1990
1995
2000
2005
2010
Year


WARSAW (GROUPER)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
0
−1
−2
−3
−4
−5
1975 1980 1985 1990 1995 2000 2005 2010
Year

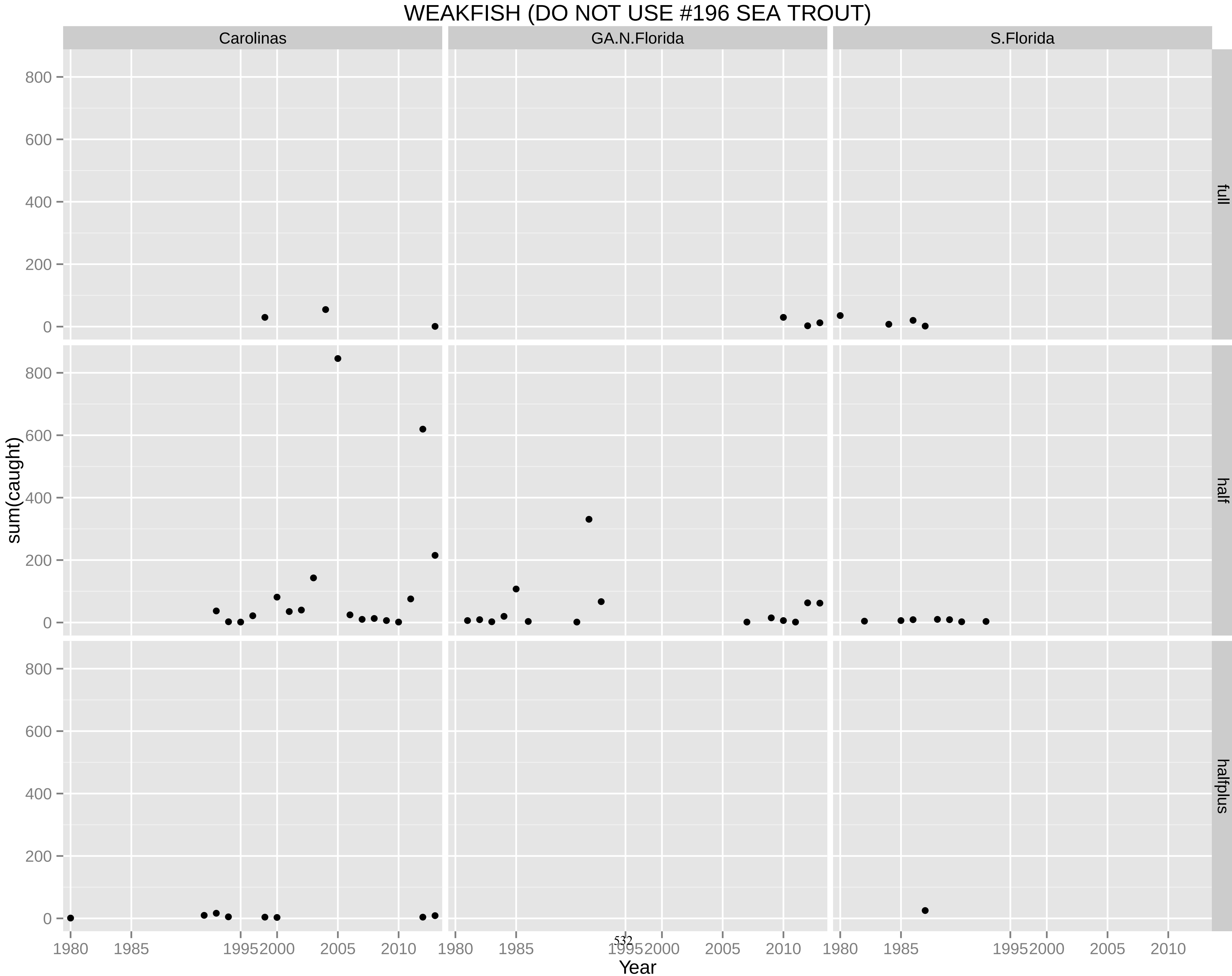

WARSAW (GROUPER)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
100
200
300
1975
1980
1985
1990
1995
2000
2005
2010

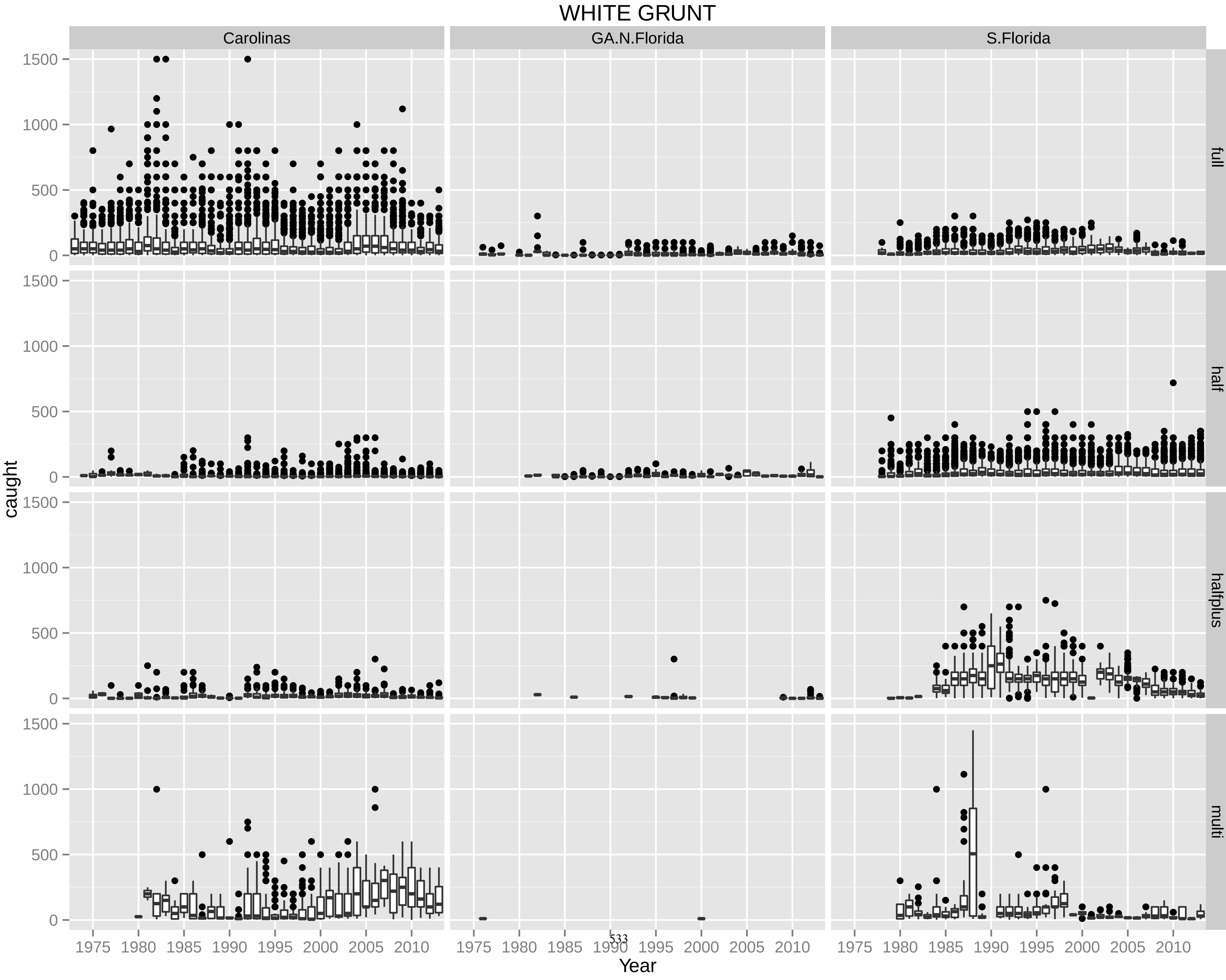

WEAKFISH (DO NOT USE #196 SEA TROUT)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
caught
Year
0
50
100
150
200
1980
1985
1995
2000
2005
2010

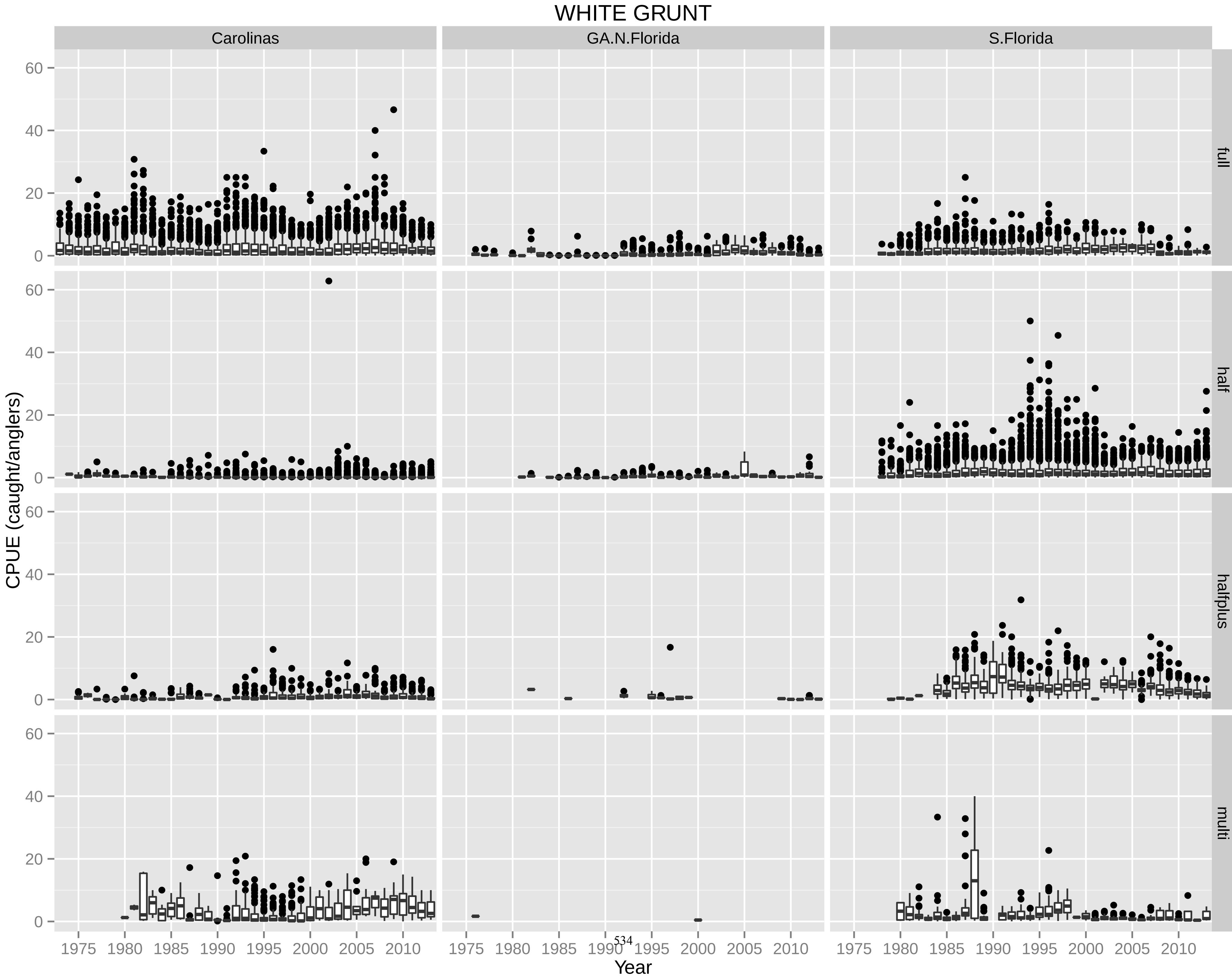

WEAKFISH (DO NOT USE #196 SEA TROUT)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
CPUE (caught/anglers)
Year
0.0
2.5
5.0
7.5
10.0
1980
1985
1995
2000
2005
2010

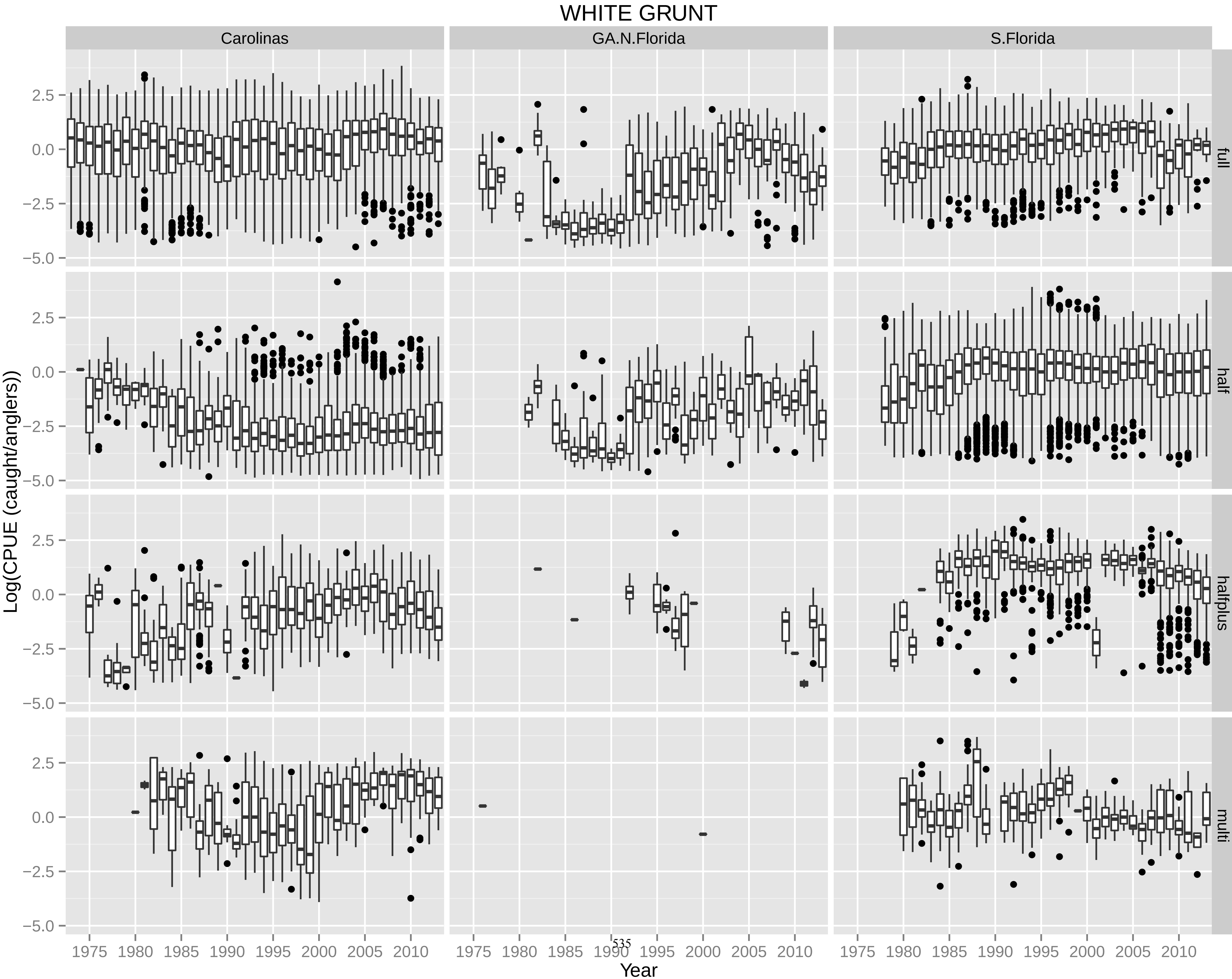


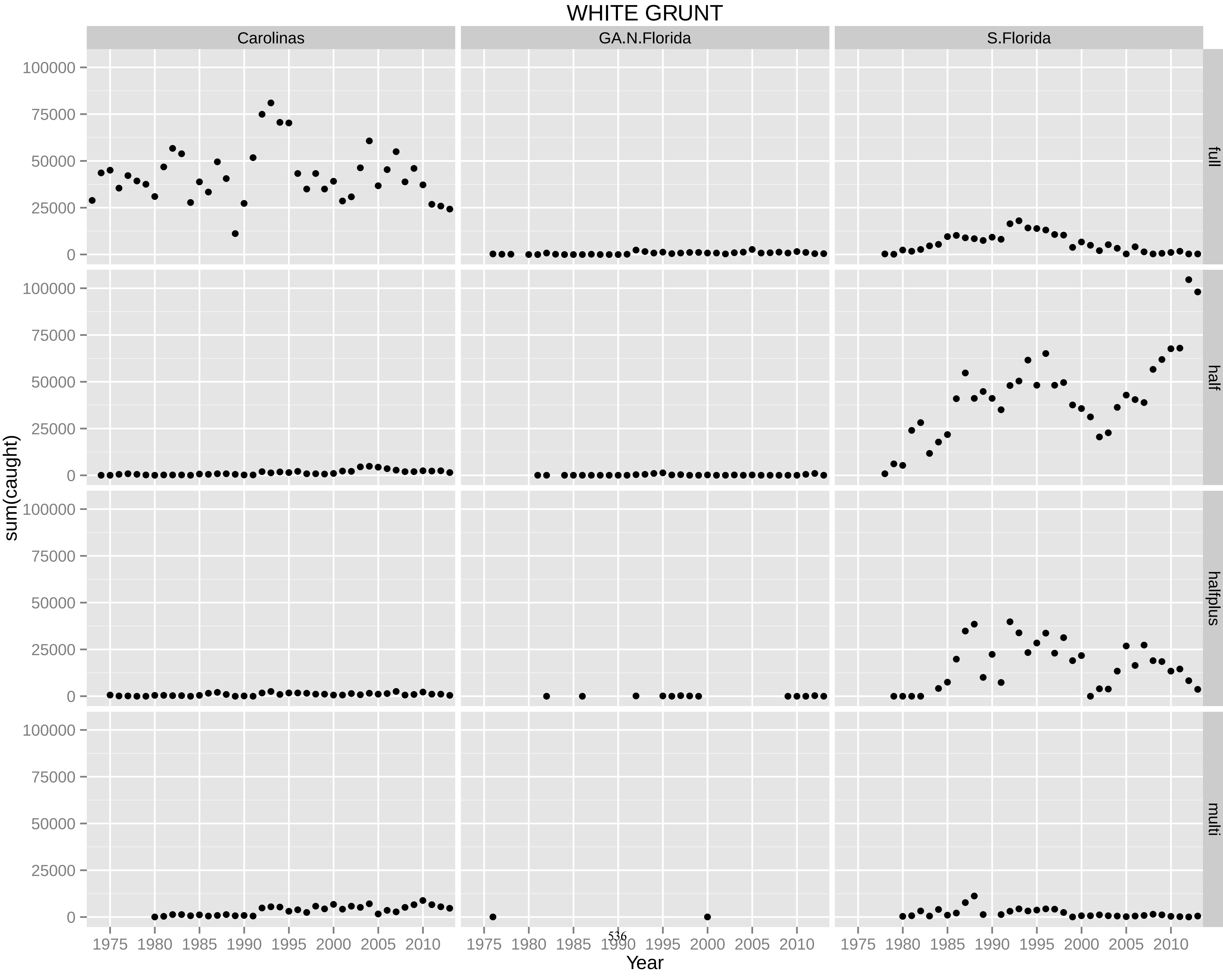
WEAKFISH (DO NOT USE #196 SEA TROUT)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
Log(CPUE (caught/anglers))
Year
2.5
0.0
−2.5
−5.0
1980
1985
1995
2000
2005
2010

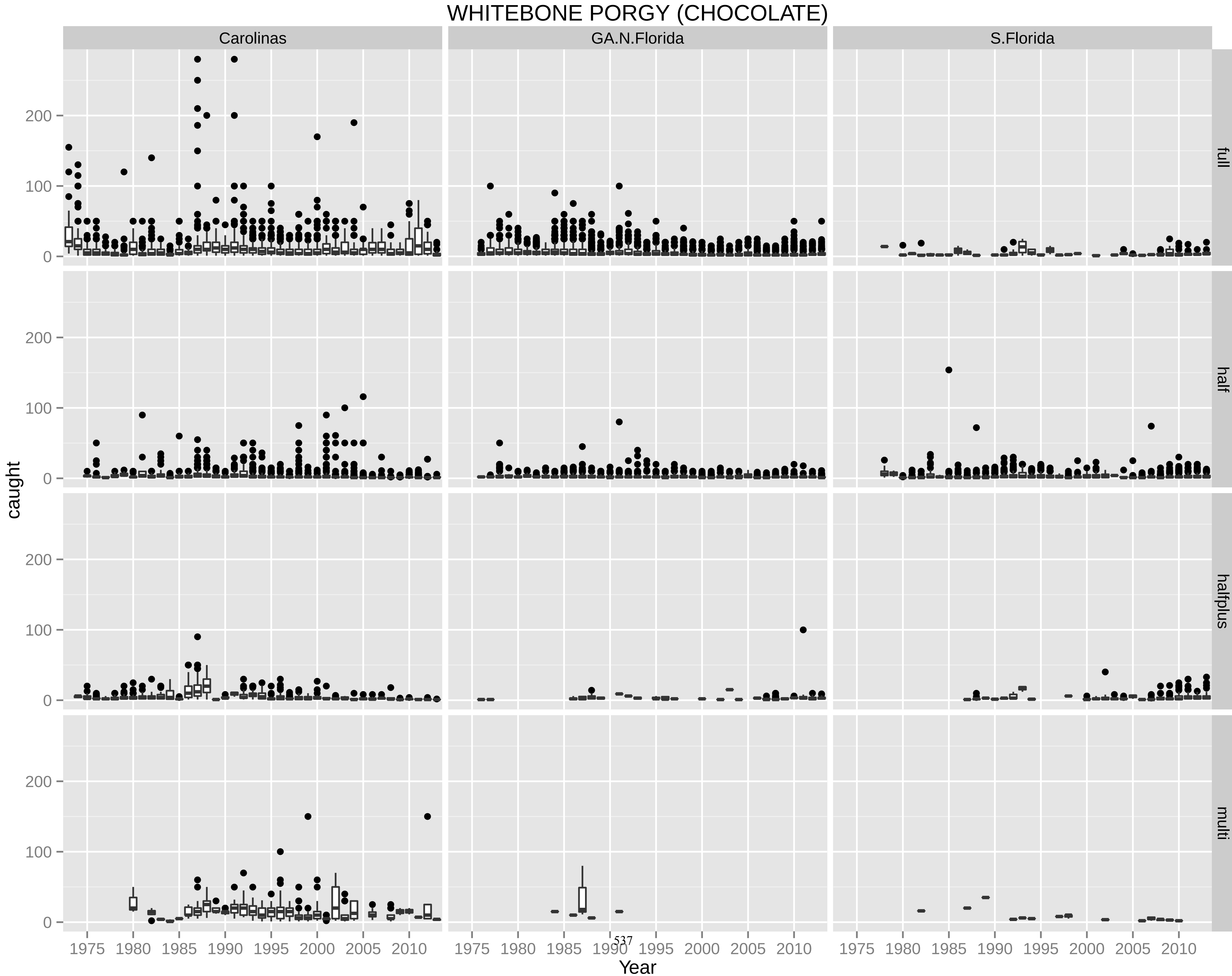

WEAKFISH (DO NOT USE #196 SEA TROUT)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
sum(caught)
Year
0
200
400
600
800
1980
1985
1995
2000
2005
2010

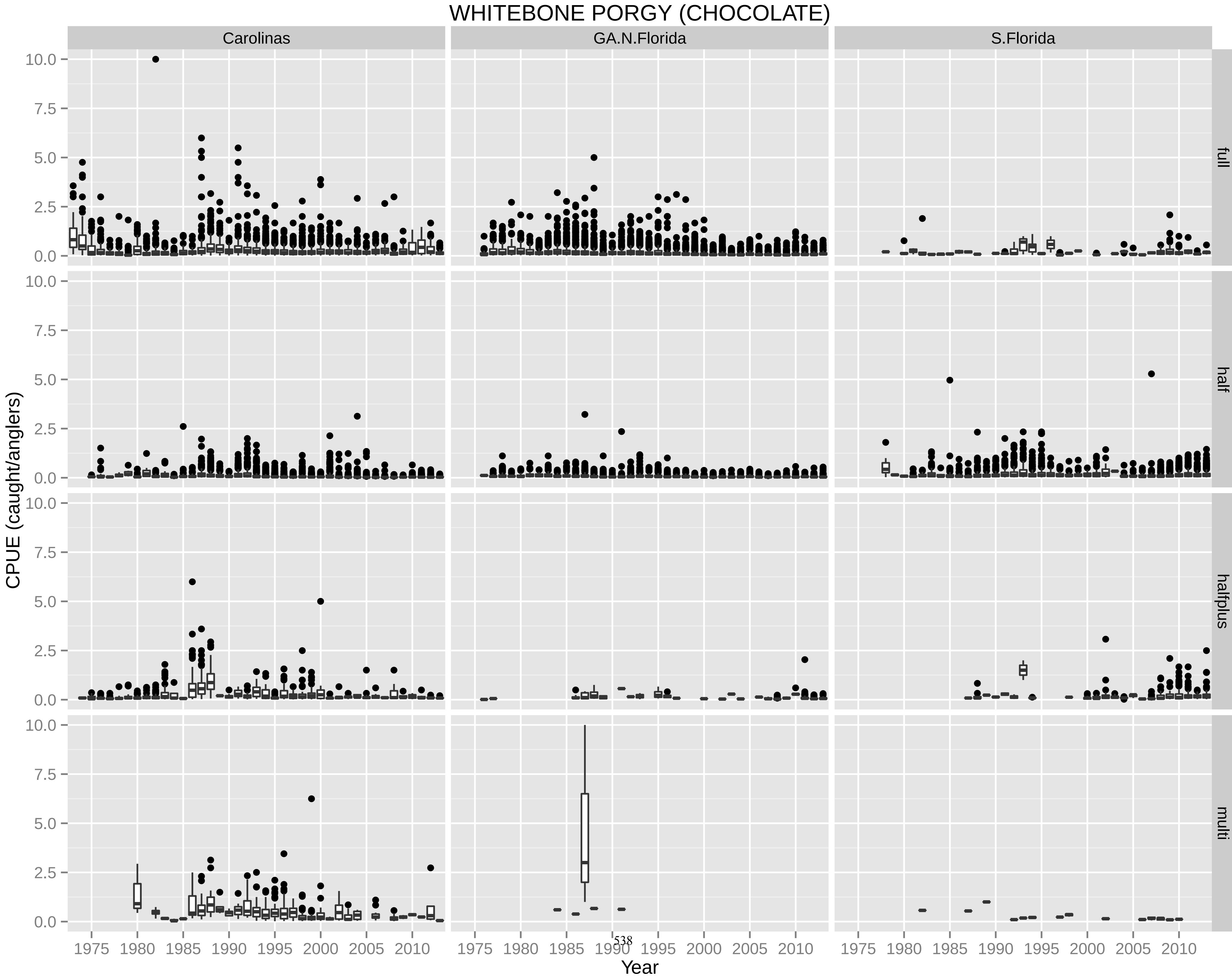

WHITE GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
500
1000
1500
1975
1980
1985
1990
1995
2000
2005
2010

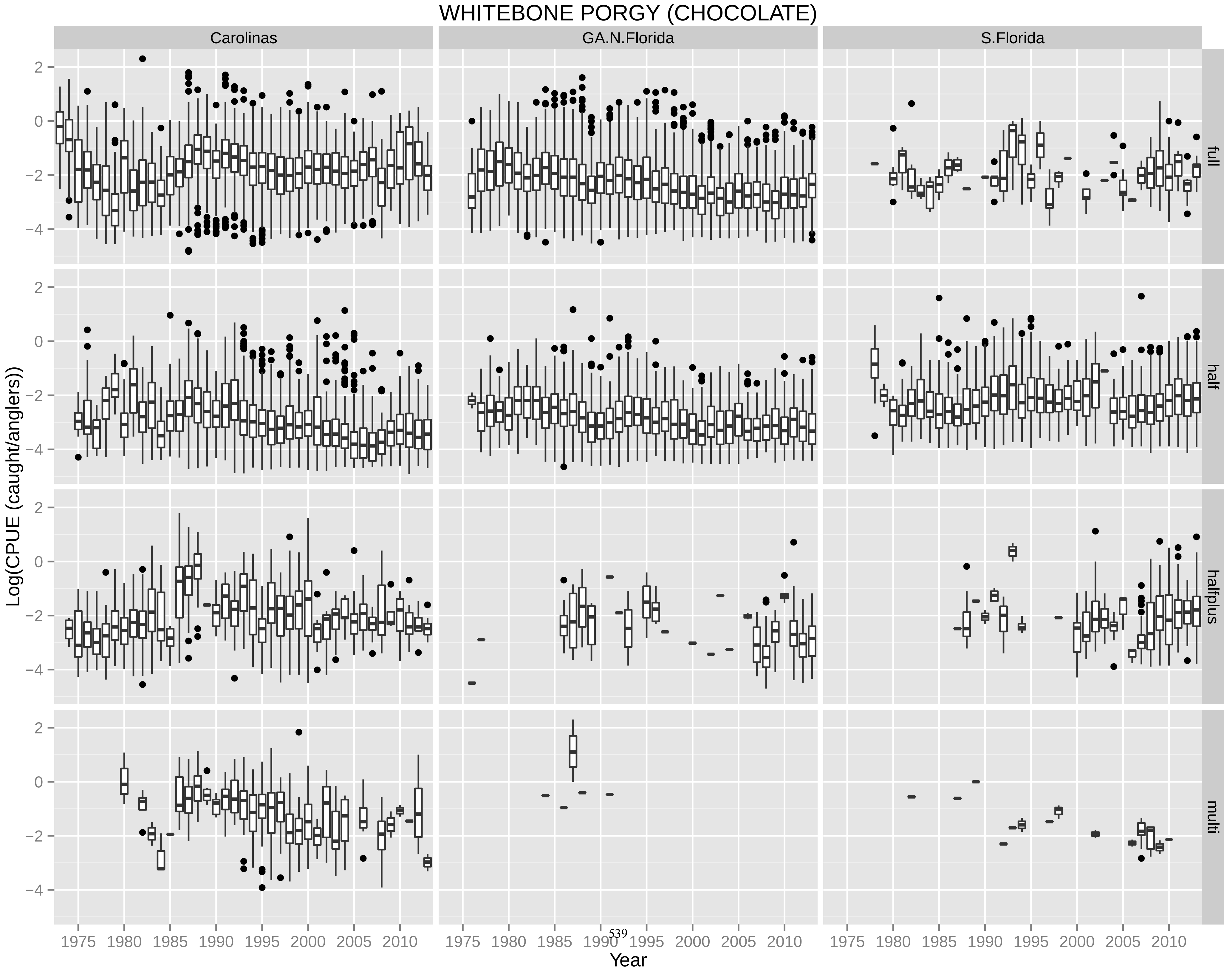

WHITE GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
20
40
60
1975
1980
1985
1990
1995
2000
2005
2010


WHITE GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010
Year

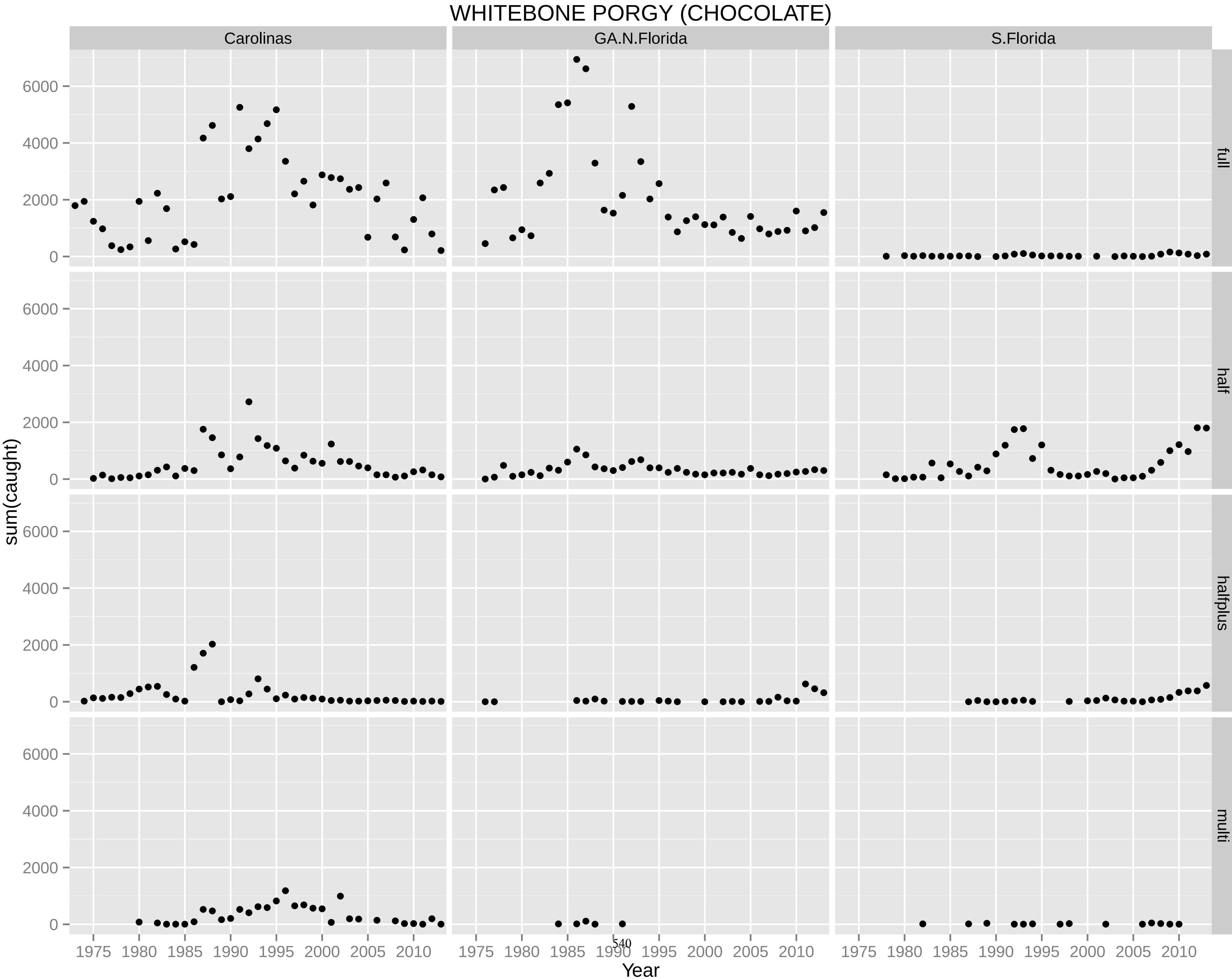

WHITE GRUNT
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
25000
50000
75000
100000
1975
1980
1985
1990
1995
2000
2005
2010

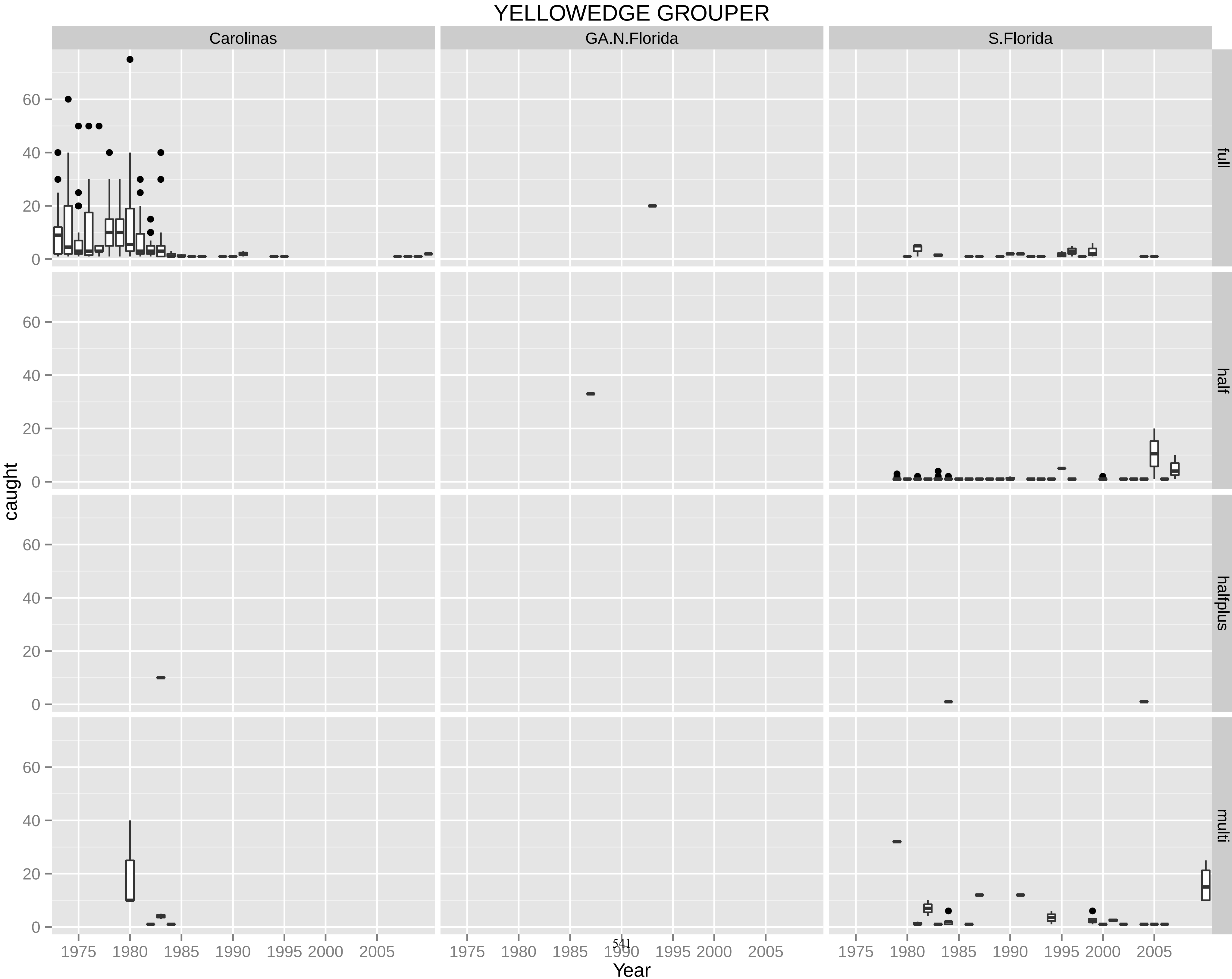

WHITEBONE PORGY (CHOCOLATE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
100
200
1975
1980
1985
1990
1995
2000
2005
2010

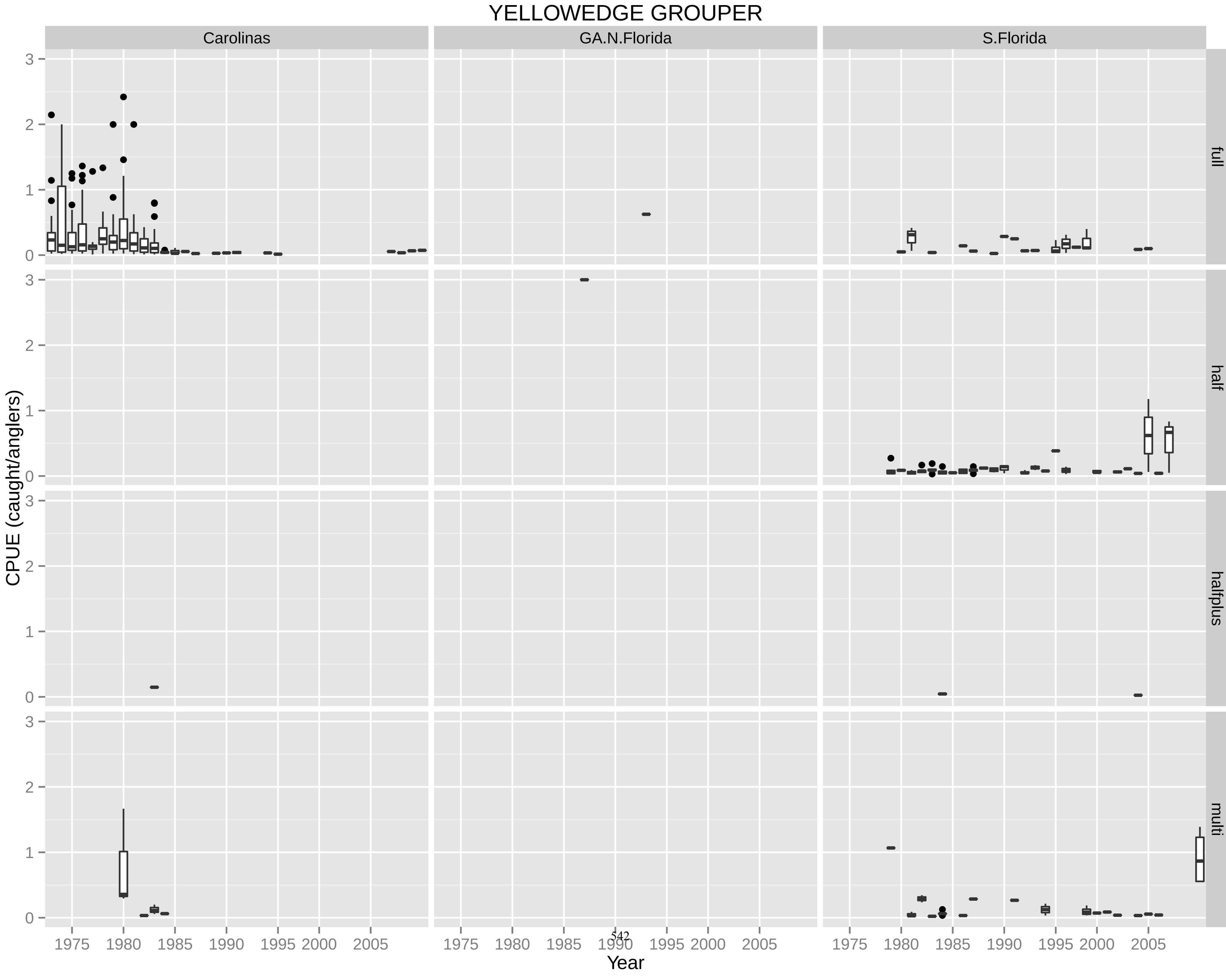

WHITEBONE PORGY (CHOCOLATE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
2.5
5.0
7.5
10.0
1975
1980
1985
1990
1995
2000
2005
2010

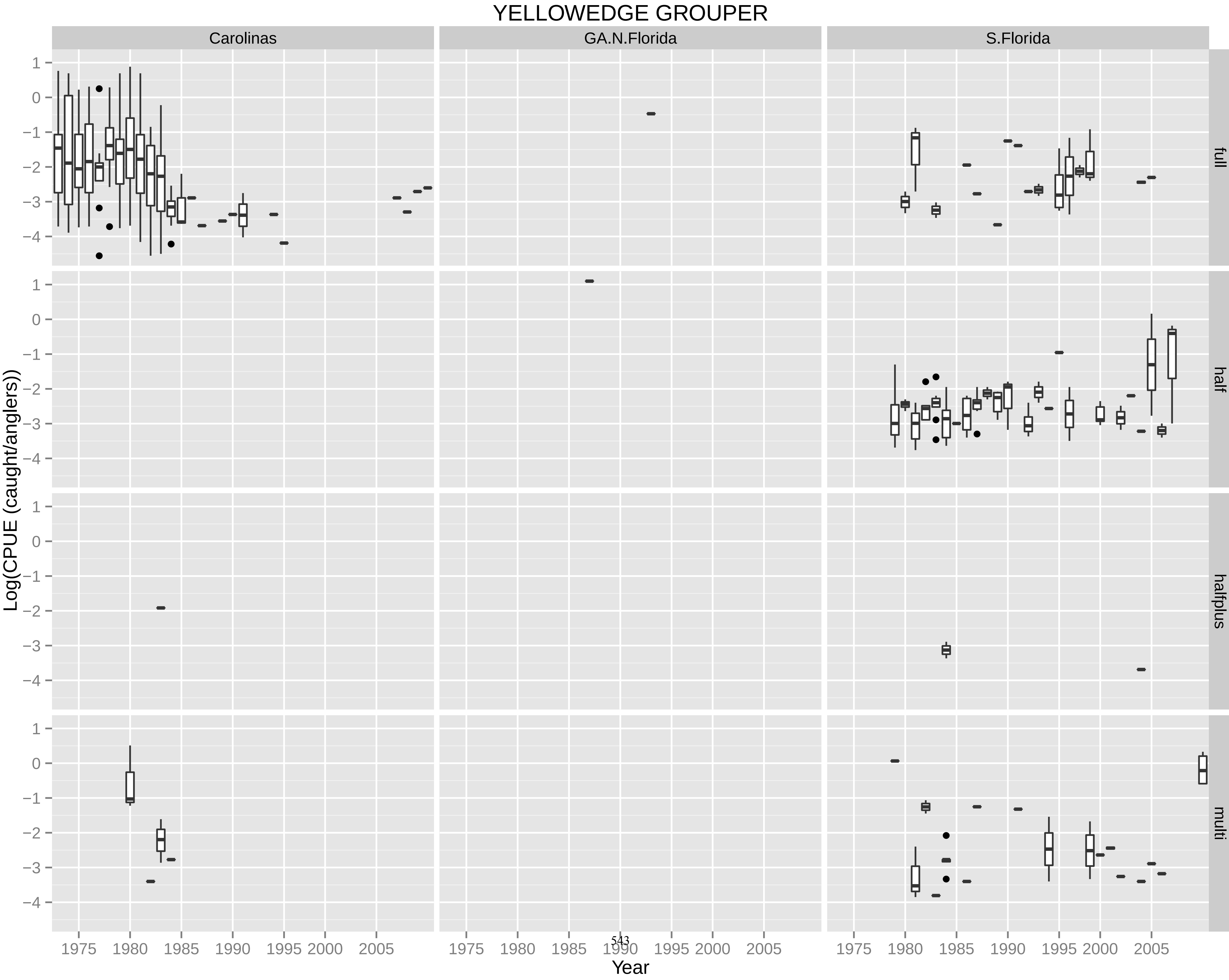


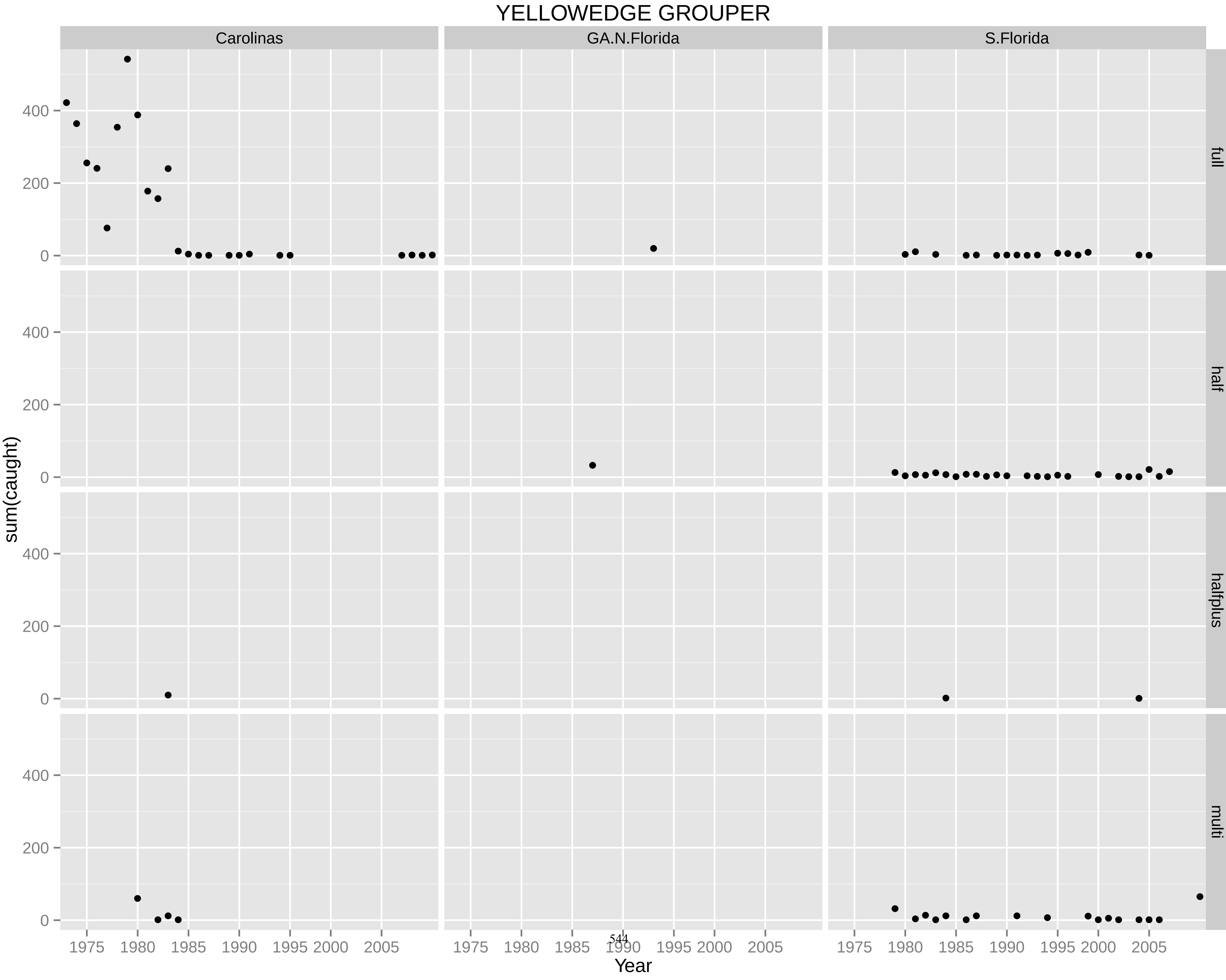
WHITEBONE PORGY (CHOCOLATE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

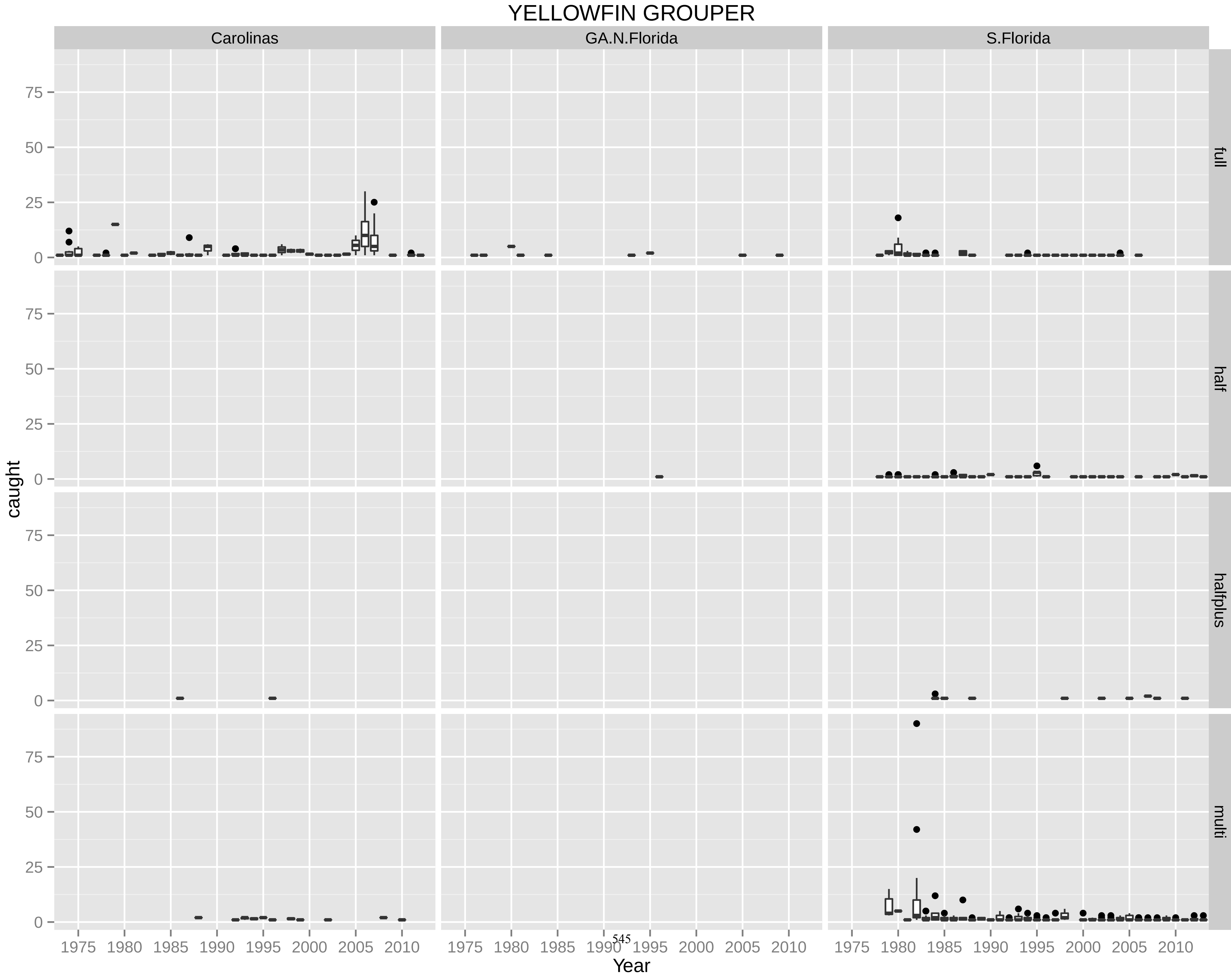

WHITEBONE PORGY (CHOCOLATE)
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
2000
4000
6000
1975
1980
1985
1990
1995
2000
2005
2010
Year

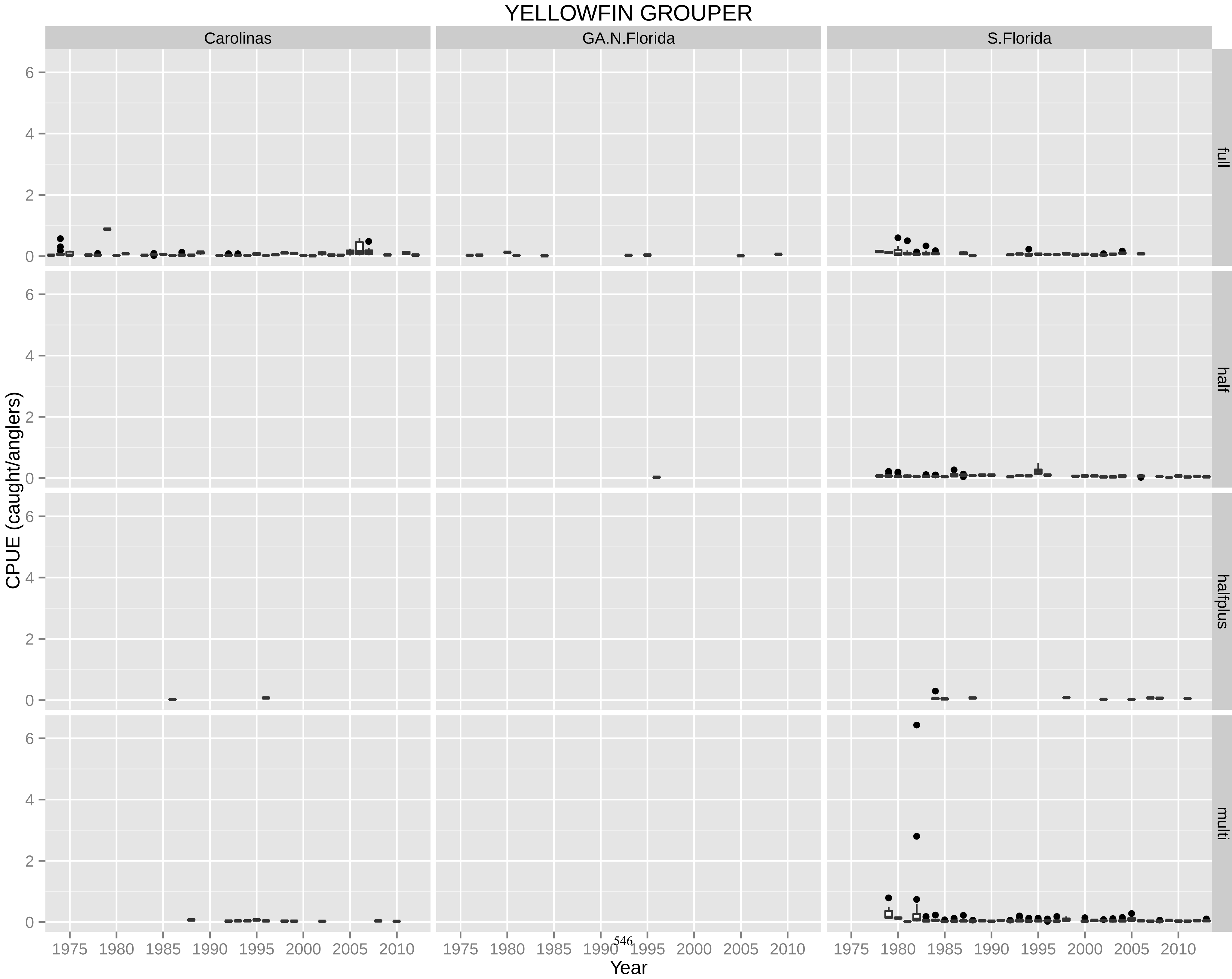

YELLOWEDGE GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
0
20
40
60
1975
1980
1985
1990
1995
2000
2005
Year

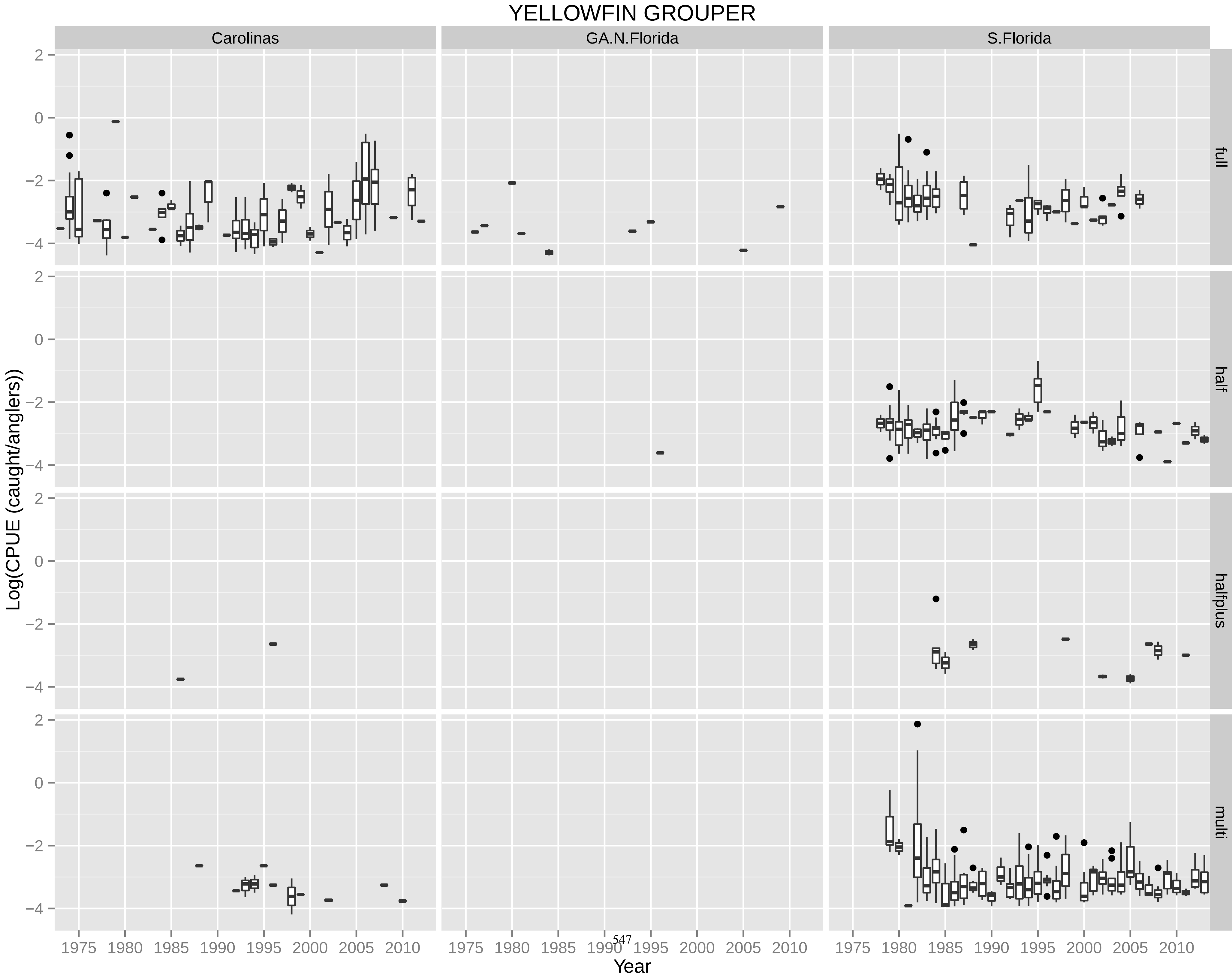

YELLOWEDGE GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
1975
1980
1985
1990
1995
2000
2005

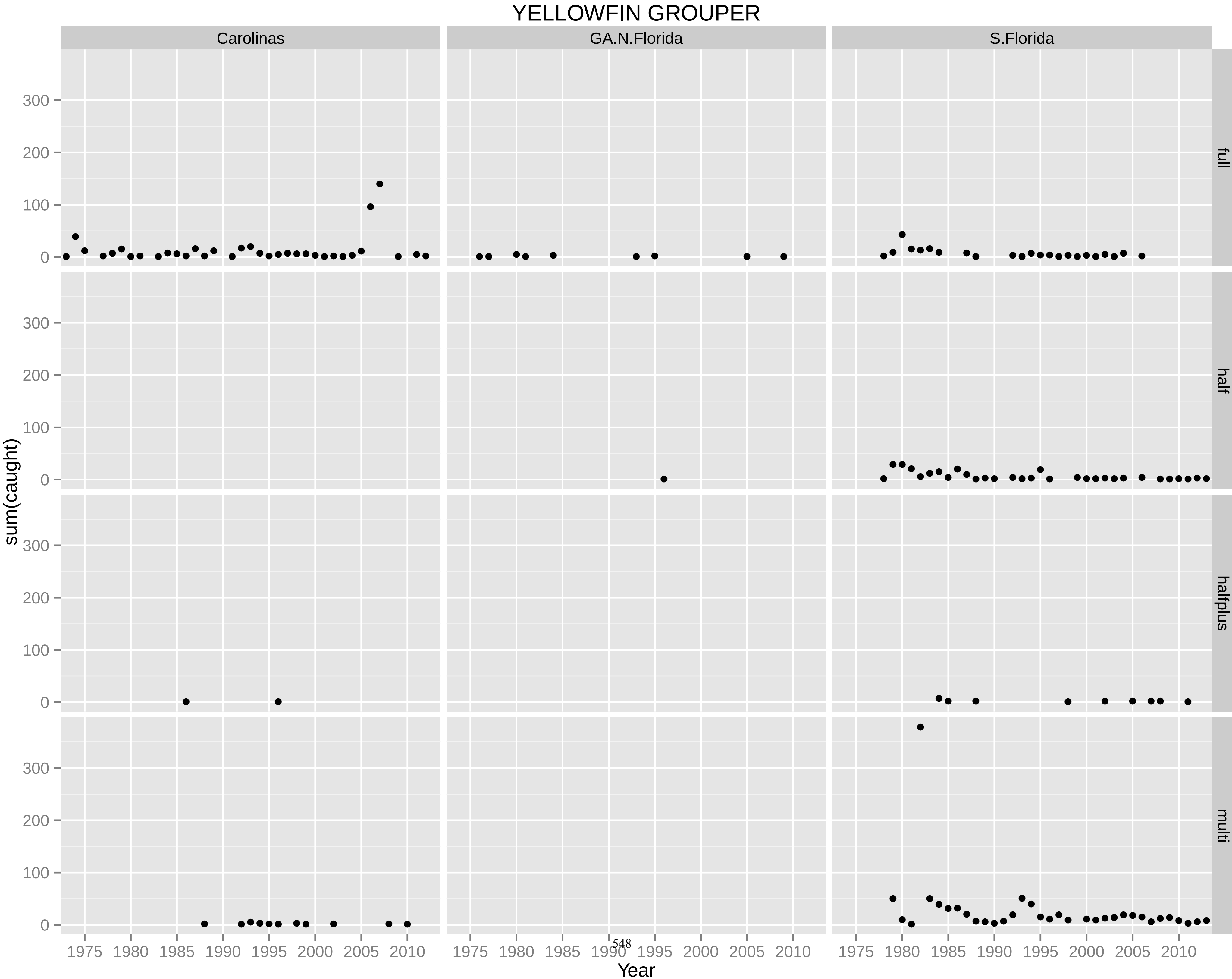

YELLOWEDGE GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
1
0
−1
−2
−3
−4
1975
1980
1985
1990
1995
2000
2005
Year


YELLOWEDGE GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
0
200
400
1975
1980
1985
1990
1995
2000
2005
Year

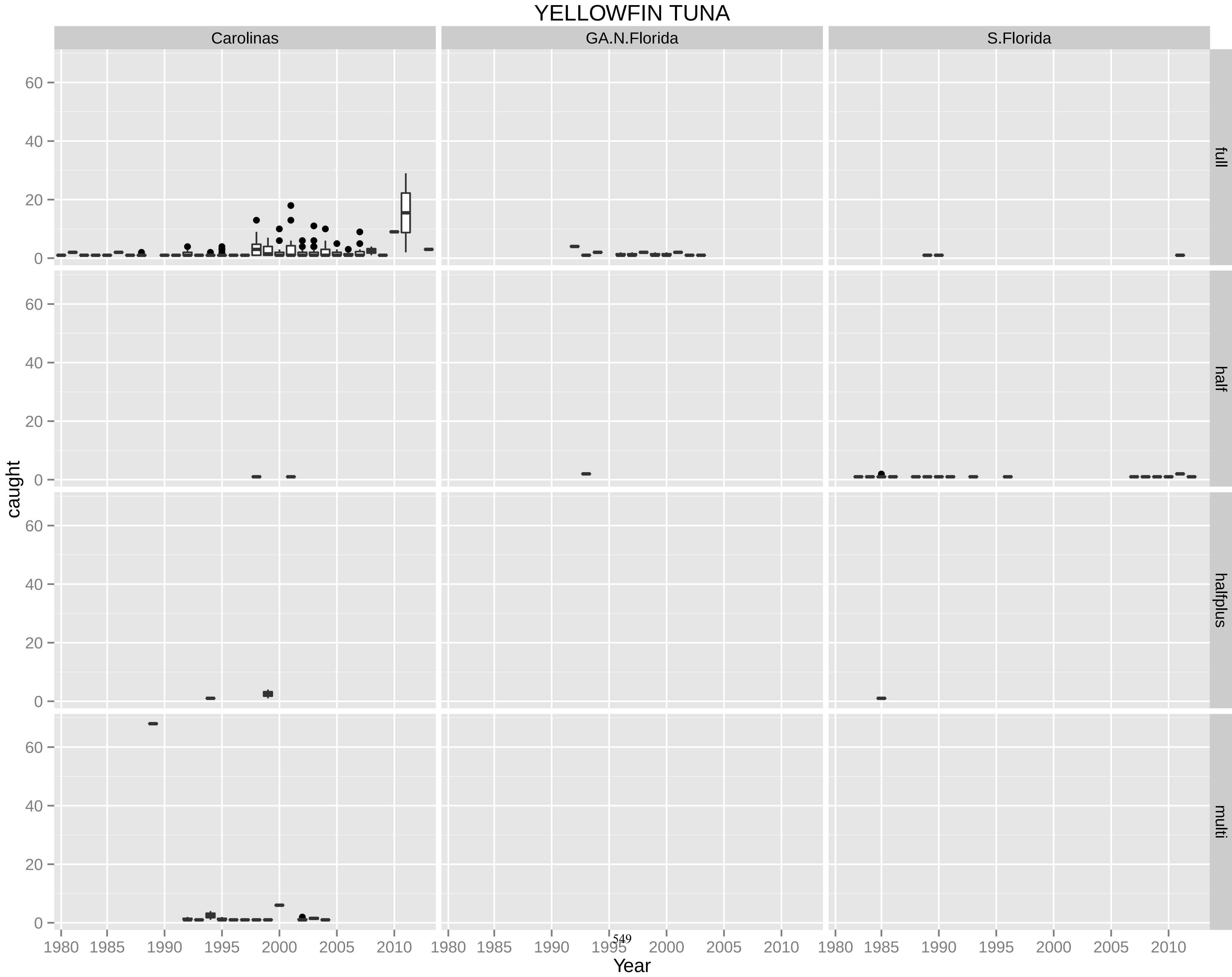

YELLOWFIN GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
25
50
75
1975
1980
1985
1990
1995
2000
2005
2010

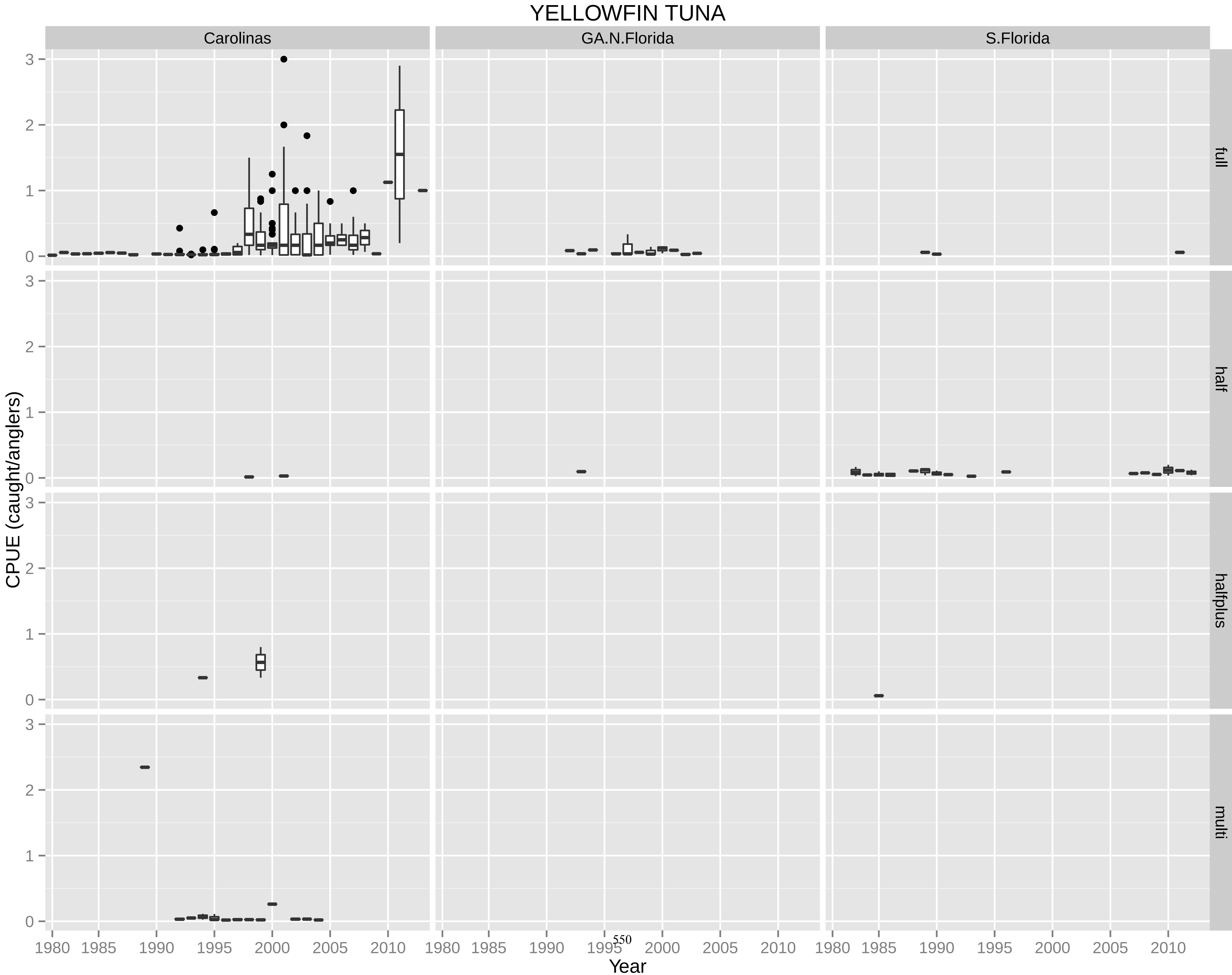

YELLOWFIN GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
2
4
6
1975
1980
1985
1990
1995
2000
2005
2010

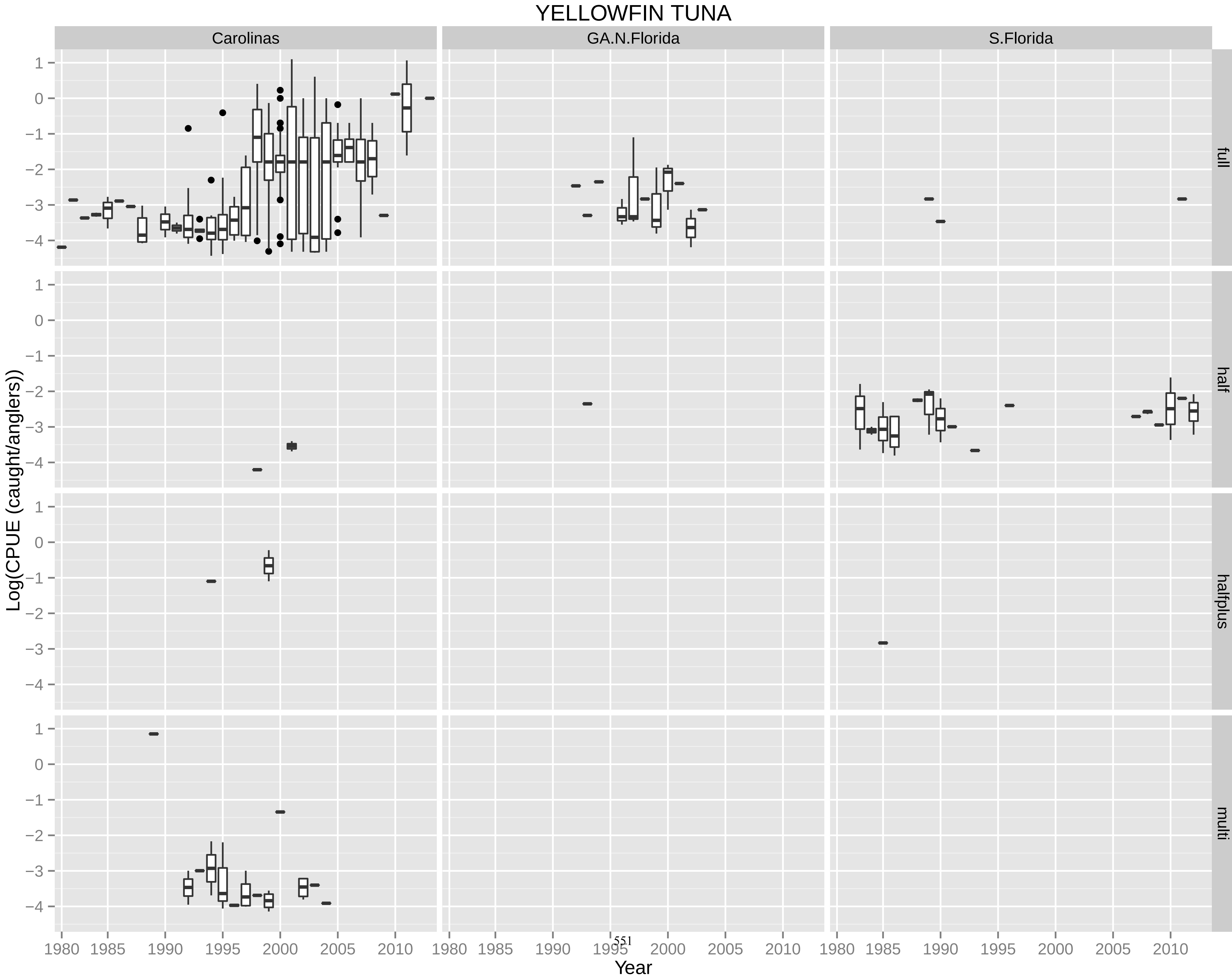

YELLOWFIN GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
2
0
−2
−4
1975
1980
1985
1990
1995
2000
2005
2010

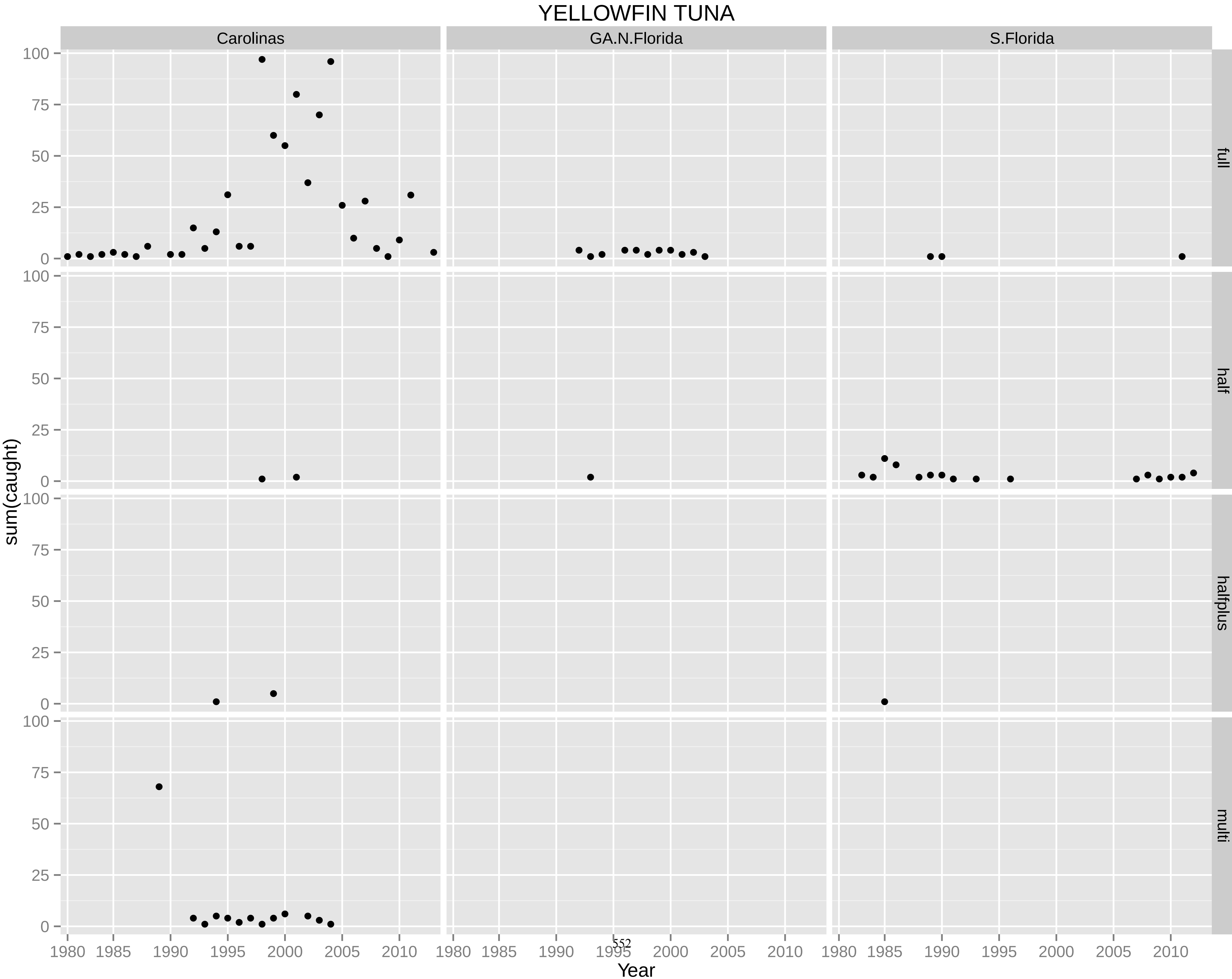


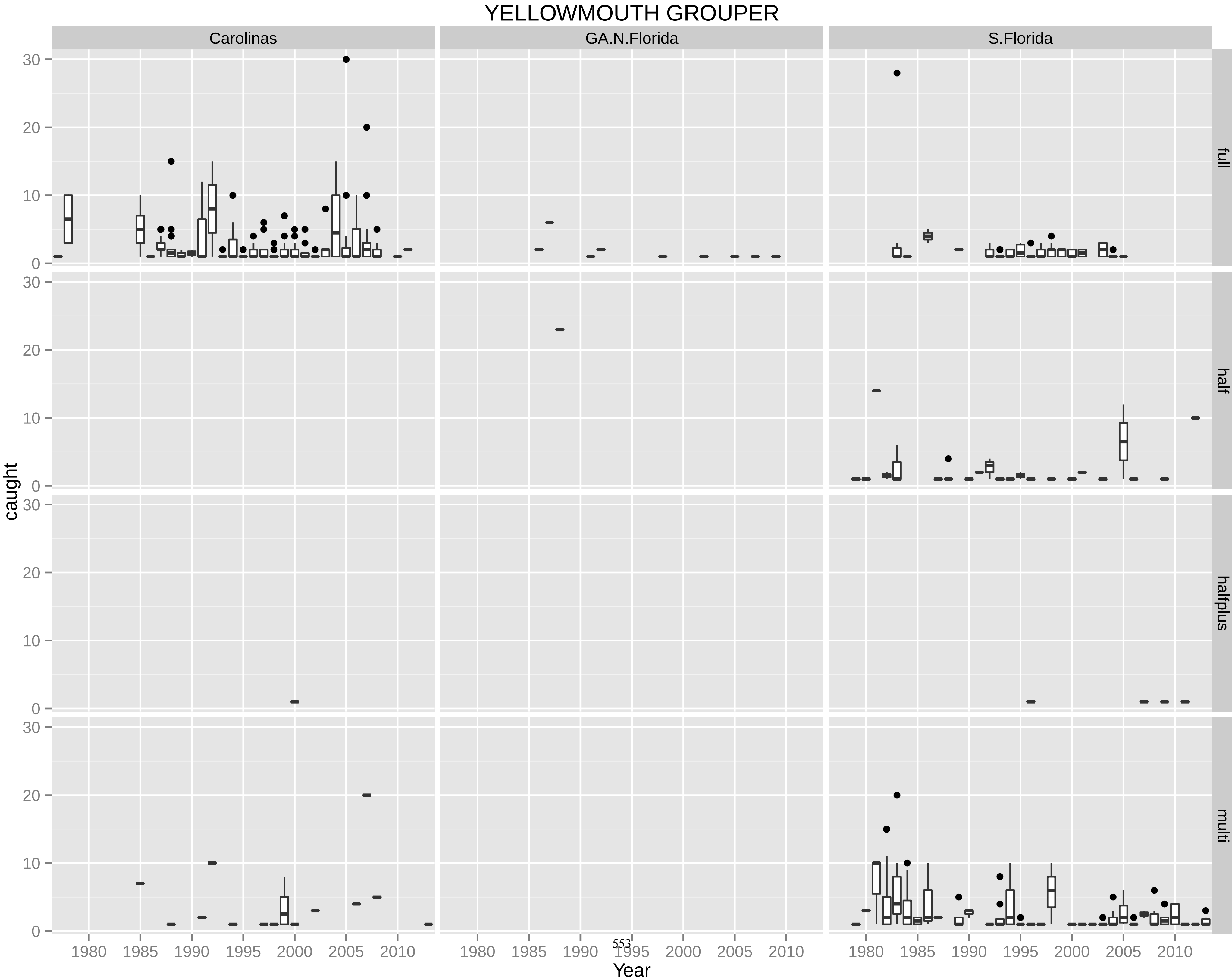
YELLOWFIN GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
100
200
300
1975
1980
1985
1990
1995
2000
2005
2010


YELLOWFIN TUNA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
20
40
60
1980
1985
1990
1995
2000
2005
2010

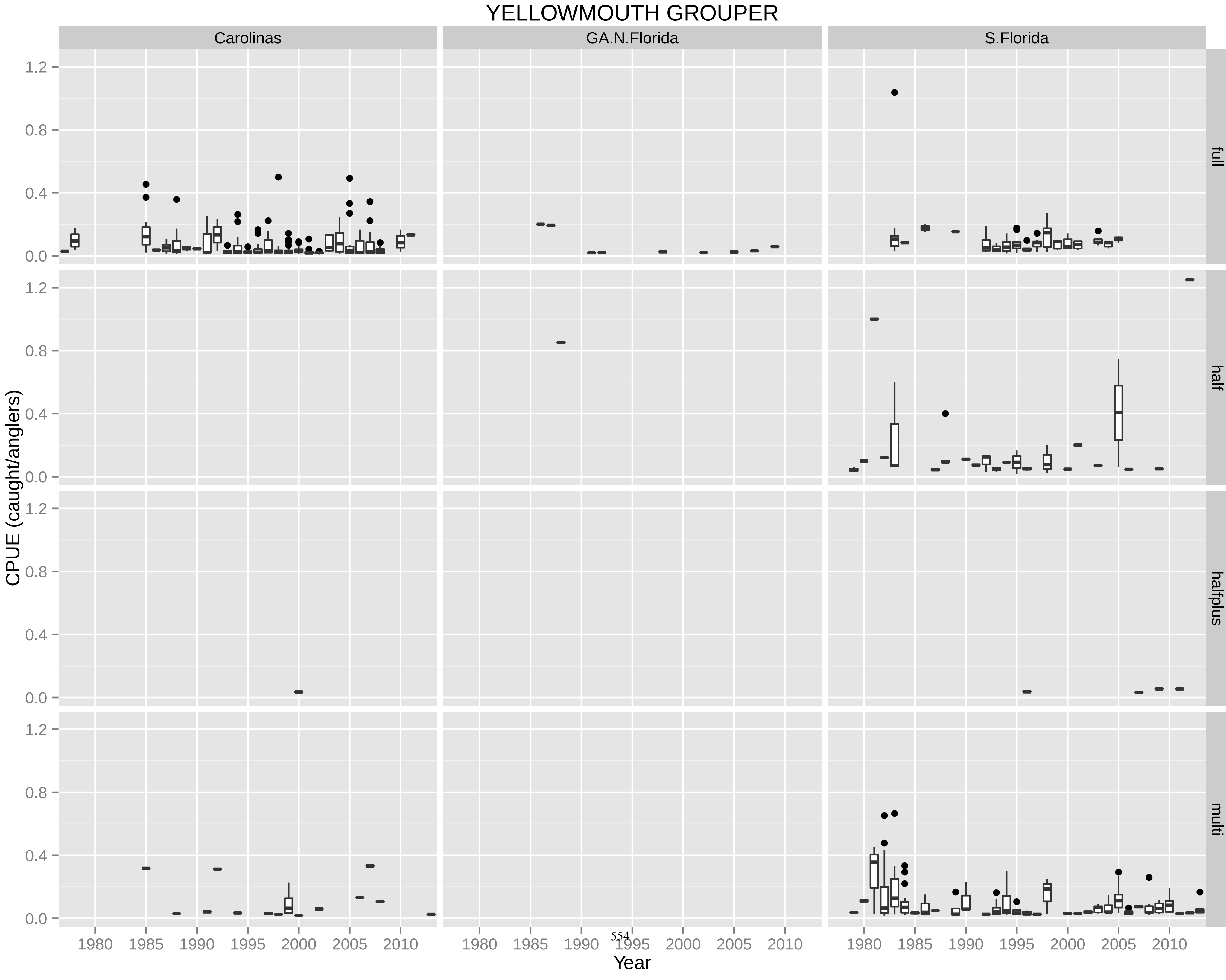

YELLOWFIN TUNA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0
1
2
3
1980
1985
1990
1995
2000
2005
2010

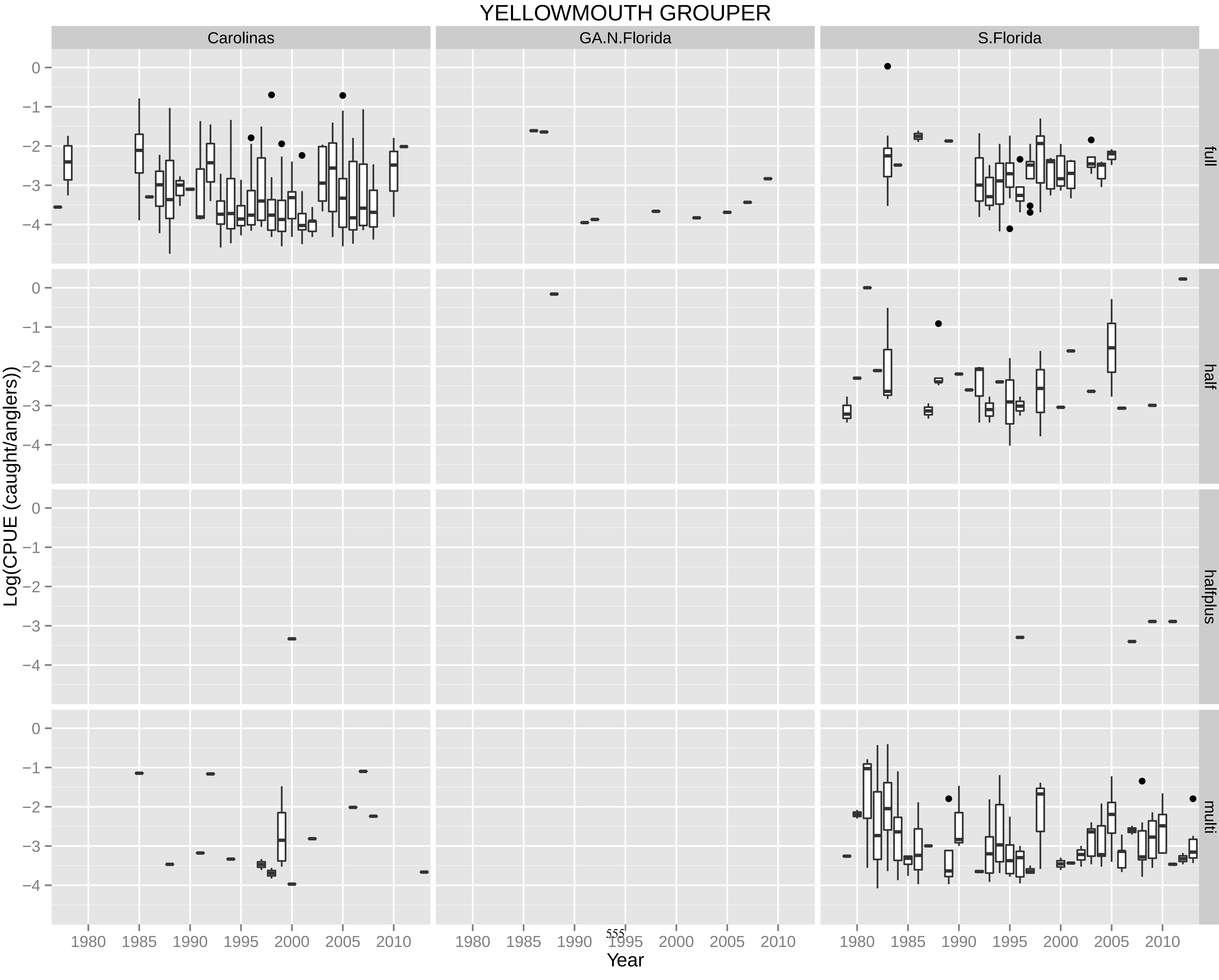

YELLOWFIN TUNA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year

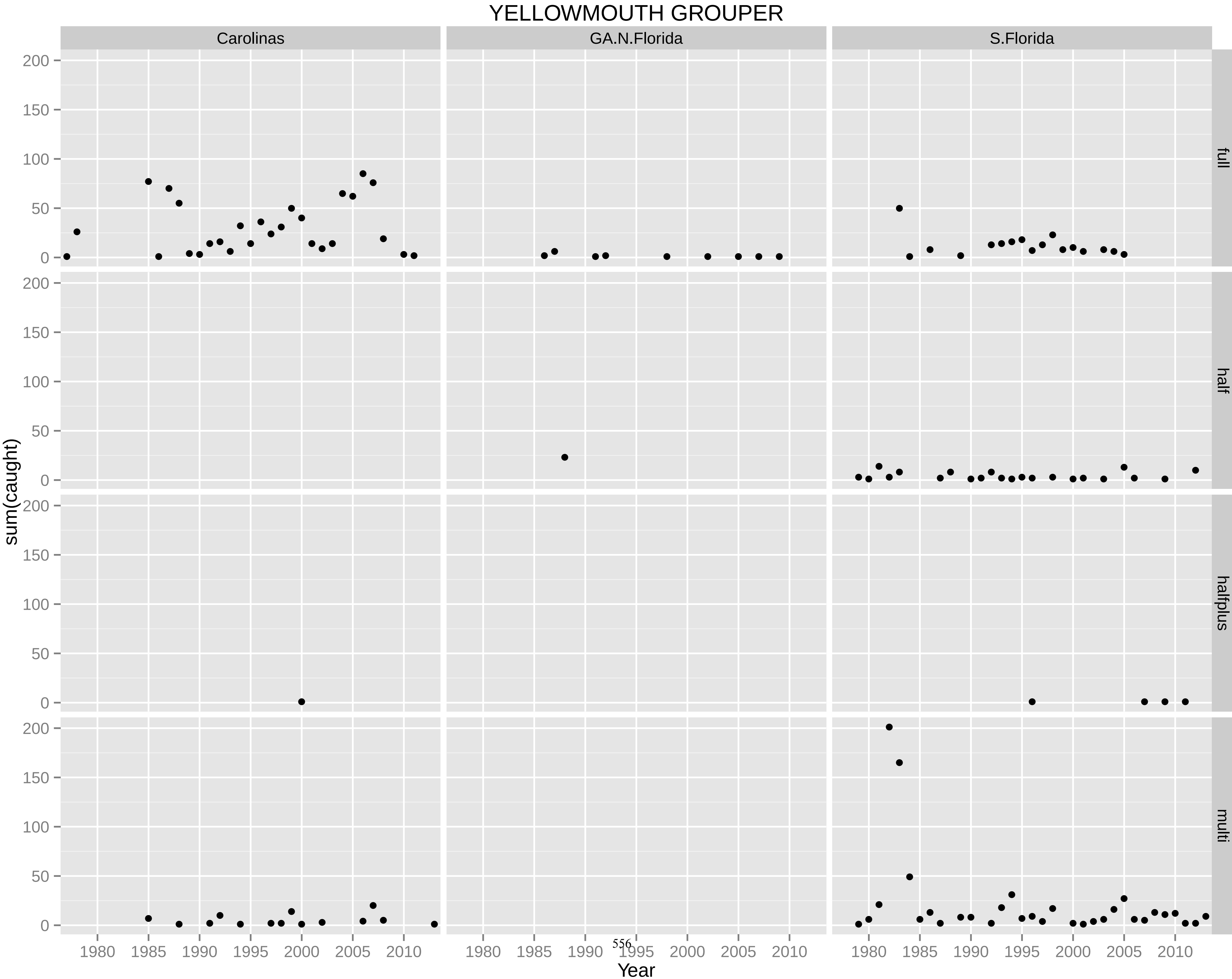

YELLOWFIN TUNA
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
25
50
75
100
1980
1985
1990
1995
2000
2005
2010

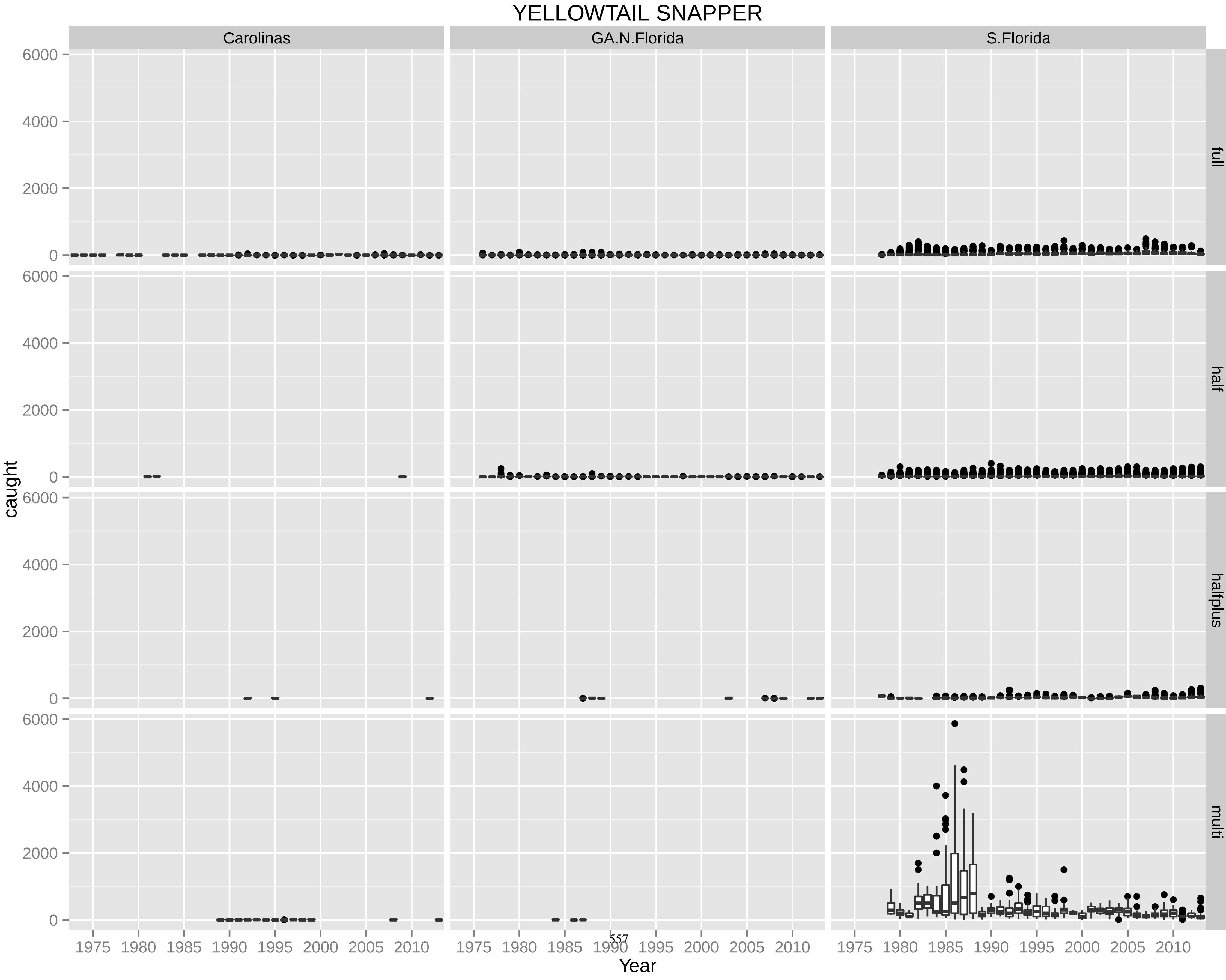


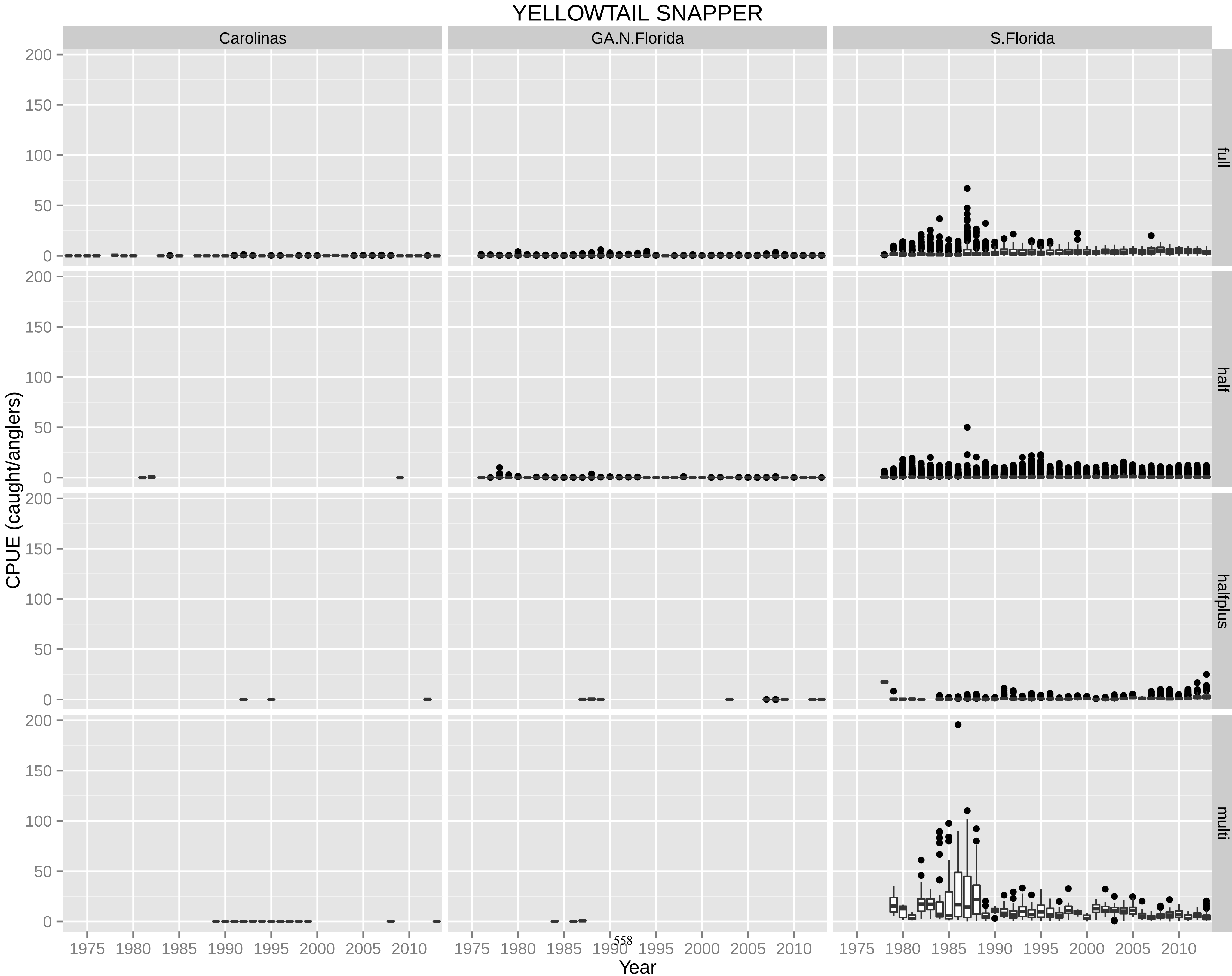
YELLOWMOUTH GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
10
20
30
1980
1985
1990
1995
2000
2005
2010

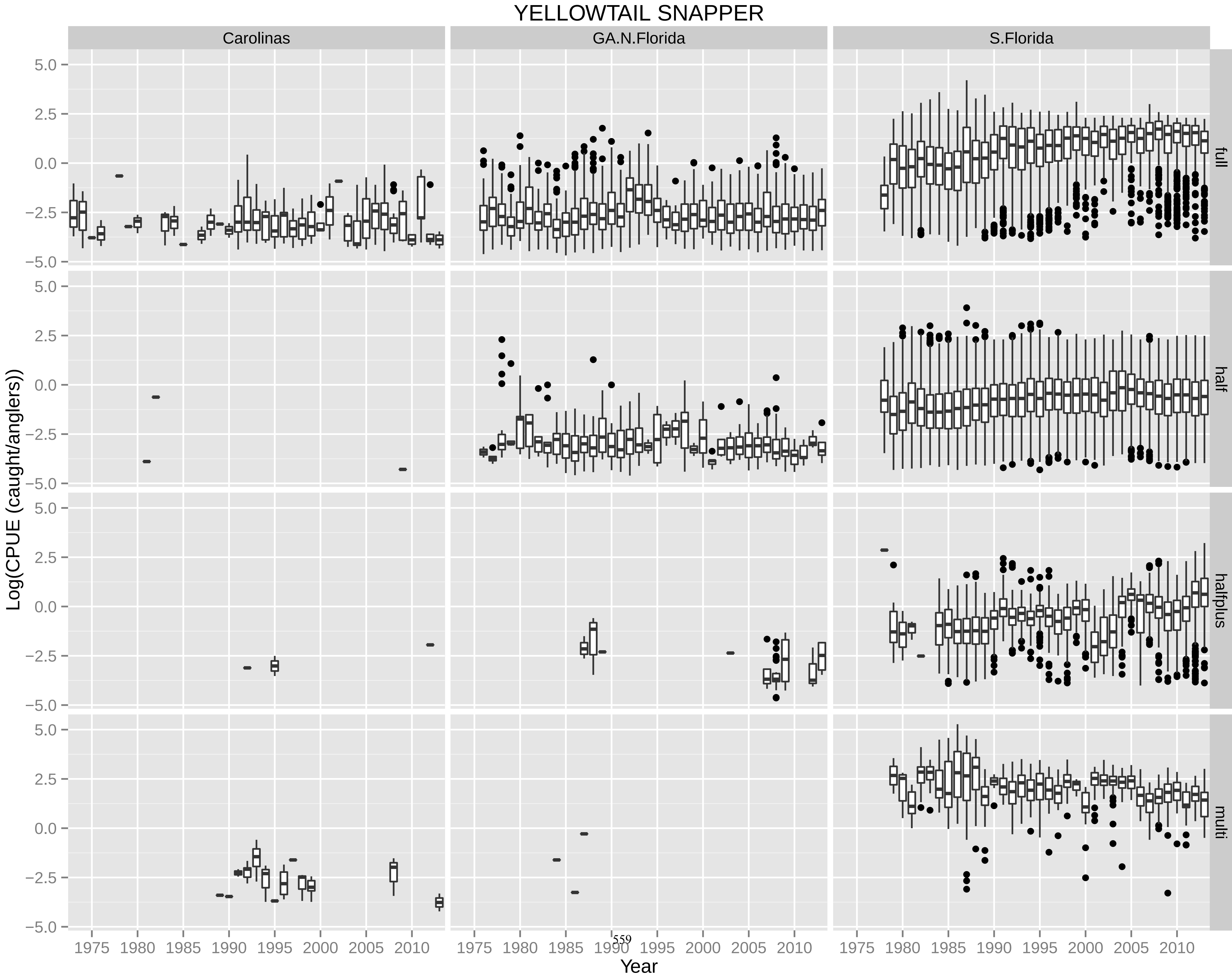

YELLOWMOUTH GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
Year
0.0
0.4
0.8
1.2
1980
1985
1990
1995
2000
2005
2010

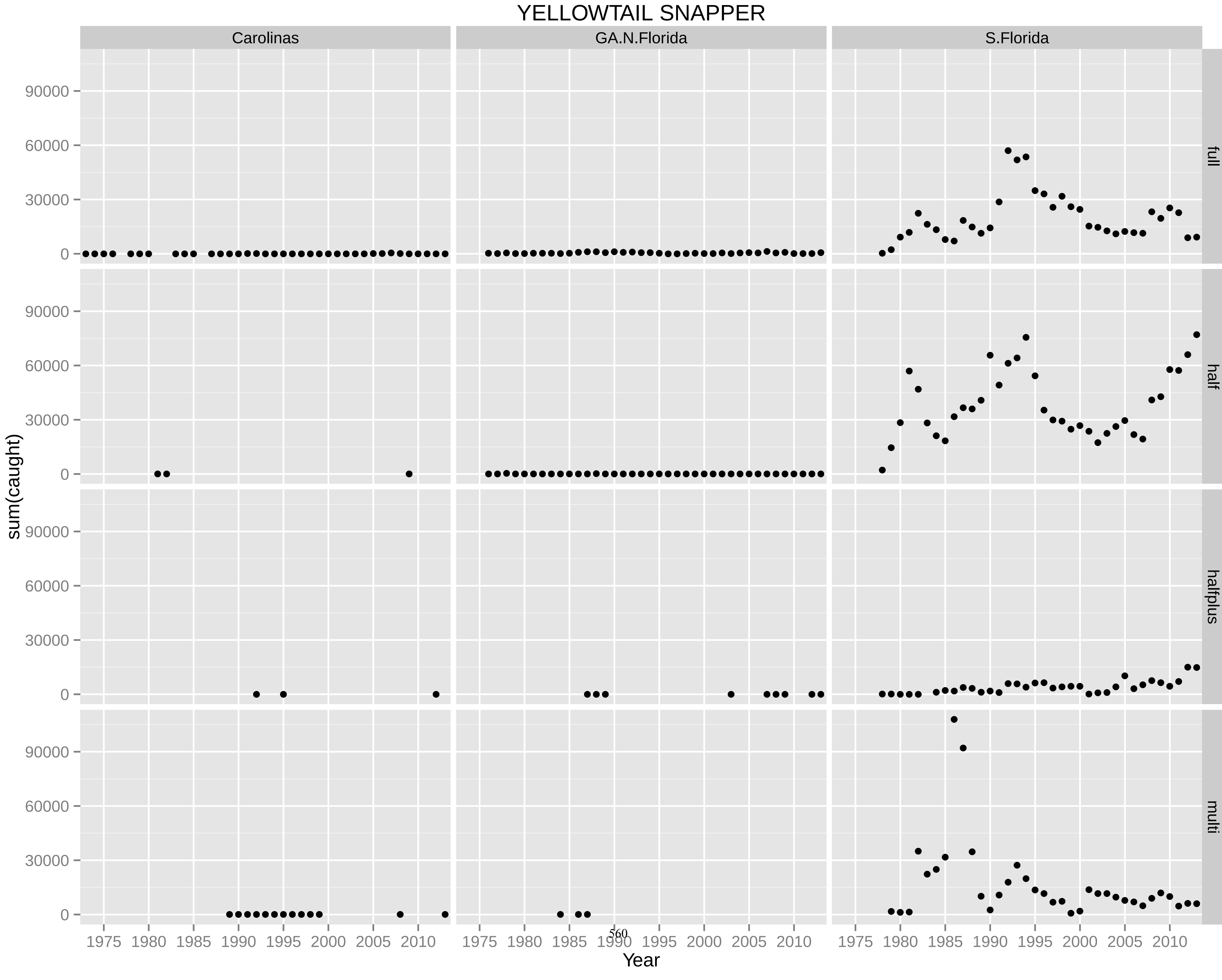

YELLOWMOUTH GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
0
−1
−2
−3
−4
1980
1985
1990
1995
2000
2005
2010
Year


YELLOWMOUTH GROUPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
50
100
150
200
1980
1985
1990
1995
2000
2005
2010


YELLOWTAIL SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
caught
Year
0
2000
4000
6000
1975
1980
1985
1990
1995
2000
2005
2010

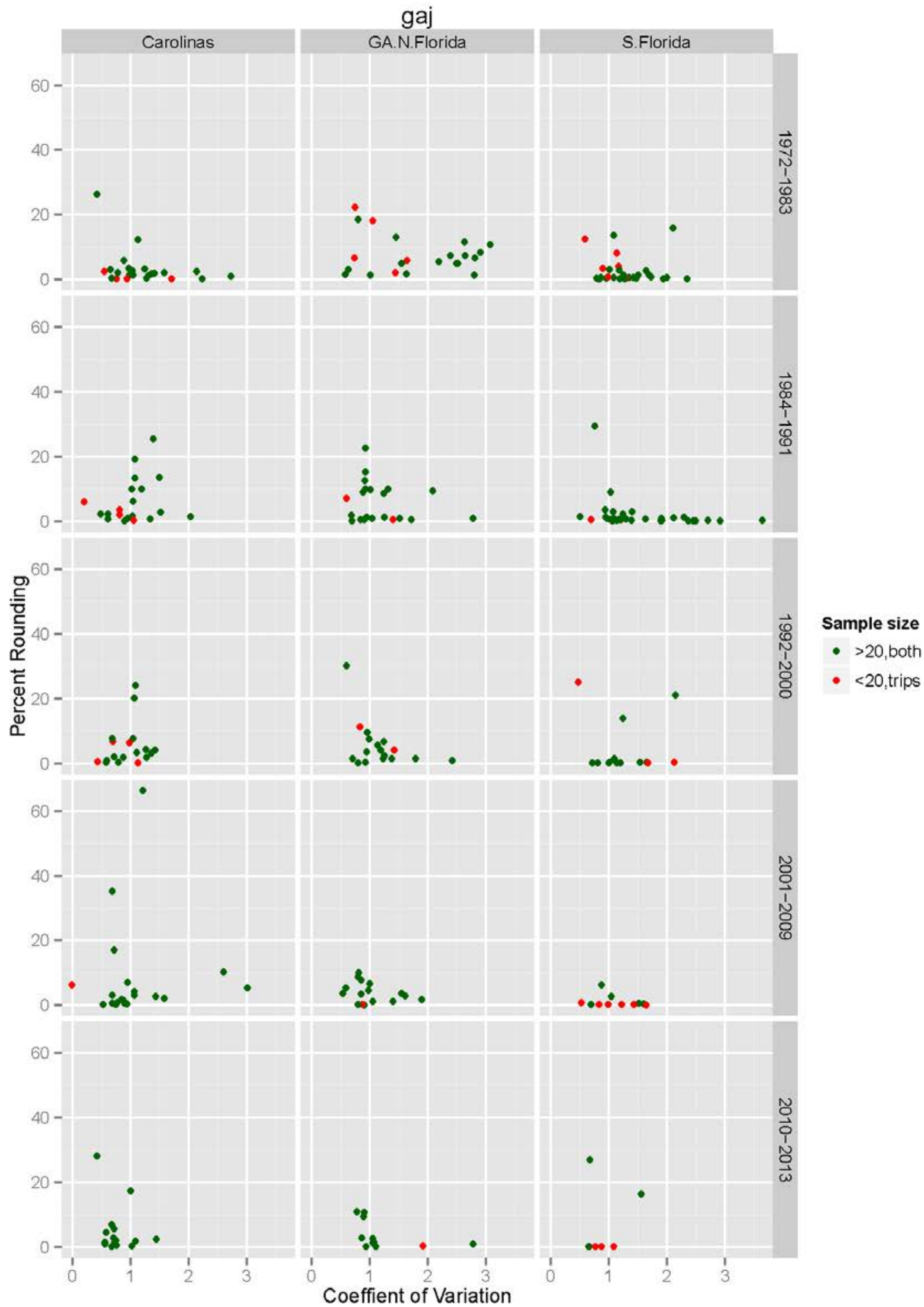

YELLOWTAIL SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
CPUE (caught/anglers)
0
50
100
150
200
1975
1980
1985
1990
1995
2000
2005
2010
Year

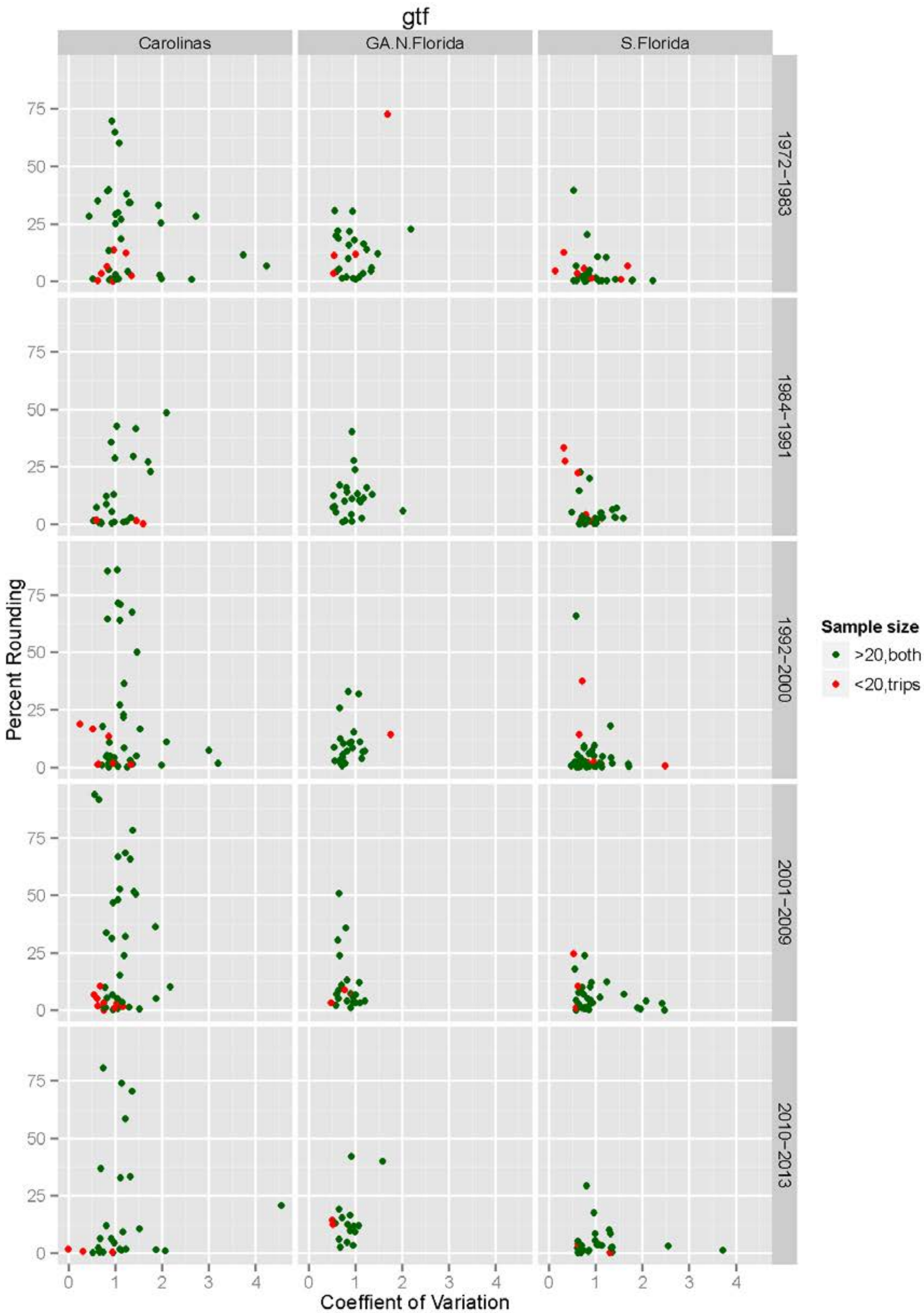

YELLOWTAIL SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
Log(CPUE (caught/anglers))
Year
5.0
2.5
0.0
−2.5
−5.0
1975
1980
1985
1990
1995
2000
2005
2010

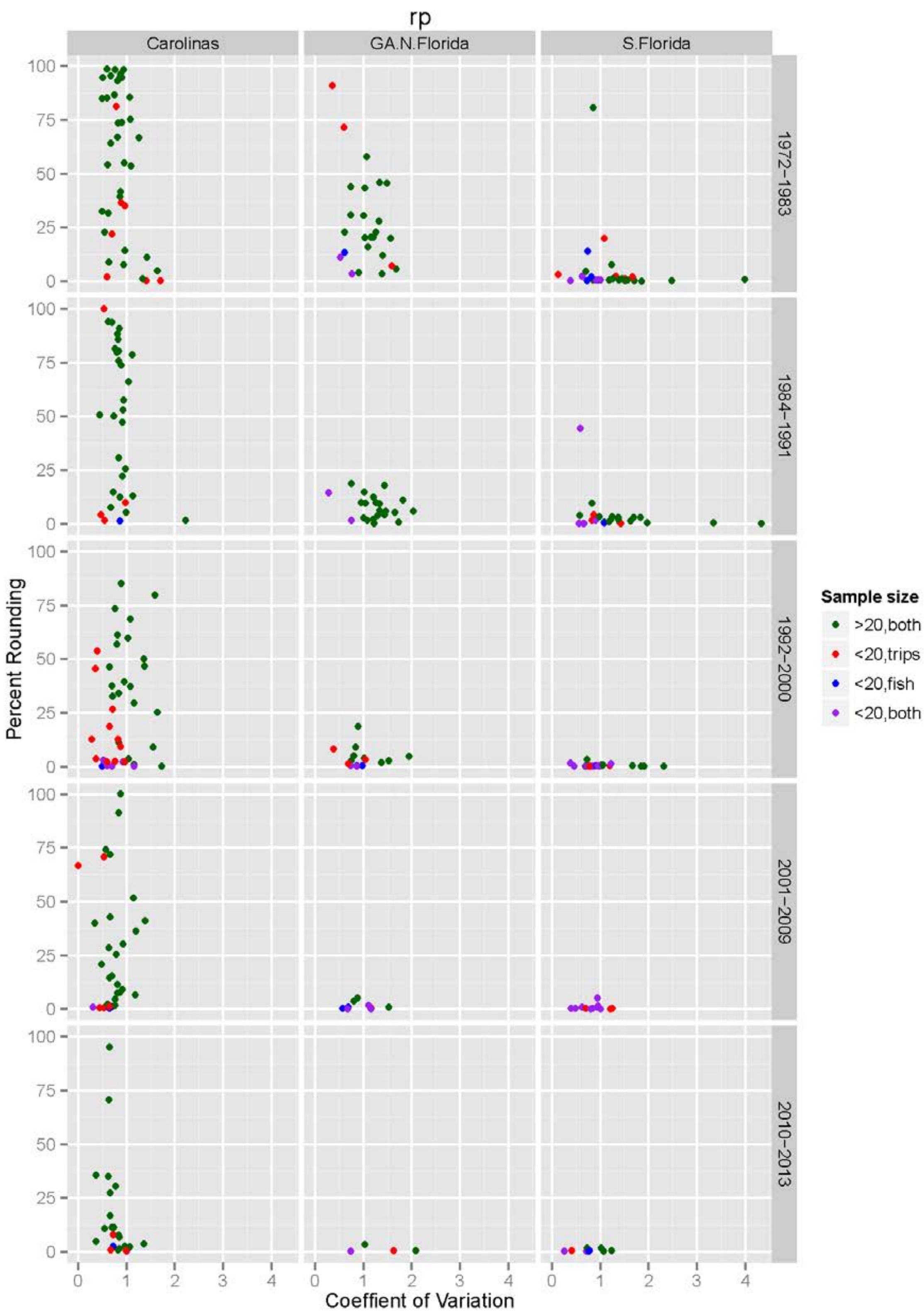

YELLOWTAIL SNAPPER
Carolinas
GA.N.Florida
S.Florida
full
half
halfplus
multi
sum(caught)
Year
0
30000
60000
90000
1975
1980
1985
1990
1995
2000
2005
2010

Appendix 12. **Redacted for confidentiality -** For each vessel in the fleet from each time-area block a box plot shows a single vessel's mean relative to the distribution of the surrounding fleet for each metric in the analysis.

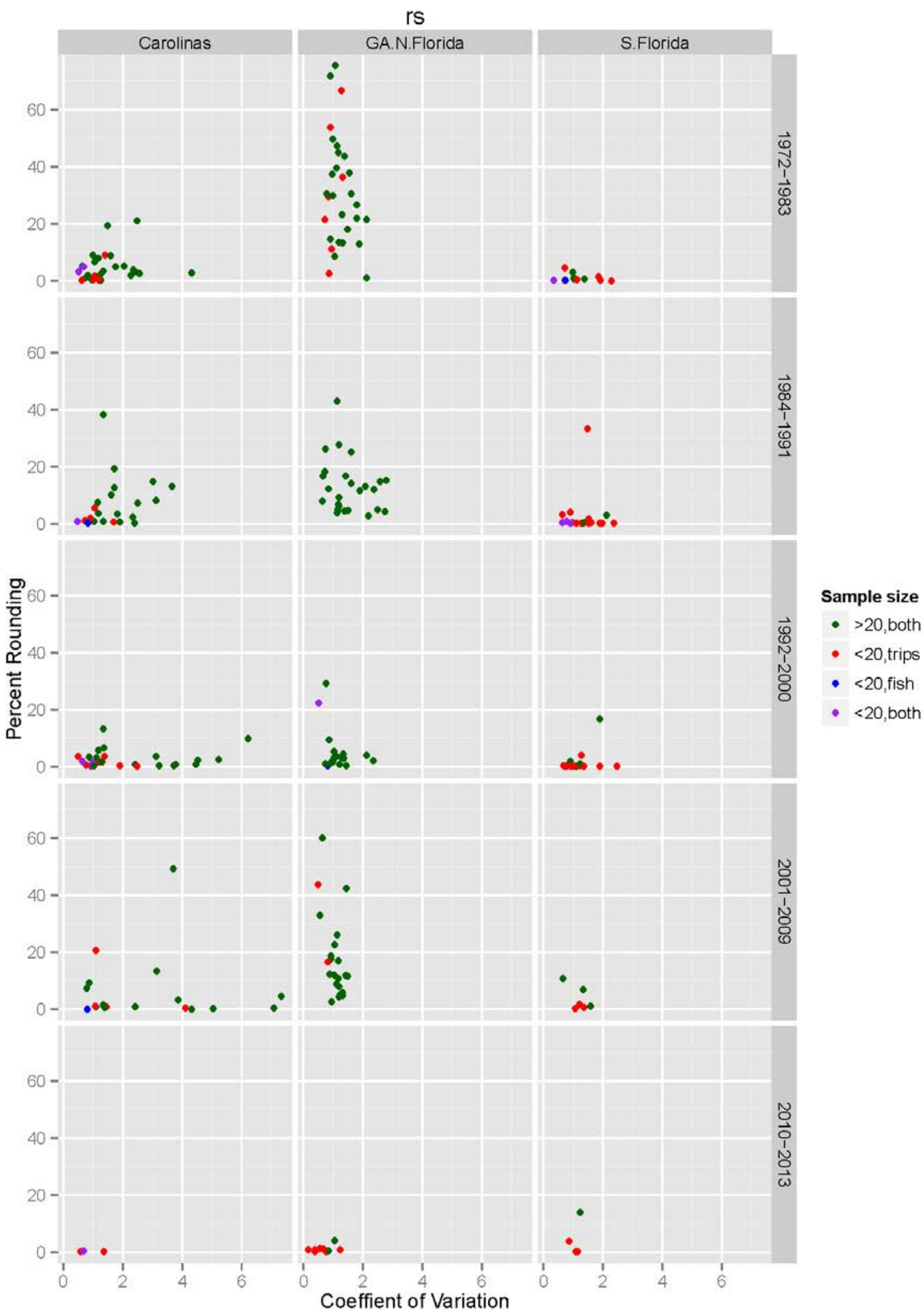
Appendix 13. Comparison of vessels' percent rounding and variance of reported caught by time area block.



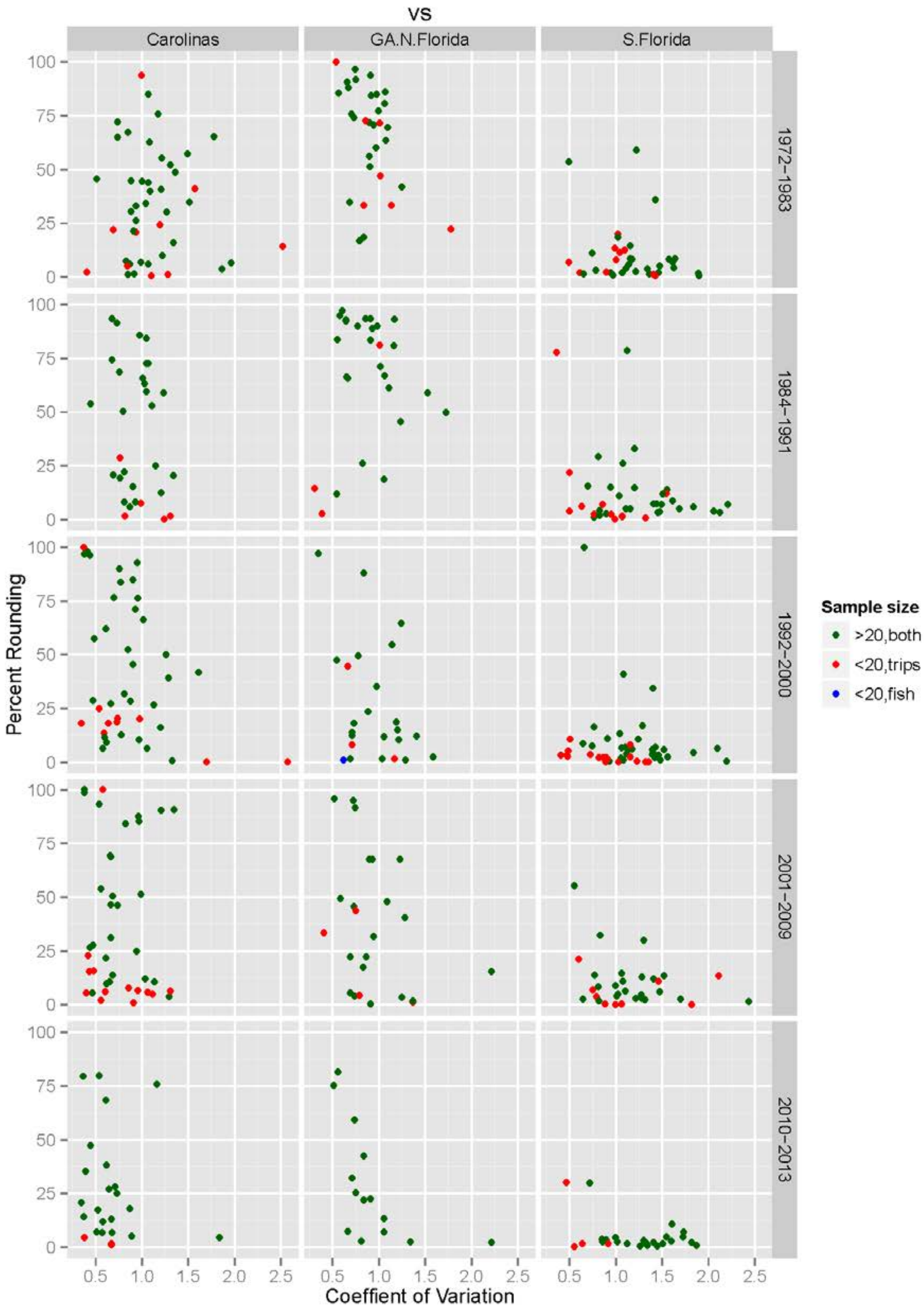

gtf
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips
0
25
50
75
0
1
2
3
4

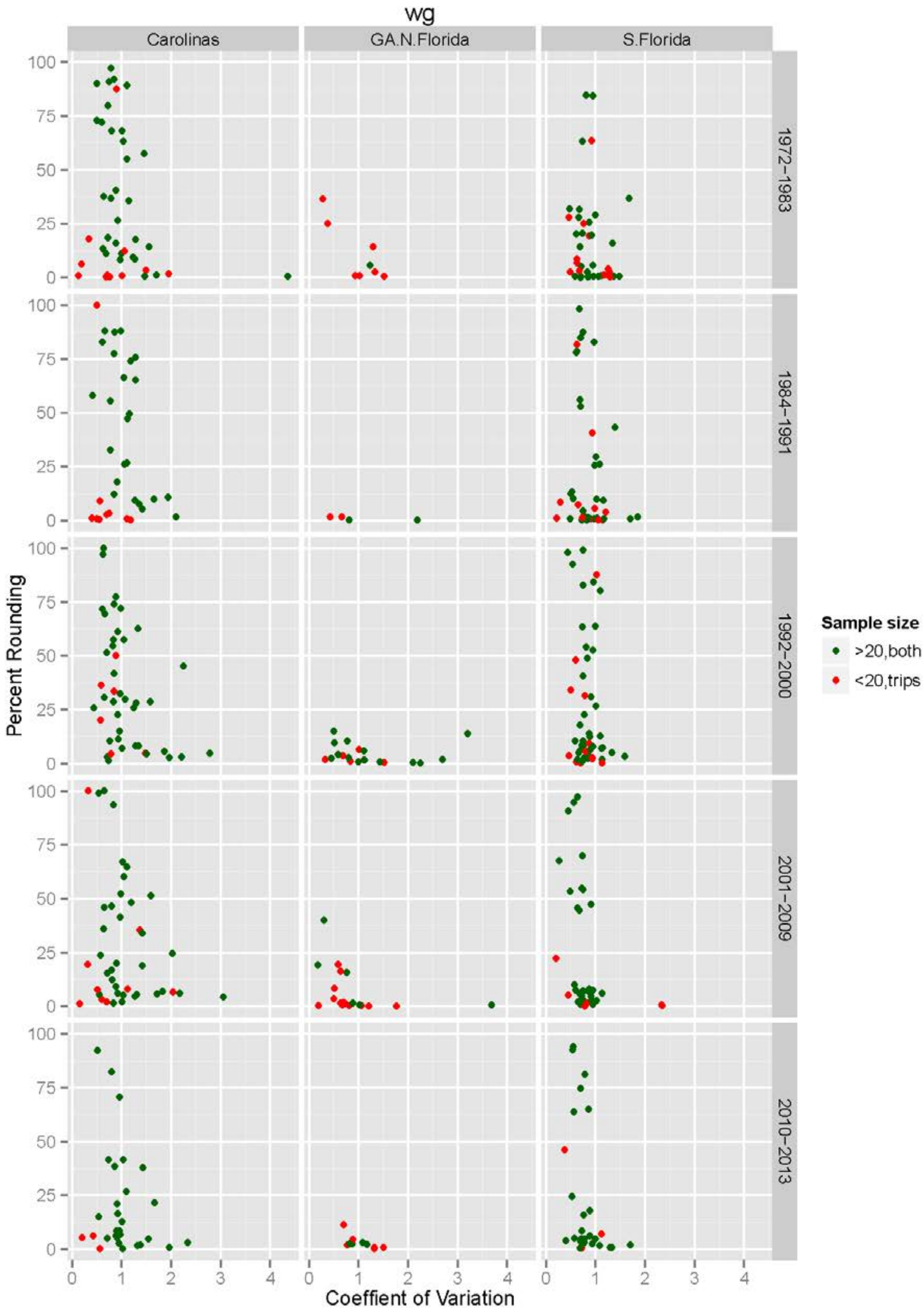


rp
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips
<20,fish
<20,both

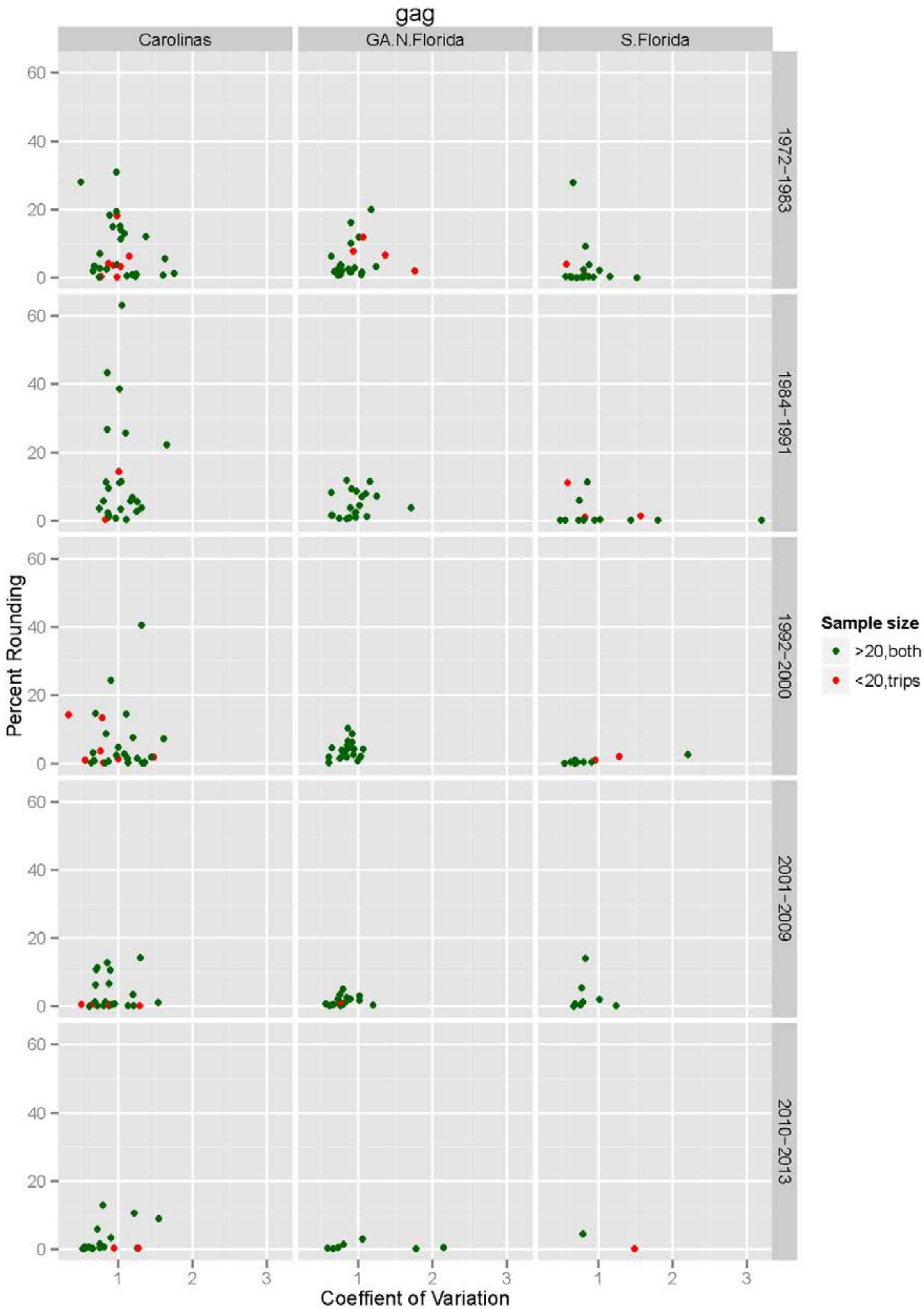


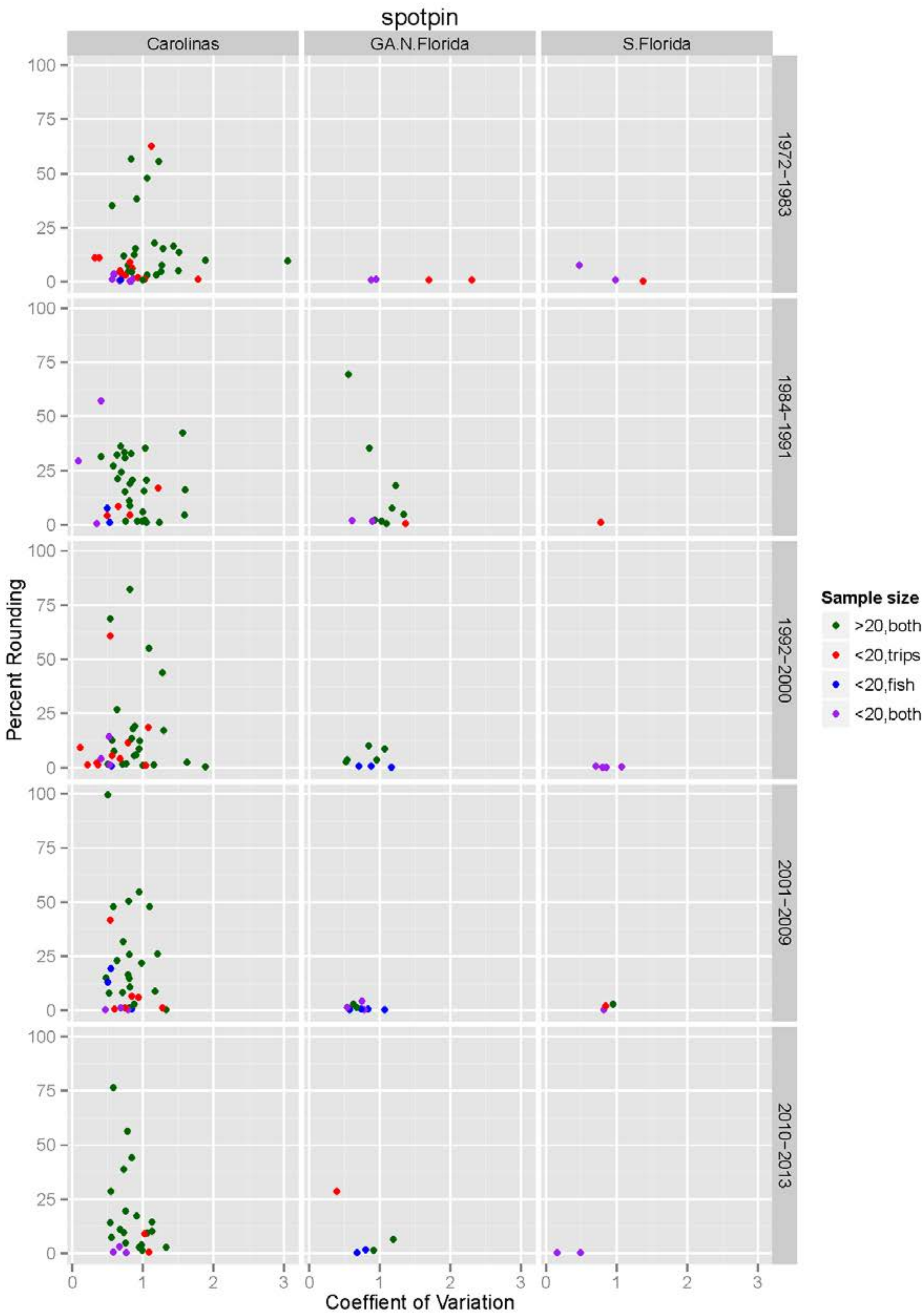
rs
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
0
20
40
60
0
2
4
6
Sample size
>20,both
<20,trips
<20,fish
<20,both

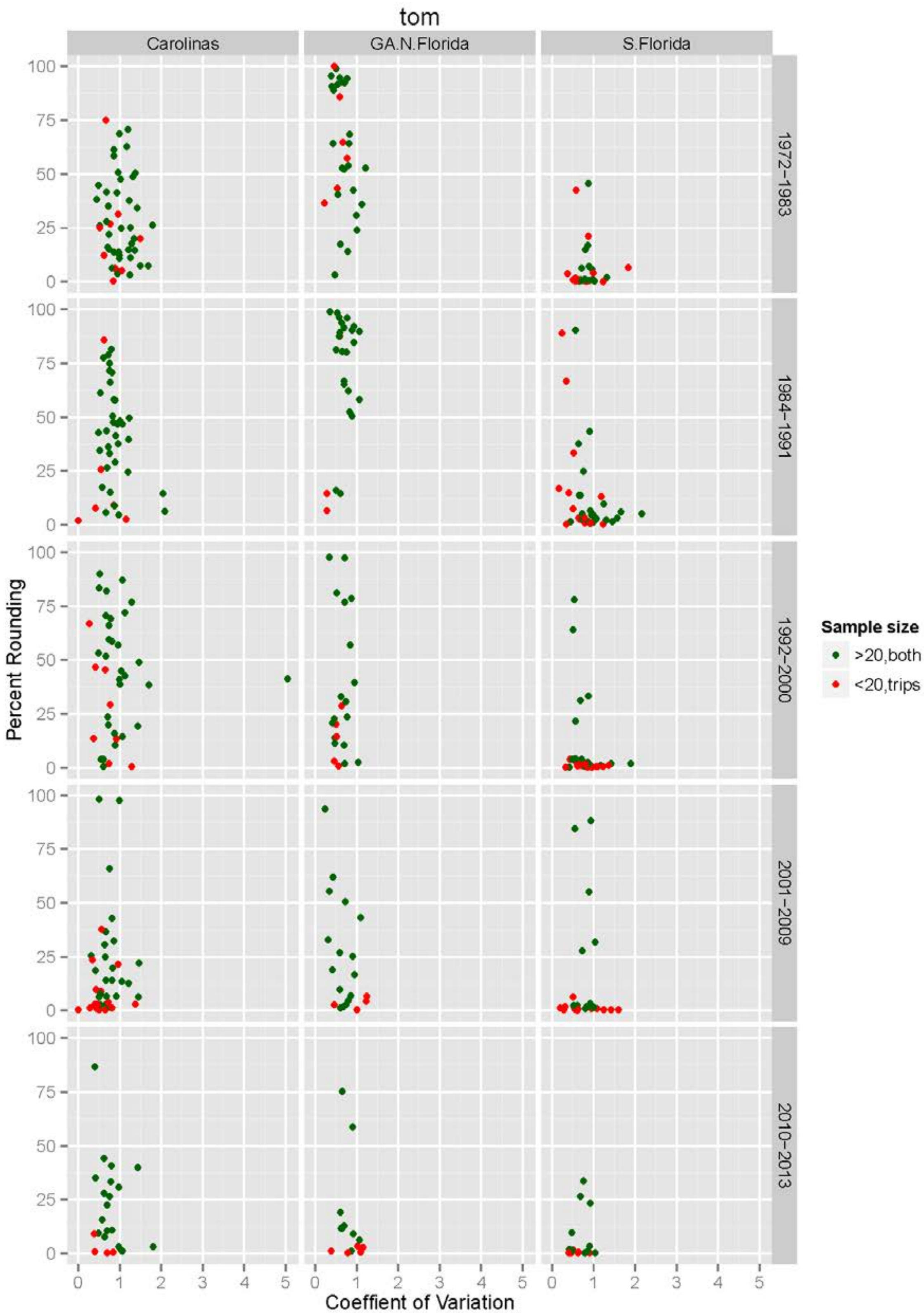

vs
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips
<20,fish

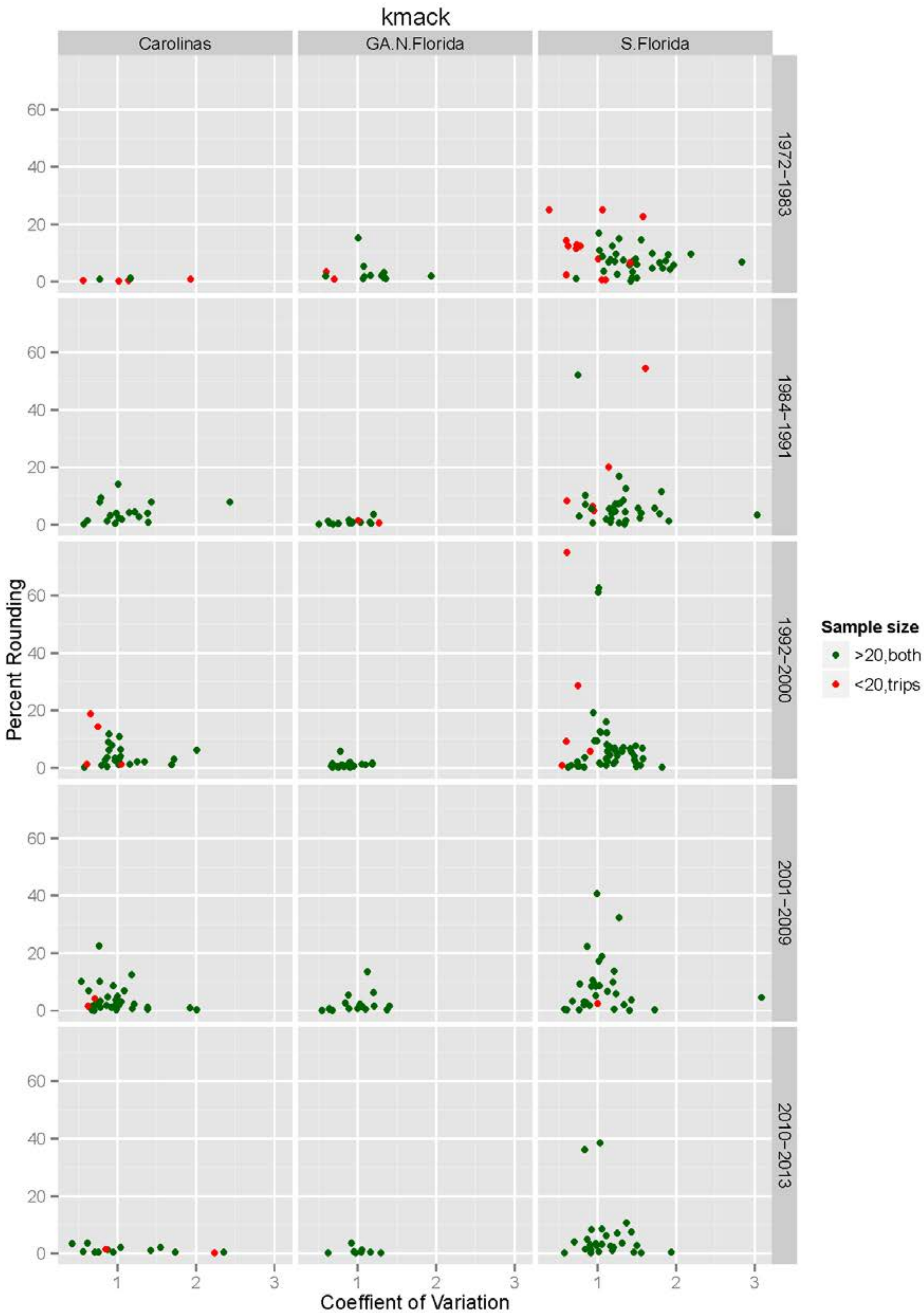


wg
Carolinas
GA.N.Florida
S.Florida
1972−1983
1984−1991
1992−2000
2001−2009
2010−2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips

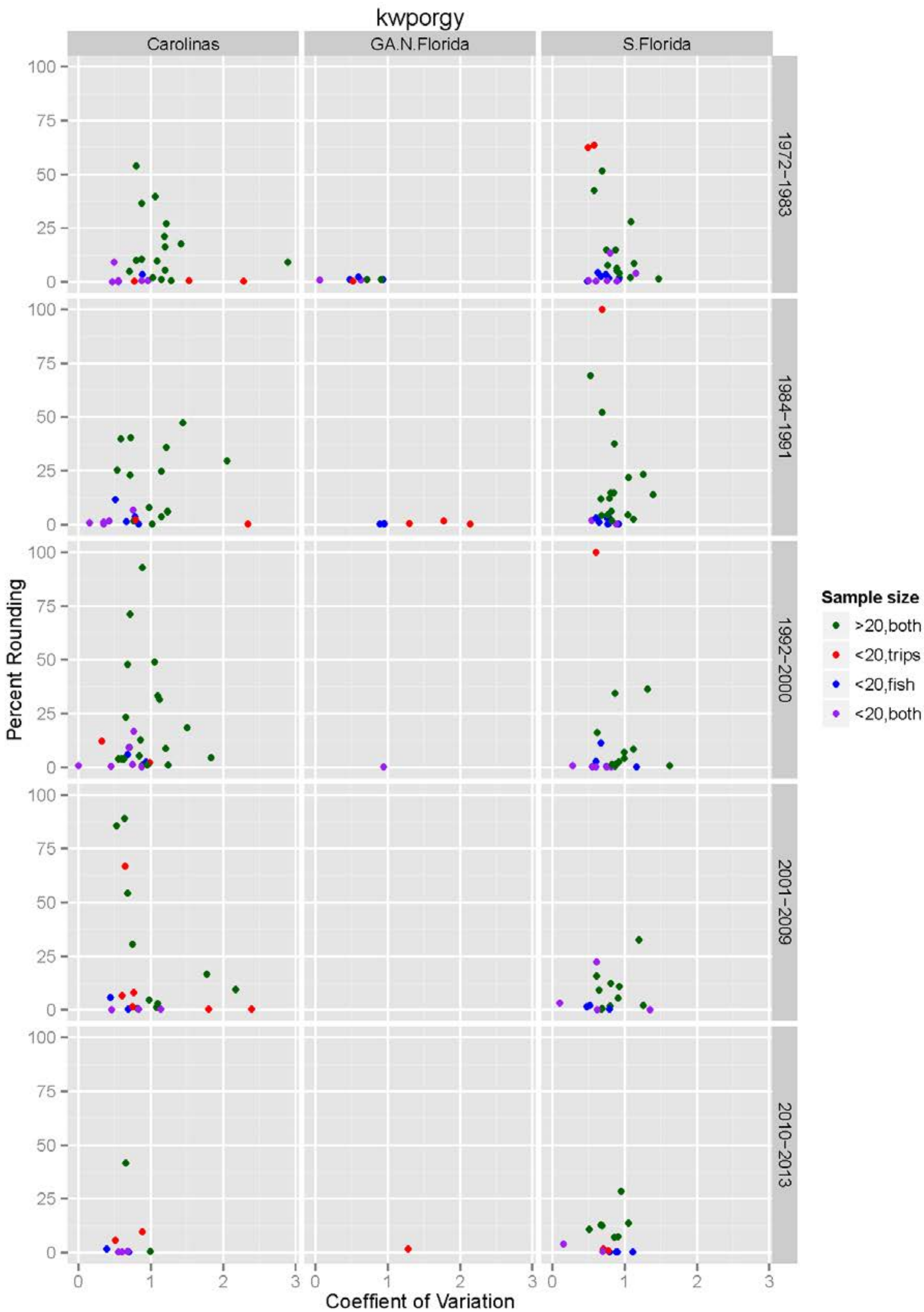

gag
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips

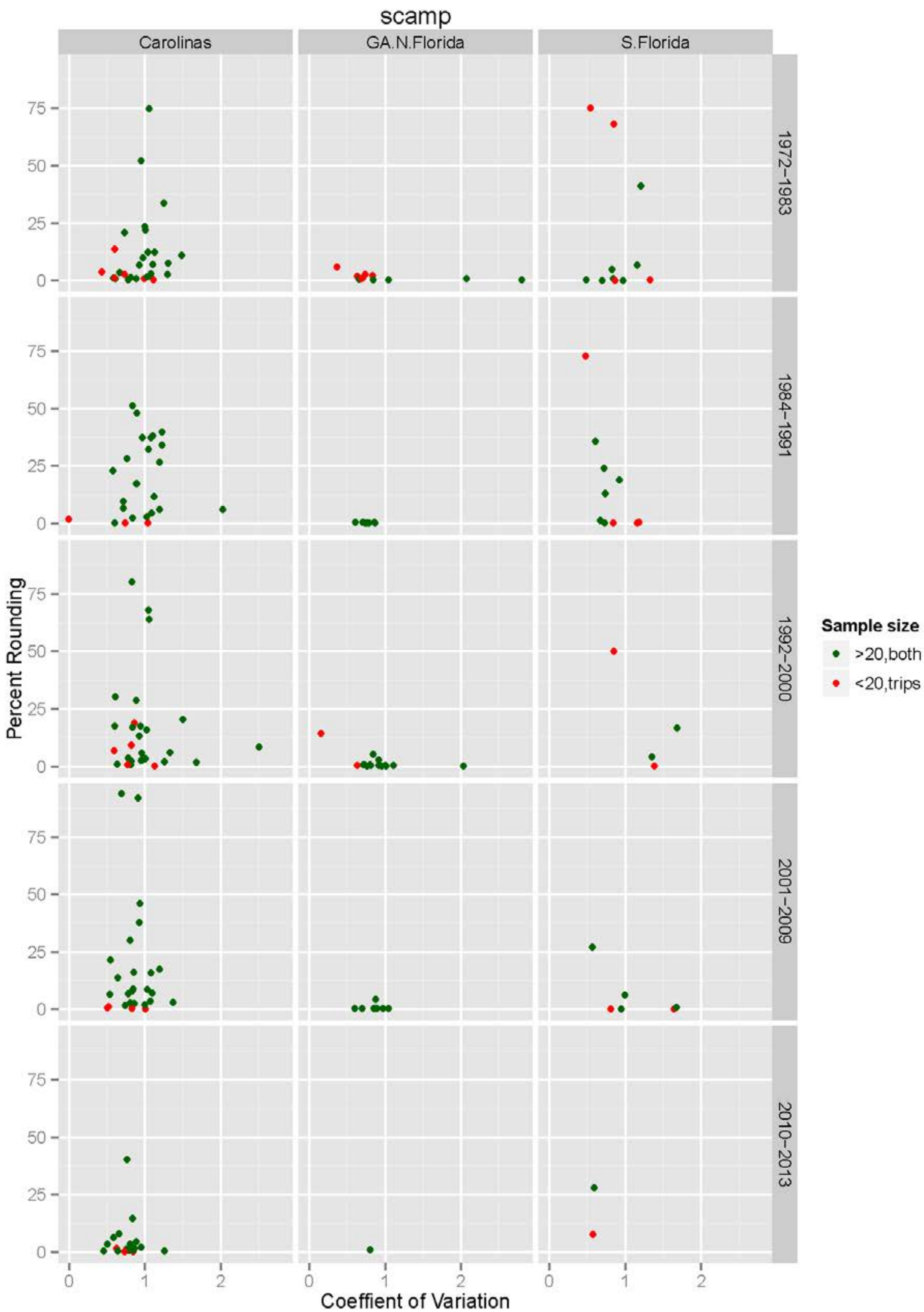

spotpin
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips
<20,fish
<20,both

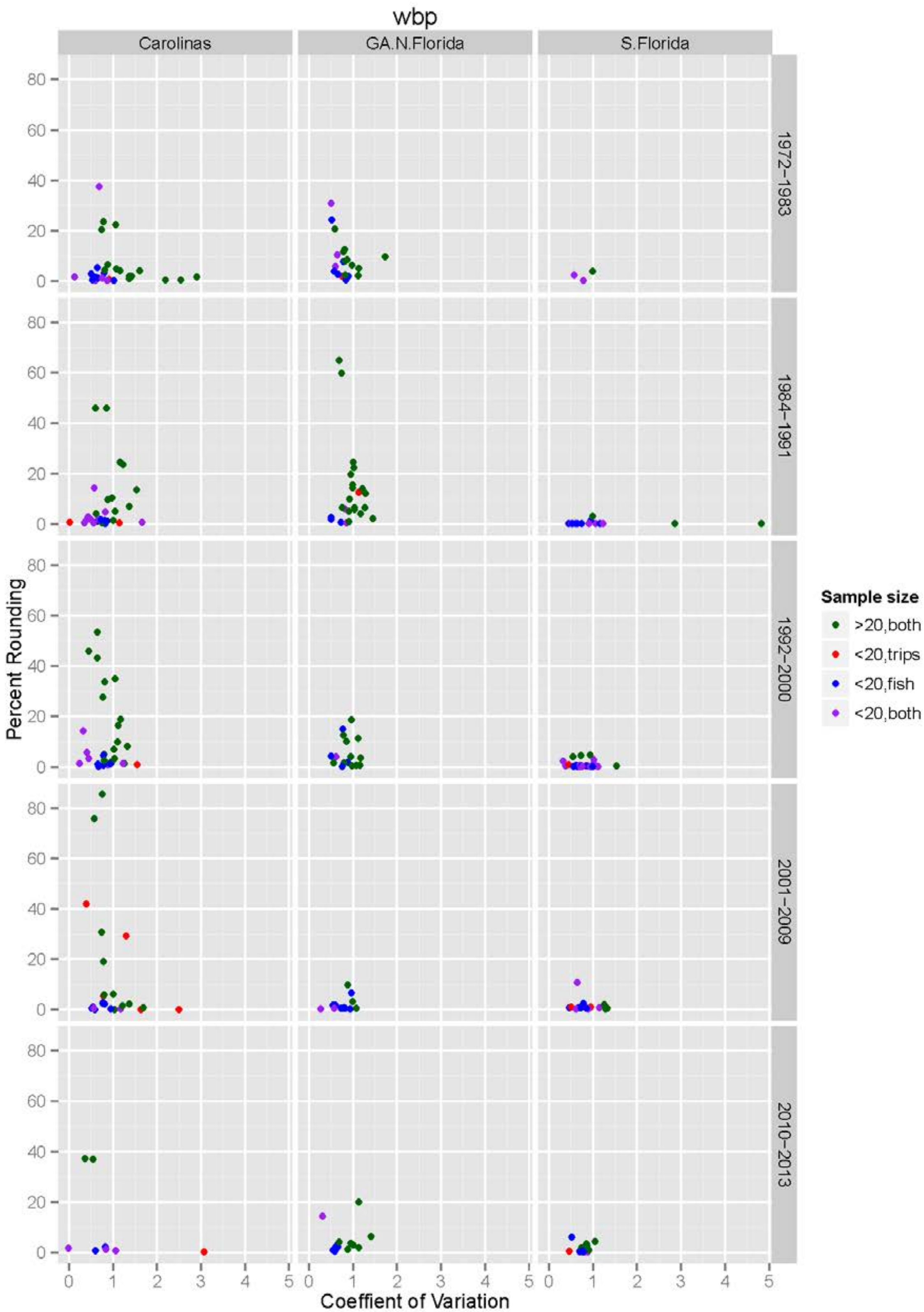

tom
Carolinas
GA.N.Florida
S.Florida
1972−1983
1984−1991
1992−2000
2001−2009
2010−2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips

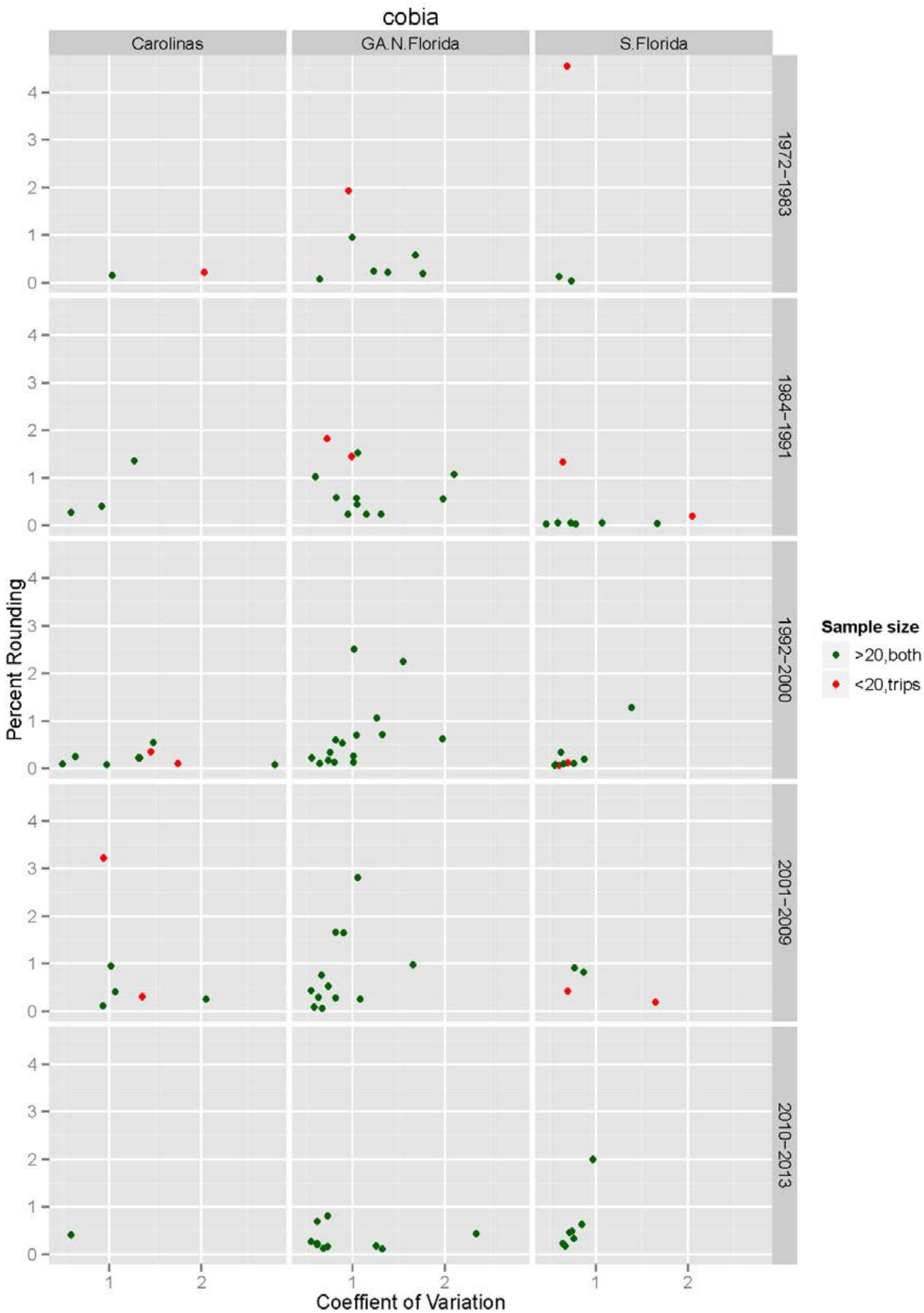


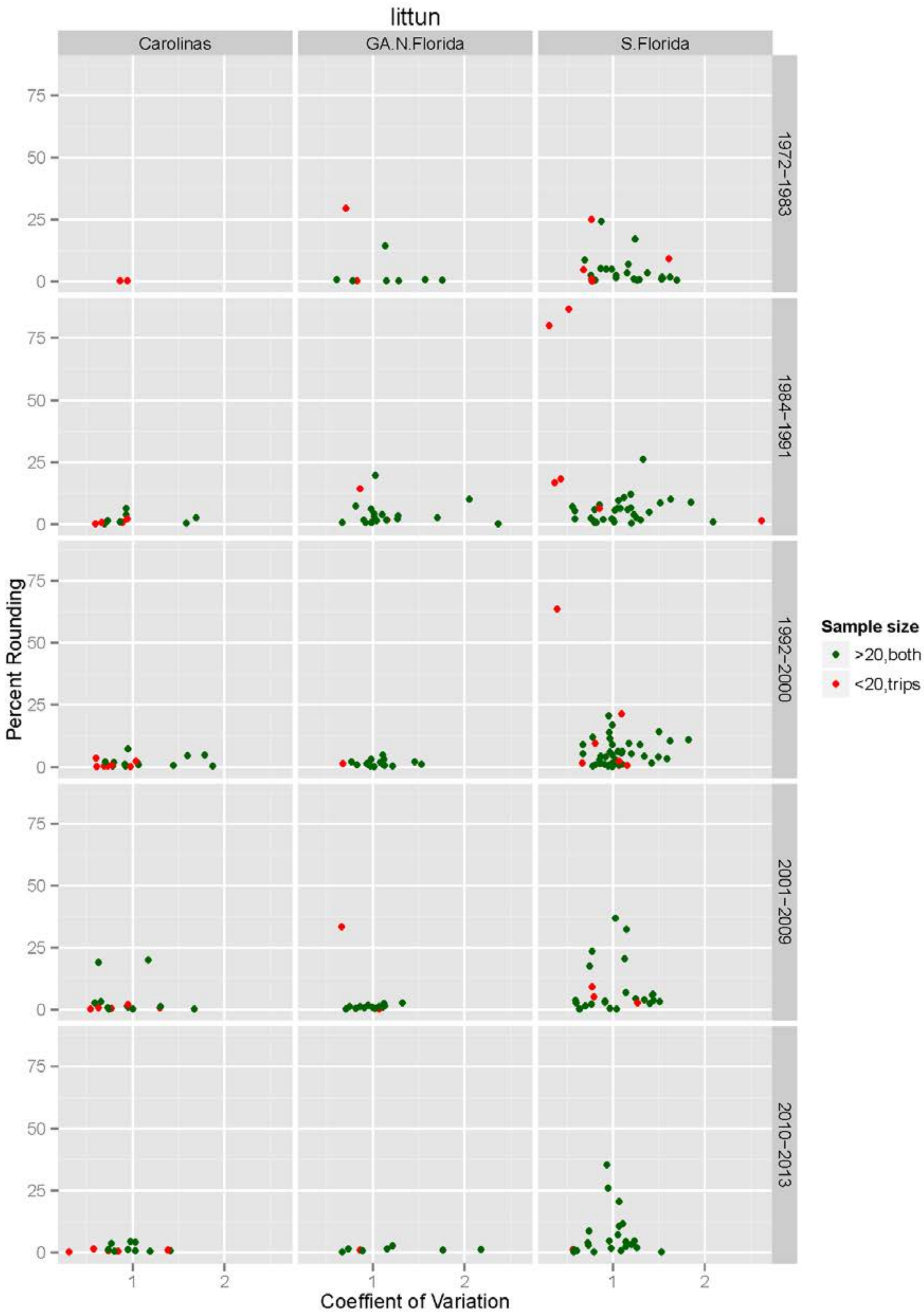
kmack
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips

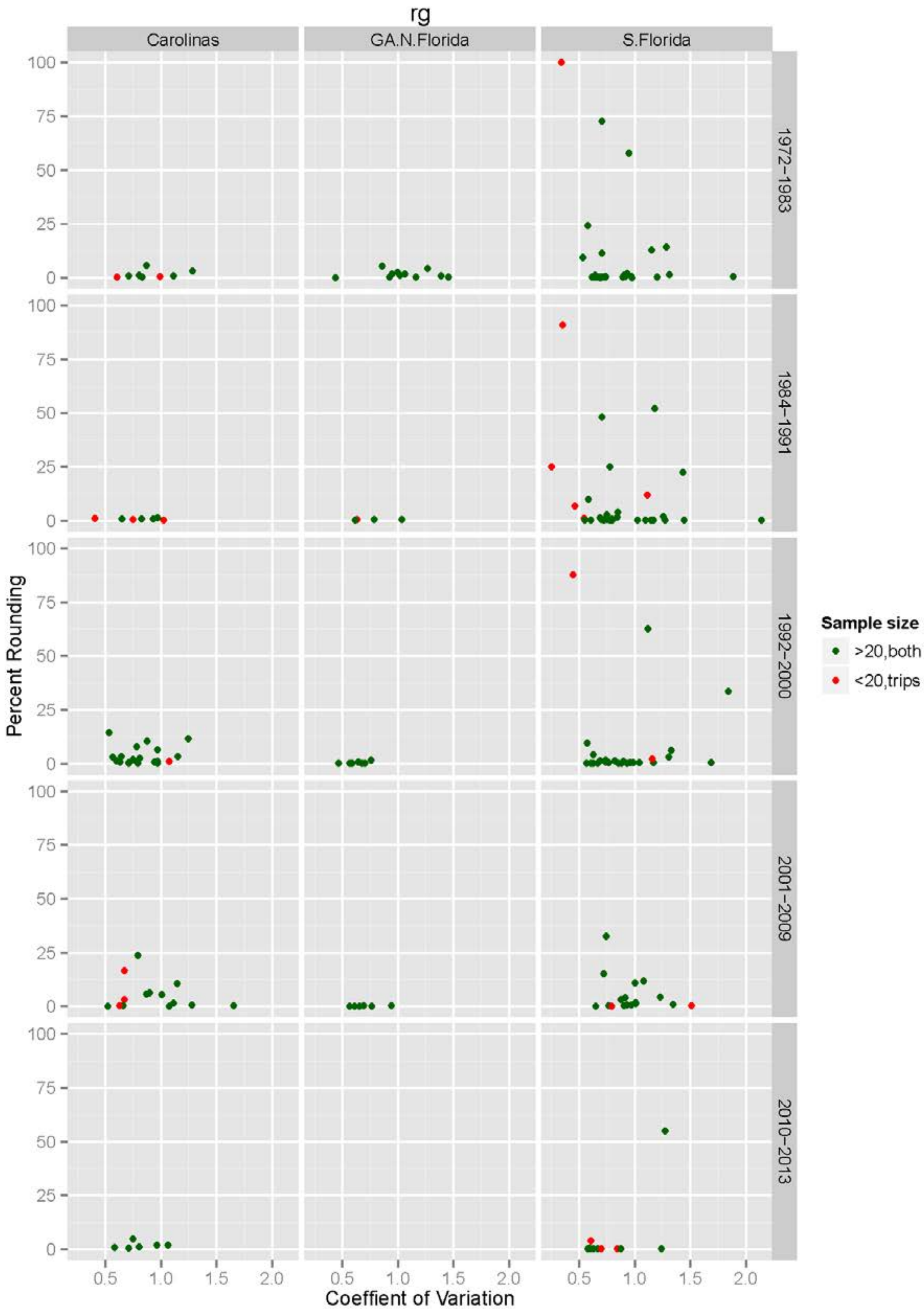

kwporgy
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips
<20,fish
<20,both

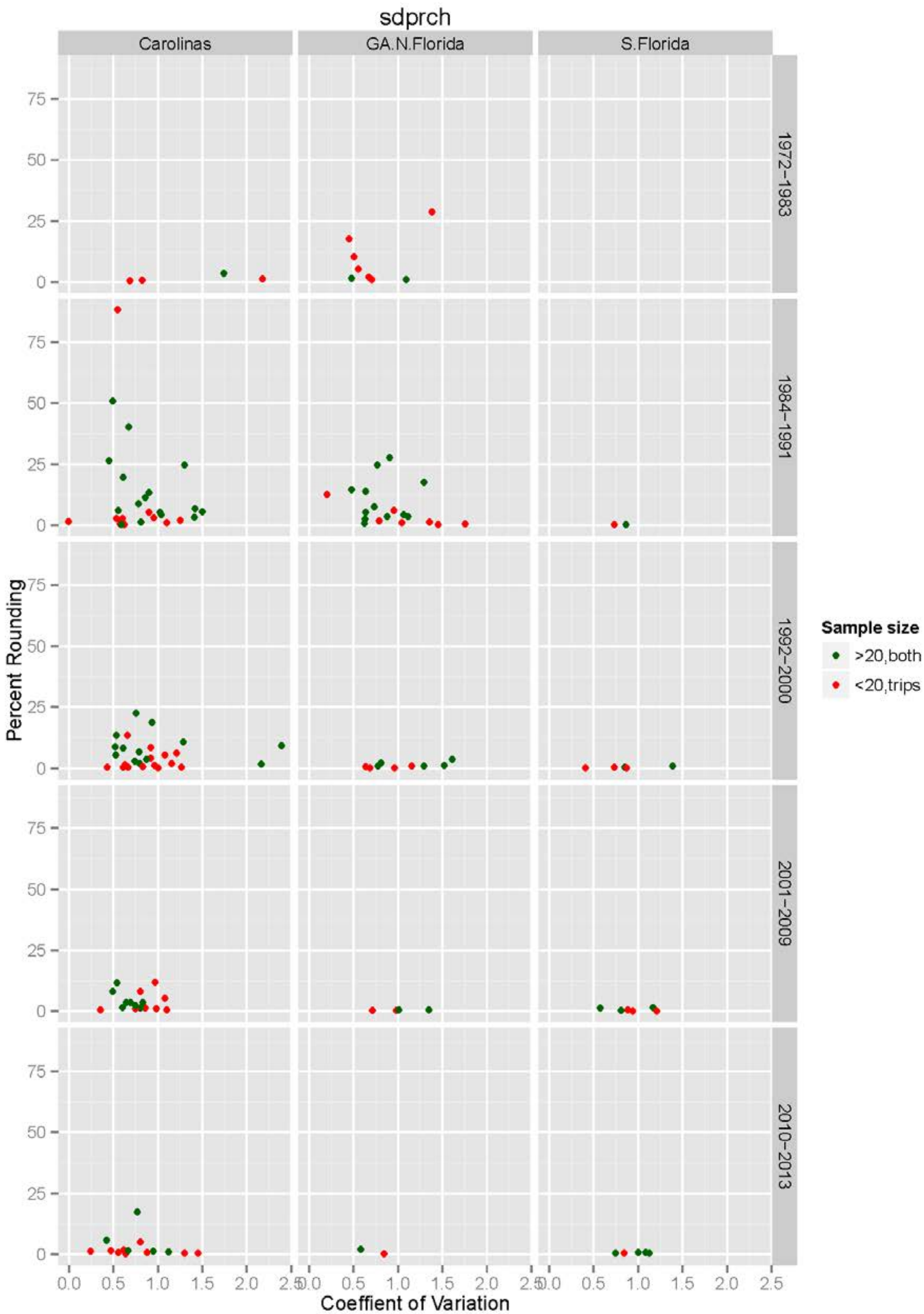

scamp
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips
0
25
50
75
0
1
2


wbp
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips
<20,fish
<20,both

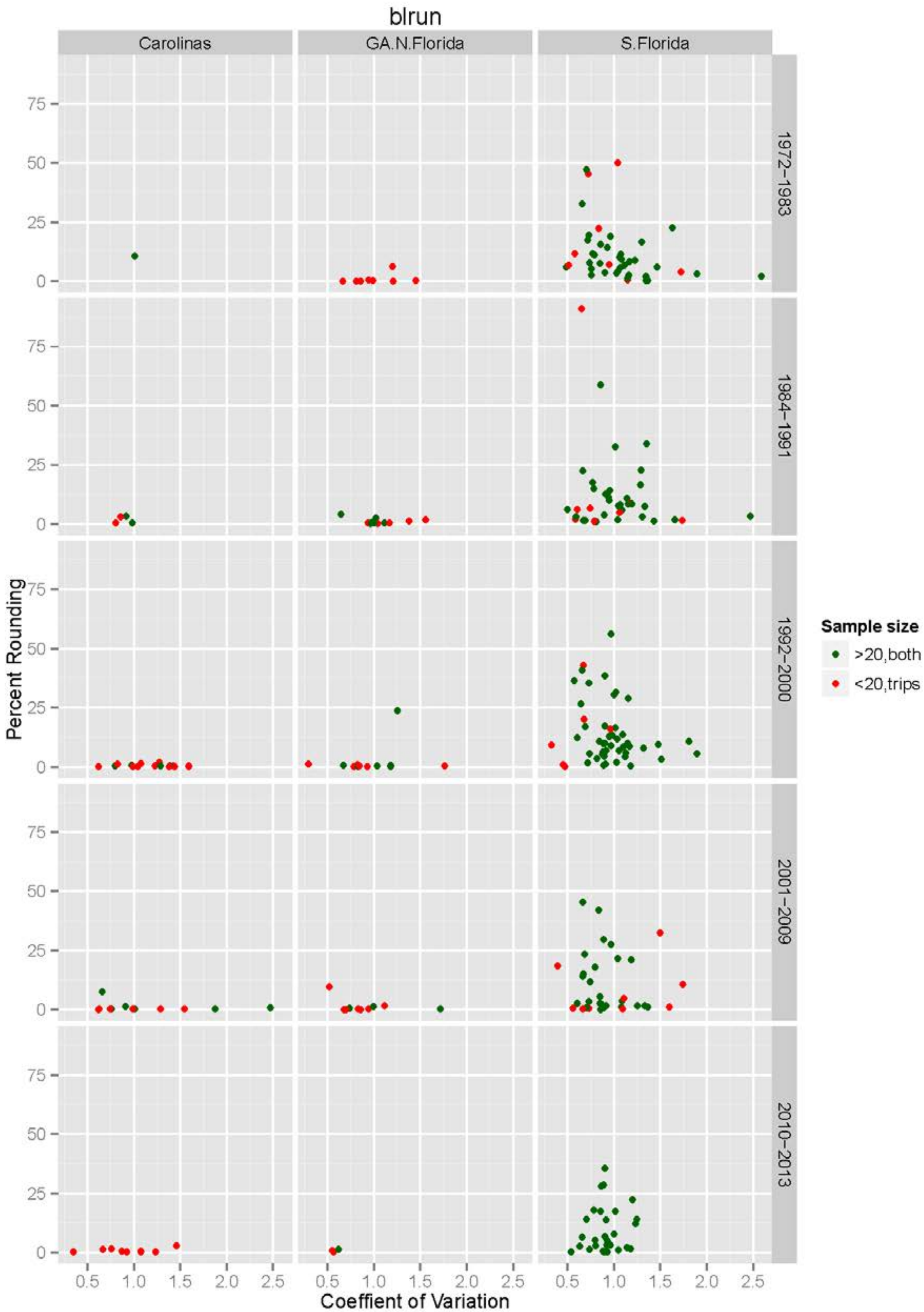

cobia
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips


littun
Carolinas
GA.N.Florida
S.Florida
1972−1983
1984−1991
1992−2000
2001−2009
2010−2013
Percent Rounding
Coeffient of Variation
0
25
50
75
1
2
Sample size
>20,both
<20,trips

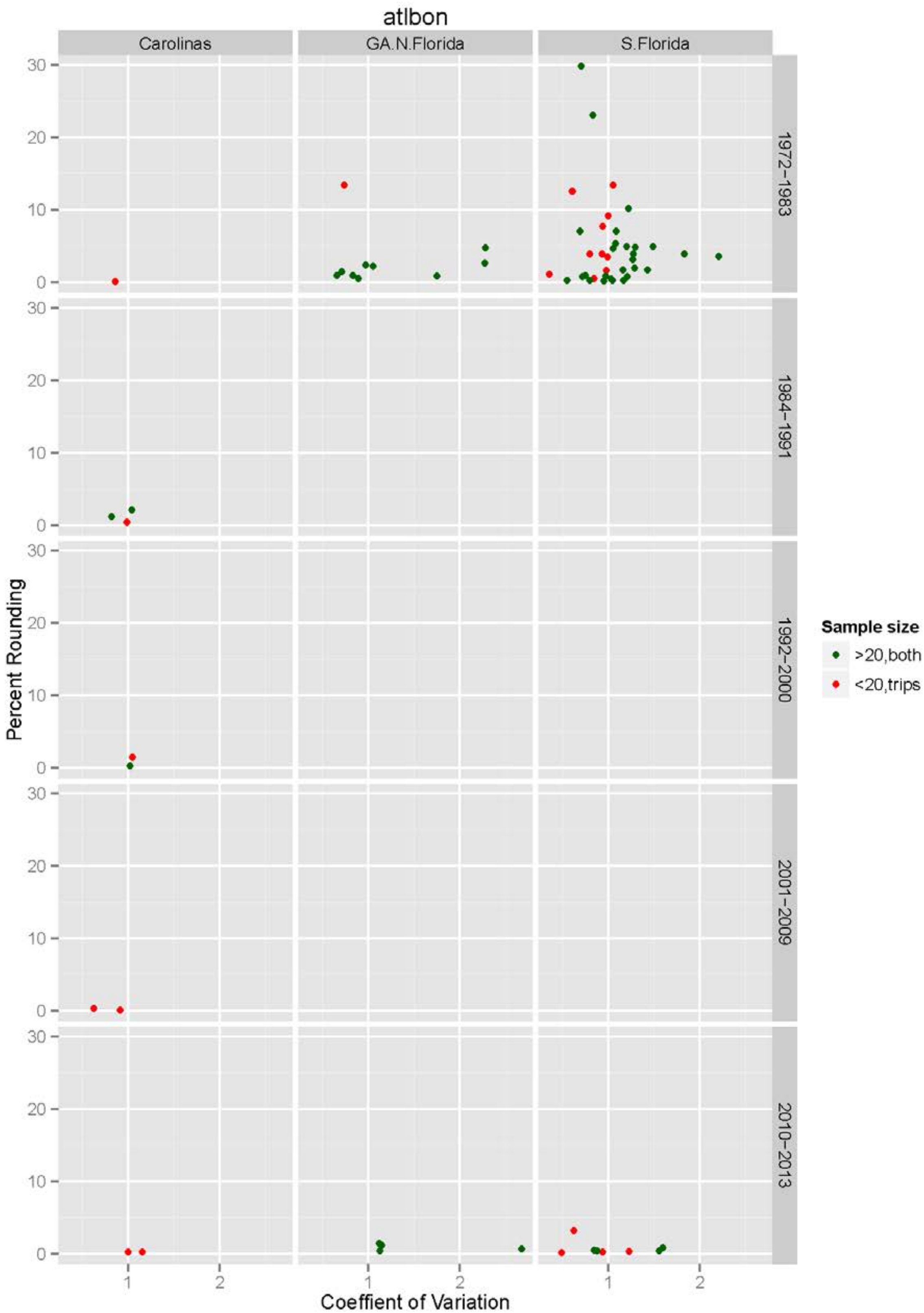

rg
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips
100
75
50
25
0
0.5
1.0
1.5
2.0

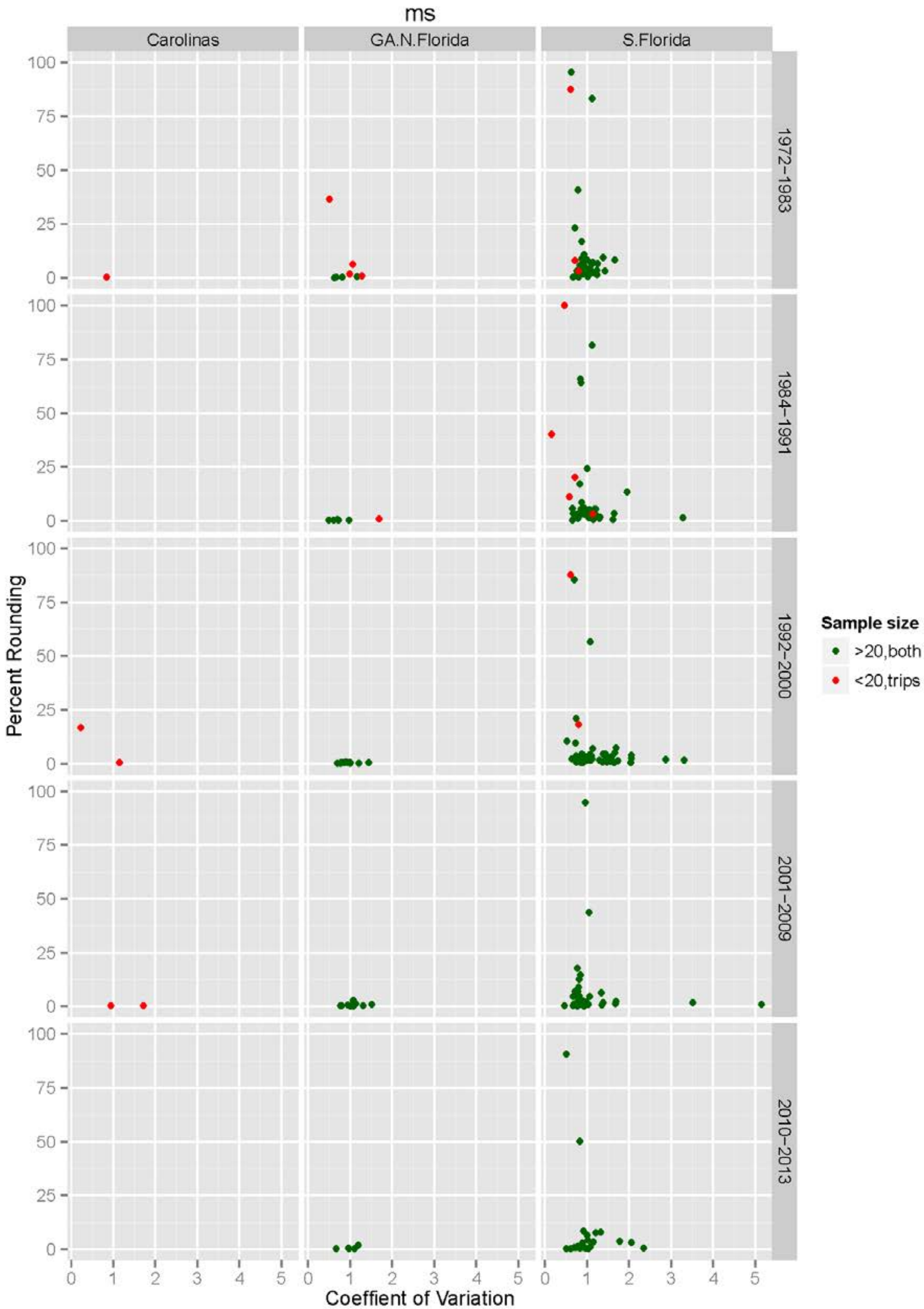


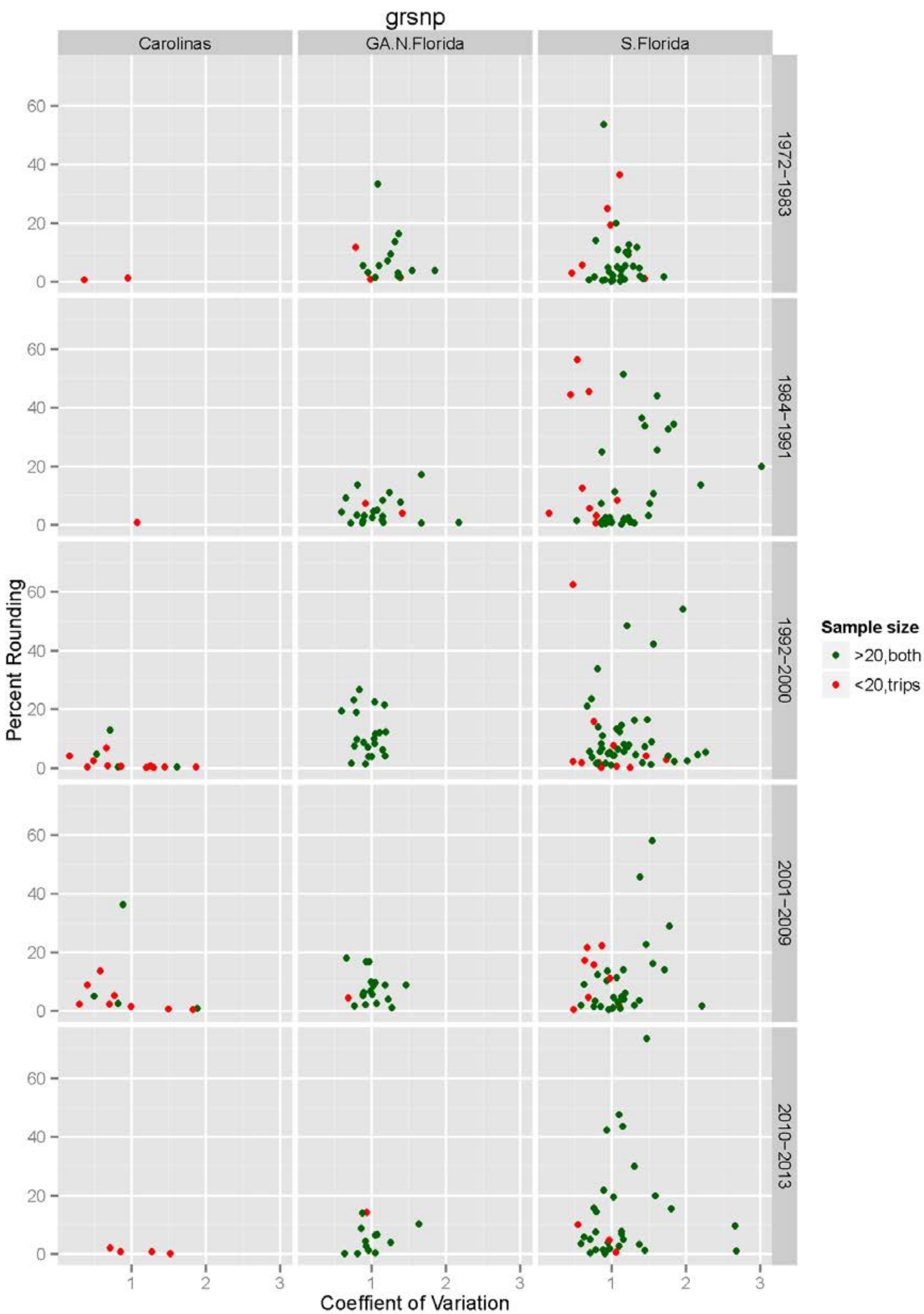
sdprch
Carolinas
GA.N.Florida
S.Florida
1972-1983
1984-1991
1992-2000
2001-2009
2010-2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips

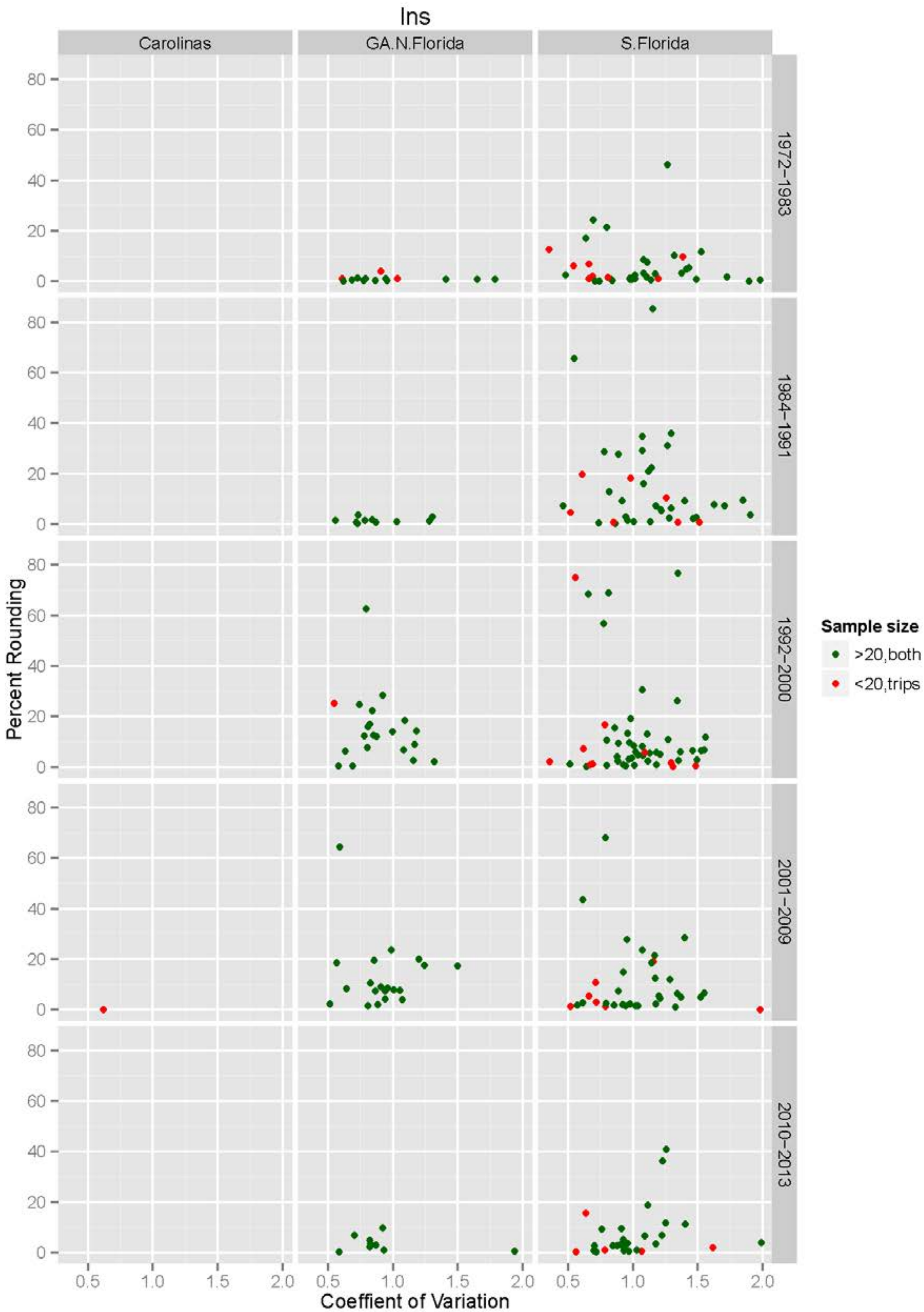


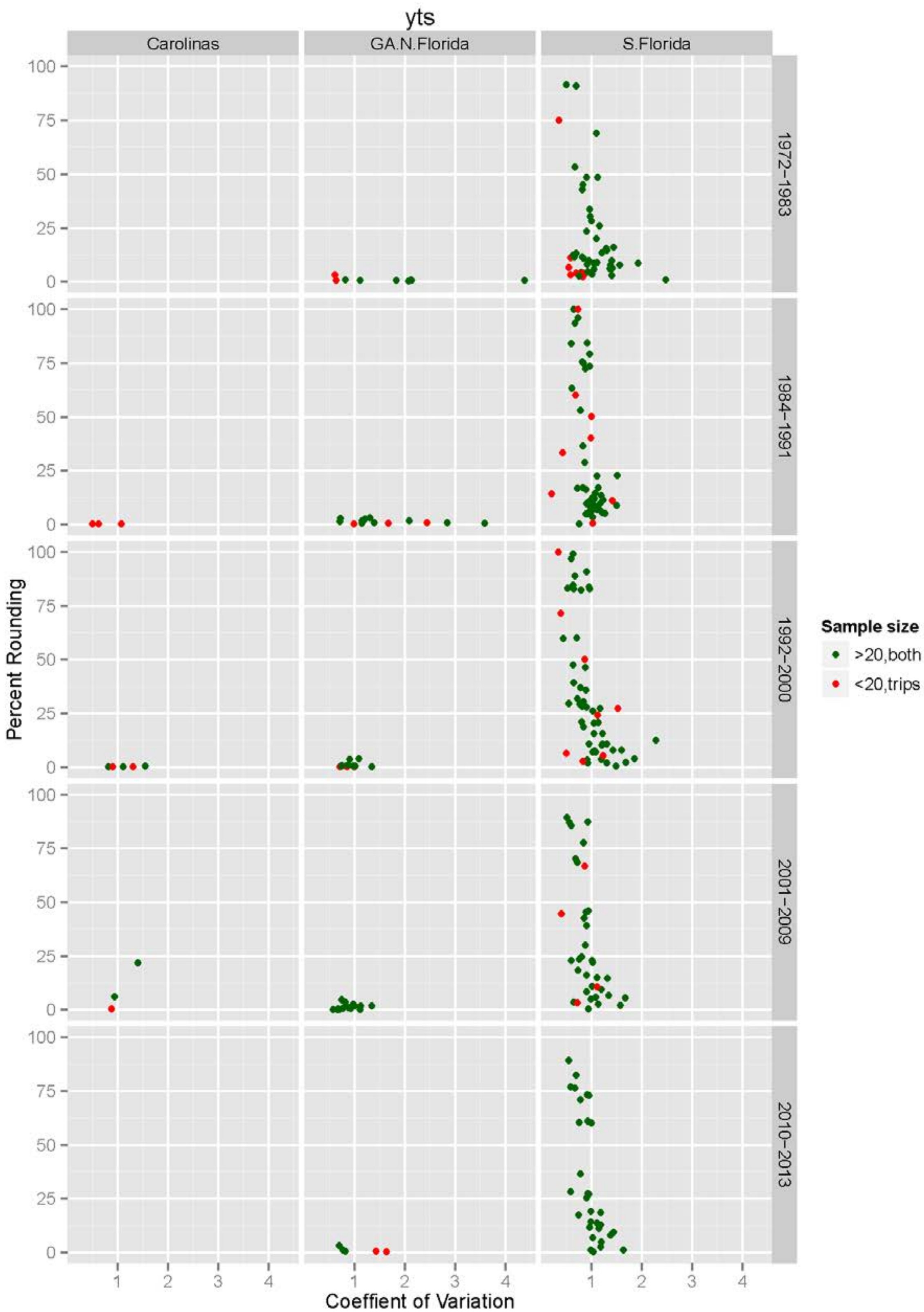
blrun
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips

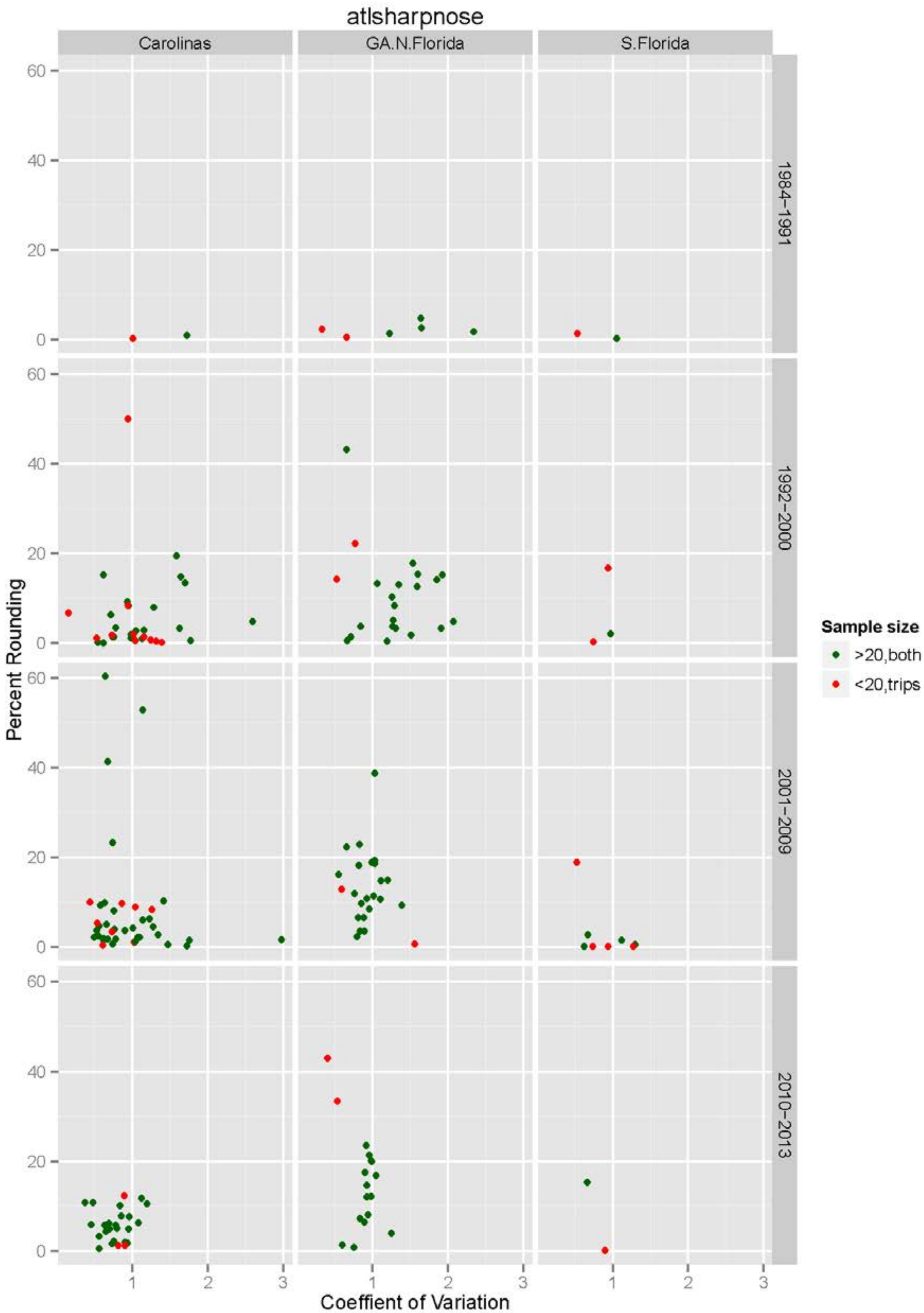

atlbon
Carolinas
GA.N.Florida
S.Florida
1972−1983
1984−1991
1992−2000
2001−2009
2010−2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips


ms
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips

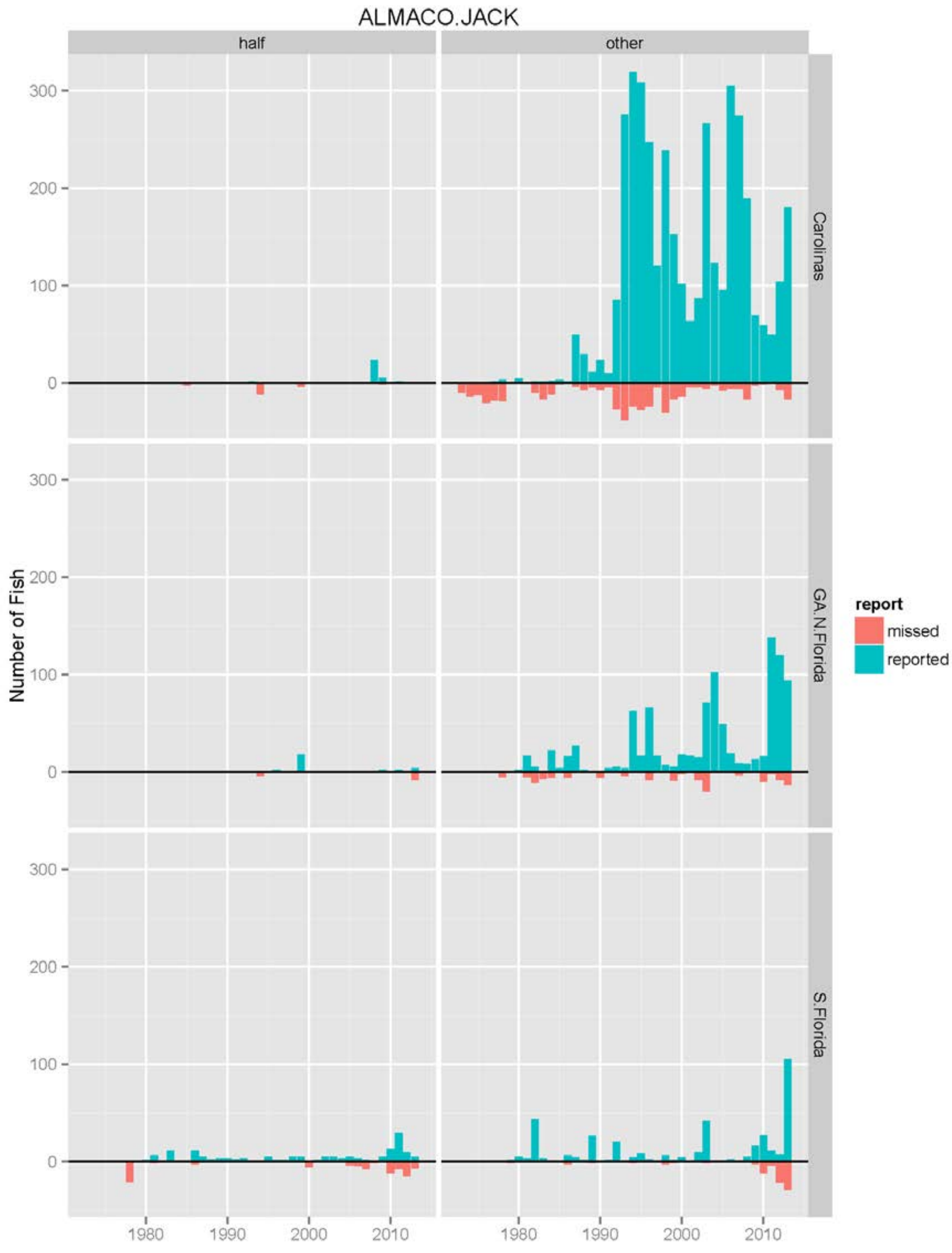

grsnp
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips

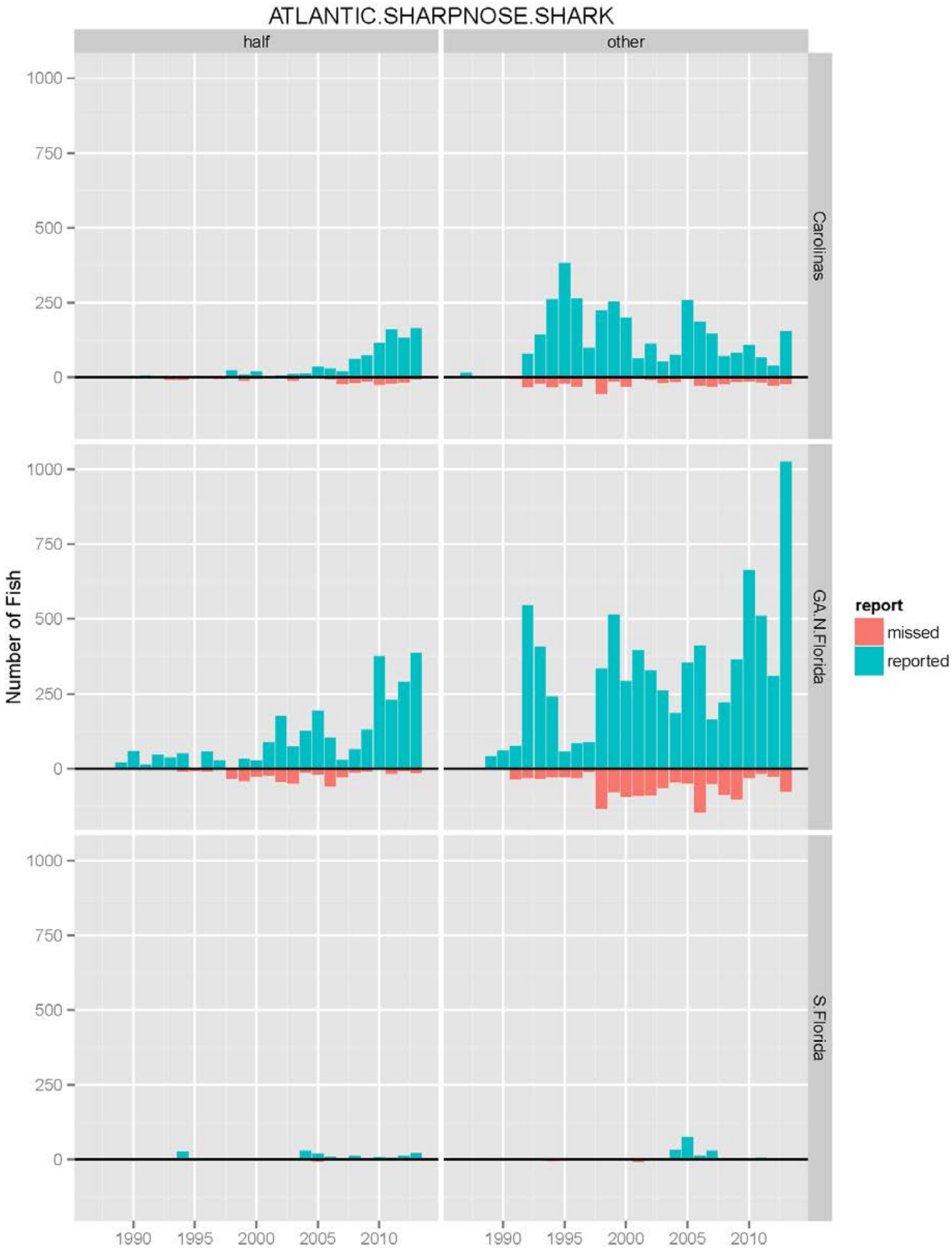

Ins
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips
0
20
40
60
80
0.5
1.0
1.5
2.0


yts
Carolinas
GA.N.Florida
S.Florida
1972–1983
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips

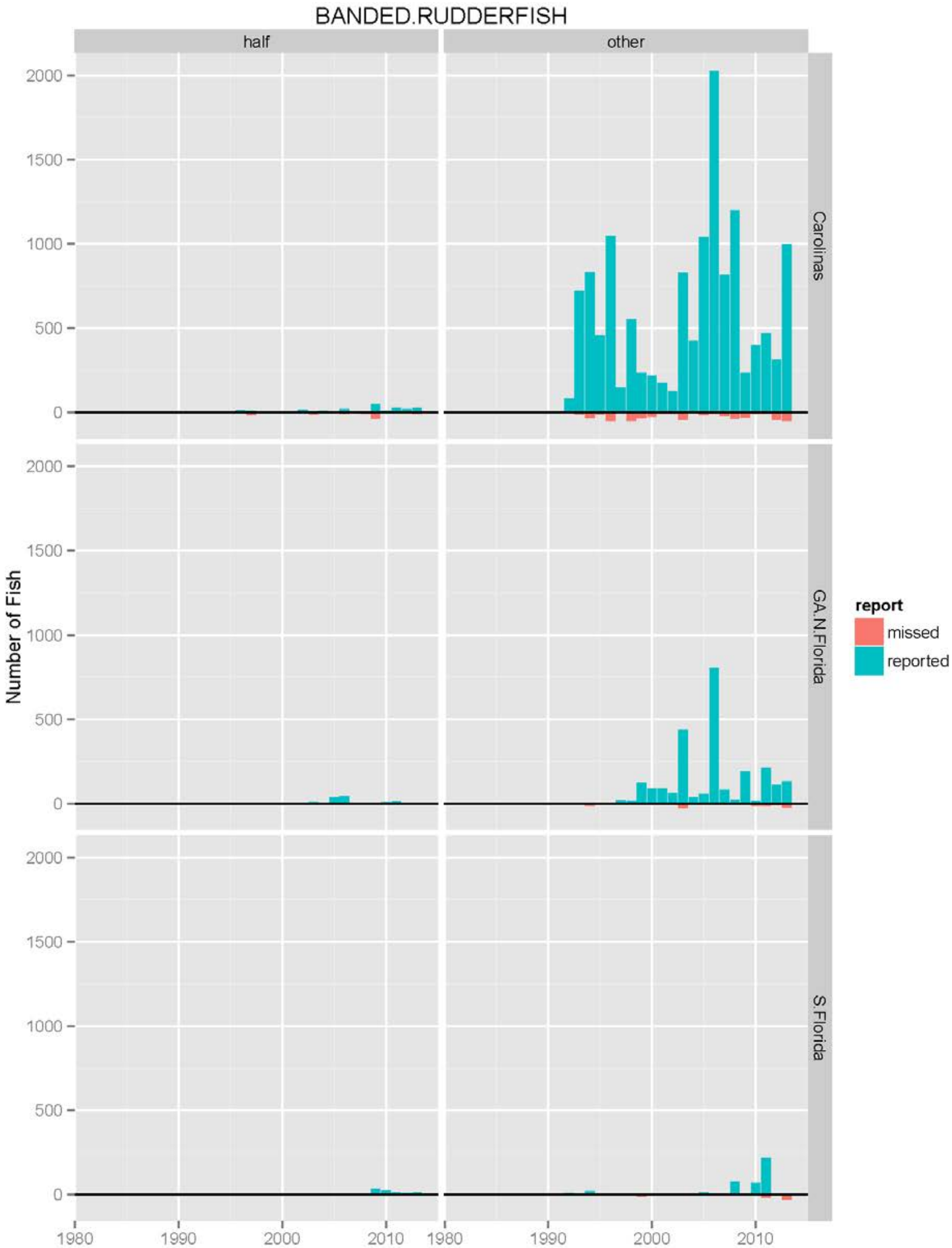

atlsharpnose
Carolinas
GA.N.Florida
S.Florida
1984–1991
1992–2000
2001–2009
2010–2013
Percent Rounding
Coeffient of Variation
Sample size
>20,both
<20,trips
0
20
40
60
1
2
3

Appendix 14: Matched Trip Analysis by Species

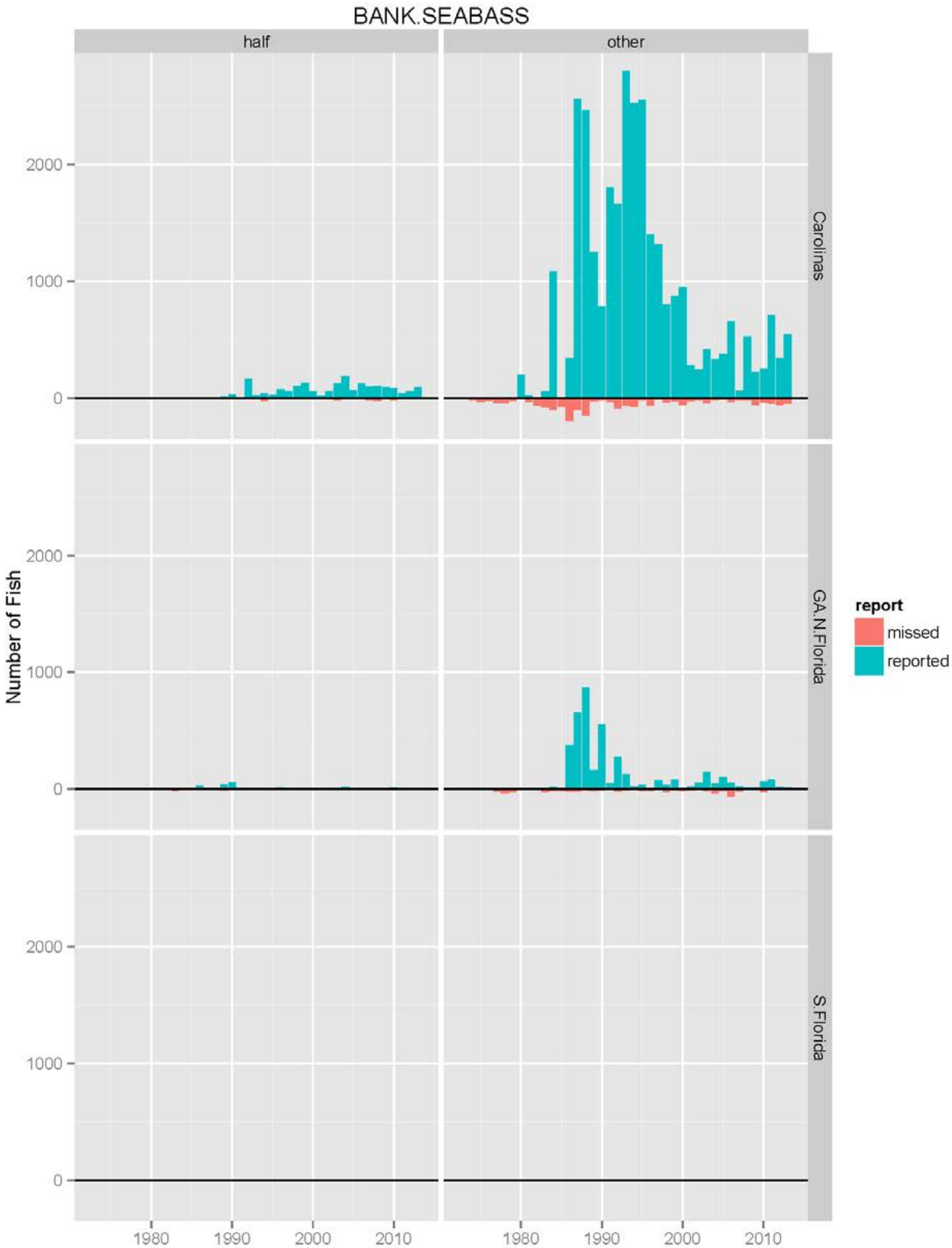




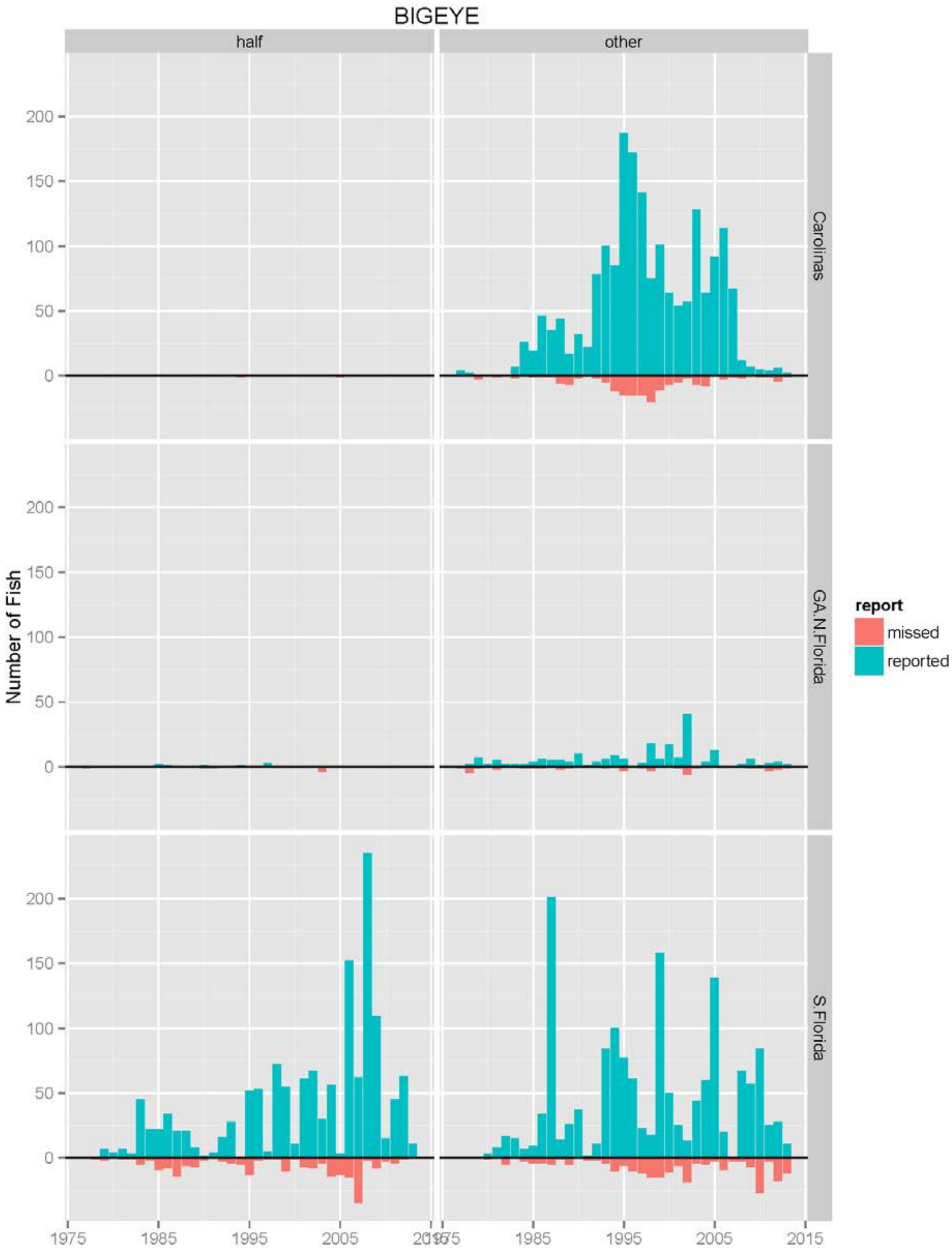
ATLANTIC.SHARPNOSE.SHARK
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
1000
750
500
250
0
1990
1995
2000
2005
2010
report
missed
reported

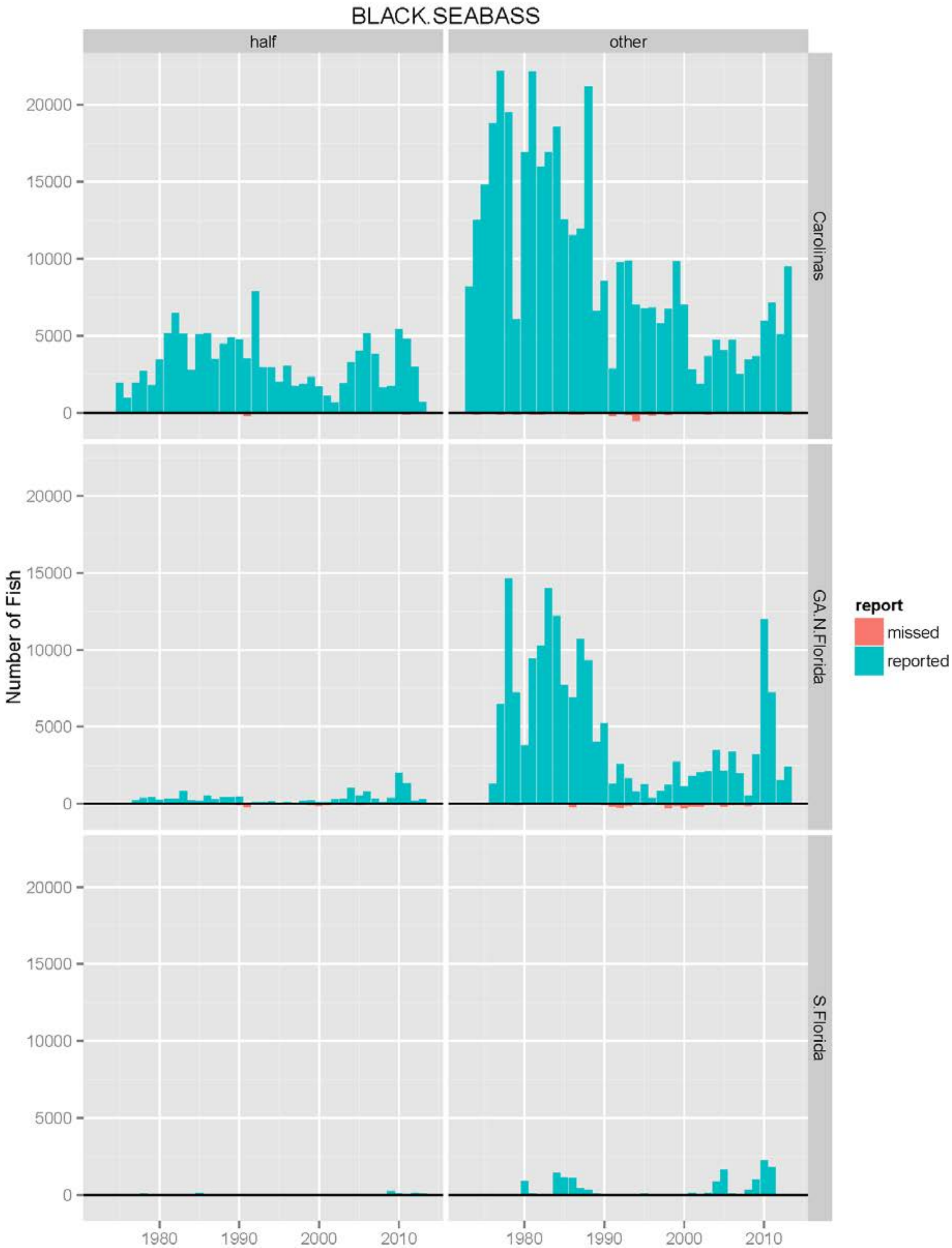


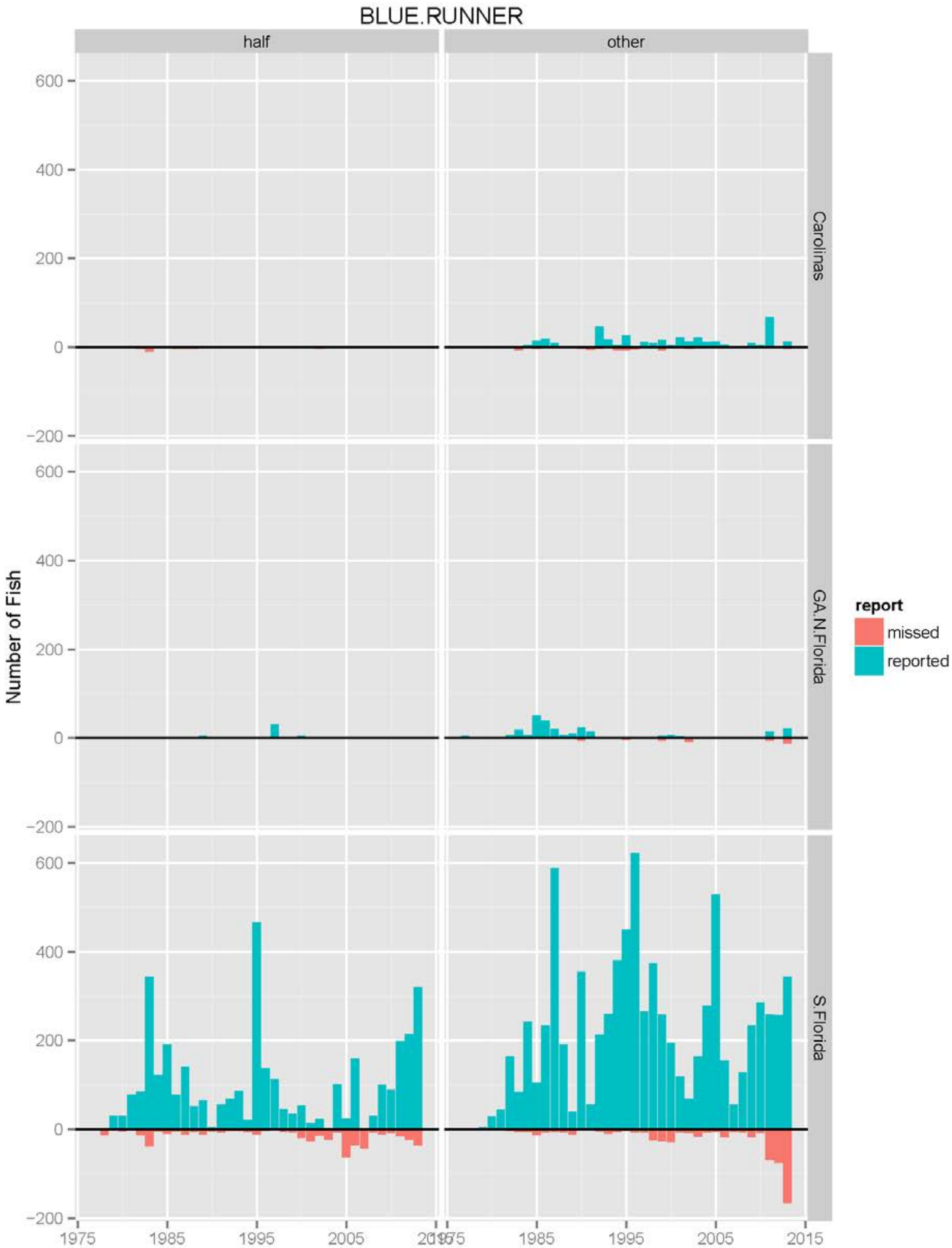
BANDED.RUDDERFISH
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
2000
1500
1000
500
0
1980
1990
2000
2010

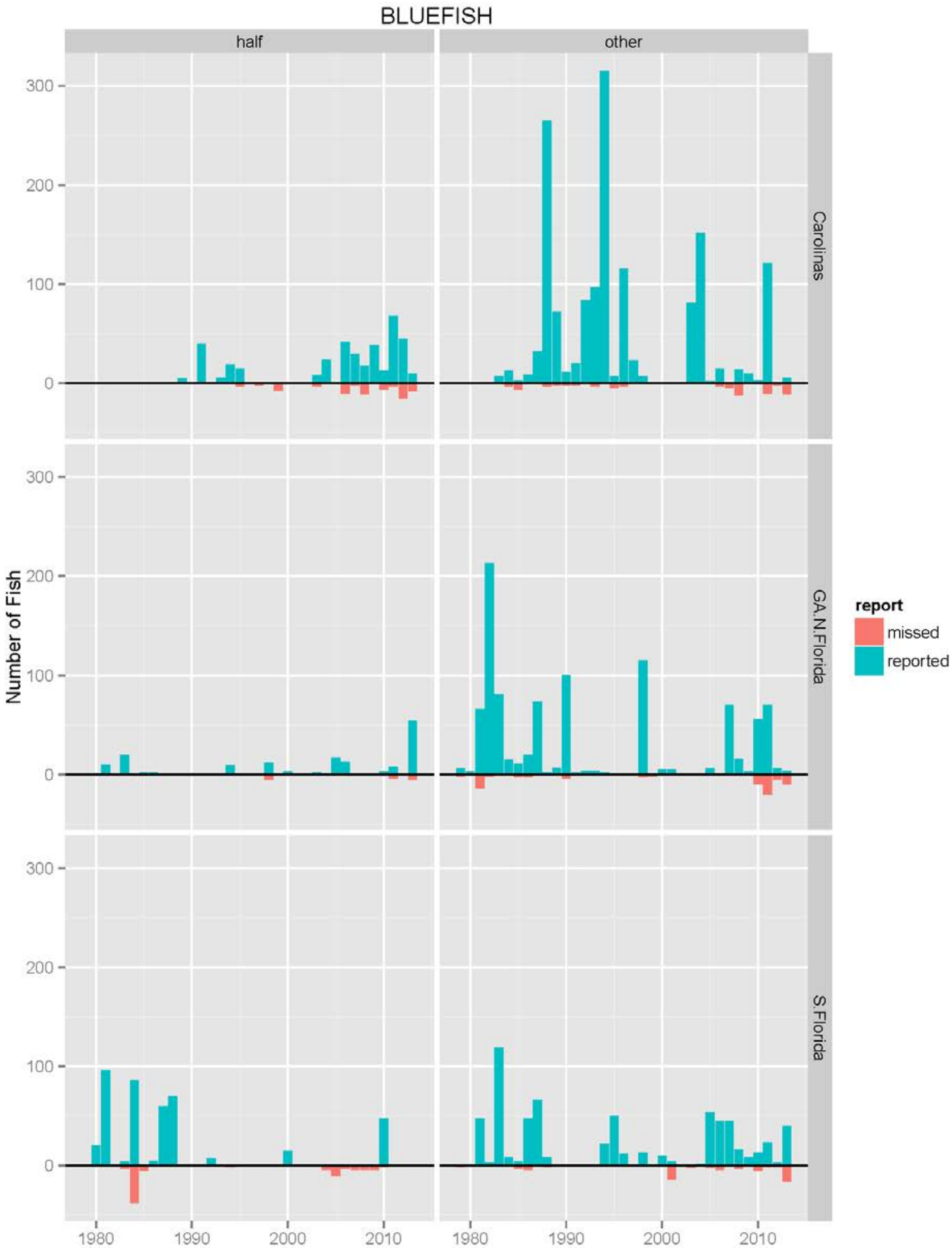


BANK.SEABASS
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
2000
1000
0
1980
1990
2000
2010
report
missed
reported

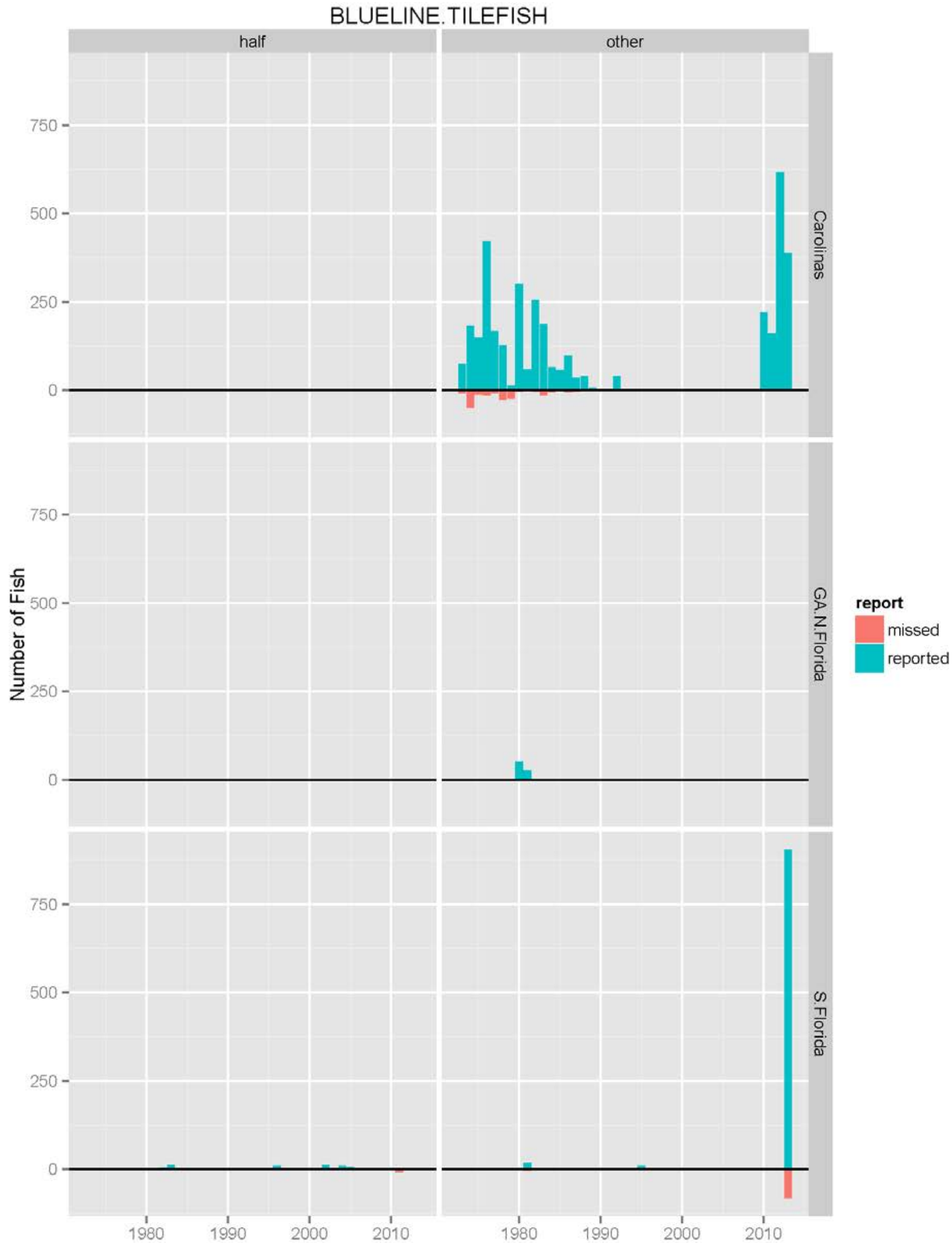

BIGEYE
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
200
150
100
50
0
1975
1985
1995
2005
2015
report
missed
reported

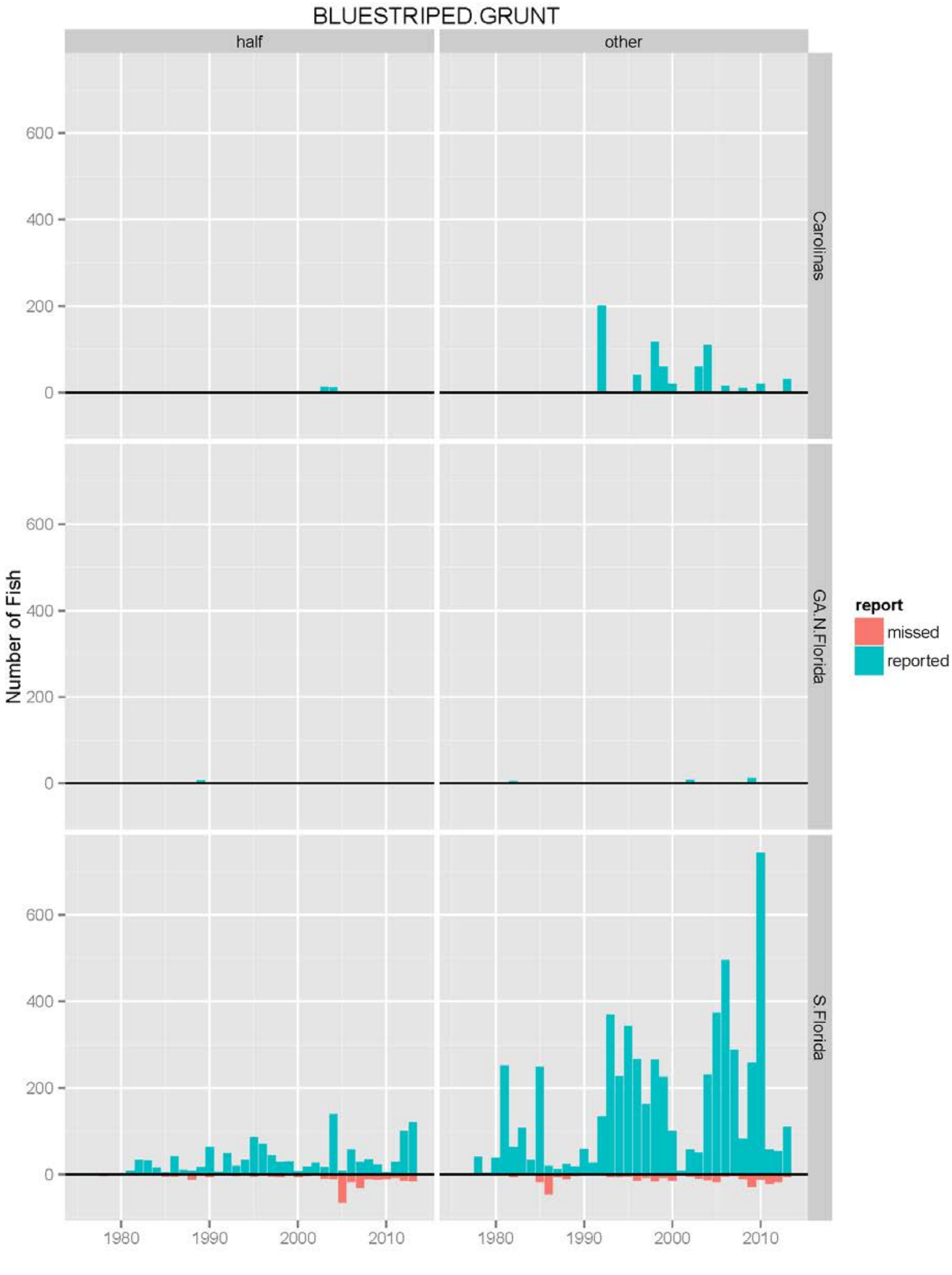

BLACK.SEABASS
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
0
5000
10000
15000
20000
1980
1990
2000
2010


BLUE.RUNNER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
600
400
200
0
-200
1975
1985
1995
2005
2015
report
missed
reported

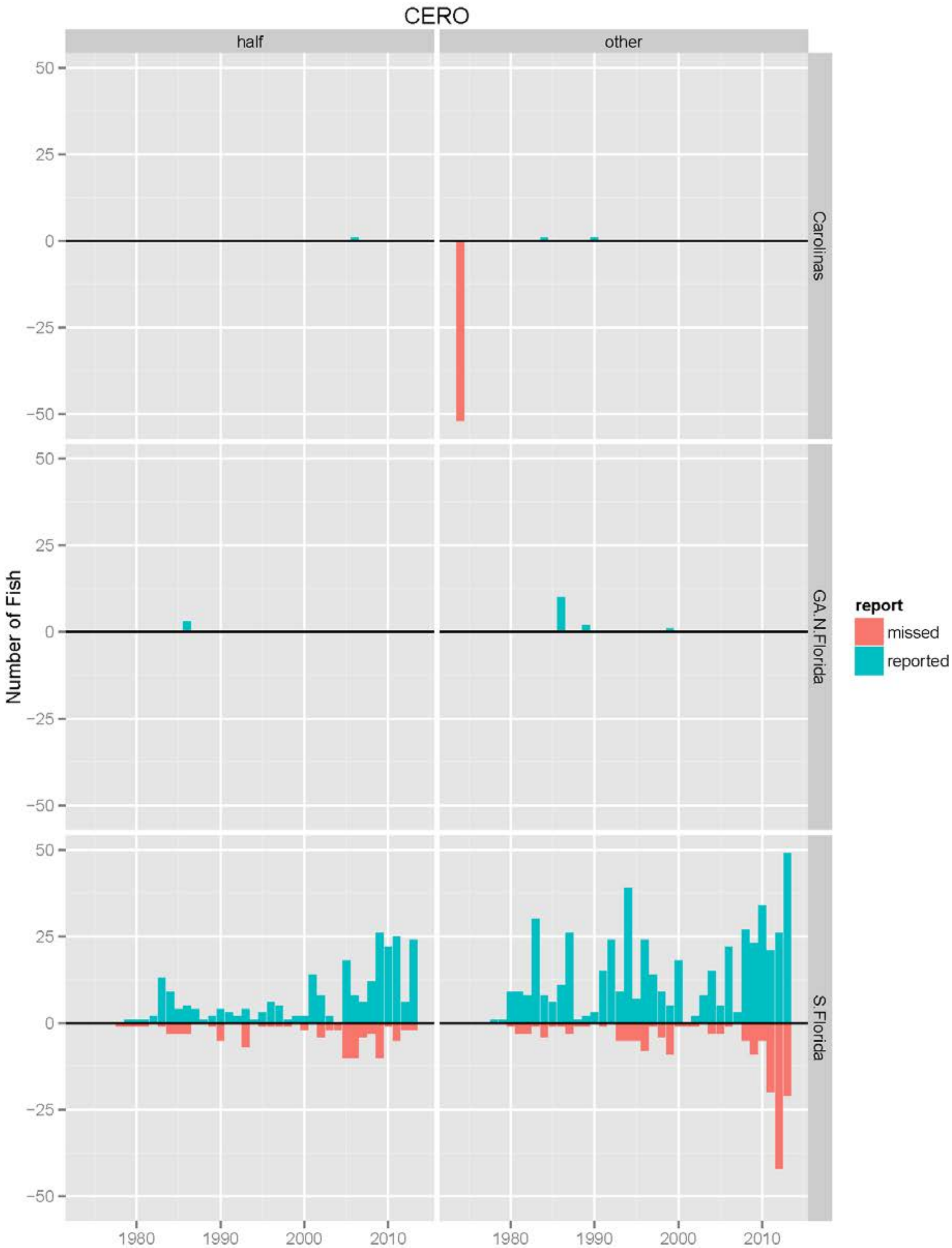


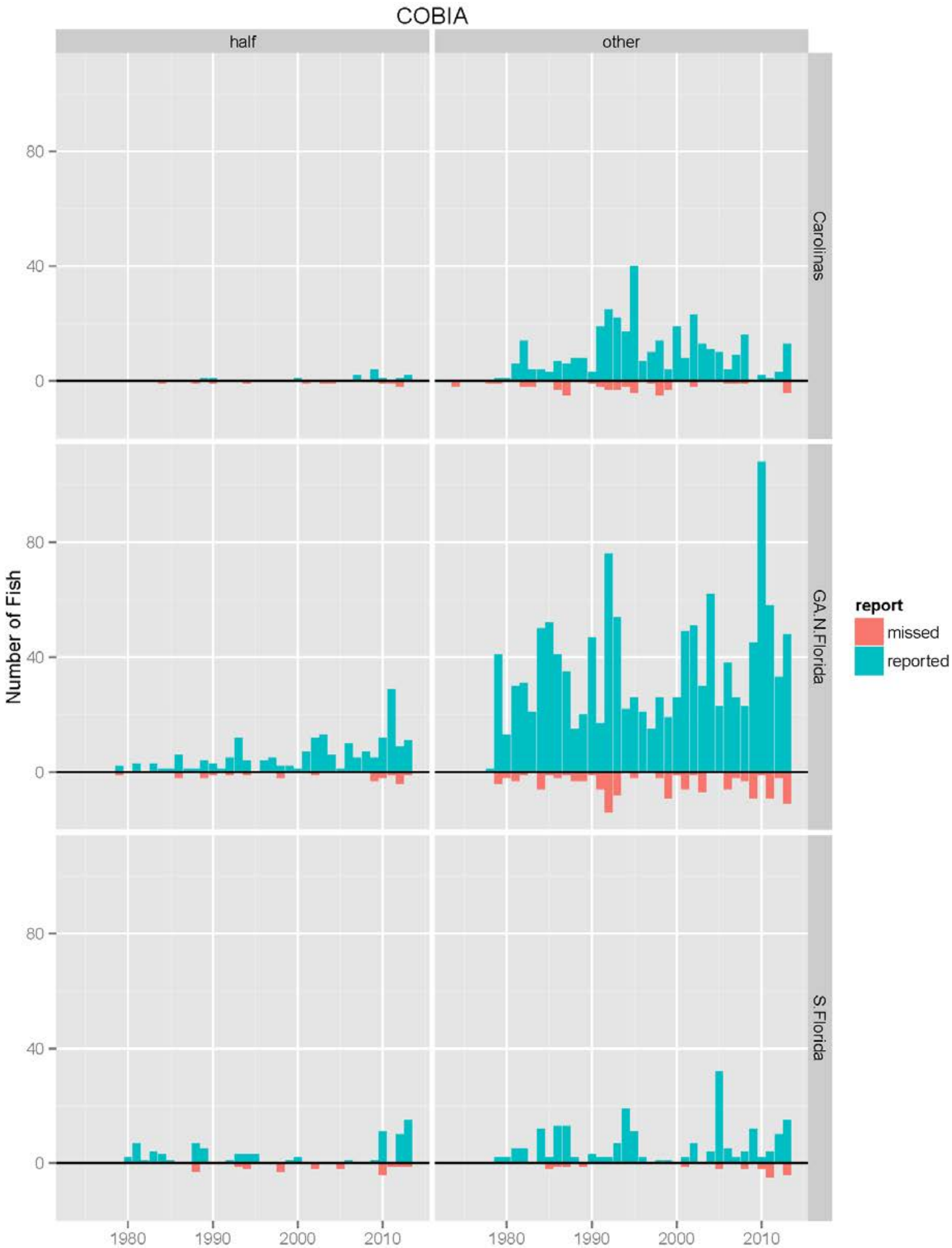
BLUEFISH
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
300
200
100
0
1980
1990
2000
2010

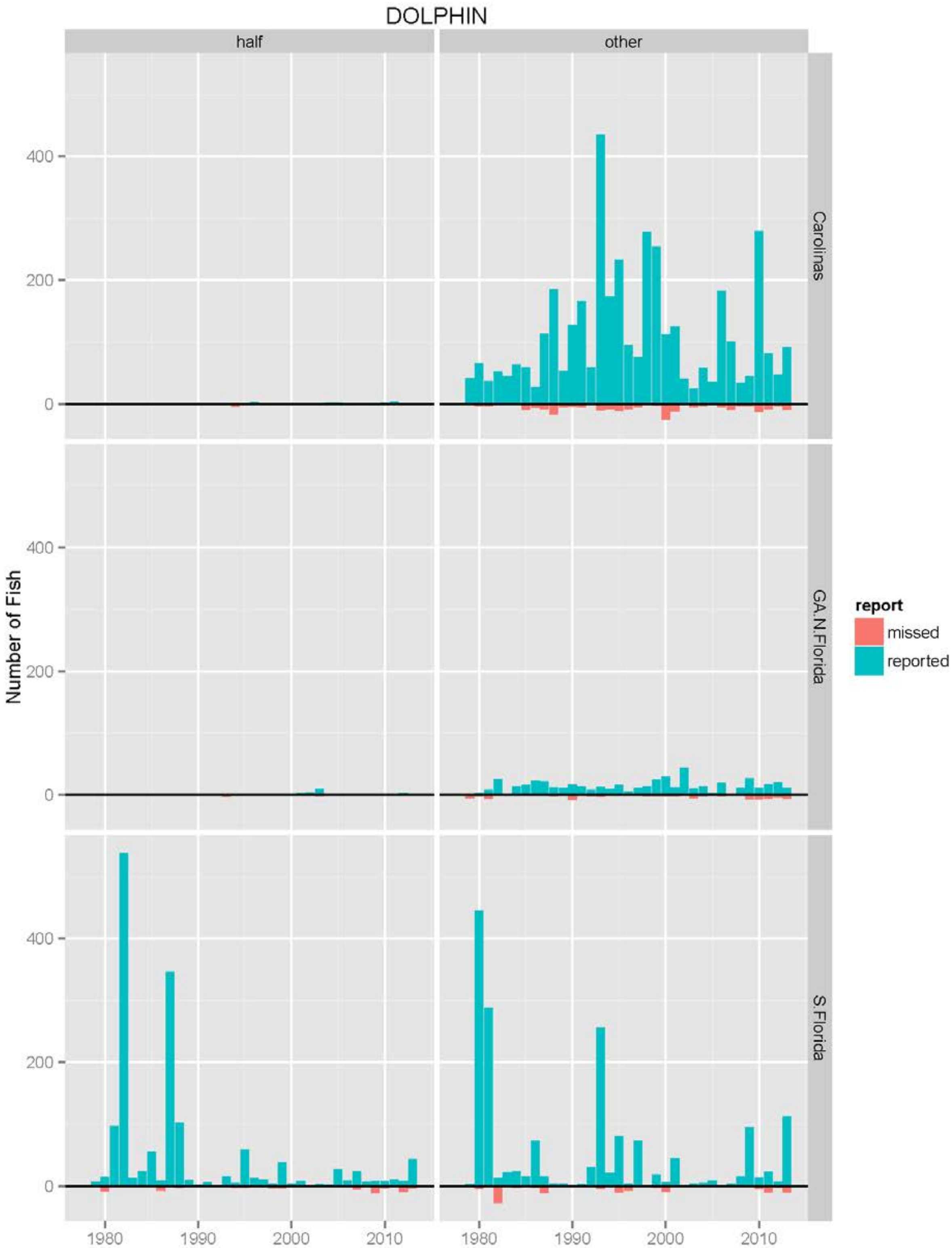

BLUELINE.TILEFISH
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
750
500
250
0
1980
1990
2000
2010
report
missed
reported

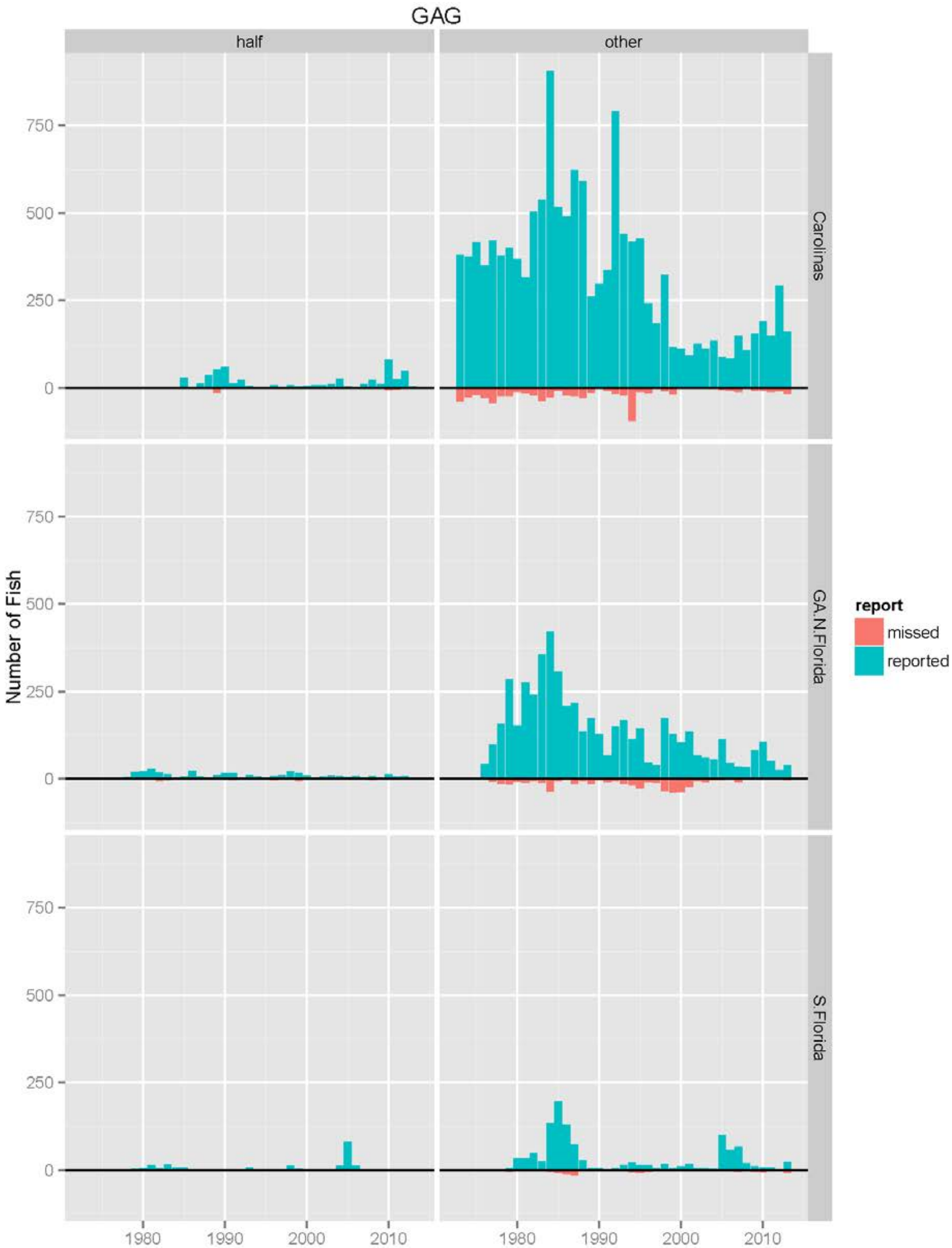


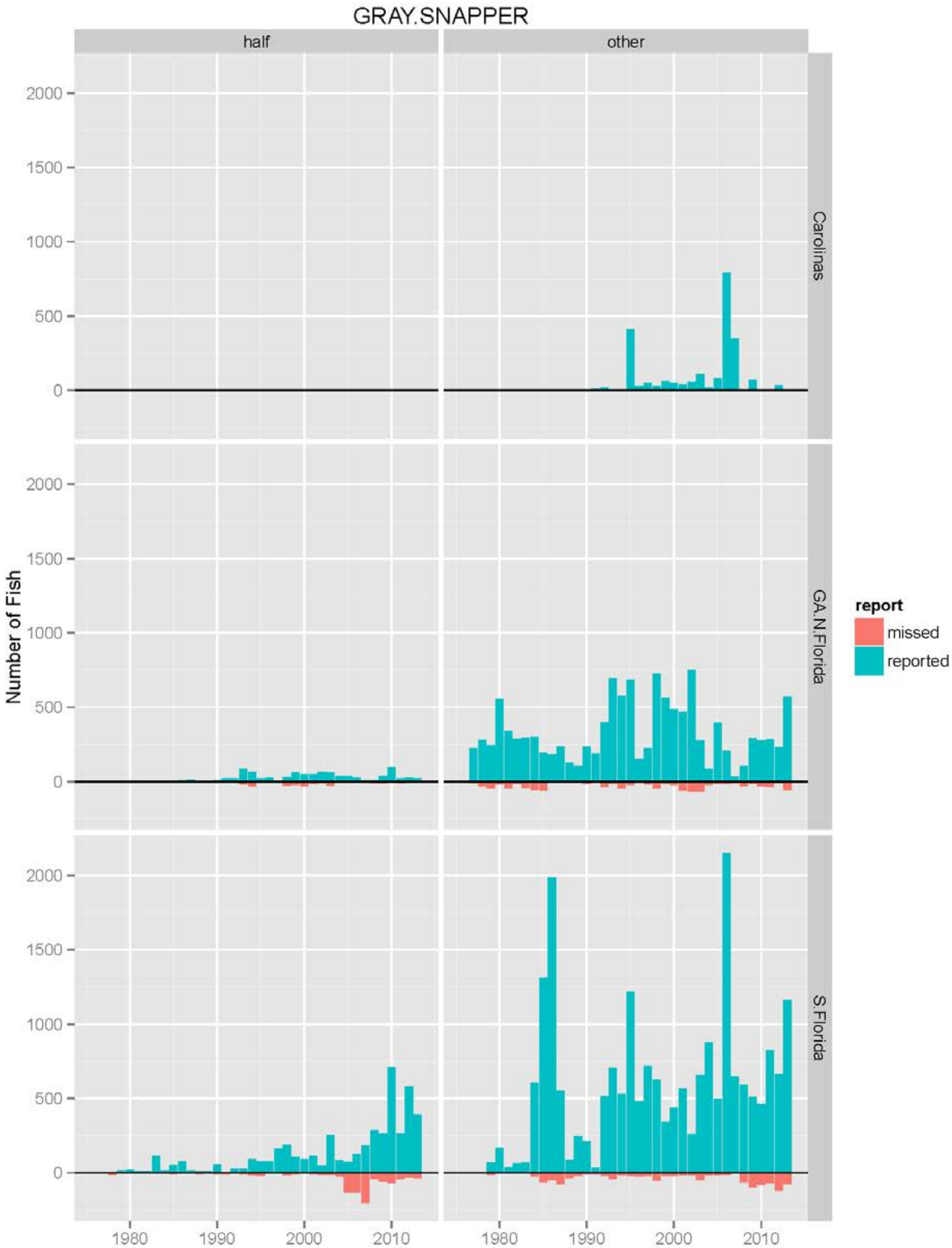
BLUESTRIPED.GRUNT
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
600
400
200
0
1980
1990
2000
2010
report
missed
reported

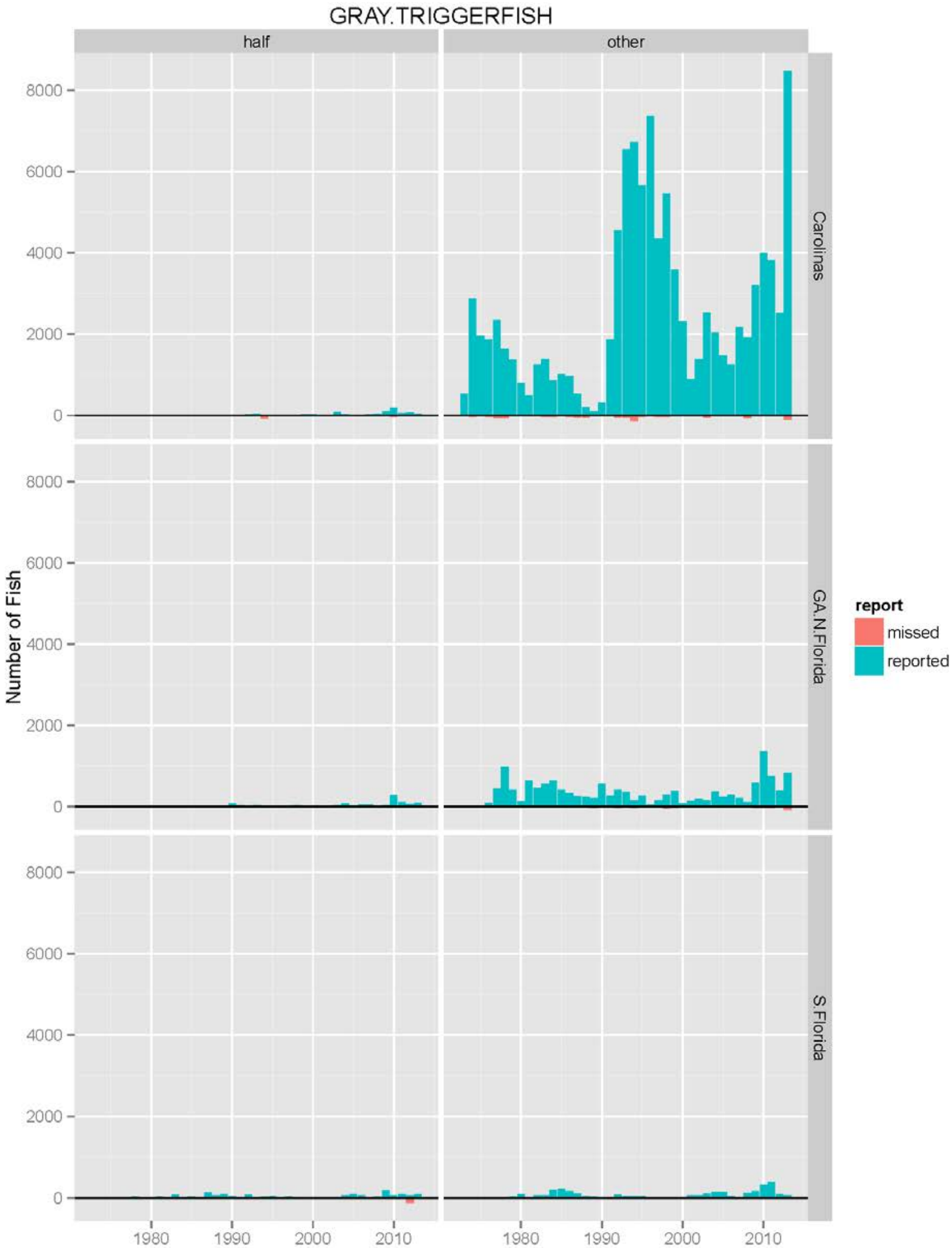

CERO
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
50
25
0
-25
-50
1980
1990
2000
2010
report
missed
reported

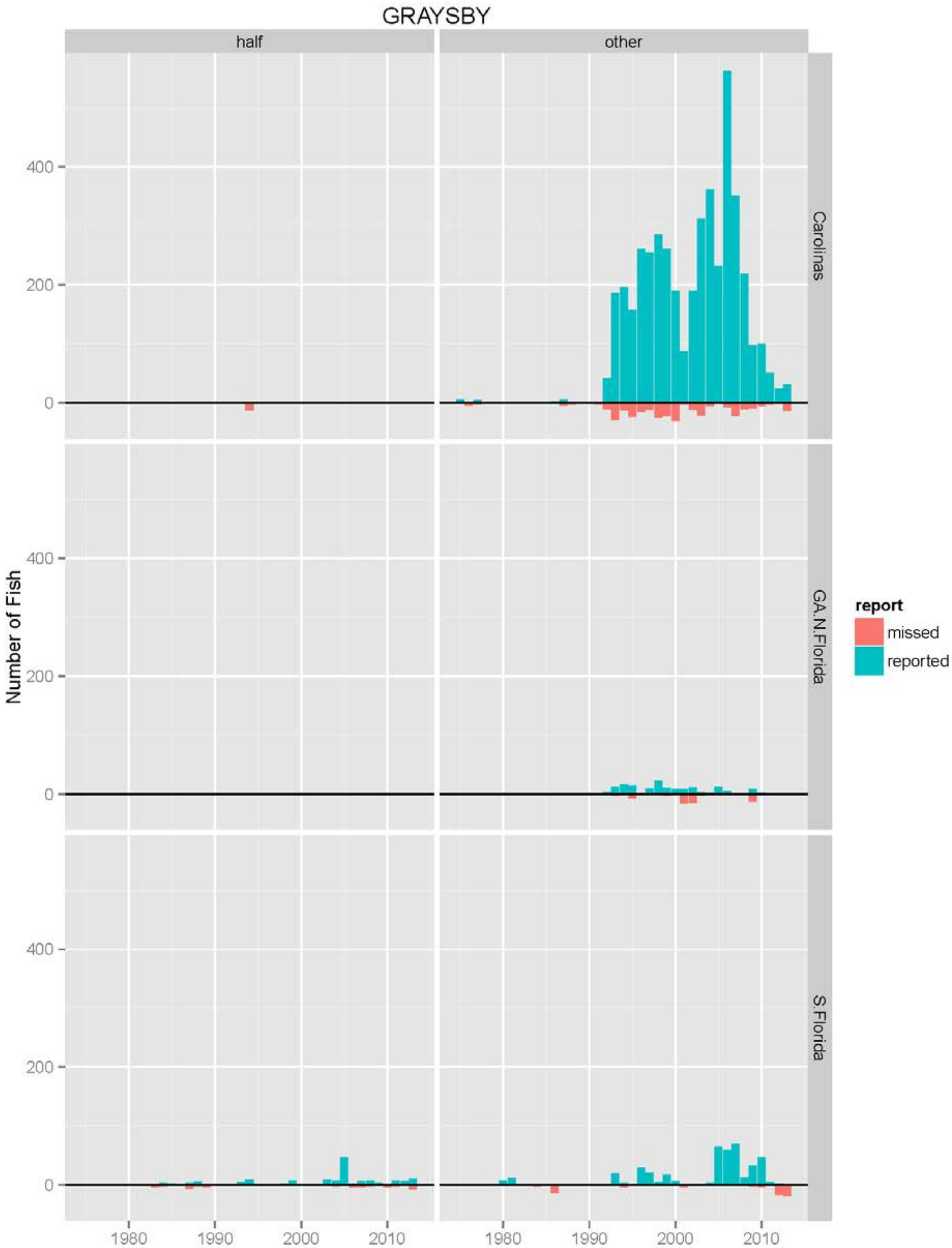

COBIA
half
other
80
40
0
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
1980
1990
2000
2010

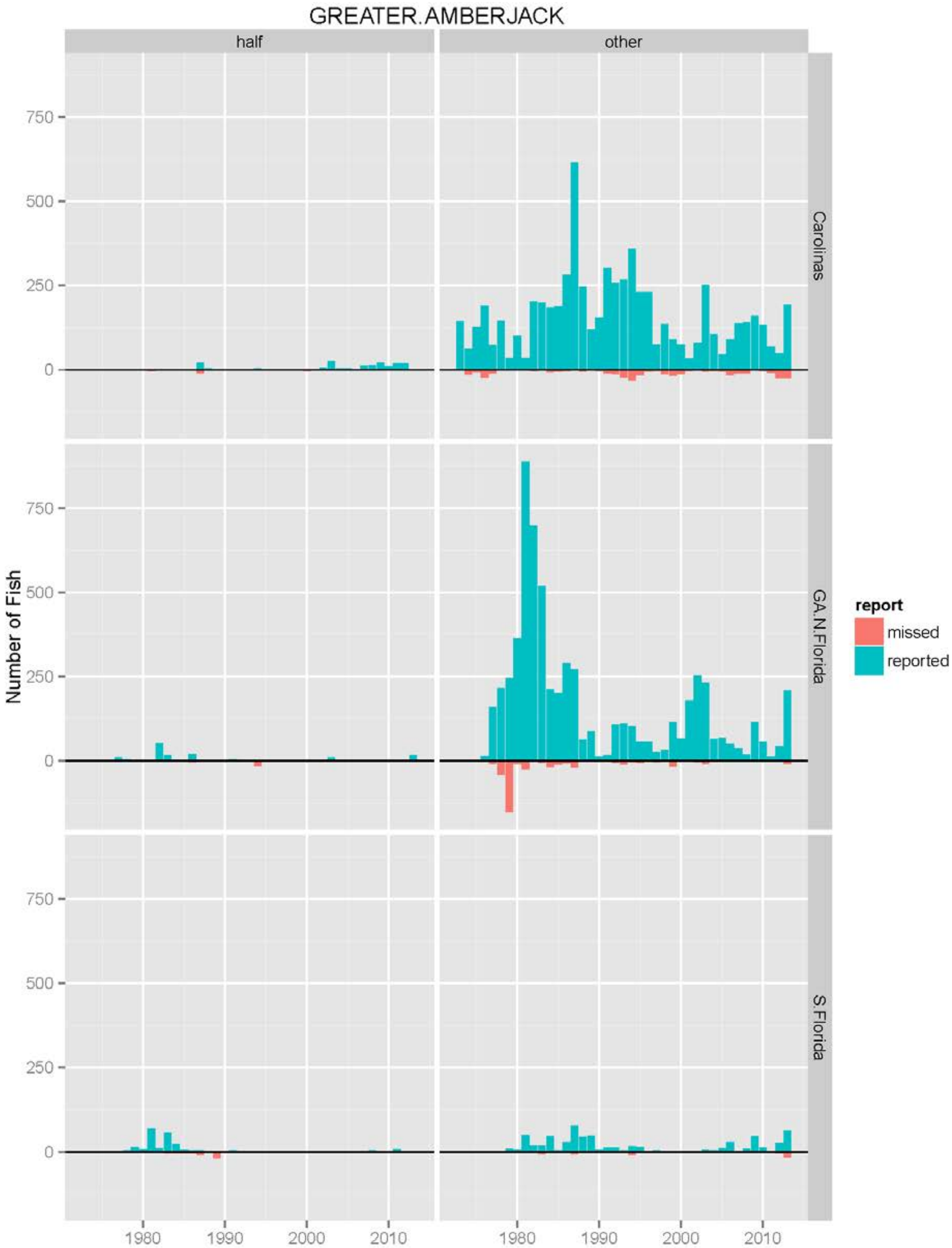

DOLPHIN
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
0
200
400
1980
1990
2000
2010
report
missed
reported

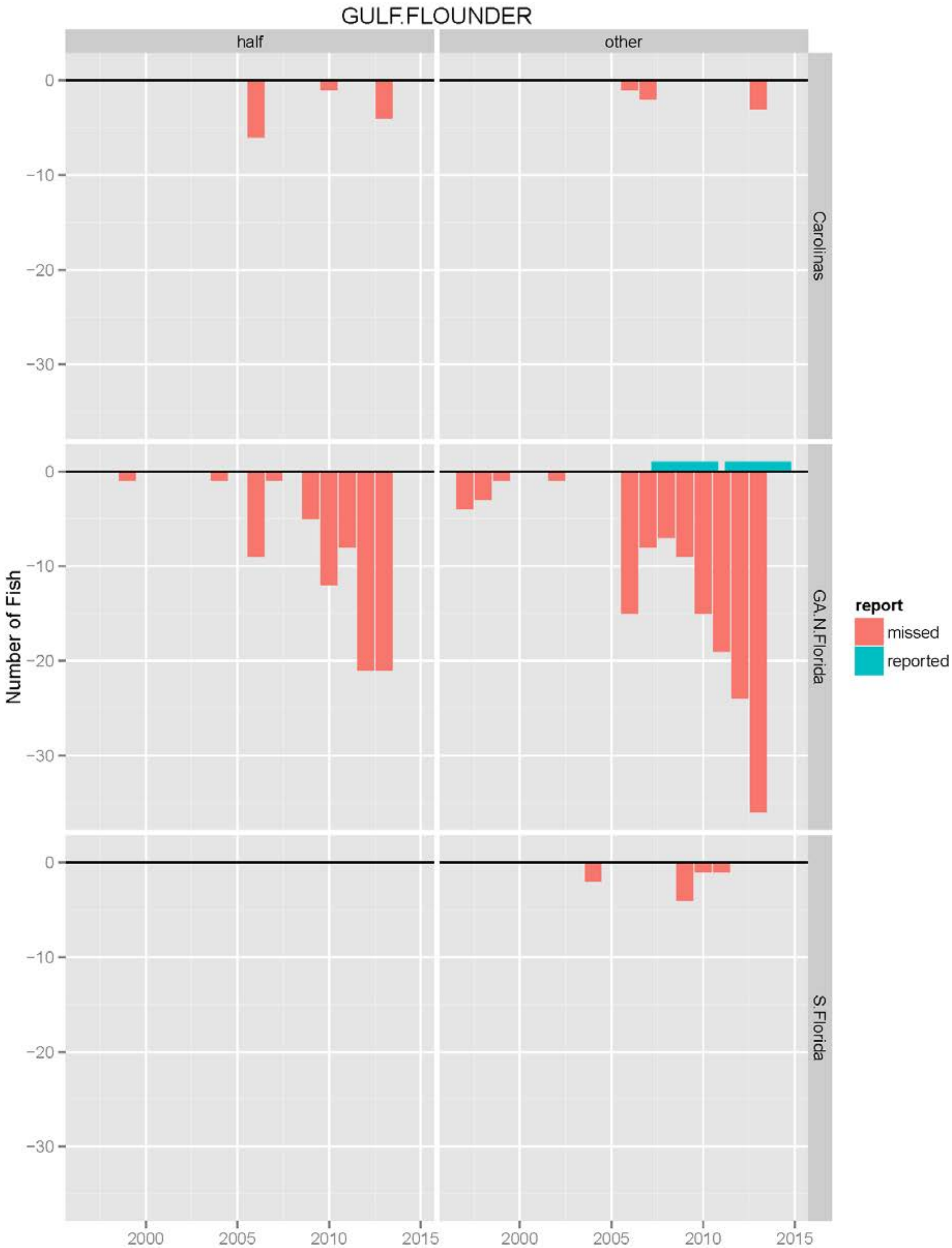

GAG
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
750
500
250
0
1980
1990
2000
2010
report
missed
reported

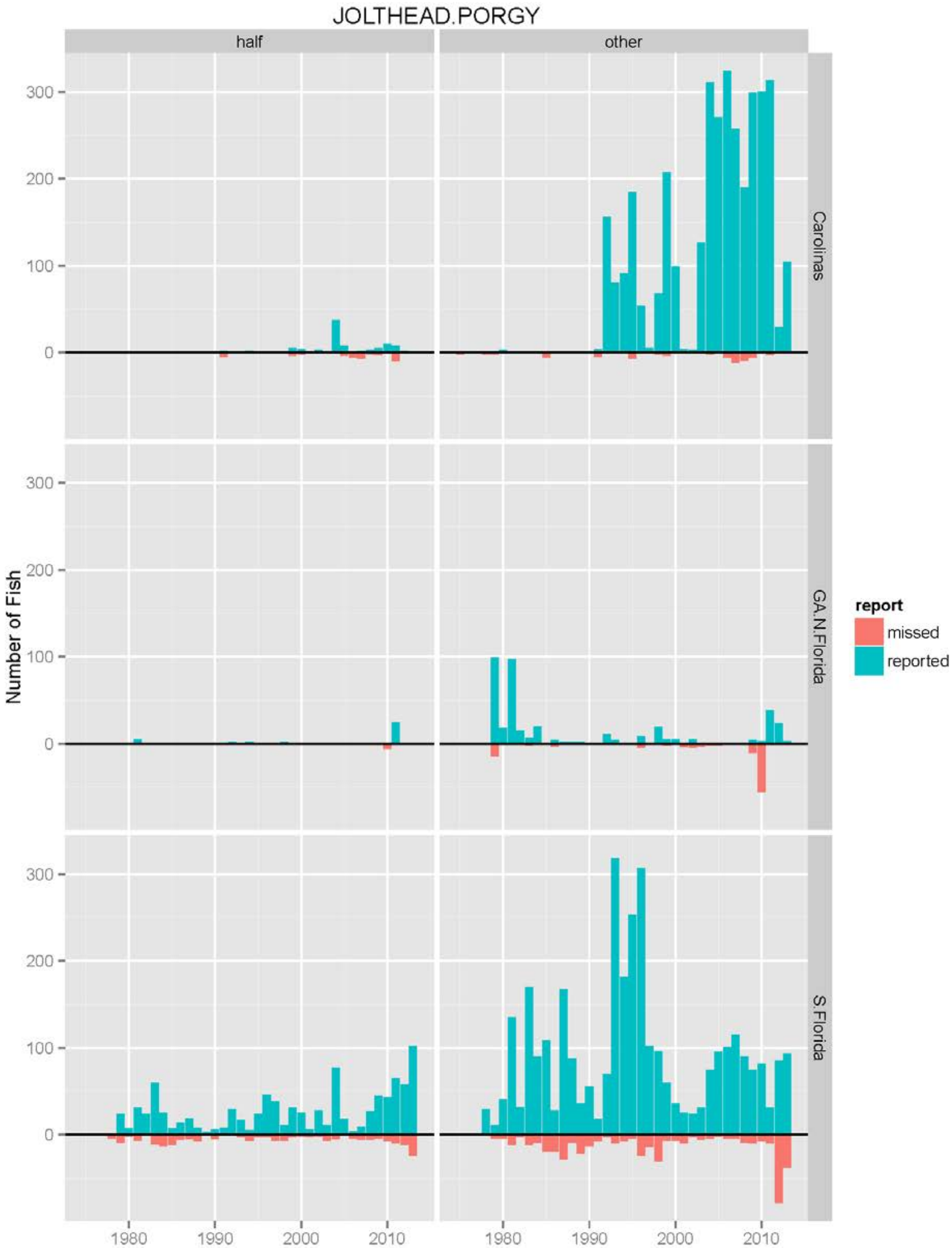

GRAY.SNAPPER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
2000
1500
1000
500
0
1980
1990
2000
2010


GRAY.TRIGGERFISH
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
8000
6000
4000
2000
0
1980
1990
2000
2010
report
missed
reported

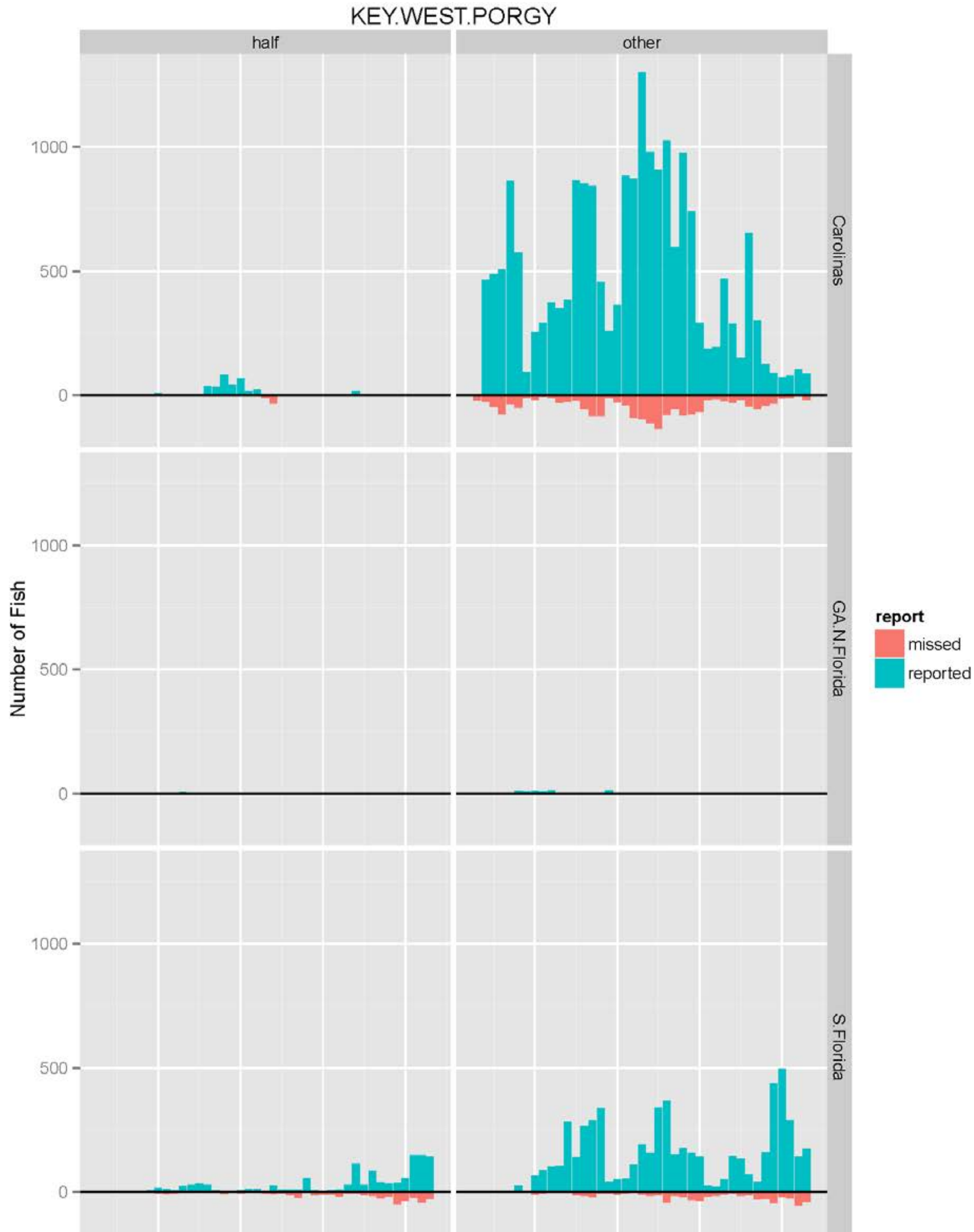

GRAYSBY
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
400
200
0
1980
1990
2000
2010
report
missed
reported

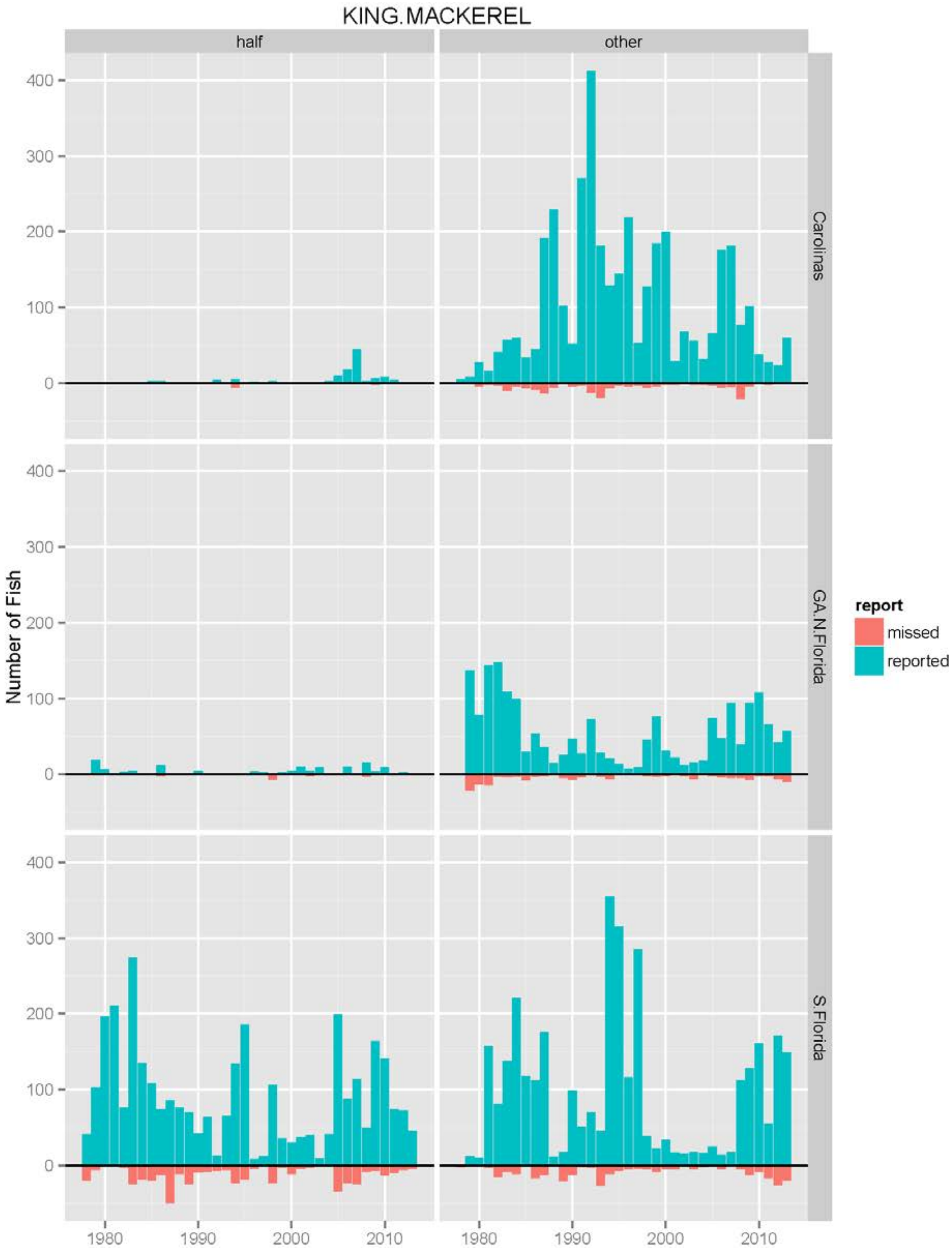

GREATER.AMBERJACK
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
750
500
250
0
1980
1990
2000
2010
report
missed
reported


GULF.FLOUNDER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
0
−10
−20
−30
2000
2005
2010
2015
report
missed
reported

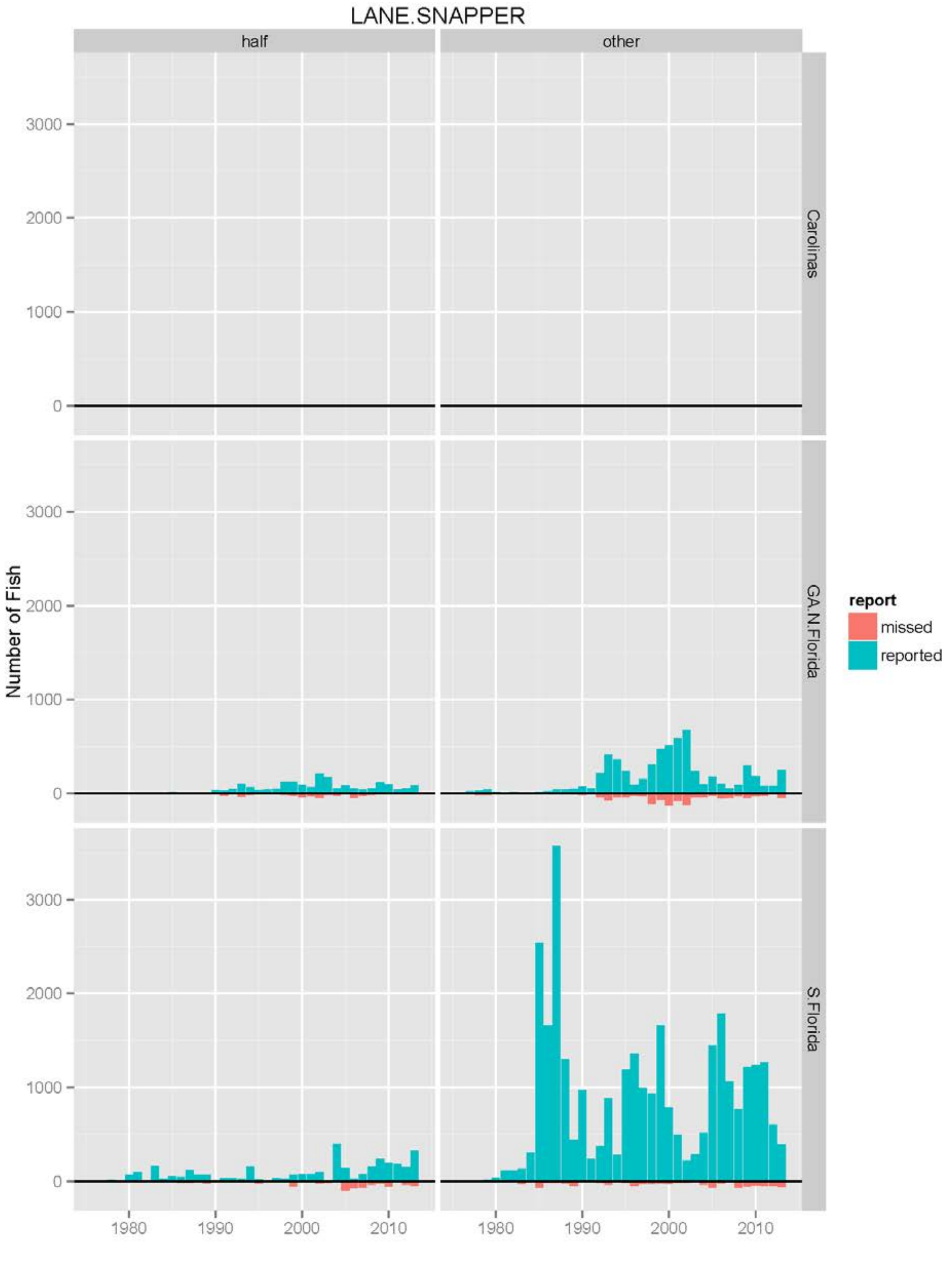


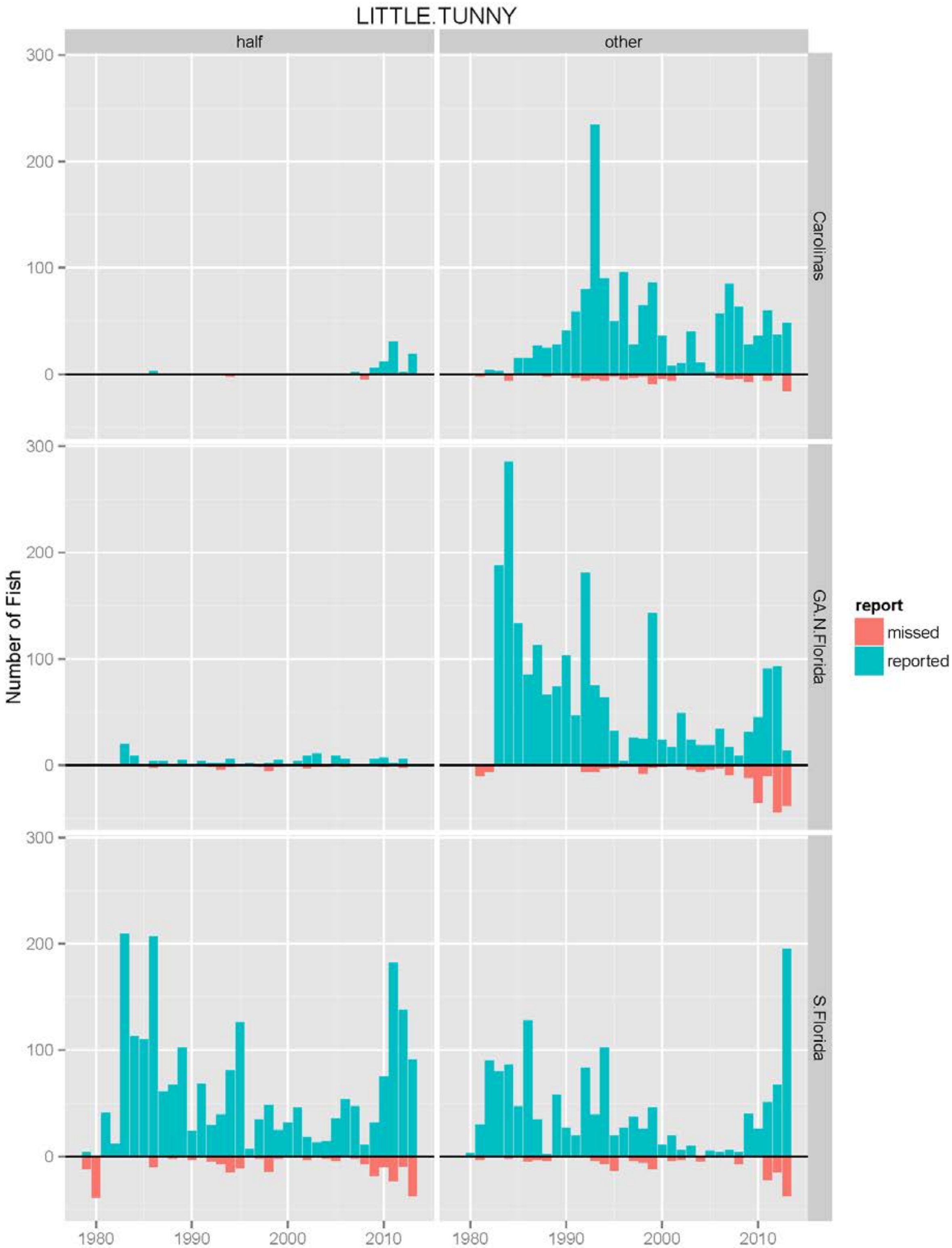
JOLTHEAD.PORGY
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
0
100
200
300
1980
1990
2000
2010
report
missed
reported

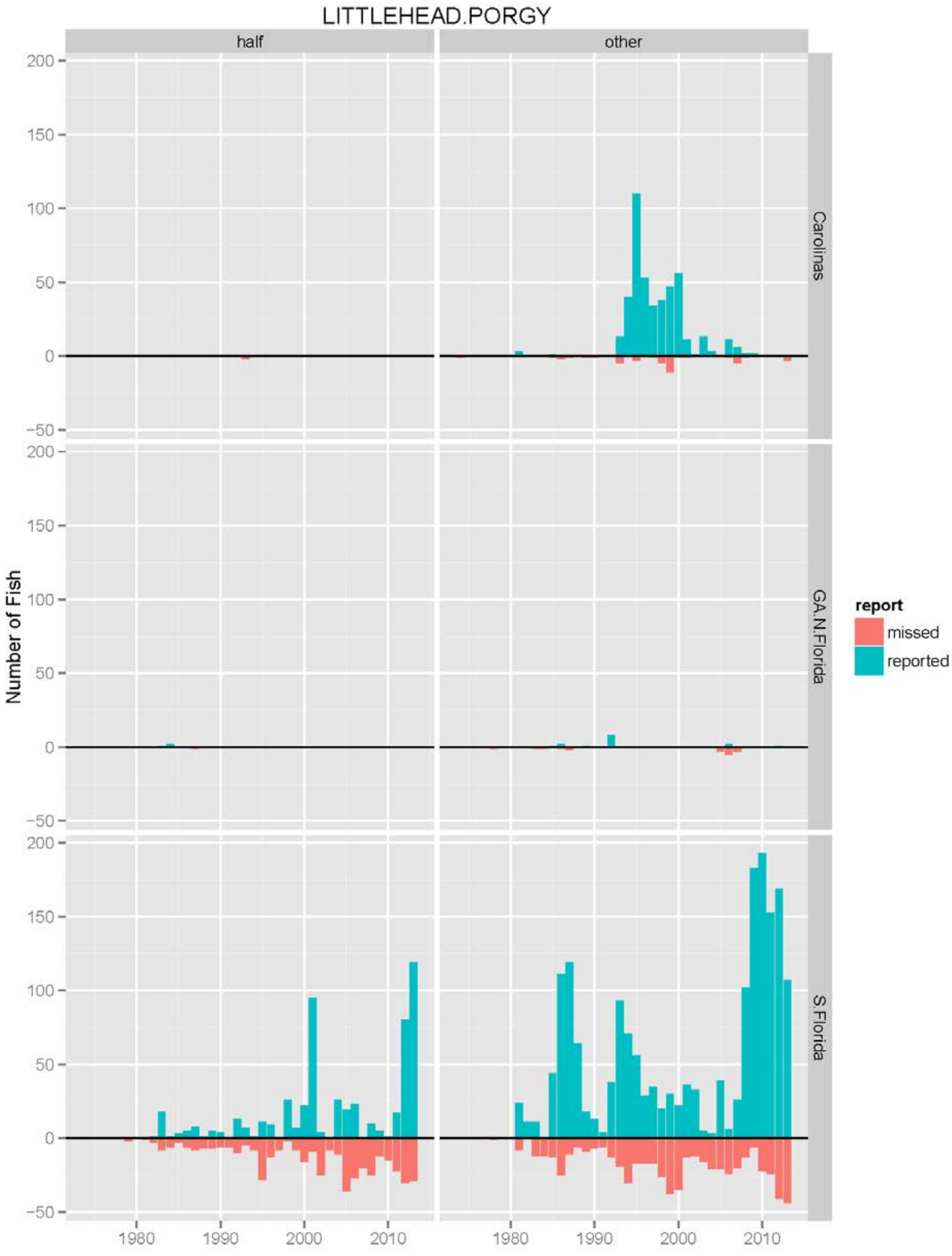

KEY.WEST.PORGY
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
1000
500
0
1980
1990
2000
2010
report
missed
reported

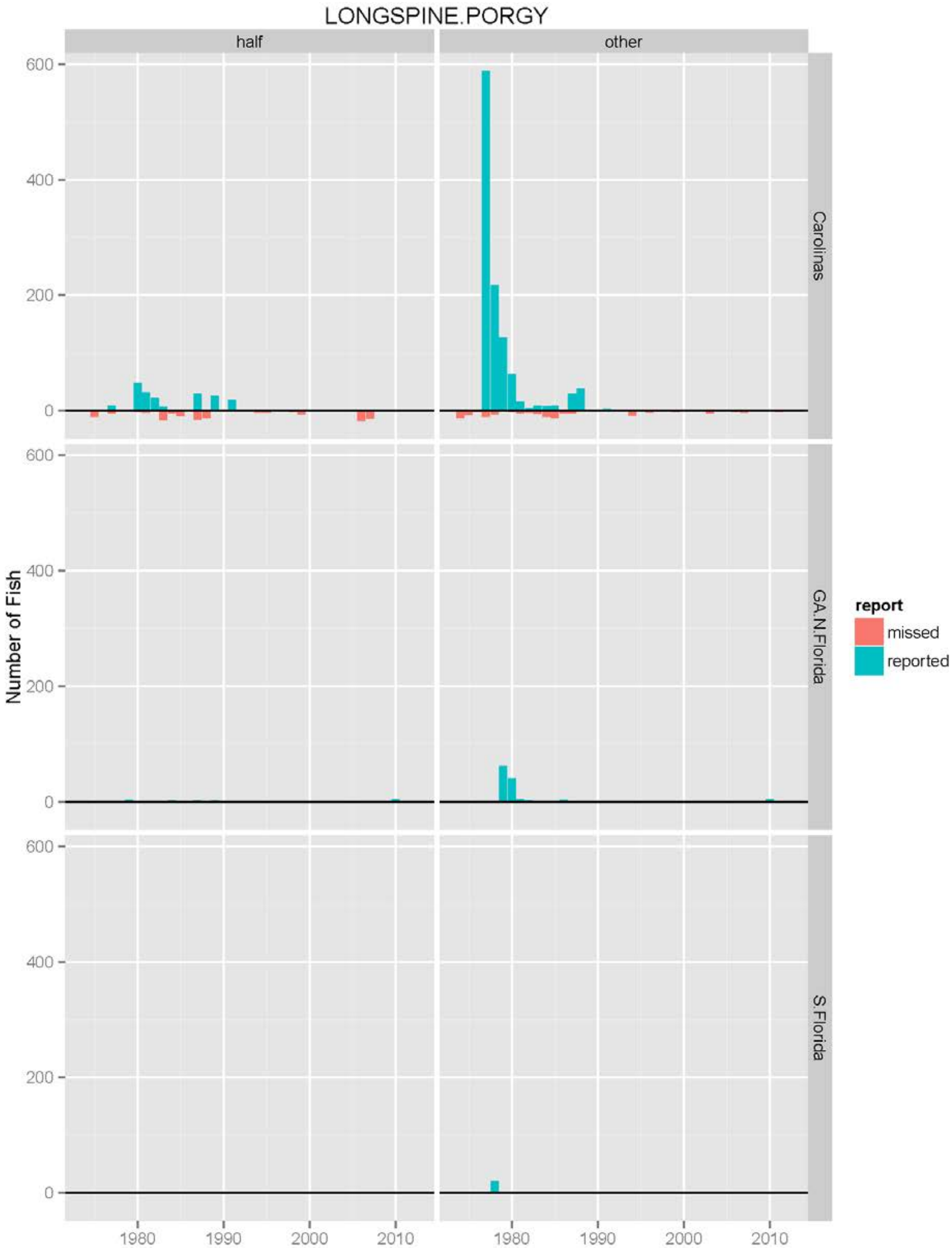


KING.MACKEREL
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
400
300
200
100
0
1980
1990
2000
2010

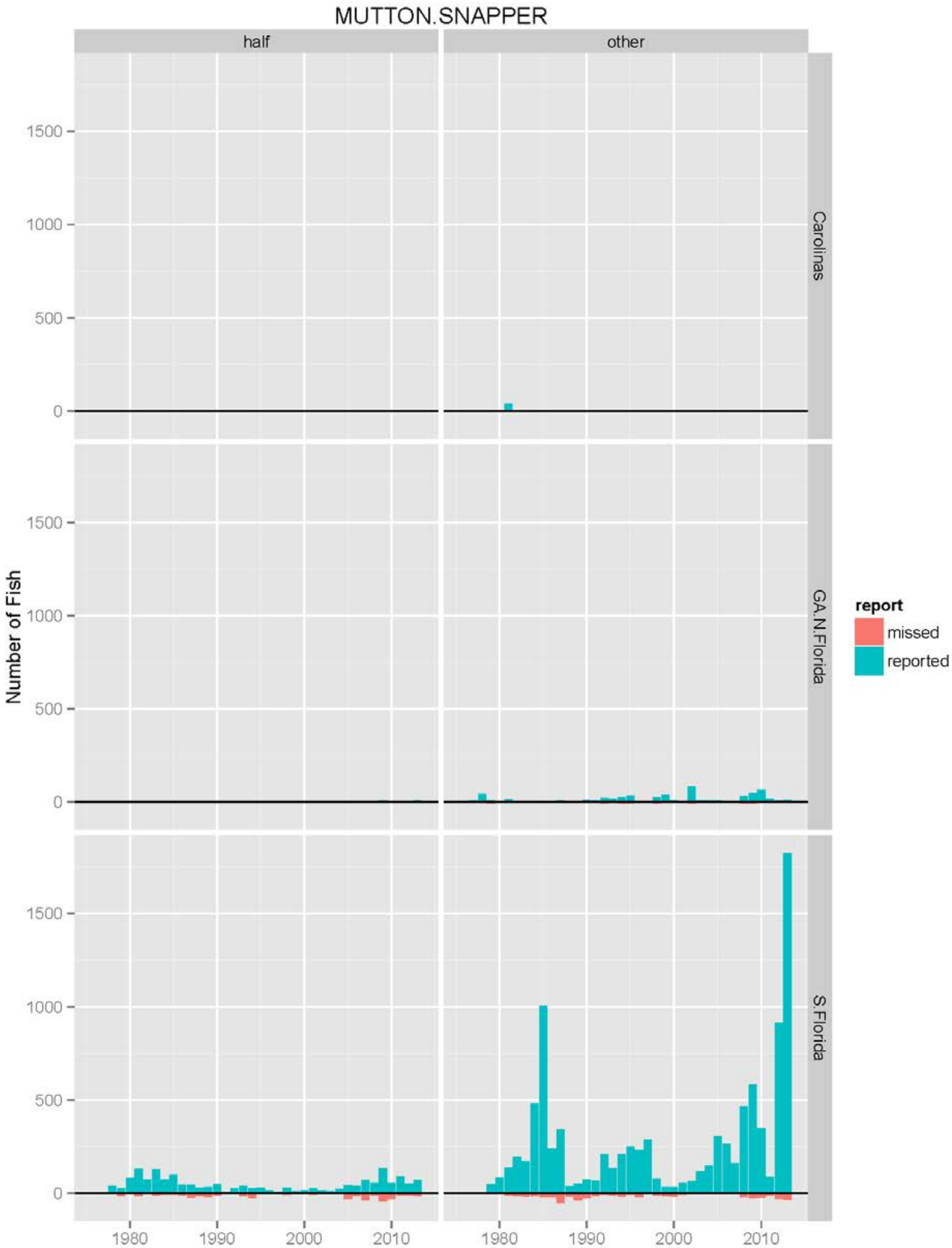

LANE.SNAPPER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
3000
2000
1000
0
1980
1990
2000
2010
report
missed
reported


LITTLE.TUNNY
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
300
200
100
0
1980
1990
2000
2010

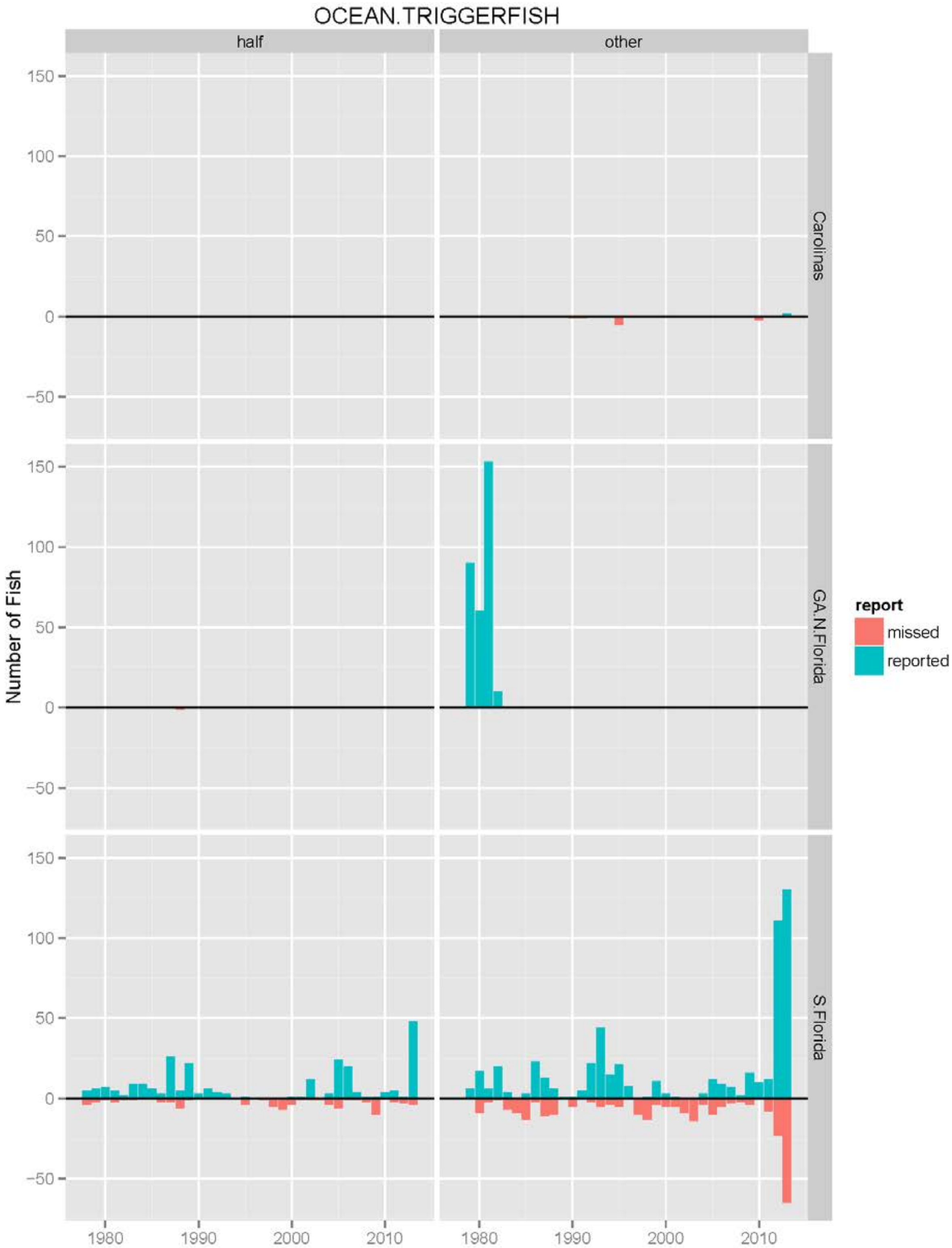

LITTLEHEAD.PORGY
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
200
150
100
50
0
−50
1980
1990
2000
2010



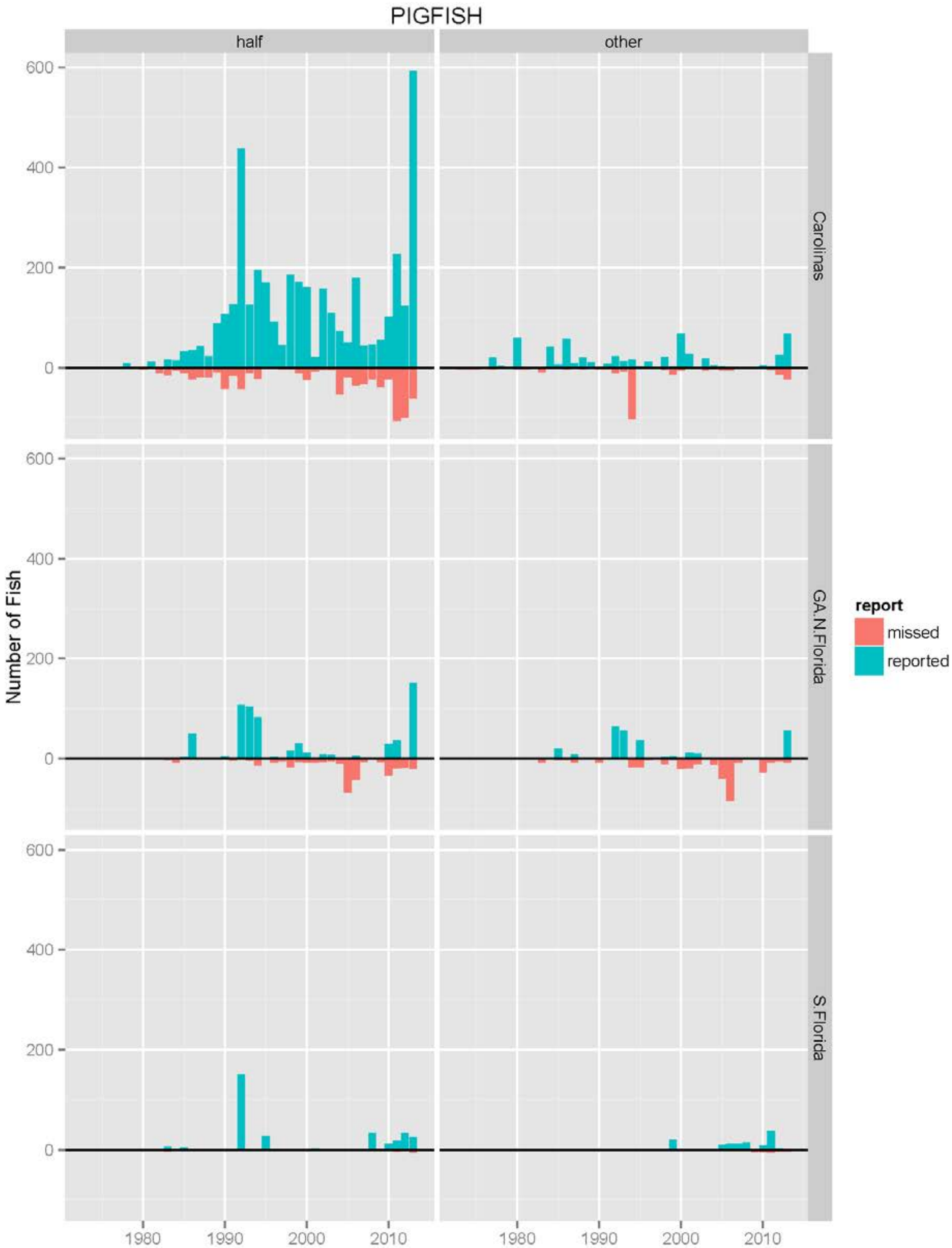
LONGSPINE.PORGY
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
600
400
200
0
1980
1990
2000
2010
report
missed
reported

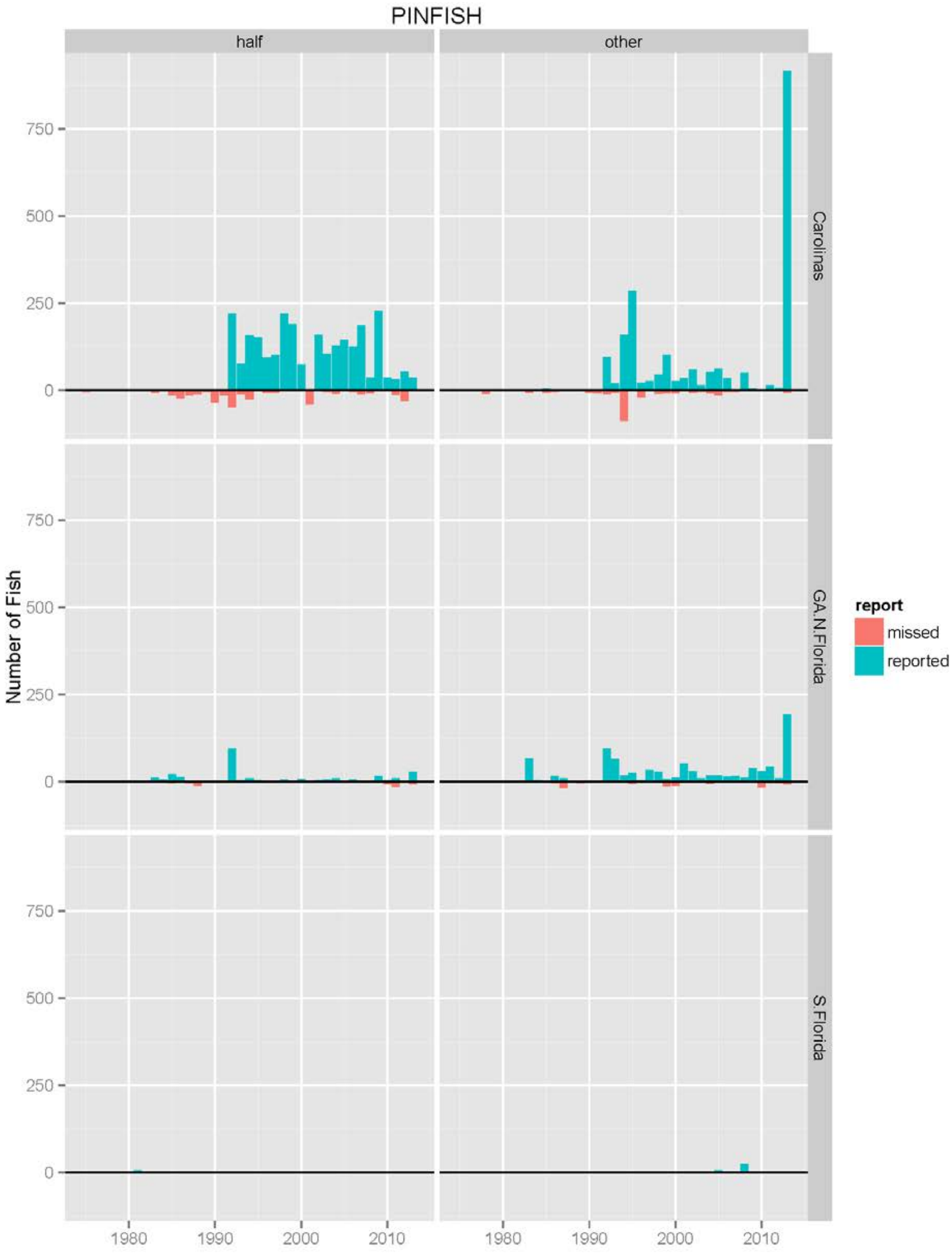


MUTTON.SNAPPER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
1500
1000
500
0
1980
1990
2000
2010
report
missed
reported

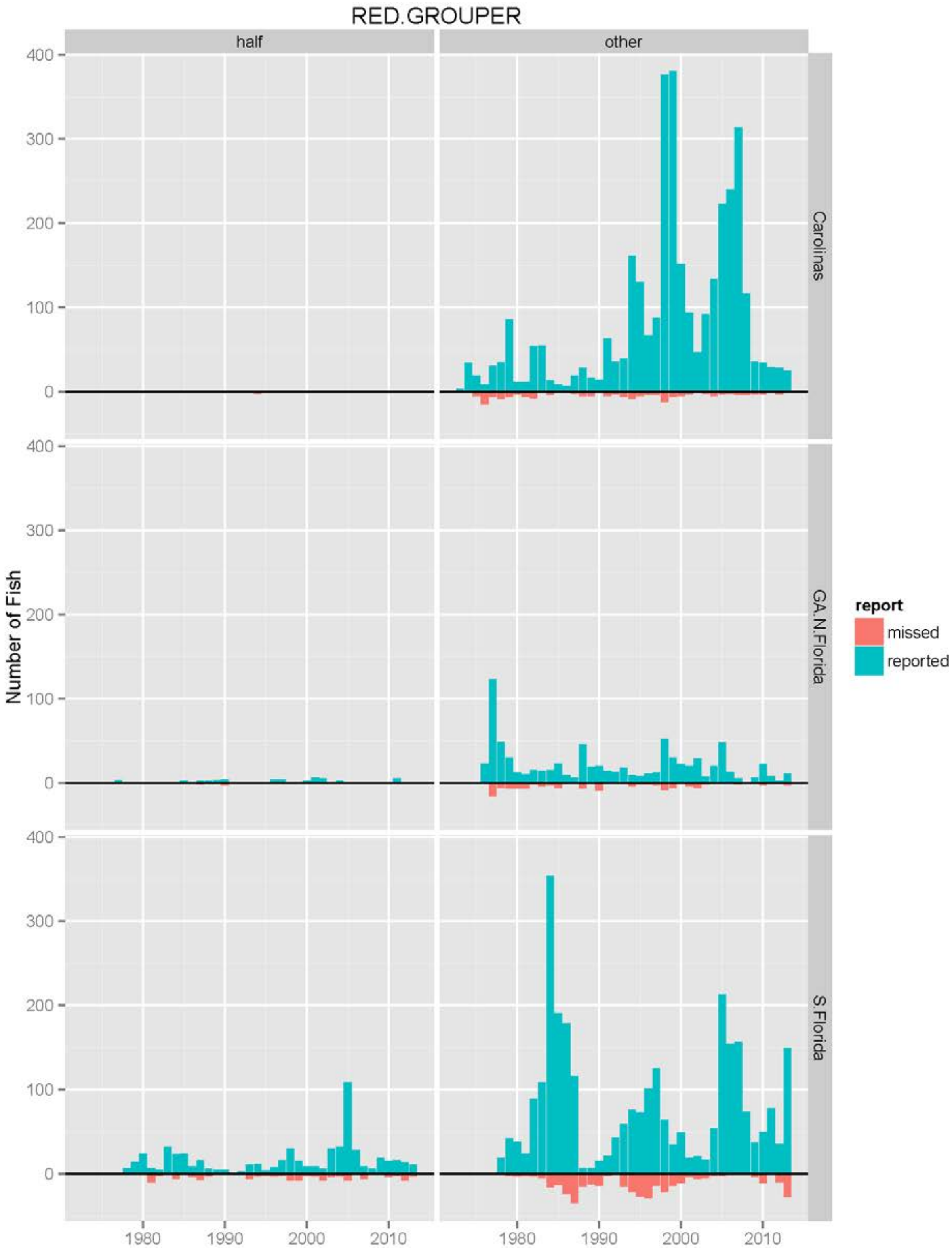


OCEAN.TRIGGERFISH
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
150
100
50
0
-50
1980
1990
2000
2010
report
missed
reported

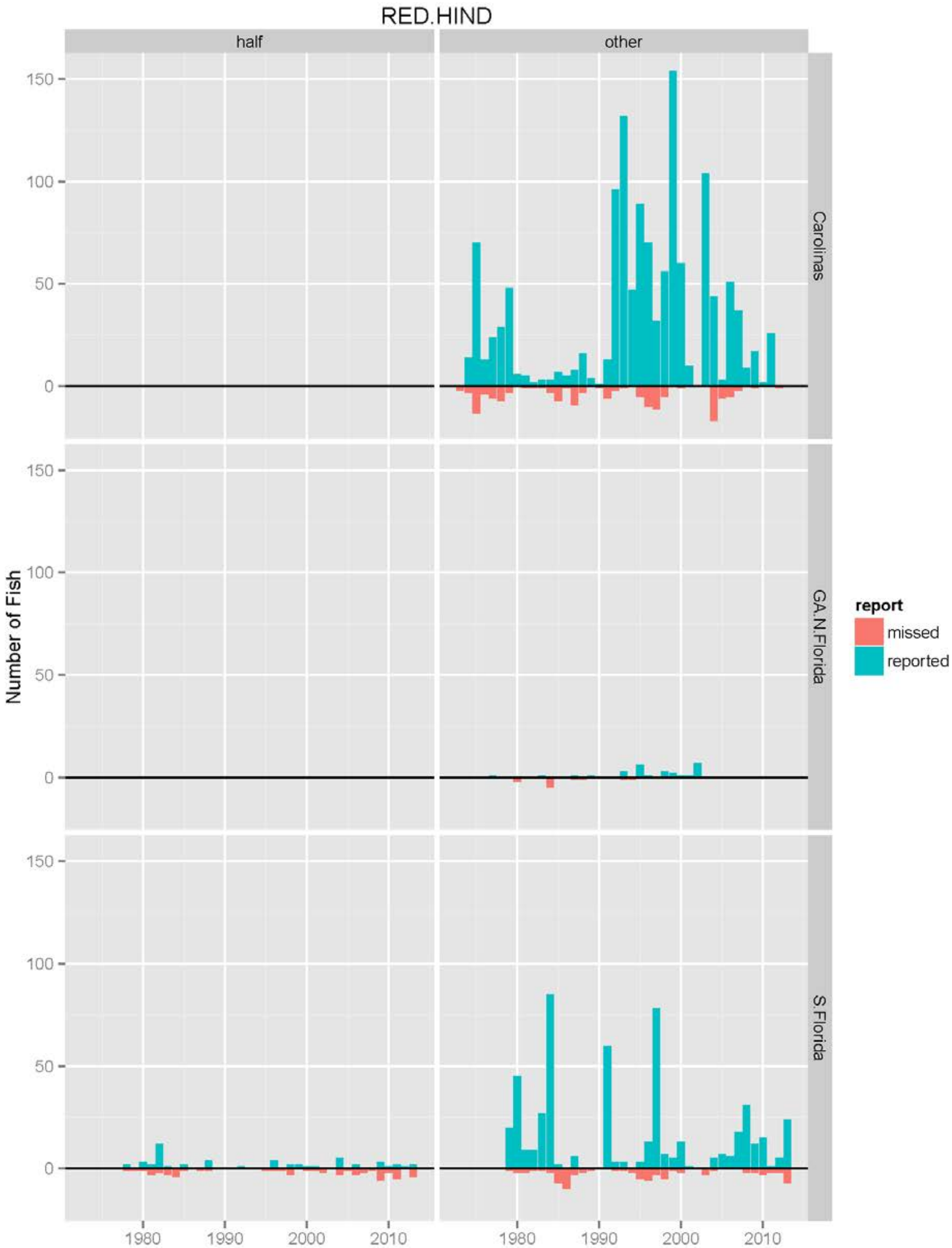

PIGFISH
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
600
400
200
0
1980
1990
2000
2010

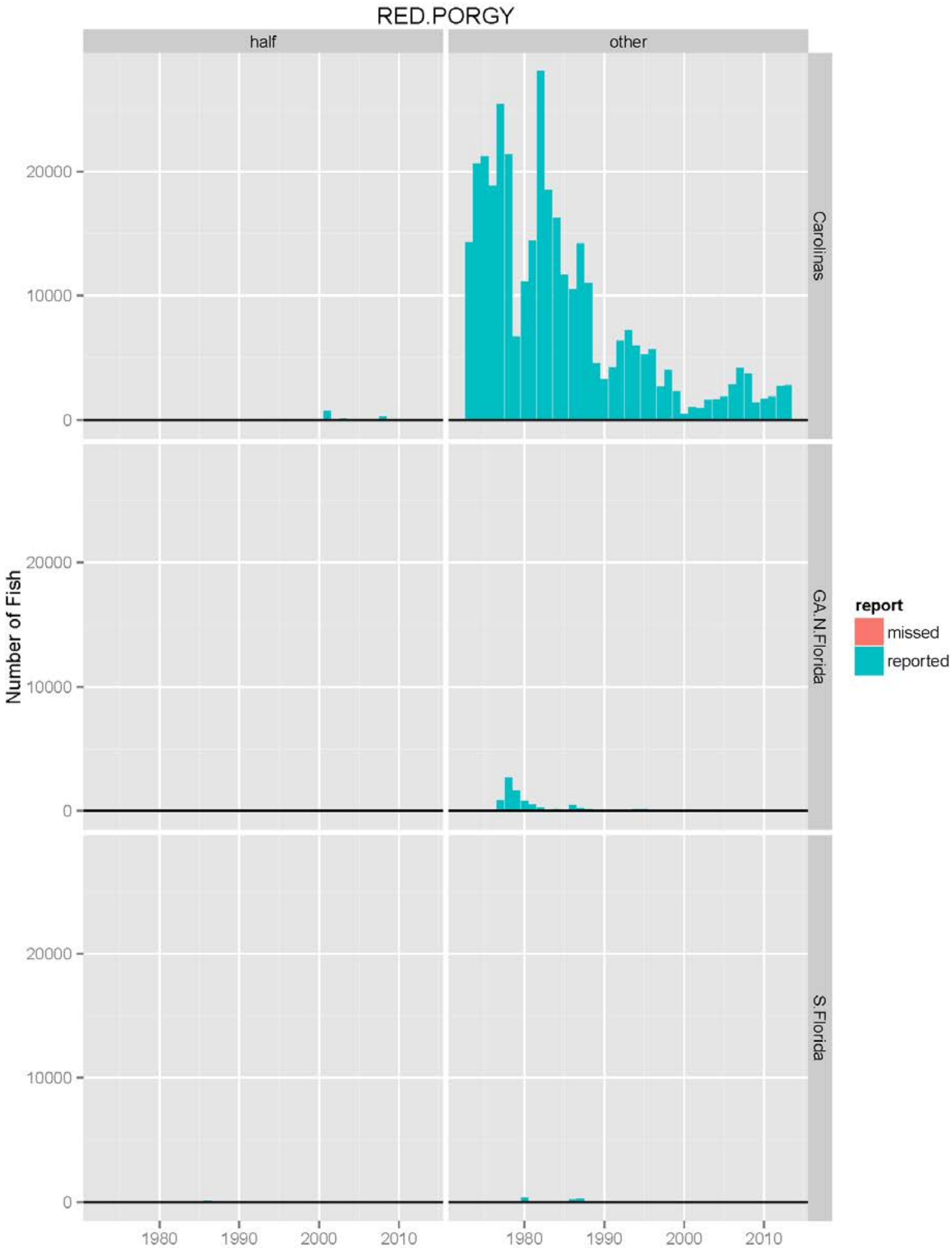


PINFISH
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
750
500
250
0
1980
1990
2000
2010
report
missed
reported

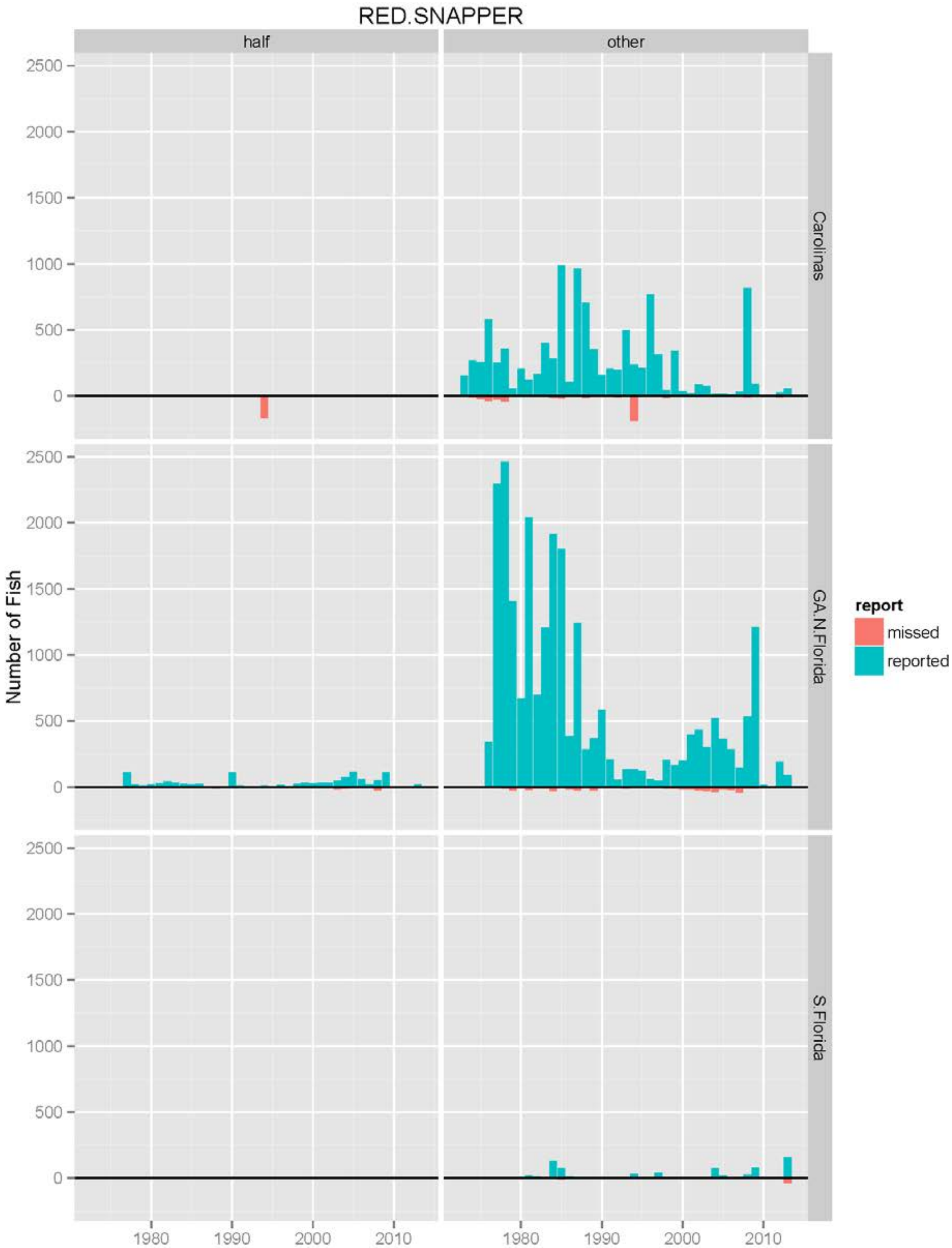


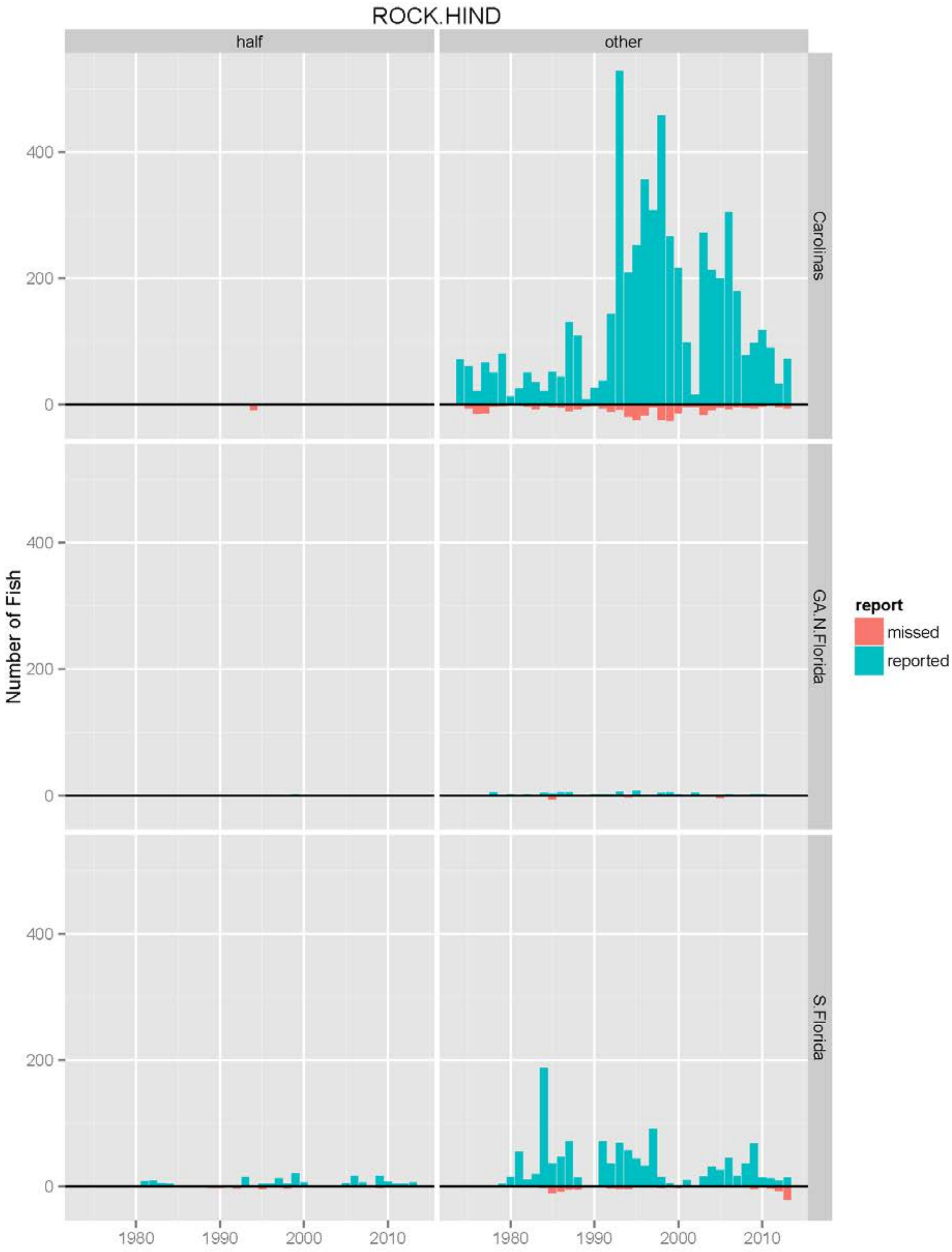
RED.GROUPER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
400
300
200
100
0
1980
1990
2000
2010
report
missed
reported


RED.HIND
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
150
100
50
0
1980
1990
2000
2010
report
missed
reported

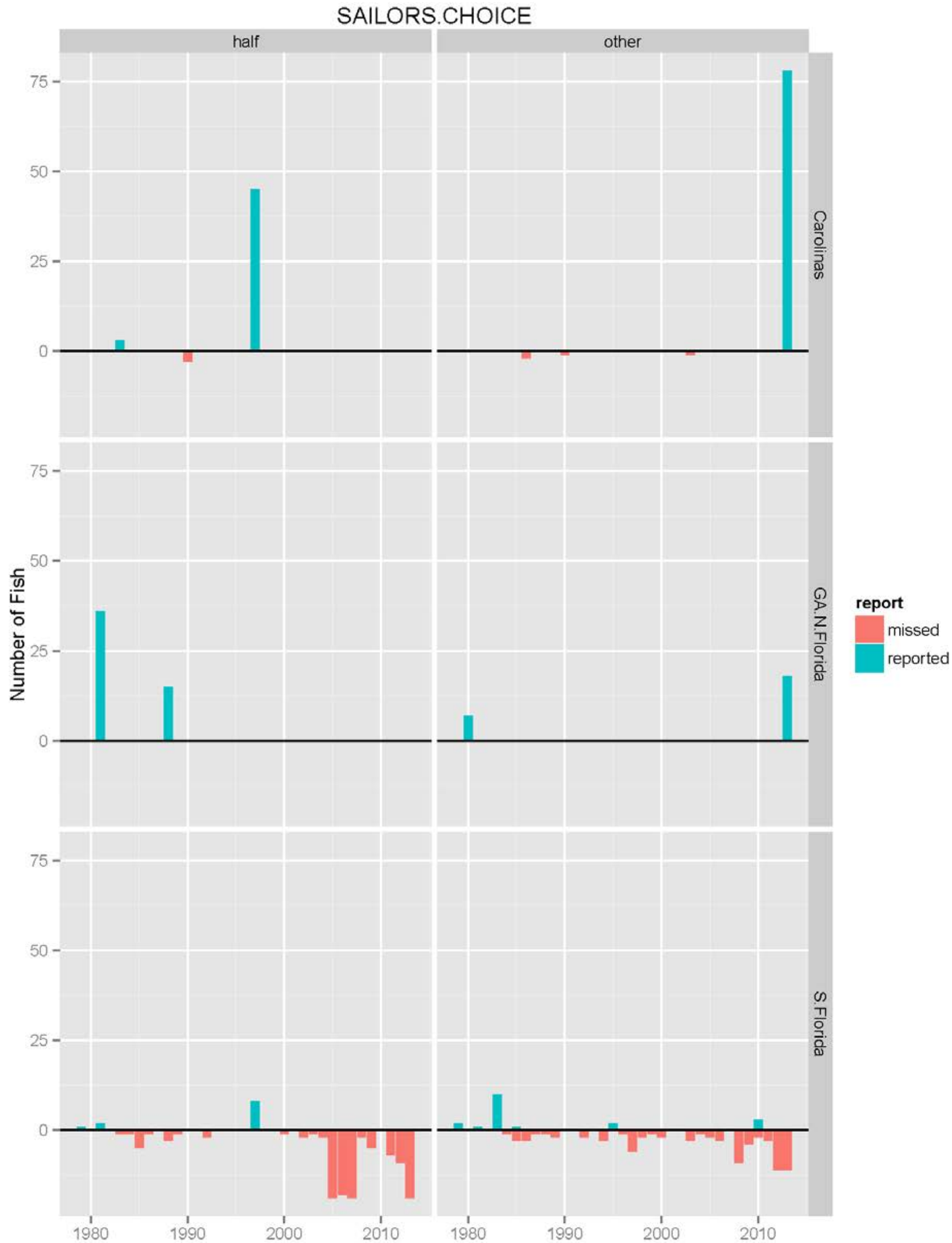


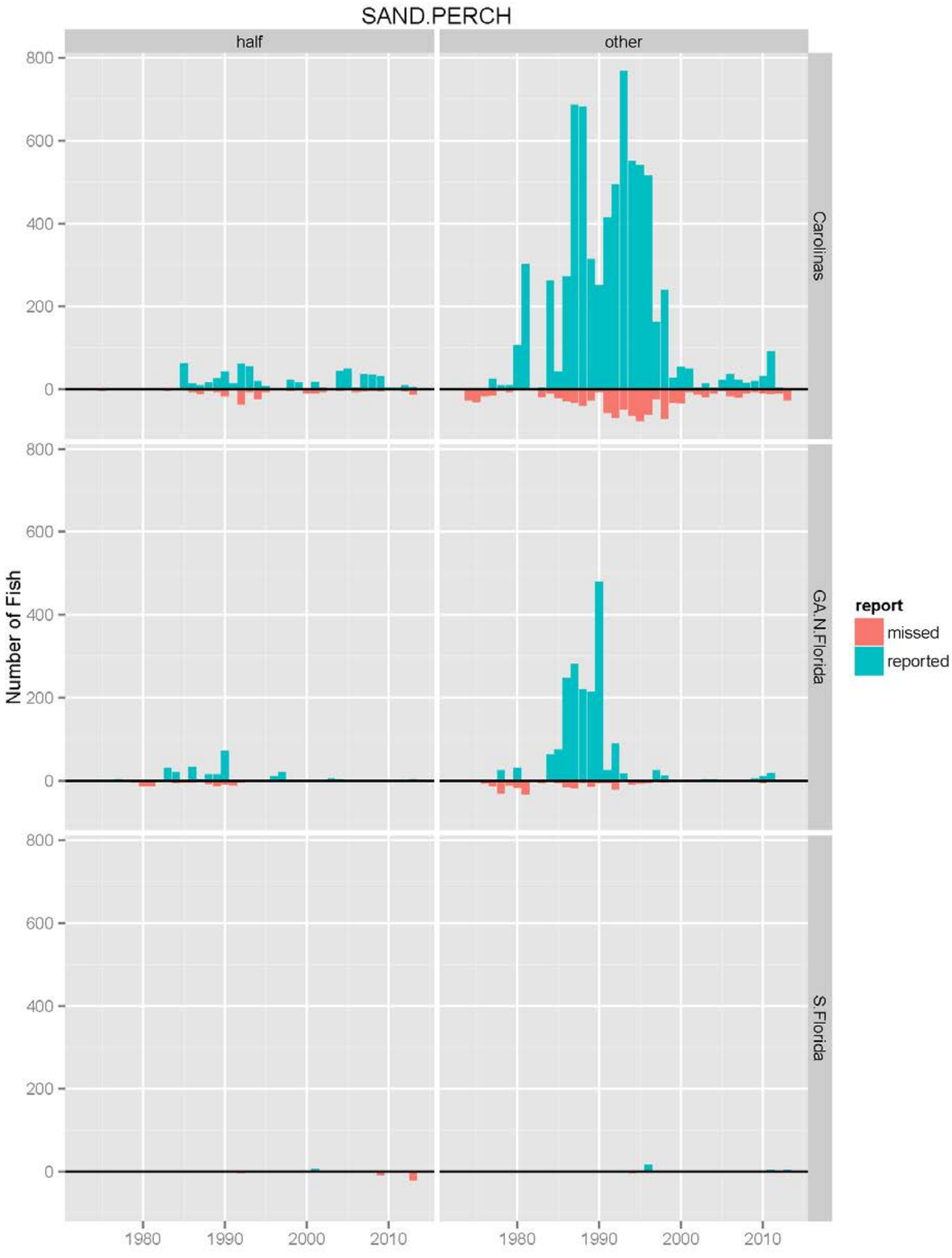
RED.PORGY
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
20000
10000
0
1980
1990
2000
2010
report
missed
reported


RED.SNAPPER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
2500
2000
1500
1000
500
0
1980
1990
2000
2010
report
missed
reported

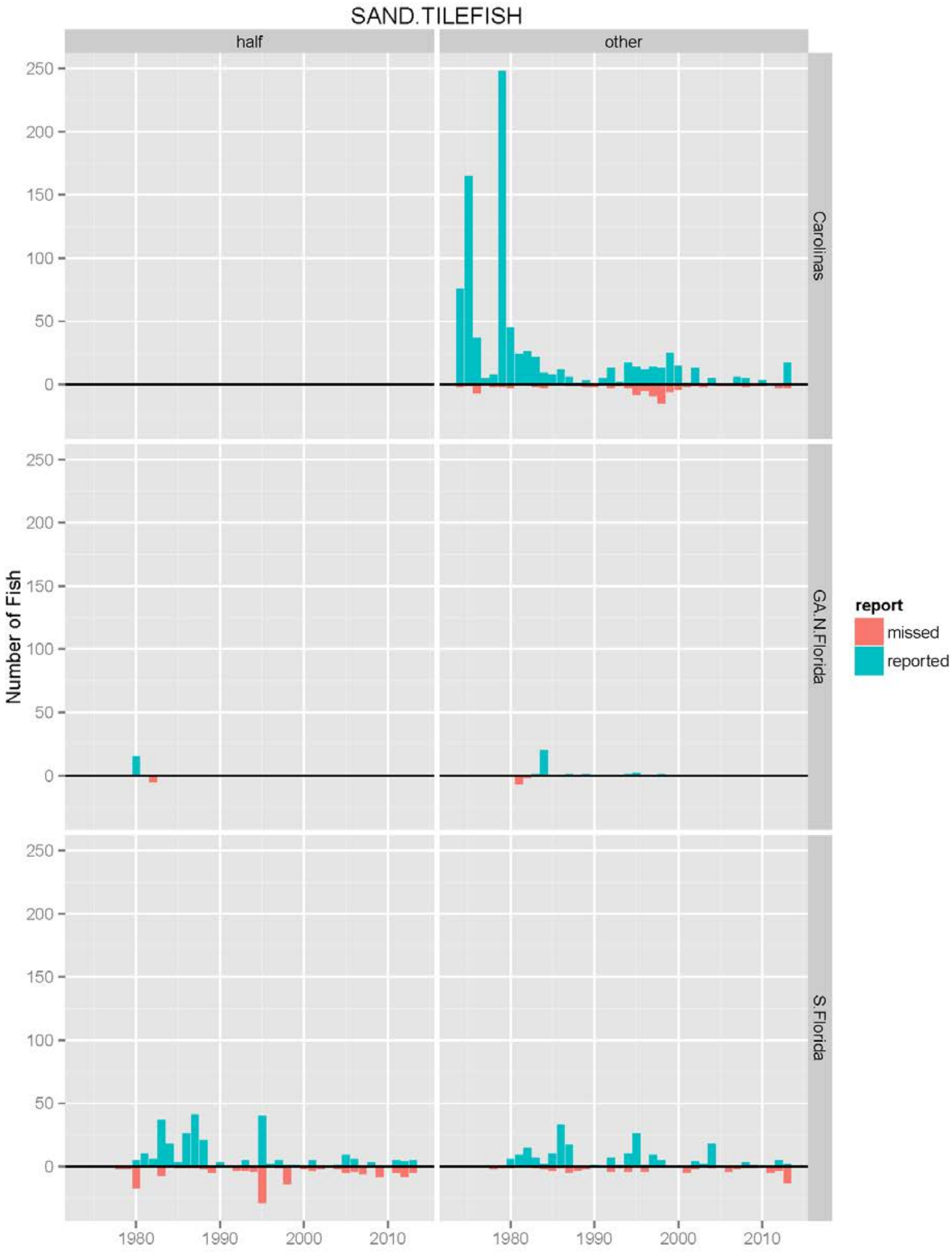


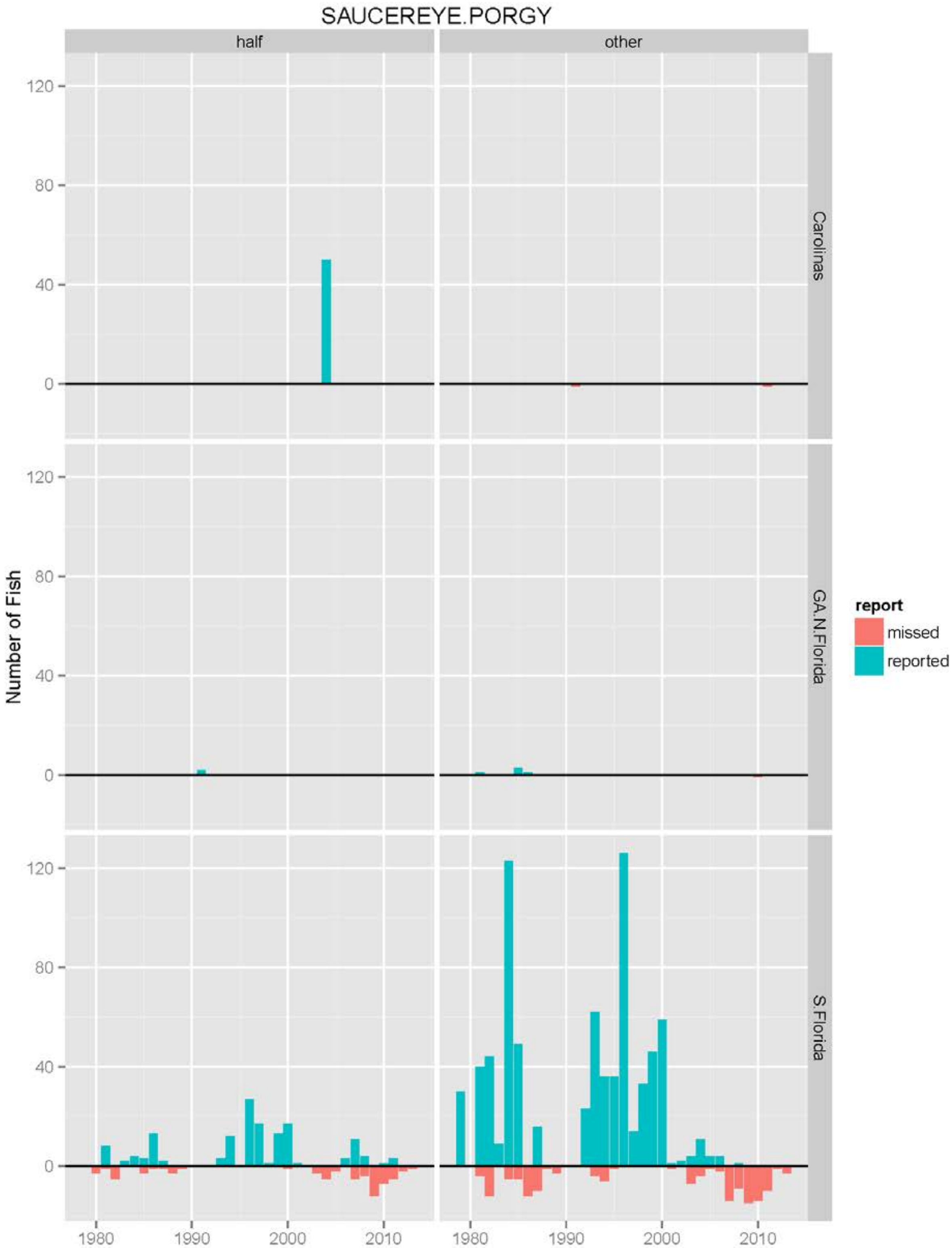
ROCK.HIND
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
400
200
0
1980
1990
2000
2010
report
missed
reported

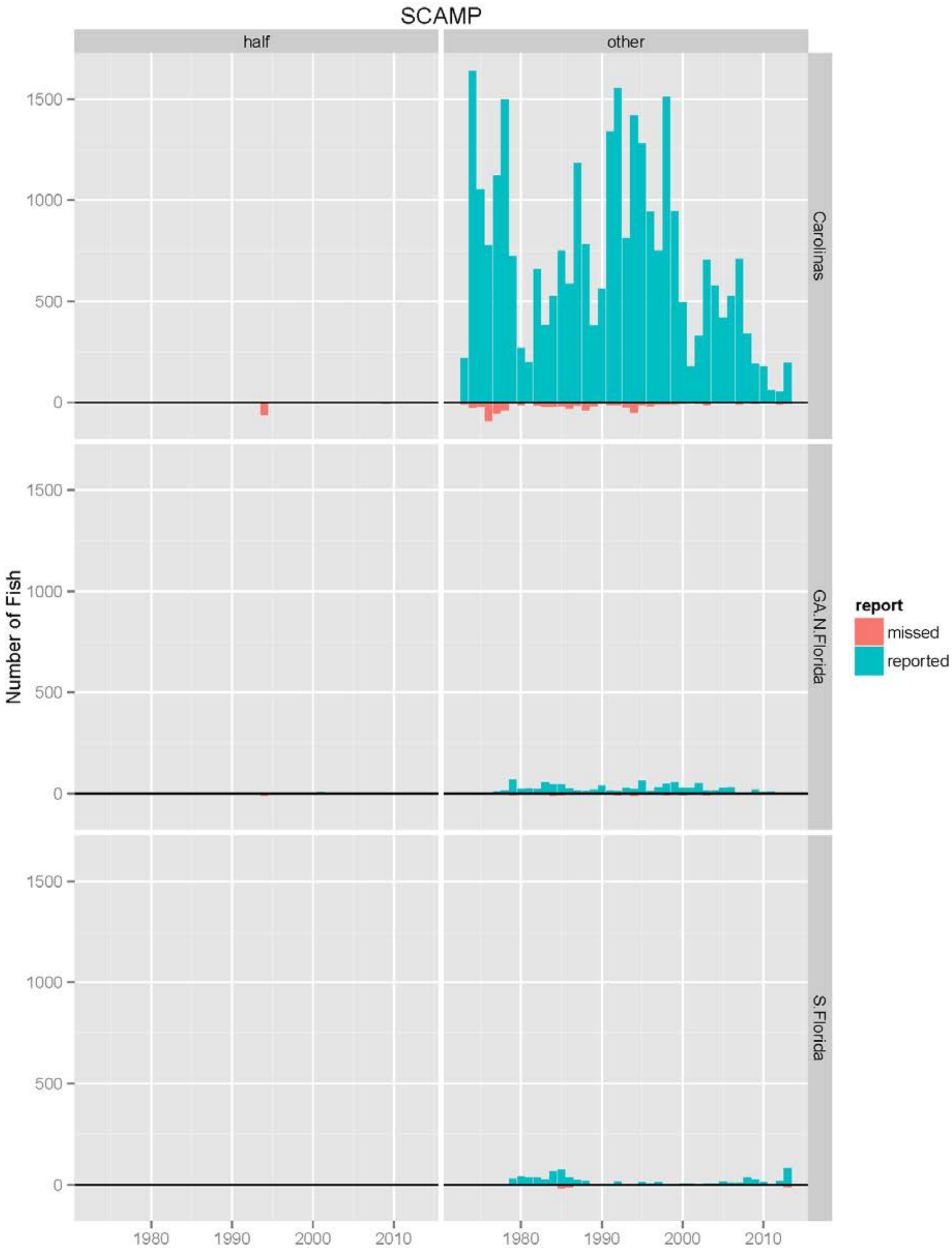

SAILORS.CHOICE
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
75
50
25
0
1980
1990
2000
2010
report
missed
reported

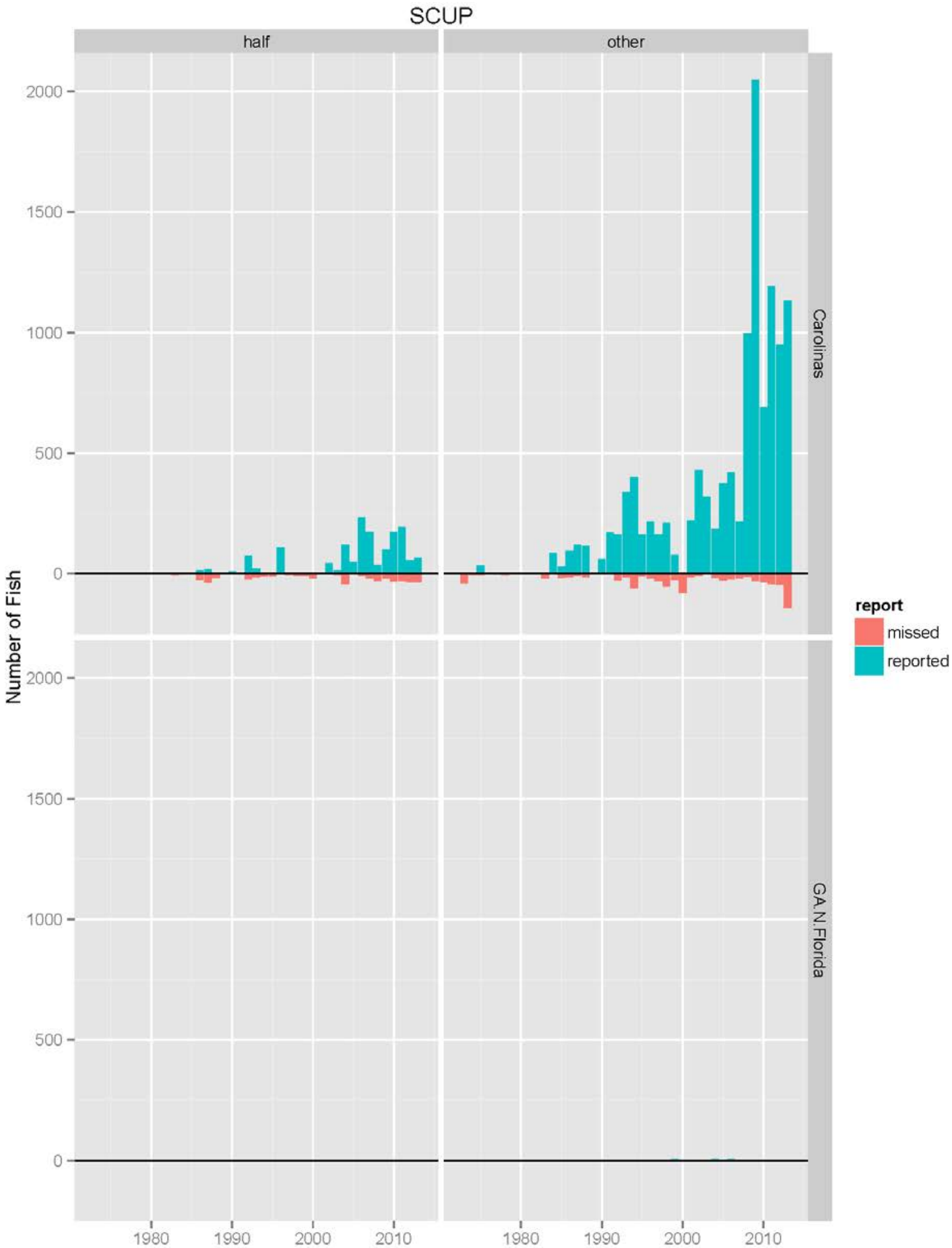


SAND.PERCH
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
800
600
400
200
0
1980
1990
2000
2010
report
missed
reported

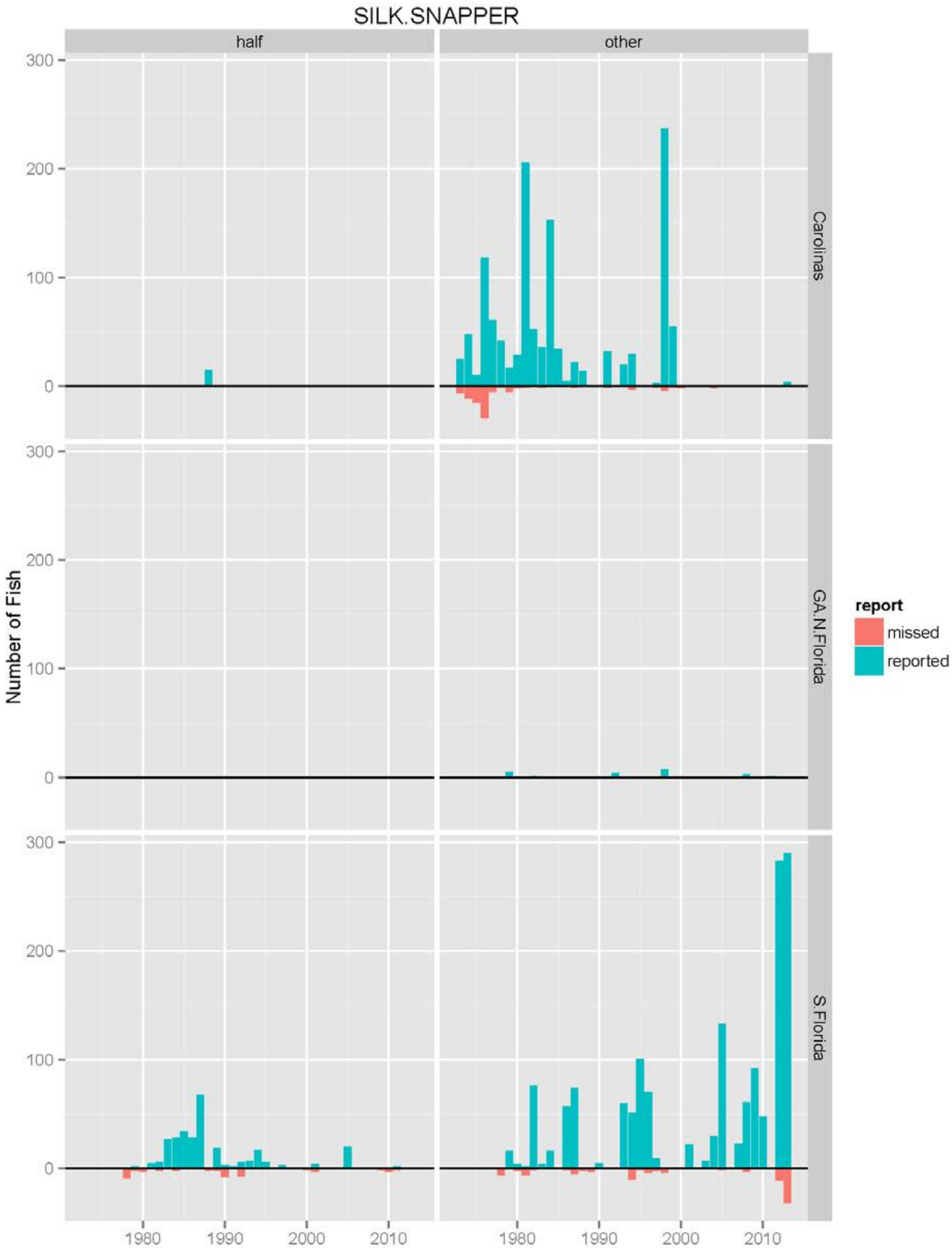

SAND.TILEFISH
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
250
200
150
100
50
0
1980
1990
2000
2010

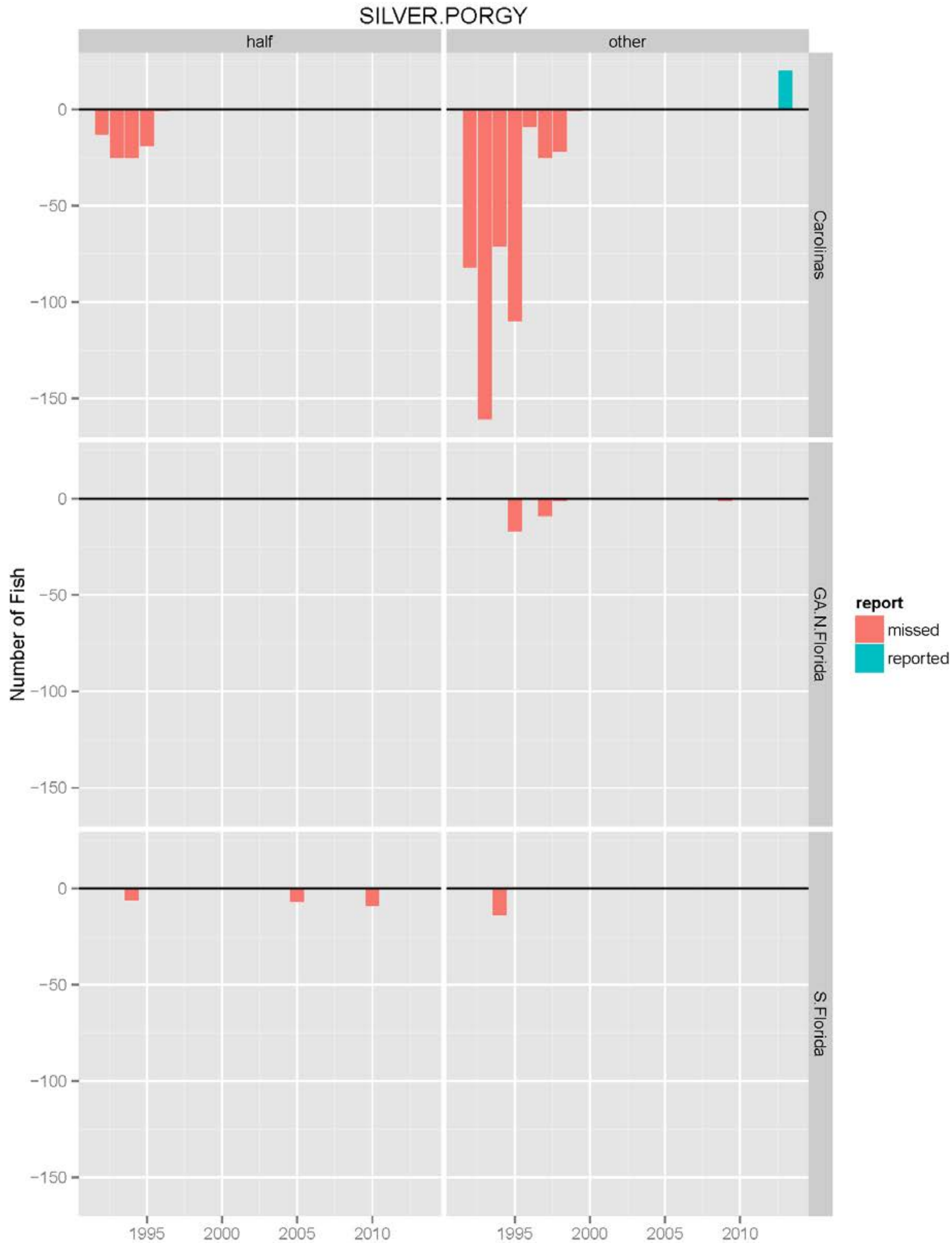

SAUCEREYE.PORGY
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
120
80
40
0
1980
1990
2000
2010
report
missed
reported


SCAMP
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
1500
1000
500
0
1980
1990
2000
2010

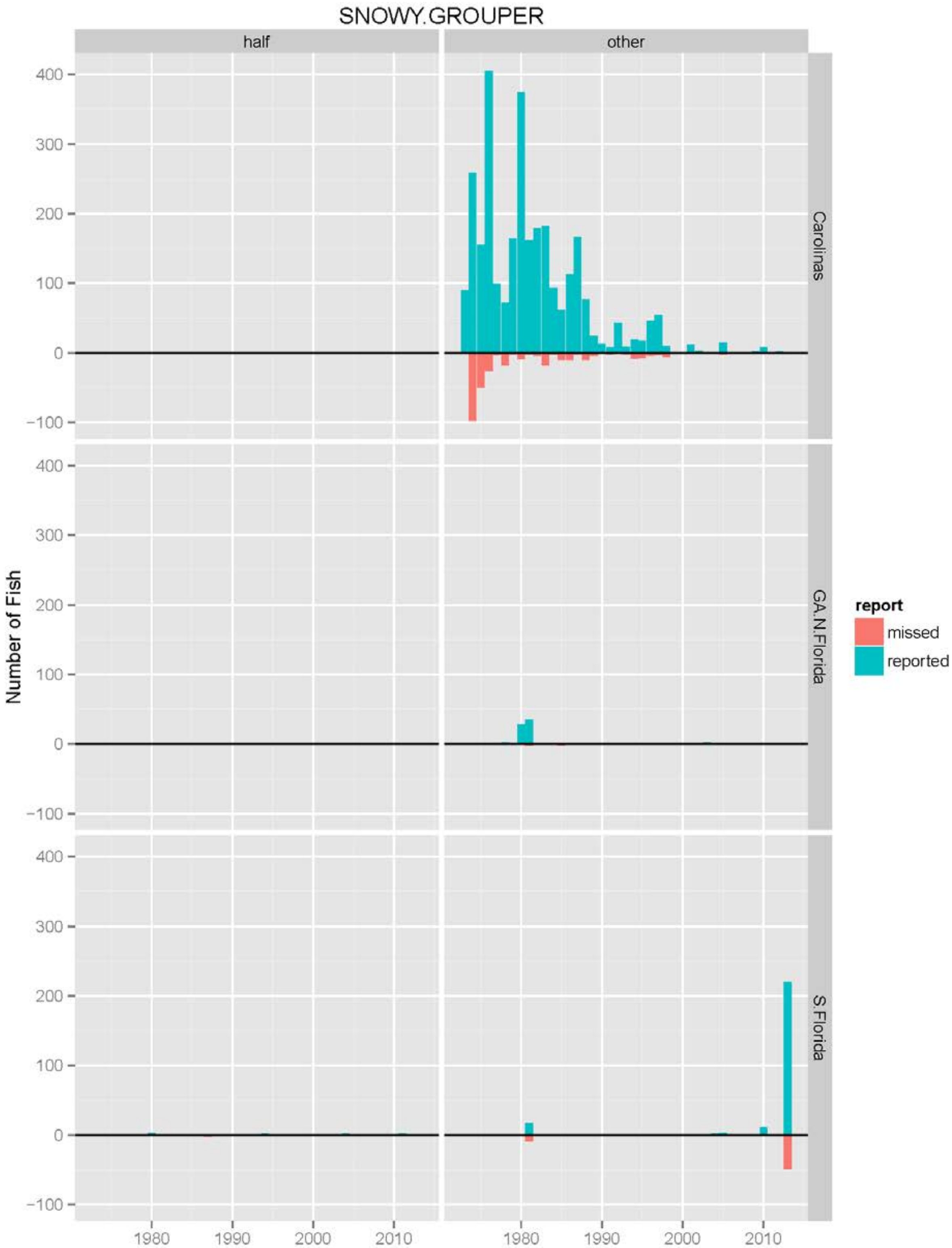


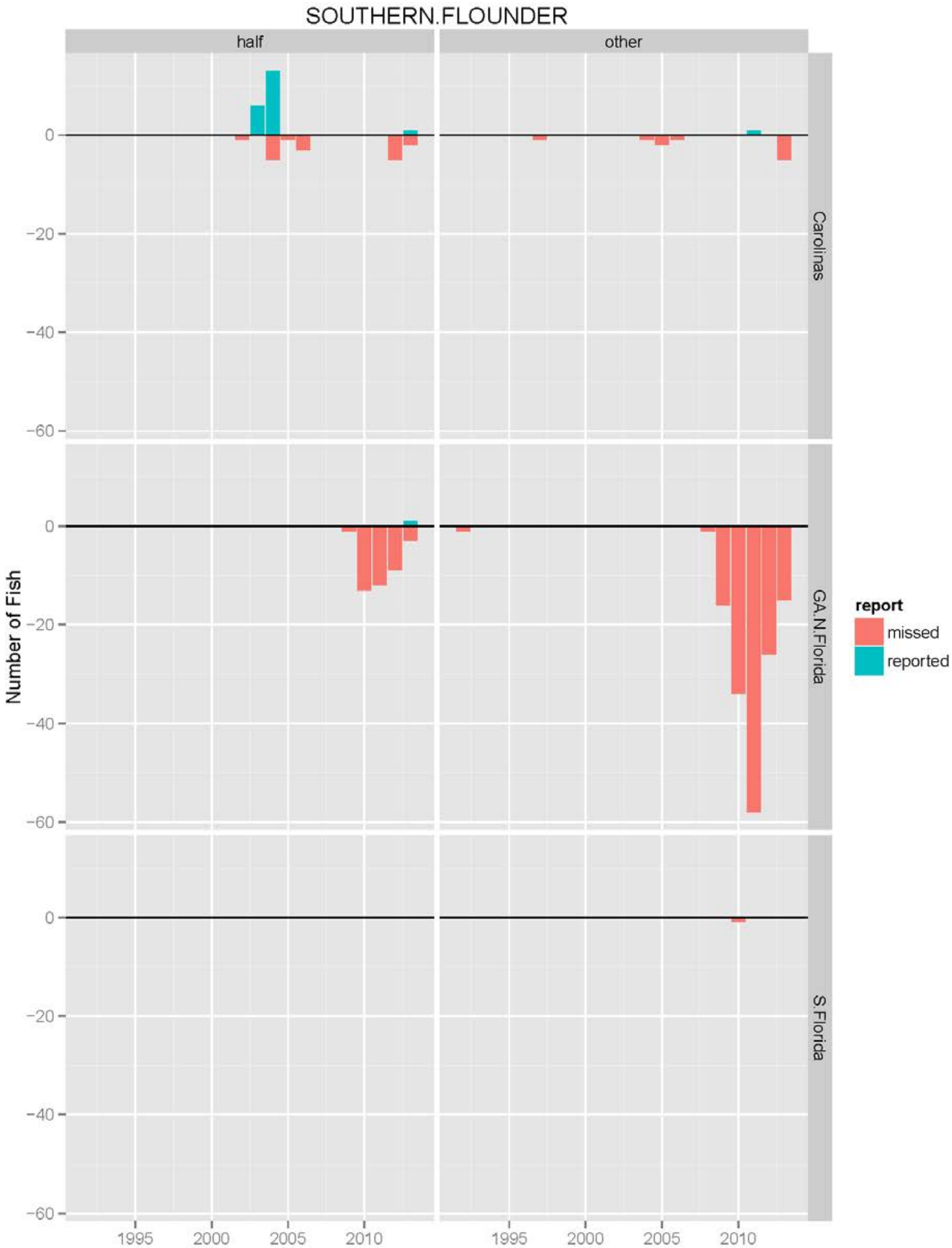
SCUP
half
other
Carolinas
GA.N.Florida
Number of Fish
report
missed
reported
2000
1500
1000
500
0
1980
1990
2000
2010

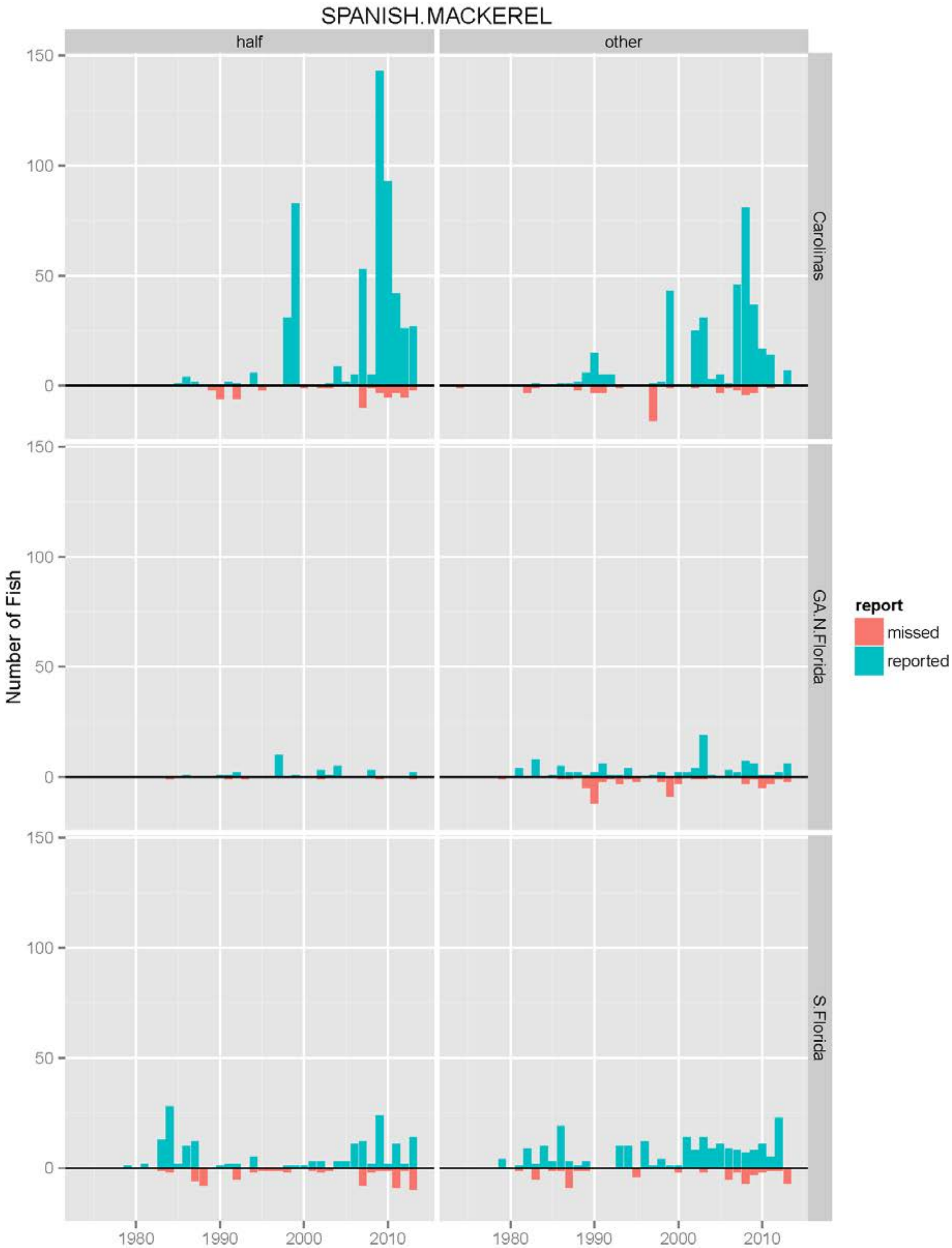

SILK.SNAPPER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
300
200
100
0
1980
1990
2000
2010
report
missed
reported

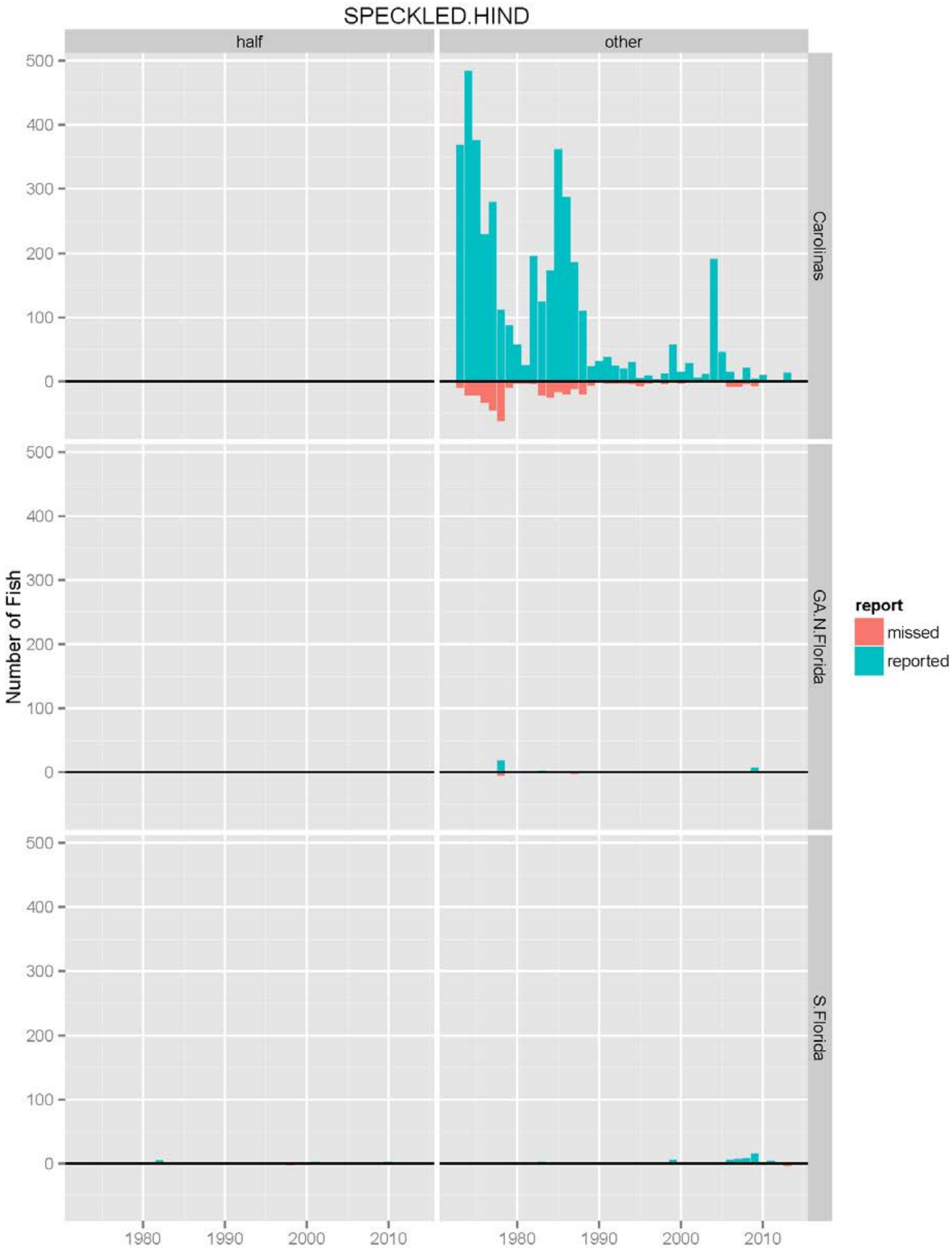


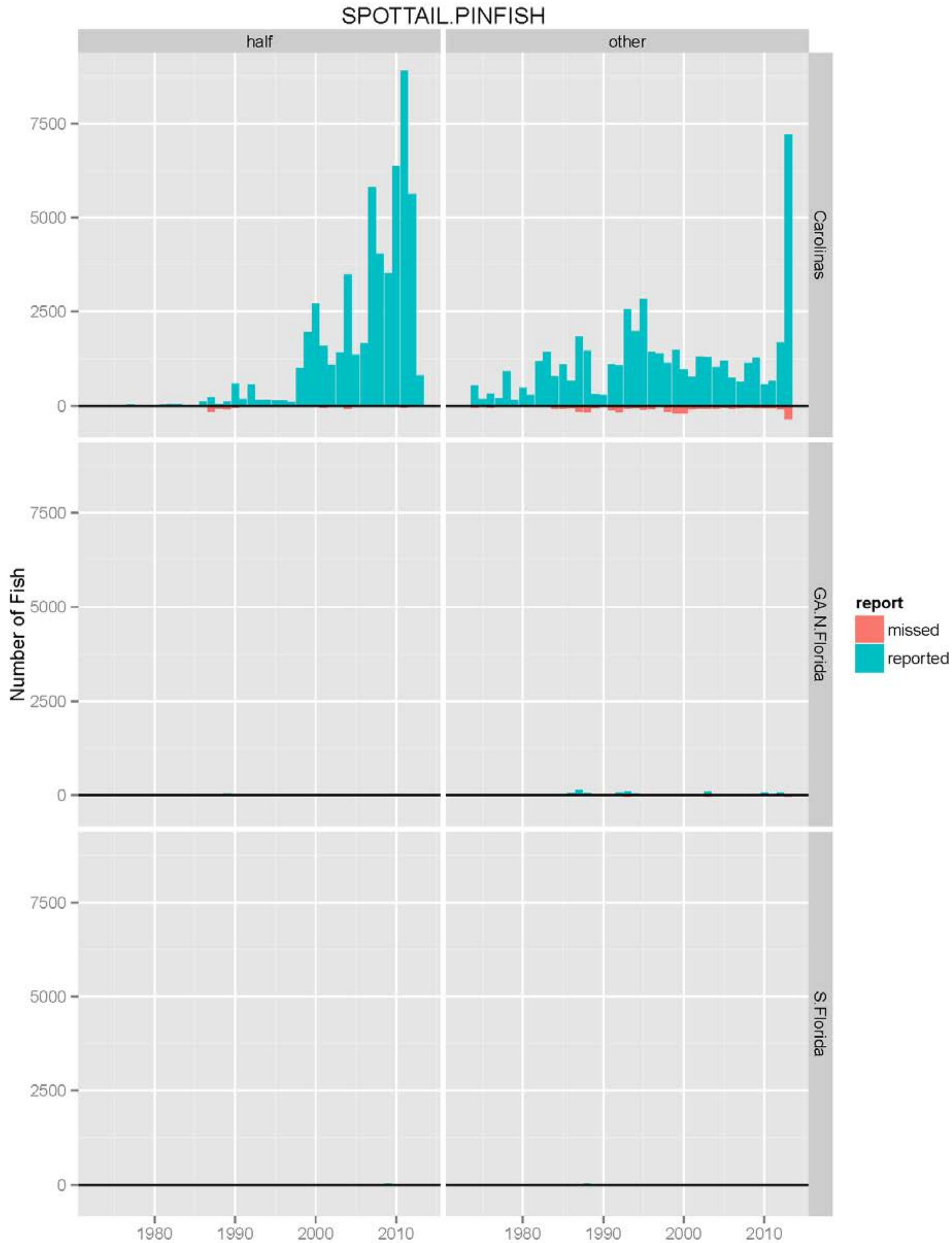
SILVER.PORGY
half
other
Number of Fish
Carolinas
GA.N.Florida
S.Florida
report
missed
reported
0
−50
−100
−150
1995
2000
2005
2010

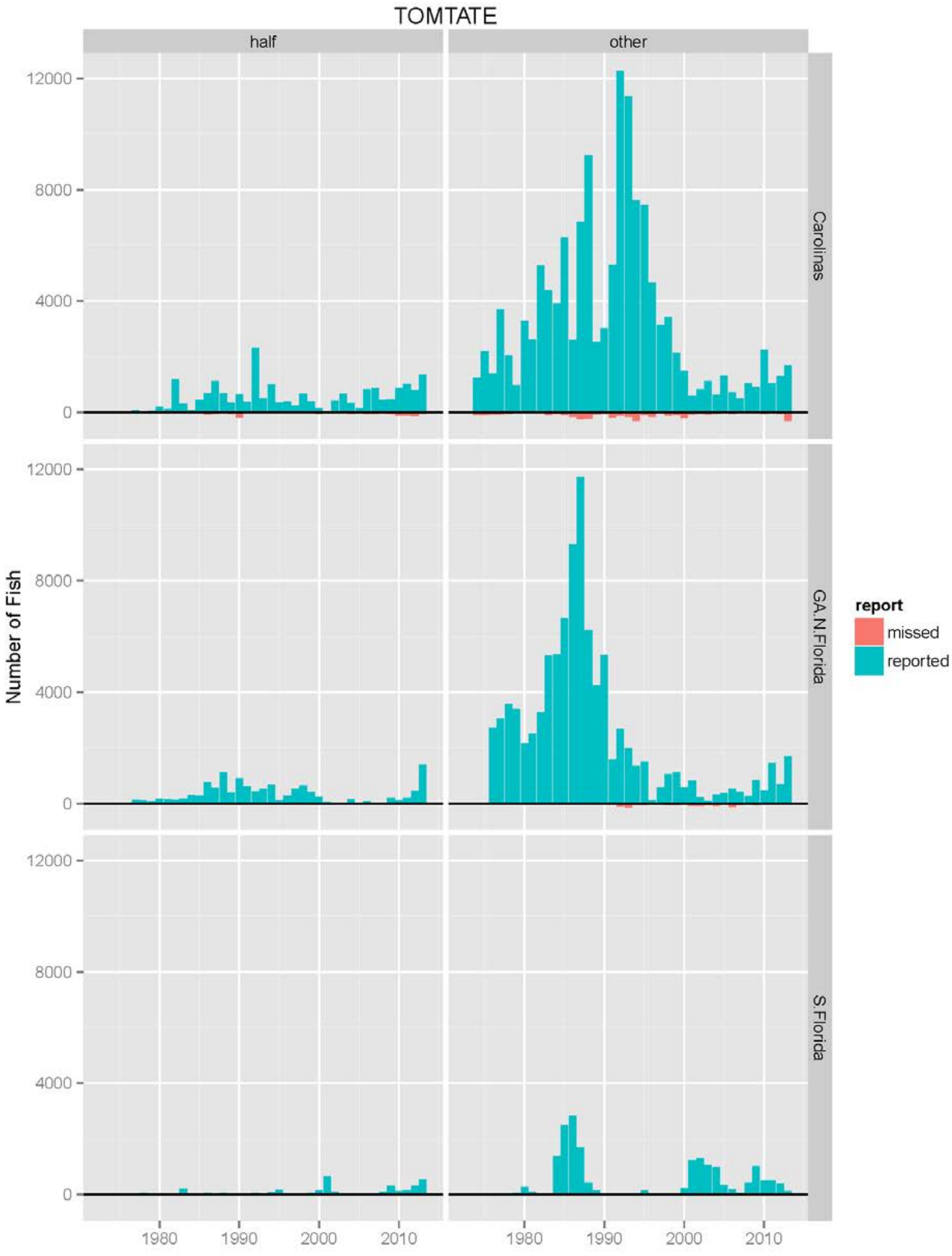

SNOWY.GROUPER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
report
missed
reported
400
300
200
100
0
-100
1980
1990
2000
2010

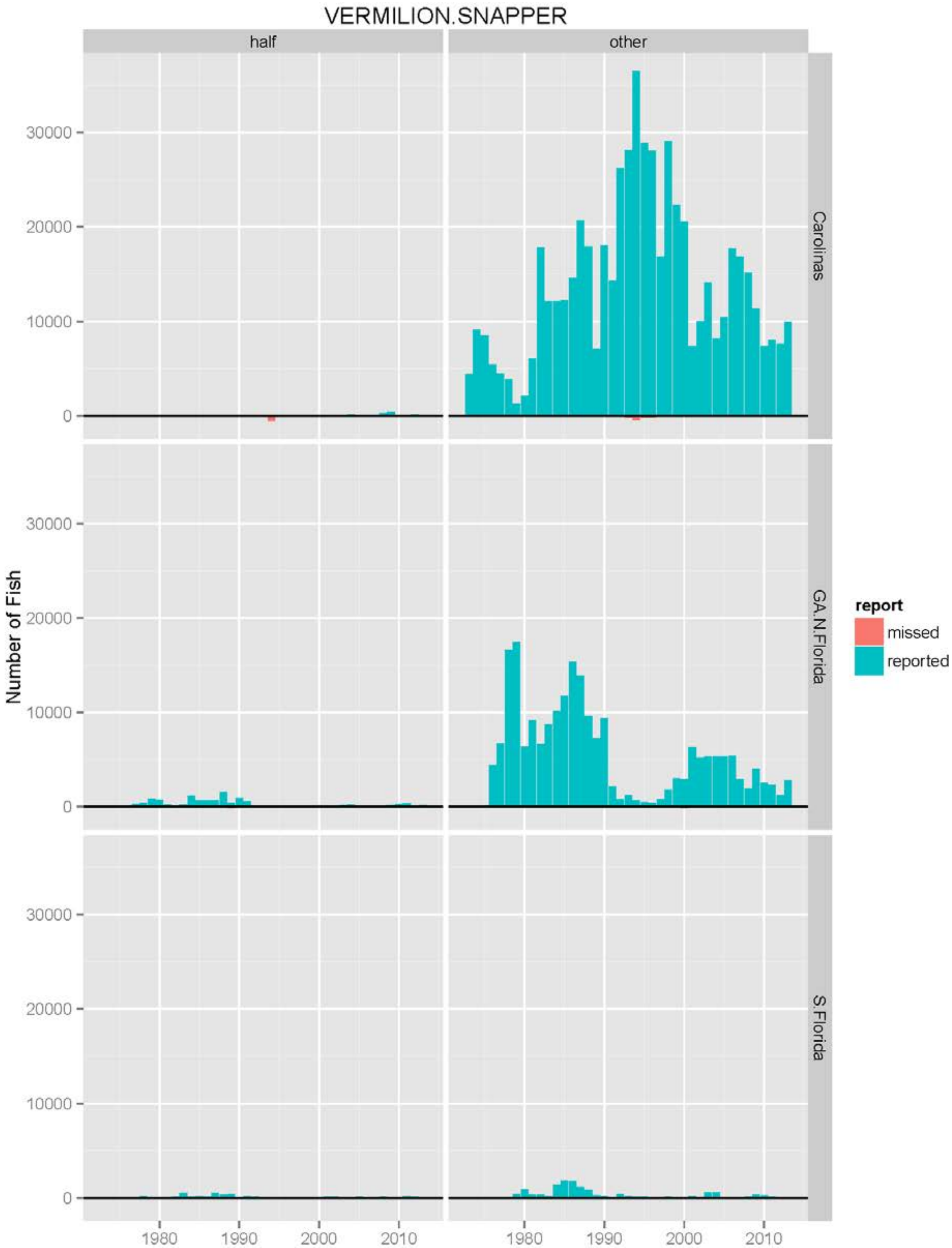

SOUTHERN.FLOUNDER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
0
-20
-40
-60
1995
2000
2005
2010
report
missed
reported


SPANISH.MACKEREL
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
150
100
50
0
1980
1990
2000
2010
report
missed
reported

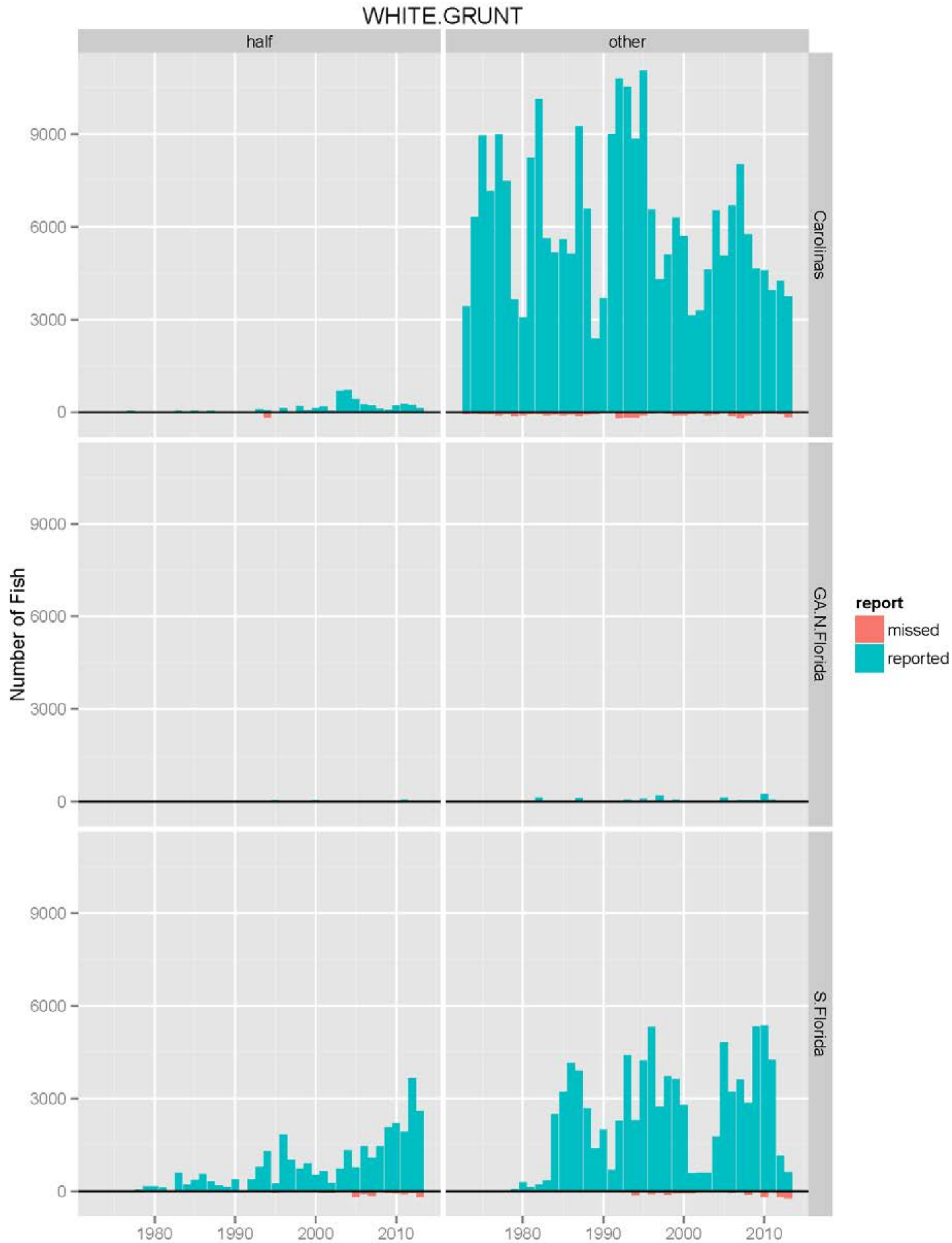

SPECKLED.HIND
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
500
400
300
200
100
0
1980
1990
2000
2010
report
missed
reported

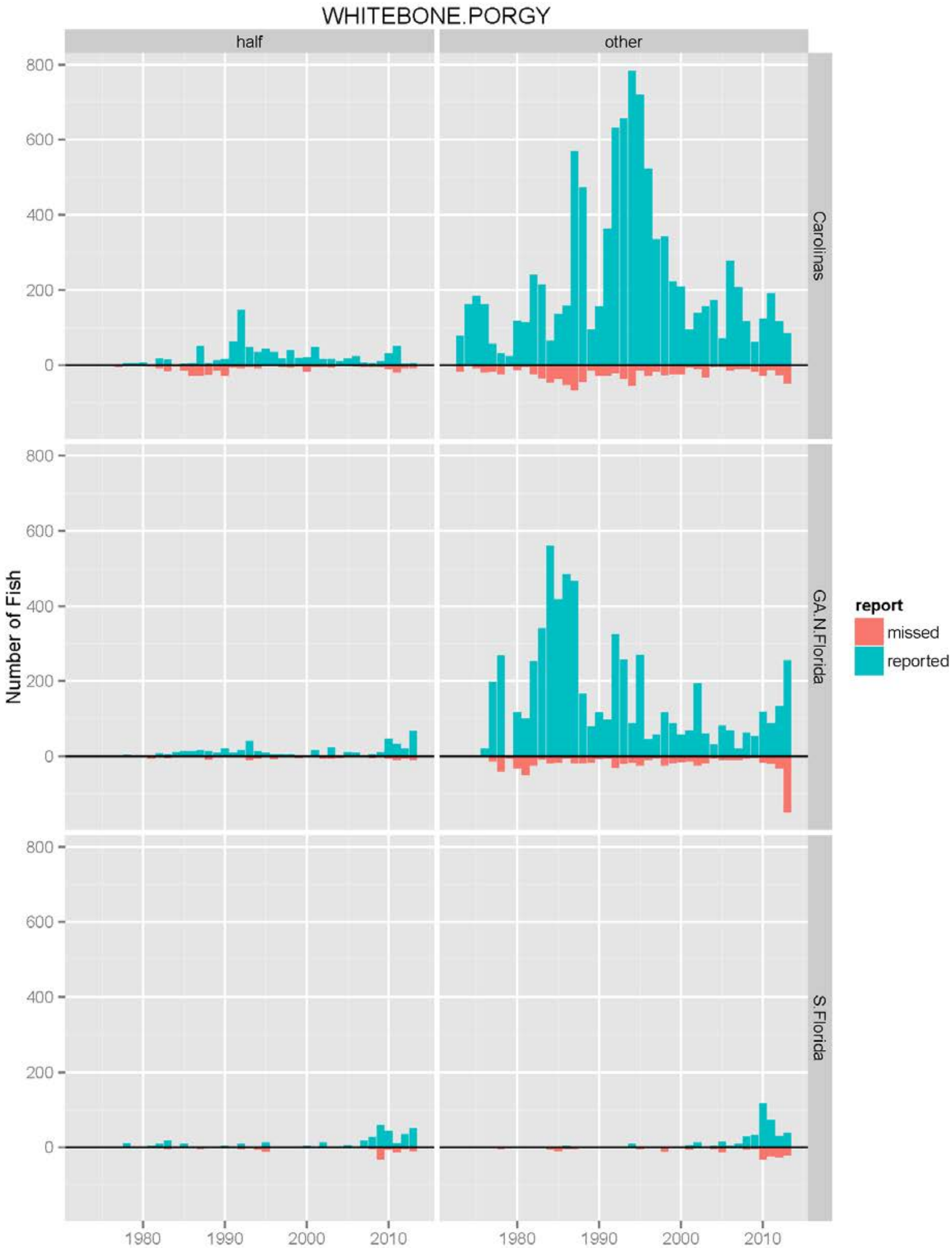

SPOTTAIL.PINFISH
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
0
2500
5000
7500
1980
1990
2000
2010
report
missed
reported

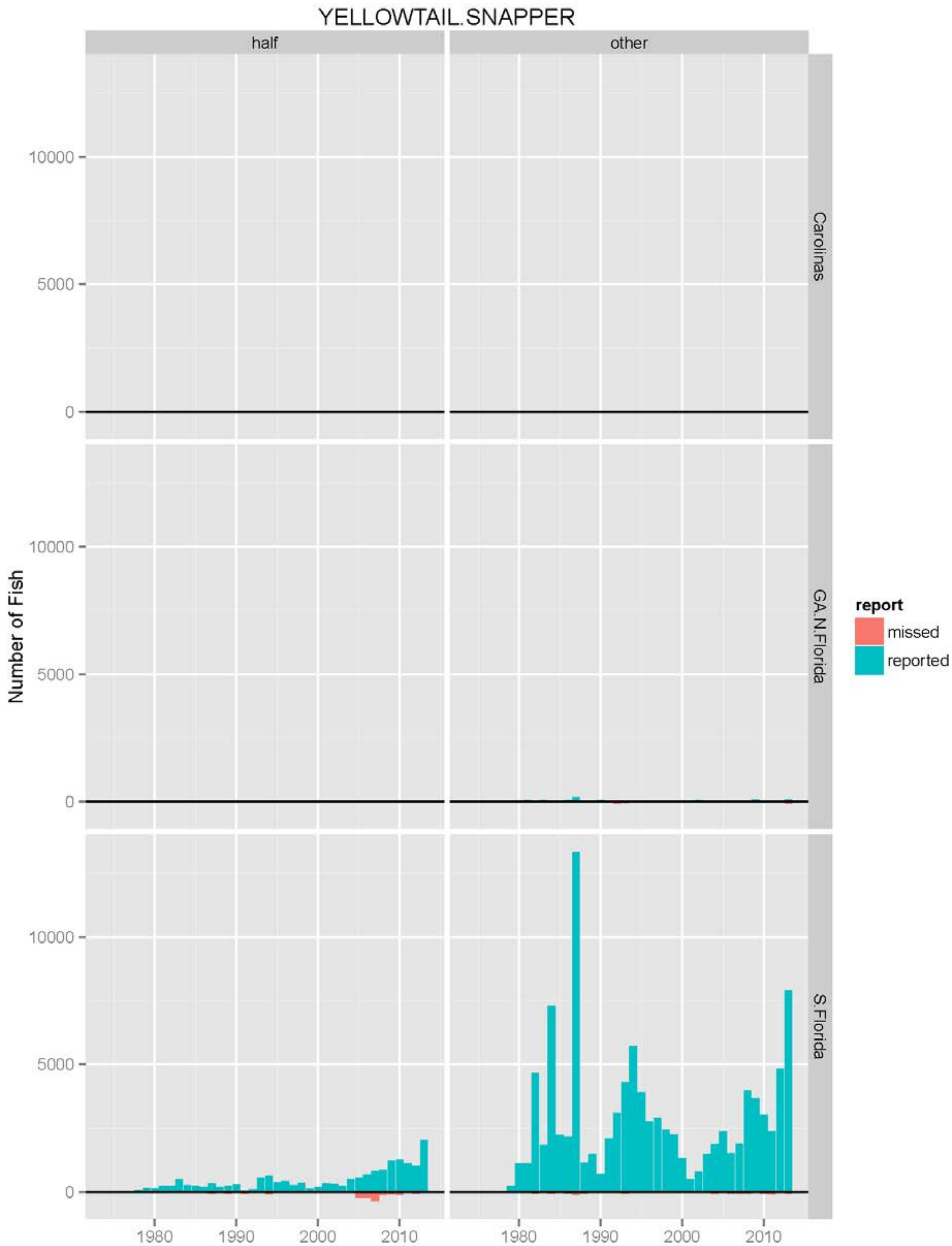

TOMTATE
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
12000
8000
4000
0
1980
1990
2000
2010
report
missed
reported



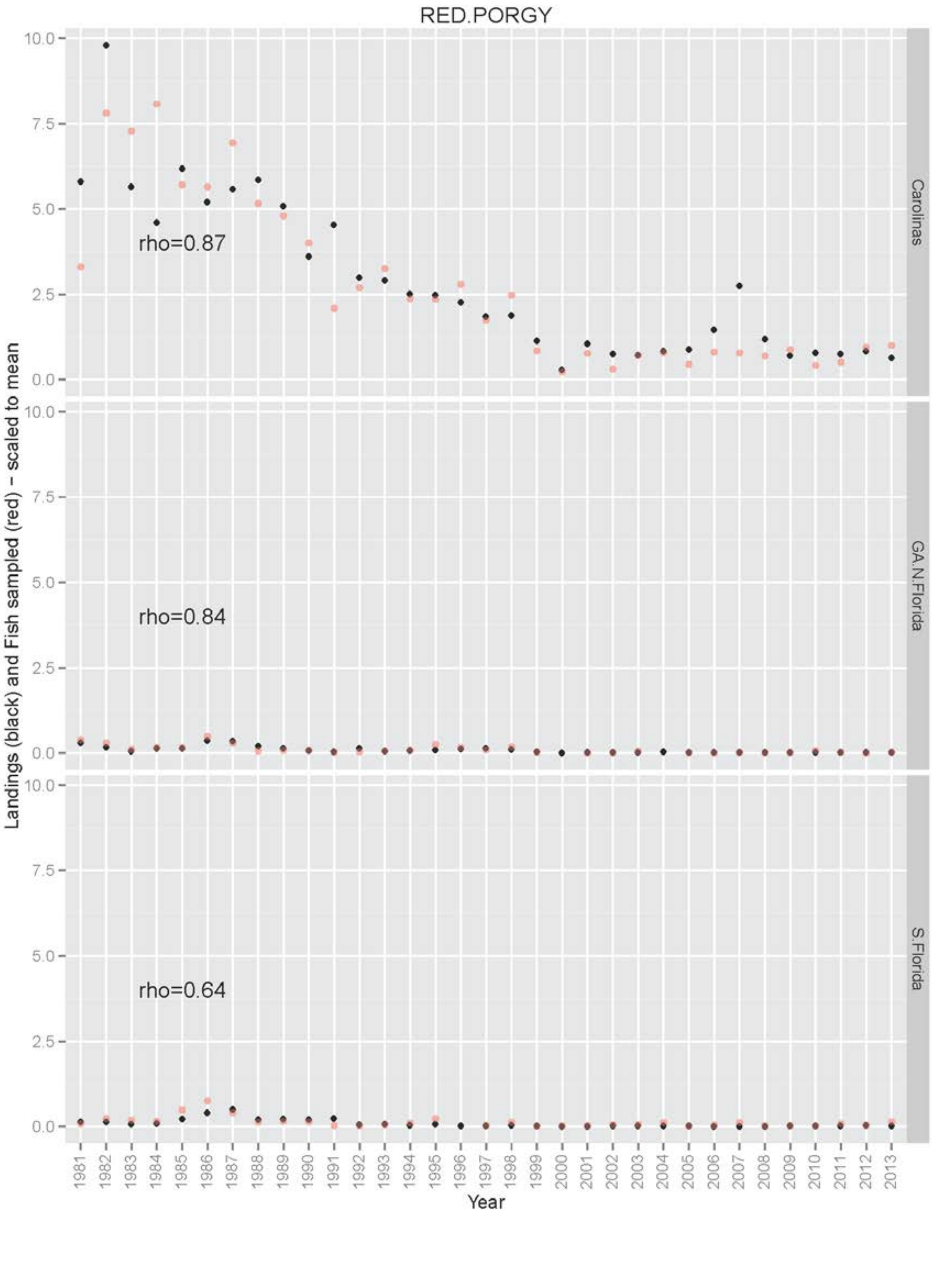
VERMILION.SNAPPER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
30000
20000
10000
0
1980
1990
2000
2010
report
missed
reported

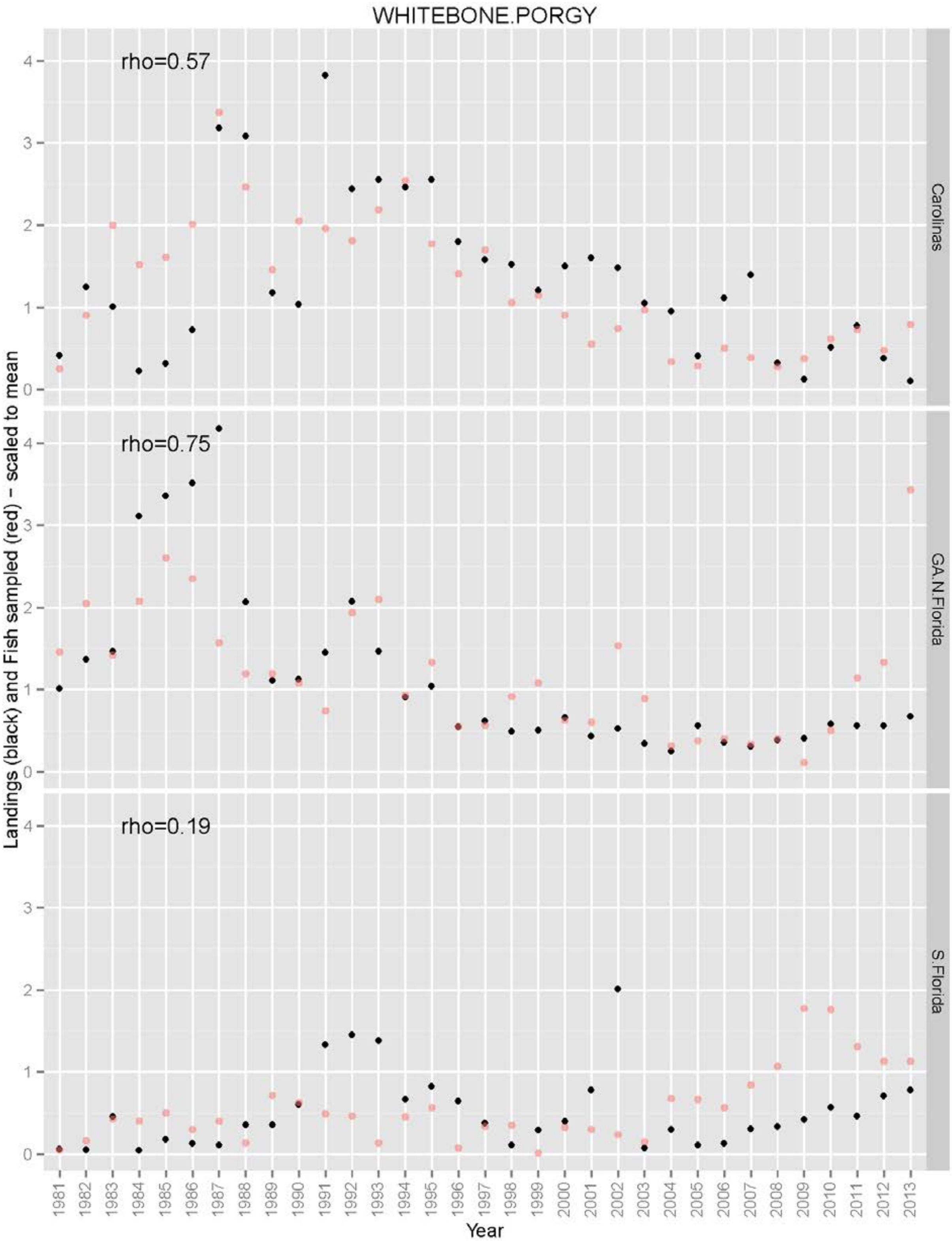

WHITE.GRUNT
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
9000
6000
3000
0
1980
1990
2000
2010
report
missed
reported

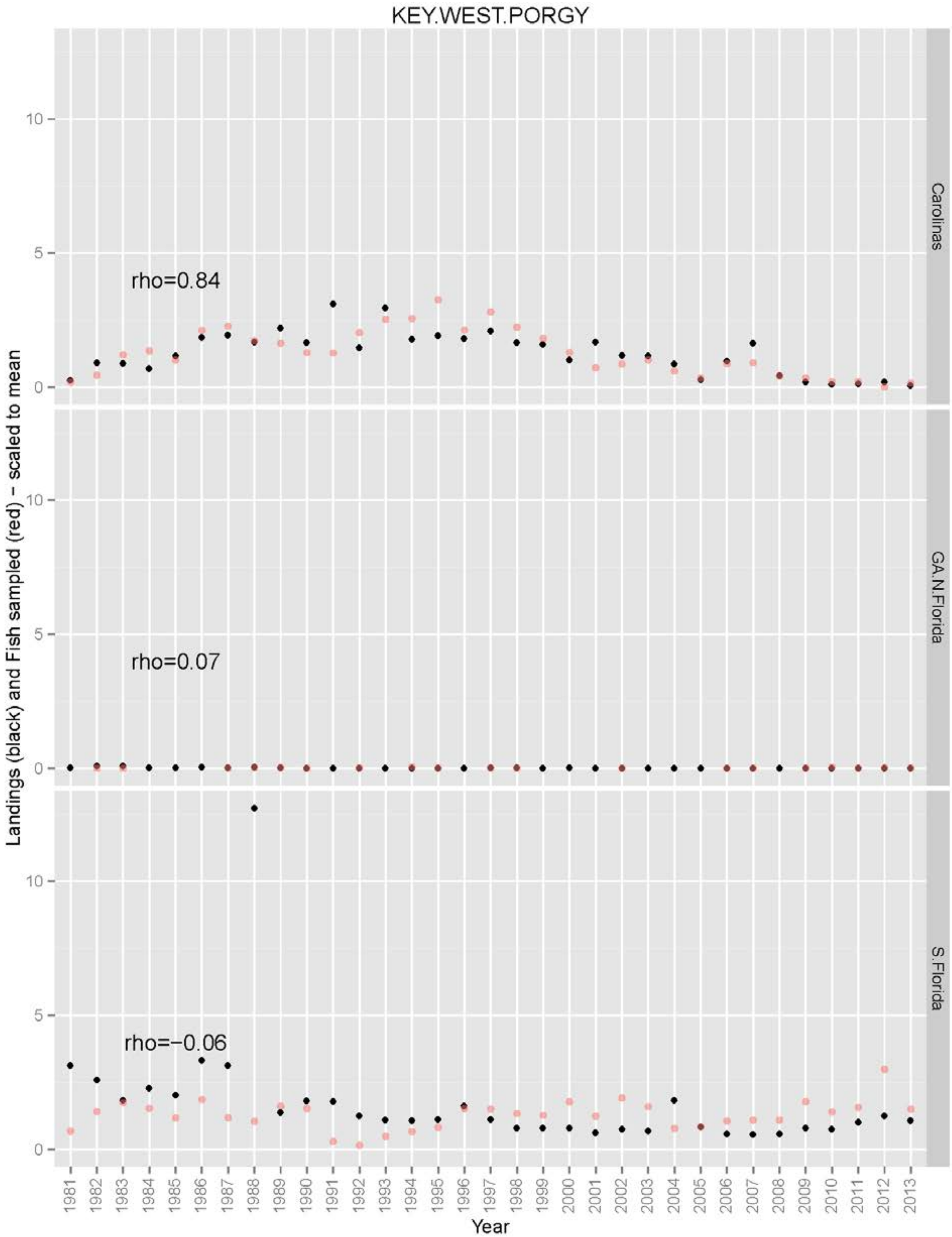

WHITEBONE.PORGY
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
800
600
400
200
0
1980
1990
2000
2010
report
missed
reported


YELLOWTAIL.SNAPPER
half
other
Carolinas
GA.N.Florida
S.Florida
Number of Fish
10000
5000
0
1980
1990
2000
2010
report
missed
reported

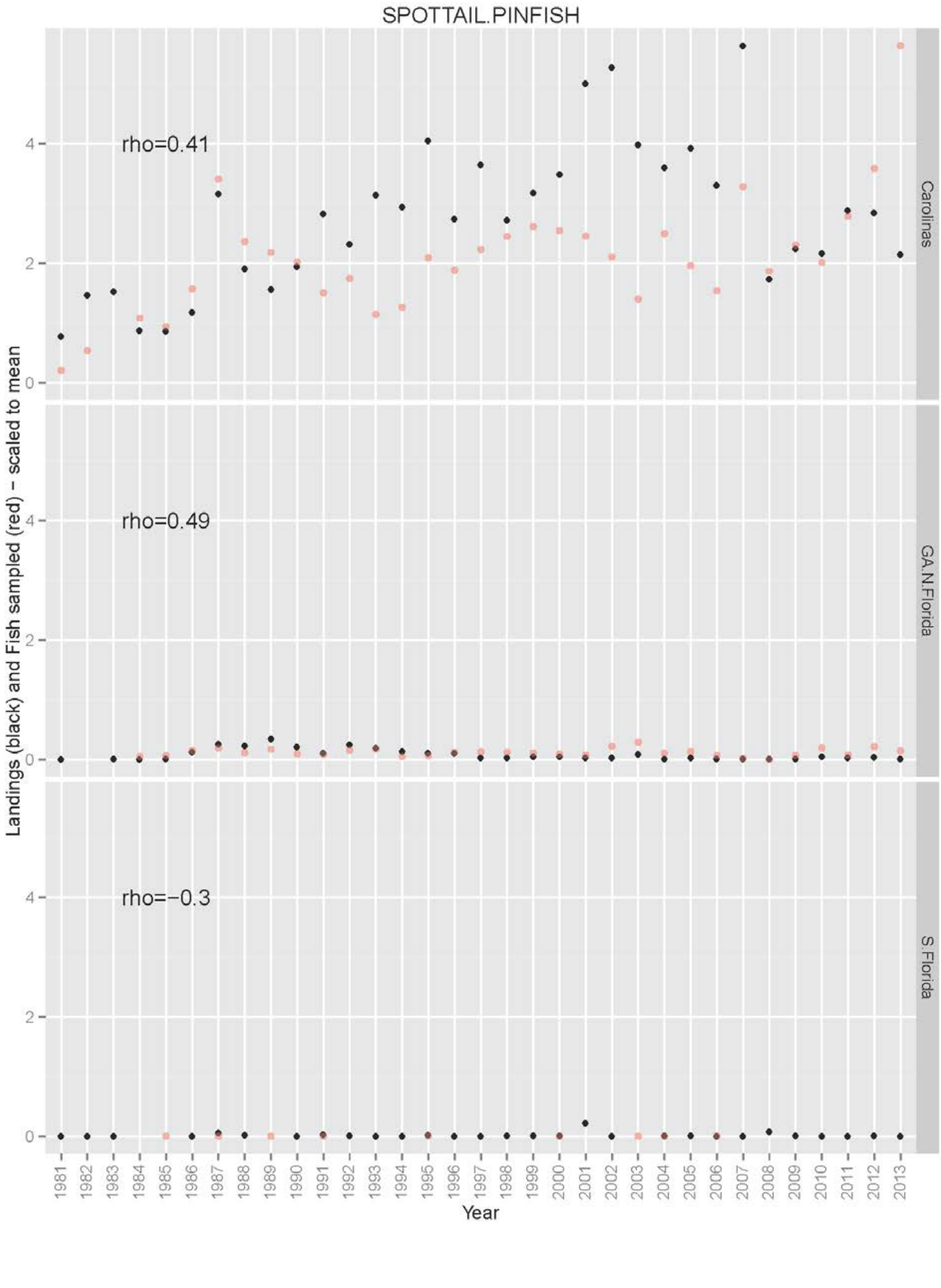
Appendix 15: Matched Landings by Species. Spearman rank correlation coefficient ρ values indicate degree of correlation between landings and fish sampled.

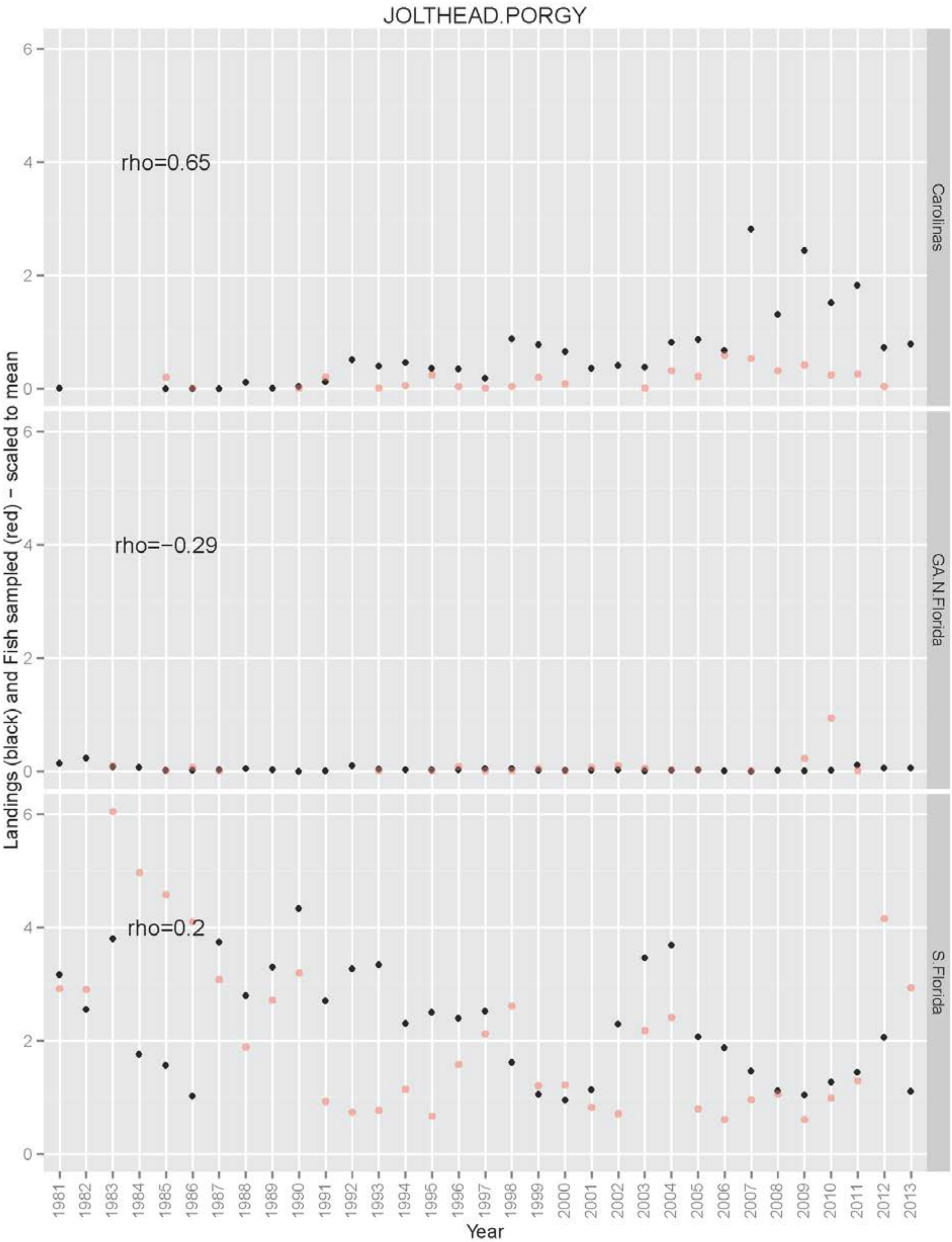


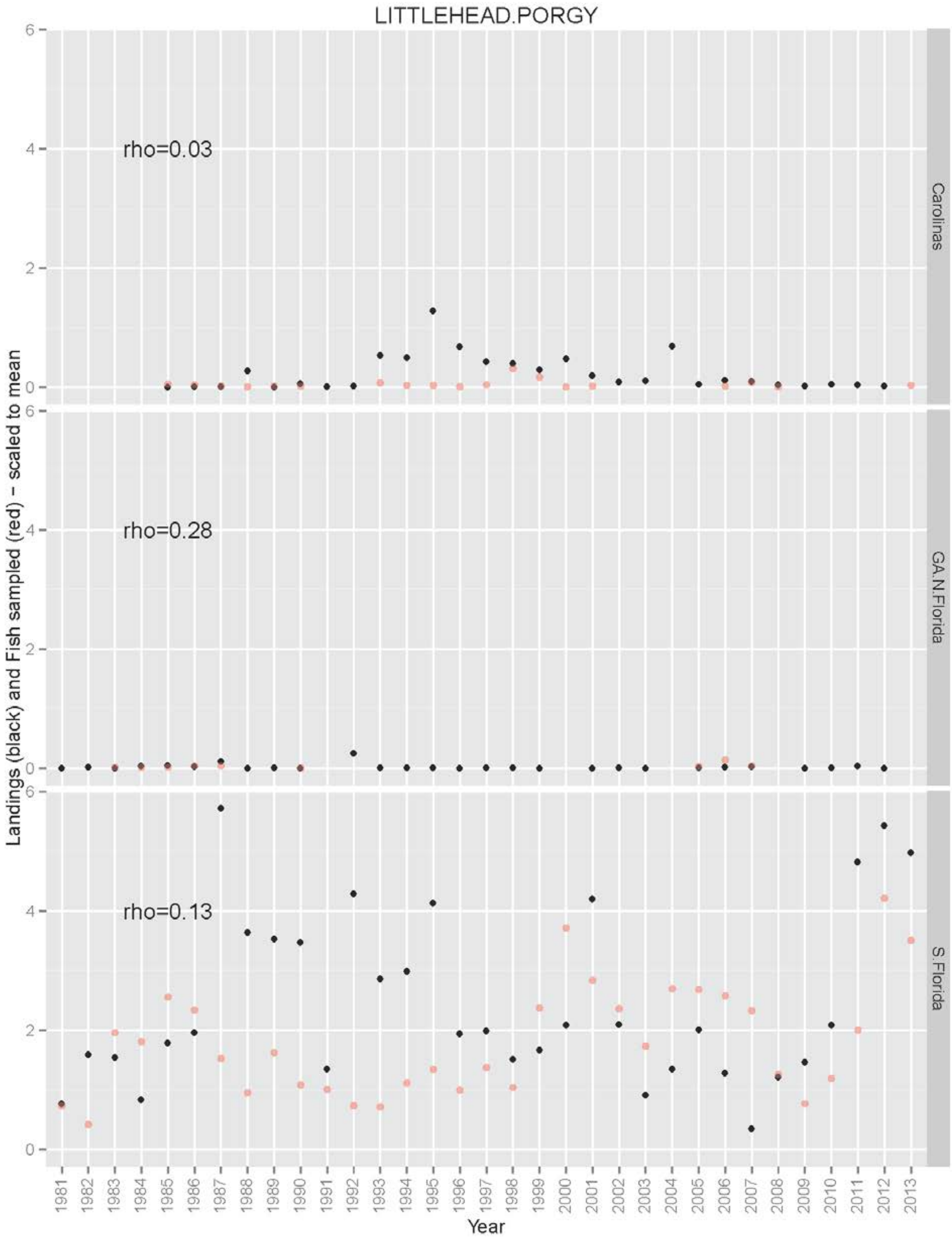

WHITEBONE.PORGY
rho=0.57
rho=0.75
rho=0.19
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
1
2
3
4
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

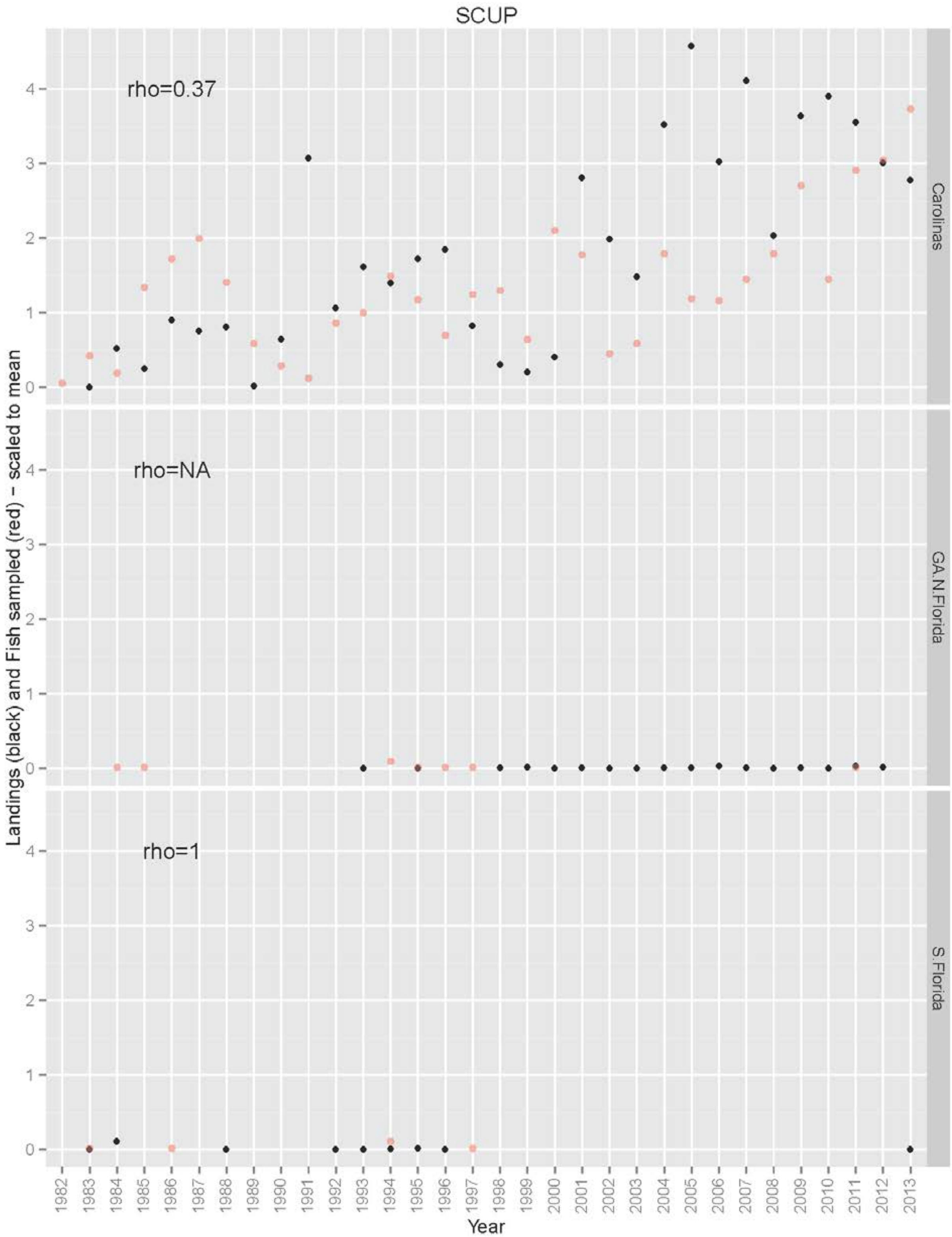


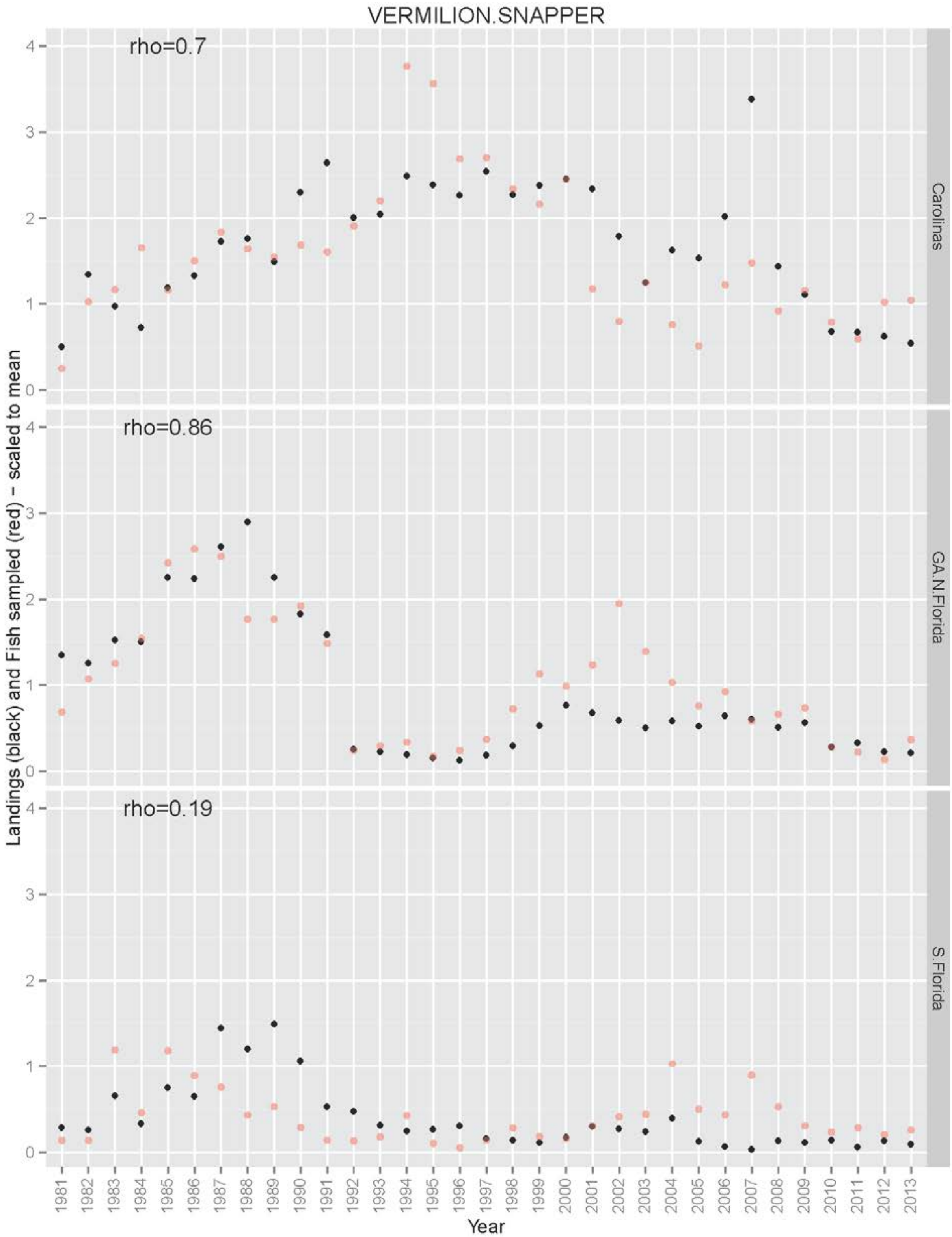
KEY.WEST.PORGY
Landings (black) and Fish sampled (red) - scaled to mean
Carolinas
rho=0.84
GA.N.Florida
rho=0.07
S.Florida
rho=−0.06
Year


SPOTTAIL.PINFISH
Landings (black) and Fish sampled (red) - scaled to mean
rho=0.41
rho=0.49
rho=−0.3
Carolinas
GA.N.Florida
S.Florida
0
2
4
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year

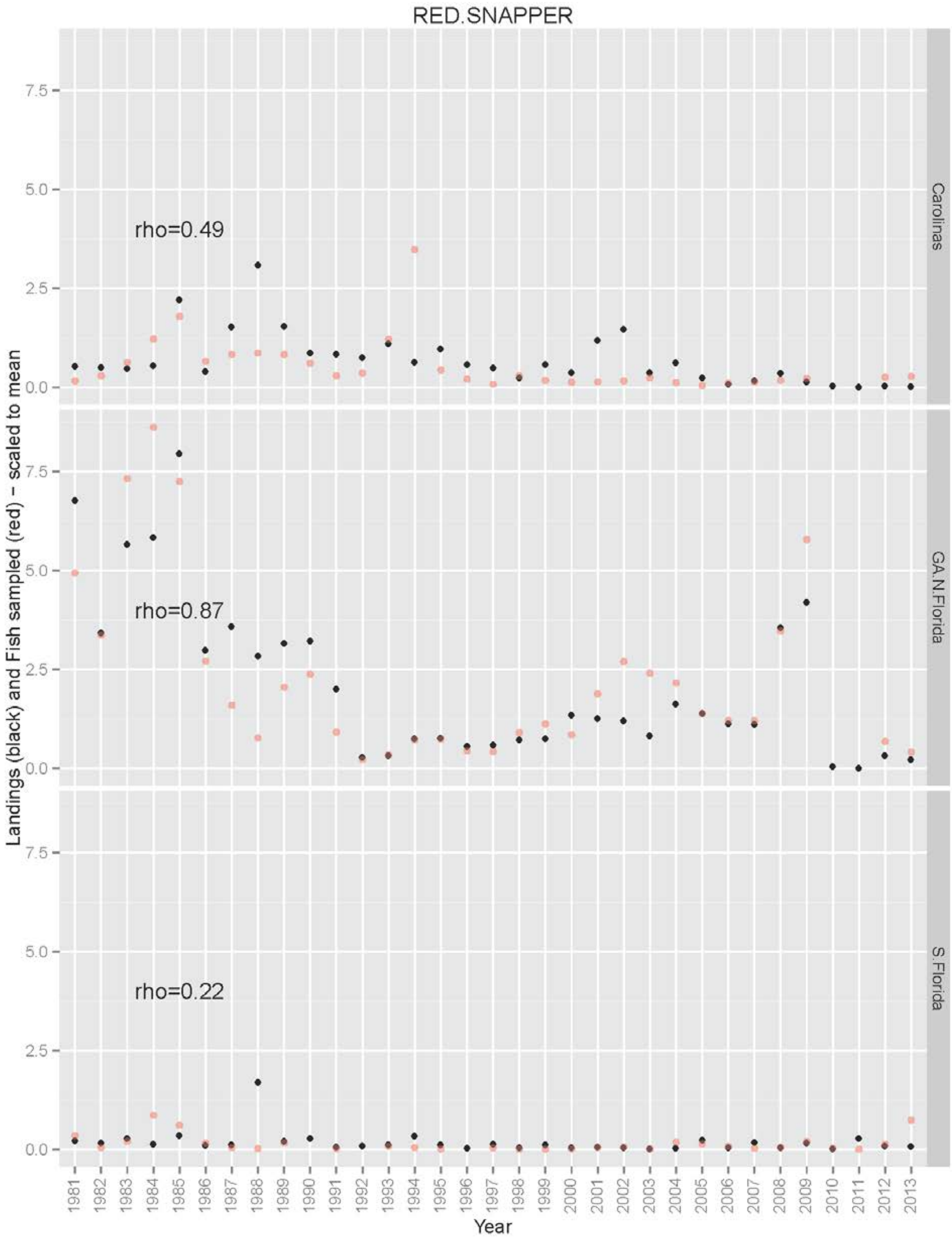

JOLTHEAD.PORGY
rho=0.65
rho=−0.29
rho=0.2
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) − scaled to mean
Year
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

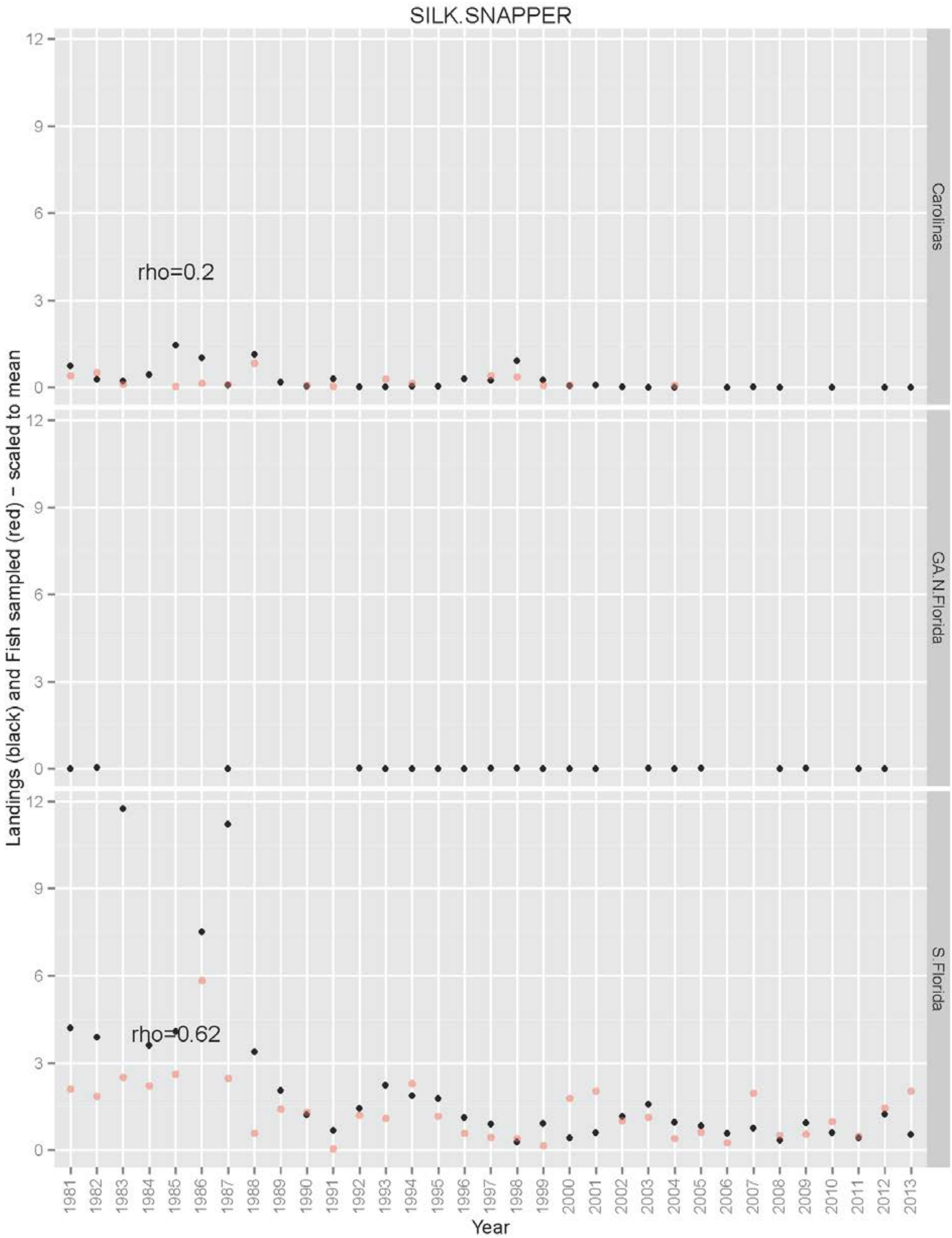

LITTLEHEAD.PORGY
rho=0.03
rho=0.28
rho=0.13
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year

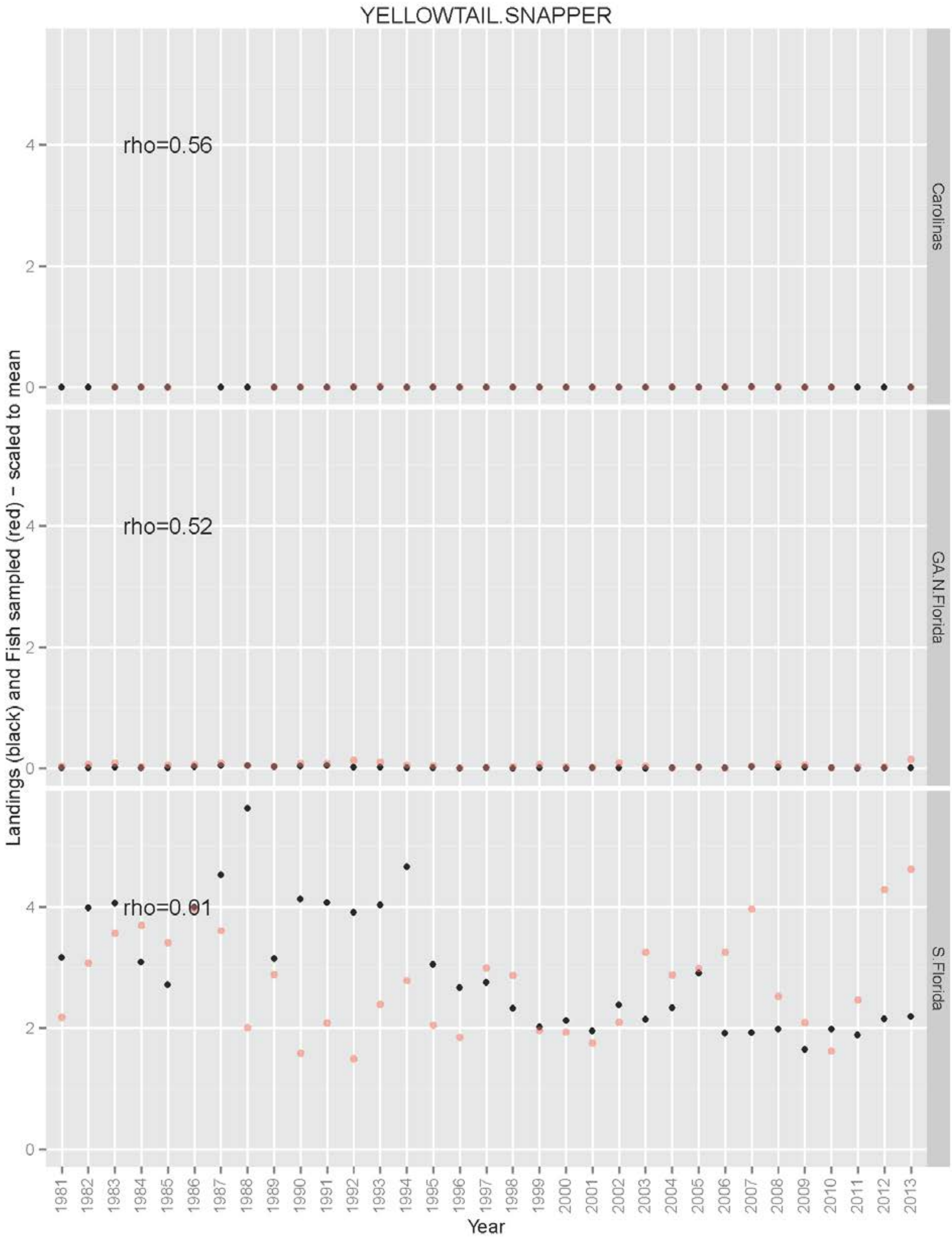

SCUP
rho=0.37
rho=NA
rho=1
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
1
2
3
4
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

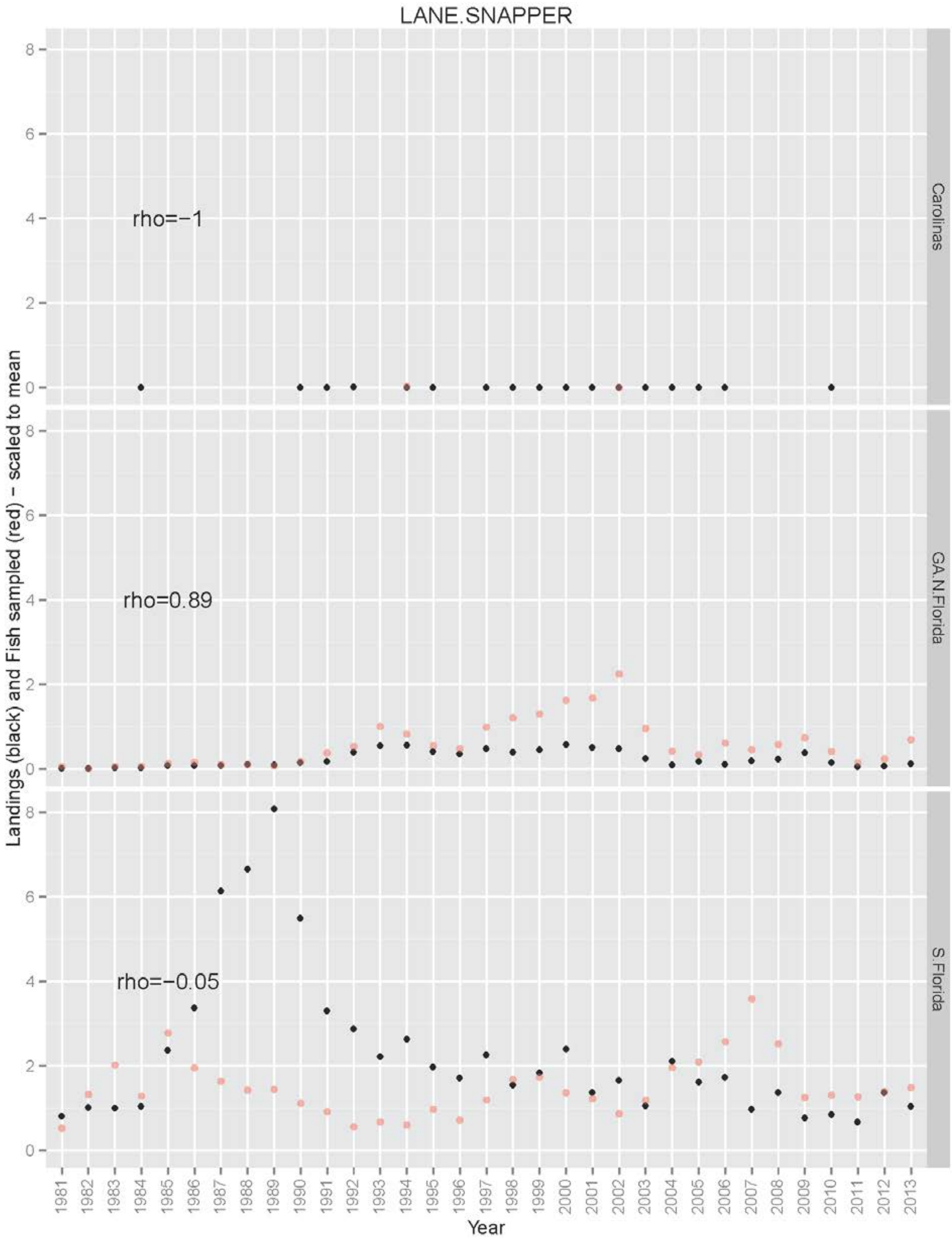


VERMILION.SNAPPER
rho=0.7
rho=0.86
rho=0.19
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year

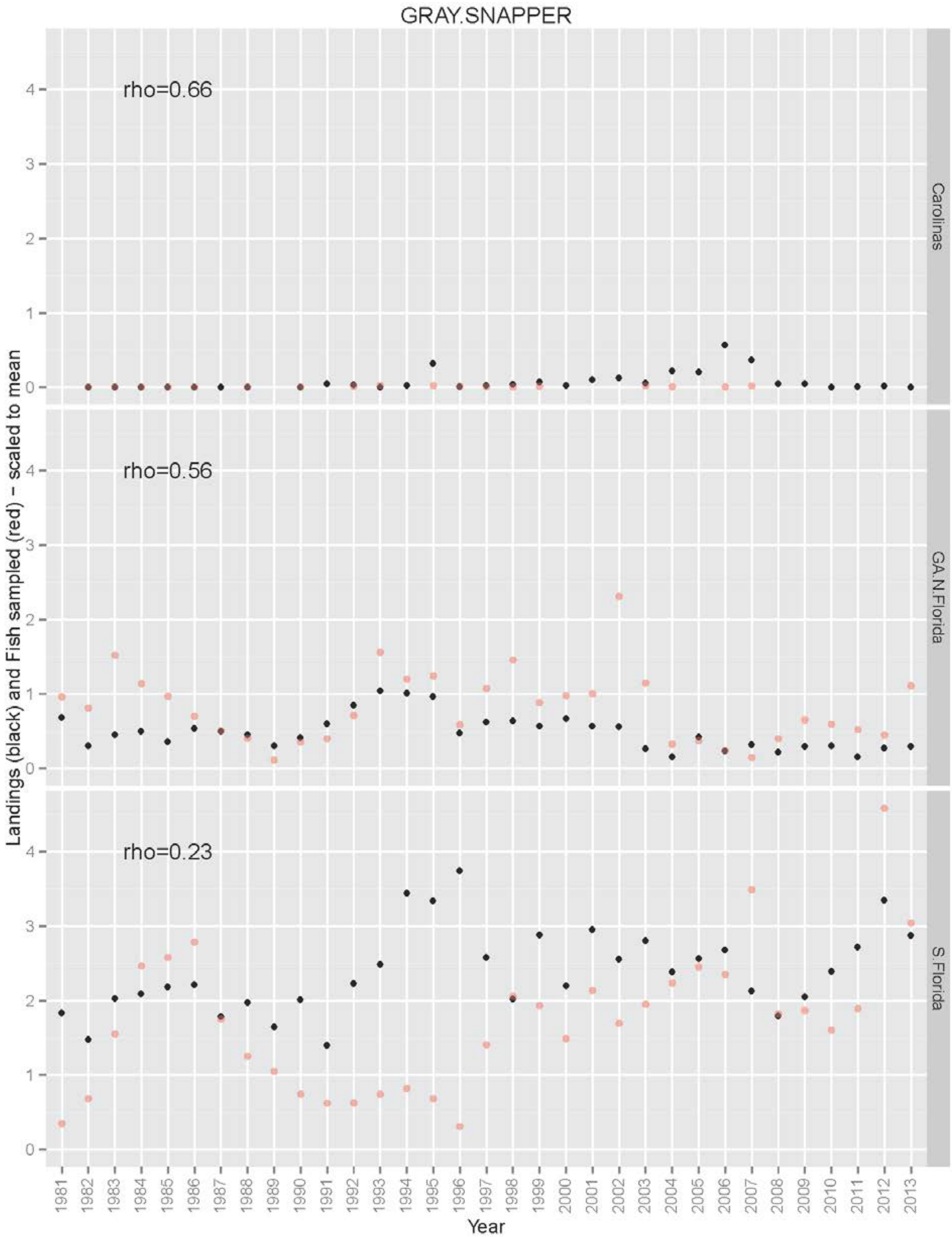

RED.SNAPPER
Landings (black) and Fish sampled (red) - scaled to mean
Carolinas
GA.N.Florida
S.Florida
rho=0.49
rho=0.87
rho=0.22
0.0
2.5
5.0
7.5
Year
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

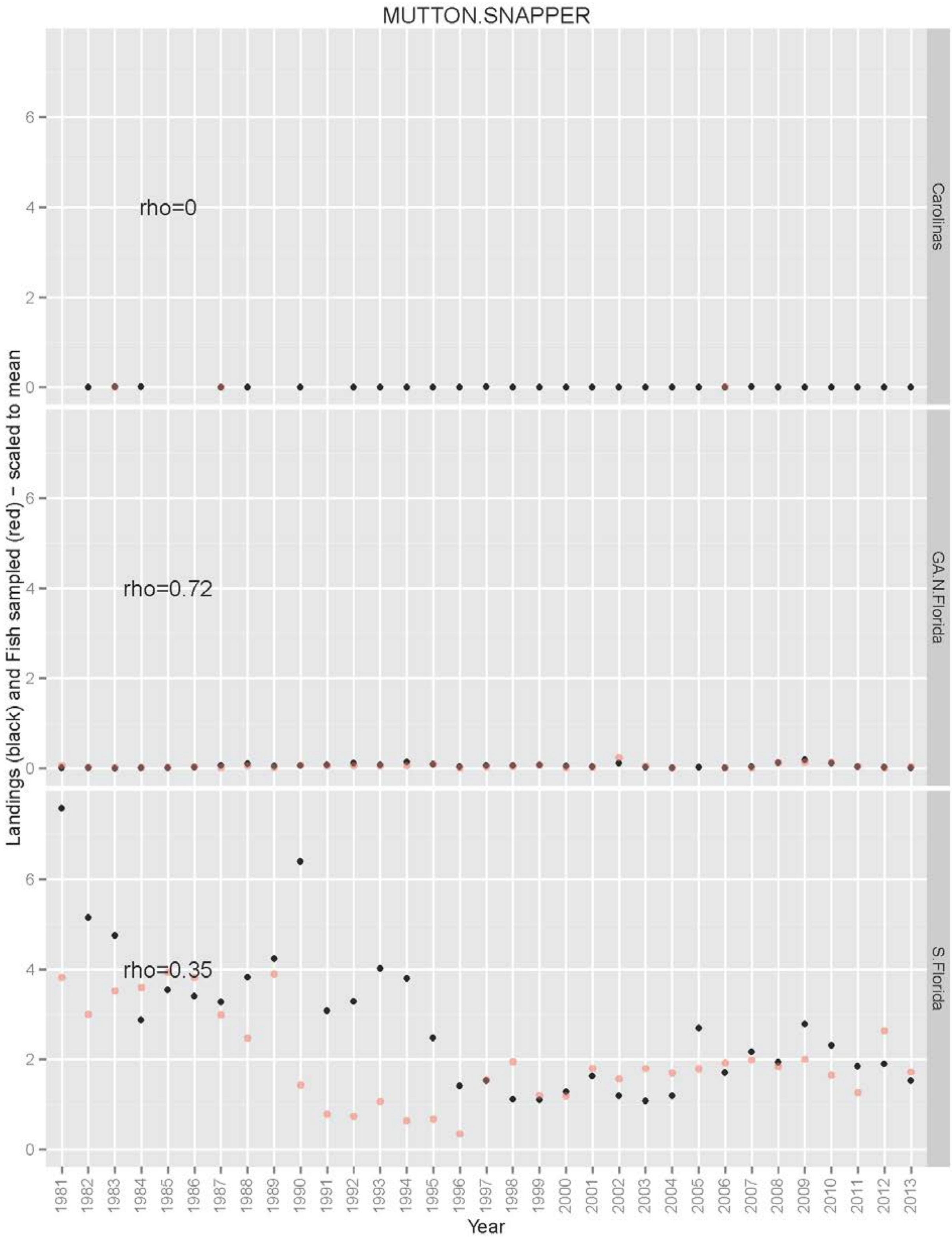

SILK.SNAPPER
Landings (black) and Fish sampled (red) - scaled to mean
Carolinas
GA.N.Florida
S.Florida
rho=0.2
rho=0.62
Year
0
3
6
9
12
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

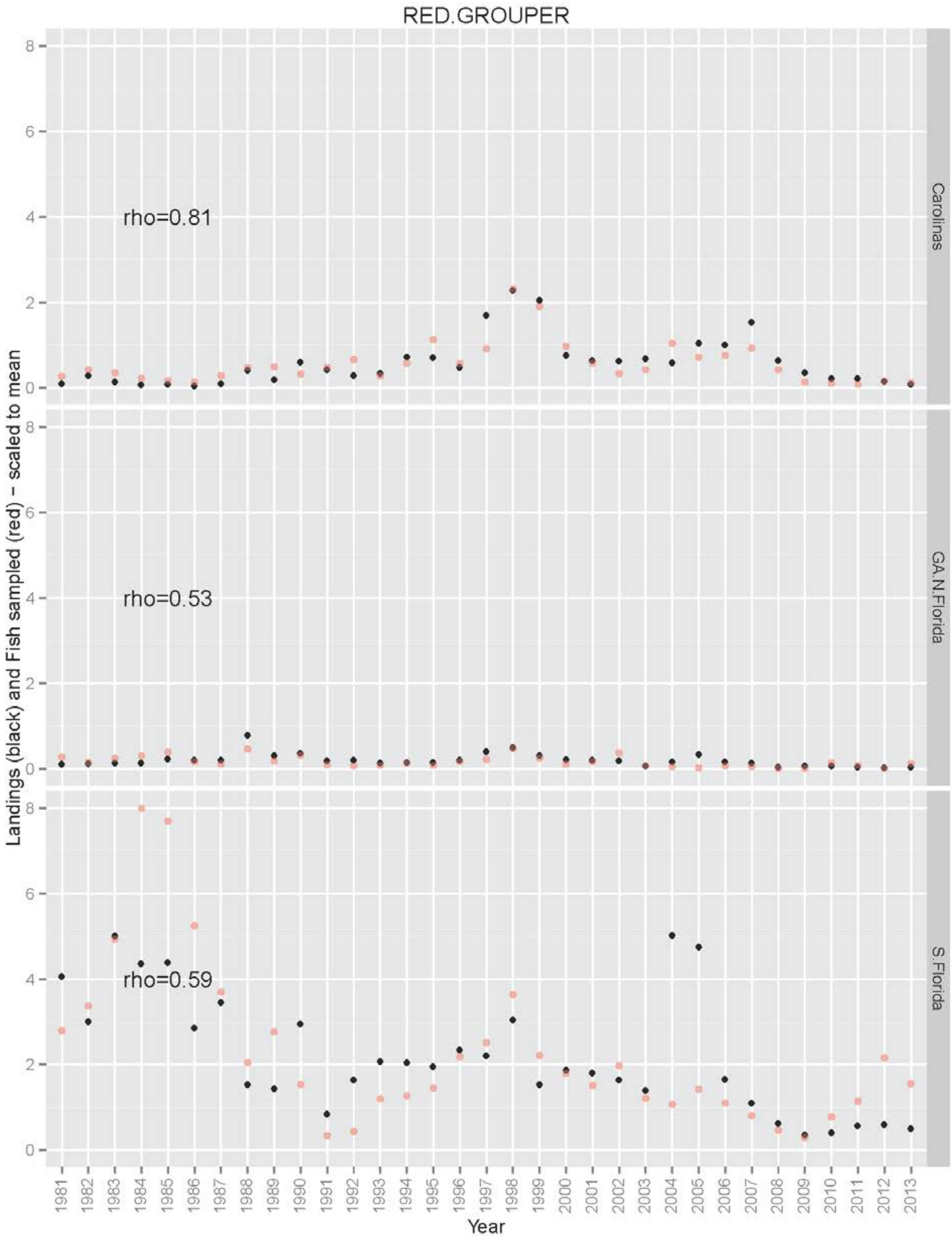

YELLOWTAIL.SNAPPER
rho=0.56
rho=0.52
rho=0.01
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
2
4
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

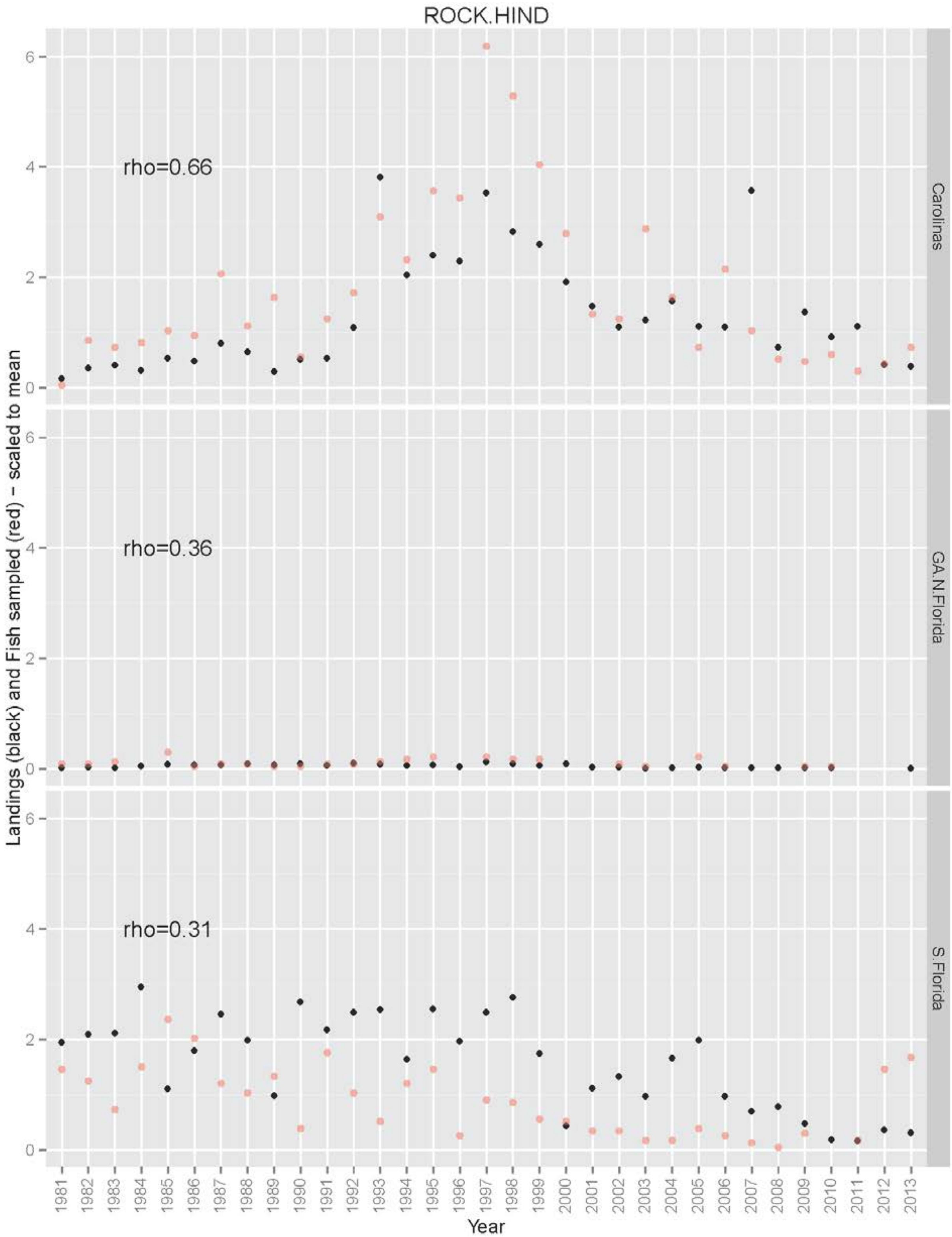


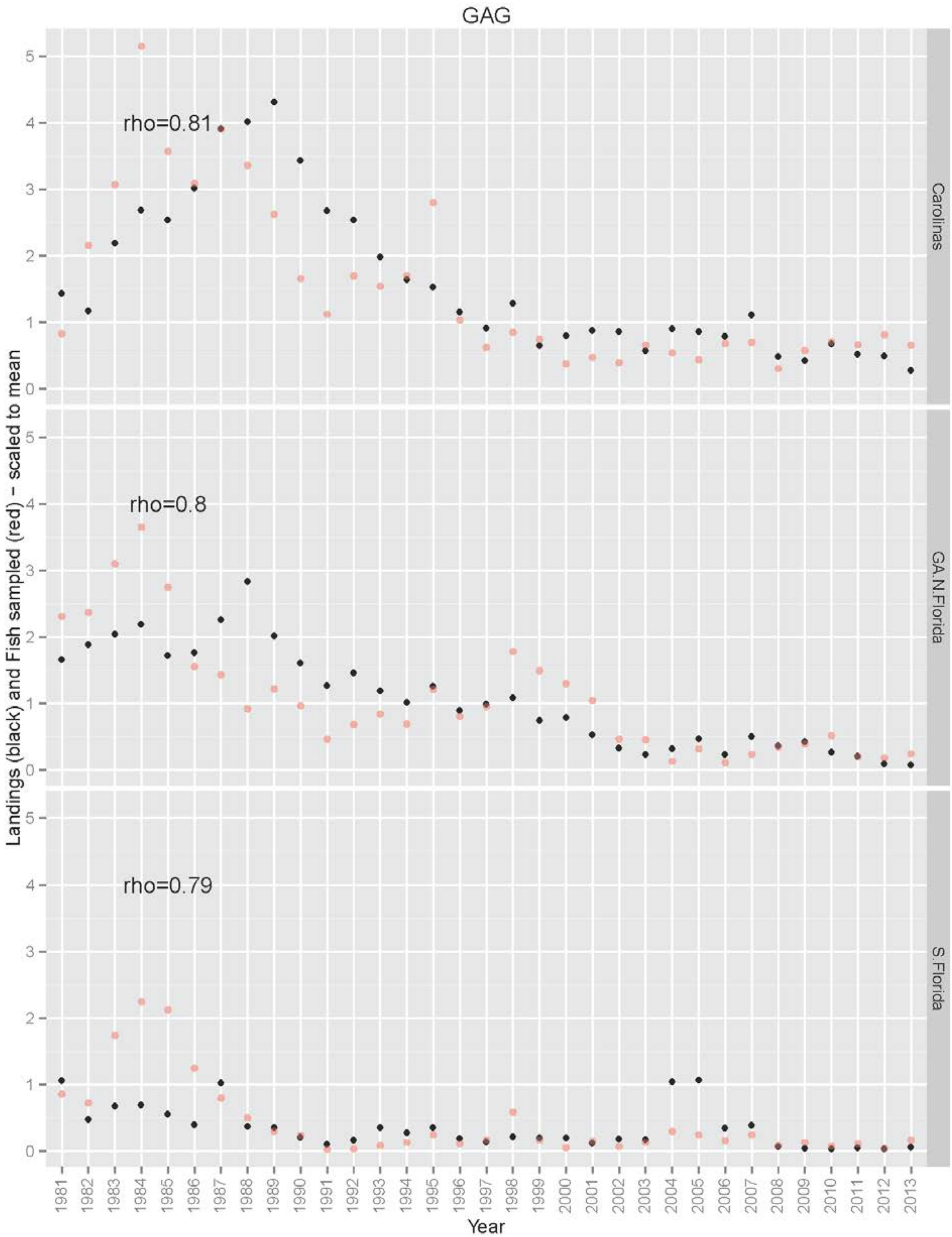
LANE.SNAPPER
Landings (black) and Fish sampled (red) - scaled to mean
Year
rho=-1
rho=0.89
rho=-0.05
Carolinas
GA.N.Florida
S.Florida

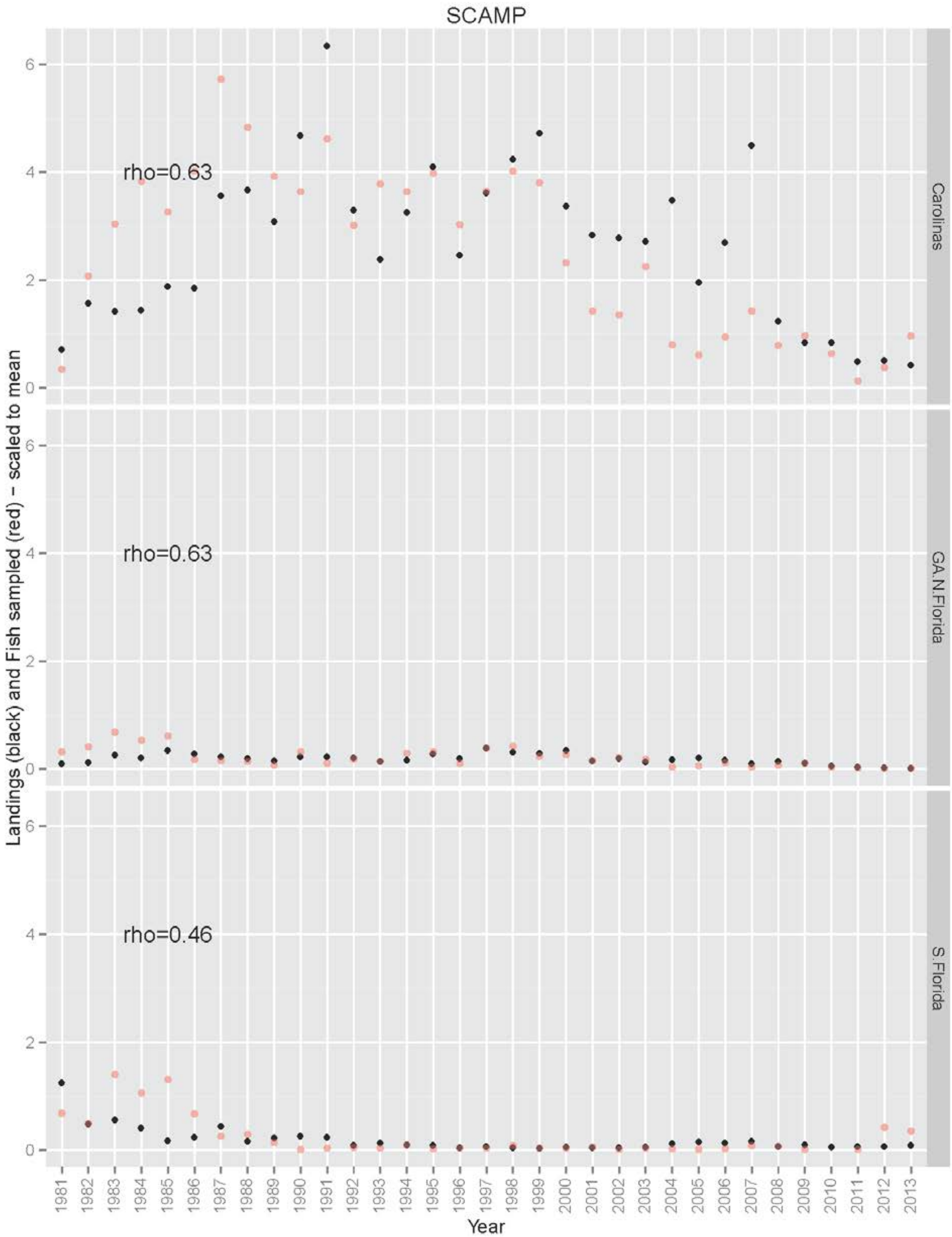

GRAY.SNAPPER
rho=0.66
rho=0.56
rho=0.23
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
1
2
3
4
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

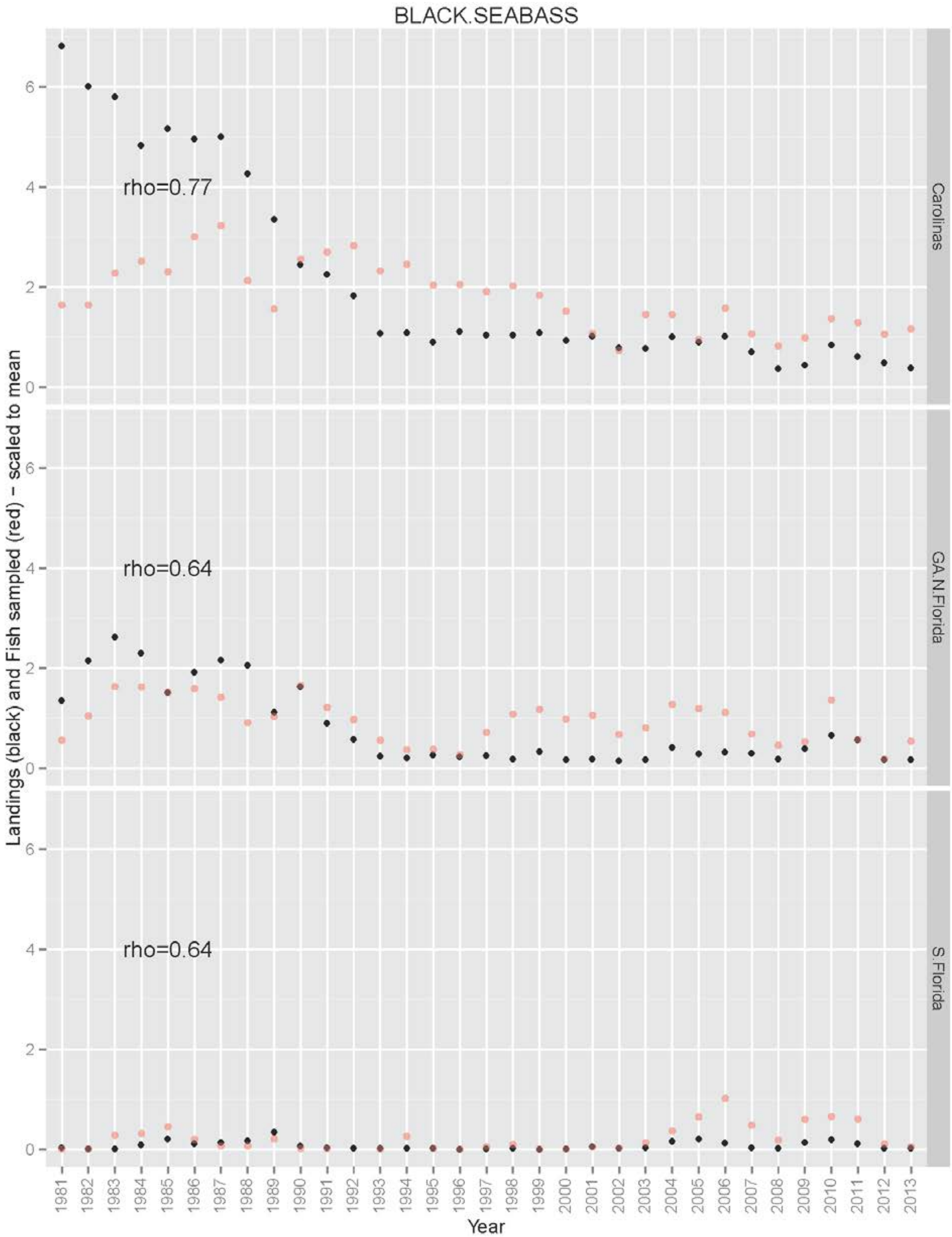

MUTTON.SNAPPER
Landings (black) and Fish sampled (red) - scaled to mean
rho=0
rho=0.72
rho=0.35
Carolinas
GA.N.Florida
S.Florida
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year

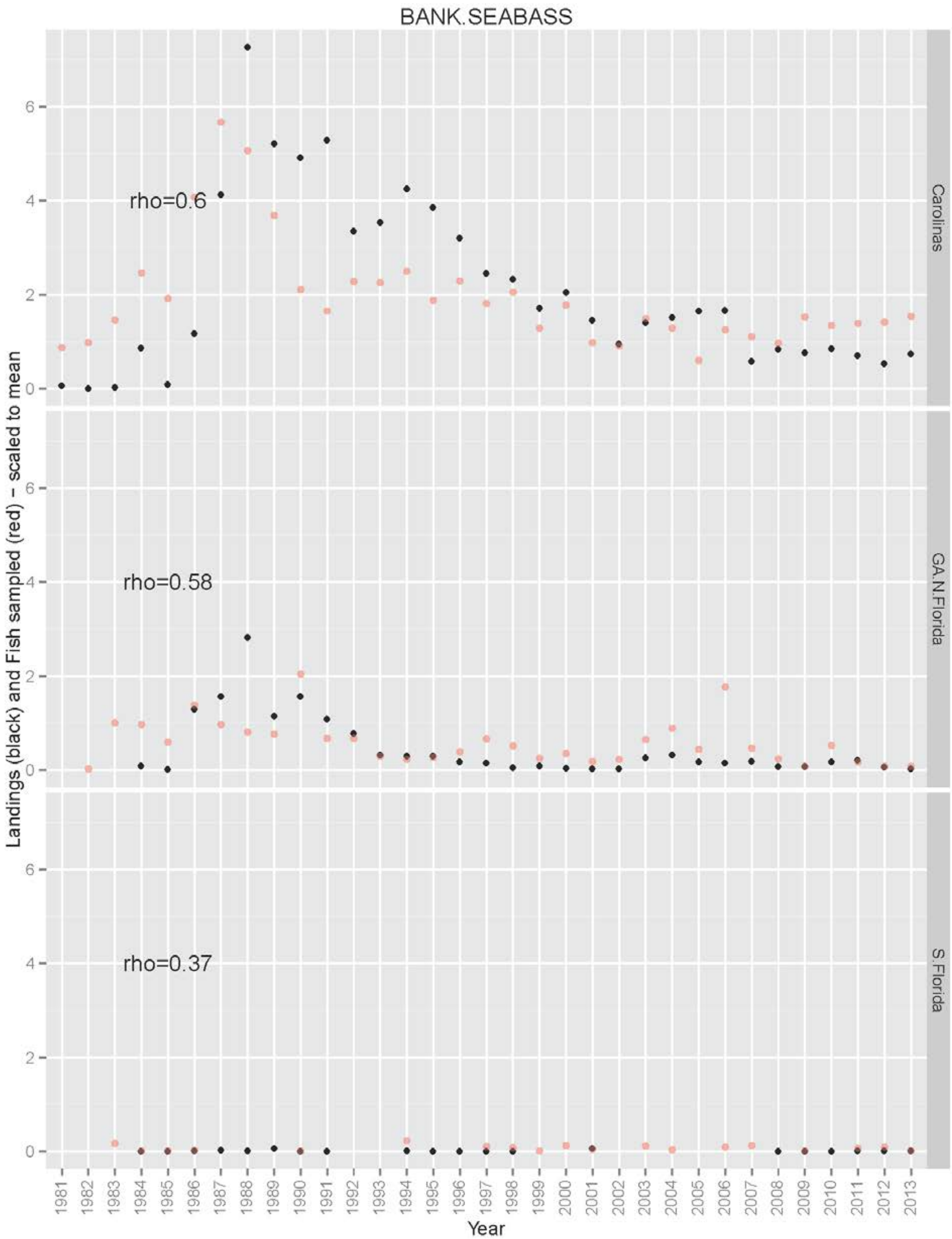

RED.GROUPER
Landings (black) and Fish sampled (red) - scaled to mean
rho=0.81
Carolinas
rho=0.53
GA.N.Florida
rho=0.59
S.Florida
Year


ROCK.HIND
Landings (black) and Fish sampled (red) - scaled to mean
rho=0.66
rho=0.36
rho=0.31
Carolinas
GA.N.Florida
S.Florida
Year
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

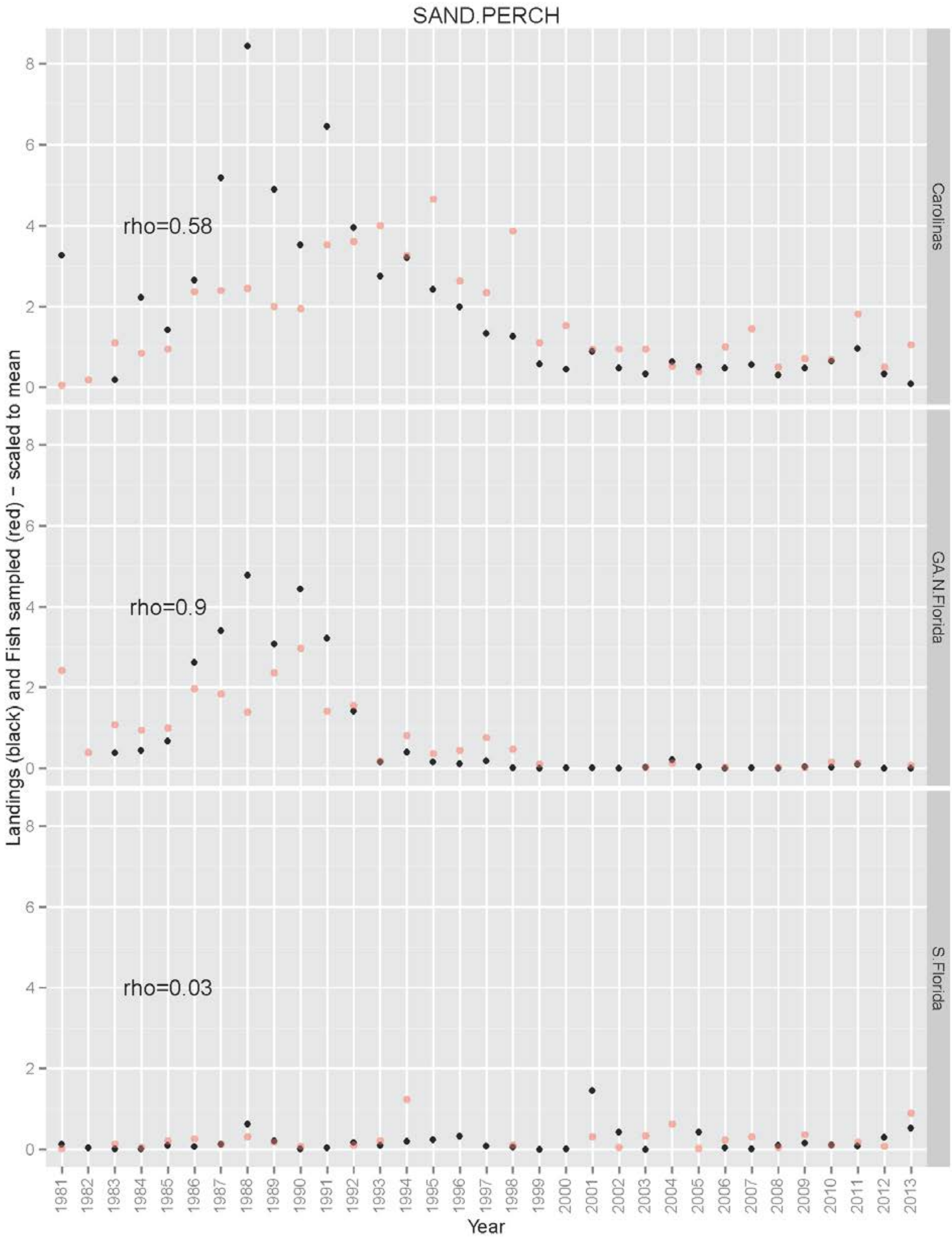

GAG
rho=0.81
rho=0.8
rho=0.79
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
1
2
3
4
5
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013


SCAMP
rho=0.63
rho=0.63
rho=0.46
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) – scaled to mean
Year

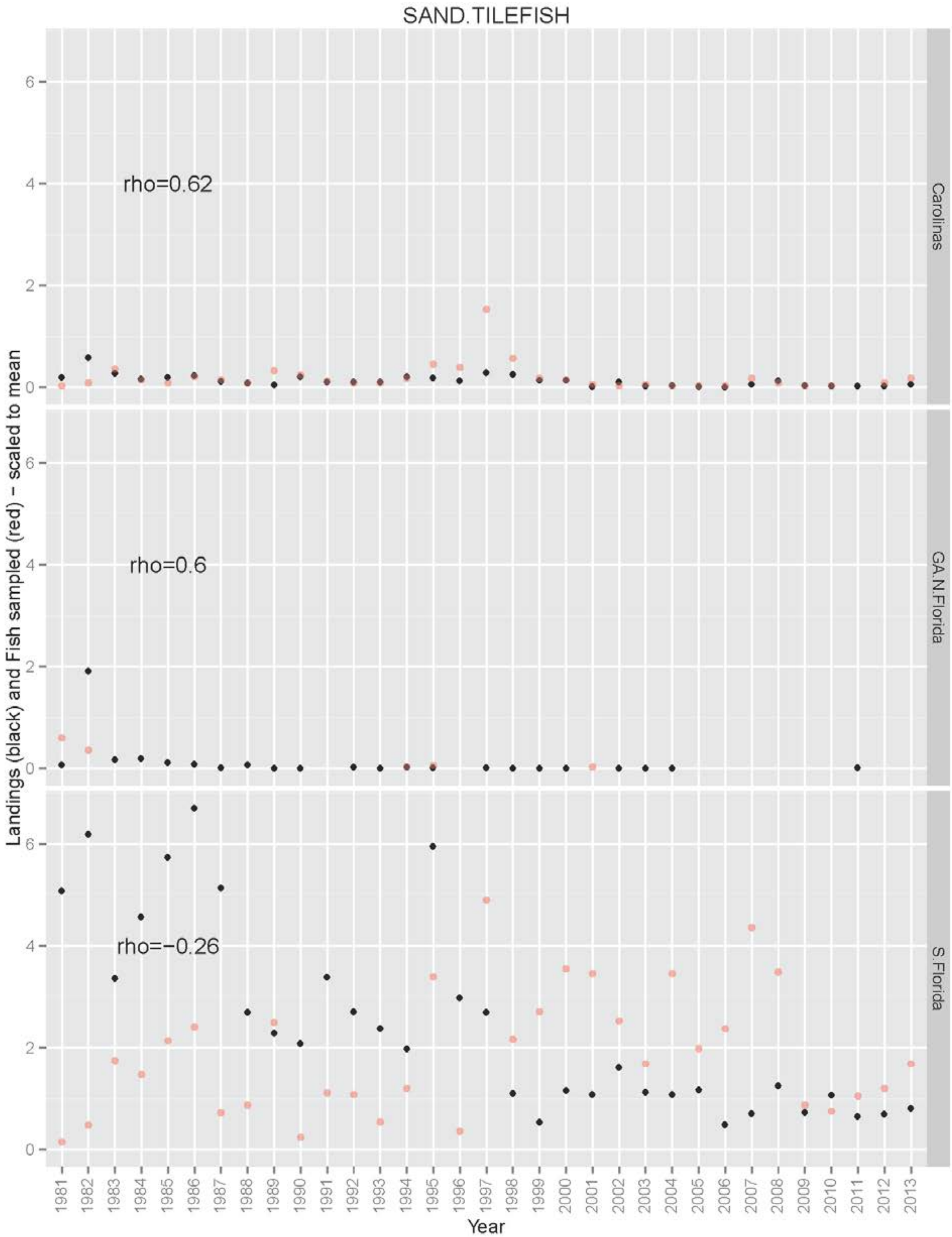

BLACK.SEABASS
rho=0.77
rho=0.64
rho=0.64
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

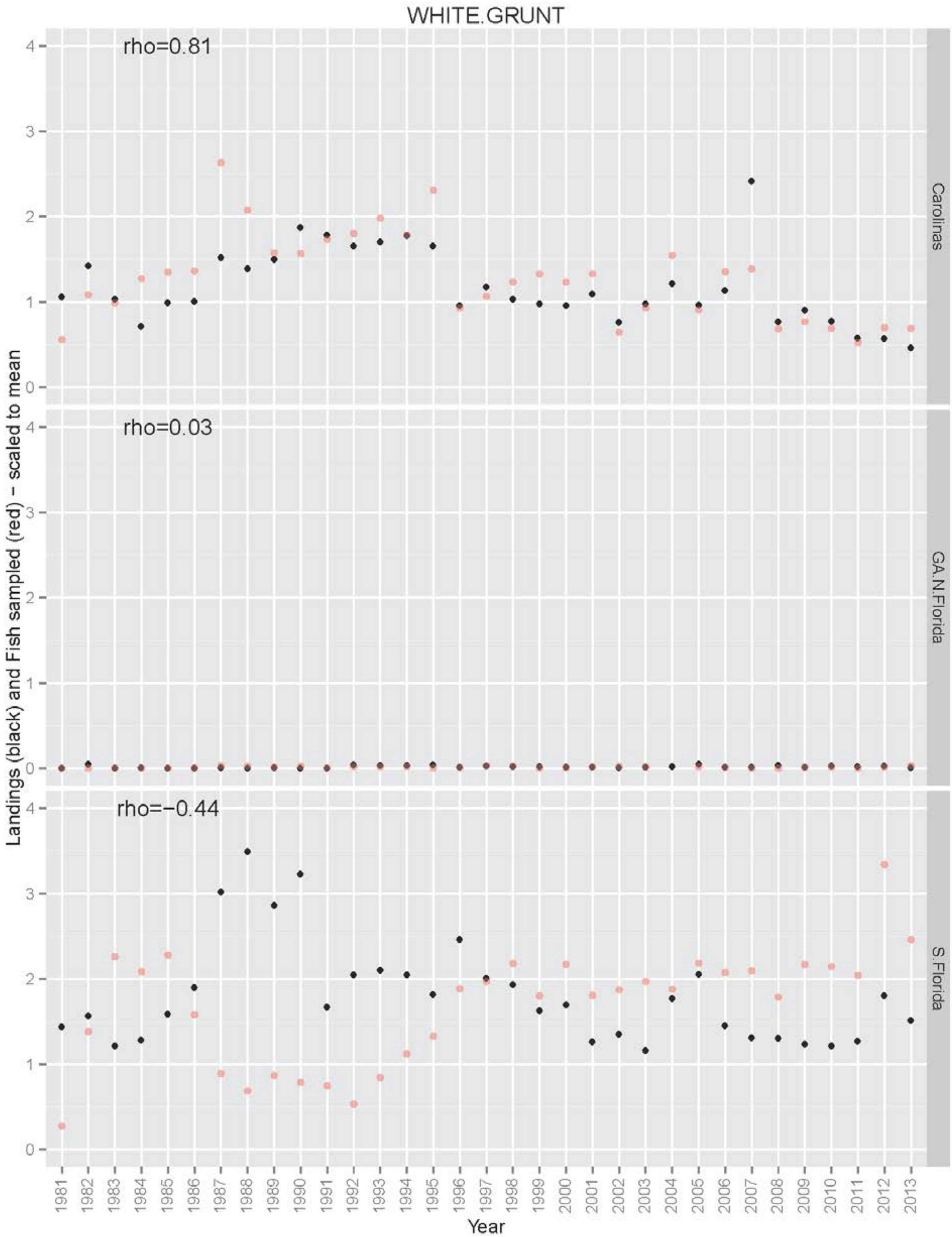


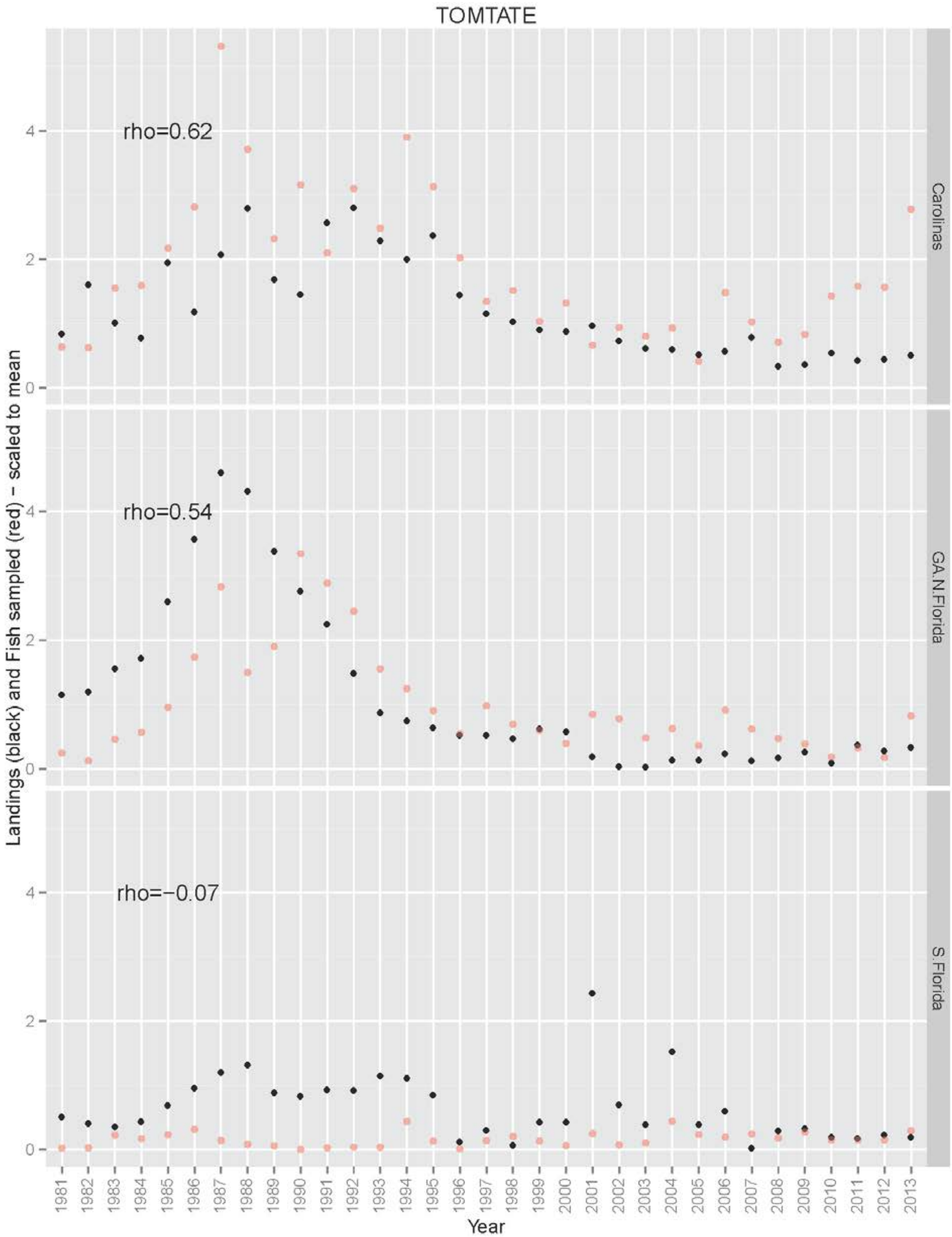
BANK.SEABASS
rho=0.6
rho=0.58
rho=0.37
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

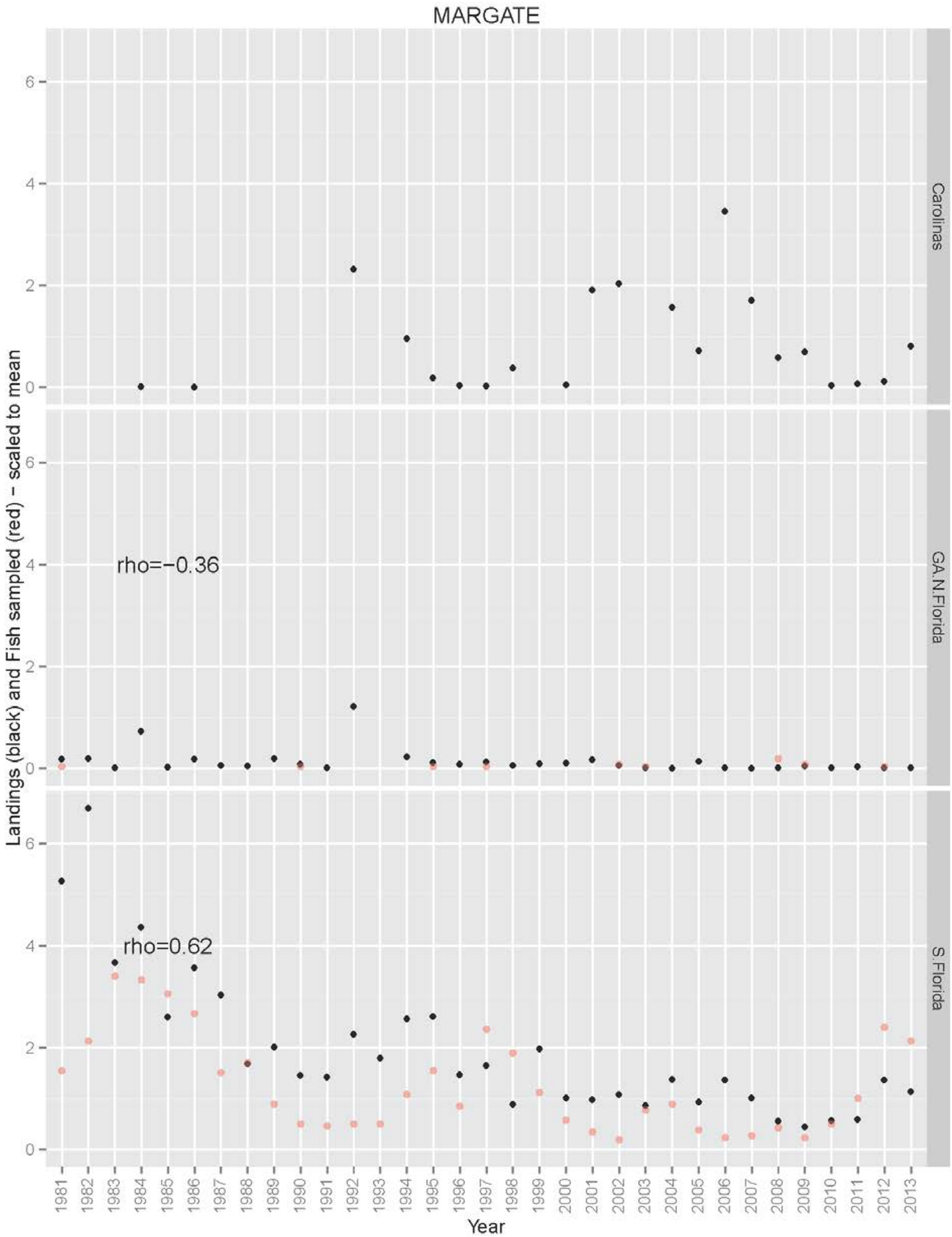


SAND.PERCH
Landings (black) and Fish sampled (red) - scaled to mean
Carolinas
GA.N.Florida
S.Florida
rho=0.58
rho=0.9
rho=0.03
0
2
4
6
8
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year

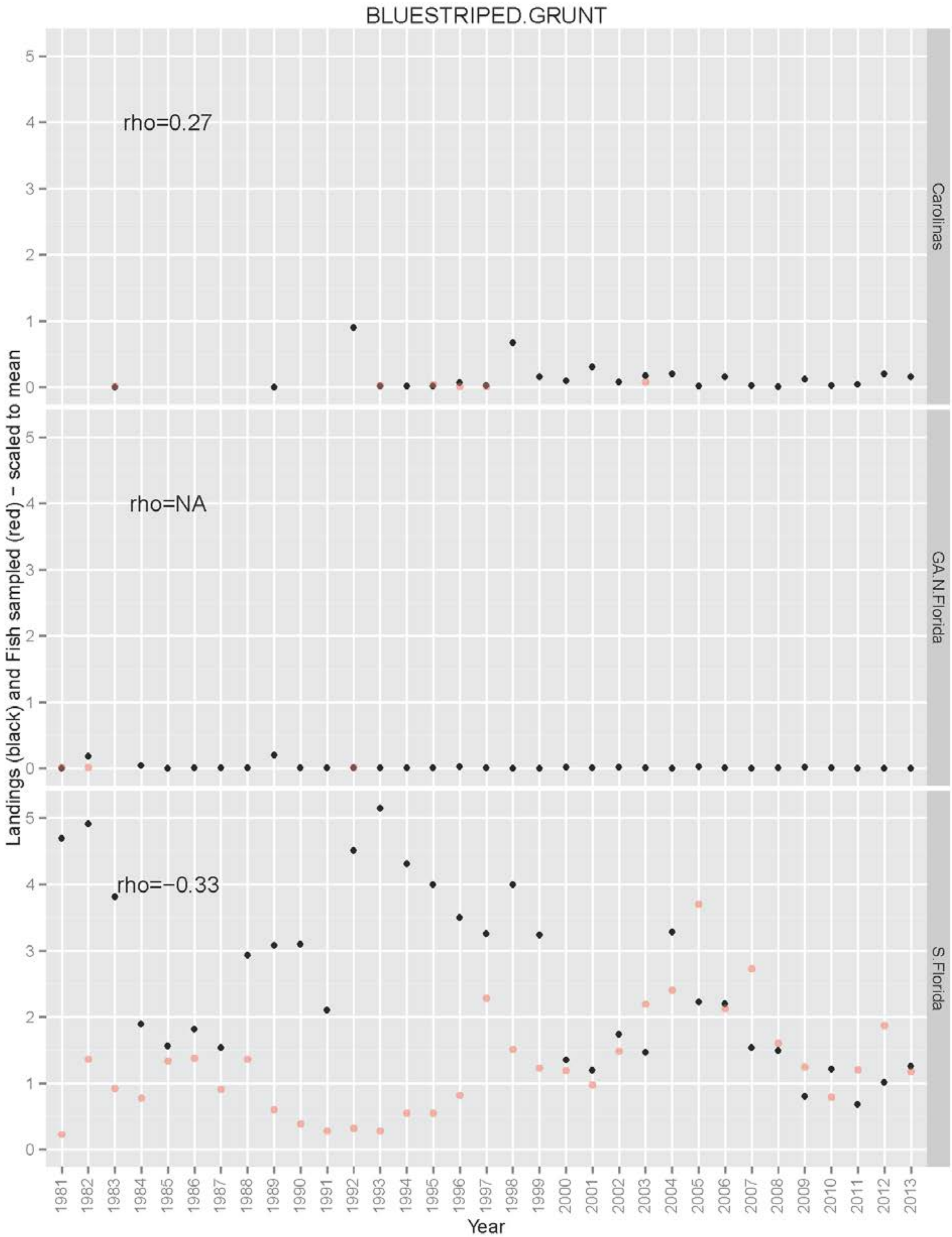

SAND.TILEFISH
rho=0.62
rho=0.6
rho=−0.26
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) − scaled to mean
Year

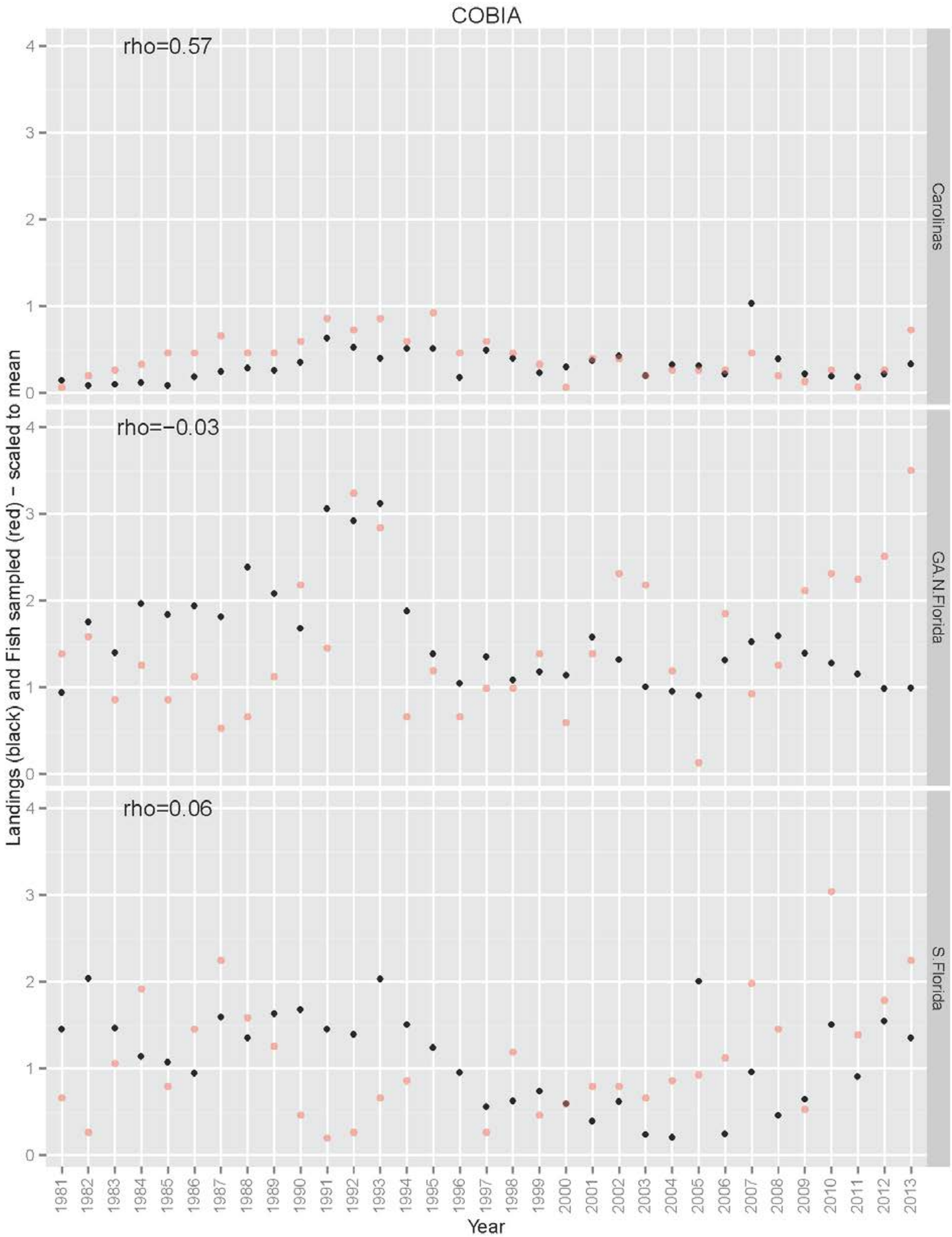

WHITE.GRUNT
rho=0.81
rho=0.03
rho=−0.44
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) – scaled to mean
Year
0
1
2
3
4
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

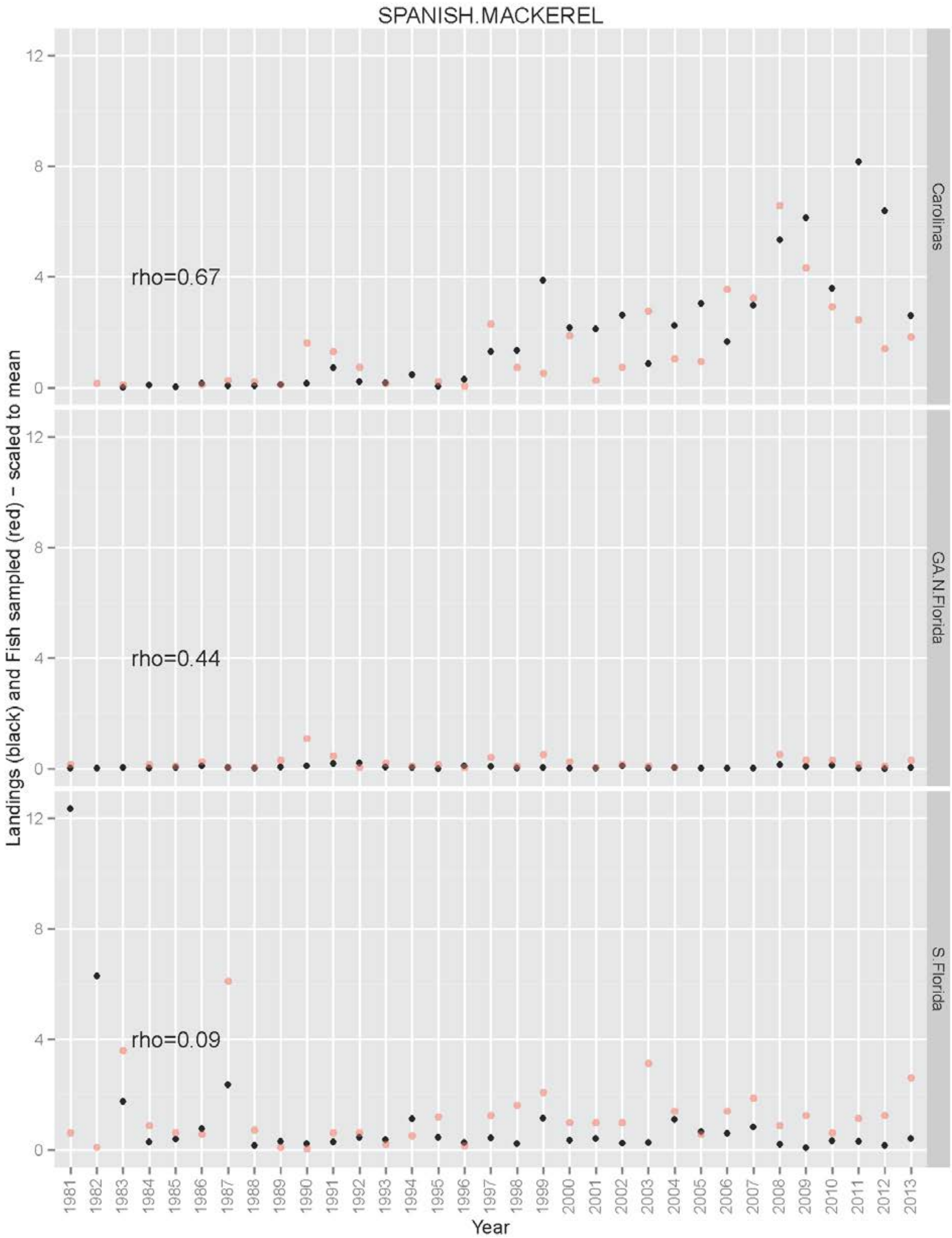

TOMTATE
rho=0.62
rho=0.54
rho=−0.07
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) − scaled to mean
Year
0
2
4
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013



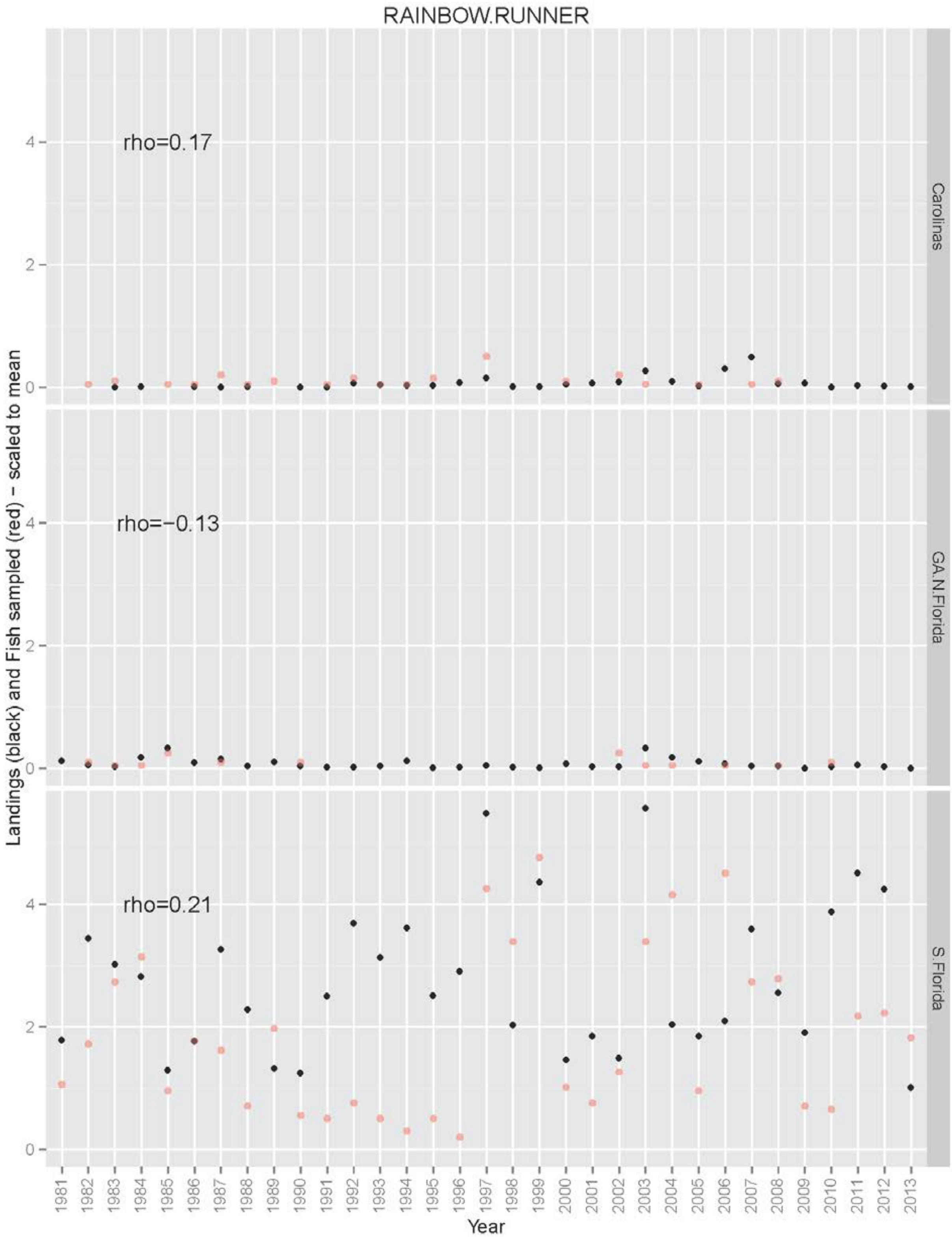
MARGATE
Landings (black) and Fish sampled (red) – scaled to mean
Carolinas
GA.N.Florida
S.Florida
rho=−0.36
rho=0.62
Year

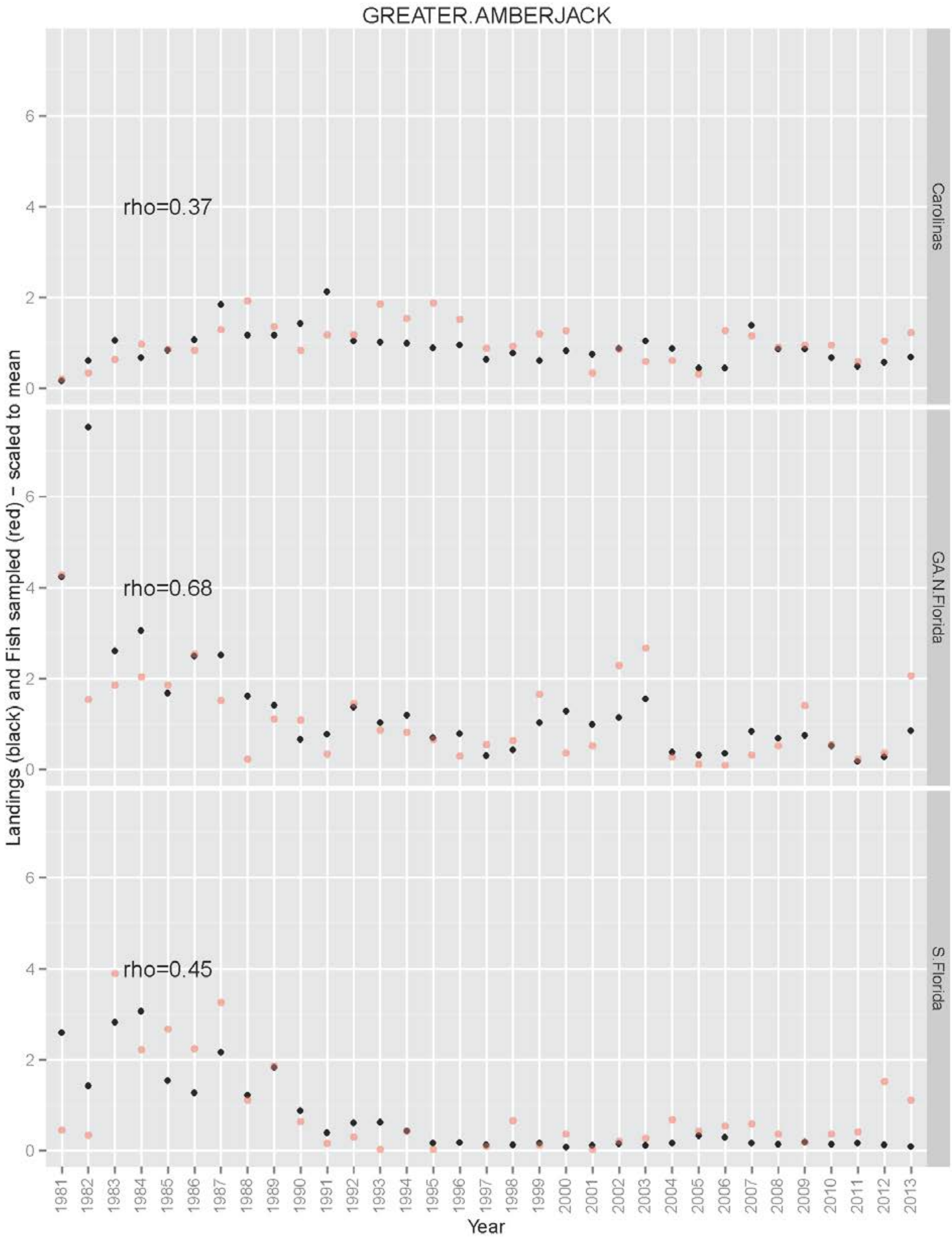

BLUESTRIPED.GRUNT
rho=0.27
rho=NA
rho=−0.33
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
1
2
3
4
5
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

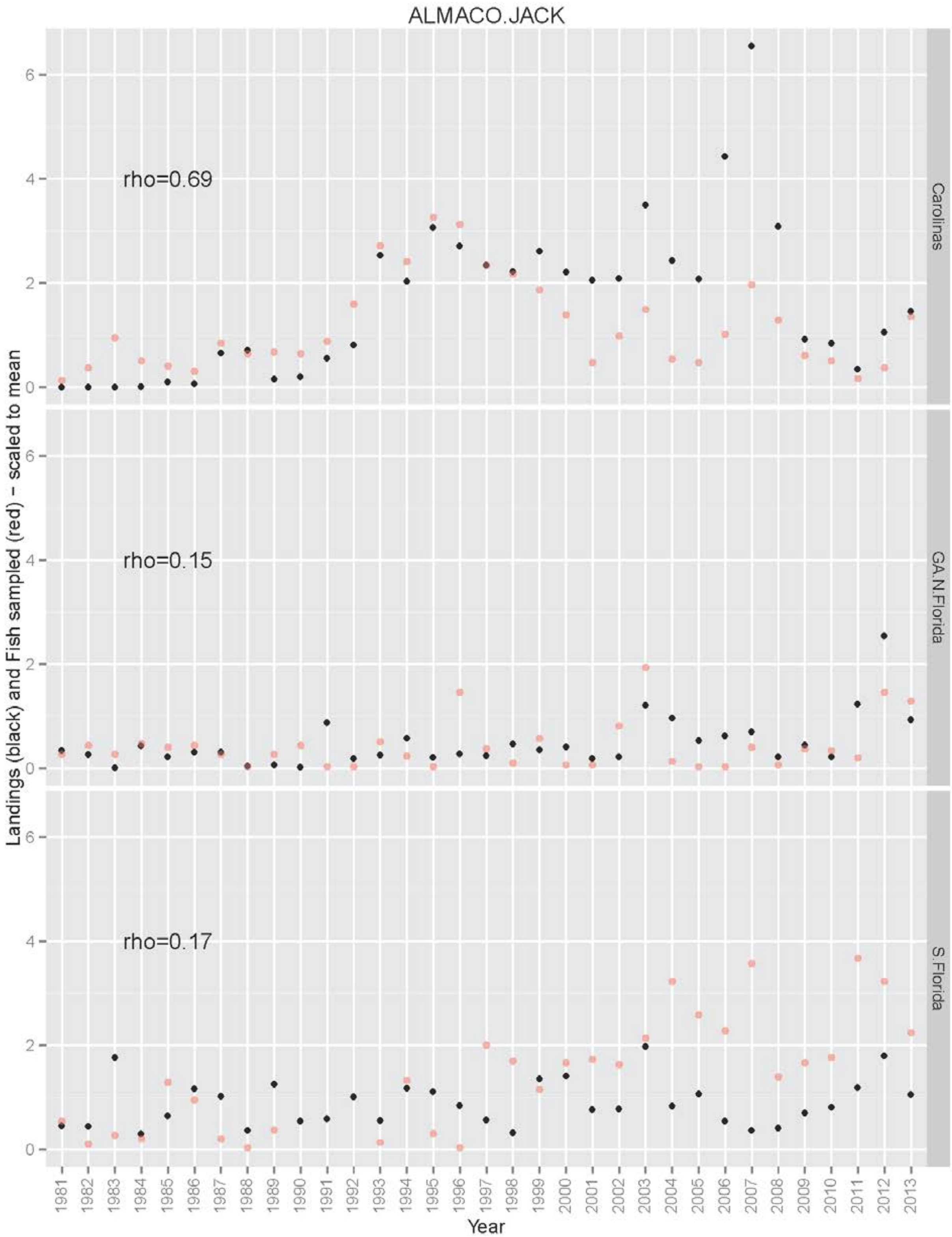

COBIA
rho=0.57
rho=−0.03
rho=0.06
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) − scaled to mean
Year
0
1
2
3
4
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013



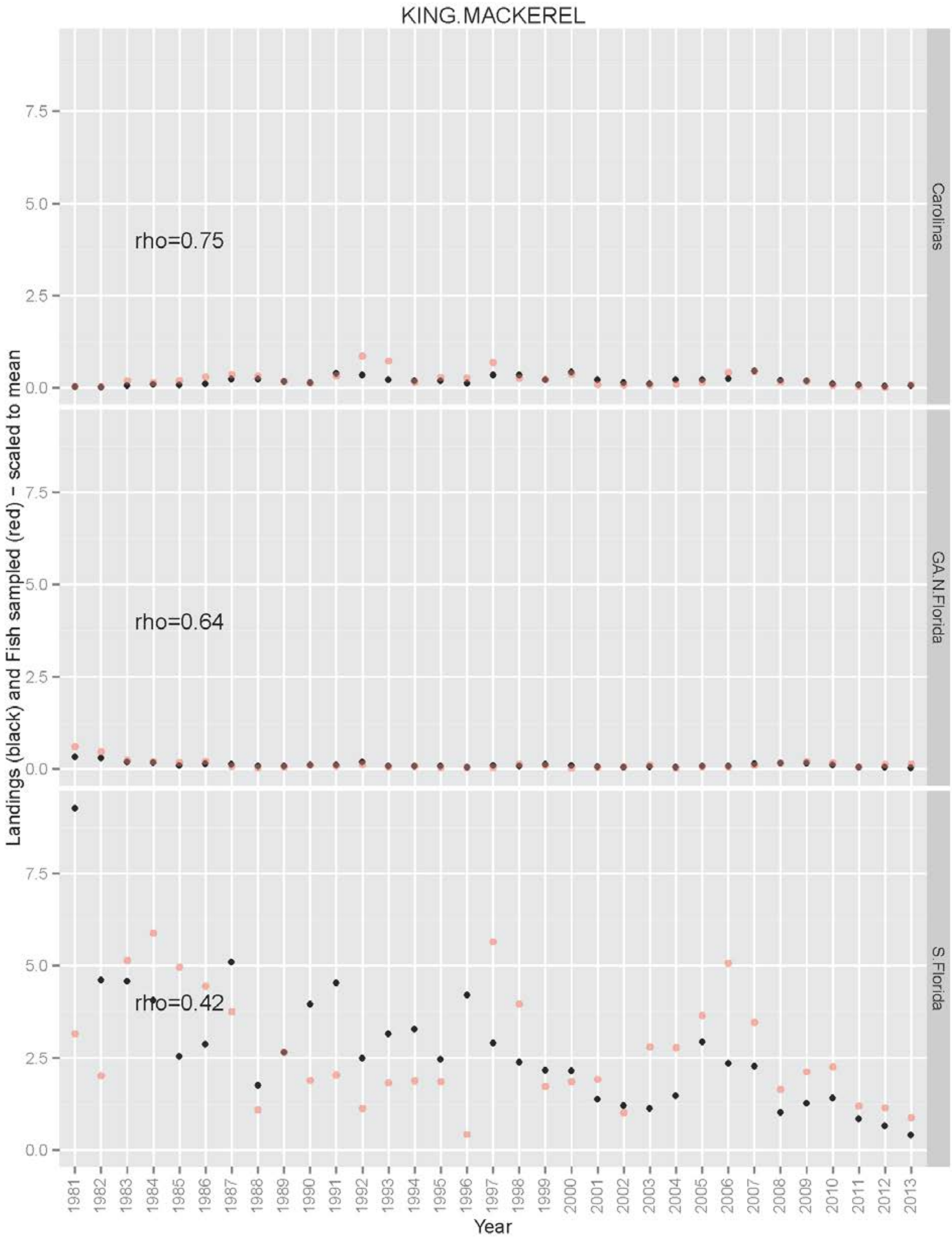
SPANISH.MACKEREL
Landings (black) and Fish sampled (red) - scaled to mean
Carolinas
rho=0.67
GA.N.Florida
rho=0.44
S.Florida
rho=0.09
Year

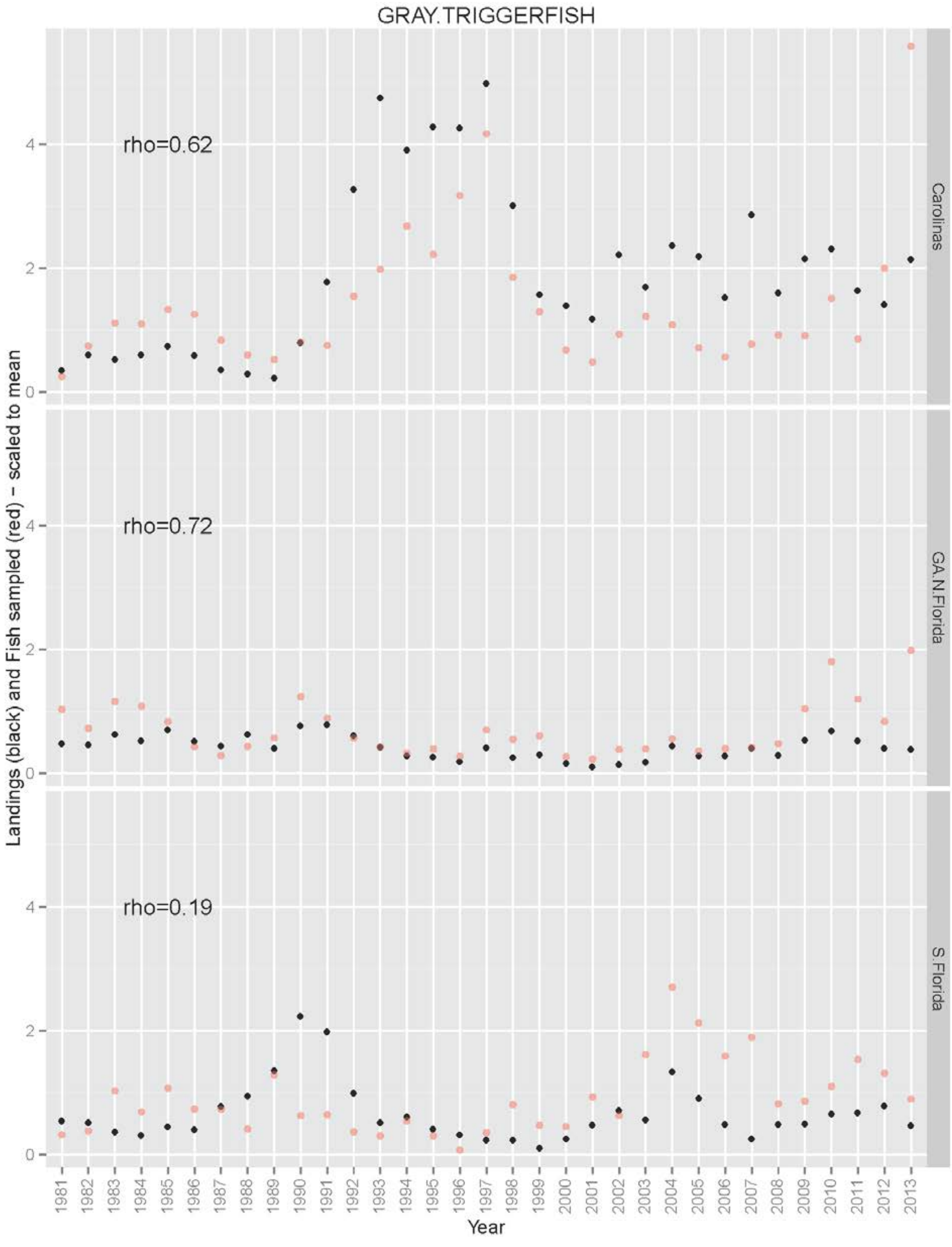

RAINBOW.RUNNER
rho=0.17
rho=−0.13
rho=0.21
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) − scaled to mean
Year
0
2
4
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

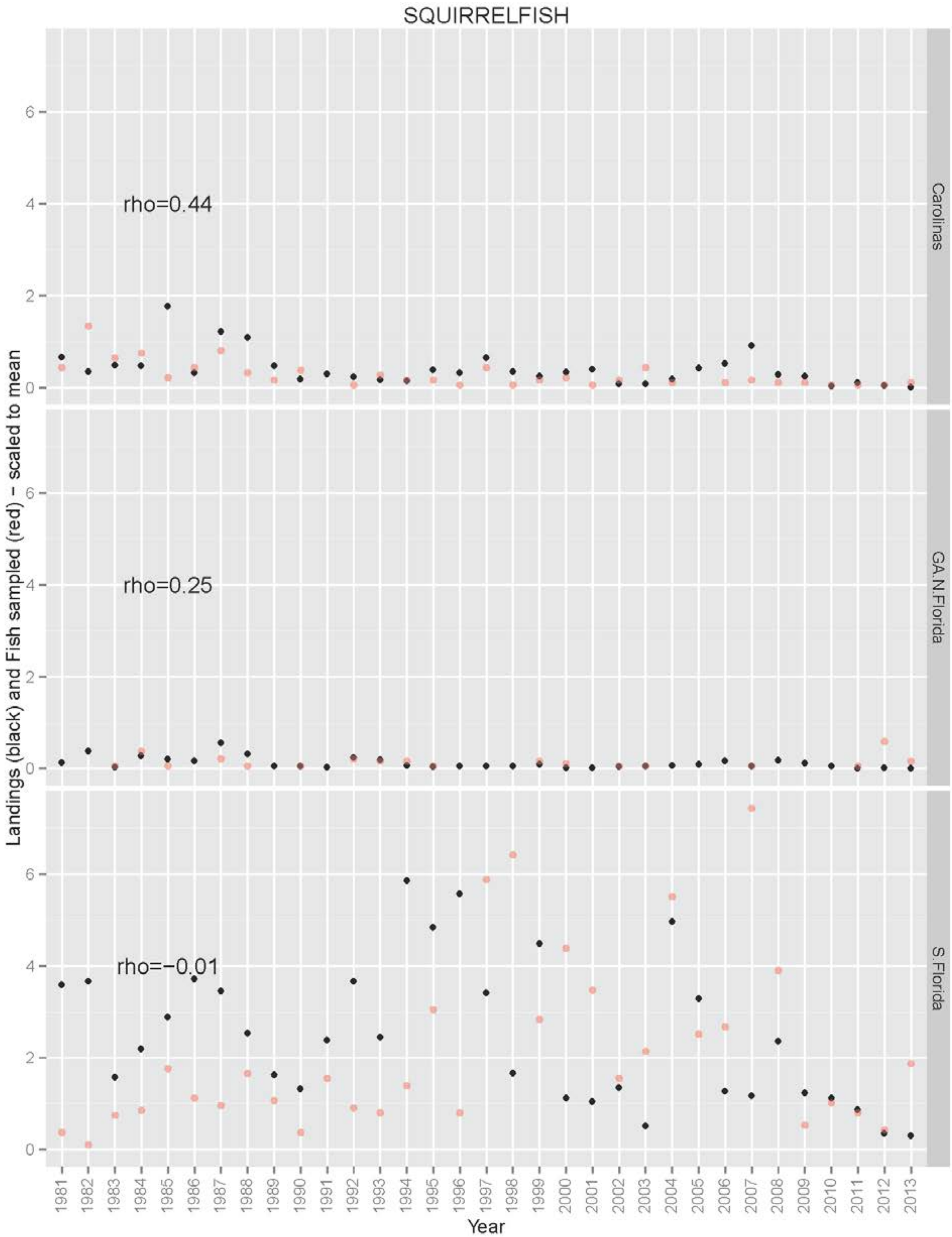

GREATER.AMBERJACK
rho=0.37
rho=0.68
rho=0.45
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013



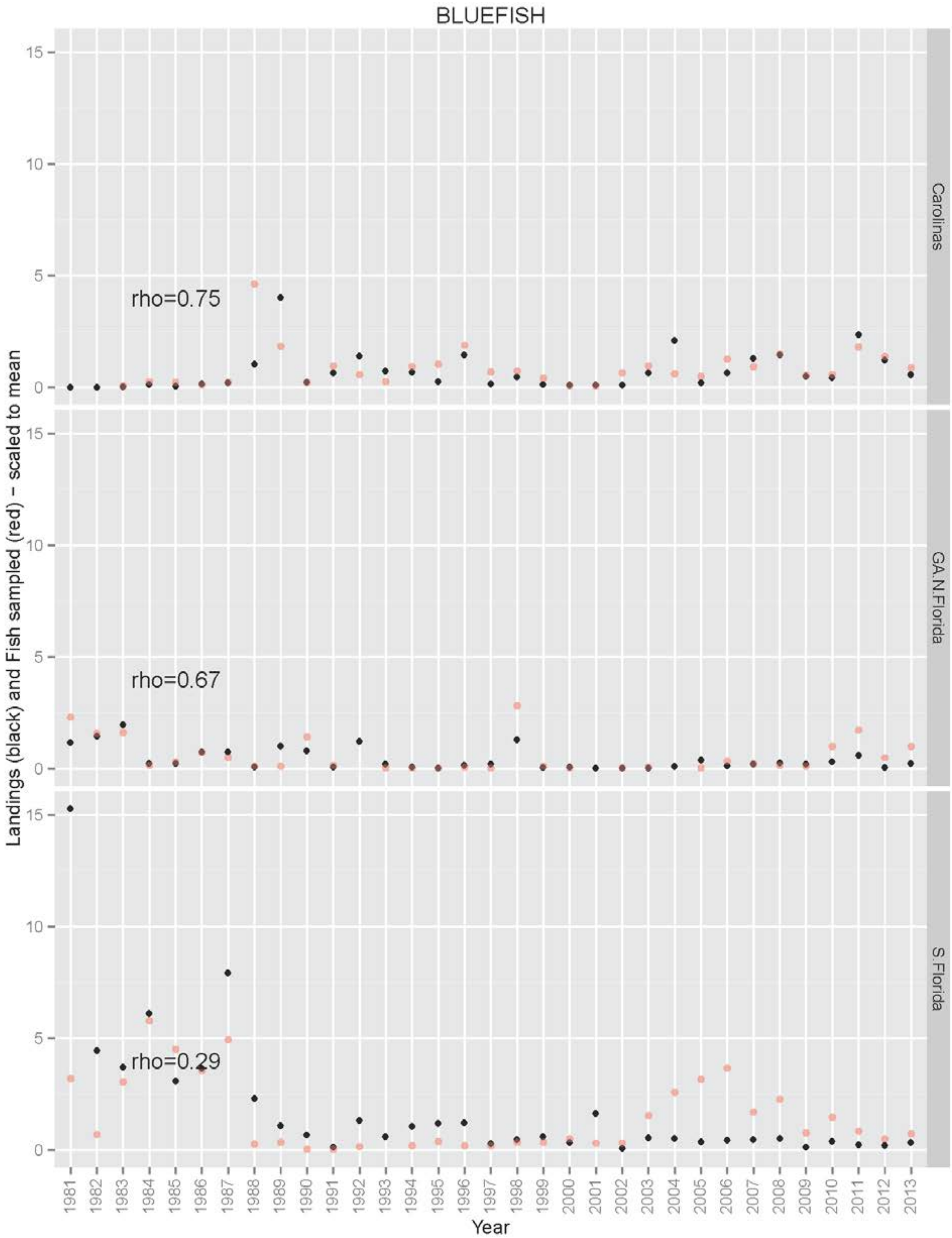
ALMACO.JACK
Landings (black) and Fish sampled (red) - scaled to mean
rho=0.69
Carolinas
rho=0.15
GA.N.Florida
rho=0.17
S.Florida
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year

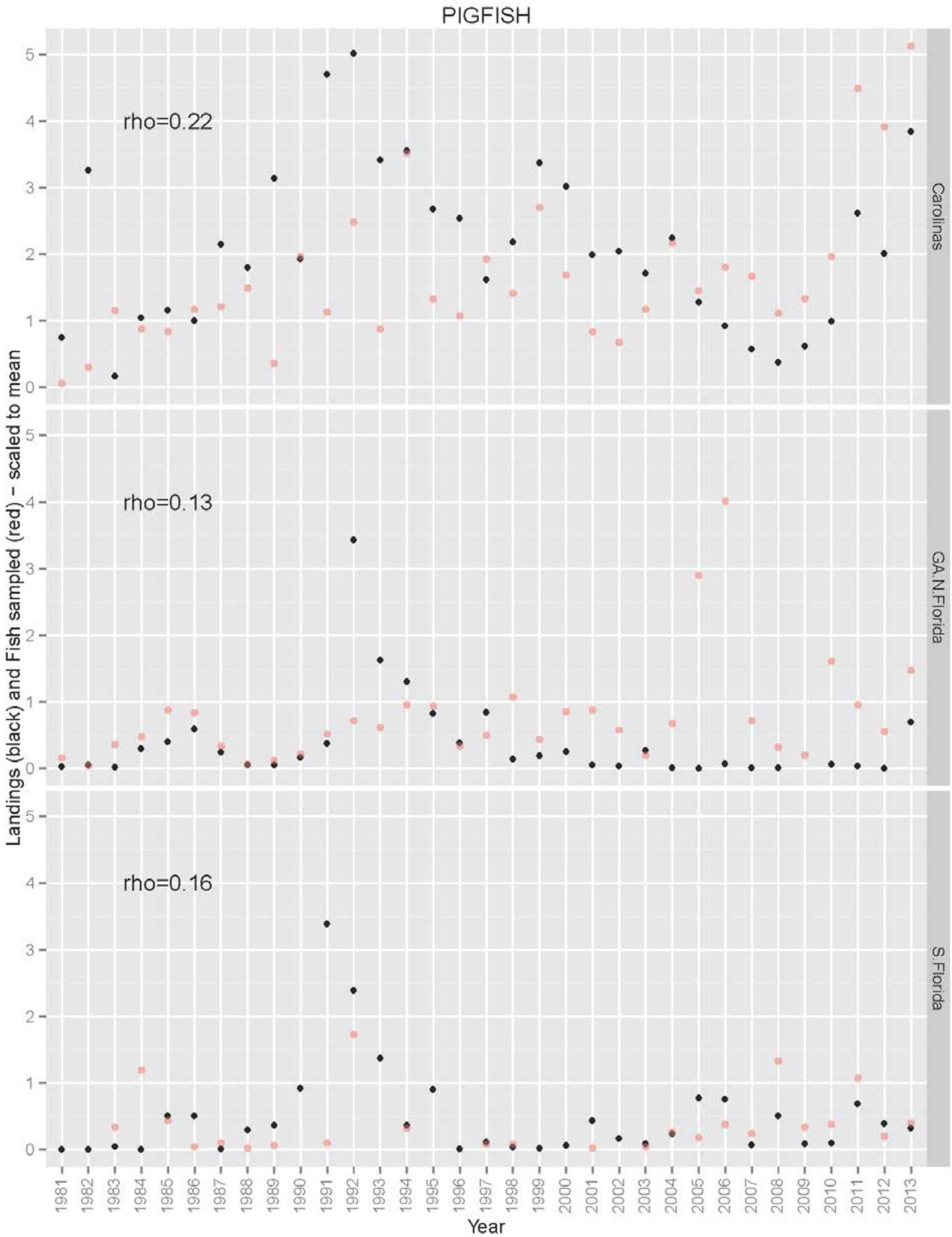

KING.MACKEREL
Landings (black) and Fish sampled (red) - scaled to mean
Carolinas
GA.N.Florida
S.Florida
rho=0.75
rho=0.64
rho=0.42
0.0
2.5
5.0
7.5
Year
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

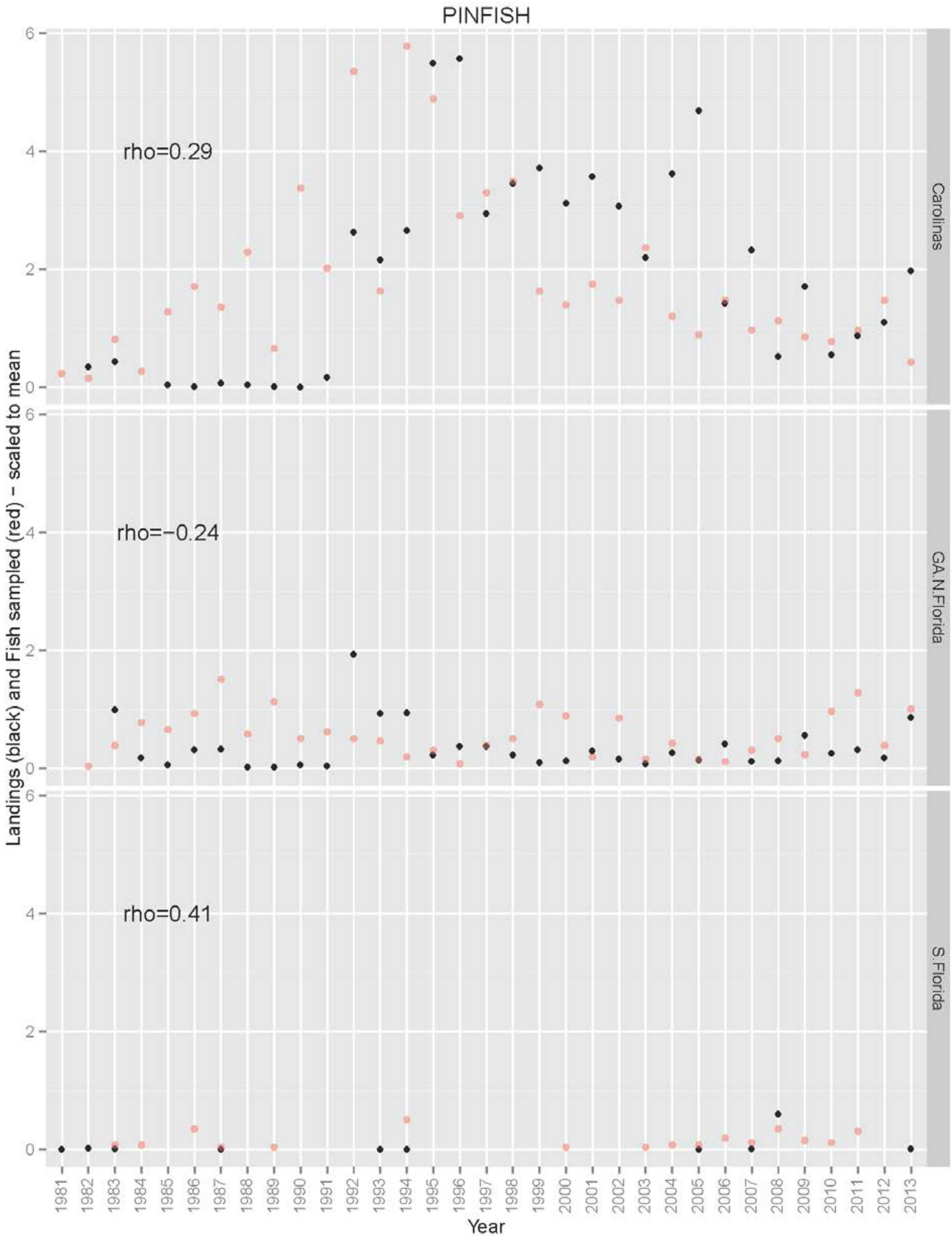

GRAY.TRIGGERFISH
rho=0.62
rho=0.72
rho=0.19
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
2
4
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013



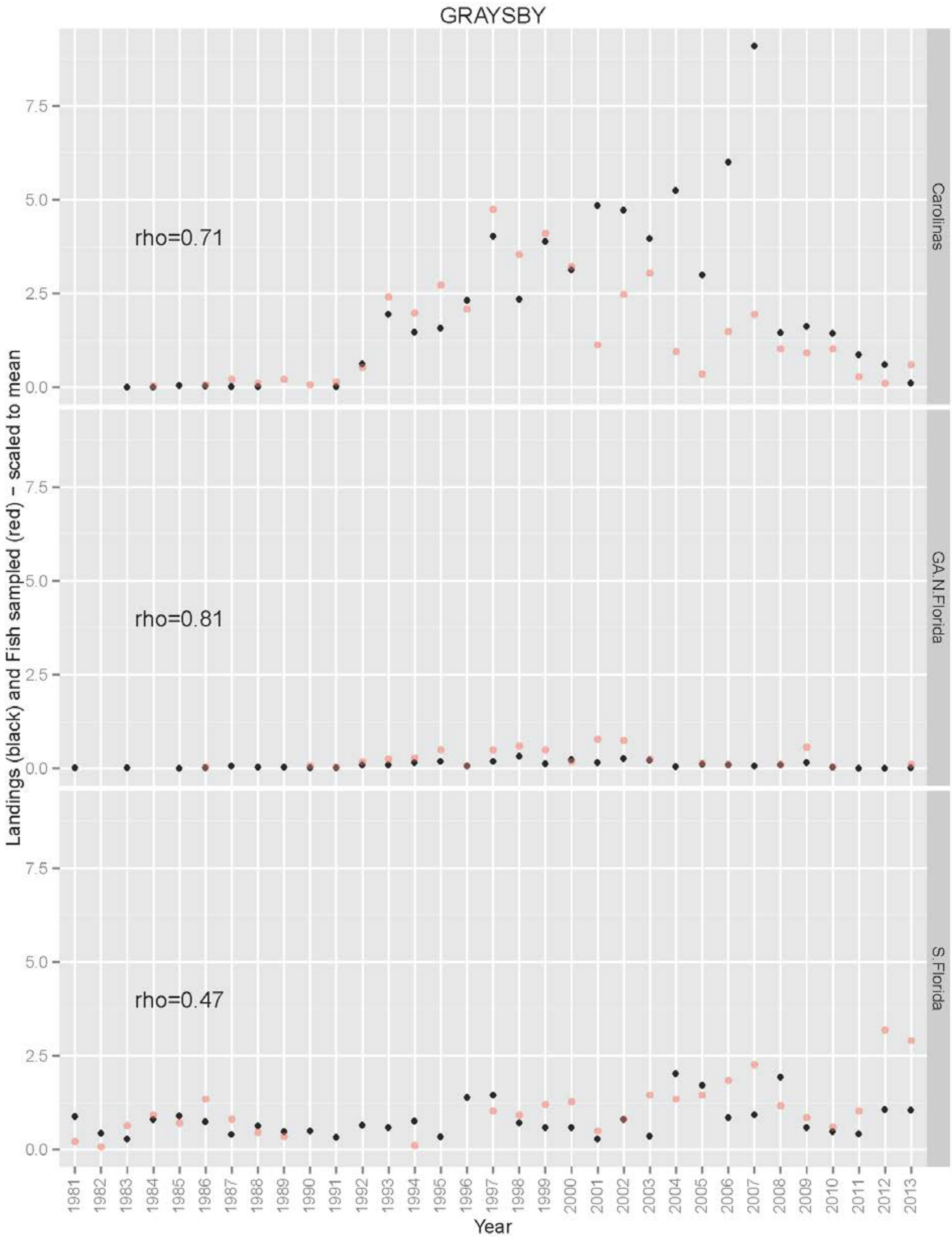
SQUIRRELFISH
Landings (black) and Fish sampled (red) - scaled to mean
rho=0.44
rho=0.25
rho=−0.01
Carolinas
GA.N.Florida
S.Florida
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year

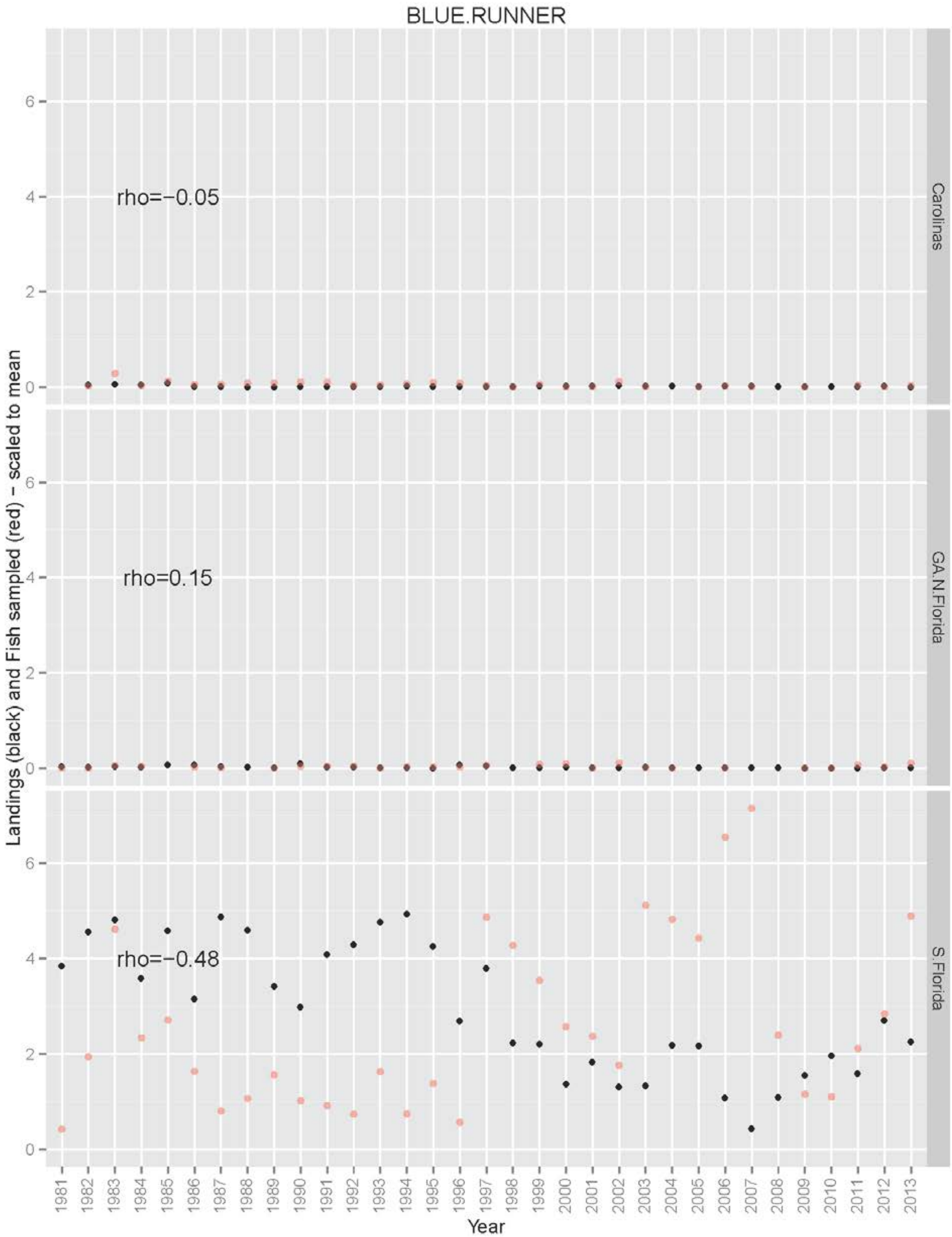

BLUEFISH
Landings (black) and Fish sampled (red) - scaled to mean
Carolinas
rho=0.75
GA.N.Florida
rho=0.67
S.Florida
rho=0.29
Year
0
5
10
15
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013


PIGFISH
rho=0.22
rho=0.13
rho=0.16
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
1
2
3
4
5
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

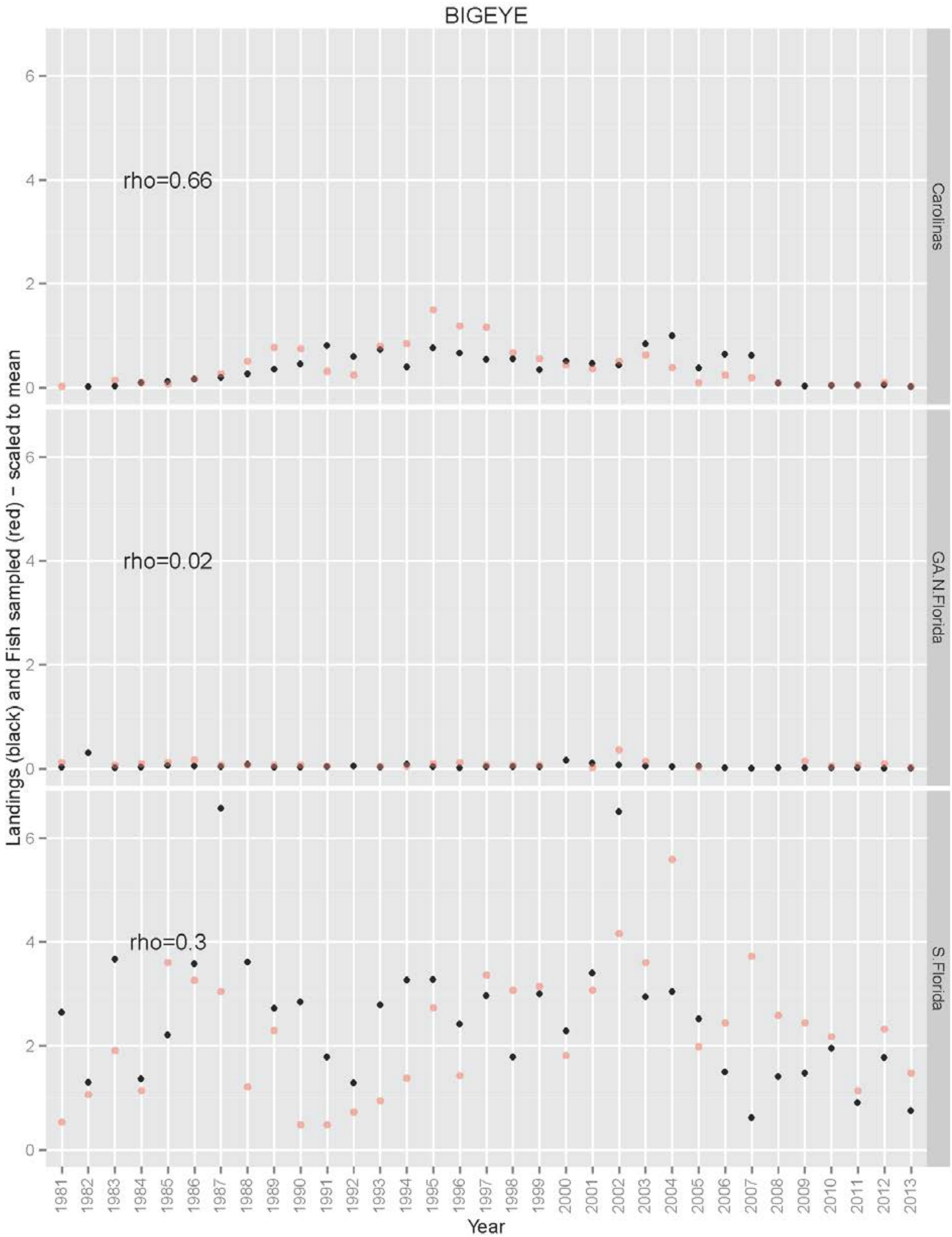


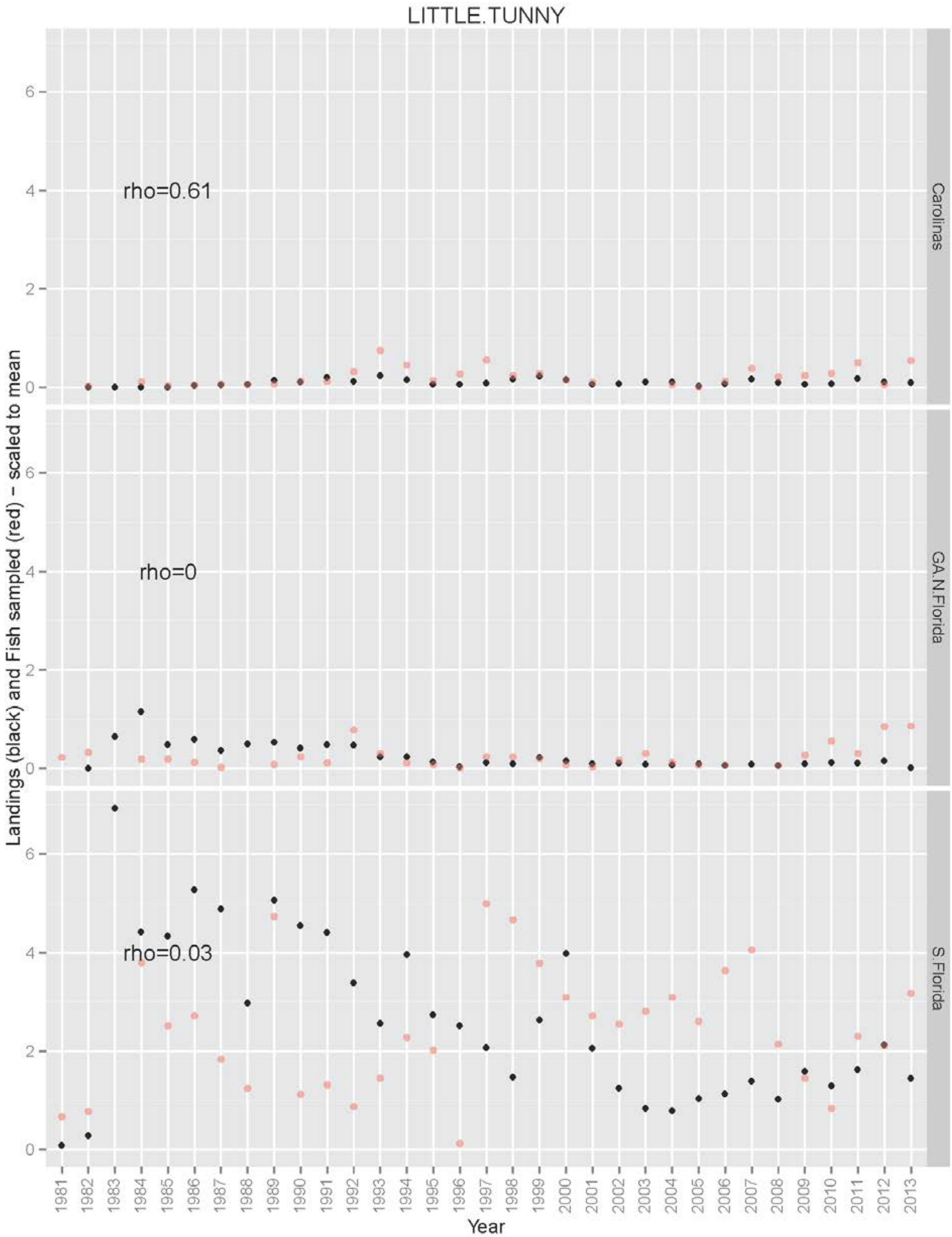
PINFISH
rho=0.29
rho=−0.24
rho=0.41
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013


GRAYSBY
Landings (black) and Fish sampled (red) - scaled to mean
Year
Carolinas
GA.N.Florida
S.Florida
rho=0.71
rho=0.81
rho=0.47
0.0
2.5
5.0
7.5
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

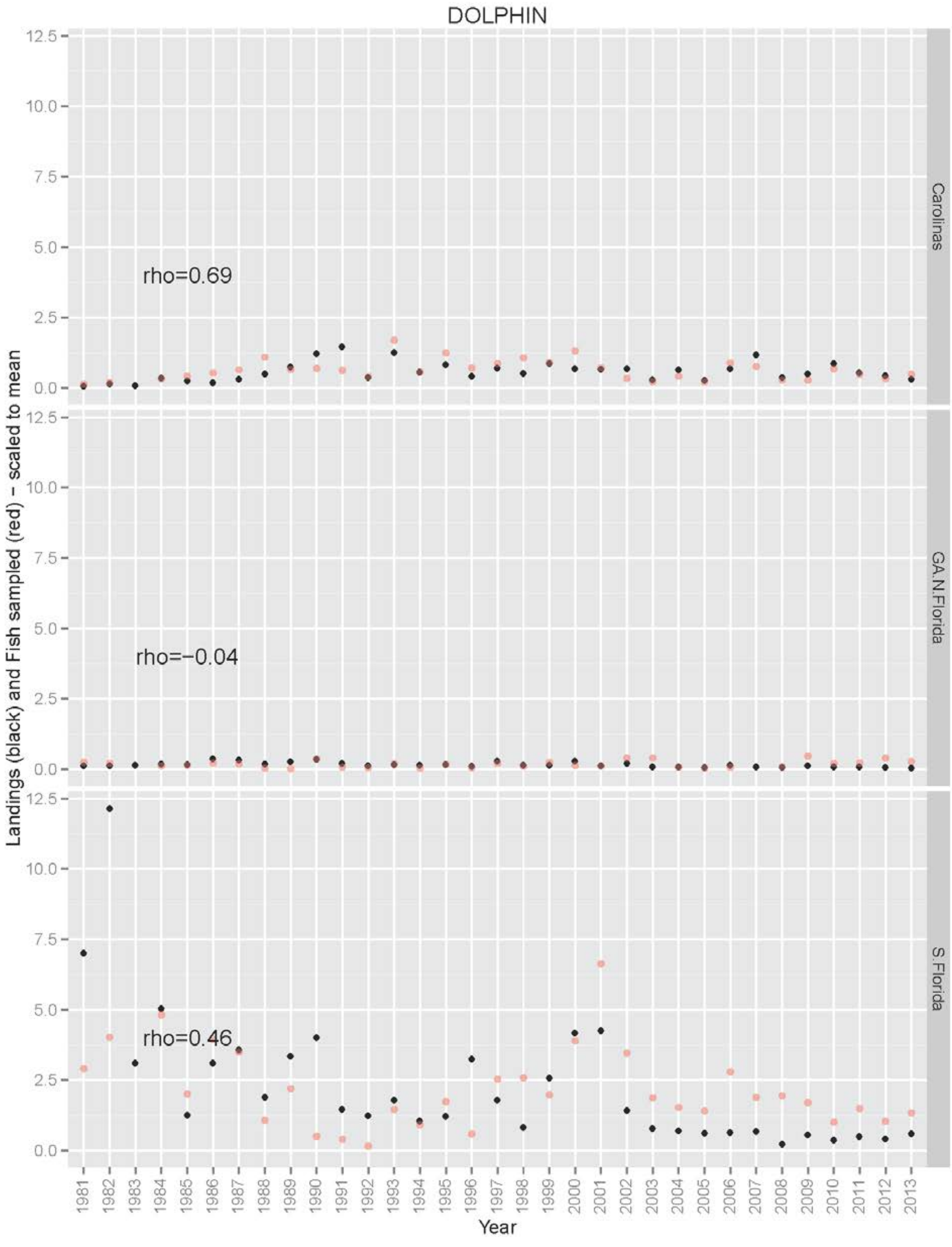


BLUE.RUNNER
rho=−0.05
rho=0.15
rho=−0.48
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) – scaled to mean
Year
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

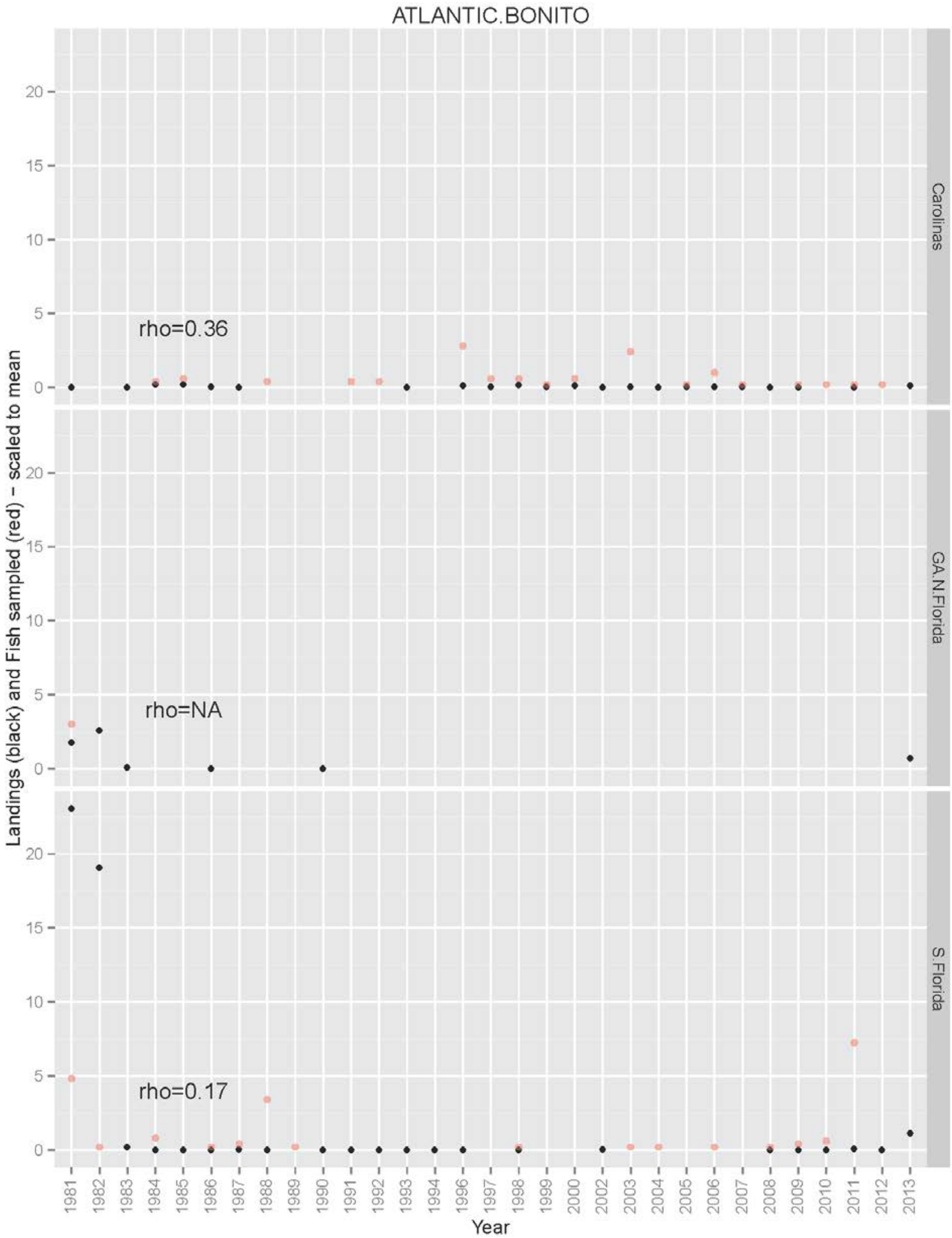

BIGEYE
rho=0.66
rho=0.02
rho=0.3
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

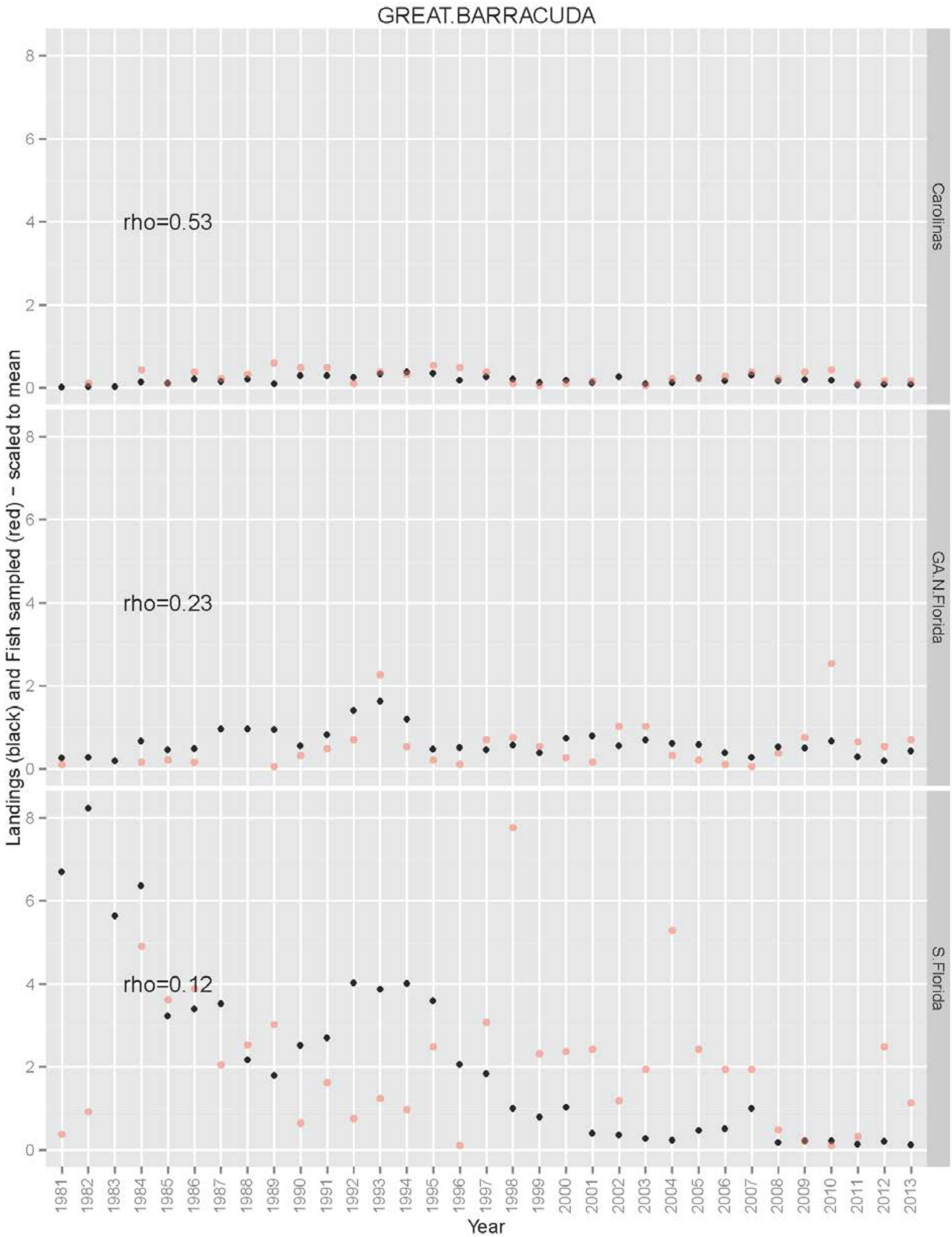


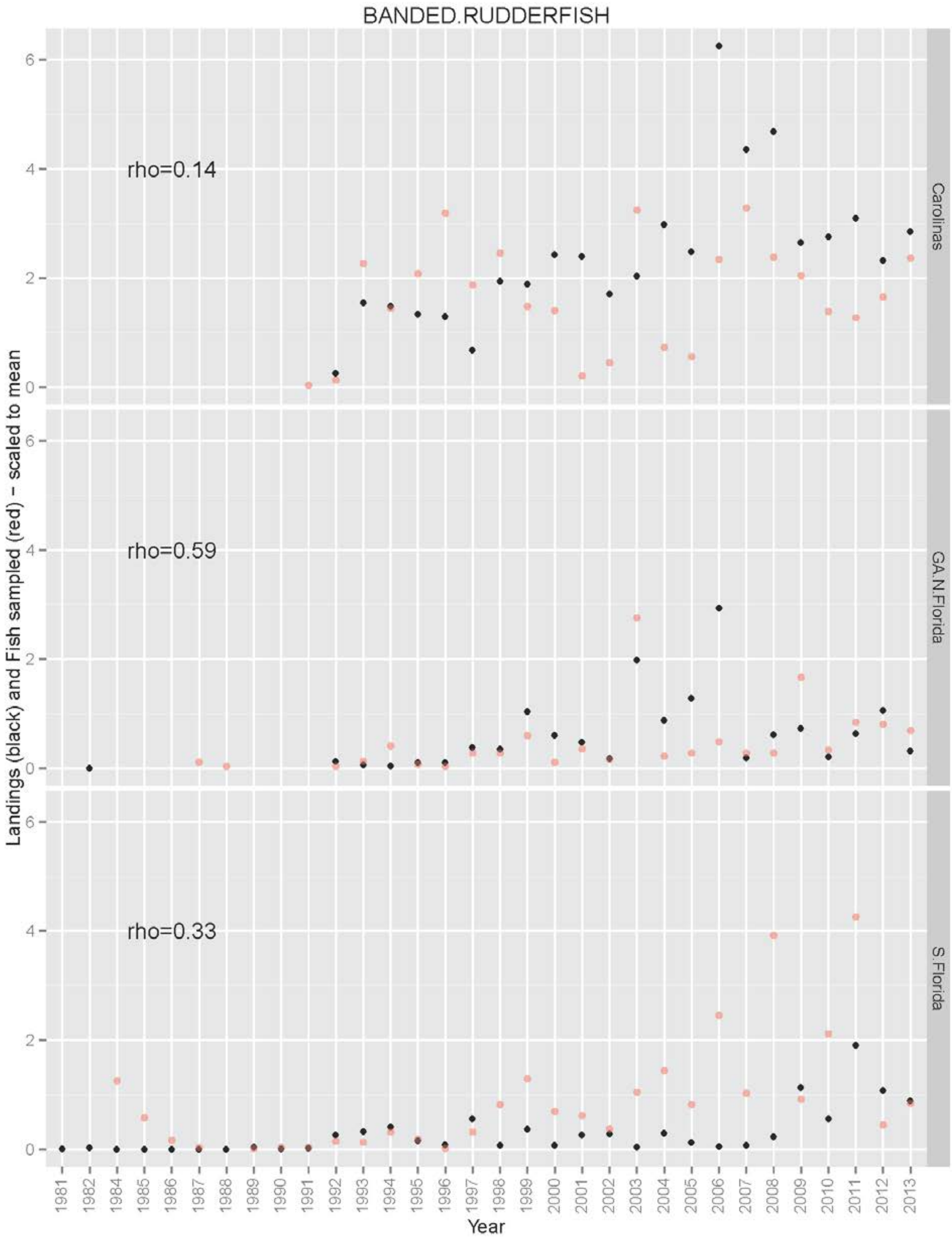
LITTLE.TUNNY
rho=0.61
rho=0
rho=0.03
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year

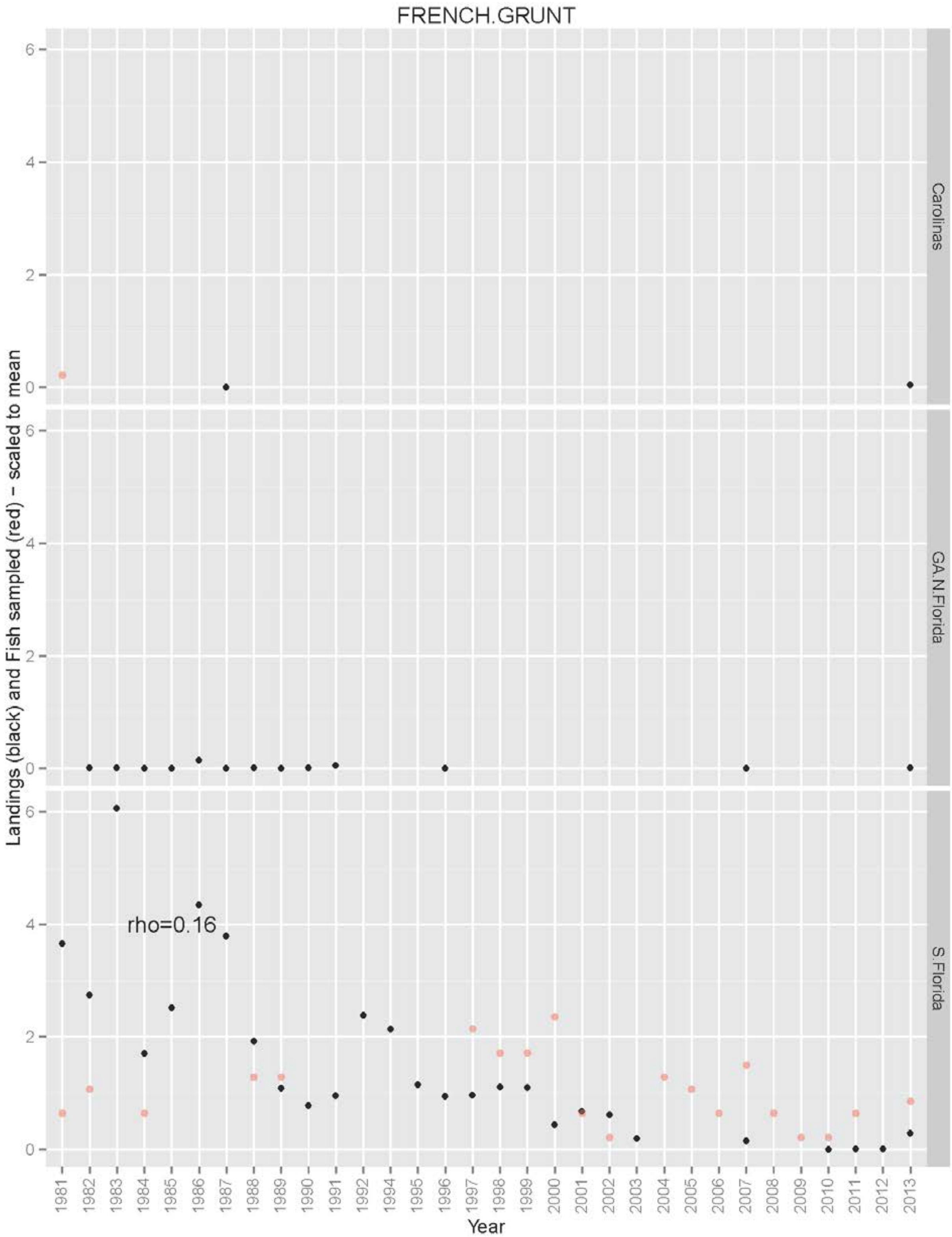


DOLPHIN
Landings (black) and Fish sampled (red) - scaled to mean
Carolinas
rho=0.69
GA.N.Florida
rho=−0.04
S.Florida
rho=0.46
Year

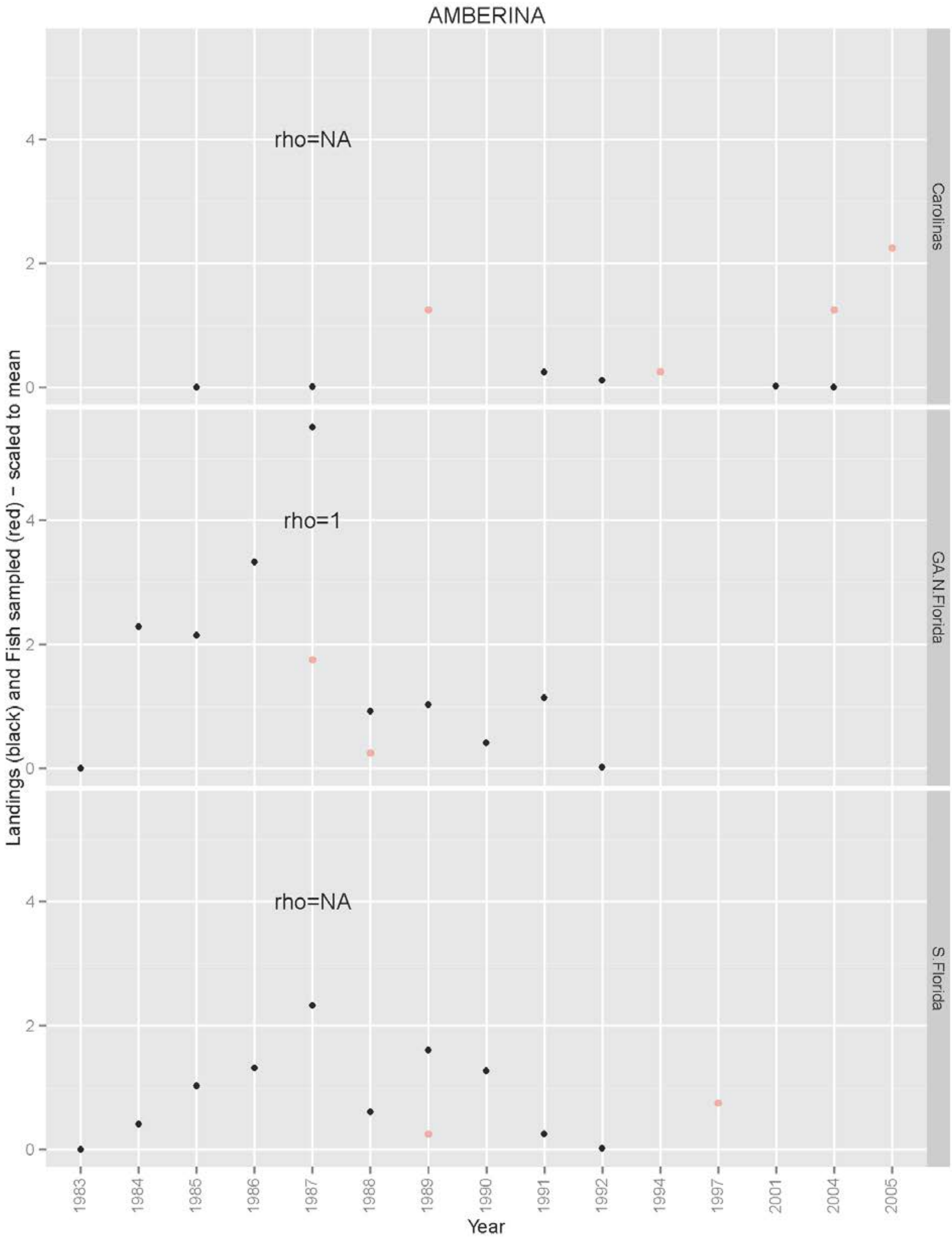

ATLANTIC.BONITO
rho=0.36
rho=NA
rho=0.17
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year


GREAT.BARRACUDA
rho=0.53
rho=0.23
rho=0.12
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
2
4
6
8
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

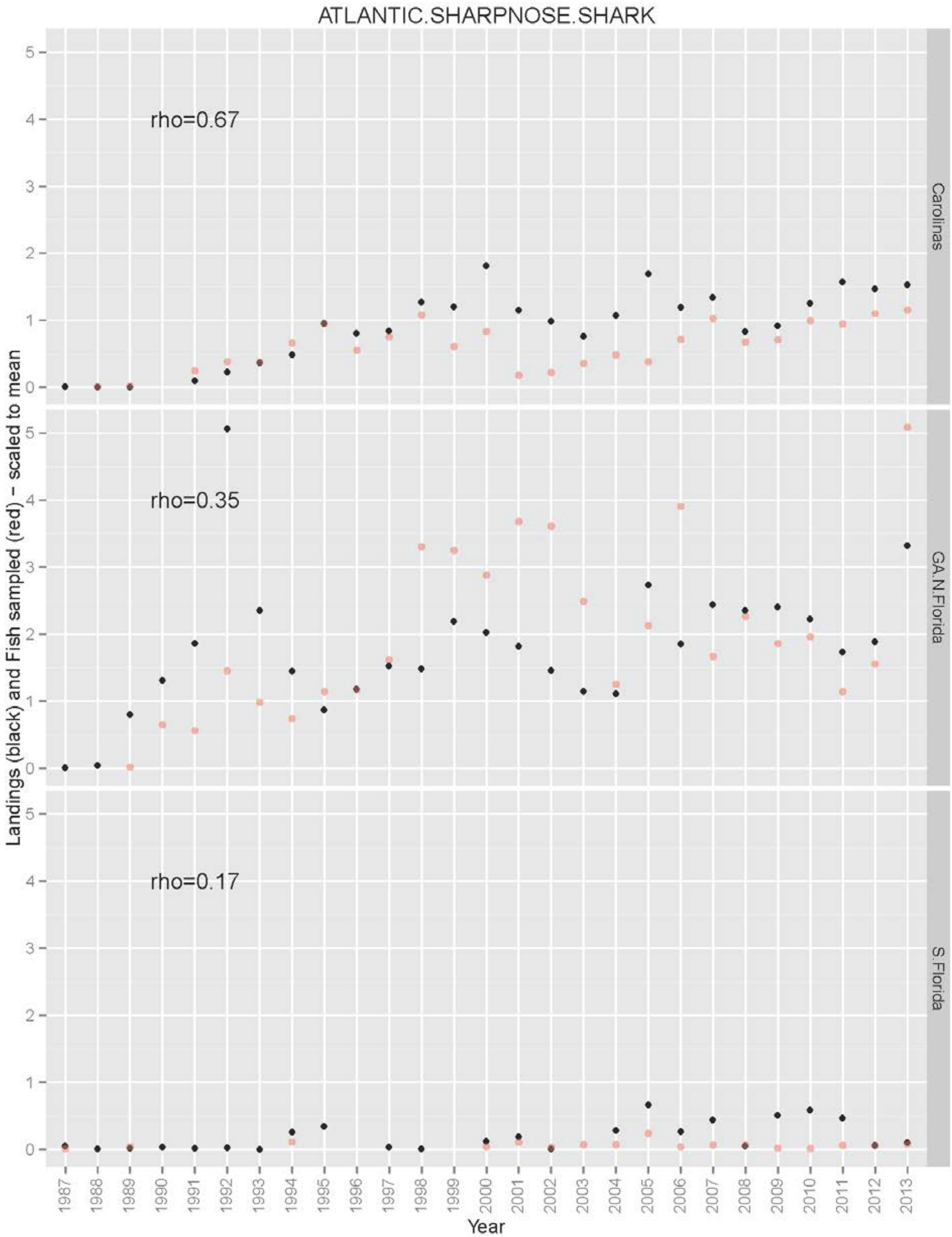

BANDED.RUDDERFISH
Landings (black) and Fish sampled (red) - scaled to mean
rho=0.14
Carolinas
rho=0.59
GA.N.Florida
rho=0.33
S.Florida
Year
0
2
4
6
1981
1982
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013



FRENCH.GRUNT
Landings (black) and Fish sampled (red) - scaled to mean
Carolinas
GA.N.Florida
S.Florida
rho=0.16
Year
0
2
4
6
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013



AMBERINA
rho=NA
rho=1
rho=NA
Carolinas
GA.N.Florida
S.Florida
Landings (black) and Fish sampled (red) - scaled to mean
Year
0
2
4
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1994
1997
2001
2004
2005


ATLANTIC.SHARPNOSE.SHARK
Landings (black) and Fish sampled (red) - scaled to mean
rho=0.67
rho=0.35
rho=0.17
Carolinas
GA.N.Florida
S.Florida
Year
0
1
2
3
4
5
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013