

Aquaculture: waste management and regulations



Subsecretaría
de Pesca y
Acuicultura

Undersecretariat for Fisheries
and Aquaculture

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Gobierno de Chile

The Undersecretariat for Fisheries and Aquaculture

- The Undersecretariat for Fisheries and Aquaculture is an agency of the Chilean Government, under the Ministry of Economy, Development and Tourism, created through the Decree of Law No 1.626 on December 21, 1976.
- Its mission is to develop policies and regulations to manage national fisheries and aquaculture, under a precautionary approach to promote the conservation and sustainability of resources.

AQUACULTURE

General background

National Register of Aquaculture

(RNA)
Number of centers registered in the RNA, by species in 2016.

(Source: Senarosa)

Region	Microalgae	Algae	Crustaceans	Molluscs	Fish	Total Centers
XV	0	0	4	9	0	13
I	5	1	0	15	1	22
II	0	4	0	7	1	12
III	0	39	0	45	3	87
IV	3	7	4	64	9	87
V	0	0	4	4	7	15
RM	0	0	0	0	8	8
VI	0	0	2	1	1	4
VII	0	0	0	0	15	15
VIII	0	5	0	7	27	39
IX	0	2	0	57	97	156
XIV	0	6	0	16	52	74
X	1	531	2	1181	667	2382
XI	0	2	0	5	764	771
XII	0	0	0	6	124	130
Total	9	597	16	1417	1776	3815

Harvest from aquaculture centers (tons), by region, 2016

(Source: Sernapesca)

Region	Total Algae	Total Fishes	Total Molluscs	Total General
XV	0	0	0	0
I	17	0	0	17
II	0	0	4	4
III	897	0	539	1436
IV	1721	1	3473	5195
V	0	0	122	122
VI	0	0	0	0
VII	0	0	0	0
VIII	30	0	6	36
IX	0	202	138	340
XIV	0	2170	25	2195
X	12198	291756	303135	607089
XI	0	367082	0	367082
XII	0	66601	0	66601
RM	0	0	0	0
Total	14863	727812	307442	1050117

Aquaculture Resources in Chile:

ALGAE

Pelillo

Gracilaria
chilensis
Gracilaria
Seaweeds



Huiro

Macrocystis
pyrifera
Giant kelp



Aquaculture Resources in Chile:

MOLLUSCS

Mejillón

Mytilus chilensis

Mussel



Abalón rojo

Haliotis rufescens

Red Abalón



Ostión del Norte

Agropecten

purpuratus

Scallop



Ostra chilena

Crassostrea chilensis

Chilean oyster



Ostra japonesa

Crassostrea gigas

Pacific oyster



Aquaculture Resources in Chile:

FISH

Salmón del
Atlántico

Salmo salar

Atlantic salmon



Salmón coho
*Oncorhynchus
kisutch*

Pacific salmon



Trucha arcoiris

Oncorhynchus

mykiss

Rainbow trout



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Wastes from aquaculture in Chile

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Main waste generated in algae production cycle

Growth in the ocean	Collection and natural dry	Processing
Remains of ropes	Domestic wastes	Domestic wastes
Remains of algae	Plastics	Remain of algae
Unused buoys	Remains of algae	Organic matter
Expanded polystyrene		Packaging remains
Used oil		oils and lubricants used
		Remains of chemicals

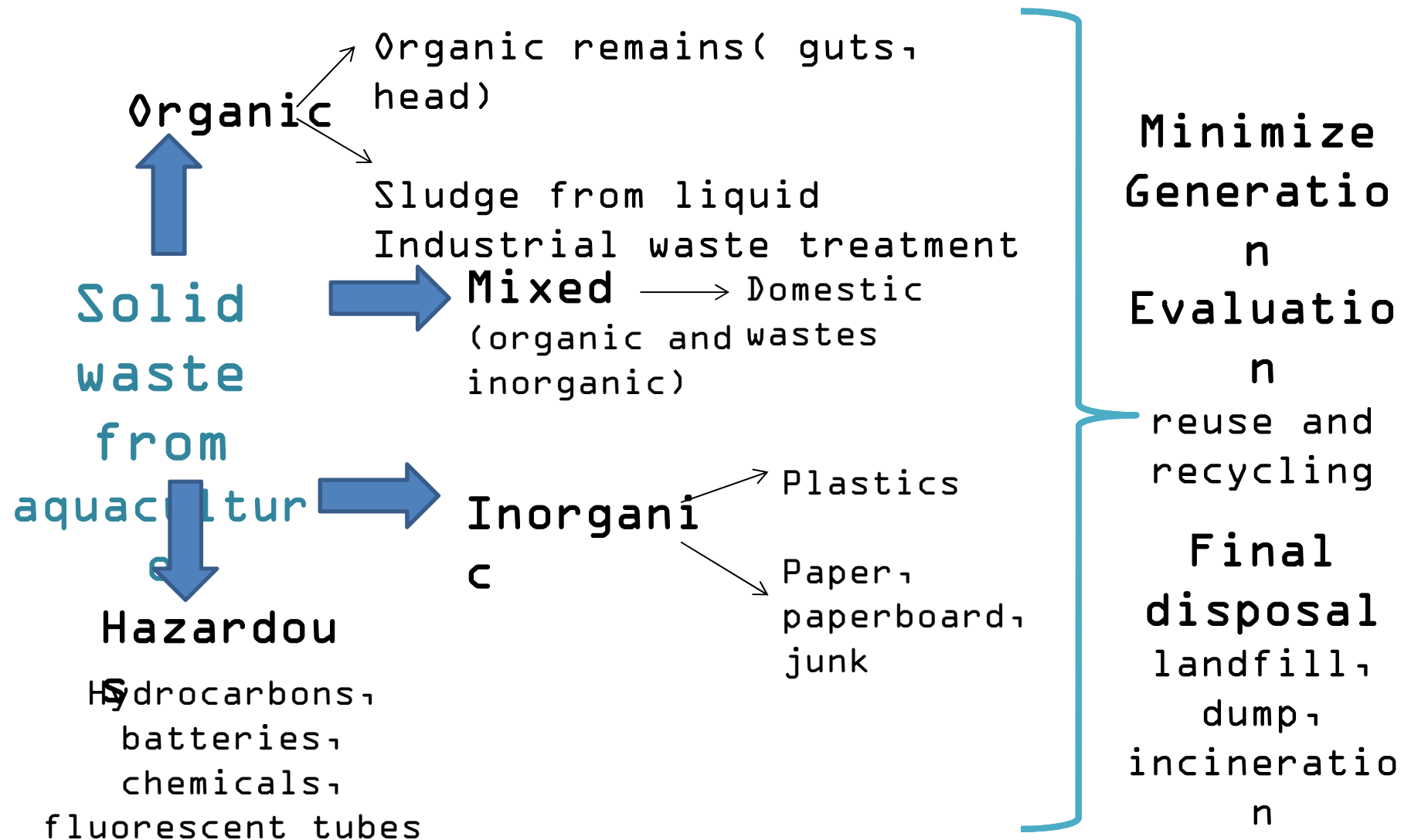
Main waste generated in Mytilid

Hatchery	Growth	Processing
Sludge from Wastewater	Remains of nets	Remains of shells
Sludge from liquid Industrial waste	Remains of buoys	Domestic wastes
Domestic wastes	feces	Hazardous wastes
Hazardous wastes	Expanded polystyrene	Empty plastic containers
Latex gloves	Domestic wastes	Remains of chemicals
Brushes and strainers	Hazardous wastes	Paperboard and paper
Empty plastic containers	Empty plastic containers	Organic remains
		sludge from the treatment system

Main waste generated in the production cycle of Salmonids

Farming centers in the sea	Process plants
Sludge from wastewater	Liquid Industrial waste
Not consumed food	Sludge from wastewater
Feces	Sludge from liquid Industrial waste
Domestic wastes	Guts, heads, etc
Hazardous wastes	Domestic wastes
Empty food bags	Hazardous wastes
Empty plastic containers	Paperboard
	Packing material
	Plastic boxes and plastic bags
	Expanded polystyrene boxes

Generation of solid waste from Aquaculture and its disposal



Waste management and regulations

Chilean Government / Undersecretariat
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General Law on Fisheries and Aquaculture regarding Aquaculture Law No. 20.434

Regarding waste generated by aquaculture activities, the transitory article 13 of the Law No. 20.434, *"... establishes the need to issue a specific regulation on the conditions for the treatment and final disposal of solid, liquid, organic and inorganic waste in farming centers, processing plants, collection centers, slaughterhouses, research centers, and other facilities for the production process of aquaculture, focusing on recycling in cases that correspond..."*¹¹

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Regulations for waste generated by ~~Aquaculture~~

1. Hazardous Wastes: batteries, used oil, lubricant and acid containers, etc.

- Article 4 a), S.D. 320/2001 Environmental Regulation for Aquaculture:

Prevents dumping of solid , liquid, organic or inorganic wastes, that may affect the seabed and water column.

Accumulation, transfer and disposal of wastes must be in hermetic containers.

- Article 22, S.D. 319/2001 Regulation for the Protection, Control and Eradication of High-Risk Diseases of Hydrobiological Species.

Transportation outside the center must be carried out in accordance with the procedures established by the authority.

- Article 136 of the Law No 18.892, 1989 . General Law on Fisheries and Aquaculture:

Prohibits the introduction into the sea, rivers or lakes, of chemical, biological or physical contaminants that cause damage to aquatic resources.

Despite of what is indicated in the sectorial regulation for aquaculture, centers must also comply with regarding hazardous wastes:

- S.D. (MINSAL) 148 /2004 Sanitary regulation for hazardous wastes
- S.D. (MINSAL) 43/2016 Regulates the storage of hazardous wastes
- D.S. (MTT) 298/1995 Regulates the storage and transport of hazardous wastes on streets and roads
- S.D. 777/1978 International maritime code of hazardous goods
- Law No. 2222 as of 1978, Navigation Law

Regulations for waste generated by ~~Aquaculture~~

2. Non Hazardous Wastes

2.1. Inorganic waste: remains of ropes, unused buoys, paper, paperboard, brushes, strainers, empty food bags, plastic containers, etc.

- Article 4 a), g) S.D. 320/2001 Environmental Regulation for Aquaculture:
Prevents dumping of solid, liquid, organic or inorganic wastes, that may affect the seabed and water column.

Accumulation, transfer and disposal of wastes must be conducted in hermetic containers.

Flotation elements must not allow any type of material detachment

- Article 9, S.D. 320/2001 Environmental Regulation for Aquaculture:
Removed nets should be deposited in hermetic containers
Collection of nets in the vicinity of the center, should be only to wash them

- Article 10, S.D. 320/2001 Environmental Regulation for Aquaculture:
Prohibition of using plastic sleeves to fix resources to the substrate in authorized centers for algae cultures
In case of hard substrate, the plastic sleeve can be used after approval of a waste management plan
- Article 136 of the Law No 18.892, 1989 . General Law on Fisheries and Aquaculture
- Article 22, S.D. 319/2001 Regulation for the Protection, Control and Eradication of High-Risk Diseases of Aquatic Species.
- Article 18, S.D. (MINSAL) 594/2000
Accumulation, treatment and final disposal of the waste must have sanitary authorization.
- Law N° 20920 /2016, establishes that consumer of tires, containers and packaging must separate it and deliver it to the product manager

Regulations for the waste generated by Aquaculture

2. Non Hazardous Wastes

2.2. Organic waste:

- Article 4 a), S.D. 320/2001 Environmental Regulation for Aquaculture:
- Article 136 of the Law No 18.892, 1989. General Law on Fisheries and Aquaculture
- Article 22, S.D. 319/2001 Regulation for the Protection, Control and Eradication of High-Risk Diseases of Aquatic Species.
- S.D. 49/2006 Regulation of collection and slaughterhouses
- Res. Ex. 1805/2003 regulates mollusc waste management
- S.D. 189/2008 Regulation of sanitary conditions and basic safety in sanitary landfills

Tipo de residuo	Normativa general que se aplica	Normativa Sectorial que se eaplica
Escapes, desprendimiento de ejemplares, Foulling, alimento no consumido, Clasificación de semillas, Fecas, entre otros	DFL N° 725 de 1967; D.S. (MINSAL) N°594/2000; Nch 3321 de 2012; D.S. (MINSAL)N° 189 de 2008 Ley (MTT) N° 20.879 de 2015; D.S. (MTT) N° 75 de 1987; D.S. (MINSEGPRES) N° 90 de 2000; D.S. (MOP) N° 609 de 1998; D.S.(MINSEGPRES) N° 46 de 2002; D.G.T.M Y M-M. ORDINARIO A-52/004	D.S. (MINECOM) N° 320 de 2001; D.S. (MINECON) N° 319 de 2001; D.S. (MINECON) N° 49 de 2006; D.S. (MINECON) N° 345 de 2015; Res. Exe. (SERNAPESCA)N° 68 de 2003; Res. Exe. (SERNASPECA) N° 1925 de 2003; Res.Exe. (SERNAPESCA) N° 1805 de 2003; Res. Exe. (SERNAPESCA) N° 8561 de 2016
Residuos Liquidos (RILes)		
Residuos Domiciliarios		

Current work on aquaculture waste regulations

Chilean Government / Undersecretariat
for Fisheries and Aquaculture

Regulations for waste generated by ~~Aquaculture~~

- FIPA Project N° 2016-69 “Establishment of necessary conditions for the treatment and disposal of waste generated by aquaculture activities”
- Proposal for an aquaculture waste regulation

It is important to point out that there are other sectoral regulations and regulatory provisions promulgated by other State agencies that the aquaculture sector must comply with in order to treat and dispose its waste.

It is necessary to:

- Improve current sanitary and environmental regulations,
- Address existing legal gaps,
- Coordinate all stakeholders involved in waste management.

Gracias.



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