Example workshop materials and guidance: Identifying key ecosystem service outcomes and developing socioeconomic metrics using ecosystem service conceptual models

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This document includes materials for workshops to help a U.S. Forest Service planning team identify key ecosystem service management outcomes and develop socioeconomic metrics for those outcomes using ecosystem service conceptual models (ESCMs). These materials were adapted from virtual workshops held in summer 2020 with the Ashley National Forest. These workshops adapted an ESCM previously developed for forest management at a project scale to a planning-scale model for the Ashley National Forest context as part of a pilot to understand how planning-scale models differ from project-scale ones. Future efforts to develop planning-scale models may build off of models like this one - the Ashley National Forest recreation planning model.

The overall goals are accomplished in two workshops: the first focuses on adapting an ESCM to your context and is followed by an online survey to get participants' input on which outcomes should be included in the metrics development process. The second workshop focuses on developing socioeconomic metrics for selected outcomes.

Contents

Workshop 1: ESCMs and key ecosystem service outcomes

Workshop overview

The first workshop is designed to adapt an ecosystem services conceptual model to your context, get planning team members on the same page about how potential plan alternatives will influence ecosystem services, and select ecosystem service outcomes for which metrics will be developed at the next workshop. We find it useful to send the generic model and discussion questions to participants ahead of time. After the workshop, a survey

can be used if needed to get additional participant feedback on key ecosystem service outcomes to include in the metrics discussion. If you prefer to select key ecosystem services during the workshop instead of using a follow-up survey, other options include a dot exercise if the workshop is held in person (giving each participant a certain number of sticker dots that they can use to vote for key outcomes) or an instant online poll using a service such as PollEverywhere (this can be used for both in-person and online workshops).

Example workshop materials are included in the next section:

- Share-ahead materials for workshop participants (introductory note, agenda, background information, discussion questions)
- Slides for workshop discussion
- Survey to identify key outcomes

EXAMPLE SHARE-AHEAD MATERIALS FOR WORKSHOP PARTICIPANTS

EXAMPLE INTRODUCTORY NOTE

Hello,

Thank you for participating in the workshop scheduled for [date]. This will be the first of two virtual workshop sessions designed to identify ecosystem services metrics for key management outcomes from recreational management activities like trail or road construction and maintenance. The metrics are designed to help people understand how the proposed forest plan alternatives will change benefits and contributions to social and economic sustainability, consistent with the 2012 Planning Rule. The first workshop will be focused on identifying the key social, economic, and ecological outcomes affected by recreational management actions that are part of the plan revision, using an ecosystem service conceptual model. This information will set the stage for the second workshop, where we will be developing a set of qualitative and quantitative metrics to report on these key outcomes.

An agenda for the first workshop is below. At the workshop, we will use the diagram on page 3 – an ecosystem service conceptual model for recreation management – as the starting point for discussion. The model summarizes the effects of several recreational management actions, or interventions, on the biophysical, ecological, and socioeconomic systems. The basic assumption behind the model is that if you take one or more of these recreational management actions, the biophysical, ecological, social and economic components in this model are likely to change. These changes can be increases or decreases, and can result in positive or negative outcomes. Additional information about the model is on page 2.

During the workshop, we will update the model to better reflect your specific context, using the questions on page 4 to guide our discussion. The workshop time will be most effective if you are able to review the ecosystem service conceptual model and workshop discussion questions ahead of time. We encourage you to send any questions or feedback to us before the workshop so we can make sure we address these during the meeting.

We look forward to (virtually) meeting you.

Example workshop agenda

2-2:10 pm: Introductions

2:10-2:15 pm: Overview of ecosystem service conceptual models

2:15-2:50 pm: Discuss how to adapt the ecosystem service conceptual model to our context, using the discussion questions on page 4.

2:50-3:00 pm: Introduce survey to identify key outcomes, for use in the second workshop

Example ecosystem service conceptual model background

Key points for understanding the model are included in this document; additional information about the model, including notes about some of the relationships and resources used to build the model, are available here.

The model is made up of a series of boxes connected by arrows (links). An arrow connecting two boxes means that a change in the first box is expected to cause a change in the second box.

Box colors indicate different types of system components:

Box color	**Component type**	**Description**
Dark blue	Management action	On-the-ground management action that affects the other components shown in the model
Gray	Intermediate component	Biophysical or ecological elements that are directly or indirectly affected by the management action
Green	Ecological outcome	Ecological elements that are often management targets
Light blue	Human activity outcome	Human activities (often recreational) that are directly or indirectly affected by the management action
Yellow	Socioeconomic outcome	Social or economic effects experienced by people as a result of the management action
White	Effect or outcome only expected to be relevant in specific ecosystems	Effects or outcomes that are only relevant in certain ecosystem types or regions
Light red	Effect due to prohibited behavior	Biophysical, ecological, or socioeconomic effects that are caused by prohibited or improper recreational use

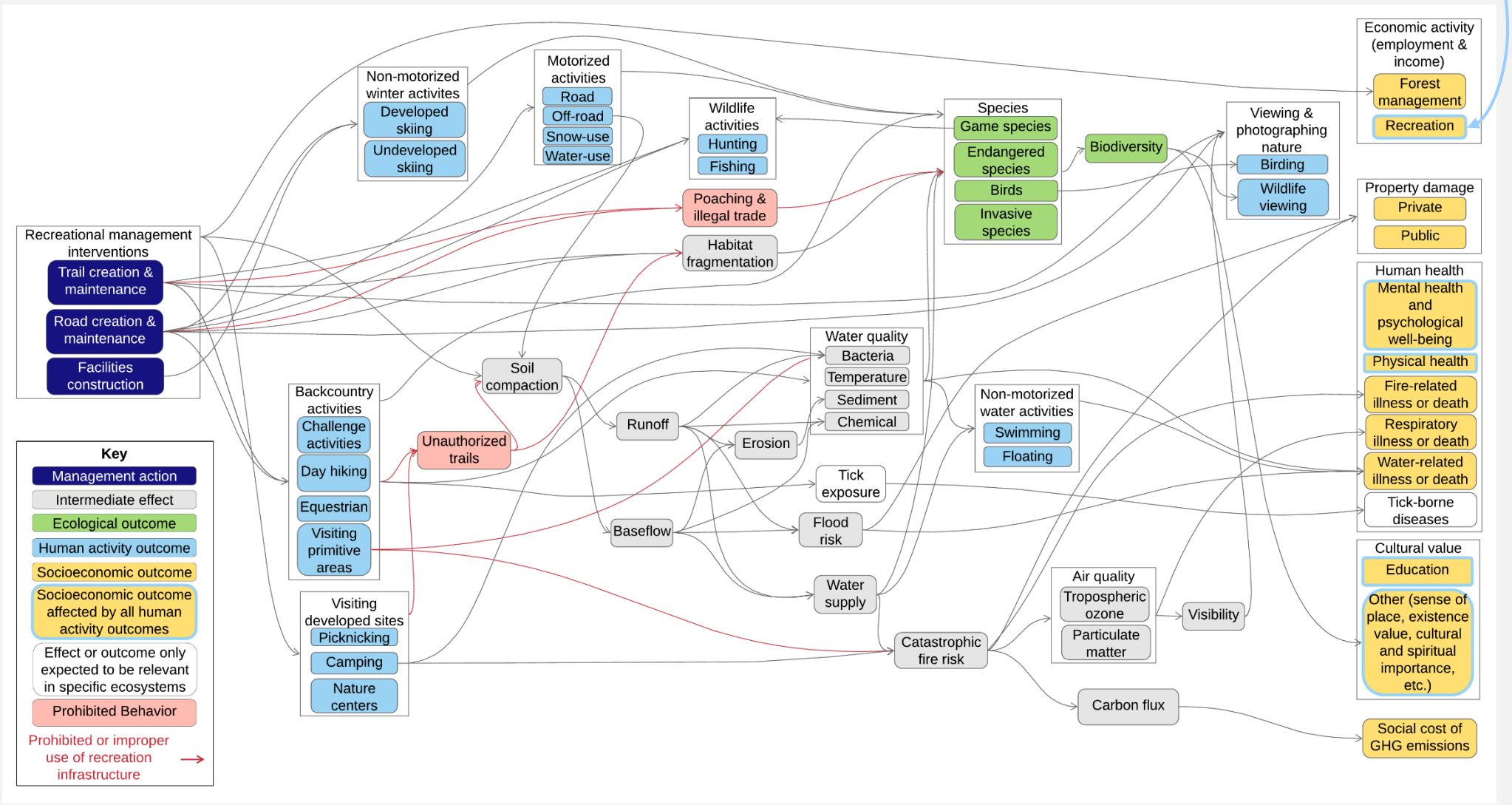
Along with the light red boxes, light red arrows indicate effects caused by prohibited or improper recreational use. For example, the red arrow from the "visiting primitive areas" box to the "catastrophic fire risk" box represents the fire risk from backpackers setting fires in unsafe areas or not completely extinguishing fires.

Some of the socioeconomic outcomes (yellow boxes) have a light blue border. This indicates that the socioeconomic outcome is affected by all of the human activity outcomes (light blue boxes). Normally, there would be arrows from each human activity outcome to each of these blue-bordered socioeconomic outcomes, but that would make the diagram impossible to read.

During the workshop on June 10, we will be updating this model to make it specific to our context. The questions on page 4 will guide our discussion during the workshop. You may find it helpful to think through these questions as you look at the model before the workshop.

EXAMPLE GENERAL ECOSYSTEM SERVICE CONCEPTUAL MODEL FOR RECREATION MANAGEMENT

Socioeconomic outcomes (yellow boxes) with a light blue border are affected by all of the human activity outcomes – there should be arrows connecting all of the light blue boxes to each of these yellow boxes, but that would make the model too difficult to read.



EXAMPLE WORKSHOP DISCUSSION QUESTIONS

These questions will guide our discussion during the workshop. You can add notes to the model diagram through comments in the pdf document or by printing it out and writing on it. We encourage you to send us questions or marked-up model diagrams (an emailed photo is fine) before the workshop.

Do the **management actions** (dark blue boxes) reflect the recreation management actions that are commonly used or under consideration? We can remove irrelevant actions or add new ones.

- Ex: If no new facilities construction is planned or under consideration, we can remove that management action from the model

Would it be helpful to make these management actions more specific?

- Ex: If certain types of new facilities are being considered, for example a picnic shelter, restrooms, or campgrounds, it may be helpful to specify this and consider how the effects of each type of facility will be different.

Are the **human activity outcomes** (light blue boxes) the right ones? We can remove irrelevant outcomes or add new ones.

- Ex: If there is no equestrian access, the "backcountry activities: equestrian" box can be removed
- Ex: If mushroom harvesting is a significant activity, it could be added.

Would it be helpful to make any of the human activity outcomes more specific?

- Ex: Road biking vs mountain biking?
- Ex: Camper, car camping, or back country camping?

Are the **socioeconomic outcomes** (yellow boxes) the right ones? We can remove irrelevant outcomes or add new ones.

- Ex: If it is too difficult to connect human health impacts to management actions, the human health outcomes can be removed.

Would it be helpful to make any of the socioeconomic outcomes more specific?

- Ex: If there are certain areas with private property considered high risk for damage by fires originating on Forest land, the "property damage" outcome can be specified to name those areas (towns, businesses, residential communities, etc.)

What **species** are key management targets? Species may be management targets because they are associated with recreational use (birding, wildlife-watching), harvested (fishing, hunting), or listed (threatened, endangered, etc.)

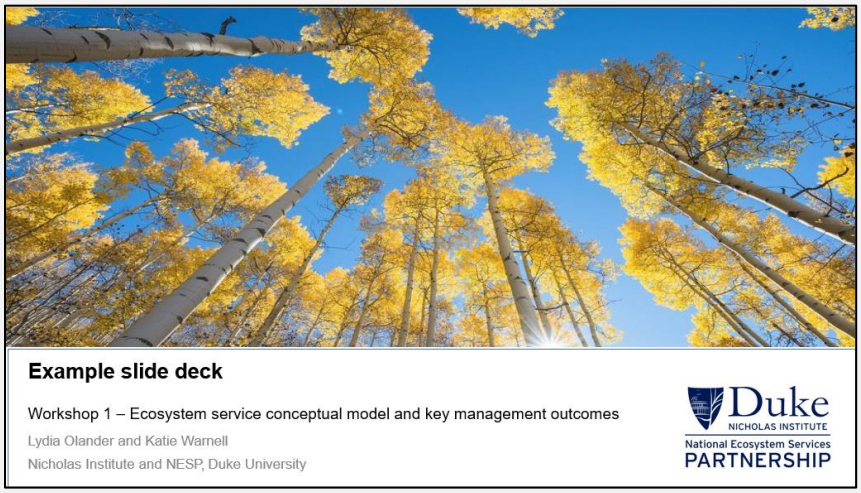
Are there any **significant relationships** influenced by the management actions that are not currently represented by arrows in the model? Are there any relationships (arrows) included in the model that you don't think are likely to occur?

- Ex: If there are no waterborne diseases of concern, the arrow from water quality to water-related illness or death can be removed.

Do you notice **anything else** about the model that doesn't make sense to you, isn't relevant to this context, or is missing?

After spending some time thinking through this ecosystem service logic model, do you think it would be helpful to create a simplified version of the model (for example, one that only shows the most important links and outcomes) to use at the second workshop (focused on developing metrics for key outcomes) or for other communication purposes?

EXAMPLE SLIDES FOR WORKSHOP DISCUSSION



EXAMPLE SURVEY TO IDENTIFY KEY MANAGEMENT OUTCOMES

The purpose of this survey is to identify critical outcomes of plan alternative related to recreation in [context or management unit]. During the second workshop, we will develop a set of metrics to measure these critical outcomes.

As we discussed during the first workshop, outcomes can be socioeconomic, human activity, or ecological. The sections below group outcomes by category. In each section, there is a list of specific outcomes for the category. Each specific outcome represents an expected change due to the recreational plan alternative. For example, the specific outcome "off-road motorized recreational activity" is a change in the level of off-road motorized recreational activity due to the recreational management.

Please put a check mark by all specific outcomes that you think should be considered during the metrics workshop. Each outcome group also has spaces for you to add additional specific outcomes if you think of any that are missing.

It may be helpful to refer to the updated version of ecosystem service conceptual model that we revised during the first workshop to see how certain outcomes are influenced by the management

actions. There is a question at the end of the survey for you provide any additional feedback on the updated model.

Please complete this survey by [date] and reach out with any questions. Thank you for your help!

Changes in cultural value ecosystem service outcomes:

	Check the box if you think this outcome is important to include in the metrics workshop
Traditional uses	◯
Other (community uses)	◯
Tribal resource use	◯
Cultural site condition	◯
Solitude	◯
Crowding	◯
Other (write in)	◯

[Add sections for additional outcomes.]

Do you have any additional feedback on the updated ecosystem service conceptual model? Please add it below.

_____

_____

Workshop 2: Metrics selection

Workshop overview

The second workshop is designed to help participants develop a list of metrics for key socioeconomic outcomes that are feasible to measure and attributable to planning, useful for the Environmental Impact Statement or can be used for implementation. This workshop will go more quickly if you have an initial list of suggested metrics to discuss (see initial metrics list section below), but can also be set up to have participants brainstorm and then discuss possible metrics.

Example workshop materials are included in the section below:

- Share-ahead materials for workshop participants (agenda, metrics criteria, background information on ESCM)
- Metrics template using Ashley National Forest metrics
- Slides for workshop

EXAMPLE SHARE-AHEAD MATERIALS FOR WORKSHOP PARTICIPANTS

EXAMPLE INTRODUCTORY NOTE

Hello,

Thank you for participating in the metrics workshop scheduled for [date]. This will be the second of two virtual workshop sessions designed to identify ecosystem services metrics for critical outcomes of recreation management alternatives being considered in the planning process. The metrics are designed to help people understand how the proposed recreation focused forest plan alternatives will change benefits and contributions to social and economic sustainability, consistent with the 2012 Planning Rule and they may be used in the NEPA Environmental Impact Statement (EIS).

At the first workshop, a small group from the planning team helped us to identify the key ecosystem services and social and economic outcomes affected by Forest Plan alternatives. Together we adapted the diagram on page 5 – an ecosystem service conceptual model for recreation management – to the context of recreation planning and used it as the basis for identifying the social and economic outcomes. Additional information about the model is on page 4.

At the upcoming workshop, we will work with all of you to develop a minimum set of qualitative and quantitative metrics to report on these key outcomes potentially for use in the EIS and for communicating with stakeholders. An agenda for the workshop is below. See page 5 for more details about the process we'll be using at the workshop to develop the metrics list.

We look forward to (virtually) meeting you.

Example workshop agenda

8-8:10 am: Introductions

8:10-8:40 am: Overview of ecosystem service conceptual model for recreation management and introduction to metrics discussions

8:40-10 am: Metrics discussions by outcome category

10-10:30 am: Break

10:30-12 pm: Metrics discussions by outcome category, continued

Example metrics discussion session information

During the workshop, we will develop a set of metrics to report on key ecosystem service (social and economic) outcomes of management alternatives. Key outcomes were identified through an initial meeting to develop the conceptual model on page 5 – the yellow boxes in that model represent socioeconomic outcomes and the light blue, human activity outcomes. We will be focused on metrics for the yellow, socio-economic outcomes, but can include light-blue human activities when needed.

We will discuss possible metrics for one outcome at a time. We will introduce one or more possible metrics for that outcome. For example, one key socioeconomic outcome is the economic activity from recreational use of the forest. A suggested metric for that outcome is the change in the number of visitors to the forest multiplied by the expenditure per trip. You will have the opportunity to suggest additional metrics for each outcome.

We will ask you to consider how suitable the suggested metric is for reporting on the outcome, considering the criteria and discussion questions for metrics on the next page.

For each metrics session, you will have a few minutes to think about the metrics and criteria on your own, then we will have a group discussion to select the best metrics for the outcome.

After the workshop, we will use the information from our discussions to create a minimum set of metrics for the key outcomes of recreational management alternatives in the Ashley National Forest, which we will share with you by email.

Example metric criteria

SMARTS criteria

Specific

- A single variable that accurately describes the outcome that is being measured

Measurable and repeatable

- Metric has the capacity to be counted, is consistent, and transferable
- Are others considering it or actively measuring it in ongoing monitoring programs?

Attainable

- Collecting the data should be straightforward and cost-effective

Relevant

- The metric is tightly connected with the logic model outcomes *and* is needed / wanted by stakeholders

Time bound

- Data can be gathered at the appropriate time or time-frame to reflect what the indicator is attempting to show

Spatial scale

- Is the spatial scale at which the metric is/can be regularly reported the right scale to detect effects of the management alternatives?

Additional questions for discussion:

- **Attribution:** Would you expect to see a change in this metric due to the management alternatives? Is the signal greater than the noise?
- **Scale**: On what spatial and temporal scales would it make sense to measure the metric? Would this work for an individual forest project or would it work better for an aggregate measure of multiple projects (cumulative effects) for the forest or watershed or region?
- **Data sources:** Is there a source for the data needed for this metric, or would new data need to be collected?
- **Feasibility:** Is this a realistic metric, given the available data and additional work that would be required to measure it?

Example ecosystem service conceptual model background

Key points for understanding the model are included in this document. This model was adapted from a general recreation management conceptual model; additional information about the general model, including notes about some of the relationships and resources used to build it, are attached separately.

The model is made up of a series of boxes connected by arrows (links). An arrow connecting two boxes means that a change in the first box is expected to cause a change in the second box.

Box colors indicate different types of system components:

Box color	Component type	Description
Dark blue	Management alternative	Forest plan alternative affecting recreation
Gray	Intermediate component	Biophysical or ecological elements that are directly or indirectly affected by the management alternative
Green	Ecological outcome	Ecological elements that are often management targets (e.g., forest plan objectives)
Light blue	Human activity outcome	Human activities (often recreational) that are directly or indirectly affected by the management alternative
Yellow	Socioeconomic outcome	Social or economic effects experienced by people as a result of the management alternative
White	Effect or outcome only expected to be relevant in specific ecosystems	Effects or outcomes that are only relevant in certain ecosystem types or regions

Dashed arrows and boxes with dashed outlines indicate effects caused by prohibited or improper recreational use. For example, the arrow from the "motorized activities" box to the "unauthorized trails" box represents the unauthorized trails that are created when people take their vehicles or OHVs off of designated roads or trails.

Some of the socioeconomic outcomes (yellow boxes) have a light blue border. This indicates that the socioeconomic outcome is affected by all of the human activity outcomes (light blue boxes). Normally, there would be arrows from each human activity outcome to each of these blue-bordered socioeconomic outcome, but that would make the diagram impossible to read

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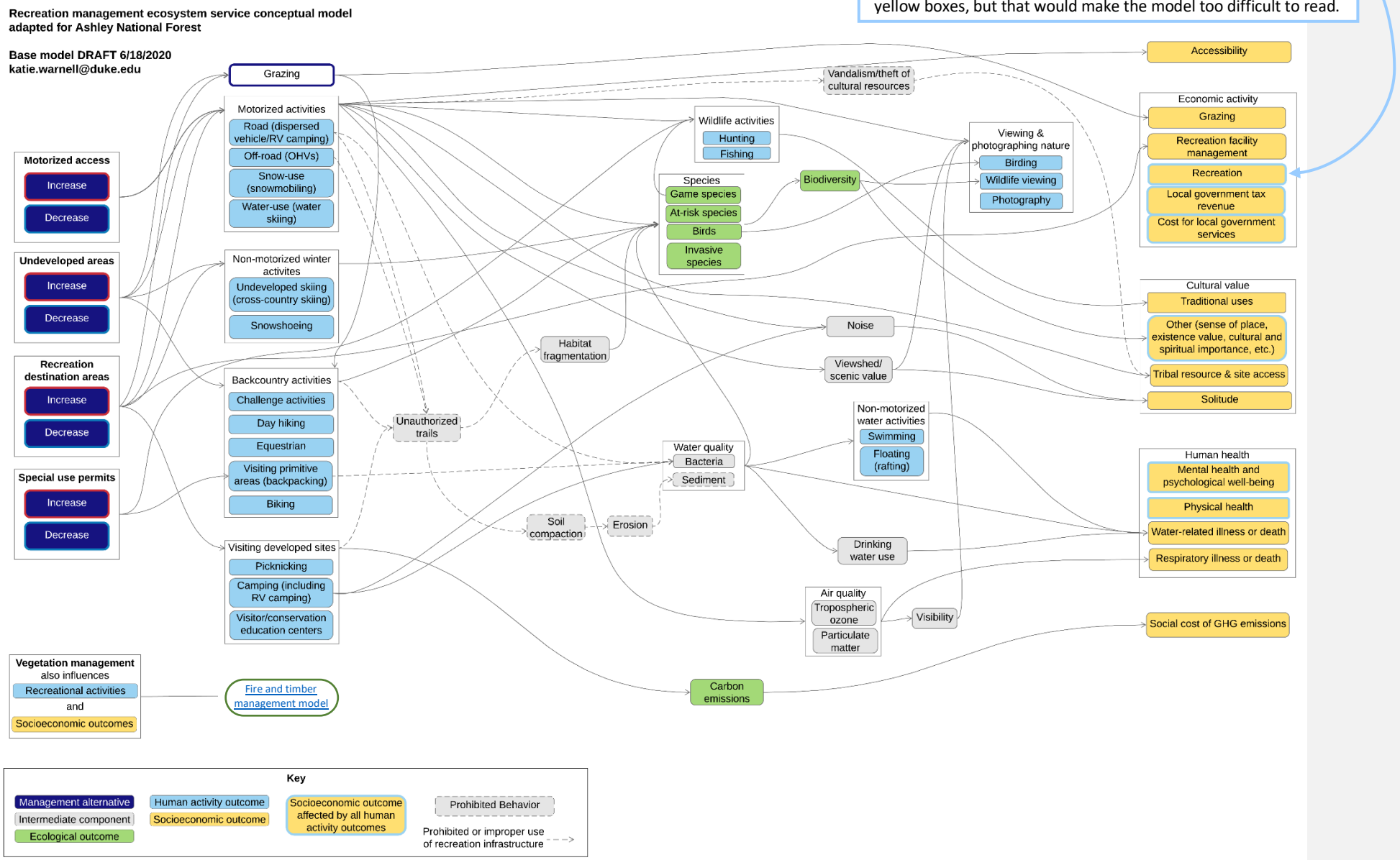

Initial metrics list

Prior to the workshop, a member of the project team should develop an initial list of suggested metrics for each selected ecosystem service outcome. This will reduce the time needed for discussion compared to asking workshop participants to brainstorm possible metrics for discussion. For the Ashley National Forest workshops, we developed the initial metrics list from existing forest plans, environmental impact statements, and monitoring programs. The final metrics list developed for the Ashley National Forest may be a useful resource for developing suggested metrics lists for other contexts and as a template for summarizing metrics information.

The suggested metrics were incorporated into the slides for workshop discussion. We also used a shared online spreadsheet (Google sheets) with the initial metrics list to allow the project team to take notes during the workshop. The spreadsheet contained the following information for each metric:

- Socioeconomic outcome that the metric is measuring
- Description of metric
- Data sources and measurement approach

EXAMPLE METRICS DATABASE

This example database includes information for several metrics from the Ashley National Forest metrics list.

Outcome group	Outcome	Suggested metric	Data source or method/approach	Planning or Implementation level?
Cultural value	Cultural site condition	Potential for conflict/competition between authorized uses and cultural site use. Categorical (increased risk, no change, decreased risk)	Categorical ranking (e.g., explicitly defined scale form 1-5). For example, other authorized uses may have to be modified due to cultural sites.	Planning
Cultural value	Solitude (level of use for areas conducive of solitude)	Utilization rates of sites - undeveloped	Targets can be set for people/acre and relative use measured by trail counters and condition of sites. Growth in social trails and impacted vegetation designates overuse in many cases. Much of this could very well be qualitative, collected through conversations with Forest staff and by observing vegetation conditions, for example, of undeveloped sites. Collecting new data is possible for monitoring, but not necessary.	Planning-qualitative

EXAMPLE SLIDES FOR METRICS WORKSHOP

Workshop 2 – Socioeconomic metrics for key recreational management outcomes

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