

**TO:** Columbia River Gorge Commission

**FROM:** Lisa Naas Cook, VSI Planner

**DATE:** February 9, 2021

**RE:** **Work Session\*:** Vital Sign Indicators Assessment and Commission Discussion

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### **Background**

The Vital Sign Indicators (VSI) program focuses on assessing the long-term health of scenic, natural, cultural, and recreation resources, and local economies, of the Columbia River Gorge National Scenic Area. The Management Plan directs the Gorge Commission to design a monitoring and evaluation program to evaluate the effectiveness of Management Plan goals and policies in protecting these resources and supporting and protecting the economy (Part IV, Chapter 1: Gorge Commission Role).

In 2007, the Gorge Commission, U.S. Forest Service, other partner agencies, Gorge residents, and non-profit organizations began working on the VSI project as a community-driven planning initiative. Through a transparent public process involving a Technical Advisory Team, Community Advisory Team, Gorge Commission Assessment Committee, and many partner agencies, 51 Vital Sign Indicators were created to assess the condition of scenic, natural, economic, cultural, and recreation resources in the National Scenic Area. A "State of the Gorge" report was released in May 2009 summarizing data for 24 indicators with the goal of reporting on the additional 27 indicators in the second phase of the project in 2011. Of the 24 indicators included in the 2009 report, only 5 had data available "off the shelf," 13 required staff to perform extensive analysis on existing information to create useful measures, and 6 others had to be developed from scratch.

As a result of budget cuts and staff changes in 2010, the VSI project did not move forward as anticipated. It is now a Commission priority to revitalize this program in alignment with the revised Gorge 2020 Management Plan and the Commission's strategic planning, evaluation, and reporting framework currently under development.

The Gorge Commission secured dedicated funding and staff to work on VSI. We recognize the tremendous time and effort of those who contributed to the 2009 VSI project and seek to carry forward the goals of the original effort, using this as a foundation while making the changes

necessary based on what we have learned in the last decade. The purpose of this staff report is to launch the VSI program by describing our approach for selecting indicators to be monitored over the next decade. ***The program framework highlighted here is discussed in detail in the attached Vital Sign Indicators (VSI) Assessment and 2021-2022 Work Plan.*** As a synthesis of key learnings from informational interviews, review of the 2009 VSI effort, and priority focus topics discussed in the Gorge 2020 Management Plan revision process, the VSI Assessment describes the thinking behind the suggested VSI program approach detailed in this staff report.

### **VSI Program Objectives**

Through the VSI program, the Gorge Commission and U.S. Forest Service will:

- (1) Track the status and trends of protected resources over time to assess if we are achieving Management Plan goals.
- (2) Use indicator data to guide adaptive management, including ongoing decision-making and future Management Plan review.
- (3) Build new and strengthen existing partnerships with the four Columbia River treaty tribes and our partner agencies, counties, and communities to leverage information and capacity toward shared monitoring goals.
- (4) Communicate our findings through accessible, interactive formats to raise awareness of the health of the National Scenic Area.

### **Developing the VSI Monitoring Program: Key Steps**

Through the VSI assessment, staff identified several key steps in developing an effective monitoring program:

- Clearly identify the role of **Vital Sign Indicators** as part of a comprehensive monitoring program.

**Vital Sign Indicators** are designed to *track a change in condition over time, not diagnose the cause of the change*. Vital signs for human health, such as blood pressure, alert us to problems in the body, but specific follow-up tests are needed to understand the full range of factors that may be contributing to blood pressure outside the normal range. As surrogates for underlying, complex ecological and human systems, Vital Sign Indicators provide critical information on long-term status and trends to better understand if we are making progress toward Management Plan goals. **Performance indicators** are other evaluation measures designed to *track the direct results of interventions or management actions*. These may be developed to compliment condition-based Vital Sign Indicators, though they cannot replace them.

- Use **priority management questions** as a starting point for discussion of indicators. While indicators are science-based, determining which indicator topics and management questions to focus on involves value judgments and a practical approach.

- Prioritize **actionable indicators**: Can the trend we are tracking prompt a management action?
- Identify **key audiences for evaluation information**: Who will use the data collected for each indicator and for what purpose(s)?
- Establish **outcomes or targets** for indicators, even if at a high-level initially (e.g., rivers and streams in the NSA that are cold enough to support salmon).
- Build **partnerships** with agencies and organizations already engaged in monitoring efforts in the National Scenic Area to leverage data and capacity to accomplish VSI program objectives. Determining data availability and partners' interest and capacity to coordinate with VSI staff is essential.

### **Choosing Indicators: Evaluation Criteria**

Based on review of other regional monitoring programs and the past VSI effort, suggested indicator evaluation criteria are described below. Given that climate change and equity intersect with the Gorge Commission's work in many ways, both directly and indirectly, the process for selecting Vital Sign Indicators should take into account these critical, overarching considerations as well. Identifying and describing how indicators connect with climate change and equity considerations will be part of indicator development, selection, and data analysis whenever possible.

1. **Measurable**: Indicators should be directly measurable through repeatable quantitative or qualitative methods.
2. **Relevant to management actions**: Indicators should provide information on the condition of protected resources related to specific Management Plan provisions.
3. **Clear**: Indicators should be understandable by the public and policymakers.
4. **Consistently available**: Indicator data should be reliably available over time to track long-term status and trends.
5. **Obtainable**: Indicator data should be available through existing monitoring programs whenever possible.
6. **Cost-effective**: Indicator data acquisition, analysis, and reporting should make efficient use of limited financial and staff resources.

## **Work Plan Timeline: Early Focus on Climate Change and Natural Resources**

Given that the health of natural resources and climate change impacts are interconnected and affect the health of other protected resources and economies in the NSA, staff will focus on these topics first to thoroughly review and use the indicator development methodology as a template to then explore options for other indicators. Staff will also be working with partners as time allows to develop draft scenic, cultural, recreation, and economic indicators in 2021.

The recommended goals for this year are to:

(1) Complete development, outreach, and *final* selection of natural resources and climate change indicators by the end of 2021.

(2) Complete a *draft* list of scenic, cultural, recreation, and economic indicators by the end of 2021. Staff anticipate completing final selection of these indicators in early 2022.

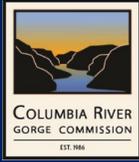
## **Topics for Commission Consideration**

Below are suggested action and discussion items for the VSI work session on February 9, 2021:

**Action Item:** Staff recommend the two-part VSI work plan timeline described above for Commission deliberation and approval. (*See pages 23-24 in VSI Assessment for details.*)

### **Discussion Items:**

- Discuss and provide feedback on **indicator evaluation criteria**. (*See page 6 in VSI Assessment.*)
  - How could we incorporate consideration of climate change and equity across resource areas as we develop and select indicators?
  - Are there other factors to consider when selecting indicators?
  
- Discuss and provide feedback on **management questions and Vital Sign topics for climate change and natural resources** as the first two resource areas we are focusing on for indicator development. (*See pages 8-13 in VSI Assessment.*)
  - Based on what the Commission has learned throughout the Gorge 2020 Management Plan revision process and your review of the VSI assessment, what are a few of the most critical climate change and natural resource management questions that connect with Management Plan goals and policies?
  - Which indicator topics most effectively address these questions?



# Vital Sign Indicators (VSI) Assessment and 2021-2022 Work Plan



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## I. Program Background

The Vital Sign Indicators (VSI) program is a monitoring and evaluation effort focused on assessing the long-term health of Columbia River Gorge National Scenic Area resources to help evaluate the effectiveness of Management Plan goals and policies. In 2007, the Gorge Commission, U.S. Forest Service, other partner agencies, Gorge residents, and non-profit organizations began working on the VSI project as a community-driven planning initiative. Through a transparent public process involving a Technical Advisory Team, Community Advisory Team, Gorge Commission Assessment Committee, and many partner agencies, 51 Vital Sign Indicators were created to assess the condition of scenic, natural, economic, cultural, and recreation resources in the National Scenic Area. A “State of the Gorge” report was released in May 2009 summarizing data for 24 indicators with the goal of reporting on the additional 27 indicators in the second phase of the project in 2011. Of the 24 indicators included in the 2009 report, only 5 had data available “off the shelf,” 13 required staff to perform extensive analysis on existing information to create useful measures, and 6 others had to be developed from scratch.

As a result of several factors including budget cuts and staff changes in 2010, the VSI project did not move forward as anticipated a decade ago. It is now a Commission priority to revitalize this program in alignment with the revised Gorge 2020 Management Plan and the Commission’s strategic planning, evaluation, and reporting framework currently under development.

For the first time in its history, the Gorge Commission now has dedicated funding and staff to work on VSI. We recognize the tremendous time and effort of those who contributed to the 2009 VSI project and seek to carry forward the goals of the original effort, using this as a foundation while making the changes necessary based on what we have learned in the last decade.

## II. Path Forward: VSI Assessment and Work Plan

The assessment and work plan that follow provide the framework for developing and implementing the VSI program in 2021-2022. The assessment portion begins with a brief overview of foundational elements of the program, moves into a summary of key themes and suggestions on program development and implementation, and concludes with discussion of management questions and potential indicator topics. This assessment is based on review of the 2009 VSI effort, priority focus topics discussed in the Gorge 2020 Management Plan revision process, and considerations raised through informational interviews with agencies and organizations noted below. The work plan provides an overview of the timeline, activities, and milestones for VSI program development and implementation in 2021-22.

In 2020, staff conducted informational interviews with individuals across different stages of the VSI project’s history, ranging from those engaged in 2007 through the present day. Other regional monitoring programs and current or potential partners were also consulted. Those interviewed include, but are not limited to:

- U.S. Forest Service,
- Columbia River Gorge Commission,
- U.S. Geological Survey,
- Oregon Department of Environmental Quality,
- Washington Department of Natural Resources,
- Columbia River Inter-Tribal Fish Commission,
- National Ecological Observatory Network, Wind River Experimental Forest Field Station,
- Puget Sound Partnership,
- Tahoe Regional Planning Agency,
- King County Clean Water, Healthy Habitat Initiative,
- Mid-Columbia Economic Development District,
- East Cascades Oak Partnership, and
- Oregon Chapter of the International Dark-Sky Association.

The key themes and suggestions that emerged from interviews are described in the assessment summary that follows.

### A. Purpose

Vital Sign Indicators are high-level measures used to assess the condition of the scenic, natural, cultural, and recreation resources, and local economies, of the Columbia River Gorge National Scenic Area. The Management Plan states that the Gorge Commission shall design its monitoring and evaluation program to determine whether the Management Plan is protecting the scenic, cultural, natural, and recreation resources, and supporting and protecting the economy, of the National Scenic Area (Part IV, Chapter 1: Gorge Commission Role).

### B. Objectives

Through the VSI program, the Gorge Commission and U.S. Forest Service will:

- (1) Track status and trends of protected resources over time to assess if we are achieving Management Plan goals.
- (2) Use indicator data to guide adaptive management, including ongoing decision-making and future Management Plan review.
- (3) Build new and strengthen existing partnerships with the four Columbia River treaty tribes and our partner agencies, counties, and communities to leverage information and capacity toward shared monitoring goals.
- (4) Communicate our findings through accessible, interactive formats to raise awareness of the health of the National Scenic Area.

## C. Scope

The geographic scope of the Vital Sign Indicators program is the Columbia River Gorge National Scenic Area. The U.S. Forest Service and Columbia River Gorge Commission are lead partners in this effort, with Gorge Commission VSI staff in the primary coordination role.

## D. Program Development and Implementation

One of the main goals of interviews with individuals involved in regional monitoring efforts was to identify best practices and lessons learned that may be relevant to the VSI program. While each monitoring effort is unique in its goals and operation, several recurring themes emerged through this assessment. Below are the key learnings related to three main topics: indicator development and evaluation criteria, reporting, and program management and leadership structure.

### 1. Indicator Development

- Clearly identify the role of **Vital Sign Indicators** as part of a comprehensive monitoring program.
  - Those interviewed emphasized the importance of clarifying what types of indicators are needed for specific evaluation purposes. People may use terms interchangeably, and it is helpful to confirm shared understanding and consistent use. For example, **Vital Sign Indicators** are designed to *track a change in condition over time, not diagnose the cause of the change*. Vital signs for human health, such as blood pressure, alert us to problems in the body, but specific follow-up tests are needed to understand the full range of factors that may be contributing to blood pressure outside the normal range. As surrogates for underlying, complex ecological and human systems, Vital Sign Indicators provide critical information on long-term status and trends to better understand if we are making progress toward Management Plan goals. **Management, or Performance, Indicators** are other evaluation measures designed to *track the direct results of interventions or management actions*. These compliment condition-based Vital Sign Indicators, though they cannot replace them.
  - While Vital Sign Indicators are useful at communicating the outcomes we want to see on a longer-time scale (e.g., 10-years), they may not, alone, provide information on a shorter-time scale needed for adaptive management. Puget Sound Partnership (PSP), for example, is now developing what they call “intermediate” and “activity progress measures” to address this need. Intermediate Progress Measures look at drivers causing change to Vital Signs (e.g., summer low flow temperature affecting harvestable shellfish acres), while activity progress measures report on different project contributions toward a Vital Sign target (e.g., number of freshwater floodgates removed to help achieve 10,800 harvestable shellfish acres by 2020). The guiding assumption is that if progress is made on intermediate and activity progress measures, the associated Vital Signs should improve.

- Use **priority management questions** as a starting point for discussion of indicators. While indicators are science-based, determining which indicator topics and management questions to focus on involves value judgments and a practical approach.
- Prioritize **actionable indicators**: Can the trend we are tracking prompt a management action?
- Identify **key audiences for evaluation information**: Who will use the data collected for each indicator and for what purpose(s)? Puget Sound Partnership described identifying “personas,” or descriptions of different types of audiences based on how they use information (e.g., planner, change maker, data steward, funder, etc.).
- Establish **outcomes or targets** for indicators, even if at a high-level initially (e.g., rivers and streams in the NSA that are cold enough to support salmon).

Several monitoring program staff consulted in this review reported that targets were established after indicators were created, and these targets inform action plans created every few years. The original VSI effort also did not identify targets as part of the initial roll-out in 2009 because there was not yet consensus on targets and a baseline for analysis (e.g., pre-NSA Act, pre-European contact, etc.). Staff did anticipate identifying targets a year or two following implementation. Evaluating a “protection” goal in the Management Plan, rather than restoration tied to quantified recovery actions (e.g., stream miles or acres restored), poses some unique challenges highlighted in the resource topic areas that follow.

- Determine which information is needed for **Vital Sign Indicators vs. reporting context**.

One overarching question that emerged throughout review of indicator topics is how available monitoring information may support, or be tiered to, a particular Vital Sign topic without serving as the Vital Sign Indicator itself. For example, how might we use Land Cover/Land Use Change data to provide context for analysis and reporting, while selecting focal species Vital Sign Indicators for each of the Priority Habitats protected in the Management Plan? Alternatively, what are the benefits and challenges of developing a Land Cover/Land Use Change Vital Sign Indicator that measures change in spatial distribution of Priority Habitats over time? Other examples of how this question plays out are included in the resource area sections of this assessment.

- Incorporate **social sciences** as part of a multi-disciplinary monitoring framework.

While the social sciences are often considered in the context of economics and recreation, there is growing recognition of the need to integrate an understanding of human behavior and values across all aspects of land use planning and natural resource management. While Human Well-being (HWB) Indicators may not be feasible or required

at this phase of the VSI revitalization effort, incorporating social science knowledge is a critical component of a multi-disciplinary approach to evaluating the health of a system as complex and diverse as the National Scenic Area. Suggestions offered in interviews include: Consider involving social scientists on technical review committees as needed for indicator development and implementation. Explore how social science knowledge can inform the VSI program, even if developing and funding specific HWB indicators is not possible at this time.

## 2. Indicator Evaluation Criteria

Based on review of other regional monitoring programs and the 2009 VSI effort, suggested indicator evaluation criteria are described below. Given that climate change and equity intersect with the Gorge Commission's work in many ways, both directly and indirectly, the process for selecting Vital Sign Indicators should take into account these critical, overarching considerations as well. Identifying and describing how indicators connect with climate change and equity considerations will be part of indicator development, selection, and data analysis whenever possible.

Other specific data considerations will be explored as needed through a technical work group (e.g., temporal and spatial scale of sampling).

1. **Measurable:** Indicators should be directly measurable through repeatable quantitative or qualitative methods.
2. **Relevant to management actions:** Indicators should provide information on the condition of protected resources related to specific Management Plan provisions.
3. **Clear:** Indicators should be understandable by the public and policymakers.
4. **Consistently available:** Indicator data should be reliably available over time to track long-term status and trends.
5. **Obtainable:** Indicator data should be available through existing monitoring programs whenever possible.
6. **Cost-effective:** Indicator data acquisition, analysis, and reporting should make efficient use of limited financial and staff resources.

## 3. Reporting

- Aligning **reporting frequency** across different partners and data sources can be a challenge. For example, Tahoe Regional Planning Authority initially relied on National Visitor Use Monitoring (NVUM) data collected every 5 years for their recreation indicators and needed to transition to data collection conducted in house to meet requirements of a 4-year agency reporting cycle.

- Regional monitoring programs are increasingly sharing status and trends reports via **web-based formats**, such as indicator dashboards (e.g., Tahoe Regional Planning Authority and Puget Sound Partnership) and story maps (e.g., Lower Columbia Estuary Partnership). *A VSI story map accessible through the Gorge Commission website is currently under development.*

#### 4. Program Management and Leadership Structure

- There is a need to establish an appropriate program management and leadership structure based on the Commission’s budget, staff capacity, and strategic plan priorities. The suggested framework below is based on insights gained from the informational interviews conducted in 2020.
  - **Partnerships:** Building partnerships with agencies and organizations already engaged in monitoring efforts in the National Scenic Area is *essential* to achieving VSI program objectives. While many monitoring networks and programs currently exist across the gorge, monitoring locations at specific points of interest within the National Scenic Area administrative boundary are often lacking. Vital Sign Indicator selection involves evaluating both data availability and capacity of partner entities to coordinate with VSI staff as needed to implement the program.
  - **Ongoing oversight/leadership:**
    - Establish a multi-disciplinary steering committee, with a Commission member, to provide bi-annual feedback on analysis and reporting.
    - Identify an indicator lead from each data steward organization or agency to coordinate with CRGC staff on each Vital Sign. Depending on the nature of the data collected, this lead may be the VSI Planner or other CRGC staff.
    - Network of indicator leads and data steward partners can become a “community of practice” that VSI staff convene occasionally to share monitoring best practices and results.
  - **Program phases:**
    - **Indicator development:** Coordinate short-term, focused work groups of subject matter specialists to develop metrics and methodologies.
    - **Data acquisition:** Completed by data steward partners.
    - **Analysis:** Completed by CRGC staff in consultation with indicator leads.
    - **Reporting:** Completed by CRGC staff with feedback from indicator leads and steering committee.
    - **Evaluation:** Identify success criteria for the VSI monitoring program (A successful program in 2, 5, 10 years looks like...) based on expected staff

capacity, funding, and other organizational factors. Identify measures of success across the adaptive management cycle (indicator development, partnership coordination, data acquisition, analysis, reporting, management action, and evaluation).

## E. Vital Sign Topics and Management Questions

The following section describes possible Vital Sign topics and key management questions based on learnings from informational interviews, as well as review of the 2009 VSI effort and Gorge 2020 Management Plan revision process. Each of the main VSI focus areas is included: scenic, natural, cultural, and recreation resources; economic vitality; and climate change. A table with Management Plan goals, key management questions, Vital Sign topics, and relevant measures is included for each section. Targets/outcomes and possible actions the Commission could take based on monitoring findings are two components of indicator development that will be explored in more detail as work progresses. The Natural Resources section includes one “target” and “possible actions” example for the Cold Water Refuge Streams Vital Sign topic. The information included in these tables is provided as background for discussion and a framework to guide indicator development efforts going forward. This is not a final list of indicator topics.

A brief explanation of terms in this section is noted here:

**Management Plan Goal:** A goal included in the text of the Columbia River Gorge National Scenic Area Management Plan.

**Key Management Question:** A priority question or information need identified by the Gorge Commission and U.S. Forest Service to support implementing the Management Plan.

**Vital Sign Topic:** The topic for a high-level indicator (e.g., Cold Water Refuge Streams).

**Measure:** A short description of what is being measured with a reference to measurement method or unit of measurement (e.g., summer low flow temperature).

**Target/Outcome:** Desired condition for a given resource that demonstrates achievement of Management Plan goals.

**Possible Actions:** Different courses of action the Commission and Forest Service could take based on VSI findings.

### 1. Climate Change

The new Climate Change chapter in the revised Management Plan calls for development of a Climate Change Action Plan and climate change indicators as part of the VSI monitoring effort. Staff have already completed significant work identifying potential strategies and actions for climate adaptation and mitigation actions. The focus of the current phase of climate change action planning

is reviewing vulnerability assessment data as a basis for prioritizing which strategies and actions will address the greatest risks and impacts to protected resources. Interviews for this assessment reveal that some monitoring programs are now looking at how climate change relates to indicators that were initially developed ten or more years ago. Conducting climate action planning and indicator development together in a coordinated effort provides an opportunity to not only ground all of our indicators in the reality of climate change, but also consider climate vulnerability as a prioritization criterion for indicator selection.

Given that climate change affects all resources, and gorge economies, addressed in the Management Plan, climate change indicators span different resource areas and management goals. Cold Water Refuge stream habitat, noted here and under the Natural Resources section of this assessment, is one example of an interrelated climate change and natural resource indicator that focuses on a significant threat to salmon survival, rising water temperatures, and connects with stream buffer policy in the Management Plan. While considering climate change as context for all resources, it is important to select a few climate-focused indicators based on the greatest risks to highly vulnerable resources.

The following table includes examples of potential indicator topics for two priorities identified for climate change action planning during the Gorge 2020 process: water and forest resources. Staff will share more information on climate change indicators after reviewing vulnerability assessment information and convening a technical work group to examine management questions, relevant measures, and data availability.

### Climate Change Management Questions and Possible Vital Sign Topics

Management Plan Goal	Key Management Question	Vital Sign Topic	Relevant Measures
<i>See Natural Resources section below for this topic</i>		Cold Water Refuge Streams	<i>See Natural Resources</i>
Climate Change Chapter, Policy 2: The Gorge Commission is committed to long-term monitoring that assesses changing conditions of and climate impacts to the scenic, natural, cultural, and recreation resources, and the economy, of the National Scenic Area.	How is the spatial distribution of wildfire risk across Land Use Designations in the NSA changing over time? How does this overlap with areas of potential development?	Wildfire	Wildfire and prescribed fire footprint; Number of red flag days
	How is the amount and spatial distribution of forest lands in the NSA changing over time? Where are the areas with highest forest carbon storage capacity (current and potential), and how does this overlap with areas of potential development?	Forest Land Cover/Forest Change	Forest carbon storage/biomass; soil carbon storage

## 2. Natural Resources

This section describes the key management questions and indicator topics that emerged from the Gorge 2020 Management Plan revision process, informational interviews, and a staff work session conducted in December 2020. This work session focused on identifying management questions that address significant threats to protected resources in the Natural Resources chapter of the Management Plan (water, wildlife habitat, and plants). Discussion also included consideration of how climate change informs priority management questions. Overall, management questions fell into three, sometimes overlapping, categories: Conditions/Trends Information, Management Plan Effectiveness, and Landowner Outreach/Awareness. While landowner outreach questions relate to the implementation of the Management Plan, they may be better suited for management action or performance indicators, rather than higher-level vital signs. Other questions focused on better understanding how the Commission is meeting enhancement goals of the Management Plan: What types of enhancement actions are being implemented? Should the Commission be more proactive on enhancement, in addition to preventing adverse impacts?

The discussion points from this staff work session are included below to highlight the complexity and breadth of information being considered. Provided here as background for Commission discussion, this list is not intended to capture every management concern or require an indicator for each question or impact. As is the case for all VSI resource areas, potential indicator topics need to be evaluated and prioritized based on agreed-upon criteria. The table at the end of this section highlights a few examples of natural resource management questions and indicator topics from the summary below.

### Water Resources

#### Impacts/Concerns:

- Rising stream temperatures threatening salmon
- Development impacts to stream structure and flow, combined with more flashy conditions and potential for flooding resulting from climate change and wildfire
- Wetlands—reduced function and condition over time resulting from climate change (drier/hotter conditions that impact surface water and groundwater) and landowner actions/development
- Groundwater pumping and changing water levels
- Agricultural practices and runoff impacts to water quality
- New agriculture development impacts to water quantity
- Logging practices and deforestation impacts to water quality
- Recreation use impacts to stream habitat: increased erosion, loss of riparian vegetation (e.g., Oneonta Gorge: high use near important water feature)
- Wildfire impacts to water resources: increased runoff, sedimentation, destabilization of slopes, impacts to aquatic species

## Management Questions:

### Conditions/Trends and Management Plan Effectiveness

- How will we know in 5-10 years if 200' stream buffers are helping protect quality cold water refuge habitat for fish?
- What is the nature and extent of changes to wetlands in the NSA?
- How will we know that the quality of wetlands is improved?

### Landowner Outreach/Awareness

- Are landowners engaging in practices that degrade water resources? If so, what are the contributing factors, e.g., need for information, enforcement, etc.?

## Wildlife Habitat

### Impacts/Concerns:

- Quality of habitat, e.g., conversion of oak to vineyard and residential development
- Habitat fragmentation, resulting from fencing and other structures/uses
- For both quality and fragmentation: winter range for big game (critical for wildlife connectivity and First Foods)
- Vulnerable habitat types:
  - Riparian, e.g., salmon habitat (threats to water apply here)
  - Oak/winter range
    - Gray squirrel habitat impacted by development, e.g., tree removal
    - Presence and extent of oak habitat in the NSA; currently we do not have a comprehensive oak map layer. Work with East Cascades Oak Partnership on this.
  - Talus slopes, pika, and microhabitat
  - Possibly old growth forest
  - Western pond turtle habitat (wetlands); need to acquire more information from WDFW on the threat; data may be confidential
- Recreation impacts to wildlife: (Historic Highway example) If mass transit is available at a Recreation Intensity Class I site, how does the potential for higher visitor numbers affect the characterization as a low-impact use and what are the impacts to wildlife?

## Management Questions:

### Conditions/Trends

- Which Priority Habitats are at the greatest risk of conversion to development?

### Conditions/Trends and Management Plan Effectiveness

- What is the rate of change and the nature of development in or near Priority Habitats?

- How is land use change affecting Priority Habitats (condition, connectivity, and focal species populations)?

## Rare Plants

### Impacts/Concerns:

- Need for better information on location, or likelihood, of rare plants on private lands to help determine when surveys should be required, and measures required to protect and enhance rare plants.
- With more localized rare plant location data, staff would be better prepared to help landowners address specific concerns on their property by connecting them with resources and partner organizations focused on enhancement activities, such as native planting and invasive species removal.

### Management Questions:

#### Conditions/Trends and Management Plan Effectiveness

- What is the condition of culturally-important plant species?
- Are populations of rare plants shifting or declining over time?
- Is it possible to model where plants are likely to be on private lands based on current state data? Consider a rare plant probability map similar to the cultural probability map planners use?

#### Landowner Outreach/Awareness

- How can we incentivize protection of rare plants on private lands?

Landowner/Outreach Questions across Natural Resource Topics: Are private landowners aware of water resources, wildlife habitat, and rare plants on their property? If not, why? What can staff and the Commission do to better inform landowners of these resources? How can we leverage our partnerships to improve awareness and information sharing?

### Cold Water Refuge Habitat Example with Target/Outcome and Possible Actions

Management Plan Goal	Key Management Question	Vital Sign Topic	Relevant Measures	Target/Outcome	Possible Actions
Protect water quality, natural drainage, and fish and wildlife habitat of streams, ponds, lakes, and riparian areas.	How will we know in 5 to 10 years if 200' stream buffers are helping protect quality cold water refuge habitat for fish?	Aquatic Habitat Quality: Cold Water Refuge Habitat	Stream temperature	Rivers and streams in the NSA that are cold enough to support salmon	How would possible actions differ if temperatures are in healthy vs. unhealthy range on the monitored CWR streams?

## Wildlife Habitat and Rare Plants: Management Questions and Possible Vital Sign Topics

Management Plan Goal	Key Management Question	Vital Sign Topic	Relevant Measures
Ensure that new uses do not adversely affect Priority Habitats or sensitive wildlife sites.	How is the condition of Oregon White Oak habitat changing over time? (Example of one Priority Habitat type; others include wetlands, talus slopes, etc.)	Priority Habitat Quality	Percent of priority habitat types rated as properly functioning or in good condition
	How is land use change affecting Priority Habitats (condition, connectivity, and/or focal species populations)?	Land Cover/Land Use Change: Priority Habitats	Acreage of priority habitat types; acreage of development in or near priority habitat types; habitat connectivity; focal species population number or distribution/range
Encourage the protection of plant species that are classified as "List 3 (Review)" or "List 4 (Watch)" by the Oregon Biodiversity Information Center or "Monitor" by the Washington Natural Heritage Program.	How are populations of rare plants shifting or declining over time?	Rare Plants	Species population number; Species distribution/range

### 3. Scenic Resources

Informational interviews for scenic resources focused on comparing the 2009 Vital Sign Indicators with Management Plan revisions that reflect the latest scenery management science used by the Forest Service and public and private entities around the world. Below are the main considerations and suggestions for refining scenic indicators.

#### Focus on key viewing areas and landscape settings for scenic Vital Sign Indicators

The Management Plan includes goals for four main scenic resource topics: Key Viewing Areas (KVAs), Landscape Settings, Scenic Travel Corridors, and Signs. Recommendations focused on Key Viewing Areas and Landscape Settings goals as the priority for indicator development—see the chart below for details. One indicator for Scenic Travel Corridors and Signs could be optional

depending on if there is a strong need to have one indicator for each of the four topics and capacity to implement these.

### **Align scenic Vital Sign Indicators with revised landscape setting character descriptions**

Several “Development Impacts” Vital Sign Indicators were included in the 2009 effort, designed to assess how the built environment contrasts with the surrounding landscape. Now that the Landscape Setting Character descriptions in the revised Management Plan include more detail on landscape features and account for natural and historic range of variability and disturbance regimes, these descriptions can help us determine the intactness of the landscape setting character by tracking change in the distinctive characteristics of each landscape setting over time. That is, rather than focusing on counting the number of buildings from select vantage points, the impact of these buildings will be captured by assessing a shift in the characteristics of different landscape settings from monitoring locations. The USFS is working on an “Existing Condition Map” that can be used for a Landscape Setting Vital Sign Indicator. This map can also help staff determine where enhancement is needed and inform design features and mitigation included in the development review process.

### **Visibility and Night Sky Quality**

The 2009 VSI report included visibility and night light as Vital Sign Indicators to develop in 2011. More discussion is needed on how these fit within the scenic monitoring priorities described above and effective use of staff resources.

The Regional Haze Program already provides air visibility data that we could use for a Visibility Vital Sign or, alternatively, reference on our VSI website/story map without establishing a separate vital sign. This is one example where a monitoring partner and data are already in place. Data collected under the Regional Haze Program also fulfills the Management Plan requirement for the Forest Service and air agencies to report annually on progress made implementing the Columbia River Gorge Air Strategy (Part 1, Chapter 3: Natural Resources, SMA Provisions, Wildlife and Plants, Policy 15).

A Night Sky Quality Vital Sign could be tiered to a Scenic Quality Vital Sign by aligning select night sky monitoring locations with existing key viewing areas. The Management Plan includes guidelines requiring that exterior lighting be “sited, limited in intensity, shielded, or hooded in a manner that prevents lights from being highly visible from key viewing areas and from noticeably contrasting with the surrounding landscape setting, except for road lighting necessary for safety purposes” (Part 1, Chapter 1: Key Viewing Areas, GMA Guideline 16 and Development and Uses Visible from KVAs, SMA Guideline 13; Part 2, Chapter 7, Resource and Treaty Rights Protection Guideline

1.A(4)). Though not required, staff may also suggest lighting fixtures approved by the International Dark-Sky Association (IDA) to landowners as part of development review decisions.

The Oregon chapter of the IDA has proposed establishing monitoring locations in the National Scenic Area as part of the Oregon Skyglow Measurement Network. This methodology involves self-contained photometers measuring and recording overhead night sky brightness at 5-minute intervals from dusk through dawn each night. Equipment cost and data acquisition would be covered by IDA. This example is offered here to consider the role of citizen science in support of the VSI program, whether by incorporation as a specific indicator or as a related monitoring effort highlighted in reporting and communication efforts.

Scenic monitoring work currently underway:

- USFS is updating a Seen Area Map (visibility from KVAs) with new language from the revised Management Plan. This can be used for a Scenic Quality Vital Sign. This map is expected to be completed in 2021.
- The Existing Scenic Condition Map mentioned above is also expected to be finished in 2021. This can be used for both Vital Sign topics described below.

### Scenic Resources Management Questions and Possible Vital Sign Topics

Management Plan Goal	Key Management Question	Vital Sign Topic	Relevant Measures
Emphasize protection and enhancement of National Scenic Area landscapes visible from key viewing areas.	How are landscapes seen from Key Viewing Areas changing over time? Are we achieving the Scenic Standards for landscapes seen from Key Viewing Areas?	Scenic Quality at Key Viewing Areas	Intactness of Landscape Setting defining characteristics as seen from Key Viewing Areas (could use Seen Area Map, Existing Scenic Condition Map, and field visits)
Maintain the diversity of Gorge landscapes to protect and enhance the Gorge's scenic beauty.	Are we maintaining the intactness of distinctive landscape setting characteristics protected in the Management Plan?	Landscape Setting Character; Intactness of Landscape Setting	Intactness rating (e.g., unacceptably low to very high) of an area based on Existing Scenic Condition Map

#### 4. Economic Vitality

As is true for other resource areas, past Vital Sign program objectives, and supporting indicators, have aligned at the Management Plan goal level in some cases, and at the policy level in others. For

example, one of the three 2009 VSI objectives for economic resources, “Protect and Enhance Agriculture and Forestry,” aligns most closely with objective #4 in the revised Management Plan, while the other two 2009 VSI objectives generally connect to the two economic goals as described in the revised Management Plan:

1. Protect and support the economy of the Columbia River Gorge area by encouraging growth to occur in existing urban areas.
2. Protect and support the economy of the Columbia River Gorge area by allowing future economic development in a manner that is consistent with the protection and enhancement of the scenic, cultural, recreation, and natural resources of the Columbia River Gorge.

Suggestions from informational interviews centered around identifying clear management questions and prioritizing economic Vital Signs that specifically relate to implementation of the Management Plan and fill information gaps not already addressed in other regional reports. Referencing and summarizing existing economic data may be an appropriate way to help tell the story of economic vitality without creating specific indicators that duplicate local partners’ reporting (e.g., income, job growth, construction, and housing affordability). Instead, the Vital Sign Indicators program could incorporate this available information by reference in reporting, while focusing economic indicators on Land Use/Land Cover Change to look at changes in the land base used for agriculture and forestry which is directly related to the Management Plan.

Other specific suggestions regarding economic vitality indicators include:

- Look at equity across the NSA regional population using American Community Survey data (available every 3-years between 10-year U.S. Census surveys) to examine income trends by race, ethnicity, and other demographic factors. Consider Census Bureau measures of income inequality (i.e., Gini coefficient) to look at the share and types of low-wage jobs across different sectors.
- Employment data for each sector is available through MCEDD. Consider Mid-Columbia Agricultural Research and Extension Center (OSU and WSU Extension Offices) as possible sources of other agriculture and forestry economic data. Important to identify base years and comparable areas in WA and OR.

### Economic Vitality Management Questions and Possible Vital Sign Topics

Management Plan Goal	Key Management Question	Vital Sign Topic	Relevant Measures
Protect and support the economy of the Columbia River Gorge area by encouraging growth to occur in existing urban areas.	How are grants and loans from OIB and WIB meeting economic development goals in urban areas?	Economic Vitality of Urban Areas	Track OIB and WIB grants and loans certified by the Commission for urban area businesses
Protect and support the economy of the Columbia River Gorge area by allowing future economic	Are policies that support agriculture and forest uses in the Plan, such as allowing commercial events at vineyards,	Land Base: Agriculture and Forestry Uses	Acres in agriculture and forestry uses and income generated

development in a manner that is consistent with the protection and enhancement of the scenic, cultural, recreation, and natural resources of the Columbia River Gorge.	contributing to the Columbia River Gorge area economy?		(e.g., vineyards with commercial events)
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## 5. Cultural Resources

VSI informational interviews, along with Gorge 2020 Management Plan discussions, reveal several important considerations for cultural resource indicator development:

### Confidential nature of cultural resources:

- The Management Plan and the NSA Act require that information on the nature and location of archeological resources and cultural resources associated with Native Americans be maintained as confidential. Past VSI reporting on the condition of monitored archeological and historic resources, for example, was led by USFS NSA Heritage Program staff who maintain a confidential inventory of cultural resources. A condition-based monitoring approach may be used to highlight the overall status of protected resources without disclosing location or other confidential information.
- Traditional Cultural Properties (TCPs):
  - Some Tribes use this term, while others do not, instead referring to these as “historic properties of religious and cultural significance to the Tribes.” Others consider the entire NSA a TCP. Given the sensitive nature of these properties and, in some cases, the lack of clear physical boundaries required for official designation, there are few TCPs included on the National Register.
  - Specific wildlife and plant species are also considered important TCPs and can be addressed through natural resource monitoring.
- The 2009 VSI effort identified condition, inventory, and awareness indicators for three of the four main cultural resource types in the Management Plan: Archeological Resources, Historic Buildings and Structures, and Traditional Cultural Properties. (The Gorge 2020 revised Management Plan adds Traditional Use Areas as a fourth type.) Input received suggests it may be more appropriate to address protection of TCPs through annual government-to-government meetings, rather than through the VSI program, to honor the sensitive nature of this information and evolving tribal concerns over time.

### Culturally-important foods:

- Essential to the well-being and livelihoods of the four Columbia River treaty tribes and indigenous people throughout the region, culturally-important foods (e.g., salmon, lamprey, camas, huckleberry, and others) are resources that intersect with the health of scenic,

natural, climate, and recreation resources, as well as the economic vitality of gorge communities. Exploring how culturally-important foods may inform indicator development was one consideration shared in interviews.

#### **Importance of baseline context:**

- Monitoring can track both natural and human disturbance that is occurring and compare this with an established baseline condition. Those interviewed emphasized the importance of not only describing the baseline used, but also providing context on past management or use of the site prior to the baseline year. This context also informs management questions driving indicator development: Is the primary information need to better understand human impacts to the site, natural deterioration over time, or both?

#### **Condition-based monitoring approach:**

- Replace the proxy measure used in 2009 for the condition of archaeological resources Vital Sign (“percent of assessments of effect per year resulting in an adverse effect finding”) with an updated condition-based metric. In 2009, this proxy was used because staff and project advisors could not reach consensus on a definition of “good condition” for cultural resources in the NSA. The USFS does use a condition-based classification system to describe the percent of a site that is intact. This approach varies based on the resource type. For example, the condition of a built environment, such as a historic structure, is easier to assess than a lithics scatter (remains from making tools) that was barely visible when discovered. Thus, in some cases, a “change/no change,” or “stable/unstable” rating, along with baseline context and past use information, may be more useful than an “excellent to poor” condition rating.
- Aligning cultural resource Vital Sign Indicators with ongoing USFS cultural monitoring efforts, as appropriate, is consistent with the overall recommended approach described in this assessment to identify existing data sources and partners whenever possible.
- Connect the cultural resource monitoring effort to protection and enhancement measures that may be used based on findings. For example, what does “enhancement” look like for cultural resources?

#### **Need for inventory indicators:**

- USFS collects information annually on the number of new significant archeological and historic resources identified and total acreage assessed each year. The number of resources identified for each type were included as two discrete indicators in the 2009 VSI effort. This information could be incorporated as background for ongoing VSI reporting or retained as specific inventory indicators.

## Cultural Resources Management Questions and Possible Vital Sign Topics

Management Plan Goal	Management Question	Vital Sign Topic	Relevant Measures
Protect and enhance cultural resources.	How is the condition and distribution of culturally-important foods changing over time?	Culturally-Important Foods (could select one that connects with natural resource and climate change indicator)	Species population number; Species distribution/range
	How is development in the NSA affecting the condition of archeological resources and historic buildings and structures over time?	Archeological Resources Condition; Historic Resources Condition	Percent of all monitored archeological resources in good condition; Percent of all monitored historic resources in good condition.

### 6. Recreation Resources

Below are key recreation issues and suggestions from interviews with staff and partners spanning the 2009 VSI effort and Gorge 2020 Management Plan revision. Overall, those interviewed recommended engaging the NSA Interagency Recreation Team on indicator review.

#### Recreation use and demand

Interviews revealed that three main factors play a role in understanding recreation use and demand: (1) visitor satisfaction and quality of visitor experience; (2) agency capacity to manage use, and (3) on-site impacts to resources.

In the revised Management Plan, four Recreation Intensity Classes (RICs), ranging from very-low-intensity to high-intensity, are applied to all lands within the National Scenic Area. They are an overlay to the underlying land use designations and describe the potential suitability of lands for recreation use, and the facilities and experience that users can expect during their visit. A description of the desired social, physical, and managerial setting for recreation development is included for each RIC. Those interviewed expressed an interest in exploring how a recreation use indicator could help us understand if the observed use levels at recreation sites in the NSA are consistent with designated Recreation Intensity Class standards for these sites (e.g., 50 vehicles observed overflowing from a 10-vehicle parking lot). A recreation use indicator aligned with RICs could also connect with a visitor experience indicator to address the question: Are visitors' perceived crowdedness and encounters with others reported at different recreation sites consistent with the RIC social setting descriptions for these sites? It is important to note that perceived crowdedness varies based on individuals' recreation expectations, diverse identities, and lived experiences.

Like other indicator topics, aligning different reporting frequencies is an important consideration for recreation monitoring. Collected every 5-years for USFS recreation sites in the NSA, National Visitor Use Monitoring (NVUM) visitor count data and survey results could be used for a Recreation Use Vital Sign, along with annual state park visitation data and an NSA-wide survey distributed to recreation site managers and/or visitors, depending on what measures are identified as most useful.

### **Visitor experience**

Several of the 2009 recreation indicators focus on aspects of visitor experience (i.e., visitor satisfaction ratings on access to recreation activities and overall recreational qualities of the NSA). Currently, NVUM surveys include questions about visitor satisfaction, and this data could be considered for a visitor experience indicator. More discussion is needed on which measures are most appropriate based on Management Plan goals and objectives, in particular those focused on assessing “equitable and accessible” resource-based recreation opportunities and alignment with desired social settings for Recreation Intensity Classes described above.

### **Environmental impacts of recreation use**

Several individuals interviewed described the challenge of evaluating environmental impacts of recreation through a high-level Vital Sign Indicator. They suggest that these impacts (e.g., loss of vegetation, soil compaction, and erosion) are often associated with unmanaged use, rather than recreation at developed sites that is managed by “hardening” areas with medium to high intensity use, or undeveloped sites where recreation is allowed when managed at a low intensity. The 2009 VSI report looked at the percent of recreation sites that were environmentally degraded through an online survey administered to managers of approximately 180 recreation sites in and near the NSA. At that time, the Commission had not yet reached consensus on a figure that represented significant degradation, and 10% was used for the 2009 analysis.

Those interviewed mentioned that any future survey of site managers would need to look at unmanaged use to capture the scale of environmental impacts of recreation. Drawing meaningful conclusions about overall impact, however, from estimates or anecdotal information, is often not possible. This poses a central question: Is assessment of environmental impact inherently a site-level management question that is more appropriately assessed at the recreation site level, rather than through a high-level measure? According to interviews, recreation site managers typically can identify where the unmanaged use problem areas are, but often lack information on the scale of the use, such as the number of unofficial trails or impacted acres. In some cases, inventories are conducted through partner organization volunteers to track these unmanaged uses.

## Recreation Resources Management Questions and Possible Vital Sign Topics

Management Plan Goal	Key Management Question	Vital Sign Topic	Relevant Measures
Resource-Based Recreation GMA Objective: Collaborate with partner agencies and stakeholders to develop management strategies and actions to protect and enhance recreation opportunities, experiences, and natural, scenic, and cultural resources from overuse at popular recreation sites and trails.	How often is visitor use at NSA recreation sites at or above capacity? Given that seasonality is a primary driver for demand and capacity, how is use changing across “high” and “low” season days? How do changing use patterns relate to changes in average temperatures and seasonal conditions associated with climate change?	Recreation Use/Demand	Percent of recreation sites at or above capacity (at specified seasons)
Recreation Intensity Classes GMA Goal: Identify suitable levels of resource-based, public-use facilities to meet the Management Plan recreation goals and objectives while protecting scenic, natural, and cultural resources.	Are the observed use levels at recreation sites in the NSA consistent with designated Recreation Intensity Class standards?	Recreation Use/Demand	Number of visitors at a site, number of vehicles
Resource-Based Recreation GMA Goal: Provide a diversity of resource-based recreation opportunities that are accessible to all segments of the public that emphasize the quality of the recreation experience meeting present and future needs by protecting and enhance the natural, scenic, and cultural resources and support economies of local communities.  GMA Objective: Provide equitable and accessible (regardless of income level, ethnicity, gender, ability, or age) resource-based recreation opportunities.	Are resource-based recreation activities in the NSA providing quality recreation experiences for diverse users?	Visitor Experience	Visitor satisfaction (e.g., access to recreation activities, information access, site quality, crowding/visibility of others, etc.)
Overall GMA Goal: Protect scenic, natural, cultural, and recreation resources when providing new recreation opportunities.	How are recreation activities impacting natural, scenic, and cultural resources in the NSA?	Environmentally Sustainable Recreation	Measure of resource impact (e.g., erosion, loss of vegetation, etc.) at developed sites, from unmanaged recreation use, both?

### III. Summary of Topics for Commission Discussion

- Discuss and provide feedback on **indicator evaluation criteria**.
  - How could we incorporate consideration of climate change and equity across resource areas as we develop and select indicators?
  - Are there other factors to consider when selecting indicators?
- Discuss and provide feedback on **management questions and Vital Sign topics for climate change and natural resources** as the first two resource areas we are focusing on for indicator development.
  - Based on what the Commission has learned throughout the Gorge 2020 Management Plan revision process and your review of this assessment, what are a few of the most critical climate change and natural resource management questions that connect with Management Plan provisions?
  - Which indicator topics most effectively address these questions?

Staff will continue working on developing scenic, cultural, recreation, and economic indicators in 2021 as time allows, and recommends focusing on climate change and natural resources first to thoroughly review and use the indicator development methodology as a template to then explore options for the other indicators. The recommended work plan approach is described on the following page.

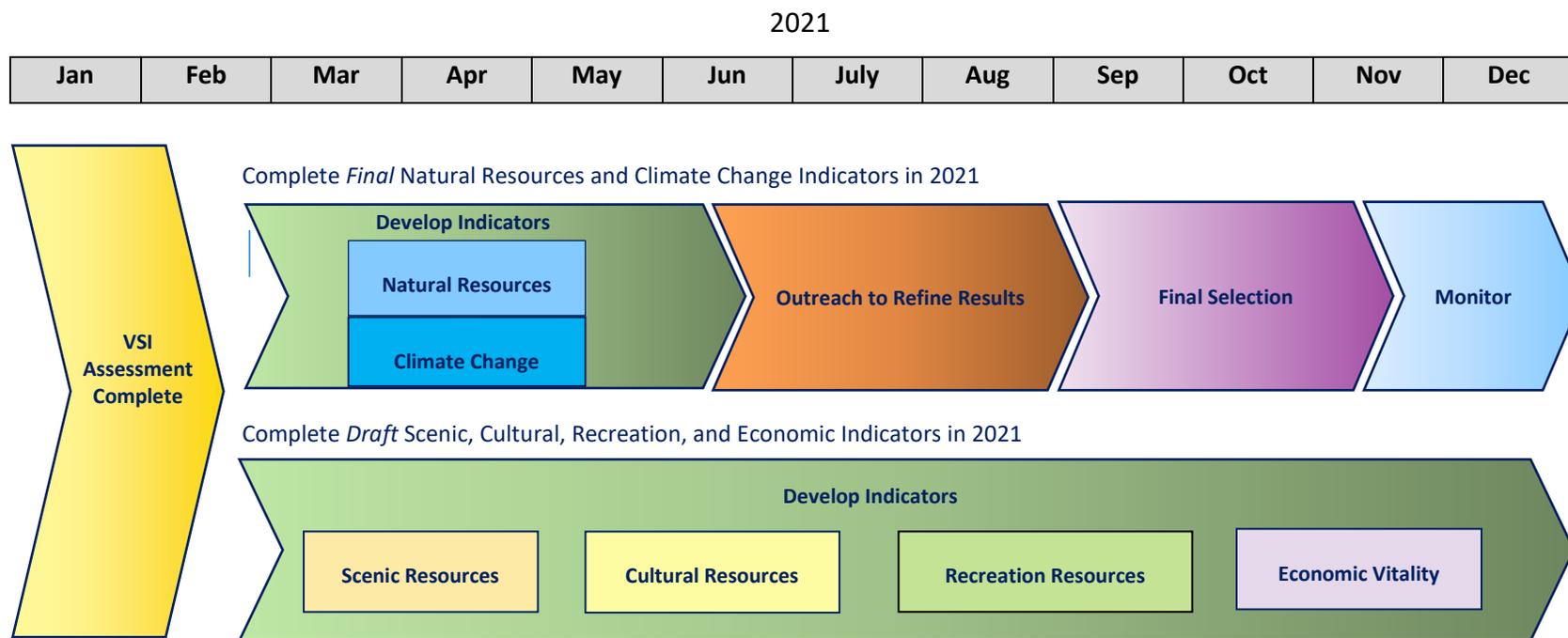
## IV. 2021-2022 VSI Work Plan

### A. VSI Timeline

The timeline below shows a two-part approach to VSI work planning in 2021:

(1) Complete development, outreach, and *final* selection of natural resources and climate change indicators by the end of 2021.

(2) Complete a *draft* list of scenic, cultural, recreation, and economic indicators by the end of 2021. Staff anticipate completing final selection of these indicators in early 2022.



## B. VSI Road Map: Activities and Milestones

	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	2022
<b>Commission Action</b>		Commission work session: Discuss Assessment and CC and NR indicator topics			Commission work session: Review Draft CC and NR Indicators			Commission work session: Review Preliminary Scenic, Cultural, Recreation, and Economic Indicators (Forest Service dependent)			Commission work session: Approve CC and NR Indicators	Commission work session: Approve Draft List of Scenic, Cultural, Recreation and Economic Indicators	
<b>Staff Action</b>	Complete VSI Assessment and Work Plan	Develop Indicators and Metrics for CC and NR Development of Scenic, Cultural, Recreation, and Economic indicators is ongoing			Complete Draft CC and NR Indicators	Summary of CC and NR Indicators released for public review	Outreach to refine CC and NR indicators: Coordinate public workshop Complete preliminary list of Scenic, Cultural, Recreation, and Economic Indicators		Incorporate feedback to finalize CC and NR indicators Refine Scenic, Cultural, Recreation, and Economic metrics	Select Final CC and NR Indicators Finalize Draft SCORE Indicators		Begin monitoring for CC and NR indicators Select Draft Scenic, Cultural, Recreation, and Economic Indicators (finalize in early 2022)	

This schedule is approximate and may change based on evolving Commission work priorities. Expected Commission work sessions are in blue. The main VSI milestones are highlighted.

## Appendix: 2009 Natural Resource Vital Signs and Draft 2021 VSI Framework

This chart lists the original objectives, Vital Sign titles, and measures included in the 2009 Vital Sign Indicators: State of the Gorge Report. An *initial* review of how these natural resource indicators connect with Management Plan provisions and an updated 2021 VSI framework is included as background for discussion and is not final.

2009 Vital Sign Indicators									2021 Draft VSI Framework (in progress)			
Resource	Objective	Vital Sign Number	Vital Sign Title	Measure	Proxy Measure	Year	Connects to Management Plan Provision?	Management Plan Reference & Notes	Vital Sign Topic			
Natural	2.1 Protect and Enhance the Native Plants and Animals and the Habitats Which Support Them	2.1.a	Habitat Quality	Percent of priority habitat types rated as properly functioning	Number of important landscape elements in the Scenic Area that are functioning at high levels	2009	YES on Vital Sign; Review of measures needed	Part 1: Chapter 3, GMA Goal 1: "Ensure that new uses do not adversely affect Priority Habitats or sensitive wildlife sites."	→	Terrestrial Priority Habitats; Land Cover/Land Use Change		
		2.1.b	Habitat Fragmentation	Percent of priority habitat types that are lost or fragmented by human activity		2011	YES on Vital Sign because habitat fragmentation connects with habitat quality; Review of measures needed	See Habitat Quality reference. Wildlife consult for development reviews includes assessment of habitat integrity. Connectivity is part of integrity.				
		2.1.c	Species Health	Percent of at-risk species whose populations in the gorge are healthy	Note: In 2009, only reported on plants; no assessments of animal species available.	2009	YES on Vital Sign because species health connects with habitat quality; Review of measures needed	See Habitat Quality reference for wildlife and Part 1: Chapter 3, GMA and SMA Goals for Rare Plants. (Note: This measure could apply to plants or wildlife.)			→	Rare Plants
		2.1.d	Species Range	Percent of native species (wildlife, plants, invertebrates) with ranges that are declining		2011	YES on Vital Sign because species range connects with habitat quality; Review of measures needed	See Habitat Quality reference for wildlife and Part 1: Chapter 3, GMA and SMA Goals for Rare Plants. (Note: This measure could apply to plants or wildlife.)				
	2.2 Protect and Enhance Quality of the Water and Aquatic Habitats	2.2.a	Surface Water Quality	Percent of streams, including Columbia River, whose water quality is (a) poor, (b) fair, (c) good, and (d) excellent.	Number of watersheds, including the Columbia River, where water quality is (a) impaired and (b) good.	2009	YES on Vital Sign; Review of measures needed	Part 1: Chapter 3, GMA Goal 3: "Protect water quality, natural drainage, and fish and wildlife habitat of streams, ponds, lakes, and riparian areas."	→	Aquatic Priority Habitats: Water Quality and Cold Water Refuge Habitat		
		2.2.b	Habitat Quality	Percent of native fish habitat that is properly functioning		2009	YES on Vital Sign; Review of measures needed	Part 1: Chapter 3, GMA Goal 3: "Protect water quality, natural drainage, and fish and wildlife habitat of streams, ponds, lakes, and riparian areas."				
		2.2.c	Surface Water Quantity	Percent of streams with satisfactory in-stream flows		2011	UNCLEAR	While the Commission does not manage for water quantity, this can relate to water resource protection.				
		2.2.d	Groundwater Quantity	Square miles of groundwater restricted areas		2011	NO	It is not the Commission's role to regulate groundwater. Is there information we want to collect that could inform management of other water resources?				
		2.2.e	Groundwater Quality	To be developed		2011	NO					
	2.3 Protect and Enhance Quality of the Air	2.3.a	Air Quality	To be developed			Summary in 2009	YES on Vital Sign; Review of measures needed	Part I: Chapter 3, Wildlife and Plants, SMA Policy 15: "Air quality shall be protected and enhanced, consistent with the purposes of the National Scenic Area Act." Includes requirement for states of OR and WA and the Forest Service to "continue to monitor air pollution and visibility levels in the Gorge" and "provide annual reports to the Gorge Commission on progress made regarding implementation of this policy [regional air quality strategy]."	→	Air Quality	