Monitoring Greenhouse Gas emissions to improve operations at Greater Farallones National Marine Sanctuary

July 12, 2016
Golden Gate National Parks Partner Meeting
Greater Farallones National Marine Sanctuary

- We protect the wildlife and habitats of one of the most diverse and bountiful marine environments in the world
- 3,295 square miles of federally protected ocean waters off the northern and central California coast
- Internationally significant marine ecosystem
- Many threatened & endangered species, over 400 submerged cultural resources
- 30 staff, 3 buildings in Presidio
Ocean Climate Program

- Green Operations planning started in 2006 as the first initiative of our new Ocean Climate Program
- Address climate change impacts in the North-central California coast and ocean region
- Foster awareness, advocate solutions, and promote action among government agencies, public & private organizations, and individuals
Improve the energy conservation and efficiency of our Crissy Field campus

- Draft and implement a Green Operations Action Plan
- Measure Greenhouse Gas Emissions each year
- Share information
- Modify behavior
Process

Set Targets

• Green Operations
  Action Plan

Measure Emissions

• Greenhouse Gas
  Inventory (CLIP Tool)

Modify Behavior

• Analyze Results
  • Share Info
Process

Set Targets

• Green Operations Action Plan

Measure Emissions

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Green Operations Action Plan

- Drafted plan with group of stakeholders; +130 actions

- 5 categories:
  - Energy
  - Transportation
  - Water
  - Waste
  - Education & Outreach

- Each category has specific actions, **measurable reduction target**, evaluation methods, and potential partners

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Ocean Climate Initiative Action Plan
Green Operations: Reducing Our Carbon Footprint

**Introduction**
The following chapter provides over 130 action plan strategies to reduce the greenhouse gas emissions that result from the facilities and operations of Gulf of the Farallones National Marine Sanctuary. They are broken into five categories: Transportation Management, Energy Efficiency, Waste Management, Water Management, and Education and Outreach. Within each category a measurable target, specific actions, evaluation metrics, and potential partners are identified to the years 2015 and 2020. To complement this chapter, the sanctuary also completed energy, transportation, and waste audits, and derived an emissions inventory for the calendar year (see attached 2008 Emissions Inventory). These studies help to prioritize recommended actions, and provide an effective evaluation and education tool to sanctuary management. The scope of the document was defined to focus on all staff activities that occurred at the headquarters facility on Crissy Field in San Francisco, CA, and included employee commuting, all work-related travel including flights, and use of the Research Vessel Fulmar.

This chapter was developed by the Gulf of the Farallones National Marine Sanctuary Advisory Council’s Green Operations Working Group, as part of the Office of National Marine Sanctuaries Blue Sea Green Communities Initiative. Participants included representatives from the San Francisco Department of Environment, Golden Gate National Recreation Area (Landlord), Presidio Trust (assets provider), a green architectural firm (LEED expert), and several members from the Advisory Council. Presented to the full Advisory Council in August 2009, the Council accepted the recommended strategies and forwarded them onto the sanctuary superintendent for adoption and promulgation to other sanctuary sites within the National Marine Sanctuary System.

I. Transportation Management

**GOAL**: Reduce greenhouse gas emissions through green transportation choices.

**Objective**: Reduce per capita greenhouse gas emissions generated from transportation 5% annually, or 25% by 2015 and 50% by 2020. Baseline year one data was derived using the National Park Service CLIP tool (see Appendix I).

**Strategy TM-1**: Reduce CO2 emissions from employee travel to and from workplace.

**Activity 1.1**: Encourage carpooling through employee incentives.

**Activity 1.2**: Encourage carpooling by designating two closest (and most visible) campus parking spots as HOW/Alternative Vehicle spaces.

**Activity 1.3**: Improve bike parking on campus.

  a. Increase the number of spaces to hold eight bikes comfortably.
  b. Delineate the bike parking area.
  c. Encourage people to use the bike rack for parking, not storage of their bicycles.

**Activity 1.4**: Take advantage of federal transportation subsidy programs.
Reduction Targets

- Energy: **Reduce** 15% by 2015 and 30% by 2020
- Transportation: **Reduce** 25% by 2015 and 50% by 2020
- Water: **Reduce** 10% by 2015 and 20% by 2020
- Waste: **Reduce** 95% by 2015 and 100% by 2020
Process

Set Targets

Measure Emissions
  • Greenhouse Gas Inventory (CLIP Tool)

Modify Behavior
  • Analyze Results
  • Share Info

• Green Operations Action Plan
Greenhouse Gas Inventory

• Measure energy (natural gas & electricity), transportation, wastewater, and solid waste

• National Park Service CLIP Tool

• Convert emissions to MTCO$_2$E (per capita)

• Use 2008 as baseline
How we measure emissions

• Staff transportation survey (Google Forms)

• Gather utility data
  - natural gas (PGE)
  - water, electricity (Trust)
  - waste (Recology)
  - vehicles (GSA + staff survey)

• Assemble data in Emissions Inventory document that serves as our final report

• Enter data in CLIP Tool
Transportation

**TARGET:** Reduce 25% by 2015 and 50% by 2020

**RESULTS:** Reduced 23% since 2008 (77% of 2015 emissions)

**Challenges** - Lack of public transit (Only PresidiGo, No Muni), long commutes for some staff, large management area

**Successes** - Carpool parking, hybrids, reduced Air travel due to budget constraints*

*Note: Image of a bicycle rack with several bikes parked.
Energy

TARGET:  Reduce 15% by 2015 and 30% by 2020
RESULTS:  Reduced 15% since 2008 (21% of 2015 emissions)

Challenges - Vampire loads, new building, old heater, drafty windows

Successes - HVAC serviced, Energy Star fridge & dishwasher, LED lights, new computers, broken heater* being replaced
TARGET: Reduce 10% by 2015 and 20% by 2020
RESULT: Increased 100% since 2008 (1% of 2015 emissions)

Challenges - Manual sprinkler system, recycled water source, drought, watering “historic landscape”

Successes - High-efficiency toilets & sinks, utilities improvements, dishwasher
Waste

TARGET:  Reduce 95% by 2015 and 100% by 2020.
RESULT:  Reduced 50% since 2008 (1% of 2015 emissions)

Challenges - Following Recology targets; unrecyclable items

Successes - Reusable meeting supplies, composting, junk mail, more recycle bins
Per Capita Emissions by Year

(MTCO$_2$E)
Set Targets

• Green Operations Action Plan

Measure Emissions

• Greenhouse Gas Inventory (CLIP Tool)

Modify Behavior

• Analyze Results
• Share Info
Per Capita Results

Per Capita Emissions by Year
(MTCO₂E)

Target
2015
2020
How do we accomplish this?

We all have limited time and resources.

What should be the priorities?

Look more closely at the data.....
2015
Emissions as Percent of Total
Greater Farallones National Marine Sanctuary

- Natural Gas: 11%
- Electricity: 10%
- Transportation: 77%
- Wastewater: 1%
- Waste: 1%
2015
Transportation Emissions as Percent of Total

- Car: 69%
- Bus: 18%
- Boat: 7%
- Plane: 6%
2015
Transportation Emissions as Percent of Total

- Car: 69%
- Bus: 7%
- Boat: 18%
- Plane: 6%
Use the CLIP Tool to generate target emission inputs

Use those target inputs to prioritize operational and budgeting decisions

To reach our 2020 targets, we are prioritizing the following actions....
Transportation

TARGET:  Reduce 25% by 2015 and 50% by 2020

REQUIRES:  Reduce additional 40 MTCO2 by 2020

Action 1: Increase telecommuting to 2 days/week

Action 2: Acquire biodiesel for research vessel

Action 3: More webinars; less auto & air travel (high speed internet)

Action 4: Pay for carbon offsets for all air travel
TARGET: Reduce 15% by 2015 and 30% by 2020
REQUIRES: Reduce additional 6 MTCO2 by 2020

Action 1: Convert to LED lighting (SF Dept of Energy Audit-free)

Action 2: Install high-efficiency heater & Energy Star appliances

Action 3: Repair and weather-strip windows

Action 4: Purchase Green Power (Trust, when available)

Action 5: Smart power-strips
TARGET: Reduce 10% by 2015 and 20% by 2020

REQUIRES: Reduce additional 1 MTCO2 by 2020

Action 1: Improve or eliminate irrigation; use graywater when available

Action 2: Install low flush toilets and low water faucets
Waste

TARGET:  Reduce 95% by 2015 and 100% by 2020
REQUIRES:  Reduce additional 2 MTCO2 by 2020

Action 1: Contingent on Recology meeting its 2020 WASTE ZERO goal

Action 2: Purchase green products and recyclable packaging
Share Information

- Share emission data with our headquarters to change our telecommuting policy
- Train all marine sanctuary sites on this process
- Share information with Golden Gate Park partners
- Make everything available on the web
- Assist with capacity building and training
- Encourage NPS to update and web-enable CLIP Tool for parks and partners
- Encourage partners to monitor and change behaviors
Observations

• If you don’t measure, you don’t know what to prioritize
• The measurement tool is not as important as your results (many available: NPS CLIP, EPA Portfolio Manager, etc.)
• Use trends & data to drive change in policies and behaviors
• Organizations are dynamic. Staff fluctuates, office space changes, you may grow or shrink (we tripled in size in 2015) or what you do may change over time
• Per capita or per square footage is good metric for dynamic organizations
• Transportation targets are the most challenging for us. We welcome any suggestions to address that.
More Information

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Carbon Dioxide Equivalent (CO2e):

The universal metric unit of measurement used to indicate the global warming potential of each of the six greenhouse gases. Carbon dioxide, a naturally occurring gas that is a byproduct of burning fossil fuels and biomass as well as land-use changes and other industrial processes, is the reference gas against which the other greenhouse gases are measured (Nitrous Oxide (N₂O), Methane (CH₄), Hydrofluorocarbons (HFC)).