ENVIRONMENTAL ASSESSMENT

Anclote River, Florida Project and Gulf Intracoastal Waterway (GIWW) Cut P-41 Pinellas & Pasco Counties

MAINTENANCE DREDGING AND DREDGED MATERIAL PLACEMENT

NEPA ID: EAXX-202-00-K3P-1765294248

APPENDIX E

Supplementary Environmental Information

U.S. ARMY CORPS OF ENGINEERS

JACKSONVILLE DISTRICT

U.S. Army Corps of Engineers
JACKSONVILLE DISTRICT

Appendix E-1 Comparison of Alternatives

Appendix E-2 Environmental Compliance

Appendix E-3 Environmental Surveys

APPENDIX E-1

COMPARISON OF ALTERNATIVES

As described in Section 4, the Corps examines both the context of the action and the intensity of the effect by considering duration, the extent to which an effect is adverse at some points in time, and/or beneficial in others, and whether the effect is direct or indirect. Table's 1 & 2 summarizes the major features and consequences of the proposed alternatives for comparison. Section 4 provides more detailed discussion of effects of the alternatives carried forward for detailed scientific analysis.

Table 1. Summary effects compared between the project dredging alternatives as evaluated in section 4.

Environmental Factor / Resource	Alternative 1 No Action	Alternative 2A Maintenance Dredging of Anclote federal channel & GIWW Cut P-41	Alternative 2B Maintenance dredging including Cut 2A
Threatened and Endangered (T&E) Birds: Piping plover and rufa red knot	No effect on species or critical habitats (no maintenance dredging)	MANLAA (project channel is near DCH and PCH and may temporarily disturb species during O&M maintenance dredging) No effect on critical habitats (Critical habitat is nearby but will not be modified).	Same as Alternative 2A.
T&E Reptiles: Sea turtles	No effect (nesting)	No effect (nesting) MANLAA (displacement due to noise and/or presence of equipment) No effect green sea turtle PCH May effect (hopper dredge or relocation trawling only)	Same as Alternative 2A
T&E Species: Smalltooth Sawfish, Manta ray and sturgeon	No effect	MANLAA	Same as Alternative 2A
T&E Species: Florida manatee	No effect	MANLAA Short-term adverse effects (decreased availability of seagrasses for foraging)	Same as Alternative 2A

EFH	No effect (no maintenance dredging)	Managed species: Same as No Action Water column and SAV: adverse impacts (dredging SAV within the channel, impacts will be mitigated for)	Same as Alternative 2A
Fish and other wildlife communities	Long-term minor adverse and beneficial effects (reduction in depth, increased vessel strikes, suspension of sediments, disruption of benthic species, increase in turbidity)	Long term beneficial and temporary minor adverse (reduction in risk of vessel strikes and shoaling due to re-alignment of the channel; burial of benthic infauna species and increases in turbidity from temporary maintenance dredging)	Same as Alternative 2A
Recreational Resources	Long-term adverse impacts (shoaling in channel may impede recreational activity)	Temporary adverse impacts (Presence of maintenance dredging equipment); Long term benefits; re-aligned channel will offer safe navigation for recreational use)	Same as Alternative 2A
Navigation and Safety	Long-term adverse impacts (migration of Anclote Key into the channel)	Long-term beneficial impacts (safer navigation); Long-term adverse impacts (parallel alignment may cause confusion; Anclote Key may also continue migration into the new channel with this alignment; sharp turns may be difficult to navigate)	Same as Alternative 2A
Parks and other Protected Areas	No effect (no maintenance dredging)	Long-term beneficial impacts and temporary adverse impact (Re-alignment would allow safer navigation and temporary adverse impacts from maintenance dredging)	Same as Alternative 2A
Noise	No effect	Temporary minor adverse effects (noise associated with maintenance dredging equipment)	Same as Alternative 2A
Water Quality	No effect	Short term adverse impacts (during maintenance dredging)	Same as Alternative 2A
Air Quality	No effect	Short term adverse impacts (emissions during maintenance dredging)	Short term adverse impacts (emissions during maintenance dredging)

Sediment characteristics	No effect	Re-alignment of the channel will have no effect on the sediment characteristics. The new channel will be in naturally deeper water, and the coastal system will not be affected. Although theoretically, sediment shoals could build in the future requiring dredging, the extent, area, volume, or characteristic of the shoaled material can't be predicted.	Same as Alternative 2A
Tribal Nations	No effect	No effect	No effect
Cultural Resources	No adverse effect, provided current avoidance areas are maintained.	Adverse effect. Realignment and future maintenance of the Cut 2A will adversely affect known cultural resources in the channel segment from GIWW P-41 to Cut 3. The segment between Cut 1a and P-41 has not been surveyed for cultural resources.	No adverse effect, provided that avoidance areas are maintained. Consultation with SHPO is pending.
Socioeconomic Environment	Long term adverse impacts (to the local economy)	Long-term beneficial effects	Same as Alternative 2A

Table 2. Summary effects compared between the project placement alternatives as evaluated in section 4.

Environmental Factor / Resource	Alternative 3B Beach Placement	Alternative 3C In-water Placement Channel	Alternative 3D In-water Placement Three Rookers
Threatened and Endangered (T&E) Birds: Piping plover and rufa red knot	NE	NE	MANLAA (placement is near DCH and PCH may have temporary impacts to species)
T&E Reptiles: Sea turtles	MANLAA	MANLAA	MANLAA
T&E Species: Smalltooth Sawfish, Manta ray and sturgeon	MANLAA	MANLAA	MANLAA
T&E Species: Florida manatee	MANLAA	MANLAA	MANLAA

EFH	No effect to species or water column. Long-term adverse to SAV (would need mitigation)	Species: Temporary adverse impacts (removal, burial or smothering of benthic infaua) Water Column and SAV habitat: Potential long-term adverse impacts to SAV (to be mitigated)	Same as 3C.
Fish and other wildlife communities	Short term adverse impacts (noise and presence of equipment during placement activities)	Same as 3B	Same as 3B
Recreational Resources	Temporary adverse impacts (equipment on beach, beach closure during placement activities)	Temporary adverse impacts (equipment may impede navigation of recreational users and may be unsightly)	Same as 3C

Navigation and Safety	No effect	Temporary adverse impacts (blocking navigation during placement activities)	Similar to 3C (equipment will be less likely to impede navigation because it will not be within the channel)
Parks and other Protected Areas	Long term beneficial impacts (expansion of beaches) and temporary adverse impacts (during placement activities)	Temporary Adverse (impacts will occur within channel exempt from preserve rules)	Temporary impacts to the preserves (during placement activities due to temporary increases in noise, turbidity and unsightly equipment)
Noise	Temporary minor adverse effects (increases in noise during placement activities)	Same as 3B	Same as 3B
Water Quality	Temporary adverse (minor and localized due to turbidity from dredging and disposal operations)	Temporary adverse (minor and localized due to turbidity from dredging and disposal operations)	Temporary adverse (minor and localized due to turbidity from dredging and disposal operations)

Air Quality	Short term adverse impacts (emissions during placement activities)	Short term adverse impacts (emissions during placement activities)	Short term adverse impacts (emissions during placement activities)
Sediment characteristics	No Effect	Temporary adverse impacts (during placement activities)	Temporary adverse impacts (during placement activities)
Geomorphology	No Effect provided capacity volume within channel is greater than placement volume.	Temporary change to beach face as project equilibrates. Sediment will be transported to the navigation channel.	Temporary perturbation to sediment transport direction and intensity as the placement equilibrates with hydrodynamic forcing.
Tribal Nations	No Effect	No Effect	No Effect

Cultural Resources	Adverse Effect. Beach placement at Anclote River Park will adversely effect eligible site 8PA10. In a letter to SHPO dated, August 14, 2019, the Corps determined it would avoid the site.	No Adverse Effect provided avoidance areas are maintained. Consultation with SHPO pending.	No Adverse Effect provided avoidance areas are maintained. Consultation with SHPO pending.
Socioeconomic Environment	Long-term beneficial effects (preservation of navigation)	Same as 3B	Same as 3B

APPENDIX E-2

ENVIRONMENTAL COMPLIANCE

ENVIRONMENTAL COMPLIANCE

ENVIRONMENTAL ASSESSMENT
Anclote River, FL Project
Pinellas & Pasco County, FL
Maintenance Dredging and Material Placement

This EA has been prepared pursuant to NEPA and its implementing regulations. The status of the proposed project's compliance with environmental acts and E.O.s are provided in Table 6-2.

The status of environmental compliance is described as follows:

Compliant: Meets all requirements of the statute for the current stage of planning (either pre-authorization or post-authorization).

In Progress: Not having met some of the requirements that normally are met in the current stage of planning or pending due notice of availability and comment public/agency comment period.

Not Applicable: No requirements for the statute required for the planning/ construction.

Reference	Law, Policy, and Regulations	Status
42 United States Code (U.S.C.) § 4321 *et seq*.	National Environmental Policy Act of 1969, as amended	In progress
43 U.S.C. §§ 2101-2106	Abandoned Shipwrecks Act, as amended	In Compliance
42 U.S.C. §§ 1996 and 1996a	American Indian Religious Freedom Act	Not Applicable
16 U.S.C. §§ 757A-757G	Anadromous Fish Conservation Act	Not Applicable
54 U.S.C. §§ 320301-320303 and 18 U.S.C. 1866(b)	Antiquities Act of 1906, as amended	In Compliance
16 U.S.C. 469-469c	Archaeological and Historic Preservation Act	In Compliance
54 U.S.C. §§ 312501-312508	Archaeological Resources Protection Act, as amended	In Compliance
16 U.S.C. §§ 668-668d	Bald and Golden Eagle Protection Act	In Compliance
42 U.S.C. § 7401 *et seq*.	Clean Air Act of 1972	In Compliance

Reference	Law, Policy, and Regulations	Status
33 U.S.C. § 1341 and 33 U.S.C. § 1344(b)	Clean Water Act of 1972, Section 401 and Section 404(b)	In Progress
16 U.S.C. § 3501 *et seq*.	Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990	Not Applicable
16 U.S.C. § 1451 *et seq*.	Coastal Zone Management Act of 1972	In Progress
16 U.S.C. § 1531 *et seq*.	Endangered Species Act of 1973	In Progress
16 U.S.C. §§ 1221-26	Estuary Protection Act of 1968	Not Applicable
7 U.S.C. § 4201 *et seq*.	Farmland Protection Policy Act	Not Applicable
16 U.S.C. § 460l-12 *et seq*.	Federal Water Project Recreation Act, as amended	Not Applicable
16 U.S.C. §§ 661-666(e)	Fish and Wildlife Coordination Act	In Progress
16 U.S.C. § 1801 *et seq*.	Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended	In Progress
16 U.S.C. § 1361 *et seq*.	Marine Mammal Protection Act of 1972, as amended	In Compliance
33 U.S.C. § 1401 *et seq*.	Marine Protection, Research, and Sanctuaries Act	Not Applicable
16 U.S.C. §§ 703-712, 715	Migratory Bird Treaty Act and Migratory Bird Conservation Act	In Compliance
54 U.S.C. § 300101 *et seq.*	National Historic Preservation Act of 1966, as amended	In Compliance
25 U.S.C. § 3001 *et seq.*	Native American Graves Repatriation Act	In Compliance
33 U.S.C. § 403	River and Harbor Act of 1899, Section 10	In Compliance
43 U.S.C. § 1301 *et seq*.	Submerged Lands Act of 1953	In Progress
42 U.S.C. § 4601 *et seq*.	Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970	Not Applicable
16 U.S.C. § 1271 *et seq*.	Wild and Scenic River Act of 1968	Not Applicable
E.O. 11593	Protection and Enhancement of the Cultural Environment	In Compliance

Reference	Law, Policy, and Regulations	Status
E.O. 11988	Floodplain Management	In Compliance
E.O. 13007	Indian Sacred Sites	In Compliance
E.O. 11990	Protection of Wetlands	Not Applicable
E.O. 13045	Protection of Children from Environmental Health Risks and Safety Risks	In Compliance
E.O. 13089	Coral Reef Protection	Not Applicable
E.O. 13112	Invasive Species	In Compliance
E.O. 13175	Consultation and Coordination with Indian Tribal Governments	In Compliance
E.O. 13186	Responsibilities of Federal Agencies to Protect Migratory Birds	In Compliance
Memorandum	Memorandum on Government-to-Government Regulations with Native American Tribal Governments	Not Applicable

i. National Environmental Policy Act of 1969, as amended

This Act requires the opportunity for public participation and comment on Federal projects, and requires agencies to cooperate with other Federal agencies, State, and local governments, and to involve public stakeholders. Environmental information on the project has been compiled and this draft EA and Proposed FONSI has been prepared and coordinated for public, state, and Federal agency review. The Preferred Alternative in progress for compliance with this Act.

ii. Abandoned Shipwrecks Act, as amended (43 USC 2101-2106)

The Abandoned Shipwreck Act (ASA) of 1987 establishes government ownership over the majority of abandoned shipwrecks located in waters of the United States of America and creates a framework within which shipwrecks are managed. Enacted in 1988, it affirms the authority of State governments to claim and manage abandoned shipwrecks on State submerged lands. It makes the laws of salvage and finds not apply to any shipwreck covered under the Act and asserts that shipwrecks are multiple-use resources. The Act covers abandoned shipwrecks that are embedded in submerged lands, abandoned shipwrecks that are embedded in coralline formations protected by a State, and abandoned shipwrecks that are on submerged lands and included in or determined eligible for inclusion in the National Register of Historic Places. State governments have title to shipwrecks located on State lands, the US Government has title to shipwrecks located on Federal lands, and Indian tribes have title to shipwrecks located on Indian lands. However, the US Government continues to hold title to sunken US warships and other shipwrecks entitled to Sovereign Immunity, no matter where the vessels are located. Such vessels are not affected by the statute.

A submerged cultural resources survey was conducted in the Project Area with avoidance areas established for potential shipwrecks. The Project is in compliance with this act.

iii. American Indian Religious Freedom Act (42 U.S.C. §§ 1996 and 1996a)

The American Indian Religious Freedom Act of 1978 (42 U.S.C. § 1996) establishes protection and preservation of Native Americans' rights of freedom of belief, expression, and exercise of traditional religions. These rights include, but are not limited to, access to sacred sites, freedom to worship through traditional ceremonial rites, and the possession and use of objects traditionally considered sacred by their respective cultures. The act requires policies of all governmental agencies to accommodate access to, and use of, Native American religious sites to the extent that the use is practicable and is consistent with an agency's essential missions.

There are no Native American religious sites within the Project Area; therefore, the Act is Not Applicable.

iv. Anadromous Fish Conservation Act

The Anadromous Fish Conservation Act requires a commitment to the conservation, development, and enhancement of anadromous fishery resources. The project does not occur in an anadromous fish river or stream; therefore, no anadromous fish species are expected to be present. This Act is not applicable.

v. Antiquities Act of 1906, as amended (54 USC 320301-320303: Monuments, Ruins, Sites, and Objects of Antiquity and 18 USC 1866(b): Historic, Archeologic, or Prehistoric, Items and Antiquities)

The Antiquities Act of 1906 (54 U.S.C. §§ 320301–320303; Public Law 59-209) gives the President of the United States authority to create national monuments to protect important natural, cultural, or scientific features and resources. The act requires a permit be issued from the secretary of the department with land management responsibilities prior to any excavation of archaeological material. It further requires all material excavated as a result of an Antiquities Permit be properly housed in a museum or facility. This act is considered to be the beginning of a long tradition of cultural resources management and protection by the Federal government. This project is in compliance Archaeological and Historic Preservation Act (Public Law 93-291 and 16 U.S.C.469-469c)

Archaeological Resources Protection Act of 1979, as amended (54 USC 312501-312508: Preservation of Historical and Archeological Data)

The Archaeological Resources Protection Act (ARPA) protects archaeological resources and sites on federally owned and Indian lands and fosters increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals. The act established civil and criminal penalties for the destruction or alteration of cultural resources.

A submerged cultural resources survey was performed and avoidance areas established for cultural resources within the Project Area. The Preferred Alternative is in compliance with this Act as no cultural resources will be impacted.

vi. Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) (Eagle Act) prohibits the take of bald eagles and golden eagles unless pursuant to regulations (and in the case of bald eagles, take can be authorized only under a permit). The Eagle Act defines the "take" of an eagle to include a broad range of actions: "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb." "Disturb" is defined in our regulations at 50 CFR 22.3 as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." Many actions that were considered likely to incidentally "take" (harm or harass) eagles under the ESA may also "take" eagles under the Eagle Act, as those terms have been defined by statute and regulation. The FWC eagle nesting mapper[1] revealed the latest eagle nests record in 2017. Nests were recorded on Anclote Key and areas near Anclote River. The Corps will include applicable standard migratory bird protection measures in the project plans and specifications and will require the contractor to abide by those requirements. The project complies with this Act.

vii. Clean Air Act of 1972

The Clean Air Act (CAA) requires Federal actions to conform to an approved state implementation plan designed to achieve or maintain an attainment designation for air pollutants as defined by the National Ambient Air Quality Standards (NAAQS). The NAAQS were designed to protect public health and welfare. The criteria pollutants include carbon monoxide (CO), ozone (O3), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter (PM2.5 and PM10), and lead (Pb).

The existing air quality within South Florida meets the NAAQS. Therefore, the project is exempt from the CAA conformity requirements because it is located in a Federal attainment area 40 CFR § 81.310; Rule 62-204.340, FAC. No Federal permits are required. The State of Florida does not regulate emissions from off-road equipment or marine vessels; however, it can be assumed that insignificant emissions will be produced by the dredge and construction equipment during construction activities. The Preferred

[1] The FWC eagle nesting mapper is available at https://myfwc.com/wildlifehabitats/wildlife/bald-eagle/management/

Alternative will not cause or contribute to violations of the National Ambient Air Quality Standards. The project complies with this Act.

viii. Clean Water Act, Section 401 and Section 404(b)

The Clean Water Act Section 401 & 404(b) govern the discharge of dredged or fill material into waters of the United States, including wetlands. The evaluation assesses whether a proposed discharge will comply with environmental protection standards. This project will be reviewed by the State of Florida after the release of the draft EA for compliance with State Water Quality Standards and CZMA consistency with the State Coastal Management Plan and will provide a preliminary concurrence of the project as it exists at the time of the review. Final WQC and CZMA FCD Consistency Concurrence will be provided with the issuance of the final Joint Coastal Permit prior to construction. Project compliance with this act is in progress.

ix. Coastal Barrier Resources Act and Coastal Barrier Improvement Act of 1990

The Coastal Barrier Resources Act (CBRA) and the Coastal Barrier Improvement Act limit federally-subsidized development within the CBRA Units to limit the loss of human life by discouraging development in high-risk areas, to reduce wasteful expenditures of Federal resources, and to protect the natural resources associated with coastal barriers. CBRA provides development goals for undeveloped coastal property held in public ownership, including wildlife refuges, parks, and other lands set aside for conservation ("otherwise protected areas," or OPAs). These public lands are excluded from most of the CBRA restrictions, although they are prohibited from receiving federal flood insurance for new structures.

The official USFWS Coastal Barrier Resources System (CBRS) maps were reviewed (https://www.fws.gov/CBRA/Maps/Mapper.html). The closest CBRS unit is FL-87P, Unit Name Anclote Key, Otherwise Protected Area. The project overlaps with this OPA, however this unit does not require a CBRA consultation. No work associated with the Preferred Alternative occurs within or will affect CBRS units; therefore, these Acts are not applicable.

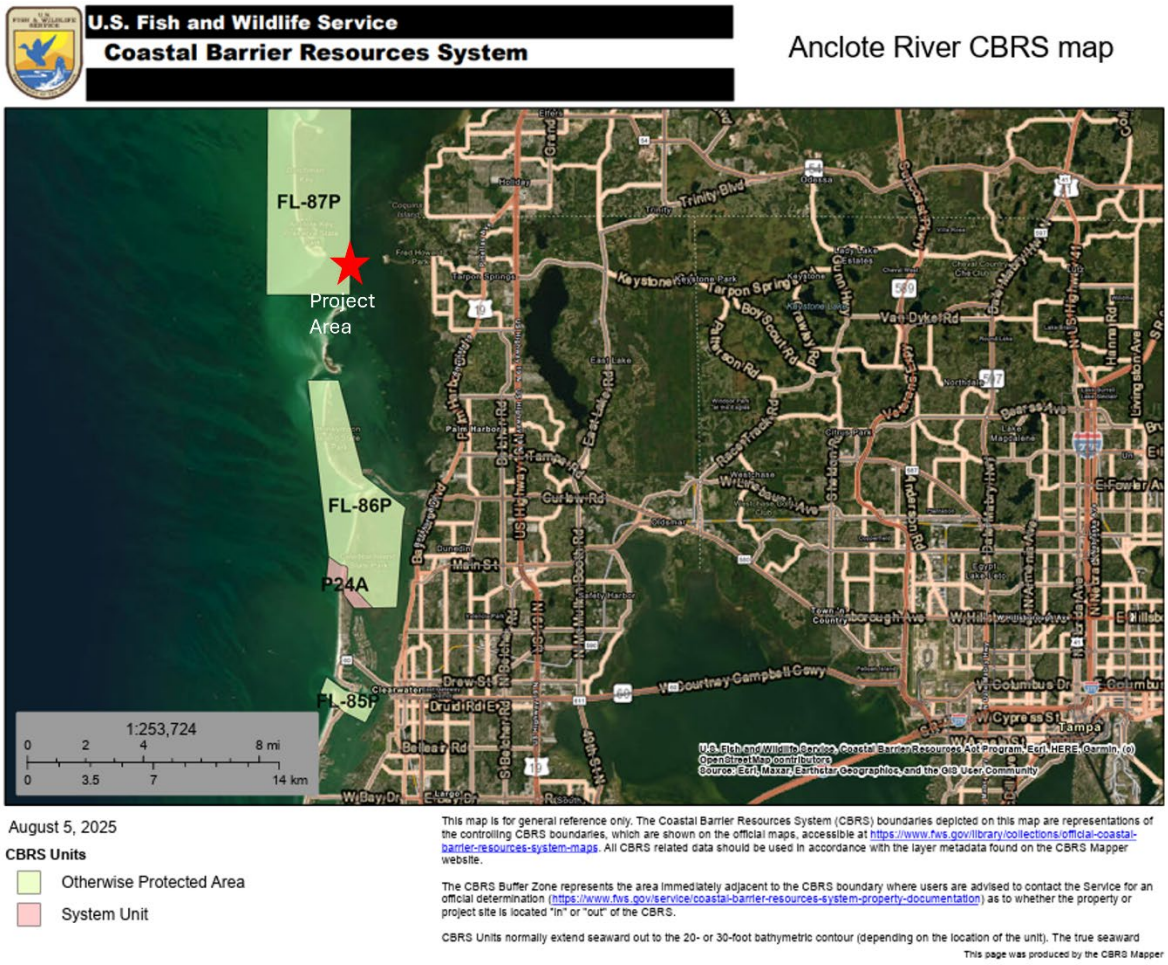

Figure 6-1. Map of CBRS units near the project area. There is an OPA (FL-87P) within the project area and CBRS unit is P24 Mandalay Point system Unit 6.5 miles south of project area.

SOURCE: https://www.fws.gov/CBRA/Maps/Mapper.html

x. Coastal Zone Management Act of 1972

The goal of the Coastal Zone Management Act (CZMA) is to “preserve, protect, develop, and where possible, to restore or enhance the resources of the nation’s coastal zone”. The CZMA requires that Federal actions that are reasonably likely to affect any land or water use or natural resource of the coastal zone be consistent with enforceable policies of a State's federally-approved coastal management program.

A Federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as **Appendix C**. The Corps has coordinated a consistency determination pursuant to the CZMA through circulation of this Draft EA. The Corps has determined that the Preferred Alternative is consistent to the maximum extent practicable

with the enforceable policies of Florida's approved CZMP. Final concurrence of consistency with the CZMP will be determined during environmental permitting processes, as applicable. Compliance with this Act is in progress.

xi. Endangered Species Act of 1973

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, (ESA) the Corps determined the project meets eligibility criteria for coverage by the 2026 National Marine Fisheries Service (NMFS) Gulf Regional Biological Opinion (GRBO) as well as U.S. Fish and Wildlife Service (USFWS) Piping Plover Programmatic Biological Opinion (P^3BO.) The project will be conducted in accordance with the ESA, as amended, and will adhere to all applicable P^3BO T&Cs (Terms and Conditions) and GRBO Protected Species Construction conditions (PDCs). Discussion on the existing conditions and potential effects to Threatened and Endangered (T&E) species are included in Sections 2.1 and 4.1, respectively. The Corps' effect determinations are summarized in Tables 4-1 and 4-2, and described in detail for this project in Section 4.1.

Effect determinations for species under NMFS jurisdiction:

For potential effects to federally listed T&E species under the NMFS jurisdiction, the project meets the eligibility criteria to be covered by the GRBO. Effect determinations for ESA listed species are provided in Table 4-1 and 4-2. The GRBO covers the following work in the southeast U.S., Gulf of America:

- Dredging (e.g., maintenance, advance maintenance, minor channel modifications, borrow area dredging, and muck dredging);
- Transportation of dredged material;
- Dredged material placement;
- Geotechnical and geophysical surveys;
- ESA species handling.

The following types of dredges and dredging methods are covered by the GRBO: mechanical (e.g., clamshell and backhoe), hydraulic (e.g., cutterhead suction/pipeline dredging and hopper), side-cast/split hull, and agitation (e.g., bed leveling, water injection dredging) as well as dredging pipelines and support vessels.

Effect determinations for species under USFWS jurisdiction:

For potential effects to federally listed T&E species under the USFWS jurisdiction, the project meets eligibility criteria to be covered by the P^3BO. Effect determinations for ESA listed species are provided in Table 4-1 and 4-2.

The P^3BO is a programmatic consultation covering construction affecting piping plover. The following construction is covered; work occurring on the sandy beaches; emergent bayside and Ocean/Gulf-side shoals and sand bars; bayside mudflats, sand flats, and algal flats; bayside shorelines of bays and lagoons; and emergent nearshore sand bars

of the Atlantic Coast (Nassau County to Miami-Dade County) and the Gulf Coast (Monroe County to Taylor County) of Florida:

- O&M dredging activities of navigational channels and sand placement on the sandy beach and dune (including up to or over hardened structures), the swash zone, and the nearshore regions associated with both shore protection projects and maintenance dredging;
- Sand placement as an associated authorization of sand extraction from the outer continental shelf by the BOEM;
- Sand by-passing/back-passing; and
- Repair or replacement of existing groins and jetties.

The Corps will initiate informal consultation and requested concurrence with the USFWS during this draft EA's public comment period for Rufa Red Knot, Florida Manatees and Gulf Sturgeon. The project will adhere to applicable T&Cs and RPMs of the P3BO. The Corps will also implement the USFWS' 2011 Standard Manatee Conditions for In-water Work. Pertinent correspondence is included in Appendix A and Environmental Consultations are in Appendix B. Compliance with this Act is in progress.

xii. Estuary Protection Act of 1968

The Estuary Protection Act requires federal agencies to consider estuaries and their natural resources when planning for the development of water and land resources. No estuaries of national significance exist in the project area; therefore, the Act is not applicable.

i. Farmland Protection Policy Act

The Farmland Protection Policy Act is intended to minimize the impact of the conversion of farmland to nonagricultural uses. No farmland exists in the project area; therefore, the Act is not applicable.

ii. Federal Water Project Recreation Act, as amended

This Act requires full consideration of recreation and fish and wildlife enhancement in federal water development projects. This project is not in development and this act is not applicable.

iii. Fish and Wildlife Coordination Act

The central objective of the Fish and Wildlife Coordination Act (FWCA) is to allow for equal consideration of wildlife resources. A Memorandum for Record (MFR), found in Appendix B, between USFWS and the Corps to document an agreement between the agencies to use the NEPA review and ESA consultation processes to complete coordination responsibilities under the FWCA. The Corps has provided a new MFR to USFWS to be signed by both agencies for this draft EA. The project is in progress to be in compliance with this Act.

iv. Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended

The MSFCMA reflects the Secretary of Commerce and Fishery Management Council authority and responsibilities for the protection of EFH. Federal agencies that fund, permit, or carry out activities that may adversely affect EFH are required to consult with the NMFS Habitat Conservation Division (HCD) regarding the potential effects of their actions on EFH. Per the January 22, 2019 and October 2, 2018 EFH Findings between NMFS' Southeast Regional Office and South Atlantic Division, Corps, respectively, the EFH Assessment for the project was integrated within the draft EA. The Corps initiated consultation with NMFS for the Preferred Alternative during this draft EA's public comment period. The Corps is complying with the Act through the NEPA review and EFH consultation processes. Compliance with this Act is in progress.

v. Marine Mammal Protection Act of 1972, as amended

The Marine Mammal Protection Act prohibits harassing, feeding, hunting, capturing, and/or killing (referred to as "take") and importing of marine mammals and marine mammal products. The project area is accessible to marine mammals, such as the Florida manatee and whales. Noise associated with dredging and vessel strikes in transit areas are known to cause impacts. Incorporation of the USFWS 2011 Standard Manatee Conditions for In-water Work, BMPs, as well as applicable T&Cs of the GRBO into the projects' plans and specifications will ensure that the potential adverse effects to these species are reduced to the maximum extent practicable. Implementation of the safeguards used to protect T&E species during construction and operation would extend protections to marine mammals within the area. No take of marine mammals is anticipated. The project is in compliance with the goals of this Act and will be in full compliance with the Act at the time of construction through implementation of referenced safeguards.

vi. Marine Protection, Research and Sanctuaries Act

The Marine Protection, Research, and Sanctuaries Act regulates the placement of dredged material into the ODMDS. This project does not place material in an ODMDS and therefore is not applicable.

vii. Migratory Bird Treaty Act and Migratory Bird Conservation Act

These Acts prohibit the take (e.g., killing, capturing, selling, or trading) and/or transporting of protected migratory bird species without prior authorization by USFWS. The proposed project occurs on submerged lands and is not expected to destroy migratory birds, their active nests, their eggs, or their hatchlings. The Corps will include applicable standard migratory bird protection measures in the project plans and specifications and will require the Contractor to abide by those requirements. The project is in compliance with the goals of this Act and will be in full compliance with the Act at the time of construction through implementation of standard migratory bird protection measures.

viii. National Historic Preservation Act of 1966, as amended

Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (C.F.R.) Part 800, provides a regulatory

framework for the identification, documentation, and evaluation of historic and cultural resources that may be affected by Federal undertakings. Under the act, Federal agencies must take into account the effects of their undertakings on historic properties, including resources that are listed or are eligible for listing in the National Register of Historic Places, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertaking. Additionally, a Federal agency shall consult with any tribe that attaches religious and cultural significance to such properties.

A submerged cultural resources survey was performed. The USACE determined that the Preferred Alternative will have no adverse effect to historic properties that are listed in or eligible for listing in the National Register of Historic Places (NRHP). The Corps consulted with the Florida State Historic Preservation Officer (SHPO) and federally recognized tribes (The Muscogee Nation, the Seminole Nation of Oklahoma, the Miccosukee Tribe of Indians, the Thlopthlocco Tribal Town, and the Seminole Tribe of Florida) on January 21, 2026. In a letter dated February 23, 2026, the SHPO concurred with the Corps' determination, provided that avoidance areas are maintained during construction activities. No comments on the cultural resources survey report were received from federally recognized tribes. No response does not imply concurrence.

ix. Native American Graves Protection and Repatriation Act (25 U.S.C. § 3001 et seq.)

The Native American Graves Protection and Repatriation Act (25 U.S.C. §§ 3001–3013; Public Law 101-601) describes the rights of Native American lineal descendants, Indian tribes, and Native Hawaiian organizations with respect to the treatment, repatriation, and disposition of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, with which they can show a relationship of lineal descent or cultural affiliation. This Act applies to federally owned lands, including Reservation lands.

The Preferred Alternative is in compliance with this Act as it does not occur on federally owned or Reservation lands.

x. Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act of 1899 prohibits obstruction to navigation of the waterway, unless recommended by the Chief of Engineers and authorized by the Secretary of the Army. Any obstruction would cease with the completion of construction. The Preferred Alternative could temporarily obstruct navigable waters of the U.S. during construction. The proposed action will be subject to the public notice and other evaluations normally conducted for activities subject to the Act. The project is in compliance with this Act.

xi. Submerged Lands Act of 1953

Portions of the project will occur within areas subject to navigation servitude (e.g., within the Federal Navigation Channel) and on submerged lands of the State of Florida (e.g.,

nearshore disposal areas, submerged SAV mitigation areas). For areas not subject to navigation servitude, a Sovereign Submerged Lands Letter of Consent will be issued by the State of Florida to the non-Federal Sponsor with the issuance of the final Joint Coastal Permit (JCP; WQC/CZMA FCD Concurrence). USACE will coordinate the project with the State of Florida through the issuance of a water quality certification (WQC), Federal Consistency Determination (FCD) review, and the review process of the draft EA. The project compliance is in progress with this Act.

xii. Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646)

The purpose of this Act is to ensure that owners of real property to be acquired for Federal and Federally assisted projects area treated fairly and consistently, and that person displaced as a result of such acquisition will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. This Act is not applicable as this project will not be acquiring any real estate interests from private property owners.

xiii. Wild and Scenic River Act of 1968

This Act requires that selected wild and scenic rivers be preserved in free-flowing condition with the immediate environment be protected for the benefit and enjoyment of future generations. There are no designated wild and scenic river located within the project area. This Act is not applicable.

xiv. Executive Order (E.O.) 11593, Protection and Enhancement of the Cultural Environment

Executive Order 11593, dated May 13, 1971, directs Federal agencies to administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations; initiate measures necessary to direct their policies, plans and programs in such a way that federally owned sites, structures, and objects of historical, architectural or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people; and, in consultation with the Advisory Council on Historic Preservation (16 U.S.C. 470i), institute procedures to assure that Federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures and objects of historical, architectural or archaeological significance.

The Preferred Alternative is in compliance with this EO as non-federally owned sites, structures, and objects of historical, architectural or archaeological significance will not be affected.

xv. E.O. 11988, Floodplain Management

E.O. 11988 directs Federal agencies to avoid siting projects in floodplains and to avoid inducing further development of flood-prone areas. To comply with E.O. 11988, the policy of the Corps is to formulate projects that, to the extent possible, avoid or minimize adverse effects associated with the use of the floodplain and avoid inducing development in the floodplain unless there is no practicable alternative.

Per guidance provided in E.O. 11988, the following factors were evaluated:

1. *Determine if a proposed action is in the base floodplain (defined by E.O. 11988 as an "area which has a one percent or greater chance of flooding in any given year").*
   Most of the land area near the project is within the 100-year flood zone as mapped by the Federal Emergency Management Agency (FEMA 2021).

2. *Conduct early public review, including public notice.*
   Public and agency coordination is described in Section 6.3. This EA was coordinated with interested stakeholders and the public via the NEPA process.

3. *Identify and evaluate practicable alternatives to locating in the base floodplain, including alternative sites outside of the floodplain.*
   The Preferred Alternative occurs on submerged lands and not occur within a floodplain.

4. *Identify impacts of the proposed action.*
   Because the Preferred Alternative occurs on submerged lands and not occur within a floodplain, no impacts to the floodplain are expected. Impacts of the proposed action to the physical, natural, and socioeconomic environment are described in Section 4 and include short-term adverse effects to aesthetics, fish and wildlife, recreation, safety, and water quality. These short-term adverse effects will cease with the completion of construction. Long-term beneficial effects associated with the action are expected to navigation, safety, economics, and needs and welfare of the people. These long-term benefits would be expected to remain for years following construction.

5. *Minimize threats to life and property and to natural and beneficial floodplain values. Restore and preserve natural and beneficial floodplain values.*
   Maintenance dredging will continue to provide navigation benefits thereby minimizing threats to life and property while maintaining socioeconomic benefits afforded by port operations (e.g., imports/exports, revenue from cruise operations, etc.). More details on the project's purpose and need are included in Section 1. Details on the environmental commitments are included in Section 6.

6. *Reevaluate alternatives.*
   Alternatives are described in Section 3. The Preferred Alternative, described in detail in Section 5.2, best meets the purpose and need of the proejct.

7. *Issue findings and a public explanation.*
   The EA provides a proposed and describes the Preferred Alternative in Section 5.2. Public and agency coordination is described in Section 6.3.

8. *Implement the action.* Construction will occur after all appropriate documentation (e.g., agreements, permitting, etc.) is completed and funds are received.

The Corps concludes that the Preferred Alternative will not result in harm to people, property, and floodplain values; will not induce development in the floodplain; and that the project is in the public interest. For the reasons stated above, the project complies with this E.O.

xvi. E.O. 13007, Indian Sacred Sites

Executive Order 13007, dated May 24, 1996, directs Federal agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners. To the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, the co-lead agencies are to avoid adversely affecting the physical integrity of such sacred sites and to maintain the confidentiality of sacred sites when appropriate. The order encourages government-to-government consultation with tribes concerning sacred sites. Some sacred sites may qualify as historic properties under the National Historic Preservation Act. This E.O. is directed towards executive branch agencies with statutory or administrative responsibility for the management of federal lands. The Preferred Alternative is in compliance with this Act as there are no sacred sites in the project area.

xvii. E.O. 11990, Protection of Wetlands

The objective of this E.O. is to avoid long and short-term adverse impacts associated with the destruction of modification of wetlands. Wetlands are not located within the proposed project footprint. This E.O. is not applicable.

xviii. E.O. 13045, Protection of Children from Environmental Health and Safety Risks

E.O. 13045 requires each Federal agency to “make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children” and “ensure that its policies, programs, activities, and standards address disproportionate risks to children that results from environmental health risks or safety risks. “The Preferred Alternative does not affect children disproportionately from other members of the population and would not increase any environmental health or safety risks to children. The project is in compliance with this E.O.

xix. E.O. 13089, Coral Reef Protection

The objective of E.O. 13089 is to preserve and protect the biodiversity, health, heritage, social and economic value of U.S. coral reef ecosystems and the marine environment. This E.O. directs Federal Agencies to expand their research, preservation, monitoring and

restoration efforts with respect to actions that affect coral reef ecosystems. No coral reefs would be impacted by the Proposed Action. This E.O. does not apply.

xx. E.O. 13112, Invasive Species

E.O. 13122 is aimed to prevent the introduction of invasive species and requires that Federal Agencies provide for their control and minimize the economic, ecological and human health impacts that invasive species can cause. The Preferred Alternative would have no significant impact on invasive species. The Preferred Alternative is in compliance with the goals of this E.O.

xxi. E.O. 13175, Consultation and Coordination with Indian Tribal Governments

The United States has a unique legal relationship with Indian tribal governments as set forth in the Constitution of the United States, treaties, statutes, executive orders, and court decisions. This order directs federal agencies to formulate and establish “regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.” This E.O is no applicable to this project.

xxii. E.O. 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

E.O. 13186 requires Federal agencies taking actions which have or are likely to have a measurable negative effect on migratory bird populations to take certain actions which promote the conservation of migratory bird populations. Migratory and resident bird species have been observed within the project area and are likely to use available habitat for foraging and transit. The proposed project occurs on submerged lands and is not expected to destroy migratory birds, their active nests, their eggs, or their hatchlings. The Corps will include applicable standard migratory bird protection requirements in the project plans and specifications and will require the contractor to abide by those requirements. The project is in compliance with the goals of this E.O.

Migratory and resident bird species have been observed within the study area and are likely to use available habitat for foraging, nesting, and breeding. The Proposed Action is not expected to destroy migratory birds, their active nests, their eggs, or their hatchlings. The project is in compliance with the goals of this E.O.

xxiii. Memorandum on Government-to-Government Regulations with Native American Tribal Governments

Memorandum signed by President Clinton April 29, 1994 directs the heads of executive departments and agencies to operate within a government-to-government relationship with federally recognized tribal governments; consult, to the greatest extent practicable and to the extent permitted by law, with tribal governments prior to taking actions that affect federally recognized tribal governments; assess the impact of Federal Government

plans, projects, programs, and activities on tribal trust resources and assure that tribal government rights and concerns are considered during the development of such plans, projects, programs, and activities; take appropriate steps to remove any procedural impediments to working directly and effectively with tribal governments on activities that affect the trust property and/ or governmental rights of the tribes; and work cooperatively with other Federal departments and agencies to enlist their interest and support in cooperative efforts, where appropriate, to accomplish the goals of this memorandum.

The project does not affect federally recognized tribal governments or tribal trust resources; however, a copy of the notice of availability for the project's proposed FONSI, draft EA, and associated appendices will be provided with tribal governments through the NEPA review process. The project is in compliance with this memorandum.

FINAL
ENVIRONMENTAL SURVEY REPORT

Anclote River & Gulf Intracoastal Waterway Benthic Survey
City of Tarpon Springs, Florida

Submitted: December 2025

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Contract No: W912EP21A 0005
Call No: W912EP25F0083

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1 INTRODUCTION

As part of the US. Army Corps of Engineer's (USACE) proposed maintenance dredging project within the Anclote River and Gulf Intracoastal Waterway (GIWW) Operations and Maintenance (O&M) federal channels (Project), benthic surveying of the seabed was conducted within the proposed dredge locations, material placement areas, and potential mitigation areas, located within Pinellas and Pasco Counties (**Figure 1)**. The proposed Project includes dredging portions of the existing navigational channel that have accumulated sediment and placing dredged material within select portions of the channel that are deeper than 10 feet or at the Three Rooker Island placement area that is outside of the navigation channels. Potential mitigation sites are also being evaluated. Additionally, the USACE is investigating an area for channel realignment to the east of Anclote Island, as the island appears to be migrating further east toward the existing GIWW channel. The USACE contracted GLE Associates, Inc. (GLE), who sub-contracted Cummins Cederberg, Inc. (Cummins Cederberg) to perform benthic surveying within the Project areas, as described in the Performance Work Statement (PWS), issued by the USACE in March 2025 (**Appendix B)**. The primary objectives of the survey were to identify and document benthic resources of importance (e.g., seagrasses, corals and hardbottom habitat, oysters), delineate the extent of resources within the survey areas, and quantitatively assess submerged aquatic vegetation (SAV) within specific areas of direct impact.

The Project survey areas consisted of the Anclote Channel dredging Cuts 1 through 12, Cuts 1A, 2A, GIWW Cut P41 (Cut 41), and the Anclote harbor turning basin. The survey areas also included four mitigation sites: one at Three Rooker Island (Mitigation 1), south and north locations at Fred Howard Park (Mitigation 2 and 3, respectively), and near Sunset Beach (Mitigation 4); as well as four potential placement sites: west and east of Cut 1 (Placement 1 and 2, respectively), Old Cut 2 (Placement 3), and Three Rooker Island (Placement 4). **Table 1** provides nomenclature references for survey areas as referenced in the PWS, in this report, and short-hand references as shown on datasheets and field notes. All the dredging cuts, mitigation, and placement areas include a 10-meter (30 feet) buffer [Direct Impact Area (DIA)] and a 150-meter (450 feet) buffer [Indirect Impact Area (IIA)] (**Figure 1**). The survey area was divided into five "focus areas" to assist with field planning and subsequent mapping (**Figure 2**).

Table 1. Nomenclature reference table for the Project survey areas.

USACE PWS Nomenclature	Report Nomenclature (referenced herein)	Field Survey Nomenclature
Cut-1	Placement 1, Cut 1, and Placement 2 (west to east)	P1 (west), C1 (middle portion), & P2 (east)
Cut-1A	Cut 1A	C1A
Old Cut-2	Cut 2	P3
GIWW Cut-P41	Cut 41 & Cut 41 North (Cut 41 collectively)	C41 & C41 N
Cut-2	Cut 2	C2
Cut-2A	Cut 2A	C2A
Cut-3 through Cut-12	Cut 3 through Cut 12	C3 through C12
Turning Basin	Turning Basin	TB
Three Rooker Island Placement Site	Placement 4	P4
Three Rooker Island Mitigation Site	Mitigation 1	M1
Fred Howard Park Mitigation Site	Mitigation 2 (south) & Mitigation 3 (north)	M2 (south) & M3 (north)
Sunset Beach Mitigation Site	Mitigation 4	M4

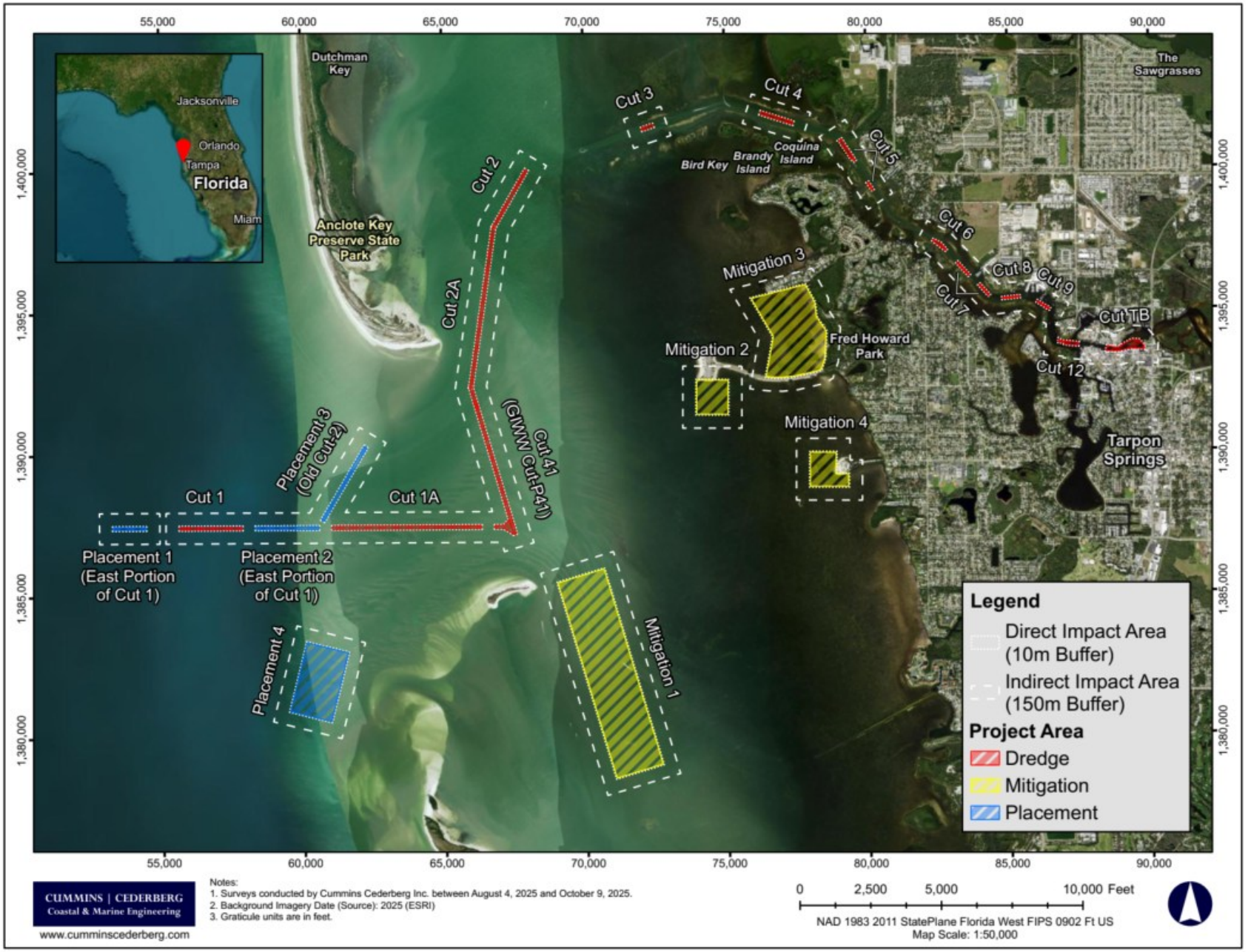

Figure 1. Project location overview map depicting all survey sites, 10-meter DIA buffer, and 150-meter IIA buffer.

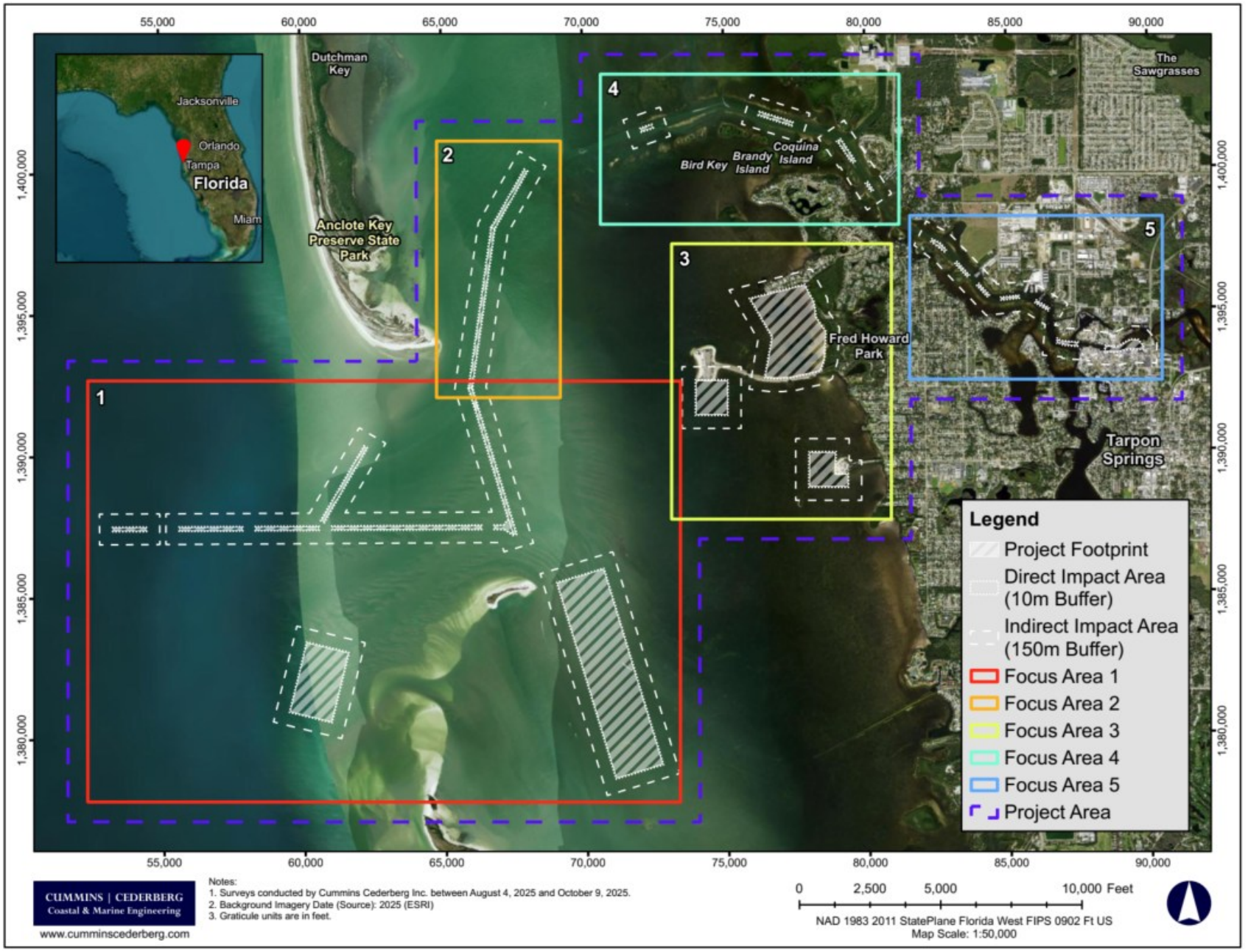

Figure 2. Focus area location map.

2 METHODS

All surveying was completed between August 4, 2025, and October 9, 2025. Surveys were completed within the federally-recognized seagrass growing season (June 1 to September 30) to the extent feasible. An out-of-season survey extension was granted by the USACE due to the order of magnitude of resources being observed within the Project area and the need for additional survey efforts/time.

Desktop Assessment

Prior to the field activities, background research was conducted to identify potential benthic resources within the Project area. The desktop assessment (**Appendix C**) reviewed and compiled historical seagrass, coral and hardbottom, and oyster distributions from several sources including previous surveys, available monitoring reports, and online databases. This information was utilized for pre-field planning purposes and surveying expectations.

Towed Camera Reconnaissance

Reconnaissance surveying of the submerged lands was conducted via towed video surveys across each Project area: dredge cut areas, mitigation areas, and placement areas. Predetermined transects were established in CAD, configured in ArcGIS Pro, and uploaded into a handheld Trimble® Geo 7X (Trimble) and onboard Hypack® hydrographic software. Transects were spaced to cover the extents of the 150-meter IIA buffer zones, with dredging and placement area transects placed 30 meters (~100 ft) apart and mitigation area transects placed 60 meters (~200 ft) apart. Altogether, 168 dredging (cut) area transects, 48 placement area transects, and 46 mitigation area transects were established (**Figure 3**). Zoomed in transect maps to highlight specific areas can be found in **Appendix D**. Transect lines occasionally traversed over shoals or mangrove islands that impeded towed camera operations and could not be conducted. When pre-planned transect lines transversed uplands, they were trimmed or removed entirely prior to going into the field. In the field, towed camera reconnaissance capabilities were sometimes further limited due to depth restrictions or docking facilities and structures present along the planned transects tracks. The survey team conducted towed camera reconnaissance to the extent practicable and utilized divers to complete reconnaissance in accessible areas thereafter.

Towed camera reconnaissance surveying was completed between August 4, 2025 to August 25, 2025, and September 11, 2025 to September 18, 2025. An underwater remotely operated vehicle camera (ROV) was mounted to a tow sled connected to the navigation system and live-video viewing system with real-time GPS overlay. An experienced biologist, viewing the live video feed from the towed camera, documented any areas that potentially contained benthic resources. When SAV or hardbottom resources were observed, latitude and longitude coordinates (i.e., waypoints) were collected in Hypack® to support post-ROV survey qualitative habitat mapping. The appropriate layback distance (i.e. distance between the tow sled and the survey vessel antenna) was applied to ensure geographical accuracy of observations. Vessel speeds ranged from approximately 1 knot to 12 knots, depending on surface conditions and underwater visibility. Final georeferenced data points associated with the ROV transects, as well as transect lengths, are provided in **Appendix D**.

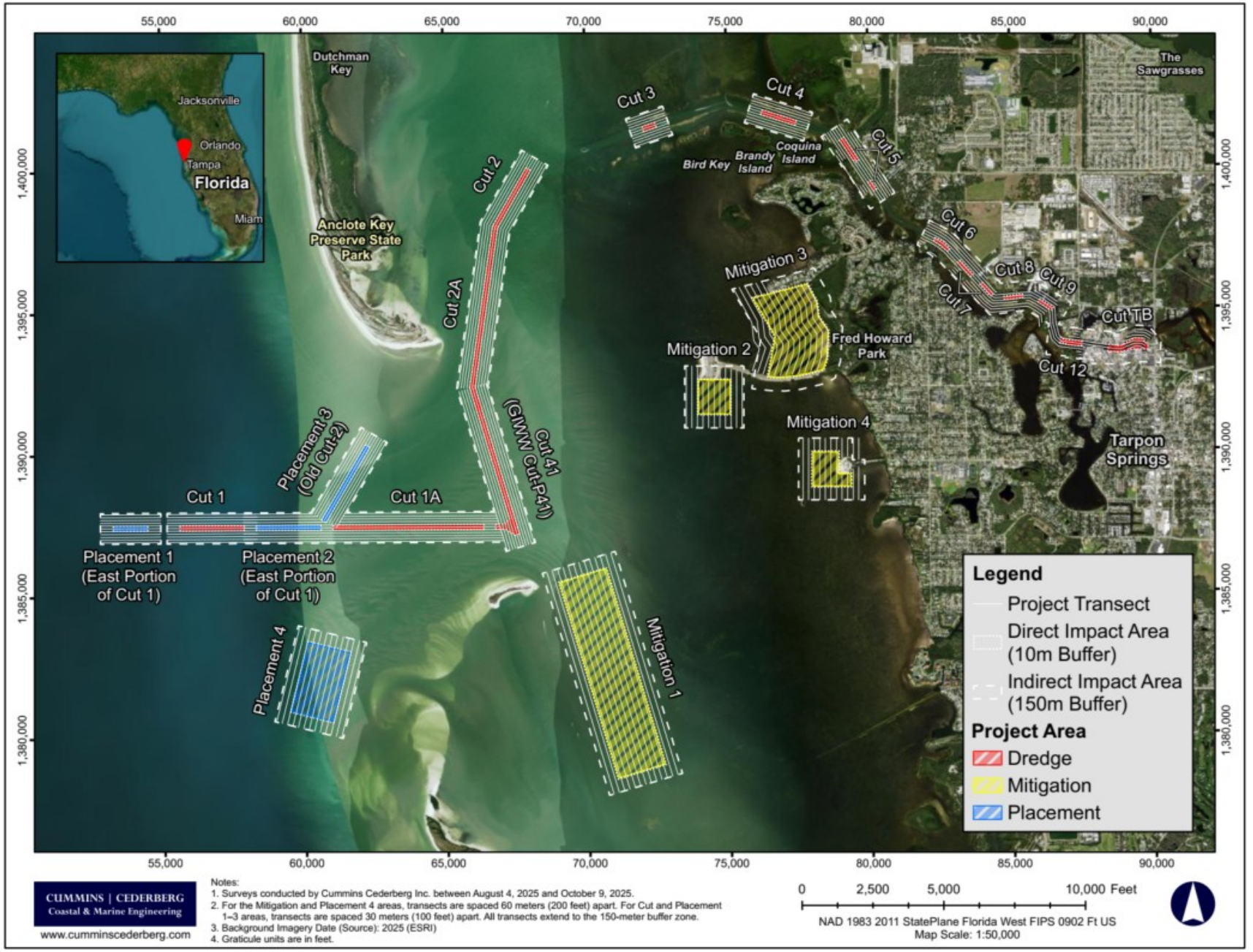

Figure 3. Transect overview map.

Qualitative Mapping/Delineation

Desktop analysis of waypoints collected during ROV surveying was completed to determine areas of potential resource presence/absence and to document anticipated habitat type (i.e., SAV, hardbottom, oysters, no resources of importance). These areas were catalogued and transformed into georeferenced points for *in-situ* observation by biologists on SCUBA. Based on the towed camera survey data, biologists were deployed to confirm the presence/absence and to delineate the extent of marine resources within the Project footprint. If potential resources were not observed during ROV reconnaissance surveying, in-water verification of resources was not required.

Qualitative surveys were completed between August 14, 2025, and October 9, 2025. Where feasible, resource extents were mapped using a handheld Trimble on a float affixed to a diver who circumnavigated the resource edge. For survey areas that presented challenging conditions (e.g., waves, strong currents, and limited visibility), divers carried weighted buoys to mark the edges of habitats. After the divers were recovered, GPS points were collected at the weighted buoys from the vessel and used to create polygons of resource extents during subsequent post-field data processing. Biologists took representative photos with an underwater camera and took notes to document benthic habitat characteristics including presence/absence of resources, species composition, and observed flora and fauna.

For mapping purposes, SAV was considered continuous when beds were observed in lengths of 30 meters (~100 ft) or more and discontinuous/patchy if less than 30 meters. SAV was recorded by approximate percent cover based on the criteria provided in **Table 2**. Other visual assessments such as species composition, canopy height, presence/absence of epiphytes, and general health were also collected.

Table 2. Seagrass coverage within the survey area.

Percent Cover	Coverage Description
0	Taxa Absent
1 - <5%	Sparse Coverage
5 - <25%	Sparse-Moderate Coverage
25 - <50%	Moderate Coverage
50 - <75%	Moderate-Dense Coverage
75 - 100%	Dense Coverage

Once habitat extents were established, percent cover of habitats within each of the survey locations were tabulated and further analysis was performed to assess the percent surface area of actual SAV (i.e., proxy for biomass) within each area.

Quantitative Characterization

Quantitative data was obtained by performing quadrat surveys in cuts that had SAV present in the 10-meter direct impact area. The USACE PWS required 5% of all SAV within the DIA to be quantitatively surveyed; however, due to the order of magnitude of resources observed during

qualitative mapping, the USACE agreed to 1% of SAV resources within Cut 1 and GIWW Cut-P41 (Cut 41) only. Based on the qualitative mapping extents, this resulted in 349 quadrats for Cut 1 and 461 quadrats for Cut 41.

Using the data from the towed camera and qualitative mapping surveys, quadrat locations were distributed throughout the SAV areas within each site. For efficiency, quadrat surveys were completed from center survey points with transects extending to the edge of resources within the surrounding area; seven survey points were established for Cut 1 and 12 survey points at Cut 41 (**Figures 4** and **5**). A random number generator was used to determine the pre-field quadrat transect headings (typically four at each survey point). These headings were rounded to the nearest ten for ease of diver use. In the field, divers dropped a weighted buoy at the center survey point and swam transect reels out to the pre-determined transect lengths and headings. If in-water conditions (e.g., strong opposing currents) made it challenging to run transects along the assigned heading, a new heading was determined and recorded *in-situ* based on the divers' ability to complete the transect. Along each transect, a 1-meter-long by 1-meter-wide quadrat (1 m^2) was completed at every other meter along the transect (i.e. 1m, 3m, 5m, etc.) and representative photographs were taken. The data collected for the quantitative assessment included drift algae presence, percent cover of SAV (including rhizophytic macroalgae) by species to the nearest 5%, canopy height of seagrass, species composition, epiphyte coverage, and any other noteworthy observations. Center points, final transect headings and lengths, and quadrat GPS locations are provided in **Appendix E**.

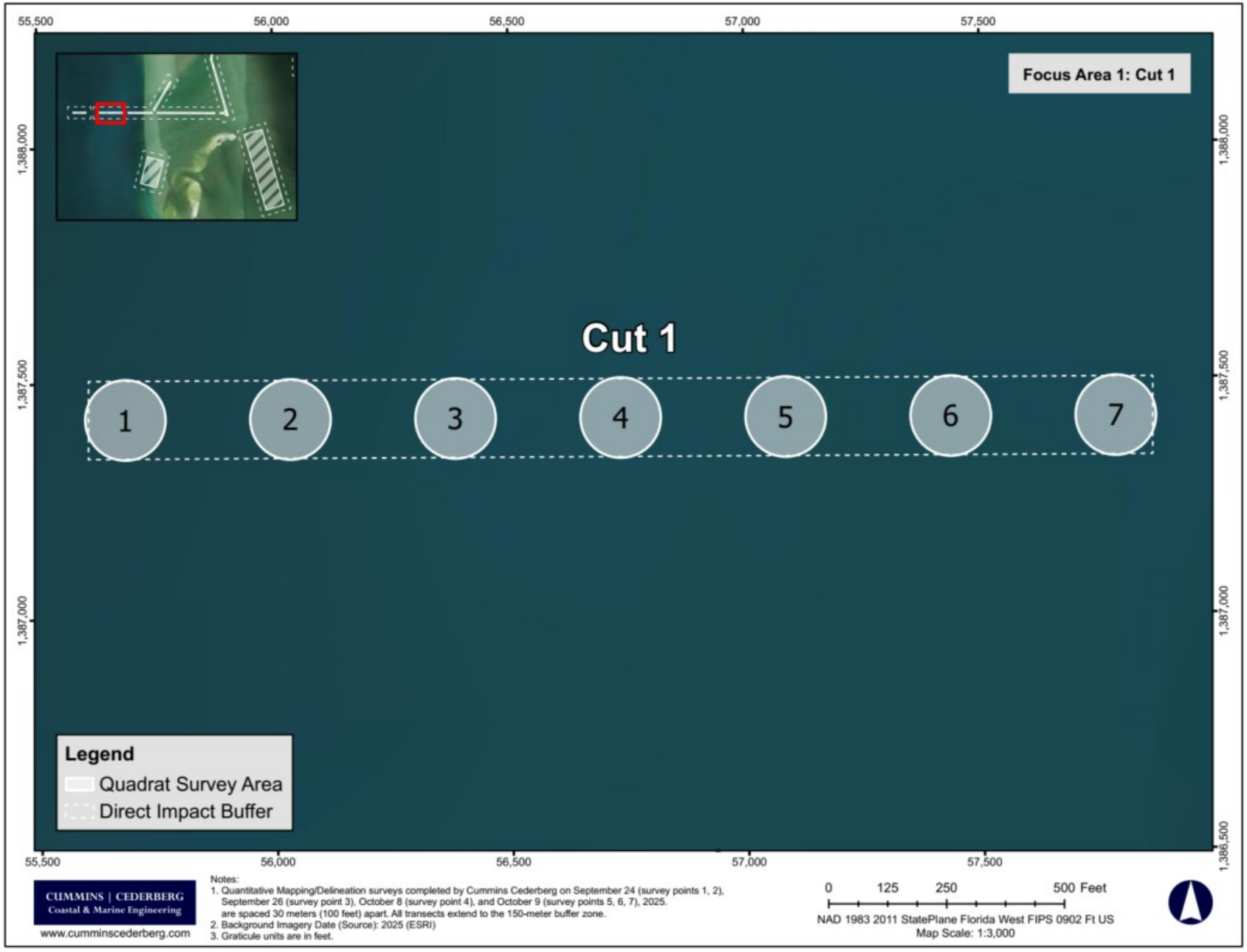

Figure 4. Quadrat survey point areas within the Direct Impact Area at Cut 1.

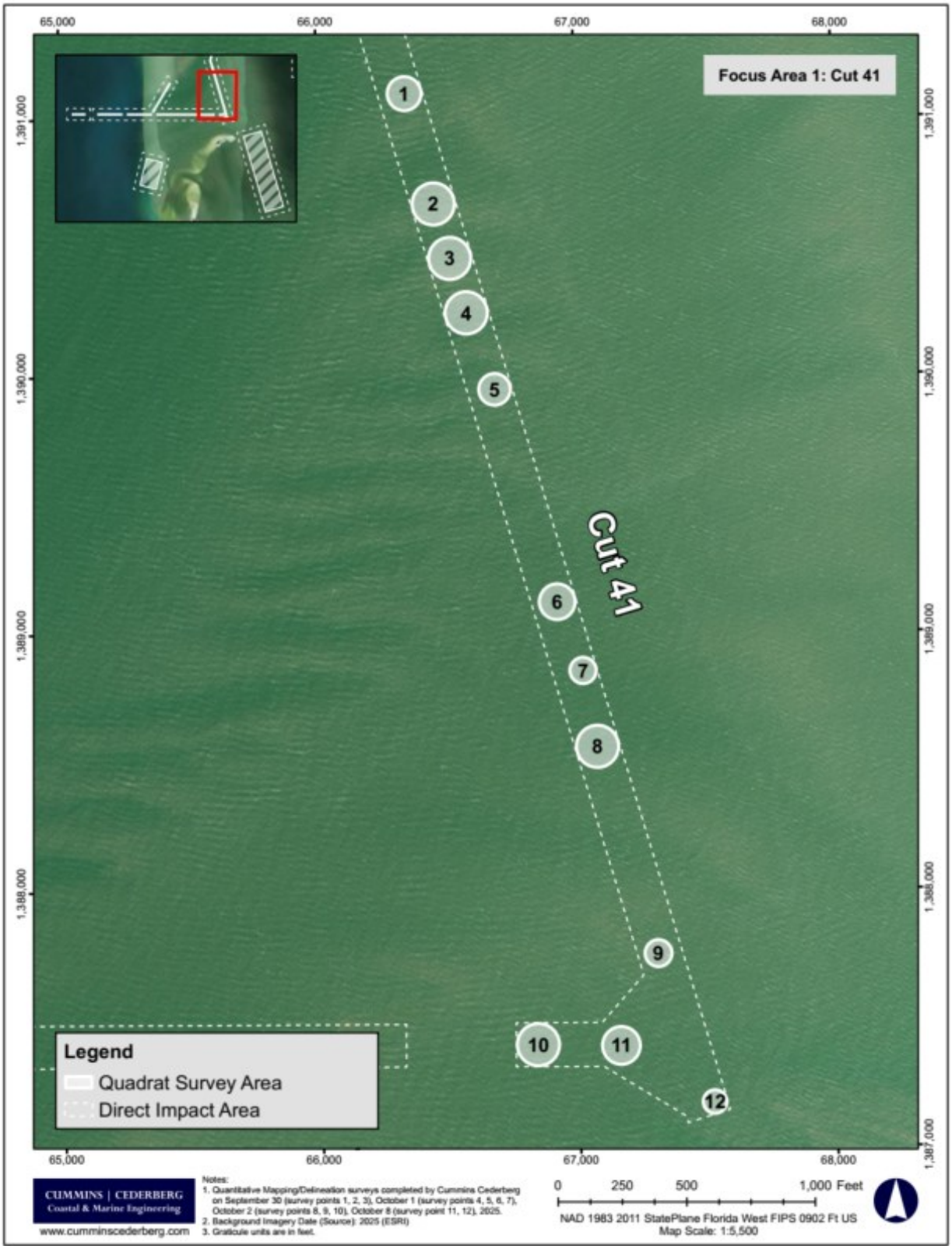

Figure 5. Quadrat survey point areas within the Direct Impact Area at Cut 41.

3 RESULTS

Basemaps depicting overall resources present within Project locations can be found in **Figures 6 - 12**. Additional zoomed in maps are provided in **Appendix F**, which include general extent and percent cover as well as additional, separate maps, identifying seagrass species present within each delineated area. Total habitat areas and actual SAV area (proxy for biomass) with survey areas are summarized below and further detailed in tabular format (**Tables 5** and **6**) in the Discussion section.

Dredge Cut Areas

Turning Basin

There was no benthic habitat of importance within the Turning Basin survey area. The ROV camera reconnaissance revealed fine, barren sediment within the basin that was devoid of resources, and therefore in-water verification was not required.

Cut 12

Towed camera transects that were completed in deeper waters showed large amounts of detritus and occasional anthropogenic debris and litter. Divers were deployed to confirm the ROV data and to survey the shallow areas the ROV could not access. Divers confirmed that no resources of importance were present in Cut 12. The benthos consisted of muck and detritus with occasional debris.

Cut 9

Oyster habitat (0.01 acres) is present on the south side of a small mangrove island within the IIA buffer at Cut 9 (**Figure 6**). There are nearshore seagrass beds present south of the DIA buffer zone, along the mangrove islands, characterized by <5% shoal grass (*Halodule wrightii*) that is patchy with moderate epiphytic growth (**Photo A-1**). Substrate within Cut 9 consisted of a fine, mucky material. No resources were documented within the DIA.

Cut 8

Seagrasses were documented in the southern extents of the IIA at Cut 8, along the mangrove islands and adjacent shoals, in varying percent coverages (**Figure 6**). Seagrass fronting the main navigation channel on northern side of the mangrove islands is monospecific (*H. wrightii*) and patchy in nature, with sparse to sparse-moderate (<5 to <25%) coverage (**Photo A-2**). To the south of the shoals, seagrass coverage increases, albeit still patchy, and is characterized by sparse-moderate (5-<25%) *H. wrightii* (**Photo A-3**) which transitions to dense (75-100%) coverage of intermixed species, including *H. wrightii*, manatee grass (*Syringodium filiforme*), and very intermittent turtle grass (*Thalassia testudinum*). The seagrass is limited on its southern extent by a navigational channel, presumably primarily used by residential boaters in the area. There are oysters present in low densities on the southern side of the mangrove island adjacent to the eastern extent of the DIA. Substrate was generally fine and mucky in the survey area. No resources were documented within the DIA at Cut 8.

Cut 7

Cut 7 is composed of two proposed dredge cut locations. The southern of the two cuts has mainland to the north and mangrove islands lining the southern and western edge. The submerged lands adjacent to the mainland support a bed of 5-<25% *H. wrightii* that encroaches the northern edge of the DIA buffer (**Figure 6**). Just northeast of the northern cut, there is a continuous 50-<75% cover bed of *H. wrightii* intermixed with occasional *T. testudinum* (**Photo A-5**). The bed reduces in coverage and waterward extent as it continues west along the shoreline and transitions to a discontinuous <5% cover *H. wrightii* patch. Resources are not present surrounding the marina on the north shoreline in between the two Cut 7 cuts.

Similar to Cut 8, the mangrove island and adjacent shoal on the south side of the two cuts associated with Cut 7 support a large area of discontinuous 5-<25% cover *H. wrightii* on the river channel side. On the bayou-side, to the south of the shoals, there is a patchy, continuous 5-<25% cover bed of *Syringodium filiforme* (manatee grass) intermixed with *H. wrightii* (**Photo A-4**). Substrate within the Cut 7 area consisted of a fine sand, with muck in some areas. Seagrasses exhibited low to moderate epiphytic coverage and varied in canopy height, with denser beds having longer (> 6 in.) blade lengths.

Cut 6

Seagrasses are limited to the nearshore areas of the mainland and adjacent mangrove islands at Cut 6 (**Figure 6**), with primarily 5-<25% cover along the northern shorelines of the IIA and 25-<50% coverage along the mangrove island shoreline in the southern portion of the IIA (**Photo A-6**). Seagrass beds are continuous with occasional small sand patches, and are exposed in the nearshore areas at low tides. The western half of the seagrass beds within the IIA of Cut 6 is a transitional zone where the species composition shifts. *H. wrightii* is still the dominant species, but there are areas on the western half of the IIA at Cut 6 that *T. testudinum* and *S. filiforme* can be found intermixed with *H. wrightii* (**Photo A-7**). The southern shoreline of the mangrove island at Cut 6 also supports oyster habitat characterized by oyster clusters and oysters growing on any available hard substrate, such as crab and fish traps. No resources were documented within the DIA at Cut 6.

The IIA of Cuts 6 – 9, Cut 12, and Cut TB overlap and the observed SAV spans the gaps between the proposed dredge cuts. This overlap makes it difficult to assign SAV habitat and actual SAV surface area (i.e., proxy for biomass) to a specific survey location. Therefore, the river cuts with observed resources (Cuts 6, 7, 8, 9) were collective evaluated as one location (“The River Dredge Cuts” in **Table 6**) for this analysis. In total, there are 21.61 acres of SAV habitat within the IIA of The River Dredge Cuts. However, when calculated accounting for percent cover, the actual SAV surface area acreage is 10.58 acres, representing 49% of the observed footprint (**Table 6**). There are no resources of importance documented within the DIA at these cuts.

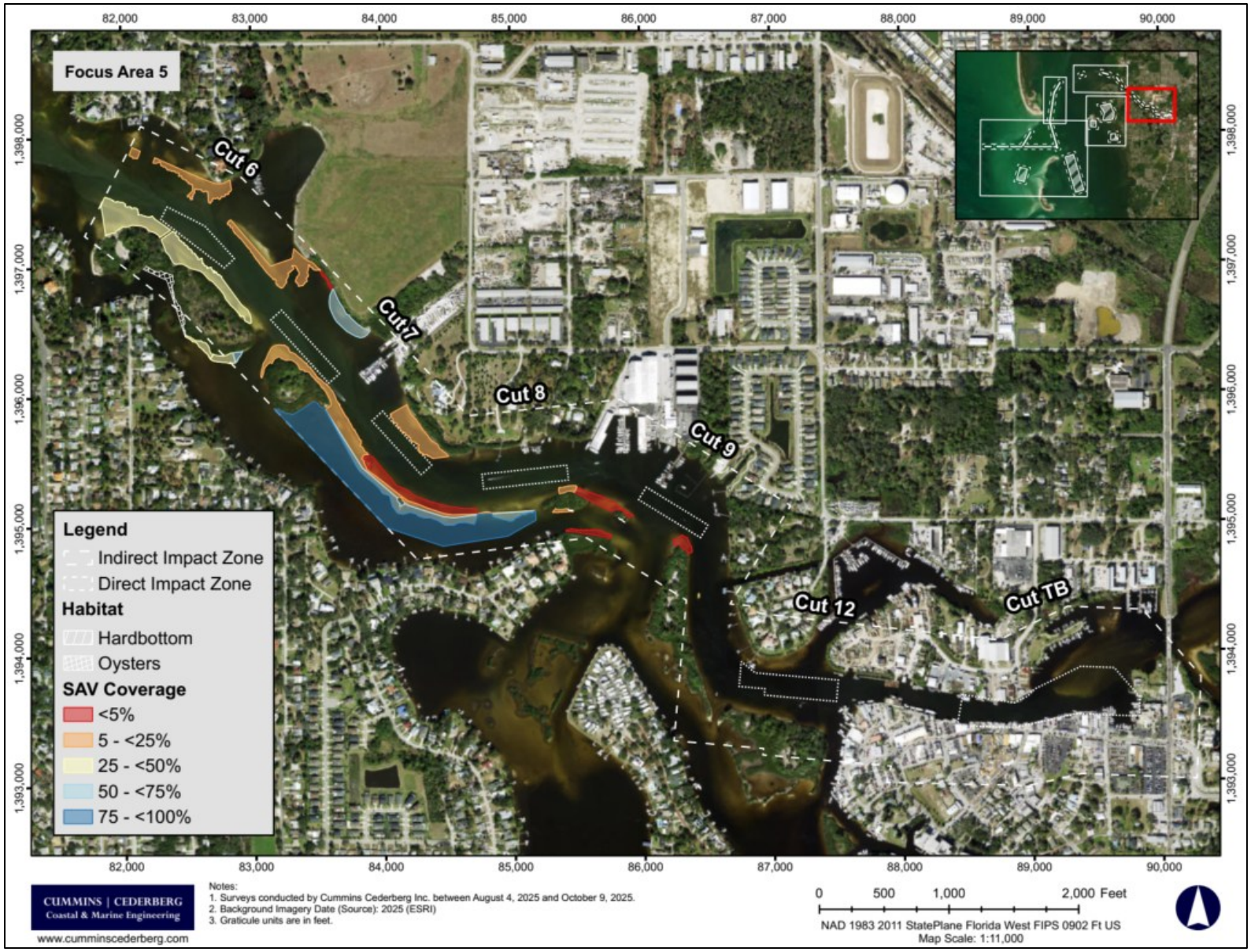

Figure 6. Benthic resource map for Cuts 6, 7, 8, 9, 12, and TB.

Cut 5

Cut 5 consists of two proposed dredging cuts, with mainland to the north and mangrove islands/shoals along the southern extent of the IIA. Seagrass is distributed in varying densities along the northwestern and southeastern edges of the IIA and along a shoal located between the two dredging sites in Cut 5 (**Figure 7**). Seagrass beds are continuous, although sometimes patchy, and dominated by *H. wrightii*, with occasional *S. filiforme* and sparse *T. testudinum* also intermixed (especially near the mangrove islands) (**Photo A-8**). Substrate consists of fine sand, with occasional shell rubble.

The observed SAV habitat within the IIA at Cut 5 is 14.97 acres (**Table 5**) and the estimated actual surface area of SAV is 4.66 acres (**Table 6**), or 31% of the observed footprint. No SAV was documented within the DIA.

Cut 4

The Cut 4 IIA has a dense seagrass area on the northern extent that exhibits occasional areas of prop scars, anchor holes, and stingray bioturbation holes. Most of the area is continuous, 75-<100% cover seagrass (**Figure 7**) with coverage decreasing slightly towards the near-channel edge. The dominant species at Cut 4 is *H. wrightii*; however, *S. filiforme* and *T. testudinum* is intermixed throughout (**Photo A-9**), and in some areas as the same density as *H. wrightii*. The southern section of the Cut 4 IIA exhibits sparse-moderate to moderate-dense (5-<75%) coverage seagrass, again in intermixed beds dominated by *H. wrightii*, primarily growing along shallower shoal areas. The seagrass extends beyond the bounds of the IIA buffer zone in all directions. Substrate within the Cut 4 survey area was fine sand with occasional shell rubble and small rocks along the near-channel edge.

The observed SAV habitat footprint in the IIA of Cut 4 is 28.75 acres (**Table 5**) and the estimated actual surface area of SAV is 19.72 acres (**Table 6**), or 68% of the observed habitat footprint. No resources of importance were documented within the DIA at Cut 4.

Cut 3

Cut 3 is characterized by similar seagrass distribution as Cut 4, with beds located outside of the DIA on the north and south sides of the channel and occasional areas of prop scars, anchor holes, and stingray bioturbation holes (**Figure 7**). The bed south of Cut 3 has continuous, moderate (25-<50%) coverage seagrass, the western side of which is dominated by *H. wrightii* and has intermixed *S. filiforme* and *T. testudinum* and the eastern side of which is dominated by *S. filiforme* with intermixed *H. wrightii* and *T. testudinum*. The bed to the north of Cut 3 has denser seagrasses, characterized by consistent 75-100% cover with slightly lower coverage (50-<75% cover) on the eastern extent just south of the shoal on that side (**Photo A-10**). The north bed transitions from monospecific *T. testudinum* (west) to an intermixed, *S. filiforme* dominant bed (east) (**Photo A-11**). Substrate was generally sandy in the survey area.

The observed SAV habitat footprint in Cut 3 is 18.44 acres (**Table 5**) and the estimated actual surface area of SAV is 11.71 acres (**Table 6**), or 64% of the observed footprint. No SAV was documented within the DIA at Cut 3.

Figure 7. Benthic resource map for Cuts 3, 4, 5.

Cut 2

Cut 2 is located east of Anclote Key and is the most northern of the continuous north-south channels leading to the pass into the Gulf (**Figure 8**). It is characterized by mostly sandy bottom with depths of 9-11 feet. The site supports four small pockets of unconsolidated hardbottom (0.12 acres collectively) and one small area (0.02 acres) of discontinuous, patchy <5% *H. wrightii* (**Photo A-12**). The unconsolidated hardbottom supported sponges, various octocorals, and scleractinian corals including *Solenastrea bournoni*, *Solenastrea* hyades, *Phyllangia americana, Oculina* spp.*,* and *Stephanocoenia intersepta.* Neither the hardbottom nor the seagrass cross into the DIA at Cut 2.

Cut 2A

Cut 2A is located between Cut 2 and GIWW Cut P-41 (Cut 41). This area is comprised of robust hardbottom habitat (**Figure 8**). The largest feature is characterized by rocky outcroppings and exposed, low-relief limestone that are largely consolidated and support the growth of various octocorals as well as scleractinian corals, including *S. bournoni*, *S.* hyades, *P. americana, Cladocora arbuscula, Oculina robusta, and Oculina arbuscula* (**Photo A-13**). The corals in the area include sizes ranging from new recruits to large individuals, with some *S. bournoni* and *O. arbuscula* reaching 30 cm (12 inches) tall. Various octocoral species are also common and robust, some reaching an estimated 3 feet tall (**Photo A-14**). Numerous sponge colonies, tunicates, and mollusks were also observed growing on the hardbottom habitat. North of the larger hardbottom habitat feature, there are small unconsolidated patches of hardbottom that support a less diverse suite of benthic species. These small areas are characterized by sponges and octocorals affixed to scattered rock debris. There are 1.82 acres of hardbottom habitat within the DIA at Cut 2A (**Table 5**).

Various fish species were observed, the most common species being Atlantic spadefish (*Chaetodipterus faber*), sheepshead (*Archosargus probatocephalus*), gray snapper (*Lutjanus griseus*), and sailor's grunt (*Haemulon parra*) **(Photo A-15**). Additional species observed throughout the survey area are included in **Table 4**.

Figure 8. Benthic resource map for Cuts 2 and 2A.

Cut 41 (GIWW Cut-P41)

Cut 41 is the final cut in the north-south direction before the designated navigational channel turns west towards the Gulf. Cut 41 is characterized by large areas of discontinuous, patchy seagrass – primarily 5-<25% coverage *H. wrightii* (**Figure 9**). However, along much of the eastern portion of Cut 41, *S. filiforme* intermixes with *H. wrightii* to form a patchy, 50-<75% coverage bed (**Photos A-16** and **A-17**). <5% *H. wrightii* and *Udotea* sp. are intermixed with unconsolidated hardbottom in the far southern reach of the cut. The hardbottom habitat in this area is sponge dominant and few corals (primarily *Octocorallia* spp., *O. robusta*, *S. bournoni*, and *S. hyades*) are found growing on the rocks.

The observed SAV habitat footprint within the IIA at Cut 41 is 85.69 acres (**Table 5**) and the estimated actual surface area of SAV is 35.05 acres (**Table 6**), or 41% of the observed footprint. Of the 35.05 acres of seagrass habitat, 10.12 acres of habitat were within the DIA. However, the actual surface area of SAV is 3.18 acres (0.04 acres of <5% coverage habitat and 3.14 acres of 25-<50% coverage habitat). Therefore, additional quantitative quadrat data collection was completed.

Of the 480 quadrats completed at the pre-determined locations (Survey Points 1 – 12) within the DIA of Cut 41 (slightly higher than the 461 required quads due to the survey methodology), only 33.5% had seagrass present, further detailing the discontinuous nature of the seagrass bed, and 8% included hardbottom habitat or rock outcroppings. Excluding the areas that did not have any resources, the average SAV cover is 12% and the median cover is 5% (**Table 3**). When including the areas devoid of resources, the average decreases to 3.1% and 0%, respectively. The average canopy height of the seagrass (all species) is 14.1 cm and the median is 12 cm. *H. wrightii* was the dominant species observed throughout quadrats within the Cut 41 DIA. Macroalgae present within the quadrats included *Udotea* sp., *Acetubularia* sp., *Gracilaria* sp. (primarily drift), *Caulerpa* spp., and *Dictyota* sp. Macroalgae was rare and not a significant proportion of the SAV within the quadrats.

Cut 1A

Cut 1A is located to the east of Cut 1 and west of Cut 41. It is generally devoid of resources on the western half of the site but seagrass and hardbottom are found in the eastern extent of the survey area (**Figure 9**). Along the southeast portion of the site, there is an area characterized by patchy hardbottom and seagrass habitat (5 - <25% cover; *H. wrightii*). Seagrass and hardbottom patches in this area are not substantial – seagrass patches are typically 100 ft^2 or less and the hardbottom areas are often small rocky outcroppings less than 50 ft^2 – however they are consistently present throughout. There are two larger hardbottom habitat areas in the north central and south central sections of the survey area. These larger areas exhibit consolidated hardbottom with emergent rock and extensive corals including *S. bournoni, P. americana, C. arbuscula*, *Octocorallia* spp., and sponges (**Photo A-18**). Between larger outcroppings, smaller unconsolidated rocky areas that are sponge dominated are present. The other two noteworthy areas are larger standalone 25-<50% cover *H. wrightii* patches (**Photo A-19**). Substrate within Cut1A consists of a fine sand composition.

The observed SAV habitat footprint in the IIA of Cut 1A is 32.94 acres (**Table 5**) and the estimated actual surface area of SAV is 4.94 acres (**Table 6**), or 15% of the observed habitat footprint. Within the DIA, there is 3.82 acres of SAV habitat, or 0.57 acres of estimated actual surface area.

Cut 1

Cut 1 is characterized by a very patchy and discontinuous, albeit consistent, sparse (<5% cover) *H. wrightii* bed, with limited areas within the IIA devoid of seagrass (**Figure 9**) (**Photo A-20**). Seagrass patches within the SAV habitat are often only few blades to <5 ft^2 in size, with spacing over 25 m in some instances. However, the patchy nature is consistent throughout the DIA. Substrate in the area consists of a fine sand.

Similar to the River Dredge Cuts, Cut 1, Placement 1, and Placement 2 have overlapping IIAs and were therefore combined into one area for purposes of analyzing SAV habitat and actual SAV surface area. The observed SAV habitat footprint in the IIA of Cut 1 (including Placement 1 and Placement 2) is 91.81 acres and the estimated actual surface area of SAV is 2.29 acres (**Table 6**), or 2.5% of the observed footprint. 8.57 acres of this habitat are within the DIA of Cut 1, with the estimated actual surface area of SAV within the DIA at 0.21 acres (there were no resources within the DIA at Placement 1 or Placement 2).

Seven quadrat Survey Points were established at Cut 1. Quantitative data in the DIA buffer zone supports the qualitative data that the SAV habitat is sparse and very patchy in nature. Only 51% of the 362 total quadrats had seagrass present and the only species of seagrass present within Cut 1 is *H. wrightii.* Excluding the areas that do not have any resources, the average *H. wrightii* cover is 5.7% and the median *H. wrightii* cover is 5%. When including the areas devoid of resources, the average decreases to 1.1% and 0, respectively. The average canopy height of *H. wrightii* is 10.2 cm and the median is 10 cm (**Photo A-21**). No macroalgae was present within the quadrats at Cut 1.

Table 3. SAV quadrat data summary within Project areas C1 and C41.

		Quads w/ SAV only	All Quads	Quads w/ SAV only	All Quads
		C1		C41	
SAV % Cover	Minimum	5	0	5	0
	Average (+/- SD)	5.7 (2.8)	1.1 (2.6)	12 (14.7)	3.1 (9.1)
	Median	5	0	5	0
	Maximum	20	20	70	70
Canopy Heights (cm)	Minimum	4	-	1	-
	Average (+/- SD)	10.2 (4.1)	-	14.1 (9)	-
	Median	10	-	12	-
	Maximum	20	-	45	-

Figure 9. Benthic resource map for Cuts 1 and 1A; Placement 1, 2, 3, 4; Mitigation 1.

Mitigation Sites

Mitigation 1 – Three Rooker Island Mitigation Site

Mitigation 1 is characterized by continuous, dense (75-100%) seagrass throughout much of the site (**Figure 10**) (**Photo A-22**), except one patch on the north extent where coverage decreases to 25-<50% and is intermixed with hardbottom habitat patches. The seagrass bed is heterogenous with *H. wrightii*, *S. filiforme* and *T. testudinum*, has moderate to high epiphytic coverage, and is generally healthy. *S. filiforme* is the dominant seagrass species at Mitigation 1; it is present throughout the entire area while *T. testudinum* and *H. wrightii* are generally patchy (**Photo A-23**). The observed SAV habitat footprint in Mitigation 1 is 498.27 acres (**Table 5**) and the estimated actual surface area of SAV is 432.77 acres (**Table 6**), or 87% of the observed footprint. Within the DIA, the observed SAV habitat footprint is 286.92 acres, and the estimated actual surface area of SAV within the DIA is 249.49 (283.35 acres of actual SAV surface area for dense coverage and 1.34 acres of actual surface area for moderate coverage).

The area also supports three discrete areas with hardbottom habitat (12.79 acres collectively, **Table 5**) – one in the south extent (2.8 acres), one near the midpoint of the site (3.57 acres), and one near the north extent (6.43 acres). The southern hardbottom area is characterized by shelly sand and occasional unconsolidated rocks with standalone sponges and corals. The corals present in this hardbottom area are *Siderastrea radians*, *S. bournoni*, *P. americana*, *Oculina* spp., and S*. intersepta* (**Photo A-24**)*.* All the corals observed were less than 30 cm in diameter and most are less than 10 cm in diameter. The transitional edge between the hardbottom and seagrass habitat supports multiple macroalgae genera, including *Penicillus* sp., Caulerpa spp., *Halimeda* sp., and *Udotea* sp. The two other patches that support hardbottom habitat (middle and north) are characterized by shelly sand and occasional rocks with standalone sponges and corals. Coral diversity within these two areas is reduced and only small, paling or bleached *S. radians* were observed.

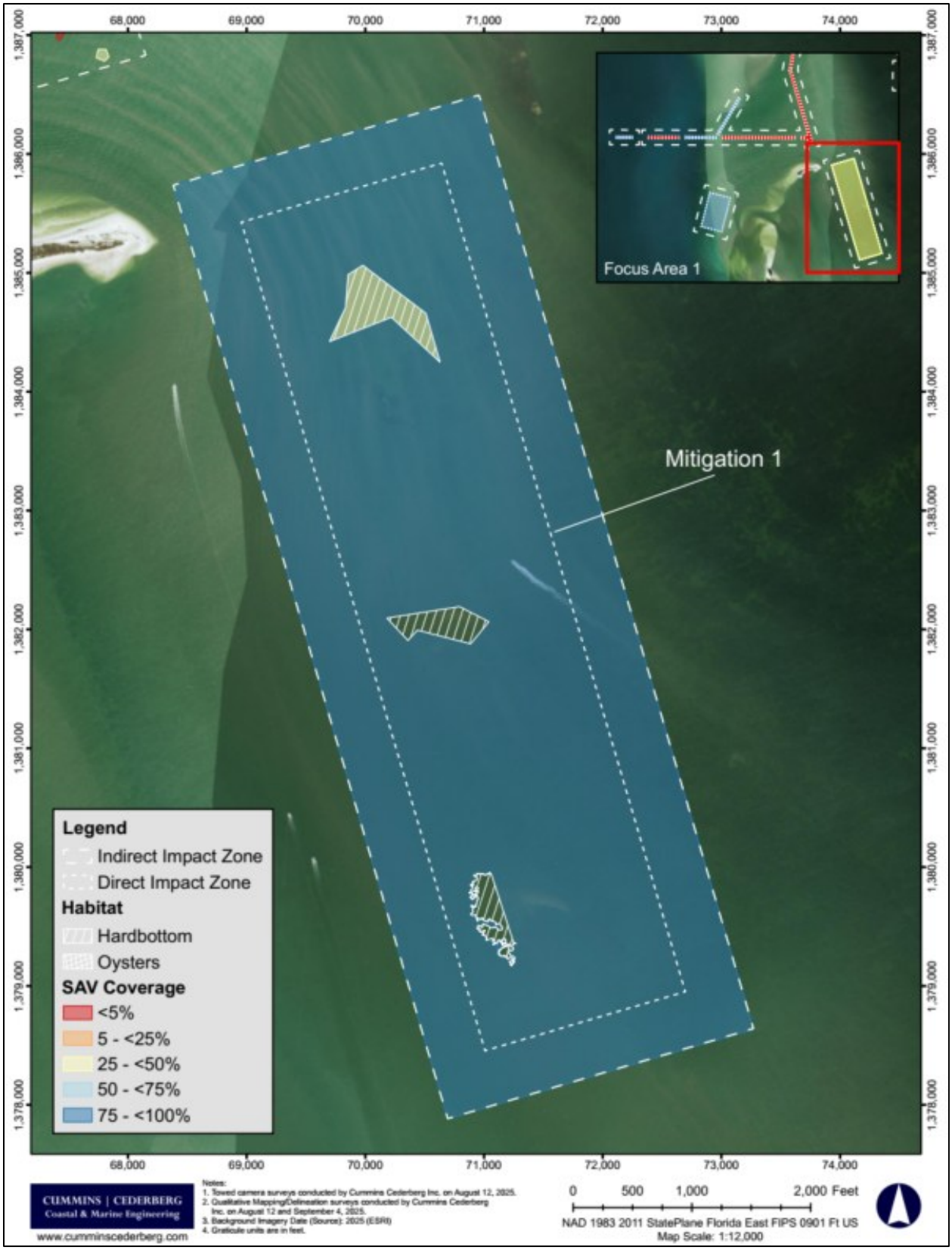

Figure 10. Benthic resource map for Mitigation 1.

Mitigation 2 – Fred Howard Park

Mitigation 2 is the most southern of the two Fred Howard Park mitigation sites. The site is characterized by dense (75-100%) coverage *H. wrightii*, *T. testudinum*, and *S. filiforme* throughout the area (**Figure 11**) (**Photo A-25**). The far northern portion adjacent to the beach and the beach access road has considerably lower cover (<5%) of monospecific *H. wrightii* along the shoreline and large amounts of detritus. The observed SAV habitat footprint in the IIA of Mitigation 2 is 92.75 acres (**Table 5**) and the estimated actual surface area of SAV is 80.89 acres (**Table 6**), or 87% of the observed footprint. Within the DIA, the observed SAV habitat area is 32.74 acres, resulting in approximately 28.65 acres of estimated actual SAV surface area 75-100% coverage within the DIA.

There is a large hole devoid of resources in the northeast corner of the site, presumably a sinkhole as water depths increase within this area**.** However, this should be investigated further to confirm. There is also a 25 ft^2 patch on the southern edge of the 'sinkhole' with rocks and colonies of *S. radians* (**Photo A-26**). Occasional *Halimeda* sp. is present along the seagrass edge of the 'sinkhole' as well. One other small hole devoid of resources was observed and mapped, about 500 ft west-southwest of the large 'sinkhole'. Just south of the smaller hole is a discrete, rocky structure that does not have noteworthy growth on it.

Mitigation 3

The survey area at Mitigation 3 is comprised of mostly continuous dense (75-100%) *T. testudinum* and *H. wrightii* (**Figure 11**) (**Photo A-27**). The composition of the two seagrass species varies based on proximity to the shoreline. In areas near to the road in the south and the shoreline to the east, *H. wrightii* is the dominant species; *T. testudinum* is more prevalent towards the center of the site. The observed SAV habitat footprint within the IIA at Mitigation 3 is 137.6 acres (**Table 5**) and the estimated actual surface area is 120.4 acres (**Table 6**), or 87.5% of the observed footprint. 96.92 acres of this habitat is within the DIA, resulting in 84.81 acres of actual surface areas of SAV within the DIA.

Additionally, two large holes devoid of resources and three creek outflows are present and influence benthic resources in the area. The two largest creek outflows scoured areas within their delta that are devoid of resources. The northern creek is located alongside the large Piney Point residential area that includes multiple personal docks. In the directly adjacent areas around the docks, there are no resources of importance growing along the benthic bottom.

Mitigation 4 – Sunset Beach

The Sunset Beach Mitigation Site (Mitigation 4) has a large hole with a mucky substrate that is devoid of resources within the center of the survey area, just west of the Sunset Beach island. Along the edge of the hole, 50-<75% *H. wrightii* mixes with *T. testudinum* and *Caulerpa* spp. (**Figure 11**) (**Photo A-28**). The edge habitat, which is dominated by *H. wrightii,* transitions after roughly 20 feet and the habitat shifts to a 75-100% cover, *T. testudinum*-dominant bed throughout the extents of the site. The observed SAV habitat footprint within the IIA at Mitigation 4 is 73.04 acres (**Table 5**) and the estimated surface area is 63.37 acres (**Table 6**), or 86.76% of the observed footprint. Within the DIA, the observed SAV habitat footprint is 21.42 acres which comes

out to 22.38 acres of actual SAV surface area (19.97 acres of dense seagrass coverage + 2.41 acres of moderate-dense coverage).

Placement Sites

Placement 1 (West portion of Cut-1)

On the eastern portion of Placement 1 there is a <5% cover bed of patchy, discontinuous *H. wrightii* that extends westward but does not intersect with the DIA buffer zone (**Figure 12**) (**Photo A-29**). There is a 0.49-acre hardbottom habitat feature present in the northwest corner that extends to the edge of the IIA buffer and has substrate composed of rocky sand and shell/rock rubble. *Octocorallia* spp., *S. bournoni*, small *S. radians*, *Caulerpa* spp., various sponges, and tunicates were observed growing within this area (**Photo A-30**). Growth and emergent hardbottom rock is very patchy. Apart from the seagrass bed in the east and the hardbottom in the west the site is devoid of noteworthy resources and there are no resources of importance within the DIA.

Placement 2 (East portion of Cut-1)

Located within the eastern portion of Cut 1, Placement 2 has discontinuous, patchy, sparse (<5%) cover *H. wrightii* in the entire northern section of the site (**Figure 12**) (**Photo A-31**). The southern half of the site is devoid of noteworthy resources. There is a small patch of hardbottom habitat present adjacent to the north side of the DIA buffer zone that supports patchy *Octocorallia* spp. and sponges (**Photo A-32**). The substrate in the survey area is otherwise fine sand. No resources are present within the DIA buffer.

Placement 3 (Old Cut-2)

The southern boundary of Placement 3 (Old Cut-2) is situated between Placement 2 (the eastern portion of Cut 1) and Cut 1A. Notwithstanding, the <5% *H. wrightii* already described in the northeastern portion of Placement 2 that also occurs at the southern end of Placement 3, there is one other 2.34 acre patch of <5% *H. wrightii* in the northeastern corner of the site which, accounting for percent cover, is 0.06 estimated actual surface area acreage (**Figure 12**). There is observed seagrass within the DIA in the far southern reach of Placement 3 (Old Cut-2) that accounts for 0.01 acres of observed habitat footprint and 2.5 e^{-4} acres of actual estimated actual surface area of SAV. Substrate is comprised of fine sand, with occasional shell rubble and detritus.

Placement 4

Towed camera reconnaissance at Placement 4 (Three Rooker Island Placement Site) failed to show any indication of benthic resources of importance, and therefore, divers were not deployed into Placement 4 for *in-situ* resource verification. The area is comprised of a fine sandy substrate and generally devoid of any resources.

Figure 11. Benthic resource map for Mitigation Areas 1, 2, 3 and 4

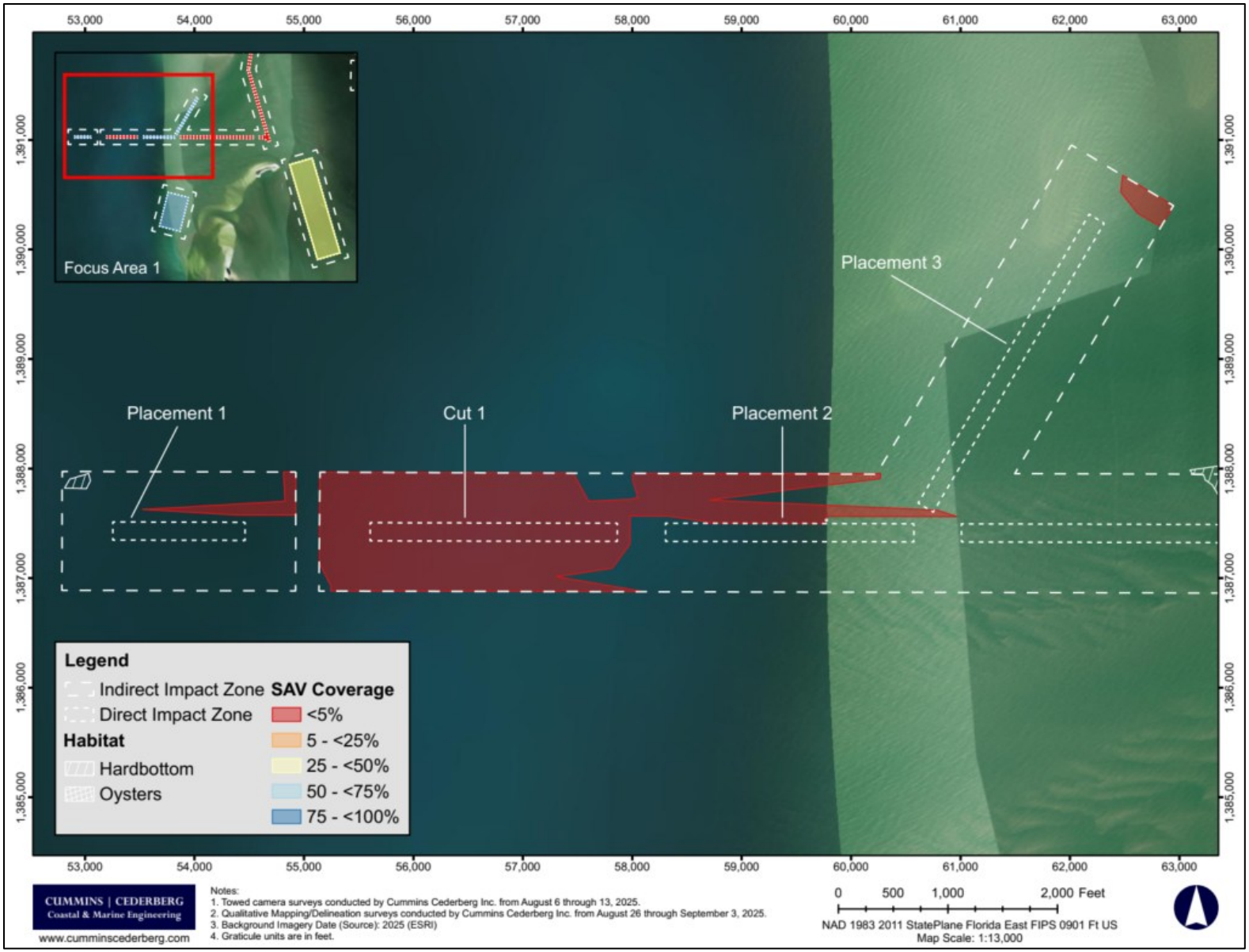

Figure 12. Benthic resource map for Placement Areas 1, 2, and 3; Cut 1.

Table 4. Observed species within the Project area during benthic surveying.

Common Name	Scientific Name	Common Name	Scientific Name
Fish		**Sponges/Corals**	
Mangrove snapper	*Lutjanus griseus*	Various sponges	Phylum Porifera
Mutton snapper	*Lutjanus analis*	Various octocorals	*Octocorallia* spp.
Sailor's choice	*Haemulon parra*	Lesser starlet coral	*Siderastrea radians*
Sheepshead	*Archosargus probatocephalus*	Hidden cup coral	*Phyllangia americana*
Sergeant major	*Abudefduf saxatilis*	Smooth star coral	*Solenastrea bournoni*
Atlantic spadefish	*Chaetodipterus faber*	Compact ivory bush coral	*Oculina arbuscula*
Spanish mackerel	*Scomberomorus maculatus*	Robust ivory tree coral	*Oculina robusta*
Speckled seatrout	*Cynoscion nebulosus*	Tube coral	*Cladocora arbuscula*
Pinfish	*Lagodon rhomboides*	Knobby star coral	*Solenastrea hyades*
Striped mullet	*Mugil cephalus*	Blushing star coral	*Stephanocoenia intersepta*
Flying fish	*Exocoetus volitans*	**Invertebrates**	
Lizardfish	*Synodus foetens*	Stone crab	*Menippe mercenaria*
Southern stingray	*Hypanus americanus*	Blue crab	*Callinectes sapidus*
Nurse shark	*Ginglymostoma cirratum*	Horseshoe crab	*Limulus polyphemus*
Porcupinefish	*Diodon hystrix*	Hermit crab	*Pagurus* spp.
Sea robin	*Prionotus* spp.	Bay scallop	*Argopecten irradians*
Common remora	*Remora remora*	Eastern oyster	*Crassostrea virginica*
Gray angelfish	*Pomacanthus arcuatus*	Horse conch	*Triplofusus giganteus*
		Lightning whelk	*Sinistrofulgur perversum*
Gag grouper	*Mycteroperca microlepis*	**Other**	
		Bottlenose dolphin	*Tursiops truncatus*
		West Indian manatee	*Trichechus manatus*
		Green sea turtle	*Chelonia mydas*

4 DISCUSSION

The Anclote River and GIWW O&M Project area encompasses a large and highly productive region of St. Joseph's Sound in west central Florida. The area includes extensive seagrass beds and some relatively larger areas of robust hardbottom habitat. Seagrass, hardbottom, and oyster habitat area observed and delineated during surveying, both for the IIA and DIA, can be found in **Table 5**. A further breakdown of percent surface area of actual SAV (i.e., proxy for biomass) within each area by percent cover bins and species composition is provided in **Table 6**.

Dredge Cut Areas

The benthic habitat location and composition within the Project area are emblematic of a few trends. The trends that indicate seagrass presence in the Anclote River are water depth, substrate type, and nearby infrastructure. Presumably, salinity levels also impact seagrass presence further up river towards the Turning Basin. Seagrass can be found along the shallow edges of the river channel and on shoals where sunlight is readily available, typically in areas with less than 10 ft of water depth. Seagrass is also found consistently in areas with a sandy substrate and is absent from areas with a mucky, silty substrate. Seagrass tends to be absent from areas around commercial docks and marina areas, likely due to consistent use and previous dredging impacts/routine maintenance. The existing channel and deeper waters in the river were commonly observed to have detritus, shell rubble, and occasional rocks.

The total combined SAV habitat footprint within the DIA in all the cut areas is 22.52 acres. Reviewing both SAV habitat footprint and the estimated actual SAV surface area is helpful to determine locations that have fewer resources than a graphical representation of the data represents. For example, this is especially helpful when considering the DIA of Cut 1. This entire DIA area of 8.57 acres is characterized as SAV habitat with <5% coverage, however due to the patchy and discontinuous nature of the seagrass, the actual surface area of seagrass is closer to 2.29 acres.

Seagrass is absent within Cut 12 and the Turning Basin. Both areas are characterized by mucky substrate that is not conducive to seagrass growth. The Tarpon Springs Sponge Docks is a large commercial location present within the Turning Basin entrance and a portion of Cut 12. The Sponge Docks have docks and piers that create shading impediments in the shallower areas where seagrass could grow. The center of the channel in these areas is too deep, like the entirety of the river channel, or has other physical or chemical characteristics that preclude seagrass growth. Cut 9 is the eastern extent of seagrass presence in the river. The seagrass this far upriver is sparse (<5% cover), discontinuous *H. wrightii*. *H. wrightii* is the most ubiquitous seagrass species, especially in the marginal habitats across all Project locations but especially within the river. The area is very isolated from the next patch of seagrass because of a large marina on the northern shoreline and a dredged channel that leads into a protected bayou to the south. Just on the opposite side of the small channel, *H. wrightii* is established in sparse (<5% cover), discontinuous patches. After this point the small-scale density of seagrass increases consistently, in an almost linear fashion, towards Cut 4. Species composition follows a similar trend to density and continuousness.

Oysters are not commonly found within the river; however, they can be found in protected bayou locations, generally on the back side (away from the channel) of the mangrove islands throughout the river. They are only present in small areas and in low densities. The largest oyster bed located within the IIA is found in the Cut 6/7 transitional area. Because of the distribution of the oysters, it is likely that impacts from the dredge would not affect the oysters because of the physical protection the islands would provide. This is also true for seagrasses growing in similar locations (i.e., south of the mangrove islands).

Moving out of the river and into the GIWW, *H. wrightii* is still the most common species encountered, but some locations in Cut 4 are *T. testudinum* or *S. filiforme*, exclusively. Most of Cut 4 is some combination of the two seagrass species or all three. The northern reach of Cuts 3 and 4 are the most robust habitat of all the cut areas. They are healthy, continuous, 75-100% mix of all three seagrass species starting at the backside of the shoals and continuing through the 150-meter buffer.

The north-to-south section of the GIWW (Cuts 2, 2A, and 41) exhibit low resource presence in the north at Cut 2 and transition to diverse habitat in the south at Cut 41. Cut 2A has the most diverse hardbottom habitat located within the survey area. The large rocks and exposed limestone substrate create a complex habitat that lends itself to diverse assemblages of benthic and pelagic species. The genesis of these large rocks that form the basis of the habitat is unknown. It is unlikely that the features are naturally occurring; it is possible they were dumped in the southern portion of Cut 2A during prior channel maintenance or the spoil from other infrastructure projects. Regardless, this feature is present along the extent of the southern portion of the cut, including the DIA.

Quantitative data from Cut 41 revealed an average SAV percent cover of 12% within the DIA, slightly lower than the qualitative mapping/delineation estimate of 25%-<50% coverage. However, seagrass was extremely patchy in nature and tended to grow more dense along the edges of the DIA and adjacent areas leading into the IIA. As a whole, the area reflected closer to 25%-<50% coverage on average.

The west-to-east portions of the GIWW (Placement 1, Cut 1, Placement 2, and Cut 1A) support resources, although resource presence and extent decrease further west. Cut 1A is the most spatially diverse habitat within this area. It includes large areas of unconsolidated hardbottom habitat that encapsulate discrete locations of hardbottom that resemble those in Cut 2A. There are also smaller hardbottom locations that intermittently dot the southeastern region of Cut 1A. The area supports interspersed *H. wrightii* patches throughout that range from 20 ft^2 to 15,800 ft^2. The sand flats that act as transitional zones between hardbottom and seagrass support a pen shell (*Atrina* sp.) community increasing the habitat complexity of the otherwise generally barren sand flats.

Table 5. Survey habitat area quantities.

Location	Survey Area (150m Buffer)							Direct Impact Area (10m Buffer)					
	Survey Area (Acres)	SAV (Acres)	% Cover of SAV	Hardbottom Habitat (Acres)	% Cover of Hardbottom	Oyster Habitat (Acres)	% Cover of Oyster Habitat	Direct Impact Area (Acres)	SAV (Acres)	% Cover of SAV	Hardbottom Habitat (Acres)	% Cover of Hardbottom	
Cut 1	79.26	68.56	86%	-	0%	-	0%	8.57	8.57	100%	-	0%	
Cut 1A*	155.34	32.94	21%	28.96	19%	-	0%	20.18	3.82	19%	3.70	18%	
Cut P41*	160.33	85.69	53%	3.07	2%	-	0%	23.18	10.12	44%	1.90	8%	
Cut 2	82.45	0.02	0%	0.12	0%	-	0%	8.78	-	0%	-	0%	
Cut 2A	166.71	-	0%	18.46	11%	-	0%	20.97	-	0%	1.82	9%	
Cut 3	34.45	18.44	54%	-	0%	-	0%	1.73	-	0%	-	0%	
Cut 4	54.37	28.75	53%	-	0%	-	0%	4.76	-	0%	-	0%	
Cut 5	75.02	14.95	20%	-	0%	-	0%	4.39	-	0%	-	0%	
Cut 6*	36.64	6.40	17%	-	0%	0.33	1%	2.00	-	0%	-	0%	**Sub Total****
Cut 7*	61.91	15.88	26%	-	0%	-	0%	3.13	0.00	0%	-	0%	
Cut 8*	37.61	5.97	16%	-	0%	0.01	0%	1.74	-	0%	-	0%	**168.51**
Cut 9*	35.24	1.05	3%	-	0%	0.01	0%	1.46	-	0%	-	0%	
Cut 12	41.77	-	0%	-	0%	-	0%	2.75	-	0%	-	0%	
Turning Basin	63.13	-	0%	-	0%	-	0%	8.72	-	0%	-	0%	
Total	**1,084.23**	**278.65**	**25%**	**50.61**	**2%**	**0.35**	**0%**	**112.36**	**22.52**	**12%**	**7.42**	**3%**	
Placement 1	53.12	3.08	6%	0.49	1%	-	0%	4.59	-	0%	-	0%	
Placement 2*	79.52	20.17	25%	0.01	0%	-	0%	8.61	0.00	0%	-	0%	
Placement 3*	99.17	3.83	4%	-	0%	-	0%	11.25	0.01	0%	-	0%	
Placement 4	198.71	-	0%	-	0%	-	0%	91.77	-	0%	-	0%	
Total	**430.52**	**27.08**	**9%**	**0.50**	**0%**	**-**	**0%**	**116.21**	**0.01**	**0%**	**-**	**0%**	
Mitigation 1	504.33	497.92	99%	12.79	3%	-	0%	293.30	286.92	98%	12.79	4%	
Mitigation 2	104.51	92.72	89%	0.01	0%	-	0%	33.64	32.74	97%	0.01	0%	
Mitigation 3	269.89	137.60	51%	0.03	0%	-	0%	140.75	96.92	69%	0.03	0%	
Mitigation 4	109.28	73.04	67%	-	0%	-	0%	33.14	21.42	65%	-	0%	
Total	**988.02**	**801.27**	**76%**	**12.84**	**1%**	**-**	**0%**	**500.83**	**438.01**	**82%**	**12.83**	**1%**	
Combined Totals	**2,502.76**	**1,107.01**	**37%**	**63.94**	**1%**	**0.35**	**0%**	**729.40**	**460.54**	**31%**	**20.25**	**1%**	

*Areas with overlapping resources within the Survey Area (150m Buffer); not counted twice in the totals row.

**Combined SAV areas of Cut 6, Cut 7, Cut 8, Cut 9 within the Survey Area (150m Buffer) due to extensive overlap.

The quantitative data obtained for Cut 1 supported the qualitative mapping/delineation efforts. The average SAV percent cover for Cut 1 is 5.7% (5-<25% sparse-moderate) but when you include the void areas that include only sand the average drops to 1.1% cover. Notably, the percent cover is skewed by the guidance in the USACE PWS that requires SAV percent cover to be rounded to the nearest 5%. Because presence is always rounded up (i.e., presence of seagrass cannot be 0%), <5% areas are documented as 5%. The true percent cover of the area aligns with the quadrat data.

Mitigation Sites

The mitigation sites for the Project were chosen as areas with the potential to be suitable for required mitigation due to Project impacts. Within the DIA, the observed SAV footprint for all the mitigation sites is 438 acres. All of the mitigation sites were mostly continuous, robust seagrass beds and supported at least two or all three species of seagrass found within the Project area. Mitigation Sites 1 & 2 supported small unconsolidated hardbottom substrate with limited coral growth, however, Mitigation 1 was the only site where corals were relatively numerous and healthy.

Given depths and existing seagrass presence at the mitigation sites, there are likely limited mitigation opportunities available at these sites. In areas where seagrasses are currently devoid of seagrasses, existing conditions (e.g., potential sinkhole, creek outflow that creates scour) may prevent successful plantings.

Placement Sites

Based on available bathymetric data and reconnaissance surveying, the placement areas are all greater than 10 feet in depth, except for the Three Rooker Island placement site which is 10 feet or less throughout. Within the DIA, the observed SAV footprint for all the placement sites is .01 acres. The two sites mostly devoid of resources that should be the most considered for dredge placement are the Three Rooker Island (Placement 4) and Old Cut-2 (Placement 3). Placement 4 is completely devoid of resources, whereas, Placement 3 does have sparse <5% *H. wrightii* located in the northeast corner of the IIA.

Table 6. Approximate area of actual seagrass surface area. Percent cover is defined as the midpoint of each SAV coverage bin (**Table 2**).

Focus Area	Survey Location	SAV Habitat Coverage Category	Seagrass Species	Acreage of SAV Habitat within the IIA	Avg. Percent Cover	Approx. Area (acres) of Actual SAV within the IIA (Acreage * Percent Cover)	Sub-total of Actual SAV Area (acres)
Focus Area 1	Mitigation 1	Moderate	*H. wrightii, S. filiforme, T. testudinum*	6.43	37.5%	2.41	**432.77**
	Mitigation 1	Dense	*H. wrightii, S. filiforme, T. testudinum*	491.83	87.5%	430.35	
	GIWW Cut-P41	Sparse	*H. wrightii*	2.60	2.5%	0.06	**35.05**
	GIWW Cut-P41	Moderate	*H. wrightii*	65.97	37.5%	24.74	
	GIWW Cut-P41	Moderate-Dense	*H. wrightii & S. filiforme*	16.39	62.5%	10.24	
	Cut 1A	Sparse-Moderate	*H. wrightii*	32.94	15.0%	4.94	
	Cut 1 (Placement 1 & Placement 2)	Sparse	*H. wrightii*	91.81	2.5%	2.29	
	Placement 3	Sparse	*H. wrightii*	2.34	2.5%	0.06	
Focus Area 2	Cut 2	Sparse	*H. wrightii*	0.02	2.5%	0.00	
Focus Area 3	Mitigation 2	Sparse	*H. wrightii*	0.31	2.5%	0.01	**80.89**
	Mitigation 2	Dense	*H. wrightii, S. filiforme, T. testudinum*	92.44	87.5%	80.88	
	Mitigation 3	Dense	*H. wrightii & T. testudinum*	137.60	87.5%	120.40	
	Mitigation 4	Moderate-Dense	*H. wrightii & T. testudinum*	2.17	62.5%	1.35	**63.37**
	Mitigation 4	Dense	*T. testudinum*	70.88	87.5%	62.02	
Focus Area 4	Cut 5	Sparse	*H. wrightii, S. filiforme, T. testudinum*	4.75	2.5%	0.12	**4.66**
	Cut 5	Sparse-Moderate	*H. wrightii*	1.34	15.0%	0.20	
	Cut 5	Moderate	*H. wrightii*	4.84	37.5%	1.82	
	Cut 5	Moderate	*H. wrightii & S. filiforme*	1.20	37.5%	0.45	
	Cut 5	Moderate-Dense	*H. wrightii*	1.65	62.5%	1.03	
	Cut 5	Dense	*H. wrightii*	0.55	87.5%	0.48	
	Cut 5	Dense	*H. wrightii & S. filiforme*	0.64	87.5%	0.56	
	Cut 4	Sparse-Moderate	*H. wrightii & S. filiforme*	0.10	15.0%	0.02	**19.72**
	Cut 4	Sparse-Moderate	*H. wrightii, S. filiforme, T. testudinum*	5.84	15.0%	0.88	
	Cut 4	Moderate	*H. wrightii & S. filiforme*	0.12	37.5%	0.04	
	Cut 4	Moderate	*H. wrightii, S. filiforme, T. testudinum*	0.11	37.5%	0.04	
	Cut 4	Moderate-Dense	*H. wrightii*	1.19	62.5%	0.75	
	Cut 4	Moderate-Dense	*H. wrightii & S. filiforme*	3.02	62.5%	1.89	
	Cut 4	Dense	*H. wrightii, S. filiforme, T. testudinum*	18.42	87.5%	16.11	
	Cut 3	Moderate	*H. wrightii, S. filiforme, T. testudinum*	8.56	37.5%	3.21	**11.71**
	Cut 3	Moderate-Dense	*S. filiforme & T. testudinum*	0.58	62.5%	0.36	
	Cut 3	Dense	*S. filiforme & T. testudinum*	9.30	87.5%	8.14	

Table 6 (Cont'd). Approximate area of actual seagrass surface area. Percent cover is defined as the midpoint of each SAV coverage bin (**Table 2**).

Focus Area	Survey Location	SAV Habitat Coverage Category	Seagrass Species	Acreage of SAV Habitat within the IIA	Avg. Percent Cover	Approx. Area (acres) of Actual SAV within the IIA (Acreage * Percent Cover)	Sub-total of Actual SAV Area (acres)
Focus Area 5	The River Dredge Cuts	Sparse	*H. wrightii*	1.96	2.5%	0.05	**10.59**
	The River Dredge Cuts	Sparse-Moderate	*H. wrightii*	3.40	15.0%	0.51	
	The River Dredge Cuts	Sparse-Moderate	*H. wrightii & S. filiforme*	1.12	15.0%	0.17	
	The River Dredge Cuts	Sparse-Moderate	*H. wrightii, S. filiforme, T. testudinum*	2.62	15.0%	0.39	
	The River Dredge Cuts	Moderate	*H. wrightii*	0.42	37.5%	0.16	
	The River Dredge Cuts	Moderate	*H. wrightii & T. testudinum*	1.94	37.5%	0.73	
	The River Dredge Cuts	Moderate-Dense	*H. wrightii*	0.34	62.5%	0.22	
	The River Dredge Cuts	Moderate-Dense	*H. wrightii & T. testudinum*	0.87	62.5%	0.54	
	The River Dredge Cuts	Dense	*H. wrightii, S. filiforme, T. testudinum*	8.94	87.5%	7.82	
				Total Acreage of SAV		**786.44**	

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ANCLOTE –MAINTENANCE DREDGING OUTER CHANNEL BENTHIC SURVEYS SUMMER 2024 FINAL

Prepared for

U.S. Army Corps of Engineers Jacksonville District
W912EP21A0004-0006

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February 7, 2025
24-5805-02

water & air RESEARCH, INC.

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ANCLOTE/GIWW –MAINTENANCE DREDGING AND PLACEMENT AREAS BENTHIC SURVEYS SUMMER 2024

Final Benthic Resources Report

February 2025

INTRODUCTION

Beds of seagrasses and other types of SAV are located in close proximity to the authorized dredging footprint of Anclote and Gulf Intracoastal Waterway (GIWW) O&M Federal channels and proposed placement areas, Pinellas, Florida (Figures 1 and 2). The U.S. Army Corps of Engineers (USACE) is preparing an Environmental Assessment (EA) and Joint Coastal Permit (JCP) application for these areas. Benthic surveys will be used for the EA, JCP application, and pre-construction. The areas shown have not been previously dredged or used for dredge material placement.

Benthic surveys are needed to document the distribution and characterize the condition of SAV resources at a much finer scale within the area with direct impacts to benthic resources within the Federal channel and placement areas. Additionally, benthic surveys will also identify hardbottom habitat which influences water and sediment transport and provides important habitat to support diverse biotic assemblages. Data on the current condition (distribution, abundance, and condition) of the resources is crucial to the permitting process as they provide information necessary for determining the appropriate amount and type of compensatory mitigation via Uniform Mitigation Assessment Method (UMAM) analysis. This data also aids in the development of the biological monitoring plan and establishment of the permanent monitoring grid to ensure any potential unpermitted impacts will be documented so they can be offset.

METHODS

Desktop Assessment of Benthic Resources

Prior to initiation of any field work for the benthic survey, Water & Air Research (Water & Air) performed a desktop assessment to identify potential benthic resources within 150 meters of the federal channel, placement areas, and mitigation areas using the best available information (e.g., historical aerial photography, data from previous surveys in the vicinity). This included Florida Fish and Wildlife Conservation Commission (FWC) GIS databases for Seagrass Habitat in Florida https://geodata.myfwc.com/datasets/seagrass-habitat-in-florida/explore?location=28.133758%2C-82.823393%2C13.70, and Oyster Beds In Florida https://geodata.myfwc.com/datasets/a78160f5acaf4439b49f9fbef4c100ac_5/explore?location=28.168157%2C-82.793878%2C15.56. Potential SAV habitats include areas known to be currently vegetated, as well as areas that have historically supported SAV and currently possess the appropriate water environment and sediment characteristics necessary for SAV growth. Water & Air also identified any potential hard bottoms within the project site.

Dive Safety Plan
Water & Air prepared a Dive Safety Plan and received USACE approval (September 6, 2024) prior to commencement of the first dive.

Qualitative Mapping/Delineation of Benthic Resources
All areas determined to potentially contain benthic resources, based on the desktop assessment, were surveyed, and a rapid on-site reconnaissance survey was conducted to determine whether any other areas containing benthic resources should also be visually assessed by divers.

The SAV field survey work was performed from September 16, 17, and 18, and 23 and 24, 2024. Continuation of the field work was halted due to the hazardous weather conditions, reduced water clarity visibility, and high levels of fecal bacteria contamination due to hurricanes Helene (September 25, 26, and 27, 2024) and Milton (October 5 through 10, 2024). Because water conditions did not improve until after the end of the SAV growing season (September 30, 2024), further field survey work was not performed.

The reconnaissance survey of the entire survey area was completed using a towed video camera or a towed diver. The video from the towed camera was viewed in real-time by observers on the vessel to ensure that the camera was positioned at the appropriate angle and height above the benthos and towed at the appropriate speed, and that the video was of sufficient quality to identify benthic resources.

The towed–diver survey was conducted using Trimble® DGPS, diver to top-side communications, and HYPACK® marine surveying, positioning, and navigation software. The towed–diver survey allowed divers to visually inspect and catalog habitat types within the survey area. Continuous communication between diver and top side personnel was maintained throughout the towed-diver survey. This communication was critical for transmitting qualitative benthic resource data necessary to ground truth and classify the data layers.

Mapping data was collected with spacing based on real time site conditions (underwater visibility). Diver positioning data was collected in WGS84 (World Geodetic System 1984), North American Datum 1983 (NAD-83), State Plane, Florida West, feet, at a rate of 1 data point per second with Horizontal Dilution of Precision (HDOP) set to <2.0. The Trimble® DGPS provided sub-meter horizontal accuracy. Diver positioning data was transmitted back to the work platform via Pacific Crest® Environmental Data Link® (EDL II) telemetry.

Topside personnel recorded observations communicated by the diver regarding habitat type, transitional zones, community boundaries, anomalous observations, etc. using the HYPACK® target command. The target command records the position of the diver (with sub-meter horizontal accuracy) where the observation was communicated, and any pertinent information entered by the topside HYPACK operator. At all times during the towed-diver survey, the diver towed a surface float for topside personnel to maintain visual contact in the event the diver released from the tow sled.

Towed-diver survey data was post-processed with HYPACK® Single Beam Editor and subsequently exported in spreadsheet format. The raw data was imported into ArcGIS® 9 (ArcMap™ 9.3) where shapefiles were created and analyzed. Georeferenced layers interpolated

using the 3D Analyst and Spatial Analyst extensions in ArcMap™ were produced from the collected data. Planar area calculations of strata were calculated using Xtools Pro (independent [Data East, LLC.] ArcGIS extension).

Seagrass percent coverage was estimated by visually assessing the seagrass at regular intervals (approximately every meter) and assigning a seagrass cover value from 0 to 5 (Table 1). The seagrass cover values were assigned based on the observed seagrass percent cover.

Table 1. Seagrass Cover Scale.

Cover Scale Value	Percent Cover
0	0%
1	<5%
2	5 to 25%
3	25 to 50%
4	50 to 75%
5	75 to 100%

The coordinates of the transects visually assessed by biologists were reported, along with the visibility of the site on the date of the survey. If any SAV resources were identified during reconnaissance surveys, then detailed SAV surveys were conducted as described below. If no SAV was documented during the reconnaissance survey, then no additional survey work was required. Qualitative Mapping/Delineation of Benthic Surveys was not required for permit plates P-10 and P-11 since there was no proposed dredging or placement on these plates.

Visual Assessment of Benthic Resources

Concurrent with the delineation survey above, qualified biologists completed an *in situ* visual assessment of SAV resource areas identified during reconnaissance surveys to document the species composition, above-ground biomass, epiphyte coverage, general condition of each SAV patch, presence of hardbottom, and describe the overall project area

Quantitative Characterization Surveys of Direct Impact Area

Due to the cessation of field work caused by the effects of hurricanes Helene and Milton on water clarity and quality, the Quantitative Characterization Survey work was not performed.

RESULTS

Direct Impact Area was defined as benthic resources found within the dredging areas of the federal channel and 10-m buffer zone outside the channel, within the placement areas including a 10-m buffer zone, and mitigation areas including a 10-m buffer zone during the mapping/delineation survey.

Desktop Assessment of Benthic Resources

Previous benthic surveys in 2018, 2020, 2022, and 2023 identified existing SAV within or near Cuts 1, 3, 4, and 5. A review of the FWC Seagrass Habitat in Florida last updated December

2023 identified existing SAV within the 150 meter Seagrass Assessment Buffer at Cuts 1, 1A, Old Cut 2, P-41, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, Fred Howard Park Mitigation Area (FHPMA), Three Rooker Island Placement Area (TRIPA), and Three Rooker Island Mitigation Area (TRIMA) (Figures 3-19). SAV was identified existing within the Direct Impact Area for Cuts 1, 1A, Old Cut 2, P-41, 3, 6, 14, FHPMA, and TRIPA (Figures 3, 6, 7, 8, 9, 11, 14, and 16). SAV was identified existing within the Mitigation Planting Area for TRIMA (Figure 19).

Summary calculations for the Direct Impact Area (without TRIPA) show approximately 20.09 acres (8.13 hectares) of continuous seagrass areas, and approximately 8.63 acres (3.49 hectares) of patchy seagrass areas. Summary calculations for the FHPMA show approximately 10.27 acres (4.16 hectares) of continuous seagrass areas, and approximately 9.57 acres (3.87 hectares) of patchy seagrass areas.

A review of the FWC Oyster Beds in Florida last updated December 2023 identified existing SAV within the 150 meter Seagrass Assessment Buffer at Cut 5, 7, 11, 12, and 14 (Figures 14, 15, and 16). No oyster beds were within the Direct Impact Area.

Qualitative Mapping/Delineation and Visual Assessment of Benthic Resources

The 2024 benthic SAV survey work was performed within channel cuts 1, 1A and P-41, as well as the FHPMA and approximately half of the TRIMA (Figure 20). Within the Direct Impact Area of the three channel cuts, *Halodule wrightii* was present in approximately 16.71 acres and *Halodule wrightii/Syringodium filiforme* was present in approximately 25.02 acres (Table 2, Figures 21-26). Within the 150-meter Seagrass Assessment Buffer of the three channel cuts, *Halodule wrightii* was present in approximately 113.37 acres and *Halodule wrightii/Syringodium filiforme* was present in approximately 158.65 acres (Figures 21-26).

Within the Direct Impact Area of the FHPMA, *Thalassia testudinum* was present in approximately 34.84 acres (Table 2, Figure 27). Within the 150-meter Seagrass Assessment Buffer of the FHPMA, *Thalassia testudinum* was present in approximately 64.62 acres.

Within the Direct Impact Area of the TRIMA, *Syringodium filiforme* was present in approximately 105.74 acres (Table 2, Figure 28). Within the 150-meter Seagrass Assessment Buffer of the TRIMA, *Syringodium filiforme* was present in approximately 172.70 acres.

Seagrass presence in the 2024 survey was similar to the FWC Seagrass Habitat in Florida from December 2023 (Figures 29-36).

Within the Direct Impact Area of the three channel cuts, the most common SAV cover scale value was <5 percent coverage, representing approximately 5.75 acres (Table 3, Figures 37 through 42). The most common SAV cover scale value within the 150-meter Seagrass Assessment Buffer of the three channel cuts was also <5 percent coverage, representing approximately 44.13 acres (Figures 37 through 42).

Within the Direct Impact Area of the FHPMA, the most common SAV cover scale value was 75 to 100 percent coverage, representing approximately 20.76 acres (Table 3, Figure 43). The most common SAV cover scale value was also 75 to 100 percent coverage within 150-meter Seagrass

Assessment Buffer of the FHPMA, representing approximately 41.02 acres.

Within the Direct Impact Area of the TRIMA, the most common SAV cover scale value was 75 to 100 percent coverage, representing approximately 42.21 acres (Table 3, Figure 44). The most common SAV cover scale value was also 75 to 100 percent coverage within 150-meter Seagrass Assessment Buffer of the TRIMA, representing approximately 83.00 acres.

No oyster beds were observed in channel cuts 1, 1A and P-41 or within the FHPMA and TRIMA.

Table 2. Seagrass spatial areas.

	Channel Cut 1, Cut 1A, & Cut P-41					
Species	**Direct Impact Area (acres)**	**Direct Impact Area (square feet)**	**Direct Impact Area (square meters)**	**Seagrass Assessment Buffer (acres)**	**Seagrass Assessment Buffer (square feet)**	**Seagrass Assessment Buffer (square meters)**
Halodule wrightii	16.71	727887.60	67623.03	113.37	4938397.20	458792.52
Halodule wrightii/Syringodium filiforme	25.02	1089871.20	101252.44	158.65	6910794.00	642034.34
Total Area	41.73	1817758.80	168875.47	272.02	11849191.20	1100826.86

	Fred Howard Park Mitigation Area					
Species	**Direct Impact Area (acres)**	**Direct Impact Area (square feet)**	**Direct Impact Area (square meters)**	**Seagrass Assessment Buffer (Ac)**	**Seagrass Assessment Buffer (square feet)**	**Seagrass Assessment Buffer (square meters)**
Thalassia testudinum	34.84	1517630.40	140992.60	64.62	2814847.20	261508.09
Total Area	34.84	1517630.40	140992.60	64.62	2814847.20	261508.09

	Three Rooker Island Mitigation Area					
	Direct Impact Area (acres)	**Direct Impact Area (square feet)**	**Direct Impact Area (square meters)**	**Seagrass Assessment Buffer (Ac)**	**Seagrass Assessment Buffer (square feet)**	**Seagrass Assessment Buffer (square meters)**
Syringodium filiforme	105.74	4606034.40	427914.98	172.70	7522812.00	698892.72
Total Area	105.74	4606034.40	427914.98	172.70	7522812.00	698892.72
Total Area Combined	**182.31**	7941423.60	737783.05	**509.34**	22186850.40	2061227.67

Table 3. Seagrass percent cover areas.

	Channel Cut 1, Cut 1A, & Cut P-41					
% Coverage	Direct Impact Area (acres)	Direct Impact Area (square feet)	Direct Impact Area (square meters)	Seagrass Assessment Buffer (acres)	Seagrass Assessment Buffer (square feet)	Seagrass Assessment Buffer (square meters)
< 5	5.75	250470.00	23269.45	44.13	1922302.80	178587.93
5 - 25	3.04	132422.40	12302.45	22.61	984891.60	91499.50
25 - 50	3.74	162914.40	15135.26	31.32	1364299.20	126747.66
50 - 75	1.81	78843.60	7324.82	21.88	953092.80	88545.30
75 - 100	0.11	4791.60	445.15	3.54	154202.40	14325.88
Total Area	14.45	629442.00	58477.13	123.48	5378788.80	499706.27

	Fred Howard Park Mitigation Area					
% Coverage	Direct Impact Area (acres)	Direct Impact Area (square feet)	Direct Impact Area (square meters)	Seagrass Assessment Buffer (acres)	Seagrass Assessment Buffer (square feet)	Seagrass Assessment Buffer (square meters)
< 5	3.52	153331.20	14244.95	4.00	174240.00	16187.44
5 - 25	0.27	11761.20	1092.65	0.51	22215.60	2063.90
25 - 50	1.98	86248.80	8012.78	2.74	119354.40	11088.40
50 - 75	5.47	238273.20	22136.32	7.35	320166.00	29744.42
75 - 100	20.76	904305.60	84012.81	41.02	1786831.20	166002.20
Total Area	32.00	1393920.00	129499.52	55.62	2422807.20	225086.35

	Three Rooker Island Mitigation Area					
	Direct Impact Area (acres)	Direct Impact Area (square feet)	Direct Impact Area (square meters)	Seagrass Assessment Buffer (acres)	Seagrass Assessment Buffer (square feet)	Seagrass Assessment Buffer (square meters)
< 5	3.50	152460.00	14164.01	4.14	180338.40	16754.00
5 - 25	8.80	383328.00	35612.37	11.41	497019.60	46174.67
25 - 50	12.57	547549.20	50869.03	16.88	735292.80	68311.00
50 - 75	15.14	659498.40	61269.46	23.21	1011027.60	93927.62
75 - 100	42.21	1838667.60	170817.96	83.00	3615480.00	335889.38
Total Area	82.22	3581503.20	332732.83	138.64	6039158.40	561056.67
Total Area Combined	**128.67**	5604865.20	520709.48	**317.74**	13840754.40	1285849.30

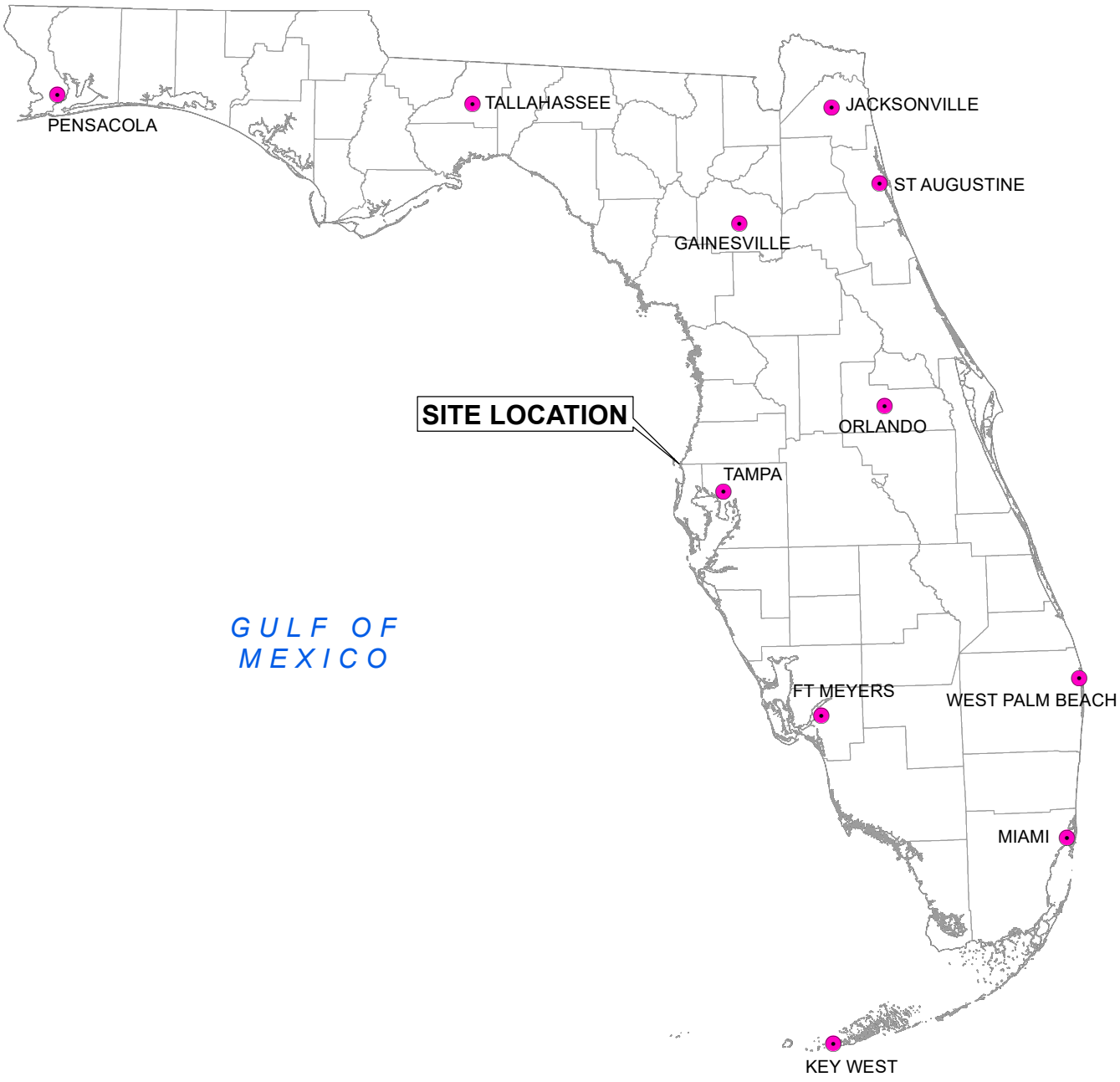

Figure 1.
Site Location Map
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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Figure 2.
Key Map
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: ESRI DigitalGlobe Imagery, 2023; Water & Air Research, Inc., 2024.

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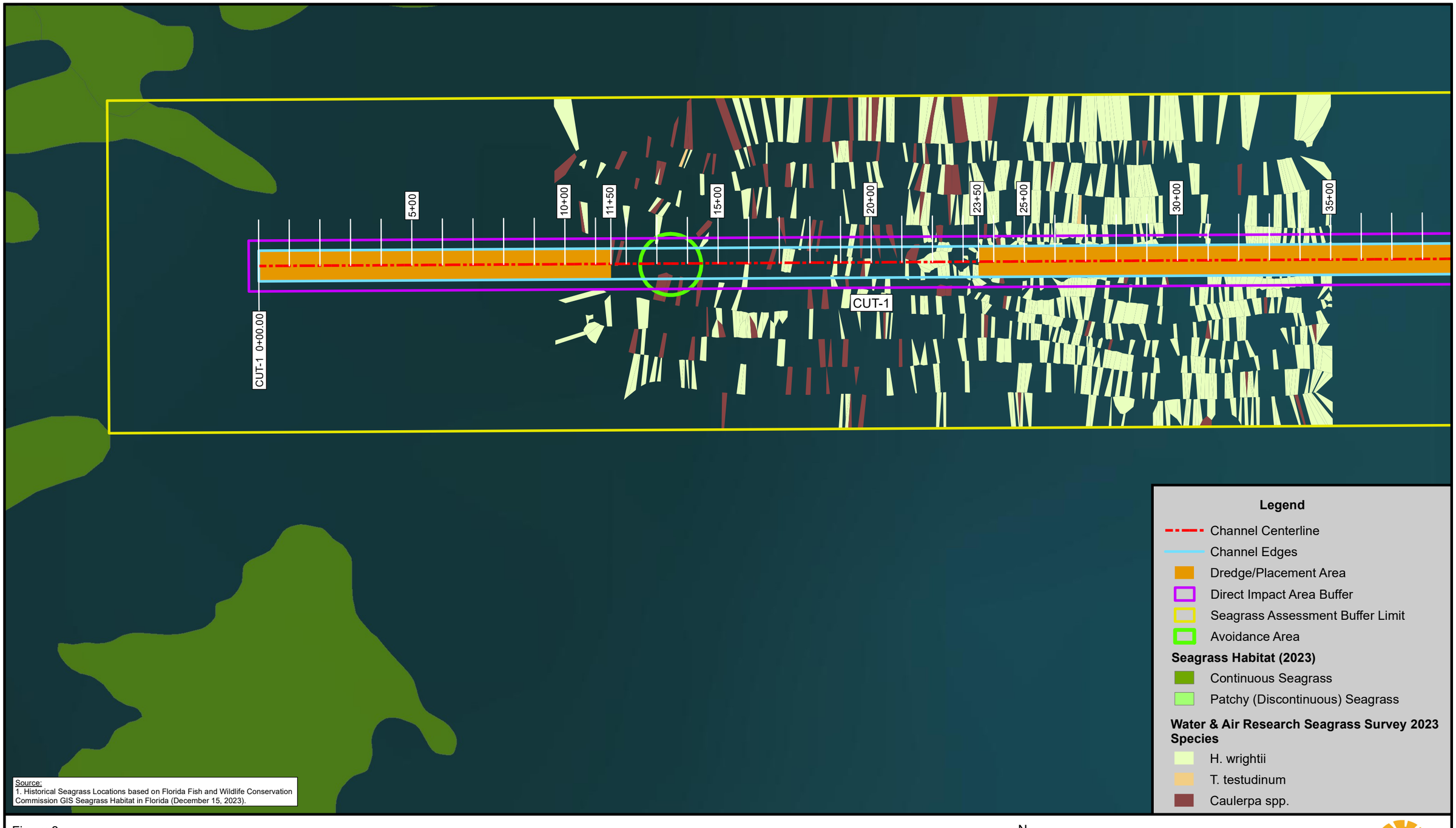

Figure 3.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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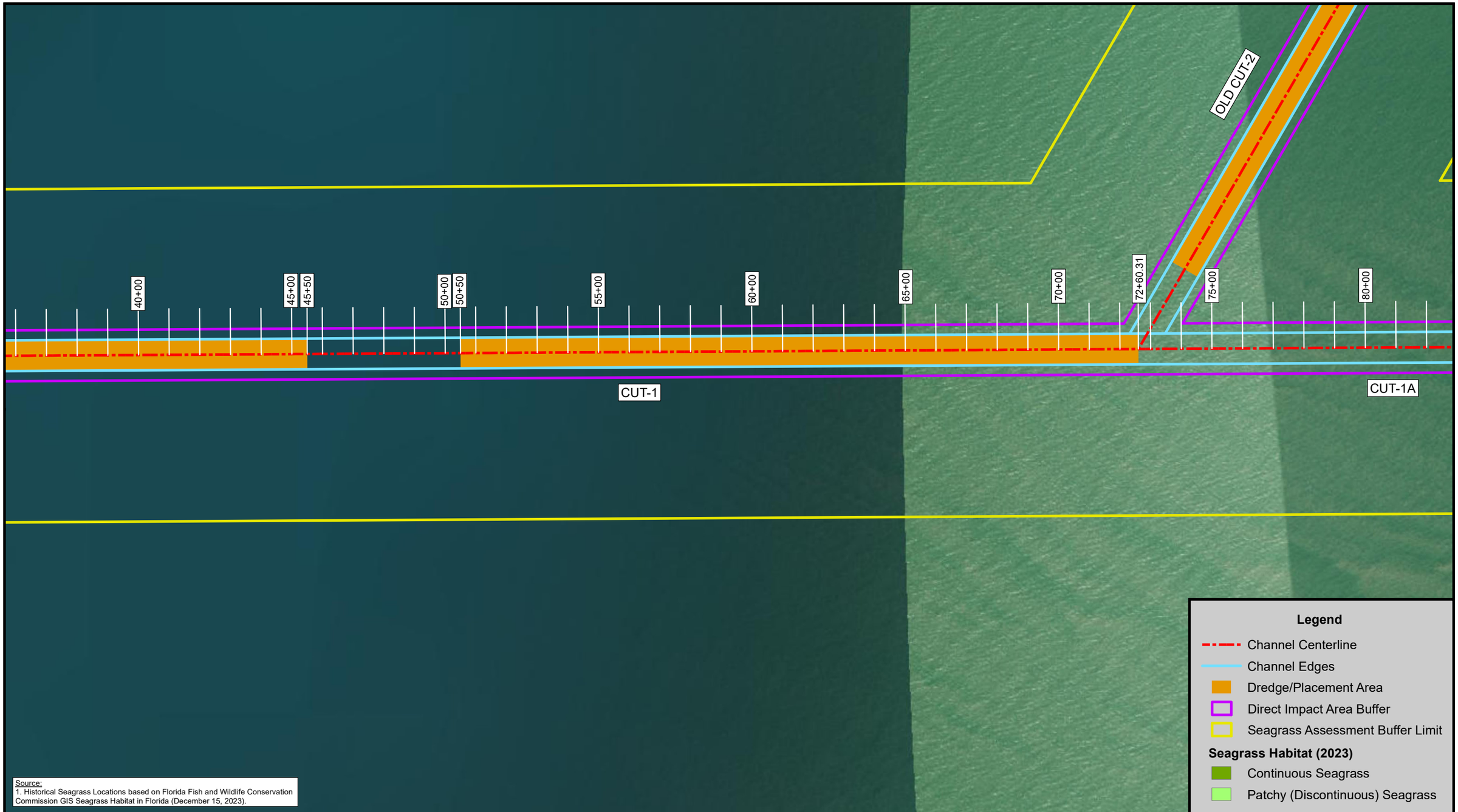

Figure 4.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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Feet

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Figure 5.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600 Feet

water & air RESEARCH, INC.

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Figure 6.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600 Feet

water & air RESEARCH, INC.

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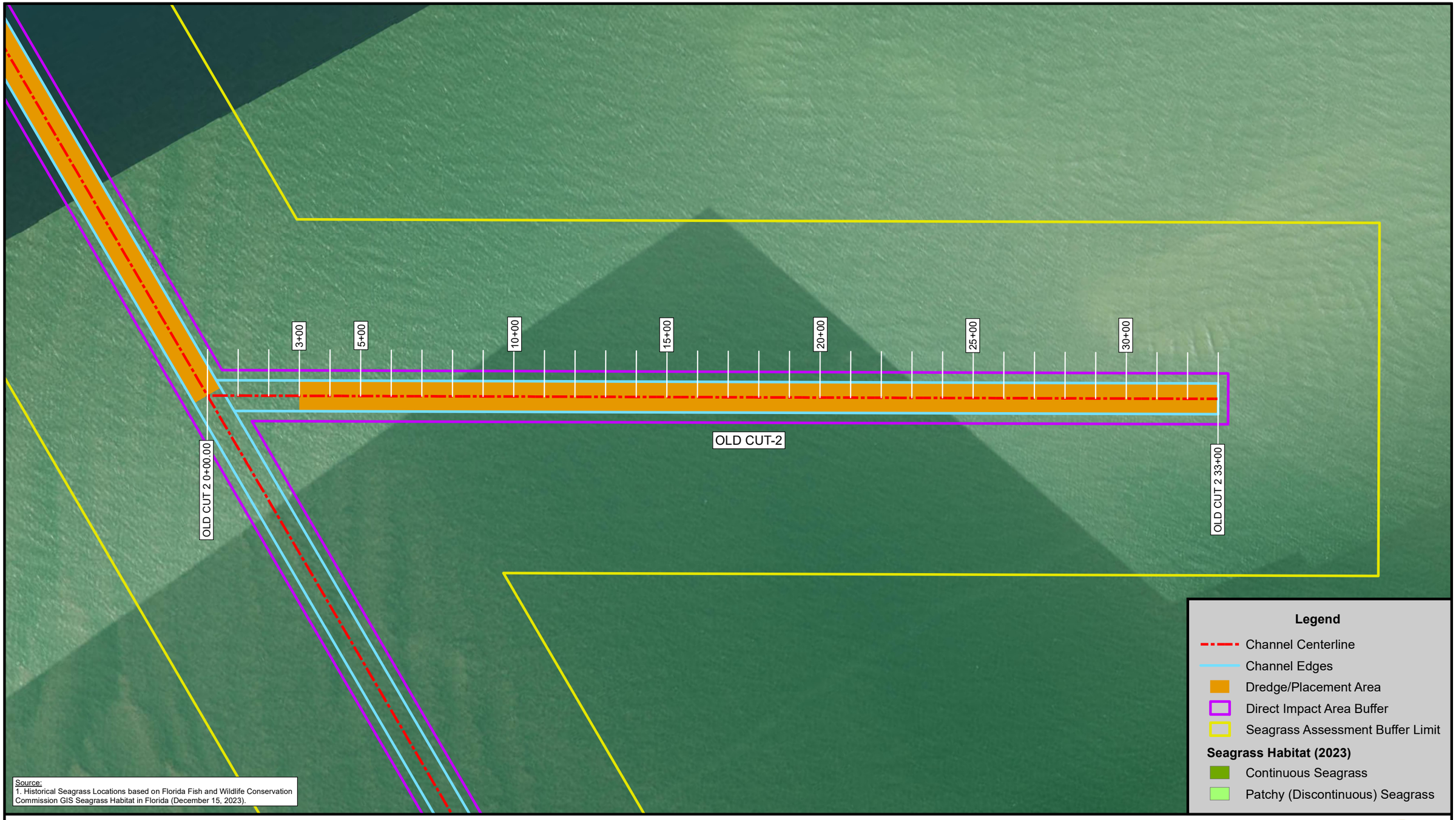

Figure 7.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600 Feet

water & air RESEARCH, INC.

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Figure 8.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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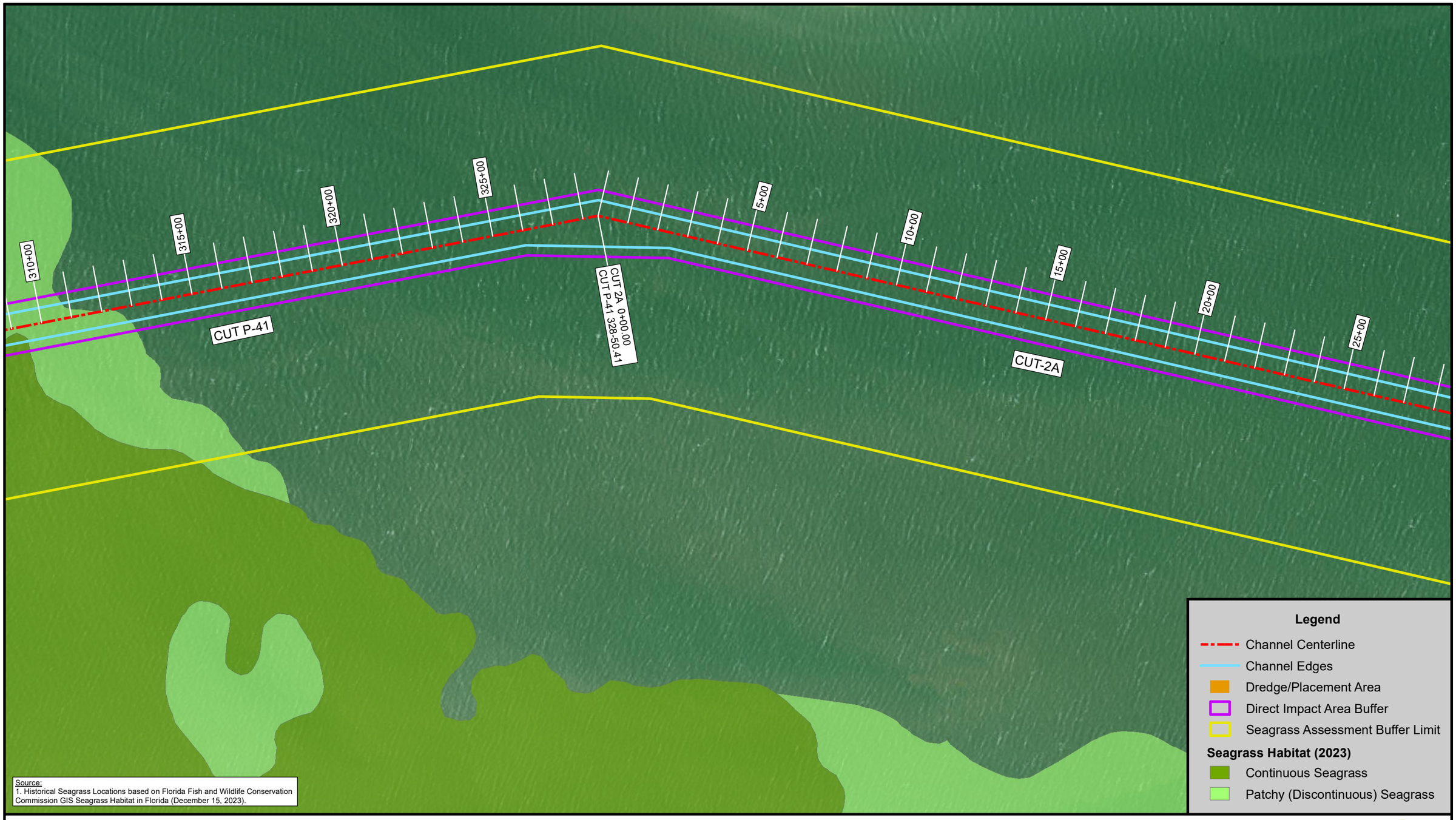

Figure 9.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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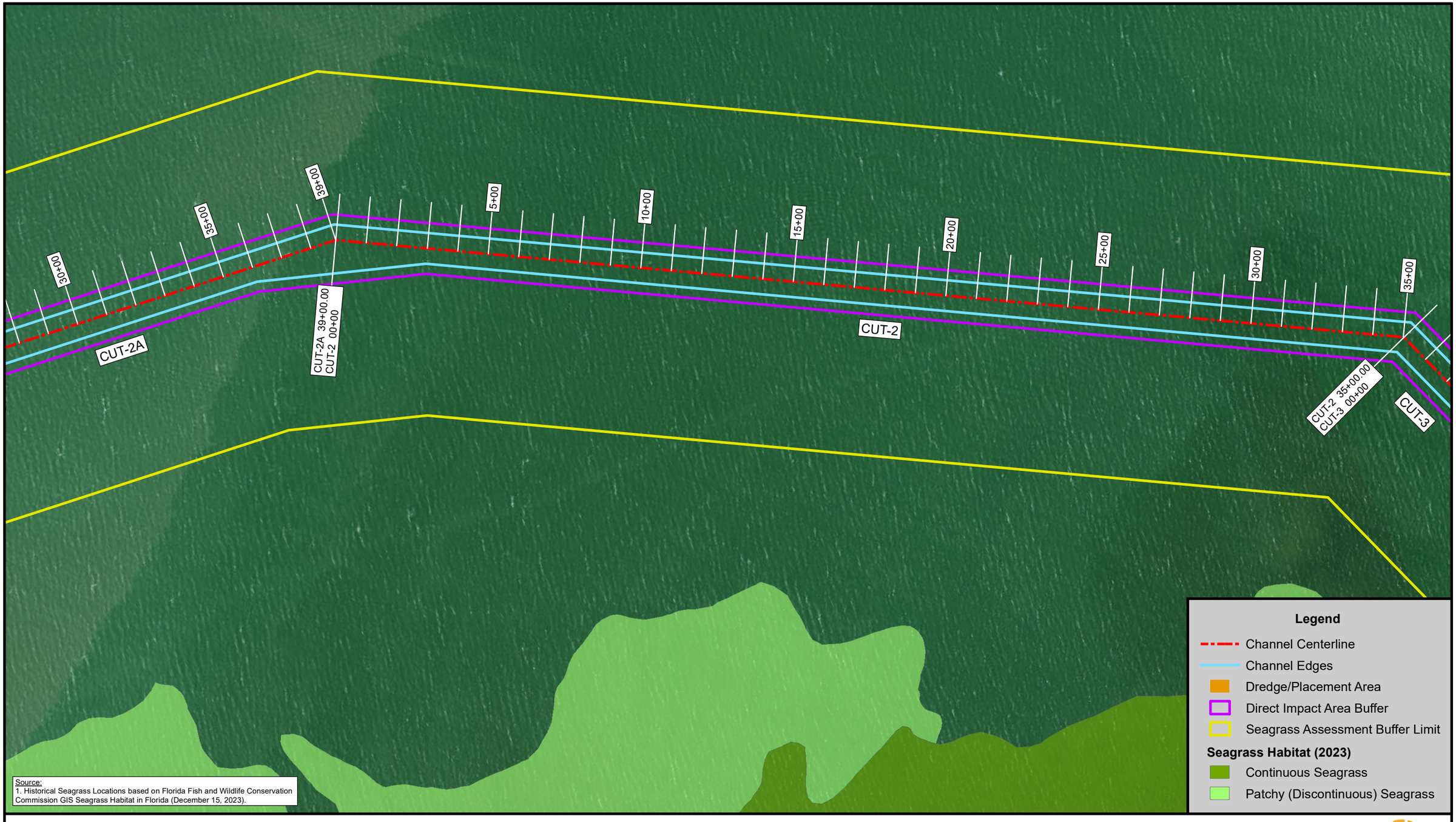

Figure 10.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

water & air RESEARCH, INC.

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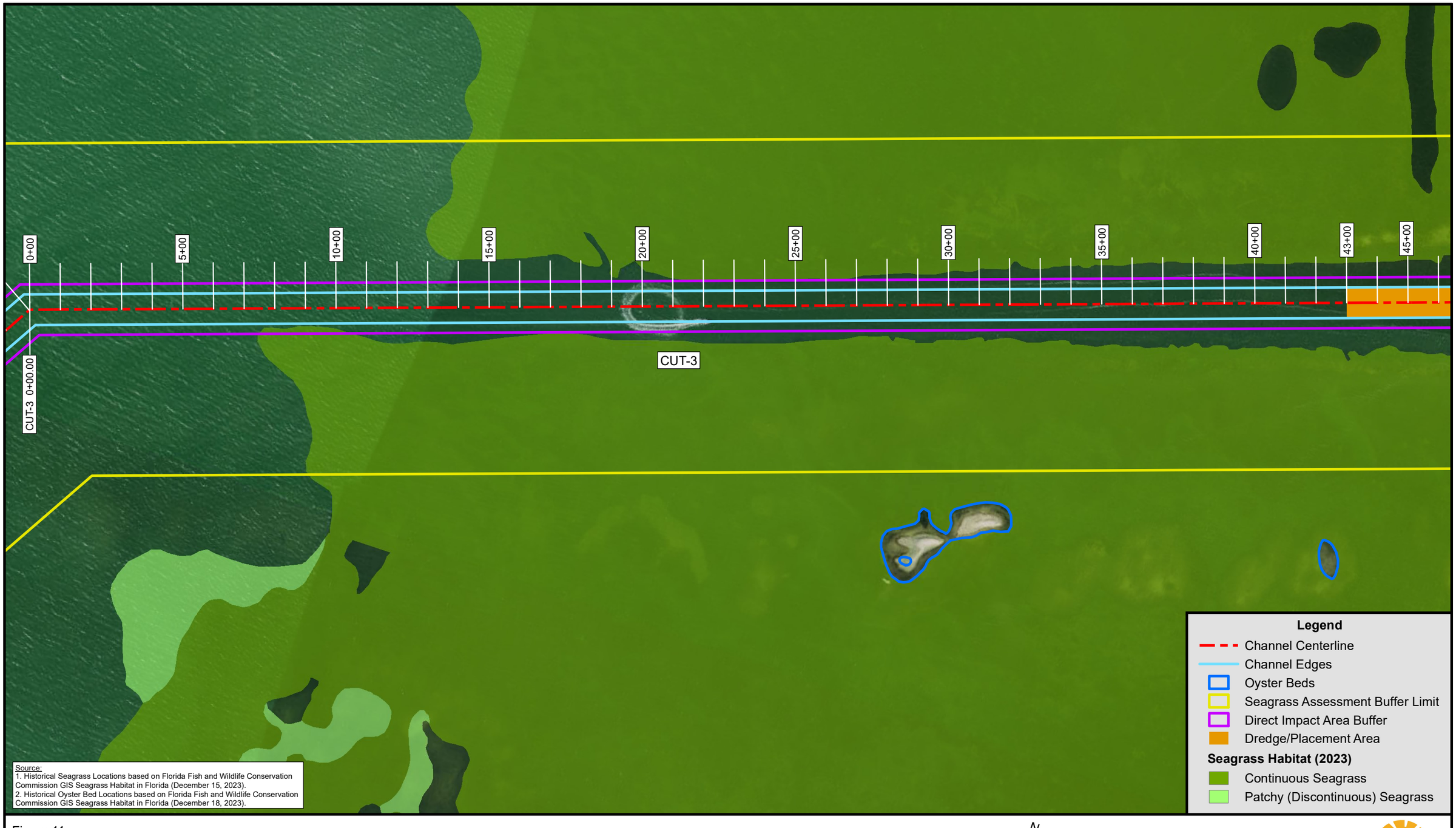

Figure 11.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

water & air RESEARCH, INC.

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43+00
47+00
50+00
55+00
60+00
65+00
70+00
CUT-3 70+20.39
CUT-3A 0+00.00
1+00
5+00
CUT-3
CUT-3A
CUT-3A 5+69.45
CUT-4 0+00.00
1+00
5+00
10+00
11+00
CUT-4

Source:
1. Historical Seagrass Locations based on Florida Fish and Wildlife Conservation Commission GIS Seagrass Habitat in Florida (December 15, 2023).
2. Historical Oyster Bed Locations based on Florida Fish and Wildlife Conservation Commission GIS Seagrass Habitat in Florida (December 18, 2023).

Legend

- Channel Centerline
- Channel Edges
- Oyster Beds
- Seagrass Assessment Buffer Limit
- Direct Impact Area Buffer
- Dredge/Placement Area

Seagrass Habitat (2023)

- Continuous Seagrass
- Patchy (Discontinuous) Seagrass

Figure 12.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600
Feet

water & air RESEARCH, INC.

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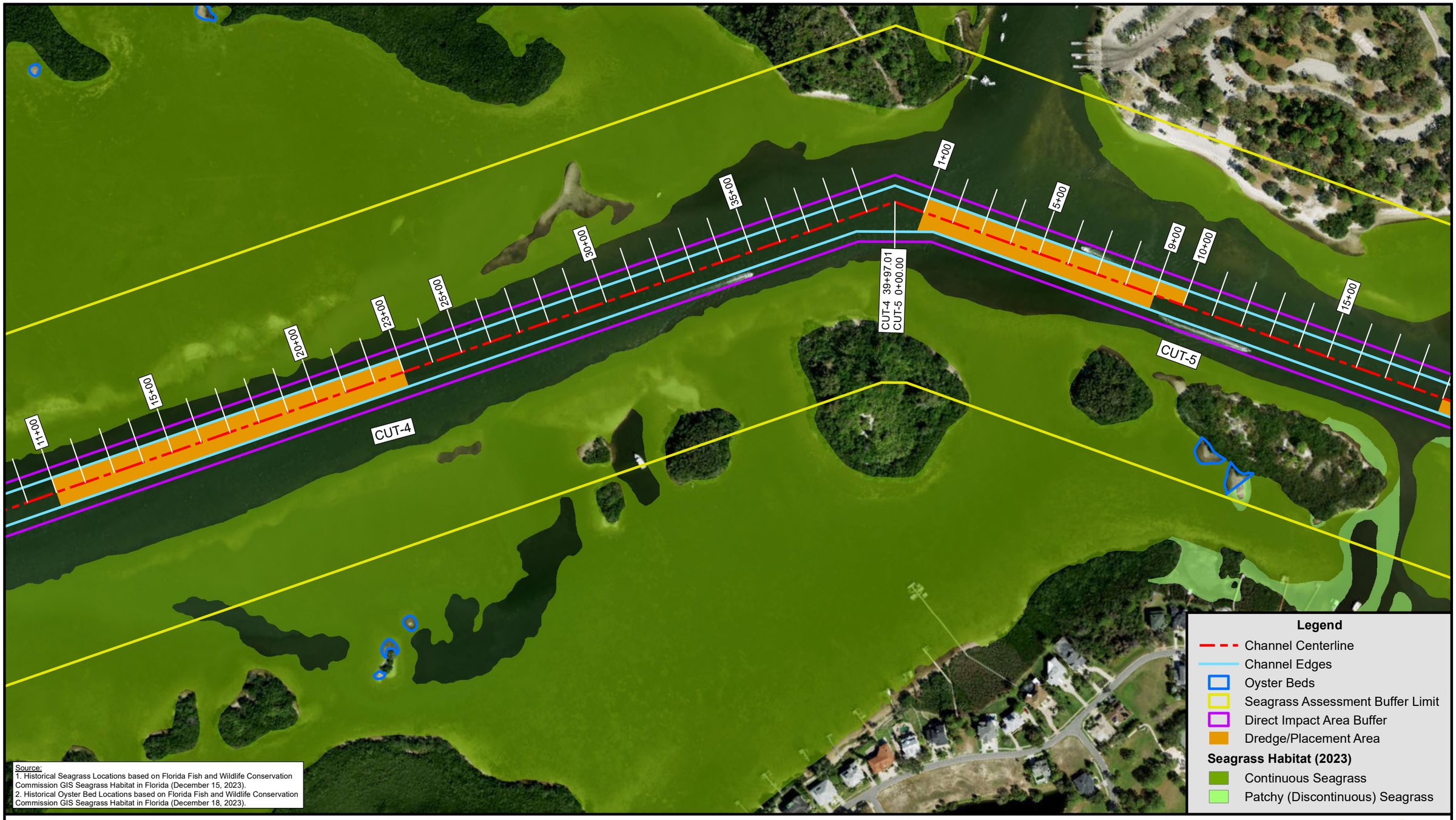

Figure 13.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

water & air RESEARCH, INC.

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Figure 14.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

0 150 300 600 Feet

water & air RESEARCH, INC.

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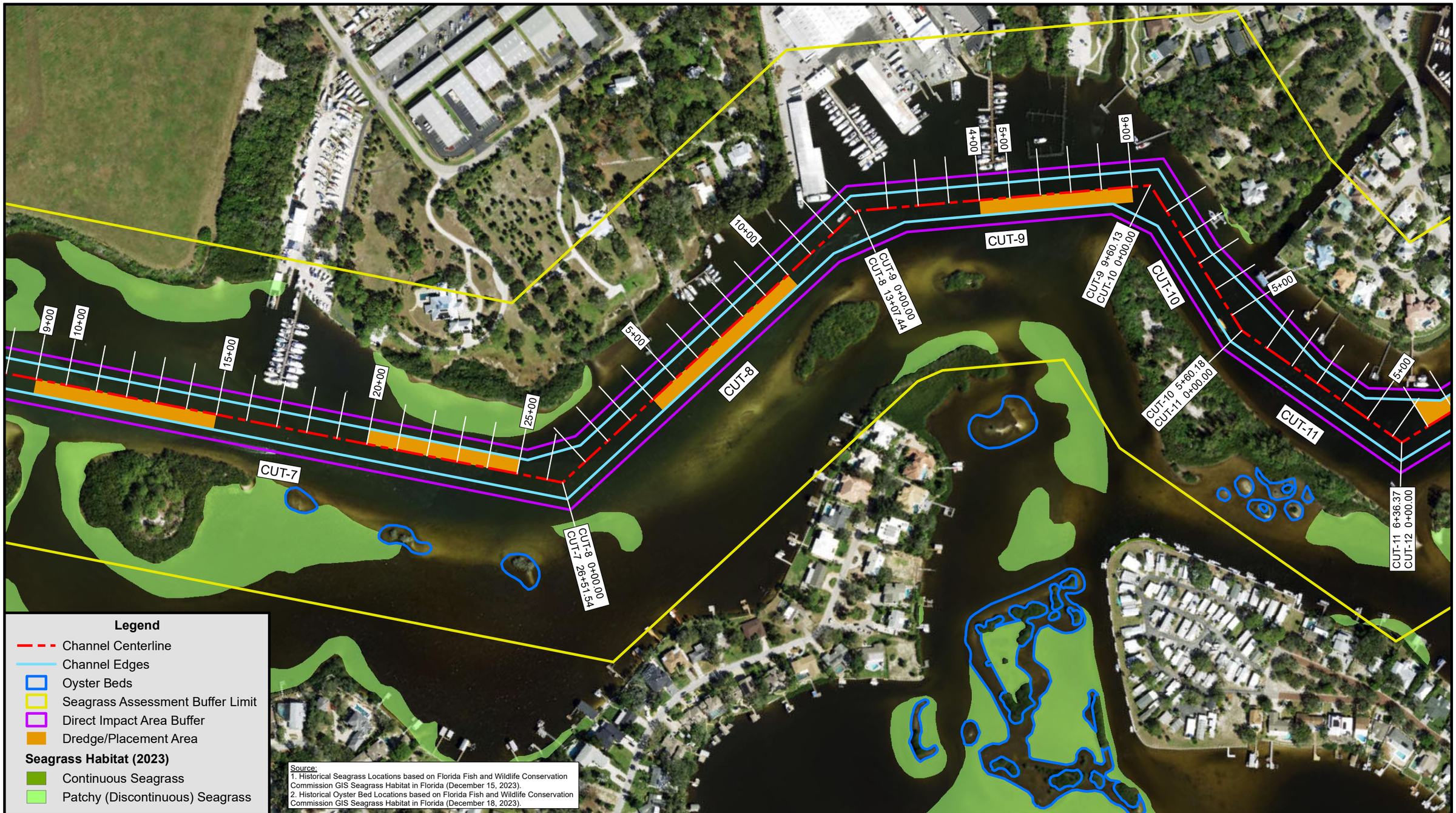

Figure 15.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600 Feet

water & air RESEARCH, INC.

CUT-11
CUT-12
CUT-13
CUT-14
1+00
3+00
5+00
8+00
10+00
1+00
1+00
4+00
5+00
9+00
CUT-11 6+36.37
CUT-12 0+00.00
CUT-12 13+55.33
CUT-13 0+00.00
CUT-13 4+65.00
CUT-14 0+00.00

Source:
1. Historical Seagrass Locations based on Florida Fish and Wildlife Conservation Commission GIS Seagrass Habitat in Florida (December 15, 2023).
2. Historical Oyster Bed Locations based on Florida Fish and Wildlife Conservation Commission GIS Seagrass Habitat in Florida (December 18, 2023).

Legend

- Channel Centerline
- Channel Edges
- Oyster Beds
- Seagrass Assessment Buffer Limit
- Direct Impact Area Buffer
- Dredge/Placement Area

Seagrass Habitat (2023)

- Continuous Seagrass
- Patchy (Discontinuous) Seagrass

Figure 16.
Dredge Area Layout
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600 Feet

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Source:
1. Historical Seagrass Locations based on Florida Fish and Wildlife Conservation Commission GIS Seagrass Habitat in Florida (December 15, 2023).

Legend

- Mitigation Planting Area
- Mitigation Planting Buffer
- Seagrass Assessment Buffer Limit

Seagrass Habitat (2023)

- Continuous Seagrass
- Patchy (Discontinuous) Seagrass

Figure 17.
Fred Howard Park Mitigation Area
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 200 400 800 Feet

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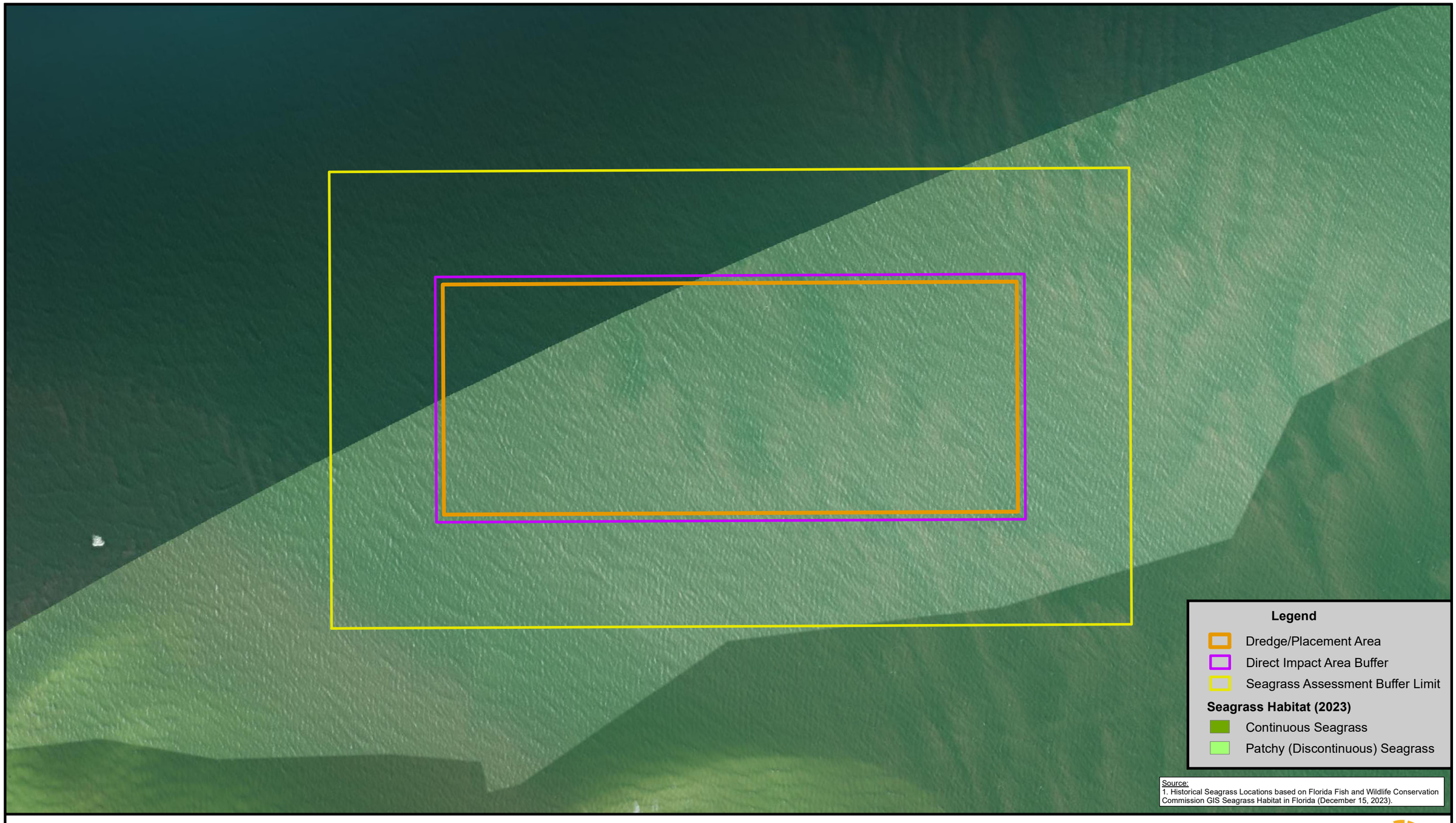

Figure 18.
Three Rooker Island Placement Area
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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Legend

- Mitigation Planting Area
- Mitigation Planting Buffer
- Seagrass Assessment Buffer Limit

Seagrass Habitat (2023)

- Continuous Seagrass
- Patchy (Discontinuous) Seagrass

Source:
1. Historical Seagrass Locations based on Florida Fish and Wildlife Conservation Commission GIS Seagrass Habitat in Florida (December 15, 2023).

Figure 19.
Three Rooker Island Mitigation Area
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 200 400 800 Feet

water & air RESEARCH, INC.

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Legend

- Channel Edges
- Dredge Placement Areas
- Mitigation Planting Area
- Mitigation Placement Area
- Seagrass Assessment Buffer Limit
- Survey Target Location

N

0 1,500 3,000 6,000 Feet

Figure 20.
Survey Target Locations
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: ESRI DigitalGlobe Imagery, 2023; Water & Air Research, Inc., 2024.

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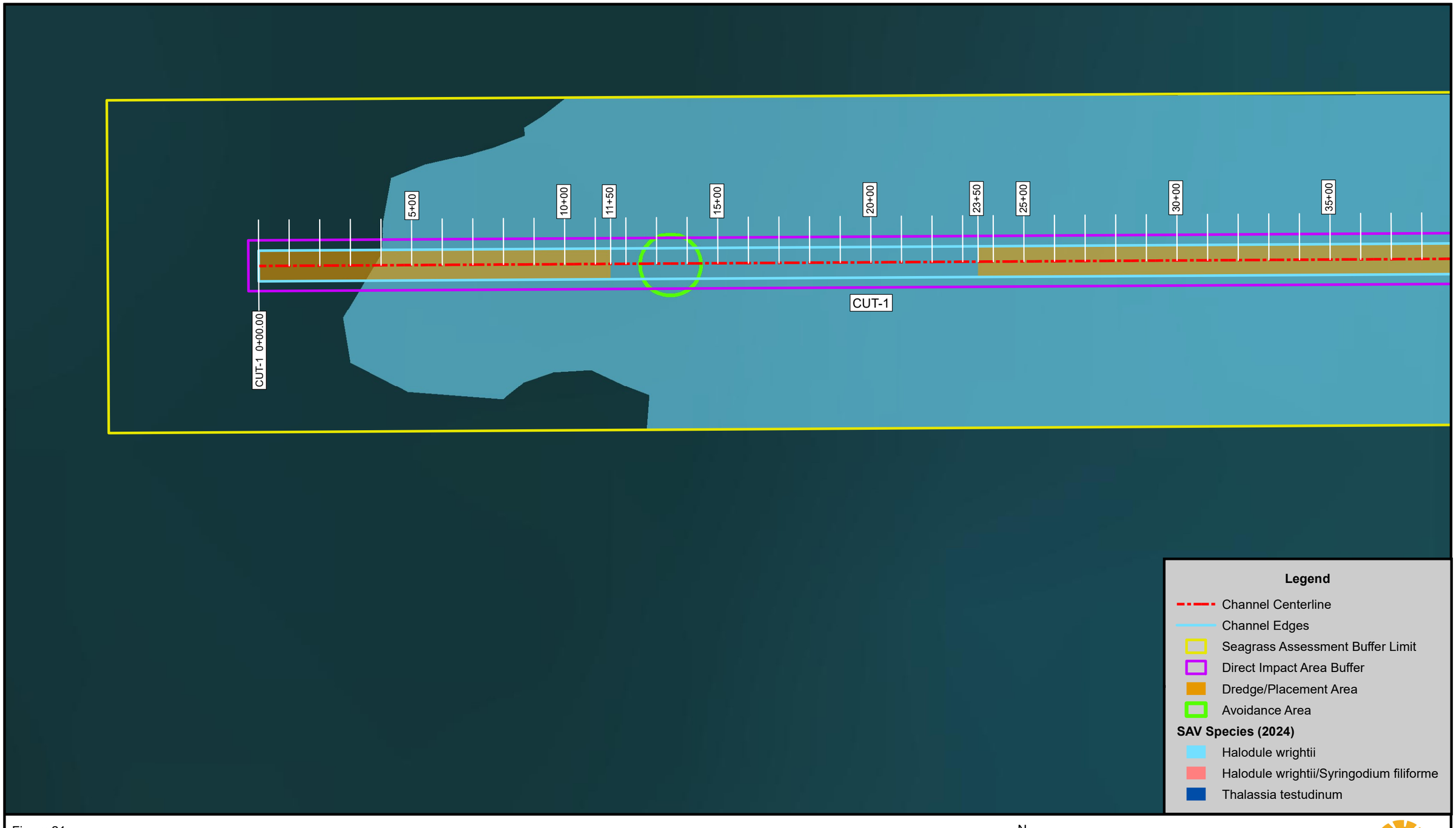

Figure 21.
New SAV Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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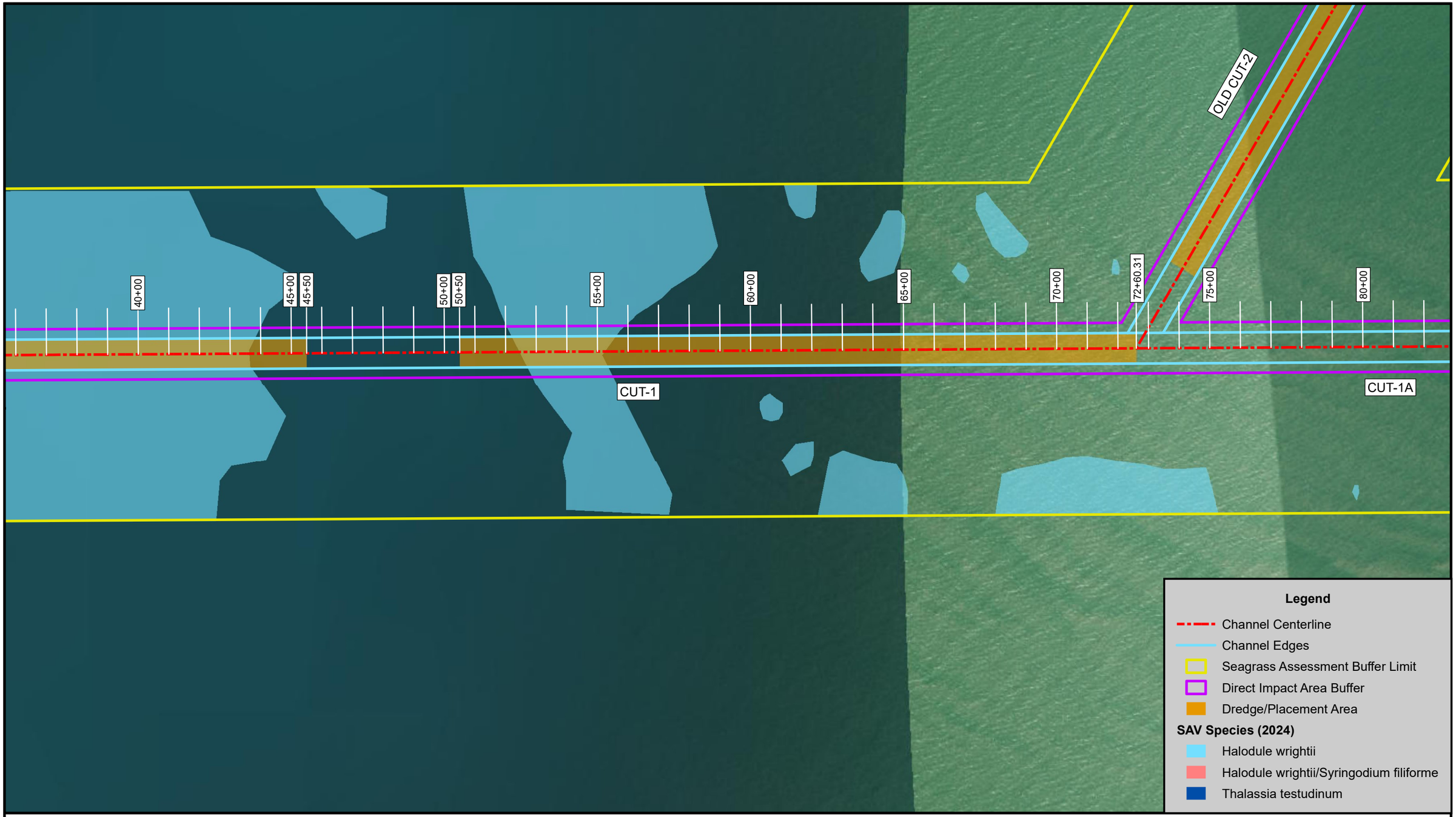

Figure 22.
New SAV Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600
Feet

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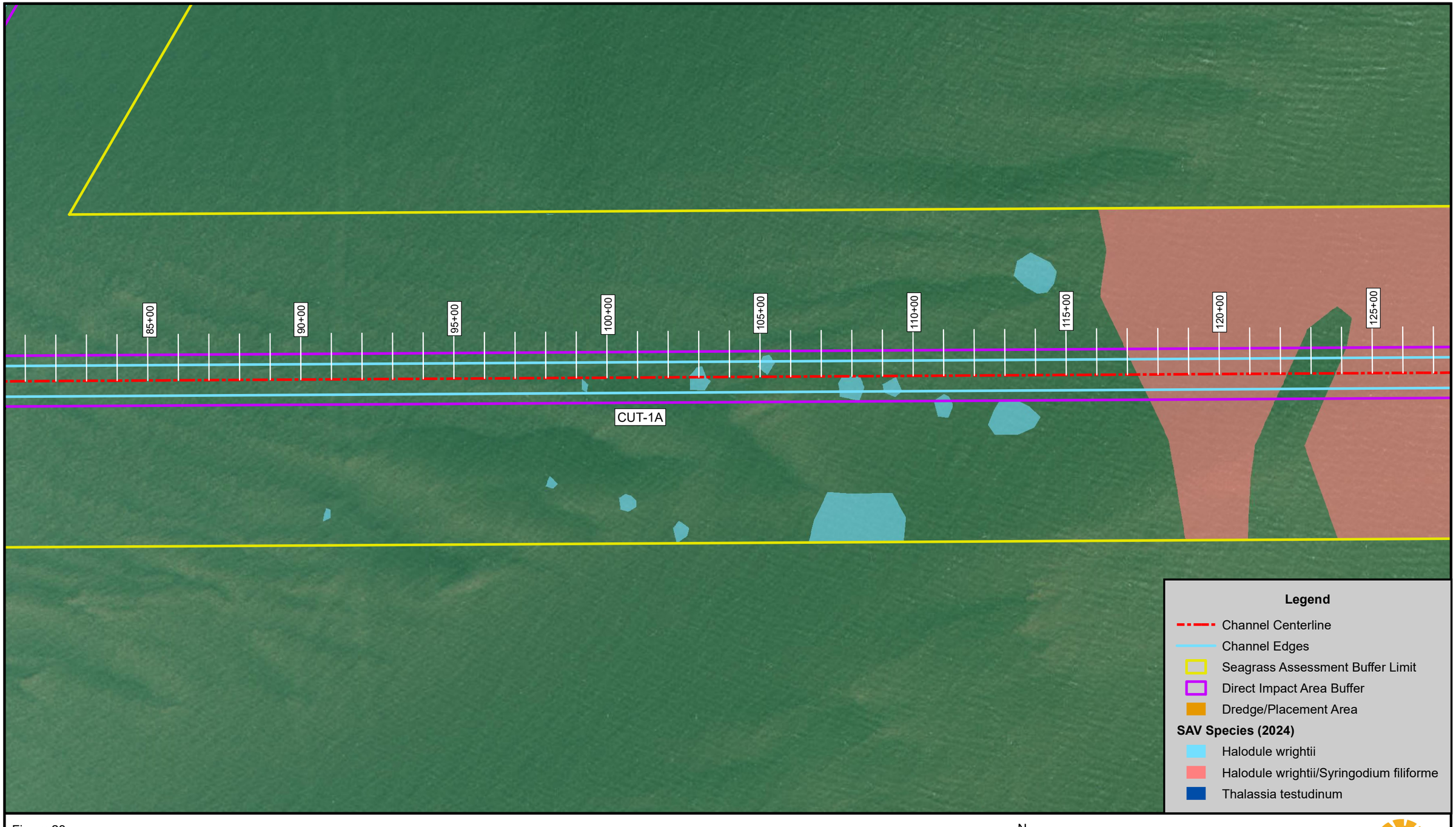

Figure 23.
New SAV Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600 Feet

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Figure 24.
New SAV Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600 Feet

water & air RESEARCH, INC.

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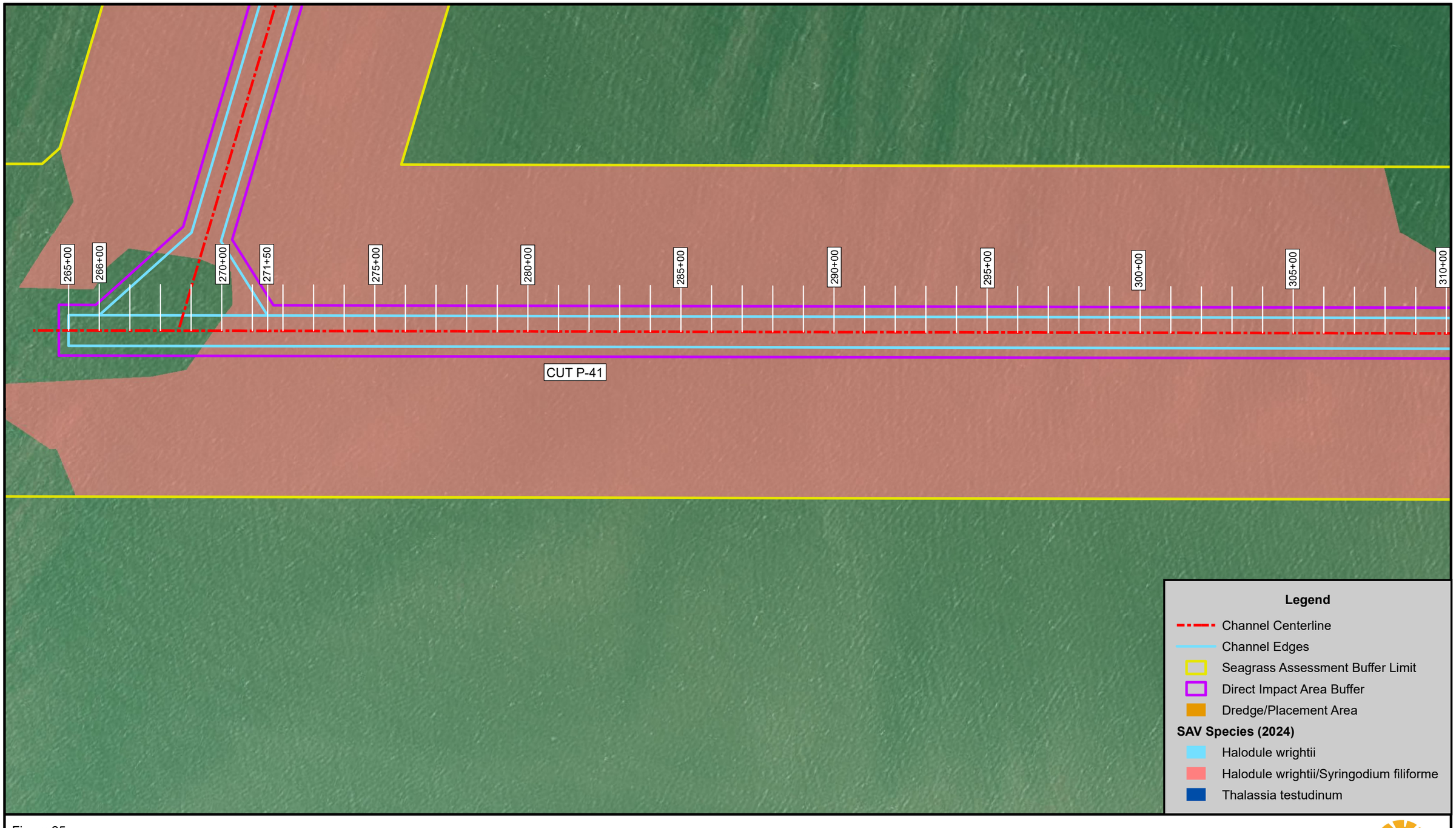

Figure 25.
New SAV Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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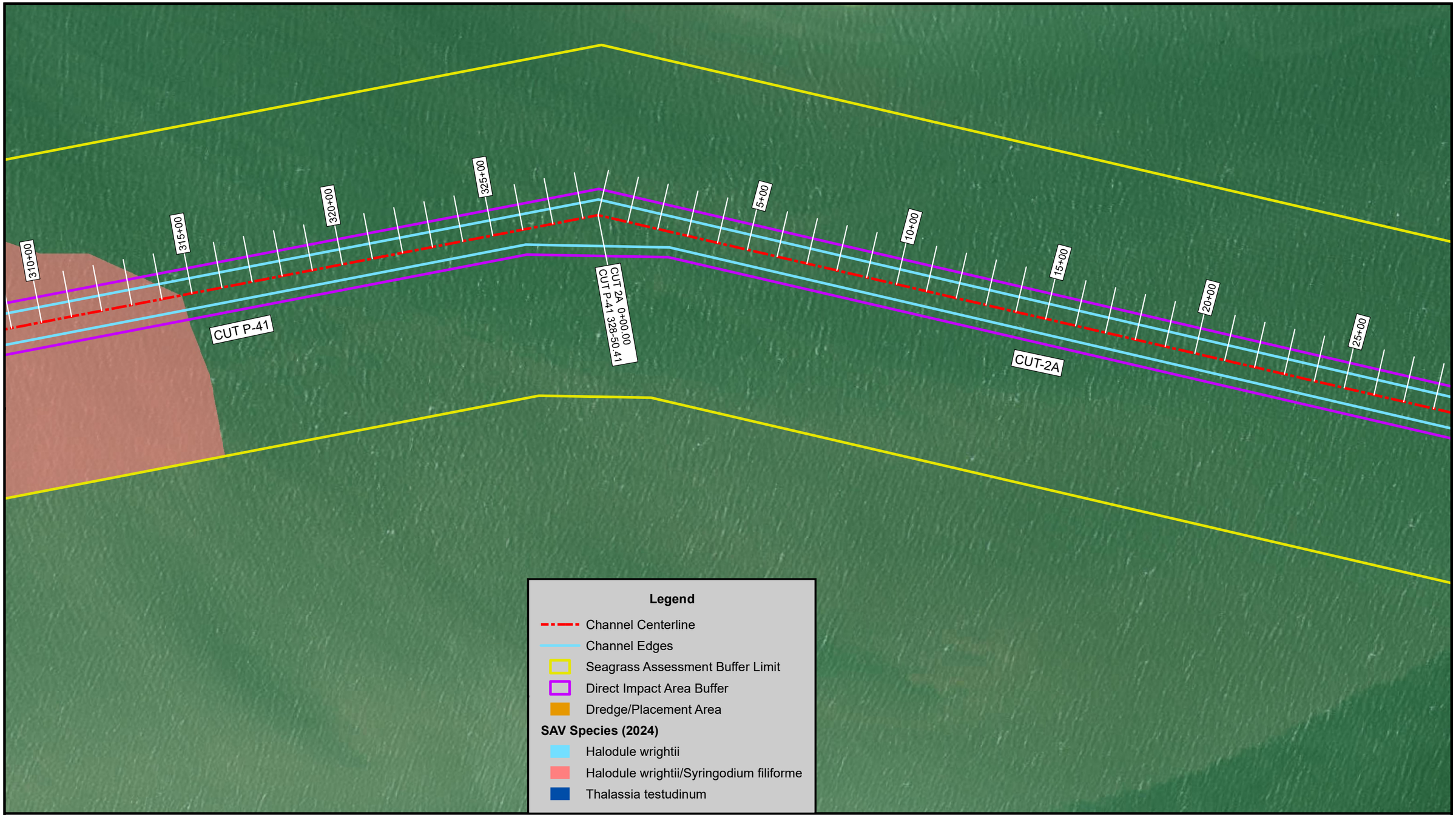

Figure 26.
New SAV Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600
Feet

water & air RESEARCH, INC.

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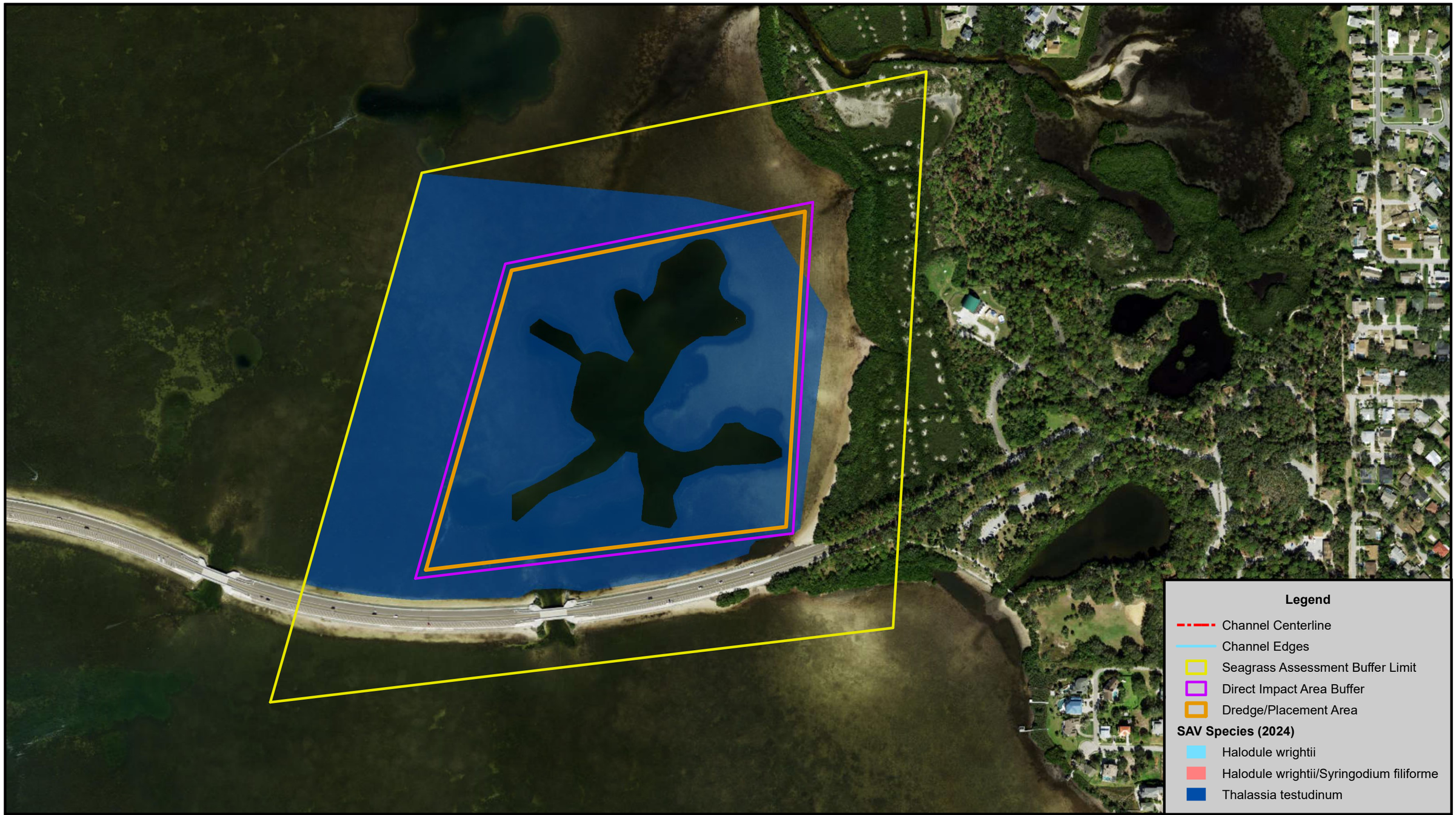

Figure 27.
New SAV Locations Fred Howard Park Mitigation Area (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 200 400 800
Feet

water & air RESEARCH, INC.

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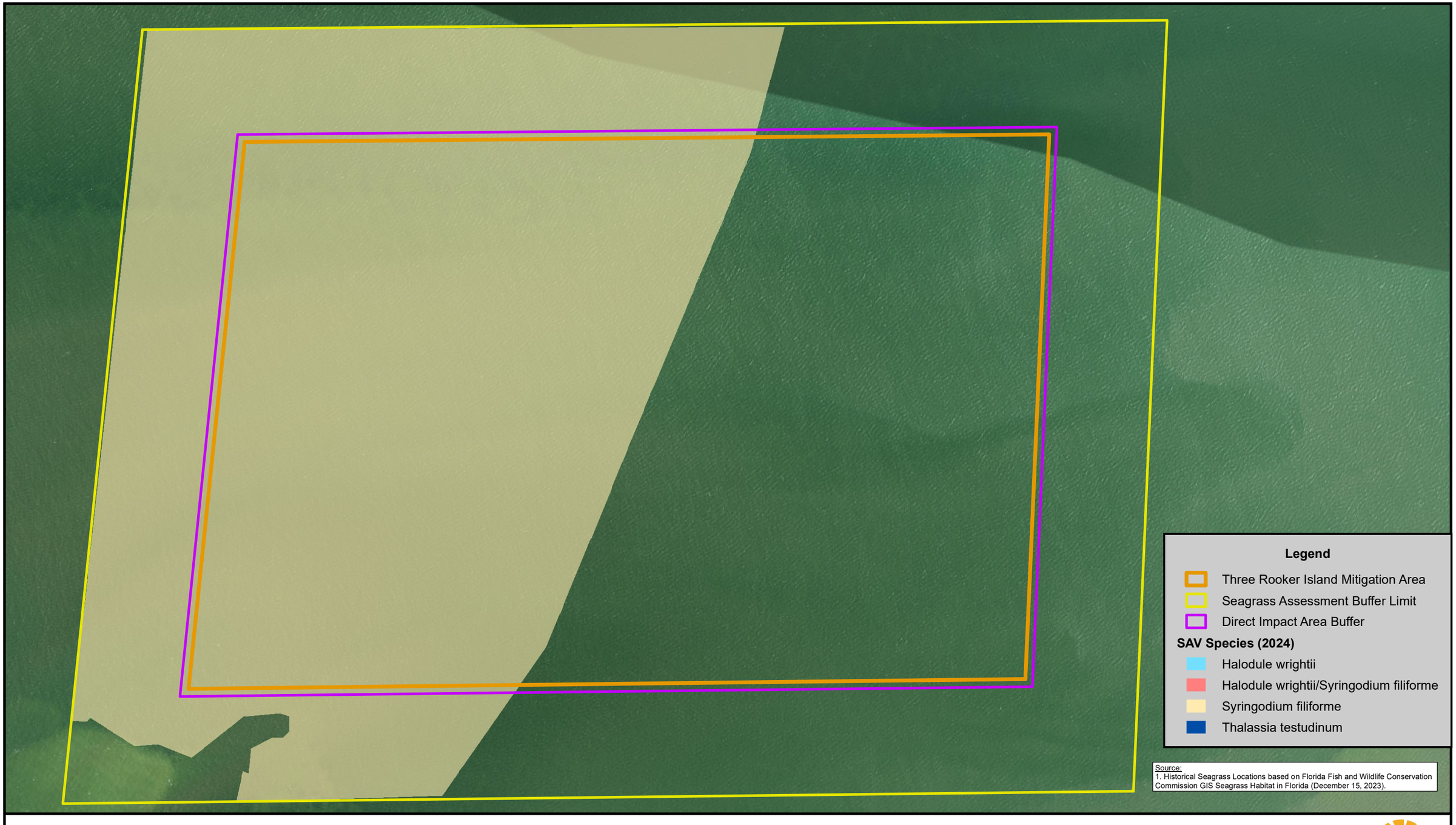

Figure 28.
New SAV Locations Three Rooker Island Mitigation Area (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 200 400 800 Feet

water & air RESEARCH, INC.

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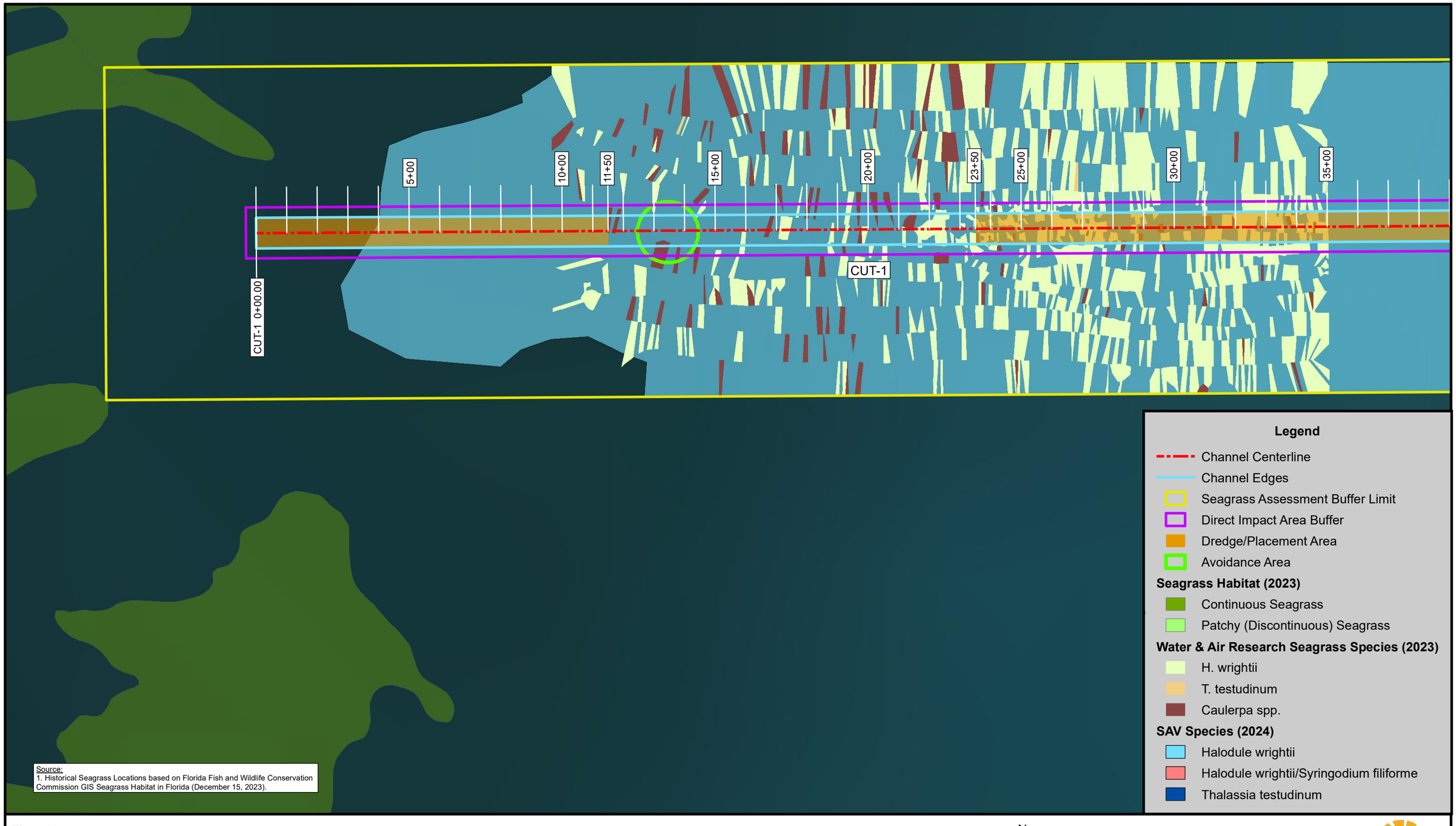

Figure 29.
New SAV and Benthic Survey Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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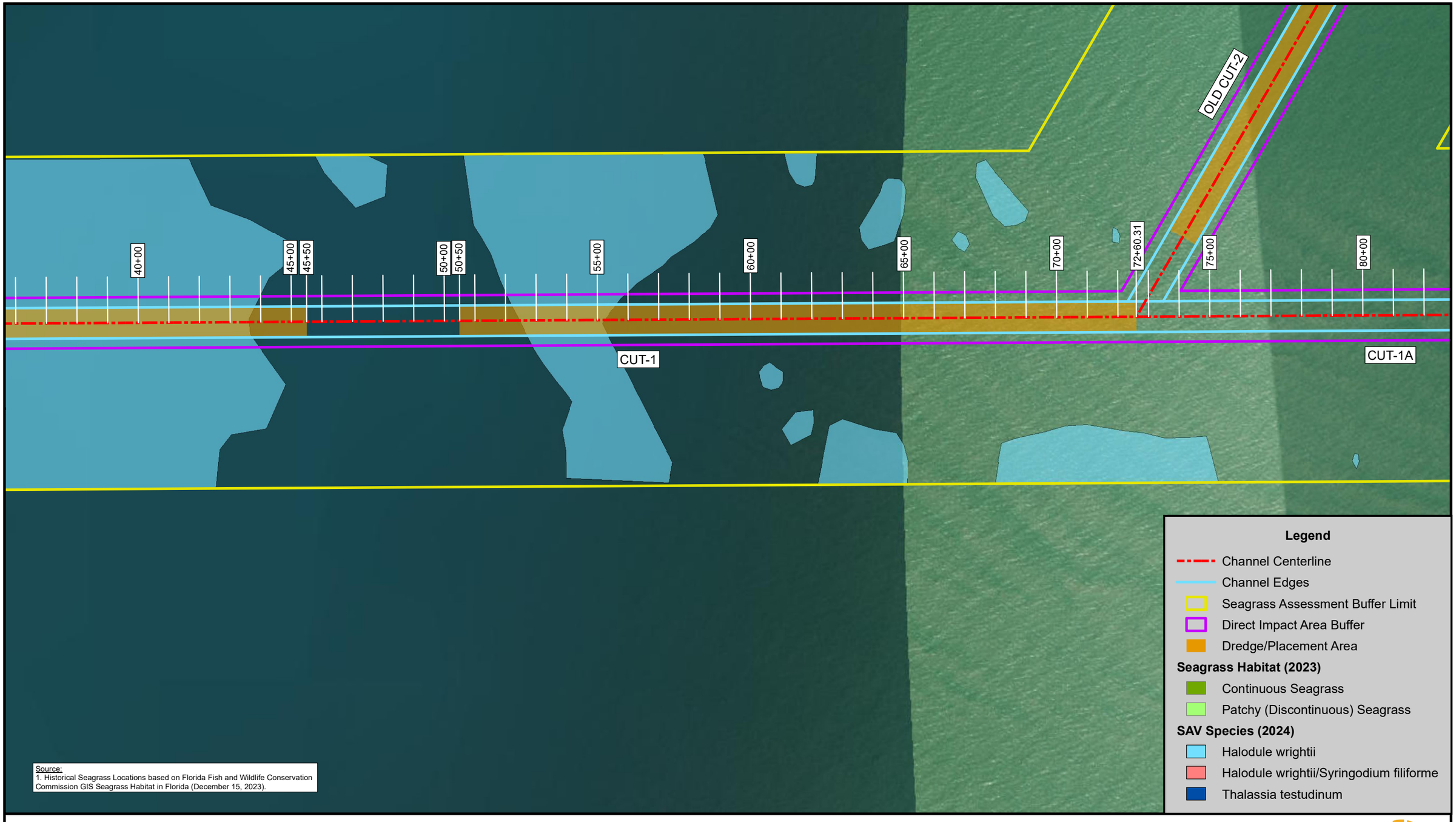

Figure 30.
New SAV and Benthic Survey Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600 Feet

water & air RESEARCH, INC.

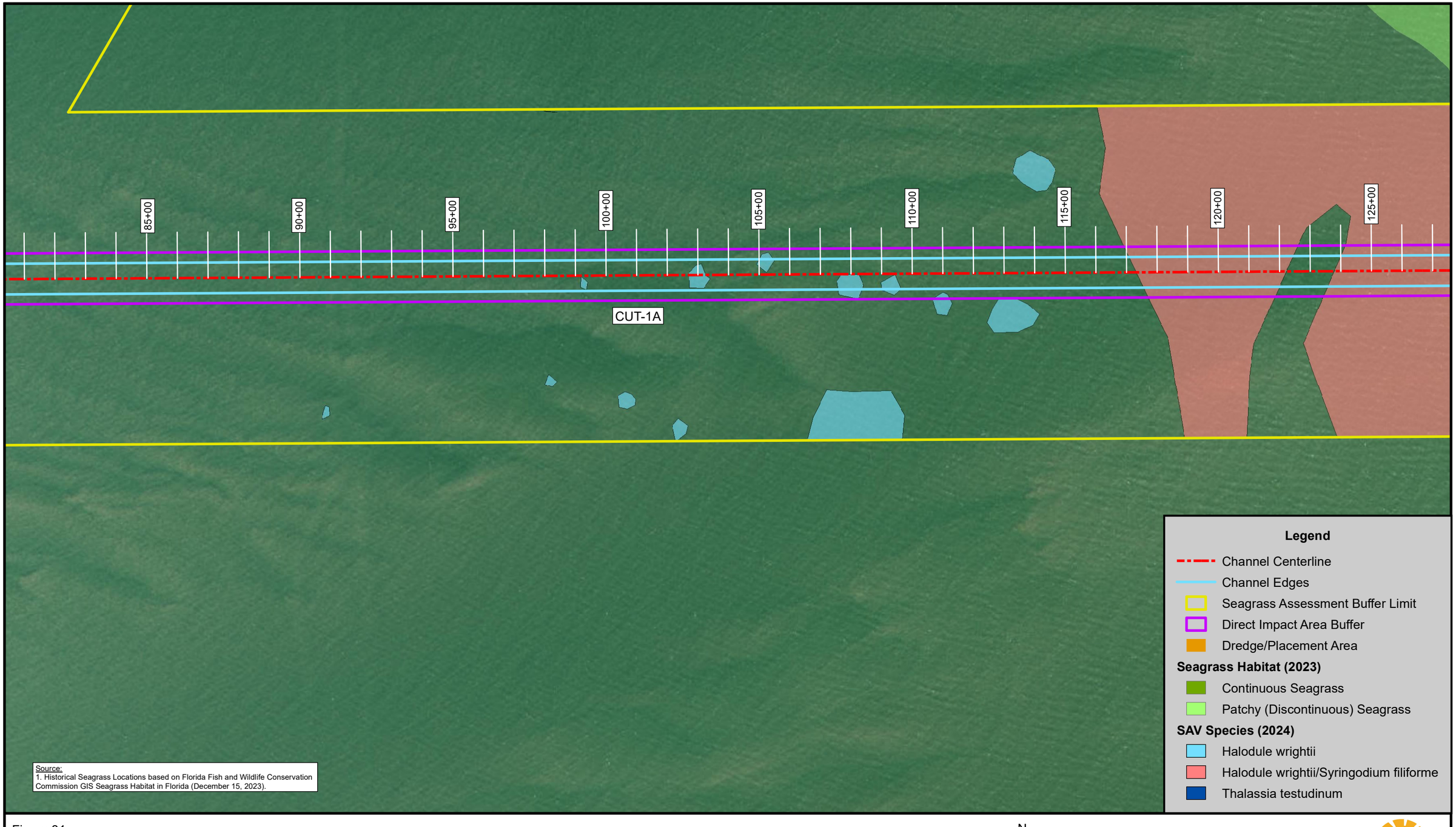

Figure 31.
New SAV and Benthic Survey Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600 Feet

water & air RESEARCH, INC.

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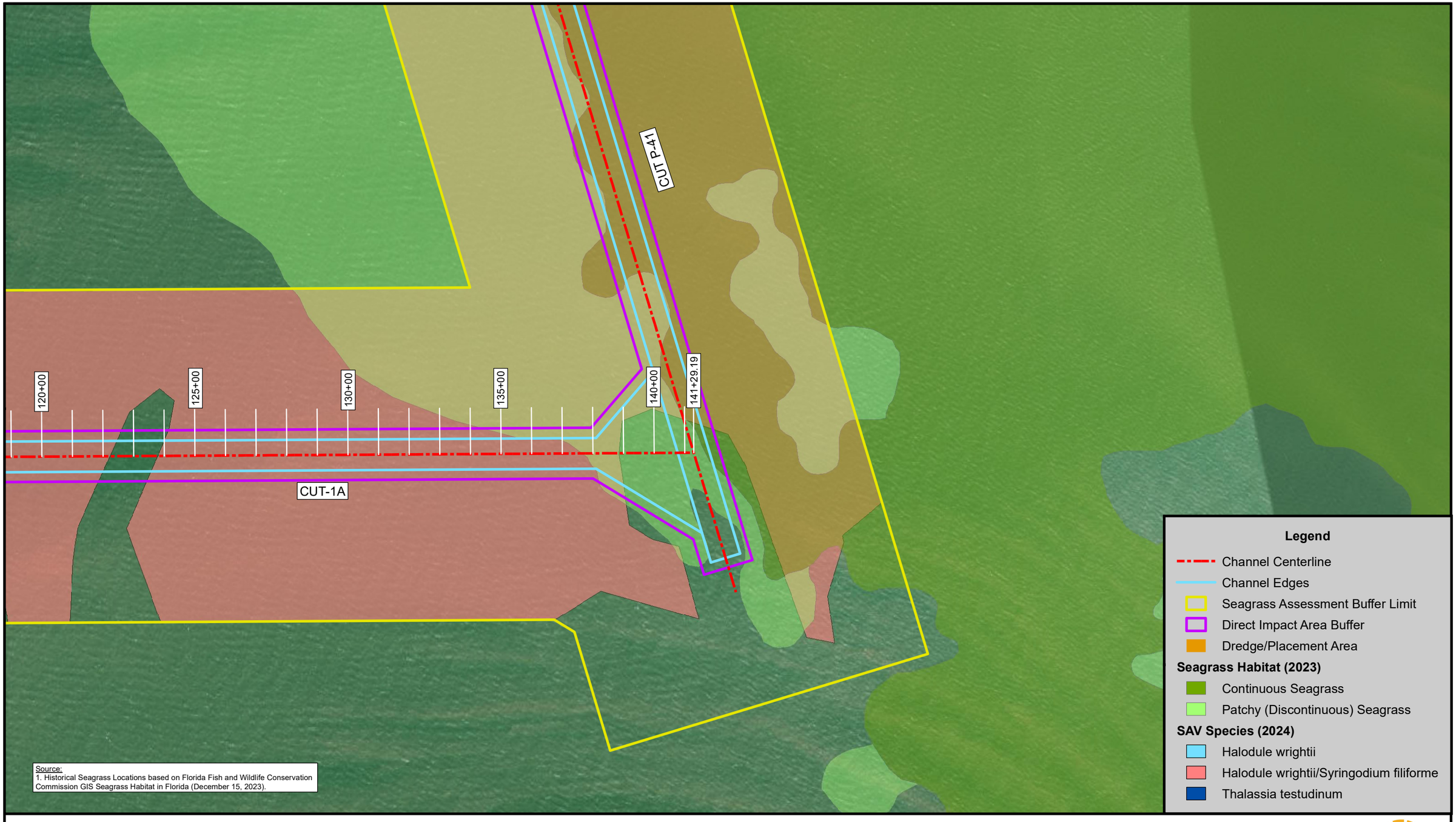

Figure 32.
New SAV and Benthic Survey Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600 Feet

water & air RESEARCH, INC.

Figure 33.
New SAV and Benthic Survey Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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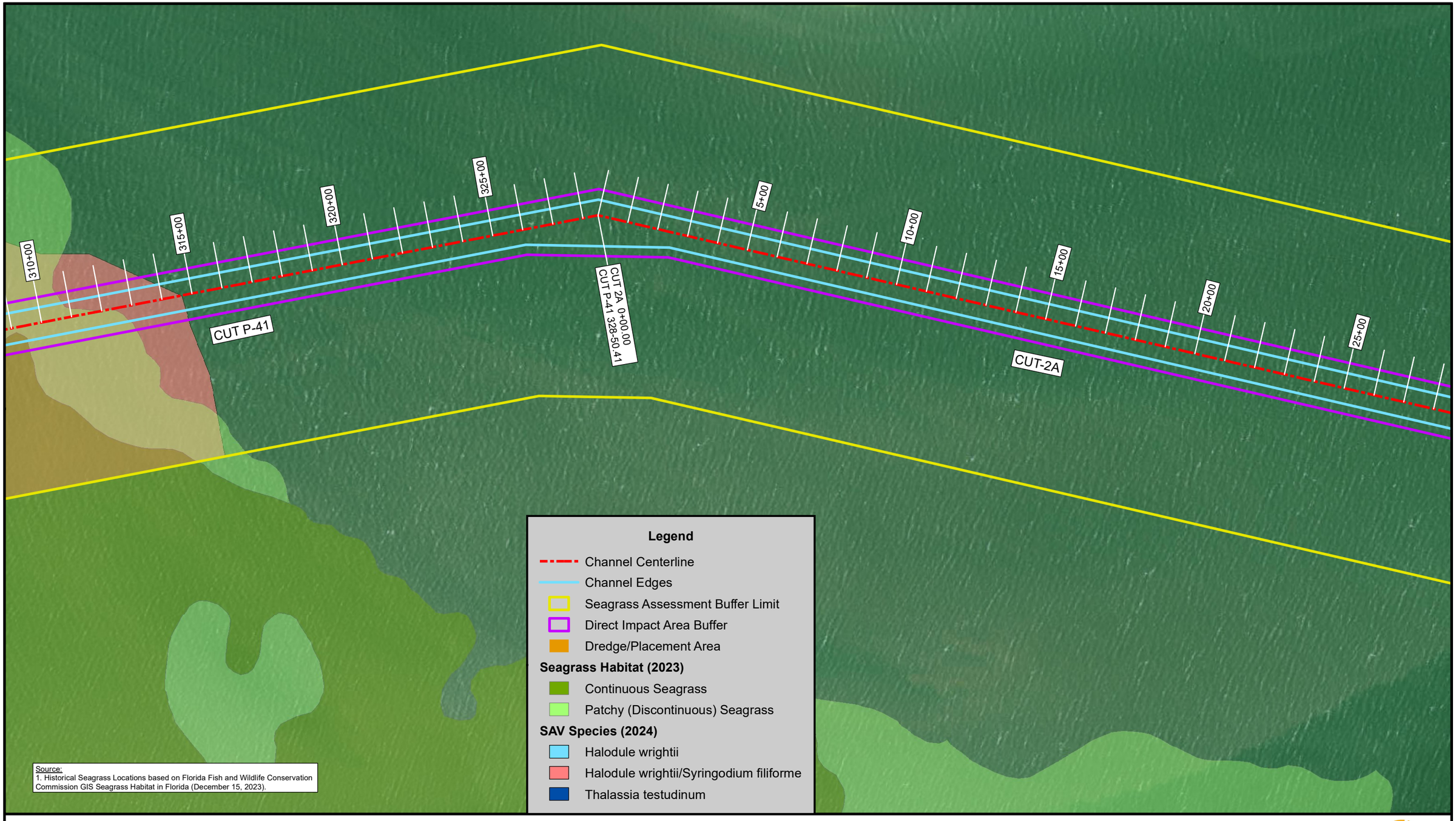

Figure 34.
New SAV and Benthic Survey Locations (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 150 300 600 Feet

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Legend

- Seagrass Assessment Buffer Limit
- Direct Impact Area Buffer
- Dredge/Placement Area

Seagrass Habitat (2023)

- Continuous Seagrass
- Patchy (Discontinuous) Seagrass

SAV Species (2024)

- Halodule wrightii
- Halodule wrightii/Syringodium filiforme
- Thalassia testudinum

Source:
1. Historical Seagrass Locations based on Florida Fish and Wildlife Conservation Commission GIS Seagrass Habitat in Florida (December 15, 2023).

Figure 35.
New SAV and Benthic Survey Locations Fred Howard Park Mitigation Area (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

N

0 200 400 800 Feet

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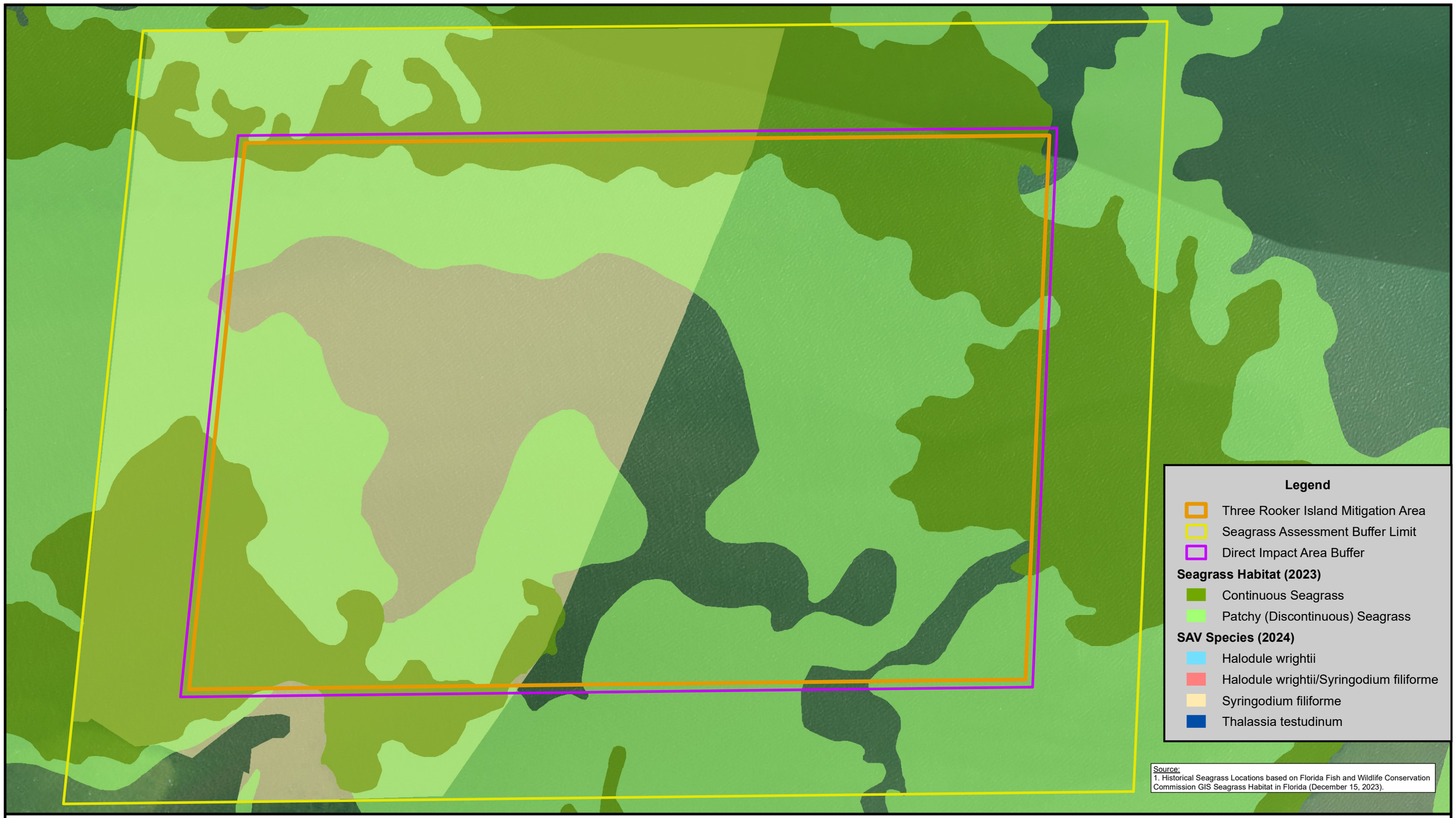

Figure 36.
New SAV and Benthic Survey Locations Three Rooker Island Mitigation Area (Species)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

water & air RESEARCH, INC.

J:\5805 - ACOE\EN\24-5805-02 Anclote & GIWW Benthic Surveys\Field Survey Report - Dec 2024\Figures\F36-SAV 2023 & 2024 Data Layout DPA Southeast.mxd, 2/6/2025 1:02:23 PM

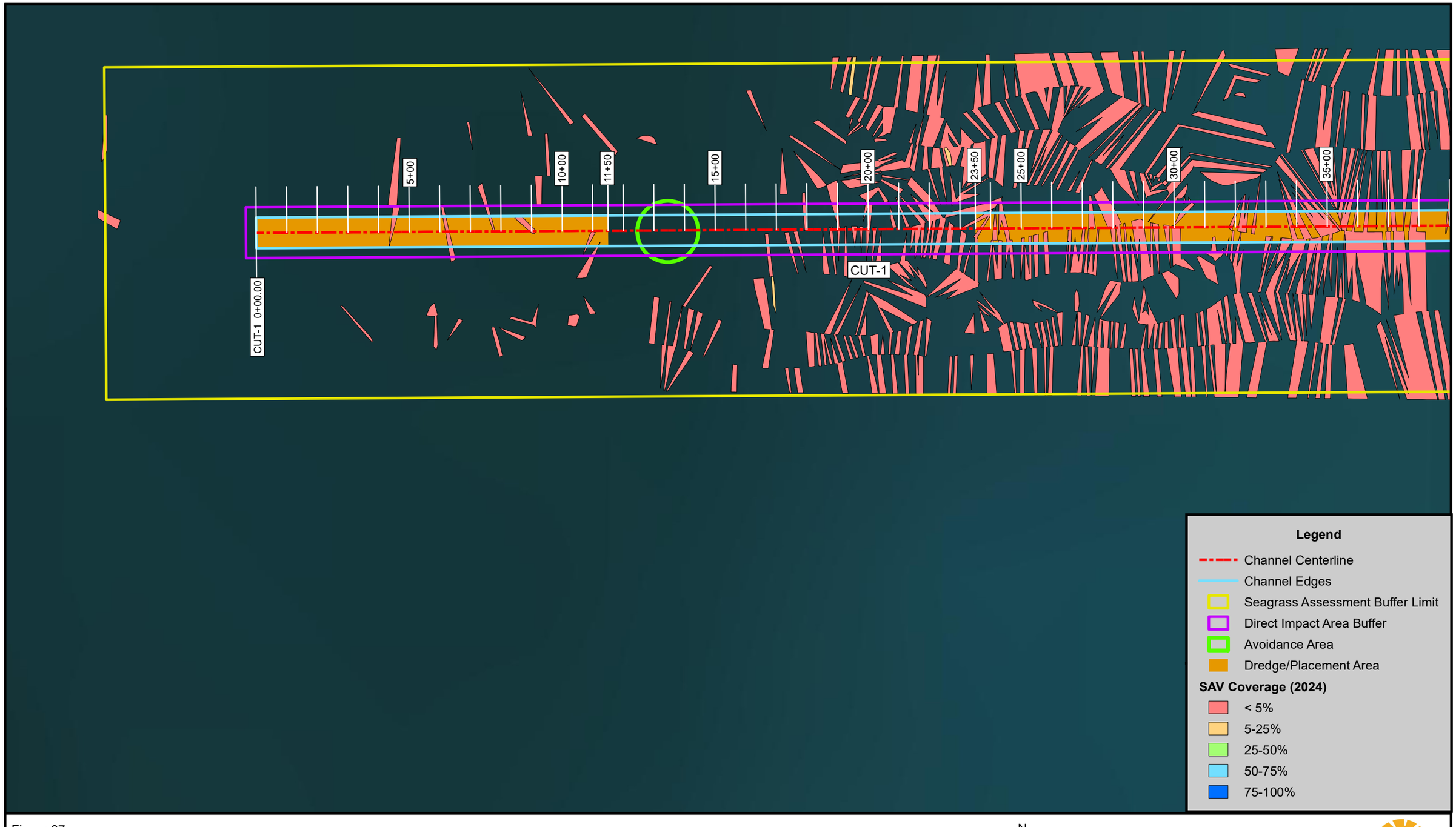

Figure 37.
New SAV Locations (Coverage)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

water & air RESEARCH, INC.

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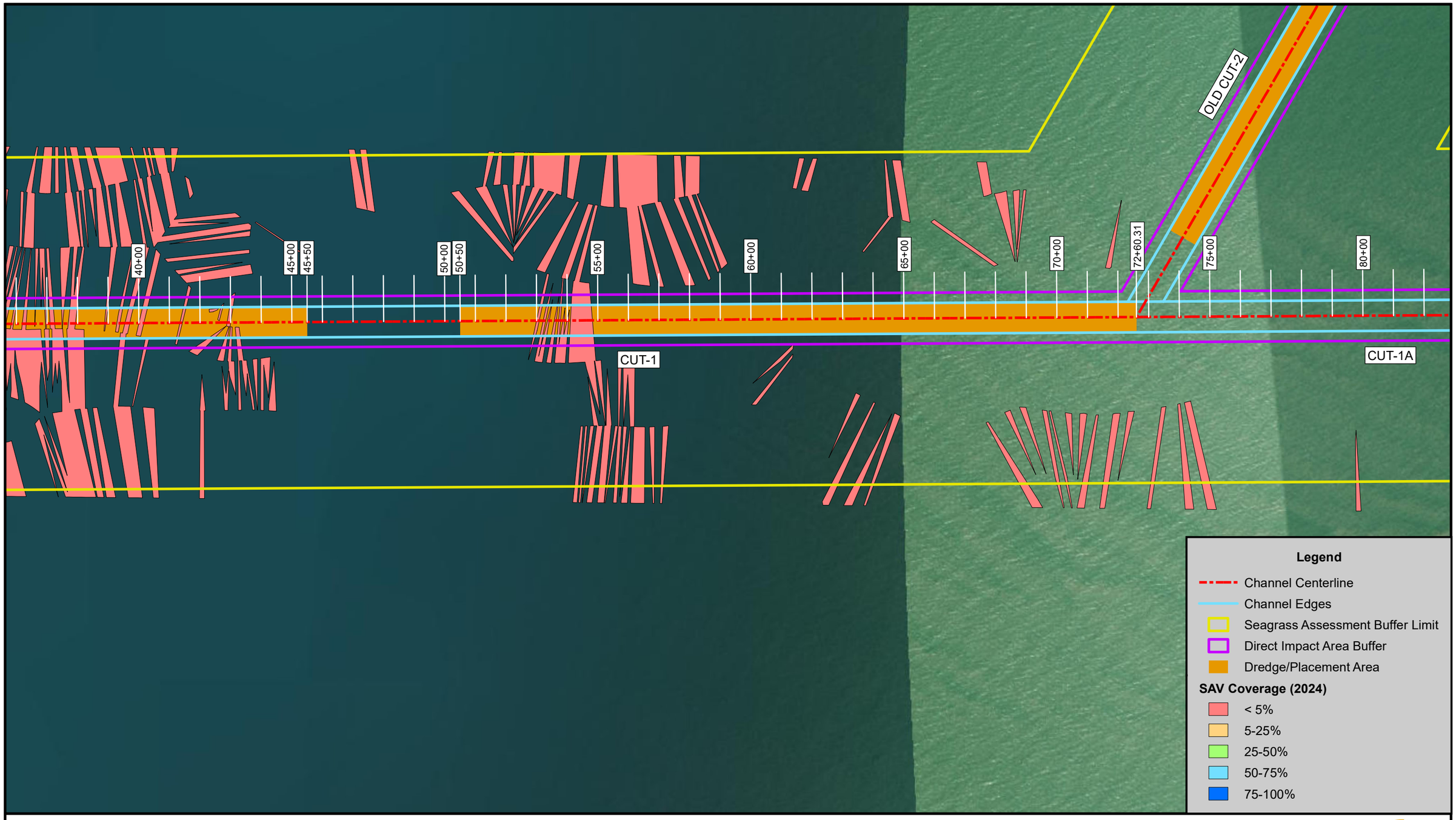

Figure 38.
New SAV Locations (Coverage)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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Figure 39.
New SAV Locations (Coverage)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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Figure 40.
New SAV Locations (Coverage)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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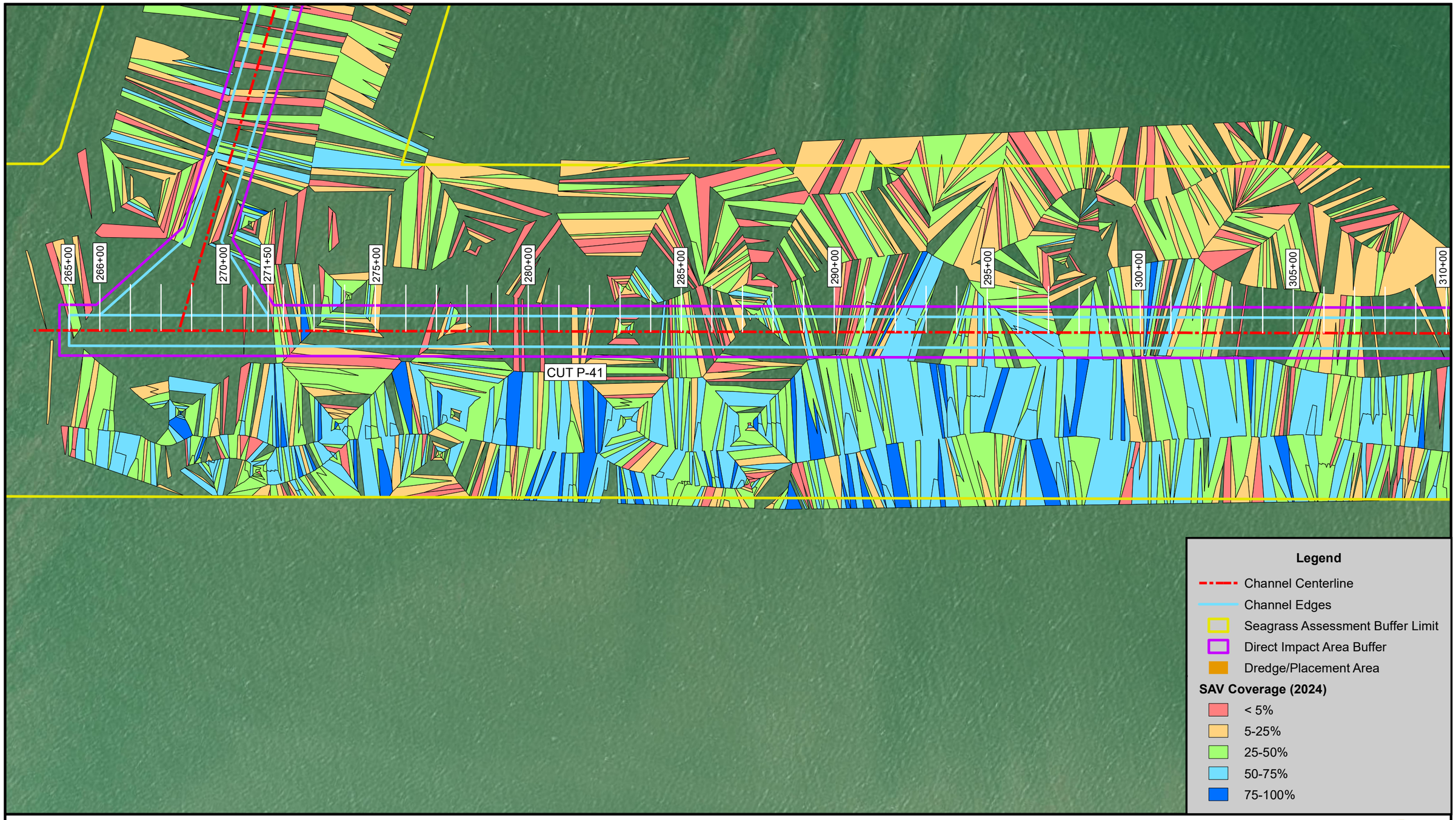

Figure 41.
New SAV Locations (Coverage)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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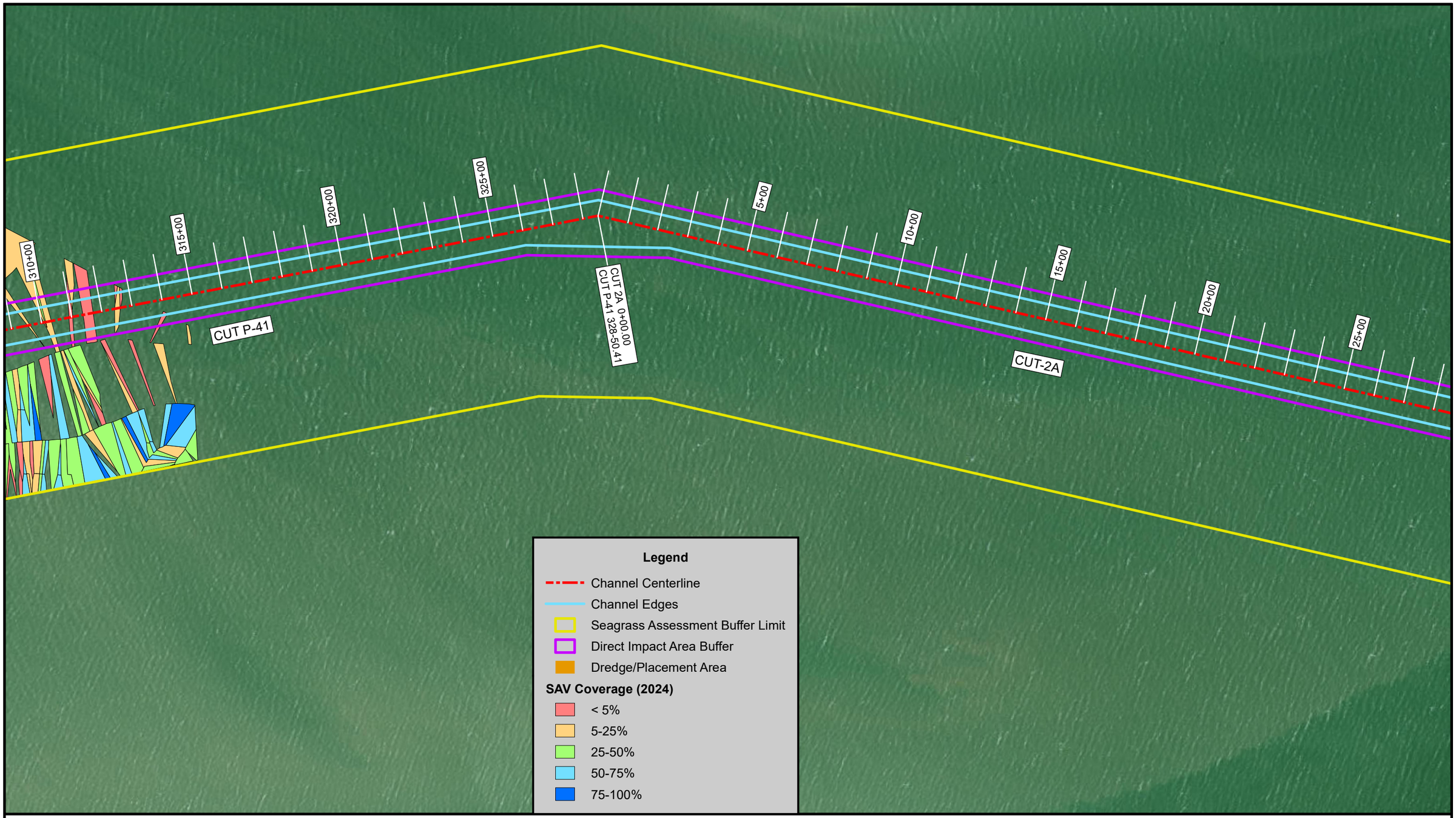

Figure 42.
New SAV Locations (Coverage)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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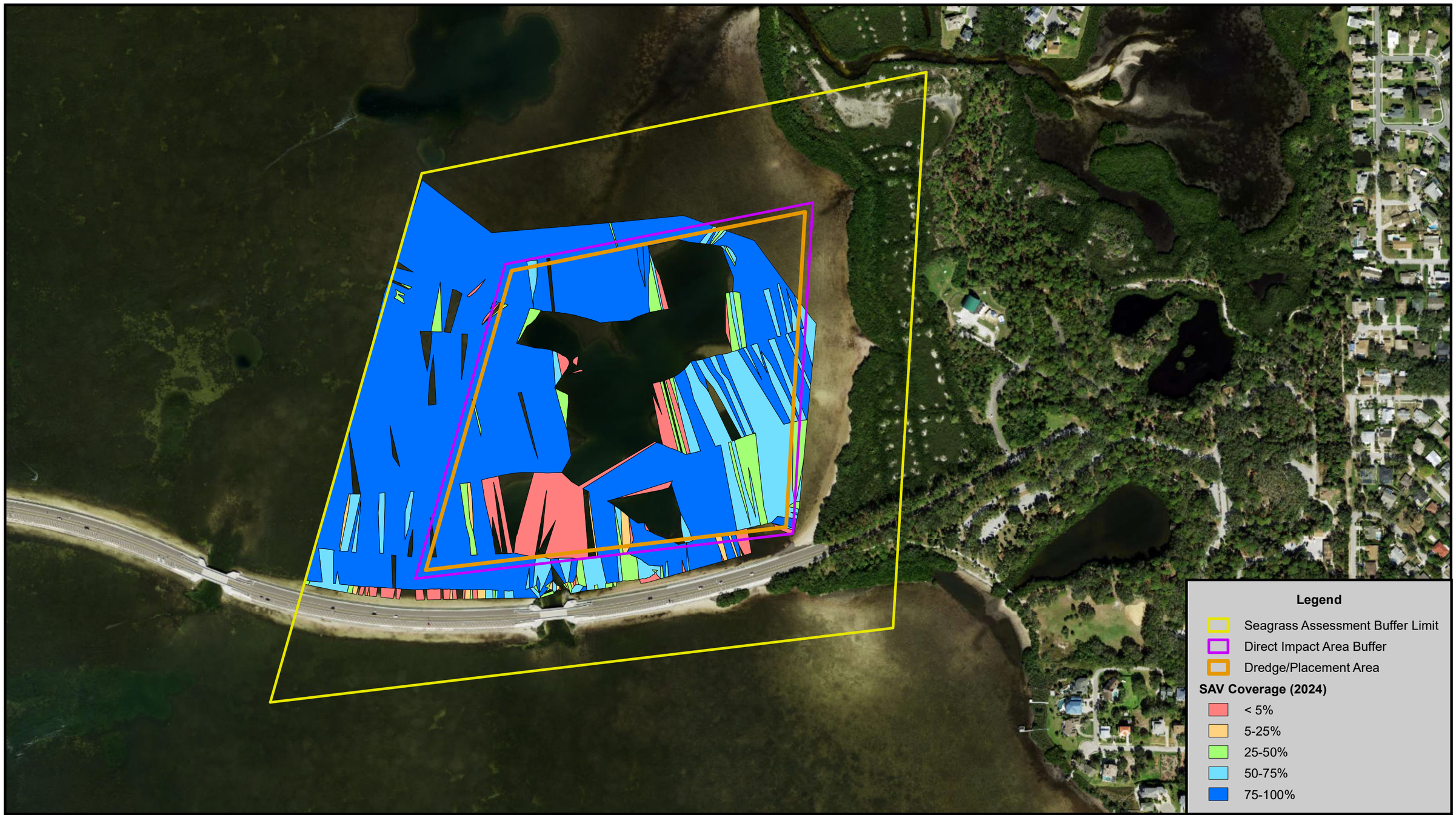

Figure 43.
New SAV Locations Fred Howard Park Mitigation Area (Coverage)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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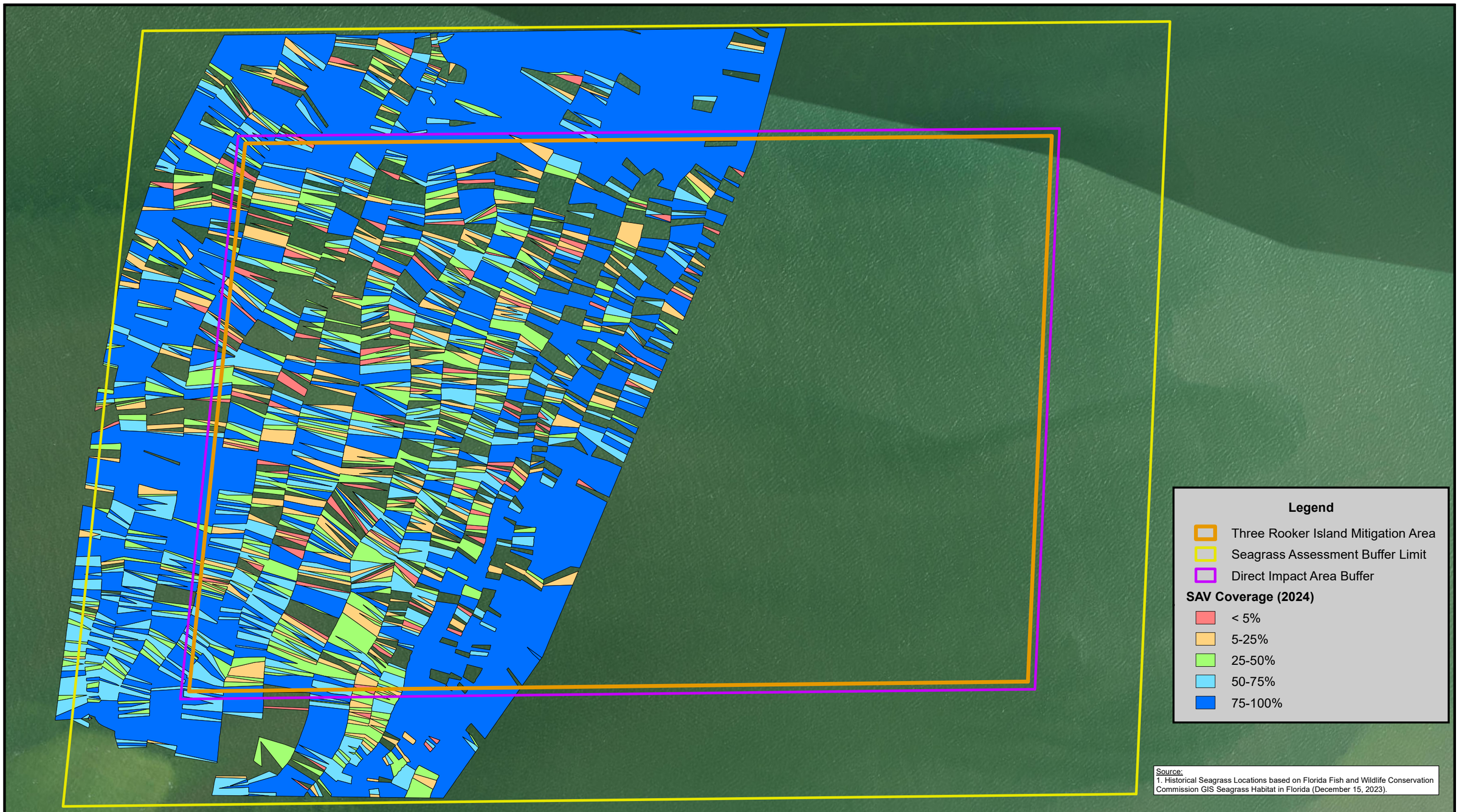

Figure 44.
New SAV Locations Three Rooker Island Mitigation Area (Coverage)
Anclote / GIWW
Submerged Aquatic Vegetation Resource Surveys
Pasco / Pinellas County, Florida
Source: Water & Air Research, Inc., 2024.

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Environmental Engineers, Scientists & Planners

ANCLOTE –MAINTENANCE DREDGING OUTER CHANNEL BENTHIC SURVEYS SUMMER 2023 FINAL

Prepared for

U.S. Army Corps of Engineers Jacksonville District
W912EP21A0004-0006

Prepared by

Water & Air Research, Inc.
6821 S.W. Archer Road
Gainesville, Florida 32608

December 2023
23-5805-04

water & air RESEARCH, INC.

REAL PEOPLE • REAL SOLUTIONS

INTRODUCTION

Water & Air Research, Inc. (Water & Air) is pleased to provide this report based on benthic surveys in the Anclote O&M outer channel area. Beds of seagrasses and other types of submerged aquatic vegetation (SAV) are located in close proximity to the authorized dredging footprint of Anclote O&M outer channel, Pinellas, Florida (Figure 1, Table 1). The Corps is preparing an Environmental Assessment (EA) and Joint Coastal Permit (JCP) application for the Anclote outer channel. Benthic surveys will be used for the EA, JCP application, and pre-construction. The areas shown have not been previously dredged.

Table 1. Station coordinates for the Anclote Benthic Survey.

Station	Easting	Northing
0+00	375613.21	1383794.77
5+00	376113.21	1383797.77
10+00	376613.20	1383800.77
15+00	377113.19	1383803.77
20+00	377613.18	1383806.77
23+00	377913.18	1383808.57
25+00	378113.17	1383809.77
30+00	378613.17	1383812.77
35+00	379113.16	1383815.77

The initial Reconnaissance Survey (conducted between October 9 and 17 in 2022) provided broad scale information on the spatial extent of submerged aquatic vegetation (SAV) in a large area surrounding the proposed project. An additional, follow up survey was needed to document the distribution and characterize the condition of SAV resources at a much finer scale within the area potentially under the influence of the project. These data on current condition (distribution, abundance, and condition) are crucial to the permitting process as they provide information necessary for determining the appropriate amount and type of compensatory mitigation via UMAM analysis. These data also aid in the development of the biological monitoring plan and establishment of the permanent monitoring grid to ensure unpermitted impacts, if occurring, will be documented so they can be offset.

1.0 Methods

For the purposes of this follow up survey, the project was split into three sections: the direct impact area, 10 m buffer zones immediately north and south of the direct impact area (to account for potential over dredging), and the qualitative area. The survey included mapping/delineation of all SAV resources within the direct impact area, 10 m buffer zone, and the qualitative area. Delineation was followed by quantitative characterization of resources in the direct impact area and the 10 m buffer zones, and qualitative characterization in the remaining portions of the survey area limits.

1.1 - Mapping/Delineation of Benthic Resources

The purpose of this delineation survey was to produce a geo-referenced map that illustrates the spatial

distribution of all benthic resources in the project area. All areas determined to potentially contain benthic resources, based on the desktop assessment, were surveyed, and a rapid on-site reconnaissance survey was conducted to determine whether any other areas contain benthic resources that should also be in-water visually assessed by divers. The reconnaissance survey was completed using a towed diver which ensures real-time observations of the benthos are made under the appropriate speed, height, and angle. Diver video of sufficient quality to identify benthic resources was collected simultaneously.

A towed–diver survey of the entire survey area was conducted using Trimble® DGPS, diver to top-side communications, and HYPACK® marine surveying, positioning, and navigation software (Figure 2). The towed–diver survey allowed divers to visually inspect and catalog habitat types within the entire survey area. Continuous communication between diver and top side personnel was maintained throughout the towed-diver survey. This communication was critical for transmitting qualitative benthic resource data necessary to ground truth and classify the data layers.

Mapping data was collected with spacing based on real time site conditions (underwater visibility). Diver positioning data was collected in WGS84 (World Geodetic System 1984), North American Datum 1983 (NAD-83), State Plane, Florida West, feet, at a rate of 1 data point per second with Horizontal Dilution of Precision (HDOP) set to <2.0. The Trimble® DGPS provided sub-meter horizontal accuracy. Diver positioning data was transmitted back to the work platform via Pacific Crest® Environmental Data Link® (EDL II) telemetry.

Topside personnel recorded observations communicated by the diver regarding habitat type, transitional zones, community boundaries, anomalous observations, etc. using the HYPACK® target command. The target command records the position of the diver (with sub-meter horizontal accuracy) where the observation is communicated, and any pertinent information entered by the topside HYPACK operator. At all times during the towed diver survey, the diver towed a surface float for topside personnel to maintain visual contact in the event the diver released from the tow sled.

Seagrass percent coverage was estimated by visually assessing the seagrass at regular intervals (approximately every meter) and assigning a seagrass cover value from 0 to 5 (Table 2). The seagrass cover values were assigned based on the observed seagrass percent cover.

Table 2. Seagrass Cover Scale.

Cover Scale Value	Percent Cover
0	0%
1	<5%
2	5 to 25%
3	25 to 50%
4	50 to 75%
5	75 to 100%

Following the reconnaissance survey, biologists visually located the edge of all SAV beds of these area(s) and recorded the position of resource edges using a sub-meter accurate GPS unit. During the mapping effort, the edge of all SAV beds within the direct impact area, 10 m buffers, and the qualitative survey area were delineated *in situ* by biologists using snorkeling or SCUBA equipment (whichever was necessary to make an accurate assessment). The positioning data was recorded vis DGPS with submeter accuracy. The total acreage of SAV within each patch/bed within the project area was calculated and reported.

1.2 - Quantitative Characterization Survey

SAV resources within the direct impact area and the 10 m buffer zones (see Figure 1) were quantitatively sampled *in situ* by biologists using snorkeling or SCUBA equipment (whichever was necessary to make an accurate assessment) during the Quantitative Characterization Survey. A minimum of 5 percent of each SAV bed within the direct impact area and the 10 m buffer zones were surveyed. Quadrats measuring 1 m^2 in area were employed to sample SAV resources. Individual quadrat locations were placed approximately 2 to 3 meters apart using a systematic haphazard approach along a compass bearing transect that crossed the different habitat types within the buffer and impact areas (Figure 3). The coordinates of each quadrat sampled was recorded. Prior to SAV characterization, drift algae within the quadrat were assessed. The cover of drift algae was recorded as sparse, moderate, or abundant and then these algae were carefully removed from the quadrat. The canopy height (to the nearest centimeter), a description of the community structure (including the species composition), and epiphyte coverage were recorded and reported within each quadrat. The percent cover of benthic resources was estimated to the nearest 5%. The percent cover of SAV taxa, which is the total cover of all seagrasses and rhizophytic macroalgae taxa, was estimated. Additionally, the percent cover of all seagrass species and all rhizophytic macroalgae genera were estimated, as well as the percent cover of each seagrass species and each rhizophytic macroalgae genera present within the quadrat. Representative photographs were taken to document site conditions and were labeled with a quadrat identifier and the date of the survey.

1.3 - Qualitative Characterization Survey

SAV resources within the qualitative survey limits (i.e., beyond the direct impact area and 10 m buffer zones; see Figure 1.) were qualitatively assessed using a towed diver as described in Section 1.1 Mapping/Delineation of Benthic Resources. The spacing between survey tracks (transects) was minimized to the maximum extent practicable to thoroughly survey the benthos, and was no greater than 20 m. The coordinates of all survey tracks (transects) were reported along with the visibility of the site on the date of the survey. The qualitative survey documented rough estimates in cover, density, species composition (including dominant species), and the general condition and health of each SAV patch and the project area overall. Representative photographs of each patch (or discrete area) were taken to document site conditions.

1.4 –Data processing and data analysis

Towed-diver survey data was post-processed with HYPACK® Target Editor and subsequently exported in xyz format. The raw data was imported into ArcGIS® 10 (ArcMap™ 10.8.1) where shapefiles were created and analyzed. Georeferenced layers interpolated using the Analysis Tools and Proximity extensions in ArcMap™ were produced from the collected data. Planar area calculations of strata were calculated using Xtools Pro (independent [Data East, LLC] ArcGIS extension).

2.0 Results

2.1 - Mapping/Delineation of Benthic Resources

Water and Air performed the Anclote benthic survey on October 18-19, 2023. The benthic survey was delayed past September 30, 2023, due to weather (rain and/or high winds) and mechanical boat problems. *Halodule wrightii* (seagrass) and *Caulerpa* spp. (rhizophytic macroalgae) were observed in the impact area and the qualitative area (Figures 4 and 5). Within the impact area of 1.63 acres *H. wrightii* composed 0.57 acres (34.97%) and *Caulerpa* spp. composed 0.04 acres (2.45%) (Table 3). Within the buffer area (excluding the impact area) of 1.34 acres *H. wrightii* composed 0.44 acres (32.84%) and *Caulerpa* spp. composed 0.02 acres (1.49%). Within the qualitative area (excluding the impact and buffer areas) of 60.15 acres *H. wrightii* composed 16.16 acres (26.87%), *Thalassia testudinum* (seagrass) composed 0.04 acres (0.07%), and *Caulerpa* spp. composed 2.71 acres (4.51%).

Low density (<5%) submerged aquatic vegetation was the primary coverage in the impact area with 0.60 acres (36.81%), the buffer area with 0.44 acres (32.84%), and the qualitative area with 18.12 acres (30.12%) (Figure 6, Table 4). *H. wrightii* with a low density (<5%) was the primary species in the impact area with 1.01 acres (61.96%), the buffer area with 0.41 acres (30.60%), and the qualitative area with 15.41 acres (25.61%) (Table 5).

Table 3. Submerged aquatic vegetation species acreage at the impact and qualitative areas of the Anclote Benthic Survey.

Location	Species	Area (acres)	Percent
Impact area	*Halodule wrightii*	0.57	34.97
Impact area	*Caulerpa* spp.	0.04	2.45
Buffer Area (excluding impact area)	*Halodule wrightii*	0.44	32.84
Buffer Area (excluding impact area)	*Caulerpa* spp.	0.02	1.49
Qualitative area (excluding impact and buffer areas)	*Halodule wrightii*	16.16	26.87
Qualitative area (excluding impact and buffer areas)	*Thalassia testudinum*	0.04	0.07
Qualitative area (excluding impact and buffer areas)	*Caulerpa* spp.	2.71	4.51

Table 4. Submerged aquatic vegetation cover class acreage at the impact and qualitative areas of the Anclote Benthic Survey.

Location	Cover	Area (acres)	Percent
Impact area	<5%	0.6	36.81
Impact area	5-25%	0.01	0.61
Buffer Area (excluding impact area)	<5%	0.44	32.84
Buffer Area (excluding impact area)	5-25%	0.01	0.75
Qualitative area (excluding impact and buffer areas)	<5%	18.12	30.12
Qualitative area (excluding impact and buffer areas)	5-25%	0.62	1.03
Qualitative area (excluding impact and buffer areas)	25-50%	0.17	0.28

Table 5. Submerged aquatic vegetation cover class acreage by species at the impact and qualitative areas of the Anclote Benthic Survey.

Location	Species	Cover	Area (acres)	Percent
Impact area	*Halodule wrightii*	<5%	1.01	61.96
Impact area	*Halodule wrightii*	5-25%	0.02	1.23
Impact area	*Caulerpa* spp.	<5%	0.07	4.29
Buffer Area (excluding impact area)	*Halodule wrightii*	<5%	0.41	30.60
Buffer Area (excluding impact area)	*Halodule wrightii*	5-25%	0.01	0.75
Buffer Area (excluding impact area)	*Caulerpa spp.*	<5%	0.03	2.24
Qualitative area (excluding impact and buffer areas)	*Halodule wrightii*	<5%	15.41	25.61
Qualitative area (excluding impact and buffer areas)	*Halodule wrightii*	5-25%	0.60	1.00
Qualitative area (excluding impact and buffer areas)	*Halodule wrightii*	25-50%	0.16	0.27
Qualitative area (excluding impact and buffer areas)	*Thalassia testudinum*	<5%	0.04	0.06
Qualitative area (excluding impact and buffer areas)	*Caulerpa* spp.	<5%	2.68	4.46
Qualitative area (excluding impact and buffer areas)	*Caulerpa* spp.	5-25%	0.02	0.04
Qualitative area (excluding impact and buffer areas)	*Caulerpa* spp.	25-50%	0.01	0.02

2.2 - Quantitative Characterization Survey

SAV resources within the direct impact area and the 10 m buffer zone were quantitatively sampled *in situ* by biologists using 1 m^2 quadrats (Figure 3). The substrate in all of the 421 quadrats was sand. *H. wrightii* was present in 133 quadrats (31.59%) and aerial cover ranged from 1% to 25%, with an average cover of 2.14% per quadrat when present (Table 6). The calcareous green *Udotea* sp. macroalgae was

only present in 1 quadrat. *Caulerpa mexicana*, *Caulerpa prolifera*, *Caulerpa sertularioides*, and *Caulerpa taxifolia* composed the *Caulerpa* sp. present and were observed in only 11 quadrats (2.61%). An unidentified algae species was only present in 1 quadrat. *H. wrightii* canopy height ranged from 3.0 cm to 25 cm, with an average height of 9.33 cm. Macroalgae canopy height, when no seagrass was present, ranged from 3.0 cm to 12 cm, with an average height of 5.92 cm.

2.3 - Qualitative Characterization Survey

The current SAV survey observed more seagrass coverage compared to the initial Reconnaissance Survey (conducted between October 9 and 17 in 2022) (Figure 7). *H. wrightii* especially was observed in a larger proportion of the qualitative survey area then had been recorded by the Reconnaissance Survey.

2.4 – Uniform Mitigation Assessment Method Analysis

Uniform Mitigation Assessment Method (UMAM) detailed written descriptions (characterizations) of the direct impact area and the 10 m buffer zones are provided for: Location and Landscape Support, Water Environment, and Community Structure.

Location and Landscape Support:

The location and landscape support of the direct impact area and the 10 m buffer zone assessment areas are adjacent and similar. Seagrass meadows are beneficial components of the marine ecosystem and provide habitat and forage to a wide variety of marine organisms. Local fisheries and marine food webs benefit from the presence of seagrass communities. Seagrass also support listed herbivorous species such as Florida manatee (*Trichechus manatus latirostris*) and green sea turtles (*Chelonia mydas*). Overall, there are seagrass meadows commonly observed in the nearshore marine waters adjacent to Pasco and Pinellas Counties, Florida. The presence, density, and species composition of the seagrass meadows in local proximity to the assessment areas are variable and likely influenced by a variety of factors. These factors include the availability of suitable substrate for attachment and nutrients, adequate light availability to support photosynthesis, wave energies that do not bury or dislodge propagules, and predation levels that do not exceed production.

The seagrass community in the assessment area was limited to almost exclusively shoal grass (*H. wrightii*) and rhizophytic macroalgae (e.g., *Caulerpa* spp.). These submerged aquatic vegetation (SAV) are noted as being early colonizer species that have tolerance to suboptimal environmental conditions. The presence of these species in low abundance suggests that the survey area is suboptimal for seagrass community persistence. Expansive and dense seagrass meadows occur outside the assessment area (for example east of Anclote Key) which will remain as natural communities that can provide both landscape support and new seagrass propagules.

The assessment area location is an area that continuously experiences the movement of sand in a southerly direction driven by regional marine currents. As such, the assessment area is subject to sand accumulation/shoaling and has been channelized to aid in vessel navigation. Recreational and commercial vessel use in this region is extensive, resulting in high vessel traffic over the assessment area.
Most of the observed benthic landscape in the survey areas was comprised of bare coarse sand with occasional *H. wrightii* presence at less than five percent aerial coverage. Some drift macroalgae (such as *Laurencia* sp.) were observed along with limited detritus from shed seagrass leaves. Limited marine debris (e.g., rope and derelict traps) was observed during towed diver surveys.

Overall, the location and landscape support provided by the seagrass in the assessment areas was degraded/suboptimal. This is due to the low density of seagrass, the lack of climax species like *T. testudinum*, and the dynamic nature of the substrate that likely prevents long-term seagrass colonization.

Table 6. Submerged aquatic vegetation substrate, percent cover by species, and canopy height from quadrats in the impact and buffer areas of the Anclote Benthic Survey.

	Stakes	Substrate	*Halodule wrightii* (%)	Calcareous Green *Udotea* sp (%)	*Caulerpa mexicana* (%)	*Caulerpa prolifera* (%)	*Caulerpa sertularioides* (%)	Caulerpa taxifolia (%)	*Caulerpa* sp. Total (%)	Algae (%)	*Halodule wrightii* Canopy Height (cm)	Macroalgae Canopy Height Only (cm)	All Taxa Canopy (cm)
Number present	421	Sand	133	1	1	5	1	4	11	1	134	12	146
Frequency present		100%	31.59%	0.24%	0.24%	1.19%	0.24%	0.95%	2.61%	0.24%	31.83%	2.85%	-
Minimum			1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3.0	3.0	3.0
Maximum			25.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	28.0	12.0	28.0
Average (n = 421)			0.67	0.0024	0.0024	0.0119	0.0024	0.0095	0.0261	0.0024	2.97	0.17	3.14
Standard deviation			2.22	0.0487	0.0487	0.1085	0.0487	0.0971	0.1597	0.0487	4.95	1.08	4.97
Average (only when present)			2.14	1.0	1.0	1.0	1.0	1.0	1.0	1.0	9.33	5.92	9.05
Standard deviation			3.6								4.2	2.7	4.2

Water Environment:
The water environment of the direct impact and the 10 m buffer zone assessment areas are adjacent and similar. The water depth ranged from 9 to 15 ft, with wave dynamics that include offshore swell and wind driven waves. Water currents include diurnal tidal flow and a regional current that moves southerly in parallel to the coastline. Wave and currents can rapidly develop and influence substrate stability. Wave energy may disrupt seagrass rhizomes. Waves affect the water clarity at the assessment area through suspension of fine organic and inorganic materials. During and following wind events, reductions in water clarity will reduce the transmission of light to seagrass beds.

Water quality in the assessment area meets the designated use for coastal waters in Florida, Class III - Fish Consumption, Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife. Water temperature, salinity, nutrient concentrations, and clarity appeared appropriate for the marine waters of the region. The water quality of the assessment areas has the potential to be influenced by the watershed conditions and discharge of the nearby Anclote River. However, the water quality of the survey area is much more representative of the Gulf of Mexico waters spanning to the west.

Community Structure:
The community structure of the direct impact and the 10 m buffer zone assessment areas are adjacent and similar. The seagrass community in the assessment area is sparse and comprised of a near monoculture of short *H. wrightii*. From a perspective of species richness or diversity the assessment areas are very low. A near absence of climax seagrass species such as *T. testudinum*, suggests that the current condition of the seagrass community within the assessment area is suboptimal due to environmental conditions.

The growth and regeneration of the seagrass community in the assessment areas suggest relatively recent opportunistic expansion that has not persisted for longer periods of time (years). No dense beds of seagrass were observed, nor any tall seagrass leaves. In the survey areas, benthic macroalgae like *Caulerpa* sp. were uncommon and never in high density or aerial coverage. Other attached macroalgae such as *Udotea* sp. (calcareous green algae) were nearly absent. The near lack of benthic macroalgae in any meaningful diversity or abundance also strongly supports the observation that the community structure is limited in the assessment areas due to suboptimal environmental conditions.

Marine herbivores which utilize seagrass meadows would not be sustained by the seagrass community in the assessment area. The minimal observed density and biomass of seagrasses would not support optimal foraging behavior. The sparse seagrasses observed also fail to provide cover or shelter for small and cryptic fauna due to the low density of shoots and diminutive leaf heights. The detritus based food-web within the assessment area is suboptimal due to the sparse seagrass densities, wave energy, and tidal flows that leads to low detrital retention. As a result, detritivore utilization is low. Marine fauna which are seagrass dependent will utilize other nearby and regional seagrass resources rather than those found in the survey areas.

Please do not hesitate to call me to discuss 352-224-1545 or email me at enelson@waterandair.com.

Sincerely,

Water & Air Research, Inc.

Eric Nelson

Eric B. Nelson
Senior Scientist/
Biology Department Manager

Sky Notestein

Sky K. Notestein
Project Scientist

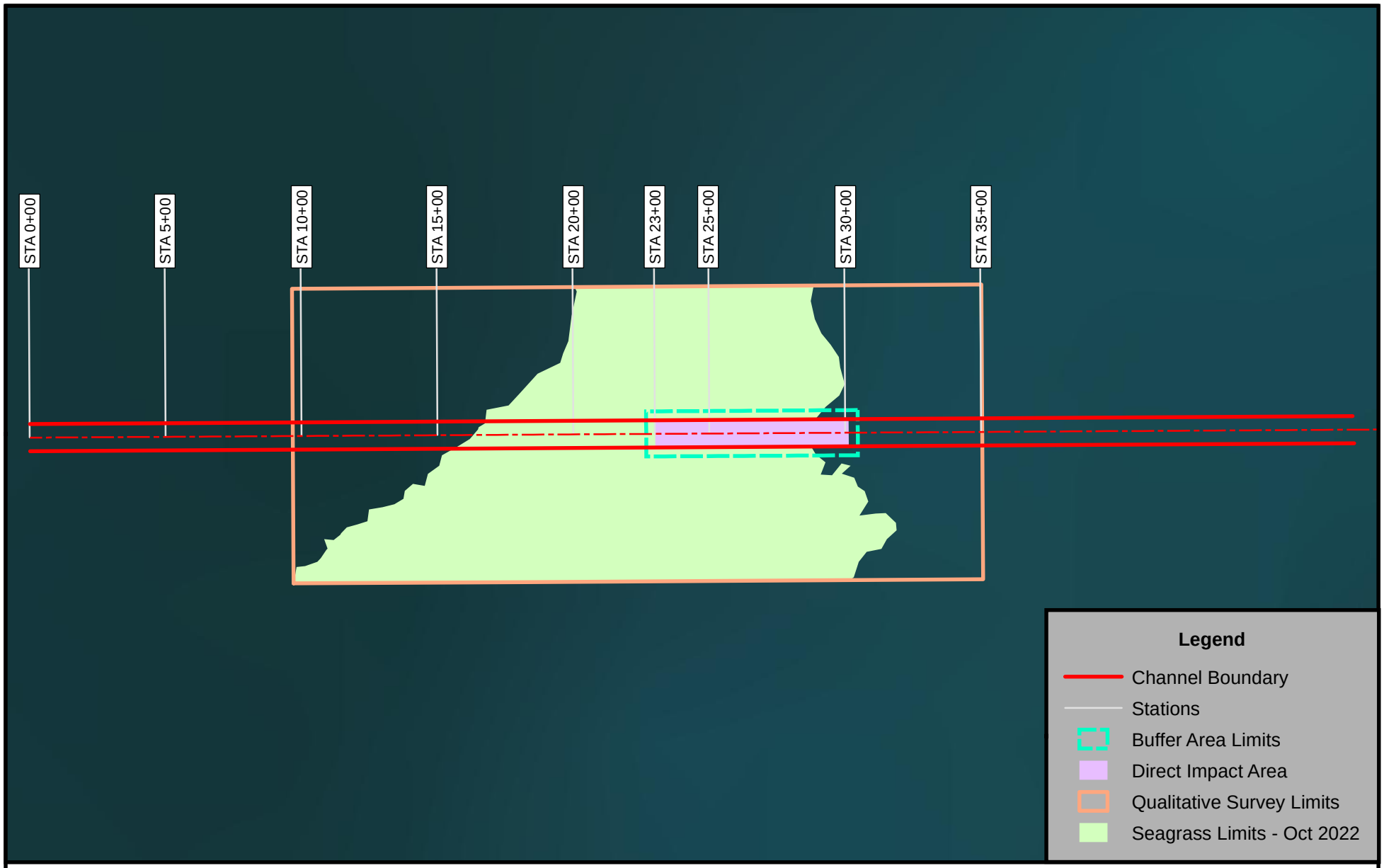

Figure 1.
Previous SAV Locations
Anclote Dredging Benthic Survey
Pinellas County, Florida

Source: Water & Air Research, Inc., 2023.

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0 250 500 1,000 Feet

water & air RESEARCH, INC.

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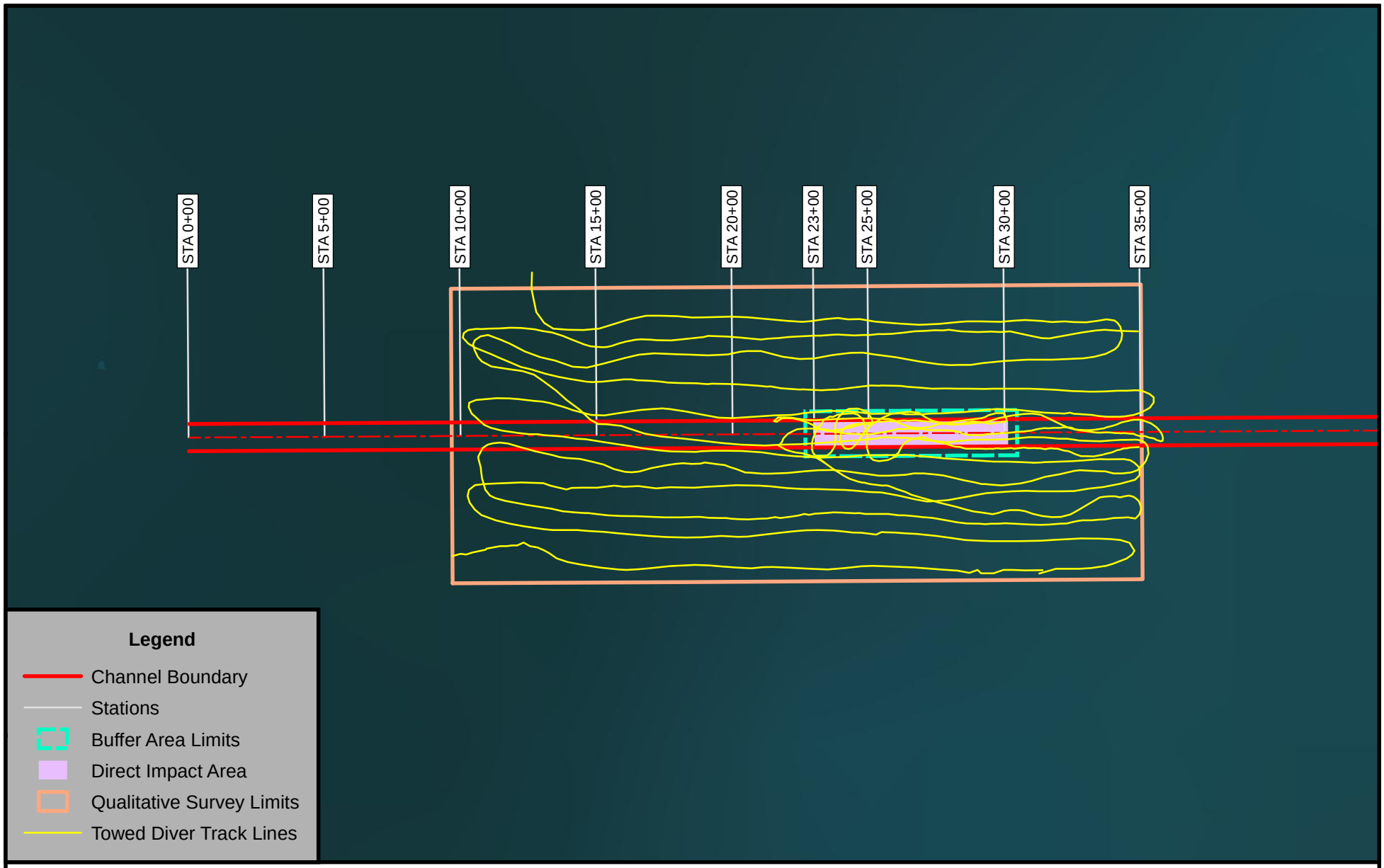

Figure 2.
Towed Diver Track Lines
Anclote Dredging Benthic Survey
Pinellas County, Florida

Source: Water & Air Research, Inc., 2023.

water & air RESEARCH, INC.

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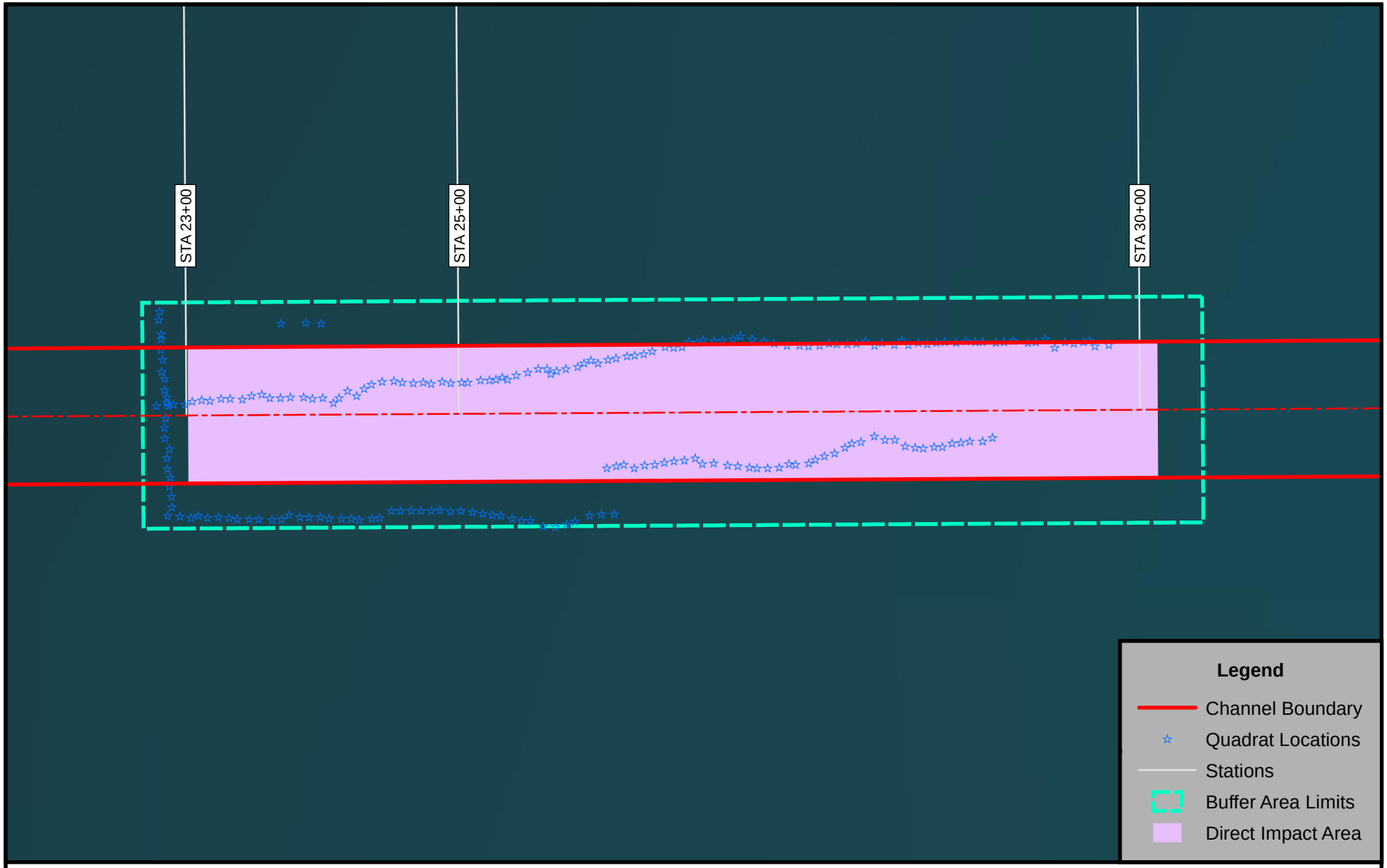

Figure 3.
Quadrat Locations
Anclote Dredging Benthic Survey
Pinellas County, Florida

Source: Water & Air Research, Inc., 2023.

water & air RESEARCH, INC.

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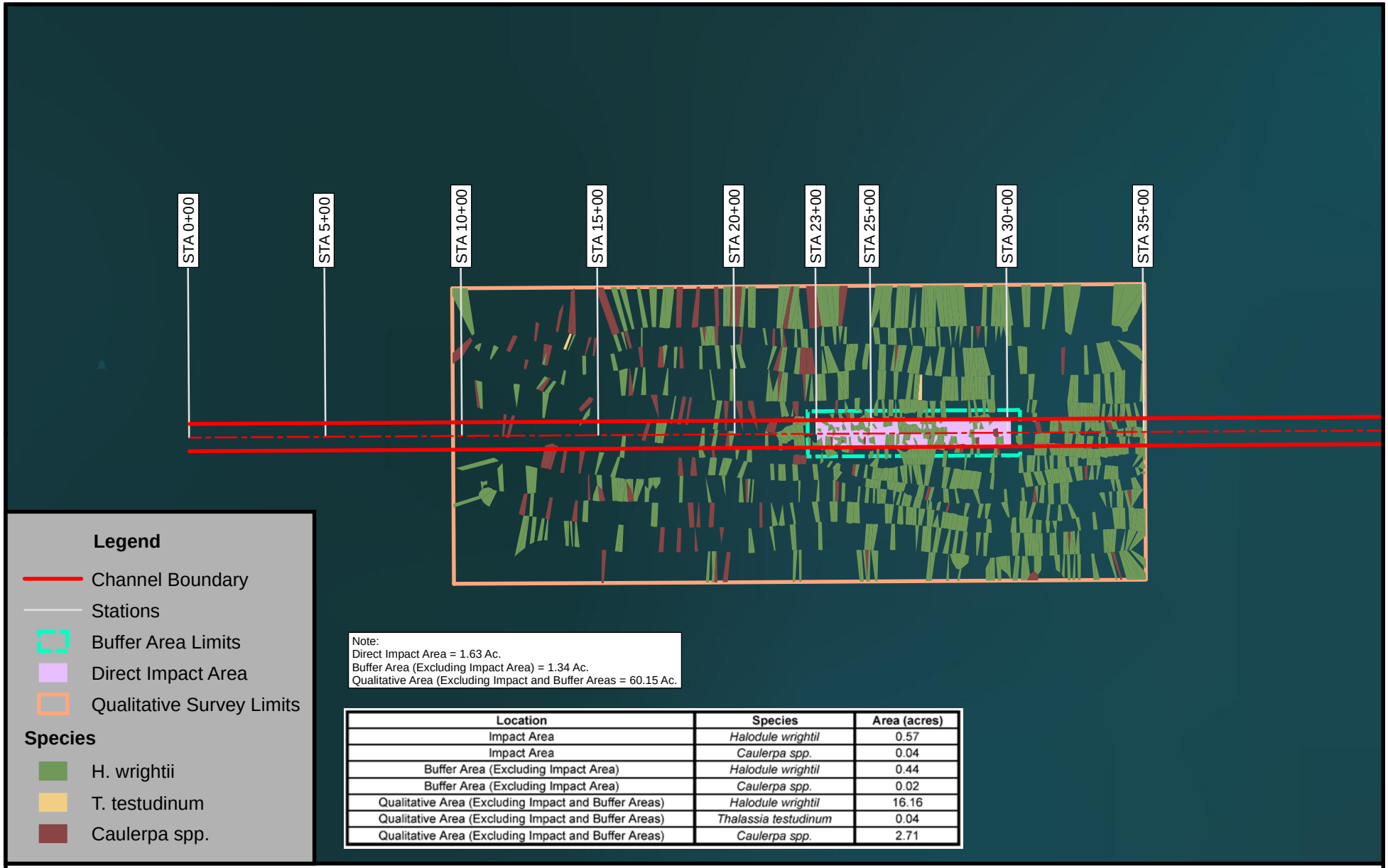
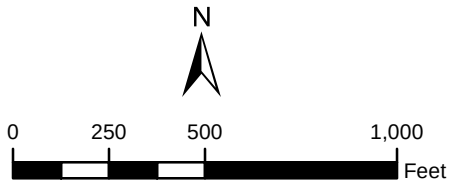


Location	Species	Area (acres)
Impact Area	*Halodule wrightil*	0.57
Impact Area	*Caulerpa spp.*	0.04
Buffer Area (Excluding Impact Area)	*Halodule wrightil*	0.44
Buffer Area (Excluding Impact Area)	*Caulerpa spp.*	0.02
Qualitative Area (Excluding Impact and Buffer Areas)	*Halodule wrightil*	16.16
Qualitative Area (Excluding Impact and Buffer Areas)	*Thalassia testudinum*	0.04
Qualitative Area (Excluding Impact and Buffer Areas)	*Caulerpa spp.*	2.71

Figure 4.
New SAV Locations (Species)
Anclote Dredging Benthic Survey
Pinellas County, Florida

Source: Water & Air Research, Inc., 2023.



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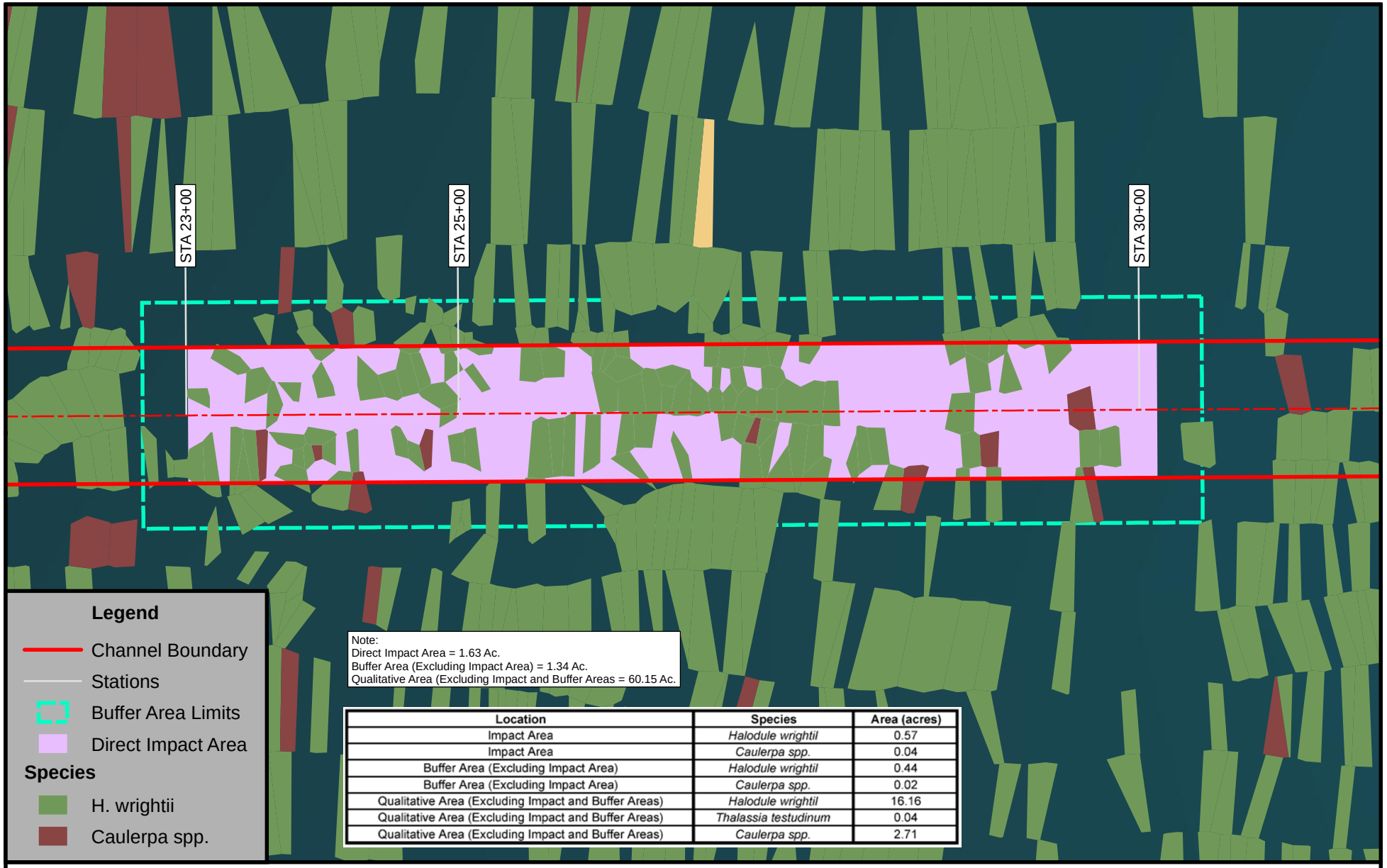

Location	Species	Area (acres)
Impact Area	*Halodule wrightil*	0.57
Impact Area	*Caulerpa spp.*	0.04
Buffer Area (Excluding Impact Area)	*Halodule wrightil*	0.44
Buffer Area (Excluding Impact Area)	*Caulerpa spp.*	0.02
Qualitative Area (Excluding Impact and Buffer Areas)	*Halodule wrightil*	16.16
Qualitative Area (Excluding Impact and Buffer Areas)	*Thalassia testudinum*	0.04
Qualitative Area (Excluding Impact and Buffer Areas)	*Caulerpa spp.*	2.71

Figure 5.
New SAV Locations (Magnified for the Buffer and Impact Areas)
Anclote Dredging Benthic Survey
Pinellas County, Florida

Source: Water & Air Research, Inc., 2023.

N

0 50 100 200 Feet

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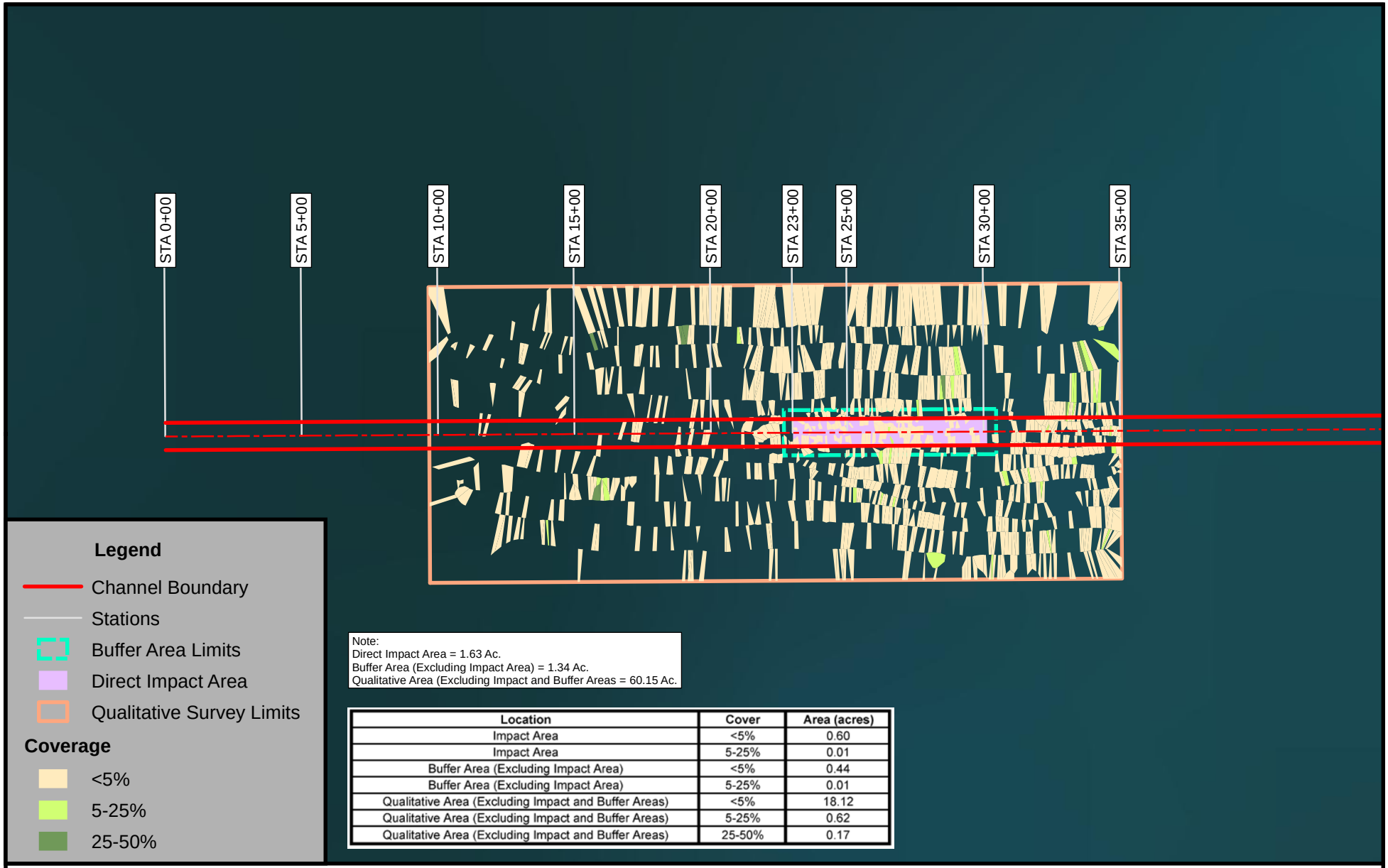

Note:
Direct Impact Area = 1.63 Ac.
Buffer Area (Excluding Impact Area) = 1.34 Ac.
Qualitative Area (Excluding Impact and Buffer Areas = 60.15 Ac.

Location	Cover	Area (acres)
Impact Area	<5%	0.60
Impact Area	5-25%	0.01
Buffer Area (Excluding Impact Area)	<5%	0.44
Buffer Area (Excluding Impact Area)	5-25%	0.01
Qualitative Area (Excluding Impact and Buffer Areas)	<5%	18.12
Qualitative Area (Excluding Impact and Buffer Areas)	5-25%	0.62
Qualitative Area (Excluding Impact and Buffer Areas)	25-50%	0.17

Figure 6.
New SAV Locations (Coverage)
Anclote Dredging Benthic Survey
Pinellas County, Florida

Source: Water & Air Research, Inc., 2023.

N

0 250 500 1,000 Feet

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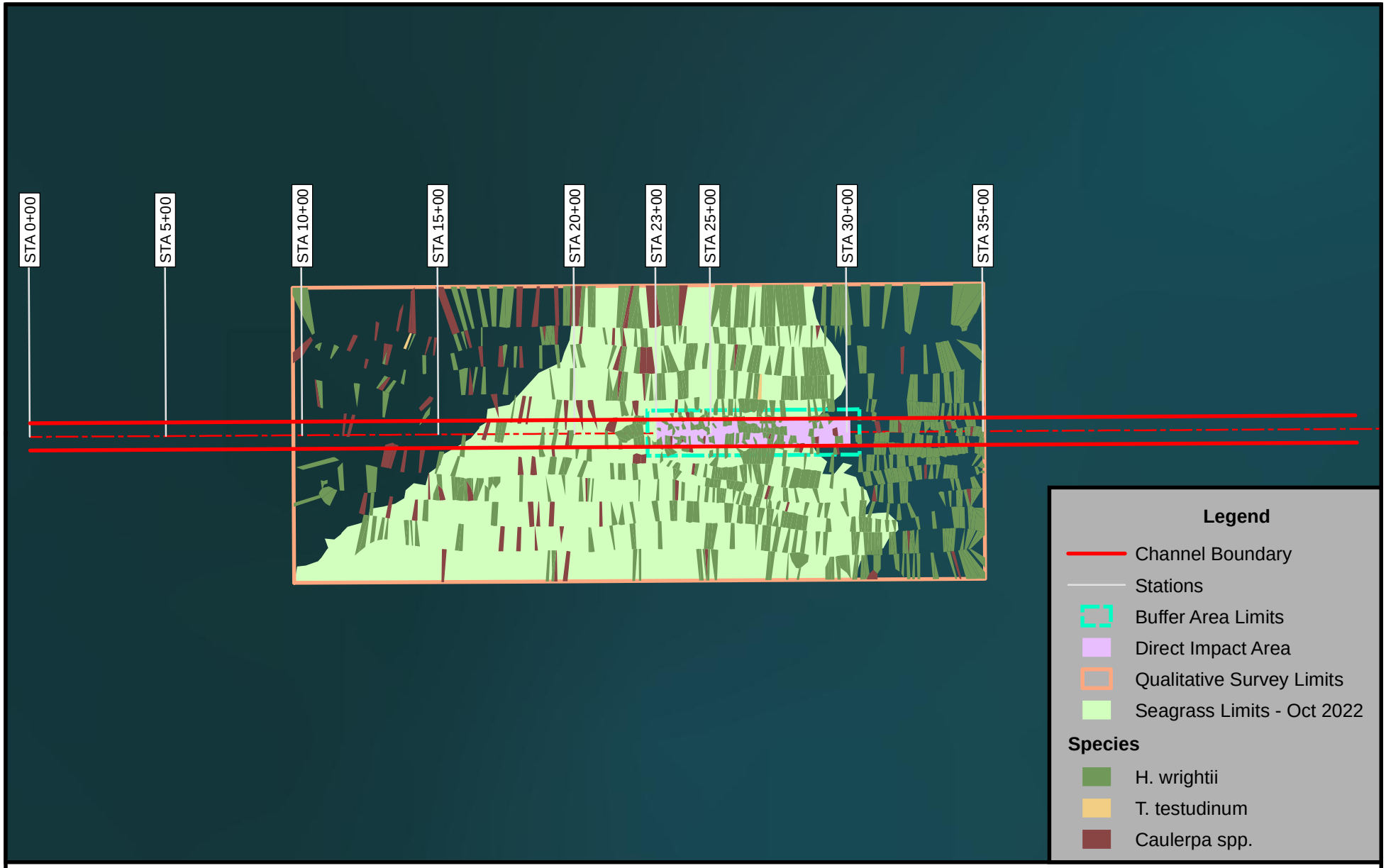

Figure 7.
Previous and New SAV Locations
Anclote Dredging Benthic Survey
Pinellas County, Florida

Source: Water & Air Research, Inc., 2023.

N

0 250 500 1,000 Feet

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