

ANALYZING BEEKEEPING IN AOTEAROA NEW ZEALAND: CHANGES IN CLIMATE, CALENDARS, AND CULTURE

Findings and Analysis Presentation



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CHANGES IN CLIMATE, CALENDARS, AND CULTURE

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Climate Change in New Zealand



New Zealand is 1°C warmer



7% more water vapor in the air

Increased sea surface temperature



Higher moisture and heavier rainfall during cyclone

Atmospheric warming



20% increase in strength and 60% increase in frequency of Atmospheric Rivers



Field Research

11 Interviews Across New Zealand

- Frank Lindsay 50+ years
- 3 Other experienced beekeepers (30+ years)
- 2 CEOs of beekeeping companies
- 2 Varroa mite researchers
- 2 Climate scientists
- Queen Breeder

10 Hand Drawn Calendars

3 Calendar Tool Submission





Findings



1. Cultural Economics

The emergence of Mānuka Honey, and the economic gains from it have altered the New Zealand beekeeping culture



1. Cultural Economics

Mānuka honey

Information sharing

Beekeeping downturn

“Most family businesses are still around, but they have cut the hive numbers in half just to go through this period ”

Beekeeper Frank Lindsay



2. Beekeepers' Experiences Echo Climate Change Science

Temperature

- “The winters have been warmer”
Steve Heal

Rain

- “Double the normal amount of rain”
Carlos Zevallos

Storms

- “Having your hives next to a stream is not a great idea anymore”
Dr. Michelle Taylor
- “Last year was very wet”
Michele Vandaleen
- “There was no indication that it would flood. Well, 27 hives disappeared overnight”
Barry Foster



3. Beekeeping Calendars

Beekeepers are experiencing phenological shifts and must adapt to changes in their beekeeping calendars

**Queen
Breeding
Period**

Later in South Island
Earlier in North
Island

**Flowering
Seasons**

Unpredictable
Earlier or lightened

**Honey
Flow**

"Years ago, we knew exactly where the honey flow would kick off ...
Now its unpredictable"

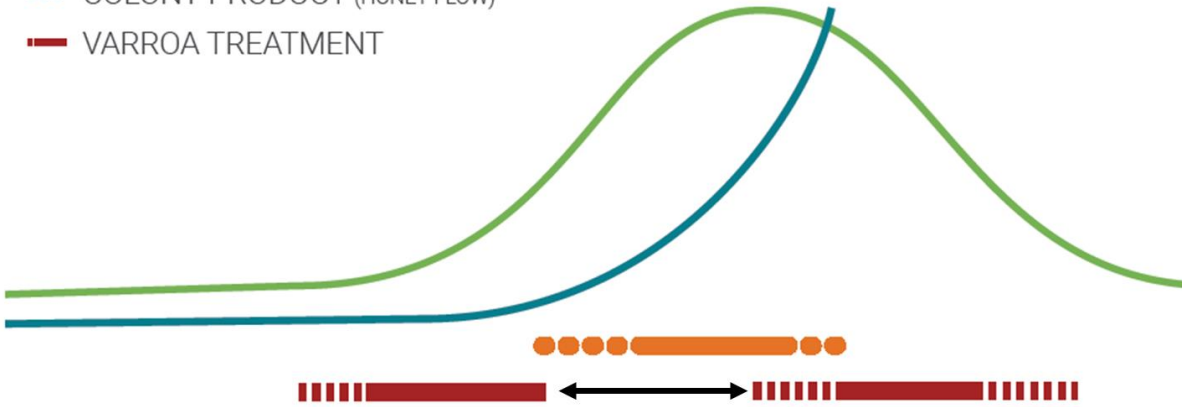
*Carlos Zevallos Head of
Apiary Development Comvita*





3. Beekeeping Calendars

- HONEY BEE GROWTH
- VARROA POPULATION GROWTH
- COLONY PRODUCT (HONEY FLOW)
- VARROA TREATMENT

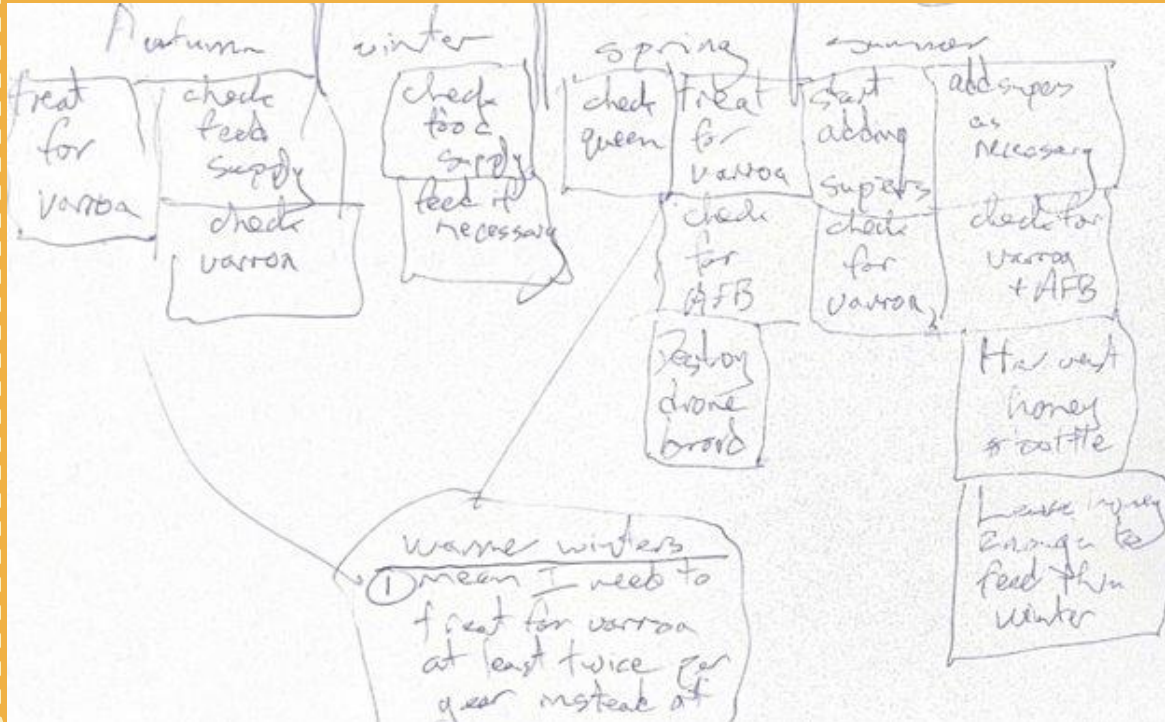


Varroa Treatment Timing

- "Additional mid-summer treatment"
Varroa Mite Researcher Phil Lester
- Broodless Period Shift
- Honey Harvest Shift

(Control of Varroa: A guide for New Zealand Beekeepers, 3rd Edition, 2021).

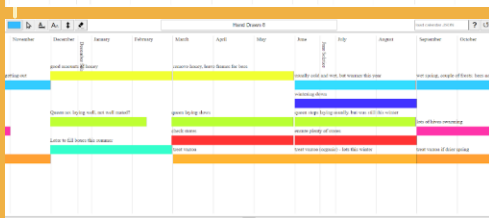
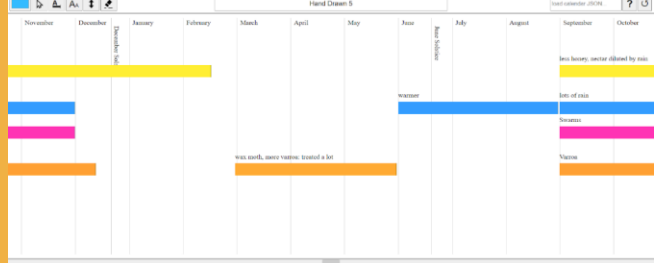
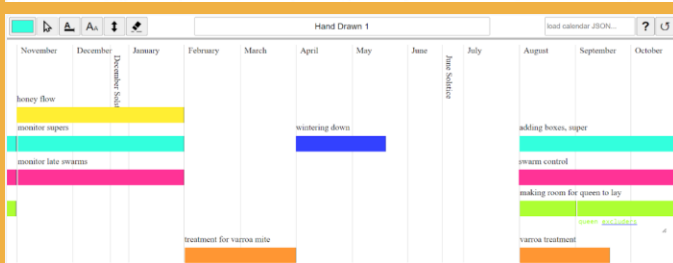
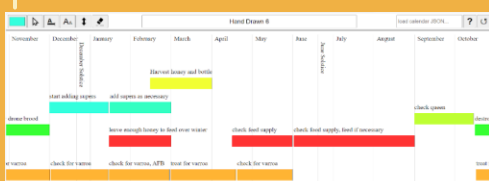
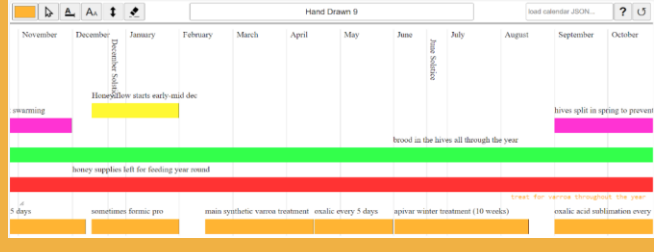
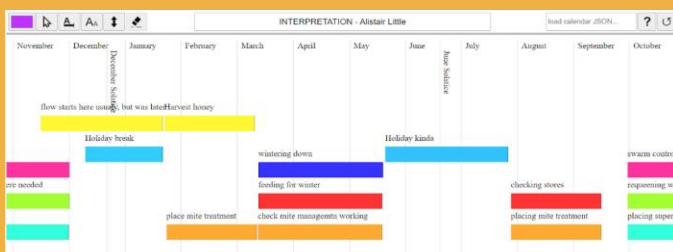
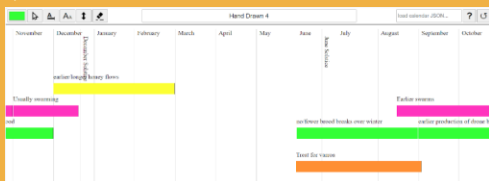
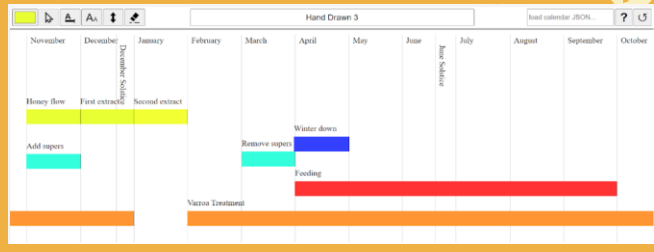
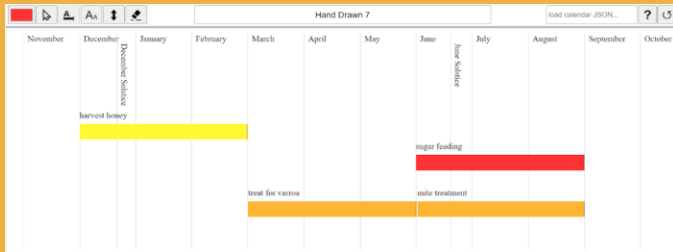
Hand-Drawn Calendar Findings



- 5/9 report experiencing a warmer winter
- "Warmer winters mean I need to treat for Varroa at least twice per year instead of once"

Beekeeper Dave Henderson

- Noted earlier swarm, drone brood production, and honey flow



New Zealand Beekeeping Seasons

1. Population Management: August – November (Red & Green, outlined in Red)

- Beginning of the beekeeping year in New Zealand
- Beekeepers monitor for swarms and split hives if necessary
- They also check on the queen, requeen when needed, and make room for the queen to lay. Brood is also checked
- These tasks are critical in preparing the hive for the upcoming honey season

3. Wintering Down: March - Mid-May (Purple)

- The wintering down season starts in mid-March and goes till early May
- During the wintering season, beekeepers check the hive to see if the hives need feeding and ensure they are prepared for the winter time.

2. Honey Flow: December – February (Yellow)

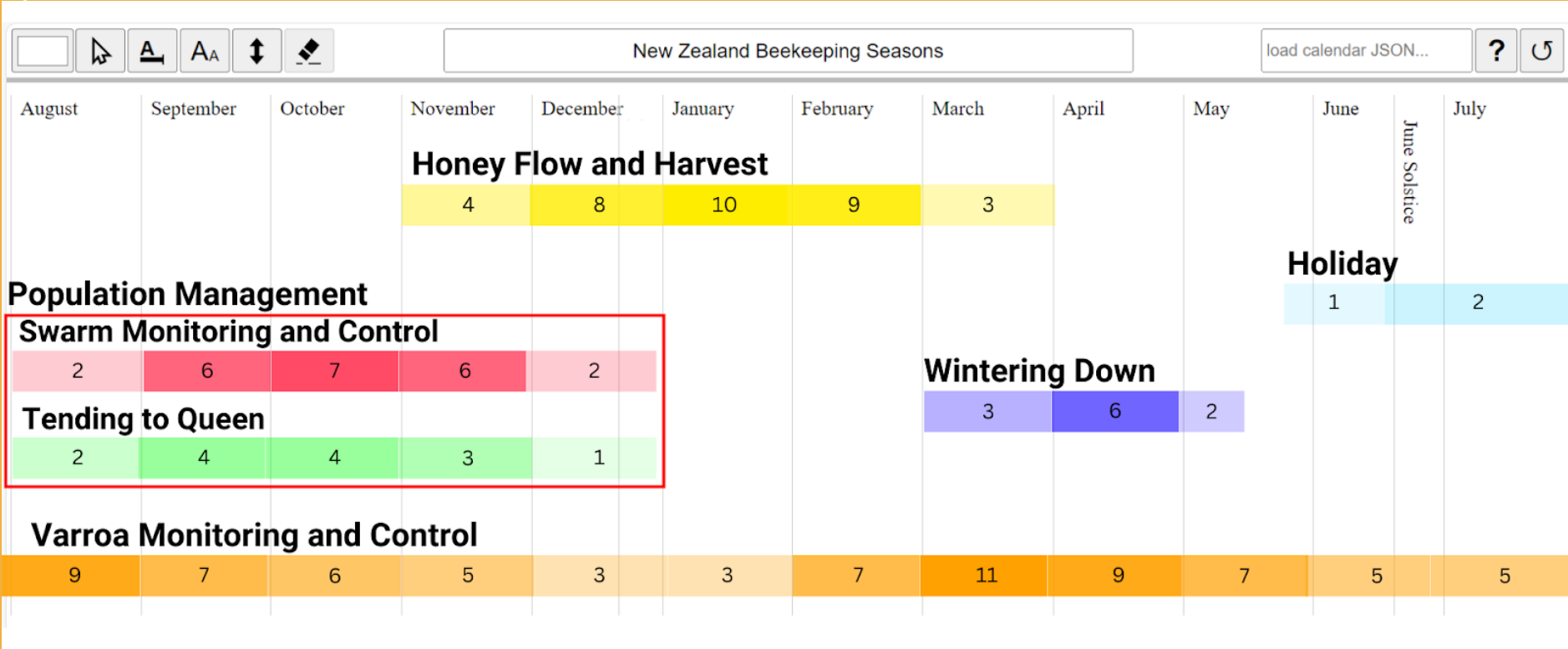
- Many beekeepers consider the honey harvesting season to be the busiest of the year
- Beekeepers are harvesting honey as bees produce it
- Some beekeepers split up into two seasons, the primary and secondary honey flow

4. Holiday: Mid-May to July (Blue)

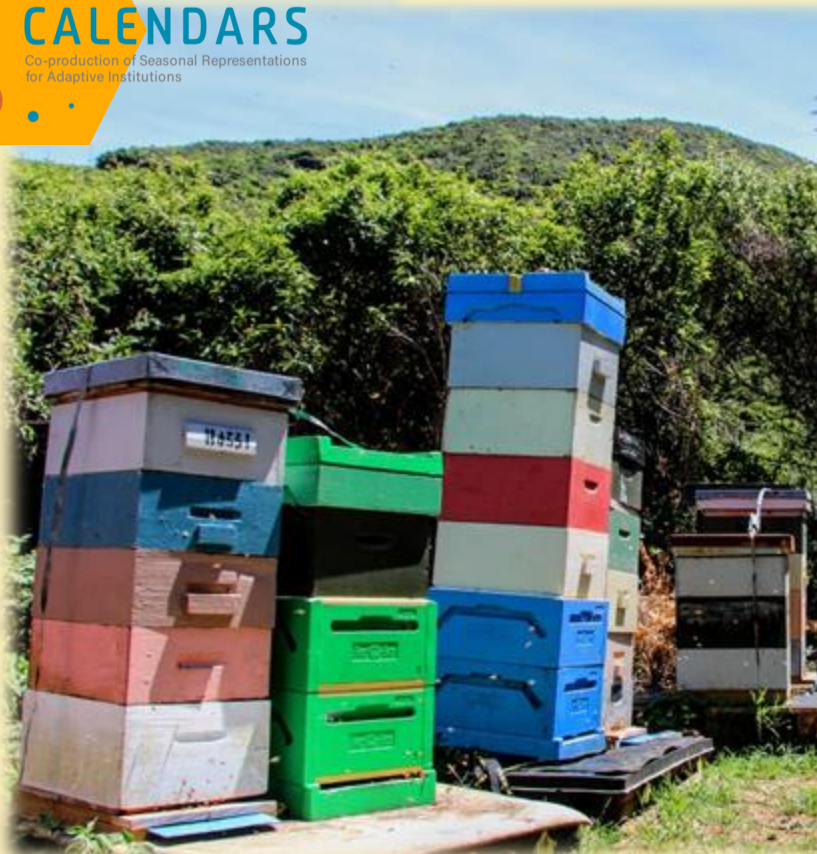
- After an initial check of food stores beekeepers tend to go on holiday and will feed through the holiday as necessary
- After the holiday bees enter into the brooding period which is often in tandem with the American Foulbrood checking, queen checking, and other population management.



of Calendars that indicted season during a given month



Research Questions



1. How have beekeeping **practices** and **technological tools** that support beekeeping changed?
2. What **climate change indicators** and **vulnerabilities** are reported?
3. What is the **future** outlook for beekeeping as described now by beekeepers?



Climate Change Vulnerabilities

“We need to adjust to what the weather is bringing us. Now it’s unpredictable”

*Carlos Zevallos
Comvita*

“There was no indication that it would flood. Well, 27 hives disappeared overnight”

Beekeeper Barry Foster



“Over the past few years, the winters have been milder (warmer) than in previous years. This has resulted in brood being in the hives all through the year”

Beekeeper Janine Davis

“If there is one stark lesson for all beekeepers in New Zealand ... it is that past benchmarks on where it is safe to locate apiaries no longer apply”

Beekeeper Barry Foster

“It’s flowering too early. It’s kind of out of balance”

*Dr. Michelle Taylor
Varroa Mite Researcher*

“Having your hives next to a stream is not a great idea anymore”

*Dr. Michelle Taylor
Varroa Mite Researcher*

“Years ago, we knew exactly where the honey flow kicked off. Now its unpredictable”

*Carlos Zevallos
Comvita*



Technology and Practices

“The biggest change is with farmers changing to irrigation systems. Everything’s wetter, so nothing’s yielding as much honey”

*Rae Butler
Bee Smart Breeding*

“Before Mānuka was valuable, it was considered a rubbish honey”

Beekeeper Alastair Little



“Beekeeping used to be an art but now it's more of a science”

*Rae Butler
Bee Smart Breeding*

“The biggest technological change that's happened in my time has been the invention of Mānuka honey and the research behind that”

*Bill McDonald
CEO Bee Fresh Farms*

“We then had to understand more about the lifecycle, the whole dynamics of the hive and how it was interacted with the mites”

*Rae Butler
Bee Smart Breeding*

“The biggest change is with farming. Farmers don't grow as much clover”

*Rae Butler
Bee Smart Breeding*

“Varroa is probably the biggest problem facing the bee industry around the world”

Prof. Phil Lester



Future of Beekeeping

“We may lose some colonies in the interim, but we will find a way. We need to have bees”

*Dr. Michelle Taylor
Varroa Mite Researcher*

“We vitally need them, so there's no question about that”

Beekeeper Barry Foster



“It's bright. And we're always going to say that because New Zealanders tend to be a find a way people”

*Dr. Michelle Taylor
Varroa Mite Researcher*

“What else can you do with honey? What are the other products you can use it for? I think we have to find ways to be smarter”

*Bill McDonald
CEO Bee Fresh Farms*

“It'll keep going. But just with a lot less hives. It'll balance itself out eventually. But there's going to be a bit of tragic sort of stories in the meantime”

Beekeeper Alistair Little

“another couple of years and then we'll be back to normal”

Beekeeper Frank Lindsay

“It is going to do a bit of a dive, there is going to be less and less beekeepers”

Queen Breeder Rae Butler



Who's in charge: the bees or the beekeeper?



"Beekeepers are still in charge. But operating under more constraints and parameters"

Beekeeper Barry Foster



"As a hobbyist, probably the bees. Commercialized, the beekeepers"

Beekeeper Alistair little



"The bees are. So, you can determine that I'm going out to do this. And when you get to the apiary and startup opening hives, it's totally different"

Beekeeper Frank Lindsay



"Oh, the bees are in charge. Definitely"

Queen Breeder Rae Butler



Recommendations

1. Additional spatial and temporal
2. Further research on the connection between Varroa mite and climate change
3. Hand-drawn calendars offer the interviewee much more creative freedom than can be lost in an interview
4. The CALENDARS Project could take our updated version of the tool and implement it on its website for further data collection.





Thanks!

Do you have any questions?

