Background Report

Draft Freshwater Turtle Rule
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FRESHWATER TURTLE TRADE IN FLORIDA AND RECOMMENDATIONS FOR REGULATORY ACTION FISH AND WILDLIFE CONSERVATION COMMISSION (FWC) STAFF REPORT

Introduction

Florida has one of the most diverse turtle assemblages in North America. Demand for Florida's freshwater turtles appears to be increasing. In September 2008, the FWC passed an interim rule to limit take of turtles while an FWC team worked on a comprehensive conservation strategy for Florida's freshwater turtles. The interim rule added a daily limit of five freshwater turtles to the existing rules. Holders of commercial freshwater fishing licenses were allowed an additional 15 Florida softshell turtles daily. This report summarizes staff research and recommendations to conserve Florida's freshwater turtles.

The term "freshwater turtle" in this document represents all turtles in Florida that are not sea turtles or tortoises. Most of these 19 species are aquatic freshwater turtles, but terrestrial box turtles and brackish-water-dwelling diamondback terrapins are also included. In Florida, freshwater turtles occur in most natural aquatic habitats (ponds, streams, bogs, springs, marshes, bays, etc.) and many manmade habitats, including canals, flooded borrow pits, flooded phosphate mines, and retention ponds.

Wild freshwater turtles face many threats to their survival, including habitat loss, road mortality, harvest by humans, natural predation, and disease. Recently, impacts of heavy commercial harvest of these turtles have become a concern. Some scientists believe that even limited turtle take is unsustainable. Turtles are long-lived, slow-growing animals. Large adult female turtles are important to populations because they can lay greater numbers of eggs than younger smaller female turtles. Some population models predict that removing these large, reproductively important female turtles from populations can have long-term negative impacts.

The foreign demand for turtles as food and pets appears to be growing, as indicated by the increasing number of turtles shipped abroad in the last decade. Shipping data show an increase for all types of turtles, except for sliders (*Trachemys* sp.). The two species most often consumed (common snapping turtles and softshell turtles) had larger percent increases than species most often kept as pets. The increase in international trade in Florida turtles to be used for food is evidenced by recent reports of large harvests of Florida softshells.

Most states with substantial turtle biodiversity have rules protecting turtles. Turtles are protected using possession limits, bag limits, seasonal closures, size limits, and prohibitions on take. Only a few states, such as Arkansas and Alabama, have programs for commercial turtle harvest. For example, in Alabama, a commercial turtle harvester must possess a license in order to collect 10 freshwater turtles daily, with a maximum annual harvest of 100. At this time, no state is conducting statewide monitoring of its turtle populations, even those states allowing commercial harvest. States that allow commercial harvest have set limits based on limited scientific evidence, usually life-history studies. Recently, several eastern states have enacted stricter regulations on turtle take (AL, MI, MD, NC, SC, TN, TX), which could cause turtle harvesters to refocus their efforts on Florida's turtle populations.

Issue History

In March 2008, two groups petitioned FWC to engage in emergency rulemaking to protect freshwater turtle populations. The Center for Biological Diversity, the St. Johns Riverkeeper, and the Center for Food Safety petitioned FWC, Florida's Department of Health, and the Governor's Office. The petition stated that (1) consumption of freshwater turtles is a significant human health risk due to PCBs, heavy metals, and other contaminants and (2) wild turtle populations could not withstand current harvest levels. This petition was part of a campaign for more restrictive turtle rules in Florida, Texas, Oklahoma, and Georgia. The International Union For Conservation of Nature/Species Survival Commission (IUCN/SSC), Tortoise and Freshwater Turtle Specialist Group, also petitioned for an emergency rule limiting collection to one turtle per person per day and two per day for groups. FWC staff found that emergency rulemaking, a temporary measure, was not warranted. Instead, the FWC passed an interim rule limiting harvest while a team worked on a more comprehensive long-term solution.

Investigations of Turtle Harvest and Commerce

To research the trade in Florida's freshwater turtles and its impact on turtle populations, FWC staff reviewed literature, held public meetings, met with stakeholders, and toured facilities participating in various aspects of the turtle trade. Initial public meetings were held in August 2008 in Okeechobee and Lakeland. Commercial turtle harvesters, turtle farmers, pet dealers, fish market owners, and members of the public attended these meetings. Staff met separately with a group of external turtle scientists to discuss their concerns, the scientific aspects of turtle harvest, and turtle life history. Another public meeting was held in Tampa in November 2008, at which stakeholders presented information about turtle farming, turtle take, turtle biology, and turtle regulation. Attendees were encouraged to comment on each topic. In addition to these meetings, staff interviewed stakeholders to confirm certain aspects of turtle commerce.

Staff toured facilities and met with individuals participating in the turtle trade, including pet dealers, shipping facilities at the Miami and Tampa airports, freshwater fish markets, and turtle farms. While visiting shipping facilities, staff interviewed U.S. Fish and Wildlife Service (USFWS) shipping inspectors and reviewed shipping documents. Information gathered included destinations of shipments, other ports used, identification of major exporters, types of species exported, shipment methods, etc. Visits to freshwater fish markets shed light on the local demand for turtles. Exporters, mostly seafood dealers, estimated the number of turtles exported in the current market.

Aspects of Turtle Biology

Turtles are generally a long-lived, late-to-mature species. Large females of most species are necessary for the population's survival because they produce more eggs than small females. The number of eggs laid is important because predation of turtle eggs and hatchlings is a limiting factor for most populations. Depending on the species, Florida turtles require from three to 13 years to become reproductively mature. Long-term effects of harvest may only be evident after many years of intensive statewide monitoring, a labor intensive and expensive endeavor that no states are currently conducting.

Existing Regulations Affecting Turtle Trade

International agreements and federal and state laws affect the trade in native Florida turtles. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between governments drafted in 1973. CITES' main goal is to protect wild populations from unsustainable harvest by establishing criteria for regulating international trade through permits. Several native Florida turtle species are protected by CITES agreements, including the alligator snapping turtle (*Macrochelys temminckii*), Barbour's map turtle (*Graptemys barbouri*), Escambia map turtle (*Graptemys ernsti*), and eastern box turtle (*Terrapene carolina*). Trade in these species in all member countries requires an appropriate export permit and a certificate of origin.

In the early 1970s, 280,000 annual cases of salmonella were blamed on pet ownership of small slider turtles. Concerns over this disease led the Food and Drug Administration (FDA) to pass a law in 1975 prohibiting the sale of turtles less than four inches long unless the turtles were being sold for exhibition, education, foreign export, or scientific purposes. After the law was passed, annual salmonella cases fell to 74,000 cases.

There are several FWC regulations pertaining to harvesting (limits, seasons, gear), possessing, selling, and importing wild freshwater turtles, their parts, or eggs. Currently, harvesting freshwater turtles is limited to five per person per day, although people with commercial freshwater fishing licenses can take an additional 15 Florida softshell turtles daily. No license is required to take five daily.

There are seasonal limitations on softshell turtles and river cooters. River cooters cannot be harvested between April 15 and July 31 and softshell turtles cannot be harvested between May 1 and July 31. Other freshwater turtles may be taken year-round manually or with baited hooks, bows, dip nets, traps (designed so that freshwater fish can escape), minnow seines, minnow lift nets, pound nets, hoop nets, or by spearing (from boats or shore only during daylight hours).

On Lake Okeechobee, no person may take or sell any peninsular cooter (*Pseudemys peninsularis*), Florida red-bellied turtle (*P. nelsoni*), Florida snapping turtle (*C. s. osceola*), or Florida soft-shelled turtle having a carapace length of less than eight inches.

Besides the limits on take, several species have possession limits and prohibitions on their sale. The possession limit is one on the alligator

snapping turtle (*M. temminckii*). Box turtles (*T. carolina*), Barbour's map turtles (*G. barbouri*), river cooters (*P. concinna*), loggerhead musk turtles (*Sternotherus. minor*), Escambia map turtles (*G. ernsti*) and diamondback terrapins (*Malaclemys terrapin*) all have a possession limit of two. Although possession of red-eared sliders (*Trachemys scripta elegans*) is allowed, they cannot be bought or sold.

Turtle eggs have the same possession limits and seasonal limits as adult turtles of the same species. In addition, wild turtle eggs cannot be bought or sold and no one can possess more than 50 eggs taken from the wild, in the aggregate, of species of freshwater turtles native to Florida.

Any person buying, trading, exhibiting, or selling freshwater turtles must possess a Class III License for Exhibition or Sale of Wildlife. Applicants for this permit must submit an inventory, including animals they plan to acquire within the year. The annual fee for this license (March 2009) is $50.00.

Importing turtles for sale or use in Florida requires a no-cost Captive Wildlife Transport/Import Permit. Individuals who transport wildlife to permitted wildlife rehabilitation centers must also have this permit. Examples of such actions include transfers between individuals, commercial wildlife dealers, zoos, or other wildlife entities in other states to similar places within Florida. The permit is valid for one year from the date of issuance.

Wild Turtle Harvest, Trade, and Transport in Florida

The primary markets for turtles from the wild are traditional medicines, food, and brood stock for farms. By the late 1990s, more than 13 million adult turtles were being sold annually in Asian countries. The turtles most commonly consumed in these markets are softshell turtles and common snapping turtles. Some scientists are concerned, because Asian turtle species have declined due to local demand, that native United States species are now being harvested more frequently. From 2000 to 2005, the number of snapping turtles shipped from airports in the U.S. increased almost 1200%, while softshell shipping increased more than 270%. In 2004, more than 170,000 wild-caught softshell turtles were shipped from airports in the United States, four times the number reported in 2000.

The commercial turtle harvest is primarily conducted by individuals who usually commercially harvest freshwater fish. Softshell turtles are the most commonly targeted species for commercial take in Florida. Turtles

are a seasonal target for harvesters when other animals are difficult to catch and the demand for wild freshwater turtles is high, generally 30 weeks each year. In order to harvest commercial quantities of Florida softshell turtles (20 daily), harvesters must be in possession of a commercial freshwater fishing license. In March 2008, FWC licensed 1,592 resident commercial freshwater fishermen and 18 nonresident commercial fishermen. Fish market workers and turtle harvesters estimated commercial turtle harvester numbers between 100 and 500. To sell live turtles legally, a harvester must possess a Class III License for Exhibition and Sale. In March 2008, only 52 individuals were in possession of both a commercial freshwater fishing license and a Class III License for Exhibition and Sale. Although others are probably harvesting freshwater turtles in Florida, 52 is the best estimate of legal commercial turtle harvesters.

Most commercial turtle harvesters use setlines or bush hooks, although some use trotlines. People operating more than 25 bush hooks or setlines, or a trotline using more than 25 hooks, are considered to be fishing commercially and must have a commercial license. Setlines or bush hooks use a hook or hooks anchored to shore (tied to a tree branch, fence post, etc.) by monofilament line. These hooks are typically left in the water for long periods. Trotlines consist of a long piece of monofilament line with smaller leaders with hooks trailing from it. Trotlines are checked twice daily and deployed by boat. Commercial fishers are required to label all trotlines and setlines. Commercial harvesters sell their turtles to freshwater fish markets or directly to turtle farms as brood stock.

In 1992 the price for turtles ranged from $0.40 to $1.25 per pound; by 2008, prices ranged from $0.75 to $1.40 per pound. On the first week of the turtle season, August 1 to August 7, 2008, records at a freshwater fish market showed that 15 commercial fishermen sold 5,534 pounds of softshell turtles. This is probably a maximum value since it was the first week of the season. That week, fishermen sold between 34 and 1,148 pounds of turtles, averaging 426 pounds per fisherman. Softshell turtles have a closed season limiting take to 36 weeks. This is a maximum value limited by temperature and other weather conditions. Most fishermen estimate they could take softshell turtles between 24 and 30 weeks annually. Fish market dealers indicate most turtle fishermen only occasionally sell turtles, further limiting the number of turtles harvested.

Fish markets are the primary buyers of freshwater turtles from harvesters, although some fishermen sell directly to farms and exporters. To estimate the number of fish markets dealing in turtles, businesses

holding both a Class III License for Sale and Exhibition and a Commercial Freshwater Fish Dealer license were reviewed to determine the number of markets dealing in food turtles. Pet stores generally dealing in farmed turtles were excluded. Only those business that reported reptiles were included. Businesses with names indicating they sold pets were excluded, leaving 26 probable food turtle dealers. When contacted, only four of these business owners indicated they were buying turtles for sale as food from commercial fishermen. Fish markets have estimated that they buy 140,000 pounds of turtle meat annually and less than 5% of these turtles are sold locally as meat. Turtle meat locally costs about $4.00 a pound with bones and $12.50 without bones. When they are shipped live, the price of turtles averages $2.50 per pound ($0.30 - $13. 00). Live turtles are shipped directly to foreign and domestic markets by fish markets or are sold to exporters who ship them.

Turtles from Florida are shipped to at least 34 different countries including China, Mexico, and Japan. Although turtles shipped abroad are generally sold as food, some are reportedly being used as brood stock for turtle farms in China. Some shipments are flown from Miami directly to Asian ports, such as Hong Kong and Singapore, while others are flown to Los Angeles or Texas. Many domestic shipments are sent eventually to foreign markets. Between 2003 and 2005, there were 1,436 shipments of turtles from the Tampa and Miami airports overseas. Florida Department of Agriculture and Consumer Services (DOACS) inspectors have reported trucks loaded with boxes of freshwater turtles at Florida Agriculture Inspection Stations. One exporter estimated he shipped an average of 3,000 pounds of turtle weekly during softshell season, and his maximum shipments were 15,000 pounds. Recent FWC law enforcement reports indicated that 1,600 to 3,000 pounds of turtles are flown out of Tampa weekly by two exporters, lending support to these estimates. The exporter further estimated he ships between 72,000 and 150,000 pounds of turtle annually, including small turtles from turtle farms and wild captured turtles. Staff has identified only three Florida-based turtle exporters. Declared value of softshell turtles shipped to China from Miami in March of 2008 was $6.00 per turtle with prices varying from $3.00 to $13.00 per pound. At $6.00 per pound, an exporter shipping 150,000 pounds of turtles makes $900,000 annually, before expenses. One exporter estimated that, after paying all expenses, he earned between $0.20 and $0.40 per pound of turtle. Given these estimates, profit on 150,000 turtles would range from $30,000 to $60,000.

Turtles as Pets

By some estimates, the trade in reptiles as pets in the United States is at least a $2 billion per year industry. The sale of live reptiles accounts for about 30% of this trade; other profits come from the sale of bedding, food, cages, and other reptile pet-associated products. Turtles are the most popular (46%) reptile pets. The pet trade in live turtles generates an estimated $276 million annually with the vast majority hatchling-sized pond slider turtles. Pet red-eared sliders (*T. scripta elegans*) have been released and become established in the wild on at least three continents. Effective July 1, 2007, an FWC rule made it illegal to sell red-eared sliders. Several citations have been issued to pet venders violating this rule. Although many are purchased illegally in spite of the 1975 FDA law, small turtles are still popular pets and the vast majority comes from farms in southern states, including Florida. Most of the farms sell the turtles as hatchlings, which range greatly in price. In February 2008, an internet site with a Florida address offered striped mud turtles (a native Florida species) for $25.00 each. Other sites offered alligator snapping turtles for $250.00 each and red-eared slider hatchlings for 39 cents.

Turtle Farms

Turtle farms supply a majority of turtles for the pet trade. Of the approximately 30 active turtle farms in Florida, 25 are certified by DOACS as aquaculture facilities. Most farms sell hatchling-sized turtles for the pet trade, although two farms are raising adult turtles for food. One bulk-food website visited March 10, 2009, (http://www.marxfoods.com) offered farm-raised snapping turtle meat at $24.95 per pound. There are more turtle farms planned in Florida and at least three are currently under development.

Most of the farms dealing in native turtles collect some brood stock from the wild. Those dealing in exotic turtle species purchase or trade to acquire the exotic turtle brood stock. The number of breeding turtles required by a farm depends on several factors and varies widely from farm to farm. Some farmers take thousands of turtles from the wild annually, while others take less than 50. When polled, several farmers suggested that taking between 250 and 500 turtles annually would be sufficient to maintain breeding populations, but more than 1,000 would be necessary to establish an aquaculture of a new species. Although Florida turtle farms take turtles from the wild, they are not required to return any to the wild. In some states, farms release some hatchlings into the wild, although this may not be good conservation practice

because of the potential for introducing disease and altering the genetics of wild populations.

Turtle farms in Florida have a high production potential because of Florida's warmer climate. A pond on a turtle farm in Florida with about 4,000 breeding-sized Florida softshell turtles produces more than 120,000 hatchlings annually. Some of the larger Florida turtle farms can produce 500,000 hatchling turtles annually. In 2004, Louisiana turtle farms produced approximately 12 million hatchling turtles, mostly pond sliders.

Conclusions

Commercial Harvest: Commercial harvest of turtles is not recommended.

The existing scientific data are insufficient to develop effective commercial harvest strategies for freshwater turtles. Although turtles have persisted with harvest for centuries, some population models suggest even short-term commercial harvests could have long-term impacts to turtle populations. These factors coupled with significant increases in commercial harvest pressure and unpredictable markets support a staff recommendation to discontinue all commercial turtle harvest in Florida.

Only a few states allow commercial turtle harvest. When commercial harvest is allowed, it follows the "set low limits" rationale. In Alabama for example, individuals can harvest turtles commercially but may only take 10 per day and a maximum of 100 annually. In Florida there are no monitoring programs or other sources of data related directly to harvest to inform the setting of quotas. In addition, without intensive monitoring, the "set low limits" method is not recommended because of our inability to detect negative impacts on turtle populations.

The foreign market for freshwater turtles appears to be insatiable. Recent decline of China's softshell turtle populations has been attributed to overharvesting for the burgeoning markets for turtles for food and traditional medicine. Furthermore, the demand for freshwater turtles and their value has fluctuated widely in the last decade, making it difficult to predict future market economics. This unpredictable and potentially eruptive foreign market could place much greater harvest pressure on Florida's turtles in relatively short time frames. The impacts of this type of harvest pressure on turtle populations have not been determined.

In the FWC's alligator program, strict monitoring and quota-setting ensure that management can adapt to population changes. There are notable differences, however, between our ability to manage alligator harvests and turtle harvests. There is broad public support for alligator harvests partially due to public safety concerns. Public safety is not a factor with regard to turtle harvesting, and strong public support is lacking. Economically, the products derived from alligator harvests (mostly hides and meat) have much greater monetary value than products derived from turtles. In fact, because of the economic value of alligators and the popularity of alligator hunting, the cost of alligator management and monitoring is completely covered by license and permit

fees associated with alligator harvest programs. This type of fee based management would not be feasible for turtles given the lower economic value of turtles and the relatively low number of people participating in commercial turtle harvesting.

The cost of a program to allow turtle harvest with monitoring is difficult to estimate given that turtles can be found and harvested in such a diversity of habitats, and currently there is no monitoring program of this scope in existence. Florida's statewide alligator harvest program has a statewide monitoring component, but the cost factors are likely to be much different, because alligator surveys can be conducted using cost effective techniques that capitalize on the relative ease of counting alligators at night using spot lights and eye shine. To this point, the cost of administering the statewide alligator harvest is about $190,000 annually, including staff time for monitoring, law enforcement, permitting, and licensing.

Unfortunately, turtle populations cannot be monitored using a single, simple method. In fact, available methods for survey and monitoring turtles are very labor and time intensive even when applied to small bodies of water, and different techniques may be required for different species of turtles in different habitats. Given this, the cost of administering a commercial harvest program for turtles, including a statewide monitoring component would be much higher than for the statewide alligator harvest. Monitoring costs would have to be estimated per water body and per turtle species. Furthermore, long-term studies would be needed to determine the best monitoring methods for and impacts of harvest on wild turtle populations. Without the data gained from such studies, it would not be feasible to design a monitoring program that would ensure a sustainable commercial harvest.

Non-commercial Take: **One Turtle per Person per Day is Recommended for Personal Use, with a Transportation Limit of One Turtle and a Prohibition on the Possession of Eggs**

Besides commercial harvest of turtles, private individuals take turtles from the wild for their own personal use as pets or food. FWC staff recommend a limited non-commercial take of turtles be allowed to give people, especially children, an opportunity to engage with Florida's wildlife. Staff recognizes that interactions with wild turtles are especially important in fostering an understanding of turtles and their habitats. The experience of capturing a wild turtle can be pivotal in creating an interest in conserving wild turtles and by association, their habitats. Staff recommends a bag limit of one per person per day as it would allow

sufficient use of the resource without endangering wild freshwater turtle populations. A limit on transportation of one turtle should accompany the limit on take to prevent poachers from moving large amounts of turtles. As private individuals rarely take and hatch eggs from the wild, there is no need to continue to allow possession of wild turtle eggs. Seasonal prohibitions on turtle harvest should remain to protect adult softshell turtles during their breeding season when they are more vulnerable to harvest.

Alligator snapping turtles, Barbour's map turtles, Suwannee cooters, and the Lower Keys population of striped mud turtles are listed as imperiled species. Previously, some possession was allowed for alligator snapping turtles and Barbour's map turtles, but this allowance should be removed because of concerns that take of these species could impact their populations. Concern about the trade in these turtles has recently (2006) caused them to be added to the CITES Appendix III species list. If species that are difficult to distinguish from listed species are not given the same protections as listed species, people could unintentionally take listed species because of misidentification. Take of common snapping turtles and cooters (*Pseudemys sp.*) should be prohibited because of their similarity to state listed species. The possession limit of two Escambia map turtles, diamondback terrapins, box turtles, or loggerhead musk turtles should remain. The high demand for these species that originally led to the establishment of their possession limits has since increased, making these possession limits even more important to their conservation. For example, Escambia map turtles and box turtles are listed in CITES because of threats due to their trade.

Turtle Farms: Allow Brood Stock Collection for Two Years and Reassess.

Twenty-five aquaculture facilities licensed by the DOACS allow production and sale of freshwater turtles. These turtle farms serve as a commercial source for freshwater turtles that could relieve and eventually eliminate pressure on wild populations of freshwater turtles. Some turtle farms currently depend on collection of wild freshwater turtles to supplement their brood stock. New farms need to collect brood stock to establish breeding populations, and established farms also need to take brood stock to farm additional species. Our recommendation is that farms be allowed to take brood stock by an FWC permit until September 30, 2011 (approximately two years). This will give FWC staff time to research the issue. Unless the FWC takes action otherwise, the draft rules authorizing this permitting program would sunset on September 31, 2011, and

licensed turtle farms would not be permitted to take freshwater turtles from the wild after that time.

Estimated Economic Impacts and Regulatory Costs

Economic Impacts to Stakeholders

The best good-faith estimates of the stakeholders impacted economically by the rule include commercial turtle harvesters (52), fish markets that sell freshwater turtles (4) and seafood dealers that export turtles (3). There will also be some impacts to other businesses and individuals not included here because of the difficultly and inaccuracy of those estimates. These include fish market workers, individuals making and selling turtle harvesting gear (trotlines), companies selling shipping supplies, outboard boat venders, agencies collecting revenue from licensing, airlines, and sellers of fuel.

These economic estimates use prices per pound for turtles. They are maximal values unless otherwise indicated.

A prohibition on selling turtles from the wild will prevent commercial take. Fish markets estimate that all together, they purchase a maximum of 560,000 pounds of turtles from fishermen, mostly softshell turtles. These fishermen are paid between $0.75 to $1.40 per pound for turtles. By selling these 560,000 turtles, all fishermen together would earn between $420,000 and $784,000 total. On average, per fishermen, the loss in revenue annually would be between $8,076 and $40,768 annually. This is an average, based on the number of turtles estimated as purchased by fish markets. To use another estimate, a fishermen could harvest between 34 and 1,148 pounds (average 426 pounds) of turtle each week. These turtles would be worth $255 and $1,607 weekly. If this were extended to the full 36 week turtle season, the annual revenue lost would be estimated as $9,180 and $57,852, although this is most likely an overestimate given that the effective harvest season is limited by weather conditions. The best estimate of the range of revenue lost by each turtle fisherman annually would be a combination of the estimates above, $8,076 to $57,852.

There are four fish markets that buy about 140,000 pounds of freshwater turtles each per year, a maximum total of 560,000 pounds of freshwater turtles, mostly softshell turtles. Less than 5% (7,000 lbs) are sold locally. Boneless turtle meat is worth more per pound, so it will be used to estimate maximum revenue lost. Only a third of a softshell turtle's weight is boneless meat ($12.50 per pound). Only 2,333 pounds of

boneless meat would come from the 7,000 pounds of turtles reduced to meat for local markets. This meat is worth about $29,163. The remaining 133,000 pounds could be sold to exporters for an average of $2.50 per pound, giving a revenue of $332,500 annually. Each fish market could lose an estimated $361,666 in turtle sales each year. All fish markets together would lose an estimated $1,446,664 annually. If they were purchasing $1,110,440 of turtle meat from harvesters, their profit would be $336,224 total or, if divided evenly between the four known markets, $84,056.

Exporters ship both farmed and wild turtles. The prohibition on sale of wild turtles will only affect part of their business. Using the maximum of 150,000 turtles per exporter for three exporters gives 450,000 pounds of turtles shipped annually. Using the declared value of a 2008 shipment of $6.00 per pound gives a total revenue loss of $2,700,000 in exports. Using an exporter's estimated maximum profit of $0.40 per turtle, then a total profit of $180,000 could be lost annually. These are maximum values, but are the best estimate currently available.

Estimated regulatory costs

The only additional costs associated with the recommended regulatory rule changes are those to permit turtle farms. Although there are currently only about 30 turtle farms in Florida, there were once 39.

The cost of issuing a Class III License for Exhibition or Sale of Wildlife was estimated at $48.00 per permit. There are currently between 500 and 600 issued annually for people with reptiles. This license was chosen because the form contained similar inventory requirements and the application could be downloaded from the internet, making it cost-effective. If the costs of the turtle farm permit are similar, the additional regulatory costs would be between $1,440 and $1,872, for 30 to 39 farms.

Individuals in legal possession of alligator snapping turtles, Barbour's map turtles and Suwannee cooters will need permits to allow them to continue to possess their turtles. Individuals needing to transport more than one turtle, who do not have an aquaculture certification or a license for Sale or Exhibition, will also need permits. If these permits are handled in the same manner as the turtle farm permits, the costs would be similar ($48.00) although the total number of permits cannot be estimated.

At the end of the two-year period, a report would be generated on the brood stock harvest program. In addition, FWC staff would be involved in

developing guidelines and monitoring permits. The estimated staff time is 480 hours for report preparation and an additional 200 hours for permit oversight for two years. The total cost would be about $14,280. Adding this cost to the expense of issuing permits gives a total estimated cost of regulatory changes of between $15,720 and $16,152. Because the costs of some permits could not be estimated, these costs are not included in the above estimate.