

Notes on *Is the local golf course a useful site for bird studies?* A powerpoint presentation by

Grahame Feletti, PhD to the Hunter Bird Observers' Club on 11 March, 2015

Is the local golf course a useful site for bird studies?

Charlestown Golf Club: a 3-year case study
by Grahame Feletti



Charlestown Golf Club, a suburban course near Lake Macquarie. As an amateur bird-watcher, I was grateful for any support or advice on useful methods. Periodically I reported my findings to the golf club which kindly allowed me to wander the course with binoculars and tape-recorder. Several key members of Hunter Bird Observers Club helped me plan and conduct fortnightly surveys so I could make some confident and useful summary statements.

Outline

Golf course & survey trail
Avian Habitats in and around course
Bird data analysed by RR and habitats
Surveys, Observations & Breeding
Comparing notes with other sites



This talk begins with a birds-eye view of the golf course site and trail walked on each survey. It then introduces four main avian habitats and their key features, which have helped me analyse bird behaviour patterns based on what bird species were seen, where and how often. I also offer some insights and simple ways for summarising bird count data. This project also identified the relative merits of observations and surveys for reporting breeding activity at this site, plus some challenges in trying to compare species statistics from other sites or official sources.



This 54ha golf course is situated within 126ha of dry sclerophyll forest. Clayey soils and disused quarry areas around its west side contribute to poor drainage of rain water. On the east side, management strategies for excess water since 2000 have been very effective. Near its south-east corner between the 13th tee and 14th green, heavy downpours flow north along a natural (wet) gully into a large dam at the 14th tee. 150m further north, at the south end of its east lake, surface water and stormwater run-off from the adjacent Bypass flow into a small holding pond and then into that lake (of 2.6ha). Another stormwater drain from the Bypass enters the north-east end of the course; it flows into a reed swamp and pond beside the 2nd green. Overflow from both these surfaces feeds into that lake. Excess water from the lake itself is syphoned into underground pipes which convey huge water volumes north into the catchment drain for Winding Creek on Hillsborough Road. So, heavy downpours in any season not only replenish open water sites but also refresh water quality and vegetation. However rain can also inject undesirable weed or algal infestations and other effluent.



Habitat type: Freshwater

For this bird survey it was useful to divide the 18-hole course into nine adjacent six-hectare areas, so that roughly equal time was spent walking through each. But for analysis it was more useful to group species in terms of their typical habitat. Neville Cayley's (1987) book *What bird is that?* helped me identify four main habitats on this golf course: *Freshwater*, *Open Forest*, *Forest Scrub* and *Blossoms and Outer Branches*.

Freshwater habitat covered nearly 4ha of open water. It included two main lakes, four dams, reed marshes and overflow ponds. These water sites offered limited protection from golfers, dogs or various predators because of their open location and weed control practices. *Open Forest* habitat included fairways and greens; all had mature native trees or remnant forest along their boundaries. This habitat also has scarce mid-level vegetation (shrubs & saplings).



Dry sclerophyll forest loosely describes remnant vegetation around the golf course. Recent flora surveys show the course straddles *three* recognised native forests. They are: *Coastal Plains*: Stringybark-Apple; *Coastal Sheltered*: Apple-Peppermint; and *Sugarloaf Lowlands*: Bloodwood-Apple-Scribbly Gum. Each forest type is defined by the main tree species providing its forest canopy. Each forest also has a recognised (*diagnostic*) set

of mid-level and ground-cover species, although there is some overlap of plant species in any locality. There are also many unrelated flora species in any such area.

Coastal Sheltered Apple Peppermint Forest	Tree (>6m)	Shrub (0.5-6m)	Ground-cover (<0.5m)
Coastal Sheltered Apple Peppermint Forest	Black Oak Bloodwood Cotton	Black She-Oak Sweet Pittosporum Banksia	Bracken Fern Crofton Weed Tree Fern
Coastal Plains Stringybark-Apple	Stringybark Apple	Black She-Oak Sweet Pittosporum Banksia	Bracken Fern Crofton Weed Tree Fern
Sugarloaf Lowlands Bloodwood-Apple-Scribbly Gum	Bloodwood Apple Scribbly Gum	Black She-Oak Sweet Pittosporum Banksia	Bracken Fern Crofton Weed Tree Fern

The *Coastal Sheltered: Apple-Peppermint Forest*, for example, may include these species of tree (>6m), shrub (0.5-6m) and ground-cover (<0.5m). Various other tree and shrub species have also been planted around the course during its 40-year history. Some of these are endemic to the Lake Macquarie area (eg. Swamp Mahogany), while others are typical of coastal NSW (Turpentine). However, some trees (eg. Illawarra Flame Tree (NSW south coast) and Ivory Curl Tree (north-east QLD)) are more esoteric - adding colour or variety to the landscape.



Forest scrub is a term used here to describe two areas inside or along the perimeter of the course; they contain mid-level vegetation under the forest tree canopy. One area is 300m along the north-west perimeter. Its canopy is mostly Smooth Barked Apple-Sydney Peppermint but its mid-level vegetation has Black She-Oak, Sweet Pittosporum, Banksias, Tall Saw-Sedge and Bracken Fern, plus a range of ground-cover species.

The other forest scrub area has a canopy of Red Bloodwood, Smooth-barked Apple, Sydney Peppermint and Scribbly Gum trees. It is a 1ha wedge of scrub along a wet gully in the south-east corner between 13th tee and 14th green. Mid-level species include tree saplings, Hairpin Banksia, White Dogwood, Sunshine Wattle, Tree Fern, Bracken Fern and Crofton Weed.



Blossoms and Outer Branches is the fourth avian habitat type on the course. Like Freshwater and Open Forest habitats it is quite diverse in terms of location and native plant species. This habitat is not restricted to blossoms on outer branches or tree tops; it includes flowering shrubs (*Acacia*, *Banksia*, *Callistemon spp*) and ground-cover. Recent flora surveys (Eastcoast Flora Surveys) in the area

have identified over 80 flowering natives. Nor is this habitat type attractive only to 'honeyeater' species; some birds are known to forage for insects or other food sources attracted to blossom. However, one key feature of this habitat for many bird species is its changing nature; many forest trees and shrubs bloom prolifically in different seasons.

Summary of Survey Statistics 2012-2014

	All Seasons	Winter	Spring	Summer	Autumn
Number of Surveys	100	25	21	21	33
Number of Species	82	28.7	28.7	28.7	28.7
Number of Sites	17	17	17	17	17
Number of Observations	14,128	5,191	15,447	6,244	7,200
Number of Surveys	100	25	21	21	33
Number of Species	82	28.7	28.7	28.7	28.7
Number of Sites	17	17	17	17	17
Number of Observations	14,128	5,191	15,447	6,244	7,200

Summary of survey statistics.

100 2-hour surveys were completed across all seasons in 30 months between June 2012 and December 2014. As expected (from similar surveys in the Hunter Region) the number of species, and bird numbers within each species, were higher in spring-summer than autumn & winter. But average and maximum counts for species can be misleading or highly variable between seasons or years.

Reporting Rate (RR%) and Surveys

Put X (once only) if that species was seen on a survey.
 RR% for a species is the percentage of all surveys that it was recorded (total Xs divided by total surveys x 100).

Does not reflect how many birds of that species were counted.
 Treats each survey record of species as equal (for calculations).

Is most useful when there are many surveys, spaced evenly over a month or season or year - reduces misleading conclusions.

Reporting Rate (RR%) is a preferred alternative statistic to the average. It measures *how often* a species is seen over the total number of surveys. RR% for a species can be calculated from simple checklists (X) or bird count records - where the count is simply replaced by a code (X). Xs are tallied and divided by total number of surveys, then converted to a percentage to yield RR%. It also helps to compare species data across sites.

RR% also helps separate Most common, Common & Uncommon species for other analyses (Species x Habitats).

Species can be grouped by:	Freshwater	Open Forest	Forest Edge	Disturbed Outer
Most Common (80-100% seen)				
Common (20-79% seen)				
Uncommon (1-19% seen)				

Analysis of bird species' use of different habitats together with their Reporting Rate (annually or even season by season) can offer some clues on their relative use of the course. In this study, species reported on 80-100% of surveys are called **Most Common**. Those seen on 20-79% are **Common**; and **Uncommon species** are those seen on less than 20% of surveys. In all, 82 native species was recorded in this study.

Most Common species numbered 19 (or 23%). Most were birds of Freshwater and Open Forest, although Noisy Miner and Rainbow Lorikeet were highly visible wherever and whenever the blossoms were – for example, in late summer and early autumn, Red Bloodwood trees are blooming profusely. Many of the Open Forest birds are also very common in woodland or forests in other rural and urban areas. It suggests they have adapted well to suburban backyards and general encroachment on their territories. This adaptation also seems to include their survival on suburban golf courses and similar public reserves.

Most Common Native Birds seen around Charlestown Golf Course 2012-2014



Common Native Birds seen around Charlestown Golf Course 2012-2014



Common species also appear in similar numbers: 17 (21%), with stronger representation by birds using Open Forest habitats. The lower Reporting Rates for these species (compared with those above) may well reflect different patterns of behaviour. For example, members of Open Forest and Freshwater species are both nomadic and sedentary. *Sedentary* means some (perhaps older birds) remain on site year-round, while others (perhaps younger) are *nomadic* and move around various sites within the Hunter Region. This behaviour is considered 'random' (unpredictable by us) but typically in response

to available food, water or breeding cycles. Several *Common* species are known to migrate into the Hunter Region – mostly in spring-summer, for breeding purposes (Dollarbird, Sacred Kingfisher, Channel-billed Cuckoo). Although identified as *Common* birds of Freshwater, species like Little Black and Little Pied Cormorant, and White-faced Heron may also frequent saltwater habitats regularly; the shore of Lake Macquarie at Warners Bay is only 3km SW from this golf course.



The list of *Uncommon species* for this site is interesting for several reasons. This group of 46 (56%) is larger than the combined tally of *Most common* and *Common* species. There is good representation (number) of species across all four habitats. Although these species were seen on <20% of surveys, records of observations also indicate varied patterns of habitat use. Several species are known to be *seasonal migrants*; some of them arrive annually to breed (White-breasted Woodswallow, Olive-backed Oriole, Eastern

Koel). Others (eg. Musk Lorikeet, Noisy Friarbird, Fork-tailed Swift) are *birds of passage* staying briefly to forage en route to warmer climates.

Others (eg. Chestnut and Grey Teal, Straw-necked Ibis, Plumed Whistling Duck, Royal Spoonbill) may move (forage) between this and other habitats irregularly, or (as *vagrants*) suddenly appear as a result of storm activity, but soon depart again. Still other species seem to be wary users of these habitats. They are not necessarily smaller *Passerines* (perching birds). Surveys noted many predators are omnipresent: Laughing Kookaburra, Pied and Grey Butcherbirds, Australian Raven and Pied Currawong. Besides observed hawking from raptors (eg. Nankeen Kestrel, Peregrine Falcon, and Swamp Harrier) other Freshwater habitat predators include eels, snakes and even Purple Swamphen.

Habitat	Most common	Common	Uncommon	Total
Freshwater	Australian Wood Duck Pacific Black Duck Purple Swamphen Dusky Moorhen Sulphur Cuckoo Masked Lapwing Marshhead Duck	Australian Grebe Little Black Cormorant Little Pied Cormorant White-faced Heron	Eastern Koala Laughing Kookaburra Crested Pigeon Australian Magpie Little Corella Sulphur-crested Cockatoo Australian Raven Osprey Magpie-lark Pied Swallowtail	19 (22%) 24=13
Open Field				
Forest				
Riparian & Estuarine				
Total	27 (22%) 24=13	22 (24%) 24=13	12 (14%) 24=12	61 (56%) 24=42

This table includes all observed species grouped by Reporting Rate and Habitat type. It also enables several insights about species' breeding activity (in bold type). Briefly, 18/19 of the *Most common* species but only 6/17 *Common* species were observed with young or at nest. Of the 6/46 Uncommon species noted breeding only 2 (White-breasted Woodswallow, Olive-backed Oriole) are seasonal breeding migrants (spring-summer).

Comments on Breeding Records

Surveys v. Observations
Breeding Activity > Success
Nest sites and wary adults
Nestlings and juveniles



Some comments are offered on breeding reports at this site. Surveys, with their requirement to spend equal time in pre-set areas, are not as effective as dedicated observations of breeding activity (searching for nest sites, prolonged recording of feeding young or nest-sharing). But survey notes of breeding *activity* (eg.

aggressive behaviour towards strangers in a specific area or near a suspected nest-site) can sometimes foretell breeding *success*. For example, in January 2015, 3 fledgling Dollarbirds, from 3 different areas were later found and rescued after this nesting activity.

Breeding successes of Pacific Black Duck, and of Australian Wood Duck, are commonly reported at this golf course. Both species often nest in hollow Scribbly Gum and Smooth-barked Apple trees. Ground nest sites are rarely noted for any birds of Freshwater – probably due to insufficient protection. One exception may be Hybrid Pacific Black Duck x Northern Mallard birds, which are being reported more often now at sites in the Lower Hunter. This family of adults and 12 ducklings appeared on the course's west lake last August. The plump adult (pictured with purple speculum) and four others appeared at the east lake six months later (26th February). By their size and comparatively tame behaviour these may well be hybrid birds.



This project's field observations have laid some basic groundwork for future studies of suburban encroachment on species seen in these golf course habitats. A research presentation (11Feb2015) to HBOC members by Dr. Laura Rayner of Canberra Ornithologists' Group described increasing and decreasing trends in woodland species in northern ACT over the last 15 years. Her list of species on the increase is almost identical with those listed as *Most Common* in this report. Laura said that some of the declining species may be linked to urban encroachment on their habitats. This aerial photo (Google Maps) shows areas (within 5km of the course) of increased traffic density, residential and commercial development in the last decade. Answering the question 'Are woodland-dependent species declining in the Lower Hunter?' will require ongoing monitoring (and analyses) of Reporting Rates of *Common* and *Uncommon* species at this site and adjacent areas.

Common Name	HR-16	M10	HR-16	M10	HR-16	M10
164	86	31	24	10	10	10
165	102	88	8	29	10	10
166	102	100	1	10	10	10
167	102	100	1	10	10	10
168	102	100	1	10	10	10
169	102	100	1	10	10	10
170	102	100	1	10	10	10
171	102	100	1	10	10	10
172	102	100	1	10	10	10
173	102	100	1	10	10	10
174	102	100	1	10	10	10
175	102	100	1	10	10	10
176	102	100	1	10	10	10
177	102	100	1	10	10	10
178	102	100	1	10	10	10
179	102	100	1	10	10	10
180	102	100	1	10	10	10
181	102	100	1	10	10	10
182	102	100	1	10	10	10
183	102	100	1	10	10	10
184	102	100	1	10	10	10
185	102	100	1	10	10	10
186	102	100	1	10	10	10
187	102	100	1	10	10	10
188	102	100	1	10	10	10
189	102	100	1	10	10	10
190	102	100	1	10	10	10
191	102	100	1	10	10	10
192	102	100	1	10	10	10
193	102	100	1	10	10	10
194	102	100	1	10	10	10
195	102	100	1	10	10	10
196	102	100	1	10	10	10
197	102	100	1	10	10	10
198	102	100	1	10	10	10
199	102	100	1	10	10	10
200	102	100	1	10	10	10

Taking the listed *Common* species for example I began to search for comparative data (RR%) in the Hunter region. As shown in the right-hand column of this table, the broadest level is HR-16; data averaged from sites across the Hunter over the past 16 years. Similar RR% data for the period 2012-14 are listed under column M10 (from Birdlife Atlas); M10 is the geographic 10-minute cell area in which the golf club is located. Two other sites in this Newcastle cell are Blackbutt Reserve (BBR) and Hunter Wetlands Centre (HWC), both of which are public reserves. Unfortunately, although monthly counts of species are available, these are not yet converted to Reporting rates.



High quality, long-term data (RR%) are available from various woodland and estuarine sites around Newcastle, even in the same 10" cell (eg. Kooragang and Ash Is., Hexham Swamp, Stockton) but each of these has distinctive ecological features that make any comparisons tentative at best. They tend to be either estuarine or woodland habitats and therefore attract a much wider range of species than a local golf course in similar areas. As data in the previous slide show, CGC row data (for a given species) also differ greatly from HR-16-year and M10 cell 3-year data. So where should we look next?

One possible answer comes from the original, perhaps not-so-academic question, 'Is the local golf course a useful site for bird studies?' Public golf courses have many features in common from an urban ecological and management perspective, regardless of geographical location or flora.

Is the local golf course a useful site for bird studies?



Thanks to exec staff & members of Charlestown Golf Club and Hunter Bird Observers Club, Dr. Stephen Bell of Eastcoast Flora Surveys, Jason Macgregor of LMCC, Geoff Pease of The University of Newcastle, Dr. Laura Rayner of Canberra Ornithologists' Group.

You can view bird reports from Charlestown Golf Club's website. References available by email: contact: gilesa@bigpond.com

Red-fronted Macaw *Ara rubrogenys* <http://www.birdlife.org.au/species>

Reporting rates and the same avian habitat types might be adopted to analyse and compare species differences, annually and seasonally. Survey requirements are not too demanding, nor is the expertise to document species. Bird counts are not essential; a flexible checklist and record of location is a simple way to start. The question of which species are most vulnerable (analogous to 'the miner's canary') to urban encroachment should be equally important to urban planners, ecologists, golf club management and the general public.

This project began from an interest in listing bird species at one public golf course. Three years on, it is obvious that the club's management of its native flora (trees, shrubs and ground-cover) is just as important to the native birds as it is to golfers and community. This emphasis also includes maintaining its surrounding remnant native forest. A challenge for local councils is to factor such natural assets into any suburban commercial and residential development, and into expansion of adjacent arterial roads and increasing traffic density. Perhaps this presentation assists as a first step – raising awareness of their potential impact.

Grahame Feletti PhD

15 March, 2015