APPENDIX A: Migratory Status and Location Use Class

An animal Element may be categorized according to its seasonal patterns of movement. Animals that do not make significant seasonal movements to and from different habitats are characterized in this document as nonmigratory.[48] Animals that make significant seasonal movements (*e.g.*, to breeding or wintering grounds) are characterized as migratory. These movements typically coincide with climatic and/or breeding seasons, and usually relate to the availability of food, shelter, or breeding sites. Migratory animals include many birds, fishes, bats, marine mammals, sea turtles, amphibians, and insects such as butterflies and dragonflies.

The seasonal movement patterns of a population influence the delineation of principal EOs for that Element (see Section 2.1, Principal EOs). In order to include all habitat necessary for the survival of a migratory Element throughout its life cycle, consideration of different seasonally occupied habitats as well as any migratory corridors is imperative. Based on different seasonal movement patterns, migratory Elements may be divided into two general categories. Elements in the first group, terrestrial and freshwater species, have a single principal EO for a given population encompassing different seasonally occupied habitats and any migratory corridors. Because principal EOs for this group tend to be quite large, tracking sub-EOs may be useful for identifying specific areas within them (see Section 2.2, Sub-EOs). These sub-EOs may be described using different feature labels (see Section 2.3, Feature Labels).

Elements in the second group, aerial, marine, and anadromous species, have multiple seasonally disjunct principal EOs, each encompassing only one seasonally occupied habitat. For this group of migrants, location use classes must be used to indicate the seasonal usage of principal EOs (see Section 2.4, Location Use Classes).

Commonly recognized location use classes include

breeding
nonbreeding
adult foraging area
juvenile foraging area
nesting area
calving area
nursery area
migratory stopover

[48]Some species have both migratory and nonmigratory populations. Such species shall be treated here as migratory Elements, and should include a "nonmigratory" class. Note also that dispersal of juveniles from a population does not qualify as migration unless it is part of a seasonal cycle involving departure and return.

migratory corridor
staging area
hibernaculum
maternity colony
bachelor colony
freshwater
estuarine
marine
nonmigratory
undetermined

An Element would typically have two classes, but may have up to four. Note that there is not necessarily a one-to-one correspondence between location use class and breeding/nonbreeding status (*e.g.*, *Myotis grisescens* [gray bat] may be considered to be breeding in all classes except "bachelor colony" [example in A2.2.2 below]).

A1 Nonmigratory Elements

A population of a nonmigratory Element occurs in one area throughout the life cycle of the individual species, not including initial dispersal. Because a nonmigratory species' population exists in essentially the same location throughout its lifetime, only this location can be designated as the occupied habitat. Thus, for a given population, a nonmigratory Element may have only one principal EO described by an "occupied habitat" feature label; multiple sub-EOs may also (optionally) be delineated. Location use classes are not applicable for nonmigratory Elements.

Example:

- *Vulpes macrotis*, kit fox

Location Use Class	Potential Feature Labels
(none)	den occupied habitat*

* The "occupied habitat" feature label is typically not used.
(See Section 2.3 for a discussion of the use of feature labels.)

A2 Migratory Elements

A2.1 Terrestrial and Freshwater Migrants

Some migratory animals move within defined terrestrial or freshwater aquatic corridors, typically between breeding and nonbreeding areas of occupancy. Examples include caribou, short-distance altitudinal mammal migrants, and some freshwater fishes that migrate (typically upstream) to spawn. These animals are dependent not only on the habitats they use for breeding and nonbreeding, but also on the habitats in the corridor that connect these areas. If a major highway or an impassable dam is constructed that blocks the corridor, the population may be effectively destroyed even though both the breeding and nonbreeding habitats are protected. Thus, in order to

conserve a population of these corridor migrants, it is necessary to protect the entire area that is contiguously occupied during their life cycle. For these species, the contiguously occupied habitat, including the corridors between breeding and nonbreeding/wintering areas, should be treated as a single principal EO. If useful, sub-EOs may be optionally tracked and described using feature labels.

Examples:

- *Rangifer tarandus*, caribou

Location Use Class	Potential Feature Labels
(none)	calving ground wintering area migratory corridor occupied habitat*

* The "occupied habitat" feature label is typically not used.

- *Emydoidea blandingi*, Blanding's turtle

Location Use Class	Potential Feature Labels
(none)	nesting area occupied habitat*

* The "occupied habitat" feature label is typically not used.

- *Acipenser fulvescens*, lake sturgeon, and
  Ptychocheilus lucius, Colorado squawfish

Location Use Class	Potential Feature Labels
(none)	spawning area occupied habitat*

* The "occupied habitat" feature label is typically not used.

A2.2 Aerial and Marine Migrants

A2.2.1 Long Distance

Most aerial and marine aquatic migratory animals move between breeding and nonbreeding (*e.g.*, wintering) habitats by flying over or swimming through broad areas of intervening habitat. It is not critical to protect *all* of the intervening habitat in order to conserve the populations of a

species for such migrants, as they can potentially fly over or swim around unsuitable areas. Examples include some birds, bats, butterflies, dragonflies, sea turtles, whales, and seals.[49]

The geographically and seasonally occupied disjunct habitats between which these species travel are typically used either for breeding, wintering, or staging/refueling (during migration), and each has conservation value for the species. Because these areas may differ in conservation importance, it is necessary to identify those seasonally occupied habitats that are significantly utilized by individuals of the species during the year in order to ensure survival of the species (see Appendix B: Persistence and Practical Conservation Value). Conservation of only one of these habitats (*e.g.*, breeding) for a species would be insufficient to conserve the species if the other seasonally occupied habitats (*e.g.*, nonbreeding) were destroyed or degraded. In order to classify these disjunct areas according to their conservation value, EOs for these aerial or noncorridor migratory species must be assigned to a location use class (*e.g.*, breeding, nonbreeding, migratory stopover) that describes the usage of the area by the species.

In some cases, the occupied-habitat EOs for some Elements during a given season may be unknown, such as may be the case for long-distance aerial migrants where the occupied habitat for one season is located on another continent. When entering the ocean, anadromous fishes become marine migrants whose nonbreeding concentration areas, if any, are mostly unknown (see Appendix A2.3, Anadromous Migrants). To conserve these species, it will ultimately be necessary to identify and ensure the protection of these currently unknown habitats.

Examples:

- *Haliaeetus leucocephalus*, bald eagle

Location Use Class	Potential Feature Labels
breeding	nest site breeding territory occupied habitat *
nonbreeding	roosting area feeding area occupied habitat *

* The "occupied habitat" feature label is typically not used.

[49] Note that there is evidence that some marine species (*e.g.*, whales, loggerheads [sea turtles]) may, at times, follow fairly narrow migration routes in the open ocean after they leave their seasonally occupied feeding or breeding/nesting areas. These corridors should be recognized as belonging to a distinct location use class if they are long (*e.g.*, hundreds of kilometers). Some bird migrants (*e.g.*, altitudinal bird migrants in the tropics) may follow narrow corridors and/or be reluctant to cross even small patches of unsuitable habitat. For these Elements, it is critical to protect the area between seasonally occupied habitats. This area may be appropriately included as part of a single EO, although feature labels may be used if desired to distinguish breeding, nonbreeding, and transient areas.

- *Myotis grisescens*, gray bat

Location Use Class	Potential Feature Labels
hibernaculum	cave mine occupied habitat*
migratory stopover	cave mine bridge
maternity colony	cave mine bridge occupied habitat*
bachelor colony	cave mine bridge occupied habitat*

* The “occupied habitat” feature label is typically not used.

- *Chelonia mydas*, green turtle

Location Use Class	Potential Feature Labels
breeding	nesting beach
nonbreeding	juvenile feeding area occupied habitat *

* The “occupied habitat” feature label is typically not used.

- *Eschrichtius robustus*, gray whale

Location Use Class	Potential Feature Labels
breeding	occupied habitat *
nonbreeding	occupied habitat *
migratory corridor	migratory corridor

* The "occupied habitat" feature label is typically not used.

A2.2.2 Short Distance

Some migratory animals fly only a short distance, typically on a seasonal basis, between areas used for seasonal feeding or breeding purposes. Many of these are altitudinal migrants that migrate up and downslope depending on season and food availability. Some species migrate only a short distance such that breeding and nonbreeding areas may be contiguous or nearly so. These species should be treated as if they were terrestrial migrants (*i.e.*, with no location use classes).

Example:

- *Lagopus leucurus*, white-tailed ptarmigan

Location Use Class	Potential Feature Labels
(none)	breeding area occupied habitat*

* The "occupied habitat" feature label is typically not used.

Other short distance migrant species migrate somewhat longer distances such that there may be some separation between breeding and nonbreeding habitats. Many of these species are known to readily cross patches of unsuitable habitat. If it is thought that the habitat suitability of the intervening area between seasonally occupied breeding and feeding areas is inconsequential to a species, the species should be treated as if it were a long distance migrant. The species should have breeding and nonbreeding location use classes, and intervening areas of transit between seasonally occupied habitats should not included as part of any (breeding or nonbreeding) EO.

Example:

- *Procnias tricarunculata*, three-wattled bellbird

Location Use Class	Potential Feature Labels
breeding	occupied habitat*
nonbreeding	occupied habitat*

* The "occupied habitat" feature label is typically not used.

A2.3 Anadromous Migrants

Anadromous fishes breed in freshwater and move downstream to live as nonbreeding individuals in marine environments before returning some years later to breed in the same freshwater streams where they hatched. Upstream habitats used for breeding may sometimes be interspersed in the migratory corridor when the areas used for breeding may not readily or practicably be distinguished from areas used solely for passage.

Anadromous species (*e.g.*, salmon) are both corridor and noncorridor migrants. While in freshwater habitats, they are naturally restricted to stream channels. When they enter marine environments these species are thought to be more widely dispersed and not confined to a corridor.

Like freshwater migrants (see Appendix A2.1, Terrestrial and Freshwater Migrants), the construction of an impassable dam that blocks the freshwater migratory corridor for anadromous species can cause loss of the population, even though the upstream breeding habitat may be protected. Thus, the entire contiguously occupied freshwater stream system used by a given population that spawns at a particular season should be treated as a principal EO. In delineating the contiguously occupied freshwater habitat of an anadromous fish population, it is possible that an entire stream network may be defined as the principal EO. In such cases, it may be of practical benefit to identify sub-EOs, such as breeding areas, basin subpopulations, or migratory corridors. For some Elements, the lower portions of a watershed may contain many overlapping EOs of different breeding populations that separate, either spatially into distinct headwater streams to spawn, or temporally by spawning at different times.

In principle, there are two classes of EOs for anadromous fishes: freshwater and marine.[50] However, when in the marine environment, the whereabouts of many anadromous species is largely unknown, and like aerial migrants, they are likely somewhat dispersed. As nonbreeding concentration areas become known, these should be treated as a second class of principal EOs. In practice, EOs are generally delineated only for freshwater or estuarine locations of anadromous fishes.

[50] Catadromous species (*e.g.*, eels), which breed in marine environments and occur in freshwater habitats as nonbreeders, are treated similarly.

Example:

- *Oncorhynchus tshawytscha*, Chinook salmon or king salmon

Location Use Class	Potential Feature Labels
freshwater	spawning area migratory corridor basin, (*i.e.*, hydrological division of entire occupied habitat) occupied habitat *
marine	[unknown – typically not tracked]

* The "occupied habitat" feature label is typically not used.

A2.4 Multiple Species in Migratory Concentration Areas

Some areas are utilized for limited time periods by a large number of migrating animals. Migratory stopover areas should be tracked as EOs if they contain a significant (*i.e.*, according to Element-specific EO specifications) aggregation of the species. Similarly, migratory corridors should be protected only if the corridor has practical conservation value (*i.e.*, is vital for migration of the species between seasonally occupied habitats).

Although a particular migratory concentration area may not contain a significant number of individuals of any species of conservation concern (and hence would not be tracked as an EO), the area may nonetheless contain a significant aggregation of multiple species. Such significant transient assemblages of multiple species should be tracked as EOs. In this case, the Element of concern is not an individual species but is an Element in the "other"[51] group. Examples include migratory shorebird concentrations, waterfowl concentrations, and bat hibernacula.

[51] According to the standard documented in the Natural Heritage Program Model Operations Manual (The Nature Conservancy 1988), Elements are divided into the following groups: vascular plants, nonvascular plants, vertebrate animals, invertebrate animals, communities, and "other". "Other" Elements were defined to include transient aggregations of mixed species. Although vague, the term "other" has been used because no standard classification or tracking system has yet been developed for transient animal communities. This is an area that needs to be addressed by the Heritage Network in the future.

Examples:

- Western hemisphere shorebird aggregation

Location Use Class	Potential Feature Labels
(none)	roosting area feeding area occupied habitat*

* The “occupied habitat” feature label is typically not used.

- North American mixed bat species assemblage

Location Use Class	Potential Feature Labels
(none)	Cave mine bridge building occupied habitat*

* The “occupied habitat” feature label is typically not used.