Double-Crested Cormorant Summary Report for Wisconsin Department of Natural Resources 2009

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BACKGROUND

The previously threatened Double-crested-Cormorant (DCCO) populations of the Great Lakes have experienced resurgences in recent years following the implementation of conservation measures and reduction of DDT and its metabolites in the environment (Weseloh et al. 2002). The most recent estimates for Wisconsin indicate 85% of the estimated 17,945 nests within the state in 2009 are located in the Green Bay/Lake Michigan area of the state (USDA, unpublished data). The population in this region of the state has been steadily growing with increases of 33% between 1973 and 1997 (Matteson et al. 1997) and 72% between 1997 and 2009 (USDA, unpublished data). Increased DCCO numbers in the Great Lakes have raised concerns among sport and commercial fisheries about DCCO depredation on the yellow perch population (Belyea et al. 1997). In addition, increasing DCCO populations have negative impacts to colonial nesting bird species and have denuded island trees and vegetation (USFWS 2003). As a result, state and federal wildlife agencies are experiencing increased pressure from fisheries interests and others regarding the management of DCCO's around Green Bay.

This report summarizes current U. S. Department of Agriculture, Wildlife Services (WS) program involvement in DCCO management within the state of Wisconsin. In addition to the direct assistance projects outlined in this report, WS provides technical assistance to the public and drafts WS Form 37's for obtaining Federal Depredation Permits from the U. S. Fish and Wildlife Service (USFWS) for DCCO damage management.

The WS program assisted the University of Wisconsin-Madison in specimen sampling efforts in Green Bay from 2004 to 2006 to research the impact of DCCO foraging on yellow perch. Wildlife Services assisted in the weekly collection of 20-30 birds from the Cat Island chain from May to September as the birds returned to their breeding colony from foraging. Study results indicate that foraging pressure is heavier during time periods when adults are providing fish for young prior to fledging (Meadows 2006). Limiting the hatch of DCCO eggs not only will reduce recruitment to the DCCO population but also may lesson the heavy foraging period of adults post-hatch.

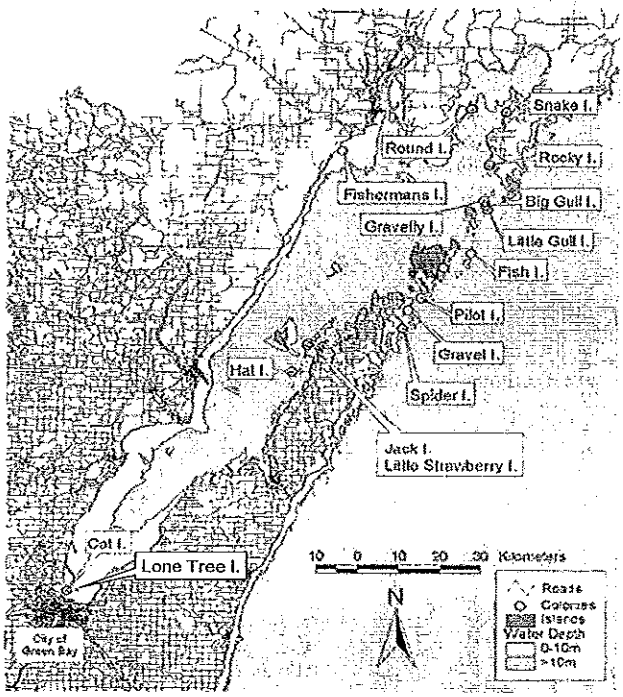


Figure 1. Map of Green Bay and Lake Michigan Islands.

Beginning in 2006, under the Public Resources Depredation Order issued by the U. S.

Department of Interior, WS, in cooperation with the Wisconsin Department of Natural Resources (WDNR), began assisting in limiting reproduction of DCCO in Wisconsin waters by oiling eggs in the Green Bay/Lake Michigan area (Figure 1). Oiling trips consist of two WS personnel to oil eggs and mark treated nests and one WDNR staff member to record data. Visits to the islands were scheduled to begin in late April to early May to coincide with the initiation of DCCO nesting. Subsequent oiling trips were spaced approximately three weeks apart with a follow-up visit made in July or August to measure the success of the previous oiling visits. During an oiling visit, all accessible DCCO eggs were oiled unless the activity is deemed too disruptive to other nearby co-nesting species. Visits to islands were scheduled to avoid severe temperature extremes and heavy precipitation and were conducted in as minimal time as necessary to limit disturbance to co-nesting species.

SUMMARY OF DCCO EGG OILING

Management of DCCO reproduction was begun in 2006 with two egg oilings on Cat and Jack Islands. Three oilings and a follow-up inspection trip to monitor success were made in 2007, 2008 and again in 2009 on Cat, Jack, Hat, and Lone Tree Islands. During egg oiling activities all DCCO nests were counted and categorized as oiled with eggs, hatched, predated, empty, or inaccessible. Since the total number of nests observed each visit changes because of asynchronous nesting by DCCO, the peak number was used to determine the DCCO population on each island (Figure 2). The cumulative number of nestlings observed on each island was determined by adding the number of nestlings recorded during oiling to the number of young observed on the final visit to monitor nesting success (Figure 3). These young represent eggs that were inaccessible, missed, hatched prior to the first oiling, or in most cases, were initiated after the last oiling effort.

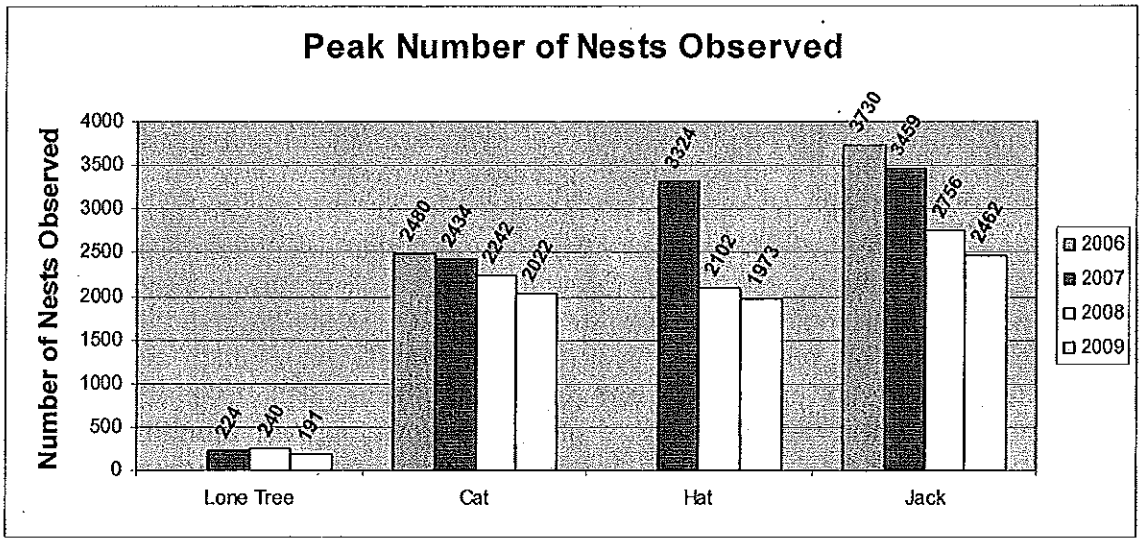


Figure 2. Peak Number of Nests Observed on Lone Tree, Cat, Hat, and Jack Islands, 2006-2009.

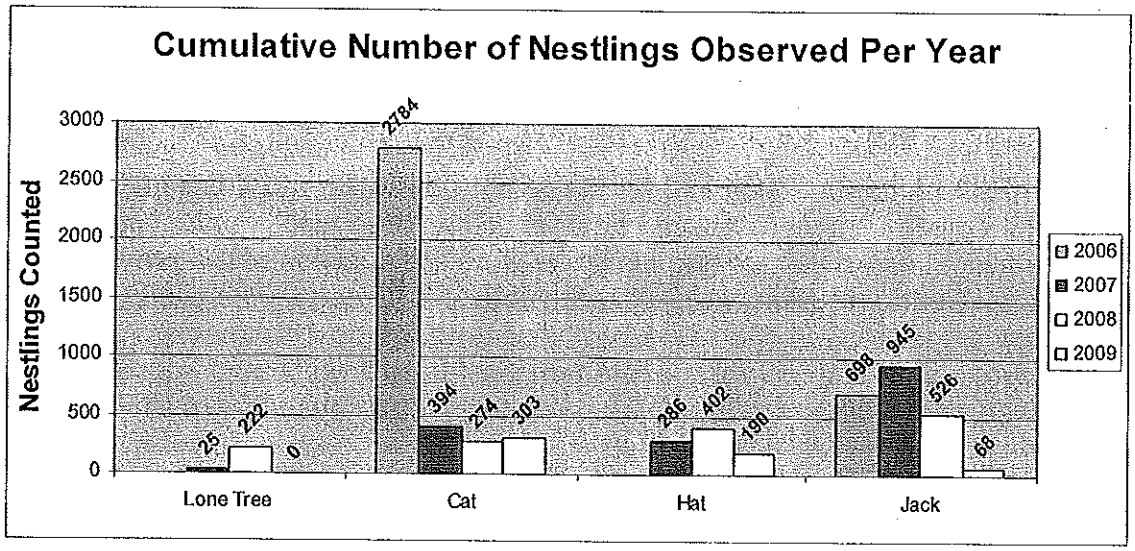


Figure 3. Cumulative Number of Nestlings Hatched on Lone Tree, Cat, Hat, and Jack Islands, 2006-2009.

Cat Island

DCCO Egg Oiling History 2006-2008 – Two egg oiling efforts were initiated on Cat Island in 2006 with the first visit in mid-May and a second visit in early June. A peak of 2,480 nests were recorded during the May 2006 oiling visit (Figure 2) and during this same initial visit it was found that 900 of the nests containing 2,784 nestlings had already hatched (Figure 3). Based on 2006 oiling efforts, recommendations were made to make the initial oiling earlier in the year to better coincide with DCCO nesting attempts. In both 2007 and 2008, three oiling visits beginning in late April were made with a follow-up visits made in July or August to document nesting success. Peak number of nests observed were very consistent from 2006 to 2008 (Figure 2) however, there was a sharp reduction in the number of nestlings hatched (Figure 3). The lower number of nestlings observed in 2007 and 2008 was the result of initiating egg oiling in late April.

2009 Egg Oiling – Three oiling visits were conducted in 2009 beginning in April with a follow-up visit made in late July to document nesting success (Table 1). A peak of 2,022 total nests was found during the second oiling trip on May 21st. This peak nest count includes approximately 50 DCCO nests not oiled that were intermingled with a large number of American white pelicans nests to avoid increased gull predation on newly hatched pelican chicks. This peak nest count represents a 10% decline from 2008. The follow-up visit in July found the highest number of nestlings for the year and the development stage of the young birds indicated they were hatched from eggs that were laid after the final oiling in June (Figure 3). Other nesting species observed included herring gulls and one black-crowned night heron nest with one chick was found under the hunting blind platform on the western side of the island.

Table 1. Summary of DCCO eggs oiled by USDA-Wildlife Services on Cat Island, Brown County, Wisconsin in 2009.

	April 28	May 21	June 9	July 28[a]
Nests oiled	1,552	1,579	1,422	
Eggs oiled	4,800	3,694	3,087	
Nests hatched	0	9	22	160
Nestlings hatched	0	15	40	263
Total predation	33	29	25	
Partial predation	64	57	56	
Nests not oiled	2	50	2	8
Empty nests	215	355	435	
Total nests	**1,802**	**2,022**	**1,906**	**168**

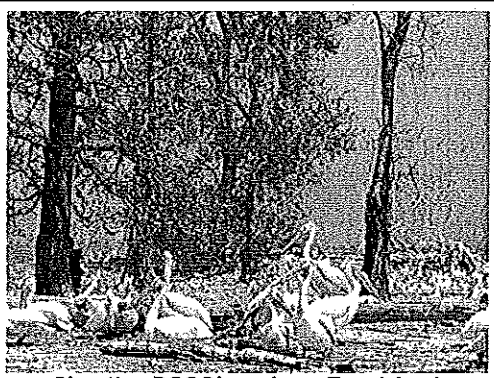
[a] Counted nestlings only, no oiling took place.

Lone Tree Island

DCCO Egg Destruction History 2007 & 2008 – The destruction of DCCO nests to prevent successful colony establishment occurred in 2007 and 2008 on Lone Tree Island with the first of three visits starting late April with a follow-up visit in July or August to document nesting success. DCCO eggs were broken and nesting materials were scattered as much as possible to discourage nesting on the island. The peak number of nests was very similar during these two years with 224 nests in 2007 and 240 nests in 2008 (Figure 2). Inaccessible nests in trees successfully hatched in both years and in 2008 a large number of nests on the ground, initiated after the last egg destruction trip, were observed with nestlings in August (Figure 3).

2009 Egg Oiling – On the initial trip to Lone Tree Island for 2009, eggs were destroyed and nesting materials were scattered. To reduce re-nesting, and due to the large number of hatched birds found in late summer 2008, nests on the ground were oiled on the second and third visits to the island. The peak number of nests of 191 was recorded during the second oiling on May 21st (Table 2). During 2008 WS staff noted one of the few remaining large cottonwood trees that had many DCCO nests located near its base had lost all its vegetation and appeared to be dead or dying. This same tree was dead in 2009 and the vegetation on other large trees on the island is starting to die off.

2009 Shooting – To further prevent colony establishment on Lone Tree Island, nesting birds were removed via shooting during egg oiling visits. Two WS employees concealed in blinds shot birds returning to the island to roost or nest with suppressed .22 caliber rifles. A total of 113 birds were removed during the four visits to the island, including all 13 nestlings that had hatched in the existing trees. The shooting appeared to create



Shooting DCCO's on Lone Tree Island

very little disturbance to other co-nesting species on the island as great egrets, black-crowned night herons, American white pelicans, and ring-billed and herring gulls remained on nests or roosting in trees during shooting (see photo above). There was no successful DCCO reproduction on Lone Tree Island in 2009.

Table 2. Summary of DCCO eggs destroyed by USDA-Wildlife Services on Lone Tree Island, Brown County, Wisconsin in 2009.

	April 28	**May 21**	**June 9**	**July 28[a]**
Nests destroyed	47	176	113	0
Eggs destroyed	77	589	259	0
Nests hatched	0	0	2	6
Nestlings hatched	0	0	7	0
Total predation	0	0	0	0
Partial predation	0	0	4	0
Nests not destroyed	0	10	10	0
Empty nests	0	5	26	0
Total nests	**47**	**191**	**151**	**6**

[a] Counted nestlings only, no eggs were destroyed.

Jack Island

DCCO Egg Oiling History 2006-2008 – DCCO egg oiling began in mid-May 2006 on Jack Island with a second visit three weeks later in early June. A peak of 3,730 nests were recorded during the May 2006 oiling visit (Figure 2) and during this same visit it was found that 698 nestlings had already hatched (Figure 3). Based on 2006 observations, recommendations were made to make initial oiling efforts in early May to better coincide with DCCO nesting in the northern Green Bay islands. A steady decline in peak nest numbers was recorded with 3,459 nests in 2007 and 2,756 nests in 2008 (Figure 2). In 2007, the peak number of nestlings observed (945) occurred when approximately 300 nests were not oiled due to weather conditions forcing the crew to leave the island prior to oiling completion. In August 2008, 526 nestlings were found during the follow-up visit and the development stage of the birds indicated they were hatched from eggs that were laid after the final oiling in June (Figure 3).

2009 Egg Oiling – Three oiling visits were conducted in 2009 beginning in early May with a follow-up visit made in late July to document nesting success (Table 3). A peak of 2,462 total nests was found during the second oiling trip on May 28th. This peak nest count represents an 11% decline from 2008 (Figure 2). There was an 87% drop in nestlings observed from 2008 to 2009 with almost all the hatched birds found in nests in trees that were inaccessible for oiling (Figure 3). Other nesting species observed include herring gulls, Canada geese, and mallards. Additionally, the remaining shrubs where DCCO's have nested annually have begun to die off around the perimeter of the island.

Table 3. Summary of DCCO eggs oiled by USDA-Wildlife Services on Jack Island, Door County, Wisconsin in 2009.

	May 5	May 28	June 15	July 29[a]
Nests oiled	903	2,240	1,704	0
Eggs oiled	2,060	6,415	3,479	0
Nests hatched	0	3	28	4
Nestlings hatched	0	4	58	10
Total predation	58	36	62	0
Partial predation	15	46	70	0
Nests not oiled	7	15	9	4
Empty nests	1,123	168	553	0
Total nests	**2,091**	**2,462**	**2,356**	**8**

[a] Counted nestlings only, no oiling took place.

Hat Island

DCCO Egg Oiling History 2007-2008 – DCCO egg oiling began on Hat Island in 2007 with three visits starting in early May with subsequent visits spaced three weeks apart and a follow up visit to document nest success in July. A sharp decline in peak nest numbers was recorded with 3,324 nests in 2007 and 2,102 nests in 2008 (Figure 2). Nestlings were found on the follow-up visits in both 2007 and 2008 (Figure 3), and based on the development stage of the nestlings, it appeared nesting and incubation had occurred after the final oiling in early June.

2009 Egg Oiling – Three oiling visits were conducted in 2009 beginning in early May with a follow-up visit made in late July to document nesting success (Table 4). A peak of 1,973 total nests was found during the second oiling trip on May 28th. This peak nest count represents a 6% decline from 2008 (Figure 2). The follow-up visit in July found the highest number of nestlings for the year (175) and the development stage of the young birds indicated they were hatched from eggs that were laid after the final oiling in June (Figure 3). Other species observed nesting on Hat Island included herring gulls, Canada geese, and American white pelicans. Although nests counts were not conducted, pelican numbers on Hat Island appear to be increasing from previous years.

Table 4. Summary of DCCO eggs oiled by USDA-Wildlife Services on Hat Island, Door County, Wisconsin in 2009.

	May 5	May 28	June 15	July 29[a]
Nests oiled	889	1,781	1,240	0
Eggs oiled	2,138	4,763	2,413	0
Nests hatched	0	1	8	102
Nestlings hatched	0	1	15	175
Total predation	89	36	81	0
Partial predation	53	48	55	0
Nests not oiled	0	0	0	33
Empty nests	809	155	573	0
Total nests	**1,787**	**1,973**	**1,902**	**135**

[a] Counted nestlings only, no oiling took place.

Strawberry Island

Since 2006, WS has made at least two visits to Strawberry Island each year to search for DCCO nesting activities. Harassment efforts with propane cannons implemented by the island's owner have been successful in preventing nesting by DCCO's the past four years. Discussions with the island's owner indicate he is committed to preventing DCCO nesting and plans to employ the propane cannons into the future.

OTHER DCCO DAMAGE MANAGEMENT ACTIVITIES IN 2009

Lake Sinissippi

Beginning in 2007, WS was contacted by the Lake Sinissippi Improvement District in Hustisford regarding the nesting of DCCO's causing concerns with vegetation loss and erosion of three islands. WS provided assistance through a cooperative service agreement to provide pyrotechnics, propane cannons, and direct control using harassment and the lethal removal of a limited number of adults under a Federal Depredation Permit issued to the Improvement District. WS has assisted the project in 2008 and 2009 by supplying pyrotechnics and renting a propane cannon to be placed on one of the islands. Abatement measures have been successful the past three years in preventing DCCO nesting on the lake.

Lake Puckaway

The Lake Puckaway Protection and Rehabilitation District initially contacted WS in fall 2007 with concerns of DCCO nesting activities resulting in the loss of vegetation and subsequent increased erosion of dredge bank islands that provide protection to aquatic vegetation and marshland habitats. WS assisted the Protection District in 2008 in the removal of DCCO nests and limited lethal removal of adults through a Federal Depredation Permit issued to a private island owner that was also a member of the Protection District board. Management

efforts, as well as a severe rain event in June 2008, appear to have limited DCCO reproduction and damages to the vegetation. In 2009, WS made two visits to Lake Puckaway, lethally removing 3 adult birds during an initial visit and noting the presence of 4 DCCO nests on a subsequent visit. DCCO's appeared to have abandoned one nesting site on the lake in 2009 where a large number of nests occurred in 2008 but have continued to use other nesting locations on the lake. DCCO's have continued to be reported using the lake; however, nesting in 2009 appeared to be limited.

Little Green Lake

Little Green Lake is located approximately six miles east of Lake Puckaway in Green Lake County. In March 2009, the Protection and Rehabilitation District requested WS assistance in dealing with DCCO damage to shoreline vegetation as well as concerns with DCCO consumption of stocked fish in the lake. The Protection District secured a Federal Depredation Permit to remove a limited number of birds to use in conjunction with their ongoing non-lethal harassment program. In May 2009, WS staff made one visit to the lake and lethally removed one DCCO and noted the presence of 30 to 50 birds. No nesting was observed throughout the year and a minimal number of DCCO's were observed utilizing the lake for the rest of the summer.

City of Oshkosh

The City of Oshkosh, Division of Parks contacted WS in 2008 with concerns of DCCO nesting causing vegetation loss on a city-owned island, locally referred to as "Monkey Island", in Miller's Bay adjacent to Menomonee Park. Great egrets and black-crowned night-herons also nest on the island and the city wanted to maintain the existing habitat to support those species. Under the authority of the Public Resources Depredation Order (PRDO) issued by the USFWS, WS was able to remove up to 10% of the population from the colony. WS staff made two visits in early to mid-May and lethally removed 225 adult cormorants from the nesting colony in 2008. In 2009, WS staff made four visits to the island in May and lethally removed 130 adult birds. A decline in peak DCCO nesting numbers was observed from 577 nests in 2008 to 240 nests in 2009. During a follow-up visit in June, it was noted that DCCO's appeared to have abandoned the island.

Long Point Island

Long Point Island is privately owned and located in Lake Winnebago approximately seven miles south of Oshkosh in Winnebago County. The wooded island supports a large number of black-crowned night-herons (478 nests in 2008), great egrets (140 nests in 2008), ring-billed gulls (600 nests in 2008), and lesser numbers of American white pelicans, cattle egrets, great blue herons, green herons, and herring gulls (T. Ziebel, personal communication). The number of DCCO nests on the island has increased dramatically from zero in 2005 to 1,832 nests in 2008 (T. Ziebel, personal communication). To protect the wooded habitat of this important colonial waterbird nesting site, plans were made to lethally remove DCCO's under the USFWS issued PRDO. Funding was

provided by a local fishing club, WDNR, and WS, to have WS staff remove adult DCCO's with suppressed .22 caliber rifles. WS staff made five visits to the island and removed a total of 1,176 birds. Other nesting species did not appear to be disturbed by the shooting as they would often remain in nests as the DCCO's were removed in their immediate vicinity. A total of 1,304 DCCO nests were recorded on the island in 2009.

DCCO Fatty Acid Study

Large declines in the harvest of brown trout stocked by WDNR in Green Bay and the Door County area of Lake Michigan have caused concerns of DCCO predation near stocking sites. Brown trout are found near shore and may be easily preyed upon by DCCO but because they may make up a small portion of the DCCO diet it may be difficult to record brown trout through traditional diet sampling. To determine if predation of brown trout by DCCO is occurring, WS staff collected 33 adult DCCO's from Jack Island during oiling visits and the fourth follow-up visit in 2008. Additional birds were collected by WDNR staff near Hat Island, Pilot Island, and the Sturgeon Bay Canal. Subcutaneous fat and stomach contents were removed from the birds and submitted for analysis by the National Wildlife Research Center in Fort Collins (subcutaneous fat) and the WDNR in Sturgeon Bay (stomach contents). At the date of this report, analysis on the 2008 samples is ongoing. During 2009, WS staff collected four nestlings at each island during the last oiling effort on Cat, Hat, and Jack Islands for further DCCO fatty acid analysis.

DCCO Environmental Assessment

An Environmental Assessment (EA) for DCCO management in Wisconsin was cooperatively developed by USFWS, WDNR, and WS and solicited for public comment during 2008. A Finding of No Significant Impact for the EA was released in April 2009. The EA lays out an integrated approach to DCCO damage management to reduce damage to property and natural resources.

RECOMMENDATIONS

Wildlife Services recommends future DCCO egg oiling efforts in the Lower Green Bay region continue to begin in late April to best coincide with the onset of nesting on Cat Island. Oiling in the northern Green Bay/Door County region should begin in early May to correspond with the slightly later DCCO nesting period. Follow-up visits the past three years have documented that DCCO's are persistent in their nesting attempts indicated by the number of nestlings hatched after the final oiling visit in June. To achieve better success in preventing DCCO recruitment, four oiling events spaced three weeks apart would be needed due to the prolonged and asynchronous nesting period of DCCO's.

WS management efforts on Lone Tree Island demonstrate that egg oiling in conjunction with shooting with suppressed rifles is an effective approach to preventing establishment and recruitment of DCCO's at a nesting site. Egg oiling in conjunction with the lethal removal of adults at sites deemed for protection

across the state could prevent DCCO nesting colonies from establishing, help preserve existing vegetation, and prevent the disruption to other colonial nesting species. Using suppressed firearms from camouflaged blinds to remove actively nesting adults causes minimal disturbance to other nesting waterbird species while reducing or eliminating DCCO use of these islands. WS recommends the use of egg oiling, where applicable, over egg/nest destruction since egg oiling appears to limit re-nesting attempts by DCCOs.

Shooting DCCO colonies appears to have minimal disturbance to other colonial nesting species. Many colonial nesting species returned to their nest immediately (< 30 seconds) after initial disturbance (entering the island) and remained on their nest while shooting was ongoing. If necessary and funding allows, shooting with suppressed firearms is an additional method to acquire a quick population reduction in an area in lieu of, or in addition to nest and egg oiling.

New technologies such as the fatty acid analysis to identify diet composition offer promising tools to document diets of DCCO's and should be continued to be implemented when the opportunity is available. WS recommends that a diet study, similar to the research conducted at Cat Island from 2004 to 2006, be implemented near the northern Door County colonies to best document DCCO foraging impacts to fisheries. Additionally, impacts to other colonial nesting waterbirds and island vegetation should be monitored to determine the impacts of DCCO management strategies.

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