

## Appendix 37

# IBIS Methodology for Identification of Functional Specialists

The IBIS USA group performed an analysis of specific KEF functions in the following manner:

### **Determine a Wildlife Key Ecological Function Assessment**

A key component of ecosystem-based management is to determine how our natural systems are functioning and how they may have changed over time. To address this, IBIS will produce the following for the sub basin planning teams to interpret and use as needed:

1. Develop a functional profile for each sub basin using all the species that may occur within it and compare this to the functional roles of the focal species. This will help identify the functional role of the focal species, and how that contributes to ecological functions across a broader, eco-province scale. That is, it helps determine if the focal species play ecological roles not generally performed by other species.
2. Using the functional profiles and the IBIS information, determine which wildlife species are functional specialists. Functional specialists are those wildlife species that perform very few ecological roles, that is, they have very few key ecological functions. Also see identifying focal species section.
3. Determine critical functional link species. A “critical functional link species” is a species that is the only species in a particular wildlife-habitat type that performs a particular key ecological function. Also see identifying focal species.
4. Determine and map change in functional redundancy from historic to current conditions, for selected KEF categories; map as color-ramped quantiles with red denoting lowest redundancy levels and blue highest.
5. Tally and graph changes in redundancy for selective KEFs. (Since there are so many categories of KEFs, this analysis will focus on a select subset of KEFs that have the least overlap of wildlife species (defined here as <20% similarity in wildlife species). This subset of KEFs will still tell a lot about overall patterns and trends of ecological functions as a whole.

### **Definitions:**

**Functional specialist** – Species that have only one or a very few number of key ecological functions. An example is turkey vulture, which is a carrion-feeder functional specialist. Functional specialist species could be highly vulnerable to changes in their environment (such as loss of carrion causing declines or loss of carrion-feeder functional specialists) and thus might be good candidates for focal species. Few studies have been conducted to quantify the degree of their vulnerability. Note that functional specialists may *not* necessarily be (and often are not)

also [critical functional link species](#) (functional keystone species), and vice versa. Thus, the manager may want to understand the array of key ecological functions performed by a species (that is, the species' degree of functional specialization) as well as the number of species that perform a given category of key ecological function (functional redundancy); these are complementary measures of the functionality of species and systems.

**Critical functional link species** -- Species that are the only ones that perform a specific ecological function in a community. Their removal would signal loss of that function in that community. Thus, critical functional link species are critical to maintaining the full functionality of a system. The function associated with a critical functional link species is termed a “**critical function.**” Reduction or extirpation of populations of functional keystone species and critical functional links may have a ripple effect in their ecosystem, causing unexpected or undue changes in biodiversity, biotic processes, and the functional web of a community. Critical functional link species may be usefully identified as focal species for subbasin planning. A limitation of the concept is that little research has been done on the quantitative effects, on other species or ecosystems, of reduction or loss of critical functional link species.