CHESAPEAKE BIOLOGICAL LABORATORY | SOLOMONS, MD

ISSUE 60

Lab Lines

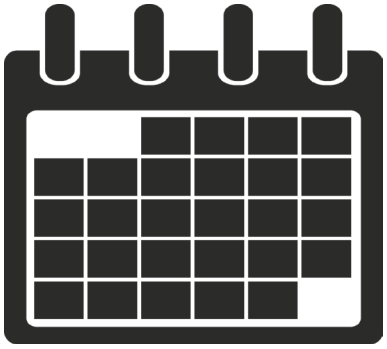
AUGUST 2021

IN THIS ISSUE:

DIRECTOR'S VIEW

It was nice to see everyone on Zoom at the Town Hall Meeting - even if it did represent a loss of ice cream. There will be future opportunities to get together I know, but an ice cream in the hand now, is worth more than two later. Please help CBL welcome our new students and FRAs to the community. With the new semester starting, I am expecting to see more people returning to campus - both to take courses and to teach them. It will be nice to have more buzz around the place. But as you return to campus, please remember to wear your mask in all common spaces and respect the choices that individual labs have made whether they wish to continue wearing masks or to form research bubbles.

We will be shortly launching a new campus calendar called CBL events which you will be able to subscribe to through your Gmail calendar. The idea is to have a central calendar of all events on campus of common interest. I have asked the shared governance representatives and several department leads to serve as editors for the calendar. So if you are a student and want something added to the calendar, you would speak to Sarah Jones or Maddie Lahm - if you are an FRA, then Casey Hodgkins would be your contact. Other contacts are Helen Bailey and Mario Tamburri for faculty, and Brian Duke, Mike Santangelo and Theresa Holloway for staff. The hope is that this calendar will be a way of keeping everyone informed of meetings and events on campus - from AAUW meetings to planned maintenance events - so that everyone will be better informed. Look for an email soon when the calendar goes live.



IN CASE YOU MISSED IT

After balancing a new blend of virtual and hybrid programming in Puerto Rico for 1.5 years, with UMCES researchers only involved in virtual events, it is exciting to report that our SEAS Islands Alliance TORTUGA undergraduate field workshop took place in person August 9-13! Lora Harris, CBL graduate student Isabel Sanchez Viruet, and HPL faculty member Jamie Pierson traveled to the island of Vieques two days working with our partners at the Vieques Conservation Historic Trust, followed by three days of work with partners at the Para La Naturaleza Cabezes de San Juan. This effort integrated undergraduate students into the design and implementation of a monitoring program documenting water quality conditions associated with bioluminescence in Puerto Rico's treasured and world-famous "BioBays". We involved family members and workforce fellows in collaboration with Universidad Ana G Mendez undergrads and non-profit and governmental agencies to help understand and conserve these fascinating lagoon ecosystems.

Amber Fandel presented a poster at the Ecological Society of America's 2021 Conference. Poster is titled "Effects of intense storm events on a marine top predator's occurrence and foraging behavior" and authors are Amber D. Fandel, A. Garrod, A. L. Hoover, J. E. Wingfield, V. Lyubchich, D. H. Secor, K. B. Hodge, A. N. Rice & H. Bailey.

University of Maryland Center for Environmental Science

TheCornellLab Center for Conservation Bioacoustics

Effects of intense storm events on a marine top predator's occurrence and foraging behavior

Amber D. Fandel[1], A. Garrod[1], A. L. Hoover[1], J. E. Wingfield[1], V. Lyubchich[1], D. H. Secor[1], K. B. Hodge[2], A. N. Rice[2] & H. Bailey[1]

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[2]Center for Conservation Bioacoustics, Cornell Lab of Ornithology, Cornell University, Ithaca, USA

Introduction

Extreme storm events such as hurricanes are becoming more frequent and intense worldwide.

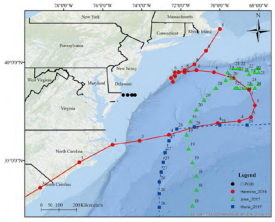
Determining how apex predators respond to storms is needed to understand how climate change mediates top-down ecological effects in marine ecosystems.

Bottlenose dolphins (*Tursiops truncatus*) may be directly affected by bottom-up ecological changes, environmental changes (i.e. storms), or indirectly through changes in their prey.

Methods

Data Collection

Acoustic instruments: Automatic dolphin click detectors (C-PODs), Marine Autonomous Recording Unit for continuous sound levels, and SM3M acoustic recorder



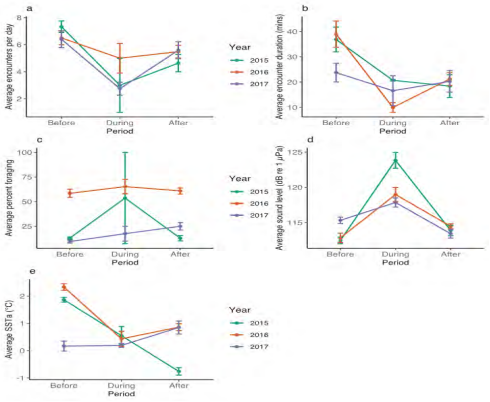
Acoustic data:
- Number of encounters
- Length of encounter
- Percentage of encounter spent foraging
- Sound levels

Environmental data:
- Storm tracks (right)
  - 2015 tropical storm Oct 1-4
  - 2016 Tropical Storm Hermine, Sept 3-8
  - 2017 Tropical Storm Jose, Sept 19-23
  - 2017 Tropical Storm Maria, Sept 27-28
- Sea surface temp anomaly

Statistical Analysis
- Linear mixed-effects models with all three years of data
  - Year as random effect (inter-annual differences)

Results

Storms resulted in
- **Fewer daily encounters with dolphins during and after storms**
- **Shorter encounters with dolphins during and after storms**
- **Increased percentage of time dolphins spent foraging after the storms**
- **Increased ambient sound levels during storms**



Average values (mean ± SE) for 2015 to 2017 in the before, during, and after storm periods for (a) encounters per day, (b) daily encounter length (min), (c) daily percent of encounter spent foraging, (d) daily sound level (dB re 1 µPa rms), (e) daily sea surface temperature anomalies (SSTa; °C).

Discussion

Storms can affect dolphins directly via
- Acoustic stress
- Cumulative stress (sound, waves, prey, anthropogenic, etc)
- Range shifts
  - Exposure to predators, pollution, threats
- Emigration
- Death
- Increased foraging opportunities during/after storms

Fish are highly responsive to environmental changes from storms causing behavioral changes such as
- Disorientation
- Reduced activity
- Range shifts
- Emigration

This results in changing behavior and occurrence of dolphins

It is and will be increasingly important to understand how disruption events such as storms effect species and ecosystems.

Future work:
- Identify range of responses of individuals to storms (via dolphin signature whistles, fish tagging)
- Determine which environmental factors influence predators and prey most significantly

Acknowledgements

Maryland Department of Natural Resources
Maryland Energy Administration
BOEM Bureau of Ocean Energy Management

Scan me to read the full publication

Annaleise Conway presented results from her paper, "Acute toxicity of the UV filter oxybenzone to the coral Galaxea Fascicularis" on August 5th, 2021 in a public session of the National Academies ocmmittee which is investigating the environmental impact of sunscreens (https://www.nationalacademies.org/event/08-05-2021/sunscreen-study-additional-information-gathering).

A recently published review paper (Mitchelmore et al., 2021 in Environmental Toxicology and Chemistry), highlighting the state of the science concerning the exposure to and effects of UV filters on corals was highlighted in a recent TIME magazine article (https://time.com/6084625/sunscreen-safety-regulations/).

Samara Nehemiah was awarded a 2021 National Marine Fisheries Service (NMFS)-Sea Grant Joint Fellowship (https://seagrant.noaa.gov/News/Article/ArtMID/1660/ArticleID/2867/Sea-Grant-and-NOAA-Fisheries-Announce-2021-Joint-Fellowship-Program-Awardees).

IN CASE YOU MISSED IT Cont.

Helen Bailey also presented a poster titled "Spatial and temporal variation in the occurrence of bottlenose dolphins in the Chesapeake Bay, USA, using citizen science sighting data" and authors are Lauren K. Rodriguez, Amber Fandel, Jamie Testa, and Helen Bailey.

Spatial and temporal variation in the occurrence of bottlenose dolphins in the Chesapeake Bay, USA, using citizen science sighting data

Lauren K. Rodriguez, Amber Fandel, Jamie Testa, and Helen Bailey
Chesapeake Biological Laboratory, University of Maryland Center for Environmental Science, Solomons, MD, USA

SCAN ME

Introduction

Although widely studied, little is known about Atlantic bottlenose dolphins (*Tursiops truncatus*) in the Chesapeake Bay, North America's largest estuary. In this study, we used community-based dolphin sighting reports to characterize the seasonal occurrence of dolphins in the Bay.

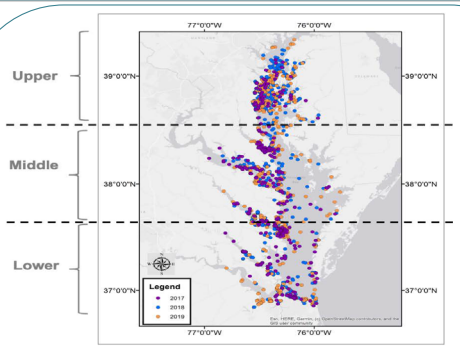
Methods

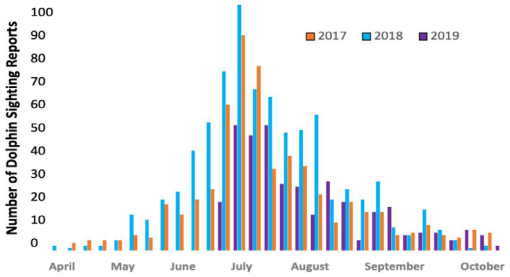
1) Dolphin sighting reports from the Chesapeake DolphinWatch application (interface shown above) were collected and summarized weekly.
2) Weekly environmental data were collected from online repositories
   - Temperature
   - Salinity (NaCl)
   - Dissolved Oxygen (DO)
   - Tidal Phase

The study site was split into three equal sections by latitude (Lower, Middle, Upper) to account for natural variability in estuarine environmental variables.

3) Weekly dolphin sightings were examined in relationship with environmental variables in three Generalized Additive Models (GAM), delineated by latitudinally-distinct section of the Bay.
4) The results of the GAMs were used to predict bottlenose dolphin occurrence for 2019 and were compared with actual sighting reports for that time period.

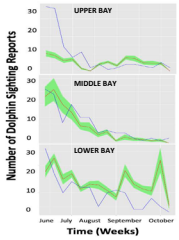
Results





Bottlenose dolphins were widespread throughout the Chesapeake Bay and most commonly reported during summer months.

Predictions



These graphs show the correlation between GAM predictions of dolphin occurrence (number of sighting reports; shown in red) and actual reports submitted to Chesapeake DolphinWatch (June-October 2019; shown in blue).
Standard error of GAM predictions are shaded in green.

Conclusions

- Bottlenose dolphins were reported throughout the Chesapeake Bay during April to October (2017-2019), with peak sightings in July of each year.
- Dolphins occurred throughout the Bay within the mainstem as well as in all major tributaries.
- Dolphin occurrence was significantly related to water temperature, salinity and tidal phase.
- This study provides a baseline from which future patterns of dolphin occurrence in this urbanized region can be compared.
- These models for dolphin presence can be implemented as a predictive tool for species occurrence and inform management of this protected species within the Chesapeake Bay.

Acknowledgements

Environmental Data
- Maryland Department of Natural Resources
- Chesapeake Bay Program
- National Oceanic and Atmospheric Association
- US Naval Observatory Astronomical Applications Department

Funding
- Chesapeake Bay Trust
- Maryland Sea Grant

WELCOME NEW STUDENTS

Nicholas Dawson is joining the Tamburri group pursuing his Ph.D. in Environmental and Society Foundation.

Robert Bell is joining Drs. Helen Bailey and Carys Mitchelmore pursuing his Ph.D. in Ecological System Foundation.

Anna Hildebrand is joining Dr. Laura Lapham's Lab team pursuing a MS in Earth and Ocean Foundation.

Sabrina Groves is the recent recipient of the Solomons House Research Fellowship and will be working towards her Ph.D. under the guidance of Dr. Hongsheng Bi.

Matthew Stefanak is a recipient of the Flagship Fellowship and will be working towards his Ph.D. in Ecological Systems under the guidance of Dr. Ryan Woodland.

Outreach

Outreach Planning

Faculty members who have not yet completed the CBL Outreach survey are encouraged to do so at: https://forms.gle/yAdcaq9Gi2JmAQkG8

FRAs/GRAs who have not yet completed the CBL Outreach survey are encouraged to do so at: https://forms.gle/tBpV7C7fPe2XcUu49

Your input is still welcome! Survey responses will be analyzed in the coming weeks.

So far, 16 faculty members have responded to the CBL Outreach survey to faculty members and 10 FRAs/GRAs have responded to their respective survey.

Thank you to the faculty members, faculty research assistants, and graduate research assistants who submitted responses to the Outreach Planning Survey! Your feedback on these topics is greatly appreciated and will inform conversations on strategic outreach priorities.

During weekly meetings, CBL's Director and Outreach Coordinator continue to discuss the impact and requirements for maintaining existing programs, and possible new directions for CBL outreach. Survey results will help guide outreach planning efforts.

Visitor Center

Due to continuing concerns related to the spread of the COVID-19 coronavirus, the Chesapeake Biological Laboratory Visitor Center will remain closed through the 2021 calendar year.

This difficult decision was made in order to mitigate the spread of the highly contagious Delta variant, and out of an abundance of caution for the health and safety of our visitors, volunteers, and the University of Maryland Center for Environmental Science community.

Science for Communities

In Fall 2021, CBL will continue to offer the Science for Communities series as Zoom webinars. Planning for the Fall 2021 Science for Communities Seminar Series is underway. The upcoming series will be themed around "Climate Change and Its Impacts." Stay tuned for a seminar series schedule!

As a reminder, beginning with our Fall 2021 series the Chesapeake Biological Laboratory is rebranding our popular Science for Citizens Seminar Series as the Science for Communities Seminar Series. In changing the title of this series, we hope to better represent UMCES' commitment to diversity, inclusivity, and equity by emphasizing that all individuals are welcome to learn about our innovative research through this public program.

Social Media

Follow CBL on Facebook and Twitter!

Please contact Outreach Coordinator Sarah Brzezinski at brzezins@umces.edu if you have information, like upcoming public presentations or news, that you would like to have shared with CBL's social media audiences.

Safety Corner: Cheryl Clark

COMPRESSED GAS SAFETY

1. When moving a gas cylinder - remember to avoid dragging, sliding or rolling them even for short distances. Never lift a cylinder by the cap and always use an approved cylinder cart for moving.
2. Never drop cylinders or let them strike each other. This can damage valves, safety devices or the cylinder itself. Do not attempt to catch a falling cylinder.
3. The valve protection cap should be kept in place until cylinder is secured in the laboratory.
4. Do not tamper with safety devices on the cylinder. Do not remove identification label or change the cylinder color.
5. When returning empty cylinders, make sure the valve is closed and the valve protection cap is on the tank. Be sure tank is labelled as empty.
6. Keep cylinders away from heat sources and extreme cold. Make sure the storage area is dry to prevent any rusting on the bottom of the cylinders.
7. Oxygen cylinders must be separated from flammable gas storage or combustible materials by at least 20 feet or a non-combustible wall.
8. Gas cylinders should only be filled by qualified producers of compressed gases.
9. Use only regulators approved for the gas in use. Once regulator is attached, be sure to open the valve slowly and stand clear of the regulator and valve outlet. Check for leaks. When removing the regulator, be sure to close the valve first and allow the regulator to drain before disconnecting.
10. Be sure to read the Safety Data Sheets for the gas you are using and wear the appropriate PPE.

Laboratory Safety Institute. Laboratory Health and Safety Notebook. 2014 (www.LaboratorySafetyInstitute.org)

Here is a video to help you: https://www.youtube.com/watch?v=ord53RaoPWk – Compressed Gas Cylinder Safety

Publications

Conway, A.J., Gonsior, M., Clark, C., Heyes, A. and C.L. Mitchelmore. (2021). Acute toxicity of the UV filter oxybenzone to the coral Galaxea Fascicularis. STOTEN, 796, 148666. DOI:10.1016/j.scitotenv.2021.148666

Gray, M.W., Alexander, S., Beal, B., Bliss, T., Burge, C.A., Cram, J., De Luca, M., Dumhart, J., Glibert, P.M., Gonsior, M., Heyes, A., Huebert, K., Lyubchich, V., McFarland, K., Parker, M., Plough, L., Schott, E., Wainger, L., Wikfors, G.H., Wilbur, A. (2021). Hatchery crashes among shellfish research hatcheries along the Atlantic coast of the United States: a case study at Horn Point Laboratory oyster research hatchery. Aquaculture. DOI https://dx.doi.org/10.1016/j.aquaculture.2021.737259

Hood, R.R, Shenk, G.W., Dixon, R.L., Smith, S.M.C., Ball, W.P., Bash, J.O., Batiuk, R., Boomer, K., Brady, D.C., Cerco, C., Claggett, P., de Mutsert, K., Easton, Z.M., Elmore, A.J., Friedrichs, M.A.M., Harris,L.A., Ihde, T.F., Lacher, L., Li, L., Linker, L.C., Miller, A., Moriarty, J., Noe, G.B., Onyullo, G., Rose, K., Skalak, K., Tian, R., Veith, T.L., Wainger, L., Weller, D., Zhang, Y.L. (2021). The Chesapeake Bay program modeling system: Overview and recommendations for future development, Ecological Modelling, Volume 456, 109635, https://doi.org/10.1016/j.ecolmodel.2021.109635.

Langendorf R, Lyubchich V, Testa J, Zhang Q (2021). Inferring controls of dissolved oxygen criterion attainment in Chesapeake Bay. Water. DOI https://dx.doi.org/10.1021/acsestwater.0c00307

Yokouchi, K., Itakura, H., Wakiya, R., Yoshinaga, T., Mochioka, N., Kimura, S., Kaifu, K. (in press) Cumulative effects of low-height barriers on distributions of catadromous Japanese eels in Japan. Animal Conservation https://doi.org/10.1111/acv.12725

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