Monitoring of Subalpine Whimbrels on Donnelly Training Area
Fort Wainwright, AK

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Resource Report 2014
Abstract

In 2000, a road accessible community of whimbrels (Numenius phaeopus) was discovered by resource personnel near Donnelly Dome approximately 18 miles south of Delta Junction, AK. At an elevation of 900 meters, the area being utilized covers approximately 775 hectares in subalpine scrub habitat. Due to proposed development in the area, weekly whimbrel surveys began in 2009. Since then, the aggregation has consistently occupied the area from early May to early July each season, however nesting was not documented until 2012. While we have monitored this site for six years, we have only documented nesting from 2012-2014. Detailed information on breeding distribution and abundance of whimbrels in Alaska is lacking due to patchily distributed communities, inaccessibility of habitats, and difficulty of nest detection. Recent monitoring efforts have highlighted the importance of areas on a more local scale as important for establishing benchmark information for future efforts. This area offers an invaluable opportunity to assess population/breeding changes that others are not able to easily access. As a Species of Concern for Fort Wainwright, this species and this nesting site require special attention and consideration when evaluating future leases or activities in the area.

Background and Introduction

The whimbrel (Numenius phaeopus) is a Species of Concern (SOC) for Donnelly Training Area (DTA), part of US Army Garrison (USAG) Fort Wainwright (FWA). This designation was made through a quantified ranking system developed by the Fort Wainwright Ecosystem Management (EM) Team. During this process, species are ranked to determine the need for special attention, monitoring efforts, or further studies due to population declines or threats to their habitats. The whimbrel is one of the highest ranked species for DTA. The reasons they rank so high include conservation status, declining populations, sensitivity to anthropogenic activity and disturbance, potential military or land management impacts, and lack of habitat resiliency.

Whimbrels are also listed as a Bird of Concern by the US Fish and Wildlife Service, Alaska Shorebird Conservation Plan, a Species of High Concern by the U.S. Shorebird Conservation Plan and listed by the Audubon Alaska Watchlist. The Shorebird Research Group of the Americas has outlined several potentially limiting factors to whimbrel populations: climate change, increasing predator populations, long-term environmental contamination, increased human disturbance, and habitat loss and degradation. Identifying discrete populations is integral to conservation, since they are the units upon which decisions must be based. Populations of this Alaska and western Canada subspecies are small, and trends poorly known. Drastic reduction of the intertidal mangrove winter habitat whimbrels depend on in Latin American wintering grounds is a concern. 85% of the population breeds in AK, nesting in habitat characterized by open, grassy tundra (Kirchhoff and Padula 2010, Ballantyne and Nol 2011).

Detailed information on breeding distribution and abundance within broader boundaries is lacking because of widely dispersed breeding areas, inaccessibility of habitats, and difficulty of detection—issues common to all arctic and sub-arctic breeding shorebird surveys (Johnson et al. 2007). Since detailed information on numbers and locations of breeding pairs is not available
over a broad geographic scale, utilizing local scale studies and monitoring efforts is necessary for establishing benchmark information with which future survey results may be compared (Wilke and Gonzalez 2010).

A community of whimbrels has been observed in the vicinity of Donnelly Dome, DTA, since 2000 and offers a rare opportunity to monitor a breeding site that is easily accessible. Weekly surveys by resource personnel began in 2009 and have collected annual data for the past six years.

Surveys began in 2009 by assessing temporal and spatial use of the area by whimbrel. Focus shifted in subsequent years to assess the number of birds that seasonally utilized the area. Once nesting was detected in 2012, surveys focused on answering annual phenology questions and looking at arrival/departure timing, nesting initiation, incubation time, nest fate, and dispersion date from nesting area.

The purpose of this report is to provide results of investigative and nesting surveys conducted by USAG-FWA staff from 2009-2014, identify data gaps in ecology of whimbrel, make recommendations for future studies or surveys, and to advise USAG-FWA in making land management decisions with concerns to this species and corresponding habitat.

**Study Area**

The study area is located on Donnelly Training Area in interior Alaska, approximately 18 miles south of Delta Junction, in the proximity of Donnelly Dome. The area is approximately 900 meters in elevation and covers approximately 775 hectares (7.75 km²) in subalpine scrub habitat (see Figure 1: Map of Whimbrel Nesting Area on Donnelly Training Area, Alaska). There is an access road that parallels the area and an adjacent set of communication towers. This makes the area both easily accessible as well as open to future development and increased human activity.

**Methods**

*Estimating Abundance of Aggregated Whimbrel, 2009-2014*

Surveys were conducted every year since 2009 to determine arrival and departure dates of whimbrel, as well as basic number of whimbrel using the study area. Each survey was conducted by 2-3 observers who either walked together or separate from each other, keeping in contact via handheld radio or verbally. Surveys began around early to mid-May and continued until there was no detection of whimbrel (usually early to mid-July). Surveys were conducted weekly, when possible, during the period of occupancy. Individual birds were identified visually or by call and tallied up at the end of the survey. Constant contact between observers was necessary to avoid double-counting birds, as well as recording where individuals were detected and where they moved (if applicable) to avoid an artificially high count. The upper 100m of elevation on the hill were surveyed on all aspects, covering most of the area birds used (See Figure 2: Map of Areas Surveyed for Whimbrel from 2009 - 2014 on Donnelly Training Area,
Alaska. Observers recorded behavior, likely territories, and minimum counts of individual whimbrel during each survey (See Figure 3: Completed 2011 Whimbrel Survey Data Sheet). Observers often saw suspected pairs in consistent locations, but could not locate nests.

Surveys were not conducted during high winds or precipitation, especially once it was confirmed that these birds were nesting, since disturbance in wet, cold or windy conditions leads to increased mortality rates in precocial young. During each survey, the date, arrival time, departure time, temperature, wind, sky, and precipitation were recorded. For each detection, observer(s), number of whimbrel for the observation, behaviors observed, behavior summary, associated waypoints, and a description of waypoints were recorded. At the end of each survey, the minimum number of whimbrel detected for the day was determined. Later survey years also included associated nest, if applicable, for each observation and identifying pair territories.

Nest Searching and Monitoring, 2012-2014

Methods for survey changed in 2012 when the first nest was located and three more nests were identified in subsequent weeks. Surveys continued to assess minimum counts, but additionally sought to identify territories where pairs were located. Techniques were refined further in 2013 to find nests more efficiently. Observers searched for nests within territories, using nest guarding behavior and intensity as clues to nest location. These nest searching methods are similar to other whimbrel studies: researchers search for nests by observing typical nest guarding behavior and search areas most heavily guarded. Observers noted areas where whimbrel flushed from within these focal areas and then concealed themselves, watching the pair as they returned to the nest (Skeel and Mallory 1996, Ballantyne and Nol 2011).

Once a nest was found, its contents were noted, a waypoint was taken and a bearing flag was placed 8-12m away. Generally whimbrel lay four eggs (Skeel and Mallory 1996, Skeel 1983) and a nest with fewer would indicate they are potentially still laying. Beginning in 2014, a nest card was filled out to record nest site location and centralize subsequent nest monitoring observations (See Figure 4.1: Completed 2014 Whimbrel Nest Card for Nest 7; Figure 4.2: Second Page of Completed 2014 Whimbrel Nest Card for Nest 7). Observers returned every week to monitor the status of nests to determine fate. Depredated eggs can often be recognized by marks from beaks or teeth, depending on whether it is an avian or mammalian predator. Additionally, if eggs are gone significantly before the projected hatch date, it can be assumed that the nest was depredated. To more accurately determine nest fate, remote cameras were deployed in 2012 and 2013.

From 2012 to 2013, certain nests were selected for motion sensor camera monitoring. Camera numbers were limited to availability (one camera in 2012, three in 2013), and placement was determined based on accessibility. Reconyx PC90 Covert Professional cameras were mounted 1-2 meters high onto fence posts approximately 5-10 meters away from the nest. When possible, these posts were mounted near shrubs or trees for concealment. Cameras were set to very-high motion sensitivity, to record a string of 10 rapid-fire pictures when activated, and to not have a quiet period between strings of pictures. Cameras were checked weekly until fledging or failure had been confirmed for the nest. Other studies have shown no effect of camera placement on shorebird nest predation rates (McKinnon, L and Béty, J. 2009).
Results

2009

In 2009 we conducted surveys from 06 May when 5 birds were detected until 8 July. The last whimbrel was detected on 25 June. The highest count during this season was on 09 June with 31 birds. However a single whimbrel shell fragment was discovered on the last survey. Surveys were focused more on minimum counts during this season, and although at least one nest was suspected, it was never documented.

Behaviors observed throughout season followed a pattern of display and vocalizations, followed by a period of seemingly territorial defensiveness, and then flocking prior to departure.

2010

In 2010 we conducted surveys from 12 May to 19 July, with the last whimbrel being detected on 9 July. Peak count of birds was detected on 14 June when 22 birds were documented.

Behaviors observed this year also followed a pattern of display and vocalizations from general areas, then a few pairs seemingly being found in territorial areas, followed by those birds becoming aggressive and drawing observers away from areas.

2011

In 2011 surveys were conducted from 10 May until 20 July, with the last whimbrel being detected at the site on 12 July. Highest number of birds detected was 21 on 19 June.

Again behaviors observed this year also followed a pattern of display and vocalizations from general areas, then a few pairs seemingly being found in territorial areas, followed by those birds becoming aggressive and drawing observers away from areas.

2012

In 2012, we conducted surveys from 14 May to 24 July with the last whimbrel detected in the typical survey area on 2 July. The highest number of whimbrel detected during this season was 15.

Birds displayed normal behavior patterns as seen in previous years. However four nests were identified throughout the incubation period with the initial nest discovery on 28 May. A game camera was set-up at the initial nest in order to capture nest fate, hatch date, and dispersal date. The monitored nest successfully hatched four chicks between 20-21 June. The chicks and adults dispersed from the immediate nest area after three days. The other three nests were also monitored for hatch success. All three hatched by 25 June (nests hatched 2, 3, and 4 chicks) and then moved away from survey area. On July 17, one adult whimbrel exhibiting guarding behavior was detected 1 km to the west of and roughly 90 meters lower in elevation than the nesting area (See Figure 5: Map of Whimbrel Nests and Potential Brood Rearing Area Detected...
from 2012 – 2014 on Donnelly Training Area, Alaska). From this observation, we believe that shortly after hatching, broods moved downhill and away from the nest area for brood rearing.

2013

In 2013, the first detection of whimbrels at the nesting area occurred on 23 May, roughly two weeks later than past seasons. Late arrival was possibly due to late snow cover on the site. On the dates of normal arrival, whimbrels were detected at lower elevations lacking snow cover. Focus for this year was to determine number of nests/pairs instead of focusing on high count of birds.

Seven nests were found with two more pairs suspected of nesting, but nests for them could not be detected. With the area encompassing detected nests comprising approximately 48 hectares and a probable 9 nesting pairs, this gave a density of one pair per 5.3 hectares. Nests were discovered ranging from 65 - 121 meters away from 2012 nests, but without marked individuals there was no way to determine if these were returning individuals to the same territory (See Figure 5: Map of Whimbrel Nests and Potential Brood Rearing Area Detected from 2012 - 2014 on Donnelly Training Area, Alaska). The nearest 2013 nests were 168 meters apart. All seven nests had 4-egg clutches. The highest count during a visit was 21 individuals, 18 of which were from inferred pairs and 3 “transient birds.”

While the birds arrived later than normal, they resumed normal phenology. Hatch dates were estimated with weekly checks and with motion sensor cameras mounted on posts near three nests. Hatching occurred between 24 June and 27 June, with some eggs pipping on 27 June. Backdating using a 26/27-day exposure period (C. Harwood, personal communication), nest initiation was estimated to occur between 29 May and 1 June. All nests showed evidence of hatching, but hatchling survival is unknown. Broods were observed to remain in the nest area as late as 8 July (See Figure 6: Motion Camera Picture of Whimbrel Adult in 2013 on Nest 6 with Chick Highlighted), after which broods are believed to have moved to lower elevations. The last whimbrel detection of 2013 was on 24 July and was a solitary individual flying around the area. Searches for broods farther away from the nesting area were not conducted.

2014

In 2014, the first survey occurred on 5 May and detected 6 whimbrel. Surveys continued until 23 July, with the last whimbrel being detected on 8 July. The highest count during a survey was 19 individuals, 16 of which were suspected pairs and three “transient birds.”

Eight nests were found this year, but at least one more nest was suspected. Surveys covered a greater area than in previous years, expanding to the east and south. The area nests were found in comprised roughly 85 hectares, giving a density of one pair per 9.4 hectares. Nests were found ranging from 87 – 255 meters away from 2013 nests. The nearest 2014 nests were 220 meters apart. Of the 8 nests, one never initiated, 6 laid 4 eggs, and one laid 3 eggs.

June 2014 received above average rainfall and below average temperatures. In an effort to minimize disturbance during the wet and cold weather, no motion sensor cameras were set out
and surveys during June and July were limited. One nest was never initiated after being identified and recorded. On 12 June, 3 nests were found to have failed and one had lost an egg. Two of the failed nests had shell fragments nearby with obvious tooth marks; the third had no shell fragments around the nest (See Figure 7: Depredated Egg from 2014 Whimbrel Nest 4). No adult birds were detected around the four failed nests and no re-nesting attempts were identified.

Observations of the remaining four nests appear to fit the normal timeline for phenology. Hatching occurred between the surveys on 12 June and 23 June. At two nests, adults were observed aggressively guarding an area nearby the nest, indicating brood rearing. The other two nests had no obvious signs of depredation, but the adults could not be found in the area of the nest.

On 8 July, an adult was detected aggressively guarding and leading observers away from an area characterized by 1.5 meter tall shrubs and sparse trees. This area was on the southeast area of the breeding area and 650 meters south east from the nearest known nest (See Figure 5: Map of Whimbrel Nests and Potential Brood Rearing Area Detected from 2012 – 2014 on Donnelly Training Area, Alaska). No juveniles were observed but based on adult behavior, observers believed a brood was in the shrubs and being actively guarded.

Graphical illustration of minimum counts of whimbrel from each survey week from each year of survey can be seen in Figure 8: Minimum Number of Whimbrel Detected During Each Week of Survey by Year.

Discussion

Currently, temporal and spatial use of this breeding area appears to be consistent from year-to-year. The number of birds annually utilizing the area varies slightly, however at the commencement of these surveys, we were only looking at number of birds per week. After learning more about their ecological use of these habitats and the determination of actual nesting, our focus shifted to number of nesting pairs. We also learned that it is fairly common for “transient birds” to move through an area for short periods of time and make some interval counts higher, however, these birds move through fairly quickly. It is thought that these individuals are either failed nesters or non-breeders passing through, and this occurrence of transient birds has been observed at other whimbrel sites in interior Alaska as well as with bristle-thighed curlews (Numenius tahitiensis) in western Alaska (C. Harwood personal communication). This could explain some spikes in counts of total birds.

In 2014, we recorded the greatest number of nests in this whimbrel nesting area. We believe this is likely due to refined nest-finding techniques rather than increased nesting activity. Whimbrel nests are very difficult to locate, even when standing within a meter from the nest, and each year of monitoring developed our understanding of whimbrel nesting behavior and thus improved our nest finding abilities. An alternative explanation is that whimbrel were not nesting from 2009 – 2011 or failed in their nest attempts. Which explanation is true, we may never know.
Forming the annual phenology of arrival, nest initiation, hatch, and dispersion dates has begun with the last three years of data. Week four (late May – early June) of surveys appears to be roughly the initiation of nesting. Between weeks eight and nine (late June – early July) seems to be roughly when nests hatch and adults defend nestlings within the territory. The weeks in between represent incubation and correlate with aggressive adult nest guarding behavior and adults leading intruders away from nest. The following week after hatch, adults and brood vacate the immediate nesting area. Within the newly determined nesting phenology the documented behaviors of the whimbrel at this site appear to substantiate the annual chronology thus far. Using motion cameras at the nests proved to be very successful in determining hatch dates and did not appear to have negative impacts on the nest success, as every nest with a camera was successful.

2014 was the first year that we documented nest failures due to predation and unknown causes. We do not believe these were caused by observer disturbance, since our survey methods did not differ from previous years’ methodology and we surveyed the area less than in 2012 and 2013. We find it interesting that the nests which failed were all on the north-west side of the nesting area, and believe this is further evidence of depredation. However, we do not have enough data to draw any concrete conclusions from these nest failures. We recommend future monitoring efforts to include increased motion camera deployment to aid in nest success/failure determination and identify nest predators.

Although this site may appear to hold only a small number of pairs, compared to other nesting aggregations described in other studies, it is of significant density and/or comparable size. McCaffery (1996) studied breeding whimbrels within the Yukon Delta National Wildlife Refuge between 1987 and 1991, where the mean number of breeding pairs within a 5 km² area was five. Also a local population of breeding whimbrels was discovered in 2008 in the boreal forest ecosystem of Kanuti National Wildlife Refuge, in the northern interior of Alaska (Harwood 2008). In the 5 km² area of tundra, studies in Kanuti found 10 nests in 2012 (vs. >19, 14, and 6 nests in 2009, 2010, and 2011, respectively). At another nearby site, researchers found 12 nests in 2012 (vs. 11 in 2011, although >14 breeding pairs were suspected) (Harwood 2012). We had 9 pairs in 2013 within an approximately 0.5 km² area.

Due to the variety of habitats, vast areas, patchy distribution and low densities of whimbrel, it is difficult to evaluate probable nesting habitat across larger spatial scales. Habitat classifications developed from one region are not suitable to other regions due to differing vegetation patterns, moisture and fire regimes, landforms, and geological substrates (Pirie et al 2009). The DTA nesting area is a discrete microclimate that serves as a locally important breeding area for a species whose specific habitat requirements are difficult to describe.

The preliminary information and data that these surveys produced has been distributed through the Alaska Shorebird Group Annual Report. This report showed that there are possibly only two breeding studies of whimbrel in interior Alaska. This fact makes this community of great interest and importance to the shorebird community and other agencies. This site also features relatively different habitat than the other study area which may argue for greater reason to study and manage appropriately.
According to the Conservation Plan for Whimbrel, the nesting habitat utilized by this western population of whimbrel encompasses a variety of habitats from open wetland and upland habitat throughout the sub-arctic and alpine tundra and taiga. Detailed information on breeding distribution and abundance is lacking due to widely dispersed aggregations, inaccessibility of habitats, and difficulty of detection. However several recent monitoring efforts have highlighted the importance of areas on a more local scale as necessary for establishing benchmark information for future efforts. They also state as one of their priority actions to include long-term monitoring of breeding populations. This DTA population helps to fill data gaps on basic information of this species and overcomes all of the issues in collecting data listed above.

The work done on DTA could aid in developing standardized methods for assessing the distribution and population size of shorebirds in various habitats across Alaska. It also adds to basic whimbrel ecology specifically for this area and can thus aid in answering regional or larger scale questions. This whimbrel community offers a unique opportunity to be able to assess population/breeding changes that others are not able to easily assess and gather data.

**Recommendations**

**Monitoring Recommendations**

The current FWA Integrated Natural Resource Management Plan (INRMP) states that “wildlife monitoring involves the continuation of existing programs and the creation of new long-term monitoring programs for fish and wildlife” (3.4.2.2. Fort Wainwright. 2013). Focusing on neotropical migratory birds, the Department of Defense is a major participant in the nationwide Partners in Flight program. There is also considerable concern in North America over declining numbers of many neotropical migratory birds. Data on the status of neotropical migratory birds is required to manage and protect these declining species, as mandated by the Sikes Act and Army Regulation 200-3. Monitoring programs are a major component of the ecosystem management program, specifically those that are of concern to partner agencies.

According to Wilke and Gonzalez (2010), the continuation and expansion of existing efforts to estimate shorebird breeding numbers, distribution, trends, and habitat associations across arctic and sub-arctic regions are critical to understanding the conservation status of migratory shorebirds. Although the remote, dispersed breeding grounds for whimbrel and other shorebirds make comprehensive and regular survey efforts difficult or impractical, priority should continue to be placed on identifying sites of importance for breeding birds. This is particularly important considering the large discrepancy between the population estimates for whimbrels on their wintering grounds versus the combined estimates for whimbrels on their breeding grounds. In addition to these efforts, biologists should prioritize initiating or maintaining existing long-term monitoring programs for discrete breeding populations in order to document factors affecting reproductive success, breeding habitat requirements, and adult mortality on the breeding grounds.

The Alaska Shorebird Group recommends focusing efforts on priority species, especially those in habitats where accurate trend information may be readily derived (Alaska Shorebird Group 2008). This whimbrel nesting site is in an area not represented in any annual bird surveys.
currently being conducted by DTA Wildlife staff, such as Alaska Landbird Monitoring Survey and the Breeding Bird Survey. Both of these surveys form the basis of avian data on DTA. The location of this nesting site within DTA allows access to a small but dense population of whimbrel, making further monitoring both practical and financially feasible.

Future monitoring of this nesting site falls into three categories: obtaining a more accurate count of nests, assessing brood rearing range, and determining whimbrel use throughout the greater DTA area. Based on the recent nesting information gained during the 2012 – 2014 nesting surveys, future monitoring efforts on the nest site should focus on pair abundance, nest counts, nest success, chick survival, and fledging ecology. Such data will help determine if this is a long-term nesting site, confirm that the inferred results from the last three seasons are representative of long-term dynamics, and provide insights into population trends in relation to nest site trends. Information and data gathered from this whimbrel community will continue to be dispensed to the Alaska Shorebird Group and could also be used to update other information outlets such as Avian Knowledge Network and regional efforts to document the Birds of Interior Alaska.

Future monitoring efforts should also be expanded to determine the areas used for brood rearing. Delineating the area these birds utilize and identifying for how long it is utilized is essential for proper NEPA compliance. Lastly, all of this work is focused on one nesting site. To the extent whimbrels utilize other parts of DTA remains unknown. Similar habitat to this site exists on both DTA-East and DTA-West, yet due to access limitations, they remain un-surveyed. For proper compliance and to be adequately prepared for future projects, surveying potential sites with similar habitats during peak activity is highly recommended.

To accomplish the above goals, we recommend capturing and marking birds with transmitters on the known nesting area. Such information would help answer many questions about the nest site, delineate areas used for brood rearing and timing, and potentially help determine other areas in DTA used for nesting. We highly recommend increasing the number of motion cameras deployed to monitor nests to aid in determining success or causes of nest failure. This work would be relatively inexpensive. The second facet of future monitoring is to expand surveys to include possible nesting habitats throughout DTA. This work would require more resources such as flight time, but would ensure comprehensive compliance for any future military activities.

Management Recommendations

The DTA whimbrel nesting site will continue to offer invaluable data on the virtually unknown nesting behavior of whimbrels in interior Alaska, but only if it remains undisturbed. Currently, increased use of the nesting area is proposed by telecommunications companies, US Air Force, and the city of Delta Junction. For management and conservation considerations, we strongly recommend limiting any use of the area to outside of the nesting period and ensuring that any disturbance to the vegetation of the utilized area is prevented. Furthermore, any additional development or construction within the immediate area should be scrutinized closely as to conserve the habitat and minimize any hazards posed to whimbrel.
What started as a general baseline survey has morphed every year since, answering new questions. We are just now at a point where reliable, consistent nesting data is being collected on which to base further studies and monitoring. Such information will allow for properly addressing this species and its area of use in the INRMP and in any NEPA reviews. This data and findings also provide us the unique opportunity to utilize the three principles of the DoD Natural Resource Program: partnerships, leadership, and stewardship.

A special thanks to Chris Harwood, Avian Ecologist at Kanuti National Wildlife Refuge, for generously sharing his knowledge and expertise on whimbrel in Alaska.
Literature Cited


Figure 1: Map of Whimbrel Nesting Area on Donnelly Training Area, Alaska
Figure 2: Map of Areas Surveyed for Whimbrel from 2009 - 2014 on Donnelly Training Area, Alaska.
## Whimbrel Survey Datasheet

<table>
<thead>
<tr>
<th>Date</th>
<th>05/16/2011</th>
<th>Corinna Datey</th>
<th>Arrival Time: 17:16</th>
<th>Departure Time: 19:30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>69°F</td>
<td>Wind: 4</td>
<td>Sky: overcast</td>
<td>Precipitation: none</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time of Count</th>
<th># of Birds</th>
<th>Behavior</th>
<th>Comments</th>
<th>Waypoint (name of GPS, waypoint name, coordinates)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:40</td>
<td>2</td>
<td>Flushed</td>
<td>Did not see, heard</td>
<td></td>
</tr>
<tr>
<td>17:40</td>
<td>1</td>
<td>Saw in flight, flew over ridge to west</td>
<td>Jeff heard to west toward top of hill, may eventually flush.</td>
<td></td>
</tr>
<tr>
<td>17:47</td>
<td>3</td>
<td>Flushed</td>
<td>After Jeff + 1 on east side of hill, left room to north</td>
<td></td>
</tr>
<tr>
<td>18:10</td>
<td>2</td>
<td>Flying north along ridgeline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:26</td>
<td>2</td>
<td>Flushed, Jeff w/ 15m before flew, birds stayed together</td>
<td>New couple headed north, stayed on east side of hill.</td>
<td></td>
</tr>
<tr>
<td>18:33</td>
<td>1</td>
<td>Flushed, landed, flushed again, flew off to new side of hill.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:46</td>
<td>1</td>
<td>Flushed from east side of hill, flew 3-400m to east + other side of ridge.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total:** 17

- Saw about 6 whimbrels flying at distance not counted.
- Two only identified by song, not seen also not counted.
- WLSF, SASP

**ENTERED 6/23/2011**

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Figure 3: Completed 2011 Whimbrel Survey Data Sheet.
Figure 4.1: Completed 2014 Whimbrel Nest Card for Nest 7.
Figure 4.2: Second Page of Completed 2014 Whimbrel Nest Card for Nest 7.
Figure 5: Map of Whimbrel Nests and Potential Brood Rearing Area Detected from 2012 – 2014 on Donnelly Training Area, Alaska.
Figure 6: Motion Camera Picture of Whimbrel Adult in 2013 on Nest 6 with Chick Highlighted.
Figure 7: Depredated Egg from 2014 Whimbrel Nest 4
Figure 8: Minimum Number of Whimbrel Detected During Each Week of Survey by Year. Week One Correlates to the Second Calendar Week of May.