

# Salmon farming in Chilean Patagonia: A growing threat for cold water corals?

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Figure 1: Left to right: *Caryophyllia huinayensis*, salmon farm, *Tethocyathus endesa*, Chilean fjord, *Desmophyllum dianthus*, fish farm, *Errina antarctica* (landscape pictures © C. Jantzen)

Fish aquaculture is a rapidly growing industry in **Chilean Patagonia** and the country is currently the **second largest producer of farmed salmon** after Norway, accounting for 28% of the world production<sup>[1]</sup>, although the cultured species are **not native to the region**.

Several species of cold water **Scleractinia**<sup>[2,3]</sup> and **Stylasteridae**<sup>[4]</sup> have been found in surprisingly **shallow water** along the southern Chilean fjords (Fig. 1), making them more accessible to research but also to pollution. **Is salmon farming threatening those unique ecosystems?**

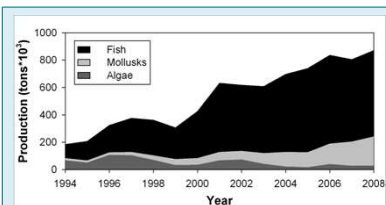


Figure 2: Aquaculture in Chile: annual production of algae, mollusks and fish between 1994 and 2008 (Source: Sernapesca)

## Salmon farming in Chile

Aquaculture is the **fourth largest economic activity** in Chile and fish has become the dominant product over the past 15 years (Fig. 2).

In 2008, 630 000 tons of fish have been produced by Chilean farmers, **75% of which were salmon species**<sup>[5]</sup>.

Salmon aquaculture is already intensive<sup>[1]</sup> and will **develop** even more in the near future (Fig. 3).

## Patagonian cold water corals

Three species of **scleractinian** corals have been found in Chilean fjords at SCUBA-reachable depths : *Desmophyllum dianthus*, sometimes in **large aggregations** (Fig. 4), *Caryophyllia huinayensis* and *Tethocyathus endesa*<sup>[2,3]</sup>. There seems to be a **north-south gradient** in the distribution of those coral banks, occurring mostly in the north (Fig. 3).

Divers can also reach **reef-like structures** formed by the **stylasterid** coral *Errina antarctica*<sup>[4]</sup> (Fig. 4) which appear to occur **only south** of the Golfo de Penas (Fig. 3).



Figure 4: Massive aggregations of Chilean cold water corals  
• Top: *Desmophyllum dianthus* <sup>[2]</sup>  
• Bottom: *Errina antarctica* <sup>[4]</sup>

## Impact of aquaculture on cold water corals

Salmon farms **release chemicals, organic matter and nutrients** into the water<sup>[6]</sup> which are detrimental to tropical corals<sup>[7]</sup>. Little is known about the **sensitivity of cold water corals** but Chilean scleractinian are suspected to be affected by sedimentation <sup>[3]</sup>. Although no information is available, antibiotics and antifoulants are also likely to impact the benthos. Aquaculture already occurs above and in vicinity of massive coral aggregations <sup>[3]</sup> and might soon threaten corals in southern Patagonia (Fig. 3). **Research and regulations are strongly needed to prevent irreversible damages to be done to Chile's fjord ecosystems.**

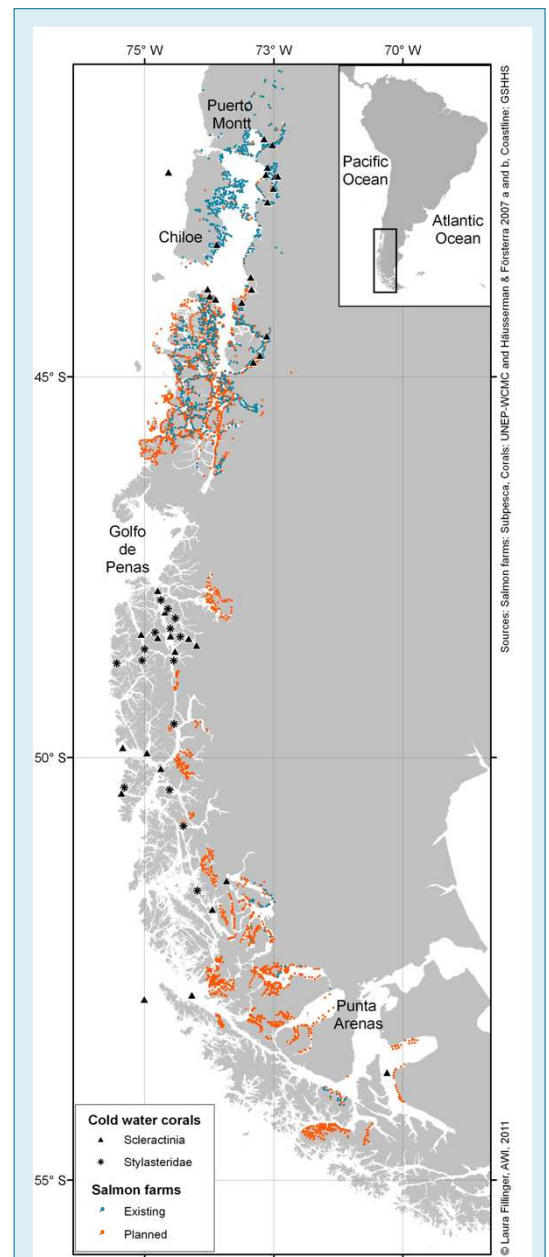


Figure 3: Existing and future salmon farms in Chilean Patagonia along with the known distribution of scleractinians and stylasterids.

- **North**: well developed aquaculture, highest abundance of scleractinian aggregations
- **Center**: little aquaculture at present, common occurrence of *Errina antarctica*
- **South**: developing aquaculture, lack of information on coral presence



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