DOGGRATE: Development of a Spiny Dogfish Excluder in a Raised Footrope Whiting Trawl : dogfish video data from F/V Barbara L. Peters NEC-MP2007-1 in the Gulf of Maine from 2008-2009 (NEC_ProjDev project)

Website: https://www.bco-dmo.org/dataset/3395
Version: 2
Version Date: 2021-05-18

Project
» Northeast Consortium: Project Development (NEC_ProjDev)

Program
» NorthEast Consortium (NEC)

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Dataset Description

See final report

A spiny dogfish *Squalus acanthias* excluder grate (grid) within the extension of a silver hake (whiting) *Merluccius bilinearis* trawl net was designed and tested in Massachusetts Bay. We collected evidence between October 2008 and August 2009 using live-fed underwater video footage around the grate to support the proof of concept. Grates with 50 mm (2 in) spacing were investigated for effects from color (white or black), angles of placement, and direction (leading to a top or bottom escape vent). Spiny dogfish numbers were greatly reduced for all gear configurations based on video observations and data collected from the codend. Catches of target species were sizeable. Four tows (of various gear configurations) resulted in spiny dogfish blockages in front of the grate. The reduction of spiny dogfish led to apparent increases in the quality of marketable catches, reductions in non-target species mortality, and decreases in the codend catch handling times.

Study location: northwest of Cape Cod

Methods & Sampling

Different nets and grates were used in each phase. Testing locations also differed between trials. In Phase 1, grate angles were investigated using an initial white prototype grate with a bottom escape opening. In Phase 2, we refined the grate design and explored grate color effects and leading fish towards a top or bottom escape vent. All tows were conducted during daylight hours following typical fishing practices for silver hake. Vessel

speed-over ground was kept at around 1.5 m/s (~3.0 kt) when possible but was affected by water current directions. Operational data (location, weather, time, duration, etc.) were recorded for each haul. Catch composition and weights (using a motion-compensated Marel M1100 floor scale) were determined for all species retained. Mid-line lengths were recorded for spiny dogfish, silver hake, red hake Urophycis chuss, managed species (Atlantic cod Gadus morhua, yellowtail flounder Limanda ferruginea, winter flounder Pseudopleuronectes americanus, etc), and other selected catch. Sub-samples were taken as time required. Please see final report for detailed information.

Tows were conducted during Phase 1 to investigate the general performance (catching and exclusion properties) of the grate at two different angles (set with the lower portion of the grate tilted to the aft of the net at approximately 45 degrees and 35 degrees on land). Tows one through six were conducted with the grate set at approximately 45 degrees (arrangement 1); tows seven through nine had the grate set at approximately 35 degrees (arrangement 2). All used an upward guiding panel, a white grate with a forward-leaning top portion, and a bottom escape vent. An underwater camera (Remote Ocean Systems Navigator) was attached either on the guiding panel pointing aft or on the grate itself viewing towards the escape vent.Net mensuration sensors were used to obtain door spreads, wing spreads, headrope heights, and net openings. Additionally, an angle sensor was borrowed from Notus Electronics Ltd. to record the grate's angle while towing; this sensor was attached to the grate.

Phase 2
The following tows and gear configurations (continuing sequentially from Phase 1) were completed:
- Arrangement 3, Tows 10-15: Black grate, top of grate forward-leaning 45 degree angle, upward guiding panel, and bottom escape vent.
- Arrangement 4, Tows 16-21: Black grate, top of grate aft-leaning 45 degree angle, downward guiding panel, and top escape vent.
- Arrangement 5, Tows 22-28: White grate, top of grate aft-leaning 45 degree angle, downward guiding panel, and top escape vent.
- Arrangement 6, Tows 29-33: White grate, top of grate forward-leaning 45 degree angle, upward guiding panel, and bottom escape vent.
The underwater camera was attached forward of the grate looking aft. as in Phase 1, net mensuration data were collected for exploratory analyses (without an angle sensor); some data were also collected on the square height and footrope height while towing. Temperature data were collected using an Onset Tidbit logger also for exploratory purposes.

Gear Letter	Net_Name	Grate_Material	grate angle (degrees)	grate spacing (inches)	Grate_Color	Escape_Vent
A	Phase 1 net	HDPE	45	2	white	bottom
B	Phase 1 net	HDPE	35	2	white	bottom
C	Phase 2 net	HDPE	45	2	black	bottom
D	Phase 2 net	HDPE	45	2	black	top
E	Phase 2 net	HDPE	45	2	white	top
F	Phase 2 net	HDPE	45	2	white	bottom

Data Processing Description

Video clips were examined to determine the number of dogfish entering the field of view. Dogfish behaviors from the video clips were individually categorized until they were lost off the camera, lost from view, escaped, or were captured (through the grate). Once spiny dogfish became impinged or twisted on the grate, or escaped through the vent, we then recorded the area of the body where the dogfish contacted the grate and the head orientation (when possible). The final body position and facing were recorded only after the dogfish settled into those movements. Video, acoustic sensor data, and other measurements were reviewed following the field work to determine if the nets performed appropriately.

All tows were conducted during daylight hours following typical fishing practices for silver hake. Vessel speed-over ground was kept at around 1.5 m/s (~3.0 kt) when possible but was affected by water current directions.

Operational data (location, weather, time, duration, etc.) were recorded for each haul. Catch composition and weights (using a motion-compensated Marel M1100 floor scale) were determined for all species retained. Mid-line lengths were recorded for spiny dogfish, silver hake, red hake Urophycis chuss, managed species (Atlantic cod Gadus morhua, yellowtail flounder Limanda ferruginea, winter flounder Pseudopleuronectes americanus, etc), and other selected catch. Sub-samples were taken as time required.

Catch weights per unit effort was measured; length frequency distributions were analyzed within the gear configurations using box and whisker plots. Catch comparisons were considered a secondary priority, and the study was not designed to allow rigorous comparisons using statistical methods.

BCO-DMO data manager processing notes:
* Version 2 (2021-05-18) replaces version 1 (2010-12-10). Updated to change source file encoding to utf-8. There was an unsupported character in comments in the dataset that is now fixed after the encoding conversion.

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Data Files

File
doggrate_behavior.csv (Comma Separated Values (.csv), 335.96 KB) MD5:8794604fd5abc7c7b4bf8f3916105e6e Primary data file for dataset ID 3395

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Parameters

Parameter	Description	Units
behavior	fish behavior within grate as observed in video	text
comments	notes and observations	text
date_local	local date	mm/dd/yyyy
day_local	day of month, local time	1 to 31
fish_id	dogfish identification number	integer
gear_code	see table	text
haul_id	haul number	integer
herring_abundant	Trie if herring were abundant in the video.	TRUE/FALSE
month_local	month in local time	1 to 12

impinged_area	part of fish where body contacted the grate	text
lat	latitude in decimal degrees; North is positive; negative denotes South	decimal degrees
lon	longitude in decimal degrees; East is positive; negative denotes West	decimal degrees
orientation_heading	final body position and facing direction	text
start_location	location on grate at first appearance	text
time_appeared	time on video when fish appeared in video	H:mm:ss
time_behavior	time on video of the behavior	H:mm:ss
time_local	local time: 24 hour clock	HHmm
trip_id	trip or cruise number	integer
year	year of sampling	yyyy
yrday_local	local day and decimal time, as 326.5 for the 326th day of the year, or November 22 at 1200 hours (noon)	
min_start	time when behavior started, minutes	minutes
sec_start	time when behavior started, seconds	seconds
min_max	maximum minutes for behavior	minutes
dog_slug	a tow where the grate became blocked with dogfish	TRUE/FALSE
video_clear	True if the video was clear	TRUE/FALSE
dog_present	True if dogfish were seen in the video.	TRUE/FALSE

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Instruments

Dataset-specific Instrument Name	Raised footrope whiting trawl
Generic Instrument Name	Raised footrope whiting trawl
Dataset-specific Description	Raised footrope whiting trawl with a spiny dogfish Squalus acanthias excluder grate (grid) within the extension trawl net. Grates with 50 mm (2 in) spacing were investigated for effects from color (white or black), angles of placement, and direction (leading to a top or bottom escape vent).
Generic Instrument Description	The raised footrope whiting (or hake) trawl is a trawl with a specially designed spiny dogfish excluder grate within the extension of a silver hake (whiting) trawl net.

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Deployments

NEC-MP2007-1

Website	https://www.bco-dmo.org/deployment/58134
Platform	F/V Barbara L. Peters
Report	http://nec.whoi.edu/pdf/DOGGRATE_final_report.pdf
Start Date	2008-10-08
End Date	2009-08-26
Description	Field work for both phases 1 and 2 was conducted on-board the F/V Barbara L. Peters (Coast Guard #149951), a 16.8 m (55 ft), 214.8 kW (288 hp) groundfish Western-rig commercial trawler with two stern ramps, two net reels, and Thyborøn 1.6 m2 trawl doors.

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Project Information

Northeast Consortium: Project Development (NEC_ProjDev)

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.

Priority areas for Northeast Consortium funding include selective fishing-gear research and development. The development of selective fishing gears that enhance gear selectivity, target healthy stocks, reduce bycatch and discard, reduce or eliminate technical barriers to trade, minimize harvest losses, and improve fishing practices. Studies of new and developing fishing gears and technologies aimed at reducing environmental impact is funded under Project Development.

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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)	09-047

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