Using Python, eLISA goes through each line of eDNA sample reads in the input file, looking for non-zero values.

If the read value is greater than zero and has full taxonomic data, eLISA extracts the species name and appends it to a list.

12S_seq_number	X12S_first1000reads.LSC.A.1.S19.L001	X12S_first1000reads.LSC.A.2.S20.L001	sum taxonomy
forward_12S_1	1	0	
forward_12S_2	1	0	Eukaryota;Chordata;Actinopteri;Centrarchiformes;Oplegnathidae;Oplegnathus;Oplegnathus woodwardi
forward_12S_3	1	0	Eukaryota;Chordata;Actinopteri;NA;Pomacentridae;Hypsypops;Hypsypops rubicundus
forward_12S_4	1	0	Eukaryota;Chordata;Actinopteri;NA;Pomacentridae;Hypsypops;Hypsypops rubicundus
forward_12S_5	0	1	Eukaryota;Chordata;Actinopteri;Labriformes;Labridae;Oxyjulis;Oxyjulis californica
forward_12S_6	0	1	Eukaryota;Chordata;Actinopteri;Clupeiformes;Engraulidae;Engraulis;Engraulis mordax
forward_12S_7	0	1	Eukaryota;Chordata;Actinopteri;Pleuronectiformes;Paralichthyidae;Citharichthys;Citharichthys stigmaeus
merged_12S_1	435	190	Eukaryota;Chordata;Actinopteri;;;;
merged_12S_2	71	76	
merged_12S_3	18	92	Eukaryota;Chordata;Actinopteri;NA;Sphyraenidae;Sphyraena;Sphyraena helleri
merged_12S_4	104	0	Eukaryota;Chordata;Actinopteri;Labriformes;Labridae;Oxyjulis;Oxyjulis californica
merged_12S_5	0	99	Eukaryota;Chordata;Actinopteri;Labriformes;Labridae;Oxyjulis;Oxyjulis californica
merged_12S_6	31	43	Eukaryota;Chordata;Actinopteri;Clupeiformes;Engraulidae;Engraulis;Engraulis mordax
merged_12S_7	37	26	Eukaryota;Chordata;Actinopteri;Centrarchiformes;Kyphosidae;Girella;Girella simplicidens
merged_12S_8	0	56	
merged_12S_9	0	51	Eukaryota;Chordata;Actinopteri;Pleuronectiformes;Paralichthyidae;Citharichthys;Citharichthys stigmaeus
merged_12S_10	0	44	Eukaryota;Chordata;Actinopteri;Centrarchiformes;Kyphosidae;Medialuna;Medialuna californiensis

```
[0, 'X12S_first1000reads.LSC.A.1.S19.L001;Oplegnathus woodwardi;Hypsypops rubicundus;Hypsypops rubicundus;;Sphyraena
helleri;Oxyjulis californica;Girella simplicidens;Semicossyphus pulcher;Rhacochilus vacca;Cyprinus carpio;Corbicula
fluminea;Nerodia fasciata', 'X12S_first1000reads.LSC.A.2.S20.L001;Oxyjulis californica;Engraulis mordax;Citharichthys
stigmaeus;;Sphyraena helleri;Oxyjulis californica;Girella simplicidens;Citharichthys stigmaeus;Medialuna
californiensis;Semicossyphus pulcher;Chromis punctipinnis;;Cyprinus carpio;Eriocheir sinensis;Nerodia fasciata']
```

finalsamplecolumn1.txt.

```
X12S_first1000reads.LSC.A.1.S19.L001
Oplegnathus woodwardi
Hypsypops rubicundus
Sphyraena helleri
Oxyjulis californica
Girella simplicidens
Semicossyphus pulcher
Rhacochilus vacca
Cyprinus carpio
Corbicula fluminea
Nerodia fasciata
```

It then creates one temporary file per sample, with the sample name on the first line. eLISA removes repeat occurences and empty lines from the files before they are analyzed in R.

finalsamplecolumn2.txt

```
X12S_first1000reads.LSC.A.2.S20.L001
Oxyjulis californica
Engraulis mordax
Citharichthys stigmaeus
Sphyraena helleri
Girella simplicidens
Medialuna californiensis
Semicossyphus pulcher
Chromis punctipinnis
Cyprinus carpio
Eriocheir sinensis
Nerodia fasciata
```

For each species in each temporary file, eLISA searches the **Global Invasive Species Database** (GISD) using *originr* to see if it is invasive in the US.

eLISA keeps a count of everything searched through GISD, and outputs a summary table with the sample name, the total number of species, the number of invasive species, the invasive percentage, and the names of the invasive species.

Sample	Count	Invasive	Percentage	Invasive_species
X12S_first1000reads.LSC.A.1.S19.L001	10	2	20.0000 %	Cyprinus carpio, Corbicula fluminea
X12S_first1000reads.LSC.A.2.S20.L001	11	2	18.1818 %	Cyprinus carpio, Eriocheir sinensis
Total	21	4	19.0476 %	

All temporary files are then deleted, and eLISA saves the summary table in a file called **results.csv**