

Árni Magnússon

Samspil þorsks og loðnu



Hafrannsóknastofnun

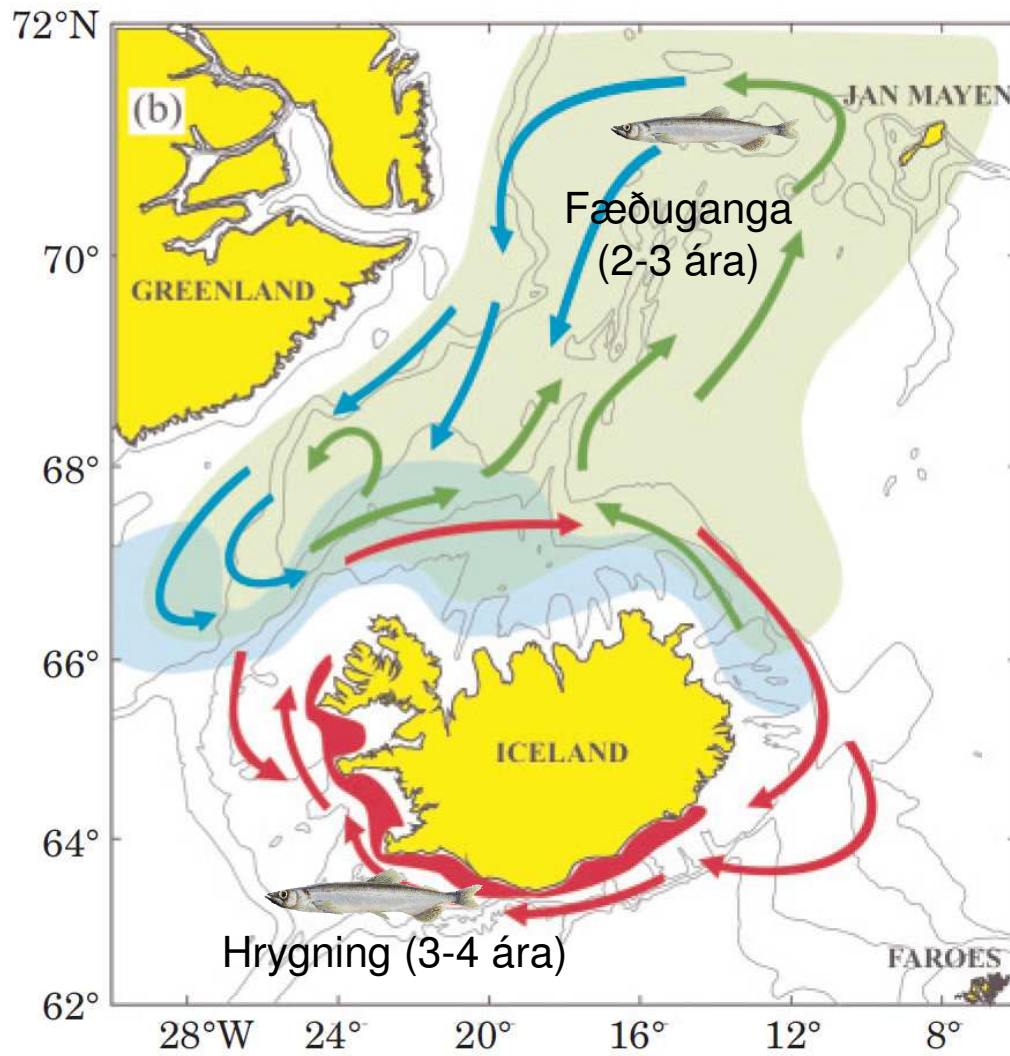
Janúar 2008

Yfirlit

Heimildarýni

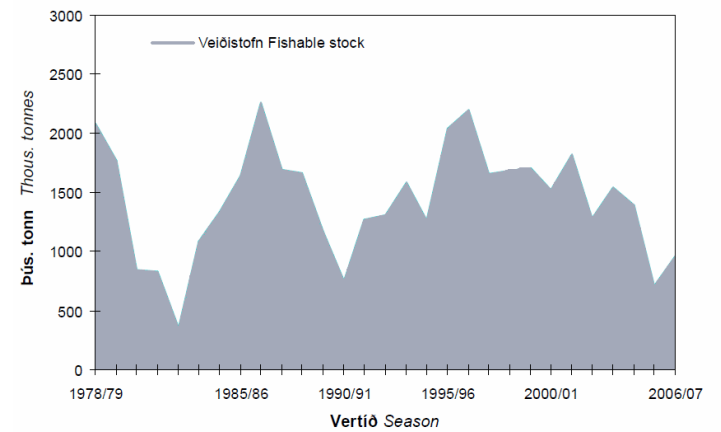
- (1) meltingarhraði
- (2) heildarát á ári
- (3) hlutfallslegt framlag í fæðu
- (4) stærðarval
- (5) áhrif á vöxt
- (6) aðgengi

Loðna



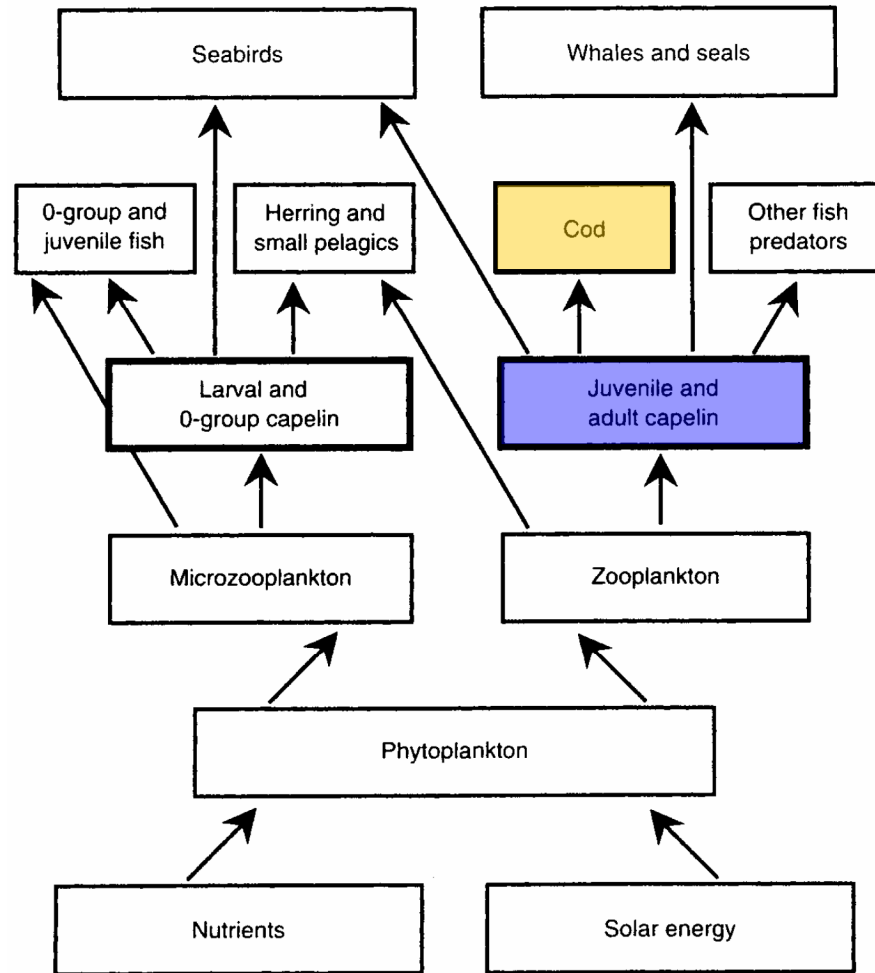
Vilhjálmsson 2002

Stofnstærð



Hafrannsóknastofnun 2007

Fæðuvefur



Meltingarhraði

$$R_i = 2.60(L_i/40)^{1.15} 1.09^{T-6} \sqrt{S_i} \text{ g/day}$$

meltingarhraði

lengd þorsks

hitastig

magainnihald

Magnússon & Pálsson 1997

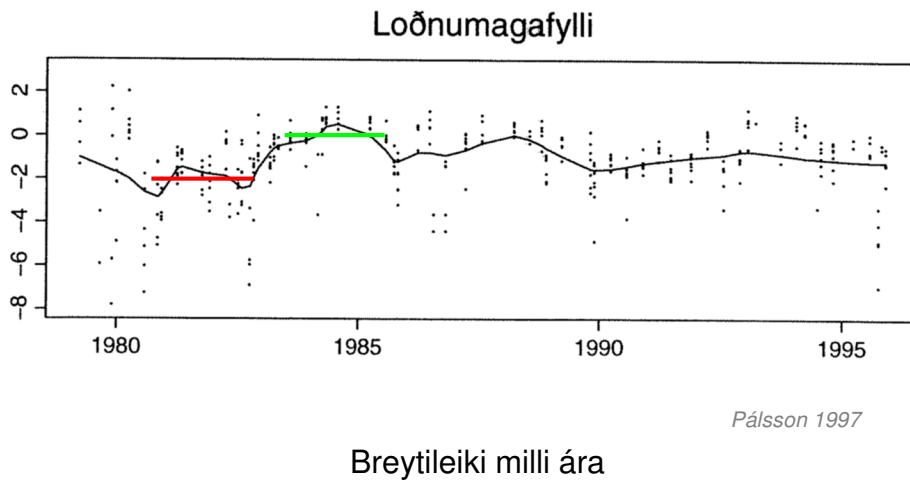
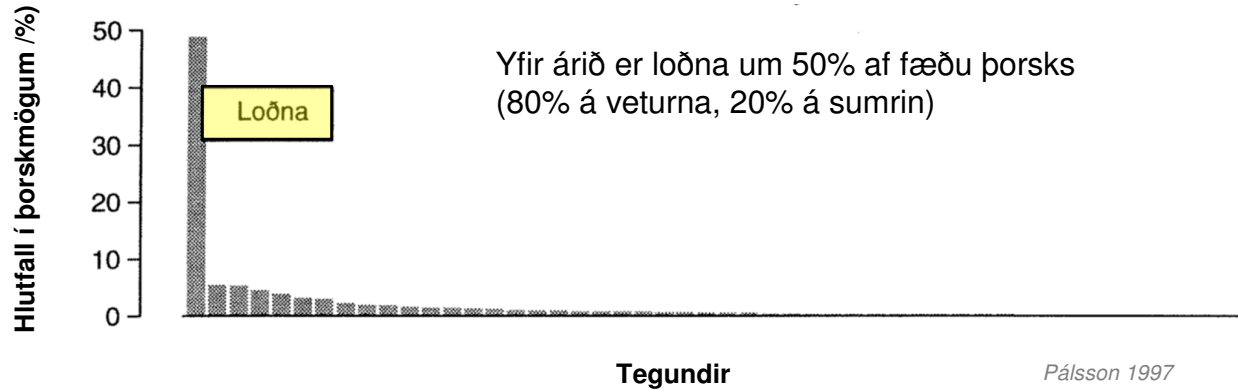
Notað til að reikna út heildarát út frá magasýnum

Heildarát á ári

Predator species	lægri tölur	Annual consumption of capelin (‘000 t)	Annual consumption of capelin (‘000 t)	hærri tölur	Source
Cod, <i>Gadus morhua</i>		620			Björnsson <i>et al.</i> , 1997
Cod			900‡		H. Björnsson, MRI, unpublished
Saithe, <i>Pollachius virens</i>		100	100		Jónsson, 1997
Haddock, <i>Melanogrammus aeglefinus</i>		80	80†		Einarsson, 1997
Greenland halibut, <i>Reinhardtius hippoglossoides</i>		220†	220†		Sólmundsson, 1997
Minke whale, <i>Balaenoptera acutorostrata</i>		610	610		Sigurjónsson and Víkingsson, 1998; Sigurjónsson <i>et al.</i> , 2000
Humpback whale, <i>Megaptera novaeangliae</i>		120	120		Stefánsson <i>et al.</i> , 1997; Sigurjónsson and Víkingsson, 1998
Humpback whale			800‡		Gunlaugsson and Víkingsson, 2001
Fin whale, <i>Balaenoptera physalus</i>		60			Sigurjónsson and Víkingsson, 1998
Fin whale			780		Stefánsson <i>et al.</i> (1997)
Guillemot, <i>Uria aalge</i>		70*	140*		Lilliendal and Sólmundsson, 1997
Brünnlich’s guillemot, <i>Uria lomvia</i>		40*	80*		Lilliendal and Sólmundsson, 1997
Razorbill, <i>Alca torda</i>		15*	30*		Lilliendal and Sólmundsson, 1997
Puffin, <i>Fratercula arctica</i>		25*	50*		Lilliendal and Sólmundsson, 1997
Kittiwake, <i>Rissa dactyla</i>		15*	30*		Lilliendal and Sólmundsson, 1997
Northern fulmar, <i>Fulmarus glacialis</i>		10*	20*		Lilliendal and Sólmundsson, 1997
Total		1985	3840		
Fishery (average annual catch of past 10 years)		1050	1050		ICES, 2001
Total		3035	4890		Magasýni benda til þess að loðnustofn sé stærri en bergmálmælingar sýna

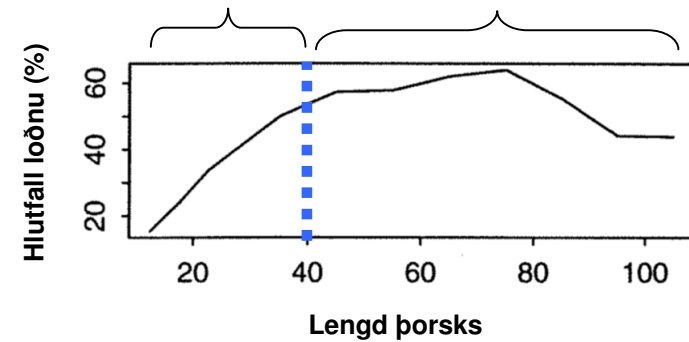
Breytilegt milli ára, eftir því hve
mikið er af þorski og loðnu

Hlutfallslegt framlag í fæðu



Smáþorskur (<40 cm)
étur minna af loðnu,
mest hryggleysingja

Þorskur >40 cm
étur mikið af loðnu

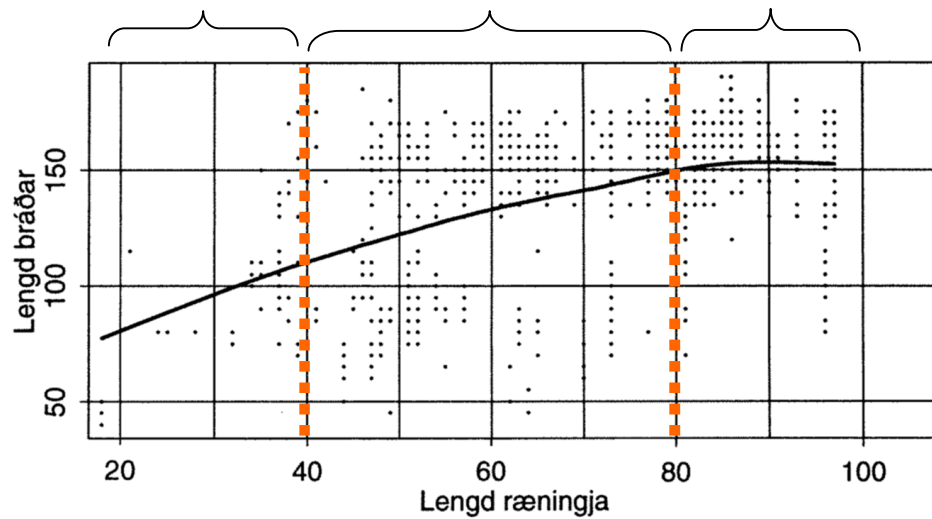


Stærðarval

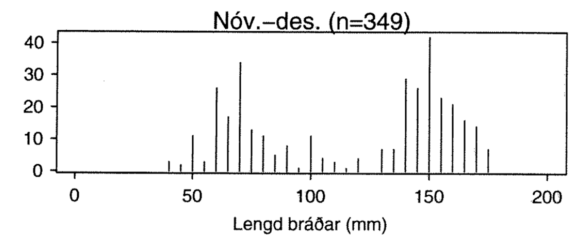
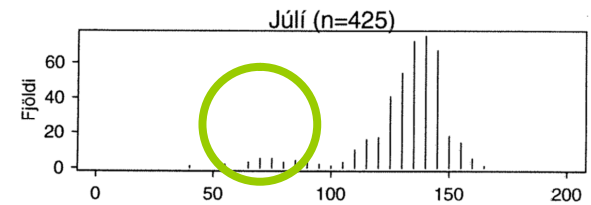
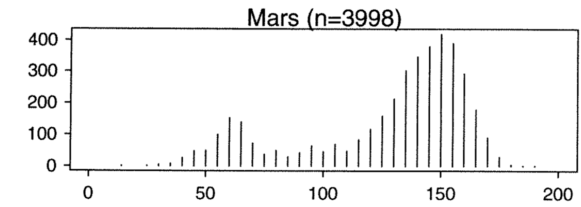
Smáporskur (<40 cm)
étur minna af loðnu,
mest hryggleysingja

Porskur 40-80 cm
étur aðallega
8-14 cm loðnu

Porskur >80 cm
étur aðallega
14-18 cm loðnu



Pálsson et al. 1997



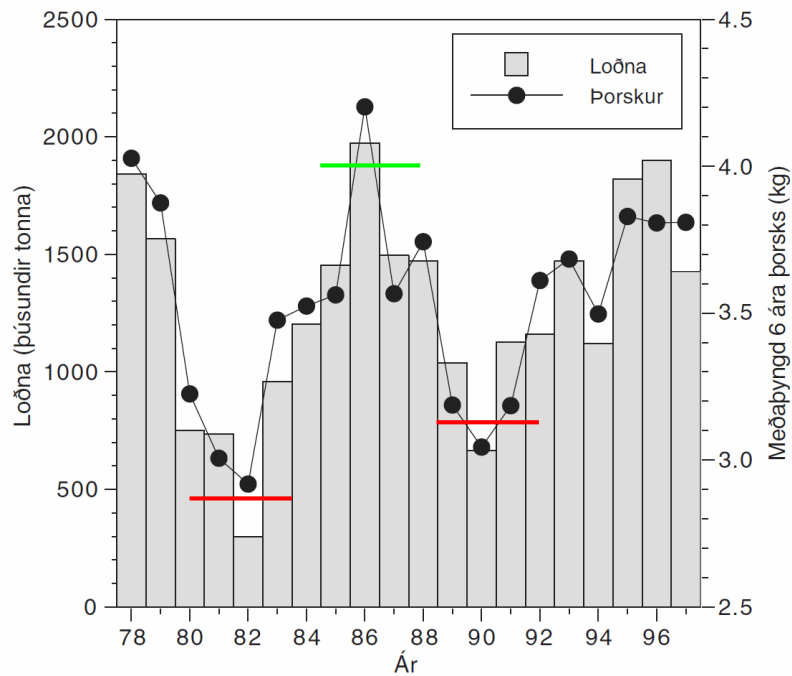
Pálsson 1997

Framboð af stærðarflokkum
er breytilegt eftir mánuðum
... og árum (gögn frá 1992)

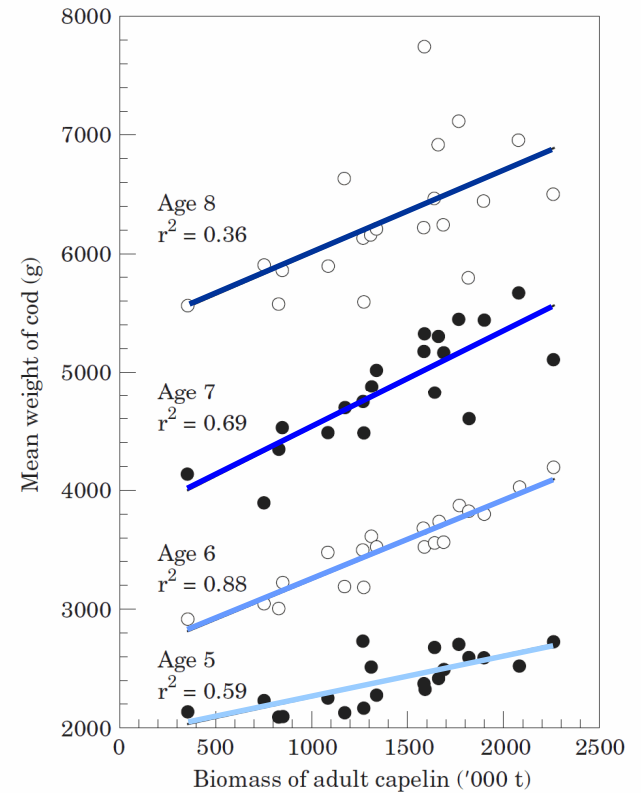
Áhrif á vöxt

Vöxtur þorsks er nátengdur stofnstærð loðnu

30% munur

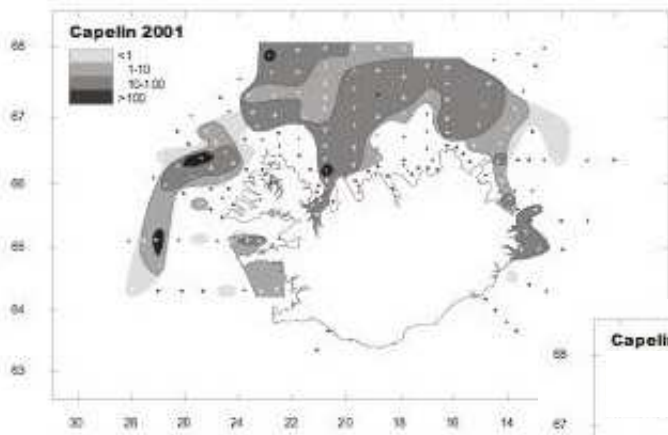


Vilhjálmsson 1998

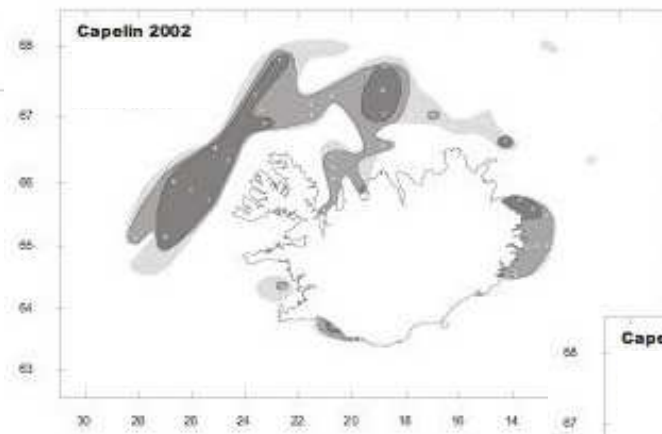


Vilhjálmsson 2002

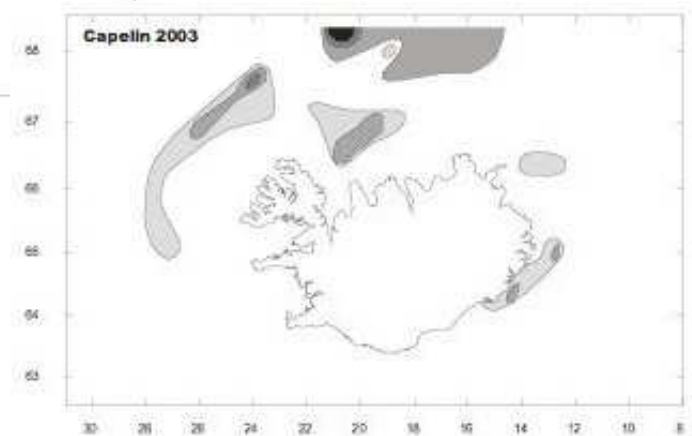
Aðgengi



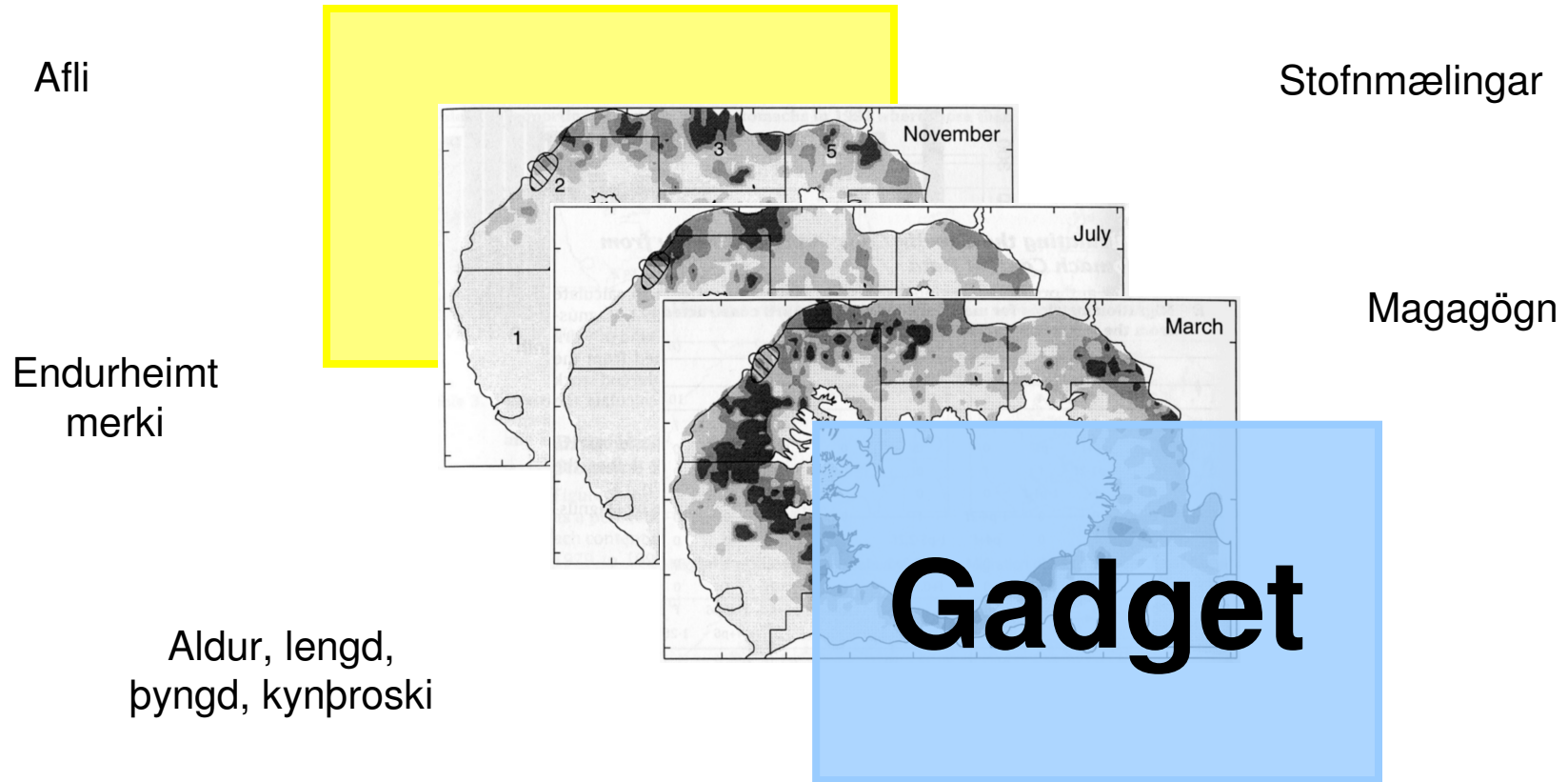
Loðnustofninn virðist hafa færð sig í átt að Grænlandi ...



... og minnkað



Heildrænt líkan



"Hvernig á að haga loðnuveiðum þannig að þær spilli sem minnst fyrir þorskveiðum?"