Section 300.18
Submerged Aquatic Vegetation and Aquatic Habitats of Particular Concern

A. Definitions

1. Submerged Aquatic Vegetation (SAV) refers to rooted, vascular, flowering plants that, except for some flowering structures, live and grow below the water surface in coastal and estuarine waters in large meadows or small disjunct beds. SAV species of concern to CRMC for regulatory purposes include eelgrass (*Zostera marina*) and widgeon grass (*Ruppia maritima*), with eelgrass as the dominant SAV in Rhode Island waters.

2. Eelgrass is a marine vascular plant capable of both vegetative and sexual growth. Eelgrass can occur in salinity ranges averaging 5-36 (PSU) practical salinity units and depths of less than one meter to six (6)meters in Rhode Island waters at MLW, depending on water clarity.

3. Widgeon grass is a rooted, submerged aquatic plant which is capable of both vegetative and sexual growth. Widgeon grass exists primarily in saline and brackish waters, salt ponds and pools within salt marshes, and inland saline waters. Widgeon grass is an important source of food for waterfowl and provides shelter and nursery habitat for fish and shellfish. (*See* Stuckey, I. H. and Lisa Lofland Gould, Coastal Plants from Cape Cod to Cape Canaveral. 2001).

4. SAV habitat is the sediment and water column, and the physical, chemical and biological processes that are necessary to support SAV. SAV habitat occurs in continuously vegetated beds and in intermittent vegetated beds, including unvegetated areas between vegetated beds.

B. Findings

1. Eelgrass roots and rhizomes inhabit sediments ranging from soft mud to coarse sand and exist in an aquatic environment subject to wave and tidal action and shifting sediment. Eelgrass has thin, green strap-like leaves ranging from up to 1m long and 10mm wide. Eelgrass coverage is variable ranging from a few individual plants in a small patch (less than one square meter) to submerged meadows covering many acres.

2. There is an annual and perennial form of eelgrass. The annual form grows from seed in June and July and the plants are not connected by rhizome. The perennial form grows laterally by means of rhizomes and a root system. Lateral expansion is fairly slow at about one meter per year. Both annual and perennial forms produce seeds. Widgeon grass has annual shoots which flower in the summer, along with a perennial base. Fruiting occurs from July to October. The plant grows in soft, muddy sediments and sandy substrates.

3. Deep water habitats include subtidal waters bordering the immediate shoreline where a depth of three (3) or more meters is typically achieved within 100 to 200 feet seaward of the MLW mark. In these areas, eelgrass is typically limited to the shoreline fringe. This environmental setting is typical of the open waters of Narragansett Bay, Block Island and Rhode Island Sounds. Examples of these areas include the shorelines of Prudence Island, Jamestown and Block Island.

4. Shallow water habitats include subtidal waters where a depth of 3 meters is not attained within 100 – 200 feet of the shoreline and where the average waterbody depth is generally less than 3 meters. This situation is typical of the salt ponds and other shallow coastal embayments. On the southern shore of the state are a series of coastal lagoons ("salt ponds") connected to Block Island Sound and the

Sakonnet River by tidal inlets. A total of 26 brackish or marine coastal lagoons have been identified within the state. Compared to the deep water habitats described above, the lagoons are generally shallow (more than half the area is only 1m deep). Sediment is primarily glacial outwash, sand and gravel. The water in these lagoons varies in its rate of exchange with oceanic water and consequently, its salinity. On the active lobes of the tidal delta, the annual form of *Zostera* occurs seasonally. On inactive lobes, *Zostera* is found in the submerged margins of the building salt marsh. *Ruppia* appears in coves with restricted water circulation. Coastal lagoons warm up earlier in the year, reach higher temperatures and cool off sooner than deep water habitats. *Zostera* is the overwhelmingly dominant species in lagoons with the greatest oceanic exchange and its biomass is most concentrated in beds nearest an opening between the pond and ocean. (*See* Sheath, R.G., and M.H. Harlin, ed. "Freshwater and Marine Plants of Rhode Island," Kendall/Hunt Publishing Company, 1988, 149pp.).

5. SAV benefits are defined to include, but are not limited to, the following: SAV provide support for large numbers of organisms, both plant and animal, and produce large quantities of organic material, which is important as a base to an active food cycle; the root structures bind sediments while the leaves baffle waves and currents, thereby trapping water column-borne material and retarding the resuspension of fine particles while enhancing sediment stability; nutrient uptake occurs through both the leaves and the root system as well as by associated algae; SAV roots and leaves provide varied food resources and physical support for large numbers of fauna; SAV also provides nursery habitat for finfish and shellfish.

6. Many species of fish and wildlife are directly dependent upon SAV for refuge, attachment, spawning, and food. SAV provide a source of attachment and/or protection for the bay scallop (*Argopectin irradians*) and hard clam (*Mercenaria mercenaria*). Tautog (*Tautoga onitis*) and other fish lay their eggs on the surface of eelgrass leaves, and juvenile and larval stage starfish, snails, mussels, and other creatures attach themselves to eelgrass leaves. Scientific evidence also indicates that blue crabs (*Callinectes sapidus*) and lobster (*Homarus americanus*) have a strong reliance on SAV. Studies in New England have documented the occurrence of 40 species of fishes and 9 species of invertebrates in eelgrass beds. Waterfowl using submergent plant beds include American coot (*Fulica americana*), Mute swan (*Cygnus olor*), Gadwall (*Anas strepera*), American Wigeon (*Anas americana*), Canvasback (*Aythya valisneria*), and Redhead (*Aythya americana*). These birds feed on the foliage or tubers of the seagrasses. Blue-winged Teal (*Anas discors*) and Mallards (*Anas platyrhynchos*) may strain out floating seeds, strip seed from emerging heads, pluck off associated invertebrates, and bottom feed. Pied-billed Grebes (*Podilymbus podiceps*) also feed among the SAV, capturing small fish and large invertebrates taking cover there. Wading birds, such as egrets (*Ardea sp*., *Egretta sp*.) may use mats of SAV as stationary feeding perches or for traversing. (*See* Weller, M.W. "Wetland Birds: Habitat Resources and Conservation Implications," Cambridge University Press, 1999, 271pp.).

7. Historically, SAV existed in Rhode Island waters in shallow water embayments and areas that were poorly flushed by tidal currents. Review of historical information has shown that eelgrass beds were once widespread in Narragansett Bay, and that as late as the 1860s, extensive eelgrass beds were present even in the Providence River at the head of the bay. The eelgrass decline during the 1930s has been attributed to the advent of a disease ("wasting disease"), which caused a 90% destruction of all eelgrass beds in the Atlantic range. Healthy populations were generally re-established by the 1960s.

8. Today, eelgrass beds cover less than 100 of the 96,000 acres that comprise Narragansett Bay. Scientific evidence suggests that the most important factor contributing to the continuing decline of eelgrass has most likely been the introduction of increasing amounts of anthropogenic nitrogen to Narragansett Bay particularly since the 1950s, as the year-round human population near the water

substantially increased both around Narragansett Bay and in the Salt Pond Region. In the salt ponds, nitrate-nitrogen loading from septic systems has contributed to a 41% decline in eelgrass beds over a 32-year period. (Short FT, Burdick DM, Granger S, Nixon SW. 1996. Long-term decline in eelgrass, Zostera marina, linked to increased housing development In: KUo J, Phillips RC, Walker DI, Krikman H (eds) Seagrass Biology: Proceedings of an International Workshop, Rottnest Island, Western Australia, 25-29 January 1996. University of Western Australia, Nedlands, Western Australia. Pp. 291-298). Historical trends of widgeon grass in Rhode Island waters have not been comprehensively studied.

9. Adverse impacts to SAV and SAV habitat include mechanical, chemical and physical damage of SAV, that may result from boat propellers, dredging and filling, bottom-disturbing fish harvesting techniques (i.e., scallop dredging, clam dredging and toothed rakes), shading caused by physical structures over beds (e.g. docks, piers) and/or excess nutrients, particularly nitrogen, causing excess algal bloom levels and high turbidity. Many activities under the Council's jurisdiction have the potential to adversely impact SAV and its habitat. These activities include but are not limited to Residential, Commercial, Industrial, and Public Recreational Structures (Section 300.3), Recreational Boating Facilities (Section 300.4), Sewage Treatment and Stormwater (Section 300.6), Dredging and Dredged Materials Disposal (Section 300.9), Filling in Tidal Waters (Section 300.10), Aquaculture (Section 300.11), and activities undertaken in accordance with municipal harbor regulations (Section 300.15). Fishery harvesting techniques can also adversely impact eelgrass beds. Scallop dredging can significantly reduce biomass and surface area as well as shoot density of eelgrass. Toothed rakes used for shellfishing can also uproot eelgrass, while boat propellers and prop scarring of the marine bottom can destroy SAV by slicing and uprooting shoots.

10. Aquaculture operations, which utilize floating racks and bottom culture techniques, can shade SAV. However, shellfish aquaculture is acknowledged to improve water quality. Therefore, in cases where an aquaculture permit has been issued where SAV was not present and then due to improved water quality as a result of aquaculture operations, SAV subsequently colonizes within the permitted facility area, the leaseholder shall be considered grandfathered and not subject to the standards/requirements of this Section. Future proposed expansions shall be subject to review under this Section.

11. Water quality and, in particular light intensity reaching the leaves is considered the most critical factor in the maintenance of healthy SAV habitats. Light availability controls the depth of SAV because SAV is dependent on photosynthesis. Factors that can act to reduce light levels include shading due to physical structures, water column clarity due to the excess of suspended solids, and nutrient enriched phytoplankton and macroalgal growth.

12. Research in Waquoit Bay, Massachusetts indicates that the height of a dock over the marine bottom is clearly the most important variable for predicting the relative light reaching eelgrass and for predicting eelgrass bed quality under docks. Docks with a north-south orientation admit more light and can better support eelgrass. Docks and their associated floats and boats placed over eelgrass beds can cause severe local impacts to eelgrass. Population-level impacts occur through shading from docks as well as boats, and prop dredging by boat motors, leading to the elimination of eelgrass under and around many docks. Research at Waquoit Bay indicates that impacts under floating docks generally resulted in complete loss of eelgrass. Research indicates that 30% is a minimum light level for support of eelgrass under docks (Short et al 1995). Based on a model developed by Burdick and Short (1995) to achieve a 30% minimum light level, docks need to be a maximum of 1 m (3.28 feet) wide and 3.0 meters (9.8 feet) above the marine bottom and situated in a north-south orientation**.** Recent reports have supported this preliminary finding (*See* Henry, K., "Jamestown Eelgrass Monitoring Review: A Summary of Existing Jamestown Eelgrass Monitoring Surveys." 2005). Even if such requirements are attained, above and below ground growth rates and vegetative reproduction

are negatively affected. (*See* Bintz, Joanne C. and Scott W. Nixon, "Responses of eelgrass *Zostera marina* seedlings to reduced light." Mar Ecol Prog Ser 223: 133-141, 2001).

13. Several recent national and regional efforts support the need for protection and management of Rhode Island SAV resources. The Atlantic States Marine Fisheries Commission (ASMFC) developed a submerged aquatic vegetation policy in 1997 to communicate the need for conservation of coastal SAV resources for the protection of ASMFC managed species, and to highlight state and ASMFC coastal SAV conservation and enhancement efforts. The New England Fishery Management Council has designated Essential Fish Habitat (EFH) as approved by the National Marine Fisheries Service (NMFS) under the requirements of the 1996 Magnuson-Stevens Fishery Conservation and Management Act. Because of its fisheries habitat value, SAV is a Habitat Area of Particular Concern protected under the EFH provisions of the Magnuson-Stevens Act.

14. SAV inventories conducted during the times of peak biomass provide the best indication of habitat or potential habitat (Fonseca et. al 1998). Peak biomass occurs in seagrass beds toward the end of the growing season and before plants have released their seeds. Plants that flower and develop seeds die shortly after releasing them. The growth and reproduction of eelgrass is affected by a number of environmental parameters such as light, water temperature, nutrient availability etc. When water temperatures exceed approximately 22 degrees Celsius (71.6 degrees Fahrenheit), seagrass growth can dramatically decrease and the development of seeds through sexual reproduction can be initiated in Rhode Island waters. As a result, the peak biomass period for eelgrass in Narragansett Bay typically occurs between July and August. Peak biomass in the south shore salt ponds and other shallow water embayments typically occurs during July.

C. Policies

1. The Council's goal is to preserve, protect and where possible, restore SAV habitat. In cases where the Council determines that SAV may be altered or grants a special exception to a prohibition listed in Section 300.18D, the Council shall require the mitigation of all impacts to SAV. Such activities requiring mitigation include, but are not limited to, marina expansions, dredging, filling in tidal waters, construction of commercial docks and/or structures and any other activity determined by CRMC that has not significantly or appropriately avoided impacts to SAV. Permanently lost or significantly altered SAV shall be replaced through the restoration of an historical SAV habitat or the creation of a new SAV habitat at a site approved by the Council. The ratio of restoration to loss shall be 2:1.

2. Activities under CRMC jurisdiction, including Residential, Commercial, Industrial, and Public Recreational Structures (Section 300.3), Recreational Boating Facilities (Section 300.4), Sewage Treatment and Stormwater (Section 300.6), Dredging and Dredged Materials Disposal (Section 300.9), Filling in Tidal Waters (Section 300.10), Aquaculture (Section 300.11), and activities undertaken in accordance with municipal harbor regulations (Section 300.15), shall avoid and minimize impacts to SAV habitat.

3. The Council supports cooperative efforts to determine the current status and identify trends in the health and abundance of SAV species in Rhode Island using the best information as it becomes available.

4. The Council shall assess the potential impacts to SAV and its habitat from proposed activities on a case-by-case basis. Such impacts may include, but shall not be limited to the introduction of excess nutrients, sedimentation, shading, and/or disruption of SAV and SAV habitats.

5. All impacts to SAV and SAV habitat shall be avoided where possible and minimized to the extent practicable. Where the impacts are substantial or cannot be avoided or minimized, the

Council may deny the application. The Council may exercise greater discretion if the proposed site is adjacent to or includes a restoration site and/or the site includes the sole source of SAV habitat.

6. SAV habitats designated for preservation within the boundaries of the Narragansett Bay National Estuarine Reserve (NBNERR) are identified on the *SAV Habitats Designated for Preservation in Narragansett Bay* maps (January 13, 2000), available for inspection at the Council's offices. The Narragansett Bay National Estuarine Research Reserve includes waters extending to the 18-foot depth contour around Patience Island, the northern half of Prudence Island, portions of the southern half of Prudence Island and Hope Island. In areas within the NBNERR which are designated for preservation on the above maps, alterations and activities which impact the health and abundance of the SAV habitat are prohibited. These maps serve to identify individual SAV habitats, and are for general reference only; in all cases precise boundaries shall be determined through a proper survey conducted in accordance with these guidelines when proposals that could impact these features are being considered.

7. In tidal waters where applicants propose activities under Sections 300.3, 300.4, 300.6, 300.9, 300.10, 300.11, and 300.15, and the Council's staff determines that SAV habitat is not present, an SAV survey will not be required. When such activities are proposed in areas of current or historic SAV habitat, an SAV survey shall be required. (See 300.18E.2)

8. It is the policy of the Council that SAV surveys shall be completed during peak biomass. SAV surveys shall be completed in Narragansett Bay between July 1 and September 15. SAV surveys shall be completed in the south shore coastal ponds and other shallow water embayments between July 1 and August 15. SAV must be avoided where possible by utilizing any available location and orientation which does not require crossing the bed with the dock. In evaluating applications for dock construction, and/or modifications to existing docks, in areas of known SAV habitat, the Council will consider dock design features including, but not limited to, the height and width of the dock structure, the orientation of the dock structure, the availability of sunlight to the eelgrass habitat, the cumulative impacts of multiple docks in the area, the disruption caused by construction and the disruption caused by normal use and maintenance of the dock structure. In determining the permissible design of a facility in an SAV habitat, the Council will rely on the latest available research, such as research findings developed by Burdick and Short (1995), and designs appropriate for the area.

D. Prohibitions

1. The Narragansett Bay National Estuarine Research Reserve (NBNERR) includes waters extending to the 18-foot depth contour around Patience Island, the northern half of Prudence Island, portions of the southern half of Prudence Island, and Hope Island. In areas within the NBNERR which are designated for preservation on the *SAV Habitats Designated for Preservation in Narragansett Bay* maps, alterations and activities which impact the health and abundance of SAV habitat are prohibited.

2. Floats, and float and platform lifts (including grate-type structures) associated with residential docks are prohibited over SAV as defined herein.

3. Boat lifts having the capacity to service vessels larger than a tender (vessels greater than 12 feet long and greater than 1,200 lbs) are prohibited over SAV.

4. The long-term docking of vessels at a recreational boating facility shall be prohibited over SAV.

5. Residential docks that span eelgrass beds to avoid and/or minimize impacts to said eelgrass and which are proposed to be 200 feet or more in length seaward of mean low water (MLW) shall be prohibited.

E. Standards

1. For activities under Sections 300.3, 300.4, 300.6, 300.9, 300.10, 300.11, and 300.15, where the Council's staff is satisfied that SAV is not present within the limits of the proposed activity, an SAV survey will not be required.

2. For activities under Sections 300.3, 300.4, 300.6, 300.9, 300.10, 300.11, and 300.15, the Council shall require SAV surveys in tidal waters of the south shore salt ponds and other shallow water embayments, around Jamestown, Newport and in other areas when the Council's staff has evidence of SAV habitats. In areas where the Council's Staff lacks enough evidence to make a determination of SAV presence or absence, an SAV survey may be required.

3. A survey that has been conducted three or more years prior to the date of the application will not satisfy the requirements of this Section.

4. Where an SAV survey is required, the following guidelines are recommended. Where these guidelines are not followed, CRMC staff may require additional information:

a. SAV surveys shall be completed during peak biomass. SAV surveys shall be completed in Narragansett Bay between July 1 and September 15. SAV surveys shall be completed in the south shore coastal ponds and other shallow water embayments between July 1 and August 15.

b. Define the area of SAV within the limits of the proposed activity: The SAV survey requires a series of transects located between the property line extensions associated with the proposed project site. A survey shall include transect lines (quantity dependant on the size of the project area) running perpendicular to the shoreline 3 meters apart (10 feet). Along each transect line a 1m² quadrat sampling station shall be placed every 3 meters (10 ft). It is important to go beyond the impacted area, especially to understand the impacts of the dock to SAV. In the case of fragmented beds, transect lines every 2 meters may be necessary. For projects not adjacent to the shoreline (i.e., aquaculture projects), locate the transects relative to another reference, such as a channel boundary or depth gradient.

c. Define a datum: The survey data for SAV shall be mean low water (MLW). MLW shall be set equal to zero.

d. Quantify SAV along the transects: Establish in-water sampling stations along transects along the bottom or as otherwise necessary to accurately delineate the bed. Use a quadrat measuring 1 m on each side. At each sampling station, determine percent coverage for SAV. Record the following data for each station:

- General sediment type (silt, mud, sand, shell, etc.) based on observation or shallow surface core only;
- Estimate of percent coverage for quadrat; and
- Estimate the mean shoot length.

e. Report data collected: Overlay the SAV percent coverage and water depth data onto the site plan for the dock. Show transects, sampling stations, water depth, date and time of survey, and

fixed-point locations on the site plan. For each transect, areas of SAV and associated water depth shall be located on the plans, as well as the landward and seaward (where practicable) limits of SAV.

5. Standard Design Options for the Construction of Residential Boating Facilities in areas of SAV habitat.

a. If it is determined that SAV cannot be avoided, the impact to the bed must be minimized by reducing the amount of structure over the bed, by making provisions for avoiding the docking or mooring of boats over the bed and through the utilization of a design which minimizes boat travel through the bed as necessary to minimize propeller impacts including leaf shearing and sediment scouring.

b. Deep-water habitat (see Section 300.18.B.3) dock design: Docks which cannot avoid the crossing of SAV shall minimize shading impacts through the utilization of a design which is consistent with the "Burdick and Short" method. Docks designed to the Burdick and Short method shall extend to a minimum depth of – 5' MLW or shall extend to the seaward limit of the bed. CRMC regulations prohibit the installation of floats over eelgrass beds (see 300.18.D.2). Facilities which do not span the bed shall terminate as an elevated fixed pier or may utilize a fixed "T" or "L" section which is turned at a 90 degree angle to the main pier. All fixed "T" and "L" sections shall be designed to meet Burdick and Short. Access from the fixed pier, "T" or "L" section shall be by a ladder. Applicants proposing a dock using this design methodology may not dock a boat at the facility for purposes other than touch and go use and must show that a mooring is available for the long-term mooring of vessels proposed to be serviced by the facility. "Burdick and Short" methodology is available from the CRMC.

c. The maximum length for facilities designed to meet Burdick and Short shall be when a depth of -5 MLW is obtained.

d. Where a facility is not authorized to have a float, boat lifts to service tenders 12' in length or less and having a 1,200 pound weight capacity or less may be authorized. These lifts shall be located near the terminus of the "T" or "L" section and achieve a minimum depth of -4' MLW. Boat lifts of greater capacities over SAV are prohibited (See 300.18 D3).

d. In shallow water habitats, where it is possible to avoid the bed by limiting the seaward extent of the facility, the design plans must depict the inland edge of the existing bed as well as depth soundings along the proposed facility. If a depth of 18 inches at MLW is obtained prior to encroaching on SAV, then the dock shall terminate at that length and depth. (*See* E(5)(a)).

e. Pile driving equipment may not be grounded on SAV during construction.

6. In order to minimize impact upon SAV, all operations and docking of vessels shall be confined to the terminal portion of the facility. Docking and operation of motorized boats and/or other vessels elsewhere along the facility shall only be permitted over areas of no SAV habitat, as determined during staff review.