

Angler Travel and Targeting Report 2021: Broward County

A data report for the Broward County Tourist Development Council and Board of County Commissioners prepared by:

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Table of Contents

Abbreviations and Definitions

NMFS: National Marine Fisheries Service.

MRIP: Marine Recreational Information Program, which is operated by NMFS to survey coastal anglers.

APAIS: Access Point Angler Intercept Survey, the survey implemented by MRIP to collect information about angling.

Southeast region: refers to the areas of and marine waters adjacent to Broward, Miami-Dade, and Palm Beach counties.

Overview Summary

Why this report might be important

Recreational fishing is one of the dominant recreational uses of marine ecosystems globally, and marine recreational fisheries (recreational fisheries occurring in saltwater) are particularly important to Florida. Florida has more saltwater anglers than any other state—2.4 million (USFWS 2011), with over a million saltwater fishing licenses sold annually. The total economic output (market activity) of saltwater fishing in Florida was estimated at around \$8b annually (NOAA 2017), making fishing a vital part of Florida's overall economy, and especially critical for coastal counties. Because of their importance, marine recreational fisheries in Florida are carefully managed by state (Florida Fish and Wildlife Conservation Commission; FWC) and by federal (NOAA's National Marine Fisheries Service, NMFS) agencies. These two agencies partner to collect information about recreational fishing that is freely available to the public in the form of large databases. Extracting and visualizing these data can be challenging. We have queried these databases and summarized information we think may be helpful to the Broward County Tourist Development Council and Board of County Commissioners. **Specifically this information can be used to inform advertisements of fishing-related tourism in Broward County.**

What this report can be used for

This report is designed to provide information about marine recreational fishing dynamics in Broward County. Fishing dynamics include information about what species of fish recreational fishers (commonly called “anglers”) are most often trying to catch and where anglers come from when they fish marine waters from Broward County. Angler targeting and travel information may have several uses. Understanding what fish species are commonly targeted may help inform:

- Which species are most popular with local or non-local anglers.
- How to best advertise fishing in this area—e.g. what fish species should be pictured in advertisements.
- Which rule changes local anglers will care the most about.
- How changes in fish populations (like from a habitat change or fish kill) may affect fishing effort, angler travel, and eventually, local economies.

Information on where anglers come from when they fish local waters has multiple potential uses as well, and we think it can inform:

- Locations to place advertisements for local fishing. For example, does it make more sense to advertise Broward County recreational fishing in New York, or in Georgia?
- Which people might want to be involved in local fisheries decision-making. For example, if many Broward County anglers reside in other counties, these anglers should perhaps be surveyed prior to any rule changes.

Together, this information is intended to help local governance entities, like the Broward County Tourist Development Council and Board of County Commissioners, access and use data that can help them better serve their constituents and sustain or improve the economic effects of marine recreational fishing in Broward County.

Where the information from this report comes from

All of the data in this report come from the NOAA's National Marine Fisheries Program (NMFS) Marine Recreational Information Program (MRIP). These data are publicly available for download at <https://www.fisheries.noaa.gov/recreational-fishing-data/data-downloads>. The MRIP program contains information voluntarily provided by anglers at fishing locations surveyed according to a scientifically designed sampling program. Data are continuously collected, but data in this report are for years 2009-2019. Future reports will show updated data as they are available.

NMFS MRIP background

What is MRIP?

While commercial fishers have a separate reporting system with specific requirements for commercial fishers to report fishing locations and catches to state and federal agencies, no such requirements exist for recreational fishers. The MRIP is NMFS's way of gathering information needed to sustainably manage recreational fisheries. The MRIP allows state and federal researchers and managers to understand things like:

- How many recreational fishing trips are being taken in a region and time period?
- How many of these trips target a certain species?
- What are angling catch rates and how are they changing?
- What are the sizes of fish that are harvested?

These things can be important for developing stock assessments that inform fisheries management decisions. The MRIP system includes two main surveys. One is an “access point” or “intercept” survey designed to understand aspects of fishing trips like length of trip, origin, target species, etc. The other, which this report does not use, is designed to understand what proportion of the human population in an area is engaging in these types of fishing trips. Information from the two surveys is combined to allow researchers to estimate some of the information described in the bullet points above, as well as important things like the total amount of a certain fish species that recreational fishers harvest or remove in a region and time.

What MRIP information does this report use?

It is important to understand that this report does not use the estimates from MRIP. This report only uses the actual data provided by the angler intercept survey. This means all the data here are exactly what anglers are telling surveyors when they are interviewed. This distinction is important for a couple reasons. The data used here are simply descriptive. We do not show “error” or “uncertainty” around them, because we are reporting the metrics from the database, and not extrapolating the data by any factors or subjecting them to statistical estimation processes. What this means, is that the data here will be correct as long as anglers are correctly reporting to surveyors what they did when they went fishing.

Additional information about MRIP

A lot of additional information is available about the NMFS MRIP data and how these data are used. We have described the parts of this information that are important to know to understand and best use the data provided in this report. Additional information directly through NOAA Fisheries at <https://www.fisheries.noaa.gov/topic/recreational-fishing-data>, as well as through the Marine Resource Education Program, MREP (different from MRIP), for which more information is available at: <https://www.gmri.org/our-work/fisheries-convening/mrep-southeast>. Finally, many Florida Sea Grant agents and county faculty, FWC personnel, and University of Florida researchers know about MRIP and may be able to answer additional questions.

Fishing Trip Origins: Where do your anglers come from?

Background on data used

Every recreational fishing trip made has an origin and a destination. In the MRIP data system, the origin is described as the angler's residence, and the destination is defined as where the angler was intercepted (e.g., boat ramp, fishing pier, etc.). For this report, the residence is considered to be the population centroid of the angler's county-of-residence. The population centroid is the spatial location in a county that "balances" the county's population. This means the centroid isn't the geographical center of the county, but it is the most likely "average" location for a person to come from, given we know they live in a certain county. The fishing site destinations that are surveyed include those in the MRIP Access Point Angler Intercept Survey (APAIS). What is important is that these destination sites are selected as part of a statistically designed survey. Further information about APAIS and the specific destinations is available at:

<https://www.fisheries.noaa.gov/recreational-fishing-data/public-access-fishing-site-register>

Fishing Trip Origins: Background on methods used

For the recreational fishing trip origin information, we use data available in the MRIP "trips" databases that describe the results of the MRIP APAIS survey—this is the information that anglers tell surveyors when they are interviewed about their trips. We designed queries that let us look at the anglers that were interviewed in specifically Broward County—i.e. the trips where anglers' fishing destination was in marine waters adjacent to Broward County, regardless of where the origin was. Once we have isolated the trips occurring in Broward County, we can analyze where most of these trips came from. Specifically, we can look at things like:

- The proportion of trips sampled in Broward County that come from out-of-state origins.
- The proportion of trips sampled in Broward County with in-state origins.
- Both the above, but for trips in a multi-county region that includes Broward County.

One thing that is important to note is that we report the proportion of the sampled trips. This is not the same as reporting the total number of trips. Enumerating the total number of trips would require estimation tools that are not described here. However, because of the statistical design that the MRIP APAIS survey is implemented, the proportions we use (of sampled trips) should correspond to the total numbers of trips. What this means is that the information in this report can be very useful for things like understanding where people, on average, are coming from when they fish Broward County. Additional information on angler trip analyses is provided in (Camp et al. 2018).

We provide two types of information about angler origins:

- Tables describing where anglers come from.
- Figures of maps graphically illustrating anglers travel.

Fishing Trip Origins Results: Tables

We provide two tables summarizing where anglers come from when they fish various parts of Florida and specifically the Southeast region and Broward County.

Table 1 compares the states that out-of-state anglers come from when they fish either anywhere in Florida, the Southeast region, or specifically Broward County.

Table 2 shows the county-origins of trips made by Florida residents. It compares the proportion of sampled trips coming from counties by anglers (*i*) living outside of the Southeast region, (*ii*) living outside of Broward County, and (*iii*) living anywhere in Florida, including Broward County.

We anticipate these tables may be useful in several ways, including:

- Understanding where anglers fishing in Broward County come from, which may inform placement of fishing and tourism advertisements.
- Understanding how angler origins may differ between Broward County and surrounding areas. This can potentially be used to further fine tune efficient advertisement placement by identifying locations where Broward County may compete more or less with nearby counties for angling visitors.
- Understanding what proportion of anglers fishing Broward County are local vs. visitors, which may be useful for deciding where to have meetings about Broward County fishing.

Table 1

Out-of-state angler origins comparison

| Orig.(FL) | Prop. | Orig.(Southeast) | Prop. | Orig.(Broward) | Prop. |
|---------------|-------|------------------|-------|----------------|-------|
| Georgia | 0.157 | Not Available | 0.298 | Not Available | 0.229 |
| Alabama | 0.075 | New York | 0.079 | New York | 0.085 |
| Not Available | 0.074 | Texas | 0.055 | Pennsylvania | 0.055 |
| Tennessee | 0.053 | Illinois | 0.054 | Illinois | 0.053 |
| Texas | 0.053 | Georgia | 0.040 | Ohio | 0.050 |
| Illinois | 0.046 | New Jersey | 0.037 | New Jersey | 0.049 |
| Ohio | 0.044 | Pennsylvania | 0.037 | Texas | 0.048 |
| New York | 0.043 | Michigan | 0.032 | Georgia | 0.041 |
| Michigan | 0.042 | North Carolina | 0.032 | Michigan | 0.036 |
| Pennsylvania | 0.032 | Ohio | 0.032 | Tennessee | 0.032 |

Table 1. State origins of anglers fishing Florida, the Southeast region, and Broward County, for 2009-2019.

This table compares which states out-of-state anglers come from when they fish either Florida as a whole, the Southeast region (here defined as including Broward, Miami-Dade, and Palm Beach counties), or Broward County.

- Columns 1 & 2 show the state origins of non-Florida residents when they fish in Florida.
- Columns 3 & 4 show the state origins of non-Florida residents when they fish the Southeast region.
- Columns 5 & 6 show the state origins of non-Florida residents when they fish Broward County.

This comparison allows understanding where (i) out of state anglers fishing Broward County come from, and (ii) how that compares to the local region and broader state of Florida. This may be helpful for understanding if Broward County is attracting anglers from specific origins differently than the surrounding region of the Southeast, or Florida as a whole.

The “Not Available” is returned either when anglers refuse to give state of origin, or do not reside in the US-i.e. international visitors.

Table 2

In-state angler origin comparison

| Out-of-region Orig. | Prop. | Out-of-county Orig. | Prop. | Any Orig. | Prop. |
|---------------------|-------|---------------------|-------|--------------|-------|
| Palm Beach | 0.460 | Miami-Dade | 0.425 | Broward | 0.839 |
| Orange | 0.071 | Palm Beach | 0.336 | Miami-Dade | 0.068 |
| Hillsborough | 0.053 | Orange | 0.042 | Palm Beach | 0.054 |
| Lee | 0.050 | Lee | 0.023 | Orange | 0.007 |
| Collier | 0.027 | Hillsborough | 0.019 | Lee | 0.004 |
| Volusia | 0.027 | Lake | 0.015 | Hillsborough | 0.003 |
| Duval | 0.026 | Volusia | 0.014 | Brevard | 0.002 |
| Brevard | 0.020 | Brevard | 0.013 | Lake | 0.002 |
| Lake | 0.020 | Collier | 0.008 | Volusia | 0.002 |
| Seminole | 0.017 | Duval | 0.008 | Alachua | 0.001 |

Table 2. County origins of Florida anglers fishing the Southeast region and Broward county, for 2009-2019.

This table compares which counties Florida resident anglers come from when they fish the Southeast region (Broward, Miami-Dade, and Palm Beach counties) or specifically Broward County.

- Columns 1 & 2 show origins of Florida residents fishing the Southeast region who live outside of the Southeast region.
- Columns 3 & 4 show origins of Florida residents fishing Broward County but living outside of Broward County.
- Columns 5 & 6 show origins of Florida residents fishing Broward County, regardless of where in Florida they live.

This comparison allows understanding (*i*) where Florida resident anglers fishing the Southeast region and Broward County come from, and (*ii*) the Florida counties from which the greatest proportion of out-of-county trips come from.

Fishing Trip Origin Results: Maps

We provide several maps to graphically illustrate where sampled anglers come from when they fish the Southeast region and Broward County. The maps show the “direct line” paths between the population centroids of anglers’ county of residence and the location where they were sampled by the MRIP APAIS survey-i.e. their fishing destinations. For all maps, thicker and warmer colored lines indicate more trips from a given county to a given destination, and thinner and cooler colors suggests fewer trips. Here, different maps are created for different species, including the top five species targeted in the Southeast region.

Figure 1 maps trips to Broward County regardless of species targeted.

Figure 2 maps trips to the Southeast region when anglers targeted Dolphin.

Figure 3 maps trips to the Southeast region when anglers targeted Snapper family.

Figure 4 maps trips to the Southeast region when anglers targeted King mackerel.

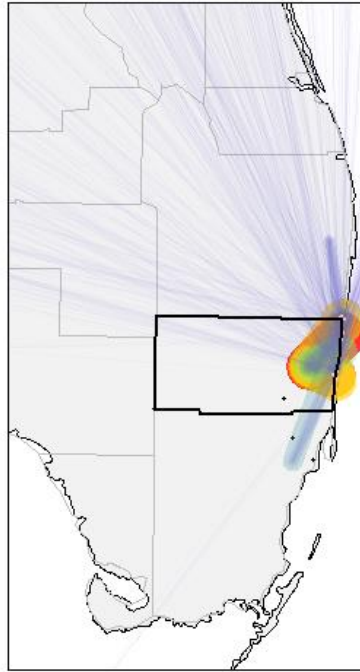
Figure 5 maps trips to the Southeast region when anglers targeted Sailfish.

Figure 6 maps trips to the Southeast region when anglers targeted Common snook.

The primary purpose of these figures is to serve as a visual aid to augment the use of the previous tables.

Figure 1.

Trips to Broward County, all species

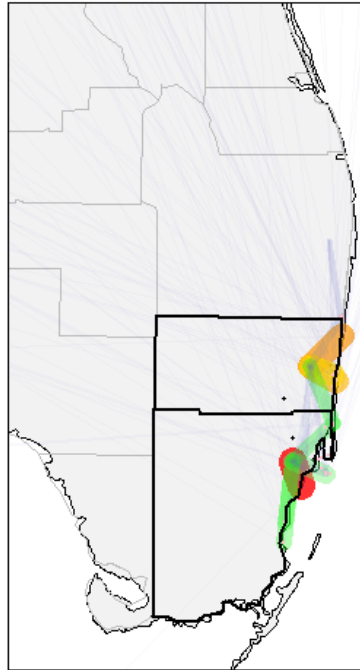


Source: NMFS MRIP Trips data

Figure 1. Map showing where trips fishing Broward County originated in, regardless of species targeted, for 2009-2019. Thicker and warmer colored lines show relatively more trips taken, and thinner, cooler colored lines show that relatively fewer trips were taken.

Figure 2.

Trips to Southeast, Dolphin

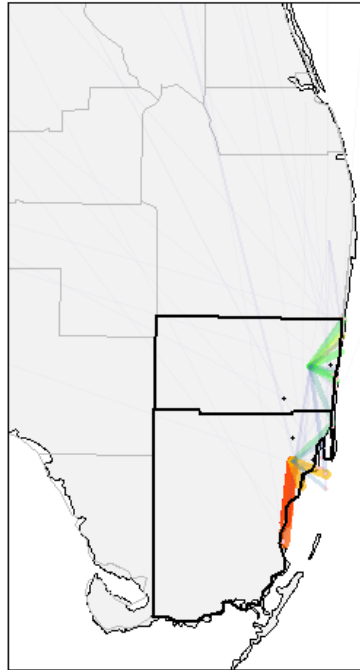


Source: NMFS MRIP Trips data

Figure 2. Map showing where trips fishing the Southeast region originated in, when targeted Dolphin, for 2009-2019. Thicker and warmer colored lines show relatively more trips taken, and thinner, cooler colored lines show that relatively fewer trips were taken.

Figure 3.

Trips to Southeast, Snapper family

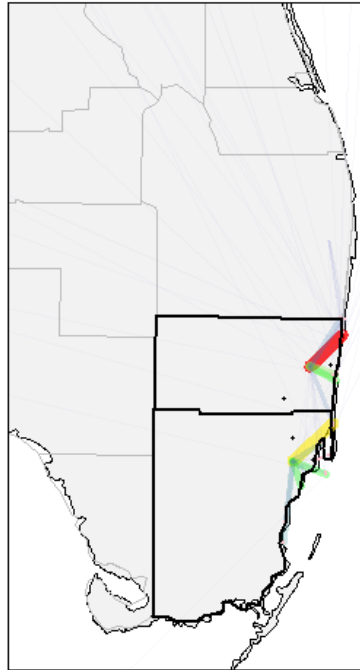


Source: NMFS MRIP Trips data

Figure 3. Map showing where trips fishing the Southeast region originated in, when targeted Snapper family, for 2009-2019. Thicker and warmer colored lines show relatively more trips taken, and thinner, cooler colored lines show that relatively fewer trips were taken.

Figure 4.

Trips to Southeast, King mackerel

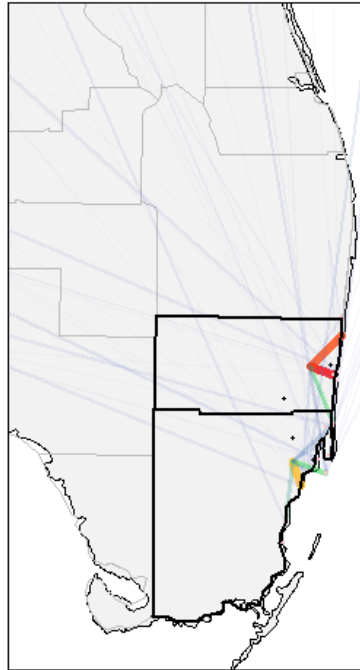


Source: NMFS MRIP Trips data

Figure 4. Map showing where trips fishing the Southeast region originated in, when targeted King mackerel, for 2009-2019. Thicker and warmer colored lines show relatively more trips taken, and thinner, cooler colored lines show that relatively fewer trips were taken.

Figure 5.

Trips to Southeast, Sailfish

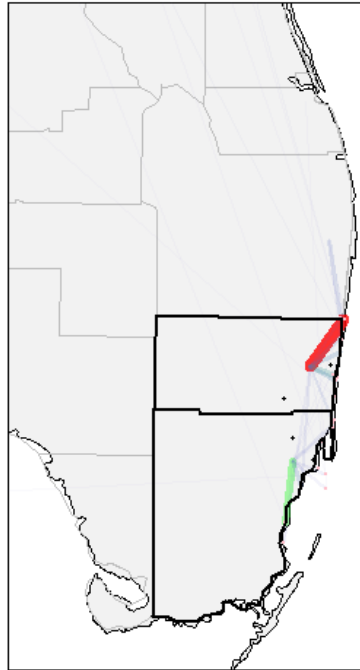


Source: NMFS MRIP Trips data

Figure 5. Map showing where trips fishing the Southeast region originated in, when targeted Sailfish, for 2009-2019. Thicker and warmer colored lines show relatively more trips taken, and thinner, cooler colored lines show that relatively fewer trips were taken.

Figure 6.

Trips to Southeast, Common snook



Source: NMFS MRIP Trips data

Figure 6. Map showing where trips fishing the Southeast region originated in, when targeted Common snook, for 2009-2019. Thicker and warmer colored lines show relatively more trips taken, and thinner, cooler colored lines show that relatively fewer trips were taken.

Species targeted: What do your anglers fish for?

Background on data used

The MRIP APIAS includes questions about the species that interviewed anglers were targeting on their recently completed fishing trips. Specifically, anglers are asked what their “primary” and “secondary” targeted species were. Not all anglers provide a specific species. Statewide, nearly 50% of trips do not have a listed target, though certain regions have much greater proportions trips targeting specific fish. The species targeted information is used by MRIP to estimate fishing effort, but can be used here to understand what species are most commonly fished for. Further information about APAIS and the specific destinations is available at: <https://www.fisheries.noaa.gov/recreational-fishing-data/public-access-fishing-site-register>.

Species targeted: Background on methods used

To understand what fish species anglers most commonly fished for, we use data available in the MRIP “trips” databases that describe the results of the MRIP APAIS survey. The “trips” database contains the information that anglers tell surveyors when they are interviewed about their recreational fishing trips. We designed a series of queries to calculate the proportions of trips targeting specific fish species. Queries represented different scenarios regarding where anglers were intercepted (their destinations) and where they listed their home residence (their origin). This information was summarized by pooling trips over time—i.e. looking at the last 10 years (2009-2019) together. To assess potential changes in the fish that anglers target, we also analyzed time series for some of the most commonly targeted species. Time series were constructed by assessing the proportions of trips intercepted in the Southeast region that targeted a specific species for each of the last 10 years.

Species targeted: Information provided

Two types of information products were developed:

- Tables describing the proportions of trips targeting different fish species at various combinations of fishing locations and residences.
- Figures showing the time series of proportion of trips taken in the Southeast region targeting the most popular fish species.

One thing that is important to note is that we report the proportion of the sampled trips targeting a certain species. This is not the same as reporting the total number of trips. Enumerating the total number of trips would require estimation tools that are not described here. However, because of the statistical design used to implement the MRIP APAIS survey, the proportions we use (of sampled trips) should correspond to the total numbers of trips. What this means is that the information in this report can be very useful for things like understanding where people, on average, are coming from when they fish in Broward County.

Species Targeted Results: Tables

Tables describing the proportions of trips targeting different fish species at various combinations of fishing locations and residences, including:

- Trips in all of Florida, regardless of origin.
- Trips in Florida's 6 coast, regardless of origin.
- Trips in the Southeast region, regardless of origin.
- Trips taken in Broward County, regardless of origin.
- Trips taken in Broward County by Broward County residents.
- Trips taken in Broward County by non-residents of Broward County.
- Trips taken in Broward County by out-of-state anglers.

These results are summarized in two separate tables that promote comparison of Broward County to surrounding areas. All results represent data pooled over the last 10 years (2009-2019).

We anticipate these tables may be useful in several ways, including:

- Understanding what species anglers are targeting when they fish in Broward County, which may help inform local government interest in state and regional fisheries management issues.
- Understanding what species visiting (non Broward-County residents) anglers target, which may inform the media outlets and visuals (e.g., fish photos) of future advertisements).

*Table 3**Proportion of species targeted, comparing county to state*

| FL trips | Prop. | FL 6 trips | Prop. | Southeast trips | Prop. | Broward trips | Prop. |
|------------------|-------|------------------------|-------|--------------------|-------|------------------|-------|
| No Target | 0.491 | No Target | 0.511 | No Target | 0.626 | No Target | 0.626 |
| Red drum | 0.098 | Red drum | 0.097 | Dolphin | 0.133 | Dolphin | 0.149 |
| Spotted seatrout | 0.076 | Dolphin | 0.080 | Snapper family | 0.034 | King mackerel | 0.042 |
| Dolphin | 0.035 | Spotted seatrout | 0.034 | King mackerel | 0.031 | Snapper family | 0.032 |
| Common snook | 0.031 | Common snook | 0.031 | Sailfish | 0.024 | Common snook | 0.021 |
| King mackerel | 0.026 | King mackerel | 0.029 | Common snook | 0.014 | Sailfish | 0.018 |
| Spanish mackerel | 0.024 | Snapper family | 0.024 | Bonefish | 0.013 | Spanish mackerel | 0.016 |
| Red snapper | 0.021 | Sheepshead | 0.018 | Yellowtail snapper | 0.013 | Wahoo | 0.013 |
| Sheepshead | 0.018 | Lefteye flounder genus | 0.016 | Spanish mackerel | 0.010 | Florida pompano | 0.012 |
| Gag | 0.016 | Cobia | 0.014 | Atlantic tarpon | 0.009 | Mackerel family | 0.010 |

Table 3. Comparison of species targeted in Broward county to other regions of Florida, for 2009-2019.

- Columns 1 & 2 show species targeted for trips made throughout Florida.
- Columns 3 & 4 show species targeted for trips made to the 6 coast of Florida.
- Columns 5 & 6 show species targeted for trips made in the Southeast region.
- Columns 7 & 8 show species targeted for trips made in Broward County.

*Table 4**Proportion of species targeted, comparing county to state*

| All Broward trips | Prop. | In county trips | Prop. | Out of county trips | Prop. | Out of state trips | Prop. |
|-------------------|-------|------------------|-------|---------------------|-------|----------------------|-------|
| No Target | 0.626 | No Target | 0.559 | No Target | 0.776 | No Target | 0.844 |
| Dolphin | 0.149 | Dolphin | 0.184 | Dolphin | 0.073 | Dolphin | 0.053 |
| King mackerel | 0.042 | King mackerel | 0.043 | King mackerel | 0.039 | King mackerel | 0.041 |
| Snapper family | 0.032 | Snapper family | 0.041 | Sailfish | 0.015 | Sailfish | 0.013 |
| Common snook | 0.021 | Common snook | 0.026 | Spanish mackerel | 0.013 | Wahoo | 0.007 |
| Sailfish | 0.018 | Sailfish | 0.019 | Snapper family | 0.012 | Florida pompano | 0.005 |
| Spanish mackerel | 0.016 | Spanish mackerel | 0.017 | Common snook | 0.010 | Snapper family | 0.005 |
| Wahoo | 0.013 | Florida pompano | 0.015 | Mackerel family | 0.008 | Spanish mackerel | 0.005 |
| Florida pompano | 0.012 | Wahoo | 0.015 | Wahoo | 0.008 | Greater amberjack | 0.003 |
| Mackerel family | 0.010 | Mackerel family | 0.010 | Yellowtail snapper | 0.006 | Requiem shark family | 0.003 |

Table 4. Proportions of species targeted by fishing trips made in Broward county by anglers from various origins, for 2009-2019.

- Columns 1 & 2 show the species targeted by all trips made in Broward County.
- Columns 3 & 4 show the species targeted in Broward County by Broward residents.
- Columns 5 & 6 show the species targeted in Broward County by Florida residents not living in Broward County.
- Columns 7 & 8 shows the species targeted in Broward County by non-residents of Florida.

Species Targeted Results: Time series figures

We provide time series of the proportion of intercepted trips that targeted each of the top nine species fished for in the Southeast region. Data are available for each year from 2009-2019, and represent the raw proportions of surveyed trips, which means that no uncertainty estimates (e.g. “error” bars) are relevant to these data.

The multi-panel figure below should primarily be useful for understanding how the species of fish anglers target when they fish has changed in recent years. These changes may be related to changes in angler’s preferences, but can have other causes as well, such as:

- Changes in costs of fishing (e.g., fuel), since some species require larger boats or longer travel times to target.
- Changes in fishing regulations for specific species.
- Changes in knowledge of how to successfully target specific species.
- Changes in fish populations, which can be the result of changing fishing, fisheries management, or habitat, as well as perturbations like red tide or cold kills.

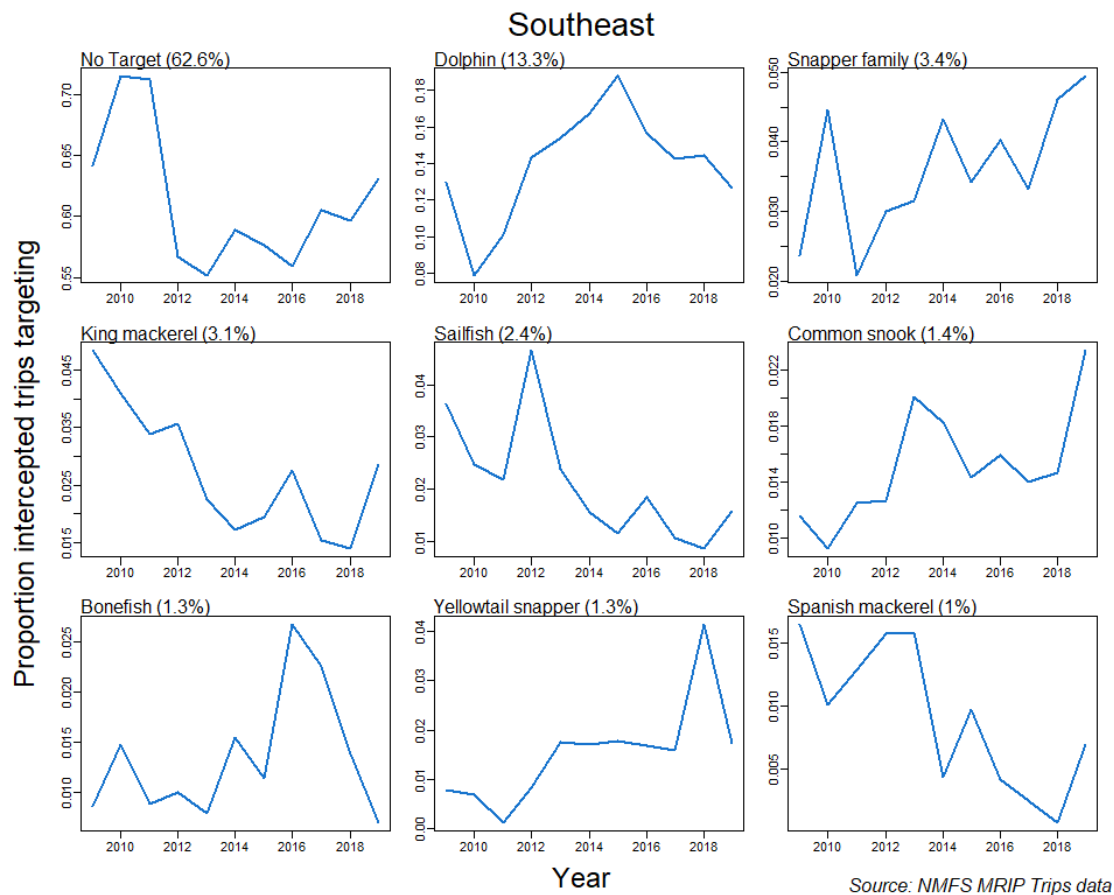


Figure 6. Time series of the proportion of intercepted trips targeting each of the top 9 fish species targets in the Southeast region, for 2009-2019.

Each panel describes the time series for one of the top-targeted fish species (including no species targeted, “No Target”). Proportion of total trips targeting each species over the entire span of years (2009-2019) shown is provided in parentheses following each species’ name.

References

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