**ANNEX A**

# Argentine blue grenadier (hoki) FIP

**Midwater and bottom trawling**

Hoki is a pelagic-demersal species widely distributed in both the Southwestern Atlantic Ocean, where it inhabits the cold temperate waters of the Malvinas Current, and the Southeastern Pacific Ocean. Its general distribution comprises two geographical areas, namely the Chilean platforms and slopes in the Southeastern Pacific from Cape Horn to 33° S (Arana, 1970) and the Argentinean platforms and slopes in the Southwestern Atlantic between 36° S and 56° S (Angelescu et al., 1958), including the Strait of Magellan and Tierra del Fuego channels (Fenucci et al., 1974; Lloris and Rucabado, 1991). It is the most abundant fish resource over the Argentinean continental shelf and slope south of 45° S.

Hoki is considered a pelagic demersal species (Angelescu and Prenski, 1987; Wöhler, 1987) as it moves between different layers of water during day and night following a feeding behavior ("nictimeral migration"). Its depth distribution is very broad ranging from 20 to 600 m (Inada, 1983; Wöhler, 1987; Chesheva, 1995), with the highest concentration between 50-200 m.

In the Southwestern Atlantic, hoki distribution is closely related to the cold waters of the Malvinas Current, which flows north and deepens when reaching the Brazilian Current near 40° S. This distribution also spans over the broad Argentinean continental platform including the San Jorge Gulf and the San Matías Gulf (Roa et al., 1976; Inada, 1983; González and Caille, 1995). This species is most abundant in the Patagonian shelf and slope, inhabiting three types of water bodies with different salinities: Malvinas Current, coastal waters and shelf waters (Fedúlov et al., 1990). Although in more limited concentration, this species also appears on the platform of the Buenos Aires province (Bezzi, 1984; Brunetti, 1996).

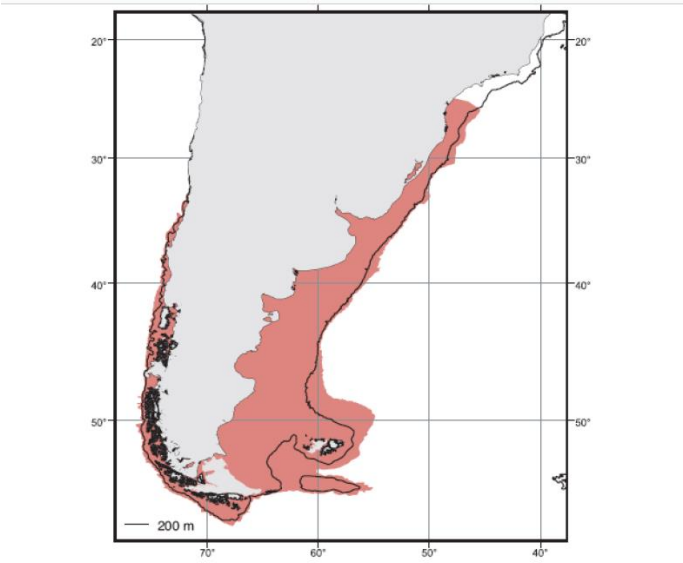


Figure 1: Geographical distribution of Patagonian hoki according to the FAO Catalogue on Hakes in South America (Lloris et al., 2003).

The migration patterns, including the location of spawning and feeding areas, and possible mixture of Atlantic and Pacific populations are still under discussion by scientists from different countries.

In order to keep providing Argentine hoki to important global customers, some important issues need to be addressed in relation to the status of the stock and its migratory characteristics, even if all parties agree that there is certainty that the stock is not at risk of collapse.

To create the conditions to settle the discussion, a Fishery Improvement Project has been proposed with the following objectives:

1) To ensure that fishery-independent data is available to give more robustness to the stock assessments
2) To provide supplementary information that help to understand the migratory patterns of South American hoki
3) To conduct a new stock assessment after new information is gathered
4) To adjust the management decisions, if necessary, to the findings of the previous objective.

**FIP Action Plan**

The FIP Action Plan has been developed in order to accomplish the objectives enunciated above:

Objective 1: To ensure that fishery-independent data is available to give more robustness to the stock assessments

Through an active set of meetings with INIDEP (the official Research Institute), the Fisheries Federal Council and the Undersecretariat of Fisheries, the proper political and budgetary conditions will be set in order to ensure the following surveys with INIDEP´s vessels:

- A campaign to compare the fishing power of the old research vessel Enrique Holmberg with the new research vessel Victor Angelescu. This will allow for the continuity of the fishery-independent series, by making the indexes obtained in the past comparable with those to be collected in the future. This campaign is already included into the work program of INIDEP for this year and the FIP will reinforce the need of it and create conditions to avoid any potential postponement.
- Reestablishment of the annual global survey for Southern demersal species as of next summery (February 2021), which includes hoki as main species, together with Southern blue whiting, Patagonian toothfish, squid and Southern hake. This campaign will start to be done with the RV Victor Angelescu.

Objective 2: To provide supplementary information that helps to understand the migratory patterns and stock/s structure of South American hoki

Argentinean and Chilean scientists are already working together to collect otoliths samplings from both sides of South America in order to conduct a microchemistry analysis, but a budgetary constraint to contract the University of California could be solved totally or partially by the FIP, in order to have the results as soon as possible.

The microchemistry analysis of otoliths allows to understand if there are connections and how strong are these connections between both sides, the Pacific and the Atlantic, of South American hoki.

Objective 3: To conduct a new stock assessment after new information is gathered.

After several annual global surveys for Southern demersal species are completed in Argentina, and with the new information collected, that information should be incorporated into the stock assessment with participation of international experts.

If the migratory patterns between oceans prove to be significant, besides considering that fact into the local stock assessment, a joint bi-national stock assessment could be encouraged and facilitated to develop an assessment model accordingly. This latter option will be defined at the due time by FIP partners.

Objective 4: To adjust the management decisions, if necessary, to the findings of the previous objective.

Coherently with new scientific findings about the situation of the stock, some adjustments for the management system might be necessary and would be proposed at the due time.

## Timeframe

| Argentine hoki FIP (Argentina hoki - midwater and bottom trawling) Workplan prepared by San Arawa and CeDePesca | 2020 Month 1 | 2 | 3 | 4 | 5 | 6 | 2021 Month 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 2022 Month 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 2023 Month 31 | 32 | 33 | 34 | 35 | 36 | MSC Indicators | Responsible parties / Completed tasks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Action 1. Promoting the comparison of fishing power between old and new research vessels** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 1.1. Encourage INIDEP and Federal Fishery Council to do a campaign for comparing the fishing power of the old RV Enrique Humbodt and the new one RV Victor Angelescu in order to provide continuity to the fishery independent abundance index of several species. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.2.3, 1.2.4 | All FIP Partners |
| **Action 2. Promoting the execution of INIDEP campaigns that can provide abundance indexes for hoki** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 2.1. Encourage the execution of the anual campaign for Southern species (hoki, blue whiting, Patagonian toothfish and squid) since the summer of 2021, covering the Argentine waters South of 48°S | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.2.3, 1.2.4 | All FIP Partners |
| **Action 3. Promoting the otholits microchemistry analysis for hoki from the Pacific and the Atlantic to define migratory processes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 3.1. Help INIDEP and IFOP researchers to contract the otholits microchemistry analysis for hoki with samplings from the Pacific and the Atlantic to define migratory processes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.2.4 | All FIP Partners |
| **Action 4. Promoting the improvement of the stock assessment** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 4.1. With the new information, the FIP will encourage and help to organize a new stock assessment with participation of international experts | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.1.1, 1.2.4, 3.1.1 | All FIP Partners |
| Task 4.2. In case the microchemistry analysis shows significant migratory process between the Atlantic and the Pacific, the FIP will decide if and when encourage a workshop to conduct a binational stock assessment considering this outcome | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Action 5. In case is necessary, promoting the improvement of the management system to include the migratory characteristics of *Macruronus magellanicus*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task 5.1. If the migratory processes between both oceans prove to be meaningful, the FIP will decide if encourage the corresponding adjustements in the management system in both countries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1.2.1, 1.2.2, 1.2.3, 1.2.4, 3.1.1, 3.2.1 | All FIP Partners |
| **COMPLEMENTARY ACTIONS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **A. Disseminating the FIP's progress among partners and other interested parties** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task A.1. To keep FIP Partners informed about FIP activities and to promote their participation in all activities that are required. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NA | CeDePesca |
| Task A.3. To elaborate and to present biannual and annual reports to FIP Partners. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Task A.4. To elaborate and to present the final report to FIP Partners. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |