New Jersey Department of Environmental Protection

Division of Fish and Wildlife

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Frosted Elfin Management Plan

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Division of Fish and Wildlife
Trenton, NJ
March 8, 2005

NEW JERSEY DIVISION OF
Fish and Wildlife

Conserve Wildlife
New Jersey Division of Fish & Wildlife
Endangered & Nongame Species Program

Frosted Elfin Management Plan

Introduction:

The frosted elfin (*Callophrys irus*) is a state threatened species with a statewide range limited to southern portion of New Jersey. Although this species is present along most of the eastern seaboard (excluding Maine where it is presumed extirpated), local populations are often isolated, with New Jersey holding one of the largest single populations worldwide.

In New Jersey, much of the existing habitat for the frosted elfin currently occurs on state- and federal-owned lands. Proper management this habitat is essential for the long-term viability of this species in the state. In recent years, however, some land-use practices have led to the destruction of at least three important frosted elfin habitats on state-owned lands. By developing a statewide management plan for this species, the New Jersey Division of Fish and Wildlife hopes to increase frosted elfin abundance in the state by better managing existing frosted habitats and by improving the suitability of habitat for this species at other sites.

Shaws Mill (east) – *Figure 1*

Background: Historically, habitat for frosted elfin existed along this power line right-of-way (ROW). According to Schweitzer (pers. comm), this site held large patches of *Baptisia* prior to 2002. Heavy ORV use at this site destroyed much of the suitable frosted elfin habitat and left the ROW impassible. The Road was repaired and the ROW leveled and disked in 2002. The area was allowed to revegetate on its own and is now heavily vegetated with warm season grasses. Only isolated Baptisia plants are found and nectar sources are limited.

Management Goals:

1) Short term – Determine to what extent the Baptisia tinctoria has recolonized this site and survey to confirm whether frosted elfin are present.

2) Long term – Restore the frosted elfin colony at this site to its historic abundance level.

Strategies:

2005 – Survey for the presence of *Baptisia tinctoria.* If surveys are positive for Baptisia, then formal surveys for frosted elfin and Baptisia should be conducted following the protocol in Appendix I & II.
If Baptisia and frosted elfin are confirmed, take steps to deter off-road vehicle use of right-of-ways.

2006 – Survey the site for the presence of frosted elfin and its host plant.

2007 – Drawing from the results of the restoration experiment (Appendix III) at the Battle Lane W. site, consider restoring to suitable frosted elfin habitat using whichever method proves most successful.

Factory Lane – *Figure 2*

Background: There is a small pocket of possibly suitable frosted elfin habitat on the western end of Factory Road where the road edge extends approximately 7.5 m on either side for approximately one-quarter mile. Frosted elfin have been sited here historically although never in great numbers. The area was disked in 2002. Baptisia tinctoria is present in vigorous, though not numerous, clumps. Nectar plants, lowbush blueberry and violets, are present though not in profusion. No surveys for frosted elfin have been conducted here for several years.

Management Goals:

1) Short term – Determine the density at which *Baptisia tinctoria* occurs at this site and survey for the presence of frosted elfin.

2) Long term – Improve the quality of the habitat for frosted elfin and establish a viable frosted elfin colony.

Strategies:

2005 – Conduct a survey to determine presence/absence of frosted elfin and the existing density of *Baptisia tinctoria* at this site (Appendix I & II).

2006 – Depending on the results of the 2005 surveys, develop a management plan.

Battle Lane (west) – *Figure 1*

Background: Similar to the Shaws Mill (east) site, this area contained documented frosted elfin habitat until it was improperly managed for this species by being disked in spring 2004. Inspections in summer 2004 found that Baptisia was recolonizing from seeds. In 2002, the frosted elfin population at this site had a Heritage Conservation Status Rank of "B", indicating that it had "good estimated viability". However, in May of 2004, only one frosted elfin male was seen.

Management Goals:

1) Short term – Restore frosted elfin habitat at this site using a scientific approach that will result in a better understanding of the most effective method for such a restoration.

2) Long term – Restore the frosted elfin colony at this site.

Strategies:

2005 – Survey for the presence of *Baptisia tinctoria* and frosted elfin (Appendix I). Establish study areas to test restoration strategies (Appendix III) and to assess the

impacts herbivores have on Baptisia and restoration efforts (Appendix IV). Establish a line transect to study vegetative composition and regeneration (Appendix II).

2006 – Survey the site for the presence of frosted elfin and its host plant. Conduct follow-up vegetation surveys to determine the rate of recolonization by Baptisia and the success of restoration strategies.

Battle Lane (east) – *Figure 1*

Background: The ROW east of rte. 555 to Buckshutem Creek was burned by a wildfire in April 2001 and was treated with herbicide in September 2002. Herbicide applicant at this site was not intense, however, and a small remnant of suitable habitat for frosted elfin still exists in this area. Frosted elfin have never been abundant at this site and were not found during a survey conducted in May 2004. This area may not have sufficient Baptisia to support a frosted elfin colony on its own at this time.

Management Goals:

1) Short term – Improve the quality of frosted elfin habitat at this site. Repatriate frosted elfin at this site and conduct surveys to determine the level of success of the repatriation.

2) Long term – Restore the frosted elfin colony at this site.

Strategies:

2005 - Survey for the presence of *Baptisia tinctoria* and frosted elfin. Establish a series of line transects in this area to study the vegetative composition. If lack of Baptisia is determined to be a key limiting factor, Baptisia plugs will be planted to improve stand quality.

2006 – Depending on the restoration results, freshly emerged frosted elfin adults will be released at this site to attempt a reintroduction. Methods for a reintroduction will be researched and developed in 2005.

2007 – Survey for the presence of frosted elfin.

Buckshutem

Background: Jim Dowdell spotted a stray frosted elfin at the northeast corner of Buckshutem and Millville-Fairton Rd. in April of 2004. However, no other sightings, historic or otherwise, can be credited to this area. This occurrence was considered to be a stray from the Millville airport population. As part of the ongoing early-successional habitat restoration project, a mixture of warm season grasses and *Baptisia australis* was planted in the 0.8 ha field on the northwest corner of this intersection. It is not known if frosted elfin will use *Baptisia australis* as a host plant.

Management Goals:

1) Short term – Determine the habitat suitability of this site and survey for the presence of frosted elfin.

2) Long term – If habitat is deemed suitable, establish a viable frosted elfin colony.

Strategies:

2005 - Survey for the presence of *Baptisia australis, Baptisia tinctoria* and frosted elfin (Appendix I & II).

Determine whether or not frosted elfin are using *Baptisia australis* as a host plant.

Peaslee – *Figure 3*

Background: The ROW running from Weatherby Rd to just west of Hunters Mill Rd. contained both suitable habitat and frosted elfin in 1994. The habitat is now overgrown with trees approaching 2 m in places. Baptisia is still present in some spots, particularly near the 'O' field. Nectar is scarce but not absent. On visits to the site in May 2000 and May 2004, no frosted elfin were seen and no obvious sign of larvae found.

Management Goals:

1) Short term – Determine the density at which *Baptisia tinctoria* occurs at this site and survey for the presence of frosted elfin.

2) Long term – Improve the quality of the habitat for frosted elfin and establish a viable frosted elfin colony.

Strategies:

2005 – Conduct a survey to determine presence/absence of frosted elfin and the existing density of *Baptisia tinctoria* at this site (Appendix I & II). Notify the power company about the presence of this species/habitat and encourage them to follow the Division's "Best Management Practices for Utility Line Rights-of Way"

2006 – Depending on the results of the 2005 surveys, develop a restoration plan that incorporates scheduled power line right-of-way maintenance activities.

Assunpink – *Figure 4*

Background: This site contained a small, but persistent, population of frosted elfin along a 30-meter section of a power line right-of-way. In 2003, woody vegetation was manually removed from the area where Baptisia was growing to reduce competition for this species. Deer browse was a reported problem at this site, and my have intensified following ENSP's habitat management. Frosted elfin surveys conducted in 2004 were negative.

Management Goals:

1) Short term – Determine to what extent *Baptisia tinctoria* still exists at this site and survey to confirm whether frosted elfin are present.

2) Long term – Restore the frosted elfin colony at this site to its historic abundance level.

Strategies:

2005 – Survey for the presence of *Baptisia tinctoria* and frosted elfin (Appendix I & II).

2006 – Depending on the results of the 2005 surveys and exclosure study (Appendix IV), develop a restoration plan that would include the use of deer fencing to reduce herbivory at this site.

Belleplain 1 – *Figure 5*

Background: There is a historic, and minor, occurrence of frosted elfin along the abandoned railroad tracks at this site. Some suitable habitat was identified in this area during a late summer survey in 2004. However, a portion of the historic habitat was converted into a paved bike path and another portion is severely overgrown. The last documented frosted elfin survey of this site occurred in 1994.

Management Goals:

1) Short term – Determine the density at which *Baptisia tinctoria* occurs at this site and survey for the presence of frosted elfin.

2) Long term – Improve the quality of the habitat for frosted elfin and establish a viable frosted elfin colony.

Strategies:

2005 – Notify the superintendent of the State Forest of the potential presence of this species along the power line right-of-way. Conduct a survey to determine presence/absence of frosted elfin and the existing density of *Baptisia tinctoria* (Appendix I & II).

2006 – Depending on the results of the 2005, develop a management plan for this site.

Belleplain 2 – *Figure 6*

Background: There are no documented occurrences of frosted elfins at this site, but there are also no records indicating that this area has been surveyed for this species. A habitat survey conducted in the late summer of 2004 found dense stands of *Baptisia tinctoria* along the power line right-of-way that extends to the north and south of Belleplain Road.

Management Goals:

1) Short term – Determine the density at which *Baptisia tinctoria* occurs at this site and survey for the presence of frosted elfin.

2) Long term – Improve the quality of the habitat for frosted elfin and establish a viable frosted elfin colony.

Strategies:

2005 – Notify the superintendent of the State Forest of the potential presence of this species along the power line right-of-way. Conduct a survey to determine presence/absence of frosted elfin and the existing density of *Baptisia tinctoria* (Appendix I & II).

Notify the power company about the presence of this species/habitat and encourage them to following the Division's "Best Management Practices for Utility Line Rights-of Way"

2006 – Depending on the results of the 2005 survey, develop a management plan for this site.

Atlantic City Airport – *Figure 7*

Background: Some entomologists consider the Atlantic City Airport to be the best site for frosted elfin globally. Field surveys for lepidoptera, including frosted elfin, have been conducted at this site in 1993, 1994, and 1997 through 2004. From 2002 – 2004 surveys specifically targeted at frosted elfin have been conducted. Plans to expand the airport terminals and runways have led to the development of a "Grasslands Management Plan" to protect and enhance habitat for the frosted elfin and a number of T&E grasslands birds. A Grassland Management Advisory Committee will oversee the implementation of this plan.

Management Goals:

1) Short term – Maintain the existing frosted elfin colony at its current abundance.

2) Long term – Maintain the existing frosted elfin colony at its current abundance.

Strategies:

2005 through 2008 – Conduct surveys and habitat restoration as described in the South Jersey Transportation Authority's "Grassland Management Plan'.

Millville Airport – *Figure 8*

Background: Extensive patches of *Baptisia tinctoria* occur just beyond the western end of the runway at the Millville Airport. Despite the abundant presence of its host plant, frosted elfin have never been recorded in large numbers at this site. Surveys in 1994, 2002, and 2004 found frosted elfins to be present, but in very low numbers. The Delaware River & Bay Authority has been very cooperative and has allowed NJDFW to conduct repeated surveys in restricted areas of the airport.

Management Goals:

1) Short term – Determine the density at which *Baptisia tinctoria* occurs at this site and survey for the presence of frosted elfin.

2) Long term – Improve the quality of the habitat for frosted elfin and establish a viable frosted elfin colony.

Strategies:

2005 – Conduct a survey to determine presence/absence of frosted elfin and the existing density of *Baptisia tinctoria* at this site (Appendix I & II). Also survey for the availability of nectar plants, which could be the limiting factor at this site.

2006 – Depending on the results of the 2005 surveys, develop a management plan.

Beaver Swamp (south and north) – *Figure 9 & 10*

Background: Three to four adults were found along this right-of-way in May of 2003. The extent of this habitat continues for approximately 1 km. The history of this site for frosted elfin is unknown.

Management Goals:

1) Short term – Determine the density at which *Baptisia tinctoria* occurs at this site and survey for the presence of frosted elfin.

2) Long term – Improve the quality of the habitat for frosted elfin and establish a viable frosted elfin colony.

Strategies:

2005 – Conduct a survey to determine presence/absence of frosted elfin and the existing density of *Baptisia tinctoria* at this site (Appendix I & II). Notify the power company about the presence of this species/habitat and encourage them to following the Division's "Best Management Practices for Utility Line Rights-of Way"

2006 – Depending on the results of the 2005 survey, develop a management plan for this site.

Bear Swamp Complex – *Figure 11*

Background: This area contained a small but persistent population of frosted elfin until it was herbicided in September of 2002. The herbicide application destroyed 95% of all woody vegetation and impacted grasses and forbs between rte. 555 and the Unimin sand plant. While Baptisia was little affected by the herbiciding, all nectar plants were destroyed. A site visit in

2003 found that deer browse on Baptisia was intense. It is believed that herbivory was more concentrated on this species than normal because it was one of the few herbaceous plant species available at the site following the 2002 herbicide application. In addition, the spring of 2003 was wet and cold and few frosted elfin were seen. On site visits in 2004, the Baptisia appeared to be vigorous and some of the nectar plants had recolonized; however, frosted elfin were absent.

Management Goals:

1) Short term – Determine the density at which *Baptisia tinctoria* occurs at this site and survey for the presence of frosted elfin.

2) Long term – Improve the quality of the habitat for frosted elfin and establish a viable frosted elfin colony.

Strategies:

2005 – Conduct a survey to determine presence/absence of frosted elfin and the existing density of *Baptisia tinctoria* at this site (Appendix I & II). Notify the power company about the presence of this species/habitat and encourage them to following the Division's "Best Management Practices for Utility Line Rights-of Way"

2006 – Depending on the results of the 2005 surveys, develop a management plan for this site.

Dennisville Railroad – *Figure 12*

Background: Sparse patches of *Baptisia tinctoria* were found at this site during habitat surveys conducted late summer 2004. Much of the history of frosted elfin at this site is unknown, but 4 adults were reportedly seen here in May 2004. Vegetation along the tracks was mowed in Winter 2004-2005, but this not expected to have affected the *Baptisia tinctoria.*

Management Goals:

1) Short term – Determine the density at which *Baptisia tinctoria* occurs at this site and survey for the presence of frosted elfin.

2) Long term – Improve the quality of the habitat for frosted elfin and establish a viable frosted elfin colony.

Strategies:

2005 – Conduct a survey to determine presence/absence of frosted elfin and the existing density of *Baptisia tinctoria* at this site (Appendix I & II). Notify the railroad that maintains the right-of-way about the presence of this species/habitat and encourage them to following the Division's "Best Management Practices for Utility Line Rights-of Way"

2006 – Depending on the results of the 2005, develop a management plan for this site.

Appendix I

Frosted Eflin (*Callophrys irus*) Survey Protocol

Background: Suitable habitat for the frosted elfin (*Callophrys irus*) is being lost throughout most of this species' range. In New Jersey, the early successional habitats required by frosted elfins are being lost to natural succession (as a result of fire suppression), overgrazing by white-tailed deer, and improper habitat management. In many cases, historic locations for this species have not be surveyed in recent years. The status of frosted elfin populations, and their habitats, therefore remain unknown at several sites in South Jersey.

Objective: Survey all historic frosted elfin occurrences where suitable habitat still exists.

Survey Methodology: Each historic site described in the "Frosted Elfin Management Plan" (Figure 1-12) will be visited 3 times during mid-April – late May 2005, which is the peak flight season for this species. Site visits should be conducted between 8:00 AM and 6:00 PM when the temperature is between 60^{o} – 80^{o} F. No surveys should be conducted during raining weather or during periods of high wind. During each site visit, the entire extent of suitable habitat (characterized by the presence of *Baptisia tinctoria*) will be searched for frosted elfin. Investigators will record data on the datasheet provided by the Division of Fish and Wildlife.

Appendix II

Vegetation Sampling Protocol

Background: Many of the "Frosted Elfin Management Plan" objectives entail the management and restoration of frosted elfin habitats at historic sites. To successfully manage for frosted elfin habitat, it is important to have an understanding of the plant community composition that is typical for this species. While it is widely understood that the presence of *Baptisia tinctoria* is of primary importance for an area to be considered suitable for frosted elfin, we have little understanding of what other plant species may contribute to the habitat suitability.

Objective: Estimate the density of *Baptisia tinctoria* and characterize the plant communities at all New Jersey sites where frosted elfin are currently present and at sites were restoration for this species is planned.

Sampling methodology: Vegetation sampling will occur at those site identified in the "Frosted Elfin Management Plan" (Figure 1-12) to estimate the density of *Baptisia tinctoria* and to characterize the plant community. Density estimates for *Baptisia* will be made by counting the number of individuals present within 3 belt transects, each measuring 6 x 100 m. Transects will be established in Spring 2005 and will be surveyed once during 2005 (May – June). Sampling will consist of counting the number of individual *Baptisia tinctoria* plants within the transects and converting this number to a plants/m^2 estimate.

The overall plant community will be characterized at each site using a plot-based sampling method. A sampling quadrat (0.5 x 0.5 m) will be placed at 10 random positions along the "spine" of the transects described above. Percent cover will be estimated for each plants species occurring within the sampling quadrat.

Appendix III

Restoration Study

Objective: to determine if plant plugs are a viable and affordable method of restoring *Baptisia tinctoria* to areas where it has been reduced or eradicated through disturbance or competition.

Method: This research will take place in the Millville WMA at the far eastern end of Shaws Mill Road (indicated on map). The study area is currently part of a larger meadow containing a mix of warm season grasses – primarily switch and little bluestem. The study area is adjacent to a larger contiguous patch of known frosted elfin habitat that was disturbed in the spring of 2004.

An area of 1,000m² (200m x 5m) will be prepared for planting by first plowing and then disking. Based on recommendations and observation of known frosted elfin habitat, 1,000 plugs will be planted on 1m centers within the prepared site. Five-hundred plugs will be surrounded by an exclosure (100x5m) to protect them from herbivory and other disturbances, the other 500 plugs will serve as a control and will not be protected.

The exclosure will be constructed using wide-mesh fence with mesh at least 10x10cm (4x4in) and at least 1.2m (4 ft) high.

The location of each plug will be mapped on a grid sheet and given an identifying number and letter beginning at the northeast corner. Rows will run along the north-south axis. The survival of each plant will be monitored throughout the growing season and the presence or absence of each plant will be noted on the map during each site visit. Measurements of the Baptisia's vigor will be taken at the height of each growing season for the duration of the study. During each growing season, all volunteer plants will be mapped and identified as well but not added to the sample population.

Baptisia plants will be started in the greenhouse this spring and will be ready for planting in September, 2005. All plants will be mapped and identified when planted. The site will be visited weekly through September and the presence or absence of plants noted. If plants are absent, the investigator should note any observations that would help determine the reason for the disappearance (signs of herbivory, dried plant material, etc.). Site visits will resume during the first week of April, 2006 and be conducted monthly through August. A sample population will be observed for qualitative information like color, damage to leaves/plant, use by butterflies or larvae, disease presence, etc. In August 2006, these plants will be measured for characteristics of plant vigor.

Data Collection: The investigator will note the presence or absence of each plant on the grid map. In addition, all volunteer plants will be mapped and assigned identification. If a plant is absent, the investigator will make note of any evidence able to provide an explanation for why the plant died or disappeared..

A sample population will be chosen from the original plants (not volunteers) and observed for qualitative information like color, damage to leaves/plant, use by butterflies or larvae, disease

presence, etc. These plants will be photographed. In August 2006, measurements of height and width will be taken at the broadest part of the plant on the horizontal X and Y axis and the number of seed pods or flowers will be counted.

APPENDIX IV

Exclosure study

Hypothesis: White-tailed deer, and other herbivores, are negatively impacting the growth of *Baptisia tinctoria.* Because *Baptisia tinctoria* is the larval host plant of the frosted eflin, it is believed that herbivory may therefore have an indirect negative effect on the breeding success of frosted elfin (*Callophrys irus)*, which is a threatened species in New Jersey.

Objective: Determine if grazing by white-tailed deer (*Odocoileus virginianus*), and other herbivores, impacts the overall growth (height and foliage volume) of *Baptisia tinctoria,* the host plant of the frosted elfin. For this study, we assume that deer are the primary herbivore of concern for this plant, but our methodology will not allow us to determine which species of herbivores are actually causing the damage to Baptisia.

Study Area: This research will take place in the Millville WMA along the far eastern end of Shaws Mill Road and Battle Lane West. This area contains a relatively large patch (> 1 ha) of *Baptisia tinctoria* that is recovering after being disked in spring 2004.

Method: Fence exclosures will be used to assess the effect of herbivory on *Baptisia tinctoria* growth. In April 2005, 20 exclosure plots, each measuring 2x2m, will be randomly placed within the sample area (described above). A total of 20 control plots will also be established in this area at this time. Placement of the control and exclosure plots will be constrained by the requirement that that at least one *Baptisia tinctoria* must be present within each plot. *Baptisia tinctoria* presence will be determined from surveys conducted in late March 2005.

Exclosures will be constructed using wide-mesh fence with mesh at least 10x10 cm (4x4 in) and at least 1.2 m (4 feet) high. Control plots will be marked with rebar at the southwest corner plot. Rebar will be painted with the plot number and also identified by a metal tag or plate buried at its base. A portable plot frame will be constructed from PVC pipe to delineate the control plot boundaries for sampling. The frame will be placed over but against the rebar and aligned along a north-south axis

Sample plots will be surveyed seven times in 2005 between April 1 and September 10 -the estimated time of egg laying and larval use by frosted elfin and seed set by Baptisia. During year one, investigators will map each plot and conduct the initial data collection no later than the first full week of April. Subsequent data collection will take place during the second or third weeks of April, the first week of May, the third or fourth week of May, the third week of June, during the first or second week of July, and the last week of August or first week of September. Data collection periods may be adjusted in subsequent years if necessary.

Investigators will count, photograph and map all Baptisia within each sample plot. Measurements of plant height and width (taken on the horizontal X and Y axis) will be collected as well as qualitative information like color, damage to leaves/plant, use by butterflies or larvae,

disease presence, etc. All browsing will be classified as entire (>75%), partial (25-75%), or tasting (<25%). The last visit will include data collection on seed output.

Data Collection:
The investigator will draw a map of each plot illustrating the location of each Baptisia plant and assigning a unique ID # to each plant. The map will remain a permanent record for that plot. The investigator will fill out a data collection sheet for each plant in the plot on each visit. If new plants appear, they will be added to the map and assigned an ID #. A sheet will be added for that plant. Plants that disappear will retain their ID and their disappearance (or reappearance) noted during each visit.

Collection Information:
Date
Time
Temperature
Weather info precipitation, cloud cover, wind speed
Plant ID
Plant characteristics
    Height
    Width (measured on the horizontal X and Y axis at the broadest part of the plant)
Changes in color from green
    Yellow
    Brown
    Black
    Percent of plant affected
Indications of disease - descriptive (wilting; blackened, shriveled leaves/branches; etc.)
Damage to leaves – descriptive (holes in leaves or edges)
Use by butterflies - descriptive (record sightings of butterflies, larvae, or eggs of all species)
    Photograph if possible
    Detailed written description of butterfly unless positive ID can be made
Deer browse classified as:
    entire (>75% of plant)
    partial (25--75% of plant)
    tasting (<25% of plant)
Seed output data collection (only to be collected on last visit)
    Number of seed pods per plant

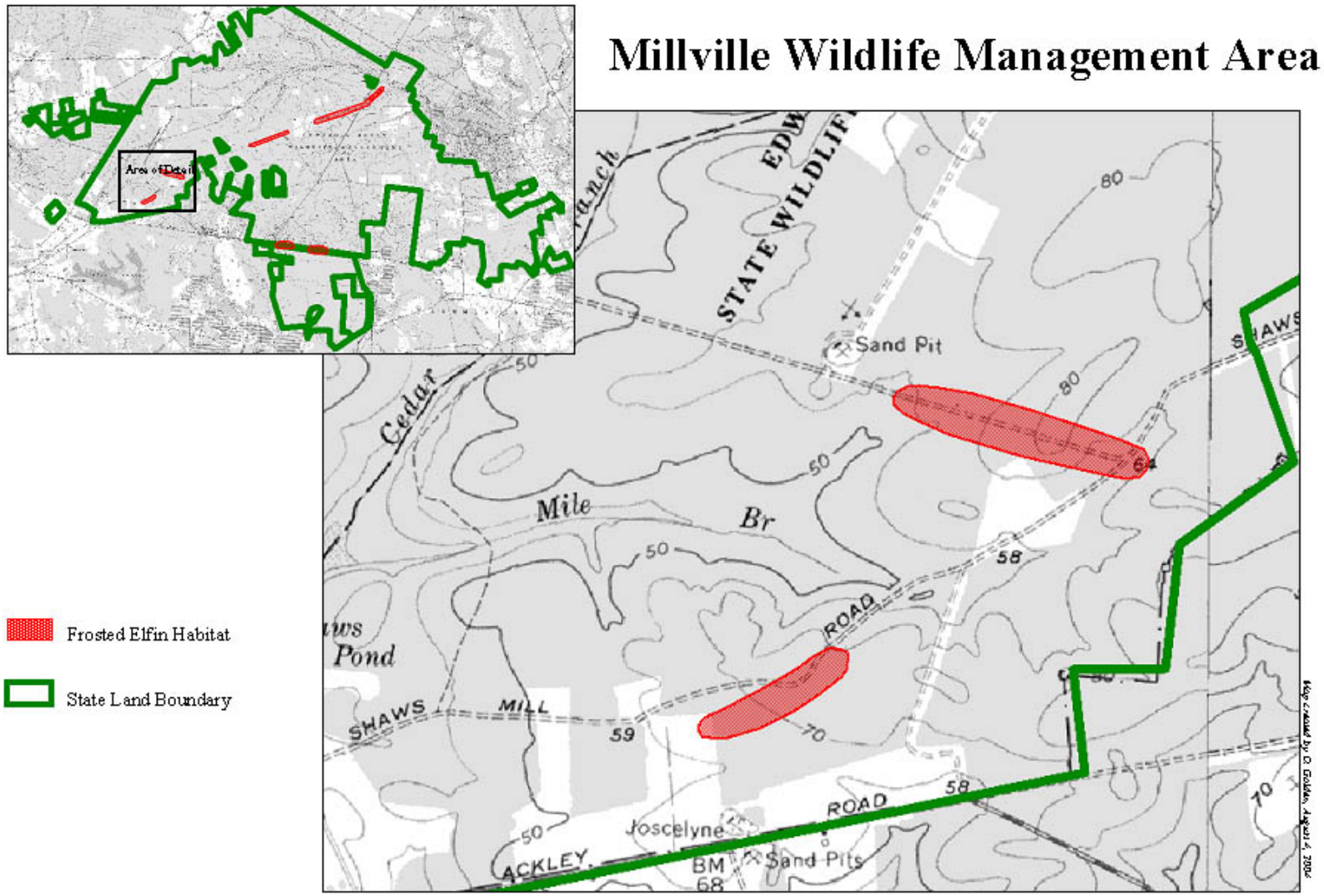

Fig. 2. Frosted Elfin habitat located within Millville Wildlife Management Area

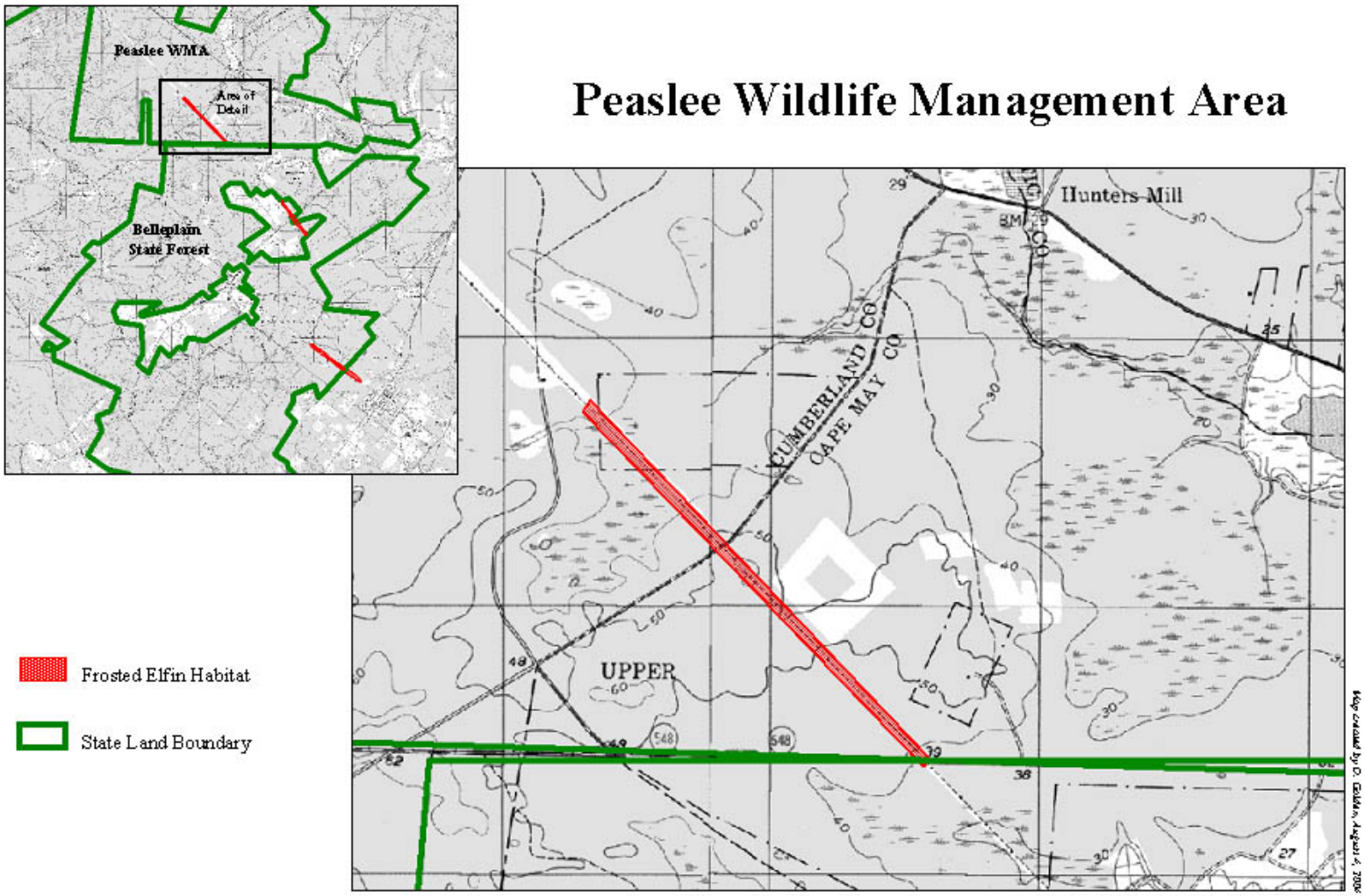

Fig. 3. Frosted Elfin habitat located on utility-line right-of-way at Peaslee Wildlife Management Area

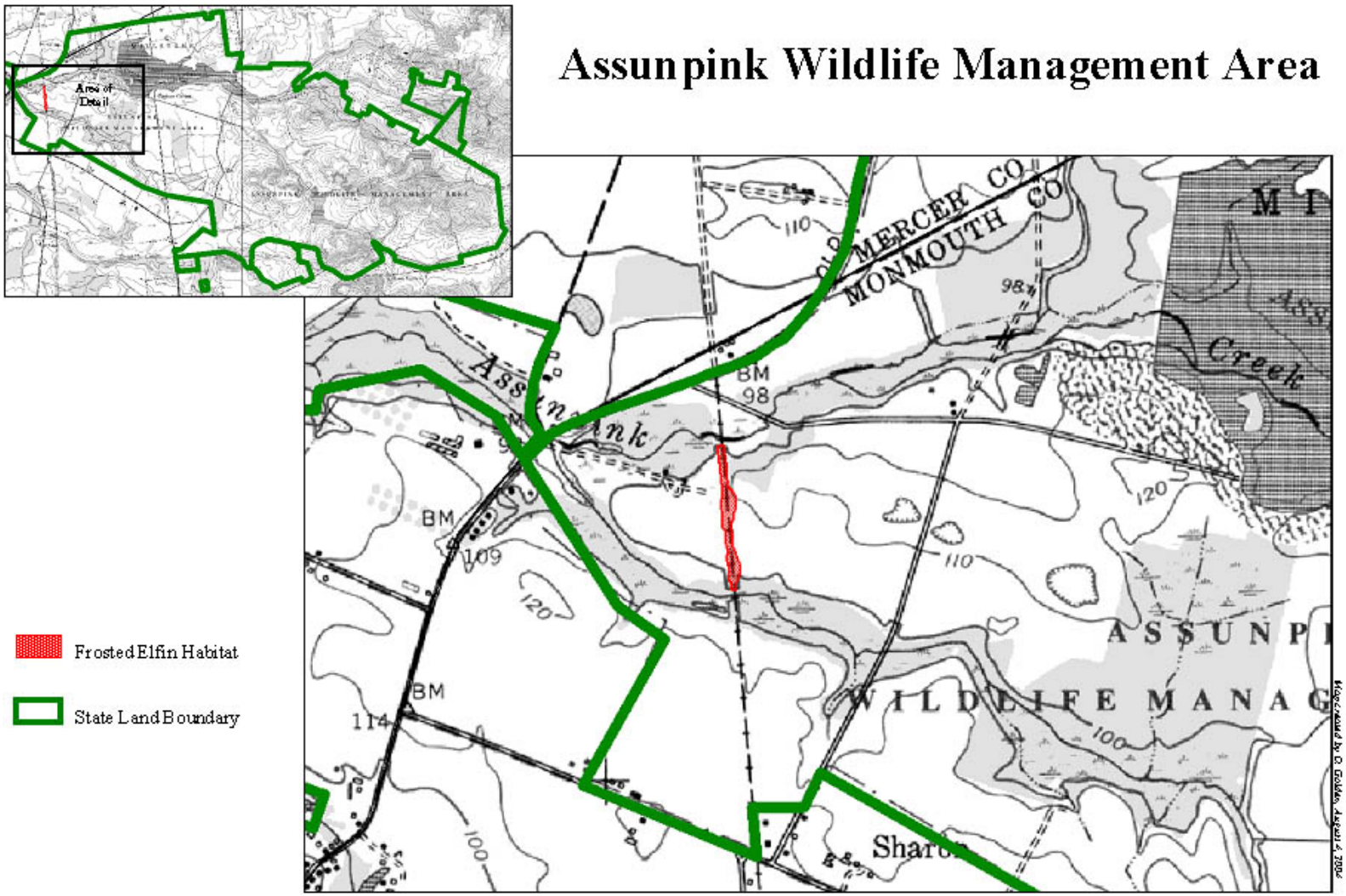

Fig. 4. Frosted Elfin habitat located on Assunpink Wildlife Management Area

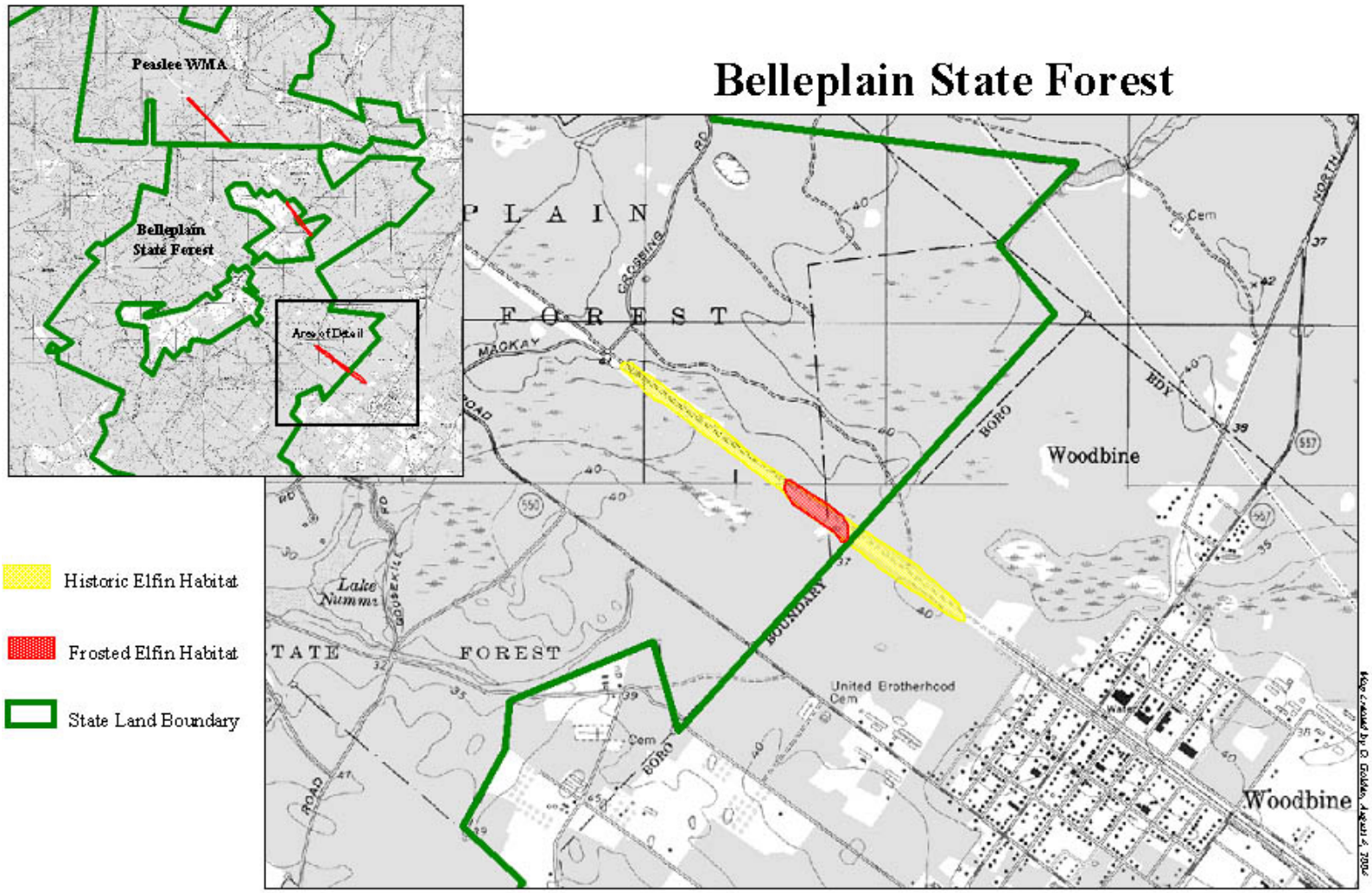

Fig. 5. Frosted Elfin habitat located on utility-line right-of-way at Belleplain State Forest

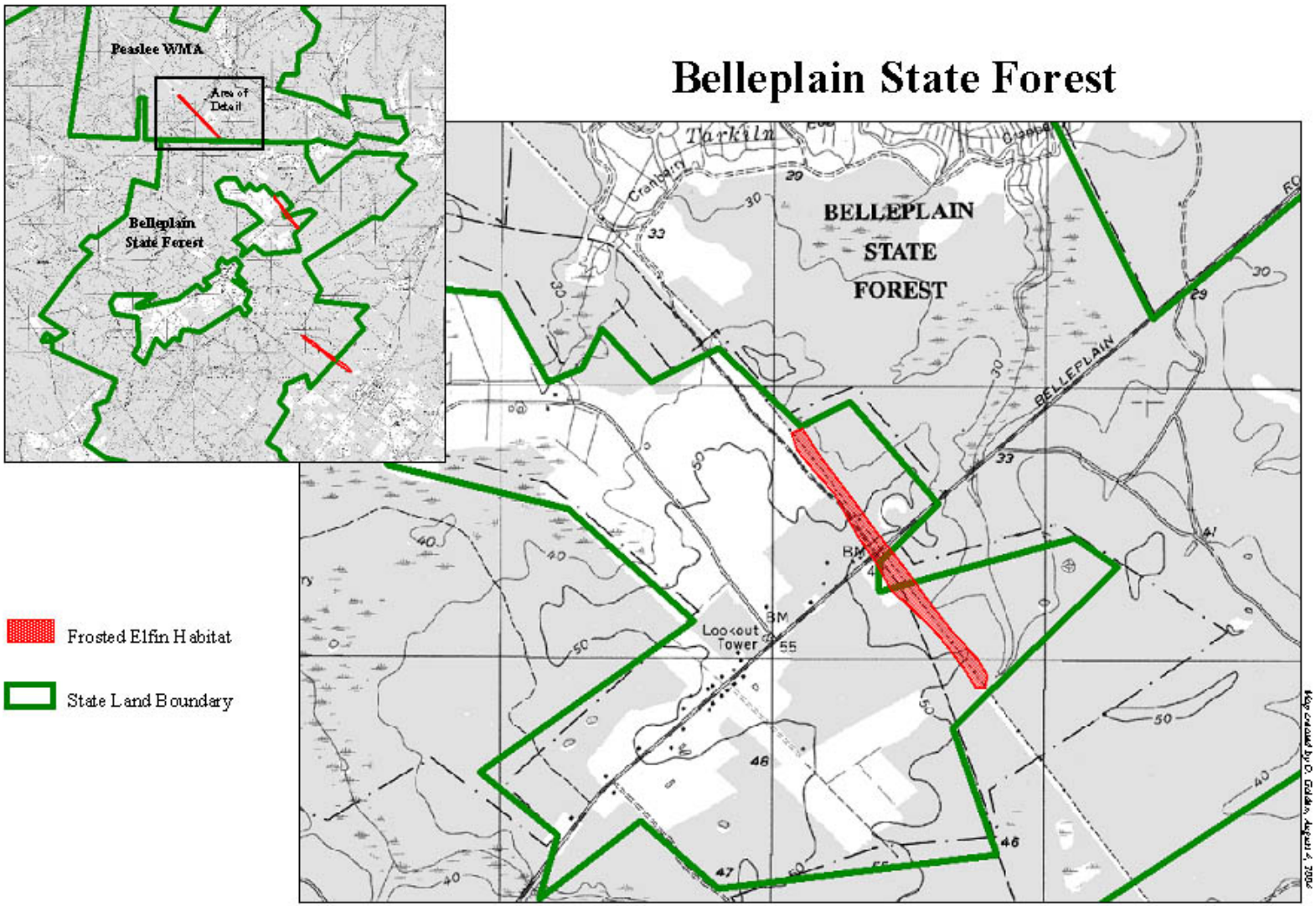

Fig. 6. Frosted Elfin habitat located on utility-line right-of-way near Belleplain State Forest

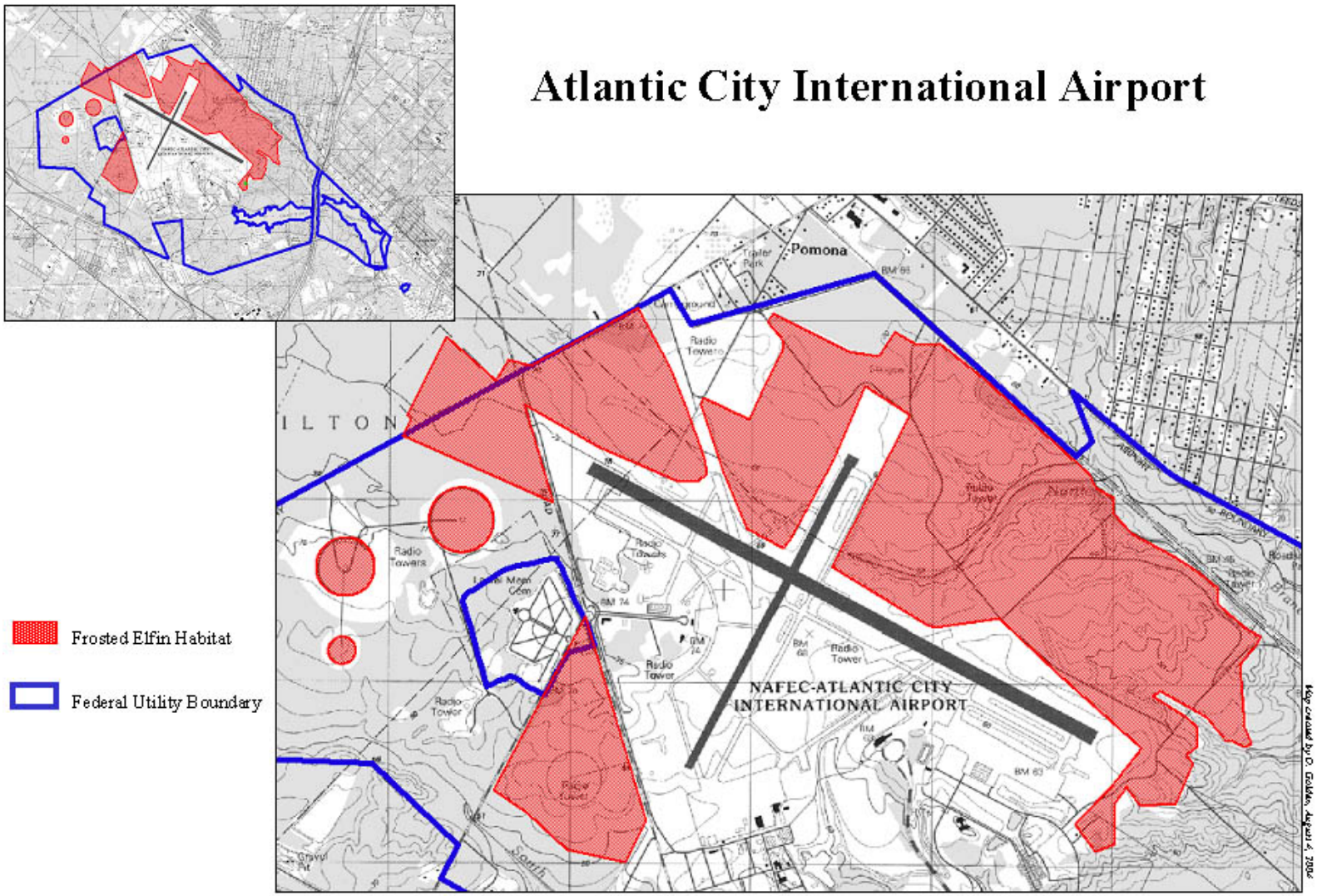

Fig. 7. Frosted Elfin habitat located at Atlantic City International Airport

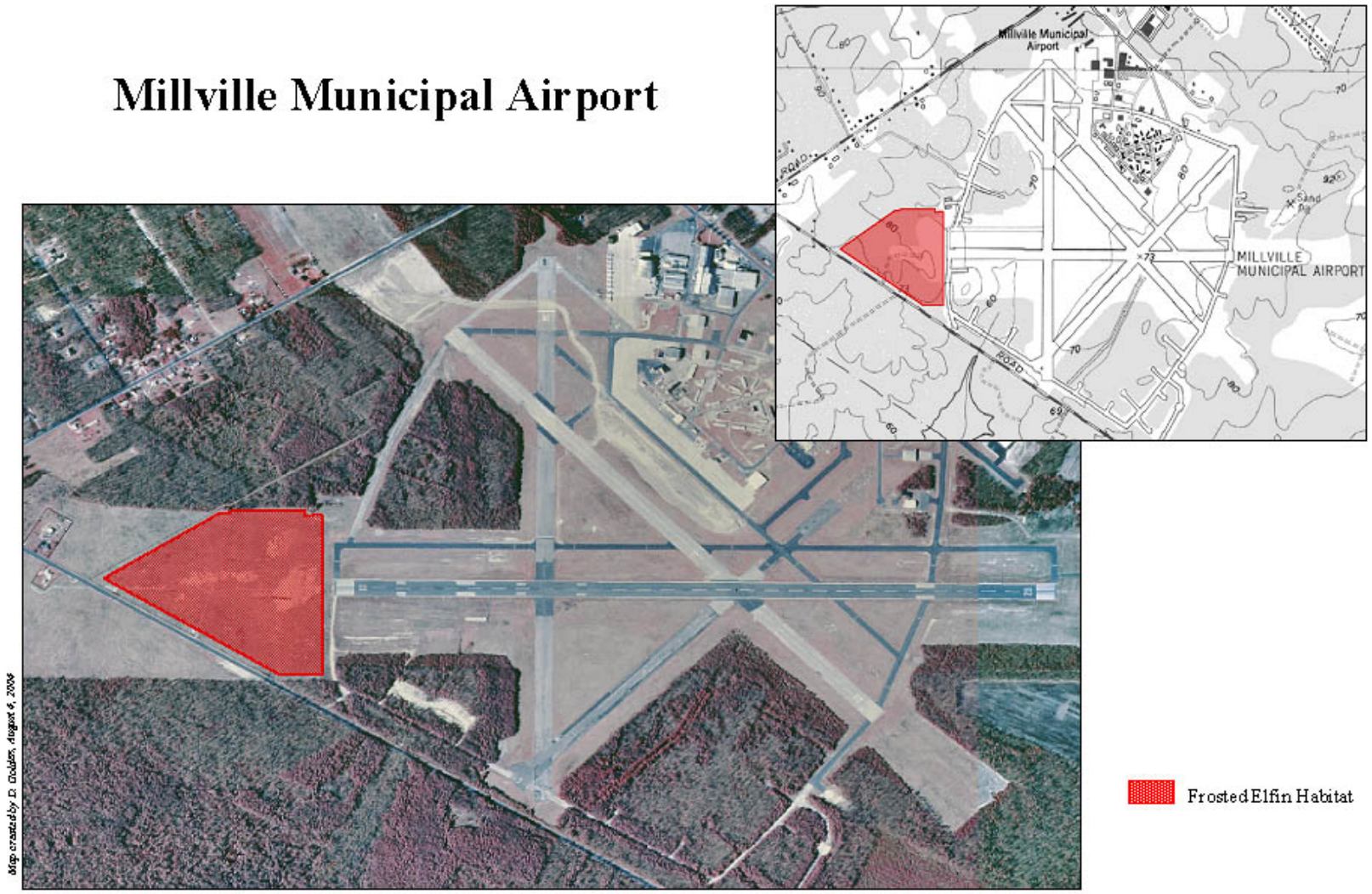

Fig. 8. Frosted Elfin habitat located on Millville Municipal Airport

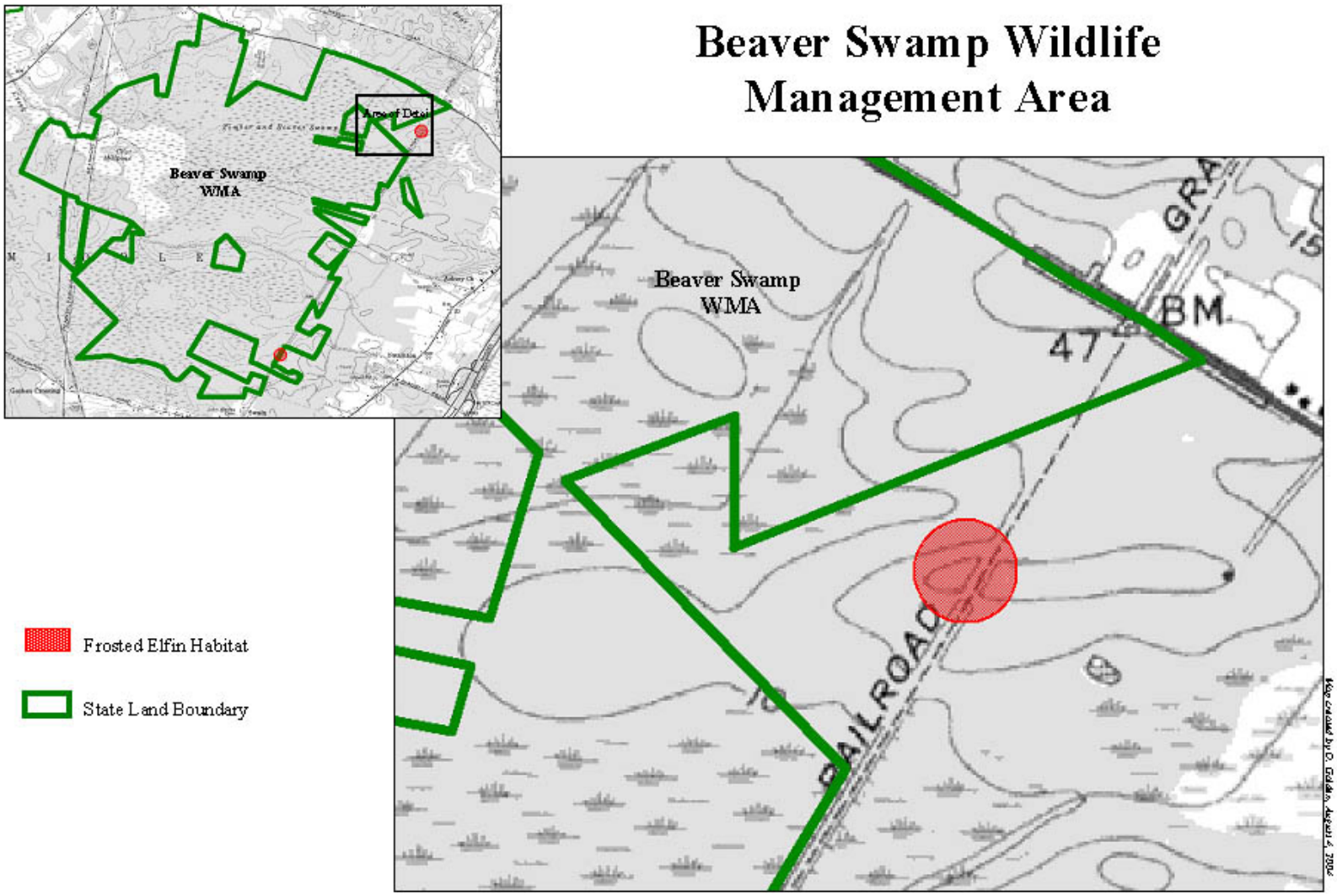

Fig. 9. Frosted Elfin habitat located on utility-line right-of-way near Bear Swamp Wildlife Management Area

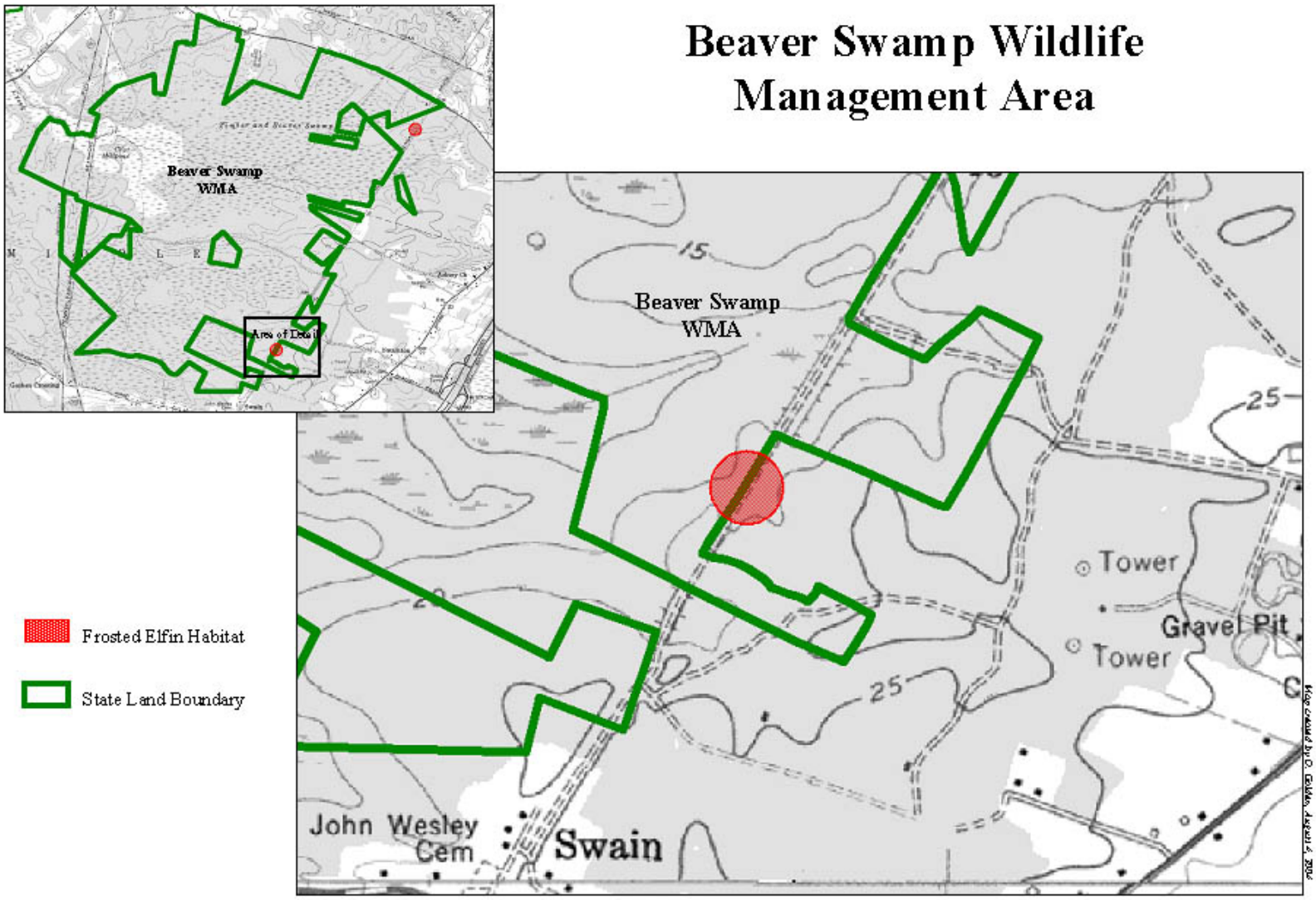

Fig. 10. Frosted Elfin habitat located on utility-line right-of-way near Bear Swamp Wildlife Management Area

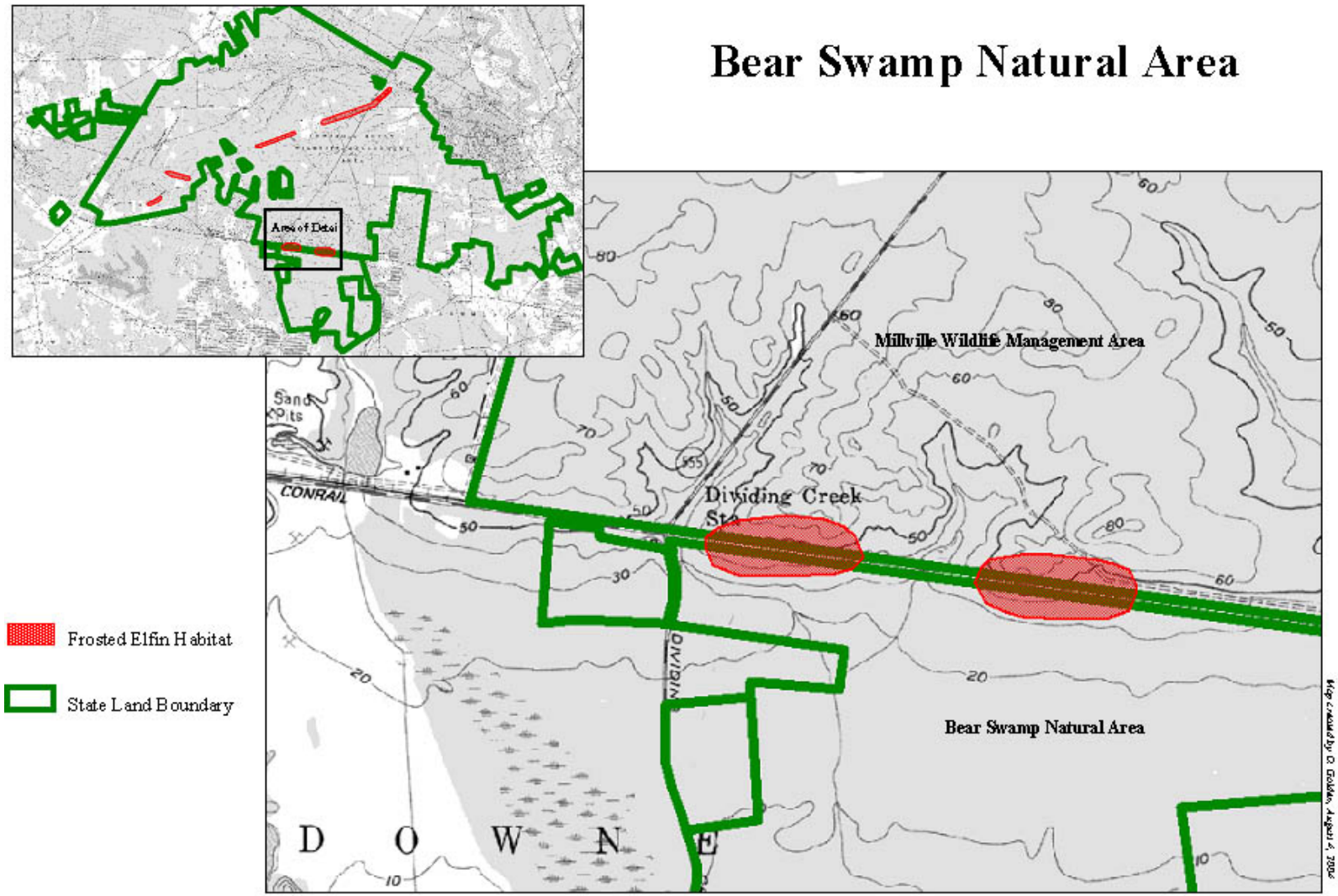

Fig. 11. Frosted Elfin habitat located along railroad tracks at Bear Swamp Natural Area

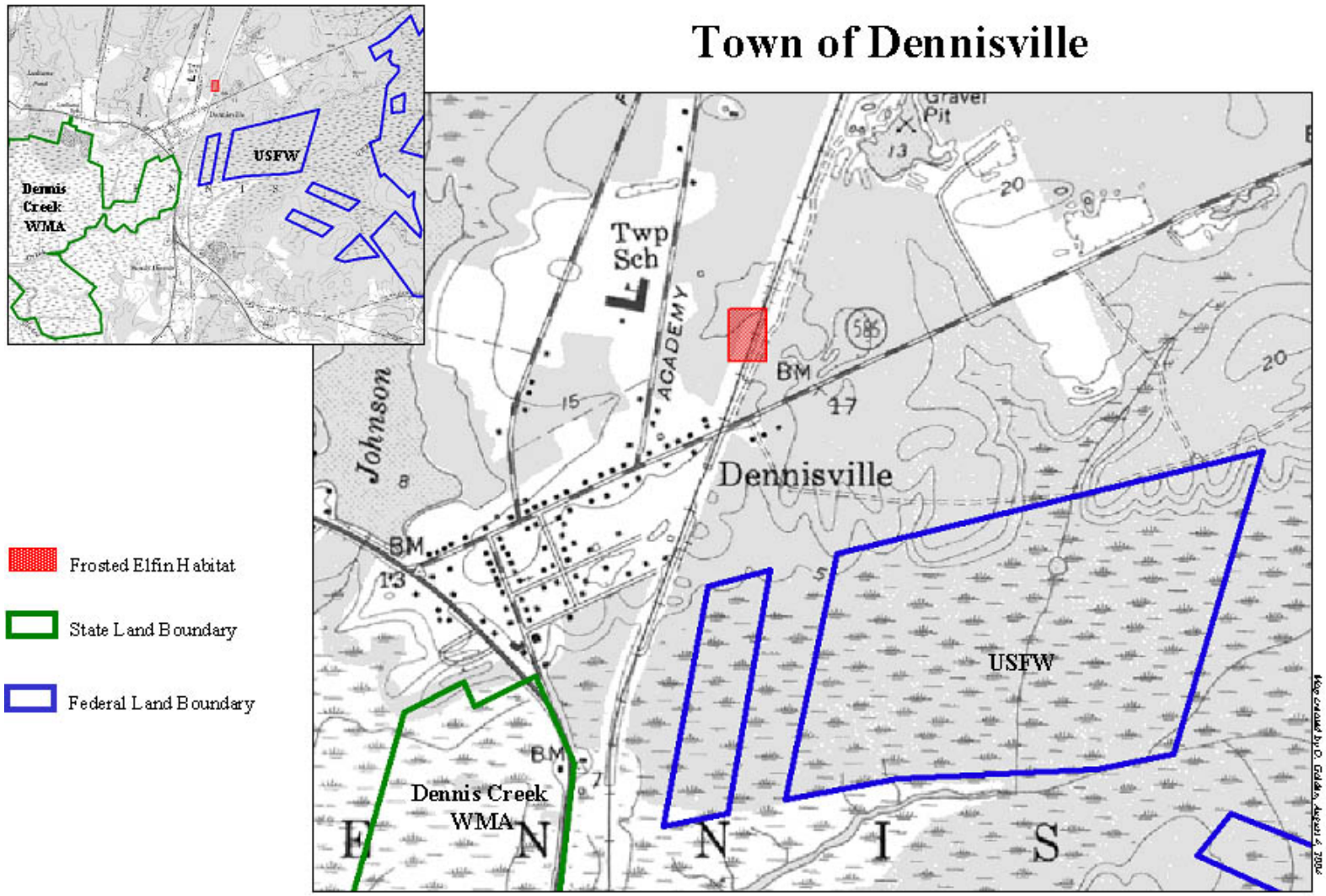

Fig. 12. Frosted Elfin habitat located along railroad tracks in Dennisville