Proposal for Phase 1 of the Environmental Dashboard
Central Wasatch Commission

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After reviewing the current status of the Central Wasatch Commission's Environmental Dashboard project, the DIGIT Lab and the Ehleringer Group at the University of Utah propose to support the Dashboard project in two phases. The first phase consisting of finalizing the framework and indicators and identifying data gaps which might impact our capacity to generate the dashboard. Phase 1 is necessary in order to determine the complete scope and level of effort required to complete Phase 2.

Currently, the Dashboard consists of five elements (air, ecosystem, plant & wildlife, soils, and water) with a set of indicators supporting each element. While the list of elements was approved by the steering committee and technical experts, the indicators per element have not been reviewed by them nor are they finalized. It is also not clear that the appropriate data sets have been selected for ecosystem vegetation descriptions of the ecosystem element. Both the finalization of the indicators and approval of the evaluation methodology per indicator are required before the scoping of Phase 2. From our review, the air, soil, and water indicators are in a good state and may only need to be updated based on current data. We expect that during Phase 1 meetings with the steering committee and technical experts, they will agree with this assessment and assist by providing updated data. The plants & wildlife indicators have already been identified as data gaps; additional data collection is necessary in order to include these indicators on the dashboard. Therefore, plants & wildlife indicators should not be included in the current dashboard other than noted that data acquisition is necessary in order to evaluate.

The ecosystem's vegetation condition class and landscape disturbance index indicators' evaluation methodologies raise concerns that need to be discussed with the technical experts. The ecosystem's vegetation condition class and landscape disturbance index indicators use LANDFIRE datasets as the basis of their evaluation. Whether or not LANDFIRE data are the appropriate data sets for this project are in question, because LANDFIRE data were not designed to address regional vegetation or vegetation health with respect to factors critical to assessment of the central Wasatch Mountain ecosystems, such as drought, beetle damage, stand age distribution, and invasive species. From the LANDFIRE website on the scale and use of LANDFIRE products (https://www.landfire.gov/documents/Scale_and_Use_of_LF_Data.pdf), we see that:

"LANDFIRE data products facilitate national- and regional-level strategic planning and reporting of wildland fire management activities. LANDFIRE products are designed to be used at a landscape-scale in support of strategic vegetation, fire, and fuels management planning to evaluate management alternatives across boundaries. Although LANDFIRE products are delivered as 30-meter pixels, using individual or small groups of pixels is not recommended. LANDFIRE products were designed to support national and regional strategic planning and strategic/tactical planning for large sub-regional landscapes and Fire Management Units (FMUs) such as

significant portions of states or multiple federal administrative entities. The applicability of LANDFIRE products to support fire and land management planning on smaller areas will vary by product, location, and specific use. Further investigation by local and regional experts should be conducted to inform decisions regarding local applicability. However, it is the responsibility of the local user, using LANDFIRE metadata and local knowledge, to determine if and/or how LANDFIRE can be used for particular areas of interest.

Managers and planners must evaluate LANDFIRE data according to the scale and requirements specific to their needs (for example, habitat requirements for the species being considered or requirements by community leaders and interagency partners). LANDFIRE products are not intended to replace local products, but rather serve as reference data by providing wall-to-wall cross-boundary products. It is the responsibility of the user to be familiar with the value, assumptions, and limitations of LANDFIRE products."

The project team proposes to lead the finalization of the framework and indicators through a series of charrettes with the technical experts. The outcomes of these charrettes will be summarized, evaluated, and a final indicators recommendation list presented to the steering committee for approval. The following tasks are included in Phase 1:

Phase 1

1.0 Framework and indicator finalization
1. Framework technical charrette - review all environmental indicators with technical experts through drop-in sessions (*Ehleringer Group & DIGIT*)
    a. Five different sessions (air, ecosystem, plant & wildlife, soils, and water)
        i. Preparation required prior to each session
        ii. In-person group sessions (2 hours each)
            1. Data discussion is part of each of the individual sessions
        iii. Summarization following each session
2. Framework and indicator finalization – final determinations (*Ehleringer Group*)
    a. Review feedback and make final determinations
    b. Produce final list of indicators and associated details in a final indicator workbook
    c. Host and lead 10th steering committee meeting (*DIGIT & Ehleringer Group*)
        i. Final indicator evaluation
2.0 CWC coordination
1. Prepare five monthly reports to CWC staff (August 1, September 1, October 1, November 1, December 1 (*DIGIT & Ehleringer Group*)
2. Monthly 1-hour meetings with CWC staff (August, September, October, November, December) (*DIGIT & Ehleringer Group*)

On the completion of Phase 1, the project team will finalize the list of tasks needed to bring the Environmental Dashboard to fruition and will submit a second Phase 2 proposal which will generally consist of the tasks described below:

Phase 2 (to be revised at the completion of Phase 1)

1.0 Rework/update indicators
Note: Necessary if any changes were made to the accepted set of indicators and methodologies as determined in Phase 1

1. Update indicator methodologies based on Phase 1 feedback
   a. Outline indicator methodologies per indicator based on Phase 1 feedback *(Ehleringer Group)*
   b. Process/update indicators based on new data and methodologies *(DIGIT)*

2.0 Online dashboard storyboarding and setup
   1. Storyboarding session
      a. Story boarding session lead by ESRI (*DIGIT & Ehleringer Group*)
      b. Define user requirements
      c. Determine overall hierarchy of information and look-feel of dashboard
   2. Dashboard setup and coordination with ESRI (*DIGIT & Ehleringer Group*)
      a. Provide list of final indicators
      b. Build preliminary dashboard and indicator template pages using one of the selected indicators
      c. Replicate and populate preliminary draft indicator template pages per the indicator workbook

3.0 Content development and refinement
   1. Content development and incorporation
      a. Develop language for each of the element page overviews; work with CWC staff (*Ehleringer Group*)
      b. Develop introductory text for the dashboard platform (*Ehleringer Group*)
      c. Review and refine the preliminary indicator pages to refine text, add/enhance graphics, and clarify the story of each indicator (*DIGIT & Ehleringer Group*)
   2. Content revisions and refinement
      a. Review by environmental dashboard stakeholders
      b. Collect, combine, and prioritize revisions to be made as described by stakeholders (*DIGIT & Ehleringer Group*)
      c. Following review, work with CWC to refine and revise content (*DIGIT & Ehleringer Group*)

4.0 Stakeholder engagement and review
   1. Host and lead 11th steering committee meeting (*DIGIT & Ehleringer Group*)
      a. Storyboarding session outcomes
      b. Development game plan
   2. Host and lead 12th steering committee meeting (*DIGIT & Ehleringer Group*)
      a. Opportunity for steering committee members to share their feedback on preliminary dashboard

5.0 Finalization and documentation
   1. Documentation and metadata (*DIGIT*)
      a. Provide all maintenance details in MS Word document
      b. Provide list of indicators screened but not incorporated
      c. Ensure all technical metadata is embedded in GIS data and available to dashboard users

2. Snapshot report (*DIGIT*)
    a. Pull a point-in-time snapshot of each indicator into a summary snapshot report
3. Data hosting and updating (*DIGIT*)
    a. Agree to host and update environmental dashboard data on servers

6.0 CWC coordination
3. Prepare nine monthly reports to CWC staff starting January 1, 2020 (*DIGIT & Ehleringer Group*)
4. Monthly 1-hour meetings with CWC staff starting January 1, 2020 (*DIGIT & Ehleringer Group*)

Schedule for Phase 1 (Assuming a July 1, 2019 start date):

1. Preparation for technical charrettes (full review of indicators, identifying and re-engaging with technical experts) completed by ***August 15, 2019***
2. Scheduling and hosting of technical charrettes completed by ***September 30, 2019***
3. Summarization of technical charrettes and final list of recommended indicators completed by ***October 31, 2019***
4. Host 10th steering committee for final approval completed by ***November 15, 2019***

Deliverables:

The following is a list of the deliverables for Phase 1:
1. Summary report of the technical charrettes
2. Recommendations for filling any gaps in the five elements of the dashboard
3. List of final indicators per element

Costs:

The costs associated with performing these **Phase 1** tasks are outlined in the table below.

Task	Ehleringer Group Hours	Ehleringer Group Cost	DIGIT Lab Hours	DIGIT Lab Cost
1.1 Technical charrettes	168 hours	$14,430	40 hours	$3,800
1.2 Indicator finalization	204 hours	$14,944	16 hours	$1,520
2.0 Coordination	30	$2,486	18 hours	$1,710
Totals	402 hours	$31,860	74 hours	$7,030

Total Direct Cost	**$38,890**
Indirect Cost (10%)	**$3,889**
Overall Total Cost	**$42,779**

An estimate of the costs to perform **Phase 2** are outlined in the table below. Note that these costs are a general estimate only and will be revised after Phase 1 is completed.

Task	Ehleringer Group Hours	Ehleringer Group Cost	DIGIT Lab Hours	DIGIT Lab Cost
1 Review/update indicators**	40 hours	$3,281	400 hours	$27,500
2 Dashboard setup	82 hours	$6,487	120 hours	$9,000
3 Content development	210 hours	$18,455	80 hours	$6,400
4 Meetings	14 hours	$1,164	8 hours	$760
5 Finalization and documentation	0 hours	$0	60 hours	$5,400
6 Coordination	54 hours	$4,475	32 hours	$3,040
Totals	400 hours	$33,862	700 hours	$52,100

Total Direct Cost	**$85,962**
Indirect Cost (10%)	**$8,596**
Overall Total Cost	**$94,558**

** The effort required to update the indicators is completely unknown until the technical experts and the steering committee have agreed upon and finalized the list of dashboard indicators and the methodologies used to evaluate the indicators. These are general estimates only and will be revised after the completion of Phase 1.