Civilisation and barbarism in the Argentine Sea

The STCW-F-1995 and the need for a national training policy for fishing captains

Jorge Frias • Carlos Cañon • Federico Larroy • Carlos Lasta • Antonio Castro Lechtaler • Julio Liporace • Roberto Pennisi

CESMAr
Centro de Estudios Superiores del Mar Argentino

Asociación Argentina de Capitanes Pilotos y Patrones de Pesca

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Argentine Fishing Captains Association
Legal status 1442 AACPyPP

Idea and script by Carlos Cañón

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A proposal on education, training and certification of fishing captains, pilots and skippers in Argentina

Written by CESMAR's Academic Council

Higher Learning Centre of the Argentine Sea

Members of the Academic Council of CESMAr:

JORGE A FRÍAS

CARLOS L. CAÑÓN

ANTONIO CASTRO LECHTALER

FEDERICO LARROY

CARLOS LASTA

JULIO LIPORACE

ROBERTO PENNISI

Published by the

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This book is dedicated to Professor Alberto Ríos, pioneer in the training of the fishing vessels' crew, to our fellow men who lost their life fishing and navigating in the Argentine Sea, and to their families.

Preamble

The Secretariat of the Food and Agriculture Organisation (FAO), the Governing Body of the International Labour Organisation (ILO), and the Maritime Safety Committee (MSC) of the International Maritime Organisation (IMO) have recommended that, on behalf of the three organisations, IMO should publish the “Document which shall act as a guide for the training and certification of the fishing vessels’ personnel.”

This document, the first international guide of its genre, was redacted by a mixed work group from FAO, ILO and IMO. It was approved in 1985 by the governing bodies of FAO and ILO, and by IMO’s Maritime Safety Committee. The second edition of the document was printed in 2001.

The Higher Learning Centre of the Argentine Sea (CESMAR), funded and directed by the Argentine Association of Fishing Captains, obtained from IMO the license of an electronic copy of the 2003 edition. Based on that, and given the ignorance of those who are responsible for the training and certification of fishermen that prevails in the country, it was decided to edit this book on the basis of the text and content of the International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel (STCW-F-1995), which was passed on 7 July, 1995. This publication intends to serve as a guide so that the Argentine authorities who have competence in maritime fishing notice that for more than 20 years they have been turning their back on the concerns of the highest international organisations in matters of fishing and the education, training and certification of fishers.

In effect, on 17 September 2014 (almost 20 years after the execution of the international convention), the Republic of Argentina, by means of Law No. 26.981 enacted by the National Executive Office, passed without reservations Convention STCW-F-1995. And, on 15 September 2015, by means of Decree No. 1829/2015 from the National Executive Office, Argentina designated the National Coast Guard as the execution authority of the International Convention.

However, Convention STCW 1995 has not come into force because, at the time this book was edited, the Ministry of Foreign Affairs still had not deposited in IMO's headquarters the instrument the National Law in force requires.

This obviously irregular and illegal situation of a ministerial body, which is below the Congress and the President who enacted the law, rejecting the fulfilment of its simple obligation to present the instrument before IMO in London serves as an excuse for the National Coast Guard, the execution authority appointed on 15 September 2015 by Executive Order No. 1829/2105, to refuse the performance of its functions and express that the international convention is not mandatory yet.

The main global concern in the history of international conventions in maritime matters, until STCW-F 1995, was navigation safety.

Before 1995, neither the member States of the new international convention nor IMO had put emphasis on the humane and professional training of fishermen or the education about human rights in the management of other workers while performing the most dangerous activity of the labour market. The decent labour on-board fishing vessels, the professional training on ecology and the environment, and, above all, responsible fisheries were not emphasised topics either.

As of that year, everything changed in the worldwide analysis carried out by specialists and fishing stopped being considered an extension of the International Merchant Navy to become a special regulation sector of the activity at sea.

In Chapters 8, 9 and 10 of this book, we design degree programmes and Fishing Bachelor's degrees and the following are the international conventions we suggest to consider:

1. SOLAS. Convention from 1974.
2. TORREMOLINOS. Torremolinos International Convention for the Safety of Fishing Vessels from 1977. Later modified by Torremolinos Protocol from 1993.
3. STCW – LONDON 1978. It established for the first time Standards of Training, Certification and Watchkeeping for Seafarers. It does not specifically refer to fishing activities, but rather to navigation safety.
4. STCW-F – LONDON 1995. It addresses fishing activities specifically and differentiates them from the Merchant Navy fishery. Hence the thought: Sailing is one thing, fishing is another.
5. MANILA CONVENTION – STCW 2010. It amends or partially modifies STCW 1978 and it does not make reference to the fishing activity, so it

can be assumed that it does not amend STCW-F-1995, at least in relation to fishing activities. Even though now it is not under discussion, it is reasonable to expect an interpretation according to which STCW-F 1995 should be applied to the modernisation of navigation safety.

According to STCW MANILA 2010, the deadline to comply with the obligation for all seafarers to possess a STCW degree which contemplates training on-board a vessel finished on 1 January 2017. Likewise, it is expressly established that, for the issuance of the degree, the training programmes must ensure approved on-board periods for services aboard an appropriate vessel. In some cases, regulations stipulate a period of at least six months on-board a training vessel. This certainly proves that in Argentina none of the degrees issued complies with boarding teaching vessels.

6. WORK IN FISHING CONVENTION No. 188. 96th ILO SESSION.

7. FAO'S CODE OF CONDUCT FOR RESPONSIBLE FISHERIES. Particularly in Chapters 4.37 and 4.37.1 of the FAO/ILO/IMO Document, as well as Chapter 9, it is expressed that "the fishing vessels personnel shall receive training on the principles and guidelines of the Code of Conduct for Responsible Fisheries". In Chapter 40, this document imposes the obligation that training programmes shall include subjects that study: concepts such as bycatch and discard, lost fishing gear, habitat damage and marine reserves; the training to think of fish as food; the definitions of selectivity and limitations; the survival of fish that escape; and the training about the duties of all States, Flag States and Port States.

8. FAO/ILO/IMO GUIDING DOCUMENT FOR THE TRAINING AND CERTIFICATION OF FISHING VESSELS PERSONNEL. As it was already mentioned, in 2002, the United Nations Organisms FAO, ILO and IMO jointly issued this document.

   It is also worth mentioning that Captain Milton Barón, technical officer of IMO's Department of Maritime Training and Human Elements, edited in Lima, Perú, on 20 February 2012, a book titled "Familiarisation with STCW-F Convention about fishers training." This was one of the first attempts to try to bring the STCW-F-1995 Convention to Latin America.

It can also be pointed out that, in 2003, Cartamar, a publishing house located in La Coruña, Spain, published the FAO/ILO/IMO Document in Spanish, which is registered in the catalogue of nautical books.

At the same time, the Operative Network for Regional Co-operation among Maritime Authorities of the Americas (ROCRAM), in the ordinary session held on 14 December 2012 in La Habana, Cuba, became aware that, regarding the International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel from 1995 (STCW-F-95) which came into force internationally on 29 September 2012 complying with the twelve months requirement, 15 States had deposited before the Secretary General of the International Maritime Organisation the corresponding instruments of ratification, acceptance, approval and adhesion.

In that meeting it was decided to "invite the plenary session to inform the measures that each Maritime Administration may adopt in relation to the processes of training and certification for fishing vessels' personnel which are proposed in the Convention, if the corresponding States decide to participate and what would be the estimated deadline."

The most important part in this document we are presenting today to everyone involved in the adventure that is fishing, and above all to the Argentine authorities, is what ROCRAM expressed in points 7 and 8 of its sessions:

> *As of the international coming into force of this Convention, the personnel aboard a vessel is divided in two great areas: the Merchant Navy and the Fishing Sector. For the Merchant Navy, in relation to the training, certification and watchkeeping aspects, the amended STCW/78 document is applied. For the Fishing Sector, IMO proposes this Convention which has similar characteristics to the previous one.*
>
> *The Convention is an effective tool to improve the safety standards onboard fishing vessels and to prevent marine pollution by means of a better level of training for the vessels' crew. According to what is established by the International Maritime Organisation (IMO), the entry into force of this Convention shall reflect a significant progress towards the improvement of safety at sea. Even more so considering the*

diplomatic conference held in South Africa from 8 to 13 October 2012, with the purpose of implementing an agreement to apply other instruments in regard to the fishing vessel safety, the 1993 Protocol on the Torremolinos International Convention of 1977.

On the other hand, in 2012, all maritime authorities in the Americas already knew that as of the STCW-F-1995 Convention, the personnel onboard a vessel would be divided in two great areas: the Merchant Navy and the Fishing Sector. We can quote this phrase by a high maritime authority of the Americas: “Sailing is one thing. Fishing is another.” What is strange, even today, is that the Republic of Argentina, which is an active member of ROCRAM and assisted to the Ordinary Session in 2012, has not yet complied with the Convention, regardless of the passing without reservations of a Law by the National Congress in 2014.

It is impossible to try to understand the reasons why some sectors of the Republic of Argentina ignore the STCW-F-1995 Convention, even 20 years after its execution, 5 years after being into force at an international level, and more than 3 years after the passing of a national law. It might only be possible to explain this situation that hurts the prestige of the Republic of Argentina as a coastal country considering the fact that REFOCAPEMM regulations (that is, Decree No. 572 which was passed on 20 April 1994) maintain the Subsecretariat of Ports and Navigable Waterways, dependent on the Ministry of Transportation, as the execution authority for the training of fishermen. It also confers it the express power to certify overseas pilots and fluvial captains, or retired officers and discharged officers from the Argentine Navy or the Argentine Coast Guard as fishing pilots or captains, *without REFOCAPEMM regulations imposing on the execution or administration authority the need and the obligation to perform all prior-to-certification nautical days and embarkations in fishing vessels*.

This simply means that today in the Republic of Argentina it is possible for the execution authority (which has no direct competence over fishing) or the authority of administration and execution of the training system (which has competence over sea warfare but not over fishing) to certify as fishing captains people who has never fished before.

In order to make the objectives and proposals in this publication understood, we believe it is necessary to make a brief summary of what has happened in our country from 1995 to 2018.

In 2018 in Argentina, we are experiencing a silent disagreement between the Argentine Coast Guard, the Argentine Navy, the National Ministry of Transport, the Subsecretariat of Ports and Navigable Waterways, the unions and the companies that represent the interests of the Merchant Navy, such as overseas captains, among others.

For all of them, fishing has become some kind of target and especially an alternative source of labour for retired, discharged or unemployed people. It is believed that training and certifying fishermen must be in charge of the Argentine Navy, the Argentine Coast Guard or the groups which represent the Merchant Navy.

On 22 August 2014, the Argentine Navy signed an official document where it literally expresses that: “the Commander in Chief of the Navy must guarantee the authenticity of the degrees and certifications issued”, in such a way that the system of training and certification of the Merchant Navy personnel on-board a vessel fully complies with Convention STCW 1978, whereas it omits any reference to STCW-F-1995 and skips directly to Manila 2010, saying that the country assumed the obligation to enact all laws, degrees, orders and regulations necessary, and to implement all required measures to give the Convention full effect.

This official 2014 document by the Argentine Navy expresses that: “the Directorate of Education of the Navy and the Naval University Institute are organically responsible for the system of training and certification of the personnel on-board a vessel and the Subsecretariat is responsible for the execution of that task.”

On 15 September 2015, by means of Executive Order No. 1829/2025, the Argentine Coast Guard was appointed as execution authority of the STCW-F-1995 Convention, which was ratified by National Law 26.981 on 26 September 2014.

This means that, contrary to what the Argentine Navy expresses, today the Argentine Coast Guard is the authority responsible for the execution of this Convention. Therefore, it must take part in the writing of the Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel. However, on 17 February 2017, upon demands received from the fishing sector requiring the fulfilment of its obligations, it evasively answered that it could not act because "to date, the corresponding instrument of ratification from our country to IMO has not been deposited", trying to set the idea that the convention should not be applied yet.

Below is the letter sent by Prefect General Director of Education of the Argentine Coast Guard, Jorge Nelson Blati, to the National General Secretary of the Argentine Fishing Captains Association, Jorge A. Frías, in response to his claims with regard to the implementation of the training programmes addressed in the International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel from 1995 (STCW-F), dated 30 June 2017.

The translation of the documents contained in this Chapter are found in Annex 6 of this book.

"2017 - AÑO DE LAS ENERGÍAS RENOVABLES"

PREFECTURA NAVAL ARGENTINA
Autoridad Marítima

Nº 351/2017.
Letra. DEDU, B6.4.-

BUENOS AIRES, 30 JUN 2017

SEÑOR SECRETARIO GENERAL:

Me dirijo a Ud. con relación a su nota de fecha 21 de abril del corriente, la cual hace referencia a aspectos de formación previstos en el Convenio Internacional sobre Normas de Formación, Titulación y Guardia para el Personal de los Buques Pesqueros, 1995, (STCW-F).

Al respecto, se hace constar que mediante Ley 26.981, dicho Convenio ha sido aprobado en el ámbito nacional, pero la República Argentina aún no es Parte del mismo ya que a la fecha no se ha depositado en la Secretaría de la Organización Marítima Internacional (OMI), el Instrumento de Ratificación correspondiente por parte de la Cancillería.

Por lo expuesto, esta Autoridad Marítima designada oportunamente Autoridad de Aplicación de dicho Instrumento, se encuentra actualmente trabajando a través de sus áreas pertinentes en el accionar preparatorio necesario tendiente a su inmediata implementación, una vez transcurrido el plazo prescripto en el Artículo 12-*Entrada en Vigor*, inciso 3 del mismo, como así también se realizaron las gestiones pertinentes ante el Ministerio de Relaciones Exteriores y Culto con relación a la incorporación de este país como Estado Parte.

Una vez determinados los criterios programáticos y contenidos de los planes de estudio, se podrá adoptar una definición al respecto.

Saludo a Ud. atentamente.-

PREFECTURA NAVAL ARGENTINA
DIRECCIÓN DE EDUCACIÓN

JORGE NELSON BLATI
PREFECTO GENERAL
DIRECTOR DE EDUCACIÓN

AL SEÑOR SECRETARIO GENERAL NACIONAL DE LA ASOCIACIÓN ARGENTINA DE CAPITANES PILOTOS Y PATRONES DE PESCA
CAPITÁN JORGE ALFREDO FRIAS
S / D

Despite this, the Argentine Coast Guard itself has published a 2011 rewritten official edition of the International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel from 1995 (STCW-F-1995) and this instrument was edited by the Navigation Regulation Department of that same maritime authority.

Meanwhile, the National Ministry of Education, the Federal Fisheries Council and the National Subsecretariat of Fishing are stone guests in everything related to the training and certification for the fishing vessels personnel. The Higher Education Law 24.521, enacted in August 1995, has been ignored until today.

Article 73 of the Federal Fishing Law 24.922 expresses:

> *The application authority shall intervene jointly with the responsible organisations in the training of fishing personnel aboard a vessel and scientific and technical personnel related to the fishing industry, creating appropriate institutions to that end in cities with ports. Likewise, this authority together with educational institutions, unions and companies, shall promote the necessary actions to organise special programmes and training courses which focus on tasks or activities to perform in the catch areas...*

This Law entrusts the Subsecretariat of Fishing and the Federal Fisheries Council with the personnel training and requires them to promote, jointly with unions and other organisms, the necessary programmes and courses.

And to add to the disorganisation and deviations of the different areas of the National Government, it is necessary to analyse the strange behaviour of the Federal Fisheries Council (FFP), the highest authority in the field in the Republic of Argentina, in compliance with Law 24.922, dated 6 July 2017, in ENTRY FFP NUMBER 18/2017, which reads:

> *"8.1. International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel, 1995 (STCW-F). The Council analysed the implications of the International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel, 1995 (STCW-F), passed by the National Congress through Law 26.981. In order to do this, work meetings with the authorities of the Argentine Navy and the Argentine Coast Guard, and with the higher personnel of their training institutes were held. The result of those meetings was the ability to respond to the requirements of the STCW-F convention, whose standards are currently being*

met. In relation to this, it was unanimously decided to communicate to the Ministry of Foreign Affairs and Worship, General Department of Legal Affairs, that, from the point of view of this Council competences, there were no objections to the start of the adhesion process. For the purposes of the foregoing, the Institutional Coordination was instructed to communicate the decision."

The Federal Fisheries Council errs greatly in its Minute of Meeting No. 18 from 2017. First of all, its assertion that "the STCW-F standards are currently being met" is untrue. Second of all, a body under the National Executive Office cannot ignore a national law that has been enacted and published, nor assume rights that the Constitution does not grant to it to raise objections to the approval of an international convention.

While this is happening in the Republic of Argentina, the IMO authorities and the countries that are part of the International Convention are already studying how to incorporate the necessary modifications given the time that has passed.

There is no doubt that while IMO and its member countries are worried and participate in seminars and conferences to update and revise the STCW-F-1995 Convention, in the Republic of Argentina the education, training and certification of professional activities related to fishing, the syllabuses and the effective compliance with competences keep depending on areas within the Executive Office and departments which do not have competence over education or fishing. Likewise, the areas involved in training, like the National Ministry of Education, CONEAU (National Commission of Evaluation and University Accreditation) and other education sectors, or the areas involved in fishing, like the Federal Fisheries Council, are stone guests in the decisions the country is making, which regrettably do not comply with the international treaties.

At the same time, hundreds of sailor-fishers, marine engineers, fishing pilots, skippers and captains lie at the bottom of the sea or are still missing, victims of shipwrecks that could have been avoided, and their families were unable to say goodbye to them. The fishing execution authorities have expressed publicly and without blushing that they are not functionally responsible for the tragedies.

The last sinking, that of the fishing vessel Repunte, caused a reaction from the population and from the families of the dead and missing men. After this maritime tragedy, nothing will be the same in our country in relation to fishing casualties because the wives, parents and children of the dead fishers have gone out into the streets to complain against the responsible authorities.

In memory of all of them and their families, now we edit this book which aims to be like a shout from the bottom of the sea.

Mar del Plata, 2018

AACPYPP

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Introduction

My colleagues at the Academic Council of CESMAR have asked me, in my capacity as Secretary General of the Argentine Association of Fishing Captains of the Republic of Argentina, to write the introduction to this book , which tries to explain precisely what the Argentine fishing captains expect from the national authorities so that the STCW-F-1995 becomes a reality in our country as soon as possible, as expected according to this International Convention. Equally necessary is the planning of a national education and training policy for the fishing vessels' personnel, as required by Chapter 2, sub-chapters 2.1., 2.1.1, 2.1.2., 2.1.3. and so on, of FAO/ILO/IMO Document from 2001.

I am simply a fishing captain like many others, a dreamer who aspires to live in a society of equals both in their sacrifices and contributions. A dreamer who, like most fishing captains, did not complete secondary school, and being barely 17 years old sailed into the sea looking for a fantasy of a better quality of life which he mistakenly thought it would be obtained through money. Over time I understood that earning money only stupefies fishers more.

That is why, against all odds, it is necessary to do the impossible to generate a new educational tool for the new and future fishers which allows them to compete in a society run over by technology and the crime of those who steer the destiny of our people.

I am also a shipwreck survivor. A victim of fishing who was rescued and saved, but who saw his older brother, also a sailor and fisher, dead by his side in the darkness and coldness of the sea. The fishing vessel I manned sank in front of the coast of Bahía Camarones due to the poor training of the captain and the violations of basic safety regulations, such as the raft conditions. Political authorities do not feel responsible for the fact that fishing vessels navigate in precarious and dangerous conditions. There is no greater hopelessness that watching the vessel sink and the raft you can barely throw into the water from the deck also sink unopened. You are left with the only option of jumping into the cold water, at temperatures in which you can only survive for a few minutes, illuminated by the stars.

Sometimes, you are lucky enough to be rescued from that deadly time, but life in the future will never be the same. We will talk about this dramatic experience in Chapter 5.2. of this book.

Undoubtedly, culture gives the individual the freedom of the spirit and the soul. Many have already said it in different ways: money and material assets in excess over-increase the burden you will have to shoulder during your short life. It does not make it better either.

Since my first trip in fishing vessel Guillermo Daniel, I started to notice the lack of knowledge of each crew member, captain, engineer and sailor in regard to what they were actually doing. That is, they performed tasks automatically, due to a mechanical transmission of information, because nobody knew how to clearly explain the reason behind each task, manoeuvre or action.

I had to learn in the same way in order to be able to do my job. I started to understand the reason why I did what I did on-board the vessel when I attended my first year of training in the National Fishing School. They educated me, but not as much as it is recommended by the regulations in developed countries. This can be attributed to mean interests on the part of those who managed the destiny of workers that sacrificed even their lives to extract resources that generated economic growth for the country.

They taught me a great theoretical part of what I had learned in practice. In that way, I understood the technical reason why a vessel needs to be righted; why, when there is a storm, it is necessary to keep the vessel forward and tack at slow speed or sail in the direction of the wind; why a certain rope should be used instead of another; why a certain knot and not another; why weight should not be lifted too much; where to stand on the vessel to preserve my physical integrity.

I understood the reasons for many other things, but nobody knew how to explain in technical terms what we do when we throw the nets and extract fish, what happens to the ecosystem that surrounds our target fish. No-one teaches us how to treat what we simply consider fish but actually is food that later will be on the plate of a person, who ultimately promotes our work and therefore should be the focus of our thoughts.

This important educational training is supported by biologist Sofía H. Fortabat: "We have an Argentina we do not know, and it is below the water column." Thus, I consider that the strength in our Regulations on Education and Training imperatively must include and repeat everything suggested in the International Conventions.

These are:

a) **The International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel, STCW-F-1995**, which shall contribute to the reduction of victims and, in great measure, improve the poor current history of safety in the fishing industry worldwide, whose importance the Argentine Government does not seem to value.

- When planning the necessary national policy of education and training for fishing vessels, points 7 7.1 to 7.8 of the Appendix of Regulation I, in Chapter II, have to be taken into consideration: Manoeuvre and steering of the fishing vessel. Basic knowledge of the manoeuvre and steering operations of the fishing vessel, including:

- Berth, casting-off, mooring and manoeuvres with the vessel laying alongside other vessels at sea.
- Manoeuvres when fishing, paying special attention to the factors that may unfavourably affect the safety of the vessel during these operations.
- The effects of the wind, tides and currents in the steering of the vessel.
- Manoeuvres in shallow waters.
- Management of fishing vessels in a storm.
- Rescue of people and provision of assistance to a vessel or aircraft in danger.
- Towing and being towed.
- Rescue procedure in case of a man overboard situation.
- Whenever applicable, practical measures that should be taken when sailing through ice or when there is accumulation of ice on-board the vessel.

The regulations of the ancient and out-of-date decree that governs our training and certification, called REFOCAPEMM, by no means take into account these basic training considerations. They practically ignore FAO's recommendations in regard to responsible fisheries.

And, what is worse for the future of our country, the political and military sector that controls and dominates the education of fishermen have called their only project RETIMMAR, which aims at reaching our certification but not our training. It only expects to maintain control of the political apparatus regarding the issuance of authorising certifications and disregards the education and training. That is why we say that "we have been facilitated our certification but not our training", a phrase that will be present in all the proposals of this book.

b) International Organisation of Labour, ILO/188, whose convention clarifies the definition of fisher, fishing captain or skipper, according to which they should be properly trained and certified. This convention also considers the work and wage regulations, and the possibility that fishers can complain before diverse institutions due to nautical safety or health reasons. The highlight is on "safeguarding" the competence and training of fishers without discrimination (the economic cost is a type of discrimination and the Argentine State does it, all the more since it has already contributed to the Federal Fishing System in relation to the FONAPE training). Moreover, among many other definitions and decisions, it determines which are the appropriate living, noise and vibration conditions for the health of fishers.

c) FAO/ILO/IMO Guide Document. Undoubtedly in these recommendations we can find everything necessary to strengthen the premise to defend the work positions of current fishers, including education as a vital tool.

The Regulations on Training for Fishing Captains, Pilots and Skippers of the Republic of Argentina must aim at being an academic offer to replace the current REFOCAPEMM and thus definitively deactivate the malicious RETIMMAR.

In my capacity as Secretary General of an association of workers who want to become professionals and obtain an education at the highest level possible, I must highlight the fact that I expect our members to see clearly that we are claiming in favour of their rights and defending their jobs. As I have done in other opportunities, I reject the idea that the members of the Argentine Navy can perform a task for which they have not been prepared just because they must be experts in maritime navigation but not in maritime navigation for fishing. As defined by STCW-F-1995, "sailing is one thing, sailing and fishing is another."

History still remembers that in 1982 men from the Armed Forces substituted the fishing captains during a strike, violating the constitutional rights of workers and, due to their lack of expertise, damaged vessels and fishing gear, and put the crew of those years at risk.

So, it is very clear which should be the objective of the Regulations offered: dignity and education for fishing captains and fishers in general. When the Argentine fishing captains decided to create the Higher Learning Centre of the Argentine Sea (CESMAR), we expressly ordered the professionals, scientists and university professors which integrated its Academic Council to:

> *Create Regulations on the Training for fishermen, especially for fishing captains or skippers, compliant with the suggestions and considerations of international regulations that provide knowledge about the ecosystem and its behaviour, naval engineering, information technology, economics and markets, and the important subjects, with an academic excellency that generates professionals capable of being part of the fisheries co-management and the industry in general.*

In this regard, I believe that the prologue or the grounds for why we started working on this cannot ignore the political definitions, which demonstrates that, historically, workers have always been taken advantage of and that we are not willing to accept any more abuse from any sector and of any kind.

We are proud to be fishers because, year after year, fishers are an essential tool to increase our country's patrimony by producing, creating jobs and income for more than 1500 million dollars for the State. We also perform an utterly important task in defence of national sovereignty by occupying maritime areas which many are not even aware of or take into consideration. On the contrary, they gave them away to other countries in acts of government that have been condemned by all the fishing industry workers. Therefore, with this book, the fishing captains, pilots and skippers want to propose a national policy of education and training that replaces the manuals that are being used today, which have clearly failed.

All the shipwrecks and all the dead and missing fishers were a consequence and the victims of a sphere of politicians, businessmen and trainers represented by the Armed Forces. They insist on continuing the education and training of fishers when their own training and spirit ignore the almost magical principles of the art and science that is fishing. Our proposal is that the education of fishers should fall within the scope of the National Ministry of Education instead of the Armed Forces or any policing force. The Fishing School should be part of the Ministry of Education; fishers are not nor want to be military men.

We are civilian citizens and workers. We are simply sea workers who enjoy the adventure of fishing and who want to be educated and trained by the Nation to be what we are. We are responsible for steering the fishing vessels that year after year set sail into the sea to defend the national economic sovereignty and bring essential food for our Argentine brothers and the rest of the world. We are Argentine Navy men and fishing men, we set sail into the sea, come sun, rain, wind or storm. Sometimes with a heavy heart for leaving the comfort of our homes and families, and having to go out to face the dangers of the sea.

In 2017, the society learnt to get familiarised with the reality of seafarers due to the sinking of the fishing vessel Repunte and the disappearance and death of 11 fishers, as well as the sinking of San Juan Submarine and the disappearance of 44 Armed Forces members. They all sailed the same seas, the same deep abysses, the same storms, winds and waves. They are all patriots who defend the national sovereignty: ones with weapons and others fishing. They all create sovereignty, safety, work and production to make the nation grow.

Lastly, when we formulate this educational and training proposal through the Argentine Fishing Captains Association of the Republic of Argentina, we are not thinking about ourselves but rather on the new generations. We feel confident that they must have better opportunities to access higher education.

In the preamble we have already analysed in depth how our country does not comply with the obligations and precautions expressed in the STCW-F-1995 so this convention works. However, there is a branch of the government that wants to keep the fishing activity and mainly the training of fishing vessels personnel as hostages of strange objectives. The purpose of this is ignoring the establishments of Convention STCW-F-1995, in which IMO established that, in relation to education and training, “sailing is one thing, fishing is another.” Consequently, fishing requires a specialised education and training which differs from that of workers who only sail. It is not better or worse, it is specific and it has different competences.

Therefore, in Chapter 8, 9 and 10, we will propose the creation of college or university degree programmes that are necessary to fulfil a training and certification for fishing vessels personnel that guarantees the compliance with the objectives of the STCW-F-1995 Convention. Likewise, in previous chapters, we will describe, after what FAO proposes and teaches, what in the world of fishing is known as precautionary approach of the Code of Conduct for Responsible Fisheries, the ecosystem approach and fisheries co-management.

The importance of the well-founded and documented content of this publication makes its translation into English necessary because the guidelines for the training of maritime personnel originate from international institutions ILO, IMO and FAO, which have central headquarters in London, England, and because the topic is of interest worldwide.

Captain Jorge A. Frías

Chapter 1

DEFINITIONS. VOCABULARY

Throughout this book, we will use the following concepts, which are defined below:

Regulations: contained in the Annex to the Convention on the Training of Fishers, 1995.

Approved: accepted by a party in accordance with these regulations.

Skipper: person having command of the fishing vessel.

Officer: member of the fishing vessel personnel, other than the Skipper, designated as such by national law or regulation or, in the absence of such designation, by collective agreement or custom.

Deck Officer: officer qualified in accordance with the provisions of regulations II/2 or II/4 of the Convention on the Training of Fishers (1995), or in accordance with the provisions hereof on the rendering of on-board services of fishing vessels not governed by such convention.

Engineer Officer: officer qualified in accordance with the provisions of regulation II/5 of the Convention on the Training of Fishers (1995), or in accordance with the provisions hereof on the rendering of on-board services of fishing vessels not governed by such convention.

Chief Engineer Officer: Senior Engineering Officer responsible for the mechanical propulsion and the operation and maintenance of the mechanical and electrical installations of the vessel.

Second Engineer Officer: officer next in rank to the Chief Engineer Officer and upon whom the responsibility for the mechanical propulsion and the operation and maintenance of the mechanical and electrical installations of the vessel will fall in the event of the incapacity of the Chief Engineer Officer.

Radio Operator: person holding an appropriate certificate issued or recognized by the Administration under the provisions of the Radio Regulations.

Radio Regulations: the Radio Regulations annexed to, or regarded as being annexed to, the most recent International Telecommunication Convention which is in force.

Qualified Fisher: any experienced personnel member of a fishing vessel whom the competent authority or fishing industry approves to participate in the risks-free operation of the fishing vessel. His job is to prepare and perform fishing operations, handling, operations safe stowage and, where applicable, to capture production and repair the fishing gear.

Convention on Training (1978): International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, as amended.

Convention on the Training of Fishers (1995): International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel.

Torremolinos Protocol (1993): protocol relating to the Torremolinos International Convention for the Safety of Fishing Vessels (1977).

Code of Conduct for Responsible Fisheries (1995): code established by the Food and Agriculture Organisation of the United Nations (FAO).

Outreach Education: the extension of activities conducted in Fishing Training Centres with the aid of the services provided by itinerant professors.

Propulsion Power: the total maximum continuous rated output power in kilowatts of all the vessel's main propulsion machinery which appears on the vessel's certificate of registry or other official document.

Limited Waters: those waters in the vicinity of a Party as defined by its Administration within which a degree of safety is considered to exist to enable the standards of competence and certification for Skippers and Officers of fishing vessels to be set at a lower level than for service outside the defined limits. In determining the extent of limited waters, the Administration shall take into consideration the guidelines developed by the Organisation.

Unlimited Waters: waters beyond limited waters.

Length: 96% of the total length on a waterline at 85% of the least moulded depth measured from the top of the keel. In vessels designed with a rake of keel the waterline on which this length is measured shall be parallel to the designed waterline.

Moulded Depth: it is the vertical distance measured from the top of the keel to the top of the freeboard deck beam at side.

Fisher: any crew member who participates in fishing operations carried out in a fishing vessel.

Fishing Vessel Personnel: any person on board of a fishing vessel other than passengers.

Fishing Vessel: any vessel used commercially to catch fish and other living resources from the sea.

Engine Room (ER) Personnel: all personnel of a fishing vessel, other than Engineer Officers, whom the administration or the fishing industry deems competent to participate in the propulsion operations and the operation and maintenance of the mechanical and electric installations of the fishing vessel.

Chapter 2

THE ARGENTINE SEA

THE FISHERIES AND THE NATIONAL FISHING FLEETS

2.1. OCEAN CURRENTS

2.1.1. Concept of ocean circulation

The ocean circulation, at a surface level, is directly promoted by the wind's friction, gravity, the pressure gradient, the Earth's rotation (Coriolis force: the apparent force produced as a result of the Earth's rotation causes the bodies in movement and the currents to deviate towards the right in the north hemisphere and towards the left in the south hemisphere), and the continent's interference; it is also indirectly promoted by the intervention of solar radiation.

As regards the surface atmospheric circulation, this is basically composed of three cells (Stewart, 2009):

a) The first, between 30 N and 30 S, is found in the trade winds zone, where the dry wind causes the evaporation of large amounts of water in subtropical areas. Therefore, such winds are responsible for the transport of latent energy in those latitudes.

b) Westerlies are found between 30° and 60° north and south latitudes. These form the second cell and move the energy drawn from the ocean between 25° and 40° latitude. This is where cyclones, which constitute the main mechanism of thermal atmospheric transport at those distances of the equator, are formed.

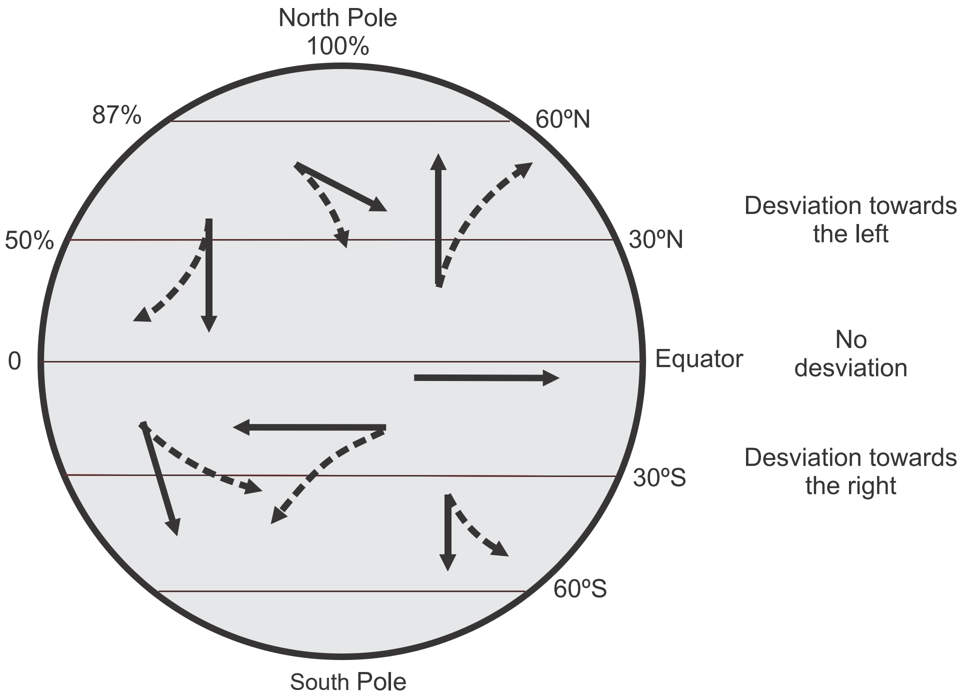


Figure 2-1. Diagram that shows the apparent Coriolis force

c) The third is placed between 60° latitude and the poles, where the Easterlies are found. These are caused by the equatorial movement of cold air on the high atmosphere.

When imagining and laying out an ideal ocean of rectangular shape, where the winds that blow on the Earth at different latitudes would appear, the circulation would be divided into several rings corresponding to the wind belts. One ring in the subsolar region in a counter-clockwise direction; one circulation in the subtropical belt above the equator in a clockwise direction; one narrow ring on each side of the equator; and a last ring in the subtropical area below the equator in a counter-clockwise direction. On each ring, there is a strong and persistent current on the west face due to the Earth's rotation and a compensation in the central and eastern part (Fig. 2-2).

In turn, a general flow towards the east can be seen in latitudes 40° to 50°. Only around the Antarctic continent a current which is not interrupted by the continents arises. In contrast with this Circumpolar Current which moves towards the east, there is another narrow current, the West Drift Current, between the Antarctic continent and the Circumpolar Current.

On their part, the border currents flow in the continental edges, transporting warm water to the poles on the western side of the oceans and cold water to the equator on the eastern side of the oceans. The western boundary currents are narrow (~ 100 km), deep (~ 2000 m), fast (> 100 cms^{-1}) and transport a high volume of water (~ 100 Sverdrup or Sv). Regarding the eastern boundary currents, these are wider (~ 300 km), shallow (~ 200 m), slow (> 10 cms^{-1}), and they transport a lower volume of water (~ 10 Sv).

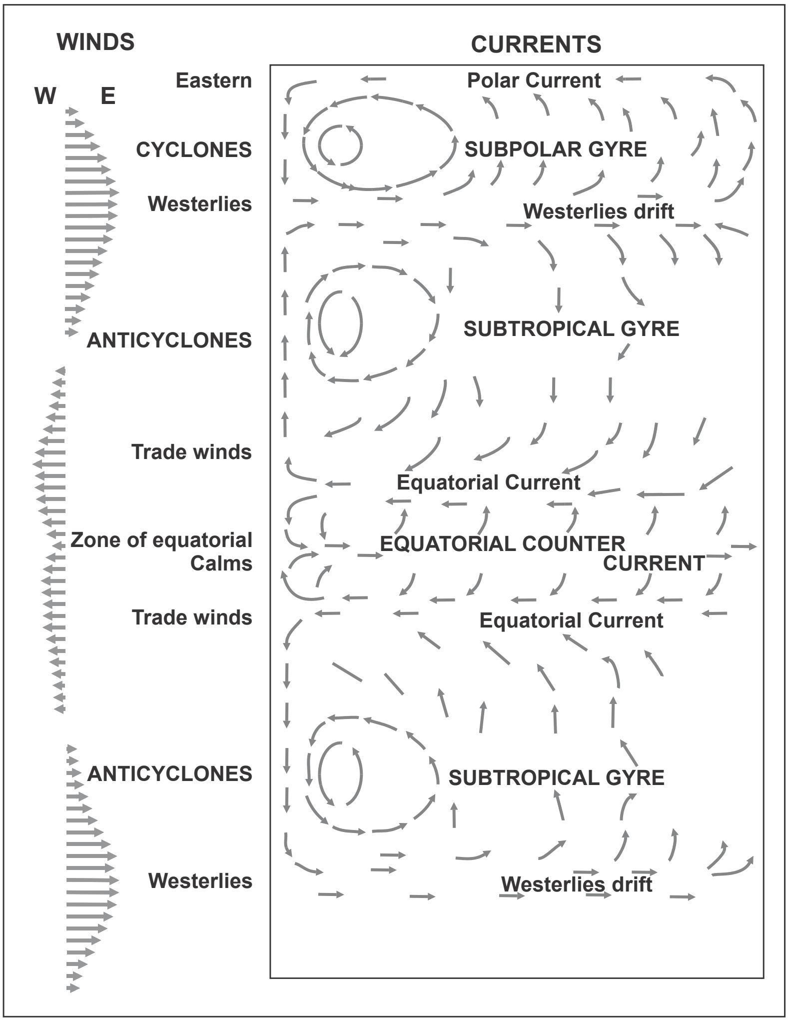


Figure 2-2. Diagram of the circulation in an "idealised" ocean, only subjected to the action of the winds (taken and modified from Stewart, 2009)

It is worth mentioning that the unit that measures the transport of water masses is the Sverdrup (Sv). Therefore, 1 Sv corresponds to a displacement of 1 million cubic meters per second (=10^6 m^3s^{-1}). This measurement unit owes its name to the Norwegian meteorologist and oceanographer, Harald Ulrik Sverdrup (1888–1957).

2.2. WATER MASSES

2.2.1. Concept of water mass

A water mass is defined as a large hydric volume with a characteristic temperature and salinity, and which can be recognised from its place of origin. Furthermore, the concept of water mass (Helland-Hansen, 1916) is defined as a curve in a temperature-salinity diagram (T-S). It can be formed by interactions between the air and the sea (precipitation-evaporation) o by the mixture of two or more water bodies. When we perform temperature and salinity measurements in the same point at different depths, we can draw the values in a system of coordinates. In the Y-axis we place the temperature (T) and in the X-axis we place the salinity (S). The union of the points generates a curve or straight line which describes the relationship between temperature and salinity in a given water volume; then the diagram is completed by outlining the points of equal density. The final figure, named T-S diagram, will be formed by a series of temperature and salinity combinations, where the points of equal density form curves called isopycnic lines (Fig. 2-3).

Water masses are slowly mixed with surrounding waters, but they have a tendency to keep their original temperatures and salinities. Thus, it is possible to identify them, which is important because they provide in-depth information about the origin of these water masses and, also, about their movement.

The recognition of the ocean water masses is made possible through observations of oceanographic data. The most useful are temperature and salinity. However, the oxygen content has been included, despite the fact that it is a non-conservative property, since water acquires it on the surface, slowly decreasing with time due to its consumption by living organisms and oxidation processes of the organic matter.

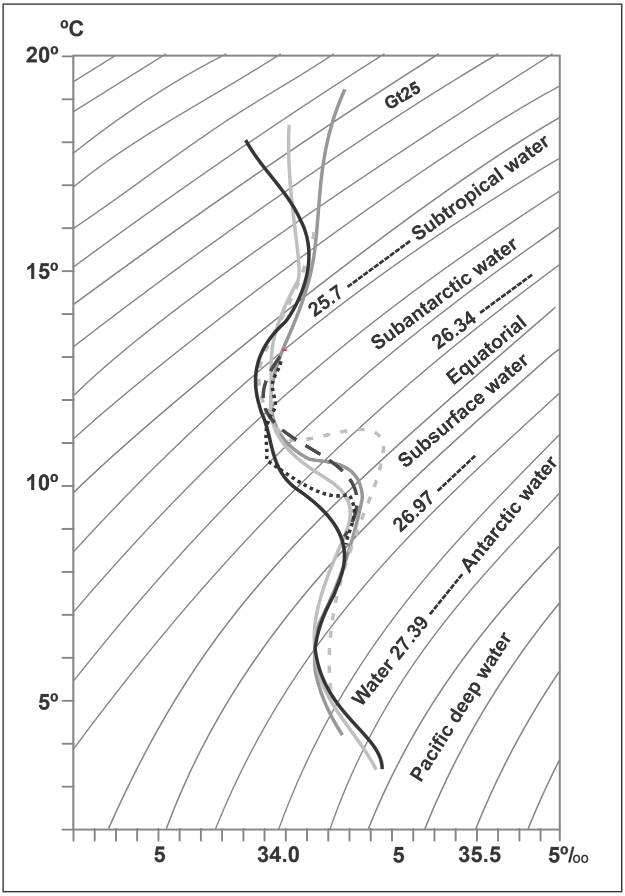


Figure 2-3. Classic T-S (temperature-salinity) diagram in which density or isopycnic lines and the different water masses present in a specific area are shown (taken and modified from Stewart, 2009).

2.3 CIRCULATION IN THE SOUTHWEST ATLANTIC OCEAN

2.3.1. The Southwest Atlantic Ocean

The Southwest Atlantic is one of the most energetic basins of the world oceans (Piola and Matano, 2001), where processes that are relevant for the water masses mixing, the sea-atmosphere interaction and the biological production take place. Inside this region, the Argentine Continental Shelf can be found between 35° S and 55° S; it is part of the greatest marine ecosystem of the south hemisphere (Bisbal, 1995).

The shelf presents a high biological productivity which supports a variety of species of phytoplankton, benthic bivalves, birds and mammals, and a considerable fish wealth.

The different water masses that exist in the shelf must be analysed in terms of the following features: the waters that enter from adjacent areas; the modifications that arise due to the exchange of properties and energy with the atmosphere; and the continental discharge that comes from the rivers.

Shelf contours are delimited by the coastal line, along the continental shelf-brake defined as edge currents and the sea-atmosphere interface. Given that the seasonal salinity variations are small, the surface distribution of this variable is also used to describe the continental shelf water masses and its alterations (Guerrero and Piola, 1997).

On the continental shelf (Fig. 2-3), it is possible to identify three water masses, namely:

- Shelf-brake water or external shelf water with relatively high salinity. (33.7 to 34.0 psu).
- Central shelf water with a relative minimum (33.4 to 33.6 psu).
- Coastal water or lower shelf water. This last one can be divided in a high salinity region (33.8 to 34.0 psu), defined by the central and southern area of the Province of Buenos Aires and the San Matías Gulf, and another region with lower salinity, defined by the Río de la Plata, El Rincón and the coast of the Province of Santa Cruz (Fig. 2-3).

According to the historical average of salinity distribution (Guerrero and Piola, 1997), it is possible to identify two low salinity areas and two high salinity areas on the shelf (Fig. 2-4).

The first low salinity area is located in the Strait of Magellan zone, where the diluted waters, which are a result of the continental runoff, enter the Strait through the Patagonian channels (Lusquiños, 1971).

The second low salinity area, north of 38° S, is due to the contribution of the Río de la Plata, which originates values lower than 33 psu. The first high salinity area is located in San Matías Gulf and it is the result of a local evaporation excess (Scasso and Piola, 1998: 12-31), whereas the second high salinity area is established outside the coastal area in El Rincón, and it can be the result of a local evaporation excess plus the effect of a more restricted circulation in the area, and/or the result of the discharge on the San Matías Gulf water shelf (Guerrero and Piola, 1997).

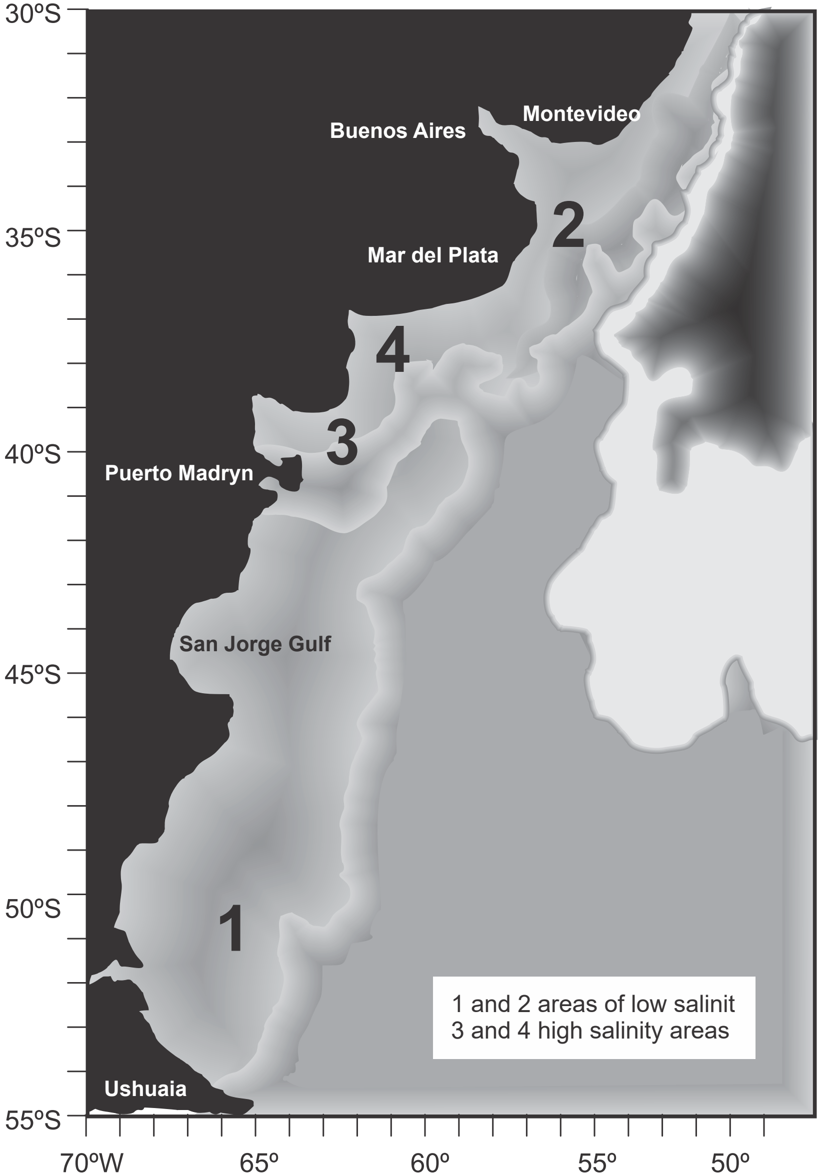


Figure 2-4. Climatological surface salinity distribution (historical average) (modified from Guerrero and Piola, 1997).

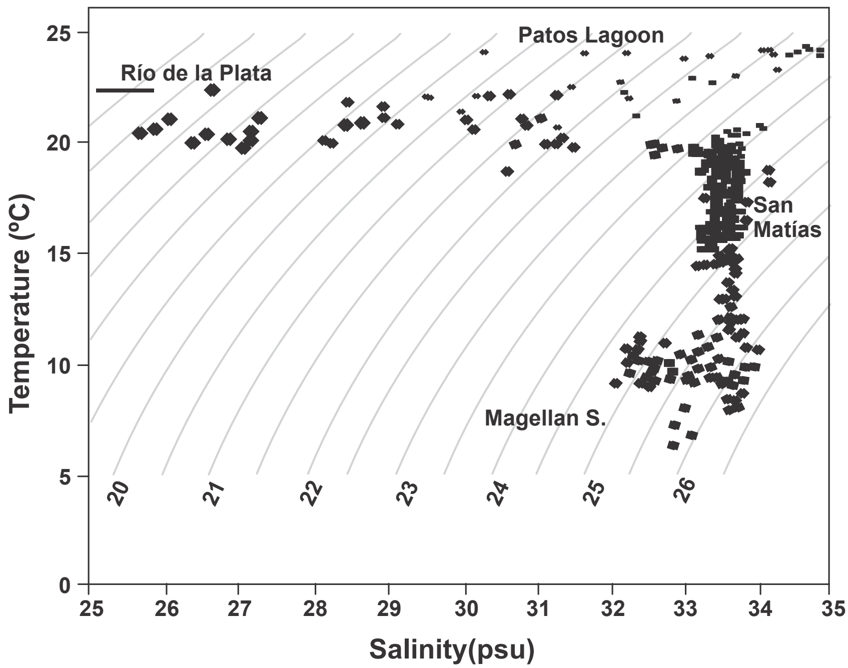


Figure 2-5 Temperature-salinity surface distribution during summers on the continental shelf between 30 and 57° S. The sampling seasons with influence on the Strait of Magellan, the San Matías Gulf, the Patos Lagoon and the Río de la Plata are highlighted (modified from Guerrero and Piola, 1997).

Shelf water, originated from subantarctic waters from the northern edge of the Drake Passage and the Malvinas current, presents a seasonal vertical stratification process which depends on the density, which, in turn, depends on the combined effect of temperature and salinity.

Warming during spring and summer and cooling during autumn and winter are the mechanisms which control the stratification's formation and rupture, respectively. The salinity fields between seasons do not show significant differences. Therefore, changes in salinity only affect the stratification in zones like the Río de la Plata (Strub et al., 2015: 3391–3418) and the Strait of Magellan (Krepper,1997: 49-65).

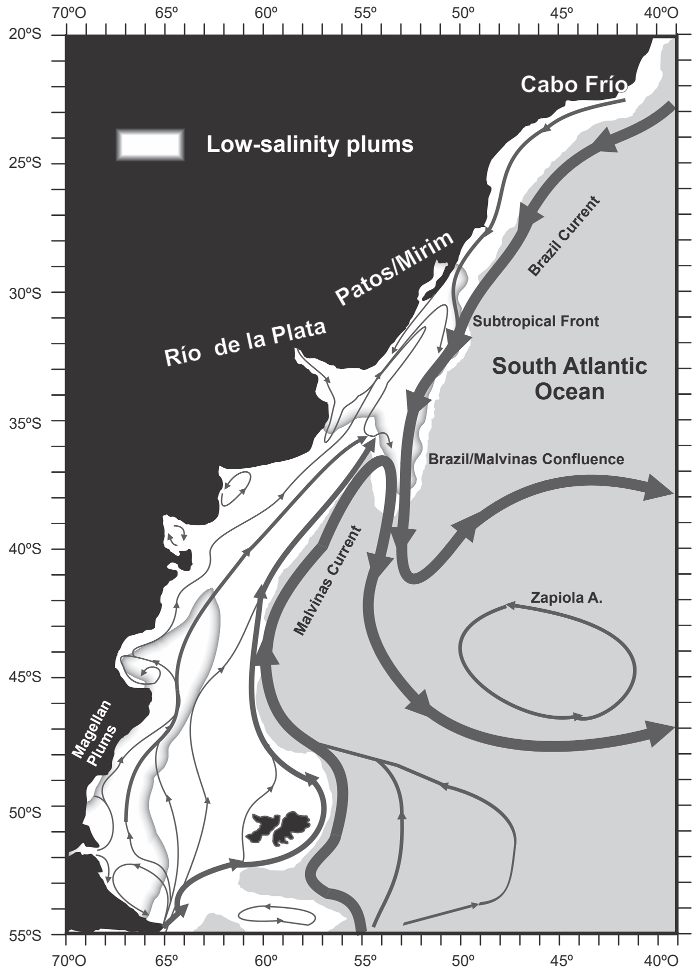


Figure 2-6 Schematic description of the circulation in the Southwest Atlantic (modified from Strub et al., 2010).

The oceanic region of the study area is characterised by the Malvinas and Brazil currents and the interaction zone between both, hereinafter referred to as confluence. The surface subtropical water of the Brazil current is characterised by temperatures higher than 10 °C (reaching 26 °C in summer) and salinities higher than 35 psu, whereas the subantarctic water of the Malvinas current presents temperatures lower than 10 °C and salinities lower than 34.3 psu (Reid et al., 1977; Severov, 1991; Bianchi et al., 1993). For both properties, the confluence zone oscillates between the indicated values, with even greater ranks, in view of the influence of the Rio de la Plata water. Gordon (1989), for example, established a temperature variation between 7 and 18° C and a salinity variation between 33.6 and 36 psu during a campaign conducted in October 1984, whereas Provost et al. (1996) in turn, established a salinity variation between 32 and 36.5 psu during February 1990.

2.3.2. Río de la Plata

The Río de la Plata drains South America's second water basin, which extends throughout Argentina, Bolivia, Brazil and Uruguay, covering 3,100,000 km2. The total discharge of the Río de la Plata, which is globally the fifth in volume, can be calculated considering the discharge of the Paraná and Uruguay rivers, its main tributaries, with estimated average values of 20,000 m3s-1 (CARP, 1989) 25,000 m3s-1 (Urien, 1967) and 22,000 m3s-1 (Framiñan and Brown, 1996), depending on the extension of the used series.

The Paraná river has an average annual discharge of 18,000 m3s-1, with a maximum flow during autumn and with a minimal flow in spring. The Uruguay river has a very variable regime and an annual average discharge of 5,000 m3s-1, with a maximum in summer and a minimum in autumn.

As a consequence of the imbalance of the tributaries' flow pikes, the Río de la Plata presents a weak seasonality in its discharge, having maximum discharge in the winter months (from May to July) and minimum discharge in summer (from December to March), with a difference of 22% (Guerrero et al., 1997). Besides, the discharge pattern interannual variations are very pronounced.

The estuarine area generated by this continental discharge has a surface of 35,000 km2, which constitutes a shallow and wide surface area for the exchange of properties between estuarine and shelf waters (Guerrero et al., 1997; Framiñan et al., 1999; Mianzan et al., 2001). Guerrero et al. (1997) describe a seasonal pattern of the bimodal water distribution on the shelf, which is close to the seasonal variation of the winds field.

In the summer months, the predominance of winds towards the coast forces a low salinity signal towards the south and along the Argentine coast up to 37° S. In autumn and winter, a net balance between the coast and ocean winds force the estuarine waters towards the north and the east, extending along the Uruguayan coast. Occasionally, these waters extend along the southern coast of Brazil, up to 23° S (Piola et al. 2000).

2.3.3. San Matías Gulf

San Matías Gulf (GSM) is located between 40° 50' and 42° 15' SL and between 63° 05' and 65° 10' WL. It is a semiclosed basin which includes an approximated area of 20,000 km2. The separation of shelf waters by means of a scarce depth bedrock (50 m) allows it to have its own oceanographic characteristics.

It is a warm water system (9-18° C) where the waters enter by the south of gulf's mouth, which stem from the Patagonic coastal current. Then, a circulation cyclonic gyre is formed (clockwise direction) with a seasonal thermohaline front in the southern region, where cooler and less brackish waters predominate (Fig. 2-7). By contrast, in the northern area of the SMG, the rain shortage, the absence of contributions of fresh waters and the high evaporation rate produce higher salinities.

This front breaks in winter, with the subsequent water mixing, creating a convection of deep waters and bottom ventilation. On the other hand, in summer temperatures reach 18° C and the average salinity is 34 (Piola and Scasso, 1988; González et al., 2004).

In summer, chlorophyll values reach 0.5 and 0.7 mg/m3, which is characteristic of less productive waters. In May, these values rise up to 1.97 mg/m3, mainly in the gulf's northwestern zone (Carreto et al., 1974).

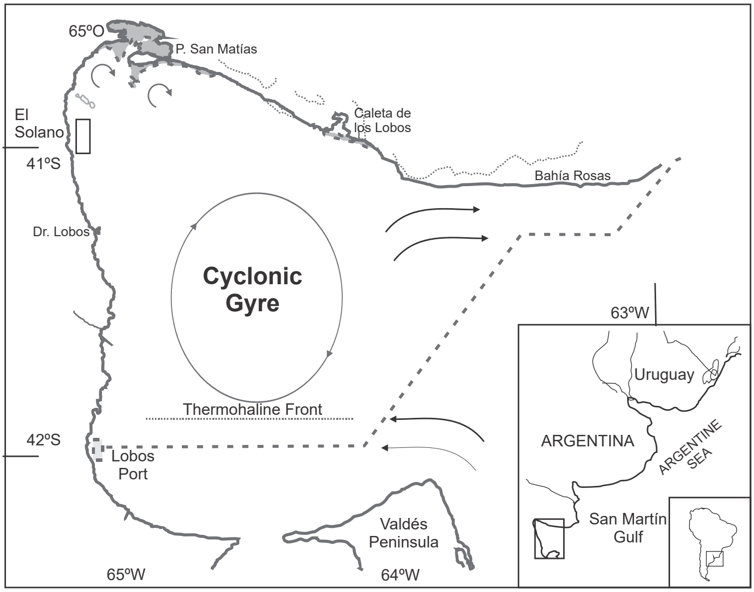


Figure 2-7. San Matías Gulf, 41°-42° SL, where the meaning of the oceanographic circulation cyclonic gyre and the seasonal thermohaline front are denoted (taken and modified from Gagliardini and Rivas, 2003).

In the southern part, low salinity and temperature values promote average chlorophyll values to 0.3-0.7 mg/m3. However, in the seasonal front these values are widely surpassed, with high concentrations of particulate matter, chlorophyll and zooplankton (Gagliardini and Rivas, 2003).

2.3.4. San Jorge Gulf (SJG)

The San Jorge Gulf (SJG) is a semiopen basin, located between 45° and 47° S, which occupies a total surface of 39,360 km2 (Fig. 2-7). It presents, in its central zone, depths between 80 and 95 m and, in the coastal southern area, the minimum depth can be of 30 m.

This system is characterised by the presence of warm-cool shelf waters which come from the mixing of pure subantarctic and coastal waters that flow from the Strait of Magellan, along the coast of the Province of Santa Cruz and enter, in part, into the SJG.

Coastal waters occupy the southern area and shelf waters cover almost the rest of the gulf (Reta, 1986; Sabatini, 2004). There is a characterisation of the gulf's sediments from the physicochemical point of view in which the analysed organic matter values indicate that the bottoms are in normal conditions with reference to its organic load (Fernández et al., 2005; Fernández, 2006), and the benthic communities' structure has remained with few variations throughout time (Roux et al., 1995; Roux and Fernández, 1997).

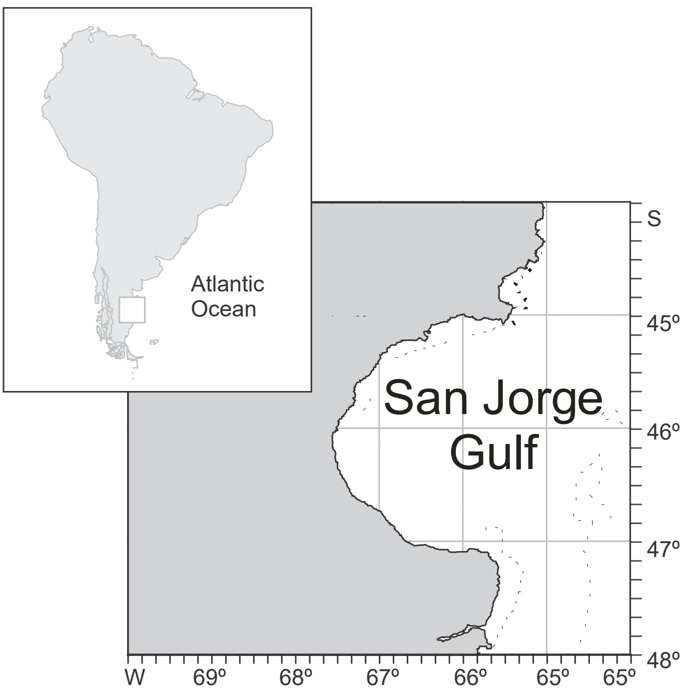


Figure 2-8. Geographical location of the San Jorge Gulf.

2.4. OCEANOGRAPHIC FRONTS

2.4.1 Introduction

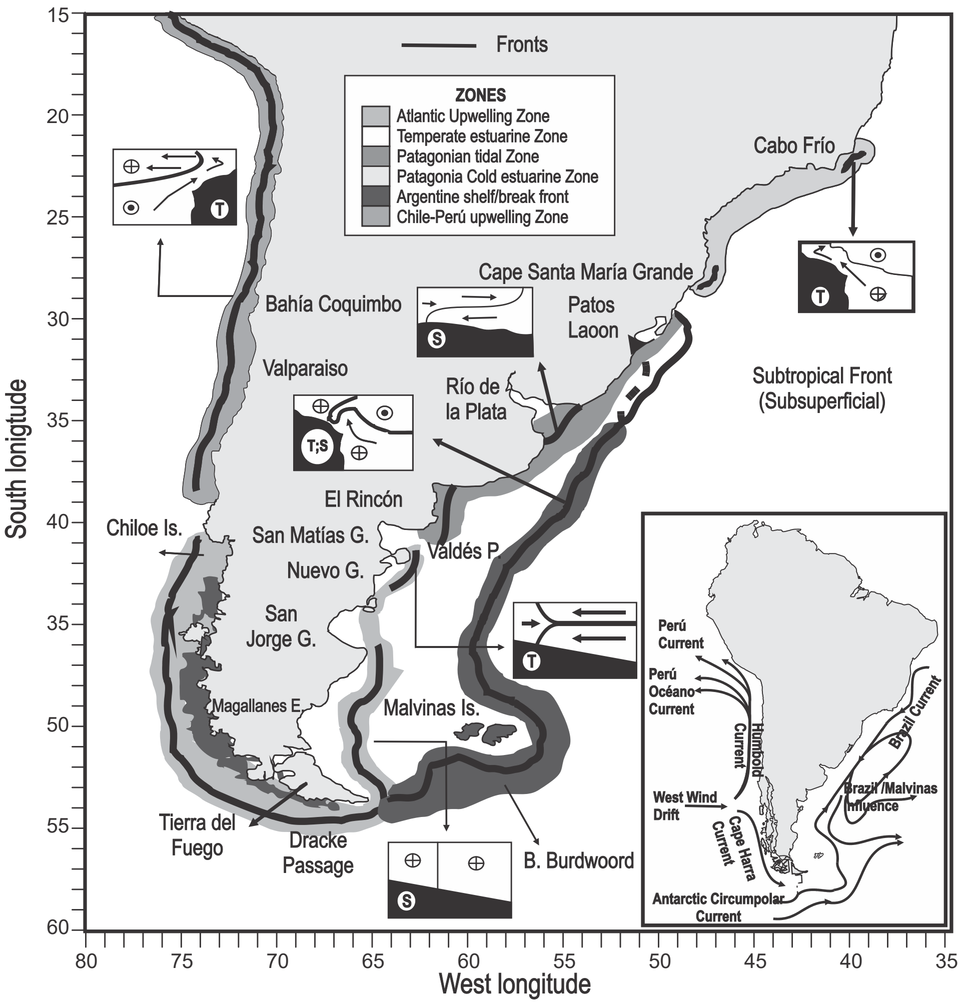


Figure 2-9. Frontal zones in South America. The diagrams in the boxes represent the fronts vertical structure; the black line shows the surface density; the arrows show the water flow; the circles with a cross indicate the water flow towards the inside and the circle with black dots shows the water flow towards the outside. T (temperature), S (salinity) (modified from Acha et al., 2004).

The fronts in the ocean constitute relatively narrow areas with important horizontal gradients of its physical, chemical and/or biological properties (Mann and Lazier, 1991; Ullman and Cornillon, 1999). Generally, the fronts can be then defined as limit zones which separate different types of water. This means that the frontal zone is extended along the water column up to a certain depth, which depends on the type of given frontal structure and the zone in which it is produced (relatively shallow and oceanic coastal zone).

The fronts surface manifestation, which presents temperature differences between both water masses, and the so called turbidity fronts originated in coastal zones by the interaction between marine and riverine waters, results identifiable through the use of satellite images and to allows infer, in many cases, the approximate position of the front in the whole water column.

On the other hand, the fronts present a great biological importance due to their capacity to gather plankton and particulate matter, thus inducing an increase in the productivity of those water masses. This productivity difference between the water masses where the front and the adjacent zones are produced, is identifiable through the use of colour satellite images of the sea as well.

Diverse frontal zones may be identified in the continental shelf of Argentina and the adjacent ocean (Fig. 2-9) which, taking into account the different spatial scales and the processes they originate, can be divided into three types of fronts:

- Oceanic fronts due to the encounter of current systems
- Fronts associated with the continental shelf and the tidal effects
- Coastal fronts originated by the encounter of shelf continental water masses and marine water masses

2.4.2 Fronts originated by the encounter of current systems

They are represented by the encounter of important current systems. Their manifestation on the surface is always of a thermal and permanent nature due to the fact that both currents have water masses with very different temperature and salinity properties.

This last fact allows its identification and analysis through the use of the sea surface temperature (SST) images and images derived from these, like the SST gradient images. As with other fronts, in the confluence fronts high levels of biomass are verified due to the permanent incorporation of nitrates which induce a great phytoplankton growth.

In the Southwest Atlantic we can mention the Antarctic polar front (Deacon, 1937; Ikeda et al., 1989; Moore et al., 1997, 1999), the subantarctic front (World

Climate Program 1985, Ikeda et al., 1989; Orsi et al., 1995) and the subtropical front (Reid et al., 1977; Olson et al., 1988; Gordon, 1989).

The latitudinal location of the first front is outside the considered area of this work. The subtropical front, characterised by the confluence of the Malvinas and Brazil currents (Fig. 2-9), varies its extension and location, not only latitudinally, but also longitudinally throughout the year, which is due to the differential influence of both currents according to the season of the year (Olson et al., 1988; Goñi et al., 1996; Bianchi and Garzoli, 1997).

2.4.3. Fronts associated with eddies and filaments in the open ocean

This type of fronts, although it originates as a consequence of derived interaction processes between two current systems with very different properties, constitutes mesoscale structures with a duration that oscillates from some days to several weeks. The filaments are originate as a consequence of the intrusion of water masses of a certain type in waters which correspond to another type, with a filament shape that gives it its name.

The eddies constitute a landslide of water masses which remain trapped in other types of waters. As the temperatures of both types of water are very different, both structures result clearly identifiable in the SST satellite images.

In the Southwest Atlantic, these frontal zones appear as a result of the interaction of waters of subantarctic and subtropical origin, which are a product of the confluence of the Malvinas and Brazil currents (Gordon, 1981; Legeckis and Gordon 1982). On the other hand, it must be highlighted that this type of fronts were understood only due to the appearance of the SST satellite images, which allowed the analysis of its spatial and temporal shape and evolution (Longhurst, 1998).

Similarly, the CZCS (Coastal Zone Color Sensor) images of the chlorophyll concentration (October 1978 to June 1986) and SeaWifs (September 1997 to December 2010) allowed the verification of the high biomass present in the edges of these structures.

2.5. FRONTS ASSOCIATED WITH THE CONTINENTAL SHELF AND THE TIDAL EFFECTS

2.5.1. Tidal fronts

When the tide finds hallower waters, as shelf waters, the width of the tidal wave and its horizontal speed increase gradually. While the wave moves forward towards the coast, the vertical turbulence produced by the friction between the tidal flow and the bottom increases.

At a certain depth, the vertical turbulence increases enough (when the turbulence produced by the wind adds to the sea surface) to break the thermal stratification of the water column and originate water mixing regions. The stratified and the mixing regions are separated by a frontal zone which migrates with the tidal period and, also, seasonally. During winter, water vertically mixed on the shelf is greater due to a greater wind effect.

The aforementioned processes cause a daily contribution of nitrates in the frontal zone, much greater than the adjacent stratified and mixture regions, and are responsible for the high biomass of phytoplankton observed on these fronts (Longhurst, 1998). In other words, the great number of phytoplankton is not a result of the accumulation in the frontal zone, but rather it is due to a growth in situ as a result of better trophic conditions.

In the Argentine shelf, a tidal front is developed at the east of the Valdés Peninsula (Glorioso, 1987) and its surface thermal manifestation is visible in the SST satellite images during the first months of spring and summer.

Actually, during spring, the seasonal thermocline starts to develop due to the warming of the surface layer, stratifying the water column. In this context, where strong tidal currents find shallow regions, part of the tidal energy is used to break the thermocline and mix the water column, generating a decrease in surface temperature due to the mixture of cooler waters which come from the bottom. The front separates waters with vertical mixing from stratified waters, mixture waters having a lower SST in comparison with stratified waters.

2.5.2. Shelf-brake front

The fact that a frontal zone of cool surface water is developed in the edge of the shelf or continental shelf-brake, which gives rise to big phytoplankton biomasses, has been known for a long time. Today, the most widely accepted explanation with regard to the shelf-brake fronts existence involves the creation of internal waves on the thermocline on the edge of the shelf, where the flow originated by the tides meets an irregular seabed topography.

It is thought that these waves are mainly originated due to the current displacement outside the shelf, where maximum speeds occur. And the existence of long internal waves of approximately 40 km long is confirmed through satellite observations (Longhurst, 1998).

These structures, together with the mixing due to the wind effect, are enough to explain the surface cooling and the enrichment of nutrients observed in these zones. Several mechanisms have been described to explain the mixing of waters through the frontal zone and, whichever the physical mechanism dominant in each place, the transfer rates must be very high and enough to hold the observed phytoplankton biomasses.

In the Southwest Atlantic, the shelf-break front is established between the medium shelf stratified waters and the shelf-brake waters (Martos and Piccolo, 1988; Carreto et al., 1995, Bertolotti et al., 1996), which consist of subantarctic waters from the Malvinas current (Fig. 2-3).

As with the Valdés Peninsula tidal front, the front thermal manifestation on the surface is visualised seasonally, during the spring and summer periods, when the shelf is vertically stratified by the warming of the mixing surface layer.

2.6. COASTAL FRONTS ORIGINATED BY THE ENCOUNTER OF SHELF CONTINENTAL AND MARINE WATER MASSES

2.6.1. Thermal coastal fronts

These fronts originate as a consequence of the cool continental waters' contribution to marine waters. As both types of waters present different properties, it is plausible to observe the oceanographic phenomenon through SST satellite images. In the Southwest Atlantic, a front with these characteristics is registered in the Province of Santa Cruz (Fig. 2-10) (Krepper and Rivas, 1979).

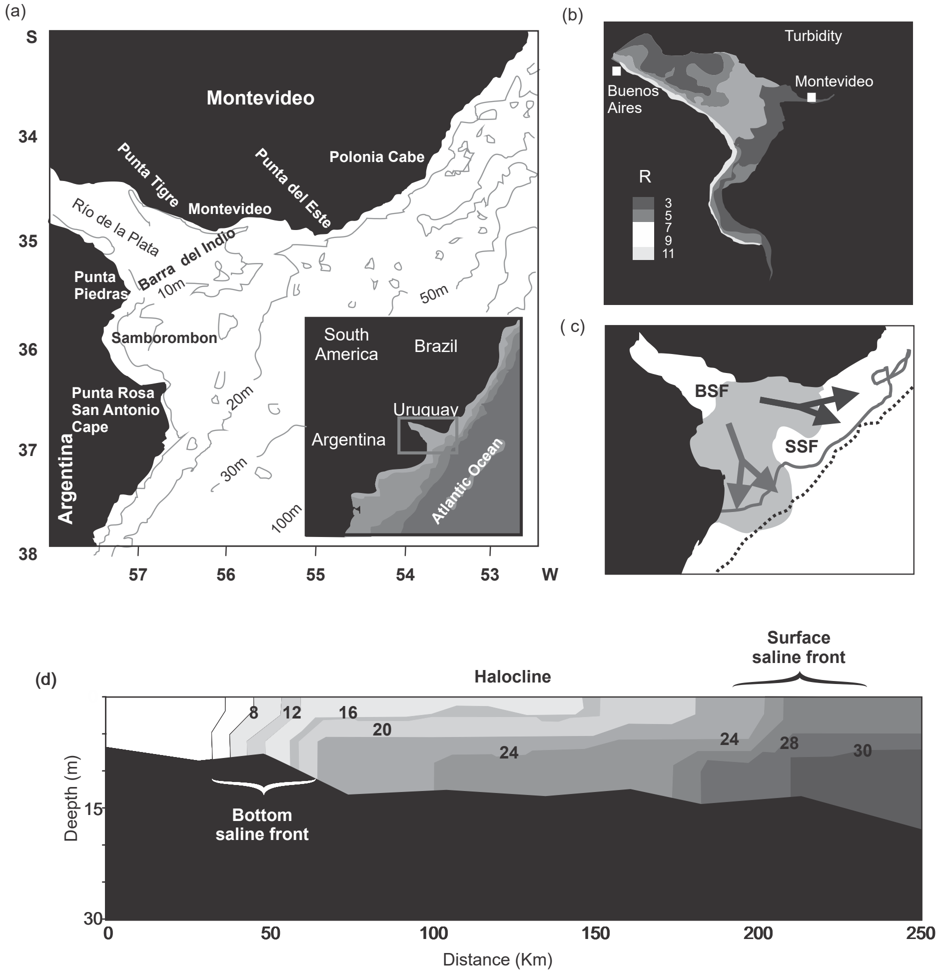


Figure 2-10. (a) Localisation of the Río de la Plata estuary; (b) turbidity distribution in spring; (c) seasonal distribution of the estuarine waters indicating the internal limit (BSF, bottom saline front) and the external limit (SSF, surface saline front); and (d) vertical saline distribution along the estuary central axis (modified from Jaureguizar et al., 2016).

Thus, during the thaw period in spring and summer, cool and low salinity shelf waters are deposited on the Strait of Magellan. These waters flow through the Strait towards the Patagonic continental shelf, turning afterwards to the left due to the Coriolis effect and moving against the Patagonic coast towards the north, reaching the San Jorge Gulf.

2.6.2. Turbid coastal fronts

A second type of coastal front is constituted by what is commonly known as turbid waterfronts Continental water, which generally comes from rivers discharge, carries a great quantity of sediments and suspended particulate matter that causes turbidity in water.

When these waters encounter with marine water under certain atmospheric and bathymetric characteristics, the differences between both types of water generate a front at the interaction area which can be clearly identified through satellite images as an abrupt change in the colour of water (Framiñan and Brown, 1996; Jaureguizar et al., 2016; Camiolo 2017).

The Southwest Atlantic has three areas where there are coastal waters with high levels of turbidity: the Patos Lagoon in the south of Brazil, the estuary in Bahía Blanca (commonly called El Rincón), and the estuary in the Río de la Plata river (Fig. 2-10). In the latter, there is a permanently turbid front on the surface whose dynamics are controlled mainly by winds.

The surface front has its counterpart in a deep saline front which originates due to marine water intrusion (denser) in the estuary in the shape of a salt wedge (Framiñan and Brown, 1996; Guerrero et al., 1997) and which is controlled by topography (Guerrero et al., 1997b).

The turbid front originates due to the addition of suspended material to the salt wedge and the sediments resuspension generated by the friction produced between tidal currents at the bottom (Framiñan and Brown, 1996).

2.6.3. Salinity coastal fronts

These fronts also originate due to the discharge from continental waters to marine water, but in this case both types of water mix at similar temperatures and the physical gradient is mainly caused by salinity differences.

In the Southwest Atlantic, this type of front can be seen in the Río de la Plata (described in “Turbid coastal fronts”) and in El Rincón (Fig. 2-10). In the latter, there is a coastal front that separates continental shelf water from water with a lower level of salinity resulting from the discharge from the Negro River and the Colorado River.

The salinity gradient increases due to the presence of high salinity waters in the shelf which originate in San Matías Gulf (Lucas et al., 2005). The front area maintenance is given by bathymetry and the shelf mean circulation (Guerrero and Piola, 1997).

2.7. AREAS OF BIOLOGICAL AND FISHING INTEREST

The oceanographic characteristics of the Southwest Atlantic, specifically the quantity and the diversity of the aforementioned fronts and the magnitude of the phenomenon that is the confluence of currents from Malvinas and Brazil, turn this ocean into a particularly productive area.

From a fishing and economic point of view, the great extension of the Argentine continental shelf requires constant monitoring of its resources to provide information about their condition.

Due to the high quantity of species of interest which inhabit these waters, this is the only manner to achieve a future development of responsible fishery that tends to preserve the exploited resources, or to recover those overexploited in order to reach a sustainable yield.

Argentina's National Institute of Fisheries Research and Development (INIDEP) carries out investigational research campaigns to achieve this objective which are complemented with information from commercial fleets (Sánchez 2000). Despite this, the campaign completion schedule has been seriously altered for a few years due to the loss of unrecoverable information.

Research campaigns do not only deal with fishing research and the gathering of biological information about the different captured species. These campaigns also gather information about bycatch which appears in every fishing operation and environmental data on the Argentine Sea ecosystems. Compiling environmental data is particularly important because without these data it would be difficult to understand the fluctuation that occurs in the population of species of interest.

The areas of biological and fishing interest in the Argentine shelf and shelf-break are the following:

In the Province of Buenos Aires, there are two main areas: the Argentine-Uruguayan Common Fishing Zone (AUCFZ), which comprises the maritime front of the Río de La Plata estuary, and the coast from 37° to 41° S. In the AUCFZ, there are demersal zone species (associated to the seabed) like the white croaker (Micropogonias furnieri) and the stripped weakfish (Cynoscion gutatucupa). The Samborombóm Bay, located at the south limit of the estuary, constitutes the breeding habitat for these and many other species of economic interest for coastal fisheries from Argentina and Uruguay.

In the coast of the Province of Buenos Aires, two of the most important species are the Atlantic chub mackerel (Scomber japonicus) and the anchovy (Engraulis anchoita). The Atlantic chub mackerel is found in Argentina and Uruguay, from 34° to 46° S. However, these resources are mainly exploited by bay and estuary fishing fleets from the port of Mar del Plata to an approximate radius of action of 30 nautical miles.

The anchovy is widely distributed (24° to 47° S) but the area of interest for our country is mainly a coastal area limited around Mar del Plata (38° S). At the same time, El Rincón (estuary of Bahía Blanca) also constitutes an important reproduction and breeding area for many species. The Argentine red shrimp (Pleoticus muelleri) is associated to the seabed and it can be captured at depths that range from 3 to 100 m. This species' distribution area extends along most part of the Argentine coast, from 37° S to 50° S. However, the area comprised from the San Jorge Gulf and its north coast to the proximity of Peninsula Valdés represents the most important area for this species in relation to its economic significance.

The Argentine red shrimp's life cycle is short, (it is considered annual in fishing terms), its growth rate is high and fluctuating both spatially and temporally and it has a great reproductive potential as well. That is the reason why a great natural variation in the Argentine red shrimp's biomass available for fishing can be characteristically observed in this fishery, which is naturally reflected in the landing that is declared per month and per year.

The distribution of the two most relevant resources in the Argentine sea, the Argentine hake (Merluccius hubbsi) and the Argentine hortfin squid (Illex argentinus), is quite broad along the Argentine shelf and it is not enclosed within any of the indicated areas.

Both species reproduce in the confluence area and their distribution is given by specific temperature patterns from the surface and the seabed.

Finally, various species of fishing interest can be found in the area located south of 50° S, like the longtail hake (Macruronus magellanicus), the southern blue whiting (Micromesistius australis) and the southern hake (Merluccius australis). These are all demersal species.

2.8. MARITIME FISHERY IN ARGENTINA

2.8.1. Definition and general characteristics

Argentina has a vast maritime coast of approximately 4700 km of shore on the South Atlantic Ocean. Argentina's continental shelf measures around 1,000,000 km2 and it is one of the widest shelves in the world. These characteristics make the Argentine Sea a region with significant marine biodiversity and one of the richest fishing grounds in the world. Around a thousand marine species of fish, molluscs and mammals are known to inhabit these waters. It is estimated that the fish diversity in the Argentine Sea is composed of around 450 species. Out of these, about 60 are fairly common and 40 are captured for commercial purposes (7 of them represent more than 70% of the total catch).

The productivity of the Argentine oceanic fronts has created diverse and abundant ecosystems which have given place to important fishing and maritime activities. These activities are the extraction of fish and other water organisms from the seas and oceans; that is, the exploitation of renewable natural marine resources. If these resources are appropriately administered, they can be preserved for future generations.

The importance of fishing resources makes Argentine fisheries an economic driving force with high hopes for the future. The importance that the fishing industry has over the economy is reflected in its contribution to the Gross Domestic Product (GDP), which has never surpassed 0.5% of the total (the maximum value ever was 0.45% of the total and it occurred in 2002). Nowadays, this industry's contribution to the GDP is 0.14%.

Since at least a decade ago, the fishing industry employs around 26,000 workers (a little under 0.2% of the total national employment). Of these workers, 16,000 are onboard crew and the rest work in processing industries and related services. Fishing exports (which represent around 80% of the total catch) are important and have reached the greatest value with US$1490 million in 2011. This value represents 1.8% of the total national exports for the same year and 7.4% of the exports of primary products.

2.8.2. Operation area

Necessarily located on the coast and focalised on their different ports, the fishing industry activities in Argentina are developed within 200 nautical miles of the Exclusive Economic Zone (EEZ) and its adjacent area called "mile 201" (currently subject to agreements between the coastal country and those fishing in international waters so as to protect transzonal species). Provincial administrations have jurisdiction over 12 nautical miles measured from the coast. This includes the gulfs and its characteristic fishing of anchovy, Atlantic chub mackerel and croaker in the coast of Buenos Aires, Argentine hake in San Matías Gulf, and Argentine hake and Argentine red shrimp in San Jorge Gulf. The activity of coastal vessels and high seas vessels, which mainly catch Argentine hake, Argentine hortfin squid and croaker, is characteristic of the common fishing area between Argentina and Uruguay (called Río de la Plata Maritime Front). The main activity performed by both wet-fish and freezer vessels of the Argentine fleet, which catch Argentine hake, Argentine hortfin squid and other species, is developed from this area to latitude 48° S. The activities carried out by vessels of great autonomy, such as freezer vessels and factory vessels, are developed south of this latitude in the area under Argentine jurisdiction and in the Malvinas Islands and South Georgia's waters (currently controlled by the Malvinas Islands' government) and in the proximity of the Argentine Antarctica. Some species captured, other than those already mentioned, are the southern blue whiting, the Patagonian toothfish, the Argentine hortfin squid and the Loligo squid.

2.8.3. Fishing fleet and ports

From a technical point of view, the national maritime fishing fleet is classified by size, autonomy of its units and operational methods as follows: (a) coastal wet-fish vessels, (b) high seas wet-fish vessels, and (c) processing freezer vessels. Therefore, coastal wet-fish vessels perform the coastal fishing activities and both the high seas wet-fish vessels and the processing freezer vessels perform the high seas fishing operations. The current fishing fleet (2012) comprises 628 vessels; 309 of these are dedicated to coastal fishing and 319 vessels are part of the industrial or high seas fleet (IDB, 2013).

The port of Mar del Plata, in the Province of Buenos Aires, has the highest quantity of landings and processing plants in the country. The other ports with the highest quantities, in descending order of importance, are in: Puerto Madryn (Chubut), Puerto Deseado and Punta Quilla (Santa Cruz), Ushuaia (Tierra del Fuego, Antarctica and South Atlantic Islands), Rawson and Comodoro Rivadavia (Chubut), Quequén (Buenos Aires), Bahía Blanca (Buenos Aires), San Julián (Santa Cruz), San Antonio Oeste (Río Negro) and Caleta Paula (Santa Cruz). The activities carried out by wet-fish vessels and the processing of the catch in the manufacturing plants are characteristic of the ports of Buenos Aires. On the other hand, the activities of freezer vessels, squid fishing vessels and surimi vessels are predominant in the Patagonia ports.

Fishing in the north area or Buenos Aires extends over around 230,000 km2, that is almost a quarter of the Argentine Sea, and generates almost half of the total national catch. The main ports are: Mar del Plata, Quequén, Ingeniero White, Bahía Blanca and Río Salado. Mar del Plata’s port has the necessary infrastructure to perform all the stages of production and therefore it is the most important port in the country. Fleets from Mar del Plata catch 80% of the total production in Buenos Aires. The Argentine hake represents 60% of the catch and thus it is the main species. Other species captured are the anchovy, the pink cuskeel, the narrownose smoothhound and the stripped weakfish. The most popular are the Argentine red shrimp among crustaceans and the Argentine hortfin squid among molluscs.

Fishing in the south area or Patagonia extends over the rest of the Argentine Sea. The main ports are: Ushuaia, Puerto Madryn, Puerto Deseado, Comodoro Rivadavia and San Antonio Oeste. In these ports, the catch includes: fish like the Argentine hake, crustaceans like the king crab and molluscs like the Argentine hortfin squid and mussels. Seaweed is collected from Valdés Peninsula to the south to produce agar mainly for export.

2.8.4. Production

Almost 21 million tons of fisheries were captured between 1990 and 2012 in the Exclusive Economic Zone (EEZ) of the Argentine Sea. Out of the total of tons, 41%

corresponds to Merluccius hubbsi (8.66 million tons), followed by Illex argentinus squid with 20.35% (4.25 million tons), unspecified fish species with 9.4% (1.97 million tons), longtail hake with 8.2% (1.7 million tons), southern blue whiting with 5.8% (1.2 million tons) and Argentine red shrimp with 3.9% of the total amount (0.82 million tons). The remaining percentage (approximately 10% of the total catch) comprises anchovy, pink cuskeel, Patagonian toothfish, stripped weakfish, white croaker, skates and sharks. For instance, in 2013 maritime catches added to a total of 821,000 tons. It was estimated that 63.2% corresponded to fish, 24.1% to molluscs and 12.7% to crustaceans. The fishing industry's challenges are focusing its efforts on high added value fish products per weight unit as well as finding market opportunities for those species whose catch might still increase significantly.

During the past decade, there was an increment in the Argentine red shrimp landings with a maximum of 233,000 tons in 2017, far exceeding all historical maximum records (http://www.minagri.gob.ar/site/pesca/). Besides the excessive catch of the Argentine red shrimp, a migration of the fishing efforts from north to south, the great problem for this fishery is the bycatch of the Argentine hake and its subsequent discards due to the fact that the shrimp fishing fleet receives more economic incentives for shrimp than for the Argentine hake itself (ratio of 3:1) (Fig. 2-11).

The Argentine hake is the base resource for the wet-fish fleets and the freezer fleets in Argentina due to catches of around 200 thousand annual tons (http://www.minagri.gob.ar/site/pesca/) and a maximum catch of 375 thousand tons in 2004. However, the Argentine hake is currently going through a crisis caused by many factors, such as a recruitment deficit, the catch of younger fish and a notorious overexploitation (Aubone et al., 2004; Cordo, 2006; Renzi et al., 2009).

The pink cuskeel, on the other hand, is on the verge of reaching its extraction capacity limit (Cordo, 2004) due to reproductive biomasses that are highly depreciated (7.5% of the virginal reproductive biomass), landings of juveniles, and a decrease in total catches, landings and biomasses (Di Marco, 2017). The provinces (under their own management jurisdictions), together with the State, have developed plans to manage this situation, which include: close seasons and areas, a national and provincial on-board observers plan, and research on the development of new methodologies and technologies to decrease the bycatch and discards experienced in the fishing of the Argentine red shrimp as well as the Argentine hake.

Both types of fishery are technologically and ecologically interdependent. That is to say, they have a strong interaction with one another not only in space and time, but also in relation to their target species. The demersal trawl fleet's target species is the Argentine hake, and its bycatch is the Argentine red shrimp (not discarded). Inversely, the bycatch of beam trawlers, which target their fishing operations at the Argentine red shrimp, is the usually discarded Argentine hake (Fig. 2-11).

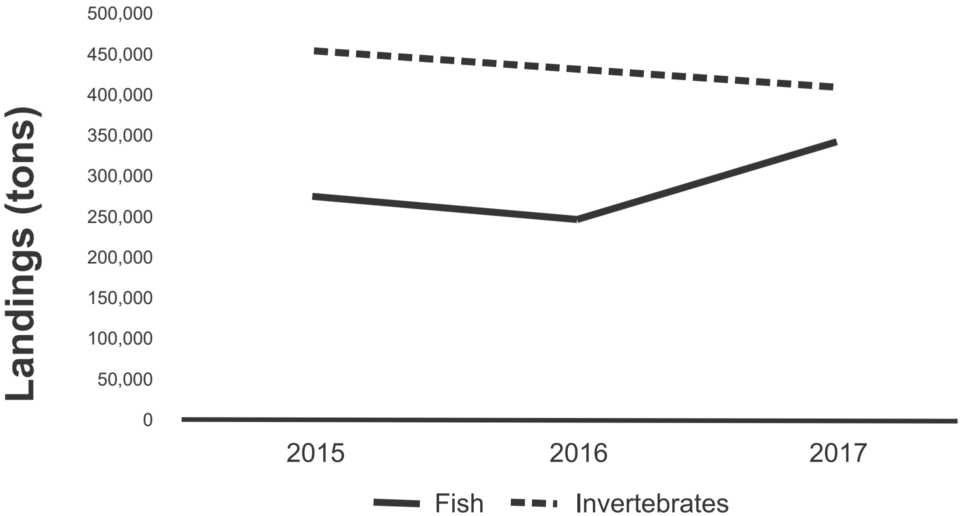


Fig. 2-11. Total landings in Argentina from 2015 to 2017, divided in fish (chondrichthyes and osteichthyes) and invertebrates (shrimps, king crabs, squids and scallops). Data obtained from http://www.minagri.gob.ar/site/pesca/.

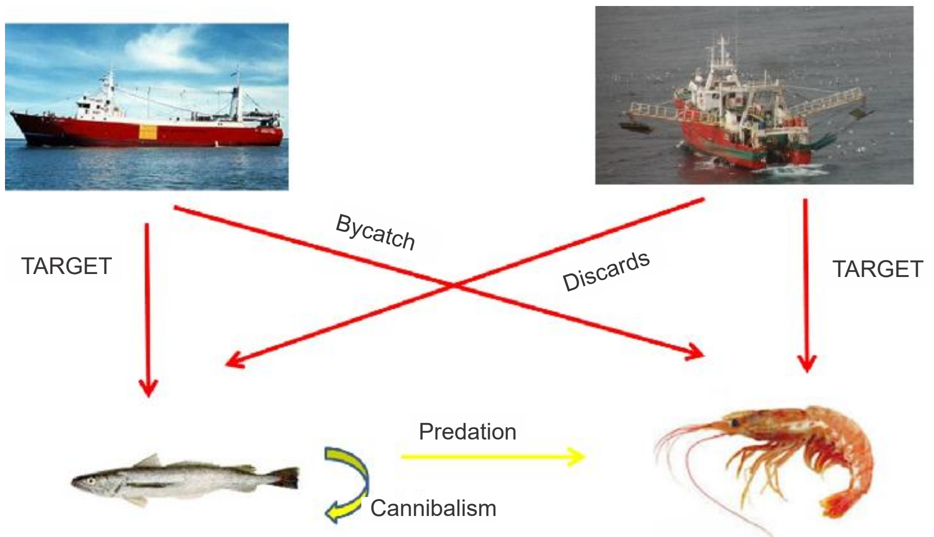


Fig. 2-12. Argentine hake and Argentine red shrimp fisheries. Technologically and ecologically interdependent.

2.8.5. International fishery

International fishery occurs outside the 200 miles of national sovereignty or Exclusive Economic Zone (EEZ). In Law 23.968, Argentina establishes the basis from which the 200 miles of the EEZ are calculated. Article 5 states: "National laws on the preservation of resources shall apply beyond the 200 nautical miles for migratory species or those which intervene in the food chain of the EEZ species."

The highly migratory resources caught outside the EEZ are mostly the Argentine hake and the Argentine hortfin squid, both of great commercial value. Other species that should be taken into account are the Loligo squid, the longtail hake, the notothens and the grenadier. The Patagonian toothfish, a species managed by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), is also captured there.

Fleets that catch transzonal species outside the Argentine EEZ mainly come from the European Union (especially Spanish and Portuguese vessels), China, South Korea, Japan, Russia, Chile and Taiwan. Even though these are the most significant fleets, there might also be vessels from other nationalities present, like Belize and Panama.

The number of vessels in these fleets might be as high as 250 to 300. These vessels fish without proper national control or regulations that protect the resources. This practice, caused by many factors which we will analyse later, generates great economic damages for our country mainly due to fishery exports losses for values which surpass the U$S600 million annually.

2.8.6. Artisanal fishing, bay and estuary fishing. Characteristics, ports and species

Artisanal fishing, or bay and estuary fishing, includes the sector commonly called artisanal due to the small-scale operations and its subsistence characteristics. This fishery is essentially characterised by a low daily catch capacity and a short sailing time and distance. During the past decades, these types of fisheries have developed greatly in the Argentine coast due to the demographic increase in the coastal areas.

The activity has given place to growth for those who make a living out of artisanal fishing. In many cases, however, this sector is highly developed and generates significant volumes of marketable fisheries. On average, these vessels have 4 crew members, they set sail 42 times in the year, and they do not stay at sea for more than two days per tide. Their total stay during the year does not exceed 70 days and the total catch barely reaches 250 tons (IDB, 2013).

Artisanal fishing in Argentina is a secondary practice developed along the near 4000 km of maritime coast. The activity is highly variable and it has many noticeable regional characteristics depending on the accessed resources, the social and cultural characteristics of the community, and the political and social conditions in the region. In addition, this is a poorly regulated activity with no perspective when it becomes necessary to develop fishing policies. These policies have invariably included excessive exploitation of the natural resources and therefore artisanal fishing has become a passive victim of the fisheries' depletion.

At the moment, associations and groups of artisanal fishers which operate in the Argentine maritime coast are brought together by the Association of Artisanal Fishermen of Argentina (UAPA), among other associations. The different groups are composed of fishers, oyster farmers, shellfish gatherers, octopus fishers, divers and seaweed harvesters who have a long career path and are representative of the industry.

- Length: up to 9 m
- Beam: 4 m
- Depth: 1.8 m
- Propeller engines: 100 to 200 HP
- Carry from 5 to 8 tons
- Crew members: 2 to 6, depending on the fishing gear used
- Sailing distance: 15 nautical miles
- Maximum time at sea: 24 hours
- Seasonal catch: anchovy, Atlantic chub mackerel, silverside, liza, white croaker, stripped weakfish, blue fish, Argentine red shrimp, prawn, Brazilian menhaden, etc.
- Fishing gear: surrounding nets, handlines, bottom trawlers, midwater pair trawls, dredges and beam trawls.
- Ports: most of the Atlantic coast

2.8.7. Nearby and distant coastal fishing Characteristics, ports and species

Coastal fishing is performed up to 12 nautical miles from shore. According to Article 3 of Law 24.922, this jurisdiction corresponds to provincial states.

Coastal fishing generates approximately 120,000 tons of annual landings (average of the last five years). This volume represents a little over 11% of the total catches during this period (Bertoloti et al., 2017). The coastal fleet has around 309 vessels with some heterogeneity.

An average of 5 crew members have boarded the nearby coastal fleet (231 vessels) per vessel. The average vessel has set sail 41 times in the year, it has stayed at sea 2.4 days per tide and it has captured an average of 457 tons per vessel during the year. On the other hand, the distant coastal fleet (78 vessels) represents 25% of the coastal fleet total. An average of 8 crew members have boarded this fleet per vessel. It has set sail 38 times during the year and has stayed at sea for an average of 5 days per tide. It has also stayed at sea during 185 days per vessel and its annual average catch was of 1,069 tons.

Nearby coastal fleet

- Length: 9 to 15 m
- Beam: 3.5 to 4 m
- Depth: 1.8 to 2.0 m
- Propeller engines: 250 to 300 HP
- Carries from 10 to 12 tons
- Sailing distance: 40 nautical miles
- Maximum time at sea: 36 hours
- Seasonal catch: pelagic species and a varied coastal fish group which includes: anchovy, little tunny, red porgy, Atlantic chub mackerel, silver side, white croaker, smoothhound, prawn, Argentine red shrimp, flounder, Argentine sea bass, Argentine croaker, stripped weakfish, angel shark, Brazilian flathead, skates and Brazilian sandperch.
- Fishing gear: surrounding nets without purse lines (lampara nets), handlines, bottom trawlers, midwater pair trawls, dredges and beam trawls.
- Ports: most of the Argentine coast

Distant coastal fleet

- Length: greater than 15 m
- Beam: 4 to 6 m
- Depth: 1.8 to 2.5 m
- Propeller engines: 250 to 400 HP
- Carries from 10 to 20 tons
- Crew members: 4 to 10, depending on the fishing gear used
- Sailing distance: 180 nautical miles
- Maximum time at sea: 72 to 96 hours

- Seasonal catch: anchovy, Atlantic chub mackerel, little tunny, red porgy, white croaker, stripped weakfish, blue fish, Argentine red shrimp, prawn, Brazilian menhaden, etc.
- Fishing gear: surrounding nets without purse lines (lampara nets), surrounding nets with purse lines (purse seines), bottom trawls, midwater trawls, midwater pair trawls, mussel dredge, red porgy traps, gillnet, etc.
- Ports: Mar del Plata, Quequén, San Antonio Oeste, Puerto Madryn, Comodoro Rivadavia and Caleta Paula

2.8.8. High seas wet-fish fleet. Characteristics, ports and species

The high seas wet-fish fleet operates beyond mile 12 and up to mile 200. It is also called offshore fishing. The industrial wet-fish fleet was established with an average of 126 active vessels, reaching a minimum of 110 in the year 2015 (Bertoloti et al., 2017).

This fleet's main port is Mar del Plata because two thirds of the vessels moor in said port. The second main port, by great difference, is Comodoro Rivadavia.

Around 70% of fish and seafood are landed there.

- Length: 25 to 50 m
- Beam: 6 to 9 m
- Depth: 2.0 to 3.5 m
- Propeller engines: 400 to 1700 HP
- Carries from 50 to 200 tons
- Crew members: 6 to 21
- Sailing distance: are allowed to fish in the whole Exclusive Economic Zone (EEZ)
- Maximum time at sea: 20 to 50 days
- Fishing gear: bottom trawler, midwater trawl, bottom pair trawl, red porgy traps, surrounding nets with purse lines (purse seines).
- Catches: Argentine hake, pink cuskeel, longtail hake, anchovy, Atlantic chub mackerel, red porgy, Argentine red shrimp, little tunny, etc.
- Ports: Mar del Plata, Quequén, San Antonio Oeste, Puerto Madryn, Comodoro Rivadavia, Caleta Paula and Puerto Deseado

TYPE OF VESSEL	Number of vessels	Number of crew members	Number of tides	Days/Tide	Sailing days/years	Annual catch (T)
Freezer vessel	38	39	8	25	208	4,028
Squid fishing vessel	65	28	3	36	111	1,160
Surimi vessel	2	88	5	43	215	13,742
Longline vessel	2	31	5	59	294	634
Beam trawler	77	23	12	14	177	857
Scallop vessel	4	31	7	35	242	1,292
Industrial fleet	188	23	13	13	165	1,721

Table 2-1. Recent average characteristics of the operation of different types of vessels from the industrial fishing fleet. Source: based on preliminary data issued by INIDEP. Communication to Unit for Rural Change — UCAR, 2013.

2.8.9. Industrial fleet: Squid fishing vessels, beam trawlers, freezer vessels, surimi vessels and scallop vessels. Characteristics, ports and species

Unlike coastal vessels, the industrial fleet vessels are of various sizes, and they have different hold capacities, engine powers and fishing gear.

An average of 23 crew members have boarded the industrial fleet per vessel. The average vessel has set sail 13 times in the year, it has stayed at sea 13 days per tide and it has captured an average of 1,721 tons per vessel during the year (Table 2-1, modified from Bertoloti et al., 2017).

In this group of vessels, some of the most prominent are those specialised in specific species like squid fishing vessels (dedicated exclusively to squid fishery), vessels for the scallop exploitation, longline vessels (dedicated to the Patagonian toothfish exploitation) and beam trawlers, which catch the Argentine red shrimp.

The others, with many variations, are all trawlers. There is no significant distribution of physical productivity per crew member between the different types of vessel, probably except for surimi vessels. Therefore, freezer vessels and wet-fish vessels' productivity per crew member per year oscillates between 104 and 116 tons, while surimi vessels reach 157 tons.

Surimi vessels' operations in the Southern Sea and the search for the Patagonian toothfish in these areas have caused the usage of the port of Ushuaia by longline vessels. The squid fishing vessels fleet has chosen Puerto Madryn as their main destination, Comodoro Rivadavia as the second and Punta Quilla as the third.

Beam trawlers dedicated to the fishing of Argentine red shrimp produced great landings in these fisheries' area of influence: Río Deseado, Comodoro Rivadavia and Puerto Madryn ports. Finally, the powerful processing freezer vessels fleet chose Puerto Madryn and Puerto Deseado as their two main naval stations, even though a similar amount of these vessels can be found in Mar del Plata.

During the period from 2000 to 2012, approximately 11.1 million tons of fisheries were captured. The industrial fleet supposedly has been responsible for catching 54% of said total (Table 2-2).

TYPE OF FLEET	TOTAL CATCH	%
Coastal fleet	1,567,018	14
Wet-fish vessel	3,556,619	32
Industrial fleet	9,512,173	54
Freezer vessel	2,639,155	24
Squid fishing vessel	1,902,696	17
Surimi vessel	675,644	6
Beam trawler	580,255	5
Longline vessel	66,258	1
Scallop vessel	91,547	1

Table 2-2. Total catch according to fleet type for years 2000 to 2012.
Source: based on preliminary data issued by INIDEP.
Communication to Unit for Rural Change — UCAR, 2013.

Freezer vessels

- Length: 40 to 144 m
- Beam: 10 to 20 m
- Depth: 5.0 to 12.0 m
- Propeller engines: from 1800 to 7000 HP
- Daily freezing: from 10 to 300 tons depending on the processing type
- Carry from 400 to 5000 tons
- Crew members: 25 to 80
- Sailing distance: are allowed to fish inside and outside the Exclusive Economic Zone (EEZ)
- Maximum time at sea: 30 to 90 days
- Fishing gear: bottom trawler, semipelagic and pelagic
- Catches: Argentine hake, longtail hake, southern blue whiting, pink cuskeel, Patagonian toothfish and various coastal fisheries.
- Ports: Mar del Plata, Quequén, Puerto Madryn, Puerto Deseado and Ushuaia

Surimi vessels

- Length: 60 to 112 m
- The maximum catch capacity was estimated at 18,000 tons per year per vessel
- Propeller engines: main engine 4000-5500 HP
- Daily freezing: 85 tons of surimi or 50 tons of fillet blocks and tons of fish flour per day
- Crew members: maximum 85
- Maximum time at sea: 30 to 90 days
- Fishing gear: bottom trawler, semipelagic and pelagic
- Catches: longtail hake, southern blue whiting, Patagonian toothfish, silver warehou, Patagonian cod, butterfish and grenadier.
- Vessels have a processing plant where it is possible to freeze fisheries (in tunnels and plates) and freezers to preserve frozen products, surimi, fillet blocks and HGT fish. They also have facilities to manufacture fish flour
- Ports: Mar del Plata, Puerto Madryn, Puerto Deseado and Ushuaia

Squid fishing vessels

- Length: 45 to 70 m
- Beam: 9 to 12 m
- Depth: 3.0 to 5.0 m
- Propeller engines: 1200 to 2200 HP
- Carry from 400 to 1500 tons
- Crew members: 22 to 30
- Sailing distance: are allowed to fish in the whole Exclusive Economic Zone (EEZ)
- Maximum time at sea: 30 to 70 days
- Fishing gear: automatic squid fishing machinery
- Catches: Illex argentinus squid and Ommastrephes
- Ports: Mar del Plata, Quequén, Punta Alta, San Antonio Este, Puerto Madryn and Puerto Deseado

Longline vessels

- Length: 28 to 60 m
- Beam: 7 to 11 m
- Depth: 2.7 to 5.0 m
- Propeller engines: 700 to 2400 HP
- Daily freezing: from 5 to 15 tons depending on the processing type
- Carry from 90 to 400 tons
- Crew members: 20 to 35
- Sailing distance: are allowed to fish inside and outside the Exclusive Economic Zone (EEZ)
- Maximum time at sea: 30 to 90 days
- Fishing gear: bottom longline
- Catches: Patagonian toothfish, southern hake, pink cuskeel, Patagonian cod, etc.
- Ports: Puerto Madryn, Puerto Deseado and Ushuaia

Beam trawlers

- Length: 28 to 50 m
- Beam: 7 to 10 m
- Depth: 3.0 to 5.0 m
- Propeller engines: 80 to 200 HP
- Daily freezing: from 5 to 10 tons depending on the processing type
- Carry from 90 to 400 tons
- Crew members: 18 to 25
- Sailing distance: are allowed to fish inside and outside the Exclusive Economic Zone (EEZ)
- Maximum time at sea: 30 to 60 days
- Fishing gear: shellfish nets
- Catch: Argentine red shrimp
- Ports: Puerto Deseado, Comodoro Rivadavia and Puerto Madryn

2.8.10. New challenges, new fisheries (crabs, lobsters)

Some of the most representative species of the Argentine Sea are at their maximum extraction capacity or, in the worst-case scenario, overexploited. As expressed by the fisheries' descriptive indicators, landings, catches and biomasses show tendencies clearly decreasing in the long term.

This situation has immediate economic, social and political repercussions which are characterised by high industry indebtedness, high unemployment, controversy between different private agents and between private agents and public regulatory and auditing entities as well.

The increase of fishing efforts on the classic stock can lead either to their collapse or to changes in the structure and functioning of the ecosystem, akin to what was reported by Gislason et al. (2000), thus compromising the future sustainability of fisheries (Pauly et al., 1998a; 2004).

In this context, the industry based on the biological, ecological and fishing knowledge about new resources needs to deviate fishing efforts of compromised species towards other sources.

Some of these new fisheries gain importance with a change of distribution determined by environmental changes or, otherwise, by further research that has generated more knowledge and, at the same time, the opening of new markets. This is the case of species like the deep-sea red crab and the deep-sea lobster.

1) The deep-sea red crab Chaceon notialis (Manning and Holthuis, 1989)

The Geryonidae family is constituted by deep-sea brachyuran crabs. These crustaceans have a high commercial value and they are broadly distributed around the world. They can be found in: the Western Atlantic Ocean, from Nova Scotia (Canada) to Puerto Madryn (Argentina); the Eastern Atlantic Ocean, from Norway to Angola; the Indian Ocean, in Madagascar and Île Saint-Paul; and, in the Pacific Ocean, they are registered in New Caledonia and Chile.

The red crab Chaceon notialis is distributed in the Southwest Atlantic and it is an endemic deep-water species which can be found between latitude 33° S and 43° S (Barea and Defeo, 1985, 1986, Spivak, 1997). In the Argentine-Uruguayan Common Fishing Zone (AUCFZ), it was first referred as Geryon quinquedens by Scelzo and Valentini (1974).

Some species of Geryonid crabs live in muddy or muddy and sandy bottom areas, where they can partially bury themselves, while others live in cracks, caves and rocky formations on the shelf and the shelf-brake, between 40 and 2155 m deep (Wigley et al., 1975). However, they are mostly found in greater numbers between 200 and 1000 m, at temperatures which oscillate from 4 and 12° C and a salinity between 34.5 and 35.2 ppm.

The red crab's life cycle is typical of most brachyuran crabs (Hastie, 1995). Mating occurs when the mature female moults. Fertilised eggs are attached to the abdomen and carried by the female for a long period (of up to nine months) until the eggs hatch. The larvae are released into the water column where they can migrate and be transported.

After several larval stages, juveniles (megalopa) settle in deep water (close to 1000 m) and subsequently migrate to shallower water during their development. In the 80s, research campaigns were performed in Uruguay with the objective of delving into topics like biomass, distribution, catch methodology and species processing (Barea and Defeo, 1986; Defeo et al., 1989, 1991).

The Chaceon notialis' relative abundance was greater between 400 and 700 m deep where a maximum output of 25 kg/trap was achieved. Male were more abundant than females, the latter being concentrated mainly in shallower water (300 to 400 m). Both female and male sizes were smaller and the percentage of females lowered as the depth increased, so a bathymetric stratification by size and sex can be deduced. There were plenty ovigerous females in shallower waters (300 and 400 m) and towards north of 38° S, which presumably could make this location a well-defined reproduction area in the Southern Atlantic for the species. Preliminary calculations about the red crab growth showed a total length of 138 mm for males and 124 mm for females.

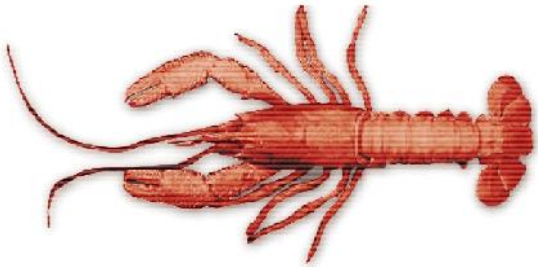
The estimated biomass of the study area oscillated between mean values of 14,000 tons (spring) and 22,000 tons (summer). According to the minimum sizes which can be commercialised due to the requirements of a large section of the international market (110 and 114 mm), the exploitable fraction of the population would fluctuate at values close to 10,000 tons.

Considering the terrain topography where the species inhabits and its behaviour, as well as the selection of gear depending on the catch by size and sex, it was concluded that the appropriate fishing gear for the red crab were traps (Barea and Defeo, 1986).

Uruguay has had fishery since 2002, but it is now suspended due to the main company's economic issues. Since 2003, the study area has been under expansion up to latitude 37° 00' and 1600 m deep with the purpose of establishing management measures based on a precautionary approach. A Maximum Sustainable Yield (MSY) is established every year. Uruguay's total annual catch was 854 and 970 tons (2013 and 2014), with an average export price of 7470 dollars per ton in 2014 (2014 Fishing Statistical Bulletin, MGAP).

2) Deep-sea lobster (Thymops birsteini)

This species inhabits the waters in the south of South America and in the Scotia Sea (Holthuis, 1991). Specifically, it is found outside the continental shelf, between 37° and 57° S and 35° and 76° W (Holthuis, 1991; Boschi et al., 1992). This includes Argentina and Chile, towards the north, east and south-east of the Malvinas Islands and the east of South Georgia (Holthuis, 1991): Argentina (Chubut, Río Negro, Santa Cruz, Tierra del Fuego); Chile (Aisén, Magallanes); Malvinas Islands, South Georgia and the South Sandwich Islands (South Georgia). This species can be found at depths that range from 122 to 2516 metres; however, it is more likely to find it between 122 and 900 metres (Holthuis, 1991; Laptikhovsky, 2009).



Specimens of Thymops birsteini have been captured at latitude 36°18' S and longitude 53° 23' W using a prawn trawler at a depth of 800 m. It is said that Thymops birsteini is related to Chorismus tuberculatus and Munida sp, even though this has not been corroborated because there are no records about the catch of said species today. Scarabino et al., (1985) refer to this species as a potential benthic resource accessible to fisheries and talk about it as a bathyal resource that could be extracted using cylindrical traps or truncated conical traps.

There are few previous studies about this lobster, like Laptikhovsky and Reyes' 2009 work. They express that the distribution area of the species is much wider than the specific fishing grounds and it is found at a particular depth range.

Lobsters are benthic organisms which have adapted to crawling. This group crawls using their thoracic legs, but they can also move quickly backwards to escape by bending the abdomen. Pleopods have never adapted for swimming, so they are used for ventilation. Lobsters are heavy decapods which generally inhabit caves and cracks on rocky bottoms.

Nephropidae have chelipeds, and they are similar to river crabs in shape. Their cephalothorax is almost cylindrical and they have a well-developed abdomen with dorso-ventral flattening. They have trichobranchiate gills enclosed at the sides of the shell. These organisms are dioecious, that is, there are distinct male and female individuals. Males transfer sperm to females through spermathophores using the male's anterior pair of pleapods.

Females carry the eggs on the pleapods and hatch as zoea larvae. The sampled specimens' modal cephalothoracic length was 75 mm (measured from the orbit to the posterior edge of the thorax at the limit with the abdomen). The average measurements were 210 mm in total length and 113 mm in abdomen length. The total average weight was 152 g and the total weight of the abdomen ("tail") was 45 g.

The experimental daily outputs on average were 19 kg/day and the outputs per trap lines were 7.55 kg/day in wet weight. The relative average weight of the "tail" is approximately 25% of the total weight of the lobster. Each block of 9 kilograms on average has approximately 200 frozen lobster tails.

Tramps which imply waiting time and are connected by recovery lines were chosen. Traps are made in a truncated conical shape, with a conical entry on the side. Each trap was prepared with several mesh bags containing bait, usually squid or sardine. Until today, the catch of lobster T. birsteini has not been considered a fishery in traditional landings of the national fishing fleet. This fishing modality using traps creates an opportunity to gain knowledge and investigate about a not very well -known species like the deep-sea lobster.

Considering all the above, it would be useful to conduct a campaign of biological and fishing evaluation to determine the distribution area, the biomass and the fishing potential of the species.

Chapter 3

FAO AND THE CODE OF CONDUCT FOR RESPONSIBLE FISHERIES

ECOSYSTEM APPROACH AND FISHERIES CO-MANAGEMENT

3.1. INTRODUCTION

In the fishing industry, the word “release”, generally uttered in solitude by the captain of a fishing vessel when throwing the net into the water, might be utterly significant. The action triggered generates a series of biological, physical, productive and business impacts which inevitably are in the captain’s hands. Therefore, the fishing captain’s education and training becomes a tool which is exact and gives him the necessary information so that making decisions in solitude is not so solitary.

The precautionary approach, the Code of Conduct for Responsible Fisheries, the ecosystem approach and the fisheries co-management are strong and comprehensive concepts which finally regulate human beings’ behaviour to achieve sustainable development.

For decades, the usually unsuccessful fishing management’s main target has been using the aquatic ecosystems in a sustainable manner. Consequently, the training of the fishing crew is a key element to prevent failure when using aquatic resources.

FAO has proposed the ecosystem approach to fisheries (EAF) as a strategy for the comprehensive management of the Earth, the sea and the living resources which equally promotes conservation and sustainable use. This is based on the application of proper scientific methods focused on levels of biological organisation which include processes, functions and interactions that are essential between organisms and their environment. Human beings, and their cultural diversity, are recognised as being part of the ecosystems.

Specifically, the ecosystem approach, officially adopted by FAO and various international agencies, imposes new efforts in that direction, which imply a better understanding and governance of the whole fisheries' system. Modifications to the marine-coastal ecosystem, like fisheries, generate an impact on the community. If this impact lasts over time and has high extraction rhythms, it produces changes to the rules and processes of the biological community which in turn affect, in a hardly predictable manner, the different components of the system. This causes alterations to the biological processes that sustain the system's productivity and thus impact on different spaces and species.

In a scenario with environmental stability, these alterations are important. However, given the natural variability and climate change, the alterations have repercussions that are more relevant for biological productivity, infrastructure and management. Understanding, predicting and explaining these alterations constitutes a great challenge.

Fisheries are complex and interdependent ecological and social systems which require integrated management approaches. The actions of an individual or a group of users affect the availability of resources for others. Managing these commonly used resources requires conscious efforts from a wide range of interest groups to organise and create rules that encourage the equitable and sustainable use of resources for everyone's benefit.

Co-management logic implies different exploitation strategies according to specific biological characteristics of populations, such as size, composition and environment, among others.

For example, in open-access fisheries, fishers receive few incentives to release juveniles and keep breeding adults over a certain level; the animals they do not catch will probably be captured by other fishers.

This characteristic may be the cause of the "Tragedy of the commons" (Hardin, 1968). Despite certain fishery limitation strategies, the world is full of examples of unsuccessful sustainable extraction processes. Overfishing is a symptom while the "race for fish" is the disease. This originates in the lack of incentives for the administration of resources and in the management institutions that exclude fishers from the management process (Parma, Hilborn and Oresanz, 2006).

The education effort to change the rules of the fishery game, this being a resource for the common good, is undeniably worth it and constitutes an obligation. Following this line of thought, it is necessary to provide tools to the fishermen, so that they are able to understand what their decisions imply. This surely will create a more auspicious forecast. It is necessary to offer a holistic and comprehensive training which can lead to the understanding of biological phenomena, the provision of a spot in the consensus process to create extraction policies and the knowledge of the existence of rights and obligations.

Oceanographers, meteorologists, modellers and weather specialists are attempting to understand the phenomena which regulate the marine environment; fishery and environmental biologists, and researchers from other exact and natural sciences, are trying to decipher the signals sent by the exploited species. The understanding of physical and biological phenomena and the protection of breeding areas, spawning areas and close areas should be transmitted to the aquatic resources' exploitation chain.

Through high-level business studies and by following stipulated precautionary concepts, it is possible to run fishing companies with a certain level of success. Fisheries engineers and technology engineers receive a product whose quality they improve through careful technological processes.

In this scenario, higher education studies for seafarers is an absolutely reasonable argument considering the fact that the "release" decision implies a more comprehensive understanding of their actions. The information they receive shall give them a thorough idea about the consequences of their actions, so that they are able to understand and alleviate them and to collaborate from a relevant position using a sustainability policy in the fisheries' extraction chain.

3.2. THE CODE OF CONDUCT FOR RESPONSIBLE FISHERIES

FAO developed the Code of Conduct for Responsible Fisheries in 1995. Although the Code is not legally binding, it sets out a list of principles for behaviour and practices towards the responsible administration of marine resources and their environments [1]. The Code advocates the principles to be followed by all actors in all fisheries, from fishers to processors, exporters, biologists and managers.

The Code urges managers to take actions to ensure that resources values (for example, the abundance and diversity of marine animals) are maintained for future generations. It covers recommendations for the behaviour and actions of States (and centralised management agencies) pertaining to, but not exclusive of, the following:

- Proper management of marine resources.
- Collection of data and provision of advice.

[1] It is necessary to highlight that some of the principles of the Code reiterate those principles which have generated a binding effect through international agreements or other legal instruments.

- Implementation of a precautionary approach to resources use and management.
- Control of the overfishing practices.
- Development of aquaculture and caution in the translocation of stocks.
- Actions to ensure proper post-harvest processing of marine animals.
- Monitoring and control of international trade of marine products and support for all aspects of research needed to understand and manage stocks.
- States are urged to prevent overfishing and excess fishing capacity and to ensure that the fishing effort is commensurate with the productive capacity of the resources.
- Conservation and management decisions should be made using the best scientific information available, and managing institutions should take responsibility to conduct or promote research into all aspects needed for responsible management.
- States (or managing institutions) should also monitor fishing activities regularly and use results from analyses of fishery-dependent data in management decisions.
- Through education and training of fishers, States (or management agencies) should promote awareness of responsible fishing practices and processing methods that add value to their catch in environmentally responsible ways and in order to minimise discard.
- The rights of indigenous and small-scale fishers should be respected and protected.
- States should ensure compliance with, and enforcement of, conservation and management measures.
- The capacity of developing countries to apply various articles of the Code should be taken into account.

3.3. THE PRECAUTIONARY APPROACH

3.3.1. Fisheries principles

There are a couple indisputable principles about fisheries based on the precautionary approach. Fishing activities impact resource stocks and can reduce populations to low levels at which reproduction becomes ineffective. Fishing activities can also affect the environment, even though indirectly in some sea cucumber fisheries, and one cannot assume that these impacts will not lead to long-term change.

The precautionary approach recognises that undesirable changes in fisheries systems, like depletion of certain stocks, are usually only restored slowly (FAO, 1996).

Therefore, where the impacts of fishing on the resources or environment are uncertain, managers and decision-makers should focus on the conservative (or “precautionary”) side of fisheries management to avoid situations where the productive capacity of the resource, or the health of the environment, is diminished. The precautionary principle thus assumes that a conservative “duty of care” is exercised in fisheries management (Grafton, Kompass and Hilborn, 2007).

A key principle in the precautionary approach is that “the absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures” (FAO, 1995).

Fishery managers should also take the following actions:

- Develop management plans that indicate which management measures are to be applied and the circumstances under which the measures should be changed, i.e. “decision control rules” (FAO, 1996; Hindson, et al., 2005).
- Take necessary corrective measures, without delay, in cases where the resource or environment has been impacted by fishing activities, giving priority to restoring the stocks to productive levels.
- Set in place mechanisms for adapting regulatory measures in the light of unexpected events. Establish legal or social management frameworks for fisheries.
- Define the objectives of the fishery and set measurable targets in a precautionary manner, for example, by setting fishing mortality lower than the level required for the maximum sustainable yield (MSY) of the stock (FAO, 1996).
- Ensure that the harvesting and processing capacity is commensurate with the sustainable levels of the resource reported by fishers on their activities.

The precautionary approach urges States (i.e. fishery managers) to take into account uncertainties related to the size and productivity of the stocks (FAO, 1995). Therefore, managers should not use management tools that assume regular recruitment of sea species or those which assume that stocks will recover quickly if fished down.

3.3.2. Concepts and definitions

World captures increased after World War II from around 20 million tons to 94 million tons during the last years (FAO, 2007 and 2014). Throughout this period, many fisheries collapsed, others became overexploited, many are being fully exploited and few of them are recovering (Botsford et al., 1997; FAO, 2007 and

2014). In fact, less than 200 years ago, it was believed that fishery resources were inexhaustible due to their apparent abundance and the general lack of awareness about marine systems. Nevertheless, today this argument is known to be incorrect.

Consequently, in the last years, the success of fisheries management schemes performed in the development of modern fisheries has been reconsidered. In 2001, FAO suggested member countries to conduct research to understand, analyse and manage fisheries through a new approach that includes all species involved in fisheries as well as the environment and the social and political spheres (FAO, 2001).

Afterwards, various international scientists suggested that the ecosystem based fisheries management is an approximation that could improve the current management schemes and generate the subsequent improvement to the resources' sustainability and their environment (Christensen et al., 1996; ICES, 2000; Pikitch et al. ,2004; Potts, 2006).

Likewise, Walters and Martell (2004) recognise that the ecosystem based fisheries management is also the result of a growing interest from society in the fisheries' sustainability, the target species and bycatch conservation and the protection of endangered emblematic species (e.g., marine mammals, turtles, birds).

This new approach does not attempt to replace traditional management (single species), but it is rather considered a complement which shall enrich its results and shall be able to lower the uncertainty related to the decision-making process (Botsford et al., 1997; Hilborn, 2003).

The impacts of fisheries' activities on the ecosystem have been extensively described and quantified (Hall, 1999; ICES, 2000). Fishing has generated the overexploitation and even the collapse of fisheries for target species as well as bycatch (Botsford et al., 1997).

The extraction of biomass of target species and bycatch also generates an indirect impact on the food web which can affect predator species and prey species, as well as competitors of the latter (Goñi, 1998; Hollingworth et al., 2000; Shannon et al., 2000).

The alteration or disturbance generated by fishing results in serious and pronounced effects on the low or high trophic levels. This depends on whether the ecosystem food webs are controlled by primary producers from the bottom, by predators from the top, or from intermediate links or by dominant species (Vasconcellos et al., 1997; Cury et al., 2000, 2008).

Evidence indicates that fishing has caused changes in marine food webs which have altered their internal structure, from communities dominated by big long-lived piscivore fish to communities characterised by small species of low trophic level, such as pelagic fish and benthic invertebrates (Pauly et al., 1998). It is currently estimated that the stocks of big predator fish species (tuna and big sharks) have decreased by 90% during the last 50 years, before industrial exploitation (Myers and Worm, 2003).

The growing conflict in coastal areas, the fishing overexploitation and the conservation of diversity and endangered species has led to the consideration of a wider vision regarding the marine resources' administration. This is reflected in the recommendations by diverse international agencies (FAO, UNESCO, GEF) to adopt a scientific approximation based on the ecosystem to manage human activities in marine and coastal regions.

In an ecosystem-based approximation to management, a key objective must be to balance diverse social and economic goals (maximising the fishing yield and employment, and protecting vulnerable species), taking into account the interaction between biotic components, abiotic components and human beings (García et al., 2003; García and Cochrane, 2005).

Due to many economic, technical or social reasons, it might seem difficult to implement this holistic approximation in the marine environment worldwide (Brodziak and Link, 2002; García et al., 2003). However, there is an increasing number of examples of concrete application of the ecosystem management, such as the one implemented on flounder fishery (scientific name) in the North Pacific Ocean (Witherell et al., 2000), or the management of Antarctic resources (Constable et al., 2000) in South Africa fisheries (Butterworth and Plagányi, 2004).

The implementation of this approximation requires, first of all, political disposition by establishing principles and goals, operational management objectives and the adoption of management measures per se (García et al., 2003).

In this context, scientific institutions must provide an operational model to formally represent the structure and functioning of the ecosystem and to generate indicators and a baseline ad hoc. It must also be possible to base on this model the spatio-temporal simulations necessary to evaluate the application of one management strategy or another (Butterworth and Plagányi, 2004).

3.4. ECOSYSTEM-BASED FISHERIES MANAGEMENT

3.4.1. Management process

This management process is performed through fishery organisation strategies or plans which specify the evaluation techniques, control rules and their implementation.

In this scheme, it is necessary to compare the future results of applying different management strategies in a fishery, by means of some type of modelling, simulation and prediction. Traditionally, fisheries management strategies have been centralised in the fishery's target species, using methods based on the population dynamics (Beverton et al., 1993; Sparre and Venema, 1995).

From here, the following expressions originate: traditional management, species-based management and single species management, commonly applied to the fisheries management approximation which prevails nowadays in most of the world fisheries. However, it is evident that the ecosystem components interact between each other and the users' actions on the resources affect, directly or indirectly, the non-target individuals, influencing the ecosystems' structure and function.

A consideration of this type of interrelations in the fisheries management plans would lead to a management in which conflicts derived from such interactions might be solved (García et al., 2003), while the greatest economic, social and ecological benefits possible would be obtained. In this context, the United Nations, through its Environment Programme (UNEP), the Oceans Act, FAO (with the Code of Conduct for Responsible Fisheries) and GEF (Duda and Sherman, 2002) have promoted for almost 30 years the ecosystem-level considerations in the management decisions.

On the other hand, due to the recognition of the effects that fishing produces in marine ecosystems, the conservation goals of biodiversity and certain wildlife groups (birds, mammals and turtles) also demand and justify that the management of marine resources considers the interactions between the species and the comprehensive management of the resources (Smith and Maltby, 2003).

In fact, the Conference of the Parties to the Convention on Biological Diversity (Nairobi, 2000, Decision V/6) identifies the ecosystem management as the main framework for the implementation of this international instrument. For such reasons, there is a broad and growing compromise of many governmental and non-governmental organisations to adopt this broad vision in the natural resources' management.

In this context, the term ecosystem-based fisheries management (EBFM) (Cortner et al., 1994) arises as a management philosophy which focuses on the desired states of the system in general, and recognises the need to protect or restore critical ecological components, functions and structures to the effects of sustaining the resources over time.

The different definitions related to the term EBFM (ecosystem-based management, comprehensive management and ecosystem-based fisheries management) have in common the concepts of interrelation between species, the environment and human activities, as well as the need to exploit the resources in an abiding way (sustainable) (FAO, 2003; Lackey, 1999).

Thus, the Southwest Atlantic and, particularly, the Argentine Sea have unique characteristics due to their oceanographic dynamics (Guerrero and Piola, 1997; Piola and Rivas, 1997), as well as its great ecological, economic and social importance. In this regard, this region contains spawning and breeding areas of diverse species of fish (Macchi et al., 2004, 2005; Vizziano et al., 2002; Dimitriadis et al., 2000; Militelli, 2012; Jaureguizar et al., 2008) and sustains artisanal and industrial fisheries of different nature.

On the other hand, species which are considered endangered and with particular value for conservation live in this region, for example the endemic Franciscana (Pontoporia blainvillei), albatross, whales, dolphins and sea turtles (ex. Cheloniamydas, Dermochelys coriacea) (IUCN, 2006).

3.4.2. Traditional fisheries management versus ecosystem-based management

The conventional fisheries management is based on strategies addressed to individual species (Beverton, 1984; Botsford et al., 1997; Mercer, 1982). However, most of the fisheries act on multiple species fishing resources (Seijo et al., 1997). Some current models and predictions involve target species, bycatch and discarded species which are affected in an equal manner by the fishery pressure (sequential overexploitation).

This is of vital importance from the fisheries management point of view, as the collapse of incidentally exploited resources may suddenly occur due to the fact that, generally, no studies are focused on them (Shelton, 1992). This approximation represents a change of paradigm as a new alternative in the management of natural marine resources (Christensen et al., 1996).

Considering the critical state of the main fishery resources in Argentina, with a decrease in biomasses and landings, it is necessary to consider these actual management schemes which promote the understanding of the exploited resource as a part of an ecosystem and not isolated, which is the way things are being done. As a matter of fact, the ecosystem approach in the fisheries management is constituted as an alternative tool to the current single species management schemes (Record 26, FFP, 2006) of the exploited stocks (Christensen et al., 1996; FAO, 2001; Watters et al., 2003; Pikitch et al., 2004).

In this context, the interactions between the organisms and its environment have special relevance. Besides, the fisheries act as another factor which provides variability in the aquatic ecosystems (Shelton, 1992). This ecosystem approximation provides the possibility to model different components which give an ecosystem structure and see how these behave in front of different variation sources (environmental and human) (Bostford et al., 1997).

There are several demonstrated effects and impacts that fisheries cause not only in populations (reflected in the decrease of abundance and increase of mortality rates and overfishing), but also in communities, where the alteration of the length of the trophic chains and changes in the ecosystems structure (cascade effects) and, finally, in the environment due to habitat destruction (Dayton et al., 1995; Philippart, 1998; Goñi, 1998; Hollingworth, 2000; Hollowed et al., 2000; Sinclair and Murawski, 1997) are highlighted.

These impacts may be divided in direct or indirect impacts. The direct impacts are those which cause mortality to the marine populations, not only to target species, but also to bycatch or discarded species, among others (Goñi, 1998). The indirect impacts are expressed through interactions between the species of an ecosystem, for example, over competence or predation (Hollowed et al., 2000). In some marine birds' populations, which prey on little pelagic fish, low recruitments and great mortality due to starvation are produced when the pelagic fish populations collapse (Goñi, 1998). Other effects are: losses in the fishing gear or "ghost fishing" (Erzini, 1997; Goñi, 1998), which shows that any fishing gear can cause these impacts (Averson et al., 1994).

One of the studies which has generated great interest and debate is the one presented by Pauly et al. (1998). These authors showed trends in the catch of several fisheries in the world, with 220 species of different trophic levels. One of the most relevant results was that species with a high trophic level (limit) are the first ones to be overexploited. Besides, they observed that in a subsequent stage, the worldwide fishing trend is to overexploit species of lower trophic level, which are generally secondary target species or members of the bycatch or discard.

Although this trend in the decrease of the trophic level has been severely criticised (Caddy et al., 1998; Caddy and Garibaldi, 2000), it has been observed at a global scale (Pauly et al., 1998; 2000) and it has also been documented for other more reduced spatial scales (Pinnegar et al., 2003), including central Chile (Arancibia and Neira, 2002).

In this context, tools (models) for the fisheries management that allow for the ecosystems' study, analysis, understanding and prediction, complementing the already existing single species models, are necessary (Bostford et al., 1997; Sinclair et al., 2002). Recent research reveals disturbing fishing trends. In this regard, Milessi et al. (2005), and Jaureguizar and Milessi (2008), evinced decreasing values of the catches trophic level and the fishing index in balance, showing that Uruguayan and Argentine industrial fisheries are causing perceptible impacts on the ecosystem structure.

Scientific knowledge shows that the Argentine shelf presents a broad combination of physical variables (depth, currents, topography, type of sediments, temperature and salinity) and biotic variables (food availability and abundance of predators) which may vary in space and time, and which sustain its high biological diversity which the fisheries act upon.

Although there are precedents on the interactions between the physical and biological components of the shelf's ecosystems, represented by the primary and secondary productivity (Carreto et al., 1995, 2003; Mianzan and Guerrero, 2001; Armstrong et al., 2004; Lutz et al., 2006; Sabatini et al., 2004), ecological processes (Acha et al., 2004; Schiariti et al., 2006) and fishery oceanography (Bakun and Parrish, 1996; Jaureguizar et al., 2003a,2003b, 2004, 2006, 2015; Wang et al., 2007), these are based on synoptic physical observations or averaged medium fields over long periods of time.

Consequently, for an ecosystem approximation development for the Argentine shelf management, it is necessary that research has a tendency towards a comprehensive understanding of the biological dynamics from organisms to ecosystems and the way in which they respond to the environmental and fishing changes.

Therefore, the assessments of our fishery resources must be accompanied by a rigorous and sustainable monitoring over time of the environmental conditions (physicochemical and biological) with the purpose of:

- Providing appropriate environmental information to fishery research, managers and the scientific community in general.
- Interpreting the natural environmental variance which may hide essential signs for the management of men's impact in marine populations.
- Developing the means to effectively predict the environmental variations effect in the fish availability and in the exploitation resilience on fish populations.
- Evaluating the effect of global climate change in the relevant oceanographic processes in marine organisms' stocks and in the dynamics of their populations.
- Searching for new approaches and methodologies which characterise and evaluate the fisheries habitat.
- The analysis of the environmental and fishery variability in an ecosystem context requires the prediction of stock biomass trends in terms of the combined effect of mortality due to fishery, and the interdependencies with other stocks or trophic groups and with the environment (Sinclair and Murawski, 1997; Watters et al., 2003).

Thus, the ecosystem approach to fisheries does not only consider its effects on the ecosystem as a whole, but it is also able to analyse the effects of a given fishery on different components of that ecosystem.

3.5. FISHERIES CO-MANAGEMENT: DEFINITION AND GENERAL CONCEPTS

In the context of the EBFM, the implementation process must be sustained by agreements between the different actors involved, with the need for a space for dialogue in which the artisanal and industrial fishing communities are considered. Without the efficient incorporation of their opinions, the effectiveness of any management measure will be compromised.

In this regard, the development of new institutional structures for the management of fishery resources in Argentina, such as co-management, results of particular relevance. Co-management can be defined as a set of legal and institutional guidelines, obtained as a result of a participative process which includes the government and the fishery communities. Under this concept, the fishers are co-responsible for the design, implementation, monitoring, control and surveillance of the management measures.

This scheme incorporates the scientific knowledge and the empiric local traditional knowledge in the decision-making process. At the same time, it seeks to reconcile the economic development and reduce poverty of the social sectors, which directly depend on the fishery resources, also using strategies which promote a responsible use of these resources, as well as the conservation of the biodiversity and the ecosystems which contain it. There are examples of this type of institutional structures in several countries of the world, including South America (Chile, Uruguay and Ecuador).

However, there is not a recipe for the a priori implementation of these schemes. The inclusion of fishers in this process requires the design and implementation of an adequate legal framework, explicitly considering concepts such as the territorial use rights for fishing (TURF). The TURF consist of the assignment of rights for the use of territories to individuals or groups linked to the fishery activity. These rights (defined jointly with the authorities) imply the users' responsible participation in management plans and the sustainable use of the fishery resources assigned to their territory.

On the other hand, the incorporation of the technical-scientific knowledge in the elaboration and monitoring of the management plans is essential. The identification of key sites for certain ecosystem processes (larvae provision, refugee, juvenile breeding, feeding, reproduction, etc.), as well as its subsequent and effective control, monitoring and evaluation will allow to offer solid bases to evaluate the FEM (Fisheries Ecosystem Management) success and provide recommendations to adapt the management schemes.

The co-management approach is a view of the way in which decisions can be made and resources management measures can be introduced, in such a way that the main sectors are included in these processes (represented, in turn, by key actors, broad participation of those involved); and that all their interests are presented (clearly and objectively), listened to, discussed and taken into consideration. It is also suggested that, in an effective manner, there should exist not only the decentralisation, but also the delegation of faculties.

That is to say, not only the level of the decision-making authority (federal, state or municipal) should decrease, but also the groups should be listened to and the responsibilities in the decision-making process should be shared. As long as this is complied with, management and application will be more efficient.

As an operative definition (general, clear and concise) and potentially useful in legal tools, it is thought that "co-management is a fishery resources management system in which those involved participate in the decision making and share the responsibilities.”

Meanwhile, the complex systems management schemes incorporate the interdisciplinary approach. It is expected that the developed models and their applications offer representations which are closer to reality (Ostrom, 2009; Peterson et al., 2010).

Co-management should not be seen as the strategy to solve all the fishery management problems. It must be perceived as a useful process in light of changing conditions (Cinti et al., 2010a; Ponce-Díaz et al., 2010a). Co-management recognises the capacity of self-organisation between communities, proposes this capacity as a balance in light of imperfect markets, reducing the effect these have in the fishery exploitation (Berkes, 2009; Ostrom, 2009; Ponce-Díaz et al., 2010a; Rakjaer-Nielsen et al., 2004).

Co-management needs to differentiate itself from the advisory arrangements, which have existed in many countries for a long time. These arrangements usually include an advisory board in which fishery industry representatives are consulted by governments before the regulations become effective.

In contrast, co-management means that the fishers’ organisations not only have a saying in the decision-making process, but also have the authority to make and implement independently some of the adopted measures (Berkes, 2009; Ponce-Díaz et al., 2010a).

It is important to promote the social learning of the process, i.e., those involved accept to define new ways of interacting with each other and learn to identify common interests with other groups. This is an iterative process and tends to improve if there is a change of attitude between participants. This change is facilitated as positive results for the system are achieved.

The process may be supported by the government, although it is common for the fishery authorities to be reluctant to accept the new value systems being proposed. Even without governmental support, social learning can take place (Berkes, 2009; Defeo et al., 2007).

In Latin America, few studies about fisheries co-management have been performed. Different levels of progress have been reported, each one with different types of institutional agreements, achieved as a result of the particular growth of the knowledge and education of the groups of users involved (Begossi and Brown, 2003; Ponce-Díaz et al., 2009; Defeo et al., 2015).

Chapter 4
FISHING DISCARD

4.1. INTRODUCTION

4.1.1. Introduction. FAO's vision

According to the data of the Food and Agriculture Organisation of the United Nations (FAO), the pre-landing discards, together with fish losses and waste, add up to 35% of the total catch worldwide.

In fact, it is believed that at least 8% of the extracted and unused fish is returned to the sea. This situation has become a matter of great importance for international organisms and for fishing countries which seek to operate in a sustainable manner and recover life under the sea.

According to FAO, the reduction in fishing discards and bycatch is a relevant matter in their agenda. Its greatest concern is that the volume of these catches may be "several times higher than that the target species", as it is deduced from their last report on the State of World Fisheries and Aquaculture (Sofía, 2016).

Besides, the organisation clarifies that, although part of the bycatch is composed of small fish of scarce value, it can also include juveniles of important species from the commercial point of view, as well as other highly vulnerable species, such as sea turtles, sharks and rays.

In order to address this reality, the international organism calls for improvements in the communication of solutions and its positive impacts on the fishing economy, together with the application of an adequate regulation. “This can create incentives for the reduction of bycatches and discards”, further states the organism.

As regards concrete measures, FAO suggests increasing the capacity and fishing efforts controls, improving the fishing gear use and design, maintaining close season for zones and periods and establishing binding limits on discards and bycatch.

As regards technological measures which tend to improve the selectivity in the fishing gear, the organism talks, for example, about modifying the nets design, installing devices for the reduction of unwanted catch and implementing operational techniques during fishing trips.

> *Experience has shown that problems related to bycatches and discards should not be addressed separately, but as components of fisheries management general systems and pursuant to the principles and operational guidance recommended in the Code of Conduct for Responsible Fisheries and the Ecosystem Fisheries Approach.*

4.1.2. Zero discard in the region: the stance of the A.A.C.P.Y.P.

Fishing discard is a conceptual problem of the extraction of sea living resources. The relationship between society and nature clearly allows to verify if the exploitation strategy of a given resource follows precautionary and sustainable principles, or otherwise, a predatory use is prioritised. Consequently, one extractive model or another predicts either a promising balanced future for the natural medium or a catastrophic future in which society and the market are clearly the beneficiaries.

It is reported that “140 thousand tons of fresh fish are thrown into the sea per year.” These are the voices from the Senate of Argentina, the Argentine Wildlife Foundation and the Argentine Fishing Captains Association, among others. The vision of an infinite and inexhaustible sea is, in sight of the Argentine Sea living resources’ state of overexploitation, a minimally rash figure; “1.5 million food portions” would be the equivalent of a job being performed by developed countries: transforming discard into high nutritional value portions.

The Inter-American Development Bank states that the discard level in industrial fishing is of 20%. However, the Argentine Fishing Captains Association reports that discard would be even greater close to 30% of everything that comes out of the sea. In any event, the experts talk about “1.5 million food portions” wasted.

Argentina's National Institute of Fisheries Research and Development (INIDEP), which reports directly to the Nation and which is responsible for the research on marine resources, does not have official figures on this point. There are also concepts from the Subsecretariat of Fisheries which state that "when there is a verified discard, it is sanctioned." This is supported by Fishing Law No. 24.922 which forbids discard and unsustainable practices. On the one hand, it prevents citizens from evaluating strategies and proposals due to the lack of information. On the other hand, it does not clearly state when or how much it is verified. It seems that the legal status quo enables the continuity of the extractive model.

In view of this reality, Fishing Captains have officially proposed to look at the scene from a completely different and ambitious angle, one of "zero discard".

When the planet speaks on several spheres about its residues, and the 3R strategy (reduce, recycle, reuse) arises as a banner, horizon, goal and process, it is even more timely to consider fishing discard as the banner.

Understanding fishing discard as a process is what several countries and regions, motivated by a mismanagement of fishing resources, have achieved.

Thus, for example, the European Economic Community has titled the new Community Fisheries Policy, which forces to take all fish to port: "The EU imposes an end point to discards, not even one fish overboard: towards sustainable fishing?" The end of discards is progressive, by species, from 2015 to 2020 and it is a discussion process which started in 2009.

Although there are several opinions on the measure effectiveness, the process of the regulation's go-live has two emerging values: the need to safekeep the fishery resource and the valuation of the discard nutritional value. Likewise, the training of the onboard personnel and the efficiency of the controls is highlighted.

The process relies on several activity incentives, as it generally has the tendency to generate empathy with the proposal across the world. These are called Incentives towards good Environmental Practices.

The MINOUW (Minimize Unwanted Catches) project is a formal research and development initiative promoted by the European Commission: "Towards the gradual elimination of discards in Europe." More than 15 organisations, from research centres to NGOs and companies from Spain, Italy, Iceland, Belgium. Portugal, Norway, Greece, the United Kingdom, Israel, and Finland, participate in the project.

Their goals are:

- To characterise European fisheries discards in social, economic and ecological terms.
- To test technological innovations and social solutions to avoid discards.
- To examine the effects of more selective fisheries and discard reductions in marine ecosystems.

- To establish recommendations for the implementation of the EU discard policy.
- To develop technological solutions to control and monitor the compliance of the obligatory nature to unload discards.
- To understand and give solutions for the problem of discards.

The proposal presented by the Argentine Fishing Captains Association has placed the topic of zero discard on the Administration and society's agenda.

Globally, there are many regulatory and operative examples to learn from the already covered path and to direct this problem which is relevant to achieve the fishery resources' sustainability. On this path, the Norwegian experience as a model which is independent from the EEC can be considered an example, since it is one of the countries with less discard worldwide.

4.1.3. Zero discard in the region: shared fishery resources, Uruguay and Chile

Upon holding the Seminar "Zero discard in Argentina and Uruguay" (2015), the organisers, the Single Union of Fishing Skippers, Traffic and Coastal Trade of Uruguay (SUDEPPU) and the Argentine Fishing Captains Federation (FACOP) agreed on a joint strategy to install the topic in both countries' fishery management.

Trade union organisations which unite bridge workers from the fishery fleets from Argentina and Uruguay ratified in Montevideo the zero discard policy to maximise the use of fishing and industrial resources, enabling the production of more food and the generation of job opportunities, and acting, in this regard, by the "imperative need to protect a resource offered freely" and discarded by "indolence, lack of information or obscure political interests."

There were several coincidences between both countries fishing captains: the lack of training of the fishing captains and officers, the valuation of fishery products due to of its nutritional value, and the requirement to cover the feeding needs of societies through an internal market creation, among others.

This agreement is more relevant, since both fishing fleets act on common resources in the Argentine-Uruguayan Common Fishing Zone in the context of the Treaty of Río de la Plata and its Maritime Front. Consequently, setting out common guidelines between both union sectors will result in a mutual benefit for the activity itself and for both societies. The "historic union agreement", reached between the Fishing Captains and Officers from Argentina and Uruguay, seeks to "raise awareness" in the industry involved sectors through coordinated and joint actions.

In the last few years, the neighbouring country of Chile has tried to take important steps as regards fishing discard. In this case, the importance of joint plans with Argentina, as well as with Uruguay, resides in the common fishing species exploitation as most of the so-called southern species.

In both cases, the ecosystemic view of fisheries, which allows to understand the biological phenomena of coexisting stocks and the effects of exploitations, is critical.

In 2013, the Fisheries Development Institute (IFOP) started the Discard and Bycatch Research Program, whose goal was to gather relevant information on the issue, mainly focused on demersal fisheries, crustaceans, Argentine hake, and longtail hake.

In February 2017, a new regulation was published in the official newspaper –in the context of Law No. 20,625 of Discard of Hydrobiological Species– which requires artisanal and fishery vessels, equal to or higher than 15 metres of length, to use image records devices to detect and sound discard and bycatch activities.

The obligatory use of these cameras, as stipulated, would begin for industrial vessels in August 2017, whereas for artisanal vessels a term of up to three years from the regulation's publishing date, (i.e. from February 2020) was established. As provided, the device must be activated when setting sail and must be deactivated at the end of the docking, and it must be approved and certified by the National Service of Fisheries and Aquaculture.

The actions taken from the IFOP's programs, just as this last regulatory change on the obligatory use of cameras on board, has led Chile to differentiate from others in the international scene, due to its will to stop discards and bycatch.

According to the Subsecretariat of Fisheries and Aquaculture (SUBPESCA), the country has become one of the "world models on the topic" and one of the pioneers in addressing the problem in depth. In fact, Chile already has one of the first fisheries with a Discard and Bycatch Reduction Plan, which correspond to shrimp, prawn and Argentine hake (Wiff et al., 2015).

Exploitation of common species and deficiencies in the administration regulation under a single species approach, allow to set out common policies, focusing on the ecosystemic approach, a more appropriate way to include fishing discard policies in its plans.

Although an operational agreement has not yet been reached between maritime unions, as with Uruguay, this challenge is viable since problems are concurrent and they need common strategic agreements under the regional approach.

Below, several concepts linked to fishing discard are presented. These will serve as elements for training of the fishing captains, concluding with a series of selectivity devices which have been under discussion in Argentine fisheries and which, nowadays, are still being revised. Meanwhile, in Argentina, fishing discard is not yet being considered a transcendental topic to achieve a sustainable fishery. Therefore, this work intends to put the topic under discussion in a serious and organised scene, where the responsibility criteria on fisheries is prioritised, more than economic powers and sectoral interests.

4.1.4. Final consideration

Consequently, with the opinions poured in this chapter, the Fishing Captains in Argentina and Uruguay have installed the phrase: “everything on-board must be brought to port.” And that is so because these actors, protagonists of the artisanal, coastal and industrial fishery, remind us that fishing is not an adventure by defending the idea that the natural resource belongs to the people of Argentina and Uruguay and calling for a participative management where no political, sectoral or union participant has the right to throw it, despoil it or waste it, because it is an essential food which can lead to mitigate hunger in Argentina and the world.

In Chapter 6 we will talk about alimentary sovereignty, which refers to people’s primary and inalienable right to reasonably exploit those natural resources of the nations with responsible criteria and, especially, taking into account that the resource is part of a basic, constitutional, and human alimentary right which no authority is entitled to damage.

With respect to discards, the Argentine Senator, Fernando Ezequiel (Pino) Solanas, writer of the National Fisheries Law reforms’ project, stated that in the proportion in which it is carried out in Argentina, “it is a crime against humanity.” That serious statement seems to be aligned with what led the European Union to maintain that discards should come to an end and, especially, that: “not even one fish should be thrown overboard.”

In Argentina, the Fishing Captains Association has announced that every Fishing Captain, Officer or Skipper must be trained and certified, knowing responsible fishing as an extractive technique conduct as well as the notion that discard violates the essential rights of people and that it is a predatory act that must stop.

Several times, we “look at” the Old World trying to emulate its conducts and the EEC has already acted upon this topic trying to establish a regulation for fishing discard. FAO, the governing organism in relation to the World’s food, has also established a consistent position. It is time for Argentine authorities to also decide that, in reference to the fishery resources of the sea, as in Europe, “in the future, no fish will be thrown overboard.”

4.2. TARGET CATCH, BYCATCH AND DISCARD

4.2.1. Introduction

The fisheries activity can have devastating consequences for the ecosystem and a sustainable management through adequate scientific research is urgently required (Halpern et al., 2008). The fisheries activities impacts are, in part, defined by the fishing gear which has certain characteristics, some of them linked to selectivity.

Besides, the area, the depth and the time of year and the gear's effective operation time are what, to a large extent, determine the composition of the catches. Together with the catch of target species, other species which are not exempt from the impact produced by fishing mortality are used to being unintentionally captured.

Globally, several species are overexploited, leading to a strong decrease in its total stock, biomass, sizes, etc., which confers them a lower ability to recover. This circumstance negatively affects the ecosystem and the group of people who live on fisheries, since it results in a "fisheries crisis", like the one which, nowadays, suffer several countries in the region (Aubone et al., 2004).

Other negative impacts which occur without being taken into consideration (many times in the same fishery) include: bycatch, discard and the destruction of seabeds (Hall, 1996, 1998).

4.2.2. Concepts, definitions and causes of fishing discard

In a fishery, catch consists of target catch, bycatch and discard (Alverson et al., 1994; Hall, 1996). The target catch consists of one or several species towards which the fishing effort is directed (Hall, 1996). Bycatch consists of unsought species, which are accidentally caught by the fishing gear during operation. These species are consumed and commercialised at lower prices than target species.

Discard is the waste of the non-edible species or species with low economic value, which are regularly discarded due to legal considerations. These are returned to the sea dead or with some chances of survival, depending on the fishery (Au, 1984; Nakano, 1992; Heessen and Daan, 1996).

The causes of discard can be classified into four categories:

- Discard by exclusion
- Discard by capacity
- Discard by size (Gillis et al., 1995)
- Discard by damaged catch

Discard by exclusion is especially relevant in multiple species fisheries which can capture tens of species with low or null economic value, and it is a product of the lack of market and/or prohibition of retaining species due to legal considerations. Discard by capacity is generated by the limited onboard storage which greatly determines the retention of sizes with more commercial value.

Large sizes have more value, which would generate discard by size, although fish are above the minimal legal landing size or lack size limitations.

The value of some species is determined by sociocultural reasons, since some highly valued species in certain countries/regions do not have commercial value in others, just as it happens with most of Elasmobranchii captured in Chile.

Discard by damaged catch refers to the null value of the damaged catch due to fishing gear manipulation problems. For example, the partial opening and emptying of the codend before completely turning the net, the lack of adequate onboard storage conditions (fish stowage, space, refrigeration conditions), low volume catches of certain species whose storage is unprofitable, individuals which were partially eaten during the turning of the net by marine mammals (tuna, black hake).

Such factors turn discard determination and quantification into a complex task. The causes of discard mentioned above are linked with legal or economic aspects that establish the managing rules which, indirectly, generate fishing discards.

An example of this are the annual capture quotas for every fishing stock, which encourage discard in order to comply with the established regulations and adequately manage the stocks, and which determine the type and volume of single species discards (Gongora et al., 2012).

Another example is the discard by sizes, where individuals below the minimal landing size cannot be commercialised or maintained onboard and are discarded, generally dead, as it happens in many fisheries (i.e., Argentine hake).

This type of discard is produced when the fishing gear selectivity prevents the scape of small species. This is the case of multiple species fisheries, where different species with different minimal landing sizes are captured. A fishing gear which allows for an adequate selectivity for all jointly captured species does not exist.

In multiple species fisheries, where the capture of a given species has to be discarded once surpassed the annual quota established by the governing organism, the fishing activity can continue if there is a quota of other species, such as the case of Pesquería Demersal Sur Austral (PDA) in Chile (Wiff et. al, 2015).

Consequently, the capture percentages in mixed fisheries produce discards when the legal percentages of the capture composition are surpassed and/or when prohibited species are captured: those protected species which cannot be kept onboard or commercialised are returned to the sea, frequently dead.

4.2.3. External causes of discard

In this context, the legal and economic causes with strict relation to the fishing activity will be called internal causes of discard. On the other hand, as Bellido et al., (2011) mention, there is a series of auxiliary factors which affect the discard nature and quantity. In this work, the auxiliary factors are categorised as environmental, biological and cultural, and we will call them external causes of discard.

- Environmental causes

  They are related to environment specific conditions during the fishing activity. For example, Startoudakis et al. (1998) analysed the discard by size variability in a demersal fishery of three species of Gadidae, finding clear differences in the composition of species, near the coast and far from it.

  Also, other studies on bycatch and discard in the Eastern Pacific have demonstrated the effect it has on oceanographic variables, such as water temperature, the chlorophyll biomass and the spatial variations of bycatch occurrence (Roberts 2006; Martines-Rincón et al., 2012; Montero et al., 2015). Consequently, there are certain environmental conditions which infer in the bycatch proportion observed.

- Cultural causes

  Within the bycatch there are species without commercial value, because they are not palatable to the country's ethnic group or because they still do not have established buyers abroad. As a consequence, some species which can be commercialised in some regions and countries in the world, lack commercial value in others.

- Biological causes

  They are related to the lack of knowledge on diverse aspects of the spatio-temporal dynamics of the species involved in bycatches and with the magnitude of such catches.

  This problem has caught the attention of international organisms such as the Food and Agriculture Organisation of the United Nations (FAO), the European Union (EU), the International Commission for the Conservation of Atlantic Tunas (ICCAT), and the Inter-American Tropical Tuna Commission (IATTC) (Mahon, 1996; Crowder and Murawski, 1996).

  One of the greatest impacts is the catch of juveniles, which encourages overfishing in recruiting and growth (Crowder and Murawski, 1996; Breweret al., 1998; Kennelly et al., 1998).

  On the other hand, bycatch can affect the extinction possibilities of vulnerable species, such as some species of elasmobranchii, mammals and sea turtles (Hall, 1996, 1998; Heessen and Daan, 1996; Ross, 1997).

Stated briefly, bycatch can have complex effects which are transmitted across trophic webs and interaction nets in an ecosystem (Pauly et al., 1998, Turner, 1997; Hall, 1998).

It is critical to be able to mitigate the magnitude of bycatch and to know the spatio-temporal aspects of its occurrence in order to develop mitigation measures and, thus, avoid losses from an economic and ecological point of view.

Obtaining quantitative indicators on possible impacts is useful for the decision-making process in the management of resources from a multiple species point of view (Crowder and Murawski, 1996; Hall, 1996).

4.3. CASES OF STUDY. SHRIMP FISHERY (PLEOTICUS MULLERI) IN ARGENTINA

Below, an example of a shrimp (Pleoticus muelleri) fishery in Argentina is introduced. The shrimp is a species which is distributed from Espíritu Santo, Brazil (21 ° S), to Río Gallegos (51 ° S). Although across its distribution, it sustains several fisheries, particularly artisanal (Segura et al., 2008), the Patagonic stock sustains a long scale artisanal and industrial fishery (Roux et al., 1995; Bertuche et al., 2000; Góngora et al., 2009).

In San Jorge Gulf (SJG, 4 ° -47 ° SL) we find the higher concentration of fishing effort, with the participation of three strata of high seas fleet composed of industrial, coastal, wet-fish and freezer-beam trawlers.

This Gulf is an area of ecological importance because it is a breeding and feeding zone for crustaceans, bony and cartilaginous fish, marine mammals and birds. There are 65 fish taxa grouped in 45 families of bony and cartilaginous fish. Furthermore, in that place there is an important group of benthic fauna which is captured as target catch and bycatch by these fishing fleets. It is constituted by benthic invertebrate represented by: 21 species of molluscs, 17 species of crustaceans, 12 species of equinoderms, 8 species of tunicates and 8 species of coelenterates, respectively (Roux et al., 1995).

In San Jorge Gulf, Argentine hake (Merluccius hubbsi) is captured as target catch and as bycatch of the shrimp fishery. There are also other species of important economic value, such as pink cuskeel (Genypterus blacodes) and sea salmon (Pseudopercis semifasciata) (Bezzi and Dato, 1995; Bertuche et al., 2000).

During the last decade, there was an increase of shrimp landings, with a maximum of ~170000 tons in 2016, widely exceeding the historical highs of past years (National Subsecretariat of Fisheries), which resulted discard of bycatch fish species, mainly juveniles of common hake (Bezzi and Dato, 1995; Tringali and Bezzi, 2003).

Definitely, this is the big problem of this fishery: the bycatch of Argentine hake and the resulting discard, since the shrimp fleet has more economic incentives for the shrimp than for the Argentine hake.

In that regard, the Argentine hake is the base resource for wet-fish fleets and freezer fleets in Argentina due to catches of around 200 thousand annual tons[1] and a maximum catch of 375 thousand tons in 2004.

However, Argentine hake is nowadays in crisis due to several factors, such as a deficit in recruitment, juvenalisation of catches and an overexploitation condition (Aubone et al., 2004; Cordo, 2006; Renzi et al., 2009); as regards the pink cuskeel, this species is in its extractive capacity limit (Cordo, 2004).

In this context, plans of joint management between provinces (with their own management jurisdiction) and the Nation have been developed. These include close seasons and areas, provincial and national onboard observers' plans, and research in the area of development of new methodologies and technologies to decrease bycatch and discard in the shrimp and Argentine hake fisheries. The condition of these fisheries is a strong techno-ecological interdependence, i.e., both fisheries interact strongly not only in space and time, but also the bycatch of the target species of the demersal trawling fleet (target species: Argentine hake) is the shrimp (which is not discarded) and the bycatch of the beam trawler fishery, directed towards the shrimp, is the Argentine hake, which is usually discarded.

However, a significant number of species which do not have commercial interest are captured as bycatch and, later, discarded. With regard to this, the strategies to control bycatch and discard are directed towards the modification of the fishing gear, the use of selectivity devices, the conditioning of the soaking time, the restriction of areas, seasons, etc.

Nevertheless, in order to implement those strategies, first it is necessary to determine and characterise the discard composition and its spatio-temporal variability within the fishery. With it, the bycatch and discard characteristics can be known.

- **Critical discards:** populations or species that are in danger of extinction.
- **Unsustainable discards:** species which, nowadays, are not at risk, but could decline in the future.
- **Sustainable discards:** captures which do not produce a detectable population decrease.
- **Biologically insignificant discards:** very low captures, below the population biomasses.

[1] See_ <http://www.minagri.gob.ar/site/pesca/>

- **Unknown discards:** absence of quantifications.
- **Charismatic discards:** the species have a special value, regardless of the impact level or conservation status.
- **Discards by regulation:** the species are discarded due to legal regulations, size, sex, etc.
- **Discards by economic reasons:** the species do not have market value.

Particularly, the shrimp fishery in San Jorge Gulf captures bycatch of 81 fish species, less than those captured in similar fisheries in the south of Brazil (91 species) (Vianna and Almeida, 2005) and above those captured in artisanal shrimp fisheries in Uruguay (27 species) (Segura et al., 2008). However, when compared to shrimp fisheries in tropical regions, these can usually capture bycatch of up to 350 fish species (Stobutzki et al., 2001).

In San Jorge Gulf, the Argentine hake is the most important species within bycatch, not only in frequency of occurrence (FO, 95% hauls), but also in the values captured (Góngora, 2012).

Some species were less frequent, common and rare. Nevertheless, this must not be taken lightly, since less frequent species in great magnitudes can generate serious impacts in its stocks (Hall et al., 2000).

More than half of bycatch species were rare (FO < 1%); this can reflect their low abundance in the ecosystem. However, some considerations must be taken into account: the fishing gear does not catch them correctly, the spatio-temporal variations did not reflect their real abundance, and there is an implicit lack of knowledge of the biology these species. This results in a great uncertainty when it comes to creating management strategies to avoid their capture and, therefore, their protection (Hall, 1996).

Extension of studies in other zones and fisheries, continuity in the data analysis of onboard observers, and research campaigns to monitor species' assemblages in space and time with the inclusion of environmental variables are necessary (García et al., 2003).

In relation to this, for the assessment of the total discard it is necessary to rely on abundance periods of the species involved (Hall, 1998; Góngora, 2012). This becomes one of the main limitations, since many times there is a lack of knowledge of these species' stock and general biology assessment.

4.4. DISCARD AND BYCATCH REDUCTION MEASURES IN DEMERSAL FISHERIES

In a first approximation to the discard problem, it could be stated that, although the total elimination of discards is an unrealistic measure, its use as a potential source of food can contribute to its decrease.

In some regions of the world, trawling fishery is of particular concern, since it produces a high proportion of discards and bycatches. The location of many of these fisheries in waters adjacent to countries with low income and food deficit can, in line with good management practices, make the use of discards for human consumption a priority.

Nevertheless, it is recognised that special problems in relation to the use of trawling fishery bycatches are considered, since they consist of a great number of many species, which makes the application of methods of conventional use problematic. The attempts carried out before in programs of use with technological methods have not given lasting solutions, especially as regards economic viability.

Recent trends seem to indicate that the increase in human population, the shortage of fishing supplies from conventional sources and, especially, the progress of aquaculture will cause bycatches, which were discarded before, to be used for direct human consumption or in aquaculture. For that reason, in the last few years there has been a tendency to use more some fish species which used to be discarded before, and that enter into the food web as bycatch.

In the future, these catches could be subject of certain fisheries, which demonstrates that it is accurate not to forget about the diversity of species with alimentary use potential in the debates on waste reduction and a more selective fishery of certain fish species.

Nowadays, bycatch and discard are seen as a morally unacceptable waste which contradicts the responsible management, the sustainable use of natural resources and the responsible conduct codes.

As a result of the commitment of international organisations (UN, FAO) and the pressure on the governments, the magnitude of bycatches and discards has decreased since the first report presented by FAO (Alverson et al., 1994); now updated by Kelleher (2008). However, there are shortfalls in the quantitative information on bycatches and discards, except in specific cases with accurate assessments.

Particularly, they have focused in discarded species with commercial importance, charismatic species or species with significant biomasses of invertebrates. This situation is contrary to the expectations proposed from various spheres of ecosystem-based fisheries management promoted by FAO (García et al., 2003).

Globally, fisheries with higher bycatch and discards are those which operate with trawling nets, with low selectivity; particularly, fisheries targeting crustaceans (shrimps) are responsible for 50% of the total of discards in the period 1992-2011 (Kelleher, 2008). These fisheries are mainly developed in tropical ecosystems; however, warm-cool water fisheries are not an exception.

4.5. THE CONSEQUENCES OF DISCARDS

4.5.1. Impacts of discards

The problem of discards and bycatch comes from social, conservational and economic aspects (Witherell et al., 2000; Catchpole et al., 2005). The consequences and impacts of discards can basically be divided into two big groups:

4.5.1.1. Social and economic impacts

These refer to the potential income losses and, also, to the food waste which could be categorised as alimentary safety.

Economic losses can be generated by direct mechanisms, where income earning stops due to the fact that bycatch does not have a market. It can also be generated by indirect causes, where the elimination of juveniles or target species' small-sized individuals has a negative effect on the population growth, reducing the future economic returns fishery may have.

4.5.1.2. Ecological impacts

They are inherently linked to mortality as a result of total fishery applied to a biological system and, therefore, it affects the structure and functioning of populations and ecosystems.

Within the ecological aspects, the main ones can be divided into the following categories:

- Reduces the reproductive potential: this is mainly a result of the elimination of juveniles from target species.
- Reduces biodiversity: the species diversity declines, as a direct effect of the elimination by fishery and as an indirect effect of the alteration of the trophic web.
- Reinforces the population growth of scavenging species.

  This point has been argued as discard of species could be subsiding food to promote the growth and territorial expansion of scavenging species. However, the scientific evidence to support this phenomenon is still weak (Catchpole et al., 2005).

- Increases the uncertainty and the bias of abundance estimates: discard is a source of elimination which is regularly not quantified; and, therefore, it adds uncertainty and bias to the elimination total estimates and subsequent abundance estimate.
- Changes the relative abundance of species. Fishing, as it is selective, removes a certain group of individuals and species in different proportions, which affects the relative abundance.

The problem of discards is the problem of the capture of bycatch; and it is specific of the particular fishery where it happens. In general, it depends on the fishery's actions rather than on the landed species' behaviour.

The problem can occur in the target species (juveniles, the completion of the quota, among others) in a fishery, when there is no authorisation to catch a given target species in multiple species fisheries, bycatch, catch of vulnerable species; also, due to regulations such as minimal size, when they surpass the limits of quotas or because of the absence of a market. Ultimately, it is produced by diverse and varied situations.

In general, demersal trawling fisheries have lower selectivity than longline fisheries, for example; and, therefore, they tend to catch more species in the same fishing operation. In Chile, the example is Pesquería Demersal Sur Austral (PDA), where the trawling and longline fleets operate in the same areas. Trawling fisheries historically recorded 167 different species, compared to the 129 species of longline fisheries (Wiff et al., 2012).

The exclusion of bycatch is more complex in mixed fisheries, as compared to fisheries which have crustaceans as their target species. This is a result of the differences in corporal form and size and in the different behaviour between crustaceans and fish (Glass and Wardle, 1995; Davis, 1995).

In this context, it is critical to perform behavioural studies of the interaction between catch and fishing gear, in order to propose measures that allow the reduction of bycatch and, thereby, discard (Rose, 1995; Glass and Wardle, 1995; Hall et al., 2005).

4.5.2. Identifying mitigation measures

Authors have proposed various regulation measures to decrease bycatch and minimise its potential impact, thus allowing the capture of resources at sustainable levels both for target species and the ecosystem (Rose, 1995; Glass and Wardle, 1995; Davis, 1995; Dykstra, 1995; Collins, 1995; Witherell et al., 2000; Catchpole et al., 2005; 2006; Johnsen and Eliason, 2011; Marine Institute, 2011). The following is a list of this potential measures, which are not mutually exclusive:

- Conservative and precautionary catch limits

- Extensive monitoring and auditing
- Bycatch capture limits
- Fishing gear restrictions
- Fishing gear modifications
- Close seasons or areas
- Fishery spatio-temporal distribution
- Protected marine areas (PMAs)

4.6. SOME SUGGESTED SOLUTIONS

4.6.1. Introduction

During the last years, a lot of attention has been given to the issue of discard and, therefore, it is not possible to perform an exhaustive revision of the subject. However, our goal is to synthesise results related to the main approaches and methods used. It is important to highlight that identifying the discard problem to be reduced is key if the solution is to be effective.

Likewise, the collaboration between the different interested parties is fundamental to achieve success. The European Commission's report (2013) contains proposals on how to construct this collaboration and methodological approaches to address and solve specific discard problems. Below is an analysis of these solutions.

4.6.2. Tactical mitigation: exclusion or prevention solution

This solution has been implemented in demersal fisheries in Alaska's North Pacific Ocean. It requires vast knowledge about the spatio-temporal distribution of the main commercial species associated with different stages of their life. For instance: juveniles' concentration area, spawning areas, concentration areas of unwanted species, vulnerable environment areas.

Additionally, it is necessary to consider the interaction between various fisheries (fleets with different fishing gear) and the fact that a fishery's target species might be the other's bycatch. In Chile, knowledge of these details or aspects can be acquired by means of the follow-up projects and through the evaluation vessels.

In some cases, specific investigation might be needed. It is fundamental to have vast knowledge of the fishery that needs to be regulated. For vulnerable environments, this can be addressed through standards and protocols; for example, those created for vulnerable marine ecosystems.

The spatial closure approach can also be performed in real time (Little et al., 2014) following a co-management approach or an automatic approach. This requires fishers to share real-time information and their willingness to avoid the bycatch high concentration area. The manager needs to receive and process real-time data to return the information to the fleet.

These solutions do not exclude the fishing gear modifications (selectivity), but they are rather complementary specially under a management based on an ecosystem approach. This kind of solution is also identified for the EU (Catchpole et al., 2005, 2006).

4.6.3. Conservation engineering

A complementary strategy to reduce bycatch was the development of fishing gear modifications through a process called conservation engineering. These processes are based on an active collaboration between fishers and engineers. It has been proved that it increases trust between the participants.

4.6.4. Dissuasive method

This approach is implemented to reduce seabirds' mortality while trawlers are being used and it is known as bird scaring lines (BSL). However, birds which crush into the trawler's ropes might get hurt or die. Paired streamer lines and warp scares, which have proved to be efficient, are used to scare birds away from cables (Sancho, 2009; Lokkeborg, 2008; Lokkeborg, 2011).

As it was already mentioned, the successful implementation of this measure is specific to each fishery and it necessarily requires research on the species behaviour when they face the net and when they are inside of it. There is a need to identify and focalise on the species whose discard has to be reduced.

Having knowledge of the factors which have an influence on discard and using it with regard to potential mitigation measures is fundamental for the development of a management strategy (Feekings et al., 2012).

The key is to identify which discard problem is to be reduced. The efficacy of the modifications can also be determined by comparing the results of the modified gear with the gear routinely used in fisheries.

Modifications to the fishing gear can occur in three situations:

- Discard of juveniles or species smaller than the target species.

In these situations, a useful option is to increase the net size or to incorporate square mesh panels (Fonseca et al., 2005; Eneveret al., 2009; Catchpole et al., 2006; Marine Institute, 2001; Attwood, 2011).

- Bycatch discard in demersal crustaceans fisheries.

  Generally, these are multiple species fisheries where juvenile and adult specimens of demersal fish species are present.

  In this case, a bigger square mesh is used, as well as separating panels and exclusion instruments (grids) inside the net (Catchpole et al., 2006; Matsuoka, 2008; Marine Institute, 2011; Broadhurst, 2000).

  Here, knowledge about the vertical distribution of different species in the net is put into practice. For instance, nephrops lobsters are located near the net floor whereas haddocks and whitings are located in a higher position. Broadhurst (2000) includes a diagram which can be used to develop a design to reduce bycatch from prawn fishery.

- Discard of unwanted species in mixed fisheries.

  This problem is more complex to solve not only due to the behaviour pattern of the species involved but also because of the different sizes and shapes, including the presence of juveniles of the target species.

  In this situation, the concept of unwanted species can include another fishery's target species whose capture is not authorised or the presence of another target species whose quota has been reached. This could occur, for example, in the coastal fishery of fish assemblage in the province of Buenos Aires.

The catch problem below the minimal size of the target species or the smaller bycatch can be solved with a change in the net's selectivity, either by increasing the mesh size or by incorporating square mesh panels (Fonseca et al., 2005; Enever et al., 2009; Matsuoka, 2008; Marine Institute, 2011; Attwood, 2011).

For bycatch discard in multiple species capture, besides increasing the mesh size and incorporating square mesh, reduction is obtained by implementing different solutions that depend on species behaviour.

If the species whose capture is to be avoided is found close to the seabed and the rest are found a little higher, a possible design would be raising the trawl fishing line so as to allow them to escape under the net. This technique is used to allow the Atlantic cod to escape (Kraget al., 2010).

Other solutions would be to incorporate separation panels and rigid grids, even though this requires vast knowledge about how species behave inside the fishing gear (Catchpole et al., 2005; Matsuoka, 2008; Marine Institute, 2011; Attwood, 2011).

This has also been observed in artisanal fisheries in Punta del Diablo, Uruguay, even with fishers' collaboration (Segura et al., 2008), and in the Argentine hake and the Argentine red shrimp fishery.

4.7. MANAGEMENT METHODOLOGIES AND MEASURES TO AVOID OR DECREASE BYCATCH IN TRAWL FISHERIES

4.7.1. Introduction

The goal of management measures which regulate the Argentine hake's exploitation is preventing catch which is captured at 41 °S from surpassing its regeneration ability limits.

According to the aforementioned, biologically acceptable catch establishes the capture that is obtained in its fishery as well as the capture obtained in Patagonian shrimp fishery as discard. The former is administered by the individual transferable catch quotas system while the discard, obtained in shrimp fisheries, is incorporated to the Argentine hake's assessment in order to determine its status and the subsequent management measures, such as catch quotas (Villarino et al., 2017).

4.7.2. DISELA and DEJUPA

The Fisheries Administration has expressed concern in relation to the great volumes of Argentine hake captured as bycatch in the Argentine red shrimp fishery. Consequently, the Secretariat for Agriculture, Livestock, Fisheries and Food issued Resolution No. 555/94, according to which conventional bottom trawlers working on Argentine red shrimp fishery are under the obligation to use DISELA I (Argentine red shrimp sorting device).

In 1997, the Secretariat for Agriculture, Livestock, Fisheries and Food, by means of Resolution No. 420/97, abolished the use of DISELA I and implemented the obligation for all shrimp trawlers to operate either with DISELA II or the selection fishing gear determined and timely approved by the Subsecretariat of Fisheries.

On this matter, the technology-fishery interaction that exists between the Argentine hake and the Argentine red shrimp in San Jorge Gulf and in part of the Argentine shelf break has originated the study and development of different selection devices.

In 2010, according to recommendations by INIDEP, the Federal Fisheries Council (FFC) concluded that, in order to sustain the current capture level mid-term, it is necessary to use selection mechanisms which enable separation by catch size. This should be done in such a manner that ages 1 and 2, smaller than 35 cm long, reach the highest escape rate possible (Resolution FFC No. 08/2010).

The Federal Fisheries Council also expresses that it is convenient to have the industry's consensus and continue searching for new possible selectivity systems as alternatives to DEJUPA (single grid sorting device) which INIDEP considers viable.

In order to determine selectivity by size, it is fundamentally important to take into account the species' first capture's length. INIDEP's group working on the assessment of Argentine hake estimated the size of first maturity at 35 cm on average and, consequently, it expressed that said value should coincide with the first catch size. In this context, selectivity research for this resource aims at obtaining selection tools which allow for the generation of a first catch size or retention size at 50% of L50 = 35 cm.

This report details the different selection devices and some results achieved by INIDEP. Moreover, some of the retention curve estimations and the selectivity parameters of each device are presented.

4.7.3. DEJUPA

The DEJUPA device allows juveniles to escape during the hake capture (or the capture of other demersal fish). This device allows for many juveniles, captured by fishing gear before they enter the net bag or codend, to escape and it substantially increases the device-codend selectivity based on fish size.

DEJUPA was developed in 1995 by INIDEP Fishing Gear Group and it was mainly based on the research presented by Larsen and Isaksen (1993). This being a genuine design, INIDEP holds an invention patent from the National Institute of Industrial Property which was declared of public use.

The DEJUPA device is made of a single rigid grid. It has been tested aboard Fishery Research Vessels during various research campaigns on the Argentine hake (Merluccius hubbsi) (Ercoli and García, 1998a, 1998b; García et al., 2000; Ercoli et al., 2000, 2003), the Peruvian hake (Merluccius gayi peruanus) (Alarcón-Vélez et al., 2014), the stripped weakfish (Cynoscion guatucupa) (Aubone et al., 2000), and the white croaker (Micropogonias furnieri) (García et al., 2001).

Comparative fishing experiences with alternate hauls were carried out, as well as hauls with retention codend in the grid and blinded net codend, and hauls with retention codend in the grid and cover in the net codend. Evaluations of deck operations, capture turning on one side and group selectivity with diamond mesh codends with 100 mm and 120 mm openings were performed. Likewise, fishing experiences have also been performed in commercial fishing trawlers, trawling on one side or through the ramp.

4.7.4. Comparative analysis between bycatch reduction devices

The Federal Fisheries Council (FFC), the regulation and management authority in Argentina, has expressed that it is convenient to have the fishing industry's consensus in order to continue searching for new options of selectivity systems as alternatives to DEJUPA which INIDEP considers viable after proper research.

In order to determine selectivity by size, it is essential to take into account the species' first catch length which, in the case of the hake, has been set at the same number as the first maturity size (LT50) at an average value of 35 cm. That is to say, smaller fish are considered juveniles; that value should coincide with the first catch size.

Consequently, selectivity research for the hake aim at obtaining selection tools which allow for the generation of a first catch size or retention size at 50% of L50= 35 cm.

This report details the results achieved with selection devices presented by the Argentine fishing industry that INIDEP Fishing Gear Group evaluated aboard vessels from different companies.

4.7.5. Diamond mesh selectivity in trawler nets

The first research carried out in Argentina, which referred to the selectivity of diamond mesh in bottom trawler nets' codends for the capture of hake, was performed during the Fishery Development Project (FAO).

Rojo and Silvosa (1970) determined that in a codend mesh opening of 56 mm the L50 value was 12 cm. The same documentation also mentions the benefit that could be obtained in fishery if a mesh with a 96 mm opening was used in the codend with a L50 of 20 cm.

By means of Resolution No. 550/72, the fishing authority at that moment established that the size should not be smaller than 110 mm in a double thread weave and 105 mm in a simple thread weave, considering the size of the stretched mesh between the centre of opposed knots.

Subsequently, the selectivity experiences with hake performed by scientists from INIDEP and the Fisheries National Institute (INAPE) from Uruguay in the Argentine-Uruguayan Common Fishing Zone (AUCFZ) resulted in a mesh opening of 120 mm (internal distance between opposite knots with a stretched mesh) in trawler nets' codends for a L50 of approximately 33 cm (Verazay et al., 1992).

In 1991, the fishing authority established a mesh opening which could not be smaller than 120 mm in codends of trawler fishing gear to capture demersal species. Therefore, since then, the mesh opening of 120 mm not only involved hake and its bycatch but also the rest of demersal species captured in Argentina.

4.7.6. Diamond mesh and square mesh

Many international works (Pikitch et al., 1995; Erickson et al., 1996) show the damage caused by the deformation of the diamond mesh in trawler's codend and their blockage as the catch volume increases. This also increases when a high volume of fish enters the codend in a short period of time and thus decreases the mesh selectivity.

The square mesh improves selectivity, if compared to the diamond mesh, because it does not alter its shape due to the trawling system tension. However, it is affected by the blockage of the mesh when the capture volume increases.

During 1994, selectivity experiences were performed using a diamond mesh with an opening of 120 mm and a square mesh with an opening of 45 mm on the side (Ehrhardt et al., 1996). Works were completed in two campaigns performed with INIDEP's Fishery Research Vessels and the collaboration of a fleet's trawler with ramp, where hauls captured up to 26 tons of hake.

Tests focused on the influence of the hake catch volume over the selectivity of the mentioned meshes. The meshes used were made by a Scottish manufacturer with a section of the upper panel of the bag, which measured 2.20 m by 6.50 m and was made of square mesh. In order to capture fish which escaped from the mesh bag, the retention codend cover method was used for both diamond mesh and square mesh.

These are the obtained results and conclusions:

- The selectivity of a diamond mesh of 120 mm decreases in relation to the codend's load and it can be totally lost if the load is high.
- The square mesh panel does not contribute significantly to the escape of hake juveniles probably due to its position and to the likely need for a bigger square mesh surface based on the fishery's characteristics.

4.7.7. A Norwegian device to allow the escape of juveniles in trawler nets: FLEXIGRID

In mid 2000, the Fishing Authority established a trial period for the use of a selection system called DEJUPA so that fishers could perform an assessment which would then give place to the establishment of its mandatory use.

The latter was determined by the Secretariat for Agriculture, Livestock, Fisheries and Food in the Argentine maritime shelf and by the Joint Technical Commission of the Maritime Front (CTMFM) in the Argentine-Uruguayan Common Fishing Zone (AUCFZ), from November 2001 and from January 2002, respectively.

The Fishing Gear Group carried out fishing experiences using a selection system called FLEXIGRID with the purpose of providing a selection alternative to vessels with a net drum located in the stern where they stow the trawler nets. FLEXIGRID has two flexible grids of identical characteristics. It is a cylindrical extension piece made of mesh material woven with synthetic fibre threads which is added to the trawler alternating it between the body and the codend, as the DEJUPA device.

The functioning of the device while the fishing operation is being performed is based on the principle of filtering fish through grids made of special plastic and rubber. Activities were performed in two stages. The first one consisted of one fishing expedition aboard a fishing vessel from the fleet with the purpose of determining the behaviour of FLEXIGRID in the stern net drum and in the net.

In the second stage, selectivity tests of the FLEXIGRID device were performed at a rod distance of 35 mm and the net codend with a 120 mm opening made of diamond mesh (FLEXIGRID-CODEND 35/120 System). The size value at 50% retention (L50) was 36.73 cm with a selectivity range of 12.13 cm for hake (Roth et al., 2005).

4.7.8. Beam trawler net and horizontal separation panel

This device was developed by Arbumasa S.A. Comparative fishing experiences were performed using a trawler net with a horizontal separation panel, one upper codend, one lower codend and a traditional trawler net from the company.

As a result, the net with the horizontal separation panel did not cause any type of selectivity by size or species between both codends (upper and lower). The captures and the selectivity of the net with a horizontal separation panel are directly related to the vertical behaviour of target species and, therefore, of a great number of variables associated to this behaviour.

At the same time, this also depends on the placement of the horizontal separation panel in relation to its distance to the lower bolt rope. The results obtained from these experiences constitute a particular event which cannot be extrapolated to other situations in the behaviour of the resource (Ercoli et al., 2006a).

4.7.9. HARGRIL selection device

This device was presented by Harengus S.A. Comparative fishing experiences were performed using a traditional trawler net which belonged to the company, with the addition of a selectivity device with a grid of 34 mm of separation between rods and another traditional net identical to the previous one, with and without DISELA II. As a result, during the first series of comparative hauls in the trawler net with HARGRIL, compared to the traditional trawler net, the Patagonian shrimp capture decreased by 6.39 % and the hake capture decreased by 73.03 %.

During the second series of comparative hauls in the trawler net with HARGRIL, compared to the trawler net with DISELA II, the shrimp capture increased by 6.76% and the hake capture increased by 61.52%.

In relation to the size of captured shrimp and considering all sampled hauls in both series of comparative hauls, there was no evidence of any selectivity pattern by size between codends of the nets involved (Ercoli et al., 2006b).

4.7.10. Hake selectivity with diamond mesh and T90 mesh codends

This device, developed by Harengus S.A., has a nominal mesh opening of 125 mm.

The codend was incorporated to the traditional bottom trawler net of the company. The result was a retention size at 50% of L50 = 23.27 cm and a selectivity range of 13.92 cm for hake (García et al., 2008).

4.7.11. Hake selectivity with diamond mesh of 96 mm and square mesh of 62 mm

This type of gear was proposed by the Argentine Chamber of Shipowners of High Seas Fishing Vessels (CAABPA) and the Argentine Chamber of Fishing Industry.

A retention size at 50% of L50 = 30.85 cm and a selectivity range of 39.35 cm for hake were obtained as a result of the codend experiences and the corresponding selectivity analysis.

A decrease in the retention of hake sizes within the range between 38 cm and 58 cm, due to the square mesh window, has been observed in all effective hauls.

In regard to specimen of sizes equal to or smaller than 30 cm, it was observed that most of them were retained in the last third of the diamond mesh codend without having used the escape through the square mesh located in the codend middle third. This work could not establish a provable cause of said behaviour (García et al., 2009a).

4.7.12. Hake selectivity with Jupiter net 2009

This gear was proposed by Alpesca S.A. The Jupiter net 2009 has four panels, including square mesh and T90 mesh in both side panels and in one section of the body (these are considered a selection device) and it also has a diamond mesh codend with a 120 mm opening of mesh with slings.

The distribution of hake sizes obtained during the fishing hauls did not show a hake size selectivity pattern in the test net. The typical retention of the selection device was estimated at practically one (total retention). Retention has been modelled by means of a logistic function with the following estimated values: L50 = 16.23 cm and selectivity range = 18.25 cm

Given the practically total retention, which is typical of the device, it is expected that the estimated mean retention of the Jupiter net 2009 does not differ from the retention curve of the codend used in said net (García et al., 2009b). The typical mean retention of the selection device (square mesh and T90 mesh panels in both side panels and in one section of the body) was almost total.

The fisheries reality (under complete exploitation) advises to use DEJUPA as a complement to current meshes, increasing the selectivity of the pair DEJUPA-CODEND (Ercoli and García, 1998a, 1998b).

In order to determine the optimal distance or opening between the grid rods of DEJUPA, as for any other selection system, it is essentially important to take into account the length and the size of the target species whose retention is 50% (L50) or first capture size. This means that 50% of specimens of that size which are captured in the net are retained in the codend whereas the other 50% escape through the selection system.

Even though in both shrimp and hake fishery Resolutions No. 7 and No. 8 (2010) issued by the Federal Fisheries Council (www.cfp.gob.ar) are in effect, these resolutions are argued by the fishing industry. Resolution No. 7 focuses on the mandatory use of double-grid selectivity devices, that is DISELA II (Ercoli et al., 1999), or single-grid devices, like HARGRIL (Ercoli et al., 2006b). Resolution No. 8, on the other hand, focuses on the rigid grid device, DEJUPA 35/120 (Ercoli et al., 2000) or on the flexible grid device, that is, FLEXIGRID-CODEND 35/120 (García and Ercoli, 2008).

4.7.13. Bycatch reduction devices for other demersal species

The stripped weakfish (Cynoscion guatucupa) is a demersal species with a wide latitudinal distribution from the coasts of Rio de Janeiro in Brazil (22° S) to the coasts of the Province of Chubut in Argentina (43° S).

The stripped weakfish fishery in Argentina is part of a group of approximately 20 species which are captured together, known as “fish assemblage”, which corresponds to a multiple species demersal fishery. In the Argentine-Uruguayan coastal ecosystem (34° to 41° S), this is the second most commercially important species.

In the last years, the average landing was of 9900 tons captured mainly by a coastal fleet, with a length of between 20 and 30 m, which operates in shallow areas of up to 50 m deep. The Argentine stripped weakfish landings come from catch obtained with trawlers in two main fishing areas: the Argentine-Uruguayan Common Fishing Zone (AUCFZ, 34° S to 39° S) and the south of the Province of Buenos Aires (El Rincón, 39° S to 41° S).

Landings have decreased in both areas (AUCFZ and El Rincón) from 17,000 tons in 1998 to 6,600 tons in 2003. Likewise, while in 2000 El Rincón generated 58% of the total catch, in 2003 it increased to 85% of the total annual catch (Carozza et al., 2004).

The white croaker (Micropogonias furnieri) is one of the more abundant demersal species in the Argentine-Uruguayan coastal ecosystem (depths of less than 50 m). It can be found in almost all the coast in the Province of Buenos Aires and occasionally in the north coast of San Matías Gulf. This is a long-lived species, the maximum age reported being 39 years. The first maturity size is significantly smaller in males (31.9 cm) than in females (34.8 cm) (Militelli, 2007).

The white croaker is the target of fisheries with diverse operation levels along the Argentine-Uruguayan coastal ecosystem, from sport fishing, artisanal fishing and small-scale fishing to coastal wet-fish vessels fleet (9-27 m in length) that use pair trawler modality.

In small-scale or artisanal fisheries in Río de la Plata and its maritime front, the white croaker is mainly captured with gillnets. Capture from Río de la Plata and the Argentine-Uruguayan coastal ecosystem represents approximately 35% of landings from fish assemblage derived from bottom trawling. However, in 2007, 61% of landings came from pair trawling and 39% came from bottom trawling with doors. Argentine landings of white croaker increased approximately by 1200% between 2002 (3629 tons) and 2013 (43,929 tons).

Capture from Argentina and Uruguay together shows that in 2007 (48,000 tons) they were at their maximum sustainable yield, or higher, for said species. This indicates that the white croaker was under full exploitation. In this regard, size selectivity studies have been developed for these two coastal species which are so important for both countries' fisheries.

Selectivity works focused on the stripped weakfish and the white croaker to try to determine which is the optimal diamond mesh to be used in codends of trawler nets in the commercial fleet.

At the same time, the DEJUPA device was used on these species to determine their selectivity or the selectivity of the DEJUPA-CODEND system. To that end, various fishing hauls were performed using codends of diverse openings with cover codends and blinding, as well as DEJUPA with different distances between the grid rods and with retention codend at the end.

The main conclusions were:

- The optimal diamond shape opening for L50 = 31 cm was of 111.78 mm.
- The optimal separation between rods for the selectivity of the DEJUPA-CODEND system in the net with an opening of 96.17 mm for a L50 = 31 cm was of 31 mm. This means that, with an opening of 96 cm in the codend,

practically all capture which escapes does it through the DEJUPA before reaching the final net codend.

- The optimal diamond shape opening for L50 = 33 cm was of 135.30 mm.
- The optimal separation between rods for the selectivity of the DEJUPA-CODEND system in the net with an observed opening of 125.35 mm for a L50 = 33 cm was of 44.50 mm.
- In relation to the escape of juveniles, the selectivity of the DEJUPA device itself is more efficient than that of the DEJUPA-CODEND system.

4.7.14. DISELA II

The DISELA II (double grid Argentine red shrimp sorting device) has been designed to reduce bycatch in the Patagonian shrimp fishery (Pleoticus muelleri), due to which hake is captured at a significant shrimp/hake weight proportion of 1:20, depending on the time of year and the geographical position in the fishing ground.

The device is made of an extension piece which can be easily assembled between the net body and its bag or codend without modifying the fishing gear or the fishing operations. It works based on the principle of fish and shrimp filtering through grids made of a rigid material. The panels and ropes used to construct this extension piece are made of polyethylene, while the grids are made with rods of galvanised iron wire. This does not restrict the use of other steels and more resistant and better quality materials.

During trawling, the fish and shrimp capture, obtained with the net trawled by the vessel, reaches the device and goes through the inside of the conical guide panel in the shape of a truncated cone and it is then directed to the foot of the first grid. This grid expresses a certain angle in relation to the horizontal plane and a distance between rods which is greater than that of the second grid. From there, fish travel through the grid and upwards, passing through the rods depending on their size, or simply reach the escape opening and exit the fishing gear.

During the capture process, shrimp behave differently than fish. They move by impulses instead of swimming and they do not have a directional escape reaction; they pass directly through grids, except for those that are dragged by fish towards the exit which, in reality, constitute a low percentage of the total catch.

Fish that reach the second grid, which has the same angle than the previous one, have a new possibility to escape through another opening; only a small number of juveniles passes together with shrimp through this grid towards the bag or codend of the net.

Flotation material is placed at the sides of both grids and on the external part of the device in order to counteract their weight, and an anchoring line is used to maintain the grids angle in relation to the horizontal plane.

- Actually, what happens is that fish are filtered twice using two grids with different separation distances between the rods in order to avoid, whenever possible, obstructions due to an excess of fish. Therefore, the escape yield increases and these fish are given a second chance.
- The selectivity or retention curves of DISELA II obtained for the hake with grids of 47/25 mm generated a retention of L50 = 22.97 cm in total length with a range of 3.65 cm (Ercoli et al., 1999).

  This means that, above this size, the percentage of retained specimens continues to decrease and it is almost null from 31 cm on (Ercoli et al., 1999).
- As it was previously mentioned, in the Patagonian shrimp fishery the hake becomes bycatch, with a shrimp/hake weight relation of 1:20 and more, depending on the hake density at the extraction site, the time of year and the geographical position of the fishing ground.

  Because this hake has less commercial value than shrimp, it is returned to the sea and this generates a great source of mortality which usually is not declared nor taken into account when performing an evaluation.

  In relation to this matter, during a comparative fishing experience with a simple grid selectivity device, Ercoli et al. (2000) observed that if a traditional trawler net with a mesh with a 50 mm opening is used, the captured sizes of hake were at a range of between 10 and 70 cm.

  With regards to this, the structure of discarded hake sizes demonstrated the urgent need to implement the use of DISELA II or some type of selectivity device which decreases the capture of hake specimens. In a study developed in 2003, the worst scenario of the interaction between hake and shrimp was posed.

  The fact that the fleet did not use selection fishing gear caused the increasing fishing effort focused on the shrimp fishery to be executed on the hake fishery as well; its availability was the highest of the period.

  In this situation, the use of a selection fishing gear could have been a reasonable alternative to minimise the impact of the effort on such resource.
- The hake bycatch values obtained in the Patagonian shrimp fishery during 2002 and 2003 surpassed those defined as acceptable for the hake resource (Villarino and Simonazzi, 2010).

Chapter 5

The safety of the Argentine fishing fleet

5.1. INTERNATIONAL ACTIONS ABOUT SAFETY AT SEA

In Argentina, the Ministry of Foreign Affairs is delaying the deposit to the International Maritime Organisation (IMO) in relation to the National Law from 2014 which passes, without limitations, the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) from 1995. Meanwhile, the wives, parents and children of Argentine fishers who died or went missing in shipwrecks that could have been avoided if a national policy for the training of fishers and the repair of fishing vessels had existed, wander the Argentine ports looking for answers and explanations from the authorities.

In October 2017, IMO, in collaboration with FAO, held international events to improve safety, save human lives, and update the standards for the training and certification for fishermen. The Cape Town Regional Seminar, celebrated from 16 to 20 October, 2017, was attended by participants from 10 countries in the African Anglophone region.

Similar events had previously been organised in cooperation with the Food and Agriculture Organisation of the United Nations (FAO) in the Cook Islands (28 August -

1 September 2017), for 10 countries in the Pacific region; in Côte d'Ivoire (December 2016), for 12 countries from the Africa Francophone region; in Indonesia (April 2015), for 11 countries from the East Asia region; in Belize (October 2014), for 13 countries in the Caribbean; and in Peru (June 2014), for 12 countries in Latin America. More seminars are being planned in other regions in 2018.

When it comes to the safety of fishing vessels, the mission is clear: enhancing safety to save lives, as expressed by Sandra Allnutt, Head of Maritime Technology in IMO's Maritime Safety Division. After the Regional Seminar in Cape Town, South Africa, celebrated to encourage the ratification and the implementation of a key treaty on safety of fishing vessels known as the Cape Town Agreement of 2012, Mrs. Allnutt said:

> *We want to reduce loss of life in one of the most dangerous professions in the world, and we want to enhance safety on board fishing vessels. This agreement, once fully ratified, in force and implemented, will be an internationally binding agreement which will facilitate better control of fishing vessel safety by flag, port and coastal States. It will also contribute to the fight against illegal, unreported and unregulated (IUU) fishing.*

The Cape Town Agreement was adopted at an international conference held in South Africa in 2012, as a means to achieve the entry into force of the provisions of the 1977 Torremolinos International Convention for the safety of fishing vessels, which was later modified by the 1993 Torremolinos Protocol.

In ratifying the 2012 Agreement, Parties agree to amendments to the provisions of the 1993 Protocol, so that they can come into force as soon as possible thereafter.

The treaty would enter into force 12 months later, in at least 22 states, after a total of 3,600 fishing vessels of 24 meters in length and over operating on the high seas expressed their consent.

To date, seven countries have ratified the Cape Town Agreement: the Congo, Denmark, Germany, Egypt, Norway, the Netherlands and South Africa. Between them, they have an aggregate of 884 high seas vessels of 24 meters long or more.

Some international treaties, such as the International Convention for the Safety of Life at Sea (SOLAS), have been in force for decades for the maritime shipping industry, including cargo and passenger ships. Nevertheless, the key instrument applicable to fishing vessels is not yet in force.

This means that there are no mandatory international requirements for stability and navigability, life-saving devices, communications equipment, fire protection or fishing vessels construction.

Sandra Allnutt expressed the following in the aforementioned meeting:

> *The implementation of the fishing vessel safety provisions is long overdue. A series of seminars have been organised around the world to explain what the Cape Town Agreement is, why it is important, how it can be implemented into national legislation and what the next steps are for the Parties to the Agreement.*

The effort to promote the Cape Town Agreement has received new stimulus due to the coming into force of other treaties related to the International Labour Organisation (ILO) and FAO, two organisations that work closely with IMO with regard to fishing vessels safety and illegal, unreported and unregulated (IUU) fishing.

The ILO Convention 188 from 2007, about work in the fishing industry, which entered into force on 26 November, 2017, establishes the minimum requirements for work on board fishing vessels, including hours of rest, food, minimum age and repatriation.

FAO's Agreement on port State measures to prevent, deter and eliminate illegal, unreported and unregulated fishing entered into force in 2016 and it now has 50 member States. The objective of this Agreement is to prevent, deter and eliminate IUU fishing through the adoption and implementation of effective port State supervision measures.

The Sub-Committee on Implementation of IMO Instruments (III), which was held in September 2017, agreed on a number of proposals to address the issue of illegal, unreported and unregulated fishing, with the focus on key areas of vessels identification, port and flag state performance, training and implementation of relevant instruments, and environmental issues.

The discussion was followed by a review of recommendations derived from the Joint IMO/FAO Working Group on IUU fishing and related matters (2015).

The IMO Assembly, meeting in November 2017, is expected to adopt a resolution to extend the IMO ship identification number scheme, on a voluntary basis, to fishing vessels of non-steel construction of 100 gross tonnage and above and all motorised inboard fishing vessels of less than 100 gross tonnage down to a size limit of 12 metres in length overall authorised to operate outside waters under national jurisdiction.

This initiative is expected to contribute to the fight against IUU fishing and to the implementation of FAO's Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels.

IMO is also undertaking a comprehensive review of its treaty on the training of fishing vessel personnel, the International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel (STCW-F, 1995).

The aim is to update and revise the treaty, taking into account the unique nature of the fishing industry, the working environment and the need to prevent damage to the marine environment.

The work being done to promote the implementation of the Cape Town Agreement on the safety of fishing vessels and other activities to improve safety and sustainability in the fishing industry and fight IUU fishing is also being supported by international governmental and non-governmental organisations.

These include the North East Atlantic Fisheries Commission (NEAFC), the Organisation for Economic Co-operation and Development (OECD), the Institute of Marine Engineering, Science and Technology (IMarEST), the International Transport Workers Federation (ITF), the Pew Charitable Trusts, the World Animal Protection and the World Wide Fund for Nature (WWF), as well as technical experts from Information Handling Services Maritime and Trade (IHM).

5.2. SHOUTS FROM THE BOTTOM OF THE ARGENTINE SEA. FROM "SHERIFF I" TO "REPUNTE"

In previous chapters, we described the characteristics of the Argentine Sea and the dangers fishers aboard fishing vessels have to face with every tide. The Argentine fishing ground in the Atlantic Ocean or the wild Southern Sea, also called "Pampa Azul" by some politicians, is one of the most rough, violent and dangerous of the world. Fishing in the continental shelf as well as in the shelf-brake and the shelf's abyss is a risky activity which requires fishing vessels in good conditions and fishermen perfectly trained to face the dangers of the task.

Chapter 2.10.2 of the Convention between FAO, ILO and IMO expects that the professional training programs shall be implemented "conforming to the national circumstances."

Chapter 3.11.1, with regard to personal survival and fishermen rescue, requires every signing state to: "provide, preferably before setting sail, basic training on personal survival, first-aid procedures and use of survival equipment."

Belos is the letter sent by Counter Admiral Director of the Argentine Navy, Hugo Manuel Vives, to the National General Secretary of the Argentine Fishing Captains Association, Jorge A. Frías, in response to his proposal on the implementation of a syllabus for the training of fishing captains and officers, dated 2 September 2011.
The translation of the documents contained in this Chapter are found in Annex 6 of this book.

"2011 - Año del Trabajo Decente, la Salud y Seguridad de los Trabajadores"

Nº 43 A1
Letra: DGED,3TC

Armada Argentina
Director General de Educación de la Armada

BUENOS AIRES, 02 de septiembre de 2011.

SEÑOR SECRETARIO GENERAL NACIONAL:

Tengo el agrado de dirigirme a Ud., por orden del Señor Jefe del Estado Mayor General de la Armada, en respuesta a su nota de fecha 2 de agosto del corriente año, solicitando una audiencia con el fin de proponer, entre otros temas, la implementación de "planes de estudio de capacitación de los Capitanes y Oficiales de pesca que cursan estudios en la Escuela Nacional de Pesca, valiéndose para ello del Buque Pesquero Bicentenario, con que cuenta esa Asociación, destinado a tareas de investigación y capacitación pesquera.

Al respecto informo que, analizada su propuesta desde el punto de vista educativo, los planes de estudio actuales ya están diagramados y aprobados por la Subsecretaría de Puertos y Vías Navegables, particularmente el programa para Piloto de Pesca que fuera confeccionado durante 2008 y 2009 y aprobado por Disposición 09/2010, cuya instancia práctica se cumple a bordo del pesquero A.R.A. "Luisito". Con respecto a los Capitanes de pesca, los requerimientos de capacitación se basan en contenidos teóricos relacionados con legislación, administración y manejo de recursos humanos, por lo que no se requiere embarco, ni prácticas a bordo.

Conforme con lo expuesto y por no resultar de utilidad para la Escuela Nacional de Pesca, me veo en la obligación de declinar el ofrecimiento, agradeciendo y valorando la propuesta realizada.

Sin otro particular, saludo a Ud. atentamente.

ARMADA ARGENTINA

HUGO MANUEL VIVES
CONTRAALMIRANTE
DIRECTOR

AL SEÑOR SECRETARIO GENERAL NACIONAL DE LA ASOCIACIÓN ARGENTINA DE CAPITANES Y PILOTOS DE PESCA
Dn. Jorge A. FRÍAS
S / D

The document also expects the mandatory inclusion in the study syllabus (Appendixes 9 and 10, and Chapter 5.9.1) of the principles of survival, the exercises, and a highlight on the need to be prepared, as well as measures to be taken if it becomes necessary to abandon ship, measures to adopt when in the water, main hazards to survivors, rescue devices, survival positions, the consequences of panic, clothing, the effect of being immersed in water and hypothermia.

Despite the good will of professors from the only Fishing School in Argentina, there is lack of a national education and training plan, and the training and certification attempts by the police and the military under no circumstance comply with STCW-F-1995. It is enough to say that the Navy, which administers and directs the National Fishing School, considers teaching vessels where students can practice the theoretical principles on these topics to be unnecessary.

Even though it might be excessive to add examples of tragedies to attempt to reach conclusions about the consequences generated by the lack of compliance with the international convention, the next section will list multiple shipwrecks that have occurred in the Argentine fishing fleet in the last thirty years leaving hundreds of fishers dead or missing.

Therefore, the editorial staff of this work has requested the National General Secretary of the Argentine Fishing Captains Association, Mr. Jorge A. Frías, to help writers and readers understand by describing the events of the 1989 shipwreck where he was a victim and which is similar to the sinking of fishing vessel Repunte, in 2017.

Thirty years later, the Argentine fishing industry has the same characteristics that have caused so many material losses and deaths. The vessels are old and deteriorated, and they are not in proper conditions to set sail. Fishers lack training to face the serious dangers of sailing and fishing in those conditions.

Captain Jorge Frías shares this personal analysis about the shipwreck in which he was involved. His narration can help us understand why we require better training for fishermen, which will save many lives in the future.

Frías says:

> *Every time a vessel sets sail, fishing captains must evaluate and guarantee that the vessel has all necessary gear and is well prepared, and depending on the vessel size, he must do it on his own or entrust the task to his crew. A fishing captain is naturally vigilant when he is faced with an imminent storm; this does not turn into fear, however. He maintains as much nautical safety as possible depending on the type of vessel. His personality, training, and experience and his time on the bridge have a powerful influence.*

And he continues:

> *Storms in the Argentine Sea are not alien to daily sailing; a great number occurs throughout the year. In 10-day tides and along the year, there is at least one stormy day, even in seasons favourable to good weather. Waves of two, three, four, six, eight and even ten meters high are a common challenge which must be faced while performing fishing tasks.*
>
> *The captain forgets temporarily about fishing and focuses on achieving the safest and most comfortable navigation condition, which can vary between keeping the vessel forward and tacking at slow speed or sailing in the direction of the wind, which depends on the intensity, the geographical position and the type of vessel. The alert state intensifies during the night and this can lead to the implementation of double watchkeeping and snugging the vessel down. The condition of the vessel increases the alert. The vessel's impermeability, proper stowage and righting are the strength of buoyancy [...] Being in a shipwreck, as many other situations I guess, makes you feel in a*

way that cannot be reproduced. For me, being only 21 years old was essential to help me go through the rough patch that life threw at me.

It was 26 October 1989, and "Sheriff I", a fishing vessel modified to a freezer vessel of 26 m in length, run aground what we later found out was a shoal at approximately 3000 m from the coast and covered by high tides, located north of Bahía de Camarones, in a place called Punta Guanacos. The impact caused a hull breach of 1.5 m by 7 m in length, what was corroborated later by the divers who carried out the expert examination of the accident.

The vessel run aground while sailing to get cover from the wind the captain had anticipated would occur that night. The plan was to drop anchor to protect the vessel and the crew from the storm. The captain made the right choice, the best manoeuvre, the same as the captains of two shipwrecks that deeply affected the Argentine people in 2017: fishing vessel "Repunte" (Lic. 1120) and Submarine "ARA San Juan".

In that moment, my youth and my four years of experience allowed me not to be afraid of what was happening, being protected by not knowing exactly where we were or what was really going on. When the impact caused a loud noise, I was classifying shrimp and packing it so later it could be glazed and frozen, because the vessel's target species was shrimp. Since the work station was on the main deck, in a semi-protected processing plant, my immediate reaction was to exit the plant and take off my boots. Then I started to realise what was happening. Those events would end in the drowning of my older brother, Víctor David Frías, a young man of only 24 years old who was on his first fishing trip, and the Captain himself, Juan Carmueda, of only 33 years of age.

After taking my boots off, I paid attention to the older crew members because my youth was only overshadowed by the presence of a 16-year-old trainee. My confidence was fortified because I trusted the crew I had been working with for a year. They were good co-workers and friends with whom I had been fishing for other species and using different gear, and all previous trips had been alright.

Around 30 minutes later, I realised my partners were not as ready as I thought and I quickly learnt that nobody is. Theory is very far from reality. The officers took refuge in the bridge. The problem was not that instructions were unclear; it was that there were no instructions at all. The commotion, the lack of training and death in the shape of waves of six-to-eight meters high, in a dark blue freezing sea, soon turned the deck into chaos.

The trigger of the crisis was the immediate sunset and the darkness it brought, which became deeper every minute. The stronger wind charged against the vessel, using waves as a punishment tool and making them break against the stern and splash over the pilothouse and up to the deck.

The sun said goodbye and the Chief Engineer Officer was "playing" with the machinery trying to refloat the vessel, neither knowing about the breach nor considering the possibility of its existence. The movements of the machinery placed Sheriff I in a worse position, facing the waves. Someone announced there was more water than normal in the engine room, so somebody ordered to open the hold, which did not have a big load because we had just been fishing for two days. A partner and I, I can't remember who, followed that order and checked if there was a lot of water in the hold, which should not have happened because while we were sailing towards the anchorage the machinery crew had ladled water from the boat, or so they said.

The truth is that fear took over the crew upon the confirmation that water had entered the vessel. The captain ordered to get the raft ready and we did so. We tied the towing cable with an external extension, a polyethylene rope which I had to tie to the fishing winch head on the starboard side to keep the open raft on that side; a mission I undertook until it was time to abandon ship. That was not possible because, minutes later, the tense and firm rope loosened and so I took it in my other hand and pulled from it, discovering that the raft was free and had disappeared between the waves. We lost the raft which was found completely unusable a day later by vessel María Dolores. Then, expert evaluation concluded that the halyard connector had loosened, food was expired, the flares were expired and the floor was unattached. However, the visible seals from the draft supplier Nautiq and the Argentine Coast Guard itself were approved.

I was never paralysed by the panic of the vessel and the draft sinking, nor by the darkness that already controlled the scene. Maybe my young age was a key factor. I did not have a family of my own, I was just a son to someone, and at that age you are not aware of what that means to a parent. I only had my dreams to grow "financially" and to enjoy life as best as I could, have a good time with my friends, improve my car and travel... Travelling was my dream.

But the dramatic situation and the fear it generated spread to the rest of the vessel. My brother was paralysed. It was his first trip, his début. He was another young man with dreams who, when Sheriff I was forced to enter Puerto Madryn's harbour, found out he was going to be a father, just four months after his wedding, as he told me. There must have been many stories like that onboard. All together, and however we could, we started to think how we could build floating devices because in the vessel we only had a draft and it had been lost. Now we only had life jackets left. Boards, net panels, anything could be used to face what our gut was telling us we would have to confront: abandonment of ship.

The hold sank, the engine room too. The vessel never stopped moving and waves kept drenching us. We were ordered to abandon ship, but not *before several misses and shouting between the captain and a sailor who was asking if the alert had been issued, and if the need for rescue had been communicated to other vessels or the Argentine Coast Guard, or between two sailors just because most crew members were overwhelmed and scared.*

My brother, who was going to be a father in four months and was on his first fishing trip, was holding onto the main mast, and he looked at me while he surrounded it with his arms. When I managed to get closer, he just asked me to tie his shoes and, in that moment, I realised how afraid he was. That fear has left a mark on me. My last memory of my brother are his eyes while I was tying his shoes. I was able to overcome the guiltiness I felt for facilitating his first fishing trip many years later, when I was a captain and accepted that each person has their own destiny and that instincts are not enough to cheat death if you have been neither trained nor prepared on how to do it. I can still see my brother holding on to the mast on deck while the vessel was sinking.

Flooding in the engine room caused engines to stop and, being night already, we were left completely in the dark. Despite all, it was good to hear the captain confirm he had asked for help.

The prow was the clearest place to decide from where to abandon ship, so we all moved to that area in the darkness; some of us had torches and the faint light of emergency beacons was useful to avoid hitting ourselves when trying to move on a vessel tilted to port side and swaying because the waves pushed it against the shoal. We tied four lifebuoys from the prow to a rope with the existing beacon buoys and threw them tied together and tied to the vessel as well, so we could descend one by one, moving from one lifebuoy to another, and leaving room so others could climb down. Finally, the last one would cut the rope tied to the vessel and we would be able to get away from it.

Again, youth and impulses lead me to decide to be the first to climb down a dock line tied firmly to a prow bitt that a crew member had thrown parallel to the lifebuoys so we could climb down it. So I did. It seemed an adventure to me. I think that is how I saw the tragedy while it was happening. That was because I never thought someone would die, let alone my brother. Maybe that is why they say ignorance is bliss.

I started to get scared when I was in the water. When I grabbed the first lifebuoy, a co-worker asked me if the water was cold. I could not see a thing. Darkness was so deep I could not see my own hands. That question was excruciating. I thought I would be left alone, that they would not jump into the water, and all I could say was "it's warm", but it was actually really cold. Luckily, they told me to move, that they would start climbing down.

I started to move from one lifebuoy to another, but when I tried to reach the last one, I felt a wave raising me several meters high, so I could not grab it and I was left adrift. I never saw my brother Víctor alive again. That used to *break my heart and I wondered if it had been worth it, maybe unconsciously, believing I did everything for everybody. Then I felt I had neglected my older brother in his first and last fishing trip.*

After that, I felt scared again when my legs got tangled in seaweed, which then I cut with my knife. My fishing teachers had taught me to always have my knife tied with a rope to my work pants. "It could save you", they said.

Immersed in the darkness, I could only hear waves crushing against something like a cliff. I found out about the shoal after I was rescued, when I was safe in the fishing vessel Jorge Antonio, which by chance was similar to Sheriff I because both had been built in the same shipyard, SANYM. Each minute the water felt colder and it was difficult to stay afloat. I tried to stay calm and just trusted God, everyone's God, as my dear maternal grandmother, Victoria Gabina, had taught me. God scared me again when I was hit on the face by a blunt object. So, I desperately threw a slap in the air and I felt it was a 1.5 m by 40 cm board which we used in the deck boxes to control the movement of the catch. Without a doubt that board gave me the serenity I was losing and the time I needed to be rescued.

Sailor José Gervasi, who could not reach the last lifebuoy, found a board as well and the strong water current brought us together during a few seconds, enough so that he could confirm everyone was in the water. He did not mention my brother and I did not ask. We were trying to hold hands without seeing each other. And we could not do it. In seconds we were separated by the waves. The boards allowed us to float but took us adrift. It felt like a film; hearing José ask if I was alright while his voice faded as he got further away. I got worried again. In that instant a strong diesel oil smell distracted me and made me think and wonder what was happening to the vessel. I think the new concern did not allow fear to come back.

I could not hear José anymore. The scenario was filled with silence and peace. The waves were rough so the water did not feel so cold. It felt like a warm protection blanket that was overpowering my body and mostly my thoughts. Thanks to the movement of the waves, I started to faintly see the beacon buoy we had tied to lifebuoys and realised the rest of the 12 crew members were all together. They were all silent. No doubt time lapses are a supposition because I no longer remember them accurately. But, in that moment, I had it under control. Before abandoning ship, I had grabbed three things: my wristwatch and two cassettes I loved at the time.

Yes, it was so tragic and unreal. Nature's presence was so strong, the waves were eight meters high; death was dramatically present. In that moment I learnt a shipwreck survivor does not think about his important possessions nor his family somewhere else. Only the small things around you count, and the brothers and friends who are facing tragedy with you.

When I believed my freezing body was feeling warm, and could start to peacefully fall asleep, I saw the spotlight of a vessel and I obviously assumed it was Jorge Antonio. Before abandoning ship, Captain Carmueda had told us that that was the closest vessel to us, because it was also anchoring trying to escape the storm.

I had also sailed in Jorge Antonio and I had friends there. These facts made the situation I was living less frustrating. They helped me because they all made me remember things we shared and forget about cold and fear. Or, maybe, it was a way of saying goodbye. The water was so cold that I could not feel my body, but a strange peace dominated the scene and I was controlled by it.

Finally, destiny wanted José and I to be the first ones to be rescued and, thus, regain body temperature. This happened because Jorge Antonio's Captain, Héctor Heriberto "Tito" Burgos, now deceased, positioned the starboard side very slowly to rescue the 12 men who were visible as they were illuminated, but Jorge Antonio's prow was above me and its movement would have made it literally run over me.

I was in the water, immobile, without being able to do anything. I shouted and shouted and it was boatswain Ricardo Villán who, from the fishing vessel prow, illuminated me with a reflector and told his captain to continue turning the course. That is how I ended up in the starboard side and I could, on a second try, grab the lifebuoy another partner threw at me. That is how they got me onboard. I do not know how, but later they told me that José was pulled up astern. I stayed several minutes face down and it took me a while to be able to stand up. I remember that, immediately, I thought about Victor, my dear brother. I needed to see him and this made me feel desperate. I went to the stern feeling great pain and cold. Captain Burgos had already aimed Jorge Antonio's stern to the group that was in the water, so I joined to help those who were climbing, anxious that one of them would be Victor. Neither Victor nor the Captain were there. The group of 12 turned out to be a group of 10. Then, I felt the world crumbling down over me.

Jorge Antonio's crew and those rescued started to take off the wet clothes to try to regain vital temperature. The faces were bruised and the eyes were bulging; mine were probably not so different. If we had not been the first to be rescued, José and I would not be here today. The manoeuvre to rescue the group of 10 would have stolen us that vital time. José and I agreed that we would not have borne ten more minutes. Burgos conducted a search all night and he hit the bottom several times. He did everything and more than his utmost, and I have always been grateful for it.

At 7 in the morning we spotted a body and, finally, I discovered where I was shipwrecked. The daylight let us see the shore and the breaker, until we distinguished the sunken vessel which slightly reappeared with the low tide. Burgos approached the body and, together with another partner, we pulled it *out of the water. My anxiety made me want to be involved in every manoeuvre. We were all aware that, unless Victor and Juan made it to shore, they would not survive. The body turned out to be Juan. My anguish and unease made me feel bitter joy and despair. I never fooled myself. With Juan laying on deck I chatted "like a madman", yes, demanding explanations from him until I was tired, and I slept in Jorge Antonio's prow searching for my brother.*

By midday, Tito Burgos ordered to wake me up and summoned me in the pilothouse. With tears in his eyes he told me that the Argentine Coast Guard ordered him to enter Camarones Port, inside Camarones Bay. I had no choice. I learnt that what a Captain suggests, indicates and proposes are actually orders. But the truth was that my brother had left and I needed to hear from my parents and, in that time, there were no mobile phones or the means we have today. Being 21 years old I was too far from the warmth and love of my parents.

The bus driver who transported us from Camarones to Trelew let me play the cassettes I had rescued and that we used to listen to with my brother. In a telephone box at the hotel in Trelew my mother told me: "they found Victor's body. Do not cry and come back home soon."

My father lived everything from a different angle. He processed his anguish taking care of everything, handling Mar del Plata's Coast Guard (represented by Prefect Vacotti) and the press to whom he stated: "Was my son's death product of the interventions of destiny? Or was it an event that occurred as a result of a sum of negative situations as regards onboard safety regulations? Are all the human and technical efforts to work in optimal operative and safety conditions onboard the fishing fleet units made?" (El Atlántico, Mar del Plata, 29 October, 1989 page 9).

The fishing activity must contemplate a sustained training and further education not only for the fulfilment of daily tasks, but also to face extreme situations with good results.

As days went by, we found out Victor never moved away from the hull, that maybe he experienced the same José and I, and even Juan, did; and that in the drift he bumped into the rope which had been thrown together with the container used to submit the shrimp to the effects of sulphite. In order to discover where the current was flowing to and whether it was able to support us while we were floating, the container was tied to the vessel's hull and Victor clanged to it. That is how he was found by María Rita's crew, which went around the zone and circled the stranded Sheriff in a boat. I believe that, with the crew statements and the events experienced it is more than evident that the crew was neither trained nor qualified.

That is how he finished narrating his shipwreck experience, the dramatic loss of his brother and the experiences drawn from this tragedy. This is what, today, allows him to state that the story will be repeated again and again, unless there is an adequate education and training for all fishermen, a joint responsibility in the control of the vessel's navigation aptitude, the security that all rafts are in good conditions, that every crew member knows which is his position on the vessel in a shipwreck clearing for action, from where to abandon the fishing vessel or where the lifeboats should be located to avoid poles, rigging ropes or boxes falling on them and sinking them. This is what hundreds of sailors and fishers who will never be able to tell us about their sufferings, shout from the bottom of the Argentine Sea.

5.3. THE CONDITIONS OF THE FISHING FLEET THAT OPERATES IN THE ARGENTINE SEA

5.3.1 Introduction

Accidents which involve fishing fleets and its crew members make people seriously reflect on the causes involved to try to revert this growing trend of casualties. This must involve the entirety of the sector: from the Administration and control organisms to the fishing companies and unions implicated. Particularly, the onboard personnel's training has special significance.

Globally, the fishing activity represents a high index of casualties, with many workers dead or permanently disabled, due mainly to accidents occurred during the performance of their tasks. As the global statistics reflect, the fishing activity mortality rate is very high in comparison with other occupations, even when compared to the security personnel, which inherently implies a high professional risk.

The casualty rate in the sector reflects that the more vulnerable the vessels, the more likely the casualty. This is a product of the structural difference in small vessels, the environmental conditions, the lack of controls, the deficient regulation or the lack of personnel training.

These characteristics of "high professional risk" are assumed by societies and the low repercussion it has on mass media, the relevant areas of the government and society in general, is remarkable compared to accidents on the ground. An infinity of examples could be brought up on the case, but generally the control organisms and the State as a whole do not notice the pain and memory or they restrict it to the most intimate and reduced part of the fishing sector involved. Fishing companies, responsible for this sequence of incidents which produce fatalities, do not acknowledge their responsibility either.

The main factors which determine the fishing vessels' safety are:

- The construction and equipment of fishing vessels.
- The working conditions onboard.

- The training of the crew members of the fishing vessels.
- The environmental conditions of the Argentine Sea[1].

This situation is difficult to evaluate without further discussing other factors which do not have a direct relation to the fishing vessels' construction and equipment details, topics treated in the Torremolinos Protocol and the ordinances of the Argentine Coast Guard.

It is critical to improve the instruction and training level of fishermen, the onboard personnel working conditions and the knowledge and use of fishing gear considering hydrometeorological conditions, their prediction and adequate diffusion.

In this regard, the STCW-F constitutes a manual of excellent characteristics to outline paths of knowledge applied to the fishing sector.

Below, international regulations and its adaptations to local regulations will be described, and it will be demonstrated that Argentina does not lack organisational instruments to improve this situation of casualties in the fishing sector.

5.3.2 International and national regulatory context

The International Maritime Organisation (IMO) and the International Labour Organisation (ILO) have studied this topic in depth, but their recommendations are not always adopted by the member nations, even by those who have a great number of vessels and men dedicated to the fishing industry.

5.3.3 Fishing casualties in the Argentine Sea

The Navigation Administrative Tribunal, created by Law No. 18870, is the organism with jurisdiction in "all navigable waters of the Nation or of the provinces which serve interjurisdictional traffic and commerce and in their shores, as well as in ports which are subject to national jurisdiction," with regard to the incidents considered as navigation accidents, which comprise those caused or suffered by vessels, ships, or naval vessels which produce damage or risk of damage to themselves or other vessels, ships or naval vessels, or an unjustified prejudice to the interests compromised in the maritime expedition [...].

The decisions of the Navigation Administrative Tribunal shall aim at determining the lack of professional aptitude, imprudence, lack of expertise or negligence of the responsible personnel, directly or indirectly, of a navigation

[1] Extensive research on these topics may be referred to in the document of the Navy Centre: The problem of safety in fishing, 2016.

accident, or the violation of current laws, regulations and ordinances applicable in each case.

The Tribunal shall neither consider nor express opinion on civil or criminal liabilities, whether by crimes, offences or misdemeanours, which could eventually arise from the investigated facts.

This organism should collect information on accidents in fishing vessels and evaluate their causes. It is composed of a president and four members, integrated by the following institutions:

- Argentine Navy (3).
- Argentine Coast Guard (1).
- Merchant Navy (1).

Once again, it is noticeable that, being the largest in number of ships in the Argentine Sea, the fishing sector does not have any role in the organism.

As mentioned, the information on accidents in fishing vessels is fractioned among several institutions. It is stored in a dispersed manner and it is inaccurate. Those interested in collecting this information have to search in several institutions and unspecialised media.

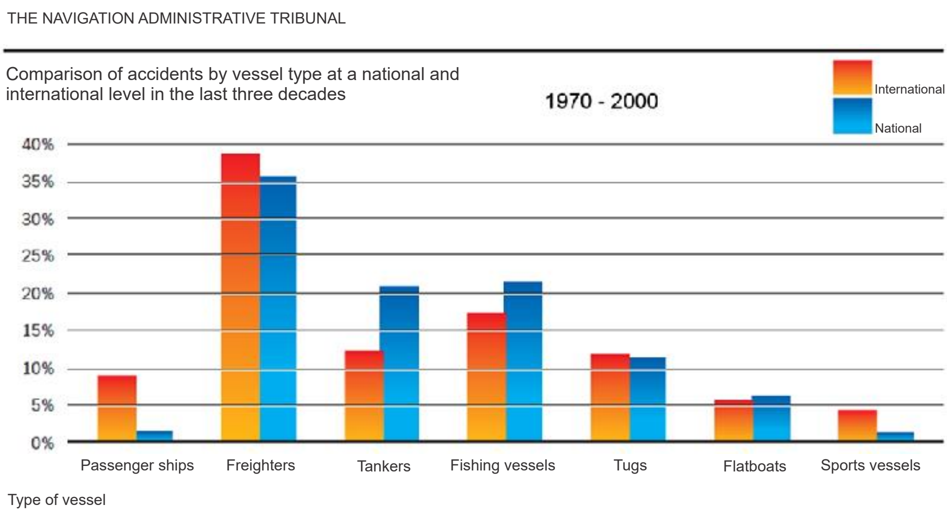


Figure 5-1. Comparison of accidents by vessel type at a national and international level in the last three decades

The first observation to emphasise is the comparative information of naval accidents in different types of vessels, at a national and international level, in the last three decades, which was conducted by the Navy Centre Bulletin in 2016.

In Figure 5-1, the scenario which places Argentine fishing surpassing the percentage of accidents in fishing vessels at an international level can be observed.

Paleo (2017), in her work about "the creation of a committee to investigate maritime accidents and casualties in fishing," states:

> *The number of accidents in the Argentine fishing fleet is painfully known and, generally, has a low journalistic coverage. There are international organisms such as the International Maritime Organisation (IMO), the International Labour Organisation (ILO) and the Food and Agriculture Organisation (FAO), which have studied this topic in depth, but their recommendations are not always adopted by the member nations, even by those who have a great number of vessels and men dedicated to the fishing industry.*

Furthermore, she summarises that "this Navigation Administrative Tribunal is responsible for judging and not for investigating." The author revises commissions of different nature at an international level, whose goal is the collection of data, research and expert analysis of accidents, the diffusion of provided conclusions and the formulation of statistics.

5.3.4 Commissions for the investigation of accidents and casualties in other countries

The commissions are:

- Danish Maritime Authority: Division for Investigation of Maritime Accidents
- Finnish Authority: Accident Investigation Board of Finland
- French Authority: Bureau d'enquêtes sur les événements de mer (BEAmer, French Marine Casualties Investigation Board)
- English Authority: Marine Accident Investigation Branch (MAIB)
- International Authority: The Marine Accident Investigators' International Forum (MAIIF)
- Irish Authority: Marine Casualty Investigation Board (MCIB)
- Italian Authority: Italian Coast Guard (ITCG)
- Swedish Authority: Swedish Accident Investigation Board (SHK)
- Spanish Authority: Comisión Permanente de Investigación de Accidentes e Incidentes Marítimos (CIAIM, Standing Commission for Marine Accident and Incident Investigations)

In all cases, these organisms are composed by official and academic institutions, leaving aside the curious situation of “that who controls also investigates.”

As an example, in our country, we can mention the Civil Aviation Accident Investigation Board (JIAAC). The JIAAC is a decentralised organism with financial autarchy and its own legal personality, under the National Ministry of Transport. Its mission is to “determine the causes of accidents and incidents occurred in the civil aviation sphere and recommend effective actions to avoid the occurrence of air accidents and incidents in the future in order to promote operational safety.”

The chapter “Certification and training of the technical personnel in charge of aircrafts” is important and critical in the JIAAC, a central axis in air safety.

It is coherent with the proposal presented in this book on the need of permanent certification of the personnel responsible of the fishing units.

There have been several national and provincial (Chubut) projects in our country which have not been successfully completed, although the situation deserves a qualitative jump of that magnitude. In the fishing case, there are not contrasting scenarios to expect this qualitative jump to happen in the safety of the fishing navigation.

There is an existing international legal framework which has been accepted by the Argentine Government; a sector with an emerging safety situation, as it is made clear in this chapter, and with an added value which is characteristic of the fishery exploitation. This exploitation is meaningful for the State’s budget, surpassing figures in fishing exportations, which are higher than those of meat exportations. Nothing justifies, then, the non-existence of an investigation commission of naval accidents, such as the models presented.

5.3.5. Casualty rates in the diverse fishing fleets in the Argentine Sea

The Argentine fishing fleet is composed by 568 vessels authorised to such end in the maritime sphere. By 2015, the vessels authorised for fishing were composed of, approximately, coastal vessels (45%), wet-fish vessels (20%) processing trawlers (7%), beam trawlers (14%), squid fishing vessels (11%), longline, surimi and scallop vessels (2%) (Bertolloti 2017).

It is not easy to obtain official data on the group of fishing vessels. From the publishing date, the increase of units of the beam trawler fleet destined to shrimp fishing has caused a substantial change in these figures and, nowadays, there are 300 vessels dedicated to the fishing of crustaceans.

Several of these vessels are product of adaptations of coastal and wet-fish vessels to the beam trawler fishery. Therefore, the fishing fleet universe has not increased. It has reduced the number of wet-fish and coastal units which have been adapted to this activity.

As per magazine "Redes" (2017), the vessels which conform the fishing fleet are distributed according to their length ranges into the following categories:

- From 0 -15 metres long: 79 units
- From 16-25 metres long: 154 units
- From 26-40 metres long: 169 units
- Of more than 40 metres long: 166 vessels

This grouping allows to understand each one of these groups of vessels which, in general, respond to specific spheres and particular fishery resources.

In this fishing vessels universe, the group of small vessels remains to be considered. Although it would be part of the shorter vessels, it responds to artisanal fishery and it is exclusively subjected to provincial administrations with maritime coastal areas.

The statistics in this sector are even more complicated than the sector analysed in this chapter and, in general, a unique record for this type of vessels is missing. Likewise, the important continental fishing fleet is not considered in this analysis.

The Naval Industry Chamber of Mar del Plata, analysing the age of the Argentine fleet which includes 568 vessels authorised for fishing, concludes that the average age of the fleet is 36.6 years old.

The study further determines the age by segmentation of the vessels' length. Vessels of less than 15 metres long are 53.5 years old; vessels between 15 and 25 metres long are 27.1 years old on average. Vessels between 25 and 40 metres long are 32.2 years old and vessels of more than 40 metres long are 36.8 years old on average.

Likewise, the study considers the age by types of fleet which constitute a type of particular product, and whose fishery resources result, in many cases, exclusive. Below, we will see the average age of every type of fleet:

- The wet-fish fleet, of more than 40 metres long, is 46.1 years old on average.
- The freezer fleet, of between 49 and 120 metres long, is 35.23 years old.
- The squid fishing fleet, of more than 40 metres long, is 33.56 years old.
- The freezer beam trawlers fleet, of between 30 to 54.2 metres long is 32 years old.
- The wet-fish fleet, of between 25 and 40 metres long, is 28.76 years old.
- The wet-fish fleet, of between 15 and 25 metres long, (it is the newest) is 27.09 years old.

On the origin of the vessels (national or international construction), the Chamber summarises that a high percentage are imported in almost all fleet ranges. The freezer vessels of between 49 and 120 metres long, and the squid fishing vessels of more than 40 metres long are completely imported. The freezer-beam trawler fleet of between 30 and 55 metres long is 95% imported and 5% national.

The wet-fish fleet of less than 15 metres long and between 15 to 25 metres long is completely national. The wet-fish fleet of between 25 and 40 metres long is 86.9% national and 13.1% imported. The wet-fish fleet of more than 40 metres long is 22% national and 78% imported.

Given the fact that the vessels import is not restricted by the age of the fleet which enters the fishing ground (for example, in 2016 the import of 8 units of 18.3 years old), the cited report concludes that there is a need to introduce a regulation which establishes a maximum lifespan for vessels, whether already active or recently incorporated.

Information from diverse sources has been collected with the purpose of obtaining a list of damaged fishing vessels in the Argentine Sea[2]. In this list, the name of the vessel, date and place of the accident, the vessel's length and the year of construction are clarified.

The events' characteristics have been established, following international criteria with regard to: accident, collision, fire, shipwreck, stranding, shipwreck by collision, shipwreck by fire; controlled fire, collision; death by accident and/or man overboard; evacuated injured person.

As regards those deceased or disappeared, they are identified by the number of individuals on the total vessel's crew members, where 2/4 means two deceased on a total of four crew members (Paleo, 2017)

As already mentioned in this chapter, the difficulty to obtain an official record on casualties is enormous. The sources of information consulted have been various, even relying on the verbal transmission of onboard personnel and specialised media. Even more so, some difficulty as regards the number of victims has been found and, as it is in many cases publicly known, it has not been possible to establish their affiliation, at least at the time of the accident.

This is due to the shortfalls in the records that every vessel should, unequivocally, give to the Argentine Coast Guard in each outing report. Consequently, the Argentine Coast Guard should create this roll of the crew. This is another important point to be outlined here. It does not mean that the State does not perform its role of comptroller of this activity: it does so ineffectively. The information on casualties is recorded by several state organisms in a disorganised

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[2] Refer to Annex 1 at the end of this chapter.

manner. If there was a protocol for that purpose, it would be performed, at least, in a more organised manner.

Comparing once again this situation with civil aviation, an air accident is inconceivable without immediately presenting a list of the injured passengers. It is possible that, in some nautical casualties, the roll of the onboard members does not coincide with the total or injured personnel and, strangely enough, some days later a crew member, which had switched his place with another person, appears in the crew's roll.

Considering the age of the fishing vessels, a correlation between this variable and the sea casualties does not arise, according to what is detailed in the following table:

Length of the fishing vessels [m]	Units /Percent age of the total fleet	Age in years	Number of casualtie s in fleet strata	Percent age in total vessels	Percent age of casualtie s/ Total vessels	Number of deaths	Risk index
0-15	79 / 13.9	53.5	15	2.6	21.1	25	0.51
15-25	154 / 27.1	27.1	25	4.4	35.2	59	0.54
25-40	169 / 29.7	32.2	10	1.7	14.1	12	0.13
+ 40	166 / 29.2	36.8	21	3.7	29.6	14	0.21
Totals	568	36.8	71				

Table 5-1. Length ranges, vessels number and age, and fishing vessels casualties Source: Naval Industrial Chamber of Mar del Plata, Redes Magazine, S. Paleo and the Argentine Fishing Captain Association's own sources.

That is how in the lower fleet strata (0-15 m) 2.6% of casualties are recorded and the higher value of 4.4% of the vessels correspond to the fleet strata of 15-25 m. The percentages of casualties 1.7% and 3.7% correspond to the values of the fleet strata of 25-40 m and more than 40 m, respectively.

It is possible that adjusting more accurate variables, such as the number of days at sea of each fleet strata in relation to casualties, these values would acquire another significance. However, these variables are not present in the observations.

It is noticeable that, although the smaller vessels are older as regards construction and the most vulnerable to the adverse conditions of the sea, they do not present a higher number of casualties. However, the number of casualties occurred and the number of deaths in relation to every fleet stratum, allows to understand a particular risk index which characterises each fleet stratum.

This index is distributed with values that range from 0 to 1. Zero (0) represents a lower possibility of the incident occurrence and the number of deaths, whereas one (1) implies a higher number of casualties and/or deaths. In this way, the aforementioned index presents higher probability values of obtaining figures of accidents which result in deaths.

In shorter fleets, this index has values of 0.51 in the 0-15 m fleet and 0.54 in the 15-25 m fleet, whereas in longer fleets, the values are 0.13 and 0.21 for the strata of 25-40 m and for the strata of more than 40 m, respectively. In the two shorter fleets, the high values are justified by the joint high frequency of casualties and deaths.

According to the Naval Industrial Chamber of Mar del Plata, the cited values clear any doubt on the relation between sea casualties and the origin of the vessels built in Argentine shipyards.

5.3.6. International conventions and guidelines on safety at sea

A summary of international conventions and guidelines on safety at sea which address in depth the topic of safety in fishing fleets, is presented below:

- IMO - ILO - FAO
- International Convention for the Safety of Life at Sea (SOLAS)
- United Nations Convention on the Law of the Sea
- Torremolinos Convention and Torremolinos Protocol
- Code of Safety for Fishermen and Fishing Vessels FAO-ILO-IMO voluntary guidelines for the design, construction and equipment of small fishing vessels
- Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel (Training Convention)
- Guideline document on training and certification for fishing vessel personnel (FAO/ILO/IMO)
- The Code of Conduct for Responsible Fisheries
- IMO’s Code for the Investigation of Marine Casualties and Incidents
- Other related IMO agreements

- Regional provisions. Application of conventions and regulations to the fishing activity
- International conventions and guidance on safety at sea:

  http://www.fao.org/docrep/004/X9656S/x9656s05.htm

ANNEX 1: List of fishing casualties in the Argentine Sea

References

- (A) Accident; (C) Collision; (F) Fire; (S) Shipwreck; (ST) Stranding; (S x C); Shipwreck caused by collision; (S x F); Shipwreck caused by fire.
- Victims 2/4 means 2 dead from a total of 4 crew members.
- (F***) Controlled fire; (C****) Collision or Boarding (B^).
- Death by accident and/or man overboard; (O^^); Evacuated injured people.

Name	Date	Place	Victims	Length	Year of construction
Sheriff I (S)	27/10/1989	Punta Guanaco, Camarones Bay	2/14	25.5 m	1984
Amapola (S)	18/04/1990	Coasts of Mar del Sud	08/08	11.5 m	1956
Angelito (S)	18/04/1990	Coasts of Mar del Sud	08/08	18.9 m	1973
Virgen del Rosario (S)	29/02/2000	30 NM from Mar del Plata	03/05	13 m	1991
Cincomar II (S)	30/07/2000	160 NM from Punta Ninfas	0/25	55.50 m	1978
Virgen de Lujan (S)	29/09/2000	Mar del Plata - 38° 23´S 56° W latitude	0	15.76 m	1955
Api II (S + F)	14/06/2001	West from Valdés Peninsula	07/58	82 m	1977
Conarpesa V (S)	01/11/2001	Dos Bahías Cape	0/24	36 m	1978
Azuchi Maru (S x C)	22/03/2001	150 NM east from Río Gallegos	0/57	89 m	1983

Name	Date	Place	Victims	Length	Year of construction
Angela Wright (S x ST)	19/01/2002	Stranded in front of Bustamante Bay	0/24	36 m	1988
Chubasco (S)	19/03/2002	Raso Cape	0/08	19.95 m	1988
Don Víctor (S)	19/08/2002	Punta Atlas	7/07	19.25 m	1973
Argentina S (SSTC)	11/11/2002	Rawson's port Breakwater	01/04	11 m	**********
Don Roberto (SSTC)	21/05/2003	San Jorge Gulf	07/07	14.40 m	2002
María Alejandra (S)	17/12/2003	190 NM east from Rawson's port	0/30	53 m	1981
Antonio Miralles (S)	24/03/2004	Outside Punta Ninfas	0/14	60 m	1960
Santa Lucía (S)	15/04/2004	Near Camarones Bay	06/06	19.60 m	1966
Jesús del Camino (SSTC)	13/04/2004	San Matías Gulf	07/08	18.66 m	1994
Santa Marta (S)	25/04/2004	San Antonio Este Bay	04/04	9.90 m	***********
Fe en Pesca (S)	02/07/2004	Blanco Cape	0/09	26.05 m	1973
Fénix (S)	05/10/2004	Caleta Córdoba	02/04	17.29 m	1947
Gaviota III (S)	21/10/2004	Claromecó's lighthouse	01/03	6.60 m	********
Siempre Don Pablo (SSTC)	25/11/2004	Isla Escondida	04/07	18.40 m	2003
Diego I (S)	25/11/2004	Comodoro Rivadavia	0/08	21 m	1987
San Daniel (S)	05/10/2005	Caleta Córdoba	0/05	8.25 m	1973

Name	Date	Place	Victims	Length	Year of construction
Vieirasa 8 (B^)	25/05/2006	Puerto Deseado	02/54	77.53 m	1988
Carlos Álvarez (S x F)	11/08/2006	On tow to Caleta Paula	02/20	36.60 m	1990
Don Juan (S)	04/09/2006	Coast of Chubut	0/08	24.50 m	1943
Eterno Jorge Padre	01/11/2006	Ingeniero White	0/07	13.58 m	1949
Stella Maris I (F***)	13/09/2006	165 NM east from P. Deseado	0/56	68 m	1988
Rosario G (S)	23/10/2006	40 NM east from Rawson	07/07	18 m	1986
Altalena (B^^)	23/01/2007	90 NM east from Puerto. Madryn	0/24	55.35 m	1960
Magdalena (F***)	24/05/2007	65 NM entered into Puerto Deseado	0/25	33 m	1978
San Jorge (SSTC)	19/06/2007	In front of the Uruguayan coast	0/08	20 m	1969
Puente América (S X F)	28/07/2007	110 NM east from Puerto Deseado	0/45	70 m	1987
Kantxope (C****)	10/08/2007	20 NM from Puerto Deseado	0/20	49 m	1975
Álvarez Entrena I (F***)	11/08/2007	50 NM east from Comodoro Rivadavia	0/28	40 m	2005
Álvarez Entrena II (F***)	25/08/2007	Outside Caleta Olivia	0/28	40 m	2005

Name	Date	Place	Victims	Length	Year of construction
Atlántida (SSTC)	02/04/2009	136 NM south from Mar del Plata	03/08	23 m	1966
Mataco II (S)	05/05/2009	42 NM east from Río Gallegos	01/44	58 m	1968
Cincomar V (B^)	26/07/2009	Waters outside Monte Hermoso	01/29	55 m	1970
Puente Chico (B^)	28/10/2009	75 NM from Comodoro Rivadavia	01/20	39.5 m	1988
Surimi I (S)	14/01/2010	44 NM east from Quequén	0/08	50.4 m	1969
Argenova XI (S)	11/03/2010	10 NM from Villa Gesell, piloting south	0/08	45 m	1970
San Pedro Apóstol (S x F)	11/03/2010	In front of the coasts of Carmen de Patagones	0/10	24 m	1963
Unión (SSTC)	30/10/2010	In front of the coast of Claromecó	02/09	20 m	1974
Mar del Chubut (B^^)	08/02/2011	180 NM east from Puerto Madryn	01/08	24 m	1987
Es Posible II (S x ST)	21/03/2011	Entering Caleta Olivia's channel	0/04	12.85 m	1990
Pablo I (S)	10/12/2011	In front of the coast of Villa Gesell	0/06	16 m	1973

Name	Date	Place	Victims	Length	Year of construction
Neptunia III (SSTC)	15/02/2013	6 NM east from Rawson's port	0/04	9.90 m	********
Virgen María (B^)	28/06/2013	In front of the coast of Miramar	01/15	57 m	1971
Orión I (S)	03/10/2013	18 NM from Villa Gesell	0/08	53.2 m	1971
Galme I (S)	04/01/2014	20 NM east from Mar del Plata	0/06	18.50 m	1972
Es Posible II (S)	26/01/2014	Caleta Olivia	0/04	12.85 m	1990
Don Juan	26/01/1014	Rawson	0/04	19.79 m	1943
Altalena (B^)	21/09/2014	Falls in the water during fishing manoeuvre	01/15	55.35 m	1960
Name	Date	Place	Victims	Length	Year of construction
San Jorge I (SSTC)	23/02/2015	40 NM east from Villa Gesell	05/08	20 m	2008
Rawson (S)	06/08/2015	60 NM east from Tres Puntas Cape	0/09	22.6 m	1965
Temerario (B^)	29/10/2015	San Matías Gulf during manoeuvres	01/07	20.55 m	1952
Mariana (SSTC)	15/12/2015	Fishing in front of the coast of Punta Delfín	0/04	9.90 m	********

Name	Date	Place	Victims	Length	Year of construction
Marianela (B^^)	26/04/2016	Evacuated injured people in Mar del Plata	0/08	27 m	1988
Villarino (B^^)	03/05/2016	142 NM from Puerto Madryn	0/30	70.20 m	1989
Padre Pío (B^)	30/06/2016	Falls into the water in front of Punta del Este	01/04	9.90 m	2011
Sole Mío (B^^)	01/07/2016	Samboromb ón in front of Puerto Lavalle	01/04	9.90 m	1994
Sagrado Corazón (S x ST)	20/08/2016	Gets stranded and sinks in Chubut river	0/06	21 m	1987
Name	Date	Place	Victims	Length	Year of construction
San Antonino (S)	01/09/2016	10 NM east from Punta Mogotes	06/06	16 m	1966
Esteiro (S x F)	11/09/2016	197 NM from Mar del Plata's port	0/17	38.10 m	1987
Victoria I (ST)	28/10/2016	In front of the beaches of Mar del Plata	0/11	25 m	1985
Noemí I (SSTC)	23/11/2016	11 NM from Rawson's port	0/04	9.90 m	2007

Name	Date	Place	Victims	Length	Year of construction
San Benito (N)	08/02/2017	3 MN San Matías Beacons San Antonio Oeste	0/04	9.90 m	**********
Orion V (B^)	16/02/2017	Puerto Deseado	01/25	53.20 m	**********
Repunte (S)	17/06/2017	15 NM northeast from Rawson's port	10/12	32 m	1966
Que le importa (S)	19/08/2017	18 NM south from Rawson's port	0/08	18.4 m	1998

Chapter 6

FOOD SOVEREIGNTY

THE ROLE OF THE STATE IN THE PROVISION OF FOOD

6.1. BRIEF REVIEW OF FISHING AND FISHER’S HISTORY

Fishing is a primary and primitive activity and a profession that is not recognised as a prominent practice anywhere in the world. It goes unnoticed and it has not yet received the importance it deserves. In other words, only a few parents are glad about their daughter marrying a fisher.

In trying to understand these parents, we acknowledge that their daughter will be alone most of the time. Many times, she will have no help in raising children and, God forbid, it is always possible that the wife will become a widow and children will be fatherless due to bad weather or a bad manoeuvre. Fishers not only have to deal with the harshness of the weather but also they have to be part of society.

Their minds and bodies undergo both visible and invisible changes. They have to adapt to living in a place that is permanently moving. Some fishers get seasick (term precisely related to the movement of the sea) because they work, live and eat as usual. Invisible changes are in their heads. They have to set their mind for every day struggle, which could also be the last one.

An example of this, and a particular situation, is what happened on 31 August, 1946. In the same way that taxis are usually black and yellow to make them more visible, in the maritime world the colours were greys, light blues and whites. It was only after the Santa Rosa storm of 1946 that white was changed to yellow.

On that day, unforgettable for the fishing community in Mar del Plata, occurred the greatest tragedy in the history of the city. The well-known Santa Rosa storm hit Mar del Plata during the early morning of 29 August, 1946, with winds of 90 kilometres per hour and waves of up to 6 and 8 metres high, and caused the death of 31 fishers who went missing in the rough sea.

The consequences of this storm were five sank vessels, five deceased people whose bodies were found, twenty-six missing fishermen and eight providentially rescued. That is why people always say each day can be the last one.

Moreover, fishers have to try to forget about being away from their families and they have to live in a vessel (which is always small) with other people who are in the same situation, what makes living together in the vessel a job in itself.

In some good seasons, they can earn more money than what their family members earn by working on land, and they can obtain some things that, due to the characteristics of the job (required to be always aboard a vessel), only the wife and children can enjoy and sometimes this is not recognised. They need to be mentally prepared to know that their children will be raised without their father present. There are great numbers of cases of people who do not choose to study or the easiest way: it happens here and in any fishing region in the world.

Of the different fishing types, like survival, artisanal and industrial, the one that developed in Argentina at the end of the 19th century and early 20th century was located at the base of the pyramid, where no basic needs, like food and housing, were fulfilled. Working in an almost wild manner, and with the help of their families, they could position themselves and improve financially.

These people did not have money or studies, they were foreigners who did not speak Spanish. They were heirs to this ancestral profession in their mother land, like Franceso Pelusso, who many consider the first man to catch a fish in the Argentine Sea, and whose great-grandson, Marcelo, continues fishing in the city of Mar del Plata even though he never met his great-grandfather.

Plenty has been written about the history and origins of fishing and its industry in Mar del Plata; here, however, we want to put ourselves in the shoes of some of these people, which in a way means putting ourselves in the shoes of all of them. They had to navigate through many difficulties and be extra resourceful to build vessels, sails and nets, and to try to preserve the abundant fishery as well as sell their production in a country that did not understand its consumption.

Countries like Japan, Italy or Spain had always fished and sales there were secured because people appreciated the resource. Unlike these nations, Argentina had another significant obstacle: distance. Buenos Aires is almost 400 km away and not properly connected. Tinned goods and salting appeared almost spontaneously decades before the arrival of industrial freezing.

There was no national plan to promote the fishing industry's development and growth, whether it was extraction or industrialisation fishing. The State always tried to order it only after difficulties appeared. A clear example of this, that many already know, is the reason why vessels are yellow.

On the other hand, commercially speaking, there is a lack of articulation between the public and private sectors, that is, between industries, vessels and the State that regulates and determines guidelines and, above all, collects taxes. Difficulties were endless and due to the lack of prevision, in the height of the 20th century, one of the most important fishing grounds in the world did not generate work or industrialisation on land with a more positive impact than what it is nowadays.

For instance, fishing permits granted by the State were not given to factories who had the biggest number of personnel, but rather to fishing vessels. In this activity, however, that profitability does not always have the desired impact on the whole production chain. White croakers, for example, are captured and exported whole without any type of processing besides freezing. This creates jobs for a few packers and freezer workers.

The anchovy industry creates jobs for hundreds of people on land between August and October. If the fishing permit belonged to the saltery, instead of fishing white croaker which generates almost no employment, the vessel would be fishing anchovy and generating hundreds of jobs.

Due to this poor decision-making about the issuance of fishing permits, thousands of workers and a great number of small and medium-sized companies cannot develop. For decades, the State has merely been a collector completely insensitive to the situation.

The reader may not know that in our maritime coast the Atlantic chub mackerel and the sardine do not exist. In the mid 20th century, a national and patriotic government had to take a risk so the species we do have in our sea, from the family of chub mackerel and sardine, could be labelled as such. Due to those regulations, the chub mackerel was labelled as Atlantic chub mackerel and the anchovy as Argentine anchovy. The same happened to the little tunny, which is labelled as tuna.

It will be impossible to acknowledge the sea and land worker, and to make this reality known, if most governments are not aware of it. It is no different than expecting people without any experience to take bold or smart decisions when they have not had life experiences related to the job position they hold.

This contribution aims at generating a debate, from those first fishers to the current authorities, more than a hundred years later. The abyss that separates fishing from offices is so huge that a handful of opportunists and another of incompetents turn national fisheries into an unknown and marginalised activity instead of one that is at the forefront of the world thanks to the excellent products obtained from nature which Argentina would be perfectly capable of exploiting.

So, to summarise:

- The fishing activity is potentially one of the most commercially significant.
- It is a complex and heterogeneous universe filled with infinite problems and great numbers of participants.
- Discard is predation, pollution and loss of proteins with high biological value.

6.2. FOOD SECURITY AND SOVEREIGNTY

6.2.1. Definitions and concepts

Food security

It is believed that food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.

This definition (FAO, 2006) strengthens the multidimensionality of food security and includes "the availability of food, the access to food and the stability of the other three elements throughout time".

Food sovereignty

Other actors, like different NGOs and other civil society organisations, widened the concept and coined the term 'food sovereignty'.

According to Food Secure Canada's document from 2012 called The Six Pillars of Food Sovereignty, developed in Nyéléni in 2007, food sovereignty sits on six pillars:

- Focuses on food for people: a) puts people's need for food at the centre of policies; b) insists that food is more than just a commodity.
- Values food providers:
    - Supports sustainable livelihoods.
    - Respects the work of all food providers.
- Localises food systems:
    - Reduces distance between food providers and consumers.
    - Rejects dumping and inappropriate food aid.
    - Resists dependency on remote and unaccountable corporations.
- Puts control locally:

    - Places control in the hands of local food providers.
    - Recognises the need to inhabit and to share territories.
    - Rejects the privatisation of natural resources
- Builds knowledge and skills:
    - Builds on traditional knowledge
    - Uses research to support and pass this knowledge to future generations
    - Rejects technologies that undermine or contaminate local food systems
- Works with nature:
    - Optimises the contributions of ecosystems
    - Improves resilience
    - Rejects the intensive use of energy from industrialised monoculture and other destructive methods.

6.2.2. The right to food

Without the right to food, neither life nor human dignity or the enjoyment of other human rights can be assured. Reaching a better definition of the right to food will create concrete instruments to improve the application. Therefore, in 1999, the Committee on Economic, Social and Cultural Rights (CESCR) adopted the general comment No. 12.

This document says:

> *The human right to adequate food must be interpreted as a right which focuses on the availability of food in a quantity and quality sufficient to satisfy the dietary needs of individuals, free from adverse substances, and acceptable within a given culture, as well as the accessibility of such food in ways that are sustainable.*

The Committee established that violations of the International Covenant on Economic, Social and Cultural Rights occur when a State fails to ensure the satisfaction of, at the very least, the minimum essential level required to be free from hunger. In this respect, there are three levels of obligations: to respect, to protect and to fulfil.

While only States are parties to the Covenant and are thus ultimately accountable for complying with it, all members of society have responsibilities in the realisation of the right to adequate food.

In Argentina, the Declarations and Covenants incorporated in the 1994 amendment compose Article 75, Paragraph 22 of the Constitution of Argentina. Therefore, the formulation of State programs and policies at national, provincial and municipal levels must accommodate and respect the principles of this rights approach.

In relation to food, there is a focus on the need to guarantee physical and mental well-being for everyone, participation and access to information, as well as respect for children's best interest and promotion of their development.

The implementation of rights recognises the comprehensive characteristic of human rights, that is, focusing on one right cannot cause a lack of attention to others. States must guarantee them up to the maximum of their possibilities and they can even request international cooperation.[1]

Being understood as a basic right, the human right to food was enshrined in 1948 in the Universal Declaration of Human Rights (Article 25), where it says:

> *Everyone has the right to a standard of living adequate for the health and well-being of themselves and of their family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control.*

In the same way, the International Covenant on Economic, Social and Cultural Rights (ICESCR) signed in 1966 includes it as well (Article 11), proclaiming "the fundamental right of everyone to be free from hunger". It mentions, in Article 11, part 3, "the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing…" This article goes beyond because it recognises the fundamental right of everyone to be free from hunger, forcing States to improve the methods of production, conservation and distribution of food and to ensure an equitable distribution of world food supplies[2].

From a legal point of view, this is part of the second-generation human rights (education, housing, health and employment) which refer to using State resources to promote a series of guarantees to its citizens.

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[1] Refer to: < http://www.fmed.uba.ar/depto/edunutri/2016derechoalaalimentacion.pdf>.

[2] Refer to: <http://www.scielo.org.ar/scielo.php?script=sci_arttext&pid=S1852-73372010000200005>.

Chapter 7

ILO'S WORK IN FISHING CONVENTION

7.1. ILO AND CONVENTION 188

The 96th General Conference of the International Labour Organisation (ILO), held on 14 June, 2007 in Geneva, adopted a historical convention known as Convention 188, which shall drive all the world efforts aimed at ensuring the safety and work of more than 38 million workers in the fishing sector.

Already in the Preamble to Convention 188, ILO recognises that: "fishing is a hazardous occupation when compared to other occupations." And, in pursuit of the fundamental mandate of ILO to promote decent work conditions, it recognises that there is a need to: "protect and promote the rights of fishers" All of this with the intention of looking forward to the promotion of decent work conditions in the fishing activity. Virgilio Levaggi, National Deputy Director of the International Labour Organisation's Regional Office for Latin America and the Caribbean, provides a wider definition of decent work: “a concept which seeks to express what should be a good and dignified job in a globalised world.”[1]

On 16 November, 2017, the Convention enters into force and, then, new work regulations designed to improve the work of millions of workers in the fishing sector shall be applied by the Members, expanding their influence, directly and indirectly, to the total number of fishers globally. Guy Rider, Director-General of ILO, also states:

> *The implementation of the work in fishing Convention marked a milestone in the history of the fishing industry [...]. It will contribute to ensure decent work conditions abroad the fishing vessels, and it will allow the compliance of the minimum requirements through labour inspection in foreign ports. The regulations established in the Convention may also have a prevention function by addressing the unacceptable work regulations for the sector, such as forced labour and child labour.*

The regulations of the Convention aim at ensuring that workers of the fishing sector are benefited with a better health and safety at work and health care at sea, and that ill or injured workers receive medical treatment on the ground. It also aims at ensuring that workers have enough rest time to preserve their health and safety, and that they are protected by a written work agreement, besides having the same social security coverage other workers have.

In this regard, in the preamble to the Convention 188, ILO includes the minimum requirements for work onboard, the protection as regards safety and health at work, within the subjects which comprise the concept of decent work onboard fishing vessels. These are three concepts strongly related to those regulated by the STCW-F Convention which, as a convention of international cooperation, establishes the regulations on training, certification and watchkeeping for the fishing vessels’ personnel.

Likewise, the STCW-F established as one of its main goals: “to promote safety of life and property at sea”. There is an interrelation between both conventions that, although they emerge from different international organisms, they converge in practice in the document of FAO/ILO/IMO which serves as Guide for the Training and Certification for Fishing Vessels Personnel.

As a general principle, Convention 188 (ILO) is applicable to all fishers and fishing vessels engaged in commercial fishing operations (Art. 2, Paragraph 1).

Similarly, Convention 188 defines commercial fishing as all fishing operations except artisanal fishing and sports fishing (Art. 1, Paragraph a), conceptualising the fishing worker as the person hired to perform a professional activity onboard a fishing vessel, excluding from such concept maritime pilots, naval personnel, people

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[1] Refer to: <http://www.ilo.org/americas/sala-de-prensa/WCMS_LIM_653_SP/lang--es/index.htm>.

in the permanent service of a government, ground staff which performs works onboard a fishing vessel and fisheries observers, (Art. 1, Paragraph e). And it additionally defines the fishing vessel as a ship or vessel destined to be used in commercial fishing (Art. 1, Paragraph e).

As a way of giving full effectiveness to Convention 188 (ILO), the aforementioned establishes (Art.6), as a general principle, that every Member:

> *"...shall implement and enforce laws, regulations or other measures that it has adopted to fulfil its commitments under this Convention with respect to fishers and fishing vessels under its jurisdiction. Other measures may include collective agreements, court decisions, arbitration awards, or other means consistent with national law and practice."*

In this way, it is highly important in our country that fishing workers themselves, through trade unions and businessmen or business chambers, through the legal tool given to them by means of a collective bargaining, may reach Collective Labour Agreements which adapt national regulations to the standards established by Convention 188, always complying with legal standards exercised by the State over those Collective Agreements or Agreements which the parties may reach (according to that provided as regards Law No. 14250 of the collective bargaining, its amendments and complementary regulations).

Accordingly, it should be emphasised that Convention 188 (ILO) establishes (Art. 8, Paragraph 1) that "the fishing vessel owner has the overall responsibility to ensure that the skipper is provided with the necessary resources and facilities to comply with the obligations of this Convention." Likewise, in the following paragraph (Art. 8, Paragraph 2), Convention 188 (ILO) emphasises the role of Skippers, stating that:

The skipper has the responsibility for the safety of the fishers onboard and the safe operation of the vessel, including but not limited to the following areas:

- providing a supervision which will ensure that, as far as possible, fishers perform their work in the best conditions of safety and health;
- managing fishers in a manner which respects safety and health, including prevention of fatigue;
- facilitating onboard occupational safety and health awareness training; and
- ensuring compliance with safety of navigation, watchkeeping and associated good seamanship standards.

On top of this we must add that Convention 188 (ILO) in part IV, when establishing the conditions for onboard service in a fishing vessel (Art. 13, Paragraph a), expressly stipulates that:

> *Each Member shall adopt laws, regulations or other measures requiring that owners of fishing vessels flying its flag ensure that: (a) their vessels are*

sufficiently and safely manned for the safe navigation and operation of the vessel and under the control of a competent skipper.

Only a highly qualified Fishing Captain or Skipper will be able to develop and respond effectively to the tasks and competences that are his responsibility, according to Convention 188. Here, the focus is on the analogy of the goals of ILO, IMO and FAO as regards education and training of Fishing Captains, which is to serve as a guide for the Training and Certification for the Fishing Vessel Personnel, as it is the Document of the FAO/ILO/IMO (Part a, Chapter 2, Art. 2.1.1.1).

7.2. COINCIDENCES BETWEEN ILO'S CONVENTION 188 AND THE STCW-F CONVENTION

Convention 188 (ILO) and the STCW-F Convention coincide insofar as they establish that Fishing Captains which operate fishing vessels of 24 m in length and over must have the necessary knowledge to be able to respond for the safety of the fishing vessel and its crew at all times, including during fishing operations. Examinations in all these subjects shall be designed to test that the candidate has assimilated properly all available information that affects the safety of the vessel and its crew in accordance with the syllabus. (Chapter II, Appendix to regulation 1 and Appendix to regulation 3).

Toward that end, the STCW-F lists the minimum requirements that a Member shall obligatorily observe for the purposes of certification of Fishing Captains which operate vessels of such length.

As regards the protection of the health of the fishing workers, Convention 188 (ILO) establishes (Art. 10, Paragraph 1) that: "no fishers shall work onboard a fishing vessel without a valid medical certificate attesting to fitness to perform their duties", with each Member having to adapt its laws or regulations on the topic to the minimum requirements listed in Art. 11 of the Convention.

However, for vessels of 24 m in length or over, or for fishing vessels which normally remain at sea for more than three days, Convention 188 (ILO) establishes that the medical certificate of a fisher shall state, at minimum, that:

The hearing and sight of the fisher concerned are satisfactory for the fisher's duties on the vessel; and the fisher is not suffering from any medical condition likely to be aggravated by service at sea or to render the fisher unfit for such service or to endanger the safety or health of other persons onboard.

Likewise, and as regards the minimum age requirement for work onboard fishing vessels engaged in commercial fishing, Convention 188 (ILO) establishes (Art. 9, Paragraph 3) the minimum age for assignment to activities which by their nature are likely to jeopardise the health or safety of young persons, such as the position of Captain or Officer of a fishing vessel, which involves a high degree of responsibility in the safety of the vessel and the loading, shall not be less than 18 years.

Likewise, the STCW-F Convention, as regards the applicable requirements for the certification for Captains of fishing vessels of 24 m in length or over, establishes that every candidate for certification shall satisfy the competent authority as to medical fitness "particularly regarding eyesight and hearing". In that regard, as regards the age requirements to access the Certification as Fishing Officer, the age of 18 is established as the minimum age for the candidates.

Another innovative and remarkable topic of Convention 188 (ILO) is the implementation of a mechanism to ensure the compliance of its provisions and the control of its application by the Member States which have ratified it, not only establishing that large fishing vessels may be subject to labour inspections in foreign ports, but also giving guidelines as to how to perform the inspections within the convention's framework for the state of the flag and the port.

Convention 188 (ILO) establishes (Art. 40) that each Member State shall effectively exercise its jurisdiction and control over vessels that fly its flag by establishing a system for ensuring compliance with the requirements of this Convention including, as appropriate, inspections, reporting, monitoring, complaint procedures, appropriate penalties and corrective measures, in accordance with national laws or regulations.

In like manner, it obliges Members (Art.42) to build a body of inspectors of sufficient number to control the compliance of the Convention's provisions, authorising public institutions or other organisations that it recognises as competent and independent to carry out inspections and issue documents, to monitor working and living conditions onboard fishing vessels.

On the other hand, the Member State shall be able to exercise such capacities as Comptroller on a fishing vessel that flies another Member's flag in any of its ports, if it receives a complaint or report that such vessel does not conform to the requirements established on Convention 188 (ILO). In this case, it must notify the Director-General of the International Labour Office with a report addressed to the government of the flag State of the vessel, and it may take measures necessary to rectify such breaches if the situation onboard is clearly hazardous to safety or health (Art. 42, Paragraph 2).

Also, Convention 188 (ILO) establishes that the Member shall require frequent inspections to be carried out, by or under the authority of the Skipper (Art. 83, Paragraphs a, b, c), to ensure that:

- the fishers' accommodation is clean, decently habitable and safe, and is maintained in a good state of repair;
- food and water supplies are sufficient; and

- galley and food storage spaces and equipment are hygienic and in a proper state of repair.

In relation to this, the Skipper shall be duly trained to be able to carry out such inspections satisfactorily, and the results of such inspections, and the actions taken to address any deficiencies found, shall be recorded.

Likewise, the STCW-F Convention (Art. 8, Paragraph 1) gives faculty to the Members to carry out inspections on those fishing vessels, while they are on other Members' ports, in order to verify that: "all personnel which perform onboard services and to whom this Convention demands certification, effectively has an appropriate certificate or valid dispensation."

From a harmonised implementation of the provisions established by Convention 188 (ILO) and the STCW-F Convention, it may be inferred that we have two conventions that the Members must take into account when regulating education and training for Fishing Captains and Officers who work onboard fishing vessels, in such a way that workers who aspire to perform such onboard tasks may professionally and effectively address the multiple difficulties presented onboard a fishing vessel, safekeeping the safety of human life at sea, of the vessel and of the marine environment.

Chapter 8

THE STCW-F-1995. ITS BASIC PRINCIPLES AND MANDATES

8.1 THE INTERNATIONAL MARITIME ORGANISATION (IMO)

In light of the need to improve the safety at sea and with the aim of establishing common standards to be observed by all the nations dedicated to maritime transport, during the 19th century several international treaties started to enter into force.

These treaties created an enabling environment so that, after the Second World War, precisely in 1948 and within the framework of an International Conference celebrated in Geneva, an agreement which constituted at that time the Inter-Governmental Maritime Consultative Organisation (IMCO) was adopted. Later, in 1982, the name was changed to International Maritime Organisation (IMO), by which it is now known.

> *This organisation, which has become a specialised agency of the United Nations has the mission of "promoting safe, secure, environmentally sound, efficient and sustainable shipping through cooperation." It was established that this mission was to be fulfilled: "through the adoption of the highest practicable standards of maritime safety and security, efficiency of navigation and prevention and control of pollution from ships, as well as through*

consideration of the related legal matters and effective implementation of IMO instruments, with a view to their universal and uniform application."

It is clear that to ensure life at sea it is necessary to elaborate and apply the international standards observed by all nations, which have the purpose of effectively promoting maritime safety. IMO's constituent convention entered into force in 1958 and the new Organisation held its first meeting a year later, in 1959.

8.2 IMO'S STCW-1978 DOCUMENT

The standards related to Training, Certification and Watchkeeping to determine the requirements to be complied with in these aspects by the people which conform the crew of the fishing vessels which navigate at sea, were established in a document approved on 7 July 1978, known as the Standards of Training, Certification and Watchkeeping for Seafarers (STCW). It was approved in the aforementioned year in a conference of the International Maritime Organisation (IMO) held in London.

Being a product of an international convention, to enter into force, this document required the ratification of no less than 25 countries and that the signers represented no less than 50% of the gross tonnage of all merchant fleets of vessels of no less than 100 tons combined.

It was decided that the depository of such document would be the general secretary of the International Maritime Organisation (IMO) and that the document should reach a consensus and be written in Spanish, English, French and Russian. These requirements caused the document to enter into force on 28 April 1984, i.e. almost six years later.

The Convention of 1978 established minimal standards with regard to the training, certification and watchkeeping for seafarers which the countries are obliged to comply with or, if possible, to exceed. It was the first to globally establish the basic requirements as regards training, certification and watchkeeping for seafarers. Previously, every government established their own standards individually, without making references to other countries. As its name and content clarified, it was thought exclusively for the Merchant Navy, whether for the transport of passengers or cargo.

The STCW 78 was updated with a complete review in 1995. Its amendments entered into force in 1997. Later, this convention underwent a new update known as the Manila Amendments, being Manila the city in which IMO's Convention was carried out in 2010. These entered into force on 1 January 2012, and they were necessary to maintain the training standards aligned with the new technological and operational requirements which demand new competences onboard.

A period of transition until 2017, in which seafarers should be certified and trained according to the new standards, was defined. The implementation was thought to be executed progressively. Every year, a modified set of requirements enters into force.

The most significant amendments are:

- New hours of rest for seafarers.
- New grades of certificates of competence for able seafarers on deck and in the engine room.
- New and updated training, and refresher requirements.
- Obligatory safety training.
- Additional medical standards.
- Specific limits of alcohol in blood or breath.

8.3. STCW–F 1995

In 1995, when the document was updated for the Merchant Navy, IMO considered that, in the case of the personnel dedicated to fishing activities at sea, a document with different characteristics was needed. For that reason, on 7 July 1995, the writing of an International Convention, currently known as STCW-F Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel, was approved.

Note that, although both documents have common aspects relating to navigation at sea, IMO differentiates between the Merchant Navy personnel engaged in the transport of goods and people, for which it issued the STCW 78 Document (with its amendments made effective in 1997 and 2010), and the fishing vessels' personnel, for which in 1995 it issued the STCW 95-F Document, that is exclusive for those engaged in fishing activities and that highlights their particularities.

The origin of STCW-F may be situated, as expressed during the session period of 1995, in IMO's Maritime Safety Committee (MSC) which, by taking notice of the results of the International Conference as regards Standards of Training, Certification and Watchkeeping for Seafarers (initially named Training for Fishers) adopted critical measures with regard to certain specific petitions formulated for the fishing sector in several resolutions of such conference.

For that reason, the aforementioned Maritime Safety Committee entrusted the Standards for Training and Watchkeeping Subcommittee to summon a mixed work group, in collaboration with FAO[1] and ILO[2], in charge of reviewing the document which would serve as a guide, in particular, with regard to the conference's aforementioned resolutions. In addition, such organisations agreed that IMO would publish it on their behalf. This document was published for the first time in 1988. It was also agreed that this document should address the training and certification for fishers at a small scale and at an industrial level.

ILO and FAO participated so that the conventions and recommendations adopted by them were taken into account and that the broad practical experience of such organisations, within the framework of their respective responsibilities, was taken advantage of.

The representatives of the employers and workers participated on ILO's behalf; at the same time, FAO put special emphasis on the aspects linked to safety and the application of the Code of Conduct for Responsible Fisheries.

Finally, the work of FAO/ILO/IMO's mixed work group elaborated a new text: The Guide for Training and Certification of Fishing Vessel Personnel (STCW-F). This was finally approved by FAO's Secretariat and by ILO's Governing Body in March 2000 and by the MSC (Marine Safety Committee) in May 2000. It entered into force on 29 September 2012 and it specifically refers to the personnel engaged in operating the fishing vessels of the ratifying states.

As regards training, the STCW-F makes two distinctions which imply different trainings for fishers, according to two characteristics of the vessels: length and power.

- Fishing vessels of 12 m long or over.
- Fishing vessels of 24 m long or over or whose main propulsion machinery has a power of 750 kW or more.

8.4. THE STCW-F BASIC MANDATES

With the execution of the International Convention STCW-F 1995, a standard which requires a differential education for seafarers was installed for the first time. This differs from the training of the Merchant Navy (Convention STCW-78), adding aspects which are specific to this activity: fishing.

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[1] FAO (Food and Agriculture Organisation) is a supranational organisation which operates within the United Nations. Its main function is to conduct international activities to eradicate hunger in the world.

[2] ILO is a specialised United Nations' organism which attends matters related to labour and labour relations. It was founded on 11 April 1919, under the Treaty of Versailles.

Previous international conventions such as Torremolinos, SOLA, etc., which regulate navigation relating to safety are still in force, and they also influence the training for “fishermen”.

The significance of STCW-F and its basic mandates can be expressed in a single phrase which will always accompany the education and training of fishermen: “SAILING IS ONE THING. FISHING IS ANOTHER.”

It is clear that, in all cases, training on how to navigate should have common aspects, whichever the operated vessel may be, with major or minor complexities depending on its characteristics.

But it is also clear that, when a vessel which is navigating and fishing at the same time, and whose exclusive and particular mission is fishing, has to be operated, the maximum onboard authorities must be very clear about additional matters besides the imperative knowledge of navigating; knowledge of the fishing gear, the biological characteristics of catches and other aspects which constitute biology, safety and, above all, responsible fishery. For that reason, the directors of the international organisations ILO-FAO-IMO held meetings from 1998 to 2001, and in 2001 approved and edited the Guide for Application and Interpretation of the STCW-F Convention.

This guide was edited in Spain in 2003 and it contains practical advises and minimal requirements for each Member to adapt, readapt or create all the applicable regulation, so that each one of them applies the standards of the STCW-1995 for the training and certification of fishermen, clarifying that it must contain particular competences which differ from the training and certification for the Merchant Navy, as regards other navigation research areas in several aspects.

This important document (Chapter 2) compels Members, the Republic of Argentina among them, to force all public and private institutions which dedicate to the training of fishers to “coordinate and develop their actions within the framework of a national programme.”

The STCW-F Document was approved by our country through Law No. 26.981, published in the Official Bulletin on 26 September 2014. However, the National Government has not yet proceeded to deposit the ratification of such Convention.

Clearly, the guide reflects the provisions of the Convention for the Training for Fishers, the STCW-F 1995 and the Code of Conduct for Responsible Fisheries, 1995. It also takes into account the conventions and recommendations adopted by ILO and IMO and, especially, in the environment of the vocational training for fishing vessels, FAO’s broad practical experience. The document itself states in the introduction (Paragraph 6):

> *It is intended to provide guidance when national training schemes and courses are instituted, amended or developed for the vocational training of any category of fishing vessel personnel.*

In the introduction (Paragraph 8), the document establishes that:

> *Upon the institution of training standards, in particular those relative to smaller fishing vessels, sociological and educational characteristics of a certain fishing community shall be taken into account with the purpose of ensuring the institution of realistic standards. Maybe, in some cases it would be enough to practically demonstrate the possession of desired professional skills, given that the persistence in tests of documentary and academic character may inhibit the development of the fishing industry.*

At the end of the introduction (Paragraph 10), which defines all the interpretations to the document's standards, it is stated that:

> *The training programmes for the fishing vessels' personnel shall be based on an analysis of the needs and circumstances which govern each zone, with the purpose of ensuring that, besides the safety of the operations, the professional skills developed respond to the need for commercial success and to the occupational requirements of the fishing vessels' personnel. It can be concluded that the training programmes shall be prepared by competent authorities in cooperation with organisations which participate in the fishing industry and taking into account the general welfare and development of the fishing community.*

This last regulation provided by FAO/ILO/IMO to all Members, motivates this publication.

Since 1970, the Argentine Sea has suffered the irruption of some Argentinean business groups, mostly settled in the Port of Mar del Plata, which incorporated several high seas fishing vessels with steel hulls to the fleet, thus replacing the old artisanal and yellow coastal fishing boats. Together with the irruption of foreign fishing fleets, this generated, through violence and disorder a new status quo characterised by improvisation.

The fishing community faced an excessive growth of the human needs to address the labour requirements and the country was neither prepared to face such reality, nor to respond to the arrival of industrial fishing which requires specialised and hierarchical workforce at sea and on the ground.

In the style of Domingo Faustino Sarmiento in *Facundo*, civilisation and barbarism settled down for good in the Argentine Sea. The civilisation which came with industrial fishing vessels and all its advances and navigation and communication forefront technologies started to coexist with barbarism, represented by fishermen condemned to continue being primitive, rude and unscrupulous, and who were impeded or hindered to access the education brought by the nautical civilisation.

The dominant powers at the Argentine Sea, of military and police origin and the residual businessmen of a Merchant Navy which was dismantled in 1950, decided that fishing vessels should be under the command of brave and rude men with barely primary education, who should remain in such state without the possibility to access higher or university studies.

Faced with the demands of a wild sea and fishery resources, which were eagerly watched by all the Oriental and European countries which had exhausted their seas, Argentina lacked visionary politicians who understood the value of educating and training human resources prepared to face a world which had decided that the Atlantic Ocean and the southern seas were the main virgin food reservoir in the world.

The truth is that our country did not prepare its habitants to face the challenge. It did not educate them nor trained them for the work at sea or to think of fish as a basic food in a coastal country. Today, we can see the results.

The national population practically does not consume fish at more than 100 kilometres of its maritime coasts, or it barely has 7% of internal consumption, and it only prepared itself to deliver to foreign countries 93% of the natural resource that is fishing. The State is only interested in collecting the thousand million dollars left by the exploitation rights and the tributes of delivery of people's natural wealth to national or foreign businessmen.

Until 26 May 1973, when the Minister of Education of the Province of Buenos Aires, Professor Carlos Ríos, dictated the Fishing School Foundation Decree based on the Port of Mar del Plata, nothing concrete had been done by national or provincial authorities to train fishing skippers or officers.

The port of Mar del Plata and its fishing families were the popular fishing university in the Republic of Argentina, and within those families the education and training that later turned children into fishers was received.

That fishing school, by means of a Technical Cooperation Convention with the Government of Japan, in 1981, turned into the National Fishing School Luis Piedra Buena, and the Argentine Navy, by delegation of the Executive Office, became the administrator of said Cooperation Convention.

On 6 January 1998, the Executive Office enacted Law 24.922, which establishes a Federal Fishing System for the Republic of Argentina, that expresses (Art. 19):

> *For the purposes of this law, all personnel aboard a fishing vessel shall have a seafarer identification and record book, certification, licence, boarding card or professional accreditation issued by the competent authorities according to the stipulations of national regulations.*

This law, for the first time ever, specifies that the professional accreditation or certification must be issued by competent authorities. There are regulations which shape the training of fishermen and the State's obligations.

According to Article 43, created by the National Fishing Funds (FONAPE), 2% shall be destined to: "financing the training of fishing personnel through official institutes" (as per Article 45, Paragraph d).

After the debates of legislators that passed the law, where the State's abandonment of the education of fishermen was discussed, there was an attempt to try to identify the responsible authorities in regard to fishing education, training and certification, arguing the following (Article 73):

> *The application authority shall intervene jointly with the responsible organisations in the training of fishing personnel aboard a vessel and scientific and technical personnel related to the fishing industry, creating appropriate institutions to that end in cities with ports.*
>
> *"Likewise, this authority together with educational institutions, unions and companies, shall promote the necessary actions to organise official programmes and training courses which focus on tasks or activities to perform in the catch process, the industrialisation and the production of fishing resources and which offer good job prospects.*

Now it is time to analyse what needs to be done so that the general principles of the FAO-ILO-IMO document are applied in Argentina in order to guarantee a better compliance of the STCW-F-1995 objectives, to allow nautical civilisation of industrial fishing to spread to human resources and to put an end to the barbarism which keeps fishermen captive. Similarly to what Sarmiento said regarding the rural and the urban populations, barbarism is essential to answer to the commercial interests of industrial fishing which needs uneducated and unscrupulous executives to make illegal fishing, depredation and discard easier.

8.5. RECOMMENDATIONS FROM THE INTERNATIONAL MARITIME ORGANISATION FOR THE TRAINING AND CERTIFICATION OF FISHING PERSONNEL

8.5.1. General considerations

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) establishes a series of recommendations that should be taken into account in the policy for the training and certification of fishing personnel. Firstly, it is necessary to remember that fisher's training in countries which comply with the International Convention must have, and actually do have, different specifications from those of the Merchant Navy. The highlight is on the fact that the competence certificates issued within the SCTW-F must consider aspects as specific as the following:

- ILO's recommendations on the vocational training of fishers
- FAO's Code of Conduct for Responsible Fisheries
- Personnel training in the interest of greater safety for life and sea resources

- Protection of marine environment

Therefore, IMO urges National Administrations (Chapter 2, Section "General principles") to establish the appropriate education and training policies for fishing vessels personnel. On the other hand, this organisation recommends planning an Education and Training National Policy in order to train fishing vessels' personnel within the general system of training services of each country.

8.5.2. Lack of planning of an Education and Training National Policy I our country

Issues about the sea and the legal provisions worldwide related to these issues are tightly linked, and they cannot be ignored at a national level, where there is a clear lack of an Education and Training National Policy.

The facts already described show society's need to execute legal regulations regarding the education and training provisions which must be complied with by the Higher Education Centres, such as universities.

The Merchant Navy University was thus created in 1965, thanks to the Manuel Trigo Foundation, which initially aimed at channelling the first training experiences directed at Merchant Navy professionals.

Afterwards, presentations to obtain recognition as a private university started. It was recognised as Merchant Navy University by means of Decree No. 1890/74 PEN and it was authorised to function under Law No. 17604 on private universities and under the legal protection of the Merchant Navy Foundation, previously called Trigo Foundation. The following year, it was open for secondary school students who decided to continue their education at a university level attending a different type of course of studies which was not related to the STCW.

It is important to keep in mind that fishing vessels personnel, that is, captains, pilots and skippers, must meet requirements and training and educational needs which are highly specific and different from those of merchant vessels or other types of vessels used for other purposes.

Under these circumstances, a shortcut was taken to try to take advantage of the gathered experience regarding the eminently technical and educational matters and to decidedly undertake the study of everything related to the training of fishing vessels' personnel in order to bring useful information to the administrative entity in charge of legislations so as to facilitate its job. At the same time, content is added to the chapters of this document.

8.5.3. Training, certification and REFOCAPEMM

Among the debates developed at this point in the chronology of the regulations related to training, it can be observed that the main criterion of experts addressing the topic is the need for modernisation and a remodelling of the normative framework for the certification of professionals from the current certification system which is archaic and in violation of the International Convention (object of study of this book) and which has been called Regulations on the Training of Onboard Merchant Navy Personnel (REFOCAPEMM), approved by Decree 572/94 on 20 April 1994.

This regulation, which is more than twenty years old, arbitrarily requires those who want to be fishing captains to study to become a sailor first. In effect, in order to obtain any degree equal to or higher than a Coastal Fishing Skipper Degree (REFOCAPEMM, Art. 2.22.2), it is necessary to become a Junior Fishing Skipper first, and to obtain the latter fishers need to become Sailors first (REFOCAPEMM: Art. 2.23): “the Junior Fishing Skipper Degree shall be awarded to Sailors who meet the following qualifications…”

These dispositions clearly must be modified in future decisions taking into account the impact of technological, social and environmental changes of great significance. In Chapter 9, Section 9.7, within Age Levels in Fishing, there is a detailed explanation and basis for these concepts and criteria.

It has been equally demonstrated that this kind of regulations have had a great impact on the degree of awareness of issues related to the application authority, even when its intensity seems to strongly depend on the influence of recognition in the educational sphere.

International studies have demonstrated there is a strong correlation between what can be defined as the challenge of the fishermen profession and the learning developed within a university focused on this topic.

However, in our country, it is impossible to foresee the impact that will follow the implementation of this new scenario which might be useful as reference when applying future regulatory measures.

In relation to this, the existing standards, criteria and recommendations produced by governmental organisations from the most advanced countries as well as by international regulation organisations and supranational institutions must be mentioned. The availability of these documents and the degree of coincidence of their principles and criteria turn them into reference material of great value for the future regulatory development.

The techniques developed in this field have been given the greatest attention because the main role these technologies play in engineering learning is clear.

Likewise, it is important to consider the quandaries the industry faces given the common knowledge that there must be a weighing and reconciling of objectives as imperative as the citizens' right to personal development, privacy and confidentiality of their personal data and communications, the appropriate protection of National Security, the fight against organised crime, and even economic, commercial and technological interests.

Finally, a repeated conclusion on this topic is the importance of diffusion, information and awareness about the benefit for society as well as for senior management of organisations.

Zero discard is not only a purely technical problem which involves a discursive fantasy but it is also a matter that affects society as a whole. Therefore, any policy aiming to be effective must both be able to rely on the active compromise and support from senior management and have knowledge and understanding of all personnel who participates in any stage of the process.

Once we get to this point and face the difficulty of regulating measures which lead to certifications, we must be aware that a coordination in the regulation processes structure is desirable so that multiple sectorial regulations are similar and coincide with a general international directive, considering our country's insertion in the global sphere.

Another alternative would be to provide certifications gradually, initially limiting its obligatory nature to sectors and ages which, due to their potential impact on the protected legal right, deserve imperative attention with the temporary exclusion of the rest of the cases from the application field. For example, starting with the high school diploma.

Lastly, it is expected that eventually common European-American criteria will be established in order to have enough judging points regarding this topic.

Our objective shall at least focus on being prepared to have professionals trained to understand and apply the international recommendations specific to the situation so that certifications granted in our country are valid in other countries as well, thanks to reciprocity.

According to the IMO-FAO-ILO base document, National Administrations (Paragraph 2.1.1) must establish education and training policies which are appropriate for fishing vessels personnel.

We have already mentioned that Argentina currently lacks an education and training policy for fishing vessels personnel; and the situation is even worse: national authorities with competence in the education and training of fishing vessels personnel, firstly the National Ministry of Education and, in second place, the Federal Fisheries Council or the :Secretariat for Agriculture, Livestock, Fisheries and Food (according to Law No. 24.922), nowadays do not intervene at all in the planning of an education policy for the industry. Even more so, they seem to have no interest whatsoever in participating.

The application manual already mentioned foresees (Art. 2.1.2.2) that the fishing vessels personnel training programme shall be created by the competent authorities in collaboration with organisations of fishing vessels owners and fishers, fishing education and research institutions and other organisms with the participation of people widely knowledgeable about the professional training of fishing vessels' personnel.

In Argentina, the only existing programmes are created by the Argentine Navy, which has competence in National Defence and war but not in the fishing industry, and by the Argentine Coast Guard, incumbent upon Nautical Safety and Policing but not upon the fishing sector. This is inadmissible by a committee without legal competence because the purposes of this division do not include the training of fishermen. This committee functions under the National Subsecretariat of Ports and Navigable Waterways which clearly does not have enough functions or experience, not to establish rules but, rather, to give an opinion on how the education and training of fishermen should be.

The personnel of the Ministry of Education in Argentina are sufficiently trained to carry out whichever studies are necessary to establish guidelines, with the help and collaboration of different intermediate entities, on how this task must be performed based on the International Recommendations from STCW-F.

8.6. ANOTHER FUNDAMENTAL OBJECTIVE: DISCRIMINATION AGAINST DISADVANTAGED GROUPS. COMPLETELY FREE TRAINING FOR FISHERS IN PUBLIC INSTITUTIONS

One of the objectives which must guide the training of men who will work in fisheries is no discrimination against disadvantaged groups.

Authorities of FAO-ILO-IMO advise National Administrations to ensure the diverse institutions and organisms that are responsible for the diffusion of the information about training and employment possibilities, like primary and secondary schools, possess complete information regarding public or private fishermen training programmes and that there is an appropriate connection between pre-professional training, professional training, outreach education and higher education for the personnel of fishing vessels.

A singular principle is established (Chapter 2, Paragraph 2.1.1.5):"

> *Education and training must be conceived as a fundamental part of the development of small-scale fishery activities. However, special attention must be paid in order to guarantee that fishing training programmes do not discriminate against educationally disadvantaged groups that usually develop their fishing activity at a small scale.*

The principle of no discrimination against disadvantaged groups will be completed by the document (Paragraphs 2.1.5, 2.1.5.1, 2.1.1.5.2, 2.1.1.5.3) when precise instructions about the financing of professional training are given by claiming that:

Fishers training programmes shall be organised systematically. Their funding shall be periodic and appropriate and the current and expected needs for the development of the fishing industry shall be taken into account. Whenever necessary, the government shall contribute financially to the training programmes established by local authorities and private organisms. The education in the public centres of fishers training shall be completely free for students.

Both the Federal Fisheries Council, which has the obligation to allocate part of the National Fisheries Fund (FONAPE) to the funding of fishers training, and the National Authorities that head the National Fishing School shall immediately issue the order that fishers training in said National Fishing School, and in any other public education and training institution, shall be completely free of charge. This is currently not fulfilled and the situation creates discrimination that is detrimental to the most disadvantaged groups which are under no conditions to stop working for an income to contribute to their households or to pay the enrolment for training.

Likewise, in order to avoid the natural discrimination which arises from the characteristics of the maritime coast and the existence of population centres and fishers along the maritime coast from Puerto Deseado to the city of Buenos Aires, the distance between those ports and the only national public school in Mar del Plata has also become a situation the document expects not to occur.

Chapter 9
STCW-F-1995
EDUCATION, TRAINING AND CERTIFICATION

9.1. PRELIMINARY APPRECIATION

The memory of Professor Carlos Alberto Ríos is present throughout the book. His name and actions have always been related to fishers and specially to fishing captains in various transcendental moments of a repeated history.

As Minister of Education of the Province of Buenos Aires since 26 March 1973, he decided to create the Adult Training Centre for Fishing Vessels Skippers in the city of Mar del Plata, through resolution No. 0222. He has always supported the union's demands destined to increase the education level of fishermen.

That is the reason why, upon the decision to create CESMAR, he was called to assume the role of Coordinator of Higher Education Projects, a distinguished position he accepted without hesitation. Finally, on 23 February 2017, he signed to participate and pursue the objectives mentioned in this book.

We are terribly sorry that he suffered a severe and irreversible stroke that caused his death while he was planning an academic activity, which would have the participation of foreign personalities and the Secretary General of the Argentine Fishing Captains Association, in a private meeting in his own house organised to manage the fishing personnel training initiative. It cannot be a coincidence that life placed Professor Carlos Ríos at the start of the Fishing Captains training and that his life ended while involved in the same tasks.

Beyond the impact caused by the loss of a partner who is irreplaceable due to his knowledge, ideas, beliefs, indomitable will and strategic vision, this book aims at paying a small homage to his name, knowing that he would have enjoyed seeing a much needed initiative being taken care of and built so carefully as this one.

For that reason, we decided to record this unfortunate event in this chapter.

Below is Resolution No. 00222 of the Ministry of Education of the Province of Buenos Aires, in which Professor Carlos Alberto Ríos determined the creation of the Adults Training Centre for Fishing Vessels Skippers in the city of Mar del Plata.

The translation of the documents contained in this Chapter are found in Annex 6 of this book.

Corresponde a expediente Nº 2624-77470/72.

...cia de Buenos Aires
...isterio de Educación

LA PLATA, 26 MAR 1973

Visto este expediente Nº 2624-77470/72, por el cual la Cámara de Armadores de Buques Pesqueros de Altura y Centro de Patrones de Cabotaje de Ríos y Puertos solicitan, la creación, en la ciudad de Mar del Plata, de un Centro de Capacitación de Adultos para Patrones de Buques Pesqueros, y

CONSIDERANDO:

Que la creación del Centro de Capacitación de Adultos para Patrones de Buques Pesqueros, ofrece a los afiliados de las entidades solicitantes la oportunidad de ampliar sus posibilidades profesionales;

Que dichos supuestos coinciden con la política / que el Gobierno de la Provincia de Buenos Aires ha establecido en apoyo del desarrollo pesquero;

Que la Dirección de Enseñanza Media, Técnica y Vocacional emite criterio favorable respecto a la creación solicitada; POR ELLO y atento a lo aconsejado precedentemente por la Subsecretaría de Educación

EL MINISTRO DE EDUCACION

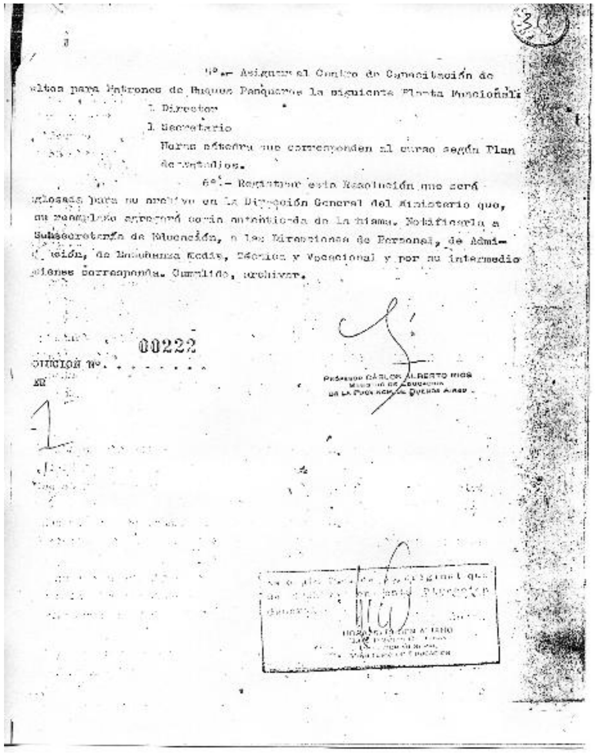
RESUELVE:

1º.– Crear el Centro de Capacitación de Adultos para Patrones de Buques Pesqueros en la ciudad de Mar del Plata, distrito de General Pueyrredón, con domicilio en la calle 12 de octubre 3144 de esa localidad.

2º.– Establecer que en el convenio que se celebre, se determinarán las condiciones y requisitos de funcionamiento del Centro creado por el apartado precedente.

3º.– Encomendar a la Dirección de Enseñanza Media, Técnica y Vocacional, la adopción de los recaudos pertinentes para el funcionamiento del Centro de Capacitación de Adultos para Patrones de Buques Pesqueros.

4º.– Aprobar para el Centro que se crea por la presente Resolución, el Plan de Estudios obrante de fojas 15 a 16 de estos actuados.


5º.- Asignar al Centro de Capacitación de ... para Patrones de Buques Pesqueros la siguiente Planta Funcional:

1 Director

1 Secretario

Horas cátedra que corresponden al curso según Plan de Estudios.

6º.- Registrar esta Resolución que será glosada para su archivo en la Dirección General del Ministerio que, su reemplazo agregará copia autenticada de la misma. Notificarla a Subsecretaría de Educación, a las Direcciones de Personal, de Administración, de Enseñanza Media, Técnica y Vocacional y por su intermedio a quienes corresponda. Cumplido, archivar.

00222

9.2. PURPOSE OF THIS DOCUMENT

The idea of creating a document that guides the introduction of professional certifications to the fishing industry emerges from the need to update the national regulations and the new international framework.

This update is also necessary due to the presence of new technologies in our society that allow for the training of the fishing industry professionals through on-line platforms, besides the free education vocation for nautical and fishing certifications, which are foreseen to appear. Similarly, the professional certification for the sailor-fisherman has to be planned as well.

Many passages and suggestions in the STCW-F Document focus on the training about environmental issues. However, it is particularly important to emphasise the review of the programmes. This implies implementing updates to national regulations whenever international regulations change, adapting to the governing regulations established by IMO. It is also necessary to highlight that given the exploitation of living resources which establish their own dynamics, the processes and phenomena that govern them are not static; therefore, permanent adaptive education must be one of the rules of this professional training.

Specifically regarding the general dynamics of variability of the environment and its resources, it must be understood that advances on the knowledge about climate change generate a greater need for a permanent understanding that evaluates the changes produced by this phenomenon at a planetary level.

The creation of this document seeks to:

- Determine the basic requirements to obtain certifications
- Determine the essential requirements to obtain the authorisation for centres and entities to offer courses, diplomas, degrees and other certifications
- Regulate the courses and courses inspections
- Determine the new training modalities and the call for special comprehensive exams
- Determine the procedure to call for exams and to have access to exams, and the evaluation method
- Determine the procedures and documentation required to issue degrees

9.3. SPECIFIC AND GENERAL CHARACTERISTICS TO TAKE INTO ACCOUNT FOR EDUCATION AND TRAINING

Through SCTW-F, IMO recommends the following, among other things:

- When teaching fishing techniques, special emphasis must be put on those techniques applied to local species in order to promote an appropriate environmental protection, guarantee the sustainable yield of those species and achieve a suitable exploitation of the resource
- Placing emphasis on the safety of fishing vessels, including also the safety of workers, is especially important in our country given the high casualty rates
- Education and training must include small-scale fishing activities in order to avoid discrimination of fishing training programmes against groups which usually develop their activities at a small-scale
- In order to obtain positive results, it becomes necessary to create Work Committees jointly composed of authorities in fishing matters, fishing organisations (such as CESMAR, the Higher Learning Centre of the Argentine Sea funded by the Argentine Fishing Captains Association), fishing vessels owners and fishing education and research institutions
- The SCTW-F precisely urges all public and private institutions that work for the training of fishers to pool together in order to develop a National Certification

and Training Programme, and it adds the following: in countries which have Marine Science Study Centres[1] or Centres for Marine Science Research, these centres must play a fundamental role in the creation of the National Programme

- The recommendation is to achieve a systematic creation of training programmes for fishers which are appropriately funded, taking into account the current and future needs for the development of the national fishing industry
- The Government shall contribute financially to the training programmes established by local authorities and private organisms, and the education given in public fishers training centres shall be completely free of charge for students
- Training syllabuses shall take into account the changes caused by the renovation of the fishing fleet and the characteristics of the new types of vessels and fishing gear with the purpose of improving performance and safety and thus guaranteeing a rational exploitation of every resource
- The duration of training programmes for the personnel of fishing vessels shall match the needs of students and their abilities to assimilate the training received

The following aspects shall be considered:

- The training extent necessary to reach a satisfactorily level of knowledge in the corresponding occupation
- The age and general level of education of students
- The practical experience of students
- The needs of the national fishing industry
- In relation to the teaching staff, the training programmes for the fishing vessels' personnel shall specify the experience and professional competence of the teacher in charge of training. The teacher shall have a wide general training, theoretical and technical education and appropriate practical experience in fishing
- Offering short courses and technical seminars aimed at the personnel of fishing vessels is important because these will allow them to develop their

[1] On 7 April 2017, the Argentine Fishing Captains Association (Union Status No. 1442) created the Higher Learning Centre of the Argentine Sea (CESMAR), which is composed by representatives of fishers, university professors, lawyers specialised in labour law and researchers specialised in Marine Science

aptitudes and technical knowledge, stay up to date regarding the modern techniques of fishing and navigating, and obtain the qualifications that are necessary to attain a higher rank

- Short training courses and technical seminars must be planned considering the following aspects:
    - The achievement of an exchange of technical information between the industry workers
    - The completion of basic long-term courses through specialised higher training
    - The offer of training on fishing techniques and management, maintenance and repair of machinery, fishing gear and equipment
    - The offer of training at all levels for fishers who were unable to take a basic long-term course
    - The update of knowledge
    - The training of fishers in the usage of rescue devices and survival at sea
    - Short-term courses shall always be considered complementary courses and not substitutes for the basic long-term training courses These can be itinerant outreach courses and they shall mainly take place as:
        - Night courses
        - Seasonal courses or courses offered during bad weather months or when fishing is scarce
        - Day courses which require fishers to temporarily leave their jobs during short periods of time

9.4. THE REPUBLIC OF ARGENTINA AND THE STCW-F

On 11 October 2017, IMO published a document called "Status of multilateral conventions and instruments in respect of which the International Maritime Organisation or its Secretary General perform depositary or other functions."

This document contains different aspects of interest for the topic at hand and explains in detail how to proceed in relation to the different treaties so the organisation considers them at different validity stages.

IMO expresses the following regarding the different stages a convention can go through and each country determines how involved it wants to be.

States can be part of a convention by means of:

- Signature without reservation as to ratification, acceptance or approval
- Signature subject to ratification, acceptance or approval, followed by ratification, acceptance or approval
- Adhesion

In order for a country to be considered full participant of the convention, and depending on the degree of participation, it must follow these steps: signature without reservation, ratification, acceptance, approval or just adhesion. In any case, the country will always have to provide an instrument which certifies the degree of involvement before the Secretary General of the Organisation (in this case, the International Maritime Organisation, OMI).

Currently, this is the situation in the Republic of Argentina:

According to Law No. 26.981, issued on 17 September 2014, the International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel (SCTW-F) was passed without reservations. In order to have full adhesion, the instrument needs to be presented before OMI's Secretary General.

Three years have passed since the promulgation of the law, and the deposit, a necessary step to have full ratification, has not occurred yet. Worst of all the distribution which must be done by the deposit has no control or functional authority in relation to the compliance with the international convention. This is an authority under the Executive Office which is not part of the Legislative Office; it is the Ministry of Foreign Affairs, which assumes roles for which it is not responsible.

9.5. REFOCAPEMM AND STCW–F

In our country, the Regulations on the Training of Onboard Merchant Navy Personnel, known as REFOCAPEMM, were passed on 20 April 1994 by Decree No. 572.

This originated in file No. 3024/93 of the Secretariat of Transportation of the Ministry of Economy, Works and Public Services, based on what is established in Article 16 of Decree No. 817, from 26 May 1992, Law No. 22.392 on the Regulations on the Training of Onboard Merchant Navy Personnel and Law No. 22.608 which passed the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (SCTW).

The Decree signed in this occasion was based on the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, passed in London in 1978, when the special document for the training of fishers, the SCTW-F, was not yet in force.

Currently, the training requirements of the Merchant Navy and the Maritime Navy are different from those that were determined for seafarers who operate and steer fishing vessels.

Therefore, due to the failure to differentiate between the training of the Merchant Navy and that of fishing vessels, the REFOCAPEMM, currently in force, includes all those that navigate the sea or rivers. Its vicious functioning allows retired members of the Argentine Navy and the Argentine Coast Guard, who have never fished, to become Fishing Captains, Officers or Skippers.

Just to exemplify this vicious functioning, we can consider the requirements to obtain the certification as Fishing Captain, for which the REFOCAPEMM establishes the conditions below.

The certification as Fishing Captain shall be issued to:

- First Officers who fulfil the following conditions:
    - Having navigated three hundred (300) nautical days as high-seas fishing vessel Captain or Fishing Officer, 100 out of which must be in a job corresponding to a First Officer's highest attainable position
    - Passing the corresponding training courses or exams
- First Overseas Officers who fulfil the following conditions:
    - Having sailed two hundred (200) nautical days as Captain
    - Passing the corresponding training courses or exams
- Fluvial Captains who fulfil the following conditions:
    - Being aboard a vessel as Captain for a total of one (1) year
    - Passing the corresponding theoretical and practical courses or exams in fishing vessels
- Retired Officers or former discharged Officers of the Argentine Navy.

  They must meet the following conditions:

  Being part of the Command Corps, Naval Forces, Surface Warfare or Submarine Warfare, with the rank of Corvette Captain or higher, passing the corresponding exams or courses and being accredited for six (6) years aboard a vessel, where five (5) of those must have been spent in maritime navigation units.
- Retired officers or former discharged officers of the Argentine Coast Guard.

  They must meet the following conditions:

  Being part of the General Corps, General Forces, Navigation, with the rank of Principal Prefect or higher, passing the corresponding exams or courses and being accredited for six (6) years aboard a vessel, where five (5) of those must have been spent in maritime navigation units.

Except in the first case, in which specific training or previous experience in fishing vessels are required, someone with experience in sailing but with no experience or training in activities related to fishing can become a Fishing Captain.

It seems necessary to issue a different document for personnel aboard fishing vessels, that is, the Regulations on the Training of Personnel Onboard Fishing Vessels which takes into consideration other aspects that constitute this very specific activity.

As a matter of fact, one of the reasons why ILO and FAO were invited to participate in the writing of the SCTW-F was one related to fishing, such as the knowledge to apply FAO's Code of Conduct for Responsible Fisheries.

9.6. BASIC DEFINITIONS RELATED TO REFOCAPEMM AND STCW–F

Now that we have described the current scenarios, it would be convenient to first clarify some topics, starting by the following basic definitions.

- STCW Convention:

  It is the Convention by the International Maritime Organisation (IMO) about the Standards of Training, Certification and Watchkeeping for Seafarers.

- Professional Certification:

  It is a Merchant Navy professional certification issued by the Administration of a State that is member of the STCW Convention.

- Academic Degree:

  It is a degree issued by a university or competent body with regard to education[2], recognised by the State, which proves the passing of the training established in the STCW Convention.

- Speciality or Authorisation Certificate:

  It is the authorisation issued by a National Maritime Administration as per national and international provisions which empowers its holder to

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[2] Our country has competent educational authorities (currently at a ministerial level) in all aspects of the job, so educational certifications of technical or professional activities should never depend on the Ministry of Transport or any other Ministry.

carry out certain functions and specialities specified in it, depending on the type of vessel, the responsibility onboard and the training received in the appropriate courses or degree programmes.

9.7. EDUCATIONAL APPROACHES. TEACHING VESSELS AND REAL FISHING

The serious consequences of maritime accidents fully justify the abundance of regulatory and legislative measures which govern the practice of this specific profession.

In order to highlight the differences between being captain of a passenger or cargo vessel versus a fishing vessel, it is enough to point out that 41 sinkings have occurred in our country in the last 16 years. These sinkings caused the death of 86 people, an unparalleled figure when analysed in comparison with other kinds of vessel with many other different purposes.

This is the origin of Resolution A.890 (21) issued by IMO's Assembly, amended by Resolution A.955 (23). This Resolution established the principles of safe manning, putting emphasis on the absolute need for vessels to have a qualified and expert crew that guarantees the safety of the vessel, crew, passengers, cargo and the adequate protection of the marine environment.

For these reasons, it is vital to ensure that the training obtained by the personnel in charge of the various responsibilities aboard fishing vessels is appropriate for graduates with the highest qualifications.

Even though the STCW-95 Convention thoroughly governs the training requirements of seamen, there are additional training requirements for fishing vessels which are expressed in other conventions or resolutions issued by IMO.

Among them, we can mention the International Convention for the Safety of Life at Sea, also known as the SOLAS Convention.

This Convention establishes that Contracting Governments, in regards to their vessels, are bound to keep or adopt whenever necessary measures to guarantee that these vessels are sufficiently and efficiently manned from a safety point of view (Chapter 5, Regulation 14).

Moreover, it expands on numerous training requirements such as those posed in the International Maritime Dangerous Goods Code (IMDG), the International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM), and the International Ship and Port Facility Code (ISPS).

It is beyond necessary to continue insisting on the strong need to offer at universities an academic degree which provides access to one of the most ancient professions memory can recall.

However, from the analysis performed and a highly contrasting reality emerges a fact that needs to be strongly highlighted. A percentage of the seamen that exist nowadays perform diverse activities on land which are essential for a developed society. Some of these activities are performed in collaboration with other professionals.

In other activities, seamen are irreplaceable. Therefore, it becomes necessary to design the degree with objectives focused not only on developing the activity on-board, but also on giving the graduate the multidisciplinary training required to assume a great variety of professional profiles on land.

Work must be done on the regulations of a training and education national policy, specifically on the points mentioned below.

9.8. AGE LEVELS IN FISHING

It is not appropriate to discuss here the different general principles which can be followed to establish if the age levels of young people between 15 and 30 years old who aspire to be fishing captains, pilots or skippers, can be divided or not into four basic levels of any activity.

However, let's remember that for young people who integrate the groups of Fishing Captain applicants, we can distinguish between:

- Young people who do not work or study
- Young people who work
- Young people who work and study
- Young people who only study

Maybe we could move forward with the percentages of young people linked to fishing activity who may be incorporated to one of these categories, but whatever the percentage of each level may be, it is clear that the STCW-F, FAO/ILO/IMO's Document and the REFOCAPEMM voluntarily exclude young people who decide to only study. This is serious in itself as we exclude an important sector of young people who may feel the call to be Fishing Captains, but who are compelled to undergo a Via Crucis of several years and difficult tasks as fishing sailors or artisanal fishers in order to obtain the certification to be Captain.

It is known that in every university course of studies there is a subject which, due to its depth, serves as a filter to exclude students. In the case of fishing there is not such subject, but there is what it is known as functional approach. And from that functional approach it arises that in order to be a fishing pilot, skipper or captain, a person first has to be a sailor and have experience in commercial fishing. Arbitrarily excluding young people who decide to only study and prepare themselves to be fishing captains is to discriminate a very important part of that population. This is only achieved by avoiding the obligation and possibility that, with higher studies and teaching vessels, both the functional and the academic approach can be covered.

9.9. FUNCTIONAL APPROACH VERSUS ACADEMIC APPROACH

The functional approach of training differs from the traditional academic approach, but the underlying thought that the functional approach is applicable to fishing and that the academic approach is inapplicable seems to prevail.

We must study this topic to try to dig into international and national standards which serve the commercial fishing businessmen's mission to keep fishermen stupefied; to introduce them to work as sailors at the age of 16; to leave them onboard or in the ships' holds, deprived, cold and living in overcrowding conditions with unpleasant odours and performing hazardous jobs; to inure them and educate them to predate, to disregard the principles of responsible fisheries, the biology, and the ecosystem, to dispose of everything which is not economically convenient; and to prevent them from growing, thinking or receiving an education. That is how they get to be captains. They have been educated with all the vices of commercial fishing. Under these conditions, the Argentine Sea has no future.

Until now, in Argentina, all those who aspire to be Fishing Captains without undergoing this Via Crucis, have come from the Merchant Navy where, in order to be officers or captains a functional approach is not demanded from them, since they never worked as fishing sailors, like those who retire from the Argentine Navy or the Coast Guard. Those who are not requested to have fishing experience easily obtain the Fishing Captain certification by violating the functional approach which is non-existent for them.

By means of this unfair criterion from the STCW-F, the National Executive Office was able to designate a Prefect, who integrated the Argentine Coast Guard (the enforcement authority as regards certification), as Captain of the most modern research vessel in the history of Argentina.

Today, a Prefect, prepared for safety at sea, and with no basic knowledge of fishing or functional abilities, has wide faculties to be Captain of the Fishing Research Vessel Victor Angelescu and to command the vessel and co-direct the campaigns, the extractive activities and to determine the destiny of the catches.

Maybe these acts can explain the national authorities' behaviour of keeping the fishers in the best state of functional ignorance to avoid their active participation in the industrial fishing's future.

9.10. HIGHER EDUCATION VERSUS FUNCTIONAL APPROACH

Standards which arise from Chapter 2.11 on higher training for the fishing vessel personnel seem to suggest a way out by proposing long-term courses.

Today, training in Argentina assumes its interpretation on embarkation periods which constitute the base for certification since they are additional requirements to education or training. These are pretended to be inexcusably performed in commercial fishing vessels.

This implies that candidates for training are going to be working onboard a fishing vessel whose captain's mission is to fish as fast as possible, throwing away everything that is not useful to main fishing and disposing of all the species they are not searching for, going on deck, living in bad and overcrowded conditions, working with sacrifice; and at that very moment, an observer, professor or inspector will be there training students. It is clear that it is impossible to do it on a fishing vessel carrying out commercial activities and especially when subsidies are not even mentioned.

There is no doubt that the future fishing captain, pilot, or skipper will have been trained with all the vices and violations to responsible fishery, committed by commercial fishing in every sea in the world. Little can be expected from them. FAO/ILO/IMO's Document in Chapter 2.13 on training means, foresees that:

> *"Whenever possible, Teaching Vessels shall be used for the personnel who enter the fishing industry [...] Teaching Vessels shall perform real fishing operations."*

The pretension that the embarking and training should be performed in commercial fishing vessels is inconvenient for Argentina given the composition and economic structure of fishing companies, which demand low fuel costs, speed in every tide, search for main species and discard of bycatch and juveniles, etc. Therefore, we propose Higher Education with School Vessels (Paragraphs 2.13.1, 2.13.2, 2.13.3), vessels which the national fishing schools or universities that teach higher education shall have, and which shall be authorised as such to perform real fishing operations, pursuant to the international convention's requirements.

9.11. DIFFERENT LEVELS IN TRAINING

In the field of medicine, different levels of education and training are accepted among all the human beings which integrate healthcare or a hospital. A maid who keeps the floors clean or a nurse who applies injections or treatments, a scrub nurse who aids in surgeries, a general doctor or a specialist in surgery: they all have influence in the patients' life and death. However, some have completed elementary school; others have completed secondary school; others have a college degree or have completed postgraduate studies. It should also be possible to offer different education and training levels for all men liked to fishing.

We should discuss which levels we believe are enough for sailors, cooks in fishing vessels, radio operators, and marine engineers. It would be good to establish, as regards the National Training Plan, which levels we plan for Coastal Skippers, Officers, Chief Officers and Fishing Captains in Argentina.

9.12. PROPOSAL ON EDUCATION AND TRAINING FOR THE FISHING PERSONNEL AND THEIR CERTIFICATION

DECK PERSONNEL

Certificate's name	Currently taught	Authorisation	Academic level
Coastal Fishing Skipper		Course approved by provision No. 07/2001 of the Subsecretariat of Rail, Inland Waterway and Maritime Transport. Duration: 32 weeks	College
Fishing Pilot		Course approved by provision No. 09/2010 of the Subsecretariat of Ports and Waterways.	College
Chief Fishing Officer		Course approved by provision No. 51/2001 of the Subsecretariat of Rail, Inland Waterway and Maritime Transport. Duration: 9 weeks	College, university
Fishing Captain		Course approved by provision No. 51/2001 of the Subsecretariat of Rail, Inland Waterway and Maritime Transport. Duration: 12 weeks	College, university
Bachelor of Fishing			University

MACHINERY PERSONNEL

Certificate's name	Currently taught	Authorisation	Academic level
Marine Engineer Officer			College, university

Marine Engine Operator		Course approved by provision No. 09/2010 of the Subsecretariat of Ports and Waterways.	College, university
Chief Marine Engine Operator			College
Senior Marine Engine Operator			College
Bachelor of Science in Marine Engineering			University

9.13. GENERAL AND SPECIFIC FISHING COMPETENCES

9.13.1. General aspects

The main purpose of the official certificate of Bachelor of Fishing proposed is to provide the basic knowledge and techniques, as well as the capacities and skills which a Fishing Captain must have at his disposal to develop his professional activity.

The Higher Education Law No. 24.521, passed in July 1995, enacted and published in August 1995, has the purposes of: providing scientific, professional humanistic and technical training at the highest level; contributing to the preservation of the national culture; promoting the generation and development of knowledge in all its forms; and developing attitudes and values which the training of responsible, reflexive, critical people, with ethical and solidary awareness, capable of improving the quality of life, requires; consolidating the respect for the environment, the institutions of the Republic and the validity of the democratic order (Art. 3).

The regulated professions are those whose exercise could compromise public interest, directly jeopardising the health, safety, rights, property and training of citizens. It is demanded that they respect the following requirements:

- Syllabuses
- Periodic certification from the CONEAU (National Commission of Evaluation and University Accreditation)

It also establishes that university certifications shall be issued by recognised university institutions. These shall certify the academic training received and authorise graduates for professional practice across the country. That is what the expression “national validity” means.

In addition, it establishes that the current general guidelines of the corresponding certifications, not only academic (Bachelor of Fishing) but also professional (Fishing Captain), shall apply to university certifications linked to regulated professional activities.

The competences cover the knowledge relating to the professional activity and that obtained as a result of learning. Such competences are decisive for the identification of certifications.

These competences can be classified in:

- Disciplinary and academic competences, which result directly from training, obtained at an academic level, such as: college, college and university, or university (learning outcomes).

  These competences respond to the knowledge obtained and the methods used to learn. In turn, academic purposes can be divided into two parts:

  - General: common to the three courses of studies (nautical, warfare, fishing)
  - Specific: relevant to each specialisation grade profile.

- Professional competences which describe capabilities and proceedings to be developed by a graduate in the labour market. Professional competences are centred in the job position to be developed and in the work performance field.

They are:

VOCATIONAL COMPETENCES	
1	Capacity and comprehension for the resolution of problems (basic training)
2	Knowledge, use and application of different principles on vessels (fishing training)
3	Knowledge and capacity to apply and calculate (specific training)

9.13.2. Capacity and comprehension for the resolution of:

- Mathematical problems on linear algebra; geometry, differential and integral calculus; numeric method and algorithm; statistics and optimisation
- General laws of physics: mechanics, thermodynamics, fields and waves, and electromagnetism
- Computers and networks, operating systems, application and use of databases and computer applications
- Basic knowledge of general chemistry, organic and inorganic chemistry and their applications in engineering
- Representation techniques, spatial approach, standarisation, computer-aided design, fundamentals of industrial design
- Fundamentals of business administration. Organisation, management, marketing and financing of maritime companies
- Knowledge of maritime technical English

9.13.3. Knowledge, use and application on vessels of the principles of:

- Circuits theory and marine electrical machines
- Electronics applied to the vessel and maritime facilities
- Automatic devices and control methods applicable to the vessel and maritime facilities
- Environmental technologies and sustainability in the marine environment
- Safety and protection of the vessel. Fire-fighting and survival. Prevention and fight against pollution
- Quality and safety management systems applied to the vessel. Vessel management audits
- Maritime health training
- Vessel theory
- Naval construction
- Main, auxiliary and propulsion systems of the vessel. Cold and air conditioning
- Maritime legislation and regulations

9.13.4. Knowledge and capacity to apply and calculate:

- Navigation for positioning, direction, time, speed and distance determination
- Weather and atmospheric sciences for weather navigation and synoptic navigation
- Different types of tides by different existing methods and their energetic use
- Loading/unloading, stowage and securing, embarking/disembarking and protection of the goods
- Measurement and control systems for the maintenance of the cargo and the atmospheres of the cargo spaces
- Special transports and hazardous goods
- Radiocommunications systems. Global Maritime Distress Safety System (GMDSS)
- Organisation and management of projects of repair, installation, modification, maintenance of loading equipment, stowage and security systems, and loading and auxiliary means of the vessel
- Cold and air conditioning
- Operation and maintenance of all existing loading and navigation systems aboard a vessel
- Mooring manoeuvre, harbour towing manoeuvre and docking of vessels
- Manoeuvre in restricted waters
- The principles of automatic regulation and its application to the automation of maritime equipment and systems
- Marine shelves, facilities for marine fishing farming and aquaculture
- Energetic optimisation systems applied to marine facilities
- Systems of repair and reconstruction for navigation equipment's elements, maritime safety and types of breakdowns
- Design and management of energetic optimisation systems applied to marine facilities
- Inspection and classification societies
- Quality management applied to the vessel

9.14. GENERAL AND SPECIFIC COMPETENCES TO BE ACQUIRED DURING STUDIES

The certifications which graduates will obtain shall allow them to perform the same professional competences to which the current certificates already issued, or in some cases simple certificates, provide them access.

These competences are similar to those reflected in the Ministerial Resolution No. 1483/99 passed by the National Ministry of Education.

In the following table, basic competences which the student must acquire during the completion of the Syllabus are compared.

BASIC COMPETENCES	
1	Acquisition, understanding and application of knowledge in a field of study based on the general secondary education and which is usually found at a level that, although it is supported by advanced textbooks, it also includes several aspects which imply knowledge deriving from the forefront of the field of study
2	Application of their knowledge to their work or profession in a professional way and acquisition of competences which are usually shown by means of an elaboration and defence of arguments and problem solving within their field of study
3	Capacity to gather and interpret relevant data (normally within their field of study) to make judgements which include a reflection on relevant social, scientific-technical and ethical topics
4	Transmission of information, ideas, problems and solutions to a specialised and non-specialised public
5	Development of those learning skills which are necessary to undertake further studies with a high level of autonomy
6	Knowledge of basic and technological subjects that train them to learn new methods and theories and provide them with a great versatility to adapt to new situations
7	Capacity to communicate. Organised exposition of written and oral ideas, based on respect for the fundamental and equality rights between men and women, as well as on the promotion of human rights and the very values of a culture of peace and democracy

8	Capacity to work in teams, in a multilingual and multidisciplinary environment, based on respect for the fundamental and equality rights between men and women and guaranteeing universal accessibility. Being capable of generating reports for the transmission of knowledge and outcomes. Capacity to learn and update themselves permanently

The students who aspire to obtain a Graduate Certificate must acquire the following basic and specific competences, as well as the descriptors and contents of basic subjects which are common to the branch of knowledge of engineering, and timely pass them to guarantee the required abilities for the professional practice. These are:

SPECIFIC COMPETENCES	
1	Application of navigation techniques for positioning, direction, time, speed and distance determination
2	Knowledge of the calculus of different types of tides by means of different existing methods
3	Application of the different techniques for weather and synoptic navigation
4	Application of techniques of loading, transport, conservation and manipulation of all types of goods, taking into account the optimisation and safety in merchant vessels
5	Mooring manoeuvre, harbour towing manoeuvre and docking of vessels. Manoeuvre in restricted waters
6	Radiocommunications systems. Global Maritime Distress Safety System (GMDSS)
7	Application of different techniques for the marine environment pollution prevention. Compliance with the international standards
8	Operation of fire-fighting, survival and abandonment of ship systems
9	Operation of food conservation systems in the maritime transport
10	Knowledge of the development, application, inspection, optimisation and construction of the vessel
11	Operation of air conditioning, ventilation, refrigeration and combustion systems

External training practices in vessels, which provide competences established in IMO's International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) and whose strict compliance is necessary for the graduate certificate to also have full professional attributes, are also included.

In the case of Official Certificates which enable the performance of regulated professional activities, the standards establish the conditions to which the corresponding syllabuses shall adapt. In addition to adjusting to the applicable Higher Education regulations, they must also adjust to IMO's Training Convention which is of strict compliance.

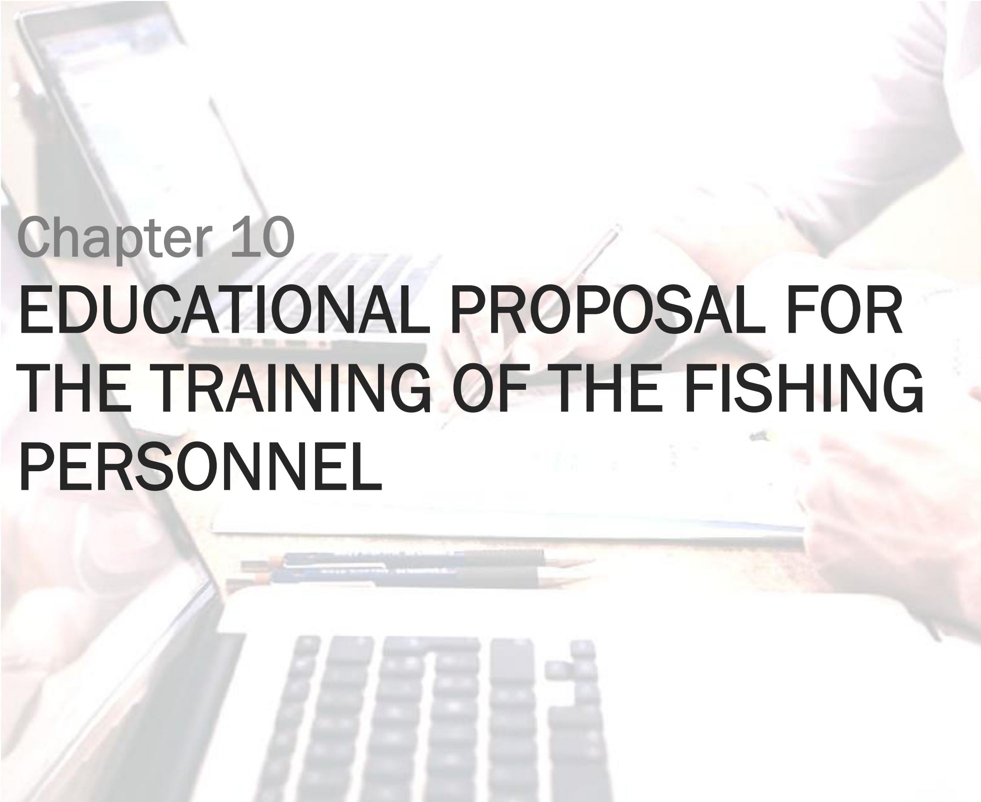
COMPETENCES OF THE STCW-F CODE	
1	Capacity to serve as officer in civilian vessels, with no limitations, once the requirements demanded by the Maritime Administration are exceeded
2	Capacity to exercise command in civilian vessels of up to 5000 GT once the requirements demanded by the Maritime Administration are exceeded
3	Capacity to determine the position of the vessel by means of different navigation methods
4	Capacity to plan and control meteorological and oceanographic track
5	Capacity to perform a safe navigational watch
6	Capacity to use correctly the different radionavigation appliances
7	Capacity to answer correctly to different emergency situations
8	Capacity to answer properly to a distress signal at sea
9	Capacity to correctly employ IMO's Standard Marine Navigational Vocabulary in English
10	Capacity to perform with precision the different vessel manoeuvres in rescue, berth or mooring situations
11	Capacity to load, manipulate and stow properly different transportable goods in a vessel
12	Capacity to maintain the good stability of the vessel
13	Capacity to keep the safety and protection of people onboard
14	Capacity to protect the marine environment and apply environmental sustainability criteria to the maritime transport
15	Capacity to monitor the compliance of legislative requirements

The training activities which are determined for the fulfilment of the aforementioned competences need to be justified on a cross-curricular thematic which ensure its success. In this regard, the cross-curricular competences are the following:

CROSS-CURRICULAR COMPETENCES	
1	Capacity for analysis and synthesis
2	Capacity for organisation and planning
3	Knowledge of a foreign language
4	Problem solving
5	Decision making
6	Teamwork
7	Cross-discipline teamwork
8	Interpersonal relations' skills
9	Critical thinking
10	Ethical commitment
11	Self-learning
12	Adaptation to new situations
13	Creativity
14	Leadership
15	Motivation for quality
16	Sensitivity towards environmental topics

The Bachelor's Commission, in the light of the general guidelines for the design of the Graduate's Certificate, establishes common criteria whose contents are detailed in the following table.

DESCRIPTORS AND CONTENTS OF BASIC SUBJECTS WHICH ARE COMMON TO THE BRANCH OF KNOWLEDGE
Mechanics. Electricity. Magnetism. Thermodynamics
Algebra. Infinitesimal calculus. Numeric calculus
General business administration, organisation, planning and control. Productive and organisational systems
Representation systems. Standarisation. Computer-aided design
Structure of matter. Applied chemistry. Chemical analysis. Integral waste management



Chapter 10

EDUCATIONAL PROPOSAL FOR THE TRAINING OF THE FISHING PERSONNEL

10.1. SYLLABUS TEMPORAL PLANNING

The distribution of the subjects into courses and terms is listed in the following table: In any case, the students will be able to manage their own temporal organisation and attend the subjects whenever they consider appropriate and with the distribution of their preference.

This liberty is limited by the conditions imposed by the university and the prerequisites suggested for each subject.

The Course of Studies Plan proposed is shown below.

CODE	SUBJECT	TIME MANAGEMENT	CREDIT HOURS
FIRST YEAR			
1	Physical fundamentals applied to engineering	A	90
2	Mathematical fundamentals applied to engineering	A	120
3	Chemical fundamentals applied to the vessel	A	60
4	Fundamentals of naval construction and vessel theory	A	60
5	Auxiliary systems of the vessel	S	60
6	Maritime legislation and regulations	S	60
7	Fishing biology and discard	A	120
8	Fishing discard	A	90
9	Fishing oceanography	A	60
10	Ecosystem approach to fisheries and co-management	A	60
11	IT fundamentals and applications	S	60
12	Practical training (onboard a vessel)	S	90
13	Graphic representation	A	70
14	Auxiliary and propulsion systems of the vessel	S	30

CODE	SUBJECT	TIME MANAGEMENT	CREDIT HOURS
SECOND YEAR			
15	Maritime safety, fire-fighting and survival at sea	A	90
16	Maritime medicine	A	60
17	Electrical engineering and electronics	A	60
18	Coastal navigation	S	90
19	IT fundamentals and applications	S	60
20	Practical training II (theory plus vessel)	S	400
21	Navigation I	A	200
22	Maritime technical English	A	60
23	Fundamentals and automatic equipment of the vessel	A	60
24	Business	A	40
25	Advanced coastal navigation	S	60
26	Fishing training I	S	90
27	Project management (PMI)	A	90
28	Basic principles of the fishing vessel management	S	90

CODE	SUBJECT	TIME MANAGEMENT	CREDIT HOURS
THIRD YEAR			
29	Astronomical navigation	A	120
30	Radioelectronic navigation	A	120
31	Meteorology	A	60
32	Manoeuvre and stowage	S	40
33	Practical training on astronomical navigation	S	140
34	Practical training on special maritime transports	S	140
35	Practical training on naval construction and vessel theory	A	140
36	Practical training on radiocommunications	A	60
37	Practical training on advanced astronomical navigation	A	60
38	Technical English II	A	60
39	Fishing training II	S	60
40	Navigation II	S	90

CODE	SUBJECT	TIME MANAGEMENT	CREDIT HOURS
FOURTH YEAR			
41	Marine pollution and safety	A	90
42	Practical training on radioelectronic navigation	A	140
43	Maritime legislation	A	90
44	Practical training on meteorological navigation	S	140
45	Fishing vessel management	S	90
46	Practical training on manoeuvre and stowage	S	140
47	Technical inspection of breakdowns	A	90
48	Radiocommunications system (SMSSM)	A	120
49	Harbour operations of the fishing vessel	A	60
50	International Maritime Agreements and Civil liabilities for damages	A	60
51	IMO's standarised English	S	40
52	End of course project	S	1420

BASIC TRAINING MODULE

SUBJECTS: Basic

The Basic Training Module, which is taught in the first course, is comprised of those subjects which will provide students sufficient and necessary knowledge to acquire future skills and abilities that will allow them to address the next modules with the guarantee of improvement.

This module is composed of the following subjects:

MATHEMATICAL FUNDAMENTALS APPLIED TO ENGINEERING

Contents:

Numbers, functions and derivates. Integration. Taylor's Formula. Application to the elemental functions. Rn vector space. Scalar product. Plane and space geometry. Matrix and numerical calculus.

Learning outcomes:

Analysis and understanding of mathematical problems resolution on linear algebra, geometry, differential and integral calculus, numeric method and algorithm, statistics and optimisation.

PHYSICAL FUNDAMENTALS APPLIED TO ENGINEERING

Contents:

Algebra and vectorial calculus. Kinematics. Material point dynamics. Work and energy. Fluid mechanics. Electric field. Electrical current and CC circuits. Magnetism. Electromagnetic induction. Thermodynamics. Fluid mechanics.

Learning outcomes:

Understanding of the general laws of physics: mechanics, thermodynamics, fields and waves, electromagnetism and heat transfer.

IT FUNDAMENTALS AND APPLICATIONS

Contents:

Algebra and vectorial calculus. Kinematics. Material point dynamics. Work and energy. Fluid mechanics. Electric field. Electrical current and CC circuits. Magnetism. Electromagnetic induction. Thermodynamics. Fluid mechanics.

Learning outcomes:

Hardware fundamentals. Software fundamentals. Spreadsheet. Word processor. Programming.

GRAPHIC REPRESENTATION

Contents:

Standarisation. Representation systems. Plan of the shape of the vessel. Applications to the D.A.O.

Learning outcomes:

Expression, knowledge and understanding of representation techniques, spatial approach, standarisation, computer-aided design, fundamentals of industrial design. Interpretation of the plans of marine facilities: symbology.

BUSINESS

Contents:

Introduction to the company. The environment. Business objectives. Business management. Investment and financing decisions. Business production function. Production plan. Business commercial management. The economic direction and viability of projects. Shipping companies.

Learning outcomes:

Acquisition of the fundamental knowledge on general economy and the maritime business in particular.

FISHING BIOLOGY

Contents:

Fishing stocks. Concept of stock. Structure of unexploited stocks. Dynamics of an unexploited stock. Exploited stock. Changes in an exploited stock. Stock responses. Mathematical models on fishery exploitation. Basic concepts. Estimate of biological parameters. Fisheries management. Objectives, biological and economic criteria for fisheries management. Assessment of fisheries resources. Direct and indirect methods of estimation of resources abundance. Influences of oceanographic conditions in fishing. Influence of temperature in the fisheries resources abundance. Oceanic dynamics and influence in the fishing stocks distribution and abundance. Influence of the weather in fishing stocks. Weather variability, climate change and influence on the fishing stocks' dynamics. Fisheries research. Backgrounds. Situation of the fisheries research. Main researched fisheries. Primary and secondary databases in the fisheries research. Importance of the data generated onboard.

Learning outcomes:

Understanding of the biological phenomena and their influences as regards weather, exploitation and oceanography. Knowledge and assessment of the impacts produced by fishing in the diverse fishing stocks. Analysis of the importance of fishing data obtained onboard.

FISHING DISCARD

Contents:

Target catch Bycatch and discard Concepts, definitions and causes of fishing discard. Discard by exclusion. Discard by capacity. Discard by size. Discard by damaged catch. Technologically and ecologically interdependent fisheries in Argentina. General background. Discards estimation. Management methodologies to avoid/decrease bycatch in trawling fisheries. Importance of discard in fisheries assessment models. Importance of the data generated onboard.

Learning outcomes:

Knowledge and analysis of the significance of discard in fully exploited fisheries. Assessment of the importance of obtaining sensible data onboard. Understanding of the different discard technological mitigation measures. Knowledge of the extractive conducts alternatives to decrease discard.

FISHING OCEANOGRAPHY

Contents:

Description of oceanographic characteristics and the areas of fishing interest. Water masses. Currents and general circulation. Different types of fronts. Definition. Oceanic fronts. Fronts originated by the encounter of current systems. Fronts associated with eddies and filaments in the open ocean. Fronts associated with the continental shelf and the tidal effects Tidal fronts. Continental shelf-brake front. Coastal fronts originated by the encounter of shelf continental and marine water masses. Coastal fronts. Temperature coastal fronts. Salinity coastal fronts. Areas of biological and fishing interest.

Learning outcomes:

Analysis of the different ecosystems in the Argentine Sea. Assessment of the different fisheries resources associated to the different environments. Assessment of the importance of the frontal zones of the Argentine Sea and its relationship with the resources. Analysis of the biological phenomena produced in different areas of the Argentine Sea.

ECOSYSTEM APPROACH TO FISHERIES AND CO-MANAGEMENT

Contents:

Fisheries management: fundamental definitions and concepts. Traditional fisheries management versus ecosystem-based fisheries management (EBFM). Ecosystem-based fisheries management: history, definitions, concepts. Case studies. Application of the EBFM in Argentina: perspectives, regulations, application. Fisheries co-management. Definition and general concepts. Structure, objectives, phases, achievements, pros and cons. Cases of study. Possibility of applying the EBFM and co-management in Argentina.

Learning outcomes:

Assessment of the importance of the extractive activity contemplating all of its actors. Assessment methodology of the behaviour of the sectors involved: state, companies and workers. Proposal of conducts which are healthy to the environment. Analysis of the guidelines of the Code for Responsible Fisheries. Knowledge of the importance of the embarked personnel in the decision-making process.

CHEMICAL FUNDAMENTALS APPLIED TO THE VESSEL

Contents:

Structure of matter: fluids, metals and alloys. Chemical reactivity. Combustion: matter and energy balance. Basic concepts of inorganic chemistry. Basic concepts of organic chemistry. Chemical pollution. Chemical characteristics of the loading of hazardous goods. Testing hydrocarbons in water.

Learning outcomes:

Knowledge and understanding of the basic knowledge of general chemistry, organic and inorganic chemistry and their applications in engineering.

MARITIME LEGISLATION AND REGULATIONS

Contents:

Legal status of the vessel: property and in rem rights. The maritime navigation business persons and their collaborators. Agreements on the exploitation and use of the vessel. Marine insurance. Bottomry loan. Breakdowns and maritime accidents. Maritime assistance and rescue. Maritime sales. SOLAS and MARPOL conventions. IMO's codes and regulations. Legislative requirements.

Learning outcomes:

Management and use of the maritime legislation and regulations.

MARITIME TECHNICAL ENGLISH

Contents:

General introduction: use of written and oral English. Introduction to maritime technical English. Safety onboard. Maintenance. Meteorological prediction. Nomenclature and aspects related to navigational watch and machines.

Learning outcomes:

Expression and demonstration of maritime technical English.

FISHING TRAINING MODULE

SUBJECTS: Compulsory

The Fishing Training Module, taught between the first and second course, is comprised of those subjects which will provide students sufficient and necessary knowledge to acquire future skills and abilities that are stipulated in the international conventions (SCTW F, IMO, which are common to Marine Engineering, Nautical Engineering and Maritime Transport and Fishing). Students are trained to preserve life at sea and operate machinery in a basic manner.

This module is composed of the following subjects:

FUNDAMENTALS OF NAVAL CONSTRUCTION AND VESSEL THEORY

Contents:

Naval construction. Vessel theory. Propellers. Project and equipment of tankers, oil tankers, chemical tankers, gas tankers, ro-ro vessels and passenger vessels. Loading, retention and unloading operations. Integrity of the hull. Stability, steering and propulsion.

Learning outcomes:

Use and application of knowledge of technology in naval construction. Application of knowledge to perform inspections.

MARITIME MEDICINE

Contents:

Fundamentals and organisation of maritime medicine. The human organism. General pathology onboard. Urgencies and evacuations at sea. Medical assistance onboard. Work and health. Special pathology of the sailor. Naval hygiene. Communicable diseases in the marine environment. Health risks: hazardous cargo, toxicity. First aid. Legislative requirements.

Learning outcomes:

Management and operation of the maritime health training.

ELECTRICAL ENGINEERING AND ELECTRONICS

Contents:

Circuits’ theory. Circuits in transient conditions. Power factor. Quadripoles. Transformers. Semiconductors. Diodes. Transistors. Power supply units. Amplifiers. Integrated circuits. Breakdowns.

Learning outcomes:

Use and application of analogue, digital and power electronics to the vessel and maritime facilities. Use and application of the circuits' theory and electric machines.

MARITIME SAFETY, FIRE-FIGHTING AND SURVIVAL AT SEA

Contents:

Survival at sea in the event of abandonment of ship and rescue. Prevention and fire-fighting. Safety at work and social responsibilities. Pollution prevention. International regulations. Environmental technologies and sustainability in the marine environment. Quality and safety management systems, emergencies and crowd management applied to the vessel. Audits. Occupation risks prevention. Individual and collective protection equipment. Safety in loading, retention and unloading operations.

Learning outcomes:

Application of the quality management and safety systems of the vessel. Vessel management audits organisation.

AUXILIARY SYSTEMS OF THE VESSEL

Contents:

Pipes and accessories. Pumps. Compressors. Ventilation.

Learning outcomes:

Use of automatisms and application of control methods to the vessel and maritime facilities.

SPECIFIC TRAINING MODULE

The Specific Training Module has 132 credits distributed in 120 compulsory credits and 12 optional credits (24 credits offered). It is comprised of those subjects which will provide students sufficient and necessary knowledge to acquire future skills and abilities which are established in the international conventions (SCTW - F, IMO).

This module is composed of the following subjects:

SUBJECTS: Compulsory

COASTAL NAVIGATION

Contents:

Geographic coordinates, introduction to terrestrial magnetism, compass, compass heading, magnetic heading, magnetic declination, study of deviations, concept of heading, fix and bearing, study of time, (UTC, ST, XET, CET, EET), methods for obtaining bearings and determination of shore distance. Mercator chart, compass, logs and leads. Position by bearings and simultaneous distances. Position by bearings and non-simultaneous distances. Navigation with wind and current. Course over water (COW), course over ground (COG), tides and tidal currents. Introduction to harmonic analysis, Spanish tide tables. Calculation of the height of the tide at a certain time. Calculation of the time of the tide for a given height. Prediction of rotating and reversible tidal currents.

Learning outcomes:

Knowledge and application of different aspects, methods and necessary instruments to safely navigate in near shore waters.

ADVANCED COASTAL NAVIGATION

Contents:

Tides and tidal currents. Tide tables, tidal stream atlas. Nautical kinematics I. Nautical kinematics II. Introduction to radar. Gain control, brightness control, reception control, anti-clutter sea control, anti-clutter rain control, taximeter, alidades. Radar kinematics. Introduction to the gyrocompass and other course sensors. Errors in the gyrocompass and its correction. Project 42 of the Bachelor's Degree in Nautical Engineering and Maritime Transport. Laser compass. Fiber optic compass. Fluxgates. Position determined by horizontal and vertical angles. Storm surge.

Learning outcomes:

Knowledge and application of different aspects, methods and necessary instruments to safely navigate in near shore waters employing electronic aids in navigation.

ASTRONOMICAL NAVIGATION

Contents:

Plane and spherical trigonometry. Advanced study of time. Horizontal coordinates. Time coordinates. The solar system. Constellations and stars. Sextants and chronometers. Sunrises, sunsets, twilights, transit of the stars across the meridian. Height-lines. Stars recognition. Position at midday. Position by three or more height-lines. Sight reduction tables. Tides and tidal currents: theories of Newton and Laplace, harmonic dynamics and analysis.

Learning outcomes:

Application of the acquired knowledge to determine the situation of the vessel at sea by means of astronomical methods. Capacity to predict tidal alterations and flows through different methods.

RADIOELECTRONIC NAVIGATION

Contents:

Direction finders: fundamentals of the system; errors; types of direction finders. VHF direction finders. UHF/VHF direction finders used in VTS. Direction finders used for PLB. Radar. ARPA: theory and operation. Loran and e-loran: theory and operation. GPS and DGPS (different methods): theory and operation; Galileo: theory and operation; radiodetermination systems: theory and operation. DP systems. Course sensors and vessel behaviour. Control systems of the movement of the vessel. Logs and leads.

Learning outcomes:

Knowledge and application to navigation of the different systems of radioelectronic navigation aid, with their limitations and errors.

PRACTICAL TRAINING ON RADIOELECTRONIC NAVIGATION

Contents:

Practical training with real equipment of direction finders onboard: assessment of errors, types of direction finders. VHF direction finders. UHF/VHF direction finders used in VTS. Direction finders used for PLB. Radar. ARPA. Loran and e-loran: GPS and DGPS (different methods); Galileo; radiodetermination systems: theory and operation. DP systems. Course sensors and vessel behaviour, Control systems of the movement of the vessel. Logs and leads.

Learning outcomes:

Knowledge and application to navigation of the different systems of radioelectronic navigation aid, with their limitations and errors. Practical training performed onboard real vessels in different conditions and navigation areas.

METEOROLOGY

Contents:

Meteorological variables. The wind. Clouds and precipitations, frontogenesis (warm fronts, cold fronts, occluded fronts, thalwegs, etc.). Project 43 of the Bachelor's Degree in Nautical Engineering and Maritime transport. Instruments, visibility. Depressions, anticyclones and tropical cyclones. Observations and services for navigation. Marine currents. Waves. Ice. Forecast on meteorological and oceanographic conditions. Meteorological navigation. Breeze regime.

Learning outcomes:

Knowledge and application of meteorological phenomena. Capability to understand the variables and information available to make an accurate prediction for the following hours.

PRACTICAL TRAINING ON METEOROLOGICAL NAVIGATION

Contents:

Interpretation of meteorological parts and predictions. Surface analysis. Height analysis. Interpretation of satellite observations. Depressions, anticyclones and tropical cyclones evolution. Observations and services for navigation. Ice. Forecast on meteorological and oceanographic conditions. Meteorological navigation. Tropical cyclone manoeuvre.

Learning outcomes:

Understanding and application of meteorological phenomena that surround the vessel. Capability to understand the variables and the information received to ensure a safe navigation.

MANOEUVRE AND STOWAGE

Contents:

Introduction to the manoeuvres of vessels; types of vessels. Marine vehicle dynamics: behaviour of the vessel at sea. Propulsion and steering systems. Directional stability, evolution and steering. Combined effects of the propeller and the rudder. Manoeuvre with waterjets. Manoeuvre lateral propellers. Influence of external elements: winds, currents and swell. Navigation in restricted waters. Manoeuvre auxiliary equipment and elements. Harbour manoeuvres. Special manoeuvres. Manoeuvre simulators. Goods transported by sea. Stowage principles, cargo handling and retention. General cargo stowage. Stowage in ro-ro vessels. Stowage in bulk-freighters. Stowage in container vessels. Atmosphere and stowage of refrigerated vessels.

Learning outcomes:

Knowledge and application of the fundamentals of vessel manoeuvre, the combined effects of the different elements which intervene in it using simulators. Knowledge and application of stowage techniques to the different types of cargo and its vessels.

PRACTICAL TRAINING ON MANOEUVRE AND STOWAGE

Contents:

Practical training on berth, casting-off, mooring, towing, boarding, etc. Manoeuvres of different types of vessels. Marine vehicle dynamics: behaviour of the vessel at sea. Propulsion and steering systems. Directional stability, evolution and steering. Combined effects of the propeller and the rudder. Manoeuvre with waterjets. Manoeuvre lateral propellers. Influence of external elements: winds, currents and swell. Navigation in restricted waters. Manoeuvre auxiliary equipment and elements. Harbour manoeuvres. Special manoeuvres. Manoeuvre simulators. Goods transported by sea. Stowage principles, cargo handling and retention. General cargo stowage. Stowage in ro-ro vessels. Stowage in bulk-freighters. Stowage in container vessels. Atmosphere and stowage of refrigerated vessels. Stowage plans. Cargo planning.

Learning outcomes:

Capacity to efficiently and safely perform manoeuvres onboard real vessels. Capacity to stow the cargo onboard the different types of vessels, drafting stowage plans and practically applying them.

PRACTICAL TRAINING ON ASTRONOMICAL NAVIGATION

Contents:

Practical training with sextants and chronometers. Practical training on location using the midday sun. Meridian. Circunmeridian. Extrameridian. Practical training on the position by three height-lines. Practical training on the position by four height-lines. Practical training on the elaboration of a Mercator chart. Practical training with different types of projections and developments used in maritime navigation. Practical training on the elaboration of loxodrome, orthodromic and mixed tracks. Calculation of the track economy. Practical training on the compensation of the compass.

Learning outcomes:

Knowledge and capacity to use the different necessary methods to effectively navigate with the aid of the stars. Knowledge of how to compensate compasses and how to safely handle cartography.

PRACTICAL TRAINING ON ADVANCED ASTRONOMICAL NAVIGATION

Contents:

Advanced practical training on the position by three height-lines. Position by angle bisectors. Advanced practical training on the position by four height-lines. Position by perpendicular bisectors. Advanced practical training on different projections and developments used at sea. Graphic and analytical practical training on loxodromics and orthodromics. Mixed track. Advanced practical training on preliminary and definite compensation of the compass employing simulators and deflectors. Heeling deviation correction.

Learning outcomes:

Understanding and application of the most advanced astronomic positioning methods, high-seas navigation and definite compensation of compasses in different latitudes in an effective and safe manner.

PRACTICAL TRAINING ON SPECIAL MARITIME TRANSPORTS

Contents:

Practical training on stowage and cargo securing onboard the vessel, equipment for cargo handling and securing and equipment for retention and lashing. Loading and unloading operations, especially with regard to the transport of cargo which is not identified in the Code of Safe Practice for Cargo Stowage and Securing. Practical training on stowage in tankers and operations in an oil tanker. Practical training on operations in chemical and gas tankers; international regulations, standards, codes and recommendations for the transport of hazardous goods. Practical training with regard to the MARPOL and IMDG codes in special vessels.

Learning outcomes:

Knowledge and application of different techniques employed for the transport of special and hazardous goods.

MARINE POLLUTION AND SAFETY

Contents:

Expansion of knowledge of survival at sea and fire-fighting. National, European and International Regulations with regards to safety. The International Maritime Organisation (IMO). Control instruments for the safety of the vessel. Management instruments for maritime safety: ISM code. Maritime rescue. Abandonment of ship. Communications and survival at sea. Assessment of fire risks. Investigation of casualties. Fight against pollution. Pollution prevention. Introduction to the marine environment. Pollution caused by hydrocarbons. Pollution caused by hazardous substances. Pollution caused by waste-waters. Pollution caused by solid waste. Atmospheric pollution. Biological pollution.

Learning outcomes:

Obtaining a wide knowledge of the control instruments for safety onboard and prevention and fight against environmental pollution.

PRACTICAL TRAINING ON NAVAL CONSTRUCTION AND VESSEL THEORY

Contents:

Practical training on naval construction. Calculation of surfaces and volumes of the hull, holds and tanks. Propellers. Project and equipment of tankers, oil tankers, chemical tankers, gas tankers, ro-ro vessels and passenger vessels. Loading, retention and unloading operations, integrity of the hull. Stability, steering and propulsion. Calculation of draughts. Calculation of initial stability, statics and dynamics.

Learning outcomes:

Effective application onboard of the theoretical knowledge acquired in the classroom and simulators. Capacity to dominate the constructive elements of the vessel and its behaviour at sea in different loading conditions and navigation areas.

PRACTICAL TRAINING ON RADIOCOMMUNICATIONS

Contents:

Practical training with VHF RT, VHF DSC, MF/HF, MF/HF DSC, NAVTEX, INMARSAT A, B, C, M; EPIRB, SART, RADIOTELEX, batteries, portable VHF, AIS, VDR.

Learning outcomes:

Developing effectively the administration of a marine mobile radiocommunications station.

IMO'S STANDARISED ENGLISH

Contents:

Normalised phrases for maritime communications (SMCP). Introduction. Glossary. Inferior communications. Communications with other vessels. Communications with passengers. Communications with STM. Safety and emergency communications. Communications with pilots. Communications with helicopters. Communications related to the cargo. General introduction. The harbour and the vessel. Maritime transport agents and types of agreements. INCOTERMS, transport clauses. Communications, description of a technical process, hypothesis and conditions. Technical instructions. Professional situations. Job interview. Curriculum vitae. Habitual work documents.

Learning outcomes:

Oral and written command of normalised phrases for maritime communications. Wide knowledge of the commercial and harbour maritime environment in English.

SUBJECTS: Optional

HARBOUR OPERATIONS

Contents:

The harbour. General considerations. Berth / casting-off manoeuvres. Mooring and harbour towing manoeuvres. Fixed and mobile ground devices for cargo handling. Loading and unloading means of the vessel. Stevedores. Solid cargo maritime terminals and passengers. Liquid cargo terminals. Regasification plants. Port Law and Merchant Navy.

Learning outcomes:

Global knowledge of the ports, their management, different agents who intervene in harbour operations and applicable regulations.

TECHNICAL INSPECTION OF BREAKDOWNS

Contents:

Data collection and digital treatment of the image. Acting protocol. Methodology. Documentation and specialist report. Damage appraisal. Average adjuster. Applicable regulations. Survey and P&I clubs. Quantity and quality control.

Learning outcomes:

Capacity to develop specialist jobs, protection and indemnity in the event of maritime casualties.

RADIOCOMMUNICATIONS SYSTEMS (SMSSM)

Contents:

Theory of VHF RT, VHF DSC, MF/HF, MF/HF DSC, NAVTEX, INMARSAT A, B, C, M; EPIRB, SART, RADIOTELEX, batteries, PORTABLE VHF, AIS, VDR. Local errors. SMSSM. Use of INMARSAT. NAVTEIX. Distress radio beacons. Search and rescue radar transponder. Procedure of the distress call and safety in the SMSSM. Radiocommunications regulations.

Learning outcomes:

Knowledge and application of the expected telecommunications equipment and procedures in the Global Maritime Distress and Safety System

INTERNATIONAL MARITIME AGREEMENTS AND CIVIL LIABILITIES FOR DAMAGES

Contents:

Maritime law and private international law. Fundamentals of the regulation of international agreements. Labour relations in the international maritime environment. Charter international agreements. International transport of goods agreements. International maritime passage contract. Insurance contract in maritime transport.

Learning outcomes:

Acquisition of the necessary knowledge to be able to interpret the different types of contracts used in the exploitation of the vessel, as well as the commonly applied insurance policies.

END OF COURSE WORK MODULE

This module is addressed in the fourth course. It is comprised of an aptitude test in which the student demonstrates the competences acquired in the previous modules.

SUBJECTS: Compulsory

END OF COURSE PROJECT IN FISHING

Contents:

Final writing of the original exercise which consists of a comprehensive project in the field of professional engineering, where the competences acquired in the training are synthesised. If possible, the project should correspond to a real case which can be presented in the fulfilment of the complementary external practical training. The project shall be related to the graduate's proper onboard future tasks, i.e., technical administration of the navigation and the commercial exploitation of the vessel adapted to its maritime environment.

Learning outcomes:

Proposal, development and defence of a project.

10. 2. TEACHING-LEARNING PROCESS WITH MODULES

10. 2.1. Basic training module

SUBJECTS: Basic

The basic training module is comprised of those subjects which will provide students sufficient and necessary knowledge to acquire future skills and abilities that will allow them to address the following modules with the guarantee of improvement.

All subjects of the module shall be evaluated with similar procedures:

- The training activities which introduce knowledge and individual study shall be evaluated with written tests.
- Lab tests shall be performed to verify the acquisition of the practical competences of the subject.
- The basic training to solve problems and cases shall be evaluated with the presentation and defence of the required work.
- The evaluation shall be continuous and it shall take into consideration the knowledge and competences' proposals and recovery mechanisms. All that, during the module period.

- The training activity of the resolution of problems or cases of gradual difficulty suggested in the subjects shall be evaluated from a specific competence profile which considers the documentation delivered, as well as the work developed and the skills and attitudes shown by the students and the work team.

10.2.2. Specific training module in fishing

SUBJECTS: Compulsory

The specific training module is comprised of those subjects which will provide students sufficient and necessary knowledge to acquire future skills and abilities which are stipulated in the international conventions (SCTW-F/95, IMO, which are common to Marine Engineering, Nautical Engineering and Maritime Transport and Fishing). All subjects of the module shall be evaluated with similar procedures:

- A continuous evaluation shall be carried out for each subject that forms the specific training module in fishing
- The training activities which introduce knowledge and procedures, and of individual study, shall be evaluated through written and/or oral tests
- The training activities in which students do exercises and practical training shall be evaluated from a competence programme specifically elaborated for such end, which considers the work developed by the student, the documentation delivered (reports), the oral expression capacity, and the skills and attitudes shown during the acquisition of competences and learning outcomes
- In the evaluation of the subjects of this module, the indications made by the STCW-F 78/95 international convention, as amended, shall be taken into consideration

10.2.3. Specific training module

SUBJECTS: Compulsory and optional

The specific training module is comprised of those subjects which will provide students sufficient and necessary knowledge to acquire future skills and abilities which are stipulated in the international conventions (SCTW- F/95, IMO).

All the subjects of this module shall be evaluated and they shall have a methodology and tutoring with similar procedures, except for the practical training subjects:

- To be able to enrol in any subject which belongs to this specific training module, it is necessary to have passed, at least, the basic correlative subjects of the field of engineering. The objective of this requirement is that this module is carried out with enough knowledge of the basic subjects of the field of engineering, which are necessary to be able to assimilate the teaching of the corresponding module.

- A continuous evaluation shall be carried out for each subject that forms the specific training module.
- The training activities which introduce knowledge and procedures, and of individual study, shall be evaluated through written and/or oral tests. The training activities in which exercises and practical training are done shall be evaluated from a competence programme specifically elaborated for such end, which considers the work developed, the documentation delivered (reports), the oral expression capacity, and the skills and attitudes shown during the acquisition of competences and learning outcomes.
- In the evaluation of the subjects of this module, the indications made by the STCW-F 78/95 international convention, as amended, shall be taken into consideration.
- In subjects with a practical component (workshops, labs, simulators), the attendance to practical training is demanded.
- In subjects of professional practices, the methodology, tutoring and evaluation is specific because the student is embarked and the enrolling in vessels is competence of the Maritime Administration.
    - To attend these subjects, the student must have passed the first two years. Then, the necessary student certificate to enrol is issued
    - The student must at least have basic the training professional speciality certificate approved, which is obtained upon the completion of the subject: Maritime safety, fire-fighting and survival at sea
    - As a prerequisite, the student must have the seaman's registration book (formality to be completed in the corresponding Maritime Authority)
    - The student must also have the approval of the maritime embarking medical recognition performed by the Marine Organism which corresponds to the applicable regulations
    - Before embarking, the training registration book is issued to the student. Said book consists of the practical trainings the students must complete onboard according to the related descriptors in the subjects

- To ensure the students embarking, the university must subscribe the necessary conventions with fisheries companies, as applicable
- Tutoring must be performed through distance learning by means of the virtual teaching campus which the university designates or makes available to the students
- The evaluation cannot be performed in a continuous basis, which is why upon termination of the practical training and based on the training registration book, the students shall demonstrate they have reached the respective proposed learning outcomes

10.2.4. End of course work module

This module is addressed in the fourth course. It is comprised of an aptitude test in which the student demonstrates the competences acquired in the previous modules. This module has the following methodology, tutoring and evaluation: to attend this subject, the student must have passed the first three years.

- It shall consist of an end-of-course work which, in turn, shall consist of a professional comprehensive project
- It may correspond to a real case which can be presented in the fulfilment of the complementary external practical training
- The degree programme Academic Committee shall assign a tutor for this subject. Tutoring may be performed through distance learning or in person
- The evaluation cannot be performed in a continuous basis. It shall be performed in a ceremony before an examining board appointed for such purpose, and the students shall defend the project description presented

10.2.5. Relationship between competences and the training activities of each module or subject.

The main objective of the Bachelor's Degree in Fishing is to obtain the corresponding professional certificates (Deck Officer and Captain for those with a Nautical and Fishing Degree).

The STCW 78/95 convention (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended, 1995) establishes the functions, competences, knowledge, understanding and skills which are applicable to these professional certifications. In the objectives of the programmes, the competences and knowledge the students must have, once the corresponding subject is approved, are listed.

In turn, taking into consideration that the Higher Education Law No. 24.521 establishes that the current general guidelines of the corresponding certifications, not only academic (Bachelor of Fishing) but also professional (Fishing Captain), shall be applied to university certifications linked to regulated professional activities.

The competences cover the knowledge relating to the professional activity and that obtained as a result of learning. These competences are decisive for the identification of certifications.

These competences can be classified in:

- Disciplinary and academic competences which result directly from university training (learning outcomes). These competences respond to the knowledge obtained and the methods used to learn
- Professional competences which describe capabilities and proceedings to be developed by a graduate in the labour market. Professional competences are centred in the job position to be filled and in the work performance field
- The academic competences which, at the very least, shall be acquired in each module are described below

Module	Credits.	COMPETENCES WHICH MUST BE ACQUIRED
Basic common training	60	Capacity and comprehension for the resolution of: • Mathematical problems on linear algebra; geometry, differential and integral calculus; numeric method and algorithm; statistics and optimisation • General laws of physics: mechanics, thermodynamics, fields and waves, and electromagnetism • Computers and networks, operating systems, application and use of databases and computer applications • Basic knowledge of general chemistry, organic and inorganic chemistry and their applications in engineering • Representation techniques, spatial approach, standarisation, computer-aided design, fundamentals of industrial design • Fundamentals of business administration. Organisation, management, marketing and financing of maritime companies • Knowledge of maritime technical English

Nautical common training	48	Knowledge, use and application on vessels of the principles of: • Circuits' theory and marine electrical machines • Electronics applied to the vessel and maritime facilities • Automatic devices and control methods applicable to the vessel and maritime facilities • Environmental technologies and sustainability in the marine environment • Safety and protection of the vessel. Fire-fighting and survival. Prevention and fight against pollution • Quality management and safety systems applied to the vessel. Vessel management audits • Maritime health training • Vessel theory • Naval construction • Main, auxiliary and propulsion systems of the vessel. Cold and air conditioning • Maritime legislation and standards
Fishing specific subjects	60	Knowledge and capacity to apply and calculate: • Navigation for positioning, direction, time, speed and distance determination • Weather and atmospheric sciences for weather navigation and synoptic navigation • Different types of tides by different existing methods and their energetic use • Loading/unloading, stowage and securing, embarking/disembarking and protection of the goods • Measurement and control systems for the maintenance of the cargo and the atmospheres of the cargo spaces • Special transports and hazardous goods • Radiocommunications' systems. Global Maritime Distress Safety System (GMDSS) • Organisation and management of projects of repair, installation, modification, maintenance of cargo equipment, stowage and security systems, and loading and auxiliary means of the vessel • Cold and air conditioning • Operation and maintenance of all existing loading and navigation systems aboard a vessel • Mooring manoeuvre, harbour towing manoeuvre

		and docking vessels • Manoeuvre in restricted waters • The principles of automatic regulation and its application to the automation of maritime equipment and systems • Marine shelves, facilities for fish farming and aquaculture • Energetic optimisation systems applied to marine facilities • Systems of repair and reconstruction for the elements of navigation equipment, maritime safety and types of breakdowns • Design and management of energetic optimisation systems applied to marine facilities • Inspection and classification societies • Quality management applied to the vessel
External practical training	24	External academic practical training which can be validated by necessary practical training for the acquisition of the professional competences of the Bachelor's Degree in Nautical Engineering and Maritime Transport
End of course project	12	Original exercise which consists of a comprehensive project in the field, of professional characteristics, where the competences acquired in the training are synthesised. If possible, the project should correspond to a real case which can be presented in the fulfilment of the complementary external practical training

Below are listed the main profiles and competences, whether academic or professional, which prepare students who have passed the acquisition, understanding and application of knowledge given by the Bachelor's Degree in Nautical Science and Fishing, that will give them the capacity of gathering and interpreting relevant data to issue value judgements within the field of application:

ACADEMIC COMPETENCES	
1	Capacity and comprehension for the resolution of problems (basic training)
2	Knowledge, use and application of different principles on vessels (nautical training)
3	Knowledge and capacity to apply and calculate (specific training)

The relationship between these competences with the proposed subjects of the syllabus of the Bachelor's Degree in Fishing is the following:

SUBJECT	COMPETENCE		
	1	2	3
Mathematical fundamentals applied to engineering	🗁		
Physical fundamentals applied to engineering	🗁		
Graphic representation	🗁		
IT fundamentals and applications	🗁		
Chemical fundamentals applied to the vessel	🗁	🗁	
Legislation and regulations	🗁		
Business	🗁		
Maritime technical English	🗁		
Fundamentals of naval construction and vessel theory		🗁	
Electrical engineering and electronics		🗁	
Maritime safety, fire-fighting and survival at sea		🗁	
Maritime medicine		🗁	
Fundamentals and automatic equipment of the vessel		🗁	
Auxiliary systems of the vessel		🗁	
Practical training on naval construction and vessel theory		🗁	🗁
Coastal navigation		🗁	🗁
Advanced coastal navigation			🗁
Astronomical navigation			🗁
Practical training on astronomical navigation			🗁
Practical training on advanced astronomical navigation			🗁
Marine pollution and safety			🗁
Radioelectronic navigation			🗁
Practical training on radioelectronic navigation			🗁
Practical training on radiocommunications			🗁
Meteorology			🗁

Practical training on meteorological navigation			🗁
Manoeuvre and stowage			🗁
Practical training on manoeuvre and stowage			🗁
Practical training on special maritime transports			🗁
IMO's standarised English			🗁
Harbour operations			🗁
Technical inspection of breakdowns		🗁	🗁
Radiocommunications systems (SMSSM)			🗁
International Maritime Agreements and Civil liabilities for damages			🗁
End-of-course project for the Bachelor's Degree in Fishing	🗁	🗁	🗁

With regard to the general academic objectives of the syllabus of the Bachelor's Degree in Fishing, the following eight basic competences are suggested.

BASIC COMPETENCES	
1	Acquisition, understanding and application of knowledge in a field of study based on the general secondary education and which is usually found at a level that, although it is supported by advanced textbooks, it also includes several aspects which imply knowledge deriving from the forefront of the field of study
2	Application of their knowledge to their work or profession in a professional way and acquisition of competences which are usually shown by means of an elaboration and defence of arguments and the problem solving within their field of study
3	Capacity to gather and interpret relevant data (normally within their field of study) to make judgements which include a reflection on relevant social, scientific-technical and ethical topics
4	Transmission of information, ideas, problems and solutions to a specialised and non-specialised public
5	Development of those learning skills which are necessary to undertake further studies with a high level of autonomy
6	Knowledge of basic and technological subjects that train them to learn new methods and theories and provide them with a great versatility to adapt to new situations

7	Capacity to communicate. Organised exposition of written and oral ideas, based on respect for the fundamental and equality rights between men and women, as well as on the promotion of human rights and the very values of a culture of peace and democracy
8	Capacity to work in teams, in a multilingual and multidisciplinary environment, based on respect for the fundamental and equality rights between men and women. Being capable of generating reports for the transmission of knowledge and outcomes. Capacity to learn and update themselves permanently

The relationship between these competences with the proposed subjects of the syllabus of the Bachelor's Degree in Fishing is the following:

SUBJECT	BASIC COMPETENCES							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mathematical fundamentals applied to engineering	🗁	🗁			🗁	🗁		
Physical fundamentals applied to engineering	🗁	🗁			🗁	🗁		
Graphic representation	🗁	🗁			🗁	🗁		
IT fundamentals and applications		🗁			🗁	🗁		
Chemical fundamentals applied to the vessel	🗁	🗁			🗁	🗁		
Legislation and regulations			🗁		🗁	🗁	🗁	🗁
Business			🗁		🗁			🗁
Maritime technical English					🗁	🗁	🗁	🗁
Fundamentals of naval construction and vessel theory		🗁			🗁	🗁		
Electrical engineering and electronics		🗁			🗁	🗁		
Maritime safety, fire-fighting and survival at sea					🗁	🗁		🗁

Maritime medicine			🗁					
Fundamentals and automatic equipment of the vessel		🗁			🗁	🗁		
Auxiliary systems of the vessel		🗁	🗁		🗁	🗁		
Practical training on naval construction and vessel theory		🗁			🗁			🗁
Coastal navigation	🗁		🗁		🗁	🗁		
Advanced coastal navigation			🗁		🗁	🗁		
Astronomical navigation			🗁		🗁	🗁		
Practical training on astronomical navigation		🗁			🗁			🗁
Practical training on advanced astronomical navigation		🗁			🗁			🗁
Marine pollution and safety			🗁		🗁	🗁		🗁
Radioelectronic navigation			🗁		🗁	🗁		🗁
Practical training on radioelectronic navigation		🗁			🗁			🗁
Practical training on radiocommunications		🗁			🗁			🗁
Meteorology			🗁		🗁	🗁		
Practical training on meteorological navigation		🗁			🗁			🗁
Manoeuvre and stowage			🗁		🗁	🗁		
Practical training on manoeuvre and stowage		🗁	🗁		🗁			🗁
Practical training on special maritime transports		🗁			🗁			🗁
IMO's standarised English				🗁		🗁	🗁	🗁

Harbour operations			🗁		🗁			🗁
Technical inspection of breakdowns	🗁				🗁	🗁		
Radiocommunications systems (SMSSM)	🗁			🗁	🗁		🗁	🗁
International Maritime Agreements and Civil liabilities for damages	🗁		🗁		🗁	🗁		
End of course project for the Bachelor's Degree in Nautical Science and Fishing	🗁	🗁	🗁	🗁			🗁	

With regard to the specific academic objectives of the syllabus of the Bachelor's Degree in Fishing, the following eight specific competences are suggested.

SPECIFIC COMPETENCES	
1	Application of navigation techniques for positioning, direction, time, speed and distance determination
2	Knowledge of the calculus of different types of tides by means of different existing methods
3	Application of the different techniques for weather and synoptic navigation
4	Application of techniques of loading, transport, conservation and manipulation of all types of goods, taking into account the optimisation and safety in merchant vessels
5	Mooring manoeuvre, harbour towing manoeuvre and docking of vessels. Manoeuvre in restricted waters
6	Radiocommunications systems. Global Maritime Distress Safety System (GMDSS)
7	Application of different techniques for the marine environment pollution prevention. Compliance with the international standards
8	Operation of fire-fighting, survival and abandonment of ship systems
9	Operation of food conservation systems in the maritime transport
10	Knowledge of the development, application, inspection, optimisation and construction of the vessel

11	Operation of air conditioning, ventilation, refrigeration and combustion systems

And its relationship with the subjects of the syllabus of the Bachelor's Degree for the basic and common fishing modules is:

SUBJECT	SPECIFIC COMPETENCES										
BASIC MODULE	1	2	3	4	5	6	7	8	9	10	11
Mathematical fundamentals applied to engineering				🗁							
Physical fundamentals applied to engineering					🗁				🗁		
Graphic representation											
IT fundamentals and applications											
Chemical fundamentals applied to the vessel				🗁				🗁			
Legislation and regulations											
Business											
Maritime technical English	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁
COMMON NAUTICAL MODULE IN FISHING	1	2	3	4	5	6	7	8	9	10	11
Fundamentals of naval construction and vessel theory				🗁						🗁	🗁
Electrical engineering and electronics				🗁		🗁					

Maritime safety, fire-fighting and survival at sea							🗁	🗁		🗁	
Maritime medicine											
Fundamentals and automatic equipment of the vessel	🗁			🗁		🗁			🗁		
Auxiliary systems of the vessel				🗁	🗁				🗁	🗁	🗁

And its relationship with the subjects of the syllabus of the Bachelor's Degree for the specific module of Bachelor in Fishing is:

SUBJECT	BASIC COMPETENCES										
SPECIFIC MODULE FOR BACHELOR'S DEGREE IN FISHING	1	2	3	4	5	6	7	8	9	10	11
Practical training on naval construction and vessel theory				🗁				🗁		🗁	🗁
Coastal navigation	🗁	🗁									
Advanced coastal navigation	🗁	🗁									
Astronomical navigation	🗁	🗁									
Practical training on astronomical navigation	🗁	🗁									
Practical training on advanced astronomical navigation	🗁	🗁									
Marine pollution and safety						🗁	🗁	🗁			
Radioelectronic navigation	🗁					🗁					

Practical training on radioelectronic navigation	🗁					🗁					
Practical training on radiocommunications	🗁										
Meteorology			🗁								
Practical training on meteorological navigation			🗁								
Manoeuvre and stowage				🗁	🗁				🗁		
Practical training on manoeuvre and stowage				🗁	🗁						
Practical training on special maritime transports				🗁							🗁
IMO's standarised English	🗁	🗁	🗁	🗁	🗁	🗁	🗁				
Harbour operations				🗁	🗁						
Technical inspection of breakdowns										🗁	
Radiocommunications systems (SMSSM)	🗁					🗁					
International Maritime Agreements and Civil liabilities for damages							🗁			🗁	
End of course project for the Bachelor's Degree in Fishing.	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁

The International Maritime Organisation's (IMO) Convention on Standards of Training, Certification and Watchkeeping for Seafarers (1978), as amended in 1995 (STCW Convention) has the following competences for the Bachelor's Degree in Fishing graduates:

COMPETENCES OF THE STCW-F CODE	
1	Capacity to serve as officer in civilian vessels, with no limitations, once the requirements demanded by the Maritime Organisation are exceeded
2	Capacity to exercise command in fishing vessels of up to 5000 GT once the requirements demanded by the Maritime Organisation are exceeded
3	Capacity to determine the position of the vessel by means of different navigation methods
4	Capacity to plan and control meteorological and oceanographic track
5	Capacity to perform a safe navigational watch
6	Capacity to use correctly the different radionavigation appliances
7	Capacity to answer correctly to different emergency situations
8	Capacity to answer properly to a distress signal at sea
9	Capacity to correctly employ IMO's Standard Marine Navigational Vocabulary in English
10	Capacity to perform with precision the different vessel manoeuvres in rescue, berth or mooring situations
11	Capacity to load, manipulate and stow properly different transportable goods in a vessel
12	Capacity to maintain the good stability of the vessel
13	Capacity to keep the safety and protection of people onboard
14	Capacity to protect the marine environment and apply environmental sustainability criteria to the maritime transport
15	Capacity to monitor the compliance of legislative requirements
16	Other (continue the list and revise those which are present)

And the relationship of the Training Code with the subjects of the syllabus of the Bachelor's Degree in Fishing proposed in this work by the Degree Programme's Academic Committee is illustrated below.

RELATION BETWEEN THE TRAINING CODE AND THE SUBJECTS OF THE SYLLABUS OF THE BACHELOR'S DEGREE IN FISHING

SUBJECT	STCW-F COMPETENCES														
BASIC MODULE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Mathematical fundamentals applied to engineering	🗁	🗁	🗁								🗁	🗁			
Physical fundamentals applied to engineering	🗁	🗁	🗁	🗁		🗁					🗁	🗁			
Graphic representation	🗁	🗁	🗁	🗁								🗁			
IT fundamentals and applications	🗁	🗁	🗁	🗁	🗁	🗁				🗁	🗁	🗁			
Chemical fundamentals applied to the vessel	🗁	🗁									🗁			🗁	
Legislation and regulations	🗁	🗁					🗁						🗁	🗁	🗁
Business	🗁	🗁									🗁				🗁
Maritime technical English	🗁	🗁			🗁	🗁		🗁	🗁				🗁		

COMMON MODULE IN FISHING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Fundamentals of naval construction and vessel theory	🗁	🗁									🗁	🗁			🗁
Electrical engineering and electronics	🗁	🗁				🗁				🗁	🗁	🗁			
Maritime safety, fire-fighting and survival at sea	🗁	🗁			🗁		🗁	🗁					🗁		🗁
Maritime medicine													🗁		
Fundamentals and automatic equipment of the vessel	🗁	🗁				🗁				🗁	🗁	🗁			
Auxiliary systems of the vessel	🗁	🗁								🗁	🗁	🗁	🗁		

SUBJECT	STCW-F COMPETENCES														
SPECIFIC MODULE FOR BACHELOR'S DEGREE IN FISHING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Practical training on naval construction	🗁	🗁									🗁	🗁			🗁

AACPYPP

and vessel theory															
Coastal navigation	🗁	🗁	🗁												
Advanced coastal navigation	🗁	🗁	🗁												
Astronomical navigation	🗁	🗁	🗁												
Practical training on astronomical navigation	🗁	🗁	🗁												
Practical training on advanced astronomical navigation	🗁	🗁	🗁												
Marine pollution and safety							🗁						🗁	🗁	
Radioelectronic navigation						🗁			🗁						
Practical training on radioelectronic navigation						🗁			🗁						
Practical training on radiocommunic ations					🗁		🗁	🗁	🗁						
Meteorology				🗁											
Practical training on meteorological navigation				🗁											

Manoeuvre and stowage										🗁	🗁				
Practical training on manoeuvre and stowage										🗁	🗁				
Practical training on special maritime transports											🗁			🗁	🗁
IMO's standarised English					🗁			🗁							
Harbour operations										🗁	🗁				🗁
Technical inspection of breakdowns										🗁				🗁	🗁
Radiocommuni cations systems (SMSSM)					🗁	🗁		🗁	🗁						
International Maritime Agreements and Civil liabilities for damages															🗁
End of course project for the Bachelor's Degree in Fishing	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁

With regard to cross-curricular competences, the Syllabus Elaboration Commission proposed and approved the following:

CROSS-CURRICULAR COMPETENCES	
1	Capacity for analysis and synthesis
2	Capacity for organisation and planning
3	Knowledge of a foreign language
4	Problem solving
5	Decision making
6	Teamwork
7	Cross-discipline teamwork
8	Interpersonal relations' skills
9	Critical thinking
10	Ethical commitment
11	Self-learning
12	Adaptation to new situations
13	Creativity
14	Leadership
15	Motivation for quality
16	Sensitivity towards environmental topics

And the relationship between the subjects and cross-curricular competences is the following:

SUBJECT	CROSS-CURRICULAR COMPETENCES															
BASIC MODULE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mathematical	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	

fundamentals applied to engineering																
Physical fundamentals applied to engineering	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Graphic representatio n	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
IT fundamentals and applications	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Chemical fundamentals applied to the vessel	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Legislation and regulations	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Business	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Maritime technical English	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
COMMON NAUTICAL MODULE IN FISHING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Fundamental s of naval construction and vessel theory	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Electrical engineering and electronics	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	

Maritime safety, fire-fighting and survival at sea	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Maritime medicine	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Fundamentals and automatic equipment of the vessel	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Auxiliary systems of the vessel	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	

SPECIFIC MODULE FOR BACHELOR'S DEGREE IN FISHING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Practical training on naval construction and vessel theory	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Coastal navigation	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Advanced coastal navigation	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Astronomical navigation	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Practical training on astronomical navigation	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	

Practical training on advanced astronomical navigation	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Marine pollution and safety	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁
Radioelectronic navigation	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Practical training on radioelectronic navigation	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Practical training on radiocommunications	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Meteorology	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Practical training on meteorological navigation																
Manoeuvre and stowage	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Practical training on manoeuvre and stowage	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Practical training on special maritime transports	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
IMO’s standarised English	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	

Harbour operations	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Technical inspection of breakdowns	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
Radiocommunications systems (SMSSM)	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
International Maritime Agreements and Civil liabilities for damages	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	
End-of-course project for the Bachelor's Degree in Fishing	🗁	🗁		🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	🗁	

The following table shows the relationship between the subjects in the proposed Syllabus, as well as its assignment to areas of knowledge and university departments that teach them:

BASIC MODULE		
SUBJECT	AREAS OF KNOWLEDGE	DEPARTMENTS
Mathematical fundamentals applied to engineering	Mathematical analysis	Mathematical analysis
Physical fundamentals applied to engineering	Applied physics	Basic physics
Graphic representation	Graphic representation in engineering	Graphic representation in architecture and engineering
IT fundamentals and applications	Applied physics	Fundamental and experimental physics

Chemical fundamentals applied to the vessel II	Organic chemistry; chemical engineering; analytical chemistry, physical chemistry; inorganic chemistry; organic chemistry	Organic chemistry; chemical engineering; analytical chemistry, physical chemistry and inorganic chemistry
Legislation and regulations	Trade law	International, procedural and trade law
Business	Business organisation	Economy and business management
Maritime technical English	English philology	English and German philology

COMMON MODULE		
SUBJECT	AREAS OF KNOWLEDGE	DEPARTMENTS
Fundamentals of naval construction and vessel theory	Naval construction	Maritime engineering
Electrical engineering and electronics	Electrical engineering	Basic physics
Maritime safety, fire-fighting and survival at sea	Naval construction Navigation sciences and techniques	Maritime engineering Navigation sciences and techniques
Maritime medicine	Preventive medicine and public health	Obstetrics, ginecology, pediatrics, preventive medicine and public health, toxicology and legal and forensic medicine
Fundamentals and automatic equipment of the vessel	Applied physics, system and automatic engineering	Fundamental and experimental physics, system and automatic engineering
Auxiliary systems of the vessel	Naval construction	Maritime engineering

SPECIFIC MODULE FOR BACHELOR'S DEGREE IN FISHING		
SUBJECT	AREAS OF KNOWLEDGE	DEPARTMENTS
Practical training on naval construction and vessel theory	Naval construction	Maritime engineering
Coastal navigation	Navigation sciences and techniques	Navigation sciences and techniques
Advanced coastal navigation	Navigation sciences and techniques	Navigation sciences and techniques
Astronomical navigation	Navigation sciences and techniques	Navigation sciences and techniques
Specific fisheries	Fisheries techniques	Fisheries biology and fisheries techniques

SPECIFIC MODULE		
Practical training on astronomical navigation	Navigation sciences and techniques	Navigation sciences and techniques
Practical training on advanced astronomical navigation	Navigation sciences and techniques	Navigation sciences and techniques
Marine pollution and safety	Navigation sciences and techniques	Navigation sciences and techniques
Radioelectronic navigation	Navigation sciences and techniques	Navigation sciences and techniques
Practical training on radioelectronic navigation	Navigation sciences and techniques	Navigation sciences and techniques
Practical training on radiocommunications	Navigation sciences and techniques	Navigation sciences and techniques
Meteorology	Fundamental and experimental physics, Electronics and systems.	Fundamental and experimental physics, Electronics and systems.

Practical training on meteorological navigation	Navigation sciences and techniques	Navigation sciences and techniques
Manoeuvre and stowage	Navigation sciences and techniques	Navigation sciences and techniques
Practical training on meteorological navigation	Navigation sciences and techniques	Navigation sciences and techniques
Practical training on special maritime transports	Navigation sciences and techniques	Navigation sciences and techniques
IMO's standarised English	English philology	English and German philology
Harbour operations	Navigation sciences and techniques	Navigation sciences and techniques
Technical inspection of breakdowns	Graphic representation in engineering	Graphic representation in architecture and engineering
Radiocommunications systems (SMSSM)	Navigation sciences and techniques	Navigation sciences and techniques
International Maritime Agreements and Civil liabilities for damages	Private international law	International, procedural and trade law
End-of-course project for the Bachelor's Degree in Fishing.	All the Areas which participate in the Syllabus	All the Departments which participate in the Syllabus

10.3. RELATIONSHIP BETWEEN THE COMPETENCES TO BE ACQUIRED IN PROFESSIONAL SPECIALITY COURSES AND THE TRAINING ACTIVITIES OF EACH SUBJECT

The speciality professional certificates described in Section 4.3 of this project description are related, with regard to knowledge, skills and competences to acquire, with the following subjects:

Certificates	Competences, knowledge and abilities	Subjects
Basic training (Section A-VI/1.2 and B-VI/I of the STCW Code)	Survival at sea in the event of abandonment of ship	Maritime safety, fire-fighting and survival at sea
	Prevention and fire-fighting	
	Safety at work and social responsibilities	
	Adoption of minimal competence regulations as regards first aids	Maritime medicine
Familiarisation in tankers (Section A-V/1 and BV/I of the STCW Code)	Cargo characteristics	Chemical fundamentals applied to the vessel
	Explanation of toxicity principles and concepts	Maritime medicine
	Explosion, ignition and reactivity risks prevention	Maritime safety, fire-fighting and survival at sea
		Chemical fundamentals applied to the vessel
	Personnel safety and protection equipment	Maritime safety, fire-fighting and survival at sea
	Pollution prevention	
Oil tankers (Section A-V/1 and BV/I of the STCW Code)	Regulations and Code of Practice	Maritime safety, fire-fighting and survival at sea
		Maritime legislation and regulations
	Project and equipment of oil tankers	Fundamentals of naval construction and vessel theory
		Auxiliary systems of the vessel
	Cargo characteristics	Chemical fundamentals applied to the vessel
	Operations performed in the vessel	Fundamentals of naval construction and vessel theory
		Maritime safety, fire-fighting and survival at sea
		Auxiliary systems of the vessel

	Repair and maintenance: precautions, safety, controls and procedures	Auxiliary systems of the vessel
	Emergency operations	Maritime safety, fire-fighting and survival at sea
		Maritime medicine

Certificates	Competences, knowledge and abilities	Subjects
Gas tankers (Section A-V/1 and BV/I of the STCW Code)	Regulations and Code of Practice	Maritime safety, fire-fighting and survival at sea
		Maritime legislation and regulations
	Fire-fighting	Maritime safety, fire-fighting and survival at sea
	Pollution prevention	
	Safety practices and corresponding equipment	
	Emergency procedures	
	Basic notions of physics and chemistry with reference to the transport of gases	Physical fundamentals applied to engineering
		Chemical fundamentals applied to the vessel
	Operations performed in the vessel: general principles and procedures	Fundamentals of naval construction and vessel theory
		Auxiliary systems of the vessel
	Health risks	Maritime medicine
	Cargo handling system	Auxiliary systems of the vessel
	Cargo retention	Fundamentals of naval construction and vessel theory

	Procedures related to operations performed in the vessel	Auxiliary systems of the vessel
Chemical tankers (Section A-V/1 and BV/I of the STCW code)	Regulations and Code of Practice	Maritime safety, fire-fighting and survival at sea
		Maritime legislation and regulations
	Project and equipment of chemical tankers	Fundamentals of naval construction and vessel theory
		Auxiliary systems of the vessel
	Cargo characteristics	Chemical fundamentals applied to the vessel
	Operations performed in the vessel	Fundamentals of naval construction and vessel theory
		Maritime safety, fire-fighting and survival at sea
		Auxiliary systems of the vessel
	Repair and maintenance: precautions, safety, controls and procedures	Auxiliary systems of the vessel
	Emergency operations	Maritime safety, fire-fighting and survival at sea
		Maritime medicine

Certificates	Competences, knowledge and abilities	Subjects
Basic	Familiarisation in passenger	Maritime safety, fire-fighting

Certificate for passenger vessels (section A-V/2 of the STCW Code)	vessels	and survival at sea
		Fundamentals of naval construction and vessel theory
		Maritime legislation and regulations
	Safety for the personnel in direct contact with passengers	Maritime safety, fire-fighting and survival at sea
	Crowd management	
	Emergencies management	
Ro-Ro passenger vessels and passenger vessels which are different from Ro-Ro vessels (section A-V/2 and AV/ 3 of the STCW Code)	Familiarisation with ro-ro vessels	Maritime safety, fire-fighting and survival at sea
		Fundamentals of naval construction and vessel theory
	Safety for the personnel in contact	Maritime safety, fire-fighting and survival at sea
	Crowd management	
	Emergencies management	
	Passengers safety, loading and integrity of the hull	Maritime safety, fire-fighting and survival at sea
		Fundamentals of naval construction and vessel theory

10.4. ACADEMIC PERSONNEL

10.4.1. Teaching staff and other necessary and available human resources

In order to carry out the proposed syllabus, as it was seen in this project description, the Official Certification of Bachelor in Fishing is an adaptation of the current certifications approved by the National Ministry of Education in Resolution No 1489/99, which is why most part of the teaching and researching personnel necessary to carry out the proposed plan is already available.

In general, there are some cases of subjects which are not sufficiently oriented towards the professional profile and which are excessively loaded with general concepts of scarce application. However, they are probably easier for non-professional professors to explain, especially with regard to what is necessary to comply with the load of a Bachelor’s Degree Programme.

In any case, the necessary personnel to cover future needs in the event of permits, leaves of absence, temporal or permanent disabilities or retirements, shall be chosen through a merit-based competition in which, at all times, the policy of merit and ability, equal opportunities and non-discrimination shall be respected.

10.4.2. Available teaching staff

It must be analysed whether the teaching staff of the current Fishing National School (which is taken as reference) reflects a percentage of professors with PhD qualifications, depending on the need for a degree programme of these characteristics, as well as professionals with an equal or higher university degree than the one proposed to be taught.

It will also be necessary to study in depth the number of professors that will teach the Bachelor’s Degree in Fishing during the period 2019/20 (date proposed for its teaching). Within this, a correct distribution by age must be established, which indicates the general tendency of academic units with a high percentage of professors above 50 years of age. This is not a favourable characteristic since a staff of younger teachers is proposed.

In relation to the dedication time (full time and part time), the results in similar degree programmes reflect that 55% of professors who have PhD qualifications work full time, whereas 29% of those who do not have PhD qualifications work full time.

The university experience shows that 77.3% of the teaching staff works full time, whereas the remaining 18.2% works part time (six hours). It is estimated that this is an acceptable relation between the teaching staff exclusively engaged in teaching versus the teaching staff engaged in an external professional activity besides teaching.

Meanwhile, 77.3% of this teaching staff dedicates between 26% and 50% of their teaching hours to teaching a degree programme. It should also be borne in mind that most part of these professors also lecture in other similar degree programmes, which is why the totality of their teaching hours is almost spent on certifications of this area.

10.4.3. Academic personnel

The academic personnel (supposing it comes from the current Higher Fishing School or the National Technical University of Mar del Plata) is considered fit for the objectives of the training programme and the requirement of their disciplines. The number of professors of the nautical certifications in the present course (2019/20) is enough to cover the educational offer. Moreover, it is estimated that in a convergence process with the training plan created for the degree certifications of this proposal, the human resources of the university which accepts the challenge to implement this degree programme may be optimised.

The academic certification of the teaching staff must be of a similar level of that which is taught. Experience indicates that the vast majority (70%) of the professors work full time, whereas the rest works part time, i.e. six hours. It is estimated that this is an acceptable relation between the teaching staff exclusively engaged in teaching versus the teaching staff engaged in an external professional activity besides teaching.

The professional experience of the teaching staff related to the certification proposed, considering it will be developed in cooperation with the Association, shall favour a vision close to the reality of the certification and the profession of fishermen.

Due to the peculiarities of the professional environment, students must perform certain academic and educational practical trainings onboard a teaching vessel, which is established in the training programme. For this reason, professionals who act like collaborators and not as teachers, shall be available.

10.4.4. Necessary teaching staff

As it was mentioned before, given that the new proposed certification of Bachelor of Fishing is a restructuring/update of the already existing certification for the Merchant Navy and the Fluvial Navy, even the National Fishing School and its available academic personnel are fit to assume the position of teacher of this new certification. All of this, assuming that 1 credit equals ten hours of classroom teaching, although methodological adaptations to cover distance teaching in the new credit system may be required.

The number of teachers currently involved in the degree programme (informal) is 21, according to the website. Likewise, part of the teaching staff of engineering of the National Technical University, composed of approximately six professors, might take teaching hours in the degree programme.

If we compare the current training programme of the National Fishing School, we will see that the teaching-learning process, which is necessary to cover the requirements currently demanded for the following certifications, is met in the proposed degree programme plan:

- Fishing Pilot. Course approved by Provision No. 09/2010 of the Subsecretariat of Ports and Waterways
- Marine Engine Operator. Course approved by Provision No. 09/2010 of the Subsecretariat of Ports and Waterways
- Sailor. Course approved by Provision No. 6/2001 of the Subsecretariat of Rail, Inland Waterway and Maritime Transport. Duration: 16 weeks
- Junior Fishing Skipper. Course approved by Provision No. 51/2001 of the Subsecretariat of Rail, Inland Waterway and Maritime Transport. Duration: 9 weeks
- Coastal Fishing Skipper. Course approved by Provision No. 07/2001 of the Subsecretariat of Rail, Inland Waterway and Maritime Transport. Duration: 32 weeks
- Fishing Pilot. Course approved by Provision No. 07/2001 of the Subsecretariat of Rail, Inland Waterway and Maritime Transport. Duration: 32 weeks
- First Officer. Course approved by Provision No. 51/2001 of the Subsecretariat of Rail, Inland Waterway and Maritime Transport. Duration: 24 weeks
- Fishing Captain. Course approved by Provision No. 51/2001 of the Subsecretariat of Rail, Inland Waterway and Maritime Transport. Duration: 12 weeks

Separately, upon the proposition of the Degree Programme Plan within the scope of Art. 42 of the National Higher Education Law No. 24.521, degrees that are officially recognised shall certify the academic training obtained and shall authorise the recipient’s professional practice in the national territory without detriment to the regulatory power that corresponds to the provinces.

The knowledge and capacities certified by said degree, as well as the activities the degree recipient is qualified to perform, shall be determined and made public by universities. The corresponding syllabuses, shall respect the minimum credit hours established by the Ministry of Culture and Education jointly with the Universities Council.

ANNEXES

ANNEX 1: LIST OF FISHING VESSELS

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M^3)	YEAR OF CONSTRUCTION
1074	10 DE NOVIEMBRE	WET-FISH VESSEL	25.6	6.5	165	1993
607	7 DE DICIEMBRE	WET-FISH VESSEL	27.2	6.5	124	1987
1008	ALCO BARI	BEAM TRAWLER	38.6	7.45	220	1967
1741	ALDEBARAN	WET-FISH VESSEL	26.4	6.24	155	1965
181	ALTALENA	WET-FISH VESSEL	55.8	9.05	430	1960
2906	ALTAR	COASTAL VESSEL	19.09	6.6	80	2012
2454	ÁLVAREZ ENTRENA I	BEAM TRAWLER	39.04	8.5	770.6	2005
2465	ÁLVAREZ ENTRENA II	BEAM TRAWLER	39.5	8.5	770.6	2005

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRU CTION
2379	ÁLVAREZ ENTRENA III	BEAM TRAWLER	31.9	7.9	185.8	2005
2761	ÁLVAREZ ENTRENA IV	COASTAL VESSEL	17.2	5	26.7	2002
2279	ÁLVAREZ ENTRENA V	BEAM TRAWLER	30.5	7.9	179.5	
3047	ÁLVAREZ ENTRENA VI	BEAM TRAWLER	30.5	7.9	198	
1576	ALVER	BEAM TRAWLER	35	8.2	183.05	1990
401	AMÉRICA I	COASTAL VESSEL	23.1	6.03	103	1992
10	ANA III	COASTAL VESSEL	19.9	6.2	90.5	1988
175	ANABELLA M	FREEZER	64.8	12.5	1,530.00	1987
2701	ANAVE	COASTAL VESSEL	18.1	5.3	42.7	2006
1953	ANGELUS	SQUID FISHING VESSEL	52.6	9	590	1974
2138	ANITA ÁLVAREZ	BEAM TRAWLER	25.5	6.6	120	2002
678	ANTÁRTIDA	FREEZER	73.5	12.1	1,432.00	1967
33	ANTONELLA	COASTAL VESSEL	16.2	5.4	23	1997
877	ANTONINO	WET-FISH VESSEL	27.6	6.5	256	1993
1429	ANTONIO ÁLVAREZ	BEAM TRAWLER	36.6	9.5	375	1989
2781	API V	FREEZER	77.4	13	1,462.40	1974
2812	API VI	BEAM TRAWLER	36.3	9	225.9	1994
1384	ARAUCANIA	WET-FISH VESSEL	28.3	6.7	181.7	1961
248	ARBUMASA I	BEAM TRAWLER	35.3	8.6	221.3	1987
260	ARBUMASA X	BEAM TRAWLER	35.3	8.6	219.8	1987
213	ARBUMASA XIV	BEAM TRAWLER	36.4	9.1	246.66	1991
218	ARBUMASA XIX	BEAM TRAWLER	36.4	9.1	246.6	1991
214	ARBUMASA XV	BEAM TRAWLER	36.4	9.1	244.7	1991

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M^3)	YEAR OF CONSTRUCTION
215	ARBUMASA XVI	BEAM TRAWLER	36.4	9.1	244.7	1992
216	ARBUMASA XVII	BEAM TRAWLER	36.4	9.1	247.4	1989
217	ARBUMASA XVIII	BEAM TRAWLER	36.4	9.1	247.4	1994
2561	ARBUMASA XXIX	SQUID FISHING VESSEL	65.6	10.4	968	1987
1958	ARBUMASA XXVI	SQUID FISHING VESSEL	62.8	10.4	1,094.00	1991
2057	ARBUMASA XXVII	SQUID FISHING VESSEL	64.2	10.7	1,059.30	1989
2569	ARBUMASA XXVIII	SQUID FISHING VESSEL	64.4	10.7	976.6	1987
2265	ARESIT	BEAM TRAWLER	36.3	8.4	196.9	1989
2180	ARGENOVA I	BEAM TRAWLER	35	8.5	246	1992
2177	ARGENOVA II	BEAM TRAWLER	38.5	9.2	243	1989
2156	ARGENOVA III	BEAM TRAWLER	36.3	8.3	143.4	1987
2157	ARGENOVA IV	BEAM TRAWLER	36.3	8.3	117.2	1988
2328	ARGENOVA IX	BEAM TRAWLER	32.5	8.7	198	1986
2179	ARGENOVA VI	BEAM TRAWLER	35	8.5	246	1992
2329	ARGENOVA X	BEAM TRAWLER	32.5	8.7	190	1987
2199	ARGENOVA XI	BEAM TRAWLER	45.2	8.2	307.3	1970
199	ARGENOVA XII	BEAM TRAWLER	47.1	8.2	369	1972
197	ARGENOVA XIV	BEAM TRAWLER	52.3	8.7	666	1972
2661	ARGENOVA XXI	BEAM TRAWLER	55.8	9.5	396	1972
2714	ARGENOVA XXII	BEAM TRAWLER	37.2	9	240.1	2001
2713	ARGENOVA XXIII	BEAM TRAWLER	37.2	9	174.4	1998

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRU CTION
2752	ARGENOVA XXIV	BEAM TRAWLER	38.8	9.3	241.4	1998
2811	ARGENOVA XXV	BEAM TRAWLER	39.7	9.3	266.8	1999
2849	ARGENOVA XXVI	BEAM TRAWLER	37.1	9	174.7	2002
142	ARGENTINO	WET-FISH VESSEL	33.8	8	305	1993
540	ARRUFO	BEAM TRAWLER	39.2	8.9	252	1976
114	ASUDEPES II	SQUID FISHING VESSEL	54.8	8.9	720	1986
2936	ATLANTIC EXPRESS	FREEZER	53.7	11.6	473.9	1992
2030	ATLANTIC SURF III	FREEZER	49.6	12.8	723	1986
145	ATREVIDO	WET-FISH VESSEL	32.5	8.1	280	1992
2581	AURORA	SQUID FISHING VESSEL	67.5	10.6	975	
2635	BAFFETTA	COASTAL VESSEL	19.4	6.4	64	2007
665	BAHIA DESVELOS	BEAM TRAWLER	37	8.5	295	1974
2847	BARBA NEGRA	COASTAL VESSEL	17.2	5.2	50.4	2012
1842	BEAGLE I	FREEZER	59.9	11	865	1973
1398	BELVEDERE	WET-FISH VESSEL	26.5	7.1	185	1993
2994	BOGAVANTE SEGUNDO	BEAM TRAWLER	37.4	8.4	244	2002
1234	BONFIGLIO	COASTAL VESSEL	21	6.2	90	1987
1095	BORRASCA	BEAM TRAWLER	39.2	8.2	252	1977
1637	BOUCIÑA	BEAM TRAWLER	41.5	8.5	389.4	1981
1475	BUENA PESCA	BEAM TRAWLER	39.1	8.5	474	1986
25	CABO BUEN TIEMPO	WET-FISH VESSEL	41.6	9.5	400	1990
1483	CABO TRES PUNTAS	WET-FISH VESSEL	31.4	8.2	250	1989

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M^3)	YEAR OF CONSTRUCTION
567	CALABRIA	COASTAL VESSEL	19.6	5.8	73	1963
2355	CALETA PAULA	COASTAL VESSEL	15.3	5.4	36	2004
2809	CALIZ	COASTAL VESSEL	20.2	6	56.4	2004
1566	CALLEJA	COASTAL VESSEL	21.8	6.2	127.7	1993
1406	CAMERIGE	WET-FISH VESSEL	27.9	6.3	136.5	1985
407	CANAL DE BEAGLE	COASTAL VESSEL	23.9	6.1	125	1979
2929	CAPESANTE	FREEZER	50.1	12	550	2002
151	CAPITÁN GIACHINO	BEAM TRAWLER	38.4	7.2	219	1975
405	CARMELO A	COASTAL VESSEL	21.8	6.2	130	1992
2045	CARMEN A	COASTAL VESSEL	15.3	5.4	23	2001
176	CAROLINA P	FREEZER	71.6	12.5	1,940.00	1988
336	CEIBE DOUS	SQUID FISHING VESSEL	40.7	8.3	471	1986
482	CENTAURO 2000	WET-FISH VESSEL	35.5	9.3	375	1995
237	CENTURIÓN DEL ATLÁNTICO	FREEZER	117.8	18	4,057.00	1986
1420	CERES	FREEZER	60.7	11.7	1,489.00	1988
2893	CHATKA I	COASTAL VESSEL	16.7	5.5	69.8	
1090	CHIARPESCA 56	WET-FISH VESSEL	38.3	7.3	156	1990
2110	CHIARPESCA 902	SQUID FISHING VESSEL	59.3	9	973	2002
2109	CHIARPESCA 903	SQUID FISHING VESSEL	64.1	10.9	973	1975
2987	CHIYO MARU No 3	KING CRAB FISHING VESSEL	52.8	*****	*****	2016

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M^3)	YEAR OF CONSTRUCTION
2584	CHOKYU MARU No 18.	SQUID FISHING VESSEL	68.7	10.6	971.9	1987
527	CIUDAD DE DIAMANTE	COASTAL VESSEL	17.4	5	55	1993
1519	CIUDAD DE HUELVA	WET-FISH VESSEL	27.4	6.4	157	1985
910	CIUDAD FELIZ	WET-FISH VESSEL	28.6	6.2	172.5	1984
2345	CLAUDINA	SQUID FISHING VESSEL	53.6	8.6	511	1979
790	COALSA SEGUNDO	FREEZER	76.2	113	2,019.00	1974
506	CODEPECA III	BEAM TRAWLER	36.8	8.4	194	1988
1012	CODEPECA IV	BEAM TRAWLER	36.8	8.4	230	1989
767	COMANDANTE LUIS PIEDRABUENA	WET-FISH VESSEL	25	6.2	150	1979
201	CONARA I	BEAM TRAWLER	38.7	7.2	215	1975
200	CONARPESA I	BEAM TRAWLER	52.5	10.2	650	1969
971	CONSTANCIA	COASTAL VESSEL	21.2	6.4	100	1988
645	CORAJE	WET-FISH VESSEL	28.3	6.2	140.1	1993
409	CORAL BLANCO	SQUID FISHING VESSEL	50.7	8.7	530	1976
1185	CRISTO REDENTOR	WET-FISH VESSEL	31	7	150	1965
499	DASA 508	SQUID FISHING VESSEL	52.8	9	568	1974
2200	DASA 757	SQUID FISHING VESSEL	52.7	9	564.5	1974
330	DEPASUR I	SQUID FISHING VESSEL	53.1	8.8	603	1972
177	DESAFÍO	WET-FISH VESSEL	29.6	8	225	1991

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRUCTION
1598	DESEADO	COASTAL VESSEL	19	5	55	1988
2416	DIEGO FERNANDO	COASTAL VESSEL	17.9	5.8	39	2003
1700	DOCK URANO	COASTAL VESSEL	17	4.9	35	1979
968	DON AGUSTíN	WET-FISH VESSEL	25.6	6.5	165	1993
29	DON ANTONIO	WET-FISH VESSEL	27.8	66.5	194	1986
2921	DON BOCHA	COASTAL VESSEL	17.9	6	70	2014
2358	DON CARLOS I	COASTAL VESSEL	12.6	4.4	22	
1320	DON CARMELO	COASTAL VESSEL	19	6	115	1991
579	DON CAYETANO	WET-FISH VESSEL	44.1	9	410	1975
2322	DON ESCIPIÓN	COASTAL VESSEL	23.6	6.4	112	2005
2562	DON FRANCISCO I	SQUID FISHING VESSEL	66.5	10.7	1,001.00	1990
2955	DON FRANCO	COASTAL VESSEL	19.9	6.6	87	2015
71	DON GAETANO	WET-FISH VESSEL	32.1	7.3	215	1995
2025	DON GIULIANO	COASTAL VESSEL	17.1	5.4	58	1999
892	DON JOSÉ	COASTAL VESSEL	16.5	5	45	1990
2241	DON JOSÉ DI BONA	COASTAL VESSEL	19.8	6.4	58	2003
1884	DON JUAN D'AMBRA	WET-FISH VESSEL	58.7	9.5	390	1955
1397	DON JUAN	WET-FISH VESSEL	27	6.1	130	1979
69	DON LUCIANO	WET-FISH VESSEL	48.6	9.5	420	1966
1400	DON MARIO	BAY OR ESTUARY	16.5	4.6	30	1991
2093	DON LUIS I	SQUID FISHING VESSEL	67.9	10.6	1,100.00	1987
748	DON MIGUEL I	WET-FISH VESSEL	26.6	6.1	149	1962

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRUCTION
1183	DON NATALIO	WET-FISH VESSEL	36	7.5	259	1976
893	DON NICOLA	WET-FISH VESSEL	28.1	7.2	215	1996
2184	DON OSCAR	COASTAL VESSEL	16.2	5	39	
68	DON PEDRO	FREEZER	73.06	13	2,246.00	1984
1431	DON RAIMUNDO	WET-FISH VESSEL	25.6	6.5	195	1993
2609	DON RAUL	COASTAL VESSEL	12.2	4.8	32	2007
2700	DON SALVADOR	COASTAL VESSEL	12.9	5.11	14	2007
1733	DON SANTIAGO	WET-FISH VESSEL	26.5	7.4	170	1993
2310	DON TOMASSO	COASTAL VESSEL	17	4.6	45	1995
1540	DON TURI	WET-FISH VESSEL	26	7.2	215	1994
1385	DON VICENTE II	COASTAL VESSEL	19.25	4.35	36	1973
539	DON VICENTE VUOSO	COASTAL VESSEL	20.7	6.1	90	1980
512	DOÑA ALFIA	COASTAL VESSEL	20.7	6.2	90	1977
2775	DUKAT	KING CRAB FISHING VESSEL	50.8	10.5	379.7	1994
326	ECHIZEN MARU	FREEZER	89.6	15	2,518.00	1984
1352	EL ARVI	COASTAL VESSEL	19.3	4		
1117	EL FARO	COASTAL VESSEL	22.3	6.1	115	1991
2350	EL MALO I	COASTAL VESSEL	15.3	5.4	40	2003
912	EL MARISCO I	WET-FISH VESSEL	27.2	6.4	160	1985
927	EL MARISCO II	WET-FISH VESSEL	56.3	10.1	486	1965
1526	EL SANTO	COASTAL VESSEL	24.9	6.2	135	1988
2565	EL TEHUELCHE	COASTAL VESSEL	17.4	5.8	31.6	2003

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M^3)	YEAR OF CONSTRU CTION
710	ELSA LIBERTAD	COASTAL VESSEL	13.1	3.6	25	1947
1390	EMILIA MARÍA	COASTAL VESSEL	22.6	6.5	130	1989
1437	EMPESUR I	BEAM TRAWLER	31	7.7	215	1989
1439	EMPESUR II	BEAM TRAWLER	31	7.7	212	1989
1438	EMPESUR III	BEAM TRAWLER	31	7.7	212	1989
1440	EMPESUR IV	BEAM TRAWLER	32	7.7	216	1988
2650	EMPESUR V	BEAM TRAWLER	30.5	8.3	168.2	1988
2983	EMPESUR VI	BEAM TRAWLER	35.03	8.3		1990
2360	ENRIQUE F	COASTAL VESSEL	16.9	5	48.8	2003
2070	ENTRENA DOS	BEAM TRAWLER	33.1	7.7	219	1987
2069	ENTRENA UNO	BEAM TRAWLER	33.1	7.7	219	1987
537	ERIN BRUCE	FREEZER	53.6	11.6	313.2	1978
467	ESAMAR No 4	SQUID FISHING VESSEL	54.8	9	510	1971
2048	ESPADARTE	SQUID FISHING VESSEL	68.2	10.4	1,286.00	1974
2577	ESPERANZA 909	SQUID FISHING VESSEL	72.3	11.2	1,218.00	2007
172	ESPERANZA DOS	SQUID FISHING VESSEL	53	8.8	633	1971
1583	ESTEFANY	COASTAL VESSEL	23.6	6	215	1991
2058	ESTHER 153	SQUID FISHING VESSEL	55.1	9.5	758.5	1979
246	ESTRELLA No 5	SQUID FISHING VESSEL	54.2	9.8	611	1973
12	ESTRELLA No 6	SQUID FISHING VESSEL	55.8	9.8	946	1970

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRUCTION
2575	ESTRELLA No 11	SQUID FISHING VESSEL	64.7	10.7	767.2	1987
242	ESTRELLA No 8	SQUID FISHING VESSEL	53.19	9	633	1970
2314	EURO II	COASTAL VESSEL	20.1	6.4	49.9	2003
1187	FE EN DIOS	COASTAL VESSEL	17.3	5.5	45	1989
529	FEIXA	WET-FISH VESSEL	41.5	9	474.8	1981
581	FELIX AUGUSTO	BEAM TRAWLER	27.8	6.6	125	1985
13	FERNANDO ALVAREZ	BEAM TRAWLER	36.6	9.5	375	1987
1531	FIDES FE I	COASTAL VESSEL	20.7	6	75	1990
1325	FIDES FE II	COASTAL VESSEL	23.8	6	110	1990
1446	FIESTA	COASTAL VESSEL	18.8	5.5	185	1991
969	FLORIDA BLANCA	WET-FISH VESSEL	27.7	6.5	185	1988
255	FLORIDA BLANCA IV	BEAM TRAWLER	34.9	7.2	180	1967
920	FONSECA	FREEZER	62.4	10.5	1,144.00	1984
495	FRANCA	WET-FISH VESSEL	27.3	6.4	160	1988
1458	FRANCO	WET-FISH VESSEL	32.5	8.1	270	1991
2984	FRANCO JOSÉ	COASTAL VESSEL	19.9	6.6	87	2016
2722	GALA	COASTAL VESSEL	15.2	5.4	52	2009
904	GALEMAR	WET-FISH VESSEL	54.4	9	370	1956
339	GAUCHO GRANDE	WET-FISH VESSEL	28.5	6.5	185	1980
1421	GÉMINIS	FREEZER	68.9	12	1,616	1988
2633	GIULIANA	SQUID FISHING VESSEL	63.9	10.6	1,142.00	1974

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M^3)	YEAR OF CONSTRUCTION
1983	GLORIA DEL MAR I	SQUID FISHING VESSEL	54.3	8.5	495	1975
2626	GLORIOSUS	COASTAL VESSEL	16.3	5	38	2002
1388	GOLFO AZUL	COASTAL VESSEL	20.8	6.14	43	1974
362	GOLFO SAN MATÍAS	WET-FISH VESSEL	24.5	6.5	145.5	1978
578	GRACIELA	WET-FISH VESSEL	44.1	9	414	1975
1538	GRAN CAPITÁN	WET-FISH VESSEL	25.4	6.3	145	1978
1386	GURISES	WET-FISH VESSEL	25.2	6.6	145	1987
75	GUSTAVO R	FREEZER	68.3	11.5	1,204.00	1971
1410	HAMPÓN	COASTAL VESSEL	19	6	80	1988
788	HOPE No 7	SQUID FISHING VESSEL	50.6	9	597	1968
2624	HOYO MARU No 37	SQUID FISHING VESSEL	64.1	10.7	843.3	1987
3027	HUA I No 616	SQUID FISHING VESSEL	59.8	10	1,806.00	1987
3013	HUAFENG 801	SQUID FISHING VESSEL	65	10	943.5	*****
3014	HUAFENG 802	SQUID FISHING VESSEL	65	10	943.5	*****
554	HUAFENG 815 FORMER VICTORIA I	WET-FISH VESSEL	25.28	6.2	110	1985
1746	HUAFENG 816	COASTAL VESSEL	22.6	6.5	130	1989
570	HUAFENG 817	COASTAL VESSEL	22.3	6.5	115	1988
245	HUAFENG 818 FORMER LETARE	WET-FISH VESSEL	24.9	6.3	140	1982
438	HUAFENG 819	WET-FISH VESSEL	23.8	6.1	110	1989

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRU CTION
1472	HUAFENG 820	WET-FISH VESSEL	24.8	6.3	140	1983
1471	HUAFENG 821	WET-FISH VESSEL	24.8	6.2	140	1983
1537	HUAFENG 822	WET-FISH VESSEL	25	6.2	150	1979
2624	HUYU 906	SQUID FISHING VESSEL	65.9	1.2	787.6	*****
3026	HUYU 907	SQUID FISHING VESSEL	72.2	11.2	1,075.60	*****
1423	IGLU I	WET-FISH VESSEL	32.7	7.8	230	1983
392	INARI MARU No 25	SQUID FISHING VESSEL	54.2	8.6	685.5	1964
2347	INDOMABLE	COASTAL VESSEL	16.1	5.3	45.7	*****
758	INSÓLITO	COASTAL VESSEL	22.7	6.2	100	1991
927	ITXAS LUR	FREEZER	63.3	11.2	1,510.00	1987
E/T	JOSÉ AMÉRICO	FREEZER	39.8	11		2017
619	JUAN ÁLVAREZ	BEAM TRAWLER	36.6	9.5	285	1988
2695	JUAN PABLO II	COASTAL VESSEL	19	6.7	93.6	2006
908	JUDITH I	WET-FISH VESSEL	30.4	6.5	200	1965
667	JUEVES SANTO	BEAM TRAWLER	39.5	9	275	1988
483	JÚPITER	COASTAL VESSEL	24	6.2	125	1984
406	JÚPITER II	WET-FISH VESSEL	27.9	7.2	215	1996
1963	KALEU KALEU	BEAM TRAWLER	36.1	8.8	215	1974
1065	KANTXOPE	WET-FISH VESSEL	50.1	9.5	543.4	1975
1462	KARINA	WET-FISH VESSEL	32.5	8.1	270	1990
2324	LA SANTA MARÍA I	COASTAL VESSEL	22.9	6.3	83	*****

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRUCTION
254	LAIA	SQUID FISHING VESSEL	53	8.6	577	1969
1181	LANZA SECA	WET-FISH VESSEL	24.8	6.6	145	1980
291	LATINA 8	SQUID FISHING VESSEL	55.9	9.2	699.5	1973
143	LEAL	WET-FISH VESSEL	27.4	6.4	160	1987
752	LEKHAN I	COASTAL VESSEL	18.45	5.82	36	1990
894	LEOAN	COASTAL VESSEL	17.5	5	55	1994
355	LIBERTAD	COASTAL VESSEL	18.2	4.9	42	1960
2186	LIBERTAD DEL MAR I	SQUID FISHING VESSEL	68.2	11	1,315.00	1975
546	LUCA MARIO	FREEZER	79.1	13	1,930.00	1976
623	LUCIA LUISA	WET-FISH VESSEL	27.9	6.6	185	1983
2539	LUCILA DEL MAR	COASTAL VESSEL	12.9	4.2	117	*****
1132	LUNES SANTO	BEAM TRAWLER	35.9	7.5	191	1974
1112	MADONNINA DEL MARE	COASTAL VESSEL	23.8	6	110	1990
1556	MADRE DIVINA	WET-FISH VESSEL	26.1	6	126	1973
2378	MADRE INMACULADA	SQUID FISHING VESSEL	64	10.6	1,060.30	*****
2728	MADRE MARGARITA	WET-FISH VESSEL	25.6	7	146	2009
2325	MAGDALENA	BEAM TRAWLER	32.7	7.9	217	1978
577	MALVINAS ARGENTINAS	WET-FISH VESSEL	29.1	6.2	172.5	1983
208	MAR AUSTRAL I	BEAM TRAWLER	37.6	9.3	305	1980
548	MAR DE ORO	BEAM TRAWLER	28.2	6.9	122	1989
487	MAR DEL CHUBUT	WET-FISH VESSEL	28.7	6.6	174.2	1989

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRUCTION
925	MAR ESMERALDA	WET-FISH VESSEL	53.3	9.2	420	1971
2960	MAR MARÍA	BEAM TRAWLER	37.8	8.7	278.1	1998
341	MAR SUR	BEAM TRAWLER	36.4	7.2	133	1973
210	MARA I	BEAM TRAWLER	35.3	8.6	227	1987
1073	MARBELLA	WET-FISH VESSEL	27.4	7.1	205	1994
352	MARCALA I	WET-FISH VESSEL	50.8	10	704	1966
1107	MAREJADA	WET-FISH VESSEL	28.5	6.6	180	1987
360	MARGOT	WET-FISH VESSEL	58.7	9.4	425	1959
E/T	MARÍA ALEJANDRA 1º	FREEZER	43.5	10.5		2017
2126	MARÍA DEL VALLE	COASTAL VESSEL	16.3	5.5	22	*****
1173	MARÍA EUGENIA	BEAM TRAWLER	22.6	6.5	735	1979
2738	MARÍA GLORIA	WET-FISH VESSEL	28	7.2	215	2008
195	MARÍA GRACIA	COASTAL VESSEL	24	6	110	1989
1174	MARÍA LILIANA	BEAM TRAWLER	53.7	9.6	735	1980
436	MARÍA RITA	WET-FISH VESSEL	30.9	6.6	160	1961
1002	MARÍA SUSANA	COASTAL VESSEL	15.3	5.4	45	2002
958	MARIANELA	WET-FISH VESSEL	25.6	6.5	162	1988
1091	MARIO R	COASTAL VESSEL	15.4	4.2	20	1991
1389	MARTA S	COASTAL VESSEL	24	6	110	1989
2172	MARYSOL	COASTAL VESSEL	19.2	5.3	53	1977
379	MATEO I	SQUID FISHING VESSEL	67.9	10.7	1,284.00	1989
1424	MELLINO I	WET-FISH VESSEL	47.2	8.3	307.1	1960
378	MELLINO II	WET-FISH VESSEL	38.9	7.3	180	1974

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M^3)	YEAR OF CONSTRUC TION
1114	MELLINO VI	WET-FISH VESSEL	64.9	9.6	521.7	1957
1089	MERCEA C	WET-FISH VESSEL	29.1	7.2	222	1997
1508	MESSINA I	WET-FISH VESSEL	22.3	6.4	160	1987
1026	MEVIMAR	BEAM TRAWLER	37.4	8.3	233	1979
666	MIERCOLES SANTO	BEAM TRAWLER	38.5	9.5	459	1989
466	MILLENNIUM	SQUID FISHING VESSEL	55	9	468	1971
3022	MINCHOS OCTAVO	BEAM TRAWLER	40	8		2002
2196	MINTA	SQUID FISHING VESSEL	65.1	10.2	807	1987
370	MIRIAM	BEAM TRAWLER	36.3	9.5	431	1989
2627	MIRTA R	COASTAL VESSEL	15	5	47.4	
2972	MISAL	COASTAL VESSEL	19.9	6.6	87	2015
2175	MISHIMA MARU No 8	SQUID FISHING VESSEL	63.4	10.2	983	1989
555	MISS PATAGONIA	BEAM TRAWLER	28.2	6.2	180	1989
2439	MISS TIDE	FREEZER	52.5	12.2	389	1982
970	MIURA MARU	SQUID FISHING VESSEL	53.7	8.7	578	1970
2771	MYRDOMA F	BEAM TRAWLER	38.5	8.5	226.7	1996
2576	NANINA	SQUID FISHING VESSEL	72.1	11.2	1,110.00	2005
711	NATALE	WET-FISH VESSEL	19.5	5.3	56	1976
2066	NATALIA	SQUID FISHING VESSEL	68.4	10.6	1,020.00	1987
542	NAVEGANTES	FREEZER	58	11	1,237.00	1988
1451	NAVEGANTES II	SQUID FISHING VESSEL	63.7	10.2	933	1986
2065	NAVEGANTES III	SQUID FISHING VESSEL	68.6	10.6	1,018.60	1997
141	NDDANDDU	BEAM TRAWLER	28.2	6.9	180	1988

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRUC TION
2125	NEPTUNIA I	COASTAL VESSEL	17.3	5.1	20.5	1948
2361	No 606 TAE BAEK	SQUID FISHING VESSEL	55.2	9.5	587.8	1987
2364	No 75 TAE BAEK	SQUID FISHING VESSEL	55.7	10.2	600	1987
2854	NONO PASCUAL	COASTAL VESSEL	24	6.9	145	2012
1381	NORMAN	COASTAL VESSEL	21	6.2	90	1986
1501	NUEVA LUCIA MADRE	COASTAL VESSEL	14.4	4	15	1948
2634	NUEVA NEPTUNIA I	COASTAL VESSEL	20	6.2	56	2002
2100	NUEVO ANITA	BEAM TRAWLER	30.9	7.9	187	1980
528	NUEVO RUMBO	COASTAL VESSEL	17.9	5	61	1994
1188	NUEVO SIEMPRE GAUCHO	COASTAL VESSEL	16.8	4.8	75	1960
1449	NUEVO VIENTO	WET-FISH VESSEL	22.2	6	115	1990
1391	OMEGA 3	COASTAL VESSEL	17.9	6.4	50	1990
1942	ORIÓN 2	SQUID FISHING VESSEL	53.2	8.6	772.7	
2167	ORIÓN 3	SQUID FISHING VESSEL	63.1	10.7	1,044.00	1987
2637	ORIÓN 5	SQUID FISHING VESSEL	65.6	10.6	933	1988
1497	ORIÓN I	COASTAL VESSEL	20.9	6	82.1	1989
2092	ORYONG 756	SQUID FISHING VESSEL	51.7	9	568	1974
2572	PACHACA	COASTAL VESSEL	17.6	5.9	34.4	2006
2822	PADRE PÍO	COASTAL VESSEL	24	6.9	145	2011
250	PAKU	BEAM TRAWLER	39.2	8.9	252	1976
557	PAOLA S	WET-FISH VESSEL	28.2	6.4	160	1986
284	PATAGONIA	WET-FISH VESSEL	30.9	6.7	180	1961

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRUC TION
2163	PATAGONIA 1	SQUID FISHING VESSEL	51.9	9	531.5	
2164	PATAGONIA 2	SQUID FISHING VESSEL	51.9	9	531.5	1973
2176	PATAGONIA BLUES	SQUID FISHING VESSEL	60.3	10.2	877.3	1987
747	PENSACOLA I	WET-FISH VESSEL	25.2	6.6	145	1984
538	PESCAPUERTA QUINTO	FREEZER	63.1	10.5	1,314.00	1988
21	PESCARGEN III	FREEZER	63.2	9	986	1974
150	PESCARGEN IV	FREEZER	63.2	9	995	1974
78	PESCARGEN V	FREEZER	60.2	10.5	1,330.00	1988
1445	PETREL	WET-FISH VESSEL	29.8	7	215	1970
2312	PEVEGASA QUINTO	BEAM TRAWLER	38.6	9	220	1988
2735	PIONEROS	WET-FISH VESSEL	35.9	9	219.2	1977
2122	POLARBORG I	WET-FISH VESSEL	45.5	9.3	388	1975
2117	POLARBORG II	WET-FISH VESSEL	45.4	9.3	382.5	1975
975	PONTE CORUXO	WET-FISH VESSEL	52.8	9.5	590	1978
244	PONTE DE RANDE	FREEZER	79.1	13	2,114.00	1976
2384	POPA	COASTAL VESSEL	23.4	6.5	120	2004
2699	PORTO BELO I	COASTAL VESSEL	24.07	6.7	120	2008
2790	PORTO BELO II	COASTAL VESSEL	24	6.7	125	2010
285	PROMAC	WET-FISH VESSEL	33.4	7.3	210	1969
2096	PROMARSA III	BEAM TRAWLER	37.6	8		2002
1822	PUCARA	COASTAL VESSEL	24.3	6	118	
756	PUENTE CHICO	BEAM TRAWLER	37	8.6	228	1988
2630	PUENTE MAYOR	FREEZER	66.7	12	1,340.00	1988

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRUC TION
207	PUENTE SAN JORGE	BEAM TRAWLER	35.3	8.6	221	1987
2205	PUENTE VALDES	SQUID FISHING VESSEL	58.1	9.4	705.5	1988
1907	PUNTA MOGOTES	COASTAL VESSEL	20.7	5.4	71.5	1971
580	QUEQUEN SALADO	COASTAL VESSEL	19.4	5.6	80	1965
1076	QUIQUETA	WET-FISH VESSEL	25.2	6.6	155	1991
1401	RAFFAELA	WET-FISH VESSEL	26.5	7.1	185	1992
2703	RASMUS EFFERSOE	WET-FISH VESSEL	44.6	10	417	1984
690	RAYO DE SOL	COASTAL VESSEL	15.7	4.7	40	1987
408	REYES DEL MAR No 2	SQUID FISHING VESSEL	52.87	9		1971
751	RIBAZON INES	WET-FISH VESSEL	38.5	7.6	193	1957
266	RIGEL	WET-FISH VESSEL	26.2	6.1	147	1974
1568	ROCIO DEL MAR	WET-FISH VESSEL	22.6	6.5	160	1991
2973	SAGRARIO	COASTAL VESSEL	19.9	6.6	87	2015
2755	SALVADOR R	COASTAL VESSEL	25.7	7.2	0	2009
569	SAN ANDRÉS APOSTOL	WET-FISH VESSEL	54.6	9	582	1976
375	SAN ANTONINO	WET-FISH VESSEL	26.7	6.4	135	1966
2098	SAN ARAWA II	FREEZER	56.5	14.2	1,045.00	1986
2643	SAN BENEDETTO	COASTAL VESSEL	15.4	5.4	15.6	2007
1022	SAN CAYETANO I	WET-FISH VESSEL	24.1	6.5	130	1965
763	SAN GENARO	WET-FISH VESSEL	25.6	6.5	162	1992
2335	SAN GIUSEPPE II	COASTAL VESSEL	19.9	5.6	48.5	2003
2152	SAN JORGE MARTIR	WET-FISH VESSEL	56.1	10.1	544.3	1966
70	SAN MATEO	SQUID FISHING VESSEL	54.1	9	690	1993

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRUCTION
289	SAN MATÍAS	WET-FISH VESSEL	34.1	7.7	266	1998
367	SAN PASCUAL	WET-FISH VESSEL	25.6	6.5	165	1993
1975	SAN PEDRO APOSTOL	COASTAL VESSEL	26	6.1	139	1963
1434	SAN SALVADOR II	COASTAL VESSEL	19.4	5.9	71	1993
425	SANT'ANGELO	COASTAL VESSEL	22.6	6	110	1989
974	SANT'ANTONIO	WET-FISH VESSEL	25.2	6.6	155	1990
9	SANTA ANGELA	WET-FISH VESSEL	57.3	9.4	384	1957
1885	SANTA BARBARA	WET-FISH VESSEL	57	11.6	455	1969
2615	SANTA MARIA MADRE	COASTAL VESSEL	20.5	6	96.5	2004
2280	SANTIAGO I	BEAM TRAWLER	30.5	7.9	187	1980
2764	SANTO VITO DI MAZZARA	COASTAL VESSEL	17.6	5.3	20.2	
2574	SCIROCCO	SQUID FISHING VESSEL	65.9	10.2	1,015.70	1987
505	SERMILIK	BEAM TRAWLER	34	7.7	255	1985
1567	SFIDA	WET-FISH VESSEL	26.5	7.1	185	1992
2687	SIEMPRE DON CONRADO	COASTAL VESSEL	19.4	6.4	54	2008
2257	SIEMPRE DON JOSE MOSCUZZA	BEAM TRAWLER	38	9	235	1990
2654	SIEMPRE DON VICENTE	COASTAL VESSEL	18.9	6.7	50	2007
801	SIEMPRE SAN SALVADOR	COASTAL VESSEL	22.3	6	9	
494	SIEMPRE SANTA ROSA	WET-FISH VESSEL	27.8	6.6	170	1986
2937	SIEMPRE VIEJO PANCHO	COASTAL VESSEL	18	6	76	2014
754	SIMBAD	WET-FISH VESSEL	51.3	8.5	320	1974
905	SIRIUS	WET-FISH VESSEL	59.8	9.22	510	1965

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M^3)	YEAR OF CONSTRUC TION
936	SIRIUS II	WET-FISH VESSEL	59.2	9.3	585	1965
937	SIRIUS III	WET-FISH VESSEL	59.2	9.3	585	1967
2679	SOFÍA B	COASTAL VESSEL	19.6	6.3	48.4	2007
2611	SOHO MARU No 58	SQUID FISHING VESSEL	65.7	10.6	941	1988
926	STELLA MARIS I	FREEZER	68.2	12	1,616.00	1988
618	SUEMAR	BEAM TRAWLER	36.6	9.5	285	1998
1113	SUEÑO REAL	COASTAL VESSEL	22.9	6.1	115	1990
1105	SUMATRA	WET-FISH VESSEL	34.6	6.9	676.9	1958
2201	SUR ESTE 502	SQUID FISHING VESSEL	54.6	9.3	676.9	1979
922	SUSANA	COASTAL VESSEL	19	5.4	65	1994
2233	TABEIRON	BEAM TRAWLER	34.1	8.6	225	2003
2323	TABEIRON DOS	BEAM TRAWLER	33	9.6	254.9	2004
2365	TABEIRON TRES	COASTAL VESSEL	23.9	6.6	105	2005
1530	TAI AN	FREEZER	100.5	15.7	2,409.00	1999
2207	TAISEI MARU No 8	SQUID FISHING VESSEL	65.6	10.3	762	1987
2263	TALISMÁN	KING CRAB FISHING VESSEL	49.9	10.8	275	1987
2724	TANGO I	KING CRAB FISHING VESSEL	50.4	10.5	256.5	1988
2791	TANGO II	KING CRAB FISHING VESSEL	50.4	10.5	293.6	1992
2565	TEHUELCHE	COASTAL VESSEL	17.4			2004
1551	TEMERARIO I	COASTAL VESSEL	23.85		22	1993
1541	TESÓN	WET-FISH VESSEL	25.9	7.1	170	1990

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M^3)	YEAR OF CONSTRUC TION
241	TOBA MARU	SQUID FISHING VESSEL	54.79	8.72		1969
1219	TOZUDO	WET-FISH VESSEL	24.2	7.1	182	1990
2904	TRABAJAMOS	COASTAL VESSEL	19.9	6.6	87	2013
2821	TRITON I	COASTAL VESSEL	19.9	6.6	87	2011
1901	UCHI	BEAM TRAWLER	54.2	10.4	582	1968
377	UR ERTZA	WET-FISH VESSEL	51	9	665	1976
612	URABAIN	FREEZER	73.2	11.6	1,556.50	1976
2614	VALERIA ALEJANDRA	COASTAL VESSEL	16.92	4.3		1998
211	VALIENTE I	BEAM TRAWLER	35.3	8.6	225.2	1987
212	VALIENTE II	BEAM TRAWLER	35.3	8.6	221	1987
2532	VAMOS A PROBAR I	COASTAL VESSEL	16.2	5.3	50	2005
479	VENTARRÓN 1º	FREEZER	63.1	11.2	1,346.00	1989
144	VERAZ	WET-FISH VESSEL	27.4	6.4	160	1988
174	VERDEL	FREEZER	71.7	12.5	1,529.60	1987
2292	VERONICA ALEJANDRA N	COASTAL VESSEL	15.3	5.4	23	2003
1075	VICENTE LUIS	WET-FISH VESSEL	27.6	6.5	190	1995
556	VICTORIA II	WET-FISH VESSEL	25.3	6.3	140	1986
2246	VICTORIA P	BEAM TRAWLER	36.1	9.6	278	1988
2563	VIEIRASA DIECIOCHO	SQUID FISHING VESSEL	67.8	10.6	932.2	1987
240	VIEIRASA DIECISEIS	BEAM TRAWLER	36.1	9	390	1989
2568	VIEIRASA DIECISIETE	SQUID FISHING VESSEL	59	9.8	741	2007
179	VIEIRASA QUINCE	BEAM TRAWLER	38.5	9.5	385	1989
2178	VILLARINO	SQUID FISHING VESSEL	64.5	10.6	1,063.10	1989

LICENSE	VESSEL	TYPE	LENGTH (M)	BEAM (M)	HOLD (M³)	YEAR OF CONSTRUC TION
550	VIRGEN DEL CARMEN	WET-FISH VESSEL	36.1	7.2	230.6	1974
2767	VIRGEN DEL MILAGRO	COASTAL VESSEL	19.9	6.6	68	2010
541	VIRGEN MARÍA	WET-FISH VESSEL	56.6	10.3	600	1971
369	VIRGEN MARÍA INMACULADA	WET-FISH VESSEL	28.1	6.5	189	1992
1476	WIRON IV	WET-FISH VESSEL	37.4	8.5	377	1999
403	XEITOSIÑO	BEAM TRAWLER	51.7	9.5	780	1975
2165	XIN SHI DAI No 28	SQUID FISHING VESSEL	62.4	10.2	919	1987
2182	XIN SHI JI No 88	SQUID FISHING VESSEL	59.2	10.2	899.5	1985
2181	XIN SHI JI No 99	SQUID FISHING VESSEL	65.1	10.6	1,245.00	1987
2593	XIN SHI JI No 18	SQUID FISHING VESSEL	66.2	10.2	915	
2903	XIN SHI JI No 89	SQUID FISHING VESSEL	68.6	10.6	1,160.40	
2924	XIN SHI JI No 91	SQUID FISHING VESSEL	68.6	10.6	1,160.40	
2930	XIN SHI JI No 92	SQUID FISHING VESSEL	68.6	10.6	1,160.40	
2933	XIN SHI JI No 95	SQUID FISHING VESSEL	68.6	10.6	1,160.40	
2995	XIN SHI JI No 98	SQUID FISHING VESSEL	67.08	10.6	875.4	1987
498	YENU	BEAM TRAWLER	36.8	8.4	193.1	1989

ANNEX 2: PROFESSIONAL AREAS OF COMPETENCE

The professional areas of competence indicate the potential ability of professionals of a particular speciality based on theoretical and practical knowledge they have acquired while studying.

Therefore, the professional areas of competence are the legal framework which regulate the professional practice so no official, private or corporate entity can place obstacles to the activities performed within the framework of areas of competence.

The professional areas of competence are legislated by Executive Order 6070/58, ratified by Law No. 14.467/58, which regulates the professional practice, and by Law No. 24.521, Article 40 to 43; Executive Order 256/94 and Resolution 1.232/2001 of the Ministry of Education and Culture. The aforementioned legislation and the corresponding regulations constitute a reasonable approach to the undergraduate degree legislation appropriate in each case.

Moreover, the professional areas of competence have a permanent dynamic which forces the update of static concepts passed by the current legislation. This task has not been fulfilled yet and it can lead to discrepancies in the application of the areas of competence.

ANNEX 3: NATIONAL LAW OF HIGHER EDUCATION

No. 24.521

Passed: 20 July 1995

Enacted: 7 August 1995 (Decree 268/95)

Published: 10 August 1995 (Legal Gazette No. 28.204)

2. DEGREES REGULATION

Article 40 It is solely the universities' responsibility to issue the undergraduate degree of bachelor and equivalent professional degrees, as well as postgraduate degrees such as Master's Degree or Doctorate.

Article 41 *The official degree recognition issued by universities shall be granted by the Ministry of Culture and Education. Officially recognised degrees shall have national validity.*

Article 42 Degrees that are officially recognised shall certify the academic training obtained and shall authorise the recipient' professional practice in the national territory without detriment to the regulatory power that corresponds to the provinces. The knowledge and abilities these degrees certify, as well as the activities the degree recipient is qualified to perform, shall be determined and made public by universities. The corresponding syllabuses shall respect the minimum credit hours determined by the Ministry of Culture and Education jointly with the Universities Council.

Article 43 In the case of degrees of professions regulated by the State, whose exercise could compromise public interest, directly jeopardising the health, safety, rights, property and training of citizens, it shall be required that the aforementioned credit hours and the following requirement is respected: the Ministry of Culture and Education shall determine under a restrictive criterion, in agreement with the Universities Council, the list of degrees and their exclusive professional activities.

ANNEX 4: DECREE No. 256/94

REGULATES THE PROFILE, SCOPE, AREAS OF COMPETENCE AND NATIONAL VALIDITY OF UNIVERSITY DEGREES

Buenos Aires, 18/2/94

According to what is established in sections 10 and 11 of Article 21 of the Law of Ministries (amended text of law from 1992), by means of which the MINISTRY OF CULTURE AND EDUCATION is assigned the responsibility to participate “in the determination of the national validity of studies and degrees” and in “the authorisations and areas of competence of professional degrees with national validity”, and...

THE PRESIDENT OF ARGENTINA ORDERS:

Article 1 For the purposes of this decree, that the knowledge and abilities each degree gives credit for shall be called “degree profile”; that those activities for which a professional is qualified based on the degree profile and the curricular contents of the course of studies shall be called “degree scope”; and, that those activities included within the degree powers whose practice could compromise public interest shall be called “areas of competence”.

Article 2 Granting the national validity of a university degree shall officially give credit to its scope and profile. To that end, universities shall attach to the corresponding request the degree scope and profile, which can only be observed by the MINISTRY OF CULTURE AND EDUCATION if they do not conform to their curricular contents.

ANNEX 5: MINISTRY OF EDUCATION RESOLUTION No. 1232/2001

The following Engineering Degrees shall be included in the list of Article 43 of Law No. 24.521:

Aeronautical Engineering, Food Engineering, Environmental Engineering, Civil Engineering, Electrical Engineering, Electromechanical Engineering, Electronic Engineering, Materials Engineering, Mechanical Engineering, Mining Engineering, Nuclear Engineering, Petroleum Engineering, and Chemical Engineering.

Basic curricular contents for the aforementioned degree programmes. Minimum credit hours. Intensity criteria for practical training. Accreditation of such degree programmes. Professional activities exclusive of such degrees.

Buenos Aires, 20/12/2001

According to what is established in Articles 43 and 46, Paragraph b

WHEREAS:

Article 43 of the Higher Education Law established that syllabuses of degree programmes for professions regulated by the State, whose practice could compromise public interest, jeopardising the health, safety, and property of citizens, shall take into account the minimum credit hours determined by Article 42 of the same regulation, the basic curricular contents and the criteria on the intensity of the practical training established by the MINISTRY OF EDUCATION in agreement with the UNIVERSITIES COUNCIL.

THE MINISTRY OF EDUCATION DETERMINES:

Article 1 To declare the following Degrees included in the list of Article 43 of Law 24.521: Aeronautical Engineer, Food Engineer, Environmental Engineer, Civil Engineer, Electrical Engineer, Electromechanical Engineer, Electronic Engineer, Materials Engineer, Mechanical Engineer, Mining Engineer, Nuclear Engineer, Petroleum Engineer, and Chemical Engineer.

Article 2 To declare that the other Engineering Degrees not included at this stage of the regulatory framework of Article 43 of Law 24.521 shall be included upon the agreement of the UNVERSITIES COUNCIL, based on the fulfilment and approval of the curricular homogenisation process implemented for Engineering Degrees whose inclusion is approved in Article 1.

Article 3 To pass the basic curricular contents, the minimum credit hours, the intensity criteria for practical training, and the accreditation standards for degree programmes of degrees mentioned in Article 1, as well as the list of activities exclusive of those who have obtained said degrees referred to in the following annexes of this Resolution: Annex I, Basic Curricular Contents; Annex I, Minimum

Credit Hours; Annex III, Intensity Criteria for Practical Training; Annex IV, Accreditation Standards; and, Annex V, Exclusive Professional Activities.

1. Syllabuses shall consider the basic curricular contents and the criteria on the intensity of practical training established by the Ministry of Culture and Education according to the Universities Council.
2. The respective degree programmes shall be accredited periodically by the National Commission for University Evaluation and Accreditation or by duly recognised private entities constituted to that end.

ANNEX 6: TRANSLATION OF THE DOCUMENTS FOUND IN THE BOOK

Translation of the letter found in the Preamble

2017 – THE YEAR OF RENEWABLE ENERGIES

No. 351/2017

Letter: DEDU, B6.4.

ARGENTINE COAST GUARD

Maritime Authority

BUENOS AIRES, 30 JUNE 2017

MISTER SECRETARY GENERAL:

I am writing to you in regard to the note dated 21 April 2017 which refers to training considerations addressed in the International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel from 1995 (STCW-F).

In that regard, it is recorded that through Law 26.981 this Convention has been passed at a national level, but the Republic of Argentina is not part of it yet because, to date, the Ministry of Foreign Affairs has not deposited the corresponding ratification instrument to the Secretariat of the International Maritime Organisation (IMO).

In view of the aforementioned, this Maritime Authority appointed in a timely manner as Execution Authority of the instrument is currently working through the corresponding areas in the necessary preparatory actions, aiming at an immediate implementation once the period established in Article 12-*Entry into force*, section 3, has expired. The corresponding processes have been carried out before the Ministry of Foreign Affairs and Worship in relation to the incorporation of this country as a Member State.

Once the curriculum and contents of the syllabuses have been determined, it shall be possible to adopt a definition.

Yours faithfully,

JORGE NELSON BLATI

PREFECT GENERAL

DIRECTOR OF EDUCATION

TO MR. NATIONAL GENERAL SECRETARY OF THE ARGENTINE FISHING CAPTAINS ASSOCIATION

CAPTAIN JORGE ALFREDO FRÍAS

s.d

Translation of the letter found in Chapter 5

"2011- "Year of Decent Work, Health and Safety of Workers"

No. 43/11

Letter: DGED, 3TC

Argentine Navy

Naval General Director of Education

BUENOS AIRES, 2 September, 2011

MR. NATIONAL GENERAL SECRETARY:

I am pleased to address this letter to you by order of the Chief of General Staff of the Navy in reply to your notification dated 2 August of this year and to request a hearing with the purpose of suggesting the implementation of a syllabus for the training of Fishing Captains and Officers who are studying in the National Fishing School, for which purpose fishing vessel "Bicentenario" of this Association, destined to fishing research and training purposes, could be used.

In this regard, I can inform you that, having analysed your proposal from an educational point of view, the current syllabuses are already designed and approved by the Subsecretariat of Ports and Waterways, especially the program for Fishing First Officer which was created during 2008 and 2009 and approved by Order 09/2010, and whose practice is being implemented aboard fishing vessel A.R.A. "Luisito". Regarding Fishing Captains, training requirements are based on theoretical content related to the legislation, administration and management of human resources, so being aboard a vessel or practicing onboard is not necessary.

In view of the aforesaid and due to not being useful to the National Fishing School, I have no option but to decline the proposition. I thank you and appreciate the proposal.

Sincerely,

HUGO MANUEL VIVES

COUNTER ADMIRAL

DIRECTOR

TO MR. NATIONAL GENERAL SECRETARY OF THE ARGENTINE FISHING CAPTAINS ASSOCIATION

Mr. Jorge A. FRÍAS

s.d.

Translation of the resolution found in Chapter 9

From file No. 2624-77470/72

Province of Buenos Aires

Ministry of Education

LA PLATA, 26 March 1973

Having reviewed file No. 2624-77470/72 through which the Chamber of High-Seas Fishing Vessels Builders and the Centre for Skippers of Cabotage in Rivers and Ports request the creation of an Adults Training Centre for Fishing Vessels Personnel in the city of Mar del Plata, and CONSIDERING:

That the creation of the Adults Training Centre for Fishing Vessels Personnel offers the members of the requesting entities the opportunity to widen their professional possibilities;

That said assumptions coincide with the policy that the Government of the Province of Buenos Aires has established in support of the fishing industry development;

That the Directorate of Secondary, Technical and Vocational Education expresses a favourable criterion in relation to the requested creation;

THEREFORE, and complying with what was previously advised by the Subsecretariat of Education,

THE MINISTRY OF EDUCATION DETERMINES:

1° - To create the Adults Training Centre for Fishing Vessels Skippers in the city of Mar del Plata, District of General Pueyrredón, domiciled at 12 de Octubre Street, number 3144 in said city.

2° - To establish that in the convention entered into the conditions and requirements for the functioning of the centre created by means of the previous section shall be determined.

3° - To entrust the Directorate of Secondary, Technical and Vocational Education the adoption of the appropriate precautions for the functioning of the Adults Training Centre for Fishing Vessels Skippers.

4° - To authorise the Syllabus registered on pages 15 and 16.

5° - To assign the following functional personnel to the Adults Training Centre for Fishing Vessels Skippers:

1 Manager

2 Secretary

Lecture hours which correspond to the course according to the Syllabus

6° - To record this Resolution which shall be filed on the record in the Directorate General of the Ministry, whose replacement shall add an authenticated copy. To notify the Subsecretariat of Education, the Directorates of Personnel, Administration, and Secondary, Technical and Vocational Education, and through them to whoever is appropriate. Once completed, it is to be filed.

RESOLUTION No. 00222

PROFESSOR CARLOS ALBERTO RÍOS

MINISTER OF EDUCATION OF THE PROVINCE OF BUENOS AIRES

FAO'S CODE OF CONDUCT FOR RESPONSIBLE FISHERIES

1 The followng programme shall be taught to make fishermen aware of their growing responsibilities and the role of FAO's Code of Conduct for Responsible Fisheries in relation to this matter. The Code establishes international principles and regulations of conduct for responsible practices with the purpose of guaranteeing an effective conservation, management and development of live marine resources, duly respecting the ecosystem and biodiversity. The Code of Conduct for Responsible Fisheries not only defines the responsibilities of fishers, but also of administrators, scientists, and managers of fisheries. The following training course aims at informing fishers about their own responsibilities and those of others with the implementation of FAO's Code of Conduct for Responsible Fisheries. This information shall include:

2 PRINCIPLES AND GUIDELINES

2.1 Responsible fisheries are those in which the total annual mortality enables the long-term maintenance of sustainable yield, the productivity of the environment is guaranteed and there is no threat to the ecosystem diversity.

3 RESPONSIBLE CAPTURE PRACTICES

3.1 Bycatch and discard

3.2 Lost fishing gear

3.3 Habitat damage

3.4 Marine reserves

3.5 Fish as food

3.6 Abandonment of fishing gear

3.7 Sectoral differences between vessels and gear

4 RESPONSIBLE FISHING GEAR/SELECTIVITY

4.1 Definition of selectivity

4.2 Selectivity limitations

4.3 Current state of fishing gear selectivity

4.4 Bycatch: selectivity failures

4.5 Selectivity by size

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4.7 Survival of fish that escape

4.8 Introduction of selective devices of proven success

5 ENERGY OPTIMISATION

5.1 Navigation and detection

5.2 Fishing operations

5.3 Fishing gear

5.4 Treatment and manipulation

5.5 Resources management

5.6 Atmosphere protection

6 OBLIGATIONS OF STATES

6.1 Obligations of all States

6.2 Obligations of Flag States

6.3 Obligations of Port States

APPENDIX

FAO's Code of Conduct for Responsible Fisheries

9.1 PRINCIPLES AND GUIDELINES

9.1.1 Responsible fisheries are those in which:

9.1.1.1 The total annual mortality enables the long-term maintenance of sustainable yield

9.1.1.2 The productivity of the environment is guaranteed and there is no threat to the ecosystem diversity

In this sense, nations should promote practices which reduce to the minimum:

9.1.1.3 The mortality of species which are not a target of fishing, as well as of those target species whose size and gender makes their capture unwanted

9.1.1.4 Uncontrolled mortality caused by fishing

9.1.1.5 Unwanted environmental impacts caused by fisheries

9.1.2 Responsible fisheries practices include a better exploitation of retained capture, documentation regarding retained capture and discard, and information about the origin of captures. It shall be necessary to restore the populations that have exhausted due to excessive fishing

9.2 RESPONSIBLE CAPTURE PRACTICES

9.2.1 Shared management

9.2.1.1 Fishing management shall be organised as a responsible society in which the industry, the scientific community, the conservation agencies, the Government and other interested parties intervene.

9.2.2 Resources evaluation and inventory

9.2.2.1 Governments have the responsibility to evaluate and compile an inventory of the resources within their jurisdiction. When performing these evaluations, Governments cannot ignore the information and abilities to perform explorations which the fishing industry offers. The conservation and distribution measures shall be based on the best scientific and socio-economic information available. In this sense, Governments are asked to be cautious when the data and information about the resources are uncertain. When this Code enters into force, countries shall consider the special requirements of developing countries, especially their need to have an appropriate financial, scientific and technical cooperation, as well as the importance of sustainable development for food safety.

9.2.3 Overcapitalisation and excessive fishing efforts

9.2.3.1 The correct balance between the fishing effort and the resources capacity is an essential component for responsible fisheries. Governments have aggravated the capture waste and they continue obstructing change by creating national subsidy and tax relief programmes that promote investment in fisheries worldwide. However, in some cases, subsidies are useful to promote change to more selective fishing gear, the reacquisition of fishing licences and the anticipated retirement programmes.

9.2.4 Bycatch discard

9.2.4.1 The worldwide generalised practice of discarding bycatch has negative consequences from an economic, biological and environmental point of view. All countries and parties interested in fishing should adopt measures and cooperate at an international level to reduce losses due to discards to a minimum. The following are some of the techniques adopted nowadays to approach this problem:

9.2.4.1.1 Fishing levels reduction

9.2.4.1.2 Close seasons and areas

9.2.4.1.3 Development of more selective gear or techniques

9.2.4.1.4 Rationalisation of regulations

9.2.4.1.5 Generalisation of the use and promotion of the commercialisation of unwanted species which are currently being discarded

9.2.4.1.6 Prohibition of fishing practices prone to waste

9.2.4.1.7 Development of handling methods which increase survival between discarded species

9.2.5 Lost fishing gear

9.2.5.1 It is known that lost or abandoned gear still works and increase the mortality of species that are liable to being caught. It is necessary to implement measures to reduce the loss of gear to a minimum. Among the possible solutions are the following:

9.2.5.1.1 Improving the systematic marking of gear. Report 485 of FAO proposes a marking system that alerts other fishers and seafarers of the presence of fishing gear and informs the direction of nets

9.2.5.1.2 Perfecting gear so that they offer more resistance to elements. If gear that is lost can probably cause ghost fishing, it shall obligatorily have timing mechanisms of release to create escape routes (holes) or neutralise their functional characteristics

9.2.5.1.3 Watching nets and limiting the deployment of gear so that it is possible to recover it in case of emergency or within the period of authorised fishing

9.2.5.1.4 Notifying the loss of gear (number and localisation) to national managing bodies

9.2.6 Habitat damage

9.2.6.1 Some specific fishing gear that comes into contact with the seabed can alter or damage the habitat and affect their benthic communities. Research on the long-term impacts of this damage to fishing productivity, the structure of the marine community and biodiversity is very limited, so the impacts are mostly unknown

9.2.6.2 Introducing a new fishing method into an area shall only be possible if there is data on experimental fishing applying this new method and if said data provide a reliable calculation of the new physical disturbance to the habitat. If data indicates that the habitat disturbance is significant, the new fishing method cannot be used at a commercial level until the necessary modifications are implemented

9.2.6.3 The use of fishing methods which significantly disturb the habitat shall be excluded through the implementation of close areas in order to preserve part of the habitat. If all the fishing area has already been significantly disturbed, it will be necessary to establish a close season so that the habitat can partially recover

9.2.7 Marine reserves

9.2.7.1 Governments are urged to study the possibility of establishing marine reserves as a management instrument which contributes to the preservation of the resources base

9.2.8 Fish as food

9.2.8.1 The capture of resources in the fishing area for human consumption shall haves priority

9.2.9 Economic factors

9.2.9.1 Even though fishing areas have a biological base, their management should consider the socio-economic side of small-scale and individual traditional fishing. Therefore, it is fundamental that managers and those in charge of the creation of policies adopt a social, economic and biological approach to regulate fishing areas, establishing an optimal dimension for the fleet and other appropriate strategies which take advantage of the bioeconomic models. A cautious and balanced planning in regard to subsidies which can generate excessive investment and overexploitation must be adopted to avoid the negative effects of expanding the existing fisheries

9.2.10 New fishing areas

9.2.10.1 The exploitation of new fishing areas should be based on a management plan which establishes the initial levels of fishing efforts and captures. The fishing area shall be scientifically studied and permanently monitored until the resource capacity is determined. Before authorising an additional monitored and controlled fishing effort, it will be convenient to establish an acceptable coefficient of mortality caused by fishing (including discards)

9.2.11 Abandonment of fishing gear

9.2.11.1 The proposed strategies to improve the compliance with laws regarding the abandonment of fishing gear at sea include the following:

9.2.11.1.1 Education

9.2.11.1.2 Development and use of technologies onboard to handle damaged or unused fishing gear

9.2.11.1.3 Port infrastructure prepared for the reception and disposal of damaged or unused fishing gear

9.2.11.1.4 Introduction of ecological products for fishing operations

9.2.11.1.5 A law that allows to take action against transgressors

9.2.12 Sectoral differences between vessels and gear

9.2.12.1 There are two types of interactions and differences between fishing gear and vessels. On one hand, those which derive from the existence of multiple maritime users that circulate in a specific fishing area; on the other hand, those produced between different types of gear

9.2.12.2 For the first kind, the best solution is to guarantee that all fishers are familiar with heading regulations of national and international governments, the lighting and other visual indications of the activities of vessels or specific transit areas, etc.

9.2.12.3 Fishers are often the ones who suggest solutions to the differences posed between different types of gear. These solutions must have the support of fisheries managers and lead to the adoption of measures by Governments

9.2.13 National answers

9.2.13.1 The Government in each country, in collaboration with other interested parties, should provide training to fishers, making them aware of the existence of the Code of Conduct for Responsible Fisheries and pointing out the appropriate practices.

9.3 RESPONSIBLE FISHING GEAR/SELECTIVITY

9.3.1 Definition of selectivity

9.3.1.1 Selective fishing is defined as “the ability to focus and capture fish according to their size and species during the capture operations, allowing bycatch to escape unharmed. Bycatch includes immature fish (or juveniles), ichthic species which are not a target of fishing, seabirds and other marine organisms that can be compromised in fishing.”

9.3.2 Selectivity limitations

9.3.2.1 Selectivity cannot solve the problem of overcapitalisation or overexploitation. However, the use of selective fishing gear can contribute to guaranteeing that marine resources are optimally exploited

9.3.3 Current state of fishing gear selectivity

9.3.3.1 Selective fishing tactics and methods have been developed and fishers know perfectly how to use these tactics and how to handle the fishing gear to increase or reduce selectivity. Even so, it is difficult to globally classify the multiple existing fishing methods as “clean” or “dirty” from the environmental point of view (with the possible exception of poison and explosives, which under no circumstance are appropriate methods). We could mention examples of cases in which the use of any fishing gear has negative impacts on the environment. However, in difference circumstances, the same fishing gear can be used efficiently and with few or no negative effects

9.3.4 Problem identification

9.3.4.1 Administrations shall compile an inventory of their fishing fleets with a catalogue of the fishing gear used, the fishing authorisations and the details about captures and bycatch regarding the available ichthic populations. They shall request the services of research institutions and personnel to continuously gather and analyse data, perform an evaluation and determine if it is necessary or not to increase the selectivity. In such cases, the industry and fishers themselves shall collaborate with scientists, technologists and managers to determine which selective gears and technologies are more appropriate to capture the ichthic population in a sustainable manner

9.3.5 Bycatch: selectivity mistakes

9.3.5.1 The absence of selective methods translates in an unacceptable volume of bycatch which sometimes is discarded, and this represents a morally inadmissible loss of food resources in the world

9.3.5.2 Countries should promote or enforce the use of selective gear to avoid regulations which contribute to increase the bycatch problem. The industry must fully adopt the use of selective gear. Regardless of the need or benefit from the market taking better advantage of bycatch, it is necessary to promote the prevention of waste by adopting measures for selective fishing

9.3.6 Selectivity by size

9.3.6.1 Selectivity by size in mobile gear can be attained in the opening of the mesh in the net's bag, which traditionally has been useful to reflect the size of target species. The most recent evolution in trawls selectivity allows non-target species to escape through devices and panels placed in other sections of the net. Fixed gear, such as traps, can measure size in the entrance and opening of the net or the space between the bars, whereas longlines tend to capture the biggest specimens of the population. Small pelagic fish tend to group in extensive shoals of the same size and species. Thus, a lot of pelagic fishing gear (pelagic trawls, surrounding nets with purse lines) does not experience the problem of selectivity by size or species. A more in-depth research that determines, among other things, the optimal capture size will provide opportunities to improve selectivity

9.3.7 Selectivity by species

9.3.7.1 Selectivity by species can be obtained with devices such as the Nordmore grid and the separating panels if it is only a limited number of species whose behaviour is different. The problem arises in mobile gear when the size and behaviour of target species and bycatch are similar. A higher level of selectivity can be obtained exploiting the behavioural differences between the various species (for instance, between fish and shrimp). It is convenient to highlight that the ichthic behaviour affects considerably the selectivity of fishing gear. It is also necessary to emphasise that these aspects need to be further investigated and that, in this context, developing countries need to receive assistance

9.3.8 Survival of fish that escape

9.3.8.1 Everything seems to suggest that demersal species have a high survival rate after passing through the net's bag. Pelagic species tend to be more sensitive and prone to suffer damage; it has also been observed that generally they are not a selectivity target, due to the mesh opening. The survival rates have to be considered when introducing any new technology

9.3.9 Introduction of selective devices of proven success

9.3.9.1 Administrations shall consider the selective fishing gear that has been successfully introduced in other countries. In various fisheries, the introduction of selective devices has helped to mitigate the bycatch problem. One example of this is the 95% reduction of bycatch in the North Atlantic thanks to the use of the Nordmore grid

9.3.10 Implementation of new technologies

9.3.10.1 The adoption of new or modified technologies, selective practices which are not technical or other alternatives must be realistic. In order to be successful, they need to be accepted willingly. However, to obtain full acceptance, it might be necessary to establish a system of incentives, regulations and compliance, accompanied by efforts in the education and training area and by the promotion of selectivity. This will require a continuous evaluation of their performance. In order to guarantee the success of any measure, the Administrations and the industry shall commit to their adoption without reservations

9.3.11 Exchange of information

9.3.11.1 A key factor for the success of selective practices is the exchange of information and cooperation between countries and the fishing industry

9.3.12 Shared ichthic populations

9.3.12.1 When many countries share ichthic populations and the adoption of selective practices is required, these shall be common to such countries

9.3.13 Socioeconomic aspects

9.3.13.1 The socioeconomic context in a fishery shall be taken into account when fishing gear selectivity measures are introduced. Although the introduction of new gear results viable in the long term from the technical and economic point of view, the community could stumble into great difficulties if the measures are abruptly implemented. The problem shall be considered more pronounced in fisheries where, traditionally, the economic gain and employment depend on a species which is a bycatch target, or if the fishery is vulnerable to the reduction of the catch of target species and their economic gain is marginal

9.3.14 Transfer of technical measures at a regional level

9.3.14.1 The project on fishing gear and selectivity devices destined to a concrete use is not necessarily transferable to other fisheries in the region. The combined effects of the trawling speed, the temperature, the species characteristics, the catch strategies and the types of fishing gear lead to important regional differences when determining the need to introduce selectivity measure and look for possible solutions. Therefore, it will be necessary to retest the devices and/or techniques before adopting them in a new region. The selectivity fishing gear tests also have technical and biological dimensions. In this regard, it may be advisable to transfer the test methods to the developing countries

9.4 ENERGY OPTIMISATION

9.4.1 Energy is essential for the economic and social development and to improve the quality of life. However, today a great part of the energy of the world is produced and consumed in an unsustainable way if technology remains constant and the total consumption levels substantially increase

9.4.2 Considerable differences are observed as regards the need for optimal energy use, on the one hand between fisheries in developed and developing countries and, on the other hand, between big and small fisheries

9.4.3 In order to guarantee the application of optimal use techniques, it would be convenient to study the following aspects:

9.4.3.1 Determination of real needs

9.4.3.2 Economic viability

9.4.3.3 Acceptable technology from the social point of view (which does not negatively affect the community)

9.4.3.4 Impartial access to technology

9.4.3.5 Continuous availability of energy, materials, services and maintenance in the long term

9.4.3.6 Existence of the necessary competences for its exploitation

9.4.3.7 Capacity related to education, training and technology transfer

9.4.3.8 Development of fisheries in an environmentally sound manner

9.4.4 The administration, owners, managers and fishers must take into account the following guidelines when planning managing and performing catch activities and its ulterior operations

9.4.4.1 Fishing vessels

Owners and managers shall ensure that:

9.4.4.1.1 They incorporate the concept of optimal energy use in the construction and maintenance of fishing vessels' hulls

9.4.4.1.2 The new hull projects have characteristics which allow to save energy, such as a greater length/beam ratio and bulb prows

9.4.4.1.3 The vessels' hulls are regularly cleaned and coated with anti-fouling paint

9.4.4.1.4 Alternative and innovative projects which make a better use of energy, such as multi hulls, are considered

9.4.4.1.5 The weight of new construction vessels is reduced by employing alternative materials such as aluminium and fibre-reinforced plastic (FRP)

9.4.4.1.6 The application of concepts which have demonstrated to save energy, such as bulb prows, in the remodelling of existing vessels

9.4.4.2 Propulsion and auxiliary systems

The concept of optimal energy use must be incorporated, whenever possible, to the installation, functioning and maintenance of the propulsion and auxiliary systems. Owners and managers shall:

9.4.4.2.1 Ensure that engines and propellers adapt to the type and the exploitation of the vessel

9.4.4.2.2 Study the possibility of installing propellers with nozzle and variable-pitch propellers

9.4.4.2.3 Study the possibility of complementing the propulsion with the sail

9.4.4.2.4 Study the possibility of incorporating heat recovery technologies which burn waste to larger vessels

9.4.4.2.5 Evaluate the possibility of using alternative fuels which contribute to the reduction of atmospheric and marine pollution

9.4.4.3 Navigation and detection

Owners, managers and fishers shall ensure that an optimal energy use is obtained through navigation and detectors aids, and they shall maximise the use of:

9.4.4.3 .1 The compass, the chart and the electronic aids

9.4.4.3 .2 The acoustic and oceanographic data, the behaviour of the ichthic species and their migratory routes to optimise the fuel consumption during fishing operations

9.4.4.4 Operations

9.4.4.4.1 The energy optimisation shall serve as a guideline to elaborate strategies for the vessels and the fleet

9.4.4.4.2 Vessels shall navigate at the most efficient speed for their fishing operations

9.4.4.4.3 The computer simulation programs shall be considered an aid for the operations planning and the vessel analysis

9.4.4.5 Fishing gear

9.4.4.5.1 The energetic efficiency shall be an integral part of the project, the exploitation and the maintenance of the fishing gear

9.4.4.5.2 The fishing gear shall be designed and chosen taking into consideration the propulsion systems of the vessel, the behaviour of the fishing target species and the manipulation capacity on deck

9.4.4.5.3 The fishing gear shall be properly maintained during fishing operations

9.4.4.5.4 Materials which improve the fishing gear performance shall be used

9.4.4.5.5 Energy consumption shall be controlled

9.4.4.6 Treatment and manipulation

Several factors can contribute to the optimal energy use, for example:

9.4.4.6.1 A deck project optimal for product manipulation and fishing gear handling

9.4.4.6.2 Quality improvement

9.4.4.6.3 Cooling, refrigeration and conservation capacity, commensurate with the volume of the catches

9.4.4.6.4 The best possible use of the isolation techniques

9.4.4.7 Resources management

9.4.4.7.1 The captures management plans shall consider the elaborated guidelines on energy saving

9.4.4.7.2 The fisheries managers shall recognise that management techniques, such as quotas systems and rules on vessels and gear, may significantly influence the energy optimisation during fishing operations

9.4.4.8 Protection of the atmosphere

9.4.4.8.1 Provisions shall be adopted for the reduction of hazardous substances in the exhaust gas emissions, prescribing that vessels shall have energy optimising devices and the equipment to reduce the emission of ozone-depleting substances

9.4.4.8.2 The vessel's machinery shall be used and effectively maintained to ensure that CO2, NOX and SOX emissions in exhaust gases do not exceed the established limits (refer to the Guidelines for the application of the Montreal Protocol related to the Vienna Convention)

9.4.4.8.3 Provisions shall be adopted for the progressive elimination of chlorofluorocarbons (CFCs) in the fishing vessels' refrigeration systems and it shall be ensured that the established terms are duly reported to the naval and fishing industries

9.4.4.8.4 Adequate measures shall be adopted for the refurbishment of existing fishing vessels and to provide them with refrigerants different from CFCs and with halons for fire-fighting facilities. These alternative products must be mentioned in the specifications of new vessels

9.4.4.8.5 The international guidelines on the CFCs elimination shall be followed

BIBLIOGRAPHY

- Acha E. M.; H. W. Mianzan; R. A. Guerrero; M. Favero; J. Bava: “Marine fronts at the continental shelves of austral South America Physical and ecological processes”, in *Journal of Marine Systems* 44, 83– 105.
- Alarcón Vélez, J. R.; C. M. Salazar Céspedes; R. Guevara Carrasco; A. Aubone; G. Chacón; R. Cornejo; J. C. Garcia; F. Ganoza; J. Calderón; C. Vásquez; A. Fiestas and A. Querevalu: “Experiencias de selectividad con red de arrastre de fondo utilizando grillas de selección aplicado a la merluza peruana (Merluccius gayi peruanus)”, in *Revista de Investigación y Desarrollo Pesquero*, 25 (2014), 83-95, Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP).
- Alverson, D. L. and S. E. Hughes: “Bycatch: from emotion to effective natural resource management”, in *Revista Fish Biol Fisheries*, 6 (1996), 443.
- Alverson, D. L.; M. H. Freeberg; J. G. Pope and S. A. Murawski. 1994. “A global assessment of fisheries bycatch and discards”, in FAO Fish. Tech. Pap., 339 (1994), 233.
- Andrew, N. L. and J. G. Pepperell: “The bycatch of shrimp trawl fisheries”, in *Oceanogr. Mar. Biol. Annu. Review*, 30 (1992), 527–565.
- Angelescu, V.A. and L. B. Prenski: “Ecología trófica de la merluza común del Mar Argentino (Merlucciidae, Merluccius hubbsi), parte 2. Dinámica de la alimentación analizada sobre la base de las condiciones ambientales, la estructura y las evaluaciones de los efectivos en su área de distribución” (Mar del Plata), in *Contribución INIDEP*, 561 (1987), 205.
- Argentina, Ministerio Relaciones Exteriores: *La Industria Pesquera Argentina*, 2010 (informe sectorial).
- Attwood, C. G.: “Potential bycatch mitigation measures in the south coast inshore trawl fishery”, in *Responsible Fisheries Alliance*, South Africa (2011), 39.
- Au, D. W. K.: “Species composition in the Japanese longline fishery off the southern and eastern United States”, in *ICCAT, SCRS*, 75 (1984), 376-385.
- Aubone, A.; J. García and R. Ercoli: “Análisis de selectividad del DEJUPA y copos de malla diamante para la pescadilla (Cynoscion guatucupa)”, Campaña (H-05/00), informe técnico CTMFM del Grupo de Trabajo Artes de Pesca, 2/00, anexo I, (2000).
- Aubone, A.; M. F. Villarino; B. Santos and M. Renzi: “Simulación del efecto de áreas de veda, esfuerzo pesquero y selectividad de dos flotas (flota arrastrera merlucera y flota tangonera langostinera) sobre la merluza (Merluccius

hubbsi) al sur del 41° S, e indicadores de sustentabilidad biológica" (Mar del Plata), informe técnico oficial del INIDEP, 16 (2010), 30.

- Aubone, A.; R. Ercoli and García: "Resumen de la retención por talla de merluza (Merluccius hubbsi) en redes de arrastre con copos de malla diamante y DEJUPA" (Mar del Plata), informe técnico interno del INIDEP, 71 (1999).
- Aubone, A.; S. I. Bezzi; G. Cañete; R. Castrucci; C. Dato; G. Irusta; A. Madirolas; M. Pérez; M. Renzi; B. Santos; M. Simonazzi and M. F. Villarino: "Evaluación y sugerencias de manejo del recurso merluza (Merluccius hubbsi). La situación hasta 1999", in: R. Sánchez and S. Bezzi (eds.): *El Mar Argentino y sus recursos pesqueros. Los peces marinos de interés pesquero. Caracterización biológica y evaluación del estado de explotación* (Mar del Plata), publicaciones especiales del INIDEP, 4 (2004), 207-235.
- Banco Interamericano de Desarrollo (BID): Diagnóstico del sector pesquero y acuícola en la Argentina, 2013.
- Barea, L. and O. Defeo: "Aspecto de la pesquería del cangrejo rojo (Geryonquinquedens) en la ZCPAU", in Frente Marítimo, 1 (1985), 38-46.
- Bertolotti M. I.; G. Verazay; E. Errazti; A. Pagani and J. Buono: "Flota pesquera argentina. Evolución durante el período 1960-1998 con actualización a 2000", Contribución INIDEP, 1166 (2001).
- Bertolotti M. I.; M. D'Atri; A. Pagani and M. Casanelli: "Evolución de la flota pesquera argentina 1960-2015", parte 1 (Mar del Plata), informe de investigación del INIDEP, 96 (2017) 16.
- Bertolotti M. I.; N. E. Brunetti; J. I. Carreto; L. B. Prenzki; R. P. Sanchez: "Influence of shelf break fronts on the shellfish and fish stocks off Argentina", in *ICES CM*-1996/Sz41 (1996), 11.
- Bertolotti, M. I.; E. Errazti; P. Gualdoni and A. Pagani, A.: Principios de política y economía pesquera, Buenos Aires, Dunken (2008).
- Bertolotti, M. I.; G. Piergentili and D. Cabut, D.: "El sector pesquero argentino" (Mar del Plata), INIDEP (1987).
- Bertuche, D.; C. Fischbach and J. De la Garza: "La fluctuación de la abundancia de langostino en el Golfo San Jorge. Un análisis preliminar de su relación con el manejo pesquero y los cambios del contexto climático global", informe técnico interno del INIDEP-DNI, 45/00 (2000a).
- Bertuche, D.; C. Fischbach and J. De la Garza: "La predicción de futuros escenarios de producción en la pesquería de langostino patagónico", informe técnico interno del INIDEP-DNI No. 30/01 (2001).
- Bertuche, D.; J. De la Garza and C. Fischbach: "Resultados de la prospección de langostino patagónico realizada por buques tangoneros en aguas

exteriores del Golfo San Jorge (Resolución SAGPyA No. 593/2000)", informe técnico interno del INIDEP-DNI No. 81/00 (2000b).

- Bertuche, D.; J. De La Garza; M. Fernández; F. Fischbach; P. Moriondo, R. Piñero; A. Roux: "Estudio de las potenciales afectaciones de las distintas actividades económico-productivas realizadas en la zona costera patagónica, en especial en el Golfo San Jorge, sobre especies bentónicas, en relación a la evolución de aquellas definidas como indicadoras" (Mar del Plata), Consultora Serman & Asociados S. A., informe Proyecto Langostino del INIDEP (2001) 162.
- Bertuche, D.; K. Fischbach; A. Roux; M. Fernandez and R. Piñero.: "Langostino (Pleoticus muelleri)" in S. I. Bezzi; R. Akselman; E. E. Boschi (eds.): *Síntesis del estado de las pesquerías marítimas argentinas y de la Cuenca del Plata.* 1997-1998 (Mar del Plata), publicaciones especiales del INIDEP, 1999.
- Bezzi, S. I. and C. V. Dato: "Conocimiento biológico pesquero del recurso merluza (Merluccius hubbsi) y su pesquería en la República Argentina", documento científico del INIDEP, 4 (1995).
- Bezzi, S.; R. Castrucci.; C. Dato; P. Ibáñez; C.G. Irusta; M. Pérez; M. Renzi; B. Santos; M. Simonazzi and F. Villarino: "Caracterización biológica y evaluación del estado de explotación de la merluza (Merluccius hubbsi)", informe técnico interno DNI-INIDEP, 133/97 (1997).
- Bianchi, A. A. and S. Garzoli: "Variability and motion of the Brazil-Malvinas Front", in *Geoacta*, 22 (1997), 7490.
- Bianchi, A. A.; C. F. Giulivi; A. R. Piola: "Mixing in the Brazil-Malvinas Confluence, in *Deep-Sea Res.*, 4, (1993), 1345-1358.
- Bisbal, G. A.: "The Southeast South American shelf large marine ecosystem: Evolution and components", in *Marine Policy* 19, 1, (1995), 21-38.
- Boschi E.; C. E. Fischbach and M. I. Iorio: "Catálogo ilustrado de los crustáceos estomatópodos y decápodos marinos de argentina", in *Frente Marítimo*, 10 (1992), 7-94.
- Brandhorst, W. and J. P. Castello: "Evaluación de los recursos de Anchoíta (Engraulisanchoita) frente a la Argentina y Uruguay" (Mar del Plata), proy. des. pesq. ser. inf. técnico 29, (1971).
- Brewer, D.; N. Rawlinson; S. Eayrs and C. Burridge: "An assessment of Bycatch Reduction Devices in a tropical Australian prawn trawl fishery", in *Fisheries Research*, 36 (1998), 195-215.
- Broadhurst, M. K.: "Modifications to reduce bycatch in prawn trawls: A review and framework for development", in *Reviews Fish Biology and Fisheries*, 10 (2000), 27-60.

- Cámara de la Industria Naval de Mar del Plata: *Edad de la Flota Pesquera Argentina* (2017).
- Camiolo, M. D.: "Distribución del material particulado en suspensión y su vinculación con la pesquería de Corvina rubia (Micropogoniasfurnieri) a través del uso de imágenes satelitales", tesis de doctorado, Universidad Nacional de Mar del Plata (2017).
- Cañete, G. R.: "Manual de Observadores a bordo de buques pesqueros" (Mar del Plata), informe técnico del INIDEP (1995).
- Carozza, C. R.; C. A. Lasta; C. Ruarte; C. P. Cotrina; H. W. Mianzan and E. M. Acha: "Corvina rubia (Micropogonias furnieri)" in R. P. Sánchez; S. I. Bezzi; (eds.): *Los peces marinos de interés pesquero.* Caracterización biológica y evaluación del estado de explotación, tomo 4 (Mar del Plata), INIDEP, (2004), 255-270.
- Carreto, J. I.; C. A. Verona; A. B. Casal and M. A. Laborde: "Fitoplancton, pigmentos y condiciones ecológicas del Golfo San Matías", informe de la Comisión de Investigaciones Científicas de la Provincia de Buenos Aires (1974), 49-6.
- Carreto, J. I.; V. Lutz; M. Carignan; A. D. Cuchi Colleoni; S. De Marco: "Hidrography and chlorophyll a in a transect from the coast to the Shelf-break in the Argentinian Sea", in *Cont Shelf Res*., 15, 2/3 (1995), 315-336.
- Castrucci, R.; A. Aubone; M. Pérez; M. A. Renzi: "Índice de abundancia del grupo merluza de edad 2 en el área de cría patagónica. Período 1995-1998", in: L. S. Tringali and S. I. Bezzi (eds.): *Aportes para la evaluación del recurso merluza (Merlucciushubbsi) al sur de los 41° S*, vol. 51 (Mar del Plata), informe técnico del INIDEP, (2003), 27-38.
- Catchpole, T. L.; C. L. J. Frid and T. S. Gray: "Discards in North Sea fisheries: causes, consequences and solutions", in *Marine Policy*, 29 (2005), 421-430.
- Catchpole, T. L.; C. L. J. Frid and T. S. Gray: "Resolving the discard problem-A case study of the English Nephrops fishery", in *Marine Policy*, 30 (2006), 821-831.
- Centro Naval. Comisión de Pesca: "El problema de la Seguridad en la Pesca Argentina", boletín 814 (2016).
- Collins, J.: "Shrimp trawl bycatch and possible solutions", in *Applications to Reduce Bycatch*. *Considerations for Today and Tomorrow* (1995), 265-267.
- Condie, H., A. Grant and T. Catchpole: "Does banning discards in an otter trawl fishery create incentives for more selective fishing?" in *Fish*. *Res*., 148 (2013) 137-146.
- Cordo, H. D.: "Evaluación del estado actual del recurso abadejo y estimación de la captura biológicamente aceptable para el año 2004", in R. P. Sánchez;

S. I. Bezzi; (eds.): *Los peces marinos de interés pesquero.* Caracterización biológica y evaluación del estado de explotación, tomo 4 (Mar del Plata), INIDEP, (2004), 237-253.

- Cordo, H. D.: "Evaluación del recurso abadejo (Genypterusblacodes) y estimación de la CBA 2012" (Mar del Plata), informe técnico del INIDEP (2012).
- Cordo, H.: "Evaluación del efectivo sur de 41° de la merluza (Merluccius hubbsi) y estimación de la captura biológicamente aceptable correspondiente al año 2006" (Mar del Plata), informe técnico interno del INIDEP, 34 (2006).
- Course G, et al.: The English North Sea catch quota pilot scheme (Using REM as a verification tool), Lowestoft (2011). Online: <http://www.cefas.defra.gov.uk/media/524514/englandremcatchquotafinalreportjuly2011final_tc.pdf>.
- Crowder, L. B. and S. A. Murawski: "Fisheries bycatch: implications for management", in *Fisheries*, 23 (1996), 8-17.
- Dato, C.; M. Renzi; M. Pérez; G. Irusta; F. Villarino; M. Simonazzi; S. Bezzi; R. Castrucci and P. Ibañez: "Propuesta para la protección del área de cría patagónica de merluza (Merluccius hubbsi)", informe técnico interno del DNI-INIDEP, 140/1996 (1996).
- Davis, S. K.: "Multispecies management: An alternative solution to the bycatch problem. In Applications to Reduce Bycatch", in *Considerations for Today and Tomorrow* (1995), 251-259.
- De La Garza, J.: "Información biológica del langostino patagónico obtenida a bordo de un barco comercial durante la prospección pesquera llevada a cabo en la provincia de Santa Cruz", inf. ases. transf. del INIDEP, 30/2010, (2010).
- Deacon, G. E. R.: "The hydrology of the Southern Ocean", in *Discovery Reports*, 15 (1937), 1-24.
- Defeo, O.; V. Little and L. Barea: "Stock assessment of the deep-sea red crab Chaceonnotilais in the Argentinean-Uruguayan Common Fishing Zone", in *Fish. Res.*, 11 (1991), 25-39.
- Delgado, E.: "Biología reproductiva del cangrejo rojo Chaceonnotialis (Decapoda, Brachyura) del Atlántico sudoccidental", tesis MSc. Universidad de la República Montevideo, Uruguay, 2001.
- Di Marco, E.: "Evaluación del recurso abadejo (Genypterusblacodes) del Atlántico sudoccidental. Período 1980-2015. Recomendación de la CBA 2017", informe técnico del INIDEP, 43 (2016).
- Dykstra, J.: "Bycatch management on the United States East Coast. In Applications to Reduce Bycatch", in *Considerations for Today and Tomorrow* (1995), 261-263.

- Ehrhardt, N. M.; R. Ercoli; J. García; J. Bartozzeti and A. Izzo: “Influencia de la cantidad de captura en la selectividad de mallas diamante y cuadrada en redes de arrastre para la merluza común (Merlucciushubbsi) e implicancias sobre el potencial de descarte”, in *Revista Invest. Des. Pesq.* (Argentina), 10 (1996), 31-43.
- Elías, I.; C. Carozza; E. E. Di Giácomo; M. S. Isla; J. M. Orensanz; A. M. Parma; R. C. Pereiro; M. R. Perier; R. G. Perrotta; M. E. Ré and C. Ruarte: “Coastal fisheries of Argentina”, in: S. Salas; R. Chuenpagdee; A. Charles and J. C. Seijo (eds): *Coastal Fisheries of Latin America and the Caribbean*, Rome: FAO Fish. Aquac. Tech. Pap., 544 (2011), 13–48 p.
- Enever, R.; A. Revill and A. Grant: “Discarding in the North Sea and on historical efficiency of gear-based technical measures in reducing discards”, in *Fisheries Research*, 95 (2009), 40-46.
- Ercoli, R. and J. García: “Estado actual de las investigaciones del dispositivo para el escape de juveniles de peces en las redes de arrastre –DEJUPA”, informe técnico interno del DNI-INIDEP, 98/98, (1998a).
- Ercoli, R. and J. García: “The Argentinean procedure and experience with the introduction and acceptance of new sustainable technology”, in *FAO Expert Consultation on Sustainable Fishing Technologies and Practices*, St. John's, Newfound-land, Canada, March 1-6 (1998b).
- Ercoli, R.; J. C. García; A. Aubone; L. Salvini and A. Izzo: “Selectividad del sistema DEJUPA-COPO en la pesquería de merluza (Merluccius hubbsi) mediante el uso de copos con mallas diamante de 100 y 120 mm luz”, Comisión Técnica Mixta del Frente Marítimo, in *Frente Marítimo*, 19 (2003), 75-84.
- Ercoli, R.; J. C. García; L. Salvini; A. Izzo and J. D. Bartozzetti: “Manual del dispositivo de selectividad de langostino con doble grilla. DISELA II”, informe técnico interno del INIDEP, 094/97 (1997).
- Ercoli, R.; J. García; A. Aubone and J. Bartozzetti: “DISELA II: Resultados sobre selectividad de merluza obtenidos en el B/P tangonero ARBUMASA VII”, informe técnico interno del INIDEP, 46 (1999).
- Ercoli, R.; J. García; R. Roth; A. Aubone and L. Salvini: “Experiencias de pesca comparativa con red tipo tangonera y paño separador horizontal desarrollado por la empresa Arbumasa S. A., CA.La.Pa.”, informe técnico del INIDEP, 17/06 (2006a).
- Ercoli, R.; L. Salvini; A. Izzo; J. C. García and J. D. Bartozzetti: “Selectivity experiences on hake (Merluccius hubbsi) by means the use of a single grid sorting device for the escape of juvenile fishes from trawls (DEJUPA)”, Comisión Técnica Mixta del Frente Marítimo, en *Frente Marítimo*, 18 (2000), 45-52.

- Ercoli, R.; L. Salvini; J. García; A. Izzo; R. Roth and J. Bartozzetti: "Manual técnico del dispositivo para el escape de juveniles de peces en las redes de arrastre (DEJUPA) aplicado a la merluza (Merluccius hubbsi)", informe técnico del INIDEP, 39 (2000).
- Ercoli, R.; R. Roth; A. Aubone, A. Izzo and J. Bartozzetti: "Experiencias de pesca" (2006), in R. Ercoli; R. Roth; A. Aubone; A. Izzo and J. Bartozzetti: "Experiencias de pesca comparativa con un dispositivo de selectividad con grilla simple HARGRIL, desarrollado por la empresa Harengus S. A.", informe técnico del INIDEP, 21/06 (2006b).
- Erickson, D. L., J. A. Pérez Comas; E. K. Pikitch and J. R. Wallace: "Effects of catch size andcodend type on the escapement of walleye Pollock (Theragrachalcogramma) from pelagic trawls", in *Fisheries Research*, 28 (1996), 179-196.
- European Commission: "Collaboration between the scientific community and the fishing sector to minimize discards", ref. ares (2013) 3755701, (18/12/2013).
- FAO, Fisheries and Aquaculture Department, SOFÍA report: "The State of World Fisheries and Aquaculture" (2012).
- FAO, Fisheries and Aquaculture Department, SOFÍA report: "The State of World Fisheries and Aquaculture" (2016).
- FAO: "Discards in the World's Marine Fisheries: An Update", technical paper, 470, (2000).
- Feekings, J.: V. Bartolino; N. Madsen and T. Catchpole: "Fishery Discards: Factors Affecting Their Variability within a Demersal Trawl Fishery", in *PLOS ONE*, 7 (4) (2012).
- Fischbach, C. and D. Hernández: "Indicadores de abundancia y esfuerzo pesquero en la pesquería de langostino en el período 1992-2000. Aplicación de un modelo lineal general", informe técnico interno del DNI-INIDEP, 51/2001 (2001).
- Fischbach, C.: "Pesquería de langostino. Situación en el mes de octubre", informe técnico del INIDEP, 25/2013 (2013).
- Fischbach, C.; D. Bertuche and J. De La Garza: "Identificación pragmática de períodos críticos en la abundancia de langostino patagónico, 1992-2008, informe técnico del INIDEP, 19/2009 (2009).
- Fischbach, C.; D. Bertuche and J. De La Garza: "La pesquería del langostino patagónico en el período 1991-2005", informe técnico del INIDEP, 03/2006 (2006).

- Fonseca, P.; A. Campos; B. Mendes and R. B. Larsen: "Potential use of a Nordmøre grid for by-catch reduction in a Portuguese bottom-trawl multispecies fishery", in *Fisheries Research*, 73 (2005), 49-66.
- Forbes, M. C. and Z. Garraffo: "A note on the mean seasonal transport on the Argentine Shelf", in *Journal of Geophysical Research Atmospheres*, 93 (C3) (1988), 2311-2319.
- Framiñán, M. B. and O. B. Brown: "Study of the Río de la Plata turbidity front. Part I: spatial and temporal distribution", in *Continental Shelf Research*, 16 (1996), 1259-1282.
- Framiñan, M. B.; M. P. Etala; E. M. Acha; R. A. Guerrero; C. A. Lasta; O. B. Brown: "Physical Characteristics and Processes of the Río de la Plata Estuary" (1999), in: G. M. Perillo; M. C. Piccolo; M. Pino Quivira (eds.): *Estuaries of South America, their geomorphology and dynamics*, Berlin: Springer Verlag (1999) 161-191.
- Gagliardini, D. A. and A. L. Rivas: "Environmental characteristics of San Matias Gulf obtained from Landsat-TM and ETM + data", in *Gayana*, 68 (2) (2004), 186-193.
- García, J. and R. Ercoli: "Estimación de la curva de retención del sistema Flexigrid-copo 35/110 mm para la merluza mediante una simulación", informe técnico del INIDEP, 56, (2008).
- García, J.; A. Aubone and R. Ercoli: "Análisis de la selectividad del DEJUPA sobre la corvina (Micropogonias furnieri)", Campaña H-06/01, informe técnico del CTMFM, Grupo de Trabajo Artes de Pesca, 1/01 (12 and 13 November 2001). anexo I.
- García, J.; A. Aubone; R. Roth and R. Ercoli: "Experiencias de selectividad de merluza con un copo de mallas diamante de 96 mm de luz y una ventana de malla cuadrada de 62 mm de lado", Cámara Argentina de Armadores de Buques Pesqueros de Altura (CAABPA) y Cámara de la Industria Pesquera Argentina (CAIPA), informe técnico del INIDEP, 028/09 (2009a).
- García, J.; A. Aubone; R. Roth and R. Ercoli: "Selectividad de merluza (Merluccius hubbsi) con una red denominada Júpiter 2009 propuesta por la empresa Alpesca S. A.", informe técnico oficial del INIDEP, 048/09 (2009b).
- García, J.; R. Ercoli; A. Aubone: "Análisis de la campaña de selectividad H-05/00 para la pescadilla (Cynoscion guatucupa) y corvina (Micropogonias furnieri) con malla diamante y DEJUPA" (Mar del Plata, Argentina), taller Grupo de Trabajo Artes de Pesca de la CTMFM, informe técnico preliminar presentado por el Grupo de Artes de Pesca del INIDEP, 17, anexo 1 (24/25 de Julio de 2000).
- García, J.; R. Roth and R. Ercoli: "Experiencias de selectividad en merluza con un copo de mallas diamante y T90 con luz de malla nominal de 125 mm

desarrollado por la empresa Harengus S. A., informe técnico oficial del INIDEP, 031/08 (2008).

- García, S. M. and J. I. de Leiva Moreno: "Global Overview of Marine Fisheries", in: M. Sinclair and G. Valdimarsson (eds.): *Responsible Fisheries in the Marine Ecosystem*, FAO and CABI Publishing (2003).
- García, S. M. and R. J. R. Grainger: "Gloom and doom? The future of marine capture fisheries", in *Philosophical Transaction of the Royal Society*, 360, B (2005), 21–46.
- Garcia, S. M.; A. Zerbi; C. Aliaume; T. Do Chi and G. Lasserre: "The ecosystem approach to fisheries. Issues, terminology, principles, institutional foundations, implementation and outlook", in FAO Fisheries Technical Paper, 443 (2003).
- Gislason, H.; M. Sinclair; K. Sainsbury and R. O'Boyle: "Symposium overview: incorporating ecosystem objectives within fisheries management", in *ICES Journal of Marine Science*, 57 (2000), 468–475.
- Glass, C. W. and C. S. Wardle: "A review of fish behavior in Relation to Species Separation and Bycatch Reduction in Mixed Fisheries. In Applications to Reduce Bycatch", in *Considerations for Today and Tomorrow* (1995), 243-250.
- Glorioso, P. D and R. A. Flather: "A barotropic model of the currents off SE South America" in *Journal Geophys. Res.*, 100 (C7), (1995), 13427–13440.
- Glorioso, P. D and R. A. Flather: "The Patagonian Shelf tides", in *Progress in Oceanography*, 40 (1-4), (1997), 263-283
- Glorioso, P. D.: "Temperature distribution related to Shelf-sea fronts on the Patagonian Shelf", in *Continental Shelf Research*, 7 (1) (1987), 27-34.
- Góngora, M. E.: "Dinámica y manejo de la captura incidental de peces en la pesquería de langostino patagónico (Pleoticus muelleri)" (Río Negro), tesis de doctorado en biología, Universidad Nacional del Comahue, 2011.
- Góngora, M. E.; N. D. Bovcon and P. Cochia: "Ictiofauna capturada incidentalmente en la pesquería de langostino patagónico Pleoticus muelleri Bate, 1888", in *Revista de Biología Marina y Oceanografía*, 44 (2009), 583-593.
- Goñi, G.; S. Kamholz; S. Garzoli; D. Olson: "Dynamics of the Brasil-Malvinas Confluence based on inverted echo sounders and altimetry", in *Journal of Geophysical Research*, 101 (1996), 16273-16289
- González, R; M. Narvarte and M. Morsan: "Estado de situación de los recursos pesqueros del Golfo San Matías, sus pesquerías, especies asociadas y ambiente", informe ad hoc para la evaluación preliminar de las pesquerías

marinas de Río Negro con vistas a la certificación de su sustentabilidad, informe técnico Interno IBMP Alte. Storni, 03/2004, 51 (2004).

- Gordon, A. L.: "Brazil-Malvinas Confluence-1984", in *Deep Sea Research*, 36 (1989), 359-384.
- Gordon, A. L.: "South Atlantic thermocline ventilation", in *Deep Sea Research*, 28 (A), 11 (1981), 1239-1264.
- Gordon, H. R.; B. Brown; R. H. Evans; J. W. Brown; R. C. Smith; K. S. Baker; D. K. Clark: "A semi-analytic radiance model of ocean color", in *Journal of Geophysical Research*, 93 (1988), 10909-10924.
- Graham, N.; R. S. T. Ferro; W. A. Karp and M. A. Mullen: "Fishing practice, gear design, and the ecosystem approach. Three case studies demonstrating the effect of management strategy on gear selectivity and discards", in *ICES Journal of Marine Science*, 64 (2007), 744–50.
- Grainger, R. and T. Farmer: The State of World Fisheries and Aquaculture 2012 Rome: FAO (2012).
- Guerrero, R. A. and A. R. Piola: "Masas de agua en la plataforma continental", in E. E. Boschi (ed.): *El mar Argentino y sus recursos pesqueros*, tomo 1, Mar del Plata, (1997), 107-118.
- Guerrero, R. A.: E. M. Acha; M. B. Framiñan; C. A. Lasta: "Physical oceanography of the Río de la Plata Estuary, Argentina", in *Continental Shelf Research*, 17 (7) (1997), 727-742.
- Hall, M. A.: "An ecological view of the tuna-dolphin problem: impacts and trade-off Review", in *Fish Biology and Fisheries*, 8 (1998), 1-34.
- Hall, M. A.: "On bycatches. Reviews", in *Fish biology and Fisheries*, 6 (1996), 319-352.
- Hall, S. J.; E. Brooke and M. Mainprize: "Managing by-catch and discards: how much progress are we making and how can we do better?", in *Fish and Fisheries*, 6 (2005), 134-155.
- Hardin, G.: *The Tragedy of the Commons. Science*, vol. 162, New Series, 3859.
- Harris, A. N. and I. R. Poiner: "Changes in species composition of demersal fish fauna of Southeast Gulf of Carpentaria, Australia, after 20 years of fishing", in *Marine Biology*, 111 (1991), 503-519.
- Hastie, L. C.: "Deep-water geryonid crabs: a continental slope resource", in *Ocean Mar. Biol. Ann. Review*, 33 (1995), 561-584.
- Heessen, H. J. L. and N. Daan: "Long-term trends in ten non-target North Sea fish species", in *Journal of Marine Science*, 53 (1996), 1063-1078.

- Helland-Hansen, B.: *Nogenhydrografiskemetoder. Scand. Naturforsker Mote. Kristiana.* Oslo (1916).
- Holthuis, L. B.: "Marine lobsters of the world. An annotated and illustrated catalogue of species of interest to fisheries known to date", *FAO Species Catalogue*, 13 (125), FAO, (1991).
- ICES: "Report of the ICES Advisory Committee" (2011). Online: <http://www.ices.dk/advice/icesadvice.asp>.
- ICES: "Report of the Workshop on Discard Raising procedures" (San Sebastian, Spain), 6-9 February, ACFM, 06 (2007).
- Ikeda, Y; G. Siedler; M. Zwierz: "On the variability of Southern Ocean Front Locations between Southern Brazil and the Antarctic Peninsula", in *Journal of Geophysical Research*, 94(C4), (1989), 4757-4762.
- Jaureguizar, A. J.; A. Solari; F. Cortés; A. C. Milessi; M. I. Militelli; M. D. Camiolo; M. Luz Clara and M. García: "Fish diversity in the Río de la Plata and adjacent waters: an overview on the environment influence on its spatial and temporal structure", in *Journal of Fish Biology*, 89 (2016), 569–600.
- Johnsen, J. P. and S. Eliasen: "Solving complex fisheries management problems: what the EU can learn from the Nordic experiences of reduction of discards", in *Marine Policy*, 35 (2011), 130-139.
- Kelleher, K.: "Descartes en la pesca de captura marina mundial. Una actualización", Documento Técnico de Pesca, 470, FAO (2008).
- Kennelly, S. J.; G. W. Liggins and M. K. Broadhurst: "Retained and discarded by-catch from oceanic prawn trawling in New South Wales, Australia", in *Fisheries Research*, 36 (1998) 217-236.
- Krag, L. A.; R. Holst; N. Madsen; K. Hansen and R. P. Frandsen: "Selective haddock (Melanogrammus aeglefinus) trawling: Avoiding cod (Gadus morhua) bycatch", in *Fisheries Research*, 101 (2010), 20-26.
- Krepper, C. M. and A. L. Rivas: "Dinámica de las aguas costeras en el Golfo Nuevo", parte 1, in *Acta Oceanográfica Argentina*, 2 (2), (1979), 55-82.
- Krepper, C. M.: "Difusión del agua proveniente del estrecho de Magallanes en las aguas de la plataforma continental", in *Acta Oceanográfica Argentina*, 1 (2), (1977), 49-65.
- Laptikhovsky, V. and P. R. Reyes: "Distribution and reproductive biology of a subantarctic deep-sea lobster, the Patagonian lobsterette Thymopsbirsteini (Zarenkov and Semenov, 1972) (Decapoda, Astacidea, Nephropidae)", in *Journal of Natural History*, 43 (1-2) (2009), 35-46.
- Lasta C.; C. Carozza and C. Ruarte: "Flota costera argentina: antecedentes y situación actual", in: M. I. Bertolotti; G. Verazay and R. Akselman (eds.): *El*

Mar Argentino y sus recursos pesqueros, vol. 3 (Mar del Plata) publicaciones especiales del INIDEP (2001), 89–106.

- Legeckis, R. and A. Gordon: “Satellite observations of the Brazil and Falkland Currents – 1975 to 1976 and 1978”, in *Deep-Sea Research*, 29 (1982), 375-401.
- Little, A. S.; C. L. Needle; R. Hilborn; D. S. Holland and C. T. Marshall: “Real-time spatial management approach to reduce bycatch and discards: experiences from Europe and the United States”, in *Fish and Fisheries* (2014), 1-27.
- Lokkeborg, S.: “Review and assessment of mitigation measures to reduce incidental catch of seabirds in longline, trawl and gillnet fisheries”, in *FAO Fisheries and Aquaculture Circular*, 1040 (2008).
- Lokkeborg, S.: “Review and assessment of mitigation measures to reduce incidental catch of seabirds in longline, trawl and gillnet fisheries – efficiency and practical applicability”, in *Marine Ecology Progress Series*, 435 (2011), 285-303.
- Longhurst, A. R.: *Ecological Geography of the Sea*, California, EE. UU.: Academic Press (1998).
- Lucas, A. J.; R. A. Guerrero; H. Mianzan; E. M. Acha and C. A. Lasta: “Coastal oceanographic regimes of northern Argentine Continental Shelf (34°-43° S), in *Estuarine, Coastal and Shelf Science*, 65 (3) (2005), 405-420.
- Lusquiños, A. J. and A. G. Schrott: “Corrientes en el mar epicontinental argentino en invierno”, Buenos Aires: Subsecretaria de Estado de Ciencia y Técnica, Programa Nacional de Recursos Naturales Renovables (1983).
- Lusquiños, A. and A. J. Valdés: “Aportes al conocimiento de las masas de agua del Atlántico Sudoccidental”, Buenos Aires: Servicio de Hidrografía Naval, H659 (1971).
- Mahon, R.: “Fisheries and research for tunas and tuna-like species in the Western Central Atlantic”, in FAO Fish. Tech. Pap., 357 (1996).
- Marine Institute: *Atlas of Demersal Discarding, Scientific Observations and Potential Solutions*, Bordlascaigh Mhara, 2011, 82
- Marine Scotland: “Report on catch quota management using remote electronic monitoring (REM)” (Edimburgo), Report to the Scottish Government (2011), 72. Online: <http://www.scotland.gov.uk/Topics/marine/Sea-Fisheries/17681/CQMS082011>.
- Martínez-Rincón, R. O.; S. Ortega-García and J. G. Vaca-Rodríguez: “Comparative performance of generalized additive models and boosted regression trees for statistical modeling of incidental catch of wahoo

(Acanthocybium solandri) in the Mexican tuna purse-seine fishery", in *Ecological Modelling*, 233 (2012), 20–25.

- Martos, P. and M. C. Piccolo: "Hydrography of the Argentine continental shelf between 38° and 42° S", in *Continental Shelf Research*, 8 (9) (1988), 1043-1056.
- Matsuoka, T.: "A Review of Bycatch and Discard Issue Toward Solution", in: K. Tsukamoto; T. Kawamura; T. Takeuchi; T. D. Beard and M. J. Kaiser (eds.): *Fisheries for Global Welfare and Environment*, 5th World Fisheries Congress (2008), 169–180.
- Mianzan, H.; C. A. Lasta; E. M. Acha; R. A. Guerrero; G. Macchi; C. Bremec: "The Río de la Plata estuary, Argentina-Uruguay" (2001), in: U. Seeliger, L. D. de Lacerda and B. Kjerve (eds.): *Ecological studies: coastal marine ecosystems of Latin America*, vol. 44, Berlin: Springer-Verlag, 185-204.
- Militelli, M.I.: "Biología reproductiva comparada de especies de la familia Sciaenidae en aguas del Río de la Plata y costa bonaerense", tesis doctoral, UNMDP, 2007.
- Montero, J. T.; R. O. Martínez–Rincón Heppell; M. Hall and M. Ewal: "Characterizing Environmental and Spatial Variables Associated with Incidental Catch of Olive Ridley (Lepidochelys olivacea) in The Eastern Tropical Pacific Purse-seine Fishery", in *Fisheries Oceanography* (2015).
- Moore, J. K.; M. R. Abbott and J. G. Richman: "Location and dynamics of the Antarctic Polar Front from Satellite Sea surface temperature data", in *Journal of Geophysical Research*, 104 (1999), 3059-3073.
- Moore, J. K.; M. R. Abbott and J. G. Richman: "Variability in the location of the Antarctic Polar Front (90°- 20° W) from satellite sea surface temperature data", in *Journal of Geophysical Research*, 102 (1997), 27825-27833.
- MRAG: "Impact assessment of discard policy for specific fisheries" (Brussels), *European Commission Studies and Pilot Projects for Carrying out the Common Fisheries Policy,* FISH 2006/17, lot. 1 (2007). Online: <http://ec.europa.eu/isheries/documentation/studies/impact_assessment_discard_policy_2007_en.pdf>.
- Nakano, H.: "A review of the Japanese fishery and research on sharks in the Atlantic Ocean", in *ICCAT/SCRS,* 145 (1992), 409-412.
- Ocampo Reinaldo, M.; R. González and M. A. Romero: "Feeding strategy and cannibalism of the Argentine hake Merluccius hubbsi", in *Journal Fish*. Biol., 79 (2011), 1795–1814.
- Olson, D. B.; G. P. Podestá; R. H. Evans and O. B. Brown: "Temporal variations in the separation of Brazil and Malvinas", in *Currents Deep-Sea Research*, 35 (1988), 1971-1990.

- Orsi, A. H.; T. Whitworth and W. D. Nowlin: “On the meridional extent and fronts of the Antarctic Circumpolar”, in *Current Deep Sea Research*, I, 42 (1995), 641-673.
- Otero, H.; S. Bezzi.; M. Renzi and G. Verazay: Atlas de los recursos pesqueros demersales del Mar Argentino”, Contribución del Inst. Nac. Invest. Des. Pesq. de la Argentina, 423 (1982).
- Paleo, S.: “Crear un comité para investigar los Siniestros y Accidentes marítimos en la Pesca”, tesis de la Fundación Atlántica (2017).
- Palma, E. D.; R. P. Matano and A. R. Piola: “A numerical study of the Southwestern Atlantic Shelf circulation: barotropic response to tidal and wing forcing”, in *Journal of Geophysical Research*, 109 (2004), 1-17.
- Parma, A.; R. Hilborn and J. M. Orensanz: “The good, the bad and the ugly: learning from experience to achieve sustainable fisheries”, in *Bulletin of Marine Science*; vol. 78 (2006).
- Pauly, D.; V. Christensen; J. Dalsgaard; R. Froese and F. Torres Jr.: “Fishing down marine foods webs”, in *Science*, 279 (1998) 860-863.
- Pikitch, E. K.; P. Suuronen; D. Erickson and J. A. Perez Comas: “Codend size selection: Good concept, but does it really work? Solving Bycatch. Considerations for today and tomorrow” (Fairbanks), Alaska Sea Grant College Program, Report 96-03, University of Alaska, (1995), 107-114.
- Piola, A. R. and A. L. Rivas: “Corrientes en la plataforma continental”, in E. E. Boschi (ed.): *El mar Argentino y sus recursos pesqueros*, tomo 1 (Mar del Plata), INIDEP (1997).
- Piola, A. R. and L. M. Scasso: “Circulación en el Golfo San Matías”, in *Geoacta*, 15, (1) (1988), 33-51.
- Piola, A. R.; E. J. D. Campos; O. O. Moller; M. Charo; C. Martinez: “Subtropical shelf front off eastern South America”, in *Journal of Geophysical Research*, 105, C 3 (2000), 6566–6578.
- Piola, A. R.; R. P. Matano: “The South Atlantic Western Boundary Currents Brazil/Falkland (Malvinas)”, in *Currents. Encyclopedia of Ocean Sciences*, Academic Press, 1 (2001), 340–349.
- Provost, C.; V. GarCon and L. Medina Falcon: “Hidrographyc conditions in the surface layers over the slope-open ocean area near the Brasil-Malvinas Confluence during Austral Summer 1990”, in *Continental Shelf Research*, 16 (2) (1996), 215-235.
- Reid, J. L.; W. D. Nowlin and W. C. Patzert: “On the characteristics and circulation of the Southwestern Atlantic Ocean”, in *Journal of Physical Oceanography*, 7 (1977), 62-91.

- Renzi, M. and G. Irusta: “Evaluación del estado del efectivo norte de 41° S de la merluza (Merluccius hubbsi) y estimación de la captura biológicamente aceptable correspondiente al año 2006” (Mar del Plata), informe técnico interno del INIDEP, 39 (2006).
- Renzi, M.; B. Santos and M. F. Villarino: “Evaluación del estado del efectivo sur de 41°S de la merluza (Merlucciushubbsi) y estimación de la captura biológicamente aceptable correspondiente al año 2008” (Mar del Plata), informe técnico interno del INIDEP, 46, (2008).
- *Revista Redes*, 207 (2017).
- Rivas, A. L.: “Spatial variation of the annual cycle of temperature in the Patagonian shelf between 40° and 50° of South Latitude”, in *Continental Shelf Research*, 14 (1994), 1539-1554.
- Roberts, J. J.; M. S. Coyne; P. N. Halpin and M. A. Hall: “Separating Sea Turtles from Fisheries: Oceanographic Habitat Models of Sea Turtles Encountered in the Eastern Tropical Pacific Tuna Fishery” (Thesis) in *Book of Abstracts* (2006).
- Rojo, A. and Silvosa, M.: “Selectividad de la red comercial de arrastre en la pesquería de la merluza argentina”, proy. des. pesq., ser. informe técnico, 24 (1970), 37-48.
- Rose, C. S.: “Behaviour of North Pacific Groundfish Encountering Trawls: Applications to Reduce Bycatch. In Applications to Reduce Bycatch”, in *Considerations for Today and Tomorrow* (1995), 235-241.
- Ross, M. R. and S. R. Hokenson: “Short-term mortality of discarded finfish bycatch in the Gulf of Maine fishery for northern shrimp Pandalus borealis”, in *North American Journal of Fisheries Management*, 17 (1997), 902-909.
- Roth, R. R.; J. C. Garcia and R. Ercoli: “Dispositivos de selectividad aplicados a la merluza (Merlucciushubbsi) como especie acompañante y especie objetivo, en la pesquería argentina” (2011), in: D. Queirolo Palma (ed.): *“Selectividad para la sustentabilidad de pesquerías demersales. Contexto y avances en las pesquerías de Merlucciusgayi y Merlucciushubbsi”*, primer seminario internacional Selectividad para la Sustentabilidad de Pesquerías Demersales, Viña del Mar, Chile, Valparaíso: Pontificia Universidad Católica, Ediciones Universitarias (29 October 2009), 57-70.
- Roth, R.; J. Garcia and R. Ercoli: “Resultados de selectividad sobre la merluza con el sistema Flexigrid-Copo (35/120 mm) en la campaña H-09/04”, informe técnico interno del INIDEP, 21 (2005).
- Roux, A.; M. Fernández and C. Bremec: “Estudio preliminar de las comunidades bentónicas de los fondos de pesca de langostino patagónico del Golfo San Jorge (Argentina)”, in *Ciencias Marinas*, 21 (3) (1995), 295-310.

- Saila, S. B.: “Importance and assessment of discards in commercial fisheries”, in *FAO Fish. Circ.*, 765 (1983).
- Sanchez, F. and L. Prenski: “Ecología trófica de peces demersales en el Golfo San Jorge”, in *Rev. Invest. Des. Pesq.*, 10 (1996), 57-71.
- Sanchez, F.: “Alimentación de la merluza (Merluccius hubbsi) en el Golfo San Jorge y Aguas adyacentes” (en prensa).
- Sánchez, R. P., en: S. Bezzi; R. Akselman and R. Boschi (eds.): *“Síntesis del estado de las pesquerías marítimas argentinas y de la Cuenca del Plata. Años 1997-1998, con una actualización de 1999”*, Publicaciones especiales del INIDEP (2000).
- Sancho, E.: “Falkland Islands National Plan of Action for reducing incidental catch of sea birds in trawl fisheries”, in *Falkland Conservation* (2009).
- Scarabino, V.; S. Maytía and M. Cachés: “Carta bionómicalitoral del departamento de Montevideo I. Niveles superiores del sistema litoral”, Comunicaciones de la Sociedad Malacológica del Uruguay, 4 (29) (1976), 117-126.
- Scarlato, N. A.: “Resultados sobre la Alimentación de Merluza Común (Merluccius hubbsi) del efectivo norte en invierno de 2013”, in *Frente Marítimo* (2016), 215-22.
- Scasso, L. M. L. and A. L. Piola: “Intercambio neto de agua entre el mar y la atmósfera en el Golfo San Matías”, in *Geoacta*, 15 (1) (1988), 13-31.
- Scelzo, M. A. Y A. Valentini: “Presencia de Geryonquinquedes Smith en Aguas del Océano Atlántico Sudoccidental (Decapoda, Braquira)”, in *Physis*, 33 (1974), 557-567.
- Segura, A.; E. Delgado and A. Carranza”, La pesquería de langostino en Punta del Diablo (Uruguay): un primer acercamiento”, in *PANAMJAS*, 3(3) (2008), 232-236.
- Severov, D. N.: “Masas de agua en el Atlántico Sudoccidental sus características y distribución”, in *Frente Marítimo*, 6, Sec. A (1991), 93-102.
- Spivak, E. D.: “Los crustáceos decápodos del Atlántico Sudoccidental (25° 55° S): Distribución y ciclos de vida”, in *Investigaciones Marinas*, 25 (1997), 69-91.
- Stewart, R. H.: Introduction to Physical Oceanography Department of Oceanography, Texas A & M University (2009). Online: <http://oceanworld.tamu.edu/resources/ocng_textbook/PDF_files/book_PDF_files.html>.

- Stobutzki, I. C.; M. J. Miller; D. S. Heales and D. T. Brewer: “Sustainability of elasmobranchs caught as bycatch in a tropical prawn (shrimp) trawl fishery”, in *Fishery Bulletin*, 100 (2002), 800–821.
- Stratoudakis, Y.; R. J. Fryer and R. M. Cook: “Discarding practices for commercial gadoids in the North Sea”, in *Canadian Journal of Fisheries and Aquatic Sciences*, 55 (1998), 7.
- Strub, P. T; C. James; V. Combes; R. P. Matano; A. R. Piola; E. D. Palma; M. Saraceno; R. A. Guerrero; H. Fenco and L. A. Ruíz-Etcheverry: “Altimeter-derived seasonal circulation on the southwest Atlantic shelf: 27° S-43° S”, in *Journal of Geophysical Research*: *Oceans*, 120 (2015), 3391–3418.
- Suuronen, P.: “Mortality of fish escaping trawl gears”, in FAO Fish. Tech. Pap., 478 (2005).
- Suuronen, P.; D. Erickson and A. Orrensalo: “Mortality of herring escaping from pelagic trawl codends”, in *Fish. Res.,* 25 (1996), 305-321.
- Tringali, L. and S. I. Bezzi: “Captura máxima de merluza (Merluccius hubbsi): Antecedentes científicos y relación con su marco regulatorio en la República Argentina entre 1970 y 2000”, informe técnico interno del INIDEP, 55 (2001).
- Turner, M. A.: “Quota-induced discarding in heterogeneous fisheries”, in *Journal Environ. Econ. Management,* 33 (1997), 186-195.
- UCAR: *“El sector pesquero Argentino”* (1999).
- Ullman, D. S. and P. C. Comillon: “Satellite-derived sea surface temperature fronts on the continental shelf off the northeast US coast”, in *Journal of Geophysical Research,* 104 (C 10) (1999), 23459-23478.
- Urien, C. M.: “Río de la Plata estuary environments”, in *The Geological Society of America, Inc. Memoir*, 133 (1972), 213-234.
- Uruguay. Ministerio de Ganadería, Agricultura y Pesca, Dirección Nacional de Recursos Acuáticos: *“Boletín Estadístico Pesquero 2014”*, Montevideo, DINARA, (2003).
- Vaz-dos-Santos, A. M. and C. L. D. B. Rossi-Wongstchowski: Merluccius hubbsi Marini (2005), in: M.C. Cergole; A. O. Ávila-da-Silva and C. L. D. B. Rossi-Wongtschowski (eds.): *Análise das principais pescarias comerciais da região sudeste-sul do Brasil: dinâmica populacional das espécies em explotação,* Série Documentos REVIZEE, Score Sul, São Paulo: Instituto Oceanográfico de la USP (1993) 88-93.
- Verazay, G.; G. Arena; M. Simonazzi; W. Ubal; H. Cordo; H. Nion; D. Hernández and M. Rey: “Selectividad en la merluza (Merluccius hubbsi) en la Zona Común de Pesca”, in *CTMFM, Series Circulares*, 3 (1992), 14-25.

- Vianna, M. and T. Almeida: "Bony fish bycatch in the southern Brazil pink shrimp (Farfantepenaeus brasiliensis and F. paulensis) fishery", in *Brazilian Archives of Biology and Technology*, 48 (2005), 611-623.
- Villarino, M. F. and B. A. Santos: "Simulación del efecto de selectividad en las flotas arrastreras merlucera y langostinera sobre la merluza (Merluccius hubbsi) al sur del 41° S" (en prensa).
- Villarino, M. F. and M. Simonazzi: "Evolución del by-catch de merluza (Merluccius hubbsi) en la pesquería del langostino patagónico (Pleoticus muelleri) en el período 2000-2003", inf. invest. del INIDEP, 15 (2010).
- Villarino, M. F.; B. A. Santos and R. O. Castrucci: "Información obtenida por los observadores del INIDEP respecto de la captura incidental de merluza durante la prospección dirigida al langostino entre los días 24 y 30 de septiembre de 2016", informe de asesoramiento y transferencia del INIDEP, 23 (2017).
- Villarino, M. F.; D. Hernández; D. Cordo and M. Simonazzi: "Análisis del desempeño de cinco estimadores de la relación merluza-langostino utilizada para la estimación de la captura incidental (by-catch) de merluza (Merluccius hubbsi) en la pesquería del langostino patagónico (Pleoticus muelleri)", informe técnico del DN-INIDEP, 42/2005 (2005).
- Wiff, R.; J. C. Quiroz; R. Céspedes and L. Chong: "Estatus y posibilidades de explotación biológicamente sustentables de los principales recursos pesqueros nacionales, año 2012, Congrio Dorado", informe técnico del IFOP-SUBPESCA (2012).
- Wiff, R.; M. Lima; J. Montero; S. Gelcich; D. Queirolo and R. Serra: "Medidas de Mitigación sobre el descarte y captura incidental en pesquerías demersales en Chile", informe final del Instituto de Fomento Pesquero-CAPES, (2014).
- Wigley, L. G.; R. B. Theoroux and H. E. Murray: "Deep-sea red crab, Geryonquinquedens, survey off North-Eastern United States", en *Mar. Fish. Review*, 37 (1975), 1-21.
- Witherell, D. and C. Pautzke: "A Brief History of Bycatch Management Measures for Eastern Bering Sea Groundfish Fisheries", in *Marine Fisheries Review,* 59 (1997) 15-22.
- World Climate Research Program: "General Circulation of the Southwestern Ocean: Status and Recommendations for Research" (Geneva), WCP-108, WMO/TD 86, World Meteorological Organization (1985).
- Yimin, Ye: "Bias in estimating bycatch-to-shrimp ratios", in *Aquat. Living Resources*, 15 (2002) 149-154.

- Yimin, Ye; A. H. Alsaffar; H. M. A. Mohammed: “Bycatch and discards of the Kuwait shrimp fishery”, in *Fisheries research*, 45, 9 (2000).
- Zyrianov, V. N.; D. N. Severov: “Circulación de aguas en el área Patagono-Malvínica y su variabilidad estacional”, in *Oceanología*, 19 (5) (1977), 782-791.

Civilisation and barbarism in the Argentine Sea

The STCW-F-1995 and the need for a national training policy for fishing captains

In 1845, when Domingo Faustino Sarmiento through *Facundo* introduced in the Argentine history the diametrically opposed concepts of "Civilisation and barbarism in the Argentine Pampas," he had in mind the central thought that "the evil afflicting the Republic of Argentina is the territorial extension." He only thought about the woods, the jungle and the pampas, and he did not consider the same dilemma for the Argentine Territorial Sea.

Facundo was to Sarmiento "the brave, barbarous and bold provincial," and he also was the embodiment of barbarism as regards natural strength which was not educated nor domesticated. If Sarmiento had taken the Argentine Sea into consideration, he would have found the blue Pampas and other Facundos embodied by a maritime and wild fishing captain, skipper or pilot.

Today, at the 200th anniversary of the Nation's origin and applying Sarmiento's thesis, barbarism is the fisher: brave, primitive, barbarous and bold. Civilisation is embodied by the powers represented by companies which own the industrial fishing technologies, the Argentine Navy and the Argentine Coast Guard. These are the policing dominant factors in the Argentine Sea which act under the protection of citizens and bureaucrats settled in political desks and offices, managers of the improvised fishing companies and businessmen from the Merchant Navy. They do the impossible to remain part of the civilisation whereas we, the fishing industry workers, keep being part of barbarism: brave, bold and primitive men who must be neither trained nor educated.

This book, 173 years later, expects to report the same facts that shocked the national hero and founder of the Argentine education, because the history on land is now repeated in the fishing industry and in the sea.

About this book