

Procedures for the transfer of paua, with special reference to taiapure and mahinga mataitai areas

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Paua is a traditional and popular food of Māori throughout New Zealand. Iwi use of paua stocks was historically conservative: only enough to feed the family was taken at one time. The gathering beds were constantly restocked by moving adult paua from further afield. The paua to be transferred would always be placed in containers, and covered to prevent them drying out in transit. Knowledge about how to remove the paua was shared within the iwi, and it was known how important it was not to damage the flesh. Often many gathering sites were stocked at a time to prevent overcrowding of the paua.

Some rohe support paua with stunted growth. Although the reasons for this are unclear, it may be possible to enhance paua stocks by transplanting stunted paua to traditional gathering areas that supported large paua. Growth and survival rates of the relocated paua can be followed as part of kaitiaki, and harvesting should not occur until the paua reach legal size. This practice is particularly suitable for traditionally managed areas, such as a taiapure or mahinga mataitai, where harvesting regulations can be enforced locally.

This leaflet details the processes of removing, tagging, measuring, releasing, and relocating paua to ensure kaitiaki and the success of transplanting and restoration.

Before doing anything else you must obtain a Customary Fishing Authorisation or a Special Research Permit from the Ministry of Fisheries because the paua being removed and handled are generally below legal size. In addition, it is likely that divers will use scuba or hookah gear, which are not legal for removing paua under the fisheries regulations. The compliance office at the Ministry of Fisheries will tell you what information they need from you.

Removing paua

Paua must be removed from the rock with extreme care. The recommended instrument is an ab-iron (or similar object) with no sharp edges that can be gently inserted under the paua shell. At no stage should knives or other sharp objects be used to remove the paua. Paua have a very delicate foot and their blood lacks a clotting agent, so a small nick in the flesh will cause the paua to bleed and may decrease its chance of survival.



Using an ab-iron to remove a paua from a rock.

The paua should be put directly into catch bags underwater. Once the bags are full, they can be swum back to the boat and hung over the side of the boat so that the fish remain in the water for as long as possible. The paua should be removed and exposed to the air only for the time needed to complete tagging and measuring. Putting paua in tanks on the boat is not recommended. The temperature of the water can increase rapidly and the oxygen will be quickly used up, stressing the paua. Keeping the paua in the sea will minimise stress and increase their chances of survival when returned to the rock.

Tagging and measuring

Paua can be tagged on the boat or on the shore, but always tag them in the shade. Only a few (say 50) should be tagged at a time.

The paua should be laid out on a damp towel (to prevent them drying out), shell up and all orientated the same way. The shells can then be dried lightly with a towel. Any algae or marine animals encrusting the shell where the tag is to be fixed should be gently removed with a stiff brush.



Tagging paua on a wet cloth in the shade.

The tags are 6 mm diameter yellow plastic discs with an individual letter and number printed on them. The glue used must be fast setting and waterproof.

One person dabs a spot of glue on the lower part of the shell and another places a tag on the glue spot with tweezers. The spot on which the glue is placed should be as clean as possible and free from encrusting organisms. It is important to place the tag in a similar place on all paua to make relocation of the tag easier when resampling. Do not put glue near the row of holes on the shell, as this is where the gills extend.



Paua with a tag in place on the upper surface of the shell.

The length of the paua is then recorded. To measure the shell, the tag number should be recorded and then the paua should be turned upside down and the basal shell length measured to the nearest millimetre. The measurement should be made with callipers (plastic callipers are available from hardware stores for about \$6) and the length recorded on waterproof paper or in an exercise book.

The tagged paua can then be put back into the catch bag and hung back in the water while the next batch of paua is tagged and measured.

Release

Once all the paua have been tagged and measured they are transferred to the chosen growing-out sites (traditional gathering beds). Unless the site is very shallow, divers should be used to return the paua. Divers should take one catch bag at a time to the relocation area and empty the bag. The paua will start to separate from each other and can be picked up and gently held on to a suitable smooth rock until they adhere. Large, dense algal or kelp beds should be avoided. The paua are tagged so that as many as possible can be relocated later for measuring and determining growth rate, and algal beds make searching difficult.

Always handle the paua gently to prevent stress build up and so increase their chances of survival.

Paua site description

GPS reference: 173°56.189'E
40°48.593'S

Description:

Rock platform extending out from point.
Outermost point of bay.
Depth where paua placed is ~5m (High tide).
Landmark - steep with native vegetation.

The description of the site should be thorough and possibly include a photo.

Details of the site must be recorded. These can include a written description, a GPS reference, and a photograph. The more details recorded, the easier it will be to relocate the site.



Where to measure shell length.

Relocation and growth measurements

The paua should be remeasured a full year later. This allows a good estimate of annual growth and ensures that any seasonal variations in growth are taken into account. The paua can be checked within the year if desired, but should not be removed until the year is up. Any measurements taken within the year should be done in situ, but will not provide an accurate comparison with the original measurements as a different part of the shell is being measured underwater.

When returning after a year, an extensive search of the area should be carried out, preferably using scuba or hookah. Divers should search systematically, laying out transect lines if necessary. The area where the paua were released and its surroundings should be carefully searched because paua are mobile. The intensity of the search will depend on personnel and time constraints, but the more paua that are relocated and measured, the more accurate the information on growth rates and stocking densities will be.

All relocated tagged paua should be placed in a catch bag, returned to the boat, and measured as before. Once measured, the paua can be returned to the same site and resampled a year later if necessary.

Growth and mortality analysis

The tag number and length of the paua need to be transferred from the waterproof paper or exercise book to an electronic spreadsheet to ensure that there are back-up copies if the original data are lost. An electronic format is also better for analysis.

An easy way to view these data and make visual comparisons is to produce a scatterplot. This gives an impression of the growth rates at various sites. The best way is to graph shell length against growth.

A spreadsheet needs to be set up tabulating the tag number, shell length when first measured (year 0), shell length after 1 year (y1), and the difference between the two measurements, which is growth (i.e., $y_1 - y_0$). Plot shell length along the x-axis and growth up the y-axis. Each site should be plotted on a separate graph, and only tagged paua found on the re-measuring trip should be graphed. There are many ways to analyse the data, and personnel at the Ministry of Fisheries or NIWA can offer further suggestions or support.

| Tag no. | Shell length (y0) (mm) | Shell length (y1) (mm) | Growth (y1-y0) (mm) |
|---------|------------------------|------------------------|---------------------|
| J1041 | 96 | 99 | 3 |
| J1072 | 84 | 90 | 6 |
| J1067 | 81 | 88 | 7 |
| J1089 | 92 | 97 | 5 |
| J1104 | 100 | 104 | 4 |
| J1106 | 108 | 112 | 4 |
| J1111 | 121 | 122 | 1 |
| J1001 | 95 | 97 | 2 |
| J2870 | 86 | 90 | 4 |
| J1740 | 109 | 111 | 2 |

An example of how to set up the spreadsheet and produce a graph for a visual display of the growth of paua at various sites. This graph indicates the larger paua are growing more slowly than the smaller ones.

