

# **Angler Travel and Targeting Report 2021: Volusia County**

A data report for the Volusia County Government and Tourist Development Council  
prepared by:

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## 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.

**East Central FL region:** refers to the areas of and marine waters adjacent to Brevard, Indian River, and St. Lucie 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 Volusia County Government and Tourist Development Council. **Specifically this information can be used to inform advertisements of fishing-related tourism in Volusia County.**

### *What this report can be used for*

This report is designed to provide information about marine recreational fishing dynamics in Volusia 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 Volusia 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 Volusia 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 Volusia 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 Volusia County Government and Tourist Development Council, access and use data that can help them better serve their constituents and sustain or improve the economic effects of marine recreational fishing in Volusia 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 Volusia County—i.e. the trips where anglers' fishing destination was in marine waters adjacent to Volusia County, regardless of where the origin was. Once we have isolated the trips occurring in Volusia County, we can analyze where most of these trips came from. Specifically, we can look at things like:

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

**Table 1** compares the states that out-of-state anglers come from when they fish either anywhere in Florida, the East Central FL region, or specifically Volusia 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 East Central FL region, (*ii*) living outside of Volusia County, and (*iii*) living anywhere in Florida, including Volusia County.

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

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

*Table 1*

*Out-of-state angler origins comparison*

Orig.(FL)	Prop.	Orig.(East Central FL)	Prop.	Orig.(Volusia)	Prop.
Georgia	0.157	Not Available	0.089	Georgia	0.194
Alabama	0.075	Michigan	0.076	Ohio	0.073
Not Available	0.074	New York	0.058	Pennsylvania	0.058
Tennessee	0.053	Ohio	0.055	North Carolina	0.054
Texas	0.053	Georgia	0.053	Michigan	0.048
Illinois	0.046	Pennsylvania	0.050	Virginia	0.045
Ohio	0.044	Illinois	0.047	Tennessee	0.043
New York	0.043	North Carolina	0.042	Not Available	0.043
Michigan	0.042	New Jersey	0.037	Indiana	0.042
Pennsylvania	0.032	Texas	0.035	Kentucky	0.042

**Table 1. State origins of anglers fishing Florida, the East Central FL region, and Volusia County, for 2009-2019.**

This table compares which states out-of-state anglers come from when they fish either Florida as a whole, the East Central FL region (here defined as including Brevard, Indian River, and St. Lucie counties), or Volusia 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 East Central FL region.
- Columns 5 & 6 show the state origins of non-Florida residents when they fish Volusia County.

This comparison allows understanding where (i) out of state anglers fishing Volusia County come from, and (ii) how that compares to the local region and broader state of Florida. This may be helpful for understanding if Volusia County is attracting anglers from specific origins differently than the surrounding region of the East Central FL, 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.
Orange	0.424	Seminole	0.326	Volusia	0.675
Seminole	0.201	Orange	0.250	Seminole	0.106
Osceola	0.102	Lake	0.108	Orange	0.081
Volusia	0.064	Flagler	0.066	Lake	0.035
Lake	0.042	Marion	0.038	Flagler	0.021
Polk	0.033	Brevard	0.035	Marion	0.012
St Lucie	0.019	Osceola	0.024	Brevard	0.011
Broward	0.013	Polk	0.022	Osceola	0.008
Palm Beach	0.013	Duval	0.020	Polk	0.007
Hillsborough	0.012	Hillsborough	0.014	Duval	0.006

**Table 2. County origins of Florida anglers fishing the East Central FL region and Volusia county, for 2009-2019.**

This table compares which counties Florida resident anglers come from when they fish the East Central FL region (Brevard, Indian River, and St. Lucie counties) or specifically Volusia County.

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

This comparison allows understanding (*i*) where Florida resident anglers fishing the East Central FL region and Volusia 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 East Central FL region and Volusia 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 East Central FL region.

**Figure 1** maps trips to Volusia County regardless of species targeted.

**Figure 2** maps trips to the East Central FL region when anglers targeted Red drum.

**Figure 3** maps trips to the East Central FL region when anglers targeted Spotted seatrout.

**Figure 4** maps trips to the East Central FL region when anglers targeted Dolphin.

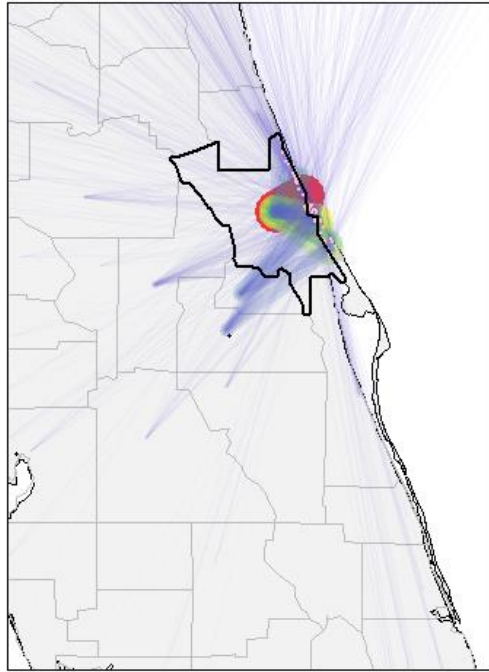
**Figure 5** maps trips to the East Central FL region when anglers targeted Common snook.

**Figure 6** maps trips to the East Central FL region when anglers targeted Lefteye flounder genus.

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 Volusia County, all species

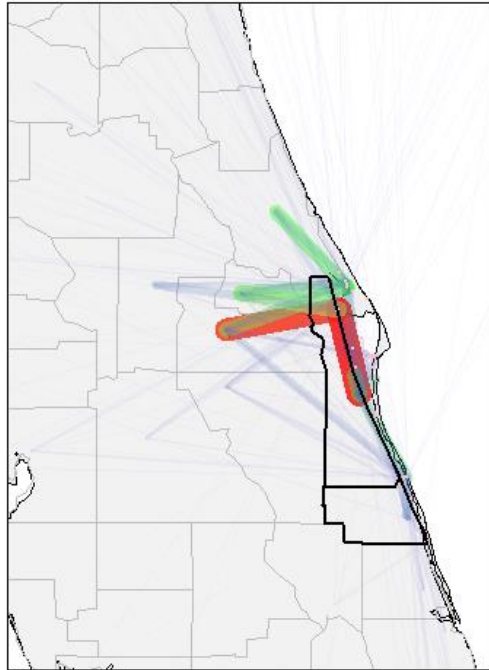


Source: NMFS MRIP Trips data

**Figure 1. Map showing where trips fishing Volusia 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 East Central FL, Red drum

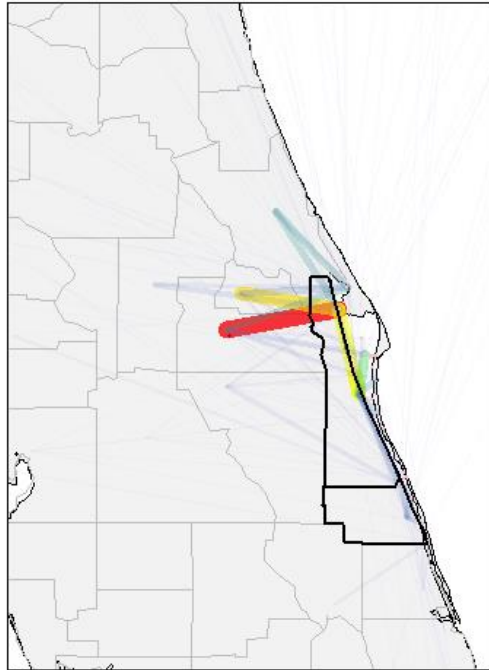


Source: NMFS MRIP Trips data

**Figure 2. Map showing where trips fishing the East Central FL region originated in, when targeted Red drum, 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 East Central FL, Spotted seatrout

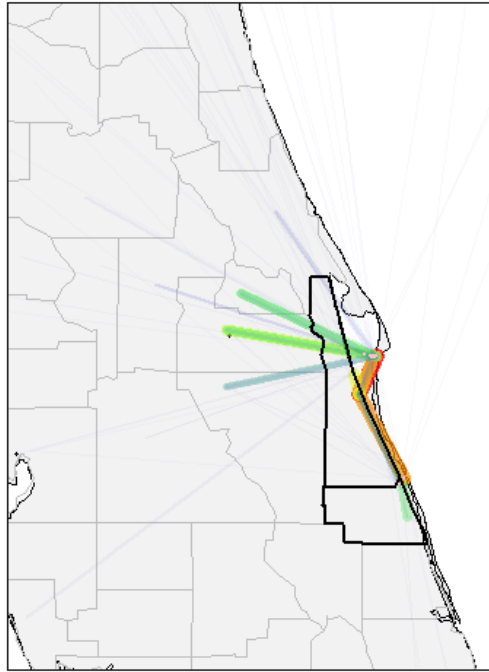


Source: NMFS MRIP Trips data

**Figure 3. Map showing where trips fishing the East Central FL region originated in, when targeted Spotted seatrout, 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 East Central FL, Dolphin

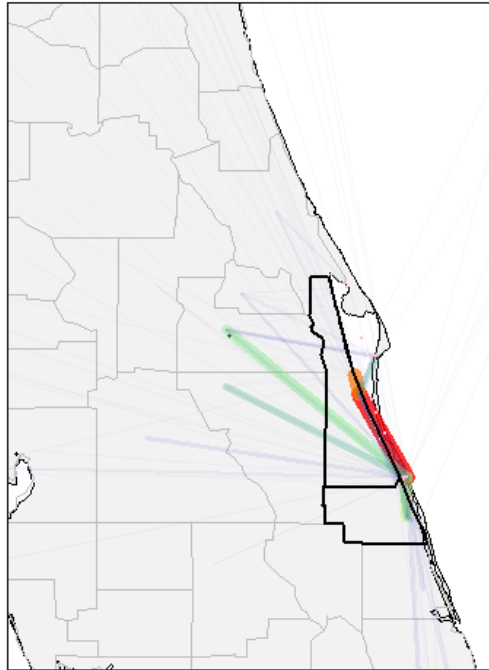


Source: NMFS MRIP Trips data

**Figure 4. Map showing where trips fishing the East Central FL 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 5.

### Trips to East Central FL, Common snook

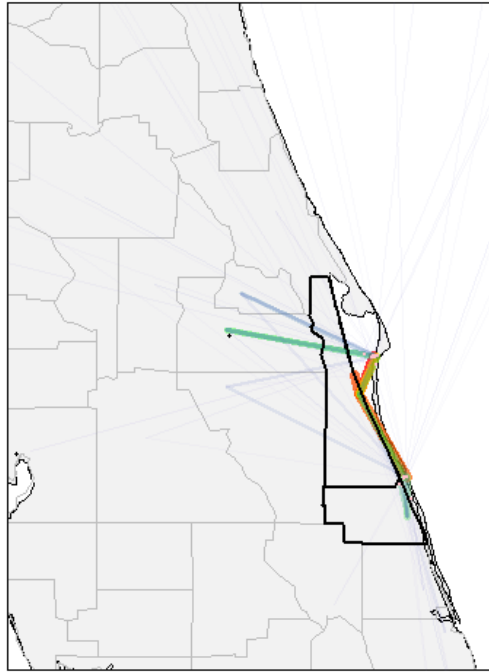


Source: NMFS MRIP Trips data

**Figure 5. Map showing where trips fishing the East Central FL 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.**

Figure 6.

### Trips to East Central FL, Lefteye flounder genus



Source: NMFS MRIP Trips data

**Figure 6. Map showing where trips fishing the East Central FL region originated in, when targeted Lefteye flounder genus, 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 East Central FL 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 East Central FL 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 Volusia 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 East Central FL region, regardless of origin.
- Trips taken in Volusia County, regardless of origin.
- Trips taken in Volusia County by Volusia County residents.
- Trips taken in Volusia County by non-residents of Volusia County.
- Trips taken in Volusia County by out-of-state anglers.

These results are summarized in two separate tables that promote comparison of Volusia 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 Volusia County, which may help inform local government interest in state and regional fisheries management issues.
- Understanding what species visiting (non Volusia-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.	East Central FL trips	Prop.	Volusia trips	Prop.
No Target	0.491	No Target	0.511	No Target	0.500	No Target	0.512
Red drum	0.098	Red drum	0.097	Red drum	0.135	Red drum	0.212
Spotted seatrout	0.076	Dolphin	0.080	Spotted seatrout	0.064	Spotted seatrout	0.045
Dolphin	0.035	Spotted seatrout	0.034	Dolphin	0.044	Sheepshead	0.035
Common snook	0.031	Common snook	0.031	Common snook	0.038	Black drum	0.020
King mackerel	0.026	King mackerel	0.029	Lefteye flounder genus	0.024	Gray snapper	0.020
Spanish mackerel	0.024	Snapper family	0.024	Cobia	0.023	Kingfish genus	0.019
Red snapper	0.021	Sheepshead	0.018	King mackerel	0.022	Lefteye flounder genus	0.016
Sheepshead	0.018	Lefteye flounder genus	0.016	Black drum	0.015	Cobia	0.015
Gag	0.016	Cobia	0.014	Gray snapper	0.015	Red snapper	0.014

**Table 3. Comparison of species targeted in Volusia 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 East Central FL region.
- Columns 7 & 8 show species targeted for trips made in Volusia County.

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

All Volusia trips	Prop.	In county trips	Prop.	Out of county trips	Prop.	Out of state trips	Prop.
No Target	0.512	No Target	0.502	No Target	0.525	No Target	0.630
Red drum	0.212	Red drum	0.219	Red drum	0.202	Red drum	0.132
Spotted seatrout	0.045	Sheepshead	0.041	Spotted seatrout	0.051	Spotted seatrout	0.039
Sheepshead	0.035	Spotted seatrout	0.041	Sheepshead	0.028	Kingfish genus	0.032
Black drum	0.020	Black drum	0.022	Gray snapper	0.021	Sheepshead	0.020
Gray snapper	0.020	Gray snapper	0.020	Kingfish genus	0.019	King mackerel	0.019
Kingfish genus	0.019	Kingfish genus	0.020	Black drum	0.018	Red snapper	0.016
Lefteye flounder genus	0.016	Lefteye flounder genus	0.019	Dolphin	0.018	Greater amberjack	0.014
Cobia	0.015	Cobia	0.018	King mackerel	0.017	Dolphin	0.012
Red snapper	0.014	Red snapper	0.015	Lefteye flounder genus	0.013	Gray snapper	0.012

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

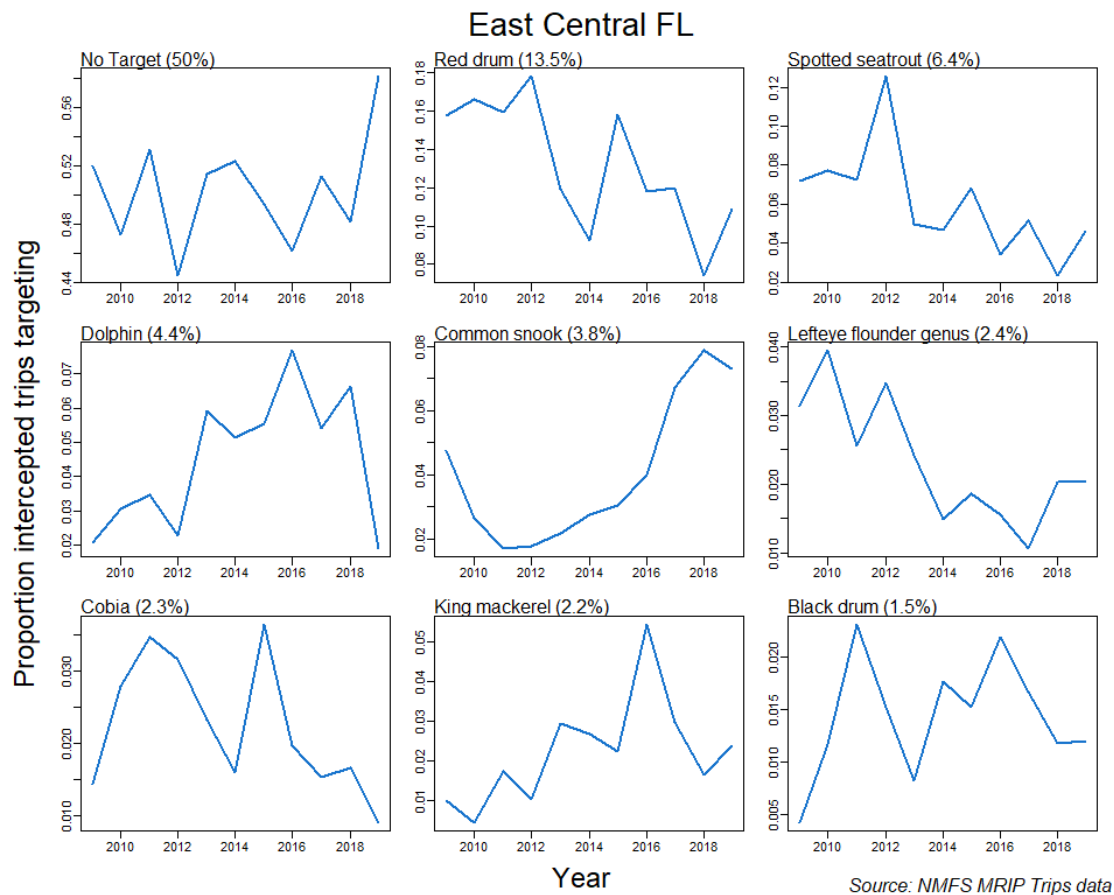
- Columns 1 & 2 show the species targeted by all trips made in Volusia County.
- Columns 3 & 4 show the species targeted in Volusia County by Volusia residents.
- Columns 5 & 6 show the species targeted in Volusia County by Florida residents not living in Volusia County.
- Columns 7 & 8 shows the species targeted in Volusia 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 East Central FL 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 East Central FL 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.

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