DISCUSSION

Overall, total U.S. expenditures in 2006 have increased 79% compared to the inflation adjusted estimates shown in Steinback, Gentner, and Castle (2004) for the U.S. in 2000.[1] Further comparisons show an inflation adjusted increase in total U.S. trip expenditures of 36% and a 93% increase in total durable expenditures from 2000 to 2006. Although these increases seem inordinately large on the surface, the majority of the differences can be traced to a rise in angler effort and participation in the U.S. during this six year time period. According to MRIP estimates, effort increased 79% from 2000 to 2006 and participation increased 41% during this time period in the U.S. Thus, although total trip expenditures increased by 36%, effort rose by 79%, suggesting that mean expenditures per trip, at the U.S. level, actually declined from 2000 to 2006. Durable expenditures, on the other hand, were up 93% nationwide while participation only increased 41%. However, angler expenditures in Texas, Alaska, and Hawaii were not included in the expenditure estimates provided in Steinback, Gentner, and Castle (2004). If the comparison is made only across states included in both studies, the inflation adjusted increase in durable expenditures was 21%, less than the increase in participation from 2000 to 2006.

Another reason for the increase in total angler expenditures is that spending on durable goods has risen faster than inflation nationwide during this same period. The most recent data from the Bureau of Labor Statistic's Consumer Expenditure Survey (CES) shows expenditures on other transportation, which includes boats, increased 26% from 2000-2006 (CES 2006). Vehicle purchases remained level, but home expenditures rose 36%, mortgage balances increased 42%, and home values were up 98%. The later two statistics imply that homeowners were borrowing money from their homes to spend in the marketplace. Also, according to the National Marine Manufacturer's Association (NMMA) boat sales have increased 31% since 2000 (NMMA 2007). The NMMA estimated that sales of the three most popular fishing boats, outboard boats, sterndrive boats, and inboards increased 39%, 21%, and 5%, respectively, from 2000-2006. Total sales of these boats in 2006 (both new and used) was estimated to be $19.1 billion, a 4% increase over 2005. Adding canoe and kayak purchases increases this total to $19.3 billion. Total boat purchases in the U.S. in 2006, including new, used, and canoe and kayak purchases, was estimated to be $6.9 billion. Purchases of boat accessories were estimated to have doubled in the last nine years, according to the NMMA, and reached $2.8 billion in 2006. The estimated value of boat accessories purchased by U.S. anglers in this report is $834 million. Overall, the estimated increase in angler expenditures from 2000-2006 seems to compare favorably with the NMMA findings.

A number of additional durable expenditure categories were added to the survey in 2006 as well. Instead of lumping tackle and other fishing gear into one category as was done in the 2000 survey ($635 million in 2006 dollars), it was split into two categories for the 2006 survey ($1.5 billion in combined expenditures). In the 2000 survey there was only one category for boat expenses with a total of $3.8 billion spent nationwide in 2006 dollars after adjusting for inflation. For the 2006 survey, the boat expense category was separated into boat insurance, maintenance,

[1] The 2000 expenditure estimates shown in Steinback, Gentner, and Castle (2004) were adjusted to year 2006 dollars using the Bureau of Labor Statistics Consumer Price Index.

storage, and registration with a total of $1.4 billion spent by anglers in 2006, far less than the previous estimate. Vehicle maintenance was only included on the Pacific Coast form previously ($244 million) and this time maintenance and insurance were added to all forms with a total of $1.3 billion in expenditures. Similarly for second homes, maintenance was only included on the Pacific Coast ($30 million) in the 2000 survey and both insurance and maintenance were included this time for a total of $452 million in expenditures. On balance, the 2006 inflation adjusted estimate across all these categories from the previous survey was $4.7 billion and for the current survey it is $4.6 billion suggesting the addition of these categories did not bias expenditures upward.

Two other methodological changes are worth noting. First, to produce the expenditure estimates from the 2000 survey, CES data were used to determine the proportion of new versus used boats, cars, and second homes, the proportion of these items purchased from private parties versus businesses, and the proportion of these items that were financed. For the 2006 survey, those questions were asked during the survey and the percentages calculated directly from the survey were higher for new purchases, dealer purchases, and financed purchases than either the CES values used before or the current CES values. This has the effect of increasing mean expenditures over the values that would have been used had this analysis relied on the CES data. Secondly, the 2000 survey asked respondents to only report expenditures on goods "primarily" used for saltwater fishing. This time, anglers were asked the percentage of time each expenditure item was used for saltwater fishing in the last year and those percentages were used to determine the value of the purchases associated with saltwater fishing. To attempt to follow the notion of primacy, only goods used more than 50% of the time in saltwater were included in the estimates. The effect of this change on the estimates is unknown.

The USFWS also collected expenditure data from saltwater anglers across the U.S. in 2006. Their data show that anglers across the U.S. spent a total of $8.9 billion on saltwater fishing in 2006 (USFWS 2007), approximately 72% lower than our estimate of total angler expenditures in the U.S. ($31.4 billion). Surprisingly, the USFWS's estimate of total trip expenditures in the U.S. ($5.3 billion) is only 8.6% lower then our estimate ($5.8 billion). For durable good purchases, however, the difference is far larger with the USFWS reporting $3.6 billion in expenditures across the U.S. in 2006 compared to our estimate of $25.6 billion.

There are three primary reasons why the expenditure estimates presented here are higher than those reported in the USFWS report. First, the durable expenditure estimates presented in this study are driven by MRIP participation estimates. For 2006, the MRIP participation estimates are generally over 3 times higher than the USFWS estimates in those states where both surveys were administered. The disparities are likely due to differences in sampling procedures. The USFWS estimates do not count participation by anglers under 16 years of age and do not fully account for license exemptions as the MRIP telephone survey does (Van Voorhees 2007). Also, the sampling rates used for this study were considerably higher than those used for the USFWS study and the MRIP survey was specifically designed to target only recreational saltwater anglers. In contrast, the USFWS targets freshwater anglers, saltwater anglers, hunters, and other recreational activities as an add-on to the decennial census. Lastly, our study contains spending estimates for far more expenditure categories than shown in the USFWS report. The saltwater expenditure categories missing from the USFWS report include: magazines, club dues, license fees, boat

purchases, boat accessories, boat registration, fishing vehicle purchase, fishing vehicle maintenance, fishing vehicle insurance, second home purchase, second home property taxes, second home real estate commissions, second home maintenance, and second home insurance.

At the U.S. level, it was difficult to estimate total angler participation. A resident participant from one state may also have fished in one or more other states or vice-versa. Summing resident and non-resident participation across all states would certainly have overstated participation at the U.S. level. Therefore, only resident participation summed across all of the coastal states was used to expand the durable good expenditure means to total durable expenditures in the U.S. As a result, the durable expenditure estimates shown in this report for the U.S. likely underestimate actual expenditures.

As total angler expenditures increased from 2000 to 2006 so did the economic activity generated from those expenditures. The total sales resulting from angler expenditures in the U.S. increased from $36.7 billion in 2000[2] to $82.3 billion in 2006. The total income produced from angler expenditures, after adjusting for inflation, rose from $14.4 billion in 2000 to $24.0 billion in 2006, and the total employment supported by angler expenditures increased from 349,119 to 533,813 across the U.S. Steinback, Gentner, and Castle (2004) did not provide estimates of value-added generated from angler expenditures. In 2006, we estimate that angler spending generated approximately $38.1 billion in value-added across the U.S.

The majority of the changes in economic activity from 2000 to 2006 are simply due to an overall rise in angler expenditures during this time period. The rest of the differences are the result of structural changes in the economy and because of adjustments in the products and services purchased by anglers. The impact estimates shown in Steinback, Gentner, and Castle (2004) are based on 2000 IMPLAN data and since 2000 the linkages between businesses that support angler expenditures has changed. For this study we utilize 2006 IMPLAN data, so presumably any underlying structural changes in an economy, such as the mix of goods and services purchased by businesses that support angler expenditures, or in the proportions of goods and services purchased from local suppliers (i.e., RPCs), are reflected in the impact estimates shown here.

A comparison of Keynesian multipliers across the two studies provides an indication of the actual mathematical effect that structural changes in an economy and adjustments in the products and services purchased by anglers have had on the level of impacts generated from angler expenditures. Keynesian multipliers are defined as the ratio of total impacts to final expenditures and express the mathematical relationships between angler expenditures and the economic impacts generated from the expenditures (Archer 1984). While these multipliers are not shown here or in the Steinback, Gentner, Castle (2004) report, the astute reader will notice that at the U.S. level the aggregate output multiplier increased from 2000 to 2006 and the income and employment multipliers decreased during this time period. This means that because of structural changes in the U.S. economy and adjustments in the types of products and services purchased by anglers from 2000 to 2006, an average dollar of angler expenditure in 2006 generated comparatively greater total sales, but lower overall income and employment than in 2000. The outcome of these multiplier comparisons across states varies.

[2] The 2000 sales estimate shown in Steinback, Gentner, and Castle (2004), $30.5 billion, was converted to its 2006 equivalent using the Bureau of Labor Statistic's Consumer Price Index.

Keynesian multipliers can also be used to predict how changes in angler expenditures (increases or decreases) will affect sales, income, value-added, and employment in a region. To do this, one simply has to multiply the appropriate Keynesian multiplier (total impact/total expenditure) by the change. For example, an increase of $100,000 in overall angler expenditures in California would yield a total increase in sales within the state of approximately $122,200 ($100,000 x ($2.99 million/$2.62 million)). Caution is advised, however, when using the expenditure and impact estimates shown in this report to make projections because the projections are based on a particular region's industrial structure in 2006 and if the outcome of an increase in angler expenditures is desired, it is must be assumed that there is sufficient productive capacity (i.e., labor and capital) within the region to satisfy an increase in angler expenditures.

The economic impact estimates shown in this report may underestimate the state-level effects associated with marine recreational fishing. Separate models were constructed for each state so the state-level impacts represent only those effects that occurred within the state of interest. Impacts generated through the imports of goods and services from other neighboring coastal states were not part of each individual state assessment. For example, if a retail store in Rhode Island sold fishing tackle that was manufactured in Massachusetts, the impacts associated with the production of the fishing tackle would not be included in the Rhode Island or the Massachusetts impact assessment. The associated wholesale, distribution, and retail mark-ups that occurred in Rhode Island were included in the Rhode Island impact assessment, but the portion attributable to tackle manufacturing was not included in the Massachusetts assessment since the effects were generated from angler purchases in Rhode Island. As such, the state-level impacts generated from angler expenditures in 2006 were likely higher than shown in this report for states that exported fishing-related commodities to other neighboring coastal states. These cross-state effect, however, are captured in the aggregate U.S. model.

Although input-output modeling is the most common approach for describing the structure and interactions of regional economies, it is prudent to be aware of its assumptions regarding linear production functions, constant relative prices, and homogenous sector output. These assumptions are of questionable validity, but are necessary in order to construct the technical coefficients used to determine the direct, indirect, and induced effects in an input-output model. In fact, Propst and Gavrilis (1987) considered these assumptions in their assessment of regional economic impact procedures and concluded that the input-output approach can satisfy the widest range of information needs at high precision levels if primary data are supplied for final demand estimates (i.e., collected directly from anglers as was done for this study).

Another caveat that deserves attention relates to the underlying purpose and use of input-output analysis. In particular, it is a positivistic model designed to identify patterns of transactions and the resource requirements and sector output requirements resulting from changes in economic activity. The input-output approach should not be considered a substitute for normative approaches such as benefit-cost analysis. Benefit-cost analysis seeks to determine whether resources are being put to their best use by examining the difference between total economic value and total costs. In the context of recreational fishing, total net economic value is generally defined as willingness to pay in excess of actual expenditures. Alternatively, input-output assessments reveal how actual expenditures affect economic activity within each sector of an economy.

It is difficult to compare the impacts generated from marine recreational fishing to those generated from commercial fishing and no attempt was made to do so here. Recreational impacts are often compared to the dockside value of commercial fisheries landings, but this comparison fails to recognize the value-added impacts associated with fish processors, wholesale fish dealers, and the retail markets where the commercial catch is sold to consumers. These forward linked sectors could add considerable sales, income, and employment impacts to those generated from commercial harvesting alone. Studies that attempt to compare the impacts generated from recreational fishing to those generated from the sale of seafood in commercial markets should attempt to incorporate all of the backward and forward linkages associated with the commercial harvesting of seafood. Recreational fishing may also generate additional sales, income, employment, and tax impacts through incidental purchases by non-fishing companions and the auxiliary expenditures that occur on trips that were part of a longer vacation. If these types of expenditures occur as a direct result of fishing, a case could be made that any comparison to the commercial sector should also include the impacts generated from these supplemental expenditures.