

Scenarios & Discussion on Where to Start for the Pilot Watersheds

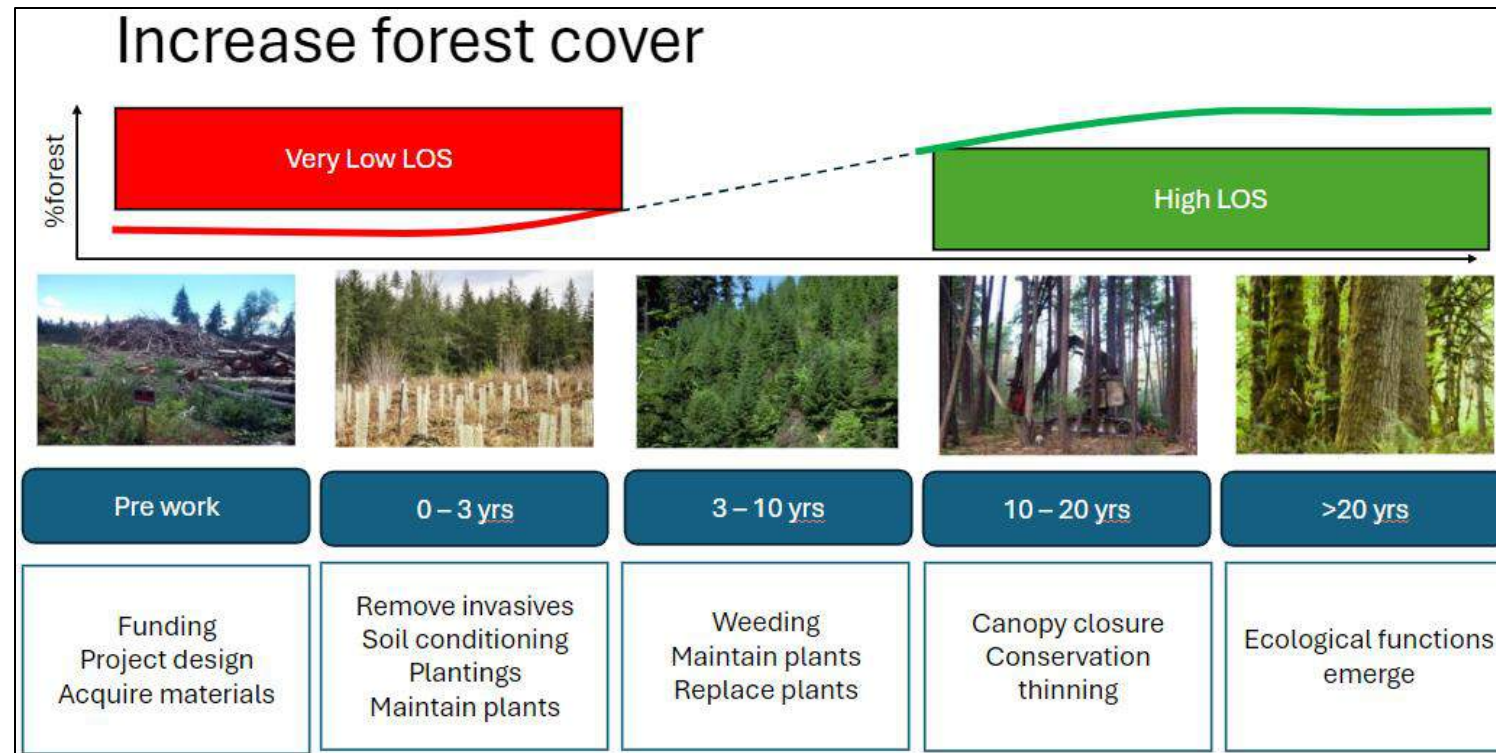
Goals

- Provide the Core Team with comparable information about each Scenario (strategy).
- Answer any clarifying questions about the scenarios (strategies).
- Gather feedback and reach agreement on which strategies to start with first in each watershed.
- Use the decision-making framework to discuss scenarios of importance.



Ecological improvement timeline slides

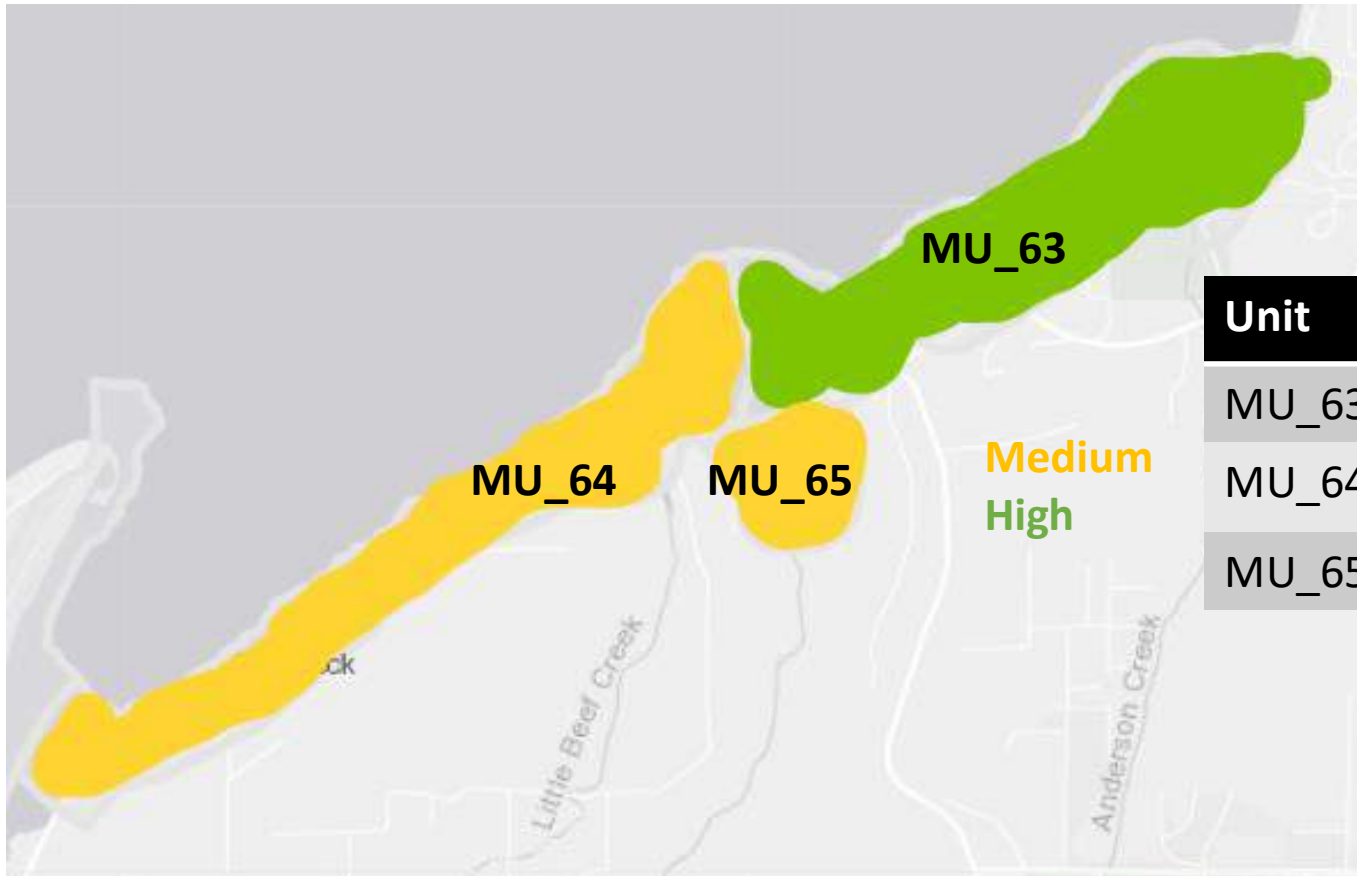
- Graphs to show the timeline of ecological improvements related to attribute improvements **will be found in a separate slide deck titled "Ecological Timelines for Scenarios"**. See example below.



Scenarios/Strategies— Big Beef Creek Shorelines

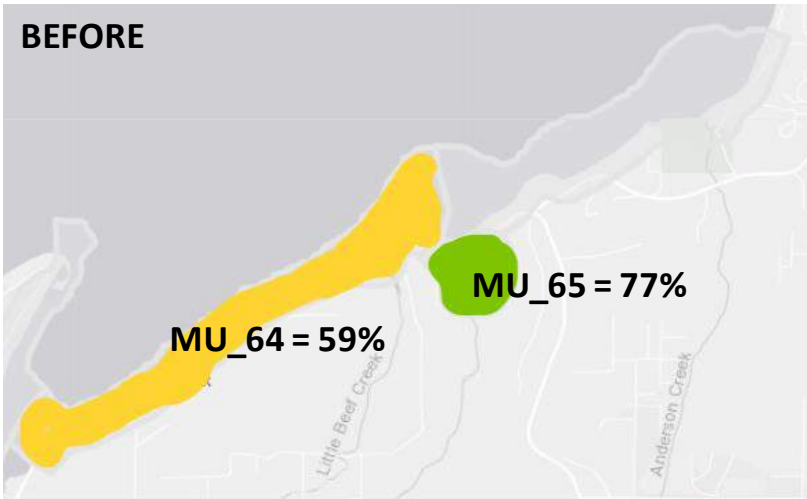


Current levels of service for three MUs



Unit	LOS	DLOS	LOS Gap
MU_63	70.18	60	+10.18
MU_64	53.16	60	6.84
MU_65	56.70	60	3.30

Scenario 1 – increase shoreline vegetation to at least 90% in the two MUs with Medium LOS

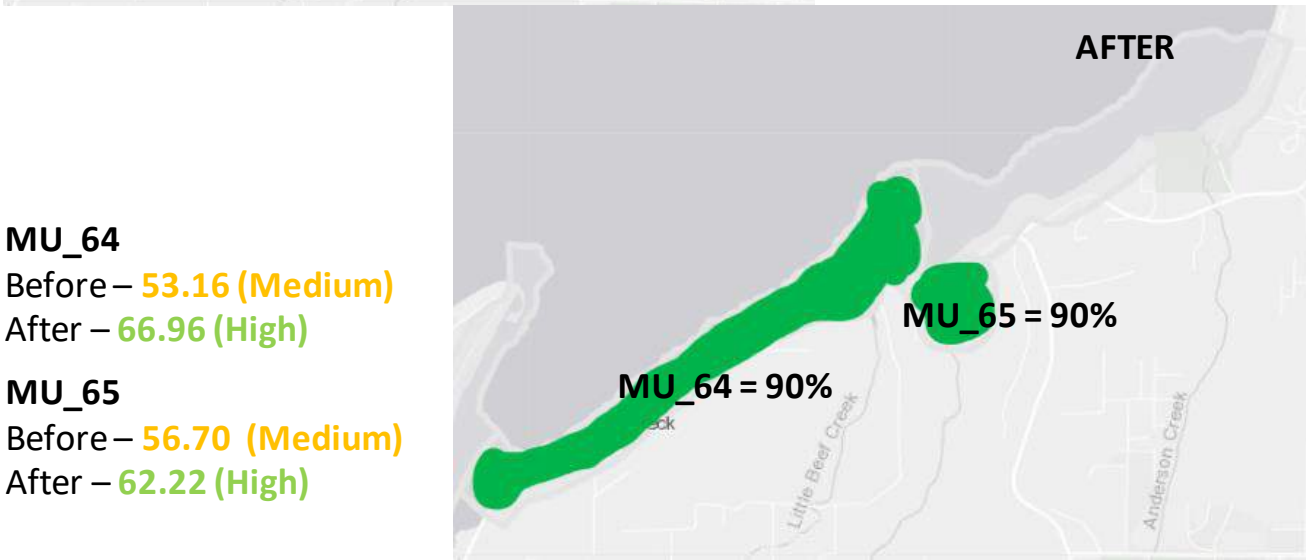


% FOREST:

Medium (55-70%)

High (70-85%)

Very High (85-100%)

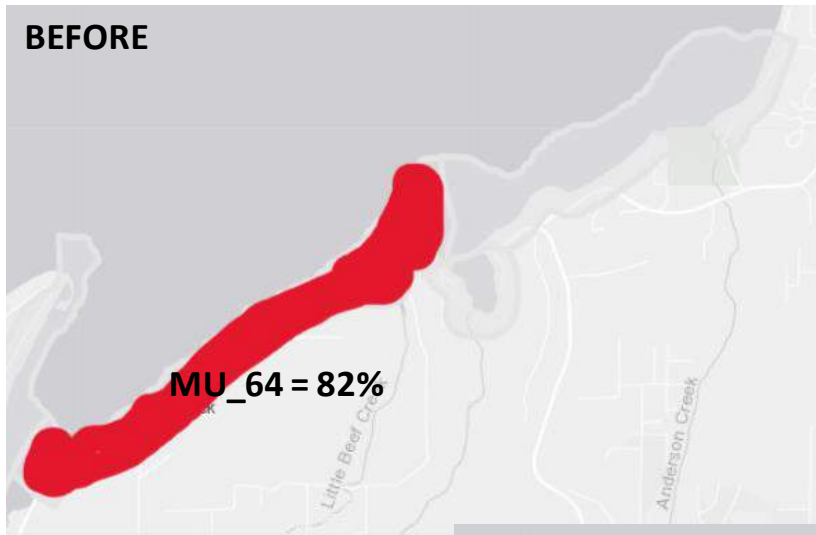


MU_64
Before – 53.16 (Medium)
After – 66.96 (High)

MU_65
Before – 56.70 (Medium)
After – 62.22 (High)

- Cost: \$228,000 (Medium)
 - 4563 ft of shoreline planted
- Who
 - WDFW revegetate lands
 - Kitsap County Transportation plantings
 - Private landowners – free native plants for shoreline property owners
 - Kitsap Conservation District

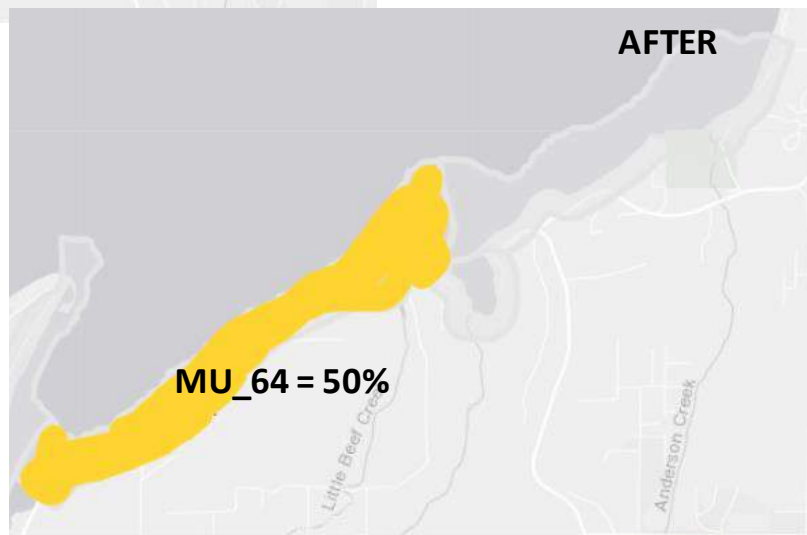
Scenario 2 – decrease shoreline armoring to <50% for MU_64 with Medium LOS



% ARMOR:

Very Low (75-100%)

Medium (25-50%)



MU_64

Before – 53.16 (Medium)

After – 62.88 (High)

- Cost: \$4,020,000 (High)
 - 4021 ft of shoreline armor removed
- Who:
 - Kitsap County Transportation armor removal as part of upcoming bridge replacement?
 - Shore Friendly project management

NOTE: would need to be coupled with %forest or shellfish growing area projects in MU_64 to achieve High LOS

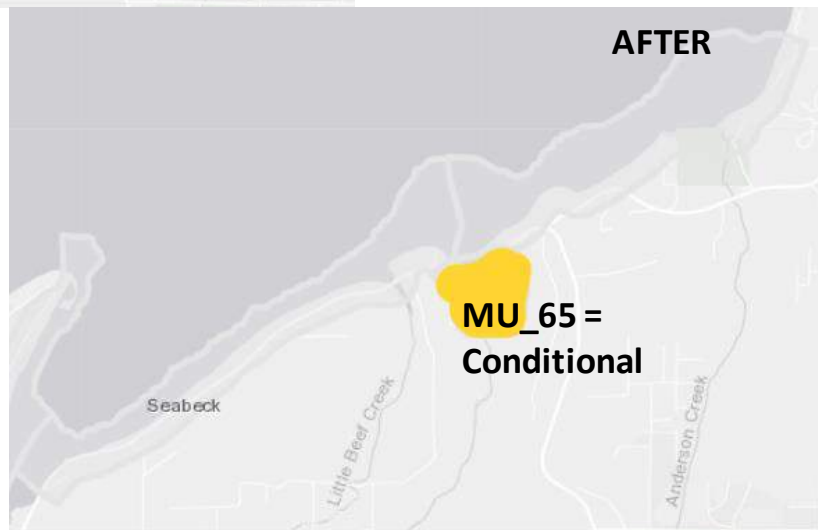
Scenario 3 – Upgrade shellfish growing area in Big Beef Creek estuary from PROH to COND



SGA CLASS:

Very Low (prohibited)
Medium (conditional)

MU_65
Before – **56.70 (Medium)**
After – **73.37 (High)**



- Cost: nominal (Low)
 - No in situ actions needed
- Who:
 - KC DCD check with KCHD on Big Beef Creek freshwater monitoring
 - KC DCD and KCHD check with DOH on administrative update to reflect current data

NOTE: would need to be coupled with %forest or %armor projects in MU_64 to achieve High LOS

Scenario 4 – Upgrade shellfish growing area in Big Beef Creek estuary from PROH to COND



SGA CLASS:

Very Low (prohibited)

Medium (conditional)

MU_65
Before – **56.70 (Medium)**
After – **73.37 (High)**

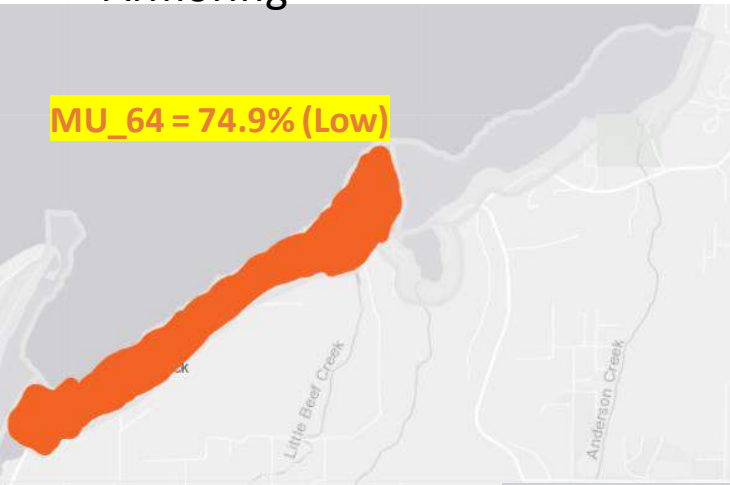


- Cost: \$100,000 (est.) (Low)
 - One Pollution Identification and Correction Program
- Who:
 - Kitsap County Health District conducts PIC program targeted on shoreline adjacent to Big Beef Creek estuary
 - DOH monitors marine waters

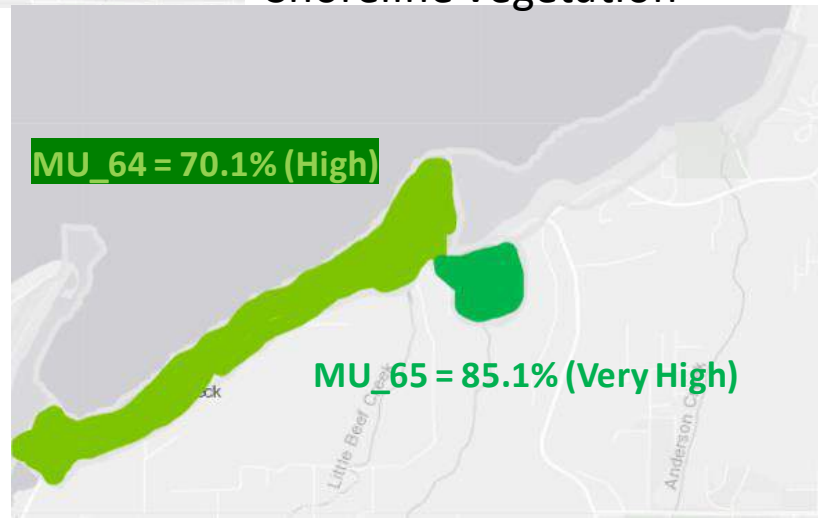
NOTE: would need to be coupled with %forest or %armor projects in MU_64 to achieve High LOS

Scenario 5 – In MU_64 reduce armoring to 74.9% and improve riparian vegetation to 70.1% and in MU_65 improve riparian vegetation to 85.1%

Armoring



Shoreline Vegetation



- Cost \$981,950 (Medium)
 - **892** ft of armor removed
 - **1799** ft of riparian planting
- Who
 - WDFW revegetate lands
 - Kitsap County Transportation
 - Private landowners – free native plants for shoreline property owners
 - Shore Friendly
 - Kitsap Conservation District

MU_64
Before – **53.16 (Medium)**
After – **60.08 (High)**

MU_65
Before – **56.70 (Medium)**
After – **60.04 (High)**

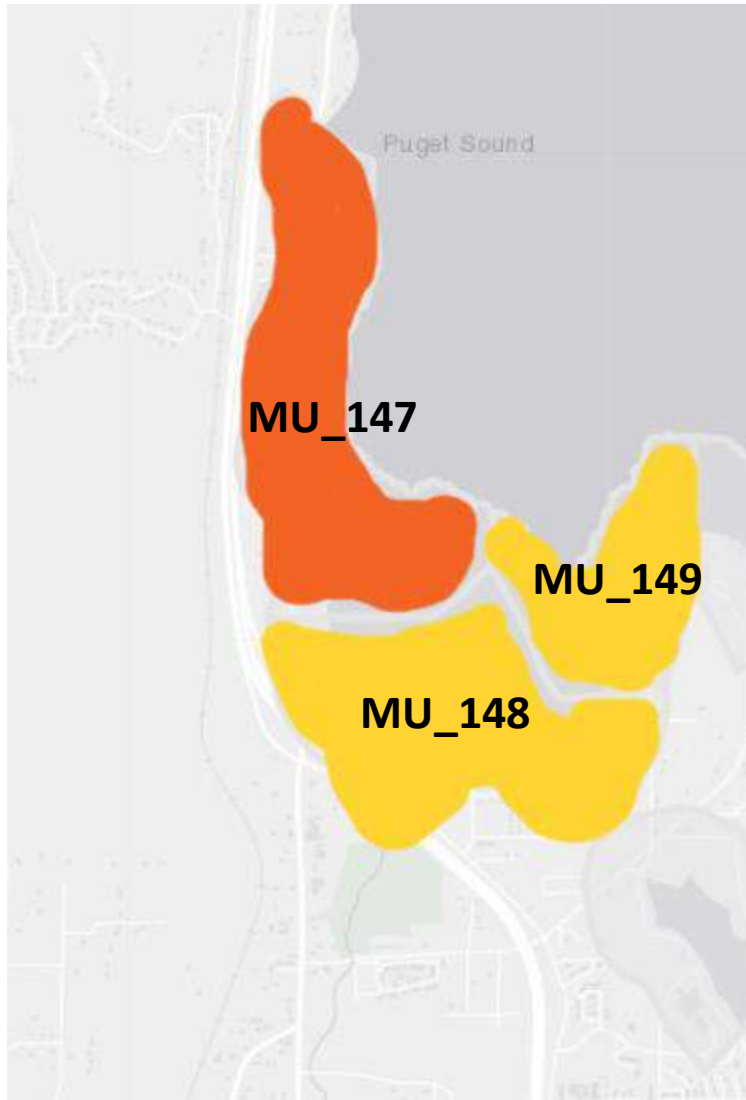
Summary Slide -- Big Beef Creek Shorelines

SCEN	WHAT	COST	WHO	LOS improvement	Area Size
1	Increase forest cover to 90% or 4563 ft of planting	\$228,000	WDFW, Kitsap County Transportation, KCD, ...	MU_64 +13.8 MU_65 +5.5	4563 ft of shoreline planting
2	Decrease armor to 50% or remove 4021 ft	\$4,020,000	Kitsap County Transportation, Shore Friendly	MU_64 +9.7	4021 ft of shoreline armoring removed
3	Admin step (no in situ action)	Nom.	KCHD, DOH	MU_65 +16.7	No in situ action
4	Decrease bacteria via PIC Program	\$100,000	KCHD, DOH	MU_65 +16.67	1 PIC Program to identify and correct pollution
5	Increase forest cover by planting 1799 ft and reduce armoring by removing 892 ft	\$981,950	Kitsap County Transportation, Shore Friendly, WDFW, KCD	MU_64 +6.9 MU_65 +3.3	1799 ft of shoreline planting and 892 ft of armor removed

Scenarios/Strategies – Chico Creek Shorelines

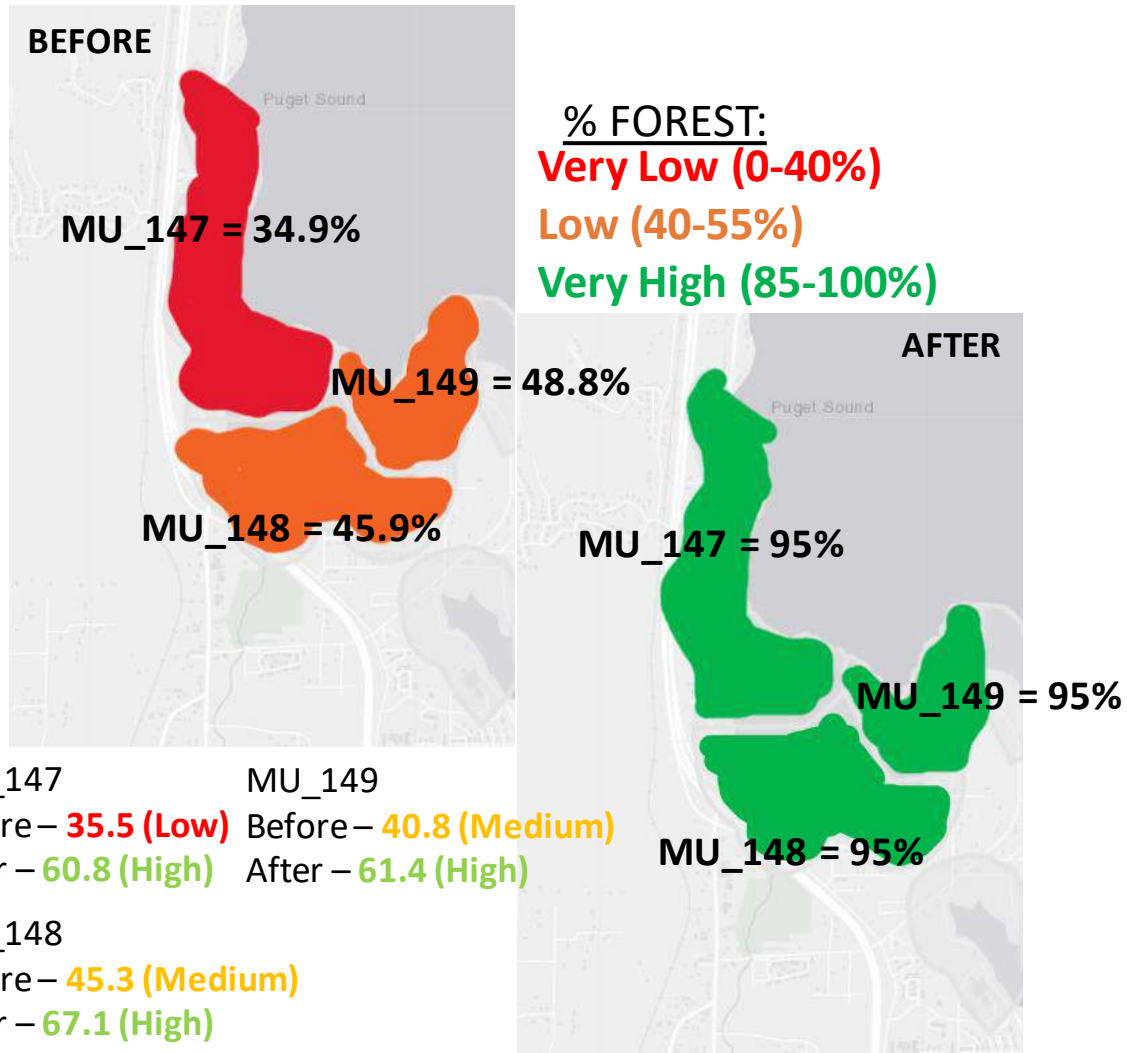


Current levels of service for three MUs



Unit	Current LOS	DLOS	LOS Gap
MU_147	35.5	60	24.5
MU_148	45.3	60	14.7
MU_149	40.8	60	19.2

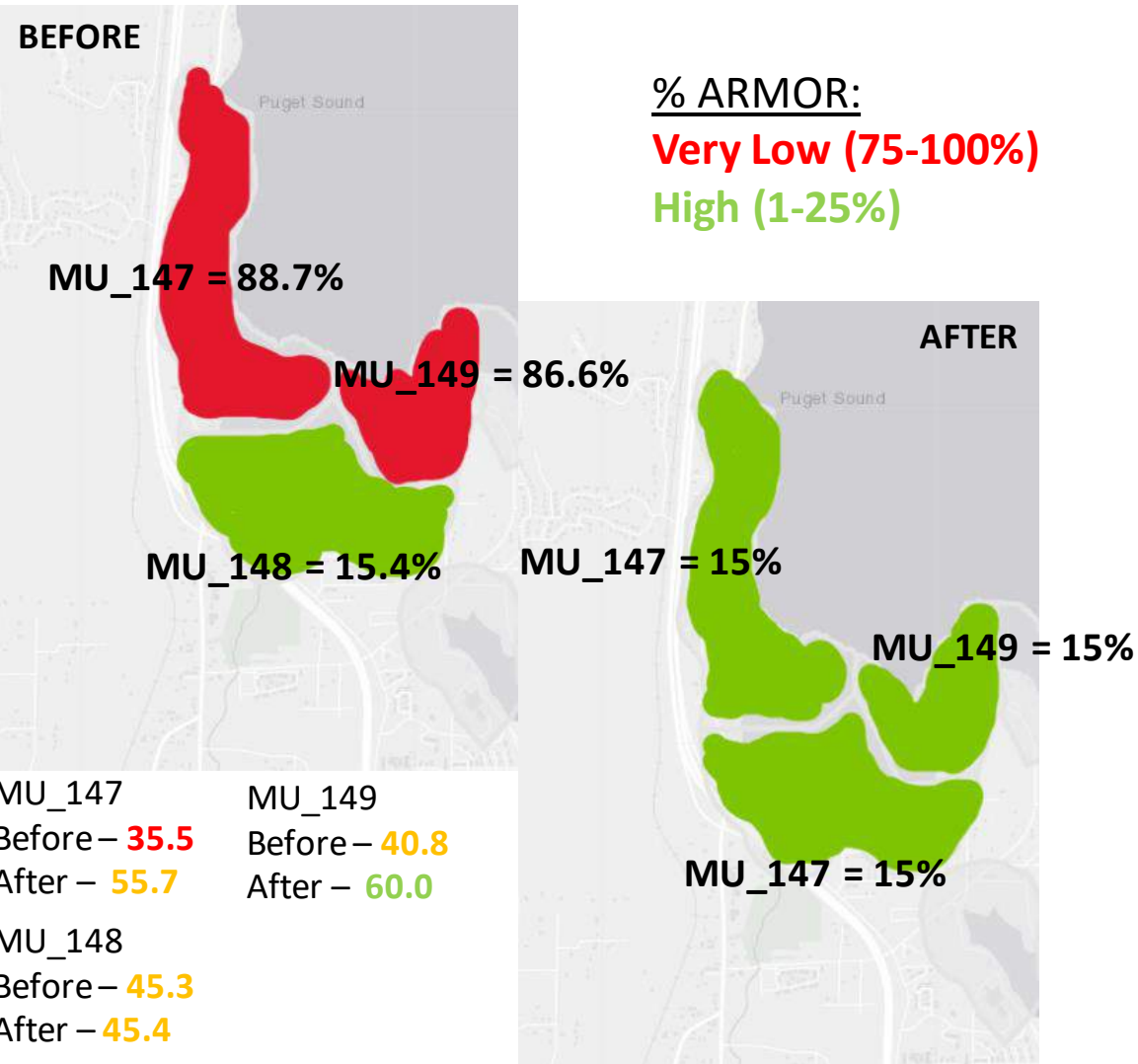
Scenario 1 – increase shoreline vegetation to at least 95% in all three MUs



- Cost: \$362,000 (Medium)
 - 7,240 ft of shoreline planted
- Who
 - WDFW revegetate lands
 - WSDOT plantings
 - Private landowners – free native plants for shoreline property owners
 - Kitsap Conservation District

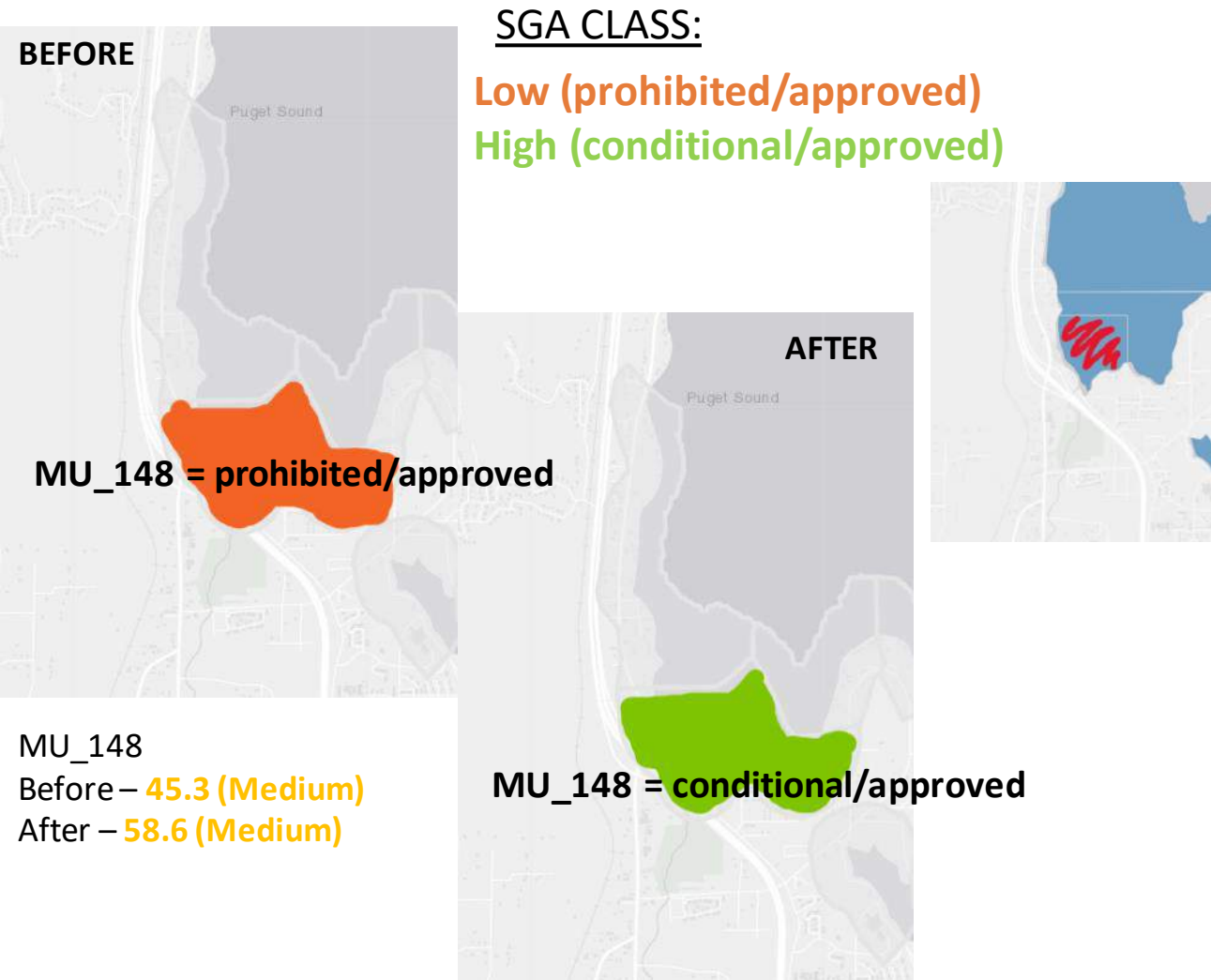
Scenario 2 – decrease shoreline armoring to <15% for all MUs

- Cost: \$5,548,000 (High)
 - **5,548** ft of shoreline armor removal
- Who:
 - Any armor still present from the culvert replacement of Hwy3 into Chico Bay? -- north or the culvert, no rock armoring.
 - Shore Friendly project management



NOTE: would need to be coupled with %forest projects in MU_147 & MU_148 to achieve High LOS

Scenario 3 – Upgrade shellfish growing area in Chico Bay from PROH to COND



- Cost: nominal (Low)
 - No in situ actions needed
- Who:
 - KC DCD check with KCHD on Chico Creek freshwater monitoring
 - KC DCD and KCHD check with DOH on administrative update to reflect current data

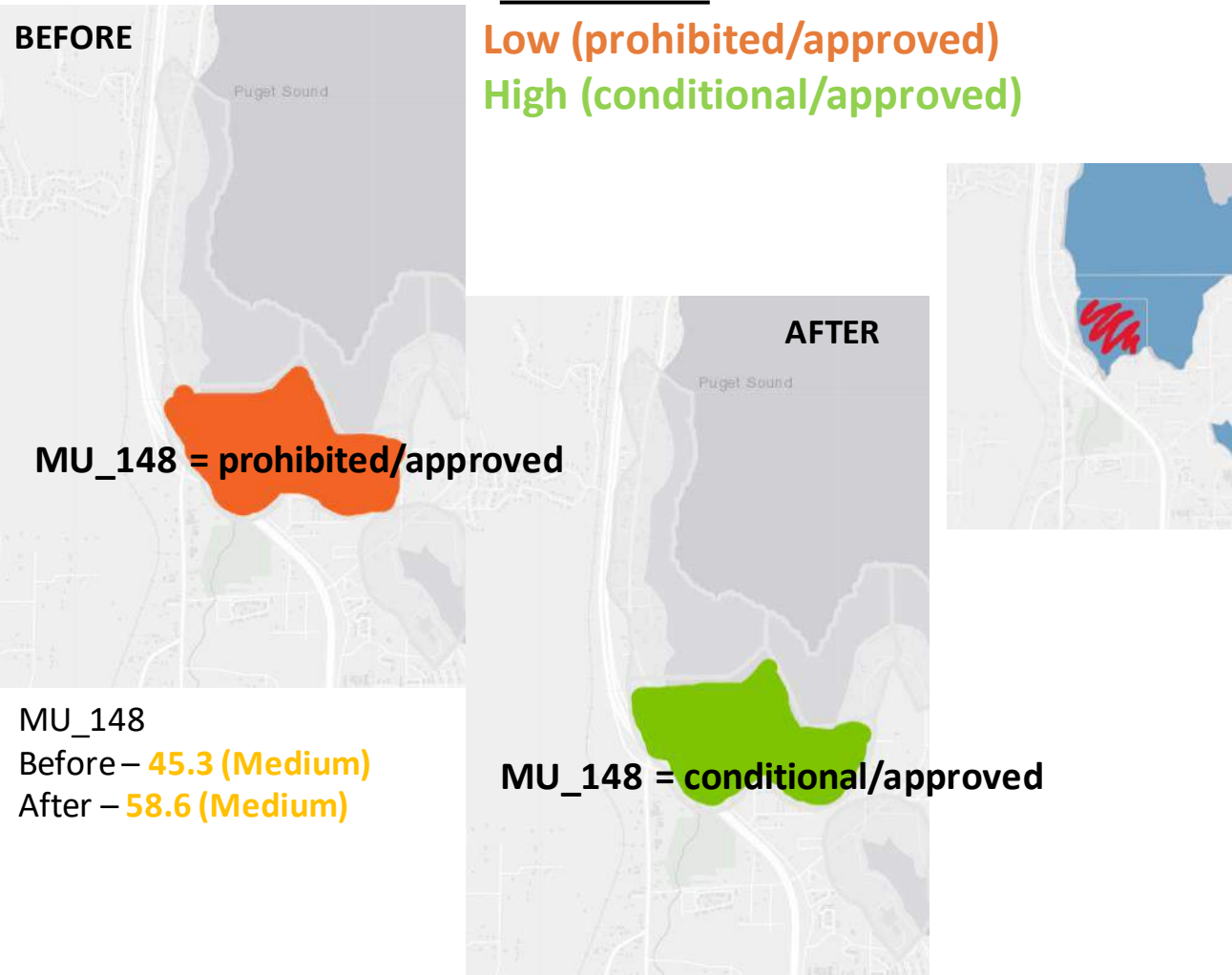
NOTE: would need to be coupled with %forest or %armor projects in MU_147 & MU_149 to achieve High LOS

Scenario 4 – Upgrade shellfish growing area in Chico Bay from PROH to COND

SGA CLASS:

Low (prohibited/approved)

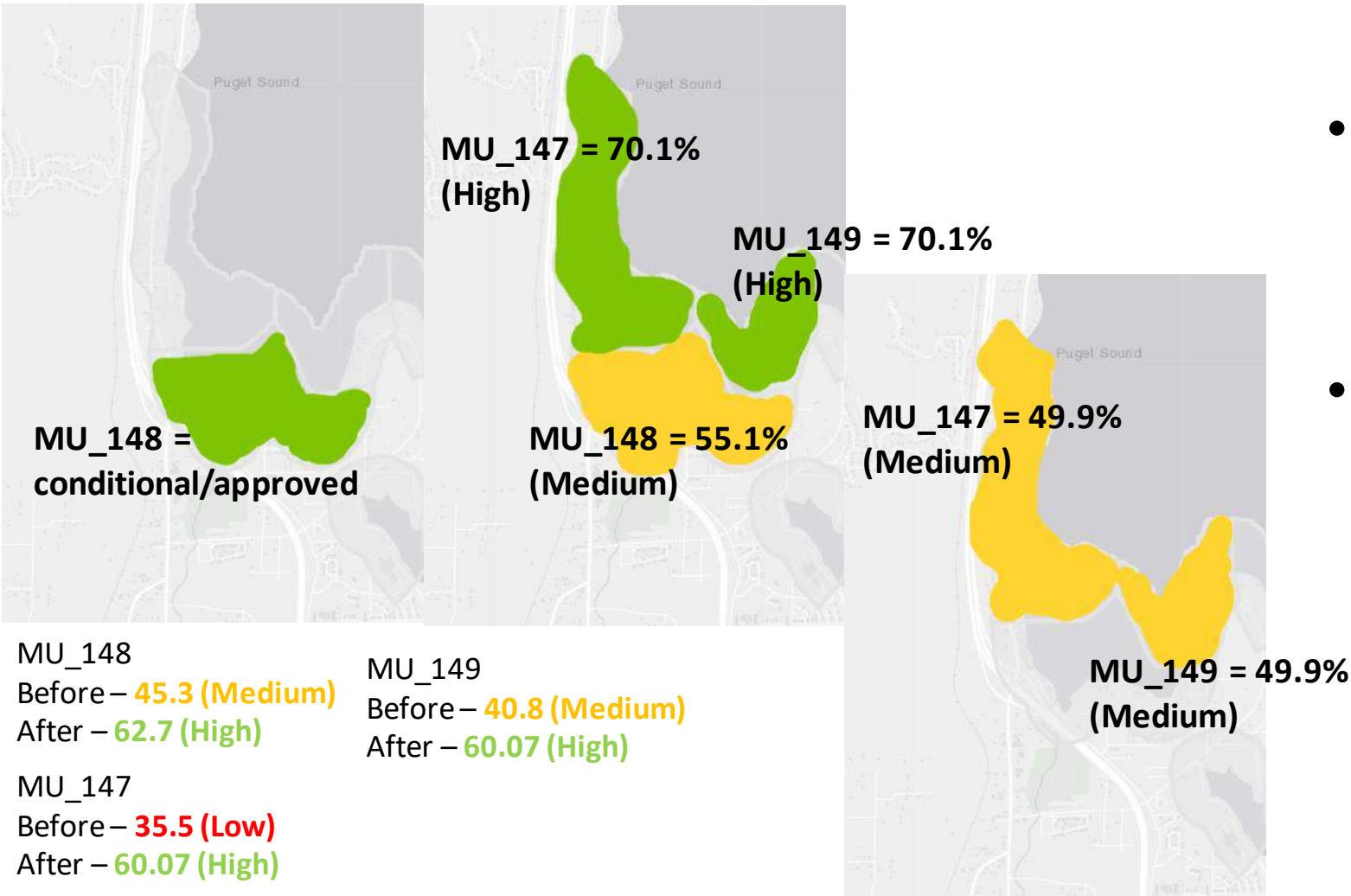
High (conditional/approved)



- Cost: \$100,000 (est.) (Low)
 - One Pollution Identification and Correction Program
- Who:
 - Kitsap County Health District conducts PIC program targeted on shoreline adjacent to Chico Creek estuary
 - DOH monitors marine waters
 - WA DOH certain criteria for shellfish harvesting.

NOTE: would need to be coupled with %forest or %armor projects in MU_147 & MU_149 to achieve High LOS

Scenario 5 –In MU_148 improve shellfish growing area to conditional and improve riparian vegetation to 55.1%, in MU_147 and MU_149 reduce armoring to 49.9% and improve riparian vegetation to 70.1%



- Cost: \$3,132,850 (High)
 - 2937 ft of shoreline planting
 - 2886 ft of armor removal
 - 1 PIC program
- Who
 - Kitsap County Health District
 - DOH
 - Shore Friendly
 - WDFW
 - WSDOT
 - KCD
 - Private Landowner incentive

Summary Slide – Chico Creek Shorelines

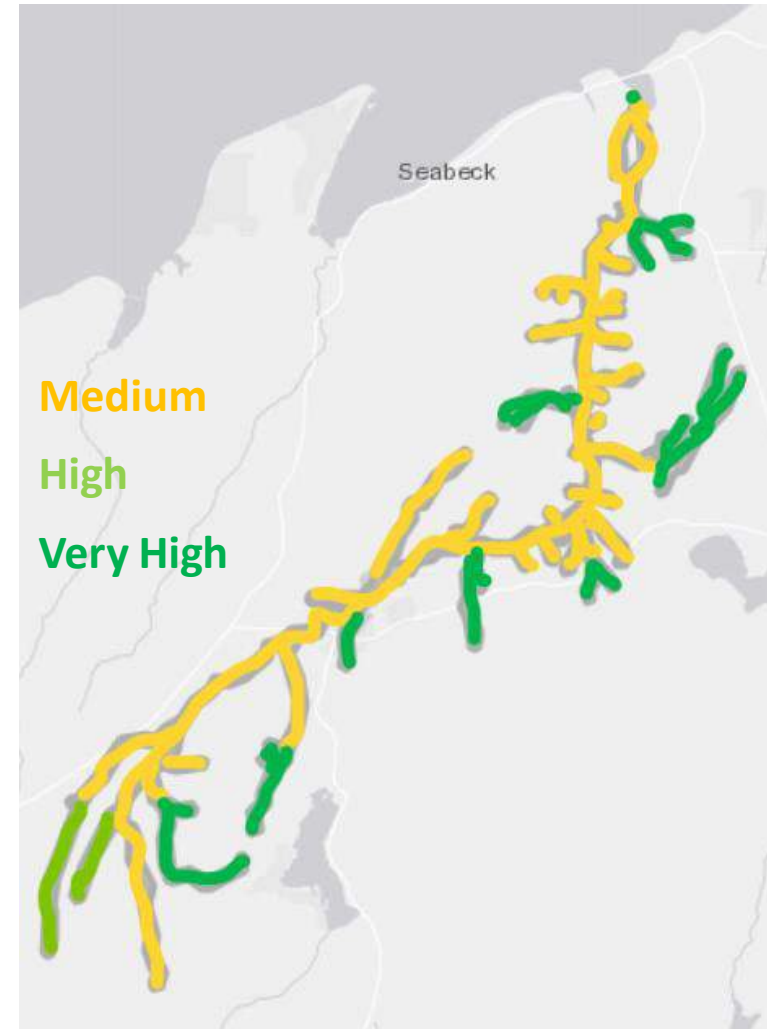
SCEN	WHAT	COST	WHO	LOS Improvement	Area Size
1	Increase forest cover to 95% by planting 7,240 ft	\$362,000	WDFW, WSDOT, KCD, ...	MU_147 +25.3 MU_148 +21.8 MU_149 +20.6	7240 ft of shoreline planting
2	Decrease shoreline armoring to 15% by removing 5,548 ft	\$5,548,000	WSDOT, Shore Friendly	MU_147 +20.2 MU_148 +0.1 MU_149 +19.2	5548 ft of armoring removed
3	Admin step (No in situ action)	Nom.	KCHD, DOH	MU_148 +13.3	No in situ action
4	Decrease bacteria via PIC program	\$100,000	KCHD, DOH	MU_148 +13.3	1 PIC Program to identify and correct pollution
5	Increase forest cover by planting 2397 ft and remove 2886 ft of shoreline armoring	\$3,312,850	WDFW, WSDOT, KCD, KCHD, DOH, Shore Friendly	MU_147 +24.6 MU_148 +17.4 MU_149 +19.3	2397 ft of shoreline planted and 2886 ft of armoring removed

Scenarios/Strategies - Big Beef Creek Streams

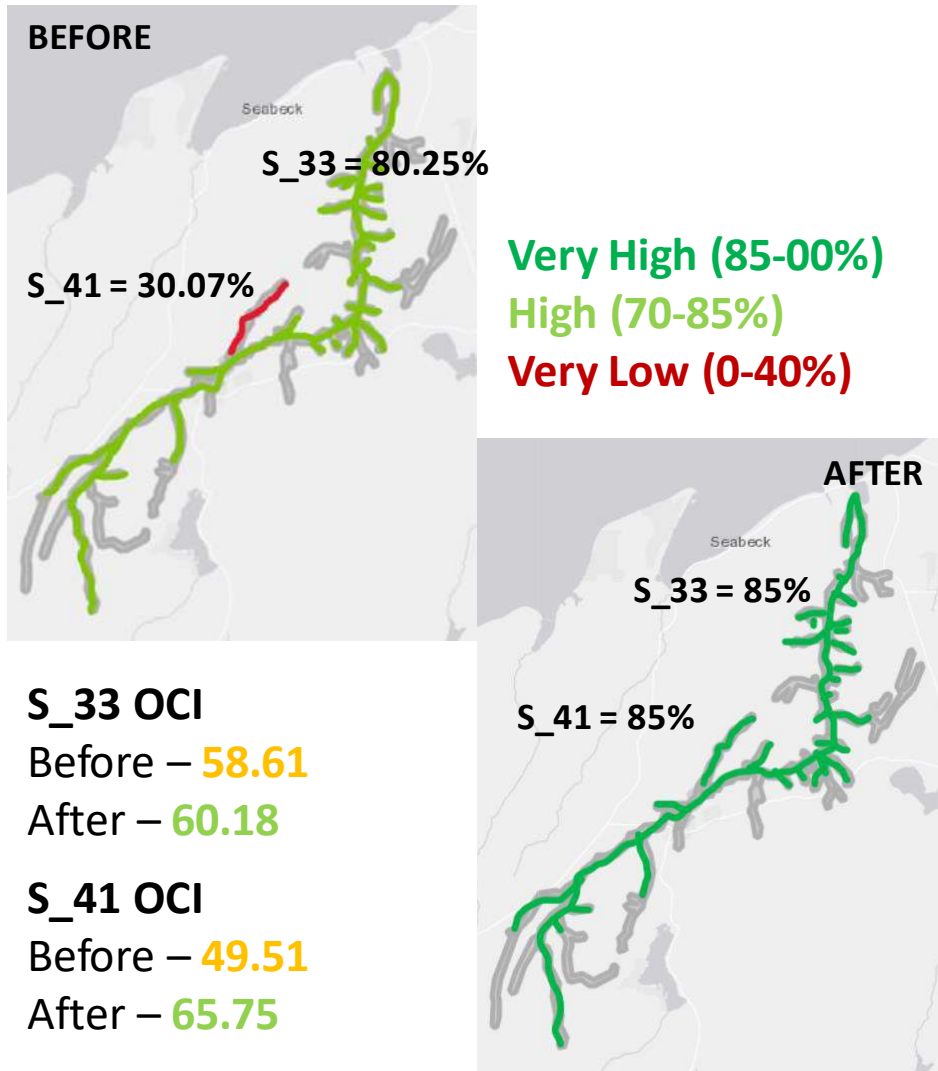


Current Level of Service

Unit	LOS	DLOS	LOS Gap
S_665	87.97	60	+27.97
S_33	58.61	60	1.39
S_415	81.99	60	+21.99
S_49	84.33	60	+24.33
S_414	91.64	60	+31.64
S_585	90.72	60	+30.72
S_57	87.34	60	+27.34
S_48	84.80	60	+24.8
S_41	49.51	60	10.49
S_786	87.01	60	+27.01
S_400	89.93	60	+29.93
S_31	87.66	60	+27.66
S_660	61.06	60	+1.06
S_289	74.79	60	+14.79



Scenario 6 – Increase % Riparian Vegetation up to 85% in S_33 and S_41 (Both currently Medium)

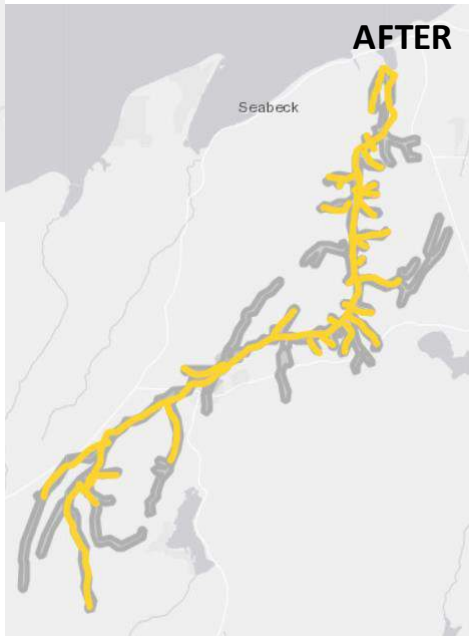


- Cost range: \$277,393 (estimate \$50/linear foot) to \$4,744,338 (estimate \$60k/acre)
 - 5,547 ft of linear stream planted or 79.1 acres planted
- Who:
 - GPC owned land (Smalser Refuge Conservation Easement and Big Beef Creek Salmon Sanctuary)
 - Incentivize private landowners to plant in RMZs
 - [KCD Programs](#)
 - Offer free plants to landowners with property in riparian areas.
 - [WDFW owned land](#)
 - [DNR owned land](#)

Scenario 7 – Remove all (2) full blockage fish passage barriers from S_33



Medium (1-2)
Very Low (5+)



S_33 OCI

Before – **58.61**

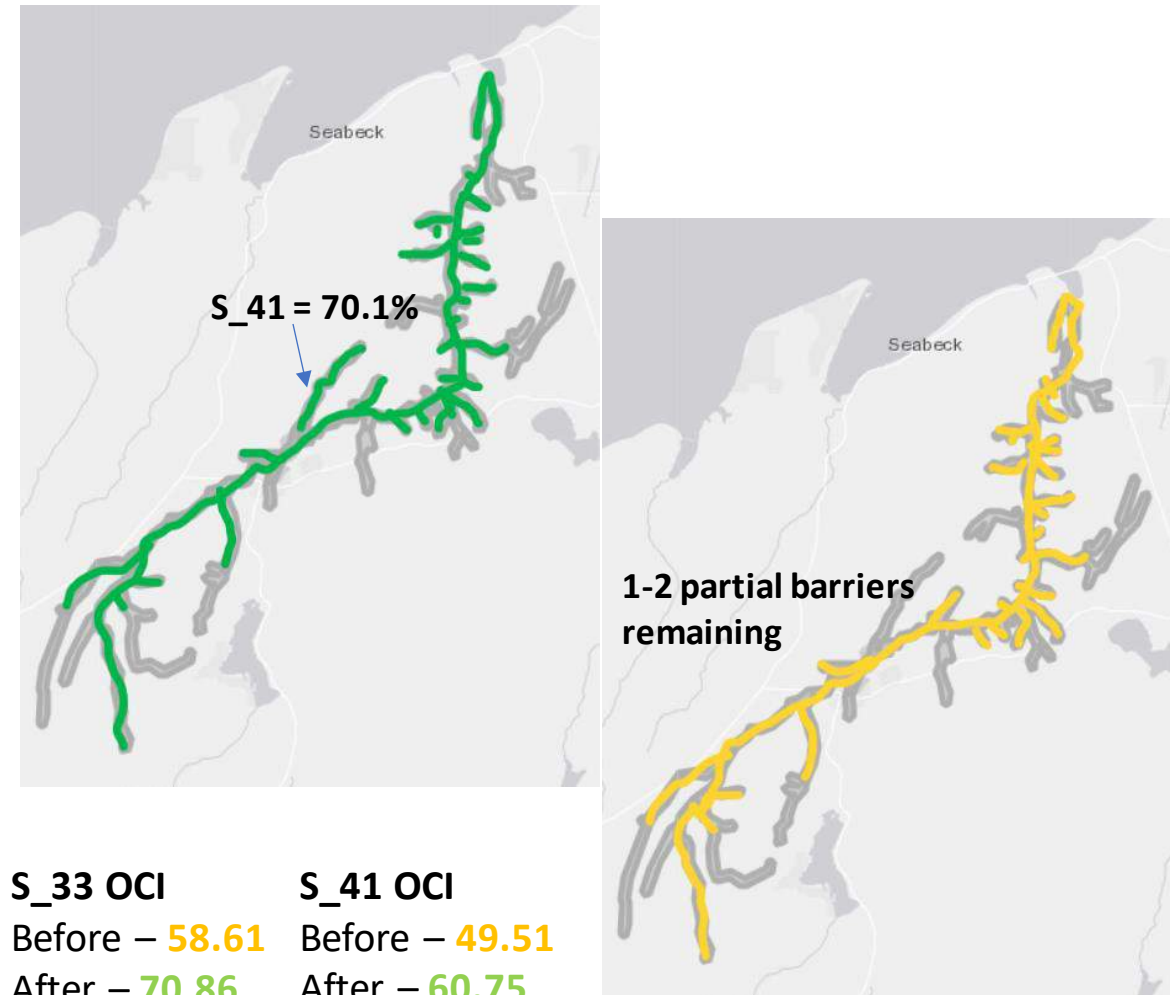
After – **70.86**

- Cost: \$1,000,000+ (estimate p\$500,000/barrier)
 - 2 fish passage barriers removed
- Who:
 - One County owned culvert (W One Mile Road) – Site ID 420717
 - One privately owned (Kid Haven Ln NW)
 - Incentives for private barrier removal?

NOTE: would need to be coupled with %riparian veg improvement to minimum 70% in S_41 to achieve High LOS

Scenario 8-- Combination of fish passage barrier removal and riparian vegetation planting

- Remove all full blockage barriers from S_33
- Improve riparian vegetation % in S_41 to 70.1%
- Cost range: \$1,115,986 to \$5,217,912
 - 2,320 ft of riparian planting or 70.3 acres planted
 - 2 fish passage barriers removed
- Who
 - County Divisions (Roads, Stormwater, DCD)
 - DNR
 - WDFW
 - GPC
 - KCD



Summary Slide – Big Beef Creek Streams

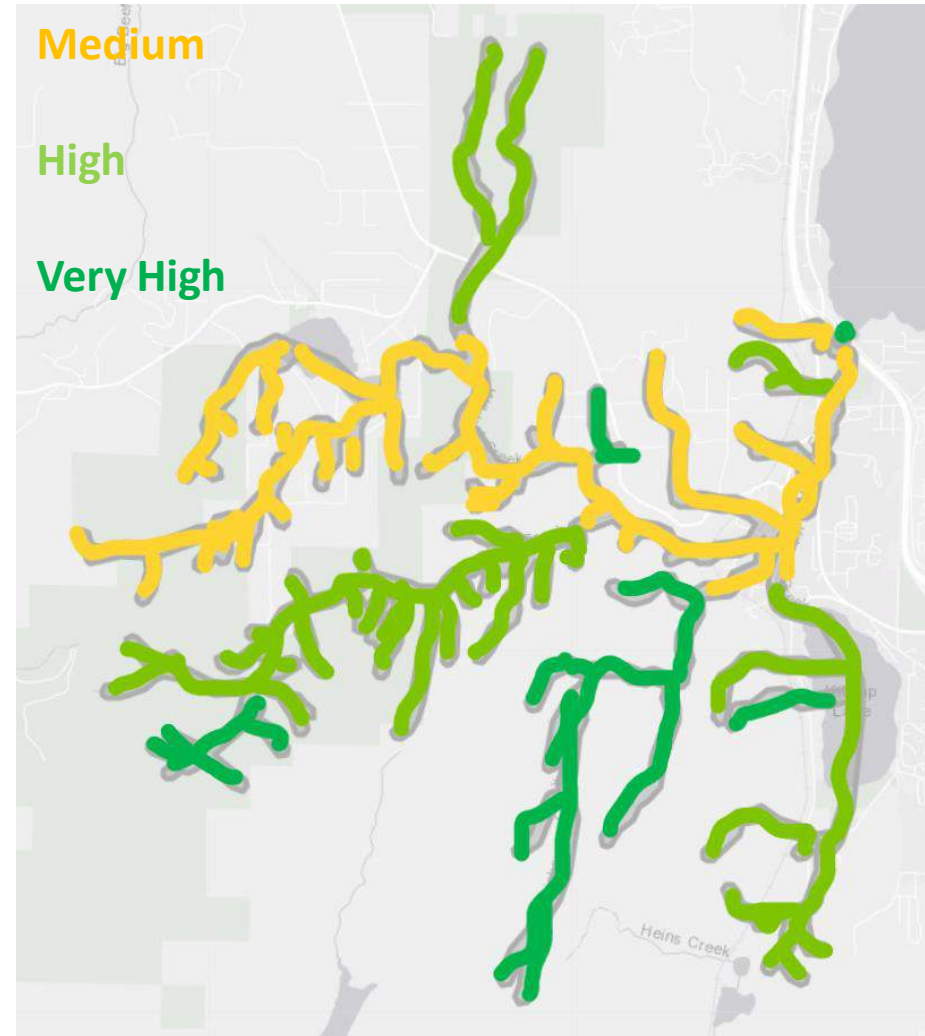
SCEN	WHAT	COST	WHO	LOS Improvement	Area Size
6	Increase riparian forest % by planting 5,547 linear feet or 79.1 acres	\$277,393 -- \$4,744,338	WDFW, DNR, GPC, KCD, Parks	S_33 +1.57 S_41 +16.24	5547 linear ft or 79.1 acres of riparian vegetation planted
7	Remove 2 fish passage barriers (full blockages)	\$1,000,000	County Divisions (Roads, DCD,...)	S_33 +12.25	2 full blockage fish passage barriers removed
8	Increase riparian vegetation % by planting 2,320 linear feet or 70.3 acres and remove 2 fish passage barriers (full blockages)	\$1,115,986 -- \$5,217,912	County Divisions (Roads, DCD,...), WDFW, DNR, KCD, Parks	S_33 +12.25 S_41 +11.24	2320 linear ft or 70.3 acres of riparian veg planted and 2 barriers removed

Scenarios/Strategies - Chico Creek Streams



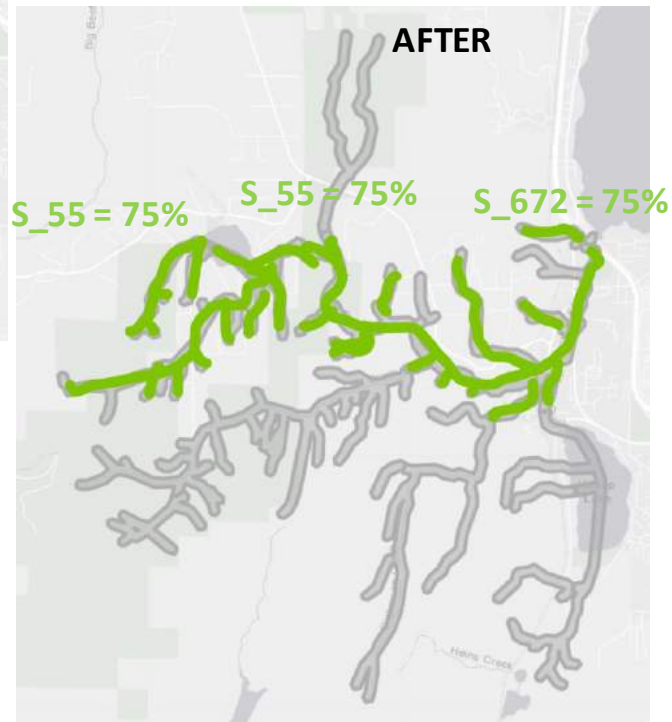
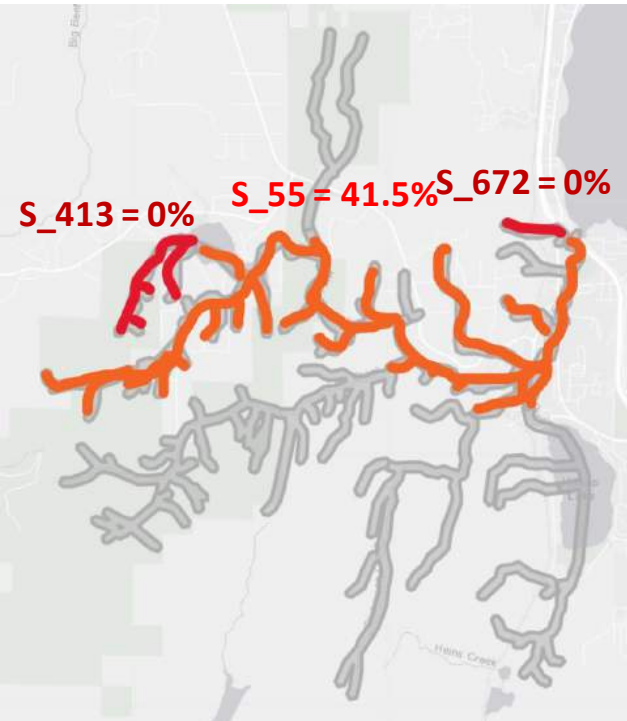
Current Levels of Service

Unit	LOS	DLOS	LOS Gap
S_422	69.86	60	+9.86
S_423	78.92	60	+18.92
S_672	43.98	60	16.02
S_55	51.09	60	8.91
S_91	76.81	60	+16.81
S_791	83.45	60	+23.45
S_308	78.32	60	+18.32
S_80	92.14	60	+32.14
S_79	96.07	60	+36.07
S_56	68.31	60	+8.32
S_298	90.75	60	+30.75
S_413	57.47	60	2.53
S_81	76.97	60	+16.97
S_92	86.58	60	+26.58



Scenario 6 – Increase riparian vegetation to 75% in 3 MUs with Medium LOS

BEFORE



Overall LOS Score

S_672

Before – 43.98

After – 60.64

S_55

Before – 51.09

After – 62.26

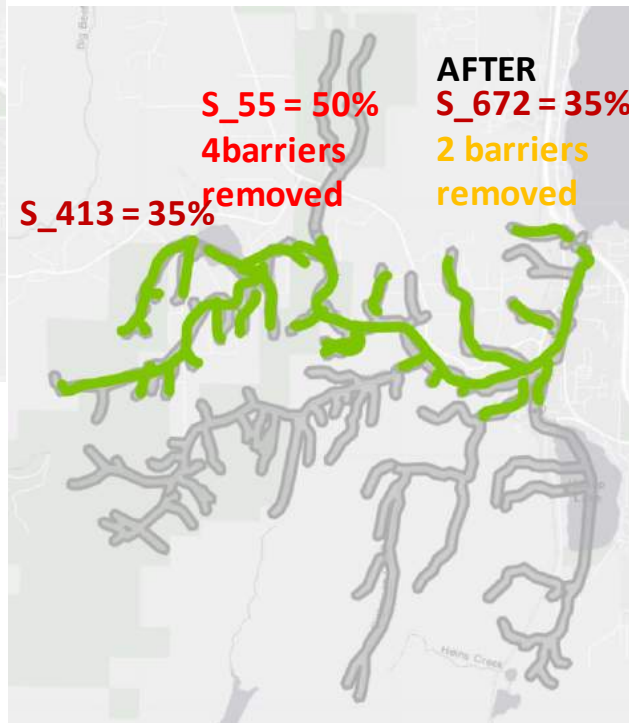
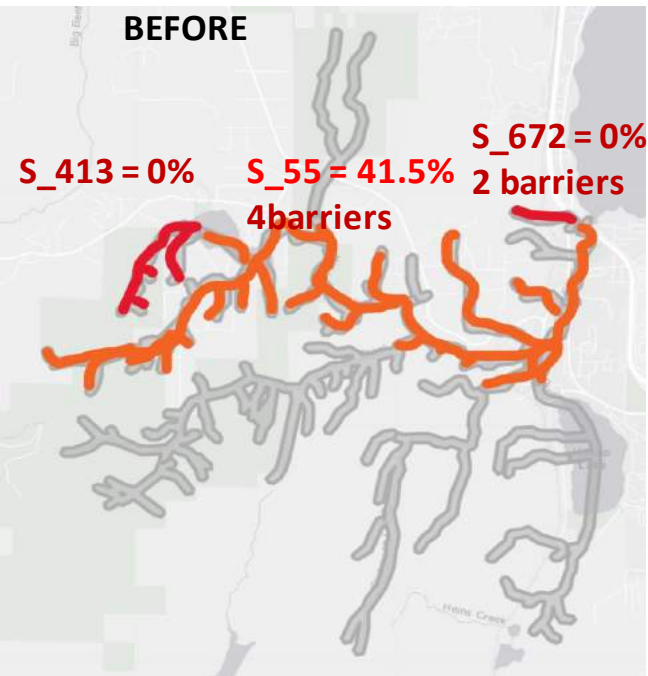
S_413

Before – 57.47

After – 74.13

- Cost range: \$1,270,685 (estimate \$50/linear foot) to \$20,293,612 (estimate \$60k/acre)
 - 25,414 ft of linear stream planted or 338.2 acres planted
- Who:
 - [GPC owned land](#) (Chico Creek Estuary Conservation Easement and Ueland Tree Farm)
 - Incentivize private landowners to plant in RMZs
 - [KCD Programs](#)
 - Offer free plants to landowners with property in riparian areas.
 - Any county or state parks/forests in the area?
YES – Green Mountain State forest
 - [DNR owned land](#) – altering from revenue generating to conservation

Scenario 7 – Remove all full blockage fish passage barriers and improve riparian % in 3 MUs currently rated Medium



Overall LOS Score

S_672
 Before – 43.98
 After – 60.60

S_55	S_413
Before – 51.09	Before – 57.47
After – 61.17	After – 61.84

- Cost range: \$3,415,589 (estimate \$50/linear foot) to \$9,330,888 (estimate 60k/acre)
 - 8,312 ft of riparian plantings or 105.5 acres planted
 - 6 fish barriers removed
- Who:
 - 2 county owned (Site ID 998106, 601625)
 - County division (Roads, Stormwater, DCD)
 - 2 federally owned (Navy)
 - 2 privately owned
 - Incentives for private barrier removal?
 - GPC
 - KCD
 - DNR

Summary Slide – Chico Creek Streams

SCEN	WHAT	COST	WHO	LOS Improvement	Area Size
6	Increase riparian forest % by planting 25,414 linear feet	\$1,270,685 -- \$20,293,612	KCD, Parks, DNR, DCD, GPC...	S_627 +16.66 S_55 +11.17 S_413 +16.66	25414 linear ft or 338.2 acres of riparian veg planted
7	Remove 7 fish passage barriers (full blockages) and plant 8,312 linear feet or 105.5 acres	\$3,915,589 -- \$9,830,888	Various County Divisions (Roads, DCD, Stormwater), the Navy, KCD, DNR, GPC,...	S_627 +16.62 S_55 +10.08 S_413 +4.37	7 full blockage fish barriers removed and 8312 ft or 105.5 acres of riparian veg planted

Scenarios/Strategies - Big Beef Creek Forests

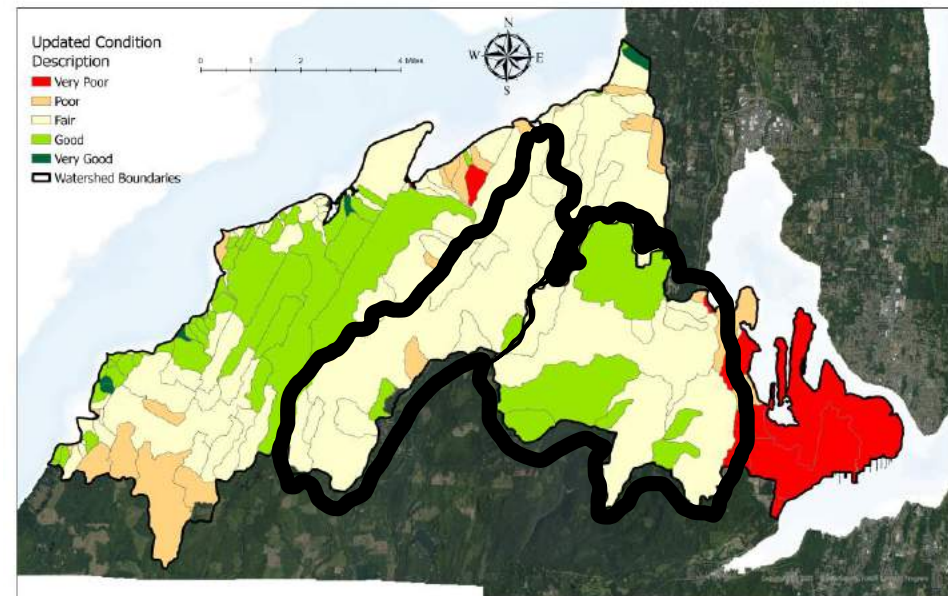
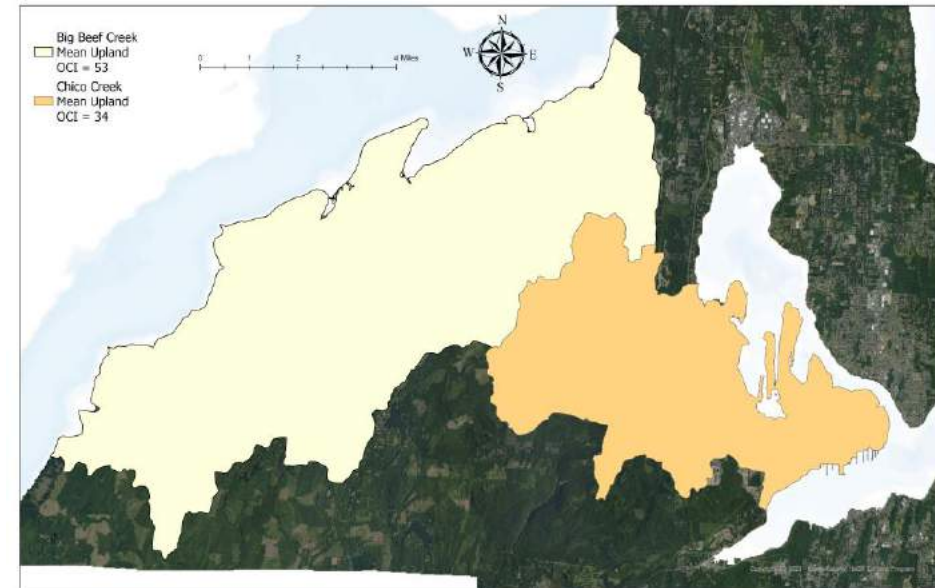


Forest LOS Reminder

- LOS for Forests is being aggregated over the entire watershed.
- Previous discussions in November 2023 workshop highlighted difficulty in achieving DLOS for urban forests.
- Also discussed if we are aggregating across the watershed, we should be weighting the LOS by size of the management unit.

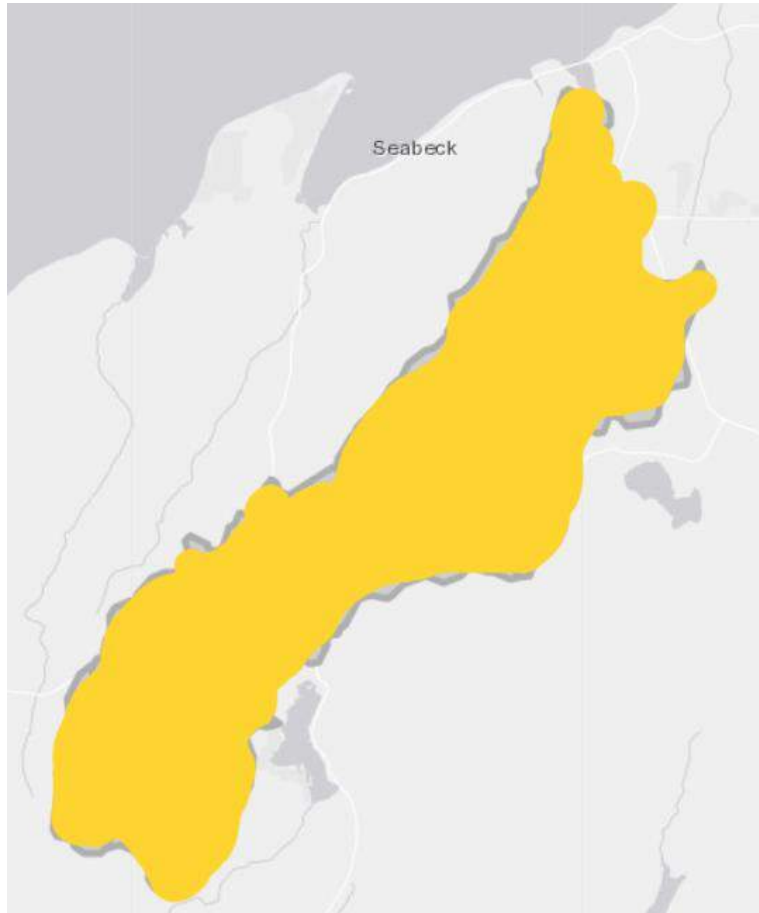
Top: HUC12 Watershed boundaries and aggregate LOS score

Bottom: Individual MU LOS score. Black outline is where scenarios are focused.



Current Level of Service

Watershed Aggregate



Overall

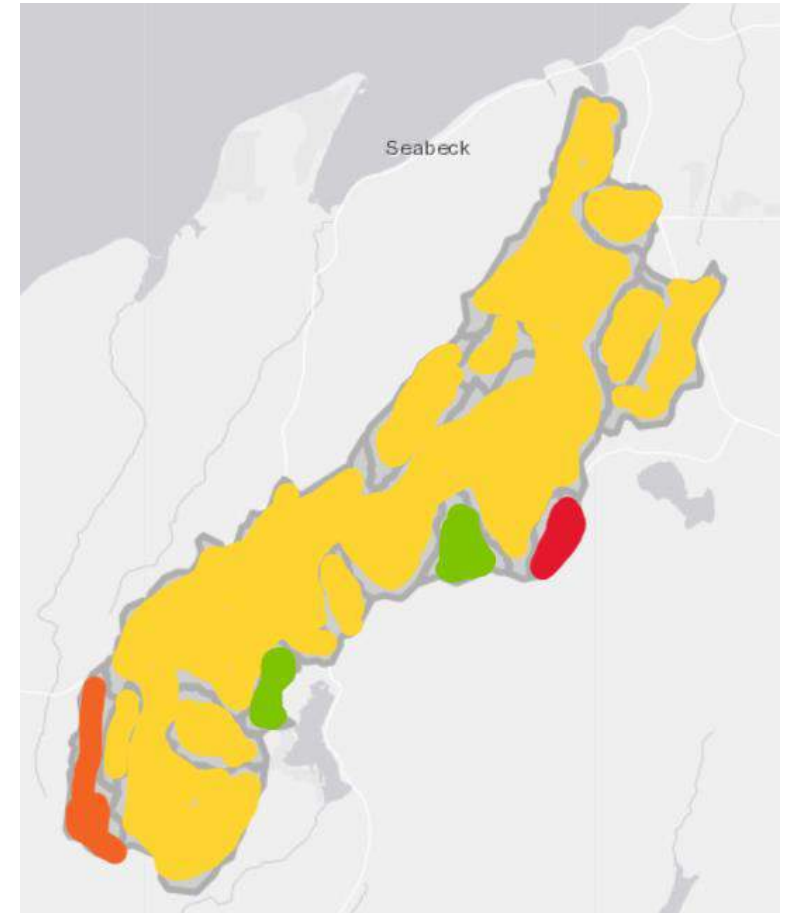
High (60-80)

Medium (40-60)

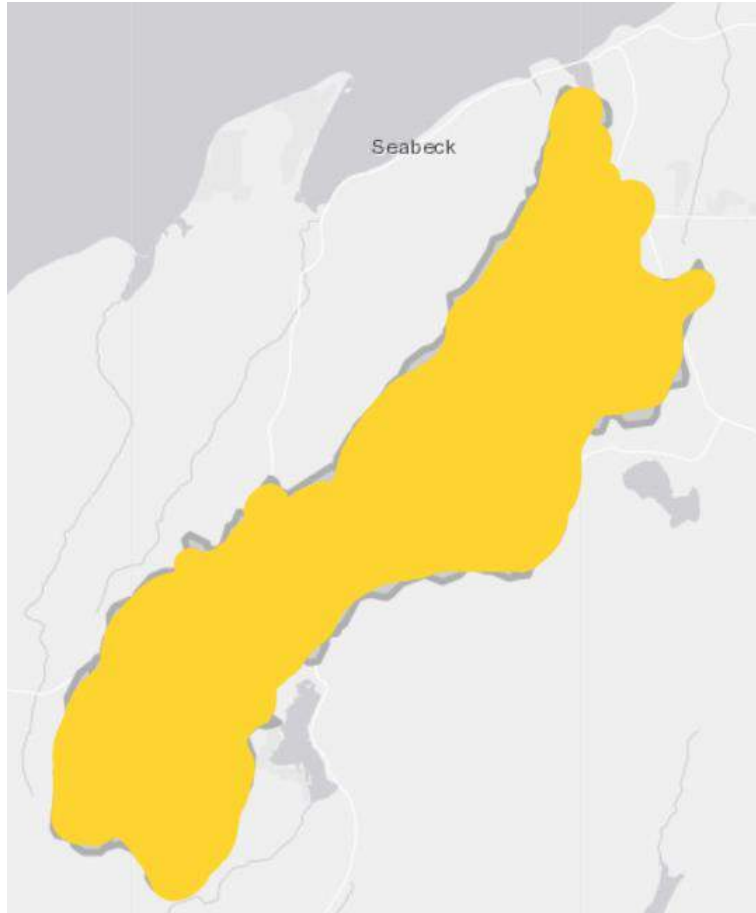
Low(20-40)

Very Low(0-20)

Individual MUs



Weighted score for watershed aggregate



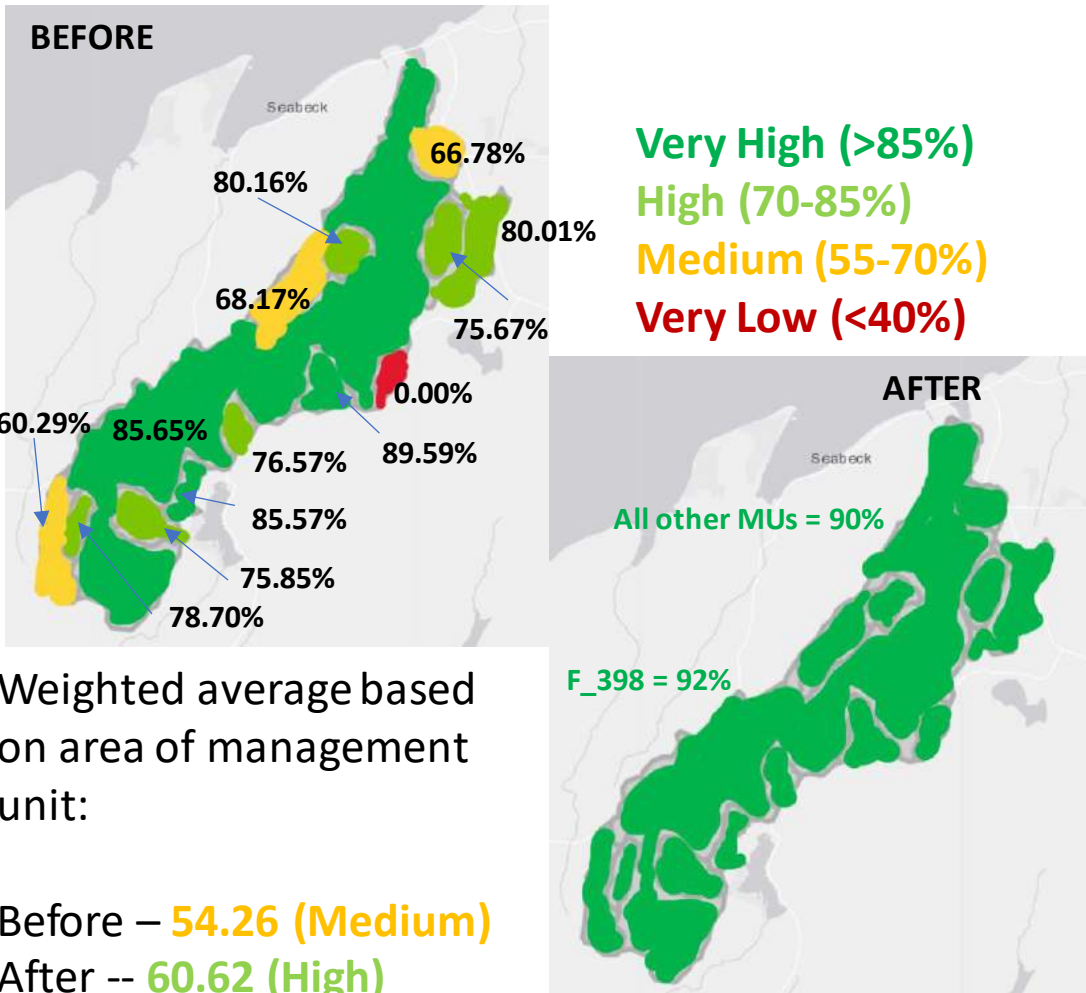
OCI Scoring

Average across all management units =
49.65 (**Medium**)

Weighted average based on management
unit area = 54.26 (**Medium**)

BB Creek Watershed	Aggregate LOS	DLOS	LOS Gap
	54.26	60	5.74

Scenario 9 – Improve forest cover in all MUs to 90% and F_398 to 92%



Cost: \$21,084,678 (High) (estimated \$20k/acre)*
1054 acres of forest planted

Who:

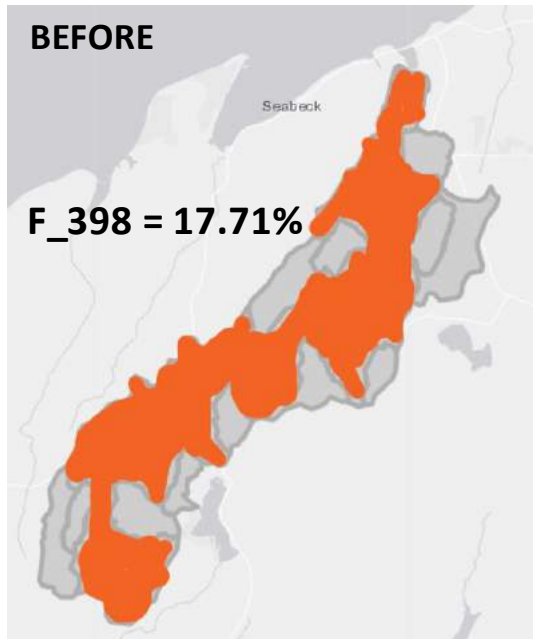
- [GPC owned land](#)
- [DNR managed forest](#)
- [WDFW owned land](#)
- KCD
 - Backyard habitat program
 - Other incentives for private landowners

Weighted average based on area of management unit:

Before – **54.26 (Medium)**

After -- **60.62 (High)**

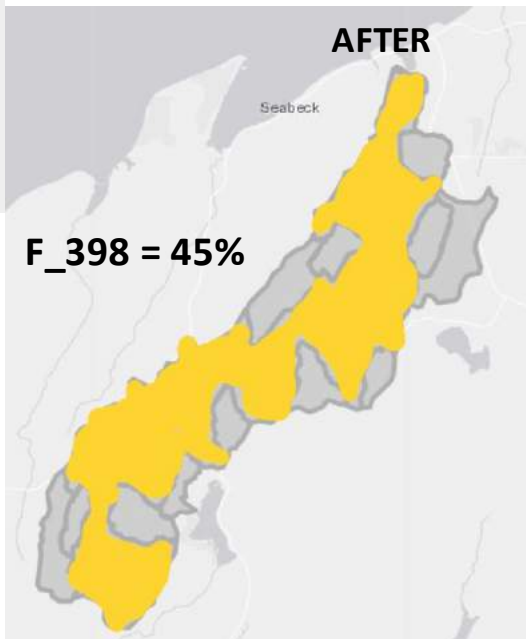
Scenario 10 – Protect forested area in F_398 to increase mature forest % up to 45%



Weighted average based on area of management unit = 61.10 (High)

Low (1-25%)

Medium (25-50%)



Weighted average based on area of management unit:

Before 54.26 (Medium)

After 61.10 (High)

Cost: \$8,943,107 (High) (estimated \$6k/acre for acquisition) *

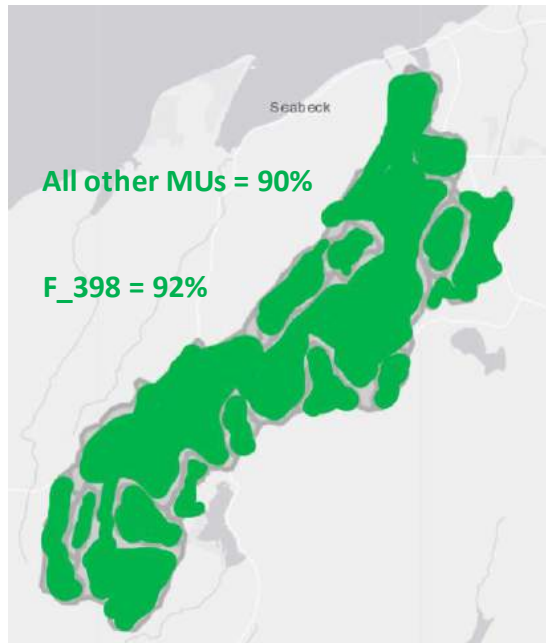
1491 acres of land acquired to protect forests growing toward maturity (Class E)

Who

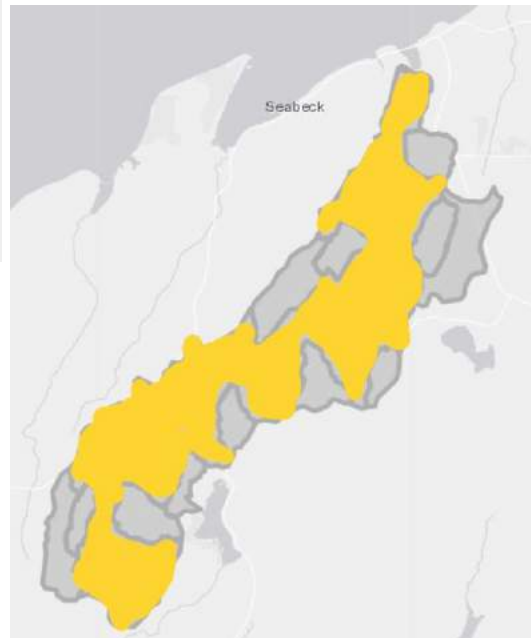
- Partner with GPC and other land trusts to acquire forest land to protect.
- Partner with DNR to alter harvesting schedule/area to promote areas to grow to mature forests.

Scenario 11 – combination of Scenario 1 and 2, what if we did both?

Forest Cover %



Mature Forest %



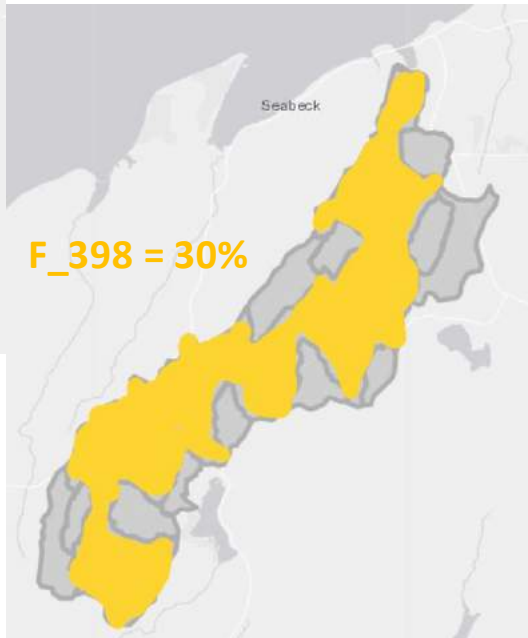
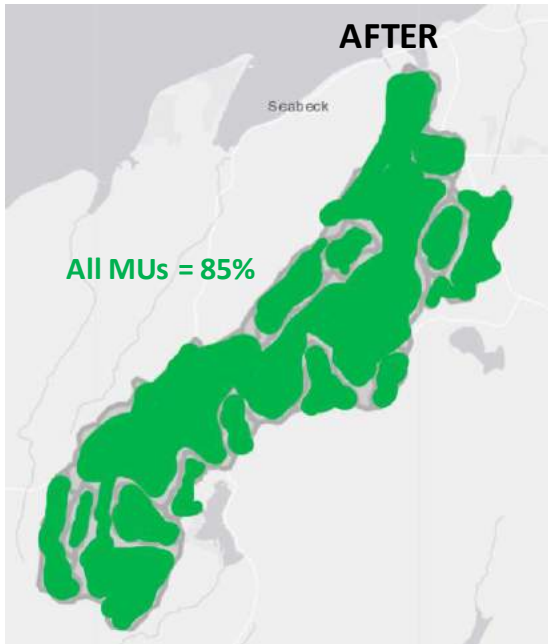
Weighted average based on area of management unit:

Before – **54.26 (Medium)**

After – **67.84 (High)**

- Improve forest cover % in all MUs to 90% and F_398 to 92%
- Improve mature forest % in F_398 to 45%
- Cost: \$30,027,785 (High) *
- **1054** acres of planting and **1491** acres of land acquired to protect
- Who

Scenario 12 -- Increase forest cover to 85% where below and mature forest to 30% in F_398



Weighted average based on area of management unit:

Before **54.26 (Medium)**
After **60.48(High)**

- Cost -- \$15,012,000 (High) *
 - **549** acres of forest planting
 - **672** acres of land acquisition to improve mature forest %
- Who
 - [GPC owned land](#)
 - [DNR managed forest](#)
 - [WDFW owned land](#)
 - KCD
 - Backyard habitat program
 - Other incentives for private landowners

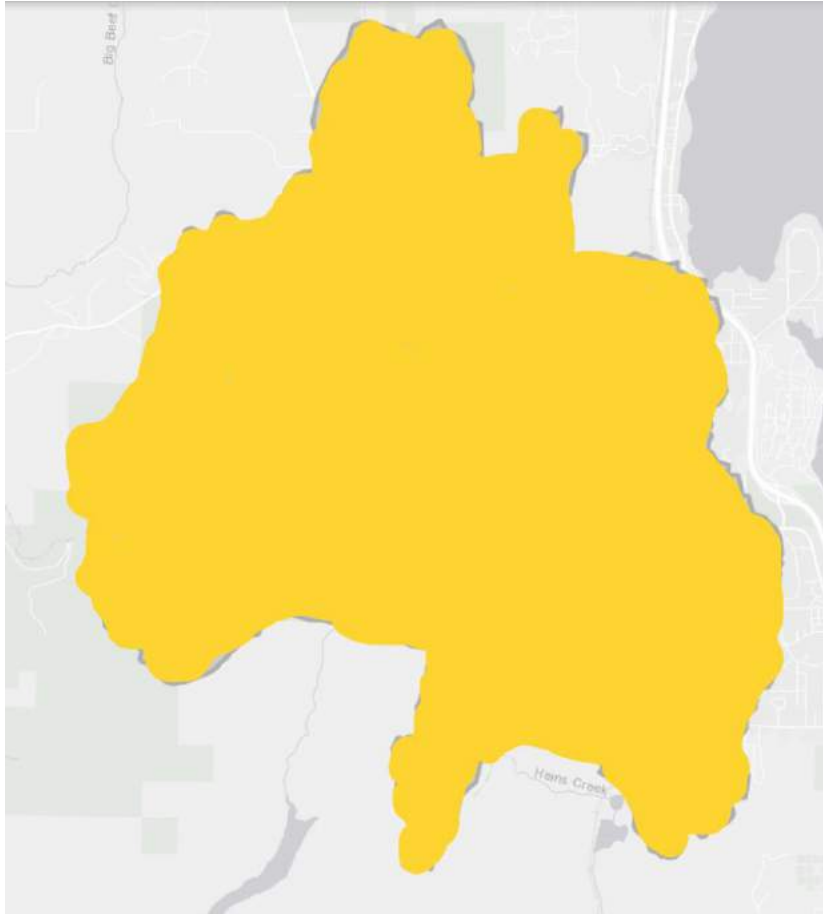
Summary Slide – Big Beef Creek Forests

SCEN	WHAT	COST	WHO	LOS Improvement	Area Size
9	Increase forest cover by planting 1054 acres of upland forest	\$21,084,678	DNR, WDFW, GPC, other land trusts, private landowners...	+6.36	
10	Improve mature forest % by acquiring 1491 acres of land for protection	\$8,943,107	DNR, GPC and other land trusts...	+6.84	
11	Scenario 9 and 10 full actions	\$30,027,785	DNR, WDFW, GPC and other land trusts	+13.58	
12	Increase forest % by planting 549 acres, and increase mature forest % by acquiring 672 acres of land for protection	\$15,012,000	KCD, DNR, WDFW, GPC and other land trusts	+6.22	

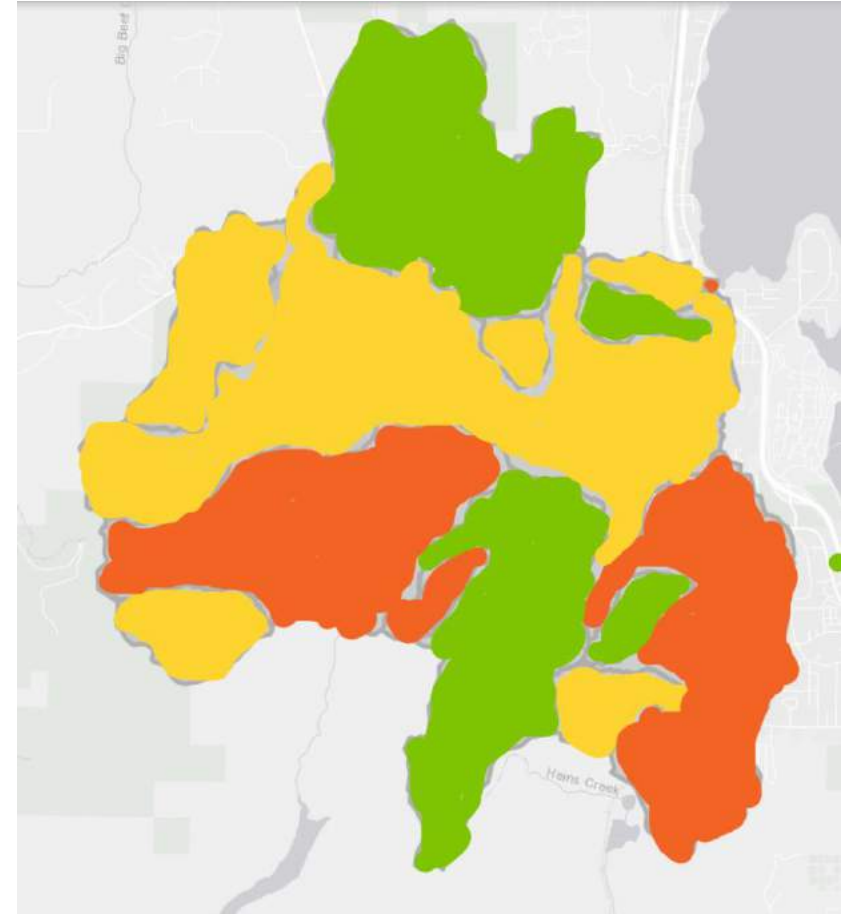
Scenarios/Strategies - Chico Creek Forests



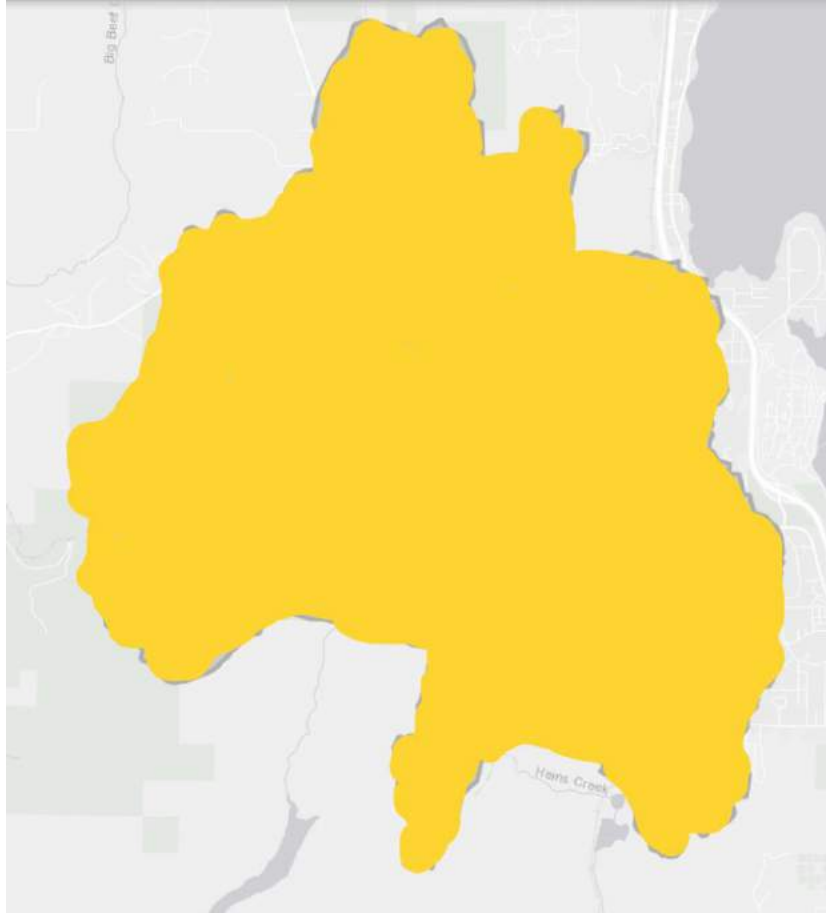
Current Level of Service



Overall
High (60-80)
Medium (40-60)
Low (20-40)



Weighted score for watershed aggregate



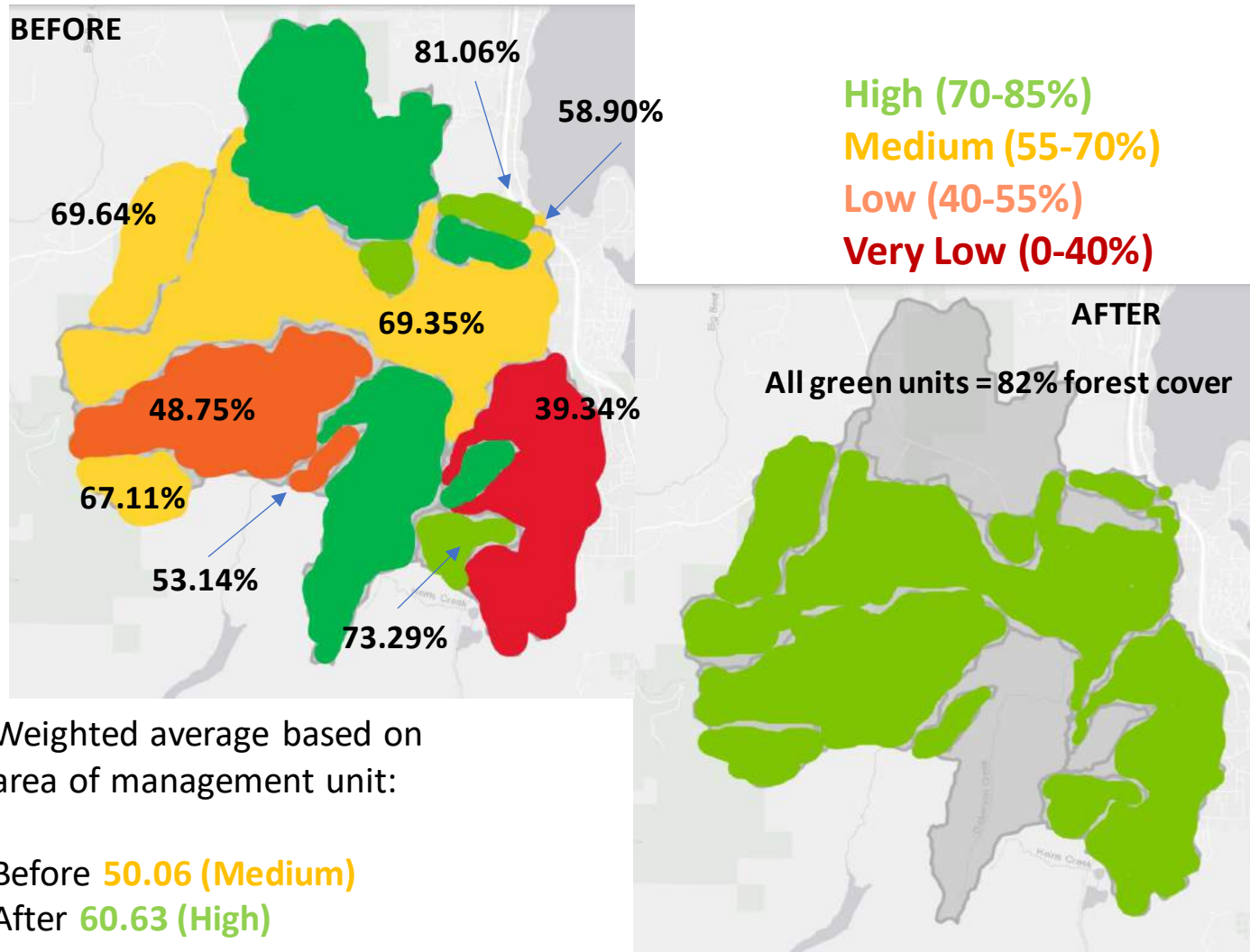
OCI Scoring

Average across all management units =
50.44 (**Medium**)

Weighted average based on management
unit area = 50.06 (**Medium**)

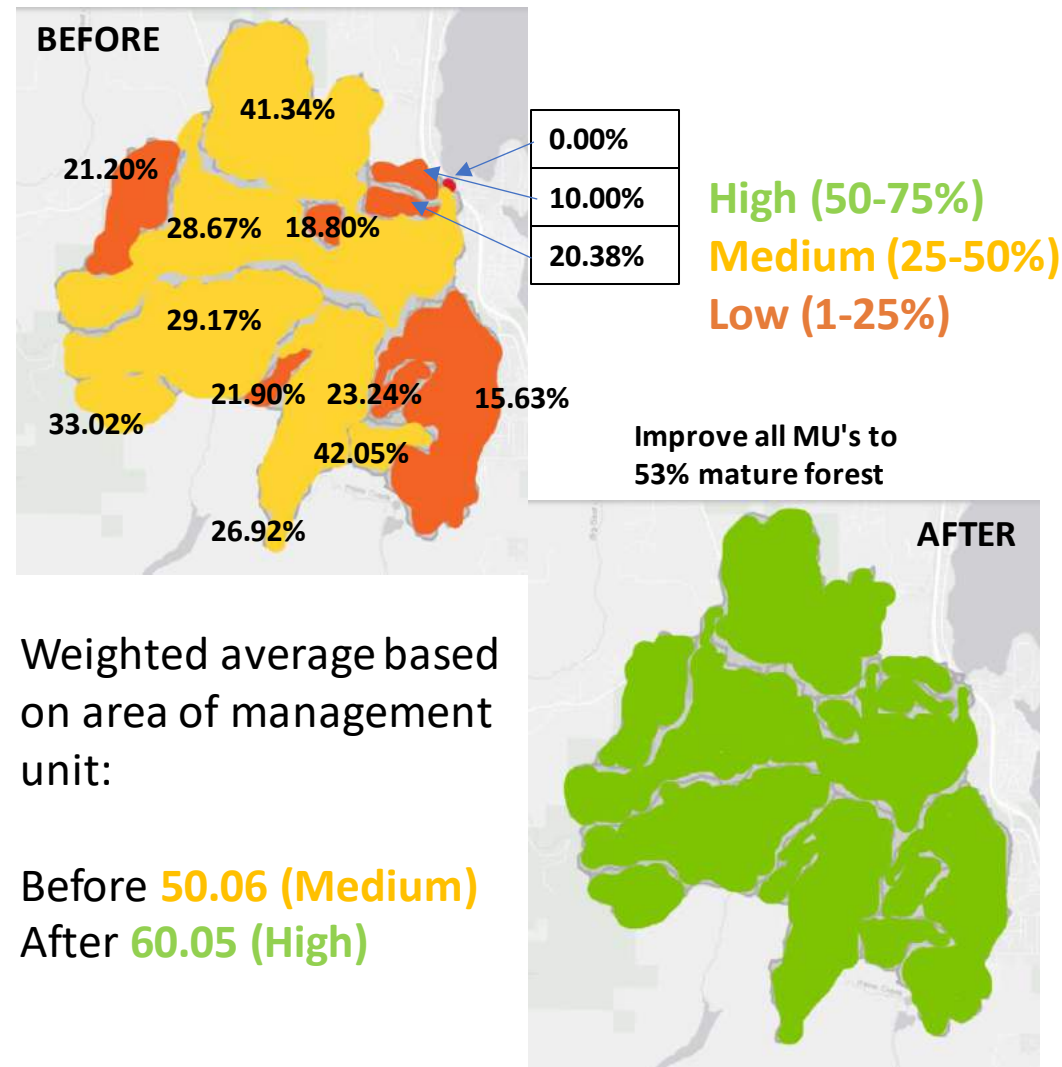
Chico Creek Watershed	Aggregate LOS	DLOS	LOS Gap
	50.06	60	9.94

Scenario 8 – improve all MUs below 82% forest cover up to 82%



- Cost: \$9,879,035 (High) (estimated \$20k/acre planting) *
 - **494** acres of forest planted
- Who:
 - City/County owned land (Erlands Point, Chico Salmon and Newberry Hill Heritage Park)
 - Some City of Bremerton owned land
 - DNR (Green Mountain State Forest)
 - KCD
 - Backyard habitat program
 - Other incentives for private landowners
 - Comp plan tree retention and replacement policies (only within UGAs)

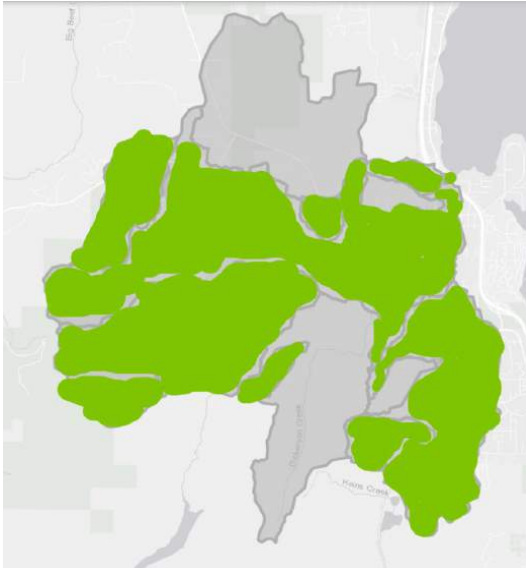
Scenario 9 – Acquire and protect forest to achieve High LOS across the watershed by improving % mature forest



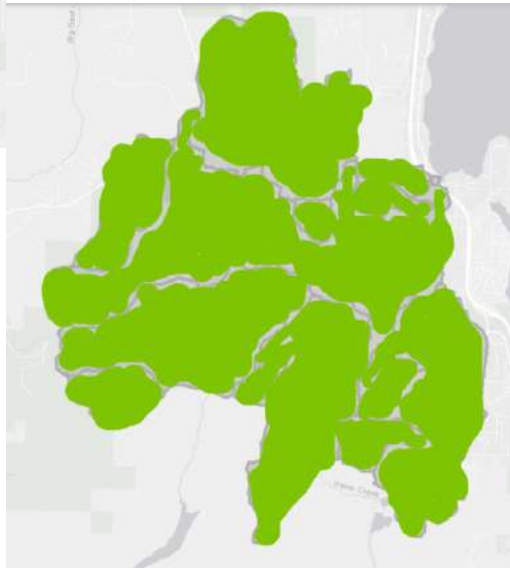
- Cost: \$15,691,145 (High) (estimated \$6k/acre acquisition) *
 - **2615** acres of land acquired to protect forests growing to maturity (Class E)
- Who
 - Partner with GPC and other land trusts to acquire forest land to protect.
 - Partner with DNR to alter harvesting schedule/area to promote areas to grow to mature forests.
 - Kitsap County Comp plan tree retention policy.

Scenario 10 – combination of Scenario 1 and 2. What if we did both?

Forest cover %



Mature forest %



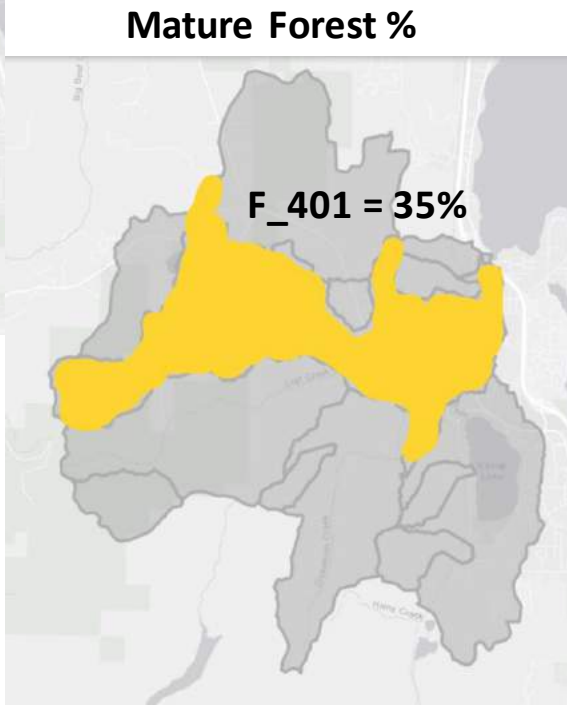
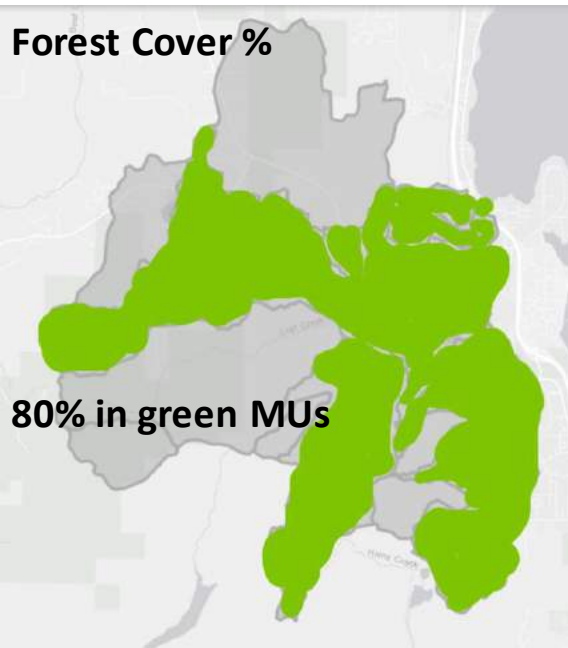
Weighted average based on area of management unit:

Before – **50.06 (Medium)**

After – **70.62 (High)**

- Improve all forest unit up to 82% forest cover.
- Improve mature forest % to 53% in all units
- Cost \$25,570,180 (High) *
 - **494** acres of planting and **2615** acres of land acquired to protect.
- Who
 - City and County owned parks
 - DNR
 - KCD
 - GPC and other land trusts

Scenario 11 -- Improve forest cover to a minimum of 80% in all MUs and mature forest to 35% in F_401



Weighted average based on area of management unit:

Before **50.06 (Medium)**
After **60.40 (High)**

- Cost: \$8,426,000 (High) *
 - **367** acres of forest planting
 - **181** acres of land acquired to protect
- Who
 - DNR
 - GPC and other land trusts
 - City and County owned parks
 - KCD

Summary Slide – Chico Creek Forests

SCEN	WHAT	COST	WHO	LOS improvement
8	Increase forest cover by planting 494 acres of upland forest	\$9,879,035	City of Bremerton, DNR, KCD...	+10.57
9	Improve mature forest % by acquiring 2615 acres of land for protection	\$15,691,145	DNR, GPC, other land trusts...	+9.99
10	Scenario 8 and 9 full actions	\$25,570,180	City of Bremerton, DNR, KCD, GPC and other land trusts	+20.56
11	Increase forest % by planting 367 acres, and increase mature forest % by acquiring 181 acres of land for protection	\$8,426,000	City and County Parks, DNR, GPC and other land trusts, KCD	+10.34