Supplementary A. Summarised data inputs, methods and limitations for each Ecosystem Service evaluated for the Falkland Islands.

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| --- | --- | --- | --- |
| Ecosystem Service | Data available | Estimation method | Limitations |
| Blue carbon stock  (Regulating service) | Satellite-derived spatial distribution of *Macrocystis pyrifera*; average density of kelps; typical plant biomass and dry weight per species; carbon content of kelps. | Maximum total carbon stored in kelp forest based on average biomass estimation. Equivalent CO2 value based on target-consistent traded / non-traded carbon market value, based on BEIS, 2019. | Full depth distribution for kelps, and full extent of *Lessonia spp.* kelp unknown; no modelled habitat distribution for any kelps; health condition assumed to be homogenous throughout extent; no modelled distribution available. |
| Blue carbon sequestration  (Regulating service) | Satellite-derived spatial distribution of *Macrocystis pyrifera*; average density of kelps; typical plant biomass and dry weight per species; carbon content of kelps. | Proportion of mapped kelp area's total NPP carbon sequestered to deep sea sediment annually, based on global analysis by Krause-Jensen & Duarte 2016. Equivalent CO2 value based on target-consistent traded / non-traded carbon market value, based on BEIS, 2019. | Full depth distribution for kelps, and full extent of *Lessonia spp*. kelp unknown; no modelled habitat distribution for any kelps; health condition assumed to be homogenous throughout extent; no modelled distribution; Falkland Islands-specific sequestration rate unknown. |
| Nutrient cycling  (Regulating service) | Satellite-derived spatial distribution of *Macrocystis pyrifera.* Species-specific nutrient cycling rates unknown. | Replacement value of nutrient cycling service, based on global analysis of seagrass and macroalgae by Costanza *et al* 2014. | Species-specific nutrient cycling rates unknown. Valuation based on global study which was based on limited data sources. |
| Associated fisheries value  (Provisioning service) | Annual harvest value per fishery; license value of fisheries; local knowlegde / research on species life-history. | Total annual value of kelp-associated fisheries' harvest in terms of harvest. | Industry costs (i.e. fuel, salaries, processing etc.) unknown; complete species trophic links / functional associations are still unknown for this habitat. |
| Alginate industry  (Provisioning service) | Satellite-derived spatial distribution of *Macrocystis pyrifera*; average density of kelps; typical plant biomass and dry weight per species; estimated viable extraction level from historic business bid (Shackleton, 1982). | Export value of Lessonia kelp (in Chile) based on dry weight. | Hypothetical industry, so precise costs and revenue are estimated. |
| Tourism (Cultural service) | Annual tourist-based revenue for the Falklands, divided by sector (Smith 2019). | Not applied | Unable to disaggregate data solely to kelp forests. |
| Culture (Cultural service) | Assessment of cultural ecosystem services for the Falkland Islands (Bormpoudakis *et al* 2019) | Not applied | Unable to disaggregate information solely to kelp forests. |
| Coastal protection  (Regulating service) | Population density and distribution in the Falklands. | Not applied | No complete modelled wave data for the Falkland Islands; no data on infrastructure damage replacement costs. |
| Scientific discovery (Provisioning service) | Research organisations studying the environment in the Falkland Islands. | Not applied | No grant / funding information available and hard to disaggregate multi-system / multi-species research. |

Supplementary B. Annual revenue (Pounds sterling) by licence type annually (2015-2017) across the 10 major target fisheries within the Falkland Islands. Data adapted from Falkland Islands Government (2018)

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| --- | --- | --- | --- | --- | --- |
| **License** | **Target species** | **2015** | **2016** | **2017** | **Average (15-17)** |
| **A** | Unrestricted finfish | 1,129,012 | 1,129,012 | 1,129,012 | 1,129,012 |
| **B** | Illex & Martialia squid | 11,208,479 | 3,346,467 | 11,093,286 | 8,549,411 |
| **C** | Falkland Calamari (Loligo) | 2,133,230 | 2,133,230 | 2,133,230 | 2,133,230 |
| **E** | Experimental fishery | 0 | 0 | 0 | 0 |
| **F** | Skates and rays | 247,121 | 247,121 | 247,121 | 247,121 |
| **G** | Illex squid and restricted finfish | 845,900 | 845,900 | 845,900 | 845,900 |
| **L** | Toothfish (Longliners) | 836,770 | 836,770 | 836,770 | 836,770 |
| **S** | Blue Whiting and Hoki | 60,419 | 60,419 | 60,419 | 60,419 |
| **W** | Restricted finfish (rock cod, southern blue whiting and Hoki) | 1,341,160 | 1,341,160 | 1,341,160 | 1,341,160 |
| **X** | All species | 4,242,082 | 4,242,082 | 4,242,082 | 4,242,082 |
|  |  | **22,044,173** | **14,182,161** | **21,928,980** | **19,385,105** |

Supplementary C. Proportion of catches in 2017 of commercial species targeted by finfish licences

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| --- | --- | --- | --- |
| **Species** | **Catch by Licence (%)** | | |
| **A** | **G** | **W** |
| *Illex* squid | 1% | 33% | 0% |
| Blue whiting | 0% | 2% | 20% |
| Hoki | 2% | 21% | 20% |
| Red cod | 2% | 4% | 6% |
| Common hake | 86% | 33% | 13% |
| Southern hake | 0% | 1% | 1% |
| Kingclip | 5% | 3% | 8% |
| Rock cod | 1% | 3% | 2% |
| Grenadier | 2% | 1% | 31% |
| ALL | 100% | 100% | 100% |