Town of Sullivan's Island

Town Council Special Meeting
Monday, November 30, 2015
Church of the Holy Cross Episcopal Church
2520 Middle Street, Sullivan's Island
5:00 PM – 7:00 PM

AGENDA

1. **Call to Order and notification that the press and public were duly notified in accordance with State Law: Mayor**

2. **Transition Zone – Description and Purpose: Mayor**

3. **Regulatory Issues for Transition Zone: Town Administrator**

4. **Transition Zone Issues**
    A. **Introduction: Mayor**
    B. **Work Session: Full Council**

5. **Public Comment – Time Permitting**

6. **Adjourn – 7 PM**

PROPOSED PRINCIPLES FOR MANAGEMENT

OF THE TOWN'S ACCRETED LAND

December 15, 2009 version

1. The Town of Sullivan's Island owns the accreted land that is protected by the deed restrictions with the Lowcountry Open Land Trust. Every Town resident and property owner has a stake in the property, regardless of the location of that individual's residence or property.
2. The accreted land is protected for its aesthetic, scientific, educational, **and ecological** and safety value for all residents, as noted in the deed restrictions placed on this land with the Lowcountry Open Land Trust **and within the Town of Sullivan's Island Codes and Ordinances. It must be recognized that this land was placed in trust for the benefit of all Sullivan's Island residents.**
3. As its owner, the Town has responsibilities to be a *good steward* of the land and a *good neighbor* to the owners of properties that abut its land.

The Management Plan must benefit the long term maritime eco- system and its impact on wildlife and vegetation. The Town also recognizes that scenic views and breezes inside and outside the accreted land are valuable natural resources.

4. Steward responsibilities
    a. As its owner, the Town has responsibility for management of the land.
        i. Responsibility for designing and implementing a management plan rests with the Town.
        ii. Management plans should be based on their impact on the land as an environmental, educational and recreational resource.
        iii. The Management Plan must recognize this land is part of a bio-diverse ecological process and must consider the natural succession of vegetation in this setting. Additionally, the accreted land provides a line of defense over which hazards of storm waves can be diminished and therefore provides an important shore protection function.
        iv. Responsibility for funding the management of the land rests with the Town and management decisions must be independent of the sources of **funding**.
    b. Management or modification of the accreted land should be at the sole direction and discretion of the Town after soliciting input from all Town citizens and property owners and appropriately credentialed experts in relevant fields.

c. Since there is much diversity in the accreted land from one area to another **which can change over time**, defined zones or management units should be identified based upon their characteristics, and a long-term plan developed for each of them. As an example, the land from Station 16 westward and in front of Fort Moultrie, and that in front of the Town-owned school property, should be allowed to evolve naturally, with minimal intervention except for purposes of public safety, education, and control of invasive species.
d. Current laws governing the accreted land should remain in effect until the Town has **adopted, funded, and begun implementation of** the management plan to a substantial extent.

5. Neighbor responsibilities
    a. The Town should do what it can to respect the neighbors to the accreted land while meeting its stewardship responsibilities.
    b. The Town's management plan **may** include a transition or edge band that abuts privately held properties that would be managed differently from, and more aggressively than, the (usually much deeper) seaward balance of the accreted land.
        i. The transition/edge band should be managed to further the following objectives **where appropriate**:
            1. Provision of a buffer from unwanted wildlife
            2. Minimization of potential fire hazard
            3. Enhancement of public safety
            4. Enhancement of breezes
            5. Enhancement of possible sight lines to the property seaward of the band
        ii. Achievement of these objectives in the transition/edge band will be accomplished via different means depending on the characteristics of the accreted land including and seaward of the band. As examples:
            1. Where the band has characteristics of a developing maritime forest, the undergrowth might be cleared and smaller bushes and trees that compete with more significant trees might be removed.
            2. Where the seaward property is primarily myrtle fields, or currently cleared **within the Town's ordinances, or** partially cleared spaces, the band may be cleared or cut to provide an open field habitat, possibly with seeding of other grasses

and/or wildflowers, with periodic mowing **under the guidance of a landscape professional.**

3. Trees that are vanguard members of a maritime forest should be spared. Trees may be pruned when it is to benefit the health of the tree.
4. Harmful, non-native, invasive species of vines, bushes, shrubs or trees should be removed.

c. Public beach paths should be maintained based on the nature of the land they traverse, whether they are used for emergency access vehicles, and existing characteristics of the paths.

[TREE SURVEY SUMMARY: TABLE FOR 40' & 100' TRANSITION ZONES]

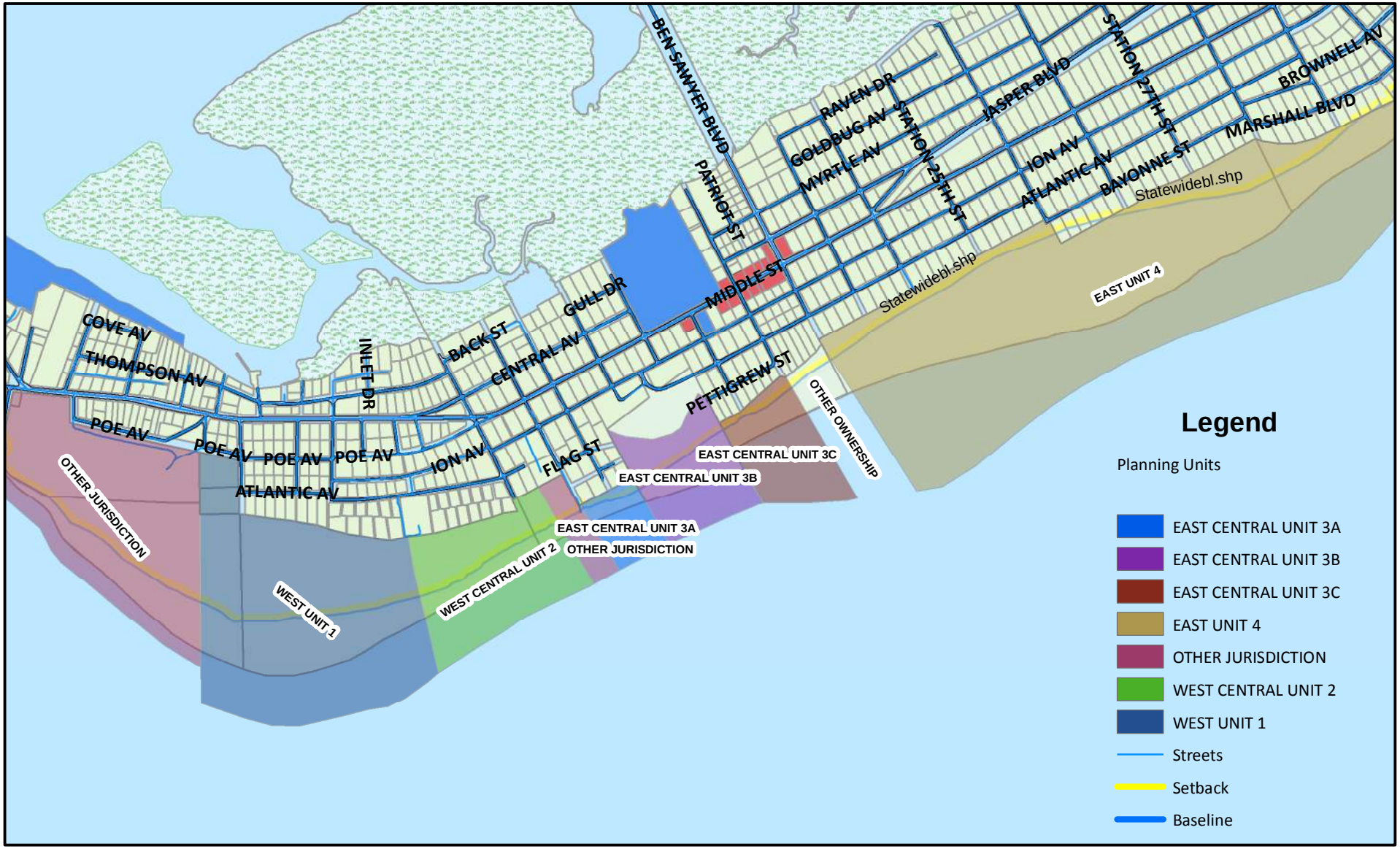
The below table identifies trees surveyed within the 40' and 100' transition zones by individual ALMP planning zone boundary.

Planning Unit	0-40' TZ (Total)	**0-40' TZ (Specimen)	0-40' TZ (12" & over)	40'-100' TZ (Total)	**40'-100' TZ (Specimen)	40'-100' TZ (12" & over)	100' TZ (Total)
West Unit 1	61	14	23	111	25	34	172
West Unit 2	67	22	25	88	13	22	155
East Unit 3A	2	none	2	none	none	none	2
East Unit 3B (SIE)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
East Unit 3C	none	none	none	6	6	2	6
Bayonne Ex. ROW (40')	29	25	25	N/A	N/A	N/A	N/A
East Unit 4 (22.5 to 26)	38	18	30	66	9	20	104
East Unit 4 (26 to 28)	10	6	6	29	5	6	39
East Unit 4 (28 to 29)	1	none	1	5	3	2	6
Totals	208	85	112	305	61	86	484

** **Specimen Trees**: Oak, Magnolia, Red Cedar, Pecan, Sabal Palmetto

Source: Thomas & Hutton Survey Conducted 2014-2015

TOSI Accreted Land Management Plan: Overview of Planning Units



Overview of The Town of Sullivan's Island Accreted Management Plan; delineating four planning units within the Town-owned protected land.

Department of Building & General Administration

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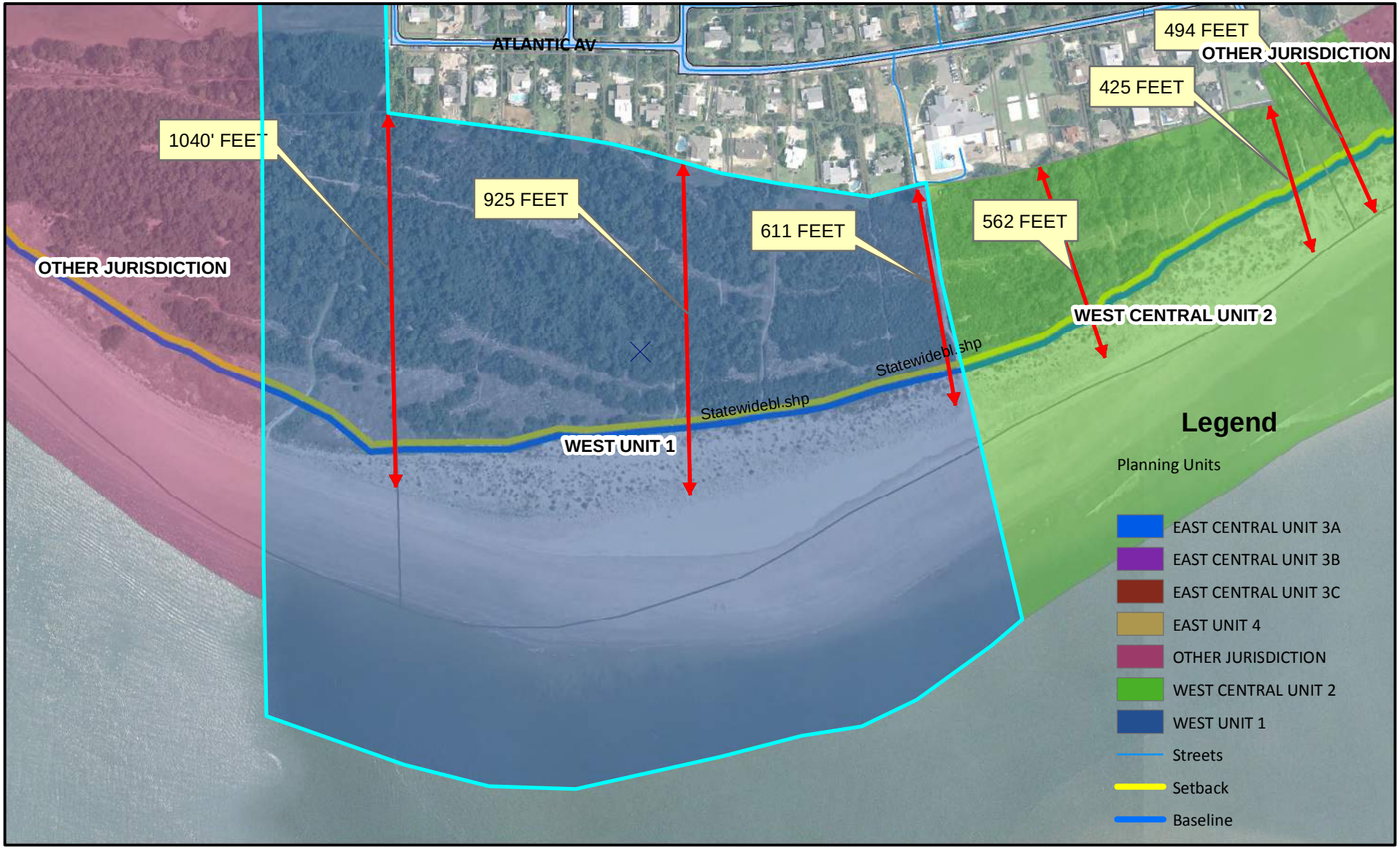
West Unit 1: Land Measurment



West Unit 1 extends from the Fort Moultrie protected land (Station 13) to the Town-maintained beach path at the Sand Dunes Club.

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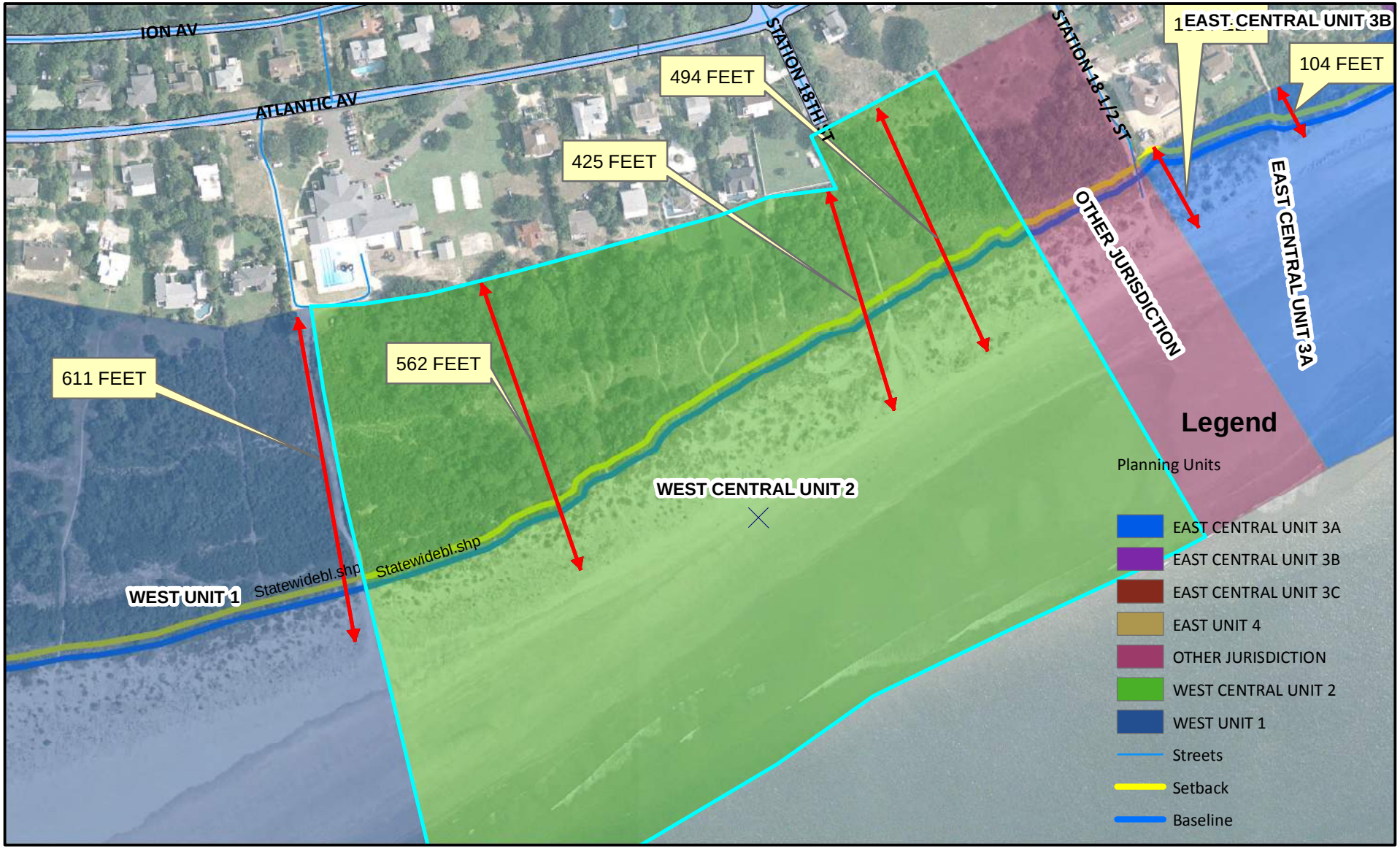
West Central Unit 2: Land Measurment



West Central Unit 2 extends from the public access path at the Sand Dunes Club to the lighthouse property, which is located at 1815 I'on Ave.

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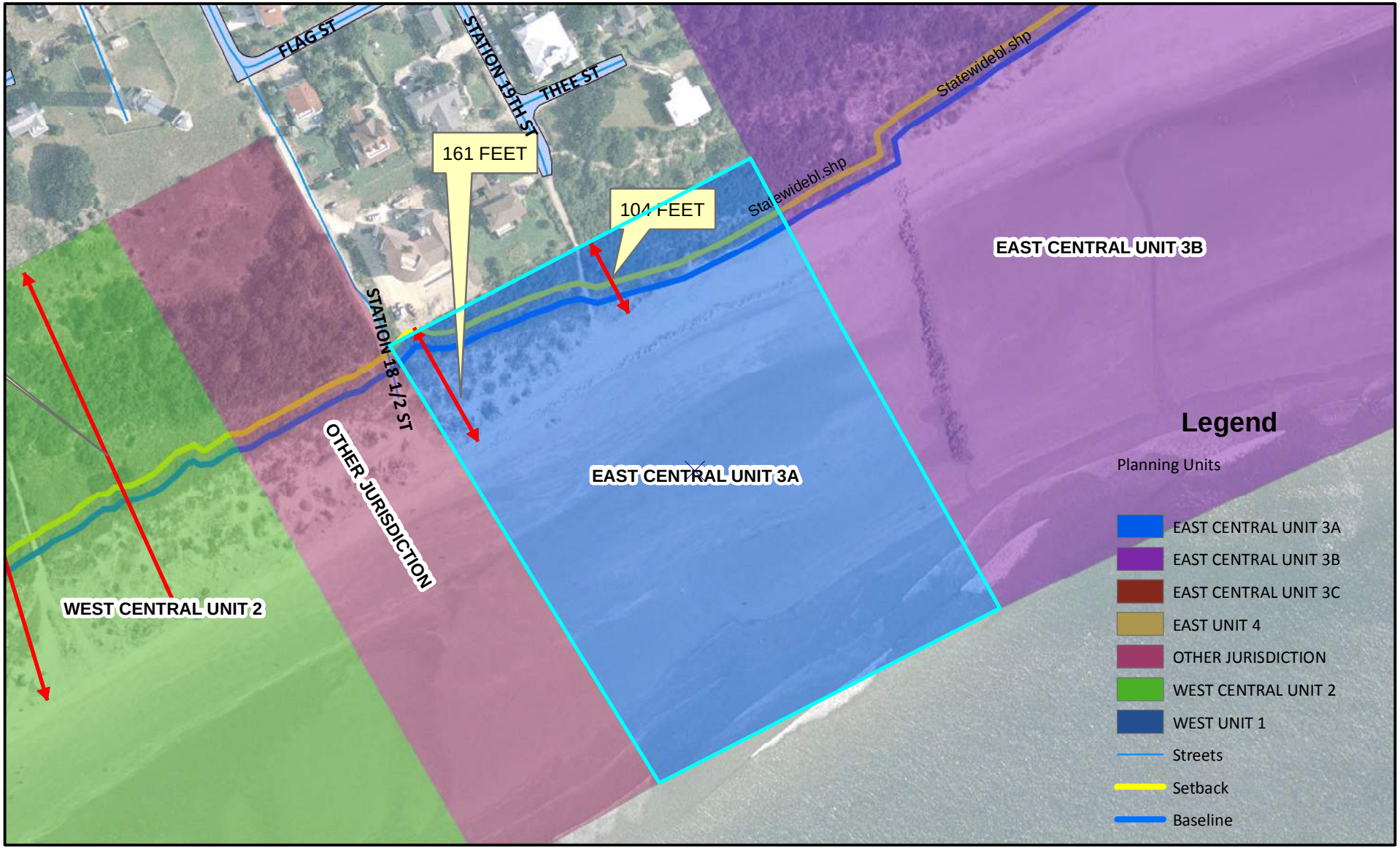
East Central Unit 3A: Land Measurment



East Central Unit 3A extends from the beach path of Station18.5 to the western boundary line of the school.

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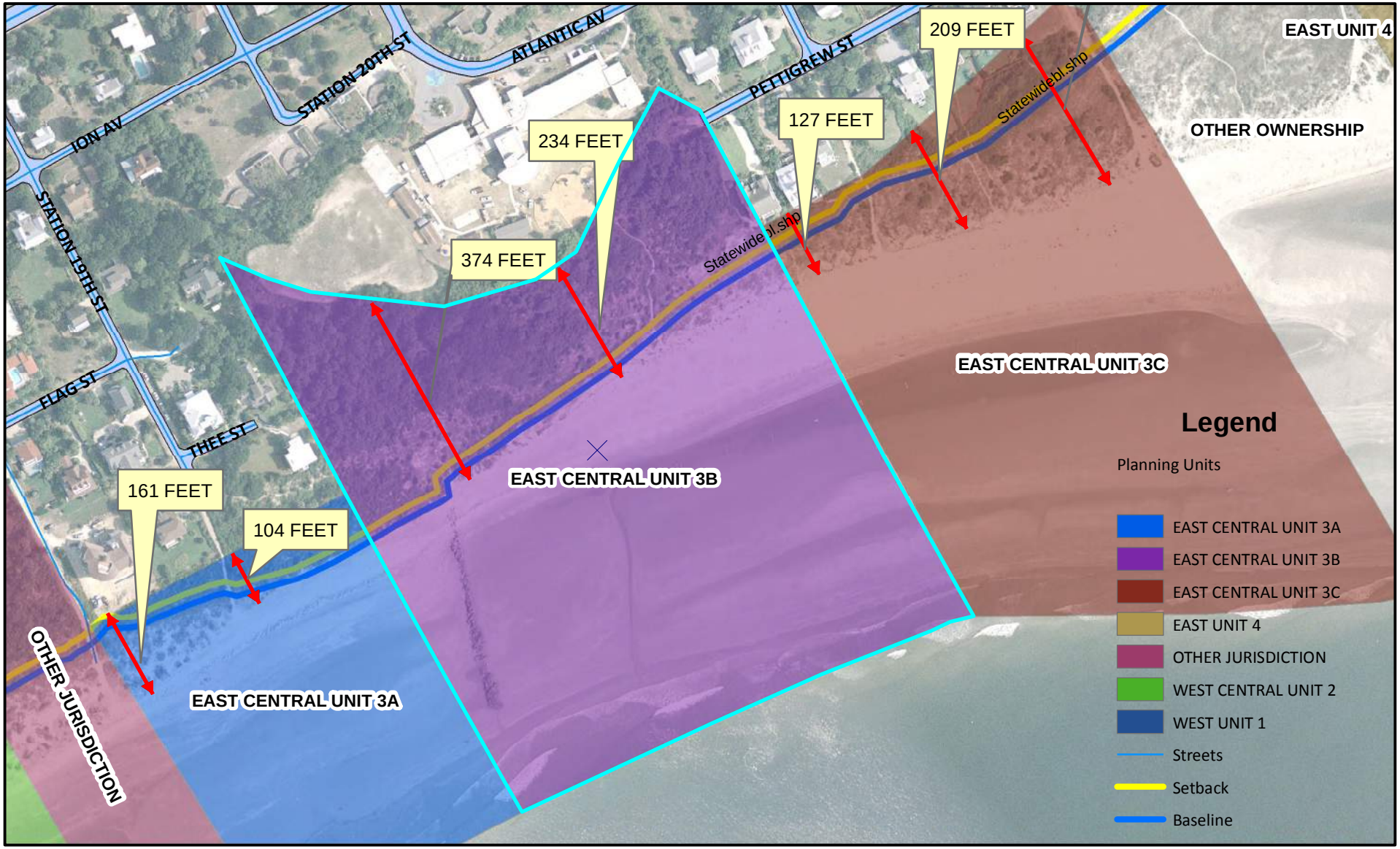
East Central Unit 3B: Land Measurment



East Central Unit 3B comprises the portion of the Town-owned property seaward of the property leased to Charleston County School District.

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East Central Unit 3: Land Measurment

East Central Unit 3C extends from the eastern boundary line of the Town-owned property to the beach path extension of Station 22.

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East Planning Unit 4: Land Measurment

East Unit # 4 extends from beach path extension of Station 22.5 to the beach path extension of Station 29.

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Councilmember Middaugh Proposal for Transition Zone 11-30-2015

This proposal is based on the extensive work by the LUNR Committee and Town Council members since 2009, as well as extensive discussions with current residents and fellow Council members. It is based on the desire to be a good neighbor to owners of property adjoining the Protected Land and at the same time respect the Protected Land Trust Area that is highly valued by many Island residents for its great natural beauty, wildlife, recreational and educational value, and protection from storms.

The Transition Zone will be 100 feet, as measured from the RS-zoned lot line (0 ft.) seaward (to 100 ft.) for all Units/Zones and will consist of two, differently managed bands: 0-40 ft. and 40-100 ft.

0-40 feet: Preserve trees of 6" diameter and larger (species to be discussed, see below)
Remove underbrush and shrubs, including myrtles
Trees less than 6" diameter may be removed with a site plan.

The purpose of the site plan is to identify, for possible preservation, small trees of desirable species of that seldom reach 6" diameter at maturity:
Hercules Club/Toothache Tree, Black Cherry, Yaupon, Red Bay

40-100 feet: Thin vegetation to provide a transition to the Protected Land beyond.
All trees to remain (except those on the List of Non-Native Invasive Species).
Underbrush to be removed
In areas adjacent to Forested Areas: all shrubs, including myrtles, to be removed.
In areas adjacent to Maritime Grassland and Maritime Shrubland: Myrtles and Other Maritime Shrubs to be thinned to 1/3 of current coverage.

OCRM Setback Line & Baseline: In areas where the Transition Zone (wholly or in part) lies seaward of the OCRM Setback Line and Baseline (Critical Line), DHEC approval and permit will be required for removal of vegetation.

Rationale for the Proposed Transition Zone Plan

This Proposed Plan achieves the overarching goal of providing a true Transition by providing - clearly and quantitatively - for greater manipulation of the Protected Land vegetation closest to adjacent homes and lesser manipulation seaward where the TZ joins the rest of the Protected Land. This Plan also takes into account the different characteristics of the land across the four Management Units. This is accomplished by specifying two differently managed Bands within a common 100 ft. Transition Zone.

Neither of the two Transition Zones, that have been considered previously, accomplish a real transition.

The Plan for a single 100 ft. Transition Zone for all Units (approved by Council on 5-20-2014) recognized the problem of selecting a different TZ size for each of the four Units, primarily based on distance from the ocean – a factor that could vary within a Unit, overlap across Units, and change over time. No management strategy was included, but it was implied (in discussion) that management would be uniform throughout.

The more detailed LUNR Committee approach (approved by LUNR Committee on April 11, 2014) recognized the strong logic of providing for differences in management based on differences in the

Protected Land itself. This was to be accomplished by specifying a range for the Transition Zone that varied from Unit to Unit (e.g., 40 to 100 ft. for Unit 1, and 25-50 for Unit 3A and 3C). However, there was no guidance on how the management strategy might differ within this range – if at all. Instead, there was adoption of a single strategy for each Unit (e.g., manage by tree removal in Unit 1; manage as grassland for Unit 4) to be carried out uniformly *for the entire range*, and with the likelihood that the range *maximum* would apply.

The Proposed Compromise Transition Zone Plan combines elements of both previous approaches. It adds a practical method for providing a true transition between homes and the Protected Land, and for adapting management strategy for different areas. This is accomplished by specifying two differently managed bands of 0 to 40 feet and 40 t0 100 ft. within a common 100 ft. Transition Zone.

The Rationale for selection of the 0-40 foot Band for heaviest manipulation.

a) 40 ft. is sufficient to achieve the goals of enhancement of breezes and relief from wildlife and mosquitoes by removal of underbrush, shrubs and small understory trees. Also, 30 ft. is the defensible space recommended by the SC Forestry Service for fire management. The LUNR Committee (April 11, 2014) and the Accreted Land Management Draft Plan 3A (November, 2011), include 40 ft. in the recommended Transition Zone Ranges for all four Units. This choice acknowledges this 5+ year body of work.

b) Rationale: 40 ft. is the typical width of a neighborhood road bed (20 ft.) plus 10 ft. ROWS (20 ft.). Island-wide, this provides open space between Residential Lots for breezes and relief from fire hazard and mosquitoes. This 40 ft. of open space allows Owls, Hawks, etc. to spot rodents and snakes crossing from a heavily vegetated lot to a neighbor's yard across the street. 40 ft. will provide the same benefit to homes adjacent to the Land Trust Area.

The Rationale for selection of a 40-100 foot Band for lighter manipulation.

a) In forested areas, 40 to 100 ft. in which underbrush and shrubs are cleared, but no trees removed, will provide significant additional relief and enhanced forest views. This will provide a real transition to the seaward Protected Land without distorting the naturally developing mixture of tree species that belong to a Maritime Forest. It is essential that trees not be removed in this area. Trees will be younger and smaller with greater distance seaward, especially for slower growing hardwoods such as oaks. As a result, if trees are removed in the 40 to 100 ft. Band, based on diameter as in the 0 to 40 ft. Band, a higher proportion of trees will be removed, fewer large trees will remain, and species diversity will be reduced. This is the exact reverse of the desired real transition.

b) In areas where the Transition Zone is adjacent to Maritime Grassland and Maritime Shrubland, clearing of underbrush and thinning of shrubs (including myrtles) to 1/3 of the current coverage will provide the desired relief and automatically increase native maritime grassland vegetation, which is naturally interspersed with maritime shrubs. This will provide a true transition to the Maritime Shrubland beyond. There should be no clear-cutting of myrtles and other maritime shrubs – this will simply produce a wall of shrubs at the 100 ft. line. Appropriate thinning will repair the damage done by years of cutting to 5 ft. and reinstate the natural mixture of maritime grassland, shrubs and trees.

Previously Proposed Transition Zones by Unit/Zone

(in feet, measured from private property line seaward

	By LUNR Committee April 11, 2014	**By ALMP 3A Nov 22, 2011**
Unit 1:	40 to 100	40 to 100
Unit 2:	40 to 70	32 to 40
Unit 3A & 3C:	25 to 50	23 to 40 (3A) 10 to 40 (3C)
Unit 4:	40 to 100	40 to 100

By Town Council May 20, 2014 All Units 100 feet with an additional 20 feet at Council discretion.

For Discussion: Species of Trees (6" in diameter) to be preserved in the 0-40 ft. Band of the TZ

1) Per Zoning Ordinance, Article XVII Tree Commission, Sec. 21-158 p 78 and Sec. 21-164 p 82
   Category I Trees: 16" diameter, is a "Significant" tree, needing Tree Commission Approval
   Category II Trees: 6" diameter of any species (and any size Palmetto), is a "Protected" tree, and a permit is required for removal.
   Category I and II trees must be replaced by the same species for Pecans, Cedars, Oaks, Magnolias, Palmettos.

2) The Tree Commission also has a Protected Tree category (as part of its Approved Tree List).
   These are also the species that must be replaced by the same species under Category II, above.

Eastern Red Cedar	Southern Red Cedar	(Both are Red Cedar variants)
Laurel Oak	Live Oak	
Pecan	Southern Magnolia	
Palmetto		

3) Additional Trees are found in the Protected Land and contribute to the Maritime Ecosystem

Black Cherry	Carolina Willow / Coastal Plain Willow
Red Mulberry	Hackberry / Sugarberry
Longleaf pine	Additional Oak species

4) Additional Small Trees are found in the Protected Land and contribute to the Ecosystem
   (All of these are on the Tree Commission Approved Tree List)

Yaupon Holly	Hercules Club / Toothache Tree
Red Bay	Carolina Cherry Laurel
Wax Myrtle	Groundsel Tree / Baccharis

For Information: Size Considerations for Transition Zone

Council needs to consider more than just depth of Transition Zone; e.g., 100 ft. vs 40 ft. when making management decisions. The Total Area size, in square feet, is an important measurement of the environmental impact and the relative costs of implementation and maintenance of a Plan.

Author/Sponsor: Councilmember Susan Middaugh

<u>Calculation of Estimated Transition Zone Area</u>:

The approximate length of the Transition Zone from Station 16 to Station 28 ½ = 2 miles
2 miles @ 5280 linear ft. per mile = 10,560 linear feet

With a 100 ft. TZ depth: 100 x 10,560 linear feet = 1,056,000 square feet of land Area
With 44,000 sq. ft. per acre: 1,056,000 sq. ft. ÷ 44,000 sq. ft. = 24 acres
Converting to standard half-acre lots: 24 x 2 = 48 half-acre lots

With a 40 ft. TZ depth the values are .4 x 100 ft. values : 422,400 sq. ft. of land Area
9.6 acres
19.2 half-acre lots

Conclusion: Manipulation of a 100 foot deep TZ = manipulation of 48 half-acre lots
Manipulation of a 40 foot deep TZ = manipulation of 19.2 half-acre lots

A plan with more reliance on underbrush clearance and less on tree removal will be more cost-effective.:

May 20, 2014

The regular meeting of Town Council was held on the above date at 6:00 p.m. at Town Hall, all requirements of the Freedom of Information Act having been satisfied:

Present were: Jerry Kaynard, Mayor Pro Tem
Chauncey Clark, Councilman
Hartley Cooper, Councilwoman
Susan Middaugh, Councilwoman
Pat O'Neil, Councilman
Mary Jane Watson, Councilwoman

Mayor Pro-Tem Kaynard led the Pledge of Allegiance, followed by a prayer by Councilwoman Watson. Town Hall was full of residents, and also two members of the media.

I. FORMAT – Mayor Pro-Tem Kaynard opened the floor for comments.

Harriet McDougal, 2429 Atlantic Ave., complained of the pine trees in the accreted land near her house, and that they should not be considered part of the maritime forest.

Julia Khoury, 1728 I'on Ave., questioned why there were designated units of the accreted land but they are considering a consistent 100 foot transition zone across all units. The transition zone should be according to science and research of each unit.

Norman Khoury, 1728 I'on Ave., stated he agreed with his wife, Julia Khoury.

Wayne Stelljes, 3104 I'on Ave., suggested everyone should be open-minded, as it will not be possible for all to receive exactly what they prefer for the accreted land transition zone.

Tim Reese, 305 Station 20, stated he was in support of the 100 foot transition zone, as it is fair and equitable. He added the property owners should pay for the management of it by the Town.

Michael Mithoefer, 407 O'Neil Court, inquired if the decision on fees for the filming ordinance had been determined and also if they would no longer be able to have photo shoots on their dock. He stated he also agreed with the comments of Julia and Norman Khoury tonight.

Mark Howard, 1820 Central Avenue, stated there are many questions to be answered about the transition zone including who manages it, plants it, and what can be planted.

Barbara Spell, 1702 Atlantic Ave., commented on the trial regarding the Sullivan's Island Elementary School. She stated the ruling by Circuit Court Judge Dennis was that Sullivan's Island Town Council violated South Carolina law when they decided to ignore a 2011 citizens petition. In his ruling he said only a court can decide the validity of a petition, and that Town officials do not have that authority. She continued that an incorrect message was being said by the Town because the judge ruled that the actions of Town Council were in violation of S.C. State law. The judge also stated the written ruling will make everything clear.

Steve Poletti, 1771 Atlantic Ave., stated he would like to see the accreted land on the island as Edgar Allan Poe described the island in *The Goldbug,* that not a tree of any magnitude was to be found on the island. He also questioned if it is worth the Town selling marsh front lots in order to pay legal expenses for the accreted land.

Barry Krell, 2713 Bayonne Ave., stated it was his understanding the transition zone was up to 100 feet maximum, and each zone would be considered individually by experts hired by the Town to make decisions according to the area.

Edward Robinson, 1901 I'on Ave., stated he attended the trial, and suggested that

the Town include a formal summary of the complaint and ruling as part of the Council minutes in the near future.

Lovic Waring, 2214 Myrtle Ave., stated that a few years back when owners were allowed to cut, everything was cut to five feet and it ruined everything. Now it has grown into a huge jungle. She said that the problem is when some owners do not obey the rules and illegally cut on the weekend when people are not around to report it.

Councilman Kaynard responded to comments regarding the school referendum case. He was at the trial both days and also was a witness representing the Town of Sullivan's Island. Shortly after Judge Dennis announced his decision, the media contacted both Mayor Pro-Tem Kaynard and other Council members. Because Mayor Pro-Tem Kaynard was involved with the press release, he informed the audience what happened in court. The judge first ruled that there was no obligation by the Town Council of Sullivan's Island to call a referendum or vote on the petition and ordinance that was presented to the Town. He ruled that the initiated ordinance was facially defective; therefore, it was invalid and it could not be implemented by the Town. The judge further said that the actions by the Town were lawful and that the Town did not take any action that was incorrect. Finally, the judge found there were no rights violated to any citizen of Sullivan's Island by the actions of Town Council. He also stated the residents and plaintiffs who pursued the case have had an opportunity to voice their opinions in court.

Mayor Pro-Tem Kaynard continued because this was the oral ruling, there are differing opinions of the ruling. However, there was never anything said by Judge Dennis that could have been construed that the Town had acted illegally. The written ruling will be issued at which time everyone can read the actual words of Judge Dennis. That opinion will be the rule of law for that case. He continued that for the last two years the case has been about having a vote in a referendum. However, when it went to court the plaintiffs in the case withdrew that claim for a referendum and a vote; they did not pursue that before the judge at the trial.

Resident Karen Coste challenged his statements regarding the ruling. Mayor Pro-Tem Kaynard responded that it was not time for responsive discussion, and the written opinion will give an answer to any questions.

II. COUNCIL ACTION ITEMS

1. 1. Motion was made by Councilman O'Neil, seconded by Councilwoman Middaugh, to approve the Minutes of the April 22, 2014 regular meeting and the May 12, 2014 special meeting.

2. Motion was made by Councilman Clark, seconded by Councilwoman Watson, to approve A Resolution to Adopt Record Retention Policy, carried unanimously.

3. Motion was made by Councilwoman Middaugh, seconded by Councilman Clark, to have First Reading of Ordinance No. 2014-04, An Ordinance to Adopt the Water and Sewer Operating Budget for Fiscal Year 2015, carried unanimously.

4. Motion was made by Councilman O'Neil, seconded by Councilman Kaynard, to defer Second Reading and Ratification of Ordinance No. 2013-09, An Ordinance Amending Section 14-25 of the Code of Ordinances for the Town of Sullivan's Island to Revise Franchise Fees for Filming, Video Taping, and

Still Photography for Commercial Purposes; and, to Add Language Prohibiting Filming of Any Type within the RC-1/RC-2 Zoning Districts or on the Beach, carried unanimously.

5. 5. Approval of Recommendations for Transition Zone Component of the Protected Land Management Plan – Councilman Clarke stated the transition zones should have a consistent line. The discussion at the last meeting showed the transition zone ranged from 40 to 100 feet. The beach changes continuously through erosion/accretion, along with a changing critical line, so he stated the transition zone should be 100 feet for all zones.

Councilwoman Middaugh stated that she was in favor of moving forward with the transition zones, although the transitional zones should be proportional to the depth of the zone. If all zones were 100 feet, it would be hard to exercise discretion. Also, she wanted the plan to have more consideration of the critical line.

Councilman O'Neil gave a timeline overview of events in the accreted land, beginning in 2007. He reported that the Land Use and Natural Resource (LUNR) Committee had a good discussion of the transitional zone depth at its meeting last month. He continued that it needed to be decided how to manage and maintain the transitional zone. Also, if it is decided to be 100 feet, how to allow for elasticity in zones that run out of beach before reaching 100 feet . He proposed to schedule the next LUNR Committee meeting for more discussion on this and to develop a plan.

Mayor Pro-Tem Kaynard stated the Phase I and Phase II lists of projects in the accreted land were adopted in October 2013. Some of the projects had been implemented such as the removal of invasive species and the path project off of Station 16 beach path. The transition zone was one of the items on the list. He stated they were trying to search for a formula/method to produce a transition zone that would be fair and equitable to different parts of the island and accreted land. This is just one piece of a comprehensive plan for the accreted land.

Councilman Clark stated he had prepared a motion. It included information from the last meeting concerning a 100 foot transition zone, as well as how to manage and supervise the area.

Motion made by Councilman Clark, seconded by Councilwoman Watson that the depth of the transition zone be 100 feet in the accreted land for each of the following management planning units: Unit/Zone 1 (West); Unit/Zone (West Central); Unit/Zone 3 (East Central), Unit 3A and 3C; Unit/Zone 4 (all). No transition zone is being proposed for Planning Unit 3B at this time, which is in front of the Sullivan's Island Elementary School. Provided, that the transition zones are subject to increase in size by adjustment of the seaward boundary line by pup to twenty (20%) percent of the gross transition zone by the Land Use and Natural Resource Committee for site specific conditions. The management strategies for each unit should be Unit/Zone 1(West); Units/Zones 2, 3A, 3C and 4: Remove all species except priority trees. Manage as a maritime grassland while protecting Priority trees. Priority trees in the transition zone are defined as Live Oak, Southern Magnolia and Palmettos, measuring a diameter of at least sixteen (16) inches at four and a half (4-1/2) feet above grade.

Councilman O'Neil stated that this was the first time he had heard of this and was not ready to support it; however, he might be able to after discussion.

Mayor Pro-tem Kaynard expressed he did not believe there was anything new that was not discussed in the Land Use and Natural Resources Committee, with the exception of the tree diameter.

Councilman O'Neil stated it was never decided in the Land Use and Natural Resources Committee what species of trees, the diameter of trees, the definitive 100 foot zone, or the 20% adjustment provision. The discussion had been for a transition zone range of 40 to 100 feet; clearing out the understory; and the trees species list was never intended to be a restrictive list. He stated he did not understand the urgency of voting on this motion, and he had concerns of Council violating its own procedures because it was not appropriate for this to first be introduced at a Council meeting without ever going through the Committee process.

Councilwoman Middaugh agreed with Councilman O'Neil. She then requested that Councilman Clark change his motion to reflect only the portion of the 100 foot transition zone, as that is what the public expected Council to vote on tonight.

Motion was made by Councilman Clark, seconded by Councilwoman Watson to amend the motion to stop after the provisional statement. Therefore, the amended motion would read:

> **That the depth of the transition zone be 100 feet in the accreted land for each of the following management planning units: Unit/Zone 1 (West); Unit/Zone (West Central); Unit/Zone 3 (East Central), Unit 3A and 3C; Unit/Zone 4 (all). No transition zone is being proposed for Planning Unit 3B at this time, which is in front of the Sullivan's Island Elementary School. Provided, that the transition zones are subject to increase in size by adjustment of the seaward boundary line by pup to twenty (20%) percent of the gross transition zone by the Land Use and Natural Resource Committee for site specific conditions.**

Councilwoman Middaugh asked the wording to be changed to "up to 100 feet", or "a maximum of 100 feet". This wording was not changed.

Councilman O'Neil stated that this motion is substantially different than what the Land Use and Natural Resources Committee had discussed.

Mayor Pro-Tem Kaynard stated Council had a right to change any recommendation by a Committee, so this is proper as presented to Council. He called for the vote.

> **Motion to amend carried by a vote of 4-2, with Councilwoman Middaugh and Councilman O'Neil casting the opposing votes.**

Motion was made by Councilman Clark, seconded by Councilwoman Watson to approve the motion as amended, carried by a vote of 4-2, with Councilwoman Middaugh and Councilman O'Neil casting the opposing votes.

6. Approval of Tree Removal Plan for Stith Park – Councilwoman Watson stated that twenty years ago, Oak and River Birch trees were given to place in the park. Since that time, the River Birch trees have died. The River Birch trees will be replaced with other types of trees. The two Bradford Pear trees to be removed will not be replaced. Seven Live Oak trees will be removed, and six will be replaced in different areas. **Motion was made by Councilwoman Watson, seconded by Councilwoman Middaugh, to remove the trees designated with a red triangle on the Stith Park tree survey dated May 20, 2014, carried unanimously.** Councilman O'Neil stated that none of these trees were being removed for the new Town Hall. Councilwoman Watson agreed and stated that the *Island Eye News* reported that the trees to be removed were marked with a red ribbon. Because there has been manipulation of the red ribbons in the park, the Stith Park tree survey will be placed on the website to indicate the actual trees being removed.

III. REPORTS AND COMMUNICATIONS

1. General and New Correspondence – Correspondence was received from Father McInerny regarding traffic issues; Marie-Louise Ramsdale about St. Patrick's Day activities; Paul Flaherty expressing appreciation for the Maintenance department; the Island Turtle Team's May Newsletter; the National Park Service regarding the National Civil War Commemoration; and dozens of residents messages regarding the Accreted Land Management Plan transition zone width.

2. Attorney Report - There was no Attorney report.

3. Boards and Commissions –

Planning Commission – Report included highlights of the last meeting; and the next meeting will include a public hearing for the proposed text amendments to allow coffee shop uses and define other food service establishments within the community commercial zoning district.

IV. COMMITTEE REPORTS

Finance Committee – Mayor Pro-Tem Kaynard for Mayor Perkis. Monthly report rendered. Fiscal year as of April 30th the Town has received approximately $1.68 million in property tax revenue and $896,700 in business license revenue. The Town sold an empty lot for $605,000 with the closing in the month of April. The cost of relocation and operation of the temporary Town Hall as of April was $315,300. The cost of the temporary Town Hall is approximately $4,000 per month. The cost for the design and construction of the new Town Hall as of April was approximately $44,000.

Public Safety Committee – Councilman Clark. Monthly reports rendered. The Isle of Palms and Sullivan's Island Public Safety departments will host the annual Emergency Preparedness Meeting at Isle of Palms Fire Station One on May 21, 2014.

Water and Sewer Committee – Councilwoman Middaugh. Monthly reports rendered. The SRF funding for the I&I project is out to bid.

Administration Committee – Mayor Pro-Tem Kaynard. Monthly report rendered. The Maintenance Department hired two part-time temporary employees for the summer; and the Police Department has hired one part-time temporary beach services officer for the summer. Town Hall offices will be closed on Monday, May 26 in observance of Memorial Day. Essential services will remain available and fully staffed.

Land Use and Natural Resources Committee – Councilman O'Neil. Monthly report rendered. The accreted land transition zone was discussed earlier in the meeting. A Public Hearing regarding the Comprehensive Plan will be held on June 17, 2014 at 6:00 p.m., followed by the regularly scheduled Council meeting.

Public Facilities Committee – Councilwoman Cooper. Monthly report rendered. Councilwoman Cooper reported that she and Administrator Benke attended a school construction meeting today, and construction is on schedule. She will get a date for the tour of the school.

Recreation Committee – Councilwoman Watson.
Stith Park Tree Plan - The Stith Park tree plan was discussed earlier in the meeting.
Independence Day – All the activities have been planned for July 4th, and they will be the same activities as last year.
Island Club – The Island Club is not planning to renew its lease with the Town. Councilwoman Watson met with Administrator Benke and Comptroller Blanton to discuss a potential budget, and possible revenue-generating ideas. If the Town does manage the activities at the Island Club, she asked Council to think about how it would be handled. In past years Council has discussed a part-time Recreation director. This person could handle the bookings for private rentals and some responsibilities of the front desk at Town Hall. The Administration and Recreation Committees will meet to further discuss and bring back to Council.

Motion was made by Councilman Clark, seconded by Councilwoman Watson, to go into Executive Session at 8:07 pm for Legal – Update by Town Attorney regarding proceedings to date on Bluestein v. SI 10-CP-10-5449 and Contractual - Raven Drive Lot Sales.

Upon returning to regular session, Mayor Pro-Tem Kaynard stated that no votes or action were taken in Executive Session.

Motion was made by Councilman Clark, seconded by Councilwoman Watson to adjourn, carried unanimously.

Respectfully submitted,

Ellen Miller

Ellen Miller

Approved at August 19, 2014 Regular Council Meeting

TOWN OF SULLIVAN'S ISLAND, SOUTH CAROLINA
LAND USE & NATURAL RESOURCES COMMITTEE OF COUNCIL
Friday, April 11, 2014

The Land Use & Natural Resources Committee of Council met at 8:35 a.m. on April 11, 2014 at Town Hall, 2050-B Middle Street, all requirements of the Freedom of Information Act having been met. Present were Committee members Pat O'Neil, Chair, Mayor Mike Perkis and Council member Jerry Kaynard; Staff, Administrator Benke, Asst. to Administrator Darrow, Zoning Administrator Henderson and Building Official Robinson.

There were approximately twenty-three members of the public present, including Council members Chauncey Clark and Susan Middaugh; no media representatives present. Jeff Jackson, Town naturalist consultant, was present for agenda items #4 and #5.

1. Call to Order. Chair O'Neil called the meeting to order, stated the press and public were duly notified pursuant to state law and noted all members were present. Chair O'Neil noted the Committee would solicit questions and comments from the public after each agenda item.

2. Approval of Agenda

MOTION: Councilman Kaynard moved to approve the April 11, 2014 agenda with the following amendment: review/approve the March 14, 2014 minutes; seconded by Mayor Perkis. MOTION UNANIMOUSLY PASSED.

3. Approval of Minutes – March 14, 2014

MOTION: Councilman Kaynard moved to approve the March 14, 2014 minutes; seconded by Mayor Perkis. MOTION UNANIMOUSLY PASSED.

4. Staff Reports: Zoning Administrator and Building Official

Zoning Administrator Henderson:

- **Planning Commission – met on April 9, 2014:**
  - Continued consideration of café eating establishment designation, carried forward to May 14, 2014 meeting. During interim a Planning Commission work group and interested residents will craft some revised draft ordinance language. Public hearing will be scheduled no earlier than June.
  - Bike path concept for marsh boardwalk from Ben Sawyer Boulevard to Patriot Street area has been removed from the Commission's agenda.
- **Board of Zoning Appeals – met on April 10, 2014**
  - Two Town appeals upheld by Board at this meeting.
- **Design Review Board – meets on April 17, 2014 to consider six items, to include parking plan for the new restaurant, Obstinate Daughter.**

Building Official Robinson:

- **Department prepares for five-year Insurance Services Organization (ISO) visit for the Town's CRS rating (Flood Insurance) – to be held after June 1st.**
    - Town is currently a Class 6 designation resulting in 20% insurance rate credit. Mt. Pleasant is currently a Class 6, City of Charleston is a Class 7, Isle of Palms is a Class 7 and Folly Beach is a Class 7 or 8 (Class 1 is ideal)
    - Town receives substantial credit for the large mass of undeveloped deed restricted land, both the Accreted/Protected Land and the marsh area. He noted more than fifty (50%) percent of the Town's land mass is not developable. This credit resulted in almost one Class Rating point.

Wayne Guckenberger, 2105 Pettigrew Street, Sullivan's Island

- Regarding the CRS/Flood Insurance rating: will this visit include a review of the flood zones and maps?

Building Official Robinson clarified that the ISO visit is more of an internal audit of the Town's current CRS program. New maps should be released in December 2014.

Francis Johnson, 2301 Atlantic Avenue, Sullivan's Island

- Regarding the CRS credit the Town receives for the Accreted Land: is credit due to the distance from residences to the beach instead of what is developed/not developed on the Accreted Land?

Building Official Robinson clarified that the CRS credit is given because the land cannot be developed. It is natural and beneficial, meaning the public can go through it but as a passive area, not accessed by dune buggies and golf carts. The fact that the land is protected from development results in almost one CRS credit point, according to a formula with the following criteria: land is under a Land Trust and deed protected so it remains passive/not developed. The distance of residences from the beach will be relevant for the flood mapping.

5. Five-year (2013) Comprehensive Plan: Status

Mayor Perkis reported that each Committee of Council will look at the portion of the proposed 2013 Comprehensive Plan relevant to its respective Committee and provide feedback to the Council by the May 12, 2014 Council Workshop. The Land Use & Natural Resources Committee had no specific changes to the proposed Plan to recommend to Council, at present.

6. Review of status of Approved Projects in the Protected Land: implementation of approved projects. Report from Town Administrator and Naturalist Consultant Jeff Jackson:

- **a. Station 16 Nature Trail & Boardwalk/benches/deck RFP**
- **b. Other projects**

Administrator Benke reported on the Station 16 Nature Trail and boardwalks:

- Nature trail has been identified and path cut. Recent rain provides a good indication of where boardwalks/hardscape will be needed through trail.

- Boardwalk Request for Proposal (RFP) has been advertised. The RFP provided for boardwalk west of Station 16 and, on the eastern section, provided for a boardwalk that would take visitors directly to the beach, removing them from being on the emergency beach access in the event of an emergency response. He noted erosion is currently occurring beach front near Station 16 and does not recommend the boardwalk on the eastern portion of the trail (side route from beach path to beach front) at present.
- Noted the Town will probably re-bid the boardwalk RFP after removing the eastern portion of the boardwalk (during erosion cycle) and tightening up other sections of the trail.
- Noted this boardwalk work would be funded by Urban Greenbelt funds (does not require matching Town funds).
- General comments about the boardwalk trail (Town moniker is Station 16 West):
    - Consultant Jeff Jackson worked on the trail design over a period of time;
    - Input on the trail has been received by the following:
        - Charleston County Greenbelt Board
        - Charleston County staff
        - Department of Natural Resources
        - Dr. Porcher (Botanist)
        - Fish and Wildlife Society
        - Audubon Society
- Noted that Phase 2 would provide potential for trail to connect to federal land and Sullivan's Island Elementary School.

Jeff Jackson walked the Committee through a GIS map of the area, noting the trail boundaries. He noted areas of identified seasonal wetlands where a boardwalk would be needed. Boardwalk sections would be six (6') feet wide and ATV accessible for emergency staff response, with care taken to allow for handicap accessibility. Boardwalk and marked trail portions would help navigate people to the preferred sections of the protected land and away from the sensitive vegetation and habitats. Mr. Jackson noted that this Station 16 West trail would be the one area that would retain interpretative trail elements. The trail from Station 16 East, if/when realized, would be passive in nature, with very limited boardwalk sections.

Administrator Benke commented that the St 16 West project would be re-bid with an anticipated six-week timeline from advertisement to selection. He anticipated the boardwalks could feasibly be started in mid-June.

Michael Borland, 1607 Atlantic Avenue, Sullivan's Island

- Asked for clarification on an interpretive trail – what would this entail?
- Where would this interpretive portion be located?

Jeff Jackson clarified that by interpretive trail he means a trail with signs that explain and educate people on the types of flora, fauna and habitats in the area. The interpretive portion would generally be located from Station 16 West in the area near/in front of the Fort Moultrie property, not in front of residences.

Ettaleah Bluestein, 2513 Atlantic Avenue, Sullivan's Island

- Will boardwalks be placed beyond SIES toward Breach Inlet?

Administrator Benke noted that Urban Greenbelt funding may be used for boardwalks running perpendicular to the beach (road/pavement to beach front) and parallel to the Island (nature trail).

Chair O'Neil noted that the majority of parallel/longitudinal paths would be mainly dirt with some boardwalk sections where needed.

Administrator Benke noted that the decision to expand trails beyond the SIES would be done at the will of Council. Mayor Perkis clarified that the current plan is to finish the Station 16 trail area and move toward the school.

Councilman Kaynard noted that the nature trail was originally the idea of the elementary school. SIES was using a portion of land adjacent to the school for educational purposes, prior to CCSD plans to build a new school at its current I'On Avenue site. The Town's negotiation with CCSD for the new SIES included the ability for the school to continue to access some of the Accreted Land for student education.

Councilman Kaynard clarified the term "boardwalk." Council does not envision a boardwalk tantamount to the Atlantic City Boardwalk. Instead limited sections of low boardwalk will be put over seasonal wetland sections. He noted that financial limitations will contribute to minimizing the scope of the trail projects.

Evelyn Needle, 2419 Atlantic Avenue, Sullivan's Island

- Concerned about trails being placed in front of the residences.
- Concerned about visitors meandering through trails in front of residences, wandering into yards, parking in inappropriate places (yards), etc.

Chair O'Neil noted that the Town would endeavor to have trails that did not run closely to residences. He also noted that the marked trails would help navigate people toward dedicated paths instead of meandering through the existing land.

Councilman Kaynard noted that Council appreciates the varying depths of the Accreted Land running in front of residences and feels Council will be sensitive to those residents' concerns as the area is discussed.

Judy Grossman, 2423 Atlantic Avenue, Sullivan's Island

- Regarding the allocated Greenbelt funds: questioned how far those funds would go toward nature trails and whether all the money should be spent on a trail system.
- Questioned why the Town seemed intent on creating a park that would invite non-residents and potentially vagrants to the area.

Administrator Benke clarified that the Urban Greenbelt grant application did not stipulate a geographic boundary for the trails. He provided a brief background on the Urban Greenbelt funds (half-cent sales tax):

- Original grant directive – purchase land to retain as open space.

- Town grant share is approximately $197,000 – not enough money for small beach communities to purchase land.
- Local beach communities petitioned Charleston County to modify the grant parameters to identify beach access for coast, to include paths from edge of pavement to beach, as an allowed use of grant funds.
- Town identified the creation of parallel/longitudinal paths to walk parallel to the beach through designated trails, off of the sand dunes and away from residential properties.
- Town's grant application incorporates both types of access.

Councilman Kaynard noted that it is not the intention of Town Council to create a "county" park or park-like environment in the Accreted Land. The Town plans to develop a limited trail area, in small steps, and Council will assess the situation. He noted that the residents' concerns are the Council's concerns.

Mayor Perkis noted that people are coming to the area right now and anticipates the interpretive signs would help attract desirable visitors to the area.

Tim Reese, 305 Station 20, Sullivan's Island

- Asked for the Committee to explain Mr. Jackson's credentials and identify the scope of work that Council has contracted to pay Mr. Jackson. Secondly, he questioned how far of a trail Council has approved at present.

Jeff Jackson

- Resident of Berkeley County; Clemson University graduate with a B.S in plant science; involved in landscaping and environmental projects since 1981.
- He has worked with the Town over the past 19 years on the Accreted Land.
- Has experience working with Dr. Porcher (who recommended him to the Town for this work), a highly respected southeast regional botanist.

Mayor Perkis stated his understanding that the Town has not considered plans beyond Station 18.

Ben Nixon, 1611 Atlantic Avenue, Sullivan's Island

- Noted he is familiar with the interpretive nature trail on Fripp Island, but over the years maintenance has become an issue. Questioned who would maintain the trail and whether the Town had money for this maintenance?
- Also, do dog leash laws apply to the trail?

Chair O'Neil
Yes, leash laws will apply. Town maintenance crews will maintain the paths just as they do the Town rights-of-way.

George Malanos, 2603 Bayonne Avenue, Sullivan's Island

- Asked if the Greenbelt funds are a one-time grant.
- Asked if the Greenbelt application specifically included parallel trails through the Accreted Land and requested a copy of the grant application.

- Commented that the Town plans to make the trails limited in nature, but, Council is setting a precedent. Submitted that everything that starts as being limited in nature or lacking funds to expand can be expanded over time. Also money can be found to accomplish a project expansion if a future Council desired to do so.

Administrator Benke

- Indicated he would get a copy of the Urban Greenbelt grant application to Mr. Malanos and anyone else interested in it.
- Clarified that the grant application did specify both perpendicular and parallel beach paths.
- Noted that Charleston County made changes to the allowed scope of grant fund projects to enable beach communities to use funds for beach access projects and/or purchasing land.

Francis Johnson, 2301 Atlantic Avenue, Sullivan's Island

- Asked how the funds, since limited, would be allocated. Stated his expectation would be for the funds to be prioritized to cover new beach paths and existing path extensions, first, and then nature trail development second.

Administrator Benke noted that work is already being done to build new beach access paths (Stations 21 ½ for example) and expand/improve current beach path boardwalks while simultaneously working toward the Station 16 nature trail.

Margaret Wilson, 2602 Bayonne, Sullivan's Island

- Asked if the longitudinal paths will be in front of a residence?

Chair O'Neil: Paths may be between ocean and residences, but not right in front of the residence.

Mrs. Wilson:

- How close will the paths be to the residences?
- What are the times people will be allowed on the paths? How will you keep them off of it at night?
- How will Town police the area to keep rowdy non-resident visitors off the path, particularly those who might have had a few drinks at a restaurant in the CCD?
- Why is the Town working to attract "party people" to the Accreted Land instead of the beach area?

Jeff Jackson: Suggested that the nature trail and passive trails would attract bird watchers and dog walkers. Anticipates the area would attract less than 1% of the people heading for the beach.

George Lewis, 2101 Pettigrew Street, Sullivan's Island

- Commented on the quality of the beach path on Station 21 ½ and asked why the Town will not place construction of the traditional beach access paths first, instead of the nature trail.
- Commented that he is not hearing about the management of the Accreted Land right now; rather he hears the Town talking about putting a nice trail through it.

- Noted that his understanding is that the Urban Greenbelt grant allows for the Town to use the grant funding for both paths – the Town appears to have the latitude to choose to use funds only for traditional street-to-beach boardwalks.

Nat Robb, 2209 Atlantic Avenue, Sullivan's Island

- Questioned why the Town should spend any money on nature trail boardwalks that the Town does not need when the Urban Greenbelt funds can save taxpayers from paying for current beach path expansions and improvements.

Jeff Jackson provided an additional report on other approved projects in the Protected Land:

Invasive species eradication:

- He and Mr. Billy McCord plan to have open workshops for residents to get educated on the area, walk around it, assist with invasive species plant removal, and, learn how to identify and remove invasive species from personal yards.
- Tentative dates for the workshop will be 4-7PM on Tuesday, May 6th and Friday, May 9th (dates/times not finalized/subject to change).
- Mr. Jackson indicated he would finalize dates/times and provide additional information to the Town in the near future.

7. Protected Land Management Plan: Review & Discussion

a. Review of Phase I projects

b. Review of Phase II projects

i. Transition zones

Committee stated that it planned to focus on Phase II and the transition zones in this meeting. The balance of the meeting will be dedicated to this topic.

Chair O'Neil provided background on the definition of transition zones (sections of draft Accreted Land Management Plan version 3A were projected on the screen for the audience). He noted that transition zones would provide a "belt" of land, transitioning from residential yard to the natural area and dunes line/beach. He noted four transition zones were identified in the Accreted Land Management Plan (version 3A, starting at page 9 of document) and then read to the audience the management principles in the draft Plan.

Cheryl Clark, 2119 Pettigrew, Sullivan's Island

Questioned whether the Committee is referencing the version 3A Accreted Land Management Plan or some other document.

Councilman Kaynard briefly reviewed the various documents the Committee references in this meeting:

- Version 3A refers to the Draft Accreted Land Management Plan, Version 3A (Town draft Plan last modified in 2011). The boundaries for the transition zones to be discussed today are identified in version 3A ;
- Phase I and Phase II refers to the list of Council approved projects in the Accreted Land (October 2013) incorporating 13 list items. Transition zones were on Phase II of the Project list, which the Committee will discuss today.

Andrew McMarland, 1850 Flag Street, Sullivan's Island

- The transition zones –will discussion today address the coyote habitats and dealing with them?

Chair O'Neil noted that the coyote habitat issue will not be discussed today. Councilman Kaynard noted that the transition zones will be discussed regarding the range of dimensions for each zone, and, what can be cleared/must remain in said transition zone.

Staff utilized GIS mapping to provide Committee and audience with graphic representation of what 50' and 100' might represent from a residential property line seaward into a transition zone.

Vegetation and Overstory - Retain and Clear

Committee considered establishing a priority tree list, an initial suggestion being:

1. Live oaks 2. Red Cedar 3. Magnolias 4. Palmettos

George Lewis, 2101 Pettigrew Street, Sullivan's Island

- Questioned why all residents along the beach should not get the same buffer size?

Nat Robb, 2209 Atlantic Avenue, Sullivan's Island

- Noted he serves on the Tree Commission which has an approved list of understory and canopy trees.
- He also suggested that the Tree Commission could be given the responsibility for reviewing the types of trees to remove.

Zoning Administrator Henderson read the trees on this list **(Exhibit A).**

General Committee discussion about using the Tree Commission list as a starting point for the list of priority trees, noting the size of trees is important too. Mayor Perkis expressed support for the Town aligning protected trees in the transition zones along the requirements placed upon residents by the Tree Commission. Chair O'Neil concurred with Mayor Perkis' comments. Committee noted that palmettos are protected, in general, throughout the Town Code.

Committee did not define the minimum size of trees that will be protected in the transition zones. Councilman Kaynard suggested the size of trees that can be removed can be discussed by Council, noting that the transition zones would be assessed and tree sizes marked in the future.

Mayor Perkis suggested that the Committee express some consensus on items that could be cleared, to include: understory, dead wood and myrtles.

Councilman Kaynard stressed that the transition zones would be special, something not anticipated when the Tree Ordinance was developed thirty years ago. Mayor Perkis suggested the Town create a guideline for the transition zones and see what types, quantity and sizes of trees are in each zone.

Thereafter the Committee discussed zone depth. Committee reached general consensus that the transition zones would be between forty (40') and one-hundred (100') feet in depth, varying by zone with the maximum transition zone being no more than one-hundred (100') feet.

The Committee reviewed the language in the Town's draft Accreted Land Management Plan (version 3A) regarding the four planning units and transition zones located therein. Version 3A of the draft Accreted Land Management Plan was developed by the Town approximately 2 years ago pursuant to a lengthy process of community and committee meetings. The following is a summary of the zone depths and accompanying management strategies the Committee considered for recommendation to Council for these planning units.

Transition Zones (Accreted Land Management Plan version 3A)

Planning Unit/Zone 1, WEST –
Fort Moultrie area to Sand Dunes Club beach access path (Stations 13-16)
Depth: Forty to one-hundred feet (40'-100')
Management strategy: Remove all species except trees protected pursuant to the Tree Commission's approved list of protected trees, and, palmetto trees.

Planning Unit/Zone 2, WEST CENTRAL –
Sand Dunes Club path to Coast Guard/National Park Service (Stations 16-Station 18, 1815 I'On Avenue)
Depth: Forty to seventy feet (40'-70')
Management Strategy: Managed as a maritime grassland emulating the lighthouse property while protecting all trees pursuant to the Tree Commission's approved list of protected trees, and, palmetto trees.

Zone 3, EAST CENTRAL – Three subsections

Zone 3A: Station 18 ½ to SIES
Depth: Twenty-five to fifty feet (25'-50')

Zone 3B: SIES (TMS 529-09-00-068) – no transition zone has been discussed for this area in front of the elementary school grounds.

Zone 3B: SIES to Station 22
Depth: Twenty-five to fifty feet (25'-50')

Management Strategy: Managed as a maritime grassland emulating the lighthouse property while protecting all trees pursuant to the Tree Commission's approved list of protected trees, and, palmetto trees.

Zone 4, EAST -
Station 22 ½ beach path extension to Station 29
Note: This zone includes a platted Bayonne Street extension, a 40' right-of-way (ROW) currently undeveloped over 4-5 blocks of this transition zone. The Bayonne Street extension is not part of the accreted land and protected with the Land Trust.

Station 22 ½ - 26 (Bayonne Street Extension area)
Depth: Bayonne Street Extension (40' ROW) plus forty to sixty feet (40'-60') measured from the seaward boundary of the Bayonne Street Extension ROW.

Station 26-29
Depth: Forty to one-hundred feet (40'-100')

Management Strategy: Managed as a maritime grassland emulating the lighthouse property while protecting all trees pursuant to the Tree Commission's approved list of protected trees, and, palmetto trees.

George Lewis, 2101 Pettigrew Street, Sullivan's Island

- Reiterated his inquiry why there are different depths for each transition zone.
- Questioned the science behind the Committee's transition zone recommendations, suggesting it appeared like arbitrary numbers.

Committee briefly discussed the benefits and pitfalls of forcing a one-size transition zone depth for the entire Island. Establishing a one-depth compromise transition zone creates inflexibility and does not recognize the varying density and development stages of the vegetation and trees in the transition zone, due to the different zone depths. The Committee stressed that the goal of the transition zones is to provide some relief for the residences abutting the transition zones.

> **MOTION: Chair O'Neil moved to recommend to Council to provide the following approach to developing transition zones in the Accreted Land; first that the range of depth for the transition zones be as follows for each of the management planning units:**
> **Unit/Zone 1 (West): 40-100'**
> **Unit/Zone 2 (West Central): 40'-70'**
> **Unit/Zone 3 (East Central), Unit 3A & 3C: 25'-50' deep**
> **Unit Zone 4 (East) Station 22 ½ -26 which includes the Bayonne Street right-of-way: 40'-60' from the seaward boundary of the Bayonne Street extension right-of-way; from Station 26-29: 40'-100'. Committee is not proposing a transition zone for Planning Unit 3B, currently, which is in front of the Sullivan's Island Elementary School. The management strategies for each unit should be:**
> **Unit/Zone 1(West): Remove all species except trees protected pursuant to the Tree Commission's approved list of protected trees, and, palmetto trees.**
> **Units/Zones 2, 3A, 3C and 4: Manage as a maritime grassland emulating the lighthouse property while protecting all trees pursuant to the Tree Commission's approved list of protected trees, and, palmetto trees.**
> **Seconded by Councilman Kaynard.**

Discussion:
Councilman Kaynard suggested the motion should clearly state that the size/diameter of trees has not been specified, and, shall be discussed and determined by Council.

MOTION ABOVE AMENDED: Chair O'Neil included the following to the main motion: the minimum diameter which would cause a tree to be in protected status has yet to be determined; seconded by Mayor Perkis.

Call for the question on Motion to Amend: MOTION UNANIMOUSLY PASSED

RESTATE MOTION (As Amended)
Recommend to Council to provide the following approach to developing transition zones in the Accreted Land; first that the range of depth for the transition zones be as follows for each of the management planning units:
Unit/Zone 1 (West): 40-100'
Unit/Zone 2 (West Central): 40'-70'
Unit/Zone 3 (East Central), Unit 3A & 3C: 25'-50' deep
Unit Zone 4 (East) Station 22 ½ -26 which includes the Bayonne Street right-of-way: 40'-60' from the seaward boundary of the Bayonne Street extension right-of-way; from Station 26-29: 40'-100'. Committee is not proposing a transition zone for Planning Unit 3B, currently, which is in front of the Sullivan's Island Elementary School.
The management strategies for each unit should be:
Unit/Zone 1(West): Remove all species except trees protected pursuant to the Tree Commission's approved list of protected trees, and, palmetto trees.
Units/Zones 2, 3A, 3C and 4: Manage as a maritime grassland emulating the lighthouse property while protecting all trees pursuant to the Tree Commission's approved list of protected trees, and, palmetto trees. Further, that the minimum diameter which would cause a tree to be in protected status has yet to be determined.

Call for the question on amended motion: MOTION UNANIMOUSLY PASSED.

Chair O'Neil noted, for audience, that Council makes all final decisions on this topic and that this Committee's recommendation will go forward to Council for its consideration at the May 12, 2014 Council Workshop.

There being no further business, the meeting was adjourned at approximately 11:05 a.m. (Councilman Kaynard motioned; Mayor Perkis seconded; unanimously passed).

Respectfully submitted,
Pat O'Neil, Chairman
Land Use & Natural Resources Committee

Approved at the April 22, 2014 Regular Council Meeting

APPROVED TREE LIST
Sullivan's Island Tree Commission
Sullivan's Island, South Carolina

UNDERSTORY TREES:
American Holly – Ilex opaca
Black Cherry – (Wild Cherry) – Prunus serotina
Carolina Laurel Cherry (Cherry Laurel) – Prunus caroliniana
Chickasaw Plum – Prunus augustifolia
Japanese Black Pine – Pinus thunbergi
Leyland Cypress – Cupressus leylandii
Red Bay (Shorebay) – persea borbonia
Southern Waxmyrtle (Southern Bayberry) – Myrica certifera
Sweetbay (Swamp Magnolia) – Magnolia virginiana
Tamarisk (Salt cedar) – Tamarix parviflora -popcorn
Toothache Tree (Hercules Club) – Zanthoxylum clave-herculis
Youpon (Cassena berry) – Ilex vomitoria
Crape myrtle

CANOPY TREES:
Black Willow (Swamp Willow) – Salix nigra
Bumelia (Tough, narrowleaf Bumelia, Buckthorn) – Bumelia tenax
Carolina Poplar (Eastern, Southern Cottonwood) Populus deltoids
Common Persimmon (Possumwood) - Diospyros virginiana
Hackberry (Sugarberry) – Celtis laevigata -
Loblolly Pine – Pinus taeda
Longleaf Pine (Southern Yellow Pine) – Pinus palustris
Red Maple – Acer rubrum
Sweet Gum – liquidambar styraciflua
White poplar – Populas alba
Planetree Maple (Sycamore Maple) – Acer pseudoplatanus
Sassafras – Sassafras albidum
Southern Catalpa (Catawba, Indian bean) – Catalpa bignonioides
Sycamore – Plantanus occidentialis

PROTECTED TREES:
Eastern Red Cedar – Juniperis virginiana removed
Southern Red Cedar (Sand/Salt Cedar) – Juniperis silicicola
Laurel Oak – Quercus laurifolia
Live Oak – Quercus virginiana
Pecan – Carya illinoensis
Southern Magnolia – Magnolia grandiflora

PROPOSED MANAGEMENT PLAN

TOWN OF SULLIVAN'S ISLAND PROTECTED LAND

DRAFT #3A

November 22, 2011

(Incorporates edits from November 4, 2011 Council Workshop and November 18, 2011 Real Estate Committee of Council Meeting – Real Estate Committee edits marked as Track Changes in Draft #3A; Incorporates documents with comments from this November 18, 2011 meeting)

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BACKGROUND

The Town of Sullivan's Island owns approximately 190 acres of beachfront land, which represents nearly all the Island oceanfront property abutting the high water mark. (Hereafter referred to as the Protected Land.) The acreage includes beach, dunes, foredune and backdune grasslands, interdunal wetlands, shrublands, early successional maritime forest and maritime hardwood depression.

In most places, the Protected Land has been in an overall state of net accretion for decades. Sullivan's Island is among a handful of barrier islands in South Carolina that have gained ground during the past centuries. Some sections of this property have accreted more than 1,500 feet seaward since the 1940s.

This property is protected by deed restrictions placed on the land in a 1991 agreement with the Lowcountry Open Land Trust that prohibits any residential or commercial development on the property. In addition, Town ordinances regulate the types and time of any vegetation cutting that is permitted.

This protected land in public ownership represents a remarkable and unique resource for the Town and surrounding Lowcountry region. It supports a great diversity of vegetation and wildlife (e.g., more than 200 species of vegetation, and birds of at least 60 species observed 5-10/2008 by consultants). (Lists of plant and bird species observed by the consultants are shown in Appendices C and D.) Thus, this protected land on Sullivan's Island represents a microcosm of the flora and fauna that can be seen in the successional ocean side habitats that occur along the South Carolina coast.

Beginning in 2007, the Town engaged consultants to assist in developing a comprehensive land management plan to enhance this natural resource of the Town. The Town recognized that it had a unique natural resource (undeveloped maritime beachfront land adjacent to a stable residential community) and had stewardship responsibilities to manage it in accordance with recognized standards of environmental management. The process included study of the land and its flora and fauna by the consultants and feedback from Town residents regarding management options. Several public meetings were held to solicit input from Town citizens. [DATES? Special Council Meetings on August 4, 2009 and December 7, 2009 minimum, plus progress reports on consultants' work were reported through Real Estate Committee of Council at every Council meeting.] To guide the consultant team in distilling the vast data from research and public input, the Town Council on December 15, 2009, approved a set of Principles for Management of this land (Appendix A).

This process resulted in a Final Draft report from the consultants dated July 16, 2010. This report formed the basis for Town Council consideration and study, which lead to this management plan. Council's consideration and study included on-site guided tours, open and advertised to the public and lead by one or more experts, which occurred on March 11, 2011 (Planning Units 1 and 3) and May 5, 2011 (Planning Units 2 and 4). These tours were accompanied by publicly advertised and open work meetings of Council held shortly after the tours, which occurred on March 12, May 6, and May 20, 2011. The work meetings were held sequentially to address Planning Units 1 and 3 (March 12), Unit 2 (May 6) and Unit 4 (May 20).

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INTENT, SCOPE AND LIMITATIONS OF THE MANAGEMENT PLAN

The intent of this document is to describe, in general, non-prescriptive but controlling terms, the background, intents, objectives, and goals of the Town of Sullivan's Island (TOSI) in managing, directing and preserving, for purposes of conservation, protection and environmental education, that land which it has placed under protection with the Lowcountry Open Land Trust, as well as the land owned by the Town which is referenced by Charleston County TMS 529-09-000-68 but generally seaward of any property leased to the Charleston County School District.

This plan is intended to apply to all the lands mentioned in the above section, as well as any that in the future may accrete and otherwise be added to the aforementioned lands. It is intended to communicate the intent of the Town in the management of these lands to accomplish the objectives enumerated throughout the plan.

This plan is not expected to be so prescriptive or detailed as to constitute in and of itself a specific directive from which implementation may flow directly. Rather, it is intended to provide a clear guide to the objectives and approaches the Town intends to achieve and utilize, respectively, in its management of this land. Therefore, it is expected that the Town will engage appropriately trained professionals to translate the management plan objectives and approaches into detailed plans, which will be accessible to all Town citizens. These detailed plans would be the blueprints that the Town would cause to be executed under appropriate direction.

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MANAGEMENT RECOMMENDATIONS APPLICABLE TO ALL PLANNING UNITS

Accepted good management practices should be followed in all zones.

Any species of vegetation which is both non-native and invasive should be killed and removed wherever it occurs. An example is Chinese Tallow (*botanical name here*); examples of other such species are in Appendix E. (Other species which are not categorized as *both* non-native and invasive *may* be removed, killed or reduced depending on the planning unit and circumstances.)

Town-maintained Beach Paths

(Paths providing access to the beach from locations seaward of the protected land):

a. **Emergency paths** should be cleared to a width of 20-25 feet. Additional understory may be cleared to a maximum of 10 feet on each side to permit off-path space for pedestrians to avoid emergency vehicles

b. **Non-emergency paths** should be cleared to a width of up to 10 feet. Additional understory may be cleared to a maximum of 5 feet on each side.

c. Understory clearance for Town-maintained beach paths may include removal of trees if approved by Town's urban forester or other appropriate professional engaged by the Town.

Non-Town-maintained Beach Paths

(Existing paths providing access to the beach from locations landward of the protected land, which are currently maintained by adjacent homeowners but will remain available for public use. I.e., foot paths from the beach to the transition zone which end at locations other than a current right of way; previously considered "private"):

a. Subject to the conditions below, these paths may be maintained, with approval of the Town and, where needed, OCRM and any other governmental agency with jurisdiction.

b. Previously existing paths that are not currently maintained, but whose prior existence is visible or documented, may be restored and maintained, subject to the conditions in (a.) above. New paths may be created subject to statutes and regulations of the Town of Sullivan's Island and other governmental agencies.

c. These paths may be cleared to a width of up to six and one half (6 ½ ft) feet as provided by Section 21-72 of the Code of Ordinances for the Town. Additional understory may be cleared to maximum of 2 feet on each side; removal of trees in this area is not allowed.

- 21-72(B) does not provide for new paths to be created – zoning amendment

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Other Paths ("Nature Paths"):

a. Rationale: Currently beach paths, in addition to providing access to the beach and ocean, also provide the primary means of accessing the Protected Land. The beach paths have been maintained to permit access to the beach for pedestrians, and at 12 designated emergency paths, for emergency vehicles that are frequently dispatched to provide relief for visitors with medical or water emergencies.

   Individuals wishing to explore the off-path parts of the land are free to do so but access is impeded by lack of apparent routes and by vegetation that in some places is extremely dense because of permitted cutting by adjacent property owners and by the Town to maintain path width. As a result, most visitors only view the vegetation and wildlife that is immediately adjacent to the existing beach paths, which often is unrepresentative of that which occurs throughout the extent of this unique preserve.

b. The plan encourages the development of additional foot paths ("nature paths"), which would run in directions other than from street/transition zones to beach. These paths may run more or less parallel to the beach but in particular would have the primary purposes of 1) permitting pedestrian access for educational and recreational purposes to permit viewing of portions of the protected land that are not currently easily accessible, while protecting fragile environments; 2) connecting existing beach access paths; and 3) providing a network of trails to permit pedestrian transit on the Island via the protected land.

c. When possible, these paths should be in swales.

d. The Town will apply for outside funding, including but not limited to County Greenbelt funds, to initiate development of these nature paths.

e. Signage and other appropriate interpretive aids should be encouraged, in particular those which involve minimal intrusion and disturbance to the environment while enhancing user education .

Punctuated Vistas:

a. When possible and consistent with the management objectives and plans for the relevant planning unit, the possibility of creating or maintaining punctuated vistas should be considered.

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Transition Zones:

a. In each unit, the management plan may include a transition zone that abuts privately held properties, that would be managed differently from, and more aggressively than, the (usually much deeper) seaward balance of the accreted land.

b. The transition zone should be managed to further the following objectives when appropriate:

   i. Provision of a buffer from unwanted wildlife.

   ii. Minimization of potential fire hazard

   iii. Enhancement of public safety.

   iv. Enhancement of breezes.

   v. Enhancement of possible sight lines to the property seaward of the band.

c. Achievement of these objectives in the transition zone will be accomplished via different means depending on the characteristics of the accreted land including and seaward of the band. As examples:

   vi. Where the band has characteristics of a developing maritime forest, the undergrowth might be cleared and smaller bushes and trees that compete with more significant trees might be removed.

   vii. Where the seaward property is primarily myrtle fields, or currently cleared within the Town's ordinances, or partially cleared spaces, the band may be cleared or cut to provide an open field habitat, possibly with seeding of other grasses and/or wildflowers, with periodic mowing under the guidance of a landscape professional.

   viii. Trees that are vanguard members of a maritime forest should be spared. Trees may be pruned when it is to benefit the health of the tree.

d. Where a platted right of way exists between the protected land and the nearest seaward private properties, that right of way will be considered to be part of the desired transition zone but not a part of or subject to the deed restrictions with the Lowcountry Open Land Trust.

e. More specific directives for transition zones are provided in the unit-specific management plans.

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RECOMMENDED PLANNING UNITS

Consistent with the management Principles approved by Council (Appendix A) and the consultants' recommendations, four planning units are delineated within the protected land, as illustrated in Appendix B. The units and their general boundaries are as follows.

Planning Unit #1 – West
Extends from the western end of the Protected Land at Fort Moultrie (vicinity of station 13) and terminates at the Town-maintained beach path at the Sand Dunes Club. Unit #1 encompasses maritime forest, established shrub land, and foredune grassland along the seaward edge.

Should the line between Zone/Unit #1 and Zone/Unit #2 be at Station 17 or at the Sand Dunes Club emergency access path?

Planning Unit #2 – West Central
Extends from the Town-maintained beach path at the Sand Dunes Club to the lighthouse property (which is between station 18 and station 18½ and is outside of the protected land). Unit #2 encompasses established vegetation and pathways, as well as additional acreage of foredune grassland along the seaward edge.

Planning Unit #3 – East Central
Unit #3 includes maritime forest, grassland and foredune grassland seaward of the established shrub line. It can be divided into three sub-units:

1. Unit #3A extends from the beach path extension of Station 18 ½ Street to the extension of the western boundary line of the Town-owned property referenced by Charleston County TMS 529-09-000-68, a portion of which is leased to Charleston County School District (CCSD).

2. Unit #3B comprises the portion of the Town-owned property which is referenced by Charleston County TMS 529-09-000-68 but generally seaward of any property leased to the Charleston County School District.

3. Unit #3C extends from the eastern boundary line of the Town-owned property referenced in (2) above, to the beach path extension of Station 22.

Should Zone/Unit #3C be included in Zone/Unit #4 or should 3C have its own management plan?

Planning Unit #4 – East
Extends from the beach path extension of Station 22½ to the beach path extension of Station 29. Unit #4 includes manipulated shrubland and foredune grassland along its seaward edge.

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MANAGEMENT PLANS BY UNIT

Planning Unit #1 - West

Location

The #1 - West planning unit extends from the western end of the Protected Land at Fort Moultrie (vicinity of station 13) and terminates at the Town-maintained beach path at the Sand Dunes Club. Unit #1 encompasses maritime forest, established shrub land, and foredune grassland along the seaward edge.

Preferred Strategy

Being the oldest and least disturbed portion of the Protected Land, the West unit supports the most developed vegetation communities (see Section 3.3 of consultants' report). Building upon the natural character of this unit, active management of the vegetation should be minimized to allow natural successional processes to drive the development of vegetation over time. Vegetation manipulation of the unit should be limited to invasive non-native species control, beach-access pathway maintenance, creation and maintenance of nature paths, and creation and management of a transition zone. Please refer to Appendix E for information on exotic species management.

Specifically, the preferred strategies are:

a. Promote progression to maritime forest

b. Protect grassland areas and repair adverse effects of past intervention.

c. Encourage restoration of wetlands

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Transition zone

a. From Sta 16 eastward

b. Remove all species except desired overstory species

c. Depth: 40 ft – 100 ft

Rationale

As discussed in Section 5.6, if left alone, it is likely that the AL within the West unit will remain stable with some continued accretion over the next 40 years, though the rate of accretion is dependent on rates of sand deposition, erosion, and sea-level rise, as well as the impacts of hurricanes. Continued accretion will result in the seaward vegetation moving outward with the shoreline. The bands of seaward vegetation, including maritime grasslands and shrublands, will move outward but will remain roughly the same size and configuration as they are today. As the coastline moves seaward, the protected inland vegetation community (maritime forest) will overtake areas previously supporting grasslands and shrublands as these communities move seaward and will increase in size relative to the other communities occurring within the Fort Moultrie unit (see Section 5.6).

The passive approach to management that is recommended for the Fort Moultrie unit precludes the use of land-cover targets, because land cover will be driven by natural processes (accretion, wind, salt spray, etc). Vegetation communities should be left alone to evolve with time and the changing shoreline.

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Other items

Should the Town desire to build a nature center within the accreted area, it would be appropriate to do so within this unit or on Town property contiguous to it. The LOLT deed restrictions limit what type of construction may occur *within* the Protected Area. A logical location for this site would be on the west side of the entrance to the emergency access pathway at the end of station 16. There is a large patch of exotic wisteria that could be cleared in this area.

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Planning Unit #2 - West Central

Location
The #2 - West Central unit extends from the public access path at the Sand Dunes Club to the western border of the lighthouse property owned by the US Coast Guard, which is located at 1815 I'On Avenue.

Preferred Strategy

a. Maintain existing priority hardwoods.

b. Convert manipulated shrubland to maritime grasslands with islands/hammocks of maritime shrubs with natural succession permitted within islands (Council should clarify the "natural succession" in this unit).

c. Strengthen dunes when clearing shrubs

d. Overall: Active management to reduce pests

e. Remove invasive non-native species.

Transition zone

a. Should be managed as maritime grassland, emulating lighthouse property at similar north-south location
b. Eliminate wax myrtles while protecting priority trees with diameter at breast height of greater than 6 inches
c. Depth of 32-40 feet

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Rationale
The #2 West Central unit should consist of maritime grassland punctuated by scattered maritime shrubland islands. Approximately 50 percent of the total land cover within this unit should be composed of maritime shrubland community, surrounded by a natural mix of maritime foredune and maritime backdune grasslands. The proportion of shrubland to grassland should increase with distance from the sea and with proximity to the Fort Moultrie and School units. Shrubland islands may vary in size and shape from single shrubs/trees to ¼ acre contiguous hammocks of random shape and may be designed such that views of the ocean are maintained from inland observation points. Ocean views may be increased by placing shrubland islands within low dune swales. Over time, larger shrubland islands may begin to develop vegetation community characteristics similar to maritime forest. This development will result in greater habitat diversity and dispersion and should not be discouraged. Naturally occurring examples of this mix of vegetation communities can be found on neighboring Dewees Island, Capers Island, and Bulls Island.

As discussed in Section 5.6 of the consultants' report, it is likely that land within this unit will continue to accrete over the next 40 years, though this is dependent on rates of sand deposition, erosion, and sea-level rise, as well as the impacts of hurricanes. Continued accretion will result in seaward expansion of

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vegetation. Existing maritime hardwood depression communities within the unit should be preserved to maximize habitat diversity.

* Suggest to Council (this is not a zoning change) language that would allow for the removal of invasive species with similar language "Existing maritime hardwood depression communities within the unit should be preserved to maximize habitat diversity; although non-native invasive species may be removed."

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Planning Unit #3 - East Central

Location

Unit #3 includes maritime forest, grassland and foredune grassland seaward of the established shrub line. It consists of three sub-units:

1. Unit #3A extends from the beach path extension of Station 18 ½ Street to the extension of the western boundary line of the Town-owned property referenced by Charleston County TMS 529-09-000-68, a portion of which is leased to Charleston County School District (CCSD);

2. Unit #3B comprises the portion of the Town-owned property that is referenced by Charleston County TMS 529-09-000-68 but generally seaward of any property leased to the Charleston County School District.

3. Unit #3C extends from the eastern boundary line of the Town-owned property referenced in (2) above, to the beach path extension of Station 22.

Should Zone/Unit #3C be included in Zone/Unit #4 or should 3C have its own management plan?

Preferred Strategy

The recommended management strategy for this unit is to conserve the existing vegetation and allow natural successional processes to drive the development of vegetation over time. Vegetation manipulation of the unit should be limited to exotic species control and beach-access pathway maintenance. Please refer to Appendix E for information on exotic species management.

Specifically, the preferred strategies for Unit 3 are to:

a. Promote progression to maritime forest

b. Protect grassland areas and repair adverse effects of past intervention.

c. *[QUESTION FOR COUNCIL. This was in Zone 1 but not included here, perhaps because there may be none in this zone? SHOULD COUNCIL INCLUDE "Encourage restoration of wetlands" ADDING "where they previously occurred"?*

Transition Zone:

a. Transition zone (sub-units A and C):

   i. Site-specific strategies

   ii. Depth: 10ft–40ft with consideration of erosion issues

b. Transition zone in sub-unit B is optional, but should permit educational nature trails.

Rationale

It is likely that the Protected Land within this unit will remain fairly stable with some continued accretion over the next 40 years, though this is dependent on rates of sand deposition, erosion, and sea-level rise, as

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well as the impacts of hurricanes. Continued accretion will result in an increase in maritime forest cover relative to the other communities occurring within the unit. The passive approach to management of this unit precludes the use of land cover targets. Vegetation communities should be left alone to evolve with time and the changing shoreline.

The most dramatic changes that are likely to occur within this unit will be within the early successional maritime forest. The maritime forest that exists on the inland portion of the unit is fairly young. However, change will be slow, measured in tens if not hundreds of years.

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Planning Unit #4 - East

Location

Unit #4 - East extends from the beach path extension of Station 22½ to the beach path extension of Station 29.

Preferred strategy

a. Maintain existing priority hardwoods

b. Convert manipulated shrubland to maritime grasslands with island/hammocks of maritime shrubs with natural succession permitted within islands

c. Strengthen dunes when clearing shrubs

d. Overall: Active management to reduce pests

e. Remove invasive non-native species

Transition zone

2. Depth:

a. Stations 22 ½ - 26 Seaward of Bayonne Avenue Right of Way: Maximum of 50 feet or up to the most landward dune, whichever is less.

b. Stations 26-29: 40 to 100 feet

3. Management strategy:

Preferred Strategy

a. Should be managed as maritime grassland, emulating lighthouse property similar north-south location.

b. Eliminate wax myrtles while protecting priority trees with diameter at breast height of greater than six (6) inches.

Rationale

[Same as Unit 2] The unit should consist of maritime grassland punctuated by scattered maritime shrubland islands. Approximately 50 percent of the total land cover within this unit should be composed of maritime shrubland community, surrounded by a natural mix of maritime foredune and maritime backdune grasslands. The proportion of shrubland to grassland should increase with distance from the sea and with proximity to the Fort Moultrie and School units. Shrubland islands may vary in size and shape from single shrubs/trees to ¼ acre contiguous hammocks of random shape and may be designed such that views of the ocean are maintained from inland observation points. Ocean views may be increased by placing shrubland islands within low dune swales. Over time, larger shrubland islands may begin to

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Convert manipulated shrubland to maritime grasslands with islands/hammocks of maritime shrubs, with natural succession permitted within islands (Council should clarify the "natural" succession in this unit).¶
Strengthen dunes when clearing shrubs¶
Active management to reduce pests
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develop vegetation community characteristics similar to maritime forest. This development will result in greater habitat diversity and dispersion and should not be discouraged. Naturally occurring examples of this mix of vegetation communities can be found on neighboring Dewees Island, Capers Island, and Bulls Island.

As discussed in Section 5.6 of the consultants' report, it is likely that land within this unit will continue to accrete over the next 40 years, though this is dependent on rates of sand deposition, erosion, and sea-level rise, as well as the impacts of hurricanes. Continued accretion will result in seaward expansion of vegetation. Existing maritime hardwood depression communities within the unit should be preserved to maximize habitat diversity.

Council should clarify

(a) Hardwood depression communities

(b) Maximize habitat diversity

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APPENDIX A: PRINCIPLES FOR MANAGEMENT OF THE TOWN'S ACCRETED LAND

Approved by Council on December 15, 2009

1. The Town of Sullivan's Island owns the accreted land that is protected by the deed restrictions with the Lowcountry Open Land Trust. Every Town resident and property owner has a stake in the property, regardless of the location of that individual's residence or property.

2. The accreted land is protected for its aesthetic, scientific, educational, and ecological and safety value for all residents, as noted in the deed restrictions placed on this land with the Lowcountry Open Land Trust and within the Town of Sullivan's Island Codes and Ordinances. It must be recognized that this land was placed in trust for the benefit of all Sullivan's Island residents.

3. As its owner, the Town has responsibilities to be a *good steward* of the land and a *good neighbor* to the owners of properties that abut its land. The Management Plan must benefit the long term maritime eco-system and its impact on wildlife and vegetation. The Town also recognizes that scenic views and breezes inside and outside the accreted land are valuable natural resources.

4. Steward responsibilities

a. As its owner, the Town has responsibility for management of the land.

i. Responsibility for designing and implementing a management plan rests with the Town.

ii. Management plans should be based on their impact on the land as an environmental, educational and recreational resource.

iii. The Management Plan must recognize this land is part of a bio-diverse ecological process and must consider the natural succession of vegetation in this setting. Additionally, the accreted land provides a line of defense over which hazards of storm waves can be diminished and therefore provides an important shore protection function.

iv. Responsibility for funding the management of the land rests with the Town and management decisions must be independent of the sources of funding.

b. Management or modification of the accreted land should be at the sole direction and discretion of the Town after soliciting input from all Town citizens and property owners and appropriately credentialed experts in relevant fields.

c. Since there is much diversity in the accreted land from one area to another which can change over time, defined zones or management units should be identified based upon their characteristics, and a long-term plan developed for each of them. As an example, the land from Station 16 westward and in front of Fort Moultrie, and that in front of the Town owned school property, should be allowed to evolve

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naturally, with minimal intervention except for purposes of public safety, education, and control of invasive species.

d. Current laws governing the accreted land should remain in effect until the Town has adopted, funded, and begun implementation of the management plan to a substantial extent.

5. Neighbor responsibilities

a. The Town should do what it can to respect the neighbors to the accreted land while meeting its stewardship responsibilities.

b. The Town's management plan may include a transition or edge band that abuts privately held properties that would be managed differently from, and more aggressively than, the (usually much deeper) seaward balance of the accreted land.

i. The transition/edge band should be managed to further the following objectives when appropriate:

1. Provision of a buffer from unwanted wildlife
2. Minimization of potential fire hazard
3. Enhancement of public safety
4. Enhancement of breezes
5. Enhancement of possible sight lines to the property seaward of the band

ii. Achievement of these objectives in the transition/edge band will be accomplished via different means depending on the characteristics of the accreted land including and seaward of the band. As examples:

1. Where the band has characteristics of a developing maritime forest, the undergrowth might be cleared and smaller bushes and trees that compete with more significant trees might be removed.

2. Where the seaward property is primarily myrtle fields, or currently cleared within the Town's ordinances, or partially cleared spaces, the band may be cleared or cut to provide an open field habitat, possibly with seeding of other grasses and/or wildflowers, with periodic mowing under the guidance of a landscape professional.

3. Trees that are vanguard members of a maritime forest should be spared. Trees may be pruned when it is to benefit the health of the tree.

4. Non-native, invasive species of vines, bushes, shrubs or trees should be removed.

c. Public beach paths should be maintained based on the nature of the land they traverse, whether they are used for emergency access vehicles, and existing characteristics of the paths.

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APPENDIX B: PLANNING UNITS MAP

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APPENDIX C: PLANT SPECIES

Plant Species as observed by the Coastal Science & Engineering project team in the Protected Land study area (summer 2008). (Appendix 8 in Coastal Science & Engineering Accreted Land Management Plan Final Consultant Plan dated July 2010)

Maritime Foredune Grassland

Shrub	Marsh-elder	*Iva frutescens*
Herbaceous	Sea-oats	*Uniola paniculata*
	Saltgrass	*Distchilis spicata*
	Camphorweed	*Heterotheca subaxillaris*
	Blackberry	*Rubus* sp.
	Sea side panicum	*Panicum amarum*
	Beach pea	*Strophostyles helvola*
	Fiddle-leaf morning-glory	*Ipomoea stolonifera*
	Dune sandbur	*Cenchrus tribuloides*
	Yucca	*Yucca* sp.
	Croton	*Croton glandulosus*
	Fire-wheel	*Gaillardia pulchella*
	Beach evening-primrose	*Onethera drummondii*
	Salt meadow saltgrass	*Spartina patens*

Maritime Backdune Grassland

Shrub	Earleaf green-brier	*Smilax auriculata*
	Saw green-brier	*Smilax bona-nox*
	Peppervine	*Ampelopsis arborea*
Herbaceous	Peppervine	*Ampelopsis arborea*
	Devil-joint	*Opuntia pusilla*
	Sea-oats	*Uniola paniculata*
	Camphorweed	*Heterotheca subaxillaris*
	Blackberry	*Rubus* sp.
	Seaside panicum	*Panicum amarum*
	Beach pea	*Strophostyles helvola*
	Seaside pennywort	*Hydrocotyle bonariensis*
	Dunes evening-primrose	*Onethera humifusa*
	Fire-wheel	*Gaillardia pulchella*
	Rumex	*Rumex* sp.
	Bushy bluestem	*Andropogon glomeratus*
	Earleaf green-brier	*Smilax auriculata*
	Virginia creeper	*Parthenocissus quinquefolia*
	Dogfennel	*Eupatorium capillifolium*
	Spiderwort	*Tradescantia virginiana*
	Poison ivy	*Rhus radicans*
	Indian-fig	*Opuntia ficus-indica*
	Croton	*Croton punctatus*

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Manipulated Maritime Backdune Grassland

Shrub	Earleaf green-brier	*Smilax auriculata*
	Saw green-brier	*Smilax bona-nox*
	Peppervine	*Ampelopsis arborea*
	American wisteria	*Wisteria frutescens*
	Rattlebush	*Daubentonia punicea*
	Yucca	*Yucca* sp.
	Devil-joint	*Opuntia pusilla*
Herbaceous	Blackberry	*Rubus sp.*
	Earleaf green-brier	*Smilax auriculata*
	Saw green-brier	*Smilax bona-nox*
	Camphorweed	*Heterotheca subaxillaris*
	Fire-wheel	*Gaillardia pulchella*
	Spiderwort	*Tradescantia virginiana*
	Sea-oats	*Uniola paniculata*
	Peppervine	*Ampelopsis arborea*
	Devil-joint	*Opuntia pusilla*
	Rough buttonweed	*Diodea teres*
	Eastern plantain	*Plantago lanceolata*
	Saltgrass	*Distichlis spicata*
	Croton	*Croton punctatus*
	Seaside panicum	*Panicum amururan*
	Beach evening-primrose	*Onethera drummondii*

Lawns and Pathways

Herbaceous	Frog-fruits	*Phyla nodiflora*
	Beach evening-primrose	*Onethera drummondii*
	Rabbit-tobacco	*Graphalium* sp.
	Crabgrass	*Digitaria* sp.
	Rough buttonweed	*Diodea teres*
	Toadflax	*Linaria canadensis*
	Common ragweed	*Ambrosia artemisifolia*
	Bahia grass	*Paspalum notatum*
	Seaside pennywort	*Hydrocotyle bonariensis*
	Hoary plantain	*Plantago virginica*
	Flatsedge	*Cyperus* sp.
	Aloe	*Aloe vera*
	Rabbit-tobacco	*Graphalium* sp.

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Maritime Interdunal Wetland

Shrub	Wax myrtle	*Morella cerifera*
	Groundsel tree	*Baccharis halmilifolia*
Herbaceous	Love grass	*Fimbristylis caroliniana*
	Frog-fruits	*Phyla nodiflora*
	Seaside pennywort	*Hydrocotyle bonariensis*
	Umbrella sedge	*Cyperus filicinus*
	Fingergrass	*Eustachys petraea*
	Common cattail	*Typha angustifolia*
	Saltmarsh bulrush	*Scirpus robustus*
	Saltgrass	*Distchlis spicata*
	Bushy bluestem	*Andropogon glomeratus*
	Arrow-leaf morning glory	*Ipomea saggittata*
	Aster	*Aster sp.*
	Soft rush	*Juncus effusus*
	Smartweed	*Polygonum* sp.
	Flatsedge	*Cyperus* sp.

Maritime Shrubland

Overstory	Wax myrtle	*Morella cerifera*
	Sugarberry	*Celtis laevigata*
	Chinese privet	*Ligustrum sinense*
	Chinese tallow	*Sapium sebiferum*
	Southern red cedar	*Juniperus silicicola*
	Carolina laurel cherry	*Prunus caroliniana*
	Red bay	*Persea borbonia*
	Hercules club	*Aralia spinosa*
	Shrub Wax myrtle	*Morella cerifera*
	Virginia creeper	*Parthenocissus quinquefolia*
	Peppervine	*Ampelopsis arborea*
	Poison ivy	*Rhus radicans*
	Alabama supple-jack	*Berchemia scandens*
	Arrow-leaf morning glory	*Ipomea saggittata*
	Groundsel tree	*Baccharis halimifolia*
	Sugarberry	*Celtis laevigata*
	Rattlebush	*Daubentonia punicea*
	Chinese tallow	*Sapium sebiferum*
	Southern red cedar	*Juniperus silicicola*
	Carolina laurel cherry	*Prunus caroliniana*
Herbaceous	Virginia creeper	*Parthenocissus quinquefolia*
	Blackberry	*Rubus sp.*

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	Peppervine	*Ampelopsis arborea*
	Poison ivy	*Rhus radicans*
	Smartweed	*Polygonum sp.*
	Passion-flower	*Passiflora incarnata*
	Yucca	*Yucca sp.*
	Spiderwort	*Tradescantia virginiana*
	Seaside pennywort	*Hydrocotyle bonariensis*
	Saw green brier	*Smilax bona-nox*
	Fire-wheel	*Gaillardia pulchella*
	Beach evening-primrose	*Onethera drummondii*
	Common ragweed	*Ambrosia artemisifolia*

Manipulated Maritime Shrubland

Shrub	Groundsel tree	*Baccharis halmilifolia*
	Wax myrtle	*Morella cerifera*
	Chinese tallow	*Sapium sebiferum*
	Dog fennel	*Eupatorium capillifolium*
	Seashore mallow	*Kostelezkya virginica*
	Alabama supple-jack	*Berchemia scandens*
	Peppervine	*Ampelopsis arborea*
	Virginia creeper	*Parthenocissus quinquefolia*
	Poison ivy	*Rhus radicans*
	Blackberry	*Rubus sp.*
	Rattlebush	*Daubentonia punicea*
	Saw green-brier	*Smilax bona-nox*
	Passion-flower	*Passiflora incarnata*
	Earleaf greenbrier	*Smilax auriculata*
	Devil-joint	*Opuntia pusilla*
Herbaceous	American beauty berry	*Callicarpa americana*
	Virginia creeper	*Parthenocissus quinquefolia*
	Peppervine	*Ampelopsis arborea*
	Wood-sage	*Teucrium canadense*
	Poison ivy	*Rhus radicans*
	Alabama supple-jack	*Berchemia scandens*
	Dye bedstraw	*Galium tinctorium*
	Wood-sorrell	*Oxalis* sp.
	Smartweed	*Polygonum* sp.
	Blackberry	*Rubus* sp.
	Wild potato-vine	*Ipoemea pandurata*
	Hedge bindweed	*Calystegia sepium*
	Whitetop sedge	*Dichromena latifolia*
	Seashore mallow	*Kostelezkya virginica*
	Dogfennel	*Eupatorium capillifolium*

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	Croton	*Croton punctatus*
	Camphorweed	*Heterotheca subaxillaris*
	Passion-flower	*Passiflora incarnata*
	Spiderwort	*Tradescantia virginiana*

Early Successional Maritime Forest

Overstory	Sugarberry	*Celtis laevigata*
	Wax mytrle	*Morella cerifera*
	Carolina laurel cherry	*Prunus caroliniana*
	Herculeus club	*Aralia spinosa*
	Pecan	*Carya illinoensis*
	Southern red cedar	*Juniperus silicicola*
Shrub	Wax myrtle	*Morella cerifera*
	Yaupon holly	*Ilex vomitoria*
	Carolina laurel cherry	*Prunus caroliniana*
	Southern red cedar	*Juniperus silicicola*
	Virginia creeper	*Parthenocissus quinquefolia*
	Poison ivy	*Rhus radicans*
	Japanese honeysuckle	*Lonicera japonica*
	Saw greenbrier	*Smilax bona-nox*
	Peppervine	*Ampelopsis arborea*
	Blackberry	*Rubus* sp.
	Earleaf greenbrier	*Smilax auriculata*
	Chinese privet	*Ligustrum sinense*
	Carolina willow	*Salix caroliniana*
Herbaceous	*Peppervine*	*Ampelopsis arborea*
	Poison ivy	*Rhus radicans*
	Spiderwort	*Tradescantia virginiana*
	Seaside pennywort	*Hydrocotyle bonariensis*
	Dogfennel	*Eupatorium capillifolium*
	Groundsel tree	*Baccharis halimifolia*
	Creeping cucumber	*Melothria pendula*
	Smartweed	*Polygonum* sp.
	Fireweed	*Erechtites hieracifolia*

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Maritime Hardwood Depression

Overstory	Pecan	*Carya illinoensis*
	Sugarberry	*Celtis laevigata*
	Red mulberry	*Morus rubra*
	Wax myrtle	*Morella cerifera*
	Carolina willow	*Salix caroliniana*
	Chinese tallow	*Sapium sebiferum*
	Live oak	*Quercus virginiana*
	Cabbage palmetto	*Sabal palmetto*
Shrub		
	Wax myrtle	*Morella cerifera*
	Yaupon holly	*Ilex vomitoria*
	Carolina laurel cherry	*Prunus caroliniana*
	Oak	*Quercus sp.*
	Pecan	*Carya illinoensis*
	Roundleaf green-brier	*Smilax rotundifolia*
	Saw green-brier	*Smilax bona-nox*
	Sugarberry	*Celtis laevigata*
	Groundsel tree	*Baccharis halmifolia*
	Chinese tallow	*Sapium sebiferum*
	Red mulberry	*Morus rubra*
	American beauty berry	*Callicarpa americana*
	Peppervine	*Ampelopsis arborea*
	Hedge bindweed	*Calystegia sepium*
	Southern red cedar	*Juniperus silicicola*
	Rattlebush	*Daubentonia punicea*
	Virginia creeper	*Parthenocissus quinquefolia*
	Dogfennel	*Eupatorium capillifolium*
	Chinese privet	*Ligustrum sinense*
	American wisteria	*Wisteria frutescens*
	Seashore mallow	*Kostelezkya virginica*
Herbaceous		
	Sugarberry	*Celtis laevigata*
	Carolina laurel cherry	*Prunus caroliniana*
	Roundleaf green-brier	*Smilax rotundifolia*
	Virginia creeper	*Parthenocissus quinquefolia*
	Blackberry	*Rubus* sp.
	Poison ivy	*Rhus radicans*
	Spiderwort	*Tradescantia virginiana*
	Hedge bindweed	*Calystegia sepium*
	Seaside pennywort	*Hydrocotyle bonariensis*
	Fireweed	*Erechtites hieracifolia*

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Vetch	*Vicia* sp.
Golden rod	*Solidago* sp.
St. John's wort	*Triadenum* sp.
Creeping cucumber	*Melothria pendula*
Arrow-leaf morning-glory	*Ipomea sagittata*
Japanese honeysuckle	*Lonicera japonica*
Passion-flower	*Passiflora incarnata*
Smartweed	*Polygonum* sp.

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APPENDIX D: BIRD SPECIES

Bird species as observed in the AL study area between May and October 2008 by Sabine & Waters and Jeff Mollenhauer (Audubon South Carolina)

(Appendix 9 in Coastal Science & Engineering Accreted Land Management Plan Final Consultant Plan dated July 2010)

Beach	Manipulated Areas	Maritime Forest	Dune Grassland
Black Tern	American Redstart	American Redstart	Blue Jay
Brown Pelican	Barn Swallow	Barn Swallow	Blue-gray Gnatcatcher
Caspian Tern	Blue Jay	Blue Jay	Boat-tailed Grackle
Forster's Tern	Boat-tailed Grackle	Blue-gray Gnatcatcher	Bololink
Great Black-Backed Gull	Brown Thrasher	Boat-tailed Grackle	Chimney Swift
Green Heron	Brown-headed Cowbird	Brown Pelican	Common Grackle
Herring Gull	Carolina Wren	Brown Thrasher	Common Ground-Dove
House Sparrow	Chimney Swift	Brown-headed Cowbird	Common Yellow-throat
Laughing Gull	Common Ground-Dove	Carolina Wren	Eurasian Collared Dove
Least Tern	Common Yellow-throat	Chimney Swift	House Finch
Merlin	Copper's Hawk	Common Ground-Dove	Laughing Gull
Osprey	Eurasian Collared Dove	Common Yellow-throat	Mourning Dove
Purple Martin	European Starling	Crow spp.	Northern Cardinal
Red Knot	Gray Catbird	Double-crested Cormorant	Prairie Warbler
Ring-billed Gull	Great-crested Flycatcher	Downy Woodpecker	Red-belllied Woodpecker
Royal Tern	House Finch	Eurasian Collared Dove	Royal Tern
Ruddy Turnstone	Laughing Gull	European Starling	
Sanderling	Mourning Dove	Gray Catbird	
Sandwich Tern	Northern Cardinal	Great-crested Flycatcher	
Semipalmated Sandpiper	Northern Mockingbird	Green Heron	
Willet	Northern Parula	House Finch	
Wilson's Plover	Painted Bunting	Laughing Gull	
	Rock Dove	Merlin	
	Royal Tern	Mourning Dove	
	Yellow-billed Cuckoo	Northern Cardinal	
		Northern Flicker	
		Northern Mockingbird	
		Orchard Oriole	
		Osprey	
		Painted Bunting	
		Prairie Warbler	
		Purple Martin	
		Red-eyed Vireo	
		Royal Tern	
		Short-billed Dowitcher	
		White-eyed Vireo	
		Yellow-billed Cuckoo	

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APPENDIX E: INVASIVE SPECIES

(Appendix 5 from Coastal Science & Engineering Accreted Land Management Plan Final Consultant Plan dated July 2010)

Chinese Tallow Tree

Chinese tallow tree or popcorn tree (*Sapium sebiferum*) was introduced in the late 1700s for vegetable tallow production from the waxy seed coating, possibly as an alternative to expensive whale blubber for lamp fuel and candle tallow. In the early 1900s, extensive plantations were established along the Gulf coastal plain in support of a soap-making industry based on the vegetable tallow derived from the tallow tree. The kernels also produce a drying oil, Stillingia oil, which can be used in machine oils, lighting fuels, and varnishes and paints. The oil is considered poisonous and has been proven toxic to cattle. The tree produces heavy seed crops, and oil in the seed averages 20 percent by weight. The species later became popular for its brilliant fall foliage and quick shade, and was planted extensively across the Gulf coastal plain in suburban housing developments (Louisiana Invasive Plant Species: *Tridica sebifera*: (L.) Small).

Observed in the AL area, associated with maritime forest and Carolina willow woodland.

Management

Mechanical Control: Cutting of horizontal shoots result in the immediate production of small independent plants, making this method impractical unless combined with herbicide use (see below). Fire can hold the tallow at bay when tree density is low, but since tallow can suppress fuel species, fire can burn up to a stand but then go out from lack of fuel, leaving the tallow relatively unharmed. Fire control is still under research.

Biological Control: The plant apparently lacks serious biocontrols or pathogens in the United States, although a bagworm (*Eumeta* sp) from Japan appears to be a pest.

Chemical Control: Attempts at managing Chinese tallow suggest that herbicidal methods are the most effective option for control at this time. Basal bark applications are made by applying herbicide directly to the bark around the circumference of the tree from ground level up to 15 inches above the ground. Hand-held equipment (paint brush) or backpack sprayer is usually used for this application. For trees that have stems less than 6 inches in basal diameter, apply up to a 5 percent triclopyr (Garlon 4) solution mixed with spray adjuvant oil. Trees exceeding 6 inches in basal diameter can be successfully controlled with a 15-20 percent triclopyr/oil solution. Old or rough bark requires more spray than smooth young bark (Jubinsky 2002).

To control resprouting of freshly cut stumps, a 20 percent solution of triclopyr will provide control. Spray the root collar area, sides of the stump, and the outer portion of the cut surface including the cambium until thoroughly wet. No more than one-half hour should elapse between cutting and applying herbicide (Jubinsky 2002). The best time to initiate herbicidal control measures on Chinese tallow is during the spring months. During this time, either the cut stump or basal bark treatment is effective. During a normal weather year, trees begin producing seed in late August or early September. Use of the cut stump treatment during periods of the year when seeds are present is not recommended. During autumn months, restrict control measures to the basil bark method only (Jubinsky 2002).

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Cattails

Cattails (*Typha latifolia*) are prolific plants that play an important role as a source of food and shelter for different marsh-dwelling animals. They can be found in damp soil or shallow water where sufficient nutrients are available. However, they can quickly dominate a wetland plant community. A 50:50 ratio of open water and vegetation is a frequent objective when managing cattail marshes in North America (Fredrickson and Reid 1987).

Observed in the AL area, associated with interdunal wetlands.

Management

Mechanical Control: The control of cattails by the manipulation of water level must be timed to the annual cycle of carbohydrate storage. Special leaf and stem cells called aerenchyma provide air passage from both living and dead leaves to the rhizomes. Removing dead leaves and submerging the shoots in early spring will strain the plant and eventually kill it. The depth of water necessary to kill the plants depends on temperature, the quantity of starch the plant stored the previous year, and the general vigor of the plants. Therefore, no minimum water depth can be prescribed, but generally, a water level maintained at 3-4 feet above the tops of existing spring shoots will retard growth. The use of water is most efficient if the water level is raised progressively, so that all plant parts remain submerged by no less than a few inches (Fredrickson and Reid 1987).

Cutting, crushing, shearing, and disking during the growing season can be used to impede starch storage. These treatments are effective if performed during a three-week window from one week before to one week after the pistillate spike is lime green and the staminate spike is dark green. However, the treatments are most effective during the 3-4 days when the spikes are so colored (Fredrickson and Reid 1987).

Deep disking can retard shoot formation and can damage the rhizomes, but the effect on plant survival is variable. The overall effect on the entire stand is minimal if water conditions are favorable for cattail survival. Control of water levels and of recruitment from the seed bank is necessary to prevent reestablishment of the cattails. Deep disking combined with continued drying and freezing in fall decreases plant survival. If the wetland can be kept sufficiently dry to repetitively disk in any two to three successive seasons, cattails can be eliminated or their stem densities severely reduced (Fredrickson and Reid 1987).

When the plants are dormant, cutting, crushing, shearing, or disking is extremely effective for severing the aerenchyma link between the rhizomes and the leaves. To reduce plant survival, however, these techniques must be combined with high water levels in spring to induce stress from anaerobic starch conversion (Fredrickson and Reid 1987).

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Burning cattails is difficult during the growing season, except during extreme low-water conditions. Dry residual cattail litter provides enough fuel to carry a fire through growing plants. The fire usually does not kill the plants but can reduce starch storage. Fires in cattail marshes rarely are hot enough at ground level for heat penetration to impede rhizome function or shoot viability (Fredrickson and Reid 1987).

Most cattail marshes must be burned in winter or before significant growth has occurred in spring when fuels are dry enough to carry a fire. However, frozen or saturated soils can hamper the progress of the fire through cattail duff. When combined with high water levels in spring to smother the residual stalks, fire can be used to control cattails (Fredrickson and Reid 1987).

In wetlands with well-developed peat soils, fires during drought conditions can destroy the entire cattail plant including the rhizomes. Such fires actually burn the peat, and the ability to smother the fire by reflooding the marsh must exist before prescribing such fires. Peat fires can also eliminate the existing seed bank and, if sufficiently severe, lower the relative bottom of a marsh. Local concern with the effects of peat fires on air quality can be substantial (Fredrickson and Reid 1987).

Biological Control: There is currently no good choice to achieve biological control of cattails. Grass carp are often mentioned as a potential control method, but in reality, they prefer not to eat cattails (Lynch 2002).
Chemical Control: Herbicides, especially glyphosate, interrupt metabolic pathways and have been used successfully to kill cattails. Herbicides that are translocated to the rhizomes are most effective for cattail control. Application in mid to late summer when carbohydrates are stored enhances the effectiveness of translocated herbicides. Therefore, herbicides have little effect on seed production during the year of application. As with other techniques, the duration of the effect of herbicides depends on subsequent water-level control and recruitment from the seed bank (Fredrickson and Reid 1987).

Sesbania

Sesbania (*Sesbania exaltata*) is an erect annual herb of the legume family, which typically grows to a height of 3–10 ft. Sesbania prefers wet, highly disturbed habitats and sandy sites. It occurs in low sandy fields, sandbars of streams, alluvial ground along sloughs and borders of oxbow lakes, and along roadsides, railroads, in disturbed urban sites and agricultural areas. It may become a troublesome exotic species in wetland communities that are managed for waterfowl (Vegetation Management Guideline Sesbania 2001)

Observed in the AL area.

Management

Control of sesbania is best accomplished by creating conditions favorable for the germination of beneficial plants early in the growing season. Once established, beneficial plants can outcompete newly germinated sesbania. Therefore, control strategies should be performed early in the growing season. If early control is not possible, late disk-flood often prevents reestablishment of sesbania and creates conditions favorable for fall migrating shorebirds. This can be followed by an early drawdown during the subsequent growing season (Vegetation Management Guideline Sesbania 2001).

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Mechanical Control: Spot treatment can best be accomplished by removal of the stems prior to the production of fruits. Follow-up will probably be necessary for several additional growing seasons if a seed bank is present or if reinfestation occurs (Vegetation Management Guideline Sesbania 2001).

Mowing should occur prior to seed set if possible. Mow as high as possible to preserve and promote growth of desirable plants in the understory. Burning appears to stimulate germination. Biological Control: An isolate of the fungal pathogen *Colletotrichum truncatum* was discovered on the Southern Weed Science Laboratory Experimental Research Farm and has been evaluated over the past several years for use as a bioherbicide against this weed. Various invert and vegetable oil emulsion formulations developed in this laboratory eliminated or greatly reduced free moisture requirements, and have consistently provided 85–95 percent control of weeds in field trials (Boyette et al 2003).

Chemical Control: Various herbicides have proved to be effective in controlling sesbania. One such method includes spraying 2,4-D with a boom sprayer at the rate of three/quarter pint per acre. The plants can also be wicked with Roundup or Rodeo (Vegetation Management Guideline Sesbania 2001).

Another chemical that has had success is propanil or Stam. The Stam 3+3 method (Stam is used twice at three quarts per acre) seems to work best. Blazer is another herbicide that works well against sesbania. Grandstand is a good, low-cost broad-leaf herbicide. It works best tank-mixed with about a quart of Stam (Kendig 2003).

Two herbicides registered for use will help manage broadleaf weeds and sedges. Research indicates that Permit has the potential to injure rice when applied pre-emergence. Therefore, Permit applications should be limited to postemergence. The control of sesbania taller than 8 inches or after permanent flood has been inconsistent. (Williams et al 2001).

Regiment belongs to the sulfonylurea herbicide family, which includes Londax. Regiment is slow-acting and usually takes two to three weeks to kill weeds. However, Regiment stops weed growth within a few hours of application. Because of injury potential, Regiment application to rice before the three-leaf stage is not recommended. Another strength is its ability to control alligator weed when tank-mixed with Aim (Williams et al 2001).

Chinese Privet

Chinese Privet (*Ligustrum sinense*) was introduced from China in the 1800s. It is a semi-evergreen shrub growing to 30 ft in height. Leaves are opposite in two rows and at right angles to the stem. Panicles of white flowers open from April through June followed by ovoid drupes formed as pale green and ripening to dark purple, almost black in late fall. The trunks of these shrubs usually branch near the ground and have a smooth gray appearance. Privet is shade-tolerant and forms dense thickets in bottomlands and along boundary lines. Reproduction is by root sprouts as well as seed which are spread abundantly by birds and other animals. Very few plants can grow under the dense vegetation of these shrubs (Cook 2005).
Observed in the AL area, associated with the maritime forest.

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Management

The most important aspect of controlling privet is managing sprouting that often occurs subsequent to initial control. Control methods that remove or damage aboveground stems, such as mechanical cutting or prescribed burning, will likely cause sprouting. Subsequent monitoring and repeated treatments may be necessary to eliminate sprouting stems.

Mechanical Control: Seedlings can be removed by hand-pulling. When hand-pulling seedlings, the entire root system must be extracted to prevent sprouting. Established seedlings become increasingly difficult to hand-pull because of a strong root system. Mowing or cutting can reduce the spread of privet by preventing seed production. Repeated cutting may eventually eradicate privet. Cutting close to ground level and applying herbicides to the cut stumps may control larger stems (see below). Cutting stems without accompanying herbicide treatment will likely promote growth from sprouting. Even with repeated follow-up cutting, mechanical control alone may be difficult. Effectiveness of prescribed fire to control privet may vary. Fire can kill aboveground portions of Chinese privet. Due to the ability of privet to sprout following damage from fire, persistent annual burning will likely be required for local eradication (Miller 2005).

Biological Control: There are currently no biological controls for Chinese privet.

Chemical Control: Painting cut stumps with herbicides can often effectively control invasive privet. Areas where this method may be particularly desirable include sparse infestations of large stems, places where stems are concentrated, such as fence lines, or habitats where the presence of desirable native species precludes foliar application. Foliar spraying can also be effective, particularly for dense populations. Apply a glyphosate herbicide solution or Arsenal AC solution in water with a surfactant to thoroughly wet all leaves in August to December. For stems too tall for foliar sprays, apply Garlon 4 as a solution in commercially available basal oil, diesel fuel, or kerosene with a penetrant (check with herbicide distributor) to young bark as a basal spray. Alternatively, cut large stems and immediately treat stumps with Arsenal AC, or Velpar L as solutions in water with a surfactant. When safety to surrounding vegetation is a concern, immediately treat stumps and cut stems with a glyphosate herbicide or Garlon 3A as solutions in water with a surfactant (Miller 2005).

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Autumn Olive

Autumn olive (*Eleagnus umbellata*) was introduced from China and Japan in 1830 and was widely planted for wildlife habitat improvement. This deciduous bush grows up to 20 ft in height, has silver undersides and produces red berries in the fall. Autumn olive prefers dryer sites and is a shade-tolerant species which forms dense stands that grow at the expense of other species (Miller 2004).

Observed in the AL area, adjacent to residences.

Management

The most effective control against autumn olive is early detection and detection by annually monitoring for small plants and hand-pulling to prevent seed production. Cutting and burning stimulate sprouting. Repeated cutting over several consecutive years will reduce plant vigor and may prevent spread. The combination of cutting and the use of herbicide are the most effect means of control.

Mechanical Control: Seedlings and small plants should be hand-pulled when the soil is moist. Be sure to remove the entire plant including the roots since new plants can sprout from the root fragments. It is difficult to pull the entire root system. Larger plants should be cut off from the main stem and treated with herbicide.

Biological Control: Currently, there are no known biological control methods (Rhoads and Block 2002).

Chemical Control: Apply Arsenal AC or Vanquish as solutions in water with a surfactant to thoroughly wet all leaves in April to October (can damage trees with roots in area). For stems too tall for foliar sprays, apply a solution of Garlon 4 in commercially available basal oil, diesel fuel, or kerosene with a penetrant (check with herbicide distributor) to young bark completely around the trunk up to 16 inches above the ground. Or, cut large stems and immediately treat stumps with a solution of a glyphosate herbicide (safe to surrounding trees) or Arsenal AC or Chopper (both will damage trees with roots in treated zone) in water with a surfactant (Miller 2002).

Multiflora Rose

Multiflora rose (*Rosa multiflora*) was introduced from Asia and planted as an ornamental, as living fences for livestock containment, and for wildlife habitat. Multiflora rose is a deciduous climbing, arching, and or trailing shrub that grows 10 ft tall. Distinguishing features are the clustered white flowers with yellow anthers, pinnately compound leaves, sharp thorns and red rose hips in the fall. This species spreads by root stems, sprouts, and seed dispersal by animals. Thickets of multiflora rose forms small and large infestations which often climb trees, exclude other desired plants, and hinder site management (Miller 2004).

Management

Young plants may be pulled by hand. Mature plants can be controlled through frequent, repeated cutting or mowing. Several contact and systemic herbicides are also effective in controlling multiflora rose. Follow-up treatments are likely to be needed. Two naturally occurring biological controls affect multiflora rose to some extent: a native fungal pathogen (rose-rosette disease) that is spread by a tiny native mite and a non-native seed-infesting wasp, the European rose chalcid. Native alternatives to Multiflora rose include common blackberry (*Rubus allegheniensis*), swamp rose (*Rosa palustris*), flowering raspberry (*Rubus odoratus*), and pasture rose (*Rosa carolina*) (USFWS 2004).

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Mechanical Control: Mechanical and chemical methods are currently the most widely used methods for managing multiflora rose. Frequent, repeated cutting or mowing at the rate of three to six times a year per growing season for two to four years has proven effective at achieving mortality of multiflora rose. In high-quantity natural communities, cutting of individual stems plants is preferred to mowing to minimize site disturbance.

Biological Control: Biological control is not yet available for the management of multiflora rose. However, researchers are investigating several options, including a native viral pathogen (rose-rosette disease), which is spread by a very tiny mite and a seed-infesting wasp, the European rose chalcid. An important drawback to the roserosette fungus and the European rose chalcid is their potential impact to other rose species and cultivators.

Chemical Control: Various herbicides have been used successfully in controlling multiflora rose but, because of the long-lived stores of seeds in the soil, follow-up treatments are usually necessary. Application of systemic herbicides (eg – glyphospate) to freshly cut stumps may be the most effective methods, especially if conducted late in the growing season. Plant growth regulators may be used to control the spread of multiflora rose by preventing fruit set (Bergman 2007).

Japanese Honeysuckle

Japanese honeysuckle (*Lonicera japonica*) was introduced from Japan in the 1800s and planted as an ornamental and a deer browse. It is the most commonly occurring invasive plant in the southeastern United States. Japanese honeysuckle is a semievergreen woody vine with opposite branches and leaves. It is a high climbing vine that can trail up to 80 ft. The fragrant, stalked flowers are in bloom from April to August. Fruits and seeds are produced from June to March in the form of nearly spherical green berries, which turn black as they ripen (Miller 2005).

Observed in the AL area, associated with the maritime forest, Carolina willow woodland, and max-myrtle saturated shrubland.

Management

Japanese honeysuckle produces long vegetative runners that develop roots where stem and leaf junctions come in contact with moist soil. Underground stems help establish and spread the plant locally. Long-distance dispersal is by birds and other wildlife that readily consume the fruits. Several effective methods of control are available for Japanese honeysuckle, including chemical and nonchemical, depending on the extent of the infestation and available time and labor.

Mechanical Control: Repeated pulling of the entire vine and root system may be effective for small patches. Monitor frequently and remove any new plants. Cut and remove any twining vines to prevent them from girdling and killing shrubs and other plants. Mowing large patches may be useful if repeated regularly but is most effective when combined with herbicide application. Mow at twice a year, first in mid-July and again in

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mid-September. Burning removes aboveground vegetation but does not kill the underground rhizomes, which will continue to sprout.

Biological Control: No biological control agents are currently available for Japanese honeysuckle.

Chemical Control: In moderate cold climates, Japanese honeysuckle leaves continue to photosynthesize long after most other plants have lost their leaves. This allows for application of herbicides when many native species are dormant. However, for effective control with herbicides, healthy green leaves must be present at application time and temperatures must be sufficient for plant activity. Several systemic herbicides (eg – glyphosate and triclopyr) move through the plant to the roots when applied to the leaves or stems and have been used effectively on Japanese honeysuckle. Follow the label guidelines (Bravo 2006).

Kudzu

Kudzu (*Pueraria montana*) was introduced into the United States in 1876 at the Philadelphia Centennial Exposition, where it was promoted as a forage crop and an ornamental plant. It is a deciduous woody leguminous vine that grows 30–100 ft long. Distinguishing features include three-leaflet leaves, yellow-green stems with erect golden hairs, lavender pea-like flowers, and hairy flattened seedpods. Colonization is by vines rooting at nodes and by wind, animal, and water-dispersed seeds. Seed viability is generally low. Kudzu grows rapidly, forming dense mats of vegetation that overwhelm all other plant species including tall trees. Kudzu requires direct sunlight for rapid growth.

Management

With a large root system packed with starch and aggressive growth habit, eradication of kudzu requires persistent treatment. Several strategies can be employed to eradicate kudzu, including herbicides, prescribed burning, mowing, and livestock grazing. When selecting control strategy consider restraints, which may prevent broadcast applications of herbicides, use of tractors to spray, or mow, and the presence of desirable vegetation in the patch. Because kudzu can reach depths of four feet or greater, the thick mat of vines and leaves can hide gullies, ditches, logs, wells and other hazards. Carefully check the site after a prescribed burn, or in winter or early spring when the leaves have fallen to determine if obstacles to application exist.

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Mechanical Control: Repeated mowing can weaken and ultimately control kudzu. Mowing is generally a good first step towards control, provided it can be done without risk to the tractor operator. Close mowing reduces the tangle of leaves and vines and treatment of re-growth is more easily accomplished. Thick mats of vines are often difficult to mow with light-duty rotary mowers. Flail mowers with horizontal blades cutting in a chopping action may operate more effectively.

Using kudzu as forage for cattle and other livestock was an early promotion with its introduction into the U.S. Kudzu hay has excellent nutritional value and is palatable to livestock. To control kudzu by grazing, it is necessary to adequately fence the entire patch and to provide sufficient additional grazing areas on which to rotate livestock as the kudzu is grazed down. Only by repeatedly grazing the re-growth over successive growing seasons will the root reserves of starch be depleted.

Prescribed fire can be used to consume vines and leaves to permit inspection of the site and to determine the size and density of the kudzu root crowns. Burning should occur in the winter or early spring. Using spring-burns limits exposure of bare soil to winter rains, minimizing soil erosion on steep slopes. Prescribed burning is useful in promoting seed germination prior to herbicide treatment (Moorhead and Johnson 2005).

Biological Control: Efforts are being organized by the U.S. Forest Service to begin a search for biological control agents for kudzu.

Chemical Control: Apply foliar sprays of Tordon 101 as a solution in water or Tordon K as a solution in water with a surfactant to wet foliage until run-off in July to October for successive years (Tordon herbicides are restricted-use pesticides). Spray foliage of climbing vines as high as possible. When using Tordon herbicides, rainfall must occur within six days after application for needed soil activation. The soil activity of Tordon herbicides can kill or damage plants having roots within the treated area. Other options provide partial control and may be useful in specific situations. Apply Escort in water to foliage from July to September. For areas where minimal injury to other plants is desired, apply Transline as a solution in water with a surfactant to thoroughly wet all leaves and stems in July to September. A glyphosate herbicide or Garlon 4 as solutions in water with a surfactant can be used during the growing season with repeated applications. Follow product application instructions (Miller 2002).

Wisteria (Chinese and Japanese)

Wisteria (*Wisteria sinensis* and *W. floribunda*) was introduced from Asia in the early 1800s as an ornamental. Both varieties of wisteria were used on porches across the south. The climbing woody vines can reach up to 70 ft long. They are deciduous vines with showy fragrant lavender pea-like flowers in the spring. The leaves are alternate and pinnately compound. Wisteria spreads by rooting at nodes and water-dispersal of seeds that form in large, velvety leguminous pods. Wisteria forms dense growth capable of killing trees and excluding other plant species.

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Observed in the AL area, associated with the maritime forest.

Management

The only practical methods currently available for control of exotic wisterias are mechanical and chemical. Cut climbing or trailing vines as close to the root collar as possible. This technique, while labor intensive, is feasible for small populations, as a pretreatment for large impenetrable infestations, or for areas where herbicide use is not desirable. Wisteria will continue to re-sprout after cutting until its root stores are exhausted. For this reason, cutting should begin early in the growing season and, if possible, sprouts cut every few weeks until autumn. Cutting will stop the growth of existing vines and prevent seed production. However, cut vines left coiled around trunks may eventually girdle trees and shrubs as they continue to grow and increase in girth. For this reason, the vines should be removed entirely or at least cut periodically along their length.

Mechanical Control: Grubbing, removal of entire plants from the roots up, is appropriate for small initial populations or environmentally sensitive areas where herbicides cannot be used. Using a pulaski, weed wrench, or similar digging tool, remove the entire plant, including all roots and runners. Juvenile plants can be hand-pulled depending on soil conditions and root development. Any portions of the root system not removed may re-sprout. All plant parts (including mature fruit) should be bagged and disposed of in a trash dumpster to prevent re-establishment (Remaley 2006).

Biological Control: No biological control agents are currently available for wisteria.

Chemical Control: Apply Tordon 101, Tordon K, or Garlon 4 as solutions in water with a surfactant to thoroughly wet foliage until run-off in July to October for successive years (Tordon herbicides are Restricted Use Pesticides). Spray foliage of climbing vines as high as possible. When using Tordon herbicides, rainfall must occur within 6 days after application for needed soil activation. The soil activity of Tordon herbicides can kill or damage plants having roots within the treated area. Other options provide partial control and may be useful in specific situations. For areas where minimal injury to other plants is desired, apply Transline as a solution in water to thoroughly wet all leaves and stems in July to August. Apply a glyphosate herbicide as a solution in water with surfactant to wet all leaves in September to October with repeated applications (Miller 2002).

Common Reed

Common reed (*Phragmites australis*) is a tall grass that inhabits wet areas like brackish and freshwater marshes, riverbanks, lakeshores, ditches and dredge spoil areas. Native and introduced forms of Phragmites occur in the United States. Researchers believe that introduced European forms are the aggressive invasive that have replaced much of our native reed. Common reed threatens by displacing native plants and forming monocultures in otherwise biologically diverse natural wetlands. It spreads by seed and strong vegetative growth and is very difficult to control once established.

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Management

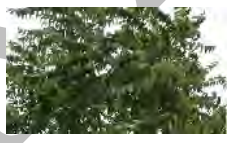
Control of Phragmites is difficult, time-consuming, labor intensive and costly. Cutting, burning and chemical herbicides are all used to control it under various circumstances. Researchers have recently begun investigating the potential for biological control of this plant.

Mechanical Control: This type of control (e.g., repeated mowing) may be effective at slowing the spread of established stands but is unlikely to kill the plant. Excavation of sediments may also be effective at control but if small fragments of root are left in the soil, they may lead to reestablishment. Prescribed burning after the plant has flowered, either alone or in combination with herbicide treatment, may also be effective. Burning after herbicide treatment also reduces standing dead stem and litter biomass, which may help to encourage germination of native plants in the following growing season. Plants should not be burned in the spring or summer before flowering as this may stimulate growth.

Biological Control: At this time no means of biological control are available in the United States for treating Phragmites infestations.

Chemical Control: Glyphosate-based herbicides (e.g., Rodeo®) are the most effective control method for established populations. S. C. Department of Natural Resources has also reported good success with Habitat®. If a population can be controlled soon after it has established chances of success are much higher because the below-ground rhizome network will not be as extensive. Herbicides are best applied in late summer/early fall after the plant has flowered either as a cut stump treatment or as a foliar spray. It is often necessary to do repeated treatments for several years to prevent any surviving rhizomes from re-sprouting. When applying herbicides in or around water or wetlands, be sure to use products labeled for that purpose to avoid harm to aquatic organisms. (Saltonstall 2008)

Tree of Heaven



Tree of heaven (*Ailanthus altissima*) was introduced from Europe as an ornamental. It is a rapid growing deciduous tree, which reaches 80 feet tall, and 6 feet in diameter and forms thickets and dense stands. It tolerates dense shade and flooding. Leaves are alternate and pinnately compound. The tree flowers April to June in long clusters, some measuring 20 inches, of greenish flowers. Persistent clusters of wing-shaped fruit can be seen on the female trees through the winter into February. Ailanthus spreads by root sprouts and wind and water born seed.

Management

Because of the high seed germination rate and the vegetative reproduction, ailanthus is difficult to irradicate and requires persistent monitoring and treatment to control this species. Most effective control is usually accomplished through the use of herbicides.

Mechanical Control: Cutting or pulling stem and vegetation will usually respond by resprouting multiple suckers from stumps and broken roots. Entire plants must be removed leaving no parts of the root or root

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fragments. If mechanical control is attempted targeting female trees decreases the reproduction rate. Choosing to remove the plants when soil is moist and early in the growing season may produce the best mechanical result.

Biological Control: Several fungal pathogens (*Verticillium dahliae* and *Fusarium oxysporum*) have been found in dying ailanthus. These may hold some potential for development of a biological control (Swearingen 2006).

Chemical Control: For larger trees the most effective method of control can be achieved through the careful use the of herbicides Garlon 3A or Arsenal AC with stem injection. Small trees, 6 inches or less can be treated with a basal spray of Garlon 4 or Pathfinder II at recommended dilution in a wide band around the circumference of the tree. For small trees and shrubs foliar spray can be applied July through October using Arsenal AC, Krenite S or Garlon 4 as the chemical company prescribes. Thorough wetting of the foliage is the most effective control in situations were application can be accomplished without unacceptable contact with nearby ornamental shrubs and trees (Swearingen 2006).

Alligator weed

Alligator weed (*Alternanthera philoxeroides*) is a perennial herb introduced from South America. It is one of the most difficult aquatic weeds to control. It grows in a wide range of soil and water conditions. It may be found free-floating, loosely attached, rooted, immersed, or in a dry field. It generally grows as a mat of interwoven plants. The leaves are glossy, lance-shaped, 2-5 inches long, and have a distinct midrib. The leaves are opposite and the flowers white.

Management

Mechanical Control: Successful mechanical/physical removal of this plant is extremely difficult since the plant is able to re-establish from very small pieces**.**

Biological Control: Biological control efforts using insect predators brought from the plant's native region have been successful in the south. Two insects that have been established are the flea beetle (*Agasicles hygrophhila*) and the stem-boring moth (*Vogtia malloi*).

Chemical Control: Alligator weed grows in different situations, each requiring particular herbicide controls. Various herbicides have proven to be successful. Glyphosate herbicides are recommended because they are biodegradable. However, glyphosate is a nonselective systemic herbicide that affects all green vegetation (Invasive Alien Plant Species of Virginia, Alligator weed). Brushoff is another herbicide suggested for terrestrial plants only (SQDNRM 2001).

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Water Hyacinth

Water hyacinth (*Eichhornia crassipes*) is a member of the pickerelweed family (Pontedericeae). The plants vary in size from a few centimeters to over a meter in height. Water hyacinth can form dense mats that interfere with navigation, recreation, irrigation, and power generation. These mats competitively exclude native submersed and floating-leaved plants, create low oxygen conditions beneath the mats, impede water flow, and create good breeding conditions for mosquitoes (Ramey 2005).

Management

Mechanical Control: Mechanical controls such as harvesting have been used in such states as Florida for many years but are ineffective for large scale control, very expensive, and can't keep pace with the rapid plant growth in large water systems (Ramey 2005).

Biological Control: Scientists believe that the best bet for a long-term solution is to introduce one or more natural enemies as biological controls. In the 1970s, two South American weevils (*Neochetina bruchi* and *N. eichorniae*) and the water-hyacinth borer (*Sameodes albiguttalis*) were released in the United States. These and other organisms are being deployed in more than 20 other countries, including Australia, Cuba, Egypt, Honduras, Indonesia, Malaysia, Mexico, Panama, South Africa, Thailand, Vietnam, and Zimbabwe. There have been many successes, but results have been variable and the weed continues to cause problems (Cordo and Center 2000).

Chemical Control: The success of herbicidal control measures has varied in effectiveness. This method of control seems to work better in controlling small infestations accessible by land or boat. The herbicides most commonly used have been 2,4-D and Glyphosate. Many plants, both aquatic and terrestrial, are susceptible to the herbicides registered for water hyacinth control, so care must be taken when applying the chemical. Instructions on application methods should be read and understood before using the chemical (Dyason 1999).

American Lotus

American Lotus (*Nelumbo lutea*) can be found in muddy, shallow waters such as lake margins or in water as deep as six feet. Its leaves may be emergent above the water or floating on it. The flowers are yellow and extremely large (typically six inches wide). American lotus leaves are circular, and do not have a "cut", as do water lily leaves.

Management

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Mechanical Control: Repeated cutting of leaves has been effective in controlling American lotus. Cutting should begin before the first flower buds open in June. Care should be taken to remove the majority of the cut leaves to avoid depleting the water of oxygen as they decay (Missouri Department of Conservation 1999).

Exposing sediments to prolonged freezing and drying during the months of December, January, and February can be effective in controlling certain aquatic plants, if exposure lasts 2-4 weeks. Drain no more water than necessary to expose the unwanted plants and always leave at least eight feet of water in the deepest part of the pond to reduce the chance of a winter fish kill (Missouri Department of Conservation 1999).

Biological Control: Grass carp do not effectively control American lotus. The waxy coating (cuticle) and thick, fibrous stems of these plants make them difficult for grass carp to eat (Missouri Department of Conservation 1999).

Chemical Control: RODEO (Glyphosate) is labeled by its manufacturer, Monsanto, for use on American lotus. Refer to the product label for specific instructions. For best results, apply herbicides in early spring and early summer, when plants are growing rapidly (Missouri Department of Conservation 1999).

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