

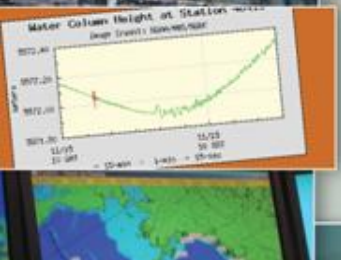


Buoy Vandalism

Data Buoy Cooperation Panel
Science and Technology Workshop
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Chung-Chu Teng, Stephen Cucullu, Shannon
McArthur, Craig Kohler, Bill Burnett and Landry
Bernard

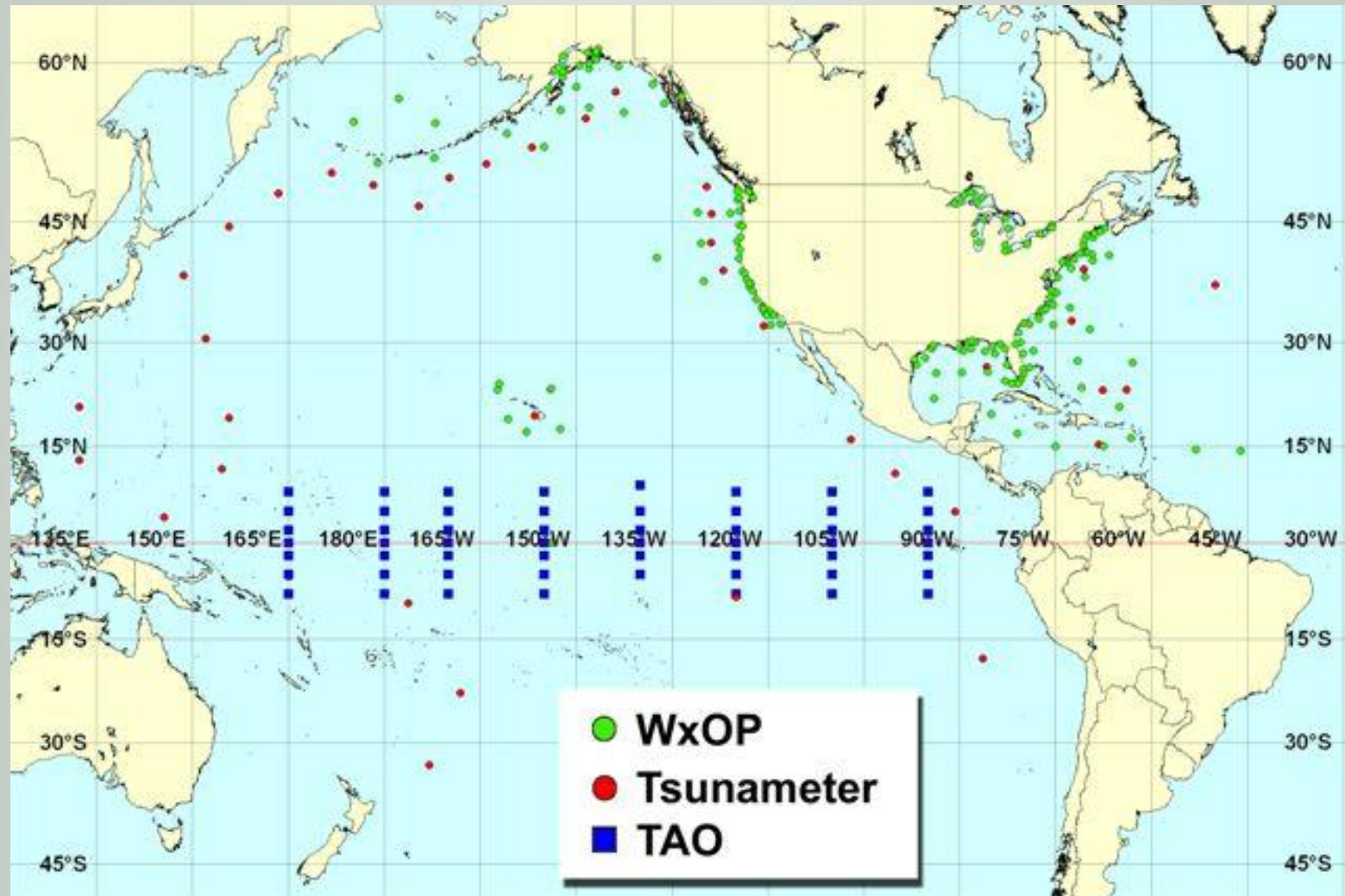
National Data Buoy Center
bill.burnett@noaa.gov



Three Major Networks

- **Weather/Ocean Platform (WxOP) Network**
 - **114** Moored (Met/Ocean) Buoys – including 12 Hurricane Supplemental Buoys.
 - **52** land-based Coastal–Marine Automated Network Stations (C-MAN)
- **Tropical Atmosphere Ocean (TAO) Buoy Network**
 - **55** TAO Buoys + 4 ADCP Moorings
- **Tsunami Buoy Network**
 - **39** DART Buoys

NDBC Ocean Observing System of Systems (NOOSS)



Buoy Vandalism

- Any unlawful interference with ocean data buoys (including willful or malicious destruction, defacement, or theft) is regarded as acts of vandalism.
- Impacts:
 - significant financial impact to NDBC's buoy operations
 - disrupting the vital data collected and reported by the buoy systems, which place lives, property, and economies in peril

Vandalism Damage

- **Vessels tying up to the buoys as temporary anchors or safe havens,**
- **Vessels collision causing buoy equipment and structural damage,**
- **Fishing vessel net or line entanglement and subsequent cutting of the mooring line to recover their fishing gear or free the vessel from the mooring,**
- **Fishing operations using the buoys as Fish Aggregating Devices (FADs), and**
- **Theft of the buoy system or its equipment (e.g., sensors, solar panels, etc.).**

Vandalism on Weather and Ocean Buoys

In FY08 –

- Out of a total of 19 mooring failures, 8 were attributed to vandalism
- Three (3) of the 6 structure damages were likely result of collision or pulling on super-structure
- Out of 11 failures due to electrical component damage, 3 were likely or confirmed results of vandalism
- Two of the 24 failures due to critical sensor damage were confirmed as a result of vandalism

Vandalism on Weather and Ocean Buoys



NDBC WxOP buoy vandalism: long-line

Vandalism on Weather and Ocean Buoys



NDBC WxOP buoy vandalism: theft

Vandalism on TAO Buoys

- Between October 2007 and June 2008, eighteen (18) TAO buoys in the Tropical Pacific Ocean went off-station due to vandalism
- A recent case of buoy theft occurred at an NDBC TAO buoy resulting in the total loss of the asset.
 - On May 1, 2009, the TAO mooring located at 80N 95oW showed signs of vandalism evidenced
 - By the next day it became obvious that the equipment was on a ship as it was traveling at a high rate of speed.
 - It made landfall at Puntarenas, Costa Rica on May 14, 2009 shortly after midnight GMT.
 - On May 15, the Costa Rican Coast Guard searched the area for the missing equipment, but was unsuccessful.

Vandalism on TAO Buoys



TAO buoy hull damage due to vessel collision

Vandalism on TAO Buoys



TAO buoy superstructure damage due to vessel collision

Vandalism on TAO Buoys



TAO buoy vandalism: long-line

Vandalism on TAO Buoys



TAO vandalism – fishing activity (possible sling shot)

“Sling shot” Method

- a fishing vessel ties to the buoy;
- the vessel moves away and stretches the mooring;
- the vessel releases the buoy;
- the buoy settles back over the anchor while the buoy is returning to the original position; and
- the vessel sets nets to catch the fish following the buoys.

Vandalism on Tsunameter Buoys

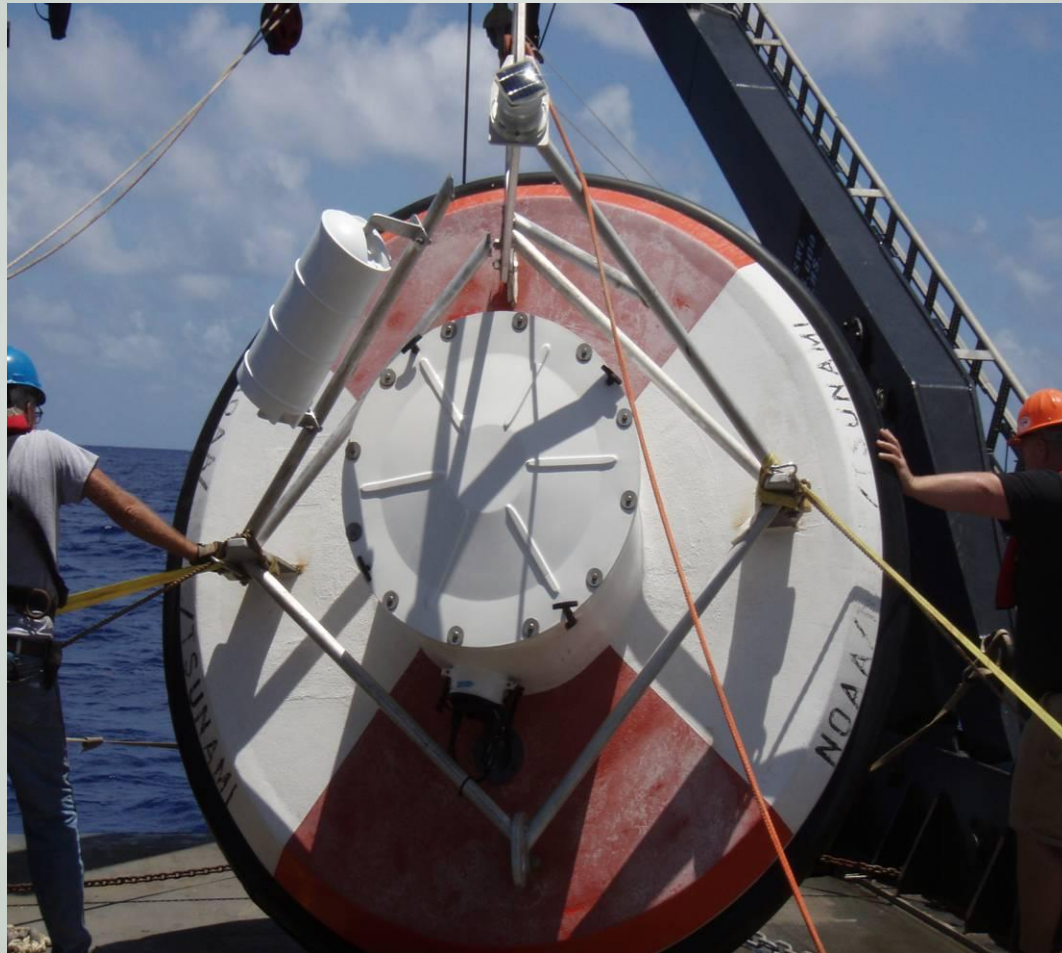
- NDBC completed the 39-buoy network in March of 2008
- Among the fourteen adrift buoys, three tsunameter buoys' mooring lines were cut.
- In some adrift cases, although NDBC categorizes them as unknown, it is likely that some of them were due to vandalism.
- The total cost for replacement of a tsunameter buoy is up to \$375,000 (including equipment, labor, and ship time).

Vandalism on Tsunameter Buoys



Tsunameter buoy vandalism: mooring line cut

Vandalism on Tsunameter Buoys



Tsunameter buoy vandalism: structure damage

Prevention of Buoy Vandalism: Buoy and Mooring Design and Buoy Location

- Using different buoy or mooring designs to reduce or prevent buoy vandalism.
 - more robust mooring systems (e.g., using abrasion or cut resistant mooring components),
 - shorten or eliminate superstructures,
 - protect or hide critical equipment (e.g., transmitter, antenna, etc.),
 - make a buoy difficult to “board”, and make equipment difficult to remove, etc.
- However, there is only so much buoy operators can do with technology without drastically increasing operating costs, making a buoy system more difficult to operate and maintain, or adversely affecting data quality.
- NDBC will continue to investigate the prospect of disestablishing or moving buoys from problematic locations.

Prevention of Buoy Vandalism: Education, Outreach, and Working Groups

- So far, most of the efforts to prevent data buoy vandalism have been mainly limited to education and outreach.
- Education and outreach have limited impact on the overall problem.
- However, education and outreach efforts have to be sustained over a long period of time can produce positive results.
- NOAA plans to establish interagency working groups to investigate a data buoy vandalism alleviation strategy.

Prevention of Buoy Vandalism: Statutory Penalty and Enforcement

- It will be more effective through statutory penalty and enforcement to curtail buoy vandalism.
- In U.S.
 - Title 33 of the United States Code (USC) contains two statutes that can be used to prevent data buoy vandalism and accidental damage (i.e., 33 USC § 408 and § 412).
 - Several Parts under Title 33 of Code of Federal Regulations (CFR) contain regulations aimed at protecting aids to navigation, which could be amended to include data buoys.
 - Many coastal and Great Lakes states have statutes that could be used to address data buoy vandalism in state waters.
 - NDBC has initiated and continues to pursue coastal buoys being classified as Aids to Navigation (ATON), which would have additional regulatory, statutory and subsequent enforcement benefits.

Prevention of Buoy Vandalism: International efforts

- DBCP has been working with the WMO-IOC participants for years to highlight buoy vandalism problems.
- This year, the DBCP will draft a letter for the WMO-IOC that details specific issues and presents possible solutions to buoy vandalism.
- NOAA recently submitted a draft resolution on data buoy vandalism to the IOC, which
 - calls for action to the UN General Assembly in order to preserve the integrity of monitoring systems that are so essential to preserving life and property in coastal communities around the world.
 - calls upon [UN] Member States to take appropriate steps under their national law to
 - prohibit damage of or interference with ocean and coastal observing systems,
 - institute incentives to reward those who supply information that supports enforcement of such prohibitions,
 - develop procedures to facilitate retrieval of non-functioning ocean and coastal observing systems, and
 - educate local communities.

Thank you



William H. Burnett
NOAA National Weather Service
National Data Buoy Center
228-688-4766

Bill.Burnett@noaa.gov

WWW.NDBC.NOAA.GOV

