Survival of sub-legal cod with different handling methods from Fishing Vessels NEC-JP2003-1 in the Gulf of Maine from 2004-2006 (NEC-CoopRes project)

Website: https://www.bco-dmo.org/dataset/3582
Version: final
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Project
» Northeast Consortium: Cooperative Research (NEC-CoopRes)

Program
» NorthEast Consortium (NEC)

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Dataset Description

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Federal fisheries regulations require that undersized individuals of commercially important species be returned to the sea and the National Marine Fisheries Service (NMFS) has listed investigations into discard mortality rates as a research priority. For demersal longline fisheries, survival of discarded bycatch is uncertain. Sub-legal sized fish can incur injuries in their mouth, gills, and eyes and sometimes in the gut from hooks, as well as undergo pressure and temperature changes as they are brought to the surface. This study built on previous work that investigated the survival of sub-legal cod. The results of the previous study were hard to assess because of the large numbers of control fish that died. Additionally, the results of the previous study were questioned because the study was not conducted using commercial vessels. This study, funded by the Northeast Consortium (NEC), was executed in collaboration with commercial vessels fishing their commercial

hook and line gear. Two handling techniques were examined and compared to jigged fish that acted as the control to estimate cage induced mortality. Longline caught fish were either removed from the hook by hand (unsnubbed) or removed by allowing the hydraulic hauler to pull the fish against the parallel steel cylinders placed vertically on the gunwale, causing the hook to pull through the jaw (snubbed). At the extreme, this process can result in breaking the jaw. This study was a cooperative effort between fishermen and scientists using standard commercial fishing practices. 3,764 sub-legal cod were assessed for survival at three different depth ranges and four sea surface temperature ranges. Survival, assessed after holding the fish in cages for a minimum of 72 hours, ranged from 30.8% to 100%. Binomial logistical regression analysis indicated that depth, sea surface temperature, and de-hooking technique all affected survival. Depth and temperature affected survival more than the de-hooking technique. Survival improved as depth and sea surface temperatures decreased. Unsnubbed fish had less mortality compared to snubbed fish. (from final report abstract)

Methods & Sampling

For each sampling event, defined as a day on which actual fishing took place, two to four vessels utilized commercial bottom set longline gear and rod and reel to target cod. After capture, sub-legal cod (<22 inches) were evaluated and held in on-board live wells until 50 fish had been collected, constituting a replicate, and the vessel was prepared for caging. The fish were then lowered to the seafloor in cages that were retrieved and evaluated after at least 72 hours. Fishermen were responsible for determining suitable experimental fishing areas within each required season-depth strata.

Strata: Fish were collected during the winter, spring, summer and fall seasons.The main variable of concern from season to season was sea surface temperature and therefore aimed to sample in each of four temperature categories as follows:

Cold	(<= 43 F)
Cool	(44-48 F)
Warm	(49-58 F)
Hot	(> 58 F)

The study was also designed to assess survival across different capture depths, and to investigate the interplay between season and depth. The statement of work called for sampling to take place in 20, 30, and 40 fathoms. This range represents the depths where most regional longline fishing occurs (J. Pappalardo, P. Comm.). The only change to the protocol in this respect was to treat these categories as ranges as follows:

20 fathoms	15-25 fathoms
30 fathoms	25-35 fathoms
40 fathoms	35-45 fathoms

Treatments: Within each unique combination of season and depth, three different treatments were conducted: snubbed, unsnubbed, and jigged. Snubbed and unsnubbed were both taken off the demersal longline gear and were intended to duplicate as closely as possible the release (discard) conditions for normal commercial fishing. As such, these treatments were comprised of the first 50 fish caught off a given string regardless of condition. While dead fish might not be tanked or caged to avoid attracting scavengers, they were still counted as mortality towards the sample size. The jigged fish were intended to act as a control, which would indicate cage-induced mortality. As such, only strong fish with no major injuries were selected towards the 50 fish sample; dead, weak or injured fish were not used or counted.

For each season, a minimum of 150 sub-legal fish were targeted for each of the three treatments at each of the three different depths.

NOTE: The 6/21/04 fish suffered from lack of oxygen while held on deck (first warm water sampling). Subsequent samples had bubblers and ice packs to keep the deck water cool and oxygenated.

For in-depth details on sampling protocols, see the final report.

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Data Files

File
sublegal_cod.csv (Comma Separated Values (.csv), 1.82 KB) MD5:e5427140fd09cf9c796b7cf23ac6509f Primary data file for dataset ID 3582

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Parameters

Parameter	Description	Units
method	method used to catch fish: jigged	snubbed or unsnubbed
temp_range	temperature range of water where fish were caught	degrees Fahrenheit
yrday_local	local day and decimal time, as 326.5 for the 326th day of the year, or November 22 at 1200 hours (noon)	number
day_local	day of month	integer
month_local	month of year	integer
year	year of sampling	integer
depth_water_fthm	depth of fish capture; plus or minus 5 fathoms	fathoms
alive	number of fish still alive after holding period	integer
dead	number of dead fish after holding period	integer
pcent_alive	survivorship; percent still alive after holding period	percent

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Instruments

Dataset-specific Instrument Name	Fish Cage
Generic Instrument Name	Fish Cage
Dataset-specific Description	A rigid low-rise cage with a cylindrical shape and integrated bottom weights, two feet high by four feet in diameter.
Generic Instrument Description	Used to catch fish.

Dataset-specific Instrument Name	Fishing Rod
Generic Instrument Name	Fishing Rod
Generic Instrument Description	Used to catch fish.

Dataset-specific Instrument Name	Longline Fishing Gear
Generic Instrument Name	Longline Fishing Gear
Generic Instrument Description	Longlining employs a central fishing line that can range from one to 50 miles long; this line is strung with smaller lines of baited hooks, dangling at evenly spaced intervals. Longlines can be set near the surface to catch pelagic fish like tuna and swordfish, or laid on the sea floor to catch deepdwelling fish like cod and halibut. (www.montereybayaquarium.org/cr/cr_seafoodwatch/sfw_gear.aspx)

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Deployments

NEC-JP2003-1

Website	https://www.bco-dmo.org/deployment/58748
Platform	Fishing Vessels
Report	http://www.northeastconsortium.org/ProjectFileDownload.pm?report_id=657&table=project_report
Start Date	2004-06-09
End Date	2006-01-24
Description	Sub-legal cod were assessed for survival from handling techniques at three different depth ranges and four sea surface temperature ranges.

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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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Funding

Funding Source	Award
NorthEast Consortium (NEC)	04-827

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