(5) Shorebird management using trained falcons & teamwork at YVR

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Migratory and wintering shorebirds are a hazard to aircraft operations at the Vancouver International Airport (CYVR). The Vancouver Airport Authority has developed a strategy to manage shorebirds using a combination of trained falcons and hazing with pyrotechnics and propane cannons. The primary targets of this strategy are Dunlin - the most commonly encountered species of shorebird at YVR. Dunlin strikes resulting in runway closures to clean-up bird remains are pronounced during heavy south/south easterly winds, when aircraft operations are concentrated on the cross-wind runway (RWY 13-31). The coincidence of Dunlin on the airfield during cross-wind operations makes these events particularly disruptive. This presentation will summarize (1) the ecology of wintering Dunlin on the Fraser River delta, and their activity and behaviour at YVR; (2) the ecology of fear – the influence of wild and trained falcons on the behaviour of wintering Dunlin; (3) evolving teamwork strategies – combining falconry with additional techniques to effect management; and (4) the results achieved to date, and possible future directions.

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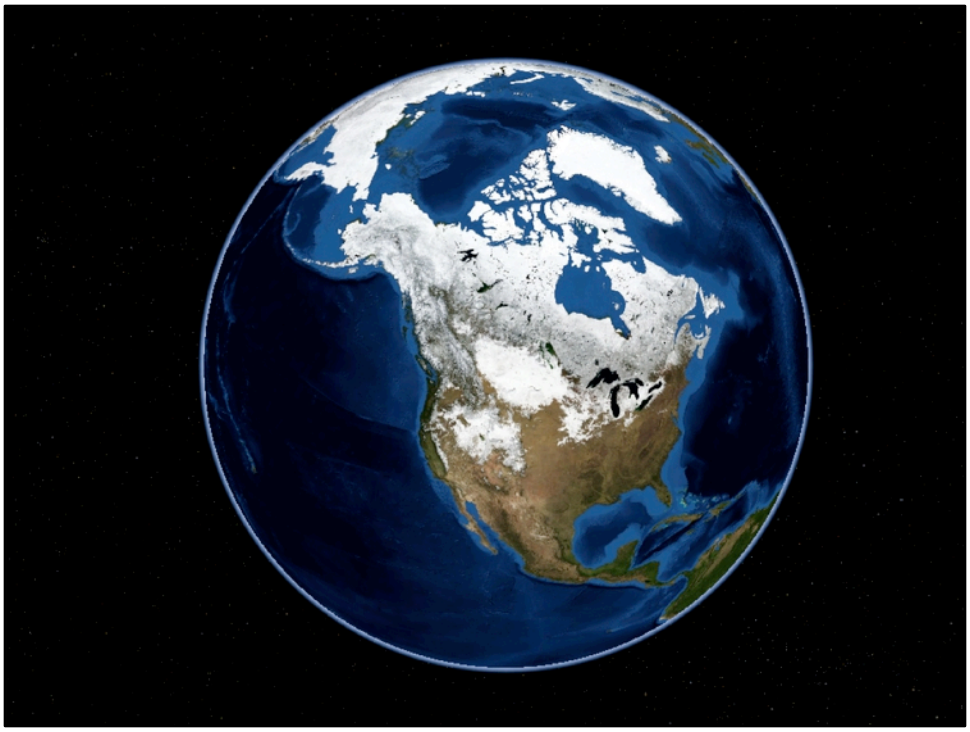
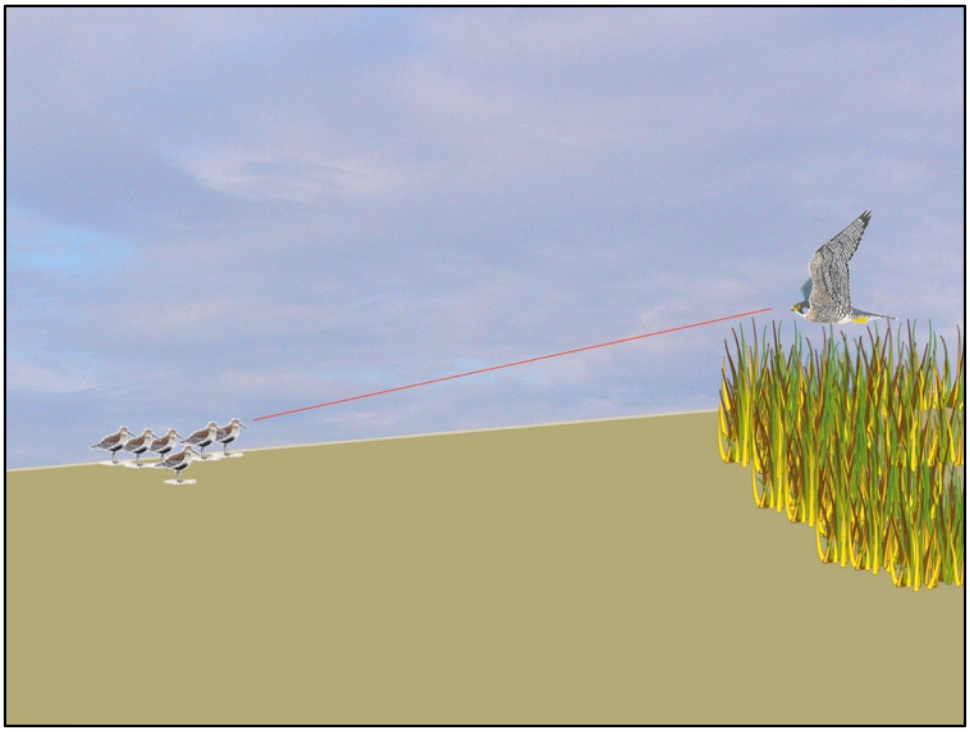


(1) the ecology of wintering Dunlin on the Fraser River delta, and their activity and behaviour at YVR;

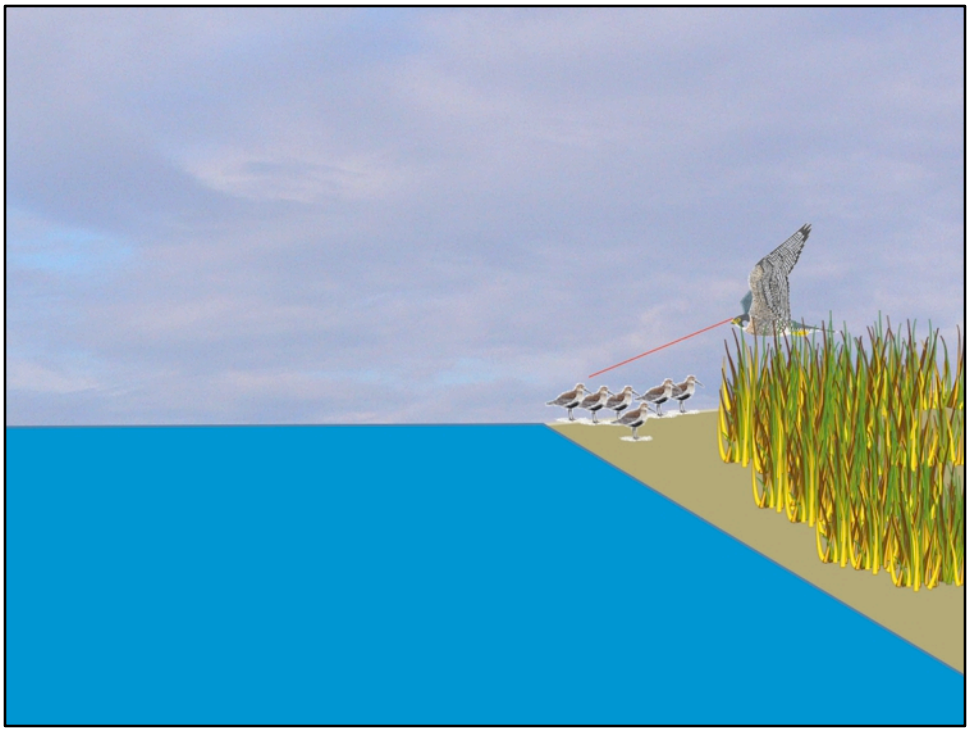
Migration – wintering habitat and food source (mud flats and invertebrates) at YVR
High tides and heavy rainfall results in DUNL coming airside for higher ground.
Runway 13 is a safe place to land – can see potential predators from all directions and large groups provide protection.

Dunlin pose a strike risk to aircraft. Since 2000, 1780 Dunlins have been struck at YVR with an average of 20 Dunlins struck per incident. The number of birds struck ranges from 1 to 250 birds. The birds weigh between 46 and 50 grams; a strike involving 250 birds results in a combined mass of 12.5 kg striking an aircraft, potentially over a concentrated area on the airframe, cockpit, or engine. There are 4 incidents on record where a Dunlin strike resulted in damage; these incidents involved a range of 6 to 100 birds struck. In 2007 a strike involving 250+ Dunlins occurred, closing RWY 08R for 38 minutes. In 2010 there were 2 events involving 200 and 150 Dunlin struck, respectively. The event involving 150 birds closed the cross-wind runway for over an hour. The 200-bird event resulted in a closure of 8 hours for cleanup and the continued presence of roosting Dunlin on the runway.

DUNLIN on the Fraser River delta



(2) the ecology of fear – the influence of wild and trained falcons on the behaviour of wintering Dunlin
Peregrines ambush DUNL at high tide, when marsh veg obscures approach
DUNL over ocean flock in response to high tide and predation risk
Note that predation risk still occurs on over ocean DUNL, but kill rate is much lower



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Overocean flocking at high tide to avoid predation due to surprise attack

Mostly plovers in this picture, but it shows shorebirds on RWY 13… DUNL may come airside rather than expending energy flocking over the ocean

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FIRE TRAINING

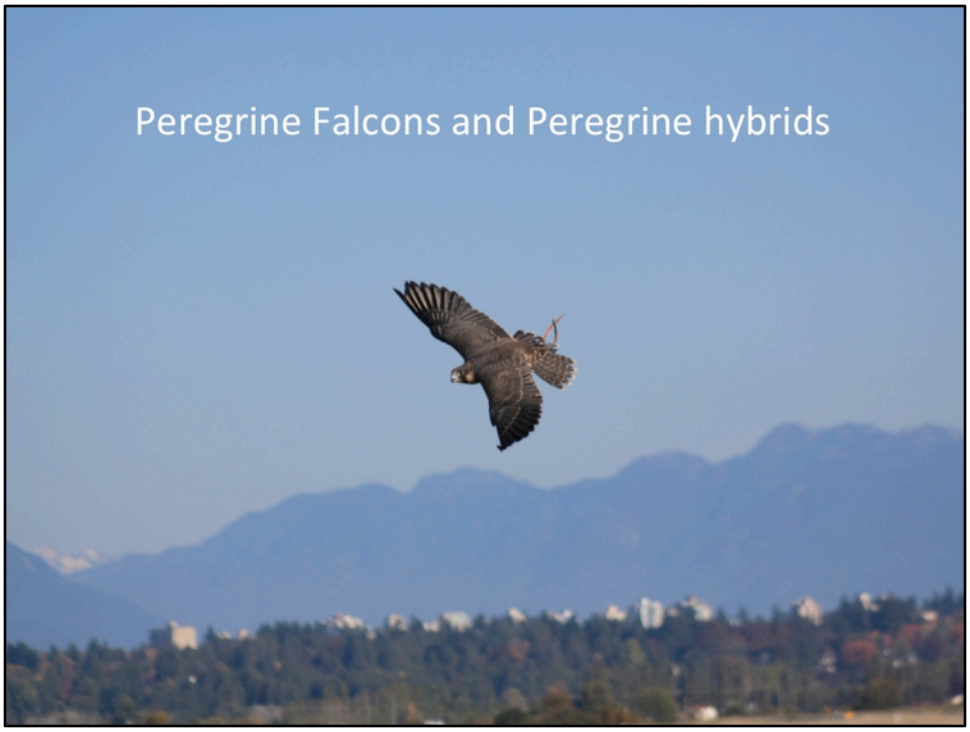
DUNLIN STRIKE 2010 200+ individuals

Once DUNL take flight in response to pyro, cannons, etc. they may no longer be manipulated and there are limitations to the path that a vehicle may pursue the flock.

Historically DUNL were intentionally left on 13 because they were too persistent for WMTs and it was often safer to leave them here than to have them on hthe parallels.

As a result, this runway was frequently closed for extended periods of time. On days with heavy rain and strong winds, this is often when we would need the runway

The solution to this problem has been found to be introducing a natural predator to the system to create a ladscape of fear



Stimulating an escape response by flying trained falcons at flocks of DUNL

Most falcons flown are PEFAs or PEFA hybrid.

These are natural predators to DUNL and we achieve very effective escape response from the shorebirds.

We do fly other species of falcons (gyrs, sakers) and hawks but but the DUNL seem to be most responsive to the PEFAs

We use the falcon's natural instinct to hunt avian prey to disperse Dunlin.

They require very little encouragement to take pursuit of the Shorebirds. The DUNL are naturally very responsive to the falcons and our falcons instinctively pursue the DUNL

PEFAs are also ideal due to their relatively water-resistent plumage.

They are known to hunt during wet weather conditions and continue to hunt when their prey is flying low over water.

Our Peregrine Falcon “Jet” in action

Usually the raptors create a strong enough escape response that we are able to move the shorebirds groundside with relative efficiency.
When Dunlin are roosting on the foreshore, we continue to fly the falcons on the perimeter with the use of lures.
This simulates, and gives the visual effect, of a falcon on the hunting airside.
We have observed flocks of DUNL flying in the direction of the airfield, but upon spotting a falcon flying in the area, they divert and avoid the airfield.
We may also be simulating a high density of predators in the area, because we so frequently have falcons hunting, or appearing to be hunting.

While DUNL are the #1 priority species for the raptors, once we have moved them groundside, we are able to focus on other problem species.
We also help disperse ducks, geese, gulls and crows.

Agreeable weather and tide conditions are not always easy to come by, and change drastically

In conditions where there is heavy rain, wind and high tides, moving the DUNL out of the airfield can be much more challenging.

The risk of flying during this weather is high for the shorebirds and they are more desperate for higher ground, which is often found in our cross-wind runway.

The goal when Dunlin are persistent on the airfield, our strategy is to keep them moving as much as possible, so that they may become wet and exhausted; desperate for rest.

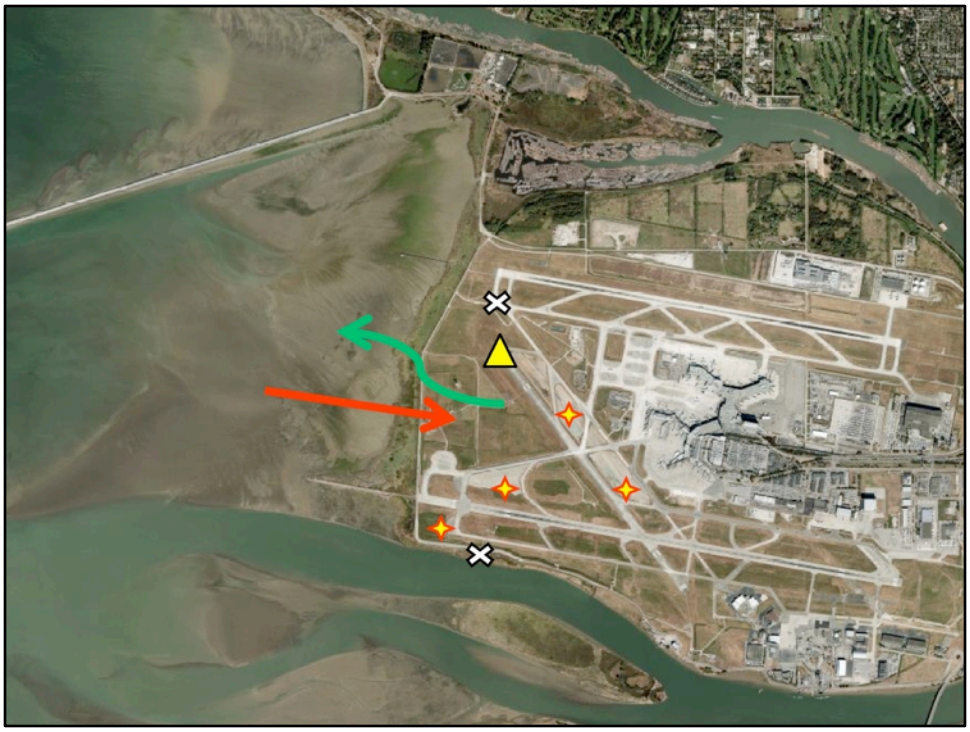
These wet, high wind days, are not surprisingly the days that we require the use of this runway. Flying our falcons consistently is not always enough, and they eventually become saturated themselves.

This is when we call on the wildlife management technicians to coordinate dispersal movements.


Teamwork with Wildlife Management Technicians
61
YVR
60

We can’t influence the Dunlin in flight… but we can prevent them from settling on the airfield

Propane cannon and pyro launchers
Whips and human presence
Audio Harrassment



Two ways that this works:

Combining the raptor team to the WMT team makes everyone's jobs more effective. Cannon and pyros may be used to put the DUNL into the air, where our falcons will take chase. We can strategically launch pursuit with our falcons
Alternatively, the falcons may chase the DUNL to another part of the airfield, where the WMTs may keep them from settling in secondary areas (Cannons strategically placed where Dunlin have been known to take refuge)

On days where the DUNL are extremely persistent, the goal is to keep the birds moving at all times. They seem to become wet and exhausted and desperate for rest. This results in their landing on the foreshore, swishwash, or any driftwood, debris, etc that they may find in order to rest, despite being a highly non-preferable area (next slide).

Example of DUNLIN movements airside (RED and YELLOW arrows), and there potential roosting spots.

Contrast with our teams positioning on the field.

The result of our persistence is Dunlin resting on areas outside of the airfield, on vegetation, wood debris, shallow water, waiting for lower tides.

We do seem to have an educated winter resident population of DUNL. They are very responsive to our controls, and even just the presence of our vehicles. Their behaviour seems to contrast the populations that we see in late fall and early spring

(3) evolving teamwork strategies – combining falconry with additional techniques to effect management; and

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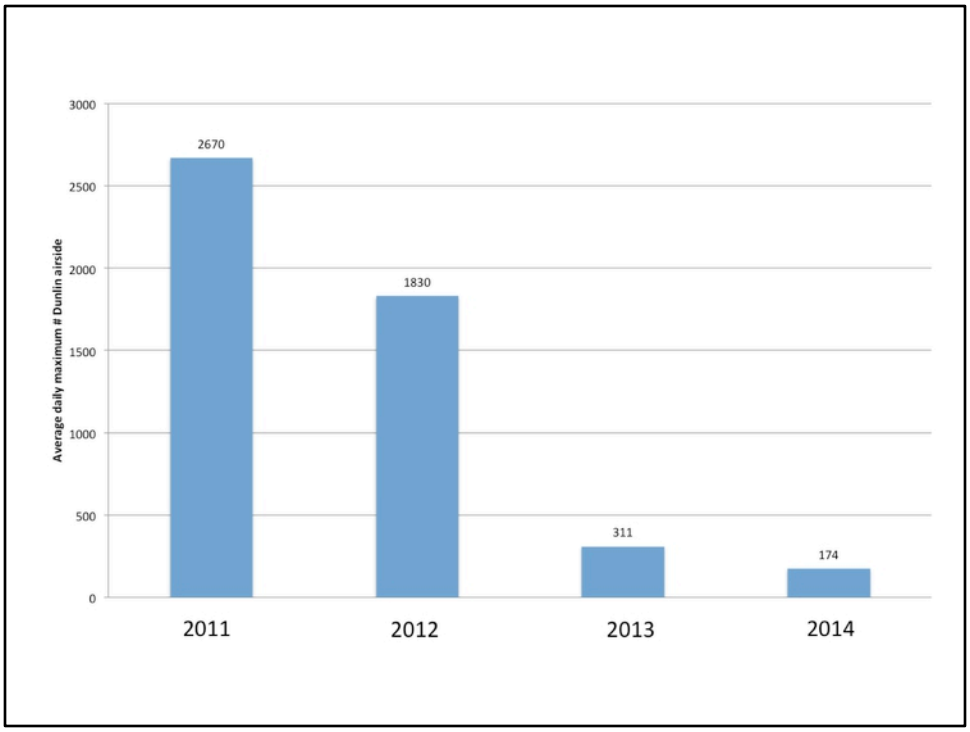
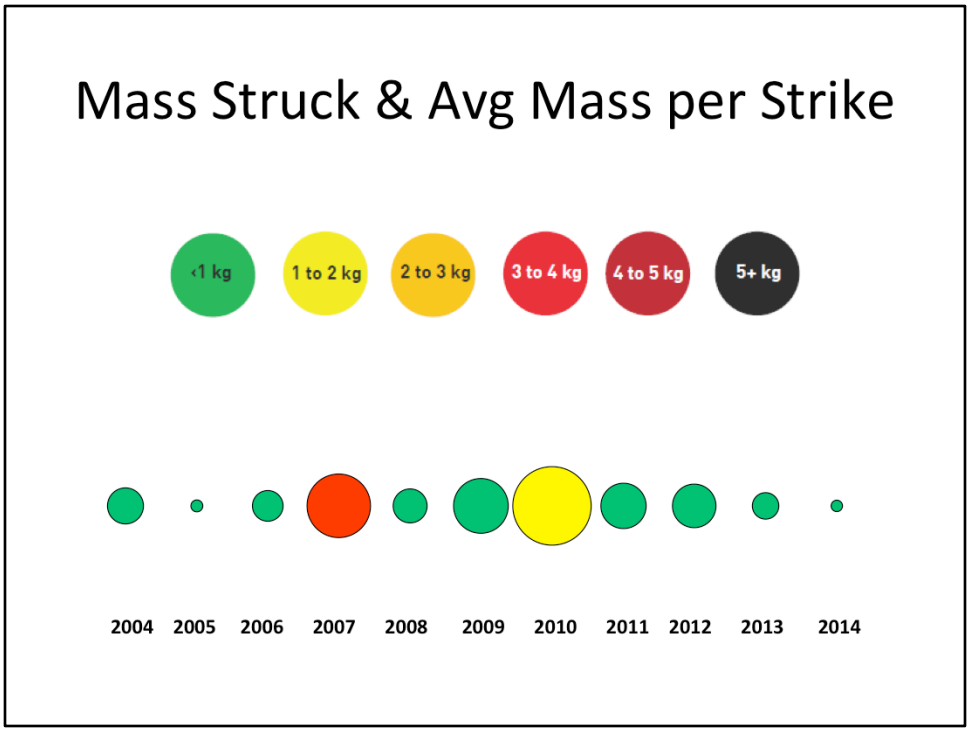


We do perform regular surveys on the airfield.
We have noticed a decline in airside DUNL over the years that our falconry program has been developed
This data could be influenced by other factors, like weather, but it does support the efficacy of the falconry program at YVR



(4) the results achieved to date, and possible future directions

This figure shows the relative mass of shorebirds struck at YVR (TOP ROW= all small sandpipers, excluding Dunlin; MIDDLE ROW=Black-bellied Plover; BOTTOM ROW=Dunlin). Note, the colour corresponds to the average mass per strike event. Green means the average mass per strike was less than 1 kg; Yellow means the average mass per strike was less than 2 kg, and Red means the average mass per strike is less than 4 kg. The data starts (on the left) at 2004 and ends at 2014.

"In 2013, YVR saw the lowest mass of Dunlin struck in the last 8 years,
-decreasing trend of Dunlin strikes; beginning in 2013 (32 individuals, decreasing to 8 in 2014).
-greater confidence in our control measures"

DUNL strike from April 23 2015… migrants who didn't know the program
(4) the results achieved to date, and possible future directions

Be prepared for the spring migrants, who may display naïve behaviour around Sea Island

Acknowledgements: Chuck, Em, Jamie, Gary, Avisure team, ATC, and of course our feathered team!