TETIAROA SOCIETY FP
2020 IMPACT REPORT

TETIAROA SOCIETY
SUSTAINABILITY IN ACTION

Dear Friends,

April 2021

We are pleased to share with you our 2020 Impact Report.

Like most organizations around the world, 2020 was a challenging year for us. Fortunately, our staff remained safe. But we struggled with finding ways to manage our shortfall in income, to maintain research programs with French Polynesia border closings, and to continue our education and cultural programs in light of health concerns and local travel restrictions.

But with cooperation, flexibility, teamwork, and a deep sense of purpose displayed by our staff and partners, we came out of 2020 financially stable and with solid progress on a number of fronts. As you will read in this report, we were able to continue a number of research projects even though several were delayed or postponed. Our education and cultural programs were suspended for most of the year, but we are hoping to resume them later this year. On the conservation side, our key program – protecting biodiversity by removing invasive rats from the entire atoll - was delayed, but we used the time to work with our good friends at Island Conservation to remove rats on motus Onetahi and Honuea.

We would like to take this opportunity to thank The Brando and S.A. Frangipani for their tremendous support of our program – without which we would not exist. It is rare when a business and a nonprofit share the same environmental values, and we want to recognize The Brando and its leadership for its forward thinking and leadership in conservation and sustainability.

We also want to thank the Maire of Arue for their partnership and vision for the future of Tetiaroa, and the support of the Minister of Environment and Culture.

We would also like to celebrate the collaborations we have developed over the years with other amazing organizations, including Te Mana o te Moana, Institut Louis Malarde, the University of Washington, the University of California, the University of French Polynesia, and more recently Island Conservation.

Lastly, we are immensely grateful to all of our donors, including Global Wildlife Foundation, who help make our programs a success. Thank you for your support. We look forward in 2021 to great progress in protecting and preserving Tetiaroa!

With appreciation,

Stan Rowland
President

Frank Murphy
Executive Director

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RESEARCH

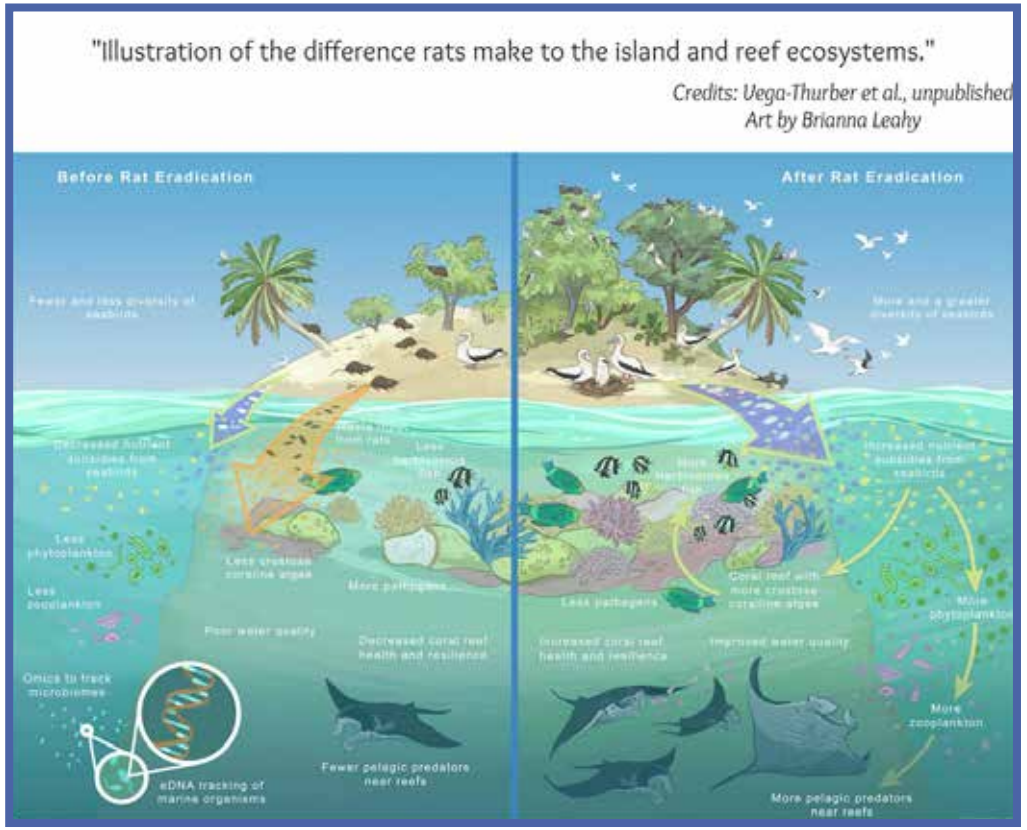
In 2020 foreign researchers had a difficult time getting through travel restrictions, but local researchers were able to get a lot of work done on Tetiaroa. Our usual teams from Institute Louis Malardé and Te Mana o te Moana worked on biting insects and sea turtle monitoring respectively. We also hosted researchers working on the rat eradication science in order understand the interactions between the two species during eradication, and to collect "before" data prior to rat removal. This data will allow us to document the long-term effects of the planned rat removal on terrestrial and marine ecosystems.

Tetiaroa Atoll Restoration Program

Impacts of rat removal on coral reef health

Principal Investigators: Rebecca Vega Thurber, Deron Burkepile

Other Members: Hannah Epstein, Kalia Bistolas, Alex Vompe, Casey Benkwitt, Kelly Speare
Affiliations: Oregon State University, Cornell University, University of California Santa Barbara
California State University Northridge
Sponsor: Global Wildlife Conservation, Tetiaroa Society
Project Dates: 15 Apr 2020 to 15 Apr 2021



A critical part of the Tetiaroa Atoll Restoration Program is measuring the impacts of rat removal and the return of healthy seabird populations on the health of adjacent coral reefs. To find a causal link across the land-sea interface, we will track how the coral assemblages and their associated microbial communities change in the years following rat removal. In 2020 permanent transects were set up adjacent to bird breeding sites and water, coral, and algae samples were collected. This will be followed in 2021 with additional sampling before and after rat removal. With the proposed research, we hope to increase our understanding of what drives coral health, allowing us to better assess the current and future resilience on Tetiaroa, other and coral reef islands across the tropics.

Tetiaroa Atoll Restoration Program

Individual Behavioral and Physiological Variation in Invasive Rats

Principal Investigators: James Russell, Richard Griffiths

Other members: David Ringler, Thomas Bodey
Affiliations: University of Auckland, Island Conservation, Tetiaroa Society
Sponsor: EU - Horizon 2020
Project Dates: 01 Jan 2020 to 31 Dec 2021

In order for an island restoration project to be successful, every invasive species individual must be removed during eradication. Just one remaining pair threatens the entire project. As part of the Tetiaroa Atoll Restoration Project, scientists are studying invasive rats' interspecific competition and reproductive biology in tropical environment to inform future operations. Researchers are interested to know if the dominant Black rat may limit access of the subdominant Polynesian rat, long enough for some not to be exposed to a lethal dose of bait, hence also endangering eradication success. This might explain the recent failure to eradicate Polynesian rats from some islands where Black rats were successfully eradicated. In 2020 we conducted a number of bait uptake trials using trail cameras and non-toxic marked bait at two sites where both species coexist (Honuea/Tiaraunu) and one site when only the Polynesian rat is present (Rimatuu). Preliminary results confirm our hypothesis and indicate that Black rats somehow limit access of Polynesian rats to bait. In another study we created and installed more than 100 artificial rat nests on Rimatuu to encourage Polynesian rats to nest in them, where they can be easily accessed and monitored using cameras. The study aims to monitor the nests after a toxic bait application to see how parents interact with young in the nest, and importantly if any young survive in the nest and emerge after bait is no longer on the ground (hence endangering the success of an eradication). Monitoring started in mid-2020 and is ongoing. Results are expected in August 2021.

Tetiaroa Atoll Restoration Program
Plant Surveys

Principal Investigators: Paul Defillion, Jean-Yves Meyer

Affiliations: Université de la Polynésie Française
Sponsor: Global Wildlife Conservation, Tetiaroa Society
Project Dates: 01 Jan 2020 to 31 Dec 2020



Invasive rats on islands are predators on seeds and seedling plants. They can have major effects on forest ecology and understanding what happens when they are removed is extremely important for good habitat management. This study on the characterization and dynamics of atoll forests characterized the different forest types found on Tetiaroa by establishing 94 circular plots of 490 m² on 8 of the 13 motu. Nine forest types were identified and the recruitment of the woody taxa were studied within these plots by counting all the seedlings. Preliminary results show that recruitment of native *Pisonia grandis* is high even in the presence of rats. The maximum number of *Pisonia* seedlings is not found in forests where it is most dominant, but rather in mixed forests. Seedling recruitment of the native tree *Guettarda speciosa* is homogeneous among all forest types although this species is never dominant.

Recruitment of the native tree *Pandanus tectorius* and the introduced coconut tree *Cocos nucifera* is, as expected, higher in the forest types where they are dominant. Continued post-eradication surveys should determine whether coconut recruitment increases significantly with the absence of rats. If this is the case, it will be necessary to control this species in order to restore the natural forests of Tetiaroa Atoll.

Tetiaroa Atoll Restoration Program

Bird Survey

Principal Investigators: Thomas Ghestemme, Tehani Withers, Frank Murphy

Affiliations: SOP Manu
Sponsor: Global Wildlife Conservation, Tetiaroa Society
Project Dates: 01 Jan 2020 to 31 Dec 2020

Restoring seabird colonies is a key part of the overall atoll restoration program. We expect seabird populations to have a strong response to the removal of rats but in order to document that, we first need to do detailed surveys before rat removal. Our objective is to obtain baseline data on the seabird colonies present on the motu during two different seasons.

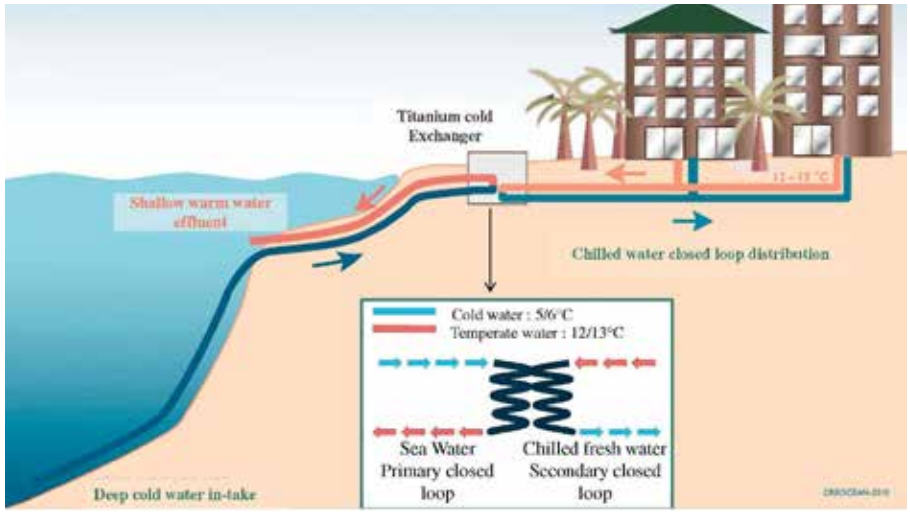
Two inventories were carried out in the Southern summer: February 2020, and then December 2020. Adults, chicks and nests were counted from the top of the beach to a distance of 5 meters inside the island (coastal strip). The “adult on egg”, “chick” and “flying juvenile” stages were counted. The chicks were categorized into Stage 1 (down) and Stage 2 (down and adult feathers). The interior areas of the islands were surveyed to locate the presence of settlements.

With future monitoring using this methodology we will be able to track populations changes over time.

Ocean Acidification and Climate Research on Tetiaroa

Principal Investigator: Julian Sachs

Additional PI: Alexander Chess Gagnon
Affiliation: University of Washington
Sponsor: Private Donor University of Washington
Project duration: January 1, 2014 to December 31, 2021



This project will attempt to understand the potential effects of climate change via ocean acidification on coral reefs. The University of Washington ocean acidification team continued efforts to create a large long-term Free Ocean Carbon Enrichment (FOCE) experiment. The goal of this project is to use deep, carbon-dioxide rich seawater brought up from one kilometer deep by the Seawater Air Conditioning (SWAC) system of The Brando resort. This continuous source of carbon dioxide can then be added to lagoon water in a controlled manner to simulate projected levels of ocean acidification at the end of the century. This year the focus was on calibrating the carbon flux from the SWAC water into the lagoon water. After this recent trip, enough pieces of this project have been tested to prove a working method of creating an efficient FOCE on the pristine reefs of Tetiaroa Atoll.

Density-dependence in Field Populations
of *Aedes aegypti* and *Aedes polynesiensis*

Principal Investigator: Herve Bossin

Additional PI: Neil Davies, Katherine Heath
Affiliations: Institute Louis Malardé, UC Berkeley, Oxford University
Sponsor: Tahiti Beachcomber SA, Tetiaroa Society.
Project duration: September 2018 to October 2021

Aedes mosquitoes are vectors of diseases including dengue, chikungunya and Zika which present enormous global health problems. Both *Aedes aegypti* and *Aedes polynesiensis* are present in French Polynesia and can act as vectors of disease. In order to properly inform public health policy and vector control, models of mosquito population dynamics must accurately capture mosquito ecology.

This long-term project continued with fieldwork in 2020. It aims to characterize density dependence in *Aedes* mosquitoes to inform policies relevant for mosquito borne disease control. The objective of the research is to understand crucial components of *Aedes* mosquito ecology across a microhabitat gradient. The research will investigate the association between *Aedes* larval density and *Aedes* larval development in multiple microhabitat locations. Preliminary laboratory experiments at the University of Oxford have demonstrated that environmental conditions - particularly resource availability - are crucial components of the density dependence process. Therefore we expect that the association between larval density and larval development will depend upon microhabitat conditions.

CULI-KO - Innovative control
against the bloodsucking midge *Culicoides belkini* in the Pacific Island context

Principal Investigator: Hervé Bossin

Other Members: Jérôme Marie, Glenn Bellis, Lee Cohnstaedt, Orava Atiu
Affiliations: Institute Louis Malardé, Charles Darwin University, USDA-ARS,
Sponsor: Agence française de développement, DFC/DBO/EF/2018/0459, Tetiaroa Society
Project Dates: 30 Nov 2018 to 26 Nov 2021

Culicoides belkini (also known as No-See-Ums) are small hematophagous midges whose bites cause itching. They are a nuisance to communities to the point of preventing the development of human activities in the most infested islands of the Pacific. Today, control of the bloodsucking midge *Culicoides belkini* relies mainly on chemical treatments in natural, swampy habitats where this midge breeds. The situation calls for the development of more effective control tools and methods, better suited for the Polynesian island context.

On Tetiaroa, these midges only inhabit one area on one of the motu, so they don't effect anyone living on the island or visiting The Brando resort. This situation also works for the research program since it provides an isolated population to work on. Fieldwork for this long-term project continued in 2020. The project aims at developing and testing, under operational conditions, the effectiveness of new control tools with the objective of a sustainable control of bloodsucking midges in wetlands. This project also seeks to mobilize existing expertise in Pacific Island countries within the range of *C. belkini* (e.g. Fiji, Samoa, Cook Islands). The control strategy once validated can be applied to the benefit of the populations living in the Pacific islands infested by *C. belkini*.

Mapping Tetiaroa - Geographic Information System

Principal Investigator: Benoit Stoll

Affiliations: Université de la Polynésie Française
Sponsors: Université de la Polynésie Française, Tetiaroa Society, Institute Louis Malardé
Project Dates: January 2016 to December 2021

Fig4 : vegetation coverage percentage (5 stratas – 1m)

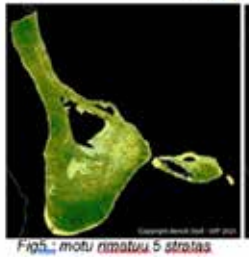


Fig5 : motu rimatuu 5 stratas

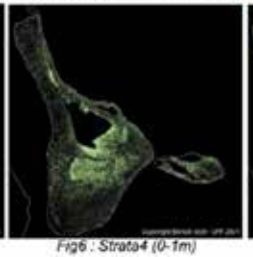


Fig6 : Strata4 (0-1m)

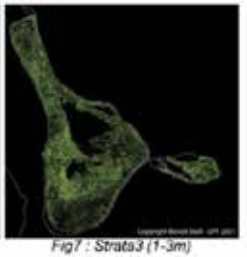


Fig7 : Strata3 (1-3m)

The Tetiaroa Geographic Information System project is involved in developing maps and analyzing GPS, Satellite, and LiDAR data on Tetiaroa. This has involved detailed mapping of Onetahi in collaboration with Institute Louis Malardé. the analysis and processing of historical aerial photos, mapping of turtle nesting sites for Te Mana o te Moana, mapping cultural sites in collaboration with Australian National University, and creating a vegetation map.

In 2020 the GIS team worked on analyzing and ground truthing the LiDAR data that was produced in 2018. This allows us to construct detailed maps of forest structure and understory plants which will be incorporated into habitat maps in 2021.

CONSERVATION

The Tetiaroa Society Conservation and Sustainable Use Plan (CASUP) envisages an atoll where the terrestrial and marine habitats have been restored to as close to their original native form as possible. To that end, the Tetiaroa Atoll Restoration Project (TARP) focuses on the removal of invasive species and restoration of native species. We are currently focusing on removing the primary threat to the island's ecosystem – invasive rats. The plan for 2020 was to remove rats from the entire atoll but the Covid pandemic made this impossible. However with the closing of The Brando, the opportunity arose to do a rat eradication on Motu Onetahi and Honuea using volunteer labor. This operation, and the ongoing Green Sea Turtle monitoring, were the main Conservation priorities in 2020.

Tetiaroa Atoll Restoration Program
Rat Eradication

Principal Investigators: Richard Griffiths, Baudouin des Monstiers

Affiliations: Island Conservation
Sponsor: Tetiaroa Society, Island Conservation
Project Dates: 01 Jan 2020 to 31 Dec 2021

Island Conservation and Tetiaroa Society carried out rat eradication programs on two motu: Honuea and Onetahi. The work included laying out a 20x20 meter grid across the two motu which used over 3000 grid markers and 75 kilometers of transects. Bait was distributed by a group of 20 volunteers following strict protocol established by Island Conservation staff. Baiting was done twice, three weeks apart, and bait stations in buildings were maintained for two months. Monitoring of these motu is continuing while preparations are being made for eradication programs on the remaining motu of Tetiaroa.

Tetiaroa Atoll Restoration Program
Biosecurity Plan

Principal Investigators: Souad Boudjelas

Affiliations: Pacific Invasives Initiative
Sponsor: Tetiaroa Society, Frangipani
Project Dates: 01 Jan 2020 to 31 July 2020

Removing invasive species is only the beginning of restoration efforts. These species must also be kept from returning to the island. As a part of the TARP, Tetiaroa Society commissioned a Biosecurity Plan which was completed in early 2020 and implementation began in the following months.

The plan covers all potential vectors for the arrival of invasive species and recommends actions to prevent invasives from arriving on the island. Tahiti Beachcomber SA and Tetiaroa Society have created a Biosecurity Taskforce to manage the implementation of the plan on the island.

Green Sea Turtle Nesting Monitoring

Principal Investigators: Cecile Gaspar, Margaux Touron

Affiliations: Te Mana o te Moana
Sponsors: Direction of Environment, Fondation Prince Albert II de Monaco, Vilebrequin, University of Veterinary Medicine Hannover, Tetiaroa Society, The Brando, Hinerava, ESRI, IFBD, Air Tahiti Nui, Van Oord, Sven Lindblad et Kristin Hettermann
Project Dates: January to May and September to December 2020

Tetiaroa Atoll represents a unique place for Green Sea Turtles in French Polynesia, it is one of the last remaining nesting sites in the Society Islands. The non-profit foundation Te Mana o te Moana created the Tetiaroa Turtle Sanctuary in 2007 with the DIREN authorizations. This sanctuary allows the conservation of this emblematic species by setting up permanent scientific monitoring during the nesting season (From October to May). Field teams, supervised by marine biologists, take turns on the island to ensure the continuity of the observations.

Fieldwork in 2020 continued the long-term monitoring program which includes:

A. **Research on nesting females**: Identification of each nesting female by photo identification, genetic samples and flipper tagging is key to better understand their inter-annual nesting frequency and their genetic structure. In addition, post-nesting females are tracked by satellite on their migration route in order to map their feeding area.

B. **Research on eggs and hatchling survival rate**: Protection of hatchlings is the second key component of this program. This involves excavation of each nest in order to better understand the natural hatching success. Researchers also record the incubation temperature by the deployment of thermo-loggers inside nests in order to have an estimation of the sex ratio of newborns.

C. **Research on Climate change impact**: Thanks to the collaboration with the Dutch company Van Oord, Specialised in marine engineering, a differential GPS system (DGPS), as well as a tide gauge, were set up on the Tetiaroa Atoll. The equipment enabled detailed mapping of beaches in order to evaluate flooding risks related to potential future sea-level rise.

D. **Research on predation impact**: To better understand the impact of predation by Ship rats (*Rattus rattus*) and Polynesian rats (*Rattus exulans*), motion-triggered cameras are set up on turtle nests. The observed behaviour indicates that Green Sea Turtle hatchlings are a familiar food source for these invasive species.

EDUCATION

The Tetiaroa Society Education program was essentially on stand-by this year. The first two months of the year the weather was too rough to get school children to the atoll and then by March the Covid pandemic restricted all school programs. The schools remained impacted for the rest of the year, and we weren't able to organize any school groups to come to Tetiaroa.

However there was one very bright moment for our education team, and the rest of the staff as well, when Sourire de la Vie brought seven children and five adults to visit Tetiaroa. This French non-profit aids cancer patients during and after their treatments and one of their programs includes adventure and educational travel. This group spent 26 days visiting five islands in French Polynesia and stayed with us for five days. On Tetiaroa they explored different motu and learned about Polynesian culture and sustainable development.

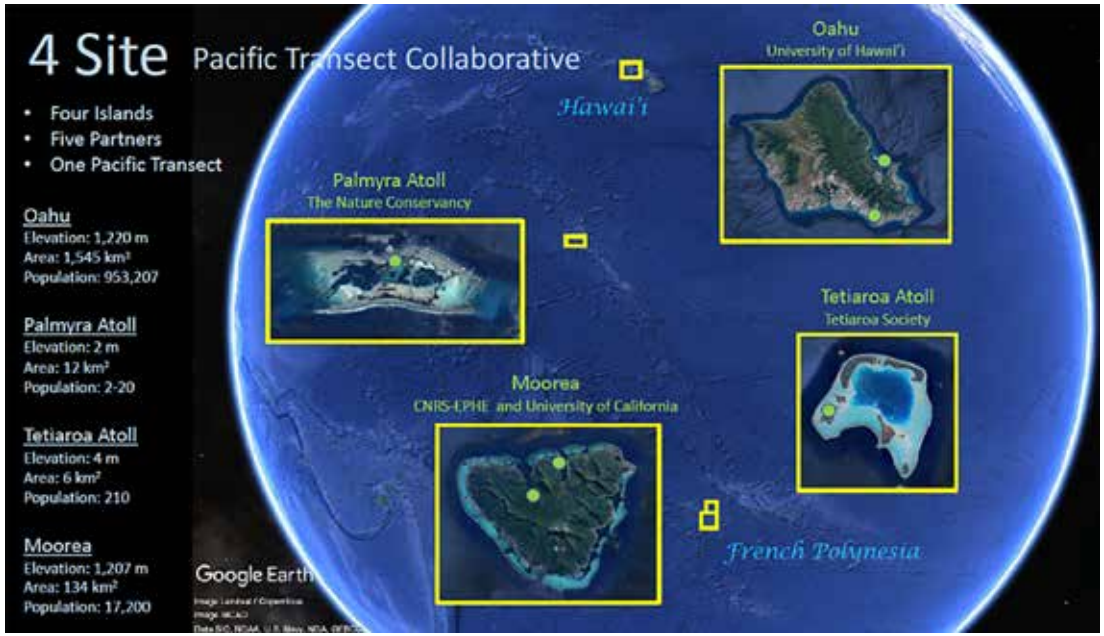
SCIENTIFIC COLLABORATIONS

In 2020 Tetiaroa Society formalized new collaborations and continued old ones. These relationships serve to establish Tetiaroa Society as a regional presence for scientific research, conservation and Pacific community issues.

4Site Pacific Collaborative

Tetiaroa Society was invited in January 2020 to participate in a workshop in Santa Barbara, California, at the National Center for Ecological Analysis and Synthesis (NCEAS). The workshop, which was sponsored by The Nature Conservancy, was convened to create a network of sites across a North/South transect in the Pacific Ocean.

The 4Site Pacific Transect will run from Hawai'i to French Polynesia and will be anchored at research hubs on Oahu (University of Hawai'i), Palmyra (The Nature Conservancy), Moorea (University of California Gump Station and CNRS-EPHE CRIOBE), and Tetiaroa (Tetiaroa Society). The sites offer a spatial, sociocultural, and biogeographical gradient and representation of both high islands and atolls. The partnership between these institutions will leverage already existing data on each site and create new research and monitoring programs across sites to help promote a sustainable future for Oceania.

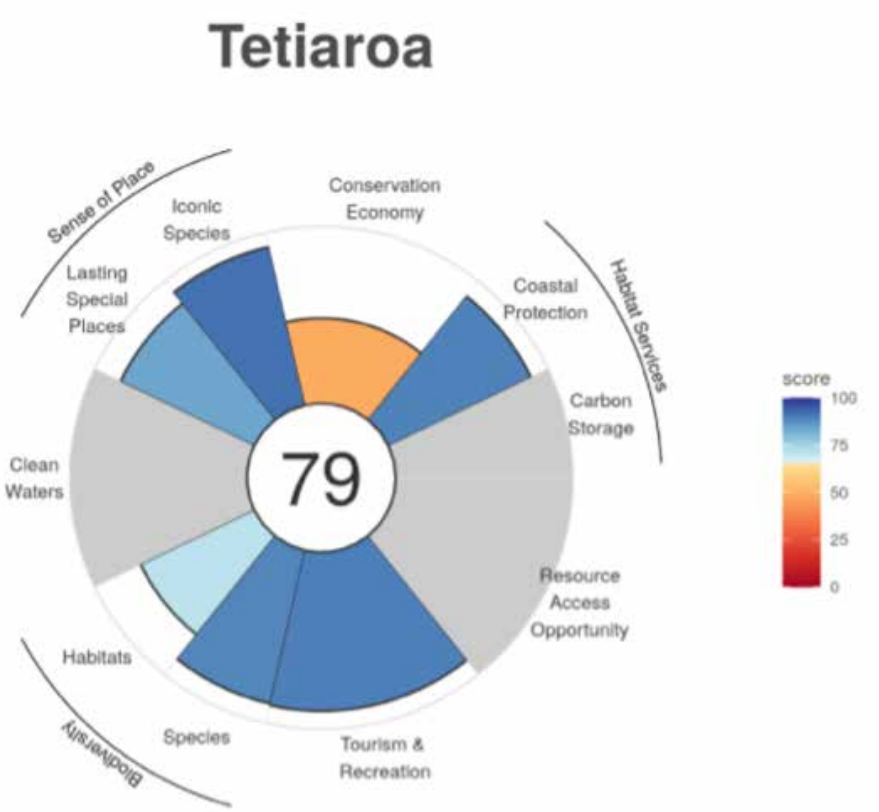


Ocean Health Index

The Ocean Health Index (OHI) is a scientific framework used to measure how healthy oceans are. Understanding the state of our oceans is a first step towards ensuring they will continue to benefit humans now and in the future. The global Ocean Health Index was originally launched in 2012, with assessments conducted every year thereafter, to assess the condition of our global oceans. The global assessment describes how well 220 countries (and some territorial regions) are sustainably managing 10 goals that represent the full suite of benefits people want and need from the ocean. These goals include: Artisanal Fishing Opportunity, Biodiversity, Carbon Storage, Clean Waters, coastal Livelihoods and Economies, Coastal Protection, Food Provision, Natural Products, Sense of Place, and Tourism and Recreation. In addition to the global assessment, the OHI framework has been used to conduct assessments at smaller regional scales for over 36 countries and regions, referred to as OHI+ assessments.

As part of the 4Site collaborative The Nature Conservancy agreed to cover the costs of doing an OHI for both Tetiaroa and Palmyra. The results for Tetiaroa are here.

The difficulty of developing this during the pandemic meant that there are some gaps on the data that can be filled in the future. But overall the protocol showed Tetiaroa with an OHI of 79 out of 100 (Palmyra was 82 and average for Hawaiian islands is 74).



Fair Island Project

The FAIR Island Project values open sharing of research data and products associated with research on Tetiaroa. In collaboration with researchers, the 4Site Data Management Community, iSamples and many others, this project will build a model research data management system feeding data across stakeholders, linking metadata, repositories and institutions, and allowing for notifications and verification, reporting in real-time, automated compliance, and guaranteed provenance.

Using Tetiaroa to initiate the FAIR Island Project provides an unparalleled opportunity in a unique, controlled environment where research is coordinated through Tetiaroa Society with an optimal data policy for open access, mandatory registration requirements for all research projects, and data management plans containing controlled vocabularies and identifiers implementing global standards wherever possible. All researchers working on Tetiaroa, resident or visiting, are required to create data management plans (DMPs) for their proposed projects to study the island and said DMPs are updated as data collection advances.

Our goal is to translate the broader FAIR principles into a set of specific requirements and implementable activities that demonstrate how good data management practices and policies accelerate research for the benefit of all stakeholders.

FAIR ISLAND

Mission Blue Hope Spot

In June 2018, Tetiaroa Atoll was designated a Mission Blue Hope Spot. In June of 2020, Tetiaroa Society participated in the first Hope Spot Summit. Dr Silvia Earl presided over the virtual Summit, which was well attended. Topics ranged over introduction of new Hope Spots to ways in which Hope Spots could potentially collaborate. Tetiaroa Society initiated a discussion on networking Hope Spots (similar to 4Site) in order to share best practices and data across similar sites.

CULTURE

In 2020 Tetiaroa Society worked with The Brando to dedicate the cultural site, *Te Pu Onetahi*, that can be visited and cared for by all of the inhabitants of the island. The site contains the remains of six *marae* (Polynesian worship sites) including the *marae* created by the famous ancestor *Honu'ura* when he named the motu Onetahi. There is a powerful significance to this site since it is obvious in the architecture of each marae that they represent families from different islands, including: Tahiti and Moorea, the Leeward Islands, the Tuamotu, and the Australs. This is very unusual for any one island and further evidence that Tetiaroa was a special place where alliances were built and cooperative futures planned. The site will be used for welcoming ceremonies, for the Education Program, and for other cultural events.

OPERATIONS

Personnel

Due to the Covid pandemic, all Tetiaroa Society staff took pay reductions beginning in April and lasting through the rest of the year. The Guide staff were at half-pay during all of this time but were also on call if occupancy at the resort necessitated them putting in more hours. This was a challenging time for everyone, but cooperation, sense of mission, and good humor got everyone through.

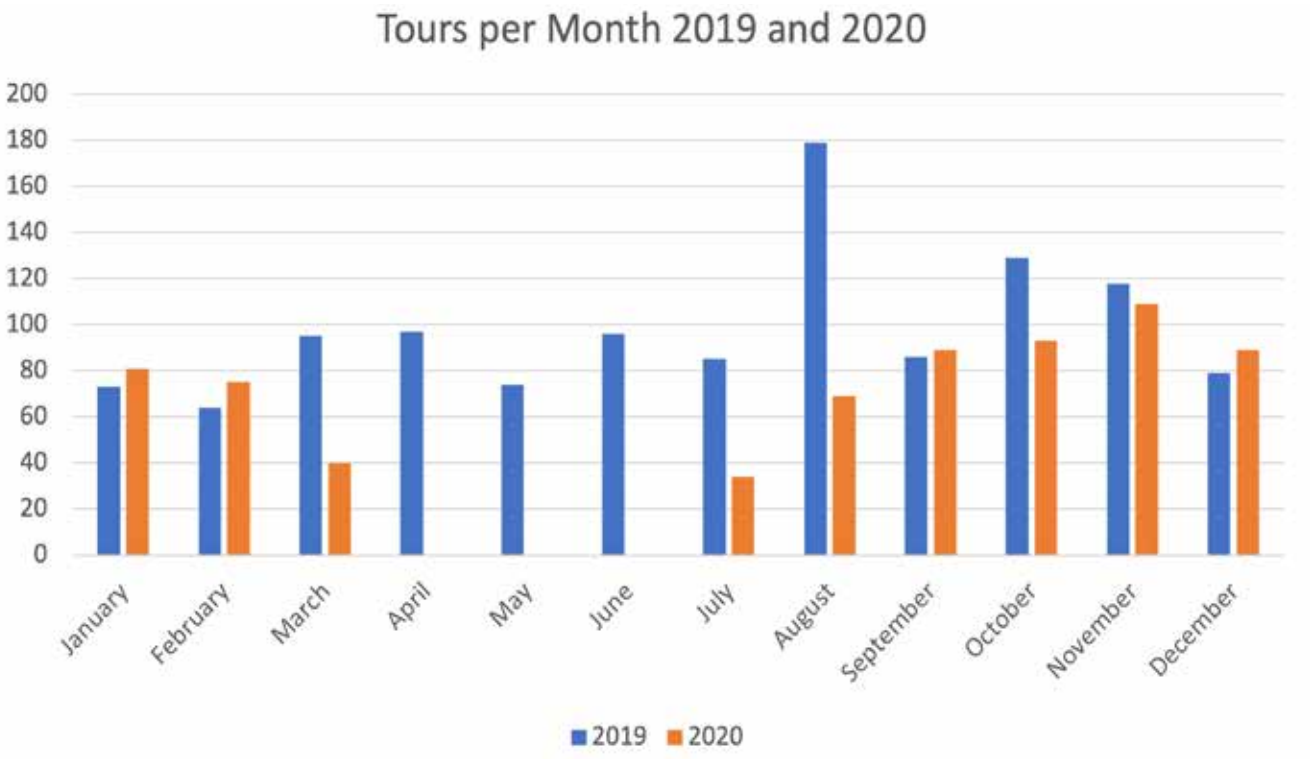
Executive Director

	Total	Av/Mo
Days worked	284	24
On Tetiaroa	162	14
Off island	122	10

Frank Murphy continued to serve as Executive Director of Tetiaroa Society French Polynesia. His duties include: overseeing the Guide Program, the Ranger Program, all administrative issues, human resources, accounting, communications, and developing and managing CASUP programs. He also interfaces with guests of The Brando, does lectures, and occasionally guides tours. He works on the island and also out of a home office on Moorea.

Guide Program : Actions and Tour Numbers

The Guide Program had some work adjustments this year, but the team of Tihoni Maire as Head Guide and the Guides Virginie Poly, Vanille Thullier, Herehia Sanford, and Mareva Barbeau did a great job throughout. With the onset of the Covid lockdown and the closure of The Brando Resort, the Guides went to work on the atoll restoration program for Onetahi and Honuea under the guidance of Island Conservation staff. When the resort opened again the Guides shifted back to doing tours with resort guests.

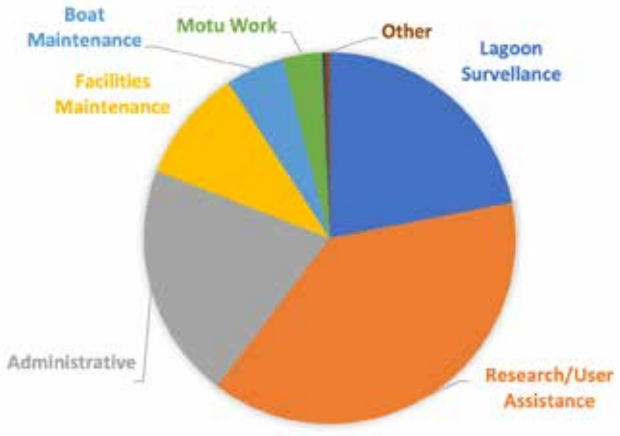


Due to the hotel closure and lower occupancy numbers the number of tours were lower than in 2019, but for the last four months of the year business picked up and December 2020 was actually busier than 2019.

Ranger Program : The team and the work

Tetiaroa Society started 2020 with a comprehensive Ranger Program and plan to continue to protect Tetiaroa. Tetiaroa Society also started the year with the three Rangers that were employed in 2019. But in March of 2020, one of the Rangers decided to leave the atoll due to the start of the worldwide global pandemic. At the same time, Tetiaroa Society applied for and received French Polynesian government assistance to help cover employee wages throughout the remaining portion of the year. This governmental program did not allow Tetiaroa Society to hire any new employees, including a replacement for the third ranger as previously planned. Therefore, Tetiaroa Society employed only two rangers throughout most of 2020.

Activities	Hours
Lagoon Surveillance	860
Research/User Assistance	1,509
Administrative	806
Facilities Maintenance	388
Boat Maintenance	201
Motu Work	135
Education Program	11
Other	14



Head Ranger Teva Beguet and Ranger Luciano Kolikalangi continued to actively patrol Tetiaroa and kept the atoll under close surveillance throughout 2020. Tetiaroa Society Guides, who had a much-reduced workload in 2020 due to the closure of The Brando and low occupancy rates, were able to fill the void left when the third Ranger left the atoll. Tetiaroa Society was also able to engage an enthusiastic group of volunteers that added to the Ranger workforce throughout the year.

While not out patrolling Tetiaroa, the Rangers also managed and maintained the Ecostation, hosted Ecostation guests, assisted scientists in the lab and in the field, drove Tetiaroa Society boats, maintained the boats, did trail maintenance, and did a lot of administrative work that allowed Tetiaroa Society to function efficiently on Tetiaroa. In fact, the Ranger Program, assisted by Guides and volunteers, was unusually active in 2020.

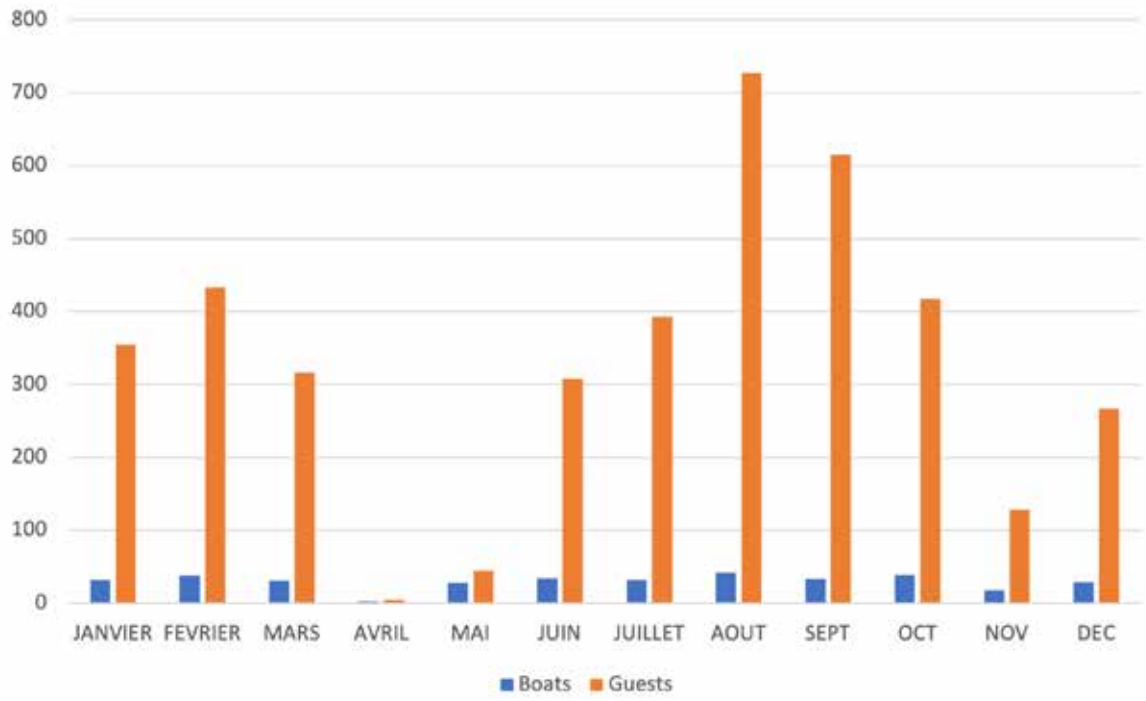
The log on the left shows the hours spent on different jobs by the two Rangers. As you can see, Lagoon Surveillance averaged 2.4 hours a day for the year. However, there were some very slow periods in March and April during the pandemic lockdown imposed by the government, where no charter boats and very few fishing boats were arriving at the atoll. During June-August, the Rangers, along with an expanded team including guides and volunteers, were working overtime on the rat eradication program. The intensity of this project greatly increased the Researcher/User hours in 2020. Some of these hours can also be attributed to a higher-than-normal demand for the Rangers to drive scientists around the lagoon of Tetiaroa.

Ranger Program : Charter Boat Monitoring

Private charter boats routinely visit Tetiaroa. These charter boats typically anchor outside of Rimatu'u, and then send their guests across the reef. Once the guests arrive on Rimatu'u, they walk the trail or beach (depending on whether they partner with Tetiaroa Society or not), and visit "Bird Island." In order to protect Tetiaroa and to better understand the impact that these charter boats are having on the environment, Tetiaroa Society Rangers carried out daily observations of these activities. The Rangers kept track of the number of private charters coming to Tetiaroa and the number of guests each charter brought to the atoll. The results of this survey are set forth in the chart below. As you can see, the number of private charters visiting Tetiaroa was very low during the government-imposed pandemic shut down from mid-March through May. The number of private charters coming to Tetiaroa returned to normal after the government lifted the restrictions on inter-island travel. In November and December, lower numbers were due to bad weather which makes the crossing from the Tahiti to Tetiaroa difficult.

Charter Boat Visits

	Boats	Guests
January	32	355
February	38	433
March	31	316
April	2	5
May	28	45
June	34	308
July	32	392
August	42	727
September	33	616
October	39	418
November	18	128
December	29	267

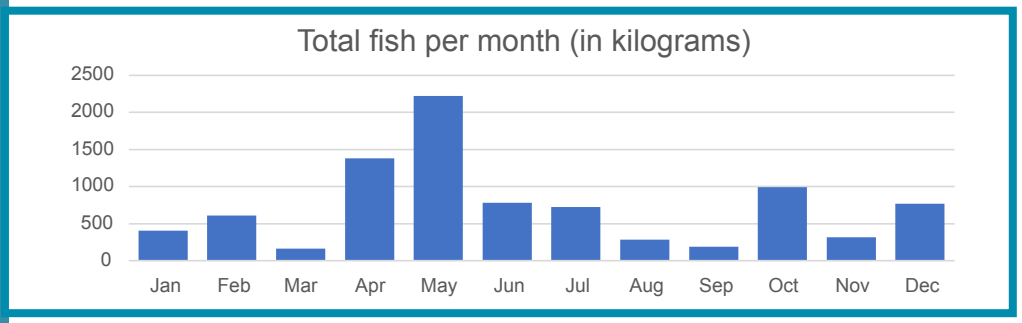


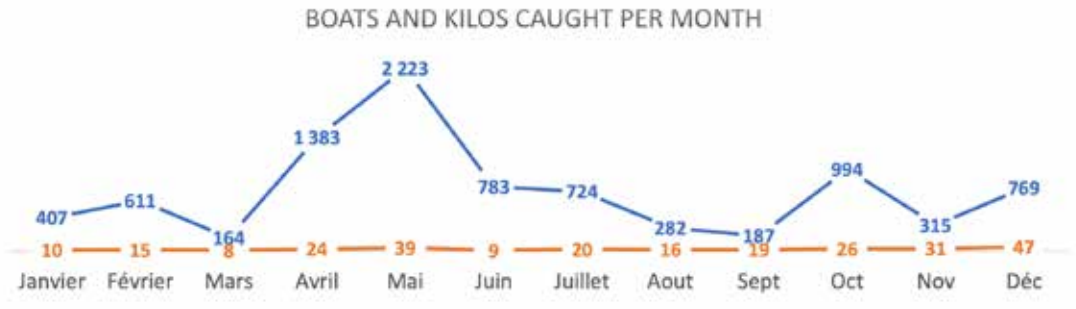
Ranger Program : Lagoon surveillance

Ranger Program : Report on the Tetiaroa Fishery for 2020

With the habitat restoration project well underway in 2020, Tetiroa Society began a high priority program to work with the Commune of Arue to protect the coral reef and lagoon of Tetiaroa. Over the years, Tetiaroa Society Rangers monitored fishing around Tetiaroa, and from anecdotal evidence gathered by the Rangers, Teihotu Brando, and the fishermen themselves, it seems that fishing pressure on Tetiaroa in 2020 was at an all-time high. This was evidenced by the number of fisherman coming to the atoll, fewer numbers of fish in the waters, and the increased difficulty locating common species of fish. It is likely that the global pandemic caused more people to fish on Tetiaroa to provide food for their families, and to sell in local markets to create additional income.

In 2020, the Rangers began monitoring fishing activity by systematically recording numbers and types of fish caught around the atoll. There are boats fishing around Tetiaroa every day, weather permitting, and fishing pressure typically increased on weekends and holidays. The chart below shows fishing pressure by month, with a total catch of 8,840 kg recorded for 2020. Note, however, that this is just an estimate of the amount of fish taken from Tetiaroa, and that this number is likely less than half of what was actually caught. As you can see from the data, the heaviest fishing pressure occurred during the months of Covid closures.



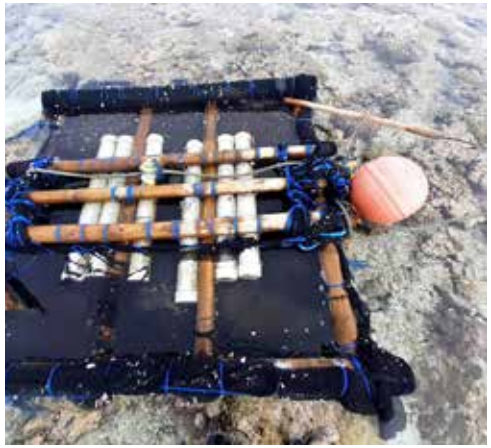


Fishermen are typically targeting three types of fish, which are the most sought after in the local markets. Nearly 46% are one species, Naso / *Ume*, the main target of fishermen. Second are a group of "red fish": Squirrel / *i'ihi*, Soldierfish / *apa'i*, and Pempheri / *mata ana ana*, at nearly 15% of the catches. The third most popular type of fish is parrotfish / *uhu*, *pa'ati*, *pahoro*, at 13.3%.

From this data, it is clear that the Naso or *Ume* is being heavily targeted by fishermen. From studies done on Moorea, we know that this species is an important herbivore on the reef and that it plays a vital role in keeping algae from impacting corals.
The work completed in 2020 and the ongoing study in 2021 will provide essential information on the overall impact of fishing on Tetiaroa. This information will allow Tetiaroa Society to work with the Commune of Arue and the French Polynesian Government to develop appropriate management practices to protect Tetiaroa's barrier reef and lagoon in the future.

Ranger Program : Atoll Clean-up Days

Tetiaroa Society continued its regular beach clean-up program in 2020. The Rangers coordinated and collaborated with The Brando administration to include their staff and other workers on the atoll in this process. There were four major beach clean-up days, including World Clean-Up Day in September, which resulted in over 500 kilos of trash removed from the beaches of Tetiaroa. Continuous clean-up by the Rangers, volunteers and guides throughout the entire year brought in more trash from the atoll. These events also netted six stranded Fish Aggregation Devices ("FAD"), which are becoming more prevalent in French Polynesian waters. Each FAD was collected, the material was recycled, and a description was sent to the Department of Marine Resources for their records.



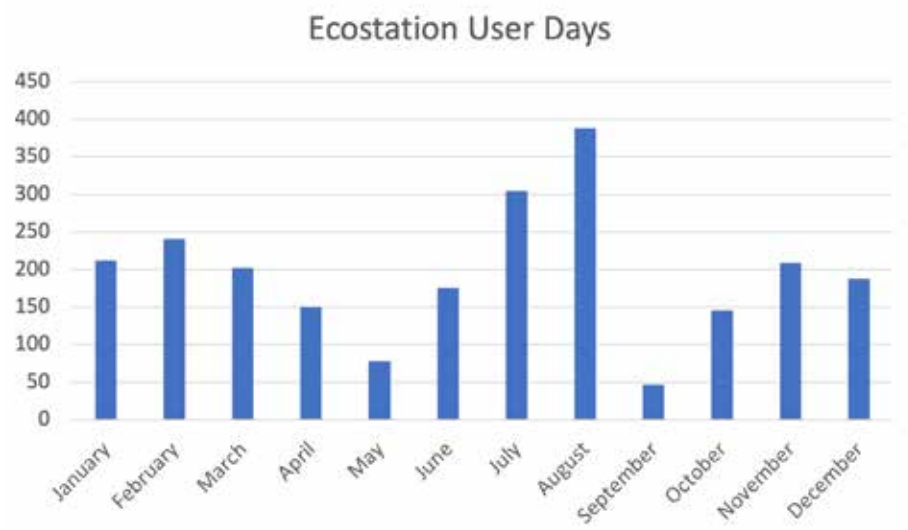
Ranger Program : Report Summary

The Ranger program is a vital part of the overall mission of Tetiaroa Society to protect and preserve Tetiaroa. This was a challenging year, but in 2021, Tetiaroa Society plans to once again hire a third ranger. In the meantime, guides and volunteers will continue to assist as needed to ensure the atoll is properly protected. In 2020, the Rangers also obtained a new high-tech drone to assist in surveillance of the atoll. Tetiaroa Society Rangers plan to use the drone on a regular basis in 2021 to help patrol the atoll.

Ecostation Use

Considering the many constraints on researchers coming to Tetiaroa in 2020, the Ecostation actually got a surprising amount of use. This was due to our usual heavy seasonal use by Te Mana o te Moana volunteers, regular use by Institute Louis Malardé, and then a large number of users associated with the rat eradication work on Onetahi and Honuea. Ecostation use was actually more than in 2019.

User Groups	User Days
Te Mana o te Moana	799
Institute Louis Malardé	257
U. of Auckland / Island Conservation	279
Island Conservation Staff	129
Eradication Volunteers	603
Université de la Polynésie Française	120
SOP Manu	32
U. of Washington	6
U. of Oregon	36
U. of Auckland	9
Media	18
Educational Program	46
Cultural Committee	24
TOTAL	2358



Month	User Days
January	212
February	241
March	202
April	150
May	78
June	176
July	305
August	388
September	47
October	146
November	209
December	188

RAISING AWARENESS

Communications

Tetiaroa Society Communications rolled along this year with regular newsletters and website updates.

Tetiaroa Society also collaborated with Island Conservation to promote the Tetiaroa Atoll Restoration Program by participating in one of their "Island Journey" webinars and by helping to create and distribute a video on the same topic narrated by long-time Tetiaroa supporter Laura Dern.

Frank Murphy participated in a podcast by Conscious Traveler about whale watching and the ethics of swimming with whales and dolphins.

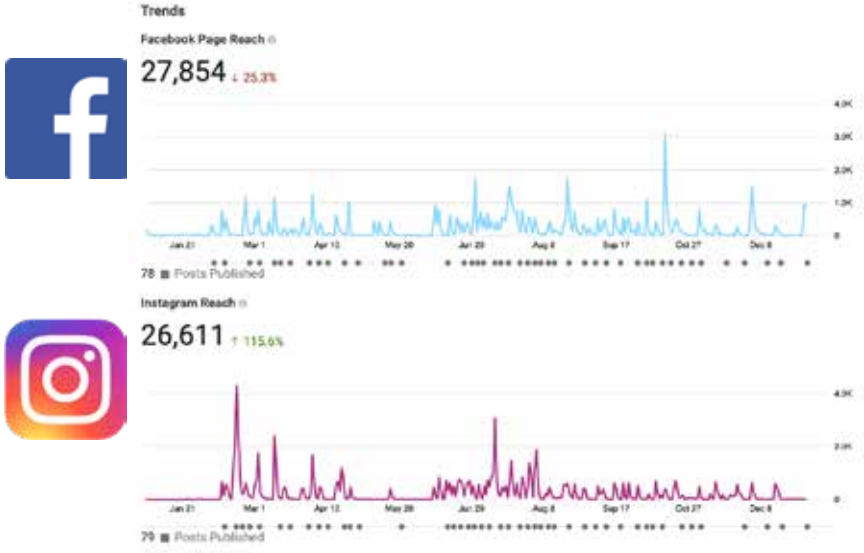
Tetiaroa Society also hosted and worked with both print (Outside Magazine) and TV media (Buffalo Pictures, Islands in the Pacific) for stories/programs about The Brando, Tetiaroa Society, and the island.

Monthly Newsletters “News from the Atoll”

Month	Open Rate
January	33%
February	36%
April	49%
August	45%
September	42%
October	46%
December	43%

Tetiaroa Society’s newsletter, “News from the Atoll” has 4377 subscribers. Our open rate is well above average for a non-profit. 51% of our newsletters are opened on a desktop, and 49% on a mobile device. Our subscribers are scattered all over the world, as is illustrated by the map on the right. The darker the shade on a country, the more subscribers there are.

Communications via Website and Social Media



Expenses and Income

Expense category	Amount XPF
Business	6 963 642
Facilities	7 846 336
Transport	2 073 936
CASUP	4 902 113
Personnel	35 686 007
Housing	3 559 500
TOTAL	**61 031 534**

These are the major Cost categories for Tetiaroa Society for 2020.

The majority of the costs go to personnel, but this year those costs were reduced when the employees agreed to reduce their salaries because of the economic downturn due to Covid. Generally other costs stayed the same as 2019.

Income source	Amount XPF
TB Donation	27 342 155
TS Grants	9 417 019
Other Donations	9 145 440
Ecostation Fees	8 421 558
Government Assistance	2 645 944
TOTAL	**56 972 116**

Income in 2020 was similar to 2019 even with the temporary closure of The Brando resort, largely because of financial assistance from the government of French Polynesia that was offered to many organizations to help deal with the economic crisis due to Covid-19. Ecostation fees increased this year with full-time rat research and other users.