# APPENDIX O

# USACE UMAM ANALYSIS

# SUB-APPENDIX O1

# UMAM ANALYSIS
# FOR
# APPLICANT'S PREFERRED PLAN
# (BASED ON JANUARY 5, 2012 PLAN REVISION)

**Hardbottom Community Two (HB2) - Fill**
**PART I – Qualitative Description**
**(See Section 62-345.400, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community Two (HB2) Impacted by Fill |

| FLUCCs code | Further classification (optional) | Impact or Mitigation Site? | Assessment Area Size |
|---|---|---|---|
| 571 | | Impact | 0.55 acres |

| Basin/Watershed Name/Number | Affected Waterbody (Class) | Special Classification (i.e.OFW, AP, other local/state/federal designation of importance) |
|---|---|---|
| Coastal waters, Atlantic Ocean | III | NA |

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This portion of the Atlantic Ocean borders on Hutchinson Island, along the central Florida coastline. Ft. Pierce Inlet (10 miles north) and St. Lucie Inlet (12 miles south) connect to the Indian River Lagoon, which separates Hutchinson Island from the Florida peninsula.

Assessment area description

The assessment area occurs within the northern segment of the proposed project footprint, from FDEP Monument R87.7 to R-90.3. Field surveys recorded patchy, low (<1 ft - 18 inch vertical) relief hardbottom (coquina rock) with a sporadic cover of turf algae and other low growing algal species. The community does not include wormrock.

| Significant nearby features | Uniqueness (considering the relative rarity in relation to the regional landscape.) |
|---|---|
| On the island, the FPL nuclear power plant occurs a few miles north of the north project terminus. Walton Rocks, a key nearshore hardbottom feature, occurs about a mile north of the project area. Ft. Pierce Shoal welds to the shoreline north of the project terminus at the St. Lucie - Martin County line. Upland development dominated by condominiums occur along much of the adjacent island upland. | not unique |
| **Functions** | **Mitigation for previous permit/other historic use** |
| Provides shelter, habitat and food for a variety of benthic invertebrates, fishes, and sea turtles; carbon and nutrient cycling; and connectivity with other marine habitats. Beach provides nesting area for endangered sea turtles. | NA |
| Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found )<br><br>Hardbottom-associated epibiota and fauna, reef- associated bony fishes dominated by non-adult individuals, juvenile sea turtles. | Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)<br>Green sea turtle (*Chelonia mydas* -E):medium intensity foraging and shelter. Loggerhead turtle (*Caretta caretta* - E) medium intensity foraging and shelter. Leatherback sea turtle (*Dermochelys coriacea* - E) - rare at project area, low intensity foraging and shelter Hawksbill sea turtle (*Eretmochelys imbricata* - E) Rare in project area, low intensity foraging and shelter. Kemp's ridley sea turtle (*Lepidochelys kempi* -E) rare in project area; low intensity foraging and shelter. Florida Manatee (*Trichechus manatus floridanus* - E) low intensity seasonal travel corridor |

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Encrusting sponges, hydroids, tunicates, bony fishes, dominated by black margate, silver porgy, newly settled grunts, sailors choice, hairy blenny, and porkfish; sea turtles, sharks.

Additional relevant factors:

HB 2 consists of ephemeral and patchy coquina rock settled by a relatively simple community compared to HB 1. Studies have documented that approximately 80% of fish species occupying hardbottom habitat are in early life stages - newly settled, early juvenile, juvenile.

| Assessment conducted by: | Assessment date(s): |
|---|---|
| D. Stites, based on baseline hardbottom surveys including fish observations, sea turtle nesting records, aerial photograph-based hardbottom habitat maps | 10/23/2011 |

**Hardbottom Community Two (HB2) - Fill**
**PART II – Quantification of Assessment Area (impact)**
**(See Sections 62-345.500 and .600, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community Two (HB2) Impacted by Fill |
| **Impact or Mitigation** | **Assessment conducted by:** | **Assessment date:** |
| Impact | D. Stites | 10/23/2011 |

| Scoring Guidance | Optimal (10) | Moderate(7) | Minimal (4) | Not Present (0) |
|---|---|---|---|---|
| The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed | Condition is optimal and fully supports wetland/surface water functions | Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions | Minimal level of support of wetland/surface water functions | Condition is insufficient to provide wetland/surface water functions |

| | |
|---|---|
| .500(6)(a) Location and Landscape Support<br>w/o pres or current: 9 with: 0 | **Current:** The landscape score is influenced by the frequency of burial and exposure inherent to ephemeral hardbottom habitats. The score represents the value of functions of the ephemeral habitat which undergoes periodic burial and reexposure. The assessment scores reflect the essential fish habitat functions and values provided by the ephemeral hardbottom while accounting for periods of complete burial. **With project,** sand placed by the project will cover the habitat and result in a complete loss of functions provided by the location and landscape support of the impacted habitat. |
| .500(6)(b)Water Environment (n/a for uplands)<br>w/o pres or current: 8 with: 0 | The water environment of the impacted area includes relatively harsh conditions that result in a relatively simple hardbottom community. The score represents the value of functions of the ephemeral habitat which undergoes periodic sand cover and reexposure. The ephemeral hardbottom provides periodic ecological services for a wide variety of species during periods of exposure. The assessment score relfects the EFH functions and values and the periods of burial. **With project,** the impacted area would no longer serve any function described above. |
| .500(6)(c)Community structure<br>1. ~~Vegetation and/or~~<br>2. Benthic Community<br>w/o pres or current: 9 with: 0 | **Current:** The score represents the community complexity and structure that this hardbottom habitat supports, albeit with periodic sand burial and related cessation of functions. Wormrock is not a component of the community, which results in much less diversity and productivity. **With Project**: construction would result in the burial of the habitat and loss of functions with benefit to fish and wildlife. |

| Score = sum of above scores/30 (if uplands, divide by 20) | |
|---|---|
| current or w/o pres: 0.87 | with: 0 |

| If preservation as mitigation, |
|---|
| Preservation adjustment factor = |
| Adjusted mitigation delta = |

| For impact assessment areas |
|---|
| FL = delta x acres = 0.87 x 0.55 = 0.48 |

| Delta = [with-current] |
|---|
| -0.87 |

| If mitigation |
|---|
| Time lag (t-factor) = |
| Risk factor = |

| For mitigation assessment areas |
|---|
| RFG = delta/(t-factor x risk) = |

**Hardbottom Community Two (HB2) - Pipeline**
**PART I – Qualitative Description**
**(See Section 62-345.400, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community Two (HB2) Impacted by Pipeline |

| FLUCCs code | Further classification (optional) | Impact or Mitigation Site? | Assessment Area Size |
|---|---|---|---|
| 571 | | Impact | 0.02 acres |

| Basin/Watershed Name/Number | Affected Waterbody (Class) | Special Classification (i.e.OFW, AP, other local/state/federal designation of importance) |
|---|---|---|
| Coastal waters, Atlantic Ocean | III | NA |

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This portion of the Atlantic Ocean borders on Hutchinson Island, along the central Florida coastline. Ft. Pierce Inlet (10 miles north) and St. Lucie Inlet (12 miles south) connect to the Indian River Lagoon, which separates Hutchinson Island from the Florida peninsula.

Assessment area description

The assessment area occurs within the northern segment of the proposed project footprint, from FDEP Monument R87.7 to R-90.3. Field surveys recorded patchy, low (<1 ft - 18 inch vertical) relief hardbottom (coquina rock) with a sporadic cover of turf algae and other low growing algal species. The community does not include wormrock.

| Significant nearby features | Uniqueness (considering the relative rarity in relation to the regional landscape.) |
|---|---|
| On the island, the FPL nuclear power plant occurs a few miles north of the north project terminus. Walton Rocks, a key nearshore hardbottom feature, occurs about a mile north of the project area. Ft. Pierce Shoal welds to the shoreline north of the project terminus at the St. Lucie - Martin County line. Upland development dominated by condominiums occurs along much of the adjacent island upland. | not unique |
| **Functions** | **Mitigation for previous permit/other historic use** |
| Provides shelter, habitat and food for a variety of benthic invertebrates, fishes, and sea turtles, carbon and nutrient cycling, and connectivity with other marine habitats. Beach provides nesting area for endangered sea turtles. | NA |
| Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found )<br><br>Hardbottom-associated epibiota and fauna, reef- associated bony fishes dominated by non-adult individuals, juvenile sea turtles | Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)<br>Green sea turtle (*Chelonia mydas* -E).medium intensity foraging and shelter. Loggerhead turtle (*Caretta caretta* - E) medium intensity foraging and shelter. Leatherback sea turtle (*Dermochelys coriacea* - E) - rare at project area, low intensity foraging and shelter Hawksbill sea turtle (*Eretmochelys imbricata* - E) Rare in project area, low intensity foraging and shelter. Kemp's ridley sea turtle (*Lepidochelys kempi* -E) rare in project area; low intensity foraging and shelter. Florida Manatee (*Trichechus manatus floridanus* - E) low intensity seasonal travel corridor |

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Encrusting sponges, hydroids, tunicates, bony fishes, dominated by black margate, silver porgy, newly settled grunts, sailors choice, hairy blenny, and porkfish; sea turtles, sharks.

Additional relevant factors:

HB 2 consists of ephemeral and patchy coquina rock settled by a relatively simple community compared to HB 1. Studies have documented that approximately 80% of fish species occupying hardbottom habitat are in early life stages - newly settled, early juvenile, juvenile. "The pipeline will impact the HB2 Community only where the pipeline collars contact the bottom. The pipeline will otherwise not touch the habitat. The 0.02 acre impact area estimate accounts for a 50 ft corridor along the entire pipeline path through areas containing hardbottom, an overestimate of the likely impact.".

| Assessment conducted by: | Assessment date(s): |
|---|---|
| D. Stites, based on baseline hardbottom surveys including fish observations, sea turtle nesting records, aerial photograph-based hardbottom habitat maps | 10/23/2011 |

**Hardbottom Community Two (HB2) - Pipeline**
**PART II – Quantification of Assessment Area (impact)**
**(See Sections 62-345.500 and .600, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community Two (HB2) Impacted by Pipeline |
| **Impact or Mitigation** | **Assessment conducted by:** | **Assessment date:** |
| Impact | D. Stites | 10/23/2011 |

| Scoring Guidance | **Optimal (10)** | **Moderate(7)** | **Minimal (4)** | **Not Present (0)** |
|---|---|---|---|---|
| The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed | Condition is optimal and fully supports wetland/surface water functions | Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions | Minimal level of support of wetland/surface water functions | Condition is insufficient to provide wetland/surface water functions |

| | | |
|---|---|---|
| .500(6)(a) Location and Landscape Support | w/o pres or current: 9 / with: 8 | Current: The landscape score is influenced by the frequency of burial and exposure inherent to ephemeral hardbottom habitats. The score represents the value of functions of the ephemeral habitat which undergoes periodic burial and reexposure. The assessment score reflect the essential fish habitat functions and values provided by the ephemeral hardbottom while accounting for periods of complete burial. **With project,** the pipeline presence would not signficantly alter the setting or landscape support for the area where the pipeline will reside temporarily (for a few weeks). |
| .500(6)(b)Water Environment (n/a for uplands) | w/o pres or current: 8 / with: 8 | The water environment of the impacted area includes relatively harsh conditions, that result in a relatively simple hardbottom community. The score represents the value of functions of the ephemeral habitat which undergoes periodic sand cover and reexposure. The ephemeral hardbottom provides periodic ecological services for a wide variety of species during periods of exposure. The assessment score relfects the EFH functions and values and the periods of burial. **With project conditions water environment** would not vary significantly from the present conditions |
| .500(6)(c)Community structure<br>1. ~~Vegetation and/or~~<br>2. Benthic Community | w/o pres or current: 9 / with: 4 | **Current**: The score represents the community complexity and structure that this hardbottom habitat supports, albeit with periods sand burial and related cessation of functions. Wormrock is not a component of the community, which results in much less diversity and productivity than HB1. With Project: The pipeline will site on collars about 3 ft in width that will suspend the pipe above the ocean floor. Where the collars sit, the bottom will be covered during the period (about 3 weeks) when the pipeline resides in the location with hardbottom comunities. As the pipeline shifts due to wave and current energy the pipeline collars may scrape the community, eliminating all but the algal holdfasts and very low-growing algae. However, the impact area represents a 50 ft corridor along the pipeline path through hardbottom habitat, and thus relfects a condition where the collars did not hold the pipeline off the bottom and the pipeline scraped the entire corridor, which represents a very unlikely event. After the pipeline is removed the algae will redevelop from basal cells and wormrock will regrow. Thus the with project condition will include minimal support of functions for the period during pipeline residence and for the period of regrowth of impacted locations after the pipeline is removed. |

| Score = sum of above scores/30 (if uplands, divide by 20) | |
|---|---|
| current or w/o pres: 0.87 | with: 0.67 |

| Delta = [with-current] |
|---|
| -0.20 |

| If preservation as mitigation, |
|---|
| Preservation adjustment factor = |
| Adjusted mitigation delta = |

| If mitigation |
|---|
| Time lag (t-factor) = |
| Risk factor = |

| For impact assessment areas |
|---|
| FL = delta x acres = 0.2 x 0.02 = 0.004 |

| For mitigation assessment areas |
|---|
| RFG = delta/(t-factor x risk) = |

**UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - MIT/PRES**
**Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Artificial Reef |

| FLUCCs code | Further classification (optional) | Mitigation or Preservation? | Assessment Area Size |
|---|---|---|---|
| 571 | | Mitigation | 0.78 Acres |

| Basin/Watershed Name/Number | Affected Waterbody (Class) | Special Classification (i.e.OFW, AP, other local/state/federal designation of importance) |
|---|---|---|
| Atlantic Ocean | III | N/A |

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This portion of the Atlantic Ocean lies offshore of Hutchinson Island which has inlets to the Indian River Lagoon approximately 10 miles north of the project ara and 12 miles south of the project area

Assessment area description

The proposed migitation area occurs in the same general vicinity as the impact area in a location devoid of hardbottom habitat (using the 2010 aerial photography) in depths of 12-15 ft of water

| Significant nearby features | Uniqueness (considering the relative rarity in relation to the regional landscape.) |
|---|---|
| Pierce Shoal welds to the shoreline of south Hutchinson Island in the project area. The FPL power plant and its intake and discharge structures lie about 2 miles north of the project area. | Not Unique |

| Functions | Mitigation for previous permit/other historic use |
|---|---|
| After mitigation the site will provide shelter, habitat, and food for a variety of benthic invertebrates, fishes, and sea turtles, and potentially mammals | N/A |

| Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found ) | Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) |
|---|---|
| After mitigation: reef associated invertebrates, bony fishes at all life stages, dominated by grunt and jack families, sharks, and sea turtles. | Green sea turtle (*Chelonia mydas* - E) and Loggerhead sea turtle (*Caretta caretta)* - medium intensity foraging and shelter |

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Existing Condition: Sand-habitat epifauna, infauna, and some fishes. Other species use sand areas for travel to higher quality hardbottom habitats.

Additional relevant factors:

The artificial reef will be constructed to provide equivalent relief (elevation off the bottom) as documented within Hardbottom Community One (HB1) and Hardbottom Community Two (HB2).

| Assessment conducted by: | Assessment date(s): |
|---|---|
| D. Stites | 10/23/2011 |

**Mitigation for Hardbottom Impacts**
**PART II – Quantification of Assessment Area (mitigation)**
**(See Sections 62-345.500 and .600, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Artificial Reef |
| **Impact or Mitigation** | **Assessment conducted by:** | **Assessment date:** |
| Mitigation | D. Stites | 10/23/2011 |

| Scoring Guidance | Optimal (10) | Moderate(7) | Minimal (4) | Not Present (0) |
|---|---|---|---|---|
| The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed | Condition is optimal and fully supports wetland/surface water functions | Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions | Minimal level of support of wetland/surface water functions | Condition is insufficient to provide wetland/surface water functions |

| | | | |
|---|---|---|---|
| .500(6)(a) Location and Landscape Support | w/o pres or current: 0 | with: 8 | The mitigation site includes open, bare sand bottom with sand cover at least one ft and not greater than five ft in depth over basement rock. The mitigation site would include depths slightly greater than at impact site (12-16 ft for mitigation compared to 6-12 ft for impact site) but within the existing range for hardbottom in this area. Low-medium relief mitigation reef would comprise sets of clean limestone bolders 4-6 ft diameter touching one another, in sets 20 ft wide and 40 ft long, with 7 ft spaces between sets. The limestone is expected to settle, decreasing the vertical relief to a maximum of about 3 ft. The proposed mitigation locations will provide similar but not identical habitats to those impacted, in similar (but not completely equivalent) locations. The mitigation structure will probably provide more a more physically diverse habitat, but certainly at least as diverse. |
| .500(6)(b)Water Environment (n/a for uplands) | w/o pres or current: 0 | with: 8 | Existing sand bottom includes no signficant functionality. After mitigation construction, the site will develop a diverse community. The slightly greater depth may result in a somewhat different community due to different wave energy and light conditions. The entire space (limestone bolders and spaces) will provide mitigation credit, As the site ages, sand spaces between the rocks and between sets of rocks will accumulate organic matter in similar ways to that in the natural rock interstices and gaps |
| .500(6)(c)Community structure<br>~~1. Vegetation and/or~~<br>2. Benthic Community | w/o pres or current: 0 | with: 8 | The mitigation site includes open, bare sand bottom with relatively little biological productivity. After mitigation, the site will develop a diverse community and may develop a wormrock community, although the sites will likely occur in areas deeper than wormrock typically occurs. The greater degree of spatial diversity (compared to shelves of rock that comprise the physical base of hardbottom habitat) will allow a wide variety of flora to develop .As the rock interstices collect organic matter, adiverse benthic community will develop; this in turn will provide high quality, protected foraging habitat for the various species that use the habitat for this purpose. |

| Score = sum of above scores/30 (if uplands, divide by 20) | | |
|---|---|---|
| current or w/o pres: 0.00 | with: 0.80 | |

| If preservation as mitigation, |
|---|
| Preservation adjustment factor = |
| Adjusted mitigation delta = |

| For impact assessment areas |
|---|
| FL = delta x acres = |

| Delta = [with-current] |
|---|
| 0.80 |

| If mitigation |
|---|
| Time lag (t-factor) = 1.03 |
| Risk factor = 1.25 |

| For mitigation assessment areas |
|---|
| RFG = delta/(t-factor x risk) = 0.62 |

## Mitigation for Hardbottom Impacts

**Mitigation Determination Formulas**

**(See Section 62-345.600(3), F.A.C.)**

For each impact assessment area:

**(FL)** Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:

**(RFG)** Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable)/((t-factor)(risk))

If the acreage of mitigation proposed is known:

**(FG)** Functional Gain = Relative Functional Gain X Mitigation acres

**(a) Mitigation Bank Credit Determination**

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

| Bank Assessment Areas | RFG | X | Acres | = | Credits |
|---|---|---|---|---|---|
| example | | | | | |
| a.a.1 | | | | | |
| a.a.2 | | | | | |
| **total** | | | | | |

**(b) Mitigation needed to offset impacts, when using a mitigation bank**

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assessed in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

| Impact Assesment Area | FL | = | Credits needed |
|---|---|---|---|
| example | | | |
| a.a.1 | | | |
| a.a.2 | | | |
| **total** | | | |

**(c) Mitigation needed to offset impacts, when not using a bank**

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG).

| | FL | / RFG | = Acres of Mitigation |
|---|---|---|---|
| **HB2-FILL** | 0.48 | 0.62 | 0.77 |
| **HB2-PIPELINE** | 0.004 | 0.62 | 0.006 |
| **TOTAL** | **0.48** | | **0.78** |

If there are multiple impact assessment areas and/or multiple mitigation assessment areas to offset those impacts,or if the proposed mitigation acreage is a given, then the summation of the appropriate functional gain (FG) must be equal to or greater than the summation of respective functional losses (FL)

example FL < FG

# SUB-APPENDIX O2

# UMAM ANALYSIS
# FOR
# APPLICANT'S PREFERRED PLAN
# (PRIOR TO JANUARY 5, 2012 REVISION)

**Hardbottom Community One (HB1) - Fill**
**PART I – Qualitative Description**
**(See Section 62-345.400, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community One (HB1) Impacted by Fill |

| FLUCCs code | Further classification (optional) | Impact or Mitigation Site? | Assessment Area Size |
|---|---|---|---|
| 571 | | Impact | 2.08 acres |

| Basin/Watershed Name/Number | Affected Waterbody (Class) | Special Classification (i.e.OFW, AP, other local/state/federal designation of importance) |
|---|---|---|
| Coastal waters, Atlantic Ocean | III | NA |

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This portion of the Atlantic Ocean borders on Hutchinson Island, along the central Florida coastline. Ft. Pierce Inlet (10 miles north) and St. Lucie Inlet (12 miles south) connect to the Indian River Lagoon, which separates Hutchinson Island from the Florida peninsula.

Assessment area description

The assessment area occurs within the northern segment of the proposed project footprint, from FDEP Monument R87.7 to R-90.3. Field surveys recorded low to medium relief (<1 ft - 18 inches) hardbottom (coquina rock) with a signficant wormrock cover, located relatively close to the shoreline. Robust, canopy-forming red algae dominate the biotic cover (10%-28% cover), with wormrock accounting for an additional 6%- 8% cover.

| Significant nearby features | Uniqueness (considering the relative rarity in relation to the regional landscape.) |
|---|---|
| On the island, the FPL nuclear power plant occurs a few miles north of the north project terminus. Walton Rocks, a key nearshore hardbottom feature, occurs about a mile north of the project area. Ft. Pierce shoal welds to the shoreline south of the project terminus at the St. Lucie - Martin County line. Upland development dominated by condominiums occur along much of the adjacent island upland. | not unique |
| **Functions** | **Mitigation for previous permit/other historic use** |
| Provides shelter, habitat and food for a variety of benthic invertebrates, fishes, and sea turtles; carbon and nutrient cycling; and connectivity with other marine habitats. Beach provides nesting area for endangered sea turtles. | NA |
| Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found ) | Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) |
| Wormrock (*Phragmatopoma lapidosa),* sea cucumbers (holothurids), 71 species of coastal, pelagic, and surf zone fish, dominated by black margate, silver porgy, newly settled grunts, sailors choice, hairy blenny, and porkfish; sea turtles, sharks | Green sea turtle (Chelonia mydas-E):medium intensity foraging and shelter. Loggerhead turtle (Caretta caretta - E) medium intensity foraging and shelter. Leatherback sea turtle ((Dermochelys coriacea - E) - rare at project area, low intensity foraging and shelter Hawksbill sea turtle (Eretmochelys imbricata - E) Rare in project area, low intensity foraging and shelter. Kemp's ridley sea turtle (Lepidochelys kempi -E) rare in project area; low intensity foraging and shelter. Florida Manatee (Trichechus manatus floridanus - E) low intensity seasonal travel corridor |

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Wormrock (Phragmatopoma lapsidosa), sea cucumbers (holothurids), 71 species of fish, dominated by black margate, silver porgy, newly settled juvenile grunts, sailors choice, hairy blenny, and porkfish; sea turtles, sharks; sea turtle nest monitoring identifies green and loggerhead sea turtles as common, other turtle species as rare in project area. various shorebirds use the site for loafing, feeding. Hardbottom occurs within travel corridor for nesting sea turtles, provides habitat for juvenile sea turtles.

Additional relevant factors:

Studies have documented that approximately 80% of fish species occupying hardbottom habitat are in early life stages - newly settled, early juvenile, juvenile.

| Assessment conducted by: | Assessment date(s): |
|---|---|
| D. Stites, based on review of baseline hardbottom surveys including fish observations, sea turtle nesting records, aerial photograph-based hardbottom habitat maps and other related data | 10/23/2011 |

**Hardbottom Community One (HB1) - Fill**
**PART II – Quantification of Assessment Area (impact )**
**(See Sections 62-345.500 and .600, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community One (HB1) Impacted by Fill |
| Impact or Mitigation | Assessment conducted by: | Assessment date: |
| Impact | D. Stites | 10/23/2011 |

| Scoring Guidance | Optimal (10) | Moderate(7) | Minimal (4) | Not Present (0) |
|---|---|---|---|---|
| The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed | Condition is optimal and fully supports wetland/surface water functions | Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions | Minimal level of support of wetland/surface water functions | Condition is insufficient to provide wetland/surface water functions |

| | | | |
|---|---|---|---|
| .500(6)(a) Location and Landscape Support | w/o pres or current | with | **Current:** The landscape score is influenced by the frequency of burial and exposure inherent to ephemeral hardbottom habitats. The score represents the value of functions of the ephemeral habitat which undergoes periodic burial and reexposure. The assessment score reflect the essential fish habitat functions and values provided by the ephemeral hardbottom while accounting for periods of complete burial. **With project**, sand placed by the project will cover the habitat and result in a complete loss of functions provided by the location and landscape support of the impacted habitat. |
| | 9 | 0 | |
| .500(6)(b)Water Environment (n/a for uplands) | w/o pres or current | with | The water environment of the impacted area occurs in a shallower zone of the currently exposed nearshore hardbottom. The score represents the value of functions of the ephemeral habitat which undergoes periodic sand cover and reexposure. The ephemeral hardbottom provides periodic ecological services for a wide variety of species during periods of exposure. The assessment score relfects the EFH functions and values and the periods of burial. **With project,** the impacted area would no longer serve any function described above. |
| | 8 | 0 | |
| .500(6)(c)Community structure<br>1. ~~Vegetation and/or~~<br>2. Benthic Community | w/o pres or current | with | **Current**: The score represents the complexity and structure that wormrock provides to the hardbottom habitat, albeit with periodic sand burial and related cessation of functions. **With Project:** The habitat would be buried by sand placement, eliminating the HB1 community. |
| | 9 | 0 | |

| Score = sum of above scores/30 (if uplands, divide by 20) | | |
|---|---|---|
| current or w/o pres | with | |
| 0.87 | 0.00 | |

| If preservation as mitigation, |
|---|
| Preservation adjustment factor = |
| Adjusted mitigation delta = |

| For impact assessment areas |
|---|
| FL = delta x acres = 0.87 x 2.08 = 1.81 |

| Delta = [with-current] |
|---|
| 0.87 |

| If mitigation |
|---|
| Time lag (t-factor) = |
| Risk factor = |

| For mitigation assessment areas |
|---|
| RFG = delta/(t-factor x risk) = |

Form 62-345.900(2), F.A.C. [effective date 02-04-2004]

**Hardbottom Community One (HB1) - Pipeline**
**PART I – Qualitative Description**
**(See Section 62-345.400, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community One (HB1) Impacted by Pipeline |

| FLUCCs code | Further classification (optional) | Impact or Mitigation Site? | Assessment Area Size |
|---|---|---|---|
| 571 | | Impact | 0.08 acres |

| Basin/Watershed Name/Number | Affected Waterbody (Class) | Special Classification (i.e.OFW, AP, other local/state/federal designation of importance) |
|---|---|---|
| Coastal waters, Atlantic Ocean | III | NA |

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This portion of the Atlantic Ocean borders on Hutchinson Island, along the central Florida coastline. Ft. Pierce Inlet (10 miles north) and St. Lucie Inlet (12 miles south) connect to the Indian River Lagoon, which separates Hutchinson Island from the Florida peninsula.

Assessment area description

The assessment area occurs within the northern segment of the proposed project footprint, from FDEP Monument R87.7 to R-90.3. Field surveys recorded low to medium relief (<1 ft - 18 inches) hardbottom (coquina rock) with a signficant wormrock cover, located relatively close to the shoreline. Robust, canopy-forming red algae dominate the biotic cover (10%-28% cover), with wormrock accounting for an additional 6%- 8% cover.

| Significant nearby features | Uniqueness (considering the relative rarity in relation to the regional landscape.) |
|---|---|
| On the island, the FPL nuclear power plant occurs a few miles north of the north project terminus. Walton Rocks, a key nearshore hardbottom feature, occurs about a mile north of the project area. Ft. Pierce shoal welds to the shoreline south of the project terminus at the St. Lucie - Martin County line. Upland development dominated by condominiums occurs along much o f the adjacent island upland. | not unique |

| Functions | Mitigation for previous permit/other historic use |
|---|---|
| Provides shelter, habitat and food for a variety of benthic invertebrates, fishes, and sea turtles, carbon and nutrient cycling, and connectivity with other marine habitats. Beach provides nesting area for endangered sea turtles. | NA |

| Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found ) | Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) |
|---|---|
| Wormrock (*Phragmatopoma lapidosa),* sea cucumbers (holothurids), 71 species of coastal, pelagic, and surf zone fish, dominated by black margate, silver porgy, newly settled grunts, sailors choice, hairy blenny, and porkfish; sea turtles, sharks | Green sea turtle (*Chelonia mydas* -E):medium intensity foraging and shelter. Loggerhead turtle (*Caretta caretta* - E) medium intensity foraging and shelter. Leatherback sea turtle (*Dermochelys coriacea* - E) - rare at project area, low intensity foraging and shelter Hawksbill sea turtle (*Eretmochelys imbricata* - E) Rare in project area, low intensity foraging and shelter. Kemp's ridley sea turtle (*Lepidochelys kempi* -E) rare in project area; low intensity foraging and shelter. Florida Manatee (*Trichechus manatus floridanus* - E) low intensity seasonal travel corridor |

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Wormrock (Phragmatopoma lapidosa), sea cucumbers (holothurids), 71 species of fish, dominated by black margate, silver porgy, newly settled juvenile grunts, sailors choice, hairy blenny, and porkfish; sea turtles, sharks; sea turtle nest monitoring identifies green and loggerhead sea turtles as common, other turtle species as rare in project area. various shorebirds use the site for loafing, feeding. hardbottom occurs within travel corridor for nesting sea turtles, provides habitat for juvenile sea turtles.

Additional relevant factors:

Studies have documented that approximately 80% of fish hspecies occupying hardbottom habitat are in early life stages - newly settled, early juvenile, juvenile. The pipeline will impact the HB1 Community only where the pipeline collars contact the bottom. The pipeline will otherwise not touch the habitat. The 0.08 acre impact area estimate accounts for a 50 ft corridor along the entire pipeline path through areas containing hardbottom, an overestimate of the likely impact.

| Assessment conducted by: | Assessment date(s): |
|---|---|
| D. Stites, based on baseline hardbottom surveys including fish observations, sea turtle nesting records, aerial photograph-based hardbottom habitat maps | 10/23/2011 |

**Hardbottom Community One (HB1) - Pipeline**
**PART II – Quantification of Assessment Area (impact )**
**(See Sections 62-345.500 and .600, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community One (HB1) Impacted by Pipeline |
| **Impact or Mitigation** | **Assessment conducted by:** | **Assessment date:** |
| Impact | D. Stites | 10/23/2011 |

| Scoring Guidance | **Optimal (10)** | **Moderate(7)** | **Minimal (4)** | **Not Present (0)** |
|---|---|---|---|---|
| The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed | Condition is optimal and fully supports wetland/surface water functions | Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions | Minimal level of support of wetland/surface water functions | Condition is insufficient to provide wetland/surface water functions |

| | | |
|---|---|---|
| .500(6)(a) Location and Landscape Support<br>w/o pres or current: 9<br>with: 8 | Current: The landscape score is influenced by the frequency of burial and exposure inherent to ephemeral hardbottom habitats. The score represents the value of functions of the ephemeral habitat which undergoes periodic burial and reexposure. The assessment score reflect the essential fish habitat functions and values provided by the ephemeral hardbottom while accounting for periods of burial as a result of natural processes. The pipeline would not significantly impact the general landscape support around the pipeline area. The pipeline would remain in the location with hardbottom for less than a month and then be moved to other locations without hardbottom habitat. |
| .500(6)(b)Water Environment (n/a for uplands)<br>w/o pres or current: 8<br>with: 8 | The water environment of the impacted area occurs in a shallower zone of the currently exposed nearshore hardbottom. The score represents the value of functions of the ephemeral habitat which undergoes periodic sand cover and reexposure. The ephemeral hardbottom provides periodic ecological services for a wide variety of species during periods of exposure. The assessment score relfects the EFH functions and values and the periods of burial. the pipeline would not affect the water environment at the site. |
| .500(6)(c)Community structure<br>1. ~~Vegetation and/or~~<br>2. Benthic Community<br>w/o pres or current: 9<br>with: 4 | **Current:** The score represents the complexity and structure that wormrock provides to the hardbottom habitat, albeit with periods sand burial and related cessation of functions. **With Project:** The pipeline will site on collars about 3 ft in width that will suspend the pipe above the ocean floor. Where the collars sit, the bottom will be covered during the period (about 3 weeks) when the pipeline resides in the location with hardbottom comunities. As the pipeline shifts due to wave and current energy the pipeline collars may scrape the community, eliminating all but the algal holdfasts and very low-growing algae. However, the impact area represents a 50 ft corridor along the pipeline path through hardbottom habitat, and thus relfects a condition where the collars did not hold the pipeline off the bottom and the pipeline scraped the entire corridor, which represents a very unlikely event. After the pipeline is removed the algae will redevelop from basal cells and wormrock will regrow. Thus the with project condition will include minimal support of functions for the period during pipeline residence and for the period of regrowth of impacted locations after the pipeline is removed. |

| Score = sum of above scores/30 (if uplands, divide by 20) | |
|---|---|
| current or w/o pres: 0.87 | with: 0.67 |

| If preservation as mitigation, |
|---|
| Preservation adjustment factor = |
| Adjusted mitigation delta = |

| For impact assessment areas |
|---|
| FL = delta x acres = 0.20 x 0.08 = 0.016 |

| Delta = [with-current] |
|---|
| 0.20 |

| If mitigation |
|---|
| Time lag (t-factor) = |
| Risk factor = |

| For mitigation assessment areas |
|---|
| RFG = delta/(t-factor x risk) = |

**Hardbottom Community Two (HB2) - Fill**
**PART I – Qualitative Description**
**(See Section 62-345.400, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community Two (HB2) Impacted by Fill |

| FLUCCs code | Further classification (optional) | Impact or Mitigation Site? | Assessment Area Size |
|---|---|---|---|
| 571 | | Impact | 0.55 acres |

| Basin/Watershed Name/Number | Affected Waterbody (Class) | Special Classification (i.e.OFW, AP, other local/state/federal designation of importance) |
|---|---|---|
| Coastal waters, Atlantic Ocean | III | NA |

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This portion of the Atlantic Ocean borders on Hutchinson Island, along the central Florida coastline. Ft. Pierce Inlet (10 miles north) and St. Lucie Inlet (12 miles south) connect to the Indian River Lagoon, which separates Hutchinson Island from the Florida peninsula.

Assessment area description

The assessment area occurs within the northern segment of the proposed project footprint, from FDEP Monument R87.7 to R-90.3. Field surveys recorded patchy, low (<1 ft - 18 inch vertical) relief hardbottom (coquina rock) with a sporadic cover of turf algae and other low growing algal species. The community does not include wormrock.

| Significant nearby features | Uniqueness (considering the relative rarity in relation to the regional landscape.) |
|---|---|
| On the island, the FPL nuclear power plant occurs a few miles north of the north project terminus. Walton Rocks, a key nearshore hardbottom feature, occurs about a mile north of the project area. Ft. Pierce Shoal welds to the shoreline north of the project terminus at the St. Lucie - Martin County line. Upland development dominated by condominiums occur along much of the adjacent island upland. | not unique |
| **Functions** | **Mitigation for previous permit/other historic use** |
| Provides shelter, habitat and food for a variety of benthic invertebrates, fishes, and sea turtles; carbon and nutrient cycling; and connectivity with other marine habitats. Beach provides nesting area for endangered sea turtles. | NA |
| Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found )<br><br>Hardbottom-associated epibiota and fauna, reef- associated bony fishes dominated by non-adult individuals, juvenile sea turtles. | Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)<br>Green sea turtle (*Chelonia mydas* -E):medium intensity foraging and shelter. Loggerhead turtle (*Caretta caretta* - E) medium intensity foraging and shelter. Leatherback sea turtle (*Dermochelys coriacea* - E) - rare at project area, low intensity foraging and shelter Hawksbill sea turtle (*Eretmochelys imbricata* - E) Rare in project area, low intensity foraging and shelter. Kemp's ridley sea turtle (*Lepidochelys kempi* -E) rare in project area; low intensity foraging and shelter. Florida Manatee (*Trichechus manatus floridanus* - E) low intensity seasonal travel corridor |

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Encrusting sponges, hydroids, tunicates, bony fishes, dominated by black margate, silver porgy, newly settled grunts, sailors choice, hairy blenny, and porkfish; sea turtles, sharks.

Additional relevant factors:

HB 2 consists of ephemeral and patchy coquina rock settled by a relatively simple community compared to HB 1. Studies have documented that approximately 80% of fish species occupying hardbottom habitat are in early life stages - newly settled, early juvenile, juvenile.

| Assessment conducted by: | Assessment date(s): |
|---|---|
| D. Stites, based on baseline hardbottom surveys including fish observations, sea turtle nesting records, aerial photograph-based hardbottom habitat maps | 10/23/2011 |

**Hardbottom Community Two (HB2) - Fill**
**PART II – Quantification of Assessment Area (impact)**
**(See Sections 62-345.500 and .600, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community Two (HB2) Impacted by Fill |
| **Impact or Mitigation** | **Assessment conducted by:** | **Assessment date:** |
| Impact | D. Stites | 10/23/2011 |

| Scoring Guidance | Optimal (10) | Moderate(7) | Minimal (4) | Not Present (0) |
|---|---|---|---|---|
| The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed | Condition is optimal and fully supports wetland/surface water functions | Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions | Minimal level of support of wetland/surface water functions | Condition is insufficient to provide wetland/surface water functions |

| | |
|---|---|
| .500(6)(a) Location and Landscape Support<br>w/o pres or current: 9 with: 0 | **Current:** The landscape score is influenced by the frequency of burial and exposure inherent to ephemeral hardbottom habitats. The score represents the value of functions of the ephemeral habitat which undergoes periodic burial and reexposure. The assessment scores reflect the essential fish habitat functions and values provided by the ephemeral hardbottom while accounting for periods of complete burial. **With project,** sand placed by the project will cover the habitat and result in a complete loss of functions provided by the location and landscape support of the impacted habitat. |
| .500(6)(b)Water Environment (n/a for uplands)<br>w/o pres or current: 8 with: 0 | The water environment of the impacted area includes relatively harsh conditions that result in a relatively simple hardbottom community. The score represents the value of functions of the ephemeral habitat which undergoes periodic sand cover and reexposure. The ephemeral hardbottom provides periodic ecological services for a wide variety of species during periods of exposure. The assessment score relfects the EFH functions and values and the periods of burial. **With project,** the impacted area would no longer serve any function described above. |
| .500(6)(c)Community structure<br>1. ~~Vegetation and/or~~<br>2. Benthic Community<br>w/o pres or current: 9 with: 0 | **Current:** The score represents the community complexity and structure that this hardbottom habitat supports, albeit with periodic sand burial and related cessation of functions. Wormrock is not a component of the community, which results in much less diversity and productivity. **With Project**: construction would result in the burial of the habitat and loss of functions with benefit to fish and wildlife. |

| Score = sum of above scores/30 (if uplands, divide by 20) | |
|---|---|
| current or w/o pres: 0.87 | with: 0 |

| If preservation as mitigation, |
|---|
| Preservation adjustment factor = |
| Adjusted mitigation delta = |

| For impact assessment areas |
|---|
| FL = delta x acres = 0.87 x 0.55 = 0.48 |

| Delta = [with-current] |
|---|
| -0.87 |

| If mitigation |
|---|
| Time lag (t-factor) = |
| Risk factor = |

| For mitigation assessment areas |
|---|
| RFG = delta/(t-factor x risk) = |

**Hardbottom Community Two (HB2) - Pipeline**
**PART I – Qualitative Description**
**(See Section 62-345.400, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community Two (HB2) Impacted by Pipeline |

| FLUCCs code | Further classification (optional) | Impact or Mitigation Site? | Assessment Area Size |
|---|---|---|---|
| 571 | | Impact | 0.02 acres |

| Basin/Watershed Name/Number | Affected Waterbody (Class) | Special Classification (i.e.OFW, AP, other local/state/federal designation of importance) |
|---|---|---|
| Coastal waters, Atlantic Ocean | III | NA |

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This portion of the Atlantic Ocean borders on Hutchinson Island, along the central Florida coastline. Ft. Pierce Inlet (10 miles north) and St. Lucie Inlet (12 miles south) connect to the Indian River Lagoon, which separates Hutchinson Island from the Florida peninsula.

Assessment area description

The assessment area occurs within the northern segment of the proposed project footprint, from FDEP Monument R87.7 to R-90.3. Field surveys recorded patchy, low (<1 ft - 18 inch vertical) relief hardbottom (coquina rock) with a sporadic cover of turf algae and other low growing algal species. The community does not include wormrock.

| Significant nearby features | Uniqueness (considering the relative rarity in relation to the regional landscape.) |
|---|---|
| On the island, the FPL nuclear power plant occurs a few miles north of the north project terminus. Walton Rocks, a key nearshore hardbottom feature, occurs about a mile north of the project area. Ft. Pierce Shoal welds to the shoreline north of the project terminus at the St. Lucie - Martin County line. Upland development dominated by condominiums occurs along much of the adjacent island upland. | not unique |
| **Functions** | **Mitigation for previous permit/other historic use** |
| Provides shelter, habitat and food for a variety of benthic invertebrates, fishes, and sea turtles, carbon and nutrient cycling, and connectivity with other marine habitats. Beach provides nesting area for endangered sea turtles. | NA |
| Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found )<br><br>Hardbottom-associated epibiota and fauna, reef- associated bony fishes dominated by non-adult individuals, juvenile sea turtles | Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)<br>Green sea turtle (*Chelonia mydas* -E).medium intensity foraging and shelter. Loggerhead turtle (*Caretta caretta* - E) medium intensity foraging and shelter. Leatherback sea turtle (*Dermochelys coriacea* - E) - rare at project area, low intensity foraging and shelter Hawksbill sea turtle (*Eretmochelys imbricata* - E) Rare in project area, low intensity foraging and shelter. Kemp's ridley sea turtle (*Lepidochelys kempi* -E) rare in project area; low intensity foraging and shelter. Florida Manatee (*Trichechus manatus floridanus* - E) low intensity seasonal travel corridor |

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Encrusting sponges, hydroids, tunicates, bony fishes, dominated by black margate, silver porgy, newly settled grunts, sailors choice, hairy blenny, and porkfish; sea turtles, sharks.

Additional relevant factors:

HB 2 consists of ephemeral and patchy coquina rock settled by a relatively simple community compared to HB 1. Studies have documented that approximately 80% of fish species occupying hardbottom habitat are in early life stages - newly settled, early juvenile, juvenile. "The pipeline will impact the HB2 Community only where the pipeline collars contact the bottom. The pipeline will otherwise not touch the habitat. The 0.02 acre impact area estimate accounts for a 50 ft corridor along the entire pipeline path through areas containing hardbottom, an overestimate of the likely impact.".

| Assessment conducted by: | Assessment date(s): |
|---|---|
| D. Stites, based on baseline hardbottom surveys including fish observations, sea turtle nesting records, aerial photograph-based hardbottom habitat maps | 10/23/2011 |

**Hardbottom Community Two (HB2) - Pipeline**
**PART II – Quantification of Assessment Area (impact)**
**(See Sections 62-345.500 and .600, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Ephemeral Hardbottom Community Two (HB2) Impacted by Pipeline |
| **Impact or Mitigation** | **Assessment conducted by:** | **Assessment date:** |
| Impact | D. Stites | 10/23/2011 |

| Scoring Guidance | **Optimal (10)** | **Moderate(7)** | **Minimal (4)** | **Not Present (0)** |
|---|---|---|---|---|
| The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed | Condition is optimal and fully supports wetland/surface water functions | Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions | Minimal level of support of wetland/surface water functions | Condition is insufficient to provide wetland/surface water functions |

| | | |
|---|---|---|
| .500(6)(a) Location and Landscape Support | w/o pres or current: 9 / with: 8 | Current: The landscape score is influenced by the frequency of burial and exposure inherent to ephemeral hardbottom habitats. The score represents the value of functions of the ephemeral habitat which undergoes periodic burial and reexposure. The assessment score reflect the essential fish habitat functions and values provided by the ephemeral hardbottom while accounting for periods of complete burial. **With project,** the pipeline presence would not signficantly alter the setting or landscape support for the area where the pipeline will reside temporarily (for a few weeks). |
| .500(6)(b)Water Environment (n/a for uplands) | w/o pres or current: 8 / with: 8 | The water environment of the impacted area includes relatively harsh conditions, that result in a relatively simple hardbottom community. The score represents the value of functions of the ephemeral habitat which undergoes periodic sand cover and reexposure. The ephemeral hardbottom provides periodic ecological services for a wide variety of species during periods of exposure. The assessment score relfects the EFH functions and values and the periods of burial. **With project conditions water environment** would not vary significantly from the present conditions |
| .500(6)(c)Community structure<br>1. ~~Vegetation and/or~~<br>2. Benthic Community | w/o pres or current: 9 / with: 4 | **Current**: The score represents the community complexity and structure that this hardbottom habitat supports, albeit with periods sand burial and related cessation of functions. Wormrock is not a component of the community, which results in much less diversity and productivity than HB1. With Project: The pipeline will site on collars about 3 ft in width that will suspend the pipe above the ocean floor. Where the collars sit, the bottom will be covered during the period (about 3 weeks) when the pipeline resides in the location with hardbottom comunities. As the pipeline shifts due to wave and current energy the pipeline collars may scrape the community, eliminating all but the algal holdfasts and very low-growing algae. However, the impact area represents a 50 ft corridor along the pipeline path through hardbottom habitat, and thus relfects a condition where the collars did not hold the pipeline off the bottom and the pipeline scraped the entire corridor, which represents a very unlikely event. After the pipeline is removed the algae will redevelop from basal cells and wormrock will regrow. Thus the with project condition will include minimal support of functions for the period during pipeline residence and for the period of regrowth of impacted locations after the pipeline is removed. |

| Score = sum of above scores/30 (if uplands, divide by 20) | |
|---|---|
| current or w/o pres: 0.87 | with: 0.67 |

| Delta = [with-current] |
|---|
| -0.20 |

| If preservation as mitigation, |
|---|
| Preservation adjustment factor = |
| Adjusted mitigation delta = |

| If mitigation |
|---|
| Time lag (t-factor) = |
| Risk factor = |

| For impact assessment areas |
|---|
| FL = delta x acres = 0.2 x 0.02 = 0.004 |

| For mitigation assessment areas |
|---|
| RFG = delta/(t-factor x risk) = |

**UNIFORM WETLAND MITIGATION ASSESSMENT WORKSHEET - PART I - MIT/PRES**
**Form 62-345.900(2), F.A.C. (See Sections 62-345.400 F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Artificial Reef |

| FLUCCs code | Further classification (optional) | Mitigation or Preservation? | Assessment Area Size |
|---|---|---|---|
| 571 | | Mitigation | 3.72 Acres |

| Basin/Watershed Name/Number | Affected Waterbody (Class) | Special Classification (i.e.OFW, AP, other local/state/federal designation of importance) |
|---|---|---|
| Atlantic Ocean | III | N/A |

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This portion of the Atlantic Ocean lies offshore of Hutchinson Island which has inlets to the Indian River Lagoon approximately 10 miles north of the project ara and 12 miles south of the project area

Assessment area description

The proposed migitation area occurs in the same general vicinity as the impact area in a location devoid of hardbottom habitat (using the 2010 aerial photography) in depths of 12-15 ft of water

| Significant nearby features | Uniqueness (considering the relative rarity in relation to the regional landscape.) |
|---|---|
| Pierce Shoal welds to the shoreline of south Hutchinson Island in the project area. The FPL power plant and its intake and discharge structures lie about 2 miles north of the project area. | Not Unique |

| Functions | Mitigation for previous permit/other historic use |
|---|---|
| After mitigation the site will provide shelter, habitat, and food for a variety of benthic invertebrates, fishes, and sea turtles, and potentially mammals | N/A |

| Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found ) | Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area) |
|---|---|
| After mitigation: reef associated invertebrates, bony fishes at all life stages, dominated by grunt and jack families, sharks, and sea turtles. | Green sea turtle (*Chelonia mydas* - E) and Loggerhead sea turtle (*Caretta caretta)* - medium intensity foraging and shelter |

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Existing Condition: Sand-habitat epifauna, infauna, and some fishes. Other species use sand areas for travel to higher quality hardbottom habitats.

Additional relevant factors:

The artificial reef will be constructed to provide equivalent relief (elevation off the bottom) as documented within Hardbottom Community One (HB1) and Hardbottom Community Two (HB2).

| Assessment conducted by: | Assessment date(s): |
|---|---|
| D. Stites | 10/23/2011 |

**Mitigation for Hardbottom Impacts**
**PART II – Quantification of Assessment Area (mitigation)**
**(See Sections 62-345.500 and .600, F.A.C.)**

| Site/Project Name | Application Number | Assessment Area Name or Number |
|---|---|---|
| St. Lucie County South Beach and Dune Restoration | SAJ-2009-03448 (IP-GGL) | Artificial Reef |
| **Impact or Mitigation** | **Assessment conducted by:** | **Assessment date:** |
| Mitigation | D. Stites | 10/23/2011 |

| Scoring Guidance | Optimal (10) | Moderate(7) | Minimal (4) | Not Present (0) |
|---|---|---|---|---|
| The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed | Condition is optimal and fully supports wetland/surface water functions | Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions | Minimal level of support of wetland/surface water functions | Condition is insufficient to provide wetland/surface water functions |

| | | | |
|---|---|---|---|
| .500(6)(a) Location and Landscape Support | w/o pres or current: 0 | with: 8 | The mitigation site includes open, bare sand bottom with sand cover at least one ft and not greater than five ft in depth over basement rock. The mitigation site would include depths slightly greater than at impact site (12-16 ft for mitigation compared to 6-12 ft for impact site) but within the existing range for hardbottom in this area. Low-medium relief mitigation reef would comprise sets of clean limestone bolders 4-6 ft diameter touching one another, in sets 20 ft wide and 40 ft long, with 7 ft spaces between sets. The limestone is expected to settle, decreasing the vertical relief to a maximum of about 3 ft. The proposed mitigation locations will provide similar but not identical habitats to those impacted, in similar (but not completely equivalent) locations. The mitigation structure will probably provide more a more physically diverse habitat, but certainly at least as diverse. |
| .500(6)(b)Water Environment (n/a for uplands) | w/o pres or current: 0 | with: 8 | Existing sand bottom includes no signficant functionality. After mitigation construction, the site will develop a diverse community. The slightly greater depth may result in a somewhat different community due to different wave energy and light conditions. The entire space (limestone bolders and spaces) will provide mitigation credit, As the site ages, sand spaces between the rocks and between sets of rocks will accumulate organic matter in similar ways to that in the natural rock interstices and gaps |
| .500(6)(c)Community structure<br>~~1. Vegetation and/or~~<br>2. Benthic Community | w/o pres or current: 0 | with: 8 | The mitigation site includes open, bare sand bottom with relatively little biological productivity. After mitigation, the site will develop a diverse community and may develop a wormrock community, although the sites will likely occur in areas deeper than wormrock typically occurs. The greater degree of spatial diversity (compared to shelves of rock that comprise the physical base of hardbottom habitat) will allow a wide variety of flora to develop .As the rock interstices collect organic matter, adiverse benthic community will develop; this in turn will provide high quality, protected foraging habitat for the various species that use the habitat for this purpose. |

| Score = sum of above scores/30 (if uplands, divide by 20) | | |
|---|---|---|
| current or w/o pres: 0.00 | with: 0.80 | |

| If preservation as mitigation, |
|---|
| Preservation adjustment factor = |
| Adjusted mitigation delta = |

| For impact assessment areas |
|---|
| FL = delta x acres = |

| Delta = [with-current] |
|---|
| 0.80 |

| If mitigation |
|---|
| Time lag (t-factor) = 1.03 |
| Risk factor = 1.25 |

| For mitigation assessment areas |
|---|
| RFG = delta/(t-factor x risk) = 0.62 |

## Mitigation for Hardbottom Impacts

**Mitigation Determination Formulas**

**(See Section 62-345.600(3), F.A.C.)**

For each impact assessment area:

**(FL)** Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:

**(RFG)** Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable)/((t-factor)(risk))

If the acreage of mitigation proposed is known:

**(FG)** Functional Gain = Relative Functional Gain X Mitigation acres

**(a) Mitigation Bank Credit Determination**

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

| Bank Assessment Areas | RFG | X | Acres | = | Credits |
|---|---|---|---|---|---|
| example | | | | | |
| a.a.1 | | | | | |
| a.a.2 | | | | | |
| **total** | | | | | |

**(b) Mitigation needed to offset impacts, when using a mitigation bank**

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assessed in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

| Impact Assesment Area | FL | = | Credits needed |
|---|---|---|---|
| example | | | |
| a.a.1 | | | |
| a.a.2 | | | |
| **total** | | | |

**(c) Mitigation needed to offset impacts, when not using a bank**

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG).

| | FL | / | RFG | = | Acres of Mitigation |
|---|---|---|---|---|---|
| **HB1-FILL** | 1.81 | | 0.62 | | 2.91 |
| **HB1-PIPELINE** | 0.02 | | 0.62 | | 0.03 |
| **HB2-FILL** | 0.48 | | 0.62 | | 0.77 |
| **HB2-PIPELINE** | 0.004 | | 0.62 | | 0.006 |
| **TOTAL** | **2.31** | | | | **3.72** |

If there are multiple impact assessment areas and/or multiple mitigation assessment areas to offset those impacts,or if the proposed mitigation acreage is a given, then the summation of the appropriate functional gain (FG) must be equal to or greater than the summation of respective functional losses (FL)

| | | | |
|---|---|---|---|
| example | FL | < | FG |