Iowa NRCS Wetland Restoration Criteria and Guidelines

January 2024

WRP Restoration, Hancock County, Iowa

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1. Introduction

Iowa has three decades of history with conservation easement programs, having been one of the original nine pilot states for the fledgling Wetland Reserve Program (WRP) dating back to 1990, and enrolling its first easements in 1993. By the time WRP and the Natural Resources Conservation Service's (NRCS) other conservation easement programs were consolidated under the Agricultural Conservation Easement Program (ACEP) in the 2014 Farm Bill, Iowa had already enrolled over 1,500 easements.

Under ACEP-Wetland Reserve Easements (ACEP-WRE), NRCS purchases easements directly from private and Tribal landowners through a reserved interest deed on eligible land to restore, protect, and enhance wetlands and associated uplands. The United States (US) holds the easement, and the Natural Resource Conservation Service (NRCS) is responsible for monitoring, management, and enforcement. The wetland easement programs can be and are used as a catalyst for protection and restoration of important statewide resources.

This Wetland Restoration Criteria and Guidelines (WRCG) document is a requirement of the ACEP Program Manual (440-528-M, 1st Ed., Amend. 131, Feb 2020). Each State must develop State-specific criteria and guidelines for wetland restoration under ACEP-WRE and Stewardship of legacy conservation easement programs such as WRP/EWRP (Emergency Wetland Reserve Program). This document may also be used for decision-making on Emergency Watershed Protection Program – Floodplain Easements (EWPP-FPE) where authorized. The State-specific WRCG is the document in which each State identifies more specifically the technical information the State will use to guide decision making for activities related to eligibility, ranking, selection, restoration, enhancement, and management of wetlands and associated habitats under ACEP-WRE to ensure program purposes are achieved. The WRCG should also capture such technical criteria and guidelines that have been developed in consultation with the State technical committee, and with input from other partners such as U.S. Fish and Wildlife Service (FWS), State wildlife agencies, and others. The State-specific WRCG should be a robust document in order to serve as a basis for various technical determinations and decisions related to wetland restoration activities implemented under ACEP-WRE throughout the lifespan of an easement or 30-year contract.

2. Objective

Iowa's WRCG addresses the requirements outlined in the ACEP manual (528.131B.). The WRCG is considered a living document for technical criteria and provides the greatest utility in supporting and aiding objective, sound, and consistent decision-making in the technical aspects of program delivery for existing WRP/EWRP and future ACEP-WRE enrollments. The WRCG may be reviewed annually with the State Technical Advisory Committee (STAC) and updated as necessary. Iowa NRCS will review and update as necessary per Farm Bill. All decisions documented in the WRCG must be consistent with ACEP statute, regulation, and policy and ensure that program purposes are achieved. The contents of the WRCG do not supersede the policy and requirements in the ACEP manual. If any conflicts arise, the language of the statute, regulation, or policy shall prevail. The State Conservationist may use this WRCG to supplement the National policy if this State-level supplement is developed, reviewed, approved, and published in accordance with Title 120, National Directives Management Manual (NDMM), Part 503.

3. Application Eligibility, Evaluation, and Ranking

This section aids Iowa NRCS in technical decision-making for new enrollments in ACEP- WRE. Unless otherwise noted, the information in this section is not applicable to existing enrollments and closed conservation easements.

Following eligibility determinations for both the landowner(s) and the land offered for enrollment, NRCS evaluates and ranks the application. Evaluation and ranking will occur within NRCS business tools- Conservation Desktop (CD) and Conservation Assessment and Ranking Tool (CART). Each year, copies of the ranking pools and evaluation criteria will be published on the public Iowa NRCS website.

3.1 Priorities

3.1.1 Size

Iowa NRCS has determined that in Iowa's severely altered landscape, applications less than 35 acres in size do not yield sufficient wetland functions and values to justify the investment of ACEP funds and the staff time necessary to enroll such small applications, and as such, these small applications will be penalized in ACEP-WRE ranking- **with three exceptions:**

- Applications <35 acres in size will not be penalized in ranking if they are contiguous with another permanent, currently enrolled, NRCS wetland conservation easement, or similarly protected land with equal or greater management requirements and the shared objective of wetland and wildlife habitat restoration.
- Applications <35 acres in size will not be penalized in ranking if they are part of a "group" application and the small parcel is critical to the overall integrity of the larger restoration.
- Applications <35 acres in size will not be penalized in the ranking if they contain restorable, unique wetland habitat types as described in section 3.3.7.

  "**Wetland**" as defined in NFSAM, is an area that meets the following three criteria:

  - Contains a **hydric soil**
  - Supports, or capable of supporting a predominance of **hydrophytic vegetation**
  - Has sufficient **hydrology** to support hydrophytic vegetation and maintain hydric soils through either:
    - Inundation (flooding or ponding) occurring for 7 consecutive days or longer during the growing season in most years (>50% chance); or
    - Saturation at or near the surface occurring for 14 consecutive days or longer during the growing season in most years (>50% chance). Soils may be considered to be saturated to the surface when the water table is within:
      - 0.5' of the surface for coarse sand, sand, or fine sandy soils; or
      - 1.0' of the surface for all other soils

- "**Wetland Functions**" are defined as the processes that wetlands perform independent of human opinion, such as nutrient cycling, flood flow alteration, sediment stabilization,

providing plant and animal habitat.

- "**Wetland Values**" are defined as a measurement of the benefit these wetlands provide to society- improved water quality, economic benefit, carbon sequestration, and recreation.

3.1.2 Duration

Iowa NRCS has determined that easement duration bears consideration during ranking. Similar to the prioritization of easement size above, NRCS realizes no efficiencies in enrolling 30-Year Easements vs. Permanent Easements, only a decreased duration of realized increases in wetland functions and values. For this reason, 30-Year Easements will be penalized in the ranking- **with one exception:**

- 30-Year Contracts/Easements constitute the maximum allowable duration of enrollment of acreage owned by Indian Tribes and as a result, such applications will not have points reduced for the duration of enrollment.

3.1.3 Resource Concern Categories

Iowa NRCS may choose in any given year to give priority to ACEP-WRE enrollments that directly address the following resource and related concerns, whether in the ranking criteria or other method as permitted by policy:

- Water quality, including the capacity of the previously degraded wetland that has been restored to improve water quality;
- Wildlife habitat addressing threatened and endangered species;
- Wildlife habitat initiatives;
- Protection of migratory birds and wetland-dependent wildlife; and
- Floodwater storage and attenuation.

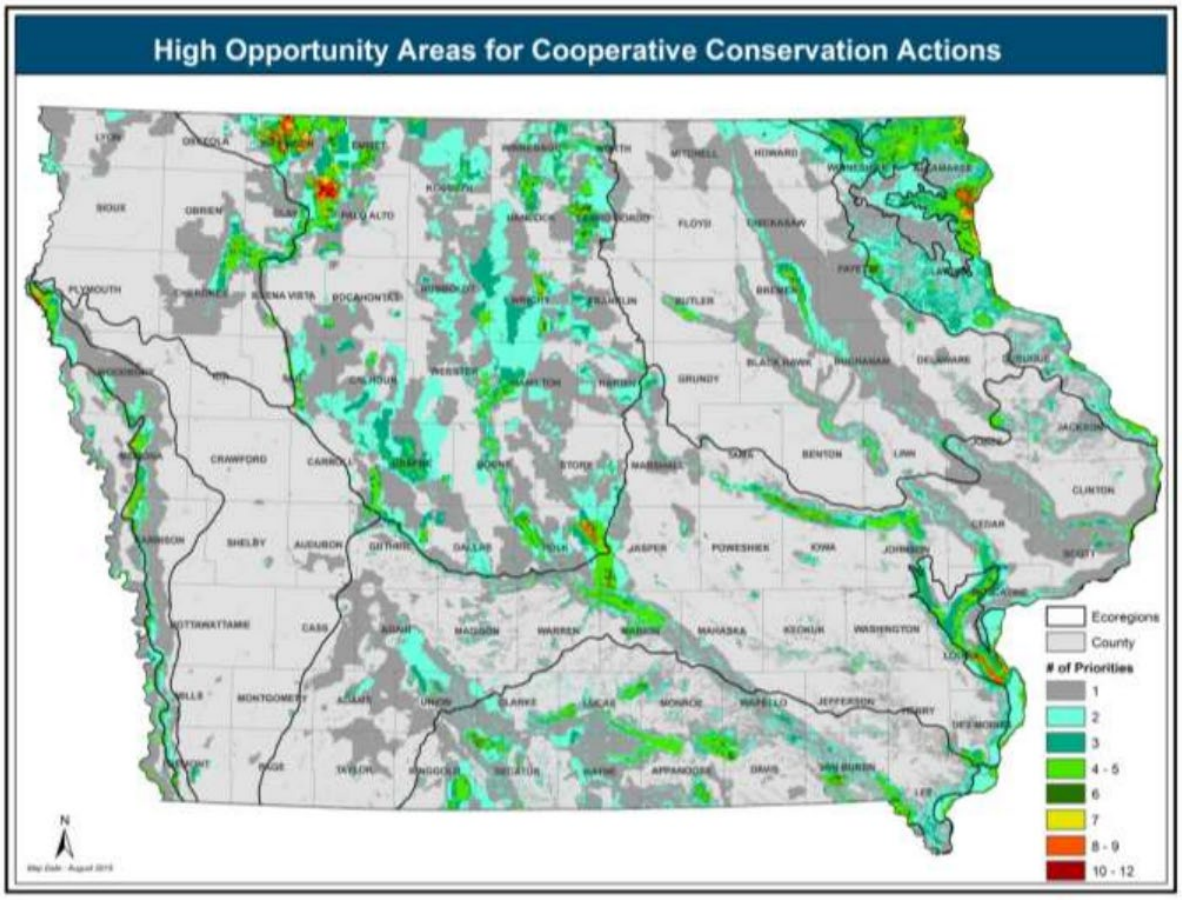
For ACEP-WRE CART assessment/ranking purposes, the following Resource Concerns will be evaluated:

- Long-term Protection of Land (Loss of Functions and Values)
- Terrestrial Habitat
- Aquatic Habitat (Aquatic Habitat for Fish and Other Organisms)

3.1.4 Priority Areas

Priority geographic regions may be used to target certain areas of the State where restoration of wetlands may better achieve Federal, State and regional goals and objectives. Additionally, the State may also set priorities for specific priority wetland habitat types.

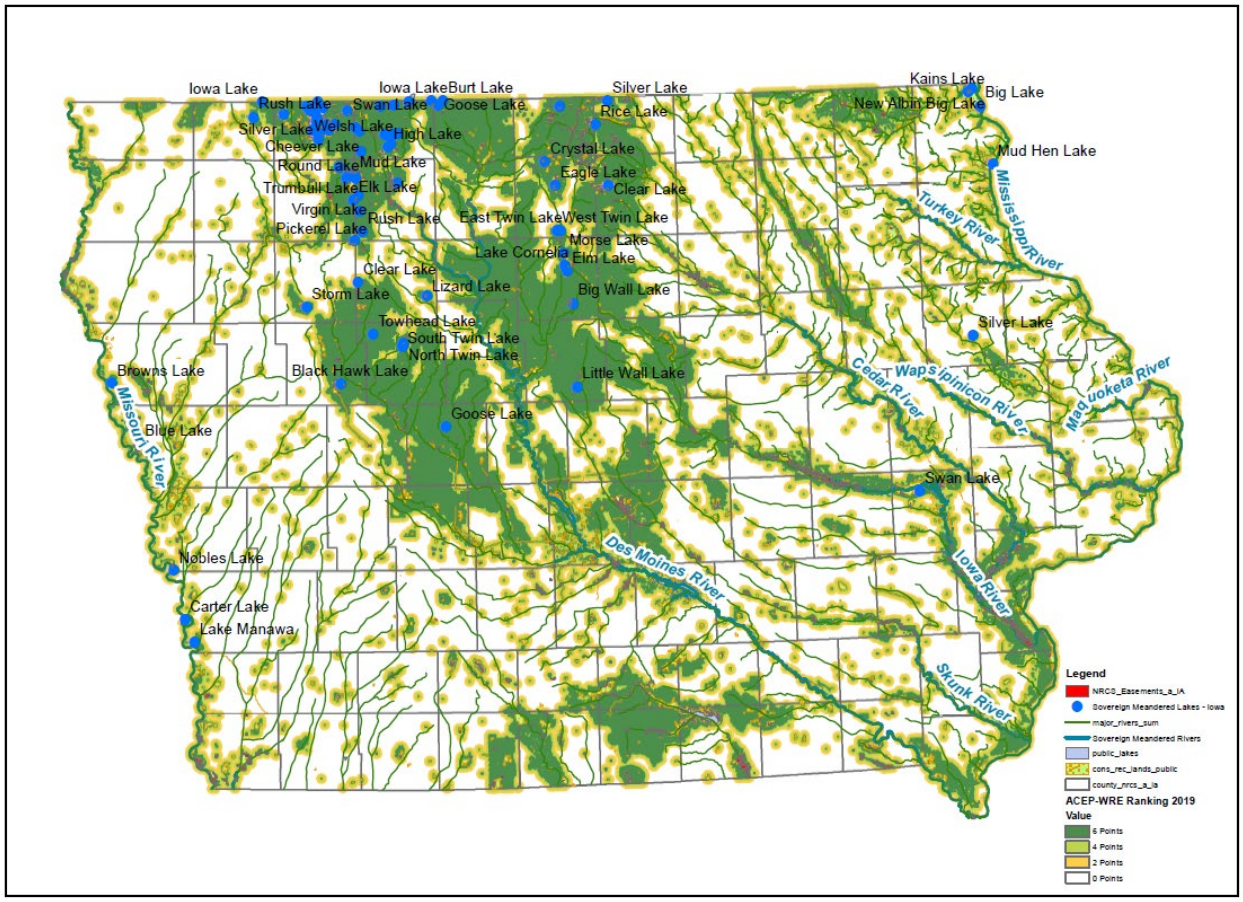
Iowa NRCS ACEP-WRE priority areas currently have their roots in the Iowa Wildlife Action Plan (IWAP). Some 22 layers of spatial data used to identify "High Opportunity Areas for Cooperative Conservation Actions" in the IWAP formed the starting point for priority area development in 2014.



In an effort to make the dataset more manageable and focus efforts on lands that would be eligible for ACEP-WRE, the following shapefiles were chosen for further analysis:

- **Shallow Lake Watersheds**
- **Wildlife Protection Priorities**
- **Bird Conservation Areas**
- **ACOE Mitigation Priorities**
- **DU Living Lakes Emphasis**
- **Important Bird Areas**
- **SE IA Amphibian/Reptile Conservation Area**
- **Significant Public Lake Watersheds**
- **Topeka Shiner Designated Habitat**
- **INHF Priority Areas**
- **TNC Priority Areas**
- **INHF Priority Areas**

Revisions were made in 2019 to incorporate Watershed Management Authorities (WMA's) as core priority areas. This information, merged with hydric soils data from SSURGO, and the Iowa NRCS Conservation Easement layer to yield the current basis for assigning priority area points in ACEP-WRE ranking.



3.2 General ACEP-WRE Eligibility

3.2.1 Required Documentation from Landowner

Basic land and landowner eligibility must be determined by NRCS at two points during the easement process- first at the time of application, prior to ranking, and again when the agreement to purchase (APCE or AECLU) is executed.

- Consistent with Section 528.102C.(4), **Iowa NRCS will not rank an application until all required application materials have been submitted by the landowner** sufficient for NRCS to determine that all current landowners of record are eligible and that the land eligibility requirements can be met. Applications will remain in "draft" or "pending" status until all landowner and land eligibility documents required from the landowner have been provided.
- Eligibility must be determined for the fiscal year in which the agreement to purchase (APCE or AECLU) is executed, which may require the landowner to submit updated documentation.

<u>All</u> the following documentation is required to be obtained <u>and</u> reviewed prior to ranking:

- Copy of current **ownership** documentation, including a breakdown of ownership shares if applicable
- Documentation of **legal access** rights, including, where applicable, documentation of legal access rights across adjoining landowner (e.g. executed right-of-way, executed agreement for granting right-of-way after survey).
    - Must be unencumbered, unrestricted, and transferrable legal right of access from an identified Federal, State, or local public right-of-way to the **entire** enrolled area for the term of enrollment.
- Form **AD-1026** "HEL/WC Certification" for all landowners listed on the ownership documentation, including required members of legal entities, filed with FSA.
- Form **CCC-941**, "AGI Certification and Consent to Disclosure of Tax Information", and related forms, or equivalent successor forms as applicable for all landowners listed on the ownership documentation, including required members legal entities, filed with FSA.
- Evidence of signature authority
- When the landowner is a legal entity:
    - Form **CCC-901**, "Member's Information", or Form **CCC-902**, "Farm Operating Plan" (when the landowner is a legal entity), or equivalent successor forms as applicable, filed at FSA.
    - Proof that the legal entity is a legal and valid entity in the State where the land is located, usually by a **certificate of good standing from the Secretary of State**.
    - Iowa has gotten a clarification from Easement Program Division to the "Landowner Eligibility Matrix" regarding 902 filing by entity members, as follows:
        - ***Members of a legal entity are not required to file a CCC-902 unless such members are also applying for or are participating in an NRCS program independently. (See NB 300-22-59)***

Iowa further defines terms important to this section as follows:

Landowner of Record – those parties listed on the most recent vesting deed(s) covering the proposed easement area and including any parties that would be considered "landowners" for NRCS purposes as defined in Easement Common Provisions Part 527, Subpart D, appearing below.

Landowner – for the purposes of administering the NRCS conservation easement programs, a person or legal entity that holds the following interest in a subject property is considered a landowner:

- Fee simple interest to any portion of the subject property
- A life estate interest in any portion of the subject property (life tenants)
- A remainder interest in any portion of the subject property (i.e., the remaining interest after the death of any life tenants).

- So called “Lady Bird Deeds” or “Enhanced Life Estate” remainder interest arrangements are **not** considered landowners for NRCS programs.
- Buyers or sellers under an active contract for deed, land contract, or other land purchase arrangement whereby the seller of the property retains legal title to any portion of the subject property.
- The estate of a deceased landowner prior to the distribution of the deceased’s assets to the legal heirs, or
- Legal entitlement to a direct payment of a portion of the proceeds resulting from the sale of a conservation easement.

3.2.2 General Land Eligibility Considerations – Restorability

Section 528.105A.(1) of the ACEP manual cites general considerations that should be made during the eligibility determination process. A majority of these considerations refer to “restoration” (defined here in Section 4.1), for that reason, Iowa wishes to place emphasis on firmly establishing the degree of restorability possible during the eligibility process. All the eligible land types covered in Section 3.3 should be evaluated in the context of restorability, with an honest assessment of on-site or off-site conditions which may impact the ability to substantially restore wetland hydrology and native vegetation. Impediments to restoration, which could result in a determination of ineligibility consistent with 528.106A.(vii) in Iowa include, but are not limited to:

- Utilities and/or utility right-of-way easements which forbid excavation, vegetation establishment/management, or vehicular and equipment access.
- Drainage district infrastructure (surface drains/ditches, subsurface drainage, etc.) of sufficient quantity and size that hydrologic restoration to historic conditions (or a close approximation thereof) is not possible or cost prohibitive.
- Man-made structures which cannot be removed, modified or otherwise mitigated to allow for substantial restoration- or if removed would cause off-site impacts to adjacent properties. Examples include, but are not limited to, levees, diversions, abandoned railroad or road grades, etc.
- Man-made structures that would place an unacceptable burden on NRCS to maintain or manage (e.g. bridges)

3.3 Land Types and Eligibility

There are six (6) categories of eligible land types for ACEP-WRE:

1. Farmed or Converted Wetlands, including:
   a. Farmed or Converted Wetlands
   b. Former or Degraded Wetlands
   c. Lands Substantially Altered by Flooding
2. Croplands or Grasslands Flooded by Overflow of a Closed Basin Lake or Pothole
3. Riparian Areas
4. Lands in the Conservation Reserve Program (CRP)
5. Wetlands Restored or Protected Under a Private, State, or Federal Program
6. Hydric Soil Minor Components (Inclusions) and Problematic Hydric Soils (Atypical Situations)

Any land not meeting the eligible land criteria described in this section, that does not meet the criteria for "adjacent lands" (see 3.2.7), and that cannot be determined otherwise eligible upon review of current National policy is considered ineligible for ACEP-WRE. Not all land eligibility categories will apply to Iowa or to all areas in Iowa. Only the most common land eligibility categories applicable to Iowa will be addressed below. For further information on other land eligibility categories, refer to Conservation Program Manual (CPM), Title 440, Part 528, Section 528.105.

3.3.1 Farmed or Converted Wetlands

Farmed wetland or converted wetland together with the adjacent land that is functionally dependent on the wetlands are eligible for enrollment, except that converted wetland are not eligible if the conversion was not commenced prior to December 23, 1985, except as provided for in CPM, Title 440, Part 528, Section 528.105(I)(6), and is identified as one or more of the following (CPM, Title 440, Part 528, Section 528.105(C)):

1. **Wetlands farmed under natural conditions, farmed wetlands, prior converted cropland, commenced conversion wetlands, and farmed wetland pastures.**
    - This eligibility category shall only be applied to acres that have had a wetland determination and have been labeled as FW, FWP, PC, MW or CC.
    - Acres which have labels of CW or CW+Year are **NOT** eligible
    - "**Farmed Wetland**" **(FW)** is defined as a wetland that was manipulated and planted before December 23, 1985, but still meets inundation or saturation criteria. These areas may be farmed and maintained as documented before December 23, 1985, as long as they are not abandoned (i.e., management or maintenance for commodity production ceased for 5 consecutive years).
    - **"Farmed Wetland Pasture" (or Hayland) (FWP)** is defined as a wetland that is used for pasture or haying, was manipulated and planted before December 23, 1985, but still meets the inundation or saturation criteria. These areas may be farmed and maintained as documented before December 23, 1985, as long as they are not abandoned (i.e., management or maintenance for commodity production ceased for 5 consecutive years).
    - **"Prior Converted Cropland" (PC)** is defined as a wetland converted to cropland before December 23, 1985, and, as of December 23, 1985, was capable of being cropped and did not meet farmed wetland hydrology criteria. These areas are not subject to the wetland conservation provisions of the Food Security Act of 1985, as amended, unless further drainage manipulation affects adjacent wetlands.
    - **"Minimal Effect Exemption" (MW)** is defined as a converted wetland that is exempt from the wetland conservation provisions of the Food Security Act of 1985, as amended, based on a NRCS determination that the conversion has or will have a minimal effect, individually or cumulatively, on the functions and values of the wetland and the wetlands in the watershed.
    - **"Commenced Conversion" (CC)** is defined as a wetland, farmed wetland, farmed wetland pasture, or converted wetland on which the conversion began but was not completed before December 23, 1985, was approved by FSA to continue, and the conversion was completed by January 1, 1995.

- **"Converted Wetland" (CW)** is defined as a wetland converted between December 23, 1985, and November 28, 1990. Production of an agricultural commodity or additional manipulation of these areas will yield UDSA benefit ineligibility. Also, these areas are wetlands converted after December 23, 1985, by a county, drainage district, or similar entity. For these instances, production of an agricultural commodity or forage for mechanical harvest or additional manipulation will cause ineligibility for USDA program benefits. **CW ACRES ARE NOT ELIGIBLE FOR ENROLLMENT IN ACEP-WRE.**
- **"Converted Wetland + (year the conversion occurred) (CW+year)** is defined as a wetland converted after November 28, 1990, where the USDA program participant is ineligible for benefits until the wetland is restored or mitigated unless an exemption applies. **CW+year ACRES ARE NOT ELIGIBLE FOR ENROLLMENT IN ACEP-WRE.**
- "**Cropland**" is defined as a land cover/use category that includes areas used for the production of adapted crops for harvest.
  - Two categories of "cropland" are recognized: *cultivated* and *non-cultivated*. Cultivated cropland comprises land in row crops or close-grown crops (generally drill-seeded or broadcast, such as wheat, oats, rice, barley and flax) and also other cultivated cropland, for example, hay land or pastureland that is in a rotation with row or close-grown crops. Non-cultivated cropland includes permanent hay land and horticultural cropland.

2. **Former or degraded wetlands that occur on lands that have been used or are currently being used to produce food and fiber, including rangeland and forest production lands, where the hydrology has been <u>significantly degraded or modified and will be substantially restored</u>;**

   - "**Fiber**" production is defined as field crops traditionally grown to make paper, cloth, or rope.
   - "**Food**" production includes livestock, grains, fruits, vegetables, nursery crops, and tree nuts.
   - "**Forest production land**" is defined as commodity production forests, grown primarily for wood products, requiring management inputs such as regeneration/revegetation, vegetation management and other silvicultural inputs with the intent of maximizing net worth.

   Iowa further defines specific language from this land eligibility category. Definitions are provided below. All enrollments utilizing this land eligibility category must adhere to these definitions. No waivers for these requirements will be granted.

   - **<u>Significantly degraded or modified</u>**: More than **50%** the **historic <u>hydrologic</u> conditions** (hydric acres) of the land offered for enrollment have been altered.
   - **<u>Substantially restored</u>**: Of the significantly degraded or modified hydric

acres identified above, **60%** or more of that total will be restored **historic <u>hydrologic</u> conditions**.

Documentation must be provided at the time of eligibility determination (prior to ranking) to substantiate the degree of degradation/modification/restoration. Evidence of degradation or modification may include, but is not limited to maps of surface/subsurface drainage that can be modified/removed; aerial photography/LiDAR maps showing man-made alterations (dikes, levees, diversions, surface drains, etc.) that can be modified/removed; photographic evidence of cropping or grazing impacts that have altered hydrology, etc. Degradation or modification extent can be in the context of land surface (e.g., percentage of hydric acres impacted by subsurface drainage) or impact to hydrologic function (e.g., surface drain removes hydrology from XX acres of a former depressional wetland basin).

Similar documentation will be required for restorability with sufficient assurances (e.g., map showing degraded/modified acres that are restorable and accompanying table quantifying that ≥60% of those acres are in fact, restorable.

3. **Agricultural lands substantially altered by flooding so as to develop and retain wetland functions and values. To qualify, the alteration must be determined to be of such magnitude and permanency that it is unlikely that the alteration and the resultant wetland functions and values will cease to exist during the easement or contract period. Furthermore, the extent of the surface or subsurface flooding or saturation must be great enough to create hydrologic conditions that have or will develop hydric soil and hydrophytic vegetation characteristics over time.**

   For application acres to be considered under this category, documentation must be provided at the time of eligibility determination (prior to ranking). Examples of acceptable documentation include verification by Resource Soil Scientist that previously non-hydric soils have developed hydric characteristics; documentation of the presence of hydrophytic vegetation, etc. In all cases, the determining factor of eligibility will be based upon the likelihood of the permanence of the hydrologic change.

   Potential applicable situations include:
   - Land that has been scoured by floods or broken levees resulting in the development of wetland characteristics and providing functions and values.
   - Lands that have soil saturation and water table elevation changes as a result of offsite surface or subsurface hydrologic changes (e.g., dams and irrigation systems) resulting in the development of wetland characteristics and providing wetland functions and values.

3.3.2 Croplands or Grasslands Flooded by Overflow of a Closed Basin Lake or Pothole

This eligibility category will **not** be utilized in Iowa due to the lack of land potentially qualifying for its use. If such a situation arises or is discovered, the State Conservationist will consult with Easement Program Division for specific guidance.

3.3.3 Riparian Areas

Riparian areas along streams or other waterways are eligible, provided that the offered riparian area directly links wetlands less than one (1) mile apart and that those wetlands are currently protected or will be protected under the same ACEP-WRE easement transaction. Protected wetlands include areas currently enrolled under an existing easement or other resource protection device or circumstance that achieves the same objectives as an easement, such as a State or Federal wildlife management area.

- If the riparian area will link already-protected wetland areas, then no additional wetland acres are required to enroll the riparian acres.
- Eligible riparian areas should average no more than 300 feet in width, measured from the top of bank on one side, or 600 feet in width, if both sides of the river, stream, channel, or water body are offered for enrollment.
- If the riparian area will link two or more wetland areas that are not yet protected but would be protected under the same ACEP-WRE easement action, then both the riparian area and wetland areas are eligible for enrollment and must be enrolled under the same or a concurrent easement transaction. **The wetland areas to be enrolled must not fall under "Ineligible Lands" as described in 528.106 of the ACEP manual.**
- Larger widths or linkages of wetland areas greater than 1 mile apart should be considered if the riparian zone and its associated wildlife or ecological values so warrant; waivers for additional width or for eligible wetland areas more than 1 mile apart may be granted by the State Conservationist (see also 3.3.7).
- The riparian areas, including the linking wetlands if enrolled under the same easement transaction, are considered to be a part of the eligible acres to which additional adjacent lands may be added.

3.3.4 Lands in the Conservation Reserve Program (CRP)

Eligible CRP lands include **farmed wetlands** (see 3.3.1.1.) and adjoining lands that meet **ALL** of the following criteria:

- Are subject to an existing CRP contract (CP23/23A, CP27/28, CP31, CP37,

CP41)

- Have already been restored to or under ACEP-WRE will be restored to a condition that maximizes the **highest <u>wetland</u> functions and values**.
- Are likely to return to production after the land leaves CRP

NOTE: The presence of a CRP contract on acres within an ACEP-WRE application area <u>DOES NOT</u> automatically make those acres eligible for WRE under this category. Eligible CRP acres in this category are limited to only those that would otherwise meet eligibility criteria under Section 3.2.1. CRP on non-hydric acres is potentially eligible under the Other Eligible Lands – Adjacent Lands category (528.105I.).

Such lands may be enrolled in the ACEP-WRE only if the land and landowner meet the necessary eligibility requirements and if the enrollment is requested by the landowner and agreed to by NRCS. Upon closing of the easement, the CRP contract for the property will be terminated or otherwise modified, subject to such terms and conditions as are mutually agreed upon by FSA and the landowner.

Lands established to trees under CRP are ineligible for enrollment unless they meet the requirements identified below (see 528.106B(2)). In general, lands established to trees under a CRP contract are not eligible, whether the contract is active or not. However, the State conservationist may determine these lands to be eligible if the application meets all other ACEP-WRE eligibility criteria and **one of the following two conditions are met:**

1. Tree establishment has not been completed, a planted stand failed to become established, or a stand that was determined to be established subsequently failed. NRCS will determine and document if plantings failed or were established and failed.
2. The State conservationist determines and documents that the enrollment of such lands would further the purposes of the program based on **<u>all</u>** of the following criteria being met:
    - The established cover conforms to ACEP-WRE restoration requirements. Confirmation of consistency with ACEP-WRE restoration requirements will be accomplished by demonstrating that the CRP tree planting is consistent with one of the two sources below:
        - Trees listed in the appropriate Ecological Site Description (ESD) “Dominant Plant Species” or “Ecological Site Concept” description are consistent with those in the CRP tree planting plan, **OR**,
        - Results from Iowa’s Plant Community Query for the soils in question return a woody plant community consistent with species planted under the CRP contract

- If the CRP contract is active, upon closing of the ACEP-WRE easement, the CRP contract for the property will be terminated or otherwise modified, subject to such terms and conditions as are mutually agreed upon by FSA and the landowner.
- Any additional criteria developed by the State conservationist. To date, no additional criteria have been developed by the Iowa State Conservationist.

Note: The basis for the NRCS decisions must be documented in the case file and a record kept of how many acres of lands established to trees under CRP are determined eligible and include such information in the easement business tool (e.g., NEST).

3.3.5 Wetlands Restored or Protected Under a Private, State, or Federal Program

Eligible land types previously restored privately or under a local, State, or Federal restoration program, on which the restored wetland areas meet or are capable of meeting NRCS restoration standards and specifications are eligible. These may include but are not limited to wetlands restored under the restoration cost-share agreement enrollment option of the former Wetlands Reserve Program (WRP), the former NRCS Wildlife Habitat Incentives Program (WHIP), or another similar restoration program, such as the FWS Partners for Fish and Wildlife Program, and may during the agreement period or after, be enrolled in ACEP-WRE. Such wetlands that have already been restored but are not fully protected will be considered a positive attribute in ranking.

Land subject to an easement or deed restriction that, as determined by NRCS, provides similar restoration and protection of wetland functions and values as would be provided by enrollment in ACEP-WRE, may still be considered eligible subject to the following requirements:

(i) Such lands may be eligible if NRCS determines that the existing easement or deed restriction terms will not restrict or interfere with NRCS in its exercise of the rights to be acquired under the ACEP-WRE easement or the easement or deed restriction can be removed or subordinated to the ACEP-WRE easement.

(ii) If the deed restriction or other interest is held by another Federal agency, a satisfactory agreement as to the respective rights of each agency must be reached and documented to the satisfaction of NRCS and OGC before NRCS may proceed.

(iii) At least **one** of the following must apply, as determined by NRCS:

- ACEP-WRE enrollment would provide significant additional resource protection, such as additional cropping restrictions.
- The additional restoration and protection would provide critical habitat for targeted threatened or endangered species.
- The existing easement or deed restrictions do not provide for full restoration of the wetland functions and values.

Examples:

(i) An area subject to an FWS "no drain, burn, level, or fill" easement, which prohibits further drainage but does not restrict cropping. Because the FWS easement does not provide "comparable" conservation benefits, the ACEP-WRE easement would be conservation value added.
(ii) A site may be eligible for a 30-year easement if the current deed restrictions would last for 10 years or less from the date of application.
(iii) A site may be eligible for a permanent easement if the current deed restriction was for a term less than 30 years.

Note: Lands with a deed restriction similar to ACEP-WRE that is 99 years in duration are not eligible for ACEP-WRE enrollment.

Individual appraisals are required to determine the easement compensation values for lands subject to an existing easement or deed restriction that are determined to be eligible by NRCS as Iowa's current areawide market analysis (AWMA) fair market values and associated GARCs do not take into consideration the presence of such deed restrictions.

3.3.6 Other Eligible Lands – Hydric Soil Minor Components (Inclusions) and Problematic Hydric Soils

Often, there are minor components (small inclusions) of hydric soils in map units of non-hydric soils. These hydric soils are relevant in determining eligibility for ACEP-WRE if hydrology and hydrophytic vegetation can be restored.

"**Problematic Hydric Soils**" are defined as those that meet the hydric soil definition but may not exhibit typical hydric soil morphology.

When hydric soil minor components (inclusions) or problematic hydric soils occur, the land proposed for enrollment *could be* considered eligible land if it otherwise meets one of the eligible land types previously listed here. The decision to use this land eligibility criterion must be made by the State Conservationist and be based upon restorability and ecological merits of the site. Based upon these requirements, acres containing hydric soil minor components would need to meet the criteria of "substantially restorable" as defined in 3.3.1.1.

3.3.7 Other Eligible Lands – Adjacent Lands

If the proposed enrollment area includes eligible lands as described in Sections 3.3.1-3.3.6 above, the proposed enrollment area may also include adjacent lands that meet **all** of the following criteria:

- The adjacent lands will contribute **significantly** to the wetland functions and values or are incidental but necessary for the practical administration and management of the enrolled area.
- The adjacent lands are considered to be primarily upland buffer and associated

areas but may also include:

- riparian areas that do not meet the requirements of Section 3.2.3.,
- restored non-agricultural wetlands,
- created wetlands (wetland on a site location that was historically non-wetland),
- artificial wetlands (artificial wetland ecosystem with hydrophytic vegetation for biological treatment of water),
- and non-cropped natural wetlands.

- The acres of adjacent lands must not exceed the acres of otherwise eligible land to be enrolled (1:1 ratio) unless a **State Conservationist's waiver** is granted consistent with the following criteria. The State Conservationist may authorize a waiver allowing adjacent land acres to exceed eligible land acres for certain unique situations. Unique situations that may warrant a waiver to allow adjacent lands acres to exceed eligible lands may include the following situations:

  - Enrollment of **unique or critical wetland complexes** whose functions and values inherently depend on adjacent lands that do not meet one of the eligible land types. Examples in Iowa (per IWAP) include, but are not limited to, prairie potholes, fens, oxbows, backwaters of meandered rivers, etc.
    - Iowa Currently has approval from Easement Program Division (EPD) to enroll adjacent lands at a ratio of **4:1** (upland to eligible acres) for HGM Class DEPRESSION and MINERAL/ORGANIC FLAT wetlands in the Prairie Pothole Region due to the recognized correlation between upland nesting habitat and temporary/seasonal wetland proximity in regard to migratory waterfowl nest success.
    - **Fens** are among Iowa's rarest wetland type, tend to contain high percentage of rare vegetation, and are dependent upon surrounding uplands and geology for their groundwater sourced hydrology. With this in mind, **if the following two criteria are <u>both</u> met**, adjacent lands may enrolled at a ratio of up to **5:1** upland to eligible acres for HGM Class SLOPE wetlands in Iowa:
      - A Floristic Quality Index (FQI) assessment has been completed and the resultant score is ≥20, **and**
      - Historic hydrology has not been compromised beyond repair and invasive vegetation (Reed canary grass, hybrid cattail, etc.) has not established/encroached to the point that there is little chance the native seed bank can be expressed.
      - Documentation of the above criteria must be provided with the waiver request.
    - **Oxbows** and **backwater sloughs** are important features in HGM Class RIVERINE wetlands and are defined as follows:

Oxbows are water bodies formed in old river channels that are cut off from the main channel and flow of a river.
Backwaters are slow moving bodies of water associated with larger river systems typically in low-lying areas that fill with water during high flow events but may be completely isolated from the river during low flow.

  - If LiDAR or NWI indicates, or soils associations common to oxbow or backwater wetland features are present within the application area, fall within the 2-year or 5-year floodplain **and** can be ***substantially*** (see 3.3.1) restored to historic hydrologic conditions, adjacent lands may be enrolled at a ratio of up to **2:1** upland to eligible acres for HGM Class RIVERINE wetlands.
  - Documentation of the above criteria must be provided with the waiver request.

- Enrollment targeting **at-risk wetland dependent** species that require additional upland areas for successfully completing their life cycle.
  - To qualify adjacent land acres under this category, documentation must be provided from USFWS/IDNR Wildlife Biologist that a wetland-dependent state or federally listed endangered, threatened, or species of concern is likely present in proximity to the application area within suitable separation distance. Consulting biologist must also cite planned restoration activities that will directly benefit the identified species.
  - If the above criteria are met, adjacent lands may be enrolled at a ratio of up to **2:1** upland to eligible acres for all wetland classes.
- Enrollment where the wetland acres could become degraded from agricultural activities or adjacent land uses on lands not in the enrolled area and **additional upland buffers are needed for adequate protection of the wetland functions and values** on the eligible lands acres.
  - Documentation of the nature of the agricultural or adjacent land use and its proximity to the application area is required at the time of waiver request. Beware that some adjacent land uses are not compatible with ACEP-WRE program purposes or may compromise the restorability or ecological function of the application area, creating an ineligible lands situation as referenced in 528.106 of the ACEP manual.
  - If an ineligible lands condition is not present, and the wetland area can be adequately buffered to yield the highest wetland functions and values, adjacent lands may be enrolled at a ratio of up to **1.2:1** upland to eligible acres for all wetland classes.
- Enrollment where the strict application of the ratio would create **unmanageable boundaries**, negatively impacting the practical

administration or management of the enrolled area by NRCS.

- Documentation of the unmanageable boundary configuration (map) and narrative description of what makes the boundary unmanageable and requires additional adjacent lands acres is required at the time of waiver request.
  - Possible acceptable circumstances include inclusion of small slivers of land or odd areas owned by the applicant that would otherwise be landlocked by the easement, odd boundary configurations/excessive corners that would significantly increase survey costs, etc.
  - If the above criteria are met, adjacent lands may be enrolled at a ration of up to **1.2:1** upland to eligible acres for all wetland classes.

NRCS determines on a case-by-case basis if an enrollment's adjacent lands meet the criteria listed above. The upper limits on the ratio of adjacent lands to eligible lands may differ based on the wetland type but may not for any wetland type exceed a ratio of 5 to 1 (five adjacent lands acres to one eligible land acre) per policy. Ranking points may be utilized to prioritize wetland to upland ratios. The higher the proportion of adjacent lands the more rigorous the technical determination to ensure the inclusion of such lands is appropriate and necessary to achieve program purposes.

Adjacent lands will not be accepted under any circumstances if they are:

- Determined not to meet the required criteria;
- Noncontiguous to otherwise eligible lands offered for enrollment;
- Developed or highly disturbed non-agricultural lands;
- Ineligible lands under ACEP-WRE;
- Insignificant or have no contribution to the wetland functions and values, or do not meet the lifecycle needs of wetland dependent wildlife;
- Not necessary for practical administration and management of the easement; or inconsistent with other State criteria specified in WRCG and National policy

Application acres meeting any of the disqualifications described above will be removed from consideration at the discretion of Iowa NRCS and in consultation with the applicant.

3.4 Ranking – Funding Pools

Generally, Iowa NRCS will fund all ACEP-WRE applications under a single CART ranking pool unless otherwise dictated by yearly allocations. Within the single funding pool, applications are broken out by wetland class and competed only against other applications of the same type (e.g. DEPRESSION does not compete directly against RIVERINE). If appropriate, Iowa NRCS may also utilize any number of priority areas as currently defined in Section 5.1.3. Priority areas may be adjusted on an annual basis in response to input/recommendations from partners, local, state, or federal initiatives, etc. Any special considerations for mandated or discretionary fund pools may be reviewed with the STAC prior to implementation. Details of the special considerations may be reflected in an update to this document.

Annually, Iowa NRCS staff will confer with the WRE Subcommittee prior to ranking to discuss funding levels for each of the four wetland classes. Historically, the breakdown has been, but is not mandated to be:

- 45% DEPRESSION
- 45% RIVERINE
- 10% MISSOURI RIVER
- SLOPE/Fen & Remnant – fund any eligible applications

3.5 Ranking – Screening, Criteria & Scoring

3.5.1 Screening

A screening and land eligibility tool may be utilized by Iowa NRCS for workload prioritization to screen high, medium, low, and ineligible applications prior to ranking. This workload prioritization tool can assist with efficient, effective, and equitable application processing.

In past years, Iowa has utilized a pre-screening tool to prioritize ranking and preliminary planning workload.

3.5.2 Criteria

Ranking criteria since the 2014 Farm Bill has changed minimally. The 2018 Farm Bill made additional changes to the ranking criteria, but much remained the same. The changes are summarized below. Although much of the ranking criteria is set Nationally, the States have some flexibility to embellish upon or create criteria if the resultant criteria do not violate policy. This document will be updated if ranking criteria substantially changes in subsequent years. The most current version of the ranking criteria is reviewed with STAC annually and posted on the public Iowa NRCS Easements website.

In general, the 2018 Farm Bill instituted the following changes and clarifications to

ranking criteria nationwide. If not already considered, these changes were incorporated into the current version of the ranking criteria:

- Water Quality: Added the capacity of the wetland to improve water quality
- Hydrology Restoration Potential:
    - Adequately consider source, attributes, and reliability of hydrology, including consideration of water rights
    - Must comprise 50% of available points for conservation benefits
- Economic Considerations:
    - Consider contributions that reduce NRCS costs as a positive attribute
    - Removed requirement that NRCS control such contributions to receive ranking points.
    - Long-term cost considerations, including monitoring and operation and maintenance

Iowa may implement the following considerations in the ranking criteria to prioritize selections for enrollment in ACEP-WRE per CPM, Title 440, Part 528, Section 528.111:

- Environmental benefits:
    - Habitat that will be restored for the benefit of migratory birds and wetland- dependent wildlife, including the diversity of wildlife species that will be benefitted or the life-cycle needs that will be addressed.
    - Habitat for threatened, endangered, or other at-risk species, including the planned extents and anticipated use of the restored habitats on the easement area, and diversity of at-risk species benefitted.
    - Protection or restoration of native vegetative communities.
    - Habitat diversity and complexity to be restored and protected on the enrollment area.
    - Proximity and connectivity to other protected habitats.
    - Extent of adjacent beneficial land uses.
    - Water quality protection or improvement.
    - Attenuation of floodwater flows.
    - Water quantity benefits through increased water storage in the soil profile or through groundwater recharge and consideration of proximity to impaired water bodies.
    - Carbon sequestration.
    - Improving climate change resiliency.
    - Hydrology restoration potential:
        - Soil properties, such as soil texture, soil structure, and soil drainage classes.
        - Landscape features, such as geomorphic position, slope, and water table depths.
        - Flooding characteristics, including frequency, timing, duration,

depth, and sources.
        - The source of the hydrology, the degree and type of hydrologic manipulation, existing connectivity and barriers to connectivity with hydrology sources, and the extent to which the hydrology can be restored.
    - Duration of the enrollment
- Economic considerations:
    - Estimated easement or 30-year contract cost per acre, if appropriate. As applicable, any voluntary landowner offer to accept a reduced per-acre easement value.
    - Estimated restoration costs.
    - Partnership contributions from a landowner or other person or entity that reduce NRCS costs should be reflected positively in the ranking process. States must ensure NRCS payments are appropriately reduced based on the amount of the partnership contribution.
    - A cost-benefit comparison. Applications that have a lower cost per environmental benefit ratio will receive higher rankings.
    - Potential near- and long-term management, repair, replacement, operation and maintenance costs, and monitoring.
- Special considerations (if determined by Iowa NRCS applicable in a particular funding year):
    - Priority areas as defined by Section 3.1.4.

3.5.3 Ranking - Scores

Each ranking criterion is assigned points based on the degree to which an application would address the criterion. The States, in consultation with the STAC, can assign point values to each criterion at their discretion. The only limitation on scoring is that 50% of the potential points awarded for environmental benefits must come from hydrology restoration potential. The Iowa ranking criteria reflect the scoring used to rank new ACEP- WRE applications. This scoring system was developed by the State in consultation with the STAC.

Note: Any points earned in the ranking must be substantiated by practices proposed in the Preliminary Wetlands Restoration Plan of Operations (Preliminary WRPO).

3.5.4 Ranking – Thresholds

NRCS is authorized to establish high-threshold scores to facilitate year-round selection. State Conservationists, with advice from STAC, may establish high threshold ranking score at a level high enough that an eligible application ranking above such threshold score would automatically warrant selection for funding. Conversely, a low threshold ranking score can be established, below which applications will not be funded. Establishing thresholds helps protect the Federal

investment, ensuring expeditious funding of the highest-quality applications and removing low- quality applications from consideration.

Iowa will implement a high threshold of greater than **90%.** Any application that receives more than **90%** of the available ranking points may be automatically selected for funding provided the application meets all eligibility requirements.

Iowa will implement a low threshold of less than **25%.** Any application that receives less than 25% of the available ranking points may be automatically removed from consideration for funding. These applications may not be funded even if there is funding available. Remaining funds will be returned to National Headquarters for redistribution.

3.5.5. Ranking – Selections

In the majority of cases, selection of applications for tentative funding will be made in rank order based upon results from CART assessment and ranking. However, per 528.113, the State Conservationist, in consultation with the STAC, may establish priorities and circumstances under which the State Conservationist may select eligible applications outside of a strictly applied rank order. Circumstances that would warrant these selections may include but are not limited to the following:

(1) **Large Project Size**.—If an eligible, high-ranking but unusually large project would consume a disproportionate amount of a State's ACEP-WRE budget, the large project may be deferred until sufficient funds become available.

(2**) Insufficient Funds**.—If sufficient funds are not available to select the next-highest-ranked offering, such eligible high-ranking offerings may be passed over until the next fundable eligible application is reached.

(3) **Augments Existing or Concurrent ACEP-WRE Acquisition Efforts in an Area.—**Eligible applications that may not rank high on their own merits but will contribute to the benefits of an existing or pending easement may be prioritized. Specifically, enrollments that further effective restoration and function of existing ACEP-WRE lands, reduce habitat fragmentation by protecting and restoring contiguous areas, resolve boundary issues, contribute to management, eliminate inholdings, or serve as a necessary buffer.

- Iowa's Des Moines Lobe, the southernmost extent of the Prairie Pothole Region, has been effectively drained in favor of agricultural production. This drainage comes in many forms- private and publicly organized drainage infrastructure including both surface and subsurface drainage, when, coupled with a land survey and road system organized on a one-mile square grid, effectively compromises nearly every pothole wetland or shallow lake. The grid system pays little heed to land features in the flat to gently rolling land of the Des Moines lobe, and as a result, potholes and shallow lakes are commonly bisected by fence or property lines, roads and ditches. This arrangement creates typical scenarios whereby multiple landowners may own the many land units that are, or once were, covered by potholes or shallow prairie

lakes. As a result, successful restoration of the DEPRESSION or MINERAL/ORGANIC FLAT class wetlands may require the simultaneous enrollment of multiple, adjacent, applications.

- To that end, the Iowa State Conservationist may elect to select "**Group Applications**", with the following conditions:
  - All applications in the "group" meet the eligibility criteria described in this document.
  - At least one of the applications in the "group" must score high enough in the ranking to merit selection outright.
  - Sufficient funding exists to allow for acquisition/restoration of all necessary applications to round out the "group".
  - Documentation is presented demonstrating that enrollment of all parcels within the "group" is undeniably necessary to ensure complete restoration of the pothole or shallow lake basin.
  - Enrollment of the "group" is supported/recommended by the WRE Subcommittee to the State Conservationist
  - The State Conservationist's final decision on "group" applications is final and not appealable (see 528.20B.(iv), (vi))

(4) **Rare, Unique, or Individual Wetland Habitats**.—Allow for enrollment of wetland types that are ecologically significant but whose values may not be adequately captured through the established ranking pools. See Section **3.3.7.** for a description of unique wetland habitats or types that may be considered under this category.

(5) **Emerging Issues.—**Enrollment of specific wetland habitat types or habitats in targeted geographic areas may be warranted due to disasters, new science, or changing priorities when contribution to and consideration of these factors is not sufficiently captured in the established ranking pools.

4. Wetland Restoration Planning & Implementation

4.1 Wetland Restoration Definition

The ACEP Manual (CPM, Title 440, Part 528, Section 528.131) defines **wetland restoration** as the rehabilitation of degraded or lost wetland and associated habitats pursuant to published State-specific criteria and guidelines developed in coordination with the State Technical Advisory Committee in a manner such that:

- The **original**, native vegetative plant community and hydrology are, to the extent practicable, reestablished;
    - In Iowa, the primary objective of wetland restoration is to reestablish the wetlands and associated habitats that would have been found on site prior to European settlement manipulation or degradation. The definition applies to all wetlands and associated habitats (e.g., eligible uplands) on the easement area.
    - Utilize the historic ecoregion landscape descriptions in Section 4.3 that follow, Ecological Site Description (ESD), or similar scholarly/peer-reviewed literature to determine the original, native community and hydrology.

-OR-

- A hydrologic regime and native vegetative community different from what likely existed prior to degradation of the site is established that will:
    - Substantially replace the original habitat functions and values while providing significant support or benefit for migratory waterfowl or other wetland-dependent wildlife; or
    - Address local resource concerns or needs for the restoration of wetland functions and values for wetland-dependent wildlife as identified in an approved Iowa Department of Natural Resources State wildlife action plan (IWAP), NRCS national initiative(s), or U.S. Fish and Wildlife Service (FWS) T&E Recovery Plan.
    - Justification for deviation from historic conditions must be provided during eligibility determination in a brief narrative stating:
        - What manipulations have occurred that prevent restoration to historic conditions.
        - How wetland functions and values comparable to historic conditions will be established, and the basis for that determination (e.g. reference wetland/habitat types in the area, etc.).
        - What local resource concerns/habitat needs are being addressed, and the wetland-dependent species benefitting from restoration.

4.2 Historic Wetland Types in Iowa

Wetlands in Iowa can be grouped into four main categories:

- Palustrine – shallow basins where water levels fluctuate reflecting rainfall patterns
- Lacustrine Fringe – associated with protected shallow lake edges and with water levels less responsive to rainfall patterns
- Riverine - associated with rivers and including areas such as side channels, overflow areas, and oxbows
- Seepage (Fens) – formed where groundwater rises to the surface and continuously saturates the soil, standing water may or may not be present.

Specific descriptions of each category, with reference to Hydrogeomorphic (HGM) class follow.

4.2.1 Palustrine and Lacustrine Fringe Wetlands

Palustrine wetlands - ***shallow basins where water levels fluctuate reflecting rainfall patterns.***

Lacustrine Fringe wetlands - ***associated with protected shallow lake edges and water levels are less responsive to rainfall patterns.***

North-central Iowa contains the southernmost reach of the Prairie Pothole Region created by the Des Moines Lobe of the Wisconsin Glacier some 12,000 years ago. The retreat of the glacier left a complex of moraines, till plains, meltwater channels and outwash plains. Much of the region is poorly drained containing numerous topographic depressions termed prairie potholes that vary in size, depth and degree of connectivity (HGM Class DEPRESSION or MINERAL FLAT). At the time of European settlement, it has been estimated that there were about 1.4M ha (~3.5M acres or 9.7% of total land area) of wetlands on the Des Moines Lobe. (*Schilling, etal. 2018*).

Shortly after statehood, wetlands were seen as an impediment to development and a threat to public health and Iowa set about a decades long systematic draining of Des Moines Lobe wetlands. Early efforts involved simple surface drainage of the multitude of temporary and seasonal wetlands with the crude technologies of the time, mostly handwork. By 1872, Iowa passed a law setting up drainage districts which had the right of eminent domain and ability to levy taxes providing both the authority and funding mechanism to implement large-scale drainage systems. Advances in technology, most notably mechanized equipment and ceramic/clay drainage tile had eliminated over 90% of Iowa's pothole wetlands by the early 20th Century. By the 1970's, wetland losses on the Des Moines Lobe totaled between 95% and 99% of historical acres, depending upon the source, leaving only approximately 12,140 ha (~30,000 A.). *(Crumpton etal. 2012)*.

Both palustrine and lacustrine fringe wetlands can be found in the 33 counties that make up the Prairie Pothole Region of Iowa. Depressional wetlands can measure only a few square meters in size while large natural marshes/shallow prairie lakes can cover several hundred

acres and be up to six feet in depth. Hydrologic regimes range from temporary and to seasonal (Okoboji/Harps soil association) all the way up through semi-permanent and permanent (muck/peat basins – Palms/Blue Earth soils). Pothole soils in and undrained condition are typified by a high water table, <12" in all months, and ponded most years from March to June and again from October through December.

Remnant glacial meltwater channels and outwash plains (HGM Class SLOPE or MINERAL/ORGANIC FLAT) are interspersed amongst and often connected to Iowa's depressional wetlands. These areas were once dominated by sedge meadows and wet prairies resulting from high water tables associated with the ancient drainageways cut by meltwater from retreating glaciers. Characterized by silty and clay loams formed in alluvium, the soils of these areas are poorly drained, commonly mineral and have a high organic matter content. Hydrology can range from seasonal to semi-permanent.

4.2.2 Riverine Wetlands

Riverine wetlands ***associated with rivers and include areas such as side channels, overflow areas and oxbows.***

Iowa is the only state in the Union bordered by two major rivers, in this case, the Mississippi to the east and the Missouri to the west. The two systems and their associated floodplains are quite different. Where the Mississippi is largely a defined channel hemmed in by limestone bluffs in its course through the state and its navigation channel managed by a series of locks and dams, the Missouri was historically wide and braided with its floodplain reaching over seven miles in width in some locations. Today's Missouri River in Iowa has little to no active floodplain, cut off first by a system of USACE levees and then an interior network of cross dikes/levees, pumps and drainage districts. River current speed prohibits navigation above Sioux City. A system of large reservoirs in the Dakotas largely dictates downstream flow.

The Mississippi River system is fed by several interior rivers- the Upper Iowa, Turkey, Wapsipinicon, Maquoketa, Iowa, Cedar, Skunk and Des Moines to name a few. Each have reaches that are relatively meandering, while other lengths are straightened/channelized and leveed. Most upper reaches of these interior rivers have relatively regular access to the floodplain while higher order reaches tend to be incised and water tables correspondingly lowered in surrounding riparian areas. Wetland types commonly encountered range from oxbows and back channels to hydrologically connected backswamps fed by lateral water movement through coarse textured soils at the mouths of the larger Iowa and Cedar River systems.

Fewer interior tributaries flow to the Missouri- larger systems include the Big and Little Sioux, Nodaway and Nishnabotna. This is a much older and topographically diverse landscape than that of eastern Iowa. As a whole, these western Iowa river systems are incised and straightened to a higher degree than those east of the Missouri/Mississippi divide. Some

remnant oxbows, meanders and back channel wetlands remain in the Big Sioux system while relatively few wetland features remain along the others.

4.2.3 Seepage Wetlands (Fens)

Seepage wetlands (fens) ***which form where groundwater rises to the surface and continuously saturates the soil, but standing water may or may not be present.***

Fen wetlands are Iowa's most critically imperiled wetland type and historically have been prioritized for enrollment through both WRP and ACEP-WRE. Acre for acre, fens support more rare and declining species of vegetation than any other ecosystem in the state.

From: Thompson, C. A. and Bettis, E. A. III (1994) "Age and Developmental History of Iowa Fens," *Journal of the Iowa Academy of Science: JIAS*: Vol. 101: No. 3-4 , Article 4:

Fens are peatlands fed by shallow groundwater. They occur in all of Iowa's landform regions, but are most prominent on the Iowan Surface and morainal margins of the Des Moines Lobe.

fens range from 0.4 to 10 hectares in extent, with most less than 4 hectares. Some occur as complexes, i.e., several fens clustered within a relatively small area. They occur primarily in sloping upland landscape positions; however some can be found in abandoned channels in valleys (both HGM class SLOPE). Most are on sideslopes, and gradient on the fen surface ranges from 0.004 to 0.243, with 90% less than 0.1. Surface features on fens are variable. The surface is often wet, but without standing water. Compression of the peat surface can lead to development of small shallow pools. Only a few Iowa fens have naturally occurring well-developed pool areas. One fen (Silver Lake) has surface patterning of alternate pools (flarks) and peat areas (strings) similar to fens in more northern climates, albeit on a much smaller scale. During drier years or extended periods without rain, the surface becomes drier, although the peat itself remains damp. In most cases, the permanent water table drops less than 0.3 meters below ground surface. Surface expression of groundwater discharge zones in the fens is not common. Some fens, particularly those with artesian water sources, have springs surrounded by well-developed mound areas. These mounds are underlain by fluidized peat, carbonate muck, and/or sand and are not particularly solid surfaces. Other areas of the fen where discharge occurs are buoyant, but can be walked on. Areas where water is discharged from the peat are often characterized by red floes caused by bacterial oxidation of iron.

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4.2.4 HGM and Cowardin Classification of Historic Iowa Wetland Communities

HGM Class	Subclass	Cowardin System	Cowardin Class	Water Regime	Common Wetland Functions & Values
FLAT	Mineral Soil	Palustrine	Forested (FO), Scrub-Shrub (SS), Emergent (EM), Unconsolidated Bottom (UB), Aquatic Bed (AB)	Temporarily Flooded, Intermittently Flooded, Semi-permanently Flooded	Fall, winter, and spring habitat for migrating waterfowl and shorebirds. Sediment filtering, flood water retention, groundwater recharge.
	Organic Soil	Palustrine	Forested (FO), Scrub-Shrub (SS), Emergent (EM), Unconsolidated Bottom (UB), Aquatic Bed (AB)		
SLOPE	Topographic	Palustrine	Forested (FO), Scrub-Shrub (SS), Emergent (EM)	Saturated	High diversity/rare herbaceous vegetation
	Stratigraphic	Palustrine	Forested (FO), Scrub-Shrub (SS), Emergent (EM)		
DEPRESSION	Temporary	Palustrine	Forested (FO), Scrub-Shrub (SS), Emergent (EM)	Temporarily Flooded	Fish and wildlife habitat. Sediment filtering. Flood water retention. Fall, winter, and spring habitat for migrating waterfowl and shorebirds. Water filtering, groundwater recharge.
	Seasonal	Palustrine	Forested (FO), Scrub-Shrub (SS), Emergent (EM)	Intermittently Flooded, Seasonally Flooded	
	Perennial	Palustrine	Forested (FO), Scrub-Shrub (SS), Emergent (EM), Unconsolidated Bottom (UB), Aquatic Bed (AB)	Semi-permanently Flooded, Permanently Flooded	
	Human impounded, excavated or beaver impounded	Palustrine	Forested (FO), Scrub-Shrub (SS), Emergent (EM), Unconsolidated Bottom (UB), Aquatic Bed (AB)	Permanently Flooded	

HGM Class	Subclass	Cowardin System	Cowardin Class	Water Regime	Common Wetland Functions & Values
LACUSTRINE FRINGE	Permanently Flooded	Lacustrine: Limnetic or Littoral	Unconsolidated Bottom (UB), Aquatic Bed (AB), Emergent (EM, Littoral only)	Permanently Flooded	Water quality improvement, carbon sequestration, wildlife habitat.
	Semi-permanently Flooded	Lacustrine: Littoral	Unconsolidated Bottom (UB), Aquatic Bed (AB), Emergent (EM)	Semi-permanently Flooded	
	Intermittently Flooded	Lacustrine: Littoral	Emergent (EM), Unconsolidated Bottom (UB)	Intermittently Flooded	
	Artificially Flooded	Lacustrine: Littoral or Limnetic	Unconsolidated Bottom (UB), Aquatic Bed (AB), Emergent (EM, Littoral only)	Permanently Flooded	
RIVERINE	Intermittent	Riverine	Emergent (EM)	Intermittently Flooded	Fish and wildlife habitat. Sediment filtering. Flood water retention. Fall, winter, and spring habitat for migrating waterfowl and shorebirds. Water filtering, and flood water storage.
	Upper Perennial	Riverine	Rock Bottom (RB), Unconsolidated Bottom (UB), Streambed (SB), Emergent (EM)	Permanently Flooded, Intermittently Exposed	
	Lower Perennial	Riverine	Rock Bottom (RB), Unconsolidated Bottom (UB), Streambed (SB), Emergent (EM), Aquatic Bed (AB)	Permanently Flooded, Intermittently Exposed	

4.3 Iowa's Landscape and Historic Conditions (from IWAP 2015)

In an effort to assist with planning of hydrologic and vegetative restoration consistent with historic conditions as described in Section 4.2, a detailed description of Iowa Ecoregions is provided below. This information can be found in Chapter 2 of the Iowa Wildlife Action Plan (2015).

Level III & IV Ecoregions of Iowa (US EPA – Omernik) Large font denotes the names of Level III ecoregions and small font, Level IV ecoregions.

Level III Ecoregion Descriptions

The following narrative is organized by EPA Level III ecoregions. Although Level III ecoregions are relatively homogeneous, tables under each major heading describe subtle differences in landform, geology and native plant communities that characterize the EPA Level IV ecoregions they encompass.

<u>40. The Central Irregular Plains</u>

The Central Irregular Till Plains have a mix of land use and are topographically more irregular than the Western Corn Belt Plains (47) to the north, where most of the land is in crops. The region, however, is less irregular and less forest covered than the ecoregions to the south and east. The potential natural vegetation (PNV) of this ecological region is a grassland/forest mosaic with wider forested strips along the streams than historically found in Ecoregion 47 to the north. The mix of land use activities in the Central Irregular Plains includes mining operations of high-sulfur bituminous coal. The disturbance of these coal strata in southern Iowa has degraded water quality and affected aquatic biota.

Characteristics of Level IV Ecoregions within the Central Irregular Plains

Level IV Ecoregion Name	Physiography	Geology	Potential Natural Vegetation
40a. Loess Flats and Till Plains	Glaciated. Low hills and smooth plains. Perennial streams with many channelized.	Moderate loess over loamy till and clay loam till. Pennsylvanian sandstone, limestone, shale. Also Mississippian limestone in Iowa.	Mosaic of Little Bluestem-Sideoats Grama prairie, Bur Oak woodland, and Chinkapin Oak woodland.

47. Western Corn Belt Plains

Once mostly covered with tallgrass prairie, over 80 percent of the Western Corn Belt Plains is now used for cropland agriculture and much of the remainder is in forage for livestock. A combination of nearly level to gently rolling glaciated till plains and hilly loess plains, an average annual precipitation of 26 to 37 inches, which occurs mainly in the growing season, and fertile, warm, moist soils make this on of the most productive areas of corn and soybeans in the world. Agricultural practices have contributed to environmental issues, including surface and groundwater contamination from fertilizer and pesticide applications as well as concentrated livestock production.

Characteristics of Level IV Ecoregions within the Western Corn Belt Plains

Level IV Ecoregion Name	Physiography	Geology	Potential Natural Vegetation
47a. Northwest Iowa Loess Prairies	Irregular plains. Dendridic streams.	Moderate to thick loess over clay- loam till. Cretacious shale, sandstone, and limestone, some Precambrian Sioux Quartzite.	Big Bluestem-Indiangrass prairie, Little Bluestem-Indiangrass prairie, limited areas of Bur Oak woodland.
47b. Des Moines Lobe	Smooth to irregular plains. Dendridic streams and drained depressional wetlands.	Loamy till with no loess cover. Ground, stagnation and end moraines.	Big Bluestem-Indiangrass prairie, Cordgrass wet prairie, limited areas of Bur Oak woodland.
47c. Eastern Iowa and Minnesota Drift Plains	Irregular to smooth plains. Low gradient streams.	Thin loess cover over loamy till. Devonian and Silurian limestone and dolomite.	Big Bluestem-Indiangrass prairie, areas of Bur Oak mixed savanna and woodlands.
47d. Missouri Alluvial	Smooth to irregular alluvial plain. Channelized streams.	Alluvium over Pennsylvanian and Cretacious shale, sandstone and	Northern floodplain forest, pin oak forest, and cordgrass wet prairie.

Plain		limestone.	
47e. Steeply Rolling Loess Prairies	Open low hills. Intermittent and perennial streams, many channelized.	Moderate to thick loess, 25-50 feet, over clay loam till. Pennsylvanian shale, sandstone and limestone.	Big Bluestem-Indiangrass prairie, and White Oak-Red Oak Woodland, Bur Oak mixed woodland.
47f. Rolling Loess Prairies	Irregular plains to open low hills. Intermittent and perennial streams, many channelized.	Moderate to thick loess, generally less than 25 feet, over clay loam till. Pennsylvanian and Cretacious shale, sandstone and limestone.	Mosaic of Big Bluestem-Indiangrass prairie, and Bur Oak woodland.
47m. Western Loess Hills	Open hills and bluffs. Intermittent and perennial streams.	Thick loess, 60-150 feet over clay- loam till. Pennsylvanian shale, sandstone and limestone in southern half of region; Cretacious shale, sandstone and limestone in the northern half.	Mosaic of Bur Oak woodland and Big Bluestem-Indiangrass prairie.

52. The Driftless Area

The hilly uplands of the Driftless Area easily distinguish it from surrounding ecoregions. Much of the area consists of a deeply dissected, loess-capped, bedrock dominated plateau. The region is also called the Paleozoic Plateau because the landscape's appearance is a result of erosion through rock strata of Paleozoic age rather than glacial or post- glacial deposition. Although there is evidence of glacial drift in the region, its influence on the landscape has been minor compared to adjacent ecoregions. In contrast to adjacent ecoregions, the Driftless Area has few lakes, most of which are reservoirs with generally high trophic states. Livestock and dairy farming are major land uses and have had a major impact on stream quality.

Characteristics of Level IV Ecoregions within the Driftless Area

Level IV Ecoregion Name	Physiography	Geology	Potential Natural Vegetation
52b. Paleozoic Plateau/ Coulee Section	Dissected hills, rolling to steep-sided valleys. Perennial streams.	Thin loess and patches of glacial drift over Silurian, Ordovician and Cambrian dolomite, shale, sandstone, and limestone.	Mosaic Little Bluestem-Indian grass prairie, Bur Oak and White Oak forests, and areas of Maple-Basswood forests.

52c. Rochester/ Paleozoic Plateau Upland	Rugged region of bluffs and valleys cut by tributaries of the Mississippi River.	Thinly deposited loess and pre- Wisconsin glacial till over an eroded Paleozoic sedimentary plateau. Pre-Wisconsin till exposed mainly in the west where loess deposits are thin and discontinuous	Mosaic Little Bluestem-Indian grass prairie on flat, fire- prone remnants of the plateau, with oak forests developing downslope. Mesic forest of basswood and sugar maple on north and east- facing slopes with wet mesic forests on silty bottomlands.

72. Interior River Valleys and Hills

The Interior River Lowland is made up of many wide, flat-bottomed terraced valleys, forested valley slopes, and dissected glacial till plains. In contrast to the generally rolling to slightly irregular plains in adjacent ecological regions to the north (54), east (55) and west (40, 47), where most of the land is cultivated for corn and soybeans, a little less than half of this area is in cropland, about 30 percent is in pasture, and the remainder is in forest. Bottomland deciduous forests and swamp forests were common on wet lowland sites, with mixed oak and oak-hickory forests on uplands. Paleozoic sedimentary rock is typical and coal mining occurs in several areas.

Characteristics of Level IV Ecoregions within the Interior River Valleys and Hills

Level IV Ecoregion Name	Physiography	Geology	Potential Natural Vegetation
72d. Upper Mississippi Alluvial Plain	Smooth to irregular alluvial plains. Channelized streams.	Alluvium. Brown to gray silt, clay, sand, and gravel. Thickness of alluvial and older fluvial deposits > 100 feet.	Cottonwood-willow riparian forest, Pin Oak forest, Cordgrass wet prairie.

4.3.1 Historic Plant Communities

Pre-settlement Iowa lay at a biological crossroads. Hardwood forests dominated the cooler and more humid lands east of the Mississippi River. The warmer, drier mixed grass prairie and prairie potholes of the northern Great Plains lay to the west. To the north, great maple-basswood and pine forests covered the Great Lakes region. To the south, oak savannas gradually gave way to the vast oak-hickory forests of the Missouri Ozarks. These different ecological regions blended together in Iowa to produce a unique landscape of great biological diversity.

Roughly two-thirds of the state (an estimated 23 million acres) was dominated by lush prairies. Most was tallgrass prairie, although short grasses were present on hot, dry sites. Nearly 7 million acres of forest or forest-prairie savanna covered much of the eastern third of Iowa and followed the river valleys into the prairies to the north and west. Around 4 million acres of prairie pothole marshes dotted recently-glaciated and poorly-drained northcentral and northwest Iowa where larger wetlands and lakes protected oak savannah from prairie fires. Another million acres of backwaters, sloughs and flooded oxbows were found in the floodplains of the Mississippi, Missouri and larger inland rivers.

Prairies

The prairie was more than just a monolithic sea of grass. Prairie plants are adapted to subtle changes in moisture and soils that occur along a gradient from lowlands to drier prairie ridges. Poorly drained wetlands and wetland margins supported rank growths of sedges, cord grass, bluejoint, prairie muhly grass, and panic grass, with common forbs such as gayfeather, prairie dock, Turk's-cap lily and New England aster. Better-drained loamy soils on slopes and broad ridges were covered with more moderate stands of switchgrass, big bluestem, Indian grass and forbs like compass plant, rattlesnake master, smooth aster, wild indigo and goldenrod. Drier sites on gravel and sand ridges or steep slopes supported shorter and more open stands of little bluestem, side-oats grama, and needlegrass, with forbs like pasque flower, silky aster, yellow pucoon and common milkweed.

Forests

Closed-canopy mature forests as we know them today existed only on the floodplains where fire could not routinely penetrate. Silver maple, American elm, and swamp white oak dominated the wettest sites, with hickories, hackberry, black walnut, white ash, red oak, basswood and slippery elm on lower slopes. Shrubs were not abundant and were primarily young silver maples and hackberry with catbriar, poison ivy and grape.

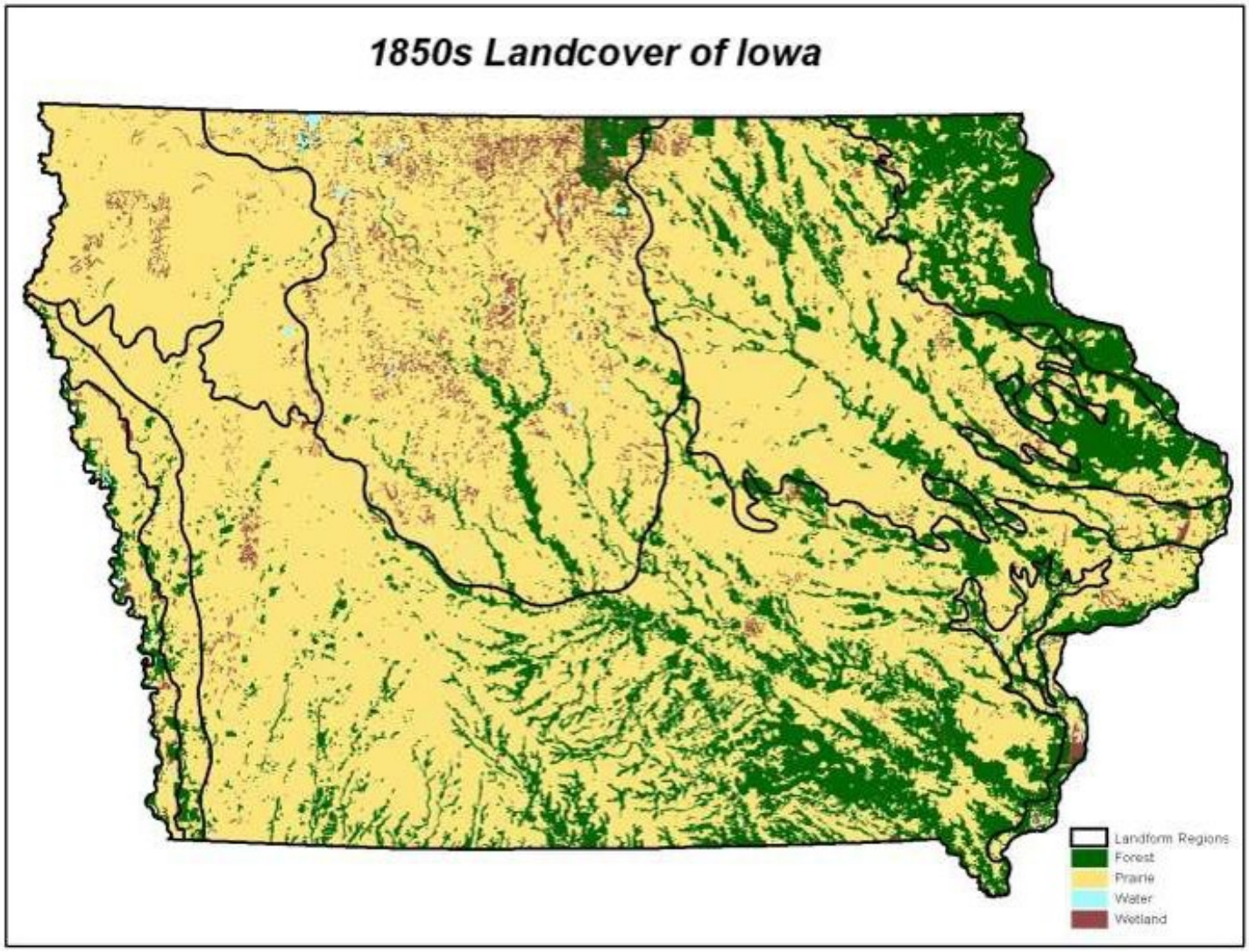
Forests on drier slopes and uplands were primarily oak openings or savannas - scattered old oak trees or small clumps of oaks with an understory of prairie or mixed prairie-forest shrubs and herbs. Burr oak, with its thick, fire- retardant bark dominated with some red and white oaks on moister sites. The understory was primarily prairie grasses and forbs but hazel, coralberry, sumac and grape occurred where fire was less common.

The heaviest concentrations of timber were in the cooler and moister eastern third of the state. In the west only the floodplains and the coolest sites on north and east facing slopes

in the deepest river valleys were timbered. Because of the many river systems that penetrated the prairies to the north and west at least some timber and shrub lands were found across most of the state.

Landcover of Iowa in the 1850s (from Government Land Office original public land survey of Iowa)

- Prairie ~23,300,000 acres (65%);
- Wetlands/ prairie pothole marshes ~4,000,000 acres (11%);
- Forest ~6,700,000 acres (19%);
- Water, floodplains, and backwaters ~1,800,000 acres (5%).



Fire and grazing

Drought, fire and grazing combined to make Iowa's prairie-wetland-forest communities dynamic ecosystems. In wet years, water levels were high, and multiple years of high water levels caused wetland vegetation to gradually die out, and marshes began to look like ponds or small lakes. But dry weather runs in approximately 10 to 15-year cycles on the prairies, with severe drought at roughly 20-year intervals. Drought caused wetland basins to temporarily de-water. Seeds buried in moist wetland soils were able to germinate once again and dense stands of emergent vegetation were reestablished and accumulated plant material decomposed in the aerobic sediments liberating nutrients. Thus regenerated wetlands awaited only the end of

drought to return them to their former productive condition.

In wet years fire was less prevalent on the prairie. Without burning the dead stems and leaves of grasses and forbs accumulated on the ground and this litter created a cooler, moister environment. In some cases sun tolerant trees, and coralberry and other shrubs were able to survive and spread from forest edges farther into the grasslands.
During drought fire burned off large areas of prairie and forest, killed invading shrubs and trees, eliminated the litter, returned nutrients to the soil and allowed grasses to regain their dominance. Thus the boundary between forest and prairie ecosystems was a dynamic back and forth movement. Fire also allowed annual plants like ragweed, fleabane, thistle and primrose to take a temporary foothold before the longer-lived grasses and forbs recovered and choked them out.

Although fires were common, it is impossible to say how much and how frequently the prairies burned. Weather is seldom in complete synchrony over all of Iowa. Local dry spells undoubtedly created mini-droughts that lowered wetlands and produced frequent fires, while just a few miles away precipitation was normal. Even in normal years a dry late summer could result in a partial drawdown of marshes and occasional fires. The network of wetlands, creeks and rivers probably stopped smaller fires from expanding too greatly.

Grazers and browsers like bison, wapiti and deer relied on this mosaic of habitat condition and also contributed to it. They suppressed trees and shrubs and slowed the growth of tall grasses where they fed intensively. Wapiti and bison created wallows - sandy areas where they rolled in the loose earth to remove hair and dislodge insects. Prairie dogs, though not common in Iowa, kept the vegetation around their towns clipped short. Even plains pocket gophers created small openings over their mounds where annual plants could gain a foothold.

The result of all this variety in soils, topography, weather, fire and animal activity was a great patchwork of plant communities in both time and space. On some sites 250 species of plants could be found. Not only were prairies, forest and wetlands in close proximity, but at any given location plant communities were in a state of growth, retrenchment or suppression depending on their local history.

4.3.2 Impacts of Settlement

Settlement in Iowa progressed roughly southeast to northwest. Most of the south half of the state had been inhabited by the end of the 1840s; northcentral and northwest Iowa were settled in the 1850s; Lyon County in extreme northwest Iowa was the last to be settled, receiving its first homestead family in 1866.

Human population growth was slow at first. By 1840 only 43,000 settlers had braved the prairies. Pressure for cheap land Increased after the Civil War, however, and massive land grants were made to railroad builders to stimulate completion of a trans-continental railroad network. By 1870, Iowa's population had increased to nearly 650,000; by 1900 it had skyrocketed to 2 million.

At the same time Iowa was being settled a revolution was overhauling industry and agriculture. The advent of improved farm implements, coupled with a rapidly expanding population base devoted mostly to agriculture, had a devastating and permanent impact on Iowa's native plant communities.

Forests

Woodlands were the first to go. Early pioneers, emerging from the eastern deciduous forest, often likened tallgrass prairie to an ocean of grass, with scattered savanna or woodlands along streams like a distant shoreline on the horizon. Some found the light and openness of the prairie invigorating, others found it oppressive, accustomed as they were to woodlands, where trees were a symbol of soil fertility. Some early settlers preferred farming woodlands rather than open prairie, fearing that land too poor to grow trees would not grow crops either. While experience would quickly prove that wrong, forests felt the bite of the pioneer's axe early in our history.

Early farmers tended to settle close to timber for building materials and fuel. By 1875 when most of the Iowa prairie had been settled, woodland acres sold for $35/ac while prairie land, thought to be less fertile, went for $5/acre (ac). As late as 1867, in Marshall County Iowa, good timbered land was selling for up to $50/ac while prairie brought a paltry $3/ac (Madson 1995).

Most of the initial forest clearing in Iowa was done to allow conversion of the land to agriculture. Iowa's native hardwoods did not prove valuable as building materials. Most of the lumber that eventually built the farm homes, barns and livestock dwellings that dotted the countryside came from the great pineries of Minnesota and Wisconsin. Starting in the 1850s, however, railroad expansion and the discovery of coal in southern Iowa fueled a demand for oak ties and mine timbers that would last into the early 20th century. By 1875, just one-third of the original 6.7 million acres of primitive forest remained, most on rough land or in floodplains either too steep or too wet to plow.

Prairies

The effect on our extensive prairies and prairie-wetland complexes was even more devastating.

When pulled by up to 5 teams of horses or yokes of oxen a steel *breaking plow* could shear through and break up 2 acres a day of the foot- thick sod with its intricately intertwined root systems. On the open prairie, huge breaking plows and teams of oxen were required to prepare the land for farming, requiring a major capital investment. If a farmer lacked such equipment he had to hire it done for as much as $600/quarter section, a staggering sum. The newly exposed soil was so fertile that a crop, first wheat and later corn, was planted directly on the overturned furrows. The next year a second plowing would complete the conversion of prairie to a field tillable by conventional methods. Starting in the 1850s, Iowa lost nearly 2 percent of its 25 million acres of native prairie a year, 3 million acres a decade, until less than 30,000 acres (0.1%) remained after 80 years.

Wetlands

The vast prairie-pothole wetlands of northcentral and northwest Iowa took longer to impact. Through the first 20 years of settlement there was plenty of good land available without trying to drain and farm wetlands. In 1850, Congress passed the SwampLand Act. It directed each county to survey all wetlands and sell them at auction for 5 cents an acre, the first of what would become a century-long succession of government-subsidized efforts to drain wetlands. County drainage commissions and drainage districts were soon organized. Eventually pothole soils were discovered to be some of the most productive when dry, further accelerating the demand for drainage.

The first drainage attempts were with hand-dug, open ditches that drained small, shallow wetlands. This reasonably ineffective approach was quickly replaced by massive teams of oxen pulling breaking plow that created a furrow through and beyond a wetland to a stream that received the water. Steam dredges did not replace manual labor until nearly 1900 and this was the era of draining lakes and large marshes into excavated ditches (bull ditches) that led to streams. Underground ceramic tiles were developed to drain smaller potholes into ditches as early as 1858. By 1917 modern clay tiles were used to drain seasonally wet fields into extensive, inter-connected drainage systems that had eliminated all but the largest wetlands. By 1906 just 25 percent of the original 4 million acres of pothole wetlands remained. By 1970 less than 1% of Iowa's historic wetlands remained.

Rivers

Even in the late 1800s, Meek noticed and reported impacts to the state's streams and fish communities:

> *The prairie was originally covered with a dense growth of prairie grass and herbaceous plants, which tended to produce a stiff sod. During heavy rains this sod absorbed the water, preventing its direct flow into the rivers, and it reached the latter*

chiefly by slowly filtering through the soil. The streams were thus relieved from overflow, and were kept from drying up during the summers. I have been informed that many streams, formerly deep and narrow, and abounding in pickerel, bass, and catfishes, have since grown wide and shallow, while the volume of water in them varies greatly in the different seasons, and they are now inhabited only by bullheads, suckers, and a few minnows.

The breaking of the native sod for agricultural purposes has especially affected the smaller streams in this respect, while the construction of ditches and the practice of underdraining have had their effects upon the larger ones. Moreover, the constant loosening of the soil, in farming, tends to reduce it to that condition in which it is readily transported by the heavy rains to produce muddy currents.

Border Rivers - Engineering began on the Mississippi River starting in 1824. Initially, this consisted mainly of snag removal. An act of Congress in 1907 approved creation of a 6-foot navigation channel from the Missouri River northward to Minneapolis. In 1935, further legislation provided for a 9-foot navigational channel maintained through a system of locks and dams as well as dredging. Navigation locks and dams result in a series of pools within the river, leading to a change in the fish community within the river towards those preferring more slow-moving water. (Harlan et al. 1987).

Engineering along the Missouri River for flood control and navigation drastically altered the river system. Between 1923 and 1976, the Missouri was corralled from a wide, braided, dynamic river to a single narrow channel. The channel area was reduced by 80%, with ~35,000 acres of this reduction being in Iowa. By the 1980s, sport and commercial fisheries along the Missouri had dwindled to a tiny fraction of their former abundance.

Interior Rivers – Because Iowa has productive, and therefore intensively cultivated, soils, the rivers which run through and drain these areas are subjected to large and sometimes sudden fluctuations. Draining heavily cultivated lands also results in silt loads, leading to sedimentation. This has changed the fish community assemblage, especially in lower, more turbid reaches of streams where the remaining species tend to be tolerant of lower water quality.

Additionally, many low-head dams were constructed across the state, usually for milling or water supply uses. By 1870, more than 1000 low-head dams dotted the state's interior rivers, restricting seasonal movement of fish species, as well as mussel species dependent upon their fish-hosts for dispersal.

4.3.3. Change Continues in the 20th Century

In less than a century the landscape of Iowa was changed more by settlement than that of any other state. In 1900, most of Iowa's 2 million residents lived on small, nearly self-sufficient farms of 100 acres or less. They subsisted on corn, wheat, oats, hay and a variety of livestock. Iowa had been converted from a seemingly limitless prairie-forest- wetland mosaic into a domesticated landscape of small farms, grain fields and pastures. There were still undrained sloughs and wet pastures on many farms and tracts of prairie could still be found to remind farmers of vintage Iowa, but these native areas were scattered and becoming ever smaller. In the early 20th century they were still looked on as waste areas needing conversion to a more productive use. Most of Iowa's native wildlife was either gone or reduced to such low numbers that rabbits, squirrels, quail and the occasional prairie chicken were the only game animals available to most hunters.

The changes in Iowa's landscape in the 20th century were less dramatic but in some ways more devastating. Wildlife and its habitats were impacted by constant improvements in farming technology and the effects of government agricultural policy on farmers' decisions about how their land would be used.

Improved Farming Technology

Change was slow at first. Much of northern Iowa was too wet to permit iron-wheeled tractors to function so gasoline-powered equipment did not replace horses on a large scale until rubber balloon tires became available in the late 1930s. Hybrid seed corn was introduced in the 1930s to improve yields; for the first time more crop could consistently be raised than was needed for use on the farm. Farming ever so gradually became less a way of life and more of a business.

Industrial technology developed during World War II rapidly accelerated the pace of change. By mid-century mechanical planters, harvesters (hay balers, corn pickers and grain combines) and grain handling equipment were reducing the need for hand labor. Repeated field cultivation for weed control was the norm, but control in cultivated fields was a constant and frequently unsuccessful battle for farmers. Inefficient harvesting equipment often left a substantial part of the crop in the field.

Labor saving devices permitted farmers to handle ever-larger farming operations. In the 1950s the average northern Iowa farm had grown to 250 acres but was still a diverse operation of livestock, small grains, hay and corn. Foxtail- choked cornfields with plenty of waste grain were

a pheasant hunter's delight and a source of food and cover for a variety of other game and nongame wildlife.

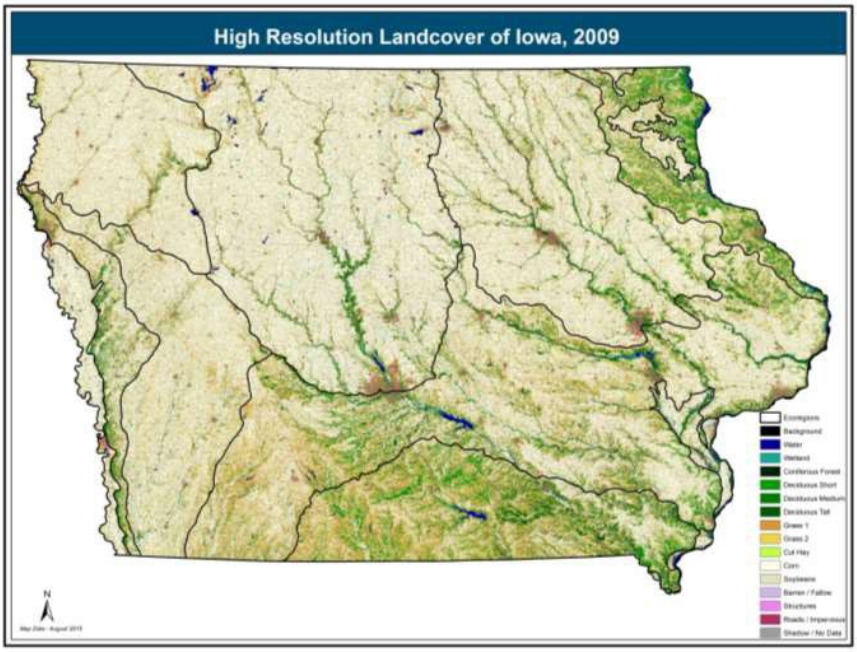
The last half of the century brought even more change. Modern tiling machines could mechanically dig and insert underground perforated field tiles to drain even the wettest areas. The use of agricultural chemicals – herbicides, pesticides, and fertilizers – became the norm and weeds and insects were, if not conquered, at least minimized as a threat to crop yields. The first pesticides were organochlorines -DDT and its derivatives- that had devastating long- term effects on bird populations that led to the ban on their use in the 1970s. Soybeans were introduced as a cash crop and genetically modified crops with built-in pesticide resistance were developed. Livestock operations shifted from on-the-farm to confinement operations and the need for extensive livestock forage (hay and small grains) was reduced. Crop rotations eventually were simplified to continuous corn or soybeans or corn-soybean rotations over most of the state. Planting and harvesting equipment and the tractors to pull them became ever larger. Modern grain combines became so efficient that little waste grain or crop residue was left in the fields for wildlife food or cover.

By 2000, the average farm had increased to more than 340 acres. The number of farms in Iowa decreased from 203,000 in 1950 to just 93,000 in 2007 (USDA and Census Bureau - Census of Agriculture). Nearly every rural county in Iowa is experiencing a continuous outmigration, primarily by young people seeking jobs no longer available as farm size and mechanization has increased. Iowa is trending toward a more urban populace. By 2010, the population of Iowa was 64% urban, up from 25.6% in 1900, and 57% in 1970 (U.S. Census Bureau). In 2010, Iowa's population was about 3 million.

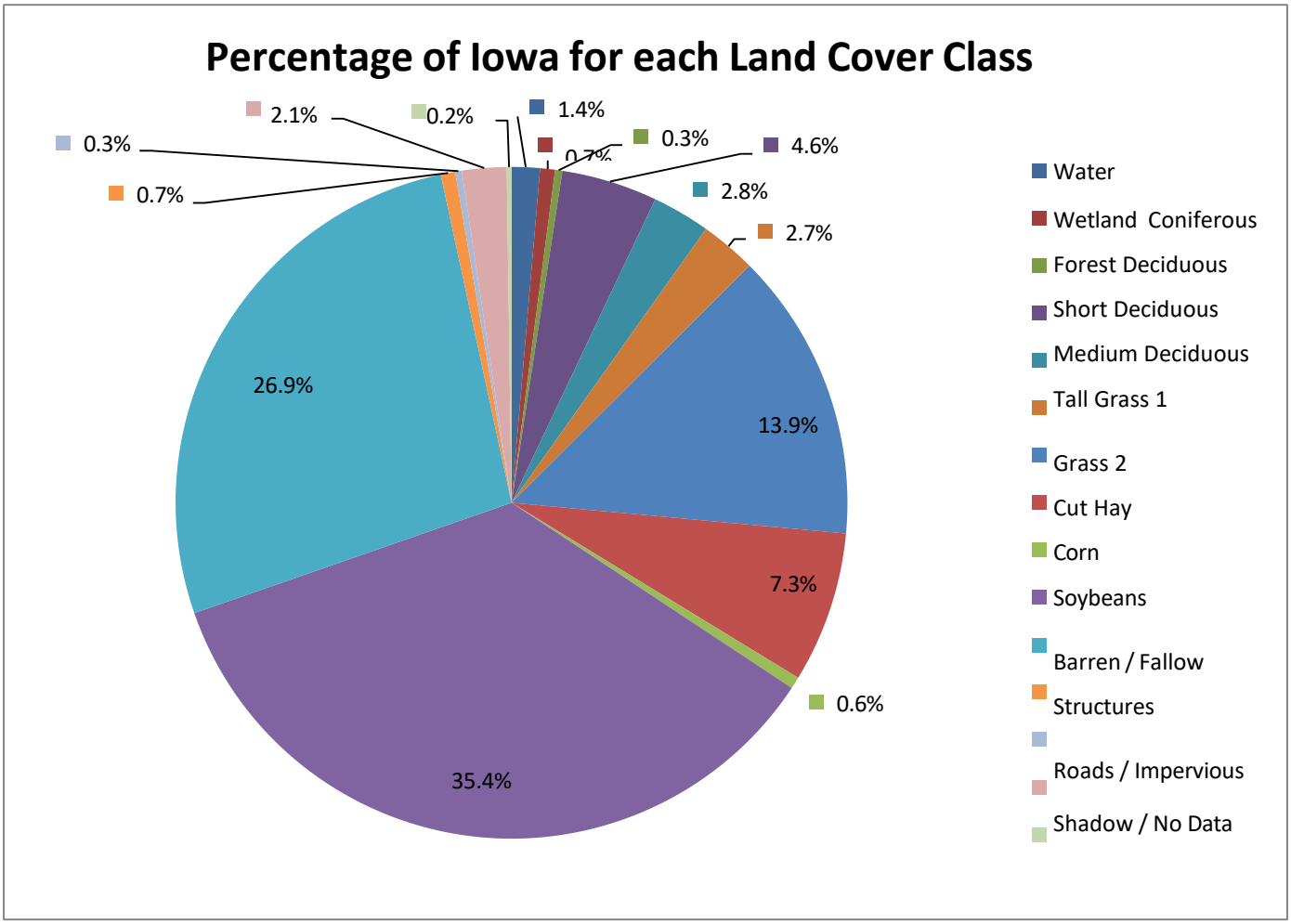
4.3.4 Iowa's Natural Communities Today

The result of a century and a half of change as a result of human intervention on Iowa's landscape has been a shift in the composition of Iowa's plant communities and the wildlife that inhabits them. Few undisturbed natural plant or wildlife communities exist today. Approximately 0.2% of Iowa's native prairies (47,000 acres including remnant, restored and reconstructed prairies), 5% of its wetlands (255,000 acres of wetlands estimate in 2009 HRLC), and 37% of its forests (2,477,000 acres) remain.

Map below shows the land cover in Iowa in the year 2009. The majority of the state is covered with row crop, primarily corn and soybeans. Most of the remainder of the state is in grassland, often conservation reserve, road ditches or pasture, with lesser acreages of timber and other habitat types.



Percentage of Iowa's total acreage for each Land Cover Class. From 2009 High Resolution Land Cover dataset.



5. Common Approaches to Wetland Restoration in Iowa

5.1 Vegetation Restoration

Iowa NRCS utilizes soils information and the Iowa Plant Community Selector to determine the appropriate seed mix(es) for each restoration. Planners must pay close attention to the ponding/flooding and frequency columns of the resulting report to home in on the best mix for a particular soil type and geographic location.

Vegetative restoration of all wetland classes and their associated uplands depends entirely upon the existing cover at the time of enrollment. Iowa receives roughly an equal number of applications coming out of row crop production and CRP, often a mixture of both. No-till drilling and broadcast seeding methods are acceptable during the spring (4/15-7/1), dormant (11/15-freeze-up) and frost (typically 2/1-4/15) seeding periods.

Iowa began adjusting all commonly used diverse native grass/forb mixes for easement restoration to meet national monarch/pollinator standards in 2016. Currently, all wet-mesic, mesic, dry-mesic and xeric mixes that would naturally support monarch/pollinator life cycle stages contain multiple species from the Central Region recommended list for that purpose.

Those coming out of row crop production are seeded to diverse native grass/forb mixes at the earliest opportunity following the final harvest of crops. Little or no site prep is necessary to complete these seedings.

Vegetative restoration of land previously enrolled in CRP can vary greatly depending upon restoration work previously completed. In recent examples, higher quality CRP (CP-23/25 for example) is seeded with diverse native mixes comparable to those used in easement restoration so the U.S. may actually recognize some cost savings by accepting those vegetative restorations as “complete” with no additional work required. On the other end of the spectrum, some of the lesser quality CRP practices, especially those utilizing cool season grasses or those sites lacking in maintenance for decades of continuous re-enrollment can require a significant amount of site preparation prior to restoration seeding. Iowa NRCS currently utilizes a full growing season of multiple herbicide applications (typically three) to fully kill cool season grasses followed by burning and dormant seeding. In some instances, low diversity CRP mixes dominated by tall warm season grasses may be set back and interseeded with forb-only mixes to add diversity.

Recommendations for how to approach each of these vegetative restoration scenarios are currently being developed as “implementation requirements” by the Ecological Sciences staff to help guide staff in planning.

In limited situations, tree plantings may be appropriate for native community restoration or requested by the landowner. Staff will utilize soils information from the application area as input to the Iowa Plant Community Selector Access database to first determine if those locations were

historically supportive of woody growth. If justified, a tree planting plan must then be developed by the local IDNR District Forester in order to be included in the final restoration plan.

Common NRCS practice codes associated with vegetative restoration include, but are not limited to: 314, 315, 327, 338, 342, 380, 394, 490, 612, 645, 666.

5.2 Hydrologic Restoration

5.2.1 HGM Class DEPRESSION and MINERAL/ORGANIC FLAT Wetland Restoration

Restoration of Prairie Pothole Region wetlands in Iowa primarily revolves around mitigating the impacts of drainage which has significant impacts on both the hydrology and the vegetation community of the easement area. The network of subsurface drainage tile and open ditches coupled with a built landscape oriented on a one square mile grid system has been extremely effective in eliminating Iowa's historic wetland acres. Decades of agricultural tillage and land-leveling have removed much of the micro- and macro-topography characteristic of temporary and seasonal depressional wetlands. Similarly, accumulation of post-settlement alluvium (PSA) through erosional processes has decreased the depth of former potholes. Most former glacial runoff channels and outwash flats (HGM Class MINERAL FLAT or ORGANIC FLAT) have been surface drained, ultimately becoming locations for district drainage ditches that facilitated subsurface drainage of the adjacent landscape.

Where feasible, practical *hydrologic* restoration of depressional wetland sites commonly involves a combination of removal/plugging of existing tile, replacing perforated subsurface drainage tile with non-perforated and shallow water excavation of PSA. In some cases, tile can be brought to the surface and outlet in easement wetlands to restore hydrology. Ditch plugs, and in some instances, wide/low dikes, may be employed to undo the effects of surface drainage and contain restored wetlands within the easement boundary. Larger semi-permanent and permanent wetland restorations may include water control structures to facilitate vegetation management and control of unwanted populations of rough fish.

Common NRCS practice codes associated with DEPRESSION and MINERAL/ORGANIC FLAT wetland hydrology restoration include, but are not limited to: 356, 587,606, 620, 351, 657, 659, 644.

5.2.2. HGM Class RIVERINE Wetland Restoration

Restoration of riverine wetlands in Iowa can be broken into two categories- one, those situations where obstructions to floodplain function (levees & diversions) can be removed or lowered to allow natural seasonal access of the adjoining river to its floodplain – and two, restoration/enhancement of former riverine wetland features (oxbows, meanders, back channels, chutes, depressions, etc.) adjacent to incised or leveed systems where precipitation, runoff and/or groundwater inputs can be relied upon to provide at least seasonal hydrology. Priority is of course given to those sites where impediments to natural seasonal flooding are not present or can be removed as part of the planned restoration.

Information from the Iowa Flood Center, Flood Inundation Risk Gradients, is utilized to prioritize riverine sites for restoration in the ACEP-WRE ranking (http://ifis.iowafloodcenter.org/ifis/newmaps/risk/map/).

Where man-made obstructions to floodplain function can be removed (typically private agricultural levees not subject to Iowa Code, agreements or levee district governance), restoration planning typically involves removing or lowering a portion of the levee to promote backwater flooding (water level in river rises to a point and "backs" onto the restoration area downstream to upstream direction) rather than "headwater" flooding where flood waters rush into the restoration area from an upstream to downstream direction. Lowered sections of levee are normally armored with rip-rap/geotextile, grouted rock or gabion chutes. Supporting earthworks are characterized by wide tops and gradual inlet/outlet slopes (≥10:1). Riverine wetland features on the landward side of lowered levees are then restored, commonly by excavation of PSA from former oxbow/meander features with defined inside/outside bends and depths representative of natural features in the surrounding area. Spoil placement from excavations is used to define these features; heights are limited to 6"-24" depending upon state or federal floodplain permitting requirements.

In situations where impediments to natural seasonal flooding cannot be fully removed, channel incision has reduced flood frequency or coarse soil texture allows for lateral ground water movement, some restoration can still be accomplished. In these situations, rather than seasonal flooding providing the source of hydrology, precipitation, runoff and/or groundwater inflows suffice. Restoration in these situations revolves almost entirely around excavation of former riverine wetland features and in some cases, removal of upland diversions, removal of subsurface drainage, plugging of surface drains, low dikes with water control structures. Spoil placement requirements are the same as stated above.

In rare, and very unique situations where an easement boundary includes both banks of a low order stream or river and adequate acres to accommodate construction, in-channel work and/or bank stabilization practices may be considered for restoration. Actions involved will likely involve excavations and creative spoiling to "guide" formerly channelized reaches back into historic channels or meanders. Such actions will require thorough hydrologic assessments and adhere to 401/404 permitting requirements.

Common NRCS practice codes associated with RIVERINE wetland hydrology restoration include, but are not limited to: 356, 587, 606, 620, 351, 580, 657, 659, 644.

5.2.3. HGM Class SLOPE Wetland Restoration

SLOPE wetland restoration in Iowa is almost exclusively targeted at one of the state's rarest ecosystems, fens. Fen restoration requires an extremely delicate approach due to the high percentage of rare and declining plant life associated with this wetland type. Due to their relatively small average size, fens over decades of agricultural pressure have been significantly degraded by a variety of drainage methods, commonly a combination of subsurface tile and surface ditching. Often, fen areas have been pattern tiled multiple times at varying depths in an attempt to gain a few more acres of crop land- even in restoration, by Iowa Code, drainage for the upstream (dominant) landowner must be maintained requiring the addition of non-perforated tile and an outlet, potentially causing greater impact to the fen. Surface outlets potentially introduce issues with different water chemistry and temperature, introducing hydrology dramatically different than the normal groundwater source.

These actions do not have to take place within the confines of the fen proper, drainage of adjacent land has the overall effect of lowering the local water table and subsequently, that of the groundwater expressed in the fen. Even small changes to fen hydrology have dramatic effects on the vegetative community- plant life common to fens has evolved to fit a narrow pH range and water/soil chemistry – deviations from those conditions immediately invite competition from less desirable species. Next to drainage, woody encroachment (especially willow sp. and gray dogwood) and infestations of Reed canary grass are the biggest threats to the integrity of fen wetlands.

The final word has not been written on fen restoration so the few efforts undertaken in Iowa have largely revolved around not causing more damage to the system. To that end, hand removal and herbicide stump treatment of encroaching woody vegetation coupled with disabling of subsurface drainage at the periphery of the fen has been implemented in the past with mixed success. Restoration of a former large fen in Emmet County in 2020 saw the first attempt at vegetation stripping and plugging of surface ditches in an effort to remove invasive vegetation (Reed canary grass) and restore groundwater hydrology, raising the water table, saturating soils and hopefully expressing the historic fen seedbank (Klimkowska, etal. 2015).

It is important to note that to date, no additional seeding has been installed as a component of fen restorations in the state. Research indicates that most species of fen vegetation have seeds with relatively long viability so in the spirit of avoiding doing more harm than good, it is strongly suggested that seeding need not be a component of fen restoration.

Common NRCS practice codes associated with SLOPE wetland hydrology restoration include, but are not limited to: 587, 410, 606, 620, 657, 659, 644.

5.3 Alternative Communities

Iowa is arguably the most altered state in the union, with nearly 85% (30,600,000 acres) of its land mass currently in agricultural production, the majority being corn and soybeans (NASS, 2019). As previously stated, sources cite between 95% and 99% of historic wetlands have been lost as a result. Given these conditions, Iowa likely takes a more liberal approach to "alternative communities" than other states with less modified landscapes.

5.3.1 Alternative Communities in HGM Class DEPRESSION and MINERAL/ORGANIC FLAT Wetland Restoration

Due to the impacts of surface and subsurface drainage in Iowa's Prairie Pothole Region, hydrology alteration in many cases no longer allows for restoration to "historic conditions".

- Lowering of the water table reduces the hydroperiod and/or groundwater inputs to seasonal and temporary wetlands, nearly eliminating them from a landscape where they once comprised >80% of all wetland types (Miller, etal. 2009).
- Lowered water tables dramatically alter vegetative communities, we typically see one step *drier* than what soils information would indicate (wet mesic>mesic, mesic>dry mesic) in heavily drained parts of the state. As a result, we see significant encroachment by various willow species and Reed canary grass where hydroperiod and regular fires would have historically kept those species in check (or RCG, as an invasive, would not have been present).
- Drainage law, via the Iowa Code, maintains that a downstream (servient) landowner must accept and not impede drainage of a superior (upstream) landowner. As such, even in restoration, subsurface drainage cannot be disabled if it comes from off-site. Similarly, organized drainage district surface ditches cannot be interrupted in their flow.
- Property boundaries/fences – Iowa was surveyed and platted on the grid system with many parts of the state being organized into one-mile square sections (unless obstructed by water or geographic features) which over time evolved into a road system with an elevated road grade bordered by ditches for drainage on either side. Subsequent divisions of land reflect this rectilinear form, as such, fences and property boundaries commonly bisect depressional basins, swales and flats making it extremely difficult to "fully restore" the true extents of historical wetlands.

Given these impediments, in restoration of HGM Class DEPRESSION and MINERAL/ORGANIC FLAT wetlands, the following "alternative communities" are <u>allowable:</u>

- Where offsite or on-site conditions (tile drainage, ditches, land leveling, etc.) preclude restoration to historic conditions within the easement boundary, over-excavation of former small depressional wetlands beyond the depth of PSA is allowable to create a reasonable facsimile of previous hydrology/hydroperiod PROVIDED soils are probed prior to design to ensure that sand lenses or other permeable layers are not present

which would drain the restored wetland. Excavation depths should vary and be irregular in construction, allowing for micro- and macro-topographic features. Overall *average* depth of excavation should not exceed 18". Regardless of excavation depth, side slopes should be a minimum of 6:1, 10:1 preferred. Such actions may result in wetland class potentially changing from "Temporary" (Class II) to "Seasonal" (Class III).

- Where threatened or endangered species requiring specific hydrologic conditions in their life cycle are likely to be present, 5% of the excavation area can be >36" in depth.
- In limited situations where a boundary fence, road or drainage ditch cuts off a former pothole or shallow lake basin (HGM class DEPRESSION) and **>75%** of the basin is within the easement boundary and greater than two acres in size, a low dike may be utilized to restore the wetland basin to the extent practicable.
- Water control structures can be installed to provide water level management options. The effect of these actions may take the restored basin one step beyond its historical wetland class (temporary>seasonal, seasonal>semi-permanent).
- Placement of earthfill (dike) perpendicular to the flowline of MINERAL or ORGANIC FLATS will **NOT** be allowed unless there is clear evidence of surface drainage and soils information supports that ponded conditions are appropriate for that location.

5.3.2 Alternative Communities in HGM Class RIVERINE Wetland Restoration

Iowa's riverine wetlands have similarly been impacted by agricultural landscape changes. Levees, both private and within organized levee districts, prevent or limit the regular seasonal flooding necessary to sustain most riverine wetlands. Networks of surface drains and ditches often coupled with subsurface drainage tile are also common in the floodplain. In areas where an adequate outlet doesn't exist for surface or tile drained systems, sumps or "lift pumps" are commonly used to mechanically pull water from the land and pump it to an outlet.

Given these impediments, in restoration of HGM Class RIVERINE wetlands, the following "alternative communities" are allowable:

- In the Missouri River region of Iowa, where historical hydrology will never return to the entirety of the floodplain due to presence of federal and private levees, drainage systems and pumps, where 100% hydric silty clay and silty clay loam soils are present, excavation can be used to create depressional riverine wetland features.
  - Such excavated riverine wetlands should be representative in size and shape of similar features in the watershed, using the Oxbow and Meander job sheets as guides to excavation depth and slope.
- In other regions of the state where historically seasonal wetlands were present due to regular seasonal flooding but no longer have a source of hydrology due to levees, channelization or channel incision, excavated wetlands (meanders/oxbows) may be planned, restoring riverine wetland features now uncommon to the state. The source

of hydrology for these semi-permanent wetlands will be precipitation and runoff from adjacent uplands- to that end, analysis of the hydroperiod should be completed to ensure sufficient hydrology will be present to sustain wetland conditions.

- Ditch plugs, low/wide dikes and water control structures are allowable supporting practices necessary to achieve hydrologic restoration.
- Construction of “ring dikes” or levees surrounding the majority of the easement area with the intention of creating semi-permanent or permanent, open-water wetlands will **NOT** be allowed.

5.3.3 Alternative Communities in HGM Class SLOPE Wetland Restoration

NO ALTERNATIVE COMMUNITIES WILL BE ALLOWED IN RESTORATION OF HGM CLASS SLOPE WETLANDS.

WRCG Approval

All the information located within this WRCG remains in effect until replaced by an updated version. Iowa NRCS's WRCG is not all inclusive and does not prevent the agency from completing due diligence analysis of restoration and/or management actions on a case-by-case basis according to the WRPO. Any additional requirements to Iowa's WRCG will be incorporated on an as-needed basis, and will be reviewed every Farm Bill at the very least.

Reviewed by the ACEP-WRE Subcommittee of the State Technical Advisory Committee:
January 12, 2024 – January 26, 2024

Approval by Iowa NRCS State Conservationist:

X JON HUBBERT

Digitally signed by JON HUBBERT
Date: 2024.02.14 07:31:08 -06'00'

Jon Hubbert
Iowa NRCS State Conservationist