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Understanding Metrics for Communicating the Economic Importance of Florida's Fisheries Part I: An Overview[1]

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Abstract

Florida's fisheries are vital to the state's economy, but often people need to know just *how* economically important they are. One problem is that "economic importance" means different things depending on what economic approaches are used. Understanding these differences is important for discussing the economic importance of fisheries and how they might be affected by management. This publication is the first in a series of three that explains the different types of economic metrics and how they are often used in a fisheries context. The series identifies the terms and analyses most often used to convey economic importance and describes how these terms differ and are related to each other. This first publication gives a broad overview of the approaches used in two sub-disciplines of economics—regional economics and natural resource economics—focusing on their different methods and uses. This information should help readers, especially management agencies, cooperative Extension agents, local government, and the interested public, better understand reported economic metrics.

Introduction

Fish and fisheries provide livelihoods for individuals in multiple industries. Some common examples include commercial fishing and for-hire fishing (guides, charters, and party boats). Fisheries and fish populations (including shellfish) also provide enjoyment and value to people who use these resources—and to many who don't. This could include anglers who enjoy fishing, coastal residents who benefit from healthy coastal and freshwater ecosystems, or even non-local people who are simply glad these ecosystems exist. While fish and fisheries are recognized as being important socioeconomically to Florida, measuring and describing the economic importance of these resources can be difficult since there are several different and specifically defined economic terms used to describe economic importance. These terms can lead to confusion in quantifying the economic value of a fishery, or the economic effects of something like an environmental disturbance or a proposed management action (Propst and Gavrilis 1987). The confusion, in turn, makes it difficult to make informed and transparent management decisions (Edwards 1991).

Many different economic metrics have arisen from different sub-disciplines (or fields) of economics. These subdisciplines study economics from different perspectives

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aimed at answering very different questions. Thus, they each have different types of analyses in their methodological toolboxes, and they use different terms or metrics to describe economic importance, such as "value," "impact," "contribution," or "benefit." Sometimes, the different terms are (mis)used interchangeably, leading to confusion and misinterpretation, especially among non-experts. Adding to the confusion is the fact that these metrics are typically calculated in the same units (dollars), which makes it seem like they can be directly compared or worse, summed together. But in the same way that receiving a $50,000 loan is different than receiving a $50,000 payment, different economic metrics using the same dollar unit have their own unique meaning, method of calculation, and use.

The overall goal of this series of publications is to help readers understand the different economic metrics they are likely to encounter when working with fish, fisheries, and related coastal resources. There are three publications within the series.

1. Part I provides an overview of the different uses and approaches of regional economic methods and natural resource economic methods, with an emphasis on when each should be used.

2. Part II explains in greater detail regional economic approaches. These focus on spending in specific places, times, and sectors, like those connected to fisheries.

3. Part III explains in greater detail natural resource economic approaches. These focus on human well-being related to resources like fisheries.

4. Specifically, this first publication will organize, define, and describe commonly used metrics and describe how these metrics can be used in decision-making. We anticipate this information will help management agencies, Extension and outreach personnel, local governance, the fishing industry, and the interested public not only understand terms that are commonly used, but also select the correct economic metrics to consider when researching the economic importance of coastal resources in Florida.

The Two Main Groups of Economic Metrics

Almost all the terms describing the economic importance of fisheries, like expenditures, revenues, contributions, impacts, outputs, and multiple types of value, can be categorized into two groups—**measures of the value of market activity** and **measures of economic value**. Measures of the value of market activity (hereafter, market activity measures) refer to how money is spent. They use metrics like expenditures, revenue, output, and jobs. Measures of economic value quantify the benefits humans derive from things (including but not limited to things they buy or sell) and use metrics like consumer surplus, producer surplus, bequest value, and value of ecosystem services. For example, imagine people want to describe the economic importance of the recreational flounder fishery to northeast Florida. Market activity measures would describe only the spending that is directly associated with that fishery, whereas economic value measures would focus on the benefits people get from the fishery (including those related to spending).

Market activity and economic value are fundamentally different things, even though they appear similar (Figure 1). One of the most important differences is that economic value metrics are specifically referring to benefits that people receive. All else being equal, more value is better for society. Measures of market activity are referring to spending that happens, which might be considered good or bad for society, depending on the situation or perspective. For example, a large oil spill might dramatically increase some types of spending (associated with, for example, clean-up or restoration), but is not usually considered a good thing for society. Or an increase in spending on recreational fishing might be good for a specific region but might not necessarily represent a benefit to broader society. For example, a management change resulting in more fishing effort and harvest might bring increased market activity to a local coastal community, but if the harvest results in ecosystem degradation, it could have a negative effect on the broader region's consumer surplus. Another critical difference between market activity and economic value is that measures of economic value can generally be summed across spatial scales (e.g., the value generated from fisheries in each county would equal the value at the state level), while most metrics communicating market activity "exist" at the regional scale they are measured. This means one cannot always sum up the market activity across counties to arrive at state-level totals. Finally, one of the more confusing aspects of market activity and value is that both can be related to spending. For example, if commercially caught grouper is sold, this transaction would result in market activity, but it would also probably generate benefits to sellers and buyers respectively. This means that while economic value can exist or change without a sale transaction, it also can be generated by these transactions.

In summary, both economic activity and economic value describe things that decision-makers care about, and both are important to consider for fisheries management decisions. Each also has a suite of terms for their specific concepts, analyses, and metrics. It is necessary to understand these terms and how they are specifically used to correctly interpret reported economic information and to appropriately describe economic effects in a way that informs management decision making. Figure 1 below provides an overview of market activity and economic value.

Overview of Market Activity

Measures of market activity describe spending. As Figure 1 shows, the terms most commonly associated with market activity will be *impact*, *contribution*, *revenue*, *sales*, and *output*. Often the words *direct*, *indirect*, *induced*, and *total* will also be used. These terms are all defined in greater detail in part two of this series, Understanding Metrics for Communicating the Economic Importance of Florida's Fisheries Part II: Quantifying Market Activity, Camp et al, forthcoming, but identifying them as belonging to the "market activity" category is a first and important step. The simplest explanation of how these terms are related is that they can be categorized intro three components: metrics, analyses, and levels. Any market activity study will select at least one option from each of these three components. Generally, the components will be one of the three in the list below.

- Activity metric (output, value-added, labor income, or employment). This component describes the type of economic effect that is of interest. Details are given in Part II of this series, but in short, the metric just describes the unit measured. It will either be jobs supported (employment) or one of several descriptions of dollars (e.g., output, labor income). The metrics most commonly used in fisheries are employment and output.
- Analysis type (impact or contribution). The analysis type depends on whether the study subject is a steady state or "the way things currently are" (contribution analysis) or a change or event (impact analysis).
- Activity level (direct, indirect, induced, or total). The activity level describes the scope of the economic activity. Details are given in Part II of this series, but in short, the activity level describes what types of additional rounds of spending are considered. *Direct* is the fewest, *induced* is the most, *indirect* is intermediate, and *total* is all of them combined.
- Again, a market activity study will include at least one option from each component listed above. For example, one could assess the direct contribution of output associated with the northeast Florida flounder recreational fishery. The word *contribution* means that this study would look at the steady-state fishery rather than at a recent change. The word *direct* means the study would report on the direct expenditures made associated with the fishery, not on any additional rounds of spending, or multiplier effects, that would be needed to support those direct expenditures (e.g., it would consider the money anglers spent buying bait at a tackle store but would not consider things like the fuel spent by commercial baitfish fishers to catch and deliver the bait to the tackle store or the tackle store's utility expenditures). Conversely, if someone wanted to understand, for example, how many total jobs were supported by tournament largemouth bass fishing on a certain lake, they would conduct an impact analysis reporting the total employment. This would be an impact study because tournaments are a specific event, and the word "total" indicates it would consider multiplier effects.

General description of how market activity is used to study fisheries

Market activity, describing spending associated with a sector, can help answer questions like "How many jobs does that fishery support?" or "How would a change in recreational fishing activity affect regional sales revenues or jobs?" These questions are assessed at a specific spatial scale—often county, multi-county region, or state. Their answers are relevant only for the scale at which they are assessed. However, the region of analysis can be adjusted to the scale at which management decisions are made—for example, county, region, state, or even a multi-state region. This means measures of market activity can provide information to agency and elected officials at multiple levels.

A challenge is that sometimes when decision-makers ask for economic information, they might not know that there is a difference between economic activity and economic value. Generally, decision-makers who want to describe the "importance" of a sector (like a specific fishery) or a thing happening in that fishery (like tournaments), will be most interested in the economic contribution or impact, and often will want the total output and total employment, which include multiplier effects. The "total" metrics will be the most all-encompassing and thus usually the largest, with output describing sales-associated dollars and employment obviously describing jobs supported.

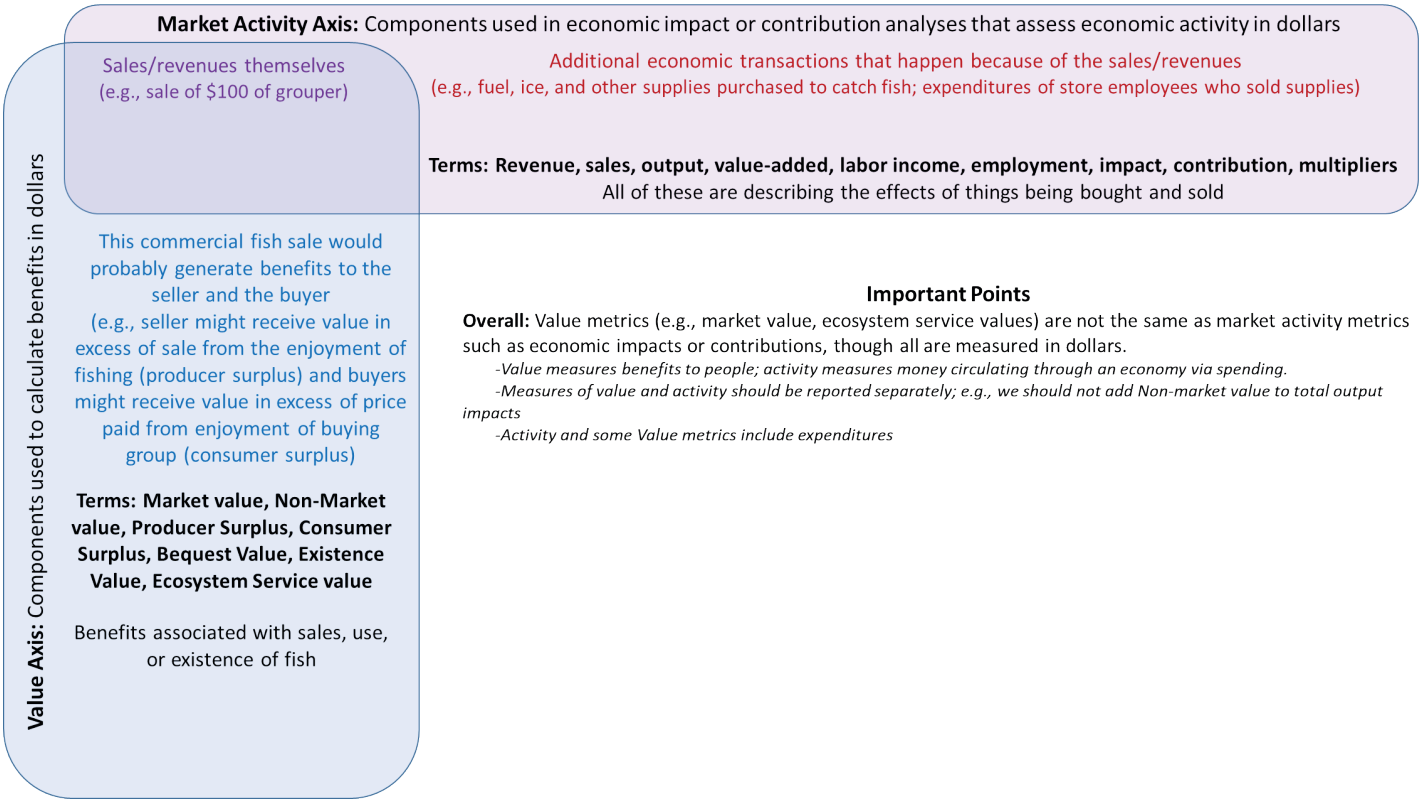

Figure 1. A simple economic metric framework. The market activity axis (horizontal, pink bubble) describes market activity, or spending, and the value axis (vertical, blue bubble) describes economic value, or benefits. The terms included for each are almost always specific to their axis—meaning that market activity axis terms would not describe value measures, and vice versa. The purple text illustrates how the two axes can overlap with spending; for example, a sale of $100 of commercially caught grouper would generate additional market activity through spending/purchases required for the sale to occur, but also would result in additional benefits to the seller and buyer (referred to as producer surplus and consumer surplus, respectively).
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Overview of Economic Value

General Description of Economic Value Metrics

Economic value is a measure of the benefits people receive from a good or service. The value axis is not as "linear" as the activity axis—meaning the different types of economic value do not "build on" each other as market activity does. Instead, the value axis is composed of some different "bins" or types of value that can be quantified or considered. The four bins included are market, non-market, existence/ bequest (sometimes called "non-use"), and ecosystem service values (Figure 1). Terms that are often used with value include *consumer surplus*, *producer surplus*, and *willingness to pay*. As with market activity, these value terms are all measured in dollars, but they are not all representing the same thing. They are briefly described here and then described in greater detail in Part III of this series.

- Market value refers to goods and services that are bought and sold.
- Non-market value refers to the benefits received from something that is not directly bought or sold, like a private, non-guided recreational fishing trip.
- Existence/ bequest (non-use) value refers to things that are important to and therefore valued by people, even if they don't use them.
- Ecosystem services are benefits provided to humans from an ecosystem. They are organized into provisioning, regulating, cultural, and supporting ecosystem service categories.

General Description of How Economic Value is Used to Study Fisheries

Economic value overall will be used whenever it is important to convey the benefit that fish or fisheries provide to society, as opposed to only considering how fisheries impact spending or market activity. The four different value metrics described above are typically associated with different types of fisheries. Market value is almost exclusively referring to commercial fisheries or for-hire recreational fishing trips. This is because commercially caught fish are bought and sold "on the market," as are guided/

chartered fishing trips. Market values here are commonly used to describe how much society values fish or fishing. Non-market value is most commonly used in recreational fisheries (exclusive of for-hire), since it corresponds to benefits fishers get that cannot simply be purchased directly. In fisheries, we often want to understand how a change in management affects recreational fisher satisfaction—and this is measured in terms of non-market value by looking at things like consumer surplus and utility. It should be noted that since recreational fisheries often involve people purchasing things, information on these purchases can be useful to estimating the non-market value fishing trips. Please see Part III of this series, *Understanding Metrics for Communicating the Economic Importance of Florida's Fisheries Part III: Measures of Economic Value* for more details.

Non-market and ecosystem service values are less commonly encountered in fisheries. Non-market values are rare because fisheries focus on fish that are in fact, "used" in some way. However, non-market value could be assigned to something like a rare darter, sunfish, or minnow species that is not actually fished for, but whose existence fishers (and the broader public) nevertheless value. Ecosystem service values are quantified in many different ways (see Wallace et al. 2023), and are certainly related to fisheries, though one generally does not calculate an ecosystem service value of a fishery per se. For example, commercial fisheries can be considered as part of the provisioning services that provide food, and so commercial fisheries contribute to the overall services provided by an ecosystem like the Gulf of Mexico. The same for recreational fishing, which is included within the cultural ecosystem services. One of the fisheries in Florida where ecosystem services are most important is the oyster fishery, which is both commercially and recreationally fished but also provides massive ecosystem services, filtering water, preventing erosion, and providing habitat for a vast array of other animals.

Summary

Most of fisheries economics can be broken down into studies of spending (market activity) and studies of benefits (economic value) that result from fish and fishing. The study of market activity includes different metrics (output, value-added, labor income, employment), different types of analyses (impact, contribution), and different levels of measurement (with or without the inclusion of multiplier effects). Any given economic study will focus on one or more combinations of these metrics, analyses, and levels, and there are specific rules about how results can or cannot be added, among themselves or across space. It is critical to remember that market activity information does not describe benefits to society, nor does it describe how much total money would have been spent or how many jobs would have existed if there were no fishery. The value axis is composed of different types of benefits that are more or less related to actual market exchanges. All require some additional assessment beyond the measure of any market sales to measure the full benefit to consumers (i.e., consumer surplus). Because of the complexity, it can be challenging to compare one value to another. This is especially true when comparing other values to ecosystem service values, because ecosystem service values sometimes include assessments of a value that no person or group of people ever indicated they would pay. Market activity and economic value have different metrics that should not be directly compared, but instead must be used alongside each other. Because fisheries have both market and economic value, it is beneficial to conduct economic analyses properly, ensuring that the analyses provide measures of both market activity and economic value. These measures can be useful for stakeholder groups, decision makers, and the broader public in understanding the big picture of the economic importance of these resources.

Glossary

Bequest value – The value an individual receives from protecting a natural environment for future generations.

Consumer surplus – The difference between the price consumers pay for a good or service and the amount that they are willing to pay for the good or service.

Direct activity – The component of market activity describing the amount actually spent on a good or service within a region; analogous to revenues.

Economic activity – Activities that involve the production, distribution, or consumption of goods or services.

Economic benefit – Any advantage or profit gained that can be quantified by the money it generates or saves.

Economic contribution – The total economic activity within an existing industry, event, or policy, and how money cycles through the region's economy.

Economic impact – The net changes in economic activity and flow of dollars resulting from a change within a given industry.

Economic value – The value an individual places on a good or service based on the benefit derived from the good or service.

Ecosystem service value – The value derived by humans from ecosystems, either directly or indirectly. The four basic types of ecosystem services defined by the UN-sponsored Millennium Ecosystem Assessment (MA) were: 1) provisioning services such as food or water, 2) regulating services such as flood and erosion mitigation, 3) cultural services such as spiritual, recreational, and cultural benefits, and 4) supporting services such as nutrient cycling (Millennium Ecosystem Assessment 2005).

Employment – Describes a metric used in IO analyses like impact and contribution; it is usually measured as full-time and part-time jobs.

Existence value – Value reflecting the benefit people receive from knowing that a particular environment or species exists.

Indirect activity – The first component of market activity beyond direct activity; the summed value of input goods and services that are required for the direct market activity and that are sourced from within a region across multiple rounds of spending.

Induced activity – The second component of market activity beyond direct activity; the spending by employees who work in these directly or indirectly supported industries, often including items such as groceries, housing, and clothing.

Market value – The benefits of a good or service that is sold exchanged in a market.

Non-market value – The value associated with a good or service that is not traded in a market.

Non-use value – The value people associate with a good or service that they will never use, often associated with ecosystems and their components.

Output – A metric used in IO analyses like impact and contribution; it describes the total value of production, equivalent to sales revenue.

Total activity – The sum of the direct market activity (expenditures/sales revenue), indirect activity, and induced activity.

Utility – A metric usually used in fisheries economics to describe the satisfaction fishers receive from fishing or aspects of fishing. Commonly used in describing economic value of recreational fisheries.

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