2017 VINEYARD CUP
EMISSIONS FOOTPRINT REPORT

Sail Martha's Vineyard is an organization committed to operating in an environmentally responsible manner. As a regatta, the Vineyard Cup supports **LOCALLY Sourced** goods and services while simultaneously maintaining a **ZERO Waste** policy. This year the 2017 Vineyard Cup furthered its sustainability efforts with the utilization of supportable metrics in measuring the emissions associated with this event.

The most apparent emission sources for the 2017 Vineyard Cup were electricity usage, vehicle emissions, support boat emissions, and emissions from burning wood by the event caterer. Additionally, we undertook the creation of a tool to calculate emissions from vessels that travelled to the regatta.

Thank you to Robbie English for collecting this data, creating an emissions calculator tool for traveling vessels, and compiling this report.

EMISSIONS FOOTPRINT

The 2017 Vineyard Cup Regatta emissions footprint totaled 0.97 tons of CO_2e (Carbon Dioxide equivalent). This is a remarkably low number for an event that involved almost 1,000 people in attendance over three days. For comparison, the same footprint is emitted from a modern vehicle driving ~2,300 miles.

Emissions Source	Tons of CO_2e
Electricity	0.24
Traveling vessels	0.32
Wood burning (for catering)	0.22
Support boats	0.15
Vehicles	0.04
TOTAL	**0.97**

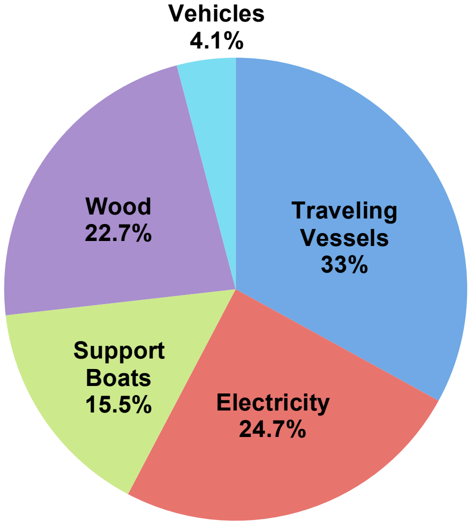

Table 1 and Figure 1. Breakdown of 2017 Vineyard Cup emissions

Traveling vessels were the largest source of emissions for the 2017 Vineyard Cup, accounting for 33% of total emissions. We believe we broke new ground in attempting to calculate the emissions footprint of vessels traveling to a regatta. We received data from 18 vessels, which comprises only 26% of the 69 vessels in attendance. Ideally, this tool will include data from all vessels and could be applied to regattas throughout the country. Apart from minimizing engine use by sailing to a regatta, there are few methods for reducing this footprint. Thus, the key function of the vessel emissions tool is to generate better awareness of carbon footprints and their sources. This tool also provides a more accurate carbon footprint calculation for a regatta.

The third largest source of emissions came from catering. Although the burning of wood involves a sizeable emissions footprint, it was reduced by a number of key factors. The catering company (Moveable Feast Catering) used only dead oak wood, which has a lower moisture content and thus yields a smaller emissions footprint. As Sail MV supports locally sourced services, all the wood was also sourced on-island, so minimal shipping/transport emissions were involved.

VINEYARD CUP SUSTAINABILITY EFFORTS

In hosting the Vineyard Cup, Sail MV makes a significant effort to utilize sustainable practices. Often event garbage is not into its proper categories, resulting in the majority of waste being put into a landfill. Separating waste into recycling, reusable, compost, and landfill yielded substantial results for the 2017 Vineyard Cup. Only 4.7 lbs. of waste was sent to the landfill (less than 1% of the total generated waste). This is an impressive statistic for an event that attracted over 1,000 people. The best way to reduce trash headed to the landfill is to have a dedicated team assigned to waste management. With the right oversight and event management plan in place this is an achievable goal for similar regatta events. Sail MV has created a guide that can be utilized for future events and also shared with others hosting similar events.

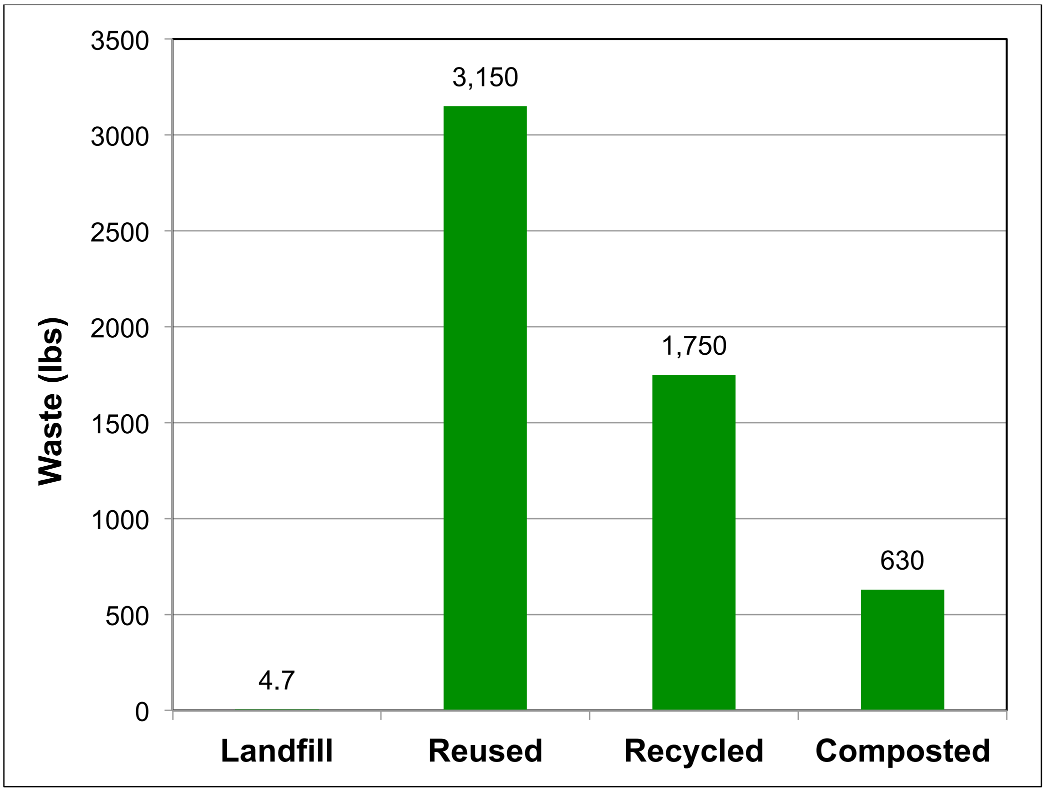

Figure 2. Breakdown of waste generated at 2017 Vineyard Cup

OFFSETING OPPORTUNITES

After the 2017 Vineyard Cup carbon footprint was calculated, the next step was to investigate offsetting our emissions. Guidance was sought from Sailors for the Sea. Sail MV has worked with this organization and their Clean Regatta Program for the past four years. The 2017 Vineyard Cup achieved Platinum Level status for our environmental efforts.

It was suggested we connect with the Ocean Foundation's SeaGrass Grow program as a way to offset our emissions. This program restores and protects seagrass beds. Seagrass beds are ecologically important for a multitude of reasons: they provide food for grazers such as manatees and sea turtles, they provide critical habitat for shellfish, juvenile fish, and crustaceans, they buffer wave energy from storms, they filter bacteria, and they take up and sequester carbon.

Sail MV purchased carbon credits from SeaGrass Grow to offset the small carbon footprint from this event. The total cost of the 2017 Vineyard Cup footprint was $10.00 US.

APPENDIX

The first step in calculating the carbon footprint of the 2017 Vineyard Cup was to set the boundaries in which to measure the carbon footprint. Greenhouse Gases come from a variety of sources that can categorized into three scopes (Fig. 3). These scopes enabled the Vineyard Cup to define the boundaries of its carbon footprint (Table 1). Scopes 1 and 2 were included in our inventory, compiled in accordance with the *WRI Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard, Revised Edition*. Traveling vessels is the only Scope 3 source included in the 2017 inventory.

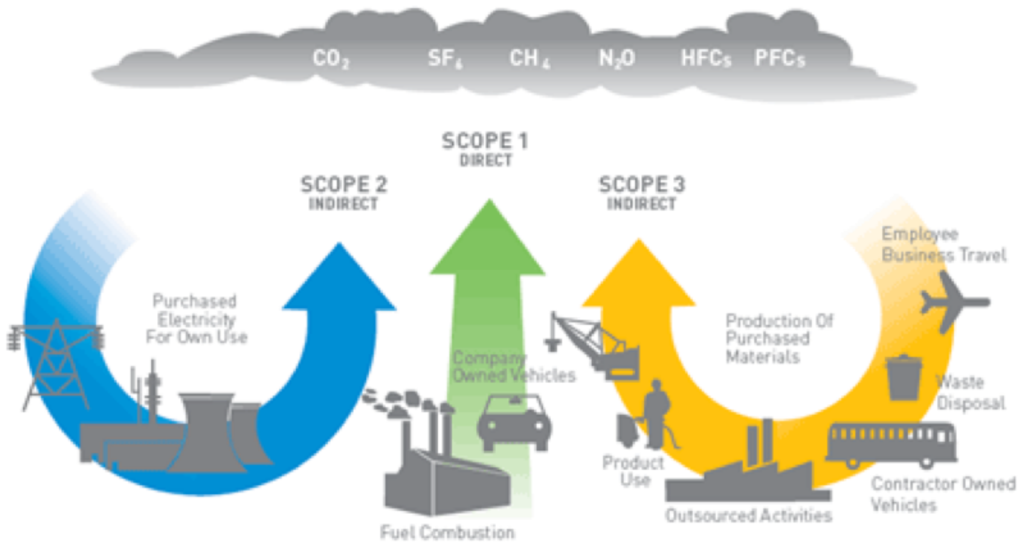

Figure 3. GHG Scopes (Source; Life Cycle Initiative, 2016)

Scopes	Definition	Vineyard Cup Example
Scope 1	Scope 1 includes GHG emissions that occur directly under the Vineyard Cup's operational control from stationary or mobile combustion of fossil fuels.	Emissions from Sail MV vehicles. Emissions from Vineyard Cup support boats. Emissions from catering (wood burning).
Scope 2	Scope 2 includes GHG emissions that are indirect from the consumption of imported electricity from a public or private utility	Electricity from the grid that is delivered to The Vineyard Cup site to power everything.
Scope 3	Scope 3 typically includes GHG emissions that occur upstream or downstream of the reporting organization (Sail MV), but may be captured as direct emissions in another entity's inventory.	Emissions from vessels traveling to compete in the Vineyard Cup.

Table 2. Vineyard Cup Green House Gas Scopes

Emission Source: Electricity purchased

Activity Data: Meter reading

Calculations Process: Convert sum of total kWh consumed to MWh by dividing using the conversion value of 1000 to match Emission Factor units. Using Emission factors, multiply MWh total, then divide by either 1,000,000 or 2204.62 to convert grams or pounds to tons depending on which units are being used. Finally, multiply t CO2, t CH4 and t N2O by their respective GWP (Global Warming Potential) and add up to attain total t CO2e for electricity consumed.

Emission Factors: These were obtained from The Climate Registry (TCR). Using TCR (2016) US grid specific emission factors found in table 14.1 (US specific) yielded more accurate results.

Electricty		
Date	**Usage**	**Units**
07/07/2017	285	kWh
07/08/2017	307	kWh
07/09/2017	248	kWh
Total	840	kWh
Total	0.84	MWh
EF	637.9	lbs CO2/MWh
EF	72.84	lbs CH4/GWh
EF	10.71	lbs N20/GWh
Total	0.24305141	tons CO2
Total	2.7753E-05	tons CH4
Total	4.0807E-06	tons N20
Total	**0.24496129**	**tons CO2e**

Table 3. Electricity Consumption

Emission Source: Vehicle emissions

Activity Data: Vehicle mileage

Calculations Process: Divide sum of total miles travelled by vessel specific MPG. Using Emission factors, multiply gallons per mile total, then divide by either 1,000 or 1,000,000 to convert grams or pounds to tons depending on which units are being used. Finally, multiply t CO_2, t CH_4 and t N_2O by their respective GWP (Global Warming Potential) and add up to attain total t CO_2e for vehicle emissions.

Emission Factors: These were obtained from The Climate Registry (TCR). Using TCR (2016) vehicle specific emission factors found in table 13.1 and table 13.4 yielded accurate results.

	Fleet Vehicles					
	Brock Truck	Andy Ford Explorer	Vehicle	Vehicle	Vehicle	
	Gas	Gas	Fuel Type	Fuel Type	Fuel Type	
07/07/2017	45	7.4				
07/08/2017	11	7.4				
07/09/2017	15	7.4				
Total	71	22.2	0	0	0	Miles
Total	21	15				MPG
Total	3.380952381	1.48	#DIV/0!	#DIV/0!	#DIV/0!	gal
EF	8.78	8.78				kg CO2/gal
EF	0.0163	0.0333				g CH4/mi
EF	0.0066	0.0134				g N20/mi
Total	0.029684762	0.0129944	#DIV/0!	#DIV/0!	#DIV/0!	t CO2
Total	5.51095E-08	4.9284E-08				t CH4
Total	2.23143E-08	1.9832E-08				t N20
Total	**0.029692789**	**0.013001542**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**t CO2e**

Table 4. Vehicle Emissions

Emission Source: Wood emissions

Activity Data: Weight of wood consumed

Calculations Process: Convert total amount of wood burnt from pounds to kilograms. Convert kilograms into British thermal unit's (BTU) specific for Red Oak. Convert from BTU to mmBTU by dividing 1,000,000. Using Emission factors, multiply mmBTU, then divide by either 1,000 or 1,000,000 to convert grams or pounds to tons depending on which units are being used. Finally, multiply t CO2, t CH4 and t N2O by their respective GWP (Global Warming Potential) and add up to attain total t CO2e for wood emissions.

Emission Factors: These were obtained from The Environmental Protection Agency (EPA). Using EPA (2014) specific emission factors found in table 1.

	Wood	
	Propane Consumed	**Units**
07/07/2017	100	lbs
07/08/2017	100	lbs
07/09/2017	100	lbs
Total	300	lbs
Total	136.0776	kg
Total	2289000	Btu
Total	2.289	mmBtu
EF	93.8	kg CO2/ mmBtu
EF	7.2	g CH4/ mmBtu
EF	3.6	g N2O/ mmBtu
Total	0.2147082	t CO2
Total	1.6481E-05	t CH4
Total	8.2404E-06	t N20
Total	**0.21757586**	**tons CO2e**

Table 5. Wood burning emissions

Emission Source: Support Boats

Activity Data: Gas consumed

Calculations Process: Add up total gas consumed in gallons. Using Emission factors, multiply total gallons, then divide by either 1,000,000 or 1,000 to convert grams or kilograms to tons depending on which units are being used. Finally, multiply t CO_2, t CH_4 and t N_2O by their respective GWP (Global Warming Potential) and add up to attain total t CO_2e for electricity consumed.

Emission Factors: These were obtained from The Climate Registry (TCR). Using Table 13.1 and Table 13.7 for marine vessels, an accurate carbon footprint could be calculated.

	Support Boats	
	2012 Protector	Units
07/07/2017	5.67	gallons
07/08/2017	5.67	gallons
07/09/2017	5.66	gallons
Total	17	gallons
EF	8.78	kg CO2/ gallon
EF	0.64	g CH4/ gallon
EF	0.22	g N2O/ gallon
Total	0.14926	t CO2
Total	0.00001088	t CH4
Total	0.00000374	t N20
Total	**0.15064652**	**tons CO2e**

Table 6. Support Boat Emissions

Emission Source: Traveling Vessel Emissions

Activity Data: Nautical miles travelled and engine gallon per hour consumption

Calculations Process: Using miles travelled and engine GPH, apply and average engine speed to all engines (in this case 8 knots was applied). 8 knots are equal to 9.21 mph. Divide MPH by GPH to attain MPG. Divide miles travelled by MPG. Using Emission factors, multiply total gallons, then divide by either 1,000,000 or 1,000 to convert grams or kilograms to tons depending on which units are being used. Finally, multiply t CO2, t CH4 and t N2O by their respective GWP (Global Warming Potential) and add up to attain total t CO2e for vessel emissions.

Emission Factors: These were obtained from The Climate Registry (TCR). Using Table 13.1 and Table 13.7 for marine vessels, an accurate carbon footprint could be calculated.

	Vessel Emissions																		
	Sea Swell	Stuart Harper	Masquerade	Juno	Apre's	Mah Jong	Penelope	Jim Pringle	Scheggia	Pandora	Tamu	Silhouette	Morfeus	Ed Lood	Santana	Torch	WM Huyett	Next Dimension	
	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Gas	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	
07/09/2017	25	1	1	1	1	1	0.33	1	1	27	1	0.25	30	20	26	140	15	20	
Total	25	1	1	1	1	1	0.33	1	1	27	1	0.25	30	20	26	140	15	20	Miles
Total	1	1	1	2.1	3.9	0.8	0.5	8	0.5	0.36	0.5	0.5	3	1	1	0.5	0.5	0.75	GPH
Total	9.21	9.21	9.21	4.6	2.36	11.51	18.42	1.15	18.42	25.583333	18.42	18.42	3.07	9.21	9.21	18.42	18.42	12.28	MPG
Total	2.7144408	0.1085776	0.1085776	0.2173913	0.4237288	0.086881	0.0179153	0.8695652	0.0542888	1.0553746	0.0542888	0.0135722	10	2.1715527	2.8230185	7.6004343	0.8143322	1.628664495	gal
EF	10.21	10.21	10.21	10.21	10.21	10.21	10.21	8.78	10.21	10.21	10.21	10.21	10.21	10.21	10.21	10.21	10.21	10.21	kg CO2/gal
EF	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.64	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	g CH4/gal
EF	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.22	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	g N20/gal
Total	0.0277144	0.0011086	0.0011086	0.0022196	0.0043263	0.0008871	0.0001829	0.0076348	0.0005543	0.0107754	0.0005543	0.0001386	0.1021	0.0221716	0.028823	0.0776004	0.0083143	0.016628664	t CO2
Total	1.629E-07	6.515E-09	6.515E-09	1.304E-08	2.542E-08	5.213E-09	1.075E-09	5.565E-07	3.257E-09	6.332E-08	3.257E-09	8.143E-10	0.0000006	1.303E-07	1.694E-07	4.56E-07	4.886E-08	9.77199E-08	t CH4
Total	1.221E-06	4.886E-08	4.886E-08	9.783E-08	1.907E-07	3.91E-08	8.062E-09	1.913E-07	2.443E-08	4.749E-07	2.443E-08	6.107E-09	0.0000045	9.772E-07	1.27E-06	3.42E-06	3.664E-07	7.32899E-07	t N20
Total	**0.0280825**	**0.0011233**	**0.0011233**	**0.002249**	**0.0043837**	**0.0008988**	**0.0001853**	**0.0077057**	**0.0005617**	**0.0109185**	**0.0005617**	**0.0001404**	**0.103456**	**0.022466**	**0.0292058**	**0.0786311**	**0.0084248**	**0.016849511**	**t CO2e**

Table 7. Traveling Vessel Emissions