

Rou Dalagurr Food Sovereignty Lab and Traditional Ecological Knowledges Institute

Site Testing History Fall 2022

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Introduction:

The Rou Dalagurr Food Sovereignty Lab and Traditional Ecological Knowledges Institute's (FSL) allocated exterior space, Wiyot Plaza, located within the Cal Poly Humboldt University campus currently includes the Native Plant Landscape and Indigenous Garden. We also have access to space within the Experimental Greenhouse. The exterior space and site of the experimental greenhouse were subject to initial soil and plant material testing in order to deem the spaces viable for the Food Sovereignty Lab's goals of transforming the spaces into healthy native, medicinal, and edible plant landscapes, and propagation sites for community and Indigenous cultural uses.

Throughout Fall of 2022, site testing was the primary objective for the exterior spaces listed. In [Table 1](#), indicates organizations and individuals contacted and correspond with by FSL staff in pursuing site testing pathways. [Table 2](#) highlights the Exterior Space Proposed Testing which is subject to change throughout the testing period. [Table 3](#) illustrates the data that has been collected by testing that has been completed.

Table 1: Site Testing Outreach

Contact	Was Testing Accomplished?	Prices & Testing Information
Humboldt Cooperative Extension	Completed	Free Testing *See Table 3 for Completed Testing Info.
California Department of Forestry and Fire Protection (Cal Fire)	No	None
Cal Poly Humboldt	No	None
Cal Poly Humboldt	No	None
Cal Poly Humboldt	No	None
Cal Poly Humboldt	No	None
Cooperation Humboldt	No	None
Cal Poly Humboldt-CORE Facility	Directed to External Resources	None
Pacific Watershed Associates	Proposed	*See Table 2 for Proposed Testing Info.
UC Davis Intertribal Agriculture Council	No	None
Humboldt Initiative for Interdisciplinary Marijuana Research (HiiMR) Archival History		
Columbia Food Laboratories	Proposed	*See Table 2 for Proposed Testing Info.
Midwest Laboratories	Proposed	*See Table 2 for Proposed Testing

		Info.
LACO Associates	Pending Consultation	

Table 1: This index was created to keep track of correspondence between the FSL and organizations/persons who were recommended, discovered, and researched by FSL staff and the FSL Steering Committee. Correspondence mainly occurred between FSL Research Associate and FSL Intern.

Proposed Site Testing

As apparent by the information found in [Table 1](#), site testing and contact with available laboratories and facilities has been difficult. We have either received no correspondence or have been told that certain testing and resources are unavailable. In [Table 2](#), the testing that has been proposed is presented along with data that has been received so far. Information will be added when made available.

Table 2: Exterior Space Proposed Testing

Testing Facility	Proposed Tests	Unit	Per Unit Cost	Details
Midwest Laboratories	Priority Pollutant (PP) Metals	100g/soil 500 ml water	\$220.00 \$200.00	Includes Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Zinc (includes sample preparation)
	Soil Volatile Organic Compounds (EPA 8260)	8 oz jar	\$125.00	
	Petroleum			Includes gasoline,

	Contamination - 'surface spills' (OA2)	8 oz jar	\$85.00	diesel, Kerosene, Mineral spirits, waste oil
Columbia Food Laboratories	P2220 - Multiresidue Pesticide Screen		\$300.00	P2220 LOQ Sheet Pesticide & Residue Testing Methods and Pricing
	P2750 - Herbicides Screen			
	P5000 Sulfonylurea Herbicide Profile			
	Polar Pesticide			Includes Glyphosate and Glufosinate
Pacific Watershed Associates (includes comprehensive testing package)	Water Testing		~\$10,800.00	Hydrology, surface water testing, initial site history. Outline of problems and possible remediation pathways. Includes Lab tests of soil and water.
	Soil Testing			

	Bioassay for Plants			Phase 2 of the environmental site assessment: Includes history of the site and records research around petroleum contamination, pollutants, metals, parcel and adjacent parcel development history.
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Table 2: This index was created to organize exterior site testing from proposed to completed testing that has occurred. This index will continue to be augmented. The importance of this table is to show what testing and pricing is proposed so far into exterior site testing. Proposals usually go through virtual meetings and Site visits before testing can occur (Does not apply to out of state companies).

Exterior Site Sample Collection Data

Current completed site sampling with the UC Cooperative Extension consisted of both soil and vegetation sampling. Vegetation sampling included sterile collection techniques of species known to host *Phytophthora ramorum* and which showed possible signs of infection, consistent with species-specific infection indicators as found in the literature. The samples were placed in sterile plastic and refrigerated before being sent to the testing facility. The soil samples were collected with similar sterile techniques in the top horizon of soils near species known to host *Phytophthora ramorum*. Samples were then placed in sterile plastic and sent to the testing facility.

Completed Site Testing

So far we have only completed one round of site testing. We were very fortunate to have the local UC Cooperative Extension perform plant testing and soil baiting. In [Table 3](#), you will find the testing information that was finalized.

Table 3: Completed Exterior Site Testing

Testing Facility	Test	Unit	Details
UC Cooperative Extension (UCANR)	Plant Foliage - <i>Phytophthora ramorum</i>	Grid 1: Huckleberry Grid 3: Huckleberry Grid 4: Huckleberry Grid 5: Indigenous Garden - Huckleberry Grid 6: Salmon Cooking Pit - Rhododendron Grid 7: Behind BSS - Rhododendron Grid 8: Greenhouse - Rhododendron Grid 9: Greenhouse Downhill - Huckleberry	All plants tested NEGATIVE for <i>P. ramorum</i>
	Soil Baiting	Grid 1	No <i>P. ramorum</i> detected.
		Grid 3	No <i>P. ramorum</i> detected.
		Grid 5	<i>Phytophthora pseudosyringae</i> *Sent to CDEA for genetic confirmation
		Grid 8	No <i>P. ramorum</i> detected.
		Grid 9	<i>Phytophthora pseudosyringae</i> *Sent to CDEA for genetic confirmation

	Soil Baiting - Where the upper horizons of soil is cultured onto rhododendron leaf substrate, testing for the presence of <i>P. ramorum</i> .		<i>*P. pseudosyringae:</i> Although it is thought to be an introduced pathogen (possibly originally from Europe), it was assumed to be native for several years due to the low mortality observed in its host trees on the north coast (tanoaks, true oaks, bays, probably others). Fairly common in the region, not primary cause of death in native trees.
	Soil Baiting	Greenhouse 1 (Uphill)	<i>Pythium anandrum</i> is likely present. Only affects young seedlings. Propagations are likely unaffected.
		Grid 3 (Lower Park)	Hyphae is likely present along with <i>Pythium</i> . Species are known to be benign.
California Department of Food and Agriculture (CDEA) * Sent by UCANR	Soil Baiting	Grid 5	CDEA concluded that it is likely <i>Pythium anandrum</i> that is present in the sample. Not <i>P.pseudosyringae</i>
		Grid 1 (Upper Park)	Detected <i>Pythium macrosporum</i> . A pathogenic species that can lead to damping off among some soy species and Douglas Firs. Odds of it killing species in a greenhouse setting are low.

		Greenhouse 2 (Downhill)	CDFA believes <i>Pythium intermedium</i> is present. A weak root pathogen that can affect food crops and conifers.
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Table 3: This index was created to keep track of completed exterior site testing. As you can see, no *Phytophthora ramorum* was found in the plant and soil samples collected by the FSL and tested by the UC Cooperative Extension or the CDFA. However, UUCAR believes another species of *Phytophthora* was present in the soil baiting samples. This species (*Phytophthora pseudosyringae*) is fairly common and not known to be the primary cause of death in native species. The sample was sent to the CDFA for genetic confirmation. Once received that information will be applied to this index.

- *Pythium* species were detected by the CDFA and confirmation was sent February 10, 2023. It is likely that the *P. pseudosyringae* detected by the UC Cooperative Extension is likely *P. anandrum*, *P. intermedium*, and/or *P. macrosporum*. *Pythium* is a species of parasitic oomycetes which have a reproductive structure known as oogonia. This spiky oogonia has been known to parasitize *Phytophthoras*, it can also contribute to damping off among plants. Because of this it is recommended to not propagate seedlings where *Pythium* is present.

Report Conclusion

This report consists of outreach, proposed, and completed exterior site testing for the Rou Dalagurr Food Sovereignty Lab and Traditional Ecological Knowledges Institute for Fall 2022. Site testing is key to informing on necessary pathways for healing the landscape. After completion of the testing done by the UC Cooperative Extension and the California Department of Food and Agriculture, we at the Food Sovereignty Lab are now able to start propagations in the Greenhouse spaces and building of raised planter beds in the Indigenous Garden. With the completion of the proposed testing, we will be able to know what is in the soil, plants, and water; by knowing this information, we are better equipped to create a safer and more just relationship with our relatives.

Research Associate Comments:

The space allocation of Wiyot Plaza to the Rou Dalaurr Food Sovereignty Lab is consistent with the initial feedback during community listening sessions regarding the vision for the FSL, and how the institute can serve community. The FSL has been envisioned to include an exterior space- a living laboratory that can serve community in the resurgence of traditional foods and cultural practices. As we build our relationship with the landscapes of Wiyot Plaza, we first held a reconnection ceremony, inviting Wiyot and regional Indigenous community back to the landscape from which they have been disenfranchised to begin the reciprocal process of healing the land and the community. The next step in this journey is restoration of Wiyot Plaza. The legacy of

colonial landscape management is apparent, but there is also a conspicuous lack of site management history. Though it is known that regular campus groundskeeping practices include the use of chemical pesticides, fungicides, and herbicides, as well as the application of synthetic fertilizers, no known records exist regarding the history of their application in the landscape. Furthermore, the history and impacts of construction and infrastructure upon the landscape is unknown. This history of chemical applications in this space is of concern, particularly regarding the presence of accumulated toxins in the landscape. Our proposed future testing aims to understand the concentration and composition of any pollutants, pathogens, and toxins, and their gradation and patterns in the landscape, as well as a comprehensive site history; this will enable planning for strategic mitigation and landscape restoration. The expertise of Indigenous scientists and Traditional Ecological Knowledge practitioners will guide this remediation.

The initial results and planned environmental site assessment hold implications for the Spring Semester (2023) in our greenhouse and Indigenous Garden programs. In the greenhouse, we will move ahead with the development of the native plant propagation program, developing a handbook detailing species-specific practices of native plant propagation. This program will also provide native plant propagules of plants of cultural significance to the Indigenous Garden and Native Plant Landscape, as well as to our regional tribal community. This semester will also see the development of nursery best management practices, specifically aiming to reduce risk of pathogen persistence and transmission within the greenhouse. This may include training for our staff; options include the CDFA Best Management Practices Program¹ or the Accreditation to Improve Restoration Program (AIR). Further testing recommended for the greenhouse would be the lead concentration in the water, in consideration of the age of the fixtures and fittings, and that lead has been found to be in concentration greater than 15 (ppb), the EPA threshold, in a number of Cal Poly Humboldt water sources within the past five years². To prevent potential heavy metals from the untested water sources from accumulating in our propagules, we aim to install a high quality in-line water filtration system, which will fill our reservoir, and feed the overhead irrigation system.

The Indigenous Garden will host a Spring 2023 growing season. In consideration of the forthcoming environmental site assessment, and the unknown pollutants, toxins, and pathogens that may be present on the landscape, we will be constructing raised beds elevated above the soil surface from reclaimed redwood. Though this will not address all possible vectors of cross-contamination. Harvest from the Spring planting is recommended to undergo a broad panel of tests for pollutants and chemicals that may be found in the initial environmental site assessment, to ensure it is safe for community consumption.

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Feedback and Oversight: FSL Lab Coordinator, FSL Co-Directors, FSL Steering Committee

¹ <https://www.cdfa.ca.gov/plant/pe/nsc/nursery/bmp.html>

² Hackett, W. 2018. 'Something's In the Water'.

<https://thelumberjack.org/2018/10/23/three-drinking-water-fixtures-with-high-lead-levels-removed-from-campus/>