



## Fiscal Analysis of the Cap on the Vessel Excise Tax

Developed by the  
**University of Maryland Environmental Finance Center**

August 2015

### Introduction

This report provides a detailed analysis estimating the impact of the \$15,000 tax cap on the vessel excise tax (VET) established by Senate Bill 90 which took effect in July 2013. Maryland imposes a 5% VET calculated on the fair market value or purchase price which, at this tax rate, causes the cap to impact vessels valued above \$300,000. To assess the impact of the excise cap, the analysis uses data provided by the Maryland Department of Natural Resources (DNR). The data provides detailed records of each newly registered boat in Maryland. That is, each record represents an additional vessel declaring Maryland's waters as its primary place of use for that calendar year.<sup>1</sup>

This study estimates the cap's impact using two key measures. First is the net change in VET revenue. In principle, the tax cap effectively lowers the cost of registering a boat in Maryland, which should lead to additional vessel registrations. At the same time, the cap lowers the vessel excise tax (VET) revenue collected on a per vessel basis. The analysis focuses on the net change to VET revenue to gauge if the gain in registrations offsets the lower per-vessel tax. The second measure considers economic impacts more broadly. This second measure estimates the how an increase in boating registrations leads to economic gains in the State's economy through boat trip expenditures.

### Trends in New Registration

DNR's boating registration data dates back several decades.<sup>2</sup> Since early 2000, new registrations of vessels have ranged between 23,400 and 34,100 per year, with an annual average of 27,900. Overall, new registrations have been falling. (See Figure 1.) This trend is not unique to Maryland. In other states and nationally, boating participation levels have been falling.

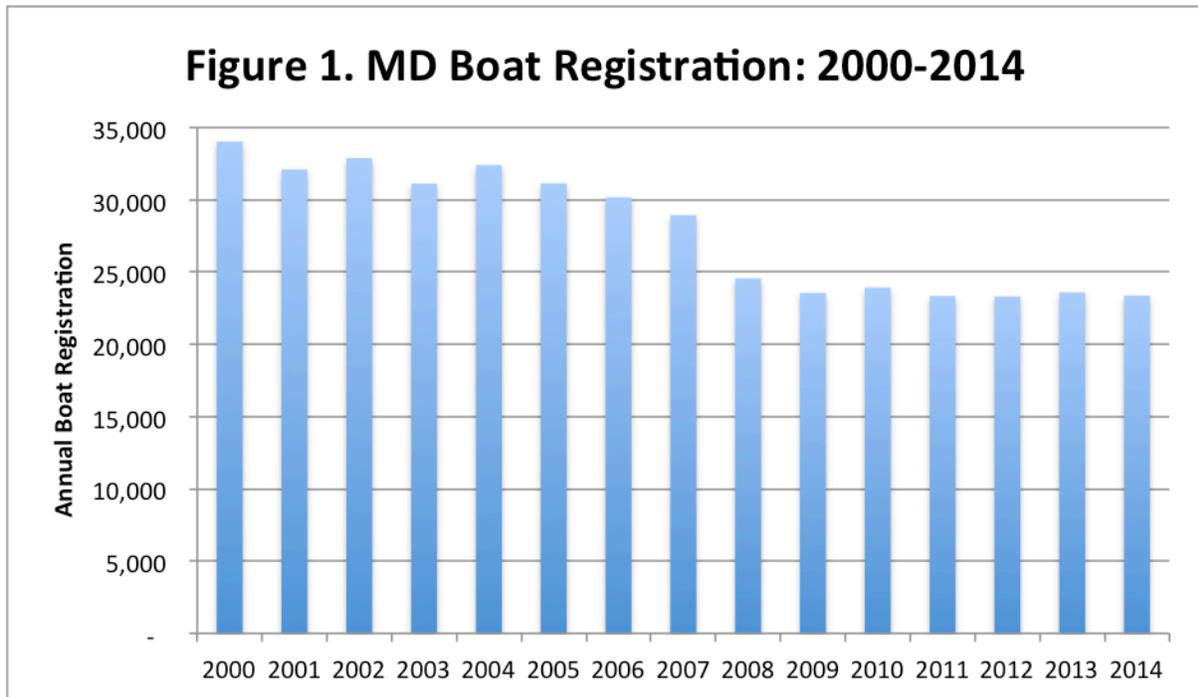
At the start of the period, Maryland had just over 34,000 new registrations. By 2014, annual registrations had fallen to around 23,400. The downward trend in new registration has slowed since the

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<sup>1</sup> The analysis concentrates on new registrations because the vessel excise is a one-off tax. For example, the first time a vessel registers in Maryland, it is subject to the excise. If that vessel was then registered in another state and subsequently returned to Maryland as its state of principal use, it would not be subject to the excise tax again.

<sup>2</sup> For the purposes of this analysis, selected data covers the period January 2000 to mid-May 2015 (inclusive) and has 418,474 records.

US economy emerged from the 2008 recession. From 2000 to 2008, registration levels fell by just over 2% per annum. After the 2008 recession, annual registration has been holding relatively steady.



### Estimating the Impact of the Excise Cap on VET Revenue

Estimating the impact of the excise cap requires constructing a baseline. The baseline presents a scenario of what registrations would have looked like without the excise cap in effect. It is the difference between what is observed in the new registration data and this baseline that reflects the change – or impact of the excise cap. This baseline requires two key pieces of information:

- (1) estimate of the average net purchase price for vessels valued in excess of \$300,000; and
- (2) estimate of the number of registrations that would have occurred without the cap.

The excise cap effectively lowers the cost of the boats. In principle, this lower cost should stimulate an increase in the demand for boats, specifically those with a net purchase price in excess of \$300,000. Table 1, below, shows the relationship between boat value and the excise with the tax cap in effect. As the value of the vessel increases the effective excise rate falls, and the avoided excise increases. For a boat valued at \$350,000, the savings is \$2,500, reducing the effective tax rate from 5% to 4.3%. At \$400,000, the effective tax rate is lowered to 3.8%. For a vessel valued at \$500,000, the cap reduces the tax liability by \$10,000 and lowers the effective tax rate by 2%.

At face value, the extent to which the tax savings offsets total expenditures (marginal increase in vessel value) does not seem sufficiently strong to induce demand for a more expensive vessel. For example,

spending an additional \$50,000 on a vessel saves only an additional \$2,500. However, one study on boating choice suggests that high wealth individuals have a strong reaction to tax savings.<sup>3</sup>

**Table 1. Excise Actual and Effective by Boat Value**

Boat Value	Excise at 5%	Cap savings	Effective tax rate
<\$300,000	<\$15,000	\$0	5%
\$300,000	\$15,000	\$0	5%
\$350,000	\$17,500	\$2,500	4.3%
\$400,000	\$20,000	\$5,000	3.8%
\$500,000	\$25,000	\$10,000	3.0%
\$750,000	\$37,500	\$22,500	2.0%
\$1,000,000	\$50,000	\$35,000	1.5%

The following examines new registration data in more detail to identify the effect the excise cap had on boat registration and VET revenue.

The excise cap affects a very small share of new registrations. Table 2 summarizes the registration data to show the composition of new registrations by vessel value. Over a 15-year period from 2000-2014, the data set reported over 418,400 new registrations. Of these, vessels valued at \$300,000 or higher account for less than half a percent of all new registrations (1,673). Annually, this category of boats averages around 110 registrations. In contrast, almost 90% of all new registrations during this period involved boats valued at less than \$30,000. Given the small number of affected registrations, it would be surprising if the effect of the cap could be detected looking at the overall level of new annual boat registrations.

Table 2 also shows that boats valued over \$300,000 have a disproportionate share of the total VET revenue. Less than 0.5% of new registrations accounted for nearly 10% of VET revenue. Since 2000, boats valued in excess of \$300,000 accounted for nearly 16,000 registrations. VET revenue generated by these new registrations is just over \$32.5 million. This relationship between registration and VET revenue suggests that a small change among high valued boats can potentially have noticeable effect on VET revenue.

The analysis offers a careful comparison of trends in new registrations for vessels valued between \$300,000 and \$349,999. The data showed new registrations of vessels in this value category follow patterns similar to vessels valued between \$200,000 and \$299,999. Based on how closely the new registrations and prices behaved and the relatively small impact of the cap on the effective tax rate, the analysis focuses on vessels valued in excess of \$350,000.<sup>4</sup>

<sup>3</sup> Lipton, Douglas. 1999. "Boat Location Choice: The Role of Boating Quality and Excise Taxes" *Coast Management*, 27:1, 81-89.

<sup>4</sup> The analysis assumes that the excise cap did not impact new registrations for vessels valued between \$300,000 and \$349,000. The average purchase price for this category was around \$321,000. As a result, the estimated loss to VET revenue is around \$55,000 over two years.

**Table 2: Net Boat Value Category: Registrations and Paid Excise from 2000 - 2014**

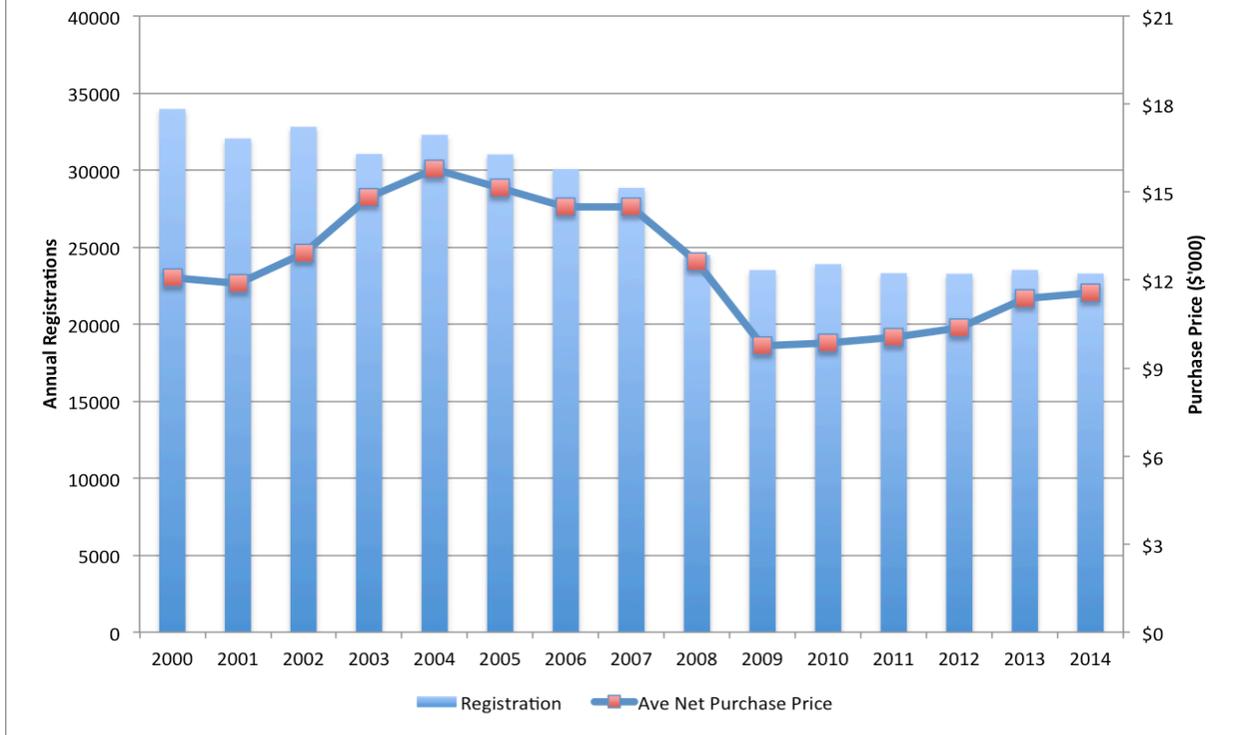
Net Purchase Price Category	Registration			Ave Net	Excise Paid	
	Total	Ave Annual	Cumulative Share	Purchase Price	Ave Annual Excise Paid	Cumulative Share
\$0 – \$49	31,463	2,098	8%	\$2	\$1	0.01%
\$ 50 – \$99	3,319	221	8.3%	\$55	\$5	0.02%
\$ 100 – \$499	80,817	5,388	28%	\$200	\$9	0.3%
\$ 500 – \$999	52,796	3,520	40%	\$615	\$29	0.9%
\$ 1,000 – \$4,999	98,309	6,554	64%	\$2,250	\$106	5%
\$ 5,000 – \$9,999	44,775	2,985	74%	\$7,145	\$331	10%
\$10,000 - \$19,999	40,858	2,724	84%	\$14,085	\$655	21%
\$20,000 – \$29,999	19,805	1,320	89%	\$24,230	\$1,121	29%
\$30,000 – \$39,999	11,651	777	92%	\$34,290	\$1,579	36%
\$40,000 – \$49,999	7,289	486	93%	\$44,370	\$2,024	42%
\$50,000 – \$59,999	4,855	324	95%	\$54,335	\$2,448	46%
\$60,000 – \$69,999	3,602	240	95.5%	\$64,285	\$2,873	50%
\$70,000 – \$79,999	2,700	180	96%	\$74,345	\$3,259	53%
\$80,000 – \$89,999	2,119	141	96.6%	\$84,195	\$3,683	56%
\$90,000 – \$99,999	1,628	109	97%	\$94,510	\$4,179	59%
\$100,000 – \$149,999	5,745	383	98%	\$121,605	\$5,377	71%
\$150,000 – \$199,999	2,795	186	99.1%	\$170,810	\$7,507	79%
\$200,000 – \$249,999	1,453	97	99.4%	\$222,060	\$9,694	84%
\$250,000 – \$299,999	822	55	99.6%	\$272,520	\$12,057	88%
\$300,000 – \$349,999	543	36	99.7%	\$321,575	\$14,327	91%
\$350,000 – \$399,999	334	22	99.8%	\$371,115	\$16,493	93%
\$400,000 +	796	53	100%	\$621,680	\$24,151	100.00%
<b>Total</b>	<b>418,474</b>	<b>27,898</b>		<b>\$14,130</b>	<b>\$564</b>	

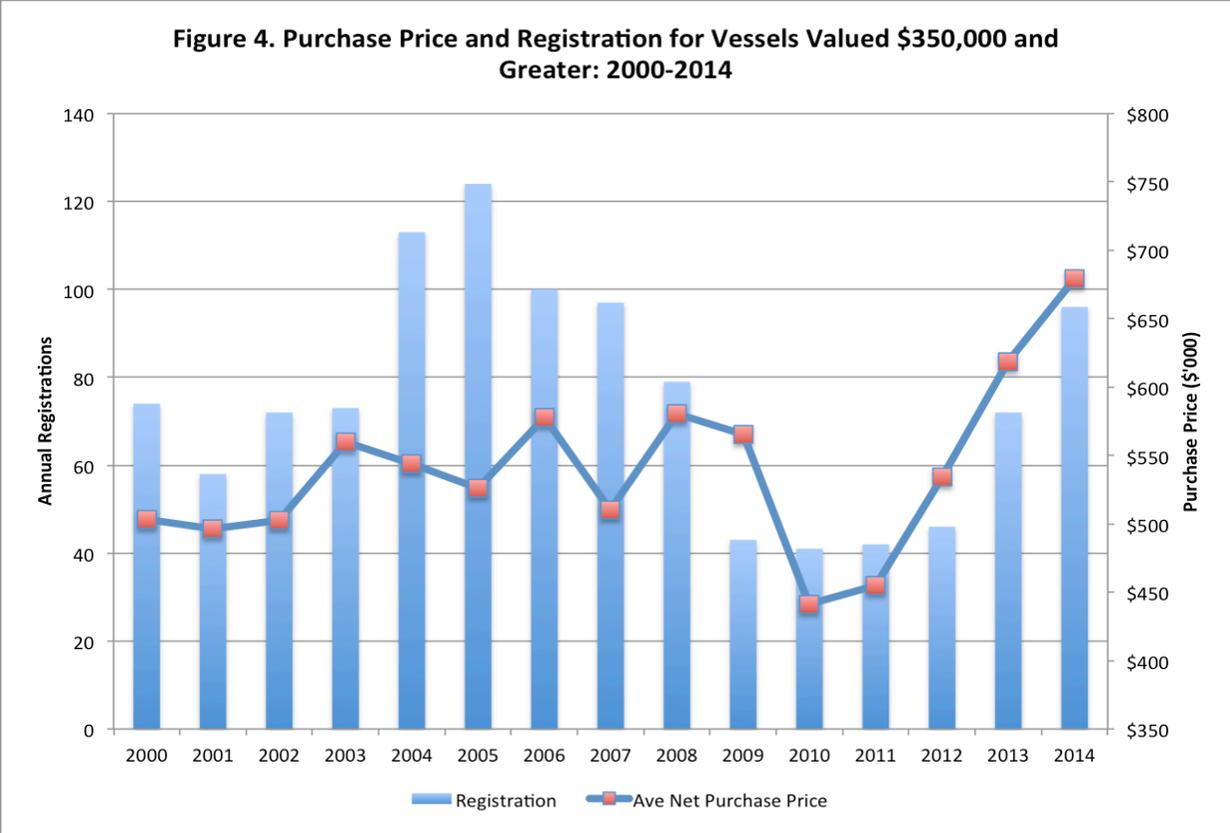
Note: All values reported in nominal dollars.

The Figures 3 and 4 segment new registration data into two categories. Figure 3 shows trends for boats with a net purchase price that is less than \$350,000; Figure 4 shows trends for vessels valued at \$350,000 and higher. When looking at these trends, it is important to note that despite the recession officially ending in 2009, the economy is still recovering. With the recovery, new registration numbers have stabilized, holding around 23,500 annually. With only one complete calendar year since the excise cap was implemented, there is little evidence to suggest whether new registrations will pick up or continue trending downward.

Comparisons across the graphs show that these two groups behave differently. For vessels valued under \$350,000, purchase price and new registration levels have tracked together since the early 2000s. Both exhibit a general downward trend leading into the 2008 recession and appear relatively stable since 2009. Average net purchase price fell from a high near \$16,000 to a low around \$10,000. New registration levels also fell leading up to the recession. Since 2009, new registrations of boats valued less than \$350,000 have been relatively constant around 23,000 per year.

**Figure 3. Purchase Price and Registration for Vessels Valued Less Than \$350,000:  
2000-2014**





In contrast, vessels valued at \$350,000 and greater show greater volatility in annual prices and new registrations. Annual registration peaked in 2005 and then fell to a low in 2010. Net purchase price did not follow the same dramatic increase in 2005. Prices did, however, fall substantially. Pre-2008 recession prices were around \$550,000 and fell to around \$450,000 post-2008 recession.

Based on the trends, the excise cap may have had an impact. Table 3 provides year-on-year changes for 2011 to 2014. The two years of data where the excise cap was in effect (2013 and 2014) show dramatic growth in both annual registration and average net purchase price. However, the table also shows that 2012 was a transition year. It registered growth in price registration numbers. This pattern confounds the analysis, making it difficult to ascertain how much of the growth seen in 2013 and 2014 can be attributed to the excise cap.

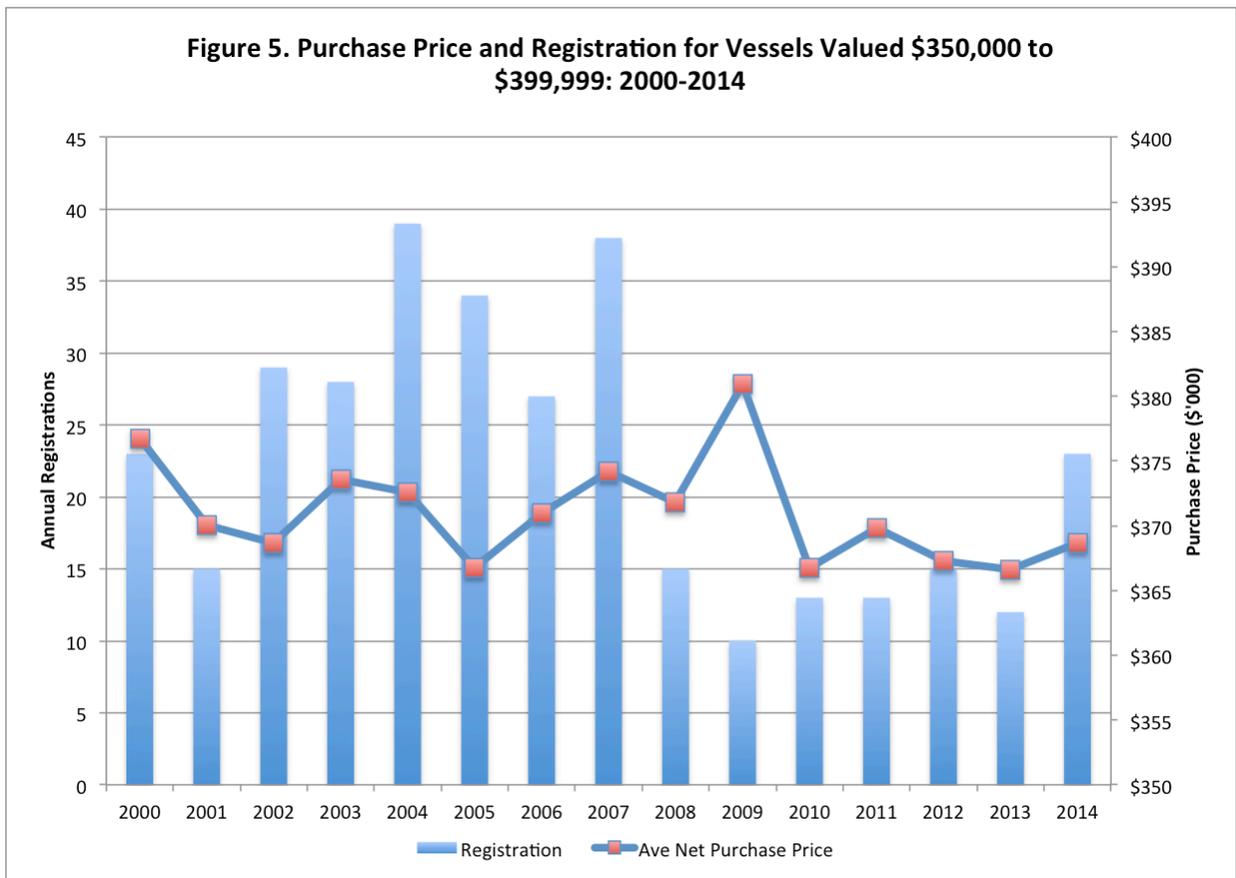
**Table 3. Boats Valued at \$350,000 and Greater: Year-on-Year Change**

Year	Registration		Average Net Purchase Price	
	Count	Yr-on-Yr Change	Price	Yr-on-Yr Change
2011	42	2%	\$455	3%
2012	46	10%	\$534	17%
2013	72	57%	\$618	16%
2014	96	33%	\$679	10%

Figures 5 and 6, below, further segment the vessels valued at \$350,000 and greater. The first segment is vessels valued between \$350,000 and \$399,000. Historically, this category of vessels has very low levels of new registration. From 2000 to 2014, it ranges from 12 to 39 per year. Figure 5 highlights that registration fell in 2013 by only two vessels. Then, new registrations picked up in 2014, nearly doubling. During this time, boat purchase price changed marginally, staying around \$367,000.

Without further information about how vessel owners make purchase decisions, it is difficult to explain what drove these results. One possible explanation is “switching,” in other words, in light of the excise cap, a handful of individuals planning to purchase a boat in this value range opted to purchase a more expensive vessel (i.e., purchase price greater than \$400,000) in 2013. As a result of this decision, the number of newly registered boats with a net purchase price greater than \$400,000 would increase and the number of newly registered boats with a net purchase price between \$350,000 and \$400,000 would decrease. These changes are seen in Figures 5 and 6.

Because the tax savings does not offset the increased boat price, it is reasonable to expect that the market would normalize after excise cap’s initial implementation. As a result, the “switching” would be less significant, and the number of registrations would return to baseline conditions. This data fits this pattern of behavior. The registrations in 2014 are close to what would be expected had the change in registration observed in 2012 continued.



The analysis builds a baseline scenario based on this theory of “switching” since it fits what is observed in the data. Table 4 summarizes actual and baseline changes. The baseline scenario assumes that the introduction of the excise cap did not affect purchase price, rather it only impacted the number of registrations.

**Table 4. Boats Valued between \$350,000 and \$399,000: Actual and Baseline**

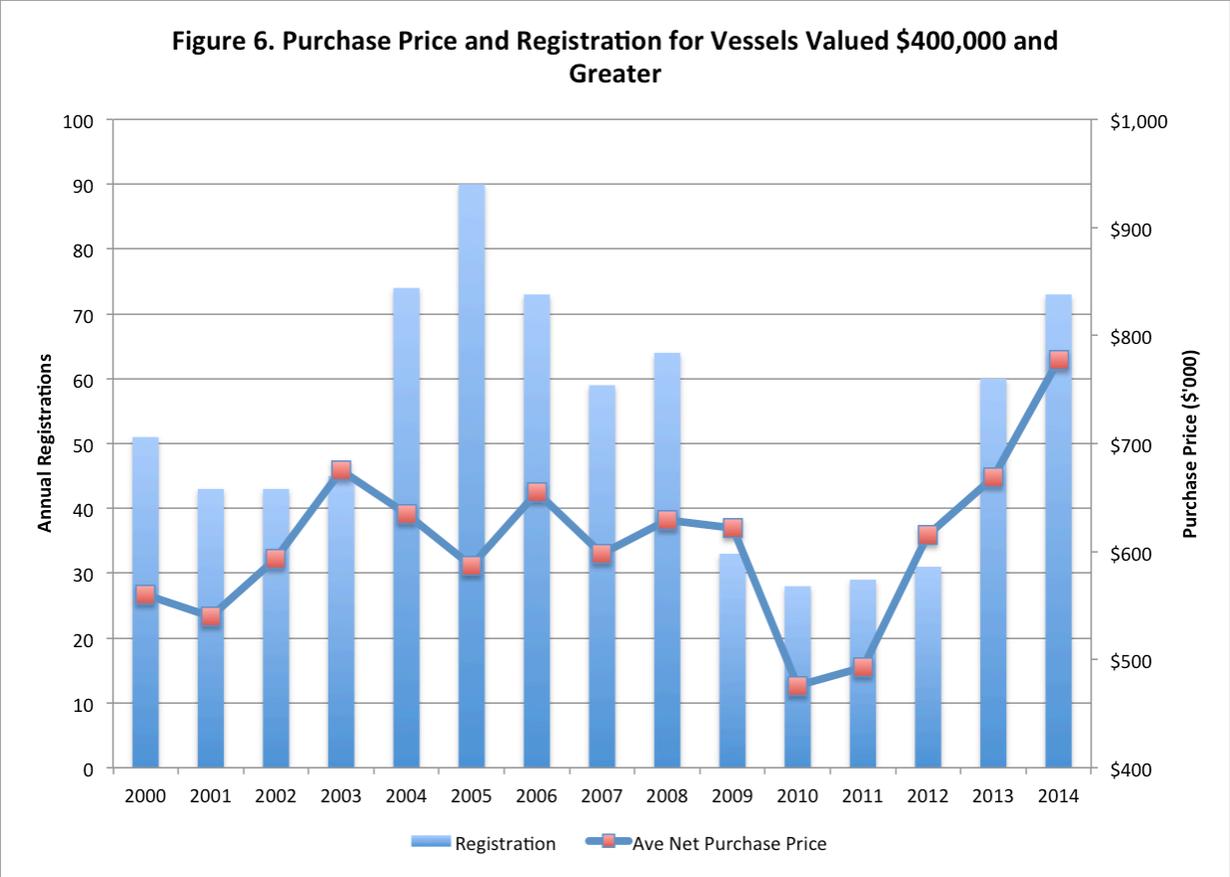
Year	Actual New Registrations		Baseline	Average Net Purchase Price	
	Count	Yr-on-Yr Change	New Registrations	Price	Yr-on-Yr Change
2011	13	0%		\$370	1%
2012	15	15%		\$367	-1%
2013	12	-20%	17	\$367	0%
2014	23	92%	20	\$369	1%

Based on the table above, the excise cap resulted in net loss to VET revenue from this boat value category. The estimated total loss is relatively small, approximately \$154,000 over the two years. It arises from two effects: (1) the excise cap resulting in fewer than expected registrations, and (2) the cap lowering the effective excise rate. Table 5 summarizes the change in VET revenue under the actual and baseline scenarios.

**Table 5. Change in VET Revenue for Vessels Valued \$350,000 - \$399,999**

Year	Actual	Baseline	Change to VET revenue
2013	\$180,000	\$311,950	- \$131,950
2014	\$345,000	\$367,000	- \$22,000
<b>Total</b>	<b>\$525,000</b>	<b>\$678,950</b>	<b>- \$153,950</b>

Figure 6 shows the trends in registration and average purchase price for vessels valued greater than \$400,000. Annual registration and purchase price did not track together in the period preceding the 2008 recession. While annual registration increased from 2002 to 2006, average purchase price was falling. In the few years leading up to the recession, new registration levels generally fell and purchase price bounced around just below \$650,000. Post-2008 recession, new registration levels were fairly flat, around 30 per year; however, purchase price was increasing. The change from 2010 to 2011 was a small increase. The change from 2011 to 2012 was very strong (\$493,000 and \$615,000, respectively).



In the two years where the excise cap has been in effect, new registration was on par with pre-recession levels. Purchase price for both years were higher than historical levels. The average net purchase price in 2014 was just under \$780,000. This average is 60 percent higher than the low in 2010 (around \$476,000).

Table 6 summarizes how new registrations and net purchase price has changed since 2011. The table shows that new registrations from 2012 to 2013 almost doubled. This increase is striking given the year-on-year changes in 2011 and 2012. 2014 continued the growth with new registration increasing by 22%. The analysis attributes this growth in registration to the excise cap. The baseline scenario estimates new registrations in 2013 and 2014 increasing but at a pace more comparable to 2011 and 2012 (7% per annum).

The average net purchase price shows stronger than expected growth in 2012 and 2014 but not in 2013. Given the historic year-on-year variation in price, the baseline scenario assumes that prices would have increased but not as quickly as observed. It also attributes some of the strong price growth to the excise cap. Purchase prices for 2013 and 2014 in the baseline are also estimated to grow at roughly 7% per annum.

**Table 6. Boats Valued \$400,000 and Greater: Actual and Baseline**

Year	Actual				Baseline	
	New Registration		Ave Net Purchase Price		Count	Price
	Count	Yr-on-Yr Change	Price	Yr-on-Yr Change		
2011	29	4%	\$493	4%		
2012	31	7%	\$615	25%		
2013	60	94%	\$669	9%	33	\$679
2014	73	22%	\$777	16%	36	\$727

Based on the table above, the excise cap resulted in a net loss to VET revenue from the \$400,000 and greater boat value category. The estimated total loss is approximately \$434,000 over the two years. This loss arises because the increase in registrations is not large enough to offset the lower effective excise rate. Table 7 summarizes the change in VET revenue under the actual and baseline scenarios.

**Table 7: Change in VET Revenue for Vessels Valued \$400,000 and Greater**

Year	Actual	Baseline	Change to VET revenue
2013	\$900,000	\$1,120,350	-\$220,350
2014	\$1,095,000	\$1,308,600	-\$213,600
<b>Total</b>	<b>\$1,995,000</b>	<b>\$2,428,950</b>	<b>-\$433,950</b>

### Net Impact to VET Revenue

The net impact of the excise cap on VET revenue is \$588,000.<sup>5</sup> VET revenue loss in 2013 was around \$152,000, and then the loss increased in 2014 to \$434,000. The excise cap appears to have positively impacted the number of newly registered, high-valued boats in Maryland. Most of this increase is estimated for boats with a net purchase price greater than \$400,000. Over the two years, this value category is estimated to have nearly doubled, resulting in over 60 additional registrations. In contrast the impact on vessels valued between \$350,000 and \$399,999, is mixed. New registrations over the two years are slightly lower due to some individuals switching to a higher valued boat due to the excise savings.

Despite the overall increase on new registrations, VET revenue is lower. This net loss is due to the increase in registration not being large enough to offset the lower effective tax rate. In order for impact to VET revenue to be neutral, almost 80 additional registrations of vessels valued over \$400,000 are needed. For vessels valued between \$350,000 and \$399,999, the cap has a much smaller impact on the effective tax rate. As a result, less than 10 additional registrations between 2013 and 2014 would have been needed for the cap to be revenue neutral.

<sup>5</sup> As noted in an earlier footnote, the analysis was not able to determine if the cap has an effect on new registrations for vessels valued between \$300,000 and \$350,000. Assuming the cap did not impact the level of new registrations, the net loss of VET revenue was approximately \$55,000 over two years.

## Estimating the Impact of the Excise Cap on Maryland's Economy

While the excise cap resulted in a net loss to VET revenue, the analysis estimates that the cap has an overall positive impact on the total number of boats registering in Maryland. Each additional registration represents a new vessel being used in Maryland.

To estimate how the change in new registrations impacts the State's economy, the analysis estimates the economic gain from the boating trip expenditures associated with each new registration. The analysis focuses on the change associated with registrations for vessels valued \$400,000 and higher. It does not account for changes in boats valued between \$350,000 and \$399,999, because the change in 2013 and 2014 of new registrations nearly cancels each other out.

The increase in boating registrations is assumed to lead to increased boating activity. To estimate how expenditures associated with boating activity impact the economy, the analysis relies on estimates of boat trip frequency and boat trip spending.

The Maryland DNR recently sponsored a survey of individuals that own high valued boat.<sup>6</sup> In this study, Maryland boat owners reported taking an average of 25 trips per year. This figure is consistent with an earlier survey of Maryland boat owners, where the mean number of trips per boater ranged between 24 and 27 annually.<sup>7</sup>

The DNR study did not include information on trip spending patterns. As a result, this analysis conducted a literature review focused on economic impact studies of recreational boating.<sup>8</sup> One of the most recent studies was conducted in 2012 in Virginia. Following this study's approach, this analysis applies an average expenditure of \$1,500 per boating trip. Table 8 summarizes how trip expenses are allocated.

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<sup>6</sup> Responsive Management, 2015. *Boat Owner Opinions on Factors Influencing their Decisions on Which States in Which to Register Their Boat.*

<sup>7</sup> Lipton, Doug and Scott Miller. 1993. *Recreational Boating in Maryland: An Economic Impact Study.* Prepared for the Marine Trades Association of Maryland and the Boating Administration, Maryland Department of Natural Resources.

<sup>8</sup> Harding, David, et. al. 2009. *Florida Boating Access Facilities Inventory and Economic Study.* August 2009  
Lipton, Douglas. *Boating 2000: A Survey of Boater Spending in Maryland – A Maryland Sea Grant Report.*  
Murray, Thomas. *Assessment of the Economic Impacts of Recreational Boating in Virginia.* December 2012  
Starbuck, Kimberly; Lipsky, Andrew, et. al. 2012 *Northeast Recreational Boater Survey: A Socioeconomic and Spatial Characterization of Recreational Boating in Coastal and Ocean Waters of the Northeast United States.* December 2013.

**Table 8. Allocation of Trip Expenses**

Expense type	Share of Trip Expenses	Expense
Groceries	12%	\$185
Boat Fuel Costs	29%	\$440
Fishing Supplies	16%	\$245
Boat Launch	3%	\$45
Equipment Rental	0.80%	\$10
Other Boat Supplies	18%	\$275
Lodging	4%	\$65
Restaurant	10%	\$155
Other	5%	\$80

The analysis estimates that in 2013 boat trip spending increased by nearly \$1.1 million and \$1.4 million in 2014. This increase reflects the additional boat registration, plus each new registration raises trip spending by roughly \$39,000 per year. Table 9 summarizes how this increase in boat trip spending flows through the Maryland economy. In 2013, trip spending supported approximately 16 full-time equivalent jobs and contributed \$1.1 million to the State's economy. In 2014, these impacts were slightly higher as a result of more boat purchases. Nearly 20 full-time equivalent jobs and almost \$1.4 million in economic growth occurred.

**Table 9. Impact of Boat Trips on Maryland's Economy**

	2013	2014	Total
Employment	16	20	36
Total Income (\$'000)	\$630	\$660	\$1,290
Total Output (\$'000)	\$1,130	\$1,430	\$2,560

### Conclusions

Based on the above analysis, the \$15,000 tax cap on the vessel excise tax had the following effects.

- The growth in new registrations for vessels with a net purchase price of \$400,000 or greater was much stronger than an expected. This increase is likely due to the excise cap. This increase in new registrations, however, was not enough to offset the loss in VET revenue as a result of the cap lowering the per-vessel tax collection.
- The cap's impact on new registrations of vessels valued between \$350,000 and \$399,999 is mixed. After an initial drop in 2013, the analysis finds that the cap may have led to an increase in the number of new registrations in 2014. Again, the net impact on VET revenue is estimated to be negative.
- The total loss in VET revenue due to the tax cap is approximately \$588,000 over two calendar years (2013 and 2014).
- While the tax cap had a negative impact on VET revenue, the increase in new registrations does have a positive impact on the Maryland economy through increased boating activity.
- The increase in new registration may have generated over \$1 million in direct spending in the Maryland economy that has a multiplier effect lifting output by nearly \$2.5 million over two years.

