

A close-up photograph of a purple wildflower with a bumblebee and a smaller insect on it. The bumblebee is in the foreground, facing left, with its head buried in the flower's center. A smaller, yellow and black insect is perched on the upper right side of the flower. The background is a soft-focus blue sky.

# Sowing Seeds of Wildflower Benefit Estimation

Rich Iovanna  
USDA Farm Service Agency  
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# Team Members

## Ecologists

Jimmy Kagan, Portland State

Dave Mushet, USGS

Clint Otto, USGS

Charlie Rewa, NRCS

## Economists

Amy Ando, U Illinois

Dan Hellerstein, ERS

Rich Iovanna, FSA

Scott Swinton, Mich State



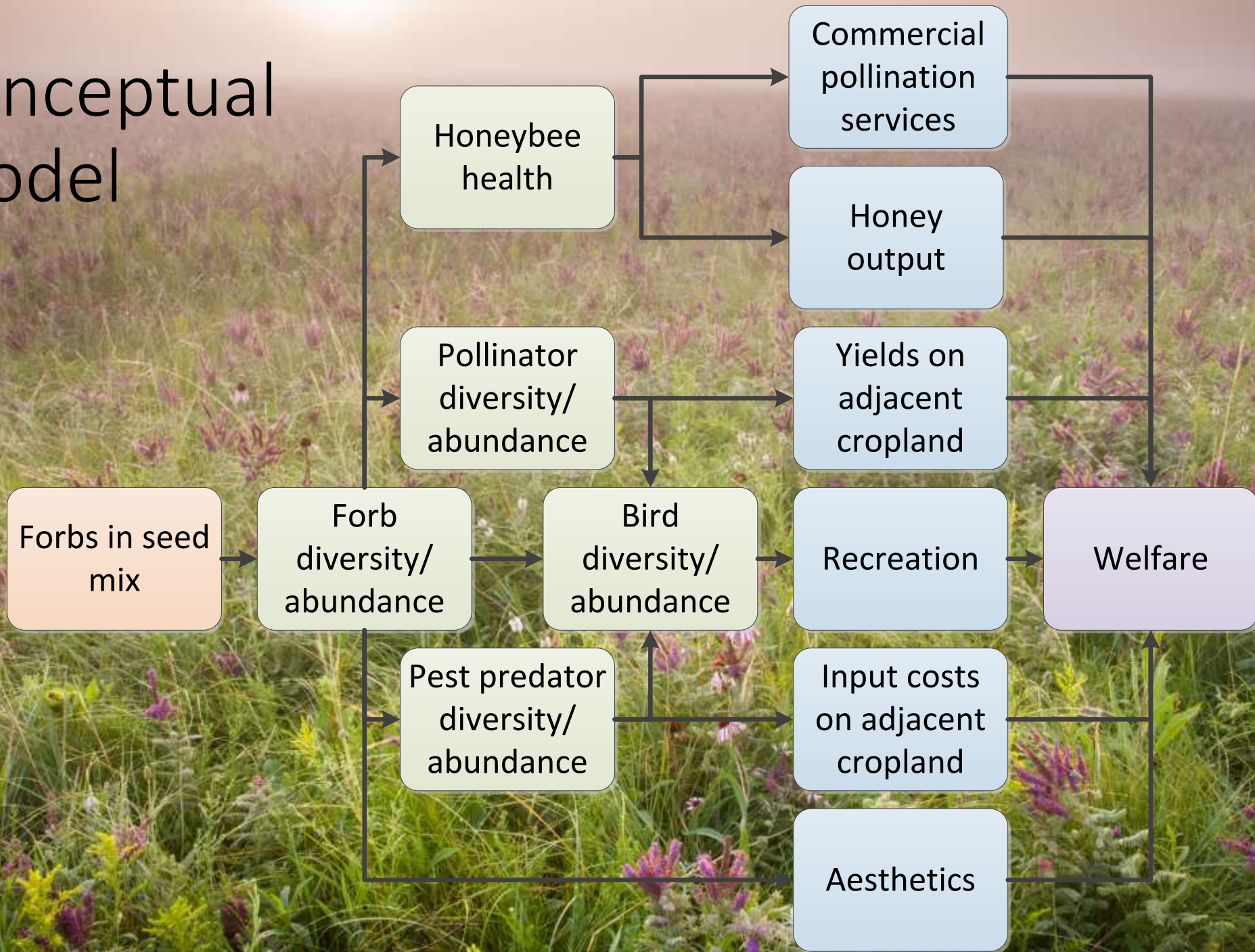


# Case Study

- Policy: Conservation Reserve Program
- Habitat: Pollinator
- Question addressed: Can we estimate the benefits of converting cropland to pollinator habitat?
  - Prairie
  - Services from pollinator habitat, rather than pollination services
  - Grass monoculture baseline
- Services:
  - Commercial pollination and honey production
  - Pollination and crop pest predation by native arthropods
  - Cultural services, e.g., non-consumptive recreation and aesthetics



# Conceptual Model





# Seed Mix

## Approach

- Assume direct relationship
- Site surveys to estimate establishment likelihood
- Policy change to limit seed mix options within region

## Considerations

- Neither practice standards nor conservation plans specify/record seed mix applied (USDA/ARS project underway)
- Periodic field visits needed to obtain cover quality data are not systematically conducted (USGS project underway)

Forbs in seed mix



Forb  
diversity/  
abundance



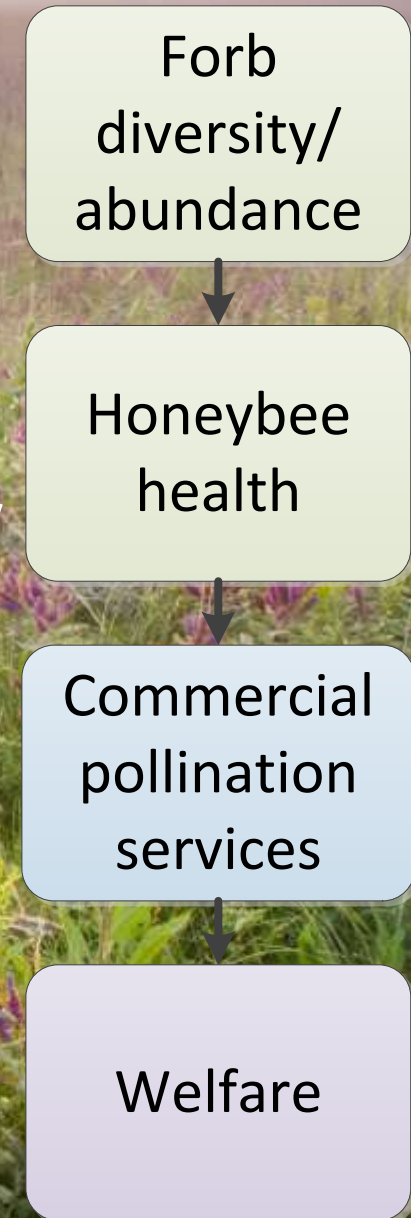
# Commercial Pollination

## Approach

- Land cover raster to forage quality raster to forage availability raster
- Assume simple relationship between forage availability and change in hive size over bloom period
- Multiply price paid per frame

## Considerations

- Data gaps (Otto 2016)
- Expert judgment
- Resolution of hive distribution data





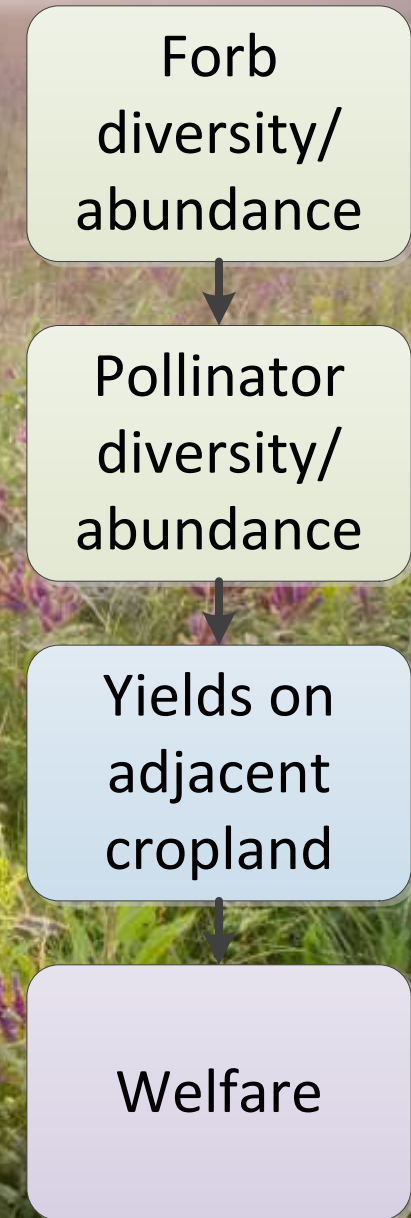
# Native Pollination

## Approach

- Land cover raster to forage/nesting quality raster to population raster to yield raster
- Apply prices and sum across crops

## Considerations

- Data gaps (USGS efforts)
- Expert judgment (Koh et al. 2016)
- Multiple species





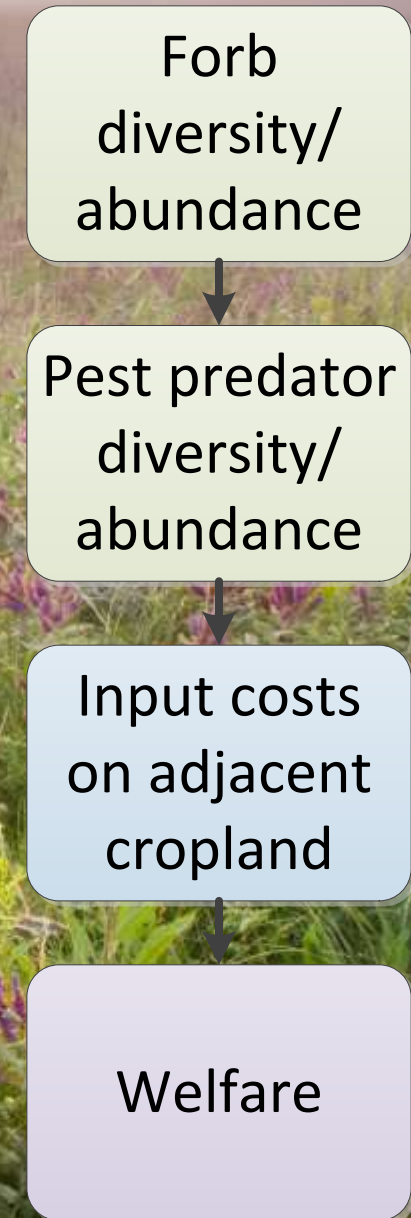
# Pest Regulation

## Approach

- Land cover raster to forage quality raster to population raster to bio-control raster (Meehan et al. 2012)
- Combine with crop loss raster, calculate change in acres of pesticide application and cost savings

## Considerations

- Data gaps (e.g., crop loss)
- Expert judgment
- Multiple species





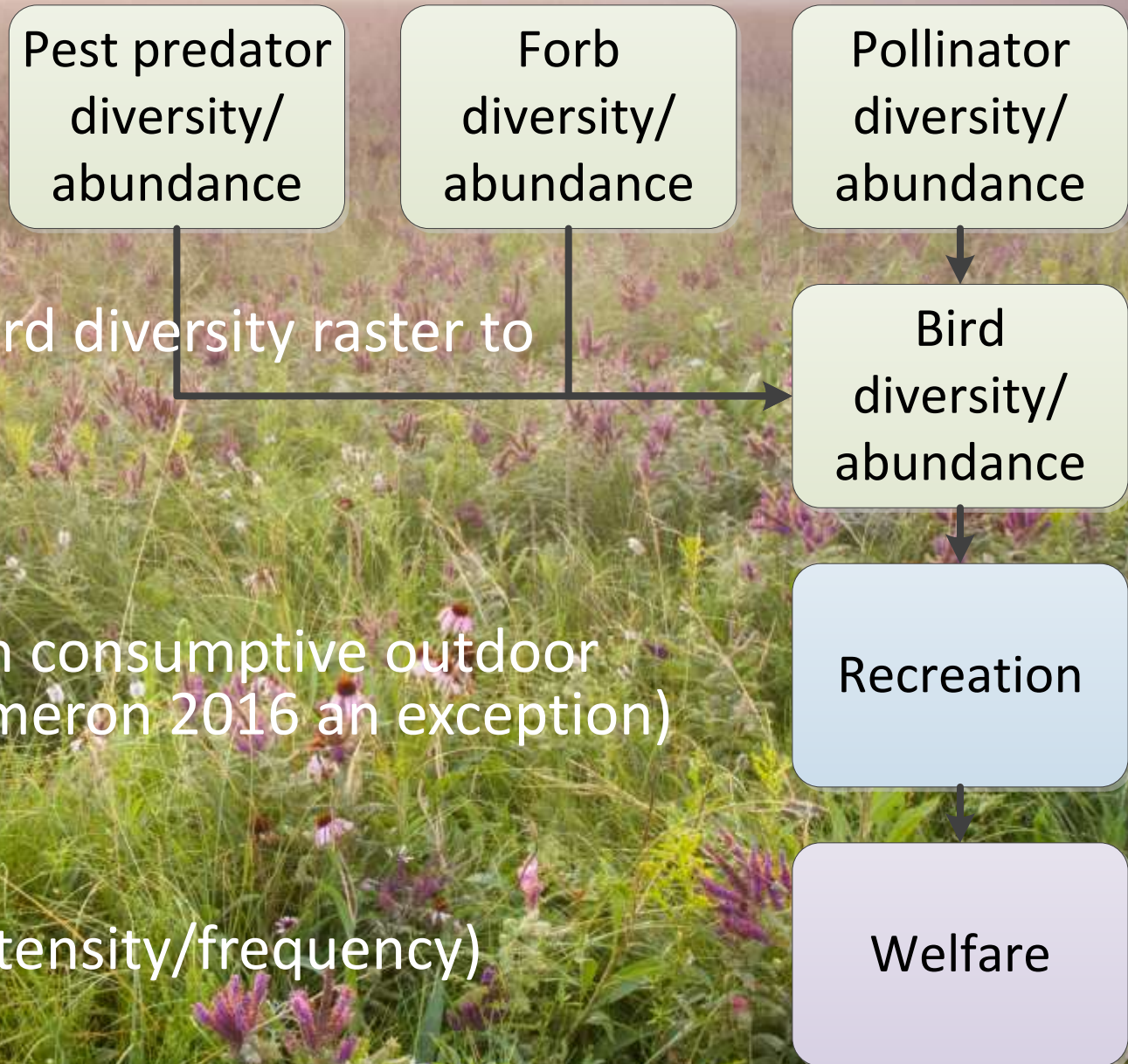
# Recreation

## Approach

- Food/nesting rasters to bird diversity raster to birding quality raster
- Multiply by population

## Considerations

- Valuation studies focus on consumptive outdoor recreation (Kolstow & Cameron 2016 an exception) and are site based
- Expert judgment
- Data gaps (e.g., birding intensity/frequency)





# Aesthetics

## Approach

- Forage quality raster to aesthetic quality raster
- Multiply by population

## Considerations

- Value for community rather than species
- Quasi-option value
- A single stated preference study (Dissanayake & Ando 2014) relevant to any degree





# Take-Away

- Develop broadly applicable and scalable approach needed for policy relevance, e.g., the spatially-explicit, raster-based modeling framework developed by the Natural Capital Project
- Rely on expert judgment to fill gaps until empirical models can be estimated
- Continue to support active research program filling some of the ecological data gaps
- Improve administrative data collection and tighten program policy
- Collaborate on projects to assess cultural services of prairie habitat
- Track program performance by quantifying/valuing specific services; boil down to an index suitable for offer selection