

eDNA Expeditions biodiversity survey of Everglades National Park

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November 26, 2023

1 Introduction

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2 Results

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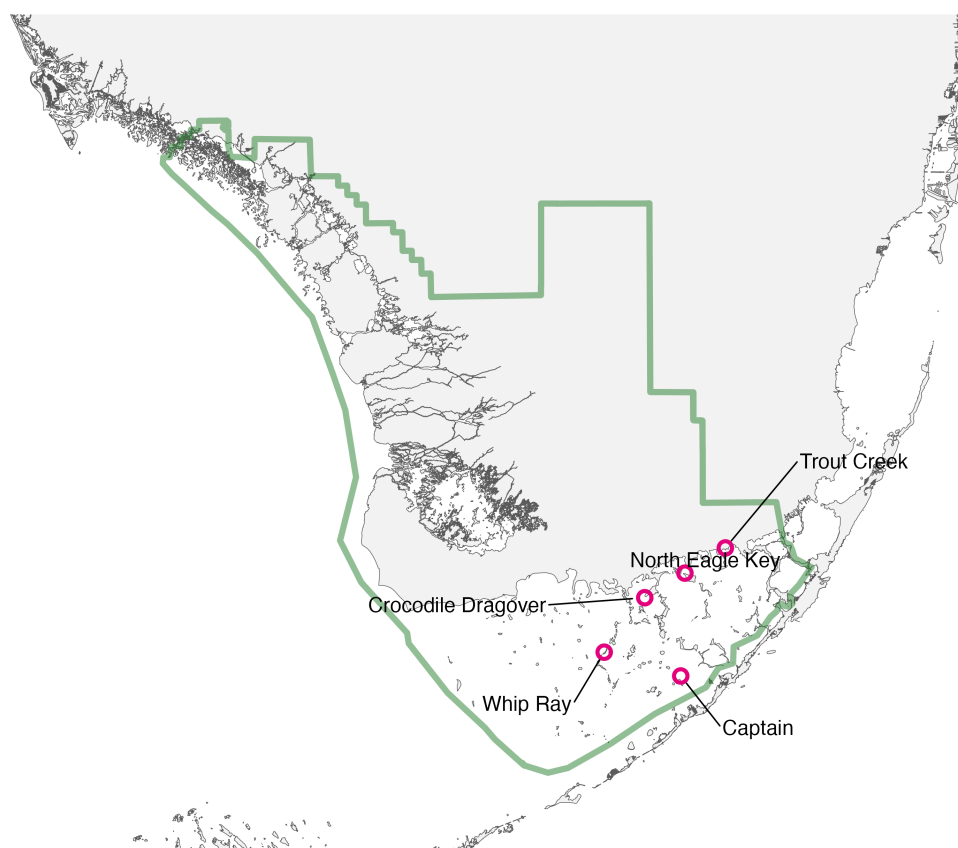
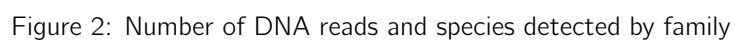


Figure 1: Map of eDNA sampling locations



3 Species list

| phylum | class | family | species | category |
|-----------------|-------------------|--------------------|-----------------------------|----------|
| Amoebozoa | Discosea | Paramoebidae | Paramoeba aestuarina | |
| Amoebozoa | Myxogastrea | Physaridae | Craterium leucocephalum | |
| Annelida | Clitellata | Naididae | Thalassodrilides gurwitschi | |
| Annelida | Polychaeta | Eunicidae | Marphysa sanguinea | |
| Annelida | Polychaeta | Chrysopetalidae | Bhawania goodei | |
| Annelida | Polychaeta | Goniadidae | Glycinde multidentis | |
| Annelida | Polychaeta | Spionidae | Polydora websteri | |
| Annelida | Polychaeta | Spionidae | Prionospio steenstrupi | |
| Annelida | Polychaeta | Cirratulidae | Timarete caribous | |
| Annelida | Polychaeta | Pectinariidae | Pectinaria gouldii | |
| Annelida | Polychaeta | Terebellidae | Loimia medusa | |
| Annelida | | Golfingiidae | Golfingia elongata | |
| Annelida | | Siphonostomatidae | Siphonostoma cumanense | |
| Arthropoda | Copepoda | Acartiidae | Acartia tonsa | |
| Arthropoda | Hexapoda | Aphididae | Rhopalosiphum padi | |
| Arthropoda | Hexapoda | Cicadellidae | Macrostelus quadrilineatus | |
| Arthropoda | Malacostraca | Ampithoidae | Cymadusa compta | |
| Arthropoda | Malacostraca | Maeridae | Elasmopus nkjaf | |
| Arthropoda | Malacostraca | Panopeidae | Neopanope packardii | |
| Arthropoda | Malacostraca | Portunidae | Callinectes sapidus | |
| Arthropoda | Malacostraca | Portunidae | Portunus sanguinolentus | |
| Arthropoda | Malacostraca | Sphaeromatidae | Paracerceis caudata | |
| Arthropoda | Merostomata | Limulidae | Limulus polyphemus | VU |
| Arthropoda | Pycnogonida | Callipallenidae | Callipallene brevirostris | |
| Ascomycota | Dothideomycetes | Cladosporiaceae | Cladosporium herbarum | |
| Ascomycota | Eurotiomycetes | Trichocomaceae | Aspergillus versicolor | |
| Bacillariophyta | Bacillariophyceae | Bacillariaceae | Cylindrotheca closterium | |
| Bacillariophyta | Bacillariophyceae | Naviculaceae | Haslea crucigera | |
| Bacillariophyta | Bacillariophyceae | Naviculaceae | Navicula minima | |
| Bacillariophyta | Bacillariophyceae | Phaeodactylaceae | Phaeodactylum tricornutum | |
| Bryozoa | Gymnolaemata | Bugulidae | Bugula rochae | |
| Bryozoa | Gymnolaemata | Vesiculariidae | Amathia evelinae | |
| Cercozoa | Chlorarachnea | Chlorarachniaceae | Chlorarachnion reptans | |
| Chlorophyta | Mamiellophyceae | Dolichomastigaceae | Dolichomastix tenuilepis | |
| Chlorophyta | Mamiellophyceae | Mamiellaceae | Micromonas pusilla | |
| Chordata | Ascidacea | Perophoridae | Ecteinascidia styeioides | |
| Chordata | Ascidacea | Styelidae | Botrylloides niger | |
| Chordata | Ascidacea | Styelidae | Botrylloides simodensis | |
| Chordata | Aves | Anatidae | Anas poecilorhyncha | |
| Chordata | Aves | Ardeidae | Ardea cinerea | |
| Chordata | Aves | Falconidae | Falco sparverius | |
| Chordata | Elasmobranchii | Carcharhinidae | Negaprion brevirostris | VU |
| Chordata | Elasmobranchii | Sphyrnidae | Sphyrna tiburo | EN |
| Chordata | Elasmobranchii | Dasyatidae | Hypanus americanus | NT |
| Chordata | Elasmobranchii | Dasyatidae | Hypanus rudis | CR |
| Chordata | Mammalia | Phocidae | Mirounga leonina | |
| Chordata | Mammalia | Delphinidae | Tursiops truncatus | |
| Chordata | Mammalia | Phocoenidae | Neophocaena phocaenoides | VU |
| Chordata | Mammalia | Trichechidae | Trichechus manatus | VU |

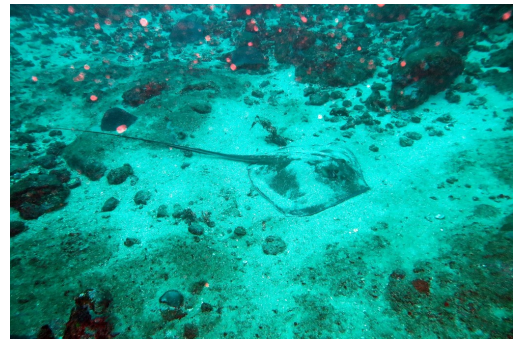
| | | | | |
|----------|-----------|-----------------|---------------------------|----|
| Chordata | Teleostei | Ephippidae | Chaetodipterus faber | |
| Chordata | Teleostei | Albulidae | Albula glossodonta | VU |
| Chordata | Teleostei | Albulidae | Albula vulpes | NT |
| Chordata | Teleostei | Ophichthidae | Myrophis punctatus | |
| Chordata | Teleostei | Ophichthidae | Myrophis vafer | |
| Chordata | Teleostei | Atherinidae | Atherinomorus stipes | |
| Chordata | Teleostei | Batrachoididae | Opsanus beta | |
| Chordata | Teleostei | Batrachoididae | Opsanus tau | |
| Chordata | Teleostei | Belonidae | Strongylura notata | |
| Chordata | Teleostei | Belonidae | Strongylura timucu | |
| Chordata | Teleostei | Belonidae | Tylosurus crocodilus | |
| Chordata | Teleostei | Hemiramphidae | Chriodorus atherinoides | |
| Chordata | Teleostei | Blenniidae | Chasmodes bosquianus | |
| Chordata | Teleostei | Centropomidae | Centropomus undecimalis | |
| Chordata | Teleostei | Sphyraenidae | Sphyraena barracuda | |
| Chordata | Teleostei | Sphyraenidae | Sphyraena jello | |
| Chordata | Teleostei | Carangidae | Caranx crysos | |
| Chordata | Teleostei | Carangidae | Caranx hippos | |
| Chordata | Teleostei | Carangidae | Caranx ignobilis | |
| Chordata | Teleostei | Carangidae | Caranx latus | |
| Chordata | Teleostei | Carangidae | Oligoplites saurus | |
| Chordata | Teleostei | Carangidae | Selene vomer | |
| Chordata | Teleostei | Carangidae | Trachinotus carolinus | |
| Chordata | Teleostei | Echeneidae | Echeneis naucrates | |
| Chordata | Teleostei | Alosidae | Brevoortia tyrannus | |
| Chordata | Teleostei | Dorosomatidae | Harengula humeralis | |
| Chordata | Teleostei | Dorosomatidae | Harengula jaguana | |
| Chordata | Teleostei | Dorosomatidae | Opisthonema oglinum | |
| Chordata | Teleostei | Engraulidae | Anchoa mitchilli | |
| Chordata | Teleostei | Spratelloididae | Jenkinsia lamprotaenia | |
| Chordata | Teleostei | Cyprinidae | Carassius auratus | |
| Chordata | Teleostei | Cyprinodontidae | Cyprinodon variegatus | |
| Chordata | Teleostei | Cyprinodontidae | Floridichthys carpio | |
| Chordata | Teleostei | Fundulidae | Adinia xenica | |
| Chordata | Teleostei | Fundulidae | Fundulus confluentus | |
| Chordata | Teleostei | Fundulidae | Fundulus grandis | |
| Chordata | Teleostei | Fundulidae | Lucania goodei | |
| Chordata | Teleostei | Fundulidae | Lucania parva | |
| Chordata | Teleostei | Poeciliidae | Belonesox belizanus | |
| Chordata | Teleostei | Poeciliidae | Gambusia affinis | |
| Chordata | Teleostei | Poeciliidae | Gambusia holbrooki | |
| Chordata | Teleostei | Poeciliidae | Gambusia rhizophorae | |
| Chordata | Teleostei | Poeciliidae | Poecilia latipinna | |
| Chordata | Teleostei | Poeciliidae | Poecilia sphenops | |
| Chordata | Teleostei | Elopidae | Elops saurus | |
| Chordata | Teleostei | Megalopidae | Megalops atlanticus | VU |
| Chordata | Teleostei | Gerreidae | Diapterus auratus | |
| Chordata | Teleostei | Gerreidae | Eucinostomus argenteus | |
| Chordata | Teleostei | Gerreidae | Eucinostomus gula | |
| Chordata | Teleostei | Gerreidae | Eucinostomus jonesii | |
| Chordata | Teleostei | Gerreidae | Eucinostomus melanopterus | |
| Chordata | Teleostei | Gerreidae | Eugerres plumieri | |
| Chordata | Teleostei | Gerreidae | Gerres cinereus | |

| | | | | |
|---------------|---------------|-----------------|-----------------------------|----|
| Chordata | Teleostei | Gerreidae | Ulaema lefroyi | |
| Chordata | Teleostei | Haemulidae | Haemulon aurolineatum | |
| Chordata | Teleostei | Haemulidae | Haemulon parra | |
| Chordata | Teleostei | Haemulidae | Haemulon plumierii | |
| Chordata | Teleostei | Haemulidae | Haemulon sciurus | |
| Chordata | Teleostei | Lutjanidae | Lutjanus argentimaculatus | |
| Chordata | Teleostei | Lutjanidae | Lutjanus griseus | |
| Chordata | Teleostei | Scaridae | Nicholsina usta | |
| Chordata | Teleostei | Sciaenidae | Cynoscion nebulosus | |
| Chordata | Teleostei | Sciaenidae | Pogonias cromis | |
| Chordata | Teleostei | Sparidae | Archosargus probatocephalus | |
| Chordata | Teleostei | Sparidae | Archosargus rhomboidalis | |
| Chordata | Teleostei | Sparidae | Diplodus kotschyi | |
| Chordata | Teleostei | Sparidae | Lagodon rhomboides | |
| Chordata | Teleostei | Gobiesocidae | Gobiesox strumosus | |
| Chordata | Teleostei | Gobiidae | Gobiosoma bosc | |
| Chordata | Teleostei | Gobiidae | Gobiosoma ginsburgi | |
| Chordata | Teleostei | Gobiidae | Gobiosoma robustum | |
| Chordata | Teleostei | Gobiidae | Lophogobius cyprinoides | |
| Chordata | Teleostei | Gobiidae | Microgobius gulosus | |
| Chordata | Teleostei | Gobiidae | Microgobius microlepis | |
| Chordata | Teleostei | Mugilidae | Mugil cephalus | |
| Chordata | Teleostei | Mugilidae | Mugil curema | |
| Chordata | Teleostei | Mugilidae | Mugil rubrioculus | |
| Chordata | Teleostei | Bythitidae | Ogilbia cayorum | |
| Chordata | Teleostei | Serranidae | Epinephelus itajara | VU |
| Chordata | Teleostei | Serranidae | Epinephelus lanceolatus | |
| Chordata | Teleostei | Achiridae | Trinectes maculatus | |
| Chordata | Teleostei | Ariidae | Ariopsis felis | |
| Chordata | Teleostei | Syngnathidae | Anarchopterus criniger | |
| Chordata | Teleostei | Syngnathidae | Hippocampus zosterae | |
| Chordata | Teleostei | Syngnathidae | Syngnathus floridae | |
| Chordata | Teleostei | Syngnathidae | Syngnathus fuscus | |
| Chordata | Teleostei | Syngnathidae | Syngnathus schlegeli | |
| Chordata | Teleostei | Syngnathidae | Syngnathus scovelli | |
| Chordata | Teleostei | Diodontidae | Chilomycterus schoepfii | |
| Chordata | Teleostei | Monacanthidae | Stephanolepis cirrifer | |
| Chordata | Teleostei | Monacanthidae | Stephanolepis hispidus | |
| Chordata | Teleostei | Tetraodontidae | Sphoeroides maculatus | |
| Chordata | Teleostei | Tetraodontidae | Sphoeroides parvus | |
| Chordata | Teleostei | Tetraodontidae | Sphoeroides spengleri | |
| Chordata | Teleostei | Cheloniidae | Caretta caretta | VU |
| Cnidaria | Anthozoa | Aiptasiidae | Exaiptasia diaphana | |
| Cnidaria | Anthozoa | Boloceroideidae | Boloceroideus mcmurrici | |
| Cnidaria | Anthozoa | Diadumenidae | Diadumene leucolea | |
| Cnidaria | Anthozoa | Edwardsiidae | Edwardsia longicornis | |
| Cnidaria | Anthozoa | Nanozoanthidae | Nanozoanthus harenaceus | |
| Cnidaria | Hydrozoa | Zancleopsidae | Zancleopsis dichotoma | |
| Cnidaria | Hydrozoa | Campanulariidae | Clytia hemisphaerica | |
| Cnidaria | Hydrozoa | Campanulariidae | Obelia bidentata | |
| Ctenophora | Tentaculata | Coeloplanidae | Vallicula multiformis | |
| Echinodermata | Holothuroidea | Synaptidae | Leptosynapta tenuis | |
| Echinodermata | Holothuroidea | Cucumariidae | Thyonella gemmata | |

| | | | |
|-----------------|-----------------|------------------|--------------------------|
| Echinodermata | Holothuroidea | Sclerodactylidae | Sclerodactyla briareus |
| Echinodermata | Ophiuroidea | Amphiuridae | Amphipholis squamata |
| Gnathostomulida | | Gnathostomulidae | Gnathostomula axi |
| Mollusca | Bivalvia | Noetiidae | Arcopsis adamsi |
| Mollusca | Bivalvia | Tellinidae | Ameritella mitchelli |
| Mollusca | Bivalvia | Mytilidae | Brachidontes exustus |
| Mollusca | Bivalvia | Ostreidae | Crassostrea virginica |
| Mollusca | Bivalvia | Veneridae | Anomalocardia auberiana |
| Mollusca | Bivalvia | Veneridae | Chione cancellata |
| Mollusca | Gastropoda | Aglajidae | Philinopsis pusa |
| Mollusca | Gastropoda | Bullidae | Bulla arabica |
| Mollusca | Gastropoda | Tornatinidae | Acteocina canaliculata |
| Mollusca | Gastropoda | Calyptraeidae | Crepidula convexa |
| Mollusca | Gastropoda | Facelinidae | Learchis poica |
| Mollusca | Gastropoda | Myrrhinidae | Nanuca occidentalis |
| Mollusca | Gastropoda | Cerithiidae | Bittium varium |
| Mollusca | Gastropoda | Cerithiidae | Cerithium eburneum |
| Mollusca | Gastropoda | Cerithiidae | Cerithium muscarum |
| Mollusca | Gastropoda | Modulidae | Modulus modulus |
| Mollusca | Gastropoda | Cylindrobullidae | Cylindrobulla beauii |
| Mollusca | Gastropoda | Hermaeidae | Cyerce antillensis |
| Myzozoa | Dinophyceae | Amphidiniaceae | Amphidinium massartii |
| Nemertea | Hoplonemertea | Tetrastemmatidae | Tetrastemma elegans |
| Nemertea | Hoplonemertea | Tetrastemmatidae | Tetrastemma wilsoni |
| Nemertea | Palaeonemertea | Tubulanidae | Tubulanus riceae |
| Phoronida | | Phoronidae | Phoronis psammophila |
| Porifera | Demospongiae | Callyspongiidae | Callyspongia diffusa |
| Porifera | Demospongiae | Callyspongiidae | Callyspongia vaginalis |
| Porifera | Demospongiae | Chalinidae | Cladocroce burapha |
| Porifera | Demospongiae | Chalinidae | Haliclona vansoesti |
| Porifera | Demospongiae | Niphatidae | Gelliodes wilsoni |
| Porifera | Demospongiae | Niphatidae | Pachychalina tenera |
| Porifera | Demospongiae | Mycalidae | Mycale fibrexilis |
| Porifera | Demospongiae | Tedaniidae | Tedania ignis |
| Porifera | Demospongiae | Halichondriidae | Amorphinopsis fenestrata |
| Porifera | Demospongiae | Halichondriidae | Halichondria melanadocia |
| Porifera | Demospongiae | Geodiidae | Geodia neptuni |
| Porifera | Demospongiae | Vulcanellidae | Poecillastra laminaris |
| Rhodophyta | Florideophyceae | Rhodomelaceae | Polysiphonia echinata |



(a) *Sphyrna tiburo*



(b) *Hypanus rudis*



(c) *Epinephelus itajara*

Figure 3: Test