

## SCIENTIFIC OUTPUT OF THE BRANCH: FISHERIES MANAGEMENT OF THE DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES (during the course of 2019 the Branch became part of the Department of Environment, Forestry and Fisheries)

2019

This document lists the scientific output of the Fisheries Management Branch for 2019, arranged by output category. Figures in brackets represent the output for the previous two years, 2018 and 2017, respectively, and are included for comparison. In the category 'peer-reviewed publications' there were 41 (30, 35) papers, an increase compared with the previous two years. There was an increase to 12 (9, 3) documents in the category 'theses/dissertations/tertiary projects', none of which were DAFF-authored but all of which were DAFF-supervised or co-supervised. There were 50 (11, 7) documents in the category 'book chapters, published reports and popular articles'. This substantial increase over previous years was attributable primarily to two major categories of published report, *The IUCN Red List of Threatened Species* (27 contributions) and the *South African National Biodiversity Assessment 2018*, published by the South African National Biodiversity Institute (16 contributions). There were 40 (27, 80) 'contributions to symposia and conferences, and public presentations', 12 of which were presentations at the *5th Southern African Marine Linefish Symposium*, 6 at the *5th Southern African Shark and Ray Symposium*, 4 at the *11th WIOMSA Scientific Symposium*, and 3 at the *Southern African Society of Aquatic Scientists Congress*, all of which were symposia with broad relevance to the research area of the Branch. There were 64 (53, 30) 'contributions to workshops, short courses, and management and scientific bodies, and unpublished technical reports'. Of these, 15 were contributions to meetings of regional fisheries management organisations, the *Indian Ocean Tuna Commission* (IOTC) (7), the *International Commission for the Conservation of Atlantic Tunas* (ICCAT) (5) and the *Commission for the Conservation of Southern Bluefin Tuna* (CCSBT) (3). In addition, there were 12 contributions to meetings of the *Convention for the Conservation of Antarctic Marine Living Resources* (CCAMLR), 8 contributions to the *DAFF/MARAM International Fisheries Stock Assessment Review Workshop* and 7 contributions to the *AFriMaqua Workshop*. Finally, there were 59 (68, 51) unpublished working group documents. This last category represents the output of the research component of the Branch in terms of its line function to provide scientific advice for resource management.

### Peer-Reviewed Publications (names of DAFF staff shown in bold)

- Attwood CG, Dawson ME, **Kerwath SE**, **Wilke C**. 2019. Life history, distribution and seasonal movements of a threatened South African endemic seabream *Chrysolephus gibbiceps*. *African Journal of Marine Science* 41: 395–411.
- Bergstad AO, Gil M, Høines ÅS, Sarralde R, Maletzky E, Mostarda E, **Singh L**, António MA, Ramil F, Clerkin P, Campanis G. 2019. Megabenthos and benthopelagic fishes on Southeast Atlantic seamounts. *African Journal of Marine Science* 41: 29–50.
- Bergstad AO, Høines ÅS, Sarralde R, Campanis G, Gil M, Ramil F, Maletzky E, Mostarda E, **Singh L**, António MA. 2019. Bathymetry, substrate and fishing areas of South-east Atlantic high-seas seamounts. *African Journal of Marine Science* 41: 11–28.
- Blanckenberg M, Mlambo MC, **Parker D**, Reed C. 2019. The negative impacts of fire on the resurrection ecology of invertebrates from temporary wetlands in Cape Sand Fynbos. *Austral Ecology* 44: 1225–1235.
- Brink M, Rhode C, **Macey BM**, **Christison KW**, Roodt-Wilding R. 2019. Metagenomic assessment of body surface bacterial communities of the sea urchin, *Tripneustes gratilla*. *Marine Genomics* 47: 100675.
- Campbell KJ, Steinfurth A, Underhill LG, **Coetzee JC**, Dyer BM, Ludynia K, Makhado AB, **Merkle D**, **Rademan J**, Upfold L, Sherley RB. 2019. Local forage fish abundance influences foraging effort and offspring condition in an endangered marine predator. *Journal of Applied Ecology*. 56: 1751–1760.
- Chang YJ, **Winker H**, Sculley M, Hsu J. 2019. Evaluation of the status and risk of overexploitation of the Pacific billfish stocks considering non-stationary population processes. *Deep Sea Research Part II: Topical Studies in Oceanography* 175: article 104707.
- Christison KW**. 2019. Building a sustainable aquaculture industry – the role of biosecurity. *OIE Scientific and Technical Review* 38: 589–600.
- Currie JC, Thorson JT, Sink KJ, Atkinson LJ, **Fairweather TP**, **Winker H**. 2019. A novel approach to assess distribution trends from fisheries survey data. *Fisheries Research* 214: 98–109.
- Dyer BM, Cooper J, Crawford RJM, Sherley RB, **Somhlaba S**, **Cockcroft AC**, Upfold L, Makhado AB. 2019. Geo-

- graphical and temporal variation in the diet of Bank Cormorants *Phalacrocorax neglectus* in South Africa. *Ostrich, Journal of African Ornithology* 90: 373–390.
- Dziergwa J, Singh S, Bridges C, **Kerwath S**, Enax J, **Auerswald L**. 2019. Acid-base adjustments and first evidence of denticle corrosion caused by ocean acidification conditions in a demersal shark species. *Scientific Reports* 9: article 18668.
- Friedman K, Braccini M, Bjerregaard-Walsh M, Bonfil R, Bradshaw CJA, Brouwer S, Campbell I, Coelho R, Cortés E, Dimlich W, Frisk MG, Kingma I, McCully Phillips SR, O’Criodain C, **Parker D**, Shephard S, Tovar-Ávila J, Yokawa K. 2019. Informing CITES Parties: strengthening science-based decision-making when listing marine species. *Fish and Fisheries*. DOI: 10.1111/faf.12411
- Froese R, **Winker H**, Coro G, Demirel N, Tsikliras AC, Dimarchopoulou D, Scarcella G, Palomares MLD, Dureuil M, Pauly D. 2019. Estimating stock status from relative abundance and resilience. *ICES Journal of Marine Science* 77: 527–538.
- Froese R, **Winker H**, Coro G, Demirel N, Tsikliras AC, Dimarchopoulou D, Scarcella G, Probst WN, Dureuil M, Pauly D. 2019. On the pile-up effect and priors for Linf and M/K: response to a comment by Hordyk et al. on ‘A new approach for estimating stock status from length frequency data’. *ICES Journal of Marine Science* 76: 461–465.
- Garçon V, Karstensen J, Palacz A, Telszewski M, Aparco Lara T, Breitburg D, Chavez F, Coelho P, Cornejo-D’Ottone M, Santos C, Fiedler B, Gallo ND, Grégoire M, Gutierrez D, Hernandez-Ayon M, Isensee K, Koslow T, Levin L, Marsac F, Maske H, Mbaye BC, Montes I, Naqvi W, Pearlman J, Pinto E, **Pitcher G**, Pizarro O, Rose K, Shenoy D, van der Plas A, Vito MR, Weng K. 2019. Multidisciplinary observing in the world ocean’s oxygen minimum zone regions: from climate to fish — the VOICE initiative. *Frontiers in Marine Science* 6: article 722.
- Greeff-Laubscher MR, **Christison KW**, Smit NJ. 2019. First record of the water mould, *Achlya bisexualis* (Saprolegniaceae) isolated from ornamental fish in South Africa. *Journal of Aquatic Animal Health* 31: 354–363.
- Greenewald G, Moloney CL, **van der Lingen CD**. 2019. Spatial variation in meristic and morphometric characteristics of sardine *Sardinops sagax* around the coast of southern Africa. *African Journal of Marine Science* 41: 51–59.
- Horton M, **Parker D**, **Winker H**, **Lamberth SJ**, Hutchings K, **Kerwath SE**. 2019. Age, growth and per-recruit stock-assessment of *Chelon richardsonii* in Saldanha Bay and Langebaan, South Africa. *African Journal of Marine Science* 41: 313–324.
- Horton M, **van der Lingen CD**. 2019. Comparative trophic ecology of Cape anchovy *Engraulis encrasicolus* and Natal anchovy *Stolephorus holodon* off South Africa’s East Coast. *African Journal of Marine Science* 41: 269–279.
- Hull KL, Asbury TA, **da Silva C**, Dicken M, Veríssimo A, Farrell ED, Mariani S, Mazzoldi C, Marino, IA, Zane L, Maduna SN. 2019. Strong genetic isolation despite wide distribution in a commercially exploited coastal shark. *Hydrobiologia* 838: 121–137.
- Kerwath S**, **Parker D**, **Winker H**, Potts W, Mann B, **Wilke C**, Attwood C. 2019. Tracking the decline of red steenbras *Petrus rupestris* against policy adjustments. *Marine Ecology Progress Series* 610: 163–173.
- Knapp JL, Hoffman LC, **Auerswald L**, **Macey BM**. 2019. Effects of chronic hypercapnia and elevated temperature on the immune response of the spiny lobster, *Jasus lalandii*. *Fish & Shellfish Immunology* 93: 752–762.
- Lewis BR**, **Madibana MJ**, Toefy R. 2019. Effect of graded levels of Aquapro® herbal stimulant on growth and intestinal morphology in dusky kob, *Argyrosomus japonicus* (Temminck & Schlegel, 1843). *Asian Fisheries Science* 32: 162–171.
- Madibana, MJ**, Mlambo V. 2019. Growth performance and haemo-biochemical parameters in South African dusky kob (*Argyrosomus japonicus*, Sciaenidae) offered Brewer’s Yeast (*Saccharomyces cerevisiae*) as a feed additive. *Journal of the World Aquaculture Society* 50: 815–826.
- Mbatha FL, **Yemane D**, Ostrowski M, Moloney CL Lipiński MR. 2019. Oxygen and temperature influence the distribution of deepwater Cape hake *Merluccius paradoxus* in the southern Benguela: a GAM analysis of a 10-year time-series. *African Journal of Marine Science* 41: 413–427.
- Malherbe W, **Christison KW**, Wepener V, Smit NJ. 2019. Epizootic ulcerative syndrome – first report in the Kruger National Park, South Africa. *International Journal of Parasitology: Parasites and Wildlife* 10: 207–210.
- Mbokane EM**, Theron J, Luus-Powell WJ. 2019. Seasonal occurrence and ecological aspects of *Afrodiplozoon polycotyleus* (Monogenea: Diplozoidae) from the gills of three cyprinids from the Nwanedi-Luphephe dams, South Africa. *African Journal of Aquatic Science* 44: 53–60.
- Mbokane EM**, Moyo NAG. 2019. Effect of dietary *Artemisia afra* on growth, some innate immunological parameters in *Clarias gariepinus* challenged with *Aeromonas hydrophila*. *Aquaculture International* 28: 539–553.
- Mbokane EM**, Moyo NAG. 2019. Effects of dietary levels of essential oil extracts from *Moringa oleifera* and *Artemisia afra* on kidney histology, haemato-immunological parameters and disease resistance in *Clarias gariepinus*. *Aquaculture Research* 51: 410–425.
- Morris T, van der Ploeg J, Bih Awa S, **van der Lingen CD**, Reed CC. 2019. Parasite community structure as a predictor of host population structure: an example using *Callorhynchus capensis* (Dumeril, 1865) caught off the west and south coasts of South Africa. *International Journal of Parasitology: Parasites and Wildlife* 8: 248–255.
- Parker D**, **Winker H**, Bernard ATF, Smith MKS, Götz A. 2019. Spatial considerations when monitoring reef fishes. *African Journal of Marine* 41: 93–101.
- Pfaff MC, Logston RC, Raemaekers SJP, Hermes JC, Blamey LK, Cawthra HC, Colenbrander DR, Crawford RJM, Day E, du Plessis N, Elwen SH, Fawcett SE, Jury MR, Karenyi N, **Kerwath SE**, Kock AA, Krug M, **Lamberth SJ**, Omardien A, **Pitcher GC**, Rautenbach C, Robinson TB, Rouault M, Ryan PG, Shillington FA, Sowman M, Sparks CC, Turpie JK, van Niekerk L, Waldron HN, Yeld EM, Kirkman SP. 2019. A synthesis of three decades of socio-ecological change in False Bay, South Africa: setting the scene for multidisciplinary research and management. *Elementa: Science of the Anthropocene* 7: article 32.
- Pitcher GC**, **Foord CJ**, **Macey BM**, **Mansfield L**, Mouton A, Smith ME, Osmond SJ, van der Molen L. 2019. Devastating farmed abalone mortalities attributed to yessotoxin-producing dinoflagellates. *Harmful Algae* 81: 30–41.
- Ryan PG, Weidemana EA, Perolda V, **Durholtz D**, **Fairweather TP**. 2019. A trawl survey of seafloor macrolitter on the South African continental shelf. *Marine Pollution Bulletin* 150: article 110741.
- Shabangu FW**, Findlay KP, **Yemane D**, Stafford KM, van den Berg M, Blows B, Andrew RK. 2019. Seasonal occur-

- rence and diel calling behaviour of Antarctic blue whales and fin whales in relation to environmental conditions off the west coast of South Africa. *Journal of Marine Systems* 190: 25–39.
- Sherley RB, Crawford RJM, Dyer BM, Kemper J, Makhado AB, Masotla M, Pichegru L, Pistorius PA, Roux J-P, Ryan PG, Tom D, Upfold L, **Winker H**. 2019. The status and conservation of the Cape Gannet *Morus capensis*. *Ostrich* 90: 335–346.
- Sherley RB, **Winker H**, Rigby CL, Kyne PM, Pollom R, Pacoureaux N, Herman K, Carlson JK, Yin JS, Kindsvater HK, Dulvy NK. 2019. Estimating IUCN Red List population reduction: JARA—a decision-support tool applied to pelagic sharks. *Conservation Letters* 13: e12688.
- Thorson JT, Rudd MB, **Winker H**. 2019. The case for estimating recruitment variation in data-moderate and data-poor age-structured models. *Fisheries Research* 217: 87–97.
- Van Niekerk L, Taljaard S, Adams JB, **Lamberth SJ**, Huizinga P, Turpie JK, Wooldridge TH. 2019. An environmental flow determination method for integrating multiple-scale ecohydrological and complex ecosystem processes in estuaries. *Science of the Total Environment* 656: 482–494.
- Vorsatz LD, **van der Lingen CD**, Gibbons MJ. 2019. Observations on the biology and seasonal variation in feeding of the east coast round herring (*Etrumeus wongratanai*) (Clupeiformes), off Scottburgh, KwaZulu-Natal, South Africa. *Journal of Fish Biology* 94: 498–511.
- Wu Q, Bouwman H, Uren RC, **van der Lingen CD**, Vetter W. 2019. Halogenated natural products and anthropogenic persistent organic pollutants in chokka squid (*Loligo reynaudii*) from three sites along the South Atlantic and Indian Ocean coasts of South Africa. *Environmental Pollution* 255: 113282.

## Theses/Dissertations/Tertiary Projects

- Arro J. 2019. The physiological effects and prevalence of two cymothoid ectoparasitic isopods on *Pachymetopon blochii* in False Bay and Hout Bay. BSc (Hons) thesis, University of Cape Town, South Africa. Supervisors: Reed C, **Parker D**, **van der Lingen C**.
- Hendricks JP. 2019. The parasite assemblage of *Scomber japonicus* (Houttuyn, 1782) off South Africa. MSc thesis, University of Cape Town, South Africa. Supervisors: Reed CC, **van der Lingen CD**.
- Kuyler D. 2019. Benthic communities in the mesophotic zone of the Gxulu area, Amathole Region, Eastern Cape. MTech thesis, Cape Peninsula University of Technology, South Africa. Supervisors: Toefy R, Samaai T, **Parker D**.
- Louw C. 2019. The reproductive cycle of the clam, *Venerupis corrugatus* from the Langebaan Lagoon, South Africa. BTech, Cape Peninsula University of Technology, South Africa. Supervisors: **Arendse DCZ**, Toefy R.
- Mackintosh A. 2019. Parasite communities associated with the Cape gurnard (*Chelidonichthys capensis*) and the lesser gurnard (*C. queketti*) from South Africa. MSc thesis, University of Cape Town, South Africa. Supervisors: Reed CC, **van der Lingen CD**.
- Mogorosi LK. 2019. A general disease and parasite survey of commercially important fishes of the Free State. MSc thesis, University of the Free State, South Africa. Supervisors: van As LL, **Christison KW**.
- Ndlovu IS. 2019. The determination of pre-clinical biomarkers for *Ichthyophonus hoferi* positive white stumpnose (*Rhabdosargus globiceps*). MSc thesis, University of KwaZulu-Natal, South Africa. Supervisors: Vosloo A, **Christison KW**.
- Nkomo T. 2019. Observations on the feeding ecology and diet of the mesopelagic fish *Phosichthys argenteus* (Stomiiformes: Phosichthyidae) in the South East Atlantic Ocean using morphology and stomach content analyses. BSc (Hons) thesis, University of the Western Cape, South Africa. Supervisors: Gibbons MJ, **van der Lingen CD**.
- Nunkoo MAI. 2019. Studies on the diversity and distribution of marine ichthyoparasites in southern Africa. PhD thesis, University of Cape Town, South Africa. Supervisors: Reed CC, **Kerwath SE**, **van der Lingen CD**.
- Okkers N. 2019. The effect of *Ulva rigida* natural products on the growth of invertebrate pathogens. BSc Hons thesis, University of the Western Cape, South Africa. Supervisors: Maneveldt GW, Beukes DR, **Macey BM**.
- Onomu AJ. 2019. The effect of fresh seaweed and formulated diets on the growth and gonad quality of the collector sea urchin, *Triploneustes gratilla*, under farm conditions. MSc thesis, University of Fort Hare, South Africa. Supervisors: Vine N, **Cyrus MD**, **Macey BM**.
- Shongwe T. 2019. Effects of the parasitic copepod, *Cardiodectes meduseus* on Hector's lanternfish, *Lampanyctodes hectoris*. BSc (Hons) thesis, University of Cape Town, South Africa. Supervisors: Reed CC, **van der Lingen CD**.

## Book Chapters, Published Reports and Popular Articles

- Bolton JJ, **Cyrus MD**, **Macey BM**. 2019. Integrating seaweeds into animal aquaculture in South Africa: a globally significant success. *Maritime Review Africa*. May/June 2019: 44–45.
- Cliff G, Bennett R, **da Silva C**, Ebert DA, Fennessy S, Fernando S, Gledhill K, Jabado RW, Kuguru B, Leslie R, McCord ME, Samoilys M, **Winker H**. 2019. *Squatina africana*. The IUCN Red List of Threatened Species 2019: e.T44996A113073072.
- Coetzee JC**. 2019. The scale is tipped against a short-term sardine recovery. *Maritime Review Africa* May/June: 31.
- Harris LR, Majiedt P, Sink KJ, Skowno AL, Van Niekerk L, Holness S, Adams JB, Currie JC, Dunga LV, **Lamberth SJ**, MacKay CF, Miza S, Perschke M, Taljaard S. 2019. Pressures and ecological condition. In: Harris LR, Sink KJ, Skowno AL, van Niekerk L (eds), South African National Biodiversity Assessment 2018: Technical report, volume 5: coast. Pretoria, South Africa: South African National Biodiversity Institute. Available at <http://hdl.handle.net/20.500.12143/6374>.
- Harris LR, Sink KJ, Dayaram A, Skowno AL, van Niekerk L, Adams JB, **Lamberth SJ**, Pfaff M, Kirkman S. 2019. About the coast: physical characteristics and biological diversity. In: Harris LR, Sink KJ, Skowno AL, van Niekerk L (eds), South African National Biodiversity Assessment 2018: Technical report, volume 5: coast. Pretoria, South Africa: South African National Biodiversity Institute. Available at <http://hdl.handle.net/20.500.12143/6374>.
- Kelly C, Foden W, Midgley G, Porter S, **Lamberth S**, **van der Lingen C**, Atkinson LJ, Robinson J. 2019. Climate change. In: Sink KJ, van der Bank MG, Majiedt PA, Harris L, Atkinson L, Kirkman S, Karenyi N (eds), South African National Biodiversity Assessment 2018: Technical report, volume 4: marine realm. Pretoria, South Africa: South African National Biodiversity Institute. Available at <http://hdl.handle.net/20.500.12143/6372>.

- Kyne PM, Barreto R, Carlson J, Fernando D, Francis MP, Fordham S, Jabado RW, Liu KM, Marshall A, Pacoureaux N, Romanov E, Sherley RB, **Winker H**. 2019. *Pteroplatytrygon violacea*. The IUCN Red List of Threatened Species 2019: e.T161731A896169.
- Mourato BL, **Winker H**, Carvalho F, Ortiz M. 2019. Stock assessment of blue marlin (*Makaira nigricans*) using a Bayesian State-Space Surplus Production Model JABBA. *Collective Volume of Scientific Papers. International Commission for the Conservation of Atlantic Tunas (ICCAT)* 75: 1003–1025.
- Pfaff M, Makwela M, Mackay F, van Niekerk L, van Zyl W, Bessinger M, Holness S, Kirkman SP, **Lamberth SJ**, Lück-Vogel M. 2019. Marine ecosystem classification and mapping. In: Sink KJ, van der Bank MG, Majiedt PA, Harris L, Atkinson L, Kirkman S, Karenyi N (eds), South African National Biodiversity Assessment 2018: Technical report, volume 4: marine realm. Pretoria, South Africa: South African National Biodiversity Institute. Available at <http://hdl.handle.net/20.500.12143/6372>.
- Pitcher GC**, Jacinto G. 2019. Ocean deoxygenation links to harmful algal blooms. In: Laffoley D, Baxter JM (eds), *Ocean deoxygenation: everyone's problem – causes, impacts, consequences and solutions*. Gland, Switzerland: IUCN.
- Pollom R, Bennett R, **da Silva C**, Ebert DA, Gledhill K, **Leslie R**, McCord ME, Weigmann S, **Winker H**. 2019. *Bythaelurus bachi*. The IUCN Red List of Threatened Species 2019: e.T124396026A124552532.
- Pollom R, Bennett R, **da Silva C**, Ebert A, Jabado RW, Fernando S, Gledhill K, **Leslie R**. 2019. *Pristiophorus nancyae*. The IUCN Red List of Threatened Species 2019: e.T103054942A140357898.
- Pollom R, Bennett R, **da Silva C**, Ebert DA, **Leslie R**, McCord ME, **Winker H**. 2019. *Acroteriobatus blochii*. The IUCN Red List of Threatened Species 2019: e.T60164A124446536.
- Pollom R, **da Silva C**, Ebert DA, Fennessy S. 2019. *Scylliogaleus queckettii*. The IUCN Red List of Threatened Species 2019: e.T39360A124406361.
- Pollom R, **da Silva C**, Ebert DA, **Leslie R**, McCord ME, **Winker H**. 2019. *Narke capensis*. The IUCN Red List of Threatened Species 2019: e.T161614A124515050.
- Pollom R, **da Silva C**, Fennessy S, Fernando S, Gledhill K, McCord ME, van der Bank M, **Winker H**. 2019. *Gymnura natalensis*. The IUCN Red List of Threatened Species 2019: e.T60116A124440092.
- Pollom R, **da Silva C**, **Leslie R**, McCord ME, **Winker H**. 2019. *Rajella caudaspinosa*. The IUCN Red List of Threatened Species 2019: e.T44618A124435873.
- Pollom R, **da Silva C**, **Leslie R**, **Winker H**. 2019. *Bathyraja smithii*. The IUCN Red List of Threatened Species 2019: e.T161561A124506957.
- Pollom R, Ebert DA, **Leslie R**, **Winker H**. 2019. *Cruriraja hulleyi*. The IUCN Red List of Threatened Species 2019: e.T42568145A42568534.
- Pollom R, Ebert DA, **Leslie R**, **Winker H**. 2019. *Etmopterus sculptus*. The IUCN Red List of Threatened Species 2019: e.T124357891A124552527.
- Pollom R, Fernando S, **Leslie R**, McCord ME, Sink K, **Winker H**. 2019. *Neoraja stehmanni*. The IUCN Red List of Threatened Species 2019: e.T44615A124435680.
- Pollom R, Gledhill K, **da Silva C**, Ebert DA, **Leslie R**, McCord ME, Sink K, **Winker H**. 2019. *Haploblepharus kistnasamyi*. The IUCN Red List of Threatened Species 2019: e.T161667A124524866.
- Pollom R, Gledhill K, Ebert DA, McCord ME, van der Bank M, **Winker H**. 2019. *Haploblepharus pictus*. The IUCN Red List of Threatened Species 2019: e.T161650A124521775.
- Raimondo DC, Adams JB, **Lamberth SJ**, MacKay CF, Turpie JK, Sink K, van Niekerk L. 2019. Indigenous species assessments. In: van Niekerk L, Adams JB, **Lamberth SJ**, MacKay F, Taljaard S, Turpie JK, Weerts S, Raimondo DC (eds), South African National Biodiversity Assessment 2018: Technical report, volume 3: estuarine realm. Council for Scientific and Industrial Research (CSIR) Report No. CSIR/SPLA/EM/EXP/2019/0062/A. South African National Biodiversity Institute (SANBI) Report No. SANBI/NAT/NBA2018/2019/Vol3/A. Pretoria, South Africa: SANBI. Available at <http://hdl.handle.net/20.500.12143/6373>.
- Rigby CL Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Jabado RW, Liu KM, Marshall A, Pacoureaux N, Romanov E, Sherley RB, **Winker H**. 2019. *Isurus oxyrinchus* (Shortfin mako). The IUCN Red List of Threatened Species 2019: e.T39341A2903170.
- Rigby CL Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Jabado RW, Liu KM, Marshall A, Pacoureaux N, Romanov E, Sherley RB, **Winker H**. 2019. *Isurus paucus* (Longfin mako). The IUCN Red List of Threatened Species 2019: e.T60225A3095898.
- Rigby CL, Dulvy NK, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Marshall A, Pacoureaux N, Romanov E, Sherley RB, **Winker H**. 2019. *Alopias pelagicus*. The IUCN Red List of Threatened Species 2019: e.T161597A68607857.
- Rigby CL, Dulvy NK, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Marshall A, Pacoureaux N, Romanov E, Sherley RB, **Winker H**. 2019. *Alopias superciliosus*. The IUCN Red List of Threatened Species 2019: e.T161696A894216.
- Rigby CL, Dulvy NK, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Marshall A, Pacoureaux N, Romanov E, Sherley RB, **Winker H**. 2019. *Alopias vulpinus*. The IUCN Red List of Threatened Species 2019: e.T39339A2900765.
- Rigby CL, Dulvy NK, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Marshall A, Pacoureaux N, Romanov E, Sherley RB, **Winker H**. 2019. *Carcharhinus longimanus*. The IUCN Red List of Threatened Species 2019: e.T39374A2911619.
- Rigby CL, Dulvy NK, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Marshall A, Pacoureaux N, Romanov E, Sherley RB, **Winker H**. 2019. *Carcharhinus obscurus*. The IUCN Red List of Threatened Species 2019: e.T3852A2872747.
- Rigby CL, Dulvy NK, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Marshall A, Pacoureaux N, Romanov E, Sherley RB, **Winker H**. 2019. *Lamna nasus*. The IUCN Red List of Threatened Species 2019: e.T11200A500969.
- Rigby CL, Dulvy NK, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Marshall A, Pacoureaux N, Romanov E, Sherley RB, **Winker H**. 2019. *Prionace glauca*. The IUCN Red List of Threatened Species 2019: e.T39381A2915850.
- Rigby CL, Dulvy NK, Barreto R, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Marshall A, Pacoureaux N, Romanov E, Sherley RB, **Winker H**. 2019. *Sphyrna lewini*. The IUCN Red List of Threatened Species 2019: e.T39385A2918526.

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