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

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Figure 1: Left to right: *Caryophylla 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[1], although the cultured species are **not native to the region**.

Several species of cold water **Scleractinia**[2,3] and **Stylasteridae**[4] 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?**

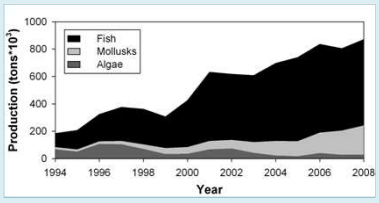

Figure 2: Aquaculture in Chile: annual production of algae, mollusks and fish between 1994 and 2008 (Source: Sernapesca)

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[5].

Salmon aquaculture is already intensive[1] 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*[2,3]. There seems to be a **north-south gradient** in the distribution of those coral banks, occuring mostly in the north (Fig. 3).

Divers can also reach **reef-like structures** formed by the **stylasterid** coral *Errina antarctica*[4] (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* [2]
- Bottom: *Errina antarctica* [4]

Impact of aquaculture on cold water corals

Salmon farms **release chemicals, organic matter and nutrients** into the water[6] which are detrimental to tropical corals[7]. Little is known about the **sensitivity of cold water corals** but Chilean scleractinian are suspected to be affected by sedimentation [3]. 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 [3] 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.**

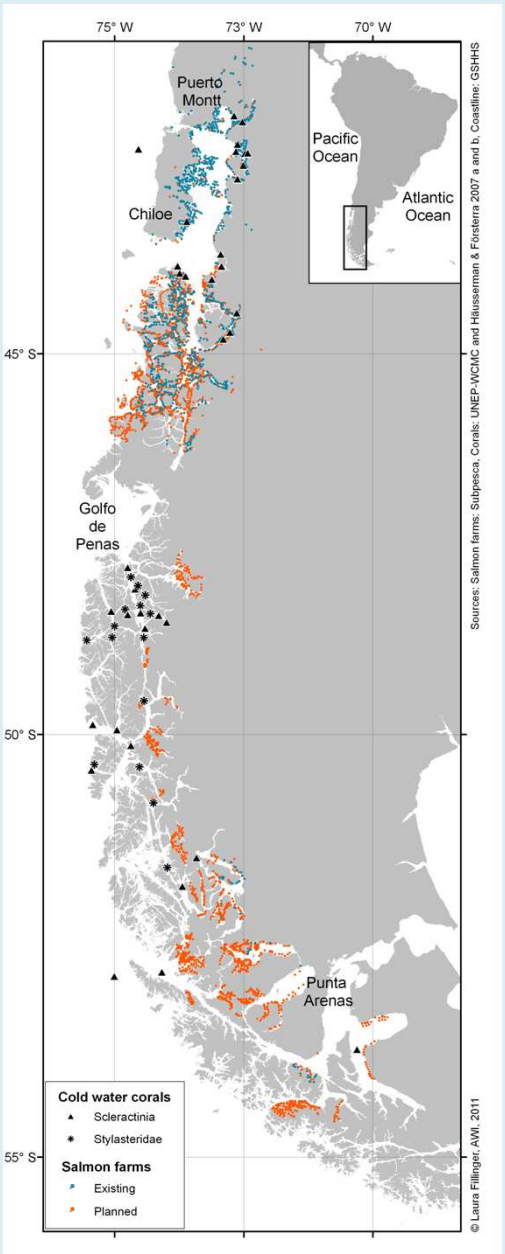

Figure 3: Existing and future salmon farms in Chilean Patagonia along with the known distribution of scleractinians and stylasterids.
- North: well developped aquaculture, highest abundance of scleractinian aggregations
- Center: little aquaculture at present, common occurence of *Errina antarctica*
- South: developping aquaculture, lack of information on coral presence

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