The
# Midnight Pass
SOCIETY, INC. "MIDNIGHT PASS – PASS IT ON!"

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## A FIELD STUDY OF THE SEAGRASSES AROUND THE BIRD ISLANDS/MIDNIGHT PASS AREA, LITTLE SARASOTA BAY, FLORIDA

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## SYNOPSIS

Little Sarasota Bay in general and especially the Bird Islands/Midnight Pass area had been known for supporting lush, dense beds of different types of seagrasses. Since the closing of Midnight Pass, it has been observed that the seagrasses in this embayment have substantially declined as to acreage and density.

On December 2, 1989, the Midnight Pass Society took advantage of a low, low tide to conduct a field study of the seagrass community around the Bird Islands/Midnight Pass area. Seagrass samples were taken from four pre-selected stations for later blade count and comparison to historical data. An aerial photography firm was hired to take a series of low level, high quality color photographs of the study area for later use. The entire study site within the boundaries of the Intracoastal Waterway and the north and south channel margins was groundtruthed by walking/wading the shallow areas.

Both sampling and groundtruthing crews recorded their findings. Field observations were made as to the type, extent and density of the seagrasses located, their relative health and amount of epiphytic growth noted. Also recorded were our observations with respect to the Bay bottom, the location, extent and relative density of Drift Algae and the marine life found in the area.

While three different types of seagrass had been known to flourish in this embayment, only Cuban Shoal Weed remained. The extent of the seagrass beds had markedly declined and the grasses remaining were of sparse to medium density. The few patches of medium density Cuban Shoal Weed found were so heavily covered with epiphytic growth as to possibly impede their photosynthetic ability.

It would appear that the closing of Midnight Pass in 1983 had significantly altered environmental conditions in this embayment. Seagrasses that historically grew here no-longer survive; those that remain are in a stressed, unhealthy condition. Drifting algae is thriving where rooted vegetation once grew. Historic environmental conditions can only be restored by restoring Midnight Pass.

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INTRODUCTION

Members of the Midnight Pass Society have been informally observing Bay conditions ever since the Pass was closed in 1983. We've had a water monitoring program in operation since June, 1988. Members report witnessing significant die-off of Little Sarasota Bay seagrasses in 1984 with additional declines in 1985 and 1986. Then in 1987, a year of above average rainfall, there was a massive decline in the seagrass community. Over the last two years, a low rainfall period, there seems to have been some minor recolonization, but the grasses remaining are just a faint shadow of the thriving seagrass community that used to support an abundance of marine life here.

Accordingly, we were upset to read published reports of the "flourishing seagrasses" growing near Midnight Pass or the "vital seagrasses" found by the Jim Neville Marine Preserve. We felt these claims were not just inaccurate, they were untrue.

Then, in a conversation with a DER representative in mid-November of last year, we were told that the DER had been given information that the seagrass acreage in the Bird Islands/Midnight Pass area had **INCREASED** since Pass closure. We knew this was certainly untrue but realized we needed to develop some hard data to counter the misleading impression created in Tallahassee as to the health and vitality of Little Sarasota Bay.

The Society decided to conduct a field study to determine the coverage, the density and the relative health of the seagrass community around the Bird Islands/Midnight Pass area. Since a low tide of -0.4 feet was to occur the morning of December 2, 1989, we decided to take advantage of the low water and conduct our study at that time. We also engaged the services of **AIR NAV PUBLISHING COMPANY** to shoot a series of low level, high quality aerial color photographs of the entire study area for later use and confirmation of our observations.

**STUDY AREA**

Sarasota County had provided the DER a chart that showed the seagrass habitat had increased in the Bird Islands/ Midnight Pass area between 1983 and 1986. Prior to the closure of Midnight Pass, this area had been known for sustaining large seagrass communities. We accordingly selected this area for our field study. Encompassing the Jim Neville Marine Preserve, the boundaries of our study area were the Intracoastal Waterway and the margins of the north and south channels to Midnight Pass. See Exhibit #1.

**PROTOCOL**

This field study was conceived, planned, initiated and executed under the advice, guidance and direction of Dr. John B. Morrill, Professor of Biology at New College of the University of South Florida. Six volunteers, including Dr. Morrill, assembled at 8:30AM for final instructions. We then proceeded to the study area in two boats,

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carrying along a canoe to hold our supplies during wading expeditions and to gain access to very shallow areas. At the study site we broke up into two teams: seagrass sampling and groundtruthing. The groundtruthing crew began at the margin of the north channel to Midnight Pass. Their observations were recorded on a 1986 Sarasota County 1"=200' aerial photograph we had mounted on firm board and waterproofed. Starting at 9:30AM, the groundtruthing crew worked their way south. They completed their observations for the day at 2:15PM. They returned to the study site the morning of December 3rd to complete their observations.

Four sampling sites had been pre-selected. We decided to take samples at three sites that Sarasota County had referenced as permanent sampling sites. The fourth site we selected was in the historic mouth of Midnight Pass, an area where seagrass was now known to be growing. Walking the Sarasota County sampling sites shown on a reference map, we were unable to find any markers identifying the exact sampling area.

At each sampling site we made a transect from near the edge of the nearby channel margin towards the Bird Islands. We then selected three sampling stations along the transect. At each station we took four plug samples with a 1/64th meter plug sampler. Thus, for each sampling site there were a total of twelve samples obtained. Each sample was bagged as taken with the location clearly marked on the bag. At each sampling station our field observations were recorded in a notebook.

Each sample was later washed individually through a 1/8th inch mesh screen. The seagrass from each sample station was preserved in a zip-loc bag with its location clearly marked thereon. These samples were refrigerated for a later blade count study. The field study was concluded at 5:00PM.

## OBSERVATIONS BY SAMPLING SITE

SITE #1. On the northern edge of the study area, east and south of the historic channel and south of a small, anchored barge. First sample taken at 10:00AM.

Station 1A--Off the tip of the Sunrise Cove condominium, about 320 feet east of their seawall. Four samples taken. Bottom extremely soft and "plumey". Hard to see bottom, but no vegetation evident. Water depth 22" to bottom, additional 12" through muck to solid bottom. Very difficult walking.

Station 1B.--335 feet from condominium seawall. Still mucky, "plumey" bottom with hardly any vegetation. Four samples taken. Water depth 12½"; pushed through 10" of muck to solid bottom.

Station 1CC--Approximately 30 feet farther east. Noted a few areas of extremely sparse Cuban Shoal Weed, very patchy. Water depth 4". Noted some grass growing farther east and north of pre-selected site so opted to designate that bed as "Official 1C". No samples at 1CC.

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Station 1C--North and east of the pre-selected site, approximately 600 feet from the condominium seawall; 100 feet north and west of a small Mangrove island. Found Cuban Shoal Weed growing of medium density. Plants appeared stressed and heavy epiphytic growth noted. Water depth 5". Four samples taken. Soft, muddy bottom. Found two dead Angel Wing clams. Found a live Stout Razor clam---a detritus feeder, not a filter feeder. Also, a live Onuphis worm. Noted dead moon snail and dead clams. Some loose pieces of Red Drift Algae intermixed with the grass and some other dense clumps in nearby area.

In walking east and south from this station, we encountered very dense Red Drift Algae (RDA) in 16" of water; then at 26", there were patches of RDA; then at 14", we found extremely sparse Cuban Shoal Weed intermixed with RDA.

Continuing farther east by wading, we came east of an oyster bar with scattered oysters. The bottom was stable with little muck. Walking mainly to the south, the waters were turbid with heavy RDA. In reaching down for hand grab samples, out of fifteen hands full, only one contained Cuban Shoal Weed...and that was sparse. The rest were mud or RDA. Between the oyster bar and the mangroved island, the water was 3' deep and the algae was extremely dense and at least 2" thick. Over by the northern main island in 6" of water, we found an area of Cuban Shoal Weed that was 40' wide...sparse to medium. Also, noted big beds of RDA.

SITE #2. West of Intracoastal marker #43. Just off the ICW, we noted Cuban Shoal Weed (CSW) growing in medium patches in 14" of water up to the exposed berm. The bottom was hard. The grass seemed to be benefiting from the wake action of the boats. Transect drawn west of ICW. First sample taken at 11:55AM.

Station 2A--Approximately 20 feet west of the exposed berm. Mucky bottom with shell gravel beneath the muck. Medium dense CSW with heavy silty growth covering plants. Water depth 6". Four samples taken.

Station 2B--Approximately 50 feet farther west. Water depth 14". Very mucky bottom...a clay type material. Four samples taken. RDA noted.

Station 2C--Large masses of RDA, very thick. The bottom is extremely soft, making it difficult to wade. Water depth 14", plus 9" of muck. This was worst area as far as bottom composition concerned. Four samples taken.

SITE #3. Midnight Pass back bay area. Along the south channel just east of the "pointy" part of the Bird Islands, off the shoal. Ran a transect from the channel margin to the north toward the Bird Islands. First sample taken at 12:35PM.

Station 3A--180 feet from the South Shore (Casey Key) edge of vegetation. Water depth 20", 3" pushed into solid bottom. Good sand bottom with beach sand. Sparse sea grass. Noted some baby worms. Four samples taken.

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Station 3B--215 feet from the south shore. Sparse seagrass all in a stressed state with a lot of epiphytic growth. Good beach sand bottom. Water depth 13", pushed in to 14". Four samples taken.

Station 3C--260 feet from south shore. Water depth 6", pushed in to 9". Medium-dense grassy area but all seem very stressed. Dead Quohog clams all over the place.

SITE #4. Throat of historic inlet. Selected because grasses known to be growing here now. Ran a transect to the northeast from the channel...due east of Survey Monument Parker #78. Three sampling stations picked at 50 foot intervals.

Station 4A--Water depth 14". Four samples taken.

Station 4B--Water depth 10". Four samples taken.

Station 4C--Water depth 4". Four samples taken.

BLADE COUNT PROCEDURE

On December 14th at 10:30AM, three volunteers assembled to count the seagrass blades from each sample taken. All counting procedures were under the direct supervision of Dr. Morrill. Every blade of whatever length was counted. Every node on each root sample was also counted whether it had an attached grass blade or not. Our counts, accordingly, would tend to be on the high side.

The grass blades were mainly a gray to brown color and did not appear healthy. The majority of the blades were quite short. While some of these conditions might be due to time of year, they appeared distinctly less healthy than grass samples from the New Pass area. The roots also were more soft and of an off-white to gray coloration.

The blade count procedure took until 4:30PM to complete. The blade counts were then summarized and the sampling station results added together. This total was then extrapolated to yield a blade density per square meter approximation. The results of the blade count procedure are shown in Exhibit #2.

DENSITY SCALE

Using the information developed from this field study, related observations made of the Cuban Shoal Weed seagrass beds found by New Pass and off the New College campus and available literature on the subject, we next developed a density scale for this species in terms of number of blade shoots per square meter:

| CUBAN SHOAL WEED BEDS | # SHOOTS/$M^2$ |
|---|---|
| DENSE | OVER 5,000 |
| MEDIUM | 2,500 -- 5,000 |
| SPARSE | 1,000 -- 2,500 |
| VERY SPARSE | UNDER 1,000 |

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SEAGRASS ZONATION

Subsequent to our field study, we felt it was important to estimate spatial ranges at which the different seagrasses grow. This would not only confirm the depths at which we found the CSW, but it would give us an idea of where the Manatee and Turtle grass might have grown in the Bird Islands area when Midnight Pass was open. Accordingly, a field team headed by Dr. Morrill visited New Pass on December 29, 1989. The predicted low tide was -0.6 feet MLW at 8:30AM. The site selected was on the south side of the inlet east of the bridge (an area comparable to the Bird Islands near Midnight Pass relative to the Inlet). The team ran a transect from the edge of the shore to the margin of the channel... a total of 120 feet long. They then determined the maximum depth at which the different grasses were found to grow. They found distinct zonation of grasses relative to depth as follows:

Cuban Shoal Weed... MLW to -18" MLW... then Turtle grass
Turtle grass..... -12" MLW to -30" MLW (CSW very sparse at -24" MLW)
Manatee grass.....-16" MLW first appearance. Extended as solid strand from -24" to -42" MLW.

These measurements were taken along the margin of the tidal channel in an area with naturally sloping beach. This is an approximate guide as to how the different grasses were distributed along the margins of the Midnight Pass channels when that inlet was still flowing.

GROUNDTRUTHING RESULTS

The groundtruthing team walked and waded the entire field study area as previously described. They drew in all grassy areas located on the 1986 aerial.. only Cuban Shoal Weed was found. They also indicated on the aerial all intertidal areas and oyster bars. Non-vegetated areas were described as firm sand or soft marly mud. They identified the densest patches of Red Drift Algae. The team also determined the approximate depths at which the Cuban Shoal Weed was found. The range was from MLW to -24" MLW. This measurement was right in line with our zonation statistics developed from our New Pass field trip described above. On the southern Midnight Pass channel the groundtruthing team confirmed throughout its length that the Coastal Planning & Engineering bathymetry information was approximately correct.

In a combined total of 65 man-hours of groundtruthing this region, we did not observe **ANY** Manatee or Turtle grass. **BOTH** seagrass species were known to be growing in this area when Midnight Pass was flowing.

Large masses of Red Drift Algae were noted in the study area. Where the dense masses had accumulated, other types of vegetation were absent suggesting they had been displaced. In other areas small pieces and clumps of Red Drift Algae were found near the bottom, often interspersed with the Cuban Shoal Weed.

The groundtruthing team found far fewer grasses growing than was depicted on the Sarasota County map as existing in 1986. The Cuban

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Shoal Weed observed was almost always of sparse density. The few medium-density areas were infrequent and patchy. The Cuban Shoal Weed had an unhealthy look to it which was made worse by the large amount of epiphytic growth and sediment on the blade shoots. The team members that had also witnessed the grass bed in the New Pass area and in Sarasota Bay by New College observed that the Cuban Shoal Weed in the study area was far less lush and dense...it looked "sick" by comparison.

While the team found no Manatee or Turtle grass, they did manage to locate a few plants of Widgeon grass. These were located on the south and west side of the Bird Islands.

**SAMPLING RESULTS**

The sampling team confirmed the above impressions with respect to the poor appearance of the seagrass samples. The samples also captured a few Widgeon grass blades in the samples taken from the east and south sides of the Bird Islands.

The sample results could not be compared to the earlier data available due to the difference in sampling procedures. Our method of actually taking a 1/64th $m^2$ would result in far higher blade counts than in simply observing the grasses in the area. Our samples included short grass blades that might have been covered in the sediment layer and counted root nodes where no blade at all could be found.

The average blade densities per square meter as shown on Exhibit #2 reveal that, for the three sample sites intended to match the County's permanent sampling quadrats, the grass "beds" could only be classified as sparse. The grasses appeared to be even more sparse than the comparison to the density scale would suggest and were often interspersed with pieces and/or clumps of Red Drift Algae. The "plumey" sediment seemed adversely affecting the plants.

Sampling Site #4 was selected because it was seen as one area that had a fair stand of seagrass. That sampling site, compared to our density scale, measured out as being of medium density. The presence of Cuban Shoal Weed at Station #4 appears to relate to boating activity and the accumulation of vegetative shoots by either wind or wakes. CSW shoots and stems uprooted in other areas were transported to this location. At the time of our field observations we noted the accumulation of many Red Mangrove "puppies" transported in the same manner. This sampling site, in the Pass channel prior to closure, had not been vegetated due to current velocity and depth. However, with the man-made closure of the inlet and the many land-altering activities coincident, the current was eliminated and a viable seagrass depth created especially by the winnowing of the sand pile left at the Midnight Pass site. It is important to realize that the continued winnowing of this man-made land form will eventually eliminate this area as a viable seagrass habitat.

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Accordingly, the seagrass growth in this area can only be considered as transitory; no long-term seagrass habitat exists here.

## CONCLUSIONS

1. The closing of Midnight Pass in 1983 significantly altered environmental conditions in Little Sarasota Bay.
2. Manatee and Turtle grasses, which had been known to exist in this embayment, are no longer found here.
3. The remaining seagrass species, Cuban Shoal Weed, is found largely only in densities best described as sparse.
4. The Cuban Shoal Weed appeared to be in poor health, perhaps due in some measure to its coverage with epiphytic growth and sediments.
5. The extent of the seagrass coverage and the density of the grasses was much less than the beds recalled in the open-Pass period.
6. Significant amounts of Red Drift Algae were noted. In areas where it had accumulated in dense masses, it appeared to have displaced the rooted vegetation.
7. The seagrass habitat found in the historic mouth of Midnight Pass was brought to a depth viable for seagrasses by the permitted land alteration activities of 1983 and by natural erosion of the man-made land form subsequent thereto. Continued natural activity on that land form can be expected to continue to raise the level of this area until seagrasses can no longer grow there.
8. The only way to restore the historic environmental conditions that favored the development of a thriving seagrass community is to restore tidal circulation through Midnight Pass.

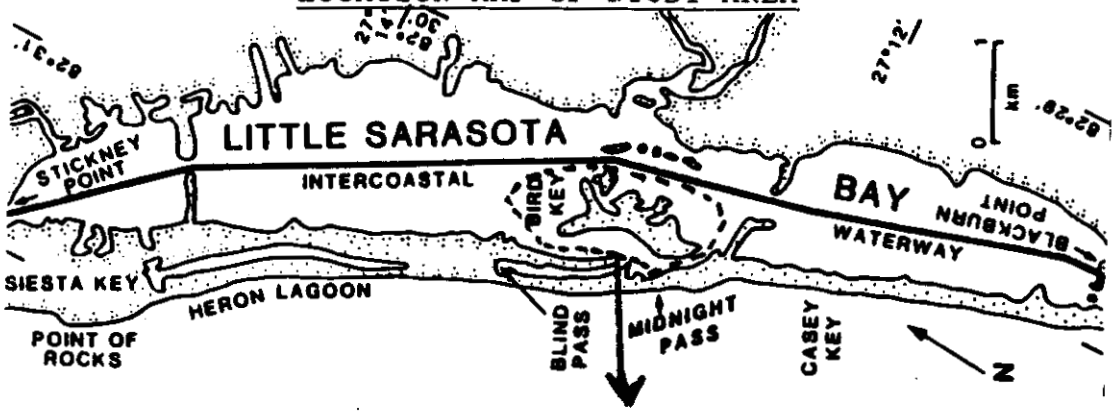
## ACKNOWLEGEMENTS

1. We must thank the Midnight Pass Society members for volunteering their valuable time during the holiday season to conduct this study. Especially those brave souls that spent December 2nd wading through the thick muck and the heavy masses of algae. The participants were: Al Harris, Morris Ramar, John Azar, Jack Petrecca, Del Herbert, Marlene Harris and the writer.
2. We must thank Tony Brannen and **AIR NAV PUBLISHING COMPANY** for agreeing to take the needed aerial photos with nearly no lead time and for producing photographs of such sparkling quality.
3. On Exhibit #1, the Bay-wide map was modified from one appearing in Coastal Sediments '87. The study area map around the Bird Keys came from Sarasota County.
4. Dr. John Morrill spearheaded this special effort to accumulate fresh data on the extant seagrasses of Little Sarasota Bay. His development of our procedures, his leadership and his direction of the entire project are beyond measure. Dr. Morrill, our "environmental Guru", is truly dedicated to the preservation and protection of the natural resources of Sarasota. Thank you, John, for all your efforts.

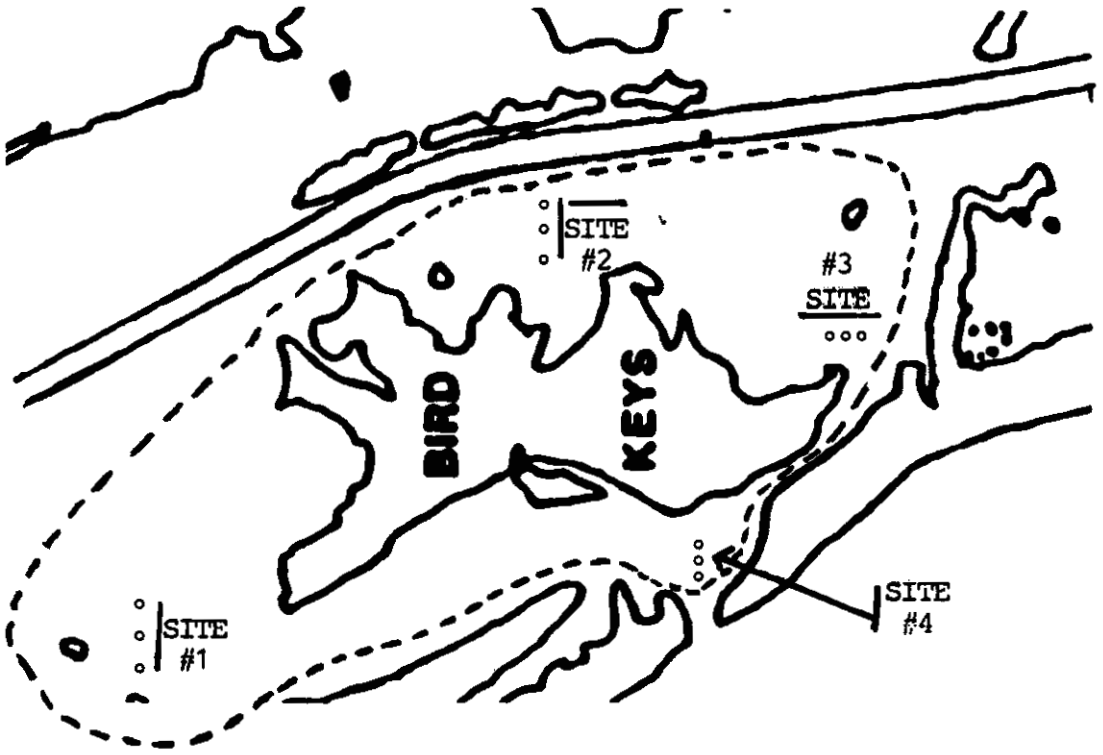
EXHIBIT #1

# MIDNIGHT PASS SOCIETY
# SEAGRASS FIELD STUDY
# DECEMBER 2, 1989
# AREA GROUNDTRUTHED AND SEAGRASS SAMPLING STATIONS

********** LOCATION MAP OF STUDY AREA **********




* * * * * * * * DETAIL MAP OF STUDY AREA * * * * * * * *




°°° SAMPLING SITES SELECTED. FOUR PLUG SAMPLES FROM EACH OF THREE STATIONS.

AREA GROUNDTRUTHED.

MIDNIGHT PASS SOCIETY
SEAGRASS FIELD STUDY DECEMBER 2, 1989
BLADE COUNT SUMMARY AND COMPUTATION

| | ---- STATION #1 ---- | | | ---- STATION #2 ---- | | |
|---|---|---|---|---|---|---|
| PLUG SAMPLE # | A | B | C | A | B | C |
| 1 | 0 | 0 | 59 | 44 | 9 | 6 |
| 2 | 0 | 3 | 26 | 59 | 22 | 0 |
| 3 | 5 | 8 | 53 | 27 | 31 | 3 |
| 4 | 0 | 0 | 35 | 25* | 29 | 0 |
| Total # per 1/16th $m^2$ | 5 | 11 | 173 | 155 | 91 | 9 |
| DENSITY PER $m^2$ | 80 | 176 | 2768 | 2480 | 1456 | 144 |

| | ---- STATION #3 ---- | | | ---- STATION #4 ---- | | |
|---|---|---|---|---|---|---|
| PLUG SAMPLE # | A | B | C | A | B | C |
| 1 | 13 | 3 | 26 | 35 | 67 | 35 |
| 2 | 9 | 0 | 56 | 25 | 55 | 37 |
| 3 | 12 | 25 | 50** | 47 | 52 | 31 |
| 4 | 45 | 6 | 31*** | 34 | 30 | 58 |
| Total # per 1/16th $m^2$ | 79 | 34 | 163 | 141 | 204 | 161 |
| DENSITY PER $m^2$ | 1264 | 544 | 2608 | 2256 | 3264 | 2576 |

AVERAGE BLADE DENSITY/$m^2$

| | |
|---|---|
| STATION # 1 | 1,008 |
| STATION # 2 | 1,360 |
| STATION # 3 | 1,472 |
| STATION # 4 | 2,699 |

* 5 Blades of Widgeon grass included
** 1 Blade of Widgeon grass included.
*** 11 Blades of Widgeon grass included.