

Appendix F
Terrestrial Wildlife and Marine Birds

Appendix F.1
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Information Request #1

December 12, 2014

Catherine Ponsford
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Dear Ms. Ponsford:

Reference: Acoustic Recording Units and Detectability of Marsh Birds Information Request #1

This letter responds to the request for Outstanding Information received from the Canadian Environmental Assessment (CEA) Agency on August 14, 2014.

Information Request #1

Government of Canada –Outstanding Information:

Agency: *The proponent did not conduct additional surveys as required in the information request, instead providing a rationale to support the adequacy of the information in the EIS. Further information is required to support the rationale that field surveys are not required as described below.*

EC: *Through its terrestrial ecosystem mapping and vegetation surveys the proponent advises that there is lack of suitable marsh habitat found on Lelu Island. The proponent's wetland bird call play-back surveys did not detect marsh bird species throughout the breeding period. The proponent also conducted acoustic recordings raptor surveys, and incidentally recorded approximately 59 wildlife species. Specify the minimum and maximum range of the acoustic recorders used in the acoustic recording surveys, and the likelihood that the recorder range would have allowed for incidental recording of any marsh bird species.*

Pacific NorthWest LNG – Response:

Presence of Marsh Birds on Lelu Island

As discussed in the response to the original information request (see response to the request for Outstanding Information #1), call playback surveys were conducted on June 17, 2013 at four stations in shrub-dominated bog habitat (Figure 1) to survey for the presence of American bittern, Virginia rail, American coot, and sora on Lelu Island (Section 5.5 of Appendix H of the Environmental Impact Statement (EIS)). Methods followed those outlined in *Inventory Methods for Marsh Birds: bitterns and rails* (RIC 1998c) and are also consistent with *Standardized North American Marsh Bird Monitoring Protocol* (Conway 2009). Passive surveys were also conducted from April 23 through July 1, 2013 near wetland habitat using acoustic recording units (ARUs) as part of the raptor surveys and data collected were analyzed for incidental species detection (Section 5.3 of Appendix H of the EIS). There were no detections of marsh birds during the call-playback surveys or recorded incidentally by the ARUs.

Preferred habitat for American bittern, Virginia rail, American coot, and sora includes freshwater wetlands with tall, emergent vegetation such as reeds, rushes, grasses, and sedges (Conway 1995, Brisbin et al. 2002, Lowther et al. 2009, Melvin 2012). Both the provincial and North American survey protocols recommend that surveys be conducted only in suitable marsh habitat. Because no suitable marsh habitat was identified on Lelu Island, call playback surveys were discontinued (Section 5.5.3 of Appendix H of the EIS). In addition to absence of suitable marsh habitat, the Project is located outside the breeding range of these species and all are considered rare in the region (Campbell et al. 1999a,b). There is only one regional occurrence record of American bittern and two of American coot from Great Backyard Bird Counts, conducted in February on Kaien Island (Appendix 1 of Appendix H). There are no regional occurrence records for Virginia rail or sora.

Acoustic Recording Units

The ARUs used for surveys were Song Meter model SM2+ from Wildlife Acoustics. The SMX-II microphones used with the ARUs have a sensitivity of -36 ± 4 dB (0 dB = 1 V/pa at 1 kHz) and a signal-to-noise ratio of > 62 dB, where a ratio greater than 0 dB indicates reliable detection of the desired sound signal. These microphones are omni-directional (i.e., capable of picking up sounds virtually equally from all directions) and are uniformly sensitive across a wide range of frequencies from 20 Hz to 20,000 Hz. The target marsh bird species produce vocalizations with dominant frequencies that range from approximately 2,000 to 3,000 Hz, with American bittern as low as 200 Hz. Vocalization ranges are well within the sensitivity range of the SMX-II microphones, making the ARUs ideal for monitoring bird vocalizations. There are also several programmable ARU specifications that can be set-up to increase the likelihood of detection, such as filters (to focus detection on target frequencies), gain levels (to increase detection range), and sampling rates (to maximize signal processing). Optimal ARU settings used for these surveys are summarized in Table 1.

Table 1: Acoustic Recording Survey Unit Settings

Specification	Setting
Bias power	2.5V 2.2K ohm
High-pass filter	3 Hz
Gain	48 dB
Sampling rate	16,000 Hz

ARUs were also placed clear of any obstructing vegetation to ensure the highest probability of detection. Units were programmed to record in 10-minute increments every 30 minutes between 22:30 and 04:30, providing optimal detection periods for the target marsh bird species. The ARUs collectively provided 539.8 hours of survey effort from April 23 to July 1, 2013.

The minimum and maximum detection range of the acoustic recorders depends on a variety of variables including habitat, temperature, distance to the sound source, and vocalization frequency of an individual. Studies using ARUs have reported that detection is consistent up to 100 m from the sound source; at greater distances detections were typically too uncommon to be included (Venier et al. 2012; Wildlife Acoustics 2014). The 100 m detection radius is based on studies of forest songbirds, and marsh birds typically vocalize at lower frequencies designed to carry through dense marsh vegetation. Accordingly, the 100 m radius can be considered a conservative estimate (Pantle 1991; Little 1996a,b; Hershberger 2000; Lowther et al. 2009; Cornell University 2014). Figure 1 shows the ARU locations with a recording radius of 100 m.

The distance from each ARU to the nearest wetland habitat was calculated for units deployed on Lelu Island (Table 2). One of the four ARUs was placed directly in treed bog habitat, two were within the 100 m recording radius of treed swamp or bog habitat, and one was within the recording radius of both shrub-dominated bog and treed swamp or bog habitat (Figure 1). Although only one ARU location had shrub-dominated bog habitat within its recording radius, it should be noted that for all three of the other ARUs, the recording radius was exceeded by a small margin. Marsh birds tend to utilize the shallows and shoreline habitat within wetlands (Brisbin 2002; Conway 1995), and if present, would likely be proximal to transitional habitats where the ARUs were located.

Table 2: Distance from Acoustic Recording Unit to Nearest Wetland Habitat

Survey Point	Distance to Closest Treed Swamp/Bog (m)	Distance to Closest Shrub Dominated Bog (m)
RAP-4	64	118
RAP-5	97	96
RAP-6	130	121
RAP-7	0	110

Summary

The likelihood is high that marsh birds, if present on Lelu Island, would have been detected by ARUs for the following reasons:

- Call playback surveys conducted in shrub-dominated bog habitat observed no detections
- ARUs were installed adjacent to wetland habitat
- Data collected from ARUs includes 540 hours of recordings from dusk through dawn during the optimal timing window for reproductive vocalizations with no detections

In addition to the above considerations, no suitable marsh habitat was detected on Lelu Island, and the project area is outside the breeding range for all four target marsh bird species. Regionally, the target marsh bird species are considered rare; few occurrence records exist and only for American bittern and American coot. Based on this information, when combined with data collected from call playback surveys and use of ARUs as additional support for presence/not-detected, confidence in the methods and results of these surveys is high.

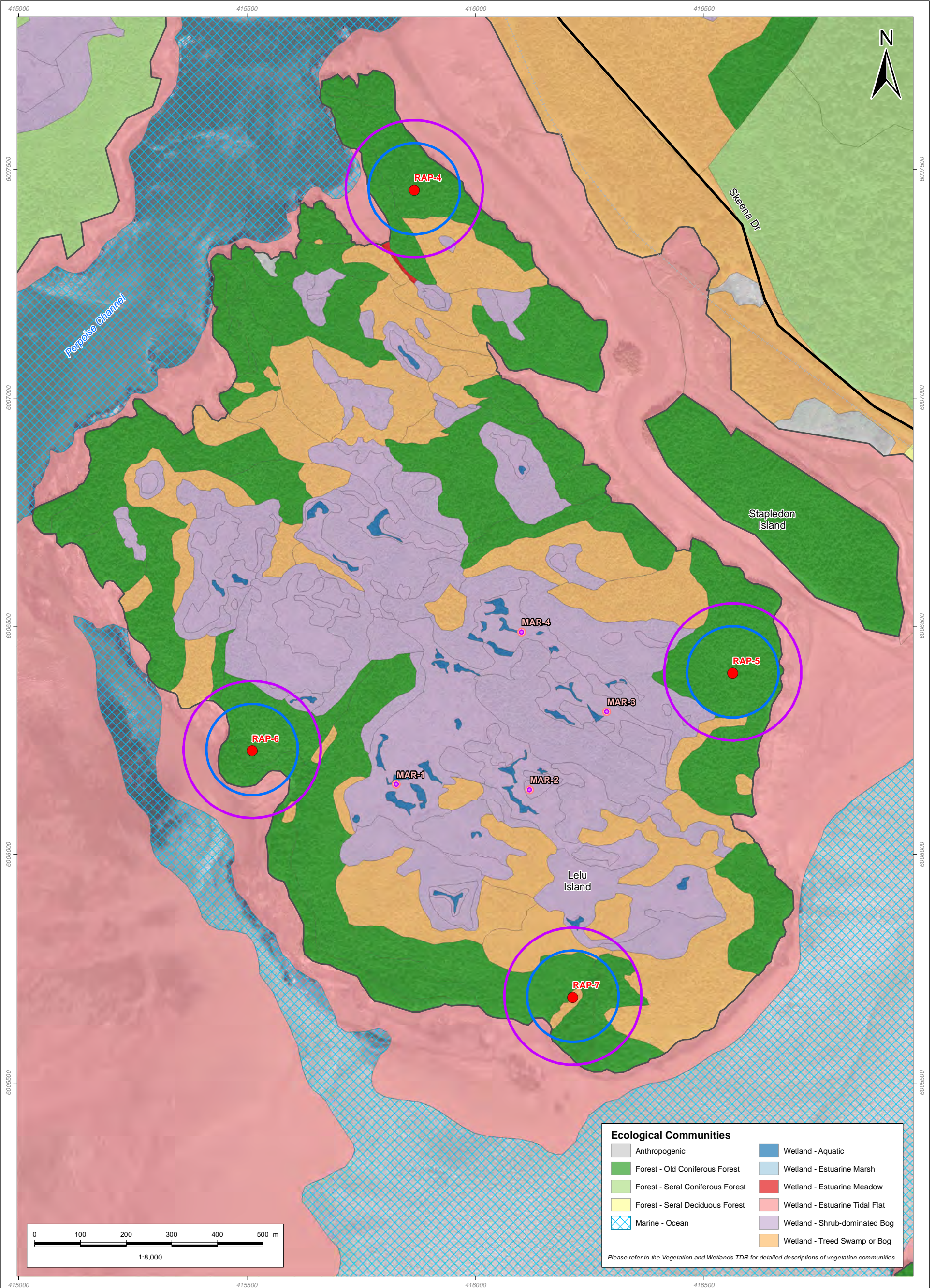
Closure

This letter and the attached figure provide the Outstanding Information requested by the Government of Canada. If you have any questions, please contact Pacific NorthWest LNG.

Attachment: Figure 1: Marsh Bird Survey Overview

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<ul style="list-style-type: none"> ● Acoustic Recording Unit Survey ● Marsh Bird Call Playback Survey □ 100 m Recording Radius □ 150 m Reference Radius 	<ul style="list-style-type: none"> — Road --- Railway □ Shoreline 	Pacific NorthWest LNG		PREPARED BY:
		Marsh Bird Survey Overview		PREPARED FOR:
<small>Sources: Government of British Columbia; Government of Canada, Natural Resources Canada, Centre for Topographic Information; Canadian Hydrological Service (CHS), 1995; Progress Energy Canada Ltd. WorldView-2 Imagery. Imagery date: 2011.</small>				FIGURE NO: 1
DATE: 16-SEP-14	PROJECTION: UTM - ZONE 9	DRAWN BY: A. BOONE		
FIGURE ID: 123110537-180	DATUM: NAD 83	CHECKED BY: J. BROOKS		

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