Greening the UNOLS Fleet
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http://www.geology.19thcenturyscience.org/books/hmsc.jpg
THE GLOBAL TRANSPORTATION SYSTEM

Ships: 2-4%

http://grist.files.wordpress.com/2011/07/anthropogenic_planet.jpg
"Greening the Fleet – UNOLS should explore how to make the present and future fleet more environmentally sustainable. New and existing technologies and practices should be used in the construction, operation, and recycling of research vessels and UNOLS should take a leadership role in promoting a green U.S. research fleet, as we move forward in developing the academic fleet."
LONG TERM GOALS:

1) Promote environmental sustainability within UNOLS

2) Guidelines for construction, operation and recycling of UNOLS Research Vessels

3) Promote environmental awareness on UNOLS ships with U.S. ocean scientists (outreach)

5) Ocean Class and Regional Class vessel construction
Creating a Green Fleet

Life Cycle of a Vessel:
1) Construction
2) Operation
3) Recycling

Hornblower Yachts- San Francisco: Ferry Design
Construction and Operation

1) Hull and design
2) Propulsion, fuel and lubricants
3) Power systems
4) Fluids; water and sewage
5) Interior: cabins, labs, galley and mess areas (Leadership in Energy and Environmental Design-LEED)
Sail: Derik M. Bayliss
Planet Solar

- 31 m long, 15 m beam
- 1.5 m draft
- Average speed: 5 knots
- Crew of 4
- 2010-2012 Circumnavigation
Solar Sailor:

*Solar wings used as solar collectors and as sails

http://www.solarsailor.com/
Carolyn Dorothy: First hybrid tugboat

Foss Marine, Seattle
The *M/V Auriga Leader* has 328 solar panels to provide power for the ship’s main electrical grid. (http://www.inhabitat.com/2009/07/06/auriga-leader-cargo-ship-gets-power-from-solar-panels/)
BIOFUELS: Ethanol and Biodiesel
Objective: convert Great Lakes vessels with petroleum-based fuels to renewable and environmentally friendly products

Environmental Research That’s Environmentally Friendly

There were many motivating factors for undertaking the Green Ships project. These include:

♦ Reducing ecosystem impact of ship-based research activities.
♦ Reducing workplace health and safety hazards.
♦ Advancing renewable technologies.
♦ Lessening dependence on fossil fuels.
GREEN BOATS AND PORTS
FOR BLUE WATERS

A Workshop to Promote Environmental Sustainability of Boats and Ports
April 8-9, 2014
Greening the U.S. Academic Fleet: A UNOLS Workshop


Composition: Participants from UNOLS, NSF, Navy, NOAA, architects and naval designers, industry, and marine scientists
Green Workshop Findings

1. Sail-assist vessels with a small environmental footprint can be used for particular operations.

2. Hybrid power systems and new technologies should be considered as options for future vessels.

3. Vessel energy management consisting of detailed energy audits and on-going monitoring can be carried out with existing vessels.

4. Biofuels and bio-lubricants and an environmental management plan can reduce a vessel's environmental impact and may be appropriate for some vessels.
5. Development of an environmental classification system will help operators and agencies identify environmental issues and successes in the fleet.

6. Environmental sustainability of UNOLS support facilities and ports should be considered in parallel with vessels.

7. Culture: Environmental sustainability can be enhanced by incorporating both technological innovation and attitude changes (green culture) amongst ship operators and users.
*Additional costs will be incurred to address or incorporate “green” solutions

*Many of these expenses will be front-loaded: construction phase, but

* Green technology may reduce operational costs during the lifetime of the vessel

* Green solutions need to be customized for individual ships or missions
RCRV
Clare Reimers, Oregon State University

Fall, 2021
Fall, 2022
RCRV Greening

- EPA tier 4 engines
- Biologic marine sanitation device
- Waste heat recovery system
- Low underwater noise
- Variable frequency drives
- Smooth, non-biocide hull coating
Hull Form

- 30,000 model runs to optimize hull
- Modified Bulbous Bow
  - Increases fuel efficiency by up to 6% at cruise speed
- Weight: Greater requires more power
  - Lightweight Construction Materials (as practical)
  - Minimized ballast and no fixed ballast
UNOLS Fleet progress

- LED lighting installed in many vessels
- Synthetic engine oil; environmentally friendly lubricants
- Solar reduction film on windows; hull paints to reduce heating
- Reducing cruising speed when feasible
- Recycling
- Port storm water mitigation
UNOLS Fleet progress

• Cold ironing

• Biofuel (100% renewable biofuel - R/V Sproul; R/V Blue Heron)

• R/V Sikuliaq: energy monitoring after one year
Around the Pier: Scripps Now Powering Point Loma Ship Facility with the Sun

on OCTOBER 7, 2012 · 2 COMMENTS

Nimitz Marine Facility installs photovoltaic system

100kW solar array
Graduate School of Oceanography
Campus Master Planning Underway

* Environmental Sustainability of Campus and Marine Facilities
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