**Section 4c: Background and Past Findings**

Outside of zoonotic disease inferencing, mosquitos can spread diseases of public health risk such as malaria, population surveillance of this taxa may be an overlooked tool to monitor ecological change. There are few prior studies utilizing mosquitos as sentinels for human change. However, within this small subset, previous research has shown that mosquito population fluctuations resulted from faunal ecosystem changes. Removing the mammalian host (*Rattus rattus*) on the Palmyra Atoll in the Pacific Ocean totally eradicated the Atoll population of *Aedes aegypti* (Lafferty et al. 2018). In reverse to this, the loss of several predatory amphibian species of mosquitos in Costa Rica and Ecuador likely created an increase in host-seeking mosquitos that led to an incidence increase of malaria (Springborn et al. 2022). A substantial portion of the prior research is solely computational and predictive based. This creates a lack of empirically based studies and studies incorporating a more accurate and complete analysis of human change to ecosystems. Human change (e.g., climate change, pollution, deforestation, over-use) does not occur in isolation, multiple forms of disturbance may interact simultaneously.

I intend to test the reliability of mosquito populations as sentinels for human change to ecosystems at alpine lake systems in Inyo National Forest and Yosemite National Park. The lakes sampled are located along a human-use gradient, with some close to an established campground and trailhead (high human use), whereas others will be several miles away from the trailhead and not directly accessible from the trail (low human use). In addition, half of the lakes will contain non-native salmonid species, and the other half will not. Thousands of lakes in the Eastern Sierras were artificially stocked with fish, causing a cascade of changes to these lake systems, many of which have already been documented (Knapp et al., 2001; Epanchin et al., 2010). This provides an ideal natural experiment to see if mosquitos can, in fact, be used as a surveillance tool for an important disturbance type (introduced, non-native species). Captured differences in mosquitos’ abundance and density between lakes could indicate the terrestrial community changes.