Cumberland Rosemary
(Conradina verticillata)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
Southeast Region
Tennessee Ecological Services Field Office
Cookeville, Tennessee

5-YEAR REVIEW
Cumberland rosemary/*Conradina verticillata*

I. GENERAL INFORMATION

A. Methodology used to complete the review In conducting this 5-year review, we relied on the best available information pertaining to historic and current distributions, life history, and habitat of this species. Our sources include the final rule listing this species under the Endangered Species Act; the recovery plan; unpublished field observations by Service, National Park Service, State and other experienced biologists; unpublished survey reports; and notes and communications from other qualified biologists or experts. We published an announcement of this review in the *Federal Register* and requested information on this species on July 6, 2009 (74 FR 31972), and a 60-day comment period was opened. Comments received and suggestions from peer reviewers were evaluated and incorporated as appropriate (see Appendix A). No part of this review was contracted to an outside party. This review was completed by the Service's lead Recovery biologist in the Cookeville Field Office, Tennessee.

B. Reviewers

Lead Field Office – Tennessee Ecological Services: Geoff Call, 931-528-6481

Lead Region – Southeast Region: Kelly Bibb, 404-679-7132

C. Background

1. FR Notice citation announcing initiation of this review: July 6, 2009, 74 FR 31972.

2. Species status: Unknown, 2010 Recovery Data Call.
We are uncertain what the trend for Cumberland rosemary populations has been during the last year, because current monitoring data were not available to the Service at the time of the 2010 recovery data call. While the threat of habitat alteration from invasive exotic plants has increased in recent years, the National Park Service has begun efforts to manage this threat in Big South Fork and Obed river drainages. Long-term monitoring will be necessary to determine how effective management efforts are at preventing habitat degradation.

3. Recovery achieved: 2 (26-50% recovery objectives achieved)

4. Listing history:
Original Listing
FR notice: 56 FR 60938
Date listed: November 29, 1991
Entity listed: Species
Classification: Threatened

5. Associated rulemakings: n/a

6. Review History:
Recovery Data Call: 2010, 2009, 2008, 2007, 2006, 2005, 2004, 2003, 2002, 2001, 2000, 1999, 1998
Final Recovery Plan: July 12, 1996

7. Species' Recovery Priority Number at start of review (48 FR 43098): 8 (i.e., a species with a moderate degree of threat and a high recovery potential)

8. Recovery Plan:
Name of plan: Recovery Plan for Cumberland Rosemary (*Conradina verticillata*)
Date issued: July 12, 1996

II. REVIEW ANALYSIS

A. Is the species under review listed as a DPS? *Conradina verticillata* is a plant; therefore, the DPS policy does not apply. The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This definition limits listing DPSs to only vertebrate species of fish and wildlife. Because the species under review is a plant and the DPS policy is not applicable, the application of the DPS policy to the species listing is not addressed further in this review.

B. Recovery Criteria

1. Does the species have a final, approved recovery plan containing objective, measurable criteria? Yes

2. Adequacy of recovery criteria.

a. Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat? Yes

b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and is there no new information to consider regarding

existing or new threats)? Yes, the recovery criteria address the two listing factors (discussed in section II.B.3. below) that are relevant to the designation of the species as threatened; however, we have current information identifying invasive exotic plants as an additional threat to Cumberland rosemary habitat.

3. List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information.

Cumberland rosemary will be considered for delisting when there are 25 protected and managed colonies with 50 genetically distinct individuals per colony on the five major rivers (five colonies on each river) where it occurs. These criteria will provide protection for all three populations.

With respect to their distribution in Tennessee, the recovery plan describes the three populations as follows: (1) the Big South Fork Cumberland River and its tributaries in Morgan, Scott, and Fentress counties; (2) the Obed River in Morgan and Cumberland counties; and, (3) the Caney Fork River in Cumberland and White counties. Based on a distribution map in the recovery plan, two major tributaries to the Obed River, Clear Creek and Daddy's Creek, are the remaining two of the five major rivers among which protected colonies are to be equally distributed. Occurrences in McCreary County, Kentucky, are considered part of the Big South Fork Cumberland River population.

The criterion requiring that 25 colonies be protected and managed addresses two listing factors: present or threatened destruction, modification, or curtailment of the species' range; and other natural or manmade factors affecting the species existence. Specific threats discussed in the recovery plan related to the first of these two factors include:

- potential for inundation of the species' habitat due to construction of reservoirs for recreational water supply or hydroelectric purposes
- shading or competition due to vegetation succession if disturbance from flooding becomes too infrequent
- recreation-related threats causing habitat modification
- deterioration of water quality from coal mining and oil and gas exploration

With respect to the category "other natural or manmade factors affecting the species' existence," the recovery plan lists the small size and number of populations as two of the most important reasons for which Cumberland rosemary was designated as threatened. This listing factor is addressed by the criterion that each of the protected and managed colonies consist of at least 50 genetically distinct individuals.

The criterion that 25 colonies be protected and managed, with five colonies distributed among each of the rivers listed above, has not been met. While many protected colonies exist among the five river drainages, we are not aware of specific management plans having been developed, or significant management efforts

undertaken, for any colonies within any of the three populations. Thus, the recovery criteria related to management of the colonies has not been met.

We do not know whether the criterion that each of the protected colonies includes at least 50 genetically distinct individuals has been met. There currently is no way to readily distinguish genetically distinct individuals in the field, and no studies of the genetic structure of the populations or the colonies within them have been undertaken.

For the purposes of this review, we consider each distinct element occurrence tracked by a Natural Heritage Program to constitute a separate colony. The data provided by Natural Heritage Programs follow the NatureServe Natural Heritage methodology, in which the fundamental unit of information is the element occurrence (EO), defined as "an area of land and/or water in which a species or natural community is, or was present" (NatureServe 2004).

C. Updated Information and Current Species Status

1. Biology and Habitat

a. Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

The recovery plan reported that colonies of Cumberland rosemary, though widespread among the streams where it occurs, are often disjunct and exhibit low levels of abundance – some consisting of only a single plant. When this plan was published, there were fewer than ten locations known to have more than 100 clumps and probably fewer than 4,000 total clumps across all known colonies.

We do not have current data for many of the known occurrences of Cumberland rosemary. However, based on data from Tennessee Department of Environment and Conservation (TDEC) (2009) and Kentucky State Nature Preserves Commission (KSNPC) (2010), there are 11 occurrences that have been observed, at some point between 1989 and present time, to have contained more than 100 clumps. We cannot, however, produce a reliable estimate of the total number of clumps across all Cumberland rosemary colonies from data available at this time.

TDEC (2001) developed a monitoring protocol for Cumberland rosemary and collected baseline data in 2001 for six occurrences in Tennessee; two sites were added during 2005 (TDEC 2006) for a total of eight (Table 1). The protocol for this monitoring program involves flagging and censusing all clumps of Cumberland rosemary at a given site and measuring the length and width of each clump to the nearest centimeter. A "clump" is defined as a contiguous cluster of Cumberland rosemary with no obvious gaps in plant material.

Table 1. Rivers, site ownership, and element occurrence numbers of Cumberland rosemary occurrences monitored by TDEC (2006).

River	Owner	Element Occurrence Numbers
Big South Fork	NPS	050, 074, 082
Caney Fork	Bowater	013, 096
Caney Fork	TWRA	051
Obed	TWRA	004
Obed	NPS	009

Based on data collected at the six original sites (Table 2), it appears that the spatial coverage of Cumberland rosemary decreased at monitored sites in the Caney Fork and Big South Fork rivers between 2001 and 2005, despite an overall increase in the number of clumps that were measured at the Caney Fork occurrences. However, it is unknown whether these numbers represent real trends in the populations at these sites or whether observer bias accounts for some of the observed differences (TDEC 2006). Specifically, it is likely that separate observers would define individual clumps differently or that errors could occur when measuring area covered by a given clump.

Table 2. Monitoring results for selected occurrences of Cumberland rosemary (TDEC 2006).

Occurrence Number	Year	# Clumps Measured	Total Area Covered m^2 (cm^2)	Average Clump Size m^2 (cm^2)	Std. Deviation $\pm$ m^2 (cm^2)	% Change Area Covered
013	**2001**	71	**8.84** (88439)	**0.1246** (1246.6)	**0.3859** (3859.4)	
	2005	117	**8.06** (80635)	**0.0690** (689.2)	**0.1965** (1964.9)	**-8.8%**
096	**2001**	24	**3.81** (38119)	**0.1588** (1588.3)	**0.1322** (1322.0)	
	2005	20	**1.93** (19285)	**0.0964** (964.3)	**0.0879** (879.5)	**-49.3%**
051	**2005**	119	**5.70** (57000)	**0.0905** (904.8)	**0.1640** (1640.2)	NA
074	**2001**	101	**12.38** (123818)	**0.1226** (1225.9)	**0.1216** (1215.6)	
	2005	118	**7.95** (79477)	**0.0674** (673.5)	**0.0928** (927.6)	**-35.8%**
050	**2001**	101	**12.03** (120297)	**0.1191** (1191)	**0.1317** (1316.9)	
	2005	63	**3.91** (39071)	**0.0620** (620.2)	**0.0861** (861.5)	**-67.5%**
082	**2005**	49	**4.26** (42620)	**0.0870** (869.8)	**0.1621** (1621.4)	NA
004	**2001**	117	**15.86** (158684)	**0.1356** (1356.3)	**0.1187** (1187.1)	
	2005	158	**24.71** (247145)	**0.1564** (1564.2)	**0.1990** (1990.1)	**+55.8%**
009	**2001**	214	**33.87** (338701)	**0.1582** (1582.7)	**0.2029** (2028.8)	
	2005	336	**35.29** (352908)	**0.1050** (105.3)	**0.1576** (1576.5)	**+4.2%**

b. Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historic range, etc.):

The recovery plan reported that 91 extant occurrences of Cumberland rosemary were distributed among the five counties in north-central Tennessee (listed above) and McCreary County, Kentucky. Those occurrences were distributed among nine major streams of the Cumberland Plateau: Big South Fork Cumberland River, New River, Clear Fork River, White Oak Creek, Caney Fork River, Obed River, Daddys Creek, Clear Creek, and Emory River.

According to data from the Tennessee Natural Heritage Program (TDEC 2009), there currently are 94 extant occurrences in Tennessee; however, 38 of these occurrences have not been observed since 1989 or earlier. While the county-level distribution of Cumberland rosemary is not thought to have changed in Tennessee, the lone occurrence known from White Oak Creek has not been seen since 1979, despite attempts to relocate it in 1992.

There currently are four extant occurrences known from Kentucky, all of which are located within Big South Fork National River and Recreation Area (BSFNRRA) in McCreary County and were observed in 2008. Seven other previously known occurrences were not found during efforts to relocate them in either 2005 or 2008 (KSNPC 2010).

During a survey of approximately 15 miles of the 17-mile reach of the Caney Fork River where Cumberland rosemary occurs (TDEC 2001), six new occurrences were found; however, several previously documented occurrences were either not relocated or no attempt was made to find them due to restricted access.

The National Park Service (NPS) monitors cobble bar habitats at BSFNRRA and Obed National and Wild Scenic River (ONWSR). During the course of mapping cobble bar habitats in these two parks since 2005, NPS biologists have documented a total of 87 Cumberland rosemary occurrences (Nora Murdock, National Park Service, pers. com. 2010). A small portion of BSFNRRA remains to be surveyed for this project. Prior to this NPS monitoring project, Natural Heritage Programs had mapped 25 occurrences within ONWSR and 28 within BSFNRRA.

Of the 72 occurrences found at ONWSR by NPS, 56 represent new occurrences. Another 16 occurrences overlapped with occurrences previously mapped by TDEC's Natural Heritage Program; and, nine previously mapped occurrences were not relocated (N. Murdock pers. com. 2010).

Of the 15 occurrences found at BSFNRRA by NPS, eight represent new occurrences. Biologists from NPS were unable to relocate 21 of the 28 occurrences previously mapped at BSFNRRA by Natural Heritage Programs (N. Murdock pers. com. 2010). However, as noted above, many of these occurrences are very old, and records describing them include imprecise location data, making it difficult to compare historic distribution data with current distribution as determined using GPS technology.

c. Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):

Cumberland rosemary is found on rocky river bars composed of unsorted boulders, cobbles, gravel and sand, with the largest populations occurring in open, washed-out areas near the centers of these bars. The essential habitat requirements of this species are: open to barely shaded sites; moderately deep, sandy, well-drained soils with no visible organic matter; periodic forceful flooding to maintain openness; topographic features to enhance sand deposition; and, perhaps, periods of inundation of at least two weeks to induce rooting at the lower nodes (Patrick and Wofford 1981).

As noted below, encroachment of woody vegetation in the cobble bar habitat where Cumberland rosemary occurs has been observed to threaten occurrences of this species. The extent to which these declines are reversible, or potentially offset by establishment of new occurrences in other suitable habitat, is unknown. In 2005, the National Park Service initiated a project to monitor cobble bar habitats, also known as "river scour prairies", within its BSFNRRA and ONWSR units, which contain the best examples of the fewer than 500 acres of this habitat estimated to remain in existence (NPS no date[a]). The goal of this monitoring program, which should provide valuable data for monitoring habitat conditions in two of the three major river systems in which Cumberland rosemary occurs, is to determine whether ecological communities associated with cobble bars are threatened by changes in natural flood cycles or degraded water quality (NPS no date[b]).

2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

a. Present or threatened destruction, modification or curtailment of its habitat or range:

The recovery plan discusses several specific threats related to this listing factor: (1) the threat of inundation by reservoirs, (2) competition and shading from woody vegetation, (3) recreation-related threats to populations on National Park Service lands at BSFNRRA and ONWSR, and (4) potential for water quality deterioration due to fossil fuel extraction and exploration. A more recently emerging threat is encroachment by invasive, exotic plant species (NPS 2005). We discuss below any new information we have concerning these threats.

While the final rule (56 FR 60938) listing Cumberland rosemary as a threatened species cited potential for inundation by reservoirs as a threat to Cumberland rosemary, the potential also exists that small ponds and reservoirs constructed in upper reaches of watersheds have altered hydrologic and geomorphologic processes necessary to maintain suitable conditions for the species on the cobble bars where it occurs. White (pers. comm. 2010) reported that encroachment of woody species, both native and exotic, onto cobble bar habitats led to the decline of at least three Cumberland rosemary occurrences in Kentucky, and suggested

that either drought or altered hydrology could be factors contributing to these declines.

The final rule (56 FR 60939) listing Cumberland rosemary as a threatened species discussed growing recreational use at BSFNRRA as a potential threat to the species, noting a steep increase in visitor use between 1986 and 1989, at which time the number of the visitors to the park stood at 730,000 annually. Current NPS data (NPS no date[c]) for BSFNRRA indicate that visitor use has remained high in the period since 1989, with annual visits for the period 1995 through 2009 ranging between 622,806 and 915,194.

The recovery plan for Cumberland rosemary identified as a critical threat the destruction of habitat associated with specific recreational activities, including camping, hiking, horseback riding, off-road-vehicle traffic, and whitewater boating. Specific examples mentioned in the recovery plan include impacts associated with hiking and equestrian trails at Big Island in BSFNRRA and impacts from vehicular and camping activity at the Lilly Bridge site in ONWSR. These activities still occur at these locations, but we do not have current data for evaluating whether threats to habitat from these activities have increased or decreased in severity.

In response to a growing threat to riparian communities at BSFNRRA, the NPS has initiated a program for controlling exotic plants in riparian areas. The proposal and biological assessment for this project (NPS 2005) listed the following species as targets for control: tree-of-heaven (*Ailanthus altissima*), mimosa (*Albizia julibrissin*), Japanese spiraea (*Spiraea japonica*), Chinese privet (*Ligustrum sinense*), Japanese knotweed (*Polygonum cuspidatum*), purple loosestrife (*Lythrum salicaria*), garlic mustard (*Alliaria petiolata*), and Nepalese browntop (*Microstegium vimineum*). This proposal identified numerous sites where control efforts will be targeted, but placed highest priority on the river section extending from Station Camp to Big Island. Cumberland rosemary populations are known from each of these locations and from the intervening reach of the Big South Fork Cumberland River.

b. Overutilization for commercial, recreational, scientific, or educational purposes:
We have no new information on this factor.

c. Disease or predation:
We have no new information concerning this factor.

d. Inadequacy of existing regulatory mechanisms:
We have no new information concerning this factor.

e. Other natural or manmade factors affecting its continued existence:
We have no new information concerning this factor.

D. Synthesis –

Cumberland rosemary remains restricted to three populations: (1) the Big South Fork Cumberland River and its tributaries in Morgan, Scott, and Fentress counties, Tennessee, and McCreary County, Kentucky; (2) the Obed River in Morgan and Cumberland counties, Tennessee; and, (3) the Caney Fork River in Cumberland and White counties, Tennessee. We are currently uncertain as to the distribution of occurrences among these populations, as data for many of the Tennessee sites are from prior to 1989 (TDEC 2009). Recent surveys by NPS of Cumberland rosemary habitat documented 15 extant occurrences at BSFNRRA and 72 at ONWSR. However, imprecise location data available for historic records prevent us from determining the true extent of increase or decline within either of these NPS units.

The threats to Cumberland rosemary that were identified at the time of listing and in the species' recovery plan are still ongoing. Threats related to encroachment by invasive exotic plants into the cobble bar habitat where the species occurs are now common throughout the species range and increasing in magnitude. Further, the degree to which basin hydrology has been altered in the watersheds where Cumberland rosemary is located, and how such alteration could affect vegetation dynamics on the cobble bar habitats where the species occurs, are currently unknown but suspected to play a role in declines observed in some populations. Because we lack sufficient data to assess the current status of many Cumberland rosemary occurrences, the threats known at the time of listing and recovery plan development are still prevalent, and newly documented threats are present across much of the species' range, we believe that the listing status of threatened remains appropriate for this species.

III. RESULTS

A. Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
_X_ No change is needed

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

A. Work with NPS, TDEC, and KSNPC to reconcile data concerning extant and historic locations, abundance at extant locations, and threats.

B. Continue efforts to control invasive, exotic plants at occurrences on NPS lands at BSFNRRA and expand these efforts, as needed, to ONWSR.

C. Continue long-term monitoring begun by TDEC. Expand monitoring effort to occurrences in Kentucky. Review monitoring protocols and revise, if warranted, to provide a more repeatable system for tracking changes in distribution and abundance. Incorporate threats assessment into monitoring program.

D. Use data from NPS Cobble Bar Monitoring program to track threats to Cumberland rosemary at BSFNRRA and ONWSR.

E. Continue implementation of Recovery Plan for Cumberland rosemary.

V. REFERENCES

Kentucky State Nature Preserves Commission. 2010. Kentucky Natural Heritage Inventory Database. March 2010.

National Park Service. 2005. Proposal to Manage Exotic Plants in Riparian Areas and Biological Assessment of Treatment Effects on Threatened and Endangered Species. U.S. Department of the Interior, National Park Service, Big South Fork National River and Recreation Area. January 2005.

National Park Service. No date[a]. Cumberland Plateau River Prairies. Unpublished document accessed April 12, 2010, at http://www.nps.ov/biso/naturescience/cobblebar.htm.

National Park Service. No date[b]. Cobble Bar Monitoring. Unpublished document accessed April 12, 2010, at http://science.nature.nps.gov/im/units/aphn/docs/cobblebars_brief.pdf.

National Park Service. No date[c]. Big South Fork National River and Recreation Area Park Statistics. Unpublished document accessed April 8, 2010 at http://ww.nps.gov/biso/parkmgmt/statistics.htm.

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Patrick, T. S. and B. E. Wofford. 1981. Status report for Cumberland rosemary. Unpublished report to U.S. Fish and Wildlife Service. 49 pp.

Tennessee Department of Environment and Conservation. 2001. Survey for *Conradina verticillata* (Cumberland rosemary) on the Caney Fork and Collins Rivers. Unpublished report to U.S. Fish and Wildlife Service, Cookeville, Tennessee. December 2001. 6 pp. + Appendix.

Tennessee Department of Environment and Conservation. 2006. Monitoring *Conradina verticillata* sites in Tennessee. Unpublished report to U.S. Fish and Wildlife Service, Atlanta, Georgia. September 2006. 14 pp.

Tennessee Department of Environment and Conservation. 2011. Tennessee Natural Heritage Inventory Database. November 2009.

White, D. 2010. Email to Geoff Call, Tennessee Ecological Services Field Office. Kentucky State Nature Preserves Commission. June 28, 2010.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of *Conradina verticillata*

Current Classification **Threatened**
Recommendation resulting from the 5-Year Review

____ **Downlist to Threatened**
____ **Uplist to Endangered**
____ **Delist**
_X_ **No change is needed**

Review Conducted By Geoff Call

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve Mary C. Jennings Date 5/13/11

The lead Field Office must ensure that other offices within the range of the species have been provided adequate opportunity to review and comment prior to the review's completion. The lead field office should document this coordination in the agency record.

REGIONAL OFFICE APPROVAL:

Lead Regional Director, Fish and Wildlife Service

for Approve Jon D. Rigg Date 6/6/11

APPENDIX A: Summary of peer review for the 5-year review of Cumberland rosemary (*Conradina verticillata*)

A. Peer Review Method: see below

B. Peer Review Charge: Email request sent to potential reviewers requesting comments and peer review on the draft 5-year review. Request was sent to Andrea Bishop (Tennessee Department of Environment and Conservation), Dr. Dwayne Estes (Austin Peay State University), Marie Kerr (National Park Service), Nora Murdock (National Park Service), and Dr. Joey Shaw (University of Tennessee – Chattanooga).

> The U.S. Fish and Wildlife Service (Service) is conducting a 5-year review of the appropriateness of the current listing of Cumberland rosemary *(Conradina verticillata*) as a threatened species under provisions of the Endangered Species Act of 1973, as amended (Act). On July·6, 2009, we published a notice in the Federal Register announcing our intent to conduct this review on this species for which our office has the lead responsibility under section 4(c)(2)(A) of the Act. At that time, we requested any new information on Cumberland rosemary since the time of its listing in 1991. In order to support the Service's interest in making its decision based on the best available science, portions of the draft review need to be subjected to an appropriate level of peer review. Due to your expertise regarding this species, we request that you peer review the attached portion of the document. We must receive your review comments within 30 days of the date of this email (June 26) in order to consider them in our final review document.
>
> The goals of peer review during this process are (1) to ensure that the best available biological data, scientifically accurate analyses of those data, and the reviews of recognized experts are used in the decision-making process; and (2) to indicate to the public, to other agencies, to conservation organizations, and to personnel within the Service that the best available data and scientific analyses were used in the decision-making process.
>
> The following materials are enclosed for use during your review:
>
> Peer Review in Endangered Species Act Activities- This July I, 1994, *Federal Register* notice established a peer review process for all listing and recovery actions taken under the authorities of the Endangered Species Act.
>
> The Biological Portion of the Draft 5-Year Review - This is the draft material that we hope you will review.
>
> The Literature Cited section of the Draft 5-Year Review - The list is enclosed.

We appreciate your assistance in ensuring that this review is based on the best available science. If you have any questions or if we can provide additional information, please contact Geoff Call by telephone at 931/528-6481, ext. 213, or via email at *geoff_call@fws.gov.*

C. Summary of Peer Review Comments/Report –
Ms. Andrea Bishop responded that Tennessee Department of Environment and Conservation had no comments to offer regarding the draft 5-year review for Cumberland Rosemary.

Ms. Deborah White provided comments concerning the decline of some Kentucky occurrences of Cumberland and perceived causes for these declines.

D. Response to Peer Review – We have incorporated information provided by Ms. Deb White into the relevant sections of the final 5-year review for Cumberland rosemary.