

***Illex* AP Informational Document - APRIL 2015**
Jason Didden

****Note - Data Sources for the following are generally from unpublished NMFS Survey, Dealer, VTR, Permit, and MRFSS databases unless noted...everything should be considered preliminary.**

Basic Biology

The age and growth of *Illex* has been well studied relative to other squid species, being one of the few for which the statolith ageing method has been validated (Dawe *et al.* 1985). Based on a statolith age analysis, *Illex* squid residing in US waters have a maximum lifespan of about 215 days (about 7 months, Hendrickson 2004).

Illex is a terminal spawner with a protracted spawning season. The only confirmed spawning area is located in the Mid-Atlantic Bight where the winter cohort spawns during late May (Hendrickson 2004). Spawning may also occur offshore in the Gulf Stream/Slope Water frontal zone, where *Illex* sp. paralarvae have been collected (O'Dor and Balch 1985; Rowell *et al.* 1985), and south of Cape Hatteras, during winter, where *Illex* sp. hatchlings have been collected (Dawe and Beck 1985).

Illex feed primarily on fish, cephalopods (i.e. squid) and crustaceans. Fish prey include the early life history stages of Atlantic cod, Arctic cod and redfish (Squires 1957, Dawe *et al.* 1997), sand lance (Dawe *et al.* 1997), mackerel and Atlantic herring (O'Dor *et al.* 1980, Wigley 1982, Dawe *et al.* 1997), haddock and scalping (Squires 1957). *Illex* also feed on adult capelin (Squires 1957, O'Dor *et al.* 1980, Dawe *et al.* 1997), smelt and mummichogs (O'Dor *et al.* 1980). Cannibalism is significant, and *Illex* also feed on longfin squid (Vinogradov 1984). Maurer and Bowman (1985) have demonstrated a seasonal shift in diet. When *Illex* are offshore in the spring, they primarily consume euphausiids, whereas they consume mostly fish and squid when they are inshore in the summer and fall. Individuals 2.4-4 in (6-10 cm) and 10.4-12 in (26-30 cm) ate mostly squid, 4.4-6 in (11-15 cm) *Illex* ate mostly crustaceans and fish, and those 6.4-8 in (16-20 cm) ate mostly crustaceans. Perez (1994) also demonstrated *Illex* consume less crustaceans and more fish as they grow larger.

Illex are an important prey species and are known to be preyed upon by many pelagic and demersal fish species, as well as by marine mammals, seabirds, and longfin squid (Butler 1971, Vinogradov 1972, Maurer 1975, Buckel 1997, Langton and Bowman 1977, Lilly and Osborne 1984, Templeman 1944, Stillwell and Kohler 1985, Scott and Scott 1988, Squires 1957, Wigley 1982, Major 1986, and Brown *et al.* 1981).

Status of the Stock

The *Illex* stock was most recently assessed at SARC 42 (2006). SARC 42 was publically available in 2006 and included data through 2004. It was not possible to evaluate current stock status because there are no reliable current estimates of stock biomass or fishing mortality rate. In addition, no projections were made in SAW 42. SAW 37 (the previous assessment) also could not evaluate current stock status because there were no reliable estimates of absolute stock biomass or fishing mortality to compare with existing reference points. However, based on a number of qualitative analyses, it was determined that overfishing was not likely to have occurred during 1999-2002.

A portion of the stock seasonally resides and is also fished outside US waters, but landings have been mostly from US waters, during most years, since 1998 (Hendrickson and Showell 2010). Also, the northern stock component, extending from Newfoundland to the Scotian Shelf, is assessed annually and managed by the Northwest Atlantic Fisheries Organization (NAFO) based on a total allowable catch (TAC).

The NMFS Northeast Science Center has provided updates regarding indices and recent biological data (<http://www.mafmc.org/council-events/2015-msb-ap>). This document should be read in conjunction with the Center's update and much of the information from that document is not repeated in detail here.

Fishery Performance

Foreign fishing fleets became interested in exploitation of the squid stocks of the Northwest Atlantic Ocean when the USSR first reported squid bycatches in the mid-1960's. By 1972, foreign fishing fleets reported landing 17,200 thousand mt of *Illex* from Cape Hatteras to the Gulf of Maine. During the period 1973-1982, foreign landings of *Illex* in US waters averaged about 18,000 mt, while US fisherman averaged only slightly more than 1,100 mt per year. Foreign landings from 1983-1986 were part of the US joint venture fishery which ended in 1987. The domestic fishery for *Illex* increased fitfully during the 1980's as foreign fishing was eliminated in the US EEZ. *Illex* landings are heavily influenced by year-to-year availability and world-market activity and vary substantially year to year (Figure 1).

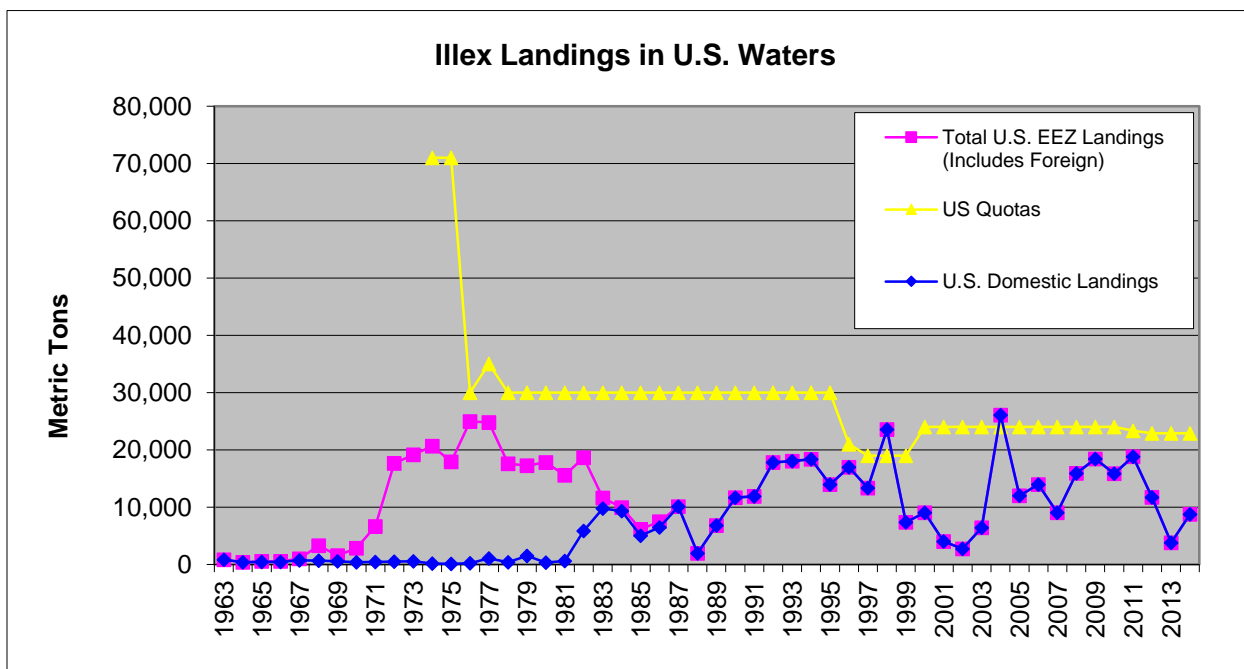


Figure 1. *Illex* landings within 200 miles of U.S. Coast (2014 Preliminary).
Source: TRAC 2010, unpublished NEFSC dealer reports

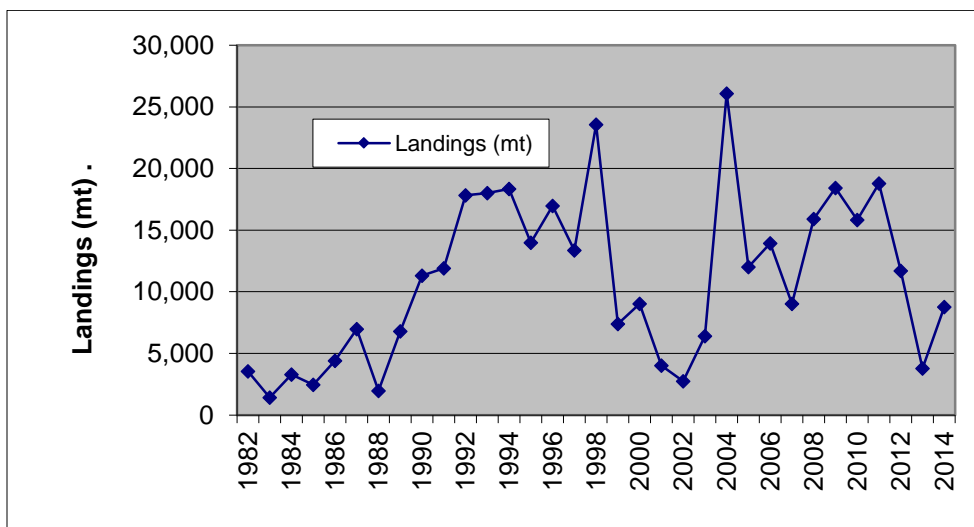


Figure 2. U.S. *Illex* landings. Source: unpublished NEFSC dealer reports

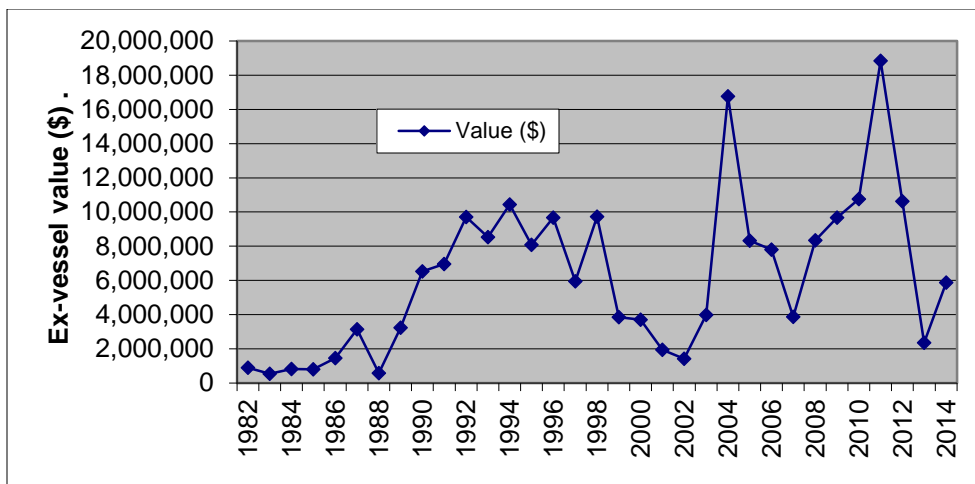


Figure 3. U.S. Illex ex-vessel revenues (nominal)

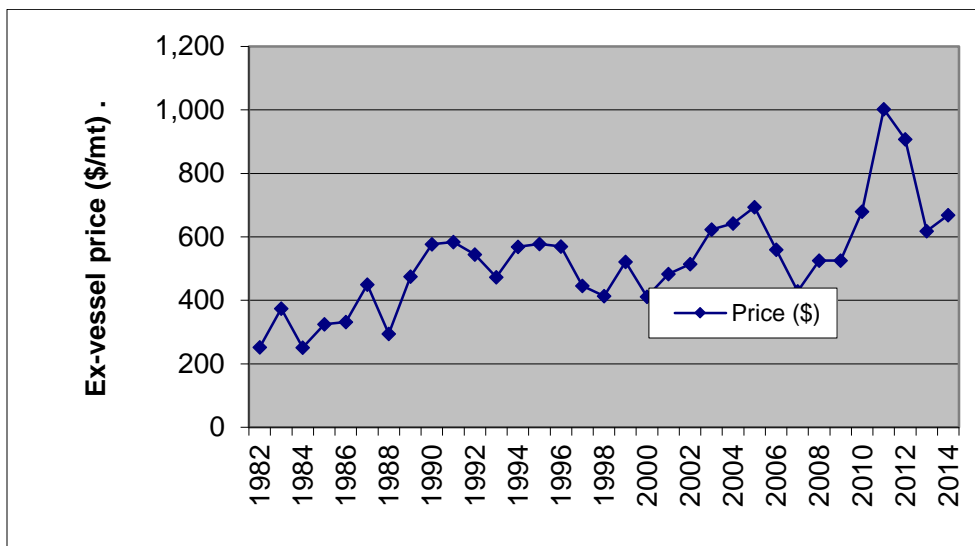


Figure 4. U.S. Illex ex-vessel prices (Nominal)

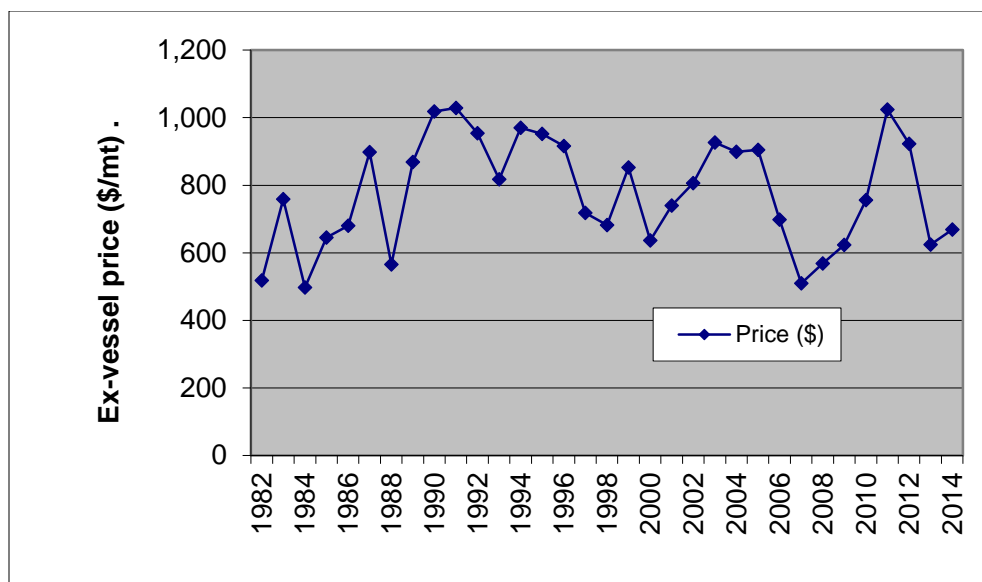


Figure 5. U.S. Illex ex-vessel prices (Producer Price Index adjusted, 2014 dollars)

Source: Unpublished NMFS dealer reports

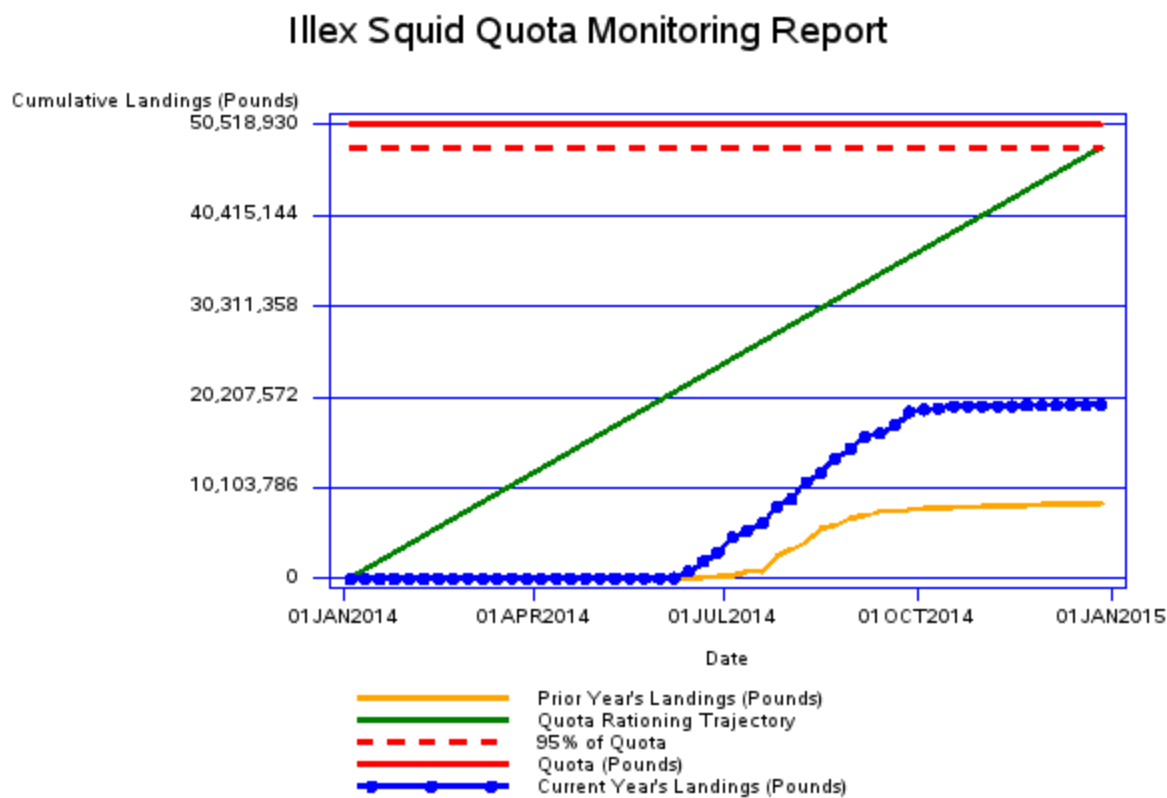


Figure 6. 2014 Landings (blue) & 2013 Landings (orange)

source: http://www.nero.noaa.gov/ro/fso/reports/reports_frame.htm

Specification Performance

The principle measure used to manage *Illex* within a year is monitoring via dealer weighout data that is submitted weekly. The dealer data triggers in-season management actions that institute relatively low trip limits when 95% of the quota is landed. Table 1 lists the performance of the *Illex* fishery compared to its quota. The quota reductions in 2011/2012 occurred due to subtracting discards from the Acceptable Biological Catch. Most *Illex* landings go into Rhode Island and New Jersey – updates for 2014 are not broken down by state because of confidentiality concerns. Both squids are in constant, multi-year quotas through 2017 subject to annual review by the SSC and Council, and the *Illex* quota is set at 22,915 mt.

Table 1. *Illex* DAH Performance. (mt)

Source: Unpublished NMFS dealer reports

Year	Landings	Quota	Percent of Quota Landed
2004	26,091	24,000	109%
2005	12,011	24,000	50%
2006	13,944	24,000	58%
2007	9,022	24,000	38%
2008	15,900	24,000	66%
2009	18,418	24,000	77%
2010	15,824	24,000	66%
2011	18,797	23,328	81%
2012	11,709	22,915	51%
2013	3,792	22,915	17%
2014	8,776	22,915	38%

Table 2. 2014 *Illex* landings (mt) by month.

MONTH	Metric Tons	Percent
1	6	0%
2	3	0%
3	18	0%
4	5	0%
5	12	0%
6	1,514	17%
7	2,180	25%
8	3,014	34%
9	1,735	20%
10	238	3%
11	37	0%
12	16	0%

Source: unpublished NEFSC dealer reports

Table 3. Vessels active in various annual landing ranges (pounds per vessel)

YEAR	Vessels 500,000 +	Vessels 100,000 - 500,000	Vessels 50,000 - 100,000	Vessels 10,000 - 50,000
1982	7	7	0	10
1983	1	8	7	11
1984	4	15	4	6
1985	2	6	4	3
1986	8	6	4	3
1987	7	10	2	1
1988	3	3	1	2
1989	8	5	1	3
1990	12	3	0	1
1991	12	1	1	0
1992	16	1	0	1
1993	19	3	1	3
1994	21	7	5	8
1995	24	5	2	7
1996	24	5	6	4
1997	13	9	2	0
1998	25	4	1	3
1999	6	9	2	10
2000	7	7	0	2
2001	3	4	1	2
2002	2	3	1	1
2003	5	6	1	2
2004	23	5	2	0
2005	7	11	2	2
2006	9	8	1	2
2007	8	2	1	0
2008	12	4	1	0
2009	10	3	1	1
2010	13	5	0	4
2011	17	4	2	0
2012	8	3	2	2
2013	5	4	3	5
2014	5	3	2	3

Source: unpublished NEFSC dealer reports

Table 4. Number of Vessels to reach 75% and 95% of annual landings.

Year	Percent of Catch Harvested by Federally-Permitted Vessels	Number of vessels that harvested approx. 75% of federal landings	Number of vessels that accounted for about the next 20%	Number of vessels that accounted for about 95% of federal landings
1997	100%	7	9	16
1998	100%	13	11	24
1999	100%	5	8	13
2000	100%	5	6	11
2001	100%	CI		7
2002	100%	CI		5
2003	100%	3	6	9
2004	100%	11	11	22
2005	100%	8	10	18
2006	100%	4	7	11
2007	100%	5	3	8
2008	100%	5	6	11
2009	100%	5	4	9
2010	100%	6	7	13
2011	100%	7	9	16
2012	100%	4	4	8
2013	100%	4	5	9
2014	100%	CI		6

CI = Confidential Information

Source: Unpublished NMFS Dealer/Permit Data

Table 5. Species Composition (by value) by the 6 vessels that accounted for 75% of total Illex harvest by weight 2008-2012. Only species that contributed at least 2% are included.

Species	For Primary Illex Vessels, percent of total revenue that came from various species.
Illex	63%
Loligo	13%
Atl mackerel	12%
Atl Herring	5%
Silver Hake	2%
Total	95%

Source: unpublished NEFSC dealer reports.

Since Illex squid is in multi-year quotas this table was not updated for 2014

Table 6. Species Composition (by value) by the 5 vessels that accounted for 75% of total Illex harvest by weight 2001-2005.

	For Primary Illex Vessels, percent of total revenue that came from various species.
Illex	35%
Atlantic Mackerel	27%
Loligo	17%
Atl Herring	9%
Menhaden	4%
Butterfish	2%
Total	94%

Source: unpublished NEFSC dealer reports.

Since Illex squid is in multi-year quotas this table was not updated for 2014