

FIELD INVESTIGATION OF FESTUCA SUBULIFLORA (CRINKLE-AWN FESCUE),
A REGION 1 SENSITIVE SPECIES,
ON THE NEZ PERCE AND CLEARWATER NATIONAL FORESTS

by

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ABSTRACT

A field investigation of Festuca subuliflora (crinkle-awn fescue) was conducted on the Nez Perce National Forest by the Idaho Department of Fish and Game's Natural Heritage Program. The investigation was a cooperative Challenge Cost-share project between the Department and the Nez Perce National Forest.

Crinkle-awn fescue, a Region 1 Sensitive Species, is a Pacific coastal disjunct in northern Idaho. Principal populations of this species occur west of the Cascade Mountains, mostly near the coast. The only populations east of the Cascade crest are in the moist, low-elevation canyons of the Selway and North Fork Clearwater Rivers and the Elk Creek Falls vicinity of northern Idaho.

Data gathered during the 1989 field season reveals that crinkle-awn fescue is scattered within suitable habitats in the western redcedar zone. A total of 23 new populations at 21 sites are documented, with the majority of these supporting less than 100 individuals. The only previously known Idaho site was relocated and permanent monitoring plots were established at this site.

All but one of the Idaho populations are located on lands administered by the Nez Perce or Clearwater National Forests. Several recommendations are made relative to the long-term viability and conservation of crinkle-awn fescue on these forest lands.

TABLE OF CONTENTS

| | |
|---|-----|
| ABSTRACT | i |
| TABLE OF CONTENTS | ii |
| LIST OF APPENDICES | iii |
| INTRODUCTION | 1 |
| CURRENT STATUS | 2 |
| TAXONOMY | |
| Family | 2 |
| Common Name | 2 |
| Citation | 2 |
| Synonyms | 2 |
| Technical Description | 2 |
| Nontechnical Description | 2 |
| Distinguishing Features and Similar Species | 2 |
| DISTRIBUTION | |
| Range | 3 |
| Habitat and Associated Species | 4 |
| Permanent Monitoring Plots | 5 |
| STATUS | |
| Ownership | 5 |
| Threats | 6 |
| Management Implications | 6 |
| ASSESSMENT AND RECOMMENDATIONS | |
| Summary | 6 |
| Recommendations to the Nez Perce National Forest | 7 |
| Recommendations to the Clearwater National Forest | 7 |
| REFERENCES | 8 |

LIST OF APPENDICES

- APPENDIX I Line drawings of Festuca subuliflora
- APPENDIX II ... Maps of precise occurrences of Festuca subuliflora in Idaho
- APPENDIX III .. Demographic data for 22 Festuca subuliflora sites (24 populations) in northern Idaho
- APPENDIX IV ... Slides of Festuca subuliflora and its habitat.

INTRODUCTION

The National Forest Management Act and Forest Service policy require that Forest Service land be managed to maintain populations of all existing native animal and plant species at or above the minimum viable population level. A minimum viable population consists of the number of individuals, adequately distributed throughout their range, necessary to perpetuate the existence of the species in natural, genetically stable, self-sustaining populations.

The Forest Service, along with other Federal and State agencies, has recognized the need for special planning considerations in order to protect the flora and fauna on the lands in public ownership. Species recognized by the Forest Service as needing such considerations are those that (1) are designated under the Endangered Species Act as endangered or threatened, (2) are under consideration for such designation, or (3) appear on a regional Forest Service sensitive species list.

Festuca subuliflora (crinkle-awn fescue) is a Pacific coastal disjunct with a limited distribution in northern Idaho. This species is presently listed as a Region 1 Sensitive Species for the Nez Perce National Forest. During the 1989 field season an investigation of this species was conducted by the Idaho Department of Fish and Game's Natural Heritage Program.

The primary objectives of this investigation were as follows:

- 1) Relocate and survey the single known population of Festuca subuliflora on the Nez Perce National Forest.
- 2) Survey for potential habitats and new populations on National Forest lands.
- 3) Acquire population data and characterize habitat conditions for known populations.
- 4) Establish long-term monitoring plots in selected populations to evaluate reaction to disturbance.
- 5) Assess population trends and threats to existing populations and make management recommendations to the forests based on these assessments.

Festuca subuliflora Scribn.

CURRENT STATUS USFS Region 1 Sensitive Species

TAXONOMY

Family: Poaceae or Gramineae (Grass)

Common Name: Crinkle-awn fescue, Coast Range fescue

Citation: Scribn. in Macoun, Cat. Can. Pl. 2(5):396 1890

Synonyms: Festuca ambigua Vasey
 Festuca denticulata Beal

Technical Description: Small tufted perennial, 5-10 dm tall, leafy to near panicle; auricles lacking; ligules about 0.5 mm. long and strongly ciliate with coarse hairs; blades flat and lax to somewhat involute, 2-4 mm wide, glabrous dorsally but strongly puberulent ventrally; panicle loose, strongly nodding, 10-20 cm long, spikelets loosely 3- to 5-flowered, rachilla slender and pubescent, about 2 mm long and jointed a short distance below the floret; glumes narrow and lanceolate the first 3-4 mm, the second 4-5 mm, long; lemmas scaberulous toward apex, 6-8 mm long, rather strongly 5-veined; awns slender, from a minutely subulate-bifid apex, flexuous or "crinkled", 10-15 mm long (A.S. Hitchcock 1935, C.L. Hitchcock 1969).

Nontechnical Description: Crinkle-awn fescue is a perennial grass forming a small tuft of long, narrow, lax blades. The plants are generally over 5 dm tall when in flower, but often are only present in the vegetative state. Spikelets are arranged in a open, nodding panicle with drooping branches. The awns of the individual florets are long (generally > 1 cm) and "crinkled" or bent. The rachilla (small stem between and joining each floret) has a distinct joint a short distance below the floret. Basal leaves are long (2-3 dm), flat, narrow (2-4 mm), smooth beneath, but with a short dense pubescence on the upper surface.

Distinguishing Features and Similar Species: Crinkle-awn fescue has several very distinct features. Aside from the fact that it occurs in a rather unique habitat for a fescue (moist, shady western redcedar forests), it also possesses three key characters that aid in identification when in flower, 1) strongly nodding panicles with drooping branches, 2) long (>1 cm), flexuous awns, and 3) a "jointed" rachilla (see diagram in Appendix I). No other fescues, and very few other grasses, possess this unique "joint" feature of the rachilla. This character is even more helpful in identification late in the season as the spikelets begin to disarticulate. Disarticulation occurs at the rachilla "joint", therefore, each floret will have a nub or short stalk at their basal end, approx. 1 mm long. If the plants are only present in the vegetative state, which is often the case in dense shade, the short, dense pubescence on the upper surface of the long, narrow leaves is easily identifiable. Since the lower surface is glabrous, a distinct color difference is visible to the naked eye, in addition to the general feel of the leaf. Using any of the above characters will require fairly close examination, even after one becomes familiar with the species.

Festuca subulata frequently grows in the same habitat as F. subuliflora and the two may be initially confusing. Both species possess long awns, however, Festuca subulata lacks several of the above mentioned key characters. It does not have the "jointed" rachilla or a strongly nodding panicle with drooping branches. Additionally, the leaves of F. subulata are wider and lack the short, dense pubescence on the upper surface. Even so, these are characters that require close examination. Unless one is quite familiar with the taxon and diligently searching for it, crinkle-awned fescue can easily be overlooked or confused with other grass species. I have found no method that allows positive identification without close scrutiny.

Although C.L. Hitchcock (1969) mentions the species and its characters, he fails to emphasize some of the most unique and identifiable aspects of the Festuca subuliflora. Caicco (1987) noted that identification is easiest when based on A.S. Hitchcock (1935), in addition to C.L. Hitchcock (1969).

DISTRIBUTION

Range: Crinkle-awn fescue is a Pacific coastal disjunct in northern Idaho. A disjunction exists when a populations segment is separated by some distance from the main, or principal population (Johnson 1983). This separation is greater than the species' natural dispersal capacity can account for (Polunin 1960). In the case of Festuca subuliflora, the principal distribution occurs west of the Cascade Mountains, from southwestern British Columbia to Humboldt County in northwestern California (Hubbard 1969, Hitchcock 1969). Within this range the species is most commonly found near the coast, as is indicated by the other common name, Coast Range fescue. Prior to 1989, the only report of the species east of the Cascade crest was from a collection along O'Hara Creek, a major tributary of the Selway River, on the Nez Perce National Forest. For documentation this collection is:

Steve Arno #1309. August 25, 1975. Clearwater Mts., O'Hara Creek Road ca. 2 mi. S of O'Hara Campground; 23 mi ESE of Kooskia. T31N, R7E, sec 1; elev. 2100 ft; 55% east slope. Thuja plicata/Pachistima myrsinites forest. Common.

In 1987, Steve Caicco (Botanist, Idaho Natural Heritage Program) conducted an investigation of crinkle-awn fescue for the Nez Perce National Forest. An excellent explanation of his questions about the identification are presented in his report (Caicco 1987). During his investigation, he relocated the O'Hara Creek collection and collected an additional 6 specimens in the same vicinity. He concluded that "the species appears to be widely-scattered, but common, in the understory of a old-growth western redcedar/maidenhair fern association along O'Hara Creek".

The interior range of crinkle-awn fescue was expanded substantially during the 1989 field season. In addition to the O'Hara Creek population, a total of 23 new populations at 21 sites were documented. The interior range now includes not only a major stretch of the Selway River, from Swiftwater Creek to Meadow Creek, but also portions of the North Fork Clearwater River and the Elk Creek Falls vicinity. In concordance with Caicco (1987), I also found the species to be widely-scattered in western redcedar understories, with the majority of these new sites supported populations of less than 100 individuals.

The existence of Festuca subuliflora, a Pacific coastal disjunct, within northern Idaho is an unusual phenomenon, but not unique. Presently, some 40 other vascular plants can be classified as Pacific coastal disjuncts with high numbers and concentrations occurring within the canyons of the Clearwater River drainage. All of these taxa have their major distributions west of the Cascade summits. Due to their limited distribution in the interior Pacific Northwest, many of these species are listed as Sensitive Plant Species for Region 1. A more complete explanation of this phenomenon is presented by Lorain (1988).

Disjunction in northern Idaho has been explored by forest ecologists at the University of Idaho since the late 1960's. The Clearwater drainage has consequently been intensively surveyed and collected for disjunct taxa. It is surprising that more populations of crinkle-awn fescue were not discovered earlier. The most likely reason for this is that crinkle-awn fescue is easily overlooked. As mentioned previously, some confusion exists between Festuca subuliflora and the more common F. subulata, which has undoubtedly complicated the situation.

Habitat and Associated Species: Within these river canyons of northern Idaho the regional macroclimate consists of high precipitation and relatively moderate temperatures. This climate has consequently promoted the development of a rich western redcedar (Thuja plicata) forest community. It is within these habitats that most of the coastal disjuncts, including crinkle-awn fescue occurs.

Unlike most fescues, Festuca subuliflora seems to prefer the late seral communities within the western redcedar habitat type series. At this successional stage grand fir (Abies grandis) is virtually codominant with western redcedar, in the overstory. Understory conditions, therefore, are moist with heavy to filtered shade. Most of the stands keyed to Thuja plicata/Clintonia uniflora (western redcedar/queencup beadlily), Thuja plicata/Asarum caudatum (western redcedar/wild ginger), and Thuja plicata/Adiantum pedatum (western redcedar/maidenhair fern) habitat types (Cooper

et al. 1988).

Crinkle-awn fescue is almost always found growing in rich humus soils over a granitic parent material. Habitats range from relatively undisturbed conditions with dense shade and thick moss layers to slightly disturbed conditions. Commonly, these later situations were natural openings within a stand where the canopy was less dense. Very old roads and trail edges provided additional habitat. This would appear to indicate that crinkle-awn fescue is fairly tolerant of various habitat conditions and at least slight amounts of disturbance.

Many other moisture-loving species are commonly found growing with crinkle-awn fescue. Associated species include, Bromus vulgaris, Carex hendersonii, Festuca subulata, Adenocaulon bicolor, Polystichum munitum, Smilacina stellata, Asarum caudatum, Disporum hookeri, Clintonia uniflora, Coptis occidentalis, and Pteridium aquilinum.

Permanent Monitoring Plots: In order to monitor the trends in crinkle-awn fescue and the effects of timber harvest activities on the species, permanent monitoring plots were established during the 1989 field season. Two permanent ecodata plots were established along O'Hara Creek, one outside and one inside designated cutting units for the Peterson Point Timber Sale (see Appendix IV). Red-painted fence posts were placed at the center of each circular tenth-acre plot. Complete ecodata (USDA Forest Service 1987) information was collected in addition to making counts of all flowering and vegetative Festuca subuliflora plants that fell within five 10-m² microplots. Microplot establishment follows Steele and Geier-Hayes (1987).

STATUS

Ownership: All but one of the known Festuca subuliflora populations occur on lands administered by the Nez Perce and Clearwater National Forests. This species also occurs on a portion of the St. Joe National Forest, which is administered by the Clearwater National Forest.

Two of the known locations are within protected areas. On the St. Joe National Forest, crinkle-awn fescue is located at the Elk Creek Falls Recreation Area. Additionally, it was found within the O'Hara Research Natural Area on the Nez Perce National Forest.

Threats: Not a great deal is known about the autecology of crinkle-awn fescue, especially how the species reacts to disturbance. Direct timber harvest and road building activities are likely to pose the biggest threat to Festuca subuliflora. Such activities should be carefully assessed with regard to their impact on the conservation status of crinkle-awn fescue.

Management Implications: All populations of crinkle-awn fescue are known from relatively narrow corridors along valley bottoms, where numerous and varied development and other habitat-altering activities are taking place. Such activities do reduce habitat and could have a deleterious cumulative effect within the species' narrow range. However, at present it appears that current land-use and management of habitat containing crinkle-awn fescue on the Clearwater and Nez Perce National Forests does not conflict with the species long-term viability.

The establishment of permanent monitoring plots within the Peterson Point Timber Sale (see Appendix IV) will document the effect of harvesting activities on this sensitive species. Such information should prove useful in future management evaluations.

ASSESSMENT AND RECOMMENDATIONS

Summary: Crinkle-awn fescue is a Pacific coastal disjunct with a restricted distribution in northern Idaho. As of 1989, a total of 24 disjunct populations at 22 sites are documented from portions of the Selway and North Fork Clearwater River canyons and the Elk Creek Falls vicinity. All but one of these populations of Festuca subuliflora occur on land administered by the Nez Perce and Clearwater National Forests. Two populations presently occur within the boundaries of protected areas, Elk Creek Falls Recreation Area and O'Hara Research Natural Area.

This investigation indicates that crinkle-awn fescue is more abundant and widespread than previously thought. The species is scattered, but locally common within suitable habitats in the western redcedar zone. At present it appears that the majority of crinkle-awn fescue populations do not conflict with current land-use and management. However, all Idaho populations of this species occur within relatively narrow corridors along valley bottoms, where numerous habitat-altering activities are taking place. Moreover, the majority of these sites supported populations of fewer than 100 individuals.

Presently, we lack a sufficient distributional and autecological information for crinkle-awn fescue. It appears to be fairly well distributed and tolerant of at least slight disturbances. However, most populations are small and continued monitoring is essential to assess correctly the proper conservation status for crinkle-awn fescue.

Recommendations to the Nez Perce National Forest: Populations of crinkle-awn fescue were found along the Selway River from just east of the town of Lowell and extending southeast to Meadow Creek. Although access to the southern bank of the Selway River is limited, crinkle-awn fescue was found at all the accessible sites and suitable habitat extends more-or-less continuously along this shore.

Until additional populations are located and a more precise assessment of its overall distribution is documented, I recommend that crinkle-awn fescue be maintained on the Sensitive Species list for the Nez Perce National Forest. The forest should carefully assess the impacts of its future management activities on the conservation status of crinkle-awn fescue. Clearance surveys should be conducted for any projects in suitable habitat along the Selway River and tributaries that may support crinkle-awn fescue populations.

As mentioned previously, two permanent monitoring plots have been established within the crinkle-awn fescue populations along O'Hara Creek, Selway Ranger District. The incentive behind establishing these plots was to provide valuable data concerning the effect of timber harvesting on crinkle-awn fescue populations. One of the plots is placed inside a cutting unit of the Peterson Point Timber Sale, scheduled to be harvested sometime within the next five years. The Timber Sale Administrator on the Selway Ranger District should be made aware of the plot centers and stringently defend these fenceposts from being removed or run over! Alteration of harvesting methods within the plot area is not necessary, but protection of the location of plot center is essential to obtain an accurate assessment of harvesting effects on the population.

Recommendations to the Clearwater National Forest: Prior to 1989, crinkle-awn fescue was not known to occur on the Clearwater National Forest. Seven fescue populations are now documented for land within or administered by the Clearwater National Forest. One population is known from the Elk Creek Falls Recreation Area and six populations occur sporadically along the North Fork Clearwater River, from Beaver Creek to Larson Creek.

Given the present state of our knowledge concerning this species, I recommend that Festuca subuliflora be added to the Sensitive Species list for the Clearwater National Forest. Should future evidence indicate that this species is more abundant and widely-distributed, this listing could be reevaluated.

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Appendix 1

Line drawings of Festuca subuliflora
(taken from A.S. Hitchcock 1935
and C.L. Hitchcock 1969)

Appendix II

Maps of precise occurrences of
Festuca subuliflora in Idaho

Nez Perce National Forest

- Map A. Portion of Goddard Point 7.5' quadrangle
- Map B. Portion of Goddard Point 7.5' quadrangle
- Map C. Portion of Goddard Point 7.5' quadrangle
- Map D. Portion of Stillman Point 7.5' quadrangle
- Map E. Portion of Stillman Point 7.5' quadrangle
- Map F. Portion of Selway Falls 7.5' quadrangle

Clearwater National Forest
(or administered by)

- Map G. Portion of Thompson Point 7.5' quadrangle
- Map H. Portion of Sheep Mountain 7.5' quadrangle
- Map I. Portion of The Nub 7.5' quadrangle
- Map J. Portion of Elk Creek Falls 7.5' quadrangle

Private Property

- Map K. Portion of Lowell 7.5' quadrangle

Appendix III

Demographic data for 22 Festuca subuliflora
sites (24 populations) in Idaho.

* - previously known and documented population

1. Swiftwater Bridge
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 51-100 plants in 1989
 - d. Density: Low to Moderate
 - e. Evidence of expansion/contraction: No evidence
2. Cedar Flats
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 11-50 plants in 1988
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
3. CCC Camp
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number of plants: 51-100 plants in 1989
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
4. Peterson Point Monitor Plot
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 101-1000 plants in 1989
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: No evidence
- * 5. O'Hara Creek
 - a. Location:
 - b. Area: 1 acre
 - c. Number of plants: 100-1000 plants in 1989
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: No evidence
6. FS Road 651 hairpin
 - a. Location:
 - b. Area: 5-10 yds²
 - c. Number of plants: 11-50 plants in 1989
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
7. O'Hara Creek Trail
 - a. Location:
 - b. Area: ca. 5 acre (scattered)
 - c. Number of plants: 2 pops. total of ca. 300 plants in 1989
 - d. Density: Low to Moderate
 - e. Evidence of expansion/contraction: No evidence

8. Rackliff Creek
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: ca. 300 plants in 1989.
 - d. Density: Low to Moderate
 - e. Evidence of expansion/contraction: No evidence
9. Boyd Creek Camp
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 51-100 plants in 1989
 - d. Density: Low to Moderate
 - e. Evidence of expansion/contraction: No evidence
10. 25-mile Bar
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 51-100 plants in 1989
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
11. Selway Falls Camp
 - a. Location:
 - b. Area: 5-10 yds²
 - c. Number of plants: 11-50 plants in 1989
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
12. Upper Selway Falls Camp
 - a. Location:
 - b. Area: 10 yd²
 - c. Number of plants: 11-50 plants in 1989
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
13. Indian Hill Road
 - a. Location:
 - b. Area: 10 yd²
 - c. Number of plants: 11-50 plants in 1989
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
14. Meadow Creek Trail - Mile 1
 - a. Location:
 - b. Area: 100 yds²
 - c. Number of plants: 51-100 plants in 1989
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: No evidence

15. Meadow Creek Trail - Mile 2
 - a. Location:
 - b. Area: 5 acres
 - c. Number of plants: 500-2000 plants in 1989
 - d. Density: Moderate to High
 - e. Evidence of expansion/contraction: No evidence
16. Steep Creek
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number of plants: 101-1000 plants in 1989
 - d. Density: Moderate to High
 - e. Evidence of expansion/contraction: No evidence
17. Aquarius Camp East
 - a. Location:
 - b. Area: 10 yds²
 - c. Number of plants: 2 pops each 11-50 plants in 1989
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
18. Quartz Creek
 - a. Location:
 - b. Area: 10-50 yds²
 - c. Number of plants: ca. 200 plants in 1989
 - d. Density: Moderate to High
 - e. Evidence of expansion/contraction: No evidence
19. Moscow Bar South
 - a. Location:
 - b. Area: 5-10 yds²
 - c. Number of plants: ca 20 plants in 1989
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
20. Larson Creek
 - a. Location:
 - b. Area: scattered within 2 acres
 - c. Number of plants: ca. 200 plants in 1989
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: No evidence
21. Elk Creek Falls
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 51-100 plants in 1989
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: No evidence
22. Lottie Creek
 - a. Location:
 - b. Area: 10 yds²
 - c. Number of plants: 51-100 plants in 1989
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: No evidence

Appendix IV

Permanent Monitoring Plot Data

1. Location of Permanent Plots and diagram of Ecodata Plot Set-up.
2. Ecodata from Permanent Plots
3. Location and number of Festuca subuliflora plants within microplots.

Location of Permanent Plots

Peterson Point Monitoring Plot - see Map A - Site # 4

O'Hara Creek Plot - see Map E - Site # 5

Ecodata Plot Set-up - 1/10 acre circular macroplot
(4356 sq ft)
5 microplots each 108 sq feet (10m²)

Appendix V

Slides of Festuca subuliflora and its habitat.