

# **Creel Fishery Management Options**

Peter Duncan

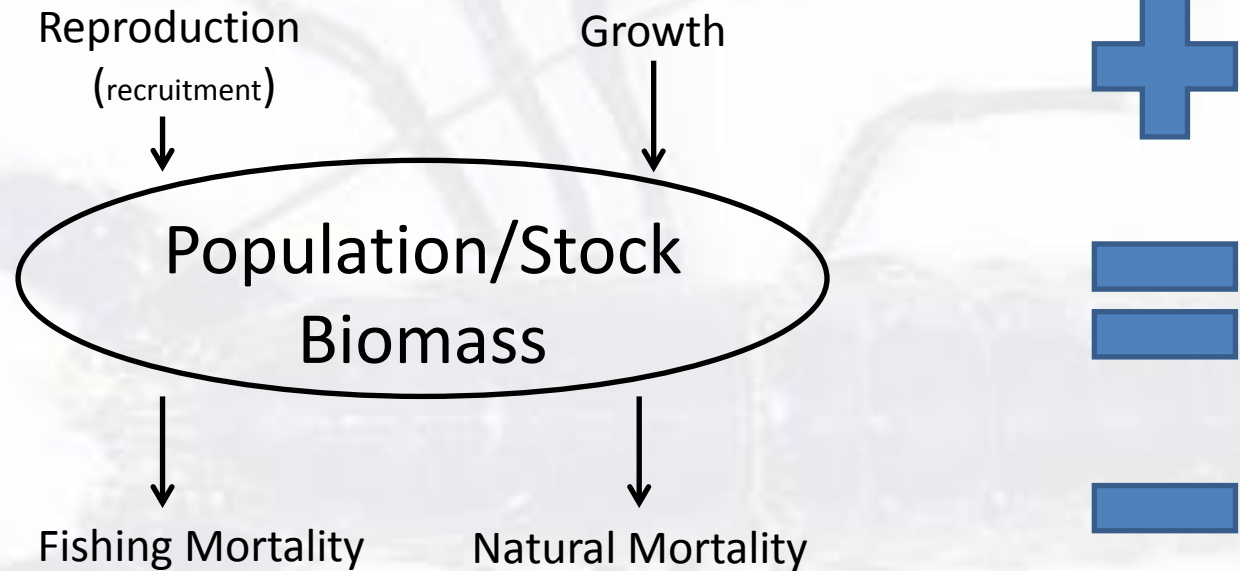


# Session Purpose

A faint, light-colored image of a crab is visible in the background, centered behind the text. The crab is facing left and its legs are spread out.

- Introductions
- Presentation of Management Options
- Industry Ideas
- Discussion

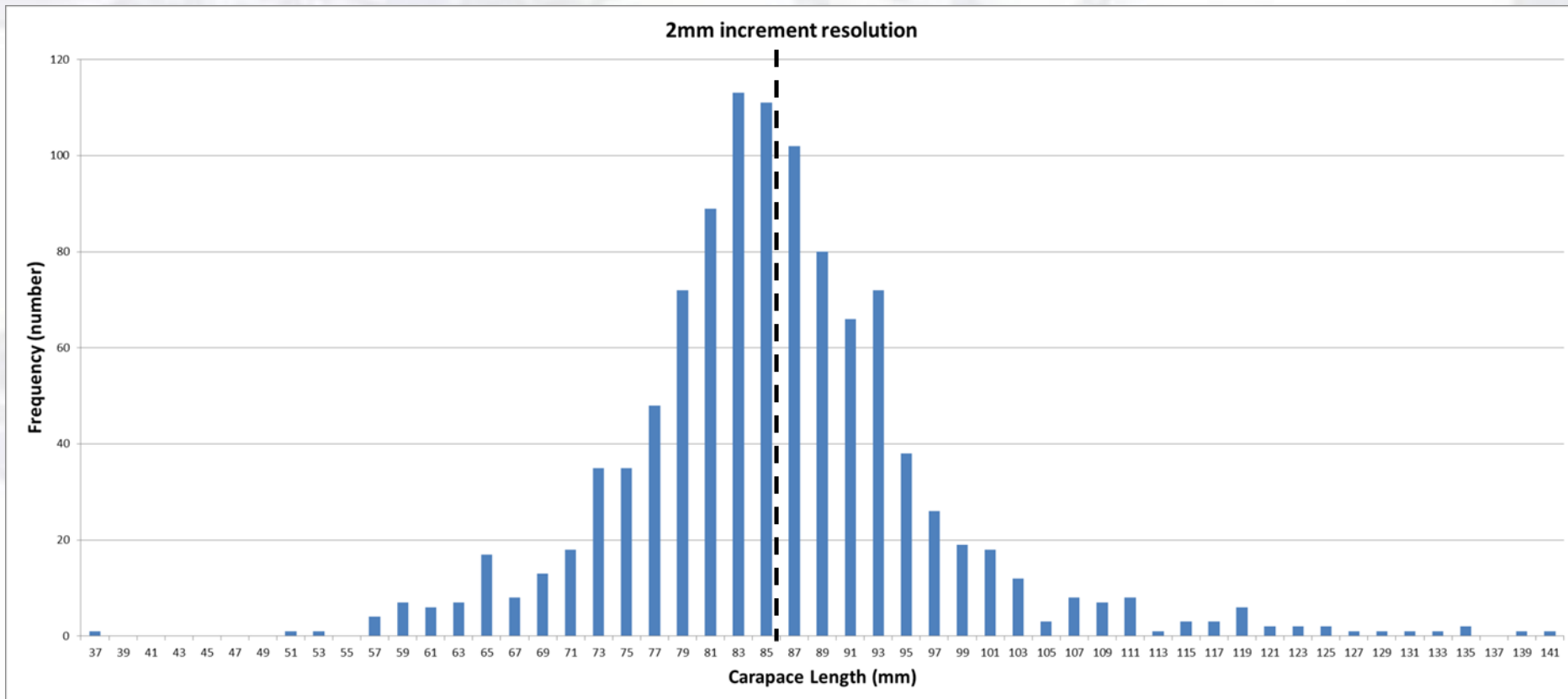
# What are we trying to achieve?



- Balancing the fish population dynamics equation to achieve a sustainable and profitable long-term fishery.
- Requires fishery data (more data, over longer time = better)

# Lobster Size Distribution (IoM)

- CL = **86.24** mm  $\pm$  **11.0** (n=1319) – **close to MLS**



# Stock Surveys/Status

Source: Jersey MSC final report

- Surveys provide population data....
- Can use to predict future of fishery

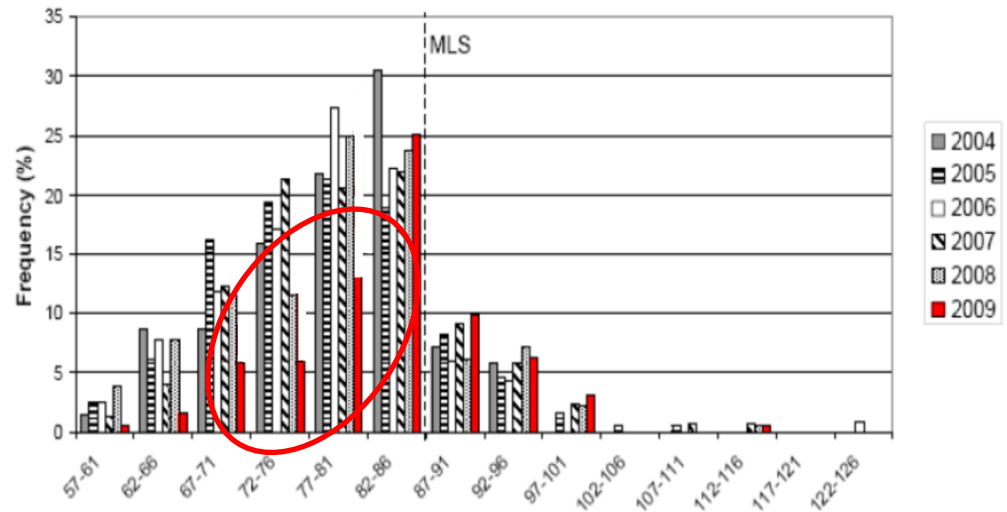
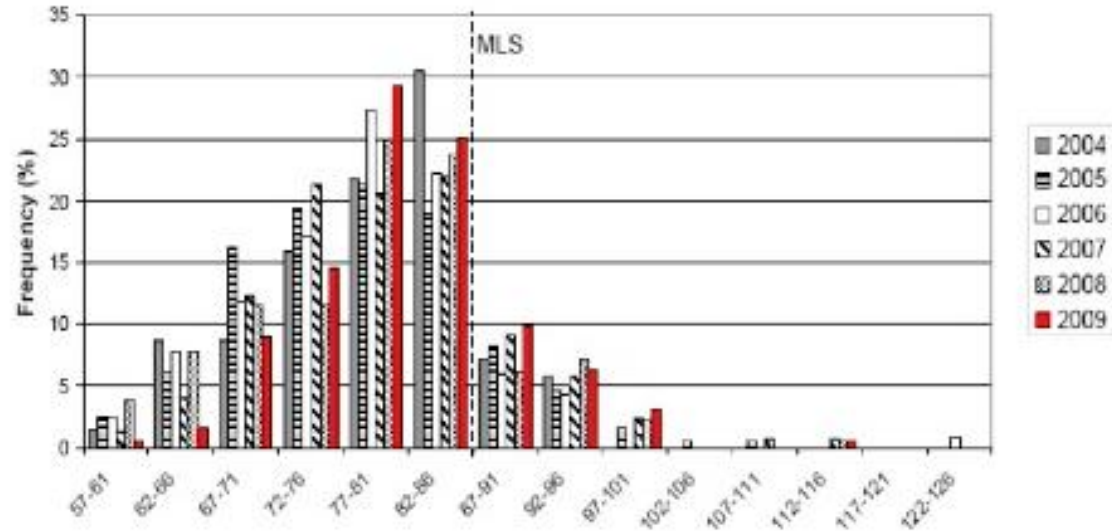
## Jersey

MLS of 87mm

Rapid decline above MLS indicates;

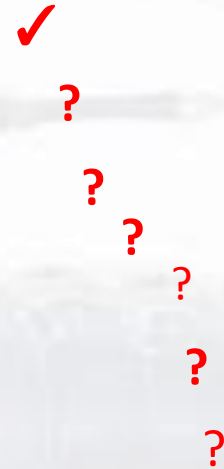
- Fishery has significant impact >87mm
- Fishery is dependent on recruits

- *Mock example – what is management response to poor recruitment year?*

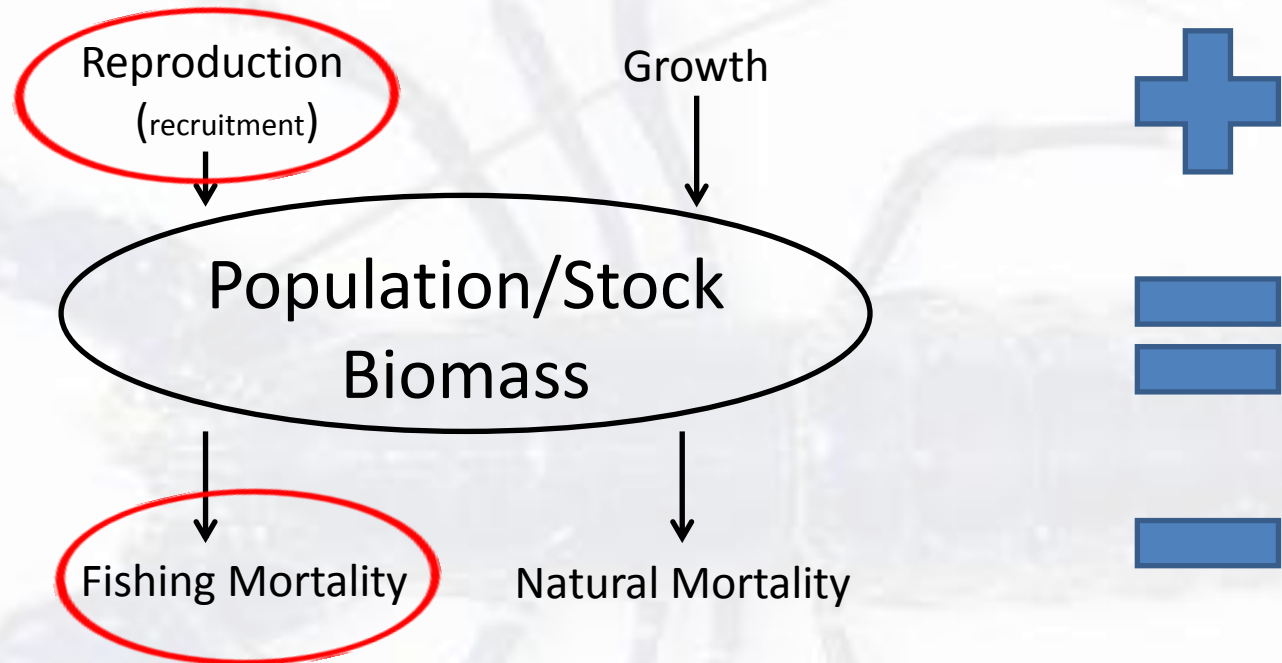


# Current Status?

- What data do we have on the fishery?
  - **Landings**
  - What is the stock status?
  - What is recruitment or related variables?
  - What is natural mortality?
  - What is fishing mortality
  - What is current fishing effort? Pot numbers, licences, soak time etc
  - **CPUE** (catch rate per pot deployed)
- Can't manage/protect fishery, respond to changes, without good fishery data.
- Can't set appropriate limits; pots, effort, TAC, etc.
- Management often political or legally-based, rather than stock/science based.
- Harder to obtain wider recognition, price premium for the product - e.g. MSC.
- **UK heading towards right-based management & quotas??**
- **But relatively little data....**
- **In meantime, can take some precautionary actions**



# What do you want to achieve?



- Data on these variables – expensive in time, people, resources.
  - If not available, put in place management to **maximise reproduction, /recruitment, growth**
  - minimise natural **mortality..??**
  - ...and/or reduce **fishing mortality (effort)???** and maximise value of catch???
- to maintain income.

# CEFAS Report (2005)

## *Percentage increase in egg production per recruit for management options*

Management measure	High fishing mortality (inshore fishery)	Low fishing mortality (offshore fishery)
10% effort reduction	18	25*
25% effort reduction	58	62 **
50% effort reduction	202	117
Increase MLS to 90 mm	43	11
Ban on berried females	113	72
10% V-notch	7	2
25% V-notch	20	6
50% V-notch	45	12
Maximum size of 125 mm	3	40

- Effort reduction (50%)
- Ban landing berried females<sup>+</sup>
- V-notching<sup>+</sup>
- Increase MLS<sup>+</sup>
- Takes time (4-5 years) to see recruitment benefits (reproduction options<sup>+</sup>).

*Eggs per recruit – average number of eggs in a lifetime.*

*\*17%*

*\*\*33%*

# V-Notching

- Increases egg production
- *‘Where population exploited close to MLS, or MLS below Mean Size at Maturity, then MLS not sufficient protection’* (Tully 2001)
- Like MLS, ideally needs survey data to understand size at maturity and fishery status, **but can rely on assumed benefit.**
- Disadvantages
  - Notch is ‘permanent’ for 2-3 moults, no capture window compared with berried landing ban (~ 9 month carrying with 3 month capture window)
  - Tully 2001: \*7600 over 5 years – estimated increase from  $2.6 - 4.3 \times 10^7$  eggs.
  - Loss of earnings (NI compensation scheme via EFF)



## Isle of Man

- **Voluntary practice – survey indicated ~ 30% are notching berried females, general scepticism?**

In highly exploited small-scale lobster fisheries, substantial increases in RP can be achieved by v-notching.

**Table 1. Annual reproductive potential by size class of v-notched lobsters based on size and number released**

Size group (mm)	Average size	Number lobsters	Proportion mature	Fecundity	Probability spawning	Annual egg production	Contribution %
79-83.9	81.5	111	0.13	4720	0.5	34540	0.1
84-88.9	86.5	1248	0.25	5695	0.5	885897	3.4
89-93.9	91.5	1637	0.42	6800	0.5	2337257	8.9
94-98.9	96.5	1497	0.61	8043	0.5	3685306	14.1
99-103.9	101.5	1164	0.78	9433	0.5	4255535	16.2
104-108.9	106.5	774	0.88	10979	0.5	3751306	14.3
109-113.9	111.5	425	0.94	12689	0.5	2538592	9.7
114-118.9	116.5	275	0.97	14573	0.5	1949328	7.4
119-123.9	121.5	155	0.99	16639	0.66	1679127	6.4
124-128.9	126.5	124	0.99	18897	0.66	1539432	5.9
129-133.9	131.5	92	1.00	21356	0.66	1294867	4.9
134-138.9	136.5	36	1.00	24024	0.66	570837	2.2
139-143.9	141.5	27	1.00	26912	0.66	473988	1.8
144-148.9	146.5	20	1.00	30029	0.66	396780	1.5
149-153.9	151.5	19	1.00	33383	0.66	411753	1.6
154-158.9	156.5	13	1.00	36985	0.66	325862	1.2
159-163.9	161.5	0	1.00	40843	0.66	0	0.0
164-168.9	166.5	3	1.00	44968	0.66	79243	0.3
169-173.9	171.5	0	1.00	49368	0.66	0	0.0
Totals		7619				26209649	

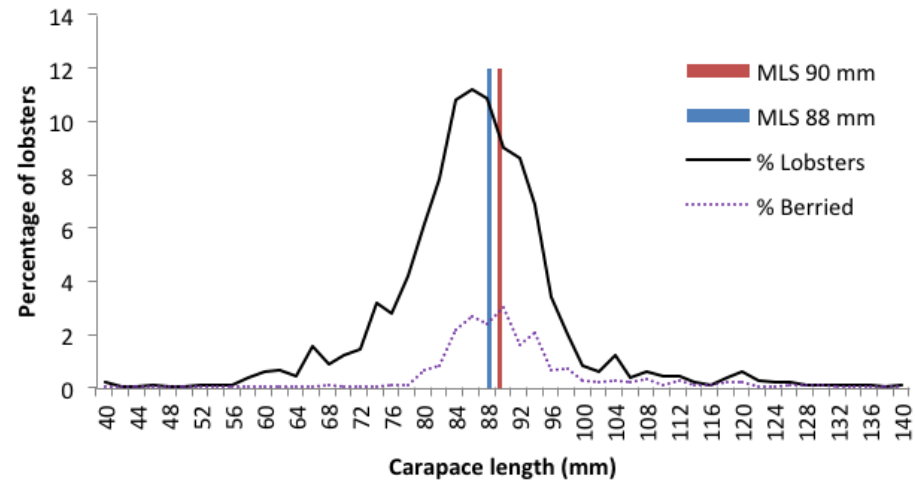
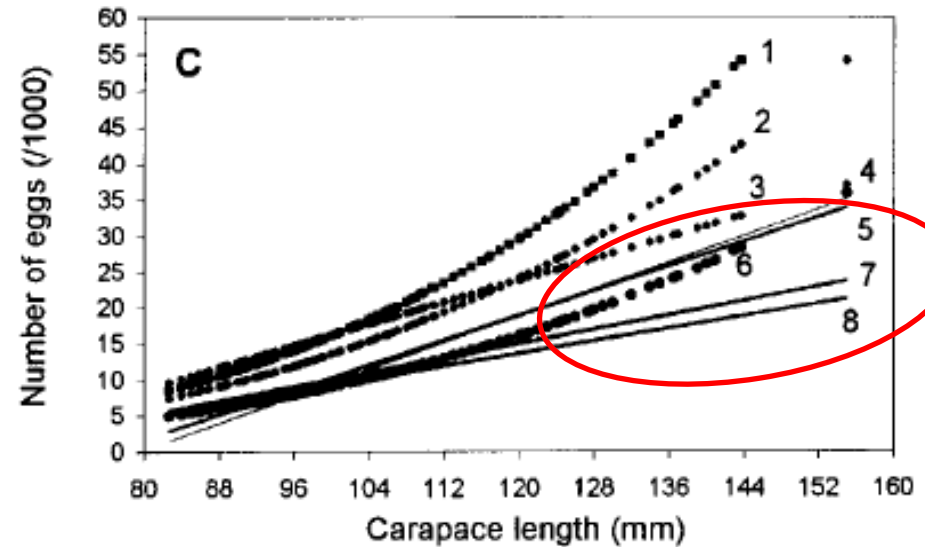
Tully 2001 - Selective notching?? e.g. 95-105mm, 10%???

# Stock Status (V- notching)

- Population Genetics Applications
- Use 'notches' genetic purposes
- Tissue notch and eggs provide DNA for parental determination (and notching compensation without landing lobsters)
- Queens University (NI) project with POs
- IoM involvement
  - Stock 'nationality'
  - Dispersion
  - Management
  - MSC etc.
- See Fishing News handout

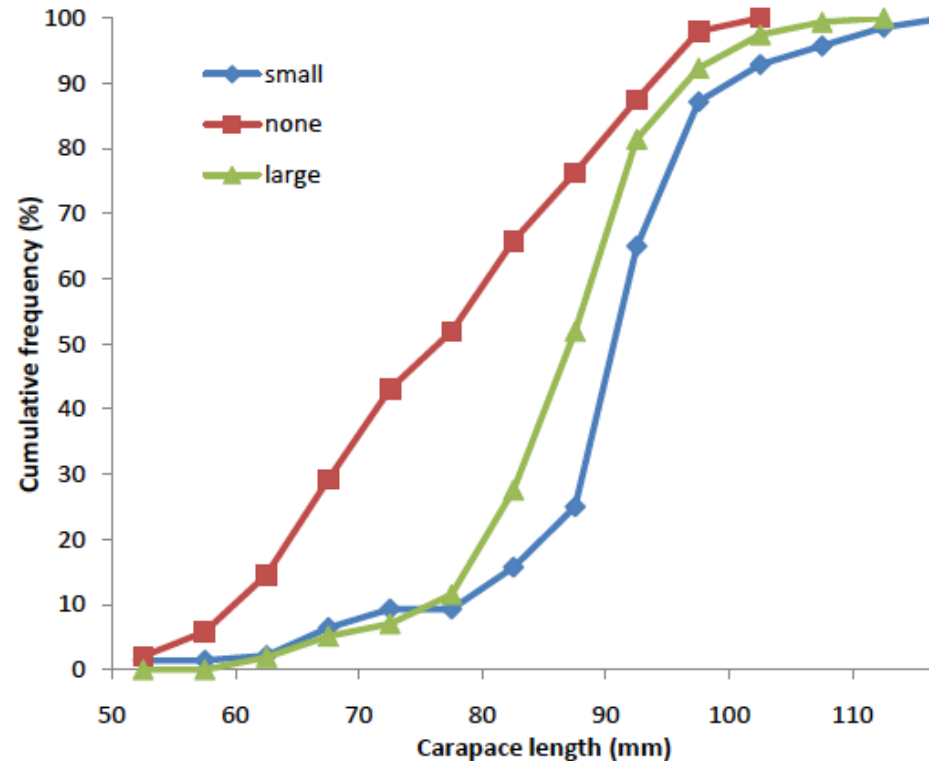
# Minimum Landing Size

- Increasing MLS increases egg production (*more berried females, eggs/female etc*) and yield per recruit (i.e. size at capture)
- Large lobsters = more eggs, more frequent reproduction, better quality eggs/larvae.
- Bigger changes in MLS are better.
  - (Predicted 7mm over 6 years = x2 eggs (Canada), but better with other measures (reduced effort))
- Introduction method - incremental (*longer to see benefit*) or instantaneous (*quicker results*).
- Short-term economic implications?
  - **Change to 90mm - economic impact of reduced catches** estimated at 9% reduction until next moult, <2 years, then recouped.



# Escape Gaps

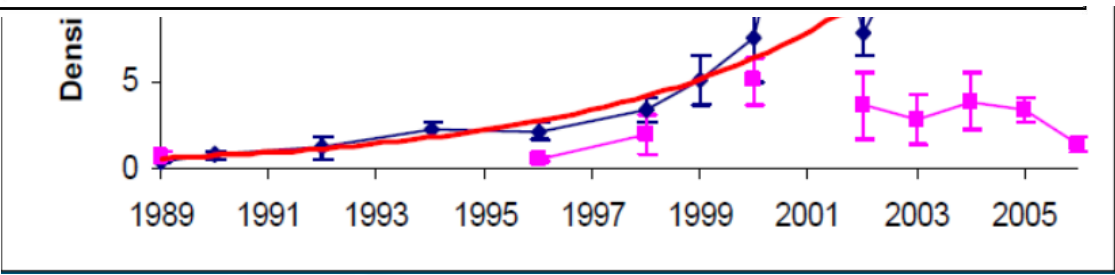
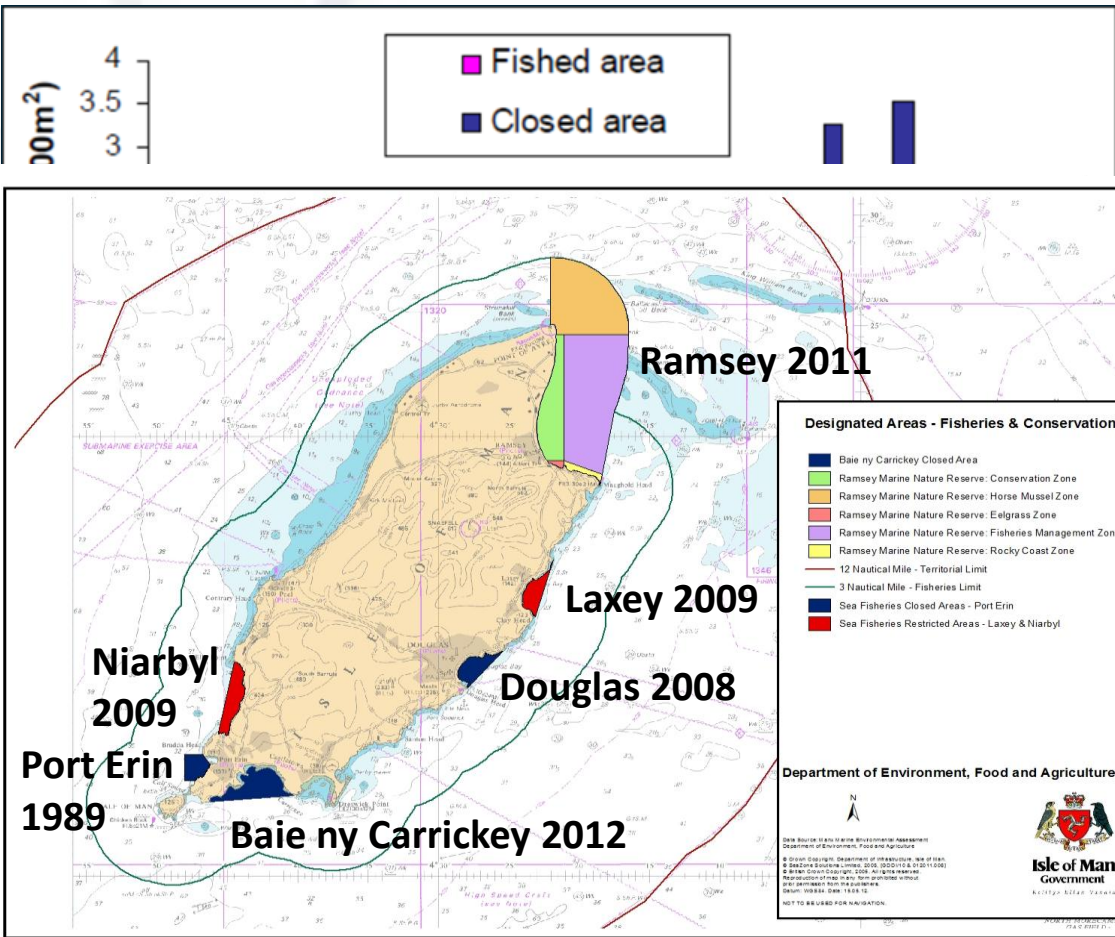
- Retaining undersize in creel is damaging
  - aggression and pot movement.
  - translocation from refuges.
  - So could reduce **mortality?**
- Catch sorting time.
- 2 common sizes: 80 x 45 and 84 x 46 mm.
- effective in allowing undersized lobsters to escape.
- Estimated 83% of lobsters escaping through 80 x 45 mm gaps had a carapace length of <90 mm.
- **80 x 45** mm escape gaps CPUE of lobsters of  $\geq 87$  mm not significantly different with escape gaps (**no commercial loss by fitting**).
- Studies indicate escape gaps can improve efficiency of catching larger lobsters, and reduce sort time.
- Gap position in creels important.



# Fishery Management Areas

- 6 closed/restricted areas - various purposes, mostly restricts mobile gear (= benefits for potters)
- Perceived benefits inside and outside MPA
- Carrick Bay (2012)
- + crustacean fishery trial 3 years (Nov 2013 - 2016)

- Limiting access (to 7 fishermen)
- Reduced total pot numbers from ~820 to 440
- Increasing MLS (87 to 88mm (lobster), 130 to 135mm (crab))
- Introducing lobster Maximum Landing Size (~120mm)



# References and Further Information

- CEFAS (2005) Stock conservation benefits of various lobster management measures. URL: <http://webarchive.nationalarchives.gov.uk/20130123162956/http://www.defra.gov.uk/marine/pdf/fisheries/cefass-lobsteradvice.pdf>.
- DEFRA (2006) Consultation on proposals for increasing the minimum landings size of lobster. URL: <https://www.iema.net/readingroom/consultation-papers/consultation-proposals-increasing-minimum-landing-size-lobster>.
- [Lobster escape gap trials – 2009](http://fisheries-conservation.bangor.ac.uk/iom/documents/9.pdf) <http://fisheries-conservation.bangor.ac.uk/iom/documents/9.pdf>
- MSC
- Normandy and Jersey
  - <http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/normandy-and-jersey-lobster>
- Maine
  - [http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/maine\\_lobster\\_trap/maine\\_lobster\\_trap\\_fishery](http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-west-atlantic/maine_lobster_trap/maine_lobster_trap_fishery)
- Shetland
  - <http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/shetland-inshore-crab-lobster-and-scallop>

A serene sunset over a calm ocean. The sun is a bright, glowing orb just above the horizon, casting a shimmering, golden path of light across the water's surface. The sky transitions from a deep orange near the horizon to a lighter, hazy orange at the top. The water is dark with gentle ripples, reflecting the sun's light.

# The End

# Questions?