

# Iowa's Commercial Turtle Harvest

Joint Committee on Turtle Harvest

Fisheries and Wildlife Bureaus

Iowa Department of Natural Resources

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## Introduction

On March 11, 2009, the Iowa Department of Natural Resources (DNR) received a formal petition from the Center for Biological Diversity, and five other Iowa organizations (i.e., the Center for Food Safety, Center for North American Herpetology, Center for Reptile and Amphibian Conservation Management, Iowa Chapter of the Sierra Club, and Tallgrass Prairie Audubon Society) requesting the immediate repeal of Iowa's Commercial Turtle Harvest Rule. In effect, such a repeal would have closed commercial turtle harvest in Iowa. In response, the Fishing and Aquaculture Association submitted a rebuttal paper in April 2009. In May 2009, the Iowa DNR Natural Resource Commission voted to deny the petition by the Center for Biological Diversity and instructed the DNR Fisheries Bureau to review the status of turtle populations in Iowa. If deemed necessary, the DNR was to present recommended regulation changes to ensure a sustainable turtle harvest in Iowa.

The Iowa DNR subsequently formed a committee of fisheries and wildlife biologists with expertise in Iowa turtles, turtle sampling, and turtle harvest management. This committee was tasked with reviewing the turtle program from an unbiased, scientific standpoint and recommending regulations and program changes if deemed necessary.

The primary goal of the Iowa DNR's Commercial Turtle Program is to maintain viable self-sustaining native turtle populations without the aid of stocking that allows for sustainable harvest of commercial species with assurance of consumption safety. The committee reviewed various issues concerning Iowa turtles including turtle biology, current harvest levels in Iowa, forecasted future turtle harvest, consumption and health of eating turtle meat, factors that influence turtle populations, harvesters' attitudes and a variety of related issues. Based on available, scientific information a complete closure was unsupported at this time. However, given the life history characteristics that could be impacted by exploitation, continued increases in demand, and anthropogenic threats that face turtles in Iowa – the Committee determined that program and regulation changes in addition to initiating a rigorous statewide turtle sampling study were necessary to ensure the commercial harvest of Iowa's turtle populations is sustainable. Below is a brief synopsis of their findings.

## **Current Regulations**

Iowa Code 482, Commercial Fishing, and Iowa Administrative Code, Chapter 86, regulates the commercial harvest of turtles in Iowa. A resident commercial turtle harvester license is \$100 and a nonresident commercial turtle harvester license is \$200. Nonresidents may only harvest turtles on the Mississippi, Missouri and Big Sioux Rivers. Resident commercial turtle harvesters may take commercial turtle species from all waters of the State of Iowa. Licensed commercial fishers may harvest turtles from the Mississippi and Missouri Rivers only. Four turtle species can be commercially harvested in Iowa: common snapping (*Chelydra serpentina*), smooth softshell (*Apalone mutica*), spiny softshell (*A. spinifera*), and painted (*Chrysemys picta*) turtles. Turtles may be legally taken by hand, turtle hook, turtle trap, licensed commercial fishing gear (in the Mississippi and Missouri Rivers), and hook-and-line. Turtle traps must be constructed with no more than one throat or funneling device. The last hoop to the tail-line of turtle traps must have a functional escape hole with a minimum diameter in all directions of 7½ inches to allow passage of fish and small turtles. Barrel and floating type turtle traps must have a functional escape hole below the water surface with a minimum diameter in all directions of 7½ inches. There is no closed season so turtles may be harvested throughout the year. Commercial turtle harvesters are required to report their harvest to the Iowa DNR on a monthly basis.

## **History of Turtle Harvest in Iowa**

### ***Anecdotal information about turtle harvest prior to reporting requirement (pre-1987).***

Turtles have been harvested for subsistence human consumption worldwide since before the written record. Archaeological excavations have found evidence of turtle consumption from about 6,000 years ago during the Bronze Age (Schleich and Bohme 1994). Gibbons and Greene (2009) state that "eating turtle eggs and larger individual turtles was a widespread practice among primitive societies living...around large rivers and lakes. Turtles were considered an edible component of the available

fauna and were consumed at a sustainable rate in situations where humans lived off the land and did not exploit turtles as a commodity.” Post Civil War, turtle consumption in the United States became more associated with either wealthy Americans who could pay for the meat preparation or poor, rural Americans living off the land (Bronner 1986). By the early 1900s, commercial trade of turtles was common in the 28-state Mississippi River Basin.

### ***Turtle harvest for the soup industry.***

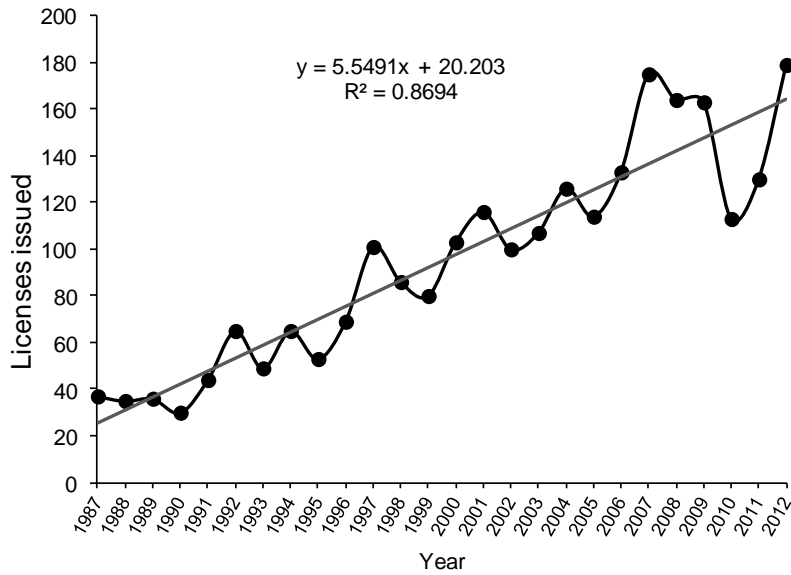
Several commercial turtle harvesters have previously suggested that 300,000-400,000 pounds of Iowa caught common snapping turtles were harvested to supply meat to Campbell’s Soup Company during the 1920s-1930s. An exhaustive literature search and personal communications with several turtle harvest experts (i.e., Peter Pritchard, Chelonian Research Institute; Paul Moler, Florida Fish and Wildlife Commission) and a representative from Campbell’s Soup Company (Dorothy Esola) could not substantiate this claim. Campbell’s Soup Company was founded in 1869 and canned turtle soup was one of 21 flavors available, first produced in 1902; however, their canned turtle soup was actually mock turtle soup and the meat used was veal (i.e., calf meat; Dorothy Esola, personal communication). The Campbell’s Soup Company claims that no common snapping turtles, nor any other turtle species, were used in the production of its canned turtle soup.

From 1954 to 1972, Campbell’s Soup Company produced frozen turtle soup that included meat largely obtained from common and alligator snapping turtles (Pritchard 1989). Although some common snapping turtles were harvested for turtle soup, most turtle meat for this frozen soup came from the larger bodied alligator snapping turtles harvested in Georgia, Louisiana, Florida, Alabama, and Mississippi (P. Pritchard and P. Moler, personal communication). Most of these populations were depleted by commercial harvest (Pritchard 1989; Peter Pritchard, personal communication) and Campbell’s Soup Company coincidentally discontinued production of their frozen turtle soup after Florida closed commercial harvest of alligator snappers in 1972 (Paul Moler, personal communication).

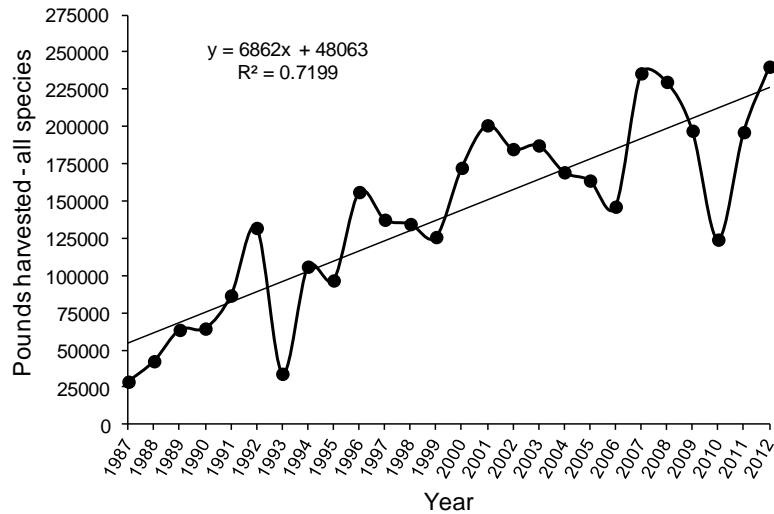
Based on this information, it seems unlikely that Iowa common snapping turtle harvest ever contributed substantially to the production of Campbell’s Soup Company’s turtle soup as previously claimed.

### ***Turtle harvest since 1987.***

Documentation of Iowa’s commercial turtle harvest began in 1987 when turtle harvester license holders were first required to report numbers and locations (county level only) of turtles harvested. In 1987, the Iowa Conservation Commission (now the Iowa DNR) issued 37 commercial turtle harvester licenses. Since then the number of licenses issued has steadily increased to 175 in 2007, with 179 licenses issued in 2012 (Figure 1). Approximately 29,000 pounds of turtles were reported taken in 1987 whereas in recent years harvest has met or exceeded 200,000 pounds (Figure 2). In general the number of harvesters and the numbers of turtles trapped has increased throughout the program’s history.

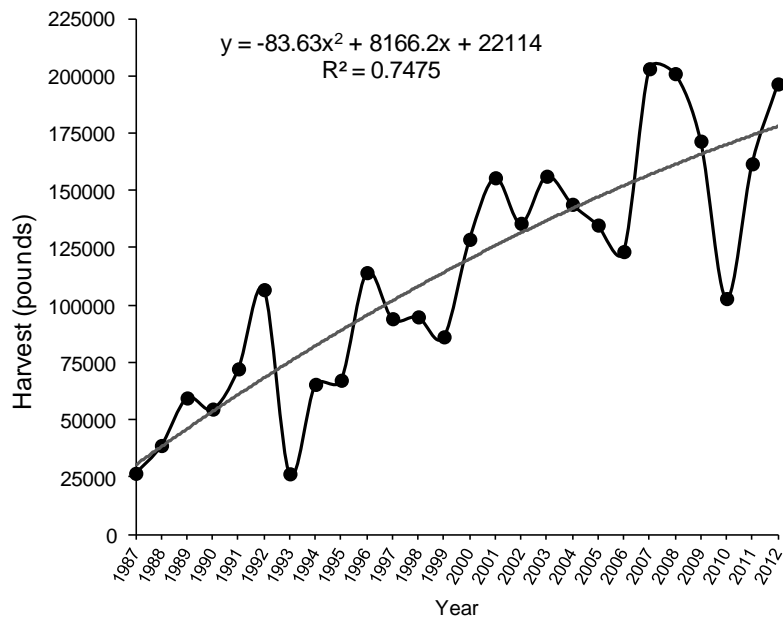


**Figure 1.** Total number of commercial turtle harvesters in Iowa from 1987-2012.

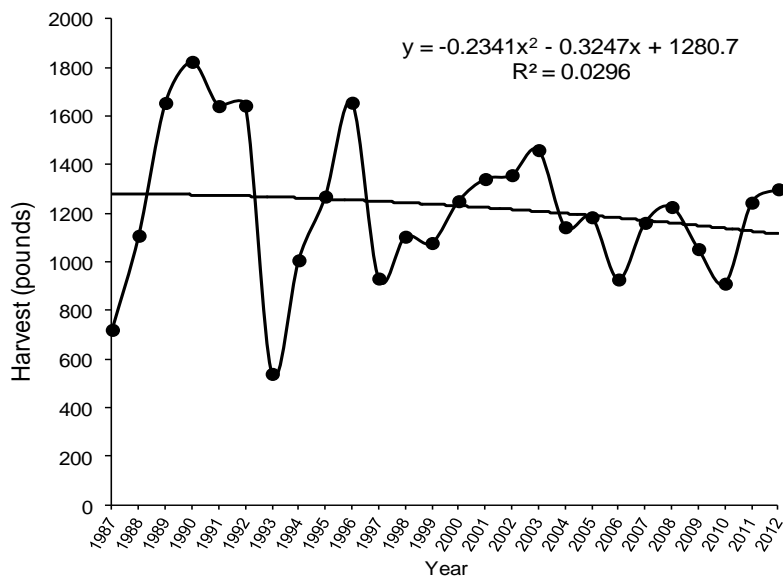


**Figure 2.** Commercial harvest (pounds) of all species of turtle by year.

Commercial snapping turtle harvest has increased steadily since 1987 at an approximate rate of 5,991 pounds per year (Figure 3). During this period however, harvest per licensee has generally decreased each year from a peak of 1,823 pounds per licensee in 1990 to 910 pounds per licensee in 2010 (Figure 4).

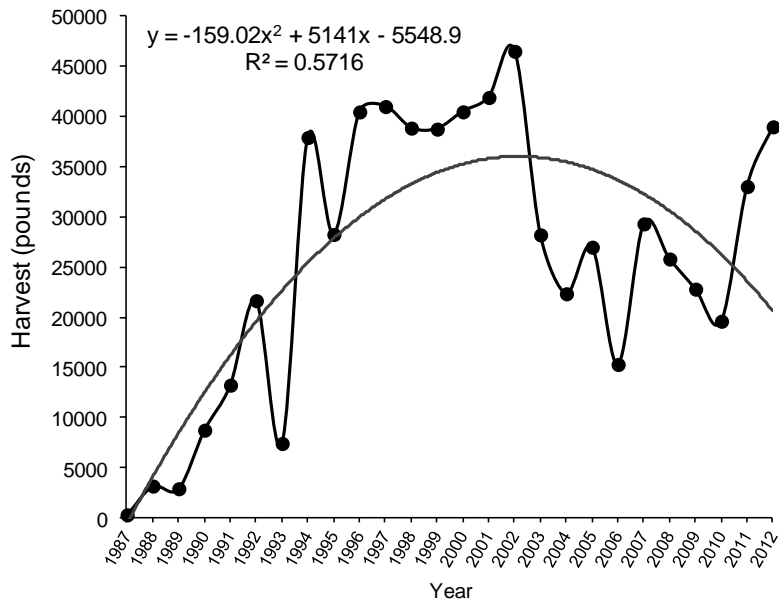


**Figure 3.** Total commercial harvest (pounds) of common snapping turtle reported by licensed turtle harvesters in Iowa from 1987-2012.

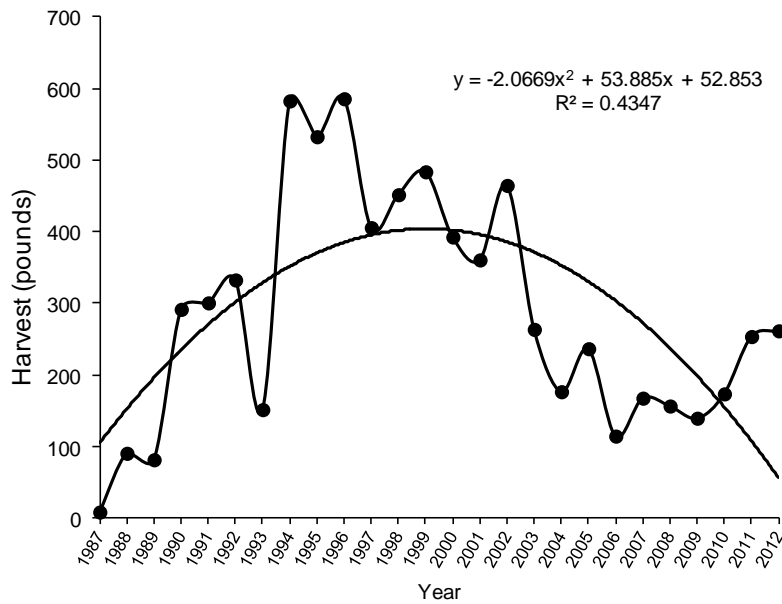


**Figure 4.** Mean reported commercial harvest (pounds) of common snapping turtle per licensed turtle harvester in Iowa from 1987-2012.

Total softshell turtle harvest has decreased since it peaked at 46,496 pounds in 2002 and has been declining since (Figure 5). Reported harvest during the 1997 to 2001 time period was around 40,000 pounds but in recent years was around 20,000 pounds. Reported harvest per licensee has continued to decrease since 1996 (Figure 6).

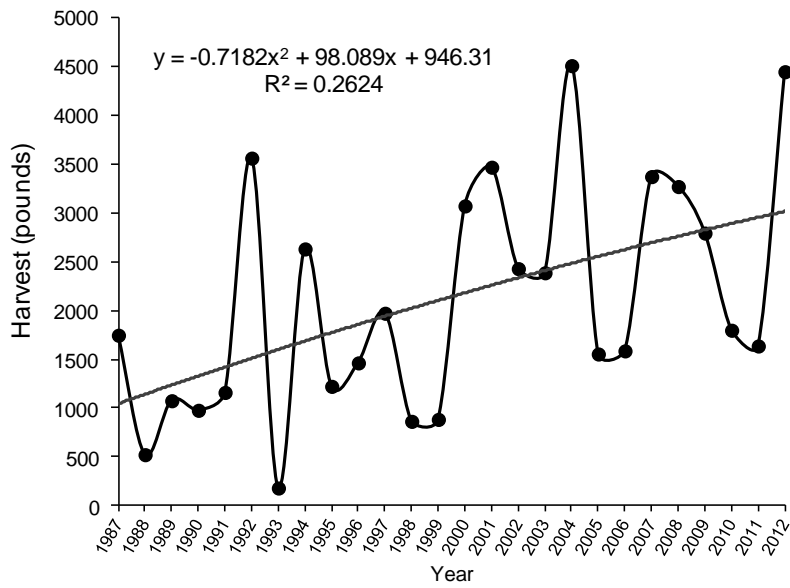


**Figure 5.** Total commercial harvest (pounds) of softshell turtle reported by all licensed turtle harvesters in Iowa from 1987-2012.

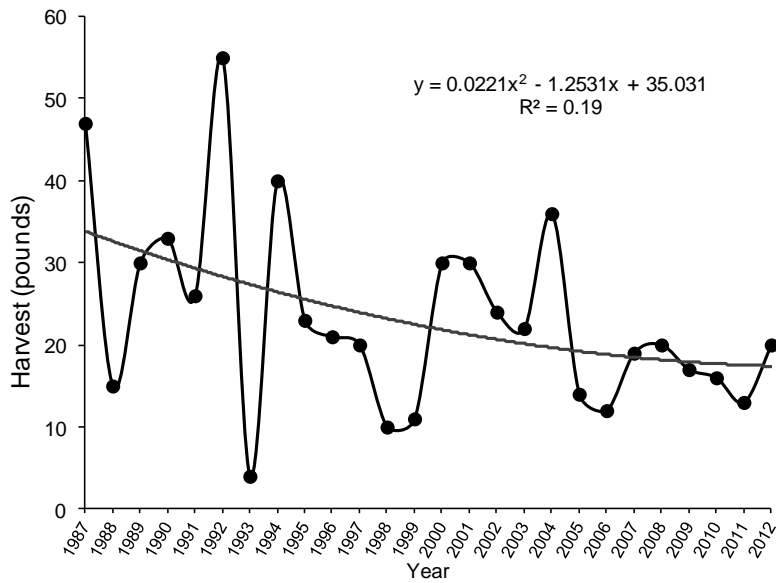


**Figure 6.** Mean reported commercial harvest (pounds) of softshell turtle per licensed turtle harvester in Iowa from 1987-2012.

Painted turtle harvest has generally increased from the 1987-1991 period when about 1,000 turtles were reported, to between 1,500 and 4,500 turtles during the 2000-2012 period (Figure 7). Painted turtle harvest per licensee has decreased gradually since 1987 (Figure 8).



**Figure 7.** Total commercial harvest (number) of painted turtle reported by licensed turtle harvesters in Iowa from 1987-2012.



**Figure 8.** Mean reported commercial harvest (number) of painted turtle per licensed turtle harvester in Iowa from 1987-2012.

## Concerns

*Demand for wild caught turtles is increasing and there are fewer US sources.*

Overseas markets, U.S. international markets and pet trade are driving demand for U.S. turtles (Brown et al 2011). Iowa's relatively liberal regulations (as compared to neighboring states) allow virtually unrestricted harvest to meet this demand. Since 1987, Iowa has experienced a nearly seven-fold increase in the commercial turtle harvest (Osterkamp and Hanson 2012). The market for turtle meat has exponentially increased over the last several years, both inside the United States and abroad (Hylton 2007). In 2012, over 8 million turtles were exported from the United States, primarily to Asian markets (USFWS, Office of Law Enforcement unpublished data). China is now the largest importer of freshwater turtles (USFWS, Office of Law Enforcement unpublished data) for consumption and supplying broodstock for an increasing turtle farming industry. Shi et al. (2007) reported over 1,000 turtle farms in operation with an estimated value of more than \$1 billion USD. These farms are expected to increase demand for wild caught turtles to sustain reproductive output (Shi et al. 2007), since successive generations of turtles tend to have a more limited reproductive capacity (Cain 2010). While many turtles in Asian markets today are farmed, commercial harvest of wild turtles occurs legally in several U.S. states, which also contributes to these markets (Nanjappa and Conrad 2010). It is likely that most turtles harvested in Iowa are ultimately shipped overseas as overseas markets are driving the demand for U.S. turtles (Brown et al. 2011).

A potential compounding factor in the increased harvest of Iowa's turtles is the relatively strict restrictions on commercial harvest in surrounding states. Commercial turtle harvest in most surrounding states is prohibited or allowed under more restrictive regulations than Iowa. Illinois, Nebraska, and South Dakota are closed to commercial turtle harvest. Commercial turtle harvest is currently allowed in Minnesota but they enacted provisions in 2002 (Statute 97C.605) specifying that except for renewals, no new turtle licenses could be issued and that a turtle license could be transferred only once to a child of the person holding the license (i.e., commercial turtle harvest will eventually be "phased out" as these harvesters and their children retire; Nanjappa and Conrad 2011).

### ***Turtle harvest trends are alarming.***

Long term trends show an overall increase in common snapping turtle harvest since 1987. Simultaneously, harvest per trapper has gradually decreased. This decrease is slight (<10 pounds per year per trapper) so it is unlikely that individual harvesters have noticed that their annual catch is gradually decreasing over time. From a sustainable management standpoint, these trends are alarming.

Softshell turtle harvest increased rapidly from 1987 through 2001 and had decreased steadily from 2002 through 2010 until the last two years. Sharp increases, followed by downward harvest trends for a commercially valuable species are concerning when the downward trend includes over 8 years of data. Decreases such as this are concerning when harvest removes the reproductively viable adults which causes a reduction in reproductive ability and thus sustainability (Beverton and Holt 1957, Ricker 1975, Quinn and Deriso 1999).

### ***Major threats to Iowa's turtle populations continue.***

Today less than 5% of Iowa's wetland acres remain from pre-settlement and 69% of Iowa's landscape was in active row crop production or urban development in 2007 (USDA 2013). Iowa's Wildlife Action



Plan lists “Habitat Conversion to Row Crop”, “Wetland Drainage”, “Habitat Fragmentation”, “Absence of Habitat”, “Conversion to Residential”, and “Loss of Connectivity” all as categories of high stress for reptiles in general (Zohrer 2006). Loss of habitat due to the draining of marshes and wetlands, sedimentation of backwaters, channelization of rivers and streams, and loss of ephemeral ponds can negatively impact turtle populations. Turtles are semi-aquatic and require both wetland and upland habitats in order to meet their life history requirements and, less available habitat means less turtles. Habitat destruction can also force turtles to utilize less suitable habitat making them more susceptible to predation.

Channelization of rivers and streams changes the natural hydrologic cycles by increasing flow rates, leading to channel incision, and erosion. These disturbances can have adverse effects on turtle populations by eliminating habitat thereby impacting feeding and nesting conditions. Rural and urban development can encroach on areas utilized by turtle species. The worst case scenario is that entire habitats can be destroyed and habitat can be fragmented, isolating populations creating reduced genetic diversity.

Mammalian predators excavate and destroy most turtle nests. For example, nearly 60% of snapping turtle nests were destroyed over the course of two visits by furbearers in a study conducted by Hammer (1969). Nest predation rates on a common snapping turtle population in Michigan averaged 70% during a seven-year study, ranging from 100% in two years to 30% in one year (Congdon et al. 1987). Similar levels of predation are endured by Iowa turtles. Raccoons, skunks, opossums, minks are all known predators on turtle nests. Even birds such as the American crow have been observed preying on turtle nests (Scott Gritters, Iowa Department of Natural Resources, personal communication). Populations of nest and hatchling predators associated with humans such as domestic dogs, cats, and scavenging raccoons (especially those associated with urban areas) promote higher levels of nest predation to the disadvantage of many turtle species (Ernst and Lovich 2009). Predation on turtle nests is a natural stressor on turtle populations that is magnified when nesting habitat is reduced in size and fragmented. Nest predation in Iowa may be un-naturally high because large natural predators of meso-predators have been eliminated. Both fur trapping and hunting need to remain viable methods to help reduce nest predators such as raccoons and skunks to manageable levels.

The construction of highways and secondary roads increases the likelihood of car-turtle collisions. Females of all turtle species leave the water and make migrations to suitable nesting areas; often, this involves crossing a roadway. Turtles can be hit by vehicles causing death or severe injury. The sex ratio of turtle populations located adjacent to roadways can be skewed to more male as females are the more likely casualty while crossing the road and female turtles on roadways are easily captured by harvesters or collected as pets (Haxton 2000; Steen and Gibbs 2004; Steen et al. 2006).

If left unchecked, turtle harvest can be a major threat to turtle populations. Populations can quickly be overharvested when demand is high and harvesters target large, old females. Even if harvesters remove only the adults, leaving behind some juveniles to eventually replenish the population, it can take years for a population to recover. Females typically require 7-11 years to attain sexual maturity, and because nest predation is so extensive, it may be another 15 years before successful reproduction takes place (James Christiansen, Professor Emeritus of Biology, Drake University, personal; communication).

Natural turtle mortality is very high and the anthropogenic threats described above have artificially elevated that mortality rate thereby reducing the number of turtles that survive to adulthood. The reproductive strategy of turtles involves producing many young (with no parental care) in hopes that a few survive and perpetuate the population. Many mature adults are needed to populate aquatic environments with hatchlings that suffer heavy mortality. Therefore, it is critical to allow as many females as possible to nest in order to maximize the number of hatchlings produced. Protecting large, old females long enough for them to lay their eggs is the best way to ensure that enough eggs are being laid to sustain the population. Most anthropogenic threats cannot be controlled; therefore more controllable sources of mortality, such as harvest, must be used to offset the impacts of other threats.

***Life history characteristics of turtles make them prone to overharvest.***

Life history characteristics of turtles make them difficult to manage for sustainable commercial harvest. These characteristics include an extended age to maturity, low annual fecundity and low hatchling survival. For Iowa turtles, like all the worlds’ turtles, the key to self sustaining populations is to have high annual adult survival (Congdon et al. 1994, Congdon and Dunham 1994, Congdon and Gibbons 1990, Heppel 1988). Habitat destruction and harvest are two factors that greatly influence adult survival of turtles – both occur relatively unchecked in Iowa. Risks associated with harvest are exacerbated in the case of Iowa turtles because harvesters normally target large adults. Additionally, targeting females for egg/hatchling market may skew the population and reproductive rates can be become further depressed. This vulnerability to overharvest requires vigilant monitoring, strict regulations, and stringent enforcement to ensure sustainability.

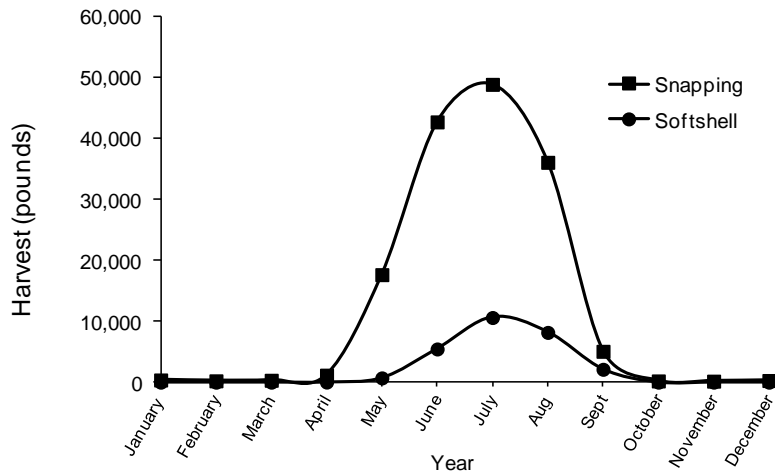
***Currently, nearly a third of commercial turtle harvest occurs during the nesting season.***

Iowa turtles nest mid May through July (Table 1). Common snapping turtles nest mid May to mid June and softshell turtles nest throughout June and July with some beginning to nest in late May. The presence of large, non-ovulatory follicles in young females had resulted in the belief that female snappers mature at younger ages than they do. Christiansen and Burken (1979) found that ovulations most often occur in the seventh full year of growth (excluding the hatching year) or even later at plastral lengths of at least 6.9 in (8.3 in carapace length). A six year old female had just matured but it was larger than many older females and one 11 year-old was still immature. Females typically mature three years later than males (James Christiansen, Professor Emeritus of Biology, Drake University, unpublished data). This has serious implications when larger snapping turtles are harvested for food. Harvest occurs throughout the year in Iowa with 40% of the snapping turtle harvest occurring in the months of May and June and 60% of the softshell harvest occurring in the months of June and July (Figure 9).

**Table 1.** Nesting season, size and age at maturity, and maximum length of commercially harvested turtle species in Iowa. PL=plastron length, SCL=straight line carapace length.

Species	Nesting season		Size at maturity	Age at maturity	Maximum length
	<i>Le Clere 2009</i>	<i>Ernst &amp; Lovich 2010</i>	(PL, inches)	(years)	(SCL, inches)
Painted turtle	Late May-June	June	M = 2.8-3.7	M = 2-4	M = 6.0
			F = 3.8-5.0	F = 6-10	F = 10

Common snapper	June	May 15-	M = 5.9-6.1	M = 4-5	M = 19.4
		June 15	F = 4.8-6.9	F = 4-7	F = 14.4
Spiny softshell	June-July	June-July	M = 3.1-3.5	M = 4-5	M = 8.5
			F = 7.1-7.9	F = 8-10	F = 21.3
Smooth softshell	June-July	Late May- July	M = 3.1-3.3	M = 4	M = 10.4
			F = 5.5-5.9	F = 9	F = 14.0



**Figure 9.** Average reported monthly Iowa commercial turtle harvest (lbs) of snapping and softshell turtle from 2008-2012.

#### ***Turtle harvester opinion survey information.***

Commercial turtle harvesters were surveyed to gain an understanding of harvesters' attitudes and opinions pertaining to turtle populations, regulations, and reporting procedures in 2002 and 2008. Responses of commercial turtle harvesters suggest that many harvesters are open to regulations (season and/or length limits) and at least some commercial turtle harvesters believe populations may be declining in parts of Iowa. For example on the issue of a harvest season, 36% of harvesters surveyed in 2008, indicated that they would welcome some sort of season on turtles. Most wanted a six-month season from May through October but some harvesters wanted only a three- or four-month open season during the summer (Gritters 2009).

#### ***Stocking of turtles.***

Stocking of turtles is not a viable option because of the risk of potential skewed sex ratios, genetic diversity issues, disease introduction, and invasive species risks. Capital to invest in buildings, broodstock and staff to operate a turtle production facility would be cost prohibited.

## Recommendations

The committee recommends that commercial turtle harvest in Iowa should be closed if turtle populations show signs of population decline. Lack of mature adults, skewed sex ratios, and decreased stock abundance are all negative impacts to turtle population dynamics that may lead to population declines. Available information does not support the need for a complete closure at this time; however, based on known turtle life history characteristics, documented harvest trends, and current demand, several steps should be taken immediately to reduce the likelihood of overharvest. The Committee recommends the following changes in addition to initiating a rigorous statewide turtle sampling study:

***Establish a closed season to allow some turtles to nest prior to being vulnerable to harvest.***

Eliminate the commercial and sport harvest of turtles during the majority of the egg-laying period (i.e., May-July 15). In order to reduce confusion, the closed season would extend from January 1 through July 15 each year. A closed harvest season will temporarily remove a source of mortality that the DNR can control and, as a result, benefit populations of Iowa's four harvestable turtle species. Although season will be closed for approximately half of the peak harvest period, turtles that would have normally been harvested before they laid their eggs (i.e., May-mid-July), can still be harvested later in the year after they have laid their eggs

***Mandatory on-line data entry for commercial turtle harvesters.***

Create an on-line system for commercial harvesters to submit monthly harvest reports. An on-line system would replace the monthly mailing needed to report turtles and would reduce Iowa DNR mailings and increase law enforcement efficiency with real-time monitoring of commercial harvest.

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