Comparison of Environmental Contaminants on Georges Bank and Stellwagon Bank: PCB's and Pesticides from F/V Skimmer NEC-EM2001-1 in the Stellwagen Bank, Georges Bank, Wilkinson Basin from 2002-2004 (NEC-CoopRes project)

Website: https://www.bco-dmo.org/dataset/2788
Version: final
Version Date: 2006-01-01

Project
» Northeast Consortium: Cooperative Research (NEC-CoopRes)

Program
» NorthEast Consortium (NEC)

Contributors	Affiliation	Role
Monosson, Emily		Principal Investigator

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Dataset Description

Comparison of Environmental Contaminants on Georges Bank and Stellwagon Bank
PCBs and Pesticides

Project Leader: *Emily Monosson,* Mt. Holyoke College
Additional Participants:
David Lincoln, Commonwealth Corporation
Angela Sanfilippo, Gloucester Fishermen's Wives Association
and over 14 Commerical Fisherman

"This project investigated the potential for contaminant-induced effects on reproduction and development in both nearshore and offshore cod. Heavy metals, polychlorinated biphenyls (PCBs), and oganochlorine pesticides (including DDTs) were measured in cod livers and gonads and sediments from Stellwagen Bank, Georges Bank, and Wilkinson Basin. In general, concentrations of most contaminants were found to be near or below detection limits in cod gonads. Several contaminants were detected in the cod liver including PCBs and DDTs. However, concentrations from Georges Bank were drastically lower than previously published data and below concentrations linked with reproductive or developmental toxicity in fish. Analysis of heavy metals suggests that the concentrations of metals measured in this study are within range of those previously reported in cod except for cadmium. The vast majority of polycyclic aromatic hydrocarbons (PAHs) and metals detected in sediments were below NOAA's Threshold Effects Levels and chlorinated pesticides were below detection limits in the sediments. No one chemical was consistently detected at concentrations suspected of causing adverse effects in cod or their offspring. It would appear that levels of exposure to the chemical contaminants measured are unlikely to have had a considerable impact on the nearshore or offshore cod fishery."*extracted from: Summary of Completed Cooperative Research Projects Funded by the Northeast*

Data Elements
Parameter Names and Descriptions

side collected. Otherwise males were included in the collection.

For more detailed information see: Final Report

Questions concerning these data should be directed to:
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Revised Sept 01, 2006; gfh

Methods & Sampling

The PCBs Aroclor 1254 and 1260 were detectable in the majority of cod livers from all sites with the highest concentrations in fish from SB. The concentration of Aroclor 1254 in these fish was approximately 5-fold greater than in fish from the GB sites, and 2-fold greater than in fish from WB. PCB concentrations detected in cod livers from the present study are below those reported to cause adverse effects on reproductive or development (Monosson 1999/2000; Reiser et al., 2004). Interestingly, PCB concentrations were below detection limits (<50ppb) in gonads from all sites. Of the several organochlorine pesticides and their metabolites analyzed in this study, only DDT and its metabolites (DDD and DDE), a-chlordane, endrin and heptachlor were detected in more than 50% of the samples across all sites. analysis included: heptachlor; endosulfan I; endosulfan II; endosulfan sulfate; methoxychlor; endrin ketone; endrin aldehyde; toxaphene. These pesticides were generally below detection limits in cod livers. Cod livers from WB had almost three-fold higher concentrations of total DDT than fish from all of the other sites for which DDTs were measured. Interestingly, WB fish also had similar concentrations of the long-lived DDE metabolite and the more rapidly metabolized DDT parent compound, unlike cod from SB and GB, suggesting a newer source of DDT exposure for Wilkinson Basin cod. A study of contaminants in tilefish collected from several deep sea canyons in the Northwest Atlantic showed a similar occurrence where DDE concentrations in tilefish from Lydonia Canyon (on GB) was detected at concentrations similar to the parent DDT compound. In contrast DDT concentrations were roughly half the concentration of DDE metabolite in tile fish from the remaining canyon sites (Steimle et al. 1996). Notably, PCB and DDT concentrations in cod from GBC are drastically lower than those reported earlier by Harvey et al. (1973). Additionally concentrations for both organochlorines in cod from GBC tend to be lower than concentrations reported historically for cod collected from various locations in the 1970's and 1980's. Concentrations of PCBs in fish from Stellwagen Bank, however are higher compared to other sites and other years (excepting the high concentrations reported in the Southern Baltic and on Georges Bank in the 1970s), as are the concentrations of DDTs found in fish from Wilkenson Basin.

Data Processing Description

"This project investigated the potential for contaminant-induced effects on reproduction and development in both nearshore and offshore cod. Heavy metals, polychlorinated biphenyls (PCBs), and oganochlorine pesticides (including DDTs) were measured in cod livers and gonads and sediments from Stellwagen Bank, Georges Bank, and Wilkinson Basin. In general, concentrations of most contaminants were found to be near or below detection limits in cod gonads. Several contaminants were detected in the cod liver including PCBs and DDTs. However, concentrations from Georges Bank were drastically lower than previously published data and below concentrations linked with reproductive or developmental toxicity in fish. Analysis of heavy metals suggests that the concentrations of metals measured in this study are within range of those previously reported in cod except for cadmium. The vast majority of polycyclic aromatic hydrocarbons (PAHs) and metals detected in sediments were below NOAA's Threshold Effects Levels and chlorinated pesticides were below detection limits in the sediments. No one chemical was consistently detected at concentrations suspected of

causing adverse effects in cod or their offspring. It would appear that levels of exposure to the chemical contaminants measured are unlikely to have had a considerable impact on the nearshore or offshore cod fishery."

DMO processing changes:

Instead of each chemical species being a column header, a parameter called 'contaminant' was added and associated with a 'concentration' parameter. Then each chemical species became a row instead of a column.

These rows included:

PCB1260 and PCB1254: Polychlorinated Biphenol measured in micrograms per kilogram of wet weight of fish tissue.

b-BHC and d-BHC: organochlorine pesticide measured in micrograms per kilogram of wet weight of fish tissue.

g-BHC(lindane) changed to g-BHC_lindane: organochlorine pesticide measured in micrograms per kilogram of wet weight of fish tissue.

aldrin: organochlorine pesticide measured in micrograms per kilogram of wet weight of fish tissue.

heptachlor_epox: organochlorine pesticide measured in micrograms per kilogram of wet weight of fish tissue.

Dieldrin: organochlorine pesticide measured in micrograms per kilogram of wet weight of fish tissue.

4,4'-DDE changed to 4_4-DDE: DDT metabolite measured in micrograms per kilogram of wet weight of fish tissue.

Endrin: organochlorine pesticide measured in micrograms per kilogram of wet weight of fish tissue.

4,4'-DDD changed to 4_4-DDD: DDT metabolite measured in micrograms per kilogram of wet weight of fish tissue.

4,4'-DDT changed to 4_4-DDT: DDT metabolite measured in micrograms per kilogram of wet weight of fish tissue.

alpha-Chlordane: organochlorine pesticide measured in micrograms per kilogram of wet weight of fish tissue.

amma-Chl: organochlorine pesticide measured in micrograms per kilogram of wet weight of fish tissue.

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Data Files

File
contaminants_PP.csv (Comma Separated Values (.csv), 50.72 KB) MD5:1a580857a10bea53f9407319c094ac83 Primary data file for dataset ID 2788

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Parameters

Parameter	Description	Units
site	site number	

location	The location/site where samples were collected, reported as a geographic name. Location Codes: SB1 is Stellwagon Bank Marine Sanctuary 1, SB2 is Stellwagon Bank Marine Sanctuary 2, GB1 is Georges Bank 1, GB2 is Georges Bank 2, WB is Wilkinson Basin, GBC is Georges Bank/Canadianside	
lat	The latitude where the sample was collected in decimal degrees. North is Positive.	
substrate	composition of the sea floor	
sample_id	The sample identifications referred to the numbers the fishermen gave for the fish. Each batch of fish had their own sample numbers, depending on which fishermen sampled.	
lipids_pct	percent lipids concentration	
solids_pct	percent solids concentration	
contaminant	the name of the polychorinated biphenol or pesticide with which the fish tissue is contaminated	
lon	The longitude where the sample was collected in decimal degrees. West is Negative.	
len_inch	length of the fish in inches	
len_cm	length of the fish in centimeters	
sex	M or F. Female fish were targeted where a sufficient number of females could be collected. Otherwise males were included in the collection.	
tissue	L = liver; G = gonads (most often ovaries); 5-10 samples of each tissue was collected.	nd
concentration	concentration of the pesticide in the tissue.	micrograms/kg wet weight

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Deployments

NEC-EM2001-1

Website	https://www.bco-dmo.org/deployment/57761
Platform	F/V Skimmer
Report	http://northeastconsortium.org/ProjectFileDownload.pm?report_id=267&table=project_report
Start Date	2002-05-28
End Date	2004-06-08
Description	Other fishing vessels were used in this study, including: F/V Francesca & Carlo, F/V Miss Sandy, F/V Razzo, F/V Caterina G, F/V Santo Vito, F/V Angela Rose, F/V Sabrina Marina, F/V Padre Pio, F/V Giovana. For details and a list of captains, see the deployment report. **Methods & Sampling** The PCBs Aroclor 1254 and 1260 were detectable in the majority of cod livers from all sites with the highest concentrations in fish from SB. The concentration of Aroclor 1254 in these fish was approximately 5-fold greater than in fish from the GB sites, and 2-fold greater than in fish from WB. PCB concentrations detected in cod livers from the present study are below those reported to cause adverse effects on reproductive or development (Monosson 1999/2000; Reiser et al., 2004). Interestingly, PCB concentrations were below detection limits (**Processing Description** "This project investigated the potential for contaminant-induced effects on reproduction and development in both nearshore and offshore cod. Heavy metals, polychlorinated biphenyls (PCBs), and oganochlorine pesticides (including DDTs) were measured in cod livers and gonads and sediments from Stellwagen Bank, Georges Bank, and Wilkinson Basin. In general, concentrations of most contaminants were found to be near or below detection limits in cod gonads. Several contaminants were detected in the cod liver including PCBs and DDTs. However, concentrations from Georges Bank were drastically lower than previously published data and below concentrations linked with reproductive or developmental toxicity in fish. Analysis of heavy metals suggests that the concentrations of metals measured in this study are within range of those previously reported in cod except for cadmium. The vast majority of polycyclic aromatic hydrocarbons (PAHs) and metals detected in sediments were below NOAA's Threshold Effects Levels and chlorinated pesticides were below detection limits in the sediments. No one chemical was consistently detected at concentrations suspected of causing adverse effects in cod or their offspring. It would appear that levels of exposure to the chemical contaminants measured are unlikely to have had a considerable impact on the nearshore or offshore cod fishery."

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Project Information

Northeast Consortium: Cooperative Research (NEC-CoopRes)

Website: http://northeastconsortium.org/

Coverage: Georges Bank, Gulf of Maine

The Northeast Consortium encourages and funds cooperative research and monitoring projects in the Gulf of Maine and Georges Bank that have effective, equal partnerships among fishermen, scientists, educators, and marine resource managers.

The Northeast Consortium seeks to fund projects that will be conducted in a responsible manner. Cooperative research projects are designed to minimize any negative impacts to ecosystems or marine organisms, and be consistent with accepted ethical research practices, including the use of animals and human subjects in

research, scrutiny of research protocols by an institutional board of review, etc.

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Program Information

NorthEast Consortium (NEC)

Website: http://northeastconsortium.org/

Coverage: Georges Bank, Gulf of Maine

The Northeast Consortium encourages and funds
cooperative research and monitoring projects in the Gulf of Maine and Georges Bank that have effective, **equal partnerships** among fishermen, scientists, educators, and marine resource managers.

At the 2008 Maine Fisheremen's Forum, the Northeast Consortium organized a session on data collection and availability. Participants included several key organizations in the Gulf of Maine area, sharing what data are out there and how you can find them.

The Northeast Consortium has joined the Gulf of Maine Ocean Data Partnership. The purpose of the GoMODP is to promote and coordinate the sharing, linking, electronic dissemination, and use of data on the Gulf of Maine region.

The Northeast Consortium was created in 1999 to encourage and fund effective, equal partnerships among commercial fishermen, scientists, and other stakeholders to engage in cooperative research and monitoring projects in the Gulf of Maine and Georges Bank. The Northeast Consortium consists of four research institutions (University of New Hampshire, University of Maine, Massachusetts Institute of Technology, and Woods Hole Oceanographic Institution), which are working together to foster this initiative.

The Northeast Consortium administers nearly $5M annually from the National Oceanic and Atmospheric Administration for cooperative research on a broad range of topics including gear selectivity, fish habitat, stock assessments, and socioeconomics. The funding is appropriated to the National Marine Fisheries Service and administered by the University of New Hampshire on behalf of the Northeast Consortium. Funds are distributed through an annual open competition, which is announced via a Request for Proposals (RFP). All projects must involve partnership between commercial fishermen and scientists.

The Northeast Consortium seeks to fund projects that will be conducted in a responsible manner. Cooperative research projects should be designed to minimize any negative impacts to ecosystems or marine organisms, and be consistent with accepted ethical research practices, including the use of animals and human subjects in research, scrutiny of research protocols by an institutional board of review, etc.

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