

# **International Trade in Live, Ornamental “Fish” in the U.S. and Florida**

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## **Abstract**

The importance of international markets as a source of live, ornamental “fish” supply is growing due to more stringent wild-harvest regulations in Florida. In addition, foreign markets are increasing in importance as a source of demand for Florida purveyors of live, ornamental “fish”. Florida plays an important role in this growing international market. Trends in imports and exports of live, ornamental “fish” are described for two primary data sets: U.S. Customs and U.S. Fish and Wildlife Service. These trends are described primarily for the 1994-98 period for Florida and the U.S. Florida imports and exports are described for the two major ports: Miami and Tampa. The most important trading countries are also described. This information will help Florida purveyors of live, ornamental “fish” better understand the international markets upon which they have become more dependent.

## **Key Words**

Live ornamental fish, international trade, exports, imports

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## **I. Introduction**

Trade in freshwater and marine live ornamental species represents an important market and supply source for the domestic aquatic ornamental industry. The primary sector of this industry in the U.S. is the aquarium hobby industry, which is purported to now be the second most popular hobby in the U.S. (Pet Industry Joint Advisory Council, 1999). Along with imported species, the demand by domestic hobbyists and other users of live marine ornamentals has been partially supplied by wild specimens collected primarily in Florida. However, as this industry has continued to increase in popularity and economic importance, so has concern over the sustainable use of these domestic marine life resources. As a result, more stringent domestic harvest regulations have increasingly limited the total supply of marine life species that can be harvested from domestic waters, thereby increasing the importance of international sources. For example, the total dockside value of marine life landed in Florida during 1998 was \$1.9 million. Freshwater species are either cultured in Florida (\$43 million farm gate sales in 1999) or imported. The value of live, ornamental “fish” (both freshwater and marine) imported into Florida during the same year was \$5.7 million. In addition, the world market for live marine ornamentals has somewhat mirrored the growth observed in the U.S. market, making foreign markets of greater importance to domestic wholesalers of live marine ornamentals.

This paper will describe the U.S. trade in live, ornamental “fish” during the 1994-98 period. Unfortunately, the data are not readily available to disaggregate trends for freshwater and marine species. Imports and exports will be discussed by country of origin and destination. In addition, trends in international trade in live ornamentals through Florida ports of entry will be described. Where possible, these trends will be described by product form. The two major sources of data will also be compared and contrasted. The discussion will serve to highlight the relative importance of the international market for this increasingly important market to purveyors of live marine ornamentals in Florida.

## **II. Data Sources**

There are two major sources of data by which the international trade in live, ornamentals can be described. These data originate from the U.S. Bureau of Census and the U.S. Fish and Wildlife Service.

The Bureau of Census data are obtained from the U.S. Customs office, which records data on declarations of international shipments as required by law for nearly all overseas

shipments and receipts. Products described as “Live Ornamental Fish” are given a specific harmonized tariff 10-digit code by the U.S. International Trade Commission (HTS 0301100000). This product category will exclude other live aquatic commodities that may be used for human consumption, such as live food fish. The value of these shipments is then recorded by Customs. Volume, or quantity, is not recorded by Customs.

The Customs export data reported in this study include only domestic exports, not transshipments of foreign product. Exports are valued as “free alongside ship” (FAS). In addition, the actual export (and import) value may be understated given that only those shipments with a declared value in excess of \$1,251 were recorded by Customs during the 1989-98 period. The degree to which the declared value and actual shipment values differ (if, for example, the total declared value is under reported due to exclusion of shipments valued at less than \$1,251) cannot be determined. Since 1998, Customs has increased the minimum value for reporting to \$2,000.

Import value is defined as the Customs Import Value, which is the value appraised by Customs at the first port of arrival (excluding import duties, freight, insurance, and other charges). Further, the Bureau of Census data do not provide any information on the species or product forms being shipped. In fact, the use of the term “fish” in the definition of the code is misleading in that other forms of live, marine ornamental species may be included, such as mollusks (i.e., snails, clams, etc.) crustaceans (i.e., shrimps, crabs, etc.), echinoderms (i.e., starfish, sand dollars, etc.) and other non-fish species. The data also do not allow a distinction between marine and freshwater species. Thus, the data describe the total trade in all species of live, ornamental aquatic organisms.

The U.S. Fish and Wildlife Service (USFWS) also compiles data on the international trade of live, ornamental aquatic species. These data are taken from Customs shipment declaration forms (Form 3-177), which are completed for each shipment that arrives or exits a given U.S. port of entry. These forms provide more detail than available via reported Bureau of Census data in that three general “species groups” are delineated in the data:

- (1) non-CITES invertebrates (i.e., invertebrate species that are not listed under the Convention on International Trade in Endangered Species) (designated as **NONV**),
- (2) other live invertebrates contained in tropical fish and other shipments (designated as **OLIN**), and
- (3) all live tropical fish including goldfish (designated as **TROP**).

The individual names of the various species in each shipment are not data based by USFWS, although they do appear on the Form 3-177. Thus, the distinction between marine and freshwater species cannot be identified through the existing data sets. A more detailed treatment of the USFWS data would have been prohibitive given that each Form 3-177 can include many pages of quantity and value data for each species shipped

(Chapman et. al., 1997). Only careful scrutiny of the original Forms can provide this information, an exhaustive effort that was clearly outside the scope of this study.

USFWS data exclude shipments where the designation codes for import or export were not recorded, which represent between 1 and 5 percent of the total (declared) annual trade value. USFWS does not exclude imports and/or export shipments of live ornamental species based on the magnitude of the shipment value as does Customs. A cursory examination of USFWS Law Enforcement Management Information System (LEMIS) declared export/import shipment data for live tropical fish shipments via U.S. west coast ports of entry found that 44 percent of all shipments were valued less than \$1,251. Exclusion of the aggregate value of these relatively small-valued shipments may have a significant impact on the total reported values of imports and exports of live, ornamental species.

The Bureau of Census value data will be described on an annual basis for the 1989-98 period, while the discussion of annual USFWS data will be confined to the 1994-98 period (only the last 5 years are available via USFWS). The 1994 data for USFWS includes only March through December, due to USFWS archiving restrictions (i.e., only the last 60 months are retained in the system) and the timing of our Freedom of Information Act data request.

Given that information on shipment quantity is not reported for the Customs data, the trends in international trade of live, ornamental aquatics species focus on the declared values of both exports and imports. The total number of specimens imported across all species is reported for the USFWS data.

### **III. Trends in U.S. Imports and Exports**

The discussion in this section will address trends in total U.S. imports and exports of live, ornamental species. The data provided by U.S. Customs and USFWS will be addressed separately. The data represent a summation of annual imports and exports over all U.S. ports of entry, including those located in Florida (the latter will be discussed separately in a later section of this report).

#### **III.A. U.S. Customs Data**

The value of imported live, ornamental “fish” (HTS 0301100000) was estimated to be \$45.1 million in 1998 (Table 1). This value represents a decline from a peak of \$54.3 million during 1995. Annual import values had increased to the peak value during the 1989-94 period. The reported domestic export values for live, ornamental “fish” mirrored those for imports. Export values increased from \$8.6 million in 1989 to a peak of \$19.8 million in 1995, then decreased steadily to \$10.5 million in 1998. The three-year decline was somewhat more dramatic for export values (-47 percent) than that

observed for imports (-17 percent) over the same period. When import values exceed export values, a negative trade balance (i.e., deficit) exists. A trade deficit for live, ornamental “fish” existed for every year during the 1989-98 period. The trade deficit for live, ornamental “fish” averaged approximately \$31 million over the 1989-98 period, although the deficit averaged about \$35 million during the last four years. The annual ratio of import value (I) to export value (E), or I/E, has averaged 3.26 during the 1994-98 period (1.0 equals trade balance). Trends during 1982-92 are described in Thunberg et. al. (1993).

Table 1. Trends in Live Ornamental “Fish” Imports and Exports  
(U.S. Customs data in 1,000 \$)

Year	Import Value	Export Value	Trade Balance
1989	38,213	8,591	(29,622)
1990	40,992	11,646	(29,346)
1991	36,104	12,747	(23,357)
1992	41,123	15,136	(25,987)
1993	45,248	17,364	(27,884)
1994	46,769	18,866	(27,903)
1995	54,301	19,816	(34,485)
1996	53,026	15,461	(37,565)
1997	49,309	14,541	(34,768)
1998	45,096	10,533	(34,563)

During the 1994-98 period, the U.S. imported live, ornamental “fish” from 116 different countries for a combined total of \$248.5 million. The largest single country sources of product included Thailand (18 percent), Singapore (18 percent), Indonesia (13 percent), Hong Kong (10 percent), and the Philippines (9 percent). Other important import Asian sources included Malaysia and Japan, with the most important western hemisphere sources being Columbia, Peru, and Brazil. With the exception of imports from Hong Kong and Japan, import values declined during 1998, with most sources exhibiting a decline from a previous peak during 1995 or 1996 (although the import value from Thailand peaked during 1997).

The U.S. exported live, ornamental “fish” to 68 different countries during the 1994-98 period, for a combined total export value of approximately \$80 million (Table 2). The top destinations for live, ornamental “fish” includes Japan (33 percent), Canada (26

percent), Hong Kong (9 percent), Brazil (6 percent), and Mexico (6 percent). The export market for Canada has remained relatively stable during the five-year period. However, the export values for the other major trading partners have exhibited declines. It is notable that Hong Kong is both a major importer and exporter of live ornamental fish with the U.S.

Table 2. Important Import Sources and Export Destinations for Live, Ornamental “Fish”  
(U.S. Customs Data in 1,000 \$)

Direction	1994	1995	1996	1997	1998
<b>Imports:</b>					
Thailand	9,460	9,560	9,205	9,720	7,802
Singapore	8,567	9,557	9,745	8,726	7,939
Indonesia	6,055	6,517	7,183	6,518	5,575
Hong Kong	4,575	4,540	4,786	4,715	5,249
Philippines	4,146	5,152	4,822	4,595	4,001
Others	13,966	18,975	17,285	15,035	14,530
Total	46,769	54,301	53,026	49,309	45,096
<b>Exports:</b>					
Japan	5,952	7,847	5,965	3,972	2,296
Canada	4,253	4,465	3,442	4,067	4,155
Hong Kong	1,977	1,807	1,426	1,427	651
Taiwan	2,076	1,220	416	488	116
Mexico	1,132	650	790	1,138	888
Others	3,476	3,827	3,422	3,449	2,427
Total	18,866	19,816	15,461	14,541	10,533

### III.B. U.S. Fish and Wildlife Service Data

The USFWS data provide a different perspective on the magnitude of value of imports and exports of live, ornamental “fish”. The three categories of ornamental species are NONV, OLIN, and TROP (as previously defined). The following discussion does not include the values reported for NONV, which is ambiguous regarding the inclusion of only live specimens. However, OLIN and TROP include only live invertebrates and/or tropical fish. Most importantly, USFWS data (as reported on Form 3-177) do not exclude shipments with values less than \$1,251, as does Customs, which can represent a significant share of the total number of shipments entering or leaving a given U.S. port. Although the exact reason has not been identified, the annual import and export values

reported by USFWS are at least on order of magnitude higher than those reported via Customs.

Import value (OLIN and TROP combined) through all U.S. ports of entry during 1998 was reported at \$660.3 million (Table 3). This value had decreased from a peak of \$802.3 million during 1995. The 1995 import value represented an increase of over 50 percent from 1994. Export value (OLIN and TROP combined) exhibited a similar trend, increasing from \$253.4 million in 1994 to a peak of \$378.4 in 1995, then decreasing steadily to a five-year low of \$182.2 million in 1998. The USFWS data indicates a more dramatic trade deficit with respect to live, ornamental species. The trade deficit, according to the USFWS data, increased from \$266.1 million in 1994 to \$478.1 million (80 percent) in 1998. The annual ratio of import value to export value averaged 2.57 during the 1994-98 period.

Table 3. Trends in Value of Total Live Ornamental "Fish" Imports and Exports  
(U.S. Fish and Wildlife Service data in 1,000 \$)

Year	Import Value (OLIN + TROP)	Export Value (OLIN + TROP)	Trade Balance
1994	519,423	253,358	(266,065)
1995	802,301	378,407	(423,894)
1996	801,389	312,339	(489,050)
1997	695,560	277,517	(418,043)
1998	660,312	182,214	(478,098)

The trade in TROP as reported by USFWS is much higher than that reported for OLIN (Table 4). The average annual import (export) value for TROP during the 1994-98 period is over 30 (45) times higher than that reported for OLIN. The value of OLIN imports averaged approximately \$20 million during the 1994-98 period, increasing from a low of \$13.1 million in 1994 to a peak of \$23.4 million in 1995. Export value of OLIN increased from \$3.9 million in 1994 to a peak of \$9.2 million in 1996, decreasing steadily thereafter. The average annual import value for TROP during the 1994-98 period was \$676 million. The average annual export value for TROP during the same period was \$275 million. Both exports and imports have declined steadily since reaching peak values in 1995.

Table 4. Trends in the Value of OLIN and TROP Imports and Exports  
(U.S. Fish and Wildlife Service data, 1,000 \$)

Year	OLIN		TROP	
	Imports	Exports	Imports	Exports
1994	13,062	3,934	506,361	249,424
1995	23,391	6,299	778,910	372,108
1996	22,599	9,194	778,790	303,145
1997	19,482	5,727	676,078	271,790
1998	21,253	4,523	639,059	177,691

USFWS data also provides an estimate of the numbers of individual specimens that were either exported or imported within the broad categories defined as OLIN and TROP (Table 5). During the 1994-98 period, trade in TROP (imports and exports combined) exceeded that reported for OLIN by 100-fold. For both product categories, the volume of imports exceeded that reported for exports. Both OLIN and TROP have exhibited declining volumes since either 1995 or 1996, with the largest percentage declines associated with TROP imports (-25 percent since 1996) and exports (49 percent since 1995).

Table 5. Trends in the Quantity of OLIN and TROP Imports and Exports  
(U.S. Fish and Wildlife Service data, millions of specimens)

Year	OLIN		TROP	
	Imports	Exports	Imports	Exports
1994	17	2	2,100	496
1995	38	11	3,160	625
1996	32	4	3,276	509
1997	28	4	2,853	421
1998	32	3	2,460	320



USFWS data indicates that the U.S. imported or exported OLIN and/or TROP products with over 170 countries. The most important TROP trading partners were basically the same as found for the Customs data. The top OLIN trading partners were the Philippines, Indonesia, Canada, Sri Lanka, and Haiti.

#### IV. Trade Flows Through Florida Ports

Imports and exports of live, ornamental species pass through two primary Florida ports: Miami and Tampa. The following discussion describes the trade patterns for each port, for both U.S. Customs (HTS 0301100000) and U.S. Fish and Wildlife Service (OLIN and TROPP) data.

##### IV.A. U.S. Customs Data

Of all the live, ornamental “fish” imports arriving in Florida during the 1994-98 period, 88 percent passed through Miami; a similar percentage was found for Miami's share of Florida's exports (Table 6). The remaining 12 percent of both imports and exports passed through Tampa. Imports arriving into Miami declined steadily from a peak of \$8.5 million in 1995 to \$4.5 million in 1998. In contrast, exports from Miami have exhibited an upward trend from \$0.3 million in 1994 to \$1.2 million in 1998. The combined value of imports arriving in Miami and Tampa annually represented an average of 15 percent of the total imports of live, ornamental “fish” arriving in all U.S. ports.

Table 6. Trends in Live Ornamental “Fish” Imports and Exports Passing Through Florida Ports (U.S. Customs data in 1,000 \$)

Year	Imports			Exports		
	Miami	Tampa	Florida as % of U.S. Total	Miami	Tampa	Florida as % of U.S. Total
1994	4,519	1,191	13	942	407	13
1995	6,245	1,560	16	1,365	334	12
1996	7,255	1,057	16	1,795	257	13
1997	8,462	483	16	2,505	249	14
1998	5,923	324	13	4,071	217	23

Similar trends were exhibited with exports. The value of live, ornamental “fish” exported through Miami declined from \$4.1 million in 1994 to \$0.9 million in 1998. However, the value of Tampa exports increased from \$0.2 million to \$0.4 million during the same period. Florida exports accounted for approximately 15 percent of the total U.S. exports of live, ornamental “fish”. The average annual value of imports during the 1994-98 period was \$7.4 million, compared to \$2.4 million for exports. Thus, the 3:1 ratio of import to exports contributes to a reported average annual trade deficit of approximately \$5.0 million.

#### IV.B. U.S. Fish and Wildlife Service Data

Of all the OLIN and TROP imports arriving in Florida during the 1994-98 period, 90 percent passed through Miami (Table 7). Approximately 86 percent of the exports passed through Miami. The remaining 10 percent and 12 percent of imports and exports, respectively, passed through Tampa.

Table 7. Trends in OLIN and TROP (combined) Imports and Exports Passing Through Florida Ports (U.S. Fish and Wildlife Service data in 1,000 \$)

Year	Imports			Exports		
	Miami	Tampa	Florida as % of U.S. Total	Miami	Tampa	Florida as % of U.S. Total
1994	1,213	7,231	15	49,558	9,674	24
1995	98,026	20,305	15	100,255	17,533	31
1996	132,773	13,016	18	113,278	17,848	42
1997	130,194	4,547	19	112,093	16,349	46
1998	44,017	5,914	8	100,054	15,060	63

Imports arriving in Miami increased from \$44 million in 1994 to a peak of \$132.8 million in 1996, then declined to \$71.2 million in 1998 (increasing 62 percent from 1994 to 1998). Exports from Miami have exhibited a similar trend, increasing to \$113.3 million in 1996, then decreasing to \$49.6 million in 1998. Similar trends exist for the import and export data for Tampa. As also suggested by the U.S. Customs data, the combined value of imports arriving in Miami and Tampa annually represented an average of 15 percent of the total value of imports of live, ornamental “fish” (in this case, OLIN and TROP) arriving in all U.S. ports. Florida exports are much more important with respect to the total U.S. export market, with Florida exports accounting for approximately 40 percent of

the total U.S. exports of OLIN and TROP specimens. Interestingly, the Florida share of exports has declined significantly from 63 percent in 1994 to 24 percent in 1998. This change in export share is more related to changes in export levels elsewhere in the U.S., although Florida exports declined dramatically during 1998. The average annual value of imports during the 1994-98 period was \$105.4 million, compared to \$110.8 million for exports. Thus, the virtual 1:1 ratio of import to exports contributes to a negligible average annual trade deficit.

## **V. Summary**

The international trade in live, ornamental aquatic species provides an important source of product for the domestic market, while also providing an important market outlet for wild-caught and cultured species. The wild-caught and cultured ornamental species industry represents an important natural resource-based industry in Florida. The increasingly stringent regulations on wild-caught species, and the growing domestic and international markets have created an increased reliance by domestic purveyors on international trade. In describing the market, similar trends are exhibited by both the U.S. Customs and U.S. Fish and Wildlife Service data, although the magnitude of reported imports and exports are considerably different between the two data sources. U.S. Customs restricts reporting to only those shipments valued in excess of \$1,251 (recently increased to \$2,000), while U.S. Fish and Wildlife Service attempts to report all shipments. Customs data provides very little information on individual species, while USFWS data contains information on three major categories. More detailed species information is collected but is not maintained in a useable database by either agency. Neither data set allows for a distinction between marine and freshwater species, although the information could ultimately be mined from the original Form 3-177s archived by USFWS. In addition, it is understood that USFWS will begin reporting import and export data on a more detailed basis (more species codes), but this information was not available for this report.

Florida represents an important domestic and international source of wild-caught and cultured live aquatic species. Miami and Tampa also represent important state and national nodes for the international markets, both in terms of importing and exporting. Both Customs and USFWS data suggest that Florida accounts for about 15 percent of the total live, ornamental “fish” imported into the U.S. The Customs data suggest that Florida accounts for about 15 percent of the total U.S. exports as well, whereas the USFWS data indicates the Florida share is much higher, approximately 40 percent. Many other countries are involved in the international trade of live, ornamental “fish”. The most important trading partners are in Asia. However, important export markets exist in Canada and Europe.

The analysis described in this paper could be improved with data that delineate between marine and freshwater species. Data on an individual species basis would allow trends to

be described for the most important species imported and exported. These data are available via the USFWS archived Form 3-177s, but the effort required to access and record these data will be substantial. A description of the seasonality of import availability and export demand would also help better describe the international market in which Florida purveyors participate. Further, assessing the determinants of import supply and export demand, with attention given to individual species price, would help Florida growers of ornamental species better determine which new species or subspecies to introduce into the market. Providing such an analysis on a species and country basis would be invaluable.

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