

2015 (Calendar Year) Greenhouse Gas Emission Inventory for the Gulf of Farallones National Marine Sanctuary

The Gulf of the Farallones National Marine Sanctuary (GFNMS) used the National Park Service's (NPS) [Climate Leadership In Parks \(CLIP\) Tool](#) to complete an inventory of 2015 greenhouse gas emissions generated from facility use, operations, and transportation activities at the sanctuary's headquarters. This information was compared to data collected since the 2008 baseline inventory to measure performance in meeting reduction goals.

Data were gathered from utility statements, internal records, and an employee transportation survey. The Greenhouse Gas (GHG) inventory includes totals for stationary combustion fuel (natural gas for heating), purchased electricity, mobile combustion (auto, public, boat and air transportation), wastewater treatment, and municipal solid waste and disposal. Each input is described in greater detail below.

For the purpose of this audit, emissions were measured only for internal staff at the headquarters facility on Crissy Field, and not for visitors to the sanctuary.

Executive Summary

Total and per capita emissions in calendar year 2015 began to increase. The demand for natural gas and electricity has essentially remained level year after year, with an increase observed when a new building was added to this survey in 2010. Due to the site's heater not functioning from late Jan to mid Mar, it consumed less natural gas than in past years. Together, these sources of energy contribute approximately 20% of the site's total emissions. Wastewater and solid waste have also remained steady since 2008, and continue to contribute less than 3% of the sites total emissions.

Transportation remains the highest portion of emissions, contributing nearly 80% of the site's total. Automobile transportation (commuting & government vehicles) makes up nearly 70% of that, the highest percentage since 2008. In 2015, the sanctuary completed the public process to expand its boundary 100 miles to the north (to Pt Arena). Staff travelled more and farther to these new sanctuary areas which resulted in an increase in mobile combustion. A new car was also acquired to support expanded travel.

Highlights

- *Per capita emissions have declined by 2.62 Metric Tons Carbon Dioxide Equivalent (MTCO₂E) since 2008*
- Sanctuary added an additional government vehicle due to sanctuary expansion
- Sanctuary staff travelled to the expansion area to discuss and implement boundary and program expansion

EMISSION INVENTORY INPUTS

General Information:

Unit Evaluated: GFNMS Crissy Field Headquarters, San Francisco, CA

Year Inventoried: 2015

Inventory completed by: Brian Johnson, Deputy Superintendent

Inventoried Operations: Stationary Combustion (Natural Gas), Purchased Electricity, Mobile Combustion, Wastewater Treatment, Municipal Solid Waste and Disposal

Number of buildings: 2 (Bldg 1901 – Residence, Bldg 1903 – Lifeboat Station)

Number of Full-Time Staff Equivalents: 26.4

Stationary Combustion:

The stationary combustion (natural gas used for heat and hot water) numbers were derived from Pacific Gas & Electric statements. PG&E is the local utility provider.

Natural Gas: 3021 Therms of natural gas used

Conversion: 1Therm = 100 cubic feet.

Input: 302,100 cubic feet (small decrease from 2014)

Purchased Electricity:

The stationary combustion numbers were derived from Presidio Trust utility statements:

Bldg 1901 kWh – 10,813

Bldg 1903 kWh – 31,597

Input: 42,410 kWh (10% decrease from 2014)

Mobile Combustion - Ground & Sea Transportation:

A survey was conducted of all staff to determine the primary mode of transportation used to commute to work. They could choose from car, carpool, bus, train, bicycle, or walk. All travel to and from the Crissy Field Headquarters office was counted, including use of government vehicles. This estimate also accounts for the use of the R/V FULMAR, the sanctuary's research vessel.

Primary mode of staff commuting: Auto

Government vehicles on-site: 4 (1-Van, 1-Hybrid SUV, 2 hybrid sedans)

Input: Autos, fueled with gasoline – 195,795 miles (15% increase from 2014)

Input: Buses, fueled by diesel – 6240 miles (10% decrease from 2014)

Input: Boats – 2000 gallons of diesel (same as 2014)

Mobile Combustion - Air Transportation

The transportation survey also asked all staff to estimate the total miles they flew on work-related travel in the past year.

Total airplane miles: 46,000 miles (50% increase since 2014)

Conversions: Greenhouse Gas Protocol Initiative calculation for long haul, economy class air travel = 0.1416 kg CO₂ per passenger mile; 1kg = 0.001 metric tons.

Input: 6.51 metric tons of CO₂ equivalent.

Wastewater Treatment:

Sewer charges are calculated at 90% of water consumption. GFNMS is located in a Mediterranean climate where rain is seasonal, so irrigation needs vary accordingly. It typically rains from October thru April, and is dry from May thru September (when irrigation is needed). Potable water from Building 1903 was used for irrigation until Dec 2015. Note reduction in water consumption due to decreased irrigation beginning in CY2014. Due to construction of dedicated irrigation lines in 2015, we used the CY2014 estimate for sewer consumption in this year’s inventory. Beginning in 2016, we will use sewer bills from the Presidio Trust to determine total sewer usage.

Total Sewer

Input: 160,614 gallons (from CY2014)

Solid Waste:

These numbers were derived from the on-site refuse collection bin. In 2015, the site switched from a 1-cubic yard bin to two 64-gallon trash bins, picked up once per week.

Conversions: A 64-gallon bin holds on average approximately 100 pounds of waste. 200 pounds x 52 weeks = 10,400 pounds/year. 1 pound = 0.0005 short tons.

Input: 5.2 short tons (decrease from 2014)

EMISSION INVENTORY RESULTS

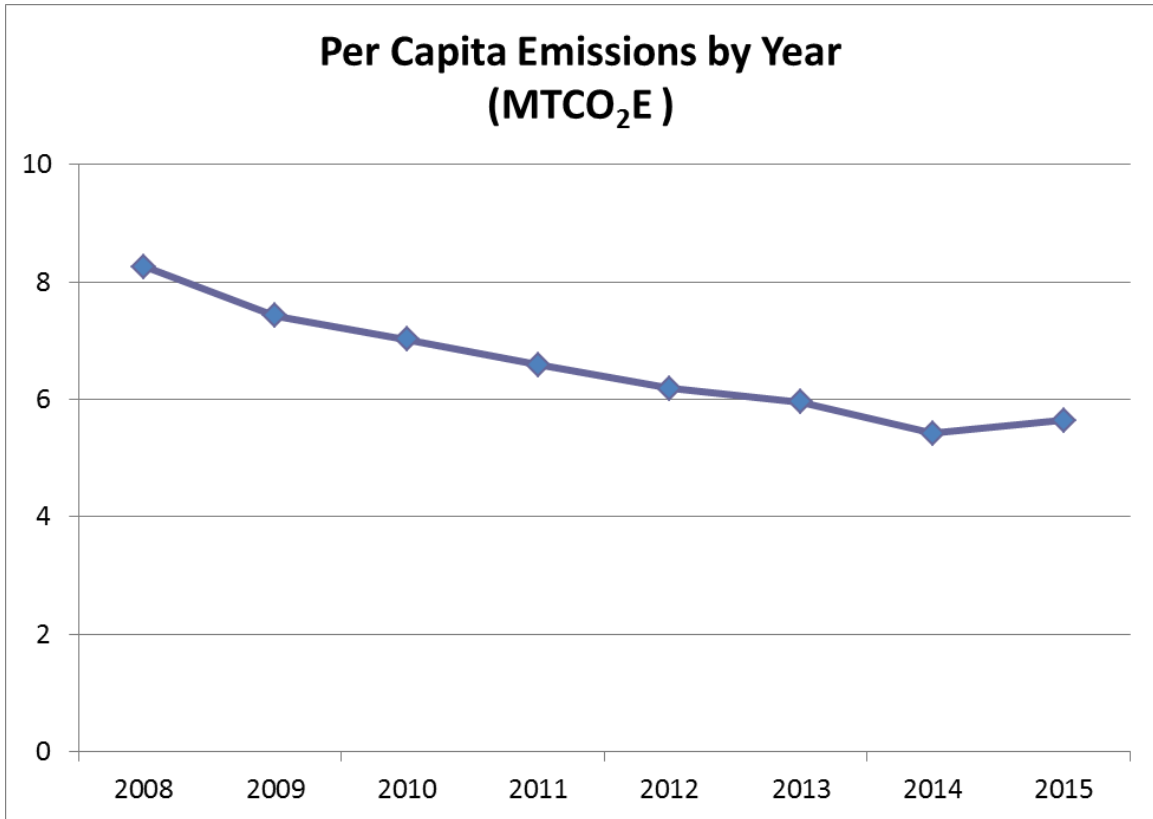
The NPS CLIP Tool derives the total Metric Tons Carbon Dioxide Equivalent (MTCO₂E) based on each input. For long-term tracking purposes, and because staff fluctuate year to year, per capita emissions were also measured. More detailed results are available in the CLIP Tool, such as emissions of each greenhouse gas CO₂, CH₄, N₂O, and HFC. The 2008 results are used as the baseline for all subsequent analyses.

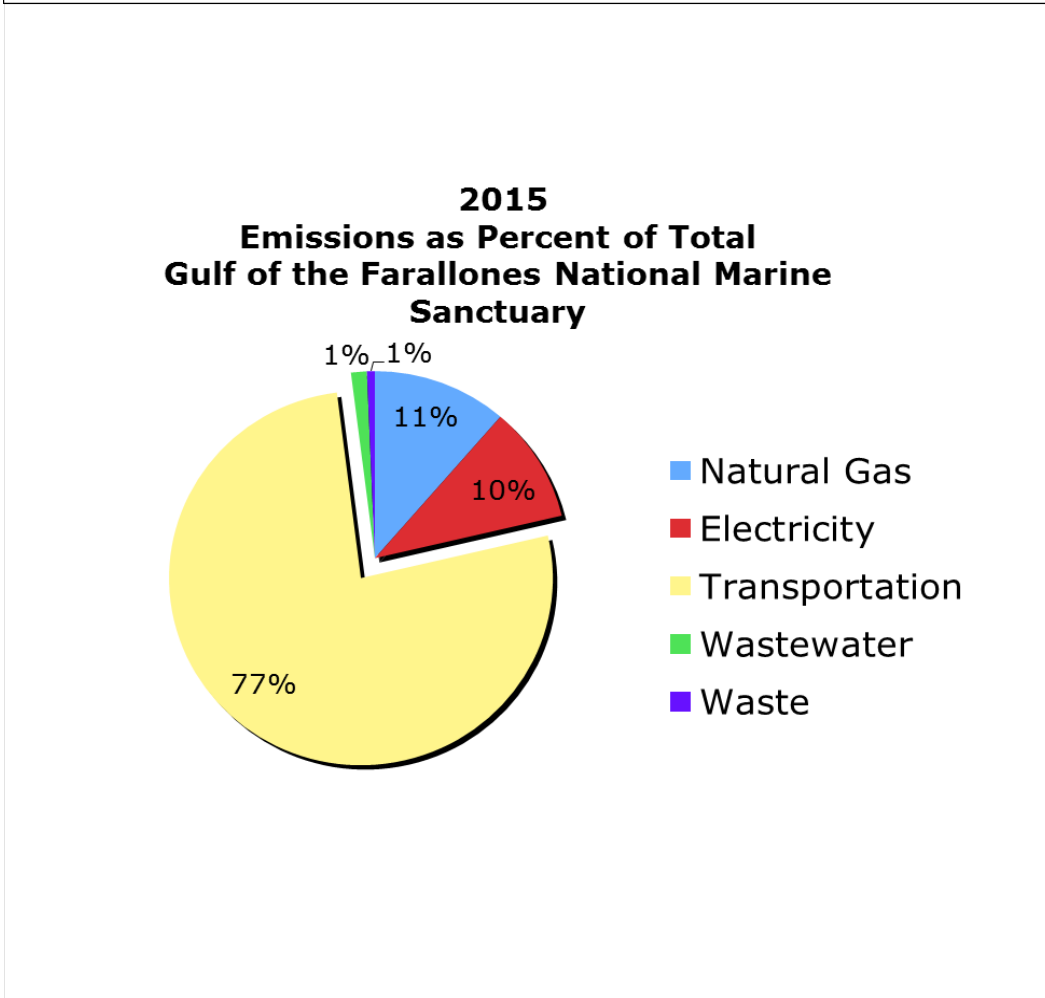
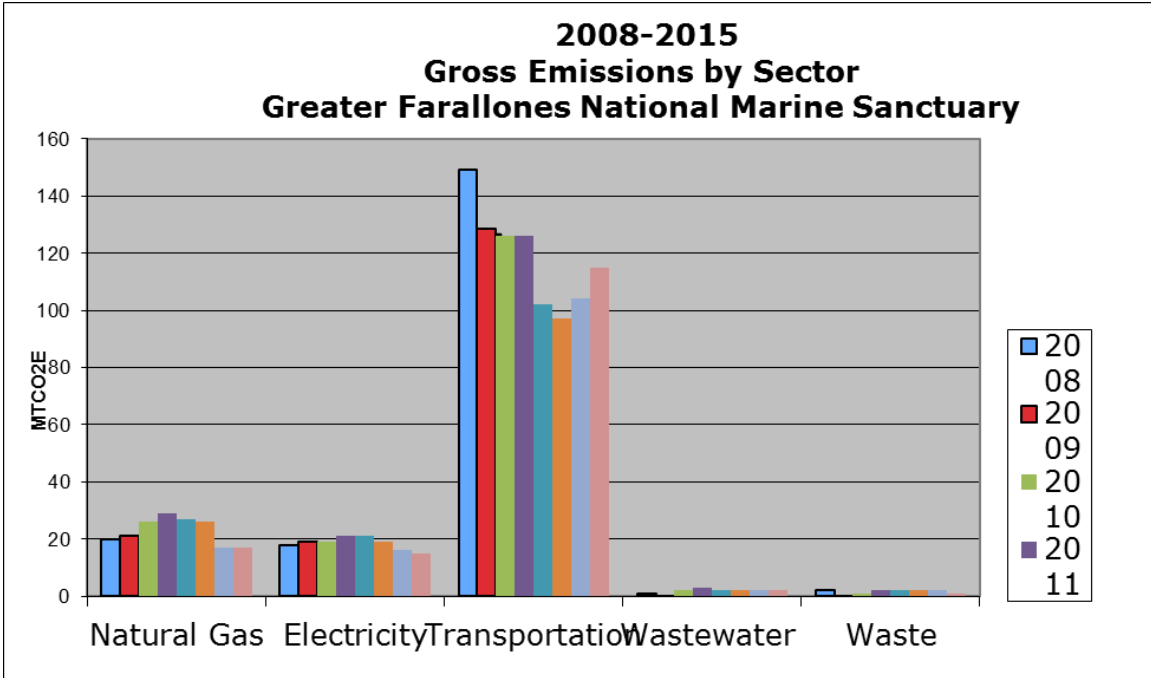
Gross Emissions by Year, Sector, and Per Capita (MTCO₂E)

Year	Stationary Combustion	Purchased Electricity	Mobile Combustion	Wastewater Treatment	Solid Waste	Gross Emissions	Number of Staff	Per Capita Emissions
2008	20	18	149	1	2	190	23	8.26
2009	21	19	128	1	1	171	23	7.43
2010	26	19	126	2	1	174	24.8	7.02
2011	29	21	126	3	2	180	27.3	6.59
2012	27	21	102	2	2	154	24.9	6.18

2013	26	19	97	2	2	145	24.3	5.96
2014	17	16	104	2	2	141	26	5.42
2015	17	15	115	2	1	149	26.4	5.64

EMISSION INVENTORY GRAPHS





2015 Transportation Emissions as Percent of Total

