

SEA CUCUMBER – SÆBJÚGA

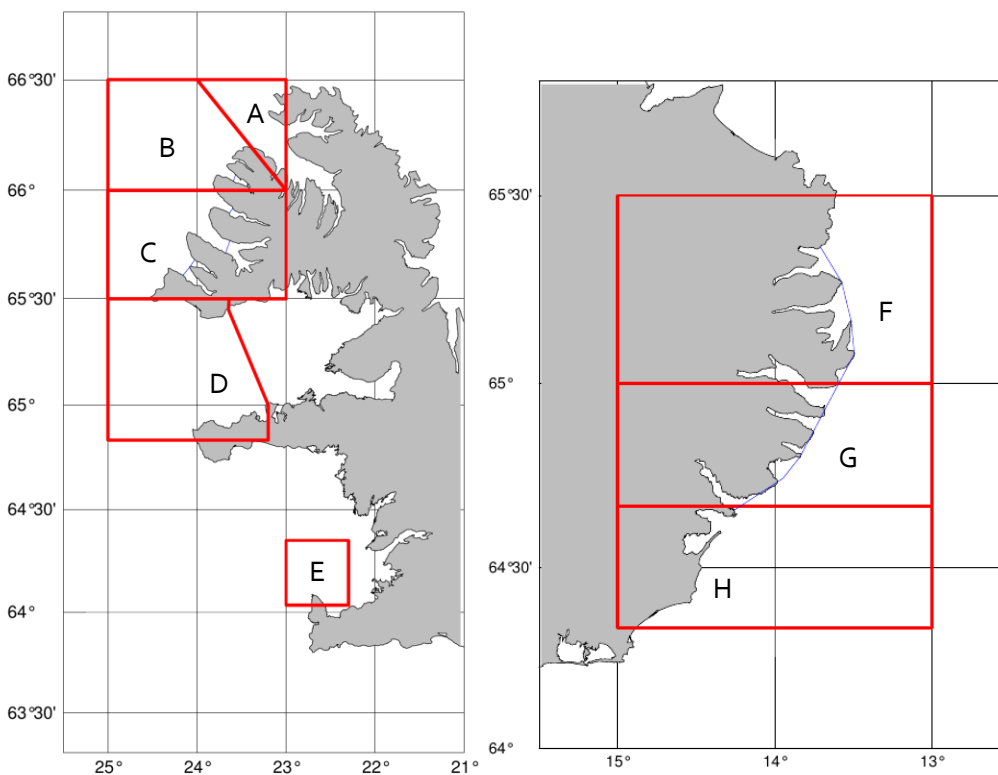
Cucumaria frondosa

INTRODUCTION

In a letter from 20th of February 2019 the Ministry of Industries and Innovation requested an advice on fishing opportunities for sea cucumber for the period between 1st of March and 31st of August 2019 for increased number of sea cucumber management areas. The new areas are granted in draft regulation presented on the governmental consultation website on the 11th of December 2018. This technical report discusses the fishing opportunity of four (B, C, D & H) of the eight demarcated fishing ground of sea cucumbers (A – H). The other four fishing areas (A, D, E, F) fall into the latest advice given by MFRI in June of 2018 (Anon, 2018).

COMMERCIAL FISHING

Fishery has been conducted in 2018 and 2019 on the newly demarcated fishing grounds B, D and H, but no fishing has been conducted on ground C.



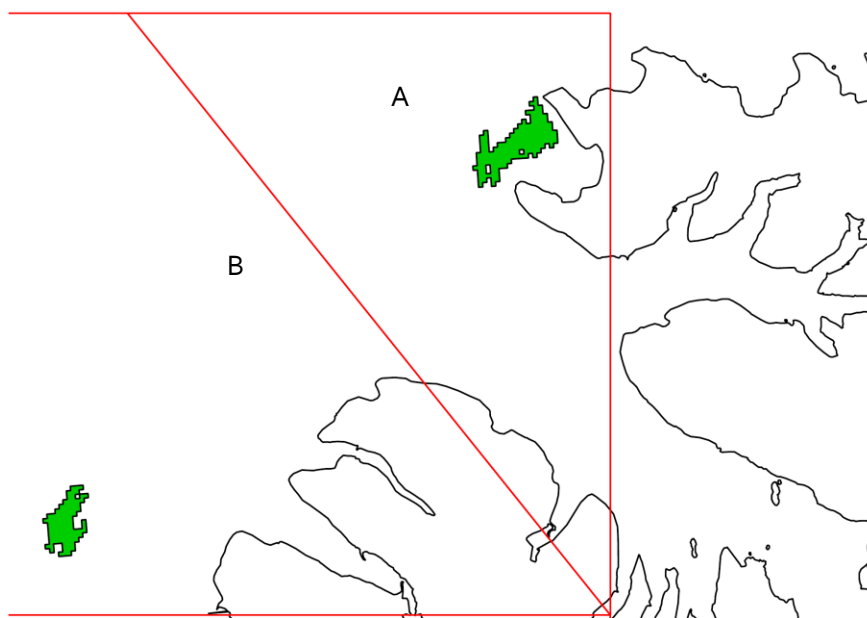
Sea Cucumber. Fishing grounds according to regulation draft.

Sæbjúga. Skipting veiðisvæða skv. reglugerðugerðardrögum.

In area B, 525 t were fished during the summer of 2018 and 200 t during winter of 2018/2019 (until end of January). No fishing has been registered in area C but limited information from the MFRI inshore demersal survey suggest a couple of locations as possible fishing grounds. In area D, outside of closed line in Breiðafjörður, 286 t were fished during summer of 2018 and 97 t during autumn of 2018. In area H in southeastern part of Iceland around 1757 t were fished during the fishing year of 2017/2018. During winter of 2018/2019 around 500 t (until end of January) have been fished in area H.

The size of the new areas was estimated with information from VMS. The records were extracted from the database only for combination of vessels and dates in which there are catches registered in the logbooks during fishing from 2008–2018. Only fishing events with landings over 1 t were included. Records close to a harbour (<2km), and erroneous records (e.g. with unrealistic positions or vessel speed) were removed. Records from each vessel were classified as fishing vs. not fishing based on vessel speed, the minimum fishing speed is 1 knot and the maximum fishing speed 3.5 knots. A grid size of 400 x 400 m was used with a minimum of 4 fishing events within each grid.

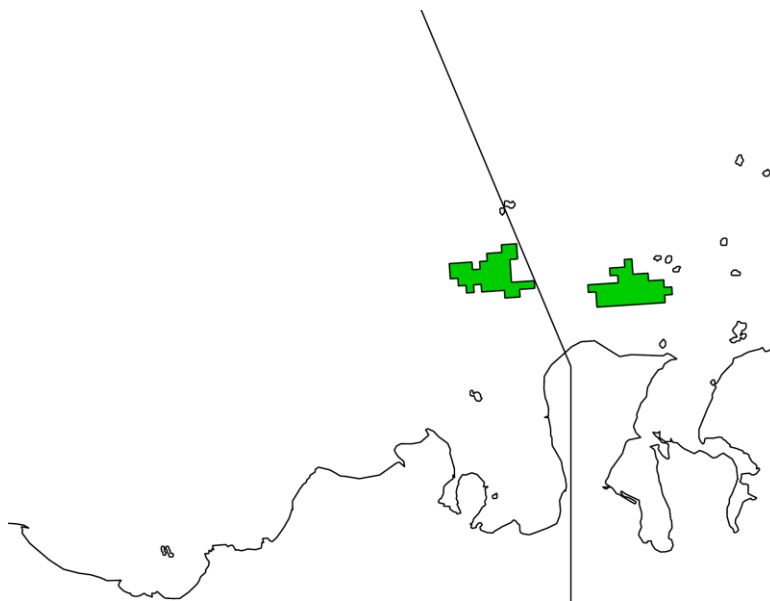
In area B, the fishing activity was restricted to one continuous ground that was estimated to be 14.4 km². In area D, fishing activity was also restricted to one continuous ground that



Sea Cucumber. The fishing ground within areas A and B, based on VMS data.

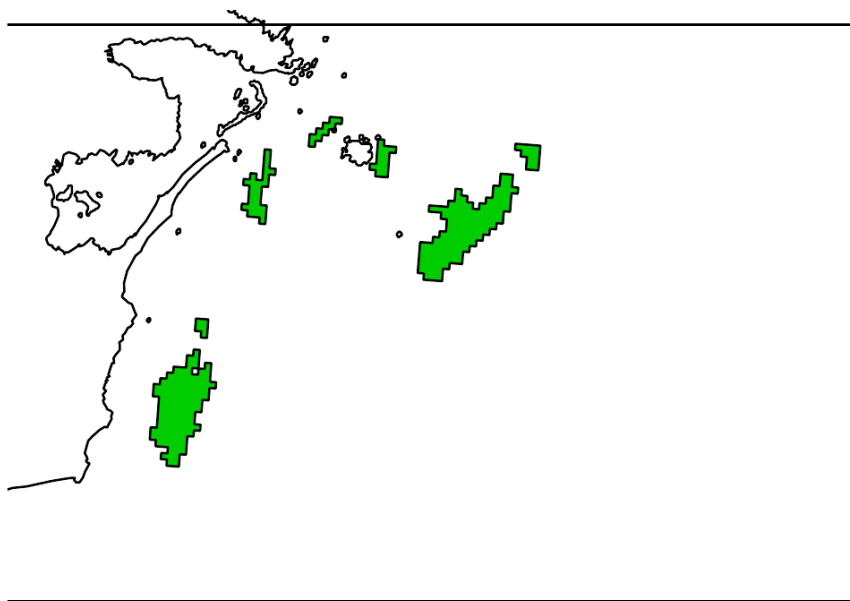
Sæbjúga. *Veðisvæði sæbjúgna á svæði A og B, byggt á VMS gögnum.*

was estimated to be 6.1 km². In area H, fishing activity was restricted to several grounds, with majority of the activity occurring on two grounds, the southern one "Hvítingjar" and SE of Papey. In total the seven areas are 44.6 km².



Sea Cucumber. The fishing area within area D (left of the line) in Breiðafjörður, based on VMS data.

Sæbjúga. *Veiðisvæði sæbjúgna á svæði D (til vinstri við línu) í Breiðafirði, byggt á VMS gögnum.*



Sea Cucumber. The fishing area of sea cucumber in within area H (East Iceland), based on VMS data.

Sæbjúga. *Veiðisvæði sæbjúgna á svæði H við austurland, byggt á VMS gögnum.*

Catch per unit effort (CPUE) was in general high on the newly established fishing ground. As such it was 1575 kg/h during summer of 2018 in area B, but 735 kg/h during the winter on same ground. The CPUE has not been standardized to one or two dredges. In area D the CPUE was 605 kg/h in 2018, but that area was fished mainly by a single rigged boat. In area H, the CPUE was 1411 kg/h during the fishing season of 2017/2018 but during the season of 2018/2019 it was 829 kg/h. There is a lack of registration if one or two dredges have been used, but in general there has been a decrease in CPUE during the autumn/winter month of 2018–2019. That is something that was foreseen, as during worse autumn/winter weather boats might use one instead of two dredges and catchability is lower. Also, the effect of such high effort on limited area is likely to drive down the abundance of sea cucumbers from the initial high CPUE on a virgin ground.

In February of 2019 the main fishing areas were defined by the following coordinates (Regulation draft):

A. Westfjords North-Aðalvíkurarea:

1. 66°00,00N – 23°00,00V
2. 66°30,00N – 24°00,00V
3. 66°30,00N – 23°00,00V
4. 66°00,00N – 23°00,00V

B. Westfjords mid area:

1. 66°00,00N – 23°00,00V
2. 66°00,00N – 25°00,00V
3. 66°30,00N – 25°00,00V
4. 66°30,00N – 24°00,00V
5. 66°00,00N – 23°00,00V

Closure within Önundarfjörður:

1. 66°04,35 N – 23°33,96 V
2. 66°02,53 N – 23°35,47 V

C. Westfjords south area:

1. 65°30,00N – 23°00,00V
2. 65°30,00N – 25°00,00V
3. 66°00,00N – 25°00,00V
4. 66°00,00N – 23°00,00V
5. 65°30,00N – 23°00,00V

Closure within Dýrafjörður:

1. 65°55,00N – 23°35,86 V
2. 65°53,76 N – 23°38,18 V

Closure within Arnarfjörður:

1. 65°46,17N – 23°37,81V
2. 65°42,76N – 23°40,62V

Closure within Tálkna- and

Patreksfjörður:

1. 65°40,72N – 24°01,73V
2. 65°38,85N – 24°04,81V

3. 65°36,46N – 24°09,60V

D. Outer Breiðafjörður:

1. 64°50,00N – 23°12,00V
2. 64°50,00N – 25°00,00V
3. 65°30,00N – 25°00,00V
4. 65°30,00N – 23°38,45V
5. 65°26,85N – 23°38,75V
6. 65°00,00N – 23°12,00V
7. 64°50,00N – 23°12,00V

E. Faxaflói:

1. 64°02,00N – 22°18,00V
2. 64°02,00N – 23°00,00V
3. 64°21,00N – 23°00,00V
4. 64°21,00N – 22°18,00V
5. 64°02,00N – 22°18,00V

F. East Iceland northern area:

1. 65°00,00N – 13°00,00V
2. 65°00,00N – 15°00,00V
3. 65°30,00N – 15°00,00V
4. 65°30,00N – 13°00,00V
5. 65°00,00N – 13°00,00V

Closure within fjords in Eastern part:

1. 65°21,82N – 13°42,57V
2. 65°16,25N – 13°34,47 V
3. 65°10,00N – 13°30,80 V
4. 65°04,70N – 13°29,60 V
5. 64°48,10 N – 13°50,30 V
6. 64°44,61 N – 13°56,74 V

7. 64°39,44 N – 14°15,21 V

G. East Iceland mid area:

1. 64°40,00N – 13°00,00V
2. 64°40,00N – 15°00,00V
3. 65°00,00N – 15°00,00V
4. 65°00,00N – 13°00,00V

5. 64°40,00N – 13°00,00V

H. East Iceland south area:

1. 64°20,00N – 13°00,00V
2. 64°20,00N – 15°00,00V
3. 64°40,00N – 15°00,00V
4. 64°40,00N – 13°00,00V
5. 64°20,00N – 13°00,00V

ADVICE

TAC was first recommended for sea cucumber by the Marine Research Institute (MRI) in 2009 for areas in Faxaflói (area E) and Aðalvík (area A). The initial advice in Aðalvík was 350 t and 950 t in Faxaflói and was based on 10% of estimated abundance in each area (Anon., 2009). In 2009 the estimated fishing stock in Faxaflói had increased to 15 000 t after a survey, leading to total advice of 1 810 t in 2010/2011 and 2011/2012. That advice was given for the three next fishing seasons: 2010/2011, 2011/2012 and 2012/2013 (Anon.; 2010, 2011, 2012). In 2012, the stock status in Faxaflói, Aðalvík and off the east coast was estimated, now based on measurement of the total fishing area based on logbooks locations multiplied with the average abundance derived from CPUE and based on 100% gear efficiency. The stock in Faxaflói was estimated to be 10 300 t; in Aðalvík 1 700 t. In 2012 advice was also given for areas east of Iceland (area F and G) as the fishing had increased considerable there and in similar manner the stock off the east coast was estimated to be 14 000 t. Harvest ratio of 10% of stock size was recommended for the quota years 2013/2014 and 2014/2015, or 170 t in Aðalvík, 1030 t in Faxaflói and 1400 t of the east coast (Anon.; 2013, 2014, 2015).

The TAC was never met in Faxaflói (highest catch was 1130 t in 2010), but from 2012 CPUE declined in Faxaflói and rather rapidly off the east coast since 2009. Due to that fact the advice was lowered in 2016 and recommended that catches in the fishing year 2016/2017 should not exceed 644 t in Faxaflói, 623 t off the east coast and 190 t in Aðalvík (Anon., 2016). The basis for the advice was the mean catch of 2010-2015 for each fishing area. Because of decreasing CPUE and lack of knowledge about biology of this species, 20% reduction in the mean catch was advised.

Further, in 2017 the size of the fishable area was estimated based on VMS data. The main fishing sites off the east coast within the demarcated fishing area were estimated to be 108 km², in Faxaflói 71 km² and Aðalvík 11.2 km². Based on the advice given in 2016, and the new area estimates, the advice in 2016 was 9.1 t/km² in Faxaflói, 5.8 t/km² off the east coast and 16 t/km² in Aðalvík. In 2017, the advice for the three areas were coordinated, based on the 2016 advice for Faxaflói (which has the longest catch history), or 9.1t/km². That yielded maximum catch of 985 t off the east coast, 644 t in Faxaflói and of 102 t in Aðalvík, for the fishing year of 2017/2018 (MFRI, 2017). The same advice was given for the fishing year of 2018/2019 although the

estimated sizes of the areas based on more parsimonious estimate had increased as the negative trend in CPUE continued (MFRI, 2018).

The estimated size of fishing areas in the new areas is based on limited fishing activity and the areas could potentially be larger. For the past year the fishing intensity has been between 50t/km² to 64t/km² on the new areas. Given the lack of knowledge of the resilience of the species to harvest it is proposed here that the TAC for the new areas should be based on the 9.1t/km² estimate. Estimated fishable ground in area B is 14.4 km² yielding 131 t, in area D it is 6.1 km² yielding 56 t and on area H 44.6 km² that yields 406 t. On areas B and H substantial effort has occurred in current fishing year and given that the TAC is only given for the next 6 months, 50 % reduction in proposed TAC is advised. No information is available for area C, but couple of possible grounds could exist there. MFRI advises precautionary catch of 50 t in area C.

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