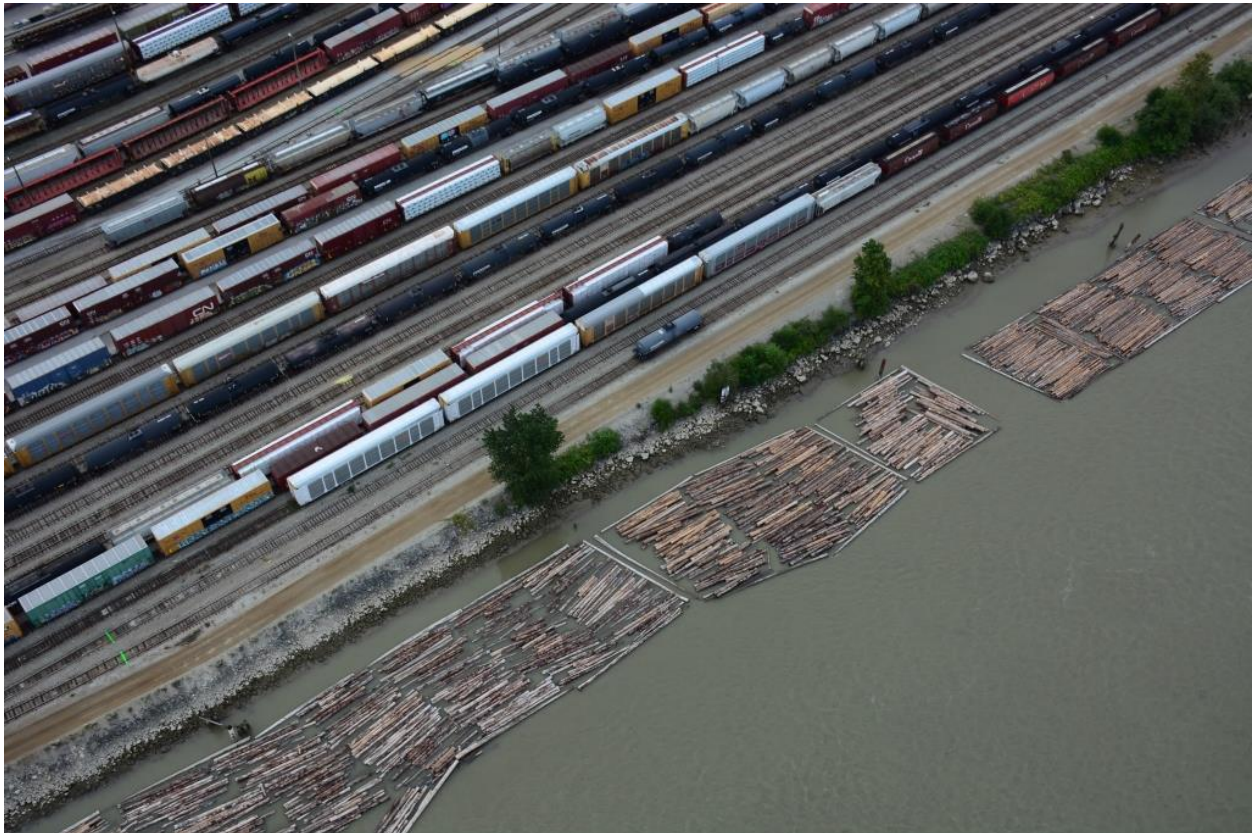


FLIGHT REPORT
ShoreZone Aerial Video Imaging (AVI) Survey
Team Fraser River (FR)
August 13, 2019



Fraser River south shore, Surrey, BC (bc19_fr_03470)

Prepared for:
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This flight report summarizes the field activities of the ShoreZone aerial video imaging surveys conducted out of Richmond, British Columbia on August 13, 2019. The survey was conducted by Coastal & Ocean Resources for the x^wməθk^wəyəm (Musqueam Indian Band). Table 1 provides a summary of field crew affiliations and responsibilities.

The tables and figures on the following pages summarize the extent and location of the 321 km of the Fraser River shoreline imagery completed under this contract.

A Eurocopter A-Star helicopter chartered from Talon Helicopters based in Richmond, BC was utilized by the team. All imagery was collected according to the latest ShoreZone protocol (Cook *et al.* 2017). Imagery was collected looking at the shoreline from the left side of the aircraft with the doors removed for better field of view. The helicopter maintained a speed of approximately 100 km/hour at an elevation of 100 meters while at a distance of 100 meters from the low water line, so the imagery was collected at an oblique angle to the intertidal. Slight deviations from this height and speed were needed in some sections due to air traffic restrictions around Vancouver International Airport and in heavily populated areas.

A total of 4 HD videos and 3,784 high resolution photos were collected during the survey. This report contains a summary table and map for these videos, illustrating their location, length, and key geographic points. All videos and photos for this survey were supplied to the Musqueam Indian Band on a hard drive organized by video number and named consistent with the ShoreZone image library data schema. The GIS data that accompanies the imagery on the hard drive illustrate the flight trackline positions at 1-second intervals while data and imagery are linked by a date-time code (yyyymmddhhmmss).

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Team Fraser River Survey Data

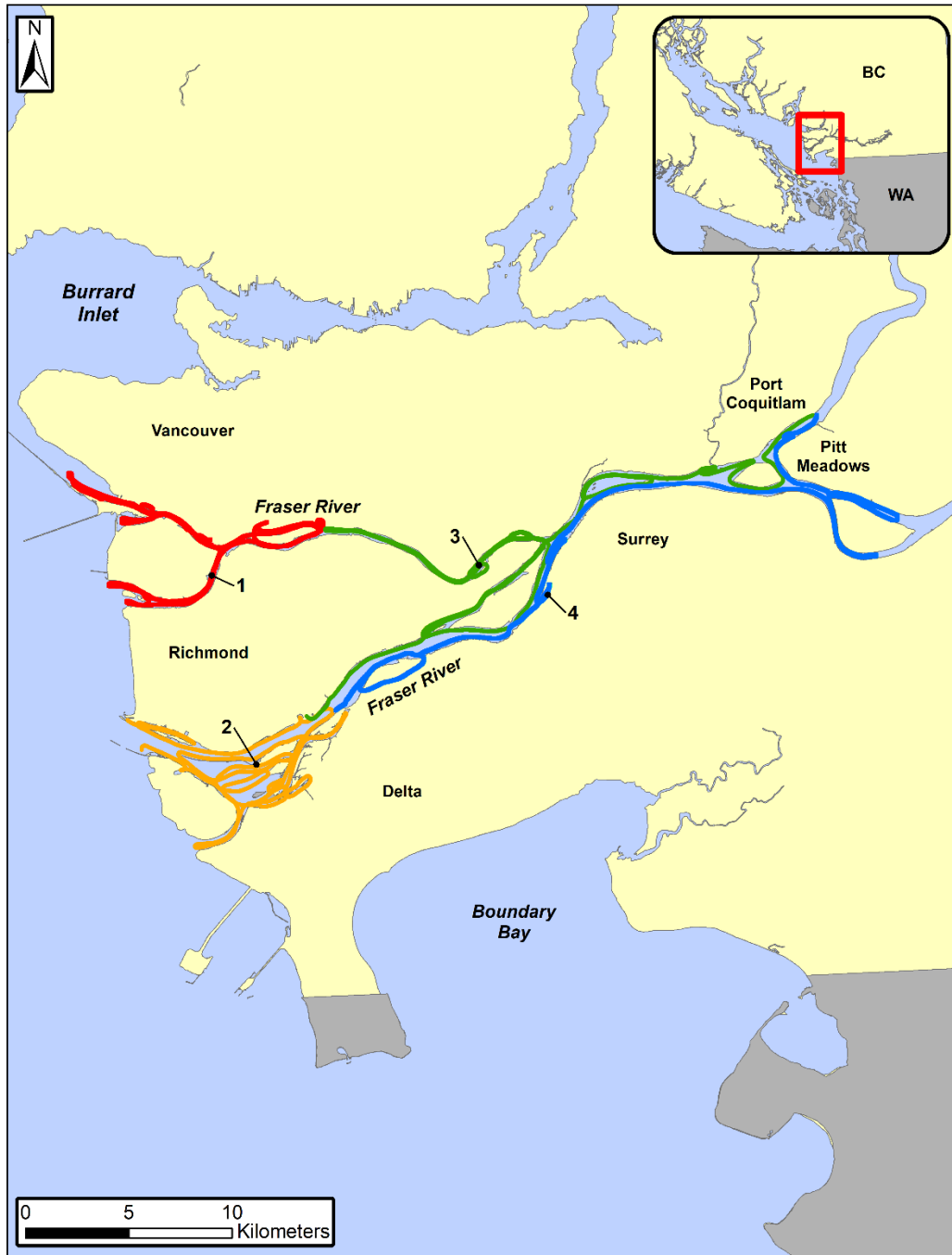
Table 1. Flight Personnel and Responsibilities for Team Fraser River (FR).

Crew Member	Individual / Affiliation	Responsibilities
<i>Geomorphologist</i>	Kalen Morrow Coastal and Ocean Resources, Victoria, BC	Videography, geomorphic commentary, survey planning & coordination, post-flight data processing
<i>Coastal Ecologist</i>	Sarah Cook Coastal and Ocean Resources, Victoria, BC	Digital photography, biologic commentary, post-flight data processing
<i>In-Flight Navigator</i>	Sean Daley Coastal and Ocean Resources, Victoria, BC	In-flight navigation, post-flight data processing
<i>Pilot</i>	Jim Stibbard Talon Helicopters Richmond, BC	Eurocopter A-Star aircraft operation

Table 2. Survey Videos: Team Fraser River (FR)

Video Number	Location
BC19_FR_01	Sea Island, Mitchell Island, North Arm Fraser River
BC19_FR_02	South Arm Fraser River, Deas Slough, Canoe Passage
BC19_FR_03	East Lulu Island, New Westminster, Pitt River
BC19_FR_04	Barnston Island, Surrey, Tilbury Island

ShoreZone Aerial Video Imaging (AVI) Survey
Team Fraser River (FR) August 13, 2019
Survey Maps and Video Logs
Videos: BC19_FR_01 to BC19_FR_04



Video location map for the August 13, 2019 Team Fraser River (FR) survey conducted out of Richmond, BC.

**2019 British Columbia Aerial Video Imaging Survey
Team Fraser River (FR)**

Video: BC19_FR_01

Date: 13 August 2019

General Location: Sea Island, Mitchell Island, North Arm Fraser River

Time Start (UTC): 16:53:38

Geo: Morrow

Time End (UTC): 17:57:44

Bio: Cook

Video Length: 48 min 47 sec

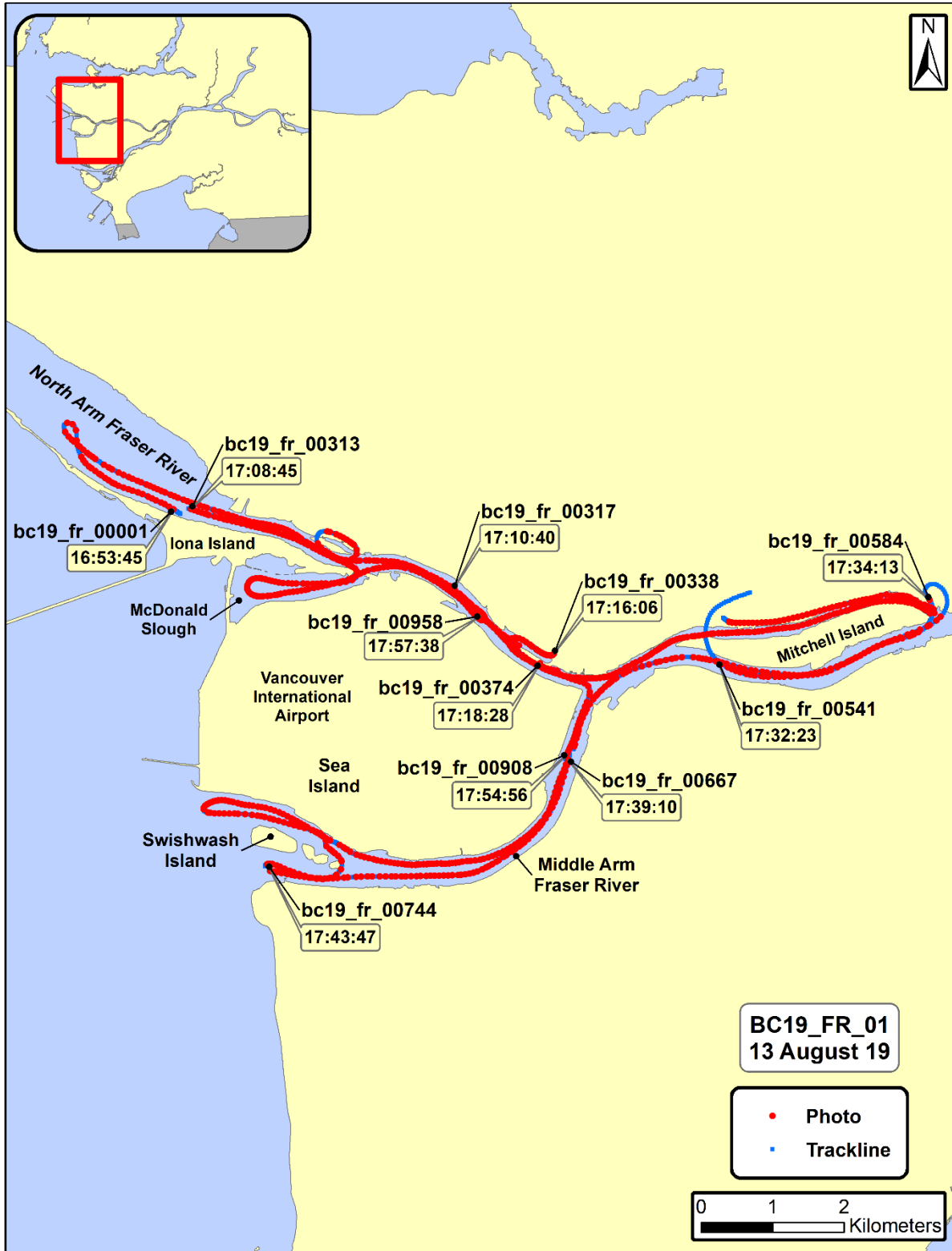
Nav: Daley

Weather: Sun

Pilot: Stibbard

Time (UTC)	Location	Photo
16:53:45	Iona Island, North Arm Fraser River	bc19_fr_00001
17:08:45	Iona Island, North Arm Fraser River	bc19_fr_00313
	Video Break: 17:08:48 to 17:10:39	
17:10:40	Fraser River Park	bc19_fr_00317
	Video Break: 17:11:34 to 17:16:03	
17:16:06	Richmond Island	bc19_fr_00338
	Video Break: 17:17:26 to 17:18:27	
17:18:28	Richmond Island	bc19_fr_00374
	Video Break: 17:26:42 to 17:31:45	
17:32:23	South Mitchell Island	bc19_fr_00541
17:34:13	East Mitchell Island	bc19_fr_00584
	Video Break: 17:38:30 to 17:39:03	
17:39:10	Lulu Island, Middle Arm Fraser River	bc19_fr_00667
	Video Break: 17:43:10 to 17:43:39	
17:43:47	Swishwash Island	bc19_fr_00744
	Video Break: 17:53:00 to 17:54:47	
17:54:56	Sea Island, Middle Arm Fraser River	bc19_fr_00908
17:57:38	North Arm Fraser River	bc19_fr_00958

Note: Imagery compromised in places due to flight restrictions near Vancouver International Airport



**2019 British Columbia Aerial Video Imaging Survey
Team Fraser River (FR)**

Video: BC19_FR_02

Date: 13 August 2019

General Location: South Arm Fraser River, Deas Slough, Canoe Passage

Time Start (UTC): 18:02:50

Geo: Morrow

Time End (UTC): 18:58:28

Bio: Cook

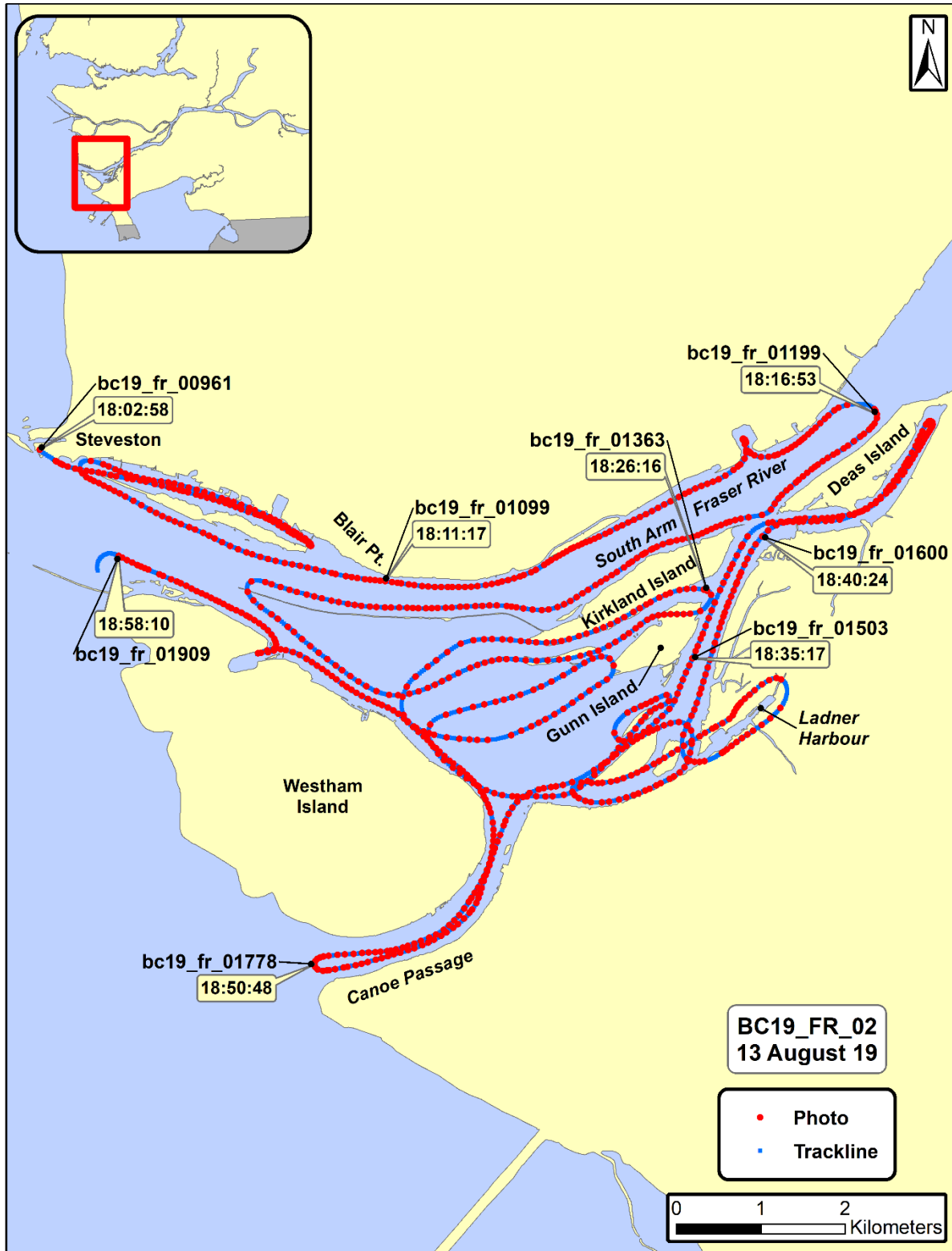
Video Length: 55 min 31 sec

Nav: Daley

Weather: Sun

Pilot: Stibbard

Time (UTC)	Location	Photo
18:02:58	Steveston	bc19_fr_00961
18:11:17	Blair Pt.	bc19_fr_01099
18:16:53	Deas Island	bc19_fr_01199
18:26:16	Kirkland Island	bc19_fr_01363
18:35:17	Gunn Island	bc19_fr_01503
18:40:24	Entrance to Deas Slough	bc19_fr_01600
18:50:48	Canoe Passage	bc19_fr_01778
18:58:10	North Westham Island	bc19_fr_01909



**2019 British Columbia Aerial Video Imaging Survey
Team Fraser River (FR)**

Video: BC19_FR_03

Date: 13 August 2019

General Location: East Lulu Island, New Westminster, Pitt River

Time Start (UTC): 19:39:04

Geo: Morrow

Time End (UTC): 20:41:42

Bio: Cook

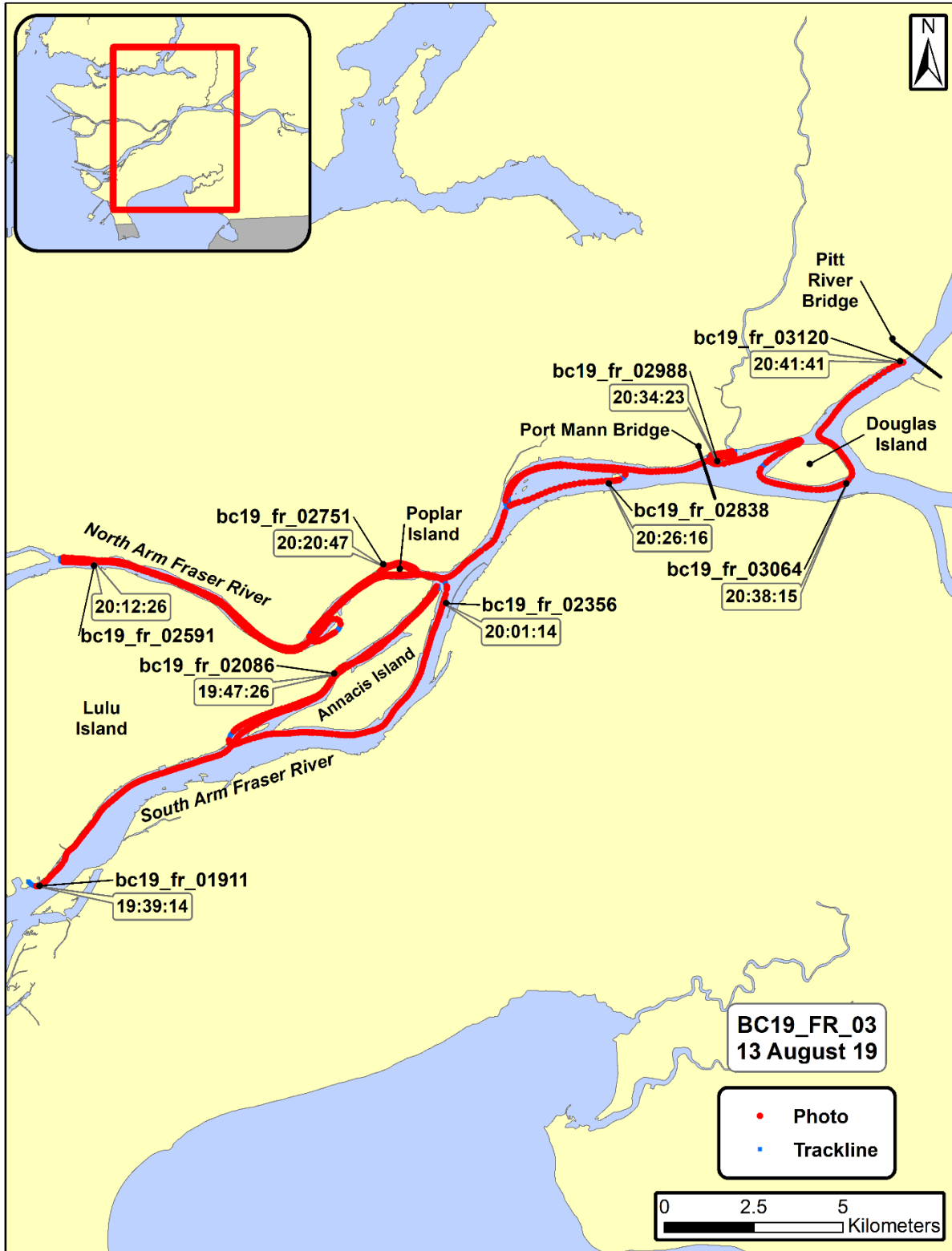
Video Length: 62 min 38 sec

Nav: Daley

Weather: Sun

Pilot: Stibbard

Time (UTC)	Location	Photo
19:39:14	George Massey Tunnel, South Arm Fraser River	bc19_fr_01911
19:47:26	Annacis Channel	bc19_fr_02086
20:01:14	Northeast Annacis Island	bc19_fr_02356
20:12:26	Riverfront Park, North Arm Fraser River	bc19_fr_02591
20:20:47	Poplar Island	bc19_fr_02751
20:26:16	Sapperton Bar	bc19_fr_02838
20:34:23	Tree Island	bc19_fr_02988
20:38:15	Douglas Island	bc19_fr_03064
20:41:41	Pitt River, South of Pitt River Bridge	bc19_fr_03120



**2019 British Columbia Aerial Video Imaging Survey
Team Fraser River (FR)**

Video: BC19_FR_04

Date: 13 August 2019

General Location: Barnston Island, Surrey, Tilbury Island

Time Start (UTC): 20:41:54

Geo: Morrow

Time End (UTC): 21:28:16

Bio: Cook

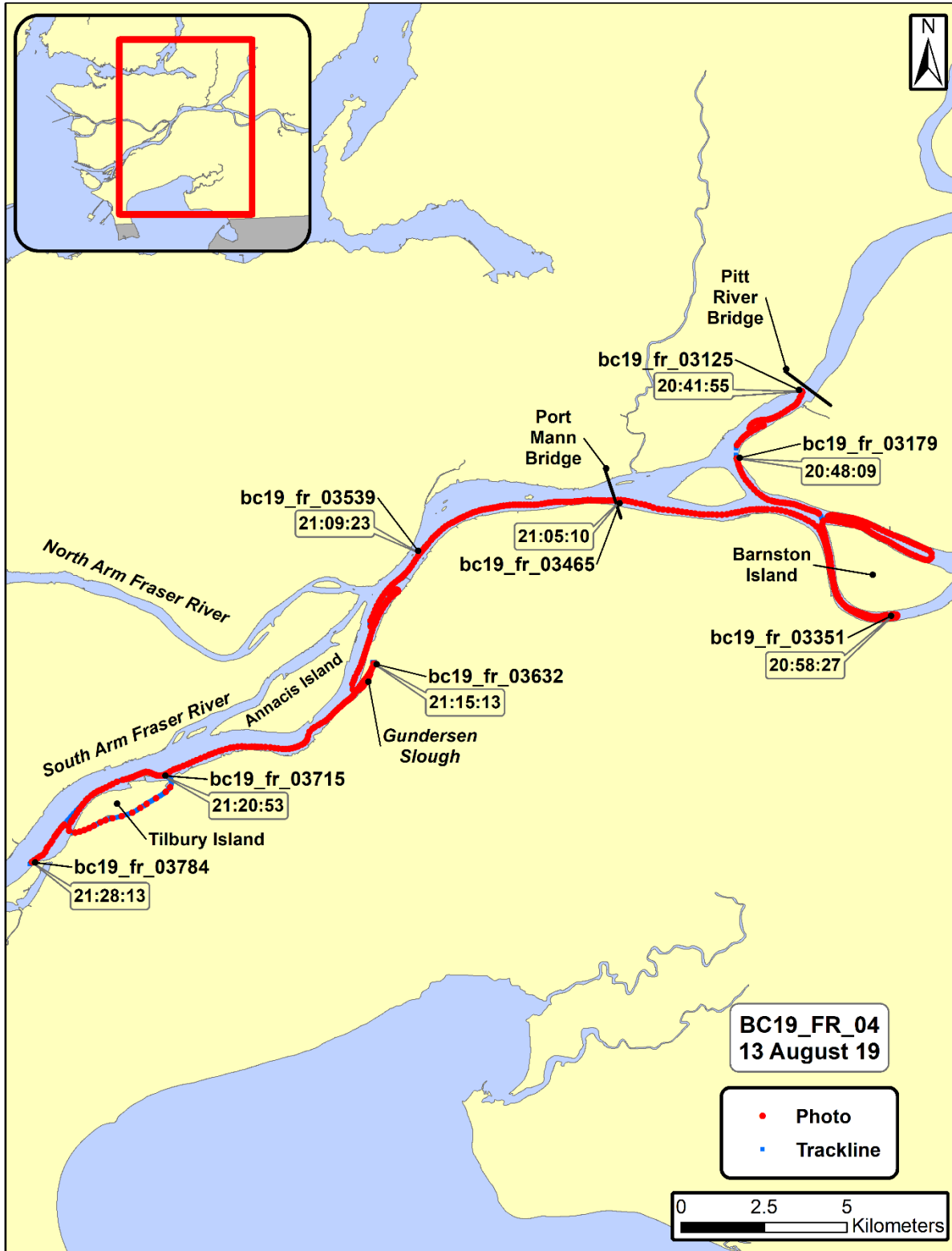
Video Length: 43 min 1 sec

Nav: Daley

Weather: Sun

Pilot: Stibbard

Time (UTC)	Location	Photo
20:41:55	Pitt River, South of Pitt River Bridge	bc19_fr_03125
Video Break: 20:45:32 to 20:47:59		
20:48:09	Chatham Reach, Pitt River	bc19_fr_03179
20:58:27	Barnston Island	bc19_fr_03351
21:05:10	Port Mann Bridge	bc19_fr_03465
21:09:23	Brownsville Bar Park	bc19_fr_03539
21:15:13	Gundersen Slough	bc19_fr_03632
21:20:53	Tilbury Island	bc19_fr_03715
Video Break: 21:25:38 to 21:26:31		
21:28:13	Deas Island	bc19_fr_03784



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References

Cook, S.E., Daley, S., Morrow, K. and Ward, S. 2017. ShoreZone Coastal Imaging and Habitat Mapping Protocol. Prepared for NOAA Fisheries, Alaska Regional Office, Juneau, Alaska. 78p.

Acknowledgments

The ShoreZone program is a partnership of scientists, GIS specialists, web specialists, non-profit organizations, and governmental agencies. We gratefully acknowledge the support of organizations working in partnership for the British Columbian ShoreZone effort, including: Department of Fisheries and Oceans, Ministry of Environment & Climate Change Strategy, Prince Rupert Port Authority, Pacific Northwest LNG, Tsleil-Waututh Nation, Musqueam Indian Band, Metlakatla First Nation, Nisga'a Lisims Government and the Gitxaala Nation.

Access and Use Constraints

Protocols for data access and distribution are established by the program partner agencies. Please see www.shorezone.org for a list of partner agencies and related web sites. Video imagery can be viewed and digital stills downloaded online at: <http://www.coastalandoceans.com/Core-Services/Imaging/>

Any hardcopies or published data sets utilizing ShoreZone products shall clearly indicate their source. To ensure distribution of the most current public information or for correct interpretation, contact the ShoreZone project manager at Coastal and Ocean Resources, Inc. At the time of publication, that person is Sarah Cook (sarah@coastalandoceans.com).

To effectively and appropriately use ShoreZone data, the user shall refer to the ShoreZone Coastal Imaging and Habitat Mapping Protocol (Cook *et al.* 2017).

Data provided are derived from large, regional databases that are continually being updated and modified. The accuracy of some information is subject to change. Any published data sets utilizing ShoreZone products (printed, digital, or online) shall clearly indicate their source. If the user has modified the data in any way, the user is obligated to describe the types of modifications performed. The user specifically agrees not to misrepresent these data, nor to imply that changes made were approved by the ShoreZone program or its partners.



North Arm Fraser River (bc19_fr_00026)

