Species		Historic range	Family	Status	When listed	Special rules
Scientific name	Common name					
*	*	*	*	*	*	*
Clarkia springvillensis	Springville clarkia	U.S.A. (CA)	Onagraceae—Evening primrose.	T	643	NA
*	*	*	*	*	*	*
Calyptridium pulchellum	Mariposa pussypaws	U.S.A. (CA)	Portulacaceae-Purslane	T	643	NA
*	*	*	*	*	*	*
Verbena californica	Red Hills vervain	U.S.A. (CA)	Verbenaceae-Vervain	T	643	NA
*	*	*	*	*	*	*

Dated: September 1, 1998.

Jamie Rappaport Clark,

Director, Fish and Wildlife Service.

[FR Doc. 98–24500 Filed 9–11–98; 8:45 am]

BILLING CODE 4310–55–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 227

[Docket No. 980811214–8214–01; I.D. 052493B]

Endangered and Threatened Species; Threatened Status for Johnson's Seagrass

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Final rule.

SUMMARY: NMFS is issuing a final rule determining Johnson's seagrass (*Halophila johnsonii*) to be a threatened species pursuant to the Endangered Species Act (ESA) of 1973, as amended, which means it is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Johnson's seagrass is rare and exhibits one of the most limited geographic distributions of any seagrass. Within its limited range (lagoons on the east coast of Florida from Sebastian Inlet to central Biscayne Bay), it is one of the least abundant species. Because of its limited reproductive capacity (apparently only asexual) and limited energy storage capacity (small root-rhizome structure and high biomass turnover), it is less likely to be able to repopulate an area when lost due to anthropogenic or natural disturbances. NMFS will soon issue protective regulations under section 4(d) of the ESA for this species.

DATES: Effective October 14, 1998.

ADDRESSES: Colleen Coogan, NMFS, Southeast Region, Protected Resources Division, 9721 Executive Center Drive, St. Petersburg, FL 33702–2432; Angela Somma, NMFS, Office of Protected Resources, 1315 East-West Highway, Silver Spring, MD 20910.

FOR FURTHER INFORMATION CONTACT: Colleen Coogan, Southeast Region, NMFS, (727) 570–5312, or Angela Somma, Office of Protected Resources, NMFS, (301) 713–1401.

SUPPLEMENTARY INFORMATION:

Background

NMFS published a proposed rule to list Johnson's seagrass as a threatened species on September 15, 1993 (58 FR 48326). Designation of critical habitat was proposed on August 4, 1994 (59 FR 39716). A public hearing on both the proposed listing and critical habitat designation was held in Vero Beach, Florida, on September 20, 1994. NMFS reopened the comment period for the proposed listing on April 20, 1998 (63 FR 19468).

The information forming the basis for NMFS' 1993 proposal has been peer reviewed, and new information confirms NMFS' conclusions regarding the threatened status of Johnson's seagrass. As stated in the notice reopening the comment period, the additional information supplements available data on the status and distribution of Johnson's seagrass. In order to update the original status report (Kenworthy, 1993) and to include information from new field and laboratory research on species distribution, ecology, genetics and phylogeny, NMFS convened a workshop on the biology, distribution, and abundance of *H. johnsonii*. The results of this workshop, held in St. Petersburg, Florida, in November 1996, were summarized in the workshop proceedings (Kenworthy, 1997) submitted to NMFS on October 15, 1997. The notice reopening the comment period contains a summary of the workshop proceedings (63 FR 19468). This final rule contains a brief description of those workshop proceedings, and updates the research findings and analysis since NMFS' 1993 proposal.

Updated Status Report

The biology of Johnson's seagrass is discussed in the proposed rule to list the species as threatened (58 FR 48326, September 15, 1993). The proposed rule includes information on the status of the species, its life history characteristics, and habitat requirements. Johnson's seagrass is one of twelve species of the genus *Halophila*. *Halophila* species are distinguished morphologically from other seagrasses in their possession of either a pair of stalked leaves without scales or a pseudo whorl of leaves. Identifying characteristics of *H. johnsonii* include smooth foliage leaves in pairs 10–20 mm long, a creeping rhizome stem, sessile (attached to their bases) flowers, and longnecked fruits. Most *Halophila* species are reduced in size, more shallow rooted, and have two to three orders of magnitude less biomass per unit area compared to all other seagrasses. The most outstanding difference between *H. johnsonii* and other species is its distinct differences in sexual reproductive characteristics. While *H. decipiens* is monoecious (has both female and male flowers on the same plant) and successfully reproduces and propagates by seed, *H. johnsonii* is dioecious (has flowers of a single sex on the same plant). However, the male flower has never been described either in the field or in laboratory culture. The absence of male flowers supports the hypothesis that sexual reproduction is absent in this species, and propagation must be exclusively vegetative. After periods of unfavorable environmental conditions of growth and vegetative branching, the regrowth and reestablishment of surviving populations of Johnson's seagrass would be significantly more difficult than for species with a sexual life history.

The status review that led to the proposed rule to list this species as threatened under the ESA included data from extensive field work at three sites (Hobe and Jupiter sounds, Sebastian Inlet, and Ft. Pierce Inlet) in the Indian River area during 1990 to 1992. Johnson's seagrass was the least abundant of the seagrass species within the study area and was distributed in patches that range in size from a few centimeters to hundreds of meters. Biomass, patch sizes, and leaf pair densities were always less than those measured in *H. decipiens*. The destruction of the benthic community due to boating activities, propeller dredging and anchor mooring was observed at all sites during this study.

Based on new qualitative and quantitative benthic surveys and interviews with scientists, the workshop report confirmed the extremely limited geographic distribution of *H. johnsonii* to patchy and vertically disjunct populations between Sebastian Inlet and northern Biscayne Bay on the east coast of Florida, finding no verifiable sightings outside the range already reported. Since additional surveys did not locate any male flowers, nor was seedling recruitment confirmed, the restricted distribution and abundance of Johnson's seagrass is attributed to a reliance on vegetative means of reproduction and growth (Kenworthy, 1993; Kenworthy, 1997). High densities of apical meristems, rapid rates of horizontal growth, and a fast biomass turnover were suggested to explain the appearance and disappearance of *H. johnsonii* observed in disturbed areas and on fixed survey transects. The workshop report confirms the conclusions from the previous data.

The results of expanded surveys during the period 1994 to 1996 corroborated previous information that: (1) *H. johnsonii* does not occur further north than Sebastian Inlet; and (2) areal distribution is patchy and disjunct from Sebastian Inlet to Jupiter Inlet. Additionally, these transects confirmed that *H. johnsonii* occurs over a depth range extending from the intertidal down to approximately –2 m mean tidal height. Average percent cover of *H. johnsonii* per transect ranged from a minimum of 0.2 percent in winter 1996 to 8.5 percent in summer 1994. Relative to the other six species that occur in the lagoon, *H. johnsonii* comprises less than 1.0 percent of the total abundance of seagrasses. The transect data corroborates previous intensive surveys in Jupiter and Hobe sounds, and near Fort Pierce Inlet (Kenworthy, 1993; Gallegos and Kenworthy, 1995; Kenworthy, 1997).

The potential for vegetative expansion, a perennial and intertidal growth habit, and a relatively high tolerance for fluctuating salinity and temperature may enable Johnson's seagrass to colonize and thrive in environments where other seagrasses cannot survive (Kenworthy, 1993; Kenworthy, 1997). Additional molecular genetic information was reviewed in the workshop which supports distinguishing *H. johnsonii* as a separate species from *H. decipiens* (Kenworthy, 1993), although more detailed and extensive phylogenetic studies were suggested to determine the origin and source of genetic diversity in Johnson's seagrass (Kenworthy, 1997). The first quantitative evidence of faunal community diversity and abundance in *H. johnsonii* meadows was also reported at this workshop. Results indicated that the infaunal communities of *H. johnsonii* are more similar to the larger seagrass, *Halodule wrightii* than to unvegetated bottom.

It is the policy of NMFS and the U.S. Fish and Wildlife Service (FWS) to solicit the expert opinions of three appropriate and independent specialists regarding pertinent scientific or commercial data and assumptions relating to the taxonomy, population models, and supportive biological and ecological information for species under consideration for listing. Also, it is NMFS' policy to summarize in the final decision document the opinions of all independent peer reviews received and to include all such reports, opinions, and other data in the administrative record of the final decision.

In response to NMFS's three solicitations of peer review on Johnson's seagrass, a response was received from Susan Williams, Ph.D., Associate Professor, Department of Biology and Director, Coastal and Marine Institute, College of Sciences, San Diego State University and from Kimon T. Bird, Ph.D., Center for Marine Science Research, University of North Carolina at Wilmington. Their opinions, which support the NMFS listing proposal, are included in the following Summary of Comments section.

Summary of Comments

The State of Florida's Department of Environmental Protection (FDEP) and Department of Community Affairs (DCA) submitted several sets of comments. Many of these comments pertained to the consideration of critical habitat designation, which is not being determined in this rulemaking. For this present rule, NMFS will address only the comments related to the listing of Johnson's seagrass as threatened.

The December 8, 1993, comments from FDEP concurred that threatened status under the ESA should be assigned to Johnson's seagrass because its distribution is among the most restricted of seagrass species, because it lacks sexual reproduction, and because it depends on vegetative reproduction. All of these factors make it particularly vulnerable to local extinction from various perturbations or environmental changes.

FDEP stated that *johnsonii* and other *Halophila* species have been shown to have relatively high productivity and turnover rates and may be more ecologically important than previously thought. Designation as a threatened species would encourage further study of Johnson's seagrass and would assist FDEP in developing conservation plans. Also, FDEP agreed with NMFS that existing protection for this species was inadequate.

FDEP included the following caveats: First, the presently known geographical locations include several inlets that have regularly experienced maintenance dredging (one since 1948). Yet Johnson's seagrass is still evident around these inlets and in other areas of high human use. It could be argued that maintenance dredging has enhanced this species, or at least not harmed it. Second, the proposed rulemaking states that there is no evidence that commercial, recreational, scientific or educational activities have contributed to the decline of this species. If this species is listed, what more needs to be done to protect it? Third, identification of this species is difficult except by seagrass experts. Those individuals surveying sites need to understand how to clearly identify *H. johnsonii* in the field.

In March 1994, NMFS received additional comments from FDEP concerning the listing proposal, stating that Johnson's seagrass has only recently been recognized as a separate species and that FDEP is seriously concerned with the general lack of knowledge about the organism, especially the many aspects of basic life history. FDEP assumed that the listing of this species as threatened under the ESA should promote the collection of additional knowledge for improved management decisions, including the ability to properly identify the plant in the field. Other *Halophila* species have been underestimated regarding their importance to nearshore ecosystems, and the FDEP did not want this species to be overlooked if it had a significant role. FDEP recommended that NMFS consider conducting an appropriate research program linked to the listing process and that more must be known

about the species so that the most appropriate management strategies can be developed. FDEP restated the caveats made in the December 1993, response.

In September 1994, FDEP commented that the steps being taken by NMFS are necessary to adequately protect this species from loss associated with human-related activities. Although FDEP had reservations as to the effects of inlet-related maintenance activities on the continued existence of Johnson's seagrass, it noted that it is clear that direct removal of existing seagrass will be detrimental to the survival of this species. It supported listing the species as a threatened species.

In January 1994 and June 1994, DCA responded to NMFS' request for a coastal zone consistency determination for the designation of critical habitat for Johnson's seagrass. Although DCA referred to both the proposed listing and critical habitat designation in responses to NMFS, the comments from individual state agencies and departments addressed primarily the critical habitat portion.

In 1998, DCA wrote, on behalf of the state, that it does not object to the listing of Johnson's seagrass as a threatened species.

Other Comments

Issue 1: Several commenters questioned whether NMFS has adequate information to determine that Johnson's seagrass should be listed. Others questioned whether it is a separate species rather than a possible mutation or an exotic species not native to the area. Some questioned whether NMFS could list a species without knowing how it reproduces.

One of the peer reviewers, Dr. Susan L. Williams, stated that while there are data gaps for the species and such data should be obtained, it is justifiable to extrapolate from other species in the genus because seagrass congeners are remarkably alike in their ecology. While it is important to clarify the taxonomic status of the species, it is not an issue that needs to be resolved before listing because the morphology of *H. johnsonii* is distinct enough from *H. decipiens* to enable field identification and thus its distribution across habitats.

In response to questions on whether *H. johnsonii* is a separate species, another peer reviewer, Dr. Kimon T. Bird, stated that the morphological and flowering characteristics of this species are markedly different from the conspecific species *H. engelmanii* and *H. decipiens*. Recently, *H. johnsonii* was compared to other *Halophila* species from Florida and the Indo-Pacific using isozymes sulfated flavonoids and DNA fingerprinting (Jewett-Smith et al. 1997). Based on these analyses, *H. johnsonii* separates out well from other *Halophila* species in Florida and appears more similar to the narrow leaved forms of the Indo-Pacific based on the use of this DNA analysis.

Regarding the mode of reproduction, Dr. Bird stated that the data provided support the absence of seeds, and he agrees that this species reproduces only by asexual methods. Dr. Williams states that there is concern about the lack of evidence of sexual reproduction since male flowers have not been observed in *H. johnsonii*. Furthermore, the sexual reproduction by seagrasses is poorly understood compared to other angiosperms (e.g. seaweeds), and there have been cases where further studies have revised conclusions on asexuality. Apomixis (vegetative reproduction where normal sexual processes are not functioning or greatly reduced in number) has not been verified in seagrasses.

Nonetheless, considerable field surveys and collections have been conducted on *H. johnsonii* to conclude that if males and/or viable seeds do occur, they are quite rare in the areas studied. Thus, the attributes of potentially limited distribution, rare (if present at all) sexual reproduction, and uncertain vegetative dispersal makes the species prone to disturbance. Dr. Williams also concludes that limited and isolated populations of *H. johnsonii* that rely primarily on vegetative dispersal are probably very prone to local extinction due to disturbances and stochastic events. The numerous field searches and laboratory transplant culture experiments have indicated the presence of pistillate flowers (no staminate flowers (i.e., only asexual reproduction) over the 16 years since *H. johnsonii* was first described.

NMFS Response: The 1996 NMFS sponsored workshop addressed several of these concerns. For example, since additional surveys have not located any male flowers, nor has seedling recruitment been confirmed, the workshop report attributed the distribution and abundance of Johnson's seagrass to a reliance on vegetative means of reproduction and growth. High densities of apical meristems, rapid rates of horizontal growth, and a fast leaf turnover were suggested to explain the appearance and disappearance of *H. johnsonii* observed in disturbed areas and on survey transects. The workshop report suggests that this potential for vegetative expansion, a perennial and intertidal growth habit, and a relatively high tolerance for fluctuating salinity and temperature may enable Johnson's seagrass to colonize and thrive in environments where other seagrasses cannot survive.

Additional molecular genetic information was reviewed in the workshop which supports distinguishing *H. johnsonii* as a separate species from *H. decipiens*, although more detailed and extensive phylogenetic studies were suggested to determine the origin and source of genetic diversity in Johnson's seagrass.

Issue 2: Some commenters believe the species is much more abundant in South Florida than the status review indicates and that it occurs in places other than the east coast of Florida (e.g., Bahamas or Florida west coast).

Dr. Bird states that he contacted three trained marine botanists along the west coast of Florida. They reported that they had never seen *H. johnsonii* along the west coast. In addition, McMillan made no reference to its presence in Texas when writing the paper describing the new species, even though he is far more familiar with the marine botany of Texas than Florida. While several commenters reported seeing it in the Bahamas, their observations were anecdotal. Based on the information provided, Dr. Bird concurs that *H. johnsonii* is limited to a narrow geographic range along the east coast of Florida.

Dr. Williams states that knowledge of the distribution of *H. johnsonii* throughout the subtropical and tropical Atlantic should be extended, but it should not affect listing the species because in its known distribution, it is vulnerable to disturbances of dredging and reduced water clarity, as are all the co-occurring seagrass species.

NMFS Response: In 1986, Robert Virnstein (St. John's River Water Management District) and Kalani Cairns (U.S. Fish and Wildlife Service) mapped a 50–mile section of the Indian River Lagoon from St. Lucie Inlet to Sebastian Inlet. Even though *H. johnsonii* and *H. decipiens* seemed to be proliferating, data did not indicate whether this was a trend or a one-time increase. Also, because both species have short leaves, they may have been overlooked in previous surveys. They stated that 1986 was considered a ''good'' year for seagrasses even though many areas were ''stressed'' and had lost seagrasses. Furthermore, they opined that one ''bad'' year could result in the loss of up to half of the present coverage and no one could predict whether such loss would be permanent or that the species would recover.

Virnstein and Morris (1996–personal communication) have said that their 3-year study of 74 seagrass transects in the

Indian River Lagoon has yielded information on deeper water distributions measuring a few centimeters to more than several hundred meters. These results do not change the distributional limits within the original range of the species.

The report of the NMFS workshop confirms the extremely limited geographic distribution of *H. johnsonii* to patchy and vertically disjunct areas between Sebastian Inlet and northern Biscayne Bay on the east coast of Florida, finding no verifiable sightings outside of the range already reported. This finding is based on new qualitative and quantitative benthic surveys and interviews with scientists.

Issue 3: Some commenters remarked that it is difficult to identify Johnson's seagrass in the field and that those reviewing sites need to understand how to clearly identify the species.

NMFS Response: Distinct morphological differences allow for both field and laboratory differentiation of the species. *H. johnsonii* is distinct from the conspecific *H. decipiens* in basic leaf characteristics. *H. johnsonii* has elongated linear leaves with complete margins and *H. decipiens* has broad, elliptical (paddle-shaped) leaves with serrated margins. Increased outreach after listing, including recovery planning and section 7 consultations, will improve stakeholders' familiarity with these differences.

Issue 4: Some commenters questioned the presence of Johnson's seagrass near inlets that have been routinely dredged for years and in other areas of high human usage. The question is whether certain dredging, especially maintenance dredging, impacts Johnson's seagrass, or whether the species occurs in these areas as a result of dredging.

NMFS Response: The effects of maintenance dredging on Johnson's seagrass have not yet been characterized. Johnson's seagrass requires suitable salinity levels, water transparency, and water quality as well as stable, unconsolidated sediments. These elements are found in shallow waters and shoals around inlets and disturbed areas as well as in undisturbed, more isolated deeper areas of the lagoon. Common factors in its distribution appear to be its ability to grow in association with other species and its ability to survive in shallow intertidal flats environments typical of the flood tide deltas near inlets. Johnson's seagrass may extend the coverage of seagrasses within lagoons in some of the zones where other grasses do not grow.

Dr. Bird questions the ability of *H. johnsonii* to withstand nearby dredging activities because the sediments of the Indian River contain a good deal of highly organic particulate materials. When resuspended by dredging activities or other physical disturbances, the fine particulate material can attenuate light (reducing Photosynthetically Active Radiation (PAR)) and be a limiting factor in photosynthesis and subsequent seagrass growth and maintenance.

Several scientists working in the area and for the state of Florida stated that it is clear that direct removal of existing seagrass through new construction will be detrimental to the survival of Johnson's seagrass. There have been no reports of healthy populations outside the presently known range. The survival of the species likely depends on maintaining existing viable populations, especially in areas where large patches are found.

Issue 5: Some commenters said that seagrasses have overwhelming importance to the ecology and economy of South Florida. Seagrasses are high primary producers within their ecosystem. They provide valuable habitat as nurseries, provide refuge for fisheries, and recycle nutrients throughout their ecosystems. Seagrasses are also a food source for endangered green turtles and the Florida manatee. When seagrass beds disappear, fishery productivity also decreases. They noted that declines in seagrass beds have been documented worldwide, particularly in the Indian River Lagoon, the primary habitat of *H. johnsonii*.

NMFS Response: NMFS agrees that seagrasses play an important role in their ecosystems and provide valuable habitat. The vulnerability of seagrasses in general and *H. johnsonii* in particular, provides the impetus for this listing.

Issue 6: Some commenters said that the species should be listed as endangered rather than threatened, and that NMFS underestimated the effects of climate change and increasing development and population growth in Florida.

NMFS Response: NMFS believes that only limited information exists regarding Johnson's seagrass, reproductive capacity, life history characteristics (growth rates, environmental requirements), and the effects of human disturbance which would be necessary in determining that Johnson's seagrass is in danger of extinction throughout all or a significant portion of its range. The protection afforded by listing as threatened will result in the subsequent development of a recovery plan for *H. johnsonii*. The recovery plan will address the gaps in our knowledge of the biology and ecology of Johnson's seagrass, and such knowledge will, in turn, lead to a better understanding of the demography and population biology of this species.

Dr. Bird states that although the evidence points to a valid species with a limited distribution, the questions of its degree of extinction is more difficult to resolve. *Halophila* species as a whole appear to be patchy with few species developing extensive stands. However, he agrees with NMFS' conclusions that human activities in the area could impact the species. Existing criteria and standards, as well as enforcement measures, are inadequate to protect seagrasses.

Issue 7: Several commenters expressed concern about whether maintenance dredging of existing inlets and channels would be allowed to continue if Johnson's seagrass is listed.

NMFS Response: NMFS is concerned about the possibility of losing patches of Johnson's seagrass that may be essential to the genetic viability of the species. However, NMFS expects that maintenance dredging activities will be authorized with the oversight provided by section 7 of the ESA.

Issue 8: Several commenters were concerned that the listing of Johnson's seagrass would prevent or severely curtail expansion or development of ports and maintenance of existing ports, channels and inlets. In turn, this would adversely affect the economy in their communities.

NMFS Response: The ESA mandates that listing determinations be made solely on the basis of the best scientific and commercial data available after conducting a review of the status of the species and taking into account those conservation efforts being made by any state. However, section 7 of the ESA provides a mechanism for actions requiring Federal funding permits or participation to be conducted in a manner that prevents jeopardy to any species. Therefore, NMFS anticipates that most marine related activities can continue when measures are taken through the section 7 consultation process with Federal agencies to reduce adverse impacts and avoid jeopardizing the continued existence of the species.

Issue 9: Some commenters stated that any threats to the habitat could be corrected or were being corrected without the species being listed. For example, problems due to prop scarring could be resolved by marking navigation channels and establishing speed zones. Several counties are installing storm water management systems to improve

water quality. Maintenance dredging is regulated by the state, and spoil is now deposited on beaches to protect shorelines rather than on spoil islands.

NMFS Response: Other embayments in the distributional range of Johnson's seagrass have marked navigational channels, but seagrass bed scarring still occurs. ''Many of the sea-grass beds in the Indian River Lagoon have prop scars resulting from boaters attempting to cross shallow waters and running aground'' (Indian River Lagoon Comprehensive Conservation and Management Plan, May 1996). Erosion caused by damage from boat wakes may also result in turbidity and siltation, which adversely affect seagrass.

Issue 10: One commenter wrote that the updated information provided by NMFS reveals that the species is doing well, and shows no signs of decrease in health or population. The commenter also wrote that its geographic range was, if anything, larger than what was reported in 1993.

NMFS Response: In order to update the original status report (Kenworthy, 1993) and to include information from new field and laboratory research on species distribution, ecology, use, genetics and phylogeny, NMFS convened a workshop on the biology, distribution, and abundance of *H. johnsonii*. The results of this workshop, held in St. Petersburg, Florida, in November 1996, have been summarized in the workshop proceedings (Kenworthy, 1997) submitted to NMFS on October 15, 1997. The new information confirmed NMFS' original determination that the species should be listed as threatened. This final rule is based on updated information.

Issue 11: Some commenters noted that in the proposed rule, NMFS stated that there is no evidence that the overutilization for commercial, recreational, scientific or educational purpose contributed to the decline of Johnson's seagrass. If this listing factor has not contributed to the decline, they questioned what more needs to be done to protect the species.

NMFS Response: This factor refers to the actual use of the species itself. For example, if a plant were harvested commercially for food, medicines, or other products, this use might have contributed to the decline of the organism. Johnson's seagrass habitat may be affected by other resource harvesting activities in the ecosystem, but the species itself is not used for commercial, recreational, or educational activities.

Issue 12: Several commenters stated that there are adequate Federal and State laws to protect all seagrasses which make the additional protection afforded by the ESA unnecessary.

NMFS Response: While it is clear that the intent of Federal and Florida state laws is to conserve and protect seagrass habitat, it is also clear that there is continued and well-documented loss of seagrass habitat in the United States and elsewhere. For example, seagrasses have declined in many areas of the Indian River Lagoon (Virnstein and Morris, 1996).

Previous transplantation efforts to mitigate for the loss of seagrass beds have failed. Until recently, *Halophila* species have not been transplanted successfully in the field and studies underway are incomplete (Kenworthy-personal communication). Many seagrass ecosystems are known to recover very slowly even under the most natural, pristine conditions. Current efforts are insufficient to protect critical seagrasses. This was also the conclusion and recommendation of scientists attending the International Seagrass Workshop in Kominato, Japan in August 1993.

NMFS believes that Johnson's seagrass needs the additional protection of listing, including consideration of effects of Federal actions on the species through the section 7 consultation process of the ESA. During consultation with other Federal agencies, NMFS can ensure that any federally funded, permitted, or authorized activity includes adequate measures to reduce adverse impacts from these activities and to prevent jeopardizing the continued existence of the species.

Issue 13: One commenter wrote that NMFS had exceeded the time limit for making a final determination after proposing to list Johnson's seagrass as threatened in 1993.

NMFS Response: In 1989, NMFS was notified by the FWS that it had received information indicating that *H. johnsonii* was a rare species which may need to be listed under the ESA. By 1993, NMFS had gathered enough information to propose listing the species as threatened. In 1994, NMFS proposed critical habitat for the species. A joint public hearing was held on both the proposed listing and proposed critical habitat. The proposed critical habitat designation was very controversial. Because of the controversy and new NMFS/FWS polices on listing, NMFS postponed the final listing decision until information used to make the original proposal had been peer reviewed and additional information gathered. Peer review of the original information and the results of new studies confirmed NMFS' original determination that the species should be listed as threatened. The new information was reviewed at a technical workshop in November 1996, and summarized in a report in October 1997. In addition to gathering new information, the final listing was delayed by the year-long Congressionally imposed moratorium on listing species in fiscal year 1996.

Summary of the Factors Affecting the Species

After a thorough review and consideration of all information available, NMFS concludes that *H. johnsonii* warrants listing as a threatened species. Procedures found at section 4(a)(1) of the ESA (16 U.S.C. 1531 *et seq.*) and regulations (50 CFR part 424) promulgated to implement the listing provisions of the ESA were followed. A species may be determined to be endangered or threatened due to one or more of the five factors described in section 4(a)(1). These factors and their application to *H. johnsonii* are as follows:

1. Present or Threatened Destruction, Modification or Curtailment of its Habitat or Range.

Habitat within the limited range in which *H. johnsonii* exists is at risk of destruction by a number of human and natural perturbations including (1) dredging; (2) prop scoring; (3) storm surge; (4) altered water quality; and (5) siltation. Due to the fragile nature of *H. johnsonii's* shallow root system, the plants are vulnerable to human-induced disturbances in addition to the major natural disturbances to the sediment, and their potential for recovery may be limited. Destruction of benthic communities due to boating activities (propeller scarring and anchor mooring) was observed at all *H. johnsonii* sites during the NMFS study. Further, this condition is expected to worsen with the predicted increase in boating activity. This severely disrupts the benthic habitat by breaching root systems and severing rhizomes, and significantly reducing the viability of the community.

Turbidity is a critical factor in the distribution and survival of seagrasses, especially in deeper regions of the lagoon, where reduced PAR limits photosynthesis. Shallow regions are less affected by turbidity unless light is rapidly attenuated. In interior lagoonal areas where salinity is low, highly colored water typically is discharged via drainage systems. Stained waters attenuate shorter wavelengths rapidly, removing important PAR as well as potentially stressing plants due to the low salinity. This is a critical factor, especially in the vicinity of Sebastian,

St. Lucie, Jupiter, and Ft. Pierce Inlets, and Lake Worth and North Biscayne Bay where freshwater reaches the flood tide delta and nearby seagrass meadows via rivers and canal systems that discharge into the lagoon.

Trampling due to human disturbance and increased land-use induced siltation can threaten viability of the species. Degradation of water quality due to human impact is also a threat to the welfare of seagrass communities. Nutrient over-enrichment caused by inorganic and organic nitrogen and phosphorous loading via urban and agricultural land run-off can stimulate increased algal growth that may smother the understory of *H. johnsonii*, shade rooted vegetation, and diminish the oxygen content of the water. Such low oxygen conditions have a demonstrated severe negative impact on seagrasses and associated communities. Continued and increased degradation of environmental quality also will have a detrimental effect upon *H. johnsonii* communities.

2. Overutilization for Commercial, Recreational, Scientific or Educational Purposes.

Overutilization for these purposes has not been a documented factor in the decline of this species.

3. Disease or Predation

There are two known herbivores that occur in the range of *H. johnsonii*—the green sea turtle *(Chelonia mydas)*, and the West Indian manatee *(Trichechus manatus)*, both of which feed upon the seagrass. Herbivorous fish also feed upon the seagrass community. Predation pressures alone are not likely to be a threat to the species existence.

4. The Inadequacy of Existing Regulatory Mechanisms.

Despite existing Federal and Florida state laws to conserve and protect seagrass habitat, there is a continued and well-documented loss of seagrass habitat in the United States and elsewhere. For example, seagrasses have declined in many areas of the Indian River Lagoon (Virnstein and Morris, 1996). The Florida Department of Natural Resources and the Florida Department of Environmental Regulation have recently merged, greatly increasing the assignment of enforcement responsibilities without an associated increase in staff for the Marine Patrol. Although stormwater management systems are installed or being installed, the Florida Indian River Lagoon Act of 1990 does not cover other large inputs that will affect water quality, which in turn could affect seagrasses (e.g. industrial discharges, brine disposal, canals, processing plants).

Previous transplantation efforts to mitigate for the loss of seagrass beds have failed. Until recently, *Halophila* species have not been transplanted successfully in the field and studies underway are incomplete (Kenworthy-personal communication). Many seagrass ecosystems are known to recover very slowly even under the most natural, pristine conditions. Current efforts are insufficient to protect critical seagrasses. This was also the conclusion and recommendation of scientists attending the International Seagrass Workshop in Kominato, Japan in August 1993.

5. Other Natural or Human-made Factors Affecting Its Continued Existence.

The existence of the species in a very limited range increases the potential for extinction from stochastic events. Natural disasters such as hurricanes could easily diminish entire populations and a significant percentage of the species. Seagrass beds that are in proximity to inlets are especially vulnerable to storm surge from hurricanes and severe storm events.

Efforts Being Made To Protect Johnson's Seagrass

Section 4(b)(1) of the ESA requires the Secretary of Commerce (Secretary) to make listing determinations solely on the basis of the best scientific and commercial data available and after taking into account state efforts being made to protect the species. Therefore, in making its listing determinations, NMFS assesses the status of the species, identifies factors that have led to the decline of the species, and assesses available conservation measures to determine whether such measures ameliorate risks to the species.

There is a continued and well-documented loss of seagrass habitat notwithstanding existing Federal and state laws to conserve and protect this habitat. Previous transplantation efforts to mitigate for the loss of seagrass beds have failed. NMFS has determined that these existing conservation efforts are not sufficient to prevent a listing determination. NMFS will, however, consider state conservation efforts when developing protective regulations under section 4(d) of the ESA. State conservation efforts may also serve as a basis for a cooperative agreement under section 6 of the ESA.

Listing Determination

Based on available information, NMFS concludes that Johnson's seagrass warrants listing as a threatened species. This species is rare, has a limited reproductive capacity, and is vulnerable to a number of anthropogenic or natural disturbances. Also, it exhibits one of the most limited distributions of any seagrass. Within its limited range (lagoons on the east coast of Florida from Sebastian Inlet to central Biscayne Bay), it is one of the least abundant species. Because of its limited reproductive capacity and limited energy storage capacity, it is less likely to survive environmental perturbations and to be able to repopulate an area when lost. Finally, habitat loss has continued despite existing Federal and state conservation efforts.

Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the ESA include recognition, recovery action, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing encourages and results in conservation actions by Federal, State, and local agencies, private organizations, and individuals. The ESA provides for cooperation with states and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against certain activities involving listed plants are discussed, in part, here.

Section 9 of the ESA prohibits certain activities that directly or indirectly affect endangered species. These prohibitions apply to all individuals, organizations, and agencies subject to U.S. jurisdiction. Section 9 prohibitions apply automatically to endangered species; as described below, this is not the case for threatened species.

Section 4(d) of the ESA directs the Secretary to implement regulations ''to provide for the conservation of [threatened] species'' that may include extending any or all of the prohibitions of section 9 to threatened species. Section 9(a)(2)(E) also prohibits violations of protective regulations for threatened species of plants implemented under section 4(d). While NMFS proposed extending the section 9 prohibitions to Johnson's seagrass, it is not including that proposal in this final rule. Rather, NMFS will issue protective regulations pursuant to section 4(d) for Johnson's seagrass in a separate proposed rulemaking.

Section 7 (a)(4) of the ESA requires Federal agencies to consult with NMFS on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. For listed species, section 7 (a)(2) requires Federal agencies to ensure that activities they

authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with NMFS.

Federal agency actions or programs that may affect populations of Johnson's seagrass and its habitat include U.S. Army Corps of Engineers authorization of projects affecting waters of the U.S. under section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act (i.e., beach nourishment, dredging, and related activities including the construction of docks and marinas); Environmental Protection Agency authorization of pollutant discharges and management of freshwater discharges into waterways; U.S. Coast Guard regulation of vessel traffic; management of national refuges and protected species by the FWS; management of vessel traffic and other activities by the U.S. Navy; authorization of state coastal zone management plans by NOAA's National Ocean Service, and management of commercial fishing and protected species by NMFS.

Listing *H.* johnsonii as threatened provides for the development of a recovery plan for the taxon. The recovery plan would establish a framework for State and Federal agencies to coordinate activities and to cooperate with each other in conservation efforts. The plan would set recovery priorities and describe site-specific management actions necessary to achieve the conservation of Johnson's seagrass.

Critical Habitat

Section 4(b)(6)(C) of the ESA requires that, to the extent prudent, critical habitat be designated concurrently with the listing of a species unless such critical habitat is not determinable at that time. As stated previously, NMFS proposed a designation of critical habitat on August 4, 1994 (59 FR 39716). Given the passage of time since that proposal, NMFS will address the designation of critical habitat in a separate **Federal Register** notice and additional comments will be solicited at that time.

References

A complete list of all references cited herein is available upon request (see **ADDRESSES**).

Classification

The 1982 Amendments to the ESA, in section 4(b)(1)(A), restrict the information that must be considered when assessing species for listing. Based on this limitation of criteria for a listing decision and the opinion in *Pacific Legal Foundation* v. *Andrus*, 657 F.2d 829 (6th Cir. 1981), NMFS has categorically excluded all ESA listing actions from environmental assessment requirements of the National Environmental Policy Act (NEPA) under NOAA Administrative Order 216–6.

As noted in the Conference report on the 1982 amendments to the ESA, economic impacts cannot be considered when assessing the status of the species. Therefore, the economic analysis requirements of the Regulatory Flexibility Act (RFA) are not applicable to the listing process. In addition, this final rule is exempt from review under E.O. 12866.

At this time NMFS is not issuing protective regulations under section 4(d) of the ESA. In the future, prior to finalizing its 4(d) regulations for this species, NMFS will comply with all relevant NEPA and RFA requirements.

This final rule does not contain a collection-of-information requirement subject to the Paperwork Reduction Act.

List of Subjects in 50 CFR Part 227

Endangered and threatened species, Exports, Imports, Marine Mammals, Transportation.

Dated: August 27, 1998.

Hilda Diaz-Soltero,

Acting Assistant Administrator for Fisheries, National Marine Fisheries Service.

For the reasons set forth in the preamble, 50 CFR part 227 is amended as follows:

PART 227—-THREATENED SPECIES

1. The authority citation for part 227 reads as follows:

Authority: 16 U.S.C. 1531–1543; subpart B, 227.12 also issued under 16 U.S.C., 1361 *et seq.*

2. The heading for part 227 is revised to read as set forth above.

3. Section 227.4 is amended by adding paragraph (p) to read as follows:

§ 227.4 Enumeration of threatened species.

* * * * *

(p) Johnson's seagrass (*Halophila johnsonii*)

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