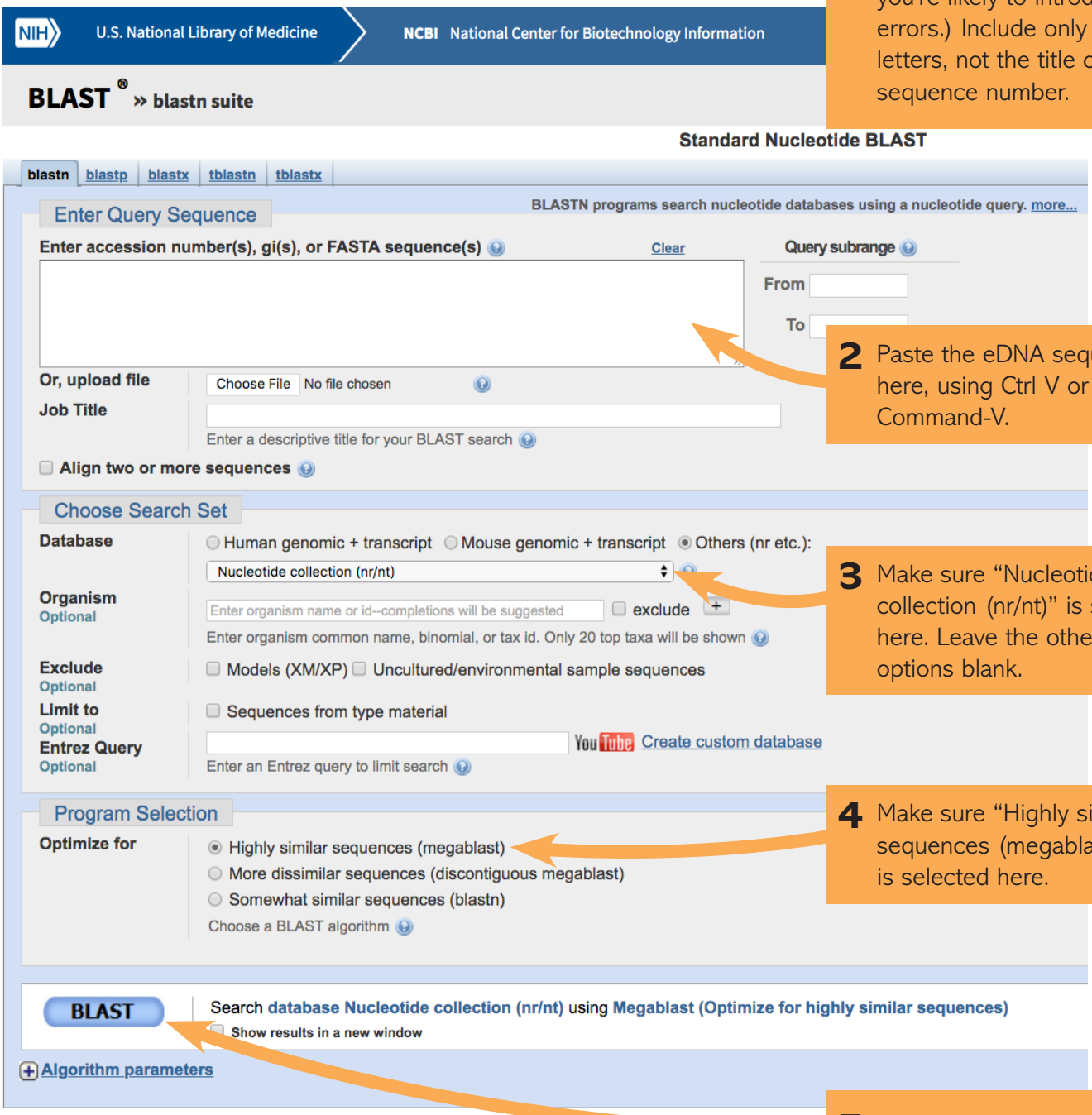
Assessing eDNA sequences

You will use the BLAST database to determine what species are present in Trout Creek. This database includes a library of known eDNA sequences (genes) for many different wildlife species. It is a tool scientists use to determine which wildlife are living in an area.

Link to BLAST database: Open the link to the BLAST database: https://blast.ncbi.nlm.nih.gov/Blast.cgi?PROGRAM=blastn&PAGE_TYPE=BlastSearch&LINK_LOC=blasthome.

To use the BLAST database:

1 Copy one of the eDNA sequences from **page 3**, using Ctrl C or Command-C. (If you try to type it in, you're likely to introduce errors.) Include only the letters, not the title or sequence number.

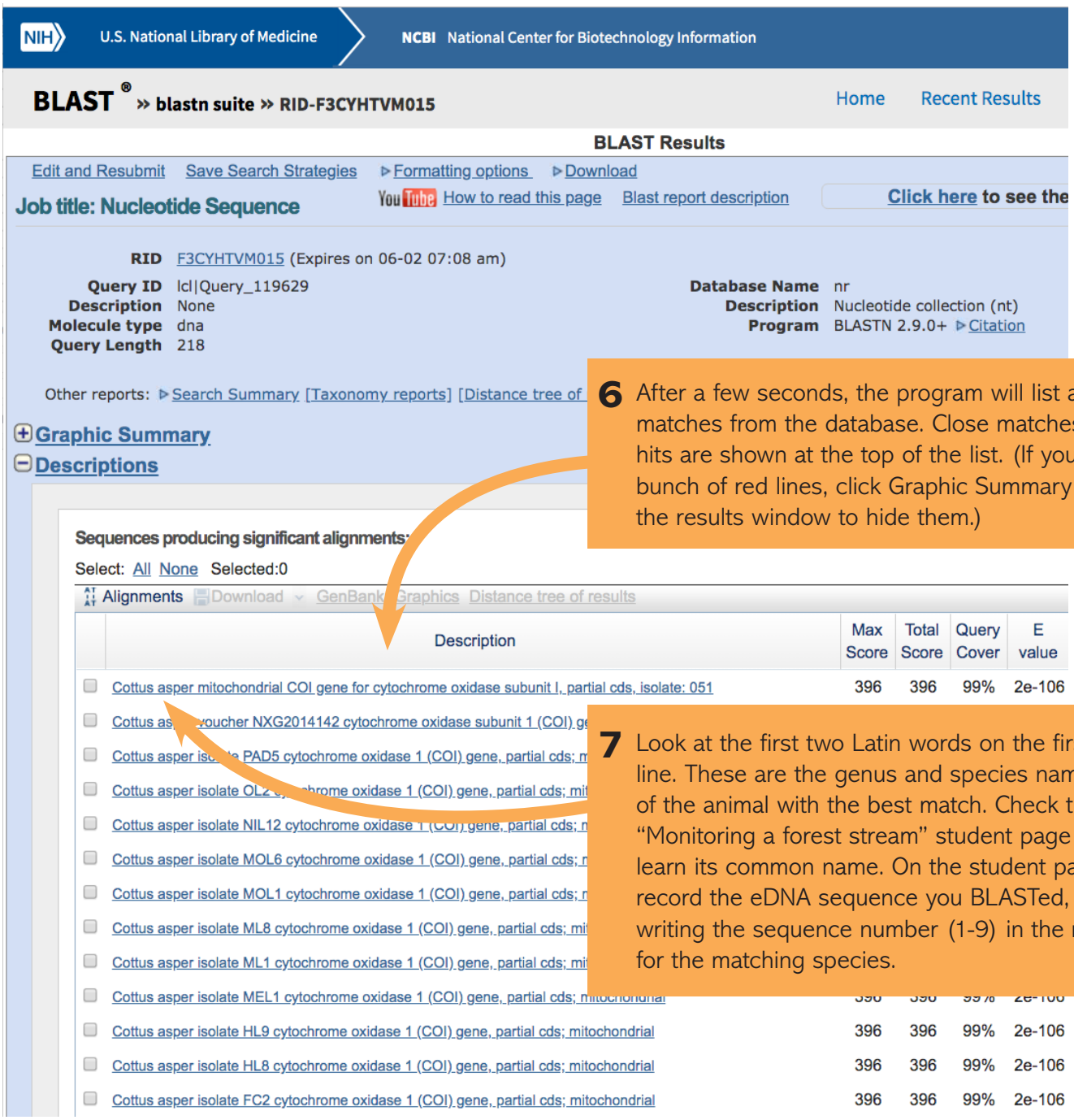


2 Paste the eDNA sequence here, using Ctrl V or Command-V.

3 Make sure "Nucleotide collection (nr/nt)" is selected here. Leave the other search options blank.

4 Make sure "Highly similar sequences (megablast)" is selected here.

5 Push the BLAST button.



6 After a few seconds, the program will list any matches from the database. Close matches or hits are shown at the top of the list. (If you see a bunch of red lines, click Graphic Summary above the results window to hide them.)

7 Look at the first two Latin words on the first line. These are the genus and species name of the animal with the best match. Check the "Monitoring a forest stream" student page to learn its common name. On the student page, record the eDNA sequence you BLASTed, writing the sequence number (1-9) in the row for the matching species.

8 Repeat steps 1-7 for the other sequences.

eDNA sequences from Trout Creek

Deoxyribonucleic acid, or DNA, is the genetic material that carries the instructions for an organism's growth, functioning and reproduction. The information in DNA is stored as a nucleotide sequence made up of four chemical bases: adenine (A), guanine (G), cytosine (C) and thymine (T).

You have isolated the following eDNA sequences from your water sample from Trout Creek. Use the BLAST database to determine what species each is likely from.

eDNA SEQUENCE 1:

CGCAGGAGCCTCTGTTGACCTAACGACCT
TCTCCCTTCACCTAGCAGGTATCTCTTCTAT
TCTTGGAGCAATCAACTTTATCACAACTAT
CATTAATATGAAACCCCCTGCTATTTCTCA
ATACCAGACCCCTCTATTCGTATGGTCTGTT
CTTATTACTGCTGTCCTACTGCTTCTTTCCC
TCCCCGTACTTGCCGCCGGCATCACAATG
CTCCTAA

eDNA SEQUENCE 2:

TTTTGCTAGTACCACCAACGCCTGACTAAT
GGGAGAATGAGAAATTCACCAACTATCACA
CCCCCTAGCAACTACAACAGTAATATTAGC
CCTCGCTCTCAAGCTTGGACTAGCACCCGT
TCACTTCTGACTCCCAGAAGTTCTTCAAGG
ACTTGAACTCACCACAGGATTAATCCTCTC
AACCTAACAAAAACTCGCACCCTTCGCAC
TTATGATTCAAGTAGCCCCAACCATCAACT
CTTCCCTACTTGTCGCAATTGGCCTTCTATC
GACACTTGTGGGAGGTTGAGGT

eDNA SEQUENCE 3:

TGTCCCACCCACCAACTATTATTCGAAAAA
CTCACCCCCTTCTATCACTAGGTAATAGCAT
GCTAGTTGACATTCCTTCTCCTGCTAAGATC
TCCGCCTGATGATGTTTTGGCTCACTTTTG
AACCGATGTCGTATCTTACCAATTATTACAG
GATTAATTCTTTCGATACATGCCTCCTATAA
CACTGAACTAGCCTTTTCG

eDNA SEQUENCE 4:

TTTTGCTAGCACCACCAACGCCTGACTTGT
AGGAGAGTGAGAAATTCACCAGCCAACAC
ACCCCTTAGCAACTACAACAGCAATATTGG
CCCTTGCCCTCAAACTTGGACTAGCCCCCG
TTCACTTTTGACTACCAGAAGTTCTTCAAG
GACTTGAACTCACAACAGGACTAATCCTGT
CAACCTGACAAAAACTAGCACCTTTTGCA
CTTATAATTCAAGTAGCCCCAACCATTAACT
CTTCTCTACTCATTGCAATTGGCCTTCTATC
AACACTTGTCGGAGGCTGAGGG

eDNA SEQUENCE 5:

AAGTCTGGTGCCAGCAGCCGCGGTAATTC
CAGCTCCAATAGCGTATACTACAGTTGTTG
CAGTTAAAAAGCTCGTAGTTGGATTTGTGG
CTGGTCACAGTGGCGTGCCCTATTGGGTTC
CGCTGTTTGTGTCTGCCATCTTTGGGTGGA
ATCTAGGTGGCATTAGGTTGTCGCCTGGGG
GATGCCCATCGTTTACTGTGAAAAAATTAG
AGTGTTCAAAGCAGGCTTATGCCGTTGAAT
ATGTTAGCATGGAATAATGATATAGGACCTT
GGTACTATTTTGTTGGTTTGCGCACTGAGG
TAATGATTAATA

eDNA SEQUENCE 6:

TTTTGCAAAAAAAAATGTATTCGGTTATTT
AGGAATGGTTTATGCAATGTTATCTATAGGT
TTATTAGGTTGTATTGTATGGGCACATCATAT
GTTTACTGTAGGTTTAGATGTAGATGCTAGA
GCTTATTTTTCAGCAGCTACTATGATTATTG
CGGTACCTACGGGTATTAAAATCTTTAGTTG
GTTAGCAACTTTAT

eDNA SEQUENCE 7:

TGTGATGAAATTTTGGCTCACTCCTGGGCC
TCTGCCTTATCACACAAATCCTAACAGGAT
TATTTCTTGCAATACACTACACAGCTGACAT
TTCAACAGCCTTCTCCTCTGTCGCCCACAT
CTGCCGAGATGTGAACTACGGATGACTAAT
TCGAAACATTCATGCAAACGGGGCCTCTT
TCTTCTTCAT

eDNA SEQUENCE 8:

TCTTAAATTAAAATATTGAATTTAACTTTTA
AGTGAAAAGGCTTAAATTATCTAGAGTGAC
GATAAGACCCTATAAAACTTTATATTTTAAA
ATAATAGTTAGTTTTATTTAAGAGTTTTATTT
TGAAATATTTTATTGGGGTGATAAAGATATA
AATTAAAATAACTGTCTTTTTTTTTTACAAT
AATATTTGAATTAATGATCCTAAGAAAGGA
GTAAAAGATCAAGTTACTTTA

eDNA SEQUENCE 9:

AAAATACACCATCCTCGAGCAACAGAAGC
AGCAACTAAATATTTTTTAATCCAAGCGTC
TGCCTCAGCTTTAATCTTATTTTCAATAACA
TTAAATTCTTGATTAACAGGACATTGAATAA
TTACAAATATAATTCACCATTTTCCCTCTATA
GTTTTAACAATTGCACTTACTATAAAACTAG
GTGTCGCACCATTTCATATATGACTG