

# **Appendix K**

## **Spark-Ignition Marine Watercraft Economic Analysis Methodology**

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California Air Resources Board  
Monitoring and Laboratory Division

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## I. METHODOLOGY TO DETERMINE ECONOMIC IMPACTS

To determine the incremental economic impacts of the proposed California Air Resources Board's (ARB) evaporative emissions standards on spark-ignition marine watercraft (SIMW) with engines greater than 30 kilowatts (kW), staff defined and selected three representative SIMW categories. The first category is represented by a personal watercraft (PWC) with an installed 16-gallon fuel tank. The second category is represented by an outboard (OB) SIMW with an installed 33-gallon fuel tank. The third category is represented by a sterndrive/inboard (SD/I) SIMW with a 50-gallon installed fuel tank. After reviewing ARB marine exhaust certification data and Department of Motor Vehicle (DMV) records of SIMW sales in California, staff determined that these categories were most representative of configurations sold in California. However, SIMW in each category may have differently sized fuel tanks and engines, or multiple fuel tanks and/or engines. Due to similar engine configurations, sterndrive and inboard SIMW are grouped together and assumed to have the same evaporative system characteristics. Sterndrive and inboard SIMW are usually longer in overall length and can therefore accommodate longer fuel hoses and larger fuel tanks. The SD/I category also includes SIMW with jet drive propulsion.

The United States Environmental Protection Agency (U.S. EPA) Regulatory Impact Analysis (RIA) from 2008 includes an in-depth analysis of the costs and cost-effectiveness of implementing their SIMW standards. Table I-1 shows estimated specifications of a typical configuration for each SIMW category based on U.S. EPA analysis (U.S. EPA RIA, 2008; page 6-78) and ARB SIMW inventory data.

**Table I-1: SIMW Category Typical Specifications**

<b>SIMW Category</b>	<b>Fuel Hose Inner Diameter (inches)</b>	<b>Fuel Hose Length (feet)</b>	<b>Fuel Tank Size (gallons)</b>
Personal Water Craft (PWC)	1/4	6	16
Outboard SIMW (OB)	3/8	8	33
Sterndrive/Inboard SIMW (SD/I)	3/8	10	50

Due to the 2012 implementation of the U.S. EPA evaporative emissions standards, evaporative emissions control component technology, manufacturing equipment, and materials will require only small changes to meet the more stringent ARB requirements. In some cases, component manufacturers have noted no change in cost because their products already meet ARB's proposed emissions standards.

Staff based the cost impact analysis on the incremental costs incurred to meet ARB compliance, above the costs required to meet U.S. EPA requirements. Component manufacturers were asked to participate in an industry-wide ARB cost survey to determine the incremental cost increase. Staff also obtained cost information by phone interviews and through follow-up communications with survey participants. For each SIMW category, staff estimated a low and a high cost for each set of evaporative emissions control system components. The average of all the cost responses was then used as a basis for estimating the average retail cost increase.

To meet the proposed fuel hose permeation standards for model year (MY) 2018 and later, staff did not include a cost increase for clamps and fittings because fuel hose manufacturers indicated that these items would be the same as those used to meet the U.S. EPA standards. Fuel hose manufacturers also conveyed that there may be little or no increase in cost for fuel hose connectors if a more stringent fuel hose standard of 5 g/m<sup>2</sup>/day at 40°C is implemented for MY 2020 and later. Regarding labor costs, SIMW manufacturers stated that there would be little or no increased cost because these evaporative emissions control components are already included in the assembly of current SIMW. A SIMW manufacturer will only need to install a different evaporative emissions control component, which is already commercially available and can meet ARB standards.

Although staff evaluated testing costs, staff expects testing costs for sealed housing for evaporative determination (SHED) tests to be incurred only by those SIMW manufacturers who choose to certify to the proposed performance-based standard. Industry representatives have informed staff that most SIMW manufacturers will choose to certify their SIMW by design, and therefore would avoid SHED testing costs. Staff only anticipates testing costs for fuel hose manufacturers that meet the 5 g/m<sup>2</sup>/day at 40°C fuel hose standard. Staff conservatively assumes that the fuel hose standard is lowered in MY 2020 for the cost analysis.

Lastly, staff relied upon industry and market research reports, the DMV boater registration database, and marine association reports to identify and assess the economic impacts on businesses and the potential impact on the economy of the state. Staff anticipates that the SIMW industry will pass on additional costs to consumers for evaporative emissions controls.

## A. COMPLIANCE EQUIPMENT COST

Staff conducted a cost analysis of the survey responses to determine the increased cost to implement ARB's proposed standards. As described in the methodology to determine economic impacts, a representative SIMW for each spark-ignition marine category was evaluated to determine the average retail price increase. Staff performed multiple surveys throughout the regulatory process to ascertain the manufacturer's cost increase for ARB compliant components. Equipment cost increases attributable to the difference between ARB and U.S. EPA compliance standards were calculated. The result was then increased to account for normal profit from component manufacturers, SIMW manufacturers, and dealers. Staff initially applied a SIMW manufacturer's markup of 19 percent (Market Research, 2010), and a SIMW dealer's markup of 18 percent (Boating Industry, 2009), to estimate the total retail price increase to SIMW consumers. However, staff was unable to obtain a more current reference for increased markup in recently published articles; therefore, a markup of 20 percent for each of three levels of industry (component manufacturer, SIMW manufacturer, and dealer) was used in the final analysis. Staff presented the proposed markup at the last workshop and received no comment on its usage.

For MY 2018 and later, all evaporative emissions standards including fuel cap, fitting and carbon canister requirements and test procedures will be harmonized with U.S. EPA standards for SIMW with engines less than 30 kW. Therefore, no additional compliance costs will be associated with this subcategory.

For MY 2018 and later SIMW with engines greater than 30 kW, ARB proposes to set more stringent fuel hose permeation standards, fuel tank permeation standards, venting standards, and a fuel injection requirement. Increased compliance costs are expected for all elements of the proposed regulation except fuel injection. There are no anticipated cost increases for fuel injection as manufacturers have already switched to fuel injected engines.

The average estimated retail price increase per SIMW was calculated using the following equation applied to each component and summed over all components. The increased cost for an individual component is multiplied by three levels of markup (component manufacturer, SIMW manufacturer, and dealer) as follows:

$$AERPI = \Sigma [(IPC) \times 1.20 \times 1.20 \times 1.20]$$

Where,

AERPI = Average Estimated Retail Price Increase  
IPC = Increase in price per component (from survey)

In order to meet ARB's proposed MY 2018 requirements, the average estimated retail price increase per SIMW ranges from \$28 to \$45. The average retail cost for these SIMW ranges from \$12,217 to \$61,076 (NMMA, 2013). The total retail price increase for each SIMW category is shown in Table I-2. Each is calculated by summing the

estimated average component cost increases and applying the increased markup value as discussed previously. Evaporative emissions encompasses all the emissions processes that occur from a SIMW. Staff evaluated each process and cost individually (i.e., permeation emissions, venting loss emissions, etc.) to determine the total retail costs.

**Table I-2: Evaporative Emissions Total Estimated Retail Price Increase for MY 2018 Standards (2013 Dollars)**

SIMW Category	Total Retail Cost Increase			Average SIMW Retail Cost <sup>2</sup>
	Low Estimate	High Estimate	Average <sup>1</sup>	
PWC	\$18	\$41	\$28	\$12,217
OB	\$20	\$68	\$44	\$21,964
SD/I <sup>3</sup>	\$21	\$80	\$45	\$61,076
Weighted Average of All Categories <sup>4</sup> :				\$36,616

<sup>1</sup> Average of cost data received from industry.

<sup>2</sup> NMMA 2013 Recreational Boating Statistical Abstract (NMMA, 2013) in 2013 Dollars.

<sup>3</sup> SD/I category includes jet drive, inboard, and sterndrive SIMW from NMMA 2013 Recreational Boating Statistical Abstract (NMMA, 2013).

<sup>4</sup> Based on sales estimates for 20 years using ARB inventory estimates.

Based on MY 2018 standards without boat manufacturer and dealer markups, the estimated evaporative emissions control component cost increases were itemized for each SIMW category and are presented in Table I-3. As proposed in the regulation, all trailerable SIMW with engines greater than 30 kW must meet a ARB deck fill plate compatibility standard beginning with MY 2018. Based on the 2013 and 2014 Spark-Ignition Marine Engine (SIME) certification database, all SD/I SIME families were already fuel injected (SIME, 2013; SIME, 2014). Industry has indicated that most outboard and SD/I SIMW manufacturers will choose to certify their SIMW by design, using ARB certified evaporative emissions control components in their evaporative systems. The testing costs for evaporative emissions control components were not included (except fuel hose testing costs) in the cost analysis as those costs will be borne by the evaporative emissions component manufacturers seeking a ARB Component Executive of Certification. Staff assumes that the more stringent fuel hose standard will be implemented in MY 2020. Staff also assumes that all costs for manufacturing and testing in the cost analysis will be passed on the consumer. Staff presented these assumptions at an April 28, 2010 workshop.

**Table I-3: Estimated Manufacturer Cost Increase for Evaporative Emissions Controls MY 2018 Standards (2013 Dollars)**

SIMW Category	Evaporative Emissions Control Technology	Estimated Manufacturer Cost Increase per Unit		
		Low Estimate	High Estimate	Average <sup>1</sup>
PWC	Fuel Hose Permeation <sup>2</sup>	\$0.44	\$0.80	\$0.62
	Fuel Tank Permeation	\$0.00	\$6.93	\$2.31
	Venting Control (Carbon Canister)	\$0.67	\$1.24	\$0.95
	Deck Fill Plate	\$10.00	\$15.00	\$12.50
	Total Estimated Cost (Carbon Canister Option)	\$11	\$24	\$16
OB	Fuel Hose Permeation <sup>2</sup>	\$0.90	\$1.54	\$1.22
	Fuel Tank Permeation	\$0.00	\$20.21	\$9.55
	Venting Control (Carbon Canister)	\$1.38	\$2.55	\$1.97
	Deck Fill Plate	\$10.00	\$15.00	\$12.50
	Total Estimated Cost (Carbon Canister Option)	\$12	\$40	\$25
SD/I	Fuel Hose Permeation <sup>2</sup>	\$1.32	\$2.72	\$2.00
	Fuel Tank Permeation	\$0.00	\$25.00	\$8.33
	Venting Control (Carbon Canister)	\$2.09	\$3.87	\$2.98
	Deck Fill Plate	\$10.00	\$15.00	\$12.50
	Total Estimated Cost (Carbon Canister Option)	\$13	\$47	\$26

<sup>1</sup> Average of cost data received from industry responses.

<sup>2</sup> Assumes 5 g/m<sup>2</sup>/day @ 40°C fuel hose costs are implemented with additional testing costs.

## **B. COST ESTIMATES TO REDUCE PERMEATION EMISSIONS**

Throughout the rulemaking process ARB staff solicited cost information from manufacturers. The evaporative emissions control component manufacturers were contacted directly for carbon canister and deck fill plate cost estimates. In order to stay current with the market prices, several cost surveys were performed for fuel hoses and tanks (see Table I-4). The most recent surveys were conducted in late 2012 through early 2013. Therefore, cost data is presented as 2013 dollars. Due to the low response rate, the summarized cost data was presented to stakeholders during public workshops

with a request for their review and comment on the estimated cost increases. No additional information on cost increases was received.

**Table I-4: Cost Surveys Completed**

<b>Year Surveyed</b>	<b>Survey Type</b>	<b>Number of Manufacturers Surveyed</b>	<b>Number of Replies from Manufacturers</b>
2009	Hose	40	12 %
2009	Hose	18	28 %
2009	Evaporative Control System	1,131	Less than 1%
2010	Tank	31	19 %
2013	Hose	22	14 %
2013	Tank	27	18 %

## **1. FUEL HOSE PERMEATION**

Initially, staff proposed a 5 g/m<sup>2</sup>/day fuel hose permeation standard. In response to a ARB survey, industry provided cost estimates for producing a hose that would meet the proposed requirements. However, industry also commented that even though manufacturing a 5 g/m<sup>2</sup>/day fuel hose was technically feasible, the California market was not sufficient to support its production. Therefore, ARB proposes setting an initial fuel hose permeation standard of 10 g/m<sup>2</sup>/day starting in MY 2018, and a more stringent standard in the future based on commercial availability. Staff has verified with two major manufacturers that this interim permeation standard can be met using the same barrier thickness or with minimal change to the barrier thickness currently used in the U.S. EPA compliant fuel hose. As presented in Table I-5, staff anticipates minimal or no cost increase for fuel hose manufacturers to meet the MY 2018 ARB fuel hose permeation standard of 10 g/m<sup>2</sup>/day. Cost-effectiveness for this rulemaking is calculated as if the 10 g/m<sup>2</sup>/day standard were lowered to 5g/m<sup>2</sup>/day in MY 2018.

A total of three fuel hose cost surveys were conducted. Based on the recent 2013 cost survey, 22 hose manufacturers were contacted. Staff verified that only a small increase in cost would be associated with producing the ARB compliant fuel hose. Table I-5 summarizes the incremental cost increase from the manufacturers from no cost increase up to \$0.27 per foot.

**Table I-5: Increased Manufacturing Costs for 10 g/m<sup>2</sup>/day Fuel Hose per Foot (2013 Dollars)**

Fuel Hose Size x Length	Responses	Increased Manufacturing Costs		
		Low Estimate	High Estimate	Average
1/4" I.D. <sup>1</sup> x 1'	3	\$0	\$0.13	\$0.06
3/8" I.D. x 1'	3	\$0	\$0.19	\$0.09
1/2" I.D. x 1'	3	\$0	\$0.27	\$0.12

1: I.D. = Internal Diameter.

As previously discussed, ARB may implement a more stringent fuel hose standard in MY 2020 or later years. Staff conducted a cost survey to determine the increased cost to manufacture fuel hoses that meet the ARB proposed standard of 5 g/m<sup>2</sup>/day. The increased cost of implementing the more stringent fuel hose standard is provided in Table I-6.

**Table I-6: Increased Manufacturing Costs for 5 g/m<sup>2</sup>/day Fuel Hose per Foot (2013 Dollars)**

Fuel Hose Size x Length	Responses	Increased Manufacturing Costs		
		Low Estimate	High Estimate	Average
1/4" I.D. <sup>1</sup> x 1'	2	\$0.07	\$0.13	\$0.10
3/8" I.D. x 1'	2	\$0.11	\$0.19	\$0.15
1/2" I.D. x 1'	2	\$0.13	\$0.27	\$0.20

1: I.D. = Internal Diameter.

## 2. FUEL TANK PERMEATION

Staff surveyed 27 SIMW fuel tank manufacturers to obtain an estimate of the increased cost to produce fuel tanks that would meet ARB's proposed standards. Based on estimates received, the increased costs to produce ARB compliant fuel tanks ranged from about \$7 for smaller PWC tanks up to \$99 for larger fuel tanks. The estimated cost increase depends on tank capacity as shown in Table I-7.

**Table I-7: Fuel Tank Increased Manufacturing Costs (2013 Dollars)**

Fuel Tank Type or Size	Responses	Increased Manufacturing Costs		
		Low Estimate	High Estimate	Average
PWC	3	\$0	\$6.93	\$2.31
Near 33 gallons	4	\$0	\$20.21	\$9.55
Up to 80 gallons	3	\$0	\$25.00	\$8.33
80+ gallons	2	\$0	\$99.00	\$49.50

The U.S. EPA fuel tank permeation standard was implemented in MY 2011 for PWC and in MY 2012 for all other SIMW with installed fuel tanks. The increased cost estimates are primarily based on the data obtained from an ARB cost survey. Several manufacturers already produce marine fuel tanks that meet both the U.S. EPA and the proposed ARB standards.

### **C. COST ESTIMATES TO REDUCE DIURNAL VENTING EMISSIONS**

Staff expects that carbon canister and pressure relief valve manufacturers will certify their products and obtain a Component Executive Order of Certification, which SIMW manufacturers will use for certification. These component manufacturers will incur testing costs that will be reflected in the component price charged to SIMW manufacturers. Based on discussions with industry, staff anticipates most SIMW manufacturers will choose to certify by design, thereby avoiding testing costs. It is possible that a manufacturer might certify a SIMW to the performance standard. This requires a SHED with its associated testing costs. If a third party laboratory is used, the SHED testing cost per diurnal test ranges from \$2,000 up to \$7,500.

#### **1. CANISTER SYSTEMS**

Staff assumes that diurnal emissions will be primarily controlled using carbon canisters. Staff estimated that the proposed ARB diurnal standard is approximately 3 percent more stringent than the U.S. EPA diurnal standard. This is within the design margin for most carbon canister manufacturers. However, some manufacturers may need to adjust their design to account for the slight increase in canister capacity in order to maintain acceptable design margins of error. Applying a 3 percent linear increase in the size of a typical canister, staff calculated the increase in carbon canister cost needed to meet the more stringent ARB standard. The difference in cost between ARB and U.S. EPA level of control also represents the incremental cost increase to meet the more stringent ARB standard.

Based on communications with component manufacturers, there should be no additional cost to meet the ARB standard for venting control. However, staff is

conservatively applying an increased cost for designing a slightly larger canister. The estimate is based on quotes from manufacturers using confidential pricing information, and assumes that the carbon canister cost increases linearly as a function of canister size. Staff used linear regression plots to extrapolate a pricing scale. Staff estimates an average cost increase of \$2 per unit for SIMW to upgrade the carbon canisters to meet ARB compliance (Table I-8).

**Table I-8: Carbon Canister Increased Manufacturing Costs**

SIMW Category	Increased Manufacturing Costs		
	Low Estimate	High Estimate	Average
PWC	\$0.67	\$1.24	\$0.95
OB	\$1.38	\$2.55	\$1.97
SD/I	\$2.09	\$3.87	\$2.98
Overall Average:			\$1.96

## 2. NON-CANISTER SYSTEM

A pressure relief valve can also be used to control diurnal venting emissions as an alternative to using a carbon canister. A SIMW manufacturer will need to select an appropriate pressure relief valve to meet the proposed ARB diurnal standard. Staff has determined that in order to meet the ARB compliance requirement of 65 percent efficiency using a pressure relief valve, SIMW manufacturers will need to use a pressure relief valve with a 0.88 psi set point. This is similar to the pressure relief valve required to meet U.S. EPA requirements, and therefore no cost increase is expected.

### D. COST ESTIMATES TO REDUCE CARBURETOR EMISSIONS

Based on the most complete SIME certification database (2013), there are no spark-ignition marine families with engines greater than 30 kW that are carbureted. Manufacturers have already switched to fuel injection for this subcategory and no additional costs are estimated for compliance with the proposed standard. About 22 percent of the engine families with less than 30 kW engines are a mix of carbureted and fuel-injected engines. This proposal recommends harmonization with U.S. EPA SIMW standards under the 30 kW engine size threshold. Since we are proposing harmonization for less than 30 kW engines, no cost increase is included in the total cost to comply.

## II. IMPACT ON THE STATE ECONOMY

The proposed regulation will require more stringent evaporative emissions controls than those required by the current U.S. EPA standards. The proposal is not expected to impose a significant cost burden to component, SIMW or SIME manufacturers because the industry has already changed their manufacturing processes to meet the U.S. EPA compliance deadlines (Staff Report, Table I-2).

Staff estimates an average retail price increase of \$28 per unit for PWC, \$44 per unit for outboard SIMW, and \$45 per unit for sterndrive/inboard SIMW. This section discusses annualized costs and estimated benefits for each vessel category to assess impacts on the California economy.

Based on the data available, the levelized annual compliance equipment cost of the proposed regulation is estimated to be \$521,000 starting in MY 2018. Staff anticipates that the increased costs for evaporative emissions controls will be passed on to consumers resulting in an average retail cost increase of \$39, or about 0.2 percent of the average retail price for a new SIMW (Staff Report Table VII-1).

All major SIMW manufacturers are located outside of California. However, there are 53 small manufacturers located within the State. SIMW manufacturers will be required to certify their SIMW evaporative families each year over the life of the regulation. Reporting costs for California SIMW manufacturers are estimated in section III. Total annual reporting costs for California SIMW manufacturers are expected to be \$136,000.

Due to the wide range of estimated evaporative emissions control system component and SIMW lifetimes, staff used a compliance lifetime of 20 years for all SIMW categories. A 5 percent capital recovery factor (CRF) was applied to annualize compliance costs over the lifetime of the equipment. Annualization permits compliance costs to be recognized over the same period and at the same rate that regulatory compliance benefits (emission reductions) are achieved. Annualized future compliance costs were discounted at a 5 percent rate to calculate their present value, and then summed to calculate total compliance cost over the 20-year lifetime of the regulation. Levelization of the present value of total compliance equipment costs provides an annual average cost for the purposes of the cost-effectiveness calculation.

Tables II-1 through II-3 provide estimates of the total annualized compliance equipment costs of the SIMW regulation from 2018 to 2037. Reporting costs are estimated in section III, below. The annualized compliance equipment cost is expected to increase over time as additional compliant SIMW are sold. For example, the annual cost of regulatory compliance in 2020 reflects the annualized compliance equipment costs of compliant vessels sold in model years 2018, 2019, and 2020. Therefore, the annual cost of regulatory compliance presented in the tables accounts for cumulative sales of new SIMW from 2018 through 2037. Based on annualized costs over the 20-year equipment lifetime and applying a 5 percent discount rate to calculate present value, the

total cost of regulatory compliance equipment is expected to be \$6.5 million, and the total cost of regulatory reporting \$1.8 million. (2013 Dollars)

**Table II-1: PWC Estimates of Total Annual Costs of the Proposed Regulation for 2018 to 2037 (2013 Dollars)**

Year of Regulation	Number Compliant PWC Sold Annually <sup>1,2</sup>	Amortized Price Increase Over Life of Regulation <sup>3</sup>	Cumulative Compliant PWC Sold <sup>4</sup>	Annual Cost of Regulatory Compliance <sup>5</sup>	Present Value of Annual Cost for Regulatory Compliance <sup>6</sup>
2018	4446	\$2.25	4,446	\$9,990	\$9,990
2019	4477	\$2.25	8,923	\$20,048	\$19,093
2020	4530	\$2.25	13,453	\$30,227	\$27,416
2021	4585	\$2.25	18,038	\$40,527	\$35,009
2022	4640	\$2.25	22,678	\$50,952	\$41,918
2023	4695	\$2.25	27,373	\$61,501	\$48,188
2024	4752	\$2.25	32,125	\$72,177	\$53,860
2025	4809	\$2.25	36,933	\$82,982	\$58,973
2026	4866	\$2.25	41,800	\$93,915	\$63,566
2027	4925	\$2.25	46,725	\$104,981	\$67,671
2028	4984	\$2.25	51,709	\$116,178	\$71,323
2029	5044	\$2.25	56,752	\$127,511	\$74,553
2030	5104	\$2.25	61,857	\$138,979	\$77,389
2031	5166	\$2.25	67,022	\$150,585	\$79,858
2032	5228	\$2.25	72,250	\$162,330	\$81,988
2033	5290	\$2.25	77,540	\$174,216	\$83,801
2034	5354	\$2.25	82,894	\$186,245	\$85,321
2035	5418	\$2.25	88,311	\$198,418	\$86,569
2036	5483	\$2.25	93,794	\$210,737	\$87,565
2037	5549	\$2.25	99,343	\$223,204	\$88,329
<b>Grand Totals:</b>				<b>\$2,255,700</b>	<b>\$1,242,381</b>
<b>Levelized Annual Cost:</b>				-	<b>\$99,692</b>

<sup>1</sup> Based on MY 2018 to 2037 Population Estimates from AQPSD.

<sup>2</sup> Manufactured nationally (including California) and sold into California.

<sup>3</sup> Price increase amortized over life of rule = per PWC Cost in Current \$ x Capital Recovery Factor of 0.0802426.

<sup>4</sup> Cumulative total of compliant PWC sold (running total).

<sup>5</sup> Annual cost of regulatory compliance = \$2.25 x Cumulative compliant PWC sold.

<sup>6</sup> Annual cost of regulatory compliance (discounted @ 5 percent) = Annual cost of regulatory compliance / (1+0.05)^(Year of Regulation - 2018).

**Table II-2: Outboard SIMW Estimates of Total Annual Costs of the Proposed Regulations for 2018 to 2037 (2013 Dollars)**

<b>Year of Regulation</b>	<b>Number Compliant SIMW Sold Annually<sup>1,2</sup></b>	<b>Amortized Price Increase Over Life of Regulation<sup>3</sup></b>	<b>Cumulative Compliant SIMW Sold<sup>4</sup></b>	<b>Annual Cost of Regulatory Compliance<sup>5</sup></b>	<b>Present Value of Annual Cost of Regulatory Compliance<sup>6</sup></b>
2018	4619	\$3.53	4,619	\$16,308	\$16,308
2019	4640	\$3.53	9,259	\$32,691	\$31,134
2020	4696	\$3.53	13,955	\$49,271	\$44,690
2021	4752	\$3.53	18,707	\$66,048	\$57,055
2022	4809	\$3.53	23,516	\$83,027	\$68,307
2023	4867	\$3.53	28,383	\$100,211	\$78,518
2024	4925	\$3.53	33,308	\$117,600	\$87,755
2025	4985	\$3.53	38,293	\$135,200	\$96,084
2026	5044	\$3.53	43,337	\$153,009	\$103,562
2027	5105	\$3.53	48,442	\$171,033	\$110,249
2028	5166	\$3.53	53,608	\$189,272	\$116,197
2029	5228	\$3.53	58,836	\$207,731	\$121,456
2030	5291	\$3.53	64,127	\$226,412	\$126,074
2031	5354	\$3.53	69,481	\$245,315	\$130,096
2032	5419	\$3.53	74,900	\$264,447	\$133,564
2033	5484	\$3.53	80,384	\$283,810	\$136,517
2034	5550	\$3.53	85,934	\$303,405	\$138,993
2035	5616	\$3.53	91,550	\$323,233	\$141,026
2036	5683	\$3.53	97,233	\$343,298	\$142,647
2037	5752	\$3.53	102,985	\$363,606	\$143,891
<b>Grand Totals:</b>				<b>\$3,674,927</b>	<b>\$2,024,124</b>
<b>Levelized Annual Cost:</b>				-	<b>\$162,421</b>

<sup>1</sup> Based on MY 2018 to 2037 Population Estimate from AQPSD.

<sup>2</sup> Manufactured nationally (including California) and sold into California.

<sup>3</sup> Price increase amortized over life of rule = per SIMW Cost in Current \$ x Capital Recovery Factor of 0.0802426.

<sup>4</sup> Cumulative total of compliant SIMW sold (running total).

<sup>5</sup> Annual cost of regulatory compliance = \$3.53 x Cumulative compliant SIMW sold.

<sup>6</sup> Annual cost of regulatory compliance (discounted @ 5 percent) = Annual cost of regulatory compliance / (1+0.05)^(Year of Regulation - 2018).

**Table II-3: SD/I SIMW Estimates of Total Annual Costs of the Proposed Regulations for 2018 to 2037 (2013 Dollars)**

<b>Year of Regulation</b>	<b>Number Compliant SIMW Sold Annually<sup>1,2</sup></b>	<b>Amortized Price Increase Over Life of Regulation<sup>3</sup></b>	<b>Cumulative Compliant SIMW Sold<sup>4</sup></b>	<b>Annual Cost of Regulatory Compliance<sup>5</sup></b>	<b>Present Value of Annual Cost of Regulatory Compliance<sup>6</sup></b>
2018	7193	\$3.61	7,193	\$25,973	\$25,973
2019	7246	\$3.61	14,439	\$52,137	\$49,654
2020	7333	\$3.61	21,771	\$78,614	\$71,306
2021	7421	\$3.61	29,192	\$105,410	\$91,057
2022	7510	\$3.61	36,702	\$132,527	\$109,030
2023	7600	\$3.61	44,302	\$159,970	\$125,341
2024	7691	\$3.61	51,993	\$187,742	\$140,096
2025	7783	\$3.61	59,776	\$215,847	\$153,398
2026	7877	\$3.61	67,653	\$244,289	\$165,345
2027	7971	\$3.61	75,624	\$273,073	\$176,025
2028	8067	\$3.61	83,691	\$302,202	\$185,526
2029	8164	\$3.61	91,855	\$331,681	\$193,927
2030	8262	\$3.61	100,117	\$361,513	\$201,304
2031	8361	\$3.61	108,478	\$391,704	\$207,729
2032	8461	\$3.61	116,939	\$422,256	\$213,268
2033	8563	\$3.61	125,502	\$453,176	\$217,985
2034	8665	\$3.61	134,167	\$484,466	\$221,939
2035	8769	\$3.61	142,937	\$516,132	\$225,187
2036	8875	\$3.61	151,811	\$548,178	\$227,779
2037	8981	\$3.61	160,792	\$580,608	\$229,766
<b>Grand Totals:</b>				<b>\$5,867,497</b>	<b>\$3,231,635</b>
<b>Levelized Annual Cost:</b>				<b>-</b>	<b>\$259,315</b>

<sup>1</sup> Based on MY 2018 to 2037 Population Estimate from AQPSD.

<sup>2</sup> Manufactured nationally (including California) and sold into California.

<sup>3</sup> Price increase amortized over life of rule = per SIMW Cost in Current \$ x Capital Recovery Factor of 0.0802426.

<sup>4</sup> Cumulative total of compliant SIMW sold (running total).

<sup>5</sup> Annual cost of regulatory compliance = \$3.61 x Cumulative compliant SIMW sold.

<sup>6</sup> Annual cost of regulatory compliance (discounted @ 5 percent) = Annual cost of regulatory compliance / (1+0.05)^(Year of Regulation - 2018).

Staff evaluated the levelized cost-effectiveness which is defined as the levelized annual equipment cost plus average annual reporting cost divided by average annual estimated emission reductions. The average annual estimated emissions reductions take into account the number of compliant SIMW in service during each year of the regulation,

and average annual emissions reductions over the 20 years. Results of the cost-effectiveness calculation are shown in Table II-4.

**Table II-4: Regulatory Cost-Effectiveness (2013 Dollars)**

	<b>Total</b>
Total Levelized Equipment Cost (\$)	<b>\$521,428</b>
Annual Reporting Cost (\$)	<b>\$136,104</b>
Average Annual Emissions Reductions (lbs.)	<b>132,641</b>
Levelized Cost-Effectiveness (\$/lb.)	<b>\$4.96</b>

Table II-5 summarizes the present value of total cost of regulatory compliance over the lifetime of the regulation, which is based on the average estimated retail cost increases calculated in section I.A and the reporting costs estimated in section III.

**Table II-5: Present Value of Total Cost of Regulatory Compliance (2013 Dollars)**

<b>Marine SIMW Category</b>	<b>Cumulative Compliant Vessel Population</b>	<b>Present Value of Total Cost of Regulatory Compliance</b>
PWC	99,943	\$1,242,381
OB	102,985	\$2,024,124
SD/I	160,792	\$3,231,635
<b>Reporting Cost:</b>		<b>\$1,780,965</b>
<b>Total Statewide Dollar Cost:</b>		<b>\$8,279,105</b>

The following cost estimate equations are used to develop values in Tables II-1 through II-5.

Annualized Price Increase

$$API = AERPI \times CRF$$

Where,

- API = Annualized Price Increase
- AERPI = Average Estimated Retail Price Increase
- CRF = Capital Recovery Factor

### Annual Cost of Regulatory Compliance

$$ACRC = API \times CCWS$$

Where,

ACRC = Annual Cost of Regulatory Compliance  
API = Amortized Price Increase  
CCWS = Cumulative Compliant SIMW Sold

### Present Value of Annual Cost of Regulatory Compliance

$$PVACRC = ACRC \times (((1 + IR)^{-YRS}))$$

Where,

PVACRC = Present Value of Annual Cost of Regulatory Compliance  
ACRC = Annual Cost of Regulatory Compliance  
IR = Interest Rate (5 percent)  
YRS = Difference in Years from Future and Present Years

### Levelized Annual Cost

$$LAC = \sum (PVACRC_{All\ Years}) \times CRF$$

Where,

LAC = Levelized Annual Cost  
PVCARC = Present Value of Annual Cost of Regulatory Compliance  
CRF = Capital Recovery Factor

### Cost-Effectiveness of Regulation

$$LCE = LAC \div APR$$

Where,

LCE = Levelized Cost-Effectiveness (per Pound ROG for CY2037)  
LAC = Levelized Annual Cost  
APR = Average Annual Pounds Reduced for SIMW over 20 years

### III. ESTIMATED ANNUAL REPORTING COSTS FOR CALIFORNIA BUSINESSES

No fee will be required to apply or obtain a SIMW Executive Order of Certification. However, SIMW manufacturers may incur additional costs for collecting the test data, preparing the application form, and for submitting a certification application to ARB. SIMW manufacturers must certify each evaporative family annually, and if any changes are made to the evaporative emissions control system, then the manufacturer must submit running change information for that model year.

Based on 2012 U.S. Economic Census data, about 96 percent of SIMW manufacturers in California are small business establishments as designated by the employment standard of less than 100 employees. Each SIMW manufacturer will group their SIMW into evaporative families based on the pairing of fuel tank volumes with the appropriate sized carbon canisters. Two component manufacturers have defined five carbon canister classes to accommodate varying fuel tank sizes up to 100 gallons for trailerable SIMW (250 gallons for nontrailerable SIMW). For this analysis, staff assumed that up to five evaporative families could exist for California SIMW manufacturers.

Based on similar programs that require reporting activities and taking into consideration that small boat builders have limited experience in applying for SIMW certification, staff estimated that 10 hours would be needed to complete one SIMW Executive Order of Certification application.

**Table III-1: Estimated Time to Complete Reporting for SIMW Certification**

<b>Reporting Tasks</b>	<b>Hours Estimated</b>
Getting Started (EPA 3 Digit Code, Intro Letter)	2 Hours
Fill Out Application (Approximately 5 Pages)	5 Hours
Submit Information Electronically	3 Hours
<b>Total Estimated Time:</b>	<b>10 Hours</b>

Assumptions:

- Marine engineer hourly mean wage: \$39.82 (BLS, 2014).
- 1904 hours = Actual hours working on the job. 2088 accountable hours per year, less 104 holiday hours per year, and less 80 hours of vacation per year, equals 1904 actual work hours. (Source: Attachment C of PY Calculator Package from Greenhouse Gas Enforcement Section).
- Pay rate adjusted by approximately 23 percent to include Federal Unemployment (after credit)-0.6 percent, CA State Unemployment-3.4 percent, Social Security/Medicare-7.65 percent, CA Workers Compensation -17 percent.

- Other benefits not included in the estimate (Health insurance, holidays, vacation, sick pay, breaks, etc.).

Finally, this adjusted pay rate was multiplied by the total hours needed for a SIMW manufacturer with five evaporative families to complete the reporting process. The estimated annual reporting cost would be as high as \$2,568 for California businesses.

**Table III-2: Estimated Annual Reporting Costs for California Businesses (2013 Dollars)**

<b>Number of Evaporative Families</b>	<b>Time to Apply, Hours</b>	<b>Pay Rate, \$ per Hour</b>	<b>Adjusted Pay Rate, \$ per Hour</b>	<b>Estimated Total Cost</b>
5	10	\$39.82	\$51.37	\$2,568

Staff also determined the annualized reporting costs as shown in Table III-3.

**Table III-3: Total Annual Reporting Costs for California Businesses (2013 Dollars)**

<b>Year</b>	<b>Number of California Manufacturers Reporting Each Year<sup>1</sup></b>	<b>Annual Per-Company Cost of Reporting</b>	<b>Total Annual Cost of Regulatory Reporting<sup>2</sup></b>	<b>Present Value of Annual Cost of Regulatory Reporting<sup>3</sup></b>
2018	53	\$2,568	\$136,104	\$136,104
2019	53	\$2,568	\$136,104	\$129,623
2020	53	\$2,568	\$136,104	\$123,450
2021	53	\$2,568	\$136,104	\$117,572
2022	53	\$2,568	\$136,104	\$111,973
2023	53	\$2,568	\$136,104	\$106,641
2024	53	\$2,568	\$136,104	\$101,563
2025	53	\$2,568	\$136,104	\$96,727
2026	53	\$2,568	\$136,104	\$92,121
2027	53	\$2,568	\$136,104	\$87,734
2028	53	\$2,568	\$136,104	\$83,556
2029	53	\$2,568	\$136,104	\$79,577
2030	53	\$2,568	\$136,104	\$75,788
2031	53	\$2,568	\$136,104	\$72,179
2032	53	\$2,568	\$136,104	\$68,742
2033	53	\$2,568	\$136,104	\$65,468
2034	53	\$2,568	\$136,104	\$62,351
2035	53	\$2,568	\$136,104	\$59,382
2036	53	\$2,568	\$136,104	\$56,554
2037	53	\$2,568	\$136,104	\$53,861
<b>Grand Totals:</b>			<b>2,722,080</b>	<b>\$1,780,965</b>

<sup>1</sup> Based on 2012 Economic Census.

<sup>2</sup> Annual cost of regulatory reporting = \$2568 x # of SIMW Manufacturer.

<sup>3</sup> Annual cost of regulatory reporting (discounted @ 5 percent) = Annual cost of regulatory reporting / (1+0.05)^(Year of Regulation - 2018).

**IV. COST OF COMPLIANCE FOR ALTERNATIVE REQUIRING FUEL INJECTION ON SIME ≤ 30 KW**

Staff initially proposed a requirement for fuel injection for all SIME. However, industry claimed that the costs to redesign and retool smaller engines (less than or equal to 30 kW) were prohibitive. Staff evaluated the costs of compliance for smaller engines and concluded that it would be cost-prohibitive. To determine the total cost of compliance for requiring fuel injection on SIME less than or equal to 30 kilowatts (kW), staff used the following approach:

1. Determined the average weighted cost for an outboard SIME.

2. Adjusted for retail price increase of 69 percent (per industry estimate).
3. Applied an additional price increase to cover the cost of evaporative controls.
4. Annualized the total retail cost increase over the life of the SIMW.
5. Multiplied the annualized unit cost by cumulative compliant SIMW sold from 2018 through 2037.

Introducing fuel injection technology to less than or equal to 30 kW SIME would be very costly. In the case of smaller SIMEs, there is limited physical space to support the electrical or hardware elements associated with fuel injection technology. Expensive retooling would be required for manufacturers to switch from carbureted to fuel injected SIMEs. The estimated weighted average compliance cost per outboard SIME is \$1,728. The annual cost of regulatory compliance would be over \$68 million.

In conclusion, staff proposes to harmonize with the U.S. EPA for design standards for SIME less than or equal to 30 kW, and set more stringent standards for SIMW with engines greater than 30 kW.

## **V. FUEL HOSE COST INFORMATION FOR A 5g/m<sup>2</sup>/day PERMEATION STANDARD**

Starting in MY 2018 and thereafter, the fuel hose permeation standard will be lowered to 5 g/m<sup>2</sup>/day at 40°C if the Executive Officer determines that all of the following criteria are met:

1. A 5 g/m<sup>2</sup>/day fuel hose has been certified, and
2. A certified 5 g/m<sup>2</sup>/day fuel hose is commercially available in all common sizes.

The more stringent fuel hose permeation standard would be implemented no earlier than MY 2018 and effective two years from the date of the finding. The increased retail cost increase to meet this more stringent standard will range from about \$0.60 to \$2.00 above the U.S. EPA costs for fuel hose permeation control. The increased costs based on the more stringent standard for ARB evaporative emissions controls are presented in Table V-1 and included in the primary compliance cost analysis in sections I and II, above.

**Table V-1: Estimated Total Retail Cost Increase for More Stringent 2020 ARB Standard, If Imposed (2013 Dollars)**

<b>SIMW Category</b>	<b>Additional Cost if Fuel Hose Standard is Lowered</b>
PWC	\$0.60
OB	\$1.20
SD/I	\$2.00

The initial proposal, presented during the March 3, 2010 stakeholder meeting, allowed the option of certifying fuel hoses using SAE J1737 for permeation testing. Because industry noted that performing SAE J1737 permeation testing is more expensive and would adversely increase the cost to manufacture the ARB compliant fuel hose, staff sent out a second fuel hose cost survey to determine the overall price increase. The overall price increase includes manufacturing costs, testing costs to meet the U.S. Coast Guard safety requirements, costs for any special connectors or clamps, and costs for retail markup.

Limited data was received for the second fuel hose cost survey. However, a major fuel hose manufacturer commented that the cost to manufacture the more stringent fuel hose (5 g/m<sup>2</sup>/day at 40°C) would be 40 to 60 percent more than the U.S. EPA compliant fuel hose. Staff completed a cost survey in 2013 to update the more stringent fuel hose cost data, and as shown in Table I-6, the range to upgrade to an ARB compliant fuel hose is about \$0.10 to \$0.20 per foot.

The average price for fuel hose permeation testing using SAE J1737 on 5 fuel hose samples is \$5,360 (3 responses). Assuming this cost will be spread over all fuel hoses sold in the 20-year compliant period, and over 11 fuel hose manufacturers, staff calculated the extra cost for testing to be \$0.02 per foot. Staff assumes this cost would be added to the fuel hose manufacturing cost for each fuel hose size. This additional cost is included in the cost analysis in Table I-3.

## **VI. POTENTIAL FISCAL IMPACT TO STATE AND LOCAL AGENCIES**

### **A. FISCAL IMPACT ON STATE GOVERNMENT (ARB), FISCAL YEARS: 2014-2015 2015-2016, 2016-2017**

ARB is proposing new evaporative emissions control regulations for SIMW that will improve California air quality by reducing hydrocarbon (HC) emissions. This reduction is above the current levels attainable by the U.S. EPA rule. To implement the program and achieve maximum air quality benefits, additional staff will be required to develop, maintain, and issue Executive Order of Certifications for SIMW and Component Executive Order of Certifications for evaporative emissions control system components. Since this will be a new program, SIMW manufacturers are inexperienced with ARB

certification. Extensive outreach and guidance will be needed during the first few years of implementation. Major SIMW manufacturers are already familiar with evaporative emissions control system component record keeping as is required by the U.S. EPA rule. However, the proposed ARB regulation will also require SIMW manufacturers to obtain an Executive Order of Certification. Additional staff will be required to process certification applications and enforce the proposed regulation to insure that non-compliant SIMW do not enter the California market.

Because SIMW evaporative emissions originate from only one category, the proposed regulation does not conform to the typical person year (PY) calculator and scheme that is based on the Greenhouse Gas regulation. Instead, a more qualitative approach is used in estimating the PY positions required to implement this regulation. Affected ARB Divisions were asked to prepare a PY estimate based on a list of common assumptions and on experience from implementing similar programs.

Monitoring and Laboratory Division’s (MLD) Engineering and Regulatory Development Section estimated that 1 PY will be required to implement the proposed SIMW regulation. In order to sell SIMW in California for MY 2018, all SIMW and evaporative emissions control system components must be California-certified compliant to the proposed emissions standards, and each component and SIMW manufacturer must obtain an Executive Order of Certification. Staff estimates about seven hours will be needed to review and analyze the data, draft the Component Executive Order of Certification, and communicate with manufacturers. ARB has allocated 0.75 PY to Small Off-Road Engine (SORE ) component certification and has processed approximately 150 Component Executive Order of Certifications. For MLD, as shown in Table VI-1, 0.64 PY would be absorbed by the existing budgets and resources for the Testing and Certification Section.

**Table VI-1: MLD PY Work Matrix**

Total Works Hours per Year:		1904
Estimated Number of Component Manufacturers:		175
<b>MLD Tasks for Component Certifications</b>	<b>Estimated Hours per Application</b>	<b>Estimated Total Hours per Year</b>
Review Application	1.5	262.5
Communicate with Manufacturer	1.0	175.0
Draft Executive Order	1.0	175.0
Review Data	1.0	175.0
Perform Statistical Analysis	1.0	175.0
Correspond with ECARS	0.5	87.5
Process Application to Completion	1.0	175.0
<b>MLD Total Estimate:</b>		<b>1225 Hours/Year (or 0.64 PY)</b>

Staff from the Emissions Compliance, Automotive Regulations and Science (ECARS) Division estimated that 2.5 PY would be required in the Off-Road Spark-Ignited Engine Certification Section to implement the proposed regulation. See Table VI-2 for the ECARS work matrix. ECARS staff expects to issue over 800 evaporative family Executive Orders of Certification per year, and about 5.5 hours per application will be needed to review and prepare the certification documents. Specifically, staff must review each manufacturer’s certification application to ensure that it meets all applicable California evaporative emissions requirements including evaporative emissions control system component information, performance based emissions data, warranty statements, and labeling. Staff will implement a streamlined electronic certification process for this category. This entails developing and maintaining a Document Management System (DMS), which includes individual account creation and file system administration for each SIMW manufacturer. In addition as part of the certification outreach effort, staff will conduct periodic on-line training sessions to inform manufacturers how to use the DMS as well as to answer questions regarding how to complete the certification application. Based on experience certifying existing evaporative families for the SORE program, 2.5 PYs are required to certify over 600 evaporative families per year. ECARS will need 2.3 PYs beginning fiscal year (FY) 2016-2017, and would be required every year thereafter for annual SIMW certification.

**Table VI-2: ECARS PY Work Matrix**

Total Work Hours per Person per Year:		1904
Estimated Number of SIMW Applications:		800
<b>ECARS Tasks for Processing Evaporative Certification Applications</b>	<b>Estimated Hours per Application</b>	<b>Estimated Total Hours per Year</b>
Review SIMW Information	2.0	1600
Check Evaporative Component Information, Warranty, Labeling, Etc.	2.0	1600
Compliance Assistance and Communication with Manufacturer	1.0	800
Issue Executive Order	0.5	400
<b>ECARS Total Estimate:</b>		<b>4400 Hours/Year (or 2.3 PYs)</b>

Enforcement Division staff estimated an additional 0.5 PY in the Vehicle Enforcement Section will be required to implement the proposed regulation. This PY estimate is based on expanding the enforcement duties associated with the SIME regulation for controlling exhaust and evaporative emissions control for high-performance SIME (Table V-3). SIME enforcement for the exhaust regulation currently accounts for 20 percent of the enforcement field duty for four staff members who conduct about 452 inspections yearly. Of those SIMW selected for exhaust inspection, enforcement staff

plans to inspect 10 percent for compliance with the proposed evaporative emissions standards. No enforcement duties would be required until FY 2016-17. Enforcement staff plans to start inspections one year prior to implementation of the SIMW regulation. The reason for this is that SIMW manufacturers typically pre-sell boats one year in advance. An additional 0.5 PY is needed beginning with FY 2016-2017, and would be required every year thereafter.

**Table VI-3: Enforcement Division PY Work Matrix**

Estimated Number of Annual Evap. SIMW Inspections:		45
<b>Enforcement Division Tasks for Inspections and Violations</b>	<b>Estimated Hours per Inspection or Case</b>	<b>Estimated Total Hours per Year</b>
Conduct Full Inspection of Evaporative Emissions Systems on 10% of inspections (about 45 inspections)	8	360
10% Projected to Result in Violations (about 5 cases)	120	600
<b>Enforcement Division Total Estimate:</b>		<b>960 Hours/Year (or 0.5 PY)</b>

Based on the following assumptions, experience from other programs, and work matrices from ECARS and Enforcement Division, staff estimated a total of 3 PYs will be needed to implement the proposed regulation over the first three FYs, resulting in an increase cost to the state of \$631,000. The fiscal impact on the State government is presented in Table VI-4.

Assumptions:

- 1904 hours = Actual hours working on the job. 2088 payable hours per year, less 104 holiday hours per year, and less 80 hours of vacation per year, equals 1904 actual work hours. (Source: Attachment C of PY Calculator Package from Greenhouse Gas Enforcement Section)
- \$175,000 = Total average annual cost for a new CARB employee (PY).
- 175 Estimated control component manufacturers.
- 800 Estimated SIMW applications to be processed by ECARS per year.

**Table VI-4: Fiscal Impact on State Government (2014 Dollars)**

<b>Fiscal Year</b>	<b># PYs</b>	<b>Unit PY Cost<sup>1</sup></b>	<b>Travel</b>	<b>Equipment</b>	<b>Other Costs</b>	<b>Total</b>
Current Year, 2014-2015	0.0	\$175,000	\$0	\$0	\$0	\$0
FY 2015-2016	0.0	\$175,000	\$0	\$0	\$0	\$0
FY 2016-2017	3.0 <sup>2</sup>	\$175,000	\$0	\$0	\$0	\$525,000
<b>Totals:</b>	<b>3.0<sup>2</sup></b>	<b>\$175,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$525,000</b>

<sup>1</sup> Reflects the average annual cost of a new CARB employee.

<sup>2</sup> Continuation of PYs to be requested for FY 2016-2017 and after MY 2018 SIMW regulation implementation.

## **B. POTENTIAL FISCAL IMPACTS TO STATE AGENCIES (NON-ARB)**

As required by section 11346.5 of the Government Code, research was done in 2010 to determine the extent of potential fiscal impacts on non-ARB state and local agencies. Staff started by investigating SIMW purchasing patterns. Due to problems with accessing old data files and incomplete submittal records, Department of General Services (DGS) staff was unable to provide any state agency-wide details. Instead, DGS staff provided a contact list of past purchasers. Staff contacted agency representatives asked how many SIMW were purchased for the current Fiscal Year (FY) 2010-2011 and how many boats were projected for purchase over the next two FYs (i.e., FY 2012-2012, FY 2012-2013). The details of the survey are presented in a Table VI-5.

All agencies contacted in 2010 commented that the ongoing California budget restrictions put them under severe limitations in their ability to acquire new equipment. Department staff consistently commented that their purchasing budgets have been drastically reduced and that they have been denied authority to purchase new SIMW for the current FY. Foreseeing continued budget constraints for the next two years, department staff also reported that there were not projected SIMW purchases.

Prior to the budgetary shortfalls encountered in 2010, department staff commented that SIMW purchases fluctuated, reaching up to 25 SIMW purchased per year. To reduce the bias caused by the recent poor economy, staff expanded the survey to include inquiries about historical purchases by each agency when a budget was not affected by a recession. Staff specifically asked each agency representative for an average number of boats purchased per year. Some agencies provided past purchasing data. An accurate number of new SIMW purchases for the current FY for the Department of Boating and Waterways could not be reported because the grant approval process was on-going during this survey. An agency representative estimated that an average of 12 SIMW were purchased in previous years and that those new SIMW purchases were

made on behalf of departments that exceeded their delegated purchasing authority. The estimated average of 8 new SIMW were purchased for non-ARB agencies. Under the proposed SIMW regulation, this number of purchases would add an additional cost to the state of about \$304 per year. A listing of the agencies contacted and a summary of their purchasing information collected is presented in the following table.

**Table VI-5: State Agencies Contacted for SIMW Purchasing Information**

State Agency	Projected New SIMW Purchase			Average Estimated SIMW Purchased Annually <sup>1</sup>
	Current FY	Current FY + 1	Current FY + 2	
Department of Boating and Waterways	Unknown <sup>2</sup>	0	0	12
Department of Fish and Game	0	0	0	6 <sup>3</sup>
Department of General Services	0	0	0	5 <sup>3</sup>
Department of Parks and Recreation	0	0	0	5 to10
Department of Food and Agriculture	No reply	No reply	No reply	No reply
State Water Control Boards	No reply	No reply	No reply	No reply
<b>Average:</b>				<b>8</b>
<b>Estimated State Fiscal Impact<sup>4</sup>:</b>				<b>\$304</b>

<sup>1</sup> Estimate based on historical data as reported by agency staff.

<sup>2</sup> Unknown at the time of survey because the grant approval process was ongoing.

<sup>3</sup> Time period noted as 2005-2009.

<sup>4</sup> Based on a the average retail cost increase (\$39).

### C. POTENTIAL FISCAL IMPACTS TO LOCAL AGENCIES

Similar to state agencies, staff initially surveyed 19 county and local agencies to determine how many new SIMW were purchased in the current FY and the following 2 FYs. Staff contacted the Department of Boating and Waterways and obtained a list of local agencies. The selected departments are listed in the Table VI-6.

**Table VI-6: List of Local Agencies/Departments Contacted**

Alameda County Sheriff	San Diego Police
Contra Costa County Sheriff	San Francisco Police
Del Norte County Sheriff	San Luis Obispo County Sheriff
Humboldt County Sheriff	San Mateo County Sheriff
Lake County Sheriff	Santa Barbara County Sheriff
Los Angeles County Fire	Santa Cruz County Sheriff
Marin County Sheriff	Solano County Sheriff
Mendocino County Sheriff	Sonoma County Sheriff
Monterey County Harbor	Ventura County Sheriff
Orange County Sheriff	

Most local law enforcement agencies purchase new SIMW through their county procurement process and with the aid of grant money from the Department of Boating and Waterways. New SIMW can also be purchased with the aid of grant money from the United States Department of Homeland Security. Additionally, several law enforcement agencies commented that new SIMW could also be acquired through donations from local specialized organizations.

Due to the poor economic climate and the resulting budget constraints, very few local agencies were given the authority and funding to purchase new SIMW in FY 2010-2011. Of those agencies that replied to the ARB survey, the majority stated that no SIMW would be purchased for the current year or in the near future. Some local agencies have encountered such severe cutbacks that they may only maintain their current fleet with no new purchases planned in the future. The local purchasing data collected for the current FY and the following two FYs is consistent with staff's assessment that local agencies purchase very small numbers of SIMW per year. One local agency stressed that they rely heavily on maintaining their current fleet of SIMW by purchasing replacement engines rather than replacing the SIMW periodically.

Staff also expanded the email/telephone survey to determine historical purchasing frequency so as to minimize the influence of the poor economy and atypical funding. Rather than estimate the number of new SIMW purchased during normal years when sufficient funding was allocated, some local agencies preferred to estimate how often old SIMW were replaced with new SIMW. Based on the historical estimates provided, staff determined that most local agencies averaged about one new SIMW purchase every seven years. Under the proposed SIMW regulation, this small number of purchases would add an additional cost to each local agency of about \$39 per SIMW approximately every five years when a new SIMW is purchased. A summary of the local purchasing data is presented in the following table.

**Table VI-7: Local Departments Contacted for SIMW Purchasing Information**

Local Department	Projected New SIMW Purchase			SIMW Replacement Frequency <sup>1</sup>
	Current FY	Current FY + 1	Current FY + 2	
City Police	0	0	0	1-2 SIMW every 5-10 years
County Fire	0	0	0	0 boats in the last 8-10 years
County Sheriff 1	0	0	0	1 SIMW every 10 years
County Sheriff 2	0	0	0	5 SIMW in the last 8 years
County Sheriff 3	0	0	0	1 SIMW every 4-5 years
County Sheriff 4	1	0	0	1 SIMW every 5-7 years
County Sheriff 5	1	1	0	1 SIMW per year
County Sheriff 6	0	0	0	2 SIMW every 12 years
County Sheriff 7	0	1	0	1 SIMW every 5-10 years
County Sheriff 8	1	0	0	1 SIMW every 3 year
County Sheriff 9	0	1	0	1 SIMW every 5 years

<sup>1</sup> Represents new SIMW purchased for a specified time period.

## VII. REFERENCES

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