

# MPA News

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## Re-opening Closed Areas: A New Tool for Balancing Consumption, Conservation?

The consumptive use of wild species is an important aspect of the relationship between humans and the marine environment. For consumption to be sustainable, its conditions must be consistent with conservation.

As one way of fostering those conditions, the concept of rotating closed areas – alternately closing and re-opening areas to fishing, allowing time for stocks to rebuild after each open season – has gained the recent attention of some fisheries managers. In the northeastern US scallop fishery, for example, areas that have been closed for half a decade were re-opened this summer for huge catches; the fishery’s managers are now considering re-opening the areas every 3-4 years. With managers and researchers elsewhere considering the idea, this could be an emerging trend in fisheries management.

A closed area of the ocean – even one re-opened cyclically for fishing – fits most definitions of “marine protected area,” including that of the IUCN (MPA News 1:4). The idea of re-opening a closed area to fishing may be unacceptable to conservationists who favor permanently closed areas for the protection of biodiversity. But some managers suggest that such re-openings could be a way of securing buy-in from the fishing industry on the use of various kinds of MPAs.

### “An astounding success”

The international dialogue on MPAs often rests on the balance between consumption and conservation, and the reasons given for designating MPAs generally reduce to: (1) to protect fisheries or (2) to protect fish. These reasons are not necessarily mutually exclusive. Nonetheless, the dialogue on MPAs is sometimes limited by fears among fishers – justified or unjustified – that advocates of closed areas care more about protecting fish than about protecting fishers’ livelihoods.

In the northeastern US, however, the sea scallop industry is warming to the idea of closed areas. The reason: this summer, the federal council that oversees the fishery re-opened three areas off the New England coast that had

been closed for five years, and the catches have been remarkable. In the re-opened areas, boats have been hauling 10,000 pounds (4545 kg) of meats in one hour of bottom-time with a single dredge; outside the closed areas, it takes well over 100 hours to haul that much with two dredges. In addition, the scallops caught inside the area have been larger on average (and thus more valuable) than those caught outside. “It’s absolutely an astounding success,” said Ron Smolowitz, a fisheries scientist for the Fisheries Survival Fund, an organization that represents the scallop industry.

The New England Fishery Management Council, which manages the scallop fishery and other federal fisheries in the area, uses days-at-sea as a tool to limit the scallop fleet’s bottom time. To counteract the change in efficiency caused by the re-opened areas, the council’s plan includes a provision to accumulate more days-at-sea in those areas than the number actually used: boats are charged 10 days-at-sea for each trip they make to the re-opened area, whether they are at sea for three days or ten

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days. The plan refers to this as the “days-at-sea tradeoff.” In total, a full-time vessel in this fishery is allocated 120 days-at-sea per year, with a maximum of 60 days-at-sea accumulated in the re-opened areas. Trips to the re-opened areas are also limited to catching 10,000 lbs. per trip; outside the areas, larger catches are allowed.

It is up to fishers to decide whether the tradeoffs are worth it, and many factors come into consideration. Fuel prices are relatively high right now, and spending fewer days on the water saves fuel – an argument in favor of fishing in the re-opened area. It also saves on food and crew pay, and earns more revenue per pound at market. On the other hand, one of the re-opened areas (Closed Area II) reportedly has fewer large scallops than the others, according to at least one fisherman: partly as a result, many fishers stayed away from that area during its re-opening period from June 15-August 14. In addition, scallop capture rates outside the closed areas have been higher than normal this year, owing to high levels of recruitment, and this has made scalloping easier everywhere.

“There’s small scallops everywhere you go,” said scalloper David Wiscott, noting that past years have found vast areas with no scallops at all. He attributed the relative abundance to four management strategies implemented by the council: the days-at-sea limits, limits on dredge-ring size, limits on crew size, and the closed areas. While he will continue to pick and choose when to fish in the re-opened areas and when to fish outside, he said of a recent trip to the Nantucket Lightship Closed Area (one of the three re-opened sites), “I’ve been fishing for 23 years and I’ve never seen scalloping as good as that.”

### Questions to be answered

Ironically, the three areas being re-opened this year were not closed to benefit scallops or the scallop industry. In 1994, the New England Fishery Management Council closed the areas to protect groundfish stocks, which were badly depleted; yellowtail flounder stocks in the area remain lower than hoped for. The scallop industry at that time was focusing its effort farther south on the coast, so it did not contest the designation.

When Smolowitz two years ago made the discovery that scallop populations had burgeoned in the closed areas, the industry urged the council to re-open the areas to scallopers. The council did so after crafting a plan that would limit bottom-time in the re-opened areas and provide automatic shut-offs to scalloping should bycatch rates of yellowtail flounder surpass set levels. Tests in 1999 demonstrated that scalloping in the closed areas could be done with low flounder bycatch, due in part to the great abundance of scallops and reduced bottom-time.

“We are witnessing a remarkable transformation of the scallop fishery in which the value of effort reduction is widely recognized and the advantages of closed areas as a management tool are gaining acceptance,” said Paul Rago, a federal scientist on the council’s scallop commit-

## Website for the scallop plan

The plan for re-opening three closed areas in New England to scalloping (titled “Framework Adjustment 13 to the Atlantic Sea Scallop Fishery Management Plan”) is available on the website of the New England Fishery Management Council, at <http://www.nefmc.org/>.

tee science team. “At present, the fisheries in the re-opened closure areas are known primarily for their large scallops, high catch rates, and short trips. It’s equally important that they be known for their low finfish bycatch rates, reduced contact time on the bottom, and their strict controls on fishing mortality.”

Rago acknowledged questions that still surround rotational closures. “The relevant question for environmental assessment is the acceptable magnitude of impact with respect to its area and temporal extent,” he said. “For ecologists, the challenge is to contrast the effects of chronic disturbance in open-access fisheries with an alternative rotational strategy characterized by intermittent pulse fishing and recovery periods.” He said experiments are needed to conclude the optimal frequency of disturbance and recovery times, although closure periods of three or four years could end up as typical for the scallops, based on the species’ recruitment cycle.

There is some question as to whether the closed areas in New England are serving as important spawning areas, triggering the overall resurgence of scallops along the coast. If such were the case, the re-openings could threaten the recovery. The effect of the closed areas in the resurgence is unknown, however, as are so many other factors in the fishery, including the long-term effect of renewed scalloping on groundfish stocks.

“We muddle forward. Actually, we muddle, and we hope it’s forward,” said Trevor Kenchington, a fisheries scientist who has worked for the Fisheries Survival Fund. “I’d hope to see an organized re-opening system set up so that it won’t be ad hoc, but that’s difficult to do.”

On the research that still needs to be done, the council’s Rago said, “The re-openings that have occurred thus far might be viewed as evolutionary rather than revolutionary steps toward rotational area management.”

### Buy-in from fishers in Hong Kong

Tony Pitcher, an economist at the Fisheries Centre of the University of British Columbia, suggests that opening some closed areas to fishing can be useful if it brings greater compliance and support for the overall conservation scheme. In July at the “Economics of Marine Protected Areas” conference in Vancouver, British Columbia

(Canada), sponsored by the Fisheries Centre, Pitcher described models for the establishment of artificial reefs inside Marine Special Areas in heavily fished Hong Kong. His results showed that a trade-off policy that opened some reefs to fishing might be worth the increased risk to resources.

"Sacrificing some artificial reefs to fishing by the numerous small-scale [fishing] sector may be worth it if biomass recovery is not prejudiced too much," he said. Compliance is a major problem in Hong Kong, he said: there is almost no enforcement of the very few regulations that exist. "The hope for the artificial reef scheme is that the local communities will help with compliance," he said.

Notably, Pitcher's model did not assume a cyclical re-opening of reefs to fishing; it was assumed that one reef was open to constant fishing year after year, while other reefs were permanently closed. Nonetheless, according to the model, having one reef always open would still result in increased overall catches to fishers over a 10-year span as compared to having no closed areas, due to larval and adult export from the MPAs.

### Re-opening closed areas in the Galápagos?

If a manager's goal is to maximize long-term catches, rotational management of closed areas makes sense for some species, according to Graham Edgar, a zoologist formerly at the University of Tasmania (Australia) and now the new head of research and conservation for the Charles Darwin Research Station in the Galápagos Islands (Ecuador).

In a paper published last year in the *Journal of Experimental Marine Biology and Ecology* (242 [1999] 107-144), Edgar wrote that re-opening the small Maria Island reserve off the Tasmanian coast in Australia every five years could provide a significant boost to rock lobster catches in the area. According to his calculations, a re-opening of the reserve after five years would allow a catch of 400 kg per hectare; this is compared to a catch of 40 kg/hectare/year taken without the reserve. Edgar suggested that rotational re-opening could result in increased catches of other species, too – but not all, depending on recruitment behavior, migration, and other factors.

In his paper, Edgar did not suggest that managers actually re-open the Maria Island reserve to fishing. The reserve was primarily declared to conserve marine habitats representative of the Tasmanian east coast, not to serve as a fishery recovery area. Said Edgar, "Re-opening MPAs does little for biodiversity, but is simply a fisheries management tool for possible use in currently exploited areas to maximize harvest rates." He added that Tasmanian fishers have shown little interest in the concept of re-opening reserves to this point.

In the Galápagos, however, Edgar is not opposed to researching the possibility of cyclically re-opening some of the islands' new no-take areas (MPA News 1:7) in the

interest of maximizing catches for artisanal fishers. "Not in the near future – there are other priorities for limited funds and there is a need first for information on what happens in the closures," he said. But research into re-opening the closed areas could occur in five years or so, he said.

### Closed one year, open the next

In Hawaii, managers of the Waikiki-Diamond Head Shoreline Fisheries Management Area (FMA) re-open the area to fishing on even-numbered years (1996, 1998, etc.) beginning 1 January. Most nets and traps are not allowed, nor is the use of a spear between 6 p.m. and 6 a.m. Nonetheless, say several witnesses, the resource is generally fished out after the first two months.

This was not the original intent of state resource managers in the 1970s, who wanted to establish a rotational management system for the entire coast of the island of Oahu, according to Brian Kanenaka, an aquatic biologist with Hawaii's Division of Aquatic Resources. In negotiations with public stakeholders, however, the rotational scheme was reduced to involve just the Waikiki-Diamond Head FMA.

In an initial two-year test closure in 1981, the FMA's reef fish returned to pristine levels, said Kanenaka. Demands from recreational fishermen led managers to set a policy of closing the FMA for just one year at a time, though. "After one year, the fish numbers are back up to levels that can support fishing, but not close to pristine levels," said Kanenaka. He said that for the future, the Division of Aquatic Resources is considering stocking the FMA just before fishing season begins, to enhance the recreational fishing experience.

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# Case Study: Merging Traditional Conservation With Modern Techniques in Yemen

Home to hundreds of terrestrial and marine species found nowhere else in the world, the small Yemeni archipelago of Socotra has a new zoning plan that integrates the protection of its land and sea environments. Developed through the cooperative efforts of international experts and local stakeholders, the plan aims to ensure the health of Socotra's biologically significant ecosystems while allowing residents to preserve their traditional resource rights against outsiders.

The plan features new protected areas, on land and in coastal waters. Although the concept of "protected area" is still relatively new to residents of the isolated archipelago, the idea of resource protection is not, said Ed Zandri, director of the project. "What we have done is to merge traditional conservation practices with modern concepts and techniques," said Zandri. "The main objective has been to preserve and strengthen the existing balance between people and nature."

## Isolation

The Socotra Archipelago lies 400 km off the southern coast of the Arabian Peninsula and consists of four islands, the largest of which is Socotra. Governed by the Republic of Yemen, the archipelago receives some tourism business but is largely removed from the rest of the world. For five months a year (June-October), heavy seas and strong winds make travel to and from the islands difficult.

Socotra's geologic and climatic isolation have made it what it is today: an archipelago with high biodiversity and a local population that has adapted to its unique environment. Most families engage in livestock herding, date palm growing, and fishing, depending on the season. Fishing villages on the coast may be inhabited for just half the year, during good weather when fishing is possible. As few as 40,000 people live in the archipelago.

Socotra's limited resources have bred a conservation-oriented culture, said Zandri. "All Socotrans know that cutting trees is bad for them, because they know they have nowhere else to go when the trees are finished; hence, strong traditional rules exist to protect trees and regulate firewood collection," he said. "The same is true for fishing: Socotrans know well the advantages of preserving their fishing grounds with rest periods and using only lines – not nets – in some areas."

International conservationists approached the Yemeni government about Socotra in 1997 when it appeared that other outsiders, including developers from mainland Yemen and foreign fishermen, had begun to show interest in the abundant resources of the archipelago. "[Some outsiders] see Socotra as a virgin land, scarcely populated, to be rapidly exploited at land and sea," said Zandri. The establishment of protected areas, especially if supported by the national government, would limit such exploitation, he said.

## The planning project

The planning project ultimately brought together some of the biggest international planning organizations in the world, including the United Nations Development Programme (<http://www.undp.org>) and the United Nations Office for Project Services (<http://www.unops.org>). Funded by the Global Environment Facility (<http://www.gefweb.org>), a World Bank-affiliated institution, the project aimed to develop an integrated resource management strategy, driven by local communities, and create a comprehensive zoning system for Socotra's terrestrial and marine ecosystems.

The socio-economic structure of the Socotran community, with three main subsistence activities, presented a unique challenge to the project's comprehensive aspect. Although the project team was split into three working groups – "terrestrial", "marine", and "environmental education and awareness (EEA)" – each working group found itself often overlapping with the others. "For six months a year, you'll find 'fishermen' grazing their livestock up the mountain 1,200 meters," said Zandri. "When we held meetings with the community, which was one of our principal activities, all of our working groups would be there."

As with projects elsewhere involving international organizations and local stakeholders, the establishment and maintenance of reciprocal trust between the project team and community leaders was key. Project leaders recruited more than 60 Socotrans to be on the project team; the Socotrans brought the conservation message to local communities from a Socotran perspective, and also facilitated field work necessary for identifying important conservation areas.

Training of the local team members by three full-time experts was an important part of the project, said Catherine Cheung, director of the project's marine zoning efforts. "The training was diverse, covering topics like marine ecology, plant taxonomy, bird surveys, scuba diving, computing, GIS, filing, and accounting," she said. In addition, English-language training early in the project made subsequent training more effective. "All courses were tailor-made on the island to suit specific needs and inadequate formal education training," she said. "Daily hands-on training and advice proved to be effective."

The local involvement was essential, said Cheung. "The 'gap' between the foreign trainers and the local villagers was huge," she said. "The [local team members] served as crucial bridges."

## Project outputs

The zoning plan, created through agreement between foreign experts and local communities, protects most of the major riverine and coastal habitats in the archipelago. The entire 500-meter coastal strip of the islands is desig-

nated as a national park, highly restricted from development except for two small general-use zones covering the port and town of Socotra.

In addition to the zoning plan, the project has had several other positive impacts, said Cheung, including a substantial increase in the local capacity to understand marine ecosystems and conduct survey work. Team members have also collected abundant information on the archipelago's biodiversity, allowing for continued efforts to protect it.

The receptiveness of locals to the idea of conservation was impressive, said Zandri. "They were much more receptive than any of us would have imagined," he said. "We were lucky to find an ecological and socio-economic situation in Socotra where the strong inter-dependence between people and natural resources was clear to the vast majority of local people."

The Yemeni government has officially designated the new protected areas, setting the necessary legal and political framework for effective protection, said Zandri. The designation serves as a mandate to the government's environmental agency (the Environment Protection Council

of Yemen) to protect the islands, and also fosters support from international donors by demonstrating government backing for the initiative.

Continued vigilance and hard work will be necessary, however, said Zandri. The project team's final effort has been to create a Socotra Conservation Fund to support the long-term implementation of the zoning plan (see box). Fund organizer Curt Fish of Global BioStrategy LLC said he expects the fund to be signed into law by the Prime Minister of Yemen by the end of this year, with seed money arriving soon afterward from individual donor countries and international organizations. Once seeded, the fund will be available to local Socotrans to support sustainable biodiversity use and development, such as for the management of protected areas, development of biodiversity artisans and ecotourism, and support of traditional medicinal uses of biodiversity.

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## **Establishing a conservation fund**

*Editor's note: Curt Fish, who has led the effort to establish the Socotra Conservation Fund, offered this advice to readers of MPA News on setting up similar funds:*

"The first step is to determine just what the financial needs of the conservation plan or area are, and what kind of financial mechanism would best fit the area. This type of analysis basically involves a study of past, current, and future activities and needs. These are then compared to single-project financing, intermittent grants, and the three basic types of funds:

- *sinking funds*, which spend the fund's capital;
- *revolving funds*, which spend money at the rate it is acquired; and
- *endowment funds*, which spend only the interest earned on the capital.

"Notably, funds may begin as sinking or revolving before accumulating enough capital to become an endowment fund. This will likely be the path of the Socotra Conservation Fund.

"Once the type of mechanism is identified, an expert in conservation finance can assist in designing the legal means by which the fund will be organized in the country, how it will be treated for tax purposes, and how it will be recognized by donors. Importantly, this process must take into account local politics, likely donors and their interests, and the control of the monies.

"Conservation funds tend to attract donors because such funds are usually designed in such a way that control over

the monies is given to a Board of Directors composed of government and non-government representatives, leaving the monies beyond the direct and unilateral control of the governments. This is the key to their success in all respects: fundraising, identifying appropriate projects, and critically reviewing their own performance.

"Several organizations that operate internationally have experience in designing and implementing conservation finance mechanisms. The Global Environment Facility has a number of publications listed on its website (<http://www.gefweb.org>) that can be helpful, and a staff of experts that can offer advice on the creation of such funds. The GEF also maintains certain guidelines on trust fund design, which are valuable for areas that might be eligible for GEF or UN funding. Generally speaking, many other donors will evaluate the design and operation of a fund in light of these GEF guidelines.

"Finally, high-level government support as well as local buy-in is critical to the success of a conservation fund. In the case of Socotra, the Prime Minister of Yemen and the Environmental Protection Council have offered their full support to the creation and operation of the Socotra Conservation Fund. Additionally, the local people in Socotra have agreed on the form and function of the fund, and look forward to developing the capacity to assist in the implementation of the fund and projects which receive its support."

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## New Law in Mexico Could Lead to More No-Take Zones

In Mexico, a new law has incorporated legal tools to allow the establishment of no-take zones in the country's marine and freshwater bodies, in wetlands, and within the 20-meter federal coastal zone. The General Wildlife Law, passed by Congress in July 2000, has the effect of balancing federal fishery regulations set in 1999, which implemented a predominantly production-centered view of Mexico's marine resources.

Under the General Wildlife Law, the Secretariat of the Environment, Natural Resources and Fisheries (SEMARNAP) may now establish what are called "aquatic species protection areas" – no-take zones, essentially. These areas may be established to protect:

- All native species present at a site;
- Particular species specified in the enabling instrument;
- Specific sizes, age classes, or other characteristics of populations, species, or groups of species that can be harmed by specific harvest methods.

The law offers managers another new tool as well – a provision for the designation of "critical habitat." Essential spawning areas, regions of high biodiversity, and other significant sites may be designated as critical habitat. According to the law, all infrastructure and activities that may affect the protection, recuperation, or restoration of natural elements in critical habitat will be subject to a management plan.

### Sustainable and unsustainable fisheries

Notably, under the new law, SEMARNAP may only designate aquatic species protection areas in cases where harvesting activities threaten the survival of species and their habitat. This means that the areas may not be designated for commercial species if the stocks are considered to be sustainably managed. Because SEMARNAP (through the Undersecretary of Fisheries) also manages Mexico's fisheries, it will be up to the secretariat to charge its own managers of providing unsustainable management.

"The legal implications of distinguishing between sustainable fisheries – not subject to this law – and unsustainable fisheries are just mind boggling," said Juan Bezaury Creel, an ecoregional-planning and policy fellow in the Mexico division of The Nature Conservancy, a US-based NGO. In addition, aquatic species protection areas may not be established to prohibit oil drilling, vessel transit, or other activities whose effects cannot be directly tied to fish stocks' survival.

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