

Development of management policy for the marine ornamental fish and invertebrate fishery in Puerto Rico: A case study

M.P.Hardin¹ & R.S.LeGore²

¹ Greystone Environmental Consultants, Inc. 5231 South Quebec Street, Greenwood Village, CO 80111; mhardin@greystone.us

² LeGore Environmental Associates, Inc., 2804 Gulf Drive N., Holmes Beach, FL 34217 USA; slegore@mindspring.com

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Abstract: In recent years the collection of tropical marine organisms for the aquarium trade has become perceived as an activity with an unsustainable history as well as obvious potential for rehabilitation through resource-based fisheries management and consumer-oriented product certification. In the case of Puerto Rico, collection of ornamentals has existed for decades, though unregulated due to a weak fisheries law dating from the 1930s. The new Fisheries Law 278 of 1998 enabled new regulatory approaches for marine ornamentals, which were met with serious challenges rooted in (1) an information gap concerning the fishery regarding participant numbers, collection methods and export volumes, and (2) the absence of consultation of fishers by agency regulators. The information gap led to worst-case assumptions of impact by regulators, and a closure of the fishery, which set the stage for threatening personal confrontations and lawsuits, the latter leading to *de facto* resource management by judicial order. To redress these issues and move management back into the arena of science and public policy, regulators have initiated a three-phase program: (1) characterize fisher numbers, methods and exports, (2) describe populations and biology of commercial species, and (3) propose appropriate fisheries management approaches. This paper describes only the first phase of this program.

Key words: Ornamental fisheries, fisheries management, Caribbean reef fisheries, regulatory policy, sustainable fisheries, Puerto Rico.

Though the capture and export of tropical marine ornamentals can be documented as far back as the 1930s, the practice has emerged as a worldwide trade of financial significance only in the past two decades (Wood 2001, A. Bruckner, unpublished). As can best be determined by direct interview and existing literature on the topic, the capture and shipment off-island ("export") of fishes and invertebrates for the aquarium trade has been taking place since the early 1960s in Puerto Rico. Reportedly popularized by surfers of the northwestern shore as an income-generating activity, the marine ornamental business in Puerto Rico was first described by Sadovy (1992). Based on participant interview data, Sadovy estimated at the time that 40 collectors were supplying six exporters with 155 finfish and 51 invertebrate species, captured entirely from the western and southern shelves of the island. The governing Fishery Law 83 of 1936 specifically excluded collectors of ornamental organisms from its definition of "fisherman", so the practice was unregulated until passage of the Puerto Rico Fisheries Law 278 (Fisheries Law) of 1998 and the Law for the Protection, Conservation and Management of Puerto Rico Coral Reefs (Coral Conservation Law) of 1999. Disparities in the interpretation of the Fisheries Law and Coral Conservation Law have contributed significantly to the present issues in the ornamental capture and export trade.

The Fisheries Law authorized the Department of Natural and Environmental Resources (DNER) to "prohibit the fishing, capture, transport, possession or export of juvenile aquatic organisms utilized for aquariums" (Article 5p). The Fisheries Law also enabled the agency to issue various types of licenses for capture fisheries, including a Special Fishing Permit of one year's validity for uses that include the "commercializing or possession of aquarium fishes" (Article 7; Attachment A). Other activities requiring a "Special Fishing Permit" include scientific research, education, exhibiting and aquaculture. Under Article 8, conditions are provided for revocation of fishing licenses, which include "denial of pertinent information required by the Department to uphold the law or its regulations," further defined under Article 9 to include "statistical information on the totality of his fishing, capture or purchase, according to Department requirements per regulation". The draft regulations for the Fisheries Law provide (Chapter

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IV) specific requirements for obtaining a Special Fishing Permit, which include a description of the proposed activity with the intended species list, origin and destination of the take.

Initial Policy Enforcement Efforts

With the stage set by passage of the Fisheries and Coral Conservation laws, several requests were sent to the DNER by ornamental fishers in early 2000 seeking permits for the capture of ornamentals. In a few cases, the DNER Legal Affairs office responded by mailing forms to the applicants for bird capture and export permits, since no forms had been prepared specifically for ornamental fisheries permits. This response was perceived by the applicants as a form of official pressure to shift collection from marine fish to birds. In March of 2000 another request was received by DNER for a permit under the new fisheries law for the collection of marine ornamentals, which reportedly included coral and live rock in the proposed take, organisms that are clearly protected under the Coral Conservation Law. This request added to a concern among DNER staff that the capture and export of ornamentals was possibly degrading target populations to a significant degree, as well as causing damage to reef habitats, with particular concern over a suspected albeit undocumented increase in live rock and coral harvest in the wake of restrictions on this activity in Florida. This concern was based on the well-documented impacts of unmanaged ornamental collection in other areas, such as the Asia-Pacific Region ([Barber and Pratt 1998](#)), [MacKinnon 1997](#)), Tanzania ([Makoloweka 1997](#)), Indonesia ([Djohani 1997](#)), the Philippines ([Cruz 2001](#), [Latin 2001](#)) as examples, as well as on a belief that Puerto Rican reef fish populations had generally declined over the 1990s (C. Lilyestrom, pers. com.). Photographic evidence of damage to corals at Desecheo Island was attributed to collectors by a local dive guide (J. Rafols, pers. com.).

The DNER personnel concerned with ornamental fishery impacts reviewed the Coral Conservation Law in light of the pending permit application. In consultation with staff attorneys as well as staff scientists of other agencies, such as the Caribbean Fisheries Management Council, the Coral Conservation Law was interpreted by DNER as constituting a *de facto* prohibition on the capture and export of ornamental fish. In its interpretation of the Coral Conservation Law, the DNER also drew on its experience with commercial fisheries, in particular the recommended Federal management guideline termed the "precautionary principal", which holds that in an absence of data, management decisions should place the risk of error on the side of conservation rather than over-exploitation. The permit request therefore remained unprocessed, and in June, 2000 Rangers stationed at airports were notified of a prohibition on the export of marine ornamentals. The resulting seizure of shipments by DNER Rangers stationed at airports, which occurred between June and August of 2000, initiated the period of the "veda" (i.e. closed season) referred to by collectors.

Stakeholder Response

Though the law's interpretation and the consequent prohibition were discussed among agency staff, the collectors felt that inadequate notice was given, and regarded the decision as having taken place precipitously and without consultation with stakeholders and other members of the natural resource management scientific community outside of DNER (consultation is not a part of DNER's standard permitting procedure), as well as in a state of general ignorance about the scope and practice of their business. Given this perception, and the direct impacts on their livelihood, the prohibition generated strong reaction from the fishermen, especially those engaged in the practice as a full-time, sole revenue-generating occupation. On one occasion, the offices of DNER were subject to a hostile entry by fishermen who brought sealed boxes of animals that had been turned back at the airport by Rangers, and who engaged in an emotional exchange with DNER personnel that escalated into a situation perceived as threatening on both sides. Other such exchanges took place in the DNER offices, through emails to DNER, in the venue of public meetings, in the public press, and through phone calls or via third party; all of which eventually served to estrange the two sides into a state of hostile non-communication.

In October of 2001, a group of ornamental fishermen, acting as the Association of Marine Life Fishermen of Puerto Rico brought suit against DNER in Mayaguez, seeking an injunction against the agency's ban of their activity, which resulted in a judicial order stipulating that DNER issue permits to Association members. The DNER responded with 12 permits in December of 2001 for the "Capture and Export of Marine Ornamental Organisms, containing conditions and authorizations that included a list of allowable species, catch limits and monthly data reporting requirements.

Meanwhile the fishermen had approached the court again, believing that the mandated interim period for issuing permits had passed with no actual permits being produced by DNER. The court formally requested an update from DNER on the status of the permits, to which no response was provided since the Justice Department attorneys responsible for the case had resigned following the fall elections. Believing the government to be in contempt, the Mayaguez court issued an order re-opening unrestricted collection activity. With permits and the judge's order in hand, the collectors resumed harvest and export between January and June of 2001.

Several good faith issues emerged from the permit language, however, of which the allowable species and quantities were the most contentious. Listing 28 finfish and 9 invertebrates, the permit roster of allowable take included only 12 of the 101 species that were exported during the previous three years, and which accounted for less than 3% of the revenue earned over that same period (E. Ojeda-Serrano, unpublished). Though no clear administrative origin has been identified for the permit list, personnel interviewed at DNER indicated that the criteria used for its development was the selection of species that, in their view, "could be harvested with minimal damage or impact to the environment".

The permits also stipulated a daily limit of four individuals per species, regarded by collectors as unrealistic both in terms of the

time frame and absolute amount. In other words, to fill a given order within the constraints of four-five day minimal holding times, the days of abundant catch (i.e. when conditions are conducive to success), would require harvest of greater numbers than the allowed four per day in order to compensate for days when collection was not possible. Furthermore, even if four individuals per day could be consistently collected over the four-five day holding times, the resulting 16-20 individuals per species was considered economically unfeasible for shipment. Finally, and with the intent of facilitating law enforcement, the permits required that fishermen provide DNER with 72 hours advance notice of their fishing activity, including identification of the proposed location; a requirement regarded by the fishermen as inconsistent with the realities of dynamic fishing conditions and the need to shift location as well as target species accordingly. In part due to these issues, compliance with the permits' statistical reporting requirement was virtually non-existent, with only one fisherman submitting two monthly reports to the DNER in the year 2001. In general, the collectors regarded the permit language and the issues described above as an attempted *de facto* continuance of the ban.

At some point over the January–June period of 2001, a newly appointed Justice Department attorney developed an argument for presentation to the court in Mayaguez, that the decision to re-open unrestricted collection activity was based on a moot issue, since the permits were in fact issued as requested and the government had not been in contempt of the court's order. Though the court eventually rejected this argument, the DNER Legal Affairs office anticipated a positive decision and notified the Ranger Corps that the permit conditions on species and numbers were to be enforced. Though the Rangers in Aguadilla were notified of the court's decision, the Rangers in San Juan were overlooked in this communication; resulting in the seizure of a shipment of organisms in June of 2001. Again, this event reinforced collectors' opinions that the DNER was operating in bad faith and in disregard for the law, further escalating the level of emotion and sense of threat on both sides, and contributing further to estrangement between the agency and collectors.

As part of the court's ruling on the re-opening of collection activities, continued collection was allowed "until administrative resolution, following public consultation supported by scientific evidence is presented for issuing permits". It should be noted that passage of the Regulations to the Fisheries Law would also supersede the court's order, and that language specifically addressing the allowable take of ornamentals is reportedly included in the current draft of the regulations.

The court order stipulated the following limits on allowable take for each permit.

- All species are allowable catch except "seahorses (*Hippocampus* spp.) and Butterfly Fish".
- The weekly quota for each fish species was set at 35 "except for the following species for which a higher weekly quota is allowed: royal grama 150/week, blue cromis 45/week, jewelfish 45/week, and green-banded goby 50/week and yellow head jawfish 50/week".
- A weekly total of 35 individuals per species is allowed for invertebrate organisms.
- The capture of anemones was prohibited, except for "Carpet anemones (*Stoichactis heliantus*) with a quota of 35/week, *Condylactis* (*Condylactis passiflora*) with a quota of 75/week, Curlique anemones (*Bartolomea annulata*) with a quota of 35/week, and Sea Mat Anemones with a quota of 35/week." [Scientific name spellings are quoted as presented in the court order.]

The order further authorized only three fishermen for the capture of invertebrates, and prohibited any capture on coral reefs or capture of any invertebrates protected under other regulations. Several fishermen have continued operations since 2001 under this court order, including four new permit holders authorized in 2001, though in an ongoing atmosphere of mutually hostile avoidance between fishermen and DNER.

Policy Enforcement Issues

Two primary issues can therefore be described, the first of which provides the immediate objective for the recently completed Phase I characterization study of this fishery (LeGore *et al.* in press).

Issue 1: The DNER lacks data on the subject resource, as well as basic understanding of the ornamental capture and export business, needed to evaluate the real impact of this activity, to make decisions on the wisest and sustainable use of this marine resource, and in general to develop effective management policy for this marine resource given to its care by law. Despite its lack of information, the DNER, believing that reef fish and invertebrate populations and their habitats were under significant threat from the ornamental trade, and acting within its understanding of existing law and fisheries management policy, prohibited the activity without the stakeholder consultation that might have led to greater acceptance of its actions by the affected groups, and leading to the second issue.

Issue 2: Trust and communication between the DNER and fishermen is at such a low state that the consultation and dialogue needed for effective policy will not take place without some practical remedy.

Conclusions: Future Policy Development and Redress of Issues

In the wake of the court decisions and the uncertain regulatory status of the ornamental fishery, DNER now seeks to address the first issue, specifically acquiring funding and preparing terms of reference for contracted technical assistance. Utilizing this technical assistance, collection of needed resource data and other information to resume regulation of the ornamental trade will take

place, and a significant gap in the understanding of how the trade operates will also be alleviated. These DNER actions have led to the initiation of a three-phased approach, with the following summary objectives.

- The Phase I objectives are to provide a characterization of the ornamental capture and export business based on secondary data sources and direct interview, and to prepare a sampling approach for data collection on populations of interest to the ornamental trade.
- The Phase II objective is to implement wild stock population census program, planned for a two-year period
- The Phase III objective is to develop recommendations to the DNER for management of the fishery resources of interest to the ornamental trade, for subsequent development of Department policy.

Though not a stated objective of the three-phased study, an expected outcome is that stake-holder consultation will lead to a rapprochement, sufficient for DNER and the ornamental fishers to engage in dialogue needed for the ongoing management of this resource. Case studies can be drawn from other areas having significant histories of ornamental collection, and where management policies have been successfully introduced based on participatory approaches, such as [McManus \(1995\)](#), [Ruffino \(1996\)](#), [Barber and Pratt \(1998\)](#), [LeGore et al. \(1998\)](#), [Isaac et al. \(1999\)](#), [Talaue-McManus et al. \(1999\)](#), [Berkes et al. \(2001\)](#), [Ruffino \(2002\)](#) and [Mahon et al. \(2003\)](#).

The Phase I activities were concluded in 2002, and major results described under separate title (LeGore et al., in press). Phase II activities will be initiated in 2004 and the policy formulation activities of Phase III in 2006.

Resumen

En años recientes, se ha llegado a percibir la captura de organismos marinos tropicales para el comercio de acuario como una actividad poco sostenible, pero a la vez, con potencial de rehabilitarla por medio del manejo del recurso y la certificación del producto para el consumidor. En el caso de Puerto Rico, la recolección de especies ornamentales ha existido durante décadas y ha sido poco regulada a causa de la débil ley sobre pesquerías existente desde la década de 1930. La *Ley 278 de las Industrias Pesqueras* de 1998 incluyó nuevas regulaciones para los organismos marinos ornamentales. Las regulaciones buscan resolver: (1) la falta de información en esta pesquería respecto al número de participantes, los métodos de captura y los volúmenes de exportación, y (2) la falta de consulta a pescadores por parte de las agencias reguladoras. La falta de información llevó a los reguladores a suponer que esta actividad tendría el peor impacto, por lo que clausuraron la actividad, produciéndose confrontaciones personales y procesos judiciales. Éstos últimos condujeron a la intervención de la pesquería por orden judicial. Para enderezar estas situaciones y para hacer regresar de nuevo la administración al ámbito de la ciencia y del orden público, los reguladores han iniciado un programa de tres fases: (1) inventariar el número de pescadores, los métodos y las exportaciones, (2) describir las poblaciones y biología de las especies comerciales, y (3) proponer estrategias apropiadas para el manejo de esta industria pesquera. Este artículo describe la primera fase de este programa.

Palabras clave: Pesquería de ornamentales, manejo de pesquerías, pesquerías del Caribe, política regulatoria, pesquería sostenible, Puerto Rico.

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