Apr 4th, 4:00 PM - 4:15 PM

Using a bioenergetic model to set waterfowl habitat objectives for the Fraser River delta

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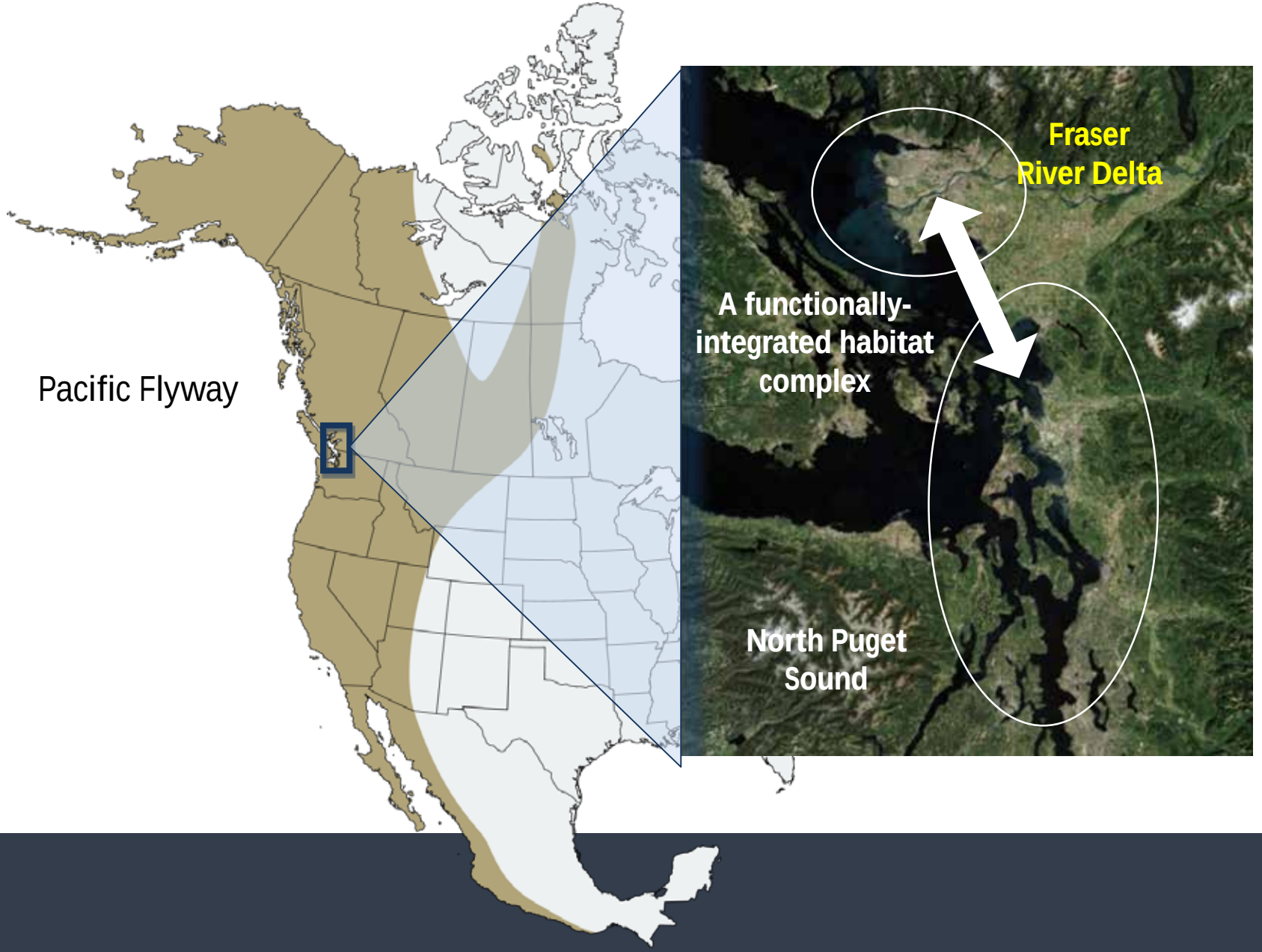
Ducks Unlimited Canada

Salish Sea Ecosystem Conference
April 4, 2018
Seattle, Washington

The 200,000 hectare Delta is the most-used migratory staging area in BC.

It supports the highest density of wintering waterfowl in Canada.

Mostly used by **wintering and migrating waterfowl** (33 species; 90 million waterfowl use days) and these birds use the FD mostly for **food supply and refuge.**



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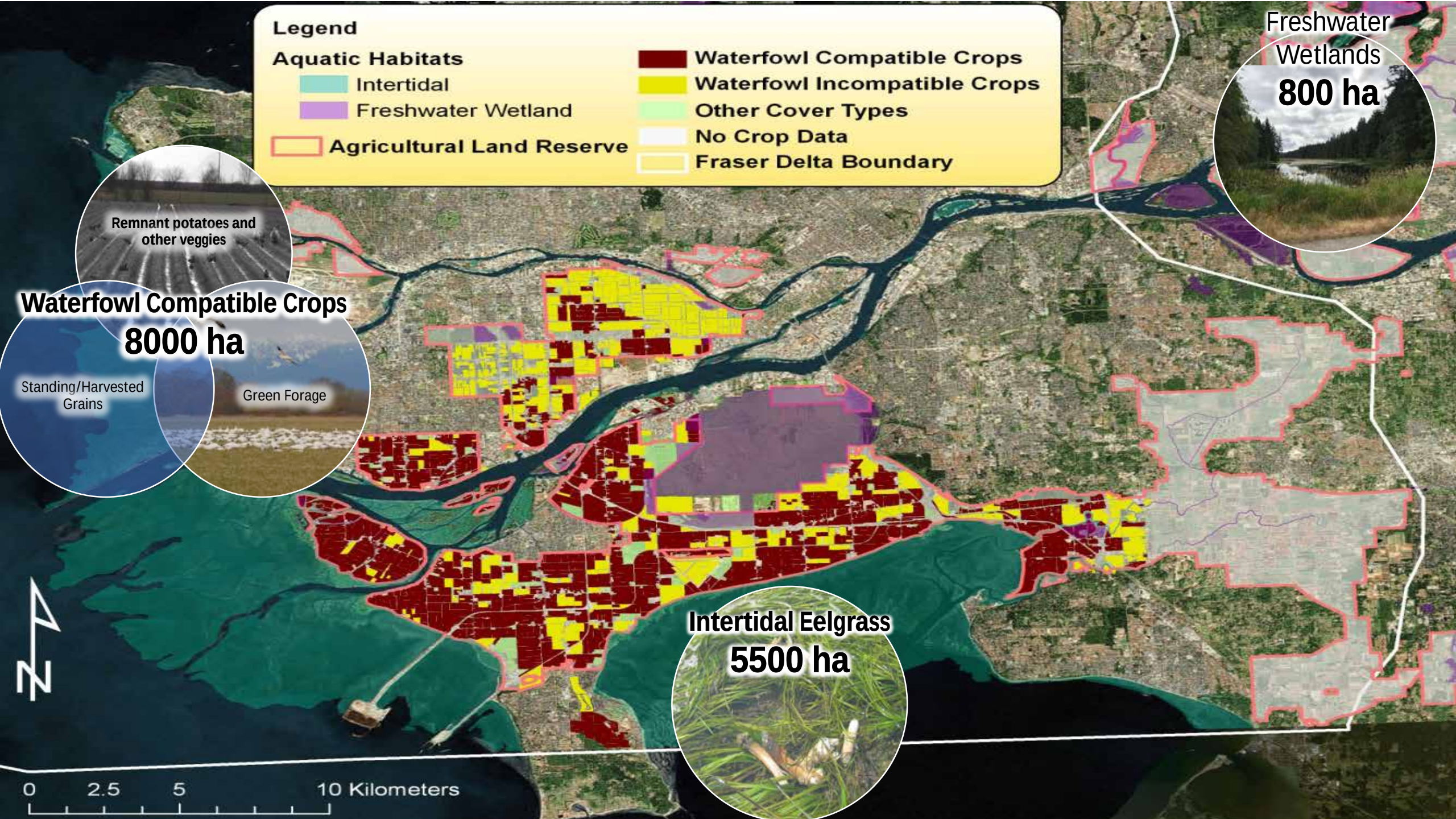

Legend
Aquatic Habitats
Intertidal
Freshwater Wetland
Agricultural Land Reserve
Waterfowl Compatible Crops
Waterfowl Incompatible Crops
Other Cover Types
No Crop Data
Fraser Delta Boundary
Freshwater Wetlands
800 ha
Remnant potatoes and other veggies
Waterfowl Compatible Crops
8000 ha
Standing/Harvested Grains
Green Forage
Intertidal Eelgrass
5500 ha
N
0 2.5 5 10 Kilometers

Legend

- Deltaport Expansion (T2)
- South Perimeter Road
- BC Rail Expansion
- Vancouver Airport Potential New Runway
- TFN Lands Excluded from ALR
- TFN Water Lots
- Berries / Nursery Crops
- Greenhouses
- Other Waterfowl Incompatible Crops
- No Crop Data
- Agricultural Land Reserve
- Fraser Delta Boundary

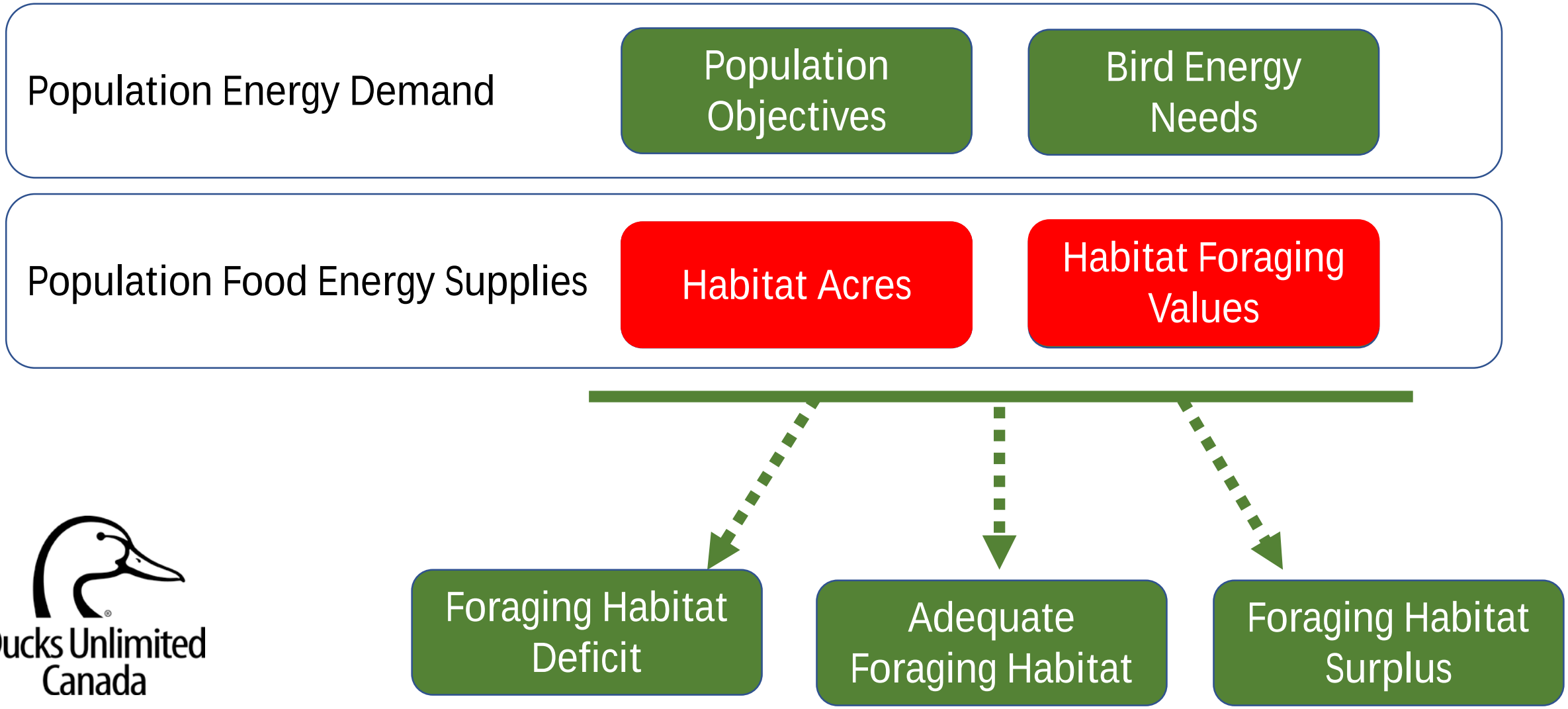
Agricultural Land Conversion

75% loss in historic marshes and flooded grasslands

Another 4000 ha lost by 2030

http://www.allpointbulletin.com/2015/11/20/tsawwassen-projects-will-be-

Bioenergetic Modeling: *TRUEMET*



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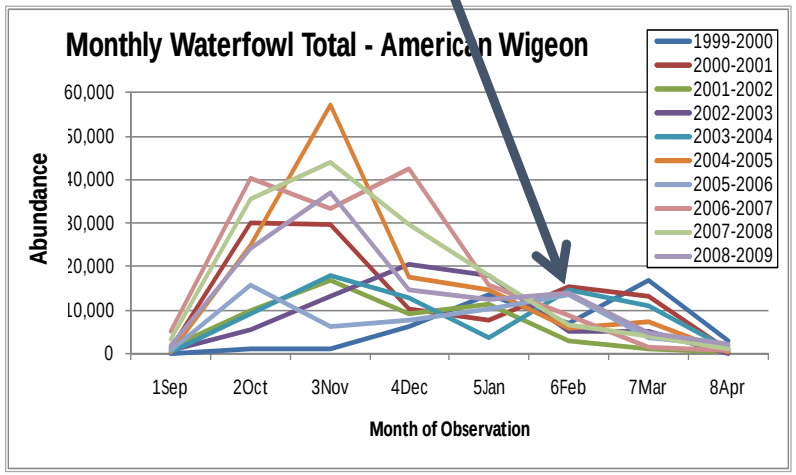
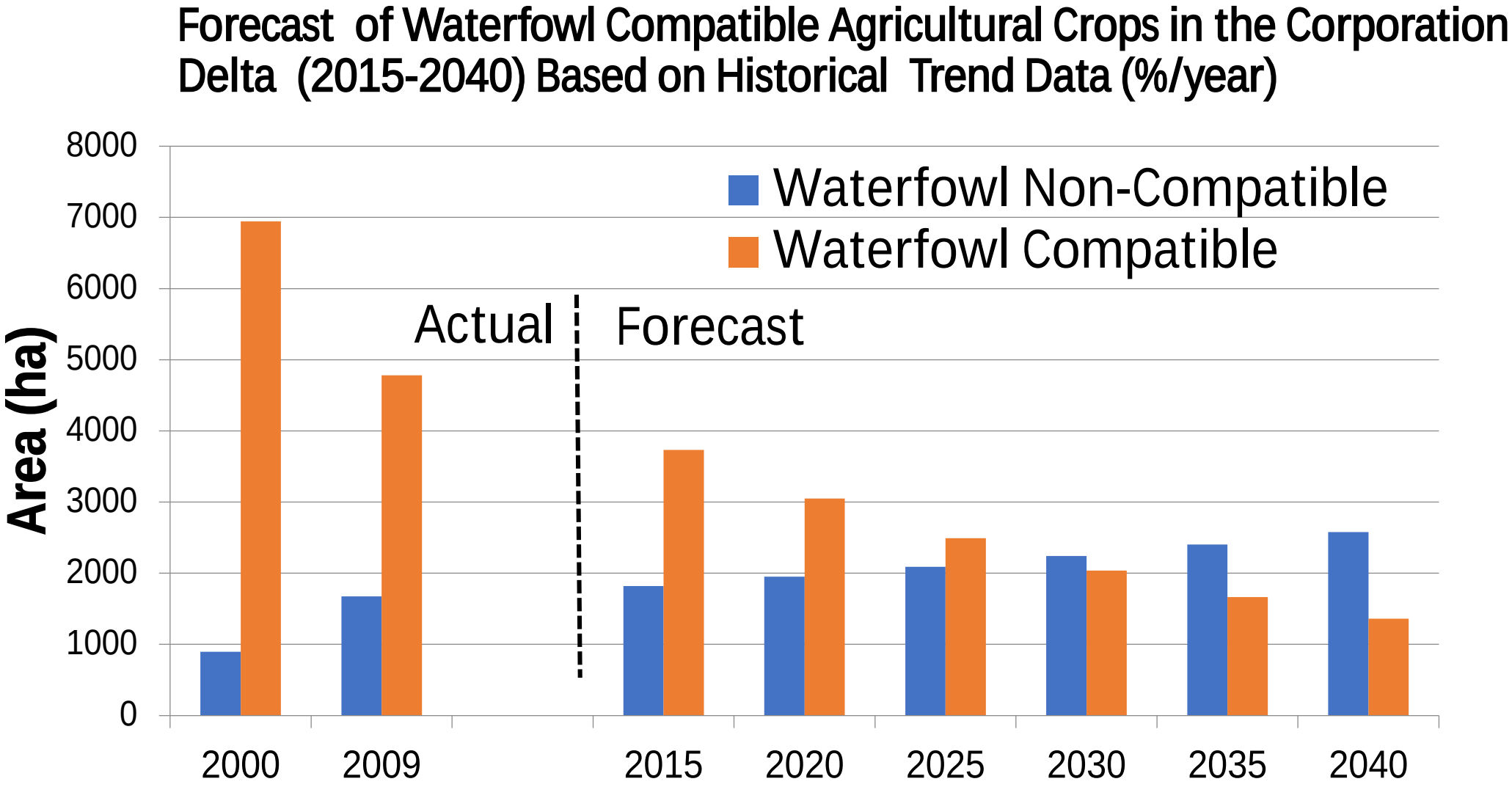
Inputs: Calculating Population Energy **Demand**

Species	Month							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Mallard	36,867	106,650	131,667	101,383	130,350	67,150	79,000	17,117
Northern Pintail	**Dabblers**	3,366	270,605	159,657	97,418	56,827	62,239	5,412
Green-winged Teal	8,475	16,271	33,898	12,881	20,000	12,542	31,864	10,508
American Wigeon	**Grazers**	19,117	288,311	193,169	138,389	100,909	74,961	11,532
Snow Goose	0	70,000	57,400	46,900	5,600	2,800	9,800	16,100

Habitat Type	Main Food Source	Current Abundance (ha)	Available Energy ($kcal x 10^6$)	Use by Guild	
				Grazers	Dabblers
Agricultural	Harvested potatoes	1,440	4,470	✓	✓
	Harvested grains	684	720	✓	✓
	Green forage	2,982	9,586	✓	
Wetland	Marsh seeds	162	51		✓
Total		**5,268**	**14,827**		



Inputs: Calculating Population Energy **Supply**



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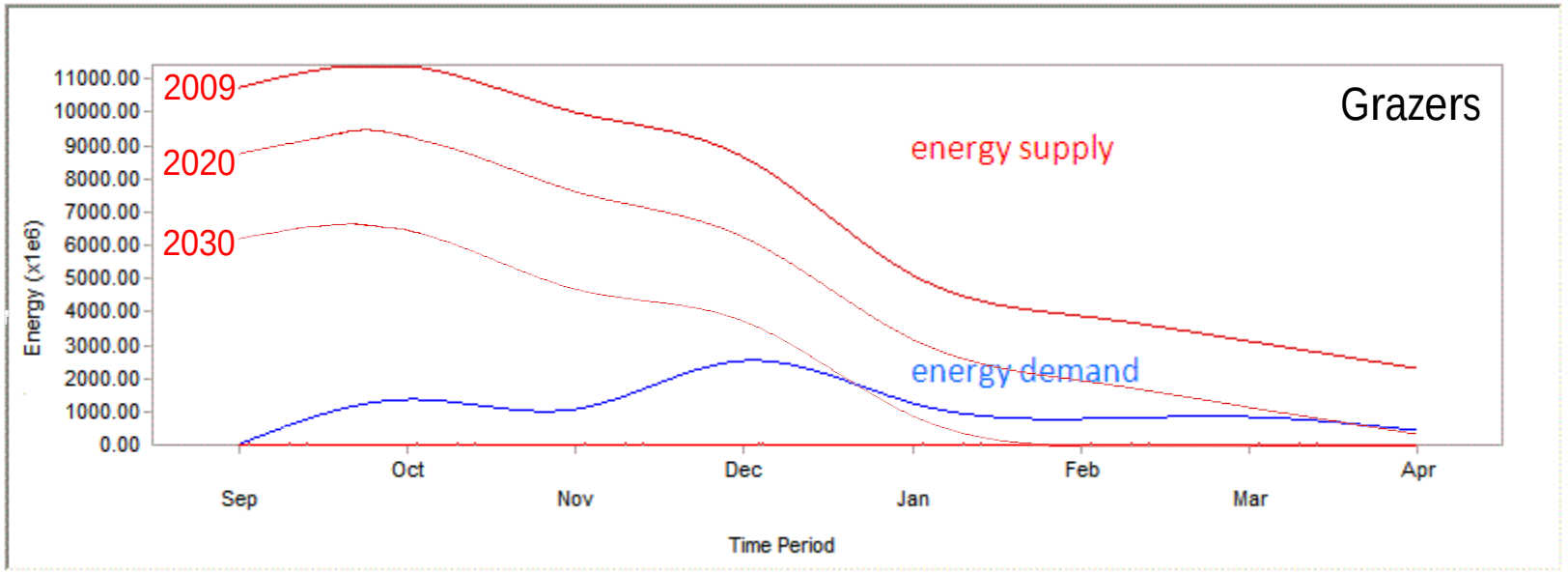
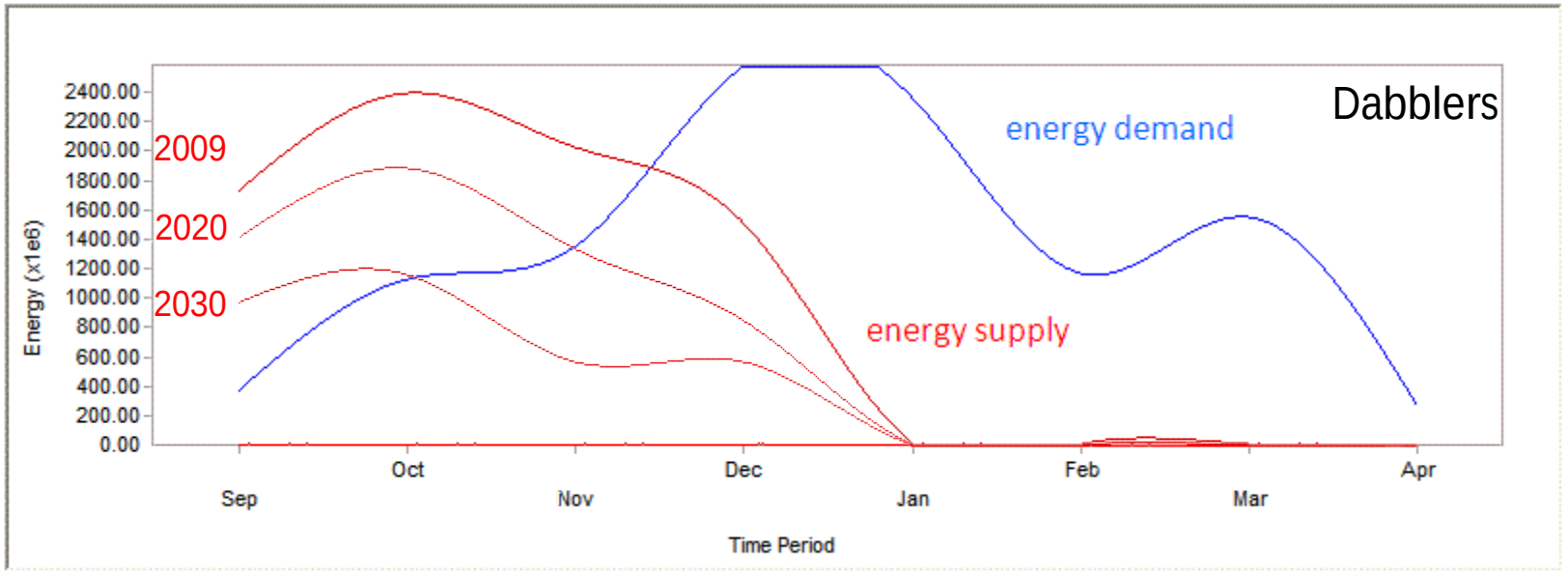
Results

Forecast for 2020 and 2030 without intervention





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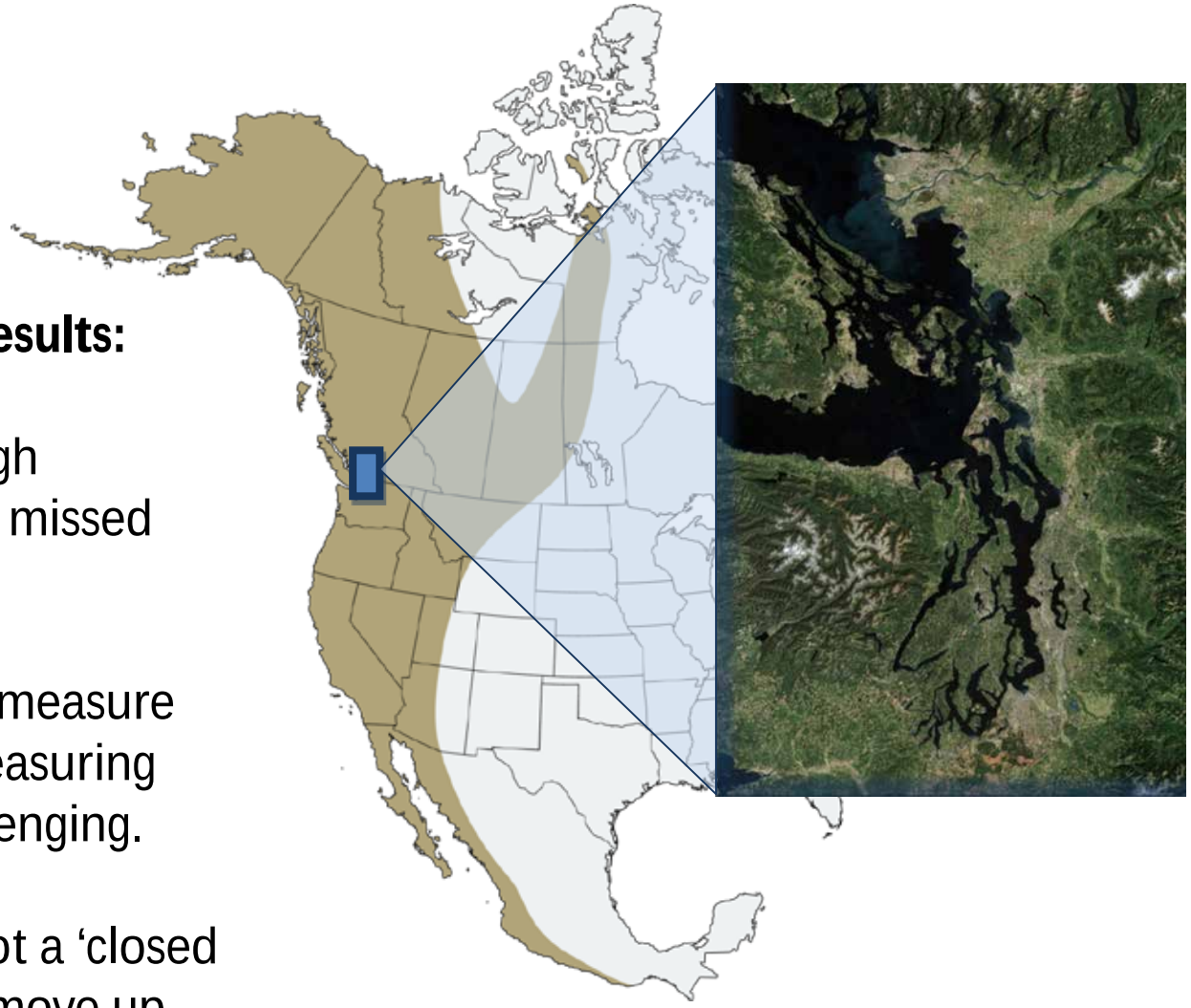

Explanation for dabbler results:

Likely a combination of high population objectives and missed ‘natural’ food sources.

We have a good ability to measure managed habitats, but measuring natural ones is more challenging.

Also, the Fraser Delta is not a ‘closed system’ – waterfowl may move up and down into Puget Sound dependent on weather and food supply.

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Setting Habitat Objectives

Approach = provide sufficient energy supply to meet 50% of the needs of dabbling and grazing waterfowl on agricultural lands.

This equates to ***15,000 x10^6*** kcal of energy.

Without intervention, by 2030 there will only be ***7,600 x 10^6*** kcal.

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What do we need?

Habitat Type	Main Food Source	Predicted scenario without intervention		Target scenario	
		2030 Abundance (ha)	Available Energy (kcalx10^6)	2030 Abundance (ha)	Available Energy (kcalx10^6)
Agricultural	Harvested potatoes	732	2,271	887	2,754
	Harvested grains	344	362	142	149
	Standing grain	0	0	257	4,919
	Green forage	1,538	4,944	2,319	7,455
Wetland	Marsh seeds	162	51	162	51
Total		**2,776**	**7,628**	**3,767**	**15,328**

How do we get to there?

- Acquire 200 hectares
- Intensively farm all ‘controlled lands’ in equal amounts of potatoes, standing grain and green forage
- Keep 800 hectares in green forage via easements/industry influence
- Encourage compatible cropping on 2,000 hectares via stewardship.

Next steps

- Collect better information on natural food sources (e.g. wetland/marsh foods, seeds, invertebrates) and migrant numbers
- Improve our understanding of the energetic needs of seaducks and brant
- Continue to monitor and measure habitat change, particularly on agricultural lands and intertidal areas (sea level rise)

Thank-you

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Environment and Climate Change Canada

Environnement et Changement climatique Canada

U.S. Fish & Wildlife Service

NAWCA

Institute for Wetland and Waterfowl Research

Ducks Unlimited Canada

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BC Waterfowl Society

Science Horizons Youth Internship Program

Delta Farmers