

**UTIKUMA PROJECT  
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WESTERN BOREAL FOREST  
DUCKS UNLIMITED CANADA**



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## **EXECUTIVE SUMMARY**

The Utikuma project is one of several projects under the auspices of Ducks Unlimited Canada's Western Boreal Program. The Utikuma project was initiated in 2000 after preliminary investigations indicated that this region was highly productive and hosted a large diversity of wetlands and water birds. Principle components of the project include the development of an accurate and enhanced satellite based landcover classification, a comprehensive inventory of waterbird communities, and the integration of Traditional Ecological Knowledge (TEK) of wetland basins in the project area. Support for the project including financial and in-kind contributions have been provided by Alberta Pacific Forest Industries, Alberta Sustainable Resource Development, Ducks Unlimited Canada, Ducks Unlimited Incorporated, North American Waterfowl Management Plan, The Pew Charitable Trust, and the United States Forest Service.

The third and final year of waterbird surveys were conducted from May through to October 2002. Surveys were completed on a sample of approximately 150 wetland basins distributed among a variety ecodistricts. The classified landcover products resulting from fieldwork in 2000 has been completed and distributed to partners. Utilizing these landcover products in conjunction with waterbird survey data collected over the last three years a decision support system (DSS) is being developed by Ducks Unlimited Canada scientists. This DSS can then be used by project partners to assist with the management of the lands within the Utikuma project area.

Communication activities related to the Utikuma project included presentations given at a Ducks Unlimited Canada fundraising banquet in Slave Lake, the Alberta Conservation Association's Partners in Conservation Conference, and the Alberta Chapter of the Wildlife Society Annual General Meeting. Ducks Unlimited Canada has also included the Utikuma project as part of the Ducks Unlimited Boreal Forest web page. The website can be viewed at [www.borealforest.ca](http://www.borealforest.ca).

The Canadian Western Boreal Forest (WBF) expands over 3 million square kilometers and is contained within portions of five provinces and three territories (Figure 1). The WBF is comprised of eight ecozones and supports a population of 12-14 million breeding ducks (Ducks Unlimited 2001). This area has been designated as a level one priority with respect to the most important waterfowl habitat areas at risk in North America (Ducks Unlimited 2001). Populations of several common boreal nesting waterfowl species such as lesser scaup and scoters are declining (Wilkins and Otto 2002). As a result, these species have been the focus of considerable discussion (Austin et al. 2000) and are currently the emphasis of many research initiatives including that conducted by Ducks Unlimited Canada (Slattery 2002). Industrial activity including petroleum exploration and development, forestry, mining and hydro electricity generation as well as agriculture has greatly expanded in the Western Boreal Forest. The influence of these activities on boreal wetland ecosystems and water birds remains largely unknown.



Figure 1. Ecozones of Canada's western boreal forest.

In 1997 Ducks Unlimited Canada (DUC) established its Western Boreal Forest Initiative in an effort to help answer questions about the function of boreal wetland basins and value to water birds. Existing land cover inventory is often unreliable, dated or incomplete. Therefore, one key component of the WBF conservation planning is an extensive land cover inventory. Other key components include a three-year inventory of waterbird communities and regional water chemistry sampling in partnership with University of Alberta researchers.

Small catchment areas within the Utikuma project area were surveyed for water birds in 1998. At the same time, researchers from the University of Alberta also sampled these same catchment areas for water chemistry analyses. This area was observed to possess very productive wetlands and to host large numbers of water birds throughout the breeding, brood rearing, and staging season. From this preliminary data, DUC identified the importance of Utikuma Lake region in north central Alberta for water birds. The Utikuma project area was selected for investigation because of the significance of this area to water birds and to further understand potential threats to the landscape including agriculture, oil and gas, and forestry,. The Utikuma project area sits within the boreal plain ecoregion (Ecological Stratification Working Group 1996) and compliments conservation planning in other project areas in northern BC, northern Alberta, Saskatchewan, Manitoba, the Yukon, and the Northwest Territories.

## PROJECT AREA

The Utikuma project area located in north central Alberta, is centered near Utikuma Lake (55° 54' N, 115° 02' W) (Figure 2). Within the project area are the towns of Slave Lake, Red Earth and Wabasca. The Atikamisis Lake Settlement, Peavine Metis Settlement, and Gift Lake Metis Settlement are present within the area in addition to the Utikoomak Lake, Woodland Cree, Sucker Creek, Drift Pile River, Swan River, Sawridge, and Wabasca Indian Reserves. Large features on the landscape within the project area include Lesser Slave Lake and the Marten Hills.

This 32,000-km<sup>2</sup> area is found within the boreal plain ecozone and includes both the Mid-Boreal Upland and the Wabasca Lowland ecoregions. These mid-boreal sub-humid ecoregions are characterized as having short cool summers, cold winters, and a mean annual precipitation of 350-550mm. Trembling aspen, balsam poplar, black spruce, white spruce, and balsam fir are the most abundant tree species in the regions. Poorly drained bogs and fens comprising of tamarack and black spruce are also abundant. The Mid-Boreal Upland include remnants from the Alberta plateau that consist mostly of cretaceous shale. Elevations in this ecoregion range from 400-800 meters above sea level and host a large number of shallow small lakes, ponds, and sloughs. The ecoregion drains northward via the Athabasca and Clearwater river systems. The gently undulating Wabasca Lowland ecoregion is formed on Mesozoic and Palaeozoic sediments. There is little relief in this poorly drained region, but as whole, it drains northward via the Athabasca and Wabasca river systems. Portions of 14 ecodistricts are contained within the project area (Figure 3), however ecodistricts where the land use is predominately agricultural, are excluded from analysis. Consequently, 8 ecodistricts were investigated from 2000-2002 (Table 1, 2). Ecoregions are subdivisions of ecozones characterized by distinctive large order landforms or assemblages of regional landforms, small order macro- or meso-climates, vegetation, soils, water, and regional human activity patterns/uses. Ecodistricts are subdivisions of ecoregions, characterized by distinctive assemblages of landform, relief, surficial geologic material, soil, water bodies, vegetation, and land uses.



Figure 2. The Utikuma project area located in the boreal plains of north central Alberta.

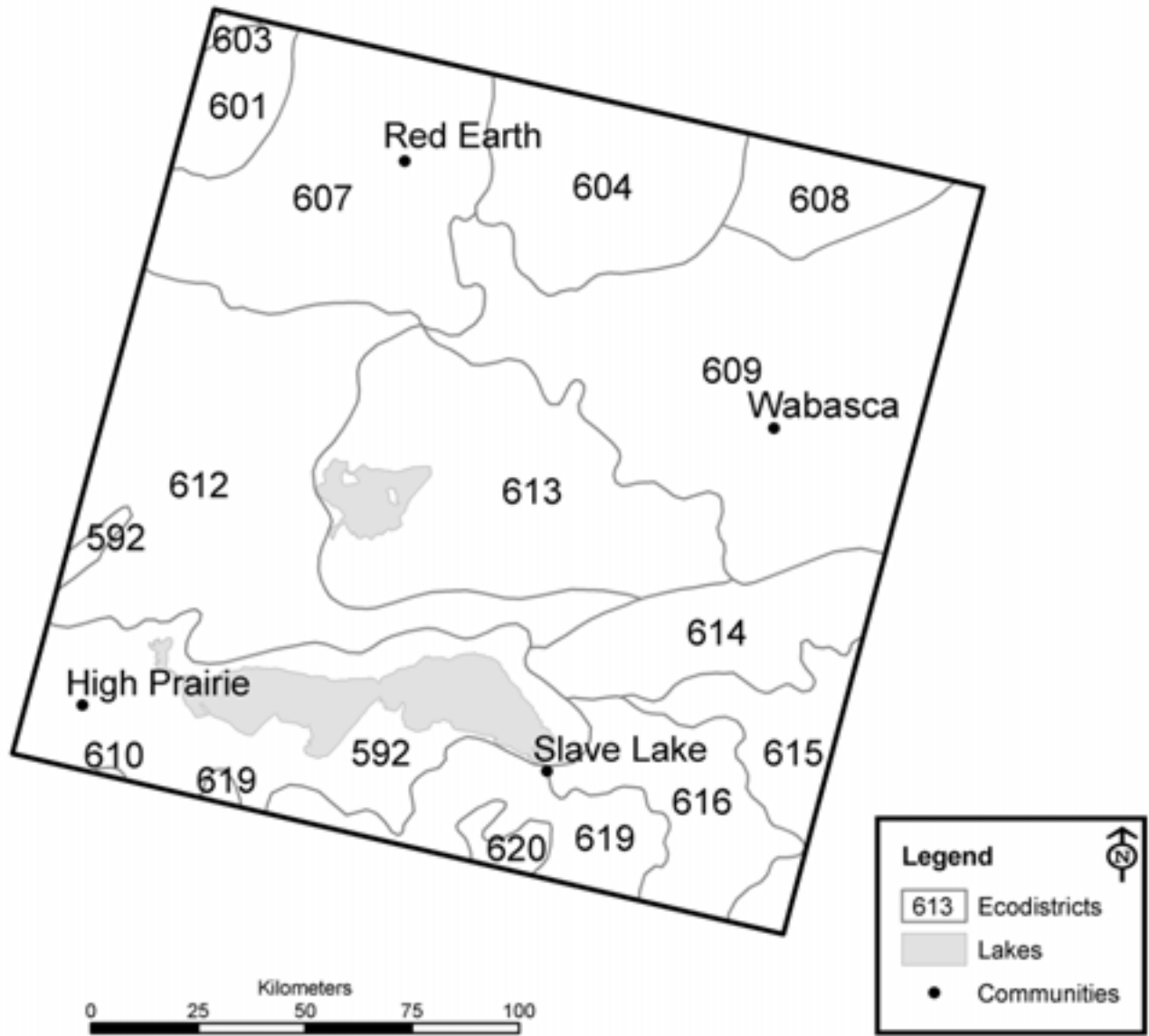


Figure 3. The Utikuma project area and the ecodistricts contained within.

The size of ecodistricts contained within the 32,000-km<sup>2</sup> Utikuma project area varied from less than 70,000 ha to over 620,000 ha (Table 1 and 2). The number of wetland basins per ecodistrict ranged from 288 to 7339 and the total wetland basin area varied from just over 400 ha to over 46,000 ha (Table 1 and 2). The number of wetland basins surveyed and the area (ha) surveyed varied by ecodistrict between the breeding pair/production surveys and the staging surveys (Table 1 and 2). For the purpose of this project, only wetland basins larger than one hectare in total area were surveyed. Wetland basins less than one hectare, small streams, rivers, and beaver flowages were excluded from the survey sample due to the satellite image's inability to accurately capture and define these wetlands. Consequently, the wetland information (total available wetlands (n), surveyed wetlands (n), surveyed area (ha), and wetland area surveyed (%)) described in tables 1 and 2, under-represent the variety of wetland and riparian habitat present in the Utikuma project area.

Table 1. Size of ecodistricts contained within the Utikuma project area and a comparison of the wetland basins (> 1ha) surveyed for breeding pairs and broods within each during 2002.

| Ecodistrict | Project Area (ha) | Wetland Area (ha) | Wetland Area (%) | Total Wetlands (n) | Total Available Wetlands (n)* | Surveyed Wetlands (n)* | Surveyed Area (ha) | Wetland Area Surveyed (%) |
|-------------|-------------------|-------------------|------------------|--------------------|-------------------------------|------------------------|--------------------|---------------------------|
| 601         | 69,795.37         | 2,267.06          | 3.25             | 1043               | 205                           | 5                      | 333.69             | 14.72                     |
| 604         | 222,721.33        | 21,456.31         | 9.63             | 1750               | 407                           | 16                     | 344                | 1.6                       |
| 607         | 372,428.54        | 14,175.13         | 3.81             | 5284               | 854                           | 14                     | 254.38             | 1.79                      |
| 608         | 87,610.22         | 1,789.00          | 2.04             | 288                | 46                            | 2                      | 13.31              | 0.74                      |
| 609         | 621,336.11        | 39,020.94         | 6.28             | 5607               | 843                           | 19                     | 558.5              | 1.43                      |
| 612         | 518,514.37        | 21,937.69         | 4.23             | 7339               | 1571                          | 50                     | 728.06             | 3.32                      |
| 613         | 413,733.40        | 46,260.88         | 11.18            | 3656               | 598                           | 20                     | 372                | 0.8                       |
| 614         | 169,830.28        | 411.38            | 0.24             | 1065               | 28                            | 1                      | 9.5                | 2.31                      |

\* Only wetland basins between 1 and 300 hectares were selected for surveys.

Table 2. Size of ecodistricts contained within the Utikuma project area and a comparison of the wetland basins (> 1ha) surveyed for staging birds within each during 2002.

| Ecodistrict | Project Area (ha) | Wetland Area (ha) | Wetland Area (%) | Total Wetlands (n) | Total Available Wetlands (n)* | Surveyed Wetlands (n)* | Surveyed Area (ha) | Wetland Area Surveyed (%) |
|-------------|-------------------|-------------------|------------------|--------------------|-------------------------------|------------------------|--------------------|---------------------------|
| 601         | 69,795.37         | 2,267.06          | 3.25             | 1043               | 206                           | 4                      | 905.38             | 39.94                     |
| 604         | 222,721.33        | 21,456.31         | 9.63             | 1750               | 410                           | 15                     | 2,958.50           | 13.79                     |
| 607         | 372,428.54        | 14,175.13         | 3.81             | 5284               | 860                           | 15                     | 7,783.25           | 54.91                     |
| 608         | 87,610.22         | 1,789.00          | 2.04             | 288                | 47                            | 1                      | 1,267.06           | 70.83                     |
| 609         | 621,336.11        | 39,020.94         | 6.28             | 5607               | 859                           | 23                     | 6,420.81           | 16.45                     |
| 612         | 518,514.37        | 21,937.69         | 4.23             | 7339               | 1580                          | 42                     | 6,980.31           | 31.82                     |
| 613         | 413,733.40        | 46,260.88         | 11.18            | 3656               | 607                           | 25                     | 5,526.00           | 11.95                     |

\* Only wetland basins between 1 and 4000 hectares were selected for surveys.

## 2002 ACTIVITIES

### Waterbird Survey Methods

*Site Selection.*-- Ideally, the wetland sample universe and subsequent random sub-sample for waterbird inventories would be derived from known wetland attributes (e.g., size, permanency, vegetation community, distribution, abundance, etc) obtained from a supervised Landsat-based classification. However, a final product of the landcover work was not available at the onset of the waterbird inventory portion of this project. There is an expectation that waterbird use will vary by wetland and wetland type across the scene and a stratification system within each project area should be established to ensure a representative sample from derived landscape units. Consequently, wetland basins were stratified using ecodistricts as a classification framework (Wiken 1986, Ecological Stratification Working Group 1996). Within the Utikuma Lake study area, basins were sampled from 8 Ecodistricts belonging to 2 Ecoregions (the Mid-Boreal Upland and the Wabasca Lowland).

An unsupervised classification was imported into ArcView (ver 3.1) and earth cover classes, which appeared to represent wetland basins were determined. Sites less than 1.0 ha were excluded from the sample universe to reduce risks of misclassification (e.g., terrain shadow, misclassified single and small clusters of pixels, etc.). Twenty percent of the basins surveyed in 2000 were randomly selected for repetition in 2001 and 2002. The ratio of the number of wetland basins per ecodistrict to total number of wetland basins on the scene was used to determine the proportion of wetland basins from each ecodistrict. Using a proportional allocation protocol, individual basins were randomly selected from each ecodistrict. Wetland basins over 300 ha were omitted from the breeding pair and production surveys, and replaced by the next randomly selected site available. A total of 128 wetland basins were selected for IBP and brood surveys in 2002.

Because the majority of wetland basins on the Utikuma scene are under 5 ha (60%), there is the chance that the standard site selection procedure may be inappropriate for capturing

use of wetland basins by staging water birds. To address this, wetland basins were divided into 7 different size classes (<1.9 ha; 2-4.9 ha; 5-9.9 ha; 10-49.9 ha; 50-299.9 ha; 300-999.9 ha; and >1000 ha). Within each size class, 20 individual basins were randomly selected using the proportional allocation protocol described above. An equal number of wetland basins from each size class were selected despite that some classes may be proportionally over or under represented. All 17 wetland basins belonging to the largest size class were selected although, due to safety issues (flying without floats) and budgetary constraints, basins over 4000 ha were dropped from the sample. Because of the exceptional numbers of birds observed on Loon Lake in 2000 and 2001, it was added to the sample as a basin of interest for 2002. A total of 124 wetland basins were surveyed for staging water birds (Appendix I).

*Waterbird Survey Protocols.* -- Individual wetland basins functioned as the sample unit when recording waterbird observations. A Robinson 44 helicopter equipped with bubble windows was utilized for breeding pair and production surveys. Breeding pair and production surveys were flown at a nominal altitude of 35 m; survey altitude was occasionally reduced to less than 35 m above ground level (AGL) as required given shoreline complexity, vegetative cover, and/or unconfirmed species or sex. Ground speeds did not exceed 100 km/h during the survey, and over areas with reduced visibility, slower speeds were employed (e.g. 30 km/h).

Both Cessna 185 and 206 aircrafts were used to conduct staging surveys. The fixed-wing aircrafts were flown at approximately 100m AGL with an average airspeed of 150km/h. Flight paths varied depending on the size and shape of the basins in order to attain approximately 100% coverage, (i.e. one central transect, circle from shoreline, multiple transects, etc).

ArcView 3.2a software integrated with a Tracking Analyst moving map extension and global positioning system (GPS) were utilized to ensure that all wetland basins surveyed corresponded with pre-defined coordinates. Each survey crew consisted of a pilot, an observer/navigator seated opposite the pilot and an observer seated in the rear behind the

pilot. Observers used micro-cassette tape recorders to record all water birds encountered on their respective side of the aircraft.

Two breeding pair surveys (May 13-14 and June 3-5) and two production surveys (June 24-25 and July 24-26) were conducted for both early and late nesting species. Wetland basins surveyed for breeding pairs were also surveyed for the presence of broods. Observers recorded the species, sex, and social status (lone male, pair etc.) for all water birds encountered during the breeding pair surveys. During the production surveys, information describing each brood's species, age, brood size, and presence of a female were recorded. Ages of broods were estimated based on Gollop and Marshall (1954), and Wishart (1983). Three staging surveys were conducted in late summer (September 2-6, September 16-17, and September 30- October 2) to evaluate the use of wetland basins by migrating/staging water birds within the project area. The number, species and sex of water birds, whenever possible, was recorded during these surveys. For a more detailed description of aerial survey methods refer to *Western Boreal Forest Program Aerial Waterbird Survey Protocols* (Ducks Unlimited Canada 2002)

*Data Analyses.* -- Indicated breeding pair (IBP) totals for each species were determined from breeding pair surveys using modified methods developed by CWS/USFWS (1987). The IBP totals were derived for duck species by summing the total observed pairs, lone males, and males in groups of 2-4. The exceptions to this IBP calculation include ring-necked ducks, scaup, redheads, and ruddy ducks where the IBP totals were derived by summing observed pairs only. Data from the first 2002 pair survey was used to calculate IBP for mallard, bufflehead, goldeneye, and northern pintail. Indicated breeding pairs for ring-necked duck, scaup, gadwall, scoters, blue-winged teal, green-winged teal, canvasback, redhead, American wigeon, ruddy duck, and mergansers were calculated using the second pair survey. Northern shoveler and all unidentified species were calculated by taking an average of the two surveys.

A conservative estimate of the total number of unique broods for each species was determined first by comparing the age and hatch dates of broods observed during each

survey on each wetland basin, and second by censoring those from the second production survey that were likely recorded during the first production survey. Hatch date was estimated by back dating the brood age from the survey date and then subsequently, clutch initiation date was estimated by back dating hatch date by known nesting periods (Wishart 1983, Harrison 1984, Klett et al. 1986, Cooke et al. 1995). The median clutch initiation date was obtained to determine which breeding pair survey to use for calculating breeding effort for each species. For species where small sample sizes precluded accurate determination of median clutch initiation dates, breeding chronology dates from other studies were employed to estimate the appropriate IBP survey interval.

Density (number of pairs, broods, or ducks/ hectares) and the estimated total of pairs, broods and staging birds were calculated for each species by ecodistrict. Density was calculated for each species by dividing the sum of birds (or pair or broods) by the total wetland area (ha) surveyed within the ecodistrict. The percent wetland coverage obtained by surveys was calculated to obtain the estimation coefficient for each ecodistrict (Table 1 and 2). Multiplying the total observed birds, pairs, or broods by this coefficient gave an estimate of the total birds for each ecodistrict.

### Waterbird Survey Results

An observed total of 3,499 IBP of ducks were obtained from pair surveys conducted on the Utikuma project area in 2002 (Table 3). Observers encountered 19 different species on a sample of 128 wetland basins within 8 ecodistricts (only the portions of ecodistricts contained within the project area are included for analysis) (Figure 3). This resulted in an average density of 0.7 IBP/hectare of wetland basin (Table 3). The dominant observed IBP of the Utikuma project area were mallard (465), bufflehead (291), blue-winged teal (283), and American Wigeon (182). Collectively, these species represented 66% of all IBP observed (Appendix 1). Dabbling ducks alone consisted of 64% of all IBP observed during pair surveys in 2002. Observed IBP numbers and density, for all ducks combined, varied greatly by ecodistrict. Density ranged from 0.45 pairs/ha (ecodistrict 601) to 1.65 pairs/ha (ecodistrict 608) (Table 3). For four of the top five breeding species, ecodistrict 608 had the highest IBP density and ecodistrict 612 had the highest observed total pairs. Of note is ecodistrict 613, which had the highest densities for scaup, a species of continental decline.

Table 3. A comparison of the observed total pairs and calculated pair densities among ecodistricts for all ducks combined and the three dominant breeding species observed at Utikuma in 2002, on pnds ranging from 1- 300ha.

| EcoDistrict | Mallard        |                  | Bufflehead     |                  | Blue-winged Teal |                  | All Ducks      |                  |
|-------------|----------------|------------------|----------------|------------------|------------------|------------------|----------------|------------------|
|             | Observed Total | Density (IBP/ha) | Observed Total | Density (IBP/ha) | Observed Total   | Density (IBP/ha) | Observed Total | Density (IBP/ha) |
| 601         | 34             | 0.045            | 51             | 0.054            | 24               | 0.072            | 243            | 0.450            |
| 604         | 79             | 0.122            | 50             | 0.044            | 23               | 0.064            | 263            | 0.465            |
| 607         | 167            | 0.370            | 63             | 0.130            | 58               | 0.208            | 686            | 1.301            |
| 608         | 13             | 0.676            | 6              | 0.300            | 3                | 0.075            | 38             | 1.653            |
| 609         | 130            | 0.143            | 111            | 0.111            | 43               | 0.056            | 579            | 0.528            |
| 612         | 325            | 0.231            | 210            | 0.148            | 137              | 0.165            | 1236           | 0.875            |
| 613         | 98             | 0.142            | 103            | 0.137            | 36               | 0.086            | 426            | 0.642            |
| 614         | 4              | 0.421            | 0              | 0.000            | 6                | 0.000            | 28             | 0.737            |
| All         | 850            | 0.178            | 594            | 0.111            | 330              | 0.108            | 3499           | 0.700            |

The most numerous non-duck species encountered during the pair surveys were American coot, red-necked grebe, common loon, and black tern. Shorebirds (including yellowlegs and unidentified shorebirds) accounted for 5% of all water birds encountered during the pair surveys.

Reproductive success of breeding ducks in the Utikuma project area was determined by the ratio of indicated breeding pairs to the number of broods for individual species (Table 4). Gadwall were the most successful of all the breeding ducks observed according to our calculation, yielding one brood for every 1.7 pairs observed. Other breeders with high reproductive success include scaup, goldeneye, and green-winged teal. Blue-winged teal had the highest pair to brood ratio (14.9:1) indicating the lowest observed reproductive success of all the breeding species observed at Utikuma (Table 4).

An observed total of 460 duck broods were derived from production surveys completed in the Utikuma project area in 2002 (Table 5). Broods were recorded for 14 different species of which, 56% were dabblers. The most abundant species observed with broods were mallard (102), bufflehead (66), and American wigeon (57) that in total, accounted for 49% of all observed broods (Appendix 2). Ecodistrict 608 had the highest densities for mallard, bufflehead, and American wigeon. Of all ecodistricts, mallards and buffleheads were observed to occur in the largest numbers in ecodistrict 612, and American wigeon ecodistrict 607 (Table 5). For all duck broods combined, density was the highest in ecodistrict 608 and the total observed broods was highest in ecodistrict 612. This is consistent with observed densities and observed total pairs obtained from the breeding pair surveys.

Table 4. Pair to brood ratios for the top 10 species observed with broods during the production surveys at the Utikuma project area in 2002 on ponds ranging from 1-300ha.

| Species           | Pairs per Brood Ratio | Broods per Pair (%) |
|-------------------|-----------------------|---------------------|
| Gadwall           | 1.7:1                 | 58.0                |
| Scaup             | 2.3:1                 | 44.3                |
| Goldeneye         | 2.8:1                 | 36.1                |
| Green-winged Teal | 2.9:1                 | 34.6                |
| American Wigeon   | 3.2:1                 | 31.3                |
| Ring-necked Duck  | 3.9:1                 | 25.8                |
| Bufflehead        | 4.4:1                 | 22.7                |
| Mallard           | 4.6:1                 | 21.9                |
| Northern Shoveler | 5.9:1                 | 16.9                |
| Blue-winged Teal  | 14.9:1                | 6.7                 |

Table 5. A comparison of the observed total broods and calculated brood densities among ecodistricts for all ducks combined and the three dominant species observed with broods at the Utikuma project area in 2002 on ponds ranging from 1-300ha.

| EcoDistrict | Mallard        |                    | Bufflehead     |                    | American Wigeon |                    | All Ducks      |                    |
|-------------|----------------|--------------------|----------------|--------------------|-----------------|--------------------|----------------|--------------------|
|             | Observed Total | Density (Brood/ha) | Observed Total | Density (Brood/ha) | Observed Total  | Density (Brood/ha) | Observed Total | Density (Brood/ha) |
| 601         | 4              | 0.012              | 1              | 0.003              | 7               | 0.021              | 44             | 0.132              |
| 604         | 16             | 0.047              | 3              | 0.009              | 11              | 0.032              | 58             | 0.169              |
| 607         | 18             | 0.071              | 8              | 0.031              | 12              | 0.047              | 69             | 0.271              |
| 608         | 1              | 0.075              | 2              | 0.150              | 1               | 0.075              | 7              | 0.526              |
| 609         | 19             | 0.034              | 12             | 0.021              | 11              | 0.020              | 97             | 0.174              |
| 612         | 35             | 0.048              | 28             | 0.038              | 10              | 0.014              | 130            | 0.179              |
| 613         | 9              | 0.024              | 12             | 0.032              | 5               | 0.013              | 55             | 0.148              |
| 614         | 0              | 0.000              | 0              | 0.000              | 0               | 0.000              | 0              | 0.000              |
| All         | 102            | 0.039              | 66             | 0.025              | 57              | 0.022              | 460            | 0.176              |

Observed totals of non-duck broods at Utikuma included American coot (25), red-necked grebe (22), common loon (16), Canada goose (8), pied-billed grebe (4) and trumpeter swan (1).

Dabbling ducks were the most abundant and dense in ecodistrict 607 for all staging surveys, whereas diving ducks varied among surveys (Table 6). For surveys one through three respectively, diving ducks showed the greatest densities in ecodistricts 613, 608 and 608 (Table 7). Staging water birds (ducks, coots, swans, and geese) peaked during the first staging survey with an observed total of over 240,000 birds (Table 8). For all surveys, total observed water birds was highest in ecodistrict 607. The highest density of water birds for the first staging surveys was observed in ecodistrict 607, and ecodistrict 608 showed the highest densities on the final two staging surveys.

Although all water birds combined (ducks, geese, swans, and coots) peaked during staging survey one, dabbling ducks and diving ducks had the greatest observed numbers during staging survey two (Table 6, 7, 8, Figure 4). Both geese and coots were observed in the highest numbers during the first staging survey, whereas swans were most abundant during the last staging survey (Figure 4).

Table 6. A comparison of the observed total dabbling ducks and calculated dabbling duck densities among ecodistricts observed during three staging surveys at Utikuma in 2002.

| Ecodistrict | Sept 02-06         |                | Sept 16-18         |                | Sept 30- Oct 02    |                |
|-------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|
|             | Density (Birds/ha) | Observed Total | Density (Birds/ha) | Observed Total | Density (Birds/ha) | Observed Total |
| 601         | 0.120              | 109            | 0.059              | 53             | 0.006              | 5              |
| 604         | 0.168              | 498            | 0.144              | 427            | 0.087              | 257            |
| 607         | 5.046              | 39,271         | 6.759              | 52,606         | 3.507              | 27,292         |
| 608         | 0.043              | 55             | 0.687              | 871            | 0.512              | 649            |
| 609         | 1.332              | 8,552          | 1.136              | 7,293          | 0.834              | 5,352          |
| 612         | 0.986              | 6,886          | 0.859              | 5,993          | 0.630              | 4,395          |
| 613         | 0.520              | 2,873          | 0.557              | 3,078          | 0.153              | 843            |
| All         | 1.829              | 58,244         | 2.208              | 70,321         | 1.218              | 38,793         |

Table 7. A comparison of the observed total diving ducks and calculated diving duck densities among ecodistricts observed during three staging surveys at Utikuma in 2002.

| Ecodistrict | Sept 02-06         |                | Sept 16-18         |                | Sept 30- Oct 02    |                |
|-------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|
|             | Density (Birds/ha) | Observed Total | Density (Birds/ha) | Observed Total | Density (Birds/ha) | Observed Total |
| 601         | 0.586              | 531            | 3.469              | 3,141          | 1.241              | 1,124          |
| 604         | 0.132              | 391            | 0.188              | 556            | 0.326              | 963            |
| 607         | 1.182              | 9,197          | 0.957              | 7,452          | 0.143              | 1,115          |
| 608         | 2.181              | 2,764          | 10.757             | 13,630         | 3.861              | 4,892          |
| 609         | 2.009              | 12,900         | 2.751              | 17,661         | 1.028              | 6,601          |
| 612         | 2.007              | 14,009         | 3.102              | 21,651         | 2.221              | 15,504         |
| 613         | 2.273              | 12,559         | 1.513              | 8,363          | 0.393              | 2,173          |
| All         | 1.644              | 52,351         | 2.275              | 72,454         | 1.017              | 32,372         |

Table 8. A comparison of the observed total staging birds and calculated staging bird densities among ecodistricts for ducks, geese, swans and coots combined at Utikuma in 2002.

| Ecodistrict | Sept 02-06         |                | Sept 16-18         |                | Sept 30- Oct 02    |                |
|-------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|
|             | Density (Birds/ha) | Observed Total | Density (Birds/ha) | Observed Total | Density (Birds/ha) | Observed Total |
| 601         | 3.072              | 2,781          | 3.599              | 3,258          | 2.081              | 1,884          |
| 604         | 0.436              | 1,290          | 0.386              | 1,143          | 0.542              | 1,597          |
| 607         | 13.813             | 107,511        | 9.515              | 74,059         | 7.333              | 57,078         |
| 608         | 6.104              | 7,734          | 11.920             | 15,103         | 9.131              | 11,569         |
| 609         | 8.980              | 57,658         | 5.264              | 33,797         | 3.170              | 20,346         |
| 612         | 6.040              | 42,158         | 4.665              | 32,566         | 5.007              | 34,900         |
| 613         | 3.788              | 20,930         | 2.773              | 15,322         | 1.287              | 7,093          |
| All         | 7.539              | 240,062        | 5.504              | 175,248        | 4.226              | 134,467        |

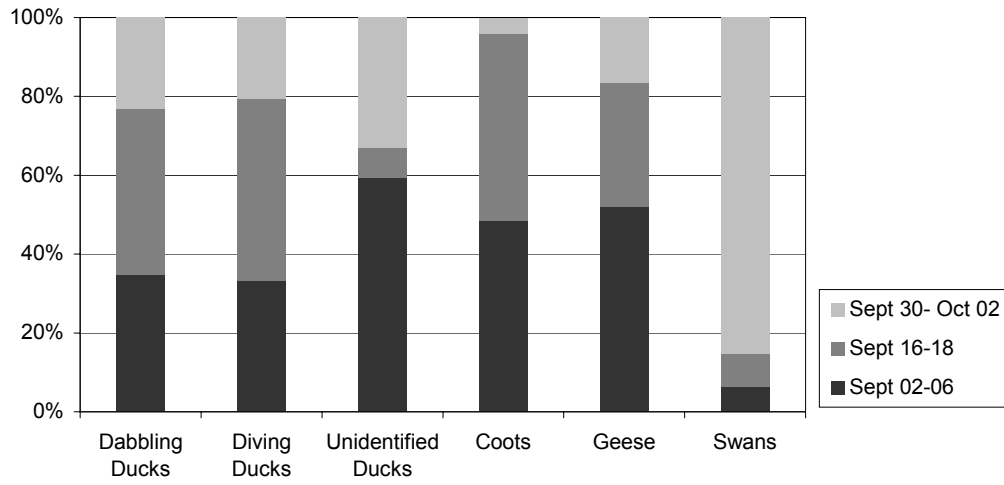


Figure 4. Percent composition among the three staging surveys of various water birds observed at Utikuma in 2002.

### **Waterbird Survey Discussion**

Overall, total numbers of IBP is down from 2000, but up slightly from 2001. The same top five breeding species observed in 2002 were also the dominant breeders in 2001 and 2000, however the ranking changed. Ring-necked ducks fell in ranking, while buffleheads rose. Certain species, including canvasback, redhead, mallard, bufflehead and wigeon, appeared to be breeding later in 2002 than in previous years, and was likely due to the late spring.

Total observed production is similar to previous years, however; the species dominating the community have changed. Mallards have remained the most productive species on the project area throughout the study. The most productive species in 2002 are similar to the most productive in 2000, with the exception of gadwall, which has increased remarkably since the onset of the study. Northern shoveler and canvasback have also showed marked increases in production over the course of this study. Redhead broods were not observed in 2000 and 2001 but were present in 2002.

Both goldeneye and scaup were among the 10 dominant species observed in both the breeding pair and production surveys. Our survey techniques made it difficult to distinguish between both species of scaup (lesser and greater) and both species of goldeneye (common and barrow's), however; given the known breeding ranges for all four species, it is likely the Utikuma project area hosted primarily lesser scaup and common goldeneye (Semenchuk 1992).

Several ecodistricts were noted to be of special importance for breeding pairs and broods. Overall, ecodistricts 608 and 609 had the two highest densities of both pairs and broods. Total estimated pairs were highest in ecodistricts 613 and 609 and total estimated broods were highest in 612 and 613. Notably, ecodistrict 613 had both the highest densities and total estimated pairs for lesser scaup, a species of continental decline. Due to their observed importance for breeding water birds, these ecodistricts may require further conservation planning. Despite the high pair and brood densities observed in ecodistrict 608, it should be considered that only 2 basins in this area were surveyed.

Due to the use of a fixed versus rotary wing aircraft and the assumed presence of young of the year birds, species identification is more difficult during the staging surveys. Plumage characteristics for young hatched during the summer of 2002 and observed in early September is typically lacking in distinguishing feather colour (Natal, Juvenile or Basic I plumage) hence limiting the observers ability to identify individual species (Baldassarre and Bolen 1994).

The Utikuma project area continues to host exceptional numbers of staging water birds. Certain lakes including Lubicon, Loon, Muskwa, Nipisi, and un-named basin 7333 are very important for staging dabbling species, coots, and shorebirds. Lubicon and Loon Lakes combined, contained over half of all observed water birds in all three years. These important lakes require further conservation planning to ensure that they will be available for future generations of water birds. Un-named basin 4422 together with Muskwa Lake were important for many diving species and also should be considered for further conservation planning.

Ecodistricts 607 and 609 were the two most important ecodistricts in relation to overall waterbird density and total estimated water birds (ducks, geese, swans, and coots) during staging periods. Dabbling duck species followed a similar pattern for density and total estimated numbers as all water birds combined, unlike diving duck species. Diving duck densities were highest in ecodistricts 613 and 608 and total estimated diving ducks were highest in 613 and 609. Although 607 and 609 were important for all water birds combined, ecodistricts that were important for diving species alone should also be considered for conservation planning due the several species being below target population goals.

Results obtained from aerial surveys in 2002 are not representative of all available habitat types in the project area. Small streams, rivers, beaver flowages, and ponds less than one hectare in size are excluded from our sample and could potentially host a variety of species. There is the chance that certain species, such as American green-winged teal and hooded mergansers may be more common than what our surveys indicate them to be,

given that they have been observed to utilize smaller ponds and streams for nesting (Semenchuk 1992). Further investigation into how different species use various wetland types is needed before we can state with assurance the abundance of different species in the water bird community in this region.

### **Communications**

In March of 2002, the landcover classification debriefing for the Utikuma project was held in Edmonton. Both a detailed synopsis of the methods behind completing the classification, and a description of the final product was provided for the partners. The final report and copies of the classification were distributed to the partners following the information session.

A presentation on Ducks Unlimited Canada's Western Boreal Program and the work being conducted on the Utikuma project area was given in Slave Lake, Alberta at a Ducks Unlimited Canada fundraising banquet in November 2002. Additionally, two posters were on display that informed the attendees about both the aerial waterbird work and the groundwork associated with the HEAD project based within the Utikuma project area.

An oral presentation titled "Habitat Use by Mallards and Buffleheads for Brood Rearing Near Utikuma Lake, AB" was given at the Alberta Conservation Association's Partners in Conservation Conference in January 2003. This presentation was intended to inform the Alberta conservation community of Ducks Unlimited Canada's work in the western boreal forest and to specifically show examples of how both the waterbird and landcover data can be integrated for use in habitat utilization modeling.

At the Alberta Chapter of The Wildlife Society's annual general meeting in February of 2003, three poster presentations were given. The first titled, "Habitat Use by Mallards and Buffleheads for Breeding Near Utikuma Lake, AB" integrated the breeding waterbird data from 2000-2002 with the classified landcover data to look at how observed pairs are using different wetland classes. Second, "Ducks Unlimited in the Western Boreal Forest: Utikuma Ground Observations" detailed the work conducted on the ground in 2002 as

part of the HEAD project. Also presented was a poster entitled “Hydrology Ecology and Disturbance of Boreal Forest Wetlands in Canada” described the invertebrate sampling component of Ducks Unlimited’s contribution to the HEAD project.

During the 2002/2003 activities season the launching of the Western Boreal Forest web page within the DUC web site occurred. Plans are to expand the web page to include additional information of interest and of value to the project partners and the general public. The website can be found at <http://www.borealforest.ca>.

### **Ancillary Data**

During the field season, information on non-waterbird species of interest including raptors, and large mammals was collected. Individual observations, nest sites, and colonial nesting sites for wetland-associated birds were recorded when possible. This information, although only collected on or near the sample basins, is available to partners. Each observation has an associated coordinate and is currently being compiled into a spatial database for future reference and distribution.

Two beaver surveys were conducted on the sample ponds in the project area to determine the abundance of beaver activity in the area and how, if at all, beaver influence the distribution of water birds. These surveys were conducted on the second breeding pair survey and the first staging survey of 2002. The data from these surveys will be discussed in the 3 year final report for the Utikuma project area.

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**LITERATURE CITED**

- Austin, J.E., A.D. Afton, M.A. Anderson, R.G. Clark, C.M. Cluster, J.S. Lawrence, J.B. Pollard, and J.K. Ringelman. 2000. Declines in greater and lesser scaup populations: issues, hypotheses, and research directions. *Wildlife Society Bulletin*, 28: 354-263.
- Baldassarre, G.A. and E.G. Bolen. 1994. *Waterfowl ecology and management*. John Wiley and Sons, NY.
- Cooke F., R.F. Rockwell, and D.B. Lank. 1995. *The Snow Geese of La Pérouse Bay*. Oxford Univ. Press, Oxford
- Ducks Unlimited Inc. 1994. *Continental conservation plan: an analysis of North American waterfowl populations and a plan to guide the conservation programs of Ducks Unlimited through the year 2000*. Ducks Unlimited Inc., Memphis, TN.
- Ecological Stratification Working Group. 1996. *A National Ecological Framework for Canada*. Agriculture and Agri-Food Canada, Research Branch, Centre for Land and Biological Resources Research and Environment Canada, State of Environment Directorate, Ottawa/Hull. <http://res.agr.ca/cansis/publications/ecostrat/intro.html>.
- Gollop, J.B., and W.H. Marshall. 1954. *A guide for aging duck broods in the field*. Mississippi Flyway Council, Technical Section, Minneapolis, MN.
- Harrison, C. 1984. *Field guide to the nests, eggs, and nestlings of North American birds*. Collins, Toronto, ON.
- Klett, A.T., H.F. Duebbert, C.A. Faanes and K.F. Higgins. 1986. Techniques for studying nest success of ducks in upland habitats in the Prairie pothole region. *U.S. Fish Wildl. Serv., Resour. Publ.* 158. 24 pp.
- Natural Resources Canada. 1997. *State of Canada's forests learning from history 1996-1997*. Natural Resources Canada. 130 pp.
- Semenchuk, G.P., editor. 1992. *The atlas of breeding birds of Alberta*. Federation of Alberta Naturalists, Edmonton, Alberta.
- Slattery, S. 2002. *Breeding ecology of scoters nesting in the lower Mackenzie River watershed, NT*. Funding proposal, 10pp.
- Wiken, E.B. 1986. *Terrestrial ecozones of Canada*. Ecological Land Classification Series, No. 19. Environment Canada, Hull, Que.

Wilkins, K.A., and M.C. Otto. 2002. Trends in duck breeding populations, 1955-2002. United States Fish and Wildlife Service, Division of Migratory Bird Management, Laurel, MD.

Wishart, R.A. 1983. Aging and back-dating duck broods. In Biological Techniques Manual. Unpubl. Ducks Unlimited Canada Rep.

## APPENDICES

### Appendix I:

Total pairs, pairs per pond, and pairs per hectare, for all species observed at Utikuma in 2002 are shown below. Additionally, the survey interval used to calculate the pairs for each species is included.

| Common Name                | Species Name                   | IBP | Survey   |            |          |
|----------------------------|--------------------------------|-----|----------|------------|----------|
|                            |                                |     | Interval | Pairs/Pond | Pairs/ha |
| Mallard                    | <i>Anas platyrhynchos</i>      | 465 | 1        | 3.633      | 0.178    |
| Bufflehead                 | <i>Bucephala albeola</i>       | 291 | 1        | 2.273      | 0.111    |
| Blue-winged Teal           | <i>Anas discors</i>            | 283 | 2        | 2.211      | 0.108    |
| American Wigeon            | <i>Anas americana</i>          | 182 | 2        | 1.422      | 0.07     |
| Ring-necked Duck           | <i>Aythya collaris</i>         | 159 | 2        | 1.242      | 0.061    |
| Northern Shoveler          | <i>Anas clypeata</i>           | 130 | Avg      | 1.016      | 0.05     |
| Common Goldeneye           | <i>Bucephala clangula</i>      | 61  | 1        | 0.477      | 0.023    |
| Lesser Scaup               | <i>Aythya affinis</i>          | 61  | 2        | 0.477      | 0.023    |
| American Green-winged Teal | <i>Anas crecca</i>             | 55  | 2        | 0.43       | 0.021    |
| Gadwall                    | <i>Anas strepera</i>           | 50  | 2        | 0.391      | 0.019    |
| White-winged Scoter        | <i>Melanitta fusca</i>         | 41  | 2        | 0.32       | 0.016    |
| Ruddy Duck                 | <i>Oxyura jamaicensis</i>      | 21  | 2        | 0.164      | 0.008    |
| Redhead                    | <i>Aythya americana</i>        | 11  | 2        | 0.086      | 0.004    |
| Northern Pintail           | <i>Anas acuta</i>              | 9   | 1        | 0.07       | 0.003    |
| Canvasback                 | <i>Aythya valisineria</i>      | 6   | 2        | 0.047      | 0.002    |
| Unidentified Diver         | <i>n/a</i>                     | 3   | Avg      | 0.023      | 0.001    |
| Scaup or Ring-necked Duck  | <i>n/a</i>                     | 2   | 2        | 0.016      | 0.001    |
| Common Merganser           | <i>Mergus merganser</i>        | 2   | 2        | 0.016      | 0.001    |
| Hooded Merganser           | <i>Lophodytes cucullatus</i>   | 2   | 2        | 0.016      | 0.001    |
| Surf Scoter                | <i>Melanitta perspicillata</i> | 1   | 2        | 0.008      | 0        |
| Cinnamon Teal              | <i>Anas cyanoptera</i>         | 1   | 2        | 0.008      | 0        |
| Unidentified Dabbling      | <i>n/a</i>                     | 1   | Avg      | 0.008      | 0        |
| Unidentified Duck          | <i>n/a</i>                     | 1   | Avg      | 0.008      | 0        |

## Appendix II

Total broods, broods per pond, and broods per hectare, for all species observed at Utikuma in 2002 are shown below. Additionally, the median clutch initiation date for each species is included.

| Common Name                | Species Name              | Broods | Broods/Pond | Broods/ha | Median Clutch Initiation Date |
|----------------------------|---------------------------|--------|-------------|-----------|-------------------------------|
| Mallard                    | <i>Anas platyrhynchos</i> | 102    | 0.797       | 0.042     | 16-May                        |
| Bufflehead                 | <i>Bucephala albeola</i>  | 66     | 0.516       | 0.027     | 20-May                        |
| American Wigeon            | <i>Anas americana</i>     | 57     | 0.445       | 0.024     | 5-Jun                         |
| Ring-necked Duck           | <i>Aythya collaris</i>    | 41     | 0.32        | 0.017     | 11-Jun                        |
| Gadwall                    | <i>Anas strepera</i>      | 29     | 0.227       | 0.012     | 10-Jun                        |
| Lesser Scaup               | <i>Aythya affinis</i>     | 27     | 0.211       | 0.011     | 10-Jun                        |
| Common Goldeneye           | <i>Bucephala clangula</i> | 22     | 0.172       | 0.009     | 11-May                        |
| Northern Shoveler          | <i>Anas clypeata</i>      | 22     | 0.172       | 0.009     | 28-May                        |
| American Green-winged Teal | <i>Anas crecca</i>        | 19     | 0.148       | 0.008     | 9-Jun                         |
| Blue-winged Teal           | <i>Anas discors</i>       | 19     | 0.148       | 0.008     | 10-Jun                        |
| Canvasback                 | <i>Aythya valisineria</i> | 12     | 0.094       | 0.005     | 30-May                        |
| Unidentified Diver         | <i>n/a</i>                | 11     | 0.086       | 0.005     | n/a                           |
| Goldeneye or Bufflehead    | <i>n/a</i>                | 10     | 0.078       | 0.004     | n/a                           |
| Unidentified Dabbling      | <i>n/a</i>                | 8      | 0.063       | 0.003     | n/a                           |
| Redhead                    | <i>Aythya americana</i>   | 6      | 0.047       | 0.002     | 16-Jun                        |
| White-winged Scoter        | <i>Melanitta fusca</i>    | 3      | 0.023       | 0.001     | 7-Jun                         |
| Scaup or Ring-necked Duck  | <i>n/a</i>                | 3      | 0.023       | 0.001     | n/a                           |
| Ruddy Duck                 | <i>Oxyura jamaicensis</i> | 2      | 0.016       | 0.001     | 16-Jun                        |
| Unidentified Teal          | <i>n/a</i>                | 1      | 0.008       | 0         | n/a                           |