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What the Hake?! Fish Forensics in Maine Markets

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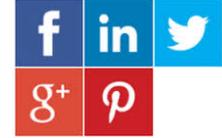


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March 2014 ESIP Journal

Title: What the Hake?! Fish Forensics in Maine Markets

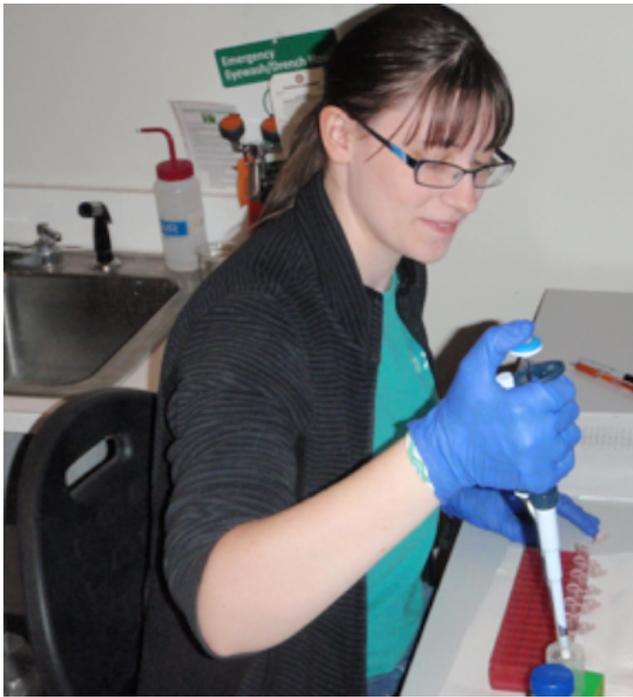
A collaborative effort to use fish forensics for quality assurance testing of fish fillets in Maine markets.

Mislabeled seafood is a widespread issue, not just locally but worldwide. Mislabeling is a multifaceted issue encompassing human health and consumer rights concerns—not to mention it is an illegal practice in the US. The most severe health concerns associated with mislabeling include exposure to allergens and toxins (e.g. tetrodotoxin in pufferfish and gempylotoxin in escolar) as well as high levels of mercury present in certain species of fish. The fraudulent substitution of lower-quality fish in place of higher quality (read: expensive) fish is also a frequent problem. While the extent of fish mislabeling varies substantially based on the product and location of sale, numerous studies, surveying both restaurants and retail markets, have reported over 30% mislabeling across samples tested. DNA testing for identifying mislabeling of seafood products has been used by a wide range of individuals from high school students¹ to high-profile ocean activist groups² and independent research labs.



Fish filets on display in a Maine supermarket. Photo: Laura Whitefleet-Smith (2/2014)

Researchers at the University of New England are particularly interested in commercially sold hake and have developed a molecular method for identifying six species of hake and an additional five groundfish species common to the Gulf of Maine. Hakes are intriguing as the name “hake” describes a number of different species belonging to multiple families of fish. According to the 2013 FDA Seafood List, there are nine species of fish that may acceptably be labeled under the name “hake.” The use of this ambiguous label invokes a number of questions. Why are all of these species grouped together under one label? What are you getting when you purchase hake in the Gulf of Maine? University of New England graduate student Laura Whitefleet-Smith and Assistant Research Professor Anna Bass have embarked on a project to address these questions by working collaboratively with local markets to achieve two main goals: 1) quality assurance testing of fish fillets and 2) determining the species composition of hake sold in Maine markets.



Graduate student and co-investigator Laura Whitefleet-Smith isolating DNA from fillet samples donated by a local supermarket. Photo: Christopher Goodchild (3/2014)

The technique used by UNE researchers is a lower-cost alternative to popular DNA barcoding which relies on expensive sequencing. In the future, this technique could be used as a means of monitoring the species composition of hake in our markets over time. Interestingly, several hake species have shown distributional changes over the past 45 years that may be related to increasing water temperatures³. This could result in an alteration of the hake species composition in the Gulf of Maine. Detecting changes in the species composition of hake in our markets could represent a valuable indicator of possible distributional changes in wild hake stocks. The ability to detect spatial changes in mobile species' ranges is crucial to our understanding of the ecological impacts of the warming waters in both the Gulf of Maine and our oceans as a whole.

Looking for more? Contact us at: <http://www.une.edu/faculty/profiles/abass.cfm>

- 1.) http://www.nytimes.com/2008/08/22/science/22fish.html?_r=1&
- 2.) <http://oceana.org/en/our-work/promote-responsible-fishing/seafood-fraud/overview>
- 3.) Nye, J.A., Link, J.S., Hare, J.A., et al. 2009. Mar. Ecol. Prog. Ser. 393:111-129

Other News in the Gulf of Maine & Bay of Fundy

- 12/1/2015 - [Nova Scotia approves oil exploration lease next to Georges Bank, entrance to Gulf of Maine](#) (Portland Press-Herald)
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- 10/27/2015 - [Gulf of Maine's cold-craving marine species retreat to deeper waters](#) (Portland Press Herald)
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- 9/8/2015 - [Army Corps Withdraws Penobscot Bay Dredging Application](#) (Portland Press Herald)
- 9/7/2015 - [Nova Scotia premier promoting province's seafood industry in China](#) (Metro News Toronto)

- 9/3/2015 - [Bay of Fundy surveyed for chemical runoff](#) (CBC News)
- 9/1/2015 - (Maine Public Broadcasting Network)
- August 30, 2015 [Where have Maine's mussels gone?](#) (Portland Press Herald)
- August 27, 2015 [New Sea-Level Rise Handbook Highlights Science and Models for Non-Scientists](#) (USGS Newsroom)
- 8/20/2015 - [Weir fishermen struggling to catch herring in Bay of Fundy](#) (CBCNews New Brunswick)
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- July 9, 2015 - [Summer storm leaves Biddeford beach lost in the weed](#) (Portland Press Herald)
- June 3, 2015 - [A Climate Calamity In The Gulf Of Maine: The Lobster Pot Heats Up](#) (Maine Sea Grant Program at the University of Maine)
- May 31, 2015 - [Bill stalls, but tribes still hope for deal on shared management of fisheries](#) (Portland Press Herald)
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- April 28, 2015 - [How to Combat Distrust of Science](#) (Scientific American)
- April 27, 2015 - [Land-based aquaculture startup prepares to scale up in Maine](#) (Portland Press Herald)
- April 24, 2015 - [Fundy Baykeeper worries whales will be impacted by potash ships](#) (CBCNEWS)
- March 26, 2015 - [A New Hike Explores the Bay of Fundy](#) (NY Times)

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- [February 2015](#) — *ESIP releases new smartphone app connecting people in the Gulf of Maine and watershed to the science happening all around them.*
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- [September 2015](#) — *Climate Change Products for Atlantic Canada.*
- [July 2015](#) — *An update from the April 2015 State of the Bays Symposium in Massachusetts.*
- [June 2015](#) — *Learn about NH Department of Environmental Services' work with 65 volunteers to improve beach grass coverage at Hampton Beach State Park.*
- [May 2015](#) — *Nova Scotia recently released risk ratings for storm surge and sea level rise for all portions of the Province - this journal summarizes the findings*
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- Eutrophication Fact Sheet
- Aquatic Habitats Fact Sheet
- Climate Change Fact Sheet
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- Indicator Reporting Tool
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Vision Statement & Core Principles

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Data