INFORMATION NEEDS IDENTIFIED IN FOREST AND HYDROLOGY WORKSHOPS
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The following topics are natural resource manager information needs that were identified during workshops addressing the potential effects of climate change on hydrology and forest resources, and that also fit the four priority activities identified by NPLCC for 2015.

1) Data and information synthesis and sharing

Forests:

- Assemble data layers to address a) inventory of current abundance of wildlife species and b) the future location of habitats. (Much of this may already be done or may be unavailable.)

Hydrology:

- Assemble any hydrology-related data sets that are not yet in the Conservation Planning Atlas: connectivity, land uses, geology, climate projections, thermal refugia, sediment transport, infrastructure, flood plain condition, redds and other biologically significant features, measures of biodiversity. (Much of this may already be done or may be unavailable.)

2) Support the use of vulnerability assessments and resilience studies in adaptation planning and implementation

Forests:

- Assess vulnerability of at-risk forest habitats (a list of valued habitats is found in the workshop summary)

Hydrology:

- Creating dynamic projections of habitat complexity as a function of climate change is an information need required to inform watershed and stream reach vulnerability assessments (next two bullets). One approach to meet this need may be to quantify an extant qualitative stream evolution model.
- Develop a tool to identify resilient stream reaches, including identifying the characteristics that make them resilient. Perhaps the properly functioning condition (PFC) protocol used for riparian and wetland areas by BLM could be adapted.
- Develop tools to incorporate climate change vulnerability into watershed analyses that are already conducted. Perhaps this could be a checklist based on extant data. (This information need is closely related to need identified in the previous bullet.)
- Assess the vulnerability of existing infrastructure to changes in flow. Specific data needs include current locations and condition of infrastructure, predicted water flows (magnitude, frequency, timing, duration, sediment load, etc.) based on improved forecasting tools that incorporate non-stationarity.
- Develop vulnerability assessment tools that incorporate the effect of land-use practices common in urban areas (e.g., impervious surfaces, wells, septic systems) on streamflow and water quality. The Washington Department of Ecology has a tool for shorelines that may be adaptable to streams.

3) Conduct, support or facilitate landscape-scale conservation exercises in a particular geography or region

Forests:

- Issues that could be addressed in regional efforts that are already planned (SE Alaska, Columbia River):
    - What are the appropriate spatial and temporal scales for forest management decisions?
    - How to deal with conflicting management objectives within and among agencies?
    - How to deal with uncertainty when making management decisions (e.g., uncertainty in climate projections, future regulations, shifts in social, economic and cultural context)
    - How to incorporate the concerns/needs of indigenous people in management decisions (e.g., the effect of the ESA, fire policy, etc. impinge on the ability of indigenous people to engage traditional activities and may endanger cultural resources).

Hydrology:

- Examples from the Willamette Valley and Columbia River demonstrate methods and examples to accomplish large-scale vulnerability assessments while leveraging necessary support.

4) Develop/improve information on how climate change and associated adaptation actions will affect linkages between ecological and human resources (including tribal and First Nation subsistence activities)

Forests**:**

- Project future economic factors affecting timber, specifically a) global supply and demand, including niche products, and b) the best return/use from harvested products, especially smaller trees.
- Predict the future demand for water and energy.
- Understand the interactions among climate change and other stressors that affect cultural sites and resources (e.g., energy development opportunities).
- Understand the perceptions of visitors to natural areas and how to inform their expectations relative to climate change.
- Forecast how future regulations, and the social, economic and cultural context regarding resource values may respond to climate change.

Hydrology:

- Determine how best to communicate information regarding hydrologic changes resulting from climate change to the public. Concepts include non-stationarity; goals include informing public decisions such as zoning, understanding potential effects on utility and insurance rates, and resolving conflicts such as between fish habitat and recreational boating over engineered log jams.
- Project the effects of climate change on agriculture.
- Project the vulnerability of existing infrastructure to climate change (see above).