

SIO 286: Sustainable Seafood: Science, Management, and Public Perception

Winter 2020

1:30-4:30pm Wednesdays
Location: Hubbs 4500 at Scripps and Pacific Room at SWFSC
Grade option: Letter grade

Instructor: Sarah Mesnick / sarah.mesnick@noaa.gov / 858-546-7148 / SWFSC 402

Office hours: Friday 2:00 – 4:00 pm or by appointment

With: Oriana Poindexter Oriana.poindexter@noaa.gov (858-334-2883)

Office hours: by appointment

We have designed *Sustainable Seafood: Science, Management, and Public Perception* to bridge gaps in our understanding of fish, fisheries, and seafood. We aim to expand and challenge your thinking about food systems, with examples drawn from various products harvested from the sea. We will cover a diverse array of topics and their relation to one another, including biology and ecology, fisheries management, business and value chains (both legal and illegal), food security, food justice, and communication.

Schedule

Week 1 – 1/8 Pacific Room

What is seafood sustainability? Course overview

Week 2 – 1/15 Hubbs 4500

San Diego Caught: Local fisheries, opportunities, and barriers

Week 3 – 1/22 Pacific Room

Introduction to fisheries management, stock assessment, and coastal pelagic species (CPS)

Week 4 – 1/29 Southwest Fisheries Science Center - Labs

Science behind stock assessment: At sea and in the lab with coastal pelagics (CPS)

Week 5 – 2/5 Hubbs 4500

Ecolabels, traceability and market strategies

Week 6 – 2/12 Pacific Room

Tunas: Biology and management of highly migratory species (HMS)

Week 7 – 2/19 Pacific Room

Transfer effects (swordfish)

Week 8 – 2/26 Hubbs 4500

California Salmonscape

Week 9 – 3/4 Hubbs 4500

Aquaculture: shellfish and seaweeds

Week 10 – 3/11 Hubbs 4500

Aquaculture: finfish. Course wrap up

Finals week 3/20 Hubbs 4500 (11:30-2:30pm)

Speed presentations; final projects due

Field trips (optional):

11 Jan – Local fisheries / San Diego Tuna Harbor docks and market. 8am. Lunch

TBD – tuna longline offload and processing / Tuna Harbor / Catalina Offshore Products

TBD – Abalone farm tour / Santa Barbara

TBD – Striped bass aquaculture / Todos Santos, Baja California

Goals

- Learn to think critically about seafood systems.
- Learn how to access the best available science on fisheries, stock status, bycatch, etc..
- Build foundational knowledge of fisheries management.
- Gain appreciation for sustainability from multiple perspectives.
- Gain exposure to local fisheries, seafood supply chain, and the people involved.
- Examine how information about seafood is acquired, communicated, and disseminated.
- Identify your role/s in the seafood system

Events (optional with varied opportunities to participate):

22 Jan – Sustainable Seafood Summit / San Francisco
27 Jan – Lunch and Learn / fish breakdown / Specialty Produce
31 Jan – Kitchens for Good Graduation 1/31/2020 at 11am
5 Feb – NMFS Deputies Meeting / seafood tacos / SWFSC
6 Feb - 2100 Kettner Fete and Feast / Little Italy
19 Feb – Ocean Sciences Town Hall
1-4 March – Pacific Fisheries Technologists Conference / Long Beach
15-17 March – Seafood Expo North America / Boston
15 April – Research Chefs Association Annual Conference / Hard Rock Hotel, San Diego
16-17 April – Patricia Majluf / CMBC seminar / Oceana / Peruvian anchoveta

Ongoing

San Diego Maritime museum tuna exhibit
Tuna Harbor Docks Market (Saturdays)

Structure/Grading

Participation (40%)

- Lectures will be followed by class or panel discussions, participation will be based on:
 - Weekly class attendance and engagement in class discussion
 - Weekly readings (on Canvas; links and citations on syllabus) and discussion
 - Field trips and events (optional)

Class crowd-sourced projects (30%)

- Collect data, enter in shared folder, and complete three short (1-2 page) papers on:
 - San Diego seafood markets (15 pts)
 - San Diego Seafood menus (7.5 pts)
 - Ecolabels and seafood sourcing (7.5 pts)

Final project (30%)

- Completion of 2500 word (ca. 5 page) paper and Ignite/speed presentation (5 min) that considers a seafood product from “ocean to table” and that cites original fisheries data (assessment, bycatch, landings, etc). Both the paper and the presentation are due in class during finals week on 22 March 11:30-2:30pm.
- Topics:
 - NOAA FishWatch species
 - California Sea Grant species
 - Topic of your choice, e.g.,
 - Abalone (Oriana)
 - Salmon hatcheries (Sarah)
 - Bycatch (Martin)

- Your capstone

Date	Topic & Activity	Assignments (assigned the week before; due the week indicated)
1/8 SWFSC	What is seafood sustainability? <ul style="list-style-type: none"> ● Course Overview ● Grand challenges ● Introduction to seafood sustainability ● Big issues in sustainable fisheries 	Read <ul style="list-style-type: none"> ● Hilborn, R., Fulton, E. A., Green, B. S., Hartmann, K., Tracey, S. R., & Watson, R. A. (2015). When is a fishery sustainable? Canadian Journal of Fisheries and Aquatic Sciences, 72(9), 1433-1441.
1/15 Hubbs 4500	Local fisheries <ul style="list-style-type: none"> ● CA Landings ● San Diego Caught ● Diversity ● History ● Management ● Availability ● Barriers and Opportunities Assignment: San Diego Market Study Panel discussion Seafood reception	Read <ul style="list-style-type: none"> ● Talley et al. 2016. Availability of local seafood. Journal on Food, Agriculture and Society ● http://thdocksidemarket.com/new/ Watch <ul style="list-style-type: none"> ● Lobster fishing with Dan Major (Sam Wells, YouTube) ● Of the Sea: A Film about California Fishermen (TrimTab Media; optional) In the news <ul style="list-style-type: none"> ● Seaport developer, fishermen reach deal to help save San Diego’s storied fishing industry https://inewsourc.org/2018/10/23/seaport-san-diego-fishermen-agreement/ Additional readings <ul style="list-style-type: none"> ● Thomson, C. 2015. California Commercial Fisheries 1981-2012. Marine Fisheries Review https://spo.nmfs.noaa.gov/content/californias-commercial-fisheries-1981-2012 ● The State of the Food System in the San Diego Region.2019. County of San Diego https://www.sandiegocounty.gov/content/dam/sdc/lueg/docs/State-of-the-Food-System-for-the-San-Diego-Region-November-2019.pdf Assignment <ul style="list-style-type: none"> ● https://docs.google.com/spreadsheets/d/1H4EvsZ7-XBq3GwWk9-rnSpt50HhsPvDC8Owqz4xV5Q/edit?ts=5e1f7997#gid=1890008740
1/22 SWFSC	Introduction to coastal pelagic species (CPS), domestic fisheries management, and stock assessment <ul style="list-style-type: none"> ● Domestic federal fisheries management ● Diversity of CPS ● CPS as “forage” fish ● CPS and environmental variability ● CPS management and the CPS FMP ● Stock assessment Guest speaker: Kevin Hill	Read <ul style="list-style-type: none"> ● NOAA FishWatch sardine profile ● PFMC’s Coastal Pelagic Species ● NMFS Fish stock assessments (main page, review content of site) Review <ul style="list-style-type: none"> ● PFMC’s Coastal Pelagic Fishery Management Plan (FMP) (review the elements that go into a FMP – ie., peruse the table of contents) ● Look up maximum sustainable yield (MSY) and how it relates to status determination. Find info in the CPS FMP here (pg 35+) and CPS SAFE document here (pg 32+). Watch <ul style="list-style-type: none"> ● The ABCs of fish stock assessment In the news <ul style="list-style-type: none"> ● Oceana: Modern Day Pacific Sardine Collapse: How to prevent a future crisis ● Oceana: http://oceana.org/blog/lack-sardines-leaves-california-sea-lions-starving

	Seafood reception: #eatbait	<ul style="list-style-type: none"> • http://civileats.com/2015/05/29/the-west-coast-sardine-fishery-is-closed-not-because-you-eat-sardines-but-because-you-dont/ • Earth Justice: https://earthjustice.org/news/press/2018/court-rejects-catch-limit-for-california-anchovy-fishery-following-oceana-lawsuit <p>Assignment</p> <ul style="list-style-type: none"> • Conduct San Diego seafood market survey and enter data in class crowd source site
1/29 SWFSC	<p>Science behind stock assessment: CPS</p> <p>SWFSC Life History lab exercises</p> <p>Group discussion</p>	<p>Watch</p> <ul style="list-style-type: none"> • CalCOFI (Hillery Eggers, MAS 2018) • SWFSC's Coastwide sardine survey (SWFSC) <p>Assignment</p> <ul style="list-style-type: none"> • Ask and answer one question based on San Diego seafood market data <p>Additional readings</p> <ul style="list-style-type: none"> • California Sea Grant seafood profiles: https://caseagrant.ucsd.edu/seafood-profiles/pacific-sardine • Hall, M. 2007. Eat more anchovies.
2/5 Hubbs 4500	<p>Ecolabels and traceability; market strategies for middle ground fisheries</p> <ul style="list-style-type: none"> • Ecolabels • Traceability • Marketing • Seafood sourcing • Storied Seafood <p>Guest lectures</p> <p>Seafood reception</p>	<p>Read</p> <ul style="list-style-type: none"> • Jaquet et al. 2010. Conserving wildfish in a sea of market-based efforts. Oryx 44: 45-56. <p>Visit</p> <ul style="list-style-type: none"> • National Ocean Council Committee on IUU Fishing and Seafood Fraud https://www.iuufishing.noaa.gov/Home.aspx <p>Assignment</p> <ul style="list-style-type: none"> • Review the criteria of one company's seafood sourcing; add to the class crowd source site; write short summary of what you found – what did you find to be present/lacking? be prepared to share in class
2/12 SWFSC	<p>Highly Migratory Species (HMS): Tuna</p> <ul style="list-style-type: none"> • Diversity of tuna • Ecological roles of tuna • History of tuna fisheries in San Diego (yellowfin, bluefin) • Current issues in tuna conservation and management • Processing • Culinary uses and approaches 	<p>Read</p> <ul style="list-style-type: none"> • Read SWFSC's bluefin tuna factsheet • Check out the Dolphin Safe Tuna Tracking and Verification Program <p>In the news</p> <ul style="list-style-type: none"> • https://www.cnbc.com/2019/01/05/tuna-sells-for-record-3-million-in-auction-at-tokyos-new-fish-market.html • http://www.npr.org/sections/thesalt/2015/06/11/412943456/why-is-this-fisherman-selling-threatened-bluefin-tuna-for-2-99-a-pound <p>Review</p> <ul style="list-style-type: none"> • Visit NOAA Fisheries West Coast Region Highly Migratory Species pages • Visit the website of the Inter-American Tropical Tuna Commission, Western and Central Pacific Fisheries Commission, or the International Scientific Committee for Tuna (ISC) • Overview of RFMO's: https://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2012/02/23/faq-what-is-a-regional-fishery-management-organization <p>Assignment</p> <ul style="list-style-type: none"> • Visit “seafood” or “sustainable seafood” restaurant (online or in person) and ask about their menu and sourcing; add data to class crowd source site; write short summary of diversity and sources of seafood

		<ul style="list-style-type: none"> Choose final project topic and record class crowd source site
<p>2/19 SWFSC</p>	<p>Transfer effects</p> <ul style="list-style-type: none"> Bycatch Spillover/transfer effects Swordfish fisheries Markets Take reduction teams Dynamic ocean management Future challenges and opportunities <p>Guest lecture Panel discussion Seafood reception</p>	<p>Read</p> <ul style="list-style-type: none"> Helvey et al. 2017. Can the United States have its fish and eat it too? <i>Marine Policy</i> 75: 62–67. <p>In the news</p> <ul style="list-style-type: none"> https://www.pewtrusts.org/en/research-and-analysis/articles/2019/01/10/new-fishing-gear-spare-whales-sea-turtles-and-dolphins (and links) https://usa.oceana.org/our-campaigns/drift_gillnets/campaign <p>Watch</p> <ul style="list-style-type: none"> Storied Seafood: California Swordfish (Aquarium of the Pacific) <p>Assignment</p> <ul style="list-style-type: none"> Work on Project <p>Additional reading</p> <ul style="list-style-type: none"> Lewis et al. 2019. Accounting for unintended consequences of resource policy: Connecting research that addresses displacement of environmental impacts. <i>Conservation Letters</i>. 2019;12:e12628. https://doi.org/10.1111/conl.12628
<p>2/26 Hubbs 4500</p>	<p>California Salmonscape</p> <ul style="list-style-type: none"> Salmonid diversity Salmon fisheries Habitat for salmon; salmon impacts on terrestrial habitat Salmon as prey Hatcheries Culinary uses and approaches <p>Salmon breakdown/reception</p>	<p>Read</p> <ul style="list-style-type: none"> Upstream: Salmon and Society in the Pacific Northwest, National Academy of Sciences, 1996. Please read the Executive Summary and, as time allows, Chapter 1 and 2. <p>Watch</p> <ul style="list-style-type: none"> SWFSC’s CA salmonscape poster <p>In the news</p> <ul style="list-style-type: none"> https://www.seattletimes.com/seattle-news/environment/hunger-the-decline-of-salmon-adds-to-the-struggle-of-puget-sounds-orcas/ https://www.npr.org/sections/thesalt/2017/05/17/528826774/many-of-california-s-salmon-populations-unlikely-to-survive-the-century http://www.spokesman.com/stories/2018/nov/25/for-endangered-orcas-its-the-hunger-games/ https://www.seattletimes.com/seattle-news/seattle-chef-renee-erickson-takes-chinook-salmon-off-menus-to-help-ailing-puget-sound-orcas/ <p>Additional reading</p> <ul style="list-style-type: none"> https://www.pcouncil.org/salmon/background/ https://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/salmon_and_steelhead.html <p>Assignment</p> <ul style="list-style-type: none"> Schedule 30 min class project review meeting with Sarah
<p>3 / 4 Hubbs 4500</p>	<p>Shellfish and seaweed aquaculture</p>	<p>Read</p> <ul style="list-style-type: none"> Pick one from the additional readings <p>Watch</p>

	<ul style="list-style-type: none"> ● CA shellfish aquaculture ● CA seaweed aquaculture ● challenges and opportunities <p>Guest lecture Site visit/SWFSC aquarium</p>	<ul style="list-style-type: none"> ● Ocean to Table: Stories of Food, Farming and Conservation (Aquarium of the Pacific) <p>Assignment</p> <ul style="list-style-type: none"> ● Work on project <p>Additional reading</p> <ul style="list-style-type: none"> ● Froehlich, H.E., R.R. Gentry, B.S. Halpern. 2017. Conservation aquaculture: shifting the narrative and paradigm of aquaculture’s role in resource management. <i>Bio. Con.</i> 215: 162-168. ● Lucas, J. Aquaculture: Quick Guide. Current Biology 25, R1057–R1069 ● Goldburg et al. Marine Aquaculture in the US: Environmental Impacts and Policy Implications. Pew Oceans Commission. ● Gentry, R.R., Froehlich, H.E., Grimm, D., Kareiva, P., Parke, M., Rust, M., Gaines, S.D. and Halpern, B.S., 2017. Mapping the global potential for marine aquaculture. <i>Nature Ecology & Evolution</i>, 1(9): 1317-1324.
<p>3/11 Hubbs 4500</p>	<p>Finfish aquaculture</p> <ul style="list-style-type: none"> ● Finfish aquaculture: challenges and opportunities ● Wrap up: Culinary Conservation ● Class evaluations <p>Guest Lectures Seafood Reception</p>	<p>Reading</p> <ul style="list-style-type: none"> ● Pick one from the additional reading/watching below <p>Watch</p> <ul style="list-style-type: none"> ● How I fell in love with a fish (Dan Barber TED talk) <p>Assignment</p> <ul style="list-style-type: none"> ● Exchange draft of final project with classmate and provide a review for each other <p>Additional reading and watching:</p> <ul style="list-style-type: none"> ● Onward: Visit the World's Largest Open-Ocean Fish Farm National Geographic (You Tube, Ocean Blue cobia farm) ● Froehlich, H.E., Runge, C.A., Gentry, R.R., Gaines, S.D. and Halpern, B.S., 2018. Comparative terrestrial feed and land use of an aquaculture-dominant world. PNAS, 115: 5295-5300. ● Froehlich, H.E., N. Sand Jacobsen, T.E. Essington, T. Clavelle, B.S. Halpern. 2018. Avoiding the Ecological Limits of Forage Fish for Fed Aquaculture. <i>Nature Sustainability</i>, 1:298-303.
<p>3/20 Hubbs 4500 11:30am – 2:30pm</p>	<p>Final projects due</p> <ul style="list-style-type: none"> ● Student ignite/speed talks 	<p>Turn in final paper</p>