Beyond The Squish Factor

What Is A Wetland?
And How Is One "Better" Than Another?

Delineating wetlands was somewhat easy for America's agriculturally-minded settlers as they forsook the original 13 colonies for opportunities west. Standing water was simply not conducive to raising crops, so if land where they sought to plant was wet, they endeavored to drain it. The poster child of extensive dewatering is present-day Ohio, where it's estimated that wetland areas declined from around 5 million acres in the late 1700s to only 483,000 by the 1980s – a loss of nearly 90 percent. Where wetlands have been drained, some soils have proved excellent for agriculture, while others have proved so poor they should never have been considered for planting.

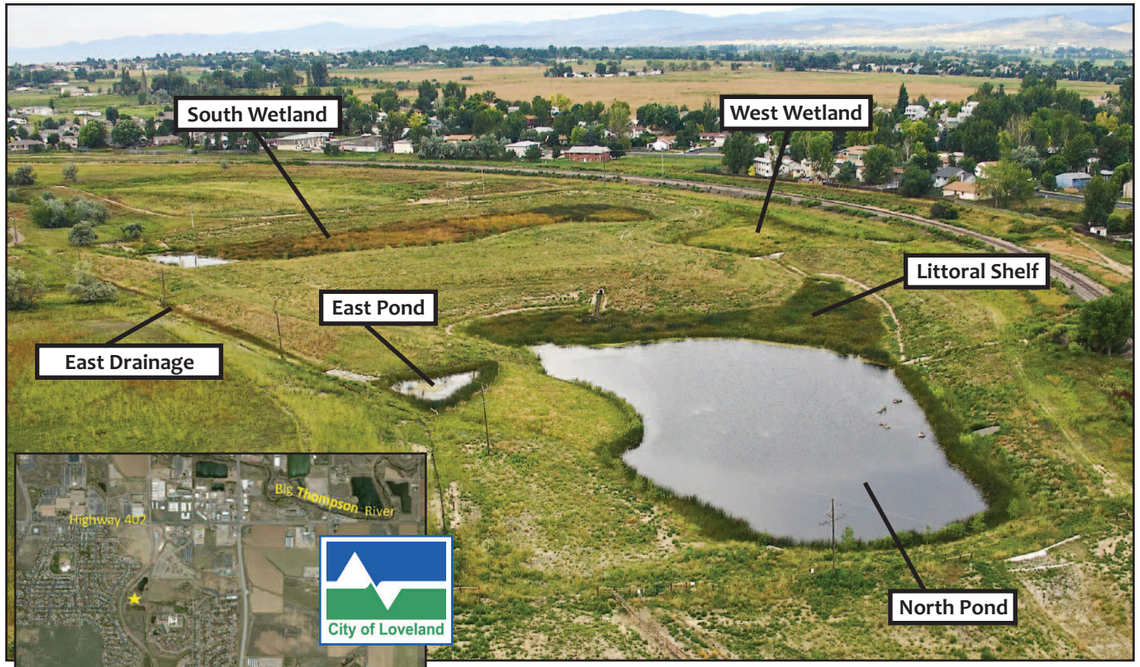
Whether or not those early settlers recognized the importance of wetlands is moot; they were merely altering a small piece of a vast new land for their own survival. Unfortunately, that attitude prevailed far too long in America, as it took nearly two centuries for widespread recognition of the ecological, social and – yes – economical benefits of wetlands.

In general, wetlands are areas characterized by soil that is either inundated by standing or flowing water or is saturated for prolonged periods. Here, water is the dominant factor controlling the environment; but just the ground squishing underfoot does not constitute a true wetland. In addition to being wet, an area must also support the specialized plants adapted to grow in wetlands, called hydrophytes, and have hydric wetland soils to be officially mapped as a wetland.

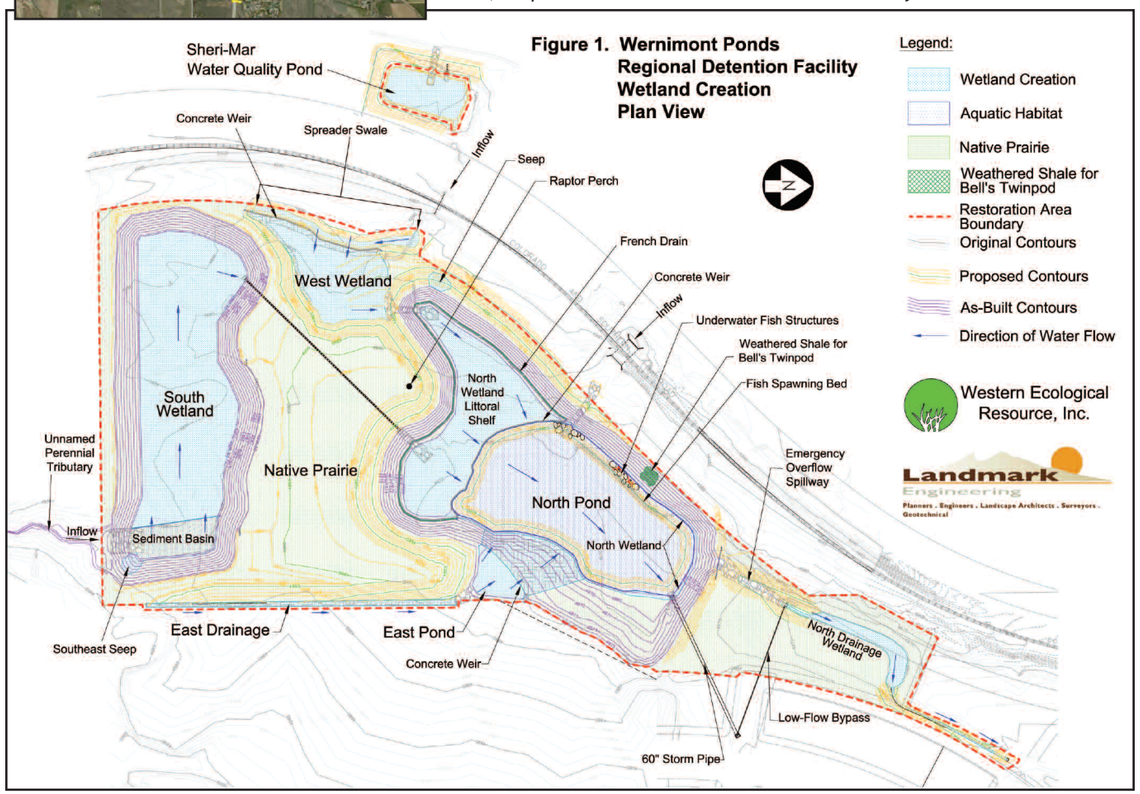
Wetlands are classified as either "jurisdictional" or "non-jurisdictional" under Section 404 of the Clean Water Act of 1972. If the wetland is connected to "waters of the United States," it is jurisdictional, meaning it falls under regulative authority of US Army Corps of Engineers. Activities that impact jurisdictional wetlands require a 404 permit, which typically stipulates compensatory mitigation on at least an acre-for-acre basis due to the nation's "no net loss" wetlands policy of the last 25 years. President George H.W. Bush first endorsed the current policy, which stems from a 1988 National Wetland Policy Forum recommendation stating: ". . .the Nation (should) establish a national wetland protection policy to achieve no overall net loss of the nation's remaining wetland base, as defined by acreage and function . . . and to increase the quality and quantity of the nation's wetlands resource base."

Two words stand out in the Forum's recommendation: function and quality. Wetland assessments should consider a range of function and value variables, such as the diversity of both animal and plant life, the effectiveness of water quality enhancement and even the recreational and educational potential. When wetlands are assessed on specific qualities rather than simply size, the resulting grade reflects the ecosystems functionality, i.e., its ability to maximize its inherent benefits to mankind.

Prior to construction of Wernimont Ponds, the site was characterized by a cattail marsh, herbaceous wetlands, alkaline flats with little vegetation, a grassland area with primarily introduced plants and a small open water habitat. Cattails were choking off other wetland vegetation.



Stormwater detention at Wernimont Ponds occurs in the 5-ft.-deep north pond after flow passes through the south pond, whose 6-in.-depth, hydric soils and wetland vegetation qualify it as a wetland. The north pond, on the other hand, is open water but is surrounded on all sides by wetlands.



Outlet pipe from north pond is installed, above, as excavation of the site nears completion. With the site dewatered, top right, crews capture normal flows through the site in a temporary pond while muck is excavated for removal by excavators and articulated trucks. Below, grading nears completion on the north pond and its wetland littoral shelf.

Fort Collins-based Connell Resources Inc. dewatered the site and performed muck removal, grading, material importation and placement, pipeline installation and pond construction.

Judging wetlands on quality, therefore, means that a wetland of smaller size might actually provide more total benefit than a wetland of larger size – but that conclusion challenges the Federal government's prevailing attitude.

"There's been a tremendous evolution of thought," explains Biologist Margaret Langworthy with the Denver Regulatory Office of the Corps of Engineers, "with the addition of biologists and other non-engineers. We've gone far beyond the squish factor to assess beneficial functions and values to determine the 'success' of wetlands."

In their environment, wetlands provide different functions based on their location, water source and vegetation. Not all wetlands perform the same functions; nor do they perform functions equally well. These functions can be grouped into three major categories: hydrology, water quality and wildlife habitat.

Langworthy agrees that no net loss is an appropriate and necessary general policy, yet believes the nation's base of wetlands can benefit more from less in certain situations. One such example is Wernimont Ponds in Loveland, a wetland property fed primarily by a steady flowing tributary of Big Thompson River that traverses

Topsoil was imported and placed for the 1.4-acre shallow water south pond. Sediment basin, below, overflows to water the pond's wetland vegetation and can be maintained without wetland disturbance.

the site. Because the tributary drains acres of irrigated farmland south of the City, flows are boosted during growing season. Those flows continue today, though new residential and commercial development continues to slowly displace farmland to encroach the site.

Loveland's Kevin Gingery, PE, who heads the City's

Continued on page 18

Wernimont Ponds Demonstrates Ecological Benefits From SW Detention

According to US Geological Survey, wetlands cover about 1 million of Colorado's 66 million acres – 1.5 percent of the total area – and are found throughout the State, from mountain to plain. The value of wetlands is easily recognized in Colorado, where they are no less than vital on the semi-arid eastern plains yet also pristine in alpine environments created by beavers over countless centuries. But wetlands also exist in urban environments, where their value might be questioned by some.

One of Colorado's "new" urban wetlands is City of Loveland's Wernimont Ponds, just under 16 acres of restricted open space that includes 4.5 acres of wetlands, 9.5 acres of new native prairie and 1.8 acres of aquatic habitat. Source water for the site's wetlands is limited to rainfall, storm runoff and groundwater, and is boosted by seasonal irrigation return flows. But the site was incapable of providing sufficient detention of the 100-year storm and lesser major events, so in 2006, the City embarked on a project to create engineered detention here, which required draining eight acres of low quality jurisdictional wetlands. While successfully resolving its master plan stormwater needs, the City mitigated impacts of the project by creating an entire new native ecosystem that supports ecological diversity at all levels.

"This is possibly the most satisfying project I've worked on in my 37-year career as an ecologist," says David Johnson, president of Western Ecological Resource Inc., the Boulder-based project designer. "We were able to create a unique ecosystem that provides water quality and hydrology functions, supports diverse plant, aquatic and wildlife and improves the aesthetics of a formerly-degraded natural area."

The wetlands, while constituting less acreage than formerly, provide a "treatment train" for storm runoff, which is captured in a 27-acre-foot wetland pond before being slowly released to lower-elevation wetlands and open water before its eventual confluence with Big Thompson River. Though water now represents only 40 percent of the property's surface area, it is the key to all life here. By first constructing capacity to capture storm runoff, the City now controls flow and distribution of the water through the site, fostering a healthy environment while releasing naturally-cleaner water downstream.

In addition to the new sustainable native wetlands, the project included creation of a riparian and prairie habitat. Plains cottonwood trees, peachleaf willows and numerous species of riparian shrubs characterize the margins of the two detention ponds.

The area between the ponds is dominated by native prairie grasses and wildflowers, which provide habitat for an ever-increasing diversity of wildlife. The deep aquatic habitat of the north pond, with its logs, stumps and underwater gravel areas, sustains three species of warm water fish: yellow perch, catfish and minnows. As the trees around the edge of the ponds grow and mature, they will shade and cool the water for the fish while providing nesting habitat for songbirds, owls and hawks. Wetland plants including hardstem bulrush, creeping spikerush, alkali bulrush, threesquare and numerous others provide habitat and food for red winged blackbirds, ibis, Canada geese, ducks, great blue heron, pelicans and other waterfowl. A raptor perch provides a convenient site for hawks and other raptors to survey the ponds for prey. Frogs, toads and the plains garter snake also live near the ponds and provide a food source for raccoons, foxes and skunks. The noisy killdeer nests in the prairie, which is characterized by western wheatgrass, blue grama, buffalo and needle grasses.

ArmorLoc® concrete interlocking blocks are installed for the inlet of the north pond to effectively control erosion. The system is installed over filter fabric and an prepared subgrade.

Upland native prairie between the south and north ponds was necessary to allow a safe 4:1 slope or less of the ponds' banks. South, or upper, pond, left, is connected to the north, or lower, pond, right, via a 30-inch concrete pipe, effectively providing temporary detention in the south pond during storm events. South pond is designed to retain about six inches of water.

"We created a grading plan that involved eradication of the massive amount of cattails growing on site," Johnson continues. "We brought in a soil scientist, David Buscher, to determine how much muck needed to be removed and how much new material needed to be imported to support the different types of wetland flora."

Water enters the site at the southeast corner of the project, with the perennial tributary channeling 1-2 cfs of flow on a typical day. During the 100-year storm event, approximately 400 cfs is anticipated to enter the project site through the tributary. Using this historic data, Western Ecological Resource staff determined proper hydrology of the site to support plant communities that survive in shallow water, saturated soil or semi-arid upland conditions. The design incorporates ways to keep optimal amounts of a varying water supply where it is needed.

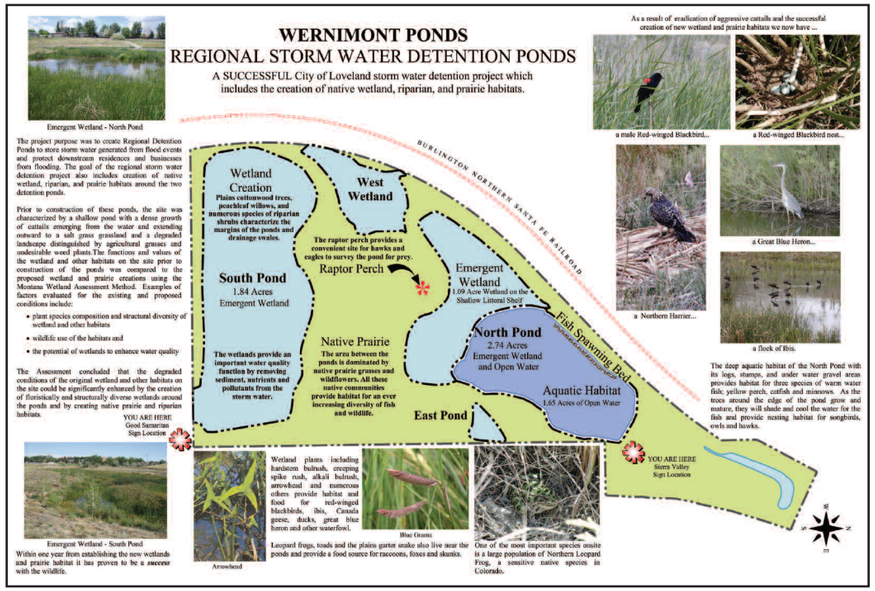
"The south pond is a 1.84-acre shallow water emergent wetland dominated by a wide diversity of wetland plants that help to remove sediment, nutrients and pollutants from the stormwater," explains Ecologist Heather Houston, who provided field oversight of the project for Western Ecological Resource. "In the east and west wetlands, concrete weirs were used to create ponds with shallow water habitats. When the ponds overflow, the walls create a sheet flow of water on the slope below them that saturates the soil for wetland plant growth. This unique design has resulted in distinct saturated soil plant communities in the East and West Wetlands at Wernimont Ponds."

Density of the new vegetation has succeeded in keeping cattails from again taking hold in the ponds. While cattails are native to Colorado, they are undesirable because they out-compete other plants to create a monoculture. They do this by secreting chemicals from their roots that inhibit growth and germination of other plants. As a result, cattail marshes typically have lower species diversity than many other wetland types in Colorado.

"From our perspective," Houston concludes, "the most important aspect of Wernimont Ponds is that the team took a project that was focused on an engineering need and, using an ecological approach, we were

Littoral shelf at southern end of North Pond supports nearly an acre of emergent wetlands in a shallow water habitat. Concrete weir, top, is designed to maintain a 6-inch water depth on the shelf to support wetland plant growth should pond level drop.

South pond's outlet pipe is about six inches above bottom to create wetlands that support native vegetation that in turn supports habitat for diverse wildlife, enhances water quality and provides valuable functions during flooding, such as erosion protection and storage of flood waters. Below is the City's public outreach display board – two were installed on-site after the project was completed to inform the public.



able to greatly expand upon the primary function by creating native wetland, riparian and prairie habitats that greatly enhance the local ecology and serve as an oasis for wildlife in this suburban environment."

Knowing how the Wernimont Ponds site was developed might lead one to consider the wetlands as manmade. When looking at the site, however, it quickly becomes obvious that wetlands are a wonder of nature that mankind can either complement or neglect. The success of Loveland's Wernimont Ponds project shows that diverse ecosystems can survive and self-perpetuate in urban environments, and that when properly done, there can be ecological benefits to stormwater detention. ●

»»»»» assessment program clearly validates MDT's pioneering role in the science."

McEldowney's work as an ecologist often takes him to Colorado as well as across the western United States for Atkins. The consulting engineering and design firm is currently working with CDOT on its long-range planning for the US 50 Pueblo to Kansas corridor, preparing GIS data for a wide range of environmental programs by mapping sensitive areas, noxious weeds and environmental clearances. One of the services the company has provided is development of a GIS-based wetland functional assessment method for evaluating wetland and riparian ecosystems within the 150-mile-long corridor. This methodology is based in part on MWAM and results in categorization of wetland/riparian polygons in the corridor into four different categories from high to low quality. Using this approach, Atkins was able to assess over 8000 wetland/riparian polygons in the study and provide recommendations on alternatives regarding existing functionality and projected loss of wetland function. This has allowed decision makers to know much more about the corridor decisions they are making, and the pros and cons associated with each alternative. With regard to wetlands, previous decisions like this have been primarily based on acreage and/or wetland type (emergent, shrub, or forested). ●

Montana Agencies Pioneer Wetland Evaluation Based On Attributes

Fostered by the third-lowest population density in the nation, Montana's great outdoors is the State's most valuable asset. Still, as far back as the late-1980s, Montana Department of Environmental Quality estimated the State had lost about one-third of its naturally-occurring wetlands since settlement. In response, and in accordance with a National Wetland Policy Forum recommendation, Montana established its overarching wetland goal: No overall net loss of the State's remaining (as of 1989) wetland resource base and an overall increase in the quality and quantity of wetlands in Montana.

With that goal in mind, Montana Department of Transportation got right to it and developed a "rapid, economical and repeatable" wetland evaluation method – Montana Wetland Assessment Method – that considers functional values of the total ecosystem of each specific wetland environment. Known as MWAM (M-Wam), the method has been refined over its 23-year life, most recently between 1999-2007. Opportunities to improve assessment accuracy and evaluator consistency were noted during this eight-year period and incorporated into MWAM's latest version in 2008.

"MWAM was originally designed to address highway and other linear projects, such as pipelines and transmission lines," explains Riparian/Wetland Ecologist Rich McEldowney with the Bozeman office of Atkins. "The newest version can be, and is being, applied to other types of projects, including mitigation projects."

McEldowney worked with the primary author, Jeff Berglund, and Larry Urban of MDT, along with many other participating agencies and individuals in revising and preparing the 2008 update to the manual for MDT. Revisions to the methodology and corresponding field form were based on data compiled from several hundred wetlands over several field seasons, as well as updated literature on wetland functions and wetland science.

MWAM 2008 assessments result in a relative rating for up to 12 functions and values. Admittedly, this rating provides no information on the rate at which an applicable function is performed. In other words, the actual rate at which a "measurable" function is performed is dependent upon site- and time-specific conditions, but that requires a lot more time and money and is simply beyond the scope of this methodology.

Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society, and relate to the ecological significance without regard to subjective human values. Values are benefits that derive from either one or more functions and physical characteristics associated with a wetland. Value, by nature, is based on human judgment.

"The newest MWAM manual reflects an effort to minimize subjectivity and variability between evaluators," McEldowney continues. "MWAM uses matrices to determine ratings in a flow chart-type method that results in better consistency. The methodology is designed to be simple when applied by resource professionals familiar with wetland science."

MWAM is a practical, common sense way to quickly and affordably yet still accurately evaluate wetlands. When impacts to wetlands are unavoidable for common good, MWAM can be extremely beneficial in securing Section 404 permits from the Corps of Engineers because of the evaluation's thoroughness in describing which functions are the most important at a particular wetland and therefore, what functions can be expected to be degraded or lost by a particular action.

"Change doesn't come as fast in Montana as is does elsewhere," McEldowney says, "but people here feel very strongly about responsible environmental stewardship. The fact that MWAM has been the example for many other states that have created their own wetland »»»»»

Slope wetland on Beartooth Highway near the Montana border with Wyoming.

CDOT's Wetlands Program – FACWet – Aims To Benefit Aquatic Ecosystems

When impacts to wetlands are unavoidable as a result of a Federally-permitted action, the Clean Water Act mandates compensatory mitigation of functional losses. Today's wetland science recognizes there's more to wetlands than just size, and multiple ecological factors must be studied to assess physical, chemical and biological functions of wetlands. Because State of Colorado lacked this capacity, CDOT created its Wetland Program to provide technical assistance for transportation project development and construction with the goal of an overall benefit to aquatic ecosystems in Colorado.

Using a methodology first developed in 1993 as its guide, CDOT created FACWet – Functional Assessment of Colorado Wetlands – in a collaborative effort with Colorado State University, EcoMetrics LLC, US Army Corps of Engineers and US Environmental Protection Agency. It is primarily designed to address the regulatory community's need for functional assessment in administration of the Clean Water Act in Colorado, including pre-project assessment, mitigation planning and post-project evaluation.

"FACWet studies a wide variety of site-specific factors to evaluate wetlands as entire ecosystems," explains Biologist Becky Pierce, who heads the CDOT Wetland Program. "Some CDOT projects need Section 404 permits for wetland impacts, and without an accurate, Federally-approved functional assessment method, we couldn't be sure we were truly providing adequate compensatory mitigation."

To address this, CDOT assembled a joint agency study panel and funded a study to develop a functional assessment methodology that could serve the State in general. Colorado State University, with Biologist Brad Johnson, Ph.D., was awarded the contract for the study and work commenced in February 2006.

"FACWet considers the degree to which nine fundamental variables have been impacted in a wetland," explains Johnson, "then models the resultant effects on natural functioning and overall condition of the assessment site. FACWet is integrated into a watershed approach to mitigation planning and permit review, and has been incorporated into the Section 404 regulatory program by the three Corps of Engineers districts in Colorado."

FACWet is a stressor-based rapid assessment method, founded on Hydrogeomorphic theory and classification that reflects how hydrology and geomorphology affect wetland function. (Stressors are defined as direct human-induced alterations.) In approach, FACWet is the formalization of an investigative process in which evidence is gathered to support a best professional judgment on the condition of nine ecological forcing factors (i.e., "State Variables") that control wetland functioning. FACWet then relates State Variable condition to functional capacity. Functional capacity is a relative index that gauges departure from the "natural" or expected level of functioning, which is exhibited in the Reference Standard. FACWet makes the key assumption that if a wetland has not been altered by humans, it is performing its functions at natural rates and capacities, regardless of the wetland type.

Dr. Brad Johnson, a Research Scientist in Colorado State University's Department of Biology, leads a recent FACWet training session at Bear Creek Lake Park. Training sessions involve a half day of classroom work followed by a full day of field application.

Becky Pierce and Brad Johnson.

Developed to meet the needs of regulatory agencies in administration of Clean Water Act in Colorado, FACWet is designed to engender consistency in reporting, aid in mitigation planning, improve mitigation performance and inform monitoring design. By itself, FACWet does not provide the necessary detail to take the place of a post-build monitoring program; however, it can be used to determine whether the basic agreed-upon goals of a mitigation project have been met and to structure monitoring programs. Basically, FACWet is used to describe "what's wrong" with a wetland, how it can be fixed, and the probable outcome of site improvements. Once site improvements have been executed, the methodology can be used to catalog the specific nature of improvements. Quantitative monitoring based on the FACWet results can then be used to demonstrate the actual efficacy of remedial measures and determine whether specific success criteria have been met.

"FACWet analyses leads to realistic mitigation goals," Johnson concludes, "which can include modeling of the potential degree of site improvement. While FACWet rates the character and capacity of various functions relative to their reference standard state, it does not rate the societal value of any given function. FACWet leaves discussion of the societal value of functions up to permit applicants and regulatory agencies and to the public comment mechanism which was promulgated for this very purpose." ●

Continued from page 11

City of Loveland's Kevin Gingery holds the 2012 APWA Colorado Chapter award for Medium Communities in the Drainage & Flood Control category at the 2012 awards luncheon. Heather Houston and David Johnson of Boulder-based Western Ecological Resource Inc. joined him at the annual presentations in January.

Stormwater Engineering Division of its Public Works Department, has studied through alternative analysis the need for stormwater detention in the area of Wernimont Ponds since joining City staff in 2000 – and even before that as a hired consultant several years after the need was first identified in the City's 1987 Master Plan. Loveland has owned the just under 16-acre site, of which just over eight acres were documented as jurisdictional wetlands, since January 2001. Gingery sought a way to add detention capacity to the existing site, but there simply wasn't enough acreage to also ensure no net loss of wetland area. He sought assistance from the Corps and was put in touch with Langworthy.

"When major storm events occurred in the area, runoff flowed uncontrolled through the site," says Gingery. "We wanted to detain the runoff in accordance with the master plan and improve the quality of the water leaving the site. There was a severe lack of native vegetation and wildlife species on the site, so there were definitely opportunities for functional improvements of the wetlands. Our vision was to create regional stormwater detention in conjunction with a self-sustaining wetland and wildlife habitat. We contacted and met with Margaret for guidance before doing anything more than rough alternative sketches. We ultimately ended up contacting Boulder-based Western Ecological Resource Inc."

Gingery retained the services of Western Ecological Resource to try the Montana Wetland Assessment Method on the site, which uses a tiered approach to assess varying levels of wetland conditions and mitigation efforts. Environmental indicators are used to determine whether wetland function is worsened or improved by permitted actions and corresponding mitigation efforts. The method was first developed by State of Montana's Department of Transportation and Department of Fish, Wildlife & Parks in 1989 and substantially revised between 1994 and 2008.

Purpose and need as defined by the applicant but ultimately determined by the Corps drive the 404 permit process, with the Clean Water Act requiring impacts to wetlands, when unavoidable, be minimized to the extent practicable. Permits, then, are only issued for the Least Environmentally Damaging Practicable Alternative, or LEDPA, that meets the need. Master planning data in the Wernimont Ponds sub-basin reflected the need for at least 50 acre-feet of detention capacity to handle the 100-year storm event. The City and its design team, which included Western Ecological Resource and Loveland-based Landmark Engineering Ltd., analyzed four alternative plans of action for the site, which was characterized by a cattail marsh, herbaceous wetlands, alkaline flats with little vegetation, a grassland area with primarily introduced plants and a small open water habitat.

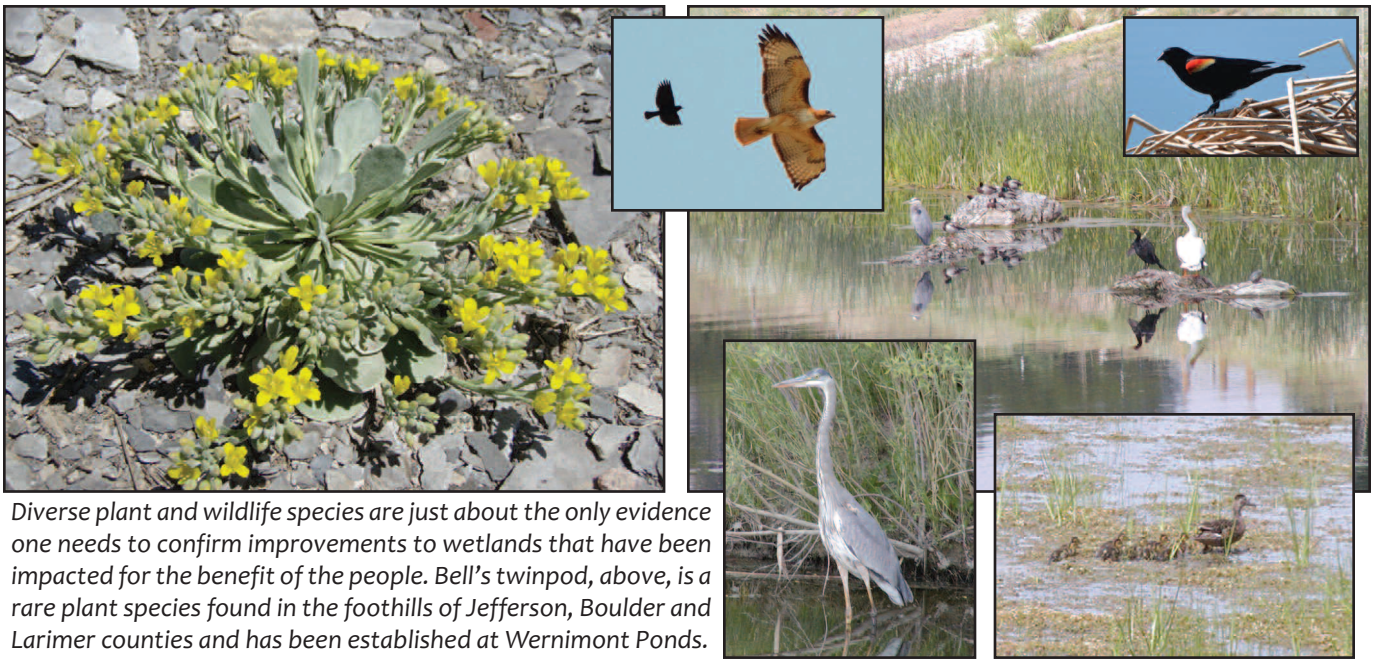
Concrete weirs were constructed for both the east and west wetlands. When the ponds overflow, the weirs create a sheet flow of water on the slope below them that saturates the soil for wetland plant growth. This unique design has resulted in distinct saturated soil plant communities. Ibis waterfowl, right, travel in flocks, feed in the wetlands and nest in surrounding trees.

"Embankments for detention ponds cannot exceed 10 feet in height or they are classified as jurisdictional dams," Gingery continues. "So it was decided to re-grade the entire site into two different elevation tiers and construct two regional detention ponds with an upland prairie between them that would keep the pond depths under 10 feet and accommodate a stable, maximum 4:1 side slope of the banks."

Loveland received its 404 permit from the Corps of Engineers in February 2006, as Langworthy was able to authorize the project based on compensatory mitigation that would result in less wetland acreage but higher functions and values by providing diversity at all ecological levels. The plan was to create higher value wetlands and riparian areas with a new upland prairie together with sustaining populations of native plants and wildlife. Dewatering of the site began in July and excavation in August by Fort Collins-based general contractor Connell Resources Inc., who completed the sitework in November.

The southern-most part of the site now features the higher-elevation 27-acre-foot pond with sediment forebay that is a shallow water habitat supporting nearly two acres of wetlands. Water flows through the south pond before exiting through a 30-inch-diameter concrete pipe to the wetland littoral shelf of the 29-acre-foot north pond. Water exiting the residential subdivision located west of the project passes over a level concrete weir that distributes the water to the west wetlands. From there, the water passes down an articulated concrete block "rundown" into the north pond's wetland littoral shelf. Water trickles by design from the north pond through a wetland-lined drainage while storm overflows continue downstream to Big Thompson River.

Cattails are a thing of the past at Wernimont Ponds, where now dense native vegetation supports a new self-sustaining wetland and wildlife habitat.



Diverse plant and wildlife species are just about the only evidence one needs to confirm improvements to wetlands that have been impacted for the benefit of the people. Bell's twinpod, above, is a rare plant species found in the foothills of Jefferson, Boulder and Larimer counties and has been established at Wernimont Ponds.

Irrigation return flows are important because they, like storm events, provide a larger pulse of water that periodically flushes out salts from the south wetland. Irrigation flows, are dependent on numerous factors and are therefore not consistent.

"The south pond was designed as a shallow emergent wetland with a high capacity to filter water entering the site," explains David Johnson, president of Western Ecological Resource. "This was accomplished by locating the inlet and outlets at opposite ends, directing water to flow through nearly two acres of wetland vegetation that filters out sediments, nutrients and pollutants. The north pond has shallow water wetlands as well as a 5-ft.-deep open water habitat. The open water greatly enhances the wildlife habitat value of the site and the floating tree stumps in the pond are in almost constant use by birds."

A number of specialized seed mixes and plantings were designed for the Wernimont Ponds site. More than 33,000 herbaceous wetland plants, more than 3000 willow cuttings, almost 200 trees and numerous shrubs were planted.

Western Ecological Resource served as project designer, drawing upon its 35 years in business providing ecological and regulatory expertise to achieve Loveland's project goals. In addition to wetlands, the firm has extensive experience in the areas of wildlife and aquatic biology; threatened, endangered and rare species; NEPA compliance; permitting and project approvals; and project management.

Under the Wernimont Ponds Department of the Army Corps of Engineers 404 Permit, City of Loveland permanently impacted 8.07 acres of low quality and degraded wetlands and 1.59 acres of aquatic habitat. The disturbance was mitigated with 4.5 acres of new wetlands with higher functions and values than the previous wetlands, 9.5 acres of new native prairie and 1.8 acres of aquatic habitat by using the Montana Wetland Assessment Method to demonstrate increased functions and values.

The project has been deemed more than a success – in fact, it is a perfect example of ecological design and construction expertise based on forward-thinking policy with respect to wetland stewardship. While the new wetland communities are smaller in size than historically existed here, they have greater ecological value.

"The site contains areas of dense and diverse cover of desirable native wetland plants that are self-perpetuating," sums up Langworthy. "The project has succeeded in establishing a native prairie, a unique place with a diverse composition of native grasses and forbs, and the structural diversity provided by the trees and shrubs, the presence of water and the mosaic of native habitats demonstrating that native ecosystems can be restored in degraded urban environments. This is the finest mitigation site I have seen in the State of Colorado." ●