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OA/ID Number: 29173
Folder ID Number: 29173-010

Folder Title:
Turtle Excluder Devices (1990) [4]:Petition by Assoc. for Rational Environmental Alternatives

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PETITION
TO THE FISH AND WILDLIFE SERVICE,
DEPARTMENT OF THE INTERIOR, AND TO THE
NATIONAL MARINE FISHERIES SERVICE,
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION,
DEPARTMENT OF COMMERCE,
FOR A TRADE EXEMPTION FOR MARICULTURED
GREEN SEA TURTLE PRODUCTS

SUBMITTED BY
THE ASSOCIATION FOR RATIONAL ENVIRONMENTAL ALTERNATIVES
AND PACIFIC LEGAL FOUNDATION

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION.....	1
IDENTITY OF PETITIONERS.....	1
REGULATIONS AT ISSUE.....	2
HISTORY OF THE PREVIOUS DECISION.....	2
I. THE POLICY BEHIND THE PREVIOUS DECISION IS INCORRECT, AND HAS SUBSEQUENTLY BEEN REJECTED BY THE FISH AND WILDLIFE SERVICE.....	4
A. High Market Demand for Turtle Products Is a Historical Fact.....	5
B. The Prohibition of Trade in Turtle Products Is an Inadequate Means of Assuring the Species' Survival.....	7
1. Prohibition Has Failed to Prevent Worldwide Growth in the Trade of Turtle Products.....	7
2. A Trade Ban Cannot Stop the Continuing Loss of Turtle Nesting Beaches.....	11
C. The Fish and Wildlife Service Has Rejected the "Stimulation of Demand" Approach in Numerous Subsequent Decisions.....	13
II. CONGRESS ITSELF HAS DETERMINED THAT AQUACULTURE IS NECESSARY FOR THE CONSERVATION OF NATURAL RESOURCES....	20
III. NONE OF THE OTHER FACTORS IDENTIFIED BY THE AGENCIES JUSTIFIES A TRADE BAN ON MARICULTURED TURTLE PRODUCTS.....	22
A. As Demonstrated by Subsequent Decisions, an Exemption for Such Products Is Enforceable.....	23
B. The Scientific Research Made Possible by Captive Breeding May Be Essential to the Survival of Wild Turtle Stocks.....	25
C. The Cayman Farm Has Succeeded in the Captive Breeding of Green Sea Turtles.....	28
CONCLUSION.....	30

INTRODUCTION

In 1978, the Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) determined that the green sea turtle is a threatened species under the Endangered Species Act, 16 U.S.C. §§ 1531, et seq. 43 Fed. Reg. 32,800 (1978). The agencies considered and rejected a proposal to exempt maricultured (i.e., captive-bred) turtles from their ensuing prohibition on commerce in the species. Id. at 32,804 cols. 2-3. The Association for Rational Environmental Alternatives (AREA) and Pacific Legal Foundation (PLF) respectfully request that FWS and NMFS reconsider the issue of maricultured sea turtles. The policies underlying the agencies' 1978 decision have subsequently been rejected by both FWS and Congress. More importantly, the agencies' approach of protecting the sea turtle by outlawing its commercial use is inadequate. Demand for turtle products continues to grow and to deplete wild turtle stocks. That demand can best be dealt with by the creation of captive-bred turtles which would satisfy it while simultaneously relieving commercial pressure on wild populations. A mariculture exemption, in short, is necessary for the continuation of the species.

IDENTITY OF PETITIONERS

AREA is a nonprofit organization engaged in evaluating and developing nongovernmental solutions to urban and environmental problems. AREA was founded in 1974, and is

organized as a tax-exempt corporation under the laws of the state of Texas. AREA publishes a quarterly newsletter, Environmental Alternatives, and has approximately 150 members in 30 states, most of whom are professionally involved in urban and environmental issues.

PLF is a nonprofit, public interest legal organization, founded in 1973, with over 14,000 contributors and supporters nationwide. PLF has been involved in a wide range of environmental issues, and has generally advocated that decisions concerning public resources be based on a consideration of all relevant factors. In the area of endangered species, PLF has participated in litigation involving the gray whale, the tan riffle shell, the green pitcher plant, and the El Segundo blue butterfly.

REGULATIONS AT ISSUE

This petition is filed pursuant to 5 U.S.C. § 553(e), 50 C.F.R. § 424.14 (1980), and 46 Fed. Reg. 47,784 (1981) (to be codified in 43 C.F.R. § 14.2). The regulations governing the green sea turtle (Chelonia mydas) are contained in 50 C.F.R. Part 17 and Parts 222 and 227 (1980). A mariculture exemption could be implemented by means of a permit provision (e.g., 50 C.F.R. § 17.32) or a special rule (e.g., 50 C.F.R. § 17.42), similar to that proposed by the agencies in 1975. See 40 Fed. Reg. 21,977, 21,985 (1975).

HISTORY OF THE PREVIOUS DECISION

The original proposals to list the green turtle were published by FWS and NMFS in the Federal Register in May, 1975.

FWS, 40 Fed. Reg. 21,974 (1975); NMFS, id. at 21,982. Both agencies proposed to exempt mariculture operations from the trade prohibitions which would follow such a listing, under a permit program which would involve recordkeeping and product marking by such operations. 40 Fed. Reg. 21,977, 21,985. On July 28, 1978, the agencies published their final decision listing the green turtle as threatened, with the exception of the Florida and Mexican Pacific coast populations which were found to be endangered. 43 Fed. Reg. 32,800. However, the agencies rejected the mariculture exemption which they had previously proposed. Id. at 32,804. In August, 1978, the Cayman Turtle Farm, which is engaged in the captive breeding of green turtles, requested reconsideration of the mariculture issue, and in September, 1978, the Farm filed suit challenging the decision. In a Decision Memorandum issued on December 5, 1978, the agencies restated their rejection of the mariculture exemption. The decision was judicially upheld in 1979, in Cayman Turtle Farm v. Andrus, 478 F. Supp. 125 (D.D.C. 1979), aff'd mem., No. 79-2031 (D.C. Cir. Dec. 12, 1980).

While the District Court upheld the administrative decision, it in no way suggested that the rejection of a mariculture exemption was legally mandated. (That rejection was, in fact, seriously questioned by one of the circuit court judges. See Page Nos. 13-14 infra.) The District Court defined the central issue as

"the effect of a mariculture exemption for captive sea turtles upon the preservation of wild sea turtles." 478 F. Supp. at 131.

Given the technical nature of this issue, it was a question within the agency's special expertise and discretion, and a reviewing court would be "particularly deferential" towards any exercise of this discretion. Id. As is shown below, since its 1978 decision, FWS has in its discretion reversed its position on the basic issue underlying this decision.

I

THE POLICY BEHIND THE PREVIOUS DECISION
IS INCORRECT, AND HAS SUBSEQUENTLY BEEN REJECTED
BY THE FISH AND WILDLIFE SERVICE

The agencies gave four reasons for their decision:

1. a mariculture exemption would lead to increased taking of wild turtles by stimulating market demand for turtle products;
2. maricultured turtle products cannot be distinguished from wild turtle products, so that it would be difficult to enforce a ban on trade in the latter under a mariculture exemption;
3. the scientific knowledge gained from mariculture would not offset the negative impact on wild turtle stocks; and
4. the Cayman Turtle Farm had not achieved a closed-cycle breeding operation. 478 F. Supp. at 132; see also Decision Memorandum at 2.

The basic issue was that of market demand and supply: would mariculture stimulate demand for turtle products and thereby increase commercial pressure on wild stocks, or would

it reduce this pressure by creating captive-bred sources of such products to satisfy this demand? As is shown below, it is the latter alternative which is supported by the history of the turtle and by the economics of human activity. Moreover, it is the latter alternative which Congress and FWS have chosen in recent decisions concerning scarce wildlife resources.

Subsequent decisions by FWS have also made it clear that, through documentation and product marking, legally traded wildlife products can be differentiated from those derived from illegal trade, thus allowing the continued enforcement of prohibitions on the latter. Similarly, as will be shown, FWS has repeatedly emphasized the value of captive breeding projects, both because of the scientific research which they make possible and because the establishment of captive gene pools may prove essential to replenishing wild stocks.

The issue of the Cayman Turtle Farm's current status is separate and distinct from the general question of a mariculture exemption. In fact, as shown at Page Nos. 28-30, infra, the Farm has achieved closed-cycle operation. Its development of a captive breeding program for green turtles makes the case for a mariculture exemption even more compelling.

A. High Market Demand for Turtle Products Is a Historical Fact

Demand for turtle products is not something that may be created by mariculture. It already exists, and it has probably

existed for as long as man has gathered food. In his Handbook of Turtles (1952), Archie Carr states:

"There can be little doubt that people have been eating turtles pretty steadily for as long as they have had the wits to get them out of their shells; and they probably had been eating turtle eggs long before that." Id. at 26.

Over 1,900 years ago, the Roman naturalist Pliny described the use of turtle parts for food, shelter, and jewelry. Brongersma, Turtle Farming and Ranching, 1980 Brit. Herpetological Soc'y Bull. No. 2 at 15. According to TRAFFIC, "[t]heir use as food probably dates back to prehistoric times." TRAFFIC, Sea Turtles: Animals of Divisible Parts--International Trade in Sea Turtle Products 1 (2d ed. 1979) (hereinafter TRAFFIC Study).¹

This historical demand for turtles owed its existence not to the marketing efforts of maricultural enterprises, but to the value of the species itself. As FWS and NMFS state, the green sea turtle is "'probably the most valuable reptile in the world.' [Footnote omitted.] Because of the great value of the green turtle its numbers have been seriously depleted by centuries of overconsumption." Decision Memorandum at 3.

The question thus is not whether man's demand for turtle products will be stimulated by a trading exemption for maricultured turtles. That demand is a historical fact, it continues to grow, and it has led to the current jeopardized

¹ TRAFFIC is the Trade Records Analysis for Flora and Fauna in Commerce Group of the Survival Service Commission of the International Union for Conservation of Nature and Natural Resources (IUCN/SSC).

situation of the green turtle in the wild. The question is how that demand can best be dealt with so as to assure the continued existence of the species.

B. The Prohibition of Trade in Turtle Products Is an Inadequate Means of Assuring the Species' Survival

1. Prohibition Has Failed to Prevent Worldwide Growth in the Trade of Turtle Products

The agencies have chosen to deal with market demand for turtle products by relying solely upon the prohibition of trade. Such a strategy does not have encouraging prospects for success. Legal barriers often fail in the face of high profits available on the black market. In describing Florida's early attempts to protect its loggerhead turtle rookery, for example, Jack Rudloe writes that "[a]s long as the black market paid top dollar for turtle eggs, the poachers took the risk." J. Rudloe, Time of the Turtle 43 (1979). More generally, according to the former Secretary-General of the Convention on International Trade in Endangered Species (CITES), "the illegal trade in furs, trophies and protected animals now has higher profit margins than the drug traffic." Sand, Combating the Trade in Endangered Species Through CITES, 31 Unasylva 32, 32-33 (1979) (citation

omitted). The impact of these high profits in increasing black market activity has been documented in numerous areas.²

FWS and NMFS themselves admit that

"[l]egal restrictions on the import of wildlife and protected species products have not cut off the illegal flow into the U.S. of banned turtle products; in fact, there are signs that the volume of this flow has increased. [Footnote omitted.] NMFS

² With respect to the elephant ivory trade, for example, the Third Conference of the Parties to CITES concluded that "due to the increasing monetary value of ivory, illegal activities have reached a significant level" 46 Fed. Reg. 37,060 col. 1 (1981).

It should be noted that the very creation of a black market in wildlife by a trade ban has its own adverse impact on society:

"Studies of underworld activities in other areas of trade allow some specific speculation about the costs to society of forcing skins and game products into a black market. Firstly, the black market gives the criminal, whether a native poacher in the field or a dealer in skins in the city, the same kind of protection that a tariff gives a domestic monopoly. It guarantees the absence of competition from people who do not want to be criminals, giving an advantage to those with a skill for evading the law. Secondly, members of the police force are made vulnerable to bribery and become potential accomplices in further limiting competition. [Footnote omitted]. If a new competitor enters the black market, the criminal can inform the policing agency to have the potential competitor prosecuted under the law. Thirdly, a large number of producers and consumers, not ordinarily criminals, are taught contempt for the law by being obliged to trade with criminals." Davis, Hanke, & Mitchell, Conventional and Unconventional Approaches to Wildlife Exploitation, Transactions of the Thirty-Eighth N. American Wildlife & Natural Resources Conference 75, 78-79 (1973).

enforcement officials have uncovered illegal schemes to distribute endangered sea turtles and sea turtle products nationwide. These officials believe the schemes uncovered represent only a fraction of those in existence. ... Enforcement officials ... are convinced that illegal traffic in wild turtle products continues on a large scale, both here and abroad. [Footnote omitted.] In short, despite existing restrictions, there is still a market in this country for illegal sea turtle products." Decision Memorandum at 16.

Moreover, the migratory nature of turtles, with widely separated nesting beaches and foraging grounds, makes the issue of their protection an international one. At the international level, however, illegal trade continues despite CITES.³ While international trade figures for turtle products are often incomplete, the continuing growth of this trade is evident from the TRAFFIC Study. For example, despite the fact that CITES took effect in 1975, world exports of raw tortoiseshell increased by

³ CITES lists threatened and potentially threatened species under two categories. Appendix I contains species which are "threatened with extinction." Art. II.1. Commercial trade between party nations in Appendix I species is generally prohibited. See Art. III.3(c). Appendix II contains species which may become threatened unless trade in them is regulated. Art. II.2. Commercial trade in Appendix II species is allowed under specified conditions. See Art. IV.

Unlike the turtle regulations issued by FWS and NMFS, CITES provides an exception for captive-bred specimens of Appendix I species. Such specimens may be commercially traded as if they were on Appendix II. Art. VII.4. Party nations are not, however, obligated to allow commercial trade in such captive-bred wildlife. See Art. XIV.1.

over 60% from 1976 to 1978. TRAFFIC Study, Table 1 at 7.⁴ The turtle skin and leather trade, for which the green sea turtle is a main source, has similarly experienced recent growth. Id. at 38. In Europe, restaurant trade in green sea turtle meat is also increasing. Id. at 45.

This trade is legally carried on not only by nonparty nations, but by parties which have taken reservations on one or more listed species of turtle and are thus not bound by the trade ban in CITES. Included in the latter group are such major participants in the turtle trade as France, Italy, and Japan. TRAFFIC states that "[u]ntil major consumers ... ratify and party states remove their reservations on turtles, the international market will always remain open." TRAFFIC Study at 63.

Even ratification of CITES without reservation, however, does not assure that a country will cease trading in these products. According to TRAFFIC, "none of the exporting countries which are parties to CITES have reservations." TRAFFIC Study at 58. They carry on their trading activities nonetheless. Laws go unenforced,⁵ or turtle stocks are classified as "pre-Convention"

⁴ Tortoiseshell is derived mainly from the hawksbill sea turtle (TRAFFIC Study at 4), despite the fact that this species has been listed in Appendix I of CITES since it took effect. Id. at 57. The hawksbill, the olive ridley, and the green sea turtle constitute the vast bulk of international trade in shell, leather, and meat. TRAFFIC Study at i. The latter two species were transferred to Appendix I in 1976. Id. at 57-58.

⁵ "Many countries have legislation covering marine turtles ... but data from official trade statistics and other sources show that domestic or CITES regulations are being enforced in very few countries." TRAFFIC Study at 58.

and therefore not subject to CITES. Id. In some cases "sea turtle products are exported disguised as other species" TRAFFIC, Memorandum--Sea Turtle Trade Update at 3 (Feb. 12, 1981).

The TRAFFIC Study concludes that, despite the lack of data,

"the statistics ... point to an ever increasing quantity of turtle products on the world market at the same time as scientists report ever declining numbers in most turtle populations. This suggests that the turtle catch is, in fact, increasing in many areas." Id. at 64.

The failure of trade prohibition as a sole means of assuring the continued existence of these species is apparent. We do not suggest that prohibition be abandoned, however. Its continuation with respect to wild stocks may well be essential. But it is clear that demand for turtle products continues to grow and that this demand is being satisfied in increasing quantities. It is only by allowing trade in maricultured turtles that this demand can be met without the total depletion of wild turtle stocks.

2. A Trade Ban Cannot Stop the Continuing Loss of Turtle Nesting Beaches

FWS and NMFS identified a second major reason for the decline of wild sea turtle stocks--the continuing loss of nesting beaches due to human encroachment and development. 43 Fed. Reg. 32,803 col. 2. Prohibitions on trade in turtle products do nothing to stem this loss. In the United States, the Endangered Species Act might seem to provide a possibility of protecting such areas through their designation as critical habitats. The green turtle, however, has few known nesting beaches remaining in

the United States and has received no critical habitat designations. See 50 C.F.R. § 17.11 Table (1980).

Internationally, the issue of habitat loss is not even addressed by CITES. Given the inability of that convention to stem the growing turtle trade between nations, it is unlikely that this problem can be effectively dealt with by international agreements. Unlike turtle trade, the preservation of nesting beaches is basically an internal, rather than international, affair.

Thus, even if trade could be effectively prohibited, it is likely that wild turtle stocks would continue to decline due to the progressive loss of nesting areas.⁶ As is shown at Page Nos. 26-28 infra, however, the genetic stock established by commercial mariculture operations might well be essential to stopping this decline.

⁶ In fact, a number of wildlife experts have begun to point out that trade prohibitions will often accelerate this process. When trade bans destroy the commercial value of wildlife, they remove a major incentive to preserve wildlife habitats. Those areas are then more quickly put to alternate uses which yield economic returns. Thus, while trade bans might theoretically reduce the threat of commercial exploitation,

"[t]hreats to a species which come from competing uses of its habitat are a different matter. Such threats can come from agriculture, forestry, intensive use of rangeland, urbanization, drainage, roads and other habitat changes." Davis, supra n.2, at 76.

After studying the increasingly precarious situation of wildlife preservation in Africa, these authors concluded that "[c]losure of [wildlife product] markets is the single action which is most likely to lead to the speedy elimination of African wildlife outside those parks and reserves which generate substantial revenues from tourism." Id. at 85. (Continued on page 13.)

C. The Fish and Wildlife Service Has Rejected the "Stimulation of Demand" Approach in Numerous Subsequent Decisions

In rejecting the proposed mariculture exemption, FWS and NMFS stated that, under such an exemption,

"increased worldwide demand for sea turtles and sea turtle products would be encouraged. This condition could lead to increased exploitation of wild stocks including the stimulation of poaching which would be inconsistent with our mandate under the act" 43 Fed. Reg. 32,804 col. 3.

The agencies rejected the possibility that maricultured turtles would act as a market substitute for wild turtles and thus relieve commercial pressure, both legal and illegal, on the latter. See Decision Memorandum at 2-11. This reasoning was questioned by one judge when the District of Columbia Circuit affirmed the decision in Cayman Turtle Farm v. Andrus:

"With respect to green sea turtles raised in a closed environment, given the fact that a very substantial demand for products of green sea turtles grew up based almost exclusively on such turtles captured in the wild and killed, the conclusion that a commercial farming operation enhances the propagation and survival of the species in the wild by lessening the demand upon wild stocks has, in my opinion, more support for it than the

⁶ (continued from previous page)

Norman Myers, the noted conservationist, has put it more bluntly:

"[T]he sooner Africans can enjoy gazelle goulash and wildebeest casserole, and the sooner the trade in zebra skins is regulated and expanded--rather than decried and suppressed--the sooner a more hopeful era will dawn for African animals." Myers, A Farewell to Africa, 11 Int'l Wildlife, Nov.-Dec. 1981 at 36.

contrary conclusion that the sale of products from such an operation increases the appetite and demand for such products so greatly that the threat or danger to the species in the wild is increased." Id., No. 79-2031 (D.C. Cir. 1981) (MacKinnon, J., concurring in an unpublished memorandum) (emphasis added).

In fact, in a number of actions by FWS following the 1978 decision, the agency totally reversed its approach. In February, 1979, only two months after the agencies issued their Decision Memorandum, FWS decided to support a proposal to change the listing of the American alligator under CITES so as to reopen commercial trade in that species. FWS, Endangered Species Convention: Status of Protected Native Species, 44 Fed Reg. 9,690, 9,692 col. 3 (Feb. 14, 1979). FWS rejected the claim that this new trade "would encourage illegal killing and smuggling of alligators." Id. at 9,693 col. 1. Rather, FWS concluded that "trade will flow through a legal outlet if one is provided." Id. at col. 2. According to the agency, such legalized trade might actually prevent the species' extinction. Id. at col. 3. This approach, of course, is directly contrary to the stimulation of demand rationale which FWS accepted in the turtle decision.

FWS took the same approach towards the reopening of international trade in Peale's peregrine falcon:

"The argument that the proposed transfer of Peale's peregrine [from Appendix I to Appendix II of CITES] would stimulate demand for the species ... does not take certain factors into account. The desirability for this species in falconry is already high" 44 Fed. Reg. 9,694 col. 1 (emphasis added).

That, of course, was precisely the case with turtle products when the agencies decided to close trade entirely; in their own words,

there was "a large and growing demand worldwide for wild sea turtle products." Decision Memorandum at 6.

As with the American alligator, the regulation of trade in Peale's peregrine, rather than its total prohibition, was found to be necessary to the species' survival; "it may become threatened with extinction unless trade is regulated."

44 Fed. Reg. 9,694 col. 2.

In October, 1979, FWS revised its own regulations to allow commercial foreign trade in American alligators, including those produced in Louisiana's alligator farm program. FWS, Final Rule, 44 Fed. Reg. 59,080, 59,081 col. 2 (1979). FWS stated that trade in these alligators would not stimulate demand for other endangered crocodilians; rather, it would lessen commercial pressure on those species:

"The Service hopes the availability of lawfully taken American alligators will result in less exploitation of other endangered crocodilians, particularly when a reliable long-term supply of American alligators is foreseeable." Id. at 59,082 col. 2.

The Endangered Species Scientific Authority (ESSA) agreed with FWS and determined that commercial export would not be detrimental to either the American alligator or to other crocodilian species. ESSA, Final Rule: Final 1979 Export Findings on the American Alligator, 44 Fed. Reg. 59,086 (1979).

ESSA cited the likelihood that

"[s]ome buyers would opt for a more accessible and steady supply of skins [of American alligators] than continue to depend on skins from endangered species which, by definition, are in limited supply. Alligators should be less expensive eventually and buyers would at

least have the opportunity to mute criticisms by dealing in a species whose status was secure." Id. at 59,093-94 (quoting from comments submitted by the State of Florida).⁷

Thus, "it is possible that access to alligators would reduce the demand for a supply of endangered crocodilian species." Id. at 59,094 col. 2 (emphasis added).

Less than a year earlier, however, the nearly identical argument of the Cayman Farm had been totally rejected.

The likelihood that legalized trade will reduce, rather than stimulate, commercial pressure on endangered species has been restated in decisions on other species. In its 1979 export findings on the bobcat, lynx, river otter, Alaskan brown bear, and Alaskan gray wolf, ESSA stated that

"the availability of relatively plentiful species may prevent switching by the trade to more endangered species." ESSA, Final Rule, 44 Fed. Reg. 55,540, 55,546 col. 2 (1979).

The obverse of this proposition is also true: by banning trade, commercial pressure on other stocks is increased. ESSA stated that

"the increasing demand for bobcat resulted to some degree from trade bans on many threatened populations of tropical spotted cats"
Id.⁸

Yet in their decision on turtles, the agencies contended that a ban on trade in captive-bred turtles would protect wild stocks.

⁷ As Davis, n.2, supra, notes: "It is likely that steady supplies of good quality game meat would competitively reduce the markets for illegal meat." Id. at 83.

⁸ Similarly, TRAFFIC points out that the ban on trade in crocodile leather stimulated the demand for turtle skin. TRAFFIC Study at 38.

As the above quote indicates, the likely result is precisely the opposite.

The stimulation of demand approach has been rejected in another context: the increasing recognition by FWS that wildlife must often be given some economic value in order to encourage its conservation. In 1980, for example, FWS proposed to allow the importation of leopard sport hunting trophies from Sub-Saharan Africa. FWS cited the statement of the Kenyan Ministry of Tourism and Wildlife that "no one is going to conserve and manage a resource that is not going to provide some financial return to them." FWS, Proposed Rulemaking, 45 Fed. Reg. 19,007, 19,010 col. 2 (1980). The Director of Wildlife, National Parks and Tourism for Botswana similarly stated that to "keep [wildlife] conserved without utilizing it would really be destructive in the long-term to its populations." Id. at col. 3. FWS concluded that

"there may be cases in which permitting the importation of leopard trophies taken under a strictly controlled management program will benefit the species by giving it an economic value which would in turn stimulate conservation measures." Id.

In 1981, FWS reopened the comment period on this proposal, citing new evidence to support the idea that "the ban [on importation of trophies] runs counter to the concept of giving the leopard monetary value that will help to justify its continued existence

in Africa." EWS, Reopening of Comment Period, 46 Fed. Reg. 44,960, 44,961 col. 2 (1981).⁹

This concept is perhaps most apparent in recent American support for proposals to allow trade under CITES for wildlife reared in ranching operations. Ranching differs from captive breeding in its greater impact on wild populations. In captive breeding, a breeding stock is established using eggs and/or animals from the wild; after that, the operation basically requires no further input from the wild, with the possible exception of minor takings to prevent inbreeding. Ranching operations, on the other hand, involve no breeding stocks. Young specimens are taken from the wild, reared in captivity, and then marketed. Thus ranching operations continually take stock from the wild, and their reliance on wild populations is far greater

⁹ The conservationist Norman Myers came to the same conclusion:

"I am convinced, after traveling to more than 40 countries across the continent, that for much of emergent Africa the only long-term hope for the big mammals of the savannahs depends in part on a radical new line of thought: you either use wildlife or lose it." Myers, supra n.6, at 36.

As several commentators have pointed out, the real issue is not whether to use wildlife, but how to use it. It is not commercial trade per se which is responsible for the depletion of wildlife stocks, but the fact that such stocks are treated as a common (i.e., publicly owned) resource. This undermines the incentive of private users to conserve it and leads to its overutilization. "The problems of overexploitation and extinction of wildlife appear to derive consistently from their being treated as a common property resource." Smith, Resolving the Tragedy of the Commons by Creating Private Property Rights in Wildlife, 1 Cato J. 439, 467 (1981). "The logic of the commons worked its inexorable tragedy for the green turtle long before the development of any modern commercial trade in sea turtles" Id. at 462.

than the essentially one-time impact of captive breeding operations.¹⁰

At its 1981 New Delhi meeting, however, the CITES Conference resolved to allow regulated trade in ranched populations of Appendix I species. See FWS, Notice, 46 Fed. Reg. 45,821, 45,822-23 (1981). The United States not only supported this resolution, but successfully urged that the implementing criteria "should not be delayed for another two years" but rather should be "immediately develop[ed]." R. Lambertson, Associate Director, FWS, Report of the U.S. Delegation 4 (1981). The United States "stress[ed] that the Convention is a trade Convention" and rejected the "tendency by some Parties to view CITES as a document which was designed to severely limit or eventually stop all trade." Id. at 2 (emphasis added), 3.

In contrast, the 1978 turtle decision cited the possibility that the Cayman Farm's captive breeding operation would encourage turtle ranching and thus allegedly further deplete wild turtle stocks. Decision Memorandum at 8. The continuation of this ban on trading in captive-bred turtles is

¹⁰ It should be noted, however, that even the immediate impact of ranching in depleting wild stocks may appear to be greater than it actually is. In the wild, survival rates for eggs and newborn are often extremely low. See n.15, infra. Since these rates are usually improved on ranches, such operations can produce a large number of adult specimens with only a very small depletion of the wild population. If the ranch returns only a fraction of its output to the wild, this may well compensate for any depletion caused by its operations. On the other hand, periodic returns to the wild by a captive breeding operation could easily not only offset its one-time taking from the wild, but actually cause a substantial direct increase in the wild stock. The Cayman Turtle Farm currently conducts such a hatchling release program. Attachment at 5-6, Cayman Farm Answer III.

contradicted by both the United States' support for ranching and by the adoption of the ranching proposal by the international community. The ban should be rescinded for this reason alone.

II

CONGRESS ITSELF HAS DETERMINED THAT AQUACULTURE IS NECESSARY FOR THE CONSERVATION OF NATURAL RESOURCES

Congress has rejected the approach taken by FWS and NMFS in banning maricultured turtle trade. In the National Aquaculture Act of 1980, Congress declared the following:

"(b) Purpose.--It is the purpose of this chapter to promote aquaculture in the United States by--

(1) declaring a national aquaculture policy;

(2) establishing and implementing a national aquaculture development plan; and

(3) encouraging aquaculture activities and programs in both the public and private sectors of the economy;

that will result in increased aquacultural production, the coordination of domestic aquaculture efforts, the conservation and enhancement of aquatic resources, the creation of new industries and job opportunities, and other national benefits.

"(c) Policy.--Congress declares that aquaculture has the potential for augmenting existing commercial and recreational fisheries and for producing other renewable resources, thereby assisting the United States in meeting its future food needs and contributing to the solution of world resource problems. It is, therefore, in the national interest, and it is the national policy, to encourage the development of

aquaculture in the United States."
16 U.S.C. § 2801.¹¹

Congress directed the Secretaries of Interior, Agriculture, and Commerce to establish a national aquaculture development plan by mid-1982 (16 U.S.C. § 2803), to provide educational and technical assistance to interested parties (16 U.S.C. § 2804(a)(1)), and to "encourage the implementation of aquacultural technology" Id. at § 2804(a)(3).

Congress identified, as one of its reasons for the Act, the current overutilization of aquatic stocks. 16 U.S.C. § 2801(a)(1). In viewing aquaculture as a solution to this problem, Congress determined that aquaculture would not worsen the situation by stimulating demand; instead, the production of new aquatic stocks would lead to "the conservation and enhancement of aquatic resources." 16 U.S.C. § 2801(b).

The reasoning of FWS and NMFS in rejecting a mariculture exemption for turtles is directly at odds with this congressional policy. Moreover, the inclusion of endangered species within the Act is made explicit in its legislative history. The Senate report states:

"The committees intend that the Secretaries shall determine which species have significant potential for culturing without regard to their possible threatened or endangered status in the wild. In the case of any species identified by the Secretaries as having a significant potential for culturing, but which species is threatened or endangered

¹¹ The term "aquaculture" is defined as "the propagation and rearing of aquatic species in controlled or selected environments, including, but not limited to, ocean ranching" 16 U.S.C. § 2802(1). It thus encompasses closed-cycle mariculture.

in the wild, the committees intend that the Secretaries include in the National Aquaculture Development Plan their recommendations [sic] on the protection of the wild populations of such species from any adverse effects of aquaculture development of the species, as well as considering the possibility of wild population enhancement through aquaculture." S. Rep. No. 660, 96th Cong., 2d Sess. 9 (1980) (emphasis added).

In assessing the history of aquaculture, Congress found that

"[d]espite its potential, the development of aquaculture in the United States has been inhibited by many economic, legal, and production factors" 16 U.S.C. § 2801(a)(7).

The 1978 decision of FWS and NMFS created yet another legal impediment to aquaculture. Both agencies have it within their power to remove this obstacle, and there is no reason why they should not do so.

III

NONE OF THE OTHER FACTORS IDENTIFIED BY THE AGENCIES JUSTIFIES A TRADE BAN ON MARICULTURED TURTLE PRODUCTS

The agencies identified two other general reasons for their decision--the alleged difficulty of monitoring and enforcing a mariculture exemption, and the alleged lack of scientific benefits from mariculture operations. As is shown below, these explanations should be reconsidered--they are justified neither on their own terms nor in light of subsequent federal actions.

A. As Demonstrated by Subsequent Decisions, an Exemption for Such Products Is Enforceable

NMFS and FWS determined that they could neither enforce a mariculture exemption nor monitor mariculture operations to assure that they engage in captive breeding. Decision Memorandum at 11-20. Neither the conclusions nor the approach of the agencies was reasonable. There are physical differences between farmed and wild turtles,¹² and existing chemical tests can distinguish between some, and possibly all, farmed and wild turtle products.¹³ Yet the agencies claimed that there was no practicable method of differentiating between the two. Decision Memorandum at 13-15. Documentation could be required to verify the origin of turtle products, but the agencies claimed that such documents could be counterfeited. Decision Memorandum at 13. The Cayman Islands currently certify the Cayman Farm's products

¹² As the TRAFFIC Study states:

"Unlike their wild counterparts, farmed turtles have a virtually flawless and barnacle-free shell and bear fewer scars and lesions on their flippers, which greatly enhances their value. In addition, the high protein diet fed to the farmed green turtles produces scutes much thicker than those found on wild green turtles." TRAFFIC Study at 1.

¹³ The shell of wild and Cayman Farm turtles can be chemically distinguished on the basis of differing amino acid composition due to the higher protein diet of the latter. Hendrickson, Wood & Young, Lysine:Histidine Ratios in Marine Turtle Shells, 57B Comp. Biochem. Physiol. 285 (1977). Work with other aquatic species has demonstrated that aquaculture diets can produce detectable differences in a specimen's tissue composition. E.g., Sandifer & Joseph, Growth Responses and Fatty Acid Composition of Juvenile Prawns Fed a Prepared Ration Augmented with Shrimp Head Oil, 8 Aquaculture 129 (1976). If necessary, a farm diet could be supplemented with distinctive chemical markers to facilitate identification of farm products.

as captive-bred, but the agencies questioned the validity of this or any future certification (id. at 18-19) and claimed that a mariculture exemption "could only be assured by on-site monitoring." Id. at 20. The Cayman Farm has offered to subsidize such monitoring by United States officials (id. at 19), but the agencies stated that they could not undertake such a program. Id. at 19-20. As shown below, the agencies' approach of postulating one worst case after another is unprecedented.

In allowing trade in other listed species, it has been the consistent position of the United States that, absent evidence to the contrary, it will assume "that CITES parties will live up to their obligations under the Treaty" and "that CITES restrictions ... will be enforced." FWS, Proposed Rule on the African Elephant, 46 Fed. Reg. 37,059, 37,061 col. 1 (1981); ESSA, Final 1979 Export Findings on the American Alligator, 44 Fed. Reg. 59,086, 59,092 col. 3 (1979). In the case of elephant ivory, it is proposed to require specific documentation for raw ivory and to limit worked ivory imports to CITES parties. 46 Fed. Reg. 37,060-61. When FWS reopened foreign trade in legally taken American alligators, it devised a closed permit system for traders and fabricators to insure against trade in illegal hides. 44 Fed. Reg. 59,082 col. 1. For leopard sport trophies, the agency has proposed to require both export and import permits. 45 Fed. Reg. 19,008 col. 1. These are only some of the alternatives available to guard against illegal trade. At the 1981 CITES Conference, moreover, the parties resolved to take

a number of security measures to reduce the possibility of forged documentation. Conference Resolution 3.7 (1981).

We submit that FWS and NMFS have failed to demonstrate that turtles are so different from other wildlife that their products cannot be traded under any circumstances at all. Were the agencies to apply their approach in the turtle case to all listed species, there would be absolutely no trade in any such wildlife whatsoever. Such a policy places the United States in the contradictory position of advocating ranching proposals at the international level while refusing to allow either captive-bred or ranched products into this country. The decision of FWS and NMFS must be reconsidered.

B. The Scientific Research Made Possible by Captive Breeding May Be Essential to the Survival of Wild Turtle Stocks

Under 16 U.S.C. § 1539(a), actions which are otherwise prohibited under the Endangered Species Act may be permitted "for scientific purposes or to enhance the propagation or survival of the affected species." The Cayman Farm submitted over 60 research projects which it had supported at numerous universities and institutes throughout the world. Cayman Turtle Farm, Comments on Reconsideration, Exhibit E (Sept. 20, 1978). Sixteen scientists sent letters describing the value of the research made possible by the Farm and the scientific importance of the Farm's activities. Id. at Exhibit O. Yet FWS and NMFS concluded that this research "may constitute only a minimal contribution to the conservation of the sea turtle." Cayman Turtle Farm, 487 F. Supp. at 133. Their basic reason was the fact that, while

many scientists support the value of the Farm's scientific advances, "a greater number of notable scientists oppose the mariculture exemption." Decision Memorandum at 22. This majority vote approach misconstrues the purpose of Section 1539(a). Scientific progress is rarely the result of consensus, and Congress did not intend that administrative determinations under this section be made by means of a head count.

The agencies also totally ignored the value of the Cayman Farm in establishing a captive turtle stock which might well be essential in replenishing wild populations in the future. FWS has consistently stressed the importance of such captive stocks elsewhere. When the agency proposed rules for captive self-sustaining populations in 1979, it stated:

"Captive propagation and other uses of captive wildlife can benefit wild populations, which are of primary concern to the Service, by:

"(1) Increasing the likelihood that captive breeding populations will be established as a source of known genetic stock to bolster or reestablish populations in the wild;

"(2) Reducing the need to take stock from the wild for scientific or other purposes; and

"(3) Providing opportunities for research that can lead to improved management of wild populations." FWS, Proposed Rulemaking: Captive Wildlife Regulation, 44 Fed. Reg. 30,044, 30,044-45 (1979).

Similarly, when FWS recently approved the import of Mexican peregrine falcons for breeding purposes, it stated that "[f]rom a very practical standpoint, we believe that breeding projects ... can buy precious time with regard to helping to solve some basic root problems." FWS, Notice: Reply to

Objections to Permit Issuance, 46 Fed. Reg. 51,040, 51,042 col. 1 (1981). One specific purpose of the peregrine project "is to establish the gene pool in captivity to offset future decline if it occurs." Id. at col. 2. It is the agency's position, "based on previous experience," that such captive gene pools should be established "prior to decline" rather than later. Id. at col. 3.¹⁴ The common sense of that position is as applicable to turtles as it is to peregrines.

The agencies argued in court that without a mariculture exemption, research in turtle propagation would continue at NMFS' Galveston "headstart" project. 478 F. Supp. at 133. That project, however, involves the Atlantic ridley turtle, not the green turtle. Decision Memorandum at 22. More importantly, FWS has elsewhere stated that "it is better management not to rely entirely on one facility" for breeding. 46 Fed. Reg. 51,042 col. 3. In the agency's words, the use of several projects

"lessens the chance of the destruction of one large breeding project through calamity, and encourages the investigation of various breeding techniques, thereby increasing chances for successful and productive breeding operations. In fact, we are favorably disposed toward the idea and establishment of private funding of projects which contribute to the survival of endangered species." Id.

¹⁴ FWS has taken this same position with respect to endangered plants as well. In its 1977 rulemaking on the subject, FWS stated that cultivation activities not only "relieve collecting pressure on wild populations," but also "serve as a reservoir for the reintroduction of such species into the wild, and encourage the survival of the germplasm of the species at least in cultivation." FWS, Final Rulemaking, 42 Fed. Reg. 32,374, 32,375 col. 2 (1977).

Research on turtle propagation, and the establishment of a gene pool in captivity, is even more essential in light of the continuing loss of nesting beaches, a problem which the agencies' current approach does little to alleviate. See Page Nos. 11-12, supra. These efforts will be restricted as long as the agencies' decision remains in effect.

C. The Cayman Farm Has Succeeded in the Captive Breeding of Green Sea Turtles

Even if no mariculture farm had yet successfully produced captive-bred turtles; a mariculture exemption would still be warranted. The existing ban stands as a legal obstacle to any attempts at commercial mariculture in this country, and it closes the American market to operations to which it may well be essential. Congress itself noted the inhibiting effect of such laws in the National Aquaculture Act. See 16 U.S.C. § 2801(a)(7).

The Cayman Turtle Farm, however, has succeeded in producing captive-bred turtles and in achieving the closed-cycle status which FWS and NMFS set out in their decision. The Farm originally established its breeding stock from approximately 220 wild turtles which were brought to the Farm and from wild eggs which were hatched on the Farm. Decision Memorandum at 25. These takings from the wild were made with the permission of the countries of origin. However, the Farm has taken no turtles from the wild since September, 1977, and it has taken no turtle eggs from the wild since March, 1978. Attachment at 4, Cayman Farm Answers I.a and b.

With these wild turtles and eggs as its source, the Farm has produced over 345,000 hatchlings since 1973. Attachment

at 4-5. (This is the sum of the Cayman Farm figures in Answers II.b, c, and d. It does not include the results of the 1981 breeding season.)

Under the definition of "bred in captivity" which was adopted by the 1979 CITES Conference, captive-bred specimens are defined as "offspring, including eggs, born or otherwise reproduced in a controlled environment ... of parents that mated or otherwise transferred gametes in a controlled environment." Second Meeting of the Conference of the Parties, Conference Resolution 2.12(b) (1979). Approximately 75,000 of the hatchlings produced by the Farm through 1980 satisfy this definition. These include: (1) 73,137 turtles produced by wild turtles which mated on the Farm and (2) 1,558 turtles produced by the offspring of the wild eggs which were hatched on the Farm. Attachment at 5, Cayman Farm Answers II.b and c for T1 and E2 turtles.

The 1979 CITES resolution also requires that the breeding stock meet certain other conditions, including the demonstrated capability "of reliably producing second-generation offspring in a controlled environment." Conference Resolution 2.12(b)(iii). It is our position that the Cayman Farm's production of the 1,558 offspring from wild egg hatchlings

satisfies this requirement.¹⁵ It is questionable, however, whether this requirement even applies to breeding stocks established before the date of the resolution. In any case, Cayman Farm products are currently accepted by a number of nations as being derived from captive-bred turtles.

The Cayman Turtle Farm has produced a stock of farm-bred turtles capable of relieving the growing commercial pressure on wild stocks. The results of the Farm's breeding program make the case for a mariculture exemption even more compelling.

CONCLUSION

In prohibiting trade in maricultured green sea turtles, FWS and NMFS rejected the possibility that farm-bred stocks would relieve commercial pressure on wild turtle populations. But wild stocks continue to be depleted as worldwide demand for turtle products grows. The approach taken by the agencies has subsequently been reversed by FWS in numerous decisions which reopened trade in other species. The agency has frequently stated that controlled trade can relieve demand for more endangered wild stocks. This reasoning has been adopted by Congress in its enactment of the National Aquaculture Act.

¹⁵ The one-year survival rate for these offspring has varied from 12.5% to 68%. Attachment at 7, Cayman Answer for E2 turtles. By comparison, the survival rate for green sea turtles in the wild, from eggs to sexual maturity, has been estimated to be as low as 0.1% due to disease and natural predation. NMFS, Final Environmental Impact Statement 83 (1978). The Farm's rates are thus quite good, especially in light of the pioneering nature of its work with a species which "may often take more than 30 years to mature." IUCN/SSC, Marine Turtle Newsletter, Jan., 1979, at 1. For the Farm's 73,000 offspring of wild turtles, survival rates have exceeded 50% in each of the last two years. Attachment at 7, Cayman Farm Answer for T1 turtles.

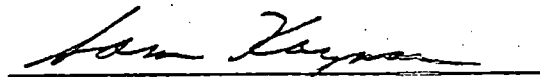
An exemption for maricultured turtles would help satisfy world demand while at the same time assisting the preservation of the wild species. For this reason, and for the other reasons set forth above, we request that the issue of a mariculture exemption be reopened.

DATED: January 22, 1982.

Respectfully submitted,

RONALD A. ZUMBRUN
RAYMOND M. MOMBOISSE
SAM KAZMAN
Pacific Legal Foundation
1990 M Street, N.W., Suite 550
Washington, D.C. 20036
Telephone: (202) 466-2686

By


SAM KAZMAN

Attorneys for the Association for
Rational Environmental Alternatives
and Pacific Legal Foundation

ATTACHMENT

October 9, 1981

Dr. W. A. Johnson
55 Norrice Lea
London N2 England

Dear Dr. Johnson:

Pacific Legal Foundation (PLF) is currently investigating the issue of the United States' ban on trade in maricultured green sea turtle products. Inasmuch as the Cayman Turtle Farm has pioneered the closed-cycle breeding of this species, we would greatly appreciate information on certain aspects of your program.

The specific information we seek is detailed in the questions below. While we are familiar with the data contained in your submissions to the United States Department of the Interior through 1978, we are especially interested in any developments which have occurred since that time. We would like to assure that the information we have is up to date.

PLF is a nonprofit public interest organization, founded in 1973, whose purpose is promoting the protection of economic rights and free enterprise. Our interest in this particular issue is based on our belief that mariculture, rather than exacerbating the problem of the green sea turtle, might well be the solution to that species' endangered status.

I hope that answering the following questions does not pose any great inconvenience to you. If your answers can be supplemented with citations to any recent scientific literature, we would appreciate this information as well.

Dr. W. A. Johnson
October 9, 1981
Page 2

I. Utilization of Wild Turtles and Turtle Eggs

a) Does the farm currently take any turtle eggs from the wild? If not, when did the last such taking occur?

b) Does the farm currently obtain any turtles from the wild? If not, when did the last such taking occur? If the farm is currently obtaining such turtles, what is the extent of this program?

c) In both absolute numbers and percent, how many of the turtles currently on the farm are wild turtles (i.e., were hatched in the wild)?

d) Does the farm currently have any program to prevent deleterious inbreeding among its turtles? If so, could you briefly describe this program if it is not described by your above answers?

II. Composition of Farm Stock

a) What was the average population of turtles on the farm during 1981? How does this break down in terms of general age groups?

b) It is my understanding that the farm's stock originally stemmed from two sources: (1) wild eggs which were brought to the farm and hatched and (2) wild turtles which were brought to the farm and mated. In order to simplify reference to the particular succeeding generations produced by these sources, I have sketched these two lines below, omitting any intermixing which might have occurred between them:

(1) Wild Eggs $\xrightarrow{\text{hatched on farm}}$ E1 $\xrightarrow{\text{E1 X E1}}$ E2 $\xrightarrow{\text{E2 X E2}}$ E3

(2) Wild Turtles (T0) $\xrightarrow{\text{mate on farm}}$ T1 $\xrightarrow{\text{T1 X T1}}$ T2 ...

An E2 turtle, for example, would be the offspring of two E1 turtles.

What are the approximate numbers of turtles which have been produced on the farm in categories E1 and T1? If possible, please break this data down by year of birth.

c) I would assume that, in the generations beyond E1 and T1, considerable mixing between the two lines occurred--i.e.,

Dr. W. A. Johnson
October 9, 1981
Page 3

E1 X T0, E1 X T1, etc. However, if you have data for the pure separate lines, I would appreciate your production figures for E2, E3, T2, etc. If possible, please break this data down by year of birth.

d) If data are available, what are the similar figures for mixed categories: E1 X T0, E1 X T1, E2 X T1, T0 X T1, etc.? If data is not available for each such category, please use the next larger category for which data is available. E.g., the aggregate of E1 X [T0 or T1] if there are no separate data for E1 X T0 and E1 X T1.

III. Restocking Programs

a) Does the farm now conduct any programs to replenish wild turtle populations?

b) If such programs were conducted in the past, either by the farm or its predecessor, why were they terminated?

c) Would the farm be willing to conduct such a program in the future? If yes, could you give a general description of the program you envision and the conditions under which you would undertake it?

Thank you for your time and cooperation, and do not hesitate to contact me if I can be of assistance. I look forward to hearing from you.

Yours truly,

SAM KAZMAN
Attorney

cc: Dr. James Wood
Frau Dr. Judith Mittag
Carleton S. Jones, Esquire

SK:sma



Cayman Turtle

30 October, 1981

Mr. Sam Kazman,
1990 M Street, N.W.,
Suite 550,
Washington, D.C. 20036,
U.S.A.

Dear Mr. Kazman,

Dr. W.A. Johnson has asked me to respond to your letter of 9 October 1981 because the data is filed here in Cayman. The answers to your questions are as follows:

- I.
 - a. No, 1978 March
 - b. No, 1977 September (breeding stock)
 - c. 185 breeders, 2.3% of total herd
 - d. Due to the relatively long time required for the sea turtle to reach sexual maturity this has not yet become a factor although existing facilities allow the control of matings to control or eliminate such a problem should it occur.
- II.
 - a. As of 1 October 1981

496 breeders 861 1,397 2,830 2,285 96	6 years of age and older 3 years old 2 years old 1 year old hatchlings (hatching season not yet completed) special turtles including 62 2-year old Atlantic Ridleys which belong to Mexican Government and are being reared to provide the nucleus of a captive breeding colony.
--	--
 - b. E 1.

1968 1969 1970 1971 1972	15,000 eggs collected, hatch figures not available 10,393 plus 15,000 eggs hatch data N.A. 12,355 plus 40,000 eggs hatch data N.A. 14,346 37,300
--	---

Total = 7,965 turtles

30 October 1981

Mr. Sam Kazman

1973	76,024
1974	60,802
1975	None
1976	26,158
1977	12,762
1978	<u>21,368</u>

271,508 plus 70,000 eggs hatch data N.A.

T 1

1973	4,905
1974	4,374
1975	3,364
1976	5,232
1977	19,545
1978	14,719
1979	11,792
1980	<u>9,206</u>
	<u>73,137</u>

c. E 2

1975	199
1976	51
1977	24
1978	745
1979	409
1980	<u>130</u>
	<u>1,558</u>

d. E 1 ϕ s x T O σ s

1978	371
1979	195
1980	<u>241</u>
	<u>807</u>

III. a. Yes

b. During the period in which wild eggs were collected yearlings were returned to the country of collection for release. This particular program was terminated when no more wild eggs were required.

c. It is our intention to continue our hatchling release program of all farm reared hatchlings in excess to internal requirements. This release program was undertaken to repopulate the vacuum

Page 3

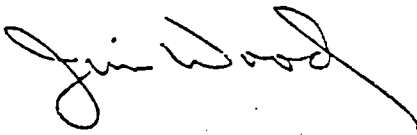
30 October 1981

Mr. Sam Kazman

created by the depletion of existing Caribbean stocks. Animals released to date have varied from hatchlings to one year old and the majority have been marked for future identification.

I trust the above information is what you need. If I can provide any additional data please let me know.

Yours sincerely,
CAYMAN TURTLE FARM LTD.

A handwritten signature in cursive script, appearing to read "J.R. Wood".

J.R. WOOD, PH.D.
General Manager-Research

JRW:dc

CC: Dr. Judith Mittag
Dr. W.A. Johnson
Carleton S. Jones, Esquire



Cayman Turtle

12 November 1981

Mr. Sam Kazman,
1990 M Street, N.W.,
Suite 550,
WASHINGTON, D.C. 20036,
U.S.A.

Dear Mr. Kazman,

As per our telephone conversation on 10 November I am enclosing the additional information requested.

1. Survivability at 1 year.

Group	Hatch Date	% Survival 1 year
Els	1974	39.0
	1976	64.0
	1977	61.5
	1978	74.2
Tls	1973	N.A.
	1974	N.A.
	1975	46.3
	1976	32.0
	1977	15.4
	1978	12.0
	1979	56.9
	1980	54.7 (8 months)
E2s + Elqs x TO ♂s	1975	68.0
	1976	61.0
	1977	12.5
	1978	12.8
	1979	34.8
	1980	26.1 (8 months)

2. Individual FRS (Els) Nest results for 1978 season.

Female #	# of Eggs	% Hatch
6	849	85.5
9	613	14.4

Page 2

12 November 1981

Mr. Sam Kazman

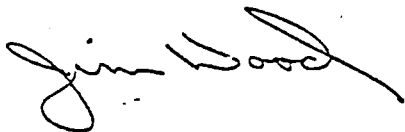
15	298	47.0
18	50	0.0
138	84	9.5
292	168	0.0
324	79	53.2
330	541	26.4
350	33	0.0
364	210	0.0
535	59	0.0
569	13	0.0
650	452	0.0
757	48	0.0
816	264	0.0
818	221	5.0
838	24	0.0
839	316	0.0

3. Enclosed are 2 papers published in the Marine Turtle Newsletter which provide comment on the age of sexual maturity of wild sea turtles.

4. I have also enclosed 3 articles which have been accepted for publication. The paper on digestibility has recently been published, the other 2 should be out in a year or so.

Please let me know if I can provide you with any additional information.

Yours sincerely,
CAYMAN TURTLE FARM LTD.



J.R. WOOD, PH.D.
General Manager-Research

JRW:dc

CC: Dr. J. Mittag
Dr. W.A. Johnson
Carleton Jones, Esq.