Waterfowl Conservation

Mount Vernon, WA
February 3, 2020

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WDFW, Waterfowl Section Manager

Washington Department of FISH and WILDLIFE

Who is this guy?

Current WDFW Waterfowl Section Manager (~3.5 yrs),
USGS Waterfowl Research Biologist (~6 yrs),
USFWS Yukon Delta NWR Senior Waterfowl Biologist (~3yrs)

Overview

What are waterfowl?
Why do wetlands matter?
What drives waterfowl management?
Why are certain areas important?
What do we know about how waterfowl use the estuary?

What are waterfowl?

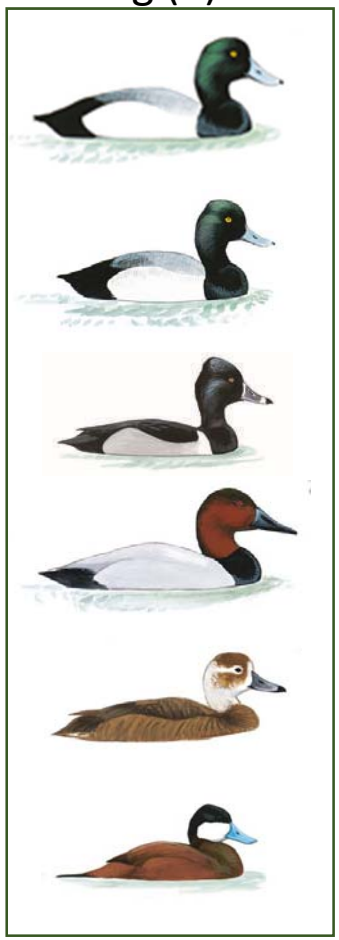
Ducks

Geese

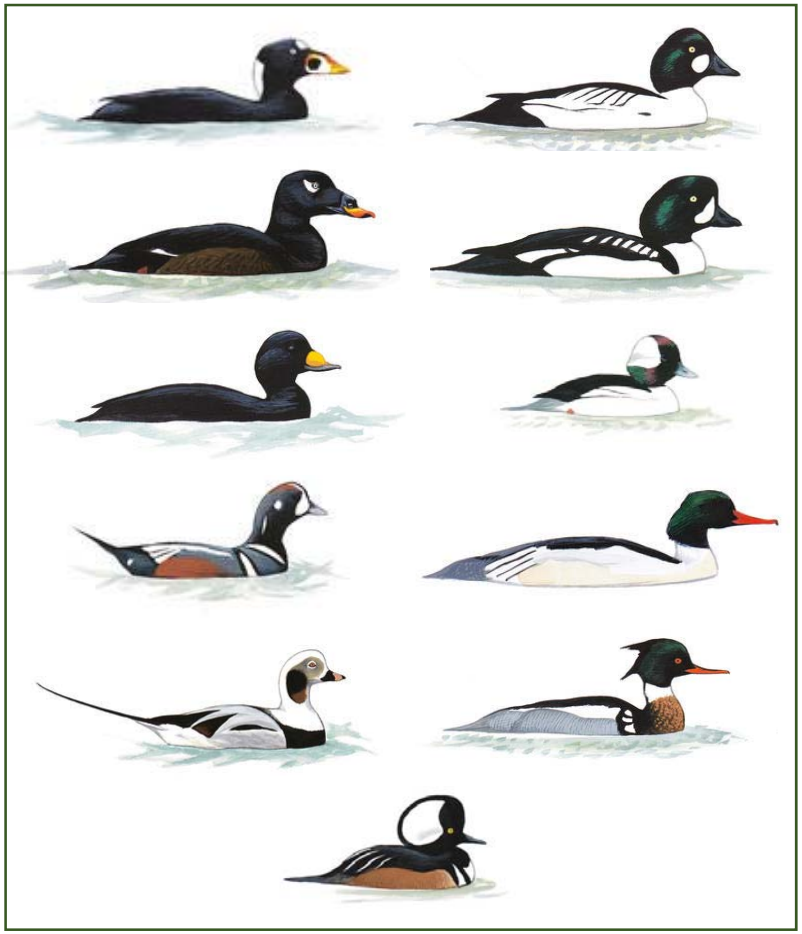
Swans

Dabbling (10)

Diving (6)



Sea (11)

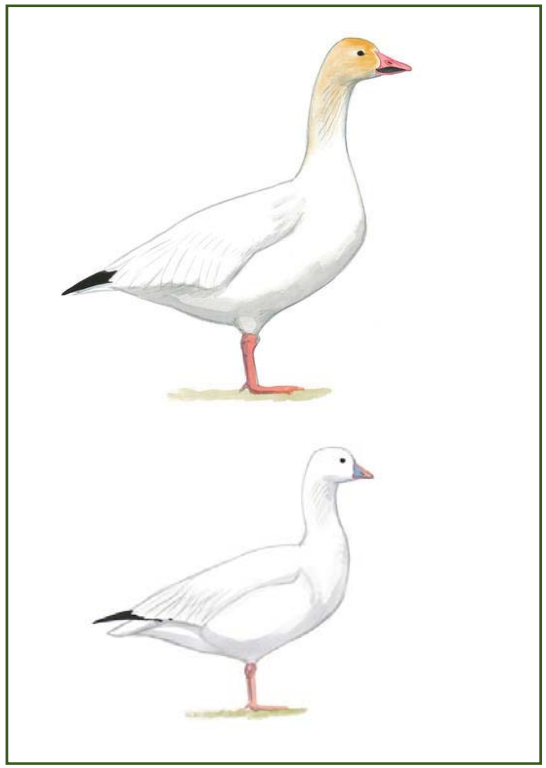


DUCKS

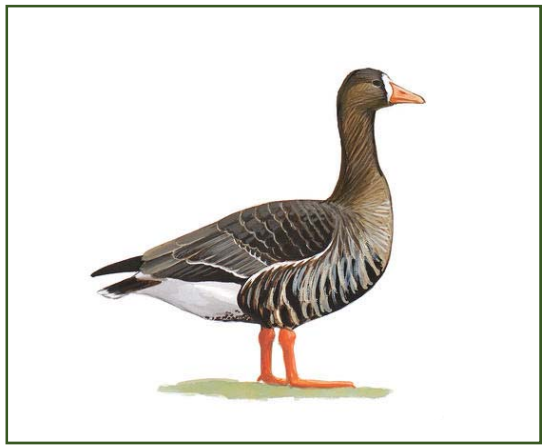
Primarily addressing mallard, widgeon, pintail and green-wing teal in this presentation

Canada (4) Cackling (3)

Snow (2) Ross's



White-fronted Goose (2)

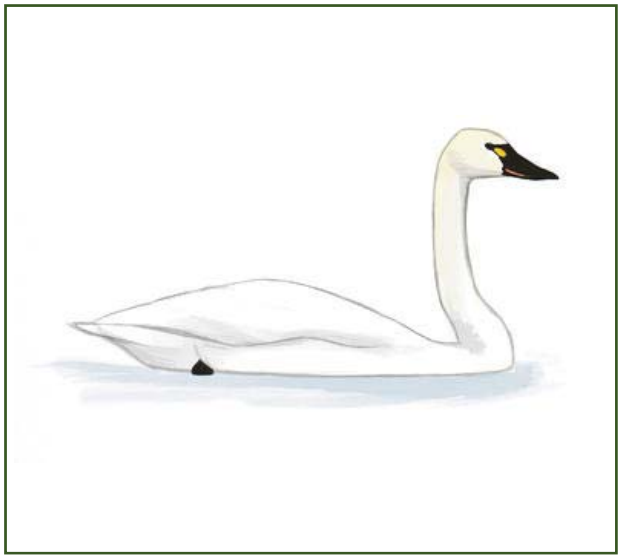


Brant (2)

GEESE

Trumpeter (2)

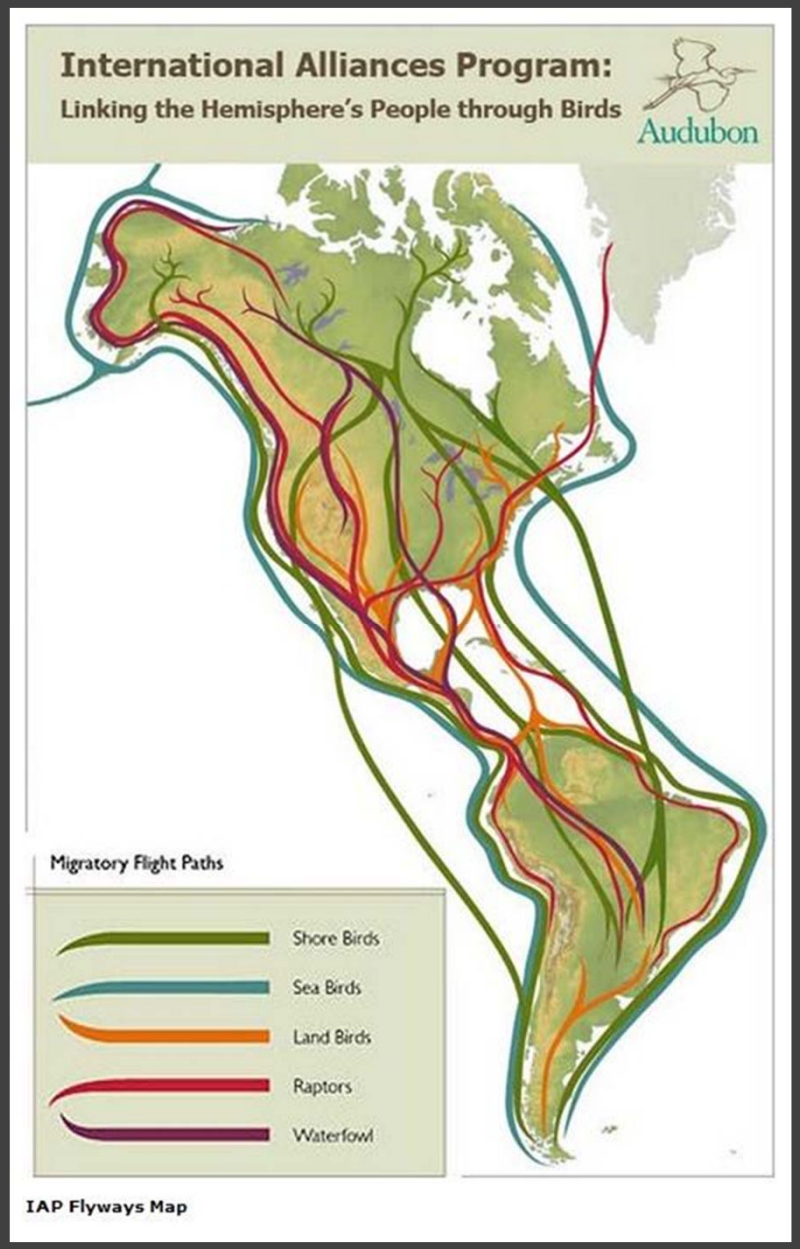
Tundra



SWANS

Why migrate?

- Temperature
- Day-length
- Food quantity, availability, and profitability



What is special about Washington?

Location,

(in the flyway)

location,

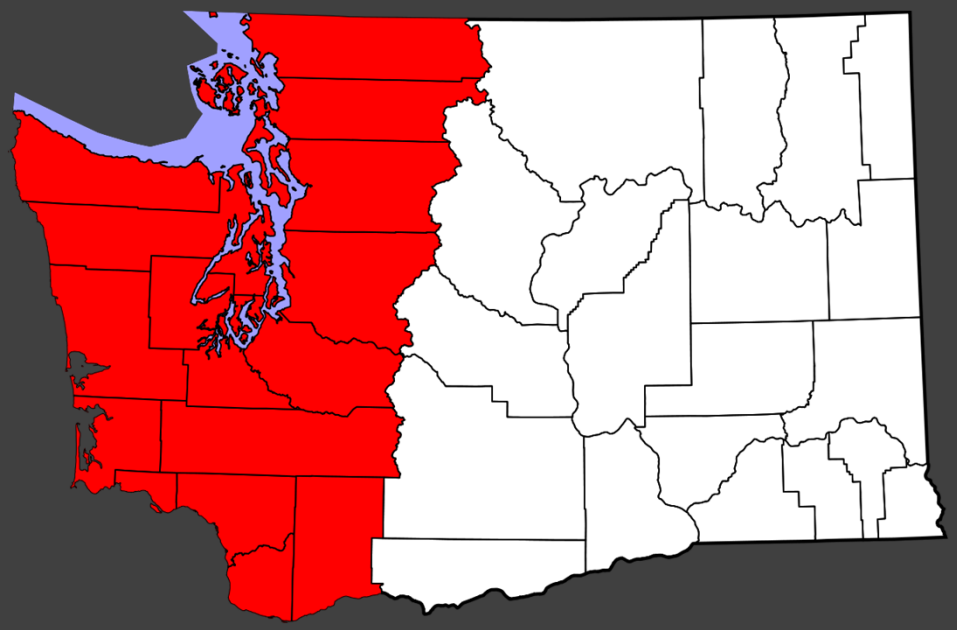
(temperature)

location

(water)

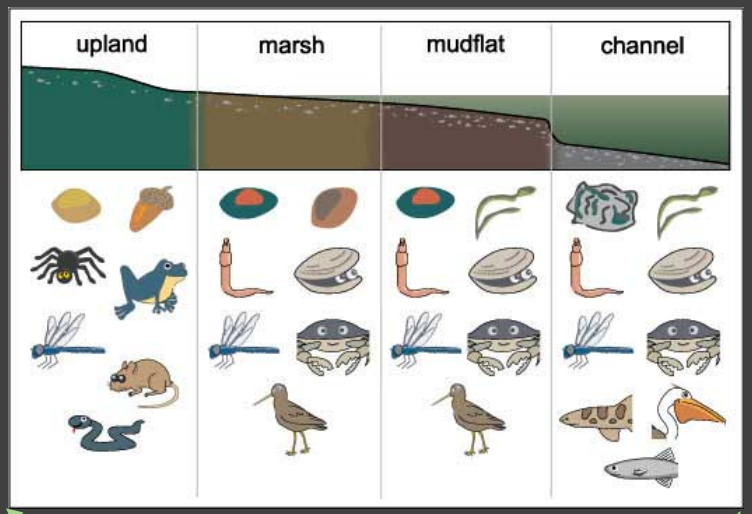
What is special about Western Washington?

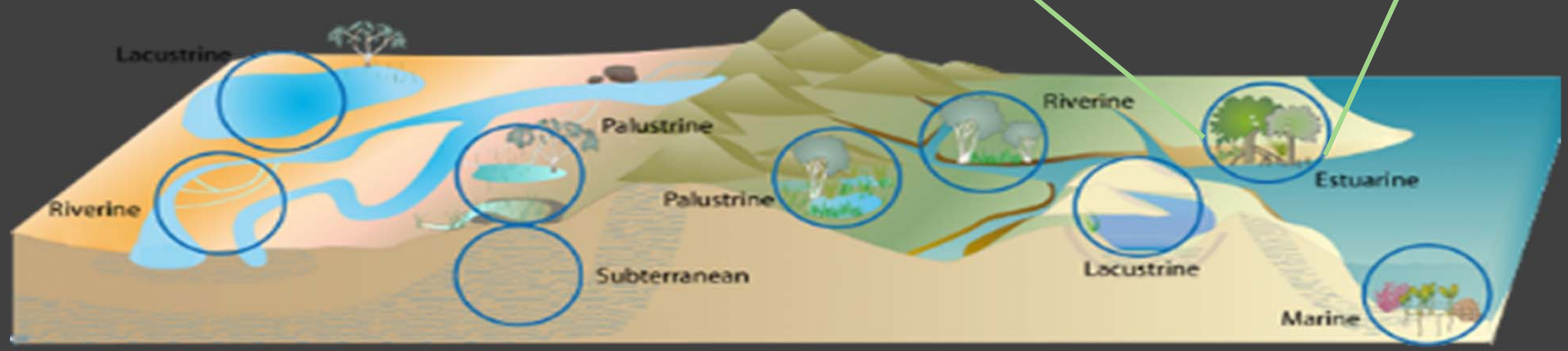
- Characterized by river deltas, estuaries and freshwater **wetlands**
- These **wetlands** provide critical breeding, wintering, and migration habitat



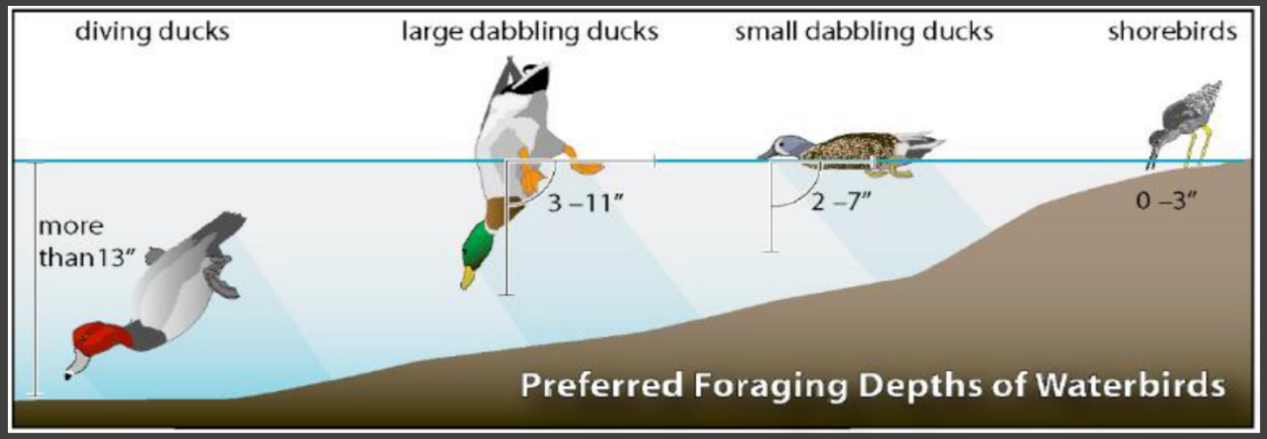
Wetland type influences waterfowl community

- Different wetland types are formed by differences in water:
  - Seasonality, duration and frequency
  - Depth
  - Salinity
- These factors in turn influence:
  - Plant communities
  - Animal communities (vertebrate & invertebrate)





Water shapes food availability…
… and finding food is essential.



Is there enough? **Can you get to it?** **Is it valuable enough?**

- Food influences where birds go, and how many congregate
- It drives overall bird health and condition
- It is crucial to survival and breeding success

WATER FOWL NEED WETLANDS

- At all times of the year
- Primarily, for FOOD and REFUGE

FALL:
Fly and Survive

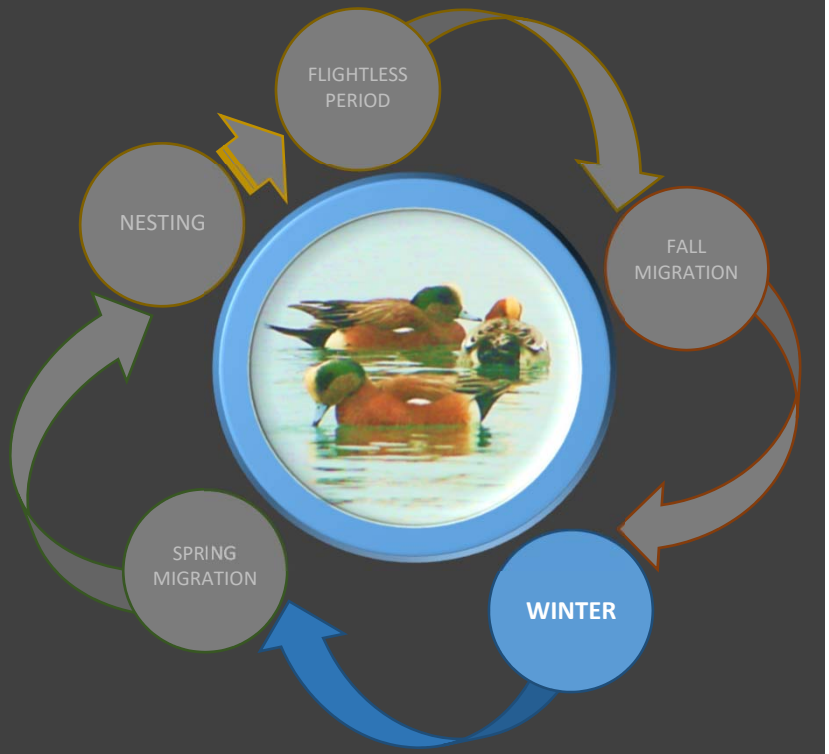
FOOD

high carbohydrate and starch: roots & tubers, seeds, and grains

Estuarine Sedge

Snow Goose Grubbing Tubers

WINTER:
Maintain weight and minimize energy use



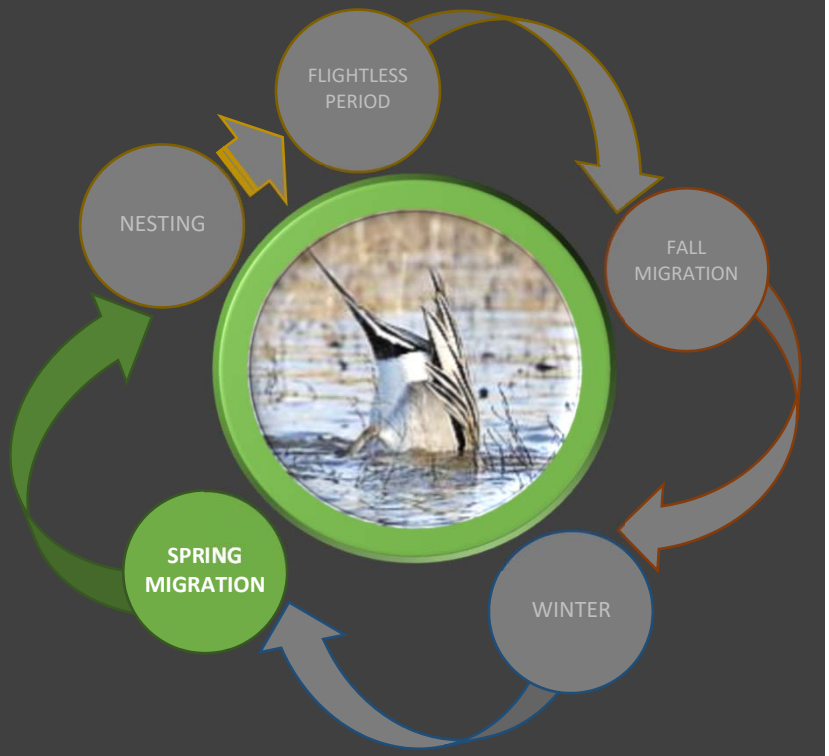
FOOD:

Whatever is available

REFUGE:

Low disturbance, in close proximity to food.

SPRING:
Feed to Breed



FOOD:

High protein; new growth plant material, invert larvae & eggs, “biofilm”

Waterfowl management in North America

International laws: Migratory Bird Treaty Act

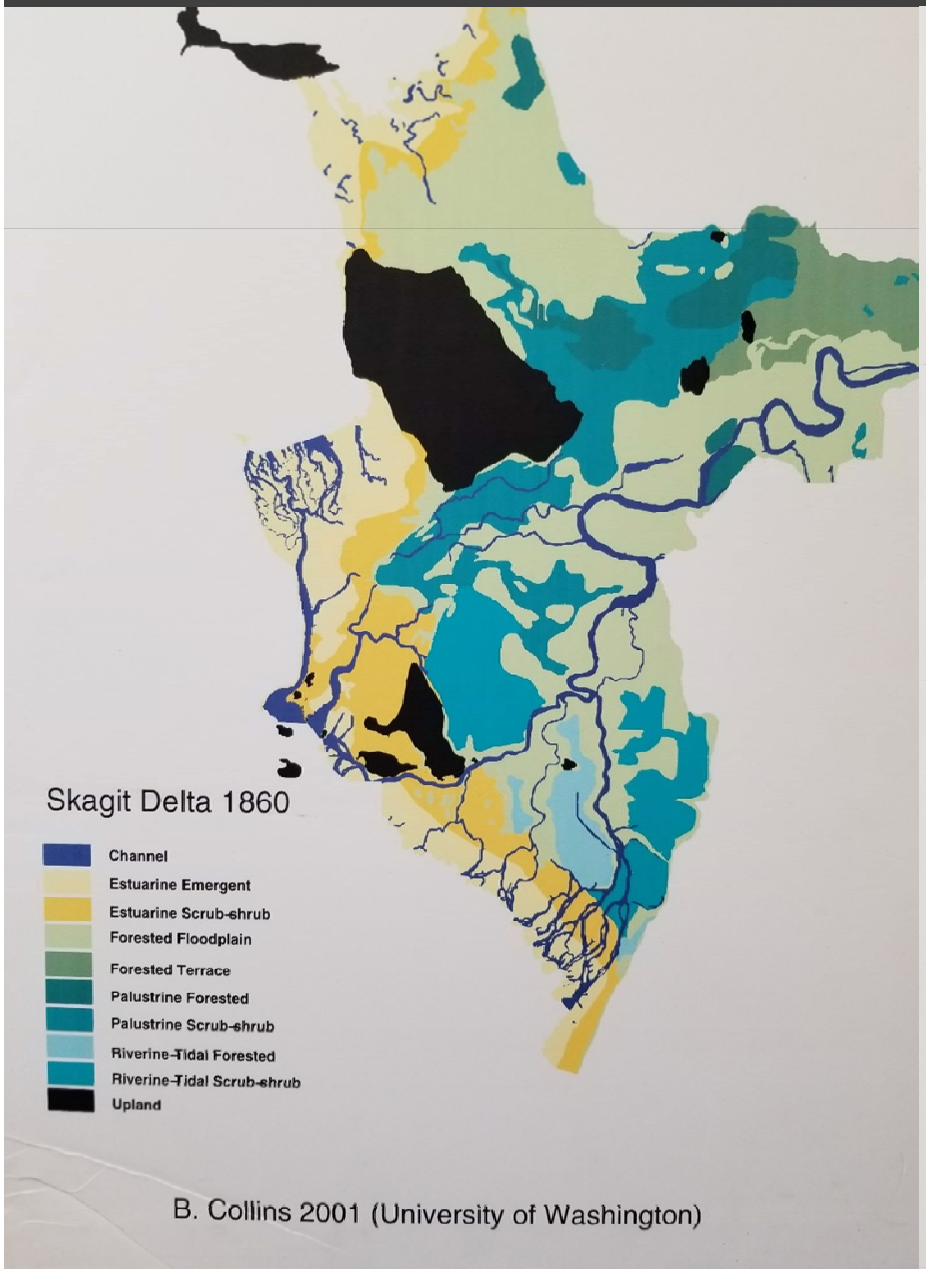
Funding: Hunter licenses, duck stamps, state and federal agencies

Partners: Joint Ventures, Flyway councils, for example

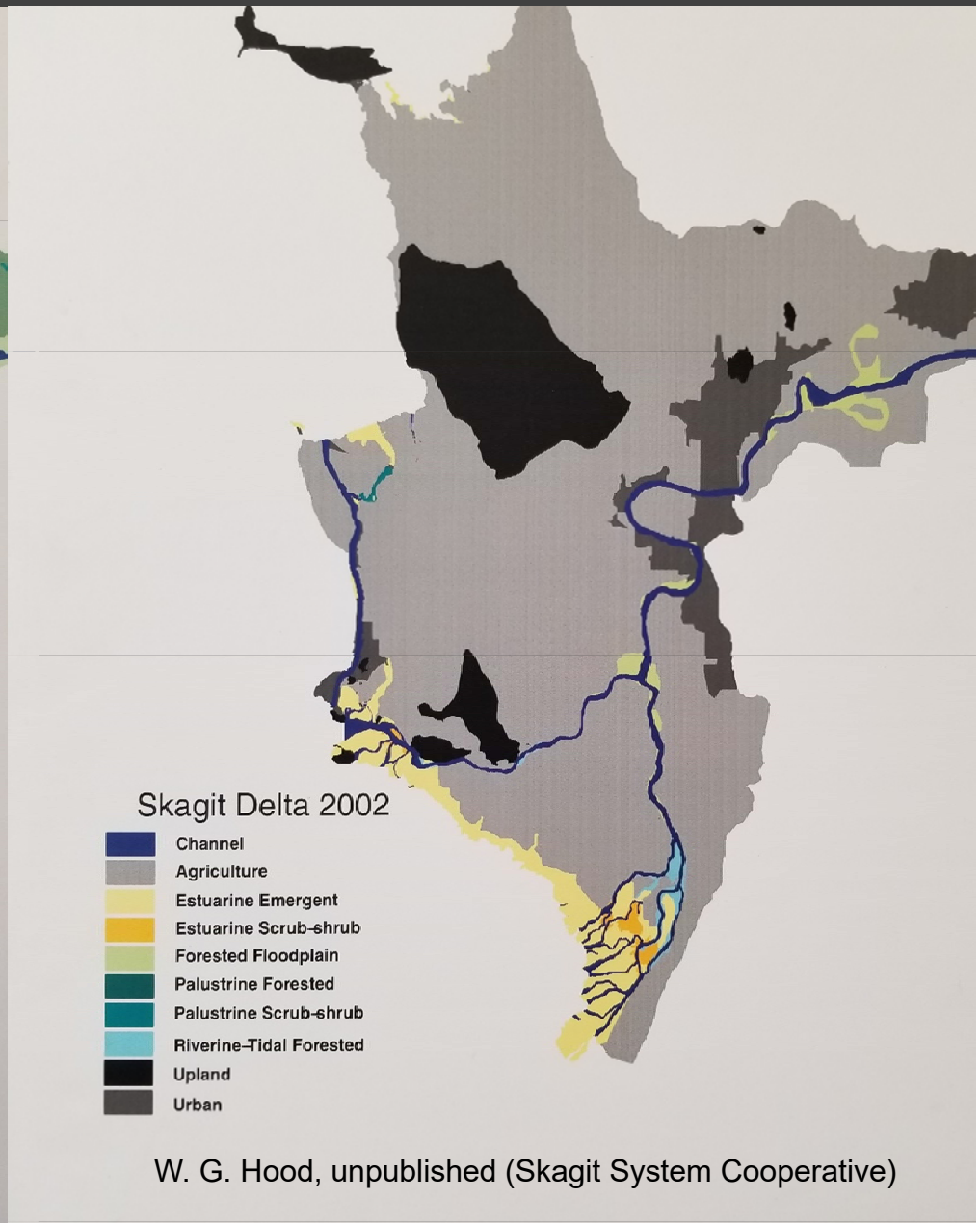
Conservation Plans

1986

Wetlands lost across North America, including Skagit



B. Collins 2001 (University of Washington)

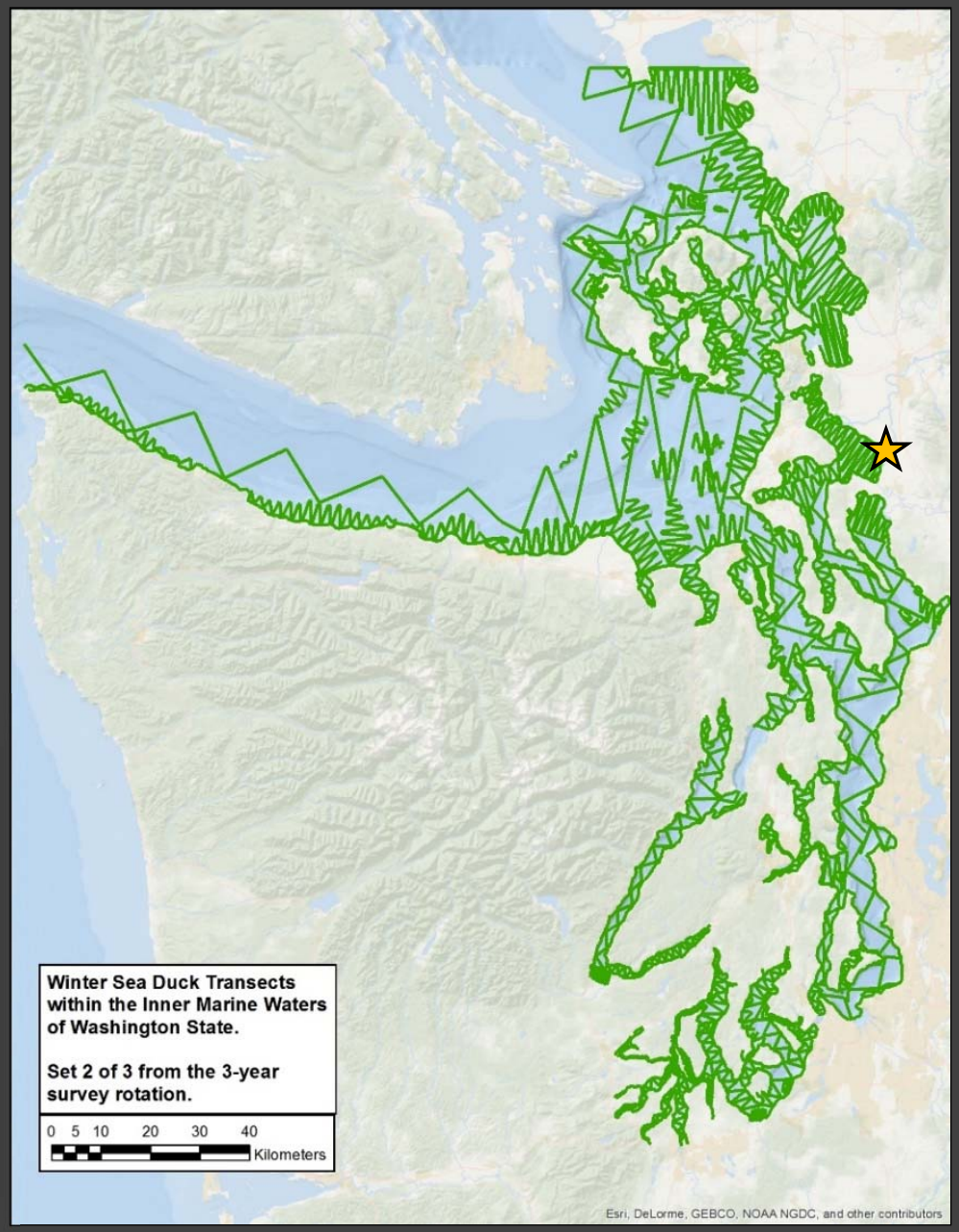


W. G. Hood, unpublished (Skagit System Cooperative)

Where are the ducks?

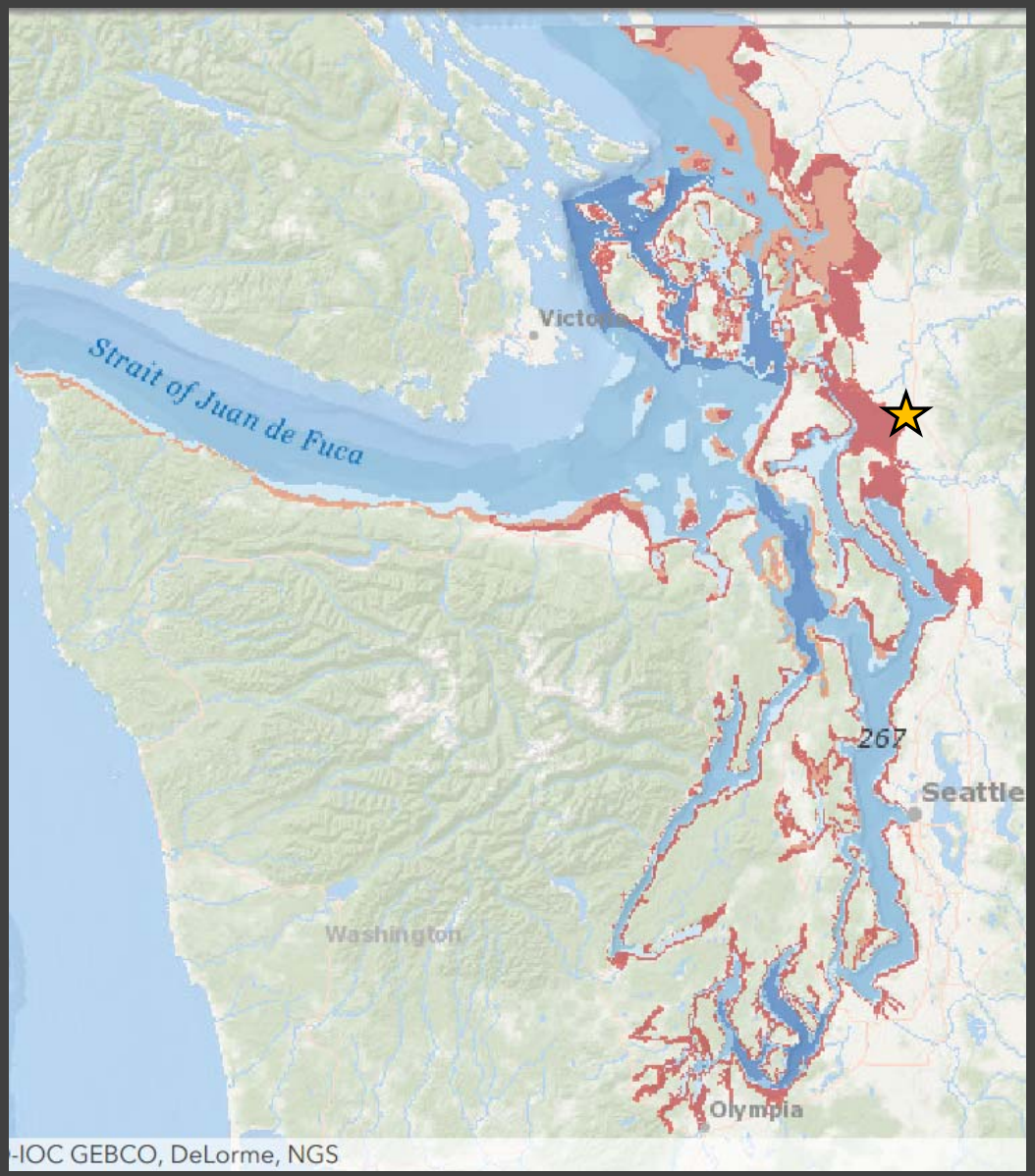
Salish Sea BIRDS Survey

- Washington waters of the Salish Sea
- Since 1994



Where are the dabbling ducks?

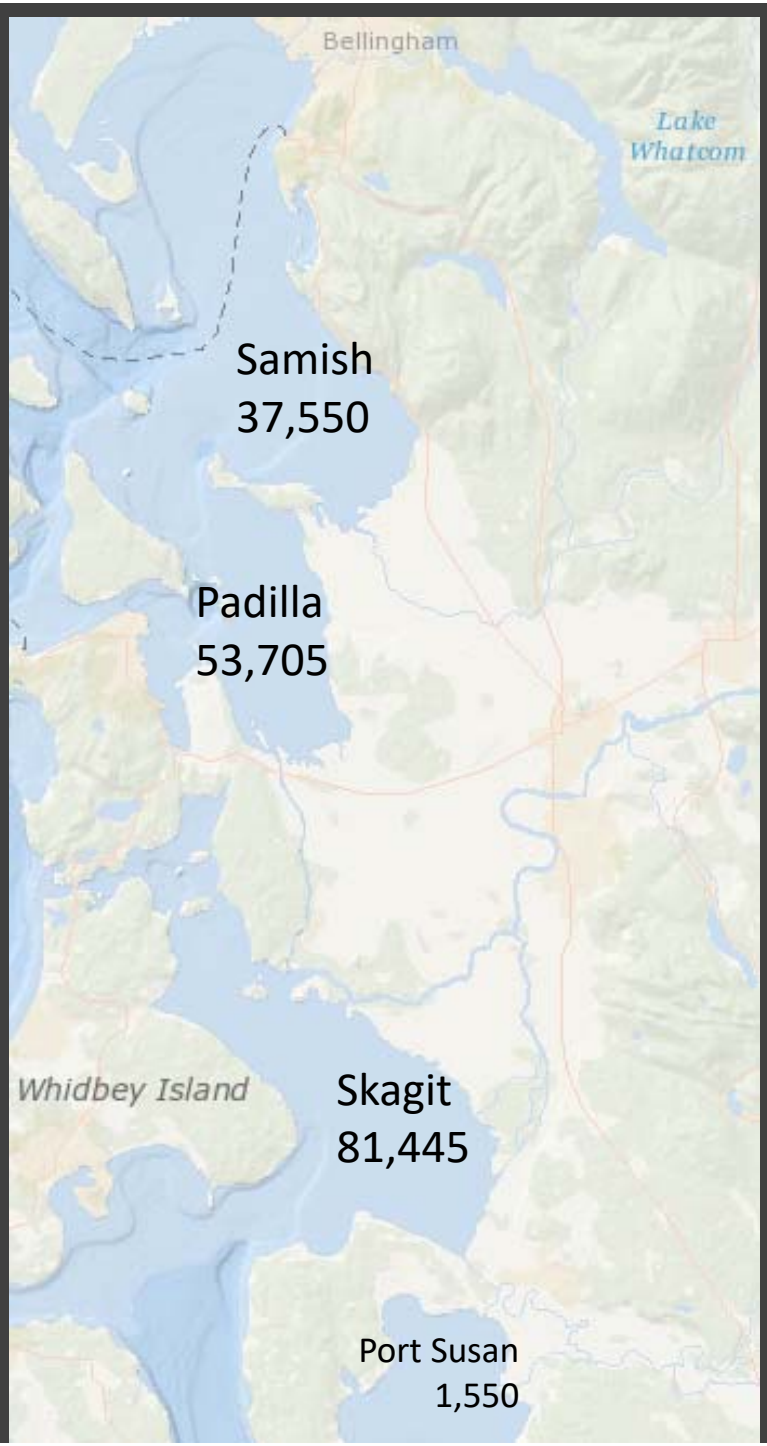
- 71-90% in North Puget Lowlands
- Long term average ~275,000 birds
  (200K – 375K)
- Highest densities of dabbling duck along nearshore
  - Mallard
  - Pintail
  - Wigeon
  - Green-winged Teal

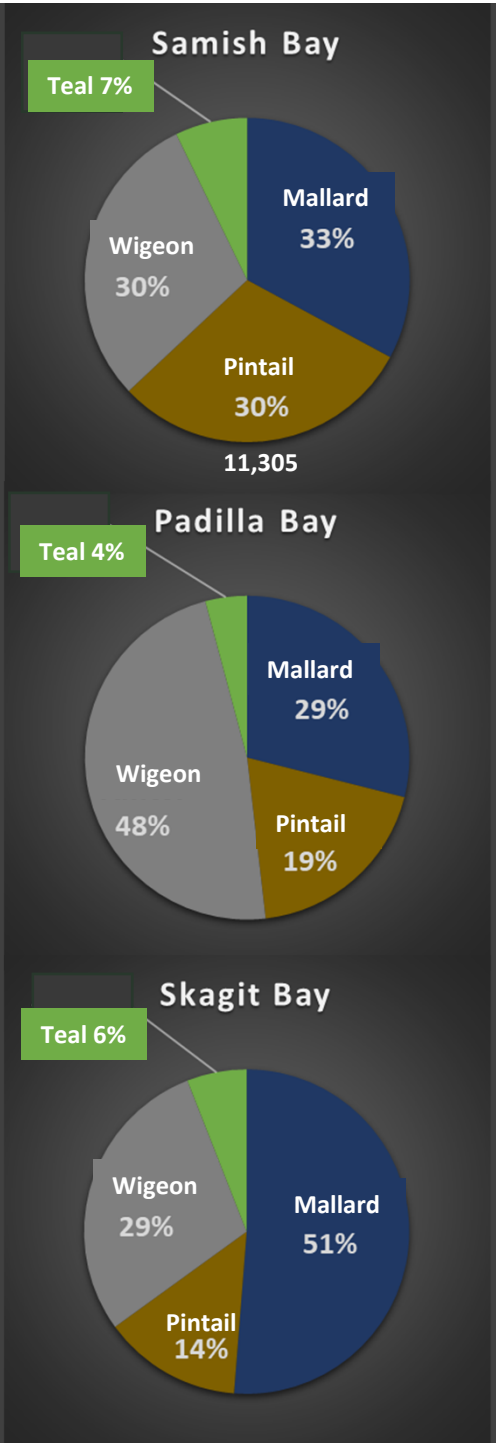


Local dabbling duck counts

- Period Surveys in some form since 1954-55
  - Mallard
  - Pintail
  - Wigeon
  - Green-winged Teal
- Single snap-shots in time
- Example:

  January 2, 2018





North Fork Skagit – Sept 24, 2019

Dabbling ducks in the estuary

"… Many waterbirds use both marine and farmland habitats on a daily and seasonal basis.

…For dabbling ducks in this [Fraser–Skagit] region, it appears that farmland adjacent to intertidal areas is an important component of coastal habitat complexes, …"

– Lovvorn and Baldwin 1996

Agricultural lands:

- Food types, quantity, availability & season influence waterfowl presence and distribution

However…

"A nearly exclusive corn diet can eventually become a nutritional drain rather than a benefit…"

(Labisky and Anderson 1973)

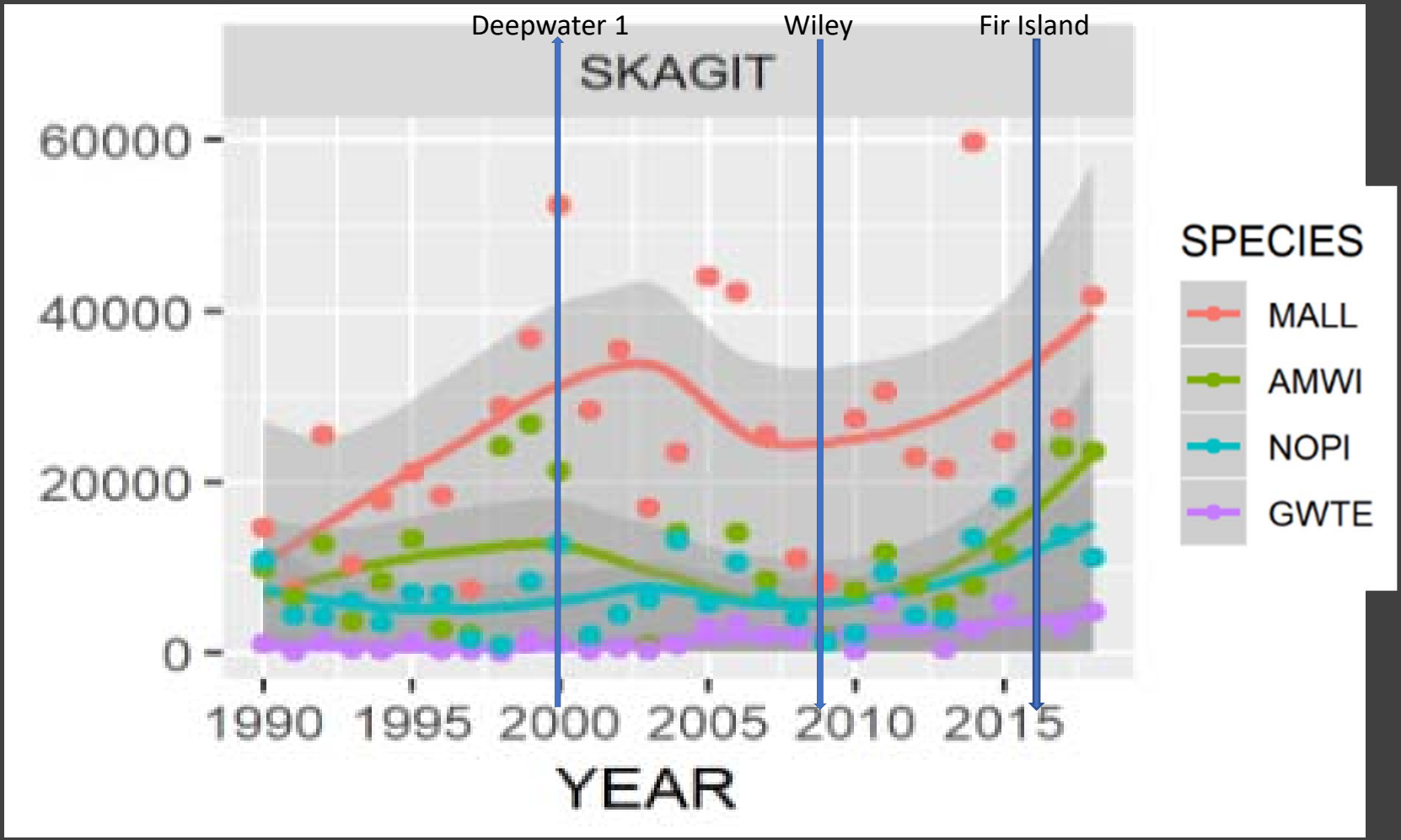
"Other food items such as animal matter, seeds, vegetation are critical as spring approaches."

(Krapu 1981)

Very little is known about food resources available to dabbing ducks in intertidal habitats

Does estuary restoration produce a dramatic change in waterfowl abundance?

Winter waterfowl counts 1990-2018



There is no obvious trend

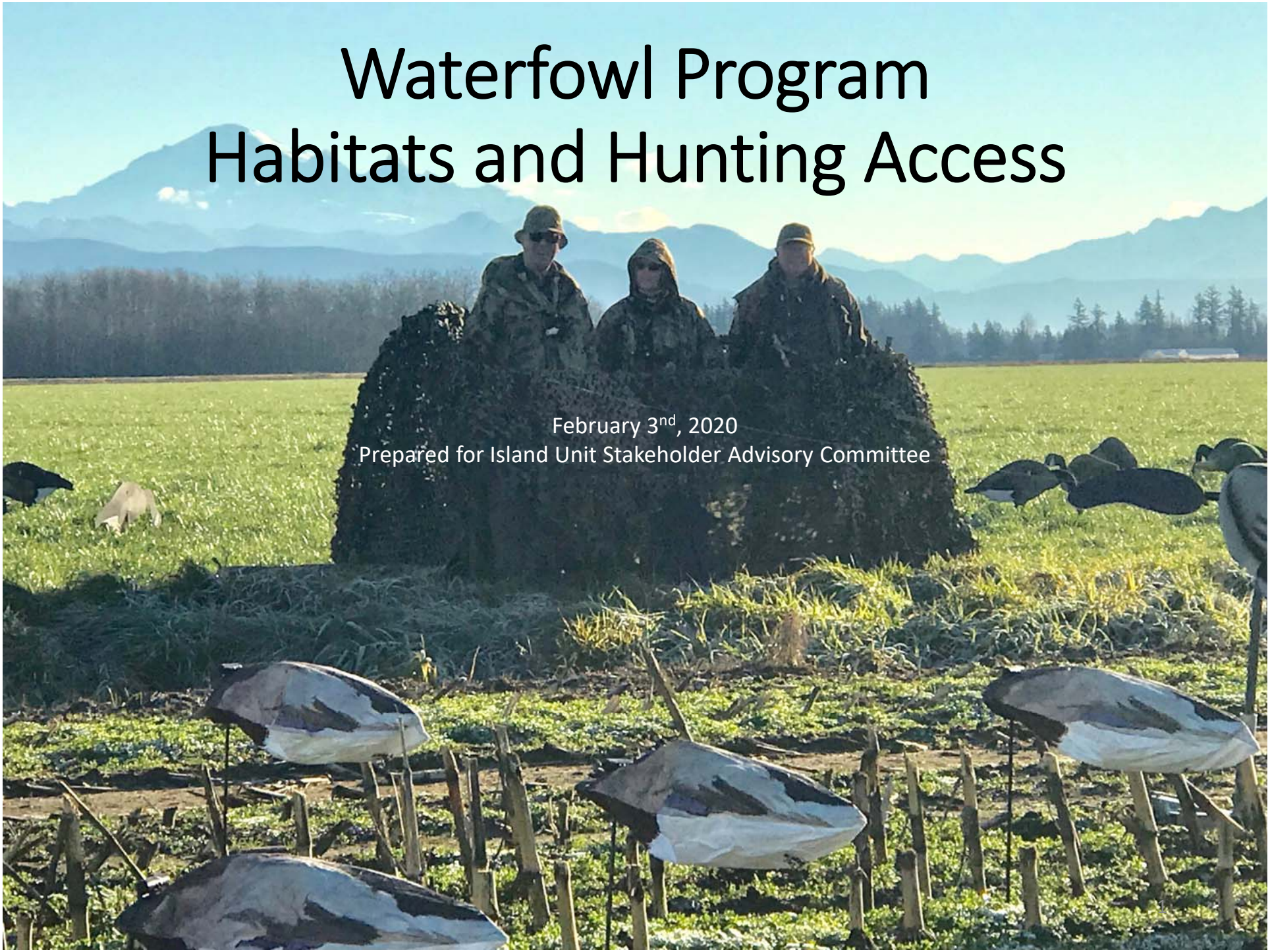
Waterfowl and the Skagit Wildlife Area: Island Unit

- Predominantly used by dabbling ducks
- Managed and Enhanced waterfowl forage provides:
  - intensely concentrated and accessible foraging habitat
    - unharvested agricultural and wetland plants
    - water managed seasonally to optimize feeding access
    - during late-fall, winter, and early-spring
- A proposed shift in the wetland type, would change:
  - Water depth and salinity
  - Stable “managed” freshwater (precipitation & river-level) to more dynamic (river-level & tide height-driven) fluctuations of water
  - Seasonal food values (types of plants and inverts)

Uncertainties regarding waterfowl and the Skagit Wildlife Area: Island Unit

- Relative value and timing of estuarine food resources (seed, plant, invertebrate).
- Long-term ability to maintain the water control structures that are required to produce managed and enhanced winter forage.
- How a change in forage would shift dabbling duck distribution and composition.
- Amount, and quality of alternative food resources available elsewhere on the landscape.
- The distance dabbling ducks would travel to seek out other foraging habitats.

Waterfowl Program
Habitats and Hunting Access



February 3nd, 2020
Prepared for Island Unit Stakeholder Advisory Committee

Waterfowl Program Habitats and Hunting Access

Waterfowl Programs

- Public Lands – Skagit Wildlife Area
- Habitat types and management
- Private Lands Access Program

Region 4 - Waterfowl Program changes

History and Status of Replacement lands

Projects since 2015 and moving forward

Purpose of WDFW Lands

WDFW Overall Mission: To preserve, protect and perpetuate fish, wildlife and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities.

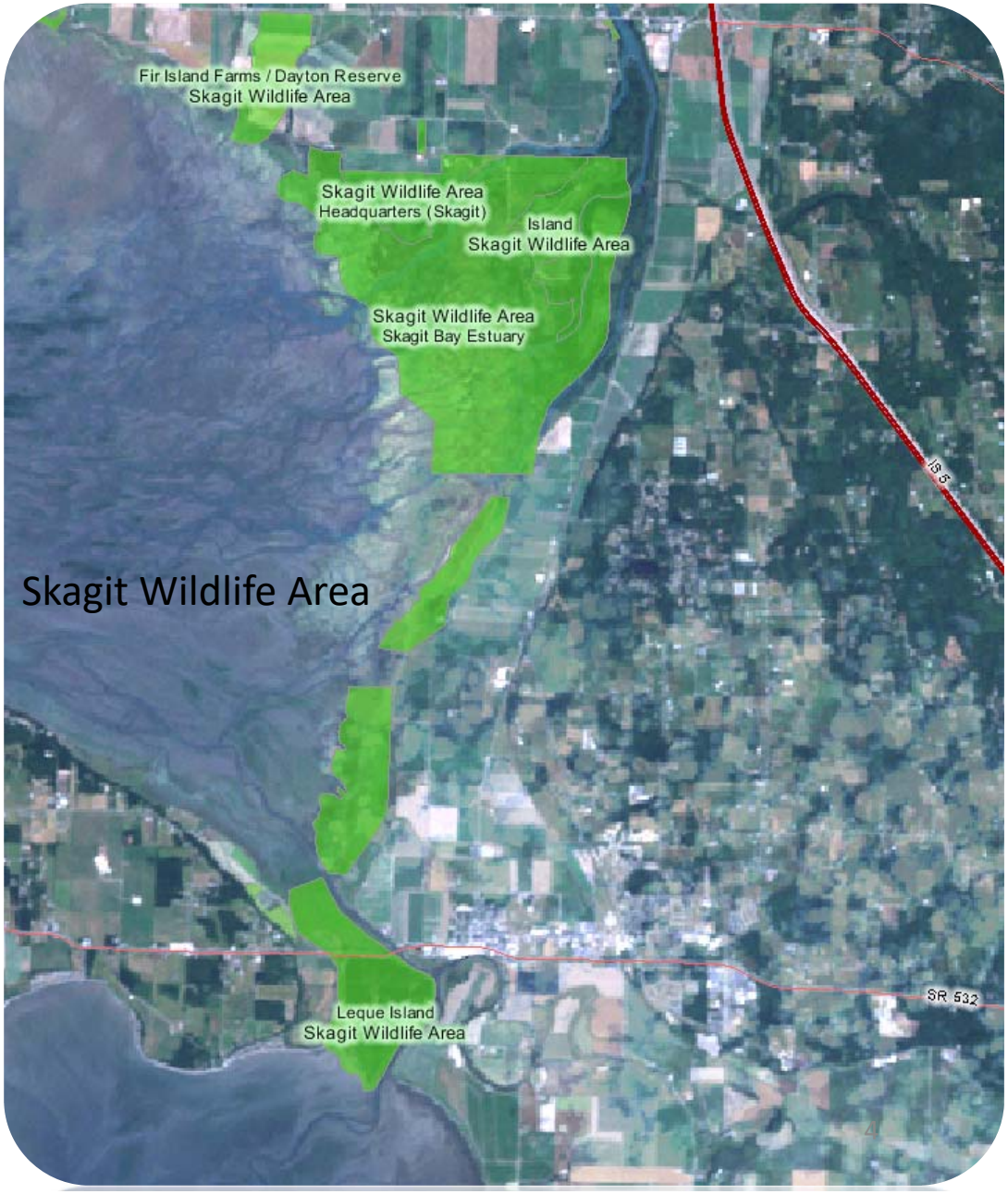
Washington Administrative Code 232-13-020. The primary purpose of department lands is the preservation, protection, perpetuation and management of fish and wildlife & their habitats. Public use on Department lands may include fishing, hunting, fish & wildlife appreciation,& other outdoor recreational opportunities when compatible with healthy & diverse fish & wildlife populations**.**

Purpose of WDFW Lands

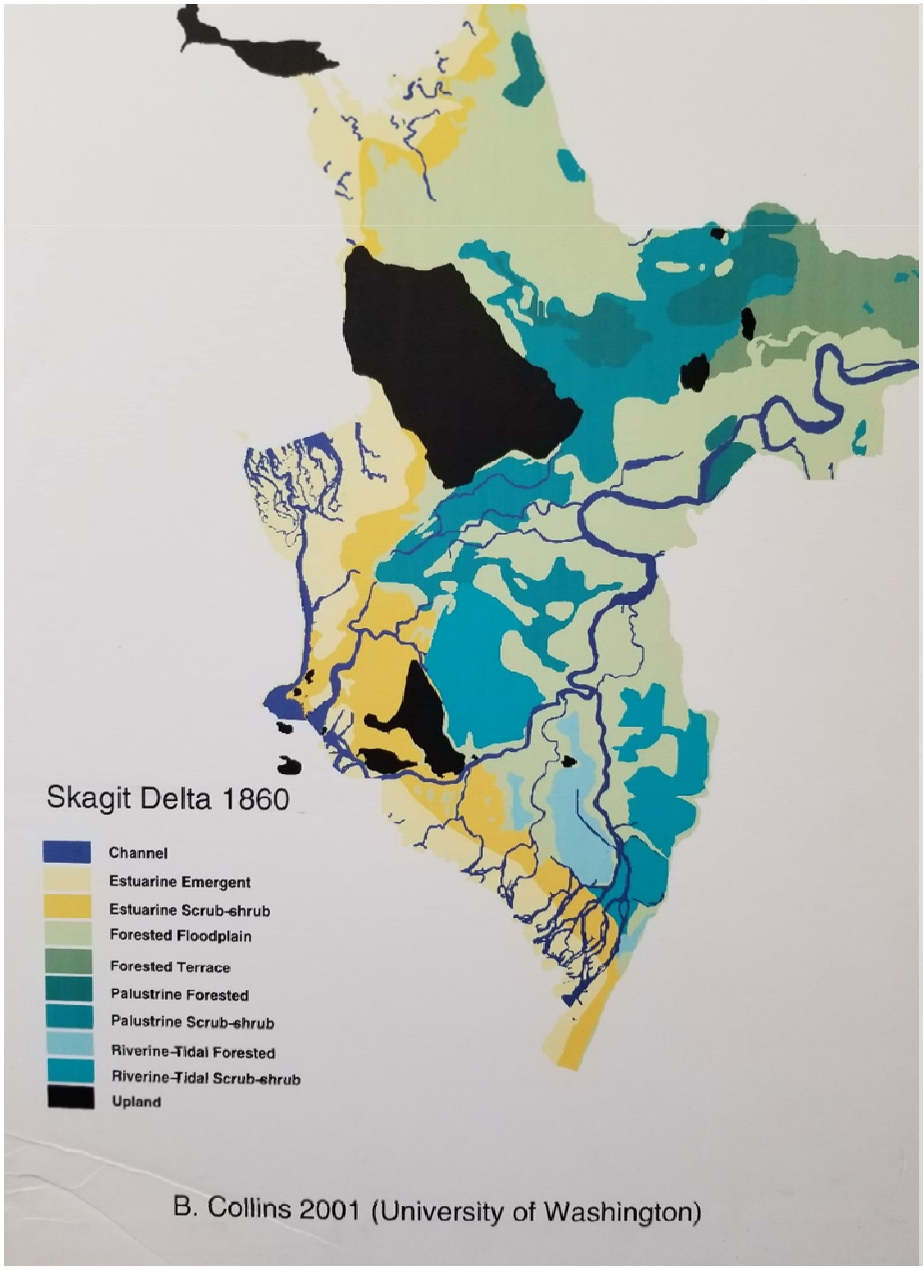
Dual Mandate

- Fish and Wildlife habitat
  - Management focused as waterfowl
  - Can benefit multiple species

- Public use and recreation where compatible
  - Boat launches
  - Parking areas
  - Trails
  - Viewing/hunting blinds



Wetland Loss



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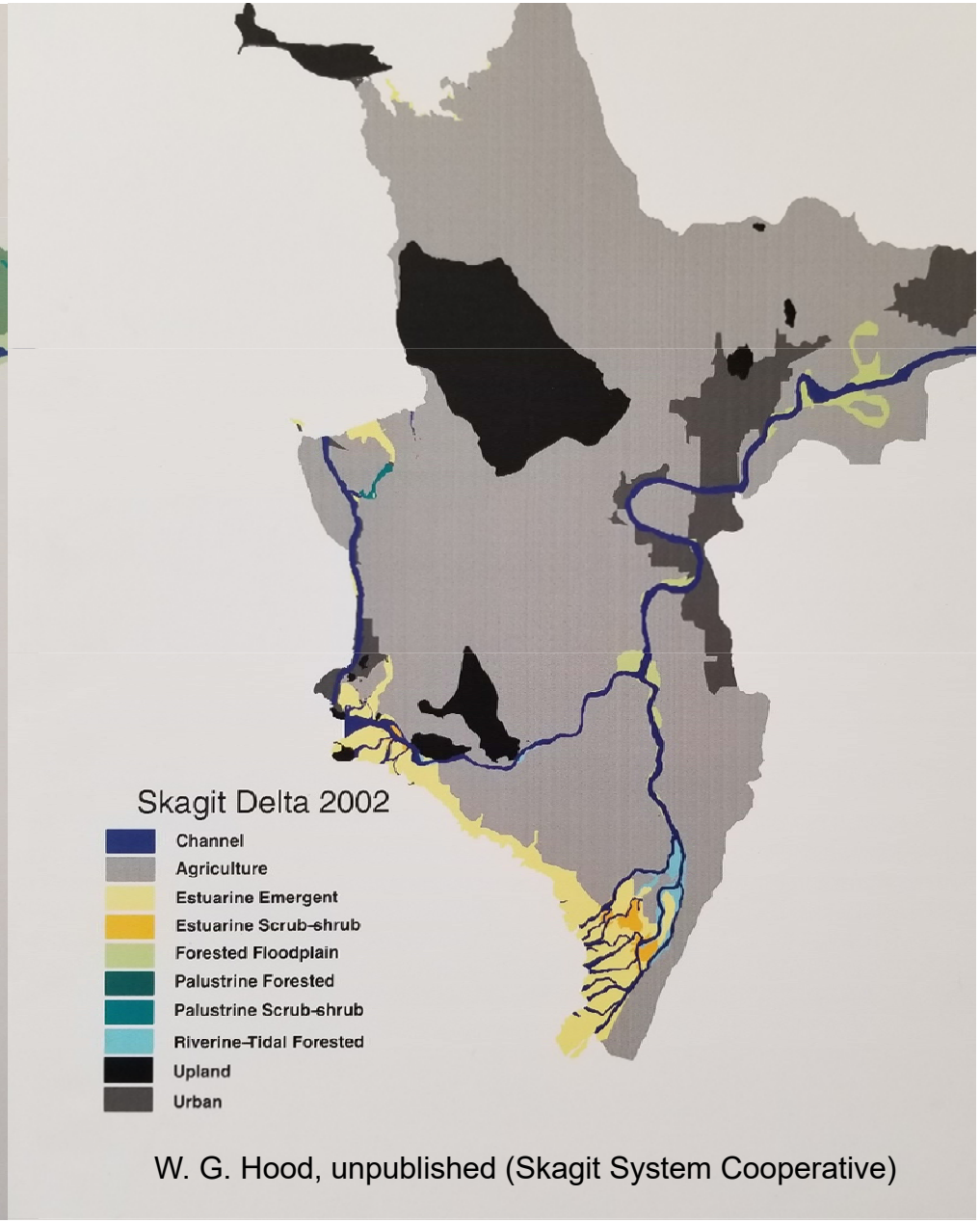

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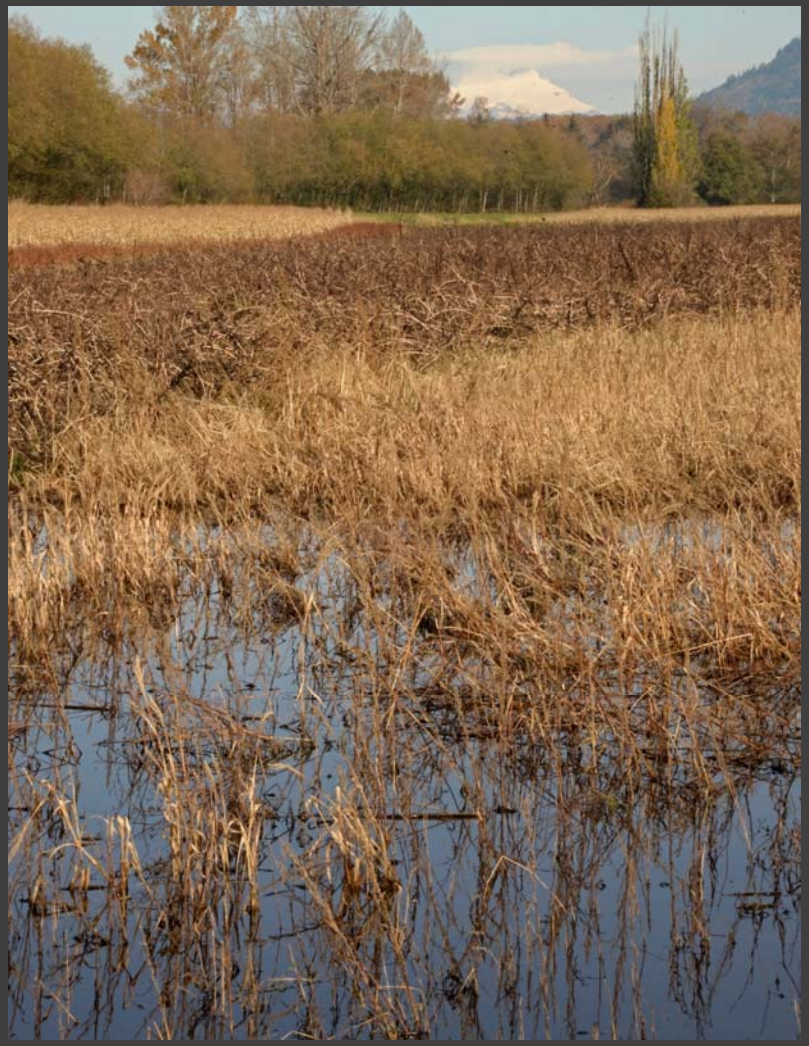


Habitat Management

- Create diverse food resources
  - Mix of agricultural crops and wetland plants
- Distribute over the land available
- Provide water conditions for forage access
- Find ways to expand timeframe usable

Habitat Management

How do we do it?

- Use standard agricultural practices to disturb the ground
- May plant agricultural or enhance with wetland plants
- Manage beneficial plants in system
- Manage weed species
- Manage water to make food available

Waterfowl Program - Habitat

Skagit Wildlife Area

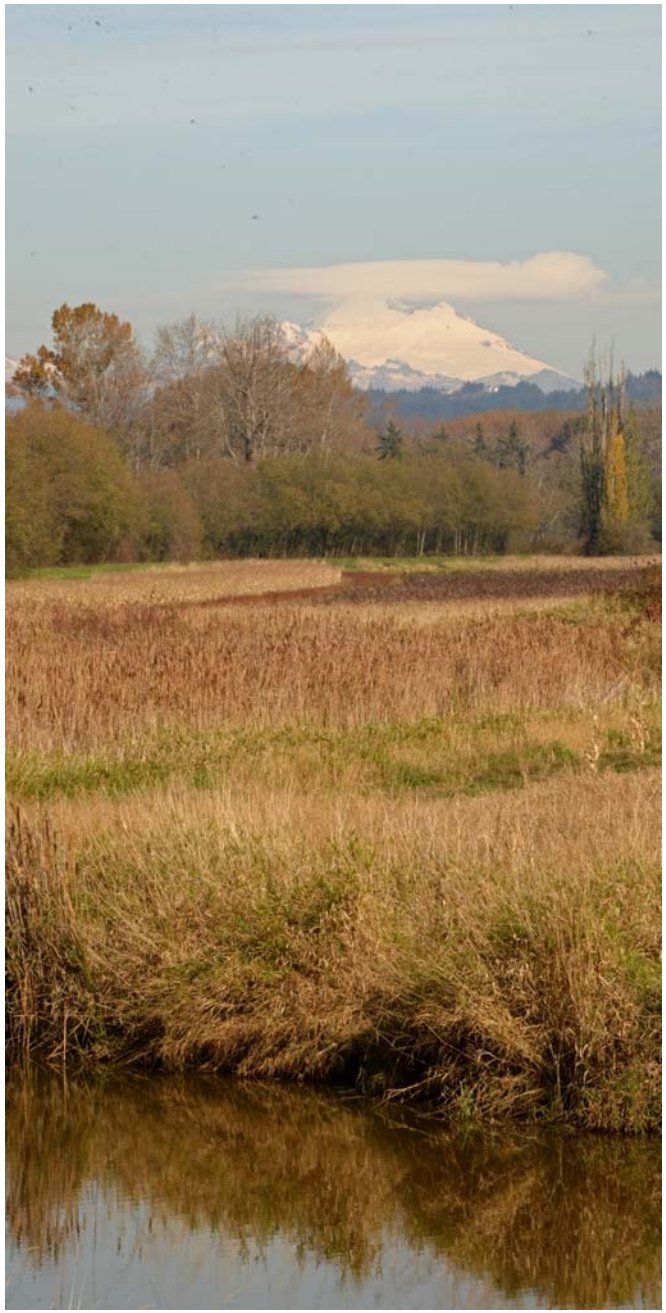
Habitat Types Provided:

- Enhanced Forage
- Managed Forage
- Intertidal Native Vegetation
- Riparian (tree/brush)

Enhanced Forage

Lands that are planted and/or managed to produce high value plants that are generally seed bearing and are left standing for forage.

Enhanced Forage includes cover crops, unharvested crops, and harvested crop areas at the Fir Island Farms (snow geese) and Johnson/DeBay's Slough Game Reserves (swans)



Enhanced Forage creates high intensity of use throughout most of the winter and spring for waterfowl and recreational users.

Skagit numbers:

~1037 acres in 2000
~490 acres in 2016

Managed Forage

Lands that Wildlife Area Staff or agricultural lessees manipulate through mowing, mid- to late-summer disking, grazing, flooding or other methods to improve habitat forage quality and access, and harvested commercial agricultural crops.

Managed Forage may include corn stubble, mowed fields, harvested crops. It may not provide the same intensity of use over time as the enhanced category.

Skagit numbers:

~175 acres 2000

~515 acres 2016

Intertidal Vegetation

Lands within the intertidal zone of the Lower Skagit River and Skagit and Port Susan Bays offering a mix of native and non-native emergent marsh species.

Intertidal Vegetation

Skagit numbers:

~11003 acres in 2000
~11561 acres in 2016

Lands that are made up primarily of mixed coniferous and deciduous trees, scrub/shrub, and other woody or rank vegetation consider less desirable for waterfowl hunting or forage. These areas can be located within or outside of the diked uplands.

Skagit numbers:

- ~883 acres in 2000
- ~747 acres in 2016

Riparian(tree/brush)

Waterfowl Program – Hunting Access

Skagit Wildlife Area – Public land
Private Lands Access Program

Private Lands Access Program

- Started with Snow Goose hunting on Fir Island
- Morphed into general waterfowl hunting opportunity in North Puget Sound with ~70 sites from the Lower Stilly to Canadian Border
- The PLAP provides over 7,500 hunt days.

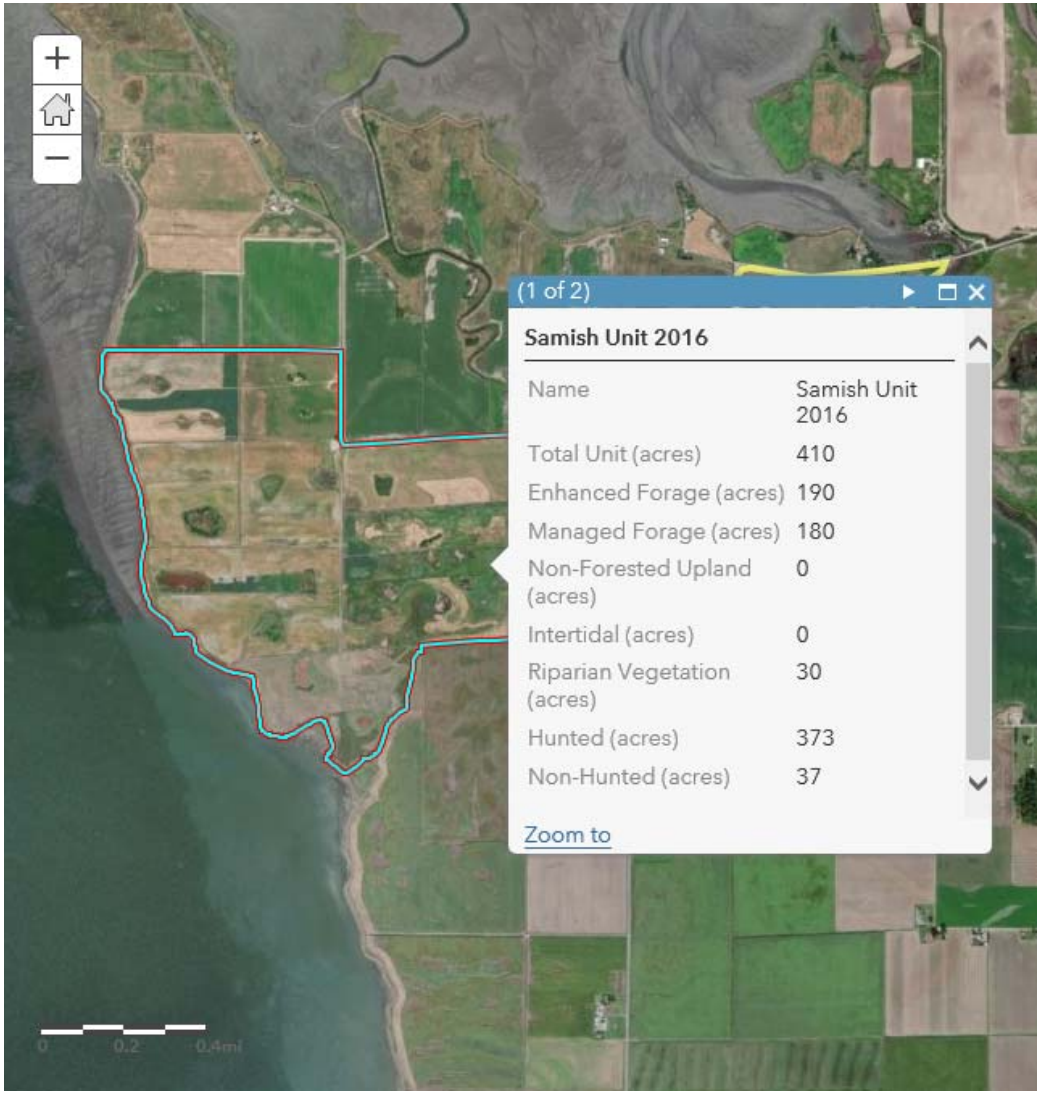
Private Lands Access Program

- Funded through Farm Bill (VPA). Not guaranteed money. In a new grant cycle now.
- Sites change year to year.
- Work with farmers to provide enhanced waterfowl forage.
- WA Duck Stamp funding, no guarantee.

Waterfowl program changes over time

Waterfowl program changes over time

Waterfowl program changes over time



Waterfowl program changes over time

Skagit Wildlife Area: Habitat Changes Between Year 2000 and 2016

	Total Unit Acres		Enhanced Forage		Managed Forage		Non-forested Upland		Intertidal		Riparian (tree/brush)		Hunted Acres		Non-Hunted Acres	
Unit Name	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016
SKAGIT WILDLIFE AREA																
Fir Island Farms*	297	297	249	95	0	5	0	0	27	193	21	0	0	0	297	297
Headquarters*	193	193	78	0	4	0	0	0	0	183	111	10	168	168	25	25
Island*	477	477	162	125	86	10	0	14	0	209	229	119	477	477	0	0
South Leque*	317	317	222	0	0	0	0	259	60	60	0	0	297	297	20	20
North Leque*	109	109	36	0	0	0	25	0	73	73	0	0	96	96	13	13
Samish	410	410	230	190	0	180	180	0	0	0	0	30	373	373	37	37
Samish River	0	104	0	0	0	10	0	94	0	0	0	0	0	10	0	94
South Padilla Bay	0	245	0	20	0	225	0	0	0	0	0	0	0	20	0	225
Skagit Totals	**13316**	**13731**	**1037**	**490**	**175**	**515**	**205**	**367**	**11003**	**11561**	**883**	**747**	**12115**	**12211**	**1199**	**1520**
Skagit Net Change	415		-547		340		162		558		-136		96		321	

Notes: For simplification, only Units that have significantly changed are shown in this table totals include all units.
Acreages are approximations using aerial imagery.

Waterfowl program changes over time

Private Lands Access Program: Habitat Changes Between Year 2000 and 2016

	Total Unit Acres		Enhanced Forage		Managed Forage		Non-forested Upland		Intertidal		Riparian (tree/brush)		Hunted Acres		Non-Hunted Acres	
Unit Name	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016
REGION 4 PRIVATE LANDS ACCESS PROGRAM (PLAP)																
Skagit County	0	579	0	148	0	417	0	0	0	14	0	0	0	579	0	0
Snohomish County	0	602	0	54	0	548	0	0	0	0	0	0	0	602	0	0
Whatcom County	0	771	0	20	0	751	0	0	0	0	0	0	0	771	0	0
PLAP Totals	**0**	**1952**	**0**	**222**	**0**	**1716**	**0**	**0**	**0**	**14**	**0**	**0**	**0**	**1952**	**0**	**0**
PLAP Net Change	1952		222		1716		0		14		0		1952		0	

Waterfowl program changes over time

Region 4: Total Net Habitat Changes Between Year 2000 and 2016

	Total Unit Acres		Enhanced Forage		Managed Forage		Non-forested Upland		Intertidal		Riparian (tree/brush)		Hunted Acres		Non-Hunted Acres	
Unit Name	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016	Year 2000	Year 2016
REGION 4 TOTAL NET CHANGE	Total Unit Acres		Enhanced Forage		Managed Forage		Non-forested Upland		Intertidal		Riparian (tree/brush)		Hunted Acres		Non-Hunted Acres	
	3196		-186		2705		-49		572		116		2837		384	

Replacement Lands

Replacement Lands

TIMELINE:

- **2007**: Wiley Slough Restoration Project planning is underway. Concept of purchasing land elsewhere to make up changed habitat and recreation is adopted, coined as "Replacement Lands".
- **2007-2009:**
  - Community meetings
    - Concern from agriculture community about further loss of farmland
  - WDFW and Western WA Agricultural Association develop document outlining land acquisition priorities.
  - Legislature does not fund proposal to purchase waterfowl forage/hunting properties.

Replacement Lands

TIMELINE:

- **2013-2015**: Skagit District WDFW staff form "Acquisition Team" to develop a replacement lands plan.
- **2015-2019**:
  - WDFW staff complete replacement lands initiative.
  - Staff identify willing sellers and apply for funding. All proposals have fallen below funding lines, due to grant program priorities.

Replacement Lands

CONSISTENT CHALLENGES:

Funding:

1. Property is expensive in this area compared to other regions. In grant competitions, there is more acreage per dollar elsewhere.
2. Most grant opportunities favor projects that restore ecosystem processes compared with managed systems.

Lack of available property:

1. Lack of willing sellers with suitable land. Need large parcel adjacent to bayfront with ability to control water and grow crops.

Local community needs:

1. Local concerns about converting commercial agriculture to other uses.

Waterfowl/ Access projects since 2015

Samish Unit enhancement project

- Improved drainage and habitat on 400 acres

Samish River Unit enhancement project

- Improved habitat on 100 acres, two seasonal blinds

New boat launches to improve access

- Hamilton Landing new motorized launch to lower Stilly and Port Susan (underway)
- Davis Slough new kayak launch to Leque
- Headquarters launch improvements (underway)
- Ebey Island kayak launch (underway)

New parking areas

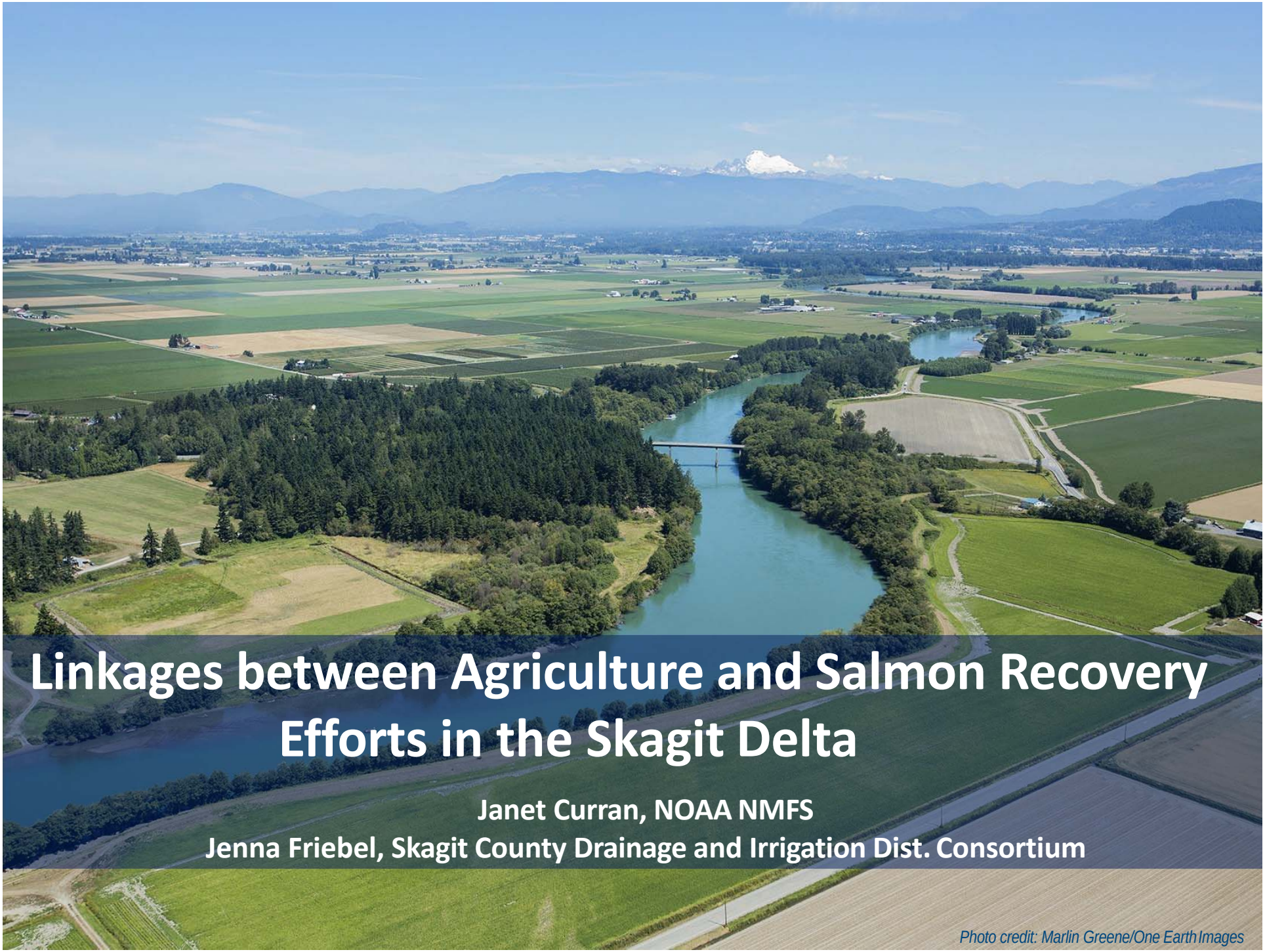
- Samish River Unit
- Ebey Island

New Access Possibilities

- PLAP in Snohomish – Monroe area
- Smith Island, 300+ acres of new opportunity negotiated with Snohomish County
- Lands 20/20 proposal for acquisition
- Exploring more structured long term access agreements with Ag community
- Skagit Wildlife Area Plan
    - Evaluate existing property management
    - Identify opportunities for increasing forage and hunting
- Ebey Island Multi-Benefit Planning grant, which will include improving waterfowl habitat and hunting access as a goal

Summary

WDFW remains committed to continuing to provide waterfowl hunting opportunities in Skagit County, though recognizes that as the landscape changes and other needs arise in the area, strategies and tools to provide these opportunities must adapt with the times.



Linkages between Agriculture and Salmon Recovery Efforts in the Skagit Delta

Janet Curran, NOAA NMFS
Jenna Friebel, Skagit County Drainage and Irrigation Dist. Consortium

Photo credit: Marlin Greene/One Earth Images

Presentation Overview

Agriculture in the Skagit Delta

Regulatory/Legal/Political Framework
- House Bill 1418
- Endangered Species Act/Recovery Plan
- Skagit Tidegate Fish Initiative (Federal Permitting/ESA)

Hydrodynamic Modeling Project

The Importance of Skagit Agriculture

Economic Development Alliance of Skagit County

- The Skagit Valley is one of the United States' most fertile regions
  - The "largest and most diverse agricultural communities west of the Cascade(s)" (WSU 2018).
  - Produce half of the US supply Chinese cabbage, Chinese kale, Chinese mustard seeds
  - Produce half of the world's beet and brussel sprout seed
- Center for the Pacific Northwest's local food movement and agriculture sustainability initiatives
- Skagit Valley Value-Added Agriculture Innovation Partnership Zone

Puget Sound Regional Council Goal to Enhance economic viability of local and regional food systems

- Skagit County ranks 4th in dairy production in Washington State.

Governors' Results Washington

- Goal 3: Sustainable Energy and Clean Environment includes increasing acreage dedicated to working farms.

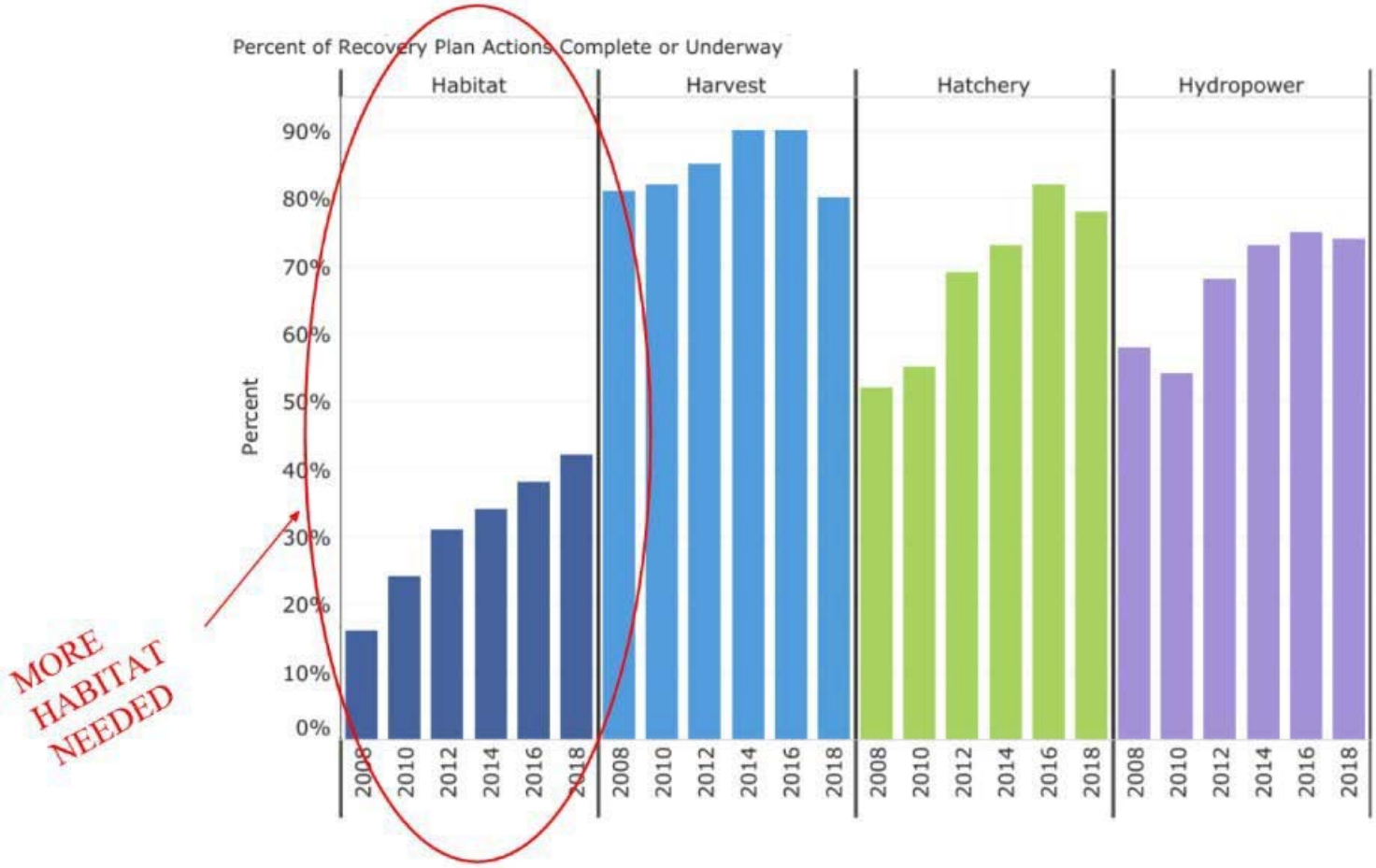
Regulatory/Legal/Political Framework

- Chinook Recovery Plan
  - Serves as a Roadmap for Habitat Restoration
- State Law- House Bill 1418
- Endangered Species Act
- Tribal Treaty Rights

How do we achieve Salmon Habitat Restoration Goals *and* maintain Agricultural Infrasture and production?

Puget Sound Chinook Recovery Plan: Status

Across Puget Sound, Habitat Restoration is Slower than Anticipated



Skagit Chinook Recovery Plan: Delta Component

- Focuses on habitat restoration

Skagit Chinook Recovery Plan Priority Projects (Alphabetical Order)
Table 7.1 from Appendix D of the Skagit Chinook Recovery Plan

Project Area	Potential estuarine area (ha)
Cross Fir Island Connector	191.175
Deepwater Slough Phase 2	108.515
Dodge Valley	34.201
Fisher Slough	27.503
Milltown Island	68.789
North Fork Setback	266.215
South Fork Setback	16.305
Sullivan Slough Setback	79.616
Swinomish Channel East[1]	196.926
Swinomish Channel West[1]	60.397
Wiley Slough	65.000
Swinomish Channel Causeway (change in existing habitat due to connectivity)	NA
Total	**1,114.642**

Deepwater Sough/Island Unit
268 Acres = 9.7 % of habitat goal

Skagit River Delta Chinook Recovery
Large Scale Projects Complete to Date

Project Name	Year	Tidal Area Restored (acres)
Deepwater Slough	2000	221
Smokehouse Floodplain Phase 2	2005-08	43
Milltown Phase 1	2006-07	212
SF Dike Setback	2007	40
Swinomish Channel Fill Removal	2008	12
Wiley Slough	2009	161
Fisher Slough[+]	2010-11	61
Fir Island Farm	2015-16	131

Before Plan

After Plan

Before TFI

After TFI

[+]Fisher Slough was part way through project design when TFI signed

HOUSE BILL 1418 Washington State (Farm AND Fish)

ENGROSSED SECOND SUBSTITUTE HOUSE BILL 1418. AS AMENDED BY THE SENATE- 2003 Passed

- The state shall: develop "A long-term plan for intertidal salmon habitat enhancement to meet the goals of salmon recovery and protection of agricultural lands."

- The proposal shall consider all other means to achieve salmon recovery without converting farmland. The proposal shall include methods to increase fish passage and otherwise enhance intertidal habitat on public lands pursuant to subsection (2) of this section…"

- "a priority list of intertidal salmon enhancement projects, and recommendations for funding of high priority projects. In conjunction with other public landowners and the task force, the department shall develop an initial salmon intertidal habitat enhancement plan for public lands in the county. The initial plan shall include a list of public properties in the intertidal zone that could be enhanced for salmon…"

- "The final intertidal salmon enhancement plan-completed in 2005

https://salishsearestoration.org/images/f/fb/Smith_et_al_2005_tide_gate_salmon_recovery_analysis_skagit.pdf

HB1418 Task Force Members

Phil Bakke, Island County Planning Department
Bob Carey, The Nature Conservancy
Ken Dahlstedt, Skagit County Commissioner
Frank Easter, Natural Resource Conservation Service
Curtis Johnson, Western Washington Agricultural Association
Marcia Isenberg, Snohomish County Council
Doreen Malony, Upper Skagit Tribe
Will Roehl, Washington Fish and Wildlife Commission
John Roozen, Washington State Farm Bureau
Micheal Rylko, Environmental Protection Agency
Ron Shultz, Office of the Governor
Shirley Solomon, Skagit Watershed Council
Alison Studley, Skagit Fisheries Enhancement Group
Curtis Tanner, U.S. Fish and Wildlife Service and NOAA Fisheries
Lyle Wesen, Dike, Drainage, and Irrigation Districts

HB1418 Technical Team Members

Josh Greenberg, Skagit County
Tom Karsh, Skagit County
Jeff McGowan, Skagit County
Lyle Wesen, Dike, Drainage, and Irrigation Districts
Curtis Johnson, Western Washington Agricultural Association
John Roozen, Washington State Farm Bureau
Ed Manary, Conservation Commission
Carol Smith, Conservation Commission
Ben Perkowski, Skagit Watershed Council
Michael Rylko, Environmental Protection Agency
Bob Warinner, WDFW
Brian Williams, WDFW

The 2005 HB1418 final report is predicated on three basic assumptions:

1) Habitat restoration is voluntary

2) Site-specific feasibility and design is necessary

3)The integrity of the agricultural drainage infrastructure must be maintained or improved.

.

House Bill 1418 Priority Restoration Project List

Tier 1 Projects (public lands)	Status
Wiley Slough	Complete
Leque Island	Complete
Milltown Island	Adaptive Management
Deepwater Slough/Island Unit	

Tier 2 Projects (public/private lands)	Status
Dry&Brown Slough/ Fir Island Farm	Complete
LaConner Area/Dodge Slough	

Tier 3 Projects (public/private lands)	Status
Rawlins Road	
South Forke Pole Yard	
Hall Slough	

Other Identified Projects (private ag land)	Status
Fisher Slough	Complete

What is the Tidegate and Fish Initiative?

Programmatic Consultation and Implementation Agreement

- Created a linkage between Tidegate Maintenance and Estuary Restoration
- Debit/Credit Tracking System
- Provides regulatory pathway for tidegate maintenance and repair

Programmatic Consultation

- Biological Opinion: ESA Section 7 Consultation between NOAA/NMFS and Army Corps)

Implementation Agreement Signatories

- Western Washington Agricultural Association
- NOAA Fisheries
- WDFW
- All dike, drainage and irrigation districts in the Skagit delta that manage tidegates

TFI Signatories Shared Roles and Responsibilities

Mutual success depends on our ability to work together

Districts/WWAA	NOAA/WDFW
Work together to develop and prioritize restoration concepts that balance salmon recovery goals and farmland protection	
• Work with the restoration community to make the landowner contacts necessary to secure the permissions, easements or ownerships to implement the restoration projects • Work with landowners to understand habitat restoration goals • Provide input and technical comments on project analysis and design	• Work with agricultural community to ensure drainage and flood protection infrastructure is not impacted by restoration actions • Fund restoration projects • Lead design, permitting, and construction of restoration projects • Provide long term stewardship and monitoring of restored lands

TFI CREDITS AS OF JANUARY2020

Total credits generated to date:

Fisher Slough Restoration + 36.8 credits

Fir Island Farm Restoration + 132.0 credits

= + 168.8

Total credits used to date: - 85.0

(eg. Higgins Slough - 27 credits,
Little Wiley - 5.2 credits, etc.)

Balance +83.8 Available for Maintenance

Restoration is outpacing repairs, but restoration and tidegate maintenance are much slower than anticipated

*Deepwater Phase 2/Island Unit would generate 268 TFI Credits

Key Points

HB 1418 prioritizes restoration on public lands and avoiding conversion of private farmland

- Deepwater Slough/Island Unit was identified as a Tier 1 project in the HB 1418 report in 2005 and Chinook Recovery Plan

TFI links estuary restoration with regulatory certainty for tidegate maintenance

- Deepwater Slough/Island Unit was identified 2010
- Project would generate 268 credits and achieve 9.7 % total restoration acreage goal

How to Find Balance Between Agriculture and Salmon Recovery
Skagit HDM Project

Improve the quality of Washington's natural resources: Salmon/Puget Sound Recovery

- The Skagit River is the only river around that produces substantial runs of all of native salmon and trout species
- Skagit River produces 60% of Puget Sound Chinook Salmon.
- Skagit River is one of the main bull trout strongholds in the United States.

Maintain current level of statewide acreage dedicated to working farms: No Net Loss of Ag Land

- The Skagit Valley is recognized as some of the most agriculturally productive farmland in the world
- More than 80 crops and dairy products can be produced
- The Skagit Valley is a major worldwide producer of vegetable seeds

Photo by Marlin Greene One Earth Image

Skagit HDM Project Overview
Alternatives Analysis Project

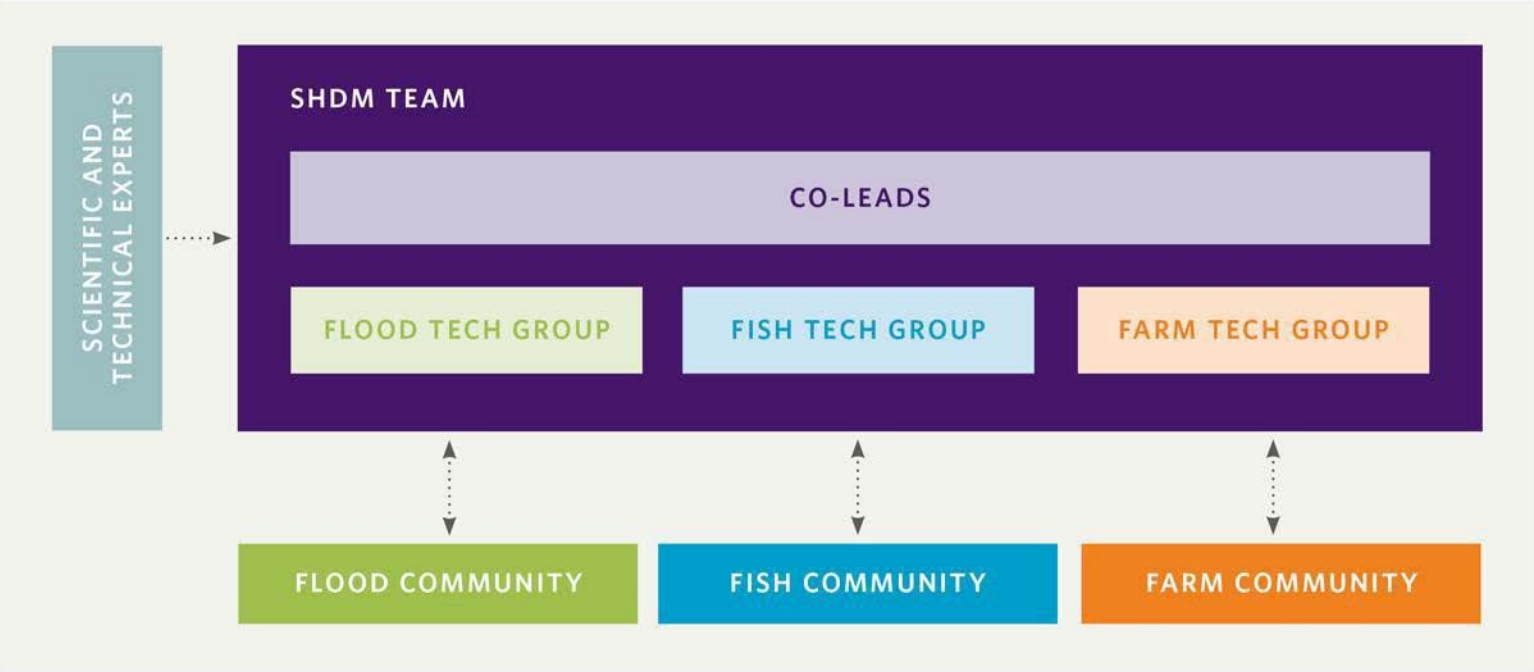
"Develop a suite of projects that are well-supported to achieve the long-term viability of Chinook salmon tidal delta habitat and community flood risk reduction in a manner that protects and enhances agriculture and drainage."

Provides **transparency** about the **benefits and impacts**

of estuary restoration concepts

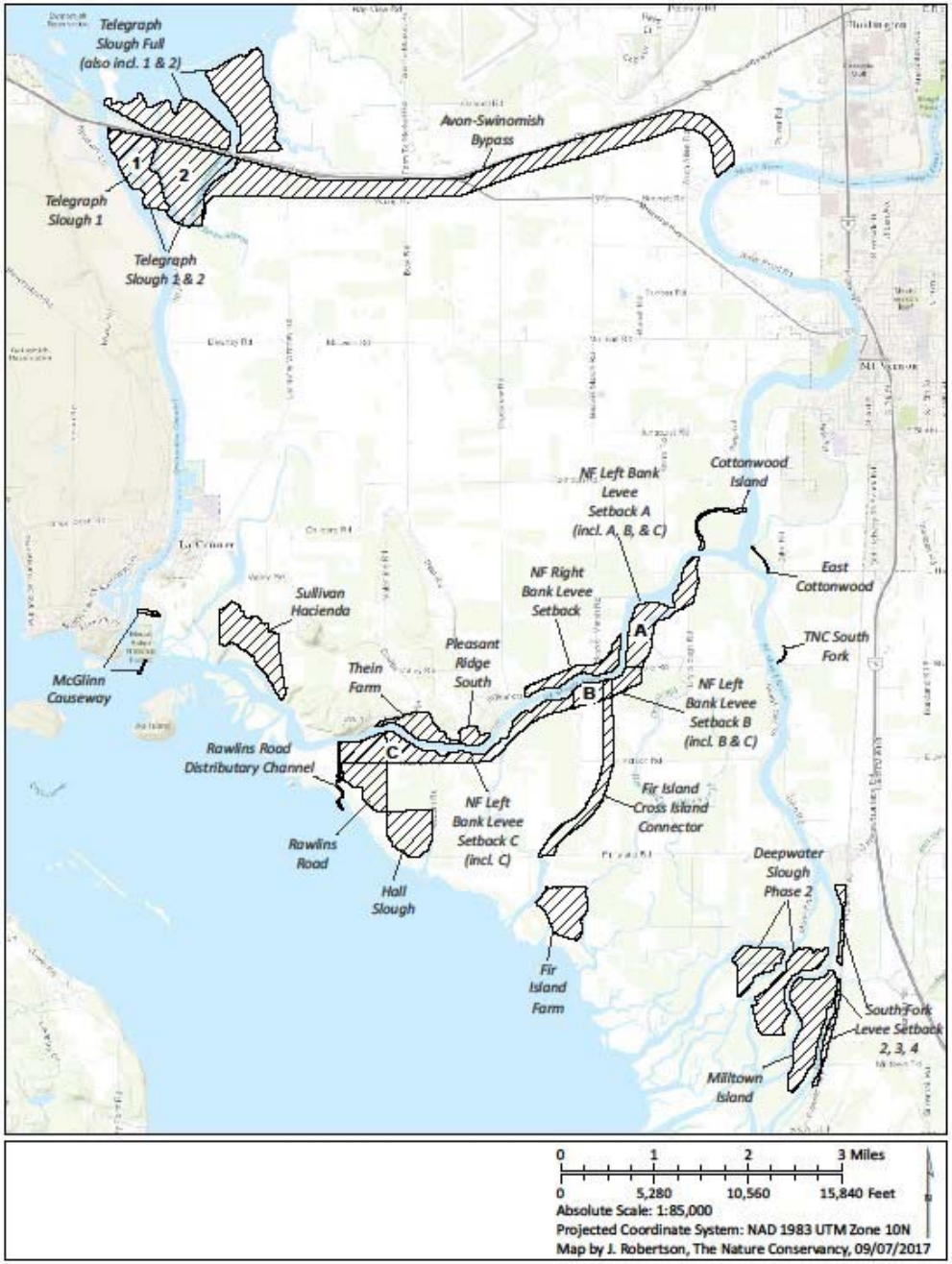
Project Working Group

- Skagit Co. Dike District #3
- Skagit Co. Dike District #17/Dike District Partnership
- Dike & Drainage District #22
- NOAA Restoration Center
- Seattle City Light
- Skagit Conservation District
- Skagitonians to Preserve Farmland
- Skagit Watershed Council
- The Nature Conservancy
- Upper Skagit Tribe
- US Geological Survey
- WA Dept. of Fish and Wildlife
- Western WA Agricultural Assoc.



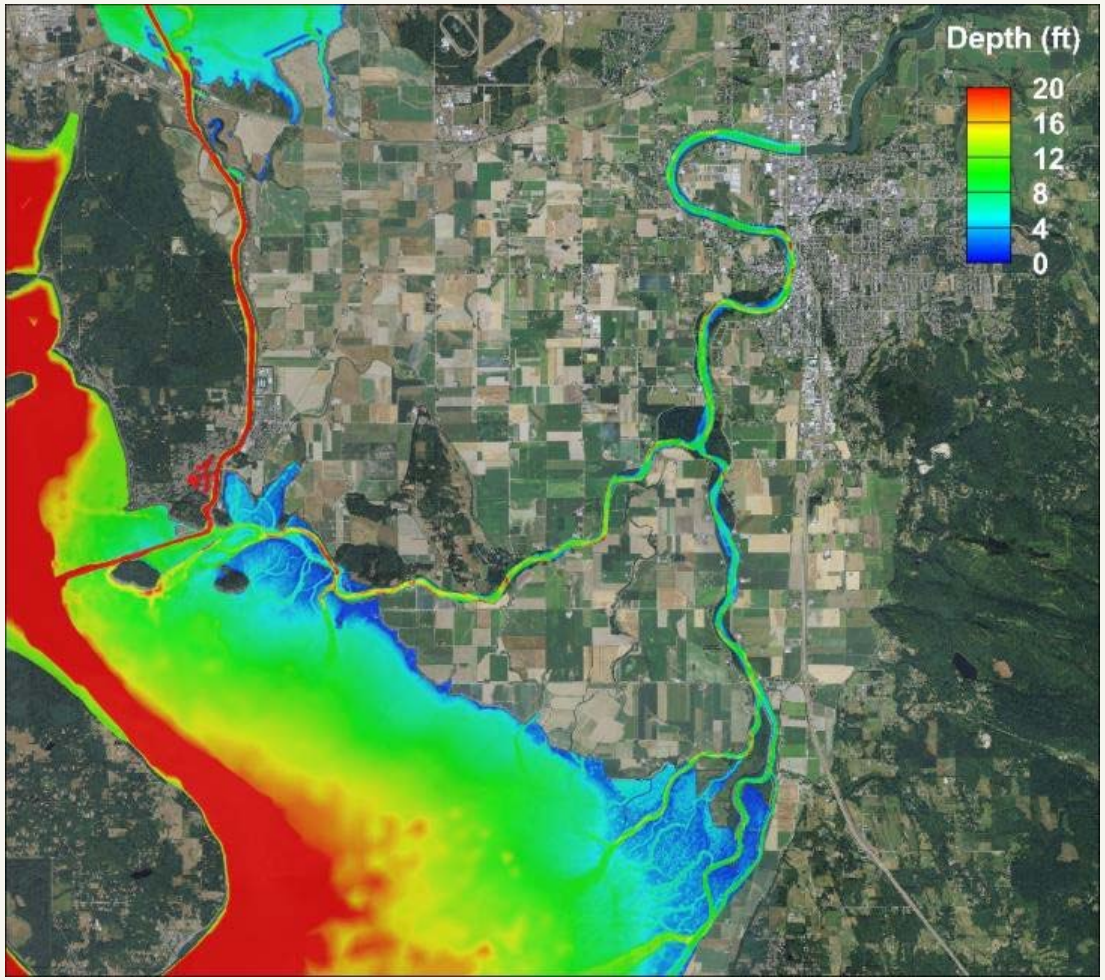
23 Project Concepts

- *Chinook Recovery Plan*
- *Skagit Flood GI*
- *Concepts identified by local partners*



Best available science – used to calculate indicators

- 3D hydrodynamic model (Batelle)
- channel development model (Greg Hood, SRSC)
- chinook smolt model (Eric Beamer, SRSC)
- GIS (Jamie Robertson, TNC)
- vegetation predictions
- Sediment characterization (Eric Grossman, USGS)

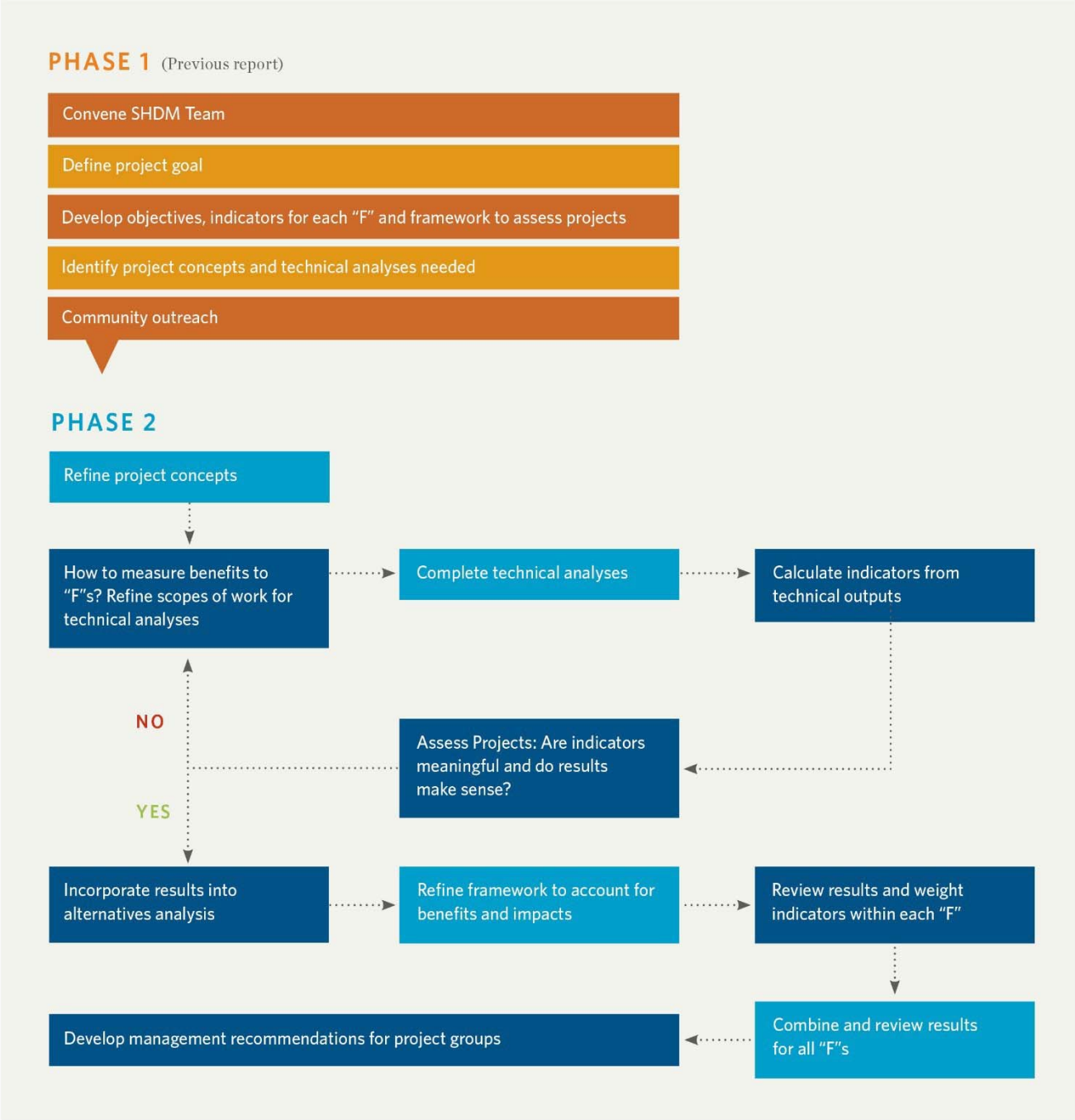


Iterative & Thoughtful Process

Phase 1
2012-2014

Phase 2
2014 - 2017

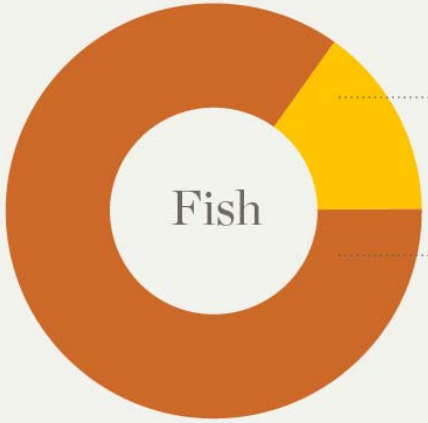
- Transparent and inclusive
- Seek understanding between interests
- Adapt to new input and ideas



Logic Framework

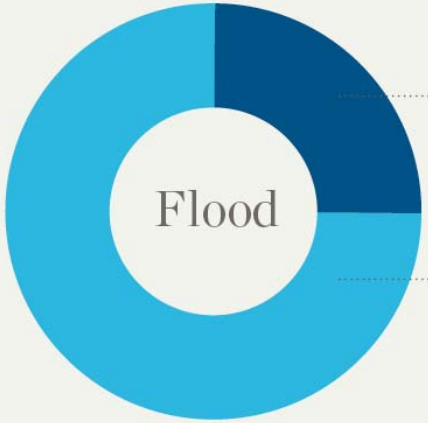
IMPACT - 40 PTS
- Minimize farmland loss
- Avoid preserved farmland

BENEFIT - 60 PTS
- Maximize fish/acre farmland
- Support regulatory agreements
- Prioritize public lands



IMPACT - 15 PTS
- Minimize loss of existing habitat

BENEFIT - 85 PTS
- Restore tidal and riverine processes
- Increase suitable channel habitat
- Increase number of smolts
- Increase connectivity
- Restore diverse habitat types



IMPACT - 25 PTS
- Minimize new levees systems where none existed

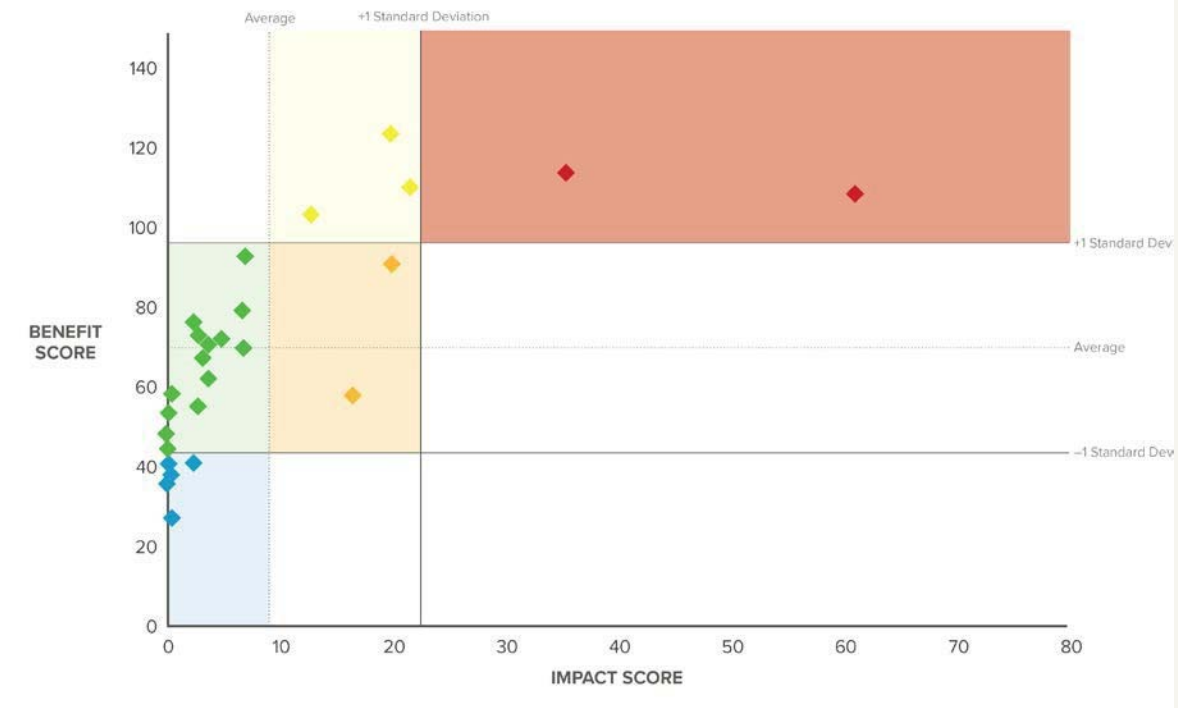
BENEFIT - 75 PTS
- Reduce flood water elevations
- Reduce risk of levee failure
- Improve drainage

TOTAL IMPACT SCORE - 80 PTS

TOTAL BENEFIT SCORE - 220 PTS

Total Multi-Interest Scores

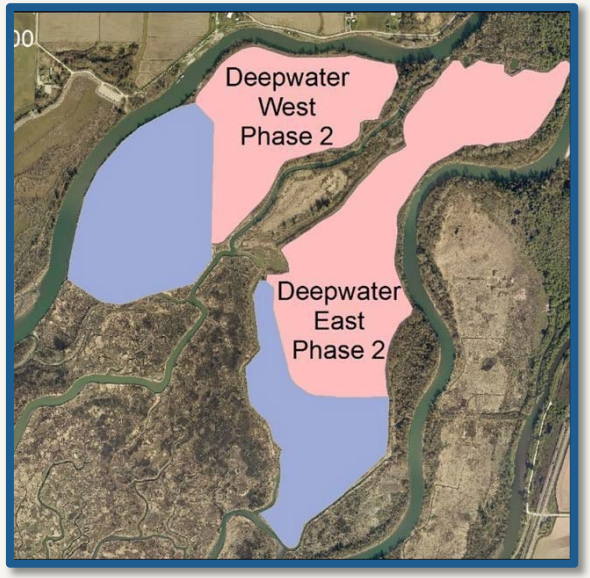
Total benefit and impact scores for each project concept were plotted



Management Groups

- Plot used to identify distinct groups of project concepts
- Focus on green groups

Island Unit Results



Deepwater Phase 2/Island Unit

267.8 acres

160,000 smolts/yr (mid-point)

- 4th highest smolt estimates of all projects evaluated
- Recovery Goal 1.35 Million smolts
- Second Highest FARM benefit score

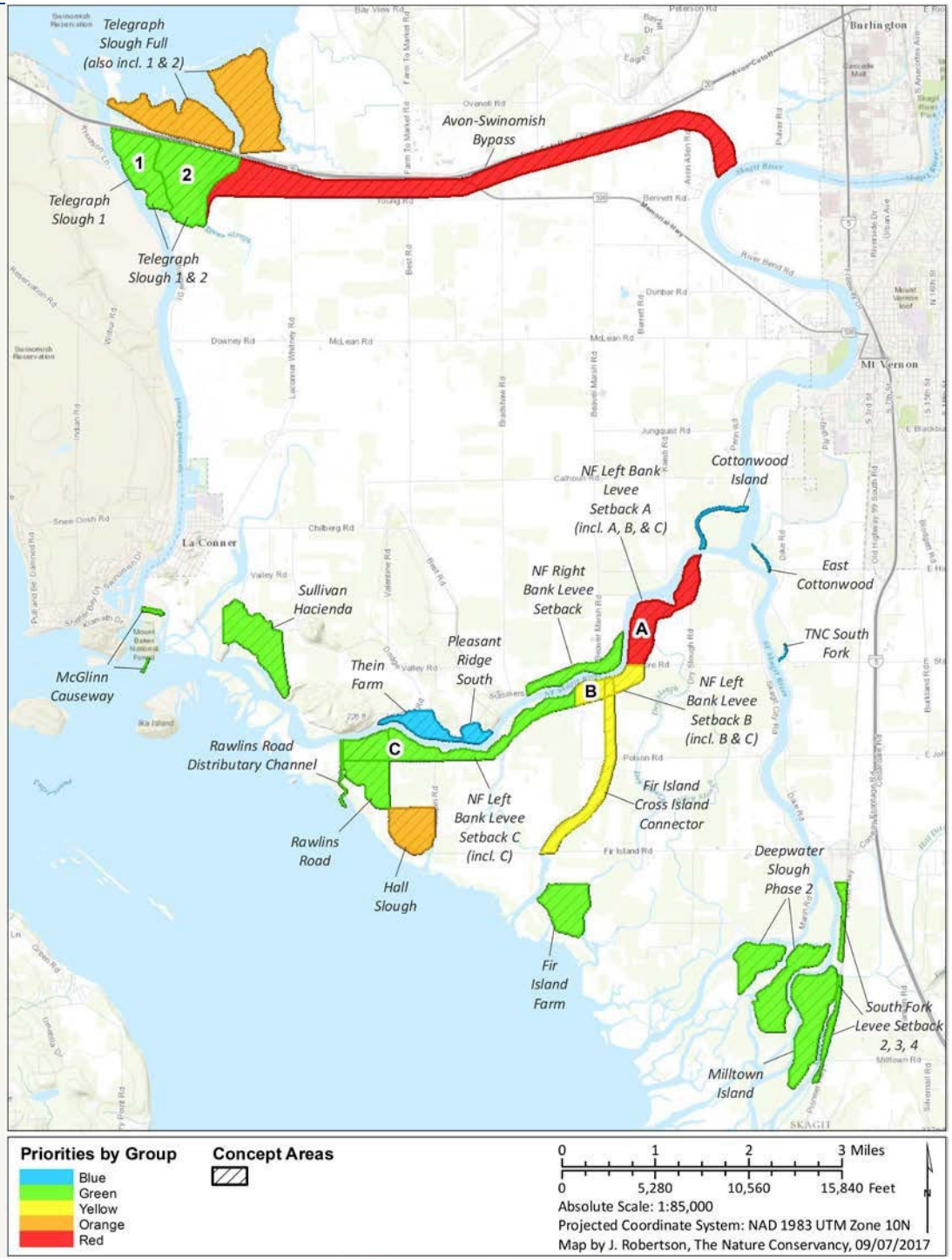
Green Projects Concepts:

- McGlinn & TS 1&2
- NF LB Setback C
- Fir Island Farm
- McGlinn & TS 1
- *Deepwater Slough #2/Island Unit*
- Sullivan Hacienda
- Telegraph Slough 1&2
- Rawlins Road
- NF RB Levee Setback
- SF Levee Setback 2,3 & 4
- Telegraph Slough 1
- Milltown Island
- McGlinn Causeway
- Rawlins Road Dist. Channel

Going forward…

- Continue to evaluate projects in terms of multiple benefits
- Adaptively manage and monitor implemented restoration projects
- Continue community outreach

… this is a tool to support continued collaboration



SHDM Working Group

Dike District #3
Dike District #17/Dike District Partnership
Dike & Drainage District #22
NOAA Restoration Center
Seattle City Light
Skagit Conservation District
Skagitonians to Preserve Farmland
Skagit Watershed Council
The Nature Conservancy
Upper Skagit Tribe
US Geological Survey
WA Dept. of Fish and Wildlife
Western WA Agricultural Association

Technical Analyses

Pacific Northwest National Laboratory
Skagit River System Cooperative
The Nature Conservancy
US Geological Survey

Funding Organizations

EPA/National Estuary Program
NOAA Restoration Center
Private Donors
SRFB/RCO/Skagit Watershed Council

Infrastructure Condition and Management

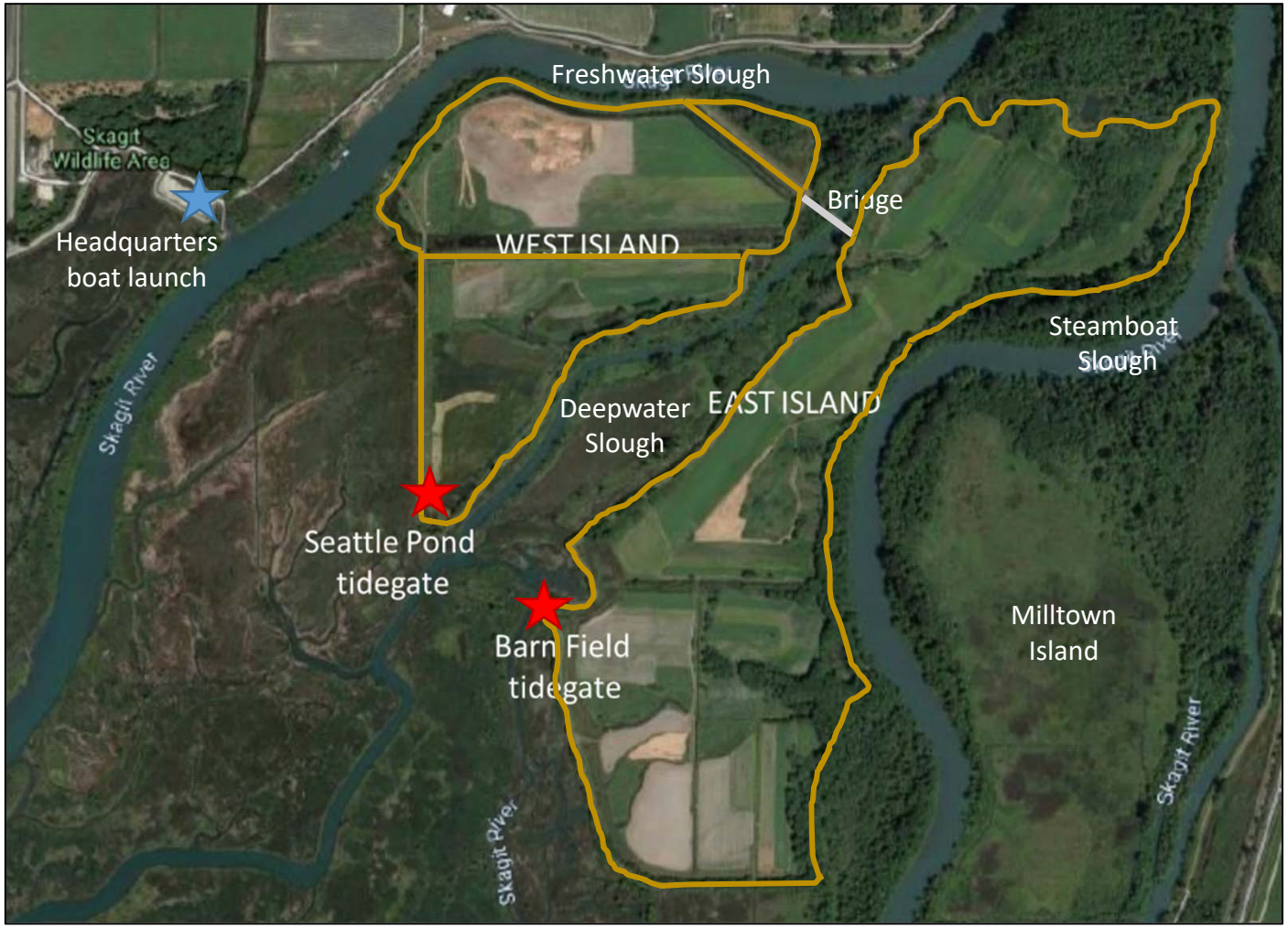
February 3, 2020

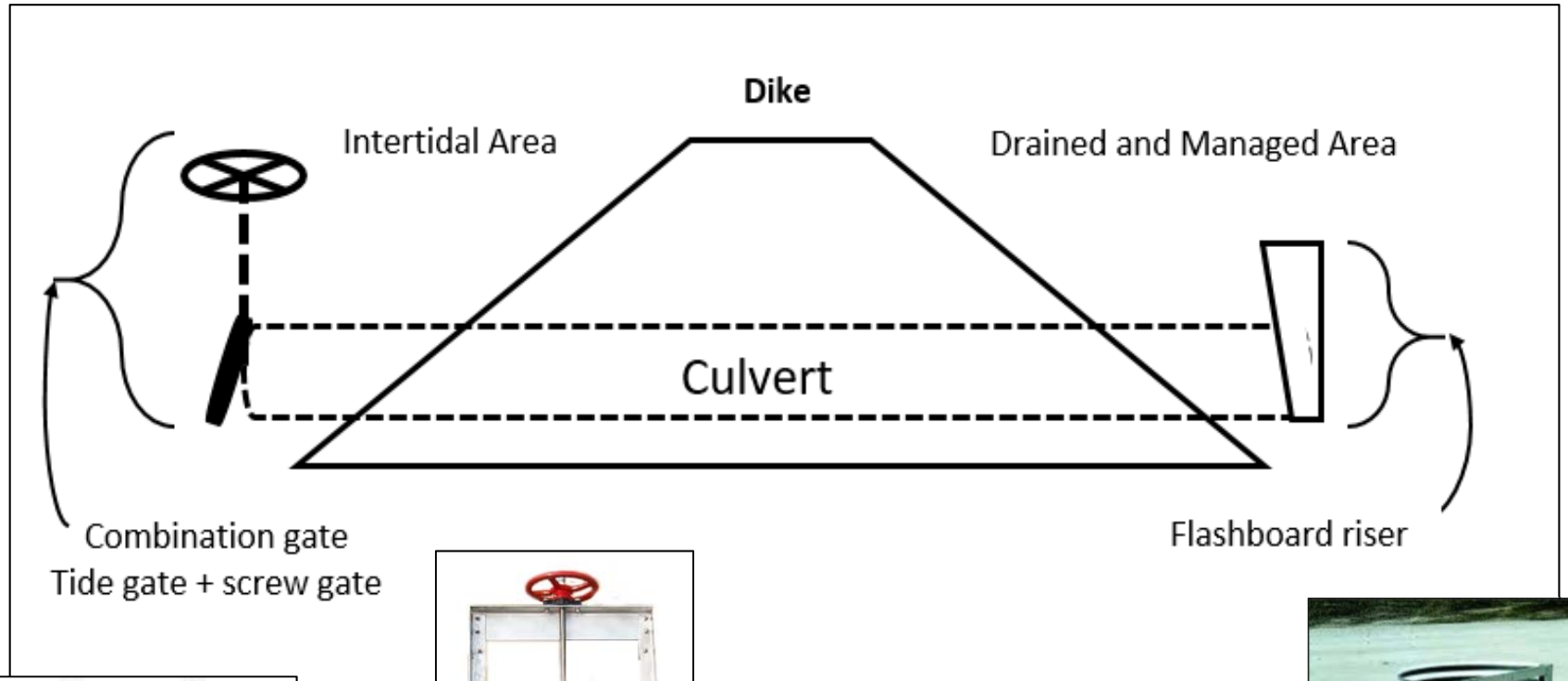
Belinda Rotton and Jenny Baker

Presentation outline

- Tidegates and water control structures
  - Design/operations
  - Current condition
  - Past efforts to replace Barn Field tidegate
- Dikes
  - Location and management
  - Past repairs
- Sea level rise / climate change
  - What is expected
  - Likely effects on infrastructure

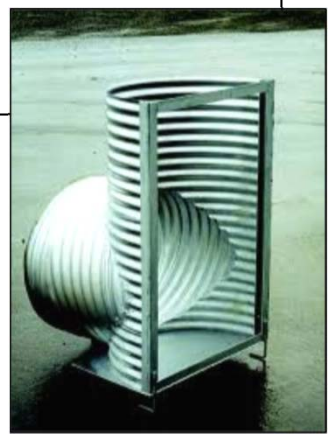
Tidegate locations





The top-hinge tidegate keeps tides out at high tide and allows water to drain at low tide

The screwgate can raise the top-hinge tidegate from blocking the culvert, allowing tides onto the site



Adding boards to the flashboard riser retains water on the site

Current condition – Barn Field

- Tidegate is leaking – cause unknown despite some investigation
- Screwgate not raised/lowered due to concerns of failure
- Flashboard riser retains some water on site, but leaky

Current condition – Seattle Pond

- Tidegate functioning
- Screwgate not raised/lowered due to concerns of failure
- Flashboard riser not effectively retaining water on site
    - Corrosion in culvert between flashboard riser and dike

Current condition

- There are multiple issues with each of the water control structures (tidegate, screwgate, culvert, flashboard riser)
- Current habitat management is limited due to inability to regulate water (drainage and inflow)
- Tidegates and water control structures are at risk of failure
- Failure of tidegates would not be optimal for managed / enhanced waterfowl forage production <u>OR</u> for salmon habitat
- A full replacement of each structure would be needed to ensure they function to support managed / enhanced waterfowl forage production.

Attempts at replacement: funding

2000

- The need to replace tidegate structures was identified before 2000
- Replacement was identified for the Deepwater restoration project funding not sufficient to cover the cost

2012-2015

- Attempts were made to fund replacement through the Migratory Bird Stamp and WDFW's capital budget process
  - Partial funding was obtained for preliminary design and some materials

AT THE SAME TIME…

- Local waterfowl enthusiast offered up his construction company (equipment and labor) for free
  - WDFW also needed funding for design, permitting, materials, construction oversight and mitigation

Attempts at replacement: permits

- Two attempts were made by WDFW between 2015 and 2017 to obtain permits through the State Environmental Policy Act process
- SRSC* objected; their primary concerns were lack of fish passage and tidal exchange, and what amount and location of mitigation was sufficient
- WDFW determined, in agreement with SRSC, that an alternatives analysis was the preferred path forward
- Part of the agreement was that if a full restoration design was selected in the alternatives analysis, the tidegates may be repaired and left in place for up to 7 years until restoration is completed

**SRSC = Skagit River System Cooperative, a natural resource consortium of the Swinomish Tribal Indian Community and the Sauk-Suiattle Indian Tribe*

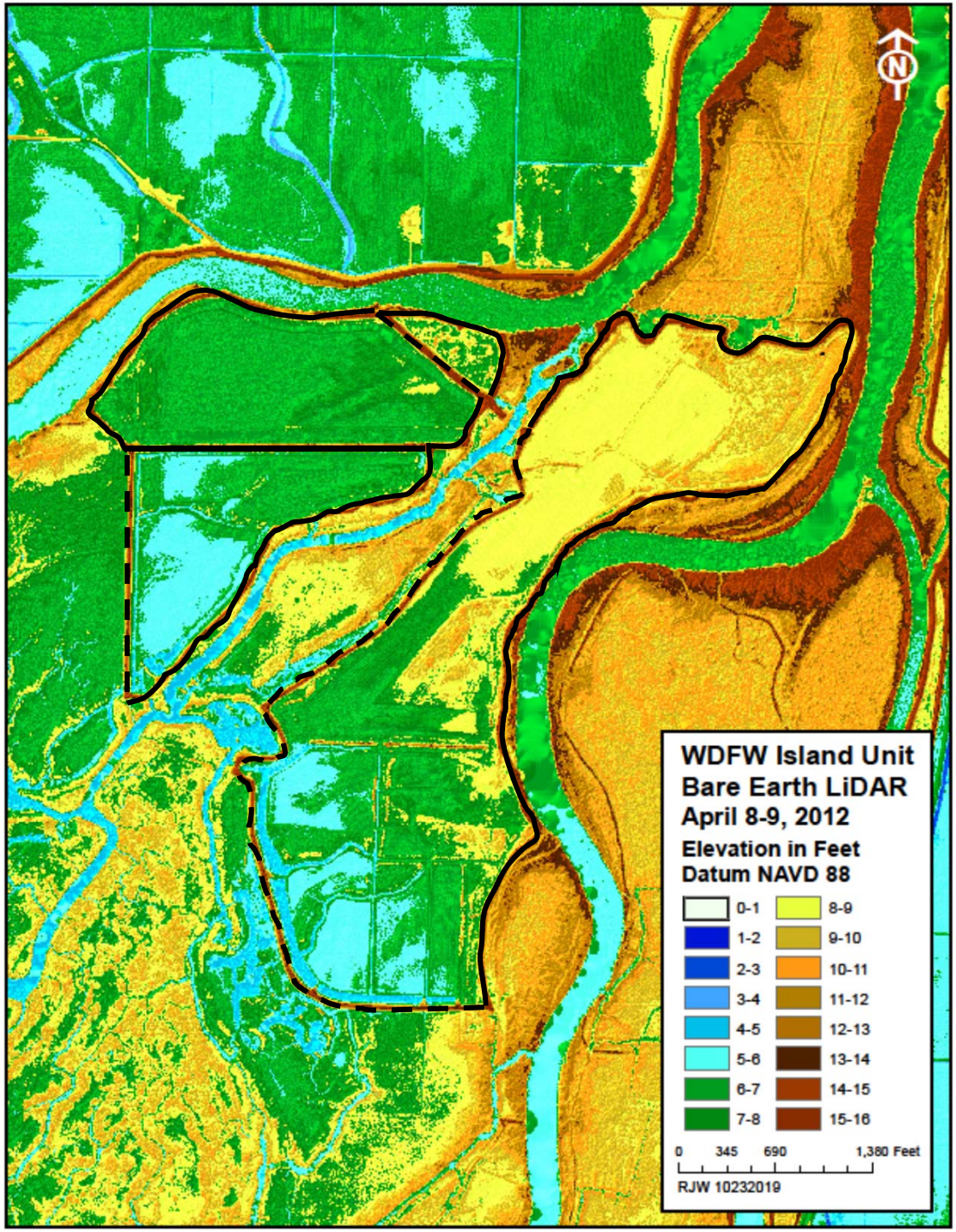
Summary: tidegates and water control structures

- The tidegates and water control structures are in disrepair and at risk of failing
- WDFW has not been able to obtain funding for replacement
- The federal permit process requires consultation with tribes
- SRSC* does not support repair or replacement of infrastructure on the site, including tidegates and water control structures that continue to isolate salmon habitat

**SRSC = Skagit River System Cooperative, a natural resource consortium of the Swinomish Tribal Indian Community and the Sauk-Suiattle Indian Tribe*

Dikes

- Protect site from high tides and river flows
- Allow managed and enhanced winter waterfowl forage production (in combo with tidegates and water control structures)



Built ~100 years ago

Built 20 years ago

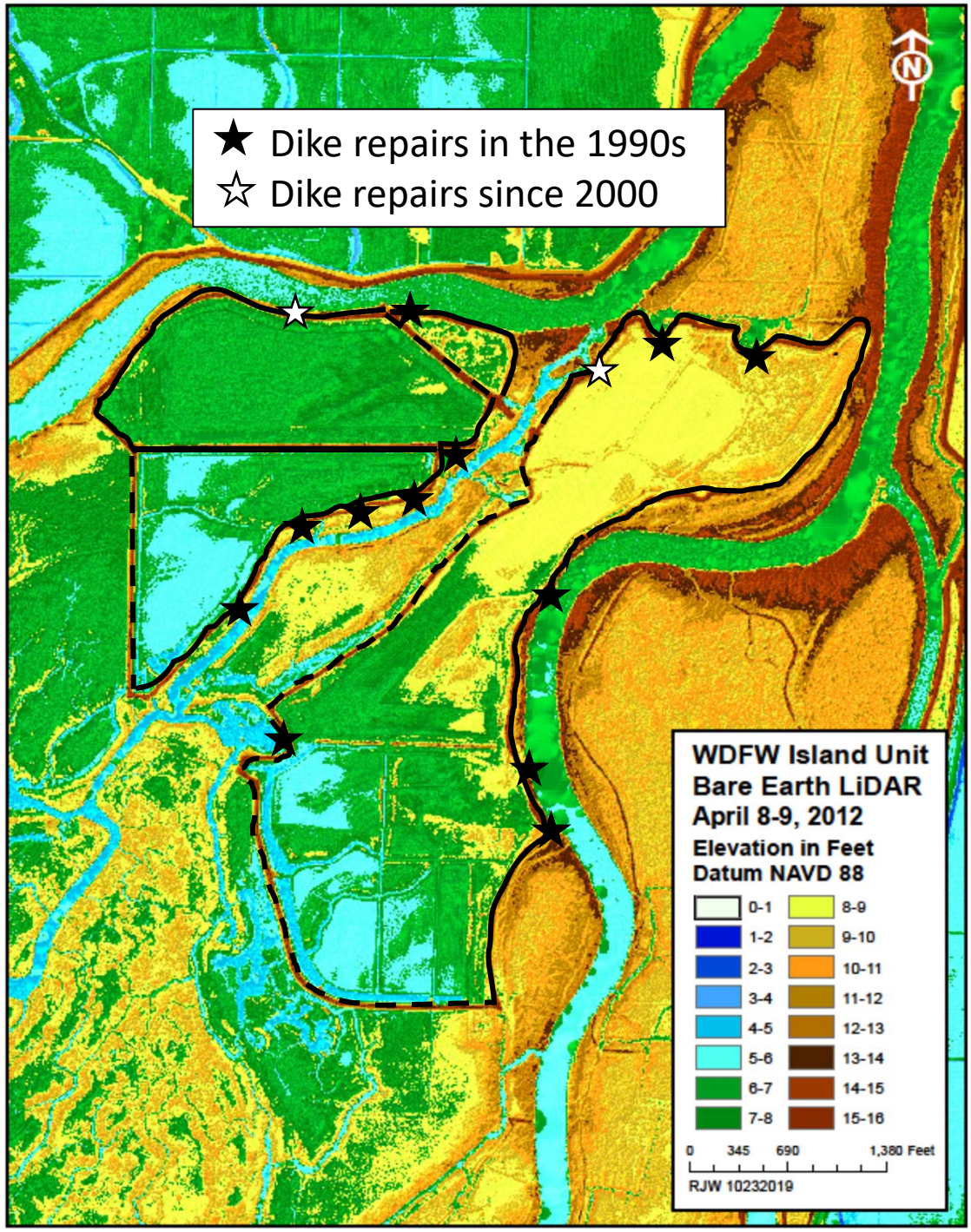
Dikes

- Are not part of a dike district (no local taxes or Corps PL84-99 funds to support maintenance and repairs)
- Are maintained to different standards than those designed for more robust flood protection.
- Deepwater Slough project (2000) = dike maintenance agreement with Corps

Past repairs

Built ~100 years ago

Built 20 years ago



Ongoing maintenance and repairs

- over time these structures are subject to damage from:
  - water (river and tides)
  - vegetation (trees)
  - mammals (beaver and muskrat)
- Permitting and mitigation requirements have made repairs more complex and costly

Expected changes: Skagit tides and river flows

RELATIVE SEA LEVEL PROJECTIONS FOR THE COASTAL AREA NEAR: 48.3N, 122.4W (Conway)

CO2 emissions scenario	year	percent chance of this amount of SLR (feet)		
		90%	50%	10%
low	2070	0.5	1	1.6
	2080	0.6	1.2	1.9
high	2070	0.7	1.2	1.8
	2080	0.8	1.5	2.2

from: www.coastalnetwork.com/wcrp-documents.html

Predicted River Flows

event	units	2015	2080
50% chance of these river flows each year	cubic feet per second	62,000	103,237

from: *Lee S, A Hamlet, E Grossman. 2016. Impacts of Climate Change on Regulated Streamflow, Hydrologic Extremes, Hydropower Production, and Sediment Discharge in the Skagit River Basin. Northwest Science, 90(1): 23-43.*

Effects on site operations

- Water levels will reach dike-top elevations more frequently, which would result in **more frequent overtopping**.
- More frequent and higher high water levels against the dikes also increases dike **saturation and seepage**.
- Overtopping, saturation and seepage contribute to **dike instability, erosion and failure**.
- Tidegates work on gravity so water drains out when water on bay-side is lower than water on land-side.
- There will be less time during each tidal cycle when water is low enough on bay-side to drain via gravity.
- This will result in **reduced drainage capacity**, which may limit management activities such as mowing and crop production.

Presentation summary

- Tidegates and water control structures are aging, not functioning optimally and at risk of failure
- Failure of tidegates would not be optimal for managed and enhanced waterfowl forage production or for salmon habitat
- Despite multiple attempts, WDFW has been unable to obtain funding or permits for tidegate replacement
- Dikes sustain damage over time
- The dikes are not part of a larger flood control system with associated funding
- Rising water levels associated with climate change will limit site drainage and put additional strain on dikes, tidegates and water control structures