

Port Environmental Review System – PERS

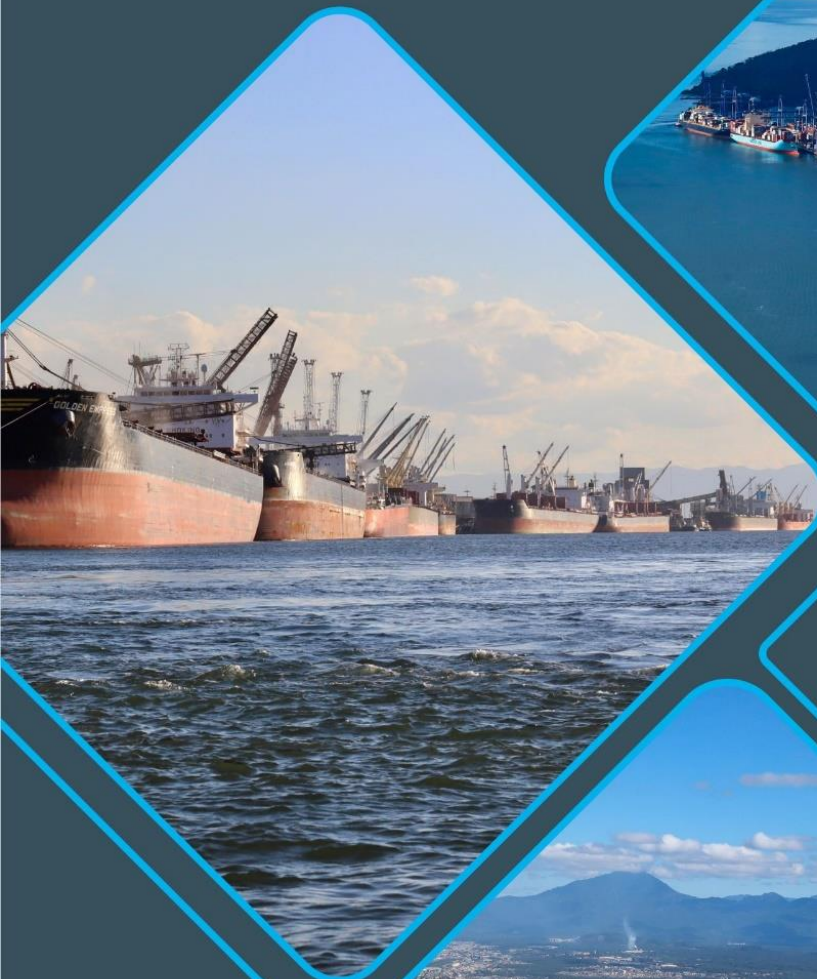
Port of Paranaguá – 2022



**PORTOS
DO PARANÁ**
LOGÍSTICA INTELIGENTE



PARANÁ
GOVERNO
DO ESTADO



ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Summary

1	Introduction	4
1.0	Port profile	4
1.0.1	Port location and port area	6
1.0.2	Legal status and port operations	10
1.0.3	Main commercial activities	12
1.0.2.1.	Port of Paranaguá organizational structure	17
1.0.4	Environmental Management	19
2	Policy statement - Port of Paranaguá Environmental Policy	21
3	Register of Environmental Aspects, Legal Requirements and Performance Indicators	22
3.1	Environmental Aspects	22
4	Responsibilities and resources	22
4.1	Port of Paranaguá Executive Team	22
4.1.1	Environment Board	23
4.1.2	Documented responsibilities of key personnel	29
4.2	Resource allocation	30
4.3	Awareness Evidences	31
5	Conformity Review of Environmental Policy and Legal Requirements	35
5.1	Integrated Management System (IMS Regulation – Environment, Health and Occupational Safety)	35
5.2	Port procedures	37
5.2.1	IMS Regulation Performance Assessment	40
5.3	Port Environmental Performance	42
5.3.1	Port Environmental Objectives and Targets	43
5.3.2	Critical analysis of the performance of environmental programs	50
5.3.3	Internal environmental audits	50
5.3.4	Independent external environmental audits	50
5.3.5	Antaq Environmental Performance Index (IDA)	51
5.3.6	Priorities for improvement plans	52
6	Environmental report	53
6.1	Ecosystems monitoring	53

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

6.1.1	Water Quality Monitoring Program	53
6.1.2	Sediment Quality Monitoring Program	56
6.1.3	Aquatic Biota Monitoring Program	58
6.1.4	Ballast Water Surveillance Program	59
6.1.5	Mangrove Monitoring Program	61
6.2	Socio-environmental actions	63
6.2.1	Social Communication Program	63
6.2.2	Environmental Education Program	65
6.2.3	Traffic Management Program	68
6.2.4	Fishing Activity Management Program	68
6.3	Environmental control actions	69
6.3.1	Solid Waste Management Plan	69
6.3.2	Atmospheric Emissions Management Program	70
6.3.3	Effluents Management Program	72
6.3.4	Noise Emissions Monitoring Program	73
6.3.5	Vectors Proliferation Control Program	74
7	Examples of Best Practices	76
7.1	“Composting for Growing” and “Green Label of Environmental Responsibility”	76
7.1.1	“School at the Port Project – Education for Sustainability”	79

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

1 Introduction

1.0 Port profile

The port of Paranaguá began its history in 1872, when it was a mooring under private management (**Erro! Fonte de referência não encontrada.**). In 1917, the State Government of Paraná took over the administration of the port, which received improvements and began operating at its current location (Figure 2). Historically, it was through Paranaguá that the first settlers got into the State of Paraná and, since the second half of the 16th century, the port of Paranaguá has been the main exporter of Brazil's agricultural products.

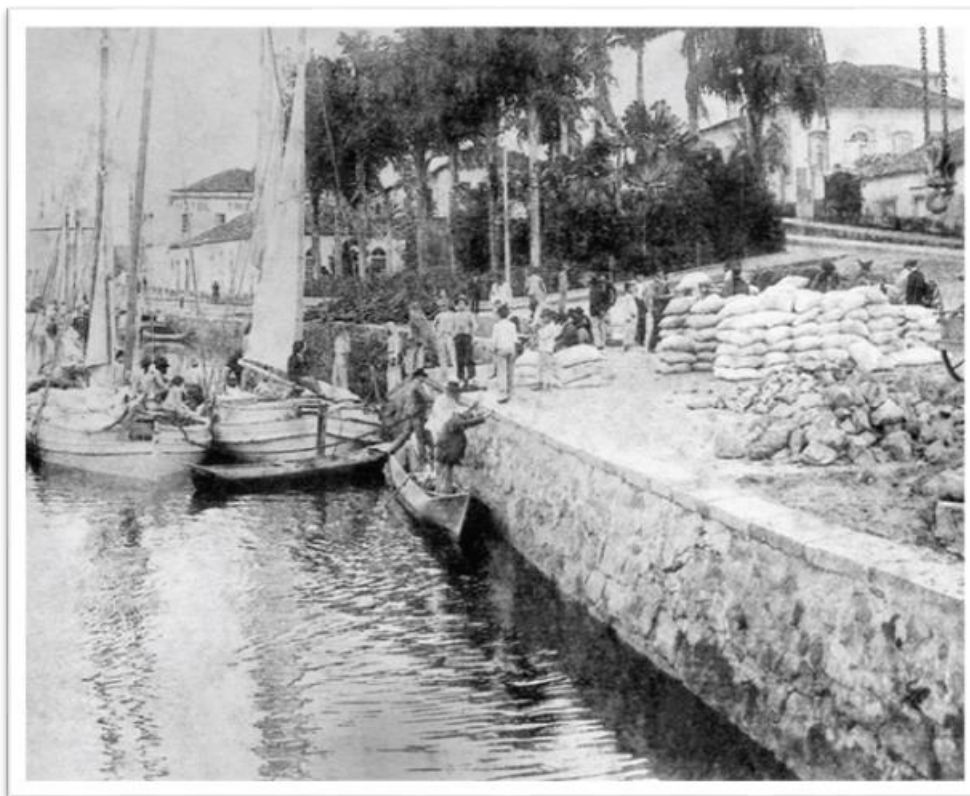


Figure 1. Port of Paranaguá in the end of the XIX century, at its former location, at the city downtown.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA



Figure 2. Port of Paranaguá in 1935, at its current location.



Figure 3. Port of Paranaguá in 2022, at its current location.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

1.0.1 Port location and port area

The port of Paranaguá is one of the world's most important sea trade centers, featuring strategic location and one of Latin America's best port infrastructures (Figure 4). It is located in the city of Paranaguá, at an important estuary, specifically in the Paranaguá bay. The Paranaguá bay is a high diverse environment, with important and protected ecosystems, such as the mangroves, important reproduction spots for various species. Besides, artisanal fishing activities are important for the economy of the region, as many anglers live in the port surroundings.



Figure 4. Port of Paranaguá aerial view. Yellow lines comprise the terrestrial area of the port of Paranaguá.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

The port of Paranaguá is the most productive Brazilian port regarding quay linear meter. Its infrastructure comprises the total area of 4.129.801,3 m², decks, and piers comprising 5.347 meters of extension. It also comprises 20 berths for cargo handling, including one dolphin for RO-RO ships and 10 ship-loaders (see Table 1 for more details about port infrastructure).

The port also counts with an Exportation Aisle, a set of horizontal and vertical silos connected to six ship-loaders, with 985.000 tons of static storage capacity and more than 1.000 tons of boarding capacity per day (Figure 5). In addition to the commercial pier, the port of Paranaguá also comprises three other piers. The liquid bulk pier, of public use, with berthing preference to the *Transpetro* ships, consists of two berths (internal and external), each with 190 meters of extension. The *Cattalini* private pier, also for liquid bulk, comprises two berths (internal and external) with a length of 244 meters each. Finally, the *Fospar* pier trades solid mineral bulk and comprises two berths of 235 meters each.

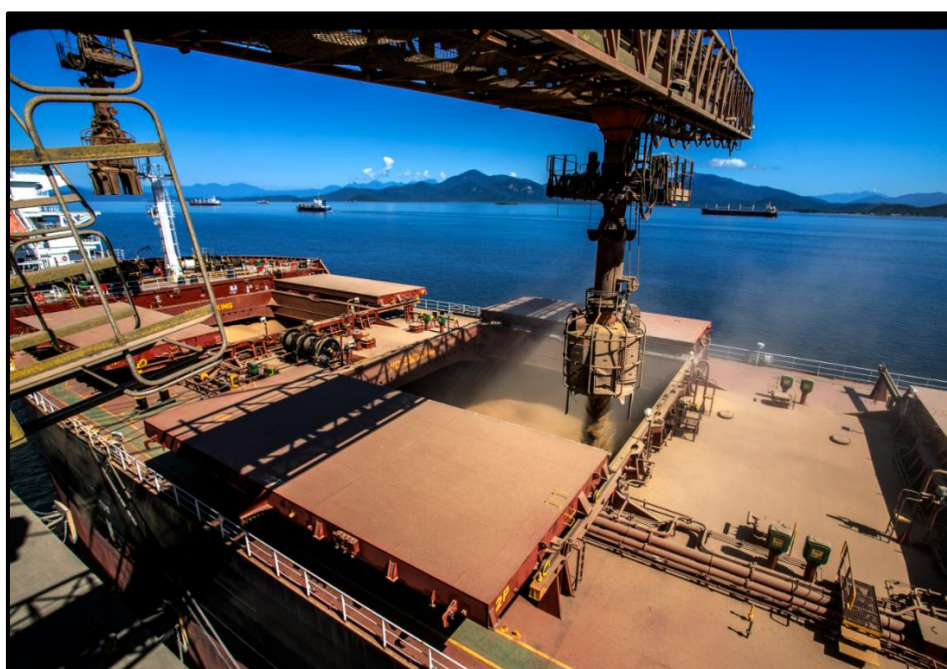


Figure 5. Shiploader from the Exportation Aisle.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Table 1. Details regarding port of Paranaguá infrastructure and main accesses.

PORT OF PARANAGUÁ INFRASTRUCTURE	
Total area	4.129.801,3 m ²
Wharf and pier extension	5.347 m
Number of berths	16 berths in the commercial wharf; 4 berths in 2 liquid piers; 2 berths in 1 pier of fertilizers.
Static capacity (solid bulk)	1.776.500 tons
Static capacity (fertilizers)	3 million tons (considering retro area)
Static capacity (liquid bulk)	974 thousand m ³
Annual container handling capacity	1,5 million of TEU's
Embarkation nominal capacity (Exportation Aisle – solid bulk – soybean; corn)	9 thousand tons/hour
Unloading capacity (average operational board for discharging fertilizers)	6 thousand tons/day/ship
MHC – Mobile Port Hoist (to unload solid bulk and general cargo)	06 units with capacity of 64 -104 tons.
Number of shiploaders	10 equipment
Number of port operators (private companies)	45 companies
Navigation draft	12,5 m
Sorting Courtyard Area	330 thousand m ²
Sorting Courtyard Capacity	1.400 trucks
Courtyard Area	538 thousand m ² (considering vehicles, containers and other yards)

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

ACCESSES TO THE PORT OF PARANAGUÁ

Maneuvering Areas	Evolution basins are delimited by sections A, B and C, from the charts that define maneuvering ship areas. They are 500m wide along all the extension of the commercial wharf, and have nominal depths of 8,70 m, 10,70 m and 12,70 m.
Road Access	Through BR-277, that links Paranaguá to Curitiba, and through BR-116, that is reached by PR-408, PR-411 and PR-410 roads. Through the support of road transportations, Paranaguá Port has a public Sorting Courtyard with parking facilities to accommodate up to 1.400 trucks.
Rail Access	Managed and operated by ALL – América Latina Logistic Concessionaire and forms the rail segment of “Paraná/Santa Catarina Aisle”, with roughly 2.2 thousand kilometers of extension.
Oil Pipeline	It has 90 km of extension and is operated by Petrobras/Transpetro, interlinking inflammable terminals of Paranaguá Port and Getúlio Vargas refinery in Araucária.
Maritime	Entrance is through the Galheta Channel, defined in the Navy Nautical Charts numbers 1.821 and 1.822. It is 150/200 meters wide, 20 miles long and 13/15 meters deep.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

1.0.2 Legal status and port operations

The port of Paranaguá is a public port, under the management of the Paraná State government. Until 2013, the port was responsible for carrying out port operations. With the establishment of the National Law nº 12.815/2013 (that approaches the direct and indirect exploitation of ports and port facilities by the Union and establishes the activities performed by port operators), Port Operators are now private companies responsible for loading and unloading of liquid and solid bulk.

The Port Operators are legal entities prequalified to operate the movement of passengers and/or handling/storage of goods destined for or from water transport, within the organized port area. Therefore, the company entitled “Portos do Paraná” exerts the function of Port Authority in the port area, thus the port of Paranaguá is a public Landlord port.

In the current management model, the port authority is responsible for the administration of Paranaguá and Antonina ports and for providing the necessary structure for cargo handling activities. The company maintains, as a representative of the government, the entire waterway access infrastructure, evolution basin, berths, road, rail and inland areas of the ports of Paranaguá and Antonina. Besides, the main responsibilities of the port of Paranaguá as a Port Authority are:

- To comply with and enforce laws, regulations and concession agreements;
- Evaluate and pre-qualify port operators;
- Supervise or carry out the construction, renovation, expansion, improvement and conservation of port facilities;
- Supervise port operation, ensuring that activities are carried out with regularity, efficiency, safety and respect for the environment;
- Authorize the traffic of vessels in the port, berthing and unblocking;
- Suspending port operations that may impair port operations.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

The private sector is responsible for providing and maintaining structures such as port equipment, warehouses, labor, and for port operations. The leasing companies are responsible for maintaining their area of use and for operational issues. In this case, port authority is responsible for regulating control and security measures of the leasing companies, operators and other port agents related to the port, as presented in Table 2.

Table 2. Definition of port agents related to the port of Paranaguá.

Port agents in the port of Paranaguá area
Tenants; authorizing agents; assignee; and port operators (including associations) of public port facilities
Other port operators operating in the common areas of the port
Stevedoring Management Group (OGMO) and professional unions
Railway operator (Rumo)
Vessel owners, ship owners or agents (shipping agencies)
Port support companies and port service providers

Portos do Paraná exerts its function as a Port Authority at a specific area, defined as the “Organized Port Area”, as established in the National Law nº 12.815/2013, which concerns the direct and indirect exploitation of ports and port facilities by the Union, and the activities performed by port operators. The law defines that the “Organized Port Area” comprises port facilities, protection infrastructure and port accesses.

The Figure 6 represents Portos do Paraná’s legal jurisdiction, where it exerts its functions as Port Authority.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

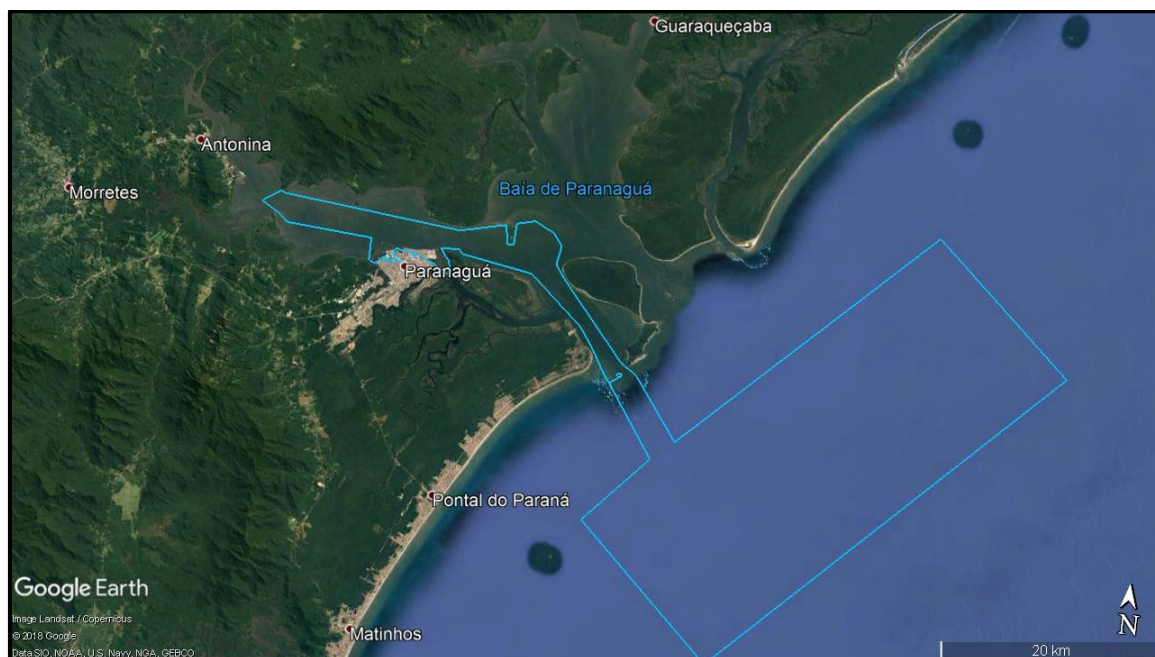


Figure 6. Portos do Paraná legal jurisdiction as a Port Authority.

1.0.3 Main commercial activities

The main commercial activities regarding port operations at the port of Paranaguá involve the exportation of agricultural goods and importation of fertilizer and general bulk. Some of the most important goods to cross the port are soybean, bran, corn, salt, sugar, fertilizers, containers (frozen poultry meat, wood, paper, and chemical products), cellulose, oil by-products, alcohol and vehicles (Figure 7). It is the largest Brazilian port regarding the exportation of agricultural products.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

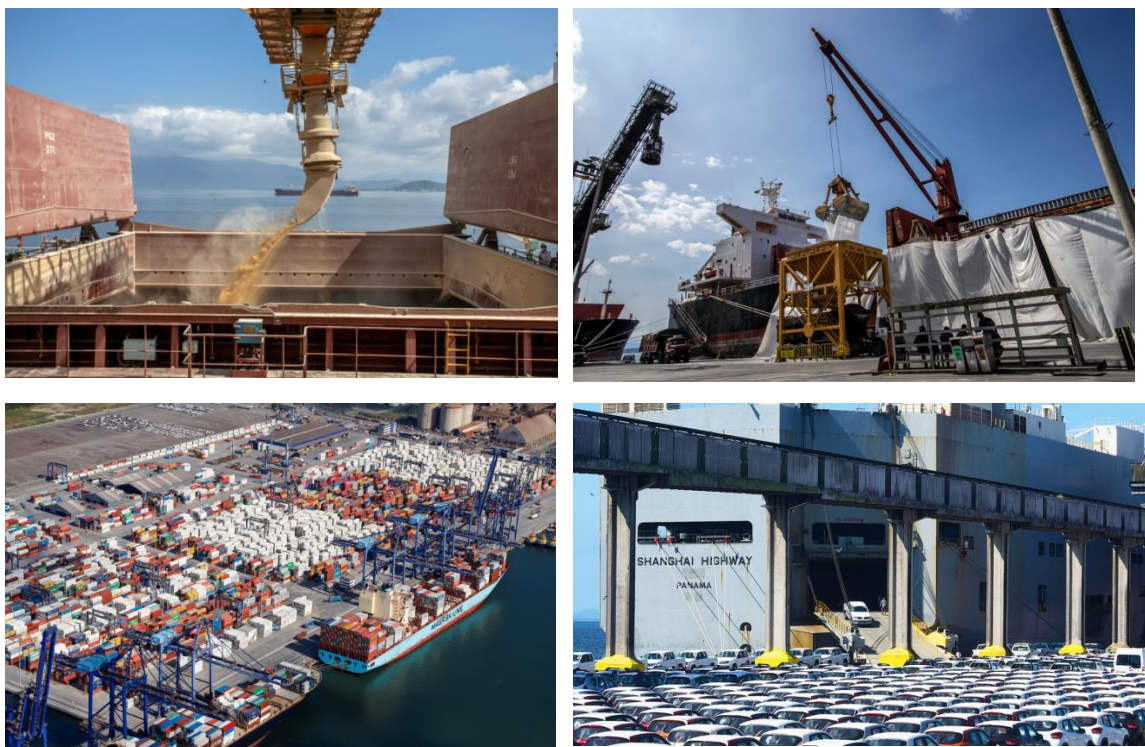


Figure 7. Main cargoes in the port of Paranaguá – soybean, fertilizers, containers and vehicles.

In 2021, total cargo handling comprised 57.520.122 tons, being 33.132.736 tons of cargo exportation and 24.387.386 tons of cargo importation. The most representative goods in exportation were soybean, sugar and general bulk. In importation, most representative cargoes were fertilizers, general bulk, and oil by-products.

The shipping model for grains in Paraná, in pool system, is unique in Brazil. Load can be shipped simultaneously in three mooring berths, which are exclusive for bulks, and a single ship can get goods from distinct producers – including the small ones. The structure comprises six ship-loaders (nominal capacity of 1.500 tons/hour), a vertical silo (100 thousand tons), four horizontal silos (with a total capacity of 60 thousand tons) and eight interlinked, private and leased terminals, with a global capacity of 1,025 million tons.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Regarding fertilizers, the public terminal at the port of Paranaguá presents a storage base with capacity for up to 30 thousand tons and it is interlinked to wharf through transportation chains that can carry a thousand tons of product per hour. In addition, the port has four terminals and four mooring berths for liquid movement. Total storage capacity is 540.781 m³, where exportation capacity is 3.450 m³ per hour and importation capacity is 3.000 m³ per hour.

As mentioned above, the port of Paranaguá is a landlord port, where Port Authority has retreated from port operations. Nevertheless, part of the port is a public wharf, where private port operators perform cargo handling. Though, some areas are under private management through long-term concessions (build-lease-operate system), regulated by leasing contracts. Portos do Paraná manages 17 leasing contracts (Figure 8), which are presented in Table 3.

Table 3. Leasing contracts managed by Portos do Paraná and main cargo handled by each company.

Area number	Contract	Tenants	Main cargo	Area m ²
PAR 01	002/2020	Klabin	General cargo	27.530,00
PAR 07	009/98	Volkswagen do Brasil Ltda.	General cargo	120.000,00
PAR 08	013/99	Pasa	Vegetal solid bulk	19.702,17
PAR 09	076/2021	Bunge	Vegetal solid bulk	21.577,34
PAR 11	020/98	TCP	General cargo	487.189,20
PAR 12	042/2021	Ascensus Gestão e Participações S/A	General cargo	74.149,00
PAR 14	087/025/00	Centro Sul	Vegetal solid bulk	20.025,67
PAR 15	068/2021	Cargill Agrícola	Vegetal solid bulk	37.431,00
PAR 16	001/94	Louis Dreyfus	Vegetal solid bulk	18.888,00
PAR 17	002/94	Interalli	Vegetal solid bulk	20.350,00
PAR 20	115/2002	Rocha Terminais Portuários e Logística S. A.	General cargo	5.000,00
PAR 32	093/2021	Teapar	General cargo	6.651,00
PAR 40	083/2021	COAMO	Vegetal solid bulk	42.203,25
PAR 41	067/98	COAMO	Vegetal solid bulk	8.724,60

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

PAR 45	016/98	Fospar	Mineral solid bulk	84.525,00
PAR 50	010/93	União Vopak	Liquid bulk	22.384,00
PAR 80	015/2006	Transpetro PGUA	Liquid bulk	182.841,46

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA



Figure 8. Port of Paranaguá area, where the colors represent areas under leasing contracts. Dark blue – liquid bulk; orange – vegetal solid bulk; pink – general bulk; clear blue – mineral solid bulk (fertilizers). Red lines represent the limits of the “organized port area”.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

1.0.2.1. Port of Paranaguá organizational structure

“Portos do Paraná” (Port Administration of Paranaguá and Antonina/APPA) is a state-owned company, subordinated to the Secretariat of Infrastructure and Logistics, with a delegation agreement with the Federal Government. Seven boards and their own specialized staff are responsible for managing the company, as described in the Item 1.5.

The main activities of Portos do Paraná are to:

- Supervise, control and regulate port activities in the Paranaguá and Antonina port complex;
- Ensure navigation safety, through systems and maintenance services;
- Monitor the environment where the port is located, managing waste generation and providing resources for the defense of fauna and flora, in case of accidents;
- Ensure road and rail accesses to the port terminals;
- Supervise the services provided by cargo and terminal operating companies, agents, towing and mooring companies, among others;
- Manage port development, through the Plan for Development and Zoning of the Organized Port of Paranaguá and Antonina;
- Favor and supervise the installation of new activities, industries, services or terminals, attracting new business, with strategic actions;
- Manage conventional tariffs, as well as tariffs for the use of maritime infrastructure, docking, operation and facilities of the Ports of Paraná, in addition to other revenues;
- Manage the contracts of the 21 leased areas and regulate the activities of the 19 leasing companies;
- Qualify the staff for these activities.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

The company's mission, vision and values, are the following:

- Mission:

To offer port infrastructure with excellence and innovation, supporting efficient, safe and sustainable intermodal logistics to promote competitive and integrated business development.

MISSÃO

Oferecer Infraestrutura portuária com excelência e inovação, provendo logística intermodal eficiente, segura e sustentável para fomentar o desenvolvimento de negócios competitivos e integrados.

- Vision:

To become recognized as an efficient and competitive Port Authority, to make “Portos do Paraná” an important logistic Hub in the Americas.

VISÃO

Ser reconhecida como Autoridade Portuária referência em eficiência e competitividade, de modo a tornar os **Portos do Paraná** um **Hub Logístico** com destaque nas **Américas**.

- Values:

Governance, safety, sustainability, human intellect, quality.

VALORES

Governança, segurança,
sustentabilidade,
intelecto humano,
qualidade.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

1.0.4 Environmental Management

The port of Paranaguá counts with a specific board for environmental management, with dedicated multidisciplinary professionals from various areas, such as biology, environmental engineer, and oceanography, amongst others (see section 4.1.1 for more information). The legal jurisdiction for environmental management comprises the “port organized area”, as mentioned in the section 1.0.2. However, some activities comprised by the environmental programs occur outside the “port organized area”, being executed in the area under direct influence of the port, as established in the environmental studies elaborated in order to support the emission of the port environmental license (Figure 9).

The port is responsible for executing more than 20 environmental programs, which are constrained to the environmental license that authorizes port operation (Figure 10). The Brazilian Institute for the Environment and Natural Resources (Ibama) accompanies the environmental activities and evaluates the annual environmental reports elaborated by the port. Section 6 of this document (Environmental Report) contains more information regarding the environmental programs of the port.

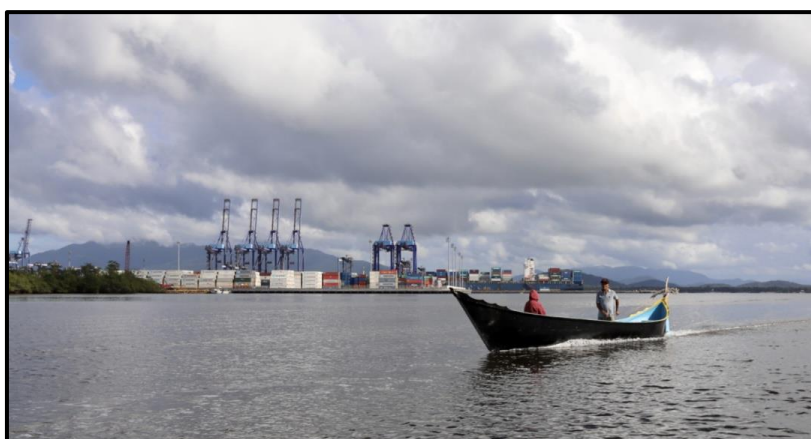


Figure 9. Artisanal fishing communities are located in the port surroundings.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA



Figure 10. The environmental programs executed by the port involve water, biota and sediment collection campaigns.

The most important laws regarding port environmental management in Brazil involve several national laws related to environmental aspects, such as solid waste management politics; specific decrees that establish water, sediment and air quality parameters; specific legislation for vector control measures; environmental education national politics, among others.

Environmental management at the port of Paranaguá also comprises inspection and supervision activities regarding port operations, based on the Regulation for Environment, Health and Occupational Safety (Integrated Management System – IMS Regulation). The Regulation is an extensive management document that establishes rules for environmental control and occupational safety in the performance of port activities that may cause any potential impact to the environment and/or may harm workers' life and health. More details regarding the IMS Regulation and all the activities subject to supervision are presented in the item 5.1.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA**2 Policy statement - Port of Paranaguá Environmental Policy**

Port of Paranaguá is committed to performing its operations in accordance with environmental legislation, minimizing its negative impacts on the environment and seeking excellence in port administration. The port priorities are to:

1. *To preserve life, human health and safety, and the environment;*
2. *To contribute to the conservation of the natural, cultural and historical heritages of the region;*
3. *To ensure compliance with current environmental legislation;*
4. *To continuously improve its environmental performance by reviewing and updating its Environmental Management System;*
5. *To prevent, control, monitor and mitigate all forms of environmental pollution, with special attention to air quality, noise generation and waste management;*
6. *To assess the environmental quality of areas under the influence of port activities;*
7. *To rationalize natural resources use and reduce related costs;*
8. *To manage environmental aspects and impacts through programs and practical measures;*
9. *To continuously strengthen the relationship with the port community and the city;*
10. *To keep abreast of trends in technology to promote more efficiency, reduce environmental impacts and minimize risks and hazards to workers' health;*
11. *To raise awareness on employees, port community and citizens on environmental issues;*
12. *To assure the dissemination of this policy to all employees, to the port community and to all stakeholders, and promote their participation in the continuous improvement of the port environmental management system;*
13. *To annually report environmental activities to the Brazilian environmental agencies.*

(The signed document is attached to PERS)

Luiz Fernando Garcia da Silva

CEO Ports of Paraná

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

3 Register of Environmental Aspects, Legal Requirements and Performance Indicators

3.1 Environmental Aspects

The environmental aspects and legal requirements related to the port of Paranaguá are presented in a spreadsheet attached to this document. All the environmental aspects regarding Port Authority itself (e.g., the port of Paranaguá) and also tenants and operators over which Port Authority has an influence were compiled in the document. The main impacts are described, as well as the legal requirements and control measures related to each environmental aspect.

4 Responsibilities and resources

4.1 Port of Paranaguá Executive Team

The “Portos do Paraná” administration is a state-owned company responsible for managing Paraná State port terminals (ports of Paranaguá and Antonina). An administrative council and an executive board run the public company. Seven boards and their own specialized staff compose the executive board. The Port CEO is responsible for directing the company and establishing guidelines to manage the port and control the other boards. The current managing model is the landlord port, in which port authority is responsible for port administration and for providing necessary structure to cargo handling and port operation.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

4.1.1 Environment Board

The establishment of the Port of Paranaguá Environment Board occurred in 2014 and, since then, the board team is responsible for managing environmental aspects and impacts, as well as hazards and occupational risks. Port of Paranaguá Environment Board comprises a dedicated multidisciplinary technical team of professionals for environment, health and safety management with the support of an additional roll of professionals specialized in various areas.

The Environment Board through the Environment Management is responsible for coordinating, monitoring and inspecting activities related to the environment in the port area and its surroundings, as well as activities that are potentially polluting.

Through the Occupational Health and Safety Management, the Environment Board is also responsible for managing and inspecting aspects related to occupational safety and employees' health.

The chart presented in Figure 11 represents Port of Paranaguá's Environment Board organization considering other boards and key personnel of the company.

Nowadays, Port of Paranaguá's Environment Board personnel composition is:

- One Environment Director – responsible for:
 - Acting as senior manager for environmental and occupational health and safety matters;
 - Representing the company's top management in matters related to the environment and occupational health and safety;
 - Advising, reviewing and approving documents related to environmental issues, as reports and plans;
 - Making the necessary resources available for the administration of the board;
 - Deliberating on the control of proposed corrective and preventive actions;
 - Managing the environmental, health and safety programs of the port.
- One Environment Manager – responsible for:

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

- Managing and ensuring the environmental procedures of the port of Paranaguá;
 - Supervising the progress of environmental licenses (terms and conditions);
 - Managing audition processes in the environmental field;
 - Identifying, registering and updating the environmental legislation applicable to the activities developed in the port;
 - Monitoring deadlines and delivering reports to environmental, supervisory and control bodies and other intervening institutions;
 - Monitoring the activities of outsourced companies hired by the port to carry out environmental actions;
 - Elaborating, managing and supervising the environmental management process of the port, comprising programs and monitoring of the physical, biotic and socioeconomic environment;
 - Managing the implementation of the environmental education and training process;
 - Proposing to the Environment Board rules and procedures for the environmental improvement of port activities;
 - Managing preventive and corrective actions in order to execute the emergency plans when necessary;
 - Carrying out the response of notifications, assessments and letters from the control bodies;
 - Controlling and monitoring activities with potential risks to the environment;
 - Analyzing the causes of non-conformities, proposing corrective and preventive actions;
 - Complying with and enforcing the laws applicable to the work area, as well as internal regulations;
 - Managing and controlling the work of other employees under its management.
- One Occupational Health and Safety Manager (Work Safety Engineer) – responsible for:
 - Preparing, implementing and monitoring the Occupational Safety Programs subject to legal requirements;
 - Assessing the conditions of environmental and occupational safety, of the environment and port operations;
 - Issuing technical reports, communicating and advising for the treatment of deviations from inspections;
 - Implementing technical-operational training programs and security campaigns, covering environmental, occupational aspects and security-related issues associated with port operations;

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

- Performing statistical monitoring of the occurrence of incidents and deviations and the respective causes and consequences for the evaluation and adoption of control measures, promoting meetings to evaluate indicators;
 - Ensuring the proper functioning of fire-fighting equipment and monitoring of risk agents;
 - Proposing to the Environmental Board rules and procedures for work safety in port activities;
 - Managing and carrying out inspections in the areas of the ports, regarding compliance with appropriate Occupational Safety rules and procedures;
 - Managing preventive and corrective actions aimed at the preparation and execution of plans for emergency situations;
 - Ensuring the implementation and maintenance of specific accident prevention programs;
 - Proposing to the Environment Board procedures related to health and safety;
 - Managing and controlling the work of employees under its management;
 - Identifying and correcting non-conformities.
- One Coordinator for Supervision and Emergency Control – responsibilities:
 - Promote the continuous improvement of the environmental aspects of port operations, through the implementation of a management system, in all port areas;
 - Supervising activities that have the potential to cause environmental impacts in the port area;
 - Coordinating environmental supervision activities;
 - Creating procedures to regulate port activities regarding environmental issues and occupational safety;
 - Coordinating emergency programs, plans and activities;
 - Promoting emergency training and simulated situations;
 - Coordinating continuous environmental activities (24h);
 - Coordinating and supervising activities that demand port's authorization to occur;
 - Coordinating and controlling the work of other employees under its management.
- One Coordinator for Monitoring and Quality Assessment – responsibilities:
 - Coordinating port's environmental monitoring programs;

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

- Elaborating reference terms to hire outsourced companies to execute monitoring activities;
 - Elaborating a management system to accompany port compliance to environmental licenses' conditions;
 - Supervising outsourced service providers to accomplish environmental licenses' conditions;
 - Accomplishing specific deadlines established by environmental organs;
 - Coordinating activities related to environmental aspects;
 - Keeping a dialogue with the environmental organs;
 - Coordinating and controlling the work of other employees under its management.
- One Coordinator for Planning and Licensing – responsibilities:
 - Accomplishing specific deadlines established by environmental organs;
 - Coordinating environmental licensing processes regarding new constructions in the port area;
 - Elaborating reference terms to hire environmental studies for licensing;
 - Creating a management system for controlling port of Paranaguá's environmental licensing;
 - Accompanying the environmental licensing of projects in the port of Paranaguá area;
 - Supervise the progress of the environmental licenses issued to the port of Paranaguá (deadlines, conditions), in order to enable their renovation;
 - Coordinating and controlling the work of other employees under its management.
- One Coordinator for Communication, Education and Sustainability – responsibilities:
 - Coordinating, creating, promoting and developing activities in the field of social communication and environmental education;
 - Coordinating environmental programs with internal audience (port workers) and with surrounding community;
 - Defining and coordinating strategies to evaluate the process of environmental education;
 - Visiting surrounding communities under the influence of port activities;

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

- Developing a continuous relationship channel between the port of Paranaguá and the society;
 - Responding to internal and external enquiries regarding the port activities;
 - Coordinating and controlling the work of other employees under its management.
-
- Four Port Analysts graduated in Biology (three) and Environmental Engineering (one);
 - One Port Technician;
 - Three Administrative Technician;
 - Four Work Safety Technician.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

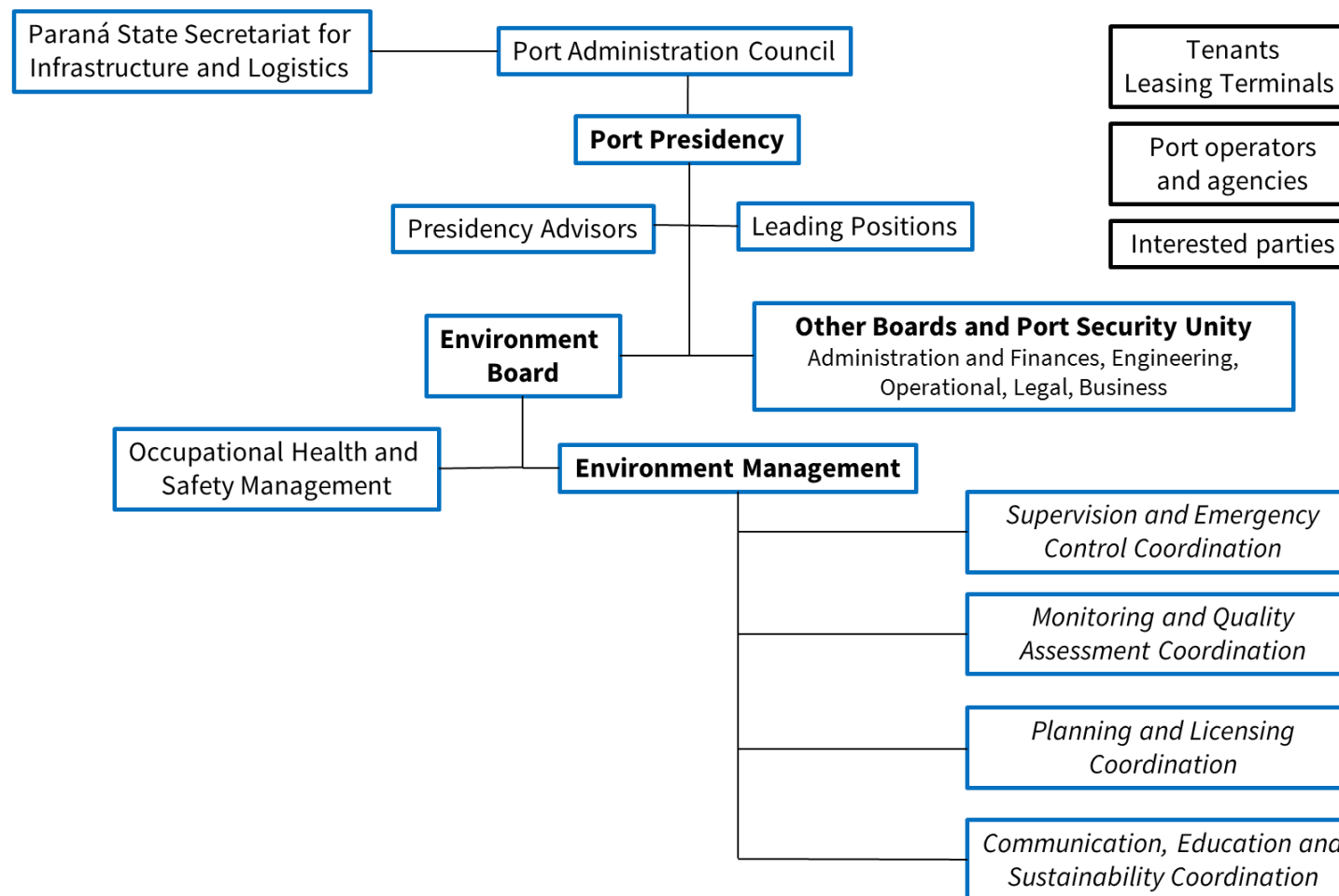


Figure 11. Chart representing the structure of the port and of the environmental organization.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

4.1.2 Documented responsibilities of key personnel

Port personnel comprise commission jobs, who are responsible for leading activities and permanent employees. Port President nominates commission employees and permanent employees are hired by public tender. The functions and responsibilities of key personnel were established in the job plan, which was approved in a State Resolution authorized by the port Administration Council. The environmental responsibilities of port key personnel is presented in Table 4.

Table 4. Environmental responsibilities of key personnel of the port of Paranaguá.

Activities	Job Title or Name	Department
Port Operations (Dredging)	Bathymetry and Dredging Coordination	Engineering Board
Port Operations (Navigation)	Berthing Coordination and Marine Traffic Coordination	Port Operation Board
Port Operations (Terminals)	Supervision Management	Port Operation Board
Wharf management	Port Operation Management	Port Operation Board
Cargo handling operations	Supervision Management	Port Operation Board
Site Management	Institucional Programs Coordinator	Communication and Marketing Management
Strategic Planning	Strategic Planning Manager	Strategic Planning Management
Personnel Capacitation	Personal Development Coordination	Personal Management
Supplies acquisition	Supply Purchasing Coordination	Administrative Board
Bidding processes	Bidding Coordination	Administration Management
Licensing/Permits	Coordinator for Planning and Licensing	Environment Board
Quality Management	Compliance Coordinator	Compliance Superintendence
On site Contractor Management	Manpower Management Body (OGMO)	Manpower Management Body (OGMO)
Emergency Planning	Coordinator for Supervision and Emergency Control & Occupational Health and Safety Manager	Environment Board
Waste management	Coordinator for Monitoring and Quality Assessment	Environment Board
Environmental Document Management	Environment Manager	Environment Board

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Environmental Data Management	Environment Manager	Environment Board
Air Quality monitoring	Outsourced company	Environment Board
Water Quality monitoring	Outsourced company	Environment Board
Sediment Quality monitoring	Outsourced company	Environment Board
Noise monitoring and management	Outsourced company	Environment Board
Wastewater monitoring and management	Outsourced company	Environment Board
Biota monitoring	Outsourced company	Environment Board
Mangrove structure monitoring	Outsourced company	Environment Board
Ballast water exchange monitoring	Outsourced company	Environment Board
Synanthropic Fauna Management	Outsourced company	Environment Board
Traffic Management	Engineer Manager	Engineering Board
Social Communication and Environmental Education activities	Outsourced company	Environment Board
Fishing Stock monitoring in the Paranaguá Bay	Outsourced company	Environment Board
Energy and Carbon Footprint Monitoring	Environment Manager	Environment Board

4.2 Resource allocation

The Environment Manager and its team annually plan budget allocation for port environmental management. The President of the port, along with the financial team, authorizes the financial outcome for each area of the port.

The annual port budget comprises the environment management items listed in the Table 5.

Table 5. Environmental responsibilities of key personnel of the port of Paranaguá.

Part of Organization	Item	Amount per year (approximate)
Human Resources	Staff costs Environment Management	R\$ 1.992.000,00

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Environmental Management	Environmental monitoring programs	R\$ 5.958.748,64
Environmental Management	Waste management	R\$ 1.530.314,83
Environmental Management	Mechanical road sweeping	R\$ 879.946,66
Environmental Management	Environmental emergency response	R\$ 3.002.077,86
Environmental Management	Oiled fauna response in case of emergency	R\$ 758.824,61
Environmental Management	Environmental monitoring during dredging campaigns	R\$ 273.482,17
Environmental Management	Environmental compensatory measures	R\$ 2.002.014,85

Approximate budget for port environmental management comprising all items described above is R\$ 16.397.409,63 per year. Port fees charged for port operators and the leasing of port areas generate the resources allocated to the Environment Board.

4.3 Awareness Evidences

Employees awareness regarding potential impacts of their working activities comprise training, direct communication and dissemination of information. In this sense, communication directed to port employees is performed every month and involves information on waste segregation and management (Figure 12); dengue control measures (Figure 13); means of reducing energy and water waste (Figure 14), among others.

Besides, port workers receive regular information regarding environmental aspects and other relevant topics, such as information on relevant ecosystems conservation, such as the mangrove, noise generation prevention, atmospheric

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

emissions, among others; and also topics regarding occupational safety, workers' health and preventive measures.



Figure 12. Poster and folder elaborated to aware employees and citizens about waste segregation and destination.

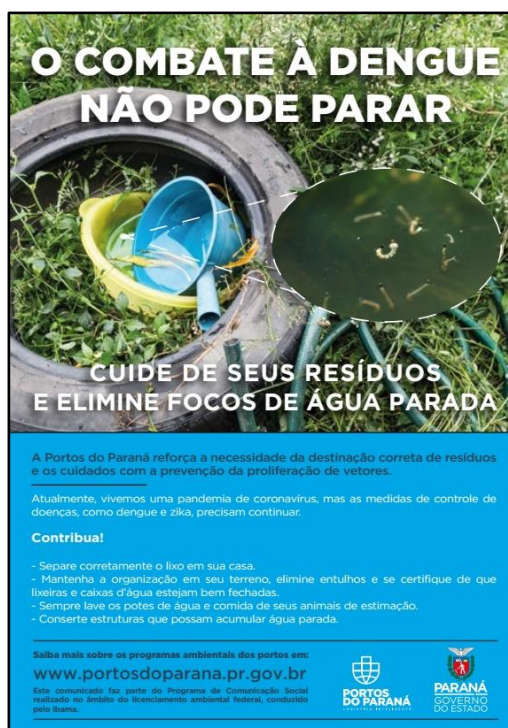


Figure 13. Newspaper publicity elaborated to aware population about control measures regarding dengue disease.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA



Figure 14. Posters installed to aware employees about waste segregation and water saving.

In order to raise awareness among port companies, several risk management workshops have been implemented to improve workers' health and occupational safety and to promote environmental protection (Figure 15). The workshops' main objective is to implement environmental good practices and improve operational procedures. The subjects of the workshops that have already been carried out involved plague and vector control procedures; environmental, health and safety rules for the public flammable pier; fuel and chemical supply procedure regarding environment, health and safety; solid bulk unloading operation and risk activities.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

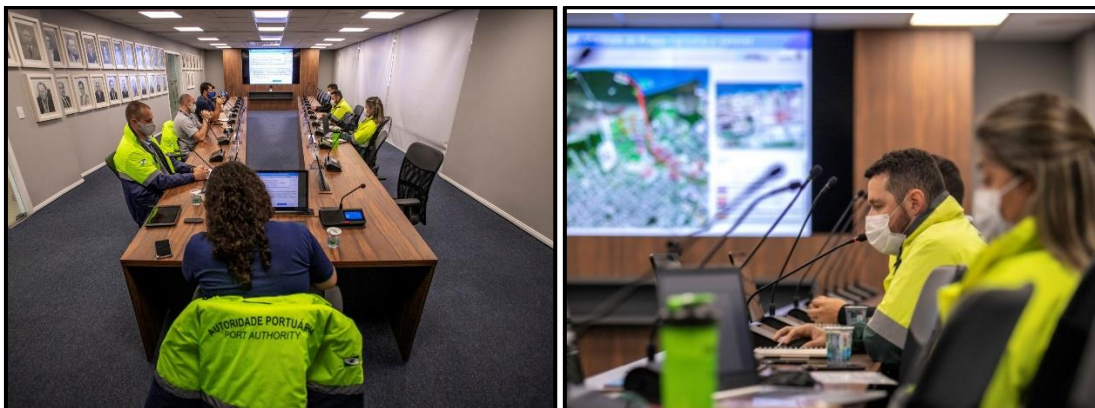


Figure 15. Workshop performed in 2021 regarding solid bulk unloading operations.

Another important communication to port employees and to all port community involves the dissemination of the port environmental policy, which happens whenever the policy is updated. The last update occurred in 2020 and all employees received a new nametag with the new policy (Figure 16).



Figure 16. Environmental policy disclosure among port employees.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

5 Conformity Review of Environmental Policy and Legal Requirements

The following items were selected to present the activities currently developed by the port in order to comply with the objectives of the port Environmental Policy, as well as with its responsibilities as a port authority.

5.1 Integrated Management System (IMS Regulation – Environment, Health and Occupational Safety)

In order to comply with its responsibilities as a port authority (as mentioned in the Item 1.2), the port of Paranaguá developed the Regulation for Environment, Health and Occupational Safety (Integrated Management System – IMS Regulation). The Regulation is an extensive management tool document that establishes rules for environmental control and occupational safety in the performance of port activities that may cause any potential impact to the environment and/or harm workers' life and health.

The IMS Regulation was developed to ensure compliance with environmental Brazilian legislation, occupational safety norms, and with the National Environmental Policy. Besides, it establishes environmental good practices and measures to promote workers' occupational safety that should be adopted by port operators regarding the impacts of their services. Therefore, it applies to all individuals and companies that perform any activity and/or service in the port of Paranaguá area.

Through this Regulation, the Port Authority seeks to guide and consolidate better organization and interaction of internal and external audiences, as well as to allow the contribution of third parties to the development of a better environmental quality and safe working conditions at the port of Paranaguá.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

The IMS Regulation establishes that companies performing activities that may generate any environmental impact should register and present several documents to the Environment Board before executing the service. The following services are included in this item:

- Cargo sample collection, handling, analysis, transport, storage and final destination;
- Waste removal from vessels, port area and public silo;
- Phytosanitary treatments (fumigation) and pest control;
- Environmental emergency preparedness and response;
- Hydrocarbon, derivatives, and chemical substances supply;
- Drinkable water supply.

Besides, the environment section of the IMS Regulation establishes general and specific guidelines for the following activities, when occurring in the port area:

- Reverse logistics;
- Painting services, painting scraping, cleaning and picking up of ship's holds and tanks;
- Cargo sampling collection, handling, analysis, transportation, warehousing and final destination of the products;
- Ship waste management in the port area;
- Phytosanitary treatments (fumigation) and pest control;
- Ballast water management;
- Port area cleaning procedures;
- Port equipment maintenance, cleaning and painting.
- Crane operations and protective 'blanket' on the side of the ship;
- Oil contention systems installation and maintenance;
- Integrated control and monitoring program of harmful synanthropic fauna;
- Handling and storage of liquid bulk;
- Drinkable water supply;
- Hydrocarbon, derivatives and chemical substances supply;
- Cleaning of cars and train carriages in loading and unloading operations;
- Environmental emergency preparedness and response.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

The occupational health and safety section of the IMS Regulation establishes guidelines for the following activities:

- Rules that determine the identification of the company responsible for the port operation;
- Use of personal protective equipment;
- Necessary fire-fighting equipment;
- Hazardous cargo;
- Procedures related to working situations (height, occupational accidents, confined spaces);
- Suspicious cases of infection in vessels' crew;
- Safety procedures related to port operations.

The IMS Regulation of Portos do Paraná is a public document, in Portuguese, available for inquiry at the Portos do Paraná website (<http://www.portosdoparana.pr.gov.br>) through the following path: tab “Environment & Health and Safety”, tab “Rules and Procedures”, option: “Environment and Safety Procedures”.

5.2 Port procedures

The port provides several procedures on how to execute certain activities, as described below (Table 1Table 4). All procedures are available in the port website (<https://www.portosdoparana.pr.gov.br/Meio-Ambiente/Pagina/Procedimentos-do-Sistema-de-Gestao-Integrado>) and they relate directly to environmental aspects and impacts and to hazards and risks register.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Table 4. Procedures established to regulate certain activities in the port area, related to the IMS Regulation.

Reference	Procedure	Objective
PO-APPA-SGI-019	Criteria for service providers participating in the Port Integration to allow working in the port area.	To establish the criteria and actions necessary for standardizing the request, schedule and participation of companies' workers in the port area in the Integration of the Integrated Management System (IMS), aiming at the adequate risk analysis of the tasks and the planning for safe execution of activities in contracts managed by the port.
PO-APPA-SGI-020	Safety in ship mooring, unmooring and pulling.	To establish security obligations in the activities of ship mooring, unmooring and pulling, as well as disciplining the administrative procedures for these activities.
PO-APPA-SGI-021	Analysis of documents related to operational risk in the "Porto sem Papel" system.	To establish criteria related to documental analysis of the operational risk regarding dangerous cargo port operations, seeking the best action in emergency cases, in addition to complying with legislation.
PO-APPA-SGI-022	IMS Incident Management.	To establish, implement and maintain processes to manage incidents of the Integrated Management System of the port, including communication procedures, recording, analysis, classification, investigation, corrective action and issuance of alerts of security to prevent recidivism.
PO-APPA-SGI-023	Procedure for testing with Breathalyzer.	To establish criteria for application of Breathalyzer test in areas under port of Paranaguá management, as well as defining the practices of using the equipment in search of safer working and operational conditions, which are applicable to all workers involved in port activities.
PO-APPA-SGI-024	General safety rules, traffic and	To establish criteria for the mandatory use of personal protective equipment (PPE) and

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

	consequences policy for port users and vehicles.	uniforms; for the transit of people and vehicles (light and heavy) in the port area; for feeding and smoking in port areas; cell phone use. To establish the policy of consequences for infractions committed in the areas managed by the port of Paranaguá, which are applicable to all workers involved in port activities.
PO-APPA-SGI-025	Occupational Health and Safety Criteria for Container Loading and Unloading Operations.	To establish minimum criteria for Occupational Health and Safety for container loading and unloading operations in the areas under, in order to preserve health and workforce safety, the environment, the community, the integrity of facilities and equipment and the continuity of operations, which are applicable to all workers involved in these activities.
PO-APPA-SGI-026	Health, Safety and Environmental (HSE) requirements for pest and vector control.	To establish Health, Safety and Environment requirements for the provision of pest and vector control port services by the private initiative at the port of Paranaguá.
PO-APPA-SGI-027	Health, Safety and Environmental (HSE) requirements for fuel and chemicals supply.	To establish Health, Safety and Environment requirements for fuel and chemical supply at the port of Paranaguá.
PO-APPA-SGI-028	Health, Safety and Environmental (HSE) requirements for solid bulk discharge.	To establish Health, Safety and Environment requirements for solid bulk discharge at the port of Paranaguá.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

5.2.1 IMS Regulation Performance Assessment

The port of Paranaguá developed an online smartphone application to accompany port operators and companies compliance to the IMS Regulation. When an employee from the Environment Board observes a deviation to the rule in the port area, the application provides a tool named “Nonconformity Observation”. The “Nonconformity Observation” application comprises four sections, according to the nature of the deviation, as exemplified in the Figure 17.



Figure 17. “Nonconformity Observation” application layout.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

When a “nonconformity” is registered, it is possible to include pictures of the occurrence, as well as information regarding date/hour; nature of the occurrence (environmental, leased companies, operational, sanitary, occupational safety, port guard); kind of infraction; place of occurrence; author (company); related rules/regulation.

After registering the nonconformity in the application, the Environment Board receives the notification and performs the “Behavioral Observation Program”, in order to promote the correction of the deviation. After that, if the deviation is not solved, it is reported to the Port Presidency, which communicates directly to the company in order to correct the nonconformity. Once again, if the deviation is not corrected, the Port Presidency notifies the regulatory agency (Antaq), responsible for supervising and penalizing the company.

In order to evaluate compliance to IMS Regulation, technicians perform daily field inspections in the port area. These inspections generate several indicators, such as number of inspections; observed actions; observed deviations; number of awareness activities; number of adequate inspections. These indicators are evaluated for each process (port services or port operation), and are used to compose an updated database (Figure 18.).

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA



Figure 18. Updated database regarding field inspections of port services and port operation.

5.3 Port Environmental Performance

Port of Paranaguá's environmental performance assessment process occurs through four main tools:

- Critical analysis of the performance of environmental programs;
- Internal audits, environmental and risk management related audits;
- Independent (external) environmental audits, in compliance with National Council of Environment (Conama) Resolution nº 306/2002 and Risk Management Program;
- Annual evaluation performed by the National Waterway Transport Agency (Antaq) Environmental Performance Index for ports (IDA).

Considering the first three assessment tools, the analysis criteria are the environmental objectives and targets, as well as standards/recommendations of legal requirements and other related rules. The fourth tool corresponds to an

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

assessment criteria established by the National Waterway Transport Agency (Antaq), observing not only legal requirements, but also international good practices.

5.3.1 Port Environmental Objectives and Targets

The environmental objectives and targets established within the scope of the port of Paranaguá activities are listed in Table 5, along with the legal requirements for each target, related plans and programs and the current situation of targets/indicators accomplishment.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Table 5. Specific objectives and targets regarding environmental aspects of the port of Paranaguá.

Specific objectives	Targets	Legal requirements	Related plans and programs	Achievement status
Establish actions to promote environmental quality, occupational health and safety by meeting legal requirements and good practices.	Update the Integrated Management System Regulation frequently, establishing minimum rules and procedures for the development of activities that represent risks to the environment and health or human life.	Federal Law N° 12.815/2013; Federal Law N° 6.938/1981; Antaq Res. N° 3274/2014; Federal Law N° 9.966/2000	Environmental Management Program	Under achievement
	Carry out inspections of environmental, safety and health procedures every day in the port area, seeking compliance with the IMS Regulation and applicable environmental and labor legislation.			Under achievement
	Monitor the consumption of water and electricity, aiming at its reduction.	Law 6.938/1981		Partially accomplished ¹
	Search for technological alternatives aiming at greater efficiency of the port services, seeking the minimization of environmental impacts.			Partially accomplished ²
	Accomplish the conditions established in the environmental licenses.	CONAMA Res. N° 237/1997		Accomplished
	Conduct performance audits periodically on directly contracted service providers.	ISO 14001:2015		Accomplished
	Train human resources annually for environmental management.	ISO 14001:2015		Partially accomplished
	Prepare annual reports to environmental agencies.	CONAMA Res. N° 237/1997		Under achievement
Maintain an integrated management system (IMS) for the environment, safety and health, based on ISO and OHSAS systems.	Review the IMS procedures every year.	ISO 14001:2015 and ISO 45001:2018	Environmental Management Program	Under achievement
	Annually review the IMS handbook, objectives and targets and environmental aspects and impacts.			Under achievement

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Specific objectives	Targets	Legal requirements	Related plans and programs	Achievement status
	Disclose the IMS to all employees and third parties.			Under achievement
Evaluate the performance of environmental actions, plans and programs through internal and external audits for continuous improvement.	Conduct internal audits every six months.	Federal Law N° 9.966/2000	Environmental Audit Program	Under achievement
	Perform an environmental audit in compliance with CONAMA Resolution N° 306/02 every two years.			Under achievement
Disseminate information and activities related to the port, both to the neighboring community and to port workers, in addition to receiving and answering doubts, complaints and suggestions.	Execute educational actions monthly to the internal and external public of Portos do Paraná.	IN Ibama N° 02/2012, Federal Law N° 9.795/1999	Social Communication Program, Environmental Education Program and other socio-environmental projects	Under achievement
	Produce and publicize on the official website of the port, as well as on social networks, the actions and activities related to port activity.			Under achievement
	Answer all calls received at the port Ombudsman.			Under achievement
	Conduct environmental education and communication actions with the port community every month.			Under achievement
Raise awareness among affected social groups and port workers and build a critical sense of understanding their role as an agent in the process of improving individual and collective quality of life.	Evaluate the effectiveness of dissemination and awareness every six months using indicators.	IN Ibama N° 02/2012; Law N° 9.795/1999	Environmental Education Program	Under achievement
Monitor infrastructure works and carry out studies to support the minimization of the impacts of heavy vehicle traffic in the urban	Gather annually information on infrastructure works, on road traffic planning and on the actions of the Port Authority.	Law N° 12.815/2013; Law N° 6.938/1981	Traffic Management Program	Under achievement
	Develop, according to the needs of Portos do Paraná,			Under

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Specific objectives	Targets	Legal requirements	Related plans and programs	Achievement status
areas of Paranaguá and Antonina.	traffic management studies that address signaling, rearranging, speed reducers and movement restrictions for heavy vehicles.			achievement
Perform ballast water control and management.	Inspect 100% of ships for checks provided for in the International Convention on Control and Management of Ballast Water and Ship Sediments, in NORMAM-20 and in IMO Resolution A.868.	NORMAM-20/DPC	Ballast Water Management Verification Program	Under achievement
Reduce and control vector populations through environmental management and periodically monitoring.	Maintain an ongoing service contract with a company specialized in pest control.	Anvisa DRC N° 072/2019	Vector proliferation control program	Under achievement
Recover contaminated, degraded and/or impacted areas.	Keep a record of areas with environmental liabilities, in order to monitor and recover these areas.	NBR 15.515: 2011 - Environmental liability in soil and groundwater.	Environmental Liabilities Recovery Program	Under achievement
Minimize the generation of waste at the source, adjust segregation, control and reduce risks to the environment and ensure correct handling and final disposal.	Audit the collection, transportation and final disposal systems on a monthly basis.	Law 12.305/2010	Solid Waste Management Program	Under achievement
	Train the port community monthly on topics related to solid waste management.			Under achievement
	Update the Solid Waste Management Program annually.			Under achievement
Analyze the sources of generation of effluents and characterize them, as well as verify alternatives for their management.	Audit the effluent treatment and final disposal systems and rainwater drainage network on a monthly basis.	Conama Resolutions N° 357/2005 and N° 430/2011	Effluent Management Program	Under achievement
	Monitor rainwater, raw and treated effluents on a quarterly basis.			Under achievement
	Keep the mapping of the entire drainage and effluent			Under

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Specific objectives	Targets	Legal requirements	Related plans and programs	Achievement status
	network up to date.			achievement
Identify, evaluate and monitor sources of atmospheric emissions.	Monitor black smoke from diesel vehicles from port internal fleet and from at least 400 trucks every month.	Conama Resolution N° 491/2018	Air Emissions Management Program	Under achievement
	Monthly monitor the quality of the surrounding air.			Under achievement
	Produce an inventory of fixed sources of atmospheric emissions every six months.			Under achievement
Monitor and propose actions to mitigate noise emissions resulting from port activities.	Monthly monitor sound pressure levels during the day and night.	Conama Resolution N° 1/1990	Noise Emission Management Program	Under achievement
Detect, through periodic analyzes, possible changes in water quality parameters in the estuary and contribute to the control and minimization of impacts resulting from port activities	Monitor water quality parameters on a quarterly basis.	Conama Resolution N° 357/2005	Water Quality Monitoring Program	Under achievement
To verify changes in the physical-chemical parameters of the sediments in the area influenced by the ports, assessing the possible impacts that occurred in that location.	Monitor sediment quality parameters on a quarterly basis.	Conama Resolution N° 454/2012	Sediment Quality Monitoring Program	Under achievement
To evaluate, in a spatial and temporal character, the behavior of mangroves.	Monitor phytosociological parameters on a quarterly basis in the mangroves of Amparo, Oceania and Rocio.	Port Environmental License N° 1173/2013	Mangrove Monitoring Program	Under achievement
	Monitor the erosion processes of Rocio and Oceania mangroves every two months.			Under achievement
	Perform bimonthly cleaning actions in the mangrove			Under

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Specific objectives	Targets	Legal requirements	Related plans and programs	Achievement status
	forests of Rocio and Oceania.			achievement
Monitor the impact of operational activities, in addition to the damage caused by eventual contamination, on the biotic structure inserted in Paranaguá bay and the adjacent coastal environment.	Quarterly monitor the planktonic community, the benthic community, the ichthyofauna and carcinofauna, cetaceans and turtles and tissue contamination by heavy metals and hydrocarbons at sampling points located in the Paranaguá bay.	Port Environmental License N° 1173/2013	Aquatic Biota Monitoring Program and Determination of Bioindicators.	Under achievement
	Monitor the avifauna monthly.			Under achievement
Generate information about fishing in the area in the Paranaguá bay in order to support other studies on the performance of fishing activity.	Get daily information on landings and fishing effort, as well as characteristics of fisheries and landing places.	PROZEE-SEAP-IBAMA/2006	Fisheries Activity Monitoring Program	Under achievement
Monitor the impact of dredging activities on the biotic and/or physical structure of the Paranaguá bay and on the adjacent coastal environment.	Execute environmental programs as proposed by the Dredging Plan and/or provisions contained in the letter and technical opinion that authorize the activity.	Conama Resolution N° 454/2012	Monitoring programs during maintenance dredging.	Under achievement
Meet the requirements of CONAMA Resolution N° 398/08.	Execute the Individual Emergency Plan (PEI), keep it updated and annually send records of training, simulations and reports of emergency assistance to Ibama.	Conama Resolution N° 398/1998	PEI and PA	Under achievement
	Coordinate the Area Plan (PA), keep it updated and operational and send to IBAMA records of training, simulations and reports of emergency care annually.			Under achievement
Comply with labor legislation applicable to the workforce of the port.	Continuously carry out the action plan of the Environmental Risk Prevention Program (PPRA).	Regulatory Standard 9	PPRA	Under achievement
	Review PPRA's action plan monthly at a board meeting.			Under

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Specific objectives	Targets	Legal requirements	Related plans and programs	Achievement status
	Train employees in mandatory training provided for in regulatory standards and update training as required.	Regulatory Standard 7	PCMSO	achievement
	Keep the Occupational Health Medical Control Plan (PCMSO) updated and prepare an annual report.			Under achievement
	Maintain Specialized Service in Safety Engineering and Occupational Medicine.	Regulatory Standard 4	Environmental Management Program	Under achievement
	Keep updated work accident history.			Under achievement
Comply with Regulatory Standard 29 requirements associated with emergencies	Execute the Emergency Control Plan (PCE), keep it updated and keep records of simulated training.	Regulatory Standard 29	PCE	Under achievement
	Coordinate the Mutual Aid Plan (PAM), keep it updated and keep records of simulated training.		WFP	Under achievement

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA**5.3.2 Critical analysis of the performance of environmental programs**

The critical analysis regarding the results of the environmental programs is carried out every year, taking into consideration their objectives and targets, as well as the standards established in the current legislation and/or recommendations of other competent authorities. The responsibility of this evaluation belongs to the technical team of the Environment Board and to the company hired to provide technical support for environmental management and the execution of environmental programs. The evidences comprise activity reports (RSA), including notes and observations, proposals for corrections and/or recommendation of a detailed investigation of any nonconformity for the proposal of corrective actions.

5.3.3 Internal environmental audits

In order to assess the environmental performance for continuous improvement of the IMS, the Environmental Management System is audited every six months by a team of internal auditors from the Environment Board and/or the company hired to provide technical support for environmental management. The auditioning scope comprises port administration, the environmental management system development and port operation in common terrestrial areas of the port of Paranaguá.

5.3.4 Independent external environmental audits

Every two years, the Environmental Management System undergoes an auditioning process leaded by a team of independent (external) professional environmental auditors certified in the Register of Certified Auditors (RAC) of the National Personnel Qualification and Certification System (SNQC). This team

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

evaluates the environmental management system and the environmental control of the port.

The objectives of the external audit are to comply with the established in the Conama Resolution nº 306/2002 and Conama nº 381/2006 and other applicable requirements; to promote continuous improvement of the company; report auditing results and conclusions to the high administration of the company; suggest improvement opportunities to the audited company and report to the high administration. In the last audit conducted in 2020, the port of Paranaguá reached 98% of attendance to legal requirements.

5.3.5 Antaq Environmental Performance Index (IDA)

Annually, on a voluntary basis, Portos do Paraná undergoes the assessment of the Environmental Performance Index (IDA) of the National Waterway Transport Agency (Antaq). The index criteria correspond to compliance to several legal requirements and international good practices. Since 2012, it takes place through the provision of information on environmental management by the Environment Manager, on a specific online platform developed by Antaq.

In 2021, the port of Paranaguá reached the first place in the prize “Regulatory Conformity” among public ports and the second place in “Environmental Performance” category (IDA), both conducted and evaluated by Antaq (<https://www.portosdoparana.pr.gov.br/Noticia/Portos-do-Parana-e-destaque-em-mais-um-premio-nacional>).

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA**5.3.6 Priorities for improvement plans**

Based on the environmental performance of the port, several items should be improved, including specific measures to mitigate some important environmental impacts, such as air pollution, traffic issues, and waste generation, among others. Therefore, the most important and recent measures that must be accomplished by the port authority and tenants in the short to medium term is listed as follows:

- Total enclosure of conveyor belts and towers for the transport of solid bulks;
- Modernization of shiploaders in order to generate less particulate material;
- Improvement of solid bulk discharge equipment to prevent the dispersion of particulate material;
- Modernization of liquid bulk pier;
- Establishment of a natural gas plant with the use of organic matter from product loading;
- Improvement of waste segregation and final destination;
- Expansion of the sorting courtyard to embrace more truck vacancies to reduce conflict in the municipality;
- Implementation of traffic management actions and improve via conditions;
- Improvement of railroads access to the port of Paranaguá, promoting the reduction of the amount of trucks in the municipality and the reduction of greenhouse gases emission.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

6 Environmental report

In 2013, the Brazilian Institute for the Environment and Natural Resources (Ibama) issued the operating license for the port of Paranaguá (L.O. nº 1173/2013). The license authorizes port activities and dredging campaigns to maintain current draft. In the license, Ibama established several environmental programs that must be constantly performed by the port, and the results of the monitoring campaigns must be reported to the institute every year.

Overall, the Port Authority is responsible for performing more than 20 environmental programs, and for updating and executing several emergency plans, such as Risk Management Plan, Individual Emergency Plan, and Emergency Action Plan. The environmental programs comprise ecosystems monitoring, socio-environmental actions, and environmental control actions, as described below.

6.1 Ecosystems monitoring

6.1.1 Water Quality Monitoring Program

The Water Quality Monitoring Program includes periodic analyzes performed every three months of the water quality condition at 32 collection points located at Paranaguá Bay and at open sea (Figure 19).

The samples are collected on the surface, in the middle and/or bottom of the water column in each point, totaling 86 samples per campaign (Figure 20). The analysis considers 60 parameters of environmental quality, in order to verify their conformity with the limits established by legislation (Conama Resolution nº 357/2005), in order to identify possible sources of pollution.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

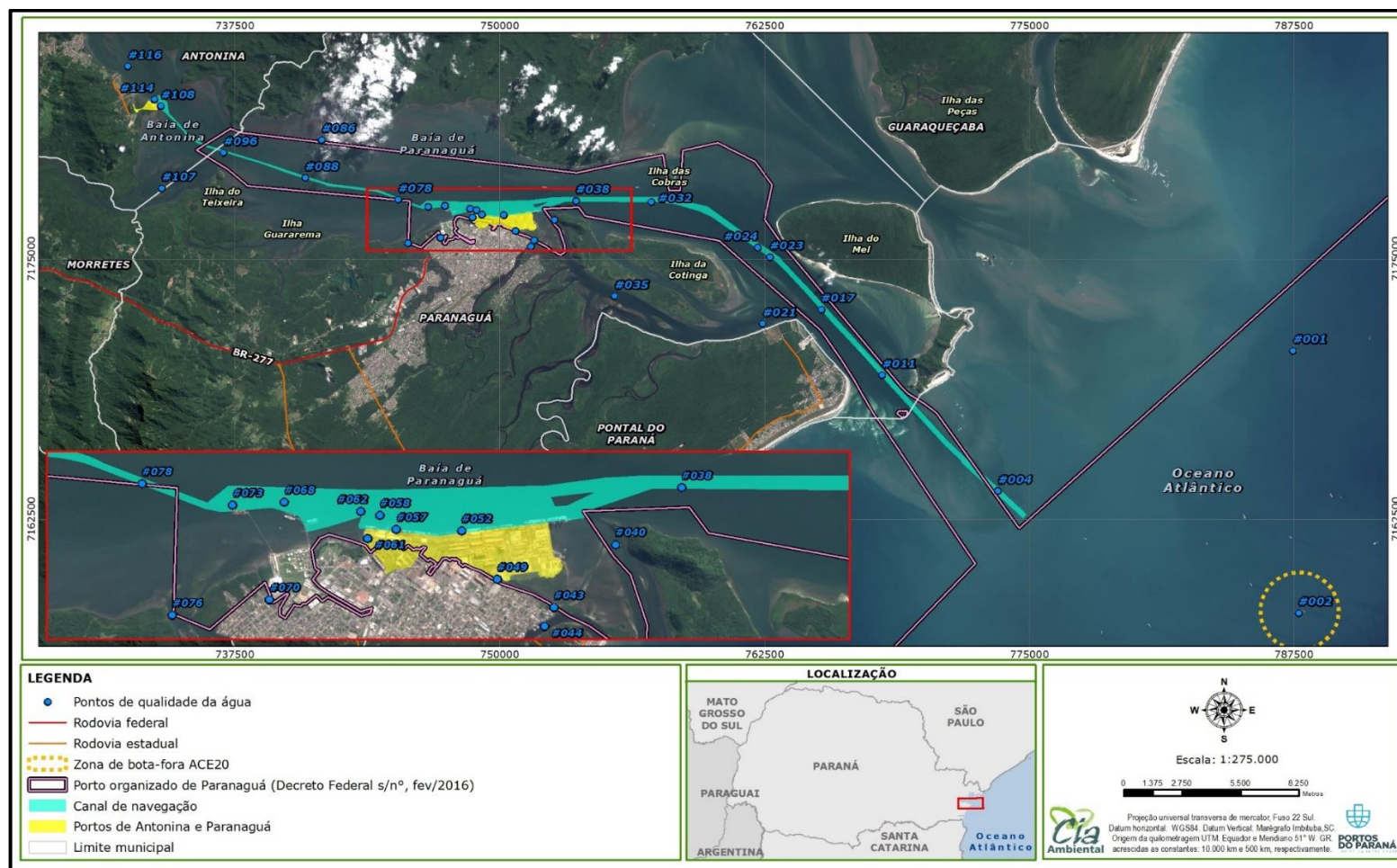


Figure 19. Sampling points for water quality monitoring (blue dots).

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

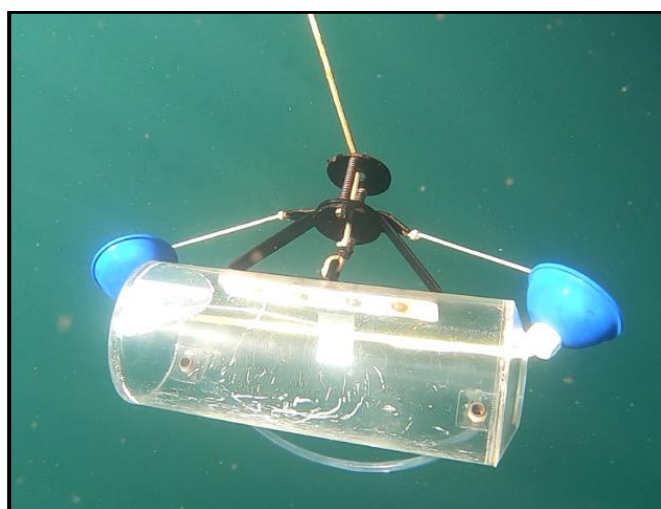
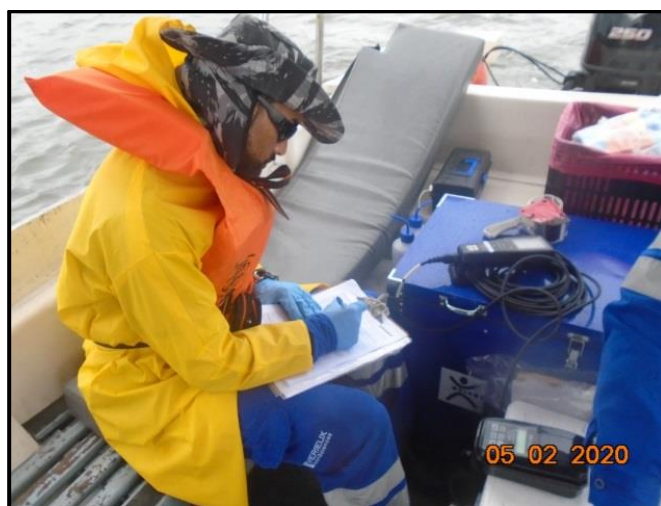


Figure 20. Equipment used to evaluate water quality parameters.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

6.1.2 Sediment Quality Monitoring Program

The Sediment Quality Monitoring Program is performed every three months through the collection and analysis of sediment samples (Figure 21) from the seabed at 23 points located in the area of influence of the ports of Paraná (Figure 22). Every three months, 35 parameters are analyzed in each sample in order to verify their conformity with legal limits established by the CONAMA Resolution nº 454/2012. This program also provides results that support the planning for execution of maintenance dredges in Paranaguá bay.



Figure 21. Sampling and storage of sediment collected during a campaign of the Sediment Quality Monitoring Program.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

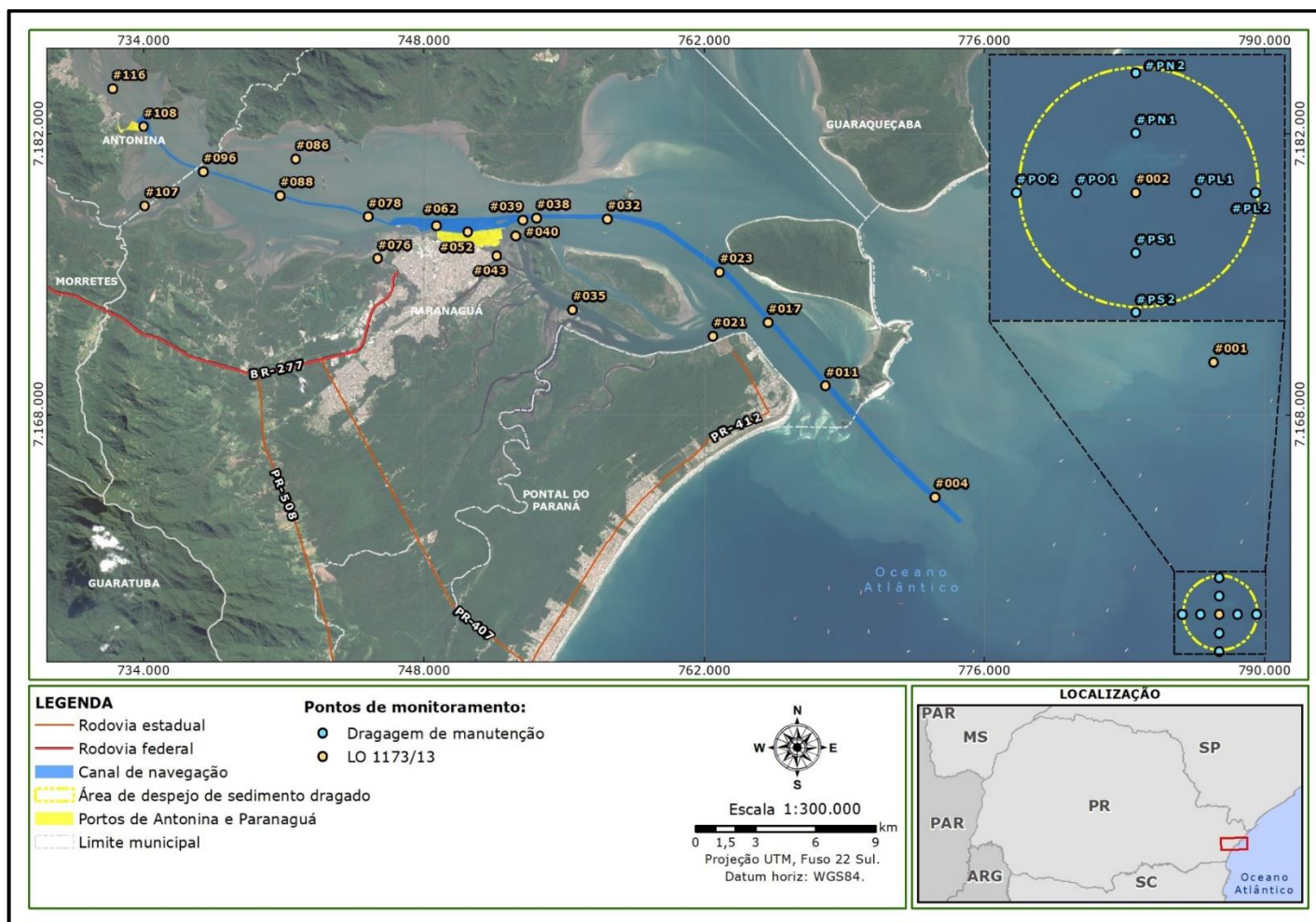


Figure 22. Sampling points for sediment quality monitoring (orange dots) and sampling points for sediment quality monitoring of dredged material disposal (blue dots).

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

6.1.3 Aquatic Biota Monitoring Program

The port monitors the aquatic biota every three months, as marine and estuarine organisms are important bio-indicators of the environmental quality of the Paranaguá Bay. The Aquatic Biota Monitoring Program is composed of six subprograms and is performed by collecting and analyzing various biotic groups such as plankton (phytoplankton, zooplankton and ichthyoplankton), benthos (organisms living in association with substrate), carcinofauna (crabs) and ichthyofauna (fish). Another activity related to aquatic biota involves the evaluation of mollusks tissue contamination by heavy metals and hydrocarbons (Figure 23).



Figure 23. Nets for collecting plankton; benthonic organisms collected during a campaign; procedures during fish samples collection and mollusks collected to analyze tissue contamination.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

In addition, visual and photographic surveys of cetaceans (dolphins and porpoises), chelonians (turtles) and birds are carried out in different points of the Paranaguá Bay every month (Figure 1Figure 24). Authorized and qualified professionals perform all monitoring activities.



Figure 24. Some species of birds and *Sotalia guianensis* (dolphins) individuals identified in the monitoring program.

6.1.4 Ballast Water Surveillance Program

The monitoring of ballast water from ships from other countries is fundamental to control the possible invasion of exotic species in Paranaguá Bay. Ballast water is used by ships to compensate for weight variations during loading and unloading operations in order to control the draft and keep the ship steady. When a foreign ship is supposed to berth in Brazilian waters, and its ballast water tanks are full, the ship is obliged by law to exchange the water in the tanks in open sea (oceanic exchange). That is, before crossing the limit of 200 nautical miles of the

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Brazilian coast, the ship must promote the exchange of ballast water in a spot at least 200-meter deep. The oceanic exchange is necessary because estuarine organisms that may be present in vessel tanks are not suited to survive in ocean waters and likewise, oceanic organisms are not adapted to survive in estuaries or bays. This procedure is described in the Regulation of the Maritime Authority (NORMAM nº 20/2014).

For this reason, the port manages the ballast water of all vessels coming from abroad, checking the origin of the vessel and analyzing the salinity of the ballast water. The salinity of the water indicates if the ship performed the oceanic exchange of ballast water. In addition, educational activities are carried out with the ship crew. Nowadays, about 99 per cent of ships that dock at Paranaguá port are surveyed in this program (Figure 25).

Ballast Water exchange

De programas de comunicação social e gerenciamento de água de lastre são realizadas como medida de mitigação dos riscos ambientais, conforme porto Seguro.

According to international norms for ballast water exchange (International Maritime Organization guidelines), and to NORMAM-20, followed by Brazilian ports, ballast water exchange is mandatory to all vessels engaging in commercial navigation between distinct hydrographic basins and/or when the vessel is navigating between maritime and fluvial ports.

Every ship must conduct the ballast water exchange at least 200 nautical miles from the nearest land and in water at least 200 metres in depth.

If that is not possible, the ballast water exchange should occur as distant from the coast as possible, at least 50 nautical miles away, and in at least 200 metres in depth.

The Brazilian maritime authorities accept exchange of ballast water by either sequential or continuous flow or Brazilian dilution method.

All ships that arrive at the Paranaguá Port must have a ballast water record book showing when ballast water is taken on board, circulated or treated for ballast water management purposes and discharged into the sea. It should also record when ballast water is discharged to a reception facility and accidental or other exceptional discharges of ballast water.

Ships are also required to be surveyed and certified and may be inspected by port workers, who should check the ballast water record books and/or sample the ballast water for its salinity levels, which must be higher than 2‰ of salinity, proving that the water exchange occurred according to the legislation guides.

If there are any further concerns, a detailed inspection may be carried out by port state control officers and the ship shall not discharge ballast water until it can do so without presenting a threat of harm to the environment, human health, property or resources.

Invasive aquatic species present a threat to the marine ecosystems and shipping is a major pathway for introducing species to new environments.

Examples of dangerous species

- Mussels**: One example of invasive species known to the general public, which arrived in Brazil through ballast water and ship hulls and, having no natural enemies, reproduced quickly in salt and fresh waters, frequently being responsible for the clogging of pipes and drainage systems.
- Cholera**: In the 1990s, South America suffered from a cholera epidemic caused by a type of vibrio propagated in Asia and transported in the ballast water of a ship docked in Porto.
- Algae**: Many species of exotic and toxic marine algae have already been reported across different regions due to improper ballast water exchange. These algae can proliferate quickly, causing the death of the native organisms and the depletion of the marine ecosystem and the depletion of the fish stocks, causing economic losses and health problems.

Find out more about the environmental programs carried out in the ports of Paraná:
www.portosdoparana.pr.gov.br

Logos: PMP, APPA, PARANÁ

Figure 25. Material used to inform ship crew about ballast water exchange.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA**6.1.5 Mangrove Monitoring Program***Mangrove Phytossociological Monitoring*

Mangrove monitoring consists of monitoring the conservation status of mangrove forests (phytosociology) in four representative areas of the Paranaguá bay. Mangrove survival and growth data are obtained from tree individuals in order to support management actions (Figure 26). Phytosociology monitoring occurs quarterly in the mangrove forests of Rocío, Oceania and Amparo regions, through the installation of plots varying from 25 to 100m². Complementarily, there is the photographic follow-up of the evolution of a mangrove forest located at Ilha do Mel. The three typical species of mangrove (*Laguncularia racemosa* - white mangrove, *Avicennia schaueriana* - black mangrove and *Rhizophora mangle* - red mangrove) coexist in these forests.



Figure 26. Measurement of mangrove tree's chest height diameter measurements in the phytossociological analyses.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Erosive Processes Monitoring in Mangroves

The monitoring program of erosive processes in mangroves analyzes whether sediment deposition or erosion is occurring in the mangroves, phenomena that naturally occur in the environment, but that can get more intense due to human interference.

This monitoring began in 2016 and has a minimum four-week revisit circuit in six mangroves and beaches around the Port of Paranaguá (in the communities of Amparo, Encantadas, Maciel, Oceania, Piaçaguera and Rocio) and should, in the medium and long term, elucidate trends and possible causes of erosive processes observed at these sites (Figure 27).



Figure 27. Analyses of erosive processes in the mangrove of Rocio.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

6.2 Socio-environmental actions

6.2.1 Social Communication Program

The main objective of the Social Communication Program is to provide continuous information regarding port activities and the environmental programs to port community and general audience. Besides, it aims at creating communication channels between the port and the society, especially those under direct influence of port activities. In addition to contributing to the dissemination of important information, this program also strengthens the information flow among workers involved in port activity (Figure 28).

The execution of the program involves dialogues, communication in social media, propagation banners, folders, advertisements, among others (Figure 29). Besides, the port provides several information in its website, including an ombudsman service via e-mail and telephone.



Figure 28. Banners developed to inform port community about masks correct discard and waste segregation in the office.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA



LEGENDA
Avistagens de boto-cinza em 2019:

	Alto
	Médio
	Baixo

O mapa apresenta os pontos em que foram observadas maiores concentrações de boto-cinza nas áreas estuarinas monitoradas pela Portos do Paraná.

Em caso de encalhe ou avistamento de animais mortos na costa, entrar em contato com o Laboratório de Ecologia e Conservação da UFPR (via PMP-BS), pelo telefone 0800-6423341.

Ano de publicação: 2020
Tiragem: 1000

CONHEÇA E PROTEJA



O BOTO-CINZA

O boto-cinza (*Sotalia guianensis*) é listado pelo Ministério do Meio Ambiente como espécie ameaçada e tem status de espécie vulnerável na Lista da Fauna Brasileira de Espécies Ameaçadas de Extinção (Portaria MMA nº 444 de 17/12/2014).

Este material faz parte do Programa de Comunicação Social, que atende ao licenciamento ambiental conduzido pelo Ibama.

Programa de Monitoramento da Biota Aquática

Atendendo ao licenciamento ambiental conduzido pelo Ibama (LO Ibama nº 1173/2013 e 1364/2017), o Subprograma de Monitoramento de Cetáceos e Quelônios monitora, mensalmente, os botos-cinza do Complexo Estuarino de Paranaguá (CEP), através de fotoidentificação.

Características da espécie

O boto-cinza pode viver entre 30 e 35 anos e atingir 2,2 metros e 90 kg. O dorso é cinza e com duas bandas laterais mais claras.



Botos-cinza vivem no CEP e alguns deles frequentam a área da Portos do Paraná, concentrando-se especialmente nos berços de atracação e no cais oeste (B201), pois utilizam os cascos de navios para arrebANHAR os peixes, ou seja, para se alimentar.

PERIGOS PARA O BOTO-CINZA

Com o tráfego de embarcações de pequeno e médio porte nas áreas de atracação do porto e, conseqüentemente, em áreas importantes para a alimentação dos botos-cinza, há o risco de colisão das embarcações com esses animais.



Pesca contra cascos de navios



Filhote ferido na região da cabeça



Ferimentos na região da cauda

Cuidado! Proteja o boto-cinza.

Normas descritas na Lei nº 7.643/1987; Portaria Ibama nº 117/1996, e como recomendação do Centro Nacional de Pesquisa e Conservação de Mamíferos Aquáticos (CIMA).

- As embarcações devem manter distância mínima exigida de 300 metros dos animais.
- Quando a distância entre a embarcação e os botos for menor que 300 metros:
 - o motor deve ser colocado em neutro ou em velocidade mínima;
 - deve-se navegar apenas em velocidade inferior a 5 nós (cerca de 10km/h);
- durante observação, não atravessar a linha de direção de deslocamento do grupo de botos;
- evitar mudanças bruscas de direção.





10 km/h



30 min

Não acompanhar a bordo de embarcação os botos por mais de 30 minutos.



15 min

Em caso de fêmeas com filhotes, não exceder 15 minutos.

Figure 29. Folder about grey dolphin preservation, with specific content for sailors.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

6.2.2 Environmental Education Program

The port Environmental Education Program aims at creating effective conditions for building a critical sense of people under the influence of port activities, to promote the understanding of their role as agents in the process of improving individual and collective life quality. Besides, the program seeks to raise awareness for the prevention and minimization of socio-environmental impacts resulting from the operational activity of the port of Paranaguá.

This program comprises both internal and external audiences related to the port. The internal audience are port employees and third parties, port community (leasing companies), port workers (stevedoring), truck drivers, as well as any worker related to the port. Awareness campaigns, specific training efforts, and environmental dialogues are constantly performed with the internal audience (Figure 30).

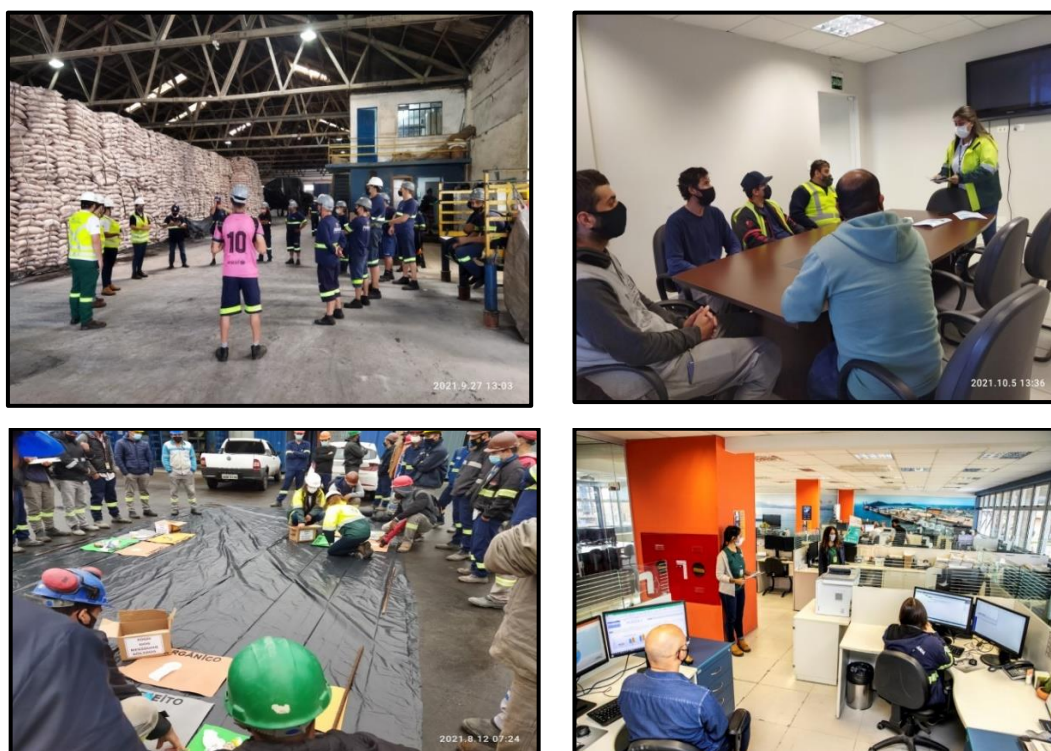


Figure 30. Environmental education activities with the port internal audience.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

The external audience are social groups located in the direct influence area of the port, such as artisanal fishing communities. The Figure 32 presents their location. The port develops 13 socio-environmental projects with the external audience, which are divided into 5 lines of action, comprising artisanal fishing strengthening, local association empowerment, and support for young people, basic sanitation, tourism, culture and environmental awareness (Figure 31).



Figure 31. Activities developed with port external audience, involving local association empowerment, activities to encourage waste composting and young audience awareness actions.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

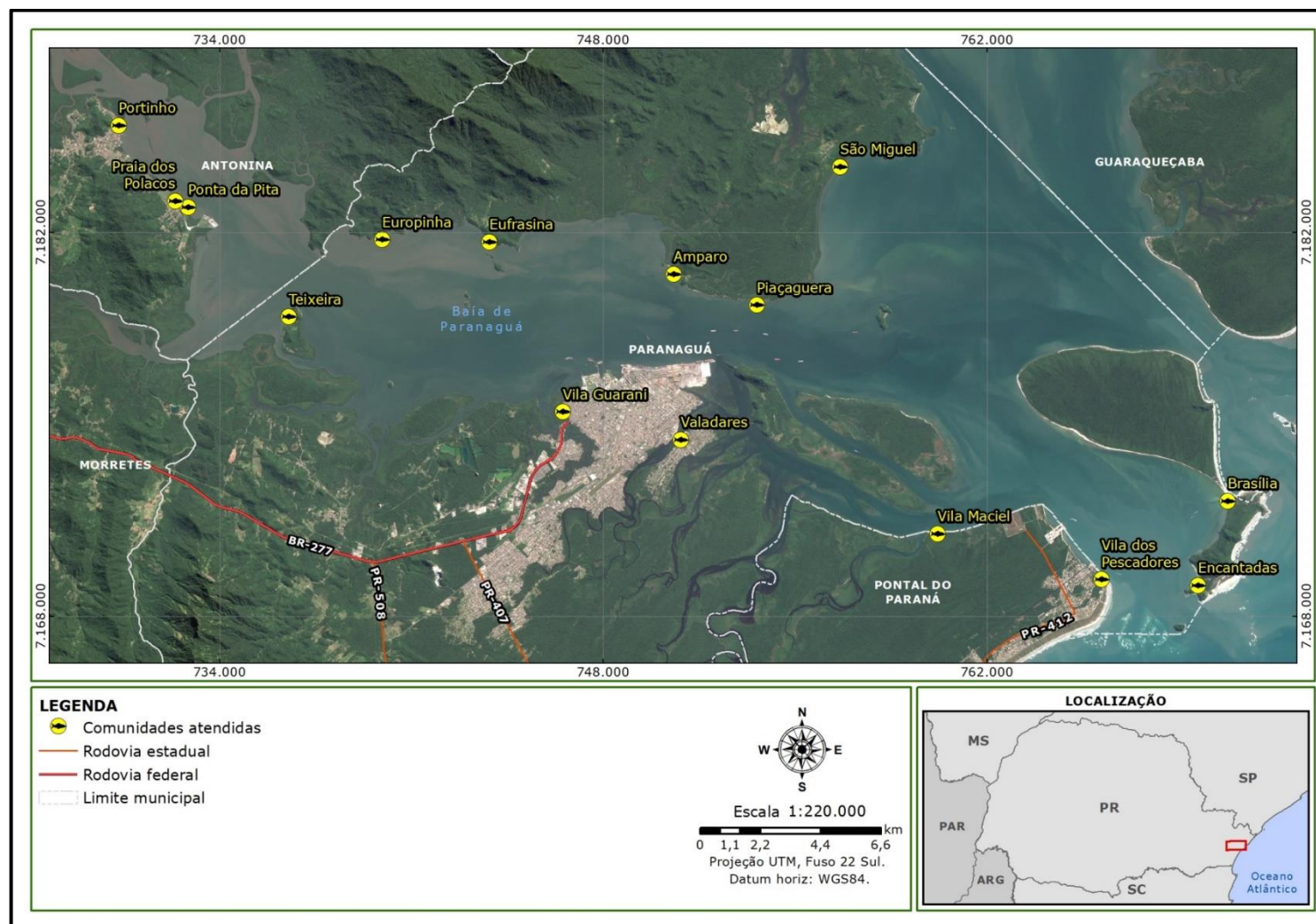


Figure 32. Location of the communities that correspond to the external audience of the Environmental Program.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA**6.2.3 Traffic Management Program**

The Traffic Management Program monitors the progress of implemented measures to mitigate the environmental impacts of heavy traffic in the urban area of Paranaguá and perform studies/projects to plan and order traffic in these areas (Figure 33).



Figure 33. Vertical signaling in the port area.

6.2.4 Fishing Activity Management Program

The Fishing Activity Monitoring Program regularly monitors artisanal fisheries in the Paranaguá Bay, supporting studies on the performance of fishing activity over time. Since 2014, this program has been evaluating the amount of arrived fishing resources, the species fished, as well as the equipment used and the type of vessel used by fishermen. Seven fishing landings are accompanied on a daily basis in the municipalities of Antonina, Paranaguá and Pontal do Sul, embracing the production of 33 fishing communities located throughout the Paranaguá bay (Figure 34).

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA



Figure 34. Registers of the arrival of fishing resources to Paranaguá, accompanied by the personnel responsible for the program.

6.3 Environmental control actions

6.3.1 Solid Waste Management Plan

The main objective of the Solid Waste Management Plan (PGRS) is to minimize the generation of waste, continually improving its segregation, and promoting its adequate final destination. In addition, PGRS aims to control and reduce risks to the environment associated to waste generation, as well as to ensure the correct handling and final disposal of waste. Therefore, these actions may reduce the supply of food and the proliferation of vectors (rats, pigeons etc.) in the port areas. In the Paranaguá Port, the solid waste is segregated in collectors arranged in waste collection points (PCS), for recyclable and non-recyclable waste (Figure 35).

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

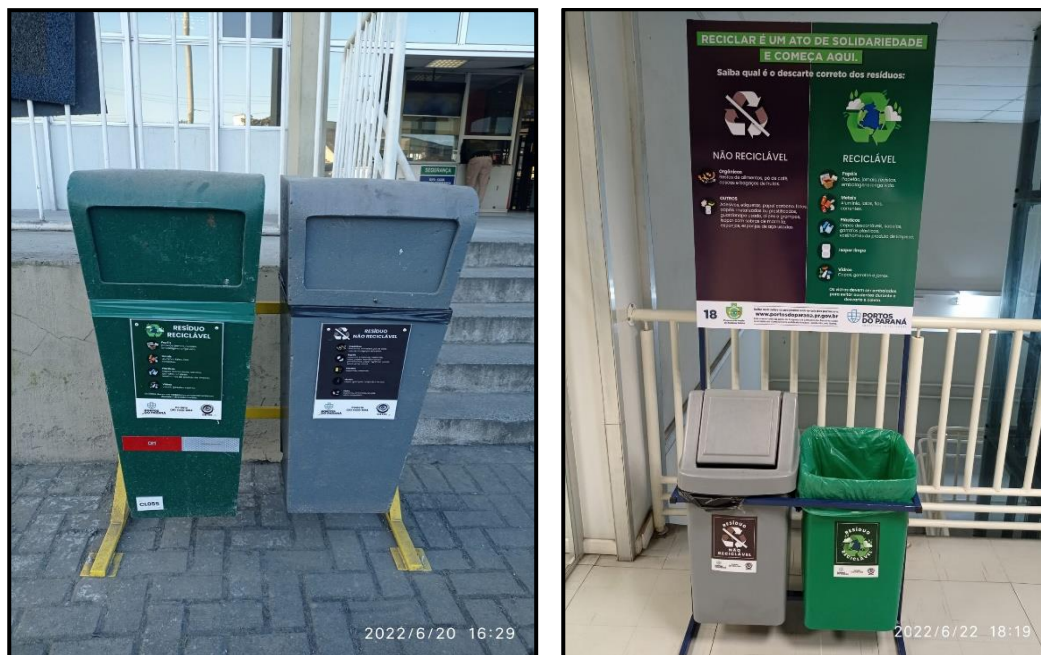


Figure 35. Collectors and buckets located in Selective Collection Points (PCS) along the port of Paranaguá legal jurisdiction.

The PGRS contributes directly to the maintenance of organization and cleaning of the port areas. The port currently counts with mechanical sweeping, not only in the port areas, but also in public roads around the port. This program also includes training, courses, lectures and educational actions regarding waste management for both internal and external audiences.

6.3.2 Atmospheric Emissions Management Program

The Atmospheric Emissions Management Program monitors air quality in 12 sample stations in the Organized Port area, in addition to emissions from mobile sources. Seven parameters are measured: total suspended particle levels, inhalable particles, smoke, sulfur dioxide, carbon monoxide, ozone and nitrogen dioxide (Figure 36). The results show that the Air Quality Indexes in the residential areas are

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

classified, according to the classes of the Environmental Institute of Paraná, predominantly as "good".

This program also maintains an updated inventory of fixed sources of atmospheric emissions. The port measures the levels of "black smoke" of diesel vehicles of its own fleet and of third-party fleet every month (Figure 37). Ship loading/unloading equipment are operated in a way that minimizes product dropping or dust generation. The equipment operators undergo specific training every six months.



Figure 36. Equipment installed to monitor air quality in the port surrounding.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA



Figure 37. Blacksmoke monitoring with the methodology known as “Ringelmann scale”.

6.3.3 Effluents Management Program

The effluent management program aims to prevent pollution of water resources. To this end, the port monitors quarterly physical-chemical and biological parameters of the effluents generated (destined to the municipal sanitation company) and rainwater at six monitoring points defined in the area of the Organized Port of Paranaguá (Figure 38).

For each sample, 10 parameters are analyzed, totaling more than 700 monthly analyzes. In addition, the program has mapped more than 800 manholes in the port area, which are monitored monthly to see if there is a need for clearing, thus preventing water accumulation and flooding in the area.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA



Figure 38. Effluents samples collection in order to evaluate physical-chemical and biological parameters.

6.3.4 Noise Emissions Monitoring Program

The Noise Emission Monitoring Program monitors every month, during the day and night periods, 21 points located in the port area and in the city of Paranaguá (Figure 39). In addition to verifying compliance with legal limits, this program also allows the creation of a database for strategic planning and management of this type of issue.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

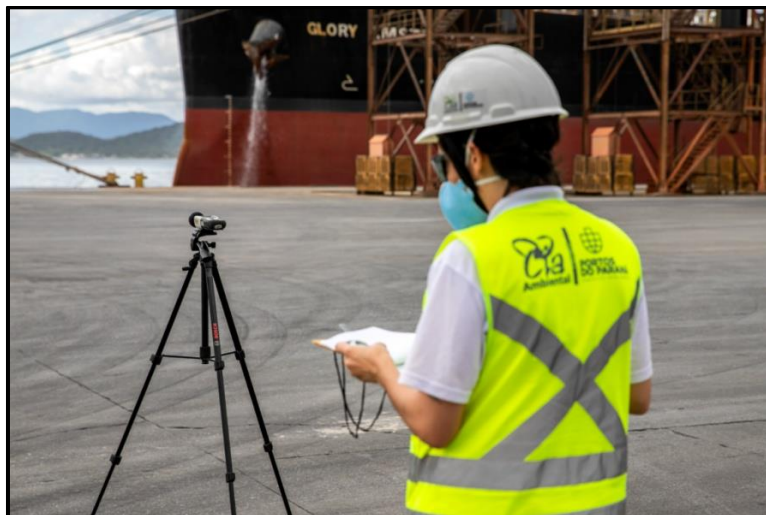


Figure 39. Evaluation of intermittent sources of noise pollution in the port area.

6.3.5 Vectors Proliferation Control Program

The program consists of a set of actions to control and reduce the population of rodents, pigeons, mosquitoes, cockroaches, bees and other vectors, through environmental management measures and several daily management actions.

The control and monitoring of rodents occurs through the installation of traps (bait holders) distributed in certain points in the area of the port (Figure 40). The controlling and monitoring activities occur on a daily basis, currently involving the maintenance of more than 450 rodent control equipment.

Pigeon population control is carried out by using repellent in areas of high concentrations of pigeons, by removing manually the eggs, nests and carcasses, by reducing shelter areas through the use of physical barriers (screens and grids in the warehouse structure) and reducing food availability through sweeping in the port area.

There are control actions at port facilities for hematophagous insects, especially *Aedes aegypti* insect larvae, such as applications, on demand, of biological insecticides in areas with the greatest potential for mosquito outbreaks (areas with

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

stored/disposed materials and structures that may accumulate water), elimination of water puddles and awareness campaigns.



Figure 40. Daily monitoring of rodent control equipment.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

7 Examples of Best Practices

7.1 “Composting for Growing” and “Green Label of Environmental Responsibility”

The port of Paranaguá develops several activities at “Ilha do Mel” (“Honey Island”), an important touristic island located at Paraná coast. Two projects are under development at the locality, as part of the Environmental Education Program, and both have been required by local communities – known as the communities of Encantadas and Brasília.

One of the projects is named “Composting for Growing” and provides assistance for local residents and commercial establishments to perform the composting of organic material (

Figure 41). A specialized professional accompanies the interested parties throughout the process, finding the best spot at the property and the best method to perform the composting process. The professional also provides constant information on the topic via *Whatsapp* group, which counts with 136 participants.



Figure 41. Simple composting structure for local small residences.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

Furthermore, two composting structures have been installed at the state schools of Encantadas and Brasília, and the students are responsible for maintaining the composting process of organic material from the school canteen. The compost produced at the end of the process is used at a vegetable garden that was established at both schools, teaching the students about nutrient cycling and sustainability (Figure 42).



Figure 42. Composting structures installed at the schools of Honey Island and vegetable gardens that receive the generated compost.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

The other project is named “Green Label of Environmental Responsibility” and focuses on establishments such as restaurants and hotels located at Honey Island. The establishments are encouraged to improve waste management and perform the composting of organic matter. In this case, local establishments have to fulfill three criteria to receive the label, as follows: promoting minimal waste segregation (separating recyclable from non-recyclable and organic residuals); providing a bin to temporary waste storage before collection; and performing composting of organic matters or having received a visit from the professional that provides assistance on composting, in the case of small spaces.

Once the establishment receives the “Green Label”, it has to continuously maintain the criteria during the period, as the label is valid for a year. Every year, new requirements will be added to the evaluation. Those commercial establishments with the “Green Label” receive marketing promotion in the local social media and at the official media of the port. The objective is that tourists that visit the Honey Island prioritize hotels and restaurants with the “Green Label”, preferring more sustainable business and commercial activities (Figure 43).



Figure 43. “Green Label of Environmental Responsibility” version 2022 issued at a hotel in Encantadas.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA

7.1.1 “School at the Port Project – Education for Sustainability”

The “School at the Port Project - Education for Sustainability” results from a partnership between the port and the municipality of Paranaguá. This is a pioneering, voluntary and educational action carried out by port Environmental Board team, supported by the Municipal Education Department. The project aims at teaching the importance of port activity to 5th year students and teachers from Elementary Schools of Paranaguá (Figure 44).

Thus, students and teachers are provided weekly meetings at the port of Paranaguá. The meetings are divided in two moments: i) pedagogical talk and ii) visit to the quay area. In the lecture, information is presented on the importance of port activity, on the history of ports, on the care of the environment, as well as notions of safety at work and safety on public roads. After the lecture, students and teachers participate in a guided tour of the quay, when they can observe the logistics of port activities. Since the creation of the project, at the beginning of 2015, about 6 thousand students have participated in the project.

The “School at the Port” Project promotes every year a contest of drawings representing the students' perception of the visit to the Port of Paranaguá and honors the ten winning students with a boat ride through Paranaguá bay. All the activities of the Project have been presenting positive results, based on the participation and interaction of the students and teachers with the technical and pedagogical team that composes the Project, promoting the strengthening of the port-city relationship.

ADMINISTRAÇÃO DOS PORTOS DE PARANAGUÁ E ANTONINA



Figure 44. Students from the municipality of Paranaguá visiting the operational area of the port and participate on a lecture during the “School at the Port Project”.

2 Policy statement - Port of Paranaguá Environmental Policy

Port of Paranaguá is committed to performing its operations in accordance with environmental legislation, minimizing its negative impacts on the environment and seeking excellence in port administration. The port priorities are:

- 1. To preserve life, human health and safety, and the environment;*
- 2. To contribute to the conservation of the natural, cultural and historical heritages of the region;*
- 3. To ensure compliance with current environmental legislation;*
- 4. To continuously improve its environmental performance by reviewing and updating its Environmental Management System;*
- 5. To prevent, control, monitor and mitigate all forms of environmental pollution, with special attention to air quality, noise generation and waste management;*
- 6. To assess the environmental quality of areas under the influence of port activities;*
- 7. To rationalize natural resources use and reduce related costs;*
- 8. To manage environmental aspects and impacts through programs and practical measures;*
- 9. To continuously strengthen the relationship with the port community and the city;*
- 10. To keep abreast of trends in technology to promote more efficiency, reduce environmental impacts and minimize risks and hazards to workers' health;*
- 11. To raise awareness on employees, port community and citizens on environmental issues;*
- 12. To assure the dissemination of this policy to all employees, to the port community and to all stakeholders, and promote their participation in the continuous improvement of the port environmental management system;*
- 13. To annually report environmental activities to the Brazilian environmental agencies.*

Assinado digitalmente por
LUIZ FERNANDO GARCIA DA
SILVA:32960264878
Localização: Paranaguá-PR
Data: 2022.08.23 11:49:
15-03'00"

Luiz Fernando Garcia da Silva

CEO Ports of Paraná

Environmental Aspect Register - Port of Paranaguá							
Reference Number	General Environmental Aspect	Environmental Aspect	Impact on	Responsible person/Organisation	Applicable legislation	Legal requirements	Control measures
Port Operation Department							
O1	Ship movement	Waste removal	Water/soil	Port operator	Port Regulation - Integrated Management System (IMS)	Requirements described in the Item 3.1.4.2 of the Port Regulation - IMS, determining all aspects regarding ship waste removal.	Mitigation measures
O2		Oil spillage	Water/soil/Biota	Harbour master	National Law nº 9966/2000	The National Law nº 9966/2000 establishes basic principles that must be considered when operating oil and other harmful or dangerous substances in ports, piers, platforms and ships under Brazilian jurisdiction.	Emergency plan/Oil spill response
O3		Noise generation	Aquatic biota/Sorrounding community	Harbour master	Environmental organ requirement	Underwater noise must be under the established limits.	Monitoring
O4		Ballast water discharge	Biota/water	Harbour master	NORMAM nº 20 - Brazilian Navy	Ship must perform ballast water exchange at least 200 nautical miles away from the coast, with 200 depth, and register the coordinates.	Monitoring/Document control
Engineering Department							
E1	Dredging	Dredging operation	Water/biota/fishing activities	Port authority	Environmental organ requirement	Biotic and abiotic parameters to asses impacts of dredging activities.	Monitoring
E2		Dredging sediment disposal	Water/biota/fishing activities	Port authority	CONAMA Resolution nº 454/2012	The resolution establishes procedures that should be adopted to manage dredged material. Sediment evaluated parameters must be in accordance with the resolution to allow its disposal in oceanic areas.	Monitoring
E3		Underwater blasting	Biota/fishing activities	Port authority	Environmental organ requirement	Biotic and abiotic parameters to asses impacts of blasting in generating underwater noise generation, and impacting local fauna.	Monitoring
E4	Infrastructure maintenance	Noise	Sorrounding community	Port authority	Environmental organ requirement; CONAMA Resolution nº 1/1990; NBR Rules 10151 and 10152	Underwater noise monitoring/Noise limits must be in line with the resolution, regarding the city zones.	Monitoring
E5		Wastewater	Water/soil	Port authority	CONAMA Resolution nº 357/2005 and nº 430/2011	In order to discharge wastewater, parameters bust be in accordance to the limits established in the Chapter III of the CONAMA Resolution nº 357/2005 and in the Chapter II of the CONAMA Resolution nº 430/2011.	Monitoring
E6		Atmospheric emissions	Air quality	Port authority	CONAMA Resolution nº 491/2018	Atmospheric emissions must be in accordance with the limits established in the CONAMA Resolution.	Monitoring

E7		Waste generation	Soil/water	Port authority	Federal Law n° 12.305/2010 for solid waste; CONAMA Resolution n° 307/2002 for construction waste generation	Solid waste generation must be reduced; the solid waste must be properly destined or recycled; consctrucion waste destination must follow the classification presented in the Resolution.	Recycle and reuse; control waste segregation and destination
Environmental Department							
M1	Use of natural resources	Solid waste generation	Soil/water	Port authority	Federal Law n° 12.305/2010	Waste generation must be reduced; the waste must be properly recycled or allocated.	Control waste segregation and destination; train employees
M2		Waste water/sewage generation	Soil/water	Port authority	CONAMA Resolution n° 357/2005 and n° 430/2011	In order to discharge wastewater and sewage, parameters bust be in accordance to the limits established in the Chapter III of the CONAMA Resolution n° 357/2005 and in the Chapter II of the CONAMA Resolution n° 430/2011.	Monitoring and destination to sewage treatment station
M3		Eletric energy consumption	Total environment	Port authority	UNO Sustainable Development Goals	UNO Sustainable Development Goal n° 12- Responsible consumption and production.	Monitoring and reducing
M4		Water consumption	Total environment	Port authority	UNO Sustainable Development Goals	UNO Sustainable Development Goal n° 12- Responsible consumption and production.	Monitoring and reducing
M5		Fuel consumption	Total environment	Port authority	UNO Sustainable Development Goals	UNO Sustainable Development Goal n° 12- Responsible consumption and production.	Monitoring and reducing
M6	Oil spill emergency response	Solid waste generation	Soil/water	Port authority	Federal Law n° 12.305/2010	Contamined waste must be properly treated and adequately allocated.	Reduce and allocate
M7		Wastewater generation	Soil/water	Port authority	CONAMA Resolution n° 357/2005 and n° 430/2011	Wastewater must be properly allocated.	Reduce, treat and allocate
Tenants and Organizations							
T1	Ship operation	Dry bulk operation	Air/water/biota/sorrounding community	Port operator	Port Regulation - Integrated Management System (IMS) and related procedures.	Operators must keep the operational area clean by mechanical sweeping; conveyor belts must be enclosed.	Supervise and improve infrastructure
T2		Liquid bulk operation - spillage	Water/biota/sorrounding community	Port operator	National Law n° 9966/2000; CONAMA Resolution n° 398/2008	Emergency and contingency plans establish the minimal procedures to be adopted in case of oil spill.	Supervise and keep the plans updated
T3		Cargo handling on land	Air/soil	Port operator	Port Regulation - Integrated Management System (IMS) and related procedures	Operators must keep the operational area clean by mechanical sweeping; cargo spillage must be reported to Port Authority.	Supervising
T4	Cargo storage	Dry bulk storage	Air/soil	Storage companies	Port Regulation - Integrated Management System (IMS) and related procedures	Companies must follow environmental and safety procedures to promote safe cargo stoarge.	Supervising
T5		Liquid bulk storage	Water/soil	Liquid bulk port tenants	Port Regulation - Integrated Management System (IMS) and related procedures	Companies must follow environmental and safety procedures to promote safe cargo stoarge.	Supervising

T6		Explosion risk	Total environment	Liquid bulk port tenants	Port Regulation - Integrated Management System (IMS) and related procedures	Companies must follow environmental and safety procedures to promote safe cargo storage.	Supervising
T7	Container operation	Container handling	Air/water/biota/surrounding community	Container terminal (private)	Port Regulation - Integrated Management System (IMS) and related procedures	Operational procedure n° 025 that establishes the minimum health and safety criteria for operating containers.	Supervising
T8		Environmental emergency	Total environment	Container terminal (private)	Terminal Emergency plan	In caso of accident, terminal must be prepared to minimize environmental impacts.	Supervising and keeping the plan updated
T9	Cargo handling	Cargo spill	Air/soil/water/biota	Terminals	Terminal Emergency plan	In caso of accident, terminal must be prepared to minimize environmental impacts.	Supervising and keeping the plan updated
T11	Cargo transport	Atmospheric emissions	Air quality	Transport companies	CONAMA Resolution n° 491/2018	Atmospheric emissions must be in accordance with the limits established in the CONAMA Resolution.	Monitoring
T12		Fuel consumption	Air/soil	Transport companies	UNO Sustainable Development Goals	UNO Sustainable Development Goal n° 12 - Responsible consumption and production.	Monitoring and reducing
T13		Cargo spill	Air/soil/water	Transport companies	Companies emergency and contingency plans	In caso of cargo spillage, the company must be prepared to minimize environmental impacts.	Supervising and keeping the plan updated