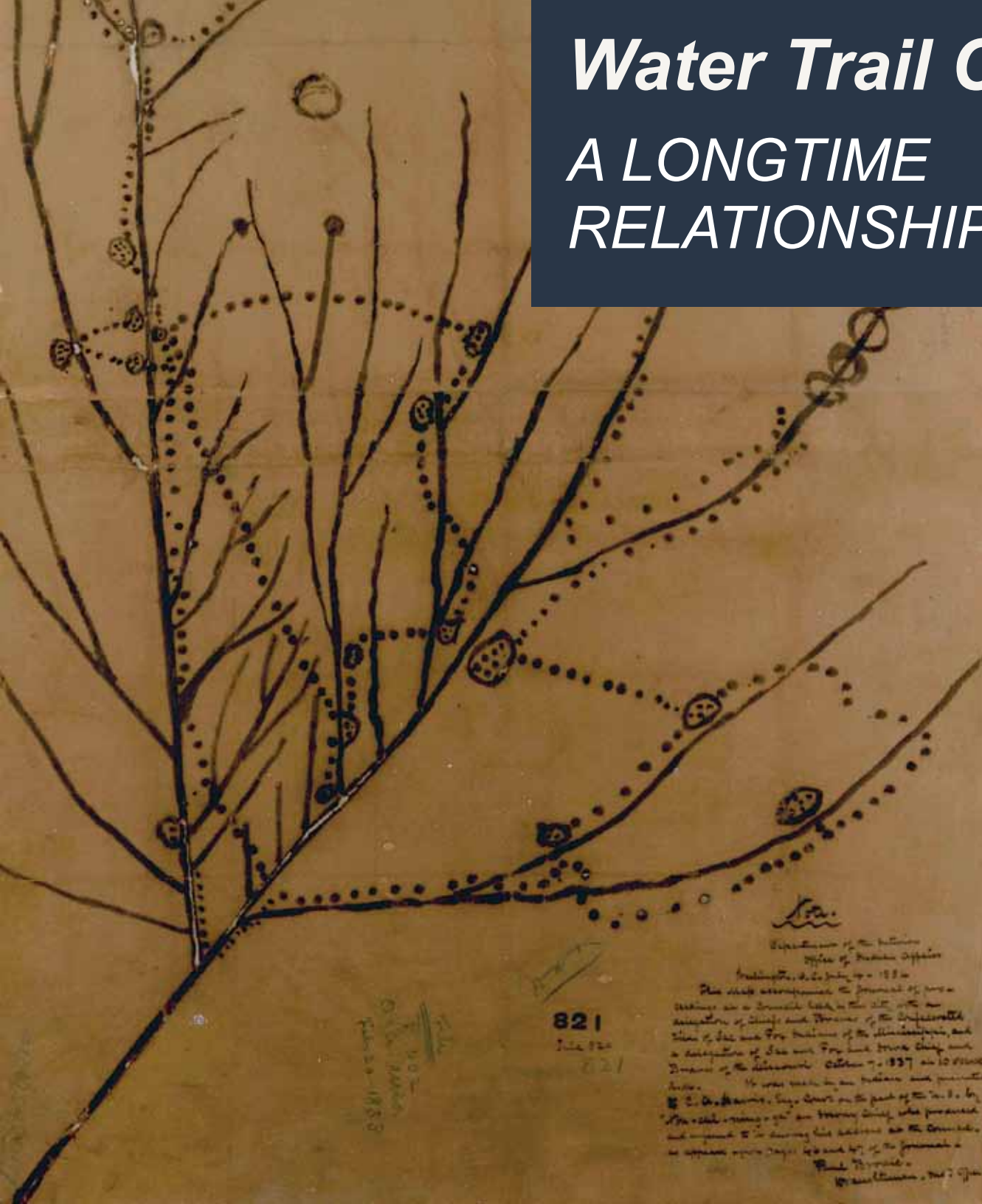


Water Trail Context

A LONGTIME RELATIONSHIP WITH WATER



The state of Iowa drains into either one of two of the United States' longest rivers, the Missouri and the Mississippi. Waterways have long played a significant role in our relationship with the land. They have provided drainage, formed transportation routes, created food sources, powered industries, and provided nourishment for the spirit—whether sacred or recreational—for many people.

Evidence suggests various non-European groups inhabiting Iowa from 7,500 B.C. to the mid-17th century had strong connections to Iowa's waterways. People of the Woodland and Late Pre-Historic traditions relied extensively on river corridors as a food source and for growing crops. The proximity of Late Pre-Historic burial grounds to rivers, such as the Effigy Mounds adjacent to the Mississippi River, also attest to the ritual and spiritual importance of rivers. The Great Oasis culture occupied areas adjacent to floodplains and lake edges in permanent, year-round settlements. Rivers are also known to have functioned as navigational routes by some groups including the loway (Figure 1).

The major period of white settlement began after the signing of the Blackhawk Purchase in 1832. The "official" removal of Indians from Iowa occurred in 1845 and statehood was declared in 1846. Though

Figure 1.

The loway defined their homeland by rivers. This 1837 map was presented by a leader whose name was translated as No Heart of Fear. The heavy line moving from bottom left to top right represents the Mississippi. The nearly vertical line at the left is the Missouri. The land occurring between the "V" of these two great rivers today includes northern Missouri and all of Iowa.



some immigrants arrived by land, most arrived by steamboat. During the 1850s the Iowa landscape was made up of approximately 69% prairie, 19% forest, and 12% wetland. Roughly one million acres of backwaters, oxbows, sloughs and floodplains dotted the wetland landscape and made for a rich diversity of aquatic wildlife. The Iowa, Missouri, Mississippi, and Des Moines rivers experienced heavy steamboat traffic as people flocked into the state. Rivers and wetlands in Iowa also presented a number of barriers to overland travel. Crossing the Mississippi River as well as interior streams proved perilous. "The covered-wagon pioneers especially dreaded the Skunk River bottoms whose 'deep and porous' soil presented a quagmire each spring."

Like the Native Americans before them, the first white settlers in Iowa settled along major rivers and their tributaries. Rivers offered banks of timber to build log cabins and hunt wild game, an abundance of fish, and immediate access to downstream markets to sell or trade commodities such as logs and grain. Steamboats gradually fell out of favor around 1870 with the rise of rail transportation.

Communities quickly sprang up adjacent to rivers based on access to commerce. By 1880 the seven largest cities in Iowa (Dubuque, Davenport, Burlington, Keokuk, Cedar Rapids, Des Moines, and Council Bluffs) were located adjacent to rivers. Many others, though, were damaged or destroyed by flood events or by a migrating river course. Similar to today's urban infrastructure, cities generally relied on rivers to provide both waste disposal and clean water supply. The presence of industry also required access to rivers for power generation and transportation. Dams on Iowa rivers supplied power to more than 1000 mills in the state by 1870. These dams were often converted to hydro-electric power generation after the decline of the milling industry. Dams and other water control structures significantly altered hydrologic functions and channel and streambank conditions and ecological function. Approximately 226 dams remain on Iowa

rivers today, despite the reason for their construction being obsolete.

Prior to 1800, there were no regulations or laws that protected wild game against overhunting. This lack in regulation and enforcement led to the exploitation of many species throughout Iowa and the United States. In Iowa during this era, 29 species ranging from mammals to fish have been extirpated. This rapid decline of species did not go unnoticed. In the early 1900s private conservation groups began to form in an effort to protect a variety of wildlife species. Agriculture eventually came to dominate the Iowa landscape.

Settlers quickly moved to harvest timber and other resources from the state for economic gain. Substantial amounts of timber were logged and transported to other states for lumber using river corridors. After the collapse of the lumber industry, industrialists again looked to rivers and streams with the growth of the pearl button industry. Iowa rivers offered 12 different species of mussels that could be used in the manufacture of pearl buttons. Coal mining industries also existed. However, agriculturally-rich soils have also been a prime source of income in Iowa.

Stream straightening, surface water ditching, and sub-surface tile drainage networks were constructed beginning in the late 1800's in many parts of the state to allow for expanded agricultural development (Figures 2 and 3). Iowa now consists of 70% agricultural lands, while less than 0.1% native prairie and 5% of wetland areas remain. Up until the last half of the century, agricultural lands were more highly diversified, but in the last fifty years trends have shifted to large scale, row crop monocultures of corn and soybeans. Substantially reduced areas of unmanaged landscape are one result of the culture of limited crop diversity and industrial-scale animal production. These shifts in landscape structure limit the type and populations of wildlife able to live in Iowa including birds, amphibians, reptiles and mammals.

River corridors also provided recreation and leisure

opportunity. Newspaper articles in the Victorian era documented the popularity of bath houses, fishing, ice skating, boating and other leisure activities along Iowa's river corridors. The earliest Iowa reference to a recreational excursion in a canoe appears in 1833 written in the book titled "The Rambler in North America" by Englishman Charles Joseph Latrobe, one of America's first travel writers. Paddling as a widespread recreational activity became popular with the establishment of the American Canoe Association in 1880. Iowa paddling enthusiast Tacitus Hussey was credited with being the first paddler of Des Moines and stimulating local interest in the sport. Before Hussey discovered canoeing, he and his friend Walther Weatherly rowed boats from Humboldt to Des Moines, only to repeat the

trip in decked canoes in 1893. Hussey wrote articles included in state newspapers about his paddle trips on the Cedar River, Boone, and Skunk Rivers, as well as Blackhawk and Beaver Creeks. While various articles discussing river paddling continued to appear, the first state publications detailing paddling Iowa streams appeared in 1954.

Recognition of the importance of water conservation and riparian protection was seen in the Iowa 25-Year Conservation Plan written in 1933. The plan acknowledged the devastating effects of industrialization and agriculture on Iowa's rivers and riparian area and set four primary goals for the conservation of Iowa's waters. These goals included the need for the abatement

of sewage pollution, control of erosion and silting, water power policies to inform judgment on dam construction, and the need to divert barnyard wash away from lakes and streams.

In Iowa, 2% of the state's natural resources are publicly owned. This 2% makes Iowa 49th in the nation for lands available for public recreation.

Stream conditions we find in Iowa today, including degraded, incised channels and steep eroding streambanks, are a reminder of the substantial changes in land use and stormwater runoff occurring in both rural and urban areas of the state.

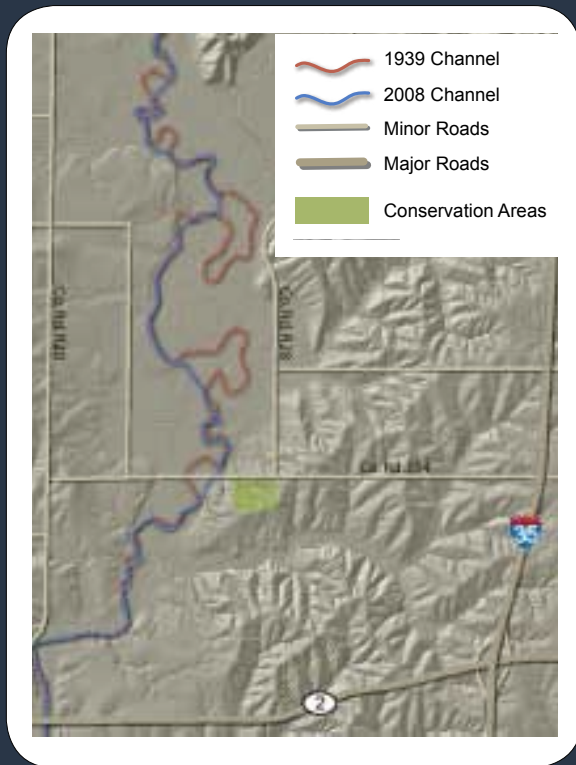


Figure 2.
Example Segments of River Channelization Between 1939 and 2008 on the Grand River in Decatur County

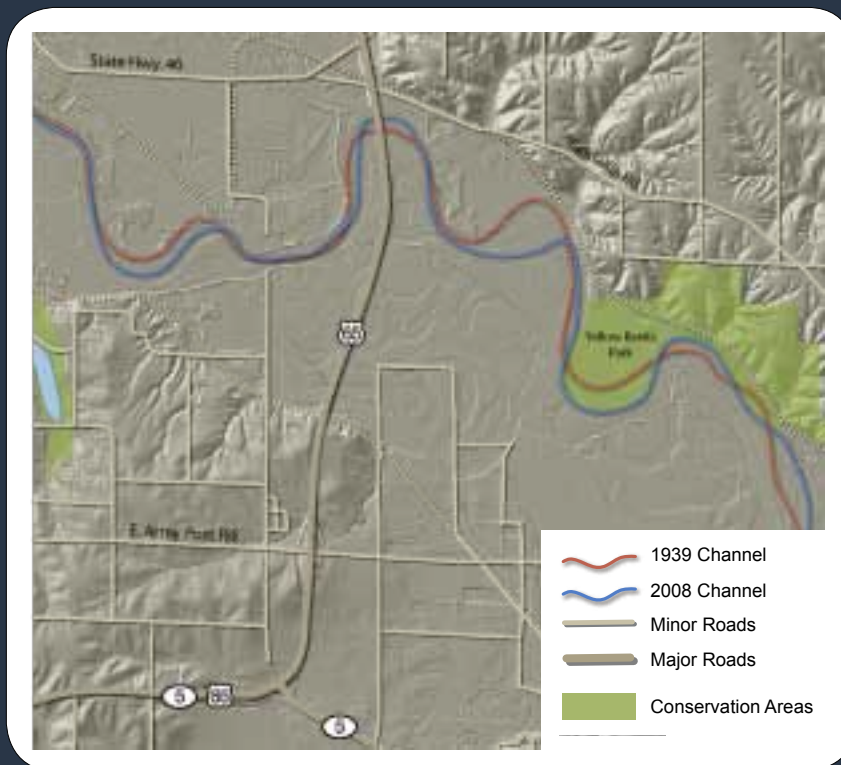


Figure 3.
Example Segments of Unaltered River Channel Between 1939 and 2008 on the Des Moines River in Polk County

HUMAN HEALTH BENEFITS of RECREATION



Recreation allows us a chance to escape the pressures of everyday life and indulge in activities that can be physically, socially, and psychologically fulfilling. Each water trail offers something different, from rushes of adrenaline to sites of historical significance. Using water trails also brings us in direct contact with areas we may not see otherwise. This contact can energize resource conservation activities.

Physical Activity for a Wide Range of Abilities

Water trail use is a form of moderate exercise contributing to maintaining healthy body weight, muscle strength, and flexibility for users regardless of age or ability. Often reaching the water's edge and entering the boat is the largest challenge. Although most people realize exercise is important for maintaining good health in all stages of life, few of us regularly exercise. Although some relationships between exercise and demographics have been identified, such as age and income, the Iowa Department of Health estimated in 2006 that more than half of adult Iowans are considered either overweight or obese, a rate higher than the national average. Nearly 40% of Iowa children in 3rd, 4th, and 5th grades were estimated to be overweight or at risk to be overweight in 2005.

Exercise derived from recreational activities such as paddling, lessens health related problems and health care costs. Regular, moderate exercise has been proven to reduce the risk of developing coronary heart disease, stroke, colon cancer, hypertension, diabetes, osteoporosis, obesity, and depression. Interesting additional studies at the University of Wisconsin Eau Claire also identified kayaking as a healthy alternative to traditional cardiovascular training and that it can be

used as a viable mode to fulfill American College of Sports Medicine exercise recommendations. Kayak training has also been used to improve lower shoulder muscle strength in post-rehabilitated persons with spinal cord injury.

Experiences Form Connections

The environments we surround ourselves with undoubtedly affect our social and psychological well-being both for adults and children. Many times we participate in outdoor recreation and leisure activities in order to spend quality time with friends and family members. Stories and traditions sometimes evolve from these family or group experiences and are passed along. These traditions help to fulfill our needs for a sense of belongingness and camaraderie. For example, a particular river oxbow may be the only place an extended family has canoed together on Mother's Day, whatever the weather. These experiences bring comforts which exist in tradition with one another and with places.

As humans, we need to be able to bond with places. Water trail routes offer the opportunity to satisfy this need. Involvement with recreational resources is a mechanism to develop this bond with the landscape. We use repetitive visits to places we care about to nurture a sense of rootedness or belonging in our life

and to develop a sense of self. Natural, or less-managed, landscape areas and moving water are strong attractors in this way for many people. Recognizable landscape features along the route evoke a sense of familiarity about where we are. This familiarity evokes a sense of security and comfort within us as well as an intense bond with the place.

Exposure to the outdoors and wilderness-like environments has been linked with treating childhood disorders such as hyperactivity, attention deficit, and childhood depression. Direct exposure to the landscape may not alleviate the most severe depression in children, however, it can relieve some of the everyday stresses and pressures that can lead to milder forms of childhood depression.

Restorative Experiences

Stress is an inevitable part of our lives. It has been well documented that stressful conditions in life can have destructive long and short-term effects on physical and mental health. Interactions with landscapes that hold our attention involuntarily, such as wading in a shallow stream looking for interesting rocks or fossils, aids in our ability to recover from mental fatigue brought on by stress. Our mind eases and we experience a sense of restoration. River floating is also identified as an activity that releases stress and serves as a release from mental fatigue.

People sometimes relate to flowing water as a symbol of the inherent connections of life on our planet. In these instances, contact with flowing water serves as a healing or spiritual experience. In a sense, specific landscapes are perceived as sacred to people because they provide an experience of their connectedness to life. Wilderness landscapes, in particular, are known to cultivate this sense of well-being.



Education and Development

Experience in Iowa streams and their associated woodlands and meadows provide an immense educational opportunity for our children. Learning about problems caused by invasive fish species, such as grass carp, becomes much more real as children watch the fish launch themselves over the low-head dam into the lake above the dam.

More than 80% of the 156 environmental educators participating in this plan told us they take adults or children to local streams and wetlands as a part of their curriculum, usually by wading or

from on-land at the water's edge. Sixty percent also indicated they would increase the amount of education they conduct on streams and lakes if a state-designated water trail were available in their region.

Water trail users have the opportunity to participate in maintaining the integrity of the route. Those who act as environmental stewards are often people who have had interactions in outdoor settings, including environmental education. Volunteer stewards become important eyes and

ears of water trails, contributing to what managers and law enforcement personnel understand about how the public is using the trail.





THE STREAM AS A SYSTEM

Streams and their floodplains are some of the most remote and wild places remaining in Iowa. Water trails offer us the opportunity to explore these areas. It's easy to realize the individual aspects of streams we rely on but rarely do we contemplate our dependence on how they function.

The Way of Water

As any of us observing a stream over time can attest, they are a dynamic part of the landscape. Not only do water levels change as a result of precipitation or snow melt, the visual appearance of the water can change as well as the shape of stream channel and streambanks. Although streams may seem to change in random ways, we know their change is linked to a process of evolution in terms of channel shape and size. They are constantly reacting to the amount of water delivered to the channel and how quickly it arrives. From a water trails perspective, being able to predict

how streams will shift and change allows us to make the best investments in terms of constructing launches in locations that will last.

While people can generally realize a streambank section has changed or is unstable, people are often unsure what a stream in good and stable condition looks like. One of the most important realizations river engineers teach us is that a river's floodplain must be physically connected with its channel. This physical connection means that the stream channel overflow is able to spill out onto its floodplain, slowing water velocity and reducing erosive properties. As such, flood-

plains are considered a physical part of the stream despite the fact that water occupies them only temporarily. Once a stream becomes separated from its floodplain, a predictable process of channel deepening and widening begins as the system reacts to instability and tries to construct a new stable shape and size.

The alignment or path of streams as well as the depth of water in a channel impacts if they are a candidate for water trails. On its own, a stream is almost always a curving and meandering shape. Despite our perceptions of curving streams as out of control, meanders are formed and used by the stream as a stabilizing ele-



ment. Previously, it was common and legal to straighten streams by removing meanders for the convenience of landowners. We know now that disturbances such as channelization or stream straightening, even on small segments, causes instability or unraveling of the stream channel upstream and well beyond the location of the disturbance. Other changes people make affecting stream stability include earthwork and construction in the watershed when it increases the volume of stormwater runoff and runoff rates. Removal of perennial vegetation on streambanks, including trees and shrubs, also increases streambank instability.

The Stream as a Corridor

All of the runoff from the land that isn't infiltrated into the soil, stored in lakes and wetlands, used by plants, or evaporated is delivered to rivers. It's as simple as that. The quantity of water delivered and the speed at which it arrives impacts a river's value as a water trail. Although entire watersheds impact water delivery, the land adjacent to the stream is of particular importance to both the stream stability and user experience.

Vegetation in stream corridors works to stabilize streambanks and filter runoff. Interestingly, the roots of woody vegetation sometimes provide temporary but critical protection from bank failure. Removal of stream edge perennial vegetation can increase water and soil temperatures particularly in smaller streams, negatively impacting habitat quality.

Although the Clean Water Act requires the protection

of wetland areas from degradation, this protection generally does not encompass the typical stream edge or channel.

Economic and Social Realities

Land adjacent to river corridors and greenways typically increases the quality of life in the community. Homes within one-half mile of wooded stream corridors in the U.S. are likely to have a 3% to 6% higher value compared to those farther away. Properties adjacent to restored streams had up to a 13% higher property value than similar homes located on un-restored stream segments in some areas.

We've come to rely on streams for many key functions that have no relationship with recreation. Effluent from all urban wastewater treatment plants in Iowa, as well as rural home septic treatment systems, makes its way out of the state through rivers. Rivers also drain stormwater runoff, allowing us to use the land more productively and quickly after precipitation. Municipalities and rural residents often rely on either shallow groundwater or deeper aquifers for drinking water supplies.

Iowans understand the damage resulting from floods. Although flooding is a regular process of rivers, many communities are vulnerable to damage because development and production agriculture are located in these floodplains. Typical flood outcomes in these areas include damaged infrastructure, erosion, lost revenue from decreased tourism, decline in property values and tax revenues, and neighborhood disruption when residents are displaced.*





Water Quality: What Does This Term Mean?



Water quality in Iowa is a reflection of how our land is used and managed. While some perceive the primary function of rivers to be drainage, those using water for recreation are likely not among them.

Bringing People to Water

Recreational use of public waters suggests people leave with more than they came with. Beyond exercise, relaxation and social experiences, people can also leave with more understanding of the water resource. Learning more about water quality and how it applies to recreational use of water may best be learned through experience.

Water quality is one way we characterize a stream segment or lake. Most of us have our own ideas about how to define “water quality.” Using the water quality criteria established in the Clean Water Act is a consistent way to measure or assess water quality condition, as other states also refer to these same criteria. Water quality measures are used to characterize how well a body of water is able to contribute to

beneficial uses, including primary-contact recreation (such as swimming), protection of aquatic life, and use as a public water supply. The Clean Water Act set water quality standards as a way to define and control water pollution, although some sources and types of pollution in Iowa are not controlled and regulated under the act. For water trail users, “impaired” water quality can range from having no bearing whatsoever on our experience to conditions that make people ill through contact with or ingestion of the water.

Demand for recreational use of rivers and lakes declines when water is polluted, affecting local economies and quality of life. Murky green or foul-smelling water are outcomes of water pollution. It’s easy to understand why people choose to avoid recreational use of rivers with these conditions. Other chemical and physical changes, however, can be less obvious to our senses but no less important to stream condition.

One example of a less noticeable pollution outcome is the types of fish or other species present. The specific species living in a stream segment depends on the chemical condition of water. The physical structure of the water body, such as layers of eroded soil in the bottom of the channel or lake, also impact what is able to live there. A river with impaired water quality may still contain invertebrates, for example, but the species present will differ as compared to what lived there prior to the current levels of pollution. Mayflies and Riffle Beetles are examples of invertebrates found in good quality water. Blackfly Larva and Leeches are examples that are pollution tolerant invertebrates and can live in any quality of water.

Pollutants reach water bodies one of two ways. Those delivered via a discharge pipe are known as point-source pollutants. Most commonly, these refer to industrial discharges including sewage treatment plants. Since 1984, cities with populations greater than 50,000 have been required to be permitted for all discharges of a point-source pollutants nature.

The second pollutant category is non-point source,

which is more challenging to assess, monitor, and reduce. Non-point source pollutants are all remaining pollutants reaching water from the land beyond those considered point-source pollution. Water from precipitation and snowmelt running over farm fields, open feedlots, parking lots, and lawns directly into streams delivers non-point source pollutants, including sediment to water bodies. Non-point-source pollution from areas with populations greater than 50,000 is regulated but allowed, while non-point-source pollution from agricultural uses is not regulated.

What we know about water quality conditions in Iowa is largely due to monitoring required by the Clean Water Act. State agencies assess a percentage of streams every two years. These general results, formerly known as a state's 305(b) List, are reported to Congress. Each state also reports on water bodies known to have water-quality impairments. Volunteer water quality monitoring and monitoring conducted on specific watersheds by other groups is also sometimes available.

Besides negatively affecting recreation, wildlife, and human health in Iowa, impaired water quality can impact conditions far from our state. All water leaving Iowa drains into the Mississippi River and, in turn, the Gulf of Mexico. Nutrient pollution in Gulf Coast waters results in hypoxic conditions—a lack of oxygen that threatens aquatic life.

Water bodies with known long term impairments causing a human health hazard are not considered for designation as a state water trail. Flooding and bridge construction can create temporary hazards. State-designated water trails affected by these conditions are designated as a temporary hazard on the DNR website and at access points. The Iowa DNR website provides more detailed information on the nature of temporary hazards. Special signage denoting temporary hazards for use at access points is included in Chapter 6 of the State Water Trails Development Manual. •



Pollutants and Conditions Contributing to Impaired Conditions

In 2008, 581 water bodies in Iowa were listed as having impaired water quality. The most common causes of river impairment were *E. coli* (indicator bacteria), biological impairments, and fish kills.

- Excess nutrients—nitrogen and phosphorus—negatively impact aquatic life, drinking water supplies, and recreational quality
- Eroded soil, also referred to as sediment, is a major pollutant in Iowa surface water and one that is easy to see. Sedimentation also negatively impacts water clarity and depth
- Water temperature affects many vital aspects of stream ecology. Increased water temperatures caused by rapid stormwater runoff, leads to impairment.
- *E. coli* (*Escherichia coli*) is one of the many types of fecal coliform bacteria commonly found in the intestines of animals and humans
- Low dissolved oxygen levels, related to water temperature is rarely a pollutant; however, extended periods of low dissolved oxygen can limit aquatic life
- Pesticides are included with herbicides in a group called toxic organic chemicals, synthetic compounds that contain carbon.
- Metals--non-synthetic compounds



Water as Home

Multiple scales of habitat are nested within the stream corridor as a whole. The smallest scale habitat we can see includes leaf litter, sand or silt over coarse cobbles, moss-covered boulders, or patches of fine gravel. Debris dams and other woody debris that people sometimes associate with poor land stewardship actually provide important in-stream habitat structure. Rocks, riffles and pools are also required for high quality habitat.

Each type of organism contributes to the stream's food web in different ways. Plants contribute significantly by changing carbon dioxide to oxygen. Microorganisms and benthic invertebrates are the main decomposers of organic matter such as leaf litter, which in turn increases their mass, providing more food for other organisms, such as fish.

A functioning and stable food web in a stream ecosystem relies on the stability of the physical aspects of the stream system. The distinctive junctures between rivers, junctions, and tributaries allow for biological diversity among various fish species. Amphibians, fish and other species are then supported further by side channels and alcoves which are elements of complex river networks providing lower-velocity refuges and access to food resources, especially during floods.

Travel Corridors

Waterways provide corridors for humans and aquatic species. Animal populations can become isolated, decline, or extinguish without quality stream and riparian corridors. Connected swaths of vegetation within these corridors are crucial for the movement of animals and the maintenance of healthy gene pools. Relatively small breaks in corridor continuity can have significant impacts on animal movement or the suitability of stream conditions to support certain aquatic species. Many amphibian lifecycles include movement to water for reproduction and then upland for adult life. On a larger scale, large mammals use corridors as a path for hunting and migration throughout the season.



In their inherent nature, water trails are physically defined by aquatic and semi-aquatic habitats. As such, there is mutual interest in conserving and restoring high quality areas. Iowa is home to a variety of native and non-native species of wildlife, many of which are found in streams and near stream areas. Riparian areas act as an edge between open water and upland areas. Many species benefit from these edge or transition conditions. Some species prefer edge habitats and corridors because they provide a variety of cover as well as a greater diversity of food sources.



Wildlife Stressors

- Vegetation removal from stream edge areas, including campsite and trail development
- Water trail launches and other human uses near established nest sites, including turtles and birds
- Human presence close to wildlife causing unintentional harassment
- Altered hydrology including dams, spillways, drainage of wetlands and channelization
- Fragmentation and isolation of habitat due to human land use activities
- Erosion and streambank / shoreline degradation destroys valuable spawning habitat, reduces vegetative cover, and increases turbidity in the water
- Water quality impairments can be chemical, physical and / or biological
- Exotic and invasive species can affect native wildlife through direct confrontation, increased competition for resources or by introducing disease

Fish species, such as trout populations found in some of Iowa's rivers, are dependent on the healthy ecological function of riparian corridors. High levels of silt and nutrients caused by erosion and land use and management negatively impact survival and reproduction of trout populations. Improved land use practices within watersheds and along streams are improving the physical characteristics of the streams. These conditions also promote populations of aquatic insects that are the primary food of trout.

A Complex Structure

The dynamic and complex nature of the stream corridor is a result of variability of hydrologic processes within a river. High flows and cycles of erosion and deposition create pools, riffles, sand bars, islands, loops and meanders within a river corridor. Riparian areas are considered to be one of the most diverse and complex terrestrial habitat types, supporting a wide range of insect, amphibian, fish, bird, and mammal species. The ecological integrity of a stream corridor ecosystem is directly related to the quality of plant communities that make up and surround the corridor.

Riparian and floodplain areas are so diverse in soil makeup, topography, and hydrology that they can produce a dynamic compilation of vegetation from large canopy trees to single celled algae. Riparian vegetation is also unique in its ability to tolerate and exploit seasonal flooding. The predictable advance and retraction of water on the floodplain enhances biological productivity and maintains diversity. Riparian area canopies typically contain layers of vegetation that vary in age, species, and classes and offer a wide array of food and physical habitat resources.



Riparian wetlands are especially unique and valuable for their functions as sites of filtering, storage, and habitat. Their hydrology is especially unique because the water table is near or at the soil surface

much of the year. These wetland conditions favor hydrophytic plants, meaning they tolerate or are encouraged by soils that are at least periodically deprived of oxygen.

Human land use practices have drastically changed the quality of habitat available to Iowa's wildlife and aquatic species.

Species Conservation

Iowa is fortunate to have a Wildlife Action Plan including a 25-year vision identifying ways to preserve wildlife heritage and conserve habitat resources. The vision emphasizes the need for adaptive ecological management practices on both public and private land as well as the increase of wildlife-associated recreational and educational opportunities.

Four threatened and endangered species in Iowa are found in wetland or aquatic habitats. An additional category, species of greatest conservation need (SGCN), is used to protect species from moving into threatened and endangered status.

The total number of SGCN found in aquatic habitats is slightly less than the total found in Iowa's terrestrial habitat, yet surface water accounts for less than 1% of Iowa's landcover as opposed to the remaining 99% terrestrial lands composed of forest, grassland, and agricultural lands. Forty-four percent of Iowa fish species, 44% of semi-aquatic species such as reptiles and amphibians, 53% of mussels and 26% of dragonflies and damselflies are classified as SGCN.



Connecting People with Water and Resources: The State Water Trails Plan

Iowa's State Water Trails Plan is a compilation of strategies and action items integrating the recreational needs and preferences of people with considerations for trail development minimizing impact to Iowa's remaining natural resources. Although water trails bring many benefits to people, Iowa's program seeks to use water trail development as a driver for river and watershed protection and restoration.

Our plan includes goals and strategies to accomplish the vision articulated through a statewide planning process. The existing 1,300 miles of state-designated water trails are characterized for the types of experiences they offer. Lastly, a plan of action identifies options to bring additional high quality experience options to the public, including new water trail routes and enhancements to existing trails. Successful water trails are those with functional relationships between people. Our plan builds upon what has already been learned in the first three years of Iowa's Water Trail program as well as what is understood about how waterways function and how people use them.

WATER TRAIL GOALS RESULTING FROM OUR VISION

Goal One: Provide positive water trail experiences meeting user expectations

- Sensibly balance water trail experience options between urban and rural, landform region, historic and cultural resource context, and waterbody types
- Provide information allowing water trail users to select routes meeting desired skill levels, time available and accessibility needs
- Minimize limitations to water trail experiences based on users age and physical abilities
- Enhance safety education for water trail users including skill-building and hazard avoidance

Goal Two: Use water trail development to strengthen natural resources conservation

- Avoid impact from intensive use to known highly-sensitive aquatic and land-based species and habitats
- Implement low- or no-impact design standards for water trail amenities including parking areas, trails, and launches
- Foster a greater sense of public awareness of and inspire citizen participation in watershed and restoration efforts on Iowa's waterways
- Coordinate with other related existing programs to enhance conservation efforts including Iowa's Protected Water Areas, Iowa Streamkeepers, IOWATER volunteer water monitoring program, the Nationwide Rivers Inventory, and the National Park Service Wild and Scenic Rivers Program

Goal Three: Adapt water trail development techniques to the waterway's individual character

- Minimize avoidable damage to new launches by locating them with consideration of flooding patterns, stream channel evolution, borrowing techniques from the field of stream restoration.
- Choose construction methods and materials relative to ability to maintain launch
- Provide tools and training to public managers working in the river setting
- Encourage broad stakeholder participation in trail planning, development, and maintenance including landowners, volunteer groups, and liveries to consider unique, existing local features and develop within that context

Goal Four: Support public access to water for recreational purposes

- Promote close-to-home recreation opportunities for lowans
- Encourage healthy lifestyles related to exercise and relaxation
- Provide alternatives for local economic development particularly in rural communities

Goal Five: Create a robust, resilient system for developing and experiencing water trails

- Develop a systematic signage system for water trail users
- Develop and implement a comprehensive dam hazard warning signage system

Goal Six: Encourage education in outdoor settings

- Integrate historic and cultural resources awareness with recreational opportunities
- Promote learning about landscape impacts resulting from land management choices, including water quality

Goal Seven: Support positive water trail experiences by initiating strategies to manage intensively used areas

- Actively manage intensively-used areas at a higher level than in past
- Utilize training and education with emergency responders, law enforcement, and liveries for hazard mitigation, user conflicts and litter control

