Model Organic Indicators and Red Flags for Natural Resources & Biodiversity

A HANDBOOK BY:

Wild Farm Alliance
# Model Organic Indicators and Red Flags for Natural Resources & Biodiversity

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Natural Resources and Biodiversity Conservation in Organic Operations:
Model Positive Indicators and Red Flags in Organic System Plans and Inspection Reports

ABOUT THIS DOCUMENT

Written by Jo Ann Baumgartner and Shelly Connor of Wild Farm Alliance (WFA) and edited by Karen Van Epen. A special thanks to Tony Fleming, and Sean Feder of CCOF for reviewing earlier versions of this document.

Organic certifiers and inspectors can use this handbook to assess how organic operations are meeting the National Organic Program (NOP) requirements to “maintain or improve the natural resources of the operation,” and “conserve biodiversity.” It contains examples of positive compliance indicators, and negative red flags with implied opportunities for improvement.

The objectives are geared towards but not necessarily limited to the five broad types of features (soil, water, wetlands, woodlands, wildlife) specifically mentioned in the NOP definition of natural resources. Many of the objectives, indicators, and red flags overlap two or more categories, and contribute to the broader goal of whole-farm biodiversity.

Organic certifiers may already “comprehensively” address the biodiversity and natural resources issues as the NOP requires in their Organic System Plans (OSPs) and Inspection Reports. Or they may only cover them partially or not at all and need to update them. As the OSPs are updated, the Inspection Reports should similarly be revised so that inspectors are prompted to report on comprehensive compliance.

Taking on increasing importance to all farmers, but not specifically mentioned in the NOP Rule, are the adaptations and mitigations necessary to continue farming successfully in a more variable and generally warmer climate. As it happens, many of the positive indicators presented provide multiple climate benefits that make the farm more resilient to extreme events, while also reducing the operation’s carbon footprint.
It is important to keep in mind that the most intensive agricultural landscapes often need to make the biggest improvements; however, these are the areas with the most potential for biodiversity benefits. So while farmers in these situations may need to be directed to resources on what is required of them, much more biodiversity benefits are to gain.

As organic agriculture expands into these regions in the future, landscapes will be more friendly to wild pollinators, beneficial insects, frogs, lizards, birds, bats and mammals.

**ABOUT WILD FARM ALLIANCE**

Since 2000, Wild Farm Alliance has educated the agricultural community about on-farm biodiversity conservation, assisted them with its practical implementation, and initiated policies that support farm stewardship. Our mission is to promote a healthy, viable agriculture that protects and restores wild nature. Our work is centered on engaging and empowering those involved in the food and farming movement, including everyone from farmers and certifiers to consumers.

To learn more, visit:
[www.WildFarmAlliance.org](http://www.WildFarmAlliance.org)

Additional Resources from Wild Farm Alliance:
[www.WildFarmAlliance.org/biodiversity_guide](http://www.WildFarmAlliance.org/biodiversity_guide)
[www.WildFarmAlliance.org/biodiversity_continuum](http://www.WildFarmAlliance.org/biodiversity_continuum)

Contact Wild Farm Alliance at:
[info@wildfarmalliance.org](mailto:info@wildfarmalliance.org)
831-761-8408
POSITIVE INDICATORS

- Work with NRCS or other programs to enhance biodiversity.
- Conservation areas, practices, and plans appear on the farm map and are described in the OSP.
- Farm has a conservation easement in place.

RED FLAGS

OSP Red Flags
- The operator does not map or otherwise indicate natural resources and biodiversity that are present on the farm.
- Practices for maintaining or improving natural resources and biodiversity are not described.
Property has some natural (woodlands, wetlands, grasslands) and semi-natural (hedgerows, alley plantings) areas.

Native plant community is present.

Connectivity is present between habitat patches on the farm as well as links to natural areas off the farm.

General abundance of wildlife species observed, such as pollinators, beneficial insects, amphibians, reptiles, birds and mammals.

RTE (rare-threatened-endangered) species are present and are recognized and protected by land owner.

Non-native invasive plant and animal species are not abundant.

Operator manages invasive species as needed.
Farm plan does not describe practices for maintaining or improving natural areas and wildlife. Farm plan does not describe any practices for managing invasive species if they are present.

• Natural and semi-natural areas dominated by invasive species and operator lacks any awareness of the issue, or has not taken steps to manage.

• Natural (woodlands, wetlands, grasslands) and semi-natural (hedgerows, alley plantings) areas or water bodies and features (riparian areas, lakes, ponds, wetlands) have been degraded or destroyed by the operation.
Wildlife habitat is only present part of the year; annual alyssum or other habitat is not replanted with the next crop.

No wildlife habitat is present anywhere on the parcel, or adjacent land managed by the operator.

Intentional killing of protected wildlife (e.g., occupied nests of migratory birds are destroyed) such as these cliff swallows featured in the photo.
All Types of Operation: Conserving Water

**POSITIVE INDICATORS**

- Water is available for uses and users other than agriculture (wildlife, streamflow, groundwater recharge, etc.).
- Riparian buffers are present along shorelines, streambanks, ditches, wetlands.
- Water is used efficiently by the operation.
- Water usage is monitored and curtailed when appropriate (drought, etc.).
The operator doesn’t describe their water conservation plans.

**OSP Red Flags**
- Excessive use of water, such as flood irrigating during a drought or where there is groundwater overdraft, or sprinkler irrigating when it is windy.

**On-the-ground Red Flags**
- No monitoring for soil moisture, water use or irrigation leaks.
- Water use by operation leaves little or no water in streams or ponds to maintain natural water level or streamflow to support wildlife needs.

Photo Credit: Lyndon Kelley

Photo Credit: Kelly Presnell / Arizona Daily Star
Cropland: Fostering Soil Biodiversity and Soil Conservation

+ POSITIVE INDICATORS

- Evidence of effective soil building practices such as: soil crumbles easily and abundance of soil animals and microorganisms like ground-nesting bees, beetles, worms, fungi, etc.

- No physical evidence of soil erosion or compaction: no gullies, sediment fans, or deep ruts and a rigid probe passes through soil, and water infiltrates easily.

- Conservation practices such as grass waterways, conservation tillage, terraces and windbreaks are utilized.

- Soil covered with crop residues or cover crops during non-cropping periods.

- Leaf litter and other plant debris are present in untilled natural and semi-natural areas.

[Photo Credit: Johnny N. Dell, Bugwood.org]

[Photo Credit: USDA NRCS]
OSP Red Flags
- The operator does not describe practices for soil building and conservation.

On-the-ground Red Flags
- No compost, cover crops or crop rotations are used.
- There are visible evidence of compaction like deep ruts, resistance to penetration or extended ponding of water.
- Soil in fields and pastures are poorly protected from wind and water erosion during non-crop season.

Photo Credit: USDA NRCS
Soil lacks appreciable biological activity.

Riparian areas, including irrigation canals and drainage ditches, lack vegetated buffers which allow soil and pollutants (fertilizers, pesticides, pathogens) to readily enter waterways.

Field edges lack vegetated buffers or runoff diversions to slow down runoff and trap sediment.

Visible evidence of erosion by wind or running water.

Riparian areas, including irrigation canals and drainage ditches, lack vegetated buffers which allow soil and pollutants (fertilizers, pesticides, pathogens) to readily enter waterways.
Visible water quality appears good in on-farm or adjacent water bodies.

Field edges have substantial vegetative buffers or runoff diversions to slow down runoff and trap soil and pollutants during extreme rainfall events.

Conservation practices oriented towards water quality are utilized.
Cropland: Maintaining and Improving Water Quality

RED FLAGS

Same issues noted under Soil Biodiversity & Soil Conservation, plus:
On-the-ground Red Flags

OSP Red Flags
- Farm plan doesn’t describe practices for maintaining or improving water quality.

- Fertilizer or manure applied to soil surface immediately before a storm or irrigation event.

- Handling or storage of manure, compost, or other inputs jeopardizes water sources or crop intended for human consumption.

- Visible evidence of water-quality degradation includes: murky, sediment-laden water in streams and ditches, gullies and rills in crop fields, soil deposited in waterways.

- Runoff from manure applied to frozen, biologically dormant soil is a leading cause of poor water quality.

- Widespread algae blooms, or thick mats of aquatic weeds in waterbodies.

- Poor water quality in on-farm stream that enters a waterbody.
Flowering crop and noncrop plants are present.

Multi-leveled crop plant structure, such as sunflowers are interspersed in vegetables.

Diversity and abundance of adjacent or interplanted noncrop habitat like woodlands, wetlands, hedgerows, alleys or ground cover beneath orchards.

Brush piles, decomposing logs, patches of bare soil (for ground-dwelling insects, especially bees) and healthy duff layer in adjacent non-crop habitat.

Native plants dominant in non-crop habitat with sparse invasive non-native plants.

Diversity of beneficial organisms such as predatory insects, wasp parasitoids, spiders and other arthropods, bats, birds and mammals.

Appropriate selection and diversification of crops suitable to site-specific conditions and resistance to prevailing pests, diseases, and weed pressure.
osp red flags

- Farm plan does not describe practices for incorporating biodiversity in crop systems (e.g., crop rotation).
- Farm plan does not describe plan for selecting crop types and varieties that are suitable to site-specific conditions and resistant to prevailing pests, diseases, etc.

on-the-ground red flags: annual crops

- Same species repeatedly grown without interruption on the same parcel.

on-the-ground red flags: perennial crops

- Only weeds or non-native plants are present by default within perennial crop system.
- Rotation does not include any sod (grasses), cover crops, green manures, or catch crops, where site-specific environmental conditions would allow it.
- Cropping system does not include additional species besides the primary crop. For example no perennial ground covers, hedgerows or alley crops.
Cropland: Incorporating Biodiversity in Annual and Perennial Cropping Systems

**RED FLAGS**

**On-the-ground Red Flags: Both Annual and Perennial Crops**

- Adjacent non-crop areas (woodlands, wetlands, hedgerows, etc) are degraded by farming practices, lack diversity, and/or are infested with non-native invasive plants.

- Evident lack of diversity of beneficial and predatory organisms and their habitats.

- Tests indicate excessive copper accumulation in the soil.

- Indiscriminate destruction of wildlife, beneficial organisms, or their habitat (e.g., strychnine treated grain used to kill rodents also kills birds, shown above; or mowing without a bar extension kills nesting birds, not shown).

- Inappropriate selection or diversity of crop types and varieties: crops demonstrably susceptible to common pests, shown above, and diseases, or unable to compete with dominant weeds, leading to ongoing usage of inputs that damage local biodiversity (in soil and adjacent areas).
Appropriate buffer zones are maintained against potential contamination sources.

Diversion ditch(es) are maintained to prevent entry of contaminated water from external sources.

Appropriate lag time is observed between application of manure (as defined by NOP rule) and harvest of crop intended for human consumption.

Presence of above- and below-ground biodiversity excludes or outcompetes pathogens.

Crop intended for human consumption is located away from contamination source (e.g., manure pile, input storage).

Livestock is located away from all water sources and crop.

Wildlife habitat is conserved.
Farm plan does not describe practices for maintaining wildlife and preventing crop contamination (for edible crops).

OSP Red Flags
- Farm plan does not describe practices for maintaining wildlife and preventing crop contamination (for edible crops).

On-the-ground Red Flags
- Buffer zones are lacking or inadequate to prevent contamination of crop by runoff or aerial drift from neighboring land uses.
- Flooding or runoff from adjacent high-risk sources (e.g., a feedlot) causes waterborne contamination of crops intended for human consumption.
On-the-ground Red Flags

- Manure handling practices directly or indirectly contaminate crops intended for human consumption. Photo shows how stepping in manure could spread pathogens to greens or other crops eaten raw, or to a packing shed or similar crop handling area.

- In an effort to reduce wildlife presence in crops, food safety buyers suggest misguided practices that can cause wildlife death. For example, copper can be used in ponds to improve water quality, but they suggest its use because it also kills frogs.

- Misguided food safety practices demand the exclusion of all wildlife and their habitat, and recommend the use of barriers such as this plastic fence. While the fence is minimally effective at keeping out wildlife, removing habitat can increase erosion and pest damage and reduce pollination.
POSITIVE INDICATORS

Same Soil Conservation indicators under Cropland, plus:

- Contains diverse mix of forages.
- Healthy biomass and height and cover of forages.
- Good color of forage; large size of plant roots.
- Well-designed and executed rotational grazing system allows forages to recover between grazing episodes.

On-the-ground Red Flags

Same Soil Conservation issues under Cropland, plus:

- Inappropriate application of manure or other inputs to pastures contributes to contamination of crops and soil by plant nutrients, heavy metals, or pathogenic organisms.
- Forages are overgrazed, thin, or degraded, soil erosion is visible.
Livestock is excluded from water sources and crops intended for human consumption.

Forages include native plant species and have few invasive plant species.

Healthy biomass and height and cover of forages.

Good color of forage; large size of plant roots.

Riparian buffers are present along shorelines, streambanks, ditches, wetlands.

Livestock access to stream crossings and water sources is tightly controlled.

Water sources for livestock are provided away from natural water bodies.

Uses intensive rotational grazing that mimics the behavior of native grazers and encourages rapid regrowth of forages.
Farm plan does not describe practices for managing livestock, manure, and containing runoff that may degrade water resources. If natural wetlands or riparian areas are present, the operator does not describe their plan for protecting them.

OSP Red Flags
- Farm plan does not describe practices for managing livestock, manure, and containing runoff that may degrade water resources.
- If natural wetlands or riparian areas are present, the operator does not describe their plan for protecting them.

On-the-ground Red Flags
- Livestock allowed to access and potentially contaminate water sources and crops intended for human consumption.
- Riparian areas overgrazed, streambanks and lakeshores eroded, wetlands degraded.
- Visible runoff of manure (shown left) into waterbodies or crops intended for human consumption or poor management of manure during storage, transport, or application.
Livestock: Incorporating Biodiversity in Livestock Operations

+ POSITIVE INDICATORS

Same Biodiversity indicators under Cropland; plus:

- Forages include native plant species and have few or no invasive plant species.
- Operation coexists with wildlife (e.g., wild ungulates, prairie dogs, grassland birds).
- Migratory paths of wildlife unimpeded by operation.
- Native trees and shrubs are used for shade.
- Appropriate selection or diversification of livestock suitable to site-specific conditions and resistance to prevailing diseases and other limitations.
Livestock: Incorporating Biodiversity in Livestock Operations

**RED FLAGS**

Same or similar Biodiversity issues under Cropland, plus:

**OSP Red Flags**
- Farm plan does not describe practices for incorporating biodiversity and co-existing with wildlife.
- Farm plan does not describe process for selecting breeds of livestock suitable for site-specific conditions and resistant to prevalent diseases and parasites.

**On-the-ground Red Flags**

- Livestock is allowed to continuously graze in or otherwise degrade high-quality natural areas (woodlands, wetlands, etc).
- Intentional killing of animals such as prairie dogs that are an integral part of the food web upon which many species rely.
Livestock: Incorporating Biodiversity in Livestock Operations

On-the-ground Red Flags

- Careless killing of wildlife such as, wildlife is entangled in barbed wire; or neglect to use escape ramps in water troughs and small animals drown.

- Livestock have no shade during hot weather.

- Inappropriate selection and diversity of livestock: animals demonstrably susceptible to common diseases, parasites, climatic conditions, or other limitations of the site, resulting in ongoing usage of inputs that may, over time, damage either local natural resources or the livestock themselves.
Livestock: Employing Predator Friendly Management Practices

**POSITIVE INDICATORS**

- Operator employs appropriate deterrents and protective measures, such as: guard animals; grazing small (vulnerable) livestock with larger ones; electric fencing; predator lights.
- Diverse landscape supports natural prey for predators.
- A diverse and healthy population of predators is present.
- Rodents are present in low numbers due to healthy predator/prey relationship.
- Records are kept of livestock deaths and predator-friendly management practices.
- Livestock are savvy in presence of predators.
Livestock: Employing Predator Friendly Management Practices

**RED FLAGS**

On-the-ground Red Flags

- Intentional killing of predators without first using preventative co-existence methods occurs.

- Lack of biologically diverse landscape reduces availability of natural prey.

- No records kept of livestock deaths in order to evaluate predator role; and no deterrent measures are documented.

OSP Red Flags

- The operator does not describe their plan for co-existing with predators.
Wildlife and livestock are not exposed to excessive manure in yards or pastures.

Wildlife are not exposed to any livestock manure in their natural habitats.

Manure dust and debris not carried beyond livestock facility.

Livestock are adapted or resistant to local diseases and parasites.

Livestock are excluded from crops intended for human consumption.
Livestock: Minimizing Transference of Diseases & Pathogens Between Livestock, People & Wildlife

**RED FLAGS**

**On-the-ground Red Flags**

- Manure runoff travels to surface water and off-site.
- Poorly drained yards, feeding pads, feedlots and lanes force animals to stand in excess water and manure.
- Songbirds are seen consuming grain in feedlots, possibly spreading parasites and pathogens off site.

**OSP Red Flags**
- Farm plan does not describe practices for managing manure.
Wild Harvest: Maintaining and Improving the Sustainability of the Harvested Species

**POSITIVE INDICATORS**

- Populations are stable or growing.
- No evidence of soil erosion or loss of quality.
- No evident impacts on water quality.
- Invasive plant and animal species are absent or present in low numbers.
- Coordination is conducted with others who harvest in the same area.
- Approval to harvest in areas is not under the operator’s control.
Farm plan does not describe practices to ensure harvesting or gathering do not degrade natural resources and will sustain the growth and production of the wild crop.

OSP Red Flags
- Farm plan does not describe practices to ensure harvesting or gathering do not degrade natural resources and will sustain the growth and production of the wild crop.

On-the-ground Red Flags
- Populations are declining or destroyed (ginseng shown here).
- Evident water quality issues, while harvesting wild mushrooms.
- Invasive species, like garlic mustard (photo to the left) can overrun wild harvest sites such as mushrooms.
Water from impervious surfaces flows through a filter strip, rain garden, or wetland.

Facility wastes are reused, recycled, or managed appropriately.

Native plant landscaping occurs around facility.

Rodenticides are not used prophylactically, i.e., in the absence of a documented rodent problem, and usage follows NOP pest management hierarchy:
1. Cultural, biological and mechanical practices,
2. Substances on the National List; and
3. Substances not on the National List.
Handling Operations: Promoting Biodiversity in Handling Operations

**RED FLAGS**

**OSP Red Flags**
- Farm plan does not describe practices for maintaining or improving natural resources and biodiversity.

**On-the-ground Red Flags**
- Runoff from facility is discharged directly into local waterbodies, where it can cause erosion, flooding, or pollution.
- Processing waste is not adequately treated and pollutes water or harms wildlife.

Photo Credit: USDA NRCS
On-the-ground Red Flags

- Emissions pollute air and/or air quality permits are not up to date.

- Premises are landscaped with invasive exotic plants such as Japanese Honeysuckle shown in photo.

- Ongoing, continuous use of rodenticides in the absence of a documented rodent problem or failure to follow NOP pest management hierarchy.
Selected Resources:

- Bohan, H. *Quick & easy habitat education activities: Wildlife sign walk*. Starflower Foundation.
- Faber, M. 2002. *Soil quality and site assessment card*. CT NRCS, USDA NRCS.
- NRCS, I. 2014. *Idaho NRCS Soil Health Assessment Card*. Idaho NRCS, USDA NRCS.
- NRCS, U. 2013. *California your farm and agricultural water quality*. USDA NRCS.

We can't do this work without you.

Please visit [www.WildFarmAlliance.org](http://www.WildFarmAlliance.org) to find more resources on how you can help support biodiversity on organic farms.