LIVING SHORELINES

What shoreline armoring?

"Armoring" is the practice of using physical structures to protect shorelines from coastal erosion. — NOAA

There are two primary types:
Grey and Green

Grey = Hardened Structures

VERITICAL BULKHEAD

SEA WALLS

Green = WADs and Vegetation

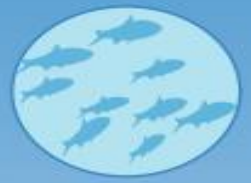
WAVE ATTENUATION DEVICES

LIVING SHORELINES SUPPORT RESILIENT COMMUNITIES

Living shorelines use plants or other natural elements—sometimes in combination with harder shoreline structures—to stabilize estuarine coasts, bays, and tributaries.

One square mile of salt marsh stores the carbon equivalent of **76,000 gal of gas** annually.

Marshes trap sediments from tidal waters, allowing them to **grow in elevation** as sea level rises.



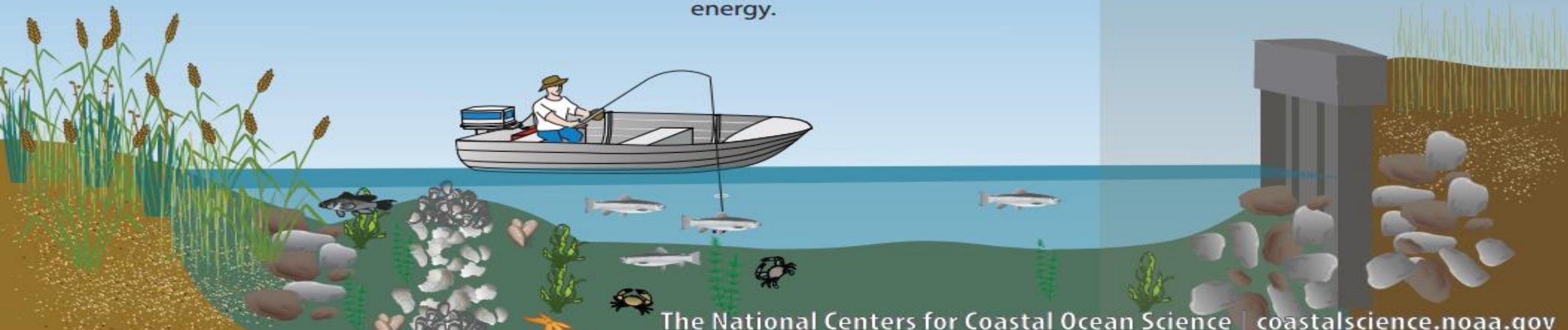
Living shorelines improve **water quality**, provide fisheries **habitat**, increase **biodiversity**, and promote **recreation**.

Marshes and oyster reefs act as natural **barriers** to waves. **15 ft** of marsh can **absorb 50%** of incoming wave energy.

Living shorelines are **more resilient** against storms than bulkheads.

33% of shorelines in the U.S. will be **hardened** by **2100**, decreasing fisheries habitat and biodiversity.

Hard shoreline structures like **bulkheads** prevent natural marsh migration and may create seaward **erosion**.



MAJOR CONSIDERATIONS when choosing a

LIVING SHORELINE verses a BULKHEAD:

Cost

Permitting

Lifespan/Maintenance

Cost: Depends on three things:

MATERIALS FOR OVERALL NEED

SIMPLICITY / COMPLEXITY OF ACCESS

PROFESSIONAL SERVICES

Permitting – refer to these two documents

Resource #1 NOAA/USACE – Grey vs Green applications.

"Natural and Structural Measures for Shoreline Stabilization"

https://coast.noaa.gov/data/digitalcoast/pdf/living-shoreline.pdf

Permitting – refer to these two documents

Resource #2 – University of Florida

"Streamlining Resiliency: Regulatory Considerations in Permitting Small-Scale Living Shorelines in Florida"

https://edis.ifas.ufl.edu/pdffiles/SG/SG15500.pdf

Lifespan/Maintenance

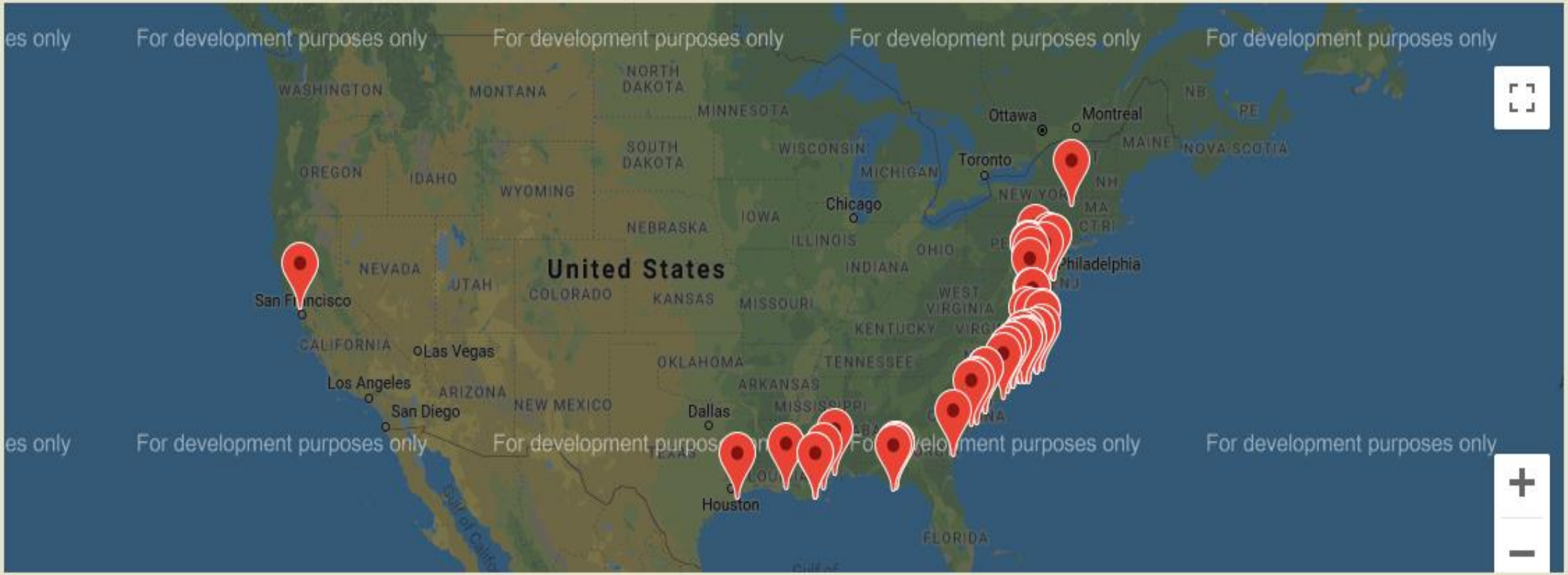
Living Shorelines grow and change as water levels rise

Damage to vegetation often recovers.

Reef balls stay in place.

Shorelines survive where bulkheads do not.

MAP OF HIGHLIGHTED PROJECTS



EMAIL PRINT

Before Wrights Landing restoration project


After Wrights Landing restoration project

Jacksonville Zoo Living Shoreline

JACKSONVILLE ZOO AND GARDENS

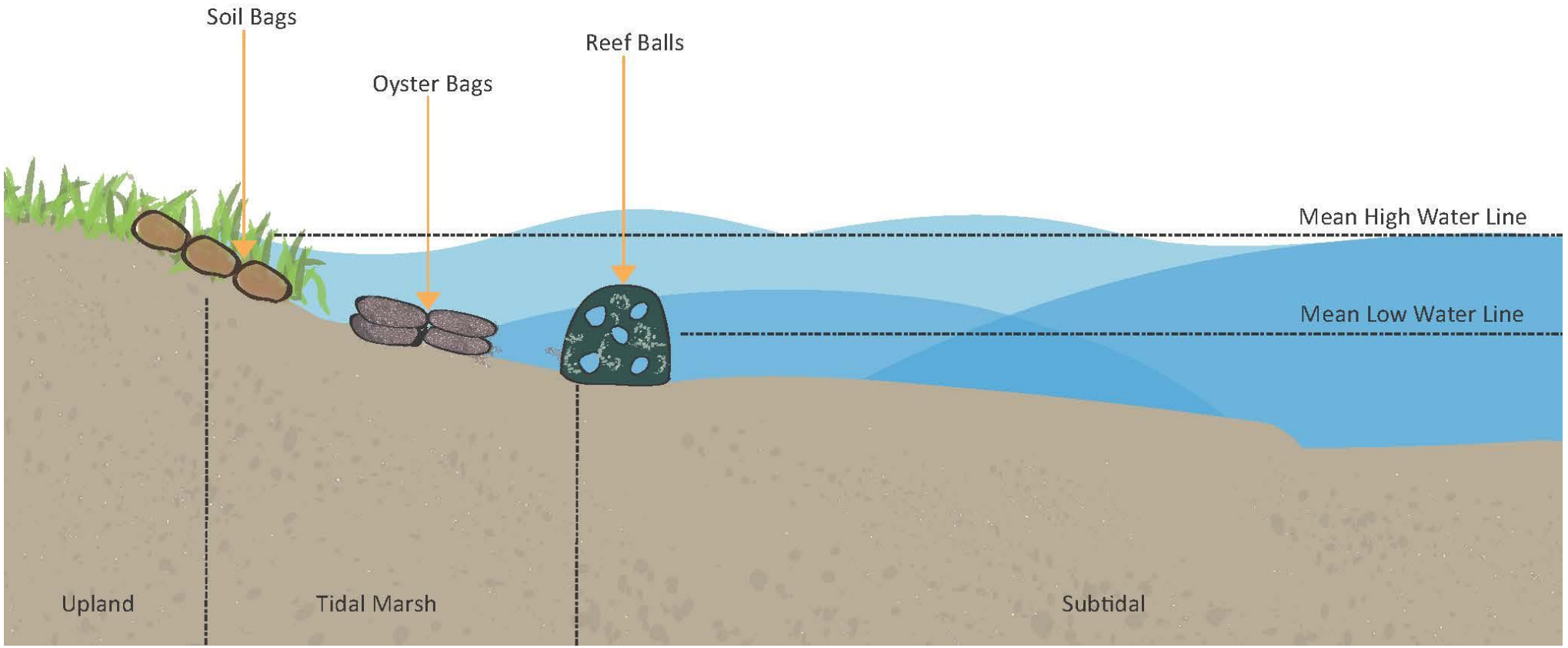

Trout River Lodge
Butterfly Hollow
Jacksonville Zoo Living Shoreline
Tides
Boardwalk Plan B
Sign
Soil Bags
Planting Area
Upland Planting Area
Oyster Bags (12' wide rows with 6' gaps)
Reef Balls (12' wide rows with 6' gaps)
N
1 in = 50 ft
60
30
0
Feet
OEC
www.onsiteec.com
Onsite Environmental Consulting, LLC
"Our Expertise Wherever You Are."
PH: 904.384.7020 FAX: 904.384.7021


3.5 feet
3.5 feet
MHW 0.90’
Sign is attached
to elevated
observation deck
5.0 feet
5.5 feet
21.0 feet
Sign
MLW -1.64’
Features Not to Scale

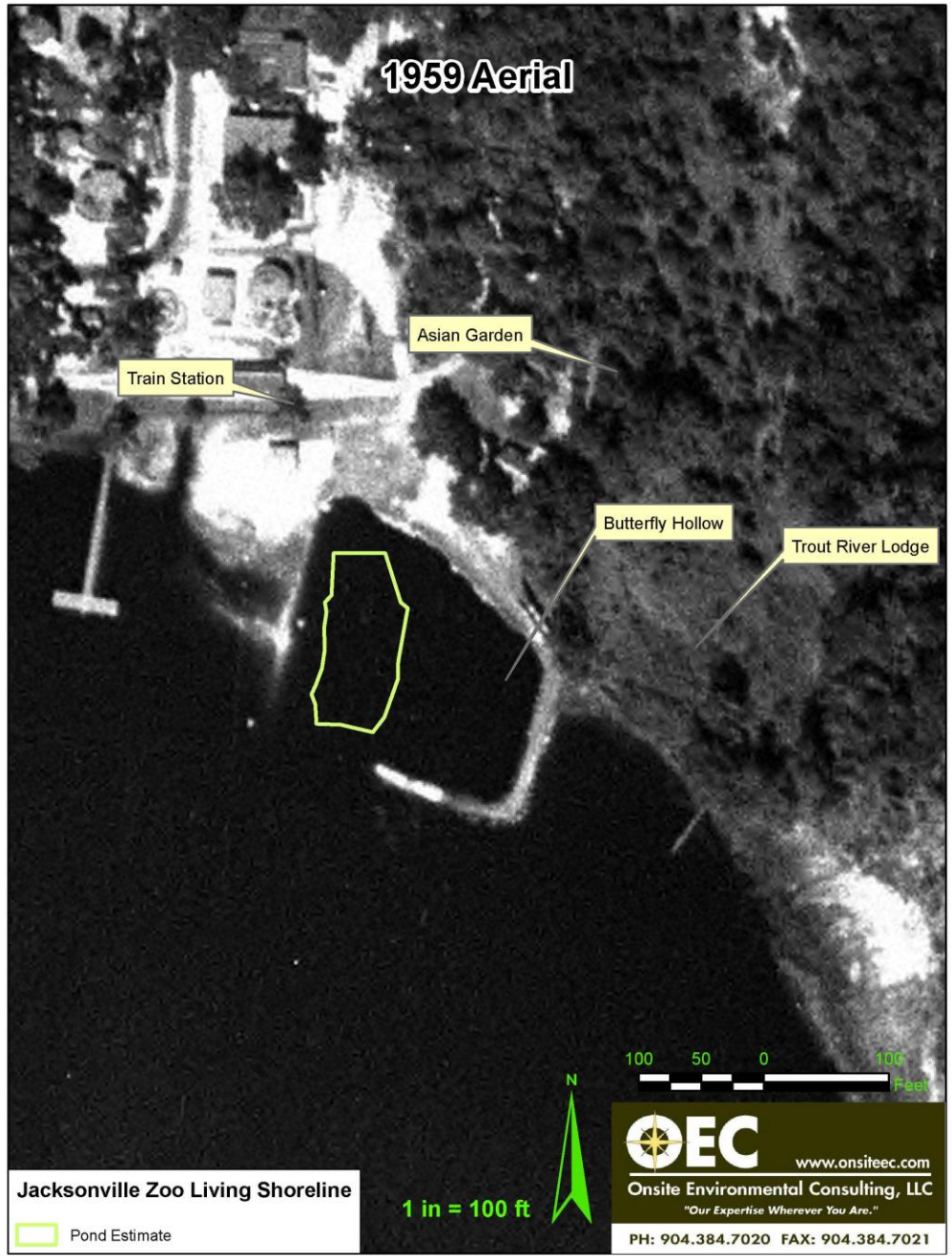
Jacksonville Zoo Living Shoreline

Zoo Living Shoreline Cross Section View

Map: Not to Scale




3.5 feet
3.5 feet
MHW 0.90'
Sign is attached
to elevated
observation deck
5.0 feet
5.5 feet
21.0 feet
Sign
MLW -1.64'
Features Not to Scale


1959 Aerial
Asian Garden
Train Station
Butterfly Hollow
Trout River Lodge
100 50 0 100
Feet
N
1 in = 100 ft
Jacksonville Zoo Living Shoreline
Pond Estimate
OEC
www.onsiteec.com
Onsite Environmental Consulting, LLC
"Our Expertise Wherever You Are."
PH: 904.384.7020 FAX: 904.384.7021


1975 Aerial
Asian Garden
Train Station
Butterfly Hollow
Trout River Lodge
100 50 0 100
Feet
N
1 in = 100 ft
OEC
www.onsiteec.com
Onsite Environmental Consulting, LLC
"Our Expertise Wherever You Are."
PH: 904.384.7020 FAX: 904.384.7021


Trout River Lodge
Butterfly Hollow
Jacksonville Zoo Living Shoreline
Tides
Boardwalk Plan B
Sign
Soil Bags
Planting Area
Upland Planting Area
Oyster Bags (12' wide rows with 6' gaps)
Reef Balls (12' wide rows with 6' gaps)
N
1 in = 50 ft
60
30
0
Feet
OEC
www.onsiteec.com
Onsite Environmental Consulting, LLC
"Our Expertise Wherever You Are."
PH: 904.384.7020 FAX: 904.384.7021

TIMELINE TO COMPLETION:

- NEXT 6 MONTHS
- Boardwalk / Observation Deck construction – Jan 2019
- Site prep, about 6 weeks before that
- ACES/JU MSRC in 2nd semester
- Completed and launched Earth Day 2019