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It's Been a Great Year!

Inside this Issue:

It's Been a Great Year--Year in Review 1
 First Annual Young Wildlife Biologist Workshop 2
 LPWWRF Finds a Home for Educational Activities 3
 Undergraduate Teaching 3

Staff Research

Long Point Aerial Waterfowl Surveys 4
 Lower Great Lakes January Survey 5
 Avian Energetics Lab 7
 Greater Scaup Contaminant Burdens 8
 Scaup Satellite Tracking 8
 Crown Marsh Rehabilitation 10
 Mute Swan Dietary Intake 11
 Scaup Banding 12
 Sandhill Crane Research 13
 New Staff 14
 LPWWRF Photographer 15

Graduate Student Program

Program Philosophy 15
 Greater Scaup Contaminant Burdens During Winter--Lindsay Ware 16
 Use of Mallard Hen Houses in Ontario and Pennsylvania--Jeremy Stempka 17
 Agricultural Grain Availability and Quality--Ted Barney 18

Honors Student Projects

Scaup Artifact Ingestion After Nontoxic Shot Regulations--Melinda Demendi 19
 Use of Boxes by Wood Ducks and Hooded Mergansers--Tyler Done 19
 Contaminants and Nutrient Reserves in Common Loons--Chris Course 20

LPWWRF New Library 21

Staff, Board of Directors, and Scientific Advisors 21

Publications 22

Welcome to the second edition of the Long Point Waterfowl and Wetlands Research Fund's (LPWWRF) annual newsletter! We hope that you agree that we have had a very exciting year at LPWWRF. Here are some of our key accomplishments over the past year:

- Acquired the Junior Ranger Camp, a 50 bed facility near Turkey Point, Ontario
- Hired three full-time staff members
- Published seven papers in peer-reviewed journals
- Presented eight papers at international conferences
- Implanted 20 additional scaup with satellite transmitters
- Taught Wildlife Ecology & Management at University of Western Ontario for the 6th year
- Coordinated and taught Wetland & Waterbird Ecology field course for the 3rd year
- Developed, coordinated, and taught our 1st Young Wildlife Biologist Workshop
- Offered graduate positions to 4 M.Sc. candidates



Aspiring biologists build Wood Duck boxes during our first Young Wildlife Biologist Workshop.



Interested in learning more about LPWWRF?

For more information and to access previous newsletters visit our website www.bsc-eoc.org/lpwwrf.html.

To be put on the mailing or e-mail list for this annual newsletter contact Scott Petrie spetrie@bsc-eoc.org, 519-586-3531, ext. 208.



About LPWWRF

LPWWRF is a non-profit, non-government organization dedicated primarily to the study and conservation of waterfowl and wetlands throughout the lower Great Lakes. By making the results of our work available to the public and scientific community, we make substantial contributions to science and are a strong voice for conservation.



YWBW participant Michael Punchak checks a hen house with Ted Barney.

LPWWRF is also committed to supervising and supporting graduate student research on waterfowl- and wetlands-related projects, as well as to providing a diversity of educational opportunities for undergraduate students. LPWWRF has recently developed a youth mentorship and education program as this is very important to the future development of wildlife biologists and builds appreciation of our hunting heritage. Our education program gives students an increased understanding of wildlife ecology, management, and conservation.

LPWWRF is administered by Bird Studies Canada (BSC) and is supported primarily by Bluff's Club members. LPWWRF also receives generous support from various other individuals and organizations, including Ducks Unlimited Canada, the Waterfowl Research Foundation, Delta Waterfowl, Ontario Federation of Anglers and Hunters, Kenneth M. Molson Foundation, Order of Good Cheer, Bayou Club, Ontario Power Generation, and the Sam Johnson Graduate Scholarship.

LPWWRF's First Young Wildlife Biologist Workshop

Opportunities to develop and explore interests in wildlife-related activities are often limited for high school age youth. Very few high schools offer natural science courses or extra-curricular programs that provide students with opportunities to learn about natural resources (including wildlife and their habitats) outside of a traditional classroom setting. This is exacerbated by a substantial decline in youth participating in wildlife-related activities (e.g., hunting, fishing, and viewing), with a corresponding increase in time spent pursuing indoor activities (e.g., television, video games, and computers). Thus, we endeavour to provide students with memorable outdoor experiences and opportunities for fun, hands-on activities showcasing wildlife. This may not only be important for instilling a life-long interest and understanding of the natural world, but also may be the impetus needed to pursue a career in the natural sciences or resource management/conservation.



LPWWRF launches its first Young Wildlife Biologist Workshop.

LPWWRF has embarked on a pilot "Young Wildlife Biologist Workshop" (YWBW), held in August 2007. We invited 14-16 year old youth (14 individuals) to participate in outdoor activities focusing on many aspects of wildlife ecology and management at Long Point and other sites throughout Norfolk County. Activities included, duck and songbird banding, wildlife and tree identification, outdoor heritage appreciation, Wood Duck box construction and placement, retriever training, fish dissection, and taxidermy demonstrations.

LPWWRF considers youth mentorship and education very important to the future development of wildlife biologists and appreciation of our hunting heritage. Thus, through coordination of the YWBW, LPWWRF desires to instill in youth a keen interest in wildlife ecology and resource conservation/management, as well as in our hunting and outdoor heritage. We hope to expand the program (geographically as well as by offering a diverse array of workshops) substantially over time. In fact, we eventually would like to hire a full-time youth coordinator if enough interest and resources can be generated. Visit our website for more information.

LPWWRF Finds a Home for Students, Field Staff, and Volunteers!

In the past, LPWWRF's capacity to expand its research, education, and professional training mandates has largely been limited because of inadequate housing and training facilities. It has also been extremely expensive to find housing for staff and students, particularly during the summer months. Fortunately, the OMNR has agreed to enter into a long-term Memorandum of Understanding to have LPWWRF take over a local Junior Ranger Camp. This has been made possible through generous donations made by Harley Hotchkiss, Fred Mannix and Bill Turnbull, all of Calgary, AB. We plan to rename the facility the LPWWRF Research and Education Centre. Situated on 40 acres and located about 10 minutes from LPWWRF's home base at BSC. The centre includes full kitchen and dining facilities, a conference/meeting room, office space, staff house, two bunk houses, and several storage sheds.



The research centre will provide a home for our graduate students, technicians, part-time employees, volunteers, undergraduate courses, and youth education workshops. We also will be making the centre available to numerous other conservation- and education-based groups that are also lacking a suitable site to conduct their activities - there currently is no facility within Norfolk County that provides a venue for conservation-based initiatives/training and associated accommodation. Therefore, this development will allow us to greatly expand our research and education programs, while providing unique opportunities for many other conservation-based groups within Norfolk County.

LPWWRF Undergraduate Teaching

We at LPWWRF firmly believe that future wildlife professionals need to have a good understanding of wildlife and habitat management, as well as the role of hunting in wildlife management. Unfortunately, management-based wildlife courses are being discontinued at many Canadian universities, and consequently, many individuals entering the wildlife management field are ill equipped to deal with today's wildlife management issues. Based on this, LPWWRF is committed to teaching undergraduate courses that provide students with an increased understanding and appreciation of wildlife and habitat management / conservation. Our undergraduate program also provides students interested in pursuing careers in the wildlife field opportunities to



Lisa Kennedy (undergraduate student and volunteer) web tags a duckling.

receive training in experimental study design, statistical analysis, and scientific writing. A close affiliation with the University of Western Ontario (UWO) has been instrumental in expanding our educational mandate. LPWWRF staff annually supervises and advises Honors B.Sc students working on a variety of research projects. We also offer a semester long course in Wildlife Ecology & Management at UWO and a one week summer field course in Wetland & Waterbird Ecology. Our undergraduate education program will continue to expand and evolve in order to ensure that students have a greater understanding of the natural environment around them, thereby also instilling an appreciation for wildlife, habitat, and the need for their management or conservation.

Long Point Aerial Waterfowl Surveys

Monitoring waterfowl populations is a cornerstone for waterfowl management and conservation in North America. Large-scale aerial surveys, such as the Waterfowl Breeding Population & Habitat Survey and Mid-winter Survey, have facilitated estimation of annual breeding and wintering population sizes which have been used, in part, to monitor short- and long-term changes of waterfowl numbers in North America. Aerial surveys are often conducted at major stopover sites where large numbers of migrant waterfowl congregate during fall and spring. These surveys not only generate data useful for population monitoring, but also can provide insight into changes in species migration chronologies, geographic distributions, and local habitat or forage conditions. Thus, aerial surveys conducted at major migratory stopover sites, such as Long Point-Lake Erie, are vital components of waterfowl management and conservation.

The Canadian Wildlife Service (CWS) began conducting aerial surveys of fall- and spring-migrant waterfowl at major stopover sites (e.g., marshes of Lake St. Clair, Rondeau Bay, and Long Point) and nearshore habitats of the lower Great Lakes (LGL) in 1968. Surveys were flown by the CWS approximately every 4 to 5 years from 1968 to 1984 and biannually thereafter until 1988. In 1991, the CWS empowered LPWWRP with the responsibility of consistently conducting fall and spring surveys of waterfowl at Long Point.

After taking over surveys, LPWWRP established standardized survey protocols. First, more than 20 transects were established over Long Point marshes. Surveys were to be flown during mid-day hours at about 7 to 10 day intervals (~5-6 flights per season) and were timed to capture peak migration periods within seasons. Fall surveys were to be flown between 1 September and 20 December; spring surveys were to begin 1 March, generally coinciding with spring thaw and arrival of first migrants, and cease by 15 May after majority of migrants have departed.



Some of the most notable trends revealed through these surveys have been the increases in total numbers of migrant Lesser and Greater Scaup (hereafter scaup) using Long Point during fall and spring. Fall-staging scaup have increased by 11% per year, on average, from about 1,630 birds in 1975 to 38,250 birds in 2005. Average numbers of scaup counted during fall at Long Point have ranged from a low of 60 in 1986 to a high of 71,350 birds in 2000. Similarly, numbers of spring-staging scaup have increased from about 1,870 to 20,000 birds from 1975 to 2006, an increase of 8% per year. These substantial increases in scaup numbers corresponded with the period of non-native Zebra Mussel colonization, and rapid expansion of their range and population throughout Lake Erie. Zebra Mussels quickly became a novel food source for scaup and were a primary reason for the increased fall- and spring-use of Long Point (plus other major stopover sites on the LGL) that has occurred since the late 1980s.

Waterfowl survey data collected within individual marsh complexes also have revealed considerable changes in habitat use at Long Point over the past three decades. For example, total numbers of bay ducks (combined Canvasback, Redhead, Lesser Scaup, and Greater Scaup) counted during fall from 1975 to 2005 have decreased within the Long Point Company Marsh (8%/yr), Big Creek Marsh (11%/yr), and Inner Long Point Bay (5%/yr). During the same period, bay duck numbers increased by about 5% per year several kilometers off the south shore of the Long Point sandspit on Lake Erie. Several factors may have caused this change in diving duck distribution and habitat use at Long Point, including: 1) decline in Lake Erie water levels (especially since the early 1990s) and associated impacts on depth and amount of open water area within marshes, 2) changes in abundance, quality, or types of food, 3) increased use of areas by Tundra Swans and other waterfowl and possible direct or indirect competition, and 3) increased human use and disturbance via boat traffic within the Inner Bay during early and peak migration periods.

Having data available to document changes in waterfowl at Long Point also was initiated after survey data showed

numbers, habitat use, and distributions has been instrumental in allowing LPWWRF to direct its research to answer key questions relating to waterfowl and wetland habitat ecology on the LGL. LPWWRF began its long-term investigation into scaup foraging ecology, body condition, and contaminant burdens at major LGL stopover sites, including Long Point, partly in response to the observed population increase at Long Point. Research on competitive interactions between Tundra Swans and other waterfowl at Long Point also was initiated after survey data showed noteworthy and divergent long-term changes in patterns of duck and swan numbers and distributions at Long Point.

Aerial waterfowl surveys clearly are a very important part of the LPWWRF mandate and its history. Continued monitoring will provide sufficient data for long-term monitoring of staging waterfowl populations and habitat use at Long Point. By maintaining the integrity of this long-term data set, LPWWRF will be able to generate new research hypotheses and continue making substantial contributions to waterfowl research, ecology, conservation, and management.



Dr. Scott Petrie counts waterfowl at Long Point.

Lower Great Lakes January Survey

Since the late 1980s/early 1990s, non-native Zebra and Quagga Mussels have increased substantially throughout the LGL. During the same time, winter diving duck and sea duck use has increased greatly, likely in response to the increase in prey abundance and milder winter conditions. This increase in winter duck use resulted in the initiation of the Lower Great Lakes January Survey (LGLJS) in 2002.

The LGLJS is a coordinated aerial waterfowl survey of the Canadian and US shorelines of lakes Ontario, Erie, and St. Clair that has been conducted annually since 2002. Because it is both a widespread and bi-national monitoring initiative, several natural resource organizations from Canada and the United States currently participate in this survey. LPWWRF, in cooperation with CWS, is the lead agency responsible for survey coordination. LPWWRF also acts as the repository for the survey data, plus produces and disseminates an annual survey summary/report to participants and other interested parties.



The survey is flown during early-mid January to estimate numbers of waterfowl wintering along the LGL shorelines. This survey coincides with the Mid-winter Survey, which is an aerial survey conducted at traditional US wintering areas. The LGLJS provides data on numbers of dabbling ducks and Canada Geese, but also on several diving duck and sea duck species (Table 1). Although the survey provides reasonably good estimates for species that frequent shoreline or nearshore habitats, it may underestimate the number of sea ducks (e.g. Long-tailed Ducks, scoters, and mergansers) wintering on the LGL.

During winter 2006, LPWWRF and CWS received funding from the Sea Duck Joint Venture to develop an improved survey framework for sea ducks on the LGL that could be used in conjunction with the LGLJS. To do this, we flew a series of offshore aerial surveys over eastern Lake Ontario (Oshawa to Stoney Creek, Ontario) where, based on LGLJS data, the majority of Long-tailed Ducks (LTDU) and scoter spp over-winter on the LGL. To get an idea of how numbers and distribution of sea ducks changed throughout winter, we flew four surveys from 13 January to 23 February. To determine how far offshore surveys should be flown to ensure that the majority of individuals are counted, on each survey we flew the LGLJS shoreline transect (0.5 km offshore), plus 4 additional transects located 2, 4, 10, and 20 km off shore. By doing this we

Table 1. Annual survey summary for the Lower Great Lakes January Survey.

Species	2002	2003	2004*	2005*	2006	2007*
Tundra Swan	9416	3426	5244	1563	8171	11511
Mute Swan	2228	2331	1552	3563	5702	5429
Swan spp	527	5325	3071	26	107	713
Canada Goose	66670	72249	96855	49940	63424	73750
Am. Black Duck	20462	18134	24028	6722	25208	12178
Mallard	81709	43773	86568	26855	87724	36404
Dabbler spp	16056	6499	2322	1429	2929	8022
Canvasback	93100	37443	151877	37932	116966	161200
Redhead	54253	18435	9727	26724	18411	33874
Scaup spp	105656	86219	107603	64502	106393	192704
Long-tailed Duck	47914	48935	39595	48355	66269	77974
Scoter spp	790	3256	12999	9075	3424	7979
Com. Goldeneye	21681	18259	21105	16137	28472	9768
Bufflehead	8987	7170	6895	9377	13110	6594
Merganser spp	36667	54949	59040	48130	91171	89546
Diver spp	263	276	1715	408	69	8146
Totals	566379	426679	630196	350738	637550	735792

* One or more strata were not surveyed

determined that numbers of LTDU and scoter spp declined from mid January to late February, with the largest numbers of both present during the mid January survey date. We also determined that about 85% and 75% of LTDU and scoter spp were counted within 2 km of shore, and nearly 100% of both species were counted within 4 km of shore.

Based on the results of our expanded survey efforts for sea ducks in 2006, the LGLJS protocol was modified in 2007 to include a 2 km offshore transect within all Lake Ontario survey strata. Collectively, the nearshore (0.5 km) and offshore (2 km) transects now constitute the Lake Ontario January Sea Duck Survey. During this first year, 102,785 LTDU and 11,359 scoter spp were counted on the Canadian side of Lake Ontario. This sea duck survey should improve the reliability of population estimates and provide added information for geographic distribution and broad-scale habitat use of sea ducks wintering on Lake Ontario.

Relatively little information exists regarding population sizes/trends, habitat use, and distributions of sea ducks during winter, so it's imperative that LPWWRF (and other organizations) continue monitoring numbers of sea ducks, and other waterfowl, on the LGL.



Dr. Shannon Badzinski enjoying a rare moment away from his computer.

Avian Energetics Lab

We have been very busy in the Avian Energetics Lab (AEL) this past year as knowledge of our services continues to grow. We have analyzed the body condition (amounts of fat, protein, and mineral within individual birds) of 8 different waterfowl species including, Surf Scoter, Common Goldeneye, Blue-Winged Teal, Ring-necked Duck and Greater Scaup. We are even applying our laboratory techniques to other wildlife such as, Wood Frogs and Common Loons. We now have a full-time laboratory coordinator as well as two technicians and several volunteers working in the AEL. Upcoming AEL contracts will include body condition analysis of Arctic Terns and, Sandhill Cranes.

The AEL is a multi-purpose facility that often is utilized for activities beyond just body composition analyses. In February and April 2007, the AEL served as an operating room for implanting satellite transmitters into Greater and Lesser Scaup - part of LPWWRF's satellite tracking project. The AEL also provided facilities for the analysis



Emily Apse our new AEL Coordinator extracts lipids for a contract.

of aquatic invertebrate samples collected throughout the LGL - part of BSC's Marsh Monitoring Program's wetland assessment of Great Lakes Areas of Concern. Both undergraduate students in the Wetland & Waterbird Ecology field course and high-school students in the Young Wildlife Biologist Workshop learned about waterbird physiology, anatomy, pathology, and forensics by watching and performing post-mortem dissections in the AEL.

Over 20 student volunteers have gained experience working in the AEL this past year. Students have come from across North America to volunteer, or work at the AEL. The AEL has provided a great opportunity for learning, where students developed their skills in laboratory techniques and acquired a better appreciation for wildlife biology. Students working in the AEL have come from high school co-op, undergraduate, and graduate programs, and have had a wide range of previous knowledge and experience in biology. Current graduate students working with LPWWRF also have the opportunity to process their samples and data on-site, allowing them to be involved in the analysis, thereby gaining valuable technical experience.

As the AEL continues to grow so will opportunities for education and research. We are continually receiving contracts from researchers across North America and continue to broaden our services. Make sure and look for our upcoming advertisement in the *Wildlife Professional*.



Dr. Glenn Olsen of the USGS implants a satellite transmitter into a Lesser Scaup.

Contaminant Burdens in Greater Scaup from Alaska

As part of LPWWRF's ongoing research into scaup contaminants, 109 female Greater Scaup (GRSC) and 6 eggs were collected throughout the 2002 and 2003 breeding seasons at the Yukon-Kuskokwim River Delta, Alaska (in partnership with Kristen Gorman). This study was done to determine if concentrations of 18 trace elements in liver tissues or eggs were elevated and if contaminant burdens affected pre-breeding body condition of females at one of the main breeding areas for GRSC in North America.

Our results showed that only cadmium (Cd), mercury (Hg), and selenium (Se) were detected above background levels. Specifically, 55%, 5%, and 40% of females, respectively, had elevated liver Cd (>3 ppm dry weight [dw]), Hg (> 3 ppm dw), and Se (>10 ppm dw) burdens. We also found that 33% and 100% of eggs, respectively, contained Se and Hg, but concentrations were below thresholds known to cause embryotoxic and other effects in other bird species. Fat reserves of pre-breeding females were not correlated with liver Cd, Hg or Se concentrations, whereas protein reserves increased and declined with increasing Cd and Se concentrations, respectively.

This study suggests that a large percentage of female GRSC arrive and initiate egg laying with elevated Se (and Cd) burdens and transfer Se to their eggs. Liver Se levels >10 ppm dw has caused reproductive impairment in captive Mallards (MALL), so scaup reproduction also might be affected. Concentrations of Se in eggs did not support contaminant-induced effects on egg viability, but this sample might not adequately reflect potential for impacts on reproductive success due to the small sample collected and not knowing sequence of eggs collected within clutches (i.e., eggs laid earlier in clutches may have higher selenium burdens). Our results further suggest that pre-breeding females with higher liver Se burdens had lower endogenous protein reserves, which could reduce breeding propensity or reproductive output and success.

Satellite Tracking Lesser Scaup and Greater Scaup from the Lower Great Lakes

Since spring 2005 LPWWRF has been using satellite telemetry to study several aspects of the migration ecology of Lesser Scaup (LESC) and GRSC captured on the LGL. The main objectives of this research are to: (1) determine spring and fall migration pathways of LGL scaup, (2) determine the breeding and wintering ground affinities of scaup, and (3) assess spring migration chronology, especially time spent outside of the LGL region until arrival at their breeding sites. To date, we have implanted 35 LESG (2005=6; 2006=18; 2007=11) and 11 GRSC (2006=2; 2007=9) at Long Point, Lake Erie and Hamilton Harbour, Lake Ontario. By doing so, we have learned much about scaup migration, as well as their potential for selenium depuration (elimination of a toxin from the body) after departing the LGL.

Lesser Scaup

LESC migrated from the LGL during spring and dispersed to breed throughout the boreal regions of North America. Overall, 45% (17 of 38) and 42% (16 of 38), respectively, of birds settled into the eastern and western boreal forest to breed, whereas far fewer spent the summer in the United States-Canadian prairie and parkland region (8%) and western Alaska (5%). Our data shows that the LGL region is an important staging area for birds breeding throughout North America, but particularly so for LESG breeding in the eastern boreal forest.



© Theodore Smith

Our study also revealed some notable data on fall migration and winter distributions of LESG using the LGL region. Based on fall 2005 and 2006 data, 75% (12 of 16) birds returned to the LGL region, but only 31% used stopover sites visited previously during spring. These results suggest that birds have a relatively high degree of philopatry or homing to the LGL region, but do not necessarily use same stopover sites during spring and fall. LESG initially captured at Lake Erie and western Lake Ontario were mostly distributed along the Atlantic coast of the US (Maryland/Virginia [18% / 2 of 11], North Carolina [9%], Florida [46%]) during winter, but ranged as far west as Louisiana (18%) and as far south as the Dominican Republic (9%) in the Caribbean.

Greater Scaup

Based on 2006 and 2007 data, 60% (6 of 10) of wintering and spring-staging GRSC from western Lake Ontario migrated west to spend the summer in western Alaska, whereas 20% and 10% traveled to the western (Nunavut)



Spring migration pathways of Lesser Scaup

and eastern (Quebec) boreal forests, respectively. Thus, LGL provide staging and wintering habitat for birds within the core GRSC breeding range in Alaska, but also for birds that might breed elsewhere at lower densities throughout the boreal forest in North America.

Both of the two GRSC we captured during spring 2006 at Hamilton Harbour returned during late fall and spent the entire 2006/2007 winter on western Lake Ontario. This limited data suggests that GRSC are highly philopatric to wintering areas on the LGL, which may make them susceptible to acquiring high Se burdens and transporting this trace element to their breeding grounds the following spring.

Potential Se Depuration

Waterfowl can relatively quickly eliminate Se from their bodies after removal from a diet enriched in this trace element. Liver Se burdens in captive MALL, for example, are reduced by 50% every 19 days (d). Our satellite telemetry data shows that female LESCS spend, on average (ave) 28 d (6-50) and GRSC spend 32 d (11-49) outside of the LGL region before arriving at breeding sites. Based on data published in the Birds of North America (BNA)

account for LESCS, about 22 d (15-60) lapse between

arrival at breeding sites and clutch initiation; data in the BNA account for GRSC suggests an ave of 18 days between arrival and nest initiation. This information allows us to calculate how much Se scaup might eliminate after departing the LGL during spring and before laying eggs on the breeding grounds.

Previous LPWWRP research found that large proportions of spring-migrant LESCS and GRSC had elevated liver Se burdens. Female LESCS contained 15.6 ppm (ave) and 56.4 ppm (maximum [max]) Se, whereas GRSC females had 22.6 ppm (ave) and 59.7 ppm (max) Se in their liver tissue. Thus, female LESCS that acquired ave and max liver Se burdens and had an ave depuration period (migration d + nest initiation d) of 50 d would have about 2.4 ppm and 8.8 ppm at start of nest initiation. Female GRSC with ave and max Se burdens and an ave depuration period of 50 d would initiate nests with 3.5 ppm to 9.4 ppm liver Se. These Se burdens are below the 10 ppm of Se in liver tissues of captive MALL that experienced reproductive impairment. If LESCS and GRSC females departed the LGL with maximum Se burdens and had minimum depuration periods of 21 d (LESC = 6 migration d + 15 nest initiation d) and 29 d (GRSC = 11 migration d + 18 nest initiation d) they could begin nesting with about 25.9 ppm and 20.4 ppm of liver Se, respectively, and thus could be at risk of reproductive impairment.



Spring migration pathways of Greater Scaup

Satellite Tracking (continued)

These rudimentary calculations suggest that some female LESC and GRSC may start laying eggs with elevated liver Se burdens. However, it seems that the majority of birds likely have sufficient time to depurate Se to levels where it might not impact reproduction. Birds that nest near the LGL, such as those that nest within the eastern boreal forest, may be most at risk to Se-based reproductive problems. Data from female GRSC at the Yukon-Kuskokwim River Delta in Alaska also shows that a substantial percentage (48%) of pre-laying birds had elevated Se burdens. Thus, more field research documenting egg contaminant burdens from throughout the scaup breeding range is warranted. Captive research, specifically using scaup, to assess how egg Se burdens impact hatching success and how long-term exposure to Se may impact female survival and breeding propensity are critical in determining to what degree this trace element might actually affect scaup. To that end, LPWWRF hopes to begin captive studies of scaup in the future to advance the current state of understanding about Se impacts on scaup. Given that satellite transmitters should remain active for a few more migrations, LPWWRF will continue to learn more about the migration ecology of LESC and GRSC in North America.

Rehabilitation of the Long Point Crown Marsh

Great Lakes coastal marshes are some of the most diverse and important ecosystems in Ontario. These marshes provide breeding habitat for a wide variety of resident birds, fish, reptiles, and amphibians, plus are critically important feeding and resting areas for large numbers of landbirds, waterbirds, and waterfowl during fall and spring migration. Because human activities have impacted and altered many of these habitats, it is important that sound science and management are used to minimize threats to the ecological function and integrity of these marshes. To that end, LPWWRF recently became involved in a multi-partner project the main goal of which is to begin rehabilitation of one debilitated coastal marsh, the Long Point Crown Marsh (LPCM).



Jim Malcolm

The LPCM is one of several marshes that make up the globally important wetland complex at Long Point, Lake Erie, Ontario. This 1750 acre marsh is owned by the Province of Ontario and is the only marsh at Long Point that is accessible to the public the entire year. Creation of the Long Point Waterfowl Management Unit in 1961 has greatly increased fall waterfowl hunting opportunities and access to the marsh, so much so that many people now hike, boat, bird-watch, fish or simply enjoy the wide array of habitats during the entire year.

Many long-time marsh-users and Long Point area residents have become concerned about the ecological integrity of the LPCM. This concern stems from the major changes in water-levels, vegetation communities, and duck/wildlife-use they have witnessed in the LPCM, particularly during the past 10 years. Such observations

prompted the Long Point Waterfowlers' Association (LPWA) to have LPWWRF undertake a quantitative evaluation of historic changes in waterfowl use and habitat characteristics within the LPCM and other major marshes at Long Point.

In that study, we analyzed several long-term data sets and quantitatively confirmed much of what waterfowl hunters and other marsh users had observed over the years. Based on our research, we surmised that low water levels in Lake Erie and the resulting sub-optimal marsh habitat conditions had reduced the attractiveness of the marsh for some waterfowl and other wetland-dependent wildlife during, and since, the 1990s. We thus concluded that the LPCM was in a debilitated state and made three suggestions about how to begin the rehabilitation process: 1) increase habitat interspersion by creating a mosaic of open water areas in large unbroken tracts of cattail and/or *Phragmites australis*, 2) create a controlled marsh to facilitate water level manipulation and vegetation management, and 3) eliminate and/or control established stands of *Phragmites australis*.

Results of our research also provided the impetus for further discussion and initiated the first steps toward the start of rehabilitation work within the LPCM. For instance, the LPCM Rehabilitation Steering Committee (LPCMRSC) was formed from a group of over 35 natural resource professionals and local stakeholder groups, including LPWA, LPWWRF, (BSC), Ontario Ministry of Natural Resources (OMNR), Ducks Unlimited Canada (DUC), and the Long Point Cottagers Association, that met at Long Point in August 2006 to discuss our research findings and witness first-hand the current state of habitat conditions and wildlife-use within the marsh. The LPCMRSC has since committed to develop a long-term rehabilitation plan, to engage the public and various stakeholders for input to the plan, and to securing funding for rehabilitation activities. To help maintain momentum in the rehabilitation process, LPWWRF has created a document and accompanying presentation titled "Toward Rehabilitation of the Crown Marsh Long Point, Lake Erie" which will aid with public consultation by providing background on the current state of the LPCM and giving an overview of marsh habitat management and techniques that may be used to rehabilitate the marsh.

Recently, the LPCMRSC, working closely with DUC engineers, has proposed and will initiate a small scale pilot project within the west end of the LPCM in August 2007. If this project is successful, results will be reported to the public along with a proposal to scale-up the small project to create a much larger flooded area. Doing so would provide more marsh habitat and improve habitat interspersion, thus benefit wildlife in this area.

Anticipating that rehabilitation might begin this fall, LPWWRF has been surveying bird, amphibian, and plant communities within the west end of the LPCM throughout spring and summer 2007. These surveys will provide baseline data on community structure, diversity, and species abundance before rehabilitation activities begin. LPWWRF will continue monitoring over the next several years so annual floral and faunal responses to management activities can be measured and used to assess project success, adjust management activities to achieve desired responses, and apply what we learned to rehabilitate other areas of the marsh.

To date, much progress has been made toward laying the ground work for making the LPCM a more attractive place for wildlife and for the people that enjoy the marsh. But, much more work lies ahead and we will keep you updated on rehabilitation activities in future newsletters. LPWWRF's ongoing involvement with the LPCM rehabilitation attests to our commitment to, and involvement in, important wetland and waterfowl research and management activities within the LGL region.

Annual Diet of Mute Swans in Lower Great Lakes Coastal Marshes

Primary Investigator: Megan Bailey

Advisors: Scott Petrie and Shannon Badzinski

The coastal marshes associated with the LGL supports hundreds of thousands of waterfowl during spring and fall migration. Staging and breeding waterfowl using those marshes depend on a diverse array and annual abundance of submerged aquatic plants to build fat and protein reserves for migration and/or reproduction. The number of wetlands within the LGL region has been greatly reduced since European settlement due to drainage and urban development. Thus, minimizing potentially harmful anthropogenic and biological impacts to the remaining wetlands in the region is of utmost importance.

During the past 30 years, non-native Mute Swan (MUSW) populations have greatly increased, and continue to increase, in the eastern US and within the LGL region. As a result, there is much concern regarding impacts of these birds on native waterfowl, aquatic plants, and marsh habitats, because MUSW consume large quantities of plant matter and are highly aggressive. There are presently only limited dietary data for MUSW in the eastern part of their North American range and none exist for birds in the LGL region. Thus, in 2001, 2002, and 2004 we collected 356 mute swans from LGL coastal marshes in Ontario, Canada, to determine dietary composition and to evaluate: 1) seasonal and sex-related variation in adult diets and 2) age-related dietary differences.



Mute Swans (continued)

In this study, we found that adult diets did not differ among years, collection sites, or seasons, but females consumed more total *Potamogeton* spp and less *Najas flexilis* and *Elodea canadensis* than did males. Adult males, adult females, and cygnets had similar diets during summer and autumn. Overall, MUSW diets mainly consisted of above-ground biomass of several *Potamogeton* spp, *Chara vulgaris*, *Ceratophyllum demersum*, *Najas flexilis*, *Elodea canadensis*, *Vallisneria americana*, and *Zizania palustris*; below-ground parts of *Vallisneria americana*, *Potamogeton pectinatus*, and *Sagittaria* spp were eaten infrequently.

Comparison of our findings with those of other diet studies suggested considerable dietary overlap between MUSW and several other species of native waterfowl. Thus, we suggest that MUSW have potential to compete with native waterfowl for food when co-inhabiting LGL marshes. Based on this dietary overlap and that MUSW populations are increasing rapidly on the LGL, we recommend that protection provided to MUSW under the Migratory Bird Treaty Act of 1918 be eliminated so lethal methods can be used to initiate widespread and effective population management in Canada and the US.

Scaup Banding

Concern over the continental decline in GRSC and LESC (hereafter scaup) has resulted in increased emphasis being placed on the importance of banding birds to acquire survival and harvest rate estimates. While traditional banding programs have been conducted in the late summer (pre-season banding), limited numbers of scaup are banded at that time as they have not concentrated on staging areas that are easily accessed by humans. However, recent research has shown that post-season banding can also be used to acquire adult survival estimates, particularly when associated with a pre-season banding program. LPWWRF initiated its spring scaup banding program in March 2006 in an effort to increase the numbers of post-season banded scaup.

Several areas within inner Long Point Bay were baited with whole kernel corn during early spring migration. Swim-in-funnel traps were placed on baited sites after migrating scaup began to heavily use the areas. A total of 8 traps were placed throughout inner Long Point Bay from 15 March to 29 April 2007. We were able to catch and band 1502 LESC during this time. The majority of the birds banded were male (1152) which resulted in a sex ratio of 4.5 males to every female. Average body weights were as follows: juvenile male, 752 grams (g); juvenile female, 730 g; adult male, 778 g; and adult female 715 g.



Ted Barney and Jim Cook weigh scaup prior to release.



Ted Barney and Jim Cook wade out and extract scaup from a trap.

Scaup banded during spring 2007 had comparable body weights to scaup collected by LPWWRF (part of LPWWRF's contaminant research) during spring 1999. Small numbers of Buffleheads (39), Canvasbacks (25), Ring-necked Ducks (2), and GRSC (2) were also banded at this time.

Band returns from scaup banded at Long Point will help managers learn where scaup staging during spring at Long Point are summering and wintering. Band returns will also help to increase knowledge of migratory behaviour in scaup and

allow managers to understand better flyway affinities. The success of LPWWRF's spring scaup banding program will hopefully encourage other managers across North America to initiate pre- and post-season banding programs. If banding effort increases continentally, better estimates of adult survival rates will be generated for scaup. LPWWRF's spring scaup banding program will continue annually with the possibility of expansion to other areas within the LGL.

Movement Patterns, Habitat Use, and Landowner Opinion of a Rapidly Expanding Sandhill Crane Population in Central Ontario

Each of the nine Sandhill Crane (SACR) populations in North America experienced widespread reductions from the 1600s to the early 1900s, due primarily to commercial-hunting and loss of wetland habitat. Most SACR populations increased substantially after cessation of commercial hunting and the subsequent acquisition or restoration of key breeding, staging, and wintering wetland habitats. Increased availability of agricultural grains also may be a major factor contributing to population increases of SACR throughout North America.

The Eastern Greater SACR (GSACR) population increased considerably from only a few dozen pairs in the 1930s to more than 30,000 individuals in the early 2000s. In recent years, this population has been rapidly increasing and individuals have begun to re-colonize parts of their historic breeding range. Over the past 30 years, GSACR have expanded their breeding range from northern Michigan well into central Ontario where they now breed in wetlands adjacent to the north shore of Lake Huron, Manitoulin Island, and the Bruce Peninsula.

Numbers of spring- and fall-migrant, along with non-breeding, GSACR along the Ontario shoreline of Lake Huron also has been increasing over the past 4 decades. In autumn 2004, there were an estimated 9,000 SACR staging in the area near Desbarats, Ontario and in early summer 2007 an estimated 250 non-breeding SACR were observed at one roost site. To date, however, there have been no extensive or complete surveys of staging SACR within the area, thus peak number and seasonal SACR use of this area is unknown. Further, breeding and wintering ground associations, major staging areas, stopover sites, and migratory routes currently are unknown for SACR that breed and stage along the Lake Huron shoreline of central Ontario.

One of the most prominent issues surrounding the recent SACR range expansion and population increase along the northern Ontario shoreline of Lake Huron is concern about agricultural crop

degradation. Some farmers state that the large number of SACR now using this area are a major contributor to crop loss/damage and are reducing harvest yield, thus their income. Based on sufficient anecdotal evidence of crop loss/damage, crop degradation permits to kill nuisance SACR within this area have been issued. Quantitative



evidence, however, is lacking on seasonal timing and relative use of different types of crops, plus how SACR utilize different agricultural and other terrestrial habitats (i.e., feed, roost, etc) during late-summer and autumn migration.

Despite their increasing numbers, range expansion, and potential economic impact on the agricultural community in some locations, there currently is no formal management strategy for SACR in Ontario. Data on breeding and staging population sizes, annual productivity, breeding/migration/winter ecology, and potential impacts on humans and other wildlife are needed to direct management and conservation of SACR within the province. Acquisition of such information is of the utmost importance where human-SACR conflict is already evident. Therefore, LPWWRF will be using satellite tracking, colour coded leg bands, aerial surveys, road-side surveys, activity budgets, and landowner surveys to advance our understanding of the staging ecology of SACR. This research will also provide an impetus to develop a management strategy for SACR breeding/staging along the north shore of Lake Huron, Ontario.



New Staff

Ted Barney

Ted Barney joined LPWWRF as a biologist in October 2006. As LPWWRF's biologist, he is involved in many ongoing research and student projects, and assists with aerial waterfowl surveys and research in the AEL. Ted coordinates the spring scaup banding program and has been involved in several LPWWRF contracts. Ted also assists Scott and Shannon with their undergraduate teaching responsibilities and is the lead coordinator of the Young Wildlife Biologist Workshop.



Emily Apse

Emily joined LPWWRF as the AEL coordinator in September 2006. As the AEL coordinator she is responsible for completing all contracts coming into the AEL, as well as for supervising volunteers and technicians. Emily also assists with numerous administrative tasks and occasionally assists with graduate student and staff based research. Emily is currently working on several AEL contracts and is assisting with the organization of a fundraising dinner, in association with the LPWA, for rehabilitation work in the Crown Marsh.

Jim Cook

Jim joined LPWWRF as a research technician in December 2006. Jim assists with contracts in the AEL and provides field support for student and staff research projects. Jim is currently overseeing Ontario field work for the MALL hen house project, plus is site manager of LPWWRF's newly acquired Research and Education Centre.



LPWWRF Photographer- Ted Smith

Theodore Smith, known to most as Ted, has a passion for life, photography, and the great outdoors. Over the past 10 years he's combined these loves and grown what started as a hobby into an award winning photography business.



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His dynamic, original images of people and wildlife have appeared on the covers or inside some of the most popular outdoor magazines in North America, including *Field & Stream*, *Reader's Digest*, *Canadian Geographic*, *Outdoor Canada*, *Ontario Out of Doors*, *Sentier CHASSE-PÊCHE*, *Cottage Life*, *Nature Canada*, *Wildfowl* and both of *Ducks Unlimited's* magazines in Canada and the US. Over the past few years, Long Point has become his second home where he can often be found within its marshes photographing waterfowl, LPWWRF staff and their research, and local hunters.

Some of his recently published images from Long Point include:

- An entertaining image of LPWWRF biologist, Ted Barney, featured as a "First Shot" double page spread in the May issue of *Field & Stream*.
- LPWWRF Research Director, Scott Petrie and son, Caleb, are featured in a *DU Inc.* volunteer recruitment advertisement and poster.
- Numerous waterfowl images used in the 2007 *DU Canada* Annual Report.
- Long Point Waterfowler, Glenn Hanson, featured on the cover of the August issue of *Ontario Out of Doors*.

Ted is a member of Canon Professional Services. He holds an honours degree in Kinesiology from Wilfrid Laurier and a Bachelor of Education from UWO. Ted resides on the Muskoka River outside of Bracebridge with his wife, Cara, 2 young children, Kelsey and Jack, plus his black lab, Shadow.

Graduate Student Program

It is our philosophy that the best way to conduct leading-edge research and train future waterfowl and wetland professionals is through properly supervised and well-funded graduate students. Consequently, LPWWRF is committed to supervising and supporting (financially and logistically) graduate students (M.Sc. and Ph.D.) as they conduct research on waterfowl- and wetland-related projects. LPWWRF staff have been annually supervising and advising between 2 and 4 graduate students through UWO. Current graduate projects include studies of: 1) contaminant burdens and condition in GRSC wintering on Lake Ontario (Lindsay Ware), and 2) use of elevated nesting structures (hen houses) by MALL in Ontario and Pennsylvania (Jeremy Stempka).

During 2008, LPWWRF anticipates a substantial expansion to our graduate research program with the addition of up to 5 students. Caroline Brady intends to evaluate impacts of Se burdens on several reproductive parameters in captive scaup. Dave Messmer will study the influence of wetland densities and habitat variables on MALL settling rates in central Ontario (a joint project with DUC). Rob Baden plans on studying sea duck wintering ecology on Lake Ontario. Mike Boyd will research SACR movement patterns and habitat use in central Ontario. Another student (to be determined) will investigate associations between breeding waterfowl population trends and land use change in southern Ontario (joint project with DUC).

Selenium Uptake and Effects in Greater Scaup Wintering on Western Lake Ontario

Primary Investigator: Lindsay Ware, M.Sc. Candidate

Supervisor: Scott Petrie; **Co-supervisor:** Robert Bailey (UWO) and Shannon Badzinski

The combined continental population of GRSC and LESC has declined substantially since the mid-1980s. One explanation is that birds are acquiring elevated levels of contaminants during winter and it is subsequently impacting their health, reproduction, or survival. Elevated levels of the trace element Se have been detected in scaup staging on the LGL. It is believed that scaup are acquiring Se by feeding on two invasive species, Zebra and Quagga Mussels. Because large numbers of GRSC winter on Lake Ontario, Lindsay's research investigates the possible effects of Se on the health and body condition of this species. Her research is focused on the wintering period because overwintering birds spend long periods on the LGL and so may obtain particularly high burdens of Se. Lindsay is also examining two probable avenues of contaminant transfer, Zebra and Quagga Mussels.



Lindsay extracts a female GRSC from the lift net.

During the winters of 2006 and 2007, Lindsay and her technicians collected blood, feather, and liver samples from GRSC in Hamilton Harbour and tested them for several contaminants, including Se. Body condition of scaup was also determined and each bird was examined for physiological abnormalities. While all GRSC contained very high Se burdens, so far these burdens do not appear to impact body condition or other aspects of health. Therefore, there is not yet evidence that high Se burdens are negatively impacting the health of wintering GRSC.

Zebra and Quagga Mussels were also found to have high Se burdens, containing about three times the amount of Se

normally considered safe for consumption by wildlife. However, the Se concentrations in the water of western Lake Ontario was very low. Se is likely accumulating in mussels because they forage by filtering water and as they do so Se accumulates within in their tissues. GRSC in western Lake Ontario would likely not be exposed to such high Se levels if Zebra and Quagga Mussels were absent given that gastropods, important historic GRSC prey species, graze for food and tend not to bioaccumulate Se within their tissues.



Utilization and Colonization of Artificial Nesting Cylinders by Mallards and Wood Ducks in Northwest Pennsylvania and Southern Ontario

Primary Investigator: Jeremy Stempka, M.Sc. Candidate

Supervisor: Scott Petrie; **Co-supervisor:** Robert Bailey (UWO) and Shannon Badzinski

In response to declining nest success and MALL populations on the prairies, Delta Waterfowl Foundation helped develop and promote the MALL hen house (HH). MALL HH are cylindrical nesting cavities that are elevated over water using a post or tripod design. These structures have had very high utilization and success rates by nesting MALL. However, HH acceptance, utilization, and success rates at the landscape level are unknown within the LGL region, plus it is uncertain if HH can effectively increase MALL production within this area. Consequently, Jeremy Stempka is currently conducting his M.Sc. research on factors that influence HH use and success in northwestern Pennsylvania (PA) and southern Ontario (ON).

The second year of the HH study has been completed and we continue to see promising results. The status of MALL and Wood Duck (WODU) nests has been closely monitored in both study sites to determine nest fate and nest success rates. Jeremy and his technician have also banded hens, web tagged ducklings, and collected data and habitat measurements to examine variables that influence occupancy rates.



Both southern ON and PA experienced an increase in HH occupancy rates in 2007. In PA a total of 56 (29%) HH were occupied including 29 WODU nests and 27 MALL nests. The overall occupancy rate for northwest PA has increased 40% from 40 occupied nests in 2006. There was a 69% increase in MALL nests and a 16% increase in WODU nests from 2006. In ON, a total of 32 (17%) HH were occupied, including 24 MALL nests and 8 WODU nests. The overall occupancy rate for ON has increased 78% from 18 occupied nests in 2006. This increase in nest occupancy is represented by a 400% increase in MALL nests and a 50% decline in WODU nests.

Nest success of MALL decreased in both study sites during 2007. PA declined from 93% in 2006 to 67% in 2007, and ON declined from 100% to 71%. Although there was a decline for MALL in both study sites, the success rate is likely well above that for ground nesting MALL in both regions. WODU nest success rates also declined in PA from 60% in 2006 to 40% in 2007, whereas ON increased from 58% to 75%. Nest success declines during 2007 are a result of several factors, including eggs freezing during early nesting attempts, abandonment in response to nest checks and capture of hens, nest flooding due to rising water levels, dump nesting of WODU, as well as to depredation.



Jeremy checks a Mallard nest.

During the 2006 nesting season, 15 hen MALL were banded in PA and ON to determine if successful hens returned to the same HH in subsequent years. During the 2007 nesting season, 8 hen MALL (55%) were recaptured in the same HH (or one nearby) that they nested in last year indicating that hen philopatry is an important factor in colonization of nesting structures. Twenty five additional hens were captured and banded this year to study philopatry. During 2007, 34 MALL nests hatched, producing 313 ducklings. Of those, 251 ducklings were web tagged to study natal philopatry to HH. None of the 160 ducklings web tagged in 2006 were recaptured in 2007.

This project will provide biologists and waterfowl managers with information on key factors that influence MALL and WODU use of HH on the LGL. Information on HH selection, nest success, duckling production and recruitment, as well as hen philopatry, will assist managers in advising landowners of appropriate locations to place HH. Information learned through this study will assist managers in making appropriate HH placement decisions throughout the LGL region.

Recently Completed Student Projects

Changes in Availability and Nutritional Quality of Post-harvest Waste Corn for Staging Waterfowl Near Long Point, Lake Erie

Primary Investigator: Ted Barney

Supervisor: Scott Petrie; **Co-supervisor:** Liana Zanette (UWO)

Ted Barney's M.Sc. research focused on waste corn availability and nutritional quality for staging waterfowl, near Long Point. Currently, little is known about waste corn availability on northern staging areas, and concerns have been raised over recent increases in harvester efficiency and their effects on waste corn availability. Ted's project focused on changes in harvester efficiency, and results from his study at Long Point have management implications applicable to the LGL area.

Results from this study suggested that waste corn currently is not limiting to staging waterfowl at Long Point in either fall or spring. Nutritional quality of waste corn also did not change significantly between seasons. Soil conservation practices, such as reduced and zero till, likely has contributed to the adequate amount of waste corn available for waterfowl staging at Long Point. Fortunately for waterfowl and wildlife in general, conservation tillage has been promoted and widely accepted by farmers throughout the LGL. If minimum and zero till practices continue to be used across the LGL in years to come, these practices could off-set the effects of increased harvester efficiency. In order to ensure current levels of waste corn are available to staging waterfowl in the LGL region, managers should promote the use of conservation tillage practices.



The practice of farming corn in the LGL area should continue well into the future. However, grain markets are highly variable and prices often drive how much of certain crops are planted each year. Advances in ethanol fuels could increase corn acreage over large areas of the LGL in the future, but this market is new and may not be economically feasible over the long term. Managers need to be cognizant of change in grain markets due to inputs from advancing technology and current human and livestock demand, as these changes may impact waterfowl food availability in the short as well as the long-term.



Increases in harvester efficiency have caused concern over amounts of waste corn available to staging waterfowl.

Shot Ingestion in Scaup on the Lower Great Lakes After Nontoxic Shot Regulations in Canada

Primary Investigator: Melinda Demendi, Honors Student, UWO

Supervisor: Scott Petrie

Use of lead shot for waterfowl hunting was banned in the United States in 1991 and in Canada in 1999 to reduce the incidence of lead toxicosis in waterfowl. The LGL are important migratory areas for GRSC and LESC and both species had a high incidence of ingested lead shot on the LGL before the Canadian ban (11% and 8%, respectively). GRSC and LESC were collected on the Canadian side of lakes Erie, Ontario, and St. Clair during fall 1999 and spring 2000 to determine if lead shot ingestion declined one year after the lead shot ban in Canada. There were no intraspecific (lake, season, sex or age) or interspecific differences in proportion of birds containing ingested shot. Overall, only 0.6% of birds ($n = 4$ of 722) contained



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lead shot and only 3.1% contained non-toxic shot. The low frequency of toxic relative to non-toxic shot ingestion suggests that shot quickly becomes inaccessible to

scaup on lacustrine areas of the LGL and that few scaup migrating through the LGL are potentially affected by lead toxicosis at this time. Pre- and post-ban differences in overall ingestion frequencies (8-11% versus 3.7%) suggests that pre-ban numbers may have been biased (elevated) because lead shot ingestion can increase harvest susceptibility. Low post-ban lead shot ingestion is also indicative of high hunter compliance with non-toxic shot regulations in Canada.



LPWWRF

The Effect of Habitat Variables on Artificial Nest Box Selection and Inter-specific Competition between Wood Ducks and Hooded Mergansers in Ontario

Primary Investigator: Tyler Done Honors Student, UWO

Supervisor: Scott Petrie; **Co-supervisor:** Robert Bailey (UWO) and Shannon Badzinski

WODU and Hooded Mergansers are two cavity-nesting waterfowl species that share almost identical geographic ranges. Population decreases in the early 1900s encouraged a response by wildlife managers, resulting in the erection of artificial nest boxes. Both species compete for nesting sites and parasitic nesting is common both intra- and inter-specifically. The purpose of this study was to evaluate



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box use and habitat variables influencing box selection and dump nesting. A discriminant function analysis of 23 habitat variables detected no differences in habitat criteria

for box selection between species. Increasing populations and annual occupancy of 86% will likely increase inter-specific competition on the study area. It is essential that managers increase the number of boxes to maximize occupancy while reducing parasitism. Future studies should focus on interspecific box use in more variable habitats and under differing population densities to determine factors that might influence competition and niche partitioning.



LPWWRF

Contaminant Burdens, Nutrient Reserve Dynamics and Artifact Ingestion in Fall-migrant Common Loons

Primary Investigator: Chris Course, Honors Student, UWO

Supervisor: Scott Petrie; **Co-supervisors:** Robert Bailey (UWO) and Shannon Badzinski

Large numbers of migrant Common Loons (COLO) stage on the LGL. Because COLO are an upper level, piscivorous predator, they may be accumulating elevated contaminant burdens on the LGL and possibly ingesting lead sinkers and other unnatural artifacts. Little is known about nutrient reserve dynamics and artifact ingestion in COLO during fall migration.

Following a fall Botulism Type E die-off on Lake Erie, 240 COLO carcasses were collected from Long Point. Livers of 56 birds were used to study age- and sex-related differences in metal and metalloid burdens (Se, Hg, Al, As, Cd, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Ni, V, and Zn). To assess body condition and investigate its relation to contaminant burdens, the total abdominal fat (index of somatic lipid) and combined leg and breast muscle (index of somatic protein) masses were determined. Gizzards from COLO were dissected to record presence of lead artifacts and fishing tackle. Birds were also externally examined for fishing line and tackle.

This research showed that Se and Hg were the only contaminants detected in birds at concentrations that might affect body condition or reproduction. The average Hg concentration was 12.9 ± 2.2 ppm and 13% of the birds had elevated burdens. Average Se concentration was 21.0 ± 1.1 ppm, and 9% of the



birds had elevated burdens. Adult male COLO had higher concentrations of Hg than did juveniles and juveniles had higher concentrations of Se than did adult females. There was an inverse relationship between Hg levels and abdominal fat mass, suggesting a potential impact on body condition.

The elevated Se and Hg burdens and the apparent influence of Hg on body fat acquisition suggests that subsequent reproductive success (or possibly survival) may be compromised in some COLO that stage on the LGL. With only 1 of 226 birds examined containing any form of artifact in its gizzard, lead sinkers, fishing tackle, and lead shot ingestion are likely not problematic for COLO staging on the LGL.



LPWWRF Receives Delta Waterfowl Reference Library

Recently, the Delta Waterfowl Foundation generously donated the David Winton Bell Memorial Library (DWBML) to LPWWRF. Charlie Bell established the library circa 1958 in memory of his son David who was killed in the Korean War. Since that time, the DWBML has been housed at the Delta Waterfowl Research Station located on the south shore of Lake Manitoba's famed Delta Marsh. While at Delta, many graduate students and professional waterfowl ecologists drew upon the library's scholarly publications and books to educate themselves about wetland and waterfowl ecology and conservation, which in turn helped them develop research hypotheses, project proposals, publish research findings, and critique the work of other scientists.

The transfer of this library to LPWWRF will ensure that all the history, tradition, and scientific productivity associated with the DWBML will continue on into the future. The DWBML will be housed at the LPWWRF Research and Education Centre near Long Point, Ontario, but will retain its long-standing name. This addition to our research and education program will most certainly be a great asset to LPWWRF staff and to our present and future graduate students.



LPWWRF would like to thank the Delta Waterfowl Foundation for this generous contribution and its ongoing support of our research and education programs.

LPWWRF receives most of its financial support either directly or indirectly through the generosity of conservation-minded hunters.



Bill Turnbull and Dr. Duncan Sinclair hunting geese near Long Point.

The people behind LPWWRF

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 Dr. Shannon Badzinski, Scientist
 Ted Barney, Biologist
 Jim Cook, Research Technician
 Emily Apse, Avian Energetics Lab Coordinator
 Kerrie Wilcox, Avian Energetics Lab Contract Coordinator

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