MAKING THE SIRE SELECTION PROCESS SIMPLER: A WEB-BASED DECISION SUPPORT TOOL (IGENDEC)

Matt Spangler

University of Nebraska-Lincoln

DECISION MAKING PROCESS

- Develop a Breeding Objective
  - Identifies sources of cost and revenue
  - Sets goals conditioned on resources
- Identify breed(s)
- Develop a Breeding System
- Select seedstock supplier(s)
- Select bulls
  - Should align with breeding objective

SELECTION INDEX

- Tool to enable informed multiple-trait selection
- Based on:
  - Breeding objectives
  - Economic parameters
  - Relationships among traits
  - Population (herd) means
- Designed to improve commercial level profitability

BULL SELECTION CAN BE TOO COMPLICATED

- A lot of bull sales, and a lot of bulls in each sale
- Too many EPD—hard, if not impossible, to select on multiple traits simultaneously using only individual EPD
- In many cases EPD are breed-specific—must convert to common base
- Need to account for the value of heterosis and differences in breeds relative to average performance
- Indexes exist and are provided by breed associations (and some vendors)
  - Although robust they are generalizations

ROBUSTNESS

- Index theory assumes genetic parameters and economic values are known without error
- Efficiency: proportion of maximum selection response achieved if one set values are 'used' when another set of values are 'true'

$$E_u = \frac{R_{H_u}}{R_{H_t}}$$

- See Ochsner et al. (2017) for examples

THESIS

- Poor technology adoption is related to the sum of many underlying issues:
  - Genetic prediction seems opaque
  - Consultancy is often from sources other than what might be preferred
  - Commercial producers do not have the needed time to excel in all areas, and focus on day-to-day animal and financial management
  - Combining all partial solutions is a very cumbersome task
    - Breeding objective
    - Breeding system
    - Breed choice
    - Trait emphasis
    - Sire selection
    - And all need to contemplate that which is economical and possible given environmental constraints

Increasing list of EPD

Requires turning tools and knowledge into impactful decisions

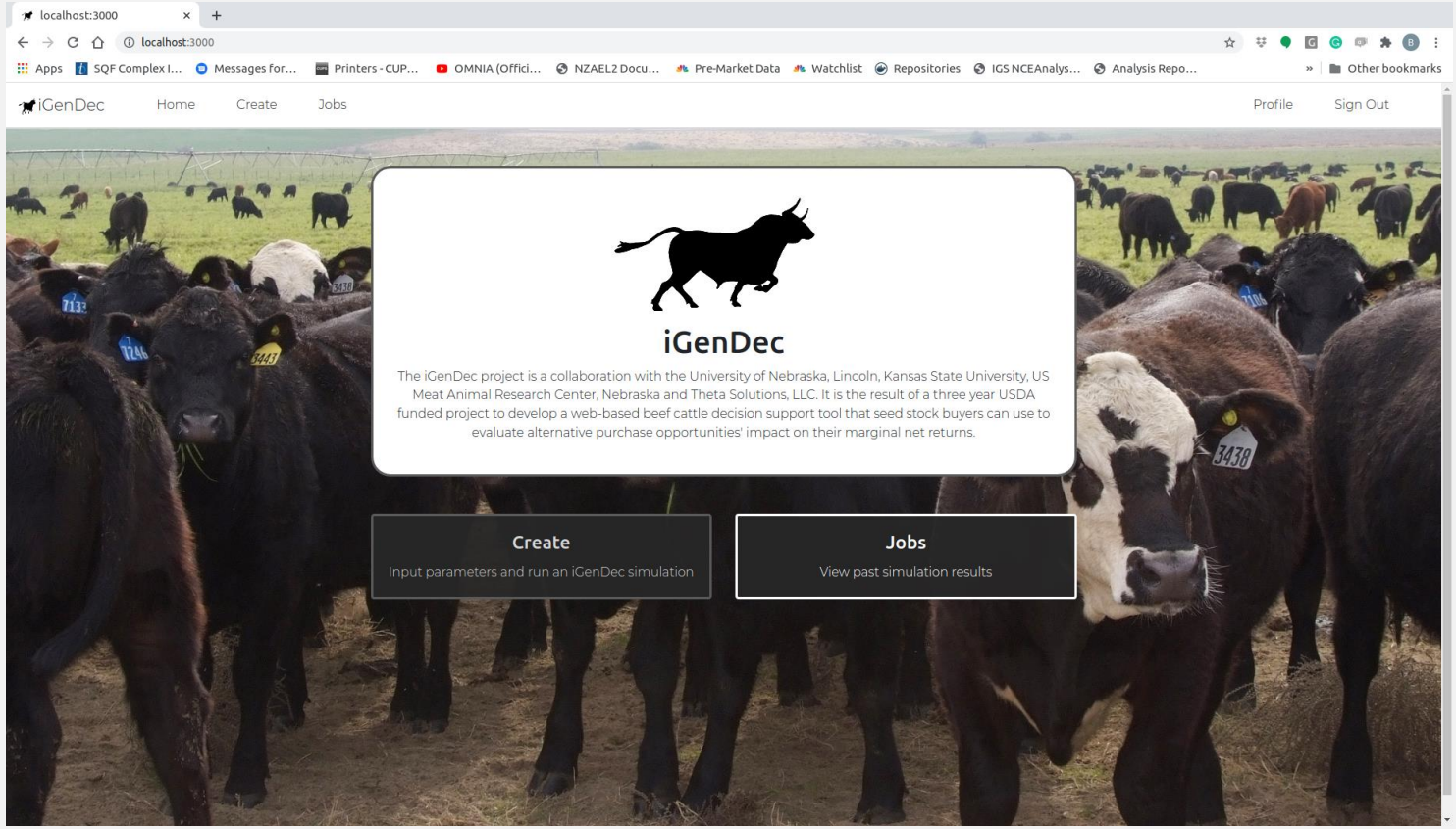
INVESTMENT THOUGHT PROCESS

- Producers face the problem of obtaining the best bulls for their operation in that given setting.
- ‘Best’ is a relative concept.
- A ‘less desirable’ bull may become the preferred choice over a ‘more desirable’ bull if his sale price discount is larger than the differential in value between the two bulls.

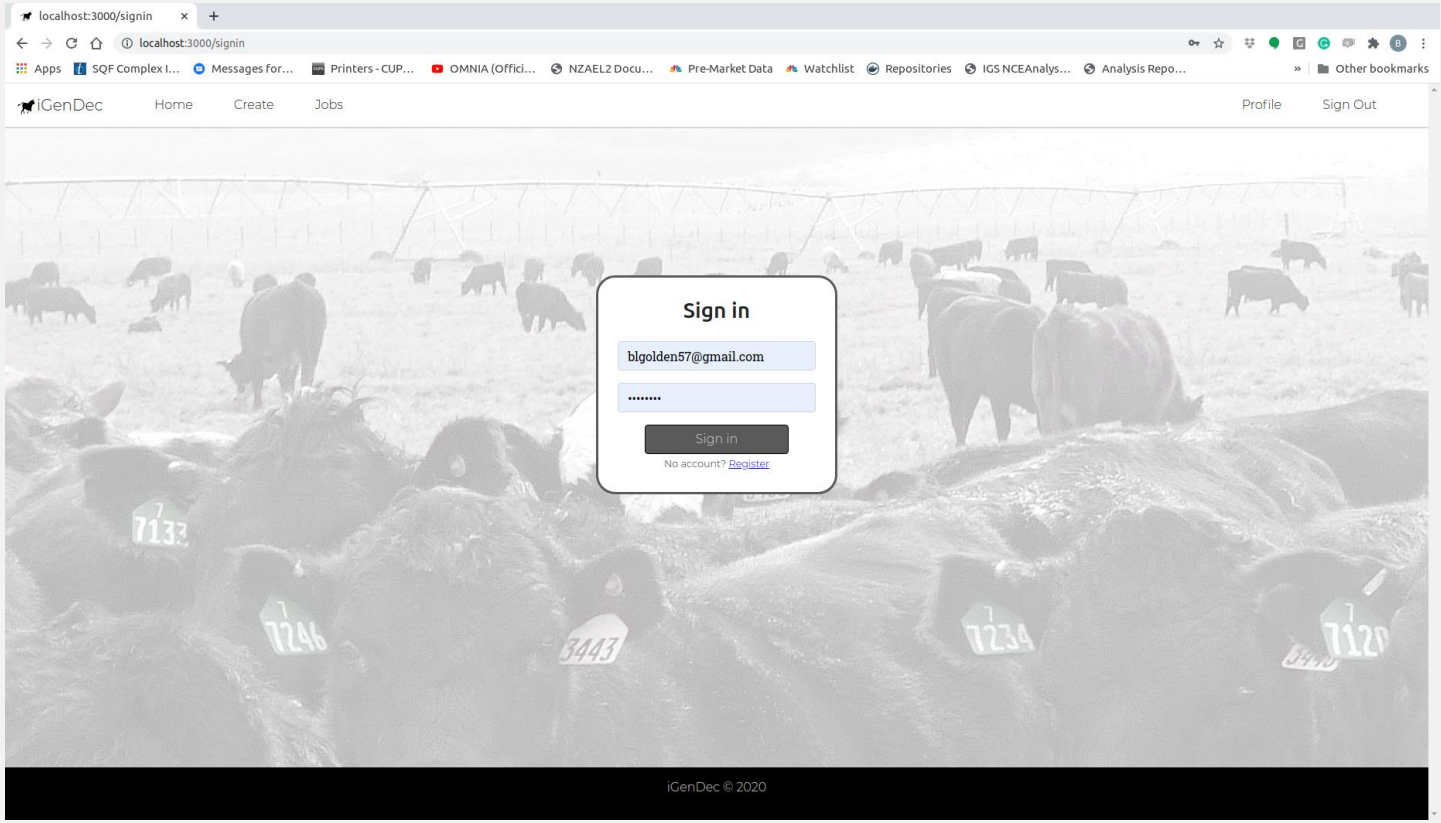
COMPONENTS OF CUSTOMIZED INDEX

- (co)Variances—literature
- Cost/revenue pricing—industry averages or use-defined
- Breed information—user defined
- Phenotypic means—industry averages or user defined
- Breeding objectives—user defined
- EPD—Uploaded (user or seedstock seller), secure API breed association

USER INTERFACE



LOGIN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Repositories
IGS NCEAnalys...
Analysis Repo...
Other bookmarks
iGenDec
Home
Create
Jobs
Profile
Sign Out
Sign in
blgolden57@gmail.com
Sign in
No account? Register
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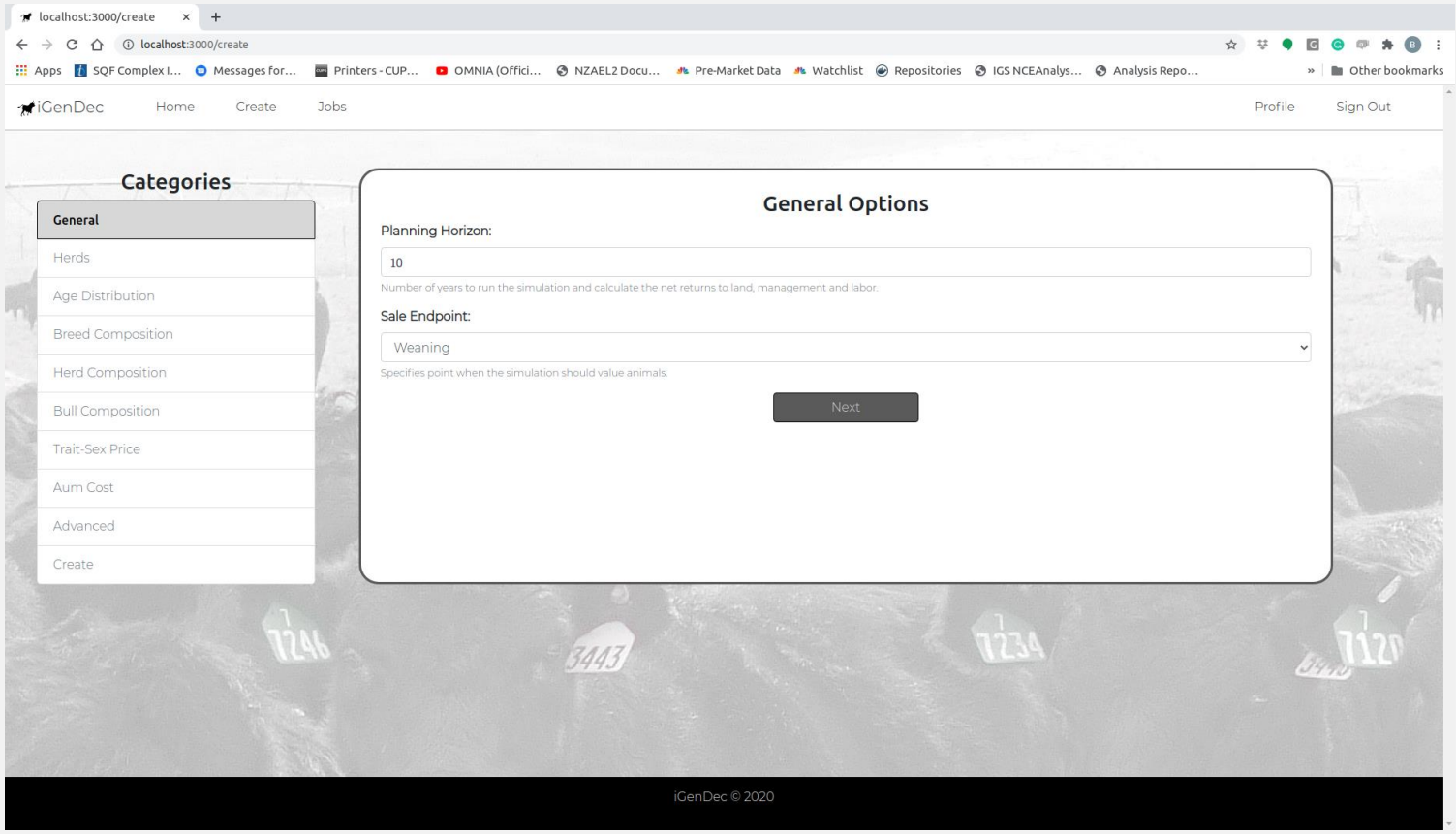
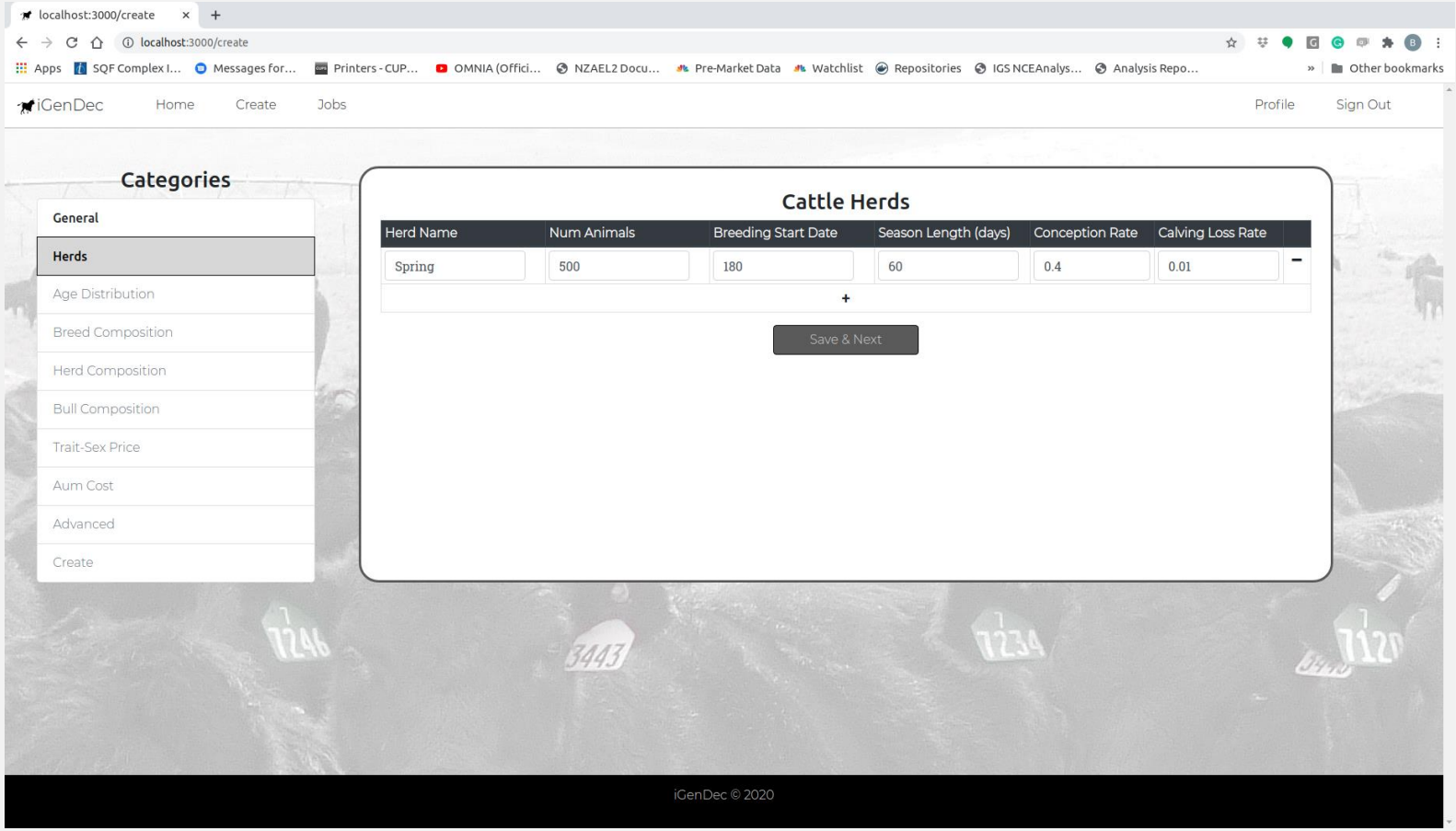
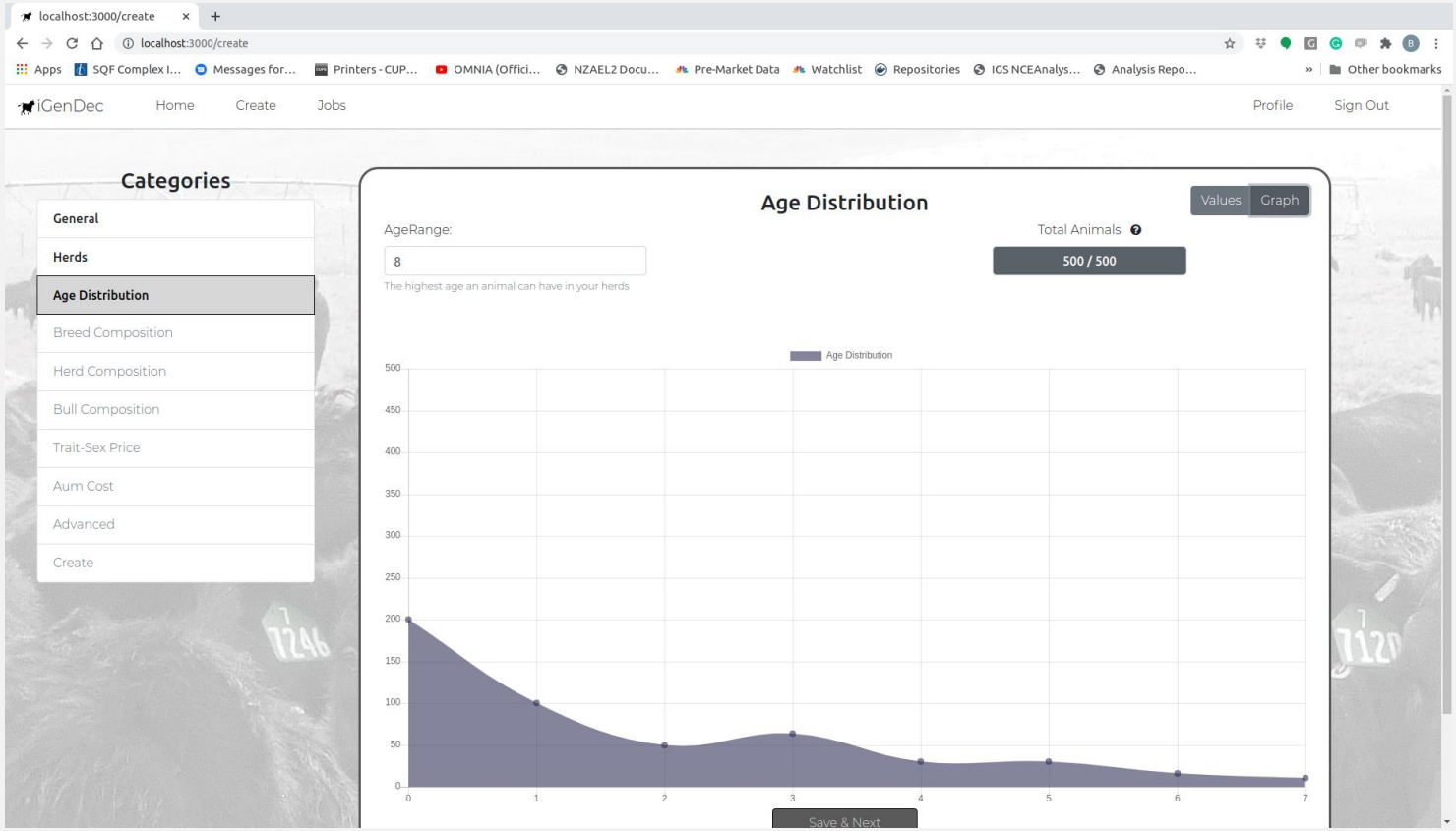
INITIAL USER INPUT

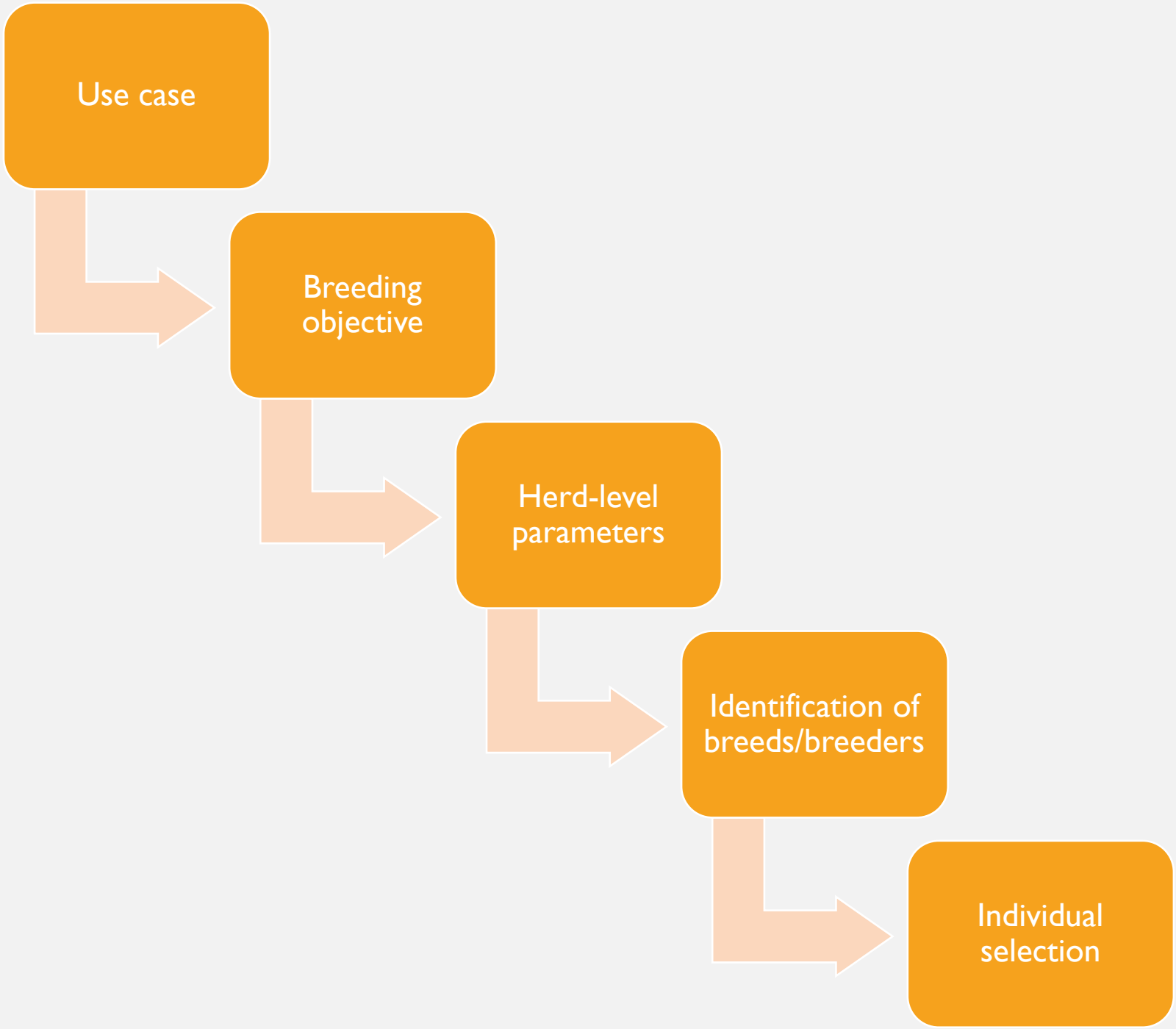


HERD-BASED PARAMETERS



INTERACTIVE COW AGE DISTRIBUTION




Use case
Breeding objective
Herd-level parameters
Identification of breeds/breeders
Individual selection

FEATURES

- Tiered layer of input
  - Essentially generalized index
  - Reasonable knowledge of unit cost of production
- Discounted gene flow
- Discounted expression rates
- Planning horizon
- Can be used to create generalized indexes with ability to further “tweak” by members/users

IMPACT OF PLANNING HORIZON
GENERAL PURPOSE INDEX W/ WW ENDPOINT

Trait	3-year	5-year	20-year
WWd	0.475	0.522	0.656
WWm	0.011	0.041	0.176
MW	0.000	-0.008	-0.067
STAY	0.015	0.252	1.403
CDd	-0.404	-0.418	-0.468
CDm	-0.051	-0.096	-0.152
HP	0.070	0.355	0.852

RELEASE TIMELINE

- Provide Advisory Board with version yet this year (2020)
- More general training of breed association staff, extension personnel, producers in 2021 (beginning late first quarter)

FINAL COMMENTS

- The impetus for this project is **not** the belief that currently available selection indices are so inherently flawed that they are of little value.
- We believe that allowing beef cattle producers to take part in the creation of their own selection index has the potential to increase the rate of technology adoption.
- The other primary improvement is in the ability to combine multiple partial solutions (e.g., additive and non-additive genetic effects) to enable sire selection across breeds in an economic framework.

THANK YOU

Team Members: Bruce Golden, Larry Kuehn, Warren Snelling, Mark Thallman, Bob Weaber

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