

Are We Ready for Reintroduction of the Karner Blue Butterfly (*Lycaeides melissa samuelis*) in Ontario?



Pak Kin Chan
York University

Why study Karner Blue?

- It is an **ENDANGERED** species in the **ENDANGERED** oak savannah habitat
- Population ↓ by >99% in past century
- It is both an **INDICATOR** & **UMBRELLA** species

Taxonomy

- Karner Blue = 1 of 6 subspecies
- Proposed to be classified as separate species
- Distinct consistent MORPHOLOGY (male genitalia)
- NO interbreeding with *L. m. melissa*
- Also **ECOLOGICALLY DISTINCT**

Ecology

- Habitat = oak/pine savannah in N. Am.
- **TWO** discrete generations per year
- Larvae feed **ONLY** on **WILD LUPINE** (*Lupinus perennis*)
- Adults feed on nectar of **MANY** flowers
- Larvae **TENDED BY ANTS**
- \uparrow ants = \downarrow predators = \uparrow survivorship

Wild lupine (*Lupinus perennis*)



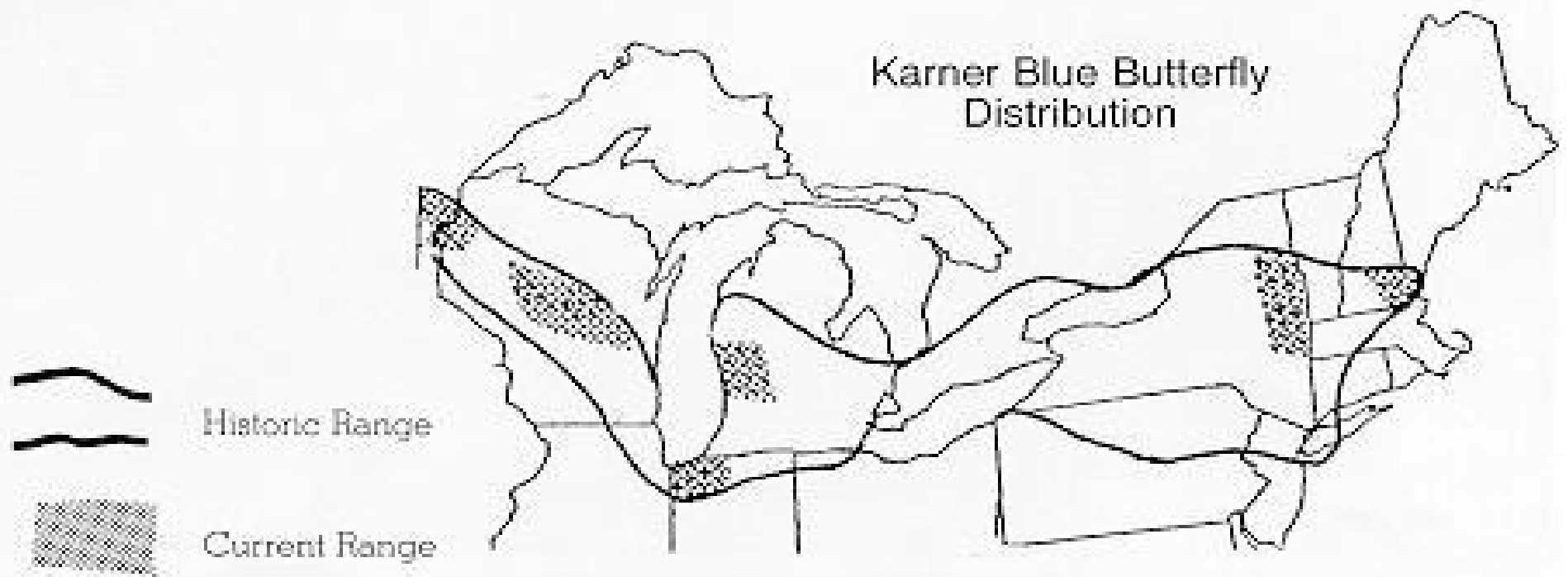
A Karner Blue larva, tended by Ants



Range and Abundance

- Historic range = b/w 41° & 45°N latitudes from Minnesota to Maine
- Current range much **smaller** and **fragmented**
- Listed as federally **endangered** rangewide by USFWS in 1992

Historic and Current Ranges of the Karner Blue Butterfly



From the website of New York State Department of Environmental Conservation

Causes of Decline

- Conversion of savannah habitat into agricultural land by humans
- Result = habitat **destruction** and **fragmentation**
- Suppression of **FIRE** which keeps the early successional status
- Result = habitat **degradation**

Current Status in the USA

- **Extirpated** in **6** states: Pennsylvania, Illinois, Iowa, New Jersey, Maine & Massachusetts
- **Extant** in **6** states: New Hampshire, Indiana, New York, Minnesota, Wisconsin & Michigan
- **Extirpated** in 1988 but **reintroduced** in 1998 in Ohio (so far successful)

Current Status in Canada

- Historically found in Ontario **ONLY**
- **Extirpated** in Canada in 1991
- **Recovery Team** established in 1991
- Metro Toronto Zoo involved in a captive rearing program
- Several oak savannah sites being restored and managed

Current unknowns

- Restored Ontario oak savannah sites in Ontario **READY** for reintroduction or **NOT**?
- **WHERE** should butterflies be taken in the USA for reintroduction in Ontario?

Objectives of my project

- Determine if restored savannah sites in Ontario are **READY** for reintroduction
- Recommend **WHERE** in the USA to take butterflies for reintroduction
- Recommend on **FUTURE MANAGEMENT** strategies

How to meet my Objectives

- **VEGETATION** community survey
- **MICROHABITAT** survey (humidity, temperature & light intensity)
- **ANT** sampling
- Study of **MANAGEMENT HISTORY** (e.g. recent prescribed burn, mowing etc.)

Methods: Vegetation & Ants

- Plant community surveys were done by the traditional **transect-quadrat** method
- Tree density was measured using the **nearest neighbour** method
- Ant specimens were collected and preserved in 70% ethanol

Methods: Microhabitat

- Temperature, relative humidity and light intensity were be measured using **data-loggers** continuously for 3-days during site visit.
- Integrated light intensity was measured using **petri dish lightmeters**

Methods: Management History

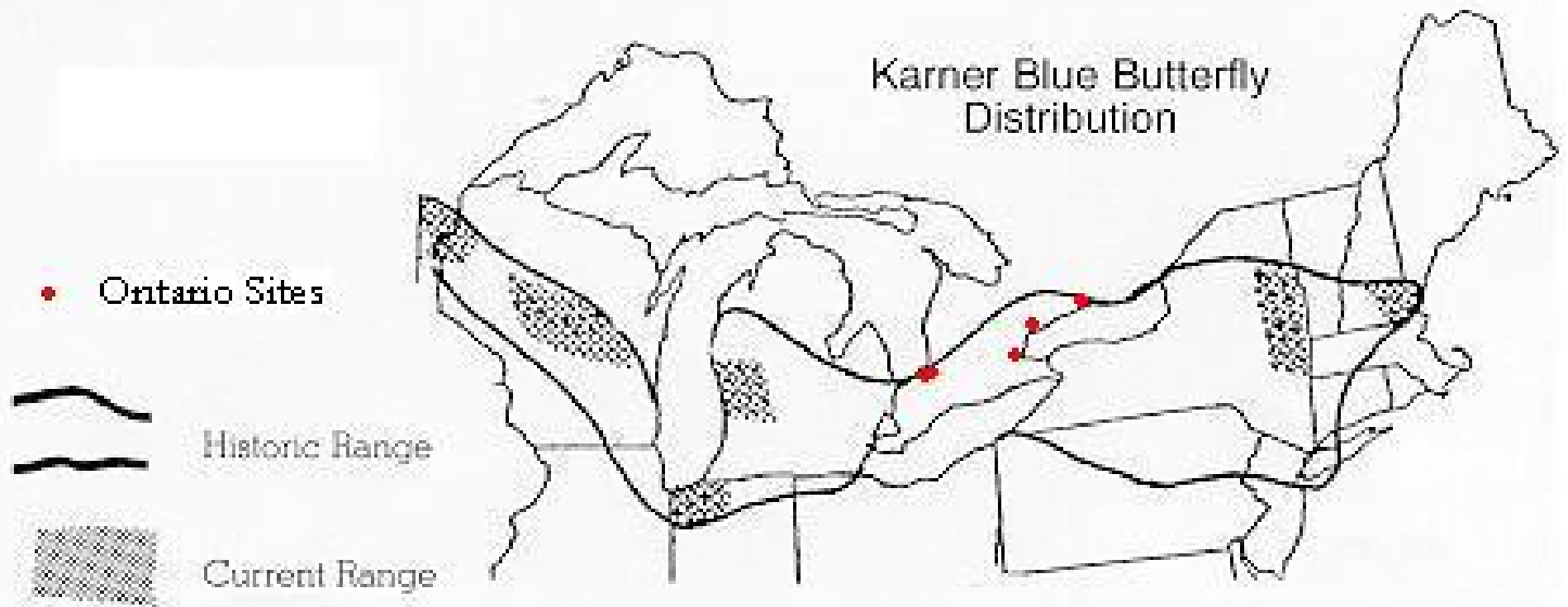
- Information about the management history of the study sites were gathered from their management units
- Special attention was paid to previous **PRESCRIBED BURNS** at the study sites

List of selected sites in Ontario

- i. High **P**ark (**HP**)
- ii. Alderville **F**irst **N**ation (**AFN**)
- iii. The **M**anestar **T**ract (**MT**)
- iv. The **P**inery **P**rovincial **P**ark (**PPP**)
- v. The **K**arner **B**lue **S**anctuary (**KBS**)

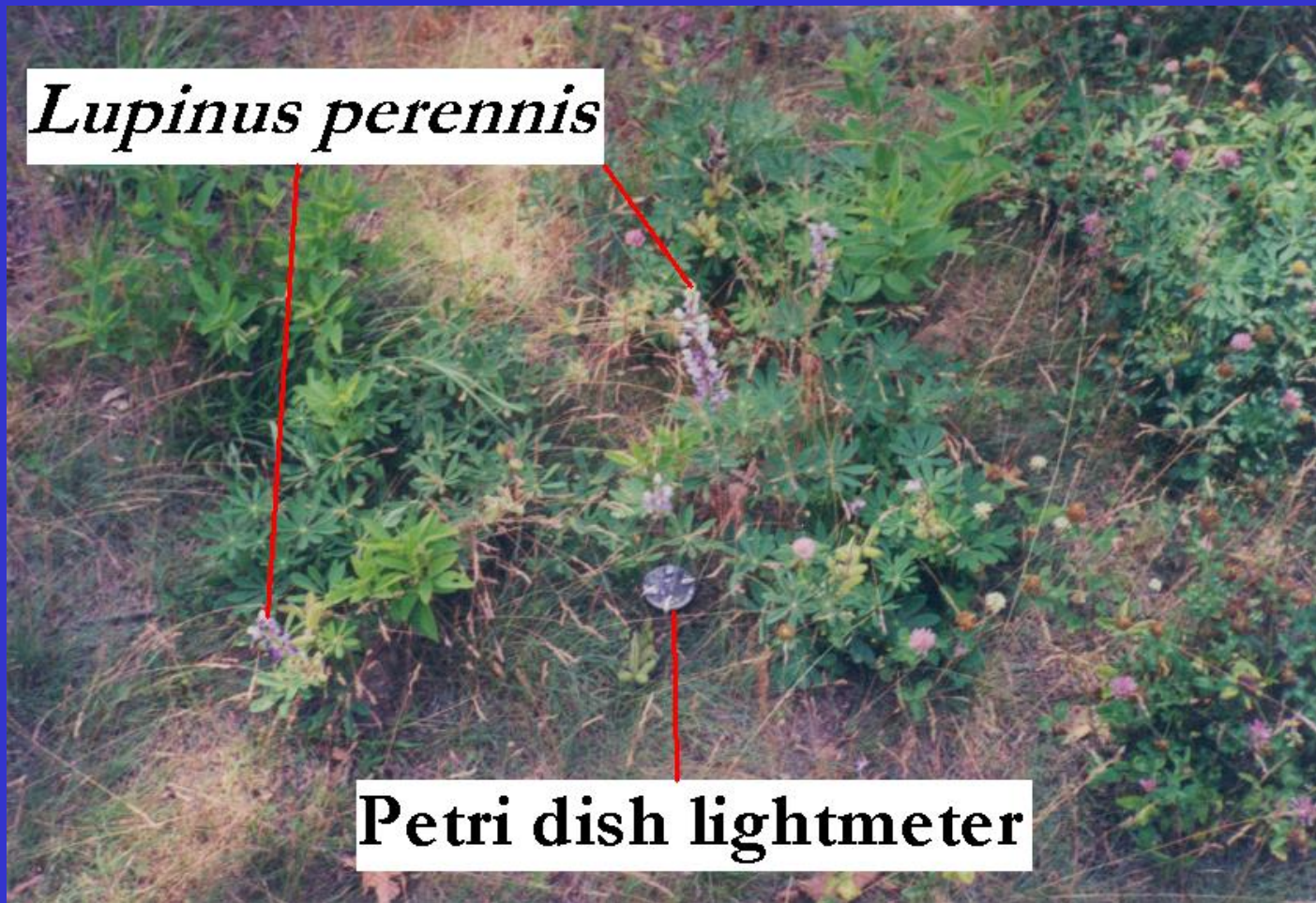
3 to 4 areas in each of these sites were
selected for detailed study

Selected sites in Ontario



From the website of New York State Department of Environmental Conservation

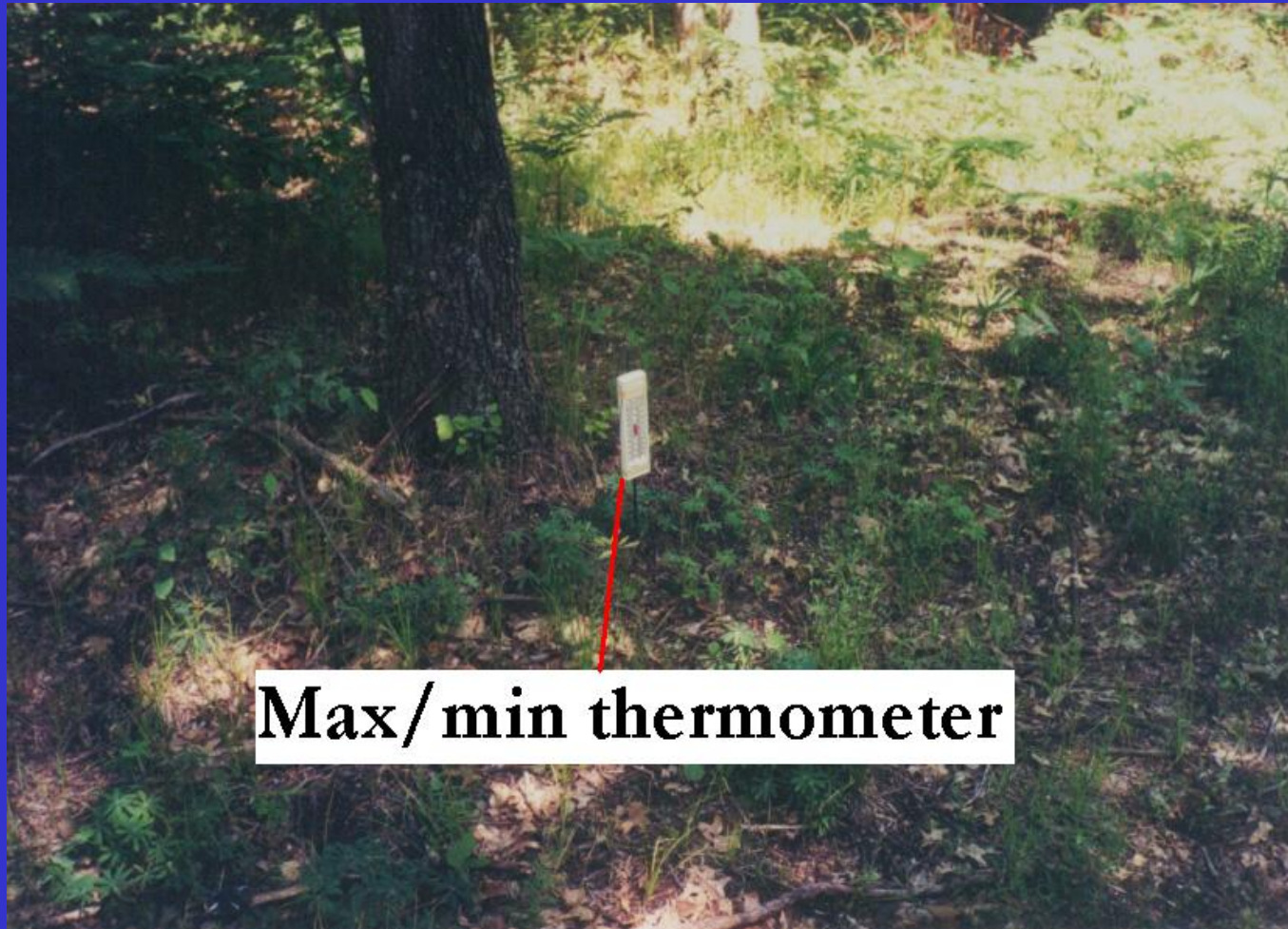
High Park (HP)



Alderville First Nation (AFN)



The Manestar Tract (MT)

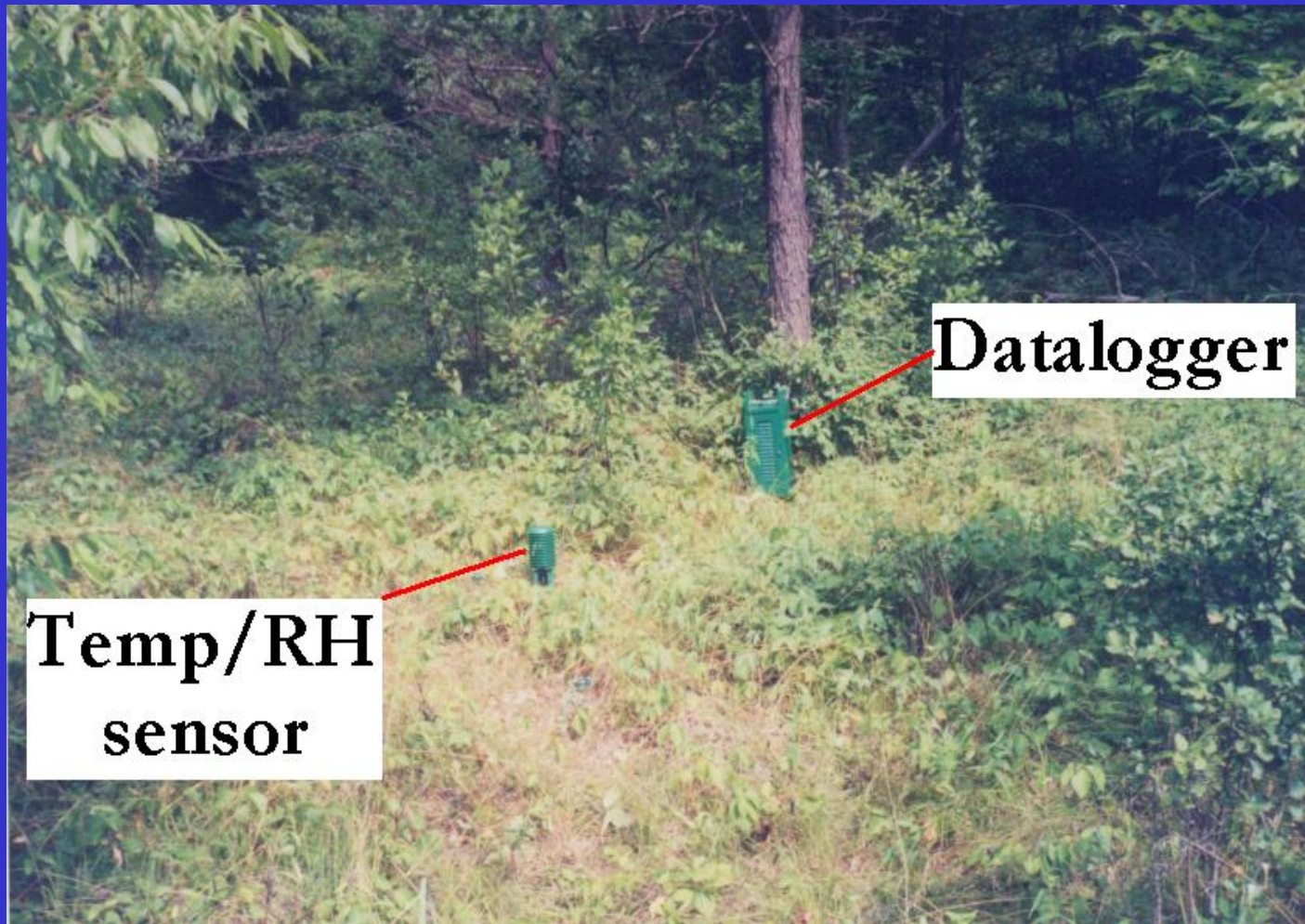


Max/min thermometer

The **P**inery **P**rovincial **P**ark (**PPP**)



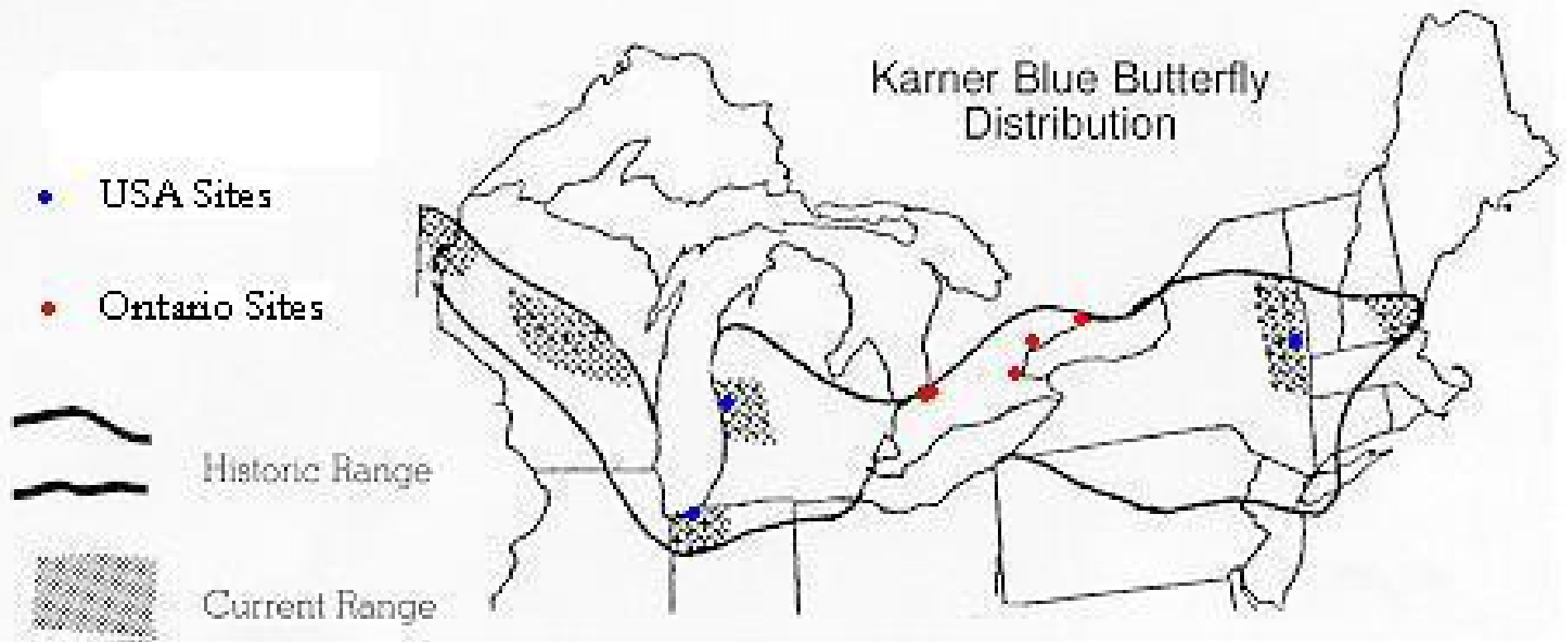
The **K**arner **B**lue Sanctuary (**KBS**)



List of selected sites in the USA

- **Manistee National Forest, Michigan (MNF)**
- **Indiana Dunes National Lakeshore, Indiana (IDNL)**
- **Saratoga County Airport, New York State (SCA)**

Sites Selected for this project



From the website of New York State Department of Environmental Conservation

Manistee National Forest (MNF)



Indiana **Dunes** National Lakeshore (**IDNL**)



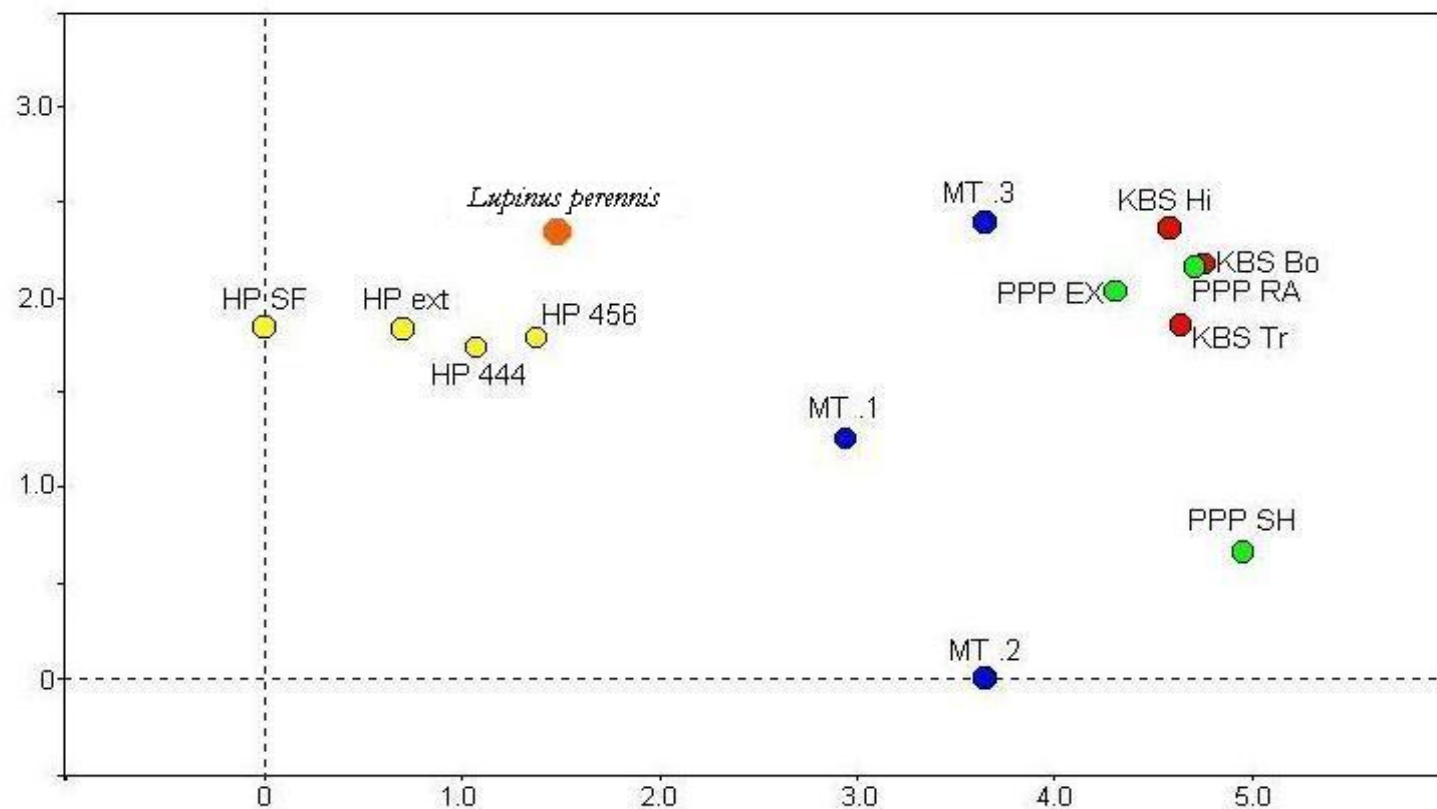
Saratoga County Airport (SCA)



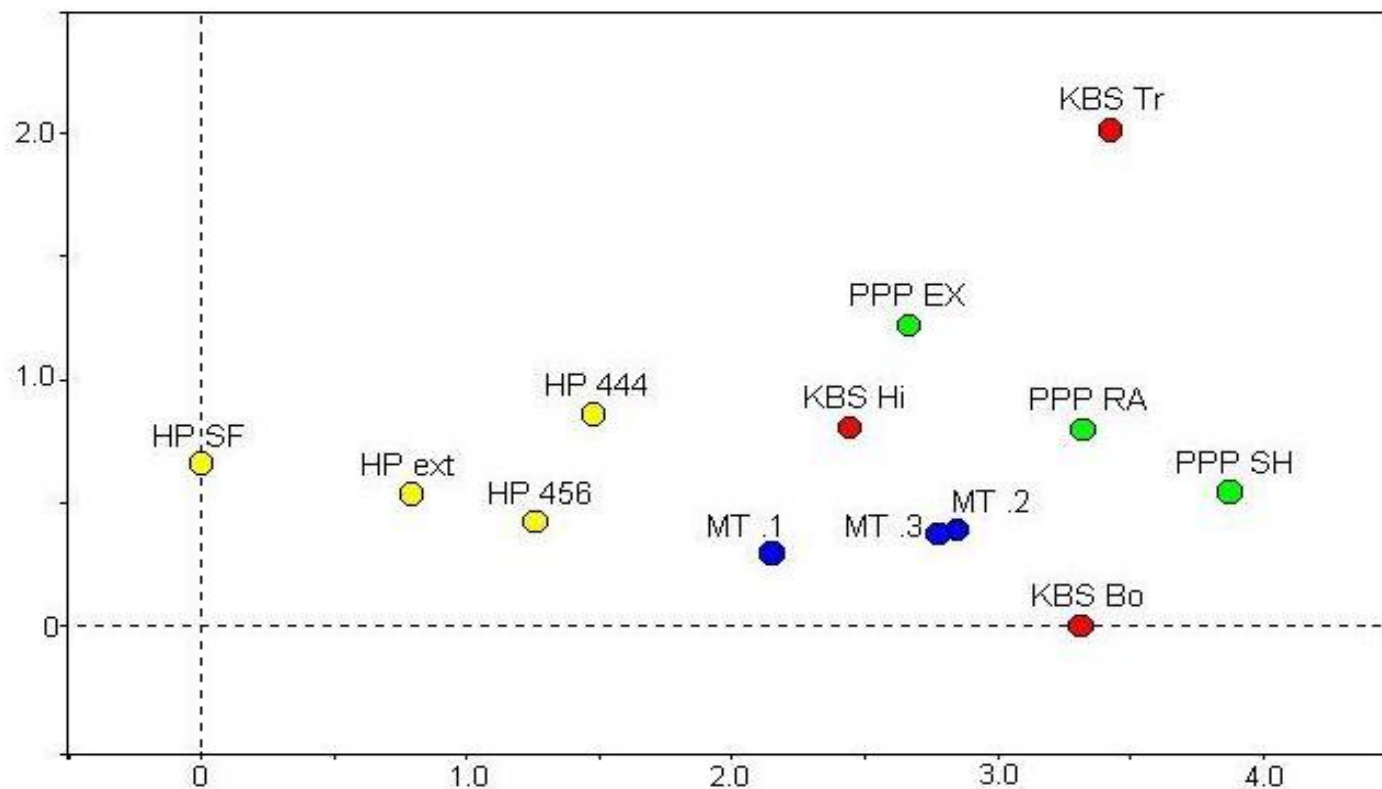
Preliminary Results (2002)

- 4 sites (**HP**, **MT**, **PPP** & **KBS**) in Ontario were visited twice for field data collection in summer **2002**.
- The same was done in all **5** sites in Ontario and all **3** sites in the USA in summer **2003**.
- Preliminary results include only the data collected in **2002**.

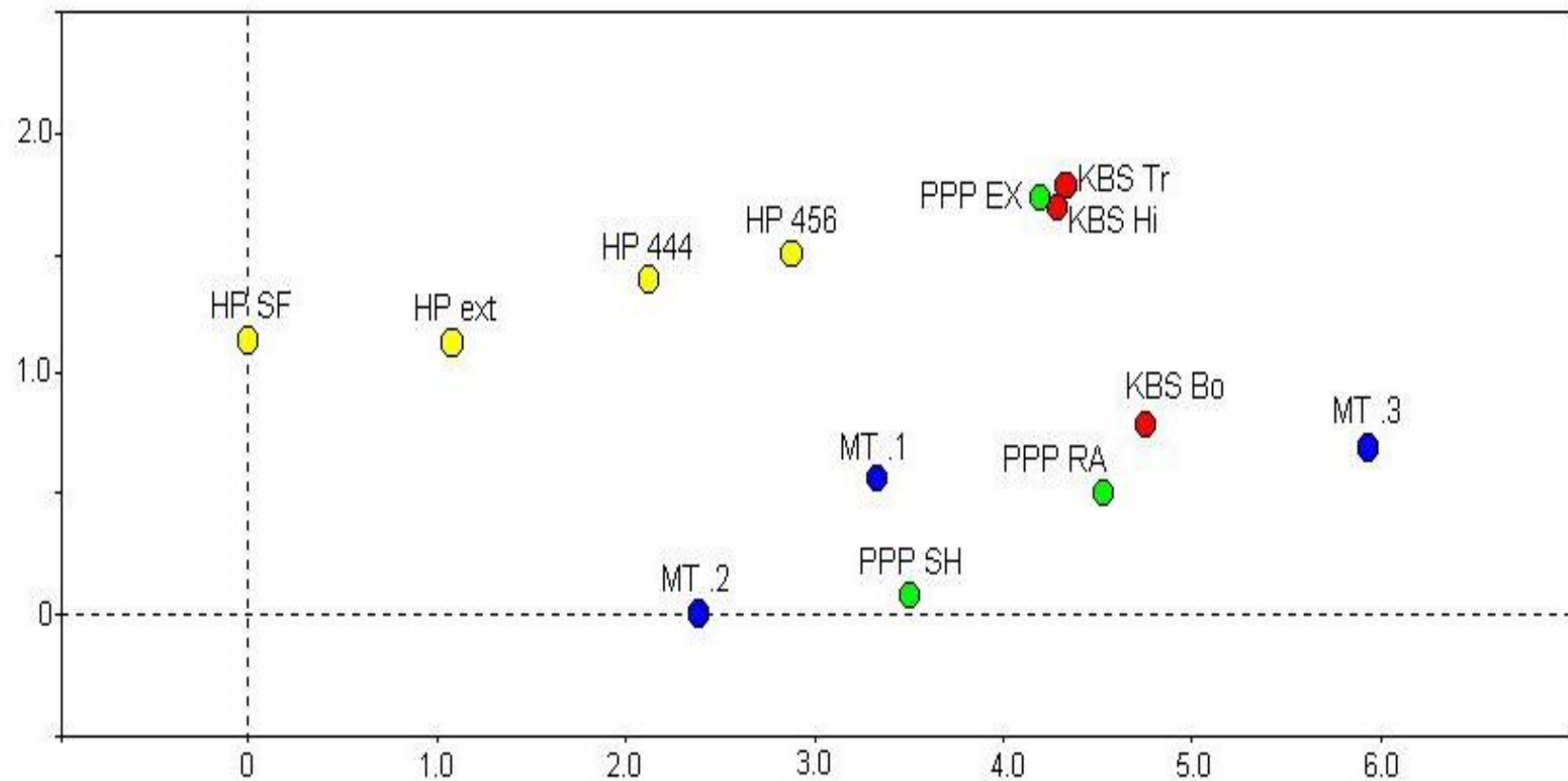
Results: Vegetation Community



Results: 1st Brood Nectar Plants

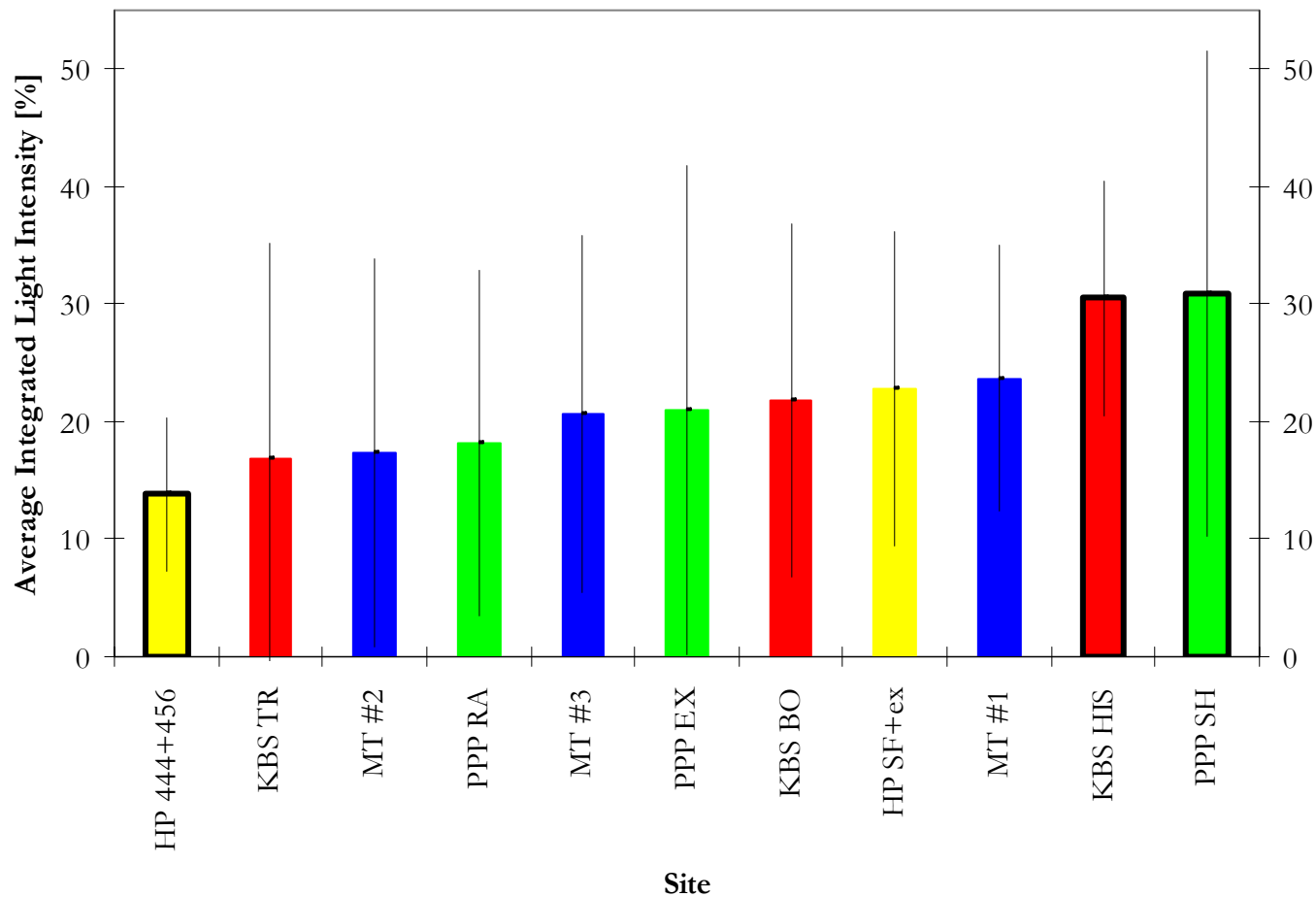


Results: 2nd Brood Nectar Plants

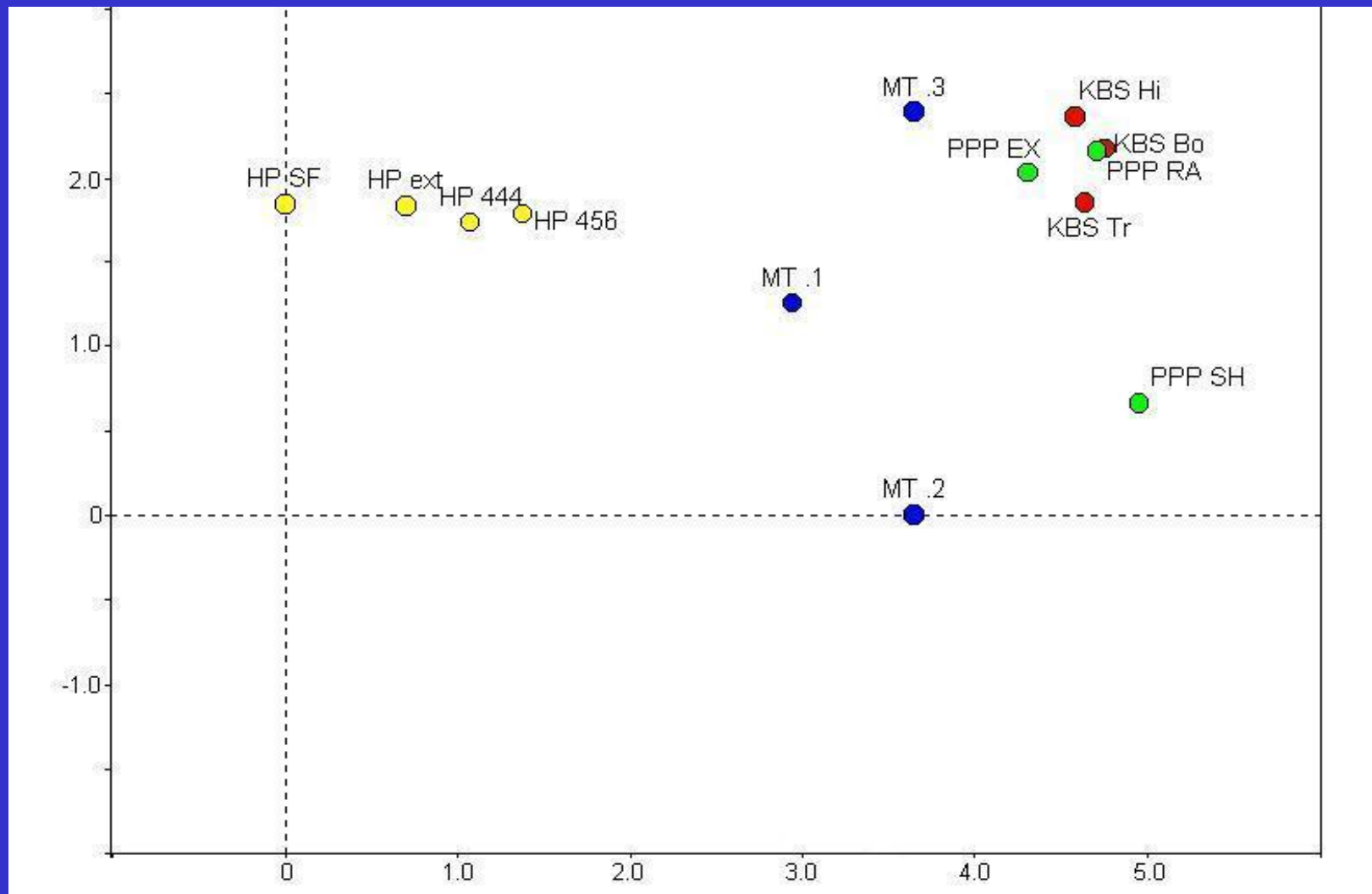


Results: Light Intensity

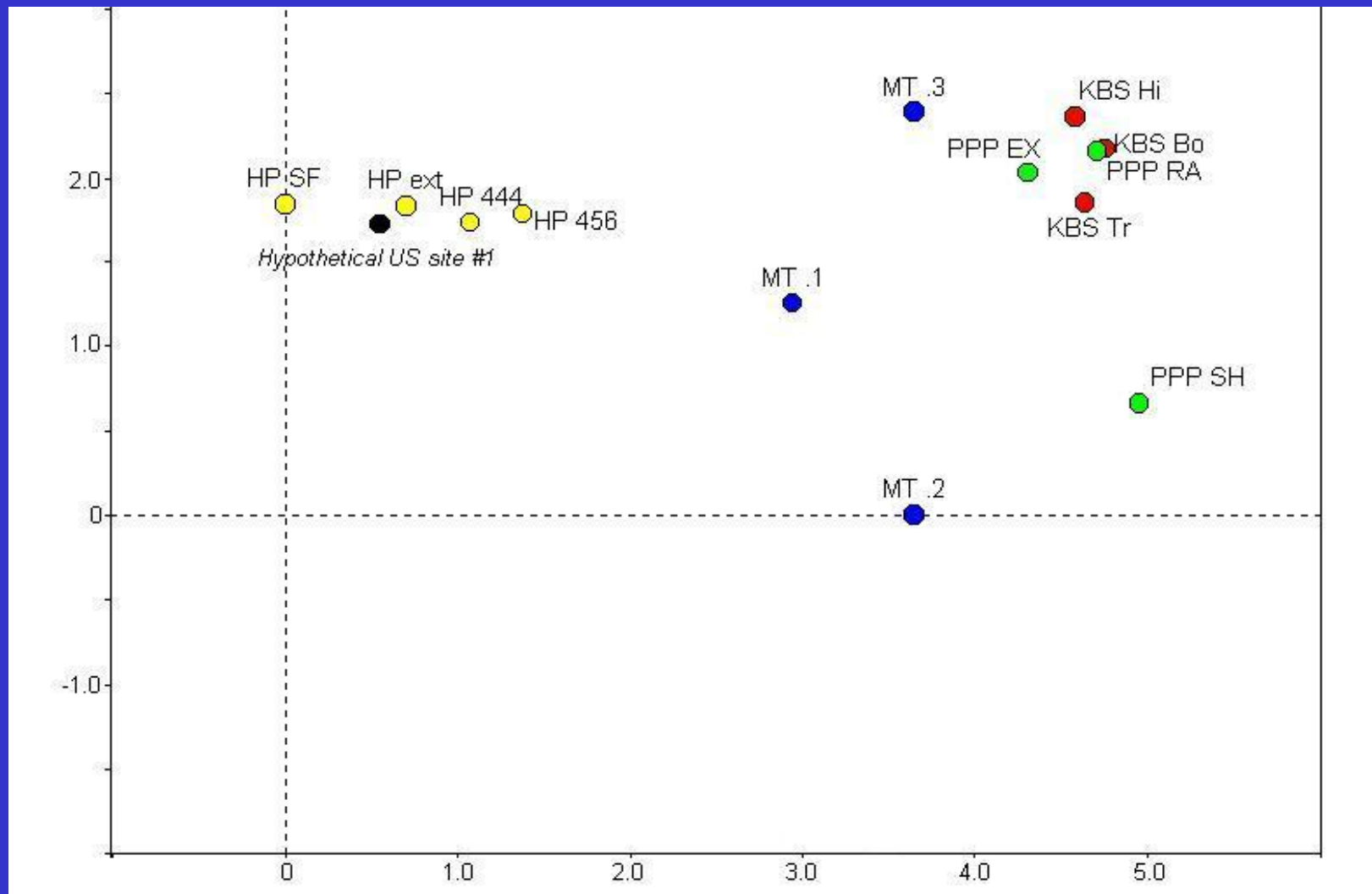
Average Integrated Light Intensity of oak savannah sites in Ontario



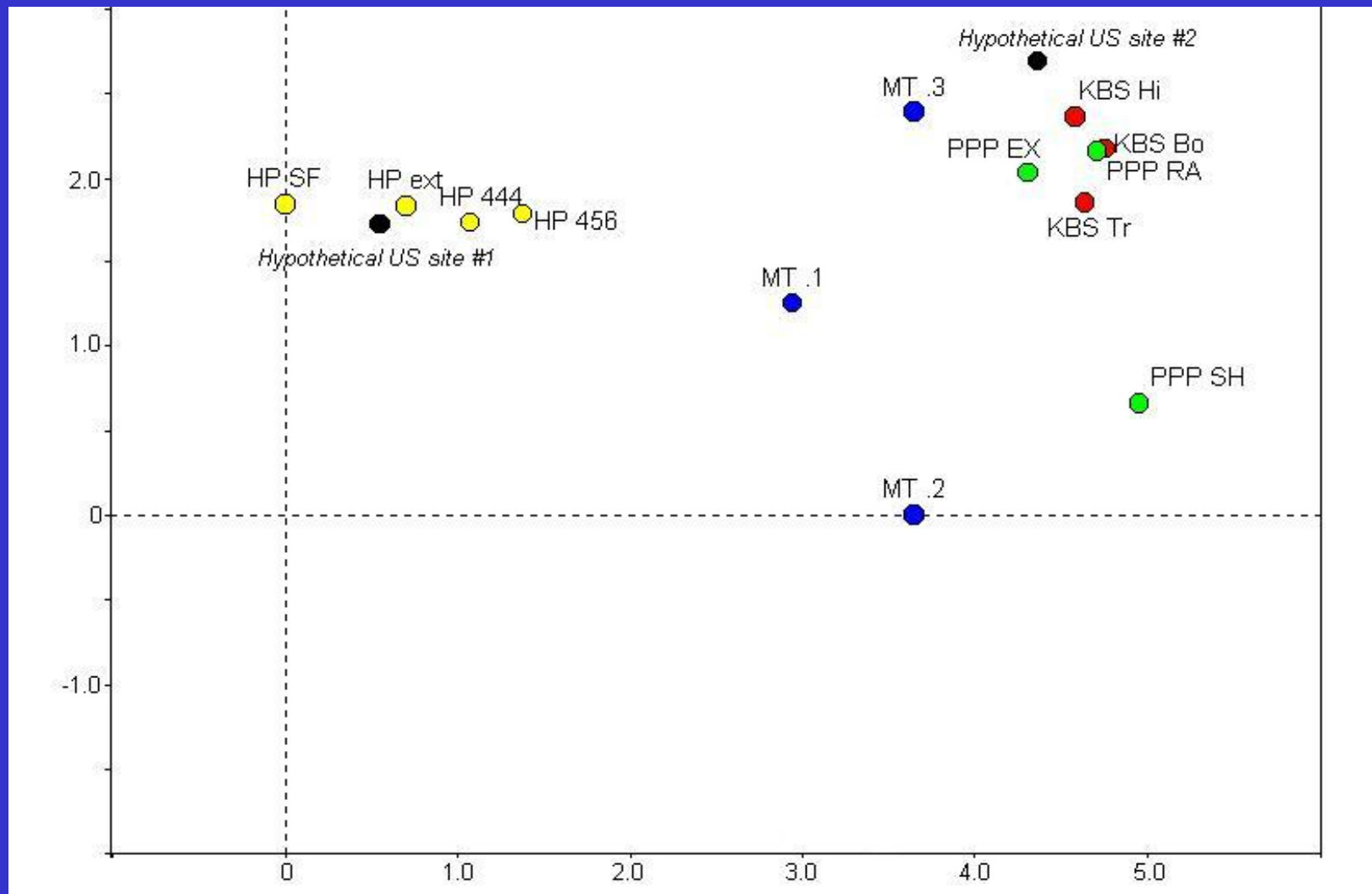
Expected Results: U.S. Sites



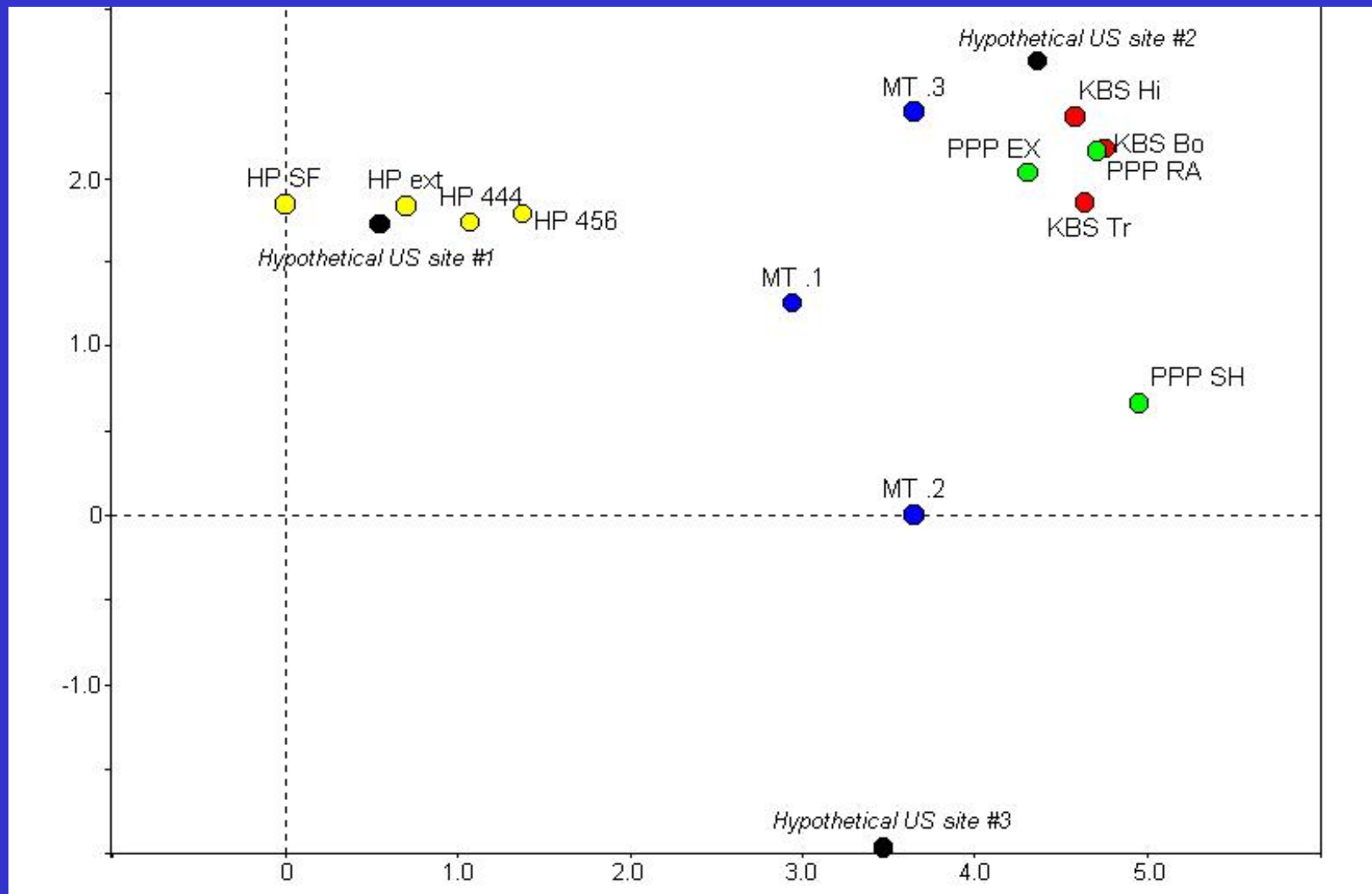
Expected Results: U.S. Sites



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Expected Results: U.S. Sites



Acknowledgement

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