

Estimating *Nephrops* stocks directly

1. The UK *Nephrops* fishery



- Landed value of *Nephrops* £57 million
- Landed value of Cod £79 million
- Landed value of Haddock £57 million

Nephrops stocks are managed by EU TAC's based on ICES advice

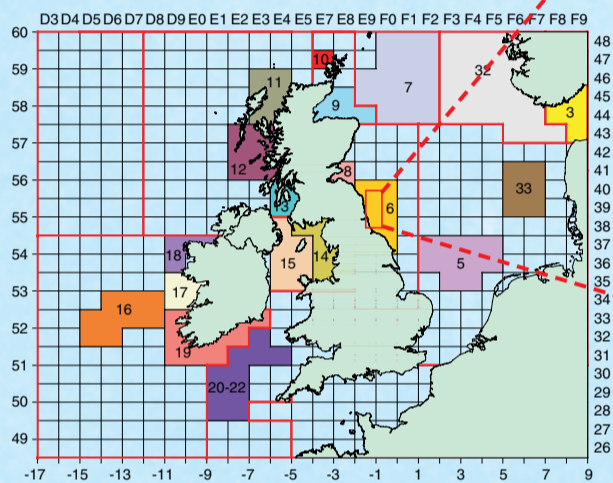


Table 1. TAC (Tonnes)

Unit	Stock Area	ICES advice		EU	
		1998/99	2000/01	1998/99	2000/01
9 / 10	Moray Firth / Noup Head (IVa)	2400	1850		
7	Fladen (IV a)	7000	9000		
6 / 8	Farn Deeps / Firth of Forth (IV b,c)	4170	4170		
5 / 33	Botney Gut - Silver Pit / Off Horn Reef (IV b,c)	1000	1600		
	Sub-total	14750	16620	15200	17200
11+12 / 13	Minch / Clyde (VI a)	11300	11300		
	Sub-total	11300	11300	12600	12600
14 / 15	Irish Sea (VII a)	9400	9400		
16 / 17 - 19	Porcupine / S+W Ireland (VII b,j,k some g)	4000	4000		
20 - 22	Celtic Sea	3800	3800		
	Sub-total	17200	17200	23000	21000
	Total	43070	45120	50800	50800

2. ICES assessments

The ICES *Nephrops* Working Group assesses stocks every second year.

It uses data on the quantity and size range landed (measured at the ports) and discarded (measured at sea).

BUT

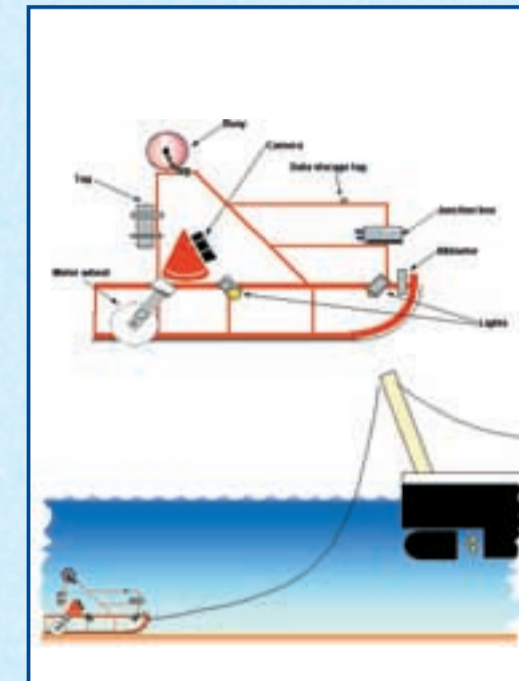
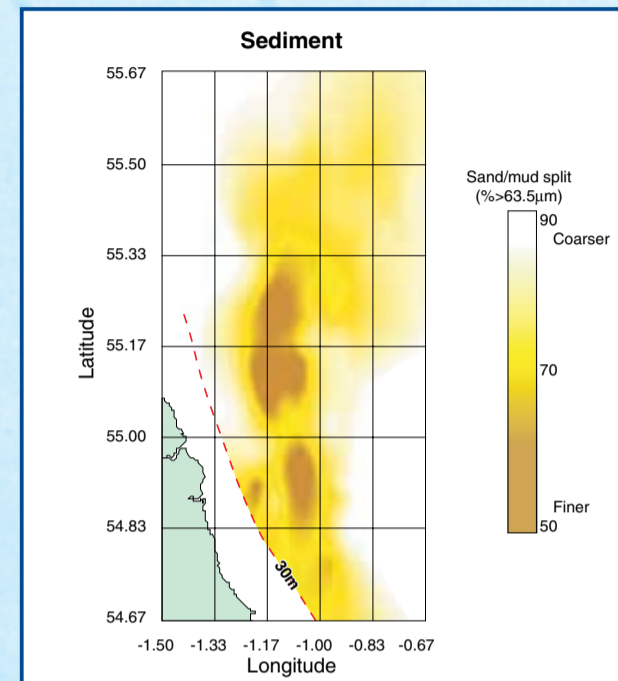
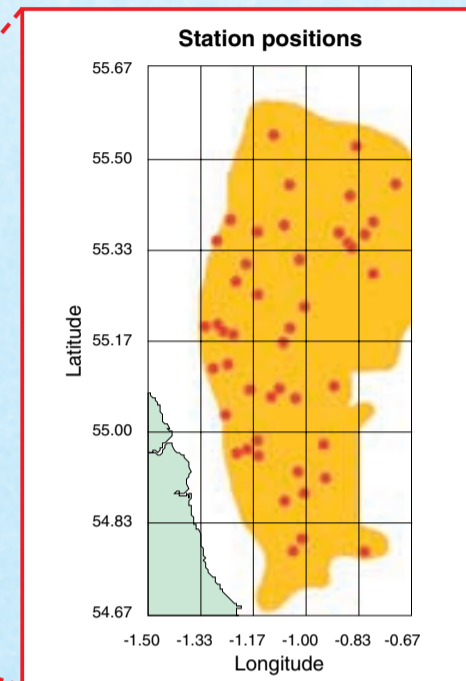
- Landings may be under reported
- Not all the stock may be fished
- *Nephrops* are only caught when they leave their burrows, so behaviour patterns could bias the catch rate, size range, and sex ratio in trawled catches



3. Direct counting of *Nephrops* burrows

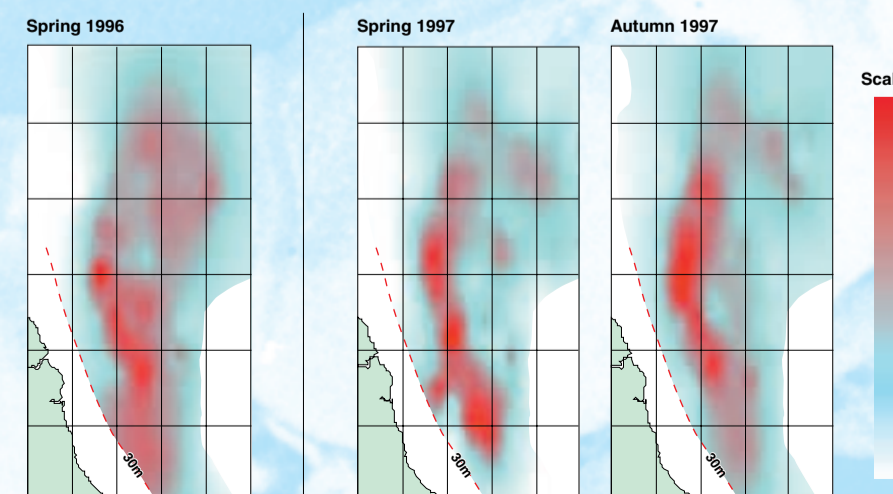
CEFAS assesses the stocks in the Farn Deeps (unit 6) and the eastern Irish Sea (unit 14), where it has been experimenting with the **burrow counting method**:

- Use sledge mounted camera to film the seabed at a grid of stations on the different sediment types



- View the film and count the number of burrows for a known field of view and distance run by the sledge
- Calculate burrow density estimates
- Estimate stock number by raising density to whole area
- Convert to biomass using size/weight data from trawl samples

4. Burrow densities



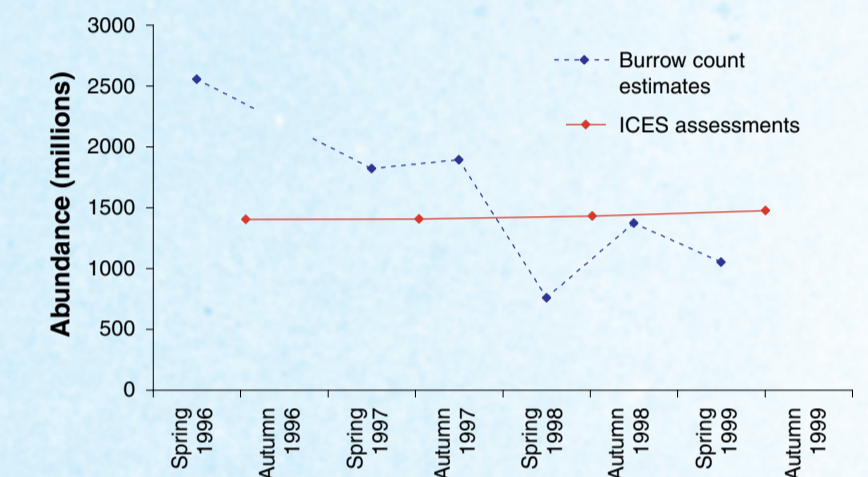
- Burrow density is highest in areas where sediment is finest.
- The areas of high density are consistent from one survey to another.

5. Results

Table 2. Comparing the abundance and biomass of the Farn Deeps *Nephrops* stock from the burrow count and the ICES assessment.

	1996 Spring	1997 Spring	1997 Autumn	1998 Spring	1998 Autumn	1999 Spring
Abundance (millions)						
Burrow count	2555	1821	1892	759	1372	1051
ICES estimates	1443	1446	1467	1467	1513	1513
Biomass ('000 t)						
Burrow count	40.8	29.1	30.2	12.1	21.9	16.8
ICES estimates	18.4	18.0	18.6	18.6	19.3	19.3

(n.b. The WG estimate is the annual estimate for the year closest to the time of the TV survey. That for autumn 1997 and spring 1998 is therefore the same (1998) estimate).



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- The burrow counts decline from Spring 1996 to Autumn 1999 compared to the ICES results which show no trend
- The burrow counts include small *Nephrops* which are not selected by trawls and are therefore invisible to the ICES assessment.
- The spring - autumn difference appears to indicate the effect of new recruitment.
- The autumn-spring difference may indicate the effect of the winter fishery.
- The comparison between the two methods needs further work, especially to understand the effect of spatial patchiness, variations in the number of small *Nephrops*, and selection by trawlers.