

Fish Habitat Offsetting in Pristine Wilderness: Regulatory & Design Challenges

Natural Channel Design
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Niagara Falls

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Agenda

1 The Scenario

2 Regulation

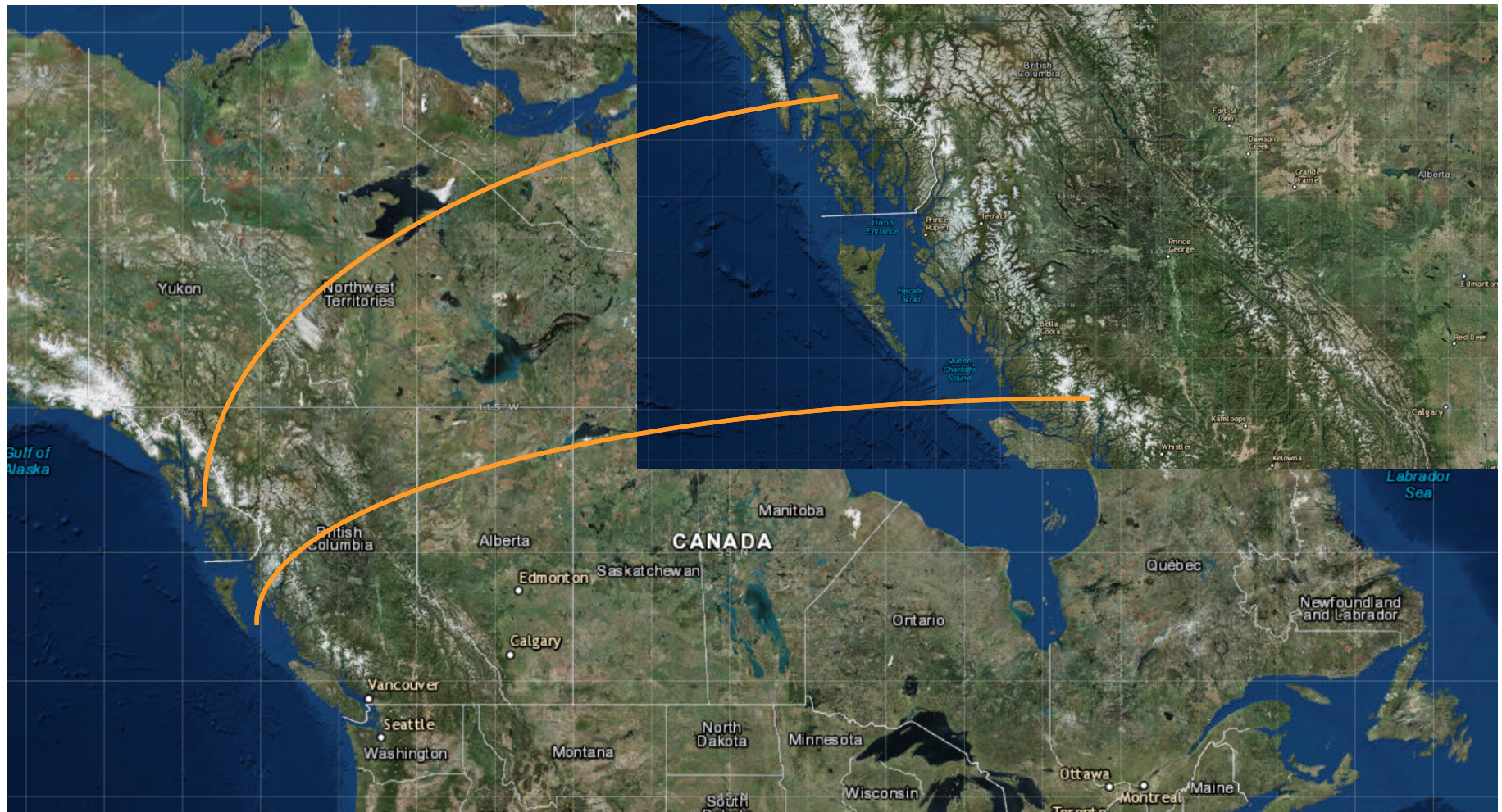
3 Habitat Loss

4 Offsetting

1 The Scenario

Coho Salmon dream home
meets large scale coastal
development

Where in the World





Salmon



Typical instream habitat



Typical Habitat



Typical Habitat

2 Regulation

Fisheries Act

Implementing updated
regulation

Regulation

Fisheries Act

“serious harm to fish is the death of fish or any permanent alteration to, or destruction of, fish habitat” (2012 Fisheries Act Section 35(1))

No fish were harmed in the making of this presentation



Regulation

Industry Arrives on the West Coast

- Avoid habitat
- Mitigate unavoidable impacts
- Offsetting

3 Habitat Loss

The Unavoidable Impacts

Regulation

Offsetting

- Prioritize offset near impact
- Offsetting may include non-habitat measures
 - Complementary measures
- Must account for serious harm for existing habitat under offset footprints (offset the offsetting)

Habitat Destruction & Permanent Alteration

- Type of habitat
- How much habitat
- Species and life stages
- Accounting – area vs productivity



Measuring Habitat Loss - reality

- Mapping of waterbodies is incomplete
- Wetted areas may vary seasonally and with the tide
- West coast annual rain fall = < 2200 mm
- Field Effort (fish and survey)
- Degree of certainty



CHANNEL MEASUREMENTS (Interval spacing of the greater of 10 m or Wb)															STREAM BANKS	
Channel Width (m)															LEFT BANK	RIGHT BANK
Wetted Width (m)															2.1	1.9
Res. Pool Depth (m)															V	V
Bankfull Depth (m)															60	65
Gradient (%)															MS	MS
Pool/Traffic/Run (%)	75	125	10												60	30
Ephemeral/Intermittent															750	10
Channel Characteristics (CL)																
Pattern	TM	ME	IM	IR	(S)	ST										
Islands	(N)	O	I	F	S	AN										
Bars	N	SD	DG	MD	SP	BR										
Coupling	QC		PC		CO											
Confinement	EN	CO	FC	OC	(N)	NA										
Morph.	RB	CP	SP	LC	WL	BDC										
COVER (CL)															STREAM BED	
Tot. Cover		0%	0-5%	5-20%	>20%	~0										
LWD	SWD	DP	B	U	OV	IV										
LWD Func.	N	F	A	Dist.	(O) E											
FEATURES															STREAM BED	
Type																
Ht. (m)																
Length (m)																
Comments															Lat./Long.	
Side channel connected during relatively high water levels ↳ downstream end															421.11 94 521144 986243	

Offsetting Ratios

- How much is a m² of habitat worth?
- What type of habitat is appropriate?
 - Rearing vs spawning
 - Perennial vs ephemeral vs seasonal



4 Offsetting

Recreating the dream home

Site Selection

Search for mitigation sites

=

Big challenge in a pristine
area

Based on:

- Proximity
- Land ownership
- The potential for stability and success
- Support from stakeholders



Pristine



Full of Fish

Types of Offsetting

Criteria based on habitat goals

Options for mitigation may include:

- Creating groundwater channels
- Creating side channels
- Enhancing riparian areas
- Enhancing instream habitat complexity
- Improving connectivity between water features





Just add water



Connect ponds to main channels

Data Requirements

Data Needs

- Flow data
- Tidal data
- Topographic data
- Groundwater data
- Soils information

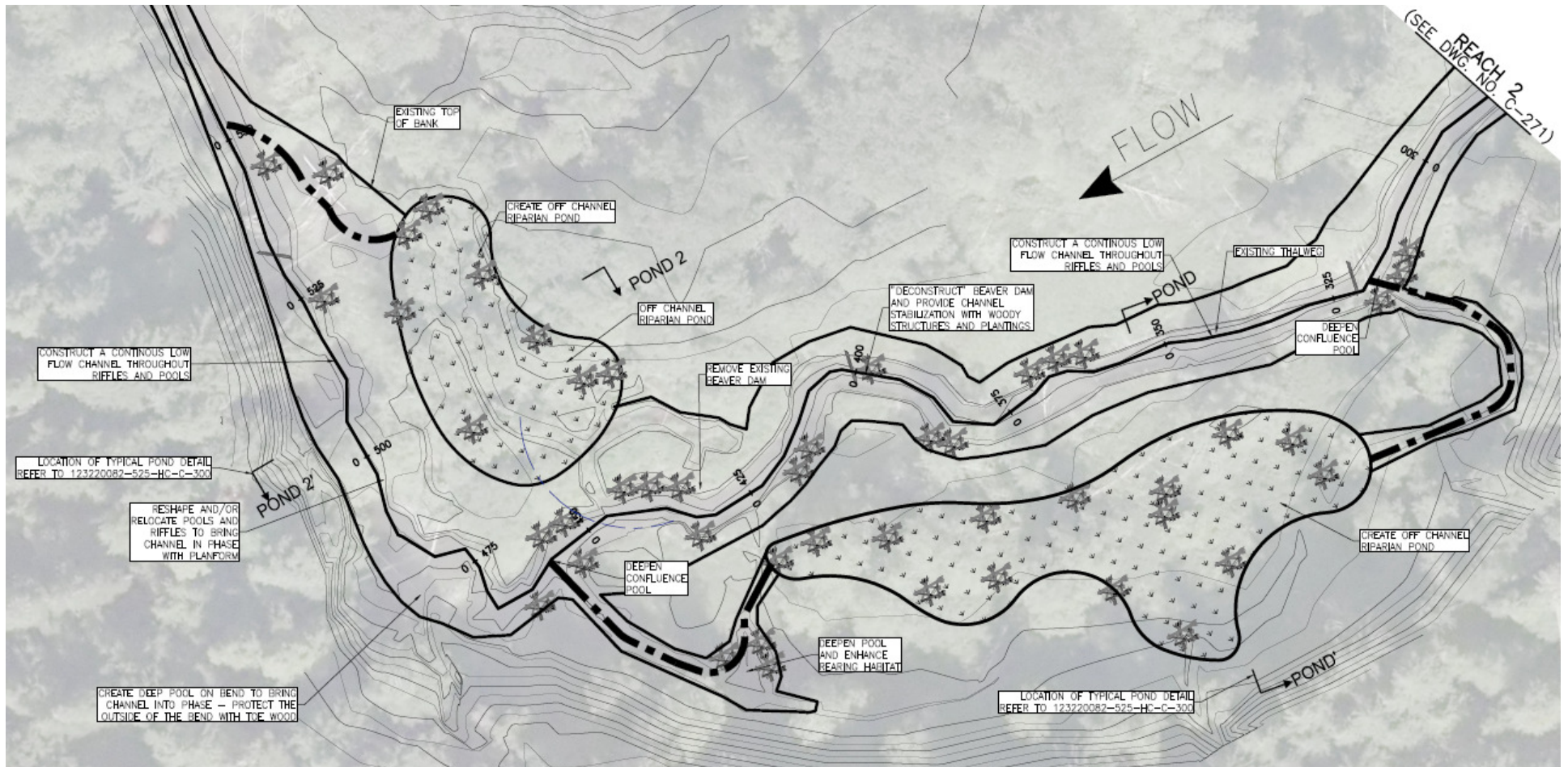
Obtaining Data

- Remote site access
- Difficult Terrain
- Wildlife
- Dense vegetation
- Access timing related to tide levels



Design

- Risk
- Constructability
- Construction cost
- Maintenance
- Material sources
- Old growth



Some Case Study Stats

Amount of mitigation
designed: 390,000 m²

Net contribution:
270,000 m²

Habitat Type	Net Area (m ²)
Marine/ Estuarine	45,000
Wetland	142,000
Mainstem	83,000



Questions?

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