

Community-managed no-take areas in fisheries management



The purpose of this leaflet is to assist fishing communities, and people working with them, in establishing and managing no-take areas.



1. What are no-take areas?

Generally, no-take areas are ones in which fishing is banned. They may be known as reserves or closed areas, or as *ra'ui*, *tambu*, *tabu* and other local names that have been used by fishing communities in the Pacific for many hundreds of years.

A **permanent no-take area** is one that is permanently closed to fishing.

A **periodically fished no-take area** is one that is closed to fishing for periods that vary from a few months to several years.

Other variations include periodically closed areas in which fishing is banned at particular, and usually short, times, often to protect breeding stocks or spawning aggregations of marine species.

2. What are the purposes of no-take areas?

Permanently closed no-take areas provide long-term protection for ecosystems, habitats and the species they support. The expectations are that species in permanent no-take areas will grow, breed and spread to adjacent fishing areas where they can be caught.

In no-take areas that are periodically fished, the expectations are similar. While the areas are closed, fish will grow and breed. And when opened to fishing, people can make improved catches of larger fish inside the managed area.

3. How can no-take areas increase catches?

In Figure 1, the no-take area is represented by the heavy circle. Fish in the no-take area spawn and produce small larval stages that either: A) settle and remain in the no-take area or B) drift with the currents to settle and grow outside the no-take area. C) Juveniles and adult fish also move out of the no-take area as spillover, perhaps due to crowding.

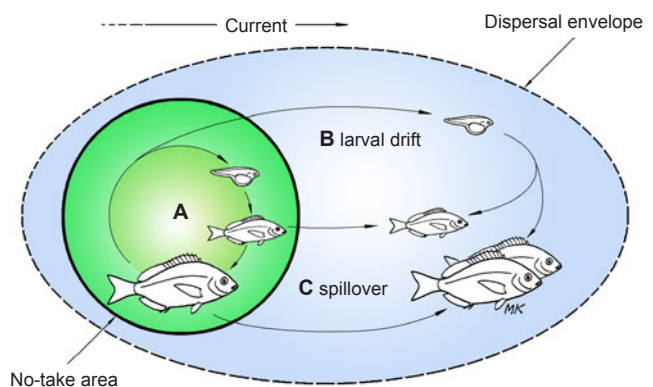


Figure 1. Larval stages produced in a no-take area (green circle) may either A) settle within its boundaries or B) drift within a dispersal envelope stretching down current. C) Juveniles and adults from the no-take area also spill over into nearby areas (adapted from King, 2007. Fisheries biology, assessment and management. Wiley Blackwell, UK).



4. Where, and how big, should a no-take area be?

A no-take area, whether permanently closed or occasionally fished, is likely to improve catches but not equally for all species and not always very quickly. Although in general, bigger no-take areas are likely to be more beneficial, the position of them is perhaps more important than size. Here are some general points.

- Position the no-take area so that it includes different habitats.** During their lifecycle, many species use more than one habitat. The more corals, seagrass beds and mangroves in a no-take area, the more effective it will be (Figure 2). Except for a few species, such as sea cucumbers and some clams, an area of bare sand or coral rubble will be unsuitable for a no-take area.
- Position the no-take area near other key habitats.** The no-take area should be as near as possible to other key habitats, even if they are unprotected. There is some evidence that small no-take areas based on reefs are more successful when positioned close to seagrass beds or mangroves.
- Position the no-take area in a place that is critical for important species.** These areas may include feeding sites, breeding areas, spawning aggregation sites and nursery areas for particular species.
- Position the no-take area in a place where it can be watched.** It will be necessary for members of the community to protect or guard the closed area.
- Position the no-take area so that currents flow towards the fishing area.** These currents may assist in carrying larval stages into the fishing area (Figure 2). Currents along a coast or inside a coastal lagoon often move back and forth but there is usually a net movement in one direction (in the absence of traditional knowledge or scientific information this can be determined by following the path of some weighted, plastic, drink bottles over several tidal cycles and during different moon phases). It must be recognised that larval movements are often more complicated and may be related to spawning times that coincide with particular tides.

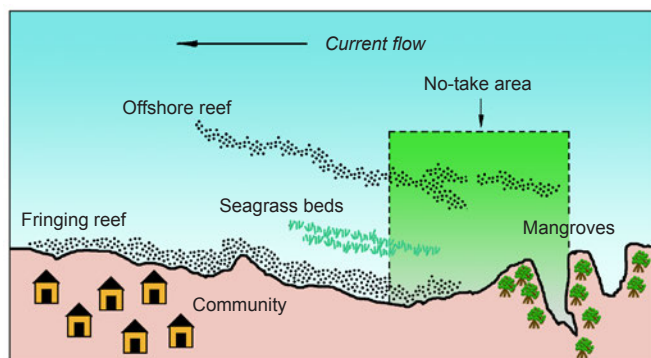


Figure 2. An idealised situation in which a fishing community has positioned a no-take area to include parts of an offshore reef, a fringing reef, seagrass beds and a mangrove area. The no-take area is also positioned up-current where the net movement of water will distribute drifting larval stages to the community's fishing area.

- If a large no-take area is not possible, plan for a smaller one.** Even small no-take zones will benefit less mobile species such as octopuses, clams and some reef fish. However, it will be less effective in protecting species that move over large territories or feeding ranges. Some fish, such as mullets, that make long migrations along the coast will not benefit from a small no-take area.
- Work with neighbouring communities to establish a network of no-take areas.** If only small no-take areas are possible, plan to establish many small no-take areas like those in Samoa or on Fiji's Coral Coast. A network of no-take areas, about ten kilometres apart, may maximise the linking of larval sources with suitable settlement areas.
- Consider establishing more than one no-take area, each with different aims.** If there were two adjacent but separate areas, for example, one could be established as a permanent no-take area and the other periodically harvested in a controlled manner.
- Don't expect immediate results.** Many species take a long time to grow to maturity and reproduce. This time will vary from species to species (see information sheets).
- Don't expect the no-take area to work equally well for all species.** Species with larval stages that drift in the sea for short times (such as Trochus) are likely to settle near the no-take area. However, those with larval stages that drift for longer times (such as lobsters) may settle some distance away from the community's fishing area. A rough illustration of the potential distance that larval stages could travel is given in Figure 3, based on a net larval movement of 50 metres per day — this figure is for illustrative purposes only; the larval stages of some fish can detect and actively move to particular reefs to settle, and there is some recent scientific evidence that the larval stages of many species do not move as far as previously thought.

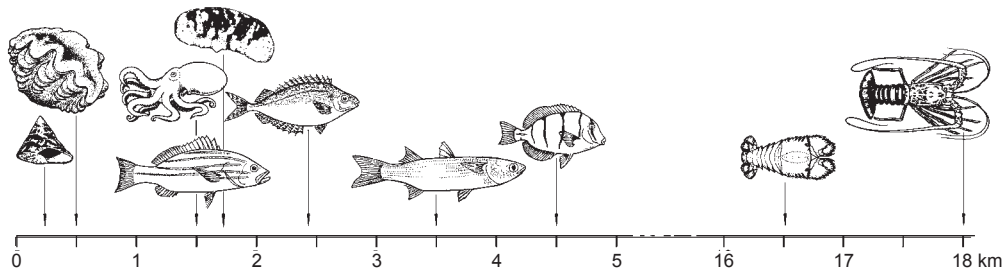


Figure 3. The relative potential distance (km) that larvae could drift before settling as juveniles. Based on a movement of 50 metres per day.

5. How can we manage our no-take area?

A no-take area requires support and management by the community. If everyone agrees to the establishment of a no-take area and understands the reason for it, the ban on fishing in the area is more likely to be respected. The area must be clearly marked so that everyone is aware of its boundaries and those who break the no-take rules should be penalised by the community.

Although there are long-term benefits in having a permanent no-take area, many are opened for fishing periodically. Some of these are deliberately established for periodic fishing — some for special occasions, including weddings, funerals and fund-raising. The temptation to open the area or even poach fish is great, particularly when people see that more fish have appeared in the area (fish jumping at night is commonly reported).

Uncontrolled fishing after an opening of a no-take area can be devastating. This is especially so if the area is opened for long periods and is fished by a large number of people. Not only will large numbers of mature fish be caught or flee from the area but habitats, particularly corals, may be trampled and destroyed, depending on the harvesting methods used. In the worst case, the area may be so badly affected that it is no longer effective as a no-take area.

The following options may help reduce the impact of opening no-take areas.

- Make the no-take area either closed permanently or opened infrequently.** Benefits are more likely if the closure is permanent or at least lasts for extended periods. Frequent opening of an area will disturb sea life and may damage habitats.
- Keep the opening of a no-take area as short as possible.** Limit fishing to half a day or less and ensure that everyone knows the opening and closing time.
- Restrict the number of fishers allowed in the reserve during any opening.** Fewer people will cause less damage. Fishers should be from the local community.
- Allow only selected species to be taken.** Allow only the catching of fast-growing species or a limited number of slow-growing species.
- Restrict the catch of some of the largest fish.** Openings often remove the largest, most productive fish from the area. As egg production is related to fish volume, large fish produce a disproportionately larger number of eggs; if a female fish is allowed to double in size, the number of eggs produced increases by approximately eight times (Figure 4).
- When opening, restrict the types of fishing gear that can be used.** Some fishing methods, such as nets, cause more damage than other methods, such as line fishing from canoes or boats.
- When opening, limit the amount of fish taken.** Set a modest catch target, or quota, and collect only the amount of fish needed. Agree to re-instate the ban once the targeted amount has been reached.
- Consider the timing of openings.** Avoid opening the area when important species are breeding or gathering to spawn.

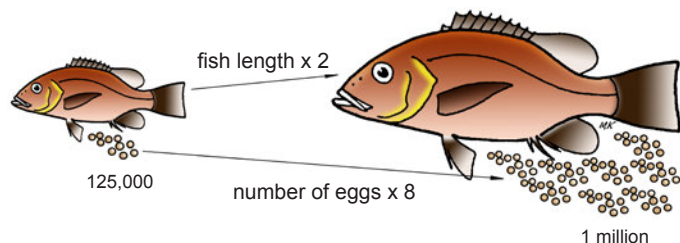


Figure 4. If a fish doubles in size, the number of eggs produced increases by approximately 8 times.



6. How do we know if our no-take area is successful?

Whether or not a management action, such as establishing a no-take area, is beneficial can be judged by the time or effort it takes for the same number of people to catch a certain amount of seafood; for example, the time taken to catch a string of fish, a basket of clams, or a number of lobsters.

If this fishing time is decreasing, the numbers of fish or other species are most likely increasing and the no-take area is likely to be working well.

If this fishing time is increasing, the no-take area is not working successfully. In this case, different or additional management measures are needed. The following questions can be discussed at community meetings.

- a) **Are all people in the community aware of the no-take area and its rules?** Do individuals understand the purpose of the no-take area and comply with bans on fishing? If not, discuss ways in which the situation can be improved.
- b) **Is the no-take area too small or poorly positioned?** See Section 4.
- c) **Is the no-take area affected by pollution?** Pollution by silt and sewage is a common cause of habitat degradation in Pacific islands.
- d) **Are areas and habitats outside the no-take area degraded?** Individuals produced in the no-take area may rely on nearby habitats, such as nearby seagrass beds and mangroves, to complete their lifecycles.
- e) **Are more people going fishing?** If more people are catching and selling fish, the existing no-take area may not be able to replace the numbers of fish caught. Eventually, there will be a need for restrictions on catches and the number of people fishing.

No-take areas (whether permanently closed or periodically harvested) are one way of managing a fishery. They can be regarded as an important tool in a toolbox of management controls, some of which are listed in the *Guide to information sheets on fisheries management for communities*, available from SPC.



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