

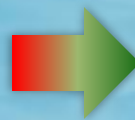
Nephrops TV-surveys: purpose, methodology, results and management outcomes

Ana Leocadio

Starting point of UWTV surveys

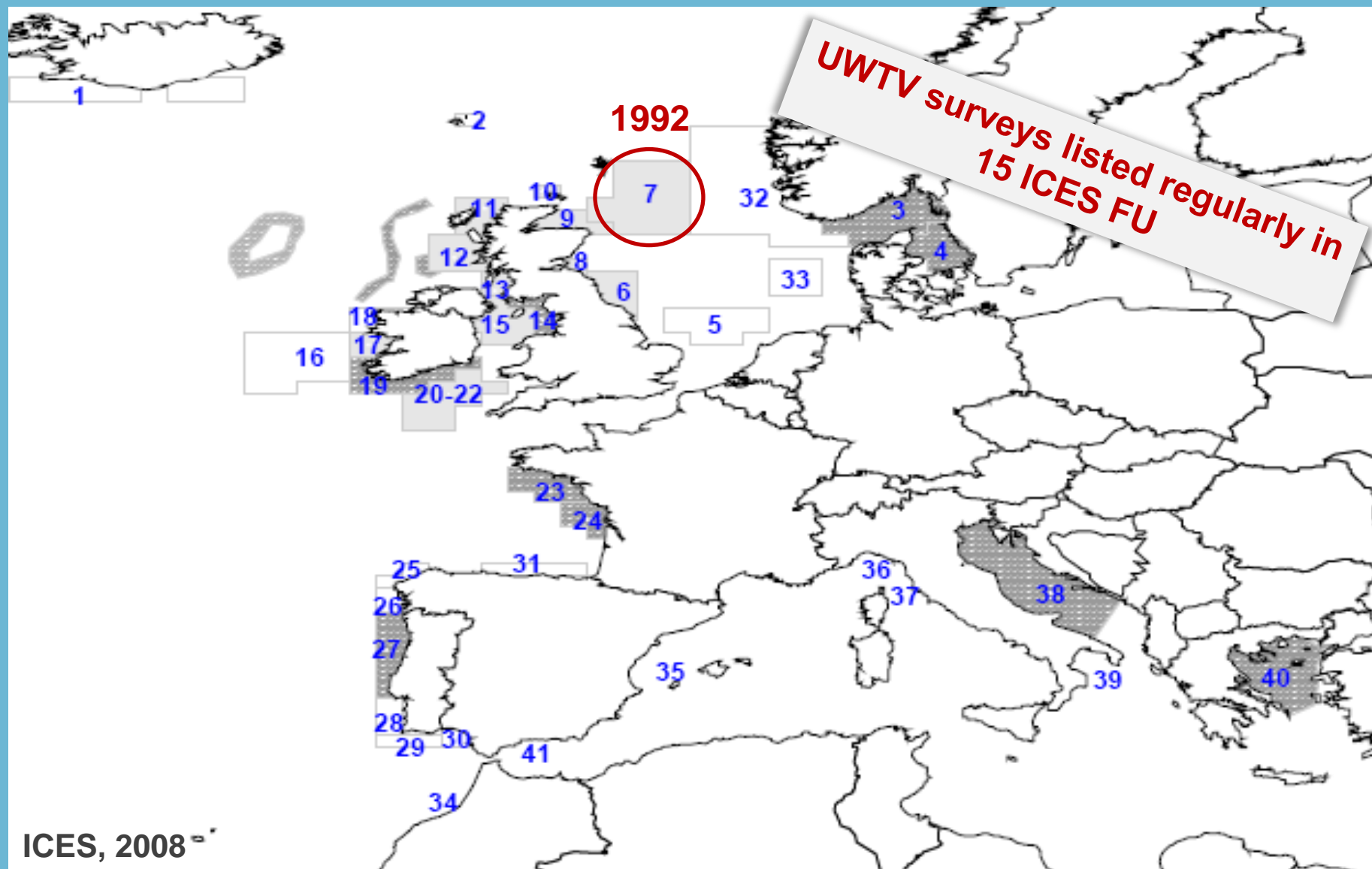
- Lack of age-structured data
- Differences in growth rates of males and females
- Catchability due to the biology (life cycle)
- Uncertain historic landings for a number of stocks (improved since the introduction of buyers and sellers legislation UK – 2005 & 2006)

**Standard stock assessments
methods, based on commercial
catch data
– difficult to apply**



**Under water TV surveys fishery
– independent indicators of
stock size, exploitation status
and catch advice**

Distribution of UWTV surveys



UWTV Surveys - methodology

1. Training pre-survey

- Burrow identification
- Reference counts

2. Recording footage

- Sledge mounted camera

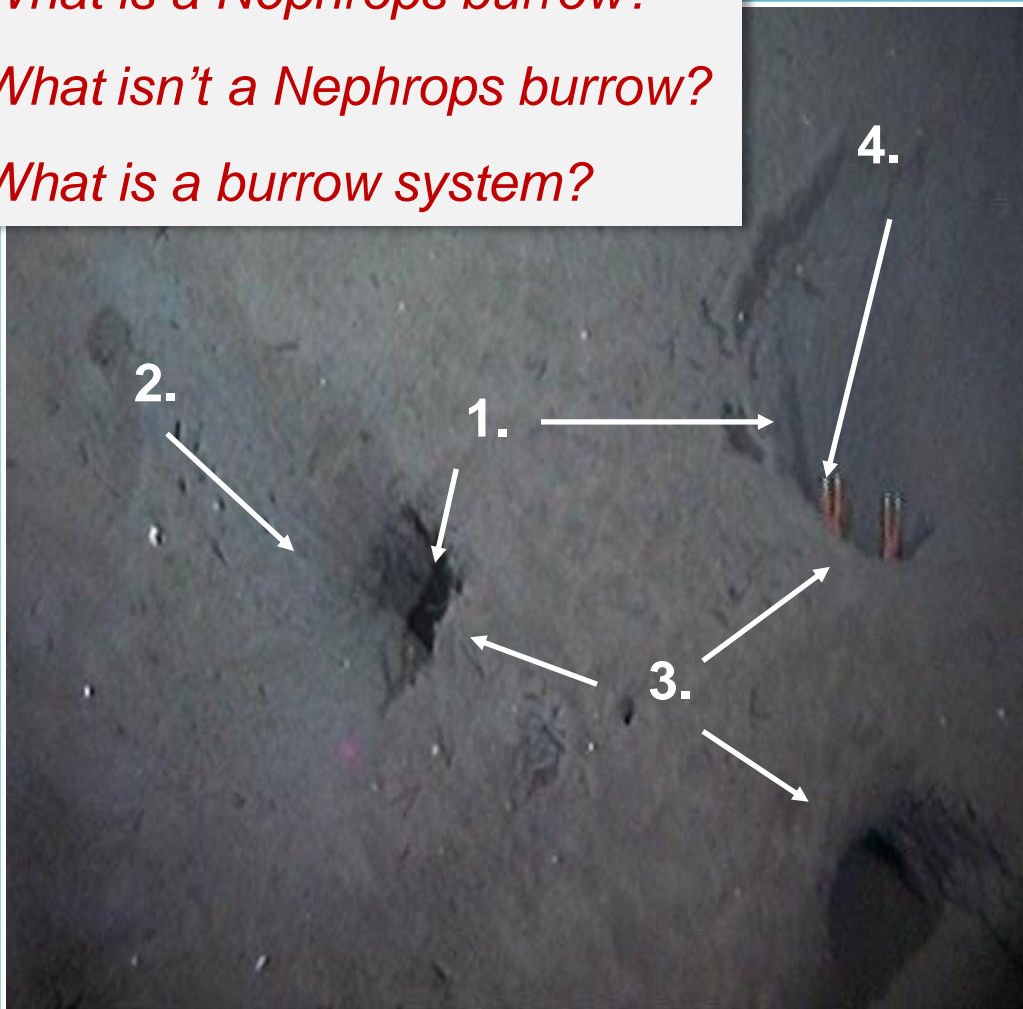
3. Recounts



What is a Nephrops burrow?

What isn't a Nephrops burrow?

What is a burrow system?



1. Crescentiform entrance

2. Sediment ejecta and radial scrapings around entrance. Claw or pereopod indents. 'Drive-way'

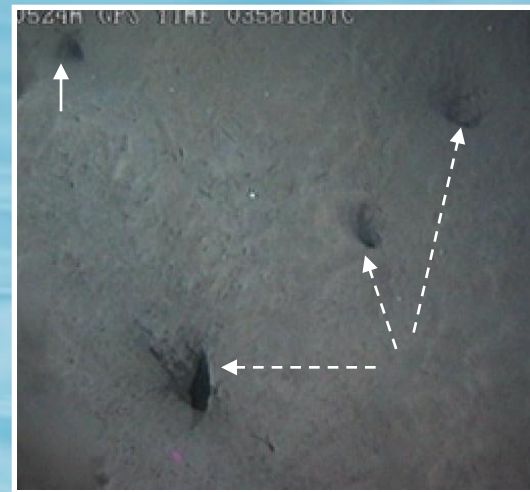
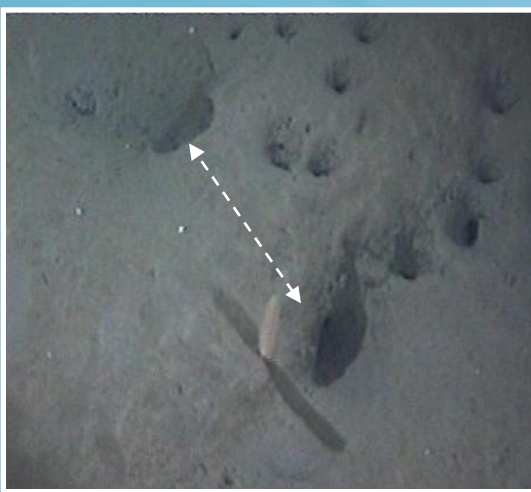
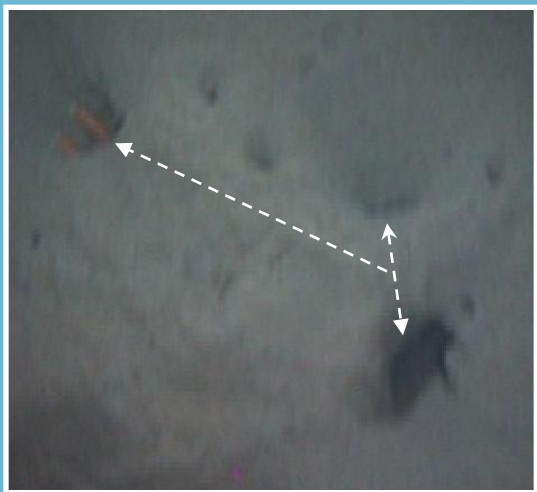
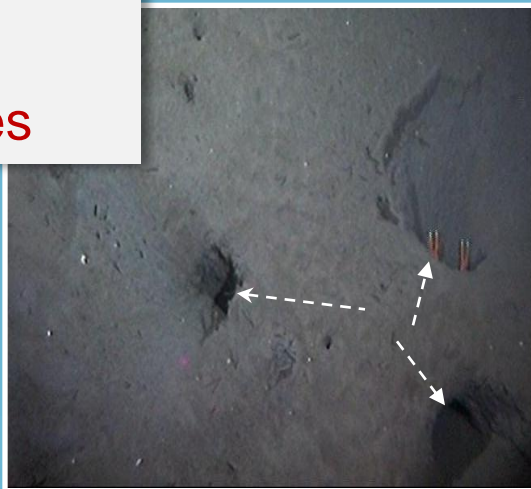
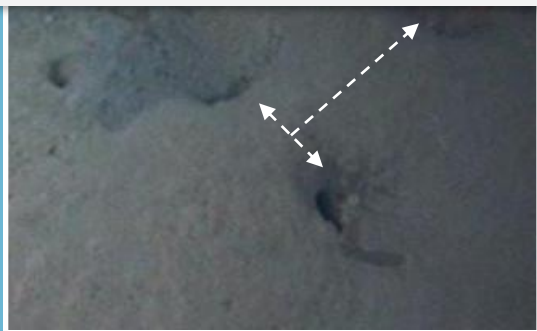
3. Single to multiple entrances, focussing on an apparent 'raised' centrum

4. *Nephrops norvegicus*

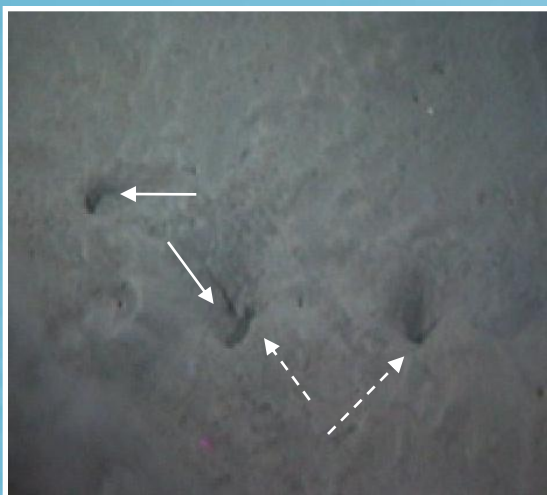
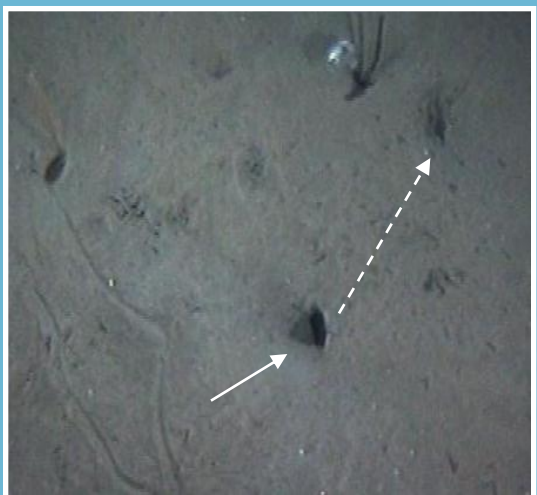
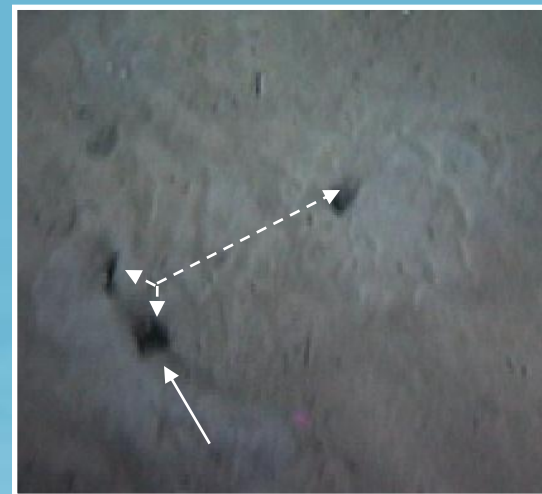
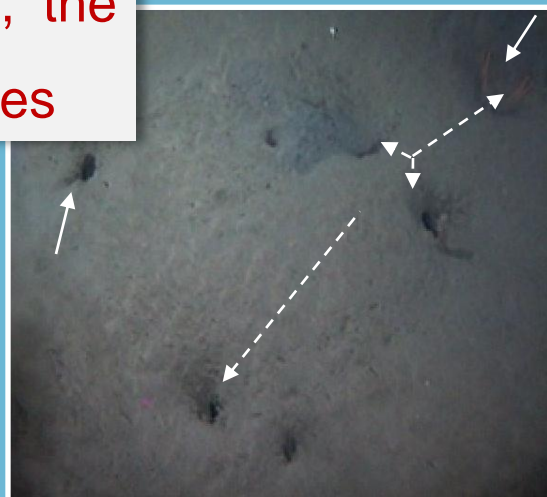
Crescentiform entrances

Sediment ejecta

Single to multiple entrances

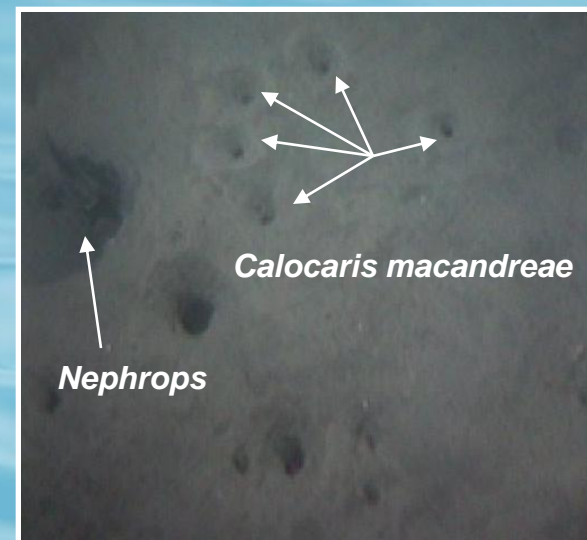
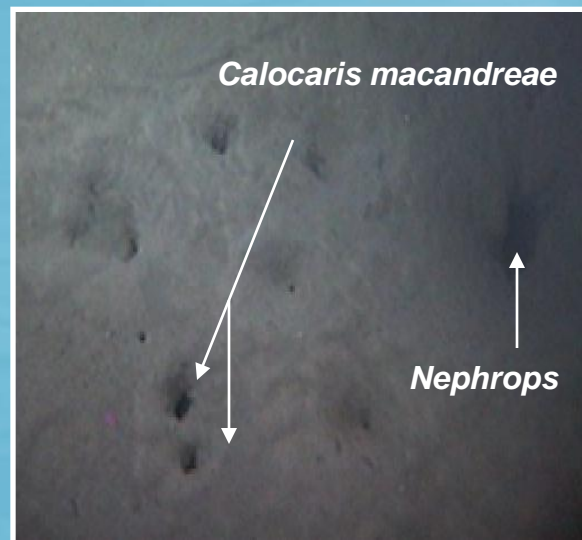
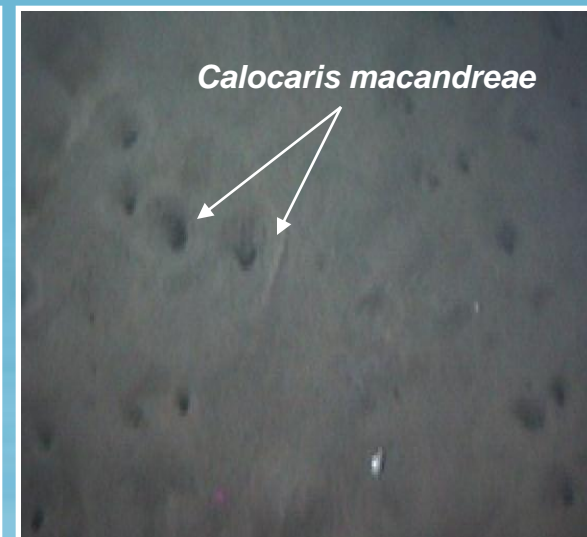
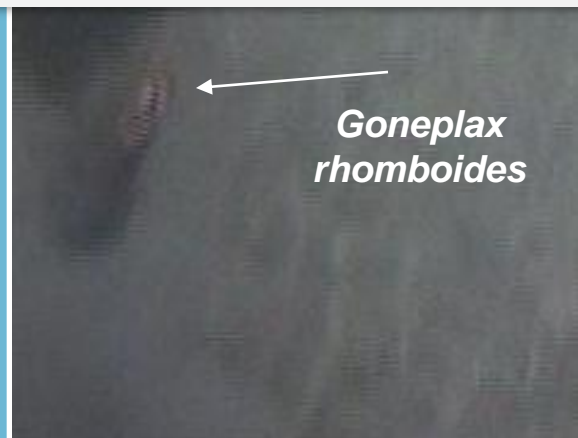


The smaller the entrance, the harder it is to spot signatures



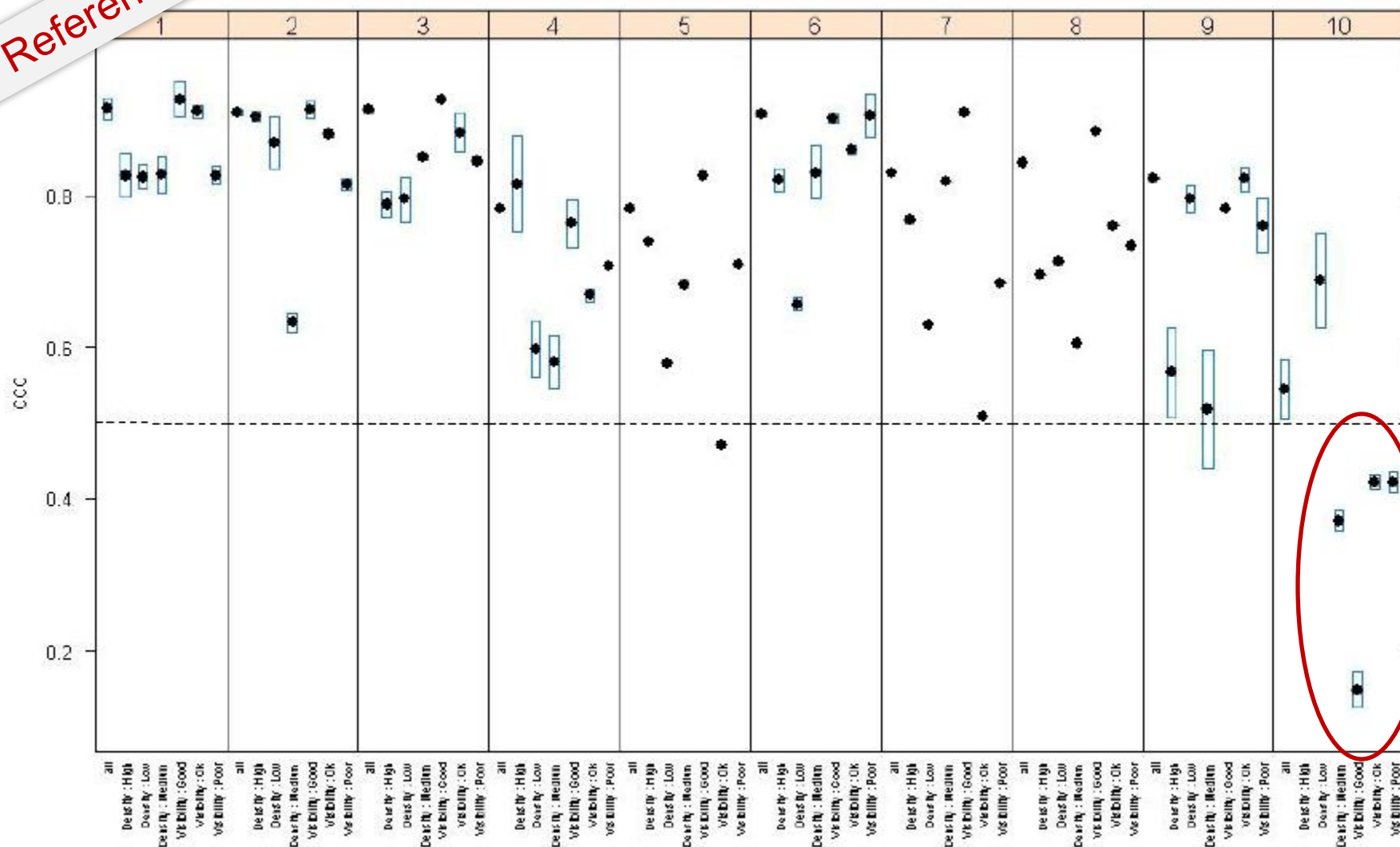
Other species

IF IN DOUBT LEAVE IT OUT



Reference counts

Individual's counting performance against the reference counts as measured by Linn's concordance correlation coefficient (CCC)



- 10 minute run
- *count 7 clear minutes only*
- *Blind counts*
- 2 counters for each station

Burrow counts

- converted into densities
(width of view + tow length)
- raised to fishing ground area

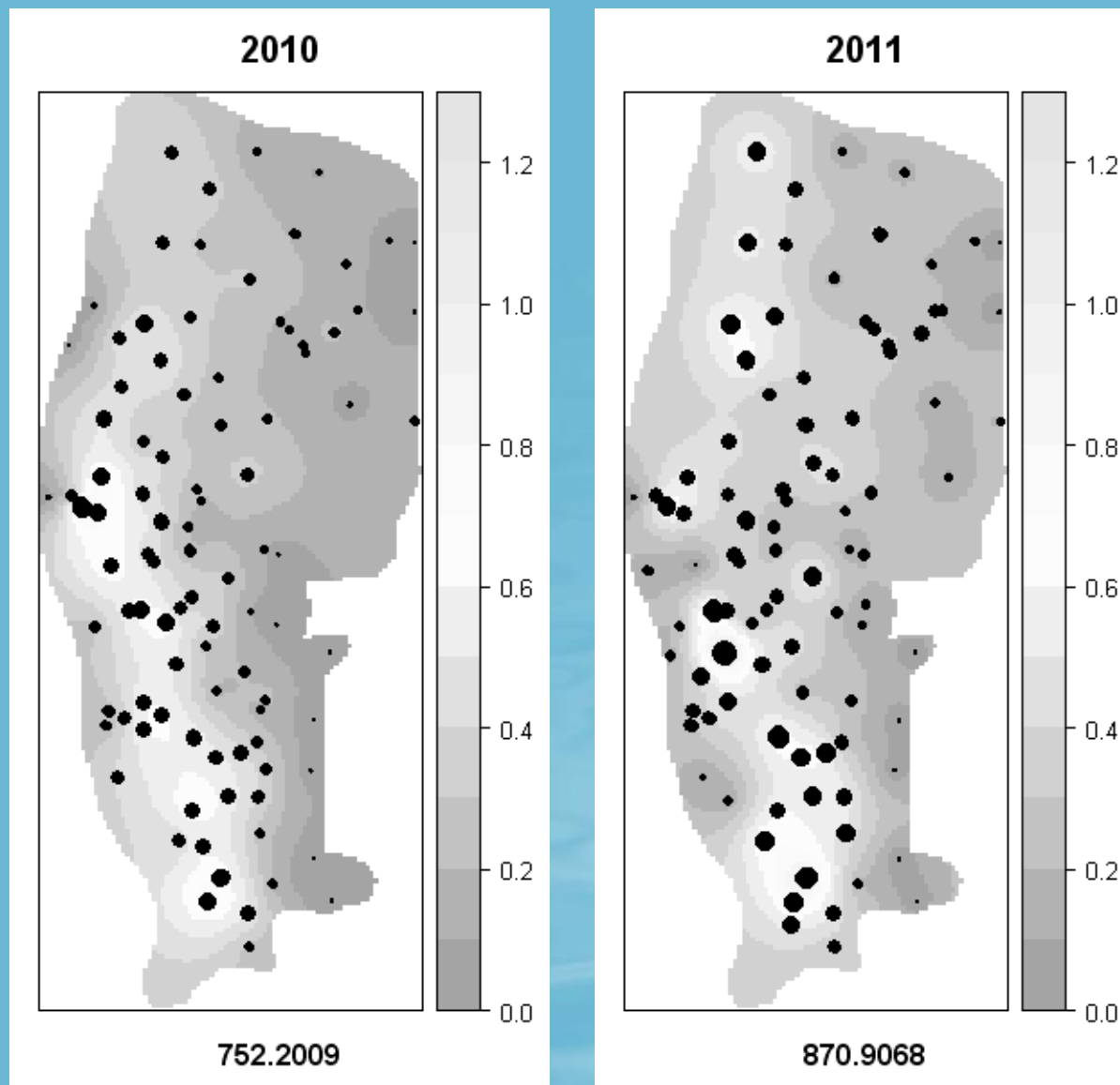


+ Estimation of overall abundance



Each system is assumed to represent one catchable *Nephrops* with occupancy assumed to be 100%

UWTV Surveys – results (e.g. Farn Deep, geo-statistical analysis)



UWTV Surveys - sources of bias

- Misidentification of *Nephrops* burrows
- High density of burrows
- Edge effects, clarity
- Variability of the counters

At 2009 ICES Benchmark the main sources of bias were estimated for each FU and an overall bias correction factor was introduced adjusting the estimates of abundance

UWTV Surveys - Advice

Nephrops TV surveys

Nephrops catch sampling programme

European commission

ICES WORKING GROUPS

fishery independent estimate of stock size
exploitation status
catch advice

Set annual TAC

ICES management for the North Sea, 2010

management should be at the FU rather than at the ICES sub-area level, as *Nephrops* densities varies throughout the different grounds and sediment strata as showed by the UWTV survey results

19-09-2006 CEnd 16-06 Stn 45 tv17
Pos 5516.3516,N,00113.0836,W
dist+0252m GPS TIME 025544UTC