

MEMORANDUM

DATE: June 22, 2020

TO: Yakima VSP Work Group
Mike Tobin, North Yakima Conservation District
Rodney Heit, South Yakima Conservation District

FROM: Lisa Grueter, Principal, BERK Consulting, Inc.

RE: Five-Year Monitoring Report for Yakima VSP – Requirements and Early Monitoring Information

Overview

The Yakima Voluntary Stewardship Program (VSP) Work Plan was approved October 30, 2017 by the State Conservation Commission. The deadline for the 5-year report for Yakima County is **January 21, 2021**.

While it has been less than 5 years since the Work Plan was approved, the VSP requirements for monitoring periods are based on when Yakima County received VSP funds, which was January 21, 2016. See Statewide Advisory Committee and Conservation Commission Policy Advisory [#05-18](#).

The 5-year report will identify if the Work Plan protection and enhancement goals and benchmarks are being met. See **Attachment A** for an excerpt of the VSP law on monitoring. Key points include:

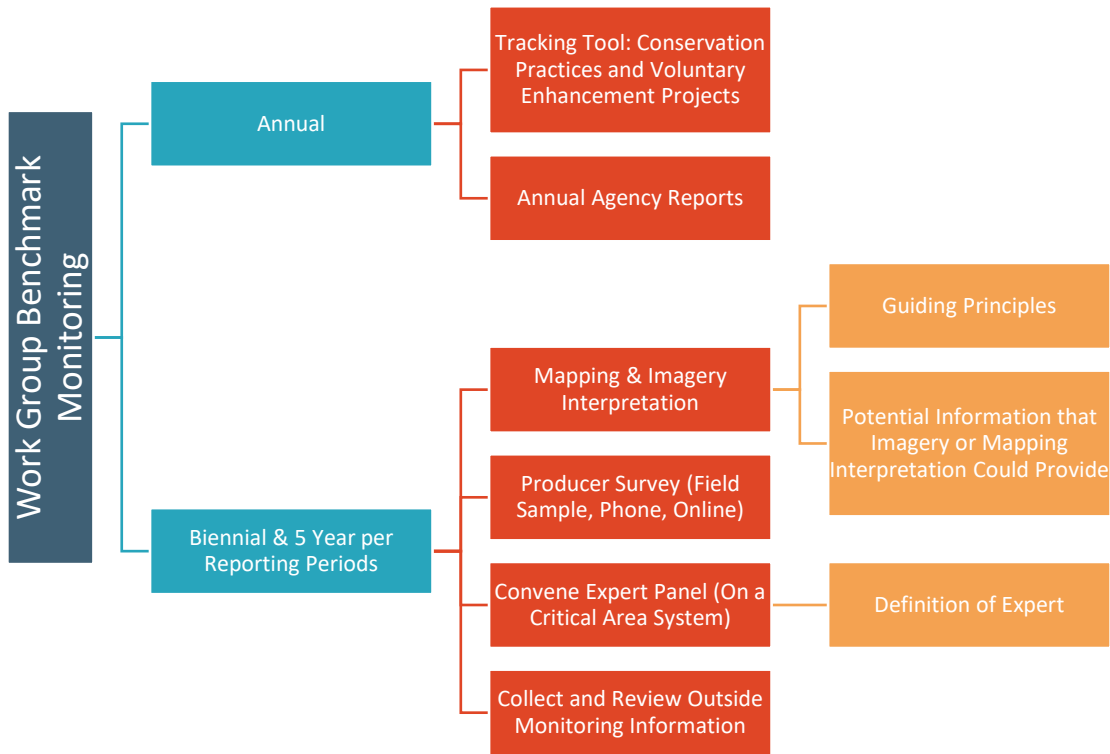
- If the goals and benchmarks are met for **protection**, the plan implementation proceeds. If goals and benchmarks for protection have not been met, adaptive management is to be implemented. If by the time of the next 5-year report (i.e. within 10 years of funding), goals and benchmarks for protection are not met, a regulatory path towards critical areas protection may be required.
- Failure to meet **enhancement** or restoration goals and benchmarks may not trigger adaptive management, as these goals and benchmarks are aspirational, voluntary, and subject to funding.
- Work Plan aims for maintaining the **viability of agriculture** are important but are not a basis for requiring adaptive management or a regulatory path.

This memo provides an overview of the Work Plan monitoring requirements, likely format for the 5-year monitoring report, early monitoring results, and next steps for the report and Work Group meetings.

Work Plan Monitoring Activities

Yakima VSP Work Plan monitoring activities are identified in the flow chart below. The 5-Year Report will address results of mapping, imagery interpretation (see **Attachment B**), surveys, and conservation practices. The two conservation districts are particularly interested in developing information, priorities, and an action schedule to accomplish protection and enhancement on the ground that will address ecological and agricultural needs in each of the watersheds.

Exhibit 1. Work Plan Exhibit 8-4. Watershed Level Monitoring Activities



The goal of the monitoring process is to answer for each watershed as a whole:

- Have Work Plan critical area protection goals and benchmarks been met?
- Where have there been losses or gains? What is the quality of what has been lost or gained?
- Where there are losses, are there opportunities for voluntary enhancement?

To help answer the questions, the monitoring process involves:

- Mapping, imagery interpretation: This will help identify areas of change for further review by the technical service providers and consultant. The review may involve review of Assessor data, aerial photo review, and where possible in-field verification such as by the Conservation Districts.
- Interface with persons knowledgeable about the critical areas or agricultural practices where appropriate to help interpret results and provide advice on critical area protection and enhancement.
- Review of surveys (e.g. SYCD online survey of persons potentially interested in technical advice) and conservation practice tracking.

50 Early results of intersect mapping are included in this memo. The process for imagery interpretation is
 51 also presented (see **Attachment B** for Work Plan guidance). Next steps are also provided for
 52 mapping/imagery, field review, collection of outside monitoring, and interface with experts.

53 5-Year Report Format

54 The Work Plan includes goal and benchmarks for critical areas¹ protection and enhancement that are
 55 meant to be addressed at a watershed scale. There may be both losses and gains in particular areas,
 56 but the overall goal and benchmark should be met across the watershed.

57 The chart below provides a draft report format developed with the Technical Panel in spring 2020. This
 58 format may change. The State Conservation Commission is working on an online Access database tool
 59 that is intended to be a portal for documenting goals and benchmarks are met and to provide supporting
 60 data. Training is anticipated to be addressed in fall 2020.

61 Exhibit 2. Applicable to each Work Plan Goal and Benchmark – Format of Report Results

Goal (<i>what is to be achieved</i>): [Describe / explain the goal] Has the goal been met? <input type="checkbox"/> Yes <input type="checkbox"/> No Explain how the goal has / has not been met (cite to data or other materials and provide electronic links):
Benchmark (<i>measurement of progress</i>): [Describe / explain the benchmark] Has the benchmark been met? <input type="checkbox"/> Yes <input type="checkbox"/> No Explain how the benchmark has / has not been met (cite to data or other materials and provide electronic links):
Monitoring: [Describe / explain how the benchmark has been and will be monitored; include a discussion of monitoring methodology] Is monitoring sufficient to meet the benchmark identified above? <input type="checkbox"/> Yes <input type="checkbox"/> No Explain how monitoring is sufficient to meet the benchmark identified above:
Has any adaptive management been used on the goal or benchmark since the last five-year report? <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, please explain:

62 Source: Technical Panel and Statewide Advisory Committee Revised draft [Five-Year Report Guidance](#)

63 The 5-Year Monitoring Report format may evolve, but the report must cite data or other materials to
 64 support the conclusions. Each county work group must:

- 65 ■ Assert whether or not it is meeting its goals and benchmarks in its work plan, and
- 66 ■ Provide evidence supporting the assertion for each goal and benchmark.

¹ Critical areas include: wetlands, areas with a critical recharging effect on aquifers used for potable water, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas.

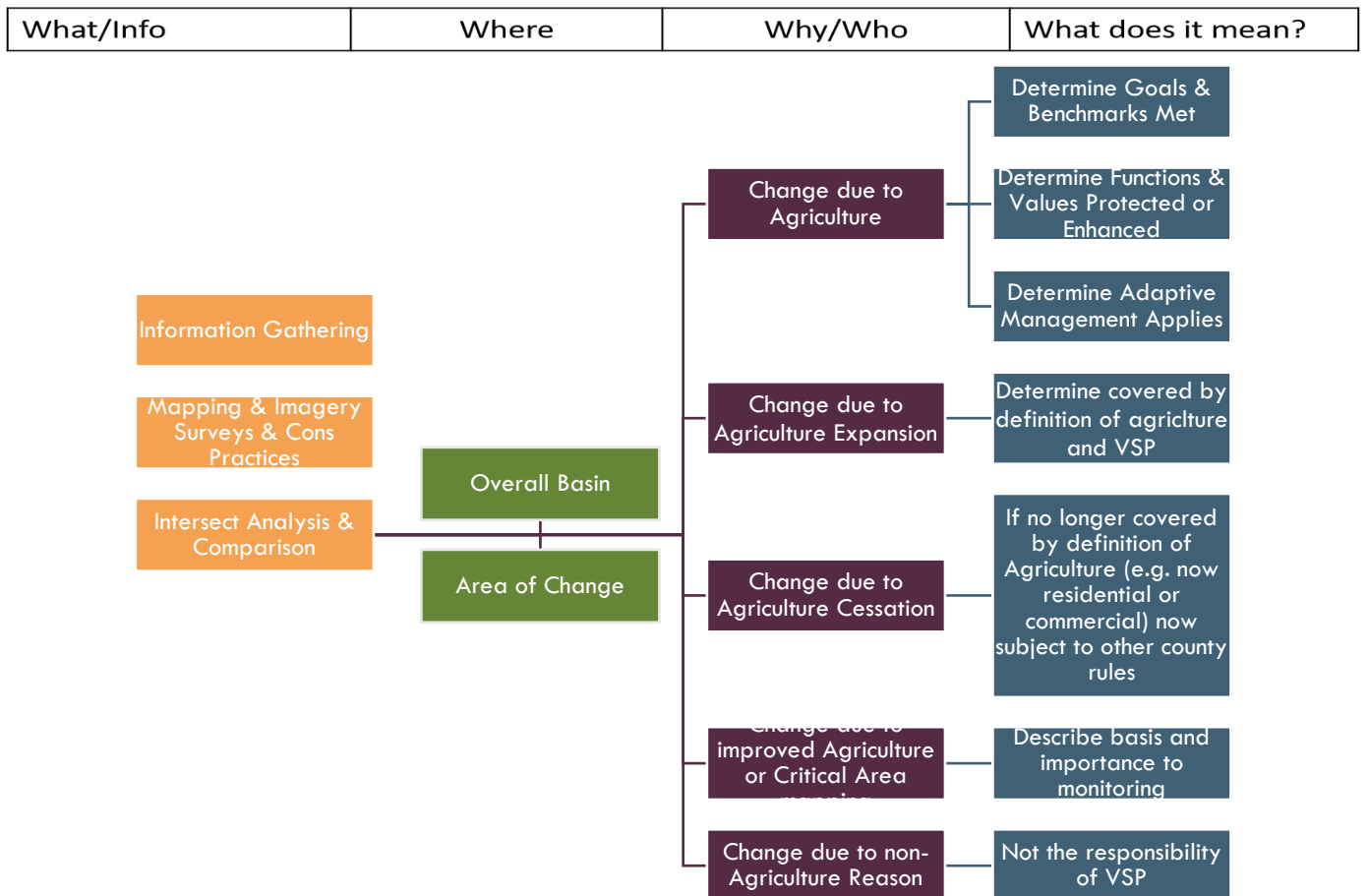
Understanding “Why” Things May Have Changed

Reviewing the Technical Panel and Statewide Advisory Committee review of early reports from Chelan and Thurston Counties (prepared prior to state guidance and prior to a full 5 years of implementation), it appears important to:

- Focus on changes to basin conditions as well as changes in areas of intersect as a result of agricultural activities.
- Go beyond describing what happened during the monitoring period; also explain why these changes happened. In explaining changes, the reports could describe:
 - There has been improved mapping rather than a change in the resource or agriculture.
 - Where there are potential changes, describe how the change has been verified (e.g. field checks or other source) and the relationship of agricultural change on critical area functions and values.
- Describe availability or lack of monitoring information. When there is less information on monitoring of a goal or benchmark describe what type of adaptive management will be applied.

For Yakima’s 5-Year Report, we have developed a conceptual diagram of how the report could explain changes below.

Exhibit 3. Concept of Monitoring and Describing Changes



85 Work Group Review Process

86 The 5-Year Monitoring Report is due January 21, 2021. Before the report is submitted:

- 87 ▪ The Work Group will need to acknowledge its approval of the content and submittal of the report.
- 88 ▪ Depending on the county, an additional 30-60 days will be needed before the deadline in order to
- 89 hold an open public meeting to approve of the report.

90 Source: Technical Panel and Statewide Advisory Committee [Revised draft Five-Year Report Guidance](#)

91 The proposed schedule for the Yakima Work Group is summarized below, and has shifted due to the
92 COVID-19 response:

93 Q1/Q2 Activity

- 94 ▪ Progress on Trends and Mapping
- 95 ▪ Work Group Meeting #1 – June 30
 - 96 □ Share progress on Trends and Mapping
 - 97 □ Set timeframe on expert review/mapping exercise

98 Q3/Q4 Activity

- 99 ▪ Draft Results
- 100 ▪ Expert Review/Mapping Exercise
- 101 ▪ Work Group Meeting #2 Draft Report
- 102 ▪ Work Group Meeting #3 Open public meeting to approve of the report
- 103 ▪ Submit the report to Technical Panel

104 Early Trend, Mapping, and Imagery Results

105 The Consultant scope includes collection of data, mapping, and imagery analysis. See a summary of the
106 scope in **Attachment C**.

107 AGRICULTURAL VIABILITY AND DEVELOPMENT

108 The VSP Work Plan considers agricultural production and stability of agricultural land base in tracking
109 agricultural viability among other aspects.

110 To help track agricultural viability, information has been collected to answer the following questions:

- 111 ▪ Has agriculture increased or decreased in area? This is primarily tracked with WSDA cropland
112 inventories.
- 113 ▪ Are producers using the Assessor current use taxation program as one sign of continuing production,
114 or has there been unenrollment and conversion?

115 Results generally show a small net increase in land in crop production. Agricultural land has been
116 converted to non-agricultural uses. However, cropland has still shown a small increase even when

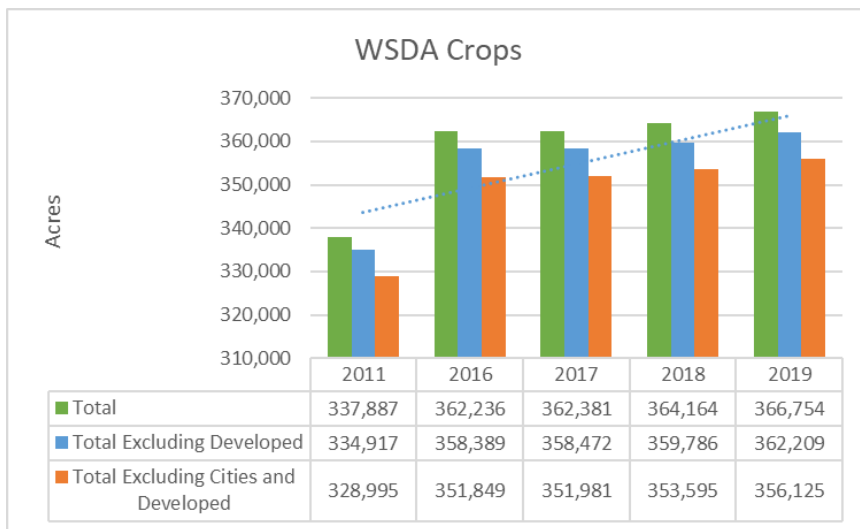
117 excluding developed land. There has been a gradual increase in cropland in current use taxation, but a
 118 decrease in rangeland in current use taxation due to larger holdings changing ownership (e.g. purchase
 119 by nonprofits or state agencies). Additional discussion is provided below.

120 **Cropland Inventory**

121 In terms of agricultural cropland, acres have increased since both 2011 and 2016 (base year of the
 122 Work Plan). See Exhibit 4. Per the Work Plan, over 60% of the agricultural cropland increase between
 123 2011 - 2016 was due to improved data; remainder is likely due to new production. For that reason, the
 124 2016 Work Plan results were considered to be equivalent to the July 2011 agricultural baseline.

125 Since 2016, agricultural cropland has modestly increased by about 4,500 acres. Much of this change is
 126 due to an increase in reported pastureland. That has been an underreported agricultural category and
 127 may just reflect improved mapping. See **Attachment D** for a summary of crop group and crop type.

128 **Exhibit 4. WSDA: Cropland Inventory 2019 compared to 2011**



129 Source: Washington State Department of Agriculture, 2020
 130

131 **Developed Agricultural Land**

132 There has been an increase in “developed” acres since 2011 of about 1,500 acres countywide or 1,100
 133 in unincorporated areas, which mostly means conversion of agriculture to non-agriculture use. Reviewing
 134 WSDA detailed notes about 50% of the developed acres are associated with conversion to non-
 135 agricultural uses like residential structures, roads, commercial facilities, schools, etc. Another 34% are
 136 called developed without detailed notes but are likely non-agricultural uses. 15% of the developed acres
 137 are agriculturally related (e.g. conversion of cropland to agricultural structures, e.g. barns, compost
 138 facilities, and other production related structures).

139 **Exhibit 5. WSDA: Tracking of Conversion/Development 2019 compared to 2011**

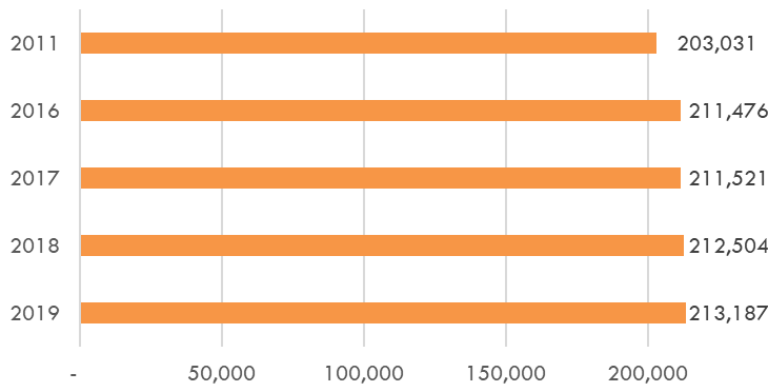
CROP GROUP	2011	2016	2017	2018	2019	2019-2016	2019-2011
Total Countywide	337,887	362,236	362,381	364,164	366,754	4,518	28,867
Developed Countywide	2,971	3,847	3,908	4,379	4,545	698	1,574
Developed Unincorporated	2,053	2,799	2,809	3,115	3,150	351	1,097

140 Source: Washington State Department of Agriculture, 2020

141 **Current Use Taxation Program**

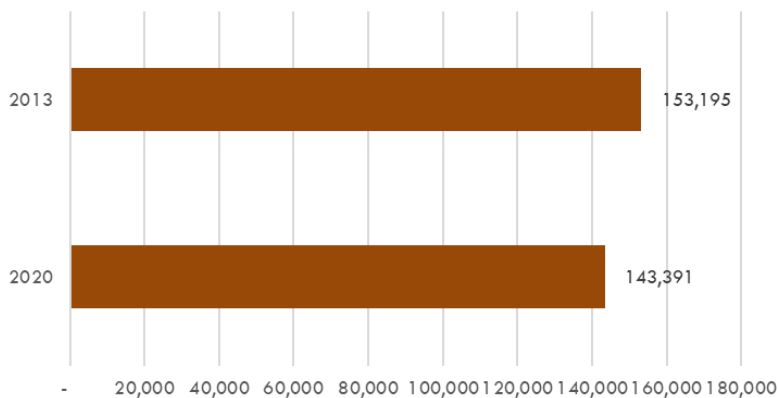
142 The current use program allows land in agricultural production to be taxed based on its use for
 143 agriculture rather than its potential use for residential, commercial, or other purposes. The intent is to
 144 reduce pressure for conversion. Land that is removed from the program may either be developing the
 145 land for non-agricultural purposes or it may be purchased for other reasons (e.g. conservation). While
 146 there has been a small increase in cropland there has been a drop in current use program usage by
 147 rangeland, illustrating a drop of about 10,000 acres.

148 **Exhibit 6. Current Use Taxation Trends on Cropland: WSDA 2011-2019 and Assessor Parcel 2020**



149 Source: Yakima County Assessor Parcel Data 2013 and 2020, and WSDA 2011-2019.

150 **Exhibit 7. Rangeland in Current Use Taxation 2013 and 2020**

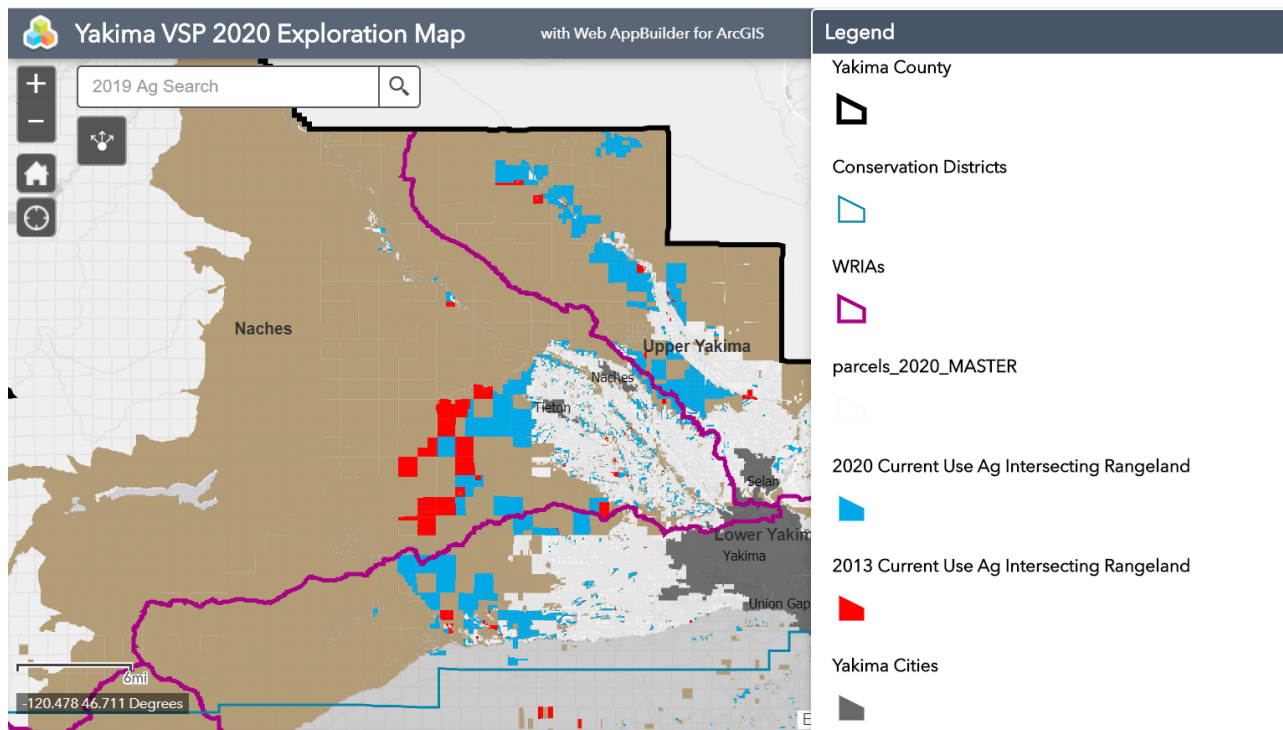


152 Source: Yakima County Assessor 2013 and 2020

153

154 Much of the range land removed from the current use tax program is found in the Naches basin; some of
 155 the land removed from the program was purchased by state and nonprofits for conservation. The
 156 Monitoring Report will provide more information about the location and nature of the change in
 157 rangeland status. Also, see the description of Shrub-Steppe monitoring, loss of land in production, and the
 158 potential for critical area enhancement later in this memo.

159 **Exhibit 8. Change in Current Use Taxation Program Enrollment – Rangeland**



160 Source: Yakima County Assessor 2013 and 2020; BERK 2016 and 2020
 161

162 **PRELIMINARY UPDATED INTERSECT RESULTS**

163 To help determine where the Yakima VSP applies, the Work Plan identified the overlap in the location of
 164 agricultural and range land and critical areas. This “intersect” can be updated with the latest agricultural
 165 inventory and any updated critical areas maps to identify trends and changes since the baseline
 166 established in the Work Plan. Reviewing locations of changes can help identify locations for closer review.
 167 Three updated intersects of agriculture and rangeland and critical areas are examined below:
 168 hydrologic study areas, critical aquifer recharge areas, and shrub-steppe.

169 **Critical Aquifer Recharge Areas**

170 Critical aquifer recharge areas are lands that have a recharging effect on aquifers used for potable
 171 water. A particularly important area of management is the Lower Yakima Valley Groundwater
 172 Management Area (LYVGWMA) where there is a goal of reducing nitrates in groundwater. The Yakima
 173 VSP Work Plan relies on the groundwater quality monitoring data collected by the LYVGWMA, which
 174 will be considered by the Work Group during the 5-Year Monitoring Report. The Work Plan promotes
 175 metrics including best management practices (BMPs) maintained to reduce runoff and protect
 176 groundwater quality, and the percentage of BMPs functioning as designed.

177 **Exhibit 9. Critical Aquifer Recharge Areas Goal, Benchmarks**

Critical Area Protection Goal	Critical Area Protection Benchmark	Performance Metric (Implementation)	Performance Metric (Resource Measurement)	Work Plan Baseline Information	Adaptive Management Threshold
Protect the functions and values of hydrologically related critical areas, including streams, wetlands, floodplains, and critical aquifer recharge areas.	Manage nutrients, pathogens, and other contaminants to maintain surface and groundwater quality (rely on regulatory backstop for pesticides, dairy nutrients, and stormwater).	Absent background regulations and TMDLs, number and extent of best management practices (BMPs) maintained to reduce runoff and protect groundwater quality in critical aquifer recharge areas (LYGWMA work products will be considered to identify BMPs for groundwater protection)	Percentage of BMPs functioning as designed to protect water quality.	Manage nutrients, pathogens, and other contaminants to maintain surface and groundwater quality (rely on regulatory backstop for pesticides, dairy nutrients, and stormwater).	<ul style="list-style-type: none"> 5% reduction of best management practices addressing water quality and nutrient management. 5% of best management practices monitored not meeting objectives.

178 Source: Yakima VSP Work Plan 2017, Chapter 7, and Appendix G.

179 Since the Work Plan was developed, Yakima County has published a new map of aquifer susceptibility
 180 areas (moderate to extreme), though it does not appear markedly different than information in the Work
 181 Plan. However, there is an updated layer of agricultural land from WSDA. Preliminary 2020 intersect
 182 results show a greater area of agricultural cropland in the intersect and a smaller area of rangeland.
 183 See Exhibit 10.

184 **Exhibit 10. Critical Aquifer Recharge Areas: Preliminary Intersect Results by Watershed**

	Countywide	Alkali-Squillchuck	Klickitat	Lower Yakima	Naches	Rock Glade	Upper Yakima
Baseline Intersect in Work Plan: 2016 excluding developed and cities							
Agriculture	266,470	0	0	241,545	19,455	48	5,422
Rangeland	185,685	771	812	107,660	65,481	414	10,548
Intersect: 2020 excluding developed and cities							
Agriculture	267,731			242,356	19,601	48	5,726
Rangeland	184,588	770	812	106,902	65,242	414	10,448
Difference: 2020 excluding developed and cities							
Agriculture	1,261	0	0	811	147	0	304
Rangeland	-1,097	-1	0	-758	-238	0	-100

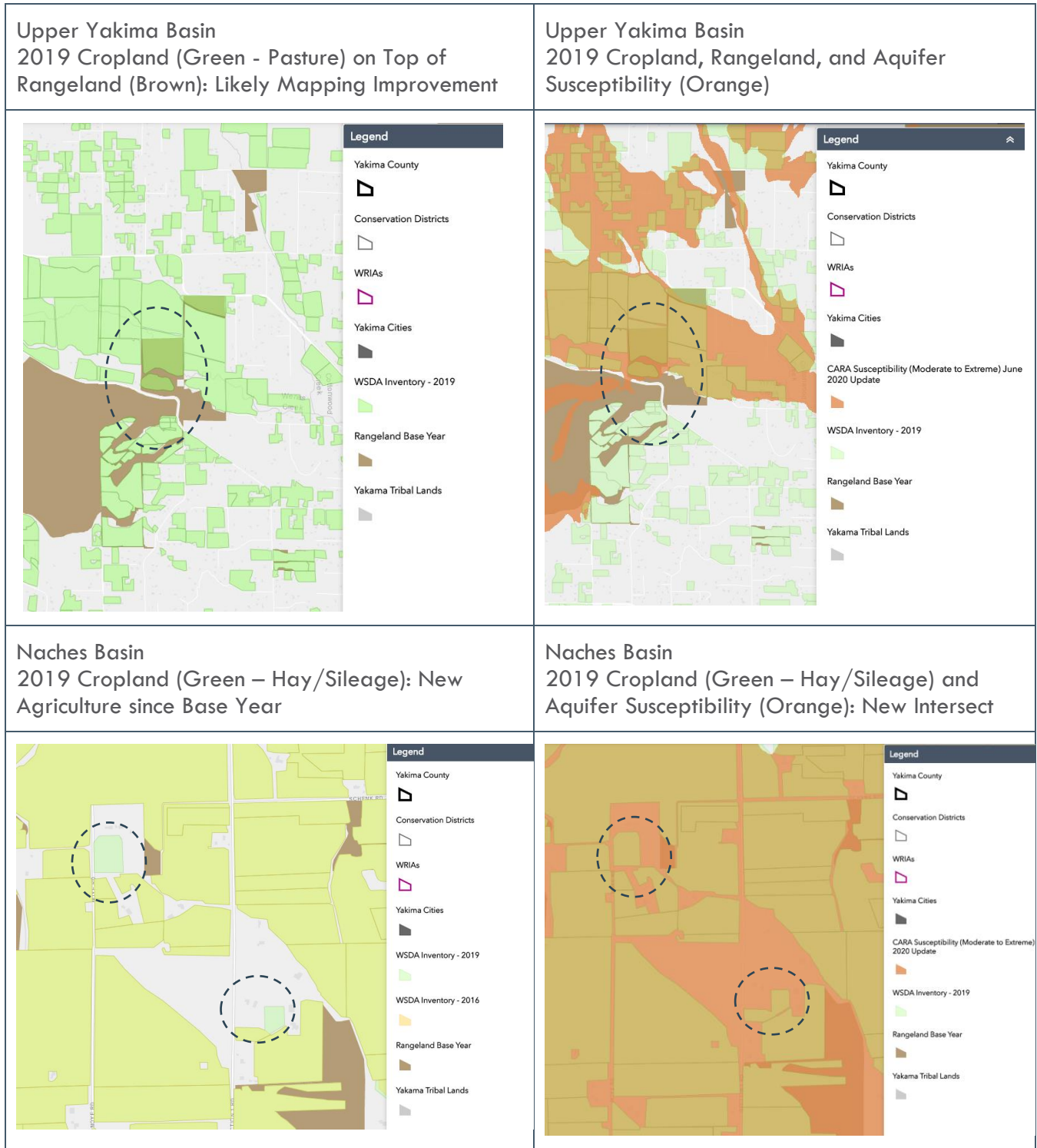
185 Source: WSDA 2020; BERK 2016 and 2020.

186 **Potential Areas of Exploration:** We anticipate using these preliminary results to explore:

- 187 Is the land that changed from rangeland to cropland due to improved mapping (e.g. pastureland),
 188 or areas that changed from one agricultural activity to another (e.g. grazing to orchard). Where is
 189 there a change in the footprint of agriculture or rangeland? Basins to review: Lower Yakima, Upper
 190 Yakima, Naches.

- 191 Within the full intersect area of critical aquifer recharge susceptibility areas, what type of BMPs
- 192 have been installed to address groundwater quality? What type of monitoring has occurred to
- 193 ensure BMPs are functioning as intended?

194 **Exhibit 11. Example – Rangeland and Cropland Inventory and CARA Extent**



195 Source: Yakima County GIS, WSDA, BERK 2020.

196 **Wetlands, Lakes, and Streams: Hydrologic Study Areas**

197 The Work Plan Goal and Benchmarks addresses protecting the functions and values of riparian areas in
 198 the agricultural intersect. See Exhibit 12. The Work Plan defines a hydrologic study area as a place to
 199 look closer at riparian vegetation, including lands within 100 feet from streams, lakes, wetlands. Metrics
 200 include best management practices related to livestock, and riparian cover change in proximity to
 201 agricultural activities.

202 **Exhibit 12. Work Plan: Riparian Areas Relevant Goal, Benchmarks**

Critical Area Protection Goal	Critical Area Protection Benchmark	Performance Metric (Implementation)	Performance Metric (Resource Measurement)	Work Plan Baseline Information	Adaptive Management Threshold
Protect the functions and values of hydrologically related critical areas, including streams, wetlands, floodplains, and critical aquifer recharge areas.	Manage riparian vegetation to maintain instream habitat, limit risk of channel migration into agricultural fields, maintain shading of stream, and other water quality functions.	Number and extent of best management practices related to livestock. Area of riparian vegetation retained, except for noxious weeds. Allow riparian areas to reestablish after natural events.	Area and cover of riparian vegetation intersecting agricultural activities.	Hydrologic Study Areas: Because there is no riparian data set, for analysis purposes a hydrologic study area was defined based on a distance of 100 feet from Streams, Lakes, Wetlands. This does not imply that there is actual riparian area or a buffer; rather it is a way to look at the footprint of agriculture along lands abutting waterbodies and wetlands.	<ul style="list-style-type: none"> 10% decrease in livestock management practices. 5% decrease in riparian cover.

203 Source: Yakima VSP Work Plan 2017, Chapter 7, and Appendix G.

204 Using updated 2019 agricultural data, and the same hydrologic study area as in the Work Plan, results
 205 show more agricultural cropland intersecting with the hydrologic study area and a small reduction in
 206 rangeland intersecting with the hydrologic study area. See Exhibit 13.

207 **Exhibit 13. Preliminary Intersect Results 2020 – Hydrologic Study Areas – by Watershed**

	Countywide	Alkali-Squilchuck	Klickitat	Lower Yakima	Naches	Rock Glade	Upper Yakima
Baseline Intersect in Work Plan: 2016 excluding developed and cities							
Agriculture	9,261	0	0.01	8,174	299	39	749
Rangeland	67,965	204	2,977	18,739	38,126	524	7,396
Intersect: 2020 excluding developed and cities							
Agriculture	9,628			8,395	327	45	862
Rangeland	67,711	201	2,977	18,572	38,095	517	7,348

	Countywide	Alkali-Squilchuck	Klickitat	Lower Yakima	Naches	Rock Glade	Upper Yakima
Difference: 2020 excluding developed and cities							
Agriculture	367	0	0	221	28	6	112
Rangeland	-254	-3	0	-166	-31	-7	-47

208 Source: WSDA 2020; BERK 2016 and 2020.

209 **Potential Areas of Exploration to explain “Why”:** As monitoring is further explored we anticipate using
 210 these preliminary results to explore:

- 211 ■ Is the land that changed from rangeland to cropland due to improved mapping (e.g. pastureland),
 212 or areas that changed from one agricultural activity to another (e.g. grazing to orchard). Where is
 213 there a change in the footprint of agriculture, regardless of inventory type? What basins and
 214 waterbodies do these lands lie along? Basins to review: Lower Yakima, Upper Yakima, Naches, Rock
 215 Glade
- 216 ■ What number of livestock best management practices have been implemented in hydrologic study
 217 areas (performance metric)?
- 218 ■ What information is available to support what vegetation changes may have occurred in the
 219 hydrologic study areas? (e.g. land cover, wetlands, etc.)

220 **Shrub-Steppe**

221 The Work Plan identifies a goal of conserving shrub-steppe habitat while along for ongoing or new
 222 agricultural activities. See Exhibit 14. Benchmarks look at protection measures especially in areas of deep
 223 soils: managed grazing, native bunch grass propagation, firefighting strategies, and rain guzzlers.
 224 Performance metrics look at area of land cover disturbance, areas managed for shrub-steppe functions,
 225 and area of composition and native cover.

226 **Exhibit 14. Work Plan: Shrub-Steppe Relevant Goal, Benchmarks**

Critical Area Protection Goal	Critical Area Protection Benchmark	Performance Metric (Implementation)	Performance Metric (Resource Measurement)	Adaptive Management Threshold
Conserve biodiversity and sensitive species, particularly within shrub-steppe habitats* without restricting ongoing or new agricultural activities. <small>* Shrub-steppe habitat encompasses rocky soils, shrubs, and grasses.</small>	Maintain functions of shrub-steppe habitat, especially areas with deep soils through voluntary management and protection measures. Examples include but are not limited to: <ul style="list-style-type: none"> ■ managed grazing at appropriate times ■ develop public/private grazing plans that enhance critical areas and agricultural viability. ■ native bunch grass propagation. Using existing bunch grasses; 	Area of shrub-steppe managed to limit landcover disturbance in areas of shrub-steppe (area of interface or overlap). Area of shrub-steppe managed to promote shrub-steppe functions- may include managed grazing (area of managed grazing or public/private grazing).	Area of shrub-steppe protected (annual/seasonal review of composition and native cover compared to baseline).	<ul style="list-style-type: none"> ■ 2.5% decrease in shrub-steppe area or native cover.

Critical Area Protection Goal	Critical Area Protection Benchmark	Performance Metric (Implementation)	Performance Metric (Resource Measurement)	Adaptive Management Threshold
	divide plants into halves or quarters and replant. Best done in late fall /winter. <ul style="list-style-type: none"> ▪ develop firefighting strategies that protect shrub-steppe habitats that compliment VSP plan goals... ▪ install rain guzzlers in rangeland shrub-steppe areas to provide water sources for both livestock and wildlife. 			

227 Source: Yakima VSP Work Plan 2017, Chapter 7, and Appendix G.

228 Considering the shrub-steppe layer (new but similar to Work Plan) and a new WSDA cropland layer, the
 229 intersect results show a greater intersect of cropland and shrub-steppe and a lesser intersect with
 230 rangeland.

231 **Exhibit 15. Preliminary Intersect Results 2020 – Shrub-Steppe – by Watershed**

	Countywide	Alkali-Squillchuck	Klickitat	Lower Yakima	Naches	Rock Glade	Upper Yakima
Baseline Intersect in Work Plan: 2016 excluding developed and cities							
Agriculture	2,155	0	0	1,365	58	501	230
Rangeland	219,293	556	0	65,688	64,128	10,626	78,295
Intersect: 2020 excluding developed and cities							
Agriculture	3,127	0	0	2,082	126	529	390
Rangeland	218,431	556	0	65,077	64,059	10,597	78,141
Difference: 2020 excluding developed and cities							
Agriculture	973	0	0	717	68	28	160
Rangeland	-862	0	0	-611	-69	-28	-154

232 Source: WSDA 2020; BERK 2016 and 2020.

233 **Potential Areas of Exploration:** We anticipate using these preliminary results to:

- 234 ▪ Review the pending imagery analysis (see below); consider the quality of shrub-steppe including
 235 areas of deep soils, composition, and native cover, as well as effects of fire. What are trends and
 236 changes?
- 237 ▪ Since 2016, some of the land mapped as rangeland is now considered cropland by WSDA.
 238 Determine where this is due to improved mapping (e.g. pastureland), or due to a change from one
 239 agricultural activity to another (e.g. grazing to orchard). There are examples of both.
- 240 ▪ What conservation practices have been implemented in the area of intersect? (Managed grazing,
 241 guzzlers, other?)

- 242 ▪ If there have been reductions in shrub-steppe habitat, is it below the adaptive management
- 243 threshold? Whether above or below the adaptive management threshold, are there opportunities for
- 244 enhancement (e.g. in priority areas identified in work plan; are there opportunities on rangeland
- 245 removed from production)?
- 246 ▪ Basins to review: Lower Yakima, Upper Yakima, Naches, Rock Glade

247 *Imagery Analysis Process*

248 The Consultant scope includes imagery analysis to calculate composition, cover, and connectivity measures

249 in the Work Plan (see **Attachment B**). Anticipated steps and data sources include:

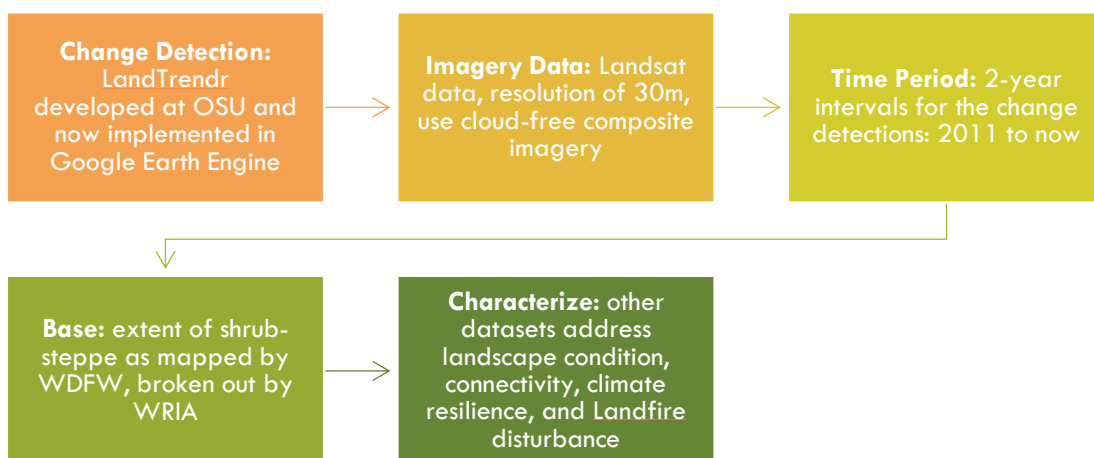
- 250 ▪ Extent of shrub-steppe considering priority habitats and species data from state sources.
- 251 ▪ Distribution of shrub/steppe stratified by soil depth (such as O and A soil horizons from the SSRUGO
- 252 soils data).
- 253 ▪ Disturbances, especially fire (using data from Landfire), which can help identify patches that may
- 254 have decreased in quality.
- 255 ▪ Change in shrub-steppe to some other landcover/land use (identified using normalized difference
- 256 vegetation index (NDVI)-based change detection using National Agriculture Imagery Program
- 257 (NAIP)).
- 258 ▪ Extent and proliferation of invasive grasses (using time-series data from Sentinel-2). It would be used
- 259 to identify areas that are greening earlier in the year due to the presence of invasive grasses. This
- 260 method would be confirmed by reviewing literature and consulting experts to ensure the
- 261 signal/timing differences would be strong enough to detect.

262 After completing the above analyses, the datasets would be combined to categorize the quality of shrub-

263 steppe by soil, disturbance, conversion, and presence of invasive species.

264 The key steps are illustrated in the flow chart below.

265 **Exhibit 16. Shrub-Steppe Imagery Analysis Process**



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Next Steps

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See the schedule on page 5. After the Work Group meeting on June 30, 2020 to introduce early results of the evaluation and the schedule, a full draft evaluation will be developed. Results will be vetted with experts in shrub-steppe (e.g. through interviews), and a draft report prepared for Work Group review.

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Attachment A: Excerpt of the VSP Law on Monitoring Process

RCW 36.70A.720 Watershed group's duties—Work plan—Conditional priority funding

(1) A watershed group designated by a county under RCW 36.70A.715 must **develop a work plan to protect critical areas while maintaining the viability of agriculture in the watershed**. The work plan must include goals and benchmarks for the protection and enhancement of critical areas.

(2)(a) The watershed group shall develop and submit the work plan to the director for approval as provided in RCW 36.70A.725.

(b)(i) **Not later than five years after the receipt of funding for a participating watershed, the watershed group must report to the director and the county on whether it has met the work plan's protection and enhancement goals and benchmarks.**

(ii) If the watershed group determines the protection goals and benchmarks have been met, and the director concurs under RCW 36.70A.730, the watershed group shall continue to implement the work plan.

(iii) If the watershed group determines the protection goals and benchmarks have not been met, it must propose and submit to the director an adaptive management plan to achieve the goals and benchmarks that were not met. If the director does not approve the adaptive management plan under RCW 36.70A.730, the watershed is subject to RCW 36.70A.735.

(iv) If the watershed group determines the enhancement goals and benchmarks have not been met, the watershed group must determine what additional voluntary actions are needed to meet the benchmarks, identify the funding necessary to implement these actions, and implement these actions when funding is provided.

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277 **Attachment B: Work Plan Excerpt: Imagery Guidance in**
 278 **Work Plan**

279 **8.3.4. IMAGERY GUIDING PRINCIPLES IN YAKIMA COUNTY VSP WORK PLAN**

280 **Potential Information that Imagery or Mapping Interpretation Could Provide**

281 Towards measuring progress on goals and benchmarks in Chapter 7 and Appendix G, the types of
 282 information that mapping or imagery interpretation could provide are shown in the table below. The
 283 intent is to interpret imagery and maps in combination with other monitoring tools such as rapid
 284 watershed assessment or expert panels to provide as complete a picture of critical area functions and
 285 values as possible.

286 **Exhibit 8-6. Use of Imagery/Map Interpretation in Measuring VSP Benchmarks**

CRITICAL AREA	TYPES OF INFORMATION FROM IMAGERY/MAP INTERPRETATION
Fish and Wildlife Habitat Conservation Areas Shrub-Steppe	Track: <ul style="list-style-type: none"> ▪ Composition <ul style="list-style-type: none"> ○ Invasive/native species ○ Rock/soils, shrubs, grasses (desirable species) ▪ Cover <ul style="list-style-type: none"> ○ Percent rock/soils, shrubs, grasses (desirable species) ○ Percent invasive ▪ Connectivity: acreage of rock/soils, shrubs, grasses (desirable species) ▪ Recognize natural variability
Riparian	Track cover. See also wetlands below.
Wetlands	Wetland Change Analysis, underway by Ecology. Consider if/when available. Acknowledge the coarse scale. Specific functions could be challenging to measure, particularly in forested areas.
Floodplains	Use available LIDAR as a tool in the future, or changes in FEMA mapping. Consider: <ul style="list-style-type: none"> ▪ Where is floodplain disconnection occurring as a result of agricultural activity? ▪ Where is water table present? Pending available LiDAR or improved FEMA mapping, identify where disconnection is occurring as a result of agricultural activities through Technical Provider interface with interested producers, and use of Checklist and Tracking Tool. Example questions: <ul style="list-style-type: none"> ▪ Are there measures that disconnect river from farm? Including roads? ▪ Do you experience flooding? ▪ Is flooding compatible with agricultural operations?
Critical Aquifer Recharge Areas	<ul style="list-style-type: none"> ▪ Track cover. Cover helps with water quality. ▪ Acres implementing groundwater management practices.

CRITICAL AREA	TYPES OF INFORMATION FROM IMAGERY/MAP INTERPRETATION
	<p>Match with Tracking Tool and Technical Provider review.</p> <ul style="list-style-type: none"> Five percent sampling of completed plans (e.g. producers implementing Groundwater Management Acre toolkit) – what percent are meeting objectives?
Geologic Hazards	<ul style="list-style-type: none"> Track cover in geologic hazard areas. <p>Match with Tracking Tool and Technical Provider review.</p> <ul style="list-style-type: none"> Example conservation practices: See Appendix F Checklist for Soil Health and Erosion Control measures. Promote proper location of farm ponds/detention particularly for those not addressed by regulatory backstop.

287 Generally, mapping and imagery interpretation would be updated every two years and the relationship
 288 of critical areas functions and values to the 2011 baseline would be assessed. Sometimes the mapping
 289 updates may show a change that is not related to a critical area change since 2011 but may only
 290 represent better available information. That would be accounted in the monitoring report.

291 **Imagery Alternatives**

292 Where use of remote sensing data is indicated in Appendix G, remote sensing interpretation will be the
 293 first source of information evaluated. If the Work Group determines that the results from remote sensing
 294 are unclear, inconclusive, or misleading, the Work Group may decide to convene an expert panel to
 295 review the results. Expert panels would be made up of qualified professionals and subject matter experts
 296 who have demonstrated education, experience, accreditation, and knowledge relevant to the particular
 297 matter. An expert panel review may include windshield surveys, rapid assessment methods, or other
 298 ground-truthing approaches.

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Attachment C: Summary of Consultant Scope

Task 1. Critical Area and Agricultural Trends

Task 1.1 Permit Trends on Agricultural Land

Task 1.2 Imagery and Mapping

Task 1.3 Participation and Conservation Practice Tracking Update

- NYCD and SYCD provide information from participation efforts and tracking tool/stewardship checklists

Task 1.4 Integrate Other Reports

Task 2. Conservation Practice Prioritization and Implementation

- Develop a field tour of shrub-steppe conservation enhancement sites [Due to COVID-19 and seasonal timing and fire risk this could be turned into webinars and focus groups that are held remotely]
- Conduct a mapping exercise and invite a panel of experts from federal, state, and university sources to identify opportunities and constraints

Task 3. Benchmark Evaluation

Task 4. Develop Reports

Task 5. Coordination and Meetings

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Attachment D: WSDA Inventory

Crop Group 2011-2019

CROP GROUP	2011	2016	2017	2018	2019
Berry	235	425	425	418	439
Cereal Grain	80,979	77,227	78,311	77,139	75,484
Commercial Tree	13	27	27	26	48
Developed	0	0	0	4,379	4,545
Flower Bulb	18	5	17	0	12
Green Manure	276	121	121	21	21
Hay/Silage	35,933	40,541	40,038	42,087	43,724
Herb	33,490	41,565	42,525	44,000	43,942
Melon	22	71	71	71	182
Nursery	909	951	945	930	996
Oilseed	1,609	1,128	1,122	1,125	1,084
Orchard	71,181	70,955	71,015	70,668	71,229
Other*	83,008	101,200	100,147	55,698	55,345
Pasture**	0	0	0	40,108	44,408
Seed	801	1,436	1,436	1,484	849
Turfgrass	904	863	863	848	844
Vegetable	8,418	6,744	6,745	6,227	5,138
Vineyard	20,093	18,977	18,571	18,936	18,463
Total	337,887	362,236	362,381	364,164	366,754
Developed (part of Other)	2,971	3,847	3,908	4,379	4,545
Total Excluding Developed	334,917	358,389	358,472	359,786	362,209
Cities Production	6,839	7,588	7,591	7,454	7,479
Cities Developed	918	1,048	1,099	1,262	1,395
County Developed	2,053	2,799	2,809	3,115	3,150
Total Excluding Cities and Developed	328,995	351,849	351,981	353,595	356,125

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306 Detailed Crop Type 2011-2019

CROP TYPE	2011	2016	2017	2018	2019	Change 2019-2011	Change 2019-2016
Alfalfa Hay	21,894	26,147	26,126	26,289	26,569	4,675	422
Alfalfa Seed	136	612	612	623	347	211	(265)
Alfalfa/Grass Hay	5,913	4,481	4,413	4,216	3,813	(2,100)	(668)
Alkali Bee Bed	-	25	25	-	-	-	(25)
Allium	-	2	14	-	12	12	10
Apple	50,175	50,903	50,976	51,307	51,861	1,686	957
Apricot	482	516	513	511	509	26	(7)
Artichoke	16	-	-	-	-	(16)	-
Asparagus	2,585	1,913	1,917	1,691	1,296	(1,289)	(617)
Barley	573	99	99	488	561	(12)	462
Barley Hay	-	372	372	345	100	100	(272)
Bean, Dry	770	289	287	80	140	(631)	(149)
Bean, Green	16	77	77	77	39	22	(39)
Blueberry	101	403	403	409	430	329	27
Bluegrass Seed	189	36	36	36	-	(189)	(36)
Cabbage	-	-	-	-	23	23	23
Caneberry	134	20	20	9	5	(129)	(15)
Cantaloupe	15	-	-	-	-	(15)	-
Carrot	-	-	-	89	89	89	89
Carrot Seed	182	448	448	450	391	209	(57)
Cherry	10,510	10,667	10,656	10,231	10,345	(165)	(322)
Chestnut	17	17	17	17	17	0	0
Christmas Tree	7	11	11	11	33	26	22
Clover Seed	35	190	190	190	31	(3)	(159)
Clover/Grass Hay	-	-	-	-	3	3	3
Corn Seed	30	136	136	136	-	(30)	(136)
Corn, Field	45,684	47,201	48,065	49,397	50,004	4,320	2,803
Corn, Sweet	826	1,418	1,402	1,575	1,088	262	(330)
CRP/Conservation	36,998	39,652	38,798	34,266	34,216	(2,782)	(5,436)
Cucumber	198	38	38	38	50	(148)	12
Currant	-	-	-	-	4	4	4
Developed	2,971	3,847	3,908	4,379	4,545	1,574	699
Dill	1,609	1,128	1,122	1,122	1,082	(527)	(46)
Driving Range	18	35	35	35	35	17	0
Fallow	12,464	17,353	12,340	9,711	7,452	(5,012)	(9,901)
Fallow, Idle	-	-	4,640	9,642	11,026	11,026	11,026
Fallow, Tilled	-	-	-	1,067	1,613	1,613	1,613
Fescue Seed	-	14	14	14	-	-	(14)
Filbert	-	-	-	16	24	24	24
Golf Course	778	776	776	776	772	(6)	(4)
Grape, Juice	14,512	12,823	12,449	12,322	12,105	(2,407)	(718)
Grape, Table	-	1	1	1	1	1	0
Grape, Unknown	-	2	2	255	-	-	(2)
Grape, Wine	5,580	6,150	6,119	6,357	6,357	777	207
Grass Hay	5,077	6,485	6,442	9,403	10,463	5,386	3,977
Green Manure	276	121	121	-	-	(276)	(121)
Hemp	-	-	-	-	45	45	45
Hops	23,933	31,265	32,238	34,433	35,752	11,819	4,487
Iris	18	3	3	-	-	(18)	(3)

CROP TYPE	2011	2016	2017	2018	2019	Change 2019-2011	Change 2019-2016
Legume Cover	-	-	-	21	21	21	21
Marijuana	-	19	19	44	31	31	12
Market Crops	1,067	1,916	1,930	1,867	1,420	354	(496)
Melon, Unknown					50	50	50
Mint	9,401	10,270	10,222	9,476	8,158	(1,242)	(2,112)
Mustard	-	-	-	3	3	3	3
Nectarine/Peach	1,900	1,684	1,679	1,517	1,437	(463)	(246)
Nursery, Greenhouse	9	1	1	1	1	(8)	0
Nursery, Lavender	1	3	3	6	6	5	3
Nursery, Orchard/Vineyard	332	489	476	487	576	244	87
Nursery, Ornamental	560	455	463	436	413	(147)	(42)
Nursery, Silviculture	8	-	-	-	-	(8)	-
Oat	193	104	104	70	70	(124)	(34)
Oat Hay	-	84	84	101	273	273	189
Onion	836	69	69	67	-	(836)	(69)
Orchard, Unknown	-	46	32	41	41	41	(5)
Pasture	29,823	39,329	39,443	40,108	44,408	14,585	5,078
Pea, Green	2	-	-	-	-	(2)	-
Pea Seed	-	-	-	1	1	1	1
Pear	7,797	6,916	6,937	6,844	6,813	(984)	(103)
Pepper	330	144	144	144	322	(8)	178
Plum	286	191	191	170	169	(117)	(22)
Poplar	6	12	12	11	11	6	(1)
Potato	1,353	338	338	251	255	(1,098)	(83)
Pumpkin	84	112	84	84	129	45	17
Research Station	78	78	78	78	78	1	(0)
Rhubarb	-	4	4	4	4	4	(0)
Rutabaga	-	13	13	-	-	-	(13)
Rye	115	-	-	-	-	(115)	-
Silviculture	-	4	4	4	4	4	(0)
Sod Farm	107	52	52	37	37	(71)	(15)
Sorghum	40	112	112	-	-	(40)	(112)
Squash	279	377	405	241	210	(69)	(167)
Strawberry	-	1	1	-	-	-	(1)
Sudangrass	1,204	1,755	1,131	651	827	(378)	(928)
Sugar Beet Seed	32	-	-	-	-	(32)	-
Sunflower Seed	197	-	-	34	34	(163)	34
Timothy	1,805	767	767	604	1,199	(606)	432
Tobacco	156	47	47	47	-	(156)	(47)
Tomato	57	36	36	18	72	15	36
Triticale	1,203	356	246	65	28	(1,175)	(328)
Triticale Hay	-	339	592	478	478	478	139
Unknown	67	25	25	97	134	67	108
Walnut	14	15	15	14	14	(0)	(1)
Watermelon	8	71	71	71	132	124	62
Wheat	25,949	22,732	22,896	17,947	15,714	(10,235)	(7,018)
Wheat Fallow	7,262	6,699	6,901	9,173	9,108	1,846	2,409
Wildlife Feed	608	890	890	837	826	218	(64)
Grand Total	337,887	362,234	362,378	364,164	366,754	28,867	4,520
Total Minus Developed	334,917	358,387	358,470	359,786	362,209	27,292	3,822