Mason VSP Monitoring Plan

This monitoring plan is an adaptive management strategy to evaluate the effectiveness of the Voluntary Stewardship Program (VSP) in Mason County. It utilizes publicly available data on critical area functions and values to assess the impact of the VSP workplan at a watershed scale. Metrics for best management practices (BMPs) implemented through the VSP program, other programs, and volunteer efforts will be collected annually and stored in a watershed summary database. This database will align practices with NRCS physical effects scoring criteria to provide a snapshot of critical area health and identify needed efforts for targeted practices.

Annually, VSP staff will compare public data metrics with BMPs to determine the impact of implemented practices on critical area functions and values. This process will accept the inherent data errors from partners. The annual reviews will contribute to the quantitative support needed for VSP's 5-year reports, demonstrating the program's success in protecting, enhancing, and maintaining agricultural viability in Mason County.

The Mason VSP will continue to adapt the plan with data verification, increased monitoring, and primary data collection through inter-agency partnerships, contingent on available funding and staffing.

Mason VSP Workplan

The VSP work plan was adopted in 2018 and its initial five-year report was submitted in 2020. The WSCC concurred with the VSP work group that it is meeting plan goals and benchmarks; however, the WSCC Technical Panel had significant review comments that were deemed vital to be addressed in the next five-year report.

The VSP work plan established a monitoring plan, goals, and benchmarks to determine success of the VSP program in Mason County. Several monitoring tools were provided as data sets to be observed over time and analyzed as a performance measure. Monitoring elements included BMPs, ISPs, Salmon habitat restoration and conservation projects, and land changes, including changes to various critical areas.

In the VSP work plan, four goals were stated:

1. Protect critical area functions and values on agricultural lands at a watershed level.
2. Enhance critical area functions and values through voluntary, incentive-based measures.
3. Ensure the viability of agriculture and reduce the conversion of agricultural land into other uses.
4. Establish baseline monitoring program to measure benchmarks.

Benchmarks are dependent on the type of area but are categorized as either protection (maintaining the baseline quantity), participation (comparing operator involvement quantities), and enhancement (improving from the baseline quantity).

Adaptive management strategies in the VSP work plan are planned ways to adjust the process if it is found that goals and/or benchmarks are not being met. For the VSP work plan, adaptive management is triggered based on specific benchmark thresholds. When a threshold is not met a set of actions to adjust the program is triggered to meet the threshold in the future. Generally, the adaptive management actions triggered include identifying factors keeping the threshold from being met, meeting with key entities that can directly address those factors, identifying and implementing technical support to producers, and re-evaluating goals and benchmarks and making any updates necessary to reflect changed conditions.

Monitoring is a key element of VSP. In contrast to the GMA, monitoring in VSP is statutorily required. Monitoring in VSP covers three primary monitoring categories set to measure performance of the program and trigger adaptive management strategies. These monitoring categories are:

1. Participation Monitoring
2. Implementation Monitoring
3. Program Effectiveness Monitoring

Stakeholder Participation Monitoring assesses the level of engagement of agricultural producers with respect to the goals and benchmarks of the county's VSP work plan. Participation monitoring is required to demonstrate that enough agricultural producers are participating to achieve implementation goals and benchmarks.

Implementation Monitoring tracks implementation of conservation practices (i.e., BMPs) across the landscape within a county and/or watershed, with an emphasis on whether BMPs were installed to proper specifications, when and where BMPs have been implemented, and whether BMPs are being maintained over time. Implementation monitoring is required to demonstrate the amount (i.e., acreage, linear feet) and type (i.e., nutrient management, habitat management, conservation tillage) of conservation practices that are occurring throughout a watershed.

Effectiveness Monitoring determines the effect of volunteer agricultural activities on critical area functions and values. Effectiveness monitoring is required to demonstrate whether conservation practices, e.g., at the amount and of the type specified in the implementation goals and benchmarks – are having the intended effects on functions and values.

This Monitoring Plan for the Mason VSP will outline VSP Monitoring moving forward and act as adaptive management to the Mason VSP in response to WSCC Technical Panel comments to the 2020 5-year report. All reviewers supported Mason County utilizing adaptive management planning to meet goals and benchmarks established in the VSP work plan; these adaptive management efforts will be key in VSP work plan implementation improvements.

This Plan acts alongside the Mason VSP workplan published in 2018 by the Mason VSP work group. VSP technical implementation staff will continue to rely on the best management practices and monitoring data not mentioned in this document. This plan is supplemented by the Work plan which can be viewed here: WORK PLAN (masoncd.org)

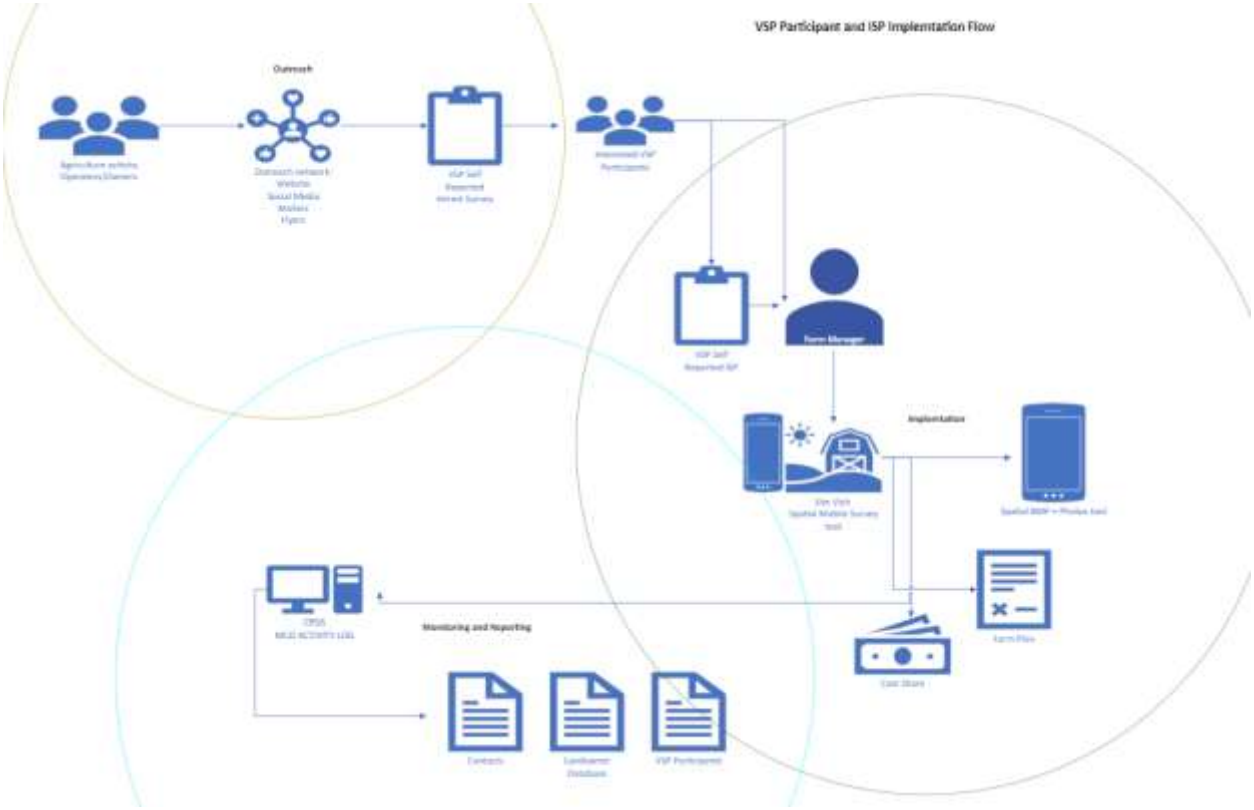
Participation and Implementation Monitoring

Mason County has met many of the goals for implementation of conservation practices which are part of the enhancement benchmark identified in the work plan. The implementation of some conservation practices has not been well tracked. Under adaptive management additional data collection and analysis will be implemented to determine if the goals for all practices are being met.

Mason County and the Mason County Conservation District have used a variety of planning tools to help producers to identify and implement appropriate conservation practices on their land. The number of conservation plans (or farm plans) completed is a key component of the protection benchmark. Based on available data it does not appear that this benchmark is being met. Much of the focus of adaptive management will be identifying and implementing changes that will result in greater numbers of plans being completed. To meet the work plan goal of 7.5 plans per year the number of plans produced would need to double. This could be achieved with increased outreach efforts to producers.

Comments from the WSCC noted that BMP implementation was not well tracked or maintained and that these efforts need improvement. Recommendations to address these comments include obtaining a record of conservation practices implanted since 2011 from NRCS and organizing data by Hydrologic Unit Code (HUC) to be able to map and track BMPs implemented. Recent communications with NRCS and the state Conservation Commission staff indicate this data should be available within a few months. This data should be enhanced by any additional information from Mason CD for any BMPs implemented but not included in the NRCS data. This mapping and database development should be used to better understand BMP implementation at a sub-watershed level.

Figure 1, Implementation flow of outreach and participants in VSP



Internal Flow of participant, outreach, and tracking by MCD Staff.

District Activity Monitoring

To address the concerns of implementation record keeping the VSP technical staff in coordination with the Mason conservation district will redesign the internal management of activity throughout the county with an interdisciplinary approach through a Customer Relationship Management (CRM) and reporting database. Using alongside tools such as CPDS, the district will use internal tools for daily monitoring of completed projects, new and prospective partnerships, collaborator contacts and activities such as technical assistance, and BMP installation.

This tool benefits both the district in its own regular management, planning and reporting, as well as the VSP program to capture the wide variety of critical area protection and enhancement actions. This tool alongside regular updating of public data gives a more accurate capture of beneficial practices year on year. Since all district activity is reported by district staff, VSP participants, ISP, and NRCS Farm plans are also recorded and captured in one location for quick summary, analysis, and review if VSP workplan benchmarks are being met.

VSP Effectiveness Monitoring

Mason County VSP Effectiveness Monitoring seeks to connect agricultural practices to indicators of critical area function and value enhancement, protection decline compared to 2011 benchmarks using a combination of monitoring strategies:

- Public spatial and quantitative data analysis, to represent critical area function and value Quantity and quality.
- NRCS BMP Physical effects scoring cross walk, to summarize and identify problem and success areas, targeted BMP outreach, and do-something levels of activity impact.
- On the ground data truthing, and case study though instrumentation and field survey where funding and staffing allow.

Further Leveraging Publicly Available data

Comments from the WSCC noted that the Work Group did not demonstrate in the report how the actions they took to protect and/or enhance critical areas resulted in protection or enhancement of specific critical areas.

Recommendations to address these comments include utilizing an analysis of the Conservation Practice Physical Effects to estimate the impact of conservation practices on critical area functions. The data on BMPs implemented (past, present and future) should be mapped and tracked. The Work Plan benchmarks are focused on measuring and tracking producer participation in implementing key stewardship strategies and practices identified by the Work Group as having a clear benefit to one or more critical area functions and values. Benchmarks and performance objectives were created for groups of similar practices that provide similar benefits to critical areas' functions and values. This acts to simplify the reporting process by focusing on groups of practices, which allows for self-funded practices outside of NRCS specific practices to be counted towards critical areas protection and enhancement.

Table 1 provides an example crosswalk of the key stewardship practices identified for the Mason County Work Plan benchmarks to critical areas function protections based on the overall averaged CPPE function effects score, and agricultural viability aims. This table can be tailored to match the BMP's and Critical Area intersects described in Tables 19, 21, 23, 25, and 27 of the Mason County VSP Work Plan. The CPPE scoring shown in Table 1 indicates the most beneficial effects to functions in light blue boxes (+5), no effect (0), and the most detrimental effects to functions in dark blue (-5). As previously discussed, it's important to note that the relative changes in functions affected from a given stewardship strategy or practice will be tracked in relation to baseline conditions, e.g., a +2 CPPE score for a practice will be captured as a +4 if practices are moving to from a -2 to +2.

Table 2 provides a summary of protection and enhancement measurable participation benchmarks for the 5-year reporting increments (2017 and 2022) for Mason County. The protection performance standard for each stewardship strategy or practice is based on historic records. New practices will often replace an existing practice. Trends in stewardship practices and updates to the protection performance standard that reflect the move to new stewardship practices will need to be included in the future 2- and 5-year reports. Acreage may be adjusted as

needed to reflect the higher or lower physical effect of the new practice, changes in practices, and changes in agricultural activities over the long term.

Utilizing NRCS CPPE scoring as a core monitor of BMP implementation on critical areas allows Mason VSP to rely on science backed practices for effectiveness monitoring. However, alongside this scoring Mason VSP will continue to use public data available for DOH 303d listed streams, Fish counts, and WDFW HRCD data sets, and leverage the primary data collection by other agencies in the county. This information, combined with tracking of participation and practices on the HUC 12 scale will allow VSP technical staff to summarize protection and enhancement of critical areas at the watershed scale. This style of monitoring can also identify problem areas to address with targeted outreach and specific management directions.

This approach provides a defensible assertion that VSP goals for stewardship practices are effectively meeting the work plan's protection and enhancement goals and benchmarks. A benefit of the physical effects scoring crosswalk to assess Critical area protection, enhancement and degradation is its comparison to the baseline. Existing trends can be ignored since BMPs in 2011 baseline year are known. Baseline data is also dynamic since new participants can report voluntary efforts implemented before, during and after 2011. Scoring can show protection and enhancement without first identifying trends.

The challenge with NRCS CPPE crosswalk is not being able to consistently identify degradation outside of the ill-effects of certain practices. This is where public data will need to be collected for long-term trend analysis.

Table 1
Example of Practices Crosswalk to National Functions Scores, Critical Areas, and Agricultural Viability

Key						
Beneficial Effects			Neutral or No Effects	Adverse Effects		
High	Medium	Slight		Slight	Moderate	High

Key Stewardship Strategies				Mason County Implementation		Critical Area Functions Protection Metrics (averaged CPPE Function Effects Score)				Critical Area Protections					Agricultural Viability and Stewardship Goals
Type		NRCS Code	Key Practices	2011-2017	2017- Present in prep.	Soil	Hydrology	Water Quality	F&W Habitat	WET	FWHCA	CARA	GHA	FFA	
Indirect intersects	Livestock Management	528	Prescribed Grazing	121 acres	TBD acres	2.75	1.50	1.30	2.40						Protect against erosion risk Protect soil function Reduce invasive and nuisance species Provide pollinator/beneficial organism habitat
		560	Access Road	520 linear feet	TBD linear feet	1.25	2.00	1.00	0.00	•	•		•	•	
		561	Heavy Use Area Protection	5.6 acres	TBD acres	0.75	-0.33	1.67	0.00						
	Forest Management	314	Brush Management	22.5 acres	TBD acres	1.50	1.33	0.50	3.50						Protect soil function Reduce invasive and nuisance species Provide pollinator /beneficial organism habitat
		381	Silvopasture	6 acres	TBD acres	2.90	1.83	1.50	3.00		•	•	•	•	
		383	Fuel Break	8.6 acres	TBD acres	-1.50	-1.00	-1.00	-0.33						
	Waste Management	313	Waste Storage Facility	2 each	TBD each	0.50	1.00	2.00	0.00						Reduce invasive and nuisance species Reduce input costs Protect Water Quality
		315	Herbaceous Weed Treatment	12.2 acres	TBD acres	2.00	1.67	0.33	4.00						
		634	Manure Transfer	1 each	TBD each	-1.00	1.00	2.00	0.00						
	Nutrient Panagement	590	Nutrient Management	162.3 acres	TBD acres	1.00	0.00	3.33	4.00	•	•	•	•		
		595	Pest Management	16.6 acres	TBD acres	2.00	0.00	4.00	2.67						
	Pest Control	340	Cover Crop	1.1 acres	TBD acres	2.83	1.17	1.43	1.00						
		484	Mulching	6 acres	TBD acres	2.29	3.50	1.50	1.00						
	Irrigation and Flood Control	614	Watering Facility	12 each	TBD each	1.10	0.00	1.71	3.00						Protect against erosion risk Protect soil function Improve water availability Reduce Flooding Reduce input costs
		620	Underground Outlet	822 linear feet	TBD linear feet	1.33	1.50	-0.50	0.00						
		430	Irrigation Pipeline	1,180 linear feet	TBD linear feet	1.00	1.67	1.14	0.00						
		441	Irrigation System, Microirrigation	1.1 acres	TBD acres	0.50	2.50	1.60	4.00						
		442	Irrigation System, Sprinkler	16.2 acres	TBD acres	1.25	2.67	1.55	4.00	•	•	•	•	•	
		500	Obstruction Removal	3 acres	TBD acres	0.00	2.00	0.00	0.50						
		516	Pipeline	3,018 linear feet	TBD linear feet	0.00	0.00	0.00	5.00						
		558	Roof Runoff Structure	8 each	TBD each	0.75	1.00	1.80	2.00						
		582	Open Channel	90 linear feet	TBD linear feet	1.00	2.50	-1.00	0.00						
Direct Intersects	Habitat Improvement	382	Fence	7,080 linear feet	TBD linear feet	1.00	0.00	1.50	1.67						Protect against erosion risk Protect soil function Reduce invasive and nuisance species Provide pollinator /beneficial organism habitat
		612	Tree/Shrub Establishment	30 acres	TBD acres	3.30	1.80	1.42	3.67						
		342	Critical Area Planting	0.7 acres	TBD acres	1.00	1.00	0.40	0.00						
		391	Riparian Forest Buffer	3.6 acres	TBD acres	2.80	1.25	2.83	3.67	•	•	•	•	•	
		395	Stream Habitat Improvement and Management	1.7 acres	TBD acres	2.50	0.00	2.67	4.00						
		643	Restoration and Management of Rare and Declining Habitats	111 acres	TBD acres	0.50	0.00	2.00	4.00						
		647	Early Successional Habitat Development/ Mgt.	3 acres	TBD acres	0.00	0.00	-2.00	3.00						
		660	Tree Shrub Pruning	13.5 acres	TBD acres	1.25	2.00	1.00	1.67						
	Agricultural Viability	325	Seasonal High Tunnel	8,418 square feet	TBD square feet	-0.50	-1.00	-1.00	0.00						Improve production Increase efficiency
		490	Tree/Shrub Site Preparation	49.7 acres	TBD acres	-1.29	1.50	-1.00	0.00						

Notes:
1. Key practices include those practices that address resource concerns and critical areas function protections and are widely implemented, anticipated for continued application, or identified as major practice trends anticipated in the future.
2. The NRCS CPPE matrix was relied upon to develop an average function effects scores for the key function and practices.

Table 2
Example of Quantification of BMP installation to meet Protection and/or Enhancement Benchmarks and Objectives
This table will be updated to the HUC12 level with data that is being developed for VSP reporting.

Mason County NRCS Conservation Practice Implementation													
			2011-2017				2017- 2022 (in prep.)					
Watershed	NRCS Code	Key Practices	Implemented		Goal	Result	Implemented		Goal	Result	Baseline	
Kennedy Goldsborough WIRA 14	314	Brush Management	22.5	linear feet	3.22	Met	TBD	linear feet	4.11	TBD	53.00	linear feet
	561	Heavy Use Area Protection	5.6		1.46	Met	TBD	-	1.86	TBD	24.00	-
	382	Fence	7080	linear feet	1.46	Met	TBD	linear feet	1.86	TBD	24.00	linear feet
	?	Access Control	?		?	?	TBD	-	?	TBD	?	-
	340	Cover Crop	1.1	acres	0.06	met	TBD	acres	0.08	TBD	1.00	acres
	382	Fence	7080	linear feet	1,360.33	Met	TBD	linear feet	1,736.17	TBD	22,383.00	linear feet
Kitsap WRIA 15	643	Restoration and Management of Rare and Declining Habitats	110.9	acres	1.46	Met	TBD	acres	1.86	TBD	24.00	acres
	?	Filter Strip	?		?	?	TBD	-	?	TBD	?	-
	614	Watering Facility	12	each	6.08	Met	TBD	each	7.76	TBD	100.00	each
	528	Prescribed Grazing	121	acres	1.22	Met	TBD	acres	1.55	TBD	20.00	acres
	561	Heavy Use Area Protection	5.6	acres	1.46	Met	TBD	acres	1.86	TBD	24.00	acres
Skokomish Dosewallips WRIA 16	643	Restoration and Management of Rare and Declining Habitats	110.9	acres	1.46	Met	TBD	acres	1.86	TBD	24.00	acres
	612	Tree/Shrub Establishment	30	acres	1.46	Met	TBD	acres	1.86	TBD	24.00	acres
	?	Stormwater Runoff Control	?		?	?	TBD	-	?	TBD	?	-
	?	Dikes	?		?	?	TBD	-	?	TBD	?	-
	?	Composting Facilities	?	each	0.18	TBD	TBD	each	0.23	TBD	3.00	each
	?	Water Storage Structure	?	each	0.30	TBD	TBD	each	0.39	TBD	5.00	each
	?	Field Border	?		?	?	TBD	-	?	TBD	?	-
	558	Roof Runoff Structure	8	each	1.58	Met	TBD	each	2.02	TBD	26.00	each
Lower Chehalis WRIA 22	?	Composting Facilities	?	each	0.18	TBD	TBD	each	0.23	TBD	3.00	each
	528	Prescribed Grazing	121	acres	1.22	Met	TBD	acres	1.55	TBD	20.00	acres
	?	Dam, Diversion	?	linear feet	30.33	TBD	TBD	linear feet	38.71	TBD	499.00	linear feet
	?	Channel Stabilization	?		?	?	TBD	-	?	TBD	?	-
	?	Wetland Wildlife Habitat Management	?	acres	0.15	TBD	TBD	acres	0.19	TBD	2.50	acres
	528	Prescribed Grazing	121	acres	1.22	Met	TBD	acres	1.55	TBD	20.00	acres
	561	Heavy Use Area Protection	5.6		1.46	Met	TBD	-	1.86	TBD	24.00	-

Conservation Plans	2011-2017				2017-2022 (in prep.)				Baseline	
	Plans Completed		Goal	Result	Plans Completed		Goal	Result		
Kennedy Goldsborough WIRA 14	28	each	45 county wide	Not Met (35 of 45)	11	each	Not Met (12 of 45)	TBD	128	each
KitsapWRIA 15	3	each			1	each		TBD	17	each
Skokomish Dosewallips WRIA 16	1	each			0	each		TBD	16	each
Lower Chehalis WRIA 22	3	each			0	each		TBD	11	each

Notes:

1. Analysis based on available data.
2. Additional data is being collected.
3. Some conservation practices identified in the work plan were not tracked historically and records of recent implantation are currently being developed.
4. Data Validation and QA/QC will occur once all available data is included.
5. Crosswalk updated for the HUC12 scale

Measuring Effectiveness of Mason VSP Goals and Benchmarks at Protecting and Enhancing Critical area Functions and values at the Watershed Scale.

The Mason VSP workplan sets goal for the protection and enhancement of critical area functions and values as follows:

- **GOAL 1 - Protect critical area functions and values on agricultural lands at a watershed level as they existed as of July 22, 2011**
- **GOAL 2 - Enhance critical area functions and values through voluntary, incentive-based measures.**

For each Critical area, benchmarks for meeting these goals give implementation staff and the county workgroup a direction to accomplish the protection and enhancement set out.

However, each critical area, and the functions and values they bring to the county have their own unique measurements of health to monitor as a check against the effectiveness of Mason VSP goals and benchmarks at accomplishing the protection and enhancement of the functions and values of these lands.

CRITICAL AQUIFER RECHARGE AREAS (CARA)

Functions:

- Water Quality Improvement
- Drinking Water Provisioning
- Hyporheic Input for Streams/Rivers

Values:

- Well Water and Water Utility Services
- Health values of clean water

Measurable Metrics that can serve as indicators of Critical area functions and values:

- Well Closure Data
- Well Drinking Water Quality
- CARA spatial area measurements

PROTECTION BENCHMARKS:

- Maintain baseline acreage of Agriculture and Critical Area Interface
- Maintain BMP Implementation

ENHANCEMENT BENCHMARKS:

- 5% annual increase of BMP implementation (based on averaged annual implementation over 5-year period of each BMP through the County)

FREQUENTLY FLOODED AREAS (FFA)

Functions:

- Flood Storage
- Groundwater Recharge
- Hydrologic Connectivity

Values:

- Reduced Erosion/Sedimentation
- Food/Habitat for Fish & Wildlife
- Nutrient/Sediment Distribution

Measurable Metrics that can serve as indicators of Critical area functions and values:

- CARA Spatial area measurements
- Flood Plane spatial area measurements.

PROTECTION BENCHMARKS:

- Maintain baseline acreage of Agriculture and Critical Area Interface
- Maintain BMP Implementation

ENHANCEMENT BENCHMARKS:

- 5% annual increase of BMP implementation (based on averaged annual implementation over 5-year period of each BMP through the County, not all BMPs have been implemented in recent past)

WETLANDS

Functions:

- Flood Storage
- Water Quality Improvement
- Shoreline & Erosion Control
- Aquifer recharge

Values:

- Natural Products (food/medicines)
- Food/Habitat for Fish & Wildlife
- Nutrient/Sediment Distribution

Measurable Metrics that can serve as indicators of Critical area functions and values:

- CARA Spatial area measurements
- Flood Plane spatial area measurements.
- HRCD

PROTECTION BENCHMARKS:

- Maintain baseline acreage of Agriculture and Critical Area Interface
- Maintain BMP Implementation

ENHANCEMENT BENCHMARKS:

- 5% annual increase of BMP implementation (based on averaged annual implementation over 5-year period of each BMP through the County)
- Reduce agricultural and wetland interface to less than 2011 baseline by: (1) maintaining and reconfiguring agricultural activities away from wetland areas; or (2) restoring and enhancing wetlands in or near agricultural activity utilizing wetland sensitive BMPs.

EROSION HAZARD AREAS (EHA)

Functions:

- Erosion Prevention
- Landslide Prevention

Values:

- Food/Habitat for Fish & Wildlife
- Sediment Input in Streams/Rivers

Measurable Metrics that can serve as indicators of Critical area functions and values:

- Rapid Sight assessment
- HRCD
- Soil Compaction study

PROTECTION BENCHMARKS:

- Maintain baseline acreage of Agriculture and Critical Area Interface
- Maintain BMP Implementation

ENHANCEMENT BENCHMARKS:

- 5% annual increase of BMP implementation (based on averaged annual implementation over 5-year period of each BMP through the County)
- Reduce agricultural and erosion hazard area interface to less than 2011 baseline by: (1) maintaining and reconfiguring agricultural activities away from erosion areas; or (2) utilizing BMPs specific to erosion areas.

FISH AND WILDLIFE HABITAT CONSERVATION AREAS (FWH)

Functions:

- Biodiversity Areas and Corridors
- Riparian Ecosystems
- Food/Habitat for Fish & Wildlife
- Bio-Material Input in Streams/Rivers
- Species Specific Functions

Values:

- Societal Food Provisioning
- Water body temperature regulation
- Groundwater recharge
- Pollinators
- Bank Stabilization

Measurable Metrics that can serve as indicators of Critical area functions and values:

- 303d Listings
- Shellfish Closure areas
- WDFW Habitat data changes

PROTECTION BENCHMARKS:

- Maintain baseline acreage of Agriculture and Critical Area Interface
- Maintain BMP Implementation

ENHANCEMENT BENCHMARKS:

- 5% annual increase of BMP implementation (based on averaged annual implementation over 5-year period of each BMP through the County)
- Reduce agricultural and fish and wildlife conservation area interface to less than 2011 baseline by: (1) maintaining and reconfiguring agricultural activities away from habitat areas; or (2) utilizing BMPs specific to habitat areas.

GOAL 3 Ensure the viability of agriculture and reduce the conversion of agricultural land into other uses.

Measurable Metrics that can serve as indicators of Agriculture Viability:

- Economic Analysis of County Agriculture
- Spatial analysis of agricultural area
- New agricultural
- Ground truth county and WDA agriculture databases.

AGRICULTURAL VIABILITY BENCHMARKS

- Maintain baseline acreage of Agriculture and Critical Area Interface.
- Maintain baseline acreage of Agricultural Activity
- Maintain 2011 annual average baseline of 7.5 completed Farm Plans (Individual Stewardship Plans)

Figure 2, internal and external data connectiveness for effectiveness monitoring in VSP

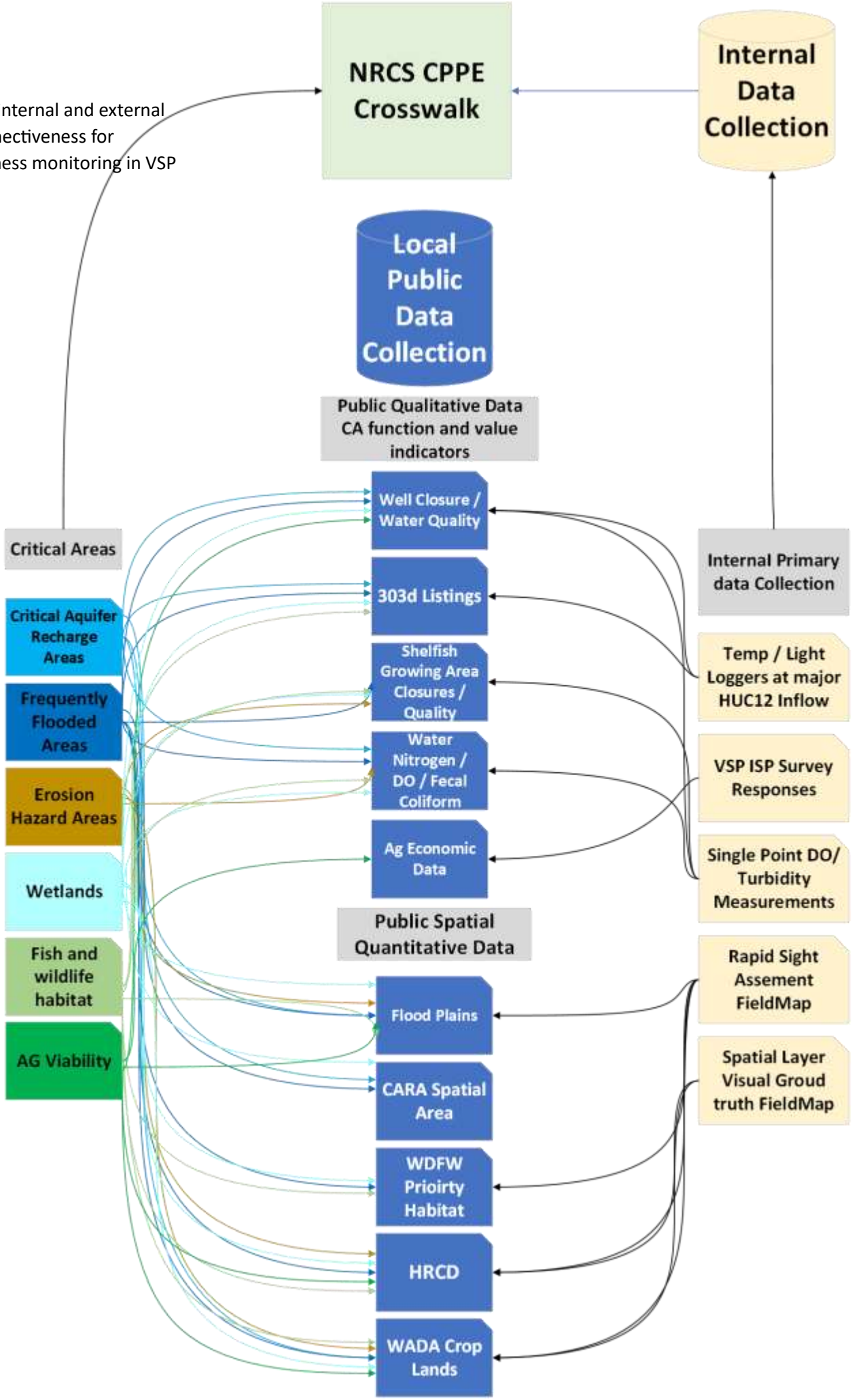


TABLE 3, Summary of function and value indicator datasets and associated critical areas

Qualitative Data set	CARA	FFA	EHA	Wetlands	FWH	AGV
Well Water Quality	Y	Y	N	Y	N	Y
303d Listings	Y	Y	N	Y	Y	N
Shellfish Growing Area Quality	N	Y	Y	Y	Y	N
Water Nitrogen/ DO/ Fecal	Y	Y	Y	Y	Y	N
AG Economic data	N	N	N	N	N	Y

Quantitative Data set	CARA	FFA	EHA	Wetlands	FWH	AGV
Flood Plains	Y	Y	Y	Y	Y	Y
CARA Spatial Area	Y	Y	N	Y	N	N
WDFW Habitat Area	N	Y	N	Y	Y	N
HRCD	N	Y	Y	Y	Y	Y
WADA Crop Lands	Y	Y	Y	Y	Y	Y

Ground Truth Data Collection	CARA	FFA	EHA	Wetlands	FWH	Ag
Temp/light loggers	N	Y	N	Y	Y	N
spatial layer ground truth	N	Y	Y	Y	Y	Y
VSP Survey/Participant Observation	Y	Y	Y	Y	Y	Y
Single point DO/turbidity	Y	N	Y	Y	Y	N
Rapid Sight assessment	Y	Y	Y	Y	Y	N

Table 4, Data sources and ground truth relationships

Data Set	Ground truth Verification	Data Partner(s)	Update Frequency	Source
Well Water Quality	Temp/light loggers	WA Ecology and Department of Health	Annually	Well Report and SWAP data
303d Listings	Temp/Pressure Loggers	WA Ecology and Department of Health	Annually	Approved Water Quality Assessment
Shellfish Growing Area Quality	single point DO/turbidity	WA Department of Health	Annually	WDOH Shellfish growing area GIS
Water Nitrogen/ DO/ Fecal	single point DO/turbidity	Tribe DNR and WA Ecology	Annually	Approved Water Quality Assessment
Flood Plains	Rapid assessment	Mason County	Annually	Mason Co GIS
CARA Spatial Area		Mason County	Five Years	Mason Co GIS
WDFW Habitat Area	Rapid assessment	WA Fish and Wildlife	Annually	WDFW Priority Habitat GIS Data
HRCD	spatial layer ground truth	WA Fish and Wildlife	Five Years	HRCD GIS Data
Ag Economic Data		USDA and WA Department of Agriculture	Annually	Mason Co GIS / USDA Ag Census
Ag Crop Data	spatial layer ground truth	WA Department of Agriculture	Annually	Agricultural Land use GIS Data

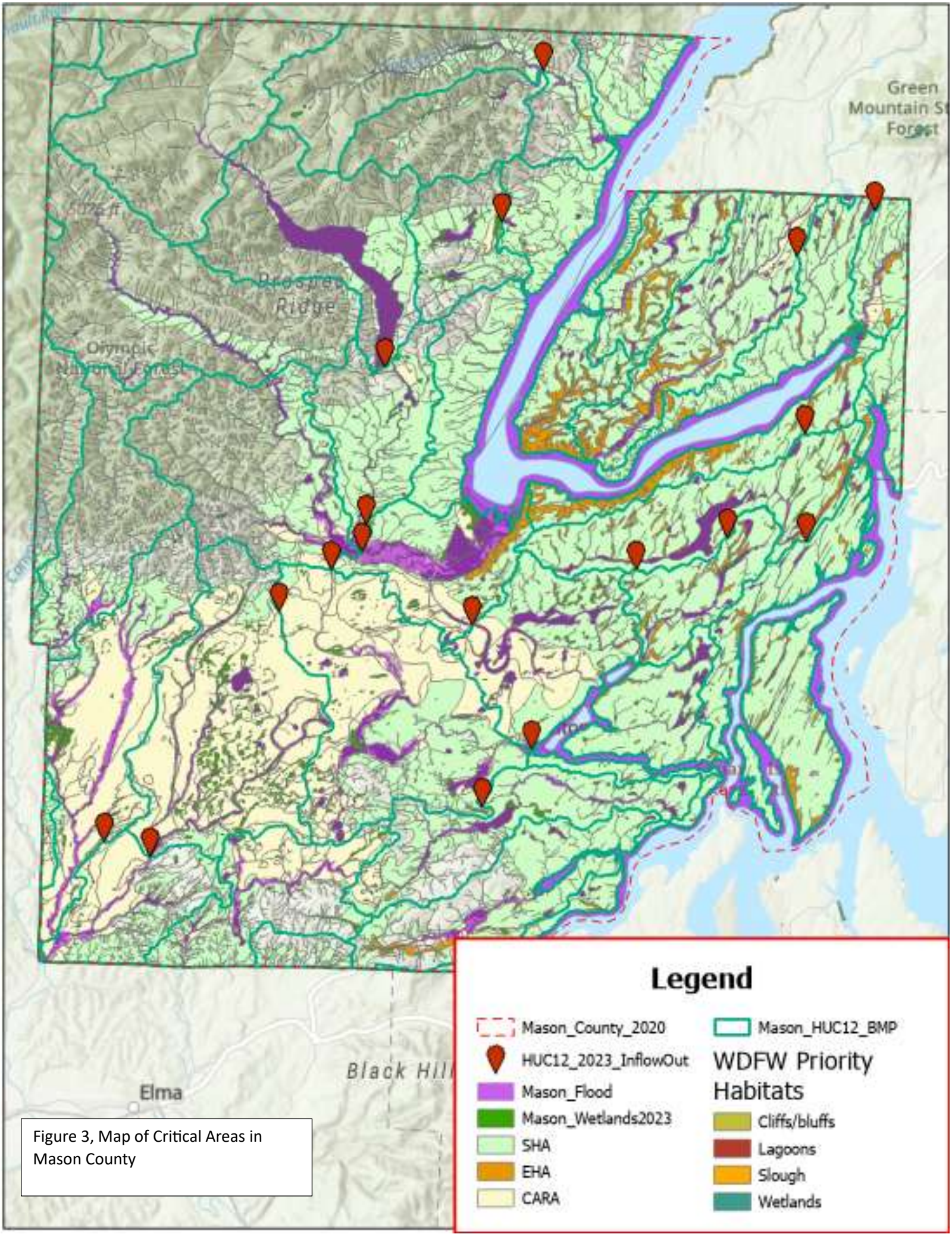


Figure 3, Map of Critical Areas in Mason County

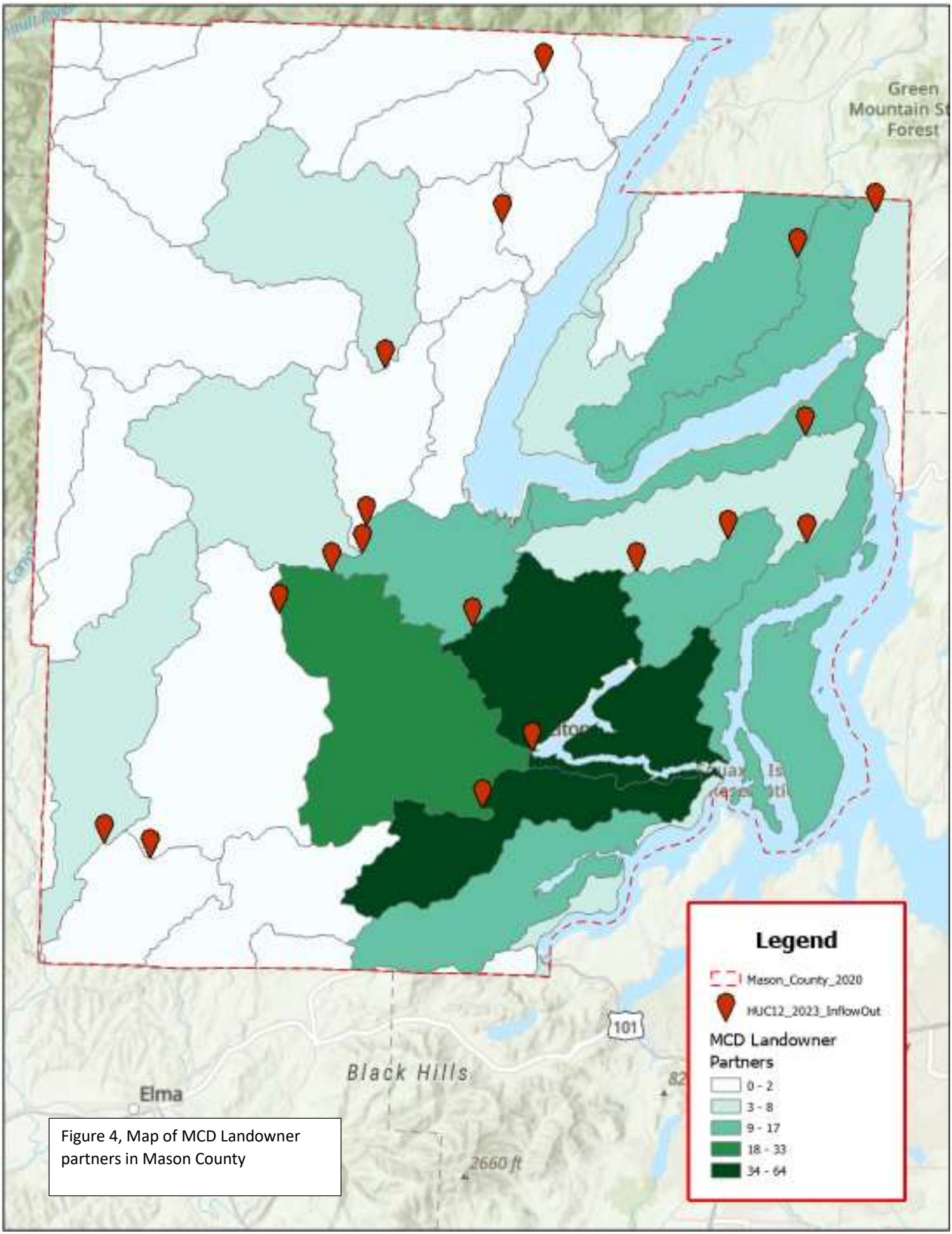


Figure 4, Map of MCD Landowner partners in Mason County

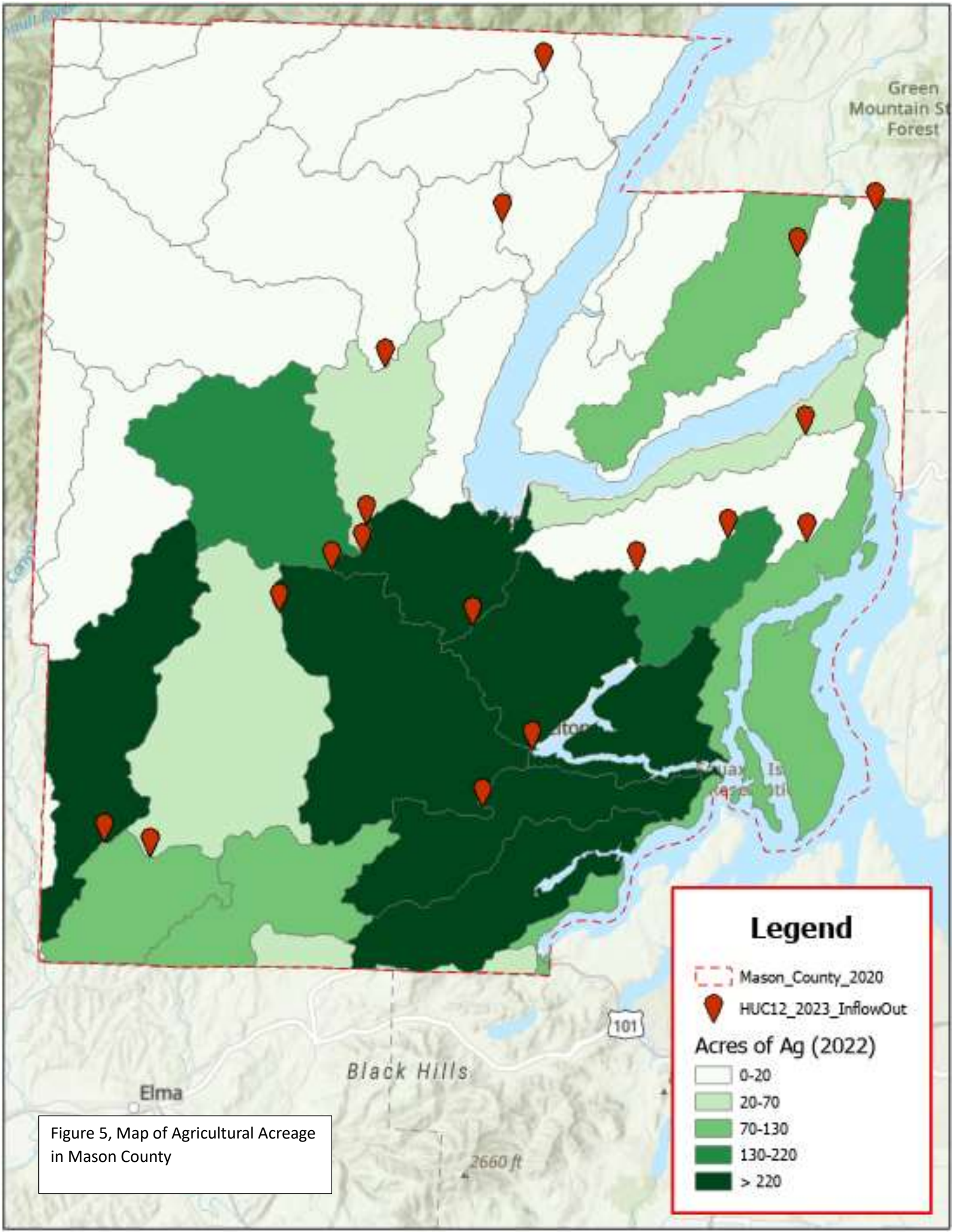


Figure 5, Map of Agricultural Acreage in Mason County

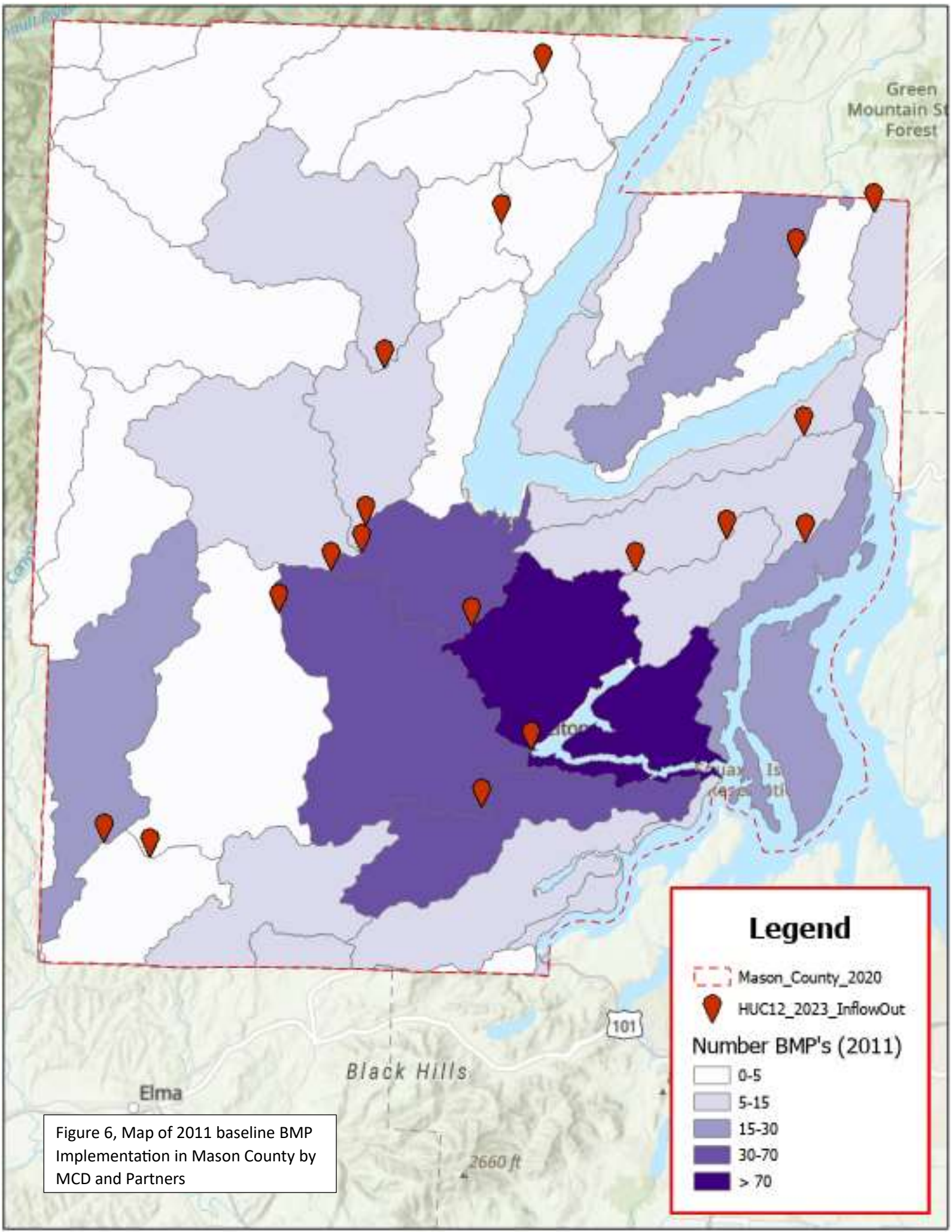


Figure 6, Map of 2011 baseline BMP Implementation in Mason County by MCD and Partners

Figure 7, Map of Priority HUC12 Watersheds in Mason County

Identifying When, Where and What to monitor for critical Area functions and values.

To establish consistent and practical effectiveness monitoring of the VSP in Mason County, our plan focuses on sub-watershed boundaries defined by Hydrologic unit code "12" or HUC12 scale being the smallest hydrologic boundary that is standardized and well known. Smaller scale watershed boundaries exist even within the HUC12 scale, however the time and resources required to focus that closely across the county would not be cost effective for the limited VSP budget. Maintaining a HUC12 Scale of monitoring allows for consistency and precision over time.

Figure 2, and tables 3 and 4, show the connectivity between the data available that represent indicators of Critical area functions and values. These identify the public data used to monitor critical area function and values, the areas they represent, the ground truthing strategy associated with those data, and the partners and sources coordinated with to gather. The frequency we obtain public data is set to an annual interval where available. This allows VSP staff to set up time to coordinate with data source staff, data formatting to the HUC 12 level, and any quality assurance, graphing and transformations necessary to show connectivity in analysis. Where available this analysis process will happen annually and show a 5-year collection of information and trends to support 5-year VSP reporting.

Public Data Analysis and Assumptions validating NRCS CPPE

To Validate physical effects scoring and provide a closer look at critical area functions and value indicators we can Identify priority watersheds in the program, perform closer analysis with public data and extrapolate these effects across other watersheds in the county. We Focus area on high activity, closely measure, and extrapolate to other watersheds, use imperial data at small scale. Through this analysis we carry a hypothesis across each critical area type that: this critical area quantity and quality is moving this way from benchmark, external buffers to this change exist. To accomplish this, we identify data sources to act as measurements of indicators of critical area functions and values in the previous section, figure 2, and tables 3-4. We must accept any error inherent in this data. To address errors in public data, we can plan for ground truth data verification strategies outlined in the next section.

Ground Truthing with primary data collection in Effectiveness Monitoring

A challenge to utilizing publicly available data for effectiveness monitoring is the margin of error in public data sets that span large areas. VSP Monitoring study area considers the Critical area function and values at the watershed scale, some publicly available datasets aren't sufficient to capture changes at that scale and answer our questions. Data at this scale is also prone to outside variables reducing the ability to draw conclusions toward our specific research questions. To address this concern Mason VSP will apply its own primary data collection efforts and case study approach for ground truthing our effectiveness monitoring strategy. Mason VSP technical providers will work with CD staff, and other local agencies already performing scientific monitoring throughout the county.

Water Quality is a large focus of the VSP in Mason alongside many other active programs whose activities promote the protection and enhancement of critical areas at the HUC12 Scale. Identifying the in-flow and out-flow of major streams through the HUC12 allows identification of sampling areas for water quality over the reach of the HUC12. The red Markers in figures 3 – 6 identify major NHD hydrography stream inflows that fall along public land or land accessible by the MCD staff through various projects and partnerships. Any primary data collection with field instruments would require landowner approval. Upstream Inflow Areas that co-inside with accessibility such as land-owner permissions, or public land, allow for visual condition monitoring through ground truth methods like rabid habitat assessment score sheets.

Long-term instrumental monitoring can be applied as a "Case Study Model" for Priority Watersheds and "do something levels" of adaptive management. Numerous Downstream outflow areas allow for accessibility by staff for visual ground truthing, rapid site assessment of indicators of critical area functions and values. Many existing public agency data collection sites exist in outflow locations into the Puget sound.

Do something Levels and Priority Watershed Identification

Preliminary Priority Watershed Identification consists of HUC 12 watersheds containing most of the Agricultural activity, landowner cooperators, and critical area boundaries in the county. These can be identified in Figures 3 -7.

Using the NRCS Physical effects crosswalk as a watershed "Summary" helps us identify where critical area function and value condition may be lacking, with the support of public and primary data we will be able to identify when and where the right practices should be adopted. This monitoring informs our staff, and local projects that impact critical areas. The do something level will compare the 2011 baseline to current conditions and match physical effects scoring to public and primary data monitoring. This combination allows us to monitor how active practices in Mason are impacting critical area functions and value or their indicators while limiting the amount of noise, error and outside factors that might contribute to change.

The Challenge faced when adaptively managing a monitoring plan, originally written in 2018 comparing to a 2011 benchmark, is data consistency, availability, and correcting for pre-

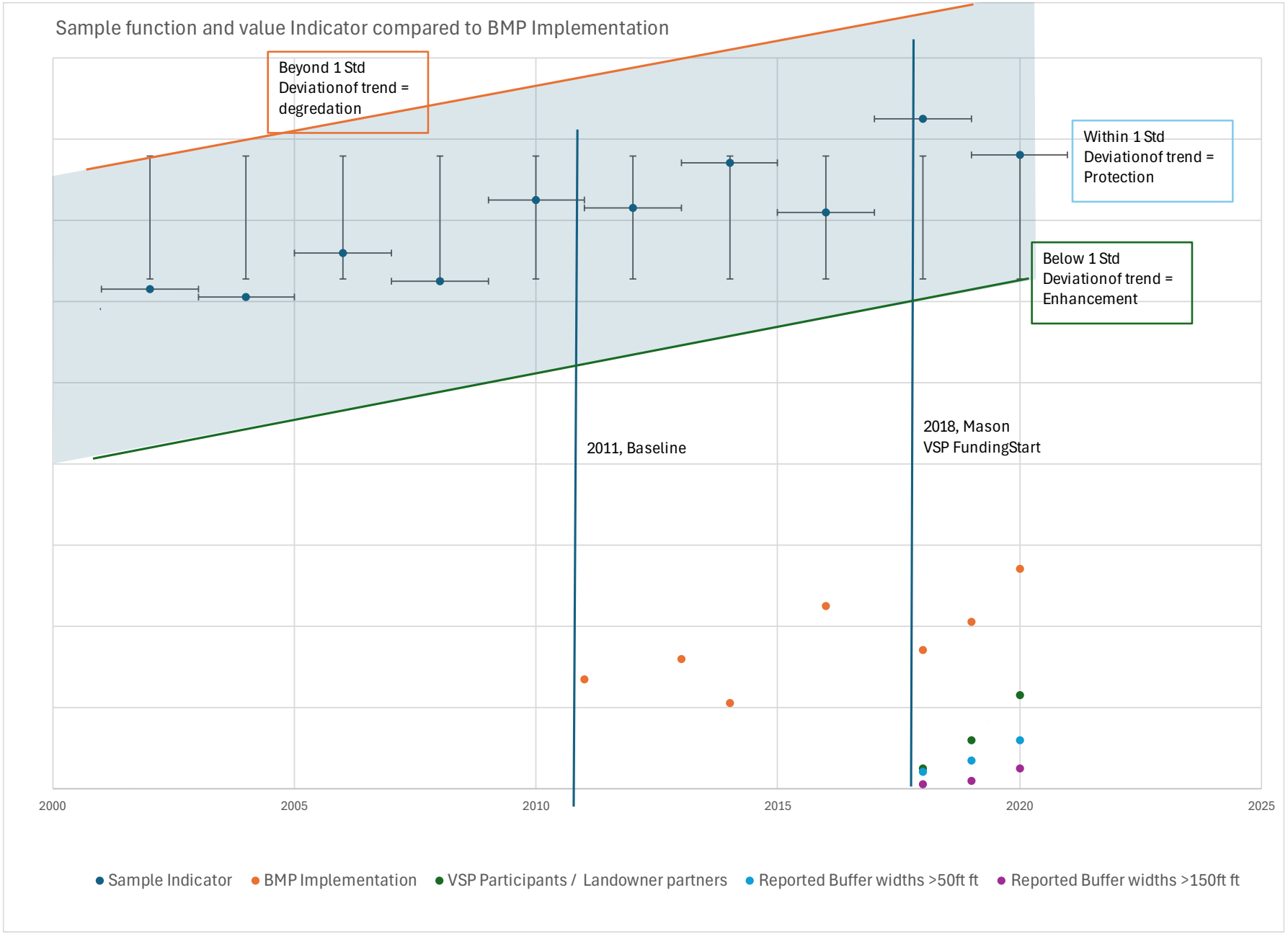
existing trends. We are working with data publishers to gather critical area function and value indicator data from today and the past and working to have this data speak the same language.

One oversite of the original 2018 monitoring plan is correcting for pre-existing trend. We cannot view a static picture of Critical area function and value indicators in 2011 as a base line, then consistently gather and compare new data to that static snapshot in time. As we gather data year on year, trends start to appear, without knowing the direct of the trend before we cannot make claims that our work is protecting or enhancing any more or less than it was previously. In these cases, protection would be maintaining the existing trend, enhancement would be changing the slope of the trend to the negative, and degradation would be a positive increase of trend.

Without identifying previous trends, comparison to a baseline snapshot in time will always look like degradation, since at the watershed scale, there are many more factors besides implementing best management practices on a parcel scale.

In Chart 1 we can look at miles of 303(d) temperature listed streams as an indicator of critical area function and value protection, enhancement or degradation. Graphed against BMP metrics targeted for critical area functions and values indicated through temperature such as riparian plantings and participation and reported volunteer stream buffers. A trend existed prior to VSP introduction and will continue after implementation and monitoring continues. To decide what protection, enhancement, and degradation are for this function and value indicator, we must first know what the existing trend was.

Chart 1, Example Indicator trend compared to BMP implementation



Adaptive Management

While this monitoring plan acts as adaptive management to the original monitoring plan published with the Mason workplan in 2018, continued review, and assessment of the effectiveness of this plan will be an ongoing effort.

In the Year 2024-2025 implementing this monitoring plan for adaptive management will show trends in the monitoring data that will further inform and allow for adaptive management for do-something levels, targeted outreach for BMP implementation and changes to this monitoring plan.

Additional funding will allow for further leverage of this monitoring plan with on the ground primary data collection by technical staff.

Spatial Public data (HRCD, WA Dept. of Agriculture)

Visual ground truthing of HRCD data every five years can be accomplished with internal mobile GIS capability to ensure ground accuracy of HRCD data via field map visual survey by field staff. HRCD is reported at 90% accuracy, allowing staff to participate in a ground truth campaign throughout the county visually confirming 10% of randomly selected HRCD polygons. These technologies and spatial tools allow staff to observe on-the-ground conditions of these public data quickly and visually in real time.

303d Listings

VSP technical staff will work in coordination with Mason CD staff to install their inventory of temperature data loggers on public property or authorized private property at select inflow and outflow locations at the HUC12 watershed scale. This allows not only an internal ground truth to leveraging 303d temperature listings but gives primary temperature data to technical staff to analyze year over year as best management practices are installed, participants are added, and other critical area protection and enhancement projects are completed. Over time, noise in this data can be corrected for.

Mason VSP stream temperate data loggers also collect data for light radiance, which could be used as a proxy measurement for stream turbidity allowing staff to answer questions about water and soil practices in the watershed.

Rapid Sight Assessment

Using ArcGIS field survey tools, MCD staff can report critical area function and value conditions using rapid sight assessment. Since many rapid site assessment methodologies exist for near all the critical area types, we combine indicators of different methodologies into one mobile survey form. Users can see what critical area boundaries exist in their survey location and answer sight-based condition assessment for those features only. This allows for a visual ground check of critical area conditions on-the-ground. Our field survey tool combines assessment features of a few prescribed methodologies, particularly suited for the best management practices being prescribes and in use in Mason County as well as the work already being done by active projects in our community. These methods include:

- Washington State Wetland Rating System (Western)
- US EPA Rapid Wetland Assessment Review
- USGS Streambank Erosion

Single Point and Case Study

With further funding, landowner engagement and as opportunity allows, we can perform single point case study on a critical area function and value indicator on a single property before and after installation and implementation of management practices. With a goal being one per reporting period of 5 years. Mason VSP Staff use single point handheld water quality monitors capable of measuring temperature, pH, Dissolved oxygen, turbidity, and other variables. The challenge with these tools is the time required to travel to site locations, calibrate the device for the variable being measured, taking and recording the measurements.

Table 5, Effectiveness monitoring Estimated Biennial staff costs

Top 7 priority marked inflows Single staff member, Quarterly, Mobile Reporting Tool							
	Meter calibration (DO) (Min)	Meter calibration (Turbidity) (Min)	Drive Time Round Trip (Min)	Measure and record per site (Min)	Download logger data per site (Min)	Archive Logger Data (Min)	Rapid Site Assessment
1	30	30	34	60	60	30	30
2	30	30	36	60	60	30	30
3	30	30	46	60	60	30	30
4	30	30	48	60	60	30	30
5	30	30	32	60	60	30	30
6	30	30	54	60	60	30	30
7	30	30	42	60	60	30	30

Total (Hours)	Avg Comp Rate	25% overhead	4x Per year	Per Biennium
32.87	53.39	66.73	8773.35	**17546.69**

Per Monitoring Staff Member, on project sites with landowner permission, Within top 4 Priority Watersheds only			
Task	Estimated Completion time per event with travel (Hours)	Estimated Number of events per year	Estimated Staff Hours Per year
Rapid Site Assessment	2	30	60
Field Ground truth (HRCD Polygons)	1.25	20	25
Field Ground truth (Crop Polygons)	1.25	20	25

Staff Rate including overhead	Estimated Staff Hours Per year	Cost Per biennium
66.73	110	**14680.6**

VSP Effectiveness Monitoring Ground Data Supplemental Analysis Costs		
Task	**Hours**	**Biennium Total**
Coordinate with data partners	20	40
Schedule coordinate Monitoring Staff and Landowners	20	40
Data Processing (Storage, Organization, Formatting, QC, Normalization, Method)	50	100
Analysis for each Critical Area Type	50	100
Data Summary for reporting and archive	20	40
	Total	320
	Cost	**19974.4**

Total Costs of additional ground truth verification to VSP Effectives Monitoring is $52,201. The 2023-2025 Biennium Monitoring VSP Funds allowed for an additional $47,000 Monitoring fund pool of which some was used to prepare this plan. Additional funding will be needed to perform on the ground monitoring to back up data partner analysis using only our four priority watersheds and extrapolating from there.

We aim for a five-year goal of implementing this monitoring plan for the 2030 report at the scope budgeted above. For the 2025, 10-year report, we will focus on a single priority watershed for ground truth data collection. This will cut our initial costs in half and allow us to make claims about and extrapolate to other watersheds in Mason County. This initial effort also allows to use monitoring funds in the training of staff focusing only on two upstream monitoring locations, and incorporating ground truth efforts, and rapid site assessment at a smaller scale, in areas we are already heavily present.

As other funding opportunities, county and state agency partnerships present themselves, we can start incorporating more and more study locations into our primary data collection for effectiveness monitoring, as well as variables being monitored.

Partnering with external Project Funding, Agencies and Tribal Nations for Increased Monitoring

Mason VSP will continue to partner with other projects, agencies, and funding opportunities that arise to further leverage this monitoring plan. With our plan's leverage of both external data analysis, and internal ground truthing, further funding and projects that fit within the VSP monitoring plan scope can allow us to increase the frequence and quality of "Case Study" analysis or increase the accuracy and relatedness of public data as it pertains to VSP effeteness monitoring.

Further Prioritization, monitoring and planning could be assisted by outside analytical and planning tools such as the Agricultural Planning Framework geospatial toolbox. Conservation planners who work with communities to develop watershed plans and proposals, as well as work with producers one-on-one can use this tool within the 9-Step Conservation Planning Process. ACPF results can be provided for conservation planners to use to work with producers within a watershed on a field-by-field basis to tackle larger watershed goals. Watershed output training is available for planners to use the ACPF in professional applications. These tools could be used in conjunction with our monitoring- especially with NRCS physical effects scoring crosswalk to identify where in the county we could be outreach for target BMP installation in response to monitoring and do-something levels.

Summary

This monitoring plan supplements the Mason VSP Work plan as an adaptive management for effectiveness monitoring of the VSP in Mason County. We plan to use the publicly available data of critical area function and value indicators outlined in this plan to assess and support how implementation of the Mason VSP workplan impacts critical area functions and values in the county at a watershed scale.

Using the metrics collected year on year for best management practices (BMP) implemented in Mason County through the VSP program itself, other programs, and the reported volunteer efforts of local landowners and operators, VSP staff will manage a watershed summary database contain a crosswalk of implanted practice with the NRCS physical effects scoring criteria. CPPE scoring for VSP watersheds will help identify needed efforts for targeted practices and show a snapshot of critical area health. Comparing CPPE scoring to the 2011 baseline limits the need to identify trends that were in effect before the VSP program began.

Annually, the comparison of public data metrics as indicators of critical area function and value can be compared to BMPs through the watershed where staff can answer the question “have the practices we implemented this year effect critical area functions and values?”. We will accept the error inherent in the data provided by our data partners.

Finally, this annual review will accumulate into quantitative support for VSP 5-year reporting to make the claim that VSP is meeting its goals of protecting, enhancing and maintaining agricultural viability in Mason County.

Mason VSP will continue to adaptively manage this plan with ground truth data verification, and increased monitoring efforts through internal primary data collection and inter-agency partnerships, as funding and staff allow.

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