Landing Obligation Economic Impact Analysis

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Challenges for the analysis

- UK fleet is very diverse
- Multiple sea basins and stocks
- Knowledge of catch based on sample of trips
- Patterns of fishing are changeable
- How the LO’s exemptions and derogations would be implemented was unclear at the time of analysis

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Choke Analysis: Methodology

Choke species

- Choke species definition:

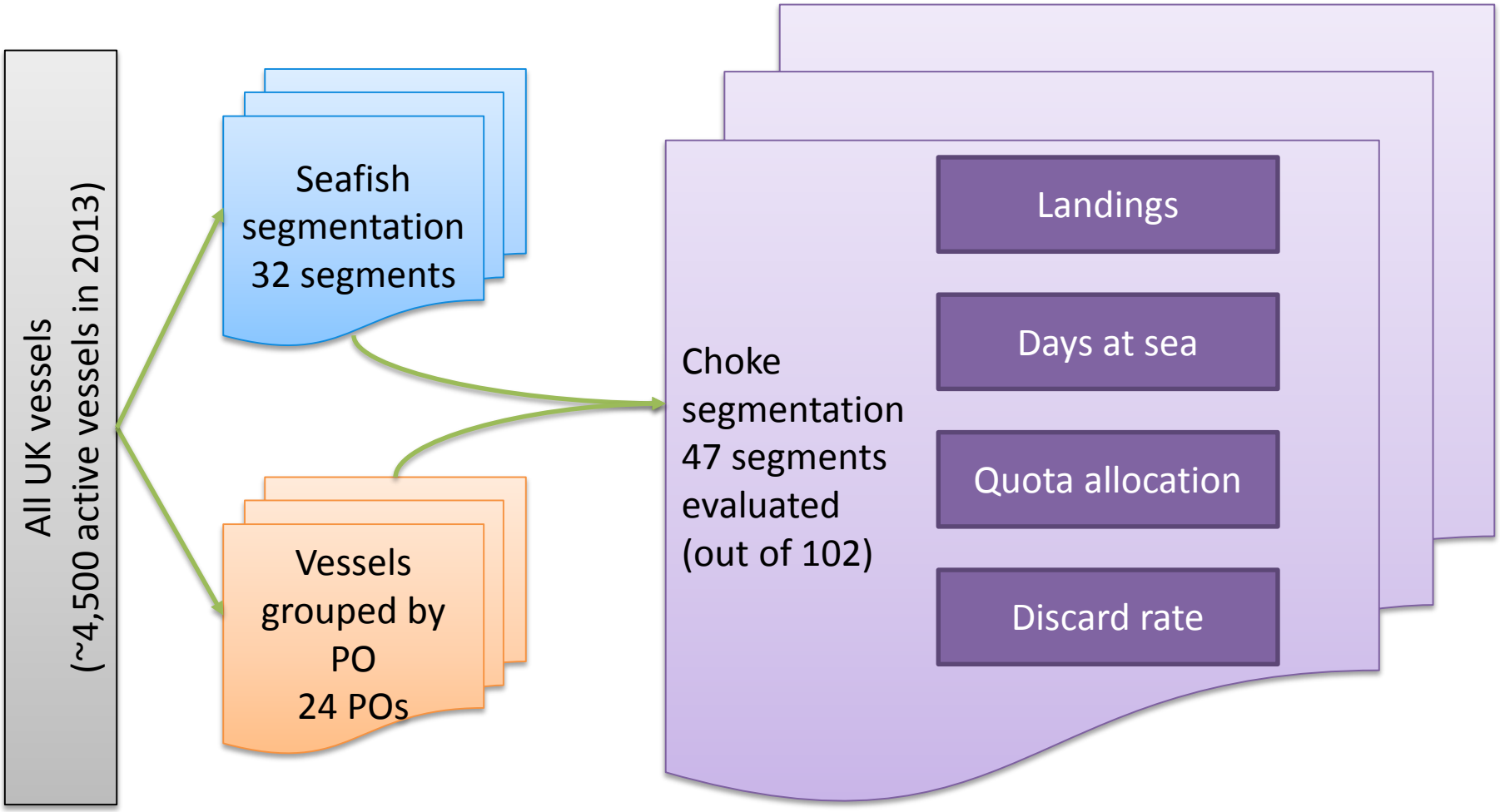
  a species for which a fleet segment had insufficient initial quota allocation in 2013 to enable it to land its total catch of the species in 2013.

- Catch in excess of initial quota allocation has been addressed by a fleet segment in one of two ways:
  - by discarding the excess catch; and/or
  - by leasing or swapping in quota for the excess catch.
- With the landing obligation, discard of unwanted catch is not a valid option

Substantial amount of data needed

- Vessel data identifying gear type, PO membership and nationality were provided by MMO.
- Landings by vessel with PO and gear type identified were provided by MMO.
- Discard data by vessel and trip, as recorded in observer programmes, were provided by Marine Scotland Science, AFBI and CEFAS.
- Days at sea by vessel with PO and gear type identified were provided by MMO.
- FQA holdings by vessel, dummy licence and entitlement were provided by MMO.
- Initial quota allocations in tonnes for 2013 were also provided by MMO.

Segmenting the UK fleet

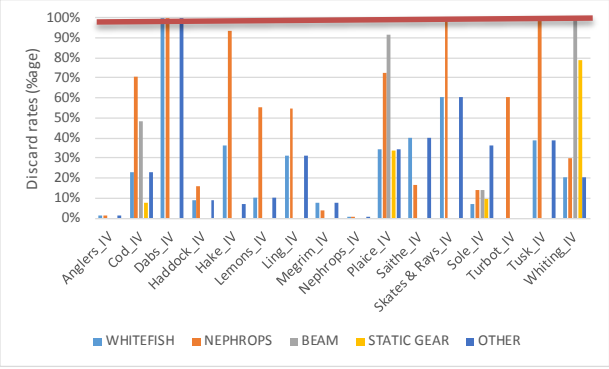


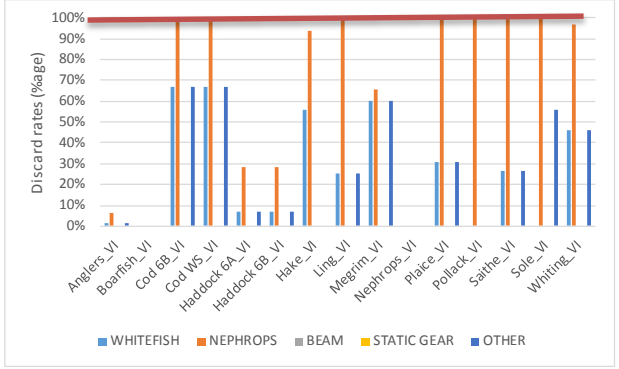
Assumptions for the choke analysis and the bioeconomic model

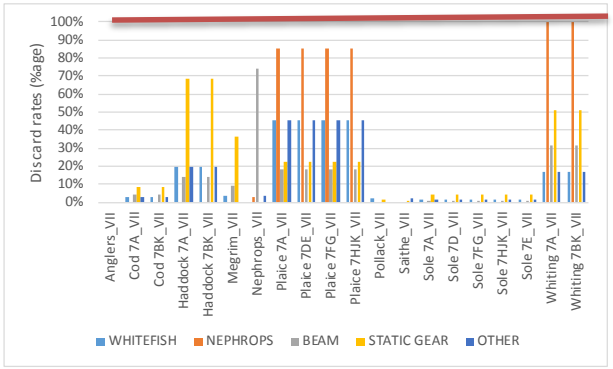
- Catch composition
  - Catch is determined by applying the discard rate to landings. This is assumed to be constant throughout the year and no seasonality is taken into account.
- Effort
  - The analysis assumes that effort not as restrictive as quota and is not limiting quota uptake. The average days at sea of the fleet are therefore assumed to be the maximum days available
- Quota allocation
  - Quota holdings are allocated across the fleet
- Dummy licenses
  - It is assumed that quota held by POs on dummy licenses is allocated across fleet segments in proportion to landings.
- Constant discard rate
  - A constant average discard rate is used
- No leasing and swaps
  - The extent that leases and swaps would be available under a landing obligation are unknown
- Quota uplift
  - ICES catch advice is used to estimate top-up
- Re-allocation of quota
  - The analysis does not reallocate unused quota, as a result of choke, between fleet segments
- IQA and EoY (just for the model)
  - Initial quota allocation to each PO fleet segment, and end of year landings by each PO fleet segment. The end of year landings analysis therefore includes the effect of 2013 patterns of quota trading

Discard rates

- Discard data has been provided by CEFAS, AFBI and Marine Scotland for 2011, 2012 and 2013, based on sample fishing trips by CEFAS and Marine Scotland observer programmes
  - Marine Scotland (432 trips) - North Sea (ICES area IV) and West Coast of Scotland (ICES area VI)
  - CEFAS (560 trips) - North Sea (ICES area IV), Irish Sea (ICES area VIIa) and other parts of ICES area VII.
- Data is available for each species caught during each trip, retained weight / discarded weight
- Discard atlases are used to sense-check the discard rates obtained, but also to cover missing discard rates that were needed for the analysis
- For a few stocks, observer data show that for all the observed trips, all the fish were discarded. In that case, the estimation of the discard rate equals to 100%. Landings were however reported for the same stocks. This would cause the choke analysis and the model to produce errors. A 95% maximum is used.
- After allocating the data per gear segment (demersal trawl/seine, Nephrops trawl and beam trawl) and area (North Sea, West Coast of Scotland, Area 7), there is not enough information to segment further discard data by country of origin of the vessel observed







Choke analysis summary table example

Choke analysis	2016	Assuming cod, haddock, whiting and saithe subject to LO							
	A. Choke species identified	B. Actual fishing days used, segment total per year	C. Average segment daily catch rate for choke species (tonnes)	D. Estimated segment total fishing days until choke species quota exhausted	E. Estimated segment days as % of actual days used in reference year (D. as % of B.)	F. Estimated average per vessel fishing days until choke species quota exhausted	G. Average days per vessel with uplift	H. Possible to use species flexibility?	Zero quota stocks with landings
2011									NS:
NS	Cod	3,000	0.9	1,000	33%	50	70	No	
WS	Haddock 6A	200	0.6	140	70%	7			
VII	none								
2012									WS:
NS	Whiting	3,000	1.0	800	27%	40	60	No	Cod WS, Cod 6B,
WS	Saithe	300	2.5	75	25%	4	7	No	Whiting,
VII	none								
2013									VIII:
NS	Cod	3,000	1.1	890	30%	45	60	No	
WS	Saithe	300	3.1	70	23%	4	7	No	
VII	none								

Scottish nephrops trawl sector

	Days until quota used as % of days actually used each year			Landings but no quota
Area IV	**2011**	**2012**	**2013**	Zero quota stock
Species	%	%	%	
Haddock	**65%**	102%	159%	
Cod	219%	129%	76%	
Whiting	**49%**	**31%**	**74%**	
Saithe	**95%**	**96%**	132%	
Plaice	**88%**	**59%**	**81%**	
Sole	113%	108%	**62%**	
Anglers		247%	282%	
Megrim	272%	250%	319%	
Nephrops	96%	122%	125%	
Lemons	**77%**	**78%**	**63%**	
Dabs				
Turbot	195%	154%	71%	
Skates & Rays	785%			
Hake	**15%**	**7%**	**2%**	
Ling	188%	118%	135%	
Tusk				

	Days until quota used as % of days actually used each year			Landings but no quota
Area VI	**2011**	**2012**	**2013**	
Species	%	%	%	
Haddock 6A	**32%**	**56%**	166%	
Haddock 6B	1910%			
Cod WS	0%	0%		yes
Cod 6B				
Whiting	0%	0%	0%	yes
Saithe		549%		
Plaice	**63%**			
Sole	**24%**	**40%**		
Anglers		280%	333%	
Megrim	**14%**	**81%**	**62%**	
Nephrops	**86%**	**80%**	**90%**	
Ling	91%	511%		
Boarfish	2534%			
Hake	**4%**	**54%**	**78%**	
Pollack				

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Bioeconomic Model: Methodology

Purpose

- To model the landing obligation
  - Project started September 2014
  - Landing obligation for demersals from 1 January 2016
- Considerable uncertainty with how the Landing Obligation was to be applied and how the sector would operate under the landing obligation
- The analysis is undertaken using a bioeconomic modelling tool that is based on economic and logbook data for 2012-13
- The model projects forward the impacts based on a number of assumptions and scenarios.
  - The scenarios are designed to test if and how the outcome varies between different implementation approaches for the landing obligation.
  - The model simulates the possible outcomes over the coming years and addresses issues of resilience, viability and vulnerability.

Approach

- The Landings Obligation EIA bioeconomic model supports the analysis of fishing fleets at a yearly level
  - it provides an indication of the number of vessels and average level of effort (i.e. days at sea) that will be likely under different scenarios
- The model addresses the following:
  - Economic performance of the modelled fishing fleets
  - Evaluation of fleets, at the segment level defined in task 1, across the UK
  - Analysis of the catching sector only
  - Opportunities available to the modelled fishing fleets, including technology/gear change response
  - Estimated biological status of the modelled stocks
  - The impact of the landings obligation on demersal fleets to be implemented in 2016.
- The model provides a time phased solution that indicates the likely trajectory of the economic performance of the modelled fleets under agreed scenarios

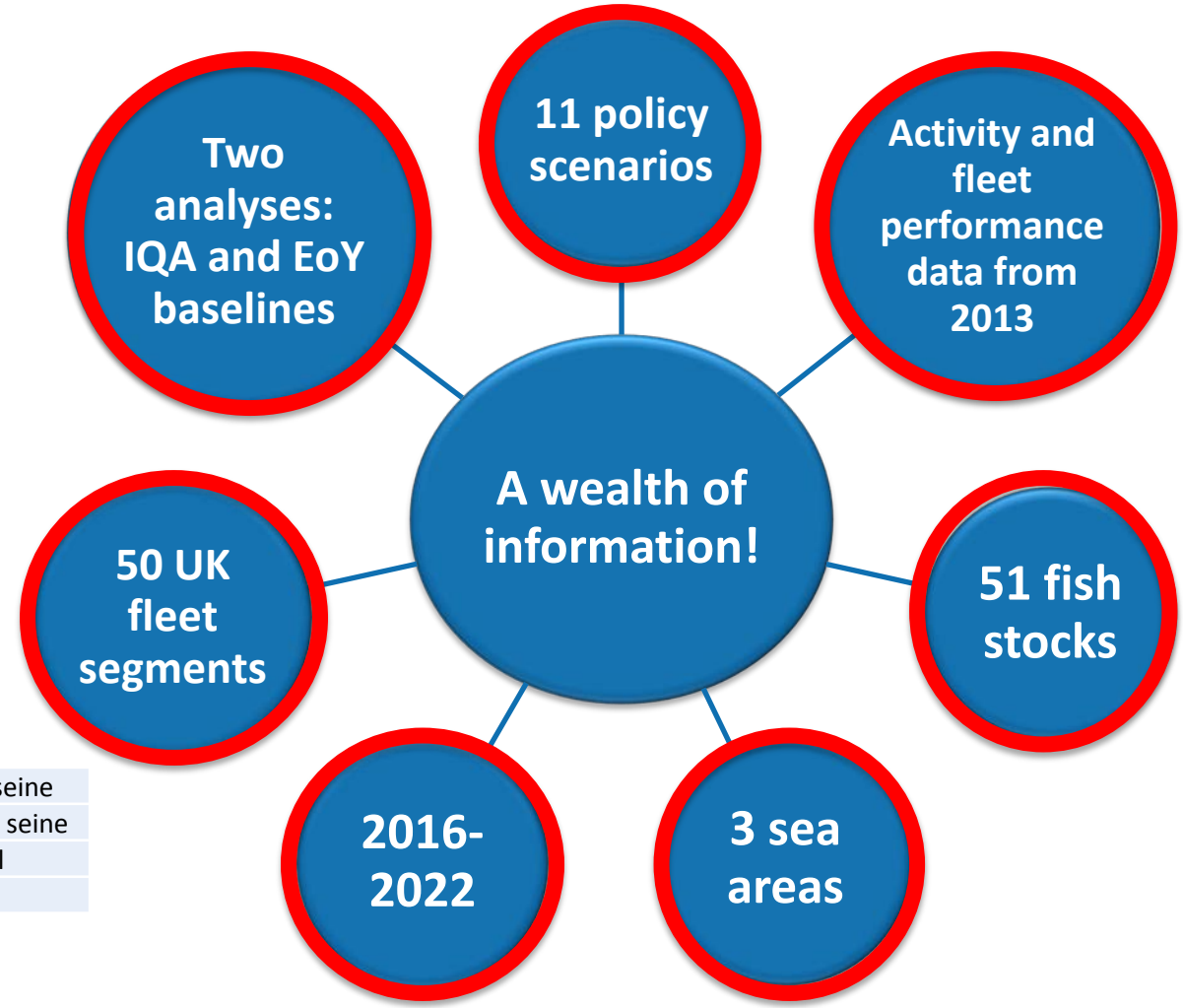
The landing obligation

- Article 15 of the reformed Common Fisheries Policy (EC Reg. 1380/2013)
  - For demersal fisheries, a phased approach on January 1st 2016

2016	2017	2018
Haddock, Plaice	+ Cod, Whiting, Nephrops, Sole	+ Saithe,

- Article 15 exemptions
  - ✓ Survivability – species with “high survival” can be returned to the sea.
  - ✓ ‘de minimis’ – 5% discards allowed where increased selectivity and/or catch handling results in disproportionate additional costs
- Article 15 derogations and other features
  - ✓ Uplift or top-up – the quota for a number of stocks will experience a ‘top-up’ as the discards component can be included in what would become a catch quota rather than the current landings quota.
  - Banking and Borrowing – an allowance for year-to-year flexibility up to 10% of quota.
  - ✓ Quota flexibility – enable unwanted catch of up to 9% of target quota to be counted against that quota, where the non-target stock is within safe biological limits
- Regional discard management plans for each sea basin

Building blocks



SFO Demersal trawl / seine
SFPO Demersal trawl / seine
NESFO Nephrops trawl
NPO Nephrops trawl

19 stocks are ICES-assessed and biomass in the model responds to fishing mortality

Haddock IV	Assessment
Cod IV	Assessment
Plaice IV	Assessment
Hake IV	Assessment
Anglerfish IV	CPUE
Megrim IV	CPUE
Nephrops IV	CPUE

Data (2013)

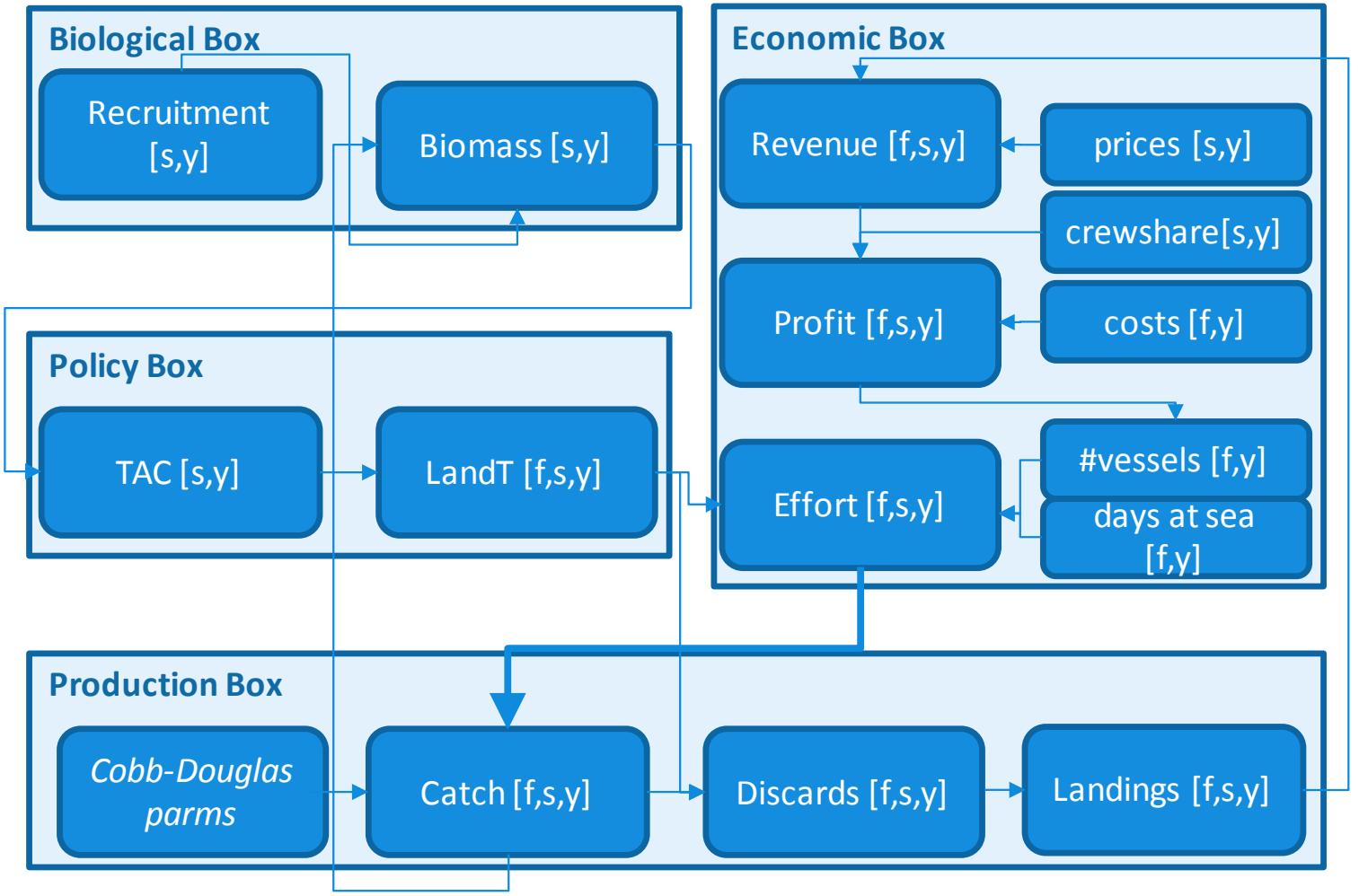
- Economic data (by fleet segment)
  - number of vessels, average days at sea, vessel price, investment parameters, fuel price, other fishing revenue, variable costs, fixed costs, crew costs, fuel costs, capacity costs
- Management data (by stock and fleet segment)
  - TAC share, vessel catch composition
- Biological data (by stock)
  - biomass, recruitment parameters, fishing and natural mortalities
- Production data (by stock and fleet segment)
  - catchabilities, catch parameters, discard parameters (for undersized/over-quota catch), fish prices.

Fleets – Economics and Activity

	2008	2009	2010	2011	2012	*2013*
Active vessels	15	14	16	10	9	*9*
Fishing Income	9,038,400	8,153,500	12,494,900	9,004,300	6,793,400	*6,653,200*
Non Fishing Income	237,000	148,200	217,200	373,500	357,700	*376,200*
Total Income	**9,275,500**	**8,301,700**	**12,712,100**	**9,377,800**	**7,151,200**	***7,029,400***
Fuel	1,780,300	1,328,700	2,092,000	2,112,800	1,655,800	*1,183,500*
Crew share	2,586,200	2,305,800	3,028,400	2,038,300	1,596,900	*1,703,100*
Other Fishing Costs	2,083,500	2,239,200	3,506,000	2,692,300	2,241,700	*2,278,900*
Total Fishing Costs	6,450,100	5,873,600	8,626,400	6,843,400	5,494,400	*5,165,500*
Total Vessel Costs	2,088,400	1,908,100	2,711,000	1,692,300	1,299,500	*1,296,300*
Gross Value Added	**3,323,200**	**2,825,800**	**4,403,000**	**2,880,400**	**1,954,200**	***2,270,700***
Operating Profit	**737,000**	**520,000**	**1,374,600**	**842,100**	**357,300**	***567,600***
Depreciation						
Interest						
Other Finance Costs						
Net Profit						

days Operational days at sea per vessel per year in Area VI DASopeVI_#a AvgDaysAtSeaVI	days Operational days at sea per vessel per year in Area VII DASopeVII_#a AvgDaysAtSeaVII	%age External operational days at sea DASext_#a AvgDaysAtSeaExt	000 euros Other species revenue rate relative to incl species OtSpR_#a0 OtherSpeciesRevRate	'000 euros Other species fixed revenues per day OtSpF_#a0 OtherSpeciesFixedRev	000 euros Non-fishing income OtSpK_#a0 OtherIncome	parameter Fuel costs parameter FuC_#a0 FuelCostsParm	parameter Crew costs parameter CrC_#a0 CrewCostsParm1	parameter Variable costs parameter VaC_#a0 VariableCostsParm	parame Fixed co parame FxC_#a FixedCo
63	15	1	1.025	13.405	19.909	1.662	18.5%	1.428	
51	7	2	1.084	0.261	86.457	1.359	24.0%	1.548	
3	14	1	1.004	28.684	37.056	2.017	18.0%	3.022	
105	4	0	1.010	0.005	18.227	0.499	22.4%	0.295	
4	38	3	0.977	25.929	20.486	8.540	17.8%	3.180	
11	0	0	1.032	0.129	73.861	1.056	24.9%	1.784	
6	4	0	1.059	0.002	87.664	1.263	23.5%	1.666	
18	50	0	1.034	12.221	13.205	1.725	18.4%	1.306	
33	95	0	1.051	0.009	4.482	0.328	26.3%	0.219	
17	3	0	3.334	0.158	0.984	0.174	25.4%	0.110	
69	81	98	1.056	0.096	18.986	0.888	43.8%	1.742	
0	216	0	1.341	0.099	22.841	1.164	25.2%	0.289	
62	1	0	3.164	0.003	2.698	0.074	29.0%	0.079	
3	0	0	1.043	0.329	64.107	0.813	24.3%	1.314	
0	15	51	2.112	9.241	2.191	4.403	45.2%	7.104	
0	24	0	1.079	0.043	91.360	2.728	22.5%	1.937	
0	0	0	0.995	0.000	3.850	3.465	7.6%	1.717	

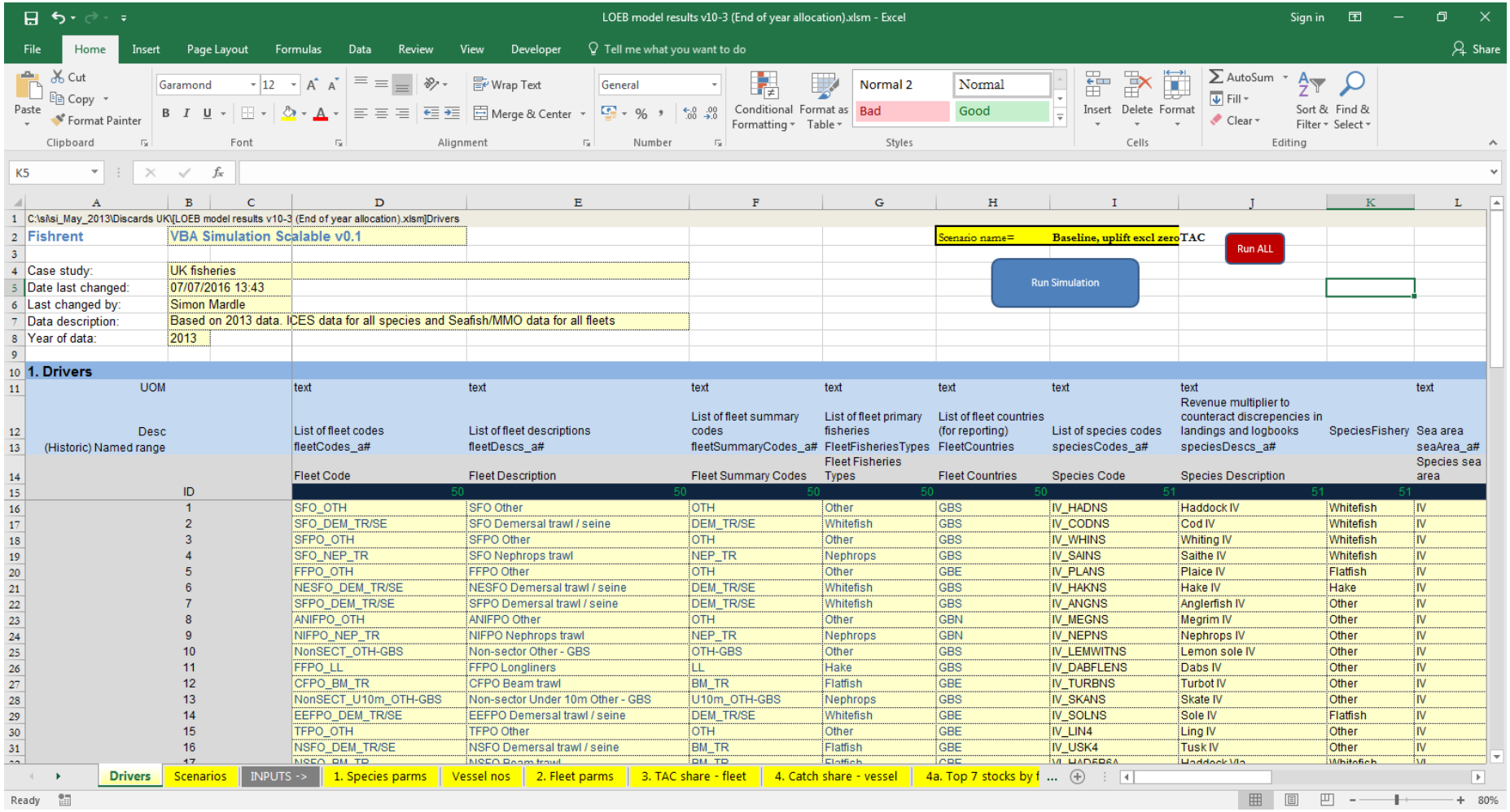
Model structure



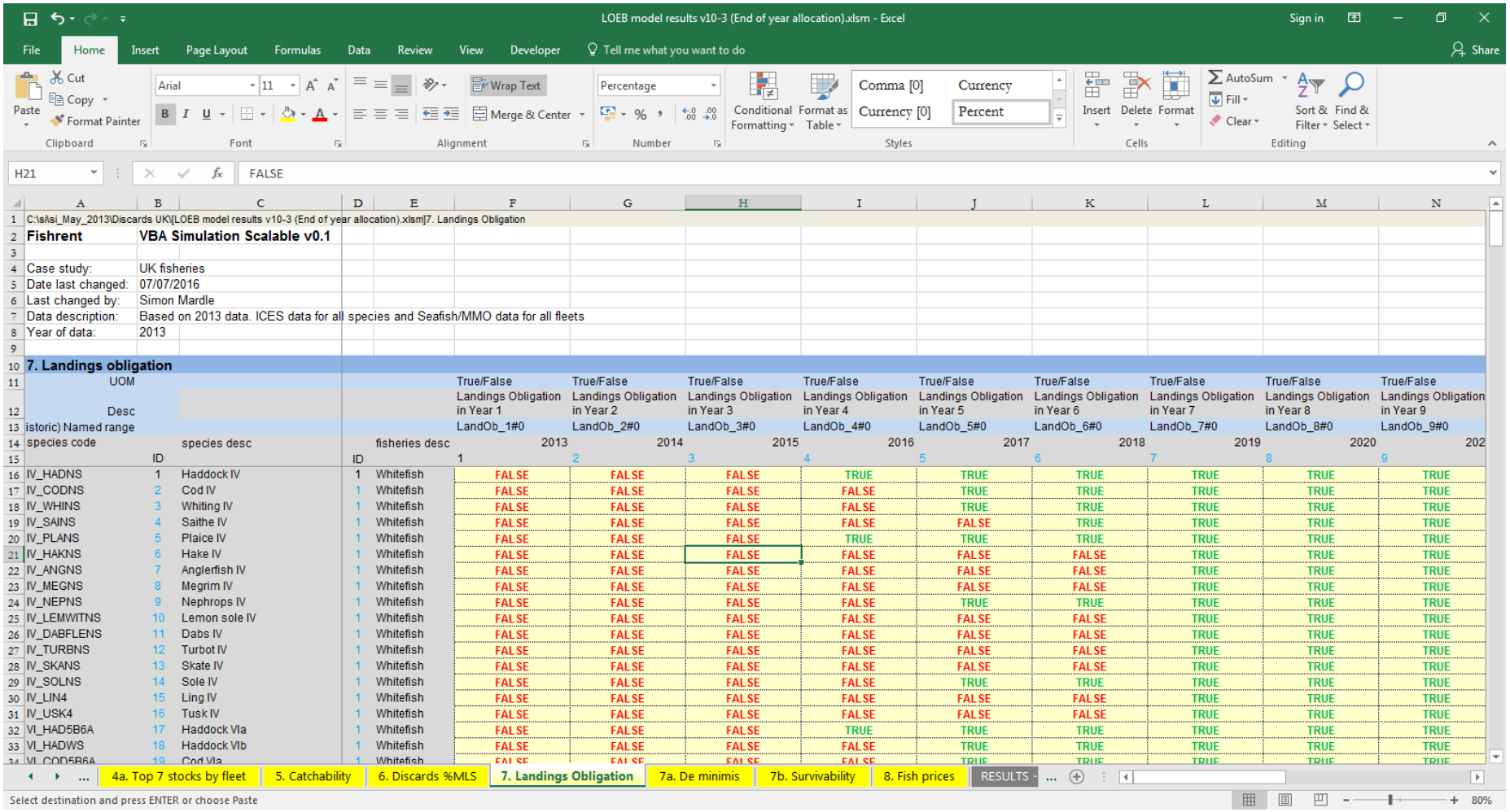
Policy levers

Management scenario	Zero TAC stocks	Quota uplift	De minimis			Inter-species flexibility	Survivability
			LAX	MID	STRICT		
Baseline B1	✓	✗	✗	✗	✗	✗	✗
Baseline B3	✗	✓	✗	✗	✗	✗	✗
Scenario 1a	✗	✓	✓	✗	✗	✗	✗
Scenario 1b	✗	✓	✗	✓	✗	✗	✗
Scenario 1c	✗	✓	✗	✗	✓	✗	✗
Scenario 2	✗	✓	✗	✗	✗	✓	✗
Scenario 3	✗	✓	✗	✗	✗	✗	✓
Scenario 4a	✗	✓	✓	✗	✗	✓	✓
Scenario 4b	✗	✓	✗	✓	✗	✓	✓
Scenario 4c	✗	✓	✗	✗	✓	✓	✓

The model


LOEB model results v10-3 (End of year allocation).xlsm - Excel
Sign in
File
Home
Insert
Page Layout
Formulas
Data
Review
View
Developer
Tell me what you want to do
Share
Paste
Cut
Copy
Format Painter
Garamond
12
Wrap Text
General
Merge & Center
Conditional Formatting
Format as Table
Normal 2
Normal
Bad
Good
Insert
Delete
Format
AutoSum
Fill
Clear
Sort & Filter
Find & Select
Clipboard
Font
Alignment
Number
Styles
Cells
Editing
K5
C:\si\si_May_2013\Discards UK\[LOEB model results v10-3 (End of year allocation).xlsm]Drivers
Fishrent
VBA Simulation Scalable v0.1
Scenario name=
Baseline, uplift excl zeroTAC
Run ALL
Run Simulation
Case study:
UK fisheries
Date last changed:
07/07/2016 13:43
Last changed by:
Simon Mardle
Data description:
Based on 2013 data. ICES data for all species and Seafish/MMO data for all fleets
Year of data:
2013
1. Drivers
UOM
Desc
(Historic) Named range
ID
List of fleet codes
fleetCodes_a#
List of fleet descriptions
fleetDescs_a#
List of fleet summary codes
fleetSummaryCodes_a#
List of fleet primary fisheries
FleetFisheriesTypes
List of fleet countries (for reporting)
FleetCountries
List of species codes
speciesCodes_a#
Revenue multiplier to counteract discrepencies in landings and logbooks
speciesDescs_a#
SpeciesFishery
Sea area
seaArea_a#
Fleet Code
Fleet Description
Fleet Summary Codes
Fleet Fisheries Types
Fleet Countries
Species Code
Species Description
Species sea area
1 SFO_OTH SFO Other OTH Other GBS IV_HADNS Haddock IV Whitefish IV
2 SFO_DEM_TR/SE SFO Demersal trawl / seine DEM_TR/SE Whitefish GBS IV_CODNS Cod IV Whitefish IV
3 SFPO_OTH SFPO Other OTH Other GBS IV_WHNS Whiting IV Whitefish IV
4 SFO_NEP_TR SFO Nephrops trawl NEP_TR Nephrops GBS IV_SAINS Saithe IV Whitefish IV
5 FFPO_OTH FFPO Other OTH Other GBE IV_PLANS Plaice IV Flatfish IV
6 NESFO_DEM_TR/SE NESFO Demersal trawl / seine DEM_TR/SE Whitefish GBS IV_HAKNS Hake IV Hake IV
7 SFPO_DEM_TR/SE SFPO Demersal trawl / seine DEM_TR/SE Whitefish GBS IV_ANGNS Anglerfish IV Other IV
8 ANIFPO_OTH ANIFPO Other OTH Other GBN IV_MEGNS Megrim IV Other IV
9 NIFPO_NEP_TR NIFPO Nephrops trawl NEP_TR Nephrops GBN IV_NEPNS Nephrops IV Other IV
10 NonSECT_OTH-GBS Non-sector Other - GBS OTH-GBS Other GBS IV_LEMWITNS Lemon sole IV Other IV
11 FFPO_LL FFPO Longliners LL Hake GBS IV_DABFLENS Dabs IV Other IV
12 CFPO_BM_TR CFPO Beam trawl BM_TR Flatfish GBE IV_TURBNS Turbot IV Other IV
13 NonSECT_U10m_OTH-GBS Non-sector Under 10m Other - GBS U10m_OTH-GBS Nephrops GBS IV_SKANS Skate IV Other IV
14 EEFPO_DEM_TR/SE EEFPO Demersal trawl / seine DEM_TR/SE Whitefish GBE IV_SOLNS Sole IV Flatfish IV
15 TFPO_OTH TFPO Other OTH Other GBE IV_LIN4 Ling IV Other IV
16 NSFO_DEM_TR/SE NSFO Demersal trawl / seine BM_TR Flatfish GBE IV_USK4 Tusk IV Other IV
Drivers
Scenarios
INPUTS ->
1. Species parms
Vessel nos
2. Fleet parms
3. TAC share - fleet
4. Catch share - vessel
4a. Top 7 stocks by f
Ready
80%

Model inputs



LOEB model results v10-3 (End of year allocation).xlsm - Excel

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Fishrent **VBA Simulation Scalable v0.1**

Case study:	UK fisheries
Date last changed:	07/07/2016
Last changed by:	Simon Mardle
Data description:	Based on 2013 data. ICES data for all species and Seafish/MMO data for all fleets
Year of data:	2013

7. Landings obligation

UOM					True/False	True/False	True/False	True/False	True/False	True/False	True/False	True/False	True/False
Desc					Landings Obligation in Year 1	Landings Obligation in Year 2	Landings Obligation in Year 3	Landings Obligation in Year 4	Landings Obligation in Year 5	Landings Obligation in Year 6	Landings Obligation in Year 7	Landings Obligation in Year 8	Landings Obligation in Year 9
istoric) Named range					LandOb_1#0	LandOb_2#0	LandOb_3#0	LandOb_4#0	LandOb_5#0	LandOb_6#0	LandOb_7#0	LandOb_8#0	LandOb_9#0
species code	ID	species desc	ID	fisheries desc	2013	2014	2015	2016	2017	2018	2019	2020	202
					1	2	3	4	5	6	7	8	9
IV_HADNS	1	Haddock IV	1	Whitefish	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
IV_CODNS	2	Cod IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
IV_WHINS	3	Whiting IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
IV_SAINS	4	Saithe IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE
IV_PLANS	5	Plaice IV	1	Whitefish	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
IV_HAKNS	6	Hake IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
IV_ANGNS	7	Anglerfish IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
IV_MEGNS	8	Megrim IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
IV_NEPNS	9	Nephrops IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
IV_LEMWITNS	10	Lemon sole IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
IV_DABFLENS	11	Dabs IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
IV_TURBNS	12	Turbot IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
IV_SKANS	13	Skate IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
IV_SOLNS	14	Sole IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
IV_LIN4	15	Ling IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
IV_USK4	16	Tusk IV	1	Whitefish	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
VI_HAD5B6A	17	Haddock VIa	1	Whitefish	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
VI_HADWS	18	Haddock VIb	1	Whitefish	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE
VI_COD5B6A	19	Cod VIa	1	Whitefish	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE

4a. Top 7 stocks by fleet | 5. Catchability | 6. Discards %MLS | 7. Landings Obligation | 7a. De minimis | 7b. Survivability | 8. Fish prices | RESULTS -

Select destination and press ENTER or choose Paste

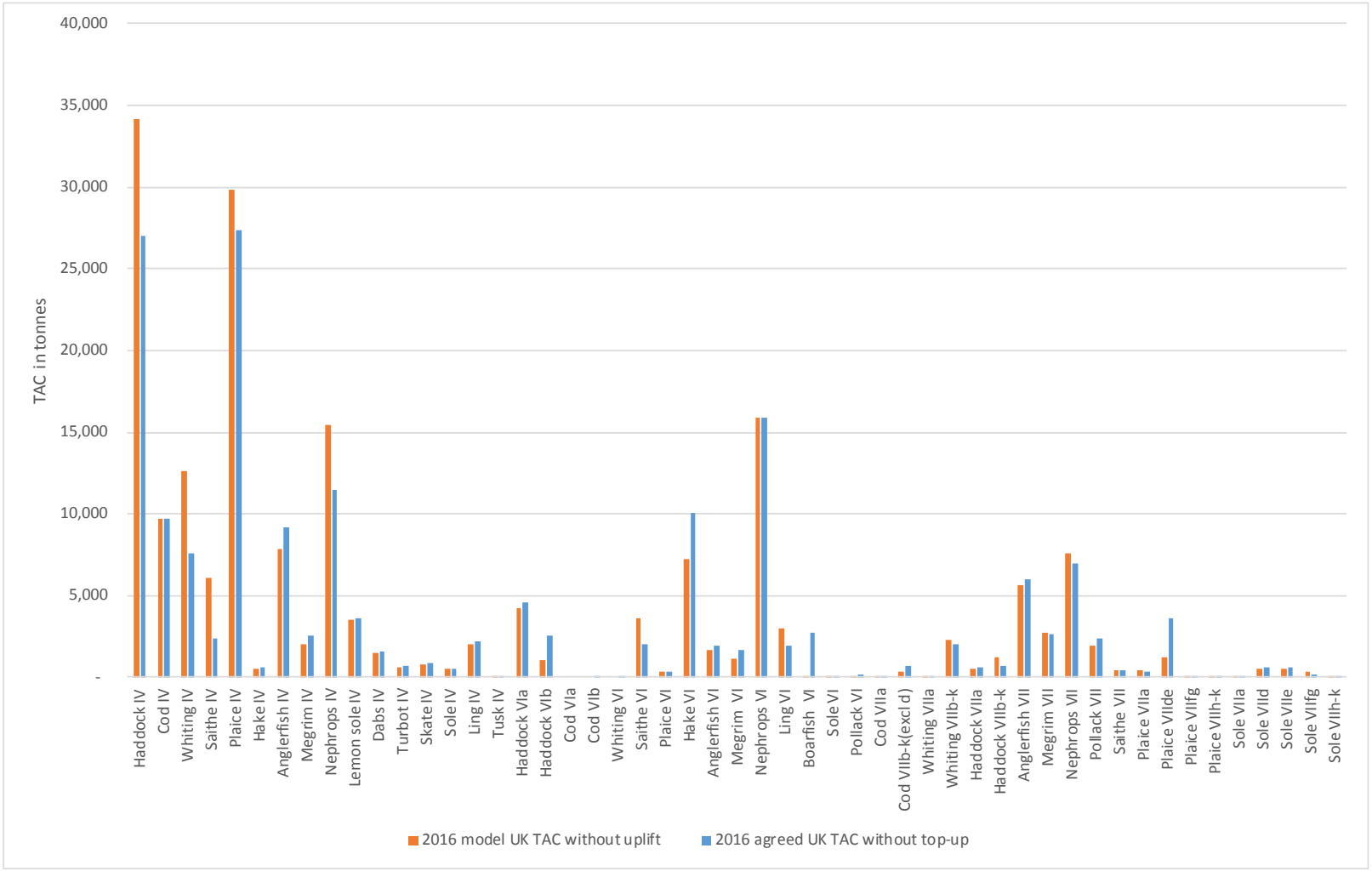
Model outputs

	2,013	2,014	2,015	2,016	2,017	2,018	2,019	2,020	2,021	2,022
Revenue	50,890	51,874	52,881	55,550	58,212	59,526	45,513	44,940	39,817	39,656
Fuel costs	12,112	12,112	12,112	12,112	12,112	12,112	8,607	8,296	7,299	7,113
Crew costs	12,221	12,458	12,699	13,341	13,980	14,295	10,930	10,793	9,562	9,524
Variable costs	13,799	13,799	13,799	13,799	13,799	13,799	9,806	9,452	8,316	8,103
Fixed costs	9,905	9,905	9,905	9,905	9,905	9,905	9,905	9,905	9,905	9,905
Capacity costs	3,977	3,977	3,977	3,977	3,977	3,977	3,977	3,977	3,977	3,977
Gross cash flow	2,853	3,601	4,365	6,394	8,416	9,415	6,265	6,495	4,735	5,012
Net profit	-1,124	-377	388	2,416	4,439	5,437	2,287	2,518	758	1,034
Discounted profit	-1,086	-352	350	2,106	3,738	4,423	1,798	1,912	556	733
Nbr vessels	47	47	47	47	47	47	33	32	28	28
Effort	8,912	8,912	8,912	8,912	8,912	8,912	6,333	6,104	5,371	5,234
Country	GBS	GBS	GBS	GBS	GBS	GBS	GBS	GBS	GBS	GBS
Landings volumes	28,428	29,145	29,888	31,976	33,878	35,027	26,645	26,424	22,999	23,020
TACs allocated	28,449	29,166	29,930	34,045	37,986	38,772	39,804	40,928	42,218	43,605

Area	Year	CHOKE	Max Effort	Min Effort	Choke_1	Choke_2	Choke_3	Choke_4
IV	2,016	Haddock IV	255	255				
IV	2,017	Haddock IV	255	255				
IV	2,018	Haddock IV	255	255				
IV	2,019	Haddock IV	255	255	Turbot IV	Cod IV	Ling IV	
IV	2,020	Haddock IV	255	255	Sole IV	Ling IV		
IV	2,021	Haddock IV	255	255	Sole IV	Ling IV		
IV	2,022	Haddock IV	255	255	Hake IV	Ling IV		
VI	2,016	Cod VIa	481	481				
VI	2,017	Cod VIa	481	481				
VI	2,018	Cod VIa	481	481				
VI	2,019	Plaice VI	481	25	Sole VI	Plaice VI	Ling VI	Pollack V
VI	2,020	Plaice VI	481	35	Plaice VI	Hake VI	Ling VI	Sole VI
VI	2,021	Plaice VI	481	34	Plaice VI	Hake VI	Ling VI	Sole VI
VI	2,022	Plaice VI	481	25	Sole VI	Plaice VI	Ling VI	Pollack V
VII	2,016	Cod VIIa	3,200	3,200				
VII	2,017	Cod VIIa	3,200	3,200				
VII	2,018	Cod VIIa	3,200	3,200				
VII	2,019	Cod VIIa	3,200	1,863	Cod VIIa	Whiting VIIb-k	Haddock VIIa	Plaice VI
VII	2,020	Cod VIIa	3,200	1,792	Whiting VIIa	Plaice VIIfg	Cod VIIa	Whiting
VII	2,021	Cod VIIa	3,200	1,772	Cod VIIa	Whiting VIIa	Whiting VIIb-k	Haddock
VII	2,022	Cod VIIa	3,200	1,781	Haddock VIIa	Cod VIIa	Whiting VIIa	Whiting

			Actual 2013		Estimate 2016		Estimate 2019	
UK	Scenario		tonnes	£	tonnes	£	tonnes	£
	4a	TAC	143,781	298,074	180,337	377,626	197,793	407,326
		Landings	142,345	294,503	166,563	325,203	122,797	243,257
		Left in sea	1,436	3,570	13,774	52,423	74,996	164,069
	4b	TAC	143,781	298,074	180,337	377,626	197,823	407,371
		Landings	142,345	294,503	166,521	325,106	99,827	197,773
		Left in sea	1,436	3,570	13,816	52,520	97,996	209,598
	4c	TAC	143,781	298,892	180,303	378,757	197,762	408,327
		Landings	142,889	296,693	166,999	326,620	74,019	152,668
		Left in sea	892	2,199	13,305	52,137	123,743	255,659
England and Wales			tonnes	£	tonnes	£	tonnes	£
	4a	TAC	45,024	110,355	61,233	150,778	60,084	147,358
		Landings	43,693	107,010	55,212	119,964	36,851	91,851
		Left in sea	1,332	3,345	6,020	30,815	23,232	55,508
	4b	TAC	45,024	110,355	61,233	150,778	60,079	147,346
		Landings	43,693	107,010	55,171	119,868	32,377	82,235
		Left in sea	1,332	3,345	6,062	30,910	27,702	65,111
	4c	TAC	45,024	111,173	61,200	151,910	60,025	148,314
		Landings	44,237	109,200	55,647	121,378	26,948	69,185
		Left in sea	787	1,974	5,552	30,532	33,077	79,129
Northern Ireland			tonnes	£	tonnes	£	tonnes	£
	4a	TAC	12,394	26,096	15,104	31,874	15,874	33,212
		Landings	12,360	26,025	13,873	28,806	8,257	16,525
		Left in sea	34	71	1,231	3,068	7,617	16,687
	4b	TAC	12,394	26,096	15,104	31,874	15,874	33,212
		Landings	12,360	26,025	13,873	28,805	4,703	9,225
		Left in sea	34	71	1,231	3,069	11,171	23,987
	4c	TAC	12,394	26,096	15,104	31,874	15,874	33,212
		Landings	12,360	26,025	13,874	28,807	4,262	7,610
		Left in sea	34	71	1,230	3,067	11,613	25,602
Scotland			tonnes	£	tonnes	£	tonnes	£
	4a	TAC	86,363	161,623	104,000	194,973	121,836	226,756
		Landings	86,292	161,468	97,477	176,433	77,689	134,881
		Left in sea	71	155	6,523	18,540	44,147	91,875
	4b	TAC	86,363	161,623	104,000	194,973	121,869	226,813
		Landings	86,292	161,468	97,477	176,433	62,747	106,313
		Left in sea	71	155	6,523	18,540	59,122	120,500
	4c	TAC	86,363	161,623	104,000	194,973	121,862	226,801
		Landings	86,292	161,468	97,478	176,436	42,809	75,873
		Left in sea	71	155	6,522	18,538	79,053	150,927

Stock status: Model Vs Actual in 2016



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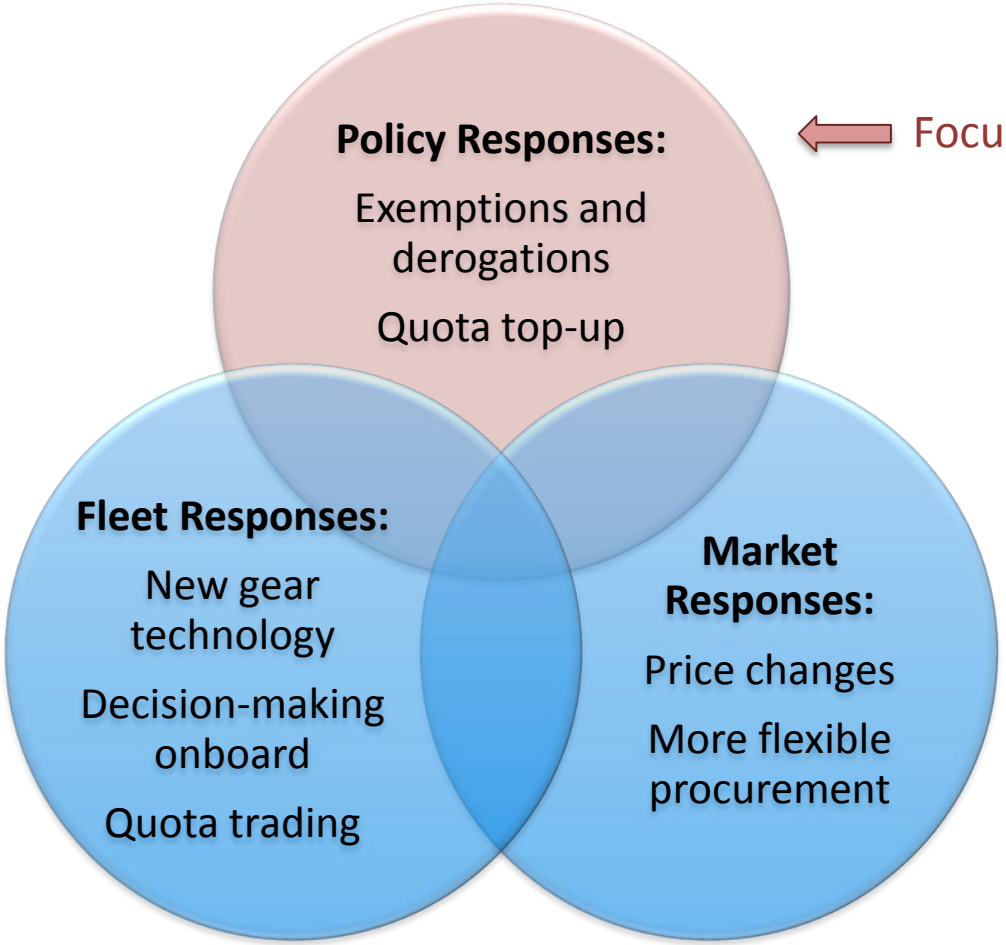
Bioeconomic model: Findings

Potential Responses to Mitigate the Impact of the Landing Obligation



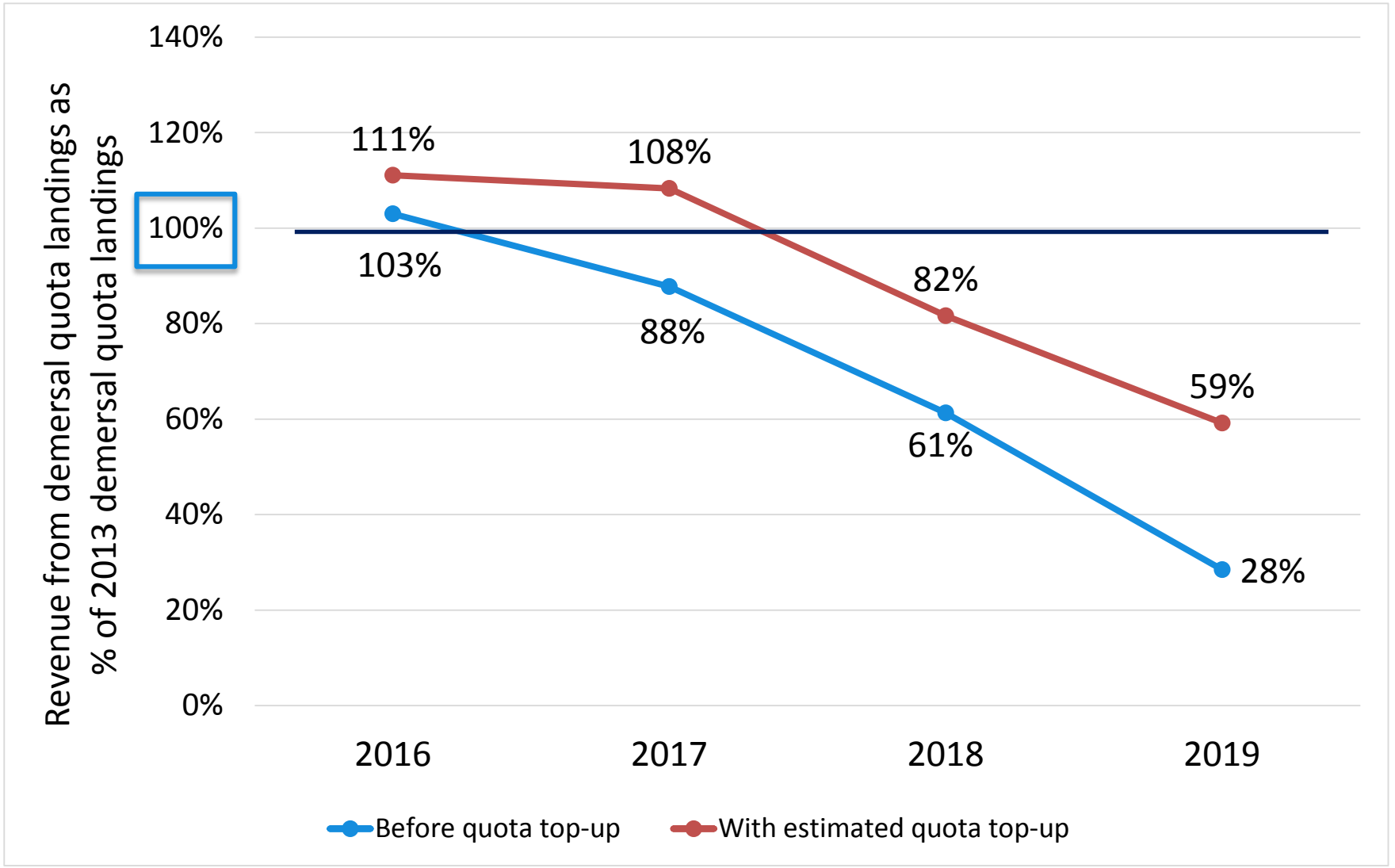
Focus of analysis in 2015/16

Some analysis undertaken in 2015/16

Baseline Scenarios

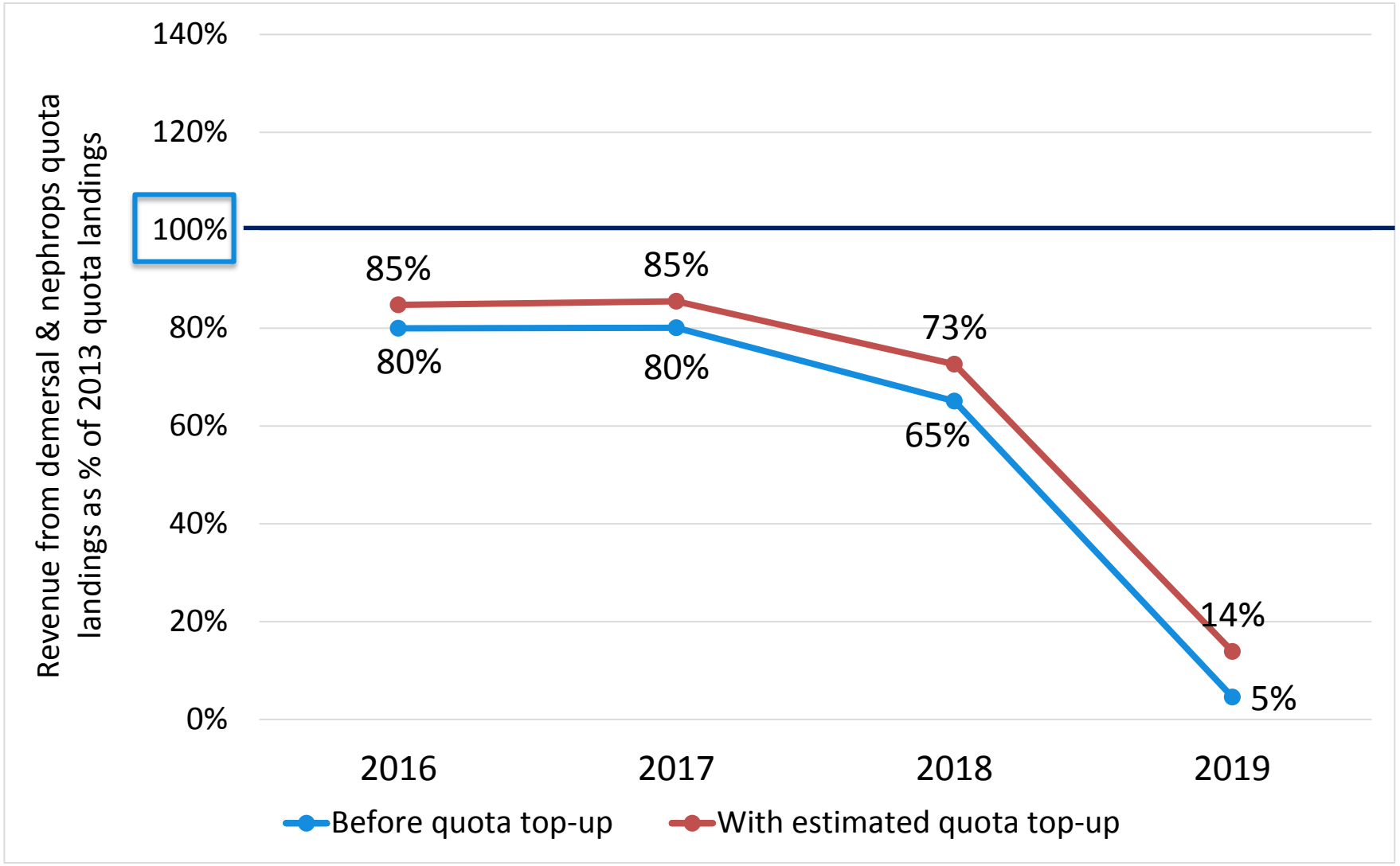
UK Whitefish Fleet: Revenue – ICES areas 4,6 & 7

Modelled quotas and discard plans, top-up based on ICES advice for 2016 assumes solution for zero-TAC stocks



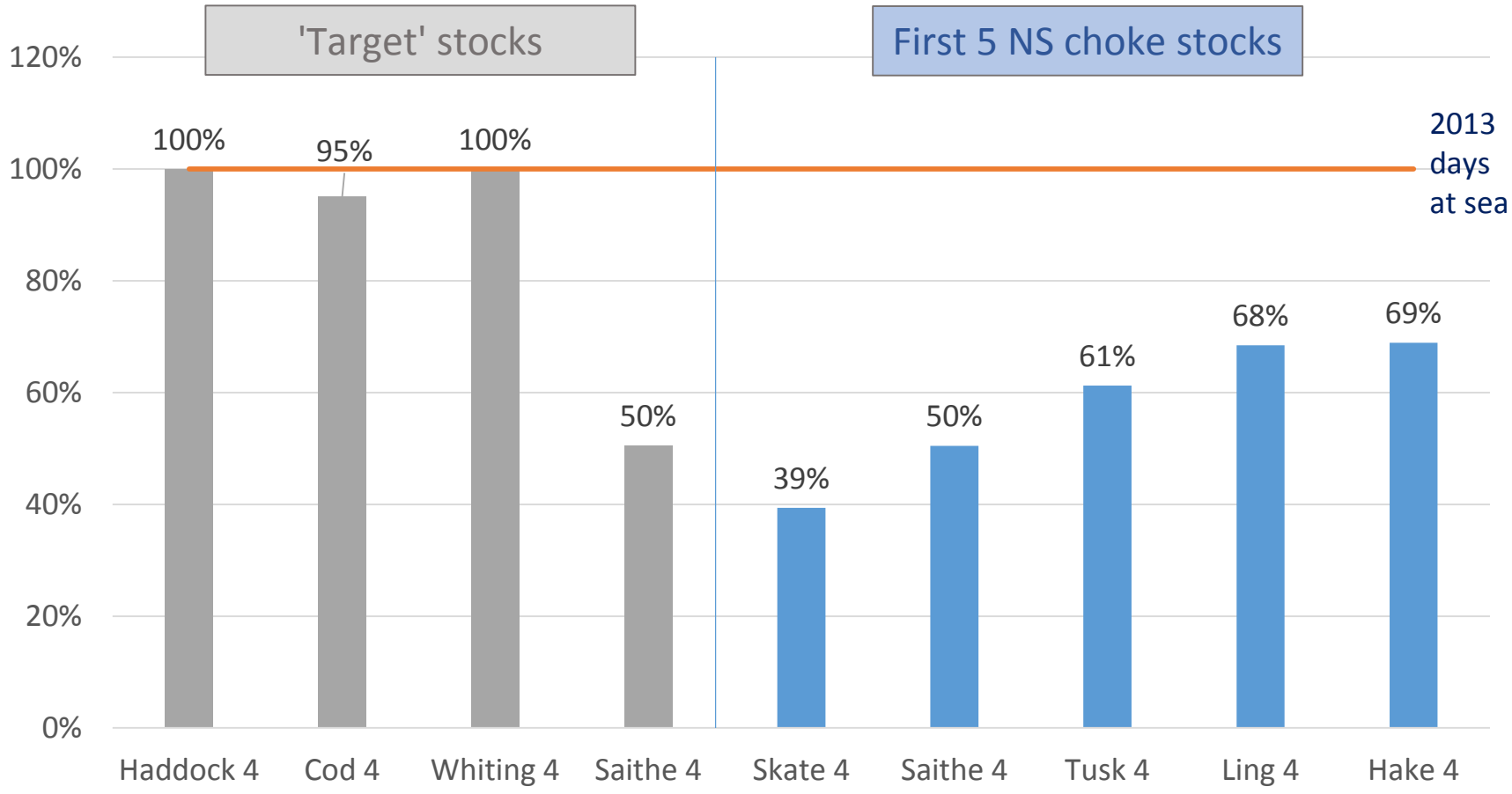
UK Nephrops Fleet: Revenue – ICES areas 4,6 & 7

Modelled quotas and discard plans, top-up based on ICES advice for 2016 assumes solution for zero-TAC stocks



What are the choke stocks?

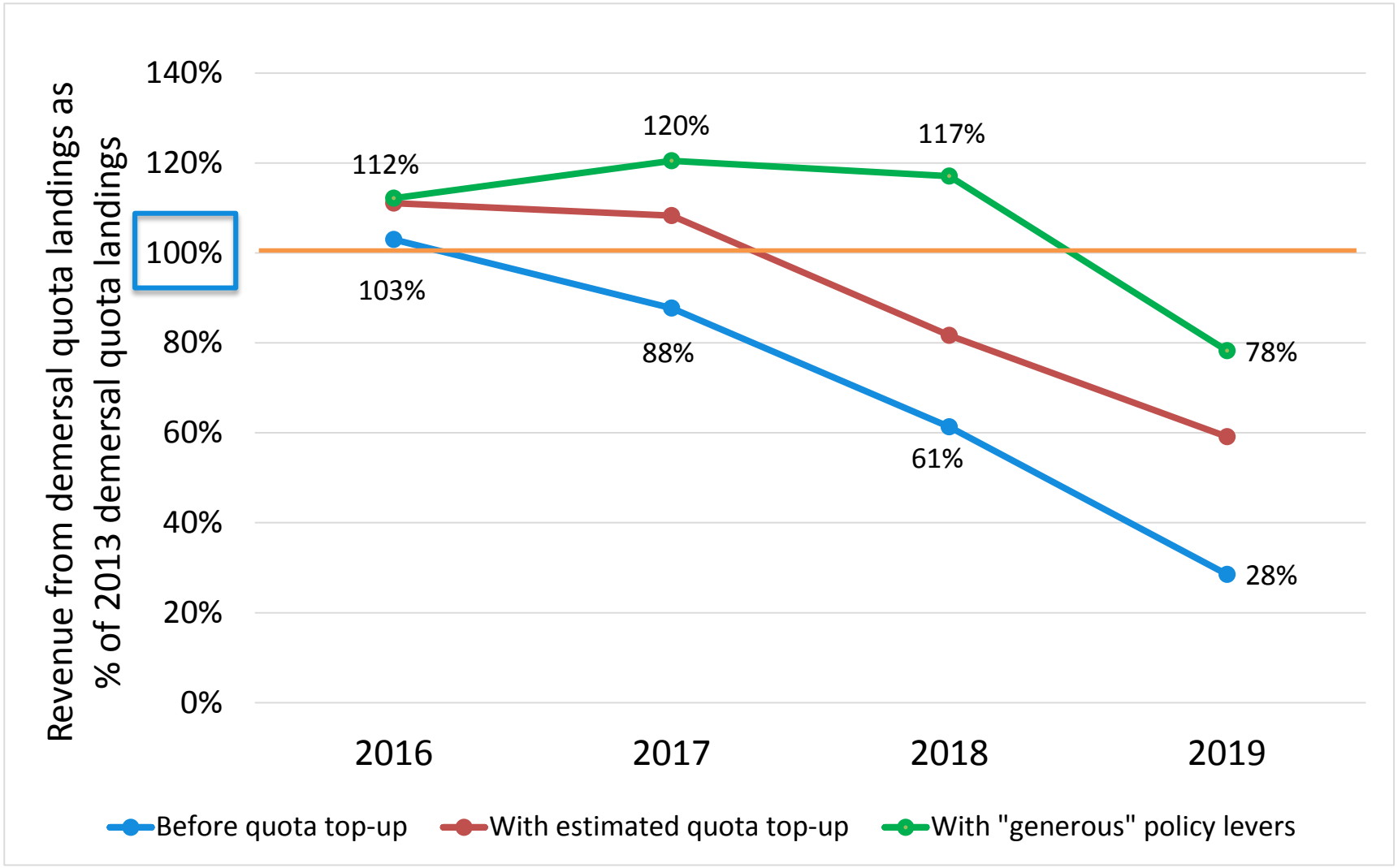
North Sea Choke Stocks for Scotland Whitefish Fleet in 2019 after top-up (2016 ICES advice) and trading



What impact might the exemptions and derogations have?

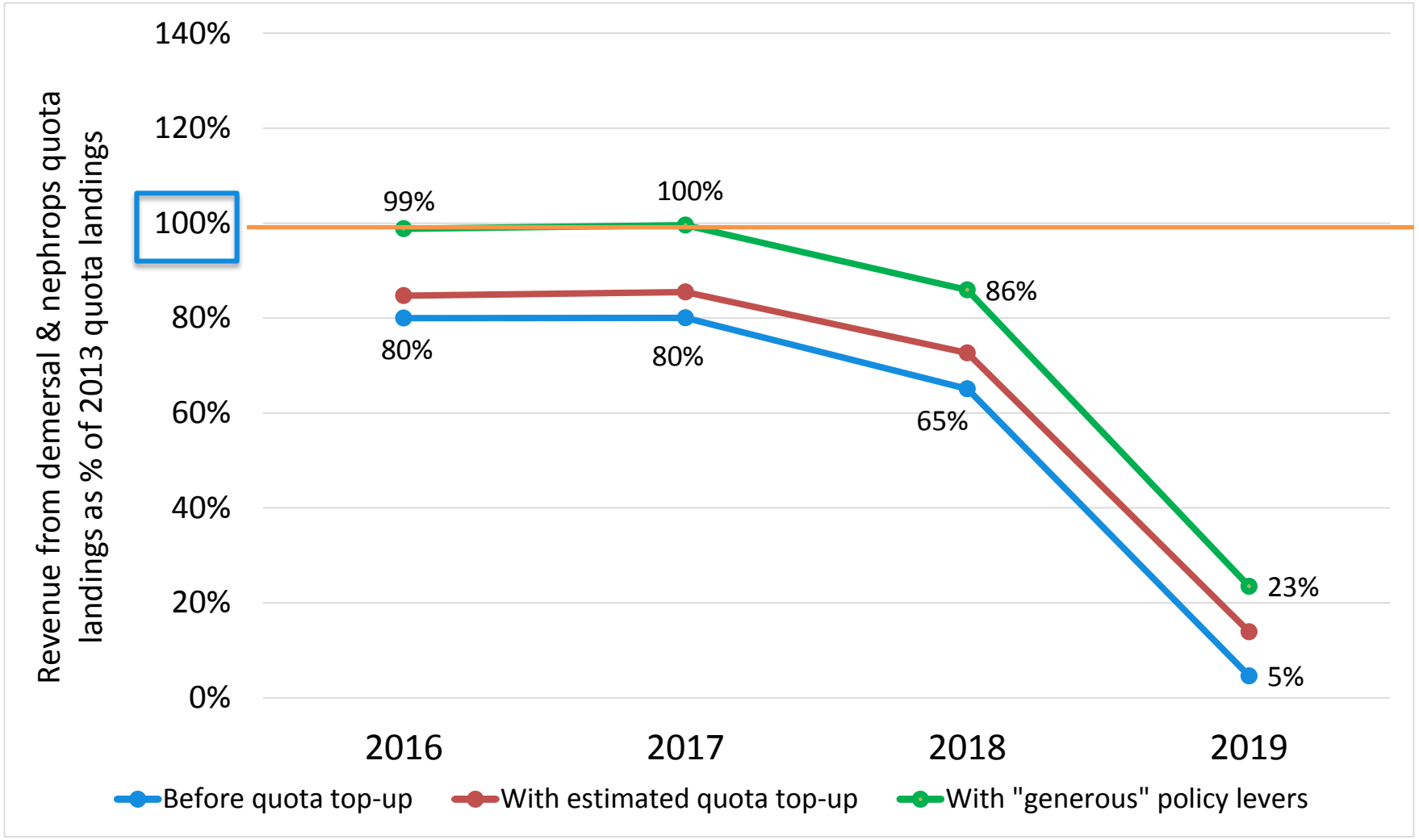
UK Whitefish Fleet: Revenue – ICES areas 4,6 & 7

Modelled quotas and discard plans, top-up based on ICES advice for 2016 assumes solution for Zero-TAC stocks



UK Nephrops Fleet: Revenue – ICES areas 4,6 & 7

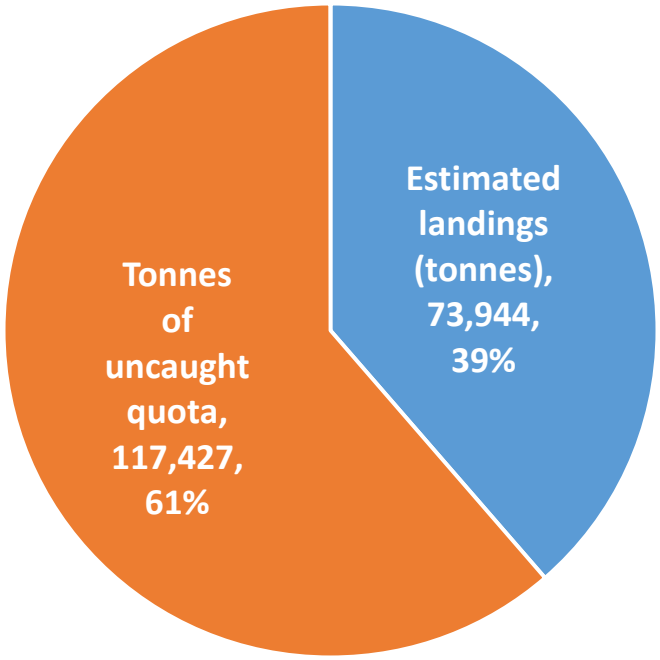
Modelled quotas and discard plans, top-up based on ICES advice for 2016 assumes solution for Zero-TAC stocks



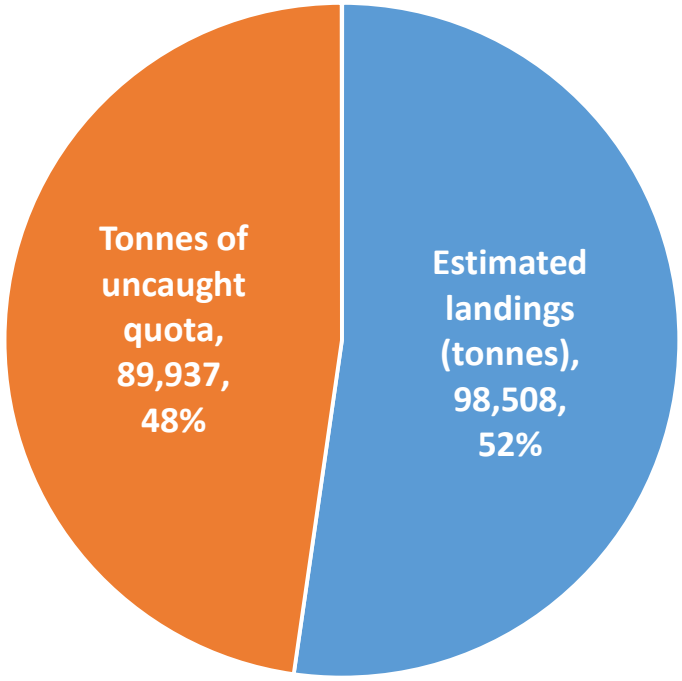
How much UK quota might be left uncaught?

Catching the quota in 2019: Landings prior to choke points (6 home nation fleet segments)

With top-up and trading

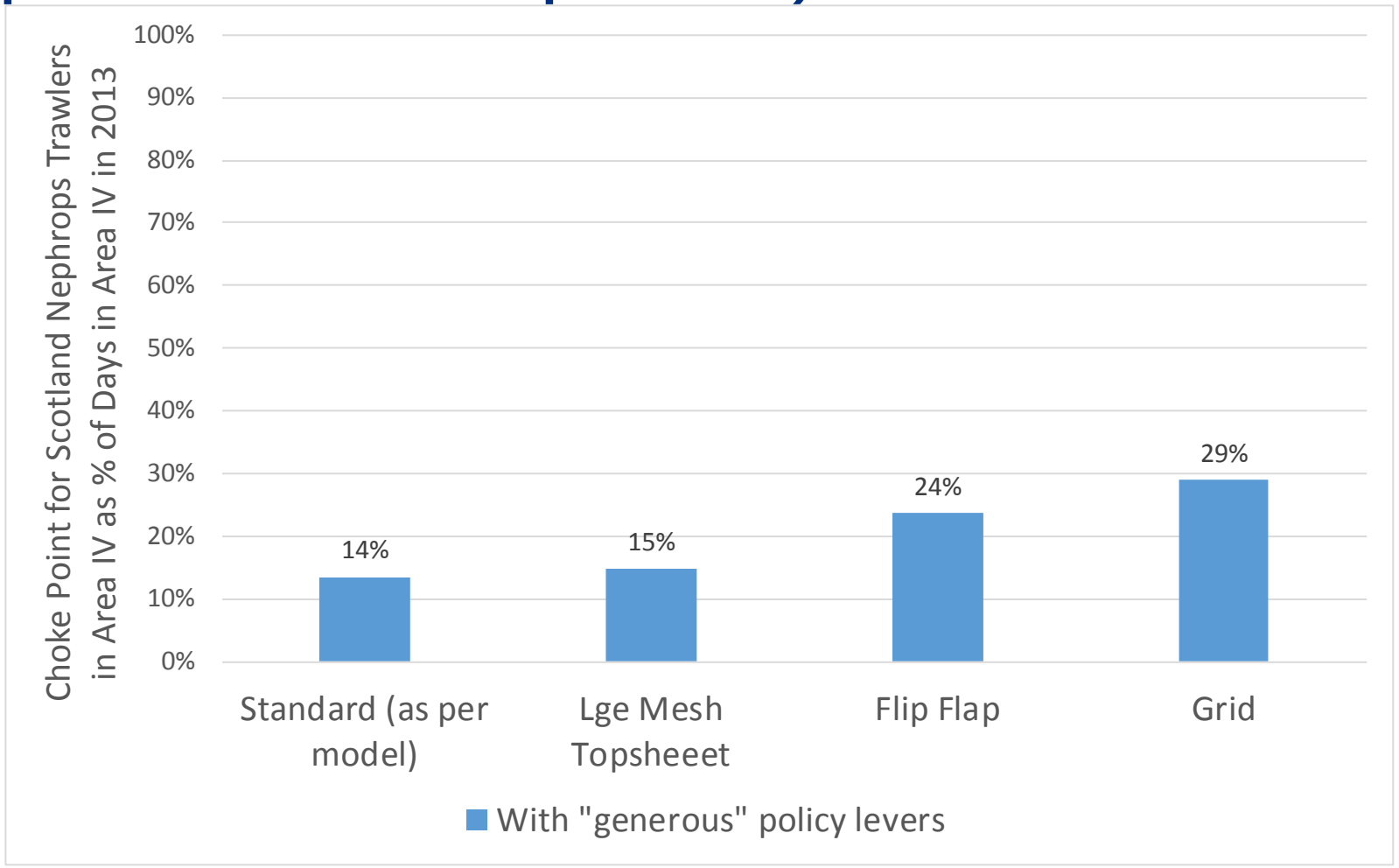


With 'generous' policy levers



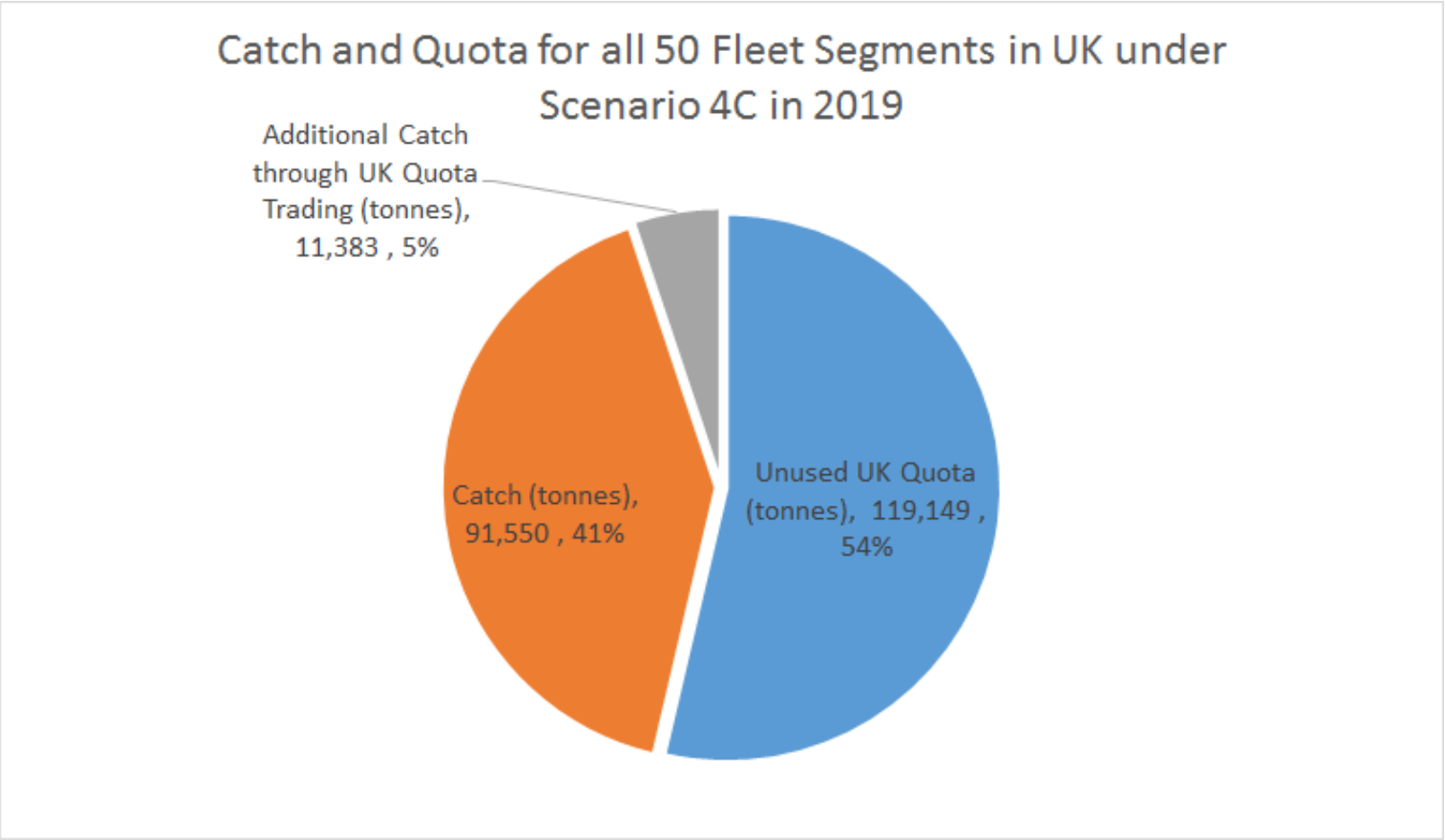
What happens if more selective gear is used?

Selectivity in Scotland Nephrops Trawl (prior to 2016 updates)



What happens if unused quota is traded within UK?

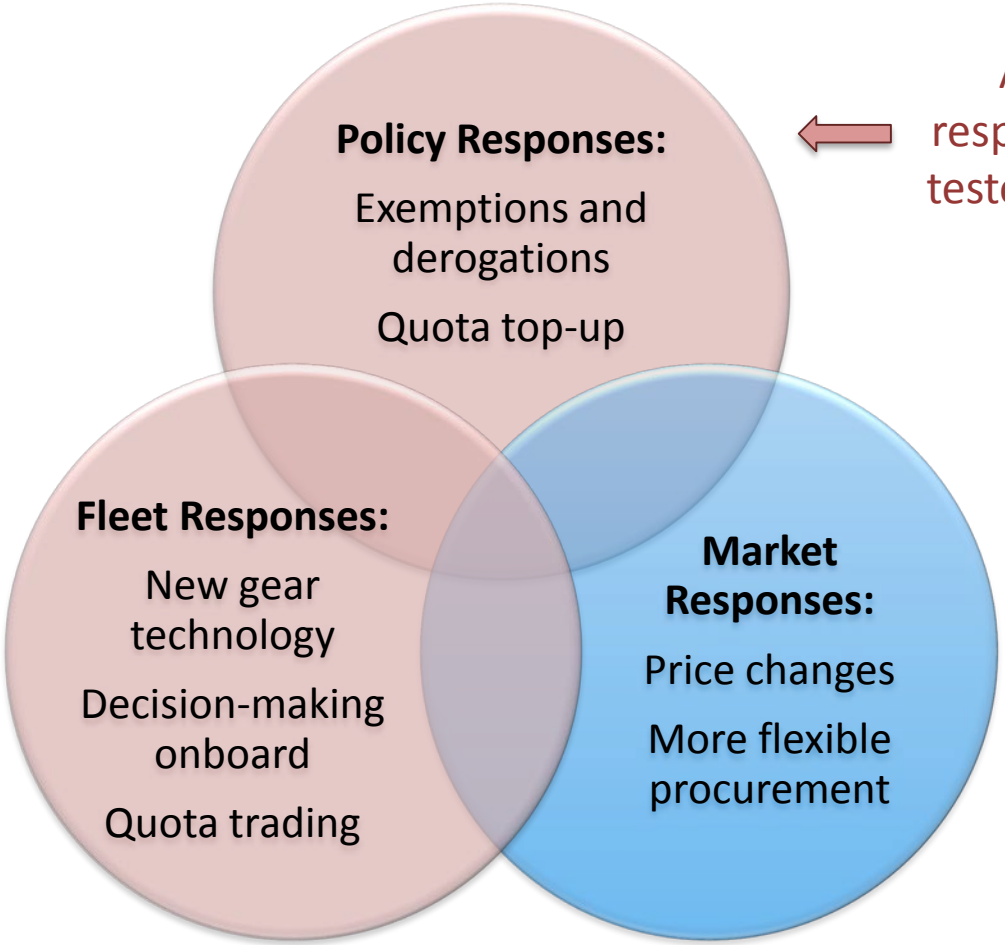
UK Quota Trading (prior to 2016 updates)



Potential of the bioeconomic model

A flexible and dynamic analytical tool

Potential Responses to Mitigate the Impact of the Landing Obligation



Additional responses can be tested in 2016/17

Can be tested in 2016/17

Thank you

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