

Nā Wai 'Ekolu: Distance learning and virtual stream biodiversity lessons (Grade 9-12)

'Iolani School and University of Hawai'i at Mānoa

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The COVID-19 pandemic continues to affect our lives in enumerate ways, especially to the education of our keiki. Social distancing guidelines and safety of our loved ones has made conventional classroom learning almost impossible, and we hope your institutions have heard your voices to what is best for you and your students. Nā Wai 'Ekolu would also like to respect your decisions and conform to whatever form of learning you and your administration feel benefits our community the best. Although we do not anticipate having any physical contact with any of you this fall, we've been busy developing a suite of resources for educators / students. Both pre-recorded and live virtual in-class stream biodiversity lessons / field trips are available, until we are able to safely interact with you all in person at nawaiekolu.org/stream-biodiversity.

Lesson 1: Introduction to stream animals and how they are indicators of stream health.



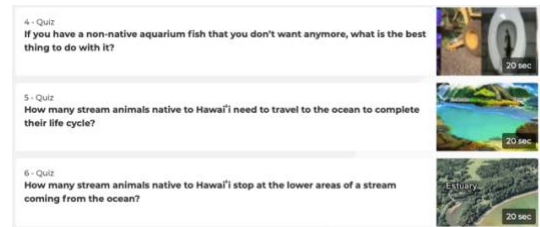
Participants are able to view videos and photos of native / non-native animals from Hawaiian streams, as well as engage in interactive activities. The entire lesson is intended to be 50 minutes, but is flexible to your schedule and student sharing.

Option A: Live via Zoom, Webex, Google Meet, etc.
Option B: A pre-recorded video of Option A, either online or downloadable in Google Drive.
Option C: Story Map where students can read / view info, photos, and videos at their own pace.

Lesson 2: Interactive activities for the classroom or for review at home

Since we are not doing any student field trips this fall, we will not be conducting Lesson 2 as we have in the past, where we rehearse field methods, safety protocols, and ethics. However, online materials are available for lecture review, animal identification, and counting of both native and invasive species. Many of these are also applicable for use in Lesson 4 (See Page 2).

- Thinglink collage: [Is this native or invasive?](#)
- Static collage: How many of each do you see? ([Easy](#))([Medium](#))([Hard](#))
- Kahoot!: [Lecture Quiz](#)
What is this animal? ([Native](#))([Invasive](#))
Name that species! ([Native](#))([Invasive](#))
- [Species Checklist](#)



Lesson 3: Virtual field trips

Physical student field trips are not available at this time, but live field trips via videoconference will still be scheduled upon request. We have had success at several study sites with online classes this past spring / summer, running a 1st-person POV while catching, identifying and counting stream animals. We have yet to test the cellular reception at all of our sites and may take some testing with your videoconferencing platform. Live virtual field trips can take anywhere between 20 to 45 minutes, and is flexible with your class time. If either time, video-conferencing technology, and cellular reception is limiting, recorded virtual field trips are available at 8 different stream sites:

Option A: Live Field Trip with Uncle Cory via video-conferencing platform (E.g. Zoom, Webex, etc.)

Option B: Recorded field trip via Youtube video at one of the following study sites:

[Kaimukī High School site](#), Mānoa-Pālolo Stream
[Kānewai Lo'i site](#), Mānoa Stream
[Mānoa Park site](#), Mānoa Stream
 Lyon Arboretum, 'Aihualama (Mānoa) Stream

[Saint Louis School site](#), Pālolo Stream
[Anuenue School site](#), Pālolo Stream
[Hālaw Kū Māna study site](#), Makiki Stream
 Washington Middle School, Makiki Stream



Recorded Hālaw Kū Māna virtual field trip, April 2020.

Option C: Field trip video files are available upon request to share with students as appropriate.

During live field trips, students/teachers will be responsible for keeping track of native / invasive species identifications by Uncle Cory, as well as the counts for each species. The teacher must host the videoconference, and also be responsible for student behavior online. By default, we ask students remain muted while Uncle Cory is in the stream, and questions only be asked via chat and relayed to him by the teacher. He will not be able to view the chat dialogue or phone screen. Recorded field trips can be used to supplement live field trip. All field activities will conclude with a summary about what animals were found and what they tell us about the health of the stream. Data collected from the field trip(s) can be used for Lesson 4.

Lesson 4: Place-based science curricula designed to fit the next generation science standards.

Lesson plans, tutorial videos, and assignments are available for the following:

[Grade 9-12: Calculating a Biodiversity Index to Assess Stream Health.](#)

Using data collected by the students on their stream field trip and by other schools collected previously, students will be able to calculate the Hawai'i Stream Index of Biological Integrity (HS-IBI) and understand how it can be used to assess stream health.

[Lesson Plan](#), Tutorial Video [\(Pt 1\)](#) [\(Pt 2\)](#)

Three related scientific journal articles are also available:

[Impacts of Human Disturbance on Biotic Communities in Hawaiian Streams](#)

[Climate change and conservation of endemic amphidromous fishes in Hawaiian streams](#)

[A native species-based index of biological integrity for Hawaiian stream environment](#)

Supplemental stream data exploration maps and database to help create your own curriculum:

[Mapped biodiversity data summary](#) (interactive data summary table/graph for each site)

[Mapped biodiversity database](#) (raw species / metadata for each site)

[Mapped biodiversity graphs](#) (large interactive graph for each study site)

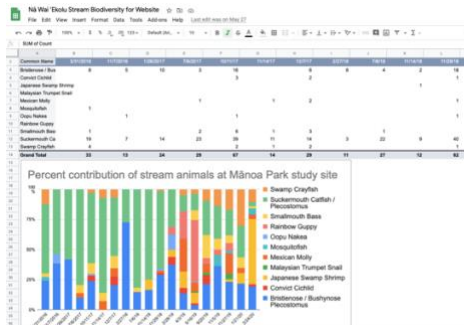
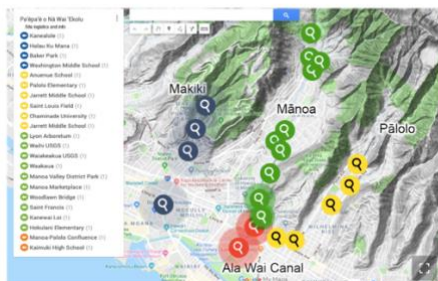
[What species are found in my stream?](#) (Interactive species graph/list for Makiki, Mānoa, Pālolo)

[What species are found at my site?](#) (Interactive graph displaying species diversity at each site)

[What site has the most invasive / native species?](#) (Interactive site graph showing origin of animals)

[What stream has the most invasive / native species?](#) (Interactive stream graph of animal origins)

[Biodiversity Summary][Database][Graphs]



Average number of non-native species captured per survey at each site

