

WETLAND SEDGES *of* ALASKA

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About This Guide

Wildlife Service Anchorage.

Overview of the Genus *Carex*

Alaska's wetlands occupy 43.3 percent of its 403,247,700 acres (163,188,554 ha). Most regions of the state have extensive areas of bogs, fens, wet and moist arctic and alpine tundra, lakes and ponds, wet forests, mudflats, and fresh and saltwater marshes. As a result, there are many plants within Alaska that are adapted to wetlands or that are associated with wetland ecosystems.

Many of the most common and important plants of Alaska's wetlands are sedges (the Genus *Carex*). They are the predominant plant in many wetlands, with some species forming nearly pure stands over large areas. Sedges are also the largest Genus of plants in the state, and constitute the most diverse and important member of the plant family Cyperaceae, which also includes the cotton-grasses, bulrushes, clubrushes, spikerushes, et al. The USDA-NRCS (2003) National Plants Database recognizes 155 species, subspecies, and varieties of sedges in Alaska, of which 113 may be found in wetlands.

Within Alaska, the sedges are not only diagnostic of different wetland types, but also serve as the preferred food for many wetland animal species, and provide important hydrologic and landscape modifying functions. Knowing the sedges, and being able to identify them, is therefore fundamental in the identification of wetlands, as well as to understanding the functioning and importance of Alaskan wetland ecosystems.

Sedges are, however, often regarded as difficult to identify and can be intimidating to non-specialists, as well as to many professional biologists and wetland scientists who conduct wetland studies. Popular picture guides to common plants are generally inadequate for accurate species identification, and typically include few, if any, sedges.

Many of the existing technical guides to Alaska's flora, such as Hultén (1968) and Welsh (1974), may also be of limited use to non-botanically trained workers because of their technical nature, lack of adequate illustrations and descriptions, and the fact that they are in need of taxonomic revision. In some cases, the identification keys in these works contain errors, resulting in mis-identifications and frustration to inexperienced workers. In the 25 to 30 years since their publication, new species have been identified, their taxonomy has changed, and our knowledge of the habitat and ranges of many species has been expanded.

We prepared this guide to provide a treatment for some of the more common and

ecologically important Alaskan wetland sedges likely to be encountered by wetland scientists and naturalists. We also hope that this guide will further the involvement and education of the public in the wetland protection process, by furnishing them an accessible means to help appreciate, identify and evaluate wetlands.

The Role and Function of Sedges in Wetlands

Sedges are ecologically important and can be found in many habitats. They have adapted to living in both wet and dry environments, and although many species occur over a range of environments, most Alaskan taxa tend to live in wet areas.

Wetlands are “lands where saturation with water is the dominant factor in determining the nature of soil development and the types of plant and animal communities living in (an) area” (Viereck et al. 1992). They include areas influenced by fresh, saline, and brackish (slightly saline) waters. Fresh water environments may include river and stream banks; lake and pond margins; marshes and wet meadows; nonforested bogs and fens; open and closed forested woodlands; swamps; and grasslands and alpine tundra. Saltwater and brackish environments may include seashores, estuaries and tidal marshes.

Characteristic attributes of a wetland, including vegetation (particularly species composition and canopy structure), water (hydrology and water quality), soils (nutrient regime, pH, and organic content), and wildlife use, are functionally interconnected. For example, wetland vegetation is integral in supporting food webs, creating habitats for a variety of animal species, removing sediments and toxic compounds from storm water, stabilizing river and streambanks and providing erosion control. Many of the sedges discussed in this manual play these roles to varying degrees as part of the wetland ecosystems in which they are found. Many of these functions are useful for wetland restoration, creation, and enhancement.

Sedges play a significant role in supporting food webs by recycling nutrients and using energy for photosynthesis to produce biomass for consumers, such as grazing animals, the animals that feed upon these higher organisms and, ultimately, also decomposers (Sather and Smith 1984). Sedges function under both aerobic (oxygen-rich) conditions, above and within the water and air columns, and anaerobic (oxygen-deprived) conditions, rooted in wet soil or muck. They provide the opportunity for nutrient cycling between these extremes and create an energy flow in wetland ecosystems— pumping nutrients to other organisms as they grow, die and provide detritus to other plants and animals inhabiting wetland ecosystems. In bogs, nutrient turnover is slow because of low nutrient input from the litter and slow decomposition rates in the waterlogged substrate. In these habitats, sedges serve to cycle nutrients faster than most mosses characterizing these systems (Damman and French 1987).

Sedges are the dominant vegetation associated with highly productive systems such

as coastal salt marshes, freshwater sedge marshes, and highly productive floating vegetation mats of sedges and forbs in groundwater discharge areas. The latter include such areas as the floating fens of the Tanana Flats of interior Alaska, fens restricted to shoreline edges, and oxbow lakes that receive periodic imports of silt (Racine and Walters 1991).

Waterfowl and fur-bearing animals abound in these active and productive wetlands, and wildlife is distinctly concentrated in these areas of the vast boreal and arctic ecosystems. Sedge-dominated wetlands occupy a unique position in a transitional zone between aquatic and terrestrial environments, providing "fertile" environments, which provide habitat for a diverse range of plants and animals, supporting a complex web of energy transfers. Biotic density and diversity of this transition zone are frequently higher than that in the adjacent uplands. (Rubec et al. 1988).

Wildlife values associated with these environments have been a prime reason for the recognition and protection of wetlands. Sedges provide the dominant source of energy during critical stages in the life cycles of many species of birds and mammals. They provide feeding, breeding, nesting, escape, and staging habitat for waterfowl, shore birds, raptors and songbirds. In addition to these roles, sedges also provide habitat structure for production of macroinvertebrates (invertebrates, crustaceans, insect larvae) that many other species of animals are dependent upon.

Most wetland sedge species produce a large crop of water-dispersed fruits. These are eaten by a variety of animals, such as insects, water birds, passerines, and some mammals. The leaves are often used as nesting material, and some mat-forming species provide shelter and nesting sites (Cooke 1997). Sedge and graminoid meadows (a mixture of sedges and grasses) in western Alaska (Yukon-Kuskokwim Delta) provide critical habitat for nesting sites and protection from mammalian predators for nearly the entire populations of cackling Canada and emperor geese, and more than half of the continental black brant and Pacific flyway population of western white-fronted geese. These habitats provide a practically unlimited supply of highly nutritional forage for these species (Lensink and Rothe 1986).

On the Copper River Delta, trumpeter swan nesting habitat is highest in plant communities dominated by emergent sedges and horsetails (*Equisetum* spp.); seeds of sedges provide approximately 75 percent of metabolizable energy for the rare dusky Canada geese during incubation; and the seeds and leaves of sedges from the edge of fresh water meadows provide critical fall forage for dusky and migrant Taverner's Canada geese (Lensink and Rothe 1986).

In southeast Alaska, coastal sedge marshes are important staging and feeding habitat for migrating snow geese, Canada and white-fronted geese (Lensink and

Rothe 1986). These authors further state that,

“...Of habitat types occurring in Alaska, the “vegetated intertidal”, usually associated with major river deltas, is of key importance wherever it occurs. Although used by most species of waterfowl and shore birds, intertidal habitats are uniquely important to geese as both nesting and staging areas, and it seems likely that the favorable habitat and geographic isolation of major coastal wetlands contributed to the evolution of many subspecies of geese unique to Alaska, and on which entire populations remain dependent, e.g., the tule white-fronted goose and cackling, dusky and Vancouver Canada geese....”

In the Yukon Flats, gradually sloping shorelines with extensive shallow areas support emergent sedges and are bordered by expanses of wet meadows of sedges and grasses. These areas are favored by dabbling ducks for feeding habitat where sedges are eaten and also provide habitat for abundant macroinvertebrates populations that they also feed upon (Lensink and Rothe 1986).

Numerous mammals are adapted to the water and hydrophytic vegetation of the wetland habitat, while other upland species use wetlands for food, escape cover, and reproductive habitat. Sedges serve as a food for many mammals. The widely distributed muskrat is the most common furbearer occurring in a variety of wetland types of the boreal forest; they feed heavily on sedges in water bodies with marsh margins. Muskrats in turn support other furbearers such as mink. Many other small and large mammals such as mice, voles, water shrews, weasels, and hares, moose, deer, caribou, and bears are common beneficiaries of the wetland environment. Estuaries further support numerous marine species.

Longawn sedge (*C. macrochaeta*) is an important summer forage species for mountain goats in Alaska and British Columbia (Pojar and MacKinnon 1994), and is also reportedly the most important component in the alpine diet of Kodiak brown bears (Atwell et al. 1977). Brown bears also rely upon the coastal sedge marshes along the Cook Inlet shoreline of Lake Clark and Katmai National Park and Preserves (Bennett 1996). Musk oxen are very dependent on wetland habitats, where they feed almost exclusively on wet sedge meadows (Tarnocai and Zoltai 1988).

Fish also rely on sedge dominated wetlands. Marshes provide spawning grounds, escape and feeding habitat for many important freshwater species. Coastal estuarine marsh habitats are used by young salmon for seawater adaptation, feeding, refuge from predators and staging areas for migration. Detritus from Lyngbye's sedge (*C. lyngbyei*) is an important food source for juvenile salmon in British Columbia estuaries (Glooschenko et al. 1988).

Sedges improve water quality by acting as filters to remove pollutants and sediments (Sather and Smith 1984); some (e.g. *C. echinata*) have even been documented to remove heavy metals by plant uptake.

Sedges also provide hydrological functions such as flow stabilization and erosion control. Peak floods are reduced by water retention in wetland basins or by temporary storage in slope wetlands. This is especially true of riverine or channel wetlands that are linked by overflow channels (Adams 1988). More specifically, sedge-dominated wetlands may control erosion of shorelines by: 1) stabilizing substrates; 2) dissipating wave and current energy; and 3) trapping sediments. Erosion control is of greatest importance on riverine marshes, shore marshes, and large, shallow-water wetlands. The most suitable vegetation for erosion control includes tall robust perennials with extensive rhizome systems (e.g. *C. aquatilis*, *C. lyngbyei*, and *C. utriculata*) that can anchor shoreline materials (Adams 1988).

When the production of plant biomass exceeds decomposition, organic matter builds up creating peat ecosystems such as bogs and fens. Sedge species play a pivotal role in the production of peat and peat soils in specific wetland types. The sedges are second in importance only to *Sphagnum* moss in peatland formation in the boreal zone (Glaser 1987b). *Sphagnum* mosses are the primary peat formers in bogs, whereas sedges, (along with the “brown mosses”), are the primary peat formers in fens. Sedges, along with rushes and grasses, are the primary peat formers in marsh wetland environments (Johnson et al. 1995).

The hydrological and peat-forming functions of sedges lead, in turn, to various roles in landscape-level processes such as pioneering species in vegetation succession, and the formation of distinctive wetland patterns on the landscape such as levees, strangs and flarks, pools, water tracts, and streamlined bog islands.

Kellogg's sedge (*C. lenticularis* var. *lipocarpa*) has been identified as an indicator of early plant successional stages of Northwest Territory sedge (*C. utriculata*) and water sedge (*C. aquatilis*) riparian vegetation types in the western U.S. It is also described as a pioneer species that invades water edges in Utah. In water sedge vegetation types, Kellogg's sedge, along with water sedge, appear to function as pioneer colonizers of exposed mineral substrates that will persist indefinitely in such areas as those created when a beaver dam breaks. High water tables and a vigorous network of roots of these species successfully limit the establishment of most other species (USFS 2002).

Pure communities of sedges serve to modify open water habitats (especially lakes and ponds with shallow margins) by their slow production of sedge peat. The general developmental trend of sub-arctic wetlands is an evolution from a depression, to open water, open fen, shrub fen, and finally to treed fens and bogs (Zoltai et al. 1988).

By dissipating the energy of waves, currents and tides along freshwater and marine shores, sedges modify the flow and capture of silt and detritus loads leading to the

building of levees and the filling in of ponded basins and channels in coastal marsh systems, and lead to the stabilization of stream and river banks in fresh-water systems. In this regard, a number of species have found uses in reclamation work where areas within wetlands have been disturbed by human activities or natural events such as flooding (e.g., *C. ramenskii*, *C. subspathacea*, *C. aquatilis*, *C. lenticularis*, and *C. mertensii*).

Wetland landscapes possess many patterns. Among these are raised parallel ridges and flooded depressions commonly referred to as strangs and flarks. As described by Drury (1956), "...movement of water across very gentle wetland slopes creates steps and falls whose steep places occur in festoon patterns. Crescentic riffles are formed upon which the growth of sedges further slows the velocity of seasonally flowing waters, further capturing sediments, and creating parallel ridges of detritus and sediment that with time are elevated by further accumulation and low deterioration allowing for other wetland plant establishment and the creation of well-defined raised ridges called strangs, and alternating flooded depressions called flarks at right angles to the slope...." These landscape-scale patterns resemble waves and riffle marks when viewed from above or on aerial photographs.

Woollyfruit sedge (*C. lasiocarpa*) reportedly reproduces vigorously by vegetative means, establishing extensive networks of rootlets and rhizomes. The permeability of this rhizomatous peat is largely responsible for the channeling of water movements and the development of water tracts in some peatlands (Glaser 1987b).

The formation of streamlined bog islands (Glaser 1987a) may also owe their origins to sedge peat formation and subsequent landscape modification. The formation of porous peat by woollyfruit sedge (*C. lasiocarpa*) and contrasting in the formation and deposition of more dense peat by *Sphagnum* moss species, leads to a peatland being divided into contrasting vegetation types of bog and fen, which lay down a peat with contrasting hydrologic properties. Runoff is progressively channeled through the more porous sedge peat in the water track drainages, and a sharp vegetative boundary develops between the bogs and fens. Drainage networks form in which water tracts fragment the lower bog flanks into streamlined globe's and islands (Glaser 1987a).

The peat developed by mud sedge (*C. limosa*), which reaches its dominance in flarks, is less fibrous because of the weakly rhizomatous nature of this species. The more decomposed peat formed by this species may contribute to the low infiltration capacity of the peat underlying flark landforms and to the formation of pools, a habitat characteristic of mud sedge (Glaser 1987b) .

Some wetland sedges (e.g., *C. glareosa*, *C. livida*) require very specific conditions such as high salinity or pH to grow. Their presence or absence can help determine the type of wetland, and the health of a specific wetland. Sedges help determine

the type of wetland based on a species optimum tolerance of pH- acidic and basic conditions. Some of the rarest sedges are calciphiles (plants preferring high pH, limestone-derived soils; Anderson et al. 1996).

The relative sensitivity of the major sedge species to water chemistry enhances their importance in distinguishing different peatland types, at least on a regional basis (Glaser 1987b). Many species reach their maximum abundance along gradients represented by the position of the water table and the water chemistry. Some species reach their maximum abundance in one bog or fen type versus another. For example, mud sedge (*C. limosa*) may reach its maximum abundance in oligotrophic bogs or poor fens, and in turn it may give way to creeping sedge (*C. chordorrhiza*) and woollyfruit sedge (*C. lasiocarpa*) in the richer fens (Glaser 1987b).

Wetland sedges serve a major role as wetland indicators. Wetlands vary in size, shape and characteristics. They may include waterbodies and stream courses, all of which are bounded by dry land. Not all wetlands are obvious however, and it is often difficult to determine where a wetland ends and drier land begins. The wetland boundary is defined by the soils, plants and the presence of surface water or saturated soil.

Because of their presence in wetland habitats, sedges may act as important wetland indicators in conjunction with soils and hydrological information. The National Wetlands Inventory Program of the U.S. Fish and Wildlife Service (USFWS 1996) has developed a list of wetland indicator plant species that include sedges. Each species has been reviewed by a panel of professionals and assigned a code that indicates the frequency of the species, from almost always present in a wetland; to occurring in non-wetlands; and present in wetlands of one part of the country and not present in wetlands of other areas.

Definitions of wetland indicator status are as follows (abstracted from the National List of Vascular Plant Species that occur in wetlands USFWS 1996):

OBL- Obligate Wetland Species. Occurs almost always under natural conditions in wetlands (estimated probability 99%).

FACW- Facultative Wetland Species. Usually occurs in wetlands, but occasionally found in non-wetlands (estimated probability 67%-99%).

FAC- Facultative Species. Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).

FACU- Facultative Upland Species. Usually occurs in non-wetlands (estimated probability 67%-99%), but occasionally found on wetlands (estimated probability 1%-33%).

UPL- Obligate Upland Species. Occurs in wetlands in another part of the country, but occurs almost always under natural conditions in non-wetlands in the region under consideration (estimated probability 99%). If a species does not occur in wetlands in any part of the country, it is not on the National List.

NA- No agreement. The regional panel of professionals has not able to reach a unanimous decision on this species.

NI- No indicator. Insufficient information is currently available to determine an indicator status.

NO- No occurrence. The species does not occur in that region.

The user is referred to USFWS (1996) for elaborations on these definitions. All of the sedges in this guide are wetland indicator species to varying degrees; a listing of all wetland sedges for Alaska is provided by USDA-NRCS (2003).

Sedges also have social, economic and ethnobotanical roles or values for humans. The leaves of many species have been used as thread by Native Americans and sewn into hide garments as decoration. The leaves and stems of many sedge family species are still used today for basketry (Cooke 1997). Sedges have also been consumed by humans in times of famine (*C. macrocephala*).

Sedges also play an indirect but critical role in furbearer production, waterfowl and big game hunting, and commercial and sport fishing by providing essential habitat for these species, as noted above.

Sedges are an important source of forage for livestock as well as wildlife. The large water sedges form a major part of the “swamp hay” that has been traditionally harvested from large Alaskan wetlands such as the Palmer Hay Flats and the Fox River Flats. These sedges contain more protein, fat, and carbohydrates, and less crude fiber than grasses, resulting in a nutritious but light-weight hay (Roberts 1983). Kellogg’s sedge (*C. lenticularis* var. *lipocarpa*) is commonly grazed by domestic livestock when other feed is scarce, and sheep reportedly thrive on it. Mud sedge (*C. limosa*) has a high nutritional value and is grazed by horses, cattle and sheep.

In general, sedges contribute to the diversity and aesthetics of Alaska wetlands. Wetlands, particularly sedge-dominated types at the interface between open water and more closed upland habitats, concentrate wildlife use and provide for extensive nonconsumptive uses of wildlife such as bird watching, wildlife photography and education (Rubec et al. 1988).

Overall Format of the Guide

This guide begins with a brief description to help the non-specialist separate out the different grasslike families, as well as a brief introduction describing key features of sedge morphology and their use in identification. It also includes keys to the genera within the family Cyperaceae.

A key is provided to 41 of the most common and ecologically important wetland sedges in Alaska. These are described in detail and accompanied by range maps, illustrations, summaries of habitat preferences, wetland indicator status, and notes on distribution. An additional 36 species having similarities to these common species are covered in lesser detail.

We have tried to use simple, non-technical language in the text and keys, and have emphasized characters readily seen by the naked eye. Some species, however, are distinguished by characteristics that can only be seen with a handlens or microscope.

A full glossary is provided for all technical botanical and ecological terms used in this guide as well as those that may be encountered when using the other sources for sedge identification cited below and in the bibliography.

Both scientific and common names are provided in this guide. Scientific names are generally more widely accepted and stable than common names. Those used in this guide follow the recent treatment for the sedge family in Volume 23 of the *Flora of North America* (FNA 2002). The few exceptions are noted in the text. We used USDA-NRCS (2003) as a standard for common names.

The major species treated in the guide are listed alphabetically in the Table of Contents. Scientific names of these and similar species referred to in the text as well as common names are listed alphabetically in the index at the end of the guide.

References

We have drawn upon many sources to prepare this guide. These include taxonomic treatments of the flora of Alaska (Hultén 1968, Welsh 1974); neighboring British Columbia (Douglas et al. 2001, Roberts 1983), Yukon Territory (Cody 1996); the Pacific Northwest (Hitchcock et al. 1969); the Intermountain West (Hurd et al. 1998); and, perhaps most importantly, the recently published treatment for the sedges in Volume 23 of the *Flora of North America* (FNA 2002).

In addition, we have referred to popular guides for the boreal forest, British

Columbia and the Pacific Northwest (Cooke 1997, Johnson et al. 1995, Pojar and MacKinnon 1994, Taylor and Douglas 1995). Finally, we have incorporated our own extensive taxonomical and ecological experience with the sedge taxa of Alaska.

Since the information provided here is restricted to the most common wetland sedge species, the guide is insufficient to identify all the sedges that may be found in Alaska, although the key and text will refer the reader to many of the similar species. The references indicated above provide a more complete and technical treatment of the sedge species in Alaska. Identifications of taxa for critical studies should always be confirmed by checking with knowledgeable botanists or with the floras listed above.

Page Format of the Species Descriptions

Plant Names

The species' accepted name, as well as synonyms, misapplied names, and common names, are listed at the top of the page. Plant names used in this guide follow the recent treatment for the sedge family in Volume 23 of the Flora of North America (FNA 2002). The few exceptions are noted in the text.

NWI Status

National Wetland Inventory (NWI) wetland indicator status is located in the upper left corner. Definitions for the codes are found above, in the section on the "Role of Sedges in Wetlands".

Species Description

Technical descriptions include notes on the plants habit, that is, the general form, or what the whole plant looks like, including height, root type, and the presence of rhizomes — below ground runners, or stolons — above ground runners; stem (shapes, stipules); leaf arrangement, shape, length, width, and surface texture; bract; spike (unbranched inflorescence) and flower (e.g., pistillate scales); perigynium (saclike structure surrounding the ovary/fruit); and fruit (achene).

Illustrations and Photographs

Color photographs and line drawings accompany the text for most species to illustrate habitat, growth habit, spikes, pistillate scales, perigynium and achenes. They were provided with the acknowledgements and permission from various sources cited at the end of the guide.

Habitat Description

The habitat preferences of each species are described. This information generally comes from the literature, as well as the field experience of the authors, other scientists and reviewers.

Distribution

A map is included to show where the plant has been found in Alaska. Plants may also be found in areas not reported here. No range lines are provided; rather, the distribution is illustrated by a spread of known collections across the state. The distribution is based on records and collections stored and maintained at the University of Alaska Museum's Herbarium. Maps were prepared from an ArcView GIS electronic database. The distribution of similar species is included where distribution ranges may assist with species identification.

While this book is specific to the state, many of the species described have a wider distribution, ranging from Alaska to Newfoundland and south into the lower 48 states or west, across the Bering Straits to the Russian Far East and Eurasia. Many boreal and arctic sedges are found around the world and are noted as "circumboreal" or "circumpolar", and some are even found in the southern hemisphere.

Similar Species

This section notes related species that may be confused with the species being described and helps to differentiate them using morphological characters and habitat preferences. Illustrated comparisons of many similar species may be found in the recently published volume on the sedges of North America (FNA 2003). Some rare species and species with limited distributions in Alaska are also listed here (and in the keys) with the hope that their inclusion may lead to new discoveries and clarifications of their range.

Notes

This section provides information about wildlife use, ethnobotanical use, revegetation potential, etc. To varying degrees, most of the plants discussed in this guide provide many of the functions discussed in the earlier section on *The Role and Function of Sedges in Wetlands*. Information from the literature on species with specific wetland roles and functions are identified here. Ethnobotanical information has been added to describe human uses of a species (e.g., shelter, basketry, food, medicine, horticulture, agriculture, reclamation) and any other use that may be known.

Measurements

All measurements are given in metric units:

10 millimeters (mm) = 1 centimeter (cm), 1 cm = 0.394 inches

1 meter (m) = 100 cm = 39.4 inches or slightly longer than 1 yard

Differentiating Between Different Grasslike Families

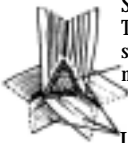





Several families of plants may appear grass-like and are grouped together as

graminoids. These include the Cyperaceae (sedges), Juncaceae (rushes) and the Poaceae (grasses). Species of all three families feature long, narrow, parallel-veined leaves and inconspicuous flowers with scalelike **bracts**—specialized leaves arising directly below a flower or inflorescence.

These families are most easily distinguished through an examination of their stems: those of sedges are generally triangular in cross-section and solid (not hollow), with the leaves in 3 rows; those of rushes are round and solid ('pithy'). Remember: 'sedges have edges and rushes are round'. Grass stems are round, jointed, often hollow, and with the leaves in two rows.

Sedges can be further isolated from other graminoids by their unique flowering structure and fruit: each sedge fruit (**achene**) is housed in a tear-shaped sac (**perigynium**), opening only at the tip and subtended by a single **scale**. The following table points out a few characteristics which can be used to distinguish

Comparison of Sedges to Other Grasslike Families

	<i>Sedges</i>	<i>Grasses</i>	<i>Rushes, Woodrushes</i>
Simplified Cross Section of Stem, Leaves	 <p>Stem Triangular solid not jointed</p> <p>Leaves 3-ranked</p>	 <p>Stem round hollow jointed</p> <p>Leaves 2-ranked</p>	 <p>Stem round solid not jointed</p> <p>Leafless or 2- ranked</p>
Flower, Fruit	 <p>Perigynium</p> <p>Achene 1-seeded</p>	 <p>Lemma</p> <p>Grain 1-seeded</p>	 <p>Capsule 3 to many seeded</p> <p>Bract-like segments</p>

(Adapted from Roberts 1983)

sedges from rushes and grasses.

Guide to Sedge Morphology

Sedges are complex and diverse in their habitats and growth forms and can be daunting to non-botanists because of their specialized structures and the terms used to describe them. Knowing a few distinguishing characteristics, however, makes the group quite manageable to deal with. Descriptions in this guide will be more readily understood if the reader will take the time to become familiar with some of these characteristics, illustrated on the following pages. Photos accompanying the species descriptions also help to clarify these morphological characteristics.

Sedges are grass-like, perennial herbs that may grow either in clumps (**tufted**) or having stems that grow laterally underground (**rhizomatous**) or above ground (**stoloniferous and mat-forming**).

Leaves are 3-ranked (appearing to arise from all 3 sides of stem) and have closed **sheaths** (the leaf bases are fused around the stem). Some species have a notched appendage (**ligule**) at the juncture of the leaf and leaf sheath.

Sedge stems (**culms**) are generally solid and triangular in cross section, but the culms of some species can be obtusely angled or, occasionally, round. Each culm bears one to many **flower spikes** or smaller secondary spikes (**spikelets**) that are either attached directly to the culms or are borne on a side stalk (**peduncle**).

A leaf-like **involucral bract** is usually attached to the base of the flower spikes. The bracts vary from large and leafy to small and inconspicuous or absent, and may or may not be wrapped around the stem (**sheathing**) at the base.

Individual flowers are attached directly to the flower spikes and have small bracts (**scales**) attached at the base. The scales of the female flowers are helpful in distinguishing between species.

In *Carex*, individual flowers are either male or female, never containing both stigmas and stamens in the same flower. Individual plants are usually monoecious (having *both* male and female flowers on the same plant), but a few species may be dioecious (having *only* male or *only* female flowers on the same plant). Similarly, individual spikes on a plant can have all male or all female flowers, or be mixed with either sex above the other in the same spike. Androgynous spikes have male flowers above the female flowers, while gynecandrous spikes have female flowers above the male.

The distinctive fused sac enclosing the female flowers is called the **perigynium** (plural = **perigynia**). It has an apical opening through which the style or stigmas protrude. A neck (**beak**) and a stem (**stipe**) may also be evident. The size and shape of the mature perigynium is often essential for identification.

Growth Habits

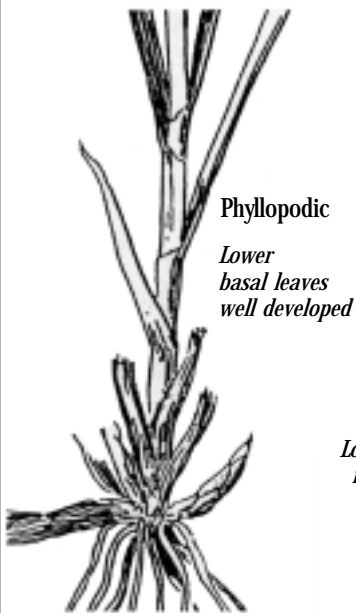


Tufted (cespitose)
*Culms tufted
or clumped*

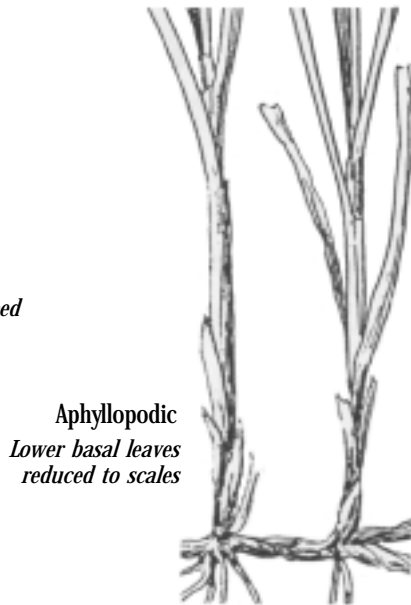


Rhizomatous
*Culms arising singly or
a few together*

Basal Leaves



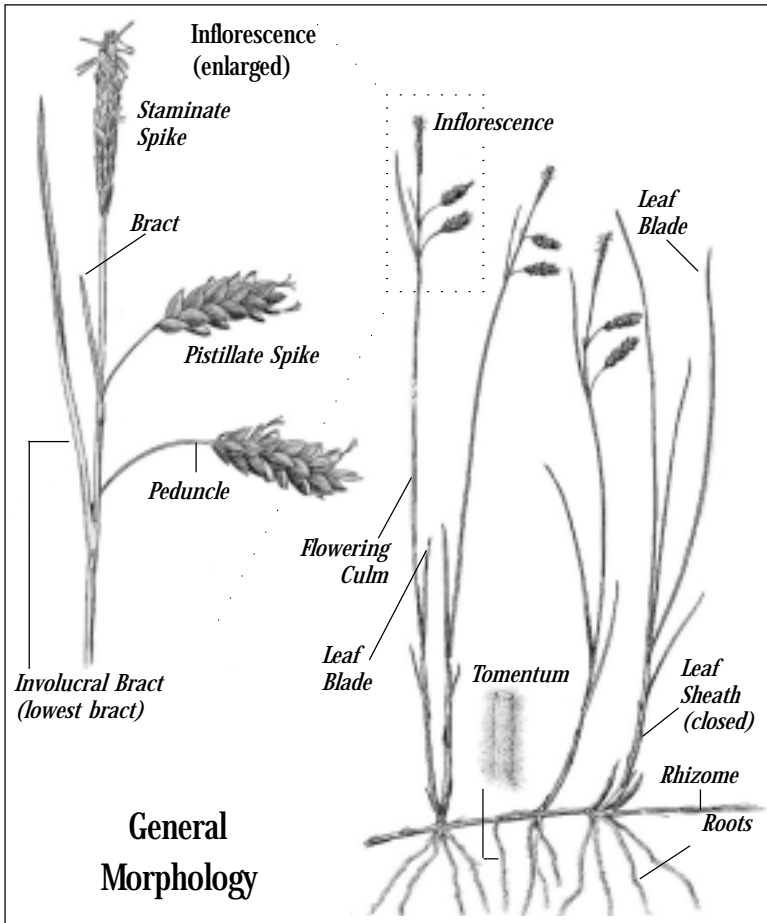
Phyllopodic
*Lower
basal leaves
well developed*

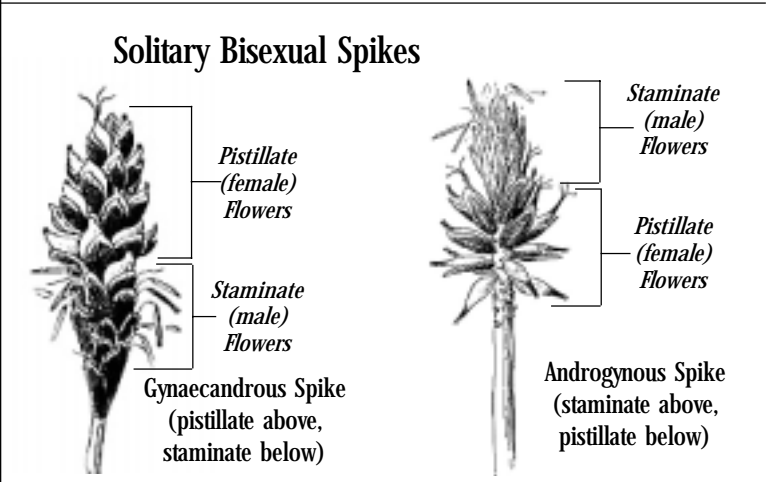
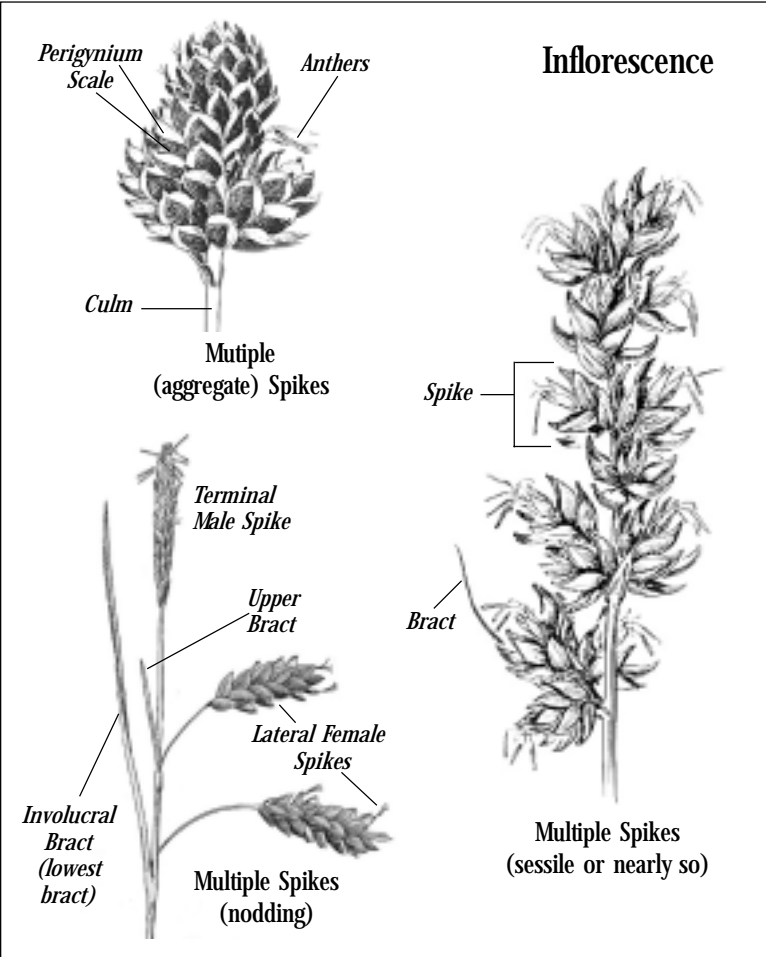


Aphyllipodic
*Lower basal leaves
reduced to scales*

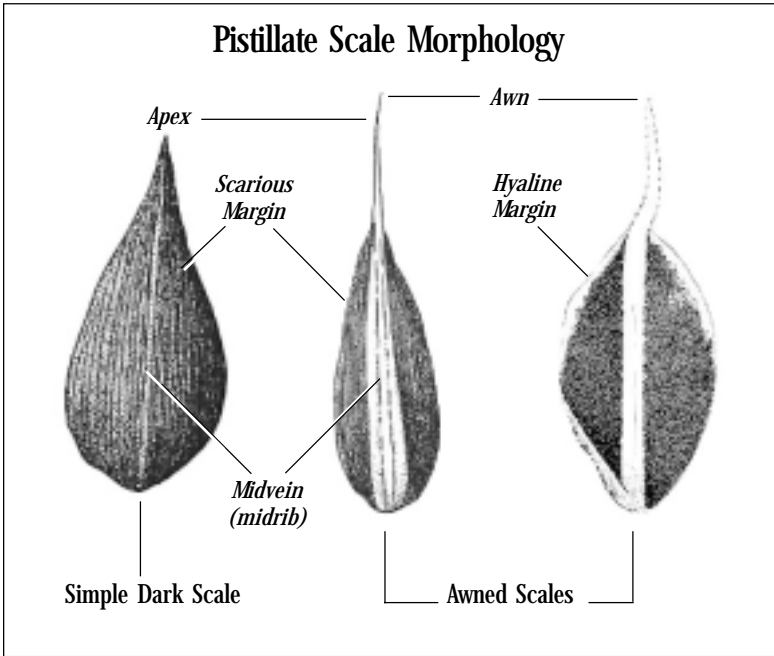
The number of stigmas on each flower is an important and often used character in keying out sedges. A hand lens is often necessary to see this character and several flowers should be examined since stigmas may break off, especially on older material. Stigmas may number 2 or 3, depending on the species. Those with 2 stigmas usually have an achene (fruit) that is 2-sided with convex sides (**lens-shaped** or **lenticular**), while those with 3 stigmas usually have achenes that are 3-sided (**triangular** or **trigonous**). Most species are consistent in always having either 2 or 3 stigmas. Male flowers often have 2 stamens but can have 3 or 1.

The pistillate scales, perigynia and achenes come in many sizes, shapes, colors and textures. A rather large, but very specific vocabulary has evolved to describe this variability. A glossary has been provided to get the user started. Good illustrated guides to plant identification terminology (e.g., Harrington 1977, Harris and Harris 1994) can also prove invaluable when starting out into the world of

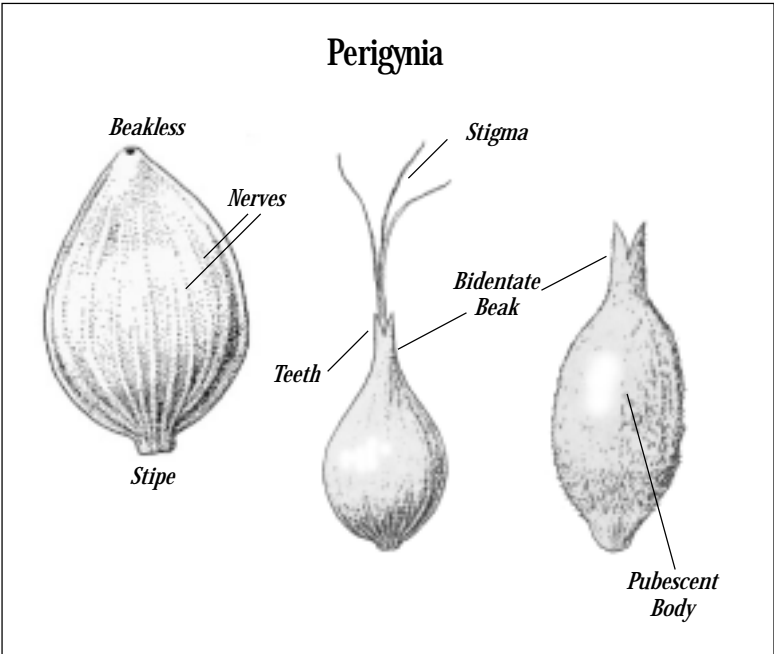




Pistillate Scale Morphology



Perigynia



KEYS

Taxonomic keys are tools for identifying plants. The keys in this guide are written as a series of paired, mutually exclusive statements that divide the available information into smaller subsets until all possibilities but one have been dismissed. For sedges, a technical key is necessary for positive identification. We have provided keys, with specialized terms kept to a minimum. These are simple, two-branched keys that rely on both vegetative and floral characteristics. When flowers or fruits are minimal, a bit of imagination and reconstruction may be necessary to determine the path to follow in the key. When confusion arises at a branch in the key, examine both options, then determine which looks more plausible for your specimen. Frequently referring to drawings and illustrations may prove useful. Final verifications of species identifications should be done by comparing a specimen with a plant that has been identified by a qualified botanist. Herbaria are repositories of plant specimens that have been accurately identified. Herbaria are generally found at major universities in Alaska and elsewhere and are usually open to the public.

Key to Genera of the Sedge Family

- 1a Flowers unisexual (either male or female); achenes enclosed or wrapped in a sac (the perigynium) and subtended by a scale
 - 2a Perigynia closed except for a small opening at the tip through which the style and stigma protrude; always with only 1 pistillate flower
 ***Carex* (the sedges)**
 - 2b Perigynia open on one side, not sealed but merely wrapped around the achene; perigynia sometimes enclosing staminate flowers in addition to a pistillate flower
 ***Kobresia***

- 1b Flowers bisexual (both male and female); achenes not enclosed in perigynia
 - 3a Scales of spikelets in 2 opposite rows ***Dulichium***
 - 3b Scales of spikelets arranged in a spiral
 - 4a Spikelets with 1 (rarely 2) achenes
 ***Rhynchospora* (the beak-rushes)**
 - 4b Spikelets with several to many achenes
 - 5a Styles thickened towards the base, forming a conspicuous tuber-

- cle on the achenes ***Eleocharis* (the spike-rushes)**
 - 5b Styles not thickened to form a tubercle
 - 6a Flower bristles 10 or more
 - ***Eriophorum* (the cotton-grasses)**
 - 6b Flower bristles 8 or fewer
 - 7a Spikelets atop leafy bracts ***Scirpus* (the bulrushes—**
 - including ***Blysmus*, *Bolboschoenus*, *Schoenoplectus*)**
 - 7b Spikelets atop slightly modified, not leafy, scales
 - ***Trichophorum* (the clubrushes)**
-

Keys to the Common Wetland Sedges of Alaska

Prepared by

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 Robert Lipkin, Alaska Natural Heritage Program

Introduction to the Key

This key is designed to aid the identification of selected sedges—ones that make up wetland vegetation in Alaska, in both brackish and fresh water habitats. These species are not necessarily restricted to wetlands, although many are. Several with broad ecological tolerances are also found in more upland situations. Some taxa are uncommon in Alaska (e.g., *C. adelostoma*, *C. parryana*), either because they are rare or have been overlooked (e.g., *C. holostoma*); they are included in the keys in hopes that their inclusion may lead to new discoveries or clarifications in their distributions.

These keys are artificial in that they do not attempt to reflect either evolutionary relationships or the subgenera or sections that one may encounter in other more thorough treatments of the sedges. Rather, they are an analytic device that allows the user to distinguish any one species from all others of this particular set of species. The intent is that with one of these plants in hand, one can consistently and accurately apply a name. Synonyms are supplied for cross-referencing to such important references as *The Flora of Alaska and Neighboring Territories* (Hultén 1968) and *Volume 23, Cyperaceae, Flora North America (FNA 2002)*. Very closely related taxa that are more difficult to distinguish are discussed under Comments in the species accounts.

Clearly, some magnification must be used to see the details of the leaves, perigynia, and scales. Familiarization first with a binocular dissection microscope will make it easier to recognize diagnostic features with a 10X hand lens when in the field.

The keys work best when the plants are well enough developed that the perigynia

are nearly mature and have achieved their final size, shape and distinctive surface characteristics. Among the single-spiked (unispicate species, Key 1), plants that are wholly staminate cannot be determined; for example, such plants occur in *C. gynocrates* and occasionally in *C. capitata*.

The versatility of the following keys will be greatly increased as the users acquaint themselves with sedge terminology in the glossary, sedge morphology, and individual species characteristics provided in their respective pictures and illustrations.

Master Key _____

- 1a Plants with a single, terminal spike or compact terminal cluster of spikes that appears as if one **Key 1**
- 1b Plants with multiple spikes
 - 2a All spikes bisexual (androgynous or gynecandrous) **Key 2**
 - 2b Some spikes unisexual; terminal spike staminate or gynecandrous
 - 3a Terminal spike gynecandrous (in the case of *C. parryana*, there may be only two or three perigynia at the summit of the otherwise staminate spike), lateral spikes pistillate **Key 3**
 - 3b Terminal spike staminate, lateral spikes staminate, pistillate or androgynous
 - 4a Uppermost 1-3 lateral spikes staminate **Key 4**
 - 4b Uppermost lateral spikes not staminate
 - 5a Lateral spikes with peduncles as long and longer than the spikes, spikes pendent **Key 5**
 - 5b Lateral spikes with peduncles shorter than the spikes, spikes erect (lowermost spike may be long-pedunculate and pendent in *C. microchaeta* subsp. *nesophila*) **Key 6**

Key 1 _____

- 1a Plants generally growing submerged in ponded water *C. chordorrhiza*
- 1b Plants terrestrial or aquatic, but not growing submerged
 - 2a Terminal spike (or compact cluster of spikes) 3 cm long or longer

- *C. macrocephala*
- 2b Terminal spike (or compact cluster) 2 cm or shorter
- 3a Plants forming dense tufts or cushions *C. ursina*
- 3b Plants not forming dense tufts or cushions
- 4a Perigynia awl-shaped, strongly reflexed at maturity
- 5a Rachilla extends through perigynia, beyond styles
. *C. microglochin*
- 5b Rachilla absent *C. pauciflora*
- 4b Perigynia not awl-shaped, not strongly reflexed (spreading to slightly reflexed in *C. gynocrates*)
- 6a Perigynia spindle-shaped, lanceolate to narrowly elliptic
. *C. anthoxanthea*
- 6b Perigynia not spindle-shaped
- 7a Perigynia beakless, spikes of 4-5 perigynia
. *C. leptalea*
- 7b Perigynia beaked, spikes of more than 10 perigynia
- 8a Perigynia with veins
- 9a Perigynia with many conspicuous veins, otherwise smooth *C. gynocrates*
- 9b Perigynia with few inconspicuous veins, papillose
. *C. media*
. (*C. norvegica* subsp. *inferalpina*)
- 8b Perigynia without veins
- 10a Perigynia with minute nipple-like bumps and minutely serrate along distal margins and beak *C. media*
(*C. norvegica* subsp. *inferalpina*)
- 10b Perigynia without minute nipple-like bumps
- 11a Perigynia circular in cross section, abruptly beaked, beaks smooth
. *C. capitata*
- 11b Perigynia lenticular in cross section, gradually beaked, margins and beaks minutely serrate *C. maritima*

(including *C. incurviformis*)

Key 2 _____

- 1a Pistillate scales less than half as long as the perigynia; perigynia many-veined *C. Ioliacea*
- 1b Pistillate scales half as long as perigynia or longer; perigynia few-veined or veinless
 - 2a Perigynia beakless *C. marina*
 - 2b Perigynia beaked
 - 3a Perigynia minutely short-beaked, less than 0.25 mm long *C. tenuiflora*
 - 3b Perigynia with distinct beak, longer than 0.25 mm
 - 4a Perigynia abruptly beaked *C. canescens*
 - 4b Perigynia gradually beaked (occasionally somewhat abrupt in *C. laevisulmis*)
 - 5a Beaks smooth *C. mackenziei*
 - 5b Beaks serrulate
 - 6a Perigynia ovate, circular in cross section, 1.5 mm long *C. laevisulmis*
 - 6b Perigynia lanceolate, lenticular in cross section, 2–4 mm long
 - 7a Perigynia erect, veinless *C. diandra*
 - 7b Perigynia spreading, veined *C. echinata*

Key 3 _____

- 1a Pistillate scales with midvein raised and usually projecting from the apex; apices mostly mucronate or awned
 - 2a Body of pistillate scale distinctly shorter than the perigynia; perigynia short-beaked, 0.5 mm long or longer *C. gmelinii*
 - 2b Body of pistillate scale as long as and longer than the perigynia; perigynia beaked, less than 0.5mm long
 - 3a Pistillate scales as broad as perigynia, slightly shorter to slightly longer than perigynia
 - 4a Perigynia conspicuously serrulate along distal margins and beaks

- *C. parryana*
 4b Perigynia not serrulate *C. adelostoma*
- 3b Pistillate scales narrower and longer than perigynia *C. buxbaumii*
- 1b Pistillate scales not apiculate, mucronate, nor awned
- 5a Pistillate scales distinctly shorter than perigynia
- 6a Pistillate scales less than half the length of the perigynia,
 with acute apices; midvein lighter in color than the body of
 the scale, conspicuous *C. mertensii*
- 6b Pistillate scales greater than half the length of the perigynia,
 with obtuse, rounded apices, midvein inconspicuous
- 7a Pistillate scales light-brown with hyaline margins;
 lateral spikes on peduncles often as long as the
 spikes, spikes pendent *C. krausei*
- 7b Pistillate scales black to the margins; lateral spikes
 on peduncles shorter than the spikes, spikes erect
C. enanderi (C. lenticularis var. dolia)
- 5b Pistillate scales varying from slightly shorter to slightly longer
 than the perigynia
- 8a Pistillate scales with midvein lighter in color than
 the body of the scale, conspicuous; perigynia
 beakless
- 9a Perigynia sparingly papillose, weakly nerved,
 greenish; stems erect *C. garberi*
 (see description under *C. aurea*)
- 9b Perigynia densely papillose, nerveless, white
 or gray; stems decumbent *C. bicolor*
 (see description under *C. aurea*)
- 8b Pistillate scales with midvein inconspicuous;
 perigynia beaked
- 10a Pistillate scales narrower than perigynia,
 purple-black to the margins
 *C. eleusinoides*
- 10b Pistillate scales as wide as the perigynia,
 enclosing them, brown with hyaline mar-
 gins *C. glareosa*

Key 4 _____

- 1a Perigynia pubescent *C. lasiocarpa*
1b Perigynia not pubescent

2a Perigynia inflated, veined, smooth; beaks long, greater than 0.5 mm,
bidentate; stigmas 3

- 3a Beaks of perigynia with long teeth, 1.5 mm or longer *C. atherodes*
3b Teeth short, 0.5—1.0 mm

- 4a Upper surface of leaves glaucous, papillose *C. rostrata*
4b Upper surface of leaves green, scabrous or smooth
. *C. utriculata* (*C. rhynchophysa*)

2b Perigynia not inflated, veined or not veined; papillose or smooth; beaks
short, less than 0.5 mm long, emarginate; stigmas 2

- 5a Perigynia veined, smooth *C. lenticularis*
5b Perigynia not veined, papillose *C. aquatilis*
(including *C. sitchensis*)

Key 5 _____

1a Plants tall, mostly 3 dm or taller; lateral spikes 3 cm and longer; stigmas 2

2a Perigynia thin walled (papery), flattened, sessile, a species of freshwater
marshes and meadows *C. sitchensis* (*C. aquatilis* var. *dives*)

2b Perigynia leathery, stalked. Plants usually in brackish water *C. lynchbyei*

1b Plants short, mostly 2.5 dm or shorter; lateral spikes 2.5 cm or shorter;
stigmas 3

3a Perigynia beakless

4a Perigynia smooth, obscurely veined, fleshy, orange at maturity
. *C. aurea*

4b Perigynia papillose, not fleshy or orange

5a Pistillate scales narrower and longer than the perigynia
. *C. magellanica* subsp. *irrigua*

5b Pistillate scales as broad and as long as the perigynia
. *C. rariflora* (including *C. pluriflora*)

3b Perigynia beaked

6a Pistillate scales aristate *C. macrochaeta*

6b Pistillate scales not aristate

7a Perigynia strongly papillose over entire surface; roots covered with rust-red felt-like hairs

. *C. limosa*

7b Perigynia not papillose (sometimes minutely papillose on margins in *C. podocarpa*)

8a Perigynia long-beaked, 0.6-0.8 mm, glossy purple

. *C. saxatilis* subsp. *laxa*

8b Perigynia short-beaked, 0.5 mm or shorter, not glossy purple

9a Lowest bract sheathless (the stalk of the lowest spike free)

. *C. podocarpa*

9b Lowest bract long-sheathing (sheath enveloping stalk of lowest spike)

10a Perigynia veined, otherwise smooth

11a Perigynia abruptly beaked; beaks dark brown *C. vaginata*

11b Perigynia gradually beaked; beaks hyaline-tipped . . . *C. williamsii*
(see descrip. under *C. capillaris*)

10b Perigynia not veined, beaks serrulate

. *C. capillaris*

Key 6 _____

1a Lateral spikes shorter than 1 cm

2a Perigynia obovate, beakless; plants of freshwater marshes and bogs

. *C. holostoma*

2b Perigynia ovate, short-beaked; plants of coastal shorelines and saline meadows

. *C. subspathacea*

1b. Lateral spikes long, greater than 1 cm

- 3a Pistillate scales distinctly shorter than perigynia
- 4a Perigynia lenticular in cross section; stigmas 2
- 5a Perigynia veined, green
 *C. kelloggii* (*C. lenticularis* var. *lipocarpa*)
 including *C. hindsii* (*C. lenticularis* var. *limnophila*)
- 5b Perigynia not veined, greenish-yellow or light brown
 *C. aquatilis*
- 4b Perigynia circular in cross section; stigmas 3 (very rarely 2)
- 6a Perigynia greenish brown, style persistent at summit of perigynium, typically as a short stub, but also longer
 *C. stylosa*
- 6b Perigynia chestnut to glossy reddish purple
- 7a Leaves flat, 2.5–6 mm wide; basal sheaths usually red; stems triangular *C. membranacea*
- 7b Leaves folded, narrow (< 2.5 mm wide); basal sheaths brown; stems rounded *C. rotundata*
- 3b Pistillate scales, slightly shorter to longer than perigynia
- 8a Lowest bract with a distinct, well-developed sheath
- 9a Perigynia beakless or with a minute beak, distinctly papillose *C. livida*
- 9b Perigynia with a distinct beak, not distinctly papillose *C. vaginata*
- 8b Lowest bract without a distinct sheath
- 10a Pistillate scales mostly blunt at the apex, purple black, midvein not lighter in color than the body of the pistillate scale
 *C. bigelowii*
- 10b Pistillate scales mostly acute at the apex, black and brown; midvein mostly lighter in color than the body of the pistillate scale
- 11a. Perigynia obovate, pistillate scales mostly narrower than the perigynia
 *C. aquatilis*

11b Perigynia ovate, pistillate scales as wide as the perigynia

12a Perigynia gradually beaked; midvein of pistillate scale broad

. *C. ramenskii*

12b Perigynia abruptly beaked; midvein of pistillate scale narrow

13a Pistillate scales black, midvein not projecting beyond the apex of scale; lowermost spike erect

. *C. bigelowii*

13b Pistillate scales dark brown, midvein projecting beyond the apex of scale as a short point; lowermost spike often pendent

. . . *C. microchaeta* subsp. *nesophila*

Species Descriptions

Carex anthoxanthea J. & C. Presl



Spike



Achene



*Perigynium,
dorsal view*



Pistillate scale



Carex anthoxanthea J. & C. Presl

NWI STATUS: FACW

Grassy-slope arctic sedge

Other Names: None

Plant Habit: Growing singly from long, yellow-brown, cordlike, scaly rhizome. **Culms:** Erect, slender, 5–40 cm tall.

Leaves: Flat, 1.5–2.5 mm wide, shorter than or equalling the culms, the lower ones lacking or reduced to bladeless sheaths (aphyllopodic).

Lowest Bract: None

Spikes: Solitary, pistillate or staminate, occasionally androgynous, narrowly cylindrical, 1–3 cm long.

Pistillate Scales: Lanceolate, shorter or longer than the perigynia, chestnut-brown with a greenish midrib, the lower ones awned or with a short point (cuspidate), the upper often rounded (obtus).

Perigynia: Linear-lanceolate to narrowly elliptical, 3–4 mm long, yellowish-green to straw colored, smooth, hairless. **Nerves:** Many. **Beak:** Tapering, dark tipped and 1 mm long.

Achenes: 3-angled, smaller than the body of the perigynia. **Stigmas:** Usually 3, rarely 2.

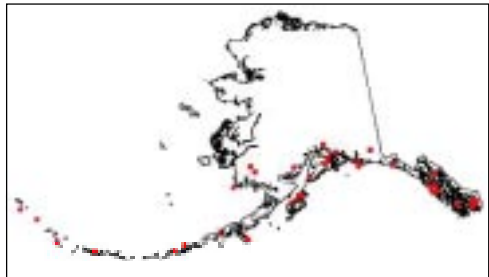
Habitat and Distribution: Fens, bogs, muskegs, wet meadows and grassy slopes, from sea level to the alpine. Grassy-slope arctic sedge is widespread across south coastal Alaska from the Aleutian and Pribilof Islands to the Panhandle, and continuing south to western British Columbia and Washington. Also known from Chukotka.

Similar Species: Grassy-slope arctic sedge is a distinctive sedge, but staminate plants may superficially resemble staminate plants of northern single-spike sedge (*C. scirpoidea*), which has well developed basal leaves, the lower ones not reduced to scalelike sheaths. Pistillate plants of *C. scirpoidea* are readily distinguished by their densely hairy perigynia.

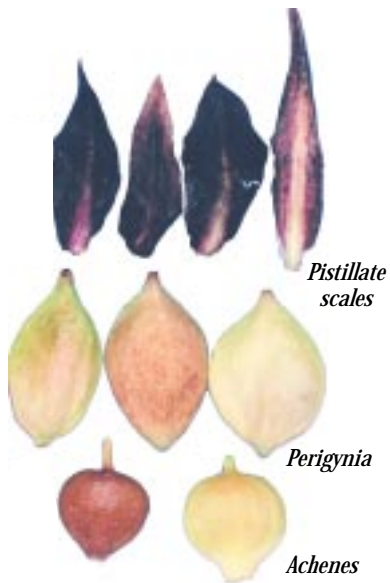
Coiled sedge (*C. circinnata*) is closely related to grassy-slope arctic sedge, but it is densely tufted and has stiff, narrow (0.5mm), inrolled leaves, that are typically curled or curved, and with perigynia that are finely serrulate. It is found on rocky ridges, talus slopes, and cliffs in the southern third of Alaska.

In wet snow beds, immature or poorly developed individuals of Bering Sea sedge (*C. microchaeta*) may have aborted pistillate spikes, leaving only a single terminal staminate spike, which may resemble grassy-slope arctic sedge.

Notes:



Carex aquatilis Wahlenb.



Carex aquatilis Wahlenb.

NWI STATUS: OBL

Water sedge

Some authors (see Standley, 2002 in The Flora of North America, vol. 23) include three varieties within this species in Alaska. The following description pertains to the typical variety (var. *aquatilis*). See below, under Similar Species, for notes regarding the other varieties, especially var. *dives*, which we treat as the distinct species *C. sitchensis*.

Other Names: *C. acutinella* Mack., *C. interimus* Maguire, *C. pachystoma* T. Holm, *C. suksdorfii* Kükenth., and *C. variabilis* L.H. Bailey = var. *aquatilis*; *C. dives* T. Holm, *C. howellii* L.H. Bailey, *C. panda* C.B. Clarke, and *C. sitchensis* Prescott ex Bong, = var. *dives* (T. Holm) Kükenth.; *C. stans* = var. *minor* Boott

Plant Habit: Plants growing singly or tufted from stout, scaly, reddish-brown, cord-like rhizomes. **Culms:** Erect, 20-120 cm tall, obtusely to sharply angled, smooth (glabrous), reddish-tinged at the base, equalling or exceeding the well-developed lower leaves and surrounded by old leaves and leaf sheaths.

Leaves: Erect with long-tapering, flat, light-green to glaucous-green blades, 2.5-8 mm wide. Basal sheaths leafless, reddish-brown.

Lowest Bract: Leaf like, sheathless, 7-35 cm long, equaling or, usually, exceeding the inflorescence.

Spikes: Erect. **Terminal:** (1) 2-4, usually staminate, linear, 1.25 cm long, 2-3 mm wide. **Lateral:** 2-7 pistillate or with the upper ones androgynous, erect, sessile, closely flowered, 1-10 cm long, 3-7 mm wide. Lowest spikes on stalks (peduncles) up to 4 cm long, arising from near the base.

Pistillate Scales: Ovate to oblong-ovate with an obtuse to acuminate tip. Awnless, reddish-brown to purplish-brown with narrow, pale midvein, shorter or longer than the perigynia and normally much narrower.

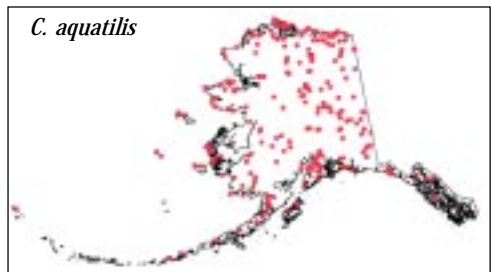
Perigynia: Pale brown or greenish-yellow, papillose, ellipsoid or obovoid, somewhat flattened and loosely enclosing the achenes. Apex rounded or obtuse, sessile or short-stipitate, 2-3.6 mm long, 1.2-2.3 mm wide, nerveless
Beak: Entire, 0.1-0.3 mm long.

Achenes: Broadly obovate, with an abrupt short point, yellowish to brownish-black, glossy, 1-1.8 mm long, 0.7-1.6 mm wide, without a constriction in the middle. **Stigmas:** 2.

Habitat and Distribution: A common and often dominant sedge in wet meadows, bogs, fens, swamps, ponds, lakeshores, and stream-banks over much of Alaska, except for the southeast. Typically in fresh water, but sometimes grading into the upper margin of brackish meadows, occurring from sea-level to the alpine. Circumboreal at high latitudes. In North America extending south through the Cascade Mountains to California and east to Nebraska.

Similar Species: Water sedge is a common and distinctive species that is easily distin-

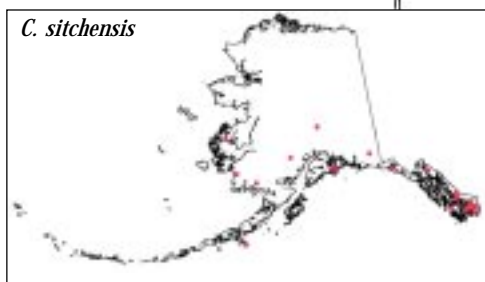
Continued, next page



Carex aquatilis Wahlenb. (continued)



C. sitchensis



Carex aquatilis Wahlenb. (continued)

guished from other sedges with 2 stigmas by its typical habit and habitat: a tall erect sedge with a long lower bract that overtops an inflorescence usually containing >1 staminate spike above and several erect, elongate pistillate spikes below. It is found in shallow water of wet meadows. Three varieties of water sedge are sometimes recognized in Alaska, with var. *aquatilis* being the typical, widespread form found throughout most of the state except for the southern part of the southeast panhandle.

Var. *minor* (= *C. stans*) is a northern form that, in Alaska, is found principally in the arctic north of the Brooks Range, where it intergrades with var. *aquatilis*. It is distinguished from var. *aquatilis* by its shorter habit (less than 100 cm), shorter inflorescence (7-12 cm vs 22-27 cm), usually with only 1-2 staminate spikes, and perigymia that are a darker purple-brown at the tip, in contrast to the pale brown or greenish-yellow perigymia of var. *aquatilis*. Many transitional forms are, however, commonly found.

Sitka sedge (*C. sitchensis*) is sometimes treated as a variety within *C. aquatilis* (var. *dives*). It differs from water sedge in its pendent, lateral (pistillate) spikes on long peduncles (the lowest one up to 11 cm long, vs 4 cm in var. *aquatilis*), scabrous culms and perigymia with purple – brown beaks. We treat it here as distinct at the species level because of its distinct morphology and because it is an important community dominant in south coastal Alaska, including southernmost southeast Alaska where water sedge is absent. Treating it as a variety of *C. aquatilis* might result in confusion in the naming and classifying of these important plant communities by resource managers. (Sitka sedge is often confused with Lyngbye sedge (*C. lyngbyei*) which differs in having yellow – brown, leathery perigymia, acuminate pistillate scales, and in being typically found in brackish or saline

marshes rather than fresh water.) Sitka sedge often forms tall, dense stands that are important wildfowl habitat.

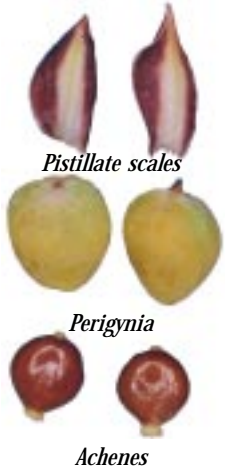
Kellogg's sedge (*C. lenticularis* var. *lipocarpa*) is similar in general habit and habitat but has perigymia with veins, unlike *C. aquatilis*.

Both Ramensk's sedge (*C. ramenskii*) and Hoppner's sedge (*C. subspathacea*) are shorter in stature than water sedge and are found in saline or brackish marshes rather than fresh water. They have shorter spikes with ovate (rather than obovate or elliptic) perigymia.

Occasional individuals of Bigelow's sedge (*C. bigelowii*) may resemble water sedge but differ in having blunt scales, scabrous culms that are usually sharply angled and a shorter lower bract, not overtopping the inflorescence.

Notes: An important species of wetland plant communities throughout much of the state, often forming pure stands, especially in the shallow water of lake margins and streams. An important food of lemmings, caribou, muskoxen, and waterfowl, especially in the arctic.

Carex aurea Nuttall



Pistillate scales

Perigynia

Achenes



Perigynium



Achene



Carex aurea Nuttall

Golden sedge

NWI STATUS: FACW

Other Names: Sometimes included within *C. bicolor* Bellardi ex All., or used as a synonym for *C. garberi* Fern., but see discussion below.

Plant Habit: Growing singly or loosely tufted from long, slender rhizomes. **Culms:** Slender, erect, 35-50 cm tall, can be shorter than the leaves (especially when young) or greatly exceeding the leaves. Stems and leaves are light brown at the base.

Leaves: Clustered near the base, light green, 1.4-4 mm wide, flat, but channeled below, tapering to a narrow tip.

Lowest Bract: Long and leaf like, usually exceeding the inflorescence, the sheaths up to 10 mm.

Spikes: Several, erect and sessile to loose and pedunculate. **Terminal:** Staminate and narrow, or occasionally with a few perigynia at apex. **Lateral:** Pistillate, with 4-20 perigynia, the upper ones on short stalks, the lower on slender, often elongate and arching peduncles, often widely separated, the lowest sometimes arising from near the base.

Pistillate Scales: Ovate to ovate-circular, 1.2-2.5 mm long, obtuse to short-pointed or acute, shorter and narrower than the perigynia, widely spreading when mature and usually deciduous, reddish brown with a wide pale or greenish mid-vein and narrow, white-hyaline margins.

Perigynia: Beakless and orbicular-obovoid, 2.3-3.2 mm long, divergent and somewhat inflated and fleshy when mature, becoming translucent and golden yellow to bright orange with a smooth or minutely papillose

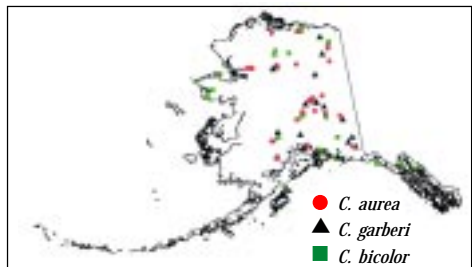
surface. Nerveless or obscurely to prominently nerved with up to 20 nerves.

Achenes: Lenticular, brownish. **Stigmas:** 2.

Habitat and Distribution: Moist, open or shaded habitats, especially meadows and seepage slopes, sandy river bars and moist dune swales, usually alkaline soils. In much of Alaska (except for western portion) and the Yukon. East to Labrador and south to California, New Mexico, Nebraska, Indiana and Pennsylvania.

Similar Species: When mature, the round, fleshy, golden-yellow or orange fruits makes golden sedge a distinctive species. Two closely related species in Alaska are two-color sedge (*C. bicolor*) and elk sedge (*C. garberi*, including ssp. *bifaria*). Two-color sedge has bluish-white perigynia, a lower bract that is often scale-like and black, or, if leaf like, not exceeding the inflorescence, pistillate scales that are black with a paler mid-vein, and terminal spikes that are always gynecandrous and sessile. The culms are often weak and arched toward the ground, with short stalked spikes. *Carex garberi* has white to pale-green perigynia, terminal spikes that are usually gynecandrous but with less than 1/3 the flowers in the spike being male.

Notes: Golden sedge can be an early colonizer of fens, dune swales, and river bars. The fleshy perigynia are eaten by waterfowl.



Carex bigelowii Torrey ex Schweinitz
ssp. *lugens* (Holm) Egorova



Carex bigelowii Torrey ex Schweinitz ssp. *lugens* (Holm) Egorova

NWI STATUS: FAC

Bigelow's sedge, Spruce muskeg sedge

Other Names: *C. lugens* Holm, *C. consimilis* Holm, *C. cyclocarpa*. Holm, *C. yukonensis* Britton

Plant Habit: Plants growing singly or loosely tufted from stout rhizomes with persistent, shiny, red- or purple-brown scales. **Culms:** Erect or ascending with dried up leaves at base, 10 – 50 cm tall, exceeding the leaves, stiff, sharply triangular and slightly rough (scabrous) below the inflorescence; last year's culms often persistent.

Leaves: Mostly basal, shorter than culm, 2-6 mm wide, flat or slightly channeled and often turned under at the margins (revolute), with dark red-brown basal sheaths.

Lowest Bract: Scale-like, or leaf-like but narrow and shorter than the inflorescence, 0.5-3 mm wide, sheathless and with blackish ear-like lobes (auricles) at the base.

Spikes: Erect, usually closely spaced. **Terminal:** 1 (2) staminate. **Lateral:** (1) 2-3 pistillate, erect, with short stalks or nearly sessile, 0.7-3cm long, 3-4 mm wide.

Pistillate Scales: Black to purplish black, equalling or shorter than the perigynia, ovate, with a blunt or acute tip but without an awn.

Perigynia: Basal 1/2 green, upper 1/2 uniformly purple-black, strongly to minutely papillose, more or less flattened, elliptical, 1.5-3 mm long, the apex rounded or acute. **Beak:** short, 0-0.2 (1.0) mm long.

Achenes: Lens-shaped, dull, not constricted. **Stigmas:** 2, rarely 3.

Habitat and Distribution: One of our most common sedges, found in a wide variety of habitats from dry to moist tundra. From sea level to 500 m across most of Alaska, except the south coastal regions. Bigelow's sedge is part of a large variable complex that is circumboreal at high latitudes. The complex is poorly understood, but we are following recent authors in treating ssp. *lugens* as the sole representative of the complex in Alaska. It is amphiberian, ranging from Siberia eastward across Alaska and the Yukon Territory to the Northwest Territories and Nunavut, and south to British Columbia. Previous treatments have recognized long rhizomatous plants with wider leaves occurring on dry to moist tundra as distinct from cespitose plants with narrow leaves occurring in wet tundra, bogs and muskegs. Other characters used to distinguish the taxa vary considerably within and between populations and are not correlated with habitat. It may be that the differences in habit (cespitose vs long rhizomatous) may simply be a response to the differences in substrate and soil moisture.

Similar Species: See above. Bering sea sedge (*C. microchaeta* ssp. *nesophila*) and small-awned sedge (*C. microchaeta* ssp. *microchaeta*) can occur in similar habitats and can superficially resemble Bigelow's sedge. They differ in having 3 stigmas, pistillate scales that are acute or mucronate, and lower pistillate spikes that are frequently widely separate and nodding on long peduncles.

Notes: An important species of a wide variety of dry to moist communities, where it is grazed by microtines and ungulates.

Carex buxbaumii Wahl.



Pistillate scale

Perigynium

Pistillate scales

Perigynia

Achenes

Carex buxbaumii Wahl.

NWI STATUS: FACW

Buxbaum sedge, club sedge, brown sedge

Other Names: *C. holmiana* Mackenzie

Plant Habit: Stems growing loosely clumped (cespitose) from long, slender, well-developed, creeping rhizomes. **Culms:** Distinctly triangular, slender, rough (scabrous), and erect to 75 cm tall. Lowermost leaves are greatly reduced (aphyllopodic).

Leaves: 2-4 on the lower one-half of the stem. Blades are erect, thin, flat, sharply keeled, smooth (glabrous), and bluish-green, to 3.5 mm wide and one-half to equal the length of the culm. Sheaths: Yellowish-brown tinged, with purple dots on the inner surface, sometimes slightly thickening near the concave mouth. Lower sheath breaks down and becomes fibrous (cross-fibrillose).

Lowest Bract: Shorter to longer than the inflorescence and sheathless or nearly so with a dark auricle. The upper bracts are reduced.

Spikes: In a loose cluster of several (2-5) erect, green-brown bicolored, and oblong- to egg-shaped, short-stalked spikes. **Terminal:** Gynecandrous (having the pistillate flowers above and staminate flowers below), club-like with short peduncles, 1-3 cm long. **Lateral:** Pistillate, stalkless (sessile) and compactly flowered; oblong-ovoid, 6-10 mm wide and 5-20 mm long; perigynia ascending

Pistillate Scales: Lanceolate to lance-ovate, narrower and longer than the perigynia, tapering to an acute to acuminate or mucronate awn-tip, purplish black with a conspicuous pale midrib, often raised, that extends to the apex.

Perigynia: Elliptic or obovoid, triangular-biconvex, with a leathery

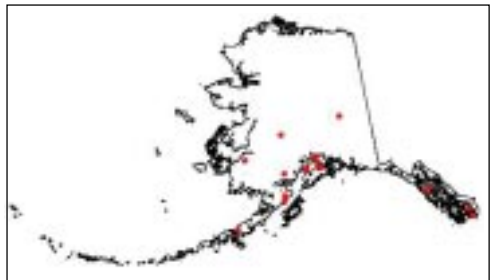
texture (subcoriaceous), and conspicuously and densely papillose throughout; light gray-green or glaucous-green; 2.5-4.3 mm long, 1.4-2.1 mm wide. **Nerves:** 6-8 inconspicuous nerves on each surface; marginal nerves present. **Beak:** Beakless to minutely beaked (0.2 mm) and reddish-tipped; minutely bidentate with a wide opening.

Achenes: Suborbicular-obovoid, 3-angled (trigonus), brownish to blackish with conspicuous depressional dots and translucent glands (punctate); 1.5-2.2 mm long, 1.1-1.5 mm wide. **Stigmas:** 3.

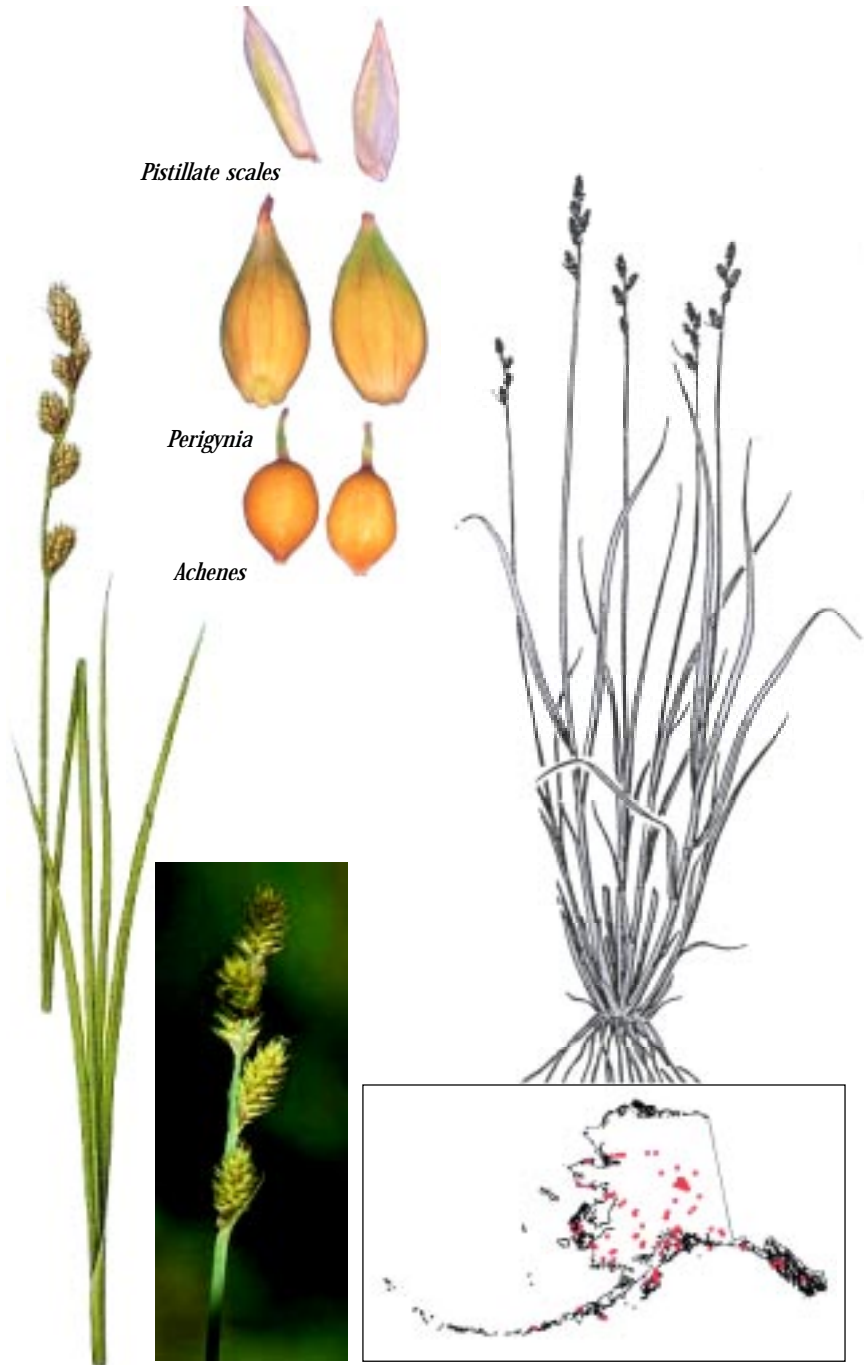
Habitat and Distribution: A widespread, but uncommon and infrequently collected sedge found in wet meadows, peat bogs, fens, marshes, and open swamps from sea level to moderate elevations. Circumboreal. South half of Alaska into the Yukon. In North America from southern Alaska to Newfoundland and south to California, Nevada, Utah, Colorado, Arkansas and Georgia. Flowering and fruiting May-September.

Similar Species: Buxbaum's sedge is characterized by its club-like short-stalked spikes; cross-fibrillose lower leaf sheaths; terminal gynecandrous spikes; narrow, dark pistillate scales extending beyond the perigynia; papillate, more or less glaucous, short-beaked

Continued on page 120



Carex canescens L.



Carex canescens L.

NWI STATUS: OBL

Silvery sedge, gray sedge, pale sedge, white sedge

Other Names: *Carex curta* Goodenough

Plant Habit: Loosely to densely clumped (tufted) on short, black rhizomes often forming large clumps that are brownish at the base and clothed in old leaves. **Culms:** Erect, slender but not stiff, often open and widely spreading (lax). Sharply triangular, equaling or exceeding the leaves, 10-50 cm tall and with the lowermost leaves slightly reduced (aphyllopodic).

Leaves: 10-20 (30) cm and clustered near the base. Flat, soft, pale-green to gray-green blades, 1.5-4 mm wide. Sheaths tight, thin and translucent (hyaline) on the inner side, and concave at the summit.

Lowest Bract: Sheathless, thin, dry (scarious), inconspicuous; sometimes bristle-tipped (setaceous), shorter to longer than the inflorescence. Upper bracts are reduced and scale-like.

Spikes: 4-8, small, and sessile, having pistillate flowers above the staminate flowers (gynecandrous). Suborbicular to oblong, 3-5 mm wide and 5-10 mm long. The upper are close together and sometimes flexuous; the lower are more or less remote. Silvery green, light green, pale gray or pale straw-colored, thus the species name *C. canescens*, from the Latin for 'turning hoary-white'. Perigynia 10-20 per spike, appressed-ascending to spreading-ascending. The terminal spike is often club-like due to a more conspicuous staminate part.

Pistillate Scales: Broadly to narrowly ovate, thin, white, and translucent, and shorter than the perigynia. Greenish midvein present when young, usually becoming brownish-tinged in age.

Perigynia: Ovoid-oblong, spongy-thickened below, planoconvex, contracted into a short beak with small marginal teeth. Light green to dull silver or straw colored, becoming brownish-golden yellow to dull brown; 1.8-3 mm long, 1.2-1.7 mm wide. Finely nerved or obscurely many-nerved on both faces. Beak is gradually tapered, with a shallow, oblique cleft, and short, inconspicuous or obsolete dorsal suture.

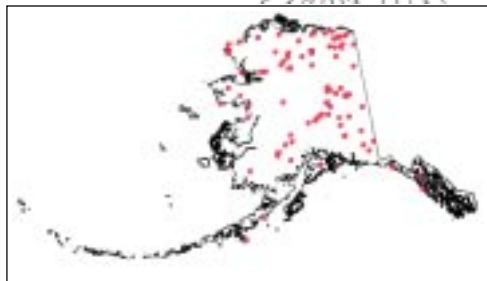
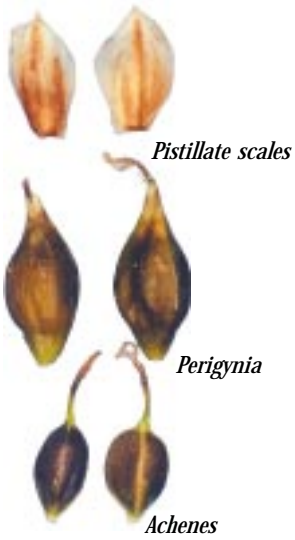
Achenes: Oblong-obovate, lenticular, contracted at the base, substipitate, 1.2-1.5 mm long, 0.8-1 mm wide. Dull to slightly glossy pallid-brown. **Stigmas:** 2.

Habitat and Distribution: Usually acidic to neutral conditions such as *Sphagnum* bogs and swamps. Also fens, wet meadows, lake-shores, streambanks, wet clearings and ditches from lowlands to near timberline in the mountains. Circumboreal. Widespread south of 68° latitude in Alaska. In North America from Alaska to Newfoundland and south to California, Nevada, Idaho, Utah, Arizona, New Jersey, and Virginia. Flowering and fruiting June-August.

Similar Species: A number of Alaskan sedges bear a resemblance to *C. canescens*. Brownish sedge (*C. brunnescens*) has smaller spikes with fewer, loosely-spreading perigynia with sharp, 2-toothed beaks, and it does not have blue-green leaves. Lapland sedge (*C. lapponica*) occupies wet, grassy habitats, and does not grow in distinct clumps or tufts. It has gracile culms and narrower leaves (1 mm wide), is few-flowered, with widely-separated globose spikes, and a lower spike with a stiff, setaceous bract.

Notes: It is reported to have good palatability for wildlife and livestock. Although its reclamation potentials are not known, it does occur regularly on disturbed sites such as wet clearings and ditches.

Carex capillaris L.



Carex capillaris L.

Hair sedge, hair-like sedge

NWI STATUS: FACW

Other Names: *C. capillaris* L. ssp. *chlorostachys* (Stev.) A. & D. Löve & Raymond, *C. capillaris* L. var. *elongata* Olney ex Fern., *C. capillaris* L. var. *fuscidula* (Krecz.) A. & D. Löve, *C. capillaris* L. var. *major* Blytt, *C. capillaris* L. ssp. *robustior* (Drej. ex Lange) Böcher

Plant Habit: Densely clumped (tufted) perennial from short rhizomes. **Culms:** Very slender, triangular and smooth, 30-60 cm tall, and exceeding the lower, well-developed leaves. Dark, somewhat shreddy sheaths at base.

Leaves: 5-8, mostly clustered toward the base and shorter than the stems. Flat blades are thin but firm, 0.5-4 mm wide, rough in the middle portion, and contracted into a short, less than 0.5 cm-long, needle-shaped (acicular) tip. Sheaths truncate at the summit and turn brownish with age.

Lowest Bract: Leaf-like with a long, well-developed, tubular sheath, shorter to longer than the inflorescence.

Spikes: 2-5, linear-oblong and brown, at the ends of nodding or loosely spreading peduncles. **Terminal:** Staminate (rarely gynaeandrous), 4-10 mm long and 0.75-1 mm wide, level with or overtopped by some lateral spikes. **Lateral:** Pistillate, 4-17 mm long, 3-4 mm wide; spreading to pendulous, at least the lower ones with slender peduncles 1.5-2 cm long or more. Perigynia 3-25, ascending and loosely arranged.

Pistillate Scales: Ovate, with a blunt or short tip; thin, light brown or greenish, wider but shorter than the perigynia, closely appressed and falling off with age.

Perigynia: Lanceolate to ovoid, 3-sided, 2-4 mm long and 0.75-1.2 mm wide, tapering to

a conical, hyaline-tipped, entire, 1 mm-long beak. Slightly ciliate and serrulate toward the apex. Short stalked and veinless; greenish-brown or usually shiny brown to brownish-olive-green.

Achenes: Obovoid, 3-sided (trigonus), stalk very short or lacking (substipitate), brownish to dark greenish-brown with blunt, green angles, 1.2-1.5 mm long, 0.7 mm wide, jointed to the style. **Stigmas:** 3.

Habitat and Distribution: Moist open forests, moist to wet shorelines, wet meadows, seeps, fens, bogs, and wet ledges. Distinctly more common on calcareous-rich soils. From moderate to high elevations in the mountains, up to about timberline. Circumboreal. In much of Alaska except the southwestern portion. In North America from southern British Columbia to north central Washington, northeastern Oregon, northeastern Nevada, Utah, Wyoming, New Mexico, Michigan and New York. Flowering and fruiting June-August.

Similar Species: William's sedge (*C. williamsii*) is similar to hair sedge, but differs in having capillary, canalicate (channeled or grooved) leaves. It is found in wet, grassy habitats in northern and central to eastern Alaska, the northern Alaska Peninsula and Kodiak Island. Krause's sedge (*C. krausei* Boeckl.) is sometimes merged with, or treated as a subspecies of, hair sedge and the morphological distinction between the two is often not clear. Krause's sedge has a terminal spike with female flowers above and male flowers below (gynaeandrous) rather than the staminate or androgynous terminal spike of hair sedge.

Notes:

Carex chordorrhiza Ehrhart ex Linnaeus f.



Inflorescence



Achene



Perigynium



Carex chordorrhiza Ehrhart ex Linnaeus f.

NWI STATUS: OBL

Creeping sedge; cordroot sedge

Other Names: None

Plant Habit: Growing singly along creeping, cord-like stolons (actually old, buried stems).

Culms: Bluntly triangular, 5-35 cm tall, smooth or scabrous below the inflorescence, ascending and curved at base to erect, the fertile culms arising from the upper nodes of old culms. Sterile culms arising from the lower nodes, becoming prostrate when mature and rooting at the nodes.

Leaves: Flat or ridged, attenuate, 0.5-3 mm wide and shorter than culm. Sheaths purplish or reddish brown to straw colored, the lower sheaths lacking blades.

Lowest Bract: Scalelike, reduced.

Spikes: 2-8, closely aggregated into a small, ovoid head, 5-15 mm long and 4-12 mm wide. All spikes sessile, androgynous, few-flowered, ovoid, 4-8 mm long and 2-5 mm wide.

Pistillate Scales: Ovate to broadly ovate, brownish with a pale margin and green or straw-colored center; ovate, acute to acuminate, usually longer than the perigynia.

Perigynia: Ovate to broadly elliptic, 2-3.5 mm long, 1.4-2.2 mm wide, glossy brown. **Nerves:** Very conspicuous on both sides. **Beak:** Short, 0.3-0.5 mm long.

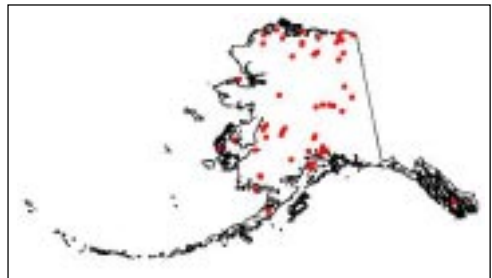
Achenes: Lens-shaped, silvery brown, smooth, 1.2-2 mm long. **Stigmas:** 2.

Habitat and Distribution: Fens, bogs, lakeshores, fresh water sedge marshes and shallow water, from sea level to 1500 m. Circumpolar in the low-arctic and boreal zones.

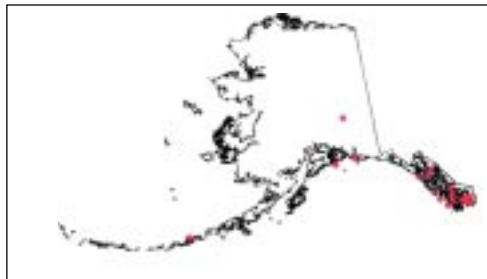
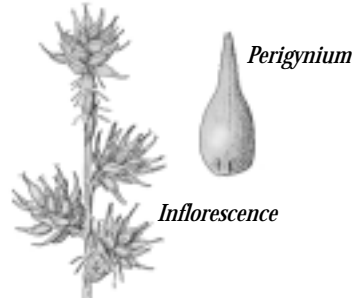
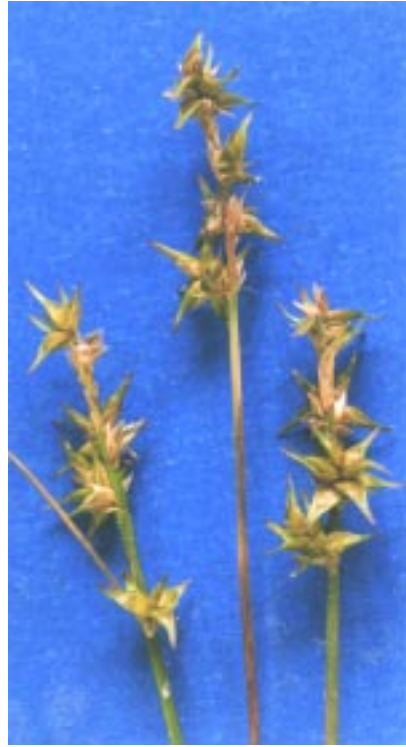
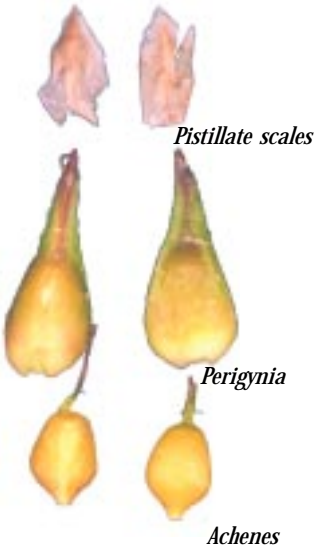
Found in much of Alaska, except the south-east and western-most areas. Creeping sedge is often overlooked but can be locally abundant and dominant, often forming extensive stands in both calcareous and non-calcareous areas.

Similar Species: The unusual growth form of creeping sedge readily distinguishes it from other species.

Notes: New plants are readily established from stolon segments and can be an aid in binding soil in wetland restoration projects.



Carex echinata Murray ssp. *phyllomanica*
(W. Boott) Reznicek



Carex echinata Murray ssp. *phyllomanica* (W. Boott) Reznicek

NWI STATUS: OBL

Star sedge, coastal stellate sedge,
stellate sedge, spiny star sedge

Other Names: *C. echinata* Murr. var. *phyllomanica* (W. Boott) Boivin, *C. phyllomanica* W. Boott

Plant Habit: Growing in low, dense clumps (tufts), with short, thick rootstalks. **Culms:** Erect but somewhat weak, 20-80 cm tall.

Leaves: Pale green, shorter than the stem; stiff, broad, flat and/or with longitudinal channels or grooves (canaliculate). 1-3.3 mm wide. Sheaths straw-colored to brownish; lowest sheath with a rudimentary leaf blade, but blades becoming elongate progressing up the stem.

Lowest Bract: Scale-like, bristle-shaped (setaceous), or linear-subulate, to 0.2-1.5 mm long.

Spikes: Without a stalk (sessile), erect, 2-4, in a very dense inflorescence 1.5-2.5 cm long. All gynecandrous but the terminal has pistillate flowers at the top and the lateral are mostly pistillate. The lower spike is separated by 3-6 mm, and spreads upwards.

Pistillate Scales: Ovate, and acute to blunt at the end; greenish or brownish with thin and translucent (hyaline) margins and a lighter green midvein that becomes obscure at the apex.

Perigynia: 3.5-4.75 mm long and 1.2-1.7 mm broad. Green, lanceolate-shaped, tapering to a flattened, minutely sawtooth (serrate) beak, the beak 1-1.5 mm long and bidentate. Usually not serrulate below the base of the beak and usually many nerved (2-12) on both surfaces.

Achene: Ovoid, golden brown. **Stigmas:** 2.

Habitat and Distribution: Coastal, from 0-200 m in elevation, and found in bogs, fens and swamps, and on stream and lakeshores (but not in truly maritime habitats). Coastal and insular southeastern Alaska and less commonly in the interior southern Alaska; and south to California. Flowering in early spring, and maturing in late spring-early summer.

Similar Species: Two subspecies of *C. echinata* are found in Alaska. Nearly all of our material is treated as ssp. *phyllomanica*, with ssp. *echinata* known only from Unalaska in the Aleutian Islands. Subspecies *echinata* differs in having smaller perigynia, 2.9-3.6 (-4) mm, that are often veinless on the adaxial (= ventral) side, and with narrow leaves, the widest being 1-2.4 (-2.7) mm wide vs 2.3-3.3 (-3.8) mm for ssp. *phyllomanica*. *Carex interior* is similar to ssp. *echinata* but has smaller perigynia (1.9-3 mm) with a shorter beak (<1 mm). Smooth sedge (*C. laeviculmis*) is equally common over virtually the same range as coastal stellate sedge (*C. echinata* ssp. *phyllomanica*). The former's inflorescence has fairly well-separated spikes in a head 2-6 cm long, and the perigynium is wingless with a nearly smooth beak.

Notes: Star sedge (*C. echinata*) is reported to be a metal hyperaccumulator and tolerant to heavy metals, and may be useful for plant remediation of metal-contaminated or polluted sites. The achenes are reportedly eaten by waterfowl.

Carex glareosa Schkuhr



Inflorescence

Perigynium



Carex glareosa Schkuhr

NWI STATUS: NOT LISTED (OBL)

Lesser saltmarsh sedge,
clustered sedge, weak-clustered sedge

Other Names: *C. amphigena* (Fernald) Mackenzie, *C. bipartita* All. var. *glareosa* (Schkuhr ex Wahlenb.) Polunin, *C. cryptantha* T. Holm = ssp. *glareosa* var. *glareosa*, *C. pribylovensis* Macoun = ssp. *pribylovensis* (Macoun) Halliday & Chater

Plant Habit: Growing in small, loose to dense clumps (tufts) from compact, pallid-brown rhizomes. **Culms:** Slender, bluish-green, slanting and curving upward in a somewhat flexuous manner; triangular and rough to the touch; 15-40 cm high and conspicuously taller than the leaves.

Leaves: Numerous, narrow, pale-to gray-green in color, and borne on the lower part of the stems. Strongly keeled or channeled, or flat, 1-2.5 mm wide. Sheaths tight, brownish or reddish to straw-colored. Blades of the lower sheaths are short or lacking.

Lowest Bract: Flat, narrow and tapering gradually to a sharp point; about 5-10 mm long or may be lacking.

Spikes: 2-4, brown, in a dense, 1-2 cm long, ovoid head; a few spikes may occasionally be separated below by 2-8 mm. **Terminal spike** is larger than the lower ones, and is club-shaped or oblong, many-flowered, 2-4 mm long, slanting and curving upward, with both female and male flowers. The female flowers are toward the tip while the male flowers are inconspicuous. The lower **lateral spikes** are sessile and mostly female.

Pistillate Scales: Egg-shaped (ovate), pointed, smooth, pale-to red-brown with a yellow-brown

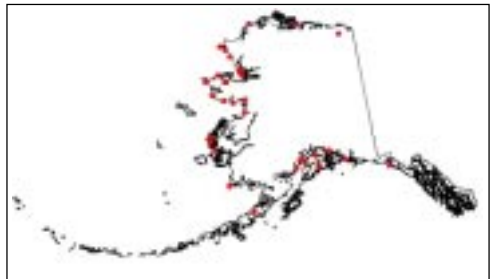
center and white hyaline margins, and usually shorter than the perigynia in fruit.

Perigynia: Egg-shaped, biconvex and smooth; bluish-green, dark-green or light to pale brown in color with minute whitish dots. Unstalked, with a smooth, minute beak 0.3-0.5 mm long and obliquely or not cleft. **Nerves:** Many lightly or obscure veins on both surfaces.

Achenes: Lens-shaped (lenticular), mid-brown to reddish-brown, dull to slightly glossy, 1-1.7 mm long and filling the perigynia. **Stigmas:** 2.

Habitat and Distribution: Coastal tidal flats and brackish marshes. Along southern coasts, it is associated with Ramensk's sedge (*C. ramenskii*) and Pacific silverweed (*Argentina egedii*) in graminoid forb communities occupying mid- to high-marsh tidal slough and stream levees, and the edges of shallow catchments and interlevee basins. Irregularly tidally flooded, though frequent rain and spring thaws keep silty soil and peaty substrate continuously saturated. Lesser saltmarsh sedge is dominant closer to levees, decreasing in importance to the center of the interlevee basins. It sometimes forms large, nearly pure

Continued on page 120



Carex gmelinii Hook. & Arn.



Pistillate scale



Perigynium



Carex gmelinii Hook. & Arn.

NWI STATUS: FAC

Gmelin's sedge

Other Names: None

Plant Habit: Growing in dense clumps from short, stout rhizomes with short runners.

Culms: Coarse or rough to the touch (scabrous), and curved at the top; 20-55 cm tall and extending above the leaves.

Leaves: Blades flat with rolled-under margins or sometimes channeled below; 2-5 mm wide (rarely less), the lower ones lacking or greatly reduced (aphyllopodic) and elongating up the stems. Sheaths purplish-red towards the bases.

Lowest Bract: Sheathless or short-sheathing, bristle-like to leaf-like, and 2-8 cm long, equal to or longer than the inflorescence.

Spikes: 3-6, in an erect to nodding, 2-8 cm long inflorescence. **Terminal** spikes have both female and male flowers with female flowers above; commonly with a short stalk. The **lateral** 2-5 spikes are erect, 0.6-2.5 cm long and short-stalked, with female flowers. The upper lateral spikes are commonly short-stalked, and more or less congested; the lowermost spikes are remote (separated by 10-35 mm) and long-stalked (6-15 mm or more), ascending to erect.

Pistillate Scales: Broadly egg-shaped and as long as and wider than the perigynia. Pointed and abruptly awned at the tips, extending from a conspicuously-raised, pale mid-vein. Scales are reddish- or purplish-black, and roughly papillose, with narrow hyaline margins. The body of the scale is distinctly shorter, although the entire scale, including the awned tip, may be as long as the perigynia.

Perigynia: Egg-shaped, green to dark brown, smooth, 4-5 mm long and 1.8-2.2 mm wide, borne on a short stipe, and abruptly contracting into a short, purple-tipped beak with a broad, shallow notch. **Nerves:** Present on both sides.

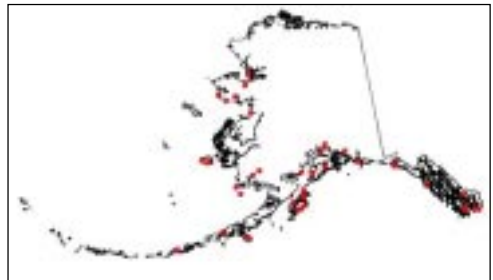
Achenes: Three-angled, 1.7-2 mm long and with small granules or grains on the surface.

Stigmas: 3.

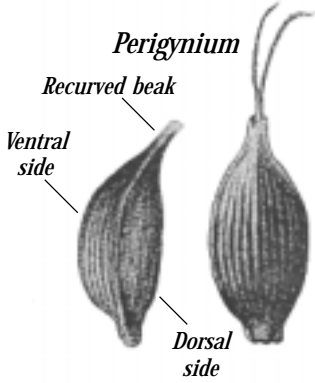
Habitat and Distribution: Coastal sand dunes, beaches, and gravels, saline marshes, swales, meadows, and exposed bluffs and sea cliffs. In coastal, western, southwestern, southern and southeastern Alaska. South to British Columbia; west into Asia (amphiberian). Coastal lowland zone.

Similar Species: None

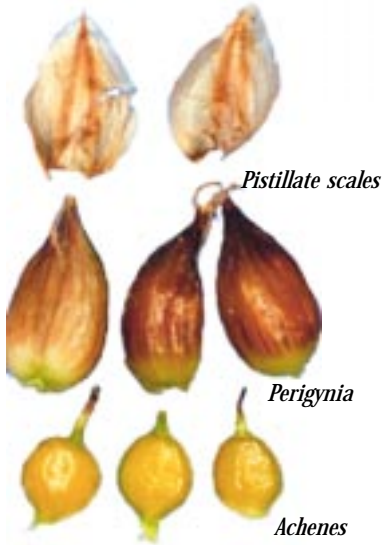
Notes:



C. gynocrates Wormsk. ex Drej.



Inflorescence



C. gynocrates Wormsk. ex Drej.

NWI STATUS: OBL

Northern bog sedge, yellow bog sedge, bog sedge

Other Names: *C. dioica* L. ssp. *gynocrates* (Wormsk. ex Drej.) Hultén, *C. dioica* L. var. *gynocrates* (Wormsk. ex Drej.) Ostenf., *C. parallela* auct. non (Laestad.) Sommerf.

Plant Habit: Stems are single or a few together arising from long, slender, yellowish-brown rhizomes with capillary runners.

Culms: Filiform, circular in cross-section (terete), 4-30 cm tall, stiff, smooth, sometimes curved, exceeding the leaves, and clothed in old leaves at the base.

Leaves: Loosely clustered near the base and well-developed (phyllopodic). Blades are stiff and channeled or narrowly involute, 3-15 cm long, 0.4-0.9 mm wide and shorter than the stems. Sheaths are thin and white-hyaline or straw-colored ventrally when young, turning brown when mature, and are shallowly to deeply concave at the summit.

Lowest Bract: Not developed.

Spikes: Solitary, chestnut brown, 5-15 mm long, varying from having male flowers above the female flowers in the same spike (androgynous), to wholly staminate or wholly pistillate. Staminate spike or portion is 8-15 mm long and very slender. Pistillate portion or spike is elliptic or broadly cylindrical and bractless, with widely-spreading, crowded perigynia.

Pistillate Scales: Egg-shaped, shorter and wider than the perigynia; thin, dry and chaffy in texture (scarious) or almost translucent (hyaline); persistent, and light reddish-brown to brown.

Perigynia: Egg-shaped, plump, glossy, yellowish to brownish-black or

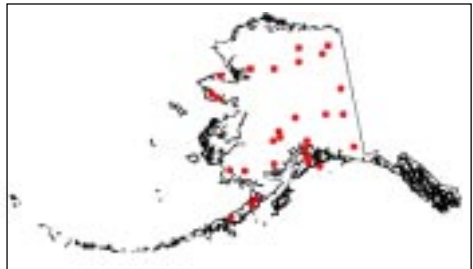
chestnut brown, 2.5-4 mm long, 1.5-2 mm wide. Thick-walled and spongy-thickened, especially below; biconvex with a thick and leathery texture (coriaceous) at maturity. A short stipe becomes apparent when dry. Numerous, conspicuous, fine nerves reaching the base of the beak, although sometimes obscure on the ventral surface. The marginal nerves are not prominent. An abruptly contracted beak, 0.5 mm long, is sparingly serrulate near the apex and obliquely cleft and recurved.

Achenes: Broadly obovate or ovate, lenticular, glossy, yellowish-brown, 1.5-2 mm long, 1.2-1.5 mm wide. Stigmas: 2.

Habitat and Distribution: *Sphagnum* bogs and wet, marshy places; stream-sides, terraces and open woods generally on calcareous soils. Middle to high elevations. Circumboreal. In most of Alaska south of the 68th parallel except the southern Panhandle region. In North America, east to Newfoundland and south to Washington, Oregon, Nevada, Utah, Colorado and Pennsylvania. Flowering and fruiting July-August.

Similar Species: This small sedge is quite distinctive. *Carex nigricans* and *C. micro-poda* both have perigynia that can be spreading to slightly reflexed at maturity, but have broader leaves and narrower (lanceolate)

(Continued on page 120)



Carex laeviculmis Meinsh.



Perigynium



Lateral inflorescence



Carex laeviculmis Meinsh.

NWI STATUS: FACW

Smoothstem sedge, smooth-stemmed sedge,
smooth-stem sedge

Other Names: None

Plant Habit: Densely clumped (tufted), arising singly from slender, creeping rhizomes. Culms: Very slender, weak, roughened near the tops, 14-66 cm tall and arching above the leaves.

Leaves: 3-5, pale green, flat, weak, 1-2.3 mm wide and mostly located on the lower half of the stem. They are rough along their margins and at their apices. Lowest leaves are very short or lacking. Sheaths tight; leaves have a ligule 2.5-7 mm long.

Lowest Bract: Short and linear-hairlike to awl-shaped; nonsheathing, and up to 5 cm long. The upper bracts are reduced.

Spikes: 3-8, terminal, erect, attached directly to the stem. The uppermost spikes are closely aggregated into a single, oval, greenish to brownish-green head, 2-6 cm long. The **terminal spike** is 4-7 mm long with both male and female flowers, with female flowers toward the tips. The **lateral spikes** are 2-7, ascending to widely spreading, and are either crowded into a head or somewhat spread out by 3-30 mm along the stem, particularly the lowest 2 spikes. Lower spikes consist of 3-10 flowers, with female flowers only.

Pistillate Scales: Egg-shaped, rounded at the tips, sharply keeled, and equal to or slightly shorter than the perigynia. Yellowish-brown or purple with greenish midribs; occasionally with transparent margins and a short awn (hyaline) at the tip.

Perigynia: A very few spreading or ascending per spike; lance-shaped, smooth, light green to greenish brown, 2.5-4 mm long and 1.5-

1.7 mm wide. Body of the perigynium is inflated around the achene, tapering to a narrow more or less flattened beak, that is up to 1 mm long, inconspicuously bidentate at the tip, and with sparsely serrulate or entire margins. Many obscure nerves on both surfaces.

Achenes: Lens-shaped, 1.2-2 mm long. **Stigmas:** 2.

Habitat and Distribution: Common sedge of wet places in wooded regions: forested wetlands, shorelines, streambanks, wet meadows and occasionally marshes and bogs. From lowlands to mid elevations. In near coastal and insular southern and southeastern Alaska. South to California, Idaho and Montana. Amphiberingian. Flowering in late spring into summer; fruiting in the summer.

Similar Species: Coastal stellate sedge (*C. echinata* ssp. *phyllomanica*) is equally common over virtually the same range as smoothstem sedge, but the former is restricted to bogs and fens. It has a minutely saw-toothed perigynium beak, and its spikes are closer together in a head 1.5-3.5 cm long.

Smoothstem sedge may sometimes also be confused with a sedge of open wetlands, silvery sedge (*C. canescens*), which has larger, more numerous-flowered spikes that appear smooth in outline.

Other similar species include: northern cluster sedge (*C. arcta*) and sawbeak sedge (*C. stipata*).

Notes:

Carex lasiocarpa Ehrh.



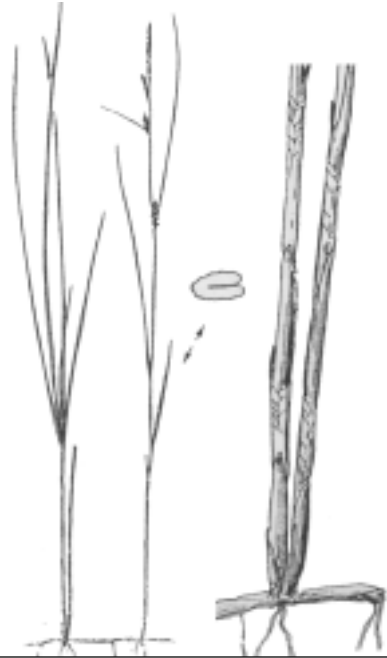
Pistillate scales



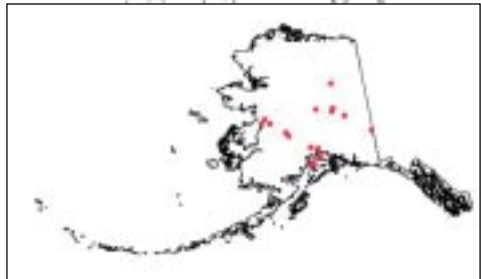
Perigynia



Achenes



Perigynium



Carex lasiocarpa Ehrh.

NWI STATUS: OBL

Wool-fruit sedge, wooly fruit sedge, slender sedge

Other Names: *C. lasiocarpa* ssp. *americana* (Fern.) Love & Bernard, *C. lasiocarpa* var. *americana* Fern., *C. lanuginosa* Michx., *C. lanuginosa* var. *americana* (Fern.) Boivin

Plant Habit: Greenish-gray and slender with only a few stems per plant that rise singly or in small clumps from long, well-developed, tough, scaly, creeping rhizomes. Plants are usually 30-100 cm tall. **Culms:** Smooth, slender, round to obtusely triangular in cross-section, and wine-red at the base.

Leaves: Few (2-5), they possess ligules, and are longer than the stems. Lowermost leaves are reduced to sheaths around the plant base (aphyllopodic). Leaf blades are tightly folded or rolled especially near the long slender tips. Light green in color, 1-2 mm wide, with minute, whitish, knot-like cross-walls between the veins. The lower sheaths are long, and break and become strongly shredded (cross-filamentose).

Lowest Bract: Leaf-like, 6-15 cm long and overtopping the spikes.

Spikes: A group of 3-6, stalkless, erect, and widely-spaced, in an 8-15 cm long inflorescence. Greenish to brown or purplish-brown in color. **Staminate:** 1-3 (usually 2) at the tip; the terminal with a peduncle and 1.5-6 cm long; the lateral are shorter and stalkless, and immediately below the terminal spike. **Pistillate:** 1-3, oblong-cylindric, 1-3 cm long, stalkless or nearly so, and closely flowered with upright perigynia.

Pistillate Scales: Reddish to purplish-brown and narrower than the perigynia; lanceolate to ovate-lanceolate, and somewhat ciliate at the tip, with a broad, pale, 3-veined midrib and brown, transparent margins. The lower scale is tipped with a short, sharp point (mucronate-awned) and is longer but much nar-

rower than the perigynia; the upper scale is acute and shorter.

Perigynia: Oblong egg-shaped, 3-5 mm long and 1.5-2 mm wide; inflated; round-tapering at the base; contracted at the apex; densely velvety hairy; dull-brown to green, and obscurely veined. Body of the perigynia abruptly tapers to a stout, notched beak, 0.6 mm long.

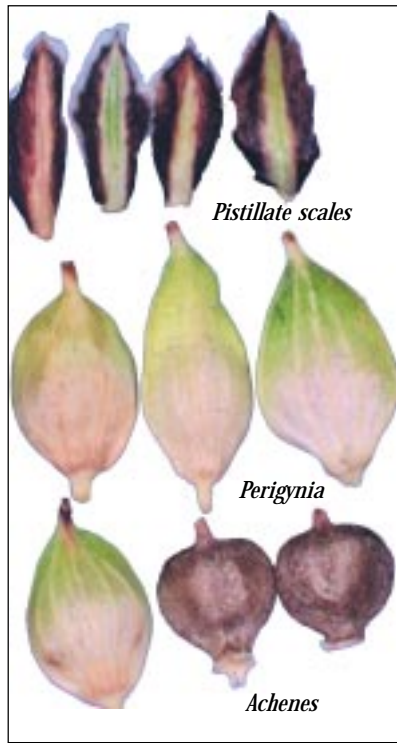
Achenes: Triangular, yellowish brown to darker brown, 1.5-2.0 mm long and 1.5 mm wide with a persistent bent style. **Stigmas:** 3.

Habitat and Distribution: Large emergent sedge preferring perennially wet habitats such as the shallow edges of lakes, ponds and stream banks, marshes, fens and the margins of pH-neutral bogs and bog ponds. Circumboreal. In Alaska, south of the Brooks Range except Alaska Peninsula and southeast Alaska. Across North America to Newfoundland; irregularly southward to Oregon, Idaho, western Montana and Utah through Iowa to New Jersey. Flowering and fruiting May-September.

Similar Species: *Carex pellita* Willdenow is very similar to *C. lasiocarpa* but has broader leaf blades (2-6 mm wide) which are flat or folded into an M shape, rather than involute. *Carex pellita* is rare in Alaska (the name *C. lanuginosa* has been incorrectly used for this species in many floras). *Carex utriculata* and *C. rostrata* are two other large sedges found in flooded areas, but they have longer spikes with inflated perigynia that are glabrous and shiny rather than hairy.

Notes: *Carex lasiocarpa* provides feed for moose, small mammals and hares. The seeds are used by many duck species, marsh and shore birds and many song birds. The leaves of vegetative shoots of *C. lasiocarpa* are elongated late in the season with long, hair-like tips.

Carex lenticularis Michx.



Carex lenticularis Michx.

NWI STATUS: OBL

Enander's sedge (var. *dolia*); lakeshore sedge, Hind's sedge (var. *limnophila*); Kellogg's sedge (var. *lipocarpa*); lakeshore sedge, lens sedge, lenticular-achened sedge, tufted sedge (var. *lenticularis*)

Following is a generalized description covering the three varieties of *C. lenticularis* found in Alaska. Distinguishing characters of the varieties are described under Habitat and Similar Species.

Other Names: For Alaska: *C. enanderi* Holm, *C. eurystachya* E.J. Herm., *C. plectocarpa* E.J. Herm. = var. *dolia* (M.E. Jones) L.A. Standley; *C. hindsii* C.B. = var. *limnophila* (Holm) Cronq.; *C. kelloggii* W. Boott, *C. lenticularis* Michx. var. *pallida* (W. Boott) Dorn = var. *lipocarpa* (Holm) L.A. Standley

Plant Habit: Growing in large, dense clumps or tussocks from fibrous, short rhizomes.

Culms: Slender, erect and triangular with smooth edges and a slight roughness below the inflorescence. Shorter to slightly longer than the leaves, 10-90 cm tall, and brownish and shreddy with conspicuous bladeless sheaths and withered leaves at the base.

Leaves: 4-9, bluish-green and clustered on the lower one-third of the culm. Blades are erect, thin, flat above and channeled below, and 1.5-5 mm wide. Sheaths: Yellowish-brown-dotted to brown spotted.

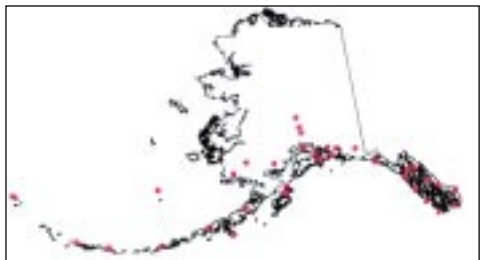
Lowest Bract: Leaf-like or scale-like, erect, sheathless or very short-sheathing, and equalling or exceeding the inflorescence. Ear-shaped lobes (auricles) are present at the bases that are pale-green, purplish-brown, brown or blackish-brown in color.

Spikes: 3-9, erect, elongate, cylindrical, narrow, 4-8 cm long, notably bicolored with green and reddish-purple, and appearing close together or slightly separated. **Terminal:** Staminate, occasionally with a few female flowers near the top or the bottom. Dark-brown, linear, attached directly to the stem and 0.8-3 cm long and 2.5 mm wide. **Lateral:** Pistillate, 2-8, unstalked or with short stalks on the lower ones, erect and cylindrical, often slenderly tapering to the base, 1-5 cm long and 3-5 mm wide. The lowermost spike is occasionally on a long stalk 3-15 mm long.

Pistillate Scales: Small and egg-shaped with a round tip. They are shorter to larger than and sometimes narrower than the perigynia, light-green to reddish-brown, or purplish or blackish-brown in color, with a broad, lighter green center and prominent translucent margins.

Perigynia: Egg-shaped, 1.8-3.6 mm long and 2.2 mm wide; bluish-green, brownish-green or green, and sometimes slightly yellow glandular-dotted. They are 3-angled, the angles rounded, and unstalked or with a short stalk, and easily falling off when ripe. **Nerves:** 5-7

Continued next page



Carex lenticularis Michx. continued



C. lenticularis



C. lenticularis var. *dolia*

on each side. Beak is well-defined, but minute or short and slender, with a dark tip up to 5 mm long.

Achenes: Lens-shaped, 1.0 -1.8 mm long and 0.8-1.6 mm wide. **Stigmas:** 2.

Habitat and Distribution: Enander's sedge (var. *dolia*): streamsides and ponds **in the subalpine and alpine zones**. Lakeshore sedge (var. *limnophila*): marshes and wet meadows **in the lowland zone**. Kellogg's sedge (var. *lipocarpa*): bogs, wet meadows, streambanks and lakeshores **in all but the alpine zone**.

Widespread from the western Aleutians, into southcentral and coastal southeastern Alaska. Across North America: Enander's sedge (var. *dolia*) occurs east to southwest Alberta and south to northwest Montana; lakeshore sedge (var. *limnophila*) ranges south along the coast to northwest California; Kellogg's sedge (var. *lipocarpa*) ranges east to Alberta and south to New Mexico, Arizona and California. Flowering and fruiting May-August.

Similar Species: The three varieties found in Alaska may be broadly separated by habitat (above) and more specifically by the following characteristics:

Enander's sedge (var. *dolia*) has a terminal spike with female flowers at the top and a few male flowers at the base, with the lowermost spike up to 1.5 cm long and with a stalk up to 1 cm long. Lakeshore sedge (var. *limnophila*) and Kellogg's sedge (var. *lipocarpa*) have a terminal spike with all male flowers, and a basal spike up to 5 cm long with a longer stalk up to 5 cm long.

Lakeshore sedge has a lowermost spike 4-6 mm wide; perigynia stalks from 0.4-0.7 mm long; and a compact inflorescence. Contrastingly, Kellogg's sedge possesses a basal spike 3-4 mm wide; perigynia stalks up to 4

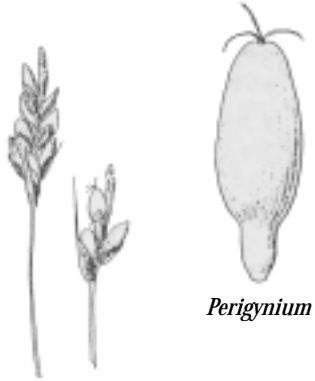
mm long; and a loosely spreading inflorescence.

Kellogg's sedge is often confused with water sedge (*C. aquatilis*). The finely-veined perigynia of Kellogg's sedge may be used to help differentiate between the two species.

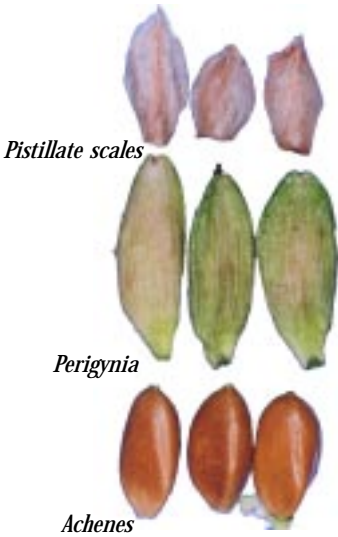
Notes: Kellogg's sedge achenes are eaten by waterfowl and it is commonly grazed by domestic livestock when other feed is scarce; sheep reportedly thrive on it. It has also been identified as an indicator of early successional stages of Northwest Territory sedge (*C. utriculata*) and water sedge (*C. aquatilis*) riparian vegetation types in the western U.S. It is also described as a pioneer species that invades water edges in Utah. In water sedge vegetation types, Kellogg's sedge, along with water sedge, appear to function as pioneer colonizers of exposed mineral substrates, such as those created when a beaver dam breaks, and will persist indefinitely. High water tables and a vigorous network of roots of these species successfully limit the establishment of most other species (USFS 2002).

Information on the value of *C. lenticularis* varieties for rehabilitation of disturbed sites is not well documented and is available only at the species level. It has been successfully utilized for rehabilitation of disturbed alpine sites, and because of its recognized pioneering habit, has been recommended for revegetating eroded streambanks and wet meadows at higher elevations in the western U.S. (USFS 2002).

Carex leptalea Wahlenb.



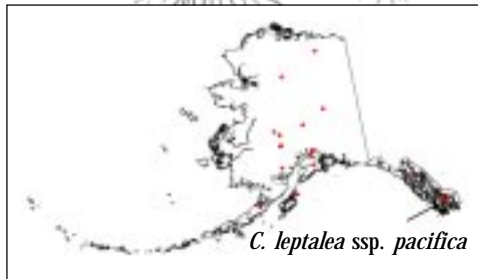
Perigynium



Pistillate scales

Perigynia

Achenes



C. leptalea ssp. *pacifica*

Carex leptalea Wahlenb.

NWI STATUS: OBL

Bristlystalked sedge, bristle-stalk sedge, flaccid sedge

Other Names: *C. jimcalderi* Boivin (= *C. leptalea* ssp. *pacifica*), *C. leptalea* Wahlenb. var. *tayloris* Boivin (= *C. leptalea* ssp. *leptalea*)

Plant Habit: Stems are usually densely clustered from a mass of finely elongated rhizomes. **Culms:** Very slender, sometimes arching; 15-30 cm tall and exceeding the leaves; triangular; and scabrous near the tops.

Leaves: Lowermost are greatly reduced (aphyllopodic). The 2 leaf blades arise from the lower part of the culm and are flat or channeled (canaliculate), thin, soft and lax, pale to deep green, and 0.5-1.3 mm wide. Leaf sheaths are membranous, yellowish- to brownish-tinged at maturity, and concave near the top.

Lowest Bract: Scale-like or none.

Spikes: Solitary, erect, linear-oblong, green to yellowish-green, 4-16 mm long, and 2-3 mm thick. The staminate flowers are above the pistillate flowers (androgynous) although the staminate portion is often short and inconspicuous. The perigynia are pressed close or flat and pointed upwards.

Pistillate Scales: Green to brown, ovate-orbicular and blunt to nearly rounded at each end, occasionally with a short awn. They are distinctly shorter than the perigynia and may become deciduous approaching maturity. The lowest scale is sometimes elongated and resembles a bristle-shaped bract.

Perigynia: 1-10; oval-elliptic to lanceolate elliptic, mostly pale green or yellowish green to straw colored throughout, 2.5-5 mm long, and 1-1.5 mm wide. They are circular in cross section and somewhat two-edged. The base is narrow and spongy, with a minute stalk, and tapers slightly to a rounded, entire or broad

and shallow-notched apex. **Nerves:** 2 marginal nerves and many fine nerves on both surfaces. **Beak:** Lacking.

Achenes: Oblong-ovoid with 3 sharp or projecting angles. Glossy, yellow to brown, 1.3-2 mm long and 0.8-1 mm wide. The rachilla is absent and the style is deciduous. **Stigmas:** 3.

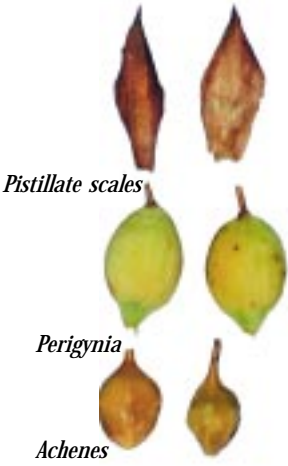
Habitat and Distribution: This distinct but inconspicuous sedge is widespread in *Sphagnum* bogs, wet, rich-calcareous, shrubby- and treed-fens and swamps, and often along small streams, lakeshores, and on low, wet ground. From lowlands to higher elevations in the mountains. Eastern two-thirds of Alaska to Labrador, south to Florida, Texas, Colorado, northeastern Utah, Idaho, and northern California. *Carex leptalea* has the widest geographic range of any sedge in North America. See also **Similar Species.** Flowering and fruiting May-August.

Similar Species: Two subspecies of bristlystalked sedge have been distinguished in Alaska. The description provided is for the typical phase, ssp. *leptalea*, which ranges south to Glacier Bay. A more robust form, Pacific bristlystalked sedge (*C. leptalea* ssp. *pacifica* Calder and Taylor), occurs in the southernmost part of southeastern Alaska. Leaves are over 1.2 mm broad and the perigynia are 3.4-4.7 mm long.

Soft-leaved sedge (*C. disperma*) may occur in wetlands but is loosely clumped (tufted) or solitary from long, slender rhizomes. Its stems are very slender and usually nodding with a number of few-flowered spikes well-separated from each other. The perigynia contracts abruptly into a tiny beak and stigmas are only 2.

Notes: The achenes are eaten by waterfowl.

Carex limosa L.



Carex limosa L.

Mud sedge, shore sedge

NWI STATUS: OBL

Other Names: None

Plant Habit: Stems arising singly or a few together from long, slender, scaly, creeping rhizomes. Roots are covered with a yellowish-brown, felty tomentum. **Culms:** Slender, sharply triangular, reddish at the base, 20-60 cm tall and exceeding the leaves. The lowermost leaves are usually greatly reduced (aphyllopodic), and old leaves are present.

Leaves: 1-3 blades which tend to be deeply channeled (canaliculate) rather than flat, and longitudinally grooved. They are somewhat glaucous, gray-green and 1-3 mm wide. Sheaths are thin and hyaline on the inner side, and shallowly concave at the top. The lower sheaths are sometimes slightly threadlike and very slender.

Lowest Bract: Nodding to erect and narrowly leaf-like, 2-7 cm long, and sheathless with dark brown auricles. They may occasionally be bristle-shaped. The upper bracts are reduced.

Spikes: Inflorescence is a small group of spikes (2-4) that are reddish- to yellowish-brown on long, slender, nodding peduncles.

Terminal: Solitary, staminate, usually erect, linear, 1-3 cm long and 2.5 mm wide. **Lateral:** 1-3, pistillate, although occasionally with a few male flowers at the tip. They are not crowded, nodding on slender peduncles, and are 1-2.5 cm long and 5-8 mm wide. Perigynia lay flat against peduncles.

Pistillate Scales: Variable in size and shape, but most commonly ovate to suborbicular. Yellowish-brown to dark reddish-brown (not black) with a green 1- to 3-nerved center. They

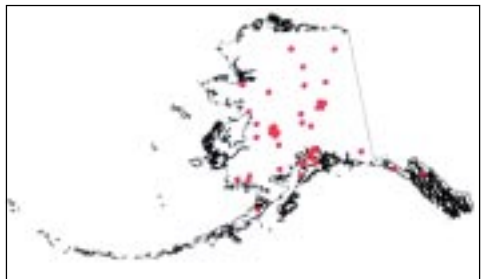
are short-tapering, blunt to nearly rounded or cuspidate at the tip, and almost hide the perigynia.

Perigynia: Pale, commonly green to straw-colored, broadly ovoid and somewhat compressed, 2.3-4.2 mm long and 2 mm wide. Thick and leathery in texture (coriaceous) and densely covered with rounded nipple-like bumps (papillate). The base is rounded or truncate with a small stipe; the apex is rounded and beakless or broadly tapers to a very short (up to 0.2 mm long) conic beak that is entire or with a broad shallow notch. **Nerves:** 4-7 evident on each face, with prominent marginal veins.

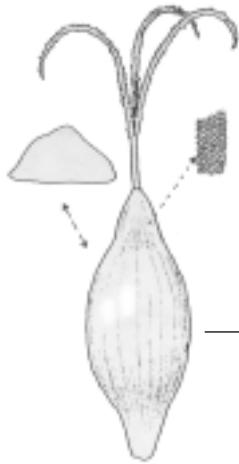
Achenes: Three-angled, oblong-ovoid, 1.5-2.7 mm long and 1-1.8 mm wide. Rather loosely filling the perigynium, the upper one-third of which is empty. Light brown becoming dark brown with maturity. **Stigmas:** 3.

Habitat and Distribution: Peat bogs, peaty fens, wet meadows and shallow ponds from low to high elevations. Circumboreal. In much of continental Alaska and central to northern southeast Alaska. Extending south in North America to California, Idaho, Montana, the Great Lakes, New England and portions of the Appalachian Mountains. Flowering and fruiting July-August.

(Continued on page 121)



Carex livida (Wahl.) Willd.



Pistillate scales



Perigynia



Achenes



Carex livida (Wahl.) Willd.

NWI STATUS: OBL

Livid sedge, pale sedge

Other Names: None

Plant Habit: Stems are solitary or a few together arising from clusters on long, slender, scaly, creeping rhizomes. **Culms:** Slender, erect, smooth, triangular, 4.5-40 cm tall and longer or shorter than the leaves. Lowermost leaf blades are well-developed (phyllopodic) and the old basal leaves are persistent.

Leaves: Pale blue-green to light bluish gray and mainly basal. Blades are firm or thick and leathery in texture, narrow (0.5-3.5 mm wide), channeled, and glaucous. Sheaths are smooth, thin and membranous.

Lowest Bract: Leaf-like, 2-10 cm long, with a well-developed, long (5-15 mm), scabrous sheath, equaling or overtopping the inflorescence. The upper bracts are reduced.

Spikes: 2-4, green to yellow-green, nearly stalkless to short stalked. **Terminal:** Staminate, erect, linear, projecting well above the pistillate spikes, 0.7-3 cm long and 3-4 mm wide. **Lateral:** Pistillate, mostly 2, narrowly oblong and slender, 1-2.5 cm long and 5 mm wide; loosely flowered with few perigynia (5-15) situated close to or slightly removed from the main axis of the inflorescence.

Pistillate Scales: Ovate, obtuse to somewhat acute or mucronate at the tip and shorter than, but partially enveloping, the perigynia bases. Pale brown to purplish brown with a broad, pale-green center and white to brown hyaline margins.

Perigynia: About 4 mm long and 1.2-2.4 mm wide, pale glaucous-green, fusiform or oblong-ovoid and 2-keeled; thick and leathery in texture (coriaceous), and minutely dotted with depressions (punctulate).

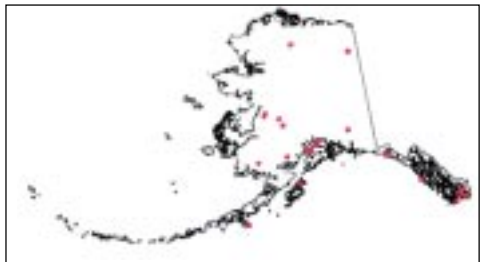
Beakless or with a small beak up to 0.2 mm long.

Achenes: Broadly ovoid, three-angled, 2.2-3.5 mm long, 0.9-1.8 mm wide, jointed to the style, and dark brown at maturity. **Stigmas:** 3.

Habitat and Distribution: Peat bogs, fens, shallow peatland pools, swampy woods, muddy streambanks and wet forest openings. Reported from wet calcareous lakeshore meadows in the Yukon. From low to middle elevations. Circumboreal. In North America from Alaska, British Columbia, and Washington, east through northern Idaho, Montana, Utah and Wyoming to Michigan and New Jersey. Flowering and fruiting May-July.

Similar Species: Livid sedge (*C. livida*) might at times be confused with mud sedge (*C. limosa*) and bog sedge (*C. magellanica* var. *irrigua*), all three of which are off-green in color. Livid sedge does not have a yellowish felt on its roots (compared to mud sedge), and its female spikes are erect and loosely flowered (compared to bog sedge). Both bog sedge and livid sedge have bluish green leaves and perigynia but this off-green color is more so in livid sedge. Livid sedge is mostly found in open (rich) fens, while bog sedge is most common in treed (poor) fens.

Notes: Indicator of soils medium-rich in nitrogen.



Carex loliacea L.



Perigynium,
ventral view



Inflorescence



Carex loliacea L.

Ryegrass sedge, rye-grass sedge

NWI STATUS: OBL

Other Names: None

Plant Habit: Loosely clumped (tufted) with very long, slender rhizomes well-buried in the peaty mat. **Culms:** Slender and about as long as the leaves or longer, 15-47 cm tall, and scabrous below the spikes.

Leaves: Blades pale- or yellowish-green, numerous, and borne on the lower part of the stem. Flat, 1-2 mm wide, and about half as long as the culms (5-15 cm), tapering gradually to a narrow tip. Sheaths tight and brownish.

Lowest Bract: Short and bristle-shaped, 2-10 mm long. The upper bracts are reduced.

Spikes: 2-5 (8), widely separated on the top of the stem in a 3- to 5-cm long, narrow, interrupted head. The lowermost spike is separated below by 1-18 mm. Each spike is egg-shaped, sessile, few-flowered, 5-8 mm long, ascending, with both male and female flowers. Male flowers are inconspicuous with female flowers towards the tips of the spikes.

Pistillate Scales: Egg-shaped and pointed to blunt or rounded at the apex, covering about half of the perigynia; whitish-green to white-hyaline with green midribs.

Perigynia: Narrowly elliptic to lanceolate without a stalk. Smooth and somewhat thick and leathery (subcoriaceous), with a scarios margin. Pale green, dark green or brownish with age, with minute white dots; 2.5-3.5 mm long, 0.6-1.5 mm wide. **Nerves:** Conspicuously veined on both surfaces. Beakless.

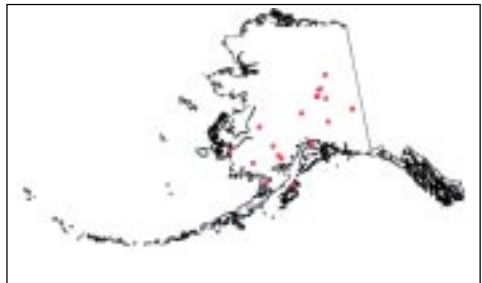
Achenes: Lens-shaped, red brown and glossy, 1.2-1.7 mm long and 1 mm wide. **Stigmas:** 2.

Habitat and Distribution: Peaty soils of muskegs, fens, marshes, wet open forests, mossy streambanks and seeps. Mostly a lowland plant, from 0-1,000 m elevation. In the southeast three-quarters of mainland Alaska; east to Quebec and south to British Columbia and Alberta; Eurasia. Flowering in early summer.

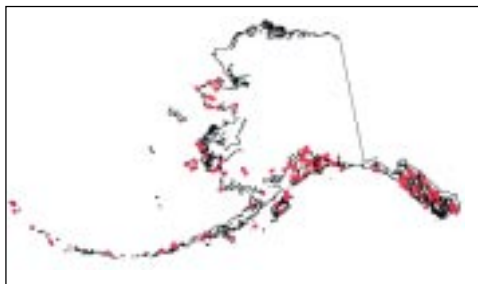
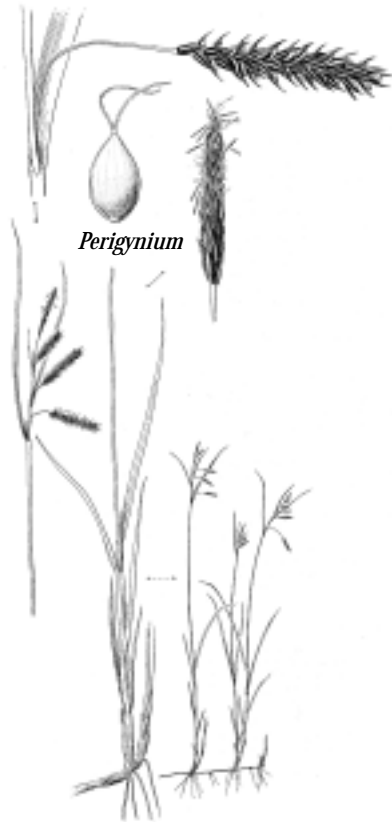
Similar Species: Sparseflower sedge (*C. tenuiflora*) resembles ryegrass sedge, but its spikes are more compact and bunched at the tip of its slender stem, and its perigynia have only a few faint veins.

Softleaf sedge (*C. disperma*) is another wetland sedge that might be confused with ryegrass sedge, possessing spikes that are well separated from each other along the stem. Softleaf sedge has a terminal spike with male flowers at the top, and perigynia that are erect or at an angle less than 90 degrees to the main axis, and thinly nerved on each surface. Ryegrass sedge has a terminal spike with staminate flowers at the base. The perigynia spread at a distinctive 90 degree angle, and are prominently nerved on each surface.

Notes:



Carex lyngbyei Hornem. in Oeder et al.



Carex lyngbyei Hornem. in Oeder et al.

NWI STATUS: OBL

Lyngbye's sedge

Other Names: *C. cryptocarpa* C.A. Meyer, *C. lyngbyei* var. *cryptocarpa* (C.A. Meyer) Hultén, *C. lyngbyei* var. *robusta* (L.H. Bailey) Cronquist, *C. salina* Wahlenberg var. *robusta* L.H. Bailey.

Plant Habit: Growing singly or in small clumps from long, creeping rhizomes. **Culms:** Erect, 20-150 cm tall, exceeding the lower leaves, obtusely to sharply angled, glabrous, with a red-brown or purplish tinge at the base, and surrounded by old leaves and leaf sheaths.

Leaves: Long, flat, shorter than culm, 2-10 mm wide, with margins rolled under (revolute), Basal sheaths red-brown, the lowermost leaves reduced or present only as sheaths (aphyllopodic).

Lowest Bract: Leaf like, sheathless, 3-8 mm wide, usually extending beyond inflorescence.

Spikes: 4-7, spreading or drooping, on long peduncles. **Terminal:** 2-3, staminate, linear, 1.5-5 cm long. **Lateral:** 2-4, pistillate or with some male flowers at the tip, 1.5-5 cm long, usually pendent (at least the lowermost) on 1.5-9 cm long peduncles.

Pistillate Scales: Narrow, lanceolate to ovate, acuminate; red-brown to purple-black with a pale green or lighter midrib, narrower and longer than the perigynia.

Perigynia: Ovate to elliptic, yellow-brown to brown, 2.5-3.5 mm long, plump, leathery and thick-walled, dull. Loosely enclosing achenes, stipe 0.5 mm. **Nerves:** Veined (sometimes only faintly) on both sides. Beak whitish, 0.1-0.3 mm long.

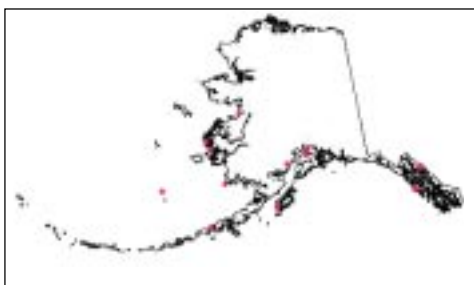
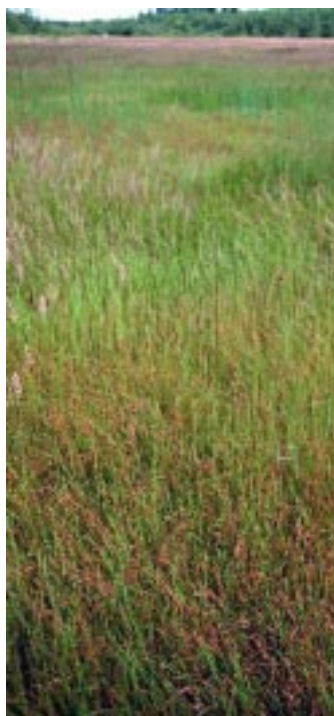
Achenes: Rounded on top, 2-2.5 mm long, often constricted on 1 or both margins. **Stigmas:** 2.

Habitat and Distribution: Common and often dominant in estuarine meadows, coastal saltmarshes and gravel beaches, typically growing in dense, nearly pure stands. Rarely found inland in fresh water marshes or meadows. Coastal Alaska from Kotzebue to the southeast Panhandle, and south along the coast to California; disjunctly to Greenland and Iceland. Also reported from the Russian Far East south to Japan.

Similar Species: Sitka sedge (*C. sitchensis*) is sometimes confused with *C. lyngbyei*, but differs in having pale brown or greenish-yellow perigynia that are papery, flattened, and papillose rather than thick-walled, inflated, and smooth. Sitka sedge also exhibits a preference for fresh water rather than brackish or salt water marshes and meadows. Slough sedge (*C. obnupta* Bailey) is also similar in appearance to Lyngbye's sedge, but has shiny perigynia and lateral (pistillate) spikes on short, stiff, erect peduncles, rather than drooping on long peduncles. Although slough sedge is not yet known from Alaska, it is known from British Columbia as far north as the northern Queen Charlotte Islands where it is typically found in fresh water marshes and bogs but also is found together with Lyngbye's sedge in brackish sloughs and tidal marshes.

Notes: Lyngbye's sedge is the most common sedge of south coastal Alaska's salt marshes and shorelines. It is an important forage species for brown bears and waterfowl in the spring since young shoots can contain up to 25% crude protein (Pojar and MacKinnon 1994). Lyngbye's sedge is a pioneer colonizer of tidal mudflats and has been used successfully in wetlands restoration and creation programs, generally by plugs rather than seed.

Carex mackenziei Krecz.



Carex mackenziei Krecz.

NWI STATUS: OBL

Mackenzie's sedge

Other Names: None

Plant Habit: Growing in low, dense clusters (tufts), 10-40 cm high with the leaf parts open and spreading; often with long, pale-brown rhizomes. **Culms:** Slender, triangular, sometimes curved, and about the same size as or higher than the leaves. Mackenzie's sedge has a distinctive straw- to brownish-color and spreading habit, occurring in the middle and upper salt marsh zones where it occupies shallow, permanently-flooded depressions.

Leaves: Blades of the lower sheaths are short, elongating upwards and about as long as the culm. Yellowish-green to pale gray-green; 1-3 mm wide; flat and soft. Basal sheaths are persistent and straw-colored to brownish. The inner band is thin, hyaline, and sometimes reddish-tinged, with a prolonged concave summit. Ligules are as long as wide.

Lowest Bract: Scale-like, bristle-shaped or a short, awl-shaped blade, 3 mm long.

Spikes: 3-6 in an erect inflorescence, 1.5-4.5 cm long. The sessile, erect or ascending spikes are separated from each other, although the upper are close together while the lower are often separated by 1-1.5 cm. All have pistillate flowers above the staminate flowers in the same spike (gynecandrous). **Terminal:** Long club-shaped, with the lower one-half to two-thirds conspicuously staminate. **Lateral:** Ob-long and less conspicuously gynecandrous, appearing to be wholly pistillate with 5-15 appressed to ascending perigynia.

Pistillate Scales: Ovate to oval, and obtuse to rounded at the ends. Brown or yellowish-brown with narrow, hyaline margins and green to straw-colored median. Slightly equalling, or longer and concealing the perigynia.

Perigynia: Elliptic to ovate, with a very small stalk and abruptly contracted to a minute beak at the apex. Wingless, and thickly flat on one surface and rounded on the other. Glabrous with dense nipple-like bumps. Straw-colored to gray-green; pallid and brown with age; and often reddish-dotted. Perigynia are appressed-ascending, and 2.5-3.5 mm long and 1.2-2 mm wide. **Nerves:** Densely fine-veined on both sides. **Beak:** 0.1-0.5 mm long, and smooth or with a few marginal teeth.

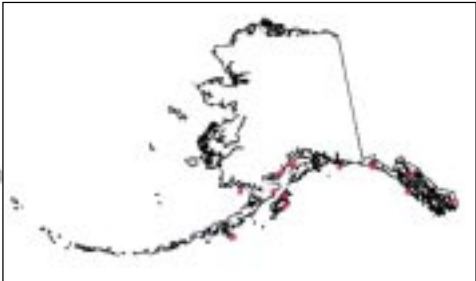
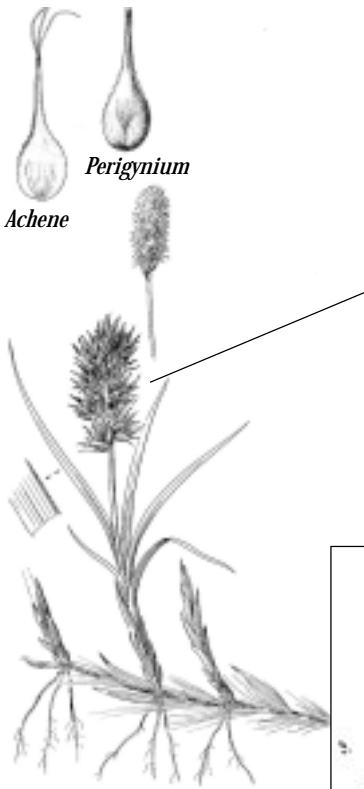
Achenes: Lenticular to oblong, pale- to gray-brown; 1.75-2 mm long and 1.25-1.5 mm wide. **Stigmas:** 2.

Habitat and Distribution: Mackenzie's sedge occurs in coastal and estuarine marshes on mostly brackish soils. It occupies shallow, permanently-flooded depressions and inter-leave basins in the middle and upper salt marsh zones. It is commonly associated with Ramensk's sedge (*C. ramenskii*), Pacific silverweed (*Argentina egedii*), mare's tail (*Hippuris tetraphylla*) and circumpolar reed-grass (*Calamagrostis deschamsioides*). It is readily identifiable in pure stands by its straw- to brownish-color and erect inflorescence of sessile club-shaped spikes. Low elevation sea-shore plant. In coastal western, southern, and southeastern Alaska; coastal Yukon, Northwest Territories and British Columbia; disjunctly east to the Atlantic, south to Maine; Eurasia. Flowering in early summer.

Similar Species: Mackenzie's sedge is a close relative of (*C. glareosa*) and (*C. lachenalii*).

Notes: Mackenzie's sedge is an important food species for brood-rearing cackling Canada geese and greater white-fronted geese in coastal lakeshore and meadow habitats along the coastal fringes of the Yukon-Kuskokwim delta (Babcock and Ely 1994).

Carex macrocephala Willd. ex Spreng.



Carex macrocephala Willd. ex Spreng.

NWI STATUS: FAC

Largehead sedge, large-headed sedge, bighead sedge

Other Names: None

Plant Habit: Locally common coastal species on sandy beaches or dunes easily identified by its large flowering spikes and extremely stout triangular stems. Because of the size of the spikes, largehead sedge is perhaps the most distinctive and showy wetland sedge in Alaska. It is a coarse, low perennial from large, horizontally-spreading, scaly rhizomes buried deep in the sand. Stiff, stout, 10-40 cm tall; the base is dark-shreddy with an accumulation of dead leaves. **Culms:** Stout, stiff, triangular and conspicuously serrulate; 10-30 cm tall, arising singly or a few together and usually shorter than the leaves.

Leaves: 2-5 per stem, clustered near the base; yellowish-green, thick, channeled, 4-8 mm wide, gradually tapering to the tips and usually surpassing the stems. Toothed along the margins with minute, sharp teeth (or spines). The basal leaves are very short and scalelike. Sheaths brownish or blackish, breaking into threads at the base and persisting, sometimes obscured by the old leaves.

Lowest Bract: Female inflorescence has several to many leaf-like bracts up to 6 cm long with enlarged bases and small-bristled teeth. Bracts are scalelike or lacking in the male inflorescence.

Spikes: Nearly always either male or female and unstalked. The female inflorescence is a compacted cylindrical to egg-shaped head of many spikes appearing as if only one large spike, 3.5-8 cm long and 2.5-5 cm wide. The male inflorescence is similarly arranged but in smaller clusters, 3.5 to 5 cm long to 1.5 cm wide.

Pistillate Scales: Firm, almost woody, egg-shaped to lanceolate, tapering to a needlelike

apex about 1.5 mm long. Conspicuously bi-colored: dark- to light-brown and multi-veined with green or gold centers and translucent margins. Usually shorter and narrower than the perigynia.

Perigynia: Mostly large and coarse, and crowded with short stalks; ascending to spreading. Lanceolate to teardrop-shaped, flat on one surface and rounded on the other, with short-bristled teeth above. Shiny and strongly nerved on both surfaces with irregular, torn-looking margins. Brownish to brownish-yellow, 10-15 mm long and 4-6 mm wide. Base of the perigynia heart-shaped and long-tapering to a strongly bidentate beak that is as long as the perigynium body (5-7 mm).

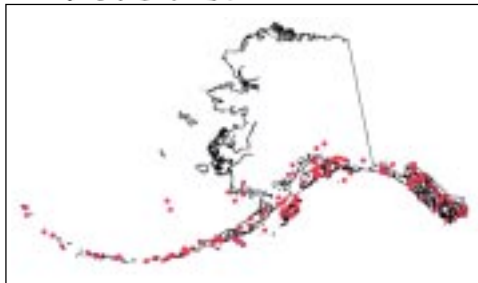
Achenes: Lens-shaped, 3.5-4 mm long and 2.3-3 mm wide. **Stigmas:** 3.

Habitat and Distribution: Sandy seashore beaches and dunes in the coastal lowland zone. Amphiberingian. In coastal southern Alaska from Bristol Bay and the Alaska Peninsula eastward to the Panhandle, south to Oregon. Coastal eastern Asia. Flowering and fruiting June-July.

Similar Species: None

Notes: Fruits are gathered for human consumption in Japan where it is considered to be very nutritious and recommended as a constructive food in malnutrition. It is said to prevent nausea and is recommended in anorexia. The root is also harvested for consumption. Easily grown in wet to damp soils though no reclamation applications are reported. Largehead sedge is only seemingly dioecious, since the male and female culms arise from the same rhizome.

Carex macrochaeta C.A. Mey.



Carex macrochaeta C.A. Mey.

NWI STATUS: FACW

Longawn sedge, large-awned sedge

Other Names: None

Plant Habit: Loosely clustered (tufted) from short, densely-matted, branching rhizomes that are covered with a soft, yellowish felt; purplish-red and fibrous-shreddy at the base. **Culms:** Sharply triangular, 10-70 cm tall and as long as or longer than the leaves; roughened toward the summit; and reddish-tinged at the bases.

Leaves: Blades 2-5, borne on the lower half of the stem, and with the lower leaves greatly reduced. Light-green, scabrous and flat, with slightly rolled-under margins; somewhat white papillate on the lower surfaces, and 2-5 mm wide, tapering toward the tips. Sheaths tight and purplish brown.

Lowest Bract: Leaf-like and about as long as the inflorescence (2.5-16 cm); sheathless or with a short sheath (3-10 mm).

Spikes: 3-5, erect, or more commonly, spreading to nodding spikes in an inflorescence 3-15 cm long. **Terminal:** Erect, linear, 15-25 mm long, with male flowers, and black or dark brown, awn-tipped scales. **Lateral:** 2-4, with female flowers; cylindrical, 1-3 cm long and 6-8 mm wide, and on slender, 1-8 cm long peduncles separated by 12-70 mm. The lower one nodding.

Pistillate Scales: Larger than the perigynia with distinctive long awns (3-5 mm, sometimes to 10 mm). Egg-shaped, rounded, black to dark brown, with lighter, green center and translucent margins.

Perigynia: Narrowly egg-shaped, short stalked, flattened-triangular in cross-section; smooth; usually straw-colored to light-green and sometimes spotted with purple; 3.5-5.5 mm long and 1-2.5 mm wide. **Nerves:** Finely

10-15 veined. Beakless to minutely beaked (0.1-0.2 mm long).

Achenes: Stalked, 3-angled, smooth and 1.7-2.3 mm long. Loosely enclosed in the lower half of the perigynium. **Stigmas:** 3.

Habitat and Distribution: Moist to wet meadows, bogs and heathlands, streambanks, rocky rivulets and waterfall spray zones, and sandy beaches from the lowland into the lower alpine zone. Amphiberingian. In coastal western, southwestern, southern, and southeastern Alaska, and less commonly in interior southern Alaska and the Yukon. South to Oregon; and along the northwest coast of Asia. Considered rare in the Yukon (Douglas et al. 1981).

Similar Species: Showy sedge (*C. spectabilis*) is within the range of longawn sedge and considered intermediate between longawn sedge and shortstalk sedge (*C. podocarpa*). Showy sedge lacks the yellowish felt on the roots characteristic of longawn sedge. It also has dark-reddish pistillate scales with conspicuous, pale midribs that often stick out from the scales as awn tips to 1 mm long. Showy sedge grows in moist meadows and forest openings and on rocky slopes from low to high elevations.

Notes: Longawn sedge is an important summer forage species for mountain goats in Alaska and British Columbia (Pojar and MacKinnon 1994), and for brood-rearing Aleutian Canada geese from spring into early fall (ESIS 1996). It is reported to be the most important component in the alpine diet of Kodiak brown bears (Atwell et al. 1977).

Carex magellanica Lam ssp. *irrigua* (Wahlenb.) Hultén



Pistillate scales



Perigynia



Achenes



Carex magellanica Lam ssp. *irrigua* (Wahlenb.) Hultén

NWI STATUS: OBL

Boreal bog sedge, little sedge, poor sedge,
poor bog sedge, tall bog sedge, bog sedge

Other Names: *C. magellanica* Lam. var. *irrigua* (Wahlenb.) B.S.P., *C. paupercula* Michx., *C. paupercula* Michx. var. *brevisquama* Fern., *C. paupercula* Michx. var. *irrigua* (Wahlenb.) Fern., *C. paupercula* Michx. var. *pallens* Fern., *C. irrigua* Wahlenb.

Plant Habit: Loosely clustered in small tufts, usually of 3-6 shoots, 10-80 cm tall that exceed the leaves. Growing from long rhizomes with roots that are covered with a yellowish-brown felt. **Culms:** Slender and leafy in their lower parts (phyllopodic), and reddish-brown to brown at the base. The remains of old leaves persist around the bases.

Leaves: 3-12, glabrous, bluish pale green, and borne on the lower one-half of the culm. Blades are 2-4 mm wide, flat and with slightly revolute margins. Sheaths very thin, plain and brownish or red-dotted on the inner surface.

Lowest Bract: Leaf-like, 2-10 cm long, sheathless to very slightly sheathing at the base, reddish at the node, and equaling or exceeding the inflorescence. The upper bracts of the other pistillate spikes are reduced.

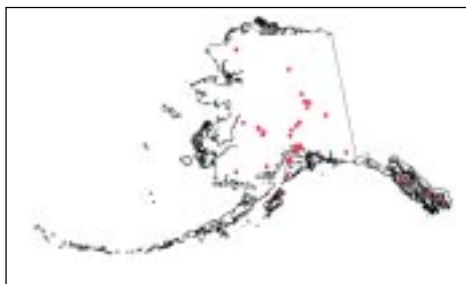
Spikes: 1-5, bicolored with green and blackish-brown or chestnut. **Terminal:** Solitary, staminate, erect and linear, 4-15 mm long and 2-4 mm wide. **Lateral:** 1-4, pistillate, often with a few staminate flowers at the base. Sub-orbicular to oblong, 4-22 mm long and 4-8 mm wide, on slender, nodding peduncles. Perigymia are ascending; the spreading pistillate scales give the spikes a ragged appearance.

Pistillate Scales: Lanceolate to ovate-lanceolate, tapering at the apex, and often with a short awn (to 1 mm). Light to dark brown, often with a green midstripe and narrower and conspicuously longer than the perigymia. Falling off with age.

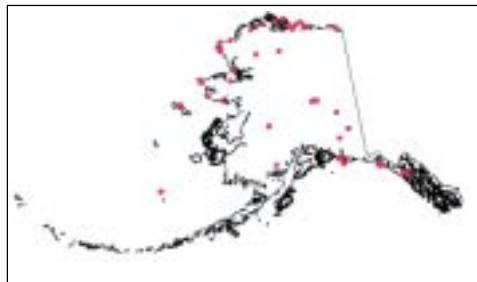
Perigymia: Elliptic to ovate, 2.2-3 mm long and 1.7-2.2 mm wide; somewhat compressed and three angled; thick, but occasionally somewhat flattened and two-edged. Pale and commonly greenish or straw-colored, and often dark brown toward the apex. Thick and leathery in texture, smooth, but with minute, rounded projections and having a stipe or stalk. Marginal nerves are prominent and 3-6 nerves are evident to obscure on each face. Beakless, or with a very short beak only 0.1 mm long that is truncate or obscurely bidentate.

Achenes: Ovoid-oblong, three angled, 1.4-1.9 mm long and 1.2 mm wide; slightly tapering to the base; the apex ending abruptly in a small point (apiculate). Loosely enveloped in the perigynium; yellowish-green maturing to brownish. **Stigmas:** 3.

(Continued on page 121)



Carex maritima Gunnerus.



Carex maritima Gunnerus.

NWI STATUS: FAC

Curved sedge

Other Names: *C. incurva* Lightf., *C. maritima* ssp. *yukonensis* A. E. Porsild

Plant Habit: Grows in elongate rows or occasionally in a loosely compact, clustered manner, arising from creeping, scaly, horizontal rhizomes. Leafy toward the base; roots pallid-brown. **Culms:** Grayish-green, 5-30 cm tall, erect and usually curved, growing in rows. Triangular in cross-section, glabrous, and 0.6-4 mm in diameter including leaf base sheathing.

Leaves: Grayish-green, mostly basal and often longer than the culms; blades are generally curved; linear and flat or involute (with edges rolled inward and to the upper side), and tapering to the tips which may be roughened. Blades are glabrous or hairy, and 0.5-2 mm wide. Sheaths: Pallid brown; ligules present.

Lowest Bract: Short or scale-like.

Spikes: 2-5, tightly aggregated, sessile spikes that are 0.5-1.4 cm long and 4.5-9 mm wide. Inflorescence is characteristically borne in a compact head, appearing as a single spherical spike, 7-20 mm long. Composed of male flowers at the tip of the spikes and female flowers at the base (androgynous).

Pistillate Scales: Ovate to lanceolate, acute to blunt, or almost rounded at the apex. Glabrous, light brown to brown, with broad, hyaline margins, and a lighter median. Shorter than the perigynia.

Perigynia: Ovate to broadly ovate, without thin, flattened winglike edges. Contracted at the base into a short stalk and tapering to a slender beak. Brown to straw-colored with a smooth, dull surface; 3-5 mm long and 1.5-2.5 mm wide. **Nerves:** Appearing nerveless,

but veined on both surfaces. **Beak:** Slender, brown, scabrous to smooth, 0.5-1 mm long, with a deeply bidentate apex. A slit runs down the beak on one side through which the style protrudes.

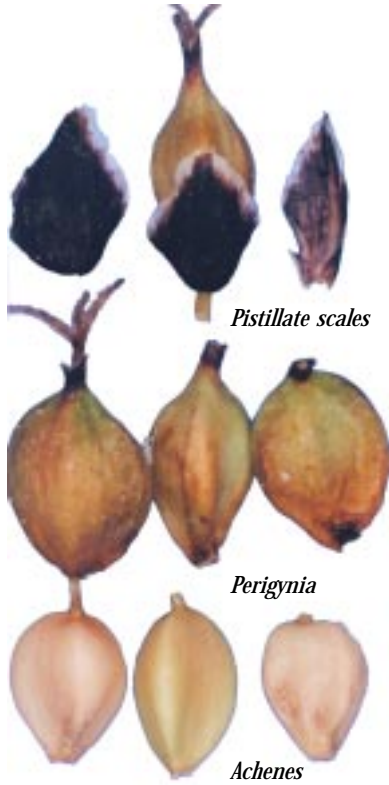
Achenes: Lens-shaped and not filling the upper part of the perigynium. **Stigmas:** 2.

Habitat and Distribution: Curved sedge habitat may be imperfectly drained or dry; calcareous or halophytic; on gravel, sand, silt (sometimes salt encrusted), or clay substrates. It is found on pond margins and streambanks; marshes; river terraces, often near the mouth of rivers in halophytic communities; marshy tundra; seashore habitats such as estuaries and lagoons, and sandy or gravelly beaches. Near the sea, it often forms dense mats on wet, flooded beaches. Plants with similar appearance from the alpine (up to 2,800 m in the St. Elias Mountains, often in calcareous well-drained areas (Hultén 1968)), are distinguished as *C. incurviformis* (see below for differences). Circumpolar. In northern, western and southeastern Alaska, and northern and southwestern Yukon; east to Newfoundland.

Similar Species: Alpine specimens have been tentatively separated out and accorded species rank as *C. incurviformis* Mackenzie. They differ in their habitat and in being finely veined on both faces of their perigynia, in contrast to *C. maritima*, which is essentially veinless on the adaxial (ventral, or front) side. *Carex incurviformis* has also been treated as a variety within *C. maritima*.

Notes:

Carex media R. Brown



Carex media R. Brown

Closedhead sedge, Norway sedge,
Scandinavian sedge, alpine sedge

NWI STATUS: FACW

Other Names: *C. angarae* Steud., *C. norvegica* Retz. ssp. *inferalpina* (Wahlenb.) Hultén, *C. norvegica* Retz. var. *inferalpina* (Wahlenb.) Boivin, *C. vahlii* Schkuhr var. *inferalpina* Wahlenb.

Plant Habit: Loosely clumped (tufted), with the lowermost leaf blades well-developed to 5 dm tall, from a compact system of slender, short-branched rhizomes. **Culms:** Exceed the leaves and are slender, sharply triangular, erect or arched open and spreading, and rough to the touch (finely scabrous) especially near the top.

Leaves: 5-7, aggregated toward the base, but with a few along the stem. Blades soft, pale green, flat with rolled-under margins, and up to 4 mm wide. Basal sheaths are characteristically bright reddish-purple to brownish.

Lowest Bract: Generally leaf-like, sheathless, and shorter to slightly longer than the flower cluster.

Spikes: 2-5, globose to oblong, crowded with-out or with only short stalks, and bicolored with green and blackish-purple. The spike near the base of the inflorescence is sometimes separate. **Terminal:** With both female and male flowers with the female flowers at the top, and the male flowers below. It is short-oblong to suborbicular, slender at the base and 3.5-14 mm long. **Lateral:** 1-3 and wholly female, short-stalked, 5-10 mm long, and clustered together in a head.

Pistillate Scales: Ovate to lanceolate, much shorter and slightly narrower than the perigymia to almost as wide. They are pointed at

the tips and are dark brown to purplish brown with light brown margins. The midrib is inconspicuous.

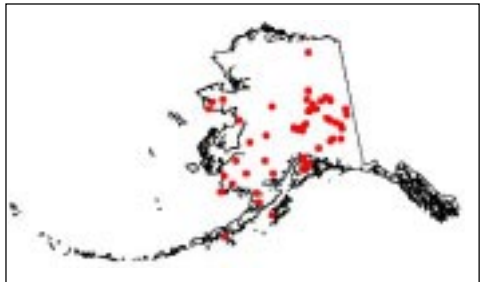
Perigymia: Egg-shaped to elliptical, 2.5-3 mm long and 1.5-1.8 mm wide; smooth or with minute, rounded projections and occasionally serrulate along their distal margins. Pale green becoming golden-brown at maturity. Beak is obscure, less than 0.4 mm long, minutely bidentate and often brownish.

Achenes: Three-angled and 1.5 mm long. **Stigmas:** 3.

Habitat and Distribution: Frequent on moist to wet bog margins, streambanks and lakeshores; open woods, fens, shallow ponds and seepage areas in the lowland and subalpine zones. Widespread circumboreal species. In most of continental Alaska except for the northern and southwestern portions. East to Labrador and south to Washington, Utah, Minnesota, Michigan and Maine. Flowering and fruiting June-August.

Similar Species: Some authors have treated *C. media* as a subspecies of *C. norvegica* (*C. norvegica* ssp. *inferalpina*), a species of turfy habitats in dry tundra and grassy slopes in the

(Continued on page 121)



Carex membranacea Hook.



Carex membranacea Hook.

NWI STATUS: FACW

Fragile sedge

Other Names: *C. physochlaena* Holm, *C. membranopacta* Bailey

Achenes: Yellow, 3-angled, smooth. **Stigmas:** 3.

Plant Habit: Stems single or few together, from long, stout, creeping, rhizomes. **Culms:** Stout, stiff, triangular, 10-55 cm tall, scabrous below the inflorescence.

Habitat and Distribution: Found as a dominant or important member of a wide variety of open, moist habitats, often with a well-developed peat layer. Moist to wet sedge meadows, muskegs, and bogs, on calcareous and non-calcareous substrates. Not typically found in standing water. Widespread in Alaska except for the south coastal areas. Arctic North America, extending south into British Columbia and Quebec, and westward to the Russian Far East.

Leaves: Mostly basal, yellowish-green to dark green, as long as or shorter than the culms, 2.5-6 mm wide, V-shaped or flat, with revolute margins, somewhat curled, glabrous, usually septate-nodulose, ligules shorter than, or as long as, wide. Sheaths: Lowermost reddish brown or purplish, with well-developed blades. Dried basal leaves persisting for several years.

Similar Species: Very similar to and easily confused with round sedge (*C. rotundata*) and rock sedge (*C. saxatilis*). Round sedge has rounded culms and narrow, involute leaves, and leaf sheaths that are usually brown, rather than the red basal sheaths that are almost always found in fragile sedge. Rock sedge is quite variable in its morphology and occasional individuals with few and short peduncled spikes can be mistaken for long peduncled individuals of fragile sedge. Rock sedge differs from fragile sedge in having 2 stigmas (very rarely 3), and perigynia that are ascending rather than spreading or reflexed.

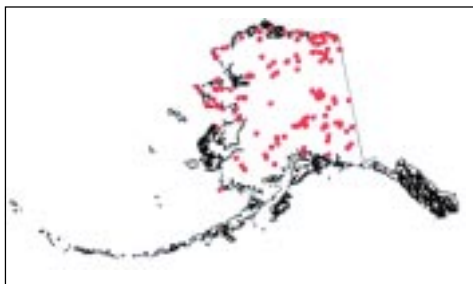
Lowest Bract: Leaf-like, shorter than or equaling the inflorescence, 0.6-16 (25) cm. Sheathless or nearly sheathless.

Spikes: 2-5 (6), in an erect, 2.5-13 cm long, inflorescence. **Terminal:** 1-3 staminate. **Lateral:** 1-3 (5) pistillate, 1-3 (5) cm long, erect or somewhat spreading, sessile or with short, stiff stalk.

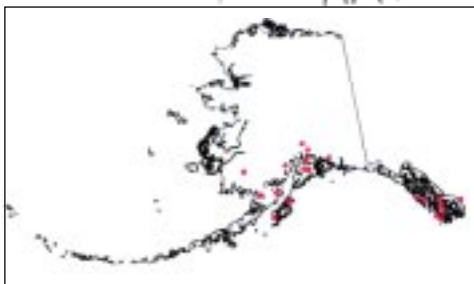
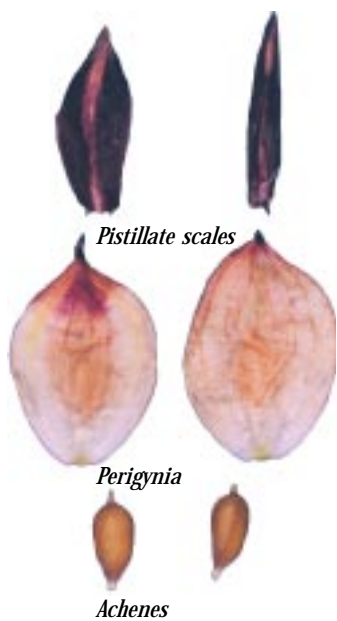
Notes:

Pistillate Scales: Egg-shaped to broadly lanceolate, the tip blunt or acute, awnless; purplish-black or dark brown with a lighter midvein and margins; narrower and usually shorter than the perigynia.

Perigynia: Egg-shaped to elliptic or globose, abruptly contracted to a short, bidentate beak; slightly inflated, spreading or reflexed, with a very short stalk (<1 mm); shiny, membranaceous, purplish-black or brown, 2.2-4.5 mm long. **Nerves:** Faint, few and not extending to the tip.



Carex mertensii Prescott ex Bong.



Carex mertensii Prescott ex Bong.

NWI STATUS: FACW

Mertens sedge

Other Names: *C. columbiana* Dewey

Plant Habit: Densely clustered from short, stout, rhizomes, often forming large clumps.

Culms: Erect, up to 120 cm tall, sharply triangular and narrowly winged, scabrous on the upper portion. Lower leaf sheaths purplish to brownish-purple, with short blades or lacking blades (aphyllopodic).

Leaves: 3-6, scattered on the lower half of the culm, flat, with slightly revolute margins, scabrous toward tip, 3-10 mm wide, 1/2 to 2/3 the length of culms. Lowest leaves reduced to scales.

Lowest Bract: Leaf-like, sheathless or nearly so, 8-30 mm long, almost always exceeding the inflorescence; the upper bracts reduced.

Spikes: 4-10, crowded and drooping on slender stalks, cylindric or club-shaped, reddish-tan to straw-colored, 1-4 cm long, 7-9 mm wide. **Terminal:** Pistillate flowers above the staminate flowers (gynecandrous); occasionally almost entirely staminate. **Lateral:** Pistillate or with a few staminate flowers at the base, closely flowered; perigynia appressed-ascending.

Pistillate Scales: Ovate-lanceolate with an acute or mucronate tip, dark reddish-brown with a conspicuous, pale-nerved center; much narrower and shorter than the perigynia.

Perigynia: Appressed-ascending, broadly ovate or obovate, very thin and flattened except where distended by the achene, rounded at the base, abruptly contracted at the apex, papery, light green, becoming pale yellow or brown, red-spotted to reddish toward the beak, 3.4-5.4 mm long, 2.1-3.5 mm wide. **Nerves:** Finely few-nerved on both faces; marginal nerves present. **Beak:** Slender, brown

to purple tipped, entire to slightly bidentate, 0.1-0.6 mm long.

Achenes: Oblong-obovoid, 3-angled, stipitate, yellowish-brown to silvery-brown, 1.3-2 mm long, 0.7-1.1 mm wide. **Stigmas:** 3.

Habitat and Distribution: Found on moist to wet, open, rocky slopes, meadows, forest openings, stream banks and disturbed areas such as roadsides and trails. Lowlands to moderate elevations (not alpine). Locally common in south coastal Alaska. From the Yukon south to Washington, Oregon, northern California, central Idaho, and western Montana. Flowering and fruiting May-August.

Similar Species: *Carex mertensii* is a distinctive and beautiful sedge with large colorful spikes and is unlikely to be confused with other species. *Carex spectabilis* is superficially similar but is smaller, with smaller spikes and with staminate terminal spikes, awn-tipped scales and darker perigynia.

Notes: This attractive species has been widely used as an ornamental for gardening. It has also been used for reclamation in the Pacific Northwest and may have potential in Alaska for stabilizing and revegetating disturbed areas, especially at mid-elevations. In areas outside of Alaska it is commonly grazed by livestock. Mertens sedge is thought to have been named for Carl Heinrich Mertens, the first European botanical collector at Sitka, Alaska. In Japan and the Russian Far East, the closely related *C. urostachys* Franchet has been treated as a variety of Mertens sedge (*C. mertensii* var. *urostachys* (Franchet) Kükenthal).

Carex microchaeta T. Holm
ssp. *nesophila* (T. Holm) D. F. Murray



Carex microchaeta T. Holm ssp. *nesophila* (T. Holm) D. E. Murray

NWI STATUS: FACW (ssp. *nesophila*),
FACU (ssp. *microchaeta*)

Bering Sea sedge

Other Names: None

Plant Habit: Growing singly or loosely tufted from short, stout, scaly, brown rhizomes.

Culms: Erect, 5-35 cm tall, with well-developed basal leaves (phyllopodic).

Leaves: Basal leaves only, the lower ones with well-developed blades, not reduced to scale-like sheaths; blades flat or V-shaped, 3-6 mm wide, and not exceeding the inflorescence.

Lowest Bract: Leaf-like, shorter than the inflorescence, sometimes reduced and bristle-like to scale-like.

Spikes: Terminal: 1-2, staminate, erect. **Lateral:** 1-3, pistillate, rarely androgynous, oblong to elongate 8-25 mm long and 3-8 mm wide, usually erect, closely spaced or with the lowest spike pendent on a long peduncle.

Pistillate Scales: Lanceolate, as wide as the perigynia and usually equalling or exceeding it, tapering to an acute or attenuate tip, sometimes with a short point; black, with a prominent, lighter colored, midvein.

Perigynia: Narrowly egg-shaped, greenish-yellow or light brown, with minute bumps (papillose). **Nerves:** Veined or veinless. **Beak:** Short, truncate or shallowly bidentate, 0.3-0.5 mm long, and purple or dark-tipped.

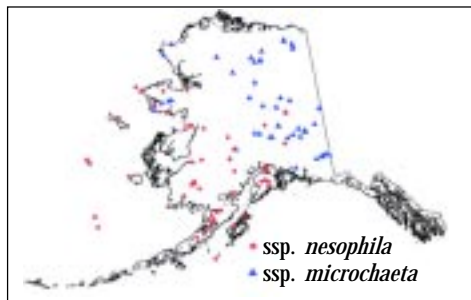
Achenes: 3-angled, filling half or less of the perigynia. **Stigmas:** 3.

Habitat and Distribution: Common in moist to wet tundra meadows and heaths of western and south-

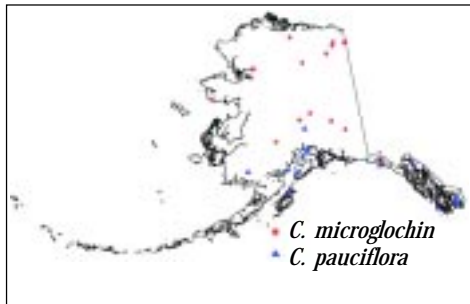
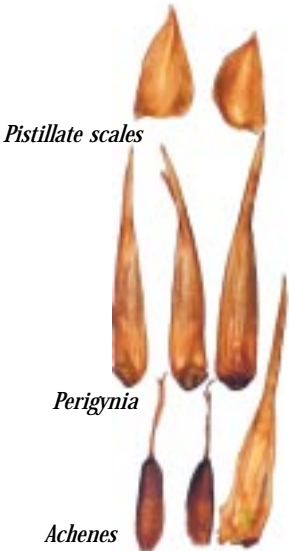
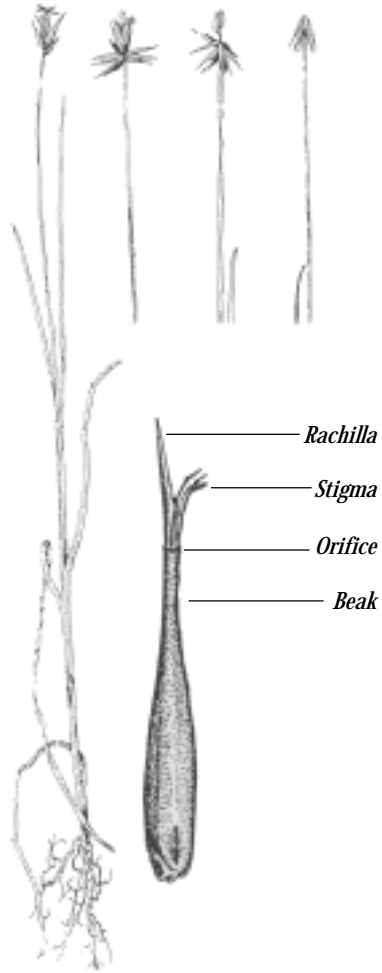
western Alaska, from 0-1000 m, extending east to Cook Inlet and the Kenai Peninsula and west to the Russian Far East. It is replaced by ssp. *microchaeta* over much of the rest of the state.

Similar Species: Small-awned sedge (*C. microchaeta* ssp. *microchaeta*) is very similar to Bering Sea sedge and is found in moist to mesic arctic and alpine tundra across much of Alaska (except the Arctic Coastal Plain, the southwest, and south coastal areas), forming mats on exposed sites with mineral soils. In contrast to Bering Sea sedge, it has perigynia that are reddish-brown or purple and pistillate scales with midveins that are dark and less conspicuous. Short-stalk sedge (*C. podocarpa*) has been confused with both subspecies of *C. microchaeta*, but it is aphyllopodic, having the lower basal leaves reduced to scalelike sheaths and with well-developed stem leaves. Short-stalk sedge also tends to be taller and has lateral spikes that are almost always pendent and long-pedunculate.

Notes:



Carex microglochin Wahlenberg



Carex microglochin Wahlenberg

NWI STATUS: OBL

Few-seeded bog sedge, short-awned sedge,
small-tipped sedge

Other Names: *C. pauciflora* Lightfoot var. *microglochin* (Wahlenberg) Poir et ex Lamarck

Plant Habit: Growing singly or a few together from slender, brown, creeping rhizomes. **Culms:** Slender, erect, stiff, smooth, brownish at the base, exceeding the leaves, 2-26 cm tall, much longer than the leaves.

Leaves: 4-10, clustered toward the base, 1-10 cm long and 0.5-0.8 mm wide, involute, the blades of the lower sheaths short, elongating upwards. Sheaths brownish, ligules much wider than long.

Lowest Bract: None

Spikes: Solitary, androgynous, yellowish-brown to golden brown when mature, 6-15 mm long, 4-11 mm wide, the upper 4-8 flowers male, erect, the lower 3-12 flowers female, with perigynia ascending but soon deflexed and easily detached.

Pistillate Scales: Oblong to ovate with an acute to obtuse tip, light chestnut-brown with a lighter center. Chaffy or with hyaline margins, wider but much shorter than the perigynia, falling off very early.

Perigynia: Linear-lanceolate, smooth, shiny, membranaceous, light green to brownish green or straw colored, 3-6 mm long, 0.5-1 mm wide. **Nerves:** Obscurely many-nerved on both surfaces. **Beak:** Not well differentiated from the body. Smooth, long tapering to a hyaline opening from which a bristle-like rachilla extends past the three styles.

Achenes: Narrowly oblong-ovoid, yellowish-brown to brownish, 2.5 mm long, 0.5-0.75

mm wide, abruptly contracted into and continuous with the long, slender, barely exerted style; rachilla longer than the achene. **Stigmas:** 3.

Habitat and Distribution: Moist, open streambanks, lake shores, wet alpine meadows, fens, and seeps, usually on calcareous soil, from sea level up to the alpine. Few-seeded sedge is found in alpine areas of northern and central Alaska where it is generally scattered or uncommon, but may be locally abundant. Alaska to Quebec and Greenland and south to western Montana, Utah, and Colorado.

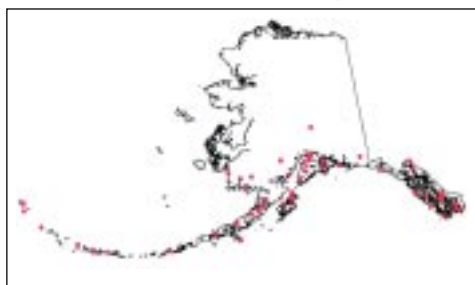
Similar Species: The distinctive, reflexed perigynia of few-seeded sedge make it easy to distinguish from other sedges, except for the closely related few-flowered sedge (*C. pauciflora*) of southcentral and southeastern Alaska. Few-flowered sedge has similarly reflexed perigynia, but has a long exerted style, and lacks the distinctive, projecting rachilla of few-seeded sedge. It is generally taller (10-50 cm), with fewer flowers and with a more tufted habit, and with culms that are slightly chaffy below the inflorescence. Few-flowered sedge is also more common on acidic, rather than calcareous sites.

Notes: Few-flowered sedge (*C. pauciflora*) has a catapult dispersal mechanism for achenes or perigynia (Hultén 1976) in contrast to the supposed clinging mechanism of *C. microglochin*.

Carex pluriflora Hultén



Perigynium



Carex pluriflora Hultén

NWI STATUS: OBLR

Manyflower sedge, several-flowered sedge

Other Names: *C. rariflora* (Wahlenb.) Sm. var. *pluriflora* (Hult.) Boivin, *C. stygia* Holm, non Fries p.p

Plant Habit: Solitary or clustered loosely from long, scaly, purplish-black, creeping rhizomes with yellow-woolly roots. **Culms:** Triangular, arising singly or a few together, 10-60 cm tall, equaling the leaves. Reddish-tinged and clothed with old leaves at the bases.

Leaves: Smooth and grayish-green, resulting from a waxy bluish or whitish covering; finely and densely white-pimpled on the lower surfaces. Blades 3 to 5 per stem, about as long as the stems and borne on the lower half of the stem, with the lower ones much reduced. Flat and narrow, 2-4 mm wide, with slightly rolled-under margins. Sheaths loose; lower sheaths are much reduced, elongated upwards.

Lowest Bract: Short and bristle-like, 5-25 (45) mm long and with a short sheath. Always much shorter than the inflorescence and usually shorter than the peduncle.

Spikes: 2-3. **Terminal:** Linear, erect, long-stalked and staminate. **Lateral:** 1-2 (3) are cylindrical and separated by 8-35 mm on long (0.7-3 cm), nodding, threadlike peduncles. Each pistillate spike has 10-20 flowers.

Pistillate Scales: Conspicuous; broadly egg-shaped and usually with a long awn at the tip up to 1 mm long. Black or purplish black with a somewhat paler median nerve; narrower and slightly longer than the perigynia, and wrapping around it from below.

Perigynia: Egg-shaped, with a small stalk; beakless, appearing squarely cut across the apex; plumply triangular in cross-section.

Smooth but densely pimpled, pale green to blackish or dark brown at maturity; 3-4.5 mm long and 1.7-2.3 mm wide, slightly shorter than the scales. **Nerves:** 10-15 and veined on both sides.

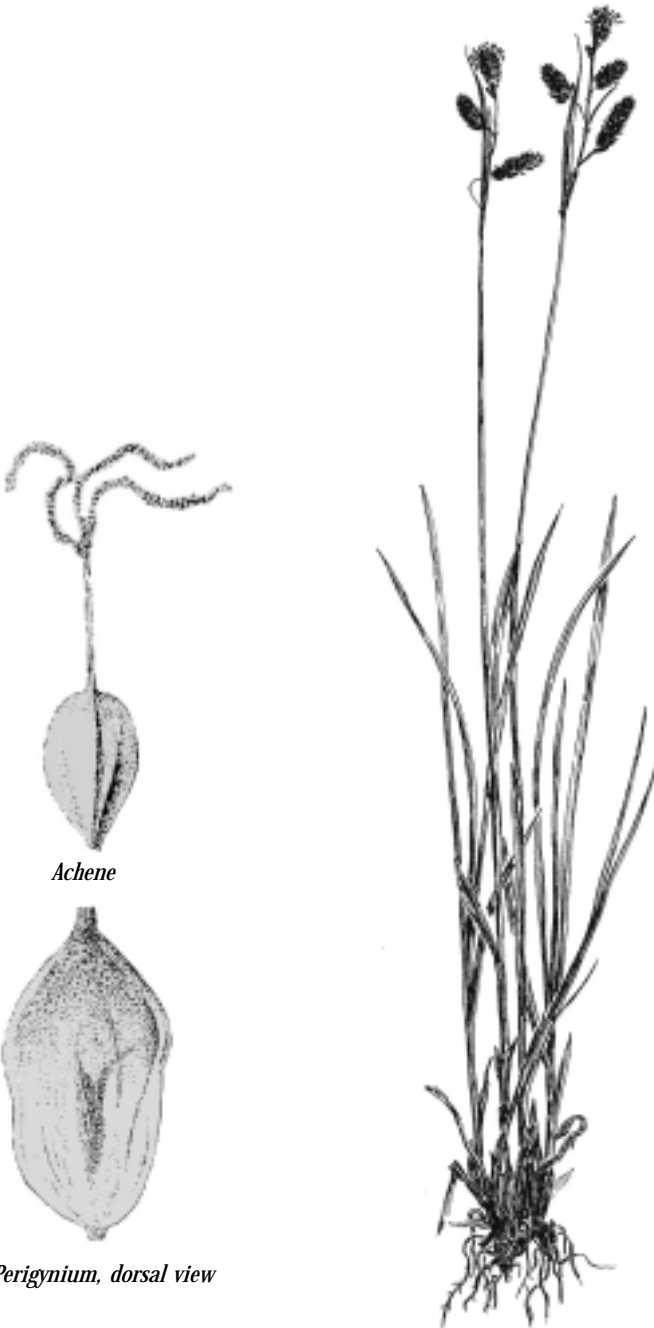
Achenes: 3-angled, short-stalked and smooth, 1.7-2.5 mm long, and loosely enveloped by the perigynia. **Stigmas:** 3.

Habitat and Distribution: Common in coastal high-marsh levees and meadows, freshwater bogs, fens (wet slopes and strangmoor), wet meadows and marshes, along streambanks and lakeshores from low to mid elevations. Amphiberingian. In coastal and insular southern Alaska and less commonly some distance from the coast in southcentral Alaska; southward to Washington and Oregon. Coastal East Asia.

Similar Species: Manyflower sedge is closely related to looseflower alpine sedge (*C. rariflora*), a smaller species with fewer-flowered female spikes and mostly smaller perigynia. Mud sedge (*C. limosa*) and boreal bog sedge (*C. magellanica* ssp. *irrigua*) are similar to manyflower sedge in appearance and habitat. Both have the characteristic yellowish, felty roots of this group of sedges, but have a leaf-like lowest bract and bluish-green perigynia. The male spikes of mud sedge are 15-27 mm long, whereas those of boreal bog sedge are 4-12 mm long.

Notes: In coastal salt marshes, manyflower sedge is a good indicator of the transition from freshwater plant communities to a more brackish salt marsh environment. Its range extends seaward from shrubby-forested borders into the mid-marsh transition zone (e.g., *C. lyngbyei*).

Carex podocarpa R. Brown ex Richardson.ar



Achene

Perigynium, dorsal view

Carex podocarpa R. Brown ex Richardson.ar

NWI STATUS: FAC

Short-stalk sedge

Other Names: *C. behringensis* C. B. Clarke; *C. montanensis* L. H. Bailey; *C. venustula* T. Holm

Plant Habit: Tufted from a stout brown rhizome. **Culms:** Erect, (5) 10-70 cm tall, with reduced basal leaves (aphyllopodic).

Leaves: Both basal and along the culm, the lowermost reduced and scale-like, elongating above; the upper are flat or V-shaped, 2-6 mm wide and abruptly pointed.

Lowest Bract: Leaf-like, shorter than or exceeding the inflorescence, occasionally reduced or bristle-like.

Spikes: 2-4, separate, elongate, spreading or pendent. **Terminal:** 1-2, staminate and erect. **Lateral:** 1-3, pistillate, 6-20 mm long and 5-8 mm wide and pendent on long peduncles.

Pistillate Scales: Shorter than or equalling and as wide as the perigynia, dark brown or black, with light brown margins, the midvein usually not prominent; broadly lanceolate, abruptly tapering to a point.

Perigynia: Brown to purplish-brown, egg-shaped or elliptic, 3-3.5 mm long and 1.75-2 mm wide, nerveless, the margins with minute bumps (papillose), contracted to a short truncate or shallowly bidentate beak, 0.3-0.4 mm long.

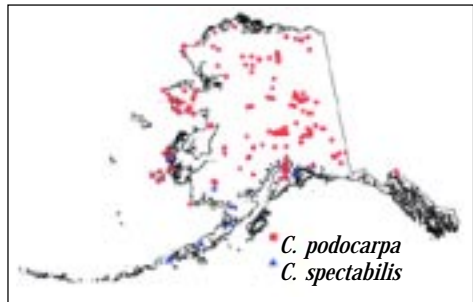
Achenes: 3-angled, 1.5-2.5 mm. **Stigmas:** 3.

Habitat and Distribution: Common in moist to wet subalpine and alpine meadows and arctic tundra across much of Alaska, except the south coast. Amphiberingian, extending

from the Russian Far East across Alaska to the Mackenzie River valley and south to Oregon, Idaho, Montana, British Columbia and western Alberta.

Similar Species: Showy sedge (*C. spectabilis*), found across the mountains of south coastal Alaska, is similar to short-stalk sedge but has pistillate scales that have prominent, light colored midveins often extending into a short point or awn. The pistillate spikes are less widely separated and are generally spreading rather than pendent and have shorter peduncles. Small-awned sedge (*C. microchaeta*) has often been confused with short-stalk sedge, but has leaves that are all basal (not extending up the culm), the lowest of which are not reduced to scale-like sheaths.

Notes: Showy sedge is a preferred food of mountain goats in the Olympic mountains of Washington (Pojar and MacKinnon 1994) and presumably both short-stalk sedge and showy sedge are important forage species in Alaska's alpine and subalpine meadows.

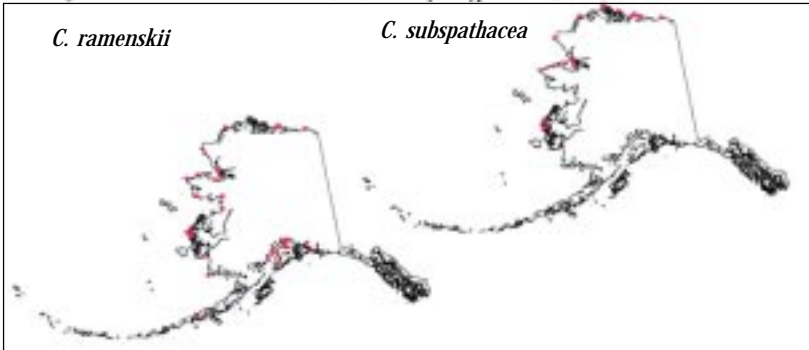


Carex ramenskii Komarov.



C. ramenskii

C. subspathacea



Carex ramenskii Komarov.

NWI STATUS: OBL

Ramensk's sedge

Other Names: *C. ramenskii* var. *caudata* Hultén; *C. salina* Wahlenberg ssp. *ramenskii* (Komarov) Egorova; *C. salina* var. *tristigmata* Kükenth.; *C. subspathacea* Wormskjold ssp. *ramenskii* (Komarov) Egorova

Plant Habit: Growing singly or loosely tufted from brown rhizomes. **Culms:** Erect, rounded or sharply angled, 10-50 cm tall, glabrous.

Leaves: Flat or folded "M" shaped, 2-4 mm wide, often arching toward and exceeding the culms, with reddish-brown basal sheaths.

Lowest Bract: Leaf-like, 1.5-3.5 mm wide, equal to or exceeding the inflorescence, and often gently arching over it.

Spikes: Erect. **Terminal:** 1-2, staminate.

Lateral: 1-4, pistillate, 1.5-2.5 cm long and 4-7 mm wide, with short peduncles (< 0.5 cm long).

Pistillate Scales: Narrower than the perigynia, 2-5.5 mm long, egg-shaped with a sharp tip, rarely with an awn (var. *caudata*); dark purple-brown, with lighter midvein.

Perigynia: Pale brown, leathery, dull, glabrous, ovate-elliptical, 2.7-3.5 mm long, somewhat inflated and loosely enclosing achenes.

Nerves: Faint or with a few prominent nerves on each side. **Beak:** Entire, short, broadly conical, 0.1-0.3 x 0.3-0.4 mm.

Achenes: Apex truncate or shallowly notched (retuse), the body sometimes constricted on one face or along the margins. **Stigmas:** 2.

Habitat and Distribution: Common in salt marshes and brackish meadows. In Alaska, Ramensk's sedge is found from the arctic coast south to Prince William Sound. Also found in

the northern Yukon Territory and northeast Asia. Ramensk's sedge is rare along the northern coast of Alaska east of Wainwright, and many collections previously identified as Ramensk's sedge have been determined to be Hoppner's sedge (*C. subspathacea*).

Similar Species: Ramensk's sedge is often confused with Hoppner's sedge (*C. subspathacea*), another species of salt marshes and brackish meadows, and both may be found in close proximity where their ranges overlap. Hoppner's sedge differs in having shorter culms (4-15 cm), with strongly involute, never "M" shaped, narrow leaves (1-2 mm wide), spikes rarely longer than 1 cm, pistillate scales that are usually wider than the perigynia and often awned, nerveless perigynia, and the lowest bract is typically widened and spatelike at the base. Hoppner's sedge is often found on pond margins and saline mud flats, where it may be found just above the high tide line with *Puccinellia phryganodes*.

Water sedge (*C. aquatilis*) is found in fresh water wetlands and is taller (20-100 cm), with longer pistillate spikes (up to 10 cm), the lowest on a peduncle > 1 cm long, and with perigynia that are always nerveless and obovate (vs ovate).

Notes: Ramensk's sedge is thought to be a stabilized hybrid between Lyngbye's sedge (*C. lyngbyei*) and Hoppner's sedge (*C. subspathacea*) and is most common where the range of these two species overlap.

An important species of coastal wetland communities especially in western Alaska, sometimes forming large, pure stands. Both Ramensk's sedge and Hoppner's sedge are preferred foods of geese and other waterfowl.

Carex rariflora (Wahlenb.) Sm.



Pistillate scale



Perigynium

Carex rariflora (Wahlenb.) Sm.

NWI STATUS: OBL

Looseflower alpine sedge

Other Names: *Carex stygia* Holm, non Fries p.p

3.5-4.5 mm long and 1.4-2 mm wide. **Nerves:** Faint on both surfaces.

Plant Habit: Small to medium-sized sedge growing singly or in small clumps of 2-3 shoots from long, dark brown, scaly rhizomes, and with rust- to yellow-colored felt on the roots. Leafy on the lower one-third of the plant. **Culms:** Erect and somewhat triangular; smooth, 8-30 cm high or more and conspicuously taller than the leaves.

Achenes: 3-angled at maturity. **Stigmas:** 3.

Habitat and Distribution: Wet peaty places on arctic tundra, bogs, wet meadows and the borders of shallow ponds and lakeshores. Low elevations. Circumboreal and circumpolar low Arctic. In northern, western, central and southcentral Alaska. Northern Yukon eastward to Newfoundland and south to Maine.

Leaves: Short, flat or channeled to folded, with a waxy bluish or whitish covering, about 2 mm wide and 5-25 cm long, and very rough on the upper half of the leaf margins. Lower leaves are absent or much shorter than the upper leaves. Sheaths brown or reddish with ligules.

Similar Species: Looseflower alpine sedge is closely related to manyflower sedge (*C. pluriflora*), a larger species with more flowers in the female spikes and mostly larger perigynia.

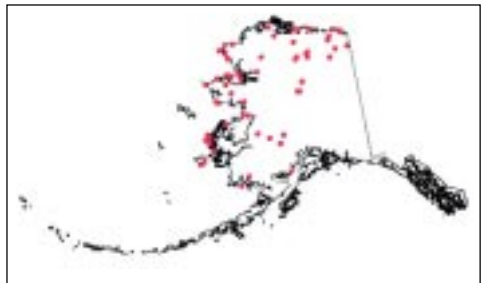
Lowest Bract: Short (0.5-3 cm), slender blade, much shorter than the inflorescence, with dark sheaths.

Notes: Looseflower alpine sedge is a principal food species of Emperor geese during their egg laying and incubation periods on the meadows and levees along the western Alaska coastline.

Spikes: 2-4 in an inflorescence, 2-5.5 cm long. The lower of the spikes is nodding. **Terminal:** Solitary, erect and staminate. **Lateral:** 1-3, pistillate, few-flowered, and short-cylindrical, with 0.5-2 cm long, arching stalks when mature. The pistillate spikes are separated by 6-25 mm.

Pistillate Scales: Elliptic to broadly egg-shaped; blunt to almost rounded or with a short, sharp, slender point at the end. Purplish black with a conspicuous pale midvein; and broader at the base but usually slightly shorter than the perigynia.

Perigynia: Egg-shaped to elliptic without a stalk and beakless with a truncate apex. Smooth, pale green;



Carex rotundata Wahl.



Achene



Perigynium



Carex rotundata Wahl.

NWI STATUS: OBL

Round sedge

Other Names: *Carex melozitnensis*
Porsild

Plant Habit: Grayish-green, forming small, low, dense clumps, with stems arising from long, pale, cordlike runners deep into mud. Surrounded by a leafy base of narrow, recurving leaves. **Culms:** Slender, stiff, rounded, smooth, 10-45 cm tall, with brown (rarely red) sheaths tightly enclosing the culm at the base.

Leaves: As long as or slightly longer than the stems. Narrow (0.5-2.5 mm), often curved with curly tips, and with the edges rolled inward toward the upper side. Sheaths brown to straw-colored, with the surfaces divided into small nodules or transverse knobs.

Lowest Bract: Leaf-like and about as long as the inflorescence (1-12 cm). Often widely divergent or spreading from the stem or bent backward or downward. Sheathless or with a sheath 1-10 mm long.

Spikes: 3-4, in an erect, 2.5-9 cm long, inflorescence. **Terminal:** Staminate, linear and 2.0-2.5 cm long. **Lateral:** Pistillate, 2 or rarely 3 spikes, well separated (7-55 mm), with no or only a short, stiff and erect peduncle; oblong or short-cylindric and about 1 cm long.

Pistillate Scales: Egg-shaped; blunt to almost round or acute, and sometimes membranous at the tip. Brown or purplish black with a paler median; usually shorter and narrower than the perigynium.

Perigynia: Egg-shaped and inflated; with a short stalk and abruptly contracting into a short, cylindrical, (0.3-1 mm), notched to bidentate beak.

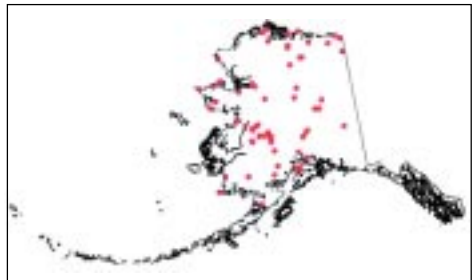
Shiny and chestnut brown to straw-colored, often becoming purplish-black when mature, membranaceous, 2.5-4 mm long and 1.8-2.4 mm wide. Crowded and spreading within the spike. **Nerves:** Obscurely few-veined, or none.

Achenes: Egg-shaped with a very short stalk, raised median and rounded apex; chestnut brown at maturity. **Stigmas:** 3.

Habitat and Distribution: Muskegs, bogs, wet meadows, shallow ponds or depressions, and lakeshore margins. Amphiberian. In most of continental Alaska except for the southeastern portion; northern and western Yukon, east to Hudson Bay; Eurasia.

Similar Species: *Carex membranacea* has 3-angled culms (vs rounded), leaves that are V-shaped and wide (2.5-5mm) vs involute and narrow (1.3-3mm), and almost always has red basal sheaths rather than the usually brown basal sheaths in *C. rotundata*.

Notes:



Carex saxatilis L.



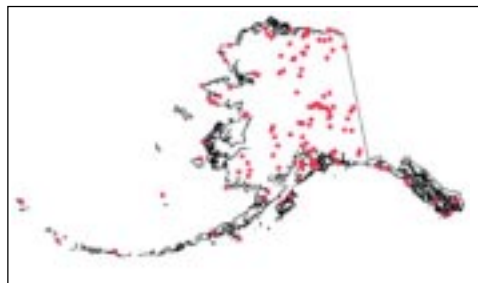
Pistillate scales



Perigynia



Achenes



Carex saxatilis L.

Rock sedge, russet sedge

NWI STATUS: FACW

Other Names: *C. ambusta* Boott, *C. compacta* R.Br. ex Dewey, *C. miliaris* Michx., *C. physocarpa* J. & K. Presl, *C. rhomalea* (Fern.) Mackenzie, *C. rotundata* Wahlenb. var. *compacta* (R.Br. ex Dewey) Boivin, *C. saxatilis* L. ssp. *laxa* (Trautv.) Kalela

Plant Habit: Stems single or few together, from short, stout, congested, rhizomes; turf-forming. **Culms:** Slender, erect or curved, 10-90 cm tall, distinctly triangular and scabrous below the spikes. Lower leaf sheaths reddish brown or purplish; basal leaves persisting for several years.

Leaves: Yellowish-green to dark green, 1-6.5 mm wide, V-shaped, with revolute margins, often septate-nodulose, and rough toward the tip. Sheaths tight, truncate to concave at the mouth, basal sheaths cross-filamentose when mature. Ligules as long as to slightly longer than wide.

Lowest Bract: Leaf-like, sheathless or nearly sheathless, 1-16 (25) cm, shorter than or equaling the inflorescence.

Spikes: 2-6, often glossy and purplish-black. **Terminal:** 1-2 (3), staminate, erect, linear, peduncled, 1-5 cm long. **Lateral:** 1-3, pistillate, often pendent, the upper sometimes sessile, 1-3.5 cm long, 5-10 mm thick, widely separate; perigynia ascending.

Pistillate Scales: Ovate or ovate-lanceolate with an obtuse to sharp and often irregular apex, dark reddish-black with a lighter mid-rib and glabrous and hyaline margins, as long as or shorter and narrower than the perigynia.

Perigynia: Ascending, sometimes slightly inflated, elliptic or elliptic-ovate, biconvex,

rounded at the base, substipitate, membranous, minutely dotted with depressions and translucent dots (punctulate), brownish with the upper half reddish-black-tinged at maturity, 2-5.5 mm long and 1-3 mm wide, abruptly contracted into a smooth, slender beak, the apex obliquely cleft and scarcely bidentate, 0.3 mm long. **Nerves:** Few, obscure or none dorsally, absent ventrally, evident on the margins.

Achenes: Yellow, lens-shaped, sessile, tapering into and continuous with the persistent, bony style that becomes contorted at maturity. **Stigmas:** 2, rarely 3.

Habitat and Distribution: A common sedge of boreal and arctic wetlands, including bogs, fens, wet meadows and wet soil or at the margins of ponds, lakes, and streams; usually in shallow water. Reported from calcareous and non-calcareous sites. Lowlands to moderate elevations. At higher altitudes it may be found along mountain streams.

Similar Species: Rock sedge is quite variable in its morphology. Occasional individuals with few and short peduncled spikes or having 3 stigmas can be mistaken for long peduncled individuals of fragile sedge (*C. membranacea*). Rock sedge is reported to hybridize infrequently with Northwest Territory sedge (*C. utriculata*, Ford et al. 1993). The hybrids are largely sterile and intermediate in morphology.

Notes: The achenes are eaten by waterfowl, although it is not a preferred food. *Carex saxatilis* may have potential for revegetation of riparian sites, especially at mid-upper elevations. Once established, the long rhizomes afford good soil stability.

Carex stylosa C.A. Mey.



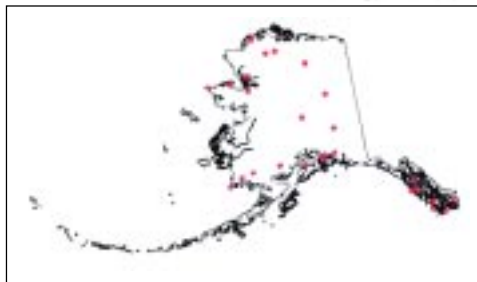
Achene



Perigynium



Pistillate scale



Carex stylosa C.A. Mey.

Variegated sedge, long-styled sedge

NWI STATUS: FACV

Other Names: *Carex beringiana* Chamisso ex Steudel, *C. nigritella* Drejer, *C. stylosa* C.A. Mey. var. *nigritella* (Drej.) Fern

Plant Habit: Growing in dense clusters from short, stout, shreddy rhizomes. Purplish-red and fibrous-shreddy at the base, which is clothed in conspicuous old leaves. **Culms:** Triangular, 15-40 cm tall and exceeding the leaves; rough on the angles.

Leaves: Bunched near the base. Blades are flat, coarse and firm, with margins that are rough, and rolled under or channeled towards the base. Lower leaves are not reduced; 2-4 mm wide and shorter than the stems. Sheaths purplish-red nearer the base.

Lowest Bract: Narrow, leaf-like, sheathless, 1.2-4 cm long but shorter than the inflorescence.

Spikes: An erect to somewhat nodding inflorescence 3-6 cm long consisting of 3-5 spikes.

Terminal: Staminate. **Lateral:** Pistillate, thick-cylindrical, and 0.5-2 cm long, on short, (1-3 cm), erect, stiff peduncles. Lower spikes are somewhat separate in a loose cluster.

Pistillate Scales: Conspicuous, egg-shaped, blunt to nearly rounded at the base and pointed at the tips. Purplish black, with light brown margins and a lighter median; shorter and narrower than the perigynia. A thick style sticks out prominently.

Perigynia: Elliptic to egg-shaped; hairless and smooth except often with a few short sharp points near the tip. Green to golden straw-colored becoming dark brown or purple; 2.5-3.5 mm long and 1.5-1.8 mm wide. The name 'variegated sedge' refers to the variable color of the perigynia. **Nerves:** Nerveless except for

two prominent lateral nerves. Beak: Very short truncate, less than 0.3 mm long. In age, with a thick, very characteristic, long-protruding style.

Achenes: 3-angled, 1.6-1.9 mm long. **Stigmas:** 3.

Habitat and Distribution: Marshes, fens, bogs, streambanks, shorelines, and moist to wet meadows and gravelly sites. Sometimes forms dense, round tussocks on open, boggy slopes. In the lowlands to the alpine zone. Circumpolar. Mostly in coastal southern Alaska, but also reported from the coastal Seward Peninsula, interior Alaska and the Yukon. Disjunctly from Quebec and Newfoundland, and south to Washington. Flowering and fruiting June to August.

Similar Species: Buxbaum's sedge (*C. buxbaumii*) grows in similar habitats to variegated sedge but at low to middle elevations. Buxbaum's sedge has single or loosely tufted stems 30-100 cm tall from long rhizomes; a terminal spike that is gynecandrous rather than staminate, and blue-green perigynia exceeded by narrow, purplish-brown scales with awned or long, pointy tips. The perigynia of Buxbaum's sedge also lack the distinctive long-protruding style of *C. stylosa*.

Notes: The thick and prominent long-protruding style is very characteristic, thus the secondary name, 'long-styled sedge'.

Carex tenuiflora Wahlenb.



Inflorescence



Perigynium



Carex tenuiflora Wahlenb.

NWI STATUS: OBL

Sparseflower sedge, sparse-leaved sedge,
thin-flowered sedge

Other Names: None

Plant Habit: Growing loosely clustered from long, slender, yellowish-brown rhizomes. Usually many old leaves present at the base.

Culms: Very slender, somewhat stiff and arching; 10-50 cm tall, and overtopping the leaves. Roughened beneath the head.

Leaves: Blades 3-7, borne on the lower part of the stem; grayish-green, soft, flat or channeled; and nearly all shorter than the stem. Leaf blades are 0.5-2 mm wide, with margins that may be downwardly roughened in the upper half. Sheaths tight; brownish with an inner hyaline band.

Lowest Bract: Strongly reduced, scale-like or bractless.

Spikes: 2-4, in a 5-15 mm long, erect, nearly spherical, closely-bunched terminal cluster. Each spike is whitish-green, egg-shaped with many spreading flowers, 5-10 mm long, with both male and female flowers on each spike. Female flowers towards the tips with inconspicuous male flowers near the base.

Pistillate Scales: Rounded to egg-shaped, blunt to nearly rounded at the tip. Light green or whitish with a green midvein and white-hyaline margins. Scale almost hiding the perigynia.

Perigynia: Oval to elliptical-elongated, and without a stalk. Smooth, pale green (often pale brown in age) and minutely whitish-dotted; 2-3.5 mm long and 1-1.3 mm wide.

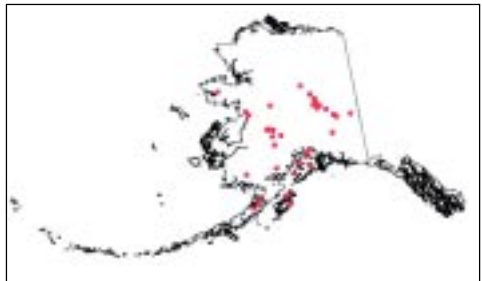
Nerves: Few, faint, small nerves on both surfaces. Beakless or with a very minute beak, 0.1-0.2 mm long.

Achenes: Lens-shaped, glossy, pale-brown and 1.7-2 mm long. **Stigmas:** 2.

Habitat and Distribution: Fens, *Sphagnum* bogs, moderately nutrient rich alder swamps, moist forests, seepage areas and peaty lakeshores. Mostly low elevations (0-1,000 m). Circumpolar. In most of Alaska except for portions of the northwest, southwest and southeast. Much of the Yukon; east to Newfoundland and south to Maine, Massachusetts, New York, Michigan, Washington and New Mexico. Eurasia.

Similar Species: Ryegrass sedge (*C. loliacea*) resembles sparseflower sedge, but its spikes are more widely spaced and its perigynia have many prominent veins. Sparseflower sedge can also be easily recognized by the (usually) three small spikes bunched at the tip of its slender stem.

Notes:



Carex ursina Dewey



Inflorescence



Achene



*Perigynium
dorsal view*



Carex ursina Dewey

Bear sedge

NWI STATUS: FACW

Other Names: None

Plant Habit: Growing in low (less than 15 cm high), very dense and compact clumps from pallid-brown roots. **Culms:** Erect and spreading, often slightly curved, barely emerging from the leaves. Smooth, triangular in cross-section and 4-6 cm tall.

Leaves: Pale to gray-green; clustered, straight, and longer than the stems. Flat or more commonly channeled or rolled upward along the margins. Smooth but rough along the margins and midvein towards the leaf tips; 3-1.2 mm wide. Sheaths grayish brown with a very short ligule.

Lowest Bract: Absent or scale-like.

Spikes: Solitary (rarely 2), with both female and male flowers; staminate are at the base or are inconspicuous. Inflorescence is erect and spherical, 5-7 mm long and 2-4 mm wide.

Pistillate Scales: Broadly egg-shaped, and blunt to nearly rounded at the top. Smooth and dark brown with a lighter midvein, and very narrow hyaline margins. Shorter than the perigynia.

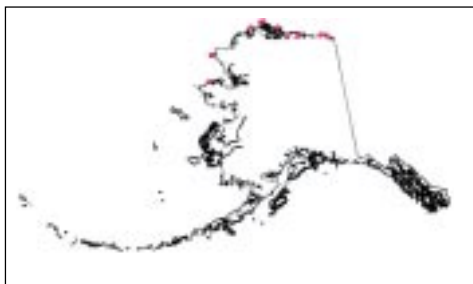
Perigynia: Egg-shaped, and short-stalked with the body contracting into a very short, smooth beak or appearing beakless. Surface dull with many small, short, rounded, nipple-like bumps. Straw colored, grayish green or midbrown; 1.4-1.8 mm long and 1-1.2 mm wide. Perigynia spreading at maturity. **Nerves:** Faintly several-nerved on both surfaces.

Achenes: Lens-shaped and filling the perigynia; dull to slightly glossy, and red brown. **Stigmas:** 2.

Habitat and Distribution: A very pronounced arctic tundra seashore species of sheltered sea and lagoon shores that are subject to flooding by high tide. Occurs on sand, gravel, silt and clay (with low to high organic matter content) substrates of tidal flats, beach ridges, wet meadows, shorelines of brackish ponds and in silts near the mouths of rivers. Often the dominant species forming dense mats with creeping alkaligrass (*Puccinellia phryganodes*) and saltmarsh starwort (*Stellaria humifusa*). Seashore plant. Circumpolar arctic. In coastal northern Alaska south to the north shores of the Seward Peninsula. Arctic shores of the Yukon east to Quebec and Greenland. Arctic Eurasia.

Similar Species: None

Notes:



Carex utriculata Boott



Pistillate scales

Perigynia

Achenes



Carex utriculata Boott

NWI STATUS: OBL Northwest Territory sedge, beaked sedge, bladder sedge

Other Names: *C. inflata* Huds. var. *utriculata* (Boott) Druce, *C. rhynchophysa* C. A. Meyer & Avé-Lall., *C. rostrata* Stokes var. *utriculata* (Boott) Bailey

Plant Habit: Stems single or loosely tufted from stout, creeping, deep-seated rhizomes, sometimes forming a dense extensive stand. **Culms:** Stout, erect, 25-120 cm tall, distinctly triangular and often scabrous below the spikes. Lower leaf sheaths light brown or tinged with red, thick and spongy.

Leaves: Pale yellow-green, 3-15 mm wide, stiff, thick, flat to broadly V-shaped, septate-nodulose, but without minute nipple-like bumps; not clustered at the base. Upper leaves long, exceeding the stems.

Lowest Bract: Leaf-like, exceeding the inflorescence.

Spikes: Several, yellowish-green becoming straw-colored or reddish-purple, forming an elongate inflorescence. **Terminal:** 2-4, staminate, narrowly linear, 1-7 cm long, 2-4 mm thick. **Lateral:** 2-5, pistillate, erect, cylindrical and oblong, 2-10 cm long, 1-1.5 cm thick, short-stalked to sessile, widely separate; perigynia ascending to spreading.

Pistillate Scales: Egg-shaped or lanceolate with a sharp tip, light brown or reddish-brown with a 3-nerved center and transparent hyaline margins, narrower than and either longer or shorter than the perigynia.

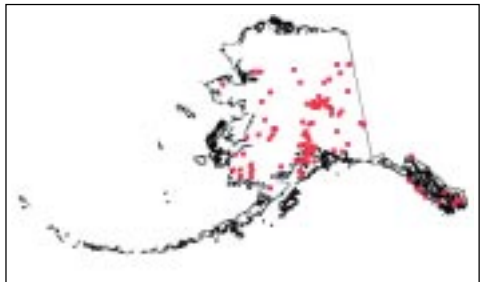
Perigynia: Strongly inflated, spreading, glabrous and shiny, yellowish-green, straw-colored or reddish-tinged at maturity, ovate to broadly elliptic, 3-8 mm long, contracted to a smooth beak with 2 short teeth at

the apex. **Nerves:** 8-16 prominent on both surfaces.

Achenes: Obovoid, 3-sided, yellowish-brown. **Stigmas:** 3.

Habitat and Distribution: A very common, often dominant sedge of boreal wetlands, where it can form extensive stands in perennially wet areas, including bogs, fens, wet meadows, and wet soil or shallow water at the margins of ponds, lakes, and streams. Lowlands to moderate elevations. Circumboreal. Most of Alaska south of the Brooks Range excluding the Alaska Peninsula. From the Yukon east to Labrador; south to California, Nevada, southern Utah, New Mexico, Nebraska, Indiana and Delaware.

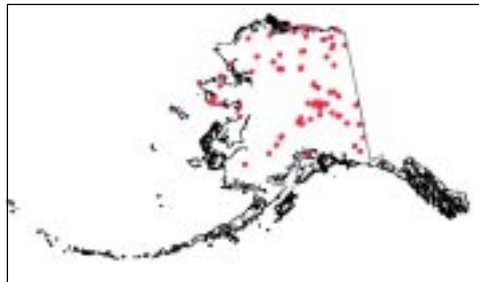
Similar Species: Northwest Territory sedge (*C. utriculata*) is often treated as part of beaked sedge (*C. rostrata*) by American authors, but it is a distinct species. Although both can be found in similar habitats, beaked sedge is always found in flooded areas with standing water, while Northwest Territories sedge is found in a wide array of wet areas. *Carex rostrata* has leaves that are glaucous-green (not pale yellow-green), U-shaped (rather than V-shaped) and covered on the upper surface with minute papillae (visible with a good microscope, but difficult to see with a
(Continued on page 121)



Carex vaginata Tausch



Perigynium



Carex vaginata Tausch

Sheathed sedge

NWI STATUS: OBL

Other Names: *Carex saltuensis* Bailey

Plant Habit: Stems arising singly or a few together from slender, creeping rhizomes that are yellowish-white to white with light-brown bracts. Principal foliage leaves are basal and shorter than the stems. **Culms:** Stiff, smooth, irregularly bent (generally open and spreading), and circular or oval in cross-section. They are 7-40 cm tall and much taller than the leaves.

Leaves: Blades are shorter near the plant base, elongating upwards, 4-8 per stem, mostly borne on the lower quarter, and much shorter than the stems. Wintergreen becoming dark green with age; soft, smooth; flat or channeled toward the base. They are downwardly rough along the margins above the middle of the blades. Sheaths tight, tubular, grayish-brown. Ligules are present but may be lost early. Lowest sheaths are without leaves.

Lowest Bract: With a conspicuous and characteristic longer, closed sheath (10-25 mm); enlarging upwards and becoming a flat blade, 1-3 cm long and shorter than the spike.

Spikes: 3-5, in a 4-20 cm long inflorescence. Spikes more or less separated by 2.5-14 cm, long stalked (1.5-6.5 cm long), and erect or spreading. **Terminal:** With staminate flowers, linear or club-shaped, 1-2 cm long and on a stout, often somewhat divergent stalk. **Lateral:** 2-4, with pistillate flowers, cylindrical, 1-2.5 cm long and in a non-compact arrangement of 5-12 flowers. Lower spikes are widely spaced on somewhat divergent, short and rather stout stalks. The stalk at times may not extend much beyond the bract's sheath.

Pistillate Scales: Egg-shaped, with rounded or short-awned tips. Smooth, brown to purplish-brown, with pale-green centers, and

narrow, translucent margins. Scales are shorter than the perigynia.

Perigynia: Egg-shaped to elliptical and slightly inflated, with a short stalk. Smooth, shiny, yellowish-green to light brown, and 3.5-5 mm long and 1.5-2 mm wide. Perigynia are spreading or curving upwards with age. **Nerves:** Nerveless or often faintly veined. **Beak:** Slender, cylindrical, bidentate, often with dark tips; 0.6-1.2 mm long.

Achenes: Elliptic and 3-angled, light to dark brown, 1.6-2.2 mm long, and not filling the upper portion of the perigynia. **Stigmas:** 3.

Habitat and Distribution: Calcareous swamps, boggy thickets, coniferous forests often with *Sphagnum* moss, seepage areas and wet meadows. Low to mid elevations to at least 760 m. Circumpolar. Widespread across most of the boreal forest north to the low arctic. Much of Alaska except for the southwestern and southeastern portions. From the Yukon east to Greenland, south to northern New England and New York, and west to Montana and British Columbia. Eurasia. Flowering and fruiting June-August.

Similar Species: None

Notes: This common sedge is said to have moderate value as winter forage for wildlife. Snow geese forage intensively on the shoots of sheathed sedge in freshwater sedge meadows as they stage and move north during spring migration in the central flyway (Abraham and Jeffries 1997).

It is reportedly a seral species that becomes increasingly important after fire and declines as the previous vegetation regenerates post fire (USFS 2002).

C. buxbaumii Wahl. *continued*
perigynia. *Carex adelostoma* and *C. parryana* are closely related but have pistillate scales that are as broad as, and usually shorter than, the perigynia. *Carex parryana* is a rare species of south central Alaska (more common southward through Canada and the intermountain west) with a distinctly serrulate-beaked perigynia. *Carex gmelinii* is a species of coastal meadows and dunes with perigynia having beaks longer than 0.5 mm and with the body of the pistillate scale distinctly shorter than the perigynia. The somewhat similar closedhead sedge (*C. media*) has many densely or loosely tufted stems, and blunt female scales that are short to as long as the perigynia, and with a beak to 0.5 mm long.

Notes: The root is reportedly cooked and eaten (Schofield 1993). Seeds are consumed by waterfowl (Larson 1993). Utilized in Europe and Asia for stable straw (Usher 1974), and stuffing for boots and mittens to protect hands and feet from cold in winter, and to cushion feet on long journeys in the summer (Johnson et al. 1995).

C. glareosa Schkuhr *continued*
stands with a characteristic yellow-green color, and unique texture resulting from the spreading, matted, and ascending character of the stems.

North, into the arctic, it occurs on flats just above the strand line, and on ridges and rocky ledges near the sea on imperfectly drained, rock, gravel and clay substrates. Typically situated between creeping alkaligrass (*Puccinellia phryganodes*) meadows and tundra by the sea, and is often the dominant species around the nesting grounds of sea birds.

Throughout coastal and insular Alaska, as far as northern Southeast Alaska. Rare in north-

ern British Columbia. Subspecies *pribylovensis* is restricted to the Pribilof Islands and the Aleutian Islands west of Unimak Pass. Circumpolar with large gaps.

Similar Species: Two subspecies are recognized in Alaska differing in distribution (noted above), and the following characteristics: subspecies *glareosa* is 15-27 cm tall, its leaves are mostly narrow and channeled, and pistillate scales are 2-3 mm long, rarely enveloping the perigynia. Subspecies *pribylovensis*, is taller (20 to 47 cm), leaves are usually flat, and the female scales are 2.75-3.5 mm long, mostly enveloping the perigynia.

Lesser saltmarsh sedge and twotipped sedge (*C. lachenalii*) are closely related. The latter is a species of freshwater mires and snow patches at high elevations, but may occur near the seashore with increasing latitude where poorly developed individuals may closely resemble lesser saltmarsh sedge. By contrast, lesser saltmarsh sedge is nearly always maritime. The following characters separate lesser saltmarsh sedge from twotipped sedge: In lesser saltmarsh sedge, the lateral spikes are entirely pistillate, while in twotipped sedge they have staminate flowers at the base. The fruits of lesser saltmarsh sedge are seldom distinctly beaked, and they may vary from brown to pale, whitish-green; in twotipped sedge, the fruits are distinctly beaked, dark brown and often tinged with green. Lesser saltmarsh sedge plants also have leaves with stomata on both surfaces, while twotipped sedge plants have stomata on the lower surface only.

Notes: Excellent indicator of halophytic conditions.

C. gynocrates Wormsk. ex Drej.
continued
perigynia with longer stipes. *Carex capitata* is tufted and has consistently bisexual, an

drogynous spikes and perigynia that are without veins on the adaxial (ventral) side.

C. limosa L. *continued*

Similar Species: Mud sedge (*C. limosa*) is similar in appearance, habitat, and the possession of yellowish wooly roots to boreal bog sedge (*C. magellanica* var. *irrigua*), but easily distinguished from the latter by its longer male spikes, channeled leaves, a usually short-beaked perigynia, and pistillate scales that are wider than the perigynia. Additionally, mud sedge roots arise few or singly from a rhizome while boreal bog sedge stems are clumped. The staminate spike is longer in mud sedge (10-30 mm) than in boreal sedge (4-15). The pistillate scales are yellowish to reddish brown, 1-nerved and short-awned.

Livid sedge (*C. livida*) might also at times be confused with mud sedge (*C. limosa*). Livid sedge, however, does not have a yellowish felt on its roots, and its female spikes are erect and loosely flowered. Both bog sedge and livid sedge have bluish green leaves and perigynia but this off-green is more so in livid sedge.

Notes: Possesses high nutritional value and is grazed by wildlife, horses, cattle and sheep. Achenes are sometimes eaten by small mammals. Indicative of acidic bogs.

C. magellanica Lam ssp. *irrigua* (Wahlenb.) Hultén *continued*

Habitat and Distribution: Widespread in peaty soils of *Sphagnum* bogs, minerotrophic woodland fens, alder swamps, wet meadows and lakeshores. Occasionally grows in large clumps and often with *C. limosa*, *C. chordorrhiza*, or *C. tenuiflora*. Lowlands to the subalpine zone. Circumboreal. In the southeast third of Alaska and disjunctly in the Brooks Range. From Alaska and the Yukon east to Newfoundland and south to Massachusetts, Minnesota, Colorado, Utah and Washington. Flowering and fruiting June-August.

Similar Species: Mud sedge (*C. limosa*) and boreal bog sedge (*C. magellanica* ssp. *irrigua*) are pale light gray-green, have nodding spikes and possess yellowish wooly roots. Mud sedge is not tufted, the culms arising singly or only a few together; leaves are grooved or channeled; pistillate scales are yellowish- to reddish-brown, usually 3-nerved, and obtuse to sharp-tipped. The staminate spike of mud sedge is generally stiff and 1-3 cm long. Boreal bog sedge is tufted; its leaves are flat; the pistillate scales are brown, 1-nerved and short-awned. The staminate spike is shorter, 4-15 mm long, and usually with a slender peduncle.

C. media R. Brown *continued*

arctic and alpine of eastern Canada, Greenland, and northern Europe. Several collections from western Alaska have been tentatively identified as *C. norvegica* but further review is needed. Compared to *C. media*, *C. norvegica* is densely tufted and more than 3.5 dm tall; has narrower leaf blades (to 3 mm wide); spikes are distinctly separate and not crowded; female spikes are 1-4; and the perigynia are up to 2.5 mm long and elliptic to obovate.

Closedhead sedge is also similar to lesser blackscale sedge (*C. atrosquama*) which has larger spikes (terminal spike more than 10 mm long) and perigynia greater than 3 mm.

Buxbaum's (*C. buxbaumii*) sedge is another somewhat similar species and has essentially stalkless spikes that are close together. Unlike closedhead sedge, the scales of the female flowers of Buxbaum's sedge have a long point that often extends past the tip of the perigynia.

C. utriculata Boott *continued*

hand lens). The stems are rounded or bluntly triangular below the inflorescence and the whole plant is generally less robust than Northwest Territory sedge. Wooly-fruit sedge (*C. lasiocarpa*) is another large sedge found in flooded areas, but it has densely hairy perigynia. Awned sedge (*C. atherodes*

Sprengel) is found in similar flooded habitats and has a similar growth form, but differs in having pistillate scales with distinct scabrous awns, and perigynia with long, divergent teeth, up to 3 mm long.

Notes: The pith of the stem can be eaten raw or cooked and the root and stem bases were eaten cooked. It is widely used by muskrats and waterfowl (especially the fruits). *Carex utriculata* and *C. rostrata* have both been used successfully in wetlands restoration and creation programs, generally by plugs or cuttings rather than seed. It is reported to be tolerant of trampling and heavy metal contamination.

Glossary, References, and Indices

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Glossary

Most technical terminology used in the description of sedges has been removed from this guide; however, an occasional more-technical term used in the description of sedges will be encountered. A glossary is provided for reference which may also be useful when referring to other sedge guides and more technical manuals on sedge and sedge-like plants. This set of sedge terminology is largely credited to Hurd et al. (1998), with additions from Harrington (1977) and Harris and Harris (1994). Wetland and plant ecological terminology follows Gabriel and Talbot (1984), Glazer (1987b) and Vitt *in* Johnson et al. (1995).

- Abaxial**- The side away from the axis (dorsal).
- Achene**- A small, dry, hard, one-celled, one-seeded, persistently closed (indehiscent) fruit with the seed attached at one point to the ripened outer wall of the mature fruit (pericarp).
- Acicular**- Needle-shaped.
- Acuminate**- Gradually tapered to a narrow tip.
- Acute**- Sharp-pointed, with the tip forming an angle of less than 90 degrees.
- Adaxial**- The side toward the axis (ventral).
- Aggregated**- Crowded into a dense cluster, but not united.
- Amphiberingian**- On and around the Bering Sea region of Alaska and Chukotka.
- Androgynous**- Having staminate (male) flowers above the pistillate (female) flowers in the same spike.
- Apex**- The highest point.
- Aphyllopodic**- With the lowermost leaves greatly reduced, bladeless or nearly so; blades, when present, nongreen, short, firm, and pointed.
- Apiculate**- Ending abruptly in a small point.
- Appressed**- Lying flat or close against something, e.g., the stem (culm).
- Approximate**- Appearing close together (opposite of remote).
- Aristate**- With a stiff bristle.
- Ascending**- Curving upward.
- Attenuate**- Slenderly tapering or prolonged; more gradual than acuminate.
- Auricle**- A small projecting lobe or appendage.
- Awl-shaped**- Narrowly triangular and sharply pointed, like an awl.
- Awn**- A bristle-shaped appendage.
- Basal**- Pertaining to the base.
- Beak**- A firm, prolonged, slender tip (the distal portion of the perigynium).
- Biconvex**- Convex on both sides.
- Bidentate**- Having two teeth.
- Bidentulate**- Minutely bidentate.
- Blade**- The broad, usually flat part of a leaf.
- Bog**- Peat-covered wetland where vegetation shows the effects of a high water table and a general lack of nutrients. Bogs receive their nutrients only from rain water; vegetation is not nourished by mineral-enriched groundwater. Calcium (Ca) and magnesium (Mg) levels in the groundwater are extremely low. Bog surfaces are virtually isolated from mineralized soil waters. The surface waters are strongly acidic (pH generally less than 4.6) and the upper peat layers are extremely low in nutrients. Cushion-forming *Sphagnum* mosses and heath shrubs are common. Trees may be present or absent; if present, they generally form open-canopied stands of low, stunted trees. Peat is primarily formed by *Sphagnum* mosses.
- Bract**- A modified leaf subtending a spike or inflorescence.

- Canaliculate-** Longitudinally channeled or grooved.
- Capitate-** Headlike; collected into a head or dense cluster.
- Cartilaginous-** Tough and firm, but somewhat flexible like cartilage.
- Castaneous-** Chestnut-colored; dark brown.
- Cauline-** Of or on the stem.
- Cespitose-** Growing in low, dense tufts; clumped or clustered.
- Chartaceous-** Papery in texture.
- Ciliate-** Marginally fringed with hairs.
- Circinate-** Coiled from the tip downward.
- Circumboreal-** Occurring at once in the northern parts of North America, Asia and Europe.
- Circumpolar-** Occurring in the polar regions of North America, Asia and Europe. Equally applied to areas around the southern polar region when referring to the southern hemisphere.
- Clavate-** Shaped like a club.
- Collar-** The area on the abaxial surface of the sedge leaf at the junction of the blade and sheath.
- Compound-** Having two or more similar parts in one organ.
- Concave-** With the surface bowed inward (see Convex).
- Concavo-convex-** With one surface bowed inward and the other outward.
- Contiguous-** Near, next, or adjacent to.
- Convex-** With the surface bowed outward (see Concave).
- Coriaceous-** Thick and leathery in texture.
- Corrugated-** Wrinkled crosswise or horizontally.
- Cross-fibrillose-** With soft tissues of a structure (for example, the leaf sheath) broken down, leaving a central longitudinal fiber and short, curving horizontal fibers connecting it with the edges.
- Crowded-** Close together.
- Culm-** Stem of a grass, sedge, or rush.
- Cuspidate-** Tipped with a cusp, a sharp or firm point.
- Cylindric-** Having the form of a cylinder.
- Deciduous-** Not persistent; falling off.
- Decumbent-** With a prostrate or curved base and an erect or ascending tip.
- Deflexed-** Bent or turned abruptly downward.
- Dioecious-** Bearing staminate (male) and pistillate (female) flowers on different plants.
- Distal-** Toward or at the tip or far end.
- Divaricate-** Widely divergent or spreading from the axis.
- Dorsal-** Pertaining to the back, or outer surface; the side away from the axis.
- Dorsal suture-** A seam visible near the tip of the dorsal (abaxial) side of the perigynium in some sedge species. It represents the line along which the lateral margins of the bract forming the perigynium are fused and is sometimes like a seam with a flap.
- Elliptic-** With the form of a flattened circle, widest in the center and with the ends equal.
- Emarginate-** With a broad, shallow notch at the apex.
- Entire-** With a smooth margin (for example, a perigynium beak without a notch or dentation).
- Erose-** With an irregular margin, as if gnawed or shallowly shredded (see Lacerate).
- Excurrent-** Running through and beyond, as a midrib projecting beyond a leaf apex.
- Exserted-** Projecting beyond the containing structure.
- Falcate-** sickle-shaped or curved like a hawk's beak.
- Fasciculate-** In close bundles or clusters.
- Fascicle-** A bundle or cluster.
- Fen-** Peatland characterized by a high water table, but with very slow internal drainage by seepage down very gradual slopes. Slow-moving groundwater is enriched by nutrients (particularly Ca and Mg) from upslope materials; fens are thus more mineral-rich than bogs. The pH of the groundwater is generally 5.5 - 7.0. Vegetation reflects quality and quantity of available water, resulting in three basic fen types: graminoid (usually sedge) fens, shrub fens, and treed fens.

- Sedges and “brown mosses” are the primary peat formers in fens.
- Fibrillose-** Bearing delicate fibers or hairs.
- Filamentous-** Threadlike, very slender.
- Filiform-** Long, slender, threadlike.
- Flaccid-** Weak and lax.
- Flexuous-** Wavy, flexible, curved in a zigzag fashion.
- Flark-** A water-filled depression or pool that is elongate perpendicular to the prevailing slope. They contain distinctive species assemblages, occur in linear or reticulate networks, and represent an important element of a patterned fen (see strang).
- Foliaceous-** Leaflike, and usually green.
- Fuscous-** Gray-brown.
- Fusiform-** Spindle-shaped, thickest near the middle and tapering at both ends.
- Glabrous-** Smooth, without hairs or glands.
- Glandular-** Bearing glands.
- Glaucous-** With a waxy bluish or whitish covering.
- Globose-** Spherical.
- Graminoids-** Grass-like plants.
- Gynecandrous-** Having pistillate (female) flowers above the staminate (male) flowers in the same spike.
- Habit-** The general appearance of a plant: the general form of arrangement of the stem, roots and branches.
- Head-** A rounded or flat-topped cluster of flowers or fruits.
- Hirsute-** With rather coarse or stiff hairs.
- Hirtellous-** Minutely hirsute.
- Hispid-** Rough with firm, stiff hairs.
- Hispidulous-** Minutely hispid; bristly-hairy.
- Hyaline-** Thin and translucent.
- Indurated-** Hardened.
- Inflorescence-** A flower cluster.
- Inframarginal-** Beneath, within, or less than the margins.
- Internodes-** The portion of a stem or other structure between two other nodes.
- Involute-** Rolled up or folded: with the edges rolled inward toward the upper (ventral) side.
- Keeled-** With a dorsal, projecting, usually central rib, like the keel of a boat.
- Lacerate-** With the margins irregular, appearing to have been torn. Margins more deeply shredded than described for erose.
- Landform-** Any element of the earth’s surface that is characterized by a distinctive surface expression or internal structure. In landscape ecology, vegetation landforms of peatlands are vegetation patterns that recur across a geographic area as seen on aerial photographs.
- Lanceolate-** Narrow and tapering to the apex, broadest toward the base, four to six times as long as broad.
- Lax-** Loose; with parts open and spreading; not compact.
- Lenticular-** In the shape of a lens; biconvex.
- Ligule-** The membranous appendage arising from the adaxial surface of a sedge or grass leaf at the junction of the sheath and blade.
- Marsh-** Wetland that is periodically inundated by standing or slow-moving water, and hence rich in nutrients. Mainly wet, mineral soil areas characterized by emergent vegetation of reeds, rushes, sedges or grasses. Peat formation is often minimal. They are subject to water drawdown, but water remains within the rooting zone for most of the growing season. Waters are usually almost neutral to slightly alkaline. Surface water levels may fluctuate seasonally, and vegetation often has distinct zones reflecting water depth, frequency of drawdowns, and/or salinity.
- Membranaceous-** Thin, soft, and pliable like a membrane.
- Membranous-** See membranaceous.
- Mesotrophic-** (adj.) Habitats of moderate nutrient capacity.
- Minerotrophic-** Sites which receive terrestrial mineral nutrition in addition to precipitation, indicating that nutrients are brought into a peatland by water that has previously extracted them from a mineral soil.
- Moniliform-** Resembling a string of beads.

- Monoecious**- With staminate (male) and pistillate (female) flowers borne on the same plant.
- Mucronate**- Tipped with a short, sharp, slender point.
- Muskeg**- Colloquial and old term used to refer to the complex mosaic of fens, bogs, swamps, pools and scrubby forest that becomes increasingly common to the north. In interior Alaska and Canada, the term is used to describe a black spruce and *Sphagnum* peatland. It is also a common term for southeast Alaskan wetlands characterized by stunted, gnarled trees (many with bonsai-like forms), pit ponds and larger pools (containing skunk cabbage, yellow pond-lily, and various pondweeds) drained by rills and small streams snaking between thick lawns of *Sphagnum* moss and islands of stunted forest and shrubs. In this cool, humid, oceanic climate, they may cover depressional areas as well as slopes of considerable steepness.
- Nerve**- A simple or unbranched vein or slender rib of a leaf, bract, perigynium, or other organ.
- Node**- The point on the stem where leaves and branches originate; the joint of a stem; the point on an axis that bears other structures.
- Ob-** Latin prefix, meaning in a reverse direction.
- Ob lanceolate**- Lanceolate but with the narrowest part toward the base.
- Obliquely cleft**- An opening with the sides unequal or slanting.
- Obovate**- Ovate, but attached at the narrow end (two dimensional).
- Obovoid**- A three-dimensional figure, obovate in outline.
- Obsolete**- Rudimentary and scarcely detectable.
- Obtuse**- Blunt to almost rounded at the end.
- Orbicular**- Circular or nearly so in outline.
- Orifice**- An opening.
- Ovary**- The expanded lower portion of the pistil that contains the ovule(s).
- Ovate**- Having the outline of an egg; broadest toward the base, one and one half times as long as broad (two dimensional).
- Ovoid**- A three-dimensional figure, ovate in outline.
- Ovule**- The structure that becomes a seed after fertilization.
- Papillose**- Bearing minute rounded or nipple-like, warty projections.
- Peat**- The decomposing remains of plants.
- Peatlands**- Generic term including all types of peat-covered terrain. Areas of accumulation of more than 40 cm of peat above the mineral soil. The 40 cm depth is the thickness of rooting for the majority of wetland plants.
- Pedicel**- The stalk of a single flower in an inflorescence.
- Peduncle**- The stalk of an inflorescence or solitary flower.
- Pedunculate**- Borne upon a peduncle.
- Perigynium** (plural = perigynia)- An inflated saclike structure enclosing the ovary (achene) in the genus *Carex*.
- Phyllopodic**- With the lowermost leaf blades well developed and not reduced.
- Pistil**- The female (seed bearing) structure of a flower, consisting usually of an ovary and one or more styles and stigmas.
- Pistillate flower**- Female flower; a flower with one or more pistils, but no stamens.
- Plane**- With a flat surface.
- Plano-convex**- flat on one surface, rounded on the other. In a plano-convex perigynium, the dorsal side is convex or rounded and the ventral side is flat.
- Plicate**- Plaited or folded like a fan.
- Proximal**- Toward the base.
- Puberulent**- Minutely hairy.
- Pubescent**- Covered with hairs, hairy.
- Punctate**- Dotted with depressions or translucent glands.
- Punctulate**- Minutely punctate, diminutive of punctate.
- Rachilla**- The axis of the spikelet in grasses and some sedges. The presence of a rachilla alongside the achene within the perigynium of some sedges demonstrates

- that each pistillate (female) flower represents an inflorescence branch reduced to a single flower. It is commonly present in single-spiked sedges.
- Remote-** Appearing slightly separated: removed to, or situated at a distance from (opposite of approximate).
- Retorse-** Bent or turned abruptly backward.
- Revolute-** Rolled under: rolled back from the margins or apex toward the dorsal side.
- Rhizome-** A prostrate underground stem, rooting at the nodes.
- Rhombic-** Diamond shaped.
- Rib-** A primary or prominent vein of a leaf, bract, or other structure.
- Rugose-** Wrinkled.
- Rugulose-** Diminutive of rugose.
- Scabrous-** Rough to the touch due to the presence of short, stiff hairs or stout projections.
- Scale-** A small, thin, or flat structure.
- Scarious-** Thin, dry, and chaffy in texture, not green.
- Separate-** Distinct from each other.
- Septate-** Divided by transverse partitions.
- Septate-nodulose-** Divided by small transverse knobs or nodules.
- Serrate-** With short, sharp teeth pointing forward.
- Serrulate-** Minutely serrate.
- Sessile-** Without a stalk, attached directly at the base.
- Setaceous-** Bristle-shaped.
- Sheath-** The basal portion of the rush, sedge, or grass leaf that forms a tubular cover surrounding the stem.
- Spiciform-** Spikelike.
- Spike-** An unbranched, elongate inflorescence with sessile or subsessile flowers maturing from the base upwards.
- Spindle-shaped-** Broadest near the middle and tapering toward both ends. Fusiform.
- Squarrose-** Spreading rigidly at right angles or recurved.
- Staminate flower-** Male flower; a flower with one or more stamens, but no pistils.
- Stigma-** The apical part of the pistil on which the pollen is deposited and where it germinates.
- Stipe-** A stalk-like structure.
- Stipitate-** Having a stipe or stalk.
- Stramineous-** Straw-colored.
- Strang (String)-** The transverse peat ridge portion of a wetland vegetation pattern of alternating peat ridges and flooded depressions (see flark) commonly known as strangs and flarks.
- Striate-** Marked with fine longitudinal lines or streaks; finely nerved.
- Strigose-** With short, stiff, appressed hairs.
- Striolate-** Minutely striate; diminutive of striate.
- Style-** The slender stalk that connects the stigma to the ovary.
- Swamp-** Wetland where standing or gently moving waters occur seasonally or persist for long periods, leaving the subsurface continuously waterlogged. Water table may drop seasonally, creating aerated conditions in the rooting zone of vegetation. Swamp waters are almost neutral to moderately acid, and show little deficiency in oxygen or mineral nutrients. They are nutritionally intermediate between bogs and fens. Substrates consist of mixtures of mineral and organic materials, or woody, well-decomposed peat. Vegetation may be dense coniferous or deciduous forest, or tall shrub thickets. Most peat-forming mosses are absent, or present only in a subordinate role. Woody species are the primary peat formers in swamps, and in many swamps, peat formation is minimal.
- Sub-** Latin prefix, meaning under, almost, or not quite.
- Subcoriaceous-** Somewhat leathery in texture.
- Suborbicular-** Egg-shaped.
- Substipitate-** With a very short stalk (peduncle or base of an achene or perigynia).
- Subtend-** To underlie so as to enclose or surround.

Subulate- Awl-shaped; flat, narrow, and tapering gradually to a sharp apex.
Suffused- Tinged, diffused, overspread.
Sulcate- Longitudinally grooved or furrowed.
Sward- Turf.
Terete- Cylindrical; circular in cross section.
Tomentum- A covering of tangled or matted, woolly hairs.
Torose- Cylindrical with alternate swellings and contractions.
Torulose- Diminutive of torose. In sedges, generally used with reference to a perigynium with a swollen base that is more or less adnate to the achene.
Trigonous- With three angles.
Triquetrous- With three sharp or projecting angles.
Truncate- Cut squarely across at the apex or base.
Tuberculate- Bearing small swellings or projections (tubercles).
Tufted- Growing in tufts or clumps; clustered; cespitose.

Tussock- A clump or tuft of grass-like plants.
Ventral- Pertaining to the inner face of an organ, or the side toward or facing the axis, adaxial.
Ventromarginal- Toward the ventral side of the margin.
Villose- Pubescent with long, soft, often bent or curved, but not matted hairs.
Water Track- Any zone in which minerotrophic water is channeled across a peatland. The streamlined vegetation pattern simulates the appearance of braided streams or networks of rills in the direction of water flow.
Wetland- Land where saturation with water is the dominant factor in determining the nature of soil development and the types of plant and animal communities living in an area.
Wing- A thin, flat appendage or the border of an organ.

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- Carex anthoxanthea* S, S, S, S, S
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- D** Mike Gracz, Kenai Watershed Forum.
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- R** Texas A & M University: <<http://www.csdl.tamu.edu/FLORA/imaxxcyp.htm>>. Mirror site for images from C.A.M. Lindman's Flora from Project Runeberg (Sweden). All images processed by Dr. Gerhard Keuck. These images are also indexed via the BioFinder image data base <<http://www.biofinder.org>>.
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- U** Dean Wm. Taylor, California Plant Database, CALIFLORA, <<http://www.califlora.org1>>.

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