

**CAPE HATTERAS NATIONAL SEASHORE
AMERICAN OYSTERCATCHER (*HAEMATOPUS PALLIATUS*) MONITORING
2011 ANNUAL REPORT**



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ABSTRACT

In 2011, 23 pairs of American Oystercatcher (AMOY) nested at Cape Hatteras National Seashore (CAHA). Nests, including re-nests by pairs with failed attempts, totaled 26. Of these nests, 22 (85%) hatched and produced chicks, for a total of 49 chicks. Seventeen pairs of AMOY were successful in fledging chicks (74%), the most successful number of pairs since record keeping began at CAHA. There were 28 AMOY chicks, which represents a 1.2 fledge rate per pair, the second highest fledge rate on record. The 2011 breeding season was the fourth breeding season and third complete year that CAHA was managing under the requirements of the Consent Decree (CD).

INTRODUCTION

The AMOY is a ground-nesting shorebird native to North Carolina. As with many shorebirds, oystercatcher numbers have been in sharp decline over the past 20 years. With only an estimated 10,000 individuals (or 3,500 breeding pairs), the AMOY has been designated Significantly Rare by the U.S. Fish and Wildlife Service (USFWS), and is a Species of Special Concern in North Carolina (but is not currently characterized as a threatened & endangered species). Habitat loss and fragmentation due to beach development has resulted in nesting attempts in marginal habitat. Nesting attempts in marginal habitat is thought to lead to an increased number of unsuccessful breeding attempts. Off-road-vehicle (ORV) use on the beach can lead to direct mortality of chicks and eggs and pedestrian disturbance can indirectly cause loss of nests or chicks. The main cause of direct mortality of chicks and eggs is believed to be mammalian predators, but studies suggest that there is also an interaction between human presence and predation events by mammalian mesopredators (McGowan 2004) (McGowan and Simons 2006).

Consent Decree

In October 2007, a lawsuit was brought against the NPS by the Defenders of Wildlife and the National Audubon Society for failure to provide adequate protection of threatened and endangered species and species of concern from the impacts of off-road vehicle (ORV) use at CAHA. On April 30, 2008, a settlement agreement that had been reached between all parties to the lawsuit was approved by the U.S. District Court as a consent decree (CD). The purpose of the CD was to provide additional protection measures pending the development of an ORV management plan and special regulation. Examples of changes in management as a result of the CD included earlier dates for the establishment of pre-nesting closures and larger buffer requirements for nesting birds and chicks. This was the fourth season that the CD determined the management of protected species at CAHA.

METHODS

CAHA employs a number of methods in the monitoring and protection of breeding AMOY. These include protection of back-shore habitat; installing pre-nesting closures for birds exhibiting territorial behavior; monitoring of breeding pairs, nests and chicks; assisting North Carolina State University (NCSU) in the banding of juvenile AMOY; removing predators; and adaptively moving closure boundaries to comply with the required buffers of the CD for nests

and chicks. Chick movements were monitored closely to ensure they were adequately protected by the established buffers.

Breeding behavior is defined as territorial behavior, courtship, mating, scraping or other nest-building activities by birds setting up in new or previously established territories. Under the CD, AMOY nests and scrapes received 150 meter buffers to reduce possible disturbance to courting or incubating adults. Once the nests hatched, 200 meter buffers were maintained around the chicks. Larger buffers were used if individual birds were observed to be disturbed at that distance.

Closures

Pre-nesting closures were established by March 15, 2011 at the points and spits containing potential nesting habitat for Piping Plovers (PIPL). Pre-nesting closures were installed at Bodie Island Spit, Cape Point, South Beach, Hatteras Overwashes, Hatteras Inlet Spit, North Ocracoke Spit, and South Point. Other nesting shorebirds such as AMOY, least tern (*Sterna albifrons*), common tern (*S. hirundo*), gull-billed tern (*S. nilotica*), and black skimmer (*Rhinchops niger*) may also benefit from these early closures. Nesting by combinations of some or all of these bird species has occurred historically and in recent years at all the spits and Cape Point/South Beach. In 2011, 39% of all AMOY breeding pairs (9 of 23 pairs) held territories within the pre-nesting closures and 38% of all AMOY nesting attempts (10 of 26) occurred inside the pre-nesting closures. (Appendix A; Maps 1-6)

Monitoring

Breeding pairs of AMOY were located by surveying potential habitat including all ocean-side beaches and sound-side beaches. Some additional undocumented nesting may occur on inaccessible, remote sound-side beaches. The presence of birds that are observed near the same location on a regular basis, or birds giving any kind of territorial or breeding display were watched carefully for signs that they were nesting. Territorial displays include alarm-calling, head-down and tail-up running displays, fighting with neighboring pairs, and scraping, whereas a breeding display is observed copulation. Once a territory has been established, AMOY may also be observed “false brooding,” which is a distraction display. Pairs were watched closely, to see if they were incubating a nest. If no nesting behavior was observed, observers looked for “scrapes,” or possible nest sites created by the birds directly in the sand. Observers transected potential nesting habitat by foot.

If nests or scrapes were found, observers marked the location with a handheld GPS unit. Staff installed a resource closure around the active nest or scrape based on the required buffer distance. New closures were installed within 6 daylight hours and closure expansions were installed within eight daylight hours.

In 2011, in an attempt to get improved information on nest predation events, nests were observed from a distance daily to check for incubation. In some cases, because of the nest location, an incubating adult may have been bumped off of the nest due to the daily check, but efforts were made to minimize the disturbance by observing from as far away as the topography would allow and by limiting the observation to just long enough to determine incubation. If an incubating bird was not observed on the nest, the nest scrape was checked for the presence of eggs and, if

the eggs were missing, the area was inspected for signs of predators. Once chicks hatched, staff attempted to observe each chick daily barring severe weather. A few of the nests were also monitored by trail cameras which were checked regularly for signs of predators or predation.

Chick Movement

After hatching, staff installed a minimum buffer of 200 meters around AMOY chicks. It appears that adults will often move the chicks to safer or more suitable habitat. Chicks have been observed to move as much as 100 meters on the first day after hatching and up to 500 meters or more within the first week after hatching. Nests were monitored closely, and checked daily near expected hatch dates, calculated from an average nest incubation period for AMOY as 27 days from first egg laid or 24 days from last egg laid (Baicich and Harrison 1997).

When the adults moved their chicks away from the nest site, they were monitored closely, and an approximate GPS point was taken for their new location and the closures were expanded to ensure adequate buffers. During observations closures were approached from the accessible (i.e. open) sides to minimize disturbance to the birds inside the closure.

The expanded closures provided a minimum buffer of 200 meters on each side of the AMOY brood but may have been larger based on the brood's documented movement patterns. This type of intensive management ensured that the flightless chick(s) were properly buffered from vehicle and pedestrian traffic per the CD requirements.

Predator Control

Because mammalian predation is a major factor in AMOY nest loss and chick mortality (McGowan 2004), predator control by trapping was conducted to target predators near nests and chicks in 2011. Trapping was conducted in all districts. When technicians walked through areas they documented and reported any signs (prints, scat, etc) of predators they observed. If predator sign was found in a closure, trapping efforts were increased in that area. Traps were installed in the vicinity of the closure with the intent of targeting the specific predator in that area.

Banding

In addition to carrying out actions required by the CD, CAHA staff banded AMOY chicks under NCSU's banding permit. Banding individuals aids in tracking survival of individuals, determining breeding success of individual pairs, documenting movement of young birds to other areas, and aids in determining breeding site fidelity. Being able to identify individual birds has also allowed NCSU and CAHA staff to coordinate data with scientists from other states to examine genetics, migration patterns, and long-term survival rates of the AMOY population. Banding birds made data collection simpler and adds certainty to observations.

RESULTS

In 2011 23 pairs of AMOY nested at CAHA. There were a total of 26 nests of which 22 nests (85%) hatched. The first banded breeding bird was observed on February 12, 2011 and the majority of the AMOY arrived between March 12 -20, 2011. All of the banded breeding birds had arrived by March 31. The first nest of the season was found on April 15, 2011 and the last nest was found on June 11, 2011. The average time to hatch for the 22 nests with known

incubation was 30.2 days. The average time to fledge for the 17 nests that fledged young was 40.6 days (Green Island chicks were excluded). The youngest chick to fledge was 36 days old and the oldest fledgling was 47 days old when flight was first observed. This average does not include separate dates for individuals within a brood but is based on the date of the first chick to fledge from all of the broods. The productivity for 2011 was 28 chicks fledged from 23 pairs for a fledge rate of 1.2 chicks per pair. (Table 1)

Table 1. AMOY 2011 Breeding Season at CAHA.

Nest #	Pair #	Location	Date Found	Date of First Egg	Hatch Date	Days from First Egg to Hatch	Fledge Date	Days to First Fledge	# Fledged
GIAM01	GI01	Green Island	4/15/11	4/15/11					0
GIAM01A	GI01	Green Island	4/22/11	UNK	5/17/11	UNK	7/5/11	~ 50 days	1
GIAM02	GI02	Green Island	4/29/11	UNK	5/23/11	UNK	7/11/11	~ 50 days	2
GIAM03	GI03	Green Island	6/6/11	UNK	6/19/11	UNK	8/5/11	~ 48 days	1
BIAM01	BI01	Bodie Island Spit	5/26/11	5/26/11	6/21/11	27 days	7/28/11	38 days	1
BHAM01	BH01	R27-R30	4/21/11	4/21/11	5/20/11	30 days			0
BHAM02	BH02	R27-R30	4/22/11	4/22/11	5/21/11	30 days	6/27/11 6/28/11 6/29/11	38 days	3
BHAM03	BH03	R27-R30	4/23/11	4/23/11	5/23/11	31 days			0
BHAM04	BH04	R27-R30	5/5/11	5/5/11	6/2/11	29 days	7/12/11 7/14/11 7/16/11	41 days	3
BHAM05	BH01	R27-R30	6/9/11	~ 6/5/11 (6/9/11 - 3 eggs)	7/6/11	32 days	8/14/11	40 days	1
BHAM06	BH03	R27-R30	6/11/11	6/11/11					0
HIAM01	HI01	Sandy Bay	4/15/11	4/15/11	5/15/11	31 days	6/23/11	40 days	1
HIAM02	HI02	South of R38	4/18/11	~ 4/16/11 (4/18/11 - 2 eggs)	5/14/11	29 days	6/18/11 6/23/11	36 days	2
HIAM03	HI03	R43-R44	4/19/11	4/19/11	5/18/11	30 days	6/24/11	38 days	2
HIAM04	HI04	Hatteras Inlet	4/21/11	4/21/11	5/22/11	32 days			0
HIAM05	HI05	R45-R49	4/24/11	4/24/11	5/23/11	30 days	7/4/11	43 days	1
HIAM06	HI06	Cape Point	4/27/11	4/27/11	Abandoned				0
HIAM07	HI07	Cape Point	5/2/11	5/2/11	6/6/11	36 days	7/18/11	43 days	1
HIAM08	HI08	R45-R49	5/7/11	~5/5/11 (5/7/11 - 2 eggs)	6/3/11	30 days	7/15/11	43 days	2
HIAM09	HI09	South of R38	5/14/11	5/14/11	Abandoned				0
HIAM10	HI10	R45-R49	5/16/11	5/16/11					0

HIAM11	HI06	Cape Point	5/20/11	~5/18/11 (5/20/11 - 2 eggs)	6/16/11	30 days			0
OIAM01	OI01	R68-R70	4/18/11	4/18/11	5/18/11	31 days	6/24/11	38 days	2
OIAM02	OI02	North Ocracoke	4/23/11	4/23/11	5/22/11	30 days	7/3/11	43 days	2
OIAM03	OI03	R59-R67	4/28/11	4/28/11					0
OIAM04	OI04	South Point	4/30/11	~ 4/28/11 (4/30/11 - 2 eggs)	5/27/11	30 days	7/5/11	40 days	1
OIAM03A	OI03	R59-R67	5/2/11	5/2/11	5/28/11	27 days			0
OIAM05	OI05	South Point	5/8/11	5/8/11	6/4/11	28 days	7/20/11	47 days	2
					Avg.	30.2 days	Avg.	40.6 days	

¹Date of first egg was calculated based on eggs being laid every other day for nests which were discovered with two or more eggs.

Nesting Summary by Island and Year

It was the sixth year in a row that CAHA documented 23 nesting pairs. Of these pairs, one pair was found on Bodie Island, 14 were found on Hatteras, five were found on Ocracoke, and three were found on Green Island. This includes one clutch continuation on Green Island and one on Ocracoke Island. Altogether, these pairs produced a total of 26 nests (Appendix A: Maps 1-6).

Compared to the ten year (2001-2010) average, there were 4 fewer breeding pairs of AMOY at CAHA in 2011 (Table 2). This is consistent with the overall total population decline in AMOY numbers. Total nest numbers were also lower (Table 3) which can be attributed partially to lower re-nesting attempts because more of the initial nesting attempts were successful. The decrease in the number of nest attempts could be attributed to efforts to remove nest predators and perhaps favorable weather as well as the fact that there were fewer pairs.

Table 2. Breeding Pairs by Year and Island.

Year	Bodie	Hatteras	Ocracoke	Green	Total
2001	2	24	13		39
2002	2	17	12		31
2003	4	16	8	3	31
2004	3	15	9	2	29
2005	2	16	5	2	25
2006	2	14	5	2	23
2007	2	15	4	2	23
2008	3	15	3	2	23
2009	4	13	4	2	23 ¹
2010 ²	1	15	4	3	23
2011	1	14	5	3	23

10-Year Average (2001-2010) 27

2011 Comparison -4

¹Twenty-three is a conservative interpretation of the pair numbers. One breeding adult lost its mate and re-paired with another bird and nested, but it was only counted as one pair rather than two pair.

²The 2010 breeding pairs have been corrected from the 2010 annual report.

Table 3. Total Nests by Year and Island.

Year	Bodie	Hatteras	Ocracoke	Green	Total
2001	3	28	15		46
2002	5	25	18		48
2003	5	23	12	3	43
2004	7	18	11	3	39
2005	3	25	10	3	41
2006	2	19	8	2	31
2007	2	23	12	2	39
2008	5	20	3	4	32
2009	4	19	6	2	31
2010	2	17	6	3	28
2011	1	17	5	3	26
10-Year Average (2001-2010)					37.8
2011 Comparison					-11.8

Productivity

Although there were fewer nests documented in 2011, more of the nests hatched (Table 4) and there were 7.4 more successful pairs in 2011 compared to the 10-year average (Table 5). In 2011, CAHA fledged 28 chicks, 12.9 more chicks than the 10-year average of 15.1 chicks fledged (Table 6). Although the chicks fledged per breeding pair appears to be cyclical, there is a generally increasing trend in productivity (Figure 1).

Table 4. Nests Hatched by Year and Island.

Year	Bodie	Hatteras	Ocracoke	Green	Total
2001	1	11	11		23
2002	1	3	6		10
2003	1	10	4	unknown	15
2004	0	14	7	2	23
2005	1	12	3	2	18
2006	1	11	5	2	19
2007	1	10	3	1	15
2008	2	9	1	1	13
2009	1	11	2	1	15
2010	1	13	5	2	21
2011	1	13	5	3	22
10-Year Average (2001-2010)					17.2
2011 Comparison					+4.8

Table 5. Successful Pairs (at Least 1 Chick Fledged) by Year and Island.

Year	Bodie	Hatteras	Ocracoke	Green	Total
2001	1	6	8		15
2002	1	3	3		7
2003	0	5	1	unknown	6
2004	0	6	5	1	12
2005	0	6	1	1	8
2006	0	4	1	2	7
2007	0	6	1	1	8
2008	2	6	1	1	10
2009	1	6	0	1	8
2010	0	10	3	2	15
2011	1	9	4	3	17

10-Year Average (2001-2010)**9.6****2011 Comparison****+7.4****Table 6.** Number of Chicks Fledged by Year and Island.

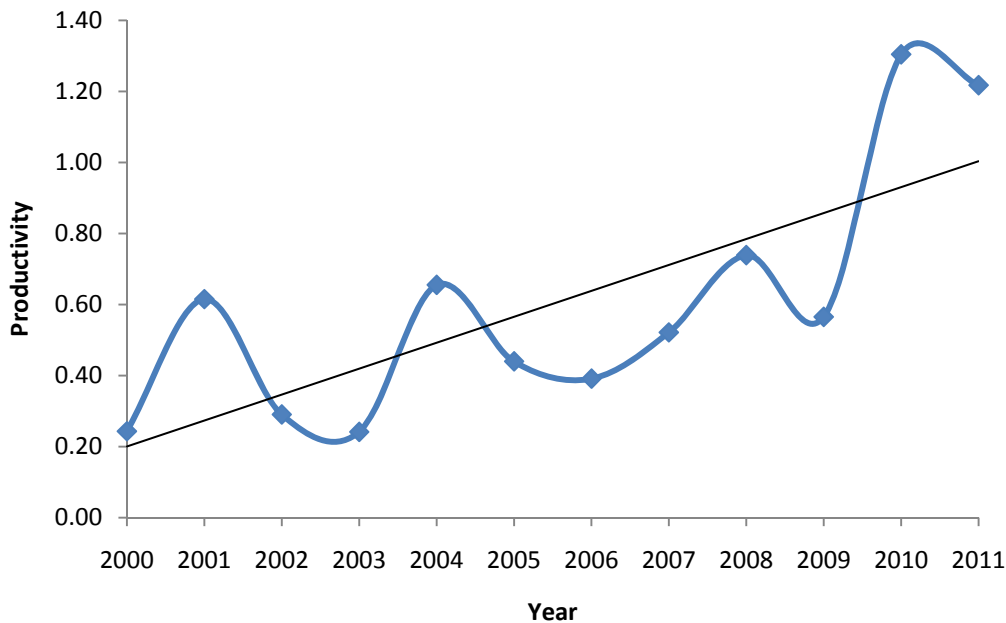
Year	Bodie	Hatteras	Ocracoke	Green	Total
2001	1	6	17 (max)		24
2002	2	4	3		9
2003	0	6	1	unknown	7
2004	0	9	8	2	19
2005	0	8	1	2	11
2006	0	5	2	2	9
2007	0	9	1 ¹	2	12
2008	2	11 ²	2	2	17
2009	1	9	0	3	13
2010	0	23	3	4	30
2011	1	16	7	4	28

10-Year Average (2001-2010)**15.1****2011 Comparison****+12.9**

¹ The AMOY chick that was believed fledged on Ocracoke Island in 2007 was found dead later and is no longer counted in the replacement population of AMOY.

² Of the chicks which fledged from Hatteras in 2008, one died after a car-strike post-fledge (at Sandy Bay), and another (also thought to be struck by a vehicle N of Buxton) was transferred to long-term care.

Figure 1. Fledge Rate and Trend for AMOY Breeding at CAHA from 2000-2011.



Nesting Season

The AMOY nesting season began on April 15, 2011 with the discovery of the first nest and ended on August 14, 2011 with the fledging of the last chick (Table 7). The first chick of the season was found on May 14. The last nest of the season was found on June 11 and the last nest to hatch, hatched on July 6.

Table 7. Annual AMOY Breeding Milestones for 2000-2011.

Year	Date First Nest Found	Date Last Nest Found	Date of Earliest Hatch	Date of Latest Hatch	Date of Latest Fledge
2001	25-Apr	20-Jun	23-May	4-Jul	1-Aug
2002	18-Apr	13-Jun	14-May	13-Jul	22-Aug
2003	17-Apr	10-Jul	15-May	15-Jul	10-Aug
2004	18-Apr	8-Jul	10-May	6-Jul	10-Aug
2005	21-Apr	9-Jul	7-May	29-Jul	20-Aug
2006	12-Apr	18-Jun	14-May	30-Jun	6-Aug
2007	11-Apr	26-Jun	17-May	16-Jul	13-Aug
2008	22-Apr	20-Jun	21-May	6-Jul	12-Aug
2009	17-Apr	19-Jun	15-May	7-Jul	20-Aug
2010	15-Apr	21-Jun	12-May	16-Jul	23-Aug
2011	15-Apr	11-Jun	14-May	6-Jul	14-Aug

Nest Failures and Chick Mortality

Of the four nests that were lost in 2011, two nests were lost to unknown predation and two nests were abandoned (Table 8). A raccoon was believed to be responsible for one of the nests lost to predation.

It is sometimes difficult to attribute nest loss to the exact species if the predation is not directly observed. Determining cause of chick loss is even more difficult than determining cause of nest loss. Environmental conditions surrounding the nest site may obscure evidence of predation. Chicks can move large distances and it is sometimes difficult to locate them. Searches for missing chicks may be intentionally delayed since many different types of disturbances may cause the chicks to hide out of view from the observers. Some of the unknown cases of nest and chick depredation might be partially attributable to ghost crab predation.

In 2011 all 21 chick mortalities were thought to be lost (either directly or indirectly) to unknown predation (Table 9). An avian predator is suspected to be responsible for two of those mortalities. One chick was observed with swelling in the left leg joint and was not utilizing that leg. The chick was captured and given a small dose of anti-inflammatory medication but was lost nine days later. In 2011 there were five complete brood failures and ten partial brood failures.

Table 8. Percentage of Nests Lost and Nests Hatched from 2005-2011.

Year	Nests	Lost to Overwash	Lost to Predation	Abandoned	Number Nests Hatched / Percent
2005	41	12%	34%	29%	18 / 44%
2006	31	7%	27%	3%	19 / 61%
2007	39	16%	32%	10%	15 / 38%
2008	32	11%	34%	11%	13 / 41%
2009	31	6%	29%	13%	15 / 48%
2010	28	3.5%	18%	3.5%	21 / 75%
2011	26	0%	7.5%	7.5%	22/ 85%
2005-2010 Avg.					17/ 51%
2011 Difference					+5/ +34%

Table 9. Percentage of Chicks Lost and Chicks Fledged from 2005-2011.

Year	Eggs Hatched	Other*	Lost to Predation	Number Chicks Fledged/Percent
2005	37	10%	61%	11 / 30%
2006	36	10%	66%	9 / 25%
2007	27	10	50%	12 / 44%
2008	24	10%	22%	17 / 71%
2009	31	0%	58%	13 / 42%
2010	48	2%	35%	30 / 63%
2011	49	0%	42%	28/ 57%
2005-2010 Avg.				15/ 46%
2011 Difference				+13/ +11%

*Siblicide, Exposure, Human Interaction

Banding and Banded AMOY

As the result of a long term cooperative banding project with NCSU, CAHA has begun to document recruitment as banded chicks survive to adulthood and join the breeding population. Of the 33 banded AMOY that nested in 2011, 13 were banded as chicks and therefore their exact age is known. Of the 13 breeders banded as chicks, six fledged in 2004, two fledged in 2005, three fledged in 2006, and two fledged in 2007. Five of them fledged from Cape Lookout National Seashore (CALO). CALO documented four chicks banded at CAHA breeding at CALO in 2011. Age of first documented nesting attempts are as follows: three first attempted nesting in their third year, seven first attempted nesting in their fourth year, and three first attempted nesting in their fifth year. The remaining 20 birds were banded as adults on their breeding territories so we can assume a minimum age of three at the time of banding. By subtracting two years from the year that they were banded and assuming the minimum breeding age of three years of age, the population of banded AMOY consists of 18 birds (54% of the banded population at CAHA) that are 7+ years old.

In 2011, the park had two pairs of unbanded breeding AMOY, up from one pair in 2010. As shown below in Table 10, pairs consisting of two unbanded birds were not frequently observed at CAHA in 2011.

Table 10. Band combinations for AMOY pairs found at CAHA in 2011.

Pair Type:	UNB/UNB	Banded/UNB	Banded/Banded
	(1 pair, GI)	GrCO/UNB	Gr11/GrUM
	(1 pair, OI)	Gr01/UNB	Gr27/GrT4
		GrC9/UNB	RdC9/GrL5
		GrAT/UNB	GrH3/GrAW
		GrL4/UNB	Gr07/GrA7
		Gr50/UNB	GrA5/GrL6
		Gr54/UNB	Gr12/GrRO
		Gr87/UNB	Gr57/GrH2
		GrU5/UNB	GrN1/GrX9
			Gr52/GrL9
			Gr14/GrN7
			Gr76/GrX1
Total:	2	9	12

¹GrAT (geo-locator on new band) was formerly banded as GrR6.

Three banded breeders from 2010 did not return this year resulting in some shifting of partners for paired birds. Three new banded AMOY were recruited into the breeding population, two of which were CALO chicks (fledged in 2006 and 2007) and the third was banded as an adult in 2010 on one of the islands off Bodie Inlet. Although there is frequently a loss of adult breeders from one year to the next, they seem to be quickly replaced by new individuals and the number of breeding pairs has remained 23 at CAHA since 2006.

In 2011, CAHA RM staff (with some assistance from J. Stocking, NCSU) banded a total of 27 chicks with uniquely identifiable bands (Table 11). Due to a shortage in two character band combinations, new three character bands were created for the 2011 season. Of the 28 chicks; 19 were banded with three character bands, eight were banded with two character bands and one was not banded. A total of 174 AMOY have been banded at CAHA since 2002 consisting of 48 adults and 126 chicks (Table 12).

Table 11. AMOY Chicks Banded at CAHA in 2011.

Bands:	Offspring of:	Capture Date:
GrCCL	Gr27, GrT4	6/14/2011
GrCCM		
GrCCN		
GrCCW	Gr50, UNB	6/27/2011
GrCCX		
GrCCY		
GrCCA	RdC9, GrL5	6/9/2011
GrCCH		6/11/2011
GrCCC	GrAW, GrH3	6/11/2011
GrCCE		
GrCCT	Gr12, GrR0	6/17/2011
GrCA3	GrA5, GrL6	7/4/2011
GrCA1	Gr57, GrH2	7/5/2011
GrCA2		
GrCCJ	Gr14, GrN7	6/13/2011
GrCCK		
GrCCP	Gr87, UNB	6/16/2011
GrCCR		
GrCCU	Gr76, GrX1	6/22/2011
GrP1	Gr11, GrUM	6/27/2011
GrP2		
Gr99	GrAT, UNB	6/9/2011
GrT1	UNB, UNB	7/6/2011
GrHA		
GrUX	GrC9, UNB	7/15/2011
GrEA	UNB, UNB	7/22/2011
GrPH	Gr52, GrL9	8/1/2011

Table 12. Banding effort at CAHA since 2002.

Year	Banded Adults	Banded Chicks	Total
2002	5	6	11
2003	1	1	2
2004	17	16	33
2005	11	10	21
2006	0	5	5
2007	5	8	13
2008	6	12	18
2009	1	10	11
2010	2	31	33
2011	0	27	27

AMOY Resights after Hurricane

Hurricane Irene passed directly over CAHA on August 27-28, 2011. Although breeding was over for the season, many of the birds were still on their breeding territories. Resource management staff tried to document as many breeders and fledglings after the storm as possible. It is unknown where or how these birds weathered the hurricane but many of them appeared to have made it through unscathed. Twelve of CAHA breeding pairs were resighted after the passing of Hurricane Irene. Seven of those twelve pairs had at least one fledged chick with them. There were a total of 42 AMOY resighted after Hurricane Irene.

DISCUSSION

The breeding population of AMOY has remained at 23 pairs for the past six breeding seasons and for the time being the decline in breeding pairs appears to have been halted. The lack of increased pair numbers in recent years can be partly attributed to the presumed deaths of existing breeding birds with recruits to the population replacing lost birds rather than increasing the number of breeding pairs. In recent years, a number of known breeding birds have either shown up in the spring and subsequently disappeared from their historical breeding territory, or have not shown up at all. One banded breeding pair from 2010 was observed at the beginning of the breeding season; however, one of these birds was only observed once and never seen again. The other banded bird was observed throughout the breeding season with an unbanded bird but no nest or territorial behavior was ever observed. We suspect that this pair may have attempted to nest on one of the offshore islands or remote stretches of the sound shoreline that are not monitored by NPS staff and occasionally “visited” CAHA throughout the breeding season. A younger breeding bird was found dead on the shoreline in early June while it still had a nest on the ground. Its mate immediately paired up with another banded bird but never renested.

Another factor influencing the lack of immediate increase of breeding pairs, even though productivity is trending upward, is the fact that juvenile AMOY may not establish territories or reproduce for three to five years, thus any productivity increases the population sees now, will not be realized as recruitment into the breeding population for at least another three to five years. During the 2011 breeding season (March to June) lone birds and pairs of birds, both unbanded and banded, unassociated with nests were observed at CAHA. The age of many of the banded

birds is known and many were of age to nest in 2011, but did not, either due to their inability to find, establish and hold a territory, or inability to find a mate of breeding age. Other observed birds will first come into breeding age in 2012.

If CAHA hopes to see an increasing population of AMOY, especially close attention will need to be paid to birds with no breeding history at CAHA. Field staff needs to be adequately trained to identify breeding behaviors associated with AMOY setting up territories to allow for the immediate protection of these areas. Adequate protection from disturbance and a continuation of the predator control program should contribute towards the recovery and maintenance of a stable population of AMOY at CAHA.

APPENDICES

APPENDIX A: MAPS

Map 1: Bodie Island and Green Island AMOY Nesting Activity 2000-2011

Map 2: Bodie/Hatteras AMOY Nesting Activity 2000-2011

Map 3: North Hatteras AMOY Nesting Activity 2000-2011

Map 4: South Eastern Hatteras AMOY Nesting Activity 2000-2011

Map 5: South Western Hatteras AMOY Nesting Activity 2000-2011

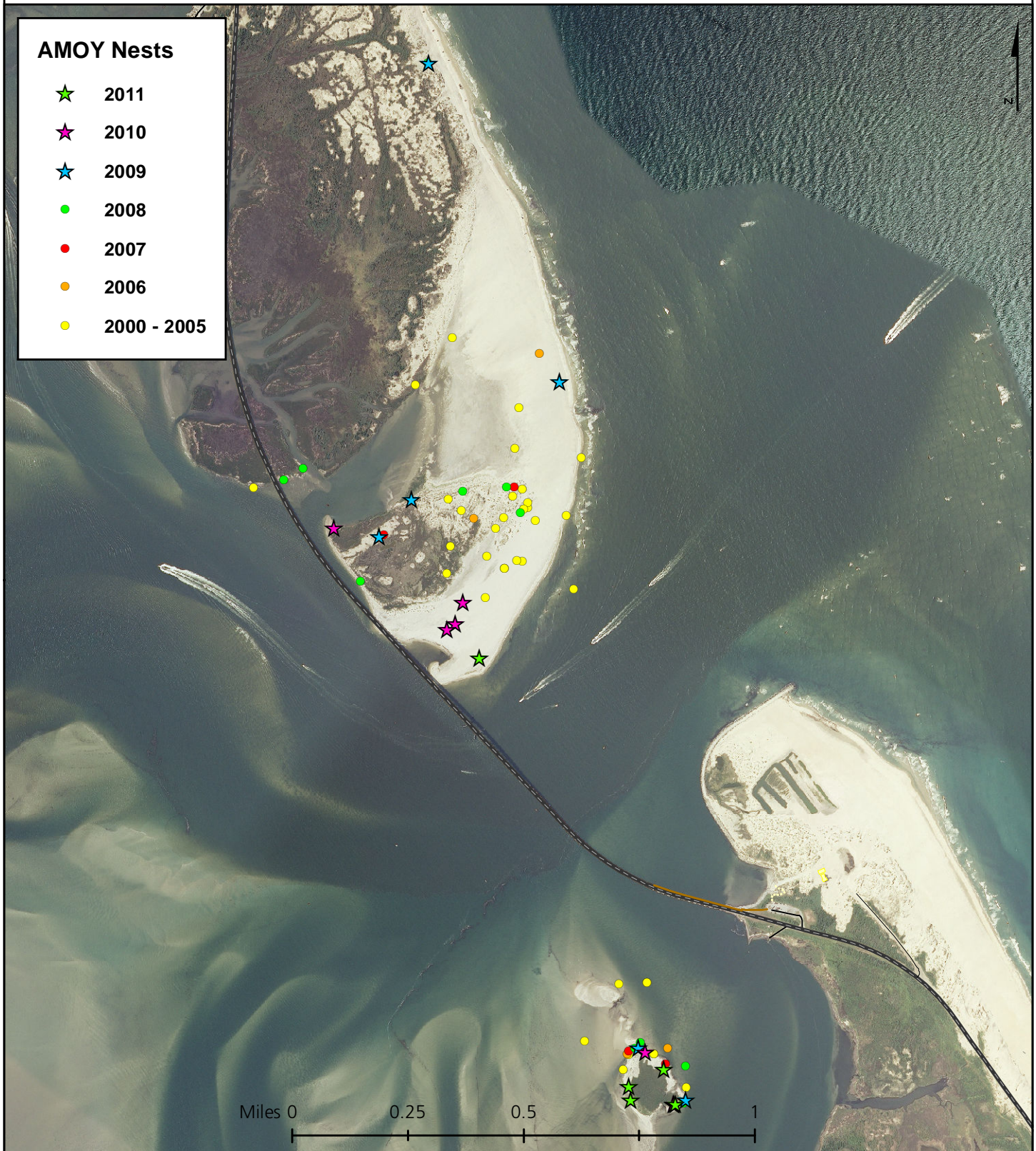
Map 6: Ocracoke AMOY Nesting Activity 2005-2011

REFERENCES

- Baichich, P.J. and C.J.O. Harrison. A Guide to the Nests, Eggs, and Nestlings of North American Birds (Second edition). Natural World Academic Press, New York. 1997.
- Consent Decree. 2008. United States District Court for the Eastern District of North Carolina. No. 2:07-CV-45-BO. Signed into effect by Defenders of Wildlife, et al (plaintiffs), National Park Service et al. (defendants), and Dare County et al. (intervenor-defendants).
- McGowan, C.P., 2004. Factors affecting nesting success of American Oystercatchers (*Haematopus palliatus*) in North Carolina. Unpublished M. Sc. Thesis, North Carolina State University, Raleigh, North Carolina.
- McGowan, C.P., T.R. Simons, 2006. Effects of human recreation on the incubation behavior of American Oystercatchers. *The Wilson Journal of Ornithology* 118:485-493.

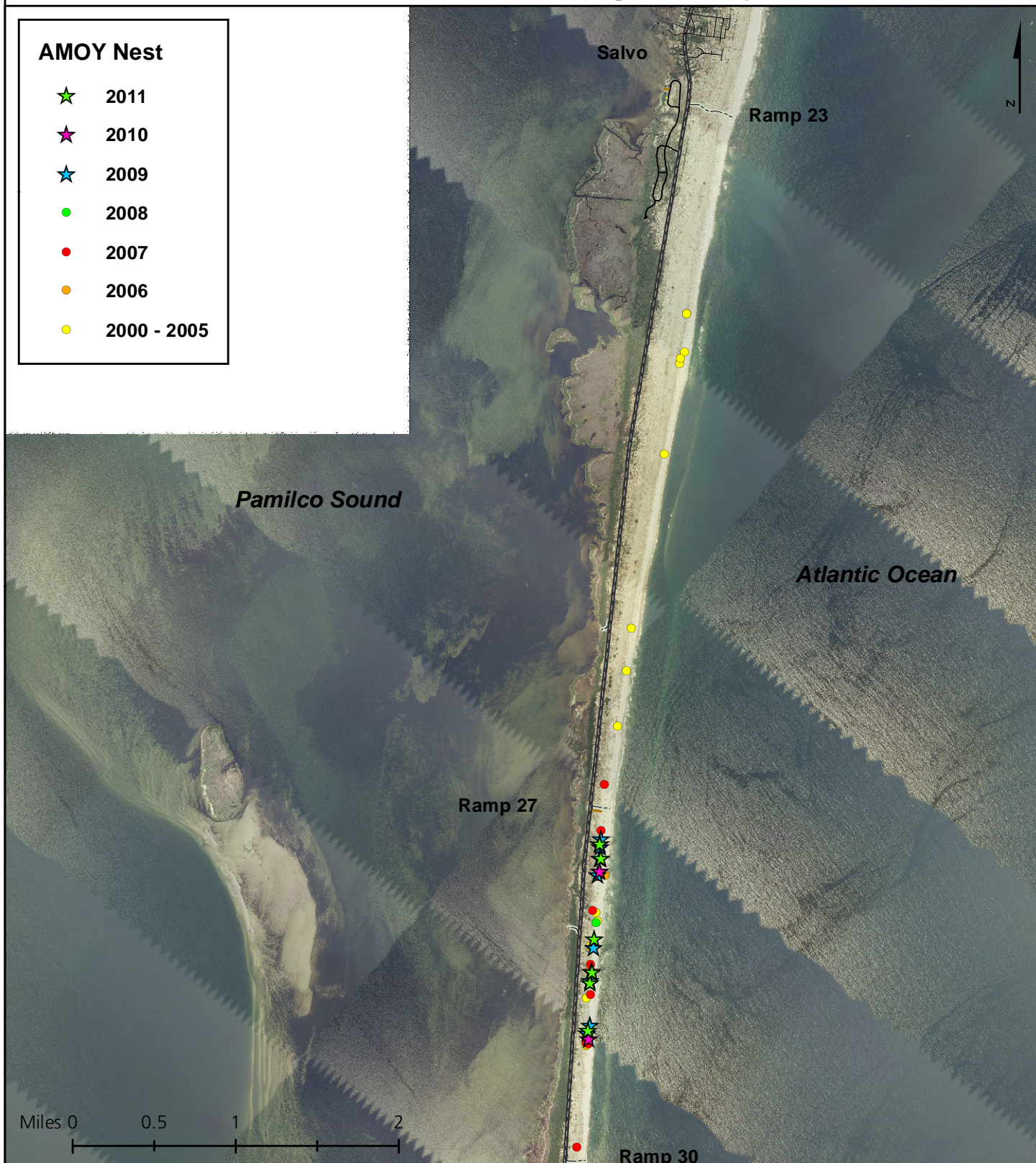


Map 1: Bodie Island and Green Island AMOY Nesting Activity



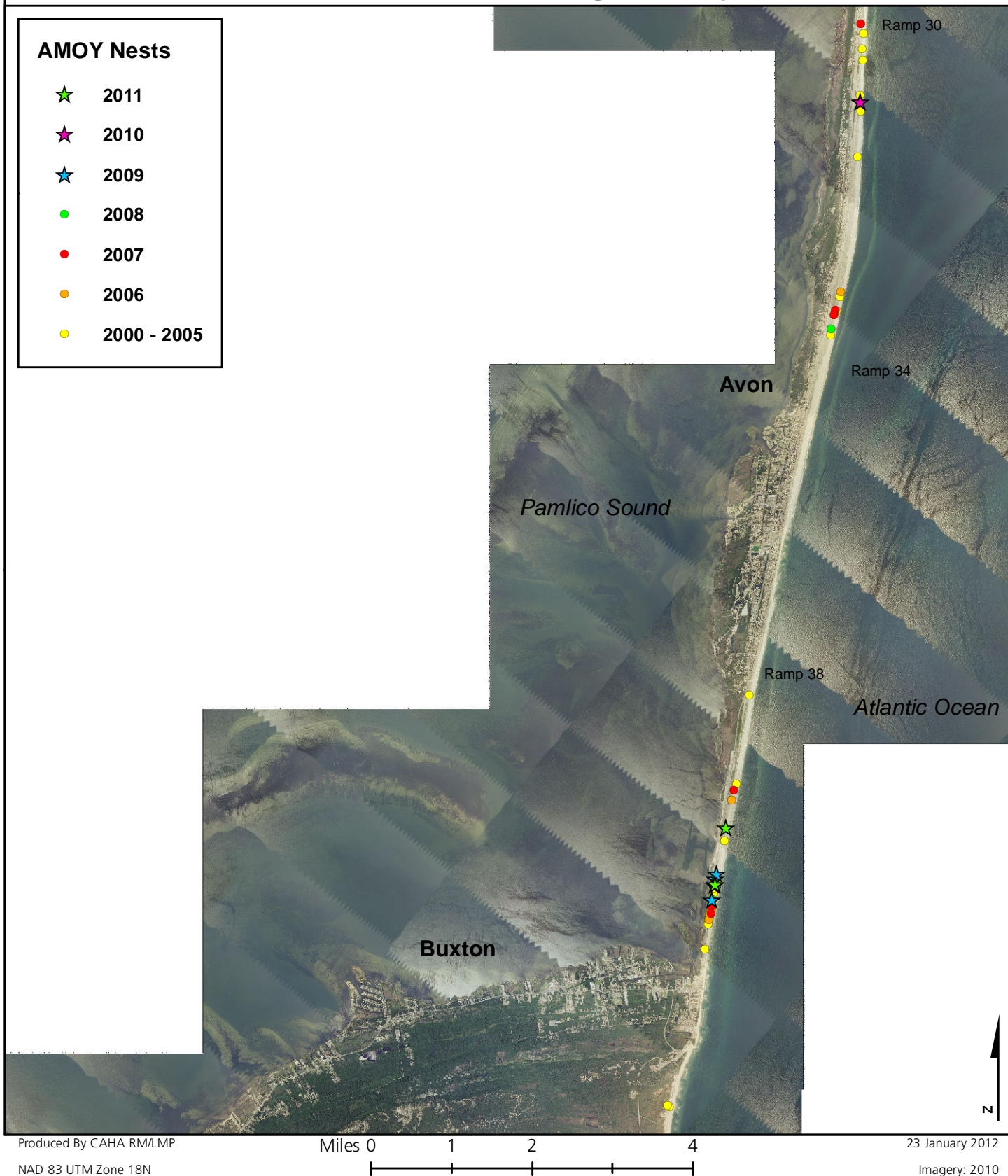


Map 2: Bodie Hatteras AMOY Nesting Activity



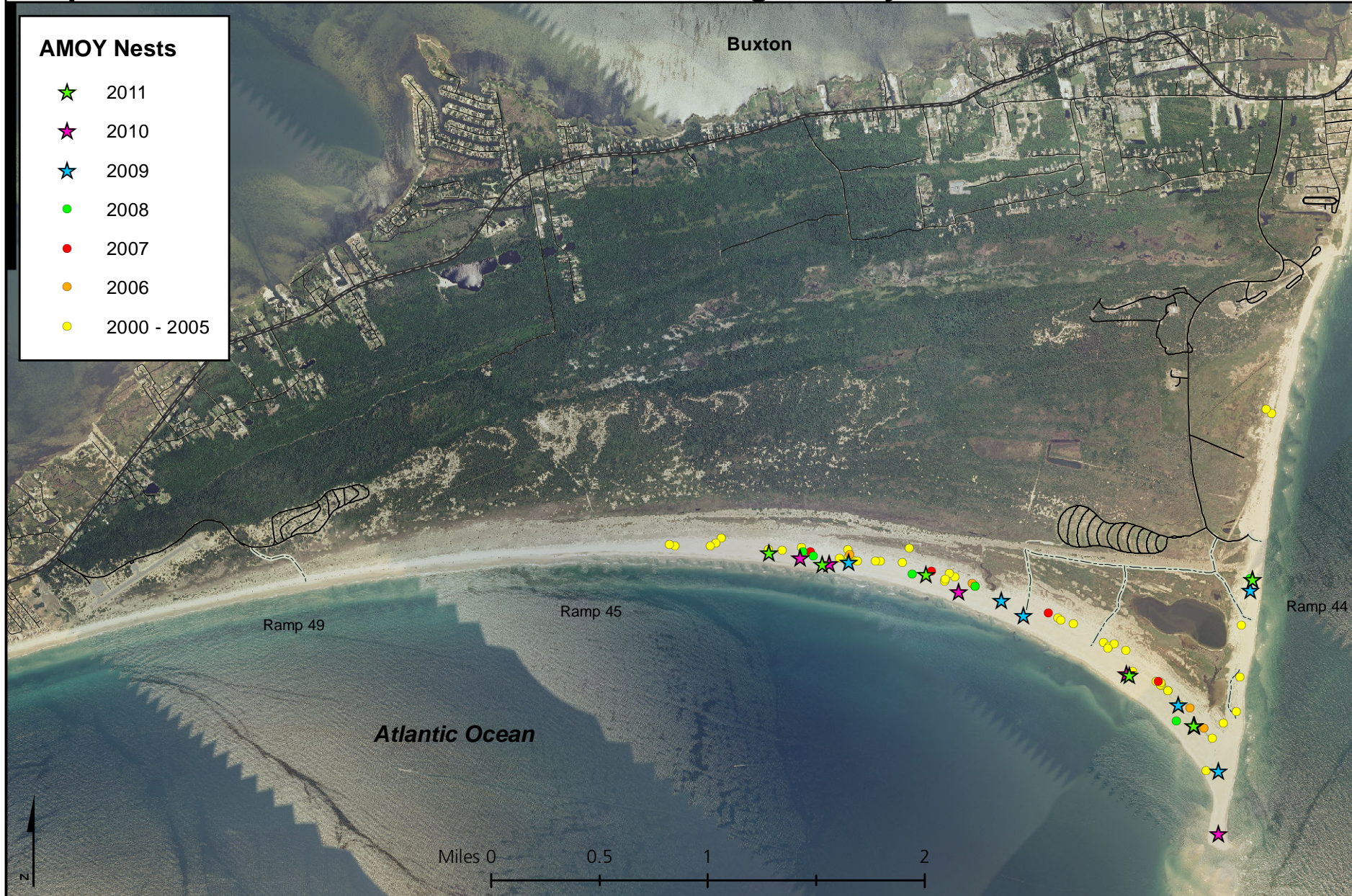


Map 3: North Hatteras AMOY Nesting Activity





Map 4: South Eastern Hatteras AMOY Nesting Activity





Map 5: South Western Hatteras AMOY Nesting Activity





Map 6: Ocracoke Island AMOY Nesting Activity

AMOY Nests

- ★ 2011
- ★ 2010
- ★ 2009
- 2008
- 2007
- 2006
- 2000 - 2005

