**Zealandia Hihi Constructed Value of Information (CVoI) Scoring Sheet**

**Round 1: May-June 2023**

**Contact Hannah Sipe (**[**sipeh@uw.edu**](mailto:sipeh@uw.edu)**) with any questions**

**about this document**

* Below you will be asked to provide CVoI component scores for each hypothesis. Please provide all scores where indicated.
* See “CVoI Instructions.pdf” for additional information about resources to consult and other details.
* Once you have finished scoring, please email responses to [sipeh@uw.edu](mailto:sipeh@uw.edu) by June 12th (NZST).

1. **Magnitude of uncertainty rubric**

*Based on existing knowledge, to what degree is this hypothesis uncertain? Base your degree of uncertainty (your degree of confidence regarding whether this hypothesis is true or false) on current knowledge, theory, personal experience, or any other rationale.*

* Score of 0: There is little to no uncertainty regarding whether this hypothesis is true or false, based on current knowledge, theory, personal experience, or other rationale.
* Score of 1: There is low to moderate uncertainty regarding whether this hypothesis is true or false.
* Score of 2: There is moderate uncertainty regarding whether this hypothesis is true or false.
* Score of 3: There is moderate to high uncertainty regarding whether this hypothesis is true or false.
* Score of 4: There is little to no information currently available to discern whether this hypothesis is true or false.

**Assign magnitude of uncertainty scores for each hypothesis in the space provided, using the above rubric.**

|  |  |
| --- | --- |
| Hypotheses | Magnitude of Uncertainty Score Based on existing knowledge, to what degree is this hypothesis uncertain? |
| Hypothesis 1: Predation by native species (ruru or falcon) is reducing adult survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 2: Birds are moving outside of the fence into surrounding neighborhoods to feed and are being depredated, reducing adult and fledgling survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 3: Birds are dispersing away from Zealandia and thus are lost to the population, functioning from the standpoint of the population as a reduction in survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 4: Inbreeding depression is reducing survival and/or breeding success and thereby dampening population growth. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 5: A male-skewed sex ratio is resulting in harassment of females by males, which reduces female survival or breeding success. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 6: Weather events, specifically cold temperatures in the early breeding season, reduce breeding success and survival of females. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 7: Disease, either aspergillosis or others (e.g., Toxoplasmosis, trematodes, Plasmodium sp., avian malaria, internal or external parasites), is reducing adult survival, fledgling survival, or breeding success. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 8: Current habitat conditions result in poor nutrition (quality or quantity of food) and reduced survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 9: Some interacting combination of factors: | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 9a: Weather events (Hypothesis 6) are causing females to approach feeders at a higher rate, where they are harassed by males (Hypothesis 5), which is reducing female survival and breeding success. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 9b: Inbreeding depression (Hypothesis 4) is increasing the disease susceptibility of Hihi (Hypothesis 7), thereby reducing survival and breeding success. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 9c: Weather events (Hypothesis 6) are causing stress to females, making them susceptible to disease (Hypothesis 7), reducing female survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 9d: A male-skewed sex ratio (Hypothesis 5) is increasing the rate of female dispersal out of Zealandia (Hypotheses 2 and 3), thereby reducing female survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 9e: The current habitat conditions (Hypothesis 8) are such that birds are dispersing out of Zealandia to find food (Hypotheses 2), reducing adult and fledgling survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 9f: Current habitat conditions and poor nutrition (Hypothesis 8) are increasing Hihi’s susceptibility to disease (Hypothesis 7), reducing survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 10: Hihi get killed from hitting fences, reducing survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 11: Hihi chicks are being fed wasps, causing internal trauma from stingers and leading to death, reducing overall chick and fledgling survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 12: Hihi are consuming poisoned baits, either through primary or secondary poisoning, causing reduced adult survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 13: Hihi are being caught in mammalian traps and other control tools, reducing adult survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 14: Wasps are limiting nectar and insects, reducing survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 15: Competition with mice for insects and seeds is reducing survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 16: Inter and intraspecific competition for supplemental feeding resources is reducing female survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |
| Hypothesis 17: Hihi rearing is phenologically asynchronous with invertebrate prey availability, leading to poor survival. | Magnitude of uncertainty score: \_\_\_\_\_\_ |

1. **Relevance (a) rubric**

*If this hypothesis is true, to what degree is it impacting the population? Consider impact relative to the range of variability in the demographic rate of interest. For example, a 4 indicates that the effect of the hypothesis could change the rate from its lowest to its highest possible value or from its highest to its lowest possible value. For example, if the range of observed adult survival is from 0.32 to 0.59, a score of 2 indicates that the hypothesis could change the adult survival range from 0.32 to 0.46 or from 0.46 to 0.59.*

* Score of 0: even if true, this hypothesis has no to very little impact on the population.
* Score of 1: if true, this hypothesis has a small to moderate impact on the population, with an impact that is approximately 25% compared to the total range of variability in population trend.
* Score of 2: if true, this hypothesis has a moderate impact on the population, with an impact that is approximately 50% compared to the total range of variability in population trend.
* Score of 3: if true, this hypothesis has a moderate to large impact on the population, with an impact that is approximately 75% compared to the total range of variability in population trend.
* Score of 4: if true, this hypothesis has a large impact on the population, with an impact as large as the total range of variability in population trend.

**Assign relevance (a) scores for each hypothesis in the space provided, using the above rubric.**

|  |  |
| --- | --- |
| Hypotheses | Relevance (a) If this hypothesis is true, to what degree is it impacting the population? |
| Hypothesis 1: Predation by native species (ruru or falcon) is reducing adult survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 2: Birds are moving outside of the fence into surrounding neighborhoods to feed and are being depredated, reducing adult and fledgling survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 3: Birds are dispersing away from Zealandia and thus are lost to the population, functioning from the standpoint of the population as a reduction in survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 4: Inbreeding depression is reducing survival and/or breeding success and thereby dampening population growth. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 5: A male-skewed sex ratio is resulting in harassment of females by males, which reduces female survival or breeding success. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 6: Weather events, specifically cold temperatures in the early breeding season, reduce breeding success and survival of females. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 7: Disease, either aspergillosis or others (e.g., Toxoplasmosis, trematodes, Plasmodium sp., avian malaria, internal or external parasites), is reducing adult survival, fledgling survival, or breeding success. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 8: Current habitat conditions result in poor nutrition (quality or quantity of food) and reduced survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 9: Some interacting combination of factors: | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 9a: Weather events (Hypothesis 6) are causing females to approach feeders at a higher rate, where they are harassed by males (Hypothesis 5), which is reducing female survival and breeding success. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 9b: Inbreeding depression (Hypothesis 4) is increasing the disease susceptibility of Hihi (Hypothesis 7), thereby reducing survival and breeding success. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 9c: Weather events (Hypothesis 6) are causing stress to females, making them susceptible to disease (Hypothesis 7), reducing female survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 9d: A male-skewed sex ratio (Hypothesis 5) is increasing the rate of female dispersal out of Zealandia (Hypotheses 2 and 3), thereby reducing female survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 9e: The current habitat conditions (Hypothesis 8) are such that birds are dispersing out of Zealandia to find food (Hypotheses 2), reducing adult and fledgling survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 9f: Current habitat conditions and poor nutrition (Hypothesis 8) are increasing Hihi’s susceptibility to disease (Hypothesis 7), reducing survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 10: Hihi get killed from hitting fences, reducing survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 11: Hihi chicks are being fed wasps, causing internal trauma from stingers and leading to death, reducing overall chick and fledgling survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 12: Hihi are consuming poisoned baits, either through primary or secondary poisoning, causing reduced adult survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 13: Hihi are being caught in mammalian traps and other control tools, reducing adult survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 14: Wasps are limiting nectar and insects, reducing survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 15: Competition with mice for insects and seeds is reducing survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 16: Inter and intraspecific competition for supplemental feeding resources is reducing female survival. | Relevance (a) score: \_\_\_\_\_\_ |
| Hypothesis 17: Hihi rearing is phenologically asynchronous with invertebrate prey availability, leading to poor survival. | Relevance (a) score: \_\_\_\_\_\_ |

1. **Relevance (b) rubric**

*To what degree could available management actions, listed or otherwise, reduce the effect on the population that this hypothesis would have, if true? You can find a list of actions previously developed in the ‘Hypotheses and actions’ document. If you identify an additional available management action that could be used to mediate the effect of this hypothesis, please make note of what it is. We will come back to those actions later.*

* + Score of 0: management actions will have no to very little impact on the hypothesized effect.
  + Score of 1: management actions will reduce the hypothesized effect on the population by approximately 25%.
  + Score of 2: management actions will reduce the hypothesized effect on the population by approximately 50%.
  + Score of 3: management actions will reduce the hypothesized effect on the population by approximately 75%.
  + Score of 4: management actions will mostly or completely reduce the hypothesized effect.

**Assign relevance (b) scores for each hypothesis in the space provided, using the above rubric.**

|  |  |
| --- | --- |
| Hypotheses | Relevance (b) To what degree could available management actions, listed or otherwise, reduce the effect? |
| Hypothesis 1: Predation by native species (ruru or falcon) is reducing adult survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 2: Birds are moving outside of the fence into surrounding neighborhoods to feed and are being depredated, reducing adult and fledgling survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 3: Birds are dispersing away from Zealandia and thus are lost to the population, functioning from the standpoint of the population as a reduction in survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 4: Inbreeding depression is reducing survival and/or breeding success and thereby dampening population growth. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 5: A male-skewed sex ratio is resulting in harassment of females by males, which reduces female survival or breeding success. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 6: Weather events, specifically cold temperatures in the early breeding season, reduce breeding success and survival of females. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 7: Disease, either aspergillosis or others (e.g., Toxoplasmosis, trematodes, Plasmodium sp., avian malaria, internal or external parasites), is reducing adult survival, fledgling survival, or breeding success. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 8: Current habitat conditions result in poor nutrition (quality or quantity of food) and reduced survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 9: Some interacting combination of factors: | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 9a: Weather events (Hypothesis 6) are causing females to approach feeders at a higher rate, where they are harassed by males (Hypothesis 5), which is reducing female survival and breeding success. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 9b: Inbreeding depression (Hypothesis 4) is increasing the disease susceptibility of Hihi (Hypothesis 7), thereby reducing survival and breeding success. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 9c: Weather events (Hypothesis 6) are causing stress to females, making them susceptible to disease (Hypothesis 7), reducing female survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 9d: A male-skewed sex ratio (Hypothesis 5) is increasing the rate of female dispersal out of Zealandia (Hypotheses 2 and 3), thereby reducing female survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 9e: The current habitat conditions (Hypothesis 8) are such that birds are dispersing out of Zealandia to find food (Hypotheses 2), reducing adult and fledgling survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 9f: Current habitat conditions and poor nutrition (Hypothesis 8) are increasing Hihi’s susceptibility to disease (Hypothesis 7), reducing survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 10: Hihi get killed from hitting fences, reducing survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 11: Hihi chicks are being fed wasps, causing internal trauma from stingers and leading to death, reducing overall chick and fledgling survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 12: Hihi are consuming poisoned baits, either through primary or secondary poisoning, causing reduced adult survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 13: Hihi are being caught in mammalian traps and other control tools, reducing adult survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 14: Wasps are limiting nectar and insects, reducing survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 15: Competition with mice for insects and seeds is reducing survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 16: Inter and intraspecific competition for supplemental feeding resources is reducing female survival. | Relevance (b) score: \_\_\_\_\_\_ |
| Hypothesis 17: Hihi rearing is phenologically asynchronous with invertebrate prey availability, leading to poor survival. | Relevance (b) score: \_\_\_\_\_\_ |

*Relevance (b) management actions:*

*If there were any additional management actions you identified that might be sensible if a given hypothesis were true, please include the hypothesis and the additional management actions below. We will revisit additional management actions at a later date, but this can serve as a way to report the ones you had in mind while scoring hypotheses on Relevance (b).*

|  |
| --- |
|  |

1. **Reducibility**

*To what degree do we have the ability to resolve uncertainty about this hypothesis?*

* + Score of 0: The uncertainty about this hypothesis is unlikely to be reduced within a relevant management timeframe due to the expected cost, logistics, and ability to obtain necessary data.
  + Score of 1: The uncertainty about this hypothesis could be reduced by approximately 25% within a relevant management timeframe based on the expected cost, logistics, and ability to obtain necessary data.
  + Score of 2: The uncertainty about this hypothesis could be reduced by approximately 50% within a relevant management timeframe based on the expected cost, logistics, and ability to obtain necessary data.
  + Score of 3: The uncertainty about this hypothesis could be reduced by approximately 75% within a relevant management timeframe based on the expected cost, logistics, and ability to obtain necessary data.
  + Score of 4: The uncertainty about this hypothesis could be mostly or completely reduced within a relevant management timeframe based on the expected cost, logistics, and ability to obtain necessary data.

**Assign reducibility scores for each hypothesis in the space provided, using the above rubric.**

|  |  |
| --- | --- |
| Hypotheses | Reducibility To what degree do we have the ability to resolve uncertainty about this hypothesis? |
| Hypothesis 1: Predation by native species (ruru or falcon) is reducing adult survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 2: Birds are moving outside of the fence into surrounding neighborhoods to feed and are being depredated, reducing adult and fledgling survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 3: Birds are dispersing away from Zealandia and thus are lost to the population, functioning from the standpoint of the population as a reduction in survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 4: Inbreeding depression is reducing survival and/or breeding success and thereby dampening population growth. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 5: A male-skewed sex ratio is resulting in harassment of females by males, which reduces female survival or breeding success. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 6: Weather events, specifically cold temperatures in the early breeding season, reduce breeding success and survival of females. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 7: Disease, either aspergillosis or others (e.g., Toxoplasmosis, trematodes, Plasmodium sp., avian malaria, internal or external parasites), is reducing adult survival, fledgling survival, or breeding success. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 8: Current habitat conditions result in poor nutrition (quality or quantity of food) and reduced survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 9: Some interacting combination of factors: | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 9a: Weather events (Hypothesis 6) are causing females to approach feeders at a higher rate, where they are harassed by males (Hypothesis 5), which is reducing female survival and breeding success. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 9b: Inbreeding depression (Hypothesis 4) is increasing the disease susceptibility of Hihi (Hypothesis 7), thereby reducing survival and breeding success. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 9c: Weather events (Hypothesis 6) are causing stress to females, making them susceptible to disease (Hypothesis 7), reducing female survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 9d: A male-skewed sex ratio (Hypothesis 5) is increasing the rate of female dispersal out of Zealandia (Hypotheses 2 and 3), thereby reducing female survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 9e: The current habitat conditions (Hypothesis 8) are such that birds are dispersing out of Zealandia to find food (Hypotheses 2), reducing adult and fledgling survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 9f: Current habitat conditions and poor nutrition (Hypothesis 8) are increasing Hihi’s susceptibility to disease (Hypothesis 7), reducing survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 10: Hihi get killed from hitting fences, reducing survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 11: Hihi chicks are being fed wasps, causing internal trauma from stingers and leading to death, reducing overall chick and fledgling survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 12: Hihi are consuming poisoned baits, either through primary or secondary poisoning, causing reduced adult survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 13: Hihi are being caught in mammalian traps and other control tools, reducing adult survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 14: Wasps are limiting nectar and insects, reducing survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 15: Competition with mice for insects and seeds is reducing survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 16: Inter and intraspecific competition for supplemental feeding resources is reducing female survival. | Reducibility score: \_\_\_\_\_\_ |
| Hypothesis 17: Hihi rearing is phenologically asynchronous with invertebrate prey availability, leading to poor survival. | Reducibility score: \_\_\_\_\_\_ |