

Critical Areas Monitoring and Adaptive Management Workshop

February 5, 2018

High Resolution Change Detection 2006-2013: Skagit County

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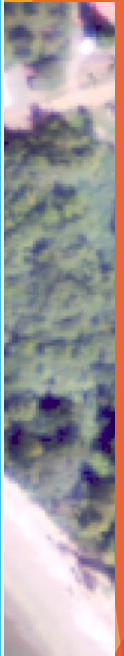
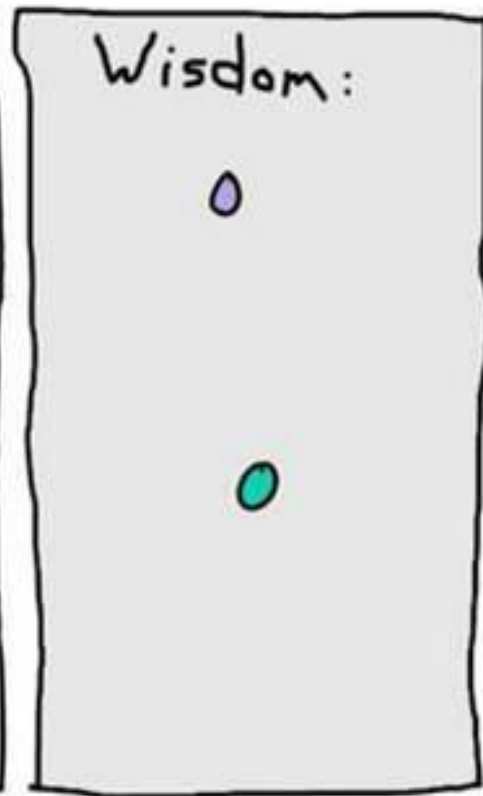
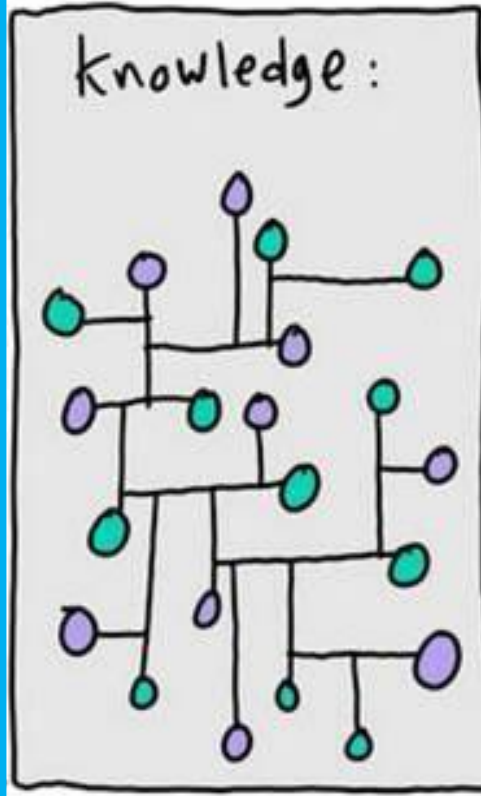
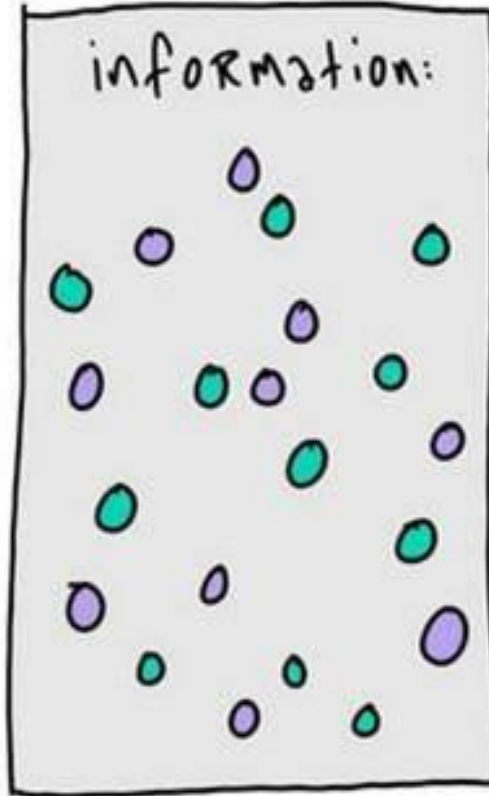


Importance of Land Cover Change

- Habitat quantity, quality, and connectivity affect species persistence and ecosystem resiliency
- Land cover change provides the best coarse scale measures of ecosystem change



New Tool Built on New Technology

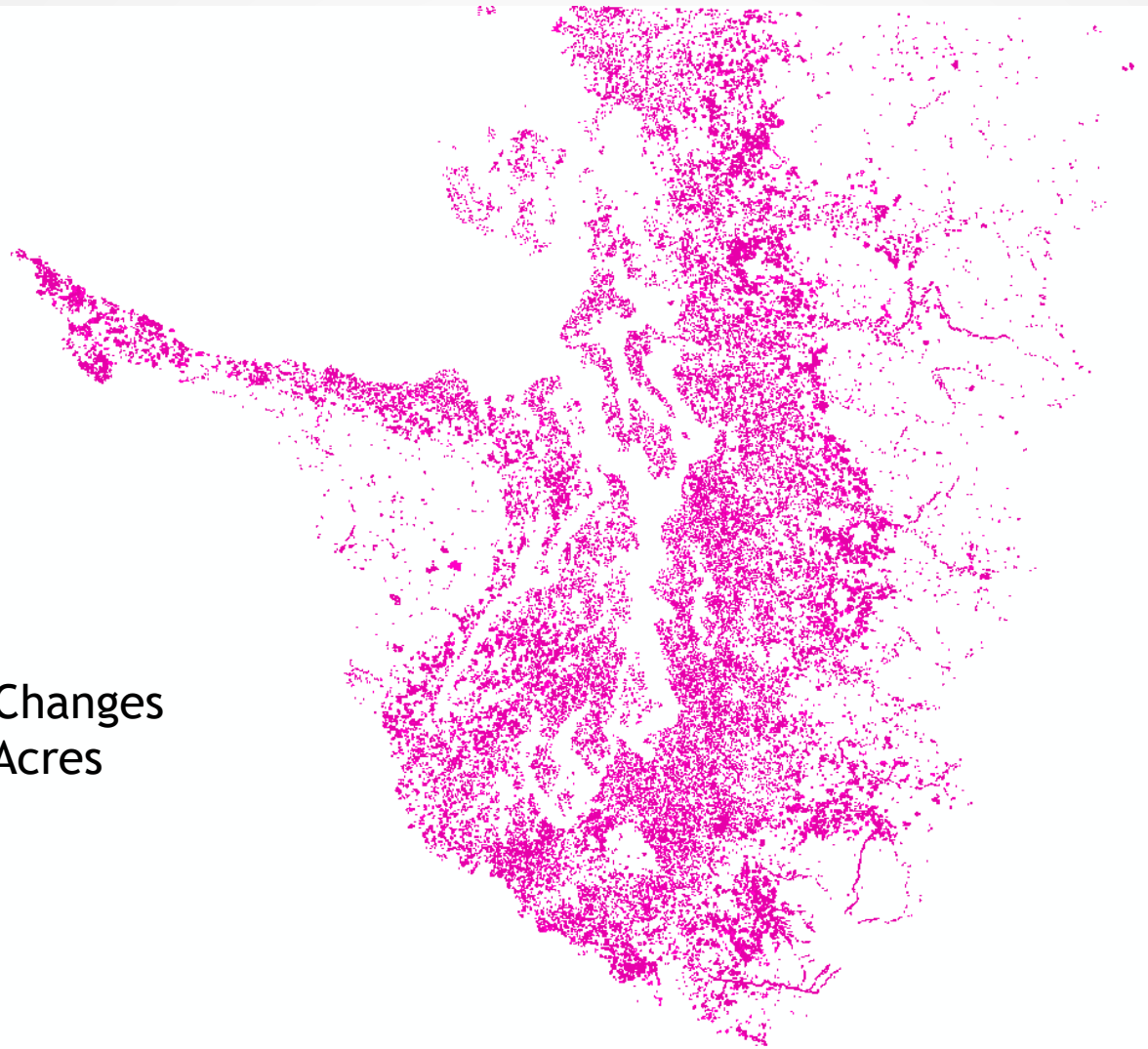


What the HRCD Shows Us:

- Where trees are lost
- Where roads and buildings are built
- Where these events occur in places you are concerned about (e.g. greenbelts, parks, stream corridors, wetlands)



179,166 Changes
626,974 Acres





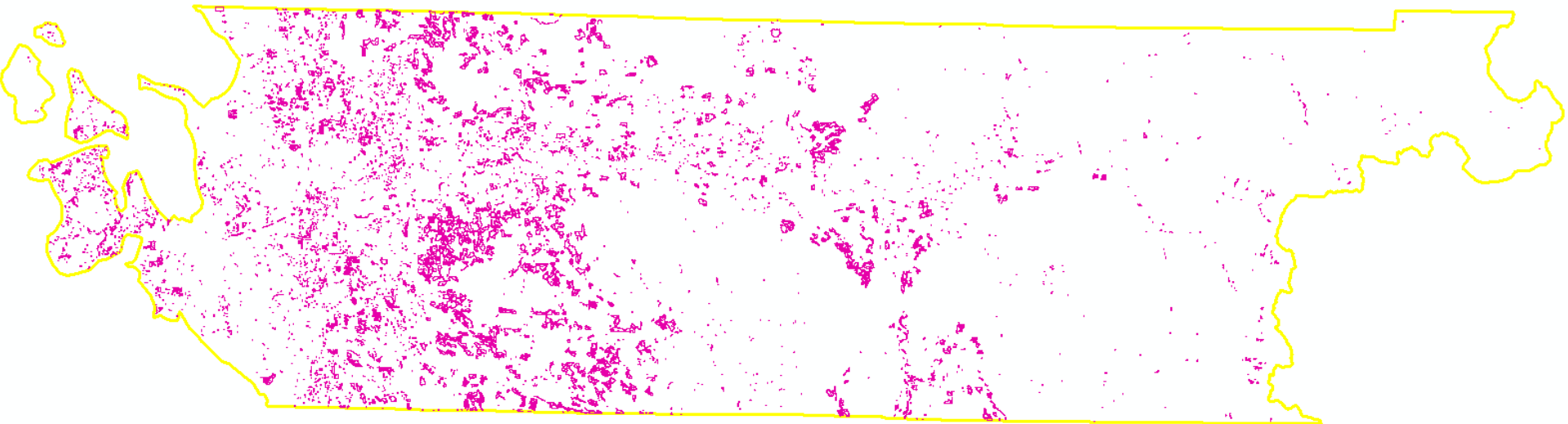
A closer look at HRCD attributes:

Initial Land Class Code	Initial Land Class Name	Change Agent Code	Change Agent Name
1	Permanent Human-use, >90% Impervious	1	Development
2	Bare Ground	2	Commercial Forestry
3	Working Lands	3	Tree Removal
4	Mixed Permanent Human- use, <25% Tree Cover	4	Stream
5	Mixed Permanent Human- use, >25% Tree Cover	5	Redevelopment
6	Mixed, Not Permanent Human-use	6	Retention Pond
7	Forest, >90% Tree Cover	7	Other - Natural
8	Herbs/Shrubs	8	Other - Non-natural

How much change is occurring?

- Need geography of interest mapped in GIS
- Intersect with HRCD
- Tree loss and impervious gain by change agent
- Example: Data has been used to set benchmarks and/or determine if goals are met in VSP





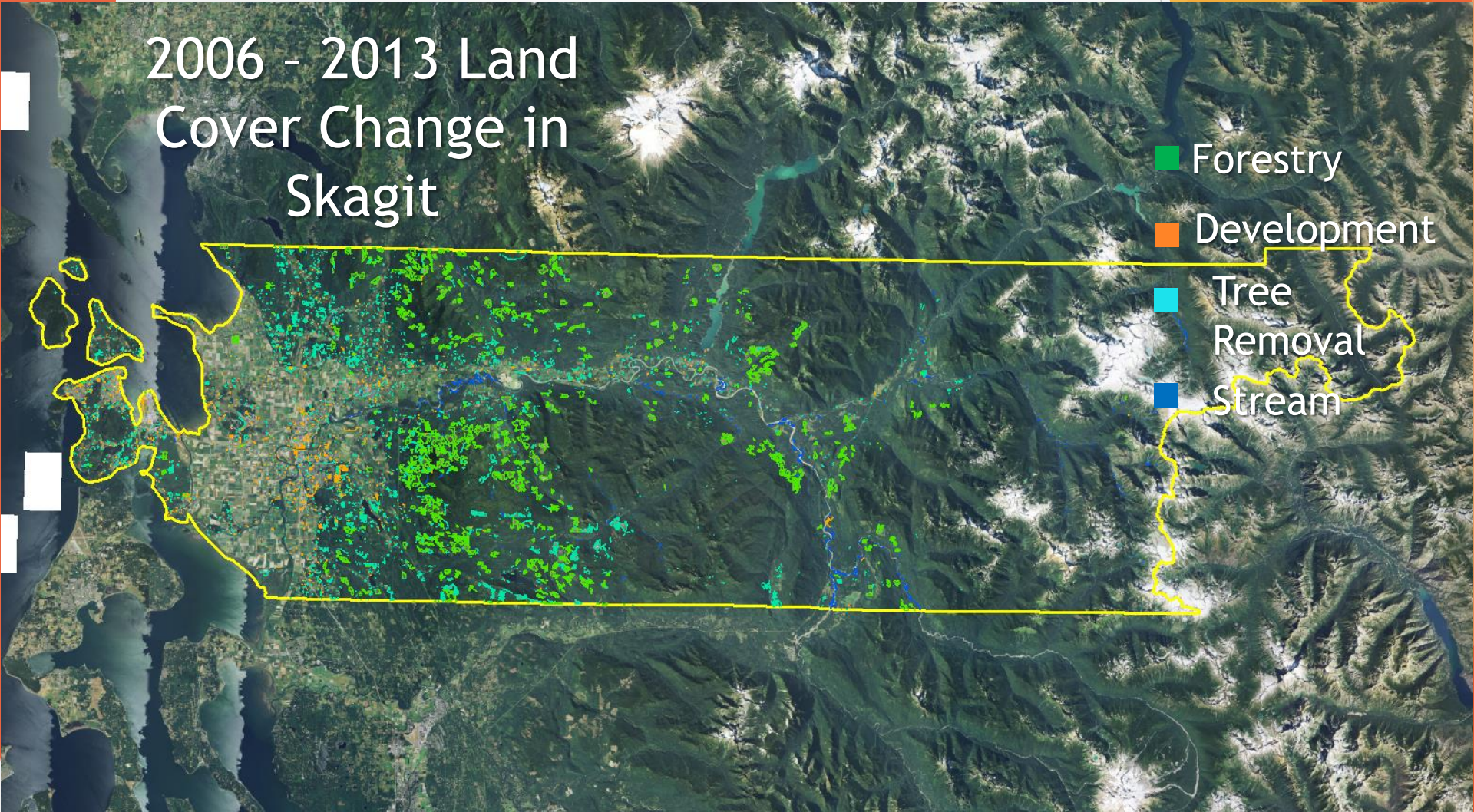
A satellite image of Skagit County, Washington, showing a mix of forested mountains, rivers, and coastal areas. A yellow line outlines the county's boundary. The text "Skagit County ~1,127,844 acres" is overlaid in the top left corner.

Skagit County
~1,127,844
acres

From: WA DNR

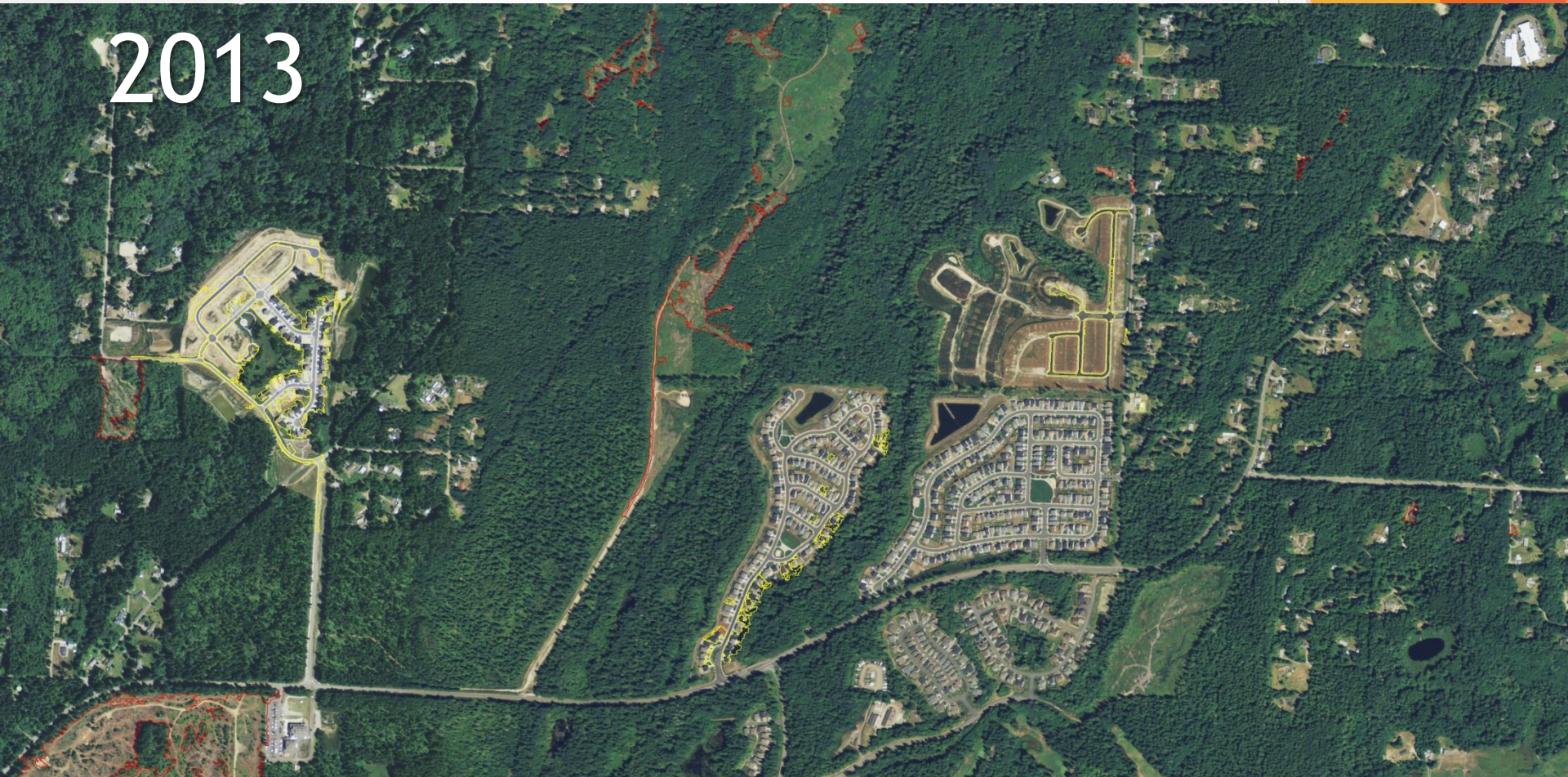
2006 - 2013 Land Cover Change in Skagit

- Forestry
- Development
- Tree Removal
- Stream



A Zoomed in Look...

2013



Skagit 2006 - 2013

	Count of Total Change	Sum of Total Change	Sum of Canopy loss	Sum of Imperv Gain
Tree Removal	6,319.00	9,602.03	9,554.75	9.23
Forestry	2,308.00	48,738.24	48,662.28	249.06
Development	2,199.00	2,112.20	490.58	1,621.13
Other, Natural	1,082.00	473.26	421.63	2.67
Stream	907.00	1,380.08	1,354.00	1.29
Other, Non-Natural	322.00	77.72	18.34	0.00
Redevelopment	82.00	26.62	2.11	8.43
Retention Pond	10.00	10.14	7.84	0.03
Grand Total	13,229.00	62,420.29	60,511.54	1,891.85

- Between 2006 and 2013, ~5.5% of the county experienced land cover change
- ~12,700 sq ft of new imperviousness per new person

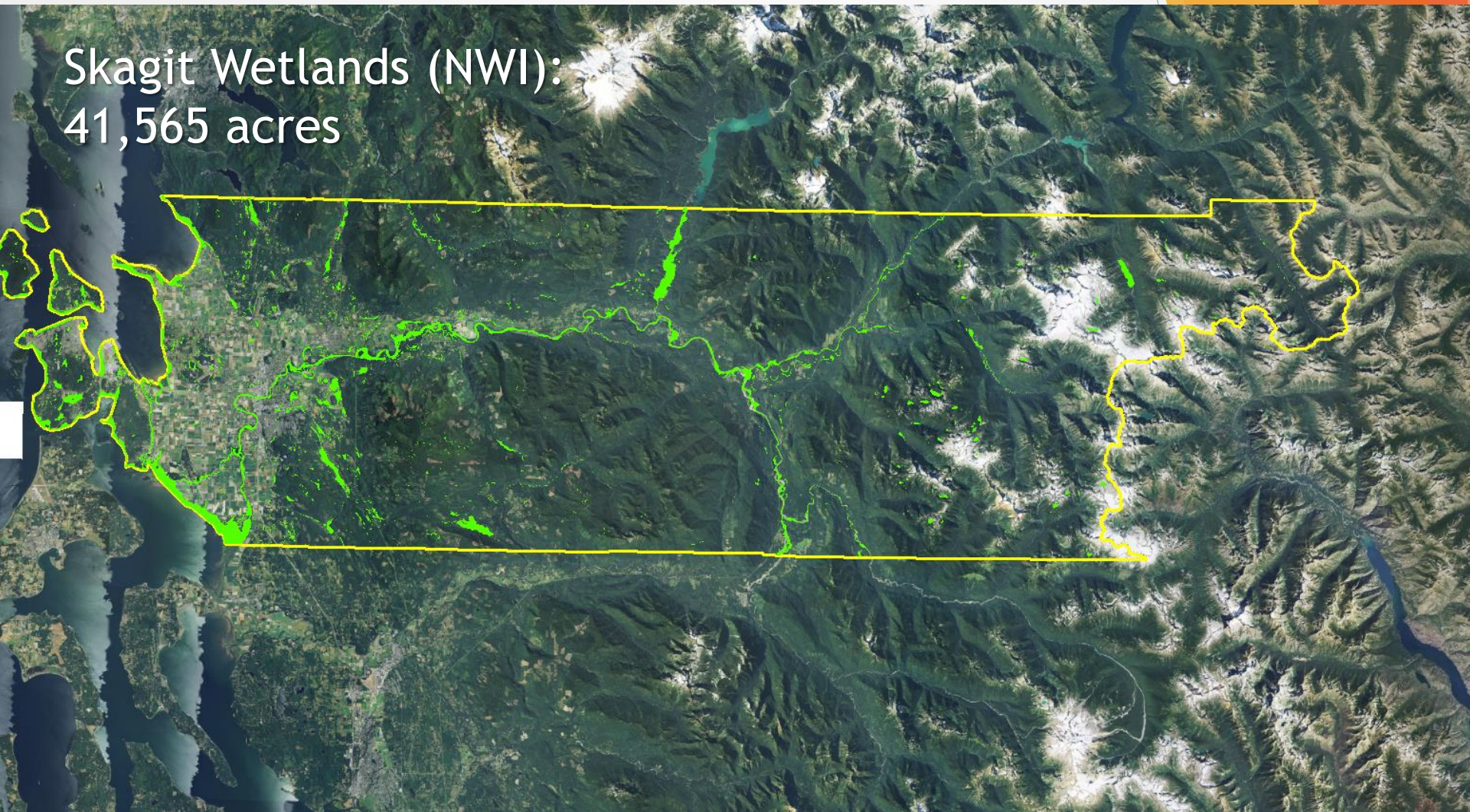
All population statistics from US Census Bureau

How Does This Compare to the Rest of the Puget Sound?

	Change Events (count)	Total Change (acres)	Canopy loss (acres)	Imperv Gain (acres)	County Acres	% of County Experiencing Land Cover Change (2006-2013)
Thurston	14,887	44,195.73	37,888.78	7,081.32	264,376.78	16.72
Mason	10,046	70,835.04	70,331.95	534.69	485,771.05	14.58
Kitsap	11,468	32,413.43	30,606.64	2,248.88	256,618.14	12.63
Clallam	9,585	69,322.86	68,360.49	745.01	619,739.72	11.19
Pierce	31,695	107,898.40	94,287.17	13,241.89	1,044,117.90	10.33
King	36,241	85,090.37	73,092.78	10,544.11	1,406,406.39	6.05
Skagit	13,229	62,420.29	60,511.54	1,891.85	1,127,844.71	5.53
Snohomish	26,839	67,216.70	61,399.24	5,933.18	1,353,481.07	4.97
Jefferson	5,080	22,772.91	22,634.88	165.99	485,796.58	4.69
Whatcom	10,277	51,350.11	50,211.21	966.91	1,388,618.42	3.70
Island	6,235	3,776.73	3,172.72	606.58	141,223.32	2.67
San Juan	2,365	583.93	456.14	112.62	117,929.77	0.50
<i>Grand Total</i>	177,947	617,876.50	572,953.55	44,073.03	8,691,923.86	7.11

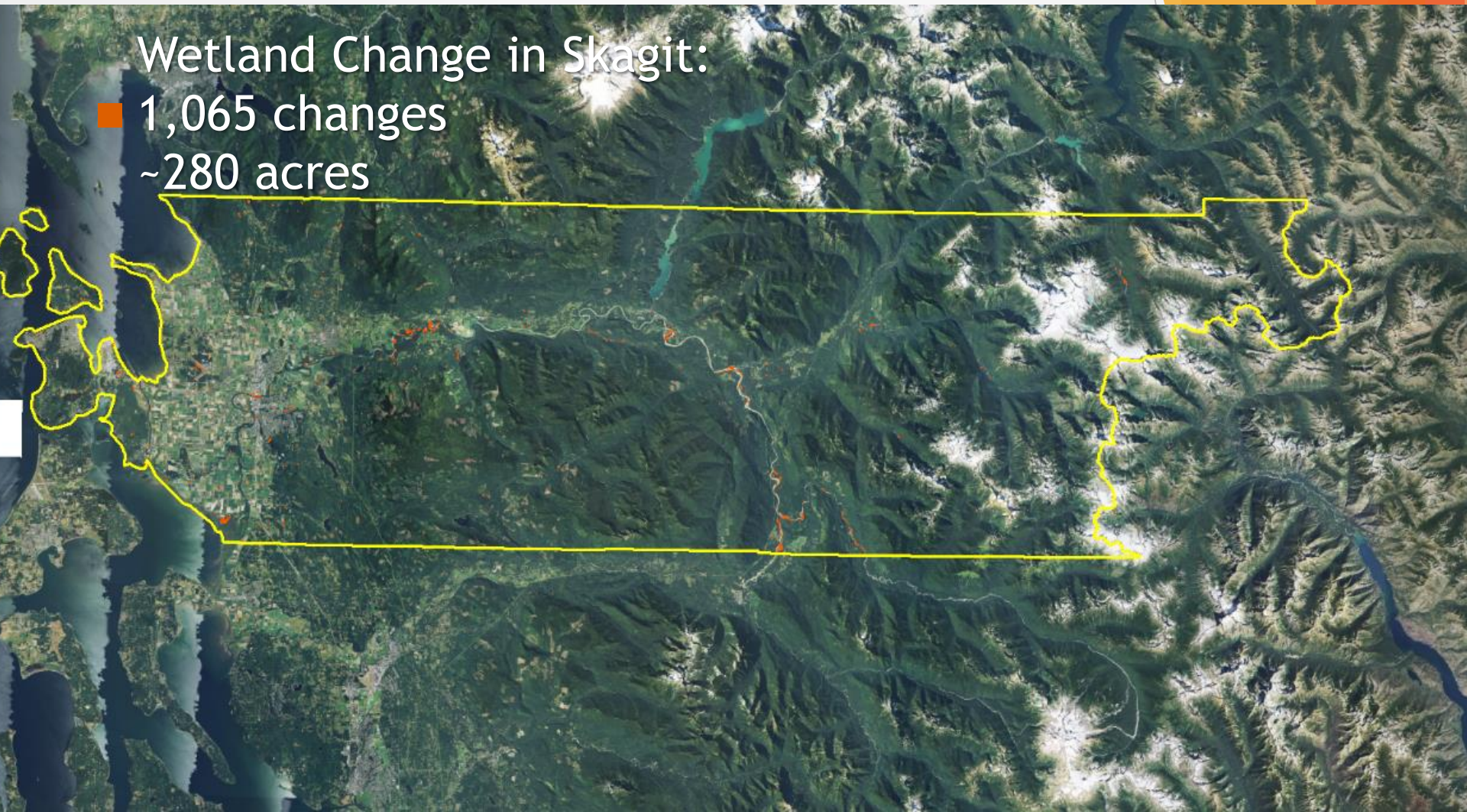
Critical Area Example: Skagit Wetlands

Skagit Wetlands (NWI):
41,565 acres



Wetland Change in Skagit:

- 1,065 changes
- ~280 acres

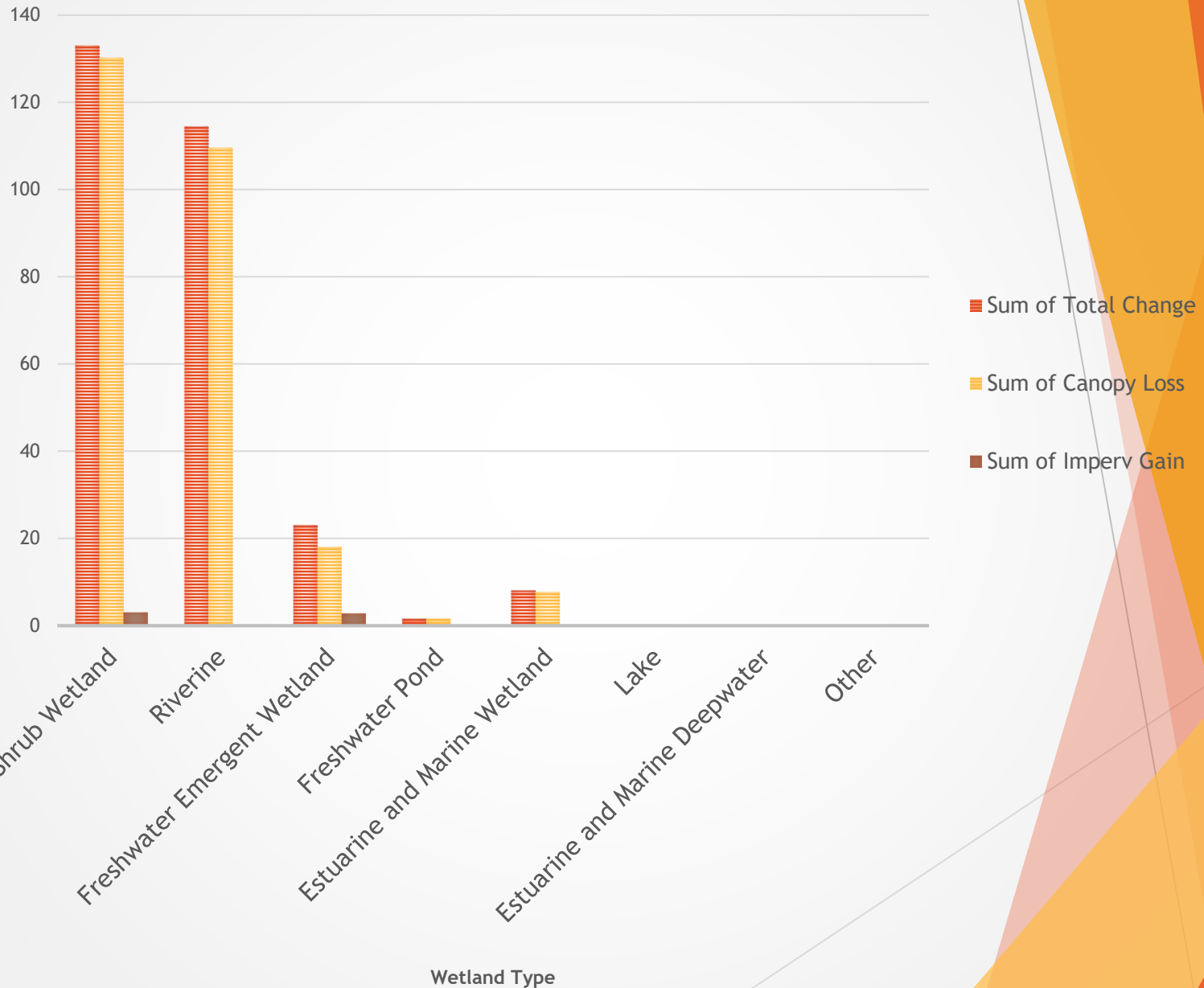


Skagit Wetlands

2006-2013 Land Cover Change

Row Labels	Count of Total Change2	Sum of Total Change	Sum of Canopy Loss	Sum of Imperv Gain
Stream	584	202.23	200.18	0.00
Tree Removal	277	29.62	29.35	0.00
Other, Natural	90	31.57	30.96	0.39
Development	79	11.63	1.83	5.55
Forestry	22	4.71	4.71	0.00
Other, Non- Natural	11	0.21	0.00	0.00
Retention Pond	1	0.17	0.00	0.00
Redevelopment	1	0.01	0.00	0.00
Grand Total	1,065	280.13	267.04	5.94

LAND COVER CHANGE IN SKAGIT COUNTY WETLANDS BY WETLAND TYPE, 2006 - 2013



Skagit Wetlands

2006-2013 Land Cover Change

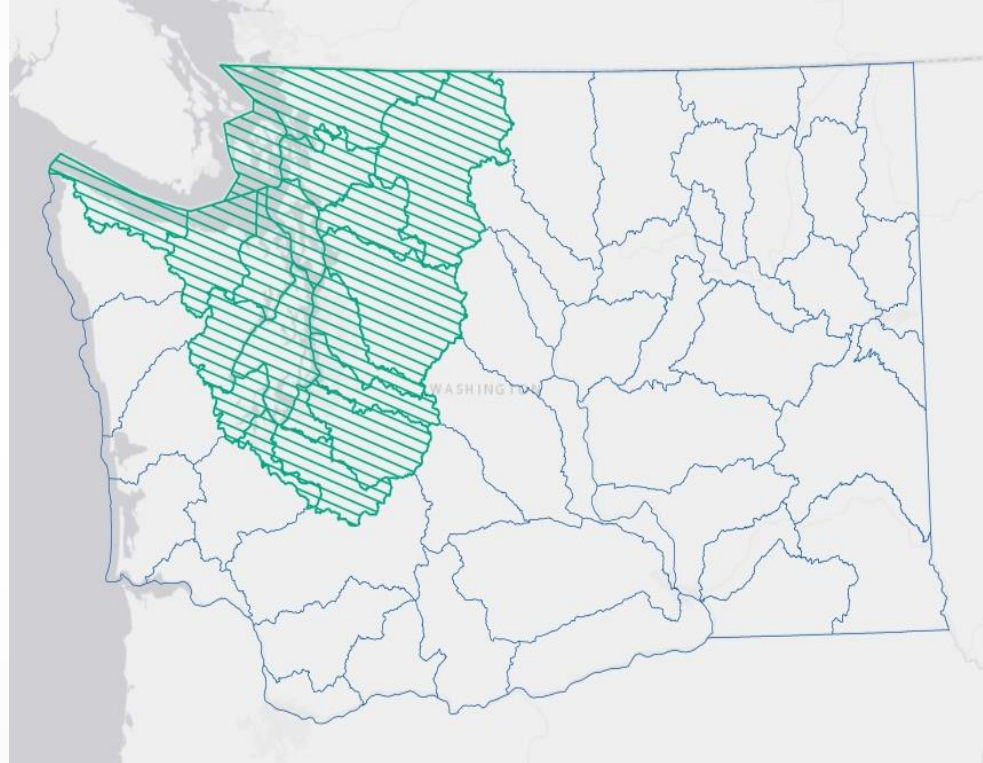
- ▶ ~0.6% of NWI mapped wetlands in Skagit County experienced land cover change
 - ▶ Note: this does not necessarily mean Skagit County *lost* 0.6% of their wetlands
- ▶ Most of change occurred within Riverine and Freshwater Forested/Shrub Wetland types
 - ▶ Riverine and Freshwater Forested/Shrub Wetland types make up ~44% of wetlands by area in Skagit
 - ▶ More than 88% of change by area in these wetland types

Many, many ways to analyze the data

- ▶ This is where your community insights come in
 - ▶ NWI accuracy
 - ▶ Information only as useful as your weakest input
 - ▶ Understand the conclusions you can draw
- ▶ Limited only by the availability of data about the area you want to evaluate
- ▶ What land conversion patterns are you looking for?

Other HRCD Notes

- Simple to use
- Accurate to $\sim 1/20^{\text{th}}$ acre
- Three time periods available
- Technical assistance also at WDFW!
- Visit www.pshrcd.com to download data and learn more!



Thank you

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Questions?