### Temporal dynamics of cod weight at age and condition

FROM INTRO

The ecosystem and species-level impacts of biomass declines of capelin in other North Atlantic  
regions (Iceland and Barents Sea) provide insight  
into what might have been expected in the NL marine environment. In the Iceland ecosystem, overfishing led to a dramatic decline of capelin biomass  
from 2 Mt in 1978 to 0.3 Mt (85% decrease) in 1982  
and, in response, the weight at age of Icelandic cod  
(ages 5-8 yr) declined by 25-30% (Vilhjálmsson  
2002). Similar responses were observed in the Barents Sea, where overfishing of capelin during the  
1980s resulted in a sudden 6 Mt collapse (Gjøsæteret al. 2009). This was followed by a 1-2 kg  
reduction in the average weight at age of 4-6 yr old  
cod (Mehl & Sunnanå 1991)

ADB notes:

1. From Mehl & Sunnanå 1991: cod’s secondary prey in the Barents Sea (pandalus borealis) stock was reduced by more than half when the reduced in weight aat age was observed
2. From Mehl & Sunnanå 1991: stock biomass of cod was virtually constant during the capelin collapse, if anything it was highest when capelin was lowest – therefore relative abundance of capelin saw a sharp decrease – as opposed to the case of the NL Shelf
3. From Mehl & Sunnanå 1991, figure 4: weights at age 1-7+. Why did Frank choose to mention ages 4-6? drop in weight at age did not reach 2 kg
   1. Age 4: about 500g
   2. Age 5: about 1 kg
   3. Age 6: a bit more than 1 kg (but NOT 2 kg)
4. Magnusson & Palsson (1989): cod in Iceland had
   1. Lower stomach contents - YES in nl (Morgan et al 2017)
   2. Smaller growth rate - YES in nl (Morgan et al 2017)
   3. Reduced feeding level - ? in NL

when capelin stock declined to low levels

1. From Lilly 1987: Predation by cod on capelin is not as seasonal in Div. 3L as it is to the north. Cod on the northern slopes of Grand Bank feed on capelin in winter (Templeman 1965; Turuk 1968; Minet and Perodou 1978; Lilly et ale 1984), and partial fullness indices can be very high (Lilly and Fleming 1981). Cod also feed on capelin in various parts of the Avalon Channel and the northern, western, and central Grand Bank in spring and summer (Popova 1962; Turuk 1968; Kovalyov and Kudrin 1973; Stanek 1975; Minet and Perodou 1~78; Lilly and Fleming 1981). Predation on capelin also occurs in autumn (Turuk 1968), but there has been less study at that season.
2. The term “northern cod” is used in reference to a complex of cod populations