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A Comparative Study on Biodiversity Offsets in Airport Development Projects

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http://www.comm.tcu.ac.jp/tanaka-semi/en/index.html

1. Background and Objectives

Biodiversity offsetting is one of the measures taken against the loss of biodiversity
from development projects.
Tanaka and Ohtaguro (2010) showed that 53 countries had already institutionalized biodiversity offset.
Yet, their implementation methods and criteria vary largely depending on regulations and historical background of each country.
In April 2018, the expansion project of Tokyo Narita International Airport embarked biodiversity offsetting based on EIA. Henceforth, it is expected that the practice of biodiversity offsets will increase substantially in Japan.

The study aims to provide suggestions for countries including Japan that are about to undertake on biodiversity offsets hereafter, through comparative case studies on three countries: the United States, the United Kingdom and Australia.

2. Method

I selected and surveyed important matters associated with biodiversity offsetting, no net loss policy, and quantitative evaluation methods in three expansion projects.

Sunshine Coast Airport (SCA) (Australia)

- Project overview
- The extent of impact site and offset site

Heathrow Airport (HA) (United Kingdom)

- Project overview
- Three risks to consider when calculating biodiversity gain

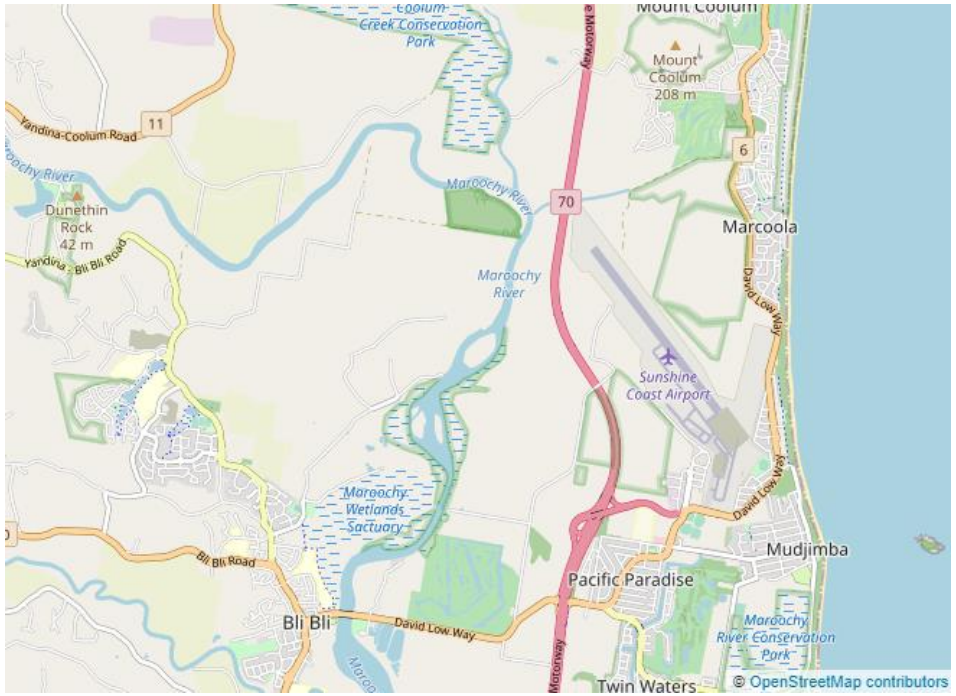
Juneau International Airport (JNU) (United States)

- Project overview
- The cost paid for the in-lieu fee program

3. Results

3. 1 Sunshine Coast Airport (SCA) (Australia)

3. 1. 1 Project Overview



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- The SCA is located in Sunshine Coast, South East Queensland.
- SCA has proposed construction of a new 2,450m long and 45m wide runway and aviation facilities.
- Environmental Impact Statement was published in 2014.
- Additional information to the EIS and further information provided by the proponent was published in 2015

Why I chose this expansion project as a survey subject

The airport has reserved a large site for biodiversity offsetting.

3. 1. 2 The extent of impact site and offset site

Table1 The extent of the project area

Site	Area (ha)
Vegetation community cleared by the project	**80.23**
Vegetation community Transition to Dwarf Heathland	9.90
Cleared	113.85
	203.98

Based on Sunshine Coast Airport (SCA) and Sunshine Coast Council (SCC) (2015)

Table2 The extent of the offset site

Site	Area (ha)
On-site（SCA Expansion Project)	83.66
Off-site（Lower Mooloolah River Environmental Reserve)	63.15
	146.81

Based on Sunshine Coast Airport (SCA) (2015)

The airport was required to offset the impact for two prescribed matters in the Commonwealth requirements and five prescribed matters in the Queensland requirements.

Quoted from Sunshine Coast Airport (SCA) (2015)

Table3 The area impacted by the habitat of each prescribed matter in the Commonwealth requirements and the area of the proposed offset

Scientific Name	Common Name	Impact (ha)	Offset (ha)
Allocasuarina emuina	Mount Emu She-oak	4.41	4.41
Litoria olongburensis	Walllum Sedgefrog	1.67	12.23
		6.08	**16.64**

Based on Sunshine Coast Airport (SCA) (2015)

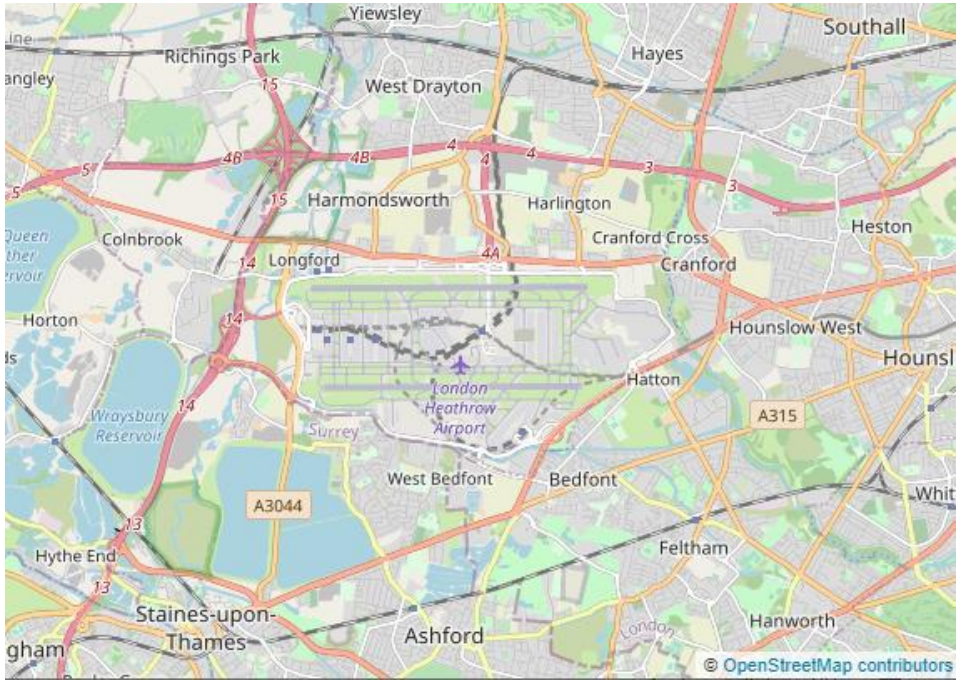
Table4 The area impacted by the habitat of each prescribed matter in the Queensland requirements and the area of the proposed offset

Scientific Name	Common Name	Impact (ha)	Offset (ha)
Allocasuarina emuina	Mount Emu She-oak	4.41	10.42
Litoria olongburensis	Walllum Sedgefrog	1.67	66.37
Crinia tinnula	Wallum Froglet	60.63	92.73
Litoria freycineti	Wallum Rocketfrog	21.85	76.01
Pezoporus wallicus	Ground Parrot	7.88	35.71
		96.44	**281.24**

Adapted from Sunshine Coast Airport (SCA) (2015)

3. 2 Heathrow Airport (HA) (United Kingdom)

3. 2. 1 Project Overview



- The Site, which includes the existing Airport boundary, is located approximately 27km to the west of central London
- and covers an area of around 2,957ha.
- Heathrow Airport Limited have proposed construction a new runway 3,500m in length and aviation facilities.
- Preliminary Environmental Information Report (PEIR) that is published previous Environmental Impact Assessment was published in 2019.

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Why I chose this expansion project as a survey subject

the airport is a representative airport of the UK as a leading hub and is located near the city center.

3. 2. 2 Three risks to consider when calculating biodiversity gain

Offset providers have improved the quantitative evaluation method described in Natural England and DEFRA (2012), in accordance with the project.
The following formula was used to calculate the biodiversity gain.

Quoted from Heathrow Airport Limited (2019)

Final biodiversity gain = Crude biodiversity gain / (Delivery Risk * Temporal Risk * Spatial Risk)

Quoted from Natural England and DEFRA (2012)

Delivery Risk: The risks associated with the actual delivery of the offset due to, for instance, uncertainty in the effectiveness of restoration or habitat creation/management techniques.

Temporal Risk: In delivering offsets there may be a mismatch in the timing of impact and offset.

Spatial Risk: These reflect ecological risks deriving from the change in location of the habitat or resource.

Cited from Natural England and DEFRA (2012)

Delivery Risk

The risks associated with the actual delivery of the offset due to, for instance, uncertainty in the effectiveness of restoration or habitat creation/management techniques.

Cited from Natural England and DEFRA (2012)

High value habitats are likely to be more difficult to expand or restore than others.
As a result, avoiding development on such habitats can effectively reduce the risks associated with habitat creation.

Cited from Natural England and DEFRA (2012)

Table5 Delivery risk multipliers

Difficulty of habitat creation/restoration	Multiplier
Very high	10
High	3
Medium	1.5
Low	1

Adapted from Heathrow Airport Limited (2019)

Table6 Delivery risk factors for creation or restoring habitats

Habitat type	Difficulty of creation	Difficulty of restoration
Semi-natural broadleaved woodland (incl. lowland mixed deciduous woodland)	Medium	Low
Wet woodland (excluding willow carr)	Medium	Low
Willow carr	Low	Low
Dense native scrub	Low	Low

Adapted from Heathrow Airport Limited (2019)

Temporal Risk

In delivering offsets there may be a mismatch in the timing of impact and offset.
Where a time lag does occur, a multiplier can be applied to take account of it.

Cited from Natural England and DEFRA (2012)

The use of this multiplier would incentivise habitat banking: if the habitat is established there is no need to apply multipliers to manage delivery risks, and to take account of time differences.

Cited from Natural England and DEFRA (2012)

Table7 Temporal risk multipliers

Years to target condition	Multiplier
5	1.2
10	1.4
15	1.7
20	2.0
25	2.4
30	2.8
32+	3

Adapted from Heathrow Airport Limited (2019)

Table8 Temporal risk factor

Habitat type	Years to target condition
Semi-natural broadleaved woodland (incl. lowland mixed deciduous woodland)	32+
Wet woodland (excluding willow carr)	32+
Willow carr	10
Dense native scrub	5

Adapted from Heathrow Airport Limited (2019)

Spatial Risk

These reflect ecological risks deriving from the change in location of the habitat or resource. Locating offsets strategically will greatly reduce the risk of an offset being delivered in a spatially less favourable location than the impacted site.

Cited from Natural England and DEFRA (2012)

Table9 Spatial risk multiplier

	Offset location	Rationale	Multiplier
Ecological based	Offset provided within the limits of 1.The River Colne and Crane Area (Area 10) of the All London Green Grid (ALGG); 2.The Colne Management Catchment when south of the M4 (motorway); 3.The Crane Rivers and Lakes Operational Catchment. Referred to as “Area 1”.	The habitats created or restored will contribute to the objectives of • the All London Green Grid strategy • Colne Valley Biodiversity Opportunity Area • Colne Valley Gravel Pits and Reservoirs Biodiversity Opportunity Area • London Biodiversity Action Plan Higher plan	1
Administrative division based	Offsets provided within the following local planning authority areas but outside of Area 1 (e.g. London Borough of Hillingdon, South Buckinghamshire, Spelthorne, Slough). Referred to as “Area 2”.	The habitats will contribute to the objectives of a variety of Biodiversity Opportunity Areas and landscape scale biodiversity improvement.	2
	Offsets provided in areas outside Areas 1 and 2 but within the following wider county boundaries; Berkshire, Surrey, Buckinghamshire and Greater London.	The habitats will provide linkages within the wider landscape and will provide landscape scale biodiversity management linked to the areas closer to Heathrow.	3
	Offset provided in any other area of England.	The habitats will not contribute to local objectives.	4

Adapted from Heathrow Airport Limited (2019)

3. 3 Juneau International Airport (JNU) (United States)

3. 3. 1 Project Overview

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- The airport is located approximately 15km northwest of downtown Juneau
- Airport property encompasses approximately 270ha of land.
- Final EIS was published in 2007
- Expansion of runway safety area and construction of aviation facilities have been proposed
- The airport is located adjacent to Mendenhall Wetlands State Game Refuge (MWSGR)
- In this project, the in-lieu fee program was used as a biodiversity offset, and the cost was paid to Southeast Alaska Land (SEAL) Trust authorized to accept in-lieu fees for mitigation projects

Why I chose this expansion project as a survey subject

This airport is located adjacent to an important habitat.

3. 3. 2 The cost paid for the in-lieu fee program

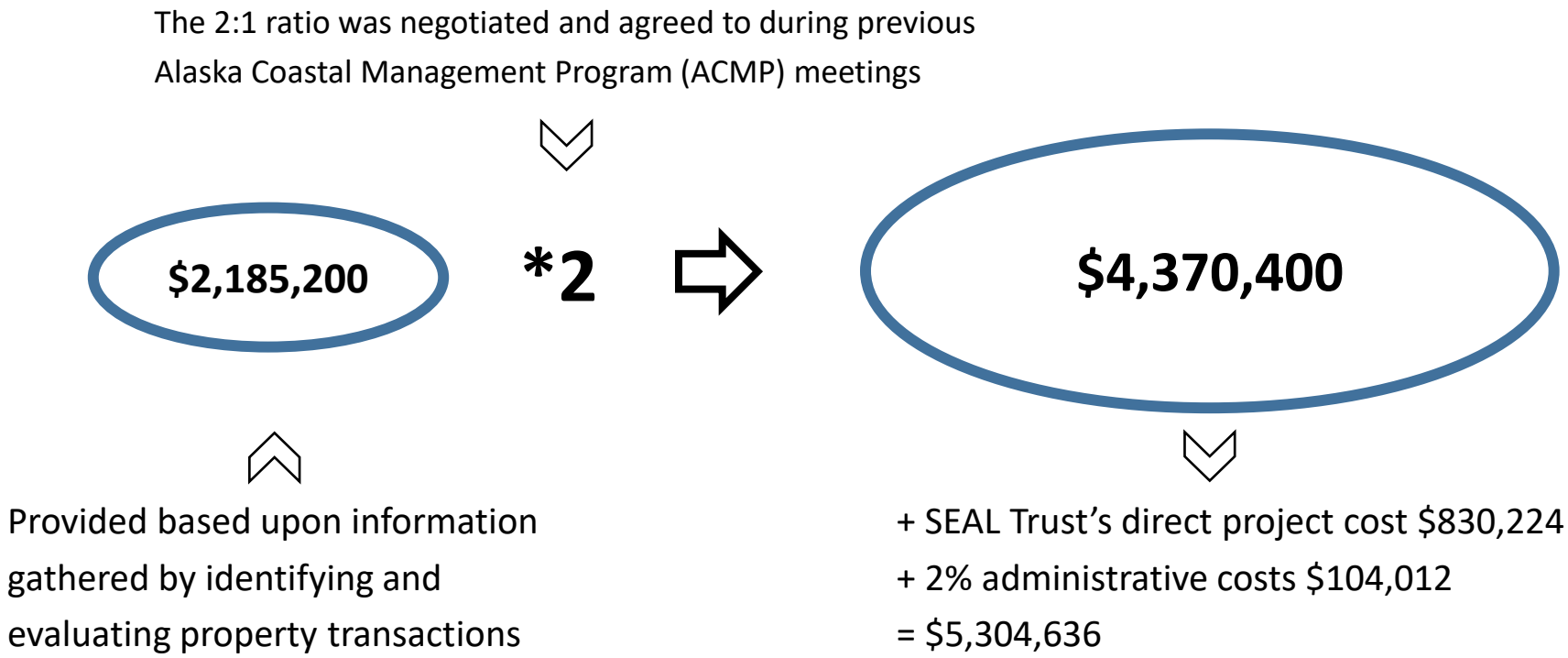

Figure1 The cost paid for the in-lieu fee program

Summarized from City and Borough of Juneau, Alaska (CBJ) and Federal Aviation Administration (FAA) (2007)

Why was the 2:1 ratio agreed to

The 2:1 ratio was negotiated and agreed to during previous ACMP meetings attended by representatives from

- Federal Aviation Administration (FAA)
- Environmental Protection Agency (EPA)
- National Marine Fisheries Service (NMFS)
- U.S. Fish and Wildlife Service (USFWS)
- Department of Natural Resources (DNR)
- Alaska Department of Fish and Game (ADF&G)
- JNU

Quoted from Alaska Department of Natural Resources (2007)

The agencies participating in the ACMP, including FAA and JNU, agreed that the baseline value would be insufficient compensation for the losses for three primary reasons.

1) the mitigation plan would only preserve existing wetlands, not create new habitat. In other words, there would be a net loss of wetlands using a 1:1 compensation ratio.
2) the wetlands lost would be high value, further justifying an increase in the mitigation ratio.
3) there is a precedent for larger projects affecting high value wetlands and habitat to compensate in greater proportion than smaller projects.

Quoted from City and Borough of Juneau, Alaska (CBJ) and Federal Aviation Administration (FAA) (2007)

4. Conclusions

Sunshine Coast Airport (SCA) (Australia)

By securing both in-site and off-site offset sites, a far larger area of offset sites than the area of the site impacted by the project was secured.

Heathrow Airport (HA) (United Kingdom)

By taking into account the three risks in calculating biodiversity gains, the offset provider improved the implementation of more effective biodiversity offsets.

Juneau International Airport (JNU) (United States)

Consultation with diverse agencies guaranteed the ecological reliability of the value paid for in-lieu fee programs.

The use of mitigation banks can contribute to an effective biodiversity offset. Planning biodiversity offset strategies by consulting with associated diverse agencies can ensure ecological compliance with biodiversity offsetting.

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