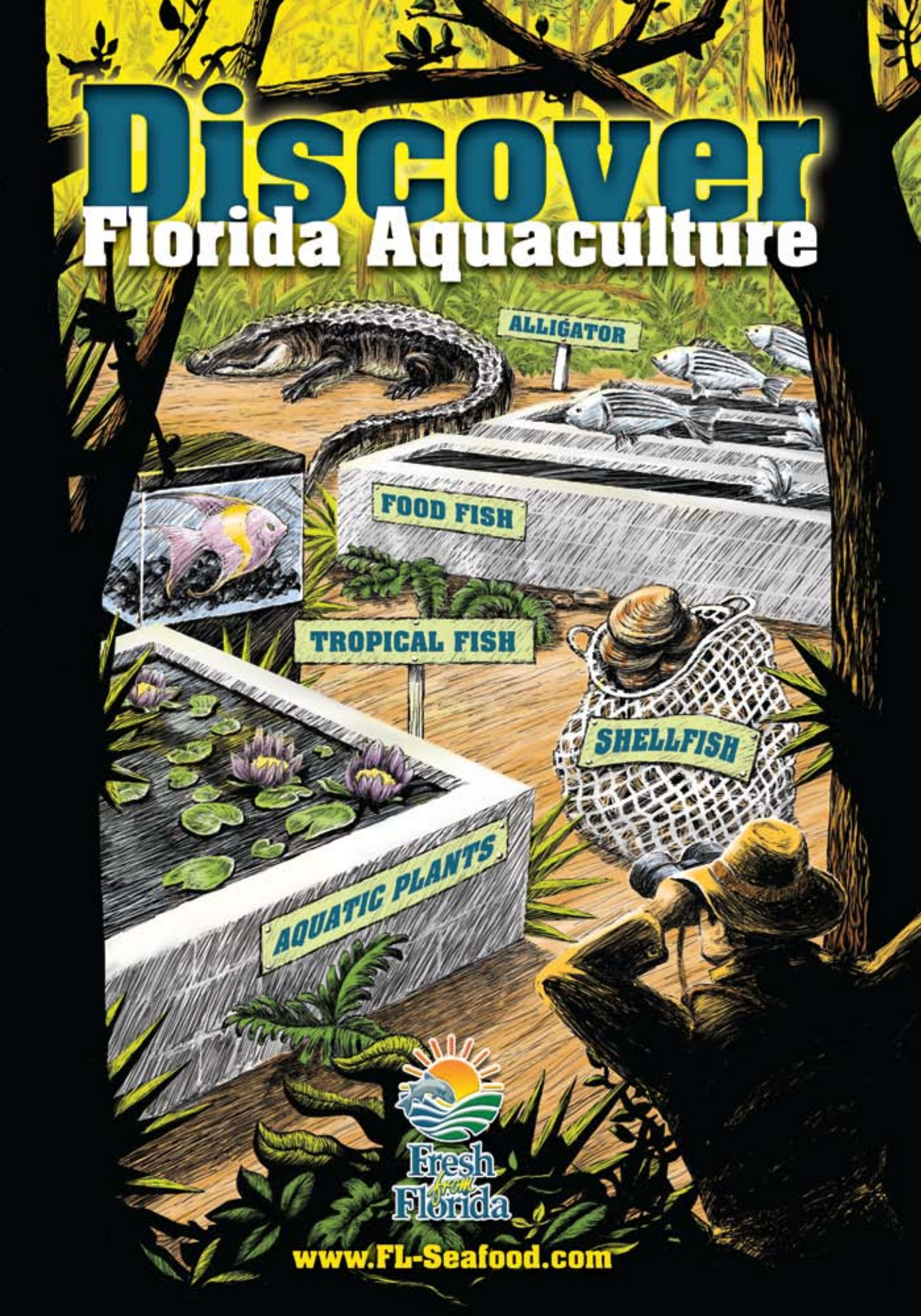
Discover
Florida Aquaculture
ALLIGATOR
FOOD FISH
TROPICAL FISH
SHELLFISH
AQUATIC PLANTS
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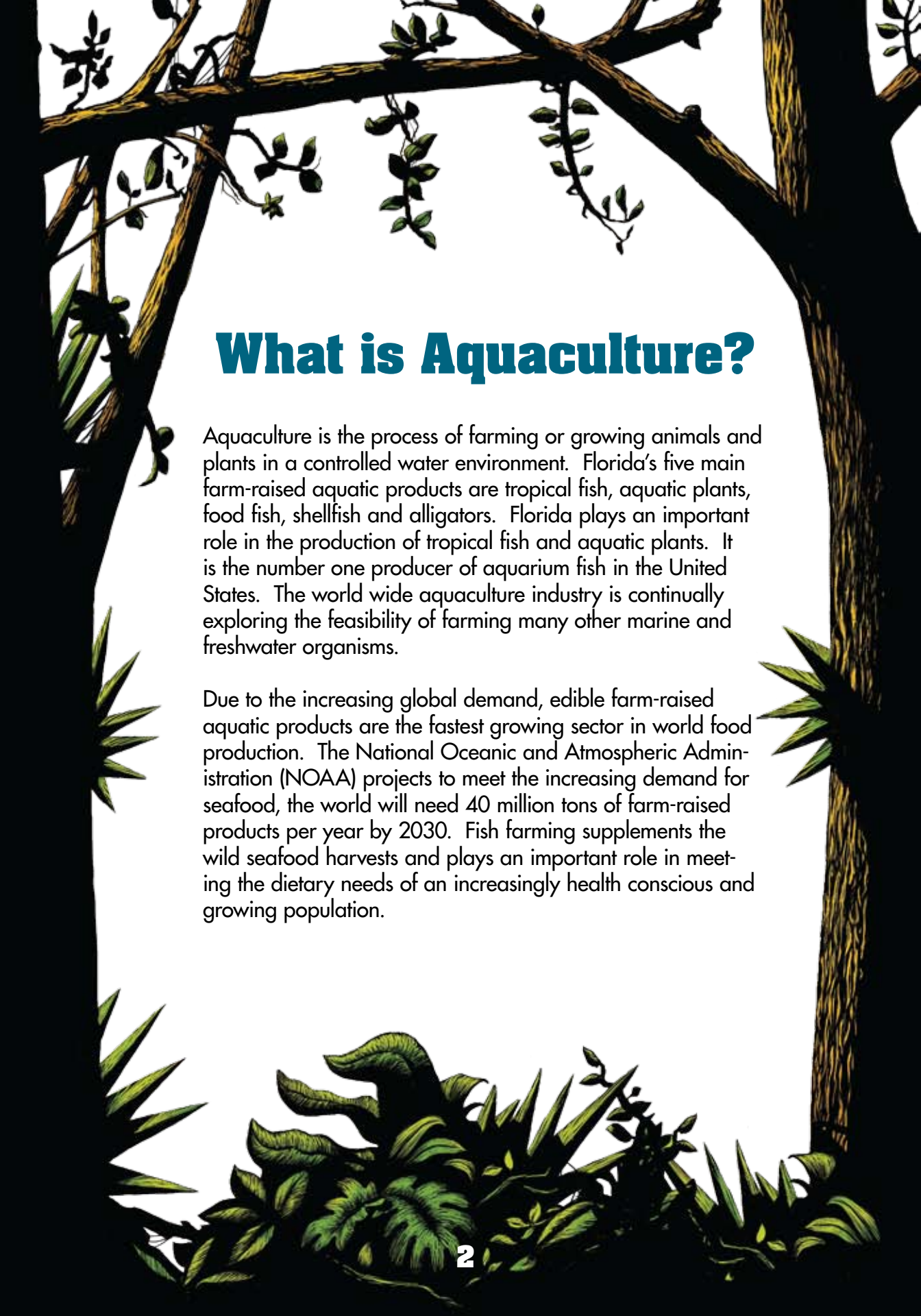
Contents



What is Aquaculture?

Aquaculture is the process of farming or growing animals and plants in a controlled water environment. Florida's five main farm-raised aquatic products are tropical fish, aquatic plants, food fish, shellfish and alligators. Florida plays an important role in the production of tropical fish and aquatic plants. It is the number one producer of aquarium fish in the United States. The world wide aquaculture industry is continually exploring the feasibility of farming many other marine and freshwater organisms.

Due to the increasing global demand, edible farm-raised aquatic products are the fastest growing sector in world food production. The National Oceanic and Atmospheric Administration (NOAA) projects to meet the increasing demand for seafood, the world will need 40 million tons of farm-raised products per year by 2030. Fish farming supplements the wild seafood harvests and plays an important role in meeting the dietary needs of an increasingly health conscious and growing population.

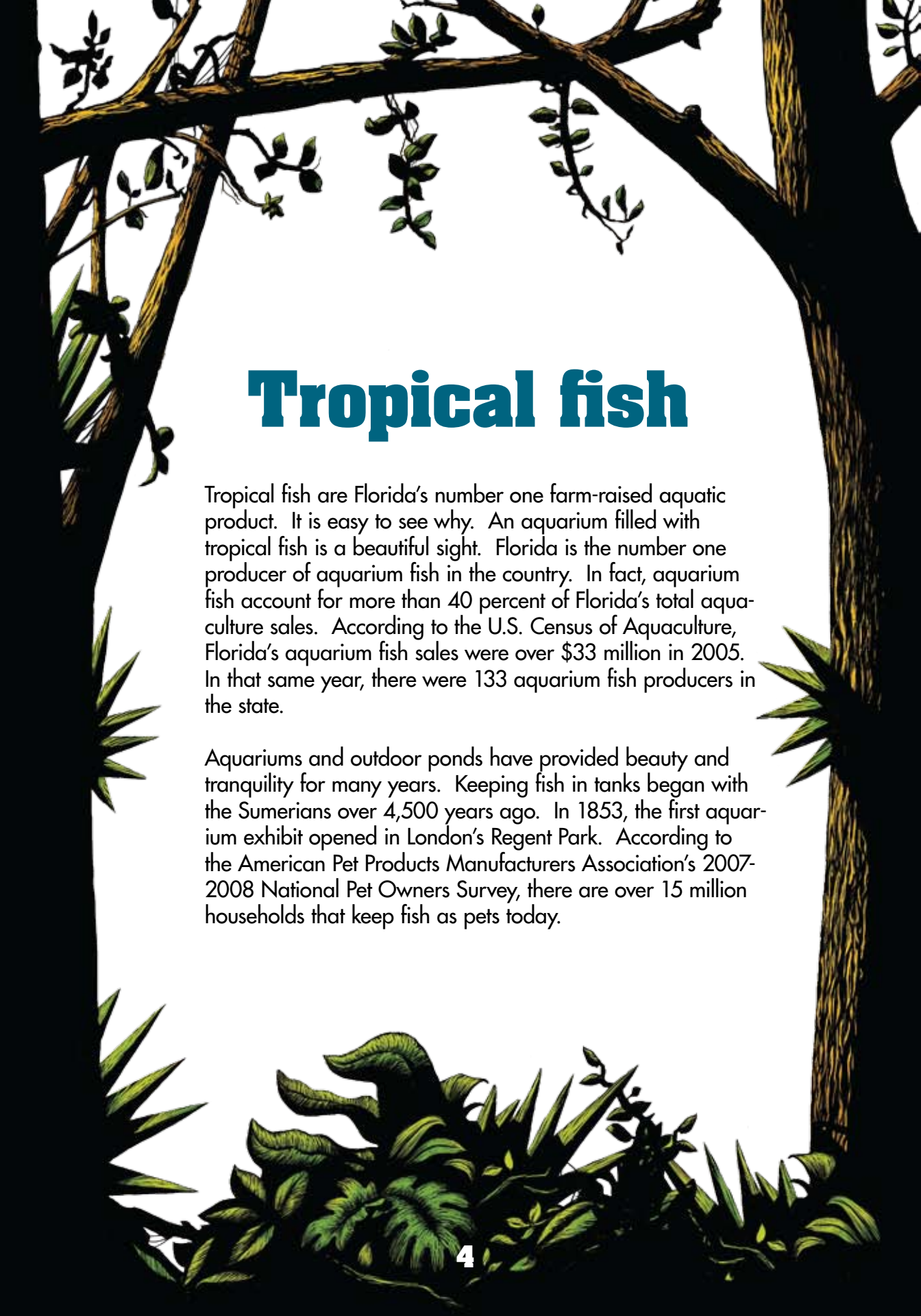
In 2005, the United States fish and aquatic product farms sales reached $1.1 billion. Florida aquaculture is ranked high in the U.S. with over $75 million in sales and over 3,000 water acres dedicated to production in 2005. Aquaculture has a number of business advantages. Growers can control a uniform size and quantity of their product. The supply of the product can be easier to maintain to help achieve a desirable price structure. Selective breeding and feeding can be used to increase disease resistance and growth rates.

How do farmers grow products in water?

Just as on any agricultural farm, the type of product a farmer wants to grow influences the methods and facilities used. Some types of aquaculture are practiced in the open ocean, in bays or in a variety of man-made ponds and tanks. Farming facilities are constructed to be environmentally compatible with Florida's abundant natural resources and varied environments. All aquaculture facilities are licensed by the State of Florida and must follow strict guidelines and Best Management Practices specific to their commodity to protect our water and environment.

The farm size can vary but in Florida the majority of the facilities are fairly small. Of the 359 farms operating in 2005, 51.5 percent were less than 3 acres of water. Another 17 percent were 3-6 acres and 2.5 percent used more than 50 acres of water area. The number of employees it requires to run the operation is reflected by the farm size and commodity. It is common for farms to be solely family owned and operated.

The following is a brief description of the state's top five farmed aquatic products and the typical approach Florida farmers use to produce them.



Tropical fish

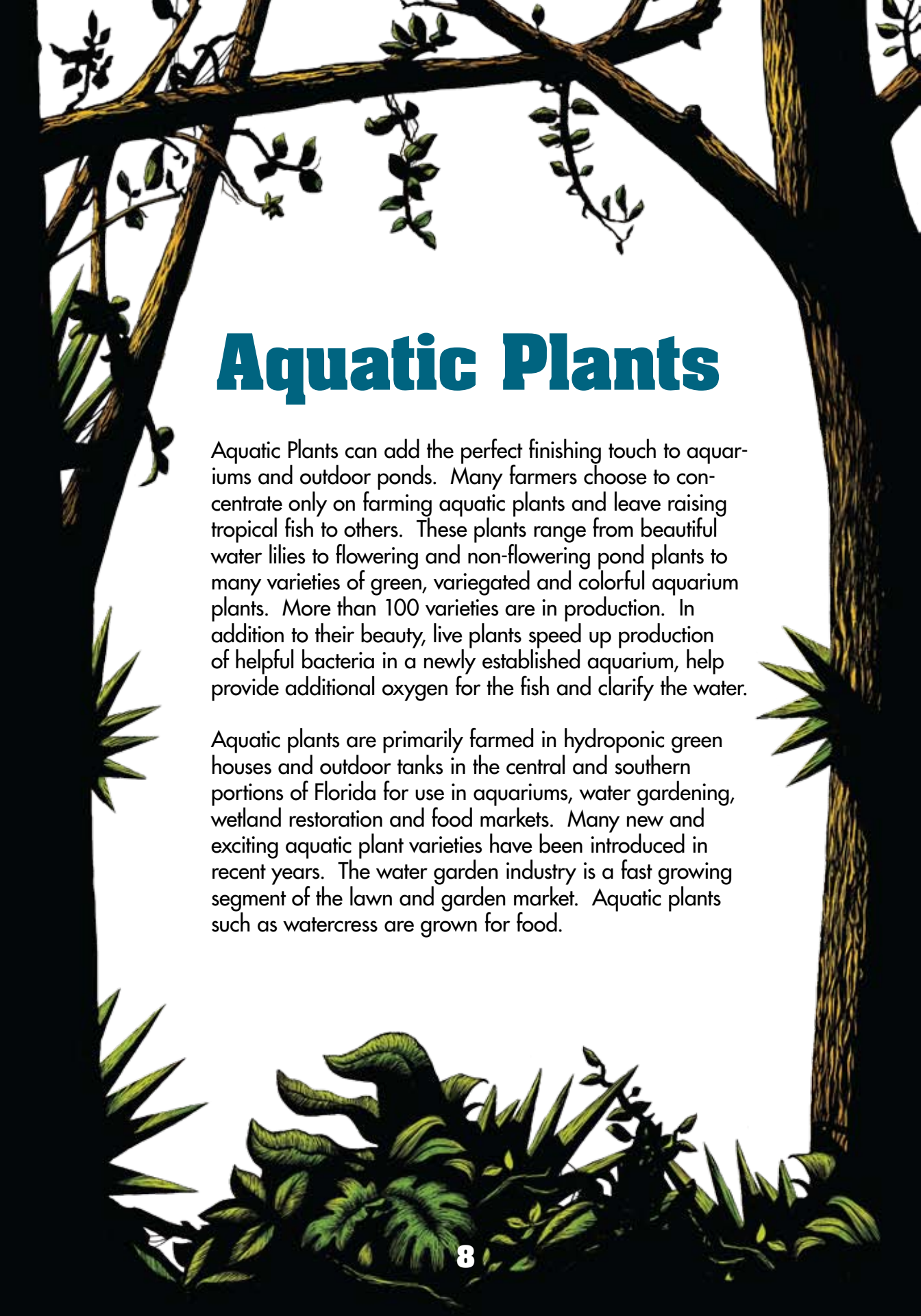
Tropical fish are Florida's number one farm-raised aquatic product. It is easy to see why. An aquarium filled with tropical fish is a beautiful sight. Florida is the number one producer of aquarium fish in the country. In fact, aquarium fish account for more than 40 percent of Florida's total aquaculture sales. According to the U.S. Census of Aquaculture, Florida's aquarium fish sales were over $33 million in 2005. In that same year, there were 133 aquarium fish producers in the state.

Aquariums and outdoor ponds have provided beauty and tranquility for many years. Keeping fish in tanks began with the Sumerians over 4,500 years ago. In 1853, the first aquarium exhibit opened in London's Regent Park. According to the American Pet Products Manufacturers Association's 2007-2008 National Pet Owners Survey, there are over 15 million households that keep fish as pets today.

Tropical fish are normally grown in tanks and ponds. Most of the Florida tropical fish farms are located below what is referred to as the state's "freeze line." This includes the central and southern portion of the state. The reason for this is that cold temperatures are detrimental to farming these fish and many of the tanks and ponds are located outside. However, there are some marine ornamental fish produced in controlled, indoor facilities. A well is often the water source for most tropical fish farms. Re-circulating, filtration and heating and cooling systems keep the water oxygenated, free of bacteria and at optimal temperatures. Because the water is re-circulated and water is re-used, there is little lost.

Tropical fish farmers have the choice of many varieties of product. Some farmers choose to focus their efforts on a specific classification like goldfish, community/non-aggressive, semi-aggressive or aggressive aquarium fish. Goldfish are not aggressive but are raised in tanks separate from other fish. Koi are a large and beautiful type of goldfish. They are typically used in outdoor landscape ponds. Tetra, mollies, guppies, danio and platys are a few examples of community/non-aggressive fish. Community fish have a tendency to get along well with all the fish in the tank or aquarium. Semi-aggressive fish like African cichlids and angel fish are very colorful but usually will not do well mixed with one another. An oscar is an example of an aggressive or non-community fish. These fish prefer to be alone and grow quite large in the appropriate size aquarium. Mixed with other fish, oscars can become very aggressive. Alone they will enjoy a peaceful existence.

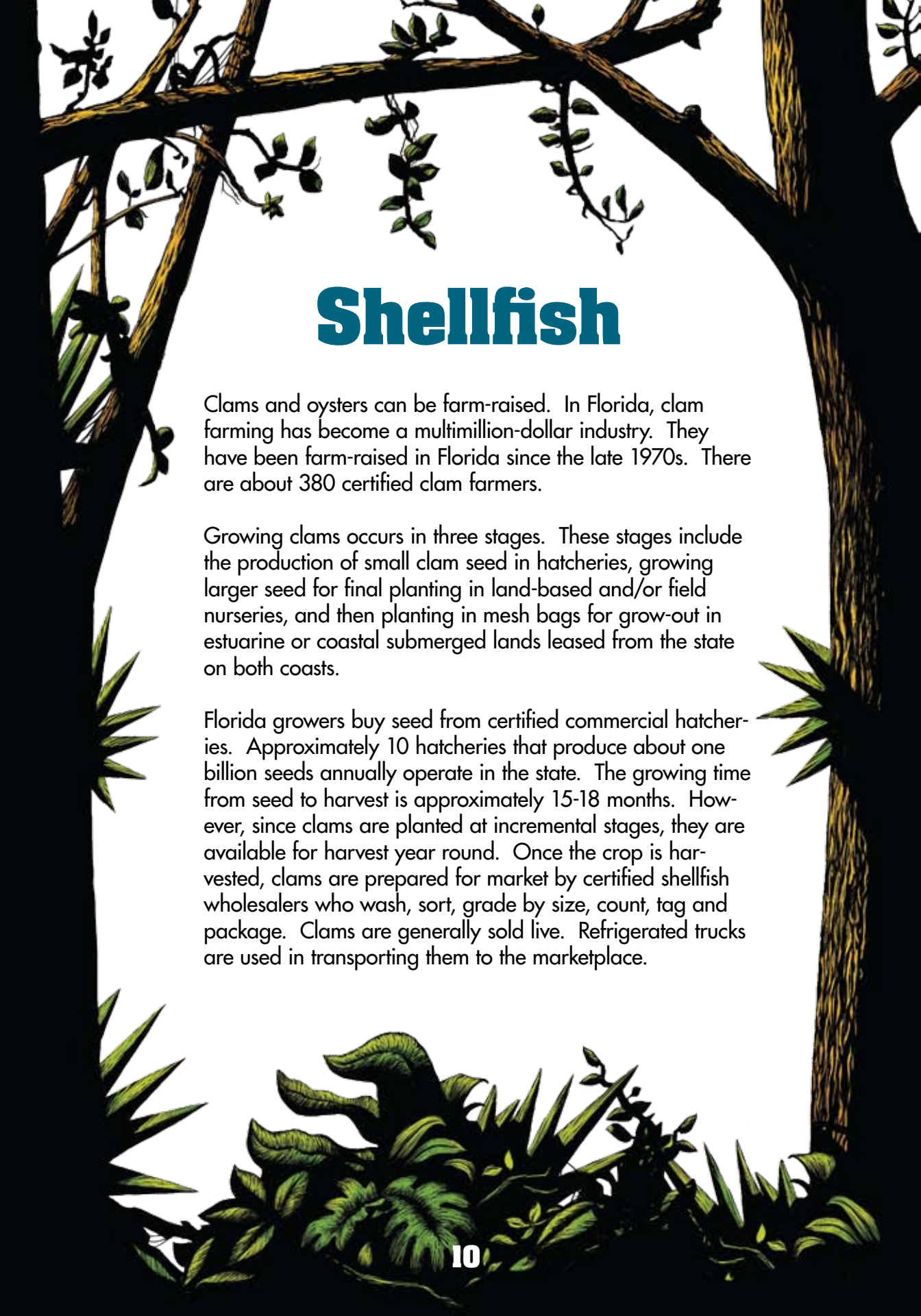
Each type of fish is fed it's own special food. When they grow to a marketable size, farmers use dip nets and put them in plastic bags or tanks to transport them to the wholesaler or retailer. As you would imagine, since the fish are live, the speed of the transition from grow out tank to the retailer is crucial to the operation and the profitability.



Aquatic Plants

Aquatic Plants can add the perfect finishing touch to aquariums and outdoor ponds. Many farmers choose to concentrate only on farming aquatic plants and leave raising tropical fish to others. These plants range from beautiful water lilies to flowering and non-flowering pond plants to many varieties of green, variegated and colorful aquarium plants. More than 100 varieties are in production. In addition to their beauty, live plants speed up production of helpful bacteria in a newly established aquarium, help provide additional oxygen for the fish and clarify the water.

Aquatic plants are primarily farmed in hydroponic green houses and outdoor tanks in the central and southern portions of Florida for use in aquariums, water gardening, wetland restoration and food markets. Many new and exciting aquatic plant varieties have been introduced in recent years. The water garden industry is a fast growing segment of the lawn and garden market. Aquatic plants such as watercress are grown for food.



Shellfish

Clams and oysters can be farm-raised. In Florida, clam farming has become a multimillion-dollar industry. They have been farm-raised in Florida since the late 1970s. There are about 380 certified clam farmers.

Growing clams occurs in three stages. These stages include the production of small clam seed in hatcheries, growing larger seed for final planting in land-based and/or field nurseries, and then planting in mesh bags for grow-out in estuarine or coastal submerged lands leased from the state on both coasts.

Florida growers buy seed from certified commercial hatcheries. Approximately 10 hatcheries that produce about one billion seeds annually operate in the state. The growing time from seed to harvest is approximately 15-18 months. However, since clams are planted at incremental stages, they are available for harvest year round. Once the crop is harvested, clams are prepared for market by certified shellfish wholesalers who wash, sort, grade by size, count, tag and package. Clams are generally sold live. Refrigerated trucks are used in transporting them to the marketplace.

Clam farming requires good water quality, free of industrial pollution. The Florida Department of Agriculture and Consumer Services administers the aquaculture lease program and monitors and manages the shellfish harvesting areas. In the hatcheries and nurseries, water is primarily pumped from inshore coastal sources. Grow out is in an open water environment. Clams can have a positive environmental impact because they filter water. In the nursery and as they mature, they feed on naturally occurring algae called phytoplankton. The time period in which the clams are growing and maturing is often referred to as grow-out.

Food Fish

Fish have been farm-raised in Florida for many decades. Tilapia, hybrid striped bass, catfish, pompano, carp and sturgeon were farm-raised on 49 Florida farms in 2005.

As in other aquaculture facilities, food fish farms operate 24 hours a day, 7 days per week. These fish are primarily raised from young fish, referred to as fingerlings, in outdoor and indoor circular tanks, rectangular containers called raceways and in ponds. Water used in these operations is circulated through a variety of filtering media before ultimately flowing back to the aquifer. This process minimizes environmental concerns related to water conservation. The food fed to these fish varies by type. A common feed is made from soy, wheat and high protein fishmeal.

The timing of the harvest of food fish depends on the type, its size and growth rate. For example, when a hybrid striped bass grows to 2 pounds it is ready for harvest. This takes approximately 4 months. When the food fish become marketable size they are harvested and shipped to wholesalers, retailers and restaurants the same day to maintain freshness.

Alligators

Farm-raising alligators are not for the faint-at-heart and workers must practice caution during handling. Most everyone is familiar with wild alligators found in swamps, lakes and rivers. In Florida, alligators have been raised in controlled conditions on farms since 1986. Farming originally was an offshoot of the efforts by alligator trappers and the government to protect the alligator from endangerment. To protect the species in the wild, farms were established to raise alligators for harvesting while allowing the wild population to increase. Land and wildlife management programs regulate the farming and harvest of the alligator and the sale of its products. Wildlife officials issue permits to collect eggs in the wild. The eggs collected are hatched and raised on the farms to adulthood. The fees collected for the harvests contribute revenue to the alligator management programs. Some farmers also collect a small percentage of their eggs from their own alligator brood stock.

The life cycle of the alligator begins with the April through May mating season. The egg collection and incubation period take place June and July. The hatchlings typically break out of their shells in late August or September. The hatchling is then placed in temperature controlled grow-out houses. The young alligators require an environment that includes clean, warm water to reach their maximum growth potential. Normally, alligators are ready to harvest within 18-24 months but the length of time may vary based on growth rate and market demand.

Producing alligators can be a very lucrative business because there is little or no waste. All parts of the alligator can be marketed and sold. The hides are salted, rolled and generally sold to a broker or tanner in the United States or abroad to be made into high-end fashion items such as wallets, jackets, briefcases, luggage, furniture upholstery and trim. These products are highly desired among fashionable consumers because each item is unique and has its own distinct markings. Consequently, this is the most profitable product from the alligator.

The meat is often marketed as an exotic meat and sold to retailers, restaurants and sometimes directly to consumers. It is low in cholesterol and high in protein. The meat is sold in many forms including ground, cubed, ribs and sausage.

Other parts of the alligator, such as the feet, teeth and heads, are made into novelty items and primarily sold at tourist attractions.

Other Products

Other Florida aquaculture products include live rock, sport fish, crustaceans, baitfish and other aquatics. Live rock is grown for use in saltwater aquariums. It is produced by placing limestone or other material in saltwater for 6 to 12 months. It attracts marine life and micro-organisms which help create a more natural ecosystem in the aquarium. Sport fish raised in Florida include largemouth bass and sunfish. The crustaceans produced are crabs, crawfish, fresh water prawns and shrimp. Some farmers choose to raise shrimp, minnows and/or small fish to supply the seafood industry and recreational fishermen with bait. Other aquatics include snails, tadpoles, turtles and frogs. Turtles are raised for the pet trade and for meat.

Are edible farm-raised aquatic products healthy and safe?

Edible farm-raised aquatic products, like their wild counterparts, are naturally low in saturated fats, cholesterol and calories and high in protein, vitamins and minerals. They contain omega-3 fatty acids. Consumption of omega-3 fatty acids contributes to the prevention of heart disease, dementia and lowering blood pressure. Studies have also shown that eating fish twice or more times per week can contribute to a person's feeling of happiness and help ward off depression.

Concerns have been expressed about chemicals and antibiotics used to prevent disease and promote growth in farm-raising aquatic products. To address these concerns, the industry is monitored and regulated by a number of government agencies, including the Florida Department of Agriculture and Consumer Services, to reduce the potential for abuse of these additives. In addition, the U.S. Food and Drug Administration provide federal oversight on the harvesting, processing, and distribution of molluscan shellfish. Florida producers must comply with Best Management Practices to operate in this state.

So what if I want to explore a career in aquaculture?

Pursuing a career in aquaculture can be a very rewarding and challenging endeavor. It is one of the fastest growing industries in the world. The occupations needed in the field are varied and require many different talents and skills. The occupational needs range from biologists, botanists, chemists and researchers to divers, business and operation managers and sales and marketing professionals. People in the industry recommend you spend time working, at least part time, for an existing aquaculture company to find your niche if you are considering this career path. This will give you a real feel for day to day operations and help you choose your direction. In addition, do some in-depth research on the aquaculture commodity that interests you.

Here are some sources of information to help you explore the abundant opportunities in the field of aquaculture:

- **Florida Department of Agriculture and Consumer Services**
  Division of Aquaculture
  1203 Governors Square Boulevard, Fifth Floor
  Tallahassee, FL 32301
  Telephone: (850) 488-5471
  Website: www.FloridaAquaculture.com

- **Florida Department of Agriculture and Consumer Services**
  Bureau of Seafood and Aquaculture Marketing
  2051 East Paul Dirac Drive
  Tallahassee, FL 32310
  Telephone: (850) 488-0163
  Website: www.FL-Seafood.com

- **Florida Aquaculture Association**
  Post Office Box 1519
  Winter Haven, FL 33882
  Telephone: (863) 293-5710
  Website: www.flaa.org

- **Florida Tropical Fish Farms Association**
  Post Office Box 1519
  Winter Haven, FL 33882
  Telephone: (863) 293-5710
  Website: www.ftffa.com

- **University of Florida/Institute of Food and Agricultural Sciences (IFAS)**
  Post Office Box 110180
  Gainesville, FL 32611
  Telephone: (352) 392-1971
  Website: www.ifas.ufl.edu

- **University of Florida/IFAS**
  Tropical Aquaculture Laboratory
  1408 24th Street SE
  Ruskin, FL 33570
  Telephone: (813) 671-5230
  Website: http://tal.ifas.ufl.edu

- **National Aquaculture Association**
  Post Office Box 1647
  Pine Bluff, AR 71613
  Telephone: (870) 850-7900
  Website: www.thenaa.net

- **University of Florida/IFAS**
  Shellfish Aquaculture Extension Program
  Sen. George Kirkpatrick Marine Lab
  Cedar Key, FL 32625-0089
  Telephone: (352) 543-5057
  Website: http://shellfish.ifas.ufl.edu

- **University of Florida, Indian River Research and Education Center**
  2199 South Rock Road
  Fort Pierce, FL 34945-3138
  Telephone: (772) 468 3922
  Website: www.irrec.ifas.ufl.edu

Florida Department of Agriculture and Consumer Services

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