



Preventing marine and water pollution and restoring rivers



Treating life-threatening hotspots



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Eilat's fish farms: IN? OUT?

E Environmentalists and planners alike call for the removal of the floating fish cages from the Gulf of Eilat

To remove or not to remove - that is the question. Should Eilat's floating fish cages remain in the Red Sea waters or should they be removed to land? This question has elicited major - and heated - public debates in Israel over the past five years, reaching a peak in recent months.

At the center of the controversy is Eilat's coral reef, once one of world's most beautiful and biologically diverse coral reefs, today facing major degradation. Despite intensive efforts to reduce pollutants, a marked deterioration in water clarity and quality in the Gulf of Eilat/Aqaba has been noted in recent years. Coral reefs have been plagued by lost diversity, decrease in coral cover, low rates of coral-larval settlement and recruitment, decreased rates of coral reef calcification, coral mortality, and intense macro-algal blooms during spring. Findings show that in 1996, about 70% of the corals in the Eilat area were alive and 30% dead; in 2001, the situation was reversed with only 30% live corals and 70% dead.

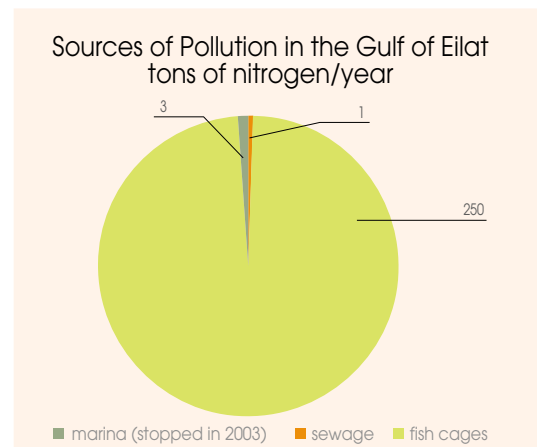
So who is Really to Blame?

Israel has long been aware of the need to protect its national treasure in Eilat. This has led to motley initiatives - a marine pollution prevention station was set up and reinforced, the Eilat municipality began to treat its wastewater, the dispersal of phosphate dust was stopped, even scuba diving was limited - and even prohibited - in some vulnerable areas. Yet, despite these activities, deterioration continued.

So, who is responsible for the reef's deterioration? The possibility that two commercial fish farms,



The fish cages: through fish eyes
Photo: Marine and Coastal Environment Division

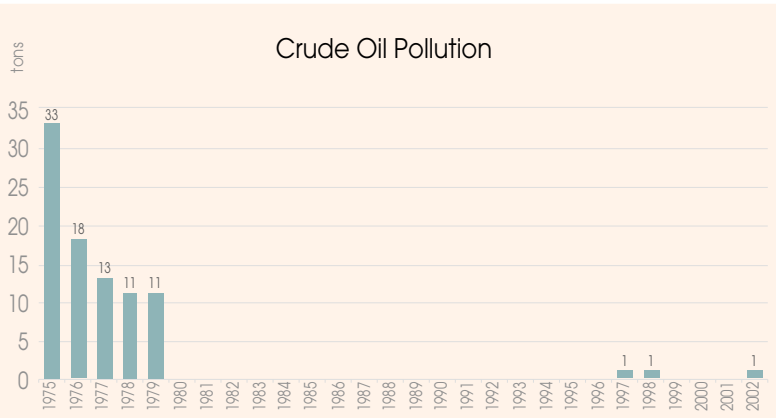


Source: Ministry of the Environment

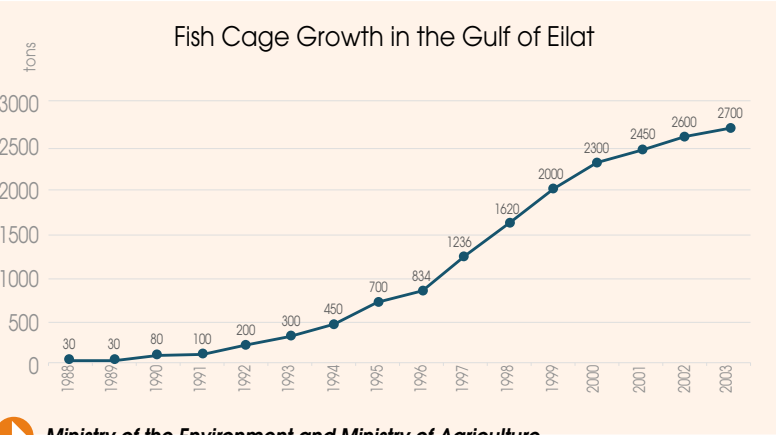
located close to the Jordanian-Israeli border at the northern tip of the Gulf of Eilat/Aqaba, are to blame for the degradation has sparked major public debate. The fish companies, which have been operating without a permit and breed some five million fish a year in cages, obviously deny any connection between the decline in biodiversity and their operations. The Ministry of the Environment, environmental NGOs and numerous marine scientists think otherwise. They point out that the



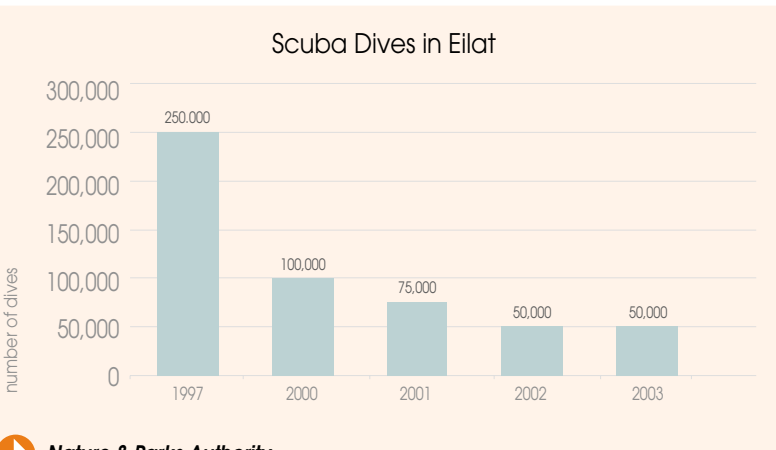
large-scale degradation can be traced back to 1993, when the fish companies started mass production, gradually increasing the yield from 300 tons per year to well over 2,000 tons per year. Both groups agree that more research will be needed to prove, beyond a shadow of a doubt, that the fish cages are responsible for the deterioration, but the second group has long contended that Israel cannot possibly sit back until a clear answer is found. By then, the coral reef may well disappear. As the largest single source of nutrient loading in Eilat's waters, the fish cages must be removed from the Gulf water.



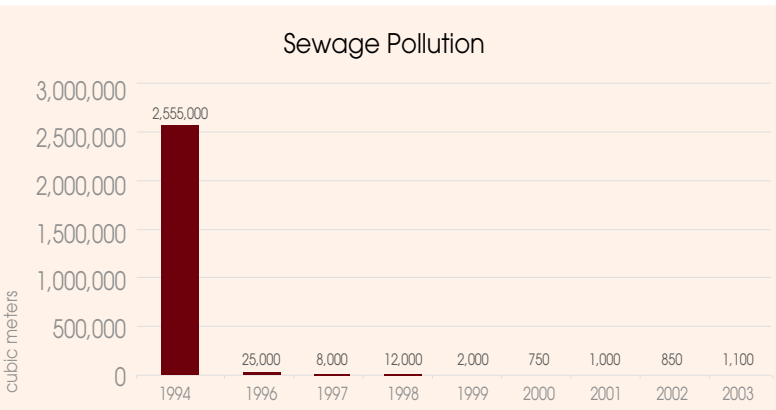
Y. Schlesinger, 1980, Nature & Parks Authority and Ministry of the Environment



Ministry of the Environment and Ministry of Agriculture



Nature & Parks Authority



Ministry of the Environment and Municipality of Eilat



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What do Scientists Say?

In the midst of claims and counterclaims, the Environment Ministry's opinion has been upheld by numerous marine scientists and by a long line of research studies.

- **In the 1990s**, the Ministries of Agriculture, Environment and National Infrastructures appointed an international expert team (IET) to identify existing and potential sources of pollution, assess the carrying capacity of the Gulf for fish-farming, and formulate recommendations for minimization of pollution and environmental pressures.
- **In December 2001**, the IET presented its scientific report. The team, which considered ten factors contributing to pollution in the Gulf, concluded that there have been multiple stressors on the coral reefs of Eilat over the past 25 years and called for further monitoring and research in order to assess the carrying capacity of the Gulf. Furthermore, it called for the immediate reduction of nitrogen loading by the fish farms by 30%.
- In line with the recommendation of the IET, the Ministries of Environment, Agriculture and National Infrastructures commissioned a series of professional research studies to assess the state of pollution in the Gulf of Eilat/Aqaba. The program consisted of 14 projects, which were implemented by researchers from the Interuniversity Institute for Marine Sciences in Eilat (IUI), the Israel Oceanographic and Limnological Research (IOLR) and the Geological Survey of Israel. **The report, presented in July 2004, notes that it is "evident that the main problem in the context of the 'carrying capacity' issue is the impact of nutrient loading from the fish farms,"** but presents conflicting opinions on the fate of the nutrients

RANI AMIR: EILAT'S FISH CAGES

Director, Marine and Coastal Environment Division



There is no room for fish cages in Eilat's waters

The Marine and Coastal Environment Division of the Ministry of the Environment is dedicated to preventing marine pollution from all sources in the Gulf of Eilat. The only source of pollution, which has never been prevented at

source, is the fish cages. What's more, this source has been enlarged and expanded during recent years despite Ministry of the Environment opposition to such a move.

Obviously, it is extremely unreasonable that the State of Israel will continue to invest boundless efforts and resources on pollution reduction and prevention, inspection and enforcement in the Gulf, while at the same time, vested interests continue to draw hundreds of millions of shekels in profits at the expense of the exploitation of natural resources which destroys the marine environment.

The question of whether the fish cages have damaged the coral reef or whether there is unequivocal proof for such damage is much less relevant than the way it was presented in the public struggle, which was voiced in the media. **Simply put: Israeli law prohibits the pollution of the sea. Period. There is no obligation, whatsoever, to prove the degree of the damage which is probably caused. Marine pollution must be stopped.** This is certainly true for nutrient quantities which are equivalent to the raw sewage produced by a city of 50,000 residents; it is most certainly so for an especially sensitive and unique ecological system - and there is no controversy surrounding this - such as the Gulf of Eilat.

Today, the precautionary principle stands at the basis of advanced environmental theory throughout the globe. Israel's National Planning and Building Board invoked this principle vis à vis the removal of the fish cages from the water, on three separate occasions!

There is room for mariculture on land or in the Mediterranean Sea under certain conditions and limitations. There is no room for fish cages in Eilat's waters. Fish farming in the Gulf of Eilat must come to an end, the sooner the better.



Eilat's fish
Photo: Oz Goren

emitted by the fish farms. One study concludes that a substantial fraction of the nutrients is retained in the northern Gulf of Eilat while another concludes that the nutrients are mixed into the larger water body of the Gulf. While Dr. Yuval Cohen, Director General of IOLR, notes that the "available data and information does not indicate a significant impact of the fish farms on the nutrient budget of the northern Gulf of Aqaba", Prof. Ottolenghi, Scientific Director of the IUI, notes "that there are several points supporting the suggestion that the fish farms may contribute substantially to the observed accumulation of nutrients in the northern tip of the Gulf".

- **The September 2002-November 2003** annual report on Israel's National Monitoring Program for the Gulf of Eilat, carried out by the Interuniversity Institute for Marine Sciences in Eilat on behalf of the Ministry of the Environment, confirms that

the continuing increase in nutrients and organic matter in the water and the sediments endangers the well-being of the coral reefs in this region. Measurements conducted in 2003 show that "the Gulf is undergoing widespread eutrophication with a multitude of ecological consequences". One of the steps advocated: prevention of nutrient influx to the Gulf from any anthropogenic source known today, and specifically from the fish cages.

- **In its final report to the Israel government, presented in September 2004, the IET confirms that the "fish farms are the largest anthropogenic nutrient source" in the Gulf of Eilat** and recommends to "move fish farming to a land-based system within a clearly defined time period". In the interim, mitigation measures should be taken.

Fish farms are the largest anthropogenic nutrient source in the Gulf of Eilat



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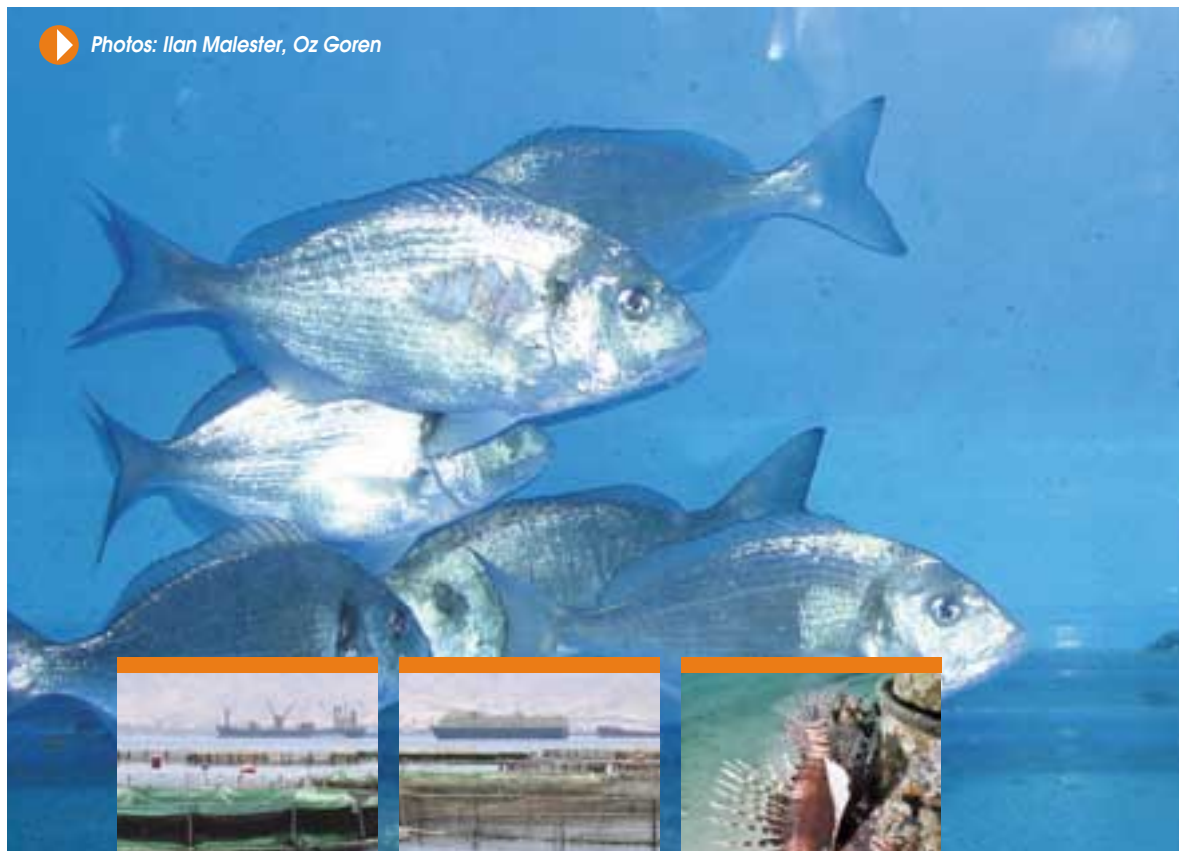
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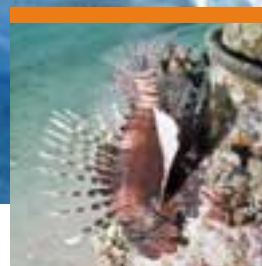
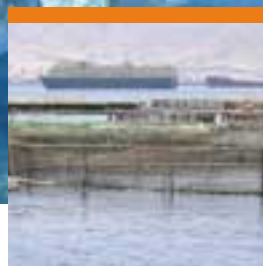
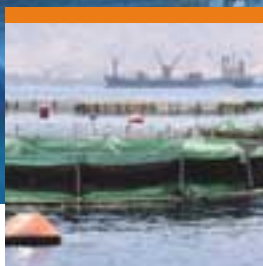
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Photos: Ilan Malester, Oz Goren



- Based on existing data, research studies, experiments and direct observation, scientists at the Ministry of the Environment, Nature and Parks Authority and academic institutes in Israel have contended that **one of the main reasons for the deterioration of the coral reef in the last decade is nutrient enrichment and that the main source of nutrients originating from anthropogenic sources is the fish cages**. Therefore, the removal of the cages from the Gulf waters is a precondition for the survival and rehabilitation of the coral reef.

Green Organizations, Planning Agencies and Courts: Remove the Fish Cages from the Gulf of Eilat

Why has public controversy on the Eilat fish cage issue reached such a crescendo in recent months?

For the simple reason that the government will soon vote on the masterplan for the coast of Eilat- with or without the fish cages. This coastal masterplan constitutes the framework for the

future of Israel's southernmost city and includes tourism, economic, transportation and environmental aspects. Recognition that the Gulf of Eilat is a national resource and an international treasure of the first degree has led Israel's top planning agency, the National Planning and Building Board, to approve the Eilat coastal masterplan without designating an area for fish cages in the Gulf waters on three separate occasions - November 2002, June 2003 and November 2004.

In fact, both the courts, who have called for the shut down of the fish cages because they are operating without permits, and the country's planning agencies, have ruled that the fish farms must be taken out of the water. But vested interests have thus far led to repeated delays in government approval of the coastal masterplan for Eilat.

Do the fish cages truly harm the biodiversity of the world's northernmost coral reef ecosystem?

Gulf of Eilat: 2004

What's been done to prevent all sources of marine pollution?

The precautionary principle must be implemented - the fish cages must be removed from the Gulf waters



Should the interests of those making the profits from the fish cages be protected beyond the interests of biodiversity and the public? In its most recent decision, the National Planning and Building Board chose to reiterate its call for the removal of the fish cages from the Gulf waters within a maximum of 14 months- the natural growth cycle of fish. The rationale is clear. We simply cannot wait idly by until conclusive results are in. By the time we find out, it might be too late.

Acknowledgments: Special thanks to Rani Amir and Alon Zask of the Marine and Coastal Environment Division of the Ministry of the Environment and to David Zakai, Gulf of Eilat Marine Biologist of the Nature and Parks Authority for the information and graphs included in this article.

Oil spills: A pollution prevention station was established between the reef reserve and the oil terminal. It can deal with spills as large as a few hundred tons from large vessels and marina activities. The Ministry of the Environment invested over \$6 million in the station, its equipment and dedicated vessels. As a result of these measures, oil spills have veritably come to a halt.

Sewage: Since 1995, the Eilat municipality has stopped discharging its sewage into the Red Sea. Over \$15 million have already been invested in sewage treatment and another \$6.5 million will be invested over the next two years in upgrading and maintaining Eilat's sewage treatment system. In addition, seven dischargers of pollution - both direct and indirect - to the sea must comply with stringent conditions specified in discharge permits issued by the Marine and Coastal Environment Division.

Municipal marina: Strict enforcement by the Ministry of the Environment has catalyzed the operation of a sewage and bilge water collection system for some 350 private and commercial boats in Eilat. At the same time, the establishment of service facilities in the marina has helped stop marine pollution. About \$350,000 were invested in solving the pollution problem from the marina.

Phosphate dust: A decade ago, dry chemicals were dropped into ships from an eight-meter height, resulting in a dust cloud, which settled on the surrounding area. Strict enforcement coupled by the installation of technological measures such as the "smart chute", installed in 2002, have reduced the number of pollution episodes to a minimum. Some \$1.5 million were invested by the Ports Authority to stop phosphate pollution.

Diving: The Nature and Parks Authority has invested major efforts in restricting scuba and snorkeling activities in sensitive areas and increasing diver education to prevent damage to the coral reefs. Fewer divers coupled with increased awareness have led to a dramatic drop in diver-caused damages. In addition, the Nature and Parks Authority is also promoting the establishment of artificial diving sites.

Sand: A coastal development policy prohibits the introduction of sand or the construction of structures, which may create sand concentrations in the sea. As of 1998, the Eilat municipality prohibits fine granule sand padding along the coast.

Fishing: Beginning with January 2005, the Fishing Division of the Ministry of Agriculture will shut down the last part of the coral reef, which is still open to fishing. For the past year, fishing licenses in the Gulf of Eilat for anyone not living and working in Eilat have not been renewed or granted. Fishing will be restricted to areas without coral reefs.

Fish Farms: While nearly all sources of pollution in the Gulf of Eilat were addressed over the past decade, only the fish farms have continued to operate with impunity. During this time, mariculture has grown by a factor of ten and has been responsible for nutrient loading in the Gulf of Eilat - with annual loads reaching some 250 tons of nitrogen and 45 tons of phosphate.